

# FCC SAR Measurement and Test Report

For

**TOPICON HK LIMITED**

Room 2314-2316, Tower C, Huangdu Plaza, Yitian Road, Futian District,

Shenzhen, China

**FCC ID: 2AHAF-MDT740**

<b>FCC Rules:</b>	FCC Part 2.1093 ANSI / IEEE C95.1 :2005+A1:2010 <u>ANSI / IEEE C95.3 :2002(R2008)</u>
<b>Product Description:</b>	<u>GPS</u>
<b>Tested Model:</b>	<u>MDT740</u>
<b>Report No.:</b>	<u>WTX19X05030902W</u>
<b>Sample Received Date:</b>	<u>2019-05-16</u>
<b>Tested Date:</b>	<u>2019-05-16 to 2019-08-20</u>
<b>Issued Date:</b>	<u>2019-08-22</u>

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

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## 1. General Information

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

#### Client Information

Applicant: TOPICON HK LIMITED  
 Address of applicant: Room 2314-2316, Tower C, Huangdu Plaza, Yitian Road, Futian District, Shenzhen, China

Manufacturer: TOPICON HK LIMITED  
 Address of manufacturer: Room 2314-2316, Tower C, Huangdu Plaza, Yitian Road, Futian District, Shenzhen, China

General Description of EUT	
Product Name:	GPS
Brand Name:	/
Model No.:	MDT740
Adding Model:	MDT741,MDT742,MDT752,MDT714D, OBC740, M710A, M710AG,M710AB,M710AKB,M740B, MDT840, MDT841, MDT814D
Rated Voltage:	DC 3.7V Battery
Battery Capacity:	4300mAh
<p><i>Note: The test data is gathered from a production sample, provided by the manufacturer. For more information see the following datasheet. The appearance of others models listed in the report is different from main-test model MDT740, but the circuit and the electronic construction do not change, declared by the manufacturer.</i></p>	

Technical Characteristics of EUT	
<b>2G</b>	
Support Networks:	GSM, GPRS,EDGE
Support Band:	GSM850/PCS1900
Uplink Frequency:	GSM/GPRS 850: 824~849MHz GSM/GPRS 1900: 1850~1910MHz
Downlink Frequency:	GSM/GPRS 850: 869~894MHz GSM/GPRS 1900: 1930~1990MHz
Max RF Output Power:	GSM850: 32.30dBm, GSM1900: 29.70dBm EDGE850: 29.08dBm, EDGE1900: 23.51dBm
Type of Modulation:	GMSK,8PSK
Antenna Type:	Internal Antenna
Antenna Gain:	GPRS850:3.0dBi; GPRS1900: 3.0dBi
GPRS/EDGE Class:	Class 12
<b>3G</b>	

Support Networks:	WCDMA, HSDPA, HSUPA
Support Band:	WCDMA Band II, WCDMA Band V
Uplink Frequency:	WCDMA Band II: 1850~1910MHz WCDMA Band V: 824~849MHz
Downlink Frequency:	WCDMA Band II: 1930~1990MHz WCDMA Band V: 869~894MHz
RF Output Power:	WCDMA Band II: 22.82dBm, WCDMA Band V: 22.81dBm
Type of Modulation:	BPSK, QPSK, 16QAM
Antenna Type:	Integral Antenna
Antenna Gain:	WCDMA Band II: 3.0dBi, WCDMA Band V: 3.0dBi
<b>4G</b>	
Support Networks:	FDD-LTE
Support Band:	FDD-LTE Band 2, 4, 5, 12,17
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 12: Tx: 699-716MHz, FDD-LTE Band 17: Tx: 704-716MHz
Downlink Frequency:	FDD-LTE Band 2: Rx: 1930-1990MHz, FDD-LTE Band 4: Rx: 2110-2155MHz, FDD-LTE Band 5: Rx: 869-894MHz, FDD-LTE Band 12: Rx: 729-746MHz, FDD-LTE Band 17: Rx: 734-746MHz
RF Output Power:	FDD-LTE Band 2: 23.87dBm, FDD-LTE Band 4: 23.58dBm, FDD-LTE Band 5: 23.38dBm, FDD-LTE Band 12: 23.57dBm, FDD-LTE Band 17: 23.23dBm
Type of Modulation:	QPSK, 16QAM
Antenna Type:	Integral Antenna
Antenna Gain:	FDD-LTE Band 2: 3.0dBi, FDD-LTE Band 4: 3.0dBi, FDD-LTE Band 5: 3.0dBi, FDD-LTE Band 12: 3.0dBi, FDD-LTE Band 17: 3.0dBi,
<b>WIFI</b>	
Support Standards:	802.11b, 802.11g, 802.11n-HT20/40
Frequency Range:	2412-2462MHz for 11b/g/n(HT20), 11n(HT40)
RF Output Power:	15.16m (Conducted)
Type of Modulation:	CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM
Data Rate:	1-11Mbps, 6-54Mbps, up to 72.2Mbps
Quantity of Channels:	11
Channel Separation:	5MHz

Antenna Type:	Integral Antenna
Antenna Gain:	3.0dBi
<b>Bluetooth</b>	
Bluetooth Version:	V4.0
Frequency Range:	2402-2480MHz
RF Output Power:	4.851dBm (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:	3.0dBi
<b>NFC</b>	
Support Standards:	NFC
Frequency Range:	13.56MHz
Max. Field Strength:	45.14dBuV/m (at 3m)/ -10.36dBm
Antenna Type:	Integral Antenna
Antenna Gain:	2.0dBi

For MDT740, MDT741, MDT742, OBC740, MDT752, M710A, MDT714D, M710AG, M710AKB, M740B are the Same antenna. Test carry only on MDT740

## 1.2 Test Standards

The following report is prepared on behalf of the TOPICON HK LIMITED accordance with FCC 47 CFR Part 2.1093, ANSI/IEEE C95.1 :2005+A1:2010, KDB 865664 D01 v01r04, KDB 865664 D02 v01r02, KDB 447498 D01 v06, and KDB 941225 D01 v03r01.

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	Body (0mm Gap)	SAR <sub>1g</sub> Limit (W/kg)
	Maximum SAR <sub>1g</sub> (W/kg)	
GSM850	1.161	1.6
GSM1900	<b>1.372</b>	1.6
WCDMA Band V	0.280	1.6
WCDMA Band II	0.661	1.6
LTE Band 2	0.993	1.6
LTE Band 4	0.621	1.6
LTE Band 5	0.193	1.6
LTE Band 12	0.268	1.6
LTE Band 17	0.265	1.6
WLAN 2.4GHz	0.194	1.6
Simultaneous Transmission	<b>1.566</b>	1.6

*The highest reported SAR values for body and simultaneous transmission conditions are **1.372W/kg** and **1.566 W/kg***

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+A1:2010, and had been tested in accordance with the measurement methods and procedure specified in IEEE 1528-2013 and KDB 865664 D01 v01r04 and KDB 865664 D02 v01r02

### 3. Specific Absorption Rate (SAR)

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#### 3.1 Introduction

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

#### 3.2 SAR Definition

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

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

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

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

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

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

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

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

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



## 4. SAR Measurement System

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### 4.1 The Measurement System

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

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

The following figure shows the system.



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

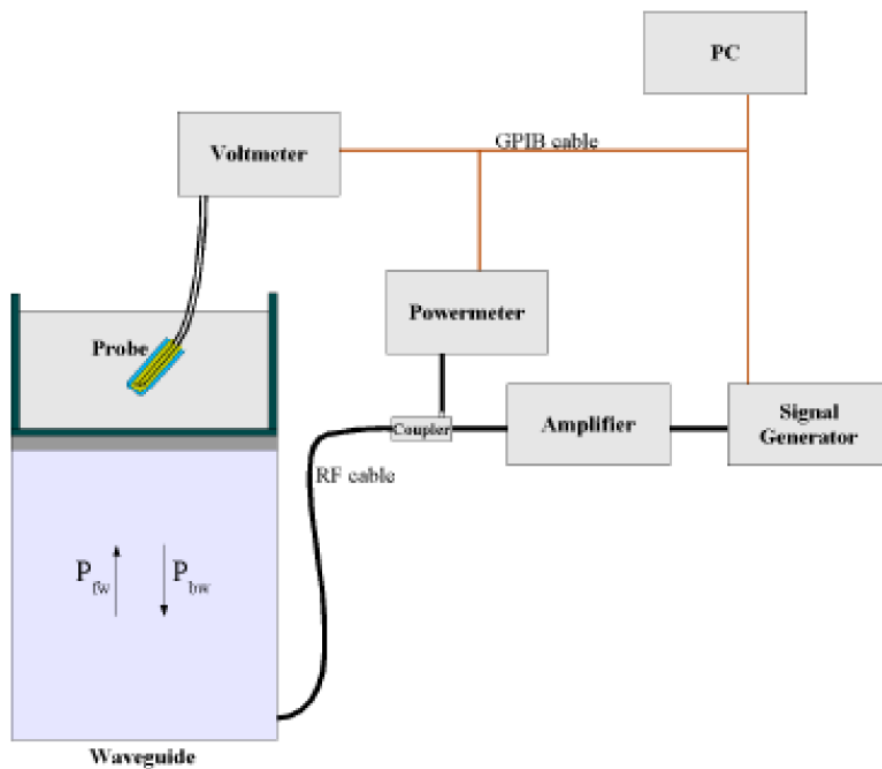
### 4.2 Probe

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

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

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

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



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

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,

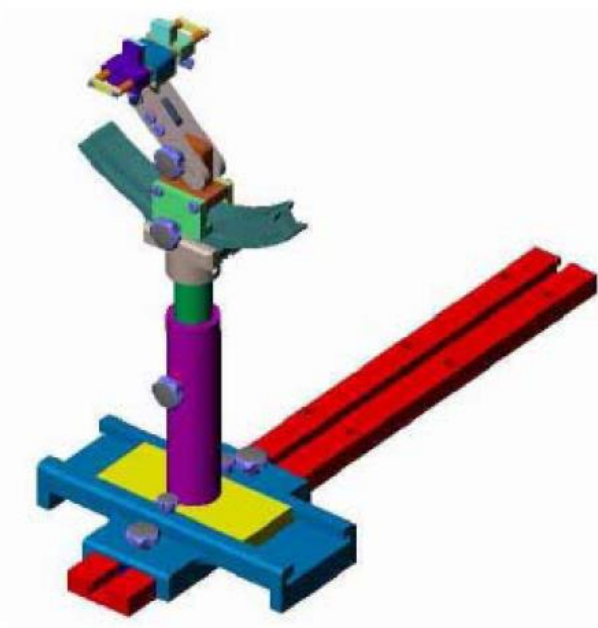
$\rho$  = Tissue density (1.25 g/cm<sup>3</sup> for brain tissue)

#### 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

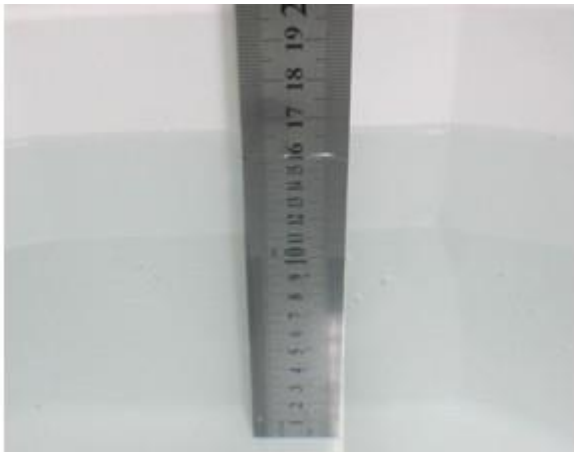
#### 4.6 Test Equipment List

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
E-Field Probe	MVG	SSE5	SN 09/13 EP168	2019-05-22	2020-05-21
750MHz Dipole	MVG	SID750	SN 47/12 DIP 0G750-203	2019-03-16	2020-03-15
835MHz Dipole	MVG	SID835	SN 47/12 DIP 0G835-204	2019-03-16	2020-03-15
1800MHz Dipole	MVG	SID1800	SN 47/12 DIP 1G800-206	2019-03-16	2020-03-15
1900MHz Dipole	MVG	SID1900	SN 47/12 DIP 1G900-207	2019-03-16	2020-03-15
2450MHz Dipole	MVG	SID2450	SN 13/15 DIP 2G450-364	2019-03-16	2020-03-15
Dielectric Probe Kit	MVG	SCLMP	SN 47/12 OCPG49	2019-03-16	2020-03-15
SAM Phantom	MVG	SAM	SN/ 47/12 SAM95	N/A	N/A
MULTIMETER	KEITHLEY	Keithley 2000	4006367	2019-04-30	2020-04-29
Signal Generator	Rohde & Schwarz	SMR20	100047	2019-04-30	2020-04-29
Universal Tester	Rohde & Schwarz	CMU200	112012	2019-04-30	2020-04-29
Communications Tester	Rohde & Schwarz	CMW500	148650	2019-04-30	2020-04-29
Network Analyzer	HP	8753C	2901A00831	2019-04-30	2020-04-29
Directional Couplers	Agilent	778D	20160	2019-04-30	2020-04-29

## 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>Body</b>						
750	50.0	0.8	48.8	0.2	0.2	0
835	50.8	0.9	48.2	0	0.1	0.00
1800-1900	70.2	0.4	0	0	0	29.4
2450	68.6	0.1	0	0	0	31.3

## 5.2 Tissue Dielectric Parameters for Head and Body Phantoms

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

Target Frequency (MHz)	Head		Body	
	Conductivity ( $\sigma$ )	Permittivity ( $\epsilon_r$ )	Conductivity ( $\sigma$ )	Permittivity ( $\epsilon_r$ )
150	0.76	52.3	0.80	61.9
300	0.87	45.3	0.92	58.2
450	0.87	43.5	0.94	56.7
<b>750</b>	<b>0.89</b>	<b>41.9</b>	<b>0.96</b>	<b>55.5</b>
<b>835</b>	0.90	41.5	<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>	1.40	40.0	<b>1.52</b>	<b>53.3</b>
<b>2450</b>	1.80	39.2	<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

Body Tissue Simulating Liquid									
Freq. MHz.	Temp. (°C)	Conductivity			Permittivity			Limit (%)	Date
		Reading ( $\sigma$ )	Target ( $\sigma$ )	Delta (%)	Reading ( $\epsilon_r$ )	Target ( $\epsilon_r$ )	Delta (%)		
750	21.2	0.93	0.96	-3.12	54.96	55.50	-0.97	±5	2019-08-12
835	21.2	0.95	0.97	-2.06	54.85	55.20	-0.63	±5	2019-08-12
1750	21.3	1.46	1.49	-2.01	51.22	53.40	-4.08	±5	2019-08-13
1800	21.3	1.46	1.52	-3.95	51.22	53.30	-3.90	±5	2019-08-13
1900	21.3	1.50	1.52	-1.32	52.42	53.30	-1.65	±5	2019-08-13
2450	21.3	1.91	1.95	-2.05	52.01	52.7	-1.31	±5	2019-08-14



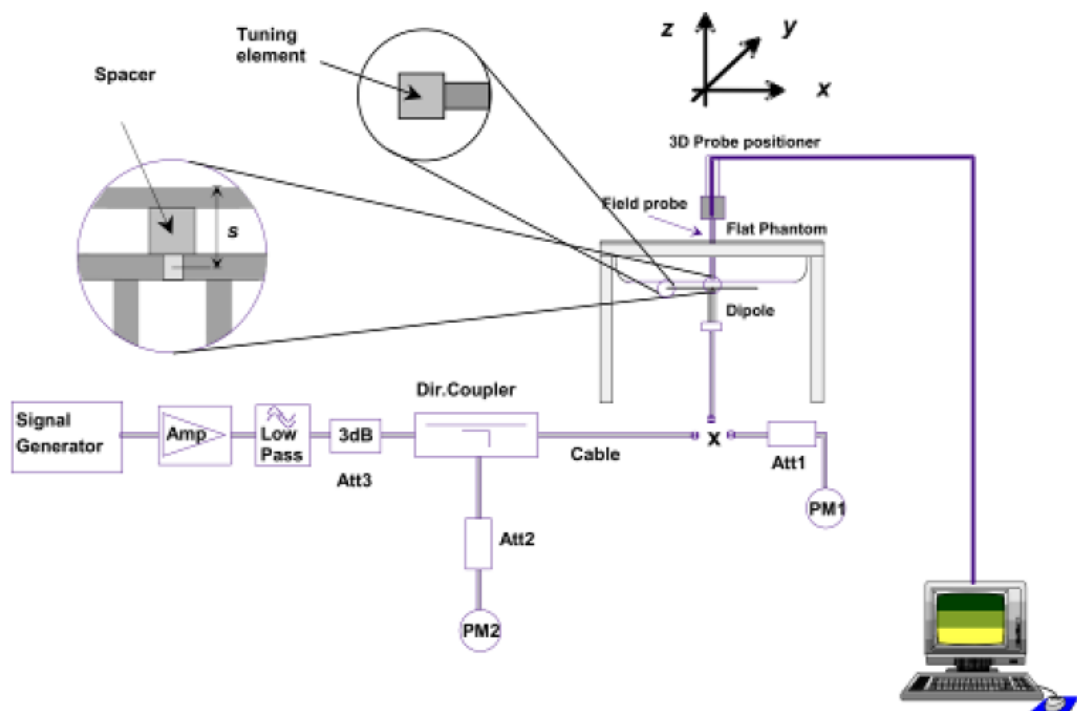
## 6. SAR Measurement Evaluation

### 6.1 Purpose of System Performance Check

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

### 6.2 System Setup

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



System Verification Setup Block Diagram



**Setup Photo of Dipole Antenna**

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

### 6.3 Validation Results

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

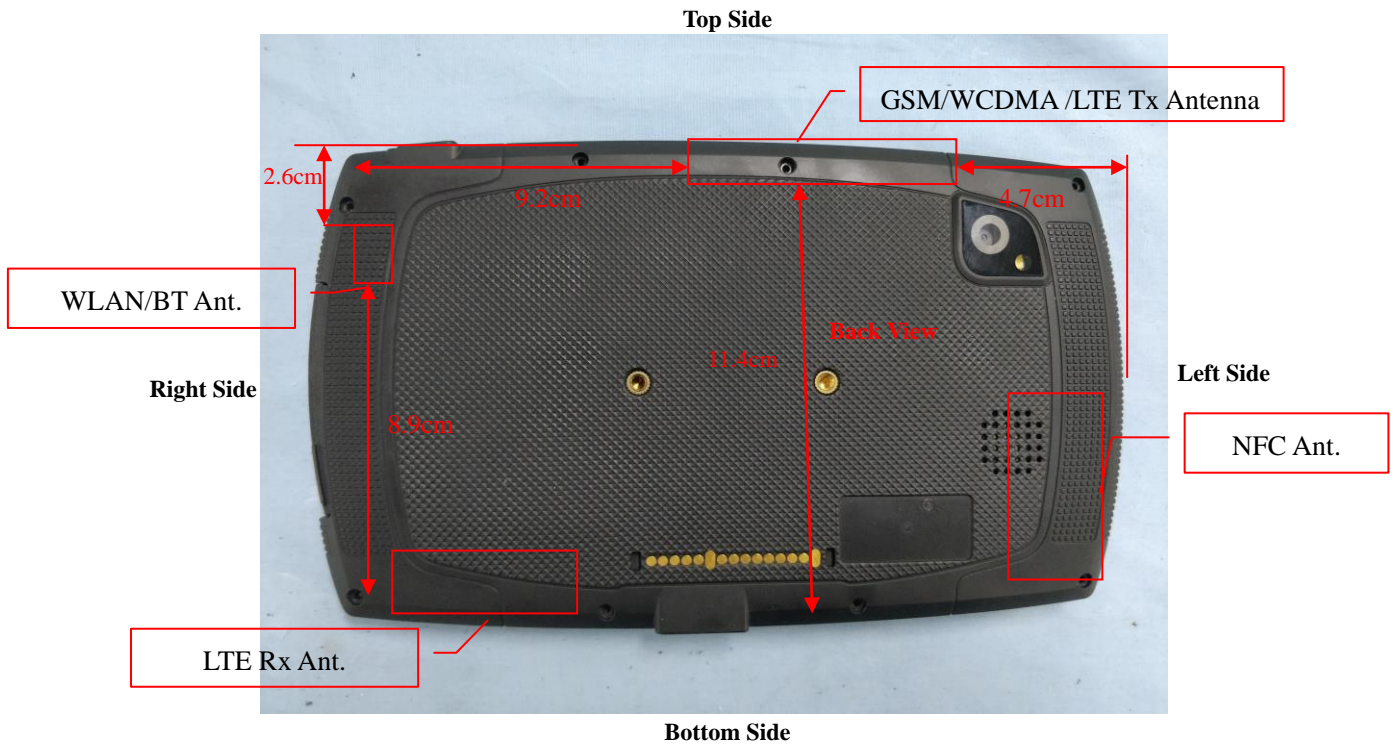
Frequency	Targeted SAR <sub>1g</sub>	Measured SAR <sub>1g</sub>	Normalized SAR <sub>1g</sub>	Tolerance	Date
MHz	(W/kg)	(W/kg)	(W/kg)	(%)	
Body					
750	8.40	2.12	8.48	0.95	2019-08-12
835	9.38	2.36	9.44	0.64	2019-08-12
1800	38.29	9.58	38.32	0.08	2019-08-13
1900	39.10	9.80	39.2	0.26	2019-08-13
2450	50.41	12.59	50.36	-0.10	2019-08-14

### Targeted and Measurement SAR

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

## 7. EUT Testing Position

### 7.1 EUT Antenna Position



**Block Diagram for EUT Antenna Position**

## 7.2 EUT Testing Position

Exclusion Distance Calculation				
Frequency Bands	Service	Maximum Tune-up Power	Average Power	Exclusion Distance
GPRS850	GPRS(4slots)	29.5dBm	26.5dBm	110mm
GPRS1900	GPRS(4slots)	27.0dBm	24.0dBm	70mm
WCDMA Band V	RMC 12.2k	23.0dBm	23.0dBm	60mm
WCDMA Band II	RMC 12.2k	23.0dBm	23.0dBm	60mm
LTE Band 2	QPSK(20MHz)	24.0dBm	24.0dBm	70mm
LTE Band 4	QPSK(20MHz)	24.0dBm	24.0dBm	70mm
LTE Band 5	QPSK(10MHz)	23.5dBm	23.5dBm	70mm
LTE Band 12	QPSK(10MHz)	24.0dBm	24.0dBm	70mm
LTE Band 17	QPSK(10MHz)	23.5dBm	23.5dBm	70mm
WLAN	11b	15.5dBm	15.5dBm	20mm

Note: Refer to Chapter 9.1 Conducted RF Output Power

### Remark:

- Referring to KDB 447498 D01v06, the distance of the antennas to all adjacent edges SAR test exclusion for adjacent edges.

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

Body SAR tests, Test distance: 0mm						
Frequency Bands	Front	Back	Right Side	Left Side	Top Side	Bottom Side
GPRS850	No	Yes	Yes	Yes	Yes	No
GPRS1900	No	Yes	No	Yes	Yes	No
WCDMA Band V	No	Yes	No	Yes	Yes	No
WCDMA Band II	No	Yes	No	Yes	Yes	No
LTE Band 2	No	Yes	No	Yes	Yes	No
LTE Band 4	No	Yes	No	Yes	Yes	No
LTE Band 5	No	Yes	No	Yes	Yes	No
LTE Band 12	No	Yes	No	Yes	Yes	No
LTE Band 17	No	Yes	No	Yes	Yes	No
WLAN	No	Yes	Yes	No	No	No

### Remark:

- Referring to KDB 616217 D04 v01r02, this device is overall diagonal dimension(>20cm) tablet, tested in direct contact (no gap) with flat phantom.
- Referring to KDB 616217 D04 v01r02, Exposures from antennas through the front (top) surface of the display section of a full-size tablet, away from the edges, are generally limited to the user's hands. Exposures to hands for typical consumer transmitters used in tablets are not expected to exceed the extremity SAR limit; therefore, SAR

evaluation for the front surface of tablet display screens are generally not necessary.

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

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## 8. SAR Measurement Procedures

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### 8.1 Measurement Procedures

The measurement procedures are as follows:

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

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

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

### 8.2 Spatial Peak SAR Evaluation

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

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

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

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

### 8.3 Area & Zoom Scan Procedures

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan measures 5x5x7 points with step size 8, 8 and 5 mm for 300 MHz to 3 GHz, and 8x8x8 points with step size 4, 4 and 2.5 mm for 3 GHz to 6 GHz. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g.

### 8.4 Volume Scan Procedures

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

### 8.5 SAR Averaged Methods

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

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

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

### 8.6 Power Drift Monitoring

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

## 9. SAR Test Result

### 9.1 Conducted RF Output Power

GSM - Burst Average Power (dBm)						
Band	GSM850			PCS1900		
Channel	128	190	251	512	661	810
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880	1909.8
GSM	32.30	32.30	32.30	29.50	29.50	29.70
GPRS (1 slot)	32.30	32.33	32.29	29.37	29.44	29.64
GPRS (2 slots)	31.70	31.70	31.60	28.83	28.87	29.02
GPRS (3 slots)	30.13	30.06	29.95	27.32	27.34	27.63
GPRS (4 slots)	29.08	28.99	28.86	26.23	26.27	26.51
EGPRS (1 slot)	27.48	27.36	27.21	26.67	26.60	26.62
EGPRS (2 slots)	26.48	26.45	26.42	25.74	25.77	25.74
EGPRS (3 slots)	24.53	24.36	24.43	23.83	23.72	23.74
EGPRS (4 slots)	23.45	23.56	23.34	22.62	22.59	22.58

GSM - Source-Based Time-Average Power (dBm)						
Band	GSM850			PCS1900		
Channel	128	190	251	512	661	810
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880	1909.8
GSM	23.30	23.30	23.30	20.50	20.50	20.70
GPRS (1 slot)	23.30	23.33	23.29	20.37	20.44	20.64
GPRS (2 slots)	25.70	25.70	25.60	22.83	22.87	23.02
GPRS (3 slots)	25.88	25.81	25.70	23.07	23.09	23.38
GPRS (4 slots)	26.08	25.99	25.86	23.23	23.27	23.51
EGPRS (1 slot)	18.48	18.36	18.21	17.67	17.60	17.62
EGPRS (2 slots)	20.48	20.45	20.42	19.74	19.77	19.74
EGPRS (3 slots)	20.28	20.11	20.18	19.58	19.47	19.49
EGPRS (4 slots)	20.45	20.56	20.34	19.62	19.59	19.58

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

#### Remark:

1. For Body SAR testing, GPRS should be evaluated, therefore the EUT was set in GPRS (4Tx slots) for GSM850 and GPRS (4Tx slots) for GSM1900 due to its highest source-based time-average power.
2. Per KDB 447498 D01 v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.



WCDMA - Average Power (dBm)						
Band	WCDMA Band II			WCDMA Band V		
Channel	9262	9400	9538	4132	4183	4233
Frequency (MHz)	1852.4	1880.0	1907.6	826.4	836.6	846.6
RMC 12.2k	22.82	22.75	22.72	22.81	22.81	22.76
HSDPA Subtest-1	22.00	21.31	21.31	21.84	21.96	21.76
HSDPA Subtest-2	20.97	21.28	21.28	21.81	21.94	21.73
HSDPA Subtest-3	20.98	21.29	21.27	21.82	21.93	21.75
HSDPA Subtest-4	20.97	21.27	21.28	21.82	21.95	21.75
HSUPA Subtest-1	21.92	21.54	21.56	21.89	21.86	21.77
HSUPA Subtest-2	21.89	21.52	21.55	21.86	21.83	21.73
HSUPA Subtest-3	21.89	21.52	21.53	21.87	21.84	21.75
HSUPA Subtest-4	21.91	21.53	21.52	21.86	21.85	21.74
HSUPA Subtest-5	21.9	21.52	21.53	21.86	21.83	21.74

**Remark:**

1. For Body SAR, per KDB 941225 D01 v03r01, 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	23.26	0
		1	3	23.31	0
		1	5	23.3	0
		3	0	22.09	0
		3	2	22.11	0
		3	3	22.12	0
		6	0	22.36	1
	MCH	1	0	23.79	0
		1	3	23.6	0
		1	5	23.63	0
		3	0	22.43	0
		3	2	22.39	0
		3	3	22.42	0
		6	0	22.52	1
	HCH	1	0	22.45	0
		1	3	22.39	0
		1	5	22.06	0
		3	0	22.07	0
		3	2	22.61	0
		3	3	22.4	0
		6	0	21.17	1
16QAM	LCH	1	0	22.14	1
		1	3	22.25	1
		1	5	22.16	1
		3	0	22.03	1
		3	2	22.02	1
		3	3	22.02	1
		6	0	21.14	2
	MCH	1	0	22.93	1
		1	3	22.91	1
		1	5	22.96	1
		3	0	22.57	1
		3	2	22.54	1
		3	3	22.59	1
		6	0	21.58	2
HCH	1	0	21.33	1	
	1	3	21.45	1	

		1	5	21.74	1
		3	0	21.12	1
		3	2	21.21	1
		3	3	21.40	1
		6	0	21.29	2

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.74	0
		1	7	22.66	0
		1	14	22.80	0
		8	0	22.27	1
		8	4	22.29	1
		8	7	22.32	1
		15	0	22.18	1
	MCH	1	0	23.57	0
		1	7	23.34	0
		1	14	23.30	0
		8	0	22.49	1
		8	4	22.42	1
		8	7	22.41	1
		15	0	22.39	1
	HCH	1	0	22.17	0
		1	7	22.13	0
		1	14	22.23	0
		8	0	21.77	1
		8	4	21.81	1
		8	7	21.97	1
		15	0	21.83	1
16QAM	LCH	1	0	22.16	1
		1	7	22.17	1
		1	14	22.26	1
		8	0	21.19	2
		8	4	21.23	2
		8	7	21.23	2
		15	0	21.06	2
	MCH	1	0	22.93	1
		1	7	22.77	1
		1	14	22.77	1
		8	0	21.57	2
		8	4	21.50	2
		8	7	21.52	2

	HCH	15	0	21.50	2
		1	0	21.07	1
		1	7	21.08	1
		1	14	21.47	1
		8	0	20.91	2
		8	4	20.94	2
		8	7	20.84	2
		15	0	20.97	2

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.70	0
		1	12	22.57	0
		1	24	22.91	0
		12	0	22.08	1
		12	6	22.06	1
		12	13	22.25	1
		25	0	22.19	1
	MCH	1	0	23.42	0
		1	12	23.07	0
		1	24	23.33	0
		12	0	22.04	1
		12	6	21.99	1
		12	13	22.12	1
		25	0	22.05	1
	HCH	1	0	22.02	0
		1	12	22.18	0
		1	24	22.43	0
		12	0	21.59	1
		12	6	21.52	1
		12	13	21.75	1
		25	0	21.58	1
16QAM	LCH	1	0	22.17	1
		1	12	22.01	1
		1	24	22.41	1
		12	0	21.19	2
		12	6	21.23	2
		12	13	21.29	2
		25	0	21.17	2
	MCH	1	0	22.66	1
		1	12	22.37	1
		1	24	22.69	1

		12	0	21.23	2
		12	6	21.24	2
		12	13	21.38	2
		25	0	21.17	2
	HCH	1	0	21.10	1
		1	12	21.09	1
		1	24	21.57	1
		12	0	20.75	2
		12	6	20.70	2
		12	13	20.92	2
		25	0	20.77	2

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.30	0
		1	24	22.56	0
		1	49	22.47	0
		25	0	22.10	1
		25	12	22.14	1
		25	25	22.15	1
		50	0	22.19	1
	MCH	1	0	22.94	0
		1	24	23.10	0
		1	49	22.64	0
		25	0	21.99	1
		25	12	22.04	1
		25	25	22.00	1
		50	0	21.94	1
	HCH	1	0	22.15	0
		1	24	22.11	0
		1	49	22.11	0
		25	0	21.27	1
		25	12	21.01	1
		25	25	21.19	1
		50	0	21.08	1
16QAM	LCH	1	0	21.80	1
		1	24	22.08	1
		1	49	21.95	1
		25	0	21.19	2
		25	12	21.27	2
		25	25	21.32	2
		50	0	21.28	2

	MCH	1	0	22.33	1
		1	24	22.56	1
		1	49	22.17	1
		25	0	21.13	2
		25	12	21.19	2
		25	25	21.14	2
		50	0	21.11	2
	HCH	1	0	21.54	1
		1	24	21.14	1
		1	49	21.05	1
		25	0	20.43	2
		25	12	20.80	2
		25	25	20.92	2
		50	0	20.58	2

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.55	0
		1	37	22.63	0
		1	74	22.82	0
		37	0	22.09	1
		37	18	22.14	1
		37	38	22.19	1
		75	0	22.20	1
	MCH	1	0	23.17	0
		1	37	23.08	0
		1	74	22.97	0
		37	0	22.04	1
		37	18	22.01	1
		37	38	22.05	1
		75	0	22.02	1
	HCH	1	0	22.95	0
		1	37	22.77	0
		1	74	22.19	0
		37	0	21.88	1
		37	18	21.43	1
		37	38	21.03	1
		75	0	21.55	1
16QAM	LCH	1	0	22.03	1
		1	37	22.07	1
		1	74	22.28	1
		37	0	21.27	2

		37	18	21.28	2
		37	38	21.32	2
		75	0	21.31	2
	MCH	1	0	22.45	1
		1	37	22.43	1
		1	74	22.37	1
		37	0	21.14	2
		37	18	21.17	2
		37	38	21.20	2
		75	0	21.12	2
	HCH	1	0	22.32	1
		1	37	21.36	1
		1	74	21.19	1
		37	0	21.04	2
		37	18	20.64	2
		37	38	20.97	2
75		0	20.75	2	

Channel Bandwidth: 20 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.75	0
		1	49	22.83	0
		1	99	23.79	0
		50	0	22.16	1
		50	25	22.15	1
		50	50	22.28	1
		100	0	22.25	1
	MCH	1	0	23.87	0
		1	49	23.18	0
		1	99	23.12	0
		50	0	22.99	1
		50	25	21.99	1
		50	50	22.03	1
		100	0	22.03	1
	HCH	1	0	23.71	0
		1	49	22.14	0
		1	99	22.18	0
		50	0	22.25	1
		50	25	21.68	1
		50	50	21.24	1
		100	0	21.88	1
16QAM	LCH	1	0	22.12	1

		1	49	22.15	1
		1	99	22.59	1
		50	0	21.28	2
		50	25	21.28	2
		50	50	21.40	2
		100	0	21.37	2
	MCH	1	0	22.69	1
		1	49	22.56	1
		1	99	22.55	1
		50	0	21.19	2
		50	25	21.16	2
		50	50	21.23	2
	HCH	100	0	21.16	2
		1	0	22.41	1
		1	49	21.56	1
		1	99	21.07	1
		50	0	21.42	2
		50	25	20.86	2
		50	50	20.48	2
	100	0	21.04	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	23.29	0
		1	3	23.25	0
		1	5	23.29	0
		3	0	22.25	0
		3	2	22.19	0
		3	3	22.21	0
		6	0	22.33	1
	MCH	1	0	23.47	0
		1	3	23.45	0
		1	5	23.46	0
		3	0	22.50	0
		3	2	22.45	0
		3	3	22.43	0
	HCH	6	0	22.49	1
		1	0	23.30	0
		1	3	23.22	0



		1	5	23.25	0
		3	0	22.21	0
		3	2	22.18	0
		3	3	22.17	0
		6	0	22.31	1
16QAM	LCH	1	0	22.50	1
		1	3	22.49	1
		1	5	22.51	1
		3	0	22.15	1
		3	2	22.14	1
		3	3	22.16	1
		6	0	21.19	2
	MCH	1	0	22.68	1
		1	3	22.72	1
		1	5	22.68	1
		3	0	22.52	1
		3	2	22.47	1
		3	3	22.49	1
		6	0	21.57	2
	HCH	1	0	22.37	1
		1	3	22.40	1
		1	5	22.35	1
		3	0	22.32	1
		3	2	22.24	1
		3	3	22.24	1
		6	0	21.20	2

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.17	0
		1	7	23.21	0
		1	14	23.21	0
		8	0	22.32	1
		8	4	22.31	1
		8	7	22.33	1
		15	0	22.28	1
	MCH	1	0	23.42	0
		1	7	23.48	0
		1	14	23.41	0
		8	0	22.49	1
		8	4	22.48	1
		8	7	22.50	1

	HCH	15	0	22.44	1
		1	0	23.30	0
		1	7	23.27	0
		1	14	23.20	0
		8	0	22.32	1
		8	4	22.31	1
		8	7	22.30	1
		15	0	22.26	1
16QAM	LCH	1	0	22.35	1
		1	7	22.39	1
		1	14	22.40	1
		8	0	21.29	2
		8	4	21.31	2
		8	7	21.29	2
		15	0	21.18	2
	MCH	1	0	22.72	1
		1	7	22.78	1
		1	14	22.73	1
		8	0	21.44	1
		8	4	21.42	2
		8	7	21.46	2
		15	0	21.40	2
	HCH	1	0	22.48	2
		1	7	22.45	1
		1	14	22.34	1
		8	0	21.24	1
		8	4	21.21	1
		8	7	21.18	2
		15	0	21.23	2

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.34	0
		1	12	23.37	0
		1	24	23.34	0
		12	0	22.33	1
		12	6	22.34	1
		12	13	22.35	1
		25	0	22.29	1
	MCH	1	0	23.54	0
		1	12	23.51	0
		1	24	23.49	0

		12	0	22.52	1	
		12	6	22.48	1	
		12	13	22.53	1	
		25	0	22.47	1	
	HCH	1	0	23.45	0	
		1	12	23.42	0	
		1	24	23.31	0	
		12	0	22.43	1	
		12	6	22.40	1	
		12	13	22.32	1	
		25	0	22.32	1	
		16QAM	LCH	1	0	22.47
	1			12	22.50	1
	1			24	22.51	1
12	0			21.31	2	
12	6			21.31	2	
12	13			21.33	2	
25	0			21.24	2	
MCH	1		0	22.75	1	
	1		12	22.72	1	
	1		24	22.70	1	
	12		0	21.60	2	
	12		6	21.60	2	
	12		13	21.57	2	
	25		0	21.46	2	
HCH	1		0	22.60	1	
	1		12	22.51	1	
	1		24	22.41	1	
	12		0	21.38	2	
	12		6	21.35	2	
	12		13	21.30	2	
	25		0	21.30	2	

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.27	0
		1	24	23.35	0
		1	49	23.19	0
		25	0	22.29	1
		25	12	22.33	1
		25	25	22.36	1
		50	0	22.34	1

	MCH	1	0	23.44	0
		1	24	23.51	0
		1	49	23.43	0
		25	0	22.47	1
		25	12	22.47	1
		25	25	22.48	1
		50	0	22.47	1
	HCH	1	0	23.47	0
		1	24	23.39	0
		1	49	23.20	0
		25	0	22.41	1
		25	12	22.37	1
		25	25	22.31	1
		50	0	22.36	1
16QAM	LCH	1	0	22.44	1
		1	24	22.55	1
		1	49	22.56	1
		25	0	21.26	2
		25	12	21.30	2
		25	25	21.34	2
		50	0	21.31	2
	MCH	1	0	22.79	1
		1	24	22.85	1
		1	49	22.79	1
		25	0	21.47	2
		25	12	21.46	2
		25	25	21.49	2
		50	0	21.49	2
	HCH	1	0	22.69	1
		1	24	22.60	1
		1	49	22.41	1
		25	0	21.38	2
		25	12	21.35	2
		25	25	21.27	2
		50	0	21.36	2

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.29	0
		1	37	23.36	0
		1	74	23.37	0
		37	0	22.45	1

		37	18	22.50	1
		37	38	22.50	1
		75	0	22.49	1
	MCH	1	0	23.49	0
		1	37	23.49	0
		1	74	23.48	0
		37	0	22.55	1
		37	18	22.56	1
		37	38	22.57	1
		75	0	22.57	1
	HCH	1	0	23.57	0
		1	37	23.47	0
		1	74	23.28	0
		37	0	22.58	1
37		18	22.56	1	
37		38	22.47	1	
75		0	22.54	1	
16QAM	LCH	1	0	22.46	1
		1	37	22.64	1
		1	74	22.64	1
		37	0	21.35	2
		37	18	21.40	2
		37	38	21.42	2
		75	0	21.43	2
	MCH	1	0	22.72	1
		1	37	22.79	1
		1	74	22.70	1
		37	0	21.52	2
		37	18	21.53	2
		37	38	21.54	2
		75	0	21.51	2
	HCH	1	0	22.78	1
		1	37	22.67	1
		1	74	22.45	1
		37	0	21.50	2
		37	18	21.48	2
		37	38	21.39	2
		75	0	21.48	2

Channel Bandwidth: 20 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.44	0
		1	49	23.52	0
		1	99	23.55	0
		50	0	22.37	1
		50	25	22.41	1
		50	50	22.43	1
		100	0	22.42	1
	MCH	1	0	23.56	0
		1	49	23.58	0
		1	99	23.55	0
		50	0	22.49	1
		50	25	22.62	1
		50	50	22.48	1
		100	0	22.49	1
	HCH	1	0	23.49	0
		1	49	23.42	0
		1	99	23.25	0
		50	0	22.53	1
		50	25	22.47	1
		50	50	22.40	1
		100	0	22.45	1
16QAM	LCH	1	0	22.50	1
		1	49	22.66	1
		1	99	22.70	1
		50	0	21.32	2
		50	25	21.37	2
		50	50	21.38	2
		100	0	21.37	2
	MCH	1	0	22.83	1
		1	49	22.88	1
		1	99	22.82	1
		50	0	21.50	2
		50	25	21.52	2
		50	50	21.49	2
		100	0	21.47	2
	HCH	1	0	22.74	1
		1	49	22.68	1
		1	99	22.42	1
		50	0	21.54	2

		50	25	21.47	2
		50	50	21.38	2
		100	0	21.45	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	22.39	0
		1	3	22.37	0
		1	5	22.41	0
		3	0	22.43	0
		3	2	22.36	0
		3	3	22.42	0
		6	0	21.44	1
	MCH	1	0	22.79	0
		1	3	22.81	0
		1	5	22.82	0
		3	0	22.36	0
		3	2	22.33	0
		3	3	22.33	0
		6	0	21.81	1
	HCH	1	0	23.15	0
		1	3	23.14	0
		1	5	23.19	0
		3	0	22.23	0
		3	2	22.21	0
		3	3	22.23	0
		6	0	22.25	1
16QAM	LCH	1	0	21.7	1
		1	3	21.74	1
		1	5	21.74	1
		3	0	21.36	1
		3	2	21.34	1
		3	3	21.38	1
		6	0	21.36	2
	MCH	1	0	22.07	1
		1	3	22.13	1
		1	5	22.1	1
		3	0	21.89	1
		3	2	21.87	1
		3	3	21.92	1

	HCH	6	0	21.45	2
		1	0	22.43	1
		1	3	22.47	1
		1	5	22.44	1
		3	0	22.37	1
		3	2	22.31	1
		3	3	22.34	1
		6	0	21.24	2

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.31	0
		1	7	22.37	0
		1	14	22.34	0
		8	0	21.41	1
		8	4	21.44	1
		8	7	21.44	1
		15	0	21.39	1
	MCH	1	0	22.72	0
		1	7	22.83	0
		1	14	22.79	0
		8	0	21.79	1
		8	4	21.83	1
		8	7	21.83	1
		15	0	21.80	1
	HCH	1	0	23.15	0
		1	7	23.22	0
		1	14	23.19	0
		8	0	22.20	1
		8	4	22.23	1
		8	7	22.24	1
		15	0	22.22	1
16QAM	LCH	1	0	21.56	1
		1	7	21.66	1
		1	14	21.65	1
		8	0	20.45	2
		8	4	20.48	2
		8	7	20.46	2
		15	0	20.32	2
	MCH	1	0	22.15	1
		1	7	22.21	1
		1	14	22.18	1



		8	0	20.81	2
		8	4	20.81	2
		8	7	20.82	2
		15	0	20.78	2
	HCH	1	0	22.42	1
		1	7	22.50	1
		1	14	22.43	1
		8	0	21.17	2
		8	4	21.20	2
		8	7	21.21	2
		15	0	21.20	2

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)	
		Size	Offset			
QPSK	LCH	1	0	22.47	0	
		1	12	22.52	0	
		1	24	22.53	0	
		12	0	21.51	1	
		12	6	21.52	1	
		12	13	21.55	1	
		25	0	21.45	1	
	MCH	1	0	22.83	0	
		1	12	22.92	0	
		1	24	22.88	0	
		12	0	21.86	1	
		12	6	21.85	1	
		12	13	21.92	1	
		25	0	21.85	1	
	HCH	1	0	23.21	0	
		1	12	23.30	0	
		1	24	23.27	0	
		12	0	22.23	1	
		12	6	22.24	1	
		12	13	22.30	1	
		25	0	22.22	1	
	16QAM	LCH	1	0	21.69	1
			1	12	21.78	1
			1	24	21.84	1
12			0	20.51	2	
12			6	20.54	2	
12			13	20.60	2	
25			0	20.42	2	

	MCH	1	0	22.15	1
		1	12	22.22	1
		1	24	22.16	1
		12	0	20.96	2
		12	6	20.95	2
		12	13	21.00	2
		25	0	20.85	2
	HCH	1	0	22.37	1
		1	12	22.47	1
		1	24	22.46	1
		12	0	21.22	2
		12	6	21.24	2
		12	13	21.26	2
		25	0	21.25	2

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.43	0
		1	24	23.33	0
		1	49	22.68	0
		25	0	21.50	1
		25	12	21.59	1
		25	25	21.68	1
		50	0	21.60	1
	MCH	1	0	22.70	0
		1	24	23.31	0
		1	49	22.97	0
		25	0	21.80	1
		25	12	21.88	1
		25	25	21.94	1
		50	0	21.86	1
	HCH	1	0	23.38	0
		1	24	23.11	0
		1	49	23.24	0
		25	0	22.07	1
		25	12	22.44	1
		25	25	22.21	1
		50	0	22.16	1
16QAM	LCH	1	0	21.70	1
		1	24	21.89	1
		1	49	22.04	1
		25	0	20.50	2

		25	12	20.60	2
		25	25	20.69	2
		50	0	20.58	2
	MCH	1	0	22.14	1
		1	24	22.26	1
		1	49	22.36	1
		25	0	20.84	2
		25	12	20.90	2
		25	25	20.94	2
		50	0	20.89	2
	HCH	1	0	22.29	1
		1	24	22.39	1
		1	49	22.50	1
		25	0	21.03	2
		25	12	21.12	2
		25	25	21.21	2
		50	0	21.15	2

**FDD-LTE Band 12:**

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.08	0
		1	3	23.22	0
		1	5	23.11	0
		3	0	22.11	0
		3	2	22.14	0
		3	3	22.15	0
		6	0	22.14	1
	MCH	1	0	23.30	0
		1	3	23.43	0
		1	5	23.31	0
		3	0	22.35	0
		3	2	22.34	0
		3	3	22.35	0
		6	0	22.34	1
	HCH	1	0	23.24	0
		1	3	23.37	0
		1	5	23.18	0
		3	0	22.26	0
		3	2	22.26	0

		3	3	22.23	0
		6	0	22.27	1
16QAM	LCH	1	0	22.27	1
		1	3	22.48	1
		1	5	22.34	1
		3	0	22.22	1
		3	2	22.21	1
		3	3	22.23	1
		6	0	21.11	2
		MCH	1	0	22.61
	1		3	22.83	1
	1		5	22.60	1
	3		0	22.43	1
	3		2	22.42	1
	3		3	22.45	1
	6		0	21.49	2
	HCH	1	0	22.65	1
		1	3	22.73	1
		1	5	22.60	1
		3	0	22.26	1
		3	2	22.30	1
		3	3	22.30	1
		6	0	21.28	2

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.00	0
		1	7	23.21	0
		1	14	23.15	0
		8	0	22.15	1
		8	4	22.18	1
		8	7	22.22	1
		15	0	22.15	1
	MCH	1	0	23.25	0
		1	7	23.40	0
		1	14	23.24	0
		8	0	22.31	1
		8	4	22.32	1
		8	7	22.31	1
		15	0	22.29	1
	HCH	1	0	23.22	0
		1	7	23.39	0

		1	14	23.20	0
		8	0	22.30	1
		8	4	22.30	1
		8	7	22.29	1
		15	0	22.28	1
16QAM	LCH	1	0	22.28	1
		1	7	22.49	1
		1	14	22.43	1
		8	0	21.18	2
		8	4	21.24	2
		8	7	21.26	2
		15	0	21.07	2
	MCH	1	0	22.66	1
		1	7	22.86	1
		1	14	22.66	1
		8	0	21.35	2
		8	4	21.32	2
		8	7	21.31	2
		15	0	21.29	2
	HCH	1	0	22.49	1
		1	7	22.66	1
		1	14	22.48	1
		8	0	21.28	2
		8	4	21.30	2
		8	7	21.29	2
		15	0	21.31	2

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.18	0
		1	12	23.41	0
		1	24	23.33	0
		12	0	22.24	1
		12	6	22.28	1
		12	13	22.31	1
		25	0	22.18	1
	MCH	1	0	23.38	0
		1	12	23.50	0
		1	24	23.30	0
		12	0	22.37	1
		12	6	22.40	1
		12	13	22.35	1

	HCH	25	0	22.38	1
		1	0	23.38	0
		1	12	23.48	0
		1	24	23.30	0
		12	0	22.35	1
		12	6	22.36	1
		12	13	22.38	1
		25	0	22.34	1
16QAM	LCH	1	0	22.40	1
		1	12	22.65	1
		1	24	22.62	1
		12	0	21.24	2
		12	6	21.30	2
		12	13	21.41	2
		25	0	21.19	2
	MCH	1	0	22.71	1
		1	12	22.82	1
		1	24	22.59	1
		12	0	21.50	2
		12	6	21.50	2
		12	13	21.45	2
		25	0	21.39	2
	HCH	1	0	22.55	1
		1	12	22.70	1
		1	24	22.51	1
		12	0	21.34	2
		12	6	21.36	2
		12	13	21.38	2
		25	0	21.37	2

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.57	0
		1	24	23.29	0
		1	49	23.26	0
		25	0	22.69	1
		25	12	22.29	1
		25	25	22.36	1
		50	0	22.21	1
	MCH	1	0	23.26	0
		1	24	23.32	0
		1	49	23.24	0

		25	0	22.31	1	
		25	12	22.51	1	
		25	25	22.33	1	
		50	0	22.37	1	
	HCH	1	0	23.36	0	
		1	24	23.32	0	
		1	49	23.29	0	
		25	0	22.31	1	
		25	12	22.34	1	
		25	25	22.33	1	
		50	0	22.33	1	
	16QAM	LCH	1	0	22.37	1
			1	24	22.66	1
1			49	22.59	1	
25			0	21.23	2	
25			12	21.32	2	
25			25	21.39	2	
50			0	21.22	2	
MCH		1	0	22.70	1	
		1	24	22.78	1	
		1	49	22.63	1	
		25	0	21.38	2	
		25	12	21.37	2	
		25	25	21.33	2	
		50	0	21.42	2	
HCH		1	0	22.65	1	
		1	24	22.59	1	
		1	49	22.58	1	
		25	0	21.34	2	
		25	12	21.30	2	
		25	25	21.34	2	
		50	0	21.36	2	

**FDD-LTE Band 17:**

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.11	0
		1	12	23.14	0
		1	24	23.09	0
		12	0	22.17	1
		12	6	22.16	1
		12	13	22.15	1
		25	0	22.17	1
	MCH	1	0	23.17	0
		1	12	23.21	0
		1	24	23.04	0
		12	0	22.16	1
		12	6	22.17	1
		12	13	22.13	1
		25	0	22.11	1
	HCH	1	0	23.15	0
		1	12	23.21	0
		1	24	23.16	0
		12	0	22.19	1
		12	6	22.18	1
		12	13	22.17	1
		25	0	22.16	1
16QAM	LCH	1	0	22.45	1
		1	12	22.41	1
		1	24	22.42	1
		12	0	21.28	2
		12	6	21.27	2
		12	13	21.24	2
		25	0	21.18	2
	MCH	1	0	22.48	1
		1	12	22.48	1
		1	24	22.31	1
		12	0	21.27	2
		12	6	21.27	2
		12	13	21.23	2
		25	0	21.12	2
HCH	1	0	22.33	1	
	1	12	22.42	1	



		1	24	22.35	1
		12	0	21.18	2
		12	6	21.17	2
		12	13	21.20	2
		25	0	21.19	2

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.14	0
		1	24	23.12	0
		1	49	22.98	0
		25	0	22.24	1
		25	12	22.19	1
		25	25	22.09	1
		50	0	22.18	1
	MCH	1	0	23.17	0
		1	24	23.11	0
		1	49	23.03	0
		25	0	22.21	1
		25	12	22.16	1
		25	25	22.12	1
		50	0	22.18	1
	HCH	1	0	23.23	0
		1	24	23.12	0
		1	49	23.10	0
		25	0	22.28	1
		25	12	22.13	1
		25	25	22.13	1
		50	0	22.17	1
16QAM	LCH	1	0	22.41	1
		1	24	22.46	1
		1	49	22.29	1
		25	0	21.23	2
		25	12	21.18	2
		25	25	21.14	2
		50	0	21.20	2
	MCH	1	0	22.43	1
		1	24	22.42	1
		1	49	22.46	1
		25	0	21.23	2
		25	12	21.17	2
		25	25	21.18	2

		50	0	21.23	2
	HCH	1	0	22.50	1
		1	24	22.39	1
		1	49	22.36	1
		25	0	21.19	2
		25	12	21.12	2
		25	25	21.17	2
		50	0	21.21	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)
802.11b	11Mbps	CH 01	2412	15.01
		CH 06	2437	15.16
		CH 11	2462	14.98
802.11g	54Mbps	CH 01	2412	12.91
		CH 06	2437	12.66
		CH 11	2462	12.2
802.11n (20MHz)	MCS7	CH 01	2412	12.72
		CH 06	2437	12.53
		CH 11	2462	12.07
802.11n (40MHz)	MCS7	CH 03	2422	11.71
		CH 06	2437	11.46
		CH 09	2452	11.31

**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)
GFSK	1Mbps	4.787
Pi/4 QDPSK	2Mbps	4.219
8DPSK	3Mbps	4.413

Bluetooth - Maximum Average Power				
Test Mode	Data Rate	Channel	Frequency (MHz)	Average Power (dBm)
BLE	1Mbps	CH 00	2402	4.851
		CH 19	2440	4.211
		CH 39	2480	3.735

NFC - Maximum Average Power			
Test Mode	Frequency (MHz)	Average Power(dBm)	Tune-up power (dBm)
NFC	13.56	-10.36	-10

**Remark:**

Bluetooth and NFC maximum output power is 4.851dBm and -10.36dBm *respectively*, and Tune-Up output power is 5.0dBm and -10dBm. Per KDB 447498 D01 v06, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances  $\leq 50$  mm are determined by:

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

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

BT:

Tune-Up Power (dBm)	Max. Power (mW)	Distance (mm)	Frequency (GHz)	Result	Limit
5.0	3.16	5	2.402	0.979	3

The exclusion thresholds is  $0.979 < 3$ , therefore, the RF exposure evaluation is not required.

NFC:

Tune-Up Power (dBm)	Max. Power (mW)	Distance (mm)	Frequency (GHz)	Result	Limit
-10	0.10	5	0.01356	0.00736	3

The exclusion thresholds is  $0.00736 < 3$ , therefore, the RF exposure evaluation is not required.

## 9.2 Test Results for Standalone SAR Test

### Body SAR

GSM850 – Body SAR Test (Gap: 0mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
1.	GPRS_4TX	Back Side	128	824.2	29.08	29.5	1.102	0.891	0.981
2.	GPRS_4TX	Back Side	190	836.4	28.99	29.5	1.125	1.032	1.161
3.	GPRS_4TX	Back Side	251	848.8	28.86	29.5	1.159	0.875	1.014
4.	GPRS_4TX	Right side	128	824.2	29.08	29.5	1.102	0.011	0.012
5.	GPRS_4TX	Left side	128	824.2	29.08	29.5	1.102	0.023	0.025
6.	GPRS_4TX	Top side	128	824.2	29.08	29.5	1.102	0.610	0.672

GSM1900 – Body SAR Test (Gap: 0mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
7.	GPRS_4TX	Back Side	810	1909.8	26.51	27.0	1.119	1.054	1.180
8.	GPRS_4TX	Back Side	512	1850.2	26.23	27.0	1.194	1.149	1.372
9.	GPRS_4TX	Back Side	661	1880.0	26.27	27.0	1.183	1.140	1.349
10.	GPRS_4TX	Left side	810	1909.8	26.51	27.0	1.119	0.004	0.004
11.	GPRS_4TX	Top side	810	1909.8	26.51	27.0	1.119	0.670	0.750

WCDMA Band V – Body SAR Test (Gap: 0mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
12.	RMC 12.2k	Back Side	4183	836.6	22.81	23.0	1.045	0.268	0.280
13.	RMC 12.2k	Left side	4183	836.6	22.81	23.0	1.045	0.004	0.004
14.	RMC 12.2k	Top side	4183	836.6	22.81	23.0	1.045	0.095	0.099

WCDMA Band II – Body SAR Test (Gap: 0mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
15.	RMC 12.2k	Back Side	9262	1852.4	22.82	23.0	1.042	0.634	0.661
16.	RMC 12.2k	Left side	9262	1852.4	22.82	23.0	1.042	0.005	0.005
17.	RMC 12.2k	Top side	9262	1852.4	22.82	23.0	1.042	0.386	0.402

LTE Band 2–Body SAR Test (Gap: 0mm)								
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					
18.	QPSK 20MHz 1RB	Back Side	1880.0	23.87	24.0	1.030	0.964	0.993
19.	QPSK 20MHz 1RB	Back Side	1860.0	23.79	24.0	1.050	0.573	0.601
20.	QPSK 20MHz 1RB	Back Side	1900.0	23.71	24.0	1.069	0.638	0.682
21.	QPSK 20MHz 1RB	Left side	1880.0	23.87	24.0	1.030	0.003	0.003
22.	QPSK 20MHz 1RB	Top side	1880.0	23.87	24.0	1.030	0.349	0.360
23.	QPSK 20MHz 50%RB	Back Side	1880.0	23.87	24.0	1.030	0.413	0.426
24.	QPSK 20MHz 50%RB	Left side	1880.0	23.87	24.0	1.030	0.001	0.001
25.	QPSK 20MHz 50%RB	Top side	1880.0	23.87	24.0	1.030	0.198	0.204

LTE Band 4–Body SAR Test (Gap: 0mm)								
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					
26.	QPSK 20MHz 1RB	Back Side	1732.5	23.58	24.0	1.102	0.564	0.621
27.	QPSK 20MHz 1RB	Left side	1732.5	23.58	24.0	1.102	0.003	0.003
28.	QPSK 20MHz 1RB	Top side	1732.5	23.58	24.0	1.102	0.232	0.256
29.	QPSK 20MHz 50%RB	Back Side	1732.5	23.58	24.0	1.102	0.216	0.238
30.	QPSK 20MHz 50%RB	Left side	1732.5	23.58	24.0	1.102	0.002	0.002
31.	QPSK 20MHz 50%RB	Top side	1732.5	23.58	24.0	1.102	0.166	0.183

LTE Band 5–Body SAR Test (Gap: 0mm)								
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					
32.	QPSK 10MHz 1RB	Back Side	844.0	23.38	23.5	1.028	0.188	0.193
33.	QPSK 10MHz 1RB	Left side	844.0	23.38	23.5	1.028	0.003	0.003
34.	QPSK 10MHz 1RB	Top side	844.0	23.38	23.5	1.028	0.081	0.083
35.	QPSK 10MHz 50%RB	Back Side	844.0	23.38	23.5	1.028	0.102	0.105
36.	QPSK 10MHz 50%RB	Left side	844.0	23.38	23.5	1.028	0.002	0.002
37.	QPSK 10MHz 50%RB	Top side	844.0	23.38	23.5	1.028	0.036	0.037

LTE Band 12–Body SAR Test (Gap: 0mm)								
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					
38.	10MHz 1RB	Back Side	704.0	23.57	24.0	1.104	0.243	0.268
39.	10MHz 1RB	Left side	704.0	23.57	24.0	1.104	0.002	0.002
40.	10MHz 1RB	Top side	704.0	23.57	24.0	1.104	0.052	0.057
41.	10MHz 50%RB	Back Side	704.0	23.57	24.0	1.104	0.122	0.135
42.	10MHz 50%RB	Left side	704.0	23.57	24.0	1.104	0.001	0.001
43.	10MHz 50%RB	Top side	704.0	23.57	24.0	1.104	0.029	0.032

LTE Band 17–Body SAR Test (Gap: 0mm)								
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					
44.	QPSK 10MHz 1RB	Back Side	709.0	23.23	23.5	1.064	0.249	0.265
45.	QPSK 10MHz 1RB	Left side	709.0	23.23	23.5	1.064	0.003	0.003
46.	QPSK 10MHz 1RB	Top side	709.0	23.23	23.5	1.064	0.053	0.056
47.	QPSK 10MHz 50%RB	Back Side	709.0	23.23	23.5	1.064	0.133	0.142
48.	QPSK 10MHz 50%RB	Left side	709.0	23.23	23.5	1.064	0.002	0.002
49.	QPSK 10MHz 50%RB	Top side	709.0	23.23	23.5	1.064	0.024	0.026

WLAN 2.4GHz –Body SAR Test(Gap: 0mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
50.	802.11b	Back Side	06	2437	15.16	15.5	1.081	0.179	0.194
51.	802.11b	Right side	06	2437	15.16	15.5	1.081	0.070	0.076

**Remark:**1. Per KDB447498 D01 v06, if the highest output channel SAR for each exposure position  $\leq 0.8$  W/kg other channels SAR tests are not necessary.

### Repeated SAR Measurement

GSM850 – Body SAR Test (Gap: 0mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
52.	GPRS_4TX	Back Side	190	836.4	28.99	29.5	1.125	1.011	1.137

GSM1900 – Body SAR Test (Gap: 0mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
53.	GPRS_4TX	Back Side	512	1850.2	26.23	27.0	1.194	1.021	1.219

LTE Band 2–Body SAR Test (Gap: 0mm)									
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
54.	QPSK 20MHz 1RB	Back Side	1880.0	23.87	24.0	1.030	0.933	0.961	

#### Remark:

SAR repeated measurement procedure:

1. When the highest measured SAR is < 0.80 W/kg, repeated measurement is not required.
2. When the highest measured SAR is  $\geq$  0.80 W/kg, repeat that measurement once.
3. If the ratio of largest to smallest SAR for the original and first repeated measurements is  $>$  1.20, or when the original or repeated measurement is  $\geq$  1.45 W/kg, perform a second repeated measurement.
4. If the ratio of largest to smallest SAR for the original, first and second repeated measurements is  $>$  1.20, and the original, first or second repeated measurement is  $\geq$  1.5 W/kg, perform a third repeated measurement.



### 9.3 Simultaneous Multi-band Transmission SAR Analysis

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

No.	Configurations	Body SAR
1	GSM(Voice/Data) + WLAN(Data)	Yes
2	WCDMA (Voice/Data)+ WLAN(Data)	Yes
3	LTE (Voice/Data)+ WLAN(Data)	Yes
4	GSM(Voice/Data) + Bluetooth(Data)	Yes
5	WCDMA (Voice/Data)+ Bluetooth(Data)	Yes
6	LTE (Voice/Data)+ Bluetooth(Data)	Yes

#### Remark:

1. GSM and WCDMA cannot transmit simultaneously.

2. According to the KDB 447498 D01 v06, when standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[√f(GHz)/x] W/kg for test separation distances ≤ 50 mm;

where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR.

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

Bluetooth:

Tune-Up Power (dBm)	Max. Power (mW)	Distance (mm)	Frequency (GHz)	X	SAR(1g) 5mm
5.0	3.16	5	2.402	7.5	0.131

NFC:

Tune-Up Power (dBm)	Max. Power (mW)	Distance (mm)	Frequency (GHz)	Result	Limit
-10	0.1	5	0.01356	0.002329	3

The exclusion thresholds is 0.002329 < 3, therefore, the RF exposure evaluation is not required.

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

**Body SAR**
**WWAN and WLAN**

Position	WWAN		WLAN	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	GSM850	1.161	0.257	1.418
Front	GSM850	--	--	--
Top side	GSM850	0.672	--	0.672
Bottom side	GSM850	--	--	--
Right side	GSM850	0.012	0.076	0.088
Left side	GSM850	0.025	--	0.025
Back	GSM1900	1.372	0.194	<b>1.566</b>
Front	GSM1900	--	--	--
Top side	GSM1900	0.750	--	0.750
Bottom side	GSM1900	--	--	--
Right side	GSM1900	--	0.076	0.076
Left side	GSM1900	0.004	--	0.004
Back	WCDMA Band V	0.280	0.257	0.537
Front	WCDMA Band V	--	--	--
Top side	WCDMA Band V	0.099	--	0.099
Bottom side	WCDMA Band V	--	--	--
Right side	WCDMA Band V	--	0.076	0.076
Left side	WCDMA Band V	0.004	--	0.004
Back	WCDMA Band II	0.661	0.257	0.918
Front	WCDMA Band II	--	--	--
Top side	WCDMA Band II	0.402	--	0.402
Bottom side	WCDMA Band II	--	--	--
Right side	WCDMA Band II	--	0.076	0.076
Left side	WCDMA Band II	0.005	--	0.005
Back	LTE Band 2	0.993	0.257	1.250
Front	LTE Band 2	--	--	--
Top side	LTE Band 2	0.360	--	0.360
Bottom side	LTE Band 2	--	--	--
Right side	LTE Band 2	--	0.076	0.076
Left side	LTE Band 2	0.003	--	0.003
Back	LTE Band 4	0.621	0.257	0.878
Front	LTE Band 4	--	--	--
Top side	LTE Band 4	0.256	--	0.256
Bottom side	LTE Band 4	--	--	--
Right side	LTE Band 4	--	0.076	0.076
Left side	LTE Band 4	0.003	--	0.003

Back	LTE Band 5	0.193	0.257	0.450
Front	LTE Band 5	--	--	--
Top side	LTE Band 5	0.083	--	0.083
Bottom side	LTE Band 5	--	--	--
Right side	LTE Band 5	--	0.076	0.076
Left side	LTE Band 5	0.003	--	0.003
Back	LTE Band 12	0.268	0.257	0.525
Front	LTE Band 12	--	--	--
Top side	LTE Band 12	0.057	--	0.057
Bottom side	LTE Band 12	--	--	--
Right side	LTE Band 12	--	0.076	0.076
Left side	LTE Band 12	0.002	--	0.002
Back	LTE Band 17	0.265	0.257	0.522
Front	LTE Band 17	--	--	--
Top side	LTE Band 17	0.056	--	0.056
Bottom side	LTE Band 17	--	--	--
Right side	LTE Band 17	--	0.076	0.076
Left side	LTE Band 17	0.003	--	0.003

**WWAN and Bluetooth**

Position	WWAN		Bluetooth	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	GSM850	1.161	0.131	1.292
Front	GSM850	--	0.131	0.131
Top side	GSM850	0.672	0.131	0.803
Bottom side	GSM850	--	0.131	0.131
Right side	GSM850	0.012	0.131	0.143
Left side	GSM850	0.025	0.131	0.156
Back	GSM1900	1.372	0.131	<b>1.503</b>
Front	GSM1900	--	0.131	0.131
Top side	GSM1900	0.750	0.131	0.881
Bottom side	GSM1900	--	0.131	0.131
Right side	GSM1900	--	0.131	0.131
Left side	GSM1900	0.004	0.131	0.135
Back	WCDMA Band V	0.280	0.131	0.411
Front	WCDMA Band V	--	0.131	0.131
Top side	WCDMA Band V	0.099	0.131	0.230
Bottom side	WCDMA Band V	--	0.131	0.131
Right side	WCDMA Band V	--	0.131	0.131
Left side	WCDMA Band V	0.004	0.131	0.135
Back	WCDMA Band II	0.661	0.131	0.792
Front	WCDMA Band II	--	0.131	0.131

Top side	WCDMA Band II	0.402	0.131	0.533
Bottom side	WCDMA Band II	--	0.131	0.131
Right side	WCDMA Band II	--	0.131	0.131
Left side	WCDMA Band II	0.005	0.131	0.136
Back	LTE Band 2	0.993	0.131	1.124
Front	LTE Band 2	--	0.131	0.131
Top side	LTE Band 2	0.360	0.131	0.491
Bottom side	LTE Band 2	--	0.131	0.131
Right side	LTE Band 2	--	0.131	0.131
Left side	LTE Band 2	0.003	0.131	0.134
Back	LTE Band 4	0.621	0.131	0.752
Front	LTE Band 4	--	0.131	0.131
Top side	LTE Band 4	0.256	0.131	0.387
Bottom side	LTE Band 4	--	0.131	0.131
Right side	LTE Band 4	--	0.131	0.131
Left side	LTE Band 4	0.003	0.131	0.134
Back	LTE Band 5	0.193	0.131	0.324
Front	LTE Band 5	--	0.131	0.131
Top side	LTE Band 5	0.083	0.131	0.214
Bottom side	LTE Band 5	--	0.131	0.131
Right side	LTE Band 5	--	0.131	0.131
Left side	LTE Band 5	0.003	0.131	0.134
Back	LTE Band 12	0.268	0.131	0.399
Front	LTE Band 12	--	0.131	0.131
Top side	LTE Band 12	0.057	0.131	0.188
Bottom side	LTE Band 12	--	0.131	0.131
Right side	LTE Band 12	--	0.131	0.131
Left side	LTE Band 12	0.002	0.131	0.133
Back	LTE Band 17	0.265	0.131	0.396
Front	LTE Band 17	--	0.131	0.131
Top side	LTE Band 17	0.056	0.131	0.187
Bottom side	LTE Band 17	--	0.131	0.131
Right side	LTE Band 17	--	0.131	0.131
Left side	LTE Band 17	0.003	0.131	0.134

## 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: 08/12/2019

Measurement duration: 7 minutes 21 seconds

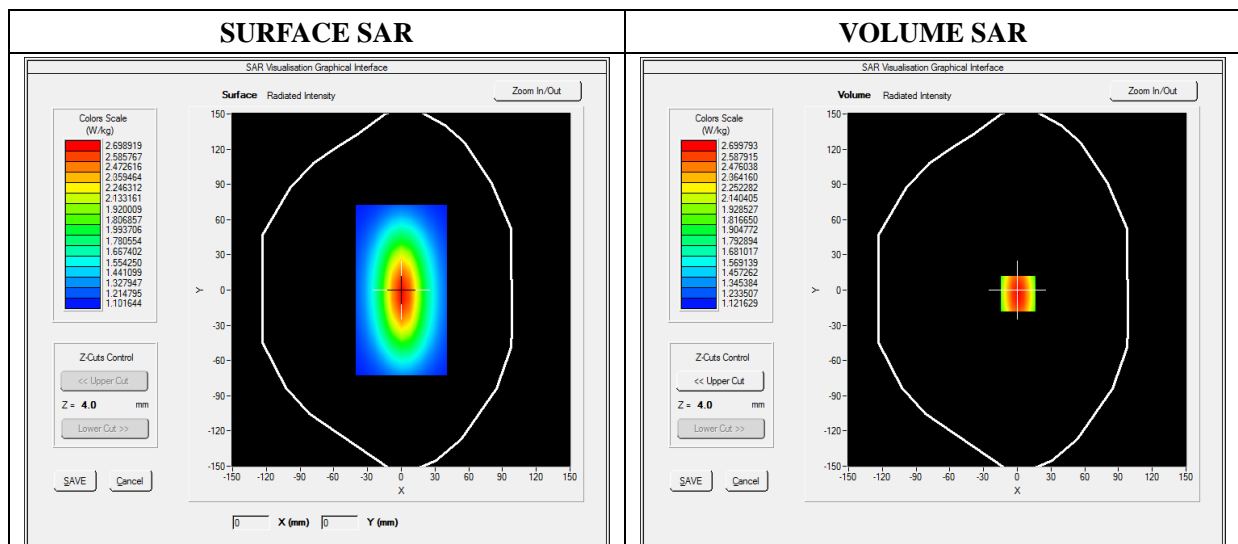
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.99; Calibrated: 05/22/2019

### A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=8mm dy=8mm dz=5mm
<b>Phantom</b>	Validation plane
<b>Device Position</b>	Dipole
<b>Band</b>	CW750
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

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



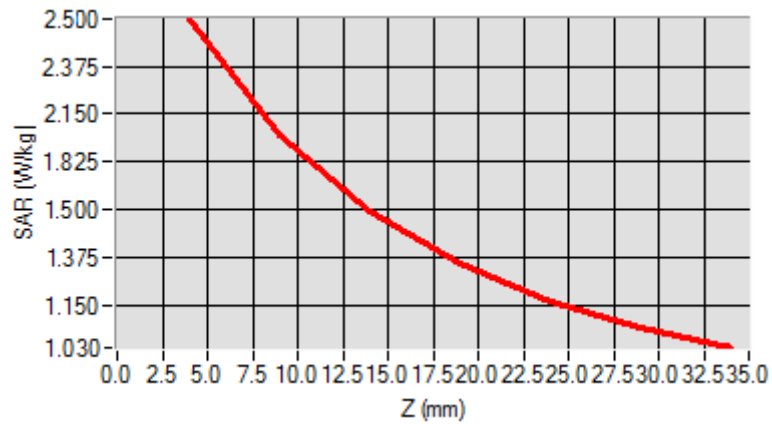


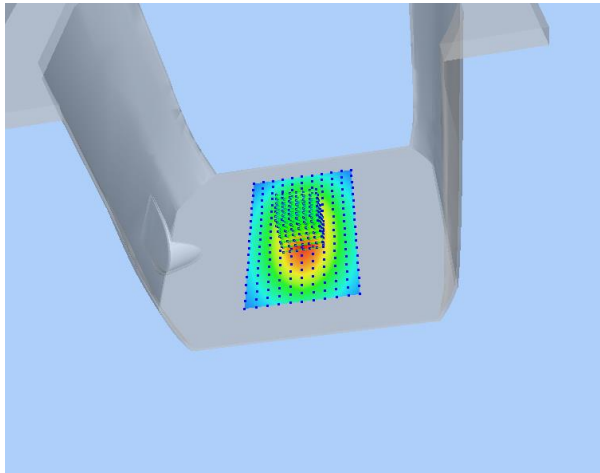
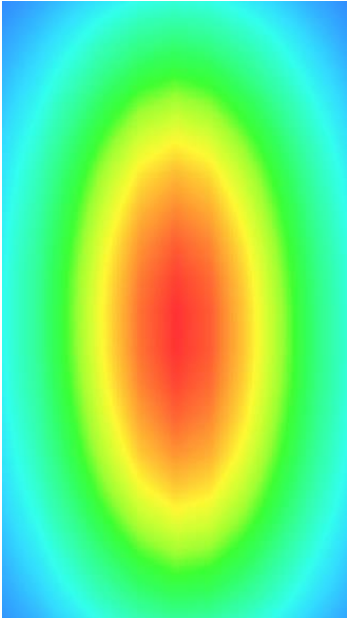
Maximum location: X=0.00, Y=0.00

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

Z Axis Scan

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



3D screen shot	Hot spot position
	

# MEASUREMENT 2

**For Body Liquid**

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/12/2019

Measurement duration: 12 minutes 21 seconds

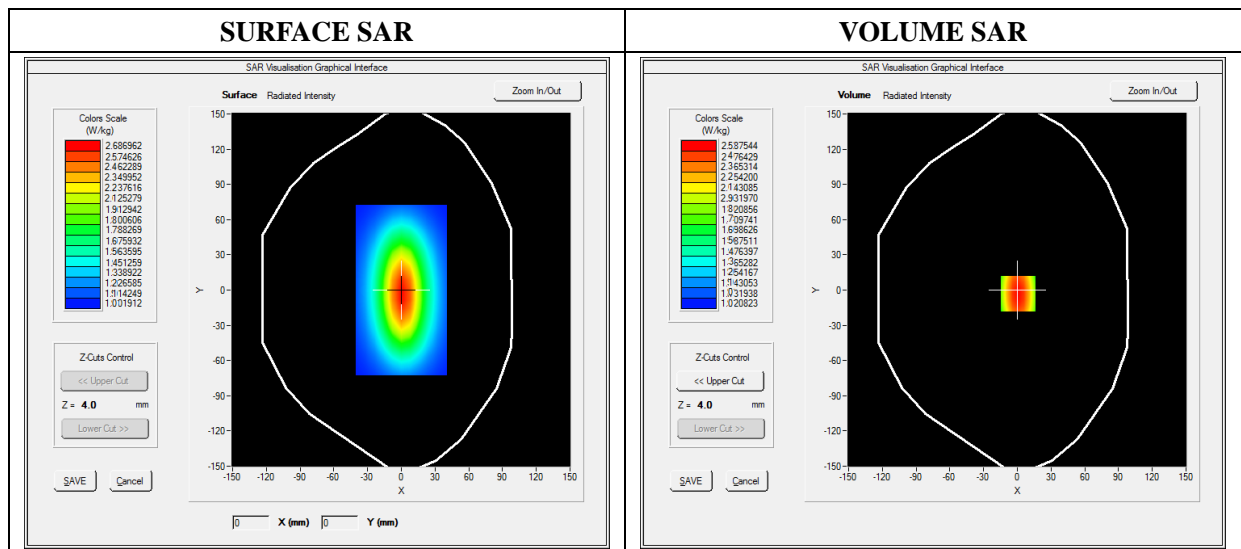
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 05/22/2019

**A. Experimental conditions**

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=8mm dy=8mm dz=5mm
<b>Phantom</b>	Validation plane
<b>Device Position</b>	Dipole
<b>Band</b>	CW835
<b>Signal</b>	Duty Cycle 1:1

**B. SAR Measurement Results**

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

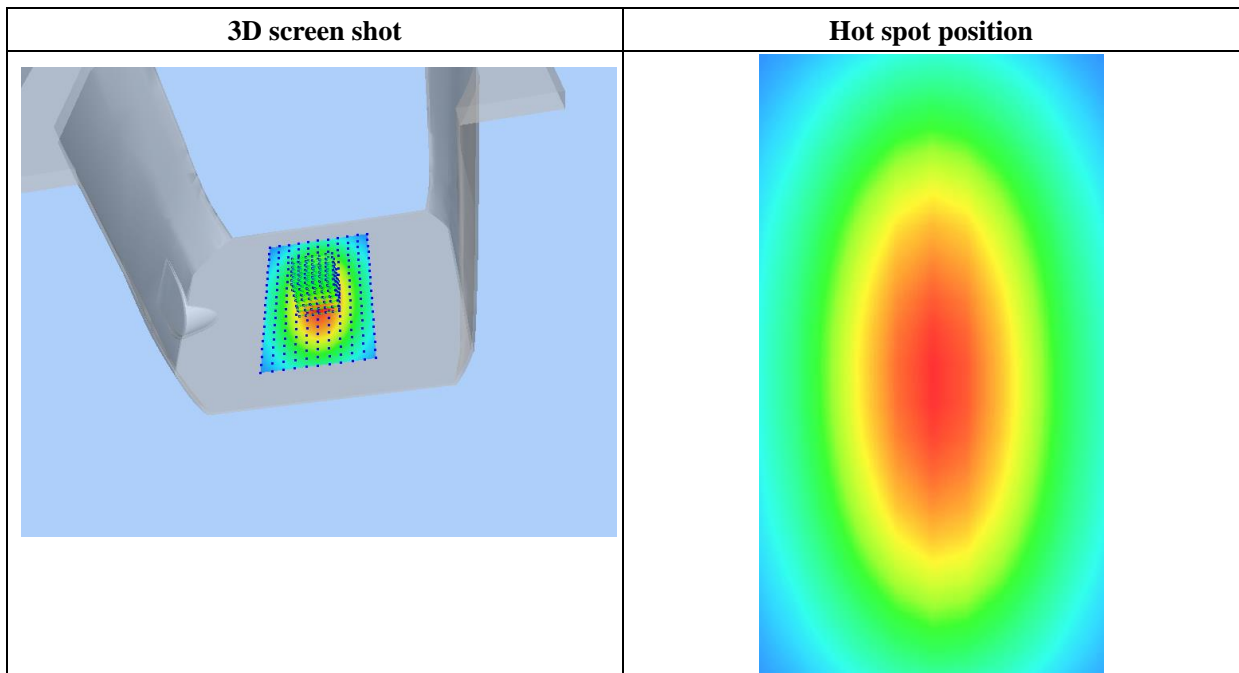
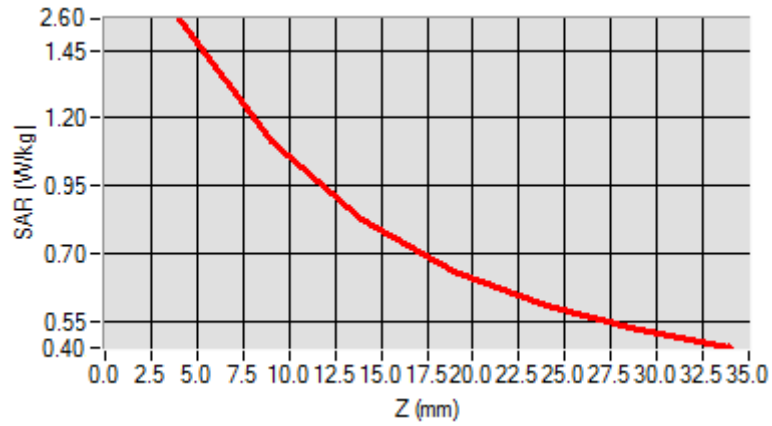


**Maximum location: X=0.00, Y=0.00**

SAR 10g (W/Kg)	1.028956
SAR 1g (W/Kg)	2.364211

**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



## MEASUREMENT 3

### For Head Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/13/2019

Measurement duration: 12 minutes 21 seconds

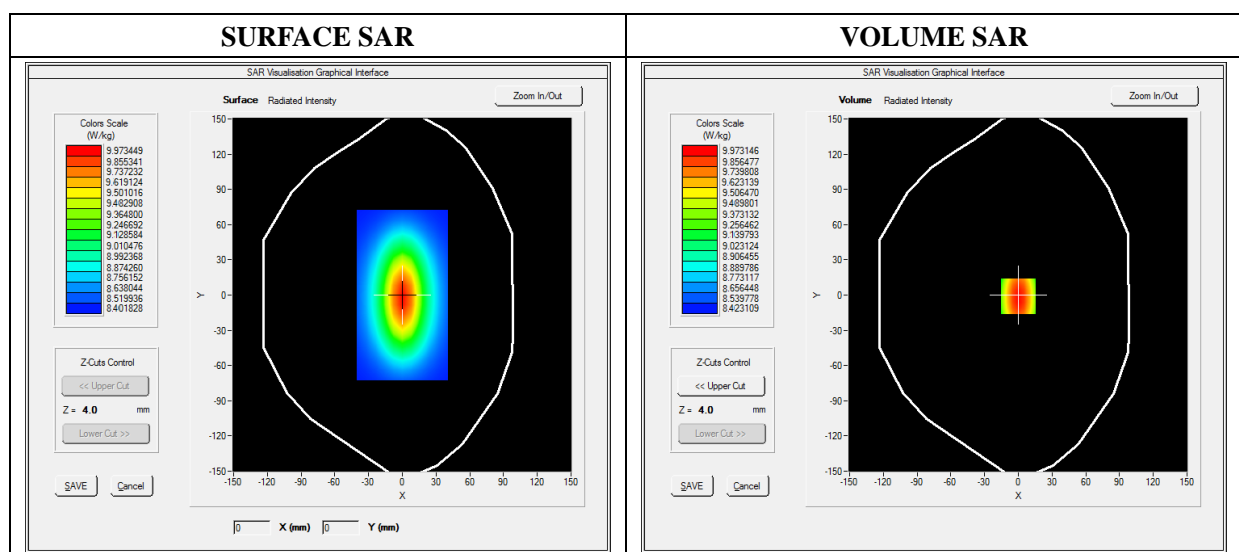
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.84; Calibrated: 05/22/2019

### A. Experimental conditions

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

### B. SAR Measurement Results

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

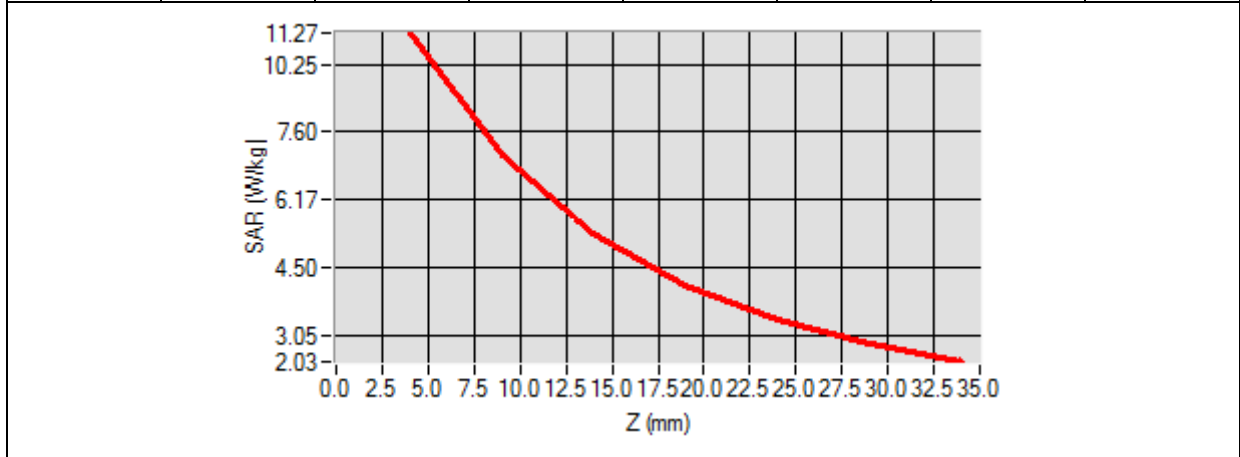


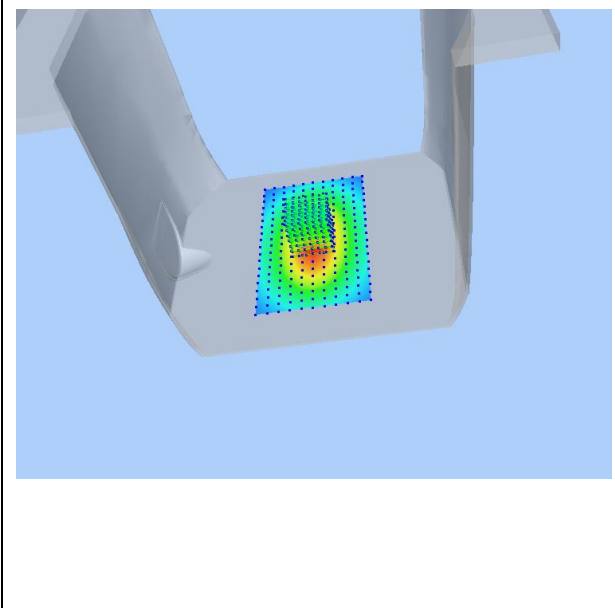
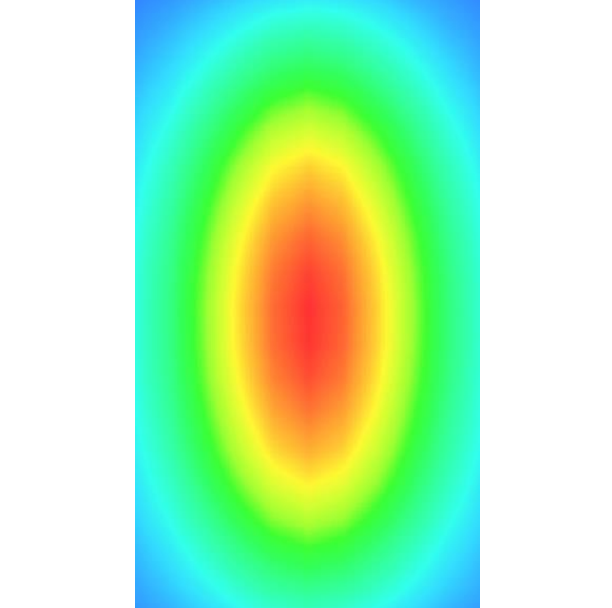
Maximum location: X=0.00, Y=0.00

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

Z Axis Scan

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



3D screen shot	Hot spot position
	

# MEASUREMENT 4

## For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/13/2019

Measurement duration: 12 minutes 21 seconds

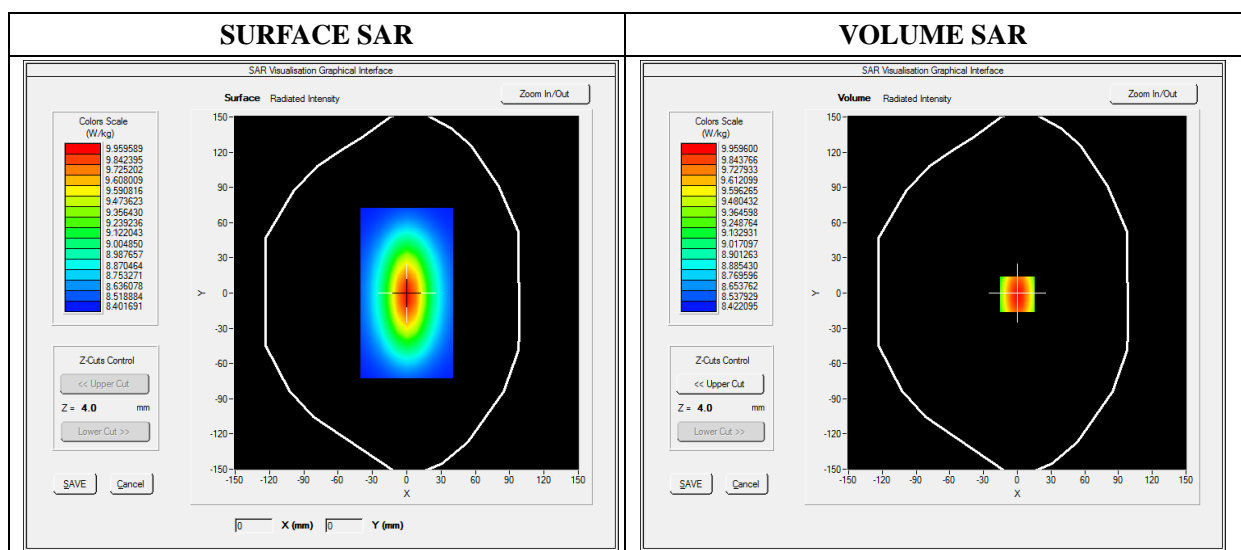
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 05/22/2019

### A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=8mm dy=8mm dz=5mm
<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

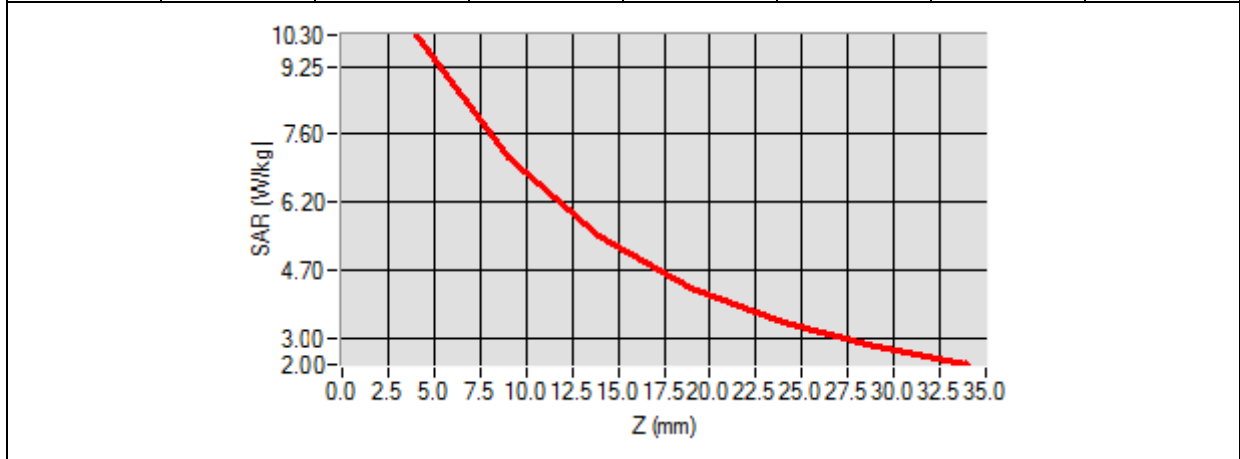


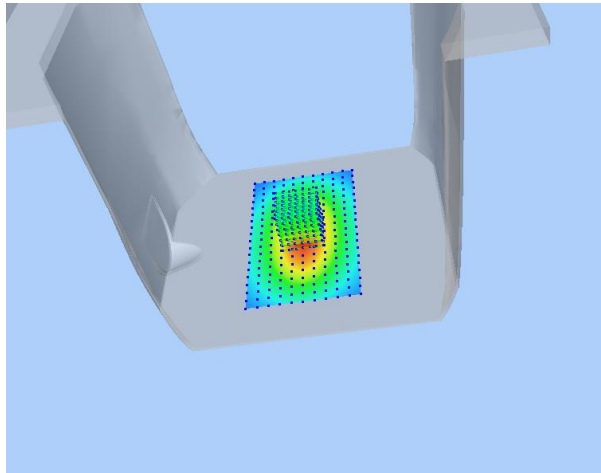
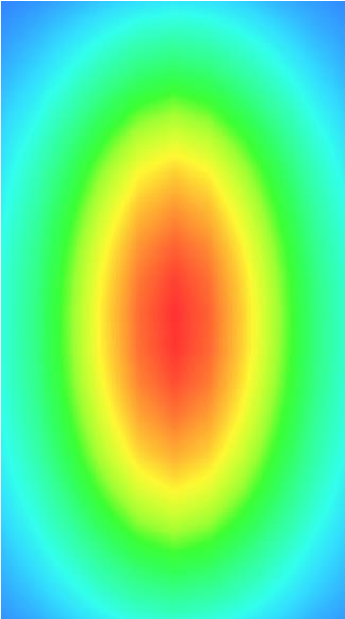
Maximum location: X=0.00, Y=0.00

SAR 10g (W/Kg)	5.134651
SAR 1g (W/Kg)	9.801550

Z Axis Scan

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



3D screen shot	Hot spot position
	

# MEASUREMENT 5

## For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/14/2019

Measurement duration: 12 minutes 21 seconds

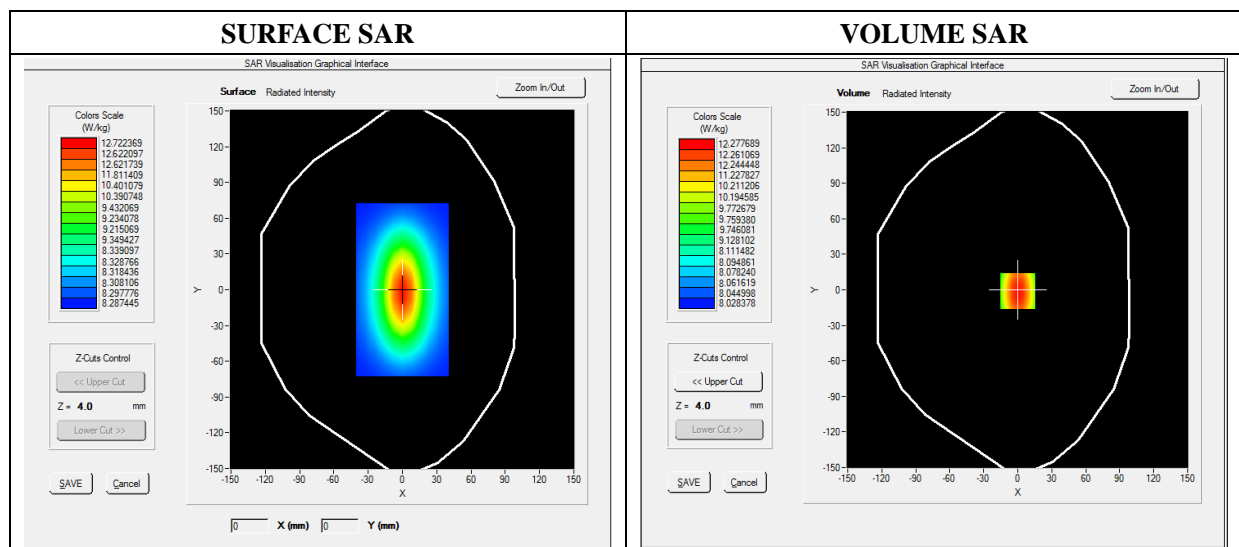
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.80; Calibrated: 05/22/2019

### A. Experimental conditions

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

### B. SAR Measurement Results

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



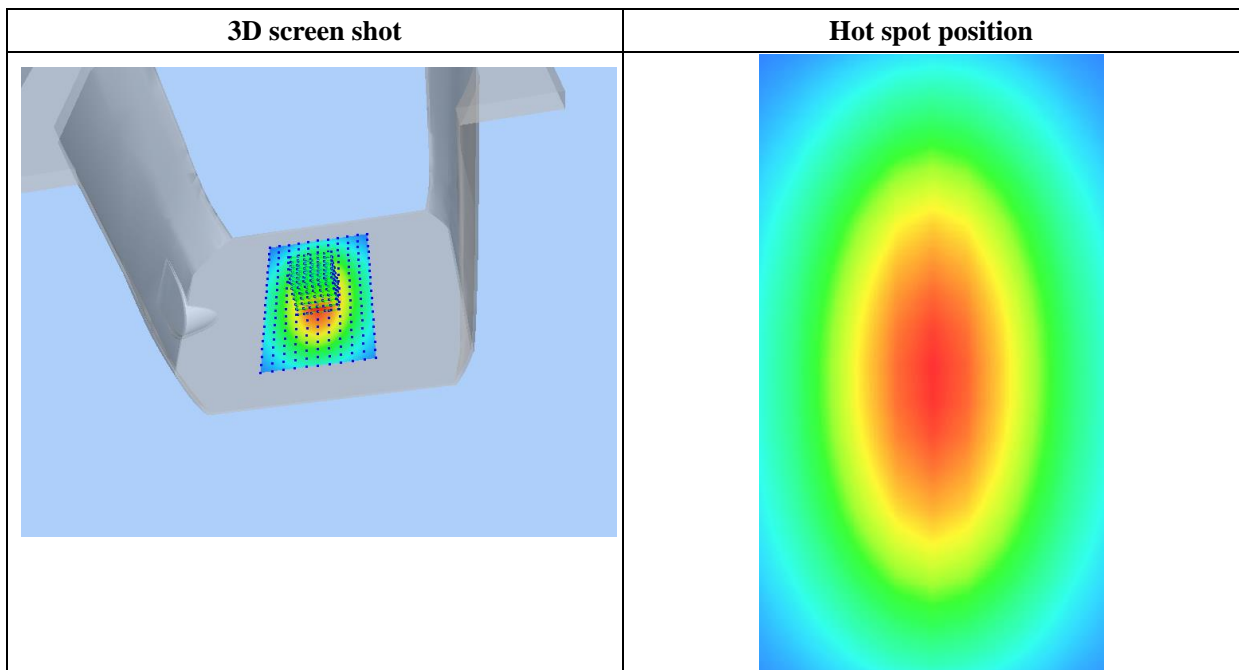
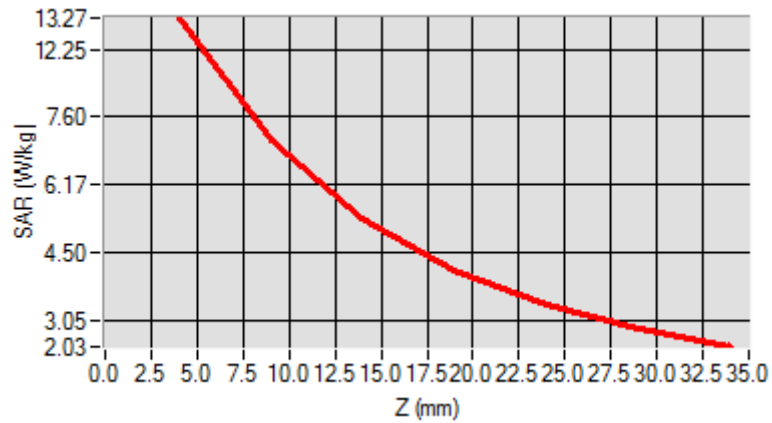


Maximum location: X=0.00, Y=0.00

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

Z Axis Scan

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



## Annex B. Plots of SAR Measurement

<b><u>TYPE</u></b>	<b><u>BAND</u></b>	<b><u>PARAMETERS</u></b>
Tablet	GPRS850_4TX	<u>Measurement 2</u> Flat Plane with Back device position on Middle Channel in GPRS mode
Tablet	GPRS1900_4TX	<u>Measurement 8:</u> Flat Plane with Back device position on Low Channel in GPRS mode
Tablet	WCDMA850_RMC	<u>Measurement 12:</u> Flat Plane with Back device position on Middle Channel in WCDMA mode
Tablet	WCDMA1900_RMC	<u>Measurement 15:</u> Flat Plane with Back device position on Low Channel in WCDMA mode
Tablet	LTE Band 2	<u>Measurement 18:</u> Flat Plane with Back device position on Middle Channel in LTE mode
Tablet	LTE Band 4	<u>Measurement 26:</u> Flat Plane with Back device position on Middle Channel in LTE mode
Tablet	LTE Band 5	<u>Measurement 32:</u> Flat Plane with Back device position on High Channel in LTE mode
Tablet	LTE Band 12	<u>Measurement 38:</u> Flat Plane with Back device position on Low Channel in LTE mode
Tablet	LTE Band 17	<u>Measurement 44:</u> Flat Plane with Back device position on Low Channel in LTE mode
Tablet	WIFI_802.11b	<u>Measurement 50:</u> Flat Plane with Back side device position on Middle Channel in WIFI mode
<i>Remark: SAR plot is showed the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.</i>		

# MEASUREMENT 2

Type: Phone measurement (Complete)

Date of measurement: 08/12/2019

Measurement duration: 12 minutes 3 seconds

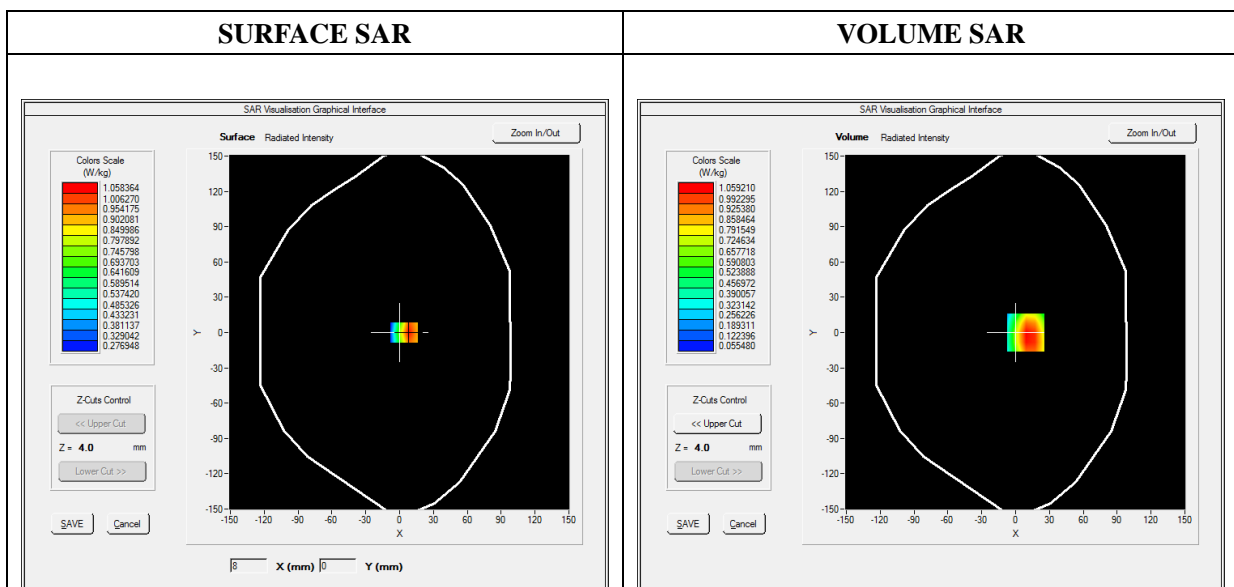
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 05/22/2019

### A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=8mm dy=8mm dz=5mm
<b>Phantom</b>	Flat plane
<b>Device Position</b>	Back
<b>Band</b>	GPRS850_4TX
<b>Channels</b>	Middle
<b>Signal</b>	Duty Cycle: 1:2

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	836.400000
<b>Relative Permittivity (real part)</b>	54.851214
<b>Conductivity (S/m)</b>	0.951454
<b>Power Variation (%)</b>	0.562472
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

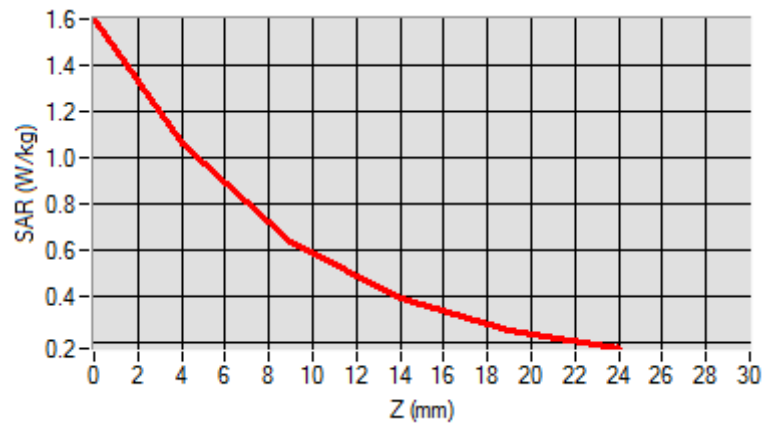


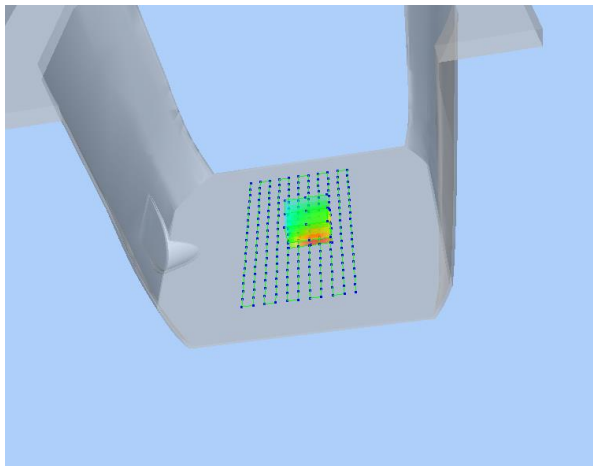

Maximum location: X=9.00, Y=0.00

SAR Peak: 1.62 W/kg

SAR 10g (W/Kg)	0.629906
SAR 1g (W/Kg)	1.031790

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.5983	1.0592	0.6284	0.3850	0.2534



3D screen shot	Hot spot position
	

# MEASUREMENT 8

Type: Phone measurement (Complete)

Date of measurement: 08/13/2019

Measurement duration: 12 minutes 3 seconds

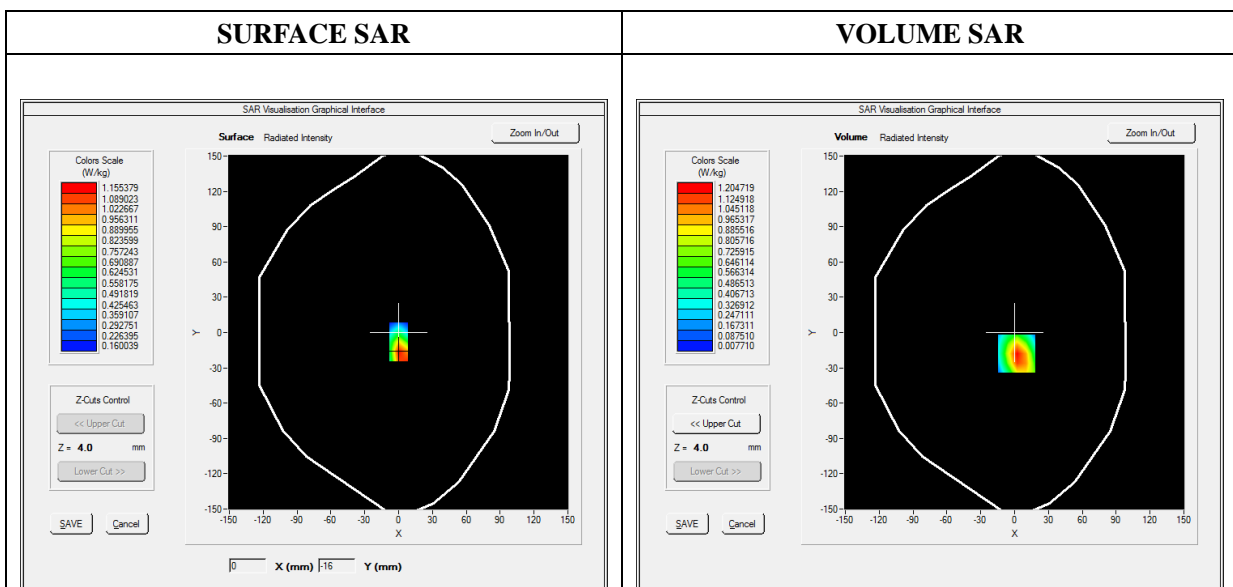
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 05/22/2019

## A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=8mm dy=8mm dz=5mm
<b>Phantom</b>	Flat plane
<b>Device Position</b>	Back side
<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>	0.986340
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

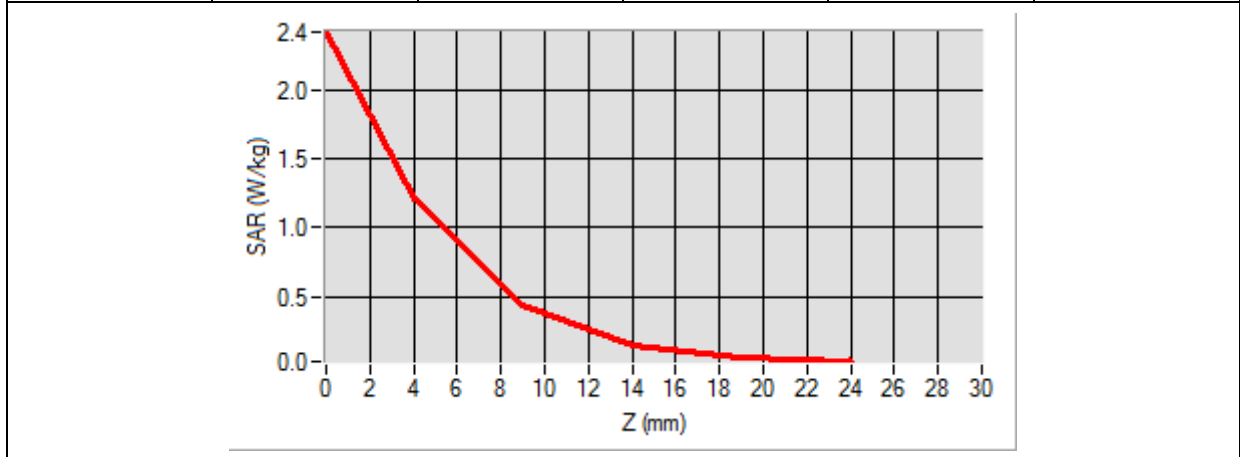


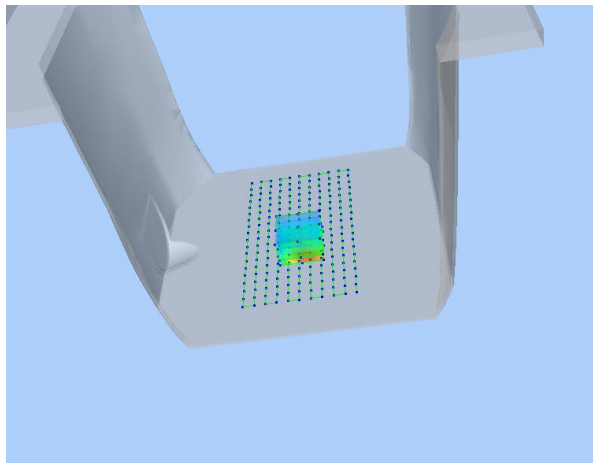

Maximum location: X=2.00, Y=-18.00

SAR Peak: 2.46 W/kg

SAR 10g (W/Kg)	0.506568
SAR 1g (W/Kg)	1.148981

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	2.4149	1.2047	0.4436	0.1524	0.0617



3D screen shot	Hot spot position
	

# MEASUREMENT 12

Type: Phone measurement (Complete)

Date of measurement: 08/12/2019

Measurement duration: 12 minutes 3 seconds

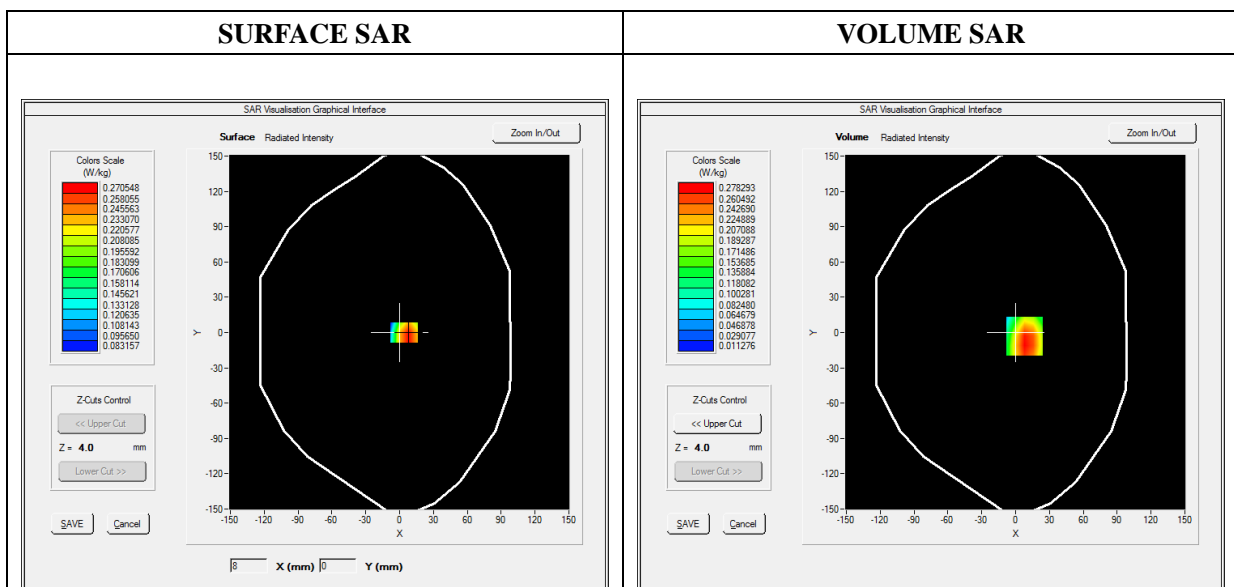
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 05/22/2019

## A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=8mm dy=8mm dz=5mm
<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>	0.986458
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

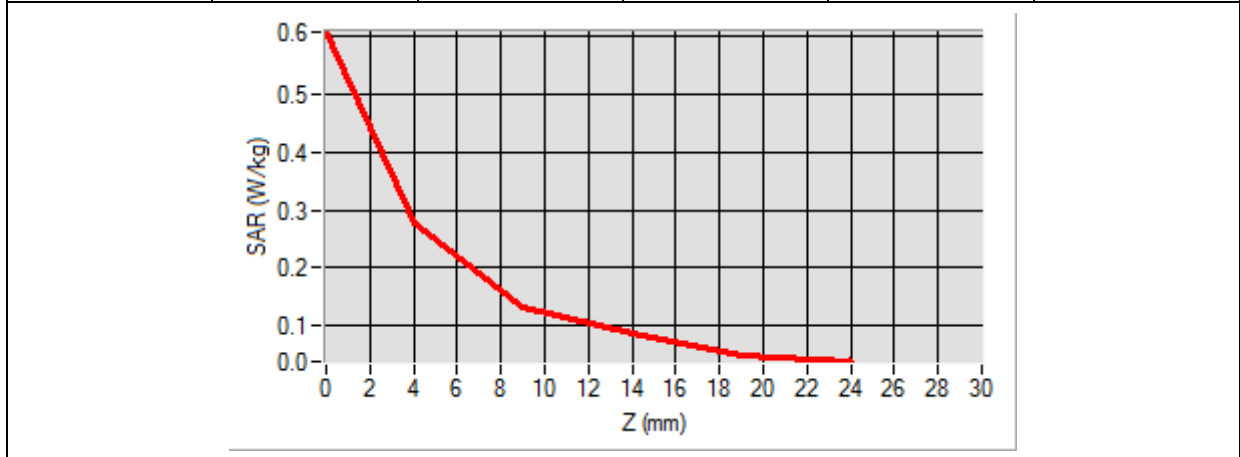


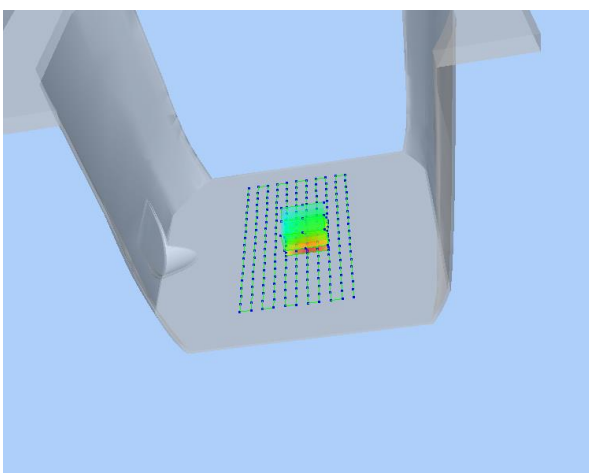

**Maximum location: X=8.00, Y=-3.00**

**SAR Peak: 0.45 W/kg**

<b>SAR 10g (W/Kg)</b>	<b>0.156435</b>
<b>SAR 1g (W/Kg)</b>	<b>0.268424</b>

<b>Z (mm)</b>	<b>0.00</b>	<b>4.00</b>	<b>9.00</b>	<b>14.00</b>	<b>19.00</b>
<b>SAR (W/Kg)</b>	<b>0.6069</b>	<b>0.2783</b>	<b>0.1334</b>	<b>0.0890</b>	<b>0.0495</b>



3D screen shot	Hot spot position
	



# MEASUREMENT 15

Type: Phone measurement (Complete)

Date of measurement: 08/13/2019

Measurement duration: 12 minutes 3 seconds

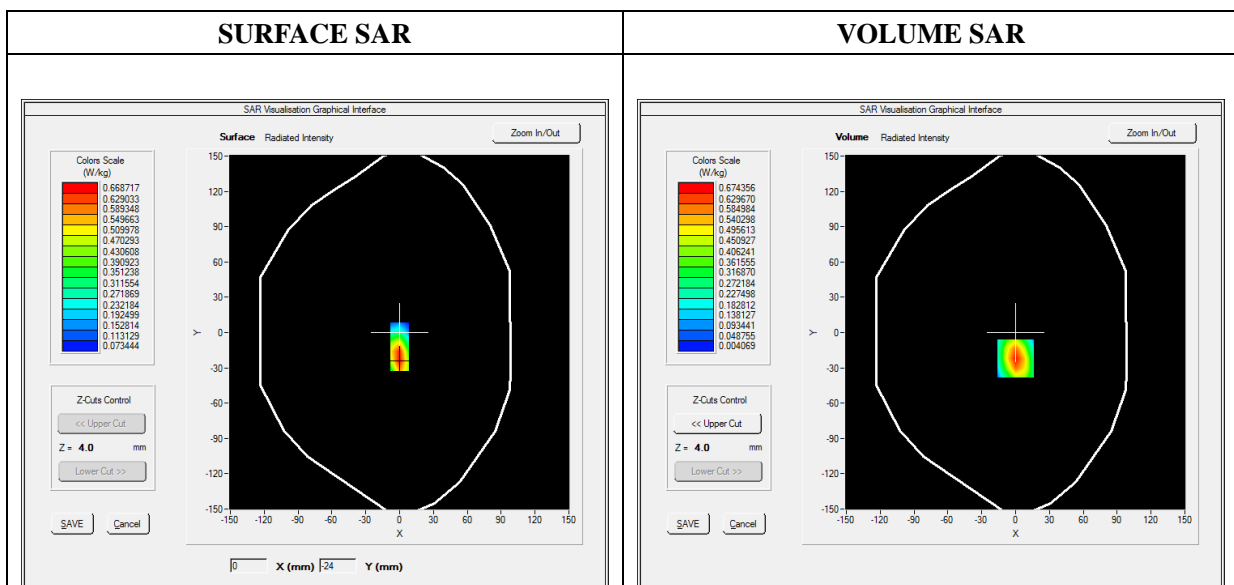
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 05/22/2019

## A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=8mm dy=8mm dz=5mm
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Back
<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>	0.687492
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

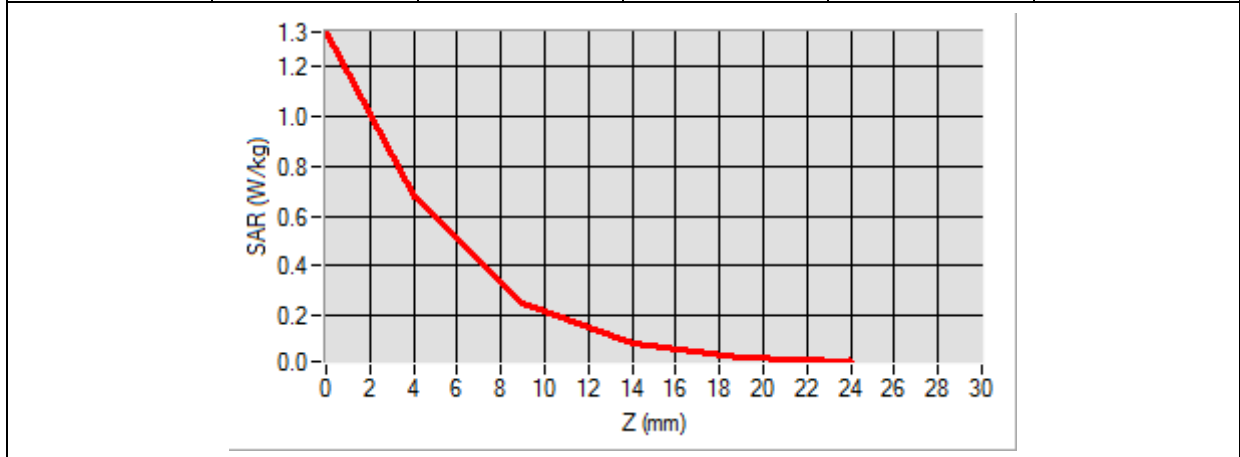


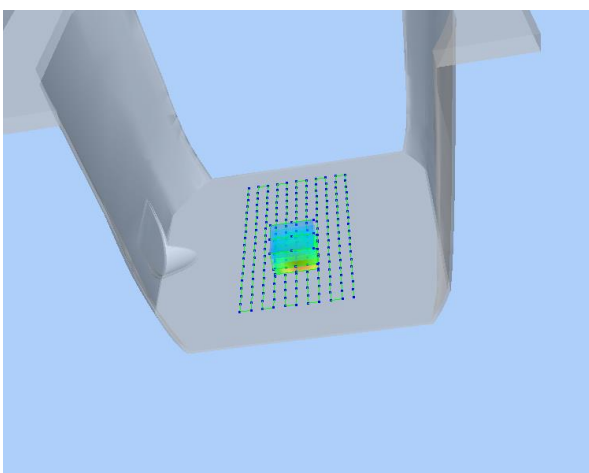
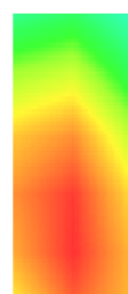
Maximum location: X=0.00, Y=-22.00

SAR Peak: 1.33 W/kg

SAR 10g (W/Kg)	0.281877
SAR 1g (W/Kg)	0.633523

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.3388	0.6744	0.2526	0.0885	0.0359



3D screen shot	Hot spot position
	

# MEASUREMENT 18

Type: Phone measurement (Complete)

Date of measurement: 08/13/2019

Measurement duration: 12 minutes 3 seconds

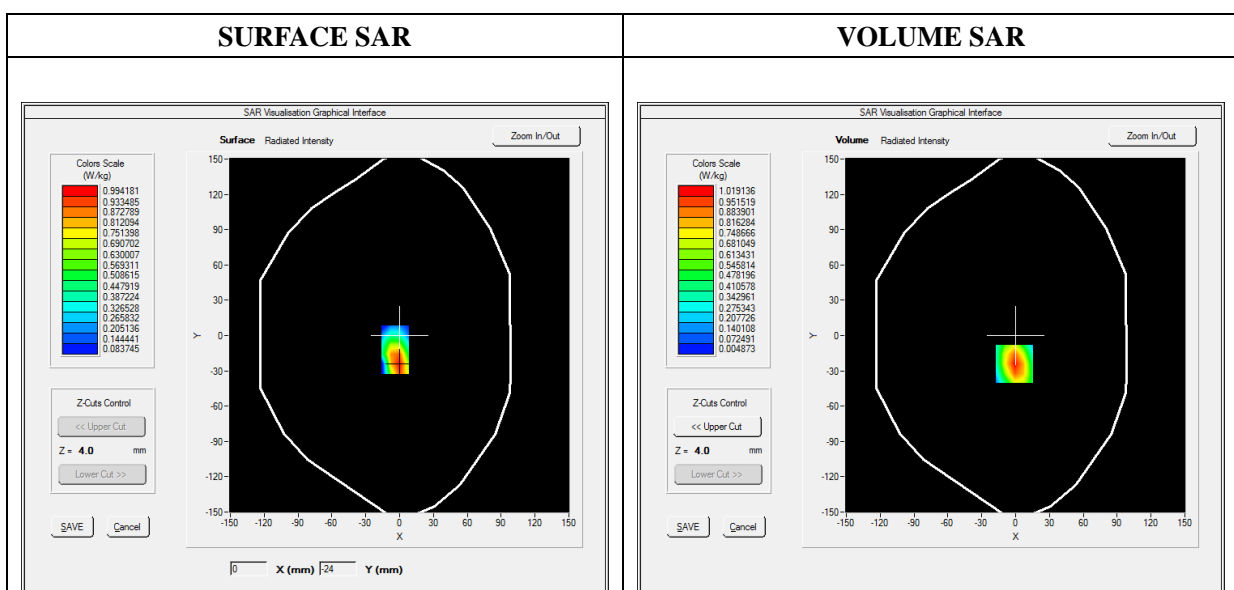
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 05/22/2019

## A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=8mm dy=8mm dz=5mm
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Back
<b>Band</b>	LTE Band 2
<b>Channels</b>	QPSK, 20MHz, 1RB,Middle
<b>Signal</b>	Duty Cycle 1:1

## B. SAR Measurement Results

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

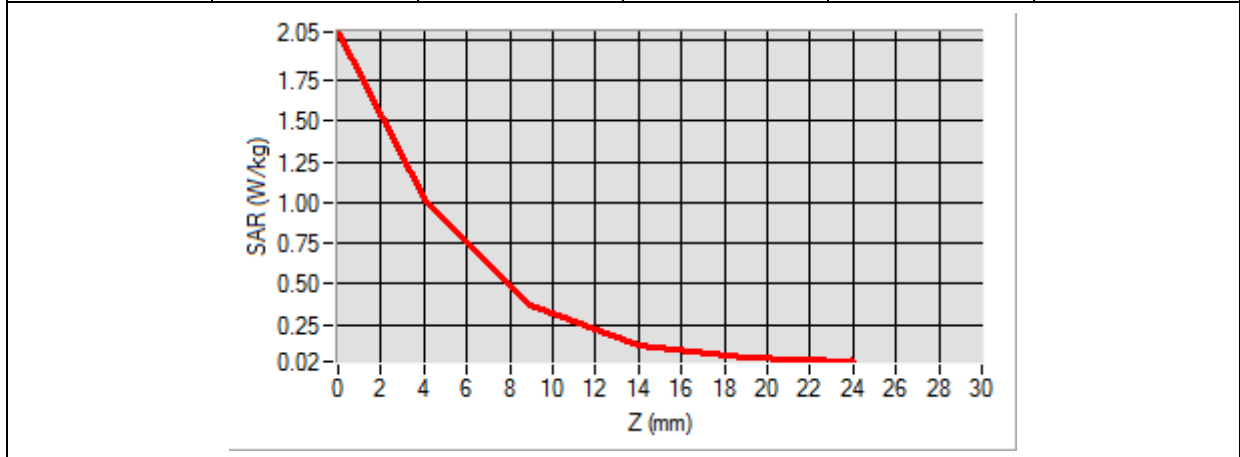


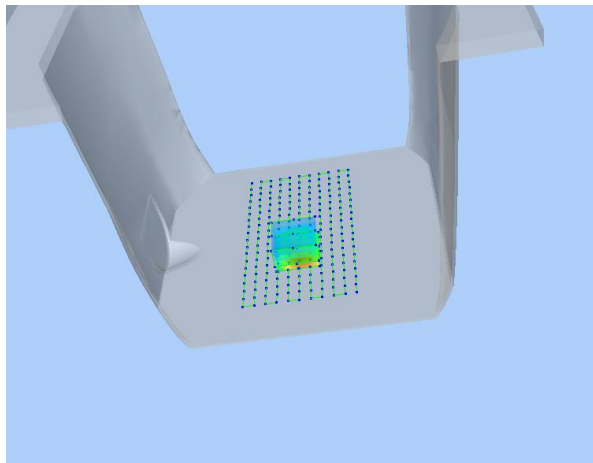
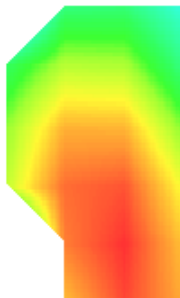
**Maximum location: X=-1.00, Y=-24.00**

**SAR Peak: 2.04 W/kg**

<b>SAR 10g (W/Kg)</b>	<b>0.429956</b>
<b>SAR 1g (W/Kg)</b>	<b>0.964068</b>

<b>Z (mm)</b>	<b>0.00</b>	<b>4.00</b>	<b>9.00</b>	<b>14.00</b>	<b>19.00</b>
<b>SAR (W/Kg)</b>	<b>2.0464</b>	<b>1.0191</b>	<b>0.3736</b>	<b>0.1270</b>	<b>0.0505</b>



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

# MEASUREMENT 26

Type: Phone measurement (Complete)

Date of measurement: 08/13/2019

Measurement duration: 12 minutes 3 seconds

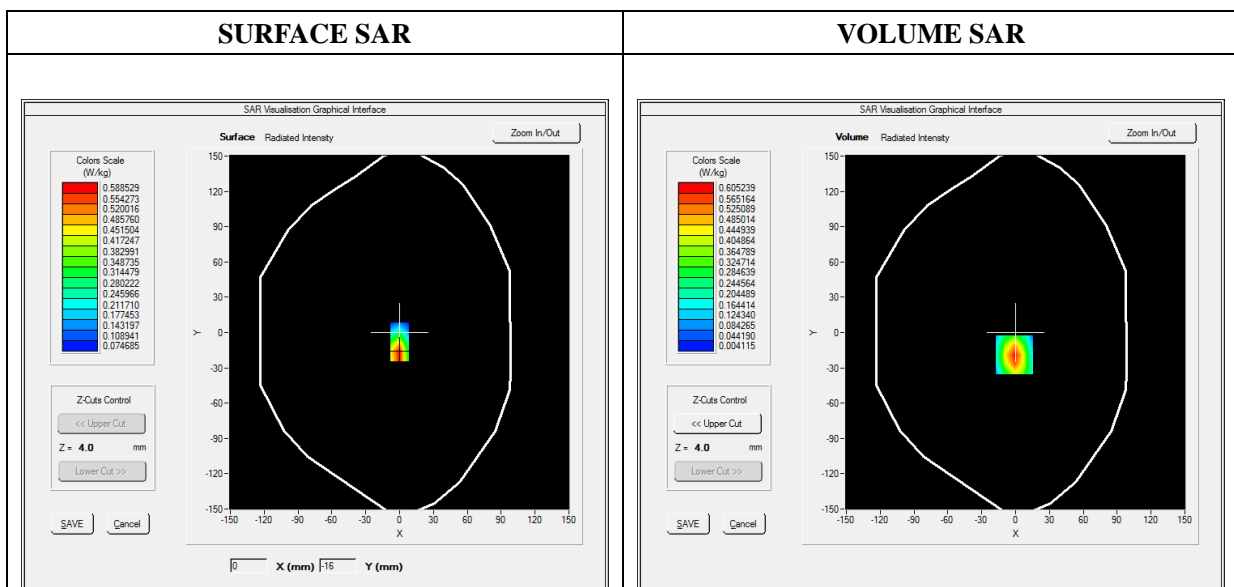
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.06; Calibrated: 05/22/2019

### A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=8mm dy=8mm dz=5mm
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Back
<b>Band</b>	LTE Band 4
<b>Channels</b>	QPSK, 20MHz, 1RB, Middle
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	1732.500000
<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

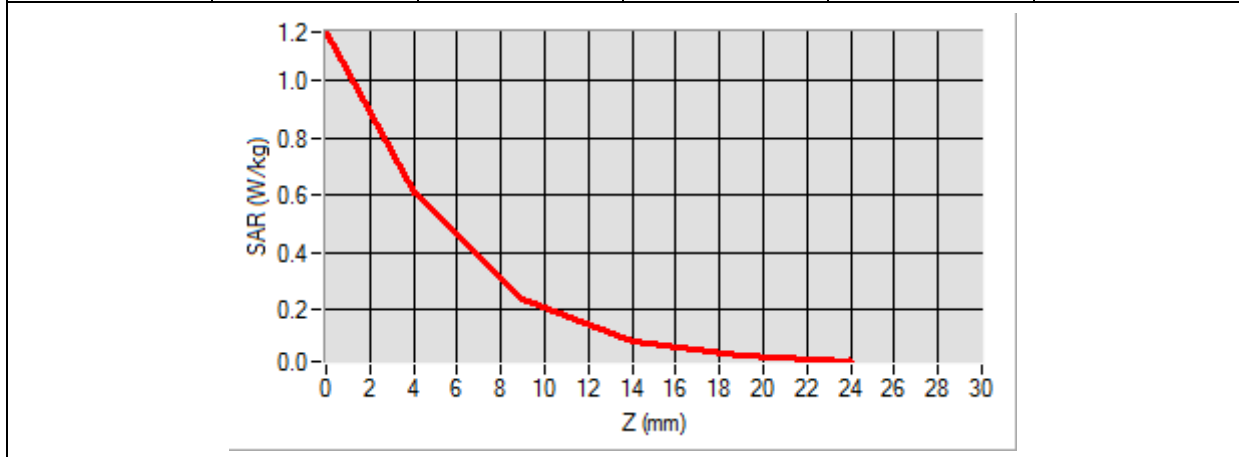


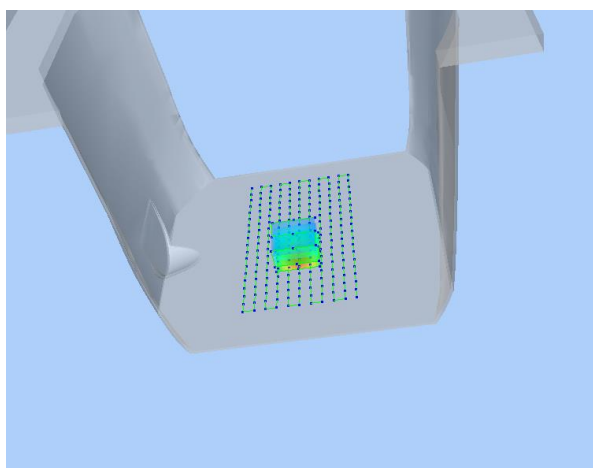
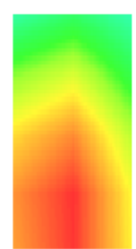
Maximum location: X=-1.00, Y=-19.00

SAR Peak: 1.17 W/kg

SAR 10g (W/Kg)	0.247373
SAR 1g (W/Kg)	0.563795

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.1680	0.6052	0.2392	0.0901	0.0389



3D screen shot	Hot spot position
	

# MEASUREMENT 32

Type: Phone measurement (Complete)

Date of measurement: 08/12/2019

Measurement duration: 12 minutes 3 seconds

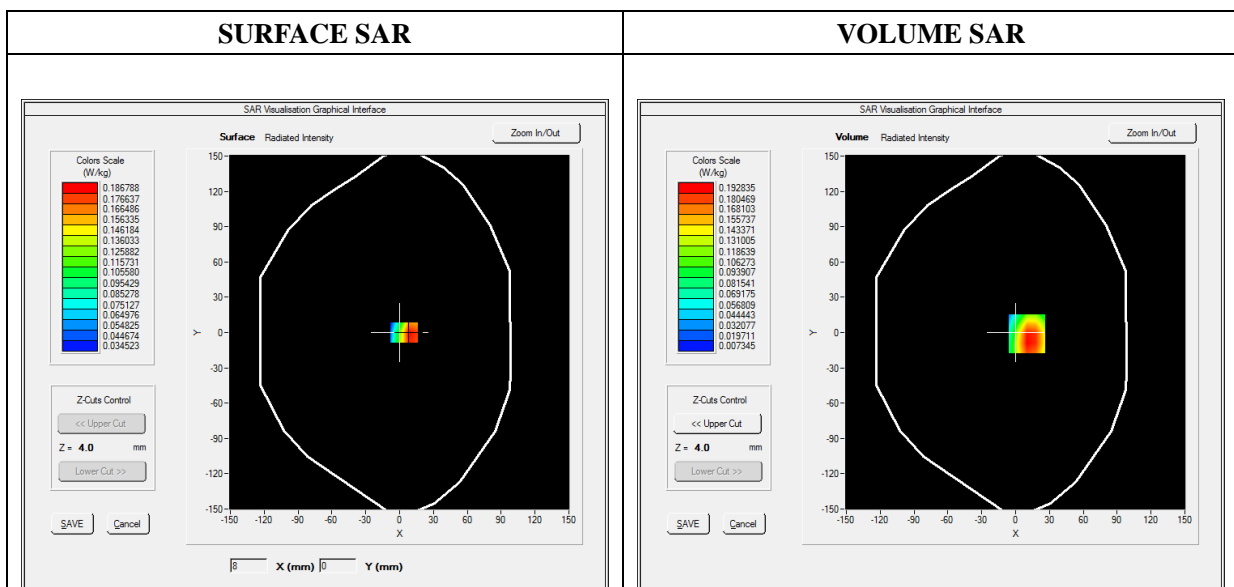
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 05/22/2019

## A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=8mm dy=8mm dz=5mm
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Back
<b>Band</b>	LTE Band 5
<b>Channels</b>	QPSK, 10MHz, 1RB, High
<b>Signal</b>	Duty Cycle 1:1

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	844.000000
<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

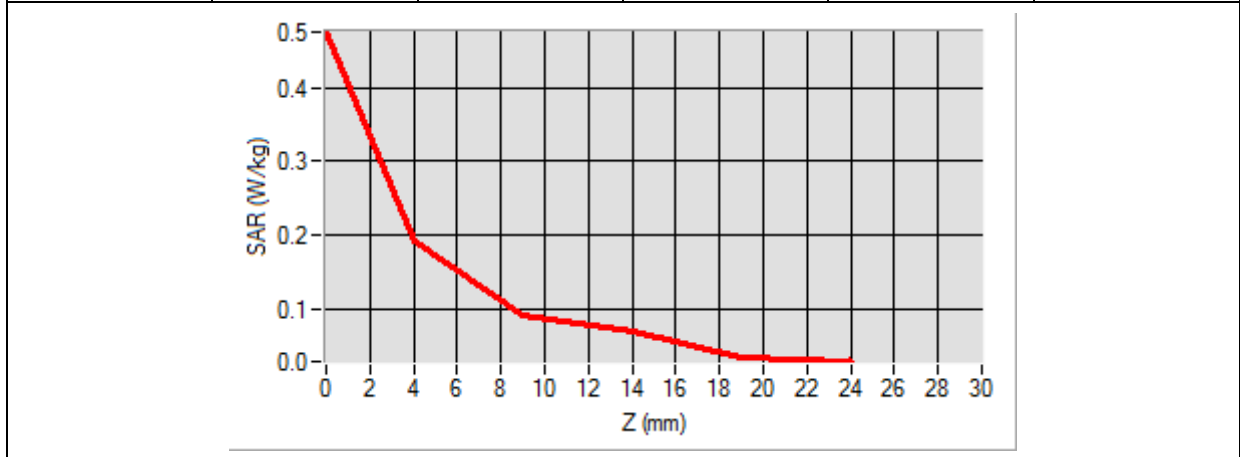


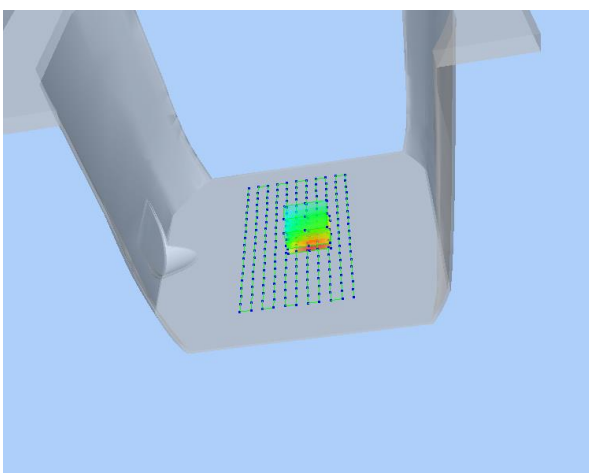

Maximum location: X=10.00, Y=-1.00

SAR Peak: 0.30 W/kg

SAR 10g (W/Kg)	0.111764
SAR 1g (W/Kg)	0.187537

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.4765	0.1928	0.0899	0.0673	0.0338



3D screen shot	Hot spot position
	



# MEASUREMENT 38

Type: Phone measurement (Complete)

Date of measurement: 08/12/2019

Measurement duration: 12 minutes 3 seconds

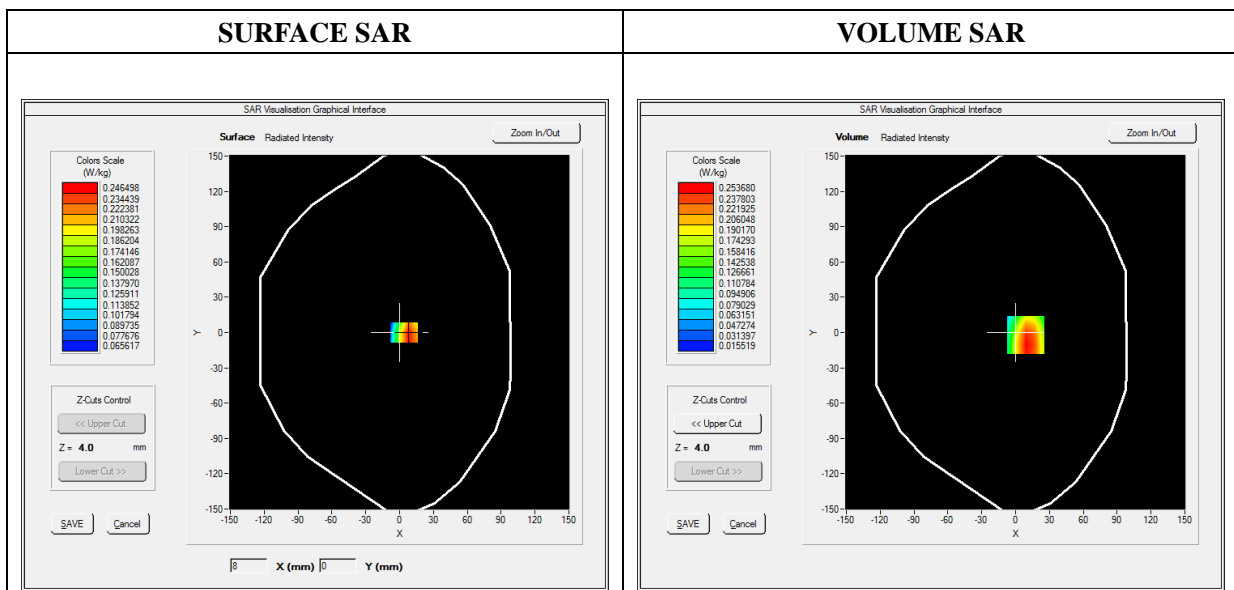
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.28; Calibrated: 05/22/2019

### A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=8mm dy=8mm dz=5mm
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Back
<b>Band</b>	LTE Band 12
<b>Channels</b>	QPSK, 10MHz, 1RB, Low
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	704.000000
<b>Relative Permittivity (real part)</b>	54.964739
<b>Conductivity (S/m)</b>	0.931048
<b>Power Variation (%)</b>	3.672346
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.2

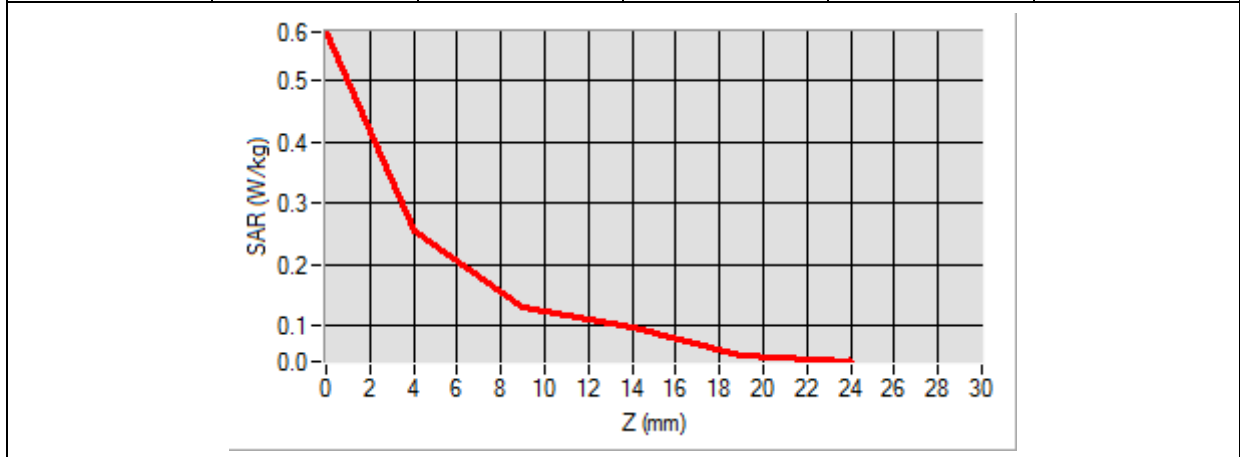


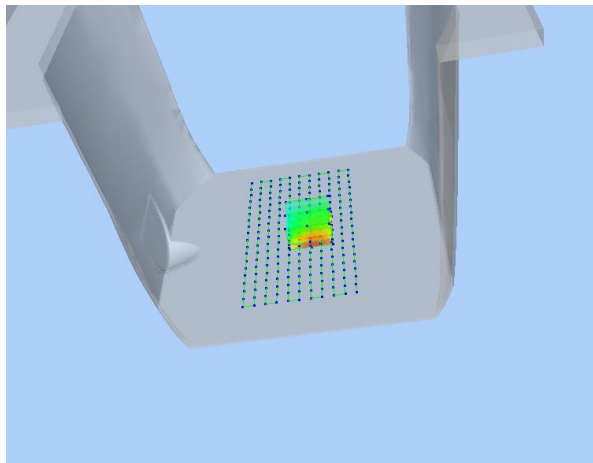

**Maximum location: X=9.00, Y=-2.00**

**SAR Peak: 0.38 W/kg**

<b>SAR 10g (W/Kg)</b>	<b>0.148232</b>
<b>SAR 1g (W/Kg)</b>	<b>0.242747</b>

<b>Z (mm)</b>	<b>0.00</b>	<b>4.00</b>	<b>9.00</b>	<b>14.00</b>	<b>19.00</b>
<b>SAR (W/Kg)</b>	<b>0.5797</b>	<b>0.2537</b>	<b>0.1292</b>	<b>0.0960</b>	<b>0.0525</b>



3D screen shot	Hot spot position
	

# MEASUREMENT 44

Type: Phone measurement (Complete)

Date of measurement: 08/12/2019

Measurement duration: 12 minutes 3 seconds

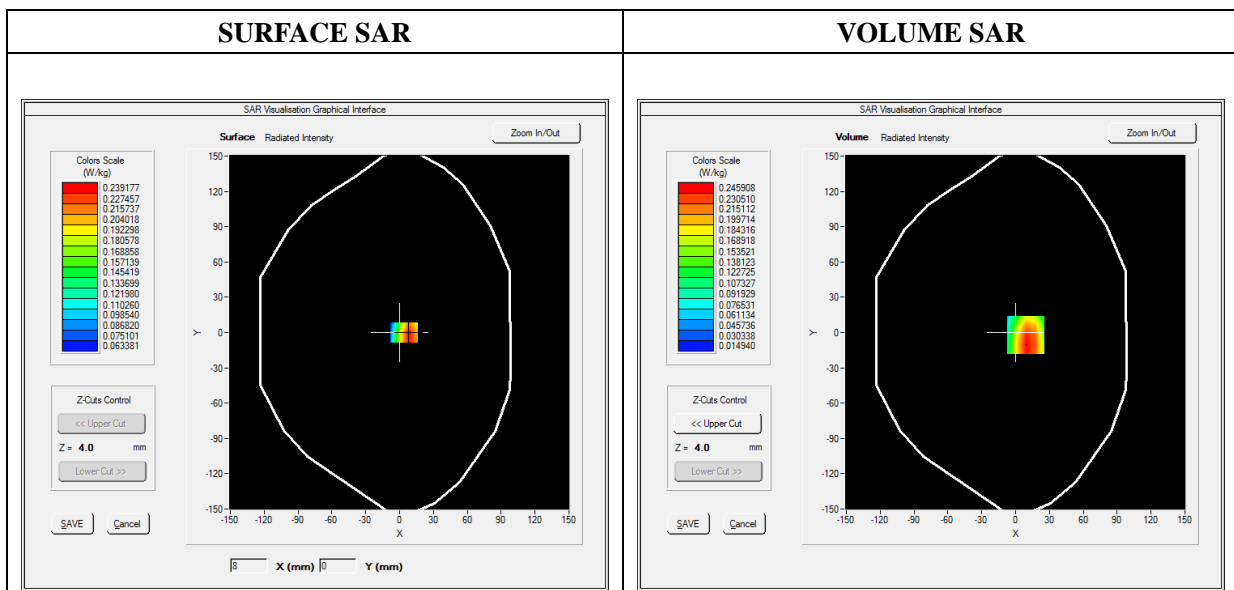
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.28; Calibrated: 05/22/2019

### A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=8mm dy=8mm dz=5mm
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Back
<b>Band</b>	LTE Band 17
<b>Channels</b>	QPSK, 10MHz, 1RB, Low
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	709.000000
<b>Relative Permittivity (real part)</b>	54.964739
<b>Conductivity (S/m)</b>	0.931048
<b>Power Variation (%)</b>	3.108329
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.2

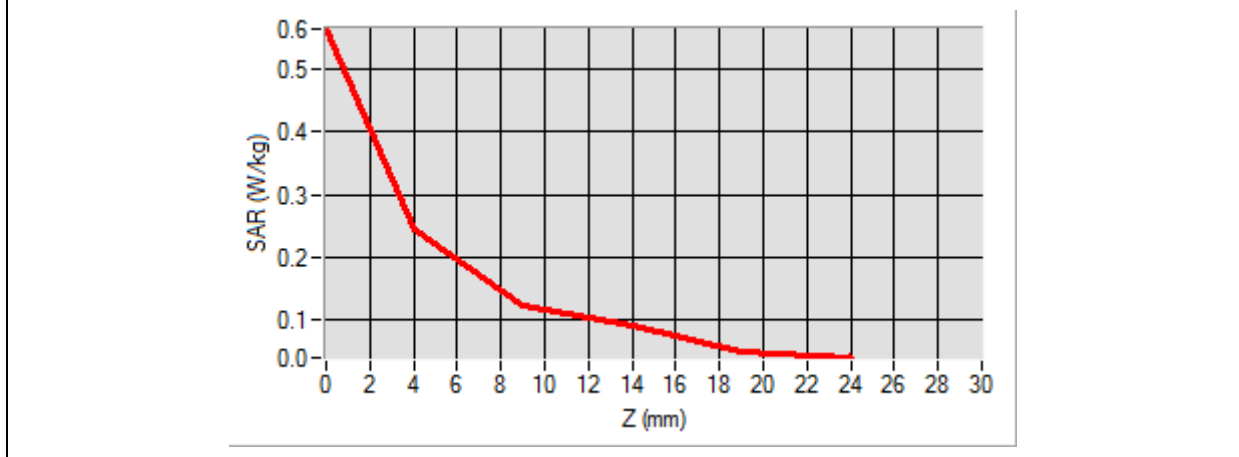


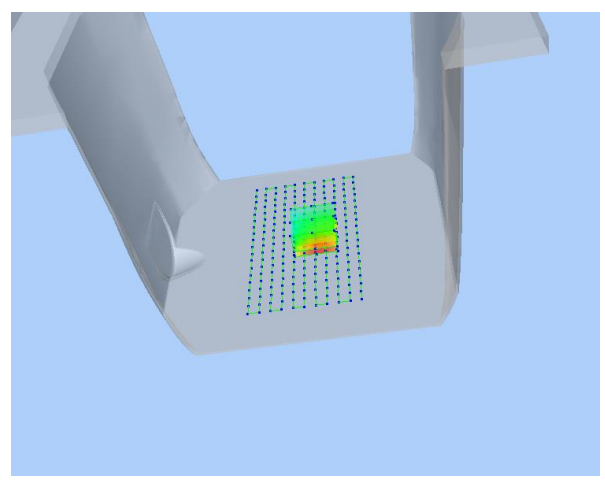

**Maximum location: X=9.00, Y=-2.00**

**SAR Peak: 0.37 W/kg**

<b>SAR 10g (W/Kg)</b>	<b>0.150298</b>
<b>SAR 1g (W/Kg)</b>	<b>0.248732</b>

<b>Z (mm)</b>	<b>0.00</b>	<b>4.00</b>	<b>9.00</b>	<b>14.00</b>	<b>19.00</b>
<b>SAR (W/Kg)</b>	<b>0.5634</b>	<b>0.2459</b>	<b>0.1249</b>	<b>0.0929</b>	<b>0.0508</b>



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

# MEASUREMENT 50

Type: Phone measurement (Complete)

Date of measurement: 08/14/2019

Measurement duration: 12 minutes 3 seconds

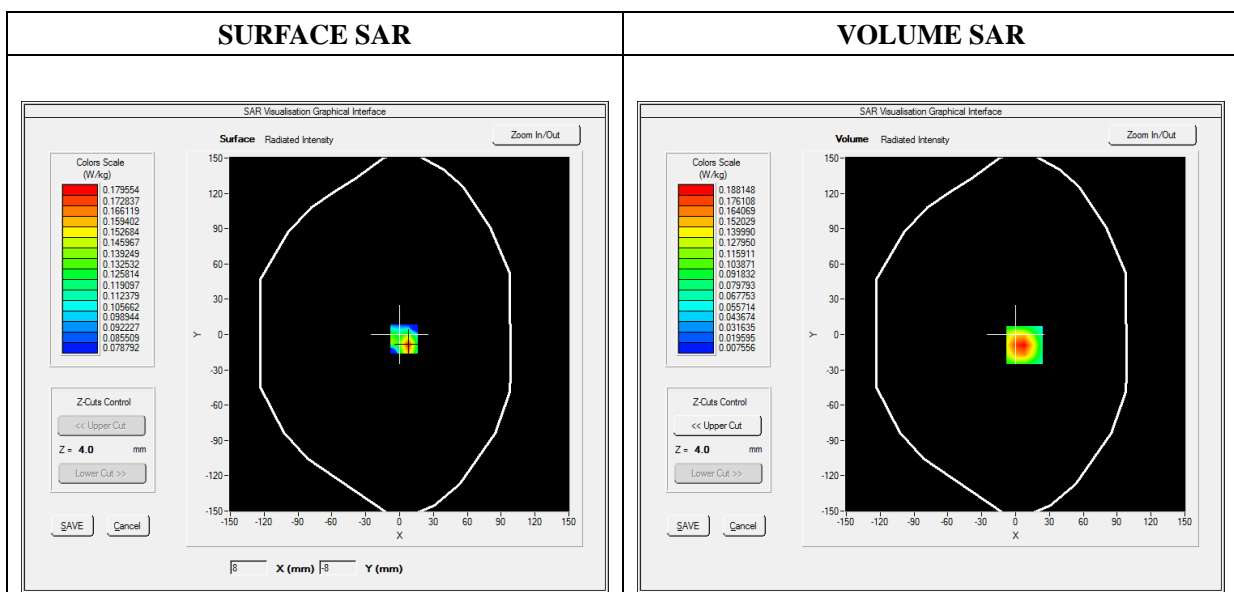
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.80; Calibrated: 05/22/2019

## A. Experimental conditions

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

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	2437.000000
<b>Relative Permittivity (real part)</b>	52.010212
<b>Conductivity (S/m)</b>	1.910255
<b>Power Variation (%)</b>	0.462345
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.2

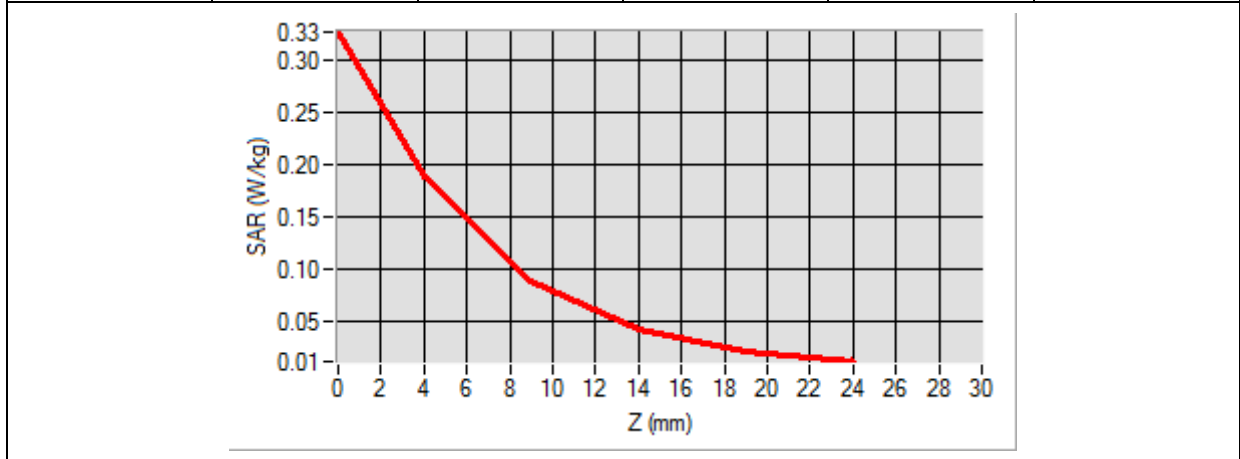


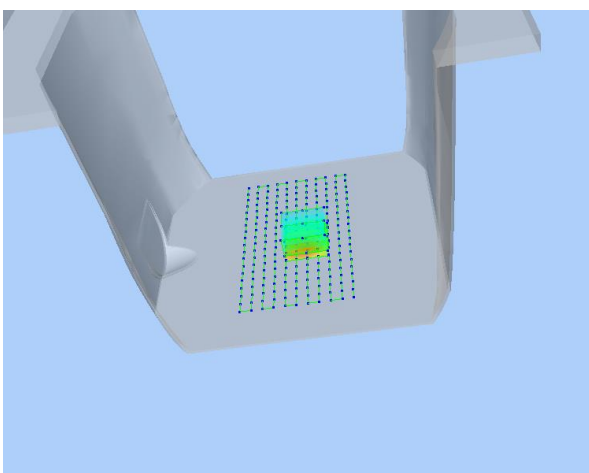
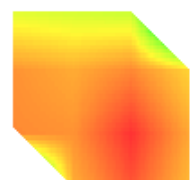
**Maximum location: X=8.00, Y=-9.00**

**SAR Peak: 0.33 W/kg**

<b>SAR 10g (W/Kg)</b>	<b>0.089318</b>
<b>SAR 1g (W/Kg)</b>	<b>0.178993</b>

<b>Z (mm)</b>	<b>0.00</b>	<b>4.00</b>	<b>9.00</b>	<b>14.00</b>	<b>19.00</b>
<b>SAR (W/Kg)</b>	<b>0.3263</b>	<b>0.1881</b>	<b>0.0897</b>	<b>0.0429</b>	<b>0.0227</b>



3D screen shot	Hot spot position
	

## Annex C. EUT Photos

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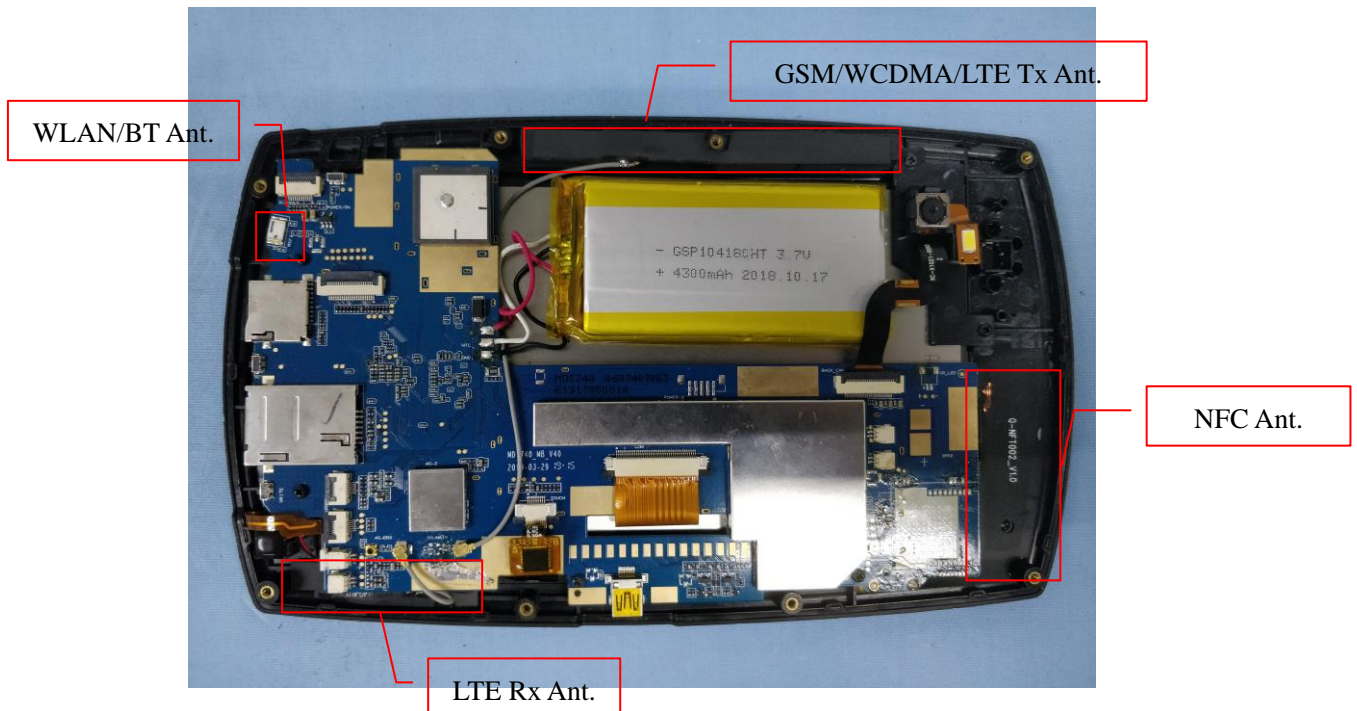
### EUT View Front



### EUT View Back



## Antenna View



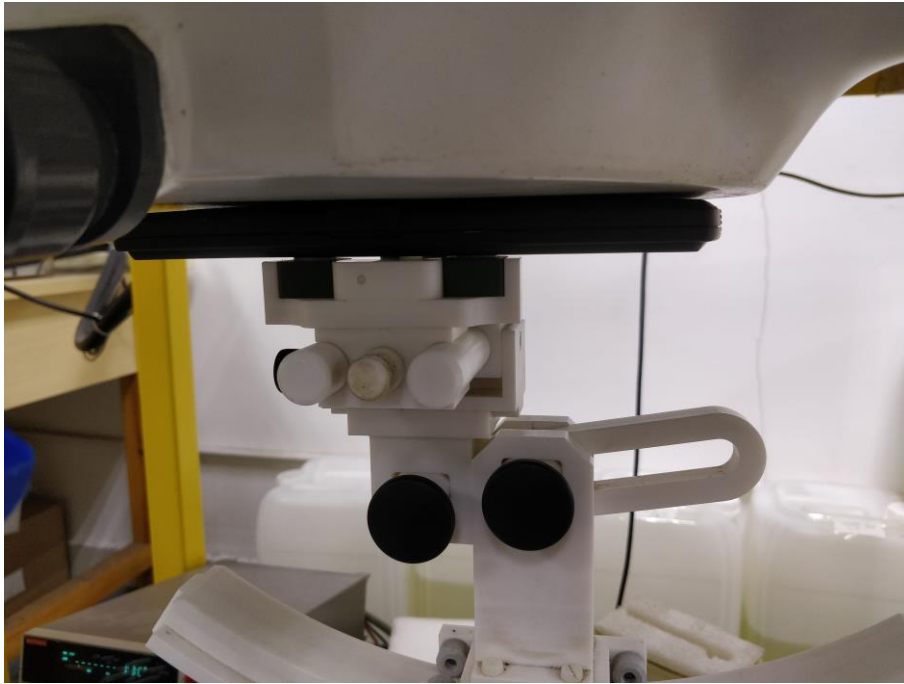


## Annex D. Test Setup Photos

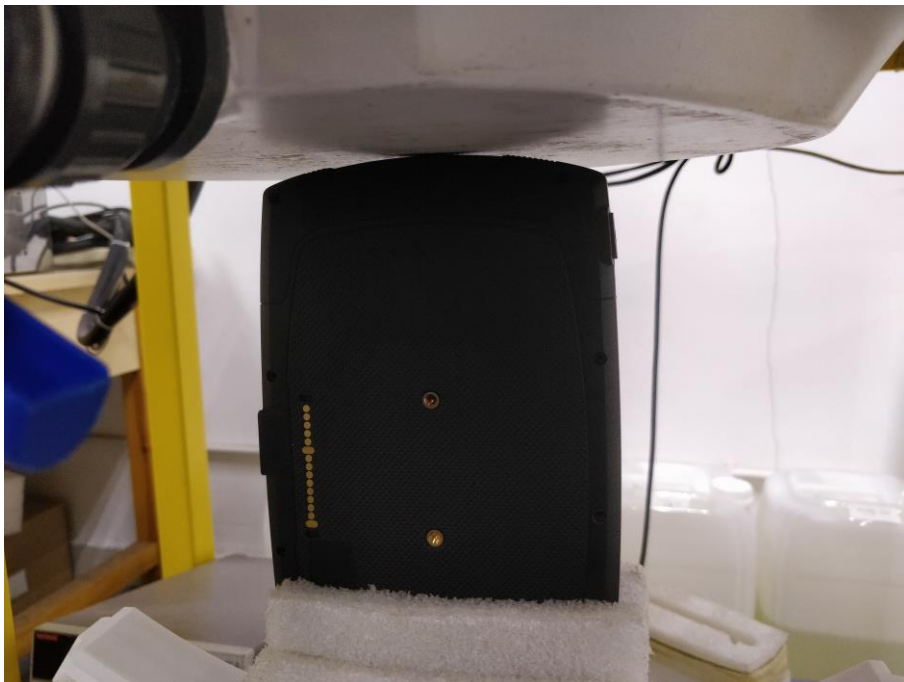
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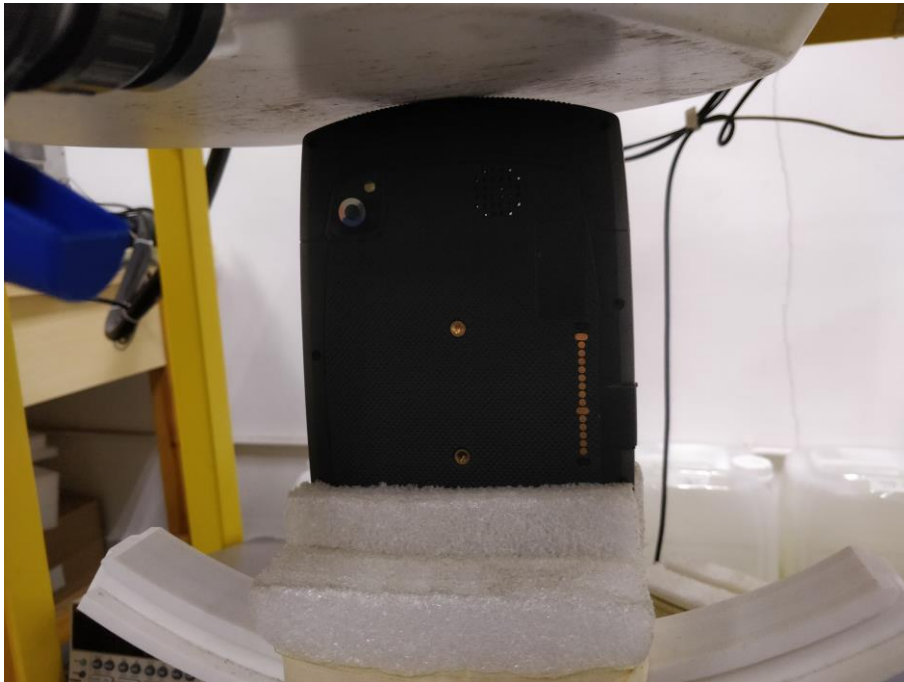
### Body mode Exposure Conditions

**Body Back**



**Body Right**



**Body Left****Body Top**

## Annex E. Calibration Certificate

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**Please refer to the Exhibit for the Calibration Certificate**

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