

# FCC SAR Measurement and Test Report

For

**Cyrus Technology GmbH**

**Hergelsbendenstrasse 49, 52080 Aachen, Germany**

**FCC ID: 2AI3KCS24SA2**

<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>Rugged Phone</u>
<b>Tested Model:</b>	<u>CS24SA</u>
<b>Report No.:</b>	<u>STR18078270H</u>
<b>Sample Received Date:</b>	<u>2018-08-13</u>
<b>Tested Date:</b>	<u>2018-08-13 to 2018-08-17</u>
<b>Issued Date:</b>	<u>2018-08-21</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>Jandy So</i>
<b>Prepared By:</b>	

**Shenzhen SEM Test Technology Co. Ltd.**  
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.....54

    9.3 Simultaneous Multi-band Transmission SAR Analysis .....67

**10. Measurement Uncertainty .....75**

    10.1 Uncertainty for EUT SAR Test.....75

    10.2 Uncertainty for System Performance Check.....76

**Annex A. Plots of System Performance Check .....78**

**Annex B. Plots of SAR Measurement.....98**

**Annex C. EUT Photos .....154**

**Annex D. Test Setup Photos .....156**

**Annex E. Calibration Certificate.....161**

## 1. General Information

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

#### Client Information

Applicant: Cyrus Technology GmbH  
Address of applicant: Hergelsbendenstrasse 49, 52080 Aachen, Germany

Manufacturer: Cyrus Technology GmbH  
Address of manufacturer: Hergelsbendenstrasse 49, 52080 Aachen, Germany

General Description of EUT:	
Product Name:	Rugged Phone
Brand Name:	Cyrus
Model No.:	CS24SA
Adding Model(s):	/
Rated Voltage:	3.85V
Battery:	4500mAh
Software Version:	CS24_V2.12_2018_01_17
Hardware Version:	L808F-MB
Device Category:	Portable Device
<i>The EUT Main board support GSM850/900/DCS1800/PCS1900, WCDMA Band 2/4/5, LTE Band 2/4/5/7 function. It is intended for speech, Multimedia Message Service (MMS) transmission. It is equipped with GPRS/EDGE class 12 for GSM850/900/DCS1800/PCS1900, GPS, FM, Bluetooth and Wi-Fi functions. For more information see the following datasheet</i>	
<i>Note: The test data is gathered from a production sample provided by the manufacturer.</i>	

<b>Technical Characteristics of EUT:</b>	
<b>2G</b>	
Support Networks:	GSM, GPRS, EDGE
Support Band:	GSM850/PCS1900
Uplink Frequency:	GSM/GPRS/EDGE 850: 824~849MHz GSM/GPRS/EDGE 1900: 1850~1910MHz
Downlink Frequency:	GSM/GPRS/EDGE 850: 869~894MHz GSM/GPRS/EDGE 1900: 1930~1990MHz
Max RF Output Power:	GSM850: 32.08dBm, GSM1900: 30.56dBm EDGE850: 27.25dBm, EDGE1900: 26.46dBm
Type of Modulation:	GMSK, 8PSK
Type of Antenna:	Integral Antenna
Antenna Gain:	GSM850: 1.62dBi; GSM1900: 1.78dBi
GPRS/EDGE Class:	Class 12
<b>3G</b>	
Support Networks:	WCDMA, HSDPA, HSUPA
Support Band:	WCDMA Band 2, WCDMA Band 5, WCDMA Band 4
Uplink Frequency:	WCDMA Band 2: 1850~1910MHz WCDMA Band 5: 824~849MHz WCDMA Band 4: 1710~1755MHz
Downlink Frequency:	WCDMA Band 2: 1930~1990MHz WCDMA Band 5: 869~894MHz WCDMA Band 4: 2110~2155MHz
RF Output Power:	WCDMA Band 2: 22.40dBm, WCDMA Band 5: 23.05dBm WCDMA Band4: 22.82dBm
Type of Modulation:	BPSK, QPSK, 16QAM
Antenna Type:	Integral Antenna
Antenna Gain:	WCDMA Band 2: 1.62dBi, WCDMA Band 4: 1.58dBi WCDMA Band 5: 1.53dBi
<b>4G</b>	
Support Networks:	FDD-LTE
Support Band:	FDD-LTE Band 2, 4, 5, 7
Uplink Frequency:	FDD-LTE Band 2: Tx: 1850-1910MHz, FDD-LTE Band 4: Tx: 1710-1755MHz, FDD-LTE Band 5: Tx: 824-849MHz 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 5: Rx: 869-894MHz FDD-LTE Band 7: Rx: 2620-2690MHz,
RF Output Power:	FDD-LTE Band 2: 24.05dBm,

	FDD-LTE Band 4: 23.38dBm, FDD-LTE Band 5: 24.08dBm, FDD-LTE Band 7: 23.85dBm
Type of Modulation:	QPSK, 16QAM
Antenna Type:	Integral Antenna
Antenna Gain:	FDD-LTE Band 2: 1.78dBi, FDD-LTE Band 4: 1.58dBi, FDD-LTE Band 5: 1.62dBi, FDD-LTE Band 7: 1.35dBi
<b>WIFI</b>	
Support Standards:	802.11b, 802.11g, 802.11n
Frequency Range:	2412-2462MHz for 11b/g/n(HT20) 2422-2452MHz for 11n(HT40)
RF Output Power:	15.35dBm (Conducted)
Type of Modulation:	CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM
Data Rate:	1-11Mbps, 6-54Mbps, up to 150Mbps
Quantity of Channels:	11/7
Channel Separation:	5MHz
Antenna Type:	Integral Antenna
Antenna Gain:	1.72dBi
<b>Bluetooth</b>	
Bluetooth Version:	V4.0
Frequency Range:	2402-2480MHz
RF Output Power:	5.575dBm (Conducted)
Data Rate:	1Mbps, 2Mbps, 3Mbps
Modulation:	GFSK, Pi/4 QDPSK, 8DPSK
Quantity of Channels:	79/40
Channel Separation:	1MHz/2MHz
Antenna Type:	Integral Antenna
Antenna Gain:	1.72dBi
<b>NFC</b>	
Support Standards:	NFC
Frequency Range:	13.56MHz
Max. Field Strength:	51.20dBuV/m (at 3m)/ -44.03dBm
Antenna Type:	Integral Antenna
Device Category:	Portable Device

## 1.2 Test Standards

The following report is prepared on behalf of the Cyrus Technology GmbH Cyrus Technology GmbH 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	0.636	0.544	0.799	1.6
WCDMA	0.760	0.881	0.881	1.6
FDD-LTE	<b>1.010</b>	<b>1.405</b>	<b>1.405</b>	1.6
WLAN 2.4G	0.295	0.327	0.327	1.6
Simultaneous Transmission	1.239	1.5	<b>1.531</b>	1.6

Frequency Band	Extremity SAR(0mm Gap)	SAR <sub>10g</sub> Limit (W/kg)
	Maximum SAR <sub>10g</sub> (W/kg)	
FDD-LTE	<b>2.927</b>	4.0

**Remark:**

*The highest reported SAR values for head, body-worn accessory, wireless router(hotspot), Extremity SAR and simultaneous transmission conditions are **1.010W/kg, 1.405W/kg, 1.405W/kg, 2.927W/kg, and 1.531W/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.

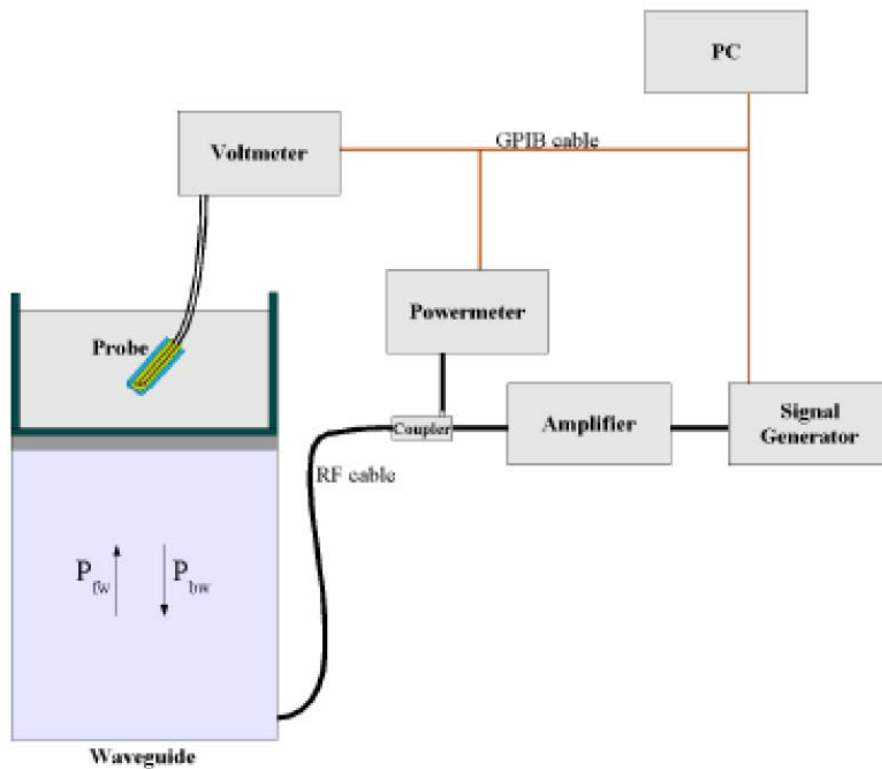
### 4.2 Probe

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,

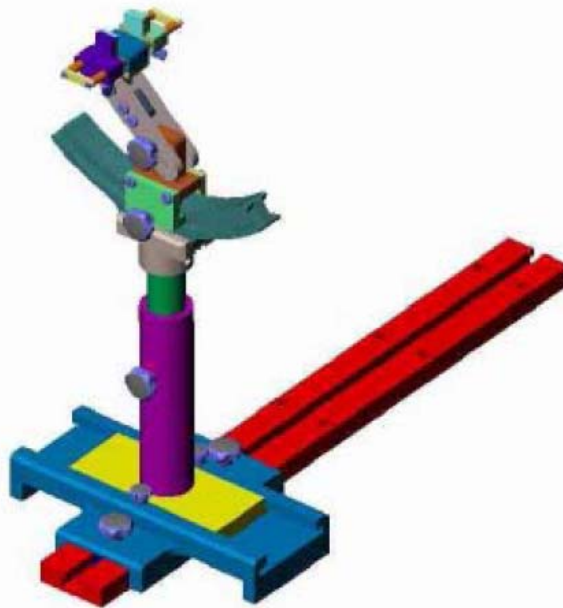
$\rho$  = Tissue density (1.25 g/cm<sup>3</sup> for brain tissue)

#### 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
1800-1900	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
1800-1900	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
750	0.89	41.9	0.96	55.5
<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	2018-08-13
1750	21.3	1.37	1.37	0.00	39.02	40.1	-2.69	±5	2018-08-14
1800	21.3	1.37	1.40	-2.14	39.02	40.0	-2.45	±5	2018-08-14
1900	21.3	1.38	1.40	-1.43	38.56	40.00	-3.60	±5	2018-08-14
2450	21.3	1.74	1.80	-3.33	38.15	39.20	-2.68	±5	2018-08-15
2600	21.3	1.93	1.96	-1.53	38.63	39.0	-0.95	±5	2018-08-15

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	2018-08-13
1750	21.3	1.46	1.49	-2.01	51.22	53.40	-4.08	±5	2018-08-14
1800	21.3	1.46	1.52	-3.95	51.22	53.30	-3.90	±5	2018-08-14
1900	21.3	1.50	1.52	-1.32	52.42	53.30	-1.65	±5	2018-08-14
2450	21.3	1.91	1.95	-2.05	52.01	52.70	-1.31	±5	2018-08-15
2600	21.3	2.12	2.16	-1.85	52.24	52.50	-0.50	±5	2018-08-15



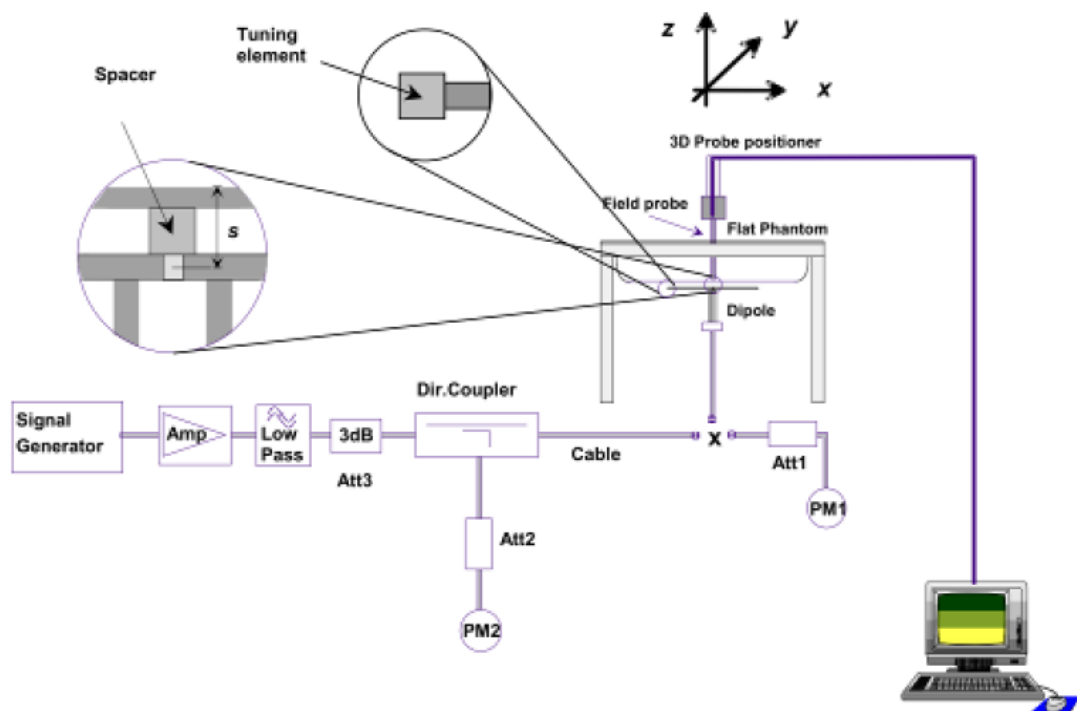
## 6. SAR Measurement Evaluation

### 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 1900MHz. 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.

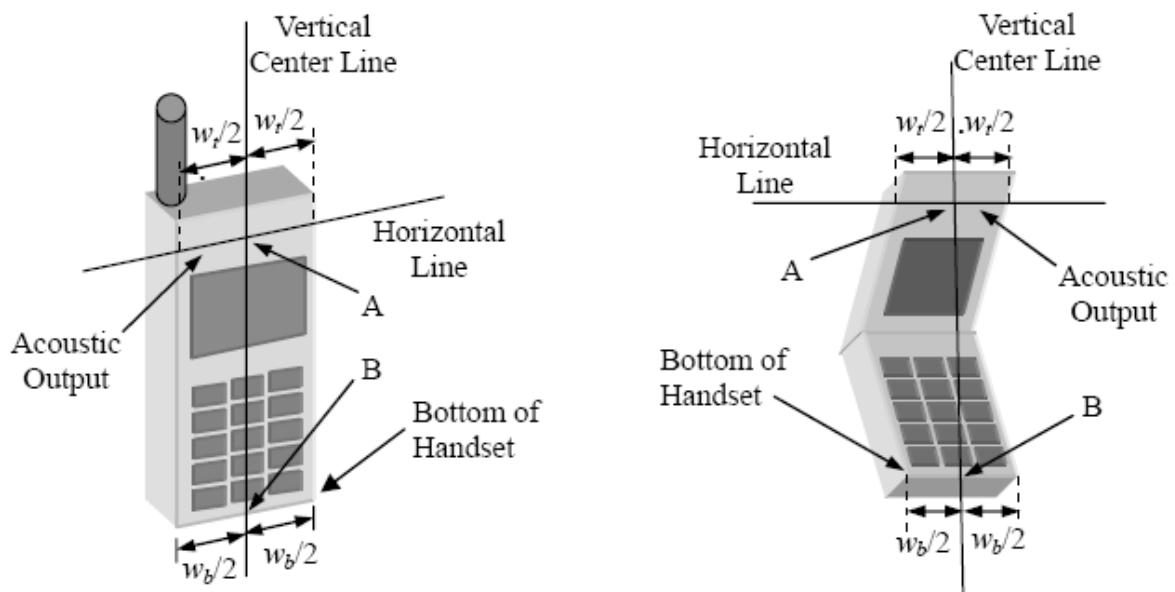


Illustration for Handset Vertical and Horizontal Reference Lines

## 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).

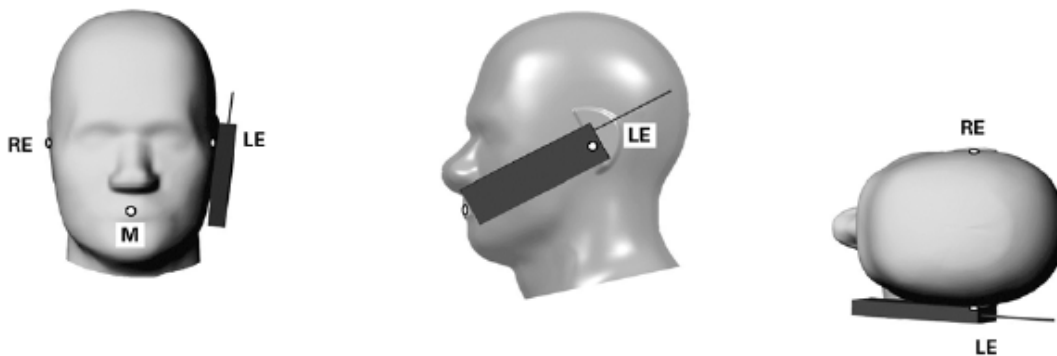


Illustration for Cheek Position

## 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).

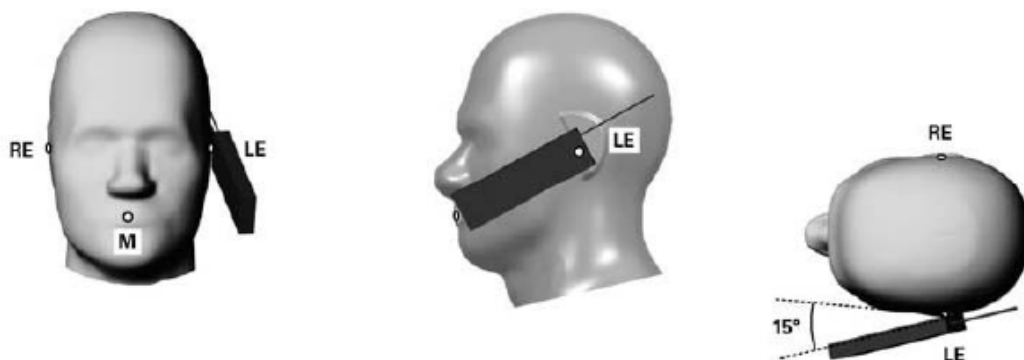


Illustration for Tilted Position

## 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.

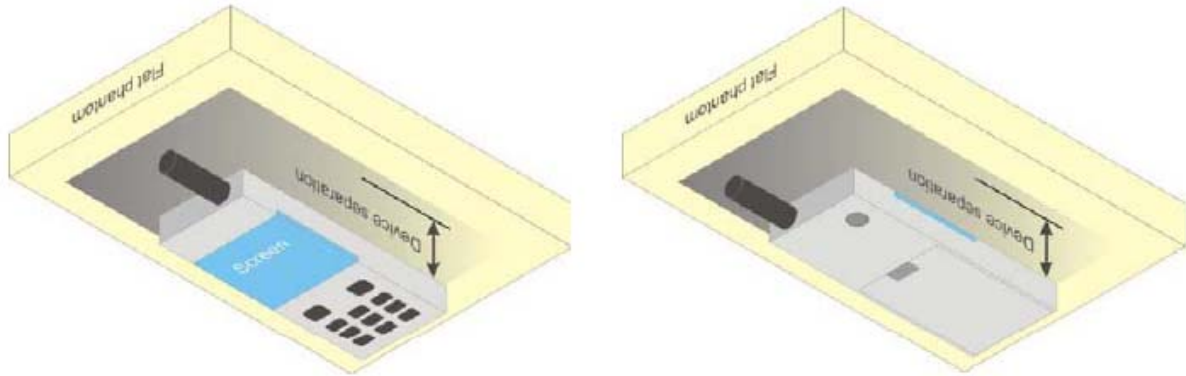
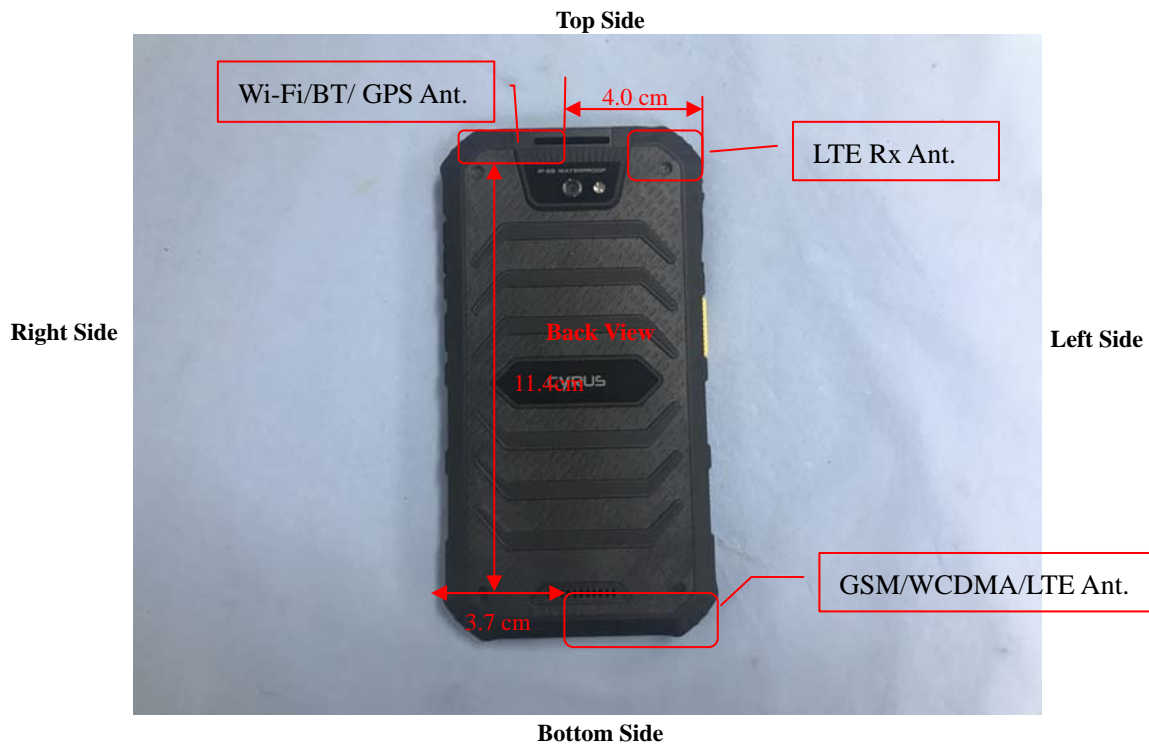


Illustration for Body Worn Position

## 7.5 EUT Antenna Position





**Block Diagram for EUT Antenna Position**

## 7.6 EUT Testing Position

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

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

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

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

Extremity SAR tests			
Antennas	Front	Back	Bottom
WWAN	Yes	Yes	Yes
WLAN	No	No	No

### Remark:

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

2. Referring to KDB 648474 D04 Handset SAR v01r03, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR  $> 1.2 \text{ W/kg}$

**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	32.05	31.94	31.81	32.5	30.46	30.32	30.28	31.0
GPRS (1 slot)	32.08	31.97	31.8	32.5	30.56	30.46	30.32	31.0
GPRS (2 slots)	31.47	31.37	31.21	32.0	29.71	29.59	29.54	30.0
GPRS (3 slots)	29.94	29.83	29.72	30.5	27.99	27.85	27.82	28.5
GPRS (4 slots)	28.79	28.71	28.64	29.0	26.86	26.84	26.78	27.0
EDGE (1 slot)	27.25	27.24	27.1	27.5	26.46	25.9	26.04	26.5
EDGE (2 slots)	26.77	26.74	26.61	27.0	25.97	25.87	25.73	26.5
EDGE (3 slots)	26.02	25.95	25.77	26.5	24.6	24.15	23.54	25.0
EDGE (4 slots)	25.38	25.27	25.08	25.5	23.85	23.24	22.34	24.0

GSM - Source-Based Time-Average Power (dBm)								
Band	GSM850			Tune-up power (dBm)	PCS1900			Tune-up power (dBm)
Channel	128	190	251		512	661	810	
Frequency (MHz)	824.2	836.6	848.8		1850.2	1880	1909.8	
GSM	23.05	22.94	22.81	23.5	21.46	21.32	21.28	22.0
GPRS (1 slot)	23.08	22.97	22.80	23.5	21.56	21.46	21.32	22.0
GPRS (2 slots)	25.47	25.37	25.21	26.0	23.71	23.59	23.54	24.0
GPRS (3 slots)	25.69	25.58	25.47	26.0	23.74	23.60	23.57	24.0
GPRS (4 slots)	25.79	25.71	25.64	26.0	23.86	23.84	23.78	24.0
EDGE (1 slot)	18.25	18.24	18.10	18.5	17.46	16.90	17.04	18.0
EDGE (2 slots)	20.77	20.74	20.61	21.0	19.97	19.87	19.73	20.5
EDGE (3 slots)	21.77	21.70	21.52	22.0	20.35	19.90	19.29	20.5
EDGE (4 slots)	22.38	22.27	22.08	22.5	20.85	20.24	19.34	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:

1. For Head SAR testing, GSM and GPRS (4TX slots) should be evaluated, therefore the EUT was set in GSM and GPRS (4TX slots) for GSM850 and GSM1900 due to its highest source-based time-average power.
2. For Body SAR testing, GPRS should be evaluated, therefore the EUT was set in GPRS (4TX slots) for GSM850 and GSM1900 due to its highest source-based time-average power.

3. Per KDB 447498 D01 v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
4. The DUT do not support DTM function.
5. This device supports VOIP capability through 3rd party apps software.

WCDMA - Average Power (dBm)								
Band	WCDMA Band II				WCDMA Band V			
Channel	9262	9400	9538	Tune-up	4132	4182	4233	Tune-up
Frequency (MHz)	1852.4	1880.0	1907.6	power (dBm)	826.4	836.6	846.6	power (dBm)
RMC 12.2k	22.40	22.17	22.08	22.5	22.79	22.82	22.69	23.0
HSDPA Subtest-1	21.11	20.83	20.67	21.5	21.82	21.89	21.74	22.5
HSDPA Subtest-2	21.08	20.81	20.65	21.5	21.81	21.86	21.72	22.5
HSDPA Subtest-3	21.07	20.80	20.63	21.5	20.80	21.87	21.72	22.5
HSDPA Subtest-4	21.08	20.81	20.64	21.5	21.85	21.86	21.72	22.5
HSUPA Subtest-1	21.14	20.79	20.73	21.5	21.97	22.00	21.92	22.5
HSUPA Subtest-2	21.12	20.76	20.71	21.5	21.95	21.96	21.9	22.5
HSUPA Subtest-3	21.12	20.75	20.7	21.5	21.95	21.97	21.91	22.5
HSUPA Subtest-4	21.11	20.74	20.71	21.5	21.94	21.95	21.89	22.5
HSUPA Subtest-5	21.1	20.73	20.72	21.5	21.96	21.96	21.91	22.5

WCDMA - Average Power (dBm)								
Band	WCDMA Band IV							
Channel	1312	1412	1513	Tune-up				
Frequency (MHz)	1712.4	1732.4	1752.6	power (dBm)				
RMC 12.2k	22.99	22.96	23.05	23.5				
HSDPA Subtest-1	22.07	22.05	22.24	22.5				
HSDPA Subtest-2	22.05	22.03	22.21	22.5				
HSDPA Subtest-3	22.03	22.02	22.2	22.5				
HSDPA Subtest-4	22.04	22.01	22.23	22.5				
HSUPA Subtest-1	22.24	22.22	22.33	22.5				
HSUPA Subtest-2	22.2	22.19	22.31	22.5				
HSUPA Subtest-3	22.21	22.18	22.31	22.5				
HSUPA Subtest-4	22.22	22.19	22.32	22.5				
HSUPA Subtest-5	22.21	22.2	22.32	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	23.66	0
		1	3	23.64	0
		1	5	23.66	0
		3	0	22.92	0
		3	2	22.86	0
		3	3	22.52	0
		6	0	22.85	1
	MCH	1	0	23.16	0
		1	3	23.04	0
		1	5	23.01	0
		3	0	22.82	0
		3	2	22.88	0
		3	3	22.58	0
		6	0	22.45	1
	HCH	1	0	23.38	0
		1	3	23.37	0
		1	5	23.37	0
		3	0	23.29	0
		3	2	23.25	0
		3	3	23.23	0
		6	0	21.91	1
16QAM	LCH	1	0	22.87	1
		1	3	22.92	1
		1	5	22.89	1
		3	0	22.82	1
		3	2	22.76	1
		3	3	22.78	1
		6	0	21.65	2
	MCH	1	0	22.44	1
		1	3	22.39	1
		1	5	22.33	1
		3	0	22.15	1
		3	2	22.06	1
		3	3	22.07	1
		6	0	21.09	2
HCH	1	0	22.37	1	

		1	3	22.42	1
		1	5	22.43	1
		3	0	22.21	1
		3	2	22.2	1
		3	3	22.18	1
		6	0	20.91	2

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.72	0
		1	7	23.74	0
		1	14	23.69	0
		8	0	22.89	1
		8	4	22.87	1
		8	7	22.85	1
		15	0	22.83	1
	MCH	1	0	23.39	0
		1	7	23.21	0
		1	14	23.13	0
		8	0	22.35	1
		8	4	22.24	1
		8	7	22.16	1
		15	0	22.19	1
	HCH	1	0	23.65	0
		1	7	23.09	0
		1	14	23	0
		8	0	22.31	1
		8	4	22.2	1
		8	7	22.38	1
		15	0	22.18	1
16QAM	LCH	1	0	22.94	1
		1	7	22.95	1
		1	14	22.9	1
		8	0	21.91	2
		8	4	21.9	2
		8	7	21.86	2
		15	0	21.81	2
	MCH	1	0	22.64	1
		1	7	22.48	1
		1	14	22.23	1
		8	0	21.32	2
		8	4	21.59	2

		8	7	21.98	2
		15	0	21.65	2
	HCH	1	0	22.02	1
		1	7	22.18	1
		1	14	22.37	1
		8	0	21.69	2
		8	4	21.47	2
		8	7	21.65	2
		15	0	21.98	2

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.96	0
		1	12	23.6	0
		1	24	23.81	0
		12	0	22.92	1
		12	6	22.85	1
		12	13	22.85	1
		25	0	22.83	1
	MCH	1	0	23.67	0
		1	12	23.29	0
		1	24	23.18	0
		12	0	22.47	1
		12	6	22.3	1
		12	13	22.11	1
		25	0	22.25	1
	HCH	1	0	23.65	0
		1	12	23.18	0
		1	24	22.65	0
		12	0	22.17	1
		12	6	22.32	1
		12	13	22.32	1
		25	0	21.69	1
16QAM	LCH	1	0	23.09	1
		1	12	22.97	1
		1	24	22.95	1
		12	0	21.94	2
		12	6	21.89	2
		12	13	21.87	2
		25	0	21.83	2
	MCH	1	0	22.75	1
		1	12	22.46	1

		1	24	22.11	1
		12	0	21.57	2
		12	6	21.4	2
		12	13	21.65	2
		25	0	21.42	2
	HCH	1	0	22.65	1
		1	12	22.65	1
		1	24	22.36	1
		12	0	21.35	2
		12	6	21.05	2
		12	13	21.36	2
		25	0	21.65	2

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.69	0
		1	24	23.58	0
		1	49	23.06	0
		25	0	22.84	1
		25	12	22.85	1
		25	25	22.82	1
		50	0	22.84	1
	MCH	1	0	23.37	0
		1	24	23.26	0
		1	49	22.65	0
		25	0	22.62	1
		25	12	22.3	1
		25	25	22.65	1
		50	0	22.35	1
	HCH	1	0	23.36	0
		1	24	22.84	0
		1	49	22.61	0
		25	0	22.41	1
		25	12	22.1	1
		25	25	22.05	1
		50	0	22.65	1
16QAM	LCH	1	0	23.04	1
		1	24	22.96	1
		1	49	22.51	1
		25	0	21.85	2
		25	12	21.81	2
		25	25	21.76	2

	MCH	50	0	21.82	2
		1	0	22.92	1
		1	24	22.55	1
		1	49	22.62	1
		25	0	21.61	2
		25	12	21.32	2
		25	25	21.65	2
		50	0	21.4	2
	HCH	1	0	22.31	1
		1	24	22.05	1
		1	49	21.61	1
		25	0	21.47	2
		25	12	21.31	2
		25	25	21.65	2
		50	0	21.1	2

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.93	0
		1	37	23.6	0
		1	74	23.07	0
		37	0	23.07	1
		37	18	23.05	1
		37	38	22.74	1
		75	0	23.04	1
	MCH	1	0	23.25	0
		1	37	23.3	0
		1	74	22.65	0
		37	0	22.08	1
		37	18	22.53	1
		37	38	22.45	1
		75	0	22.65	1
	HCH	1	0	23.43	0
		1	37	22.99	0
		1	74	22.77	0
		37	0	22.65	1
		37	18	21.97	1
		37	38	21.58	1
		75	0	21.69	1
16QAM	LCH	1	0	23.12	1
		1	37	22.99	1
		1	74	22.51	1



		37	0	21.97	2
		37	18	21.95	2
		37	38	21.91	2
		75	0	21.98	2
	MCH	1	0	22.45	1
		1	37	22.51	1
		1	74	22.98	1
		37	0	21.96	2
		37	18	21.46	2
		37	38	21.32	2
		75	0	20.51	2
	HCH	1	0	22.97	1
		1	37	22.74	1
		1	74	22.55	1
		37	0	21.65	2
		37	18	21.41	2
		37	38	21.64	2
75		0	21.74	2	

Channel Bandwidth: 20 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	24.05	0
		1	49	23.51	0
		1	99	22.91	0
		50	0	23.33	1
		50	25	23.28	1
		50	50	23.18	1
		100	0	23.31	1
	MCH	1	0	23.94	0
		1	49	23.87	0
		1	99	23.65	0
		50	0	23.02	1
		50	25	22.36	1
		50	50	22.62	1
		100	0	21.56	1
	HCH	1	0	23.95	0
		1	49	23.65	0
		1	99	23.47	0
		50	0	23.27	1
		50	25	23.14	1
		50	50	23.19	1
		100	0	22.35	1

16QAM	LCH	1	0	23.16	1
		1	49	22.84	1
		1	99	22.22	1
		50	0	21.88	2
		50	25	21.8	2
		50	50	21.68	2
		100	0	21.79	2
	MCH	1	0	22.8	1
		1	49	22.62	1
		1	99	21.98	1
		50	0	21.75	2
		50	25	21.41	2
		50	50	21.65	2
		100	0	20.55	2
	HCH	1	0	22.65	1
		1	49	22.71	1
		1	99	21.94	1
		50	0	21.87	2
		50	25	21.83	2
		50	50	21.82	2
		100	0	21.32	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	22.3	0
		1	3	22.11	0
		1	5	22.31	0
		3	0	22.02	0
		3	2	22.05	0
		3	3	22.11	0
		6	0	21.66	1
	MCH	1	0	22.32	0
		1	3	22.26	0
		1	5	22.33	0
		3	0	22.42	0
		3	2	22.4	0
		3	3	22.39	0
		6	0	21.35	1
	HCH	1	0	23.24	0

		1	3	23.23	0
		1	5	23.22	0
		3	0	23.3	0
		3	2	23.26	0
		3	3	23.28	0
		6	0	22.29	1
16QAM	LCH	1	0	21.63	1
		1	3	21.56	1
		1	5	21.75	1
		3	0	21.52	1
		3	2	21.61	1
		3	3	21.67	1
	6	0	20.79	2	
	MCH	1	0	21.55	1
		1	3	21.62	1
		1	5	21.58	1
		3	0	21.45	1
		3	2	21.43	1
		3	3	21.48	1
	6	0	20.48	2	
	HCH	1	0	22.42	1
		1	3	22.31	1
		1	5	22.23	1
		3	0	22.21	1
		3	2	22.33	1
		3	3	22.36	1
	6	0	21.23	2	

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.28	0
		1	7	22.15	0
		1	14	22.31	0
		8	0	21.24	1
		8	4	21.29	1
		8	7	21.37	1
		15	0	21.27	1
	MCH	1	0	22.31	0
		1	7	22.37	0
		1	14	22.32	0
		8	0	21.4	1
		8	4	21.39	1

		8	7	21.4	1
		15	0	21.35	1
	HCH	1	0	23.22	0
		1	7	23.25	0
		1	14	23.21	0
		8	0	22.31	1
		8	4	22.31	1
		8	7	22.3	1
		15	0	22.27	1
16QAM	LCH	1	0	21.55	1
		1	7	21.47	1
		1	14	21.66	1
		8	0	20.43	2
		8	4	20.51	2
		8	7	20.58	2
		15	0	20.51	2
	MCH	1	0	21.62	1
		1	7	21.68	1
		1	14	21.68	1
		8	0	20.41	1
		8	4	20.36	2
		8	7	20.4	2
		15	0	20.38	2
	HCH	1	0	22.44	2
		1	7	22.3	1
		1	14	22.23	1
		8	0	21.25	1
		8	4	21.27	1
		8	7	21.25	2
		15	0	21.3	2

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.57	0
		1	12	22.05	0
		1	24	22.71	0
		12	0	21.21	1
		12	6	21.09	1
		12	13	21.33	1
		25	0	21.24	1
	MCH	1	0	22.42	0
		1	12	22.43	0

		1	24	22.41	0
		12	0	21.43	1
		12	6	21.4	1
		12	13	21.44	1
		25	0	21.37	1
	HCH	1	0	23.25	0
		1	12	23.34	0
		1	24	23.29	0
		12	0	22.29	1
		12	6	22.32	1
		12	13	22.32	1
		25	0	22.24	1
	16QAM	LCH	1	0	21.81
1			12	21.35	1
1			24	22.05	1
12			0	20.39	2
12			6	20.29	2
12			13	20.53	2
25			0	20.36	2
MCH		1	0	21.57	1
		1	12	21.67	1
		1	24	21.67	1
		12	0	20.55	2
		12	6	20.55	2
		12	13	20.57	2
		25	0	20.4	2
HCH		1	0	22.41	1
		1	12	22.49	1
		1	24	22.46	1
		12	0	21.31	2
		12	6	21.34	2
		12	13	21.32	2
		25	0	21.31	2

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.33	0
		1	24	22.65	0
		1	49	22.72	0
		25	0	21.58	1
		25	12	21.8	1
		25	25	21.85	1
		50	0	21.93	1
	MCH	1	0	22.43	0
		1	24	22.34	0
		1	49	22.47	0
		25	0	21.38	1
		25	12	21.38	1
		25	25	21.44	1
		50	0	21.4	1
	HCH	1	0	22.96	0
		1	24	23.14	0
		1	49	23.21	0
		25	0	22.06	1
		25	12	22.14	1
		25	25	22.19	1
		50	0	22.14	1
16QAM	LCH	1	0	21.62	1
		1	24	21.98	1
		1	49	21.85	1
		25	0	20.66	2
		25	12	20.87	2
		25	25	20.85	2
		50	0	20.98	2
	MCH	1	0	21.66	1
		1	24	21.73	1
		1	49	21.86	1
		25	0	20.42	2
		25	12	20.44	2
		25	25	20.49	2
		50	0	20.47	2
	HCH	1	0	22.22	1
		1	24	22.39	1
		1	49	22.37	1
		25	0	21.08	2

		25	12	21.16	2
		25	25	21.23	2
		50	0	21.21	2

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.6	0
		1	37	22.79	0
		1	74	22.57	0
		37	0	21.94	1
		37	18	22	1
		37	38	21.88	1
		75	0	21.98	1
	MCH	1	0	22.59	0
		1	37	22.36	0
		1	74	22.59	0
		37	0	21.58	1
		37	18	21.51	1
		37	38	21.54	1
		75	0	21.54	1
	HCH	1	0	22.67	0
		1	37	23.07	0
		1	74	23.27	0
		37	0	21.94	1
		37	18	22.12	1
		37	38	22.26	1
		75	0	22.1	1
16QAM	LCH	1	0	21.91	1
		1	37	21.99	1
		1	74	21.66	1
		37	0	21.01	2
		37	18	20.93	2
		37	38	20.77	2
		75	0	20.91	2
	MCH	1	0	21.65	1
		1	37	21.67	1
		1	74	21.88	1
		37	0	20.51	2
		37	18	20.5	2
		37	38	20.58	2
		75	0	20.5	2
HCH	1	0	21.91	1	

		1	37	22.36	1
		1	74	22.48	1
		37	0	20.91	2
		37	18	21.09	2
		37	38	21.23	2
		75	0	21.08	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	22.78	0
		1	99	22.52	0
		50	0	21.91	1
		50	25	21.71	1
		50	50	21.55	1
		100	0	21.69	1
	MCH	1	0	22.92	0
		1	49	22.41	0
		1	99	22.77	0
		50	0	21.46	1
		50	25	21.41	1
		50	50	21.56	1
		100	0	21.5	1
	HCH	1	0	23.38	0
		1	49	22.81	0
		1	99	22.49	0
		50	0	21.69	1
		50	25	21.93	1
		50	50	22.33	1
		100	0	22.11	1
16QAM	LCH	1	0	21.95	1
		1	49	21.87	1
		1	99	21.61	1
		50	0	20.89	2
		50	25	20.69	2
		50	50	20.52	2
		100	0	20.66	2
	MCH	1	0	21.81	1
		1	49	21.75	1
		1	99	22.12	1
		50	0	20.52	2
		50	25	20.5	2



		50	50	20.62	2
		100	0	20.51	2
	HCH	1	0	21.67	1
		1	49	22.12	1
		1	99	22.46	1
		50	0	20.73	2
		50	25	20.95	2
		50	50	21.15	2
		100	0	20.95	2

**FDD-LTE Band 5:**

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	24.07	0
		1	3	23.97	0
		1	5	24.02	0
		3	0	23.29	0
		3	2	23.15	0
		3	3	23.12	0
		6	0	22.99	1
	MCH	1	0	23.77	0
		1	3	23.7	0
		1	5	23.7	0
		3	0	22.82	0
		3	2	22.71	0
		3	3	22.72	0
		6	0	21.76	1
	HCH	1	0	23.38	0
		1	3	23.35	0
		1	5	23.38	0
		3	0	22.9	0
		3	2	22.77	0
		3	3	22.61	0
		6	0	22.24	1
16QAM	LCH	1	0	22.85	1
		1	3	22.82	1
		1	5	22.78	1
		3	0	22.71	1
		3	2	22.65	1
		3	3	22.64	1
		6	0	21.69	2
	MCH	1	0	22.07	1
		1	3	22.04	1
		1	5	21.99	1
		3	0	21.74	1
		3	2	21.67	1
		3	3	21.69	1
		6	0	20.7	2
HCH	1	0	21.53	1	
	1	3	21.59	1	

		1	5	21.55	1
		3	0	21.62	1
		3	2	21.95	1
		3	3	21.96	1
		6	0	20.85	2

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.2	0
		1	7	23.29	0
		1	14	23.11	0
		8	0	22.38	1
		8	4	22.16	1
		8	7	22.3	1
		15	0	22.2	1
	MCH	1	0	23.3	0
		1	7	23.22	0
		1	14	23.09	0
		8	0	22.36	1
		8	4	22.24	1
		8	7	22.2	1
		15	0	22.27	1
	HCH	1	0	22.79	0
		1	7	22.83	0
		1	14	22.81	0
		8	0	21.93	1
		8	4	21.92	1
		8	7	21.91	1
		15	0	21.9	1
16QAM	LCH	1	0	22.32	1
		1	7	22.12	1
		1	14	22.17	1
		8	0	21.51	2
		8	4	21.29	2
		8	7	21.65	2
		15	0	21.78	2
	MCH	1	0	21.93	1
		1	7	21.94	1
		1	14	21.98	1
		8	0	21.34	2
		8	4	21.25	2
		8	7	21.65	2

		15	0	21.47	2
	HCH	1	0	22.06	1
		1	7	22.11	1
		1	14	22.06	1
		8	0	21	2
		8	4	21.02	2
		8	7	21.36	2
		15	0	20.89	2

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.5	0
		1	12	23.28	0
		1	24	23.06	0
		12	0	22.34	1
		12	6	22.22	1
		12	13	22.15	1
		25	0	22.16	1
	MCH	1	0	23.52	0
		1	12	23.3	0
		1	24	23.1	0
		12	0	22.43	1
		12	6	22.29	1
		12	13	22.22	1
		25	0	22.27	1
	HCH	1	0	23.05	0
		1	12	22.54	0
		1	24	22.95	0
		12	0	22.65	1
		12	6	21.92	1
		12	13	21.94	1
		25	0	21.92	1
16QAM	LCH	1	0	22.43	1
		1	12	22.24	1
		1	24	22.14	1
		12	0	21.26	2
		12	6	21.18	2
		12	13	21.13	2
		25	0	21.12	2
	MCH	1	0	21.92	1
		1	12	21.93	1
		1	24	21.98	1

		12	0	21.35	2
		12	6	21.41	2
		12	13	21.34	2
		25	0	21.3	2
	HCH	1	0	22.24	1
		1	12	22.15	1
		1	24	22.12	1
		12	0	21.06	2
		12	6	21.02	2
		12	13	20.99	2
		25	0	20.95	2

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	24.08	0
		1	24	23.69	0
		1	49	23.49	0
		25	0	23.34	1
		25	12	22.98	1
		25	25	22.76	1
		50	0	23.06	1
	MCH	1	0	23.67	0
		1	24	23.28	0
		1	49	23.01	0
		25	0	22.8	1
		25	12	22.3	1
		25	25	22.14	1
		50	0	22.28	1
	HCH	1	0	23.13	0
		1	24	23.65	0
		1	49	22.71	0
		25	0	22.67	1
		25	12	21.97	1
		25	25	21.91	1
		50	0	22.74	1
16QAM	LCH	1	0	22.41	1
		1	24	22.09	1
		1	49	21.77	1
		25	0	21.12	2
		25	12	21	2
		25	25	20.79	2
		50	0	21.03	2
	MCH	1	0	22.01	1
		1	24	22.13	1
		1	49	22.32	1
		25	0	20.97	2
		25	12	20.82	2
		25	25	21.14	2
		50	0	21.33	2
	HCH	1	0	22.35	1
		1	24	22.14	1
		1	49	22.08	1
		25	0	21.64	2

		25	12	21.64	2
		25	25	20.94	2
		50	0	21.65	2

**FDD-LTE Band 7:**

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.4	0
		1	12	22.61	0
		1	24	22.35	0
		12	0	21.64	1
		12	6	21.48	1
		12	13	21.55	1
		25	0	21.64	1
	MCH	1	0	22.95	0
		1	12	22.02	0
		1	24	22.65	0
		12	0	22.79	1
		12	6	22.94	1
		12	13	22.01	1
		25	0	22.17	1
	HCH	1	0	22.61	0
		1	12	22.32	0
		1	24	22.55	0
		12	0	22.05	1
		12	6	22.42	1
		12	13	21.95	1
		25	0	21.49	1
16QAM	LCH	1	0	21.43	1
		1	12	21.68	1
		1	24	21.1	1
		12	0	21.86	2
		12	6	21.67	2
		12	13	21.76	2
		25	0	21.68	2
	MCH	1	0	21.1	1
		1	12	21.41	1
		1	24	21.62	1
		12	0	21.69	2
		12	6	21.74	2

		12	13	21.62	2
		25	0	21.47	2
	HCH	1	0	21.27	1
		1	12	21.38	1
		1	24	21.69	1
		12	0	21.99	2
		12	6	21.36	2
		12	13	21.94	2
		25	0	21.5	2

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.19	0
		1	24	22.57	0
		1	49	22.32	0
		25	0	22.18	1
		25	12	22.19	1
		25	25	22.16	1
		50	0	21.27	1
	MCH	1	0	22.38	0
		1	24	22.08	0
		1	49	22.55	0
		25	0	22.14	1
		25	12	22.45	1
		25	25	22.49	1
		50	0	22.17	1
	HCH	1	0	22.58	0
		1	24	22.3	0
		1	49	22.6	0
		25	0	21.56	1
		25	12	21.26	1
		25	25	21.56	1
		50	0	21.44	1
16QAM	LCH	1	0	21.47	1
		1	24	21.33	1
		1	49	21.08	1
		25	0	21.89	2
		25	12	21.51	2
		25	25	21.33	2
		50	0	21.43	2
	MCH	1	0	21.8	1
		1	24	21.55	1



		1	49	22.65	1
		25	0	21.36	2
		25	12	21.74	2
		25	25	21.04	2
		50	0	21.29	2
	HCH	1	0	21.32	1
		1	24	21.58	1
		1	49	21.64	1
		25	0	21.75	2
		25	12	21.45	2
		25	25	21.37	2
		50	0	21.61	2

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.65	0
		1	37	22.47	0
		1	74	22.69	0
		37	0	22.14	1
		37	18	22.11	1
		37	38	22.11	1
		75	0	22.29	2
	MCH	1	0	22.65	0
		1	37	22.89	0
		1	74	22.99	0
		37	0	22.32	1
		37	18	22.93	1
		37	38	22.78	1
		75	0	22.65	2
	HCH	1	0	22.17	0
		1	37	22.5	0
		1	74	22.5	0
		37	0	22.65	1
		37	18	22.45	1
		37	38	22.66	1
		75	0	22.84	2
16QAM	LCH	1	0	22.6	1
		1	37	22.15	1
		1	74	22.18	1
		37	0	21.98	2
		37	18	21.25	2
		37	38	21.22	2

	MCH	75	0	21.39	2
		1	0	21.47	1
		1	37	21.3	1
		1	74	21.69	1
		37	0	21.67	2
		37	18	21.62	2
		37	38	21.67	2
		75	0	21.74	2
	HCH	1	0	21.97	1
		1	37	21.71	1
		1	74	21.32	1
		37	0	21.15	2
		37	18	21.67	2
		37	38	21.83	2
		75	0	21.03	2

Channel Bandwidth: 20 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.65	0
		1	49	22.95	0
		1	99	22.43	0
		50	0	22.2	1
		50	25	21.54	1
		50	50	21.98	1
		100	0	21.69	1
	MCH	1	0	23.76	0
		1	49	23.41	0
		1	99	22.69	0
		50	0	22.31	1
		50	25	21.94	1
		50	50	21.97	1
		100	0	21.97	1
	HCH	1	0	23.85	0
		1	49	22.91	0
		1	99	22.95	0
		50	0	22.72	1
		50	25	22.34	1
		50	50	22.47	1
		100	0	22.62	1
16QAM	LCH	1	0	22.58	1
		1	49	22.15	1
		1	99	21.65	1

		50	0	21.39	2
		50	25	21.74	2
		50	50	21.02	2
		100	0	21.33	2
	MCH	1	0	21.53	1
		1	49	21.59	1
		1	99	21.82	1
		50	0	21.73	2
		50	25	21.25	2
		50	50	21.18	2
		100	0	21.42	2
	HCH	1	0	21.26	1
		1	49	21.45	1
		1	99	21.25	1
		50	0	21.55	2
		50	25	21.49	2
		50	50	21.52	2
		100	0	21.99	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	14.82	15.5
		CH 06	2437	15.02	15.5
		CH 11	2462	15.35	15.5
802.11g	6Mbps	CH 01	2412	12.53	13.0
		CH 06	2437	12.75	13.0
		CH 11	2462	12.53	13.0
802.11n (20MHz)	MCS0	CH 01	2412	12.49	13.0
		CH 06	2437	12.72	13.0
		CH 11	2462	12.28	13.0
802.11n (40MHz)	MCS0	CH 03	2422	11.56	12.0
		CH 06	2437	11.29	12.0
		CH 09	2452	11.06	12.0

**Remark:**

1. Per KDB 248227 D01 v02r02, For 802.11b DSSS SAR measurements, DSSS SAR procedure applies to fixed exposure test position and initial test position procedure applies to multiple exposure test positions.
2. Per KDB 248227 D01 v02r02, For 802.11b DSSS SAR measurements, when the reported SAR of the highest measured maximum output power channel (see 3.1) for the exposure configuration is  $\leq 0.8$  W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration. When the reported SAR is  $> 0.8$  W/kg, SAR is required for that exposure configuration using the next highest measured output power channel. When any reported SAR is  $> 1.2$  W/kg, SAR is required for the third channel; i.e., all channels require testing.
3. For OFDM modes (802.11g/n), SAR is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and it is  $\leq 1.2$  W/kg.

Bluetooth - Maximum Average Power			
Test Mode	Data Rate	Average Power(dBm)	Tune-up power (dBm)
GFSK	1Mbps	5.488	6.0
Pi/4 QDPSK	2Mbps	4.663	6.0
8DPSK	3Mbps	4.725	6.0

Bluetooth - Maximum Average Power					
Test Mode	Data Rate	Channel	Frequency (MHz)	Average Power (dBm)	Tune-up power (dBm)
BLE	1Mbps	CH 00	2402	4.23	6.0
		CH 19	2440	4.692	6.0
		CH 39	2480	5.575	6.0

NFC - Maximum Average Power			
Test Mode	Frequency (MHz)	Average Power(dBm)	Tune-up power (dBm)
NFC	13.56	-44.03	-40

**Remark:**

Bluetooth and NFC maximum output power is 5.575dBm and -44.03dBm *respectively*, and Maximum Tune-Up output power is 6.0dBm and -40dBm *respectively*. 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

- $f(\text{GHz})$  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
6.0	3.98	5	2.480	1.25	3

The exclusion thresholds is  $1.25 < 3$ , therefore, the RF exposure evaluation is not required.

**NFC:**

Tune-Up Power (dBm)	Max. Power (mW)	Distance (mm)	Frequency (GHz)	Result	Limit
-40	0.0001	5	0.01356	0.000002	3

The exclusion thresholds is  $0.000002 < 3$ , therefore, the RF exposure evaluation is not required.

## 9.2 Test Results for Standalone SAR Test

### Head SAR

GSM850 – Head SAR Test									
Plot No.	Mode	Test Position Head	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
1.	GSM	Right Cheek	128	824.2	32.05	32.5	1.109	0.292	0.324
2.	GSM	Right Tilted	128	824.2	32.05	32.5	1.109	0.085	0.094
3.	GSM	Left Cheek	128	824.2	32.05	32.5	1.109	0.307	0.341
4.	GSM	Left Tilted	128	824.2	32.05	32.5	1.109	0.123	0.136

GSM1900 – Head SAR Test									
Plot No.	Mode	Test Position Head	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	M Hz					
5.	GSM	Right Cheek	512	1850.2	30.46	31.0	1.132	0.23	0.260
6.	GSM	Right Tilted	512	1850.2	30.46	31.0	1.132	0.062	0.070
7.	GSM	Left Cheek	512	1850.2	30.46	31.0	1.132	0.459	0.520
8.	GSM	Left Tilted	512	1850.2	30.46	31.0	1.132	0.185	0.209

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_4TX	Right Cheek	128	824.2	28.79	29.0	1.050	0.468	0.491
10.	GPRS_4TX	Right Tilted	128	824.2	28.79	29.0	1.050	0.112	0.118
11.	GPRS_4TX	Left Cheek	128	824.2	28.79	29.0	1.050	0.479	0.503
12.	GPRS_4TX	Left Tilted	128	824.2	28.79	29.0	1.050	0.152	0.160

GPRS1900 – Head SAR Test									
Plot No.	Mode	Test Position Head	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	M Hz					
13.	GPRS_4TX	Right Cheek	512	1850.2	26.86	27.0	1.033	0.432	0.446
14.	GPRS_4TX	Right Tilted	512	1850.2	26.86	27.0	1.033	0.123	0.127
15.	GPRS_4TX	Left Cheek	512	1850.2	26.86	27.0	1.033	0.616	0.636
16.	GPRS_4TX	Left Tilted	512	1850.2	26.86	27.0	1.033	0.134	0.138

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	9262	1852.4	22.40	22.5	1.023	0.428	0.438
18.	RMC	Right Tilted	9262	1852.4	22.40	22.5	1.023	0.156	0.160
19.	RMC	Left Cheek	9262	1852.4	22.40	22.5	1.023	0.743	0.760
20.	RMC	Left Tilted	9262	1852.4	22.40	22.5	1.023	0.162	0.166

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	4182	836.6	22.82	23.0	1.042	0.285	0.297
22.	RMC	Right Tilted	4182	836.6	22.82	23.0	1.042	0.082	0.085
23.	RMC	Left Cheek	4182	836.6	22.82	23.0	1.042	0.304	0.317
24.	RMC	Left Tilted	4182	836.6	22.82	23.0	1.042	0.102	0.106

WCDMA Band 4 – 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					
25.	RMC	Right Cheek	1513	1752.6	23.05	23.5	1.109	0.294	0.326
26.	RMC	Right Tilted	1513	1752.6	23.05	23.5	1.109	0.096	0.106
27.	RMC	Left Cheek	1513	1752.6	23.05	23.5	1.109	0.483	0.536
28.	RMC	Left Tilted	1513	1752.6	23.05	23.5	1.109	0.123	0.136

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						
29.	RMC QPSK 20MHz 1RB	Right Cheek	1860.0	24.05	24.5	1.109	0.533	0.591	
30.	RMC QPSK 20MHz 1RB	Right Tilted	1860.0	24.05	24.5	1.109	0.207	0.230	
31.	RMC QPSK 20MHz 1RB	Left Cheek	1860.0	24.05	24.5	1.109	0.911	1.010	
32.	RMC QPSK 20MHz 1RB	Left Cheek	1880.0	23.94	24.5	1.138	0.727	0.827	
33.	RMC QPSK 20MHz 1RB	Left Cheek	1900.0	23.95	24.5	1.135	0.682	0.774	
34.	RMC QPSK 20MHz 1RB	Left Tilted	1860.0	24.05	24.5	1.109	0.254	0.282	
35.	RMC QPSK 20MHz 50%RB	Right Cheek	1860.0	23.33	23.5	1.040	0.323	0.336	
36.	RMC QPSK 20MHz 50%RB	Right Tilted	1860.0	23.33	23.5	1.040	0.091	0.095	
37.	RMC QPSK 20MHz 50%RB	Left Cheek	1860.0	23.33	23.5	1.040	0.612	0.636	
38.	RMC QPSK 20MHz 50%RB	Left Tilted	1860.0	23.33	23.5	1.040	0.164	0.171	
39.	RMC QPSK 20MHz 100%RB	Left Cheek	1860.0	23.31	23.5	1.045	0.643	0.672	

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					
40.	RMC QPSK 20MHz 1RB	Right Cheek	1745.0	23.38	23.5	1.028	0.201	0.207
41.	RMC QPSK 20MHz 1RB	Right Tilted	1745.0	23.38	23.5	1.028	0.082	0.084
42.	RMC QPSK 20MHz 1RB	Left Cheek	1745.0	23.38	23.5	1.028	0.524	0.539
43.	RMC QPSK 20MHz 1RB	Left Tilted	1745.0	23.38	23.5	1.028	0.12	0.123
44.	RMC QPSK 20MHz 50%RB	Right Cheek	1745.0	22.33	22.5	1.040	0.165	0.172
45.	RMC QPSK 20MHz 50%RB	Right Tilted	1745.0	22.33	22.5	1.040	0.047	0.049
46.	RMC QPSK 20MHz 50%RB	Left Cheek	1745.0	22.33	22.5	1.040	0.453	0.471
47.	RMC QPSK 20MHz 50%RB	Left Tilted	1745.0	22.33	22.5	1.040	0.104	0.108

LTE Band 5– 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					
48.	RMC QPSK 10MHz 1RB	Right Cheek	829.0	24.08	24.5	1.102	0.368	0.405
49.	RMC QPSK 10MHz 1RB	Right Tilted	829.0	24.08	24.5	1.102	0.122	0.134
50.	RMC QPSK 10MHz 1RB	Left Cheek	829.0	24.08	24.5	1.102	0.440	0.485
51.	RMC QPSK 10MHz 1RB	Left Tilted	829.0	24.08	24.5	1.102	0.201	0.221
52.	RMC QPSK 10MHz 50%RB	Right Cheek	829.0	23.34	23.5	1.038	0.296	0.307
53.	RMC QPSK 10MHz 50%RB	Right Tilted	829.0	23.34	23.5	1.038	0.109	0.113
54.	RMC QPSK 10MHz 50%RB	Left Cheek	829.0	23.34	23.5	1.038	0.399	0.414
55.	RMC QPSK 10MHz 50%RB	Left Tilted	829.0	23.34	23.5	1.038	0.112	0.116

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					
56.	RMC QPSK 20MHz 1RB	Right Cheek	2560.0	23.85	24.0	1.035	0.129	0.134
57.	RMC QPSK 20MHz 1RB	Right Tilted	2560.0	23.85	24.0	1.035	0.032	0.033
58.	RMC QPSK 20MHz 1RB	Left Cheek	2560.0	23.85	24.0	1.035	0.260	0.269
59.	RMC QPSK 20MHz 1RB	Left Tilted	2560.0	23.85	24.0	1.035	0.099	0.102
60.	RMC QPSK 20MHz 50%RB	Right Cheek	2560.0	22.72	23.0	1.067	0.104	0.111
61.	RMC QPSK 20MHz 50%RB	Right Tilted	2560.0	22.72	23.0	1.067	0.021	0.022
62.	RMC QPSK 20MHz 50%RB	Left Cheek	2560.0	22.72	23.0	1.067	0.196	0.209
63.	RMC QPSK 20MHz 50%RB	Left Tilted	2560.0	22.72	23.0	1.067	0.054	0.058



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					
64.	802.11b	Right Cheek	11	2462	15.35	15.5	1.035	0.285	0.295
65.	802.11b	Right Tilted	11	2462	15.35	15.5	1.035	0.075	0.078
66.	802.11b	Left Cheek	11	2462	15.35	15.5	1.035	0.221	0.229
67.	802.11b	Left Tilted	11	2462	15.35	15.5	1.035	0.042	0.043

**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					
68.	GSM	Back	128	824.2	32.05	32.5	1.109	0.390	0.433
69.	GSM	Front	128	824.2	32.05	32.5	1.109	0.255	0.283

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					
70.	GSM	Back	512	1850.2	30.46	31.0	1.132	0.187	0.212
71.	GSM	Front	512	1850.2	30.46	31.0	1.132	0.480	0.544

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					
80	RMC 12.2k	Back Side	9262	1852.4	22.40	22.5	1.023	0.319	0.326
81	RMC 12.2k	Front Side	9262	1852.4	22.40	22.5	1.023	0.861	0.881
82	RMC 12.2k	Front Side	9400	1880.0	22.17	22.5	1.079	0.75	0.809
83	RMC 12.2k	Front Side	9538	1907.6	22.08	22.5	1.102	0.683	0.752

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					
86	RMC 12.2k	Back Side	4182	836.6	22.82	23.0	1.042	0.357	0.372
87	RMC 12.2k	Front Side	4182	836.6	22.82	23.0	1.042	0.255	0.266

WCDMA 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)
			CH.	MHz					
90	RMC 12.2k	Back Side	1513	1752.6	23.05	23.5	1.109	0.294	0.326
91	RMC 12.2k	Front Side	1513	1752.6	23.05	23.5	1.109	0.613	0.680

LTE Band 2–Body SAR Test (Gap: 10mm)								
Plot No.	Mode	Test Position Body	Freque ncy	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB		MHz					
94	RMC QPSK 20MHz 1RB	Back Side	1860.0	24.05	24.5	1.109	0.577	0.640
95	RMC QPSK 20MHz 1RB	Front Side	1860.0	24.05	24.5	1.109	1.153	1.279
96	RMC QPSK 20MHz 1RB	Front Side	1880.0	23.94	24.5	1.138	1.235	1.405
97	RMC QPSK 20MHz 1RB	Front Side	1900.0	23.95	24.5	1.135	1.152	1.308
102	RMC QPSK 20MHz 50%RB	Back Side	1860.0	23.33	23.5	1.040	0.468	0.487
103	RMC QPSK 20MHz 50%RB	Front Side	1860.0	23.33	23.5	1.040	0.894	0.930
104	RMC QPSK 20MHz 50%RB	Front Side	1880.0	23.02	23.5	1.117	0.902	1.007
105	RMC QPSK 20MHz 50%RB	Front Side	1900.0	23.27	23.5	1.054	0.801	0.845

LTE Band 4–Body SAR Test (Gap: 10mm)								
Plot No.	Mode	Test Position Body	Freque ncy	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB		MHz					
110	RMC QPSK 20MHz 1RB	Back Side	1745.0	23.38	23.5	1.028	0.291	0.299
111	RMC QPSK 20MHz 1RB	Front Side	1745.0	23.38	23.5	1.028	0.447	0.460
114	RMC QPSK 20MHz 50%RB	Back Side	1745.0	22.33	22.5	1.040	0.213	0.222
115	RMC QPSK 20MHz 50%RB	Front Side	1745.0	22.33	22.5	1.040	0.412	0.428

LTE Band 5–Body SAR Test (Gap: 10mm)								
Plot No.	Mode	Test Position Body	Freque ncy	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB		MHz					
118	RMC QPSK 10MHz 1RB	Back Side	829.0	24.08	24.5	1.102	0.532	0.586
119	RMC QPSK 10MHz 1RB	Front Side	829.0	24.08	24.5	1.102	0.362	0.399
122	RMC QPSK 10MHz 50%RB	Back Side	829.0	23.34	23.5	1.038	0.485	0.503
123	RMC QPSK 10MHz 50%RB	Front Side	829.0	23.34	23.5	1.038	0.316	0.328

LTE Band 7–Body SAR Test (Gap: 10mm)								
Plot No.	Mode	Test Position Body	Freque ncy	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB		MHz					
126	RMC QPSK 20MHz 1RB	Back Side	2560.0	23.85	24.0	1.035	0.97	1.004
127	RMC QPSK 20MHz 1RB	Back Side	2510.0	23.65	24.0	1.084	1.111	1.204
128	RMC QPSK 20MHz 1RB	Back Side	2535.0	23.76	24.0	1.057	1.056	1.116
129	RMC QPSK 20MHz 1RB	Front Side	2510.0	25.13	25.5	1.089	0.533	0.580
134	RMC QPSK 20MHz 50%RB	Back Side	2560.0	22.72	23.0	1.067	0.683	0.728
135	RMC QPSK 20MHz 50%RB	Front Side	2560.0	22.72	23.0	1.067	0.312	0.333

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					
142	802.11b	Back Side	11	2462	15.35	15.5	1.035	0.316	0.327
143	802.11b	Front Side	11	2462	15.35	15.5	1.035	0.092	0.095

**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					
72.	GPRS_4TX	Back Side	128	824.2	28.79	29.0	1.050	0.701	0.736
73.	GPRS_4TX	Front Side	128	824.2	28.79	29.0	1.050	0.495	0.520
74.	GPRS_4TX	Bottom side	128	824.2	28.79	29.0	1.050	0.324	0.340
75.	GPRS_4TX	Left side	128	824.2	28.79	29.0	1.050	0.166	0.174

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					
76.	GPRS_4TX	Back Side	512	1850.2	26.86	27.0	1.033	0.348	0.359
77.	GPRS_4TX	Front Side	512	1850.2	26.86	27.0	1.033	0.774	0.799
78.	GPRS_4TX	Bottom side	512	1850.2	26.86	27.0	1.033	0.549	0.567
79.	GPRS_4TX	Left side	512	1850.2	26.86	27.0	1.033	0.099	0.102

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					
80.	RMC 12.2k	Back Side	9262	1852.4	22.40	22.5	1.023	0.319	0.326
81.	RMC 12.2k	Front Side	9262	1852.4	22.40	22.5	1.023	0.861	0.881
82.	RMC 12.2k	Front Side	9400	1880.0	22.17	22.5	1.079	0.75	0.809
83.	RMC 12.2k	Front Side	9538	1907.6	22.08	22.5	1.102	0.683	0.752
84.	RMC 12.2k	Bottom side	9262	1852.4	22.40	22.5	1.023	0.533	0.545
85.	RMC 12.2k	Left side	9262	1852.4	22.40	22.5	1.023	0.108	0.111

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					
86.	RMC 12.2k	Back Side	4182	836.6	22.82	23.0	1.042	0.357	0.372
87.	RMC 12.2k	Front Side	4182	836.6	22.82	23.0	1.042	0.255	0.266
88.	RMC 12.2k	Bottom side	4182	836.6	22.82	23.0	1.042	0.207	0.216
89.	RMC 12.2k	Left side	4182	836.6	22.82	23.0	1.042	0.085	0.089

WCDMA 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)
			CH.	MHz					
90.	RMC 12.2k	Back Side	1513	1752.6	23.05	23.5	1.109	0.294	0.326
91.	RMC 12.2k	Front Side	1513	1752.6	23.05	23.5	1.109	0.613	0.680
92.	RMC 12.2k	Bottom side	1513	1752.6	23.05	23.5	1.109	0.434	0.481
93.	RMC 12.2k	Left side	1513	1752.6	23.05	23.5	1.109	0.125	0.139

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						
94.	RMC QPSK 20MHz 1RB	Back Side	1860.0	24.05	24.5	1.109	0.577	0.640	
95.	RMC QPSK 20MHz 1RB	Front Side	1860.0	24.05	24.5	1.109	1.153	1.279	
96.	RMC QPSK 20MHz 1RB	Front Side	1880.0	23.94	24.5	1.138	1.235	1.405	
97.	RMC QPSK 20MHz 1RB	Front Side	1900.0	23.95	24.5	1.135	1.152	1.308	
98.	RMC QPSK 20MHz 1RB	Bottom side	1860.0	24.05	24.5	1.109	0.86	0.954	
99.	RMC QPSK 20MHz 1RB	Bottom side	1880.0	23.94	24.5	1.138	0.871	0.991	
100.	RMC QPSK 20MHz 1RB	Bottom side	1900.0	23.95	24.5	1.135	0.8	0.908	
101.	RMC QPSK 20MHz 1RB	Left side	1860.0	24.05	24.5	1.109	0.3	0.333	
102.	RMC QPSK 20MHz 50%RB	Back Side	1860.0	23.33	23.5	1.040	0.468	0.487	
103.	RMC QPSK 20MHz 50%RB	Front Side	1860.0	23.33	23.5	1.040	0.894	0.930	
104.	RMC QPSK 20MHz 50%RB	Front Side	1880.0	23.02	23.5	1.117	0.902	1.007	
105.	RMC QPSK 20MHz 50%RB	Front Side	1900.0	23.27	23.5	1.054	0.801	0.845	
106.	RMC QPSK 20MHz 50%RB	Bottom side	1860.0	23.33	23.5	1.040	0.699	0.727	
107.	RMC QPSK 20MHz 50%RB	Left side	1860.0	23.33	23.5	1.040	0.216	0.225	
108.	RMC QPSK 20MHz 100%RB	Front side	1860.0	23.31	22.5	0.830	0.701	0.582	
109.	RMC QPSK 20MHz 100%RB	Bottom side	1860.0	23.31	22.5	0.830	0.642	0.533	

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						
110.	RMC QPSK 20MHz 1RB	Back Side	1745.0	23.38	23.5	1.028	0.291	0.299	
111.	RMC QPSK 20MHz 1RB	Front Side	1745.0	23.38	23.5	1.028	0.447	0.460	
112.	RMC QPSK 20MHz 1RB	Bottom side	1745.0	23.38	23.5	1.028	0.418	0.430	
113.	RMC QPSK 20MHz 1RB	Left side	1745.0	23.38	23.5	1.028	0.099	0.102	
114.	RMC QPSK 20MHz 50%RB	Back Side	1745.0	22.33	22.5	1.040	0.213	0.222	
115.	RMC QPSK 20MHz 50%RB	Front Side	1745.0	22.33	22.5	1.040	0.412	0.428	

116.	RMC QPSK 20MHz 50%RB	Bottom side	1745.0	22.33	22.5	1.040	0.397	0.413
117.	RMC QPSK 20MHz 50%RB	Left side	1745.0	22.33	22.5	1.040	0.065	0.068

**LTE Band 5–Body SAR Test (Gap: 10mm)**

Plot No.	Mode	Test Position Body	Freque ncy	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB		MHz					
118.	RMC QPSK 10MHz 1RB	Back Side	829.0	24.08	24.5	1.102	0.532	0.586
119.	RMC QPSK 10MHz 1RB	Front Side	829.0	24.08	24.5	1.102	0.362	0.399
120.	RMC QPSK 10MHz 1RB	Bottom side	829.0	24.08	24.5	1.102	0.287	0.316
121.	RMC QPSK 10MHz 1RB	Left side	829.0	24.08	24.5	1.102	0.125	0.138
122.	RMC QPSK 10MHz 50%RB	Back Side	829.0	23.34	23.5	1.038	0.485	0.503
123.	RMC QPSK 10MHz 50%RB	Front Side	829.0	23.34	23.5	1.038	0.316	0.328
124.	RMC QPSK 10MHz 50%RB	Bottom side	829.0	23.34	23.5	1.038	0.195	0.202
125.	RMC QPSK 10MHz 50%RB	Left side	829.0	23.34	23.5	1.038	0.086	0.089

**LTE Band 7–Body SAR Test (Gap: 10mm)**

Plot No.	Mode	Test Position Body	Freque ncy	Outp ut Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB		MHz					
126.	RMC QPSK 20MHz 1RB	Back Side	2560.0	23.85	24.0	1.035	0.97	1.004
127.	RMC QPSK 20MHz 1RB	Back Side	2510.0	23.65	24.0	1.084	1.111	1.204
128.	RMC QPSK 20MHz 1RB	Back Side	2535.0	23.76	24.0	1.057	1.056	1.116
129.	RMC QPSK 20MHz 1RB	Front Side	2560.0	23.85	24.0	1.035	0.425	0.440
130.	RMC QPSK 20MHz 1RB	Bottom side	2560.0	23.85	24.0	1.035	1.08	1.118
131.	RMC QPSK 20MHz 1RB	Bottom side	2510.0	23.65	24.0	1.084	1.212	1.314
132.	RMC QPSK 20MHz 1RB	Bottom side	2535.0	23.76	24.0	1.057	1.272	1.344
133.	RMC QPSK 20MHz 1RB	Left side	2560.0	23.85	24.0	1.035	0.251	0.260
134.	RMC QPSK 20MHz 50%RB	Back Side	2560.0	22.72	23.0	1.067	0.683	0.728
135.	RMC QPSK 20MHz 50%RB	Front Side	2560.0	22.72	23.0	1.067	0.312	0.333
136.	RMC QPSK 20MHz 50%RB	Bottom side	2560.0	22.72	23.0	1.067	0.727	0.775
137.	RMC QPSK 20MHz 50%RB	Bottom side	2510.0	22.2	23.0	1.202	0.635	0.763
138.	RMC QPSK 20MHz 50%RB	Bottom side	2535.0	22.31	23.0	1.172	0.71	0.832
139.	RMC QPSK 20MHz 50%RB	Left side	2560.0	22.72	23.0	1.067	0.116	0.124
140.	RMC QPSK 20MHz 100%RB	Back Side	2560.0	22.62	23.0	1.091	0.612	0.668
141.	RMC QPSK 20MHz 100%RB	Bottom side	2560.0	22.62	23.0	1.091	0.701	0.765

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					
142.	802.11b	Back Side	11	2462	15.35	15.5	1.035	0.316	0.327
143.	802.11b	Front Side	11	2462	15.35	15.5	1.035	0.092	0.095
144.	802.11b	Right side	11	2462	15.35	15.5	1.035	0.028	0.029
145.	802.11b	Top Side	11	2462	15.35	15.5	1.035	0.095	0.098

### Extremity SAR

LTE Band 2–Body SAR Test (Gap: 0mm)									
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR10g (W/kg)	Scaled SAR1g (W/kg)	
	Modulation, Bandwidth, RB		MHz						
146.	RMC QPSK 20MHz 1RB	Front Side	1860.0	24.05	24.5	1.109	2.611	2.896	
147.	RMC QPSK 20MHz 1RB	Front Side	1880.0	23.94	24.5	1.138	2.573	2.927	
148.	RMC QPSK 20MHz 1RB	Front Side	1900.0	23.95	24.5	1.135	2.372	2.692	

LTE Band 7–Body SAR Test (Gap: 0mm)									
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR10g (W/kg)	Scaled SAR1g (W/kg)	
	Modulation, Bandwidth, RB		MHz						
149.	RMC QPSK 20MHz 1RB	Back Side	2560.0	23.85	24.0	1.035	1.822	1.886	
150.	RMC QPSK 20MHz 1RB	Back Side	2510.0	23.65	24.0	1.084	2.001	2.169	
151.	RMC QPSK 20MHz 1RB	Back Side	2535.0	23.76	24.0	1.057	2.018	2.133	
152.	RMC QPSK 20MHz 1RB	Bottom side	2560.0	23.85	24.0	1.035	1.192	1.234	
153.	RMC QPSK 20MHz 1RB	Bottom side	2510.0	23.65	24.0	1.084	1.334	1.446	
154.	RMC QPSK 20MHz 1RB	Bottom side	2535.0	23.76	24.0	1.057	1.229	1.299	



## Repeated SAR

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					
155.	RMC QPSK 20MHz 1RB	Left Cheek	1860.0	24.05	24.5	1.109	0.902	1.000

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					
156.	RMC 12.2k	Front Side	9262	1852.4	22.40	22.5	1.023	0.854	0.874

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						
157.	RMC QPSK 20MHz 1RB	Front Side	1880.0	23.94	24.5	1.138	1.221	1.389	

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						
158.	RMC QPSK 20MHz 1RB	Bottom side	2535.0	23.76	24.0	1.057	1.264	1.336	

LTE Band 2–Body SAR Test (Gap: 0mm)									
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR10g (W/kg)	Scaled SAR1g (W/kg)	
	Modulation, Bandwidth, RB		MHz						
159.	RMC QPSK 20MHz 1RB	Front Side	1860.0	24.05	24.5	1.109	2.587	2.869	

LTE Band 7–Body SAR Test (Gap: 0mm)									
Plot No.	Mode	Test Position	Frequency	Output	Rated	Scaling	SAR10g	Scaled	
			ncy	ut	Limit	Factor		SAR1g	
					(dBm)		(W/kg)	(W/kg)	

	<b>Modulation, Bandwidth, RB</b>	<b>Body</b>	<b>MHz</b>	<b>Power (dBm)</b>	<b>(dBm)</b>		<b>(W/kg)</b>	<b>(W/kg)</b>
160.	RMC QPSK 20MHz 1RB	Back Side	2535.0	23.76	24.0	1.057	2.001	2.115

**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/Data) + Bluetooth(Data)	Yes	Yes	-
6	LTE(Data) + Bluetooth(Data)	Yes	Yes	-

#### Remark:

- GSM and WCDMA share the same antenna, and cannot transmit simultaneously.
- WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
- According to the KDB 447498 D01 v06, when standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:  
 $(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm}) \cdot [\sqrt{f(\text{GHz})} / x] \text{ W/kg}$  for test separation distances  $\leq 50 \text{ mm}$ ;  
 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
6.0	3.98	5/10	2.480	7.5	0.167	0.084

- 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	0.324	0.295	0.619
Right Tilted	GSM850	0.094	0.078	0.172
Left Cheek	GSM850	0.341	0.229	0.57
Left Tilted	GSM850	0.136	0.043	0.179
Right Cheek	GSM1900	0.260	0.295	0.555
Right Tilted	GSM1900	0.070	0.078	0.148
Left Cheek	GSM1900	0.520	0.229	0.749
Left Tilted	GSM1900	0.209	0.043	0.252
Right Cheek	GPRS850	0.491	0.295	0.786
Right Tilted	GPRS850	0.118	0.078	0.196
Left Cheek	GPRS850	0.503	0.229	0.732
Left Tilted	GPRS850	0.160	0.043	0.203
Right Cheek	GPRS1900	0.446	0.295	0.741
Right Tilted	GPRS1900	0.127	0.078	0.205
Left Cheek	GPRS1900	0.636	0.229	0.865
Left Tilted	GPRS1900	0.138	0.043	0.181
Right Cheek	WCDMA Band 2	0.438	0.295	0.733
Right Tilted	WCDMA Band 2	0.160	0.078	0.238
Left Cheek	WCDMA Band 2	0.760	0.229	0.989
Left Tilted	WCDMA Band 2	0.166	0.043	0.209
Right Cheek	WCDMA Band 5	0.297	0.295	0.592
Right Tilted	WCDMA Band 5	0.085	0.078	0.163
Left Cheek	WCDMA Band 5	0.317	0.229	0.546
Left Tilted	WCDMA Band 5	0.106	0.043	0.149
Right Cheek	WCDMA Band 4	0.326	0.295	0.621
Right Tilted	WCDMA Band 4	0.106	0.078	0.184
Left Cheek	WCDMA Band 4	0.536	0.229	0.765
Left Tilted	WCDMA Band 4	0.136	0.043	0.179
Right Cheek	LTE Band 2	0.591	0.295	0.886
Right Tilted	LTE Band 2	0.230	0.078	0.308
Left Cheek	LTE Band 2	1.010	0.229	<b>1.239</b>
Left Tilted	LTE Band 2	0.282	0.043	0.325
Right Cheek	LTE Band 4	0.207	0.295	0.502
Right Tilted	LTE Band 4	0.084	0.078	0.162
Left Cheek	LTE Band 4	0.539	0.229	0.768
Left Tilted	LTE Band 4	0.123	0.043	0.166
Right Cheek	LTE Band 5	0.405	0.295	0.7

Right Tilted	LTE Band 5	0.134	0.078	0.212
Left Cheek	LTE Band 5	0.485	0.229	0.714
Left Tilted	LTE Band 5	0.221	0.043	0.264
Right Cheek	LTE Band 7	0.134	0.295	0.429
Right Tilted	LTE Band 7	0.033	0.078	0.111
Left Cheek	LTE Band 7	0.269	0.229	0.498
Left Tilted	LTE Band 7	0.102	0.043	0.145

**WWAN and Bluetooth**

Position	WWAN		Bluetooth	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Right Cheek	GSM850	0.324	0.167	0.491
Right Tilted	GSM850	0.094	0.167	0.261
Left Cheek	GSM850	0.341	0.167	0.508
Left Tilted	GSM850	0.136	0.167	0.303
Right Cheek	GSM1900	0.260	0.167	0.427
Right Tilted	GSM1900	0.070	0.167	0.237
Left Cheek	GSM1900	0.520	0.167	0.687
Left Tilted	GSM1900	0.209	0.167	0.376
Right Cheek	GPRS850	0.491	0.167	0.658
Right Tilted	GPRS850	0.118	0.167	0.285
Left Cheek	GPRS850	0.503	0.167	0.67
Left Tilted	GPRS850	0.160	0.167	0.327
Right Cheek	GPRS1900	0.446	0.167	0.613
Right Tilted	GPRS1900	0.127	0.167	0.294
Left Cheek	GPRS1900	0.636	0.167	0.803
Left Tilted	GPRS1900	0.138	0.167	0.305
Right Cheek	WCDMA Band 2	0.438	0.167	0.605
Right Tilted	WCDMA Band 2	0.160	0.167	0.327
Left Cheek	WCDMA Band 2	0.760	0.167	0.927
Left Tilted	WCDMA Band 2	0.166	0.167	0.333
Right Cheek	WCDMA Band 5	0.297	0.167	0.464
Right Tilted	WCDMA Band 5	0.085	0.167	0.252
Left Cheek	WCDMA Band 5	0.317	0.167	0.484
Left Tilted	WCDMA Band 5	0.106	0.167	0.273
Right Cheek	WCDMA Band 4	0.326	0.167	0.493
Right Tilted	WCDMA Band 4	0.106	0.167	0.273
Left Cheek	WCDMA Band 4	0.536	0.167	0.703
Left Tilted	WCDMA Band 4	0.136	0.167	0.303
Right Cheek	LTE Band 2	0.591	0.167	0.758
Right Tilted	LTE Band 2	0.230	0.167	0.397
Left Cheek	LTE Band 2	1.010	0.167	<b>1.177</b>
Left Tilted	LTE Band 2	0.282	0.167	0.449
Right Cheek	LTE Band 4	0.207	0.167	0.374
Right Tilted	LTE Band 4	0.084	0.167	0.251
Left Cheek	LTE Band 4	0.539	0.167	0.706
Left Tilted	LTE Band 4	0.123	0.167	0.29
Right Cheek	LTE Band 5	0.405	0.167	0.572
Right Tilted	LTE Band 5	0.134	0.167	0.301

---

---

Left Cheek	LTE Band 5	0.485	0.167	0.652
Left Tilted	LTE Band 5	0.221	0.167	0.388
Right Cheek	LTE Band 7	0.134	0.167	0.301
Right Tilted	LTE Band 7	0.033	0.167	0.2
Left Cheek	LTE Band 7	0.269	0.167	0.436
Left Tilted	LTE Band 7	0.102	0.167	0.269

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

Position	WWAN		WLAN	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	GSM850	0.433	0.327	0.76
Front	GSM850	0.283	0.095	0.378
Back	GSM1900	0.212	0.327	0.539
Front	GSM1900	0.544	0.095	0.639
Back	WCDMA Band 2	0.326	0.327	0.653
Front	WCDMA Band 2	0.881	0.095	0.976
Back	WCDMA Band 5	0.372	0.327	0.699
Front	WCDMA Band 5	0.266	0.095	0.361
Back	WCDMA Band 4	0.326	0.327	0.653
Front	WCDMA Band 4	0.680	0.095	0.775
Back	LTE Band 2	0.640	0.327	0.967
Front	LTE Band 2	1.405	0.095	<b>1.5</b>
Back	LTE Band 4	0.299	0.327	0.626
Front	LTE Band 4	0.460	0.095	0.555
Back	LTE Band 5	0.586	0.327	0.913
Front	LTE Band 5	0.399	0.095	0.494
Back	LTE Band 7	1.004	0.327	1.331
Front	LTE Band 7	1.204	0.095	1.299

**WWAN and Bluetooth**

Position	WWAN		Bluetooth	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	GSM850	0.433	0.084	0.517
Front	GSM850	0.283	0.084	0.367
Back	GSM1900	0.212	0.084	0.296
Front	GSM1900	0.544	0.084	0.628
Back	WCDMA Band 2	0.326	0.084	0.41
Front	WCDMA Band 2	0.881	0.084	0.965
Back	WCDMA Band 5	0.372	0.084	0.456
Front	WCDMA Band 5	0.266	0.084	0.35
Back	WCDMA Band 4	0.326	0.084	0.41
Front	WCDMA Band 4	0.680	0.084	0.764
Back	LTE Band 2	0.640	0.084	0.724
Front	LTE Band 2	1.405	0.084	<b>1.489</b>
Back	LTE Band 4	0.299	0.084	0.383
Front	LTE Band 4	0.460	0.084	0.544



Back	LTE Band 5	0.586	0.084	0.67
Front	LTE Band 5	0.399	0.084	0.483
Back	LTE Band 7	1.004	0.084	1.088
Front	LTE Band 7	1.204	0.084	1.288

### Hotspot SAR

#### WWAN and WLAN

Position	WWAN		WLAN	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	GSM850	0.736	0.327	1.063
Front	GSM850	0.520	0.095	0.615
Top side	GSM850	--	0.098	0.098
Bottom side	GSM850	0.340	--	0.340
Right side	GSM850	--	0.029	0.029
Left side	GSM850	0.174	--	0.174
Back	GSM1900	0.359	0.327	0.686
Front	GSM1900	0.799	0.095	0.894
Top side	GSM1900	--	0.098	0.098
Bottom side	GSM1900	0.567	--	0.567
Right side	GSM1900	--	0.029	0.029
Left side	GSM1900	0.102	--	0.102
Back	WCDMA Band 2	0.326	0.327	0.653
Front	WCDMA Band 2	0.881	0.095	0.976
Top side	WCDMA Band 2	--	0.098	0.098
Bottom side	WCDMA Band 2	0.545	--	0.545
Right side	WCDMA Band 2	--	0.029	0.029
Left side	WCDMA Band 2	0.111	--	0.111
Back	WCDMA Band 5	0.372	0.327	0.699
Front	WCDMA Band 5	0.266	0.095	0.361
Top side	WCDMA Band 5	--	0.098	0.098
Bottom side	WCDMA Band 5	0.216	--	0.216
Right side	WCDMA Band 5	--	0.029	0.029
Left side	WCDMA Band 5	0.089	--	0.089
Back	WCDMA Band 4	0.326	0.327	0.653
Front	WCDMA Band 4	0.680	0.095	0.775
Top side	WCDMA Band 4	--	0.098	0.098
Bottom side	WCDMA Band 4	0.481	--	0.481
Right side	WCDMA Band 4	--	0.029	0.029
Left side	WCDMA Band 4	0.139	--	0.139
Back	LTE Band 2	0.640	0.327	0.967
Front	LTE Band 2	1.405	0.095	1.5
Top side	LTE Band 2	--	0.098	0.098

Bottom side	LTE Band 2	0.991	--	0.991
Right side	LTE Band 2	--	0.029	0.029
Left side	LTE Band 2	0.333	--	0.333
Back	LTE Band 4	0.299	0.327	0.626
Front	LTE Band 4	0.460	0.095	0.555
Top side	LTE Band 4	--	0.098	0.098
Bottom side	LTE Band 4	0.430	--	0.430
Right side	LTE Band 4	--	0.029	0.029
Left side	LTE Band 4	0.102	--	0.102
Back	LTE Band 5	0.586	0.327	0.913
Front	LTE Band 5	0.399	0.095	0.494
Top side	LTE Band 5	--	0.098	0.098
Bottom side	LTE Band 5	0.316	--	0.316
Right side	LTE Band 5	--	0.029	0.029
Left side	LTE Band 5	0.138	--	0.138
Back	LTE Band 7	1.204	0.327	<b>1.531</b>
Front	LTE Band 7	0.440	0.095	0.535
Top side	LTE Band 7	--	0.098	0.098
Bottom side	LTE Band 7	1.344	--	1.344
Right side	LTE Band 7	--	0.029	0.029
Left side	LTE Band 7	0.260	--	0.260

## 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: 08/13/2018

Measurement duration: 7 minutes 21 seconds

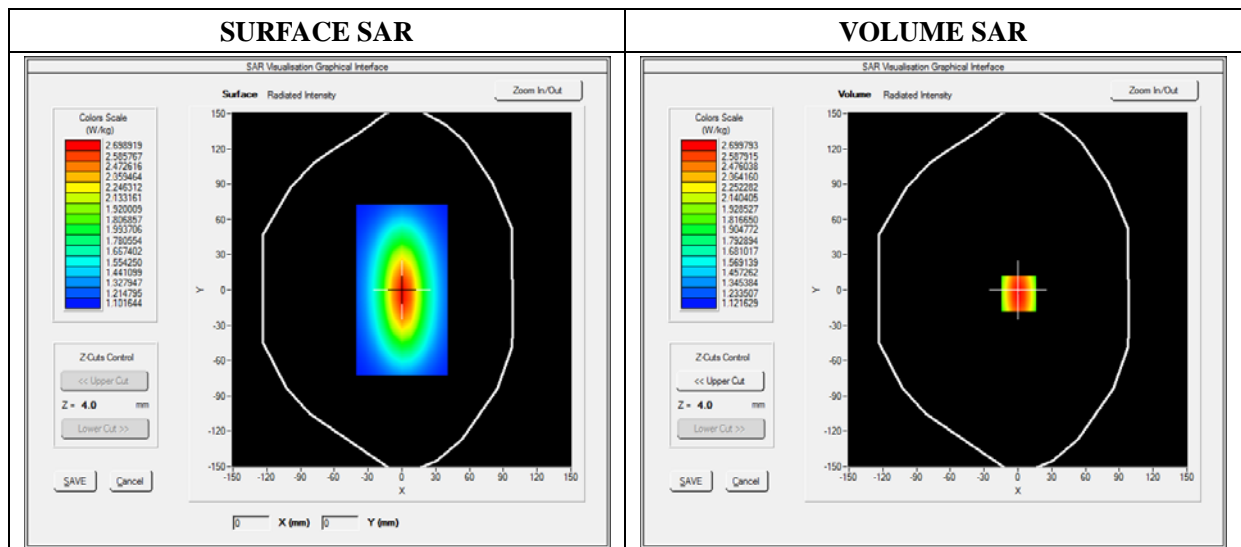
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.93; Calibrated: 06/01/2018

### A. Experimental conditions

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

### B. SAR Measurement Results

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

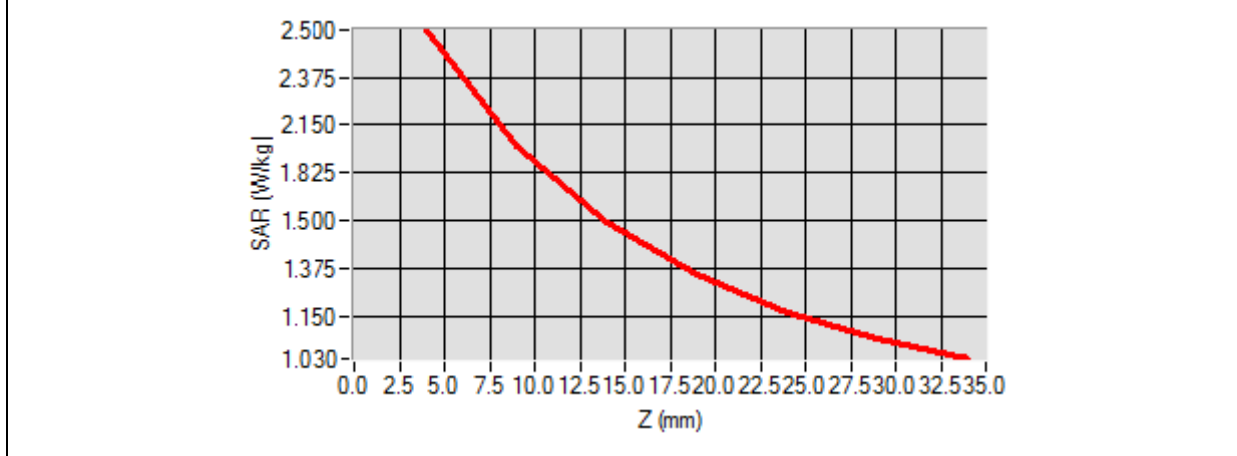


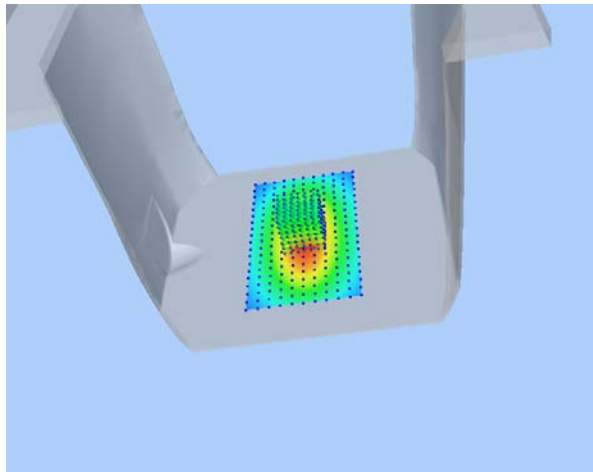
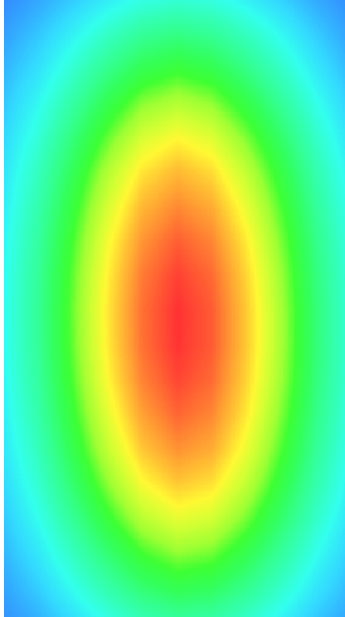
Maximum location: X=0.00, Y=0.00

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

Z Axis Scan

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



3D screen shot	Hot spot position
	

## MEASUREMENT 2

### For Head Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/14/2018

Measurement duration: 12 minutes 21 seconds

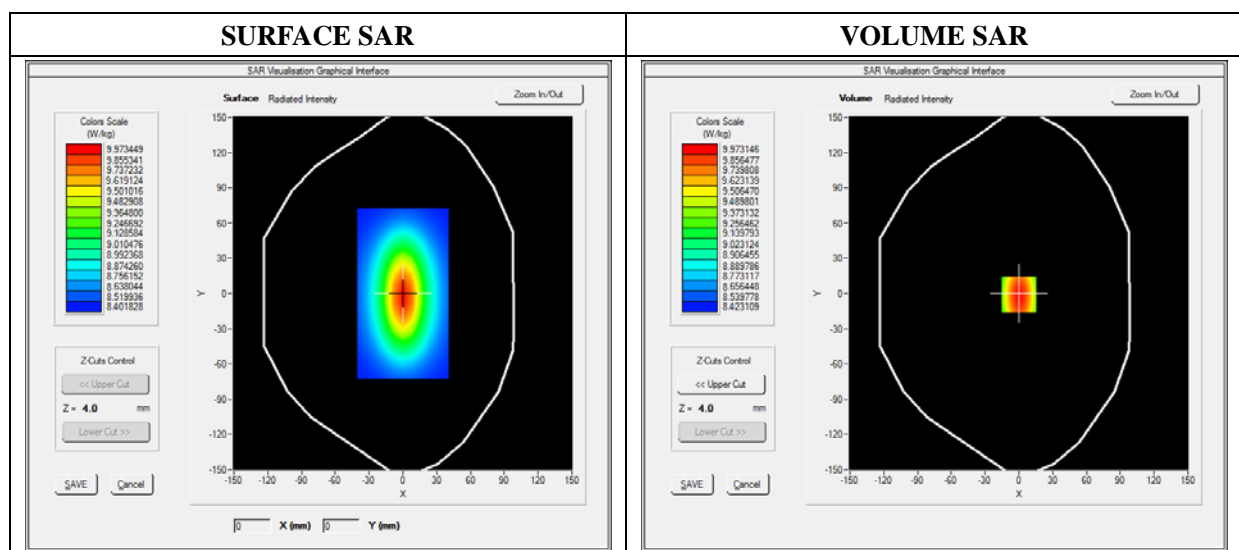
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.84; Calibrated: 06/01/2018

### 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



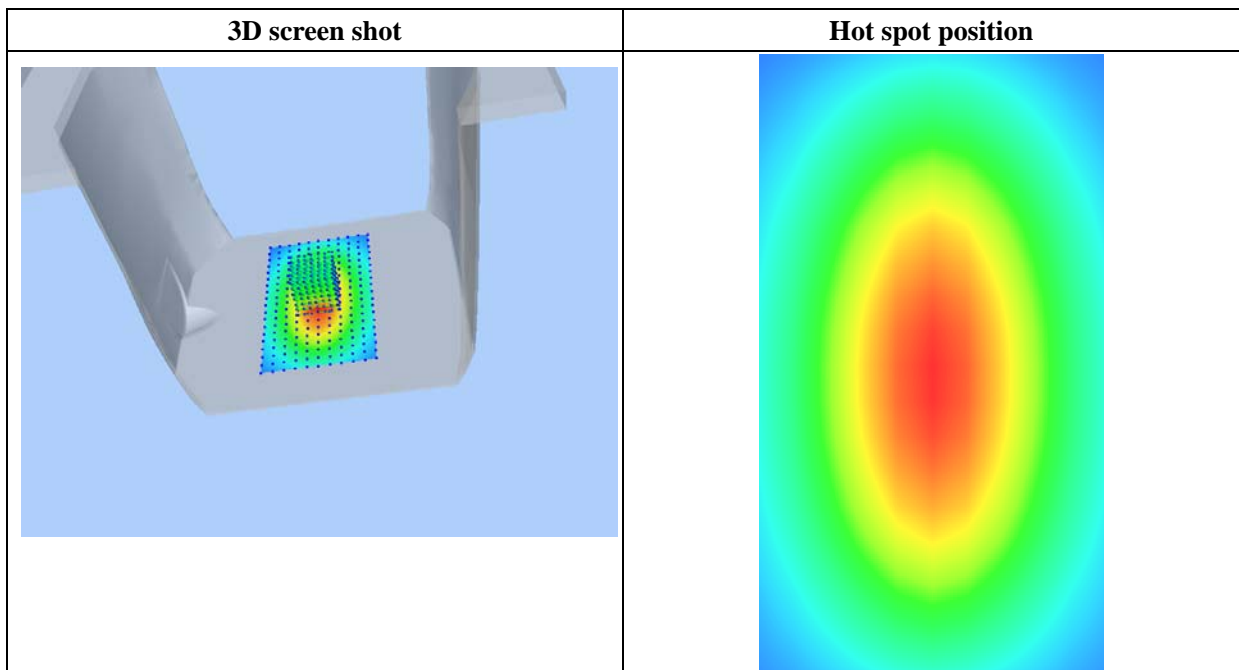
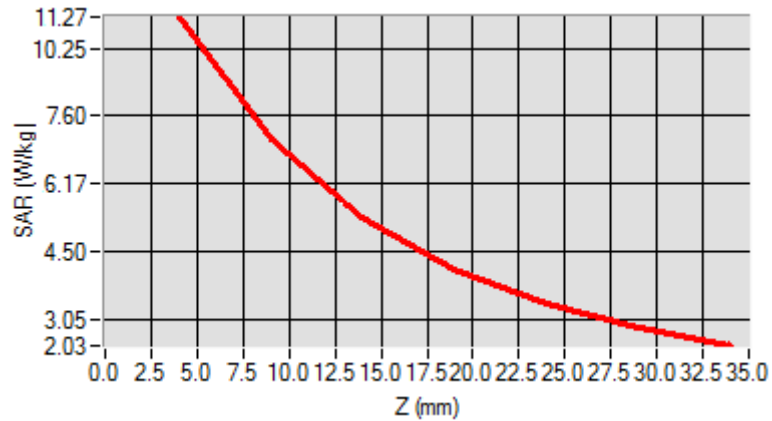


Maximum location: X=0.00, Y=0.00

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



## MEASUREMENT 3

### For Head Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/14/2018

Measurement duration: 12 minutes 21 seconds

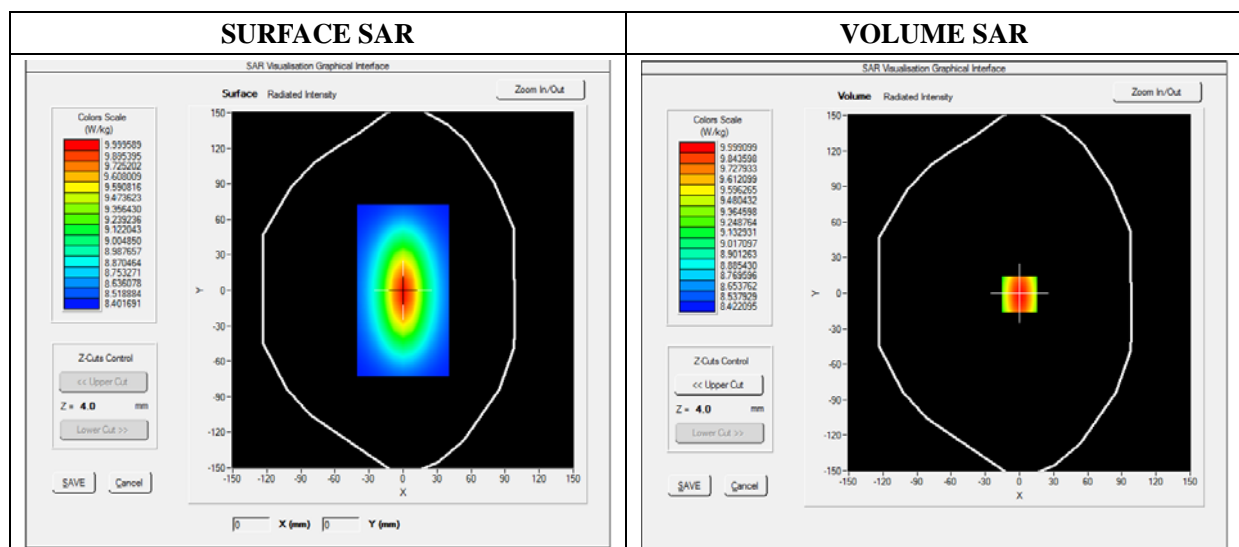
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2018

### 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

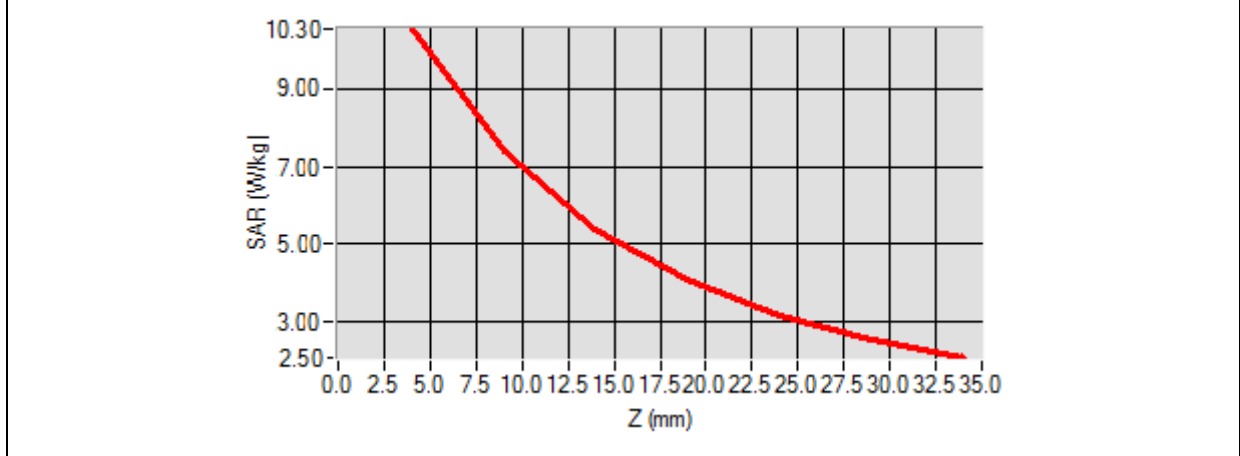


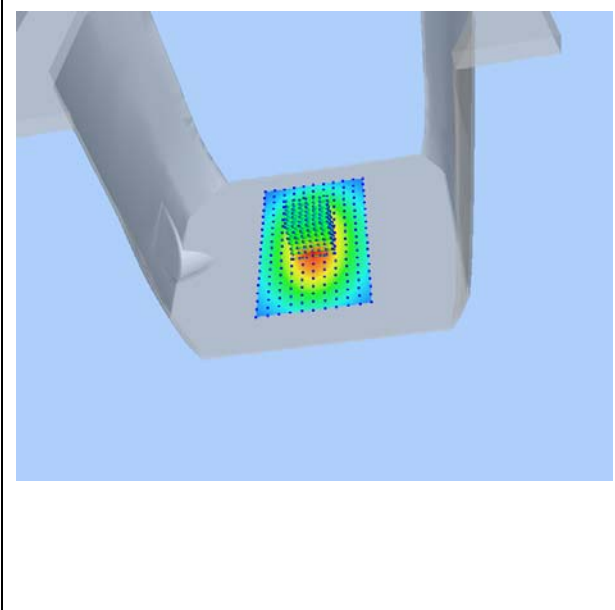
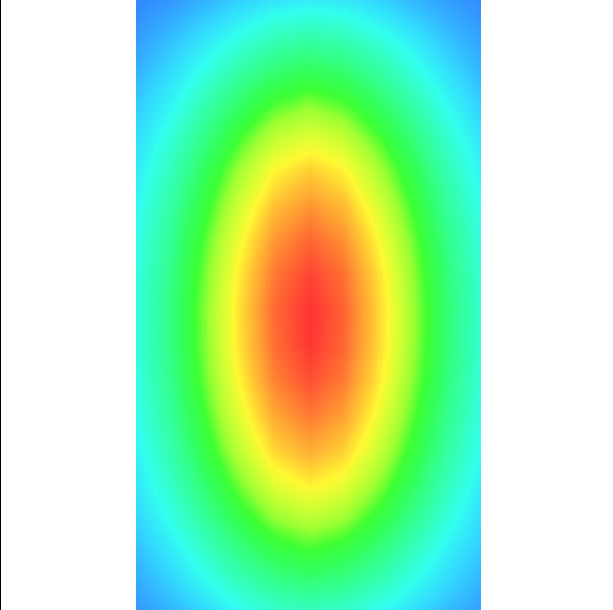
Maximum location: X=0.00, Y=0.00

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: 08/15/2018

Measurement duration: 12 minutes 21 seconds

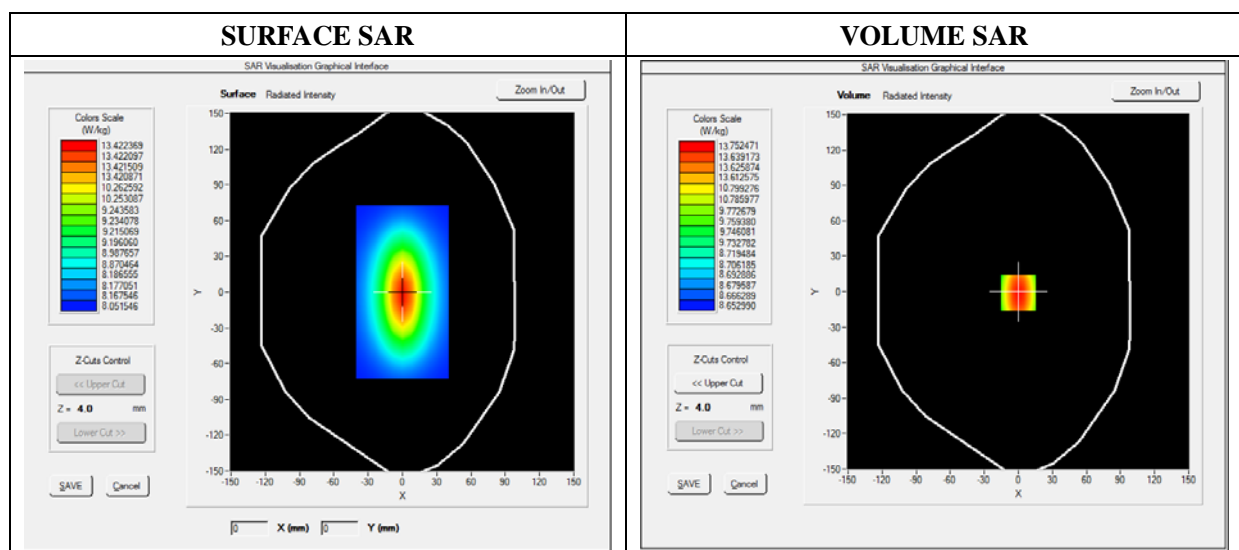
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.64; Calibrated: 06/01/2018

### 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

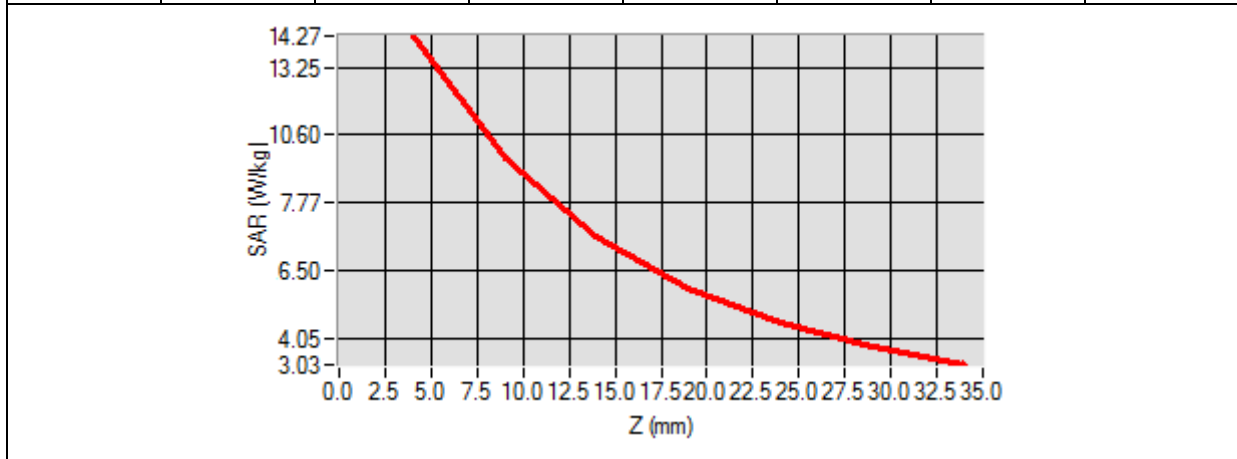


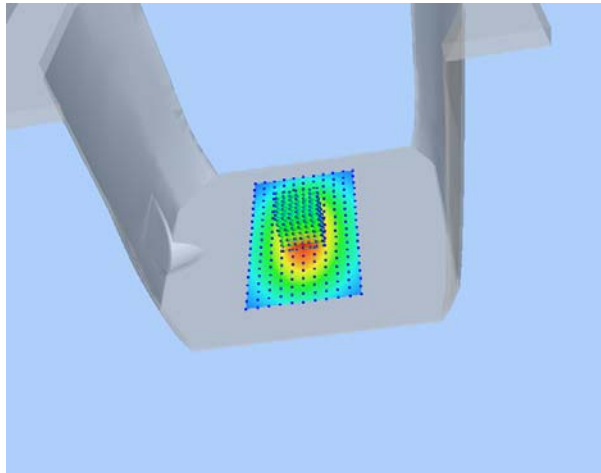
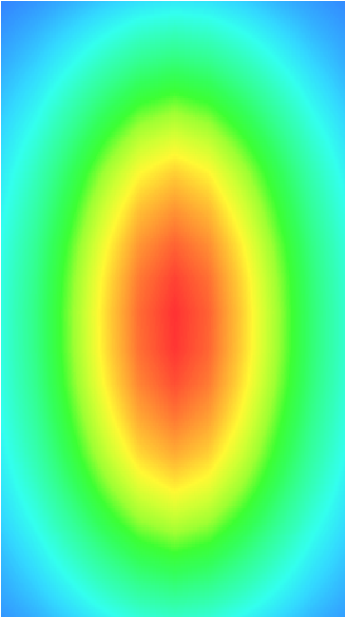
Maximum location: X=0.00, Y=0.00

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: 08/15/2018

Measurement duration: 12 minutes 21 seconds

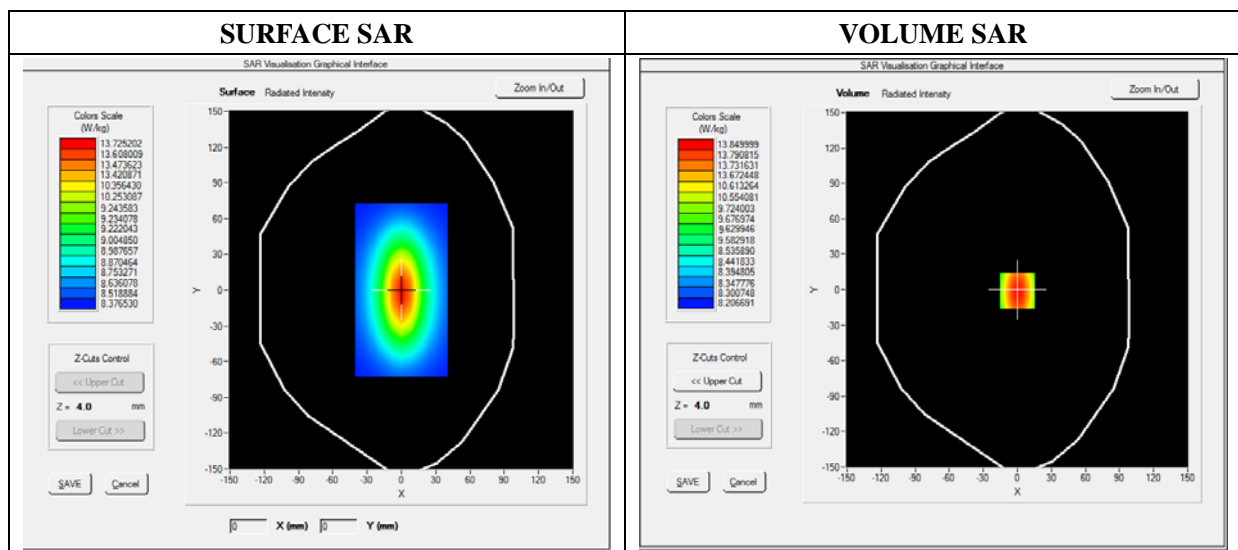
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.37; Calibrated: 06/01/2018

### 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

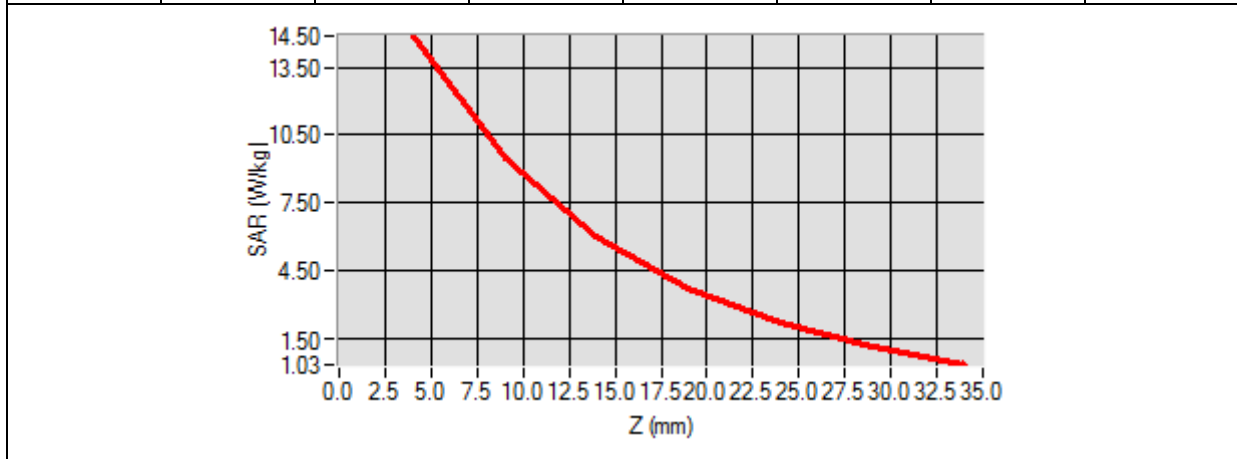


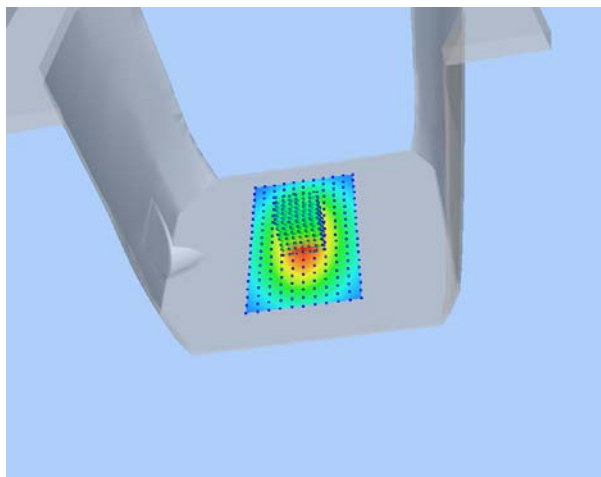
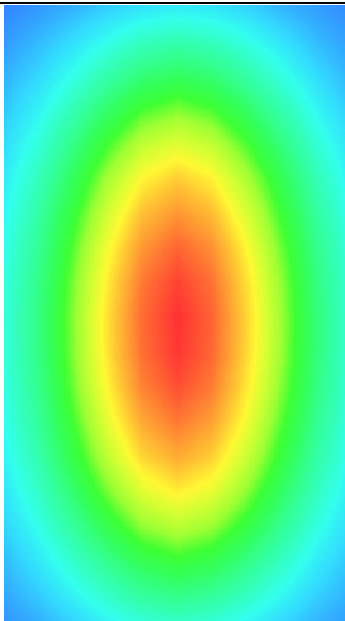
Maximum location: X=0.00, Y=0.00

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: 08/13/2018

Measurement duration: 12 minutes 21 seconds

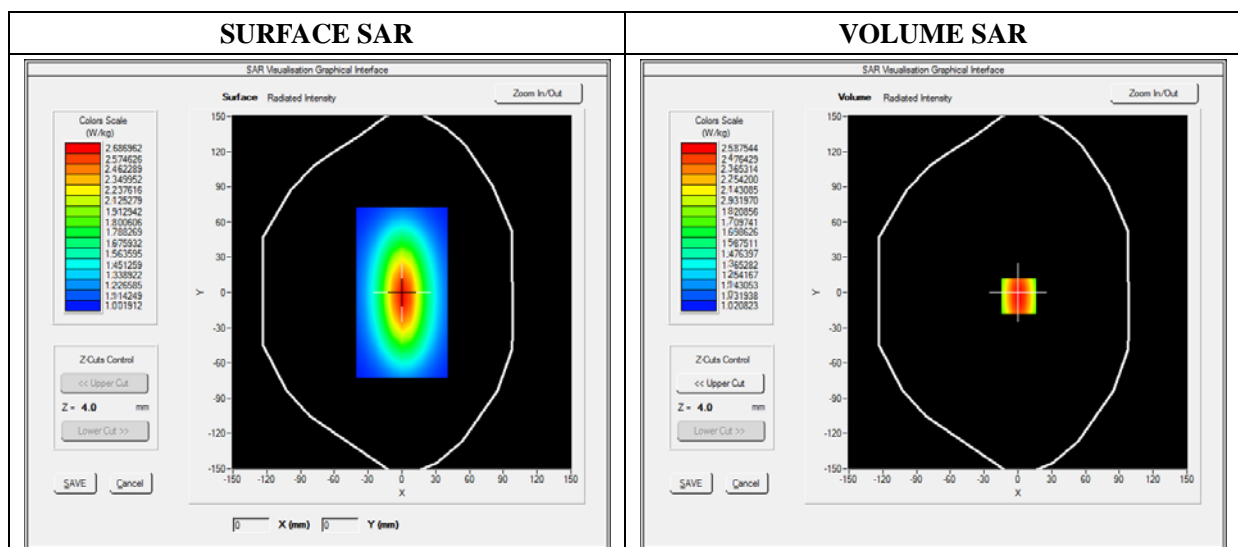
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 06/01/2018

### A. Experimental conditions

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

### B. SAR Measurement Results

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



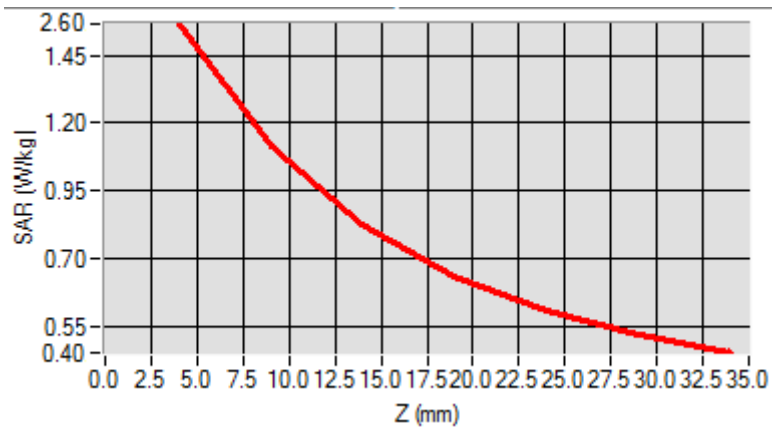


Maximum location: X=0.00, Y=0.00

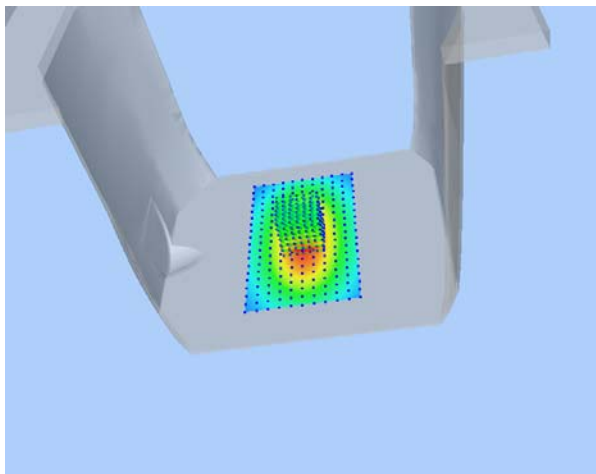
SAR 10g (W/Kg)	1.028956
SAR 1g (W/Kg)	2.354211

Z Axis Scan

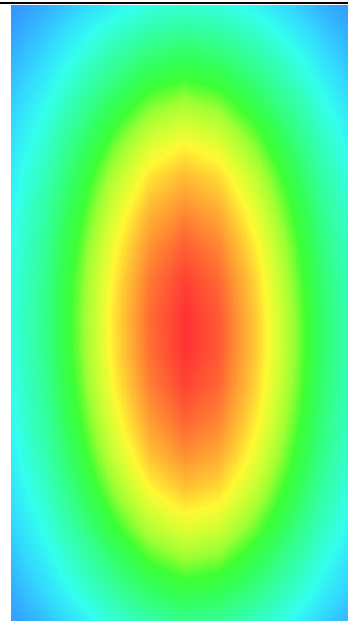
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	2.5789	1.1300	0.8795	0.5940	0.5011	0.5100



3D screen shot



Hot spot position



# MEASUREMENT 7

## For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/14/2018

Measurement duration: 12 minutes 21 seconds

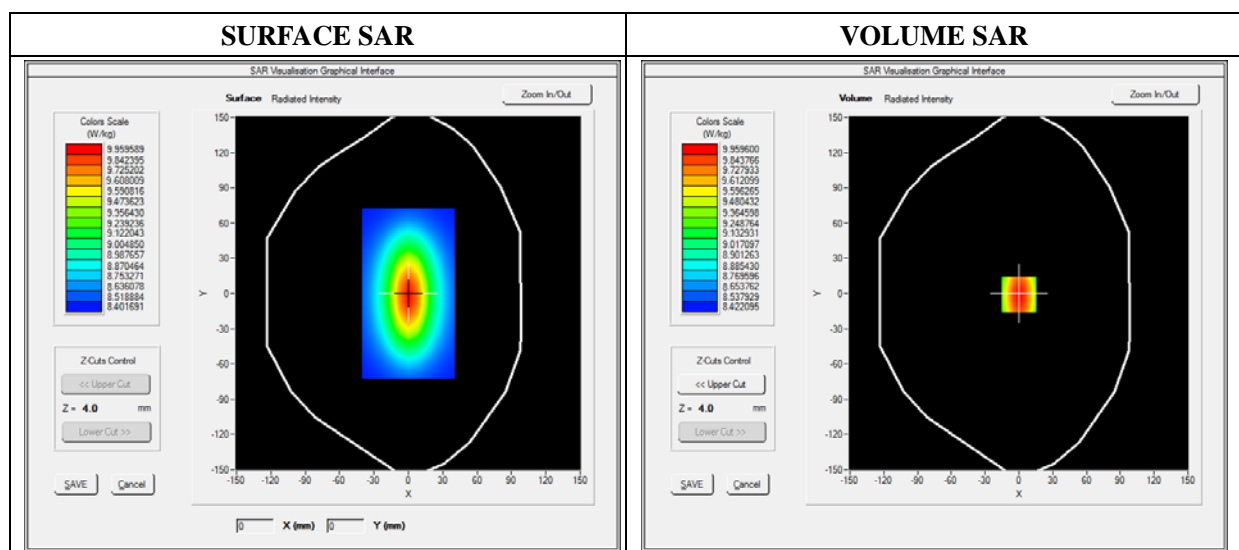
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.06; Calibrated: 06/01/2018

### 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

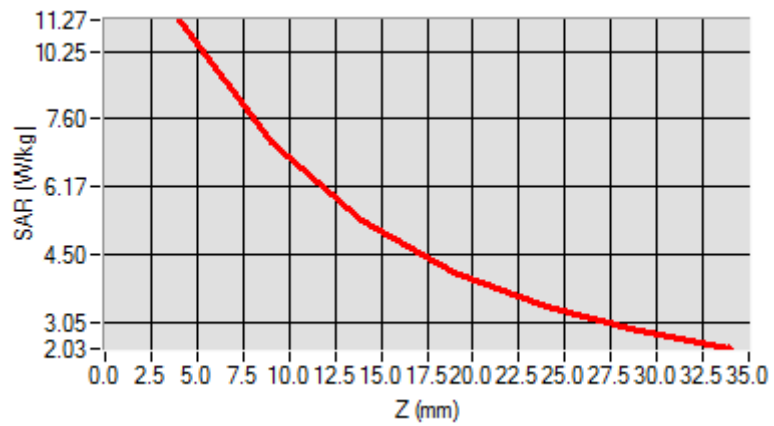


Maximum location: X=0.00, Y=0.00

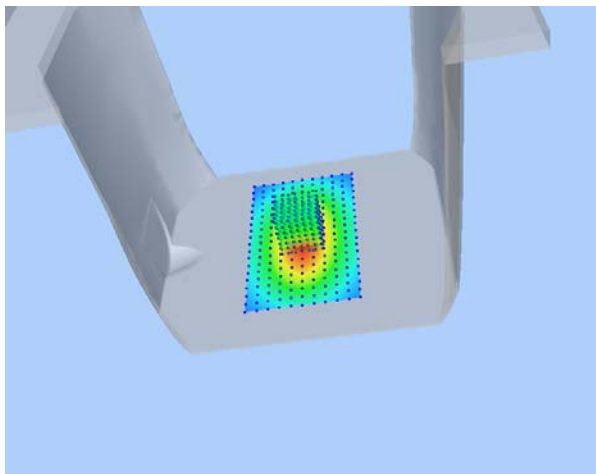
SAR 10g (W/Kg)	5.221202
SAR 1g (W/Kg)	9.582560

Z Axis Scan

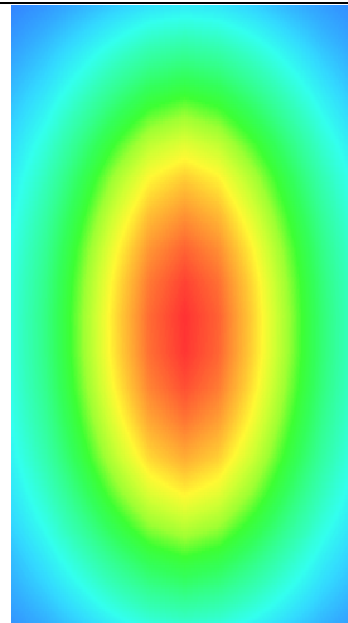
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	11.2425	9.4123	8.0345	6.9125	6.3092	3.9460



3D screen shot



Hot spot position



# MEASUREMENT 8

## For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/14/2018

Measurement duration: 12 minutes 21 seconds

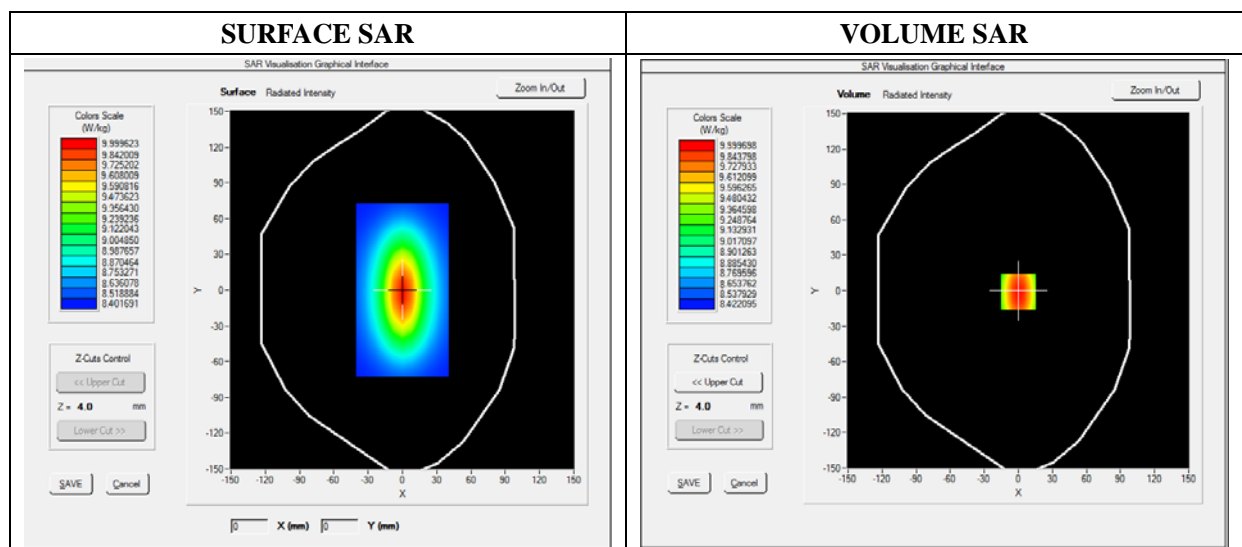
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2018

### 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

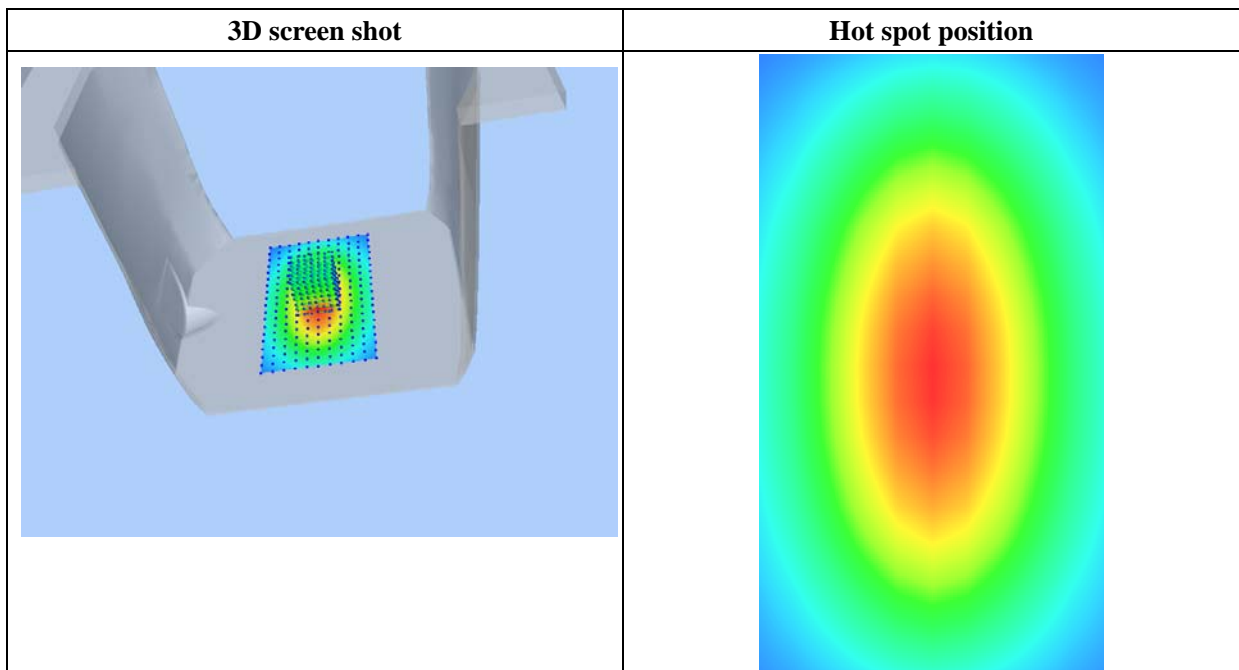
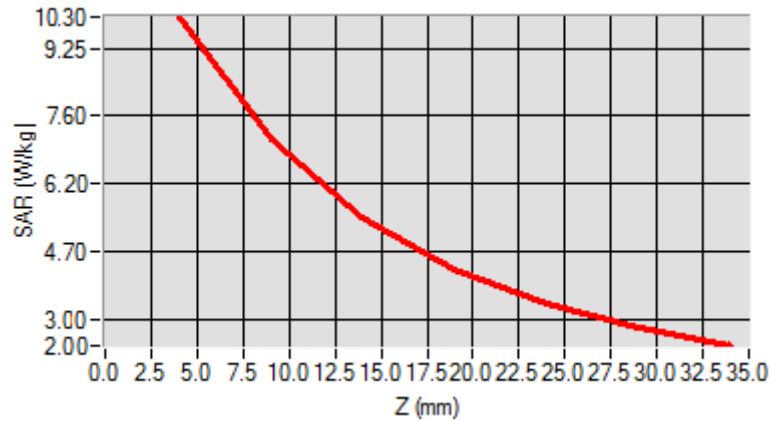


Maximum location: X=0.00, Y=0.00

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



# MEASUREMENT 9

## For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/15/2018

Measurement duration: 12 minutes 21 seconds

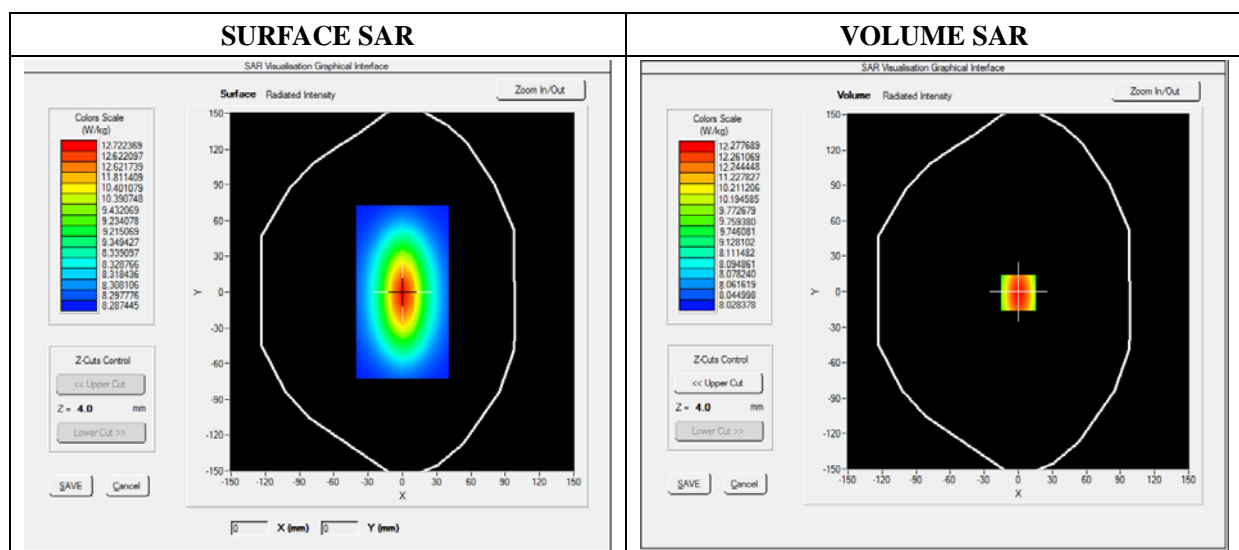
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.80; Calibrated: 06/01/2018

### A. Experimental conditions

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

### B. SAR Measurement Results

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

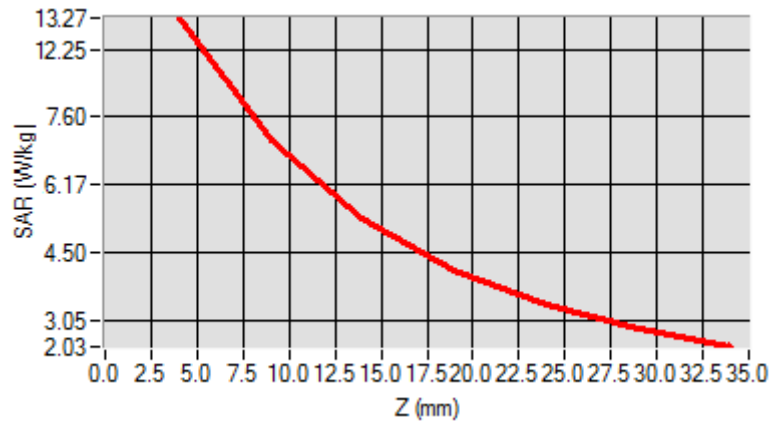


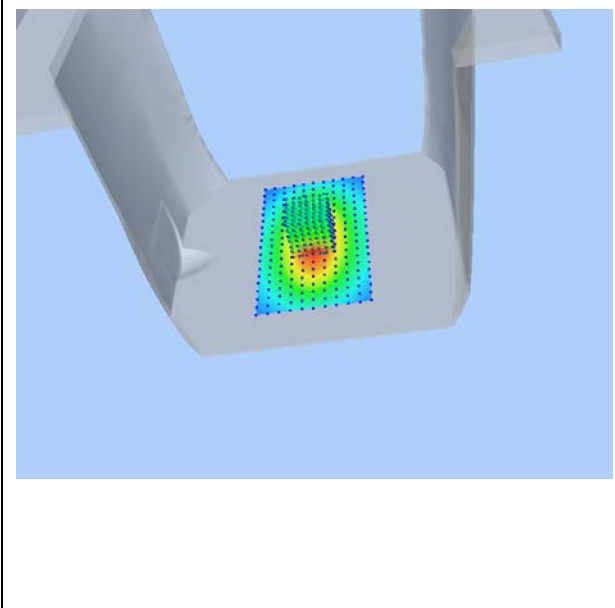
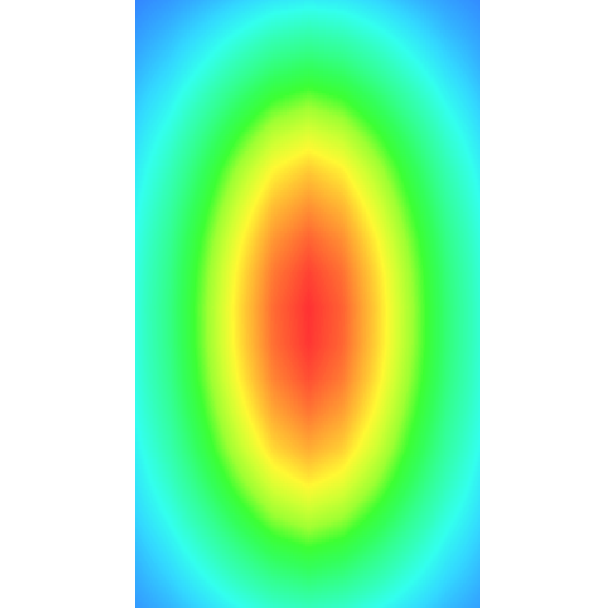
Maximum location: X=0.00, Y=0.00

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

Z Axis Scan

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



3D screen shot	Hot spot position
	

# MEASUREMENT 10

## For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/15/2018

Measurement duration: 12 minutes 21 seconds

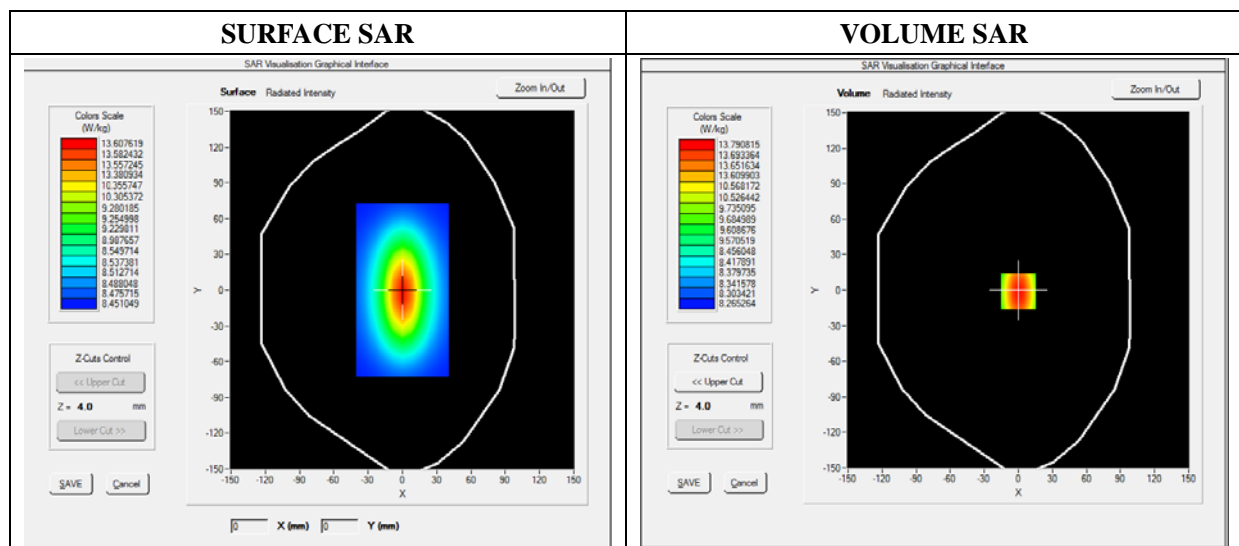
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.58; Calibrated: 06/01/2018

### 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



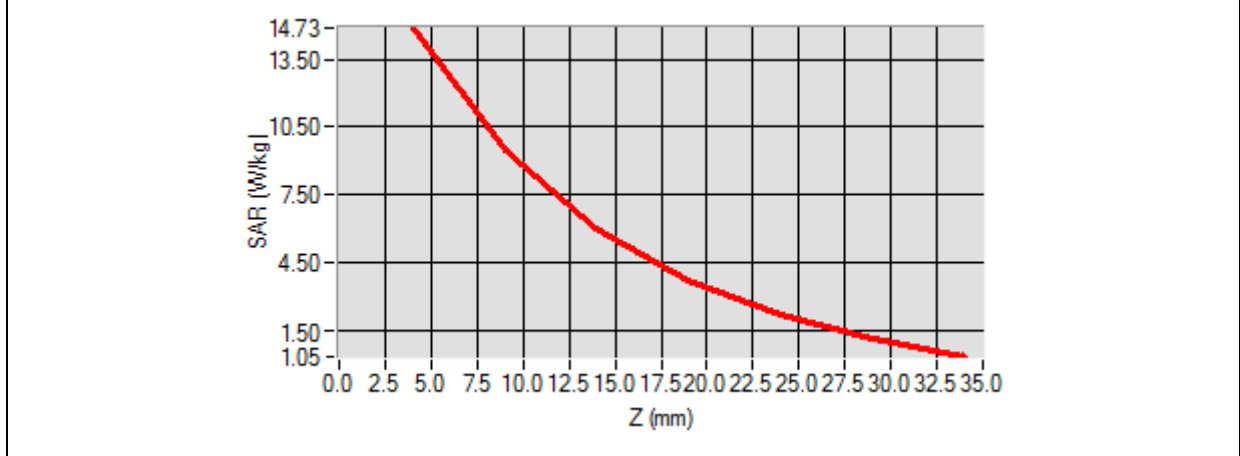


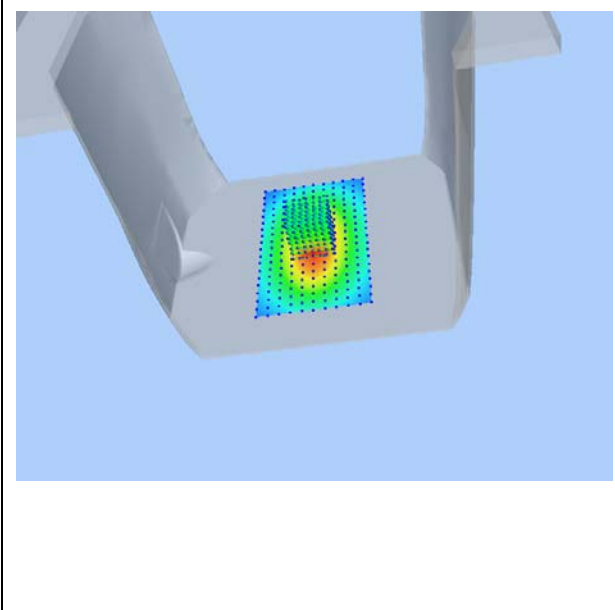
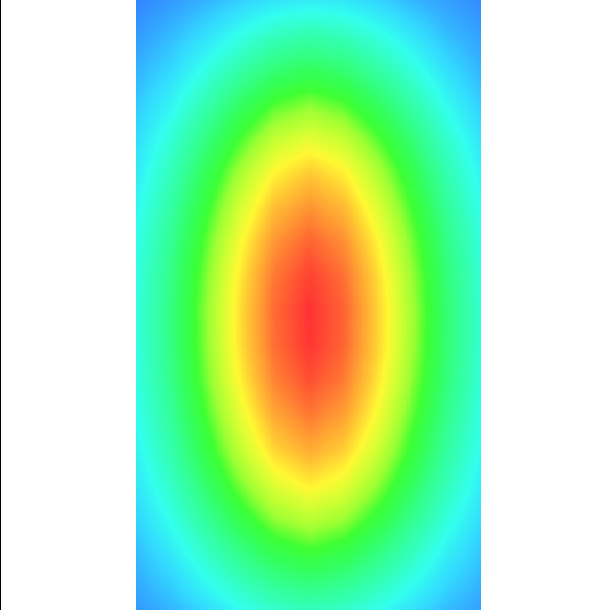
Maximum location: X=0.00, Y=0.00

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 Low Channel in GSM mode
Phone	GSM1900	<u>Measurement 7:</u> Left Head with Cheek device position on Low Channel in GSM mode
Phone	GPRS850_4TX	<u>Measurement 11:</u> Left Head with Cheek device position on Low Channel in GPRS mode
Phone	GPRS1900_4TX	<u>Measurement 15:</u> Left Head with Cheek device position on Low Channel in GPRS mode
Phone	WCDMA1900_RMC	<u>Measurement 19:</u> Left Head with Cheek device position on Low Channel in WCDMA mode
Phone	WCDMA850_RMC	<u>Measurement 23:</u> Left Head with Cheek device position on Middle Channel in WCDMA mode
Phone	WCDMA1700_RMC	<u>Measurement 27:</u> Left Head with Cheek device position on High Channel in WCDMA mode
Phone	LTE Band 2_RMC	<u>Measurement 31:</u> Left Head with Cheek device position on Low Channel in LTE mode
Phone	LTE Band 4_RMC	<u>Measurement 42:</u> Left Head with Cheek device position on High Channel in LTE mode
Phone	LTE Band 5_RMC	<u>Measurement 50:</u> Left Head with Cheek device position on Low Channel in LTE mode
Phone	LTE Band 7_RMC	<u>Measurement 58:</u> Left Head with Cheek device position on High Channel in LTE mode
Phone	WiFi_802.11b	<u>Measurement 64:</u> Right Head with Cheek device position on High Channel in 802.11b mode
Phone	GSM850	<u>Measurement 68:</u> Flat Plane with Back(Body-worn) device position on Low Channel in GSM mode
Phone	GSM1900	<u>Measurement 71:</u> Flat Plane with Front(Body-worn) device position on Low Channel in GSM mode
Phone	GPRS850_4TX	<u>Measurement 72:</u> Flat Plane with Back device position on Low Channel in GPRS mode
Phone	GPRS1900_4TX	<u>Measurement77:</u> Flat Plane with Front device position on Low Channel in GPRS mode
Phone	WCDMA1900_RMC	<u>Measurement 81:</u> Flat Plane with Front side device position on Low Channel in WCDMA mode
Phone	WCDMA850_RMC	<u>Measurement 86:</u> Flat Plane with Back device position on Middle Channel in WCDMA mode
Phone	WCDMA1700_RMC	<u>Measurement 91:</u> Flat Plane with Front device position on High Channel in WCDMA mode

<b>Phone</b>	<b>LTE Band 2_RMC</b>	<u>Measurement 96: Flat Plane with Front device position on Middle Channel in LTE mode</u>
<b>Phone</b>	<b>LTE Band 4_RMC</b>	<u>Measurement 111: Flat Plane with Front device position on High Channel in LTE mode</u>
<b>Phone</b>	<b>LTE Band 5_RMC</b>	<u>Measurement 118: Flat Plane with Back device position on Low Channel in LTE mode</u>
<b>Phone</b>	<b>LTE Band 7_RMC</b>	<u>Measurement 127: Flat Plane with Back device position on Low Channel in LTE mode</u>
<b>Phone</b>	<b>LTE Band 7_RMC</b>	<u>Measurement 132: Flat Plane with Bottom device position on Middle Channel in LTE mode</u>
<b>Phone</b>	<b>WiFi_802.11b</b>	<u>Measurement 142: Flat Plane with Back side device position on High Channel in 802.11b mode</u>
<i>Remark: SAR plot is showed the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.</i>		

**Extremity SAR**

<u><b>TYPE</b></u>	<u><b>BAND</b></u>	<u><b>PARAMETERS</b></u>
<b>Phone</b>	<b>LTE Band 2_RMC</b>	<u>Measurement 146: Flat Plane with Front device position on Low Channel in LTE mode</u>
<b>Phone</b>	<b>LTE Band 7_RMC</b>	<u>Measurement 151: Flat Plane with Back device position on Middle Channel in LTE mode</u>
<i>Remark: SAR plot is showed the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.</i>		

## MEASUREMENT 3

Type: Phone measurement (Complete)

Date of measurement: 08/13/2018

Measurement duration: 11 minutes 48 seconds

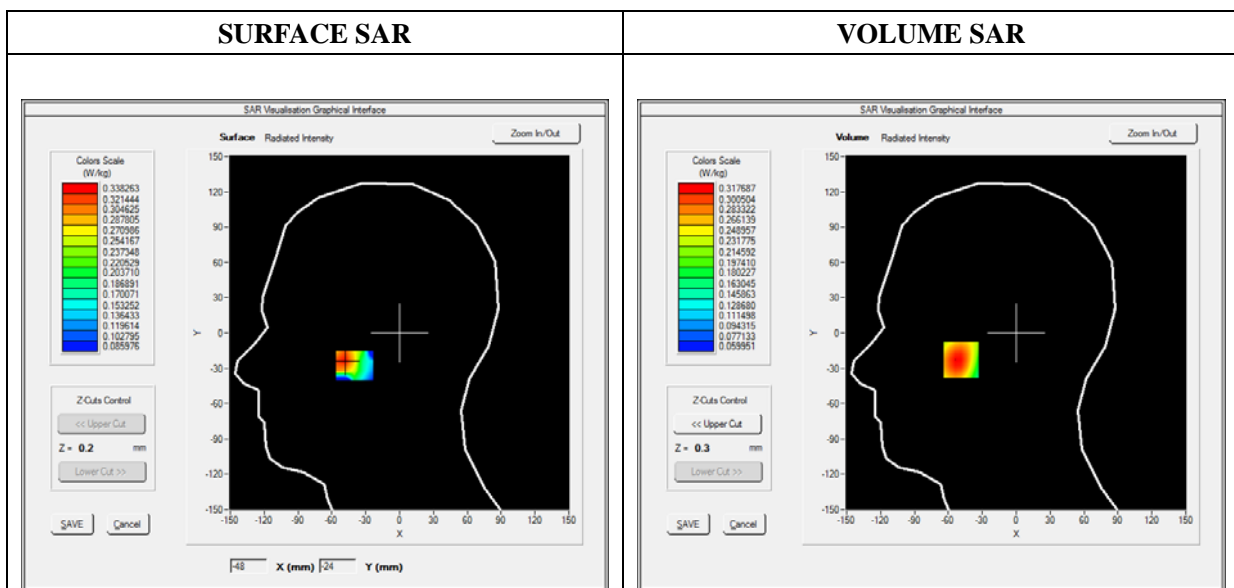
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.93; Calibrated: 06/01/2018

### 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>	Low
<b>Signal</b>	TDMA (Crest factor: 8.0)

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	824.200000
<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

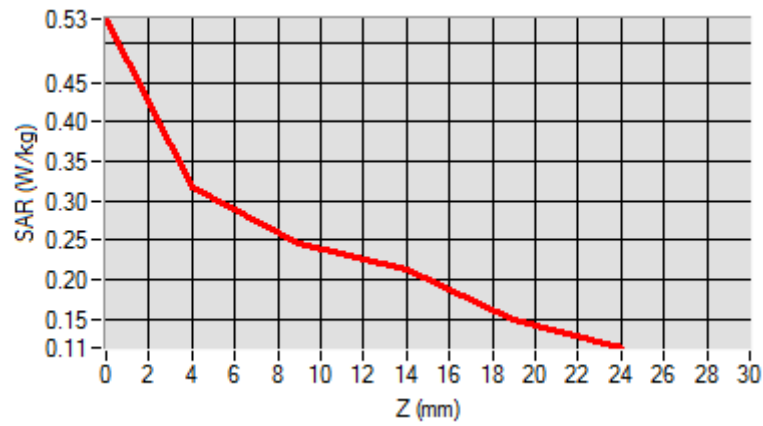


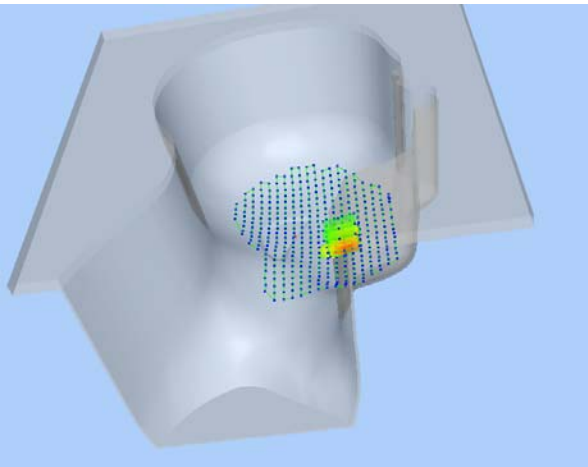

Maximum location: X=-49.00, Y=-23.00

SAR Peak: 0.36 W/kg

SAR 10g (W/Kg)	0.230463
SAR 1g (W/Kg)	0.307441

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.5300	0.3177	0.2455	0.2120	0.1488



3D screen shot	Hot spot position
	

# MEASUREMENT 7

Type: Phone measurement (Complete)

Date of measurement: 08/14/2018

Measurement duration: 11 minutes 48 seconds

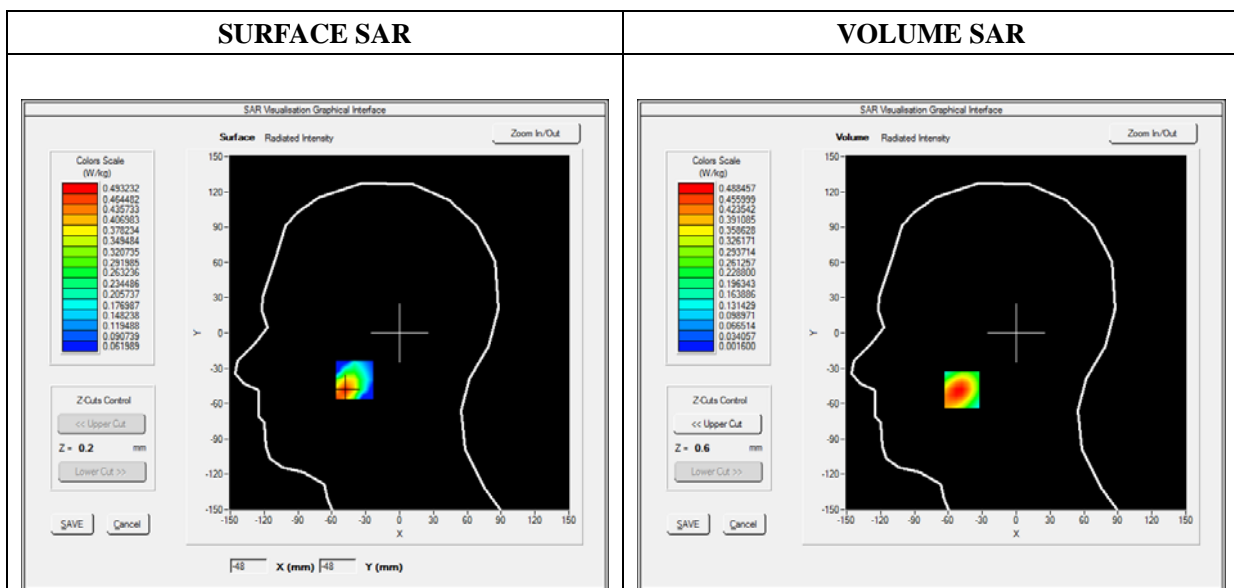
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2018

## A. Experimental conditions

Area Scan	sam_direct_droit2_surf8mm.txt
Phantom	Left head
Device Position	Cheek
Band	GSM1900
Channels	Low
Signal	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

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

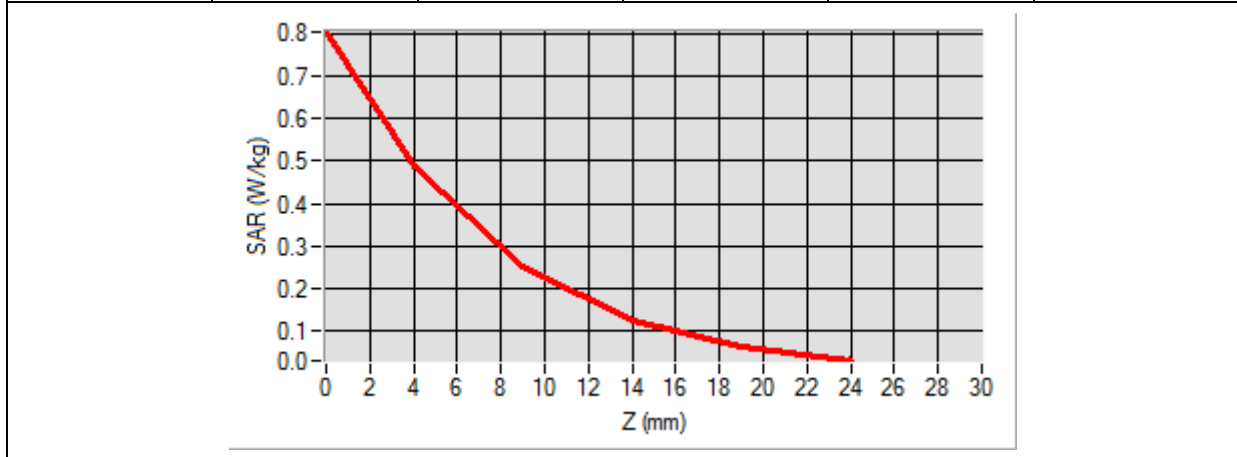


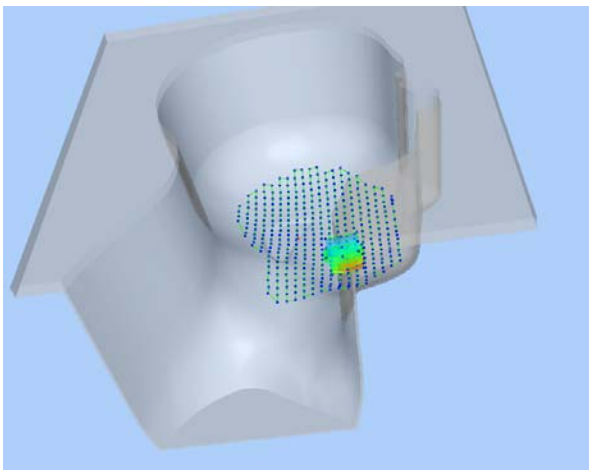
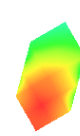
Maximum location: X=-48.00, Y=-48.00

SAR Peak: 0.81 W/kg

SAR 10g (W/Kg)	0.238008
SAR 1g (W/Kg)	0.458628

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.8057	0.4885	0.2485	0.1228	0.0611



3D screen shot	Hot spot position
	

# MEASUREMENT 11

Type: Phone measurement (Complete)

Date of measurement: 08/13/2018

Measurement duration: 12 minutes 3 seconds

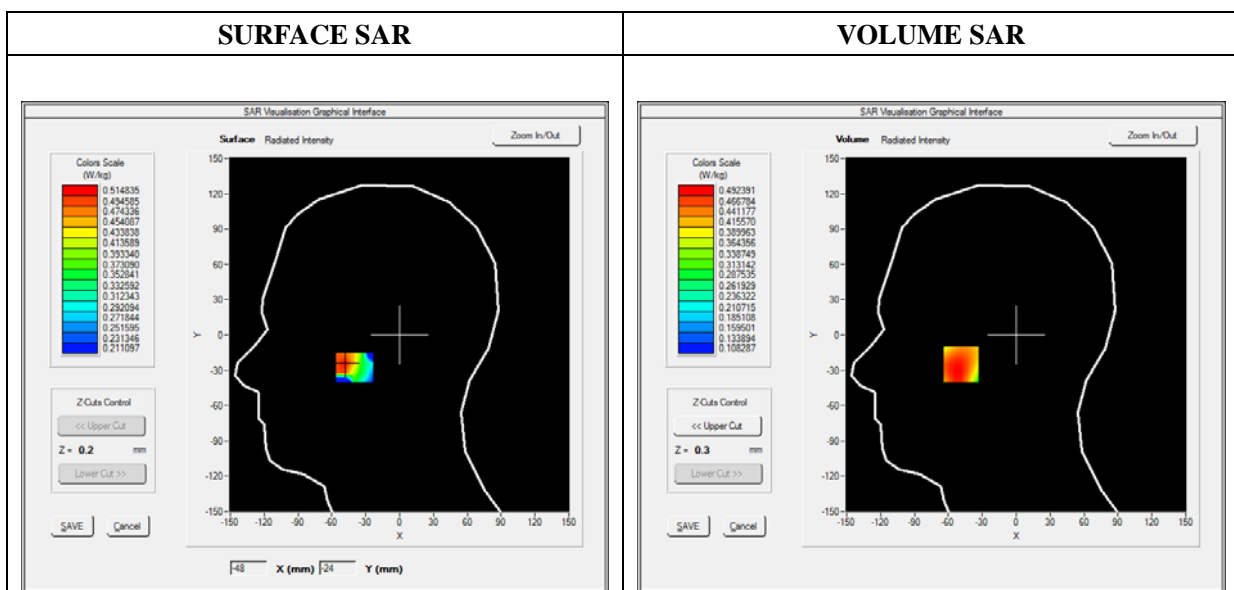
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2018

## A. Experimental conditions

Area Scan	sam_direct_droit2_surf8mm.txt
Phantom	Left head
Device Position	Cheek
Band	GPRS850_4TX
Channels	Low
Signal	Duty Cycle: 1:2

## B. SAR Measurement Results

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



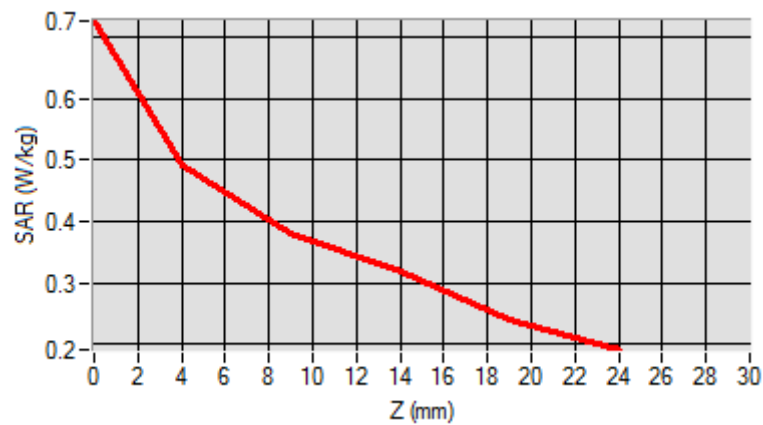


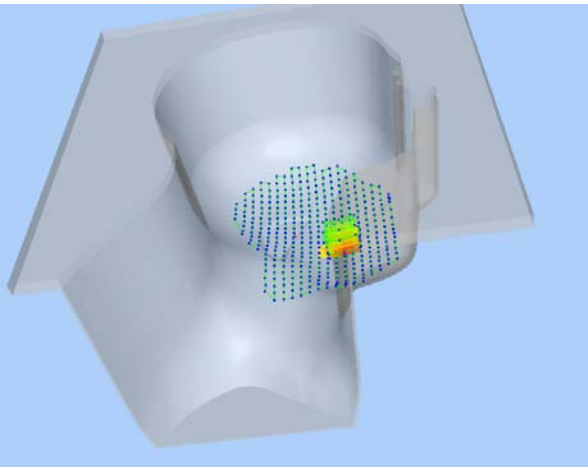

Maximum location: X=-49.00, Y=-25.00

SAR Peak: 0.61 W/kg

SAR 10g (W/Kg)	0.364691
SAR 1g (W/Kg)	0.479180

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.7256	0.4924	0.3809	0.3177	0.2403



3D screen shot	Hot spot position
	

# MEASUREMENT 15

Type: Phone measurement (Complete)

Date of measurement: 08/14/2018

Measurement duration: 12 minutes 3 seconds

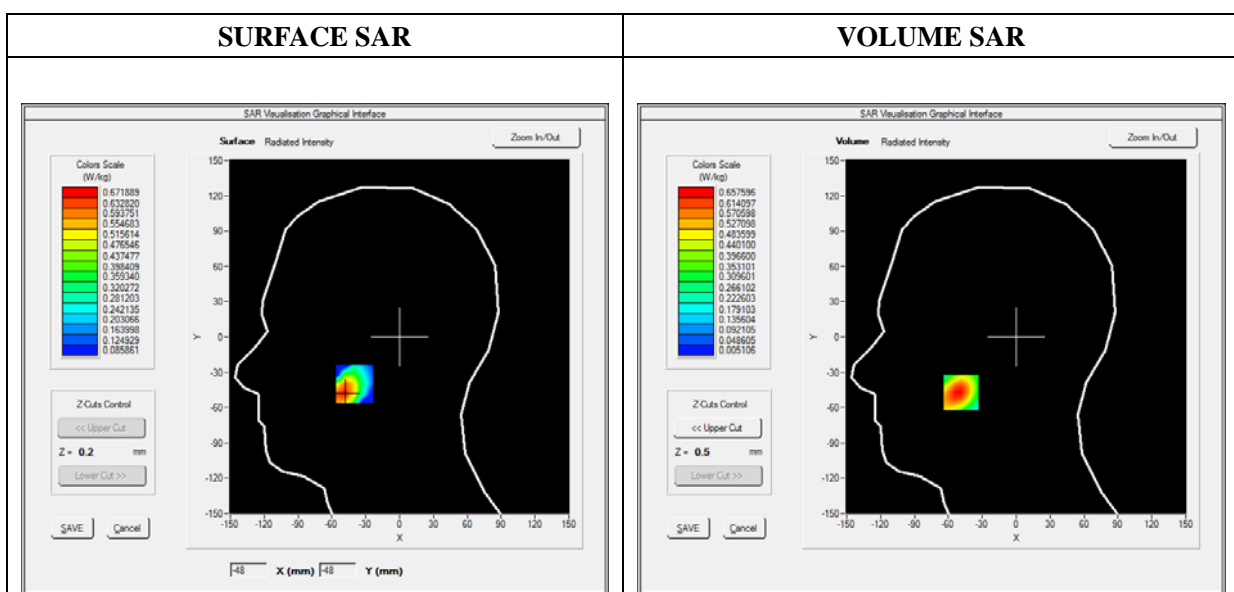
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2018

## 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_4TX
<b>Channels</b>	Low
<b>Signal</b>	Duty Cycle: 1:2

## B. SAR Measurement Results

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

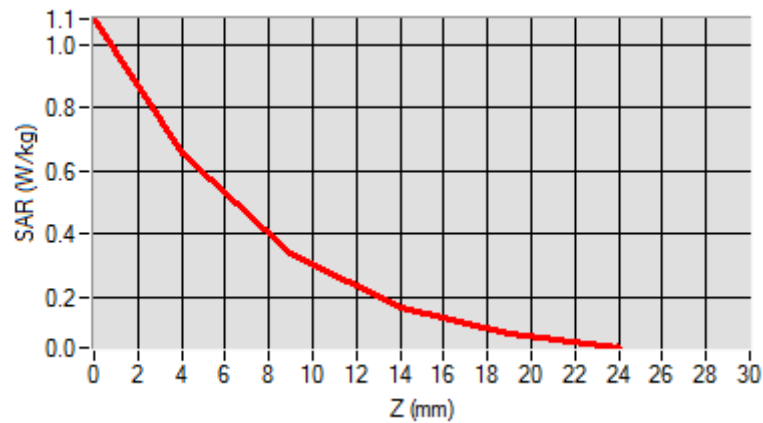


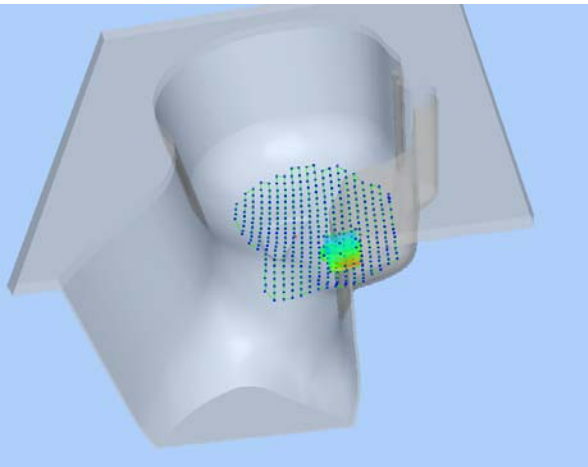
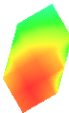
Maximum location: X=-49.00, Y=-47.00

SAR Peak: 1.09 W/kg

SAR 10g (W/Kg)	0.319320
SAR 1g (W/Kg)	0.616334

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.0814	0.6576	0.3366	0.1680	0.0850



3D screen shot	Hot spot position
	

# MEASUREMENT 19

Type: Phone measurement (Complete)

Date of measurement: 08/14/2018

Measurement duration: 12 minutes 3 seconds

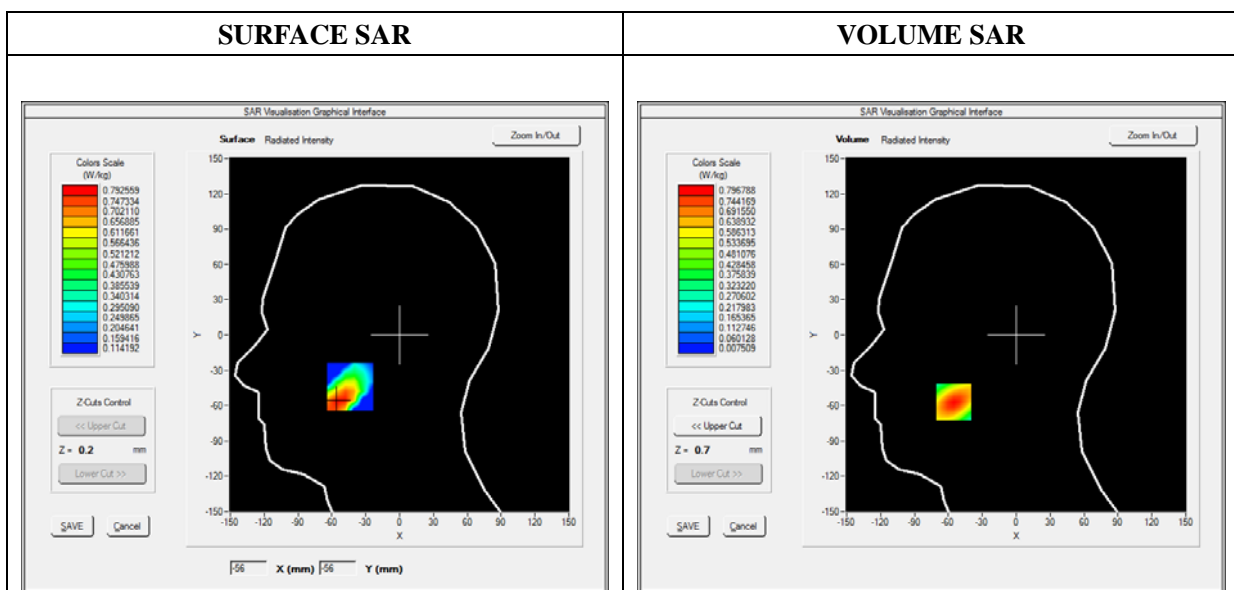
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2018

## 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>	Low
<b>Signal</b>	Duty Cycle 1:1

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	1852.400000
<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

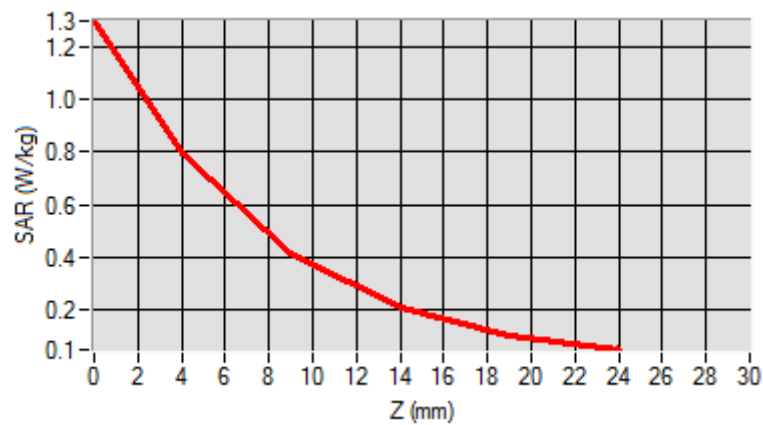


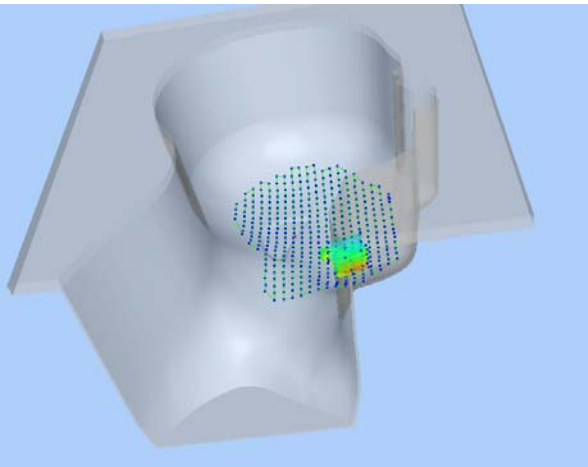
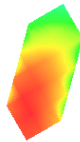
Maximum location: X=-55.00, Y=-57.00

SAR Peak: 1.30 W/kg

SAR 10g (W/Kg)	0.397949
SAR 1g (W/Kg)	0.743432

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.2968	0.7968	0.4142	0.2102	0.1077



3D screen shot	Hot spot position
	

## MEASUREMENT 23

Type: Phone measurement (Complete)

Date of measurement: 08/13/2018

Measurement duration: 12 minutes 3 seconds

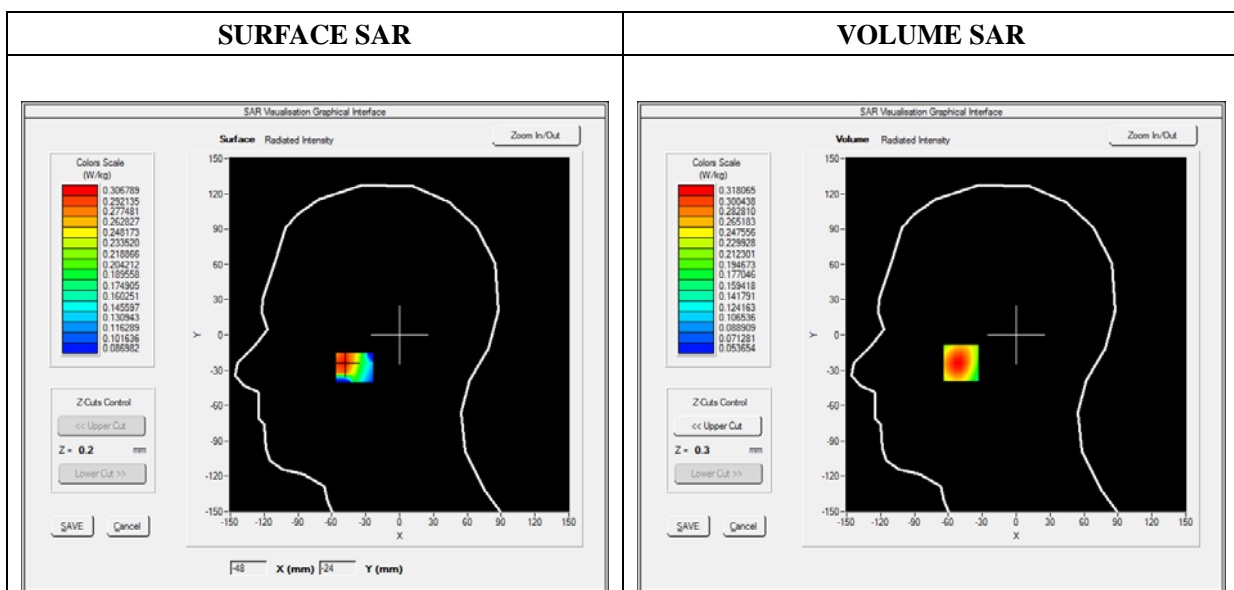
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.93; Calibrated: 06/01/2018

### 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>	Middle
<b>Signal</b>	Duty Cycle 1:1

### 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>	1.342427
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

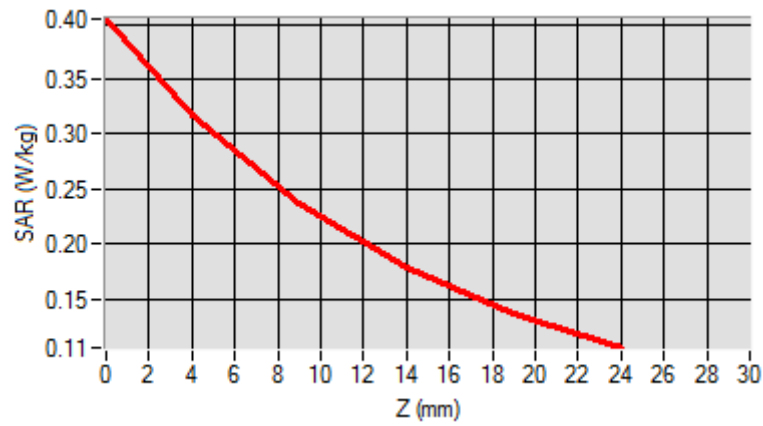


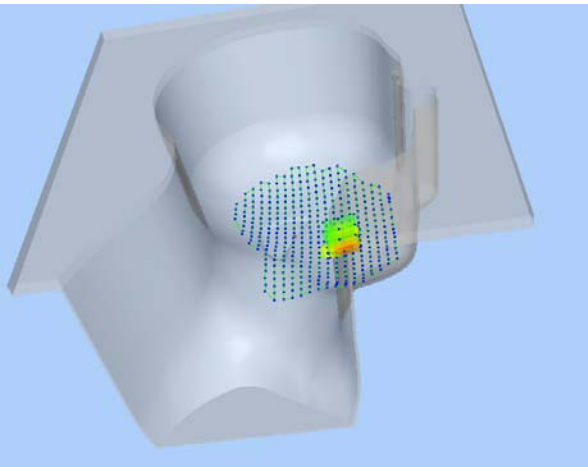

Maximum location: X=-49.00, Y=-24.00

SAR Peak: 0.41 W/kg

SAR 10g (W/Kg)	0.213411
SAR 1g (W/Kg)	0.304089

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.4046	0.3181	0.2365	0.1787	0.1379



3D screen shot	Hot spot position
	

## MEASUREMENT 27

Type: Phone measurement (Complete)

Date of measurement: 08/14/2018

Measurement duration: 12 minutes 3 seconds

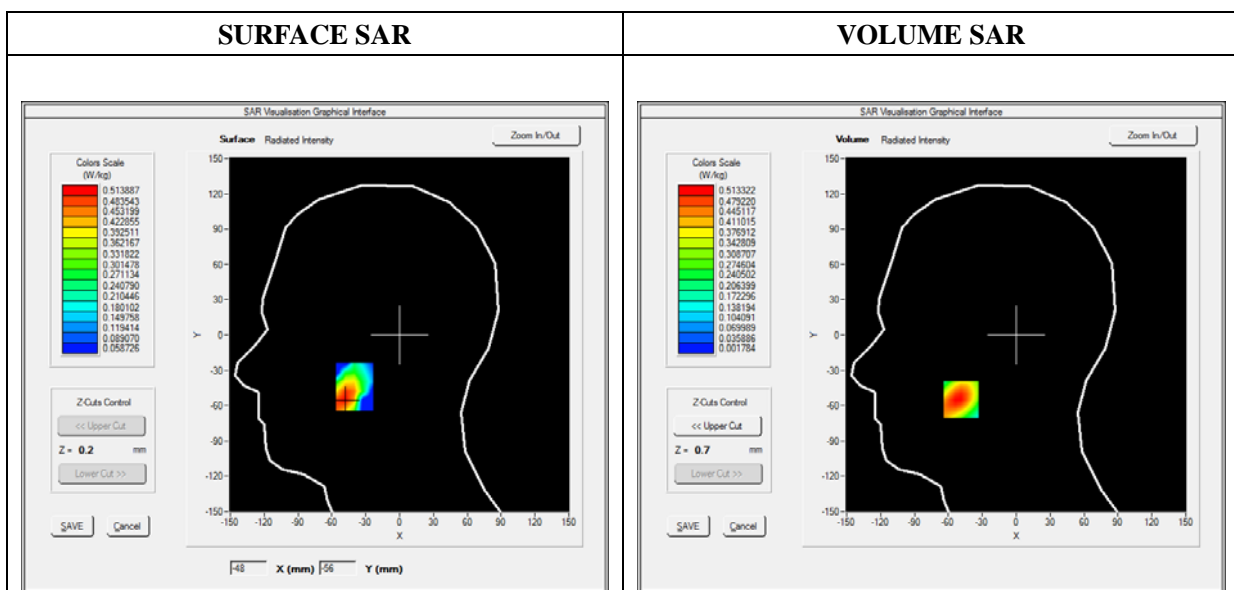
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.84; Calibrated: 06/01/2018

### 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>	WCDMA1700_RMC
<b>Channels</b>	High
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	1752.600000
<b>Relative Permittivity (real part)</b>	39.025421
<b>Conductivity (S/m)</b>	1.370123
<b>Power Variation (%)</b>	1.342427
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3



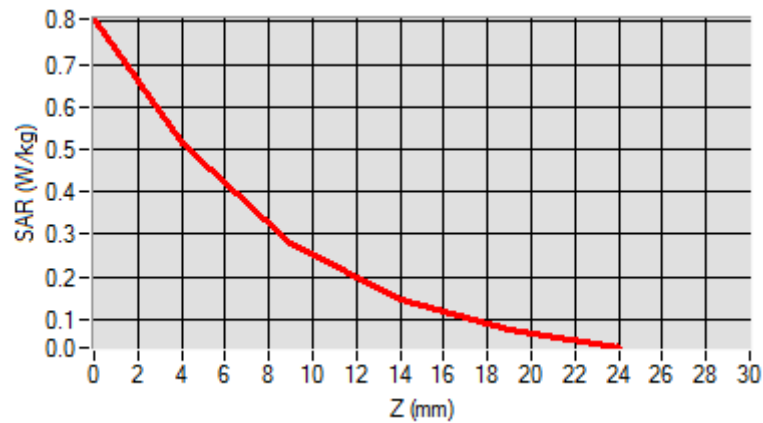


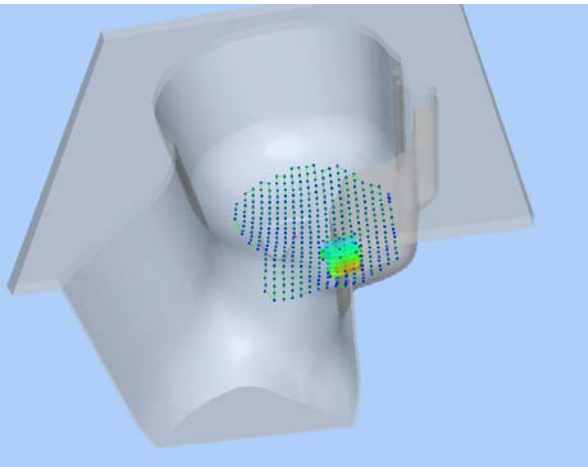
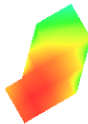
Maximum location: X=-49.00, Y=-55.00

SAR Peak: 0.82 W/kg

SAR 10g (W/Kg)	0.260258
SAR 1g (W/Kg)	0.482943

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.8061	0.5133	0.2797	0.1472	0.0754



3D screen shot	Hot spot position
	

# MEASUREMENT 31

Type: Phone measurement (Complete)

Date of measurement: 08/14/2018

Measurement duration: 12 minutes 3 seconds

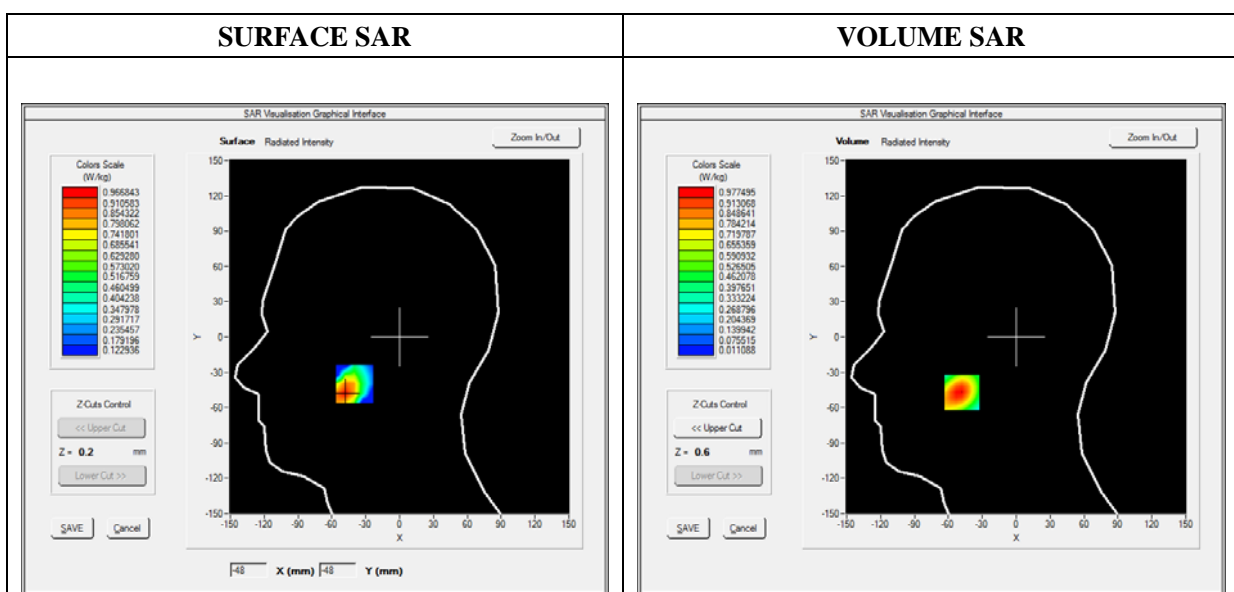
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2018

## 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>	LTE Band 2_RMC
<b>Channels</b>	QPSK, 20MHz, 1RB, Low
<b>Signal</b>	Duty Cycle 1:1

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	1860.000000
<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

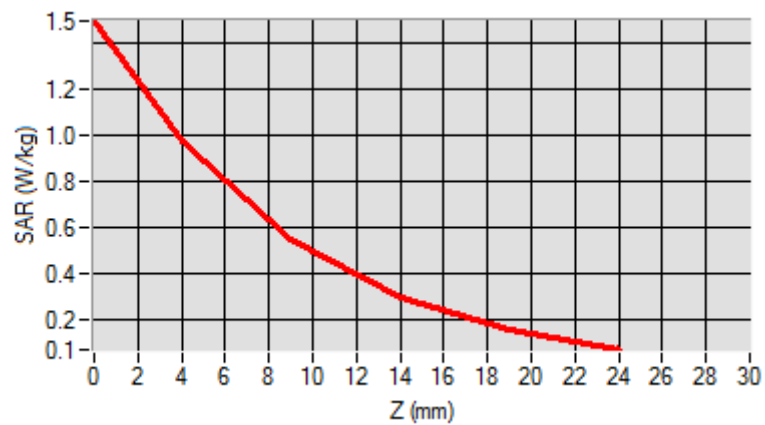


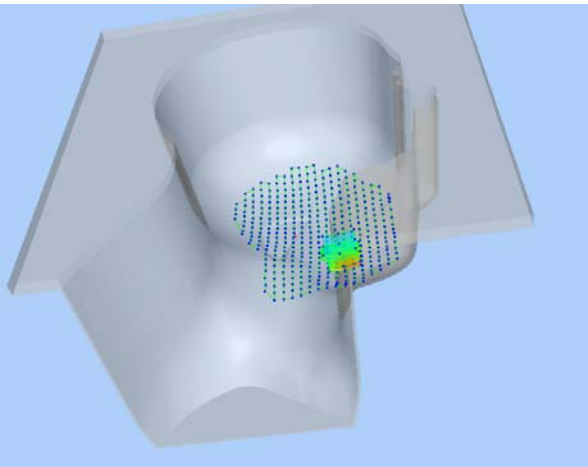
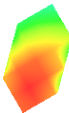
Maximum location: X=-48.00, Y=-47.00

SAR Peak: 1.51 W/kg

SAR 10g (W/Kg)	0.487178
SAR 1g (W/Kg)	0.910918

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.4958	0.9775	0.5509	0.2979	0.1539



3D screen shot	Hot spot position
	

## MEASUREMENT 42

Type: Phone measurement (Complete)

Date of measurement: 08/14/2018

Measurement duration: 12 minutes 3 seconds

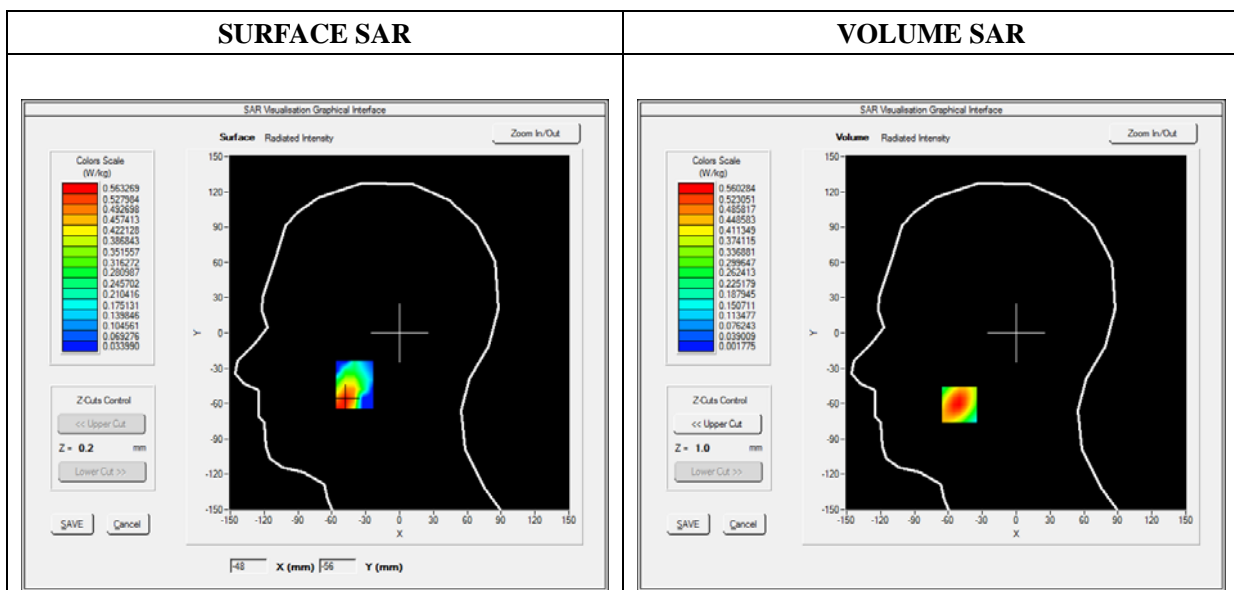
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.84; Calibrated: 06/01/2018

### 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, High
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	1745.000000
<b>Relative Permittivity (real part)</b>	39.025421
<b>Conductivity (S/m)</b>	1.370123
<b>Power Variation (%)</b>	1.374628
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.2

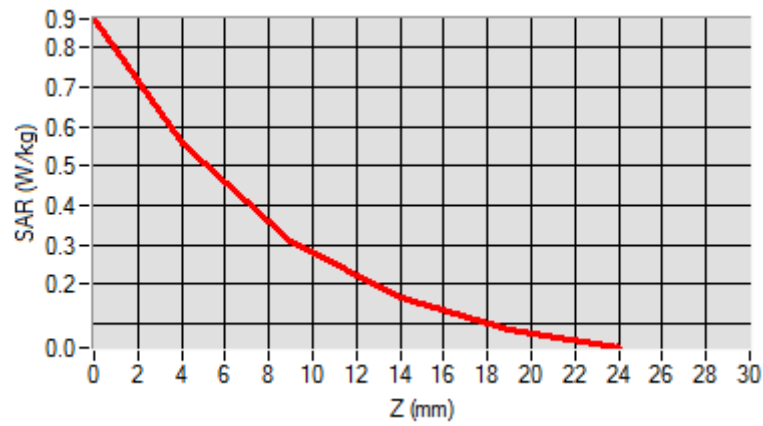


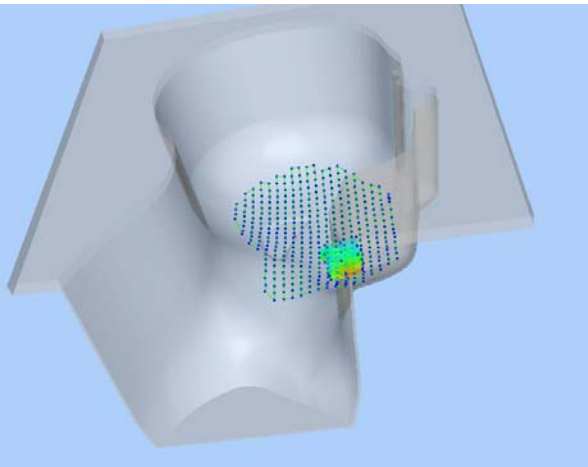
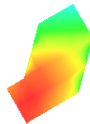
Maximum location: X=-50.00, Y=-61.00

SAR Peak: 0.88 W/kg

SAR 10g (W/Kg)	0.282067
SAR 1g (W/Kg)	0.523974

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.8736	0.5603	0.3088	0.1648	0.0860



3D screen shot	Hot spot position
	

# MEASUREMENT 50

Type: Phone measurement (Complete)

Date of measurement: 08/13/2018

Measurement duration: 12 minutes 3 seconds

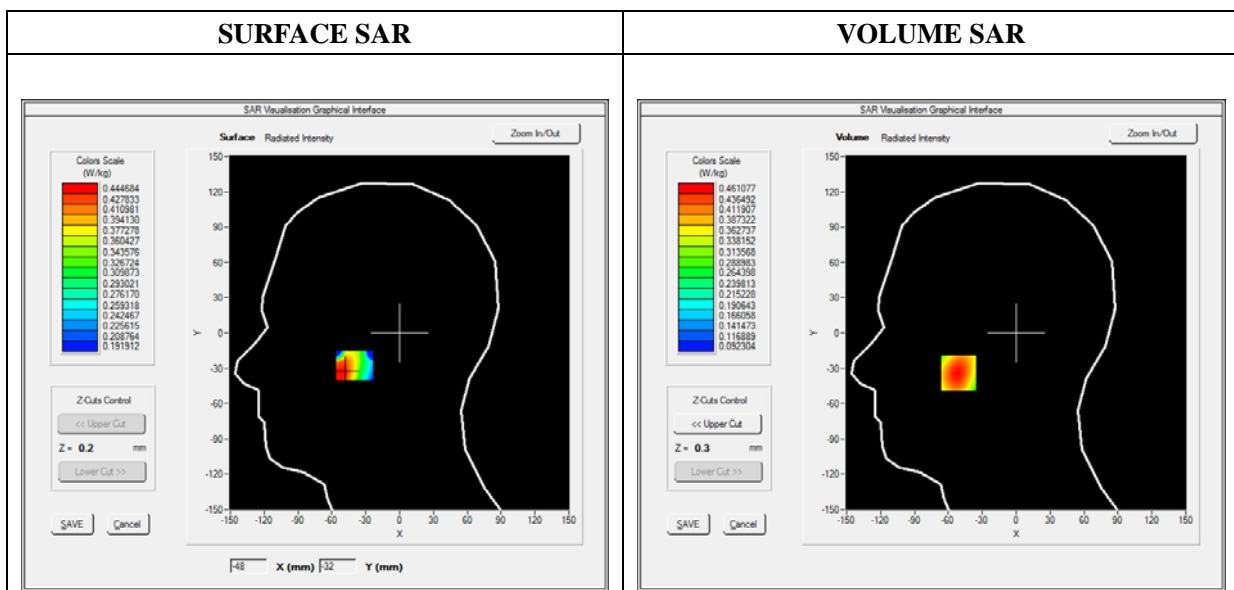
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.93; Calibrated: 06/01/2018

## 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>	LTE Band 5_RMC
<b>Channels</b>	QPSK, 10MHz, 1RB, Low
<b>Signal</b>	Duty Cycle 1:1

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	829.000000
<b>Relative Permittivity (real part)</b>	41.110245
<b>Conductivity (S/m)</b>	0.871245
<b>Power Variation (%)</b>	0.924535
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.2

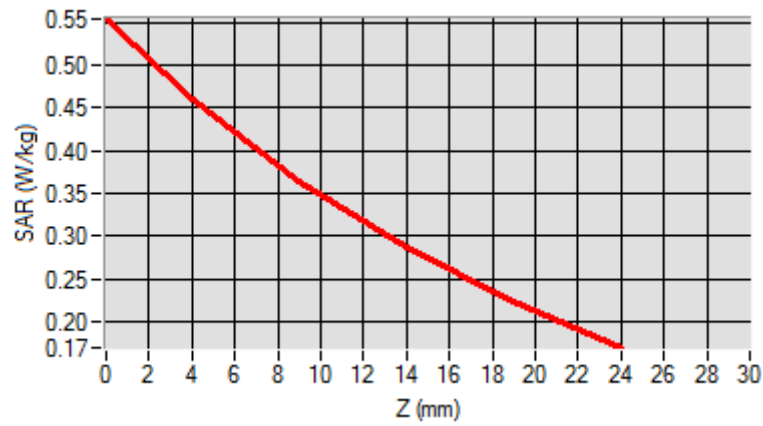


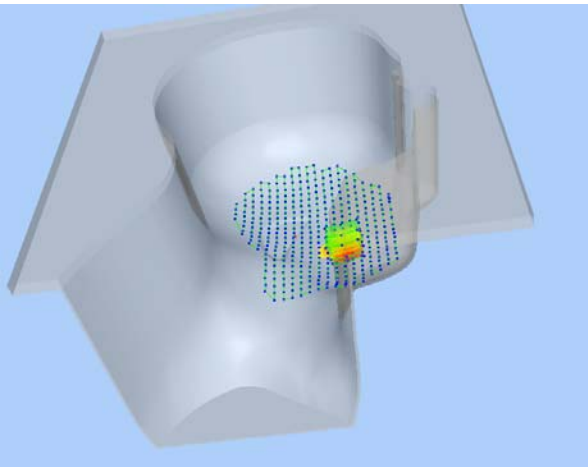

Maximum location: X=-51.00, Y=-34.00

SAR Peak: 0.55 W/kg

SAR 10g (W/Kg)	0.324926
SAR 1g (W/Kg)	0.440126

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.5539	0.4611	0.3642	0.2860	0.2227



3D screen shot	Hot spot position
	

# MEASUREMENT 58

Type: Phone measurement (Complete)

Date of measurement: 08/15/2018

Measurement duration: 12 minutes 3 seconds

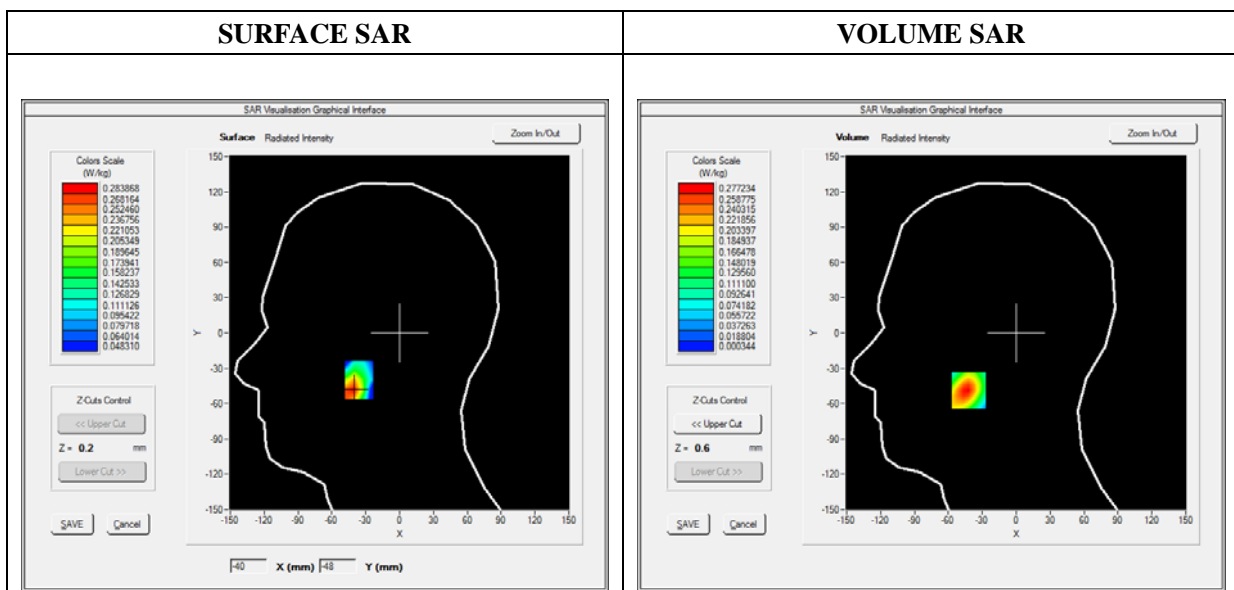
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.37; Calibrated: 06/01/2018

## A. Experimental conditions

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

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	2560.000000
<b>Relative Permittivity (real part)</b>	38.631092
<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



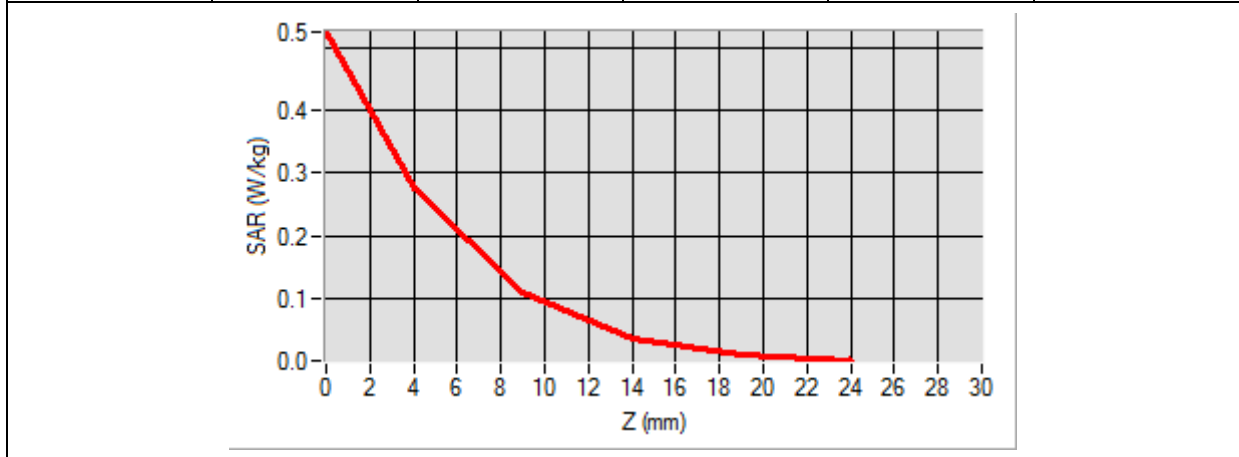


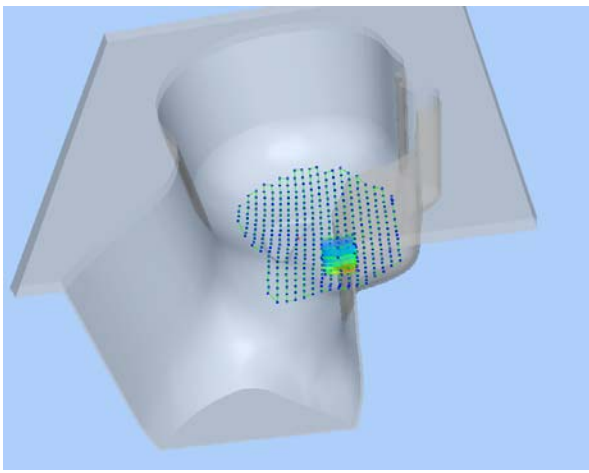
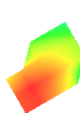
Maximum location: X=-42.00, Y=-49.00

SAR Peak: 0.53 W/kg

SAR 10g (W/Kg)	0.118334
SAR 1g (W/Kg)	0.259747

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.5241	0.2772	0.1106	0.0383	0.0117



3D screen shot	Hot spot position
	

# MEASUREMENT 64

Type: Phone measurement (Complete)

Date of measurement: 08/15/2018

Measurement duration: 12 minutes 3 seconds

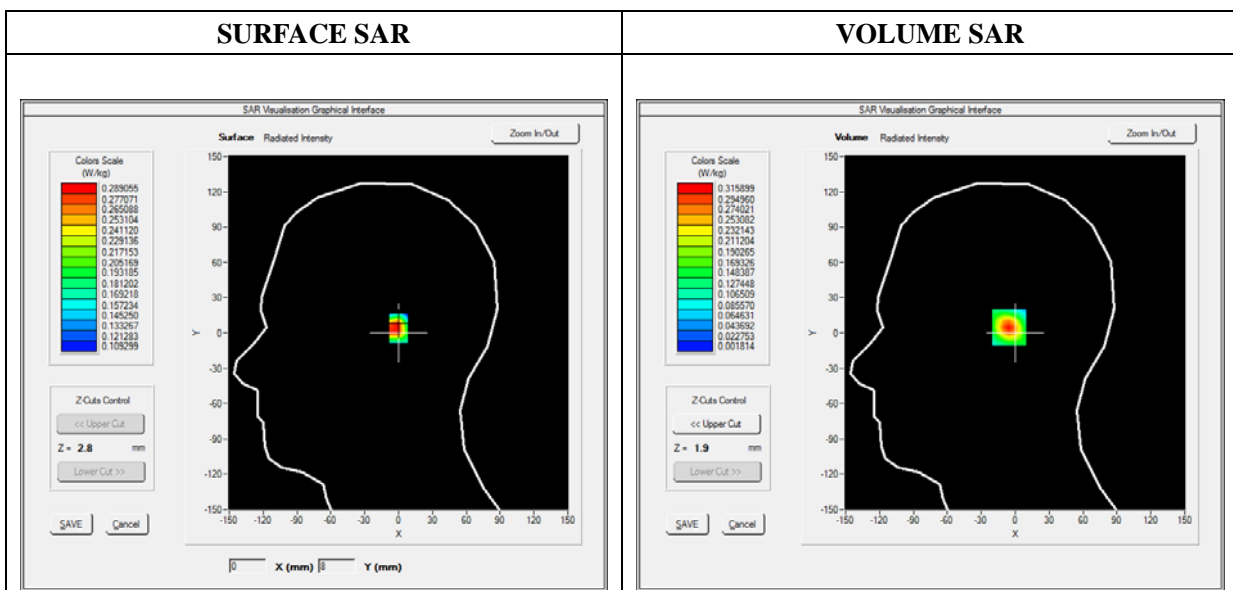
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.64; Calibrated: 06/01/2018

### 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

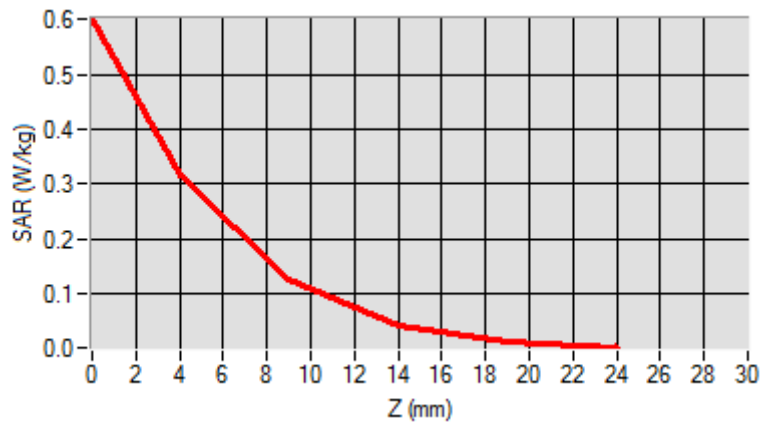


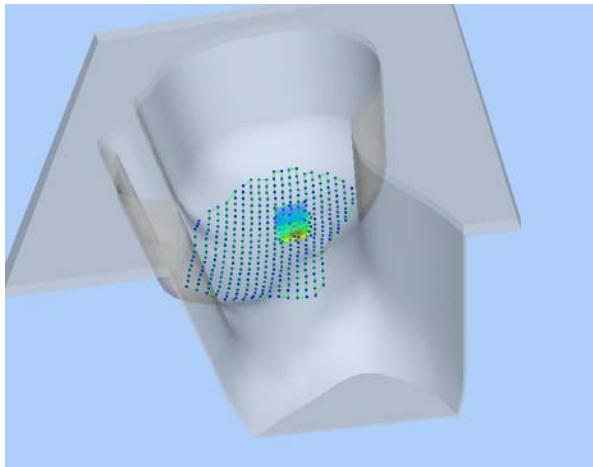

Maximum location: X=-3.00, Y=5.00

SAR Peak: 0.60 W/kg

SAR 10g (W/Kg)	0.121860
SAR 1g (W/Kg)	0.284594

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.6008	0.3159	0.1245	0.0423	0.0124



3D screen shot	Hot spot position
	

# MEASUREMENT 68

Type: Phone measurement (Complete)

Date of measurement: 08/13/2018

Measurement duration: 12 minutes 3 seconds

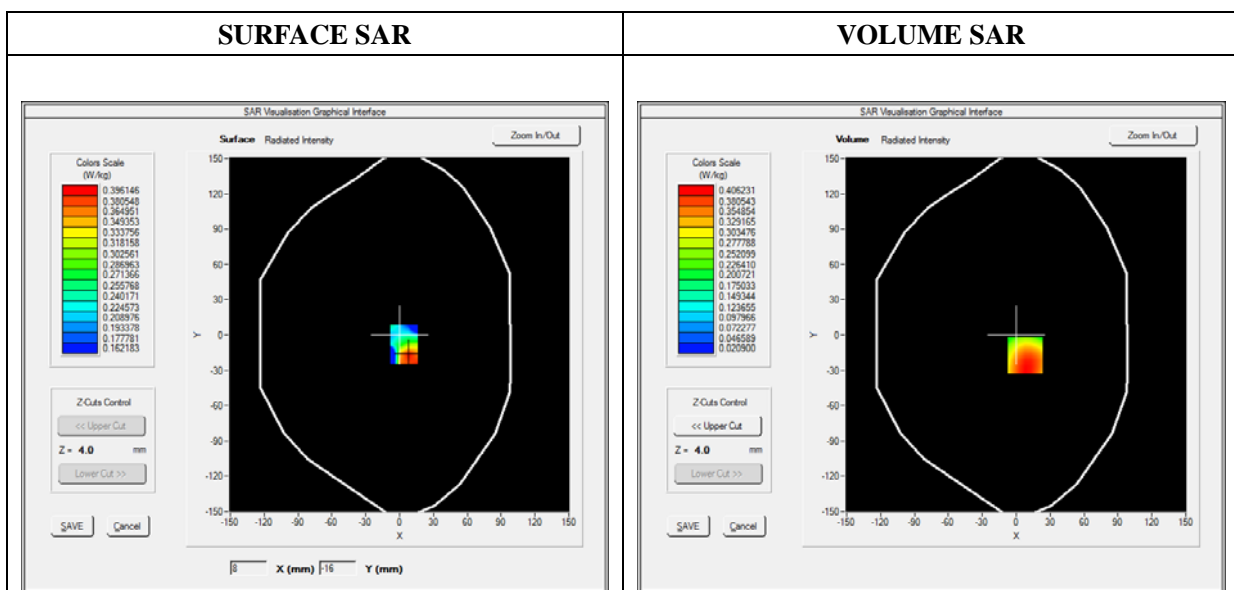
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 06/01/2018

## 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>	Low
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	824.200000
<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

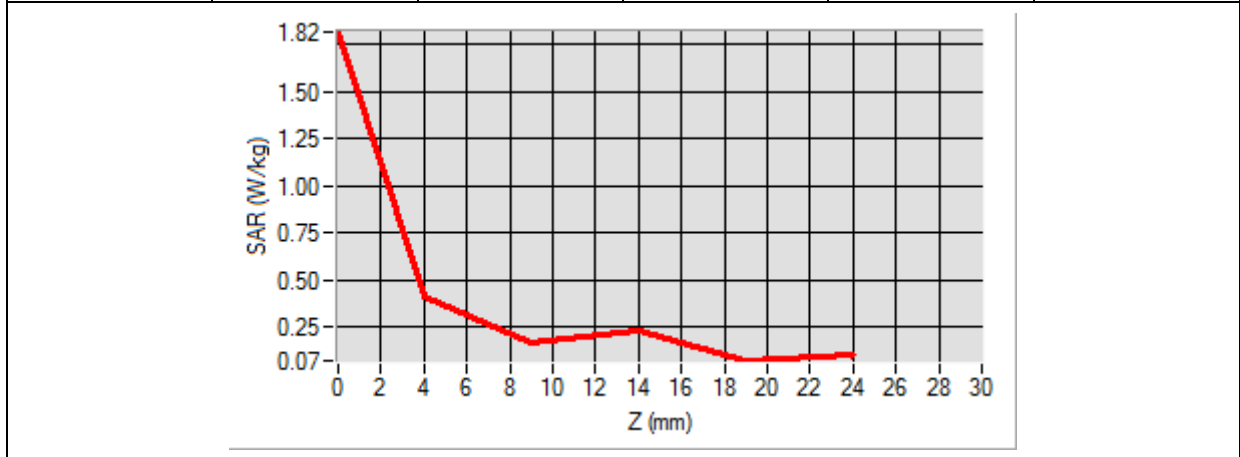


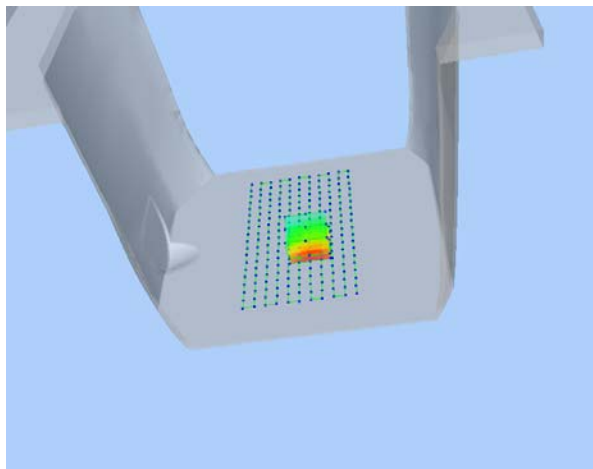

Maximum location: X=8.00, Y=-17.00

SAR Peak: 0.51 W/kg

SAR 10g (W/Kg)	0.258906
SAR 1g (W/Kg)	0.389586

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.8194	0.4062	0.1623	0.2315	0.0677



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

# MEASUREMENT 71

Type: Phone measurement (Complete)

Date of measurement: 08/14/2018

Measurement duration: 12 minutes 3 seconds

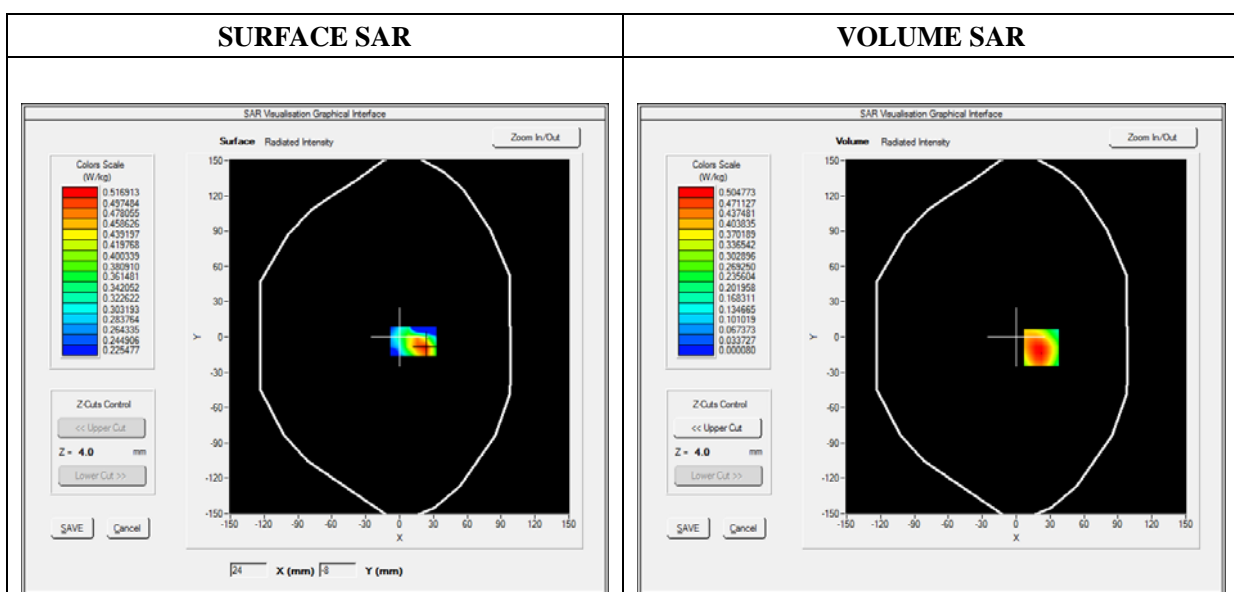
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2018

## A. Experimental conditions

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

## B. SAR Measurement Results

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

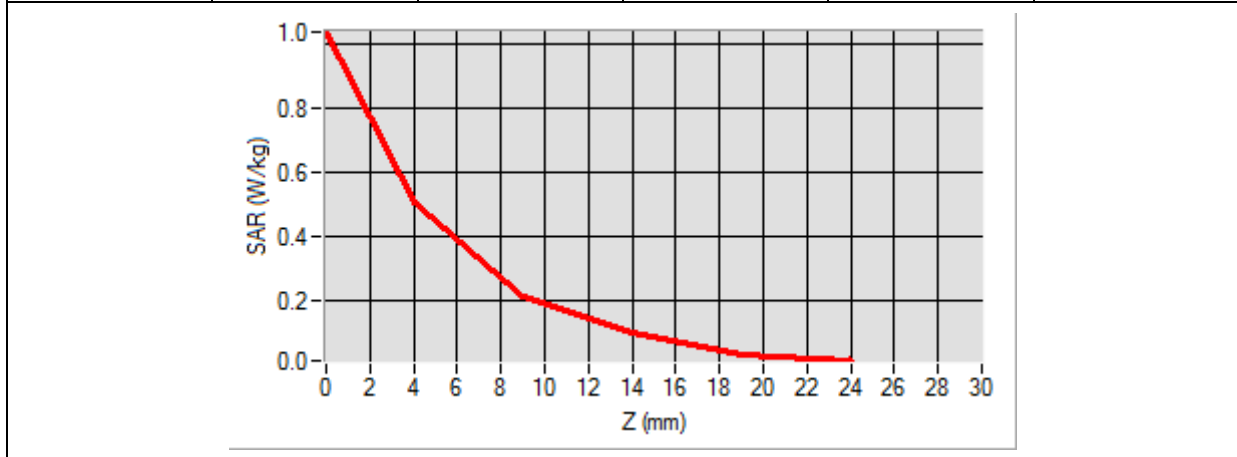


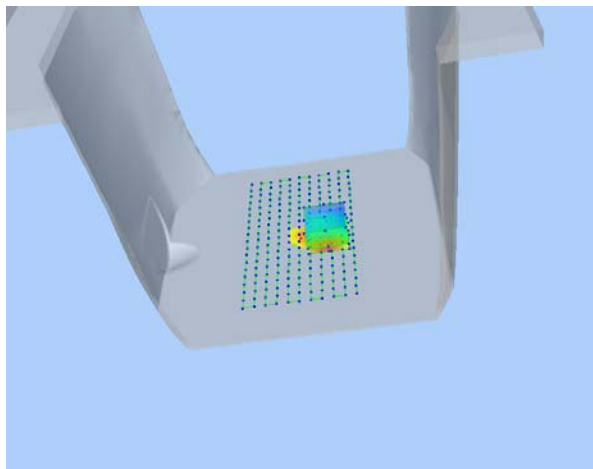
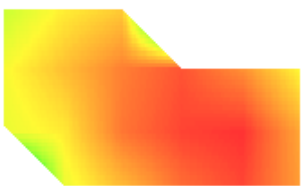
Maximum location: X=22.00, Y=-9.00

SAR Peak: 0.88 W/kg

SAR 10g (W/Kg)	0.241776
SAR 1g (W/Kg)	0.480049

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.0392	0.5048	0.2160	0.1028	0.0333



3D screen shot	Hot spot position
	

## MEASUREMENT 72

Type: Phone measurement (Complete)

Date of measurement: 08/13/2018

Measurement duration: 12 minutes 3 seconds

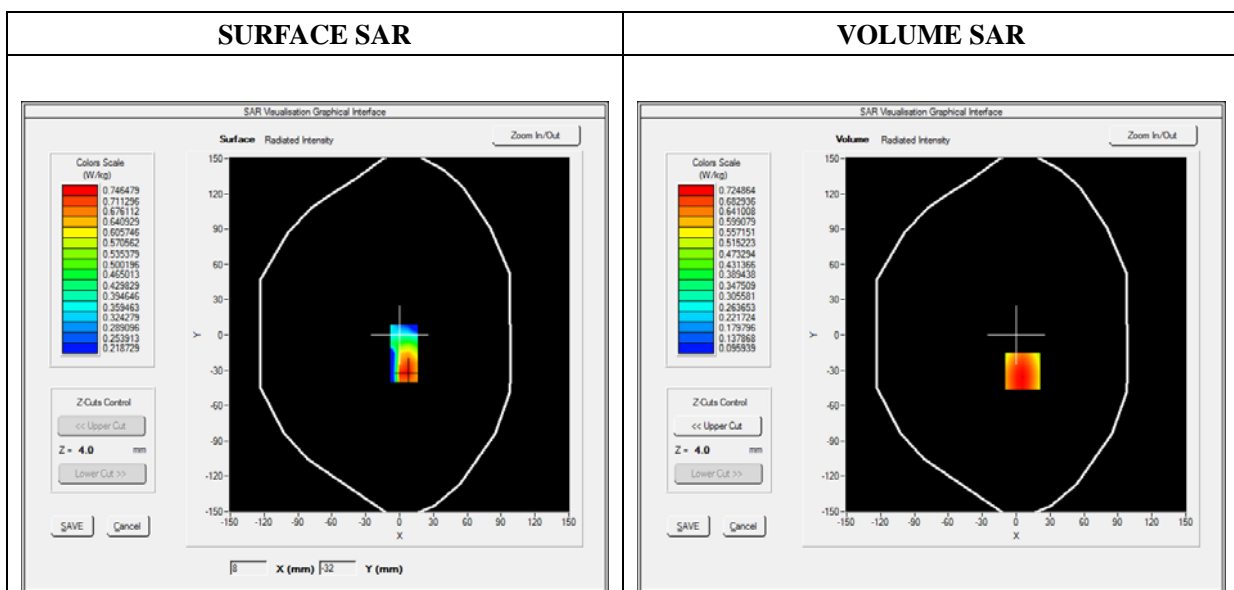
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 06/01/2018

### 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_4TX
<b>Channels</b>	Low
<b>Signal</b>	Duty Cycle: 1:2

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	824.200000
<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



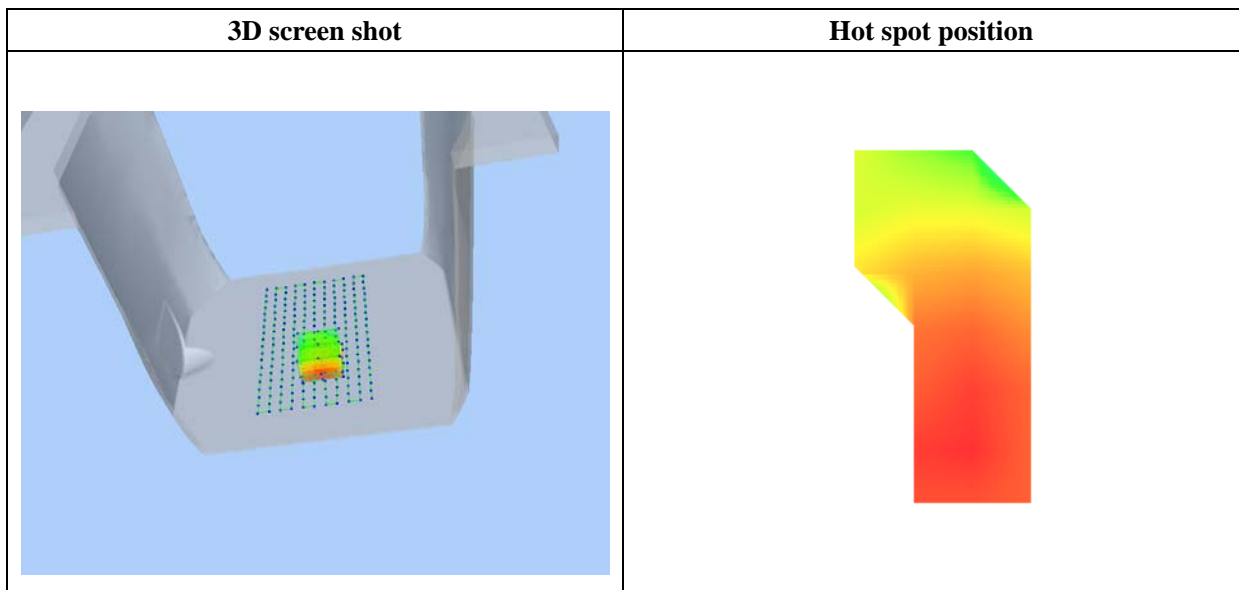
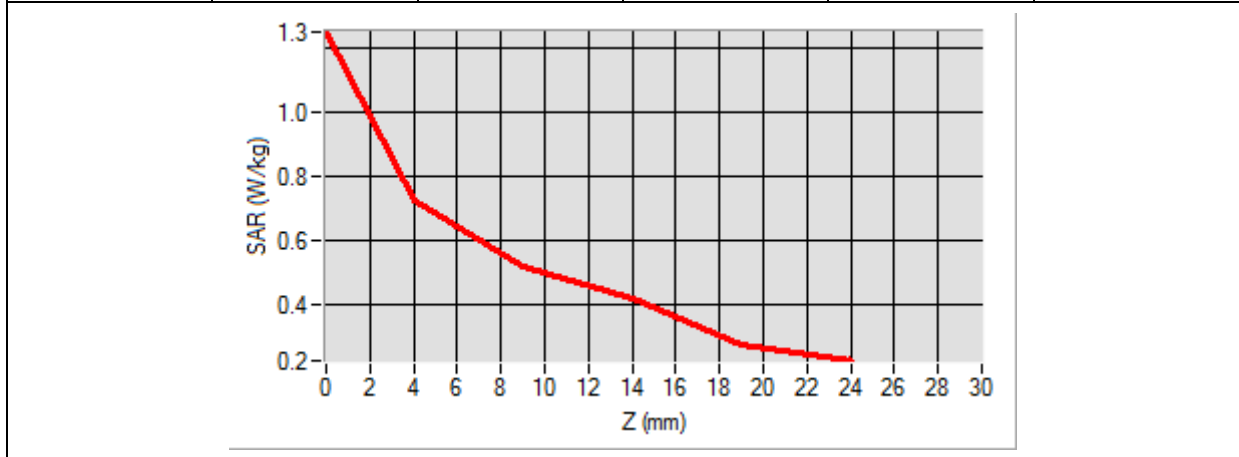


Maximum location: X=6.00, Y=-31.00

SAR Peak: 0.90 W/kg

SAR 10g (W/Kg)	0.505616
SAR 1g (W/Kg)	0.701317

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.2528	0.7249	0.5159	0.4162	0.2744



# MEASUREMENT 77

Type: Phone measurement (Complete)

Date of measurement: 08/14/2018

Measurement duration: 12 minutes 3 seconds

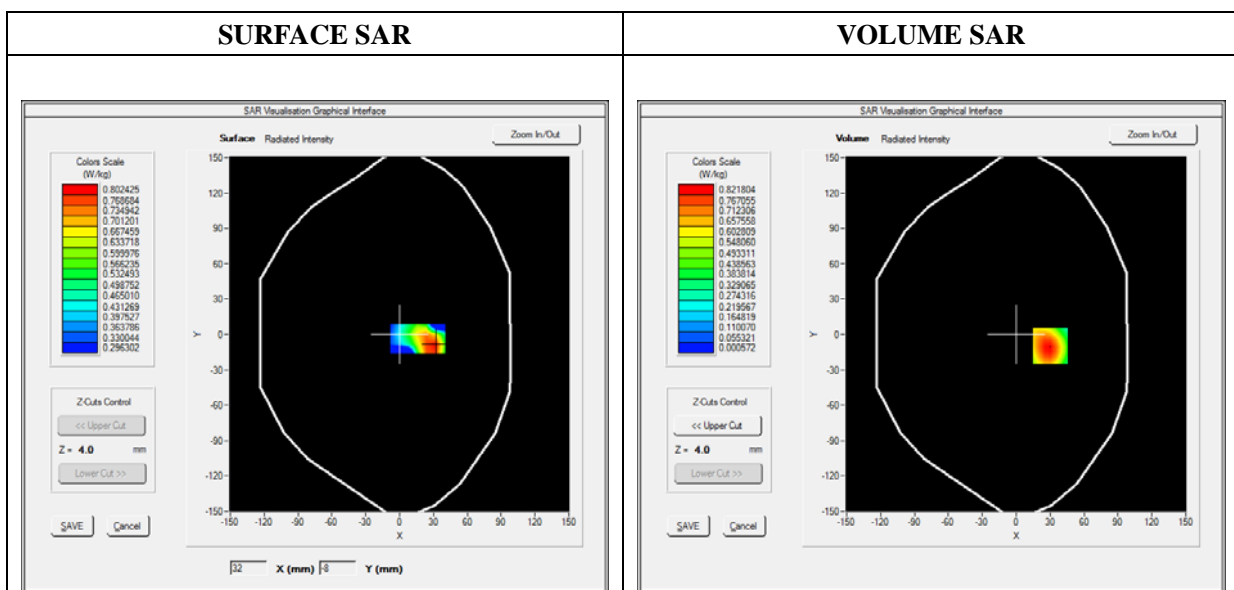
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2018

## A. Experimental conditions

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

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	1850.200000
<b>Relative Permittivity (real part)</b>	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

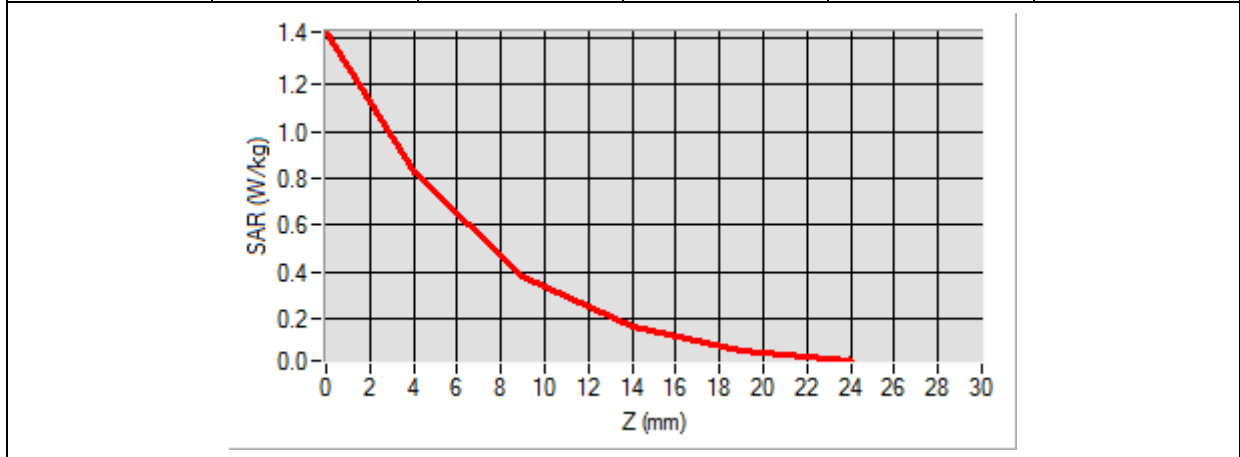


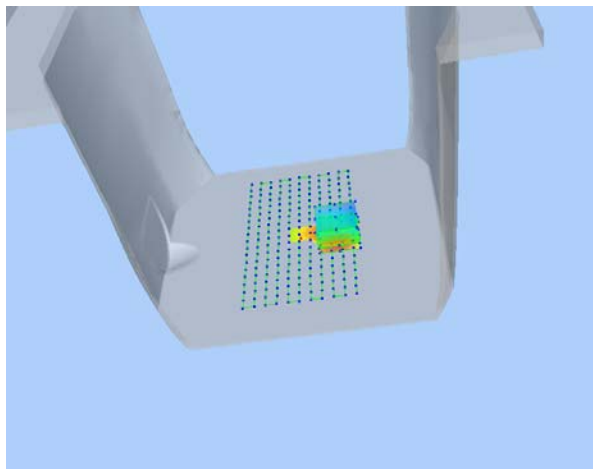

Maximum location: X=30.00, Y=-10.00

SAR Peak: 1.43 W/kg

SAR 10g (W/Kg)	0.394715
SAR 1g (W/Kg)	0.774122

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.4234	0.8218	0.3838	0.1676	0.0704



3D screen shot	Hot spot position
	

# MEASUREMENT 81

Type: Phone measurement (Complete)

Date of measurement: 08/14/2018

Measurement duration: 12 minutes 3 seconds

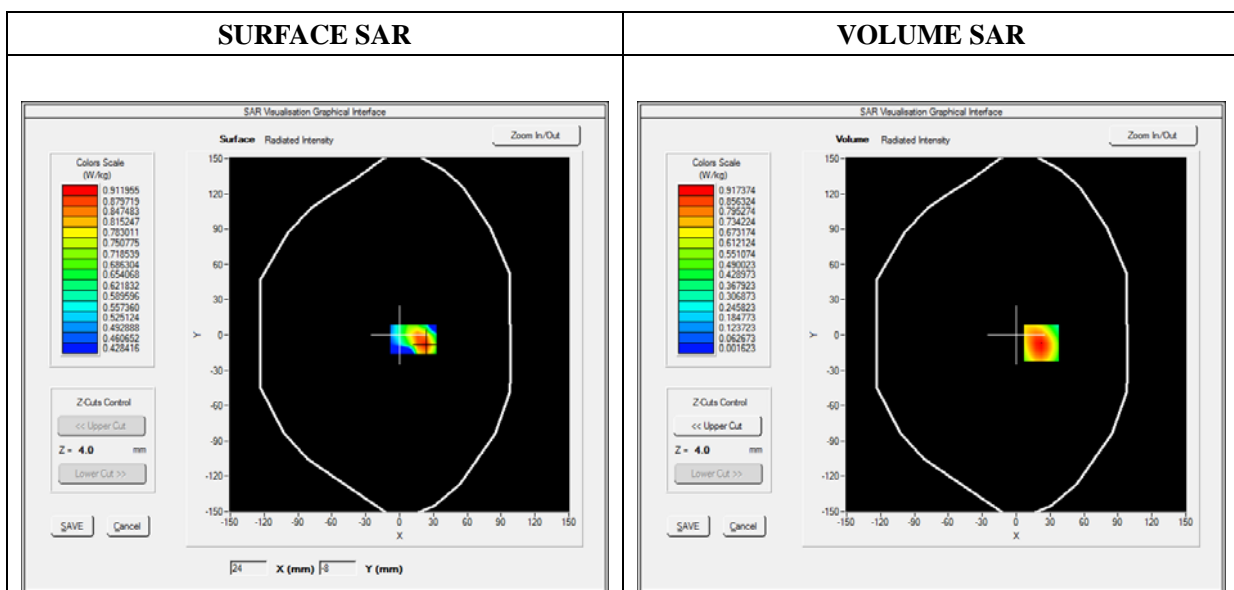
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2018

## A. Experimental conditions

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

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	1852.400000
<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

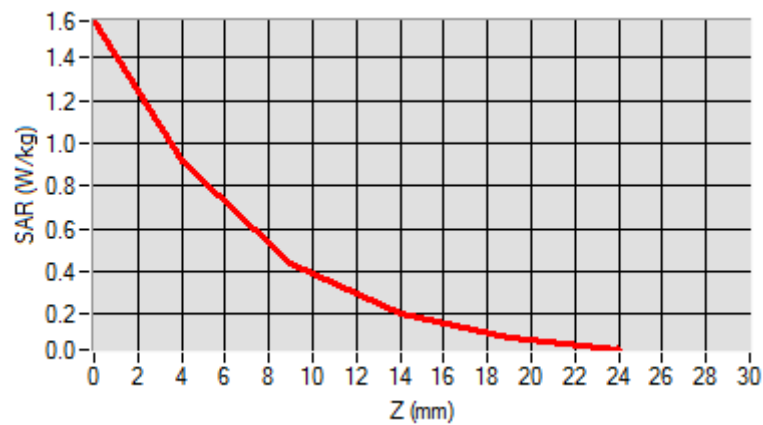


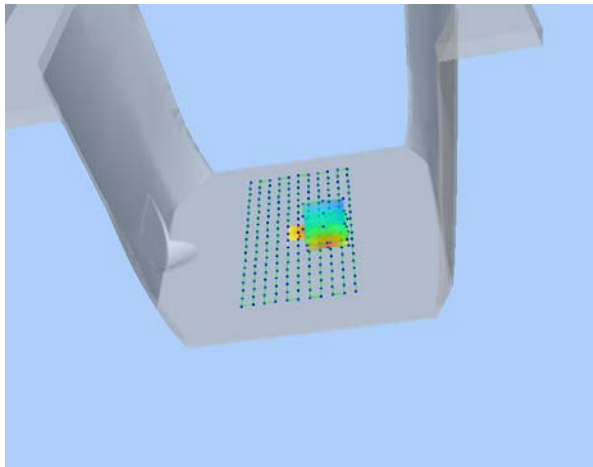

Maximum location: X=22.00, Y=-7.00

SAR Peak: 1.57 W/kg

SAR 10g (W/Kg)	0.442911
SAR 1g (W/Kg)	0.860727

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.5717	0.9174	0.4374	0.1977	0.0877



3D screen shot	Hot spot position
	

# MEASUREMENT 86

Type: Phone measurement (Complete)

Date of measurement: 08/13/2018

Measurement duration: 12 minutes 3 seconds

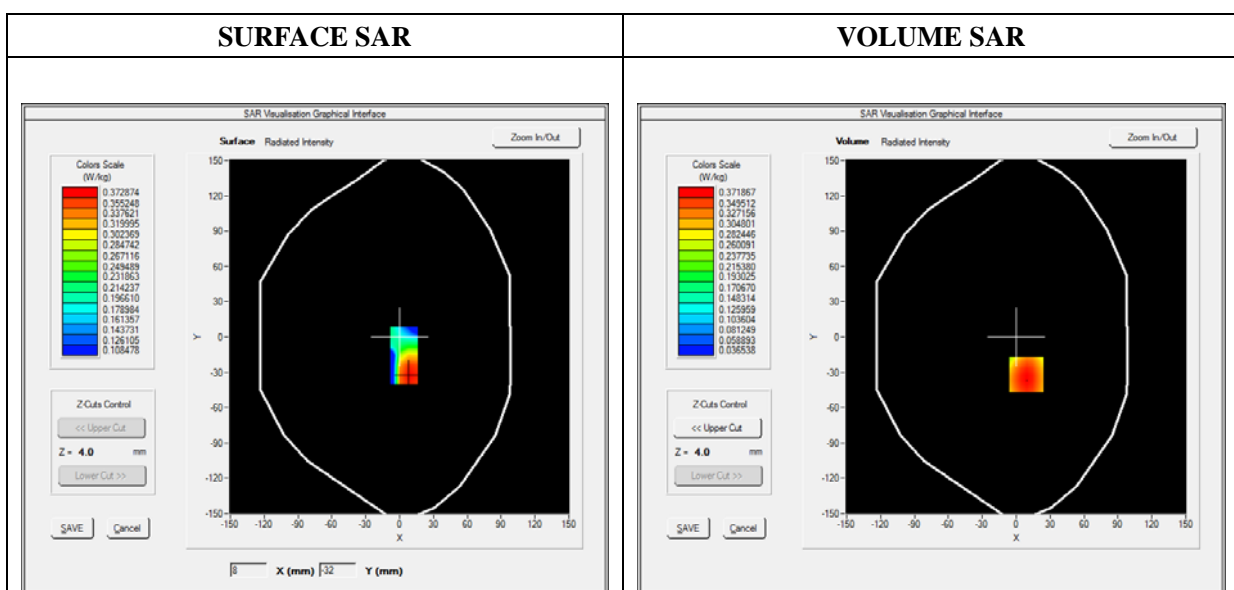
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 06/01/2018

## 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>	Middle
<b>Signal</b>	Duty Cycle 1:1

## 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>	2.341234
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

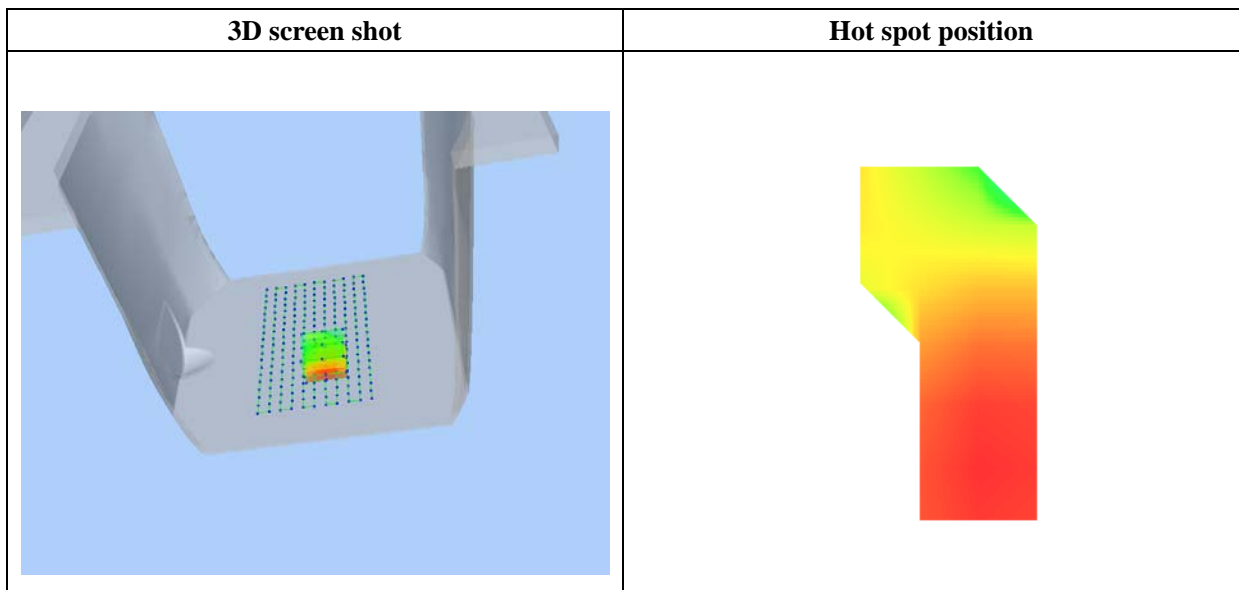
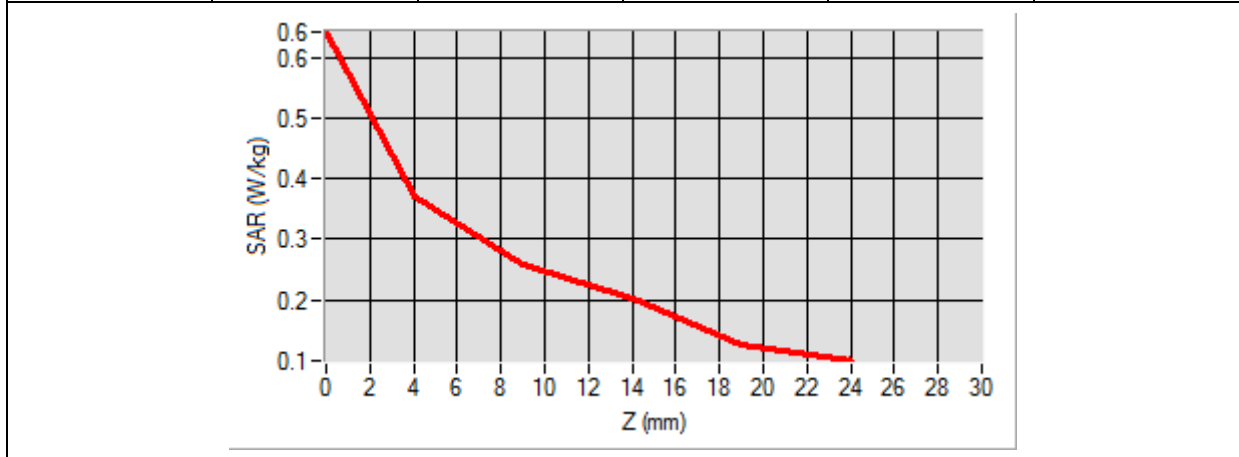


Maximum location: X=9.00, Y=-32.00

SAR Peak: 0.47 W/kg

SAR 10g (W/Kg)	0.251044
SAR 1g (W/Kg)	0.356631

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.6419	0.3719	0.2584	0.2014	0.1267



# MEASUREMENT 91

Type: Phone measurement (Complete)

Date of measurement: 08/14/2018

Measurement duration: 12 minutes 3 seconds

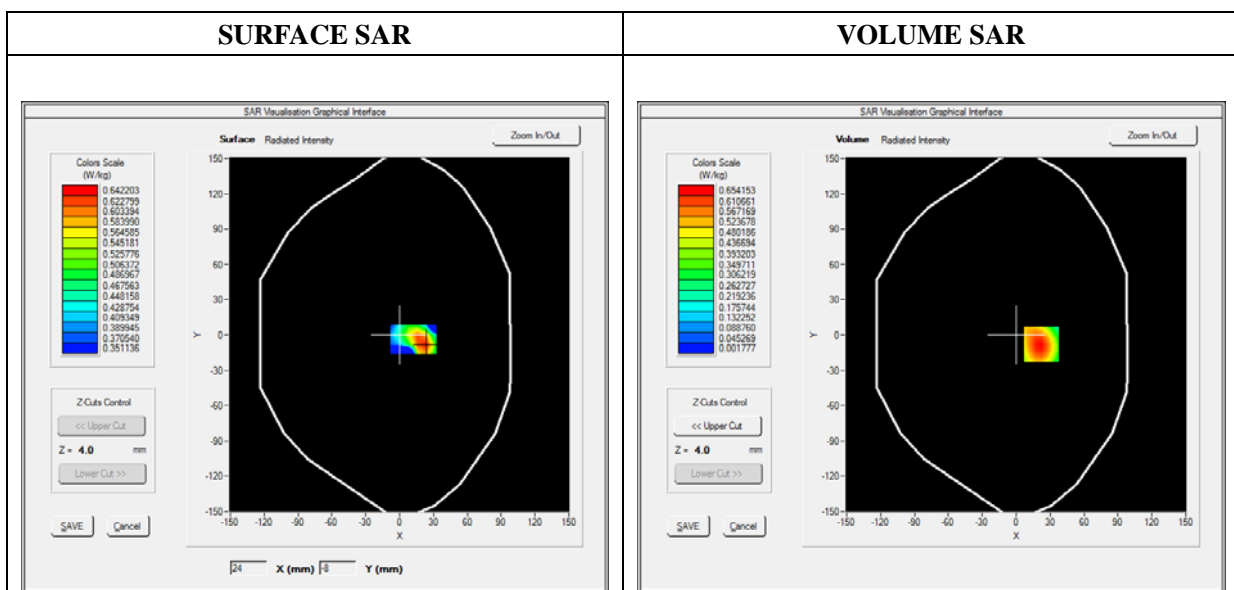
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.06; Calibrated: 06/01/2018

## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Front
<b>Band</b>	WCDMA1700_RMC
<b>Channels</b>	High
<b>Signal</b>	Duty Cycle 1:1

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	1752.600000
<b>Relative Permittivity (real part)</b>	51.220432
<b>Conductivity (S/m)</b>	1.460124
<b>Power Variation (%)</b>	2.341221
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3



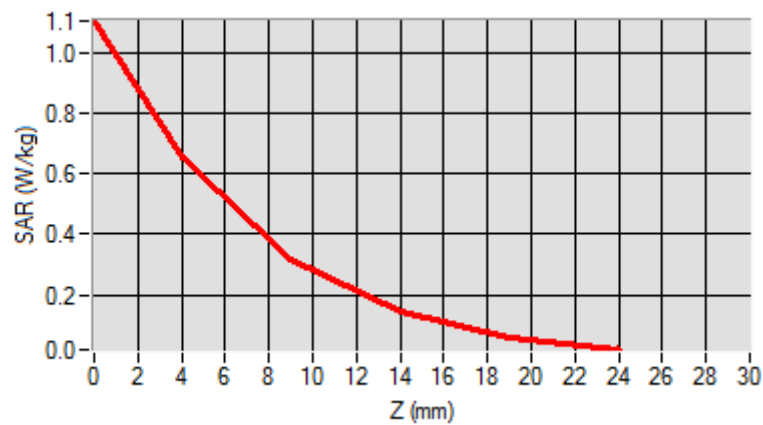


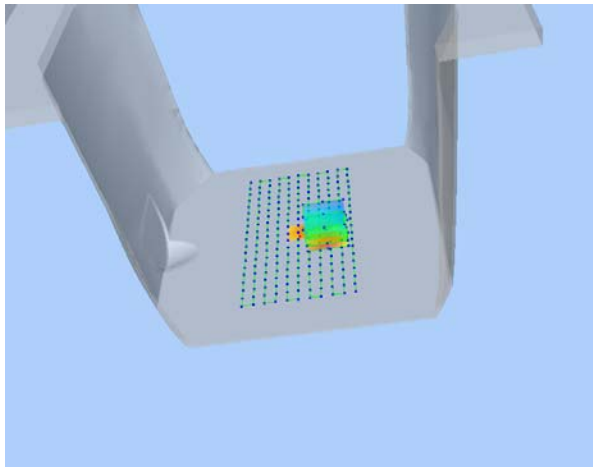

Maximum location: X=22.00, Y=-8.00

SAR Peak: 1.11 W/kg

SAR 10g (W/Kg)	0.317102
SAR 1g (W/Kg)	0.612937

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.1057	0.6542	0.3161	0.1419	0.0593



3D screen shot	Hot spot position
	

# MEASUREMENT 96

Type: Phone measurement (Complete)

Date of measurement: 08/14/2018

Measurement duration: 12 minutes 3 seconds

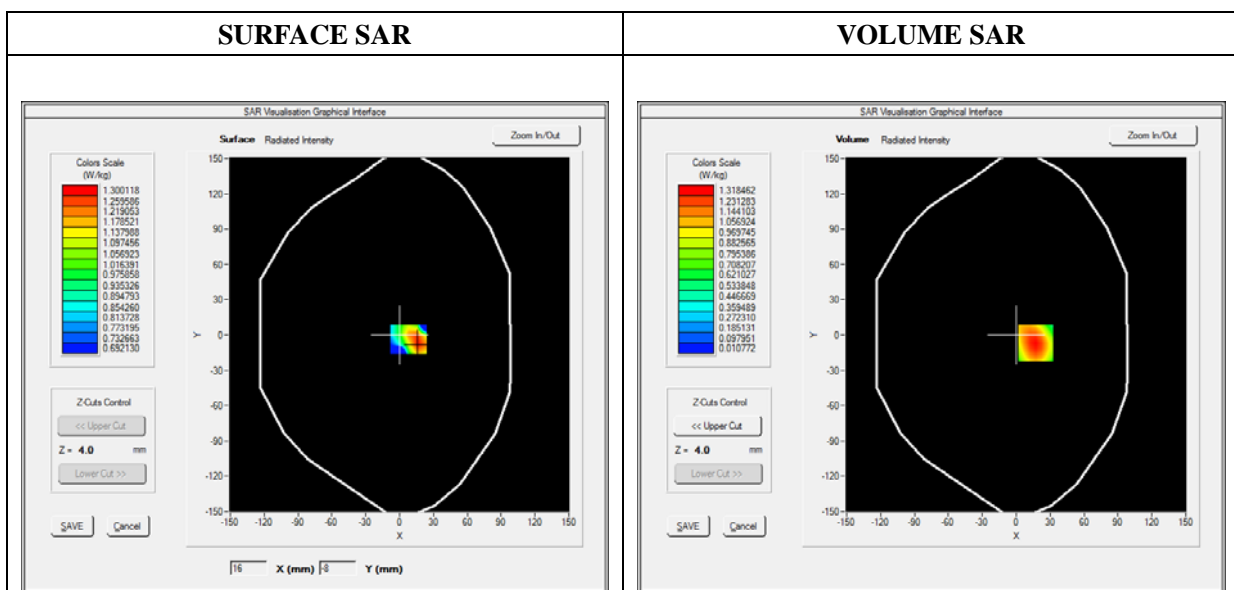
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2018

## A. Experimental conditions

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

## B. SAR Measurement Results

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

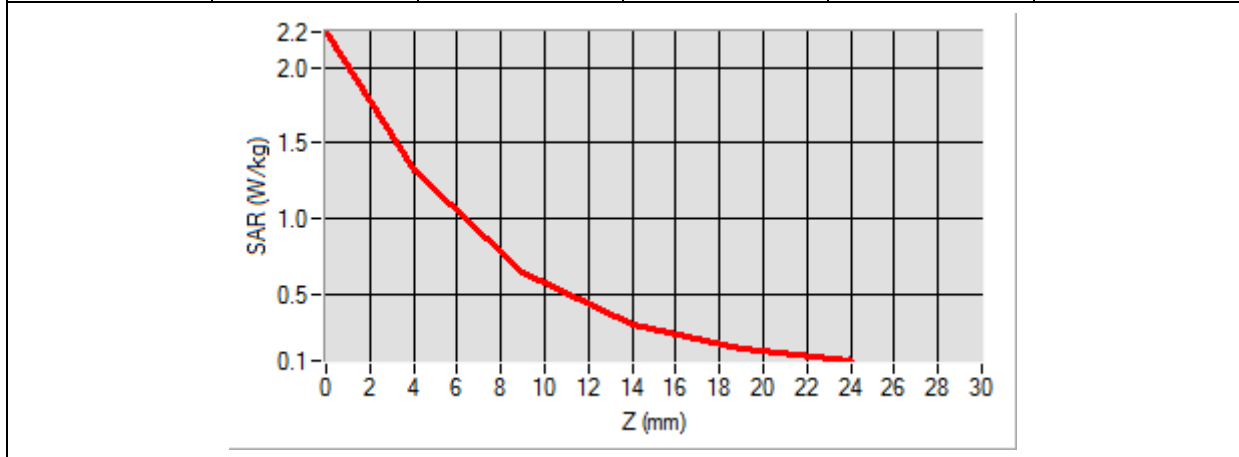


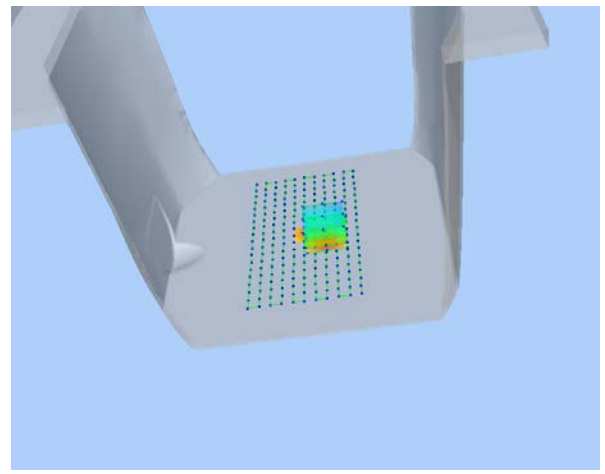

Maximum location: X=17.00, Y=-7.00

SAR Peak: 2.23 W/kg

SAR 10g (W/Kg)	0.648201
SAR 1g (W/Kg)	1.235323

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	2.2369	1.3185	0.6399	0.2971	0.1371



3D screen shot	Hot spot position
	

# MEASUREMENT 111

Type: Phone measurement (Complete)

Date of measurement: 08/14/2018

Measurement duration: 12 minutes 3 seconds

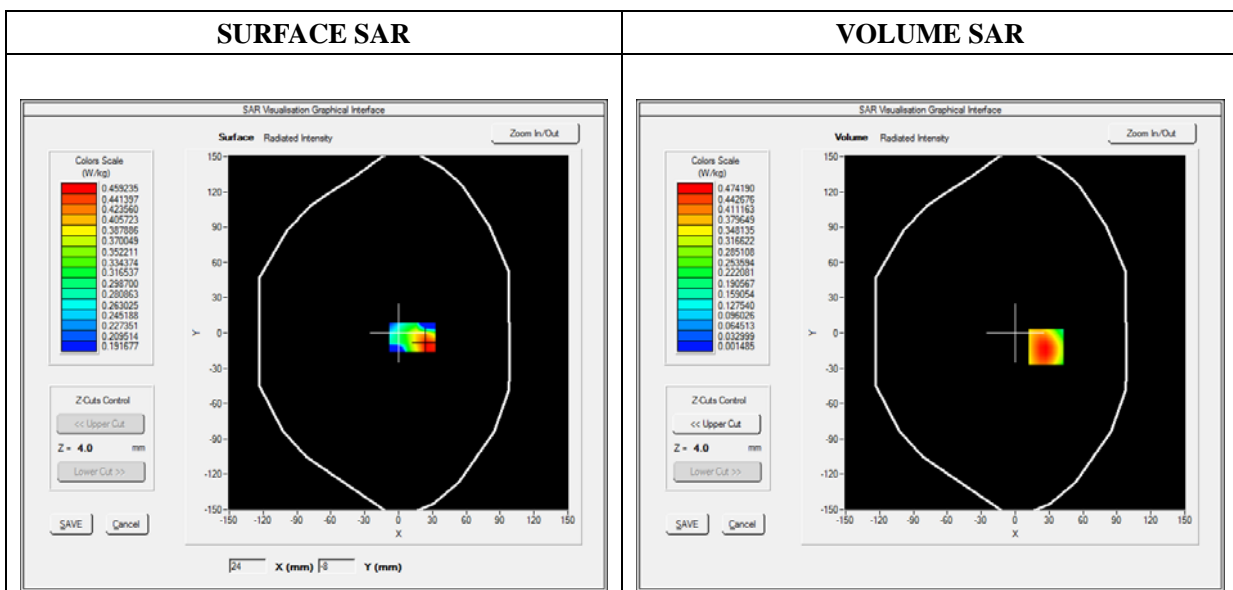
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.06; Calibrated: 06/01/2018

### A. Experimental conditions

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

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	1745.000000
<b>Relative Permittivity (real part)</b>	51.220432
<b>Conductivity (S/m)</b>	1.460124
<b>Power Variation (%)</b>	0.858383
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.2

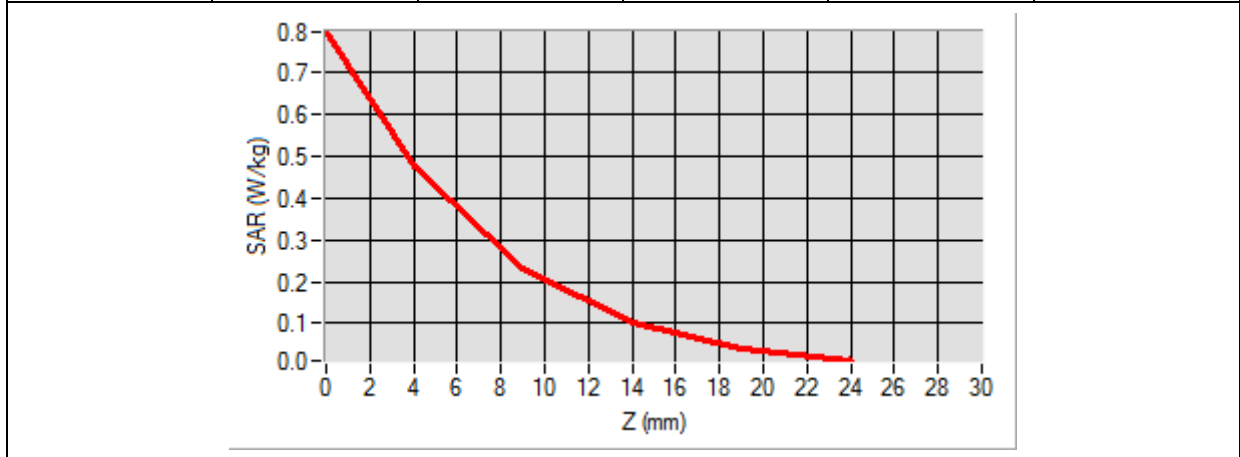


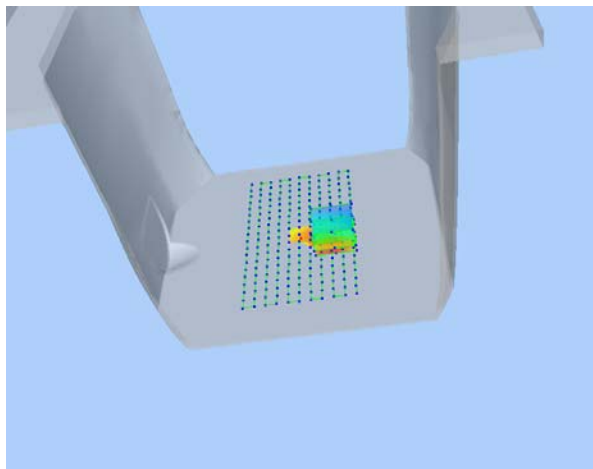
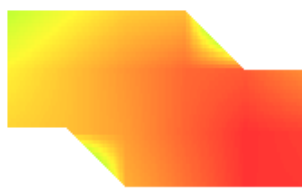
Maximum location: X=27.00, Y=-12.00

SAR Peak: 0.80 W/kg

SAR 10g (W/Kg)	0.235639
SAR 1g (W/Kg)	0.447432

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.7939	0.4742	0.2314	0.1037	0.0419



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

# MEASUREMENT 118

Type: Phone measurement (Complete)

Date of measurement: 08/13/2018

Measurement duration: 12 minutes 3 seconds

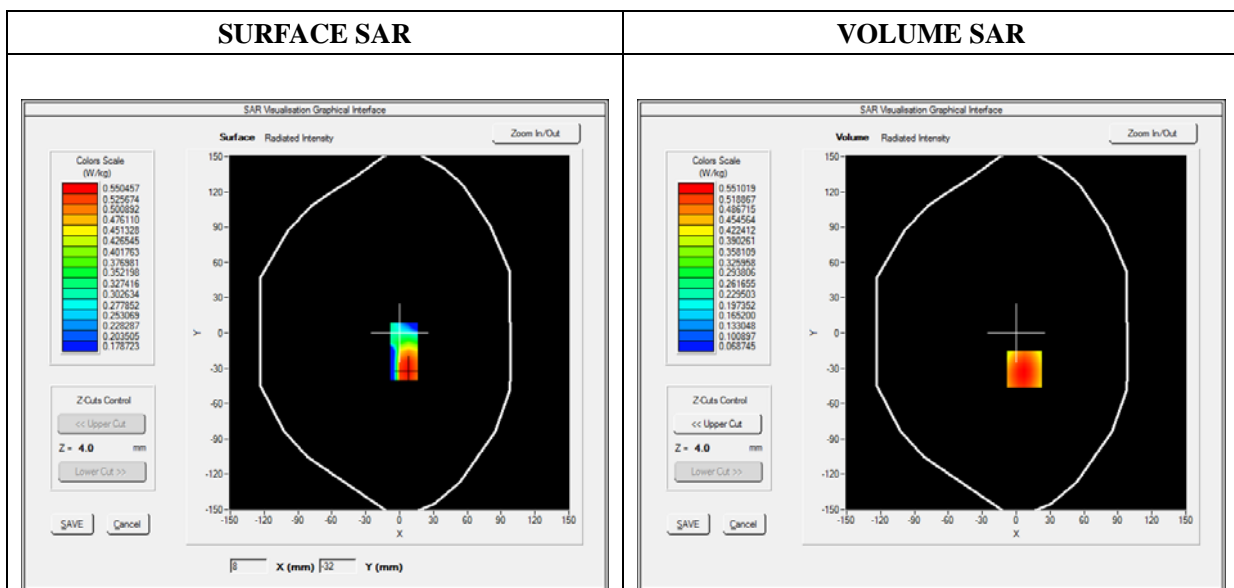
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 06/01/2018

## 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>	LTE Band 5_RMC
<b>Channels</b>	QPSK, 10MHz, 1RB, Low
<b>Signal</b>	Duty Cycle 1:1

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	829.000000
<b>Relative Permittivity (real part)</b>	54.851214
<b>Conductivity (S/m)</b>	0.951454
<b>Power Variation (%)</b>	1.037332
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.2

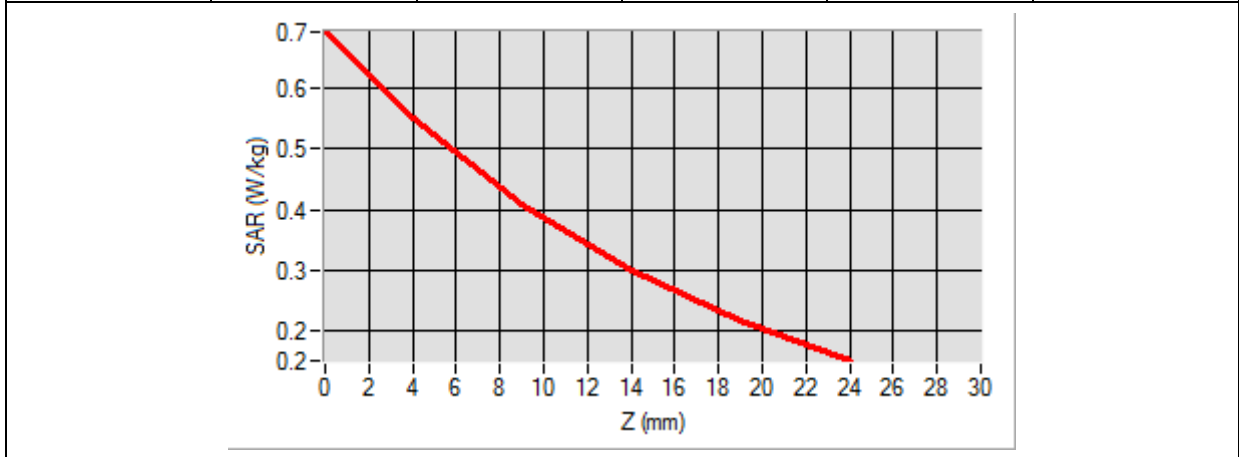


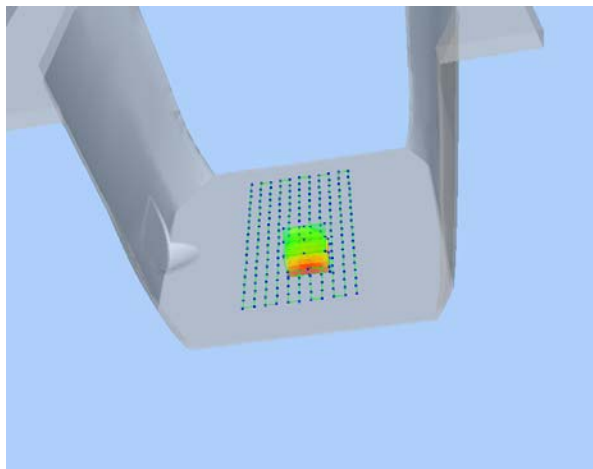

Maximum location: X=7.00, Y=-31.00

SAR Peak: 0.69 W/kg

SAR 10g (W/Kg)	0.380479
SAR 1g (W/Kg)	0.531664

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.6922	0.5510	0.4096	0.3010	0.2178



3D screen shot	Hot spot position
	

# MEASUREMENT 127

Type: Phone measurement (Complete)

Date of measurement: 08/15/2018

Measurement duration: 12 minutes 3 seconds

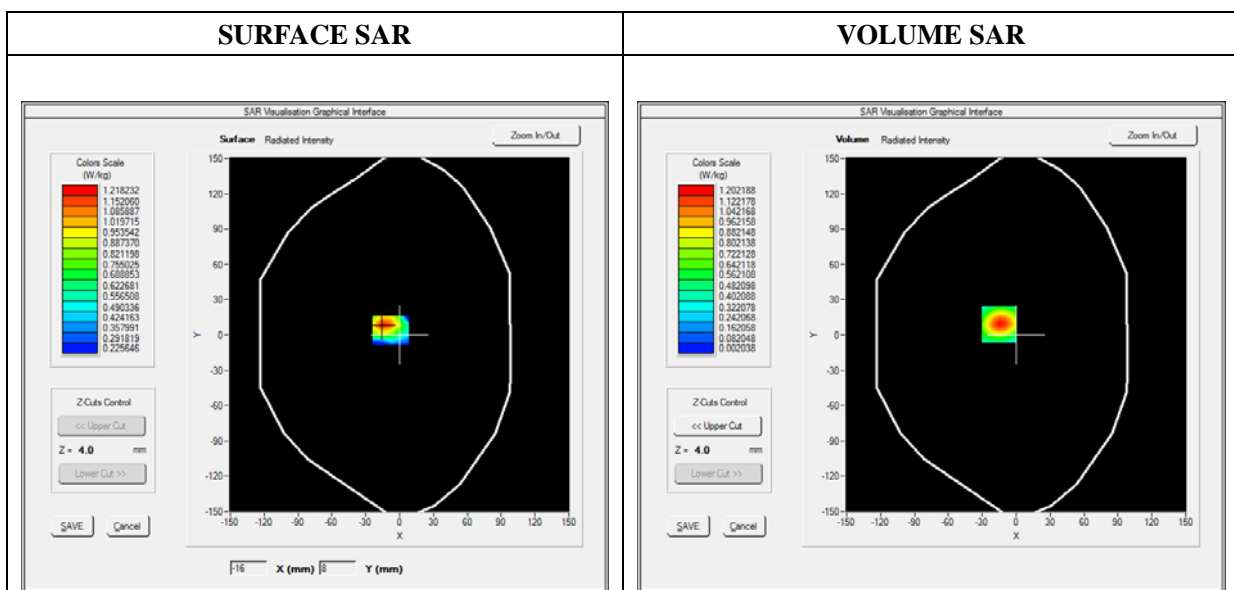
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.58; Calibrated: 06/01/2018

## 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



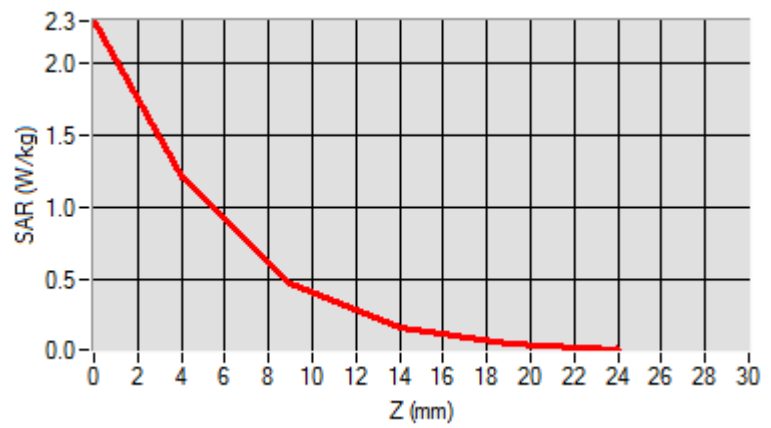


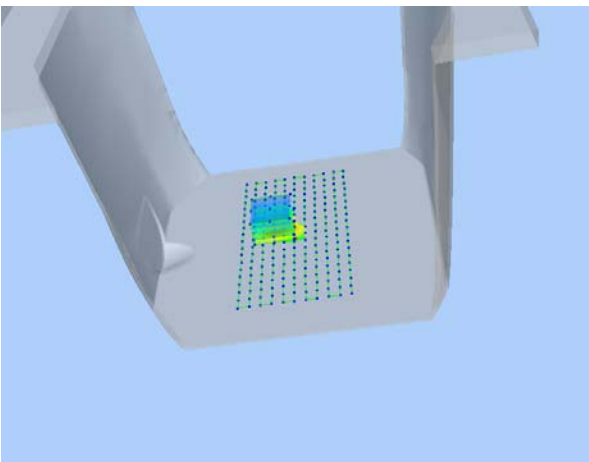
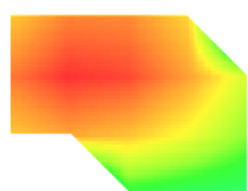
Maximum location: X=-15.00, Y=9.00

SAR Peak: 2.29 W/kg

SAR 10g (W/Kg)	0.495908
SAR 1g (W/Kg)	1.111478

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	2.2912	1.2022	0.4759	0.1669	0.0551



3D screen shot	Hot spot position
	

# MEASUREMENT 132

Type: Phone measurement (Complete)

Date of measurement: 08/15/2018

Measurement duration: 12 minutes 3 seconds

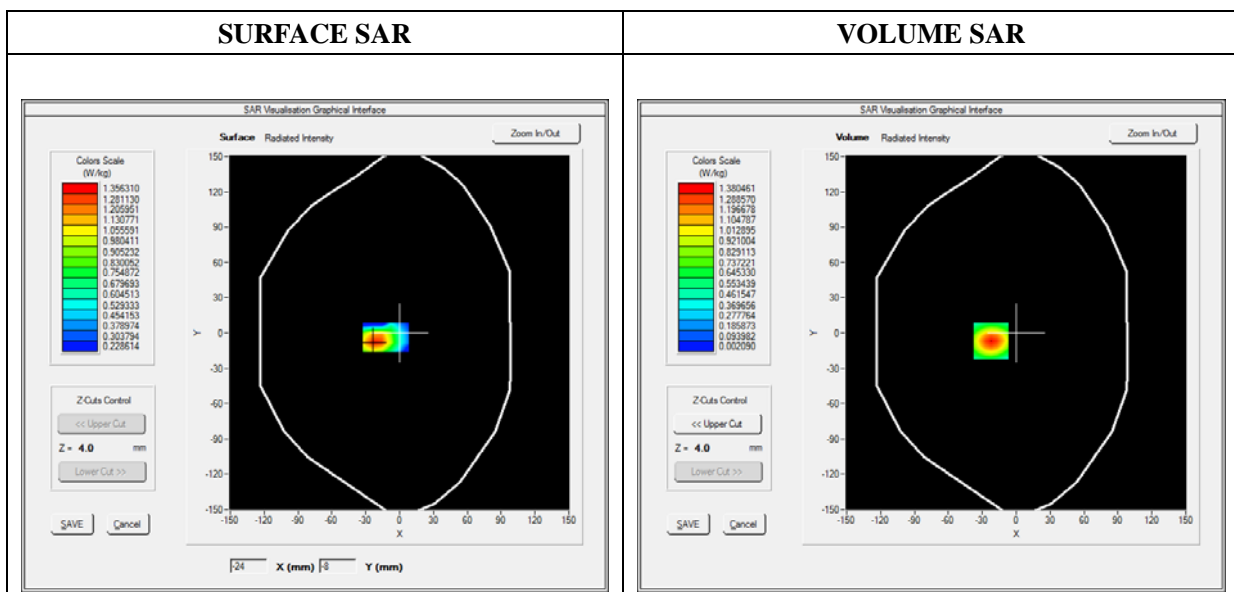
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.58; Calibrated: 06/01/2018

## A. Experimental conditions

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

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	2535.000000
<b>Relative Permittivity (real part)</b>	52.241202
<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

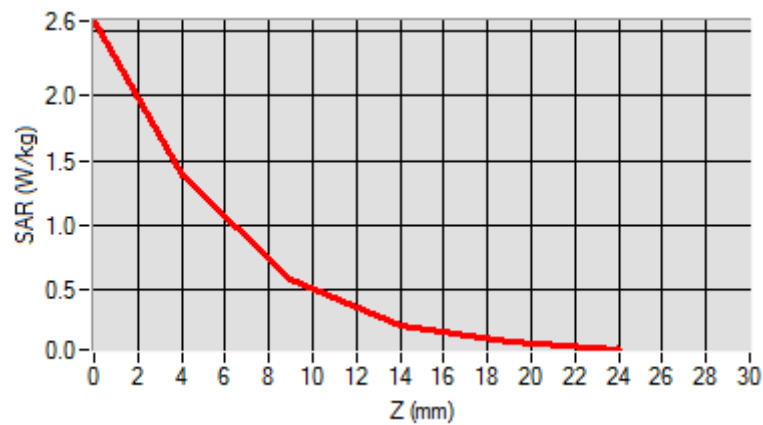


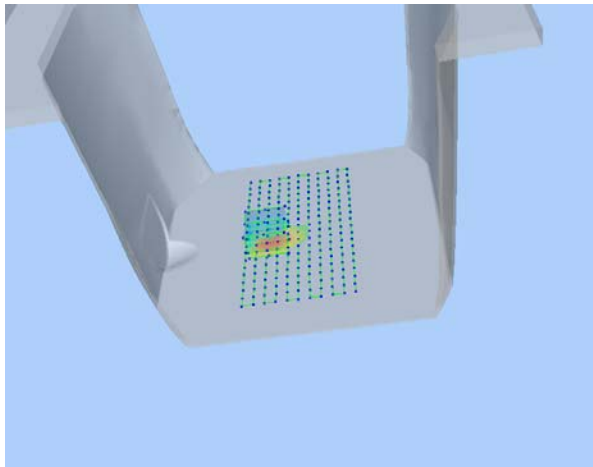
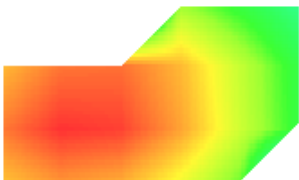
Maximum location: X=-22.00, Y=-7.00

SAR Peak: 2.57 W/kg

SAR 10g (W/Kg)	0.583982
SAR 1g (W/Kg)	1.272481

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	2.5822	1.3805	0.5694	0.2168	0.0836



3D screen shot	Hot spot position
	

# MEASUREMENT 142

Type: Phone measurement (Complete)

Date of measurement: 08/15/2018

Measurement duration: 12 minutes 3 seconds

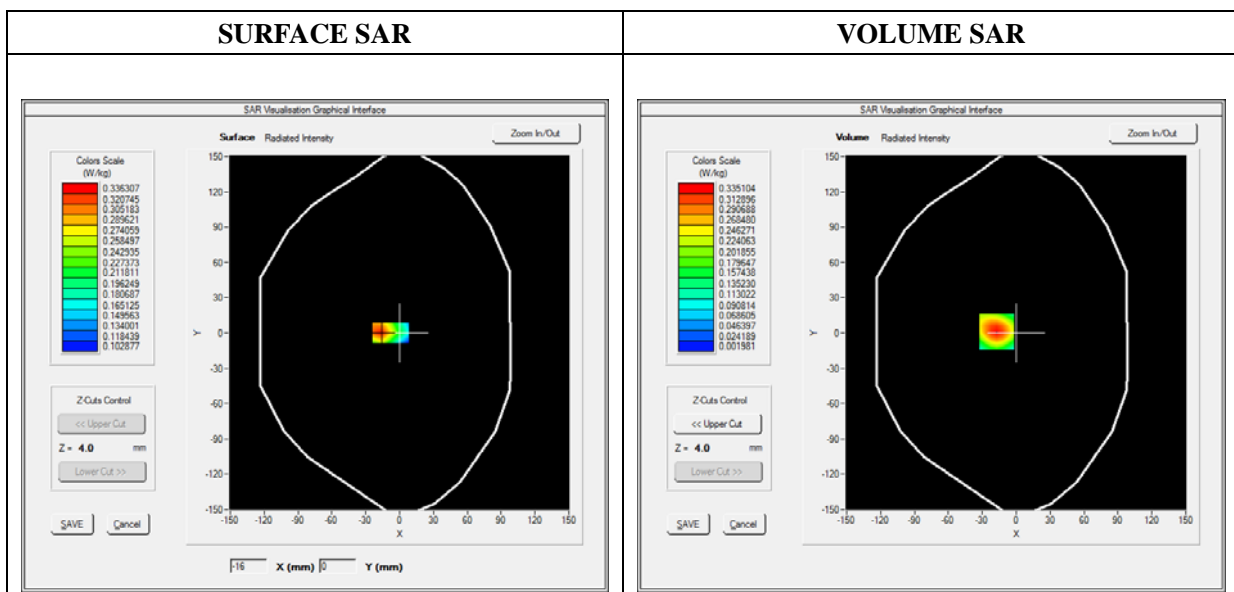
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.80; Calibrated: 06/01/2018

## 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

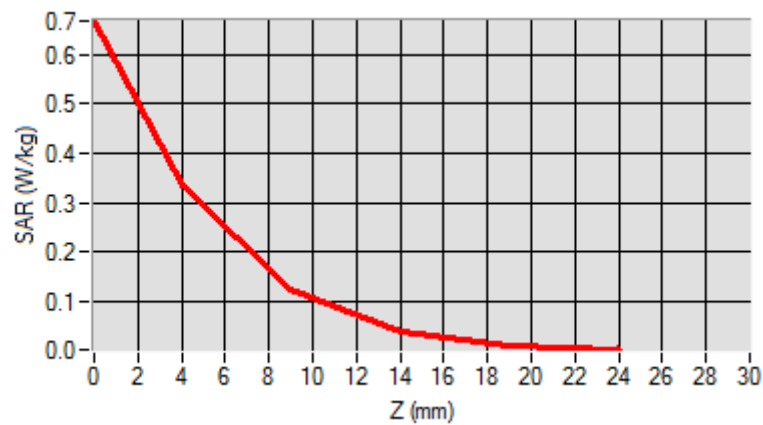


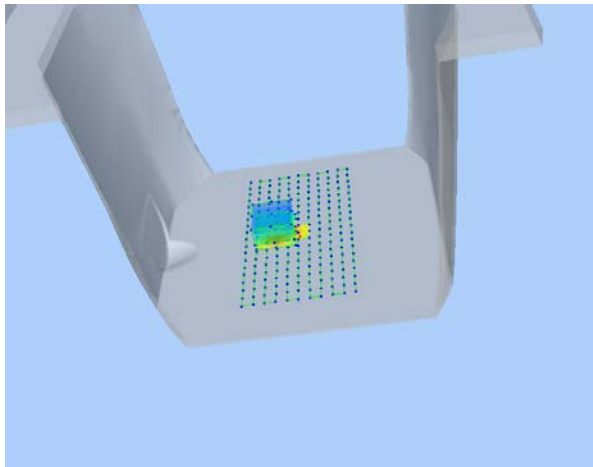

Maximum location: X=-17.00, Y=1.00

SAR Peak: 0.67 W/kg

SAR 10g (W/Kg)	0.142839
SAR 1g (W/Kg)	0.315563

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.6672	0.3351	0.1221	0.0379	0.0107



3D screen shot	Hot spot position
	

# MEASUREMENT 146

Type: Phone measurement (Complete)

Date of measurement: 08/14/2018

Measurement duration: 12 minutes 3 seconds

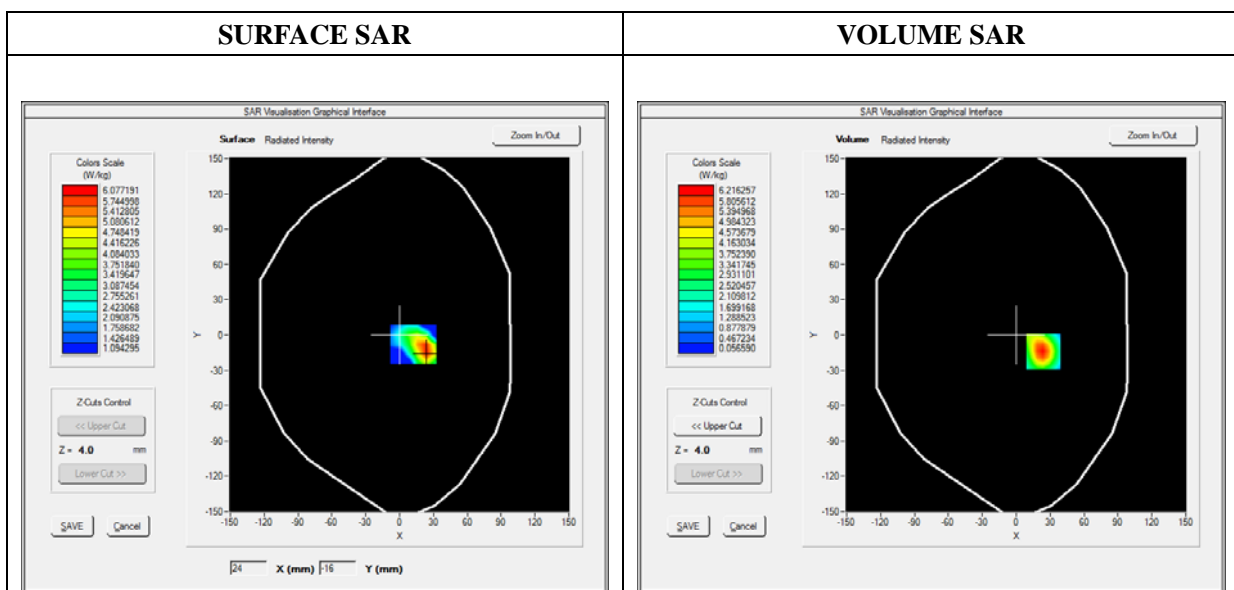
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2018

## A. Experimental conditions

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

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	1860.000000
<b>Relative Permittivity (real part)</b>	52.420415
<b>Conductivity (S/m)</b>	1.501966
<b>Power Variation (%)</b>	1.042196
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

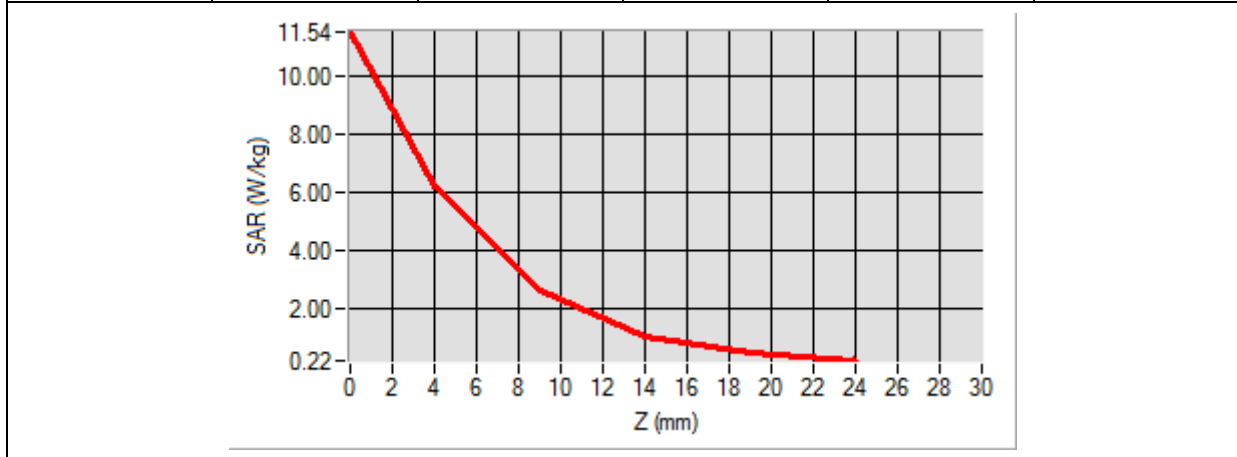


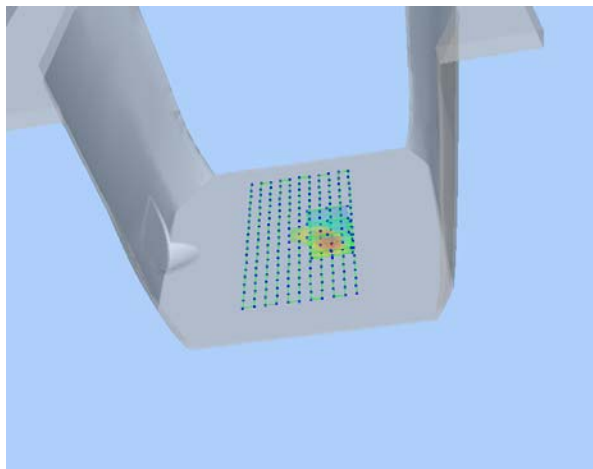
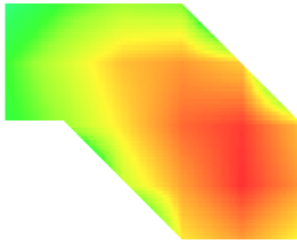
Maximum location: X=24.00, Y=-14.00

SAR Peak: 11.51 W/kg

SAR 10g (W/Kg)	2.611352
SAR 1g (W/Kg)	5.695697

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	11.5350	6.2163	2.6272	1.0669	0.4744



3D screen shot	Hot spot position
	

# MEASUREMENT 151

Type: Phone measurement (Complete)

Date of measurement: 08/15/2018

Measurement duration: 12 minutes 3 seconds

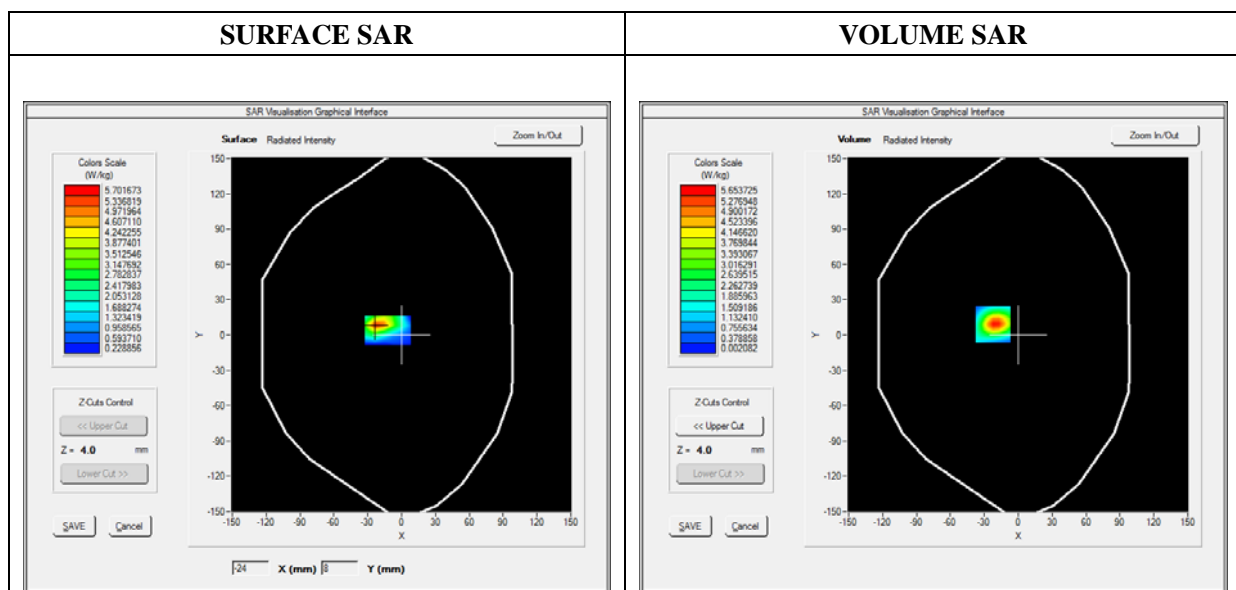
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.58; Calibrated: 06/01/2018

## 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,Middle
<b>Signal</b>	Duty Cycle 1:1

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	2535.000000
<b>Relative Permittivity (real part)</b>	52.241202
<b>Conductivity (S/m)</b>	2.120943
<b>Power Variation (%)</b>	3.325754
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.2



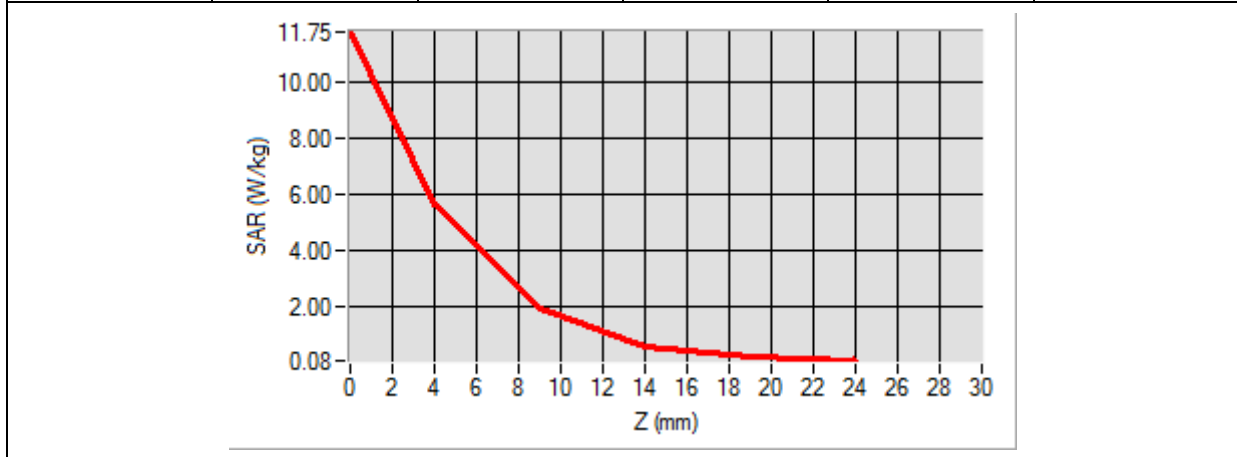


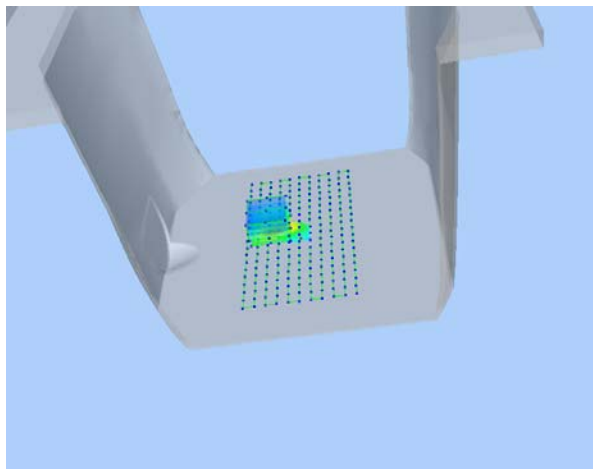
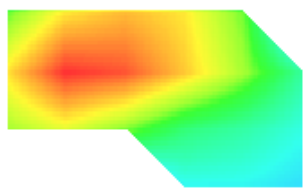
Maximum location: X=-22.00, Y=9.00

SAR Peak: 11.90 W/kg

SAR 10g (W/Kg)	2.018472
SAR 1g (W/Kg)	5.191802

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	11.7488	5.6537	1.9266	0.5776	0.1954



3D screen shot	Hot spot position
	

## Annex C. EUT Photos

---

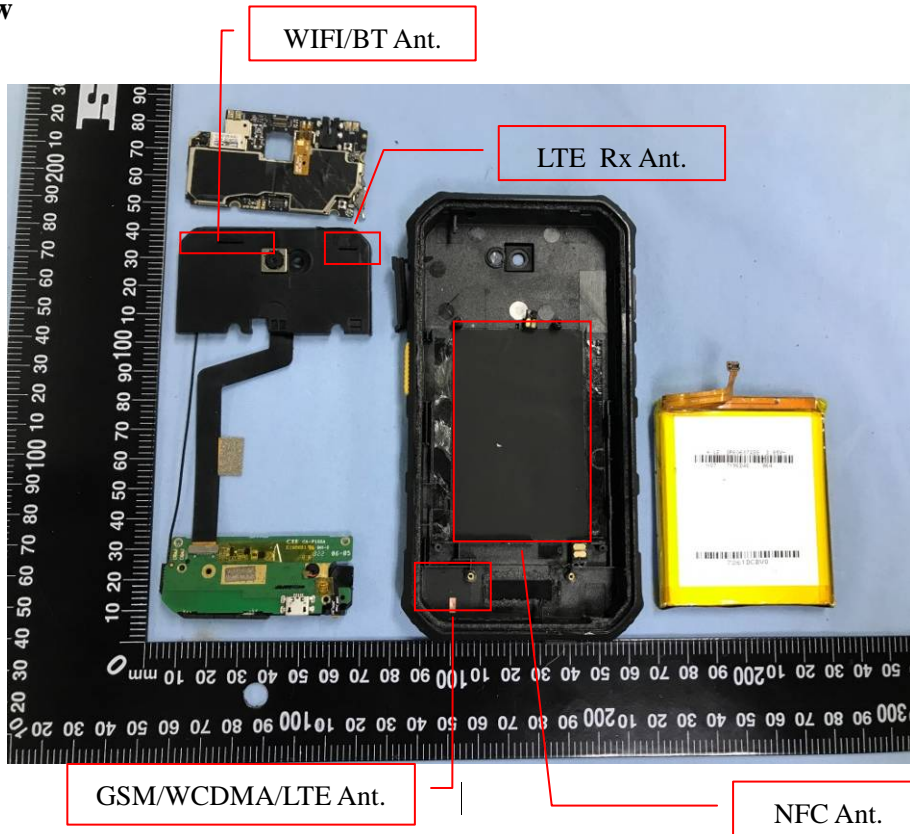
### EUT View Front



### EUT View Back



### Antenna View

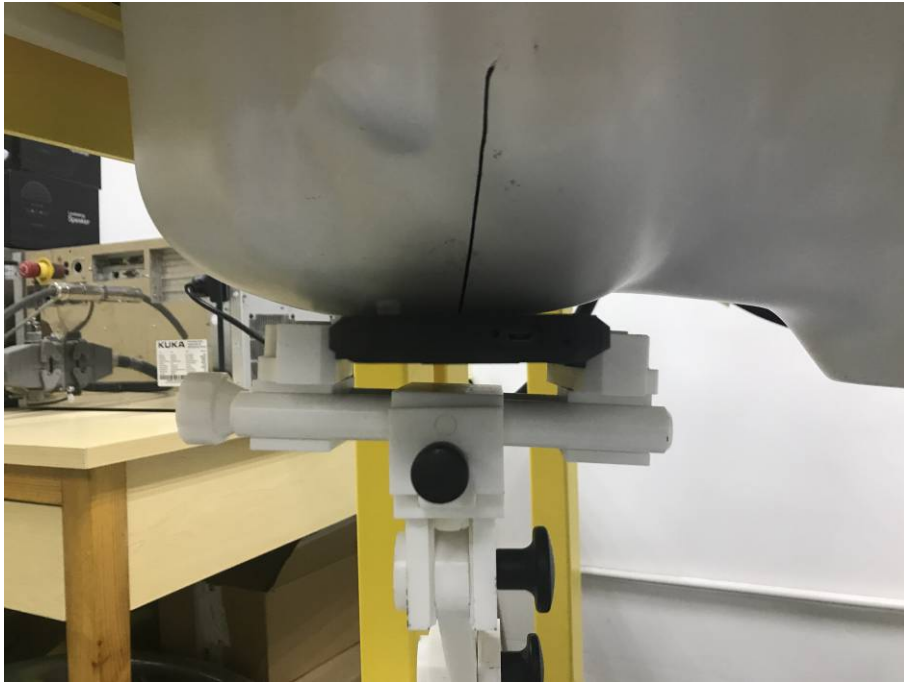


## Annex D. Test Setup Photos

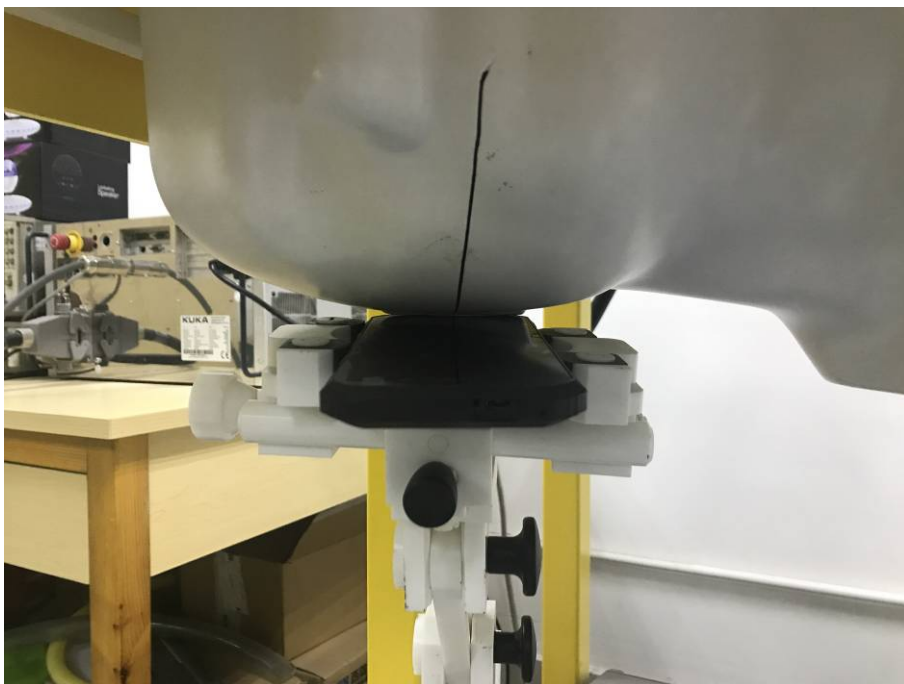
---

### Head Exposure Conditions

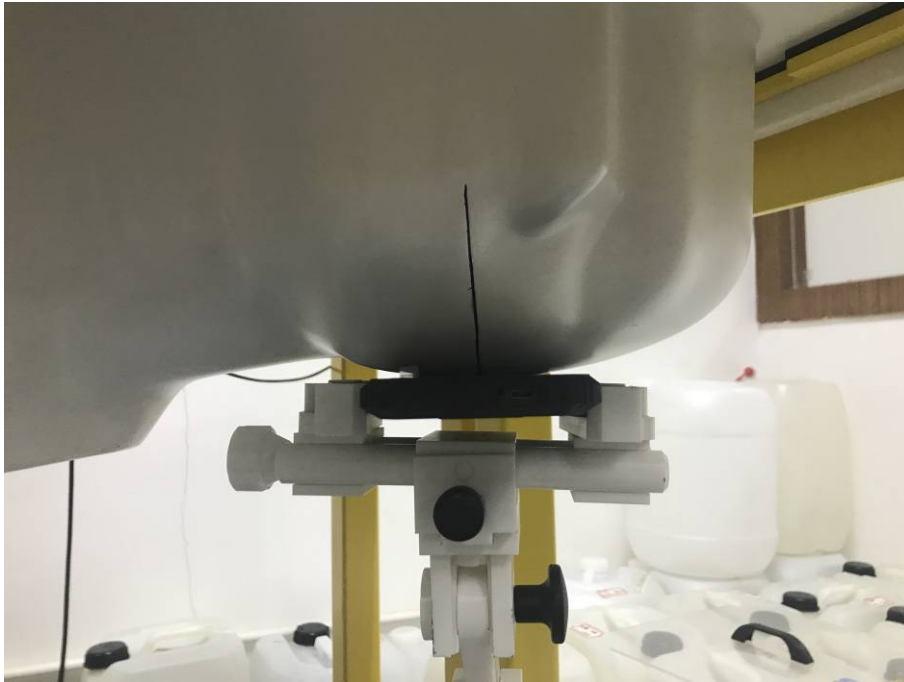
**Cheek**



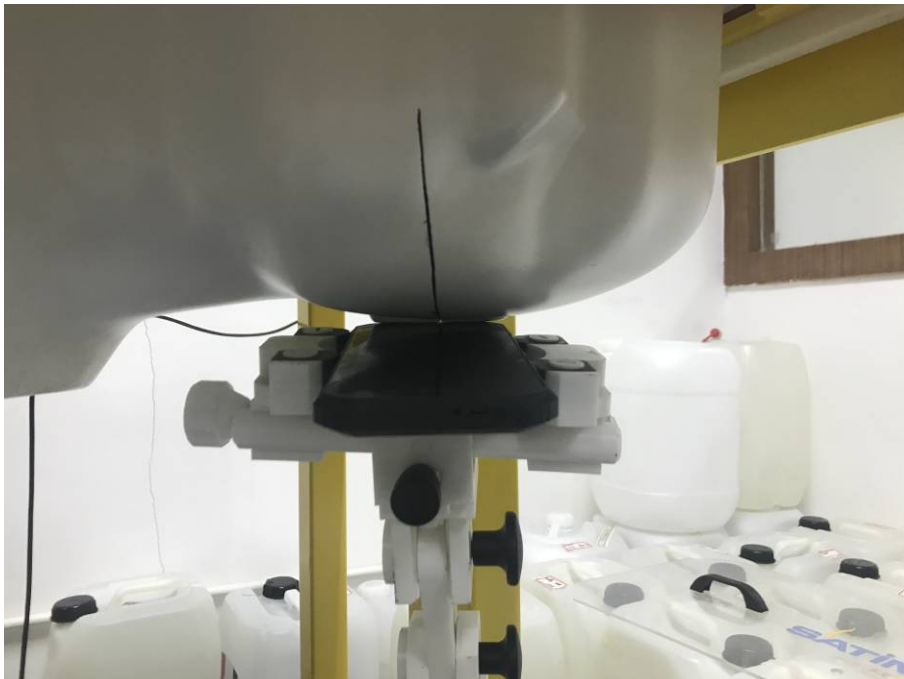
**Tilt**



### 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 \*\*\*\*\***