

FCC SAR

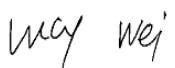
Measurement and Test Report

For

Cyrus Technology GmbH

Hergelsbendenstrasse 49, D-52080 Aachen, Germany

FCC ID: 2AI3KCS22SA2

Test Standards:	FCC Part 2.1093 ANSI / IEEE C95.1 ::2005+A1:2010 ANSI / IEEE C95.3 : 2002(R2008) <u>IEEE 1528 :2013</u>
Product Description:	<u>Rugged Phone</u>
Tested Model:	<u>CS22SA</u>
Report No.:	<u>STR18098107H</u>
Sample Received Date:	<u>2018-09-18</u>
Tested Date:	<u>2018-09-25 to 2018-09-26</u>
Issued Date:	<u>2018-09-29</u>
Tested By:	<u>Lucy Wei / Engineer</u> 
Reviewed By:	<u>Silin Chen / EMC Manager</u> 
Approved & Authorized By:	<u>Jandy So / PSQ Manager</u> 
Prepared By:	Shenzhen SEM Test Technology Co. Ltd. 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C. (518101) Tel.: +86-755-33663308 Fax.: +86-755-33663309 Website: www.semtest.com.cn

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

TABLE OF CONTENTS

1. General Information	3
1.1 Product Description for Equipment Under Test (EUT).....	3
1.2 Test Standards	6
1.3 Test Methodology	6
1.4 Test Facility	6
2. Summary of Test Results	7
3. Specific Absorption Rate (SAR).....	8
3.1 Introduction.....	8
3.2 SAR Definition	8
4. SAR Measurement System.....	9
4.1 The Measurement System	9
4.2 Probe.....	9
4.3 Probe Calibration Process	11
4.4 Phantom	12
4.5 Device Holder	12
4.6 Test Equipment List.....	13
5. Tissue Simulating Liquids.....	14
5.1 Composition of Tissue Simulating Liquid.....	14
5.2 Tissue Dielectric Parameters for Head and Body Phantoms.....	15
5.3 Tissue Calibration Result.....	16
6. SAR Measurement Evaluation	17
6.1 Purpose of System Performance Check.....	17
6.2 System Setup	17
6.3 Validation Results.....	18
7. EUT Testing Position	20
7.1 Define Two Imaginary Lines on The Handset.....	20
7.2 Cheek Position	21
7.3 Tilted Position	21
7.4 Body Worn Position	22
7.5 EUT Antenna Position	22
7.6 EUT Testing Position	24
8. SAR Measurement Procedures.....	25
8.1 Measurement Procedures	25
8.2 Spatial Peak SAR Evaluation	25
8.3 Area & Zoom Scan Procedures	26
8.4 Volume Scan Procedures	26
8.5 SAR Averaged Methods	26
8.6 Power Drift Monitoring	26
9. SAR Test Result	27
9.1 Conducted RF Output Power	27
9.2 Test Results for Standalone SAR Test.....	55
9.3 Simultaneous Multi-band Transmission SAR Analysis	67
10. Measurement Uncertainty	75
10.1 Uncertainty for EUT SAR Test.....	75
10.2 Uncertainty for System Performance Check.....	76
Annex A. Plots of System Performance Check	78
Annex B. Plots of SAR Measurement	98
Annex C. EUT Photos	152
Annex D. Test Setup Photos	154
Annex E. Calibration Certificate.....	159

1. General Information

1.1 Product Description for Equipment Under Test (EUT)

Client Information

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

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

General Description of EUT:	
Product Name:	Rugged Phone
Brand Name:	Cyrus
Model No.:	CS22SA
Adding Model(s):	/
Rated Voltage:	DC3.8V
Battery:	4000mAh
Software Version:	CS22_V1.01_2017_12_28
Hardware Version:	L808F_MB
Device Category:	Portable Device
<i>The EUT Main board support GSM850/900/DCS1800/PCS1900, WCDMA Band 2/4/5, LTE Band 2/4/5/7 function. It is intended for speech, Multimedia Message Service (MMS) transmission. It is equipped with GPRS/EDGE class 12 for GSM850/900/DCS1800/PCS1900, GPS, FM, Bluetooth and Wi-Fi functions. For more information see the following datasheet</i>	
<i>Note: The test data is gathered from a production sample provided by the manufacturer.</i>	

Technical Characteristics of EUT:	
2G	
Support Networks:	GSM, GPRS, EDGE
Support Band:	GSM850/PCS1900
Uplink Frequency:	GSM/GPRS/EDGE 850: 824~849MHz GSM/GPRS/EDGE 1900: 1850~1910MHz
Downlink Frequency:	GSM/GPRS/EDGE 850: 869~894MHz GSM/GPRS/EDGE 1900: 1930~1990MHz
Max RF Output Power:	GSM850: 32.87dBm, GSM1900: 30.21dBm EDGE850: 28.24dBm, EDGE1900: 22.81dBm
Type of Modulation:	GMSK, 8PSK
Type of Antenna:	Integral Antenna
Antenna Gain:	GSM850: -0.80dBi; GSM1900: 1.20dBi
GPRS/EDGE Class:	Class 12
3G	
Support Networks:	WCDMA, HSDPA, HSUPA
Support Band:	WCDMA Band 2, WCDMA Band 5,WCDMA Band 4
Uplink Frequency:	WCDMA Band 2: 1850~1910MHz WCDMA Band 5: 824~849MHz WCDMA Band 4: 1710~1755MHz
Downlink Frequency:	WCDMA Band 2: 1930~1990MHz WCDMA Band 5: 869~894MHz WCDMA Band 4: 2110~2155MHz
RF Output Power:	WCDMA Band 2: 22.51dBm, WCDMA Band 5: 22.24dBm WCDMA Band4: 22.45dBm
Type of Modulation:	BPSK, QPSK, 16QAM
Antenna Type:	Integral Antenna
Antenna Gain:	WCDMA Band 2: 1.20dBi, WCDMA Band 4: 0.7dBi, WCDMA Band 5: -0.80dBi
4G	
Support Networks:	FDD-LTE
Support Band:	FDD-LTE Band 2, 4, 5, 7
Uplink Frequency:	FDD-LTE Band 2: Tx: 1850-1910MHz, FDD-LTE Band 4: Tx: 1710-1755MHz, FDD-LTE Band 5: Tx: 824-849MHz FDD-LTE Band 7: Tx: 2500-2570MHz,
Downlink Frequency:	FDD-LTE Band 2: Rx: 1930-1990MHz, FDD-LTE Band 4: Rx: 2110-2155MHz, FDD-LTE Band 5: Rx: 869-894MHz FDD-LTE Band 7: Rx: 2620-2690MHz,
RF Output Power:	FDD-LTE Band 2: 24.31dBm,

	FDD-LTE Band 4: 23.78dBm, FDD-LTE Band 5: 23.67dBm FDD-LTE Band 7: 22.89dBm,
Type of Modulation:	QPSK, 16QAM
Antenna Type:	Integral Antenna
Antenna Gain:	FDD-LTE Band 2: 1.20dBi, FDD-LTE Band 4: 0.70dBi, FDD-LTE Band 5: -0.80dBi,FDD-LTE Band 7: 1.10dBi,
WIFI	
Support Standards:	802.11b, 802.11g, 802.11n
Frequency Range:	2412-2462MHz for 11b/g/n(HT20) 2422-2452MHz for 11n(HT40)
RF Output Power:	13.92dBm (Conducted)
Type of Modulation:	CCK , QPSK, BPSK, 16QAM, 64QAM
Data Rate:	1-11Mbps, 6-54Mbps, up to 150Mbps
Quantity of Channels:	11/7
Channel Separation:	5MHz
Antenna Type:	Integral Antenna
Antenna Gain:	0.80dBi
Bluetooth	
Bluetooth Version:	V4.0
Frequency Range:	2402-2480MHz
RF Output Power:	1.961dBm (Conducted)
Data Rate:	1Mbps, 2Mbps, 3Mbps
Modulation:	GFSK, Pi/4 QDPSK, 8DPSK
Quantity of Channels:	79/40
Channel Separation:	1MHz/2MHz
Antenna Type:	Integral Antenna
Antenna Gain:	0.80dBi
NFC	
Support Standards:	NFC
Frequency Range:	13.56MHz
Max. Field Strength:	65.70dBuV/m (at 3m)/ -29.53dBm
Antenna Type:	Integral Antenna
Device Category:	Portable Device

1.2 Test Standards

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

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

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

1.3 Test Methodology

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

1.4 Test Facility

FCC – Registration No.: 125990

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

Industry Canada (IC) Registration No.: 11464A

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

2. Summary of Test Results

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

Frequency Band	Head SAR	Body-worn (10mm Gap)	Hotspot (10mm Gap)	SAR _{1g} Limit (W/kg)
	Maximum SAR _{1g} (W/kg)	Maximum SAR _{1g} (W/kg)	Maximum SAR _{1g} (W/kg)	
GSM	0.694	0.486	0.791	1.6
WCDMA	0.691	1.144	1.144	1.6
FDD-LTE	0.588	1.066	1.066	1.6
WLAN 2.4G	0.065	0.098	0.098	1.6
Simultaneous Transmission	0.769	1.242	1.242	1.6

Remark:

*The highest reported SAR values for head, body-worn accessory, wireless router(hotspot), and simultaneous transmission conditions are **0.694W/kg**, **1.144W/kg** , **1.144W/kg**, and **1.242W/kg** respectively.*

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

3. Specific Absorption Rate (SAR)

3.1 Introduction

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

3.2 SAR Definition

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

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

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

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

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

Where: C is the specific heat capacity, δT is the temperature rise and δt is the exposure duration, or related to the

electrical field in the tissue by

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

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength.

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

4. SAR Measurement System

4.1 The Measurement System

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

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

The following figure shows the system.



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

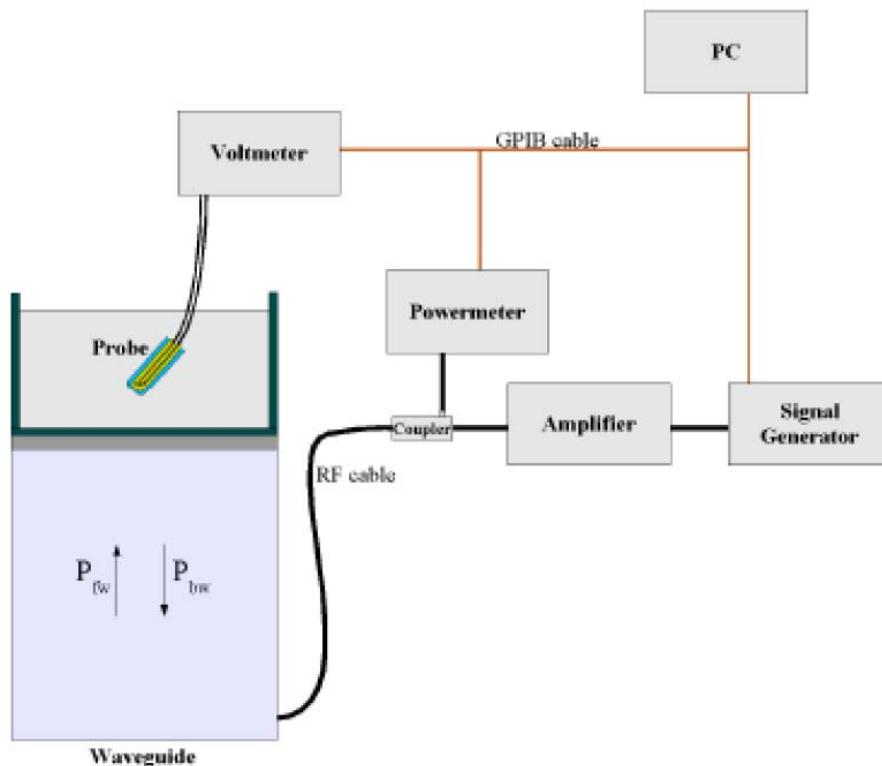
4.2 Probe

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

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

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

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



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

Where :

Pfw = Forward Power

Pbw = Backward Power

a and b = Waveguide dimensions

I = Skin depth

Keithley configuration:

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

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

$$CF(N) = SAR(N)/Vlin(N) \quad (N=1,2,3)$$

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

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

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/cm²) 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/cm².

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:

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

Δt = exposure time (30 seconds),

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

ΔT = temperature increase due to RF exposure.

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

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

Where:

σ = simulated tissue conductivity,

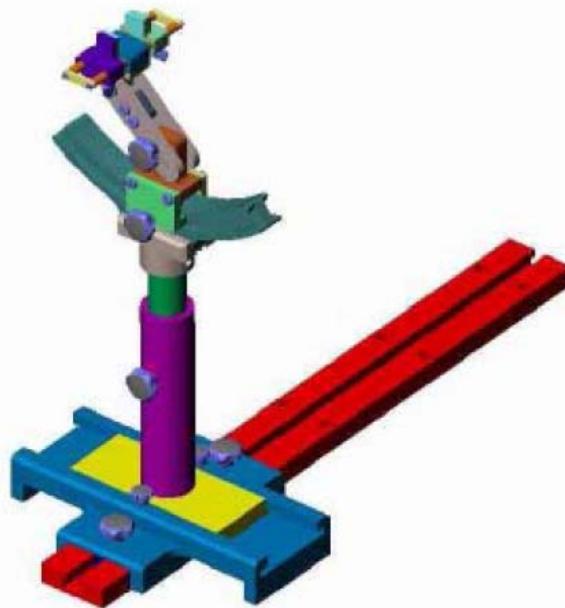
ρ = Tissue density (1.25 g/cm³ for brain tissue)

4.4 Phantom

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

4.5 Device Holder

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



System Material	Permittivity	Loss Tangent
Delrin	3.7	0.005

4.6 Test Equipment List

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

5. Tissue Simulating Liquids

5.1 Composition of Tissue Simulating Liquid

For the measurement of the field distribution inside the SAM phantom with SMTIMO, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm. Please see the following photos for the liquid height.



Liquid Height for Head SAR



Liquid Height for Body SAR

The Composition of Tissue Simulating Liquid

Frequency (MHz)	Water (%)	Salt (%)	Sugar (%)	HEC (%)	Preventol (%)	DGBE (%)
Head						
835	40.3	1.4	57.9	0.2	0.2	0
1800-1900	55.2	0.3	0	0	0	44.5
2450	55.0	0.1	0	0	0	44.9
2600	54.9	0.1	0	0	0	45.0
Body						
835	50.8	0.9	48.1	0.1	0.1	0
1800-1900	70.2	0.4	0	0	0	29.4
2450	68.6	0.1	0	0	0	31.3
2600	68.2	0.1	0	0	0	31.7

5.2 Tissue Dielectric Parameters for Head and Body Phantoms

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

Target Frequency (MHz)	Head		Body	
	Conductivity (σ)	Permittivity (ϵ_r)	Conductivity (σ)	Permittivity (ϵ_r)
150	0.76	52.3	0.80	61.9
300	0.87	45.3	0.92	58.2
450	0.87	43.5	0.94	56.7
750	0.89	41.9	0.96	55.5
835	0.90	41.5	0.97	55.2
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
1750	1.37	40.1	1.49	53.4
1800-2000	1.40	40.0	1.52	53.3
2450	1.80	39.2	1.95	52.7
3000	2.40	38.5	2.73	52.0
5800	5.27	35.3	6.00	48.2

5.3 Tissue Calibration Result

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

Calibration Result for Dielectric Parameters of Tissue Simulating Liquid

Head Tissue Simulating Liquid									
Freq. MHz.	Temp. (°C)	Conductivity			Permittivity			Limit (%)	Date
		Reading (σ)	Target (σ)	Delta (%)	Reading (ϵ_r)	Target (ϵ_r)	Delta (%)		
835	21.2	0.87	0.90	-3.33	41.11	41.50	-0.94	±5	2018-09-25
1750	21.3	1.37	1.37	0.00	39.02	40.1	-2.69	±5	2018-09-26
1800	21.3	1.37	1.40	-2.14	39.02	40.0	-2.45	±5	2018-09-26
1900	21.3	1.38	1.40	-1.43	38.56	40.00	-3.60	±5	2018-09-26
2450	21.3	1.74	1.80	-3.33	38.15	39.20	-2.68	±5	2018-09-27
2600	21.3	1.93	1.96	-1.53	38.63	39.0	-0.95	±5	2018-09-27

Body Tissue Simulating Liquid									
Freq. MHz.	Temp. (°C)	Conductivity			Permittivity			Limit (%)	Date
		Reading (σ)	Target (σ)	Delta (%)	Reading (ϵ_r)	Target (ϵ_r)	Delta (%)		
835	21.2	0.95	0.97	-2.06	54.85	55.20	-0.63	±5	2018-09-25
1750	21.3	1.46	1.49	-2.01	51.22	53.40	-4.08	±5	2018-09-26
1800	21.3	1.46	1.52	-3.95	51.22	53.30	-3.90	±5	2018-09-26
1900	21.3	1.50	1.52	-1.32	52.42	53.30	-1.65	±5	2018-09-26
2450	21.3	1.91	1.95	-2.05	52.01	52.70	-1.31	±5	2018-09-27
2600	21.3	2.12	2.16	-1.85	52.24	52.50	-0.50	±5	2018-09-27

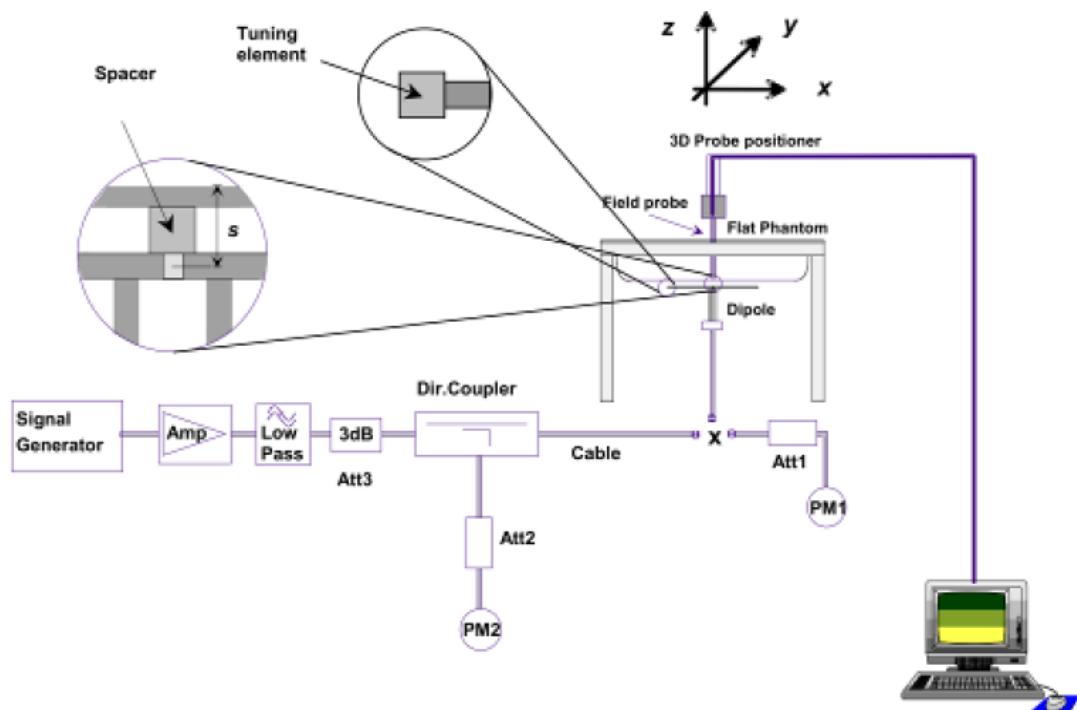
6. SAR Measurement Evaluation

6.1 Purpose of System Performance Check

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

6.2 System Setup

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



System Verification Setup Block Diagram



Setup Photo of Dipole Antenna

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

6.3 Validation Results

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

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

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

Targeted and Measurement SAR

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

7. EUT Testing Position

7.1 Define Two Imaginary Lines on The Handset

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

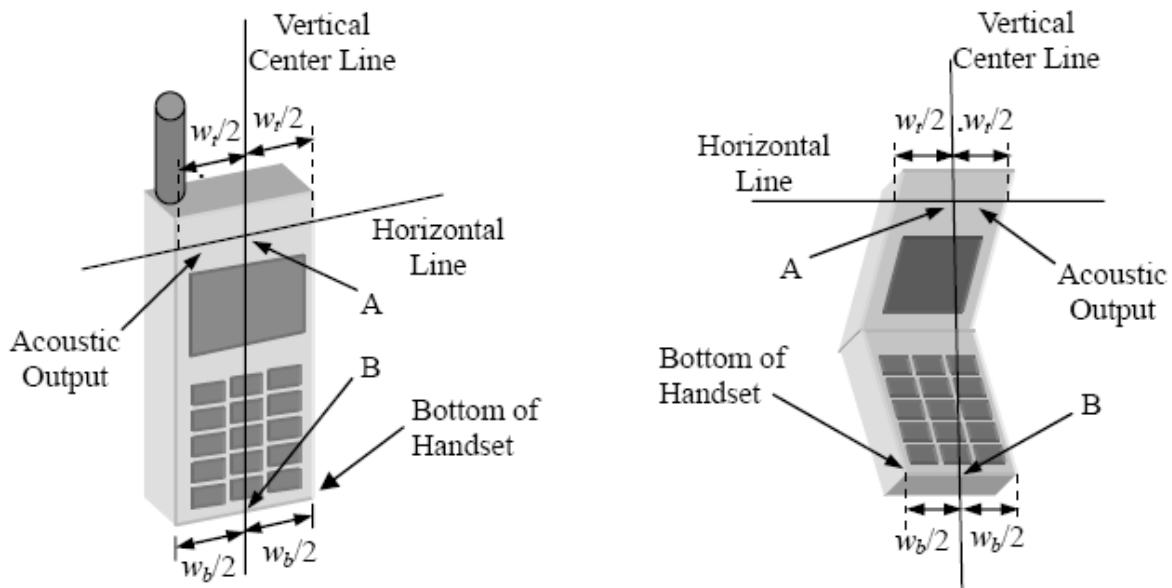


Illustration for Handset Vertical and Horizontal Reference Lines

7.2 Cheek Position

- (a) To position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the three ear and mouth reference point (M: Mouth, RE: Right Ear, and LE: Left Ear) and align the center of the ear piece with the line RE-LE.
- (b) To move the device towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost (see Fig. 7.2).

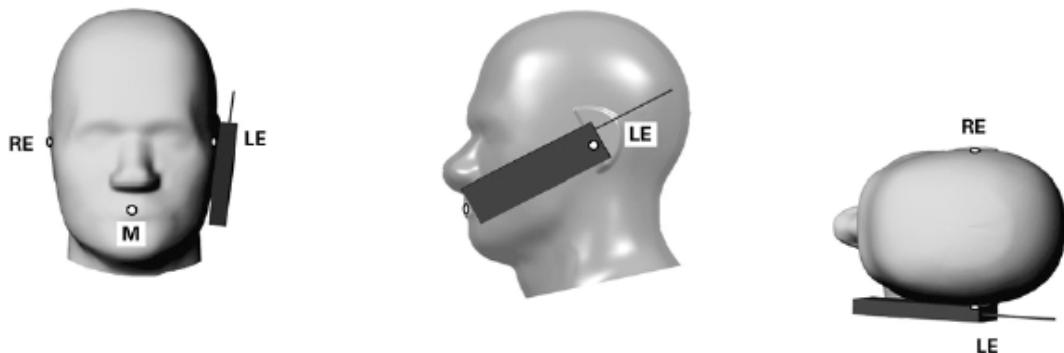


Illustration for Cheek Position

7.3 Tilted Position

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

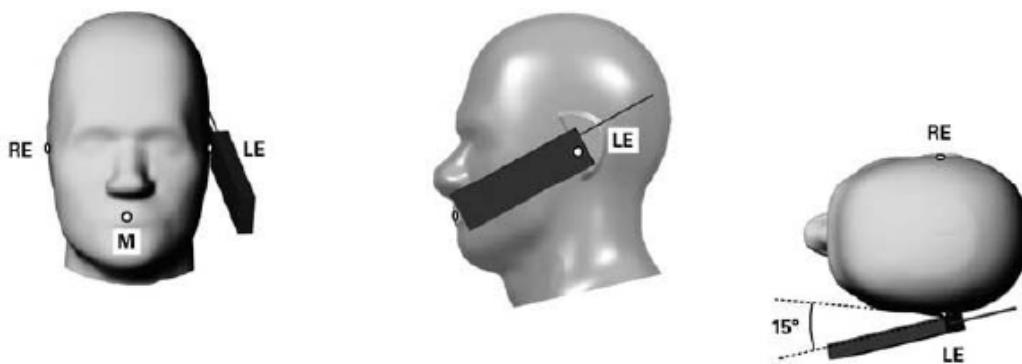


Illustration for Tilted Position

7.4 Body Worn Position

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

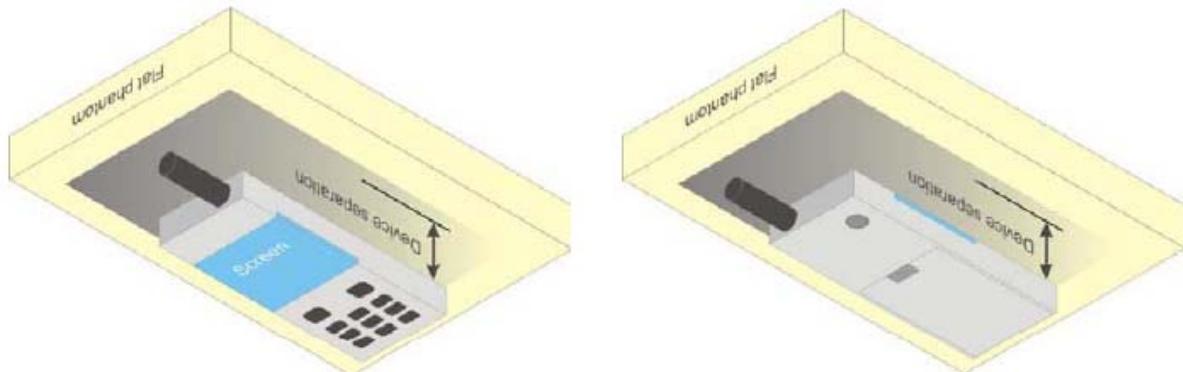
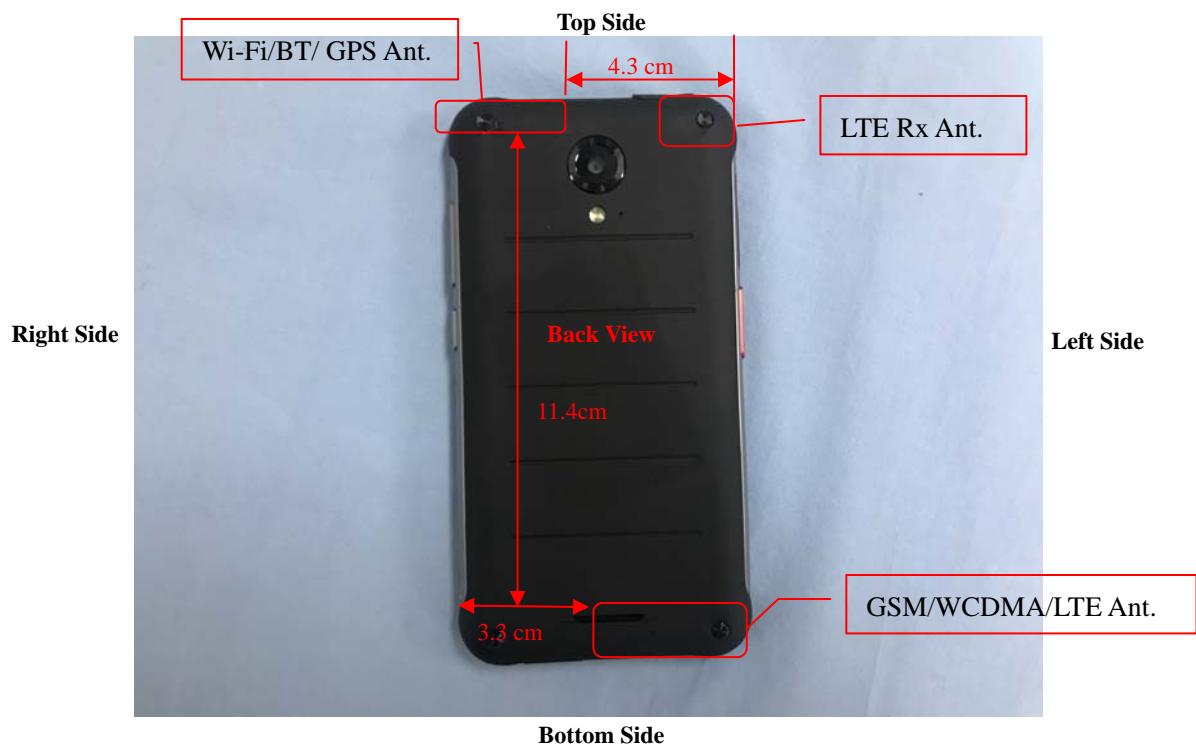


Illustration for Body Worn Position

7.5 EUT Antenna Position





Block Diagram for EUT Antenna Position

7.6 EUT Testing Position

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

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

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

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

Remark:

- Referring to KDB 941225 D06, when the overall device length and width are $\geq 9\text{cm} \times 5\text{cm}$, the test separation distances is 10 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.
- Referring to KDB 648474 D04 Handset SAR v01r03, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR $> 1.2 \text{ W/kg}$

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

8. SAR Measurement Procedures

8.1 Measurement Procedures

The measurement procedures are as follows:

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

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

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

8.2 Spatial Peak SAR Evaluation

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

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

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

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

8.3 Area & Zoom Scan Procedures

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

8.4 Volume Scan Procedures

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

8.5 SAR Averaged Methods

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

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

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

8.6 Power Drift Monitoring

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

9. SAR Test Result

9.1 Conducted RF Output Power

GSM - Burst Average Power (dBm)								
Band	GSM850			Tune-up power (dBm)	PCS1900			Tune-up power (dBm)
Channel	128	190	251		512	661	810	
Frequency (MHz)	824.2	836.6	848.8		1850.2	1880	1909.8	
GSM	32.68	32.77	32.84	33.0	29.72	30.05	30.21	30.5
GPRS (1 slot)	32.72	32.8	32.87	33.0	29.77	30.1	30.19	30.5
GPRS (2 slots)	32.16	32.17	32.2	32.5	29.03	29.3	29.41	30.0
GPRS (3 slots)	30.60	30.64	30.69	31.0	27.36	27.60	27.66	28.0
GPRS (4 slots)	29.45	29.46	29.53	30.0	26.27	26.51	26.57	27.0
EDGE (1 slot)	28.16	28.18	28.24	28.5	22.81	22.27	22.65	23.0
EDGE (2 slots)	27.76	27.8	27.81	28.0	20.71	21.15	21.52	22.0
EDGE (3 slots)	26.89	26.89	26.87	27.0	18.65	19.1	19.52	20.0
EDGE (4 slots)	26.26	26.26	26.24	26.5	17.54	17.9	18.31	18.5

GSM - Source-Based Time-Average Power (dBm)								
Band	GSM850			Tune-up power (dBm)	PCS1900			Tune-up power (dBm)
Channel	128	190	251		512	661	810	
Frequency (MHz)	824.2	836.6	848.8		1850.2	1880	1909.8	
GSM	23.68	23.77	23.84	24.0	20.72	21.05	21.21	21.5
GPRS (1 slot)	23.72	23.80	23.87	24.0	20.77	21.10	21.19	21.5
GPRS (2 slots)	26.16	26.17	26.20	26.5	23.03	23.30	23.41	24.0
GPRS (3 slots)	26.35	26.39	26.44	27.0	23.11	23.35	23.41	24.0
GPRS (4 slots)	26.45	26.46	26.53	27.0	23.27	23.51	23.57	24.0
EDGE (1 slot)	19.16	19.18	19.24	19.5	13.81	13.27	13.65	14.0
EDGE (2 slots)	21.76	21.80	21.81	22.0	14.71	15.15	15.52	16.0
EDGE (3 slots)	22.64	22.64	22.62	23.0	14.40	14.85	15.27	15.5
EDGE (4 slots)	23.26	23.26	23.24	23.5	14.54	14.90	15.31	15.5

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

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

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

Remark:

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

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

WCDMA - Average Power (dBm)								
Band	WCDMA Band II				WCDMA Band V			
Channel	9262	9400	9538	Tune-up power (dBm)	4132	4182	4233	Tune-up power (dBm)
Frequency (MHz)	1852.4	1880.0	1907.6		826.4	836.6	846.6	
RMC 12.2k	21.63	21.89	22.51	23.0	22.05	22.22	22.24	22.5
HSDPA Subtest-1	20.65	20.97	21.70	22.0	21.16	21.25	21.22	21.5
HSDPA Subtest-2	20.61	20.95	21.68	22.0	21.12	21.22	21.20	21.5
HSDPA Subtest-3	20.62	20.94	21.67	22.0	21.15	21.22	21.21	21.5
HSDPA Subtest-4	20.63	20.96	21.63	22.0	21.14	21.23	21.20	21.5
HSUPA Subtest-1	20.70	21.05	21.62	22.0	21.07	21.22	21.23	21.5
HSUPA Subtest-2	20.68	21.03	21.6	22.0	21.02	21.2	21.2	21.5
HSUPA Subtest-3	20.65	21.02	21.61	22.0	21.06	21.21	21.21	21.5
HSUPA Subtest-4	20.64	21.02	21.58	22.0	21.05	21.21	21.22	21.5
HSUPA Subtest-5	20.66	21.01	21.59	22.0	21.03	21.2	21.22	21.5

WCDMA - Average Power (dBm)								
Band	WCDMA Band IV							
Channel	1312	1412	1513	Tune-up power (dBm)				
Frequency (MHz)	1712.4	1732.4	1752.6					
RMC 12.2k	22.45	22.09	21.74	23.0				
HSDPA Subtest-1	21.55	21.31	20.86	22.0				
HSDPA Subtest-2	21.52	21.28	20.83	22.0				
HSDPA Subtest-3	21.51	21.26	20.84	22.0				
HSDPA Subtest-4	21.5	21.27	20.83	22.0				
HSUPA Subtest-1	21.49	21.28	20.77	22.0				
HSUPA Subtest-2	21.42	21.23	20.73	22.0				
HSUPA Subtest-3	21.43	21.25	20.72	22.0				
HSUPA Subtest-4	21.48	21.24	20.72	22.0				
HSUPA Subtest-5	21.47	21.21	20.74	22.0				

Remark:

1. Per KDB 941225 D01 v03, The 12.2kbps RMC mode was selected for SAR testing(the primary mode).
2. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq 1/4$ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode

FDD-LTE Band 2:

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.28	0
		1	3	23.28	0
		1	5	23.31	0
		3	0	23.2	0
		3	2	23.28	0
		3	3	23.3	0
		6	0	22.4	1
	MCH	1	0	24.07	0
		1	3	24.06	0
		1	5	24.07	0
		3	0	23.17	0
		3	2	23.09	0
		3	3	23.15	0
		6	0	23.05	1
	HCH	1	0	23.46	0
		1	3	23.45	0
		1	5	23.49	0
		3	0	23.14	0
		3	2	23.05	0
		3	3	23.12	0
		6	0	22.62	1
16QAM	LCH	1	0	22.54	1
		1	3	22.64	1
		1	5	22.58	1
		3	0	22.57	1
		3	2	22.5	1
		3	3	22.54	1
		6	0	21.39	2
	MCH	1	0	23.41	1
		1	3	23.44	1
		1	5	23.42	1
		3	0	23.12	1
		3	2	23.07	1
		3	3	23.16	1
		6	0	22.08	2
	HCH	1	0	22.59	1
		1	3	22.56	1

		1	5	22.48	1
		3	0	22.5	1
		3	2	22.41	1
		3	3	22.42	1
		6	0	21.64	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	23.28	0
		1	14	23.28	0
		8	0	22.41	1
		8	4	22.4	1
		8	7	22.45	1
		15	0	22.4	1
	MCH	1	0	24.01	0
		1	7	24.05	0
		1	14	24.01	0
		8	0	23.16	1
		8	4	23.14	1
		8	7	23.14	1
		15	0	23.1	1
	HCH	1	0	23.63	0
		1	7	23.51	0
		1	14	23.44	0
		8	0	22.73	1
		8	4	22.64	1
		8	7	22.62	1
		15	0	22.64	1
16QAM	LCH	1	0	22.48	1
		1	7	22.58	1
		1	14	22.55	1
		8	0	21.48	2
		8	4	21.51	2
		8	7	21.52	2
		15	0	21.39	2
	MCH	1	0	23.33	1
		1	7	23.38	1
		1	14	23.34	1
		8	0	22.14	2
		8	4	22.12	2
		8	7	22.13	2

		15	0	22.11	2
HCH		1	0	22.7	1
		1	7	22.6	1
		1	14	22.44	1
		8	0	21.64	2
		8	4	21.55	2
		8	7	21.51	2
		15	0	21.6	2

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.41	0
		1	12	23.48	0
		1	24	23.5	0
		12	0	22.47	1
		12	6	22.51	1
		12	13	22.56	1
		25	0	22.47	1
	MCH	1	0	24.13	0
		1	12	24.15	0
		1	24	24.07	0
		12	0	23.19	1
		12	6	23.18	1
		12	13	23.2	1
		25	0	23.13	1
16QAM	HCH	1	0	23.92	0
		1	12	23.67	0
		1	24	23.6	0
		12	0	22.84	1
		12	6	22.74	1
		12	13	22.63	1
		25	0	22.68	1
	LCH	1	0	22.65	1
		1	12	22.72	1
		1	24	22.72	1
		12	0	21.55	2
		12	6	21.6	2
		12	13	21.64	2
		25	0	21.47	2
	MCH	1	0	23.32	1
		1	12	23.36	1
		1	24	23.29	1

		12	0	22.32	2
		12	6	22.31	2
		12	13	22.33	2
		25	0	22.19	2
HCH	HCH	1	0	22.98	1
		1	12	22.91	1
		1	24	22.53	1
		12	0	21.81	2
		12	6	21.69	2
		12	13	21.61	2
		25	0	21.7	2

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.3	0
		1	24	23.46	0
		1	49	23.67	0
		25	0	22.52	1
		25	12	22.59	1
		25	25	22.65	1
		50	0	22.59	1
	MCH	1	0	24.1	0
		1	24	24.04	0
		1	49	24.01	0
		25	0	23.14	1
		25	12	23.14	1
		25	25	23.16	1
		50	0	23.16	1
16QAM	HCH	1	0	23.96	0
		1	24	23.66	0
		1	49	23.4	0
		25	0	22.91	1
		25	12	22.82	1
		25	25	22.69	1
		50	0	22.81	1
	LCH	1	0	22.62	1
		1	24	22.71	1
		1	49	22.81	1
		25	0	21.52	2
		25	12	21.6	2
		25	25	21.63	2
		50	0	21.62	2

	MCH	1	0	23.43	1
	MCH	1	24	23.41	1
	MCH	1	49	23.37	1
	MCH	25	0	22.19	2
	MCH	25	12	22.2	2
	MCH	25	25	22.2	2
	MCH	50	0	22.24	2
	HCH	1	0	23.04	1
	HCH	1	24	22.87	1
	HCH	1	49	22.52	1
	HCH	25	0	21.88	2
	HCH	25	12	21.79	2
	HCH	25	25	21.68	2
	HCH	50	0	21.83	2

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.36	0
		1	37	23.59	0
		1	74	23.9	0
		37	0	22.68	1
		37	18	22.82	1
		37	38	23.01	1
		75	0	22.85	1
	MCH	1	0	24.17	0
		1	37	24.1	0
		1	74	24.09	0
		37	0	23.26	1
		37	18	23.25	1
		37	38	23.25	1
		75	0	23.13	1
	HCH	1	0	24.1	0
		1	37	23.73	0
		1	74	23.5	0
		37	0	23.25	1
		37	18	23.11	1
		37	38	22.94	1
		75	0	23.07	1
16QAM	LCH	1	0	22.65	1
		1	37	22.81	1
		1	74	23	1
		37	0	21.65	2

		37	18	21.75	2
		37	38	21.89	2
		75	0	21.79	2
MCH		1	0	23.31	1
		1	37	23.37	1
		1	74	23.27	1
		37	0	22.23	2
		37	18	22.26	2
		37	38	22.26	2
		75	0	22.25	2
		1	0	23.12	1
HCH		1	37	22.92	1
		1	74	22.56	1
		37	0	22.09	2
		37	18	21.97	2
		37	38	21.85	2
		75	0	21.98	2

Channel Bandwidth: 20 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	24.17	0
		1	49	23.89	0
		1	99	23.52	0
		50	0	22.69	1
		50	25	22.79	1
		50	50	22.91	1
		100	0	22.81	1
	MCH	1	0	24.31	0
		1	49	24.15	0
		1	99	24.21	0
		50	0	23.38	1
		50	25	23.17	1
		50	50	23.19	1
		100	0	23.19	1
	HCH	1	0	24.02	0
		1	49	23.76	0
		1	99	23.38	0
		50	0	23.07	1
		50	25	22.94	1
		50	50	22.85	1
		100	0	22.97	1
16QAM	LCH	1	0	22.71	1

		1	49	22.92	1
		1	99	23.19	1
		50	0	21.66	2
		50	25	21.72	2
		50	50	21.83	2
		100	0	21.77	2
	MCH	1	0	23.41	1
		1	49	23.45	1
		1	99	23.41	1
		50	0	22.27	2
		50	25	22.24	2
		50	50	22.26	2
		100	0	22.2	2
	HCH	1	0	23.18	1
		1	49	22.97	1
		1	99	22.59	1
		50	0	22.04	2
		50	25	21.92	2
		50	50	21.82	2
		100	0	21.95	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	23.77	0
		1	3	23.68	0
		1	5	23.73	0
		3	0	22.26	0
		3	2	22.25	0
		3	3	22.26	0
		6	0	22.24	1
	MCH	1	0	22.58	0
		1	3	22.51	0
		1	5	22.4	0
		3	0	22.65	0
		3	2	22.16	0
		3	3	22.17	0
		6	0	22.21	1
	HCH	1	0	22.08	0
		1	3	22.04	0

		1	5	22.06	0
		3	0	22.12	0
		3	2	22.32	0
		3	3	22.14	0
		6	0	22.32	1
16QAM	LCH	1	0	22.87	1
		1	3	22.21	1
		1	5	22.48	1
		3	0	22.44	1
		3	2	22.35	1
		3	3	22.35	1
		6	0	21.22	2
	MCH	1	0	22.27	1
		1	3	22.25	1
		1	5	22.21	1
		3	0	21.95	1
		3	2	21.91	1
		3	3	21.91	1
		6	0	21.02	2
	HCH	1	0	21.22	1
		1	3	21.25	1
		1	5	21.19	1
		3	0	21.29	1
		3	2	21.32	1
		3	3	21.39	1
		6	0	20.48	2

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.62	0
		1	7	23.67	0
		1	14	22.93	0
		8	0	22.24	1
		8	4	22.25	1
		8	7	22.24	1
		15	0	22.15	1
	MCH	1	0	23.41	0
		1	7	23.11	0
		1	14	23.11	0
		8	0	22.23	1
		8	4	22.19	1
		8	7	22.18	1

		15	0	22.07	1
16QAM	HCH	1	0	22.11	0
		1	7	22.07	0
		1	14	22.01	0
		8	0	21.19	1
		8	4	21.15	1
		8	7	21.14	1
		15	0	21.15	1
QPSK	LCH	1	0	22.37	1
		1	7	22.41	1
		1	14	22.35	1
		8	0	21.34	2
		8	4	21.24	2
		8	7	21.32	2
		15	0	21.12	2
	MCH	1	0	22.27	1
		1	7	22.23	1
		1	14	22.14	1
		8	0	21.12	1
		8	4	21.06	2
		8	7	21.06	2
		15	0	21.05	2
	HCH	1	0	21.3	2
		1	7	21.27	1
		1	14	21.13	1
		8	0	20.55	1
		8	4	20.65	1
		8	7	20.39	2
		15	0	20.47	2

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.49	0
		1	12	22.99	0
		1	24	23.51	0
		12	0	22.23	1
		12	6	22.31	1
		12	13	22.27	1
		25	0	22.24	1
	MCH	1	0	23.35	0
		1	12	22.85	0
		1	24	22.93	0

16QAM	HCH	12	0	22.22	1
		12	6	22.15	1
		12	13	22.09	1
		25	0	22.08	1
		1	0	22.35	0
		1	12	22.16	0
		1	24	22.13	0
		12	0	21.17	1
	LCH	12	6	21.19	1
		12	13	21.32	1
		25	0	21.17	1
		1	0	22.39	1
		1	12	22.26	1
		1	24	22.42	1
		12	0	21.42	2
		12	6	21.43	2
	MCH	12	13	20.99	2
		25	0	21.41	2
		1	0	22.33	1
		1	12	22.16	1
		1	24	22.06	1
		12	0	21.27	2
		12	6	21.2	2
		12	13	21.12	2
	HCH	25	0	21.05	2
		1	0	21.5	1
		1	12	21.3	1
		1	24	21.23	1
		12	0	20.65	2
		12	6	20.78	2
		12	13	20.64	2
		25	0	20.48	2

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.03	0
		1	24	23.05	0
		1	49	22.97	0
		25	0	22.3	1
		25	12	22.25	1
		25	25	22.19	1
		50	0	22.16	1
	MCH	1	0	23.3	0
		1	24	22.86	0
		1	49	22.35	0
		25	0	22.21	1
		25	12	22.1	1
		25	25	21.89	1
		50	0	22.08	1
16QAM	HCH	1	0	22.65	0
		1	24	22.47	0
		1	49	22.04	0
		25	0	21.65	1
		25	12	21.17	1
		25	25	21.67	1
		50	0	21.48	1
	LCH	1	0	22.48	1
		1	24	22.47	1
		1	49	22.46	1
		25	0	21.32	2
		25	12	21.17	2
		25	25	21.06	2
		50	0	21.19	2
	MCH	1	0	22.54	1
		1	24	22.28	1
		1	49	21.41	1
		25	0	21.2	2
		25	12	21.08	2
		25	25	20.98	2
		50	0	21.11	2
	HCH	1	0	21.93	1
		1	24	21.2	1
		1	49	21.22	1
		25	0	21.19	2

		25	12	20.98	2
		25	25	21.28	2
		50	0	21.09	2

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.17	0
		1	37	23.12	0
		1	74	22.88	0
		37	0	22.36	1
		37	18	22.27	1
		37	38	22.18	1
		75	0	22.27	1
	MCH	1	0	22.8	0
		1	37	22.69	0
		1	74	22.15	0
		37	0	22.58	1
		37	18	22.24	1
		37	38	21.62	1
		75	0	22.25	1
	HCH	1	0	22.17	0
		1	37	22.39	0
		1	74	22.08	0
		37	0	21.32	1
		37	18	21.45	1
		37	38	21.35	1
		75	0	21.9	1
16QAM	LCH	1	0	22.52	1
		1	37	22.42	1
		1	74	22.11	1
		37	0	21.35	2
		37	18	21.25	2
		37	38	21.15	2
		75	0	21.26	2
	MCH	1	0	22.23	1
		1	37	22.21	1
		1	74	21.27	1
		37	0	21.38	2
		37	18	21.22	2
		37	38	20.83	2
		75	0	21.23	2
	HCH	1	0	21.68	1

		1	37	21.77	1
		1	74	21.35	1
		37	0	21.78	2
		37	18	21.75	2
		37	38	21.09	2
		75	0	21.66	2

Channel Bandwidth: 20 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.26	0
		1	49	22.97	0
		1	99	22.88	0
		50	0	22.22	1
		50	25	22.09	1
		50	50	21.93	1
		100	0	21.75	1
	MCH	1	0	23.78	0
		1	49	22.56	0
		1	99	22.01	0
		50	0	22.71	1
		50	25	22.1	1
		50	50	21.46	1
		100	0	22.62	1
	HCH	1	0	23.38	0
		1	49	22.93	0
		1	99	22.76	0
		50	0	21.25	1
		50	25	21.9	1
		50	50	21.32	1
		100	0	21.11	1
16QAM	LCH	1	0	22.49	1
		1	49	22.28	1
		1	99	21.94	1
		50	0	21.13	2
		50	25	21.1	2
		50	50	20.73	2
		100	0	21.31	2
	MCH	1	0	22.15	1
		1	49	21.94	1
		1	99	21.1	1
		50	0	21.36	2
		50	25	21.13	2

		50	50	20.65	2
		100	0	21.12	2
HCH	1	0	21.57		1
	1	49	21.97		1
	1	99	21.05		1
	50	0	20.35		2
	50	25	21.14		2
	50	50	21.22		2
	100	0	21.17		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	23.3	0
		1	3	23.25	0
		1	5	23.26	0
		3	0	22.32	0
		3	2	22.28	0
		3	3	22.29	0
		6	0	22.34	1
	MCH	1	0	23.27	0
		1	3	23.25	0
		1	5	23.27	0
		3	0	22.32	0
		3	2	22.24	0
		3	3	22.3	0
		6	0	22.28	1
16QAM	HCH	1	0	23.45	0
		1	3	23.41	0
		1	5	23.41	0
		3	0	22.44	0
		3	2	22.42	0
		3	3	22.4	0
		6	0	22.5	1
	LCH	1	0	22.44	1
		1	3	22.49	1
		1	5	22.44	1
		3	0	22.43	1
		3	2	22.35	1
		3	3	22.36	1
		6	0	21.26	2
	MCH	1	0	22.61	1
		1	3	22.63	1
		1	5	22.61	1
		3	0	22.28	1
		3	2	22.25	1
		3	3	22.28	1
		6	0	21.22	2
	HCH	1	0	22.57	1
		1	3	22.62	1

		1	5	22.56	1
		3	0	22.54	1
		3	2	22.47	1
		3	3	22.47	1
		6	0	21.4	2

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.25	0
		1	7	23.26	0
		1	14	23.22	0
		8	0	22.36	1
		8	4	22.35	1
		8	7	22.35	1
		15	0	22.34	1
	MCH	1	0	23.27	0
		1	7	23.3	0
		1	14	23.29	0
		8	0	22.35	1
		8	4	22.34	1
		8	7	22.37	1
		15	0	22.33	1
	HCH	1	0	23.36	0
		1	7	23.4	0
		1	14	23.33	0
		8	0	22.52	1
		8	4	22.5	1
		8	7	22.47	1
		15	0	22.47	1
16QAM	LCH	1	0	22.46	1
		1	7	22.48	1
		1	14	22.43	1
		8	0	21.39	2
		8	4	21.39	2
		8	7	21.36	2
		15	0	21.28	2
	MCH	1	0	22.6	1
		1	7	22.62	1
		1	14	22.63	1
		8	0	21.32	2
		8	4	21.3	2
		8	7	21.33	2

		15	0	21.31	2
HCH		1	0	22.61	1
		1	7	22.63	1
		1	14	22.56	1
		8	0	21.54	2
		8	4	21.54	2
		8	7	21.48	2
		15	0	21.4	2

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.44	0
		1	12	23.4	0
		1	24	23.46	0
		12	0	22.4	1
		12	6	22.39	1
		12	13	22.41	1
		25	0	22.36	1
	MCH	1	0	23.61	0
		1	12	23.2	0
		1	24	23.35	0
		12	0	22.38	1
		12	6	22.39	1
		12	13	22.51	1
		25	0	22.34	1
16QAM	HCH	1	0	23.65	0
		1	12	23.42	0
		1	24	23.42	0
		12	0	22.56	1
		12	6	22.51	1
		12	13	22.48	1
		25	0	22.46	1
	LCH	1	0	22.6	1
		1	12	22.59	1
		1	24	22.57	1
		12	0	21.42	2
		12	6	21.39	2
		12	13	21.44	2
		25	0	21.34	2
	MCH	1	0	22.57	1
		1	12	22.59	1
		1	24	22.79	1

		12	0	21.7	2
		12	6	21.47	2
		12	13	21.49	2
		25	0	21.36	2
HCH		1	0	22.79	1
		1	12	22.7	1
		1	24	22.61	1
		12	0	21.59	2
		12	6	21.54	2
		12	13	21.51	2
		25	0	21.45	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	23.24	0
		1	49	23.22	0
		25	0	22.28	1
		25	12	22.28	1
		25	25	22.27	1
		50	0	22.28	1
	MCH	1	0	23.4	0
		1	24	23.43	0
		1	49	23.34	0
		25	0	22.46	1
		25	12	22.49	1
		25	25	22.59	1
		50	0	22.47	1
16QAM	HCH	1	0	23.67	0
		1	24	23.28	0
		1	49	23.39	0
		25	0	22.61	1
		25	12	22.73	1
		25	25	22.36	1
		50	0	22.73	1
	LCH	1	0	22.5	1
		1	24	22.49	1
		1	49	22.47	1
		25	0	21.27	2
		25	12	21.27	2
		25	25	21.17	2
		50	0	21.17	2
	MCH	1	0	22.64	1
		1	24	22.65	1
		1	49	22.77	1
		25	0	21.34	2
		25	12	21.35	2
		25	25	21.38	2
		50	0	21.36	2
	HCH	1	0	22.65	1
		1	24	22.67	1
		1	49	22.59	1
		25	0	21.48	2

		25	12	21.49	2
		25	25	21.45	2
		50	0	21.74	2

FDD-LTE Band 7:

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.61	0
		1	12	22.66	0
		1	24	22.63	0
		12	0	21.73	1
		12	6	21.72	1
		12	13	21.03	1
		25	0	21.81	1
	MCH	1	0	21.68	0
		1	12	21.79	0
		1	24	21.78	0
		12	0	21.16	1
		12	6	21.28	1
		12	13	21.56	1
		25	0	21.38	1
16QAM	HCH	1	0	22.2	0
		1	12	22.43	0
		1	24	22.72	0
		12	0	21.74	1
		12	6	21.44	1
		12	13	21.24	1
		25	0	21.8	1
	LCH	1	0	21.26	1
		1	12	21.83	1
		1	24	21.67	1
		12	0	20.72	2
		12	6	20.36	2
		12	13	20.65	2
		25	0	20.78	2
	MCH	1	0	21.58	1
		1	12	21.53	1
		1	24	21.32	1
		12	0	20.98	2
		12	6	20.49	2

		12	13	20.73	2
		25	0	20.69	2
HCH	HCH	1	0	21.3	1
		1	12	21.49	1
		1	24	21.9	1
		12	0	20.65	2
		12	6	20.47	2
		12	13	20.78	2
		25	0	20.67	2

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.4	0
		1	24	22.58	0
		1	49	22.89	0
		25	0	21.72	1
		25	12	21.63	1
		25	25	21.32	1
		50	0	21.1	1
	MCH	1	0	22.46	0
		1	24	22.17	0
		1	49	22.55	0
		25	0	21.85	1
		25	12	21.22	1
		25	25	21.69	1
		50	0	21.35	1
16QAM	HCH	1	0	22.37	0
		1	24	22.65	0
		1	49	22.79	0
		25	0	21.85	1
		25	12	21.83	1
		25	25	21.31	1
		50	0	21.67	1
	LCH	1	0	21.46	1
		1	24	21.91	1
		1	49	21.27	1
		25	0	20.72	2
		25	12	20.87	2
		25	25	20.65	2
		50	0	20.65	2
	MCH	1	0	21.94	1
		1	24	21.63	1

		1	49	21.24	1
		25	0	20.65	2
		25	12	20.78	2
		25	25	20.65	2
		50	0	20.79	2
	HCH	1	0	21.68	1
		1	24	21.62	1
		1	49	21.21	1
		25	0	20.63	2
		25	12	20.75	2
		25	25	20.73	2
		50	0	20.79	2

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.33	0
		1	37	22.83	0
		1	74	22.11	0
		37	0	21.63	1
		37	18	21.6	1
		37	38	21.23	1
		75	0	21.25	2
	MCH	1	0	22.32	0
		1	37	22.12	0
		1	74	22.58	0
		37	0	21.67	1
		37	18	21.18	1
		37	38	21.35	1
		75	0	21.42	2
	HCH	1	0	22.54	0
		1	37	22.78	0
		1	74	22.18	0
		37	0	21.39	1
		37	18	21.79	1
		37	38	21.77	1
		75	0	21.13	2
16QAM	LCH	1	0	21.16	1
		1	37	21.65	1
		1	74	21.68	1
		37	0	20.35	2
		37	18	20.65	2
		37	38	20.47	2

		75	0	20.69	2
MCH	1	0	21.9	1	
	1	37	21.47	1	
	1	74	21.83	1	
	37	0	20.83	2	
	37	18	20.55	2	
	37	38	20.58	2	
	75	0	20.53	2	
	1	0	20.78	1	
HCH	1	37	21.13	1	
	1	74	21.41	1	
	37	0	20.56	2	
	37	18	20.83	2	
	37	38	20.53	2	
	75	0	20.65	2	

Channel Bandwidth: 20 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.63	0
		1	49	21.86	0
		1	99	21.95	0
		50	0	21.15	1
		50	25	21.06	1
		50	50	21.44	1
		100	0	21.51	1
	MCH	1	0	22.15	0
		1	49	22.62	0
		1	99	22.14	0
		50	0	21.63	1
		50	25	21.26	1
		50	50	21.21	1
		100	0	21.54	1
	HCH	1	0	22.89	0
		1	49	22.23	0
		1	99	22.14	0
		50	0	21.85	1
		50	25	21.58	1
		50	50	21.55	1
		100	0	21.77	1
16QAM	LCH	1	0	21.68	1
		1	49	21.32	1
		1	99	21.39	1

		50	0	20.68	2
		50	25	20.78	2
		50	50	20.67	2
		100	0	20.39	2
MCH	MCH	1	0	21.65	1
		1	49	21.31	1
		1	99	21.15	1
		50	0	20.98	2
		50	25	20.68	2
		50	50	20.47	2
		100	0	20.65	2
		1	0	21.06	1
HCH	HCH	1	49	21.32	1
		1	99	21.47	1
		50	0	20.72	2
		50	25	20.65	2
		50	50	20.78	2
		100	0	20.68	2

Remark:

1. Per KDB941225 D05 v02r05, Start with the largest channel bandwidth then measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle, and lower edge of each required test channel. When the reported SAR is $\leq 0.8 \text{ W/kg}$, 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. When the reported SAR of a required test channel is $> 1.45 \text{ W/kg}$, SAR is required for all three RB offset configurations for that required test channel.
2. Per KDB941225 D05 v02r05, The procedures required for 1 RB allocation in 5.2.1 are applied to measure the SAR for QPSK with 50% RB allocation.
3. Per KDB941225 D05 v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations, and the highest reported SAR for 1 RB and 50% RB allocation in 5.2.1 and 5.2.2 are $\leq 0.8 \text{ W/kg}$. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is $> 1.45 \text{ W/kg}$, the remaining required test channels must also be tested.
4. Per KDB941225 D05 v02r05, For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in 5.2.1, 5.2.2, and 5.2.3 to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is $> \frac{1}{2} \text{ dB}$ higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is $> 1.45 \text{ W/kg}$.

WLAN - Maximum Average Power					
Test Mode	Data Rate	Channel	Frequency (MHz)	Average Power (dBm)	Tune-up power (dBm)
802.11b	1Mbps	CH 01	2412	13.92	14.5
		CH 06	2437	13.61	14.5
		CH 11	2462	13.29	14.5
802.11g	6Mbps	CH 01	2412	9.82	11.5
		CH 06	2437	11.33	11.5
		CH 11	2462	11.38	11.5
802.11n (20MHz)	MCS0	CH 01	2412	9.82	12.0
		CH 06	2437	11.42	12.0
		CH 11	2462	11.24	12.0
802.11n (40MHz)	MCS0	CH 03	2422	10.17	10.5
		CH 06	2437	10.09	10.5
		CH 09	2452	10.21	10.5

Remark:

1. Per KDB 248227 D01 v02r02, For 802.11b DSSS SAR measurements, DSSS SAR procedure applies to fixed exposure test position and initial test position procedure applies to multiple exposure test positions.
2. Per KDB 248227 D01 v02r02, For 802.11b DSSS SAR measurements ,when the reported SAR of the highest measured maximum output power channel (see 3.1) for the exposure configuration is $\leq 0.8 \text{ W/kg}$, no further SAR testing is required for 802.11b DSSS in that exposure configuration. When the reported SAR is $> 0.8 \text{ W/kg}$, SAR is required for that exposure configuration using the next highest measured output power channel. When any reported SAR is $> 1.2 \text{ W/kg}$, 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 $\leq 1.2\text{W/kg}$.

Bluetooth - Maximum Average Power			
Test Mode	Data Rate	Average Power(dBm)	Tune-up power (dBm)
GFSK	1Mbps	1.961	2.5
Pi/4 QDPSK	2Mbps	1.142	2.5
8DPSK	3Mbps	1.33	2.5

Bluetooth - Maximum Average Power					
Test Mode	Data Rate	Channel	Frequency (MHz)	Average Power (dBm)	Tune-up power (dBm)
BLE	1Mbps	CH 00	2402	1.427	2.5
		CH 19	2440	1.582	2.5
		CH 39	2480	1.913	2.5

NFC - Maximum Average Power			
Test Mode	Frequency (MHz)	Average Power(dBm)	Tune-up power (dBm)
NFC	13.56	-29.53	-25

Remark:

Bluetooth and NFC maximum output power is 1.961dBm and -29.53dBm respectively, and Maximum Tune-Up output power is 2.5dBm and -25dBm respectively. Per KDB 447498 D01 V06, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances \leq 50 mm are determined by:

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

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

- The result is rounded to one decimal place for comparison

Tune-Up Power (dBm)	Max. Power (mW)	Distance (mm)	Frequency (GHz)	Result	Limit
2.5	1.78	5	2.480	0.56	3

The exclusion thresholds is 0.56 < 3, therefore, the RF exposure evaluation is not required.

NFC:

Tune-Up Power (dBm)	Max. Power (mW)	Distance (mm)	Frequency (GHz)	Result	Limit
-25	0.0032	5	0.01356	0.00007	3

The exclusion thresholds is 0.00007 < 3, therefore, the RF exposure evaluation is not required.

9.2 Test Results for Standalone SAR Test

Head SAR

GSM850 – Head SAR Test									
Plot No.	Mode	Test Position Head	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
1.	GSM	Right Cheek	251	848.8	32.84	33.0	1.038	0.408	0.423
2.	GSM	Right Tilted	251	848.8	32.84	33.0	1.038	0.202	0.210
3.	GSM	Left Cheek	251	848.8	32.84	33.0	1.038	0.322	0.334
4.	GSM	Left Tilted	251	848.8	32.84	33.0	1.038	0.175	0.182

GSM1900 – Head SAR Test									
Plot No.	Mode	Test Position Head	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	M Hz					
5.	GSM	Right Cheek	810	1909.8	30.21	30.5	1.069	0.203	0.217
6.	GSM	Right Tilted	810	1909.8	30.21	30.5	1.069	0.112	0.120
7.	GSM	Left Cheek	810	1909.8	30.21	30.5	1.069	0.323	0.345
8.	GSM	Left Tilted	810	1909.8	30.21	30.5	1.069	0.153	0.164

GPRS850 – Head SAR Test									
Plot No.	Mode	Test Position Head	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
9.	GPRS_4TX	Right Cheek	251	848.8	29.53	30.0	1.114	0.189	0.211
10.	GPRS_4TX	Right Tilted	251	848.8	29.53	30.0	1.114	0.099	0.110
11.	GPRS_4TX	Left Cheek	251	848.8	29.53	30.0	1.114	0.203	0.226
12.	GPRS_4TX	Left Tilted	251	848.8	29.53	30.0	1.114	0.102	0.114

GPRS1900 – Head SAR Test									
Plot No.	Mode	Test Position Head	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	M Hz					
13.	GPRS_4TX	Right Cheek	810	1909.8	26.57	27.0	1.104	0.224	0.247
14.	GPRS_4TX	Right Tilted	810	1909.8	26.57	27.0	1.104	0.117	0.129
15.	GPRS_4TX	Left Cheek	810	1909.8	26.57	27.0	1.104	0.629	0.694
16.	GPRS_4TX	Left Tilted	810	1909.8	26.57	27.0	1.104	0.303	0.335

WCDMA Band 2 – Head SAR Test									
Plot No.	Mode	Test Position Head	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
17.	RMC 12.2k	Right Cheek	9538	1907.6	22.51	23.0	1.119	0.218	0.244
18.	RMC 12.2k	Right Tilted	9538	1907.6	22.51	23.0	1.119	0.117	0.131
19.	RMC 12.2k	Left Cheek	9538	1907.6	22.51	23.0	1.119	0.617	0.691
20.	RMC 12.2k	Left Tilted	9538	1907.6	22.51	23.0	1.119	0.287	0.321

WCDMA Band 5 – Head SAR Test									
Plot No.	Mode	Test Position Head	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
21.	RMC 12.2k	Right Cheek	4233	846.6	22.24	22.5	1.062	0.460	0.488
22.	RMC 12.2k	Right Tilted	4233	846.6	22.24	22.5	1.062	0.224	0.238
23.	RMC 12.2k	Left Cheek	4233	846.6	22.24	22.5	1.062	0.414	0.440
24.	RMC 12.2k	Left Tilted	4233	846.6	22.24	22.5	1.062	0.208	0.221

WCDMA Band 4 – Head SAR Test									
Plot No.	Mode	Test Position Head	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
25.	RMC 12.2k	Right Cheek	1312	1712.4	22.45	23.0	1.135	0.278	0.316
26.	RMC 12.2k	Right Tilted	1312	1712.4	22.45	23.0	1.135	0.121	0.137
27.	RMC 12.2k	Left Cheek	1312	1712.4	22.45	23.0	1.135	0.434	0.493
28.	RMC 12.2k	Left Tilted	1312	1712.4	22.45	23.0	1.135	0.237	0.269

LTE Band 2 – Head SAR Test									
Plot No.	Mode		Test Position Head	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB	MHz							
29.	QPSK 20MHz 1RB		Right Cheek	1880.0	24.31	24.5	1.045	0.189	0.197
30.	QPSK 20MHz 1RB		Right Tilted	1880.0	24.31	24.5	1.045	0.101	0.106
31.	QPSK 20MHz 1RB		Left Cheek	1880.0	24.31	24.5	1.045	0.428	0.447
32.	QPSK 20MHz 1RB		Left Tilted	1880.0	24.31	24.5	1.045	0.21	0.219
33.	QPSK 20MHz 50%RB		Right Cheek	1880.0	23.38	23.5	1.028	0.129	0.133
34.	QPSK 20MHz 50%RB		Right Tilted	1880.0	23.38	23.5	1.028	0.063	0.065
35.	QPSK 20MHz 50%RB		Left Cheek	1880.0	23.38	23.5	1.028	0.301	0.309
36.	QPSK 20MHz 50%RB		Left Tilted	1880.0	23.38	23.5	1.028	0.164	0.169

LTE Band 4– Head SAR Test								
Plot No.	Mode Modulation, Bandwidth, RB	Test Position Head	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			MHz					
37.	QPSK 20MHz 1RB	Right Cheek	1732.5	23.78	24.0	1.052	0.267	0.281
38.	QPSK 20MHz 1RB	Right Tilted	1732.5	23.78	24.0	1.052	0.121	0.127
39.	QPSK 20MHz 1RB	Left Cheek	1732.5	23.78	24.0	1.052	0.489	0.514
40.	QPSK 20MHz 1RB	Left Tilted	1732.5	23.78	24.0	1.052	0.231	0.243
41.	QPSK 20MHz 50%RB	Right Cheek	1732.5	22.71	23.0	1.069	0.132	0.141
42.	QPSK 20MHz 50%RB	Right Tilted	1732.5	22.71	23.0	1.069	0.076	0.081
43.	QPSK 20MHz 50%RB	Left Cheek	1732.5	22.71	23.0	1.069	0.221	0.236
44.	QPSK 20MHz 50%RB	Left Tilted	1732.5	22.71	23.0	1.069	0.131	0.140

LTE Band 5– Head SAR Test								
Plot No.	Mode Modulation, Bandwidth, RB	Test Position Head	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			MHz					
45.	QPSK 10MHz 1RB	Right Cheek	844.0	23.67	24.0	1.079	0.545	0.588
46.	QPSK 10MHz 1RB	Right Tilted	844.0	23.67	24.0	1.079	0.241	0.260
47.	QPSK 10MHz 1RB	Left Cheek	844.0	23.67	24.0	1.079	0.489	0.528
48.	QPSK 10MHz 1RB	Left Tilted	844.0	23.67	24.0	1.079	0.233	0.251
49.	QPSK 10MHz 50%RB	Right Cheek	844.0	22.73	23.0	1.064	0.237	0.252
50.	QPSK 10MHz 50%RB	Right Tilted	844.0	22.73	23.0	1.064	0.128	0.136
51.	QPSK 10MHz 50%RB	Left Cheek	844.0	22.73	23.0	1.064	0.226	0.240
52.	QPSK 10MHz 50%RB	Left Tilted	844.0	22.73	23.0	1.064	0.119	0.127

LTE Band 7– Head SAR Test								
Plot No.	Mode Modulation, Bandwidth	Test Position Head	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			MHz					
53.	QPSK 20MHz 1RB	Right Cheek	2560.0	22.89	23.0	1.026	0.098	0.101
54.	QPSK 20MHz 1RB	Right Tilted	2560.0	22.89	23.0	1.026	0.054	0.055
55.	QPSK 20MHz 1RB	Left Cheek	2560.0	22.89	23.0	1.026	0.324	0.332
56.	QPSK 20MHz 1RB	Left Tilted	2560.0	22.89	23.0	1.026	0.179	0.184
57.	QPSK 20MHz 50%RB	Right Cheek	2560.0	21.85	22.0	1.035	0.047	0.049
58.	QPSK 20MHz 50%RB	Right Tilted	2560.0	21.85	22.0	1.035	0.023	0.024
59.	QPSK 20MHz 50%RB	Left Cheek	2560.0	21.85	22.0	1.035	0.159	0.165
60.	QPSK 20MHz 50%RB	Left Tilted	2560.0	21.85	22.0	1.035	0.112	0.116

WLAN 2.4GHz – Head SAR Test									
Plot No.	Mode	Test Position Head	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
61.	802.11b	Right Cheek	01	2412	13.92	14.5	1.143	0.045	0.051
62.	802.11b	Right Tilted	01	2412	13.92	14.5	1.143	0.017	0.019
63.	802.11b	Left Cheek	01	2412	13.92	14.5	1.143	0.057	0.065
64.	802.11b	Left Tilted	01	2412	13.92	14.5	1.143	0.021	0.024

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

Body-worn SAR

GSM850 – Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
65.	GSM	Back	251	848.8	32.84	33.0	1.038	0.427	0.443
66.	GSM	Front	251	848.8	32.84	33.0	1.038	0.400	0.415

GSM1900 – Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
67.	GSM	Back	810	1909.8	30.21	30.5	1.069	0.455	0.486
68.	GSM	Front	810	1909.8	30.21	30.5	1.069	0.366	0.391

WCDMA Band 2 – Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
77	RMC 12.2k	Back Side	9538	1907.6	22.51	23.0	1.119	0.906	1.014
78	RMC 12.2k	Back Side	9262	1852.4	21.63	23.0	1.371	0.806	1.105
79	RMC 12.2k	Back Side	9400	1880.0	21.89	23.0	1.291	0.886	1.144
80	RMC 12.2k	Front Side	9538	1907.6	22.51	23.0	1.119	0.708	0.793

WCDMA Band 5 – Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
83	RMC 12.2k	Back Side	4233	846.6	22.24	22.5	1.062	0.506	0.537
84	RMC 12.2k	Front Side	4233	846.6	22.24	22.5	1.062	0.487	0.517

WCDMA Band 4 – Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
87	RMC 12.2k	Back Side	1312	1712.4	22.45	23.0	1.135	0.924	1.049
88	RMC 12.2k	Back Side	1412	1732.4	22.09	23.0	1.233	0.879	1.084
89	RMC 12.2k	Back Side	1513	1752.6	21.74	23.0	1.337	0.818	1.093
90	RMC 12.2k	Front Side	1312	1712.4	22.45	23.0	1.135	0.601	0.682

LTE Band 2–Body SAR Test (Gap: 10mm)								
Plot No.	Mode Modulation, Bandwidth, RB	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			MHz					
93	QPSK 20MHz 1RB	Back Side	1880.0	24.31	24.5	1.045	0.521	0.544
94	QPSK 20MHz 1RB	Front Side	1880.0	24.31	24.5	1.045	0.462	0.483
97	QPSK 20MHz 50%RB	Back Side	1880.0	23.38	23.5	1.028	0.251	0.258
98	QPSK 20MHz 50%RB	Front Side	1880.0	23.38	23.5	1.028	0.221	0.227

LTE Band 4–Body SAR Test (Gap: 10mm)								
Plot No.	Mode Modulation, Bandwidth, RB	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			MHz					
101	QPSK 20MHz 1RB	Back Side	1732.5	23.78	24.0	1.052	0.887	0.933
102	QPSK 20MHz 1RB	Back Side	1720.0	23.26	24.0	1.186	0.899	1.066
103	QPSK 20MHz 1RB	Back Side	1745.0	23.38	24.0	1.153	0.832	0.960
104	QPSK 20MHz 1RB	Front Side	1732.5	23.78	24.0	1.052	0.509	0.535
107	QPSK 20MHz 50%RB	Back Side	1732.5	22.71	23.0	1.069	0.567	0.606
108	QPSK 20MHz 50%RB	Front Side	1732.5	22.71	23.0	1.069	0.264	0.282

LTE Band 5–Body SAR Test (Gap: 10mm)								
Plot No.	Mode Modulation, Bandwidth, RB	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			MHz					
112	QPSK 10MHz 1RB	Back Side	844.0	23.67	24.0	1.079	0.631	0.681
113	QPSK 10MHz 1RB	Front Side	844.0	23.67	24.0	1.079	0.606	0.654
116	QPSK 10MHz 50%RB	Back Side	844.0	22.73	23.0	1.064	0.301	0.320
117	QPSK 10MHz 50%RB	Front Side	844.0	22.73	23.0	1.064	0.289	0.308

LTE Band 7–Body SAR Test (Gap: 10mm)								
Plot No.	Mode Modulation, Bandwidth, RB	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			MHz					
120	QPSK 20MHz 1RB	Back Side	2560.0	22.89	23.0	1.026	0.785	0.805
121	QPSK 20MHz 1RB	Back Side	2510.0	22.63	23.0	1.089	0.391	0.426
122	QPSK 20MHz 1RB	Back Side	2535.0	22.62	23.0	1.091	0.57	0.622
123	QPSK 20MHz 1RB	Front Side	2560.0	22.89	23.0	1.026	0.437	0.448
128	QPSK 20MHz 50% RB	Back Side	2560.0	21.85	22.0	1.035	0.421	0.436
129	QPSK 20MHz 50% RB	Front Side	2560.0	21.85	22.0	1.035	0.241	0.249
132	QPSK 20MHz 100%RB	Back Side	2560.0	21.77	22.0	1.054	0.416	0.439

WLAN 2.4GHz –Body SAR Test									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
134	802.11b	Back Side	01	2412	13.92	14.5	1.143	0.086	0.098
135	802.11b	Front Side	01	2412	13.92	14.5	1.143	0.025	0.029

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

Hotspot SAR

GSM850 – Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
69.	GPRS_4TX	Back Side	251	848.8	29.53	30.0	1.114	0.244	0.272
70.	GPRS_4TX	Front Side	251	848.8	29.53	30.0	1.114	0.189	0.211
71.	GPRS_4TX	Bottom side	251	848.8	29.53	30.0	1.114	0.139	0.155
72.	GPRS_4TX	Left side	251	848.8	29.53	30.0	1.114	0.056	0.062

GSM1900 – Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
73.	GPRS_4TX	Back Side	810	1909.8	26.57	27.0	1.104	0.672	0.742
74.	GPRS_4TX	Front Side	810	1909.8	26.57	27.0	1.104	0.696	0.768
75.	GPRS_4TX	Bottom side	810	1909.8	26.57	27.0	1.104	0.716	0.791
76.	GPRS_4TX	Left side	810	1909.8	26.57	27.0	1.104	0.356	0.393

WCDMA Band 2 – Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
77.	RMC 12.2k	Back Side	9538	1907.6	22.51	23.0	1.119	0.906	1.014
78.	RMC 12.2k	Back Side	9262	1852.4	21.63	23.0	1.371	0.806	1.105
79.	RMC 12.2k	Back Side	9400	1880.0	21.89	23.0	1.291	0.886	1.144
80.	RMC 12.2k	Front Side	9538	1907.6	22.51	23.0	1.119	0.708	0.793
81.	RMC 12.2k	Bottom side	9538	1907.6	22.51	23.0	1.119	0.693	0.776
82.	RMC 12.2k	Left side	9538	1907.6	22.51	23.0	1.119	0.378	0.423

WCDMA Band 5 – Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
83.	RMC 12.2k	Back Side	4233	846.6	22.24	22.5	1.062	0.506	0.537
84.	RMC 12.2k	Front Side	4233	846.6	22.24	22.5	1.062	0.487	0.517
85.	RMC 12.2k	Bottom side	4233	846.6	22.24	22.5	1.062	0.246	0.261
86.	RMC 12.2k	Left side	4233	846.6	22.24	22.5	1.062	0.112	0.119

WCDMA Band 4 – Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
87.	RMC 12.2k	Back Side	1312	1712.4	22.45	23.0	1.135	0.924	1.049
88.	RMC 12.2k	Back Side	1412	1732.4	22.09	23.0	1.233	0.879	1.084
89.	RMC 12.2k	Back Side	1513	1752.6	21.74	23.0	1.337	0.818	1.093
90.	RMC 12.2k	Front Side	1312	1712.4	22.45	23.0	1.135	0.601	0.682
91.	RMC 12.2k	Bottom side	1312	1712.4	22.45	23.0	1.135	0.503	0.571
92.	RMC 12.2k	Left side	1312	1712.4	22.45	23.0	1.135	0.114	0.129

LTE Band 2–Body SAR Test (Gap: 10mm)									
Plot No.	Mode		Test Position Body	Frequency MHz	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB								
93.	QPSK 20MHz 1RB		Back Side	1880.0	24.31	24.5	1.045	0.521	0.544
94.	QPSK 20MHz 1RB		Front Side	1880.0	24.31	24.5	1.045	0.462	0.483
95.	QPSK 20MHz 1RB		Bottom side	1880.0	24.31	24.5	1.045	0.408	0.426
96.	QPSK 20MHz 1RB		Left side	1880.0	24.31	24.5	1.045	0.211	0.220
97.	QPSK 20MHz 50%RB		Back Side	1880.0	23.38	23.5	1.028	0.251	0.258
98.	QPSK 20MHz 50%RB		Front Side	1880.0	23.38	23.5	1.028	0.221	0.227
99.	QPSK 20MHz 50%RB		Bottom side	1880.0	23.38	23.5	1.028	0.225	0.231
100.	QPSK 20MHz 50%RB		Left side	1880.0	23.38	23.5	1.028	0.172	0.177

LTE Band 4–Body SAR Test (Gap: 10mm)									
Plot No.	Mode		Test Position Body	Frequency MHz	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB								
101.	QPSK 20MHz 1RB		Back Side	1732.5	23.78	24.0	1.052	0.887	0.933
102.	QPSK 20MHz 1RB		Back Side	1720.0	23.26	24.0	1.186	0.899	1.066
103.	QPSK 20MHz 1RB		Back Side	1745.0	23.38	24.0	1.153	0.832	0.960
104.	QPSK 20MHz 1RB		Front Side	1732.5	23.78	24.0	1.052	0.509	0.535
105.	QPSK 20MHz 1RB		Bottom side	1732.5	23.78	24.0	1.052	0.452	0.475
106.	QPSK 20MHz 1RB		Left side	1732.5	23.78	24.0	1.052	0.113	0.119
107.	QPSK 20MHz 50%RB		Back Side	1732.5	22.71	23.0	1.069	0.567	0.606
108.	QPSK 20MHz 50%RB		Front Side	1732.5	22.71	23.0	1.069	0.264	0.282
109.	QPSK 20MHz 50%RB		Bottom side	1732.5	22.71	23.0	1.069	0.251	0.268
110.	QPSK 20MHz 50%RB		Left side	1732.5	22.71	23.0	1.069	0.067	0.072
111.	QPSK 20MHz 100%RB		Back Side	1732.5	22.62	23.0	1.091	0.521	0.569

LTE Band 5–Body SAR Test (Gap: 10mm)								
Plot No.	Mode	Test Position Body	Frequen	Output Power	Rated Limit	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			cy	(dBm)	(dBm)			
112.	QPSK 10MHz 1RB	Back Side	844.0	23.67	24.0	1.079	0.631	0.681
113.	QPSK 10MHz 1RB	Front Side	844.0	23.67	24.0	1.079	0.606	0.654
114.	QPSK 10MHz 1RB	Bottom side	844.0	23.67	24.0	1.079	0.302	0.326
115.	QPSK 10MHz 1RB	Left side	844.0	23.67	24.0	1.079	0.146	0.158
116.	QPSK 10MHz 50%RB	Back Side	844.0	22.73	23.0	1.064	0.301	0.320
117.	QPSK 10MHz 50%RB	Front Side	844.0	22.73	23.0	1.064	0.289	0.308
118.	QPSK 10MHz 50%RB	Bottom side	844.0	22.73	23.0	1.064	0.172	0.183
119.	QPSK 10MHz 50%RB	Left side	844.0	22.73	23.0	1.064	0.098	0.104

LTE Band 7–Body SAR Test (Gap: 10mm)								
Plot No.	Mode	Test Position Body	Frequen	Output Power	Rated Limit	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			cy	(dBm)	(dBm)			
120.	QPSK 20MHz 1RB	Back Side	2560.0	22.89	23.0	1.026	0.785	0.805
121.	QPSK 20MHz 1RB	Back Side	2510.0	22.63	23.0	1.089	0.391	0.426
122.	QPSK 20MHz 1RB	Back Side	2535.0	22.62	23.0	1.091	0.57	0.622
123.	QPSK 20MHz 1RB	Front Side	2560.0	22.89	23.0	1.026	0.437	0.448
124.	QPSK 20MHz 1RB	Bottom side	2560.0	22.89	23.0	1.026	0.911	0.934
125.	QPSK 20MHz 1RB	Bottom side	2510.0	22.63	23.0	1.089	0.424	0.462
126.	QPSK 20MHz 1RB	Bottom side	2535.0	22.62	23.0	1.091	0.649	0.708
127.	QPSK 20MHz 1RB	Left side	2560.0	22.89	23.0	1.026	0.256	0.263
128.	QPSK 20MHz 50%RB	Back Side	2560.0	21.85	22.0	1.035	0.421	0.436
129.	QPSK 20MHz 50%RB	Front Side	2560.0	21.85	22.0	1.035	0.241	0.249
130.	QPSK 20MHz 50%RB	Bottom side	2560.0	21.85	22.0	1.035	0.445	0.461
131.	QPSK 20MHz 50%RB	Left side	2560.0	21.85	22.0	1.035	0.117	0.121
132.	QPSK 20MHz 100%RB	Back Side	2560.0	21.77	22.0	1.054	0.416	0.439
133.	QPSK 20MHz 100%RB	Bottom side	2560.0	21.77	22.0	1.054	0.643	0.678

WLAN 2.4GHz -Body SAR Test									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
134.	802.11b	Back Side	01	2412	13.92	14.5	1.143	0.086	0.098
135.	802.11b	Front Side	01	2412	13.92	14.5	1.143	0.025	0.029
136.	802.11b	Right side	01	2412	13.92	14.5	1.143	0.013	0.015
137.	802.11b	Top Side	01	2412	13.92	14.5	1.143	0.049	0.056

Repeated SAR

WCDMA Band 2 – Body SAR Test (Gap: 10mm)								
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)
			CH.	MHz				
138.	RMC 12.2k	Back Side	9538	1907.6	22.51	23.0	1.119	0.899 1.006

WCDMA Band 4 – Body SAR Test (Gap: 10mm)								
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)
			CH.	MHz				
139.	RMC 12.2k	Back Side	1312	1712.4	22.45	23.0	1.135	0.918 1.042

LTE Band 4–Body SAR Test (Gap: 10mm)								
Plot No.	Mode		Test Position Body	Freque	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)
	Modulation, Bandwidth, RB	MHz		ncey				
140.	QPSK 20MHz 1RB		Back Side	1720.0	23.26	24.0	1.186	0.883 1.047

LTE Band 7–Body SAR Test (Gap: 10mm)								
Plot No.	Mode		Test Position Body	Frequen	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)
	Modulation, Bandwidth, RB	MHz		cy				
141.	QPSK 20MHz 1RB		Bottom side	2560.0	22.89	23.0	1.026	0.902 0.925

Remark:

- 1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
- 3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .

9.3 Simultaneous Multi-band Transmission SAR Analysis

List of Mode for Simultaneous Multi-band Transmission

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

Remark:

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

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

Bluetooth:

Tune-Up Power (dBm)	Max. Power (mW)	Distance (mm)	Frequency (GHz)	X	SAR(1g) 5mm	SAR(1g) 10mm
2.5	1.78	5/10	2.480	7.5	0.075	0.037

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

Head SAR**WWAN and WLAN**

Position	WWAN		WLAN	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Right Cheek	GSM850	0.423	0.051	0.474
Right Tilted	GSM850	0.210	0.019	0.229
Left Cheek	GSM850	0.334	0.065	0.399
Left Tilted	GSM850	0.182	0.024	0.206
Right Cheek	GSM1900	0.217	0.051	0.268
Right Tilted	GSM1900	0.120	0.019	0.139
Left Cheek	GSM1900	0.345	0.065	0.41
Left Tilted	GSM1900	0.164	0.024	0.188
Right Cheek	GPRS850	0.211	0.051	0.262
Right Tilted	GPRS850	0.110	0.019	0.129
Left Cheek	GPRS850	0.226	0.065	0.291
Left Tilted	GPRS850	0.114	0.024	0.138
Right Cheek	GPRS1900	0.247	0.051	0.298
Right Tilted	GPRS1900	0.129	0.019	0.148
Left Cheek	GPRS1900	0.694	0.065	0.759
Left Tilted	GPRS1900	0.335	0.024	0.359
Right Cheek	WCDMA Band 2	0.244	0.051	0.295
Right Tilted	WCDMA Band 2	0.131	0.019	0.15
Left Cheek	WCDMA Band 2	0.691	0.065	0.756
Left Tilted	WCDMA Band 2	0.321	0.024	0.345
Right Cheek	WCDMA Band 5	0.488	0.051	0.539
Right Tilted	WCDMA Band 5	0.238	0.019	0.257
Left Cheek	WCDMA Band 5	0.440	0.065	0.505
Left Tilted	WCDMA Band 5	0.221	0.024	0.245
Right Cheek	WCDMA Band 4	0.316	0.051	0.367
Right Tilted	WCDMA Band 4	0.137	0.019	0.156
Left Cheek	WCDMA Band 4	0.493	0.065	0.558
Left Tilted	WCDMA Band 4	0.269	0.024	0.293
Right Cheek	LTE Band 2	0.197	0.051	0.248
Right Tilted	LTE Band 2	0.106	0.019	0.125
Left Cheek	LTE Band 2	0.447	0.065	0.512
Left Tilted	LTE Band 2	0.219	0.024	0.243
Right Cheek	LTE Band 4	0.281	0.051	0.332
Right Tilted	LTE Band 4	0.127	0.019	0.146
Left Cheek	LTE Band 4	0.514	0.065	0.579
Left Tilted	LTE Band 4	0.243	0.024	0.267
Right Cheek	LTE Band 5	0.588	0.051	0.639

Right Tilted	LTE Band 5	0.260	0.019	0.279
Left Cheek	LTE Band 5	0.528	0.065	0.593
Left Tilted	LTE Band 5	0.251	0.024	0.275
Right Cheek	LTE Band 7	0.101	0.051	0.152
Right Tilted	LTE Band 7	0.055	0.019	0.074
Left Cheek	LTE Band 7	0.332	0.065	0.397
Left Tilted	LTE Band 7	0.184	0.024	0.208

WWAN and Bluetooth

Position	WWAN		Bluetooth	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Right Cheek	GSM850	0.423	0.075	0.498
Right Tilted	GSM850	0.210	0.075	0.285
Left Cheek	GSM850	0.334	0.075	0.409
Left Tilted	GSM850	0.182	0.075	0.257
Right Cheek	GSM1900	0.217	0.075	0.292
Right Tilted	GSM1900	0.120	0.075	0.195
Left Cheek	GSM1900	0.345	0.075	0.42
Left Tilted	GSM1900	0.164	0.075	0.239
Right Cheek	GPRS850	0.211	0.075	0.286
Right Tilted	GPRS850	0.110	0.075	0.185
Left Cheek	GPRS850	0.226	0.075	0.301
Left Tilted	GPRS850	0.114	0.075	0.189
Right Cheek	GPRS1900	0.247	0.075	0.322
Right Tilted	GPRS1900	0.129	0.075	0.204
Left Cheek	GPRS1900	0.694	0.075	0.769
Left Tilted	GPRS1900	0.335	0.075	0.41
Right Cheek	WCDMA Band 2	0.244	0.075	0.319
Right Tilted	WCDMA Band 2	0.131	0.075	0.206
Left Cheek	WCDMA Band 2	0.691	0.075	0.766
Left Tilted	WCDMA Band 2	0.321	0.075	0.396
Right Cheek	WCDMA Band 5	0.488	0.075	0.563
Right Tilted	WCDMA Band 5	0.238	0.075	0.313
Left Cheek	WCDMA Band 5	0.440	0.075	0.515
Left Tilted	WCDMA Band 5	0.221	0.075	0.296
Right Cheek	WCDMA Band 4	0.316	0.075	0.391
Right Tilted	WCDMA Band 4	0.137	0.075	0.212
Left Cheek	WCDMA Band 4	0.493	0.075	0.568
Left Tilted	WCDMA Band 4	0.269	0.075	0.344
Right Cheek	LTE Band 2	0.197	0.075	0.272
Right Tilted	LTE Band 2	0.106	0.075	0.181
Left Cheek	LTE Band 2	0.447	0.075	0.522
Left Tilted	LTE Band 2	0.219	0.075	0.294
Right Cheek	LTE Band 4	0.281	0.075	0.356
Right Tilted	LTE Band 4	0.127	0.075	0.202
Left Cheek	LTE Band 4	0.514	0.075	0.589
Left Tilted	LTE Band 4	0.243	0.075	0.318
Right Cheek	LTE Band 5	0.588	0.075	0.663
Right Tilted	LTE Band 5	0.260	0.075	0.335

Left Cheek	LTE Band 5	0.528	0.075	0.603
Left Tilted	LTE Band 5	0.251	0.075	0.326
Right Cheek	LTE Band 7	0.101	0.075	0.176
Right Tilted	LTE Band 7	0.055	0.075	0.13
Left Cheek	LTE Band 7	0.332	0.075	0.407
Left Tilted	LTE Band 7	0.184	0.075	0.259

Body-worn SAR**WWAN and WLAN**

Position	WWAN		WLAN	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	GSM850	0.443	0.098	0.541
Front	GSM850	0.415	0.029	0.444
Back	GSM1900	0.486	0.098	0.584
Front	GSM1900	0.391	0.029	0.42
Back	WCDMA Band 2	1.144	0.098	1.242
Front	WCDMA Band 2	0.793	0.029	0.822
Back	WCDMA Band 5	0.537	0.098	0.635
Front	WCDMA Band 5	0.517	0.029	0.546
Back	WCDMA Band 4	1.093	0.098	1.191
Front	WCDMA Band 4	0.682	0.029	0.711
Back	LTE Band 2	0.544	0.098	0.642
Front	LTE Band 2	0.483	0.029	0.512
Back	LTE Band 4	1.066	0.098	1.164
Front	LTE Band 4	0.535	0.029	0.564
Back	LTE Band 5	0.681	0.098	0.779
Front	LTE Band 5	0.654	0.029	0.683
Back	LTE Band 7	0.805	0.098	0.903
Front	LTE Band 7	0.448	0.029	0.477

WWAN and Bluetooth

Position	WWAN		Bluetooth	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	GSM850	0.443	0.037	0.48
Front	GSM850	0.415	0.037	0.452
Back	GSM1900	0.486	0.037	0.523
Front	GSM1900	0.391	0.037	0.428
Back	WCDMA Band 2	1.144	0.037	1.181
Front	WCDMA Band 2	0.793	0.037	0.83
Back	WCDMA Band 5	0.537	0.037	0.574
Front	WCDMA Band 5	0.517	0.037	0.554
Back	WCDMA Band 4	1.093	0.037	1.13
Front	WCDMA Band 4	0.682	0.037	0.719
Back	LTE Band 2	0.544	0.037	0.581
Front	LTE Band 2	0.483	0.037	0.52
Back	LTE Band 4	1.066	0.037	1.103
Front	LTE Band 4	0.535	0.037	0.572

Back	LTE Band 5	0.681	0.037	0.718
Front	LTE Band 5	0.654	0.037	0.691
Back	LTE Band 7	0.805	0.037	0.842
Front	LTE Band 7	0.448	0.037	0.485

Hotspot SAR**WWAN and WLAN**

Position	WWAN		WLAN	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	GSM850	0.272	0.098	0.37
Front	GSM850	0.211	0.029	0.24
Top side	GSM850	--	0.056	0.056
Bottom side	GSM850	0.155	--	0.155
Right side	GSM850	--	0.015	0.015
Left side	GSM850	0.062	--	0.062
Back	GSM1900	0.742	0.098	0.84
Front	GSM1900	0.768	0.029	0.797
Top side	GSM1900	--	0.056	0.056
Bottom side	GSM1900	0.791	--	0.791
Right side	GSM1900	--	0.015	0.015
Left side	GSM1900	0.393	--	0.393
Back	WCDMA Band 2	1.144	0.098	1.242
Front	WCDMA Band 2	0.793	0.029	0.822
Top side	WCDMA Band 2	--	0.056	0.056
Bottom side	WCDMA Band 2	0.776	--	0.776
Right side	WCDMA Band 2	--	0.015	0.015
Left side	WCDMA Band 2	0.423	--	0.423
Back	WCDMA Band 5	0.537	0.098	0.635
Front	WCDMA Band 5	0.517	0.029	0.546
Top side	WCDMA Band 5	--	0.056	0.056
Bottom side	WCDMA Band 5	0.261	--	0.261
Right side	WCDMA Band 5	--	0.015	0.015
Left side	WCDMA Band 5	0.119	--	0.119
Back	WCDMA Band 4	1.093	0.098	1.191
Front	WCDMA Band 4	0.682	0.029	0.711
Top side	WCDMA Band 4	--	0.056	0.056
Bottom side	WCDMA Band 4	0.571	--	0.571
Right side	WCDMA Band 4	--	0.015	0.015
Left side	WCDMA Band 4	0.129	--	0.129
Back	LTE Band 2	0.544	0.098	0.642
Front	LTE Band 2	0.483	0.029	0.512
Top side	LTE Band 2	--	0.056	0.056

Bottom side	LTE Band 2	0.426	--	0.426
Right side	LTE Band 2	--	0.015	0.015
Left side	LTE Band 2	0.220	--	0.220
Back	LTE Band 4	1.066	0.098	1.164
Front	LTE Band 4	0.535	0.029	0.564
Top side	LTE Band 4	--	0.056	0.056
Bottom side	LTE Band 4	0.475	--	0.475
Right side	LTE Band 4	--	0.015	0.015
Left side	LTE Band 4	0.119	--	0.119
Back	LTE Band 5	0.681	0.098	0.779
Front	LTE Band 5	0.654	0.029	0.683
Top side	LTE Band 5	--	0.056	0.056
Bottom side	LTE Band 5	0.326	--	0.326
Right side	LTE Band 5	--	0.015	0.015
Left side	LTE Band 5	0.158	--	0.158
Back	LTE Band 7	0.805	0.098	0.903
Front	LTE Band 7	0.448	0.029	0.477
Top side	LTE Band 7	--	0.056	0.056
Bottom side	LTE Band 7	0.934	--	0.934
Right side	LTE Band 7	--	0.015	0.015
Left side	LTE Band 7	0.263	--	0.263

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
Measurement System									
Probe calibration	E.2.1	7.0	N	1	1	1	7.00	7.00	∞
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	$(1_{-Cp})^{1/2}$	$(1_{-Cp})^{1/2}$	1.02	1.02	∞
Hemispherical Isotropy	E.2.2	4.0	R	$\sqrt{3}$	$(Cp)^{1/2}$	$(Cp)^{1/2}$	1.63	1.63	∞
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Readout Electronics	E.2.6	0.02	N	1	1	1	0.02	0.02	∞
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
RF ambient Conditions – Noise	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
RF ambient Conditions - Reflections	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞
Extrapolation, interpolation and integration Algorithms for Max. SAR Evaluation	E.5	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
Test Sample Related									
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	∞
SAR scaling	E6.5	0.0	R	$\sqrt{3}$	1	1	0.0	0.0	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞
Uncertainty in SAR correction for deviations in permittivity and conductivity	E3.2	1.9	R	$\sqrt{3}$	1	0.84	1.10	0.90	∞
Liquid conductivity - deviation	E.3.2	5.00	R	$\sqrt{3}$	0.64	0.43	1.85	1.24	∞

from target value									
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	∞
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
Measurement System									
Probe calibration	E.2.1	7.0	N	1	1	1	7.00	7.00	∞
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	$(1_{Cp})^{1/2}$	$(1_{Cp})^{1/2}$	1.02	1.02	∞
Hemispherical Isotropy	E.2.2	4.0	R	$\sqrt{3}$	$(Cp)^{1/2}$	$(Cp)^{1/2}$	1.63	1.63	∞
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Modulation response	E.2.5	0	R	$\sqrt{3}$	0	0	0.0	0.0	∞
Readout Electronics	E.2.6	0.02	N	1	1	1	0.02	0.02	∞
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
RF ambient Conditions – Noise	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
RF ambient Conditions - Reflections	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞
Extrapolation, interpolation and integration Algorithms for Max.	E.5.2	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞

SAR Evaluation									
Dipole									
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	∞
Deviation of experimental dipole from numerical dipole	E.6.4	5.5	R	$\sqrt{3}$	1	1	3.20	3.20	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞
Uncertainty in SAR correction for deviations in permittivity and conductivity	E3.2	2.0	R	$\sqrt{3}$	1	0.84	1.10	1.10	∞
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: 09/25/2018

Measurement duration: 7 minutes 21 seconds

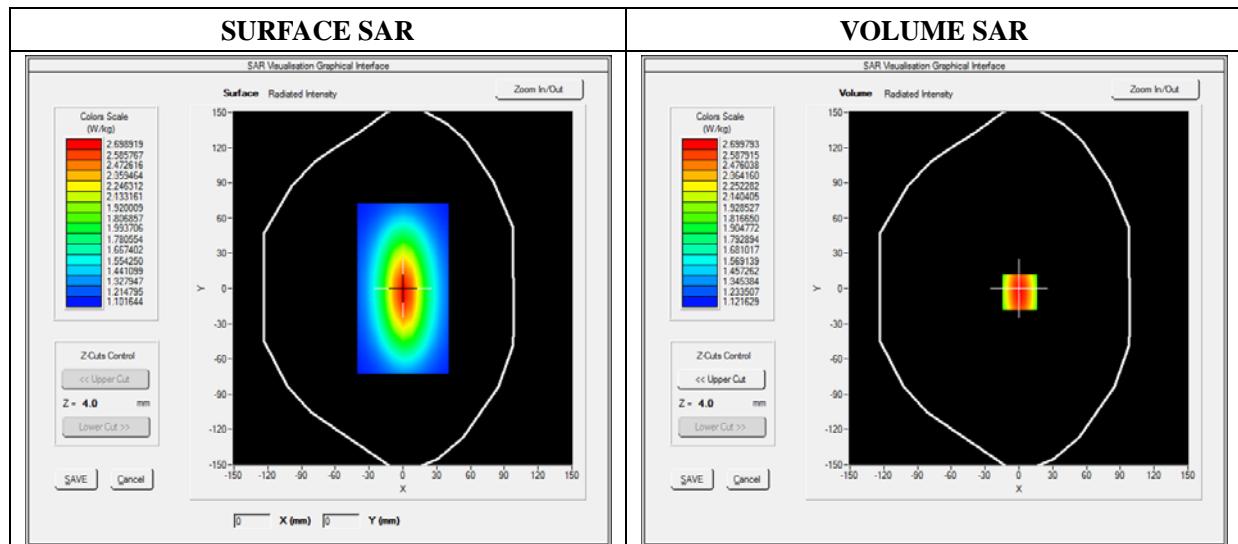
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.93; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

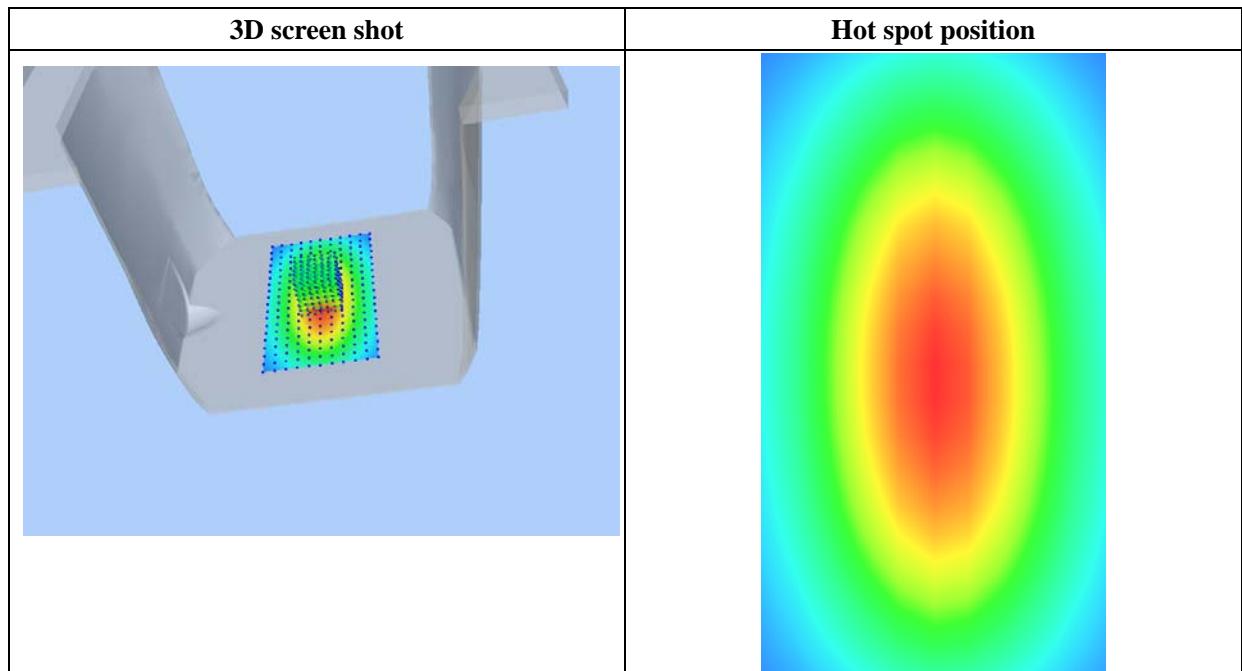
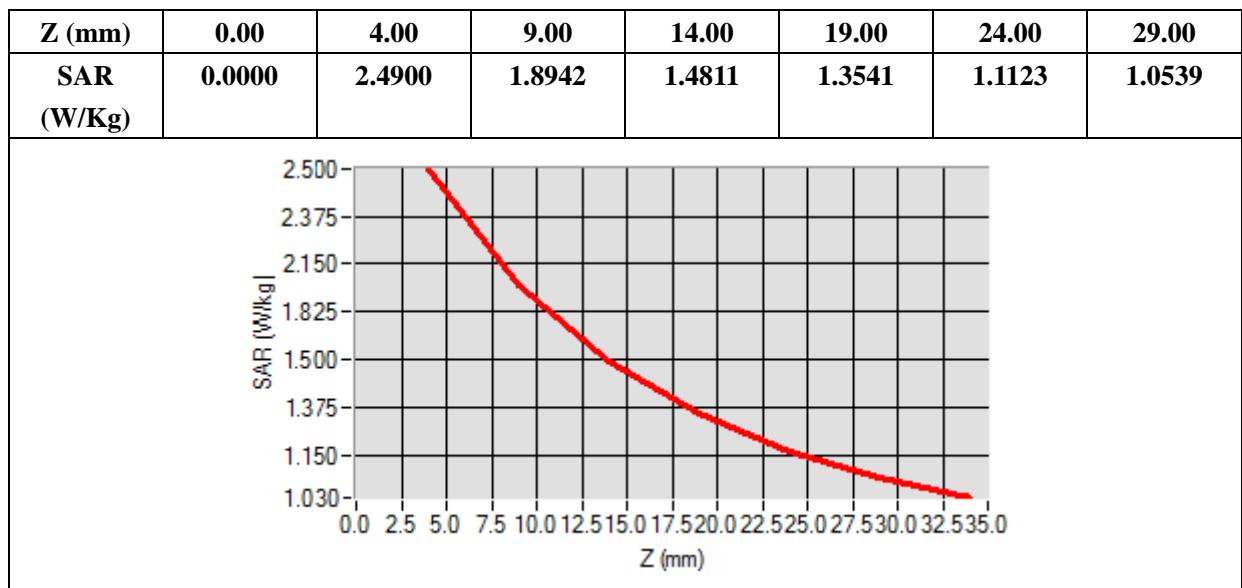
Frequency (MHz)	835.000000
Relative Permittivity (real part)	41.110245
Conductivity (S/m)	0.871245
Power Variation (%)	0.038437
Ambient Temperature	21.1
Liquid Temperature	21.3



Maximum location: X=0.00, Y=0.00

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

Z Axis Scan



MEASUREMENT 2

For Head Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 09/26/2018

Measurement duration: 12 minutes 21 seconds

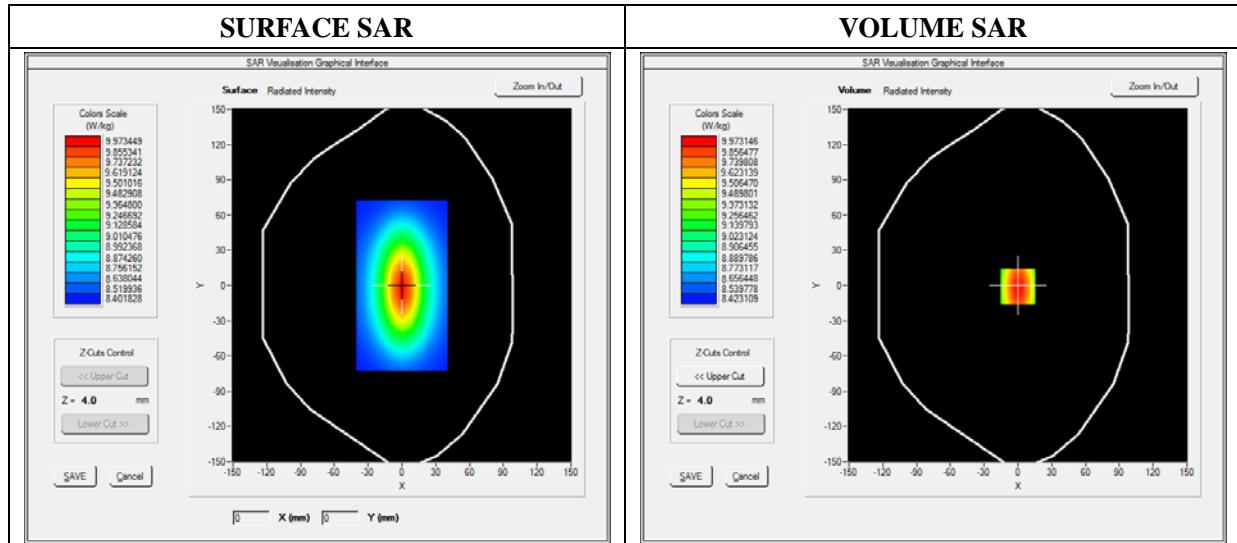
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.84; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

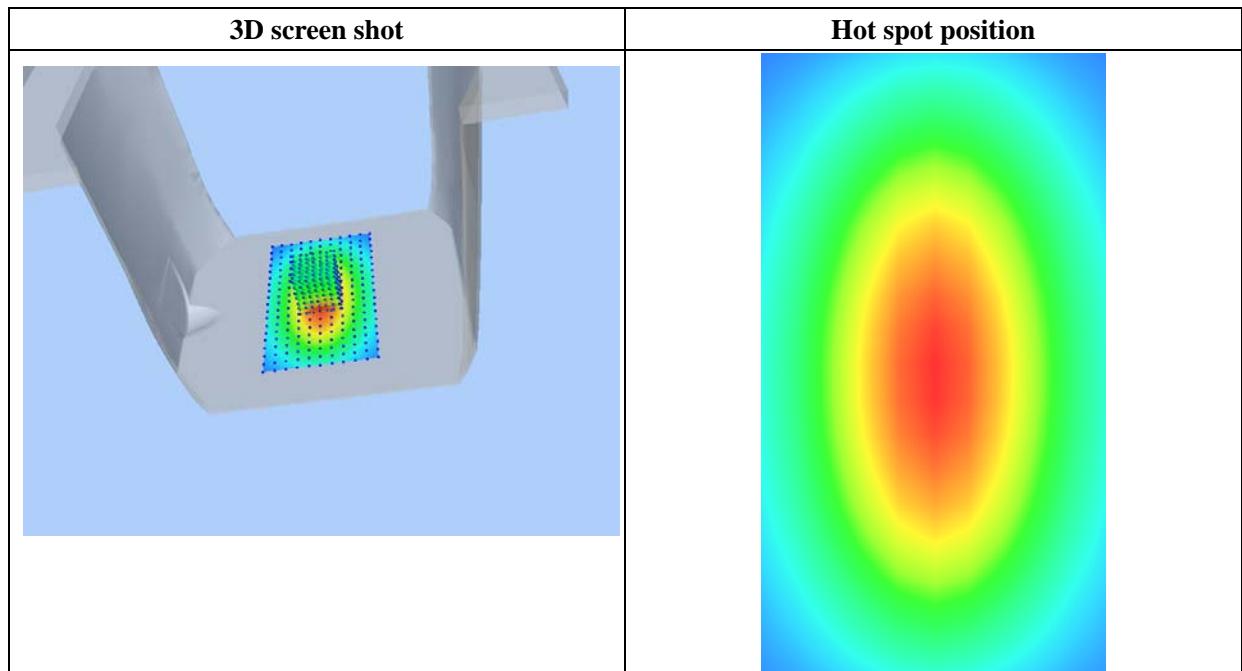
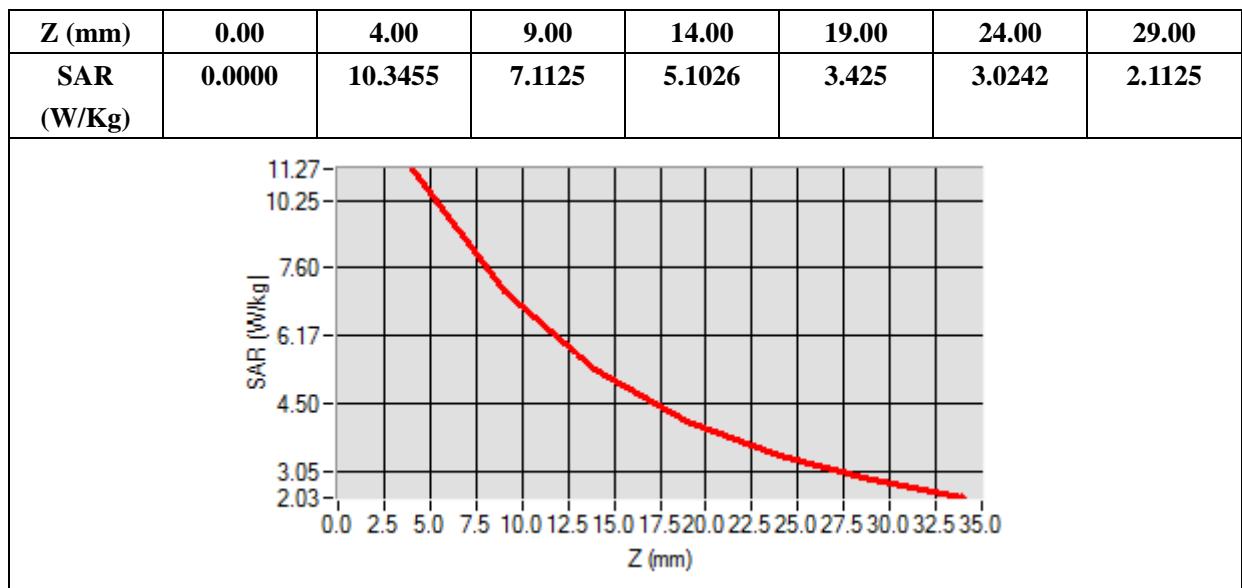
Frequency (MHz)	1800.000000
Relative Permittivity (real part)	39.024890
Conductivity (S/m)	1.371250
Power Variation (%)	1.401232
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=0.00, Y=0.00

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

Z Axis Scan



MEASUREMENT 3

For Head Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 09/26/2018

Measurement duration: 12 minutes 21 seconds

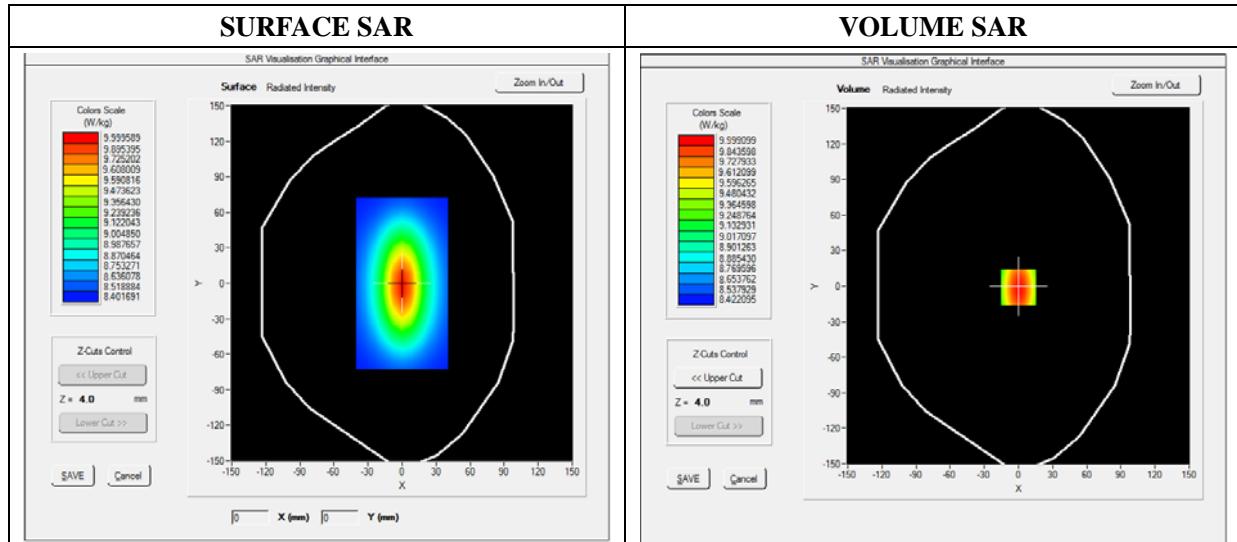
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

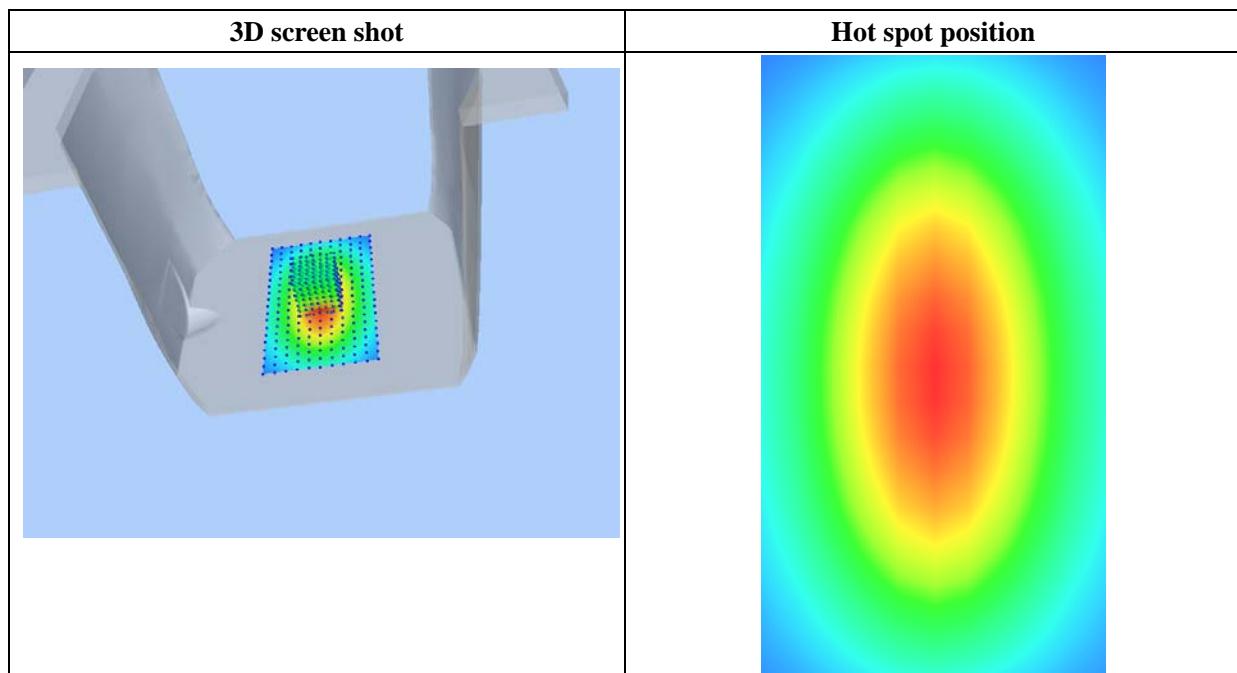
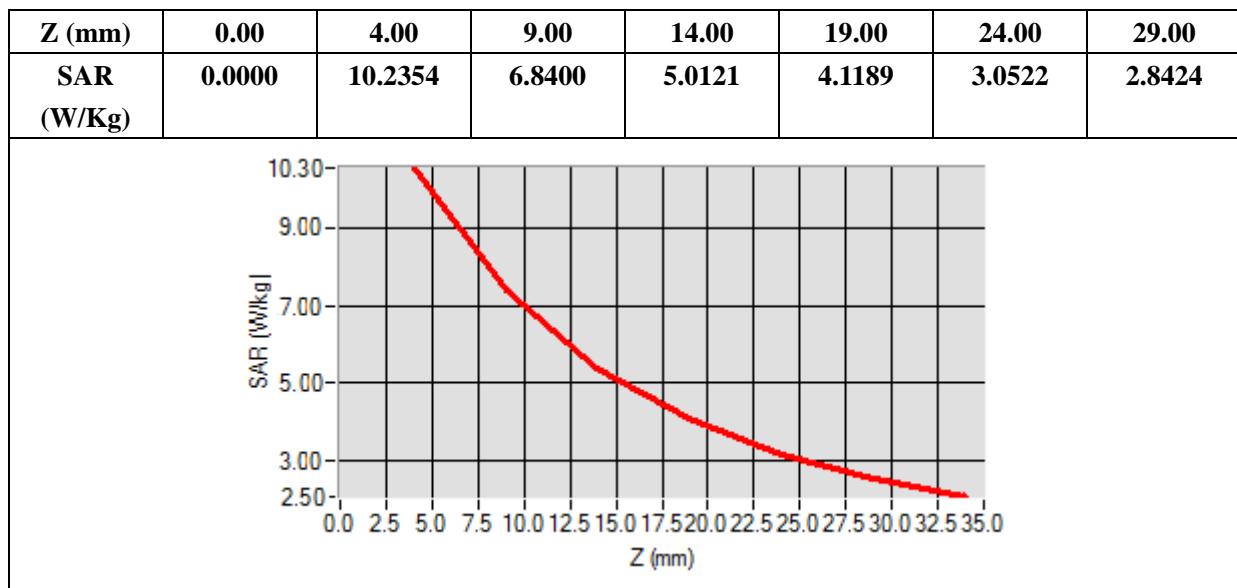
Frequency (MHz)	1900.000000
Relative Permittivity (real part)	38.560124
Conductivity (S/m)	1.380369
Power Variation (%)	1.022540
Ambient Temperature	21.1
Liquid Temperature	21.3



Maximum location: X=0.00, Y=0.00

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

Z Axis Scan



MEASUREMENT 4

For Head Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 09/27/2018

Measurement duration: 12 minutes 21 seconds

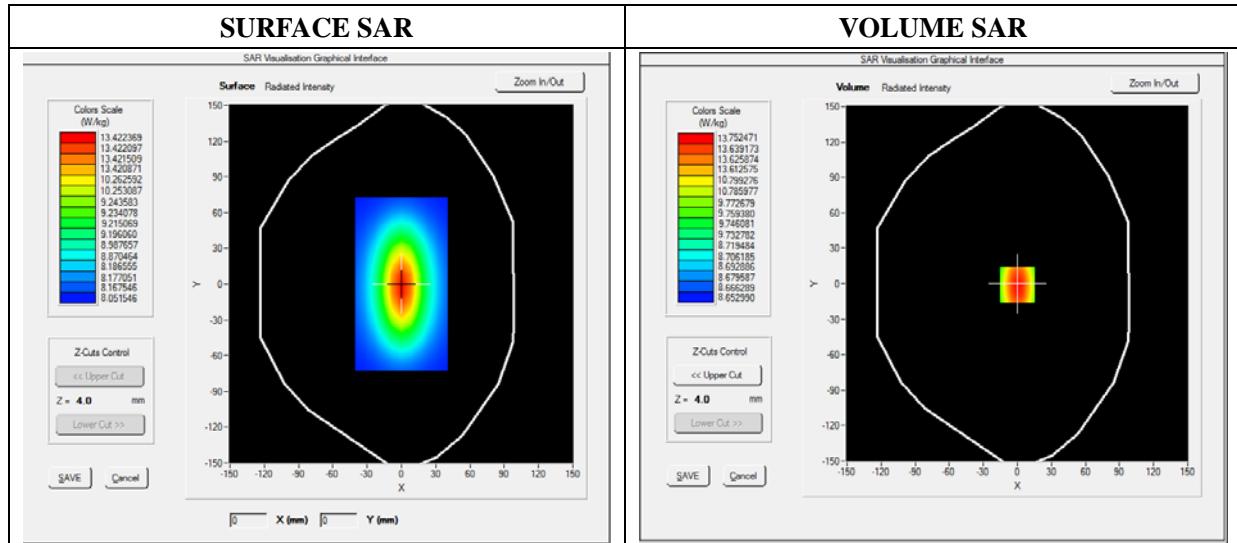
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.64; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

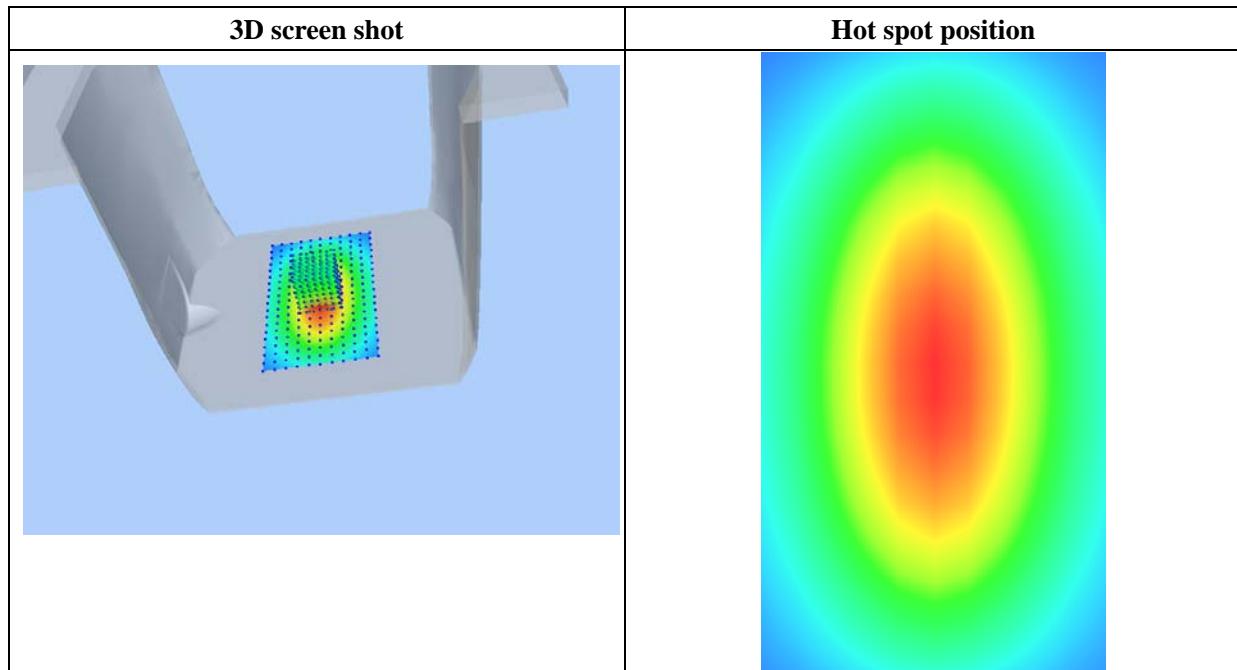
Frequency (MHz)	2450.000000
Relative Permittivity (real part)	38.153660
Conductivity (S/m)	1.740236
Power Variation (%)	1.141452
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=0.00, Y=0.00

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

Z Axis Scan



MEASUREMENT 5

For Head Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 09/27/2018

Measurement duration: 12 minutes 21 seconds

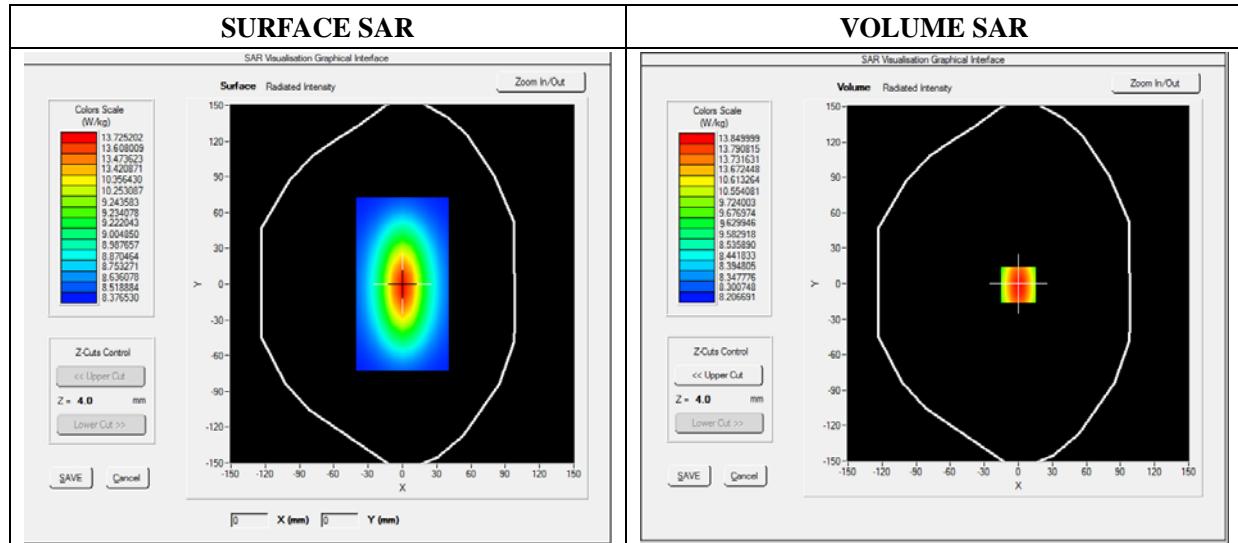
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.37; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

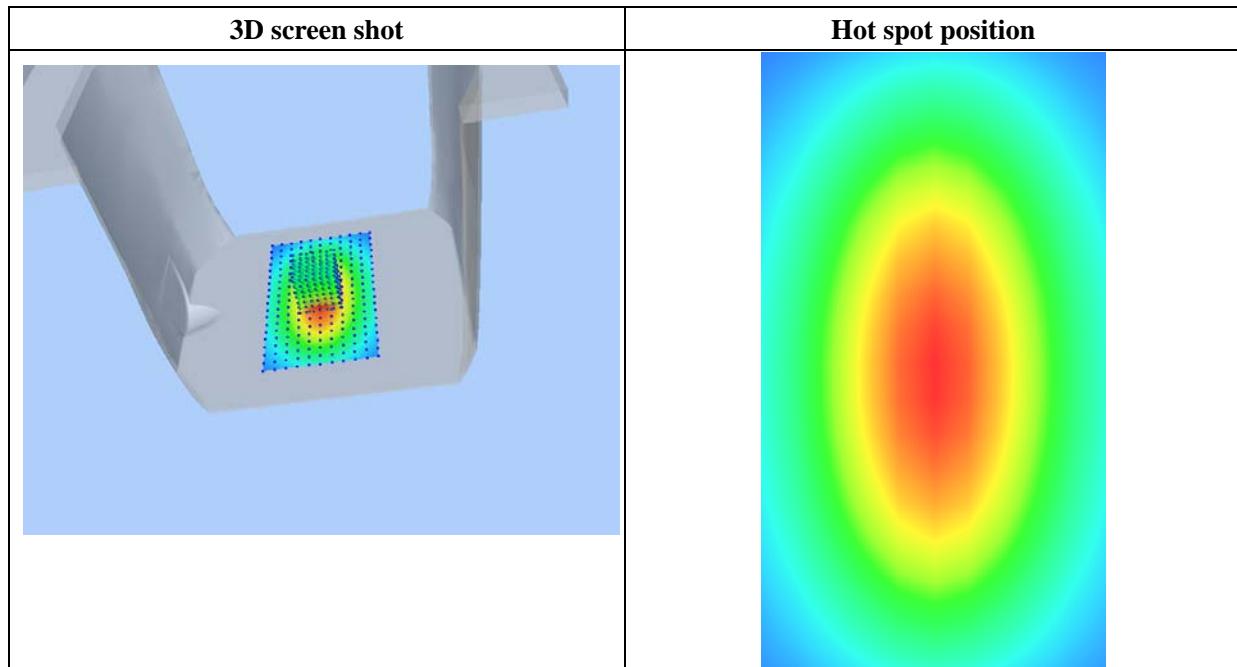
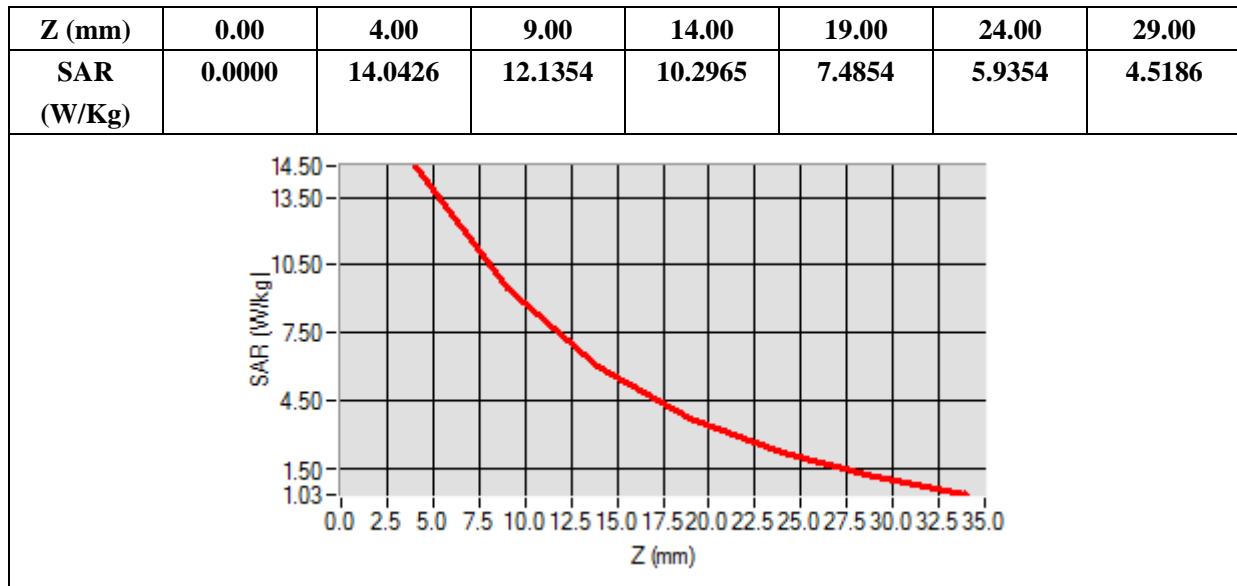
Frequency (MHz)	2600.000000
Relative Permittivity (real part)	38.631092
Conductivity (S/m)	1.930182
Power Variation (%)	1.028221
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=0.00, Y=0.00

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

Z Axis Scan



MEASUREMENT 6

For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 09/25/2018

Measurement duration: 12 minutes 21 seconds

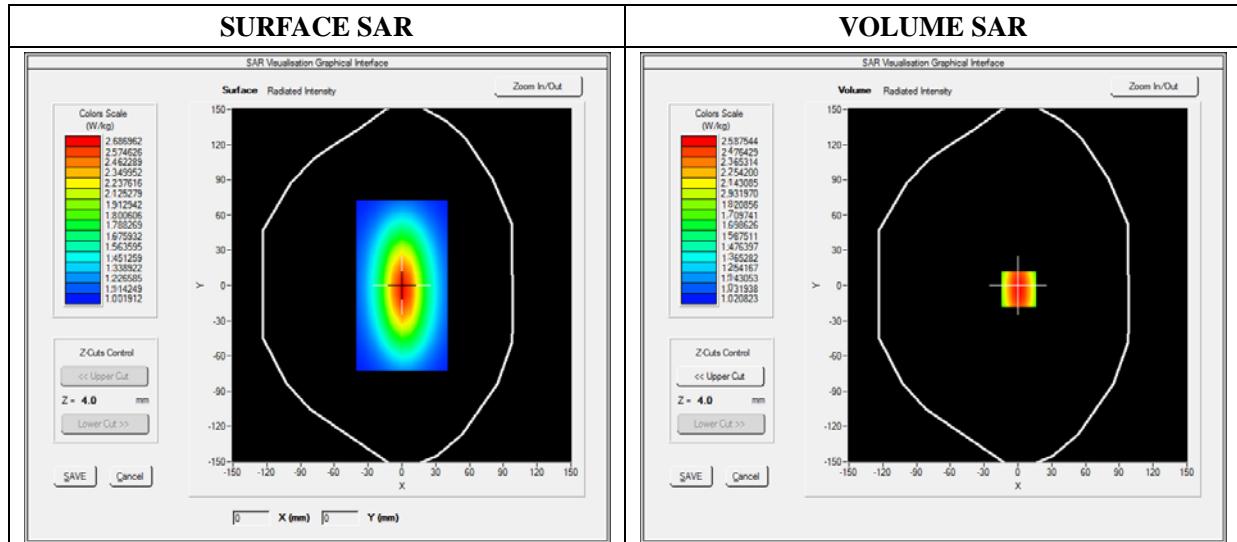
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

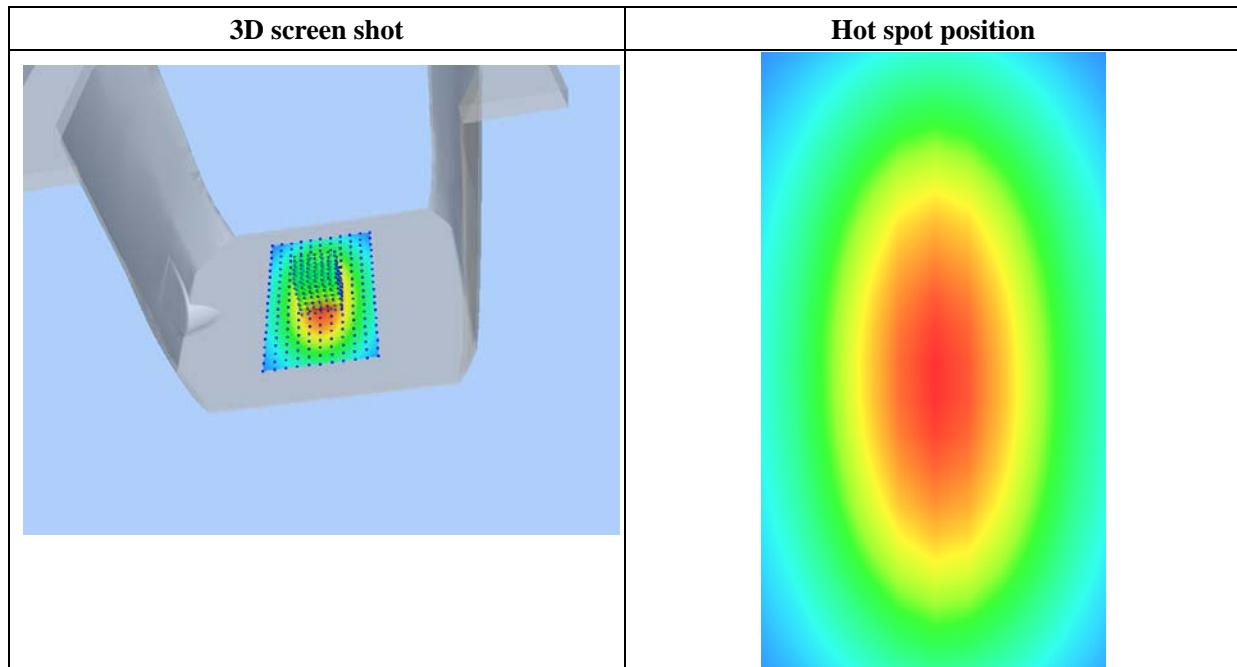
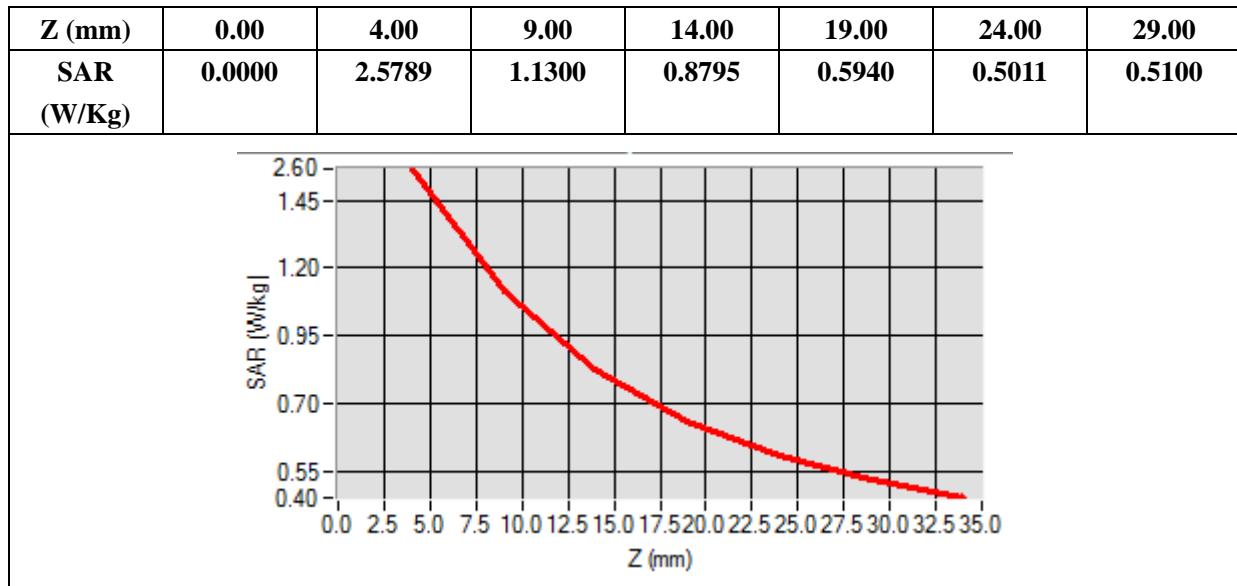
Frequency (MHz)	835.000000
Relative Permittivity (real part)	54.851214
Conductivity (S/m)	0.951454
Power Variation (%)	0.901472
Ambient Temperature	21.1
Liquid Temperature	21.3



Maximum location: X=0.00, Y=0.00

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

Z Axis Scan



MEASUREMENT 7

For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 09/26/2018

Measurement duration: 12 minutes 21 seconds

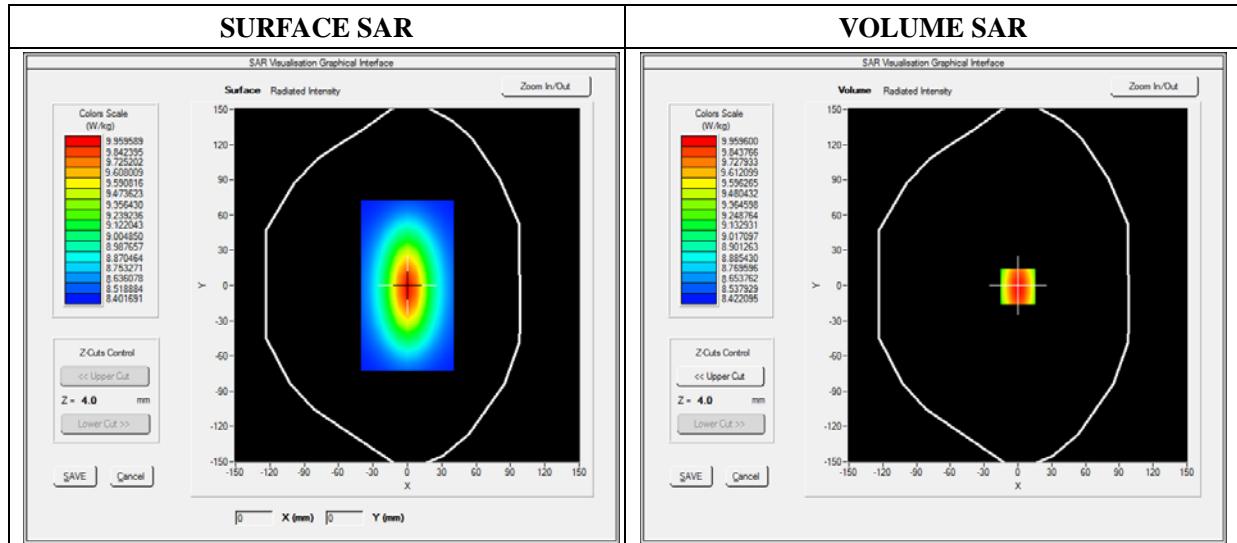
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.06; Calibrated: 06/01/2018

A. Experimental conditions

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

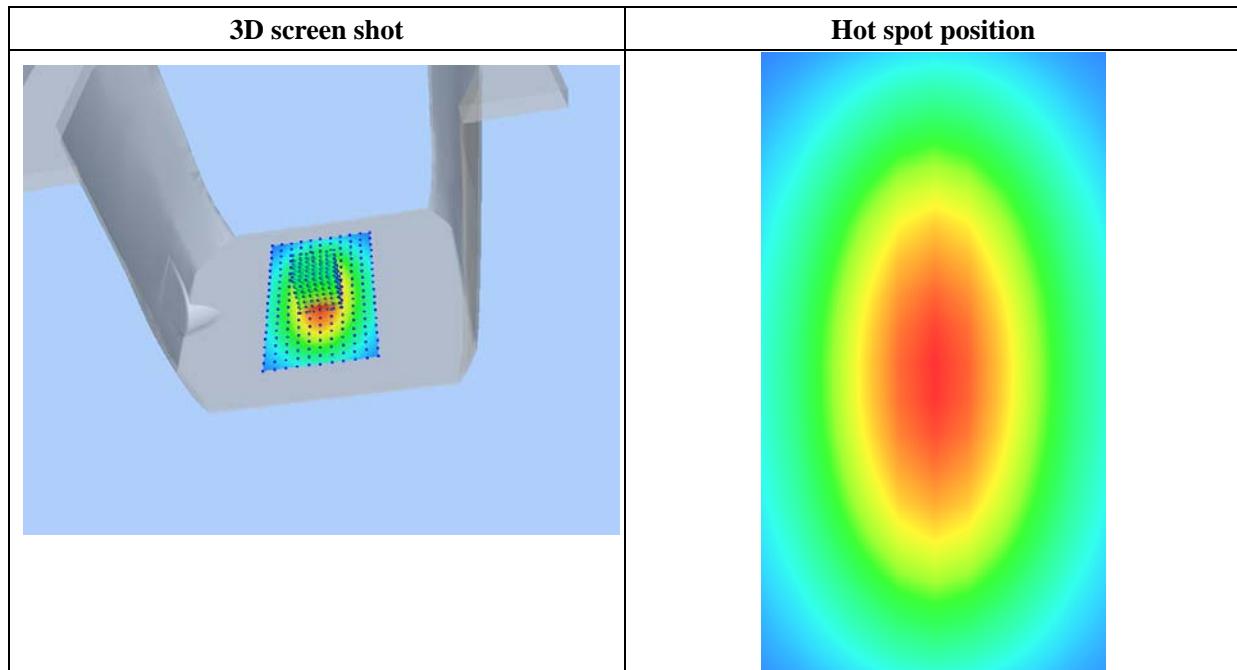
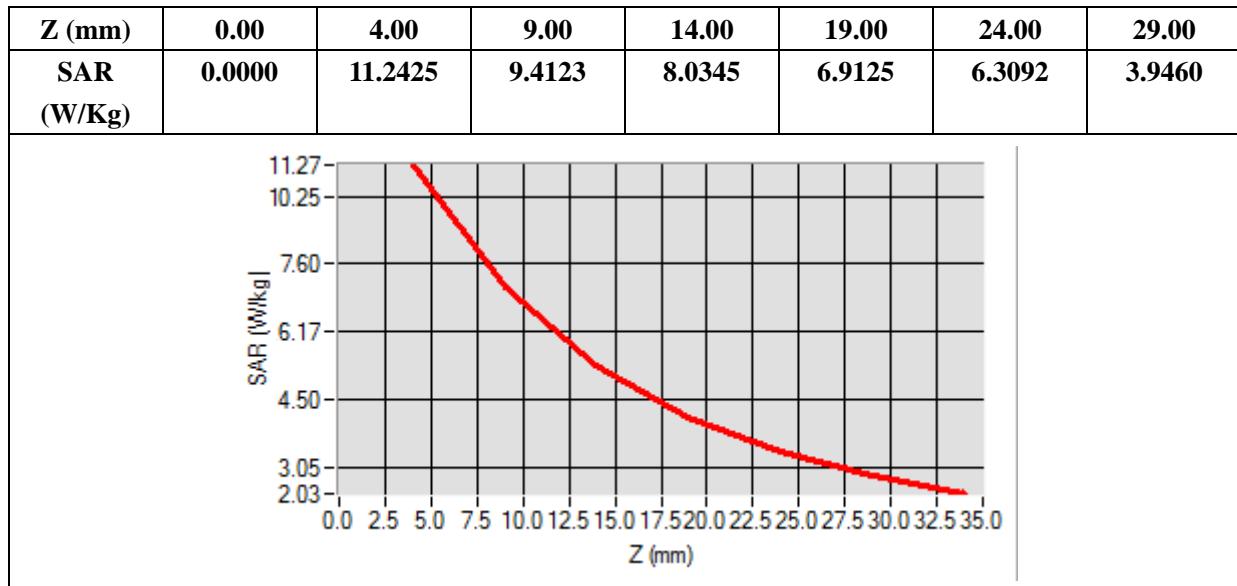
B. SAR Measurement Results

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



Maximum location: X=0.00, Y=0.00

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

Z Axis Scan


MEASUREMENT 8

For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 09/26/2018

Measurement duration: 12 minutes 21 seconds

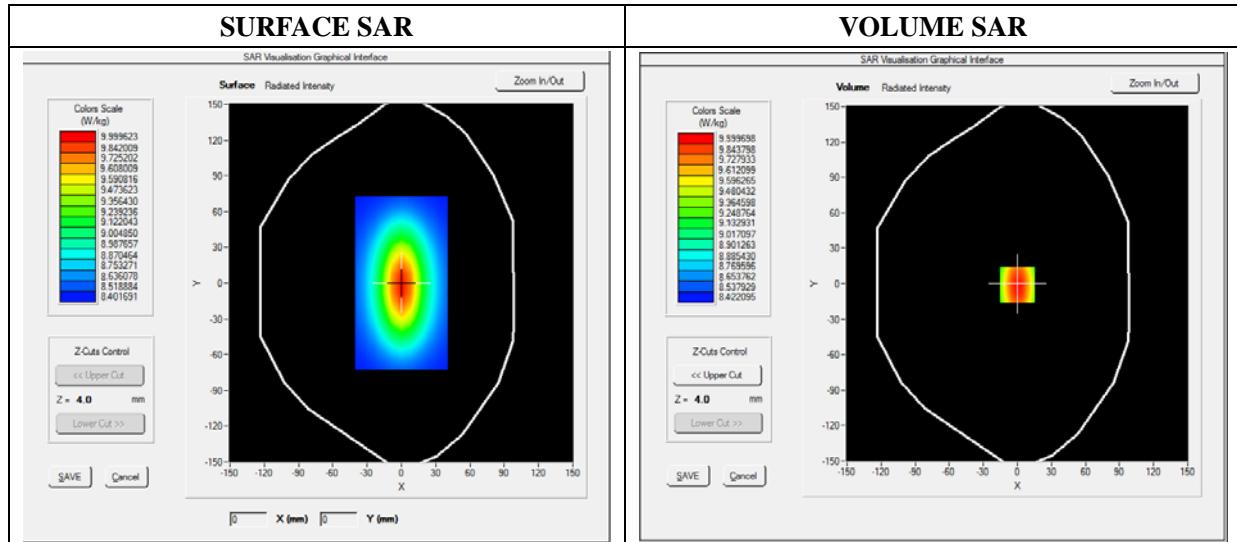
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

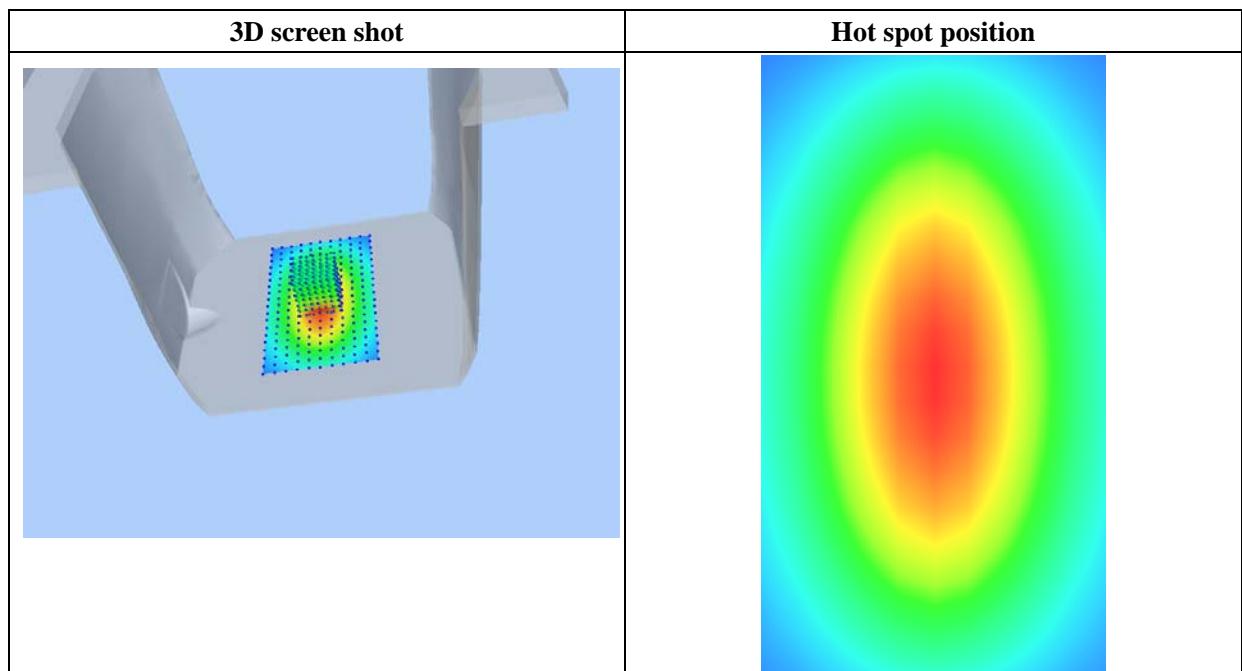
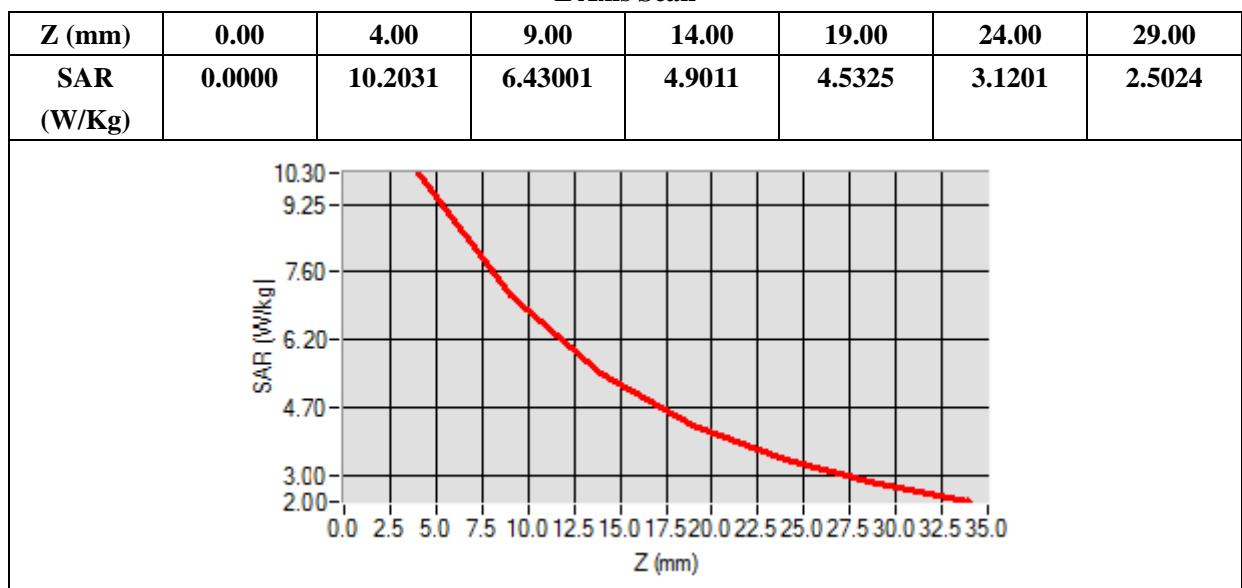
Frequency (MHz)	1900.000000
Relative Permittivity (real part)	52.420415
Conductivity (S/m)	1.501966
Power Variation (%)	0.541872
Ambient Temperature	21.1
Liquid Temperature	21.3



Maximum location: X=0.00, Y=0.00

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

Z Axis Scan



MEASUREMENT 9

For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 09/27/2018

Measurement duration: 12 minutes 21 seconds

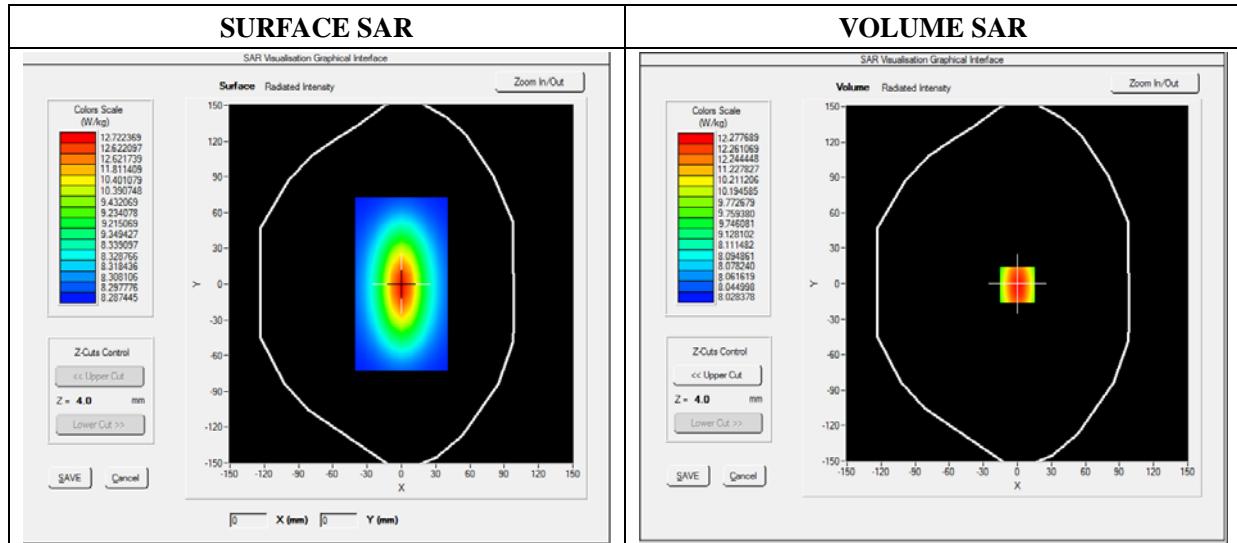
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.80; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

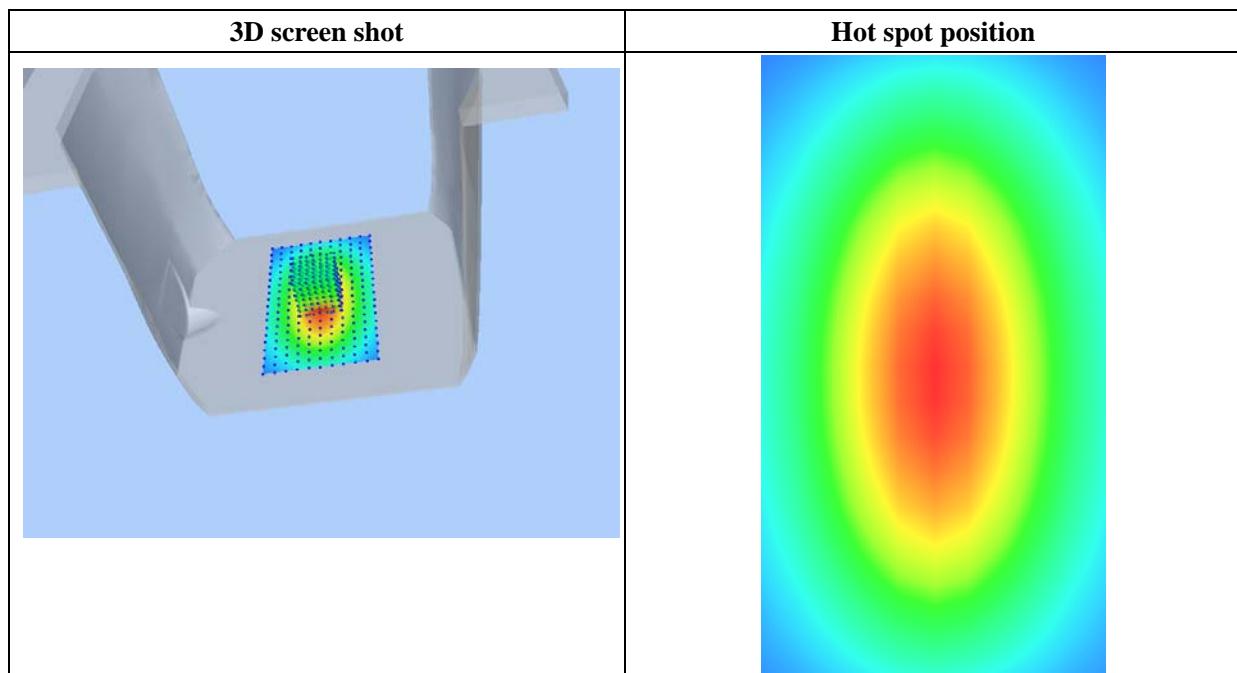
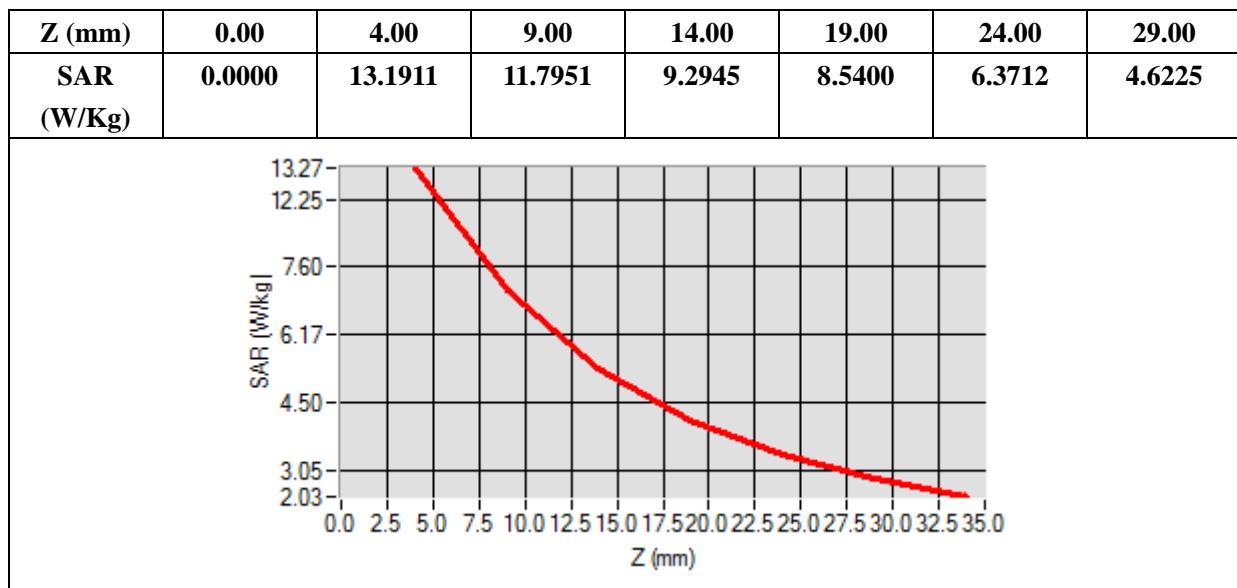
Frequency (MHz)	2450.000000
Relative Permittivity (real part)	52.010212
Conductivity (S/m)	1.910255
Power Variation (%)	1.369745
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=0.00, Y=0.00

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

Z Axis Scan



MEASUREMENT 10

For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 09/27/2018

Measurement duration: 12 minutes 21 seconds

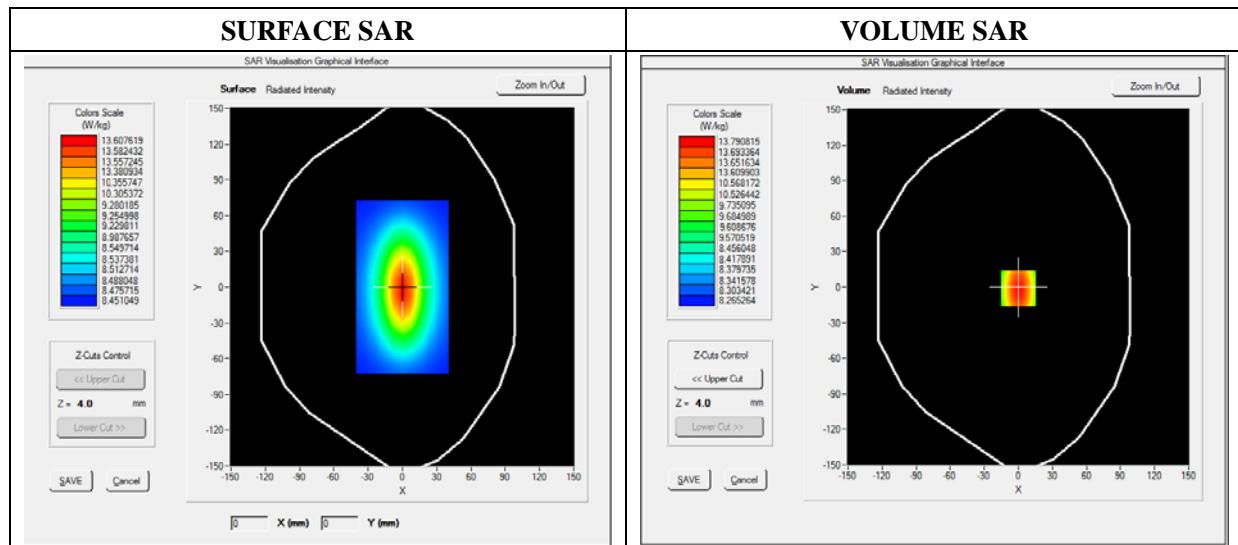
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.58; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

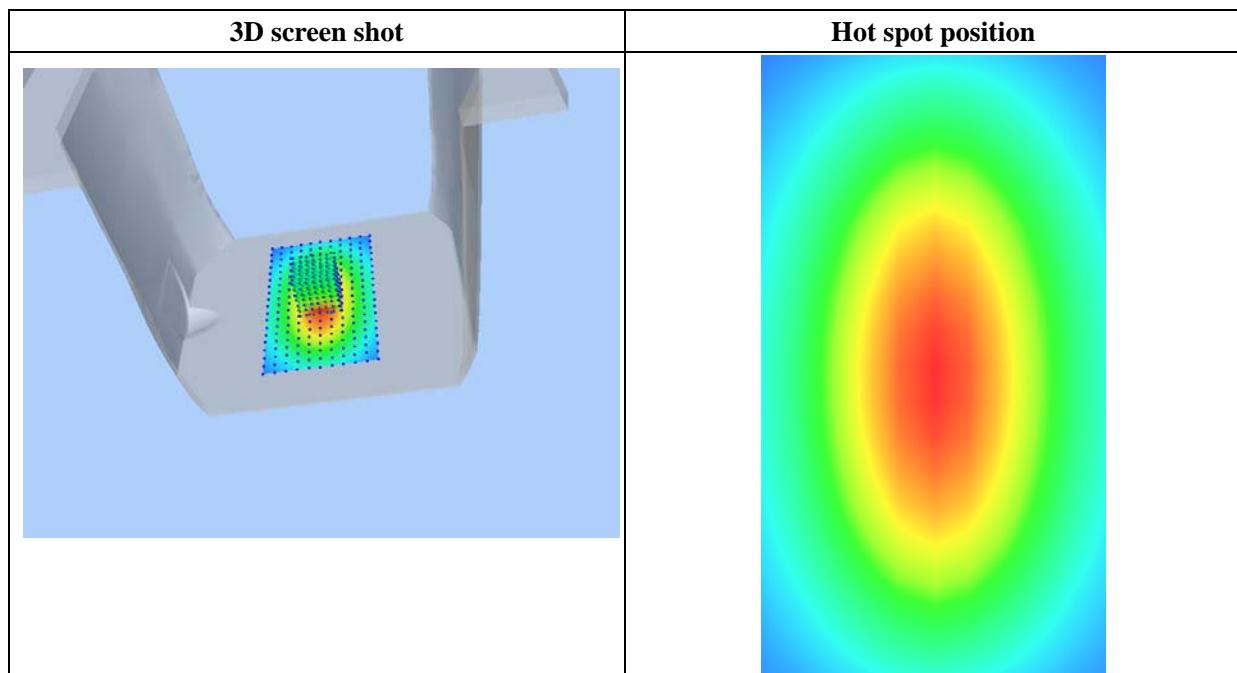
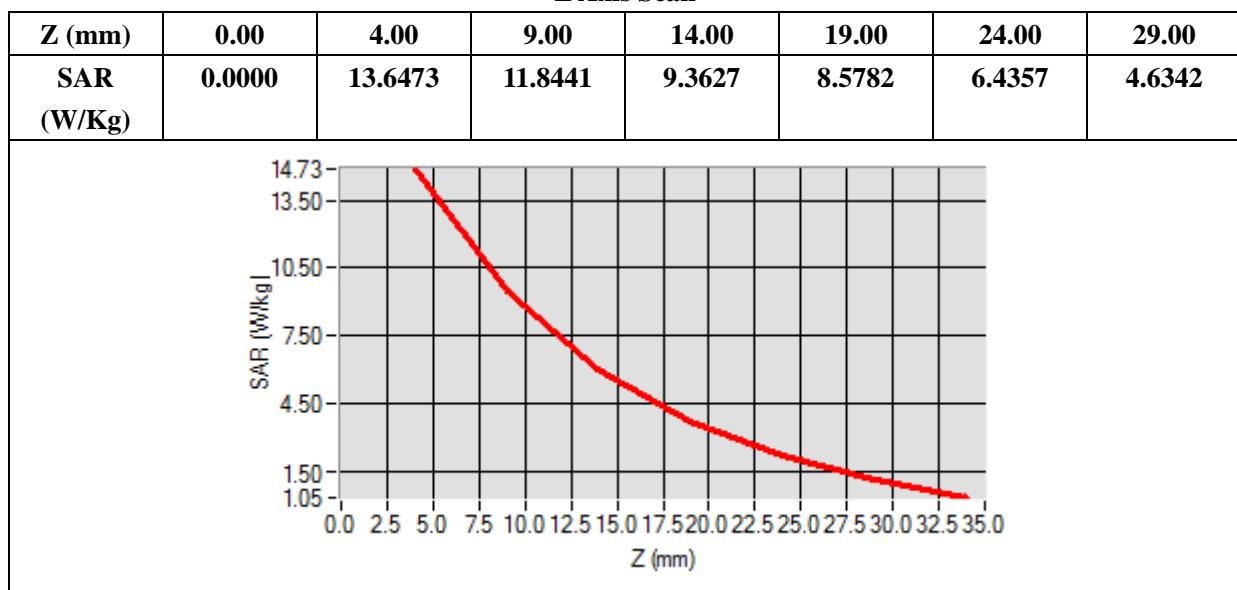
Frequency (MHz)	2600.000000
Relative Permittivity (real part)	52.241202
Conductivity (S/m)	2.120943
Power Variation (%)	1.038832
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=0.00, Y=0.00

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

Z Axis Scan



Annex B. Plots of SAR Measurement

<u>TYPE</u>	<u>BAND</u>	<u>PARAMETERS</u>
Phone	GSM850	<u>Measurement 1:</u> Right Head with Cheek device position on High Channel in GSM mode
Phone	GSM1900	<u>Measurement 7:</u> Left Head with Cheek device position on High Channel in GSM mode
Phone	GPRS850_4TX	<u>Measurement 11:</u> Left Head with Cheek device position on High Channel in GPRS mode
Phone	GPRS1900_4TX	<u>Measurement 15:</u> Left Head with Cheek device position on High Channel in GPRS mode
Phone	WCDMA1900_RMC	<u>Measurement 19:</u> Left Head with Cheek device position on High Channel in WCDMA mode
Phone	WCDMA850_RMC	<u>Measurement 21:</u> Right Head with Cheek device position on High Channel in WCDMA mode
Phone	WCDMA1700_RMC	<u>Measurement 27:</u> Left Head with Cheek device position on Low Channel in WCDMA mode
Phone	LTE Band 2	<u>Measurement 31:</u> Left Head with Cheek device position on Middle Channel in LTE mode
Phone	LTE Band 4	<u>Measurement 39:</u> Left Head with Cheek device position on Middle Channel in LTE mode
Phone	LTE Band 5	<u>Measurement 45:</u> Right Head with Cheek device position on High Channel in LTE mode
Phone	LTE Band 7	<u>Measurement 55:</u> Left Head with Cheek device position on High Channel in LTE mode
Phone	WiFi_802.11b	<u>Measurement 63:</u> Left Head with Cheek device position on Low Channel in 802.11b mode
Phone	GSM850	<u>Measurement 65:</u> Flat Plane with Back(Body-worn) device position on High Channel in GSM mode
Phone	GSM1900	<u>Measurement 67:</u> Flat Plane with Back(Body-worn) device position on High Channel in GSM mode
Phone	GPRS850_4TX	<u>Measurement 69:</u> Flat Plane with Back device position on High Channel in GPRS mode
Phone	GPRS1900_4TX	<u>Measurement 75:</u> Flat Plane with Bottom device position on High Channel in GPRS mode
Phone	WCDMA1900_RMC	<u>Measurement 77:</u> Flat Plane with Back side device position on High Channel in WCDMA mode
Phone	WCDMA850_RMC	<u>Measurement 83:</u> Flat Plane with Back side device position on High Channel in WCDMA mode
Phone	WCDMA1700_RMC	<u>Measurement 87:</u> Flat Plane with Back device position on Low Channel in WCDMA mode

Phone	LTE Band 2	Measurement 93: Flat Plane with Back device position on Middle Channel in LTE mode
Phone	LTE Band 4	Measurement 102: Flat Plane with Back device position on Low Channel in LTE mode
Phone	LTE Band 5	Measurement 112: Flat Plane with Back device position on High Channel in LTE mode
Phone	LTE Band 7	Measurement 120: Flat Plane with Back device position on High Channel in LTE mode
Phone	LTE Band 7	Measurement 124: Flat Plane with Bottom device position on High Channel in LTE mode
Phone	WiFi_802.11b	Measurement 134: Flat Plane with Back side device position on Low Channel in 802.11b mode

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

MEASUREMENT 1

Type: Phone measurement (Complete)

Date of measurement: 09/25/2018

Measurement duration: 11 minutes 48 seconds

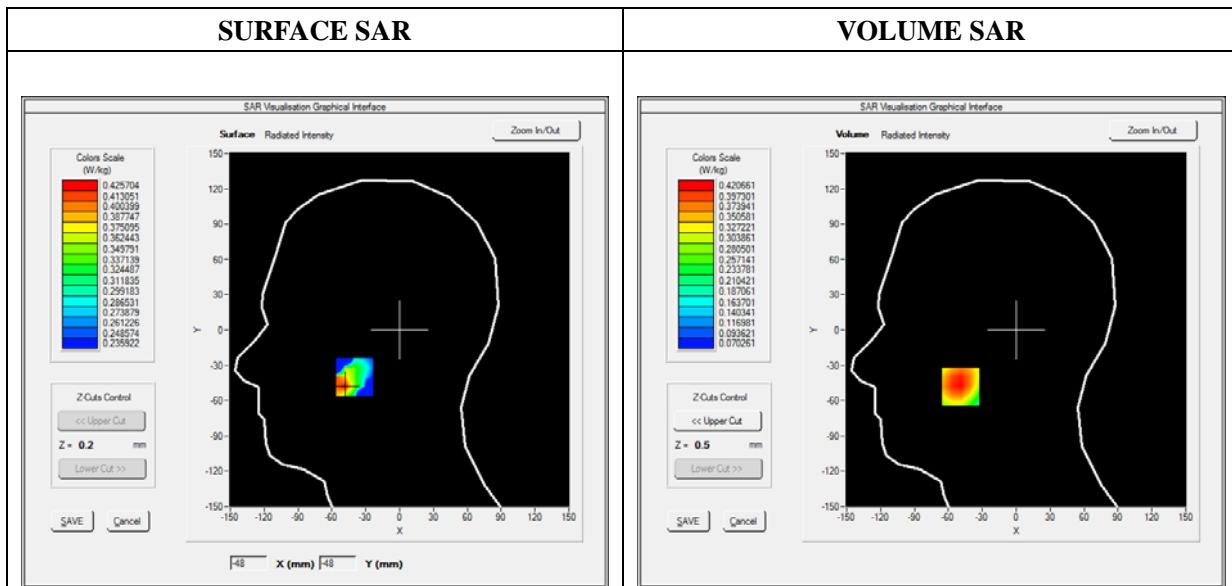
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.93; Calibrated: 06/01/2018

A. Experimental conditions

Area Scan	sam_direct_droit2_surf8mm.txt
Phantom	Right head
Device Position	Cheek
Band	GSM850
Channels	High
Signal	TDMA (Crest factor: 8.0)

B. SAR Measurement Results

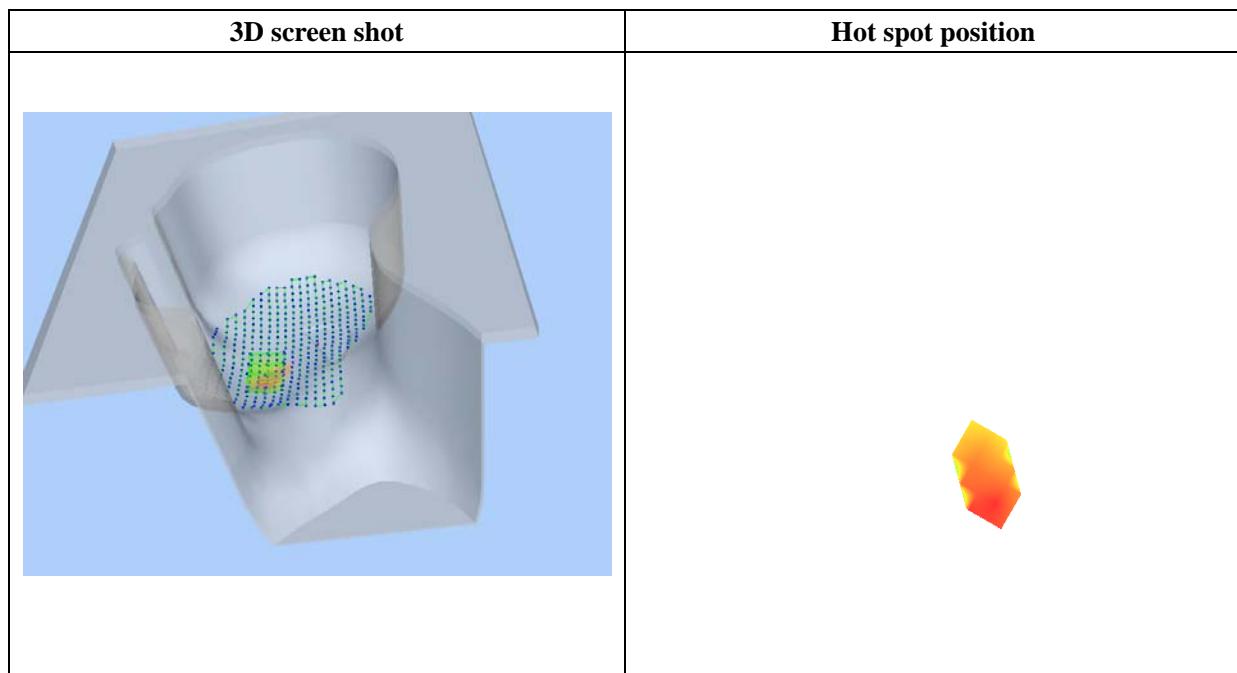
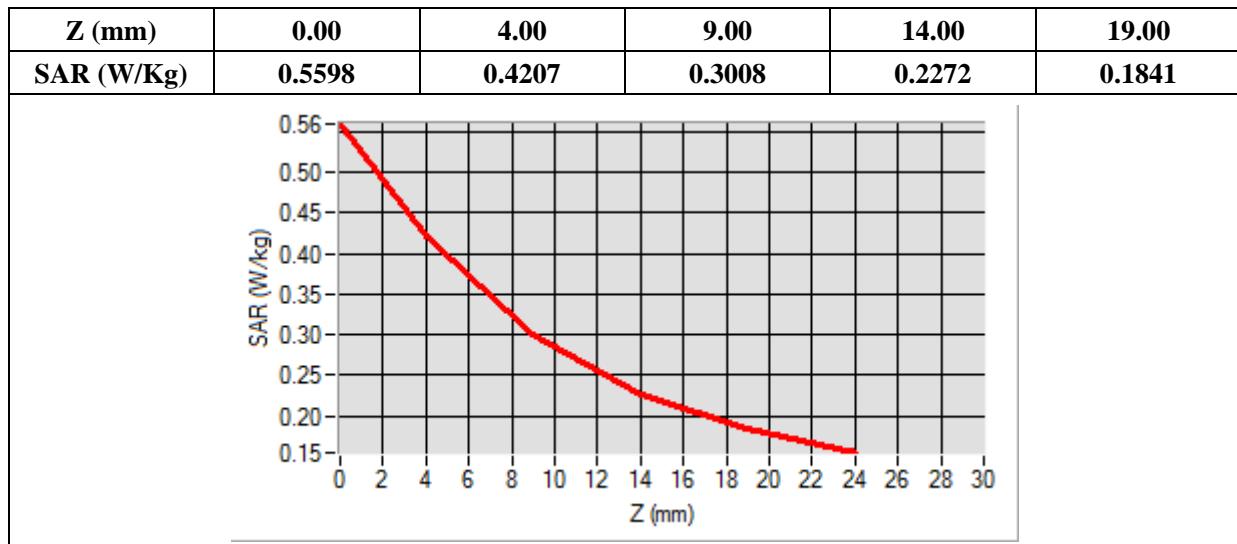
Frequency (MHz)	848.800000
Relative Permittivity (real part)	41.110245
Conductivity (S/m)	0.871245
Power Variation (%)	1.144536
Ambient Temperature	21.1
Liquid Temperature	21.3



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

SAR Peak: 0.56 W/kg

SAR 10g (W/Kg)	0.290824
SAR 1g (W/Kg)	0.407661



MEASUREMENT 7

Type: Phone measurement (Complete)

Date of measurement: 09/26/2018

Measurement duration: 11 minutes 48 seconds

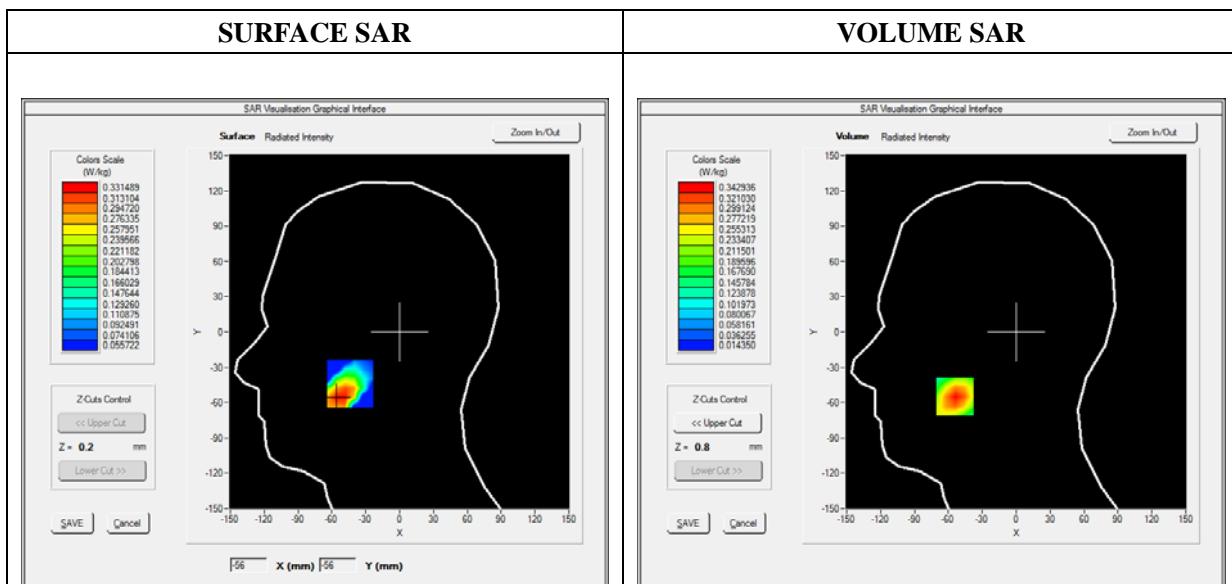
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

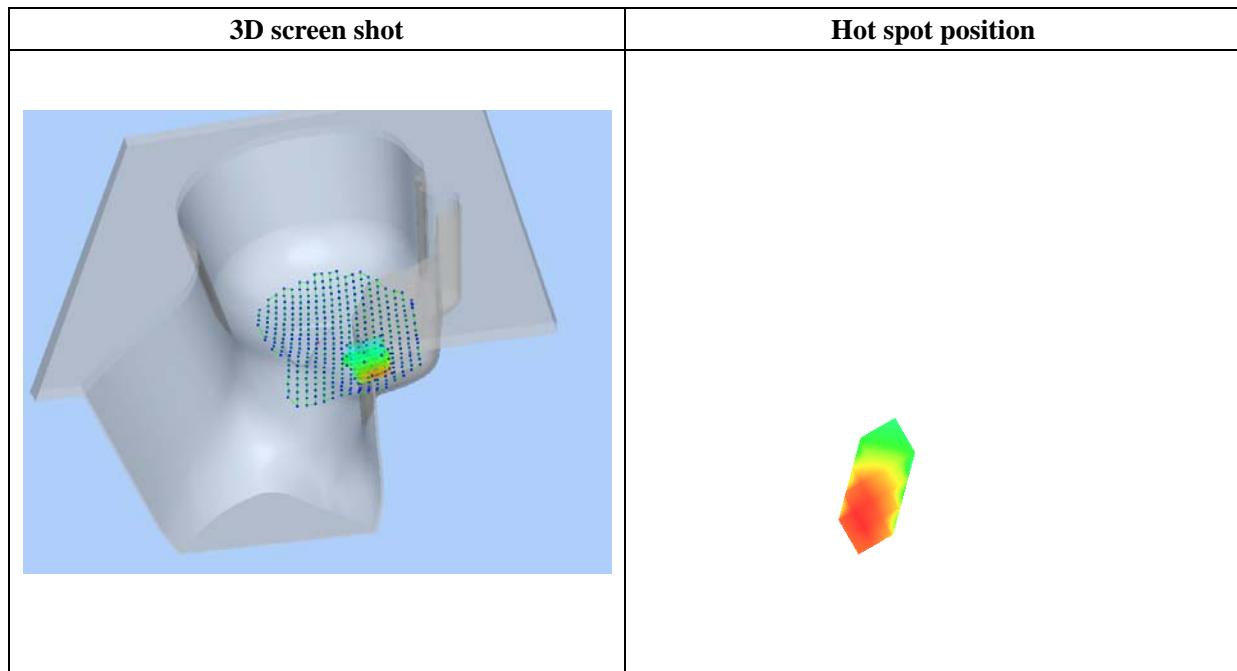
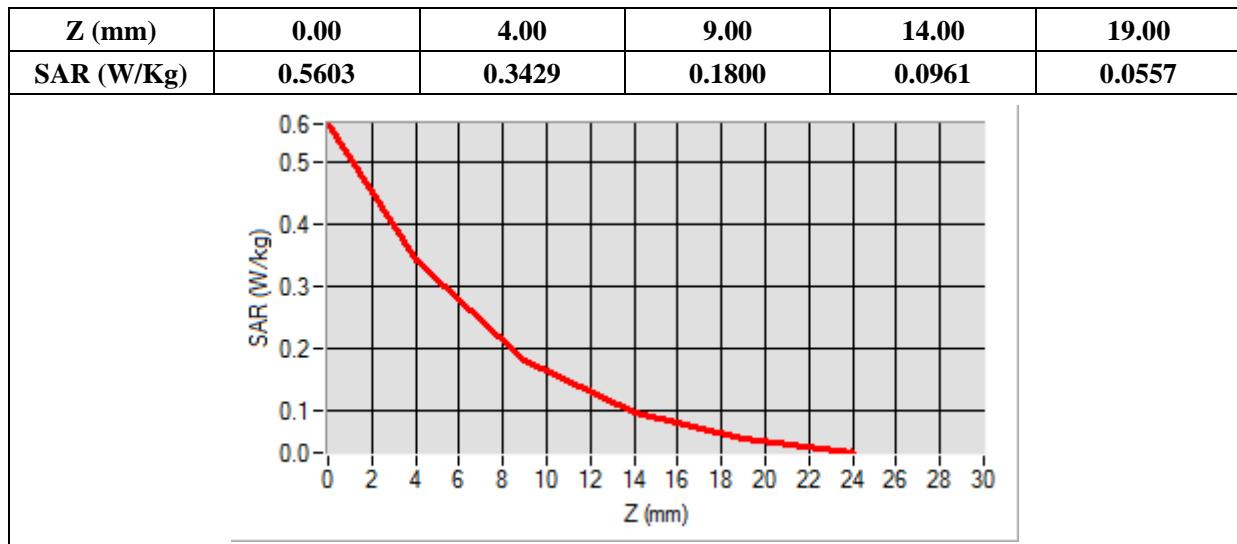
Frequency (MHz)	1909.800000
Relative Permittivity (real part)	38.560124
Conductivity (S/m)	1.380369
Power Variation (%)	1.442440
Ambient Temperature	21.1
Liquid Temperature	21.3



Maximum location: X=-54.00, Y=-55.00

SAR Peak: 0.56 W/kg

SAR 10g (W/Kg)	0.174277
SAR 1g (W/Kg)	0.323035



MEASUREMENT 11

Type: Phone measurement (Complete)

Date of measurement: 09/25/2018

Measurement duration: 12 minutes 3 seconds

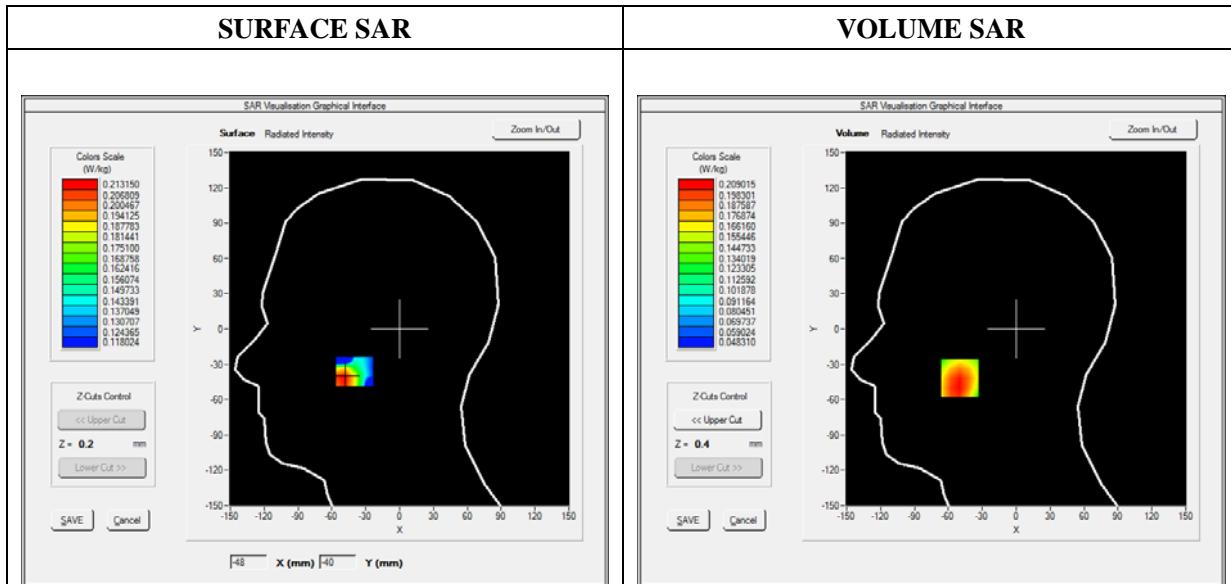
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.93; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

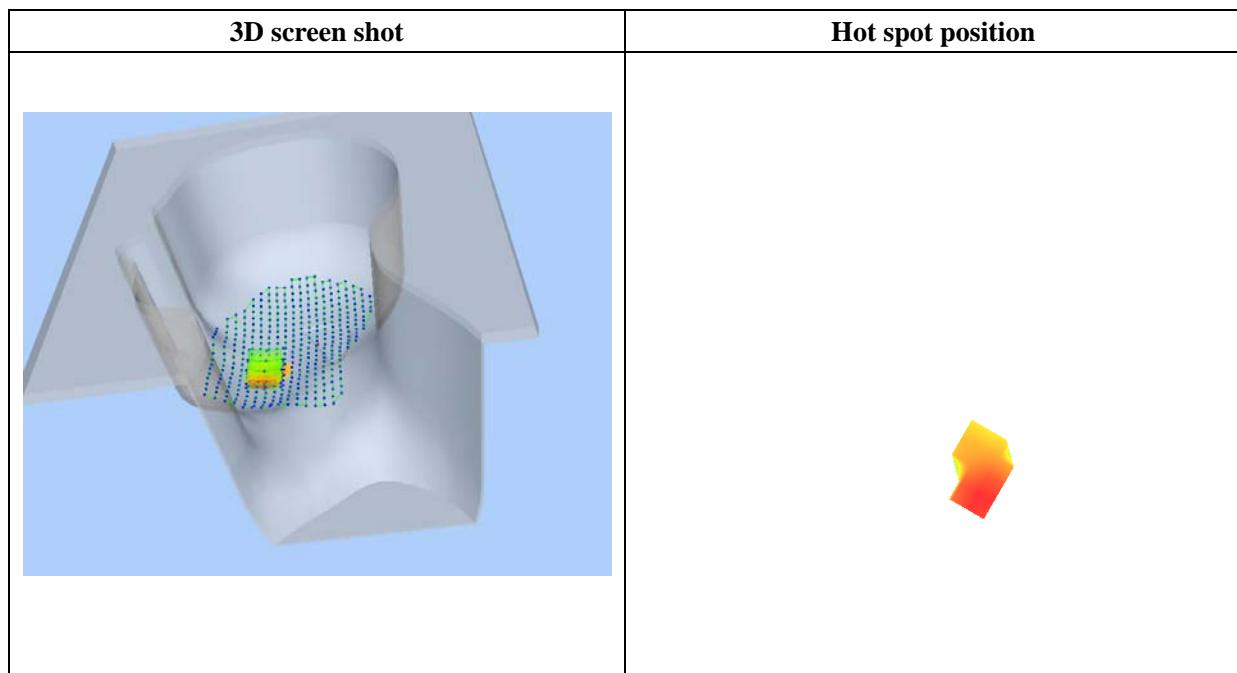
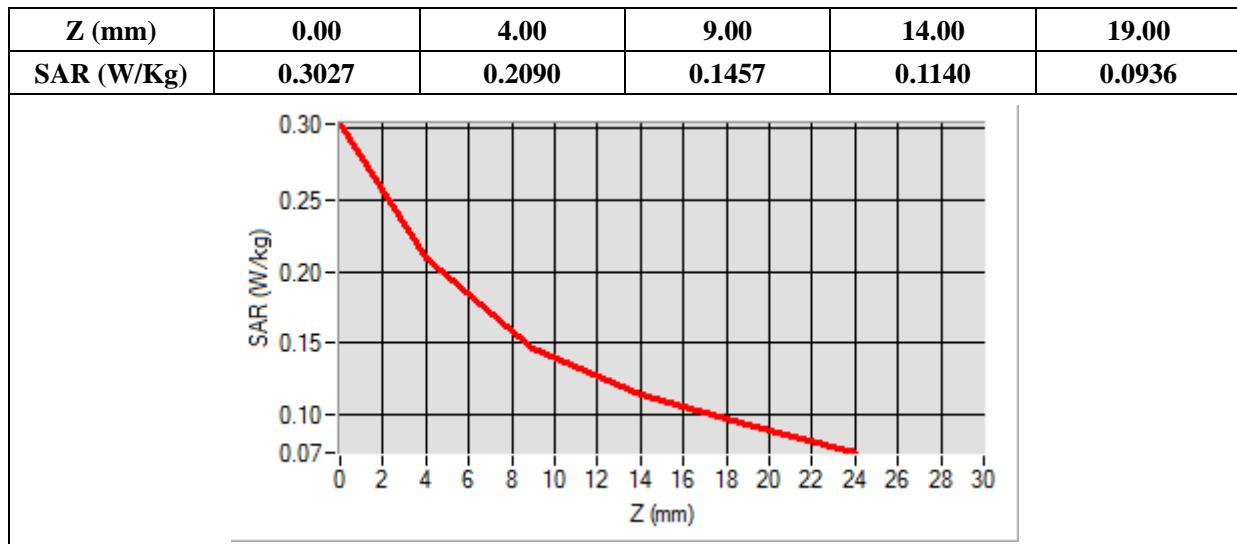
Frequency (MHz)	848.800000
Relative Permittivity (real part)	38.560124
Conductivity (S/m)	1.380369
Power Variation (%)	1.536272
Ambient Temperature	21.1
Liquid Temperature	21.3



Maximum location: X=-50.00, Y=-42.00

SAR Peak: 0.28 W/kg

SAR 10g (W/Kg)	0.146086
SAR 1g (W/Kg)	0.202741



MEASUREMENT 15

Type: Phone measurement (Complete)

Date of measurement: 09/26/2018

Measurement duration: 12 minutes 3 seconds

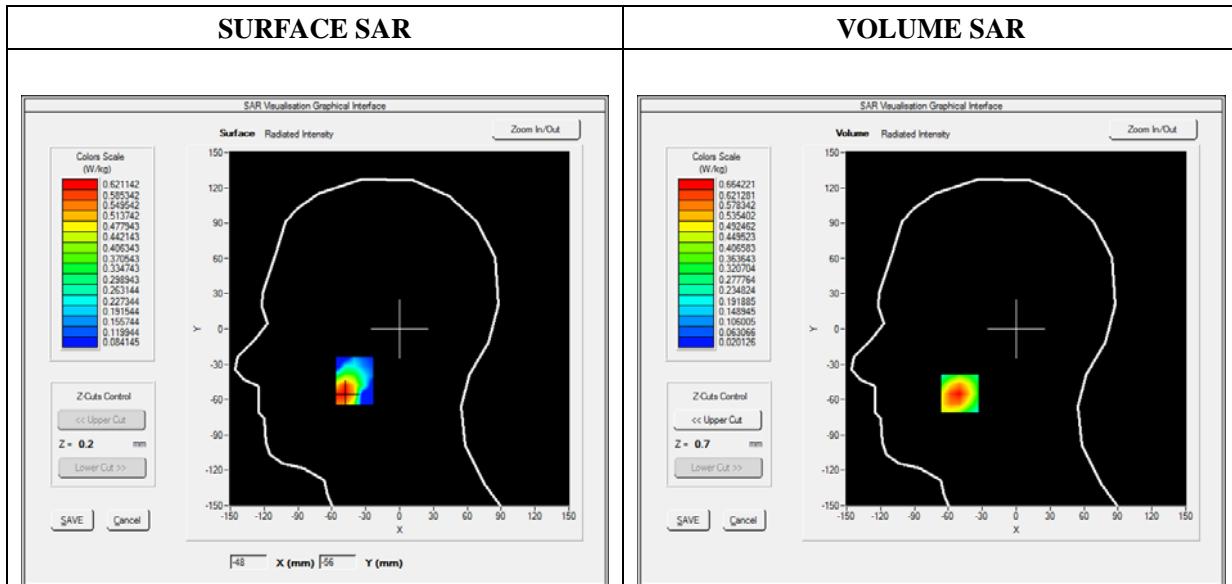
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2018

A. Experimental conditions

Area Scan	sam_direct_droit2_surf8mm.txt
Phantom	Left head
Device Position	Cheek
Band	GPRS1900_4TX
Channels	High
Signal	Duty Cycle: 1:2

B. SAR Measurement Results

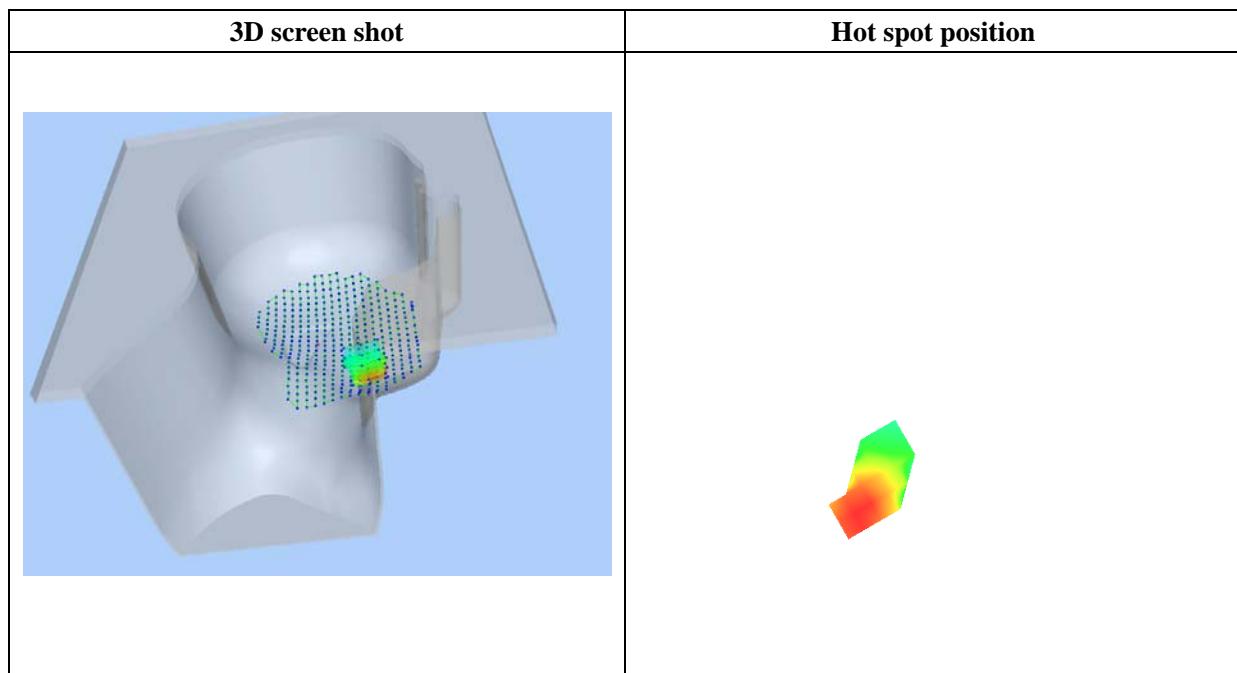
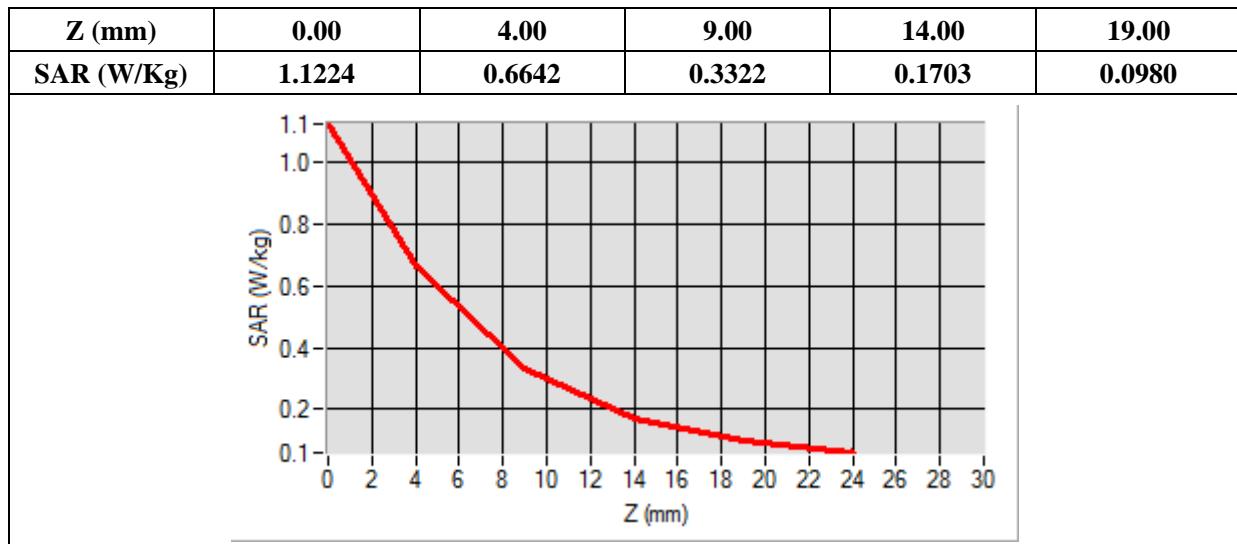
Frequency (MHz)	1909.800000
Relative Permittivity (real part)	38.560124
Conductivity (S/m)	1.380369
Power Variation (%)	1.536272
Ambient Temperature	21.1
Liquid Temperature	21.3



Maximum location: X=-50.00, Y=-55.00

SAR Peak: 1.13 W/kg

SAR 10g (W/Kg)	0.329478
SAR 1g (W/Kg)	0.628948



MEASUREMENT 19

Type: Phone measurement (Complete)

Date of measurement: 09/26/2018

Measurement duration: 12 minutes 3 seconds

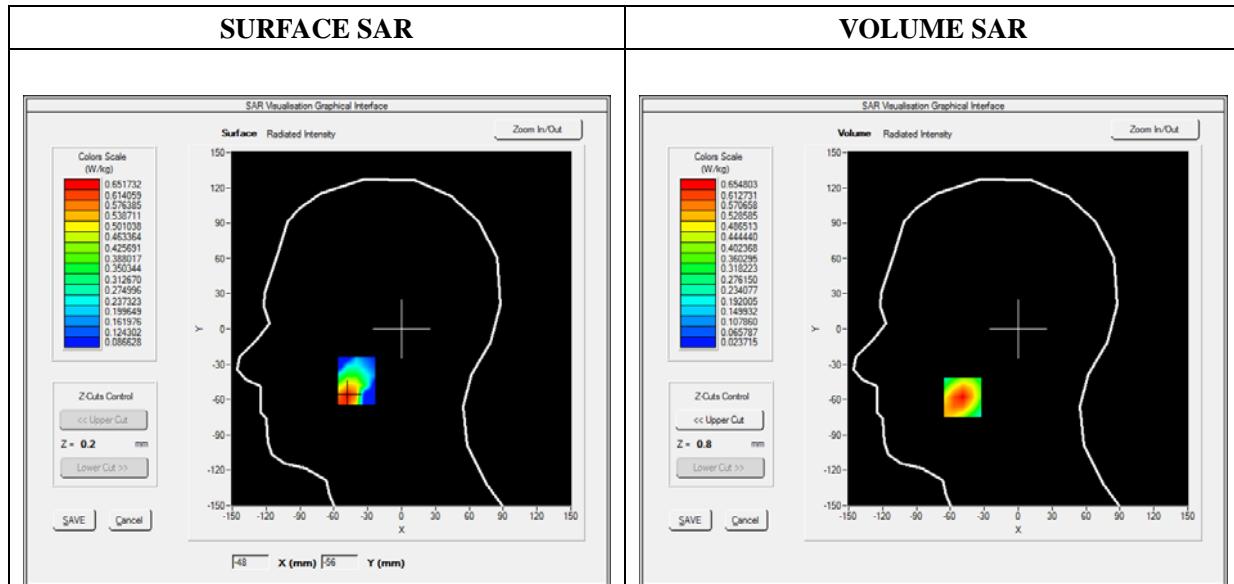
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2018

A. Experimental conditions

Area Scan	sam_direct_droit2_surf8mm.txt
Phantom	Left head
Device Position	Cheek
Band	WCDMA1900_RMC
Channels	High
Signal	Duty Cycle 1:1

B. SAR Measurement Results

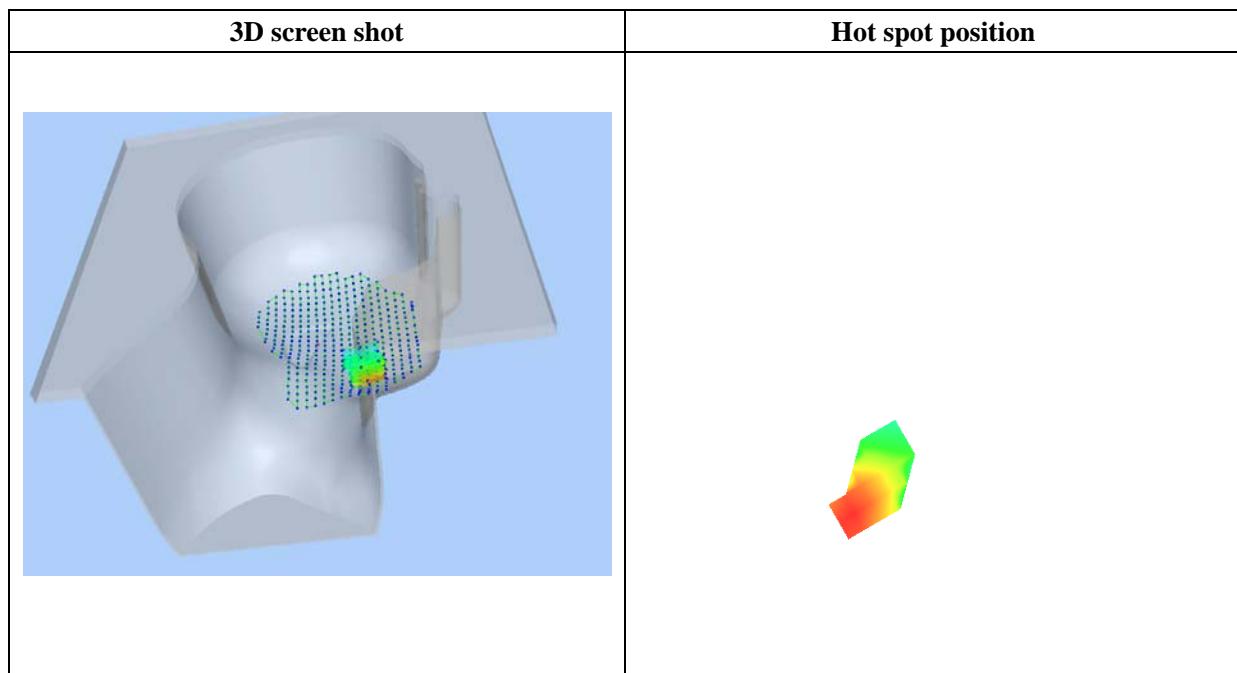
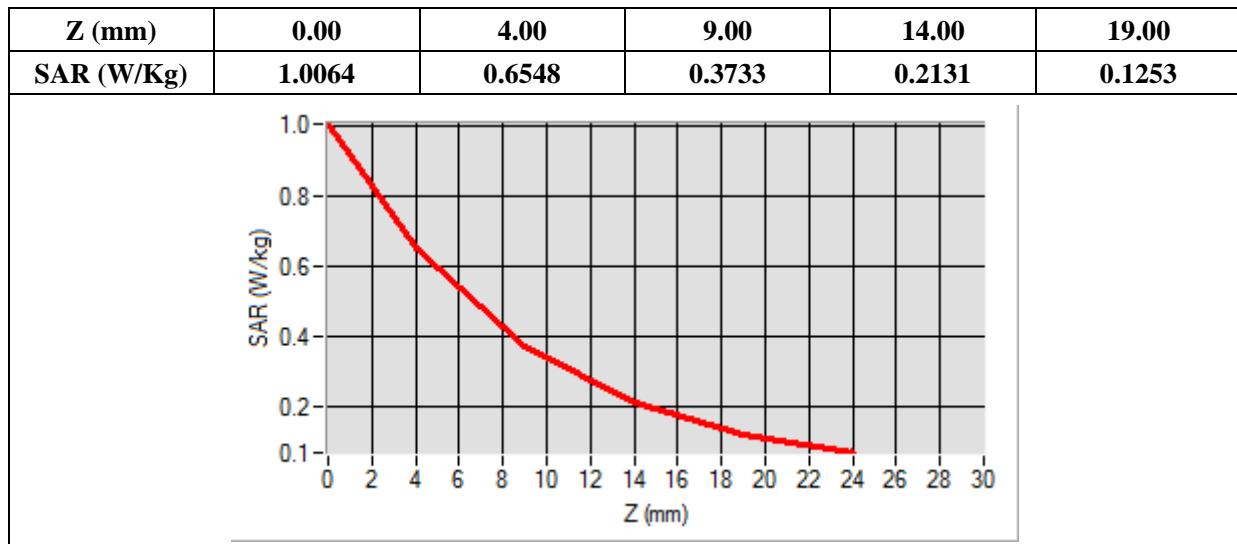
Frequency (MHz)	1907.600000
Relative Permittivity (real part)	38.560124
Conductivity (S/m)	1.380369
Power Variation (%)	1.524540
Ambient Temperature	21.1
Liquid Temperature	21.3



Maximum location: X=-49.00, Y=-58.00

SAR Peak: 1.01 W/kg

SAR 10g (W/Kg)	0.343722
SAR 1g (W/Kg)	0.617416



MEASUREMENT 21

Type: Phone measurement (Complete)

Date of measurement: 09/25/2018

Measurement duration: 12 minutes 3 seconds

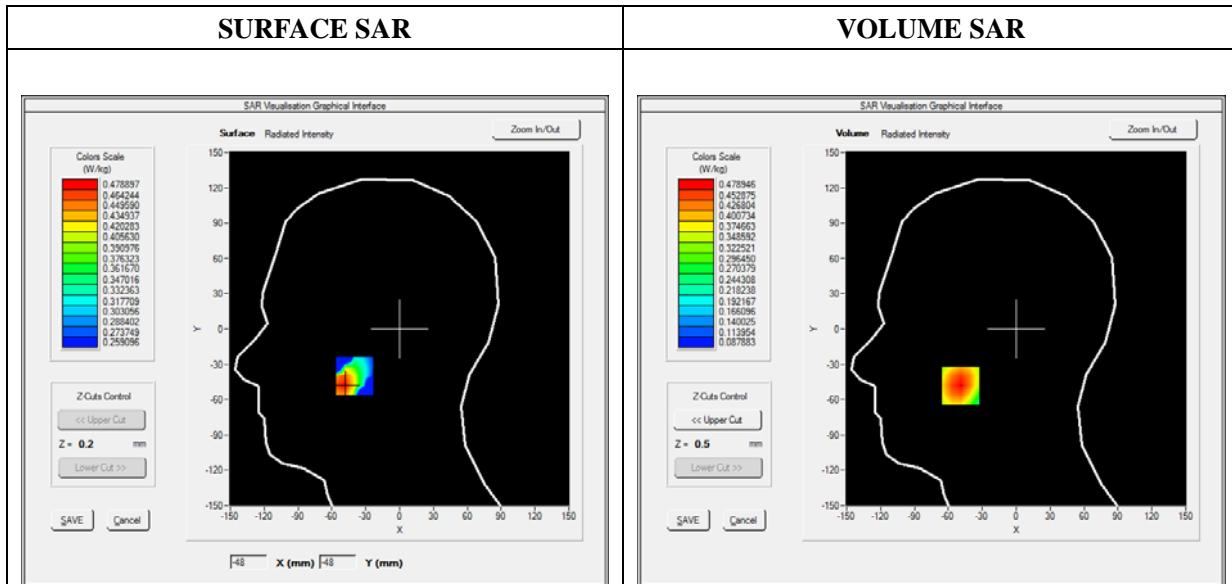
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.93; Calibrated: 06/01/2018

A. Experimental conditions

Area Scan	sam_direct_droit2_surf8mm.txt
Phantom	Right head
Device Position	Cheek
Band	WCDMA850_RMC
Channels	High
Signal	Duty Cycle 1:1

B. SAR Measurement Results

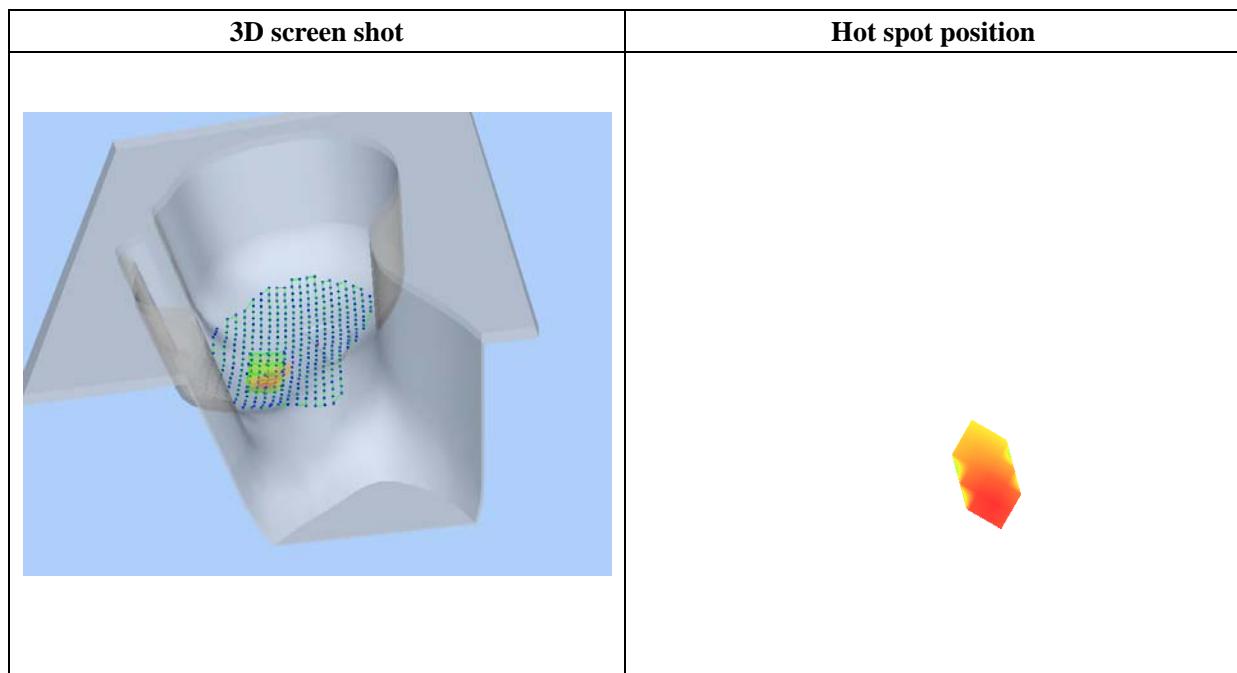
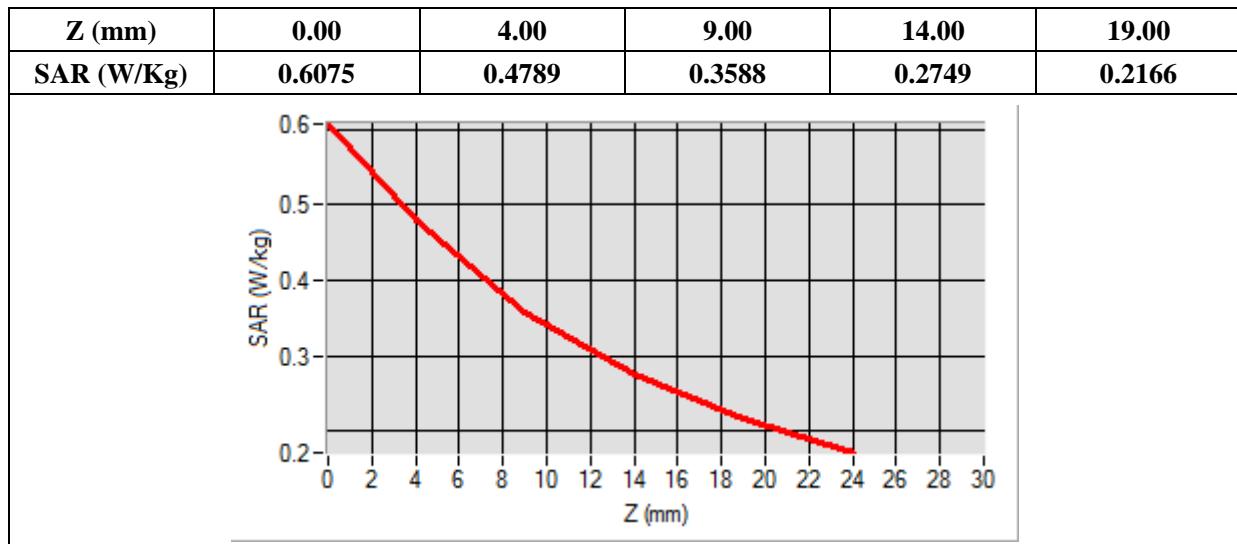
Frequency (MHz)	846.600000
Relative Permittivity (real part)	41.110245
Conductivity (S/m)	0.871245
Power Variation (%)	1.342427
Ambient Temperature	21.1
Liquid Temperature	21.3



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

SAR Peak: 0.61 W/kg

SAR 10g (W/Kg)	0.329908
SAR 1g (W/Kg)	0.459968



MEASUREMENT 27

Type: Phone measurement (Complete)

Date of measurement: 09/26/2018

Measurement duration: 12 minutes 3 seconds

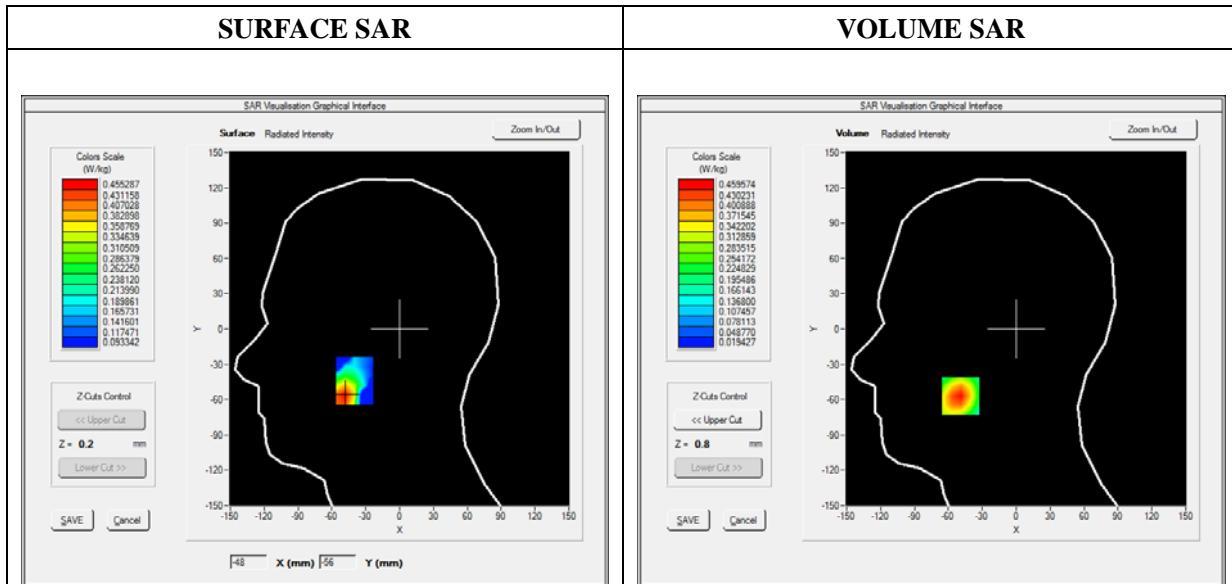
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.84; Calibrated: 06/01/2018

A. Experimental conditions

Area Scan	sam_direct_droit2_surf8mm.txt
Phantom	Left head
Device Position	Cheek
Band	WCDMA1700_RMC
Channels	Low
Signal	Duty Cycle 1:1

B. SAR Measurement Results

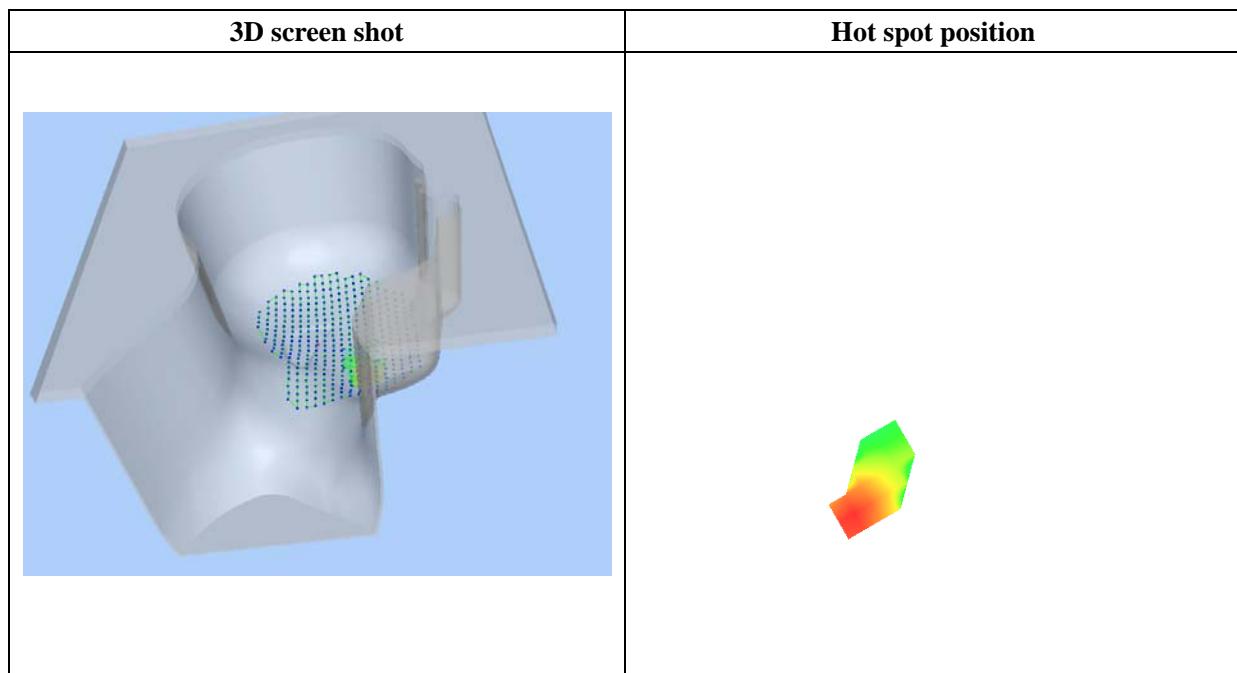
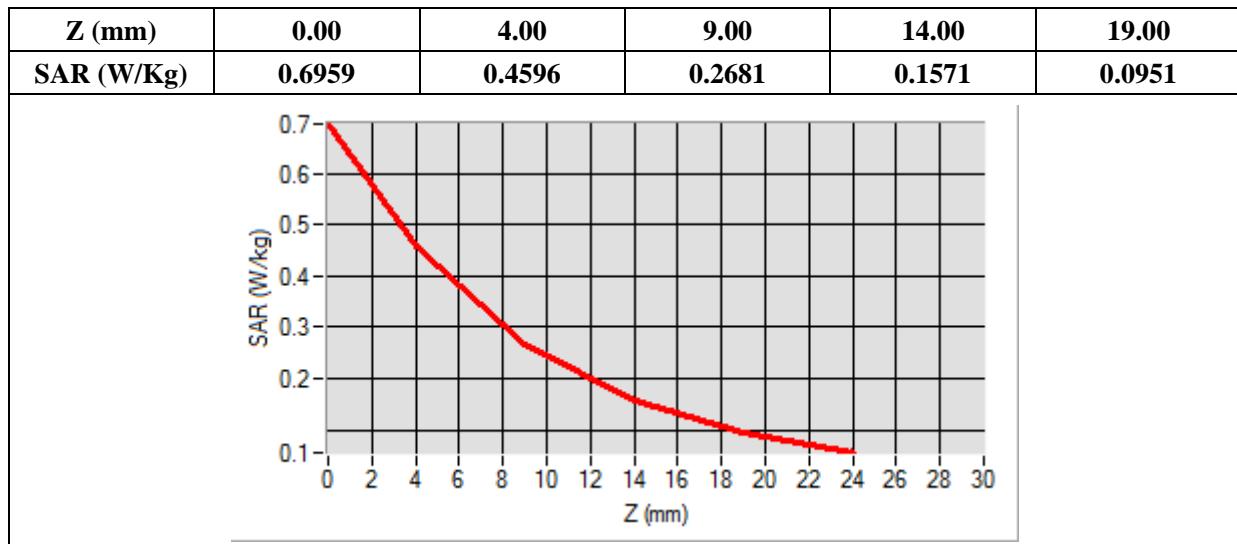
Frequency (MHz)	1712.400000
Relative Permittivity (real part)	39.025421
Conductivity (S/m)	1.370123
Power Variation (%)	1.342427
Ambient Temperature	21.1
Liquid Temperature	21.3



Maximum location: X=-49.00, Y=-57.00

SAR Peak: 0.70 W/kg

SAR 10g (W/Kg)	0.243869
SAR 1g (W/Kg)	0.433778



MEASUREMENT 31

Type: Phone measurement (Complete)

Date of measurement: 09/26/2018

Measurement duration: 12 minutes 3 seconds

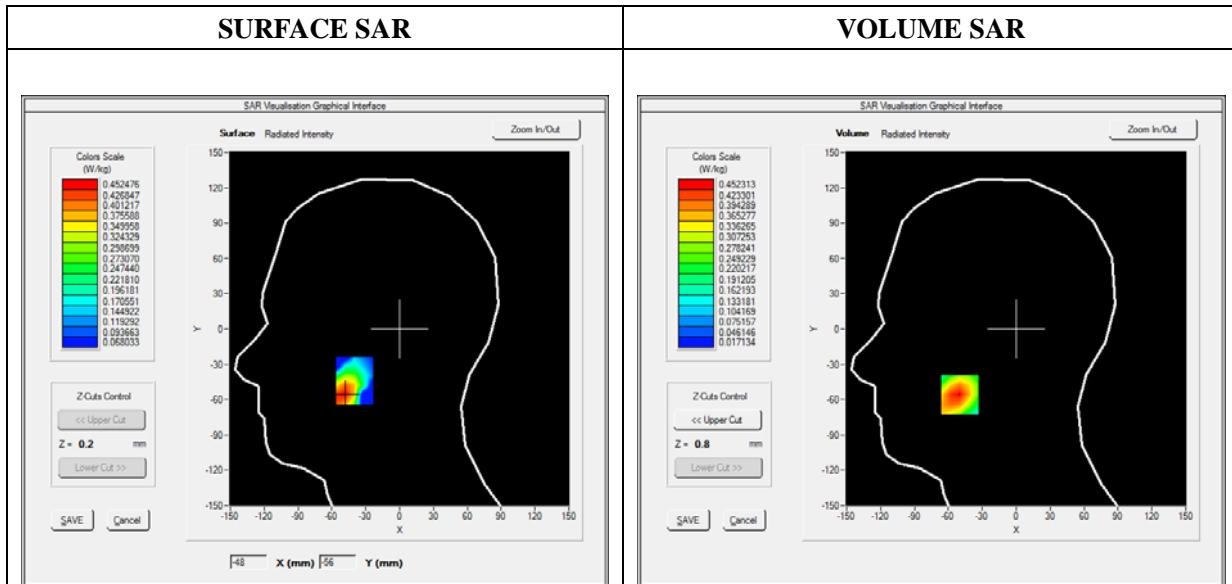
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

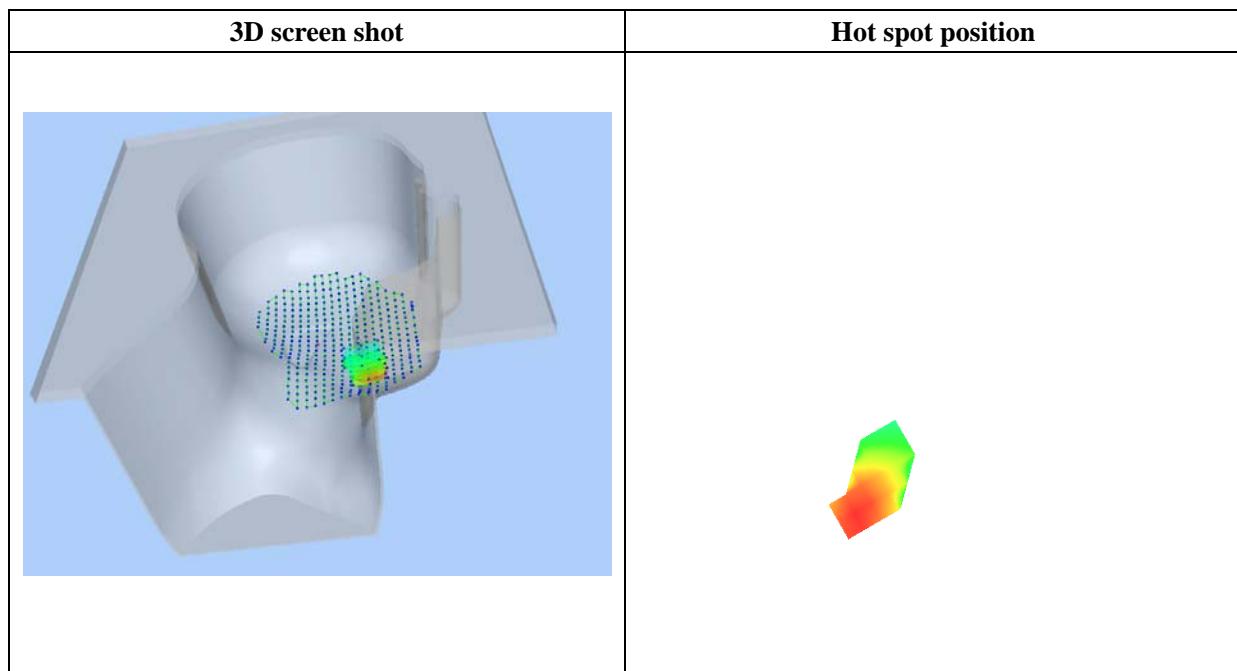
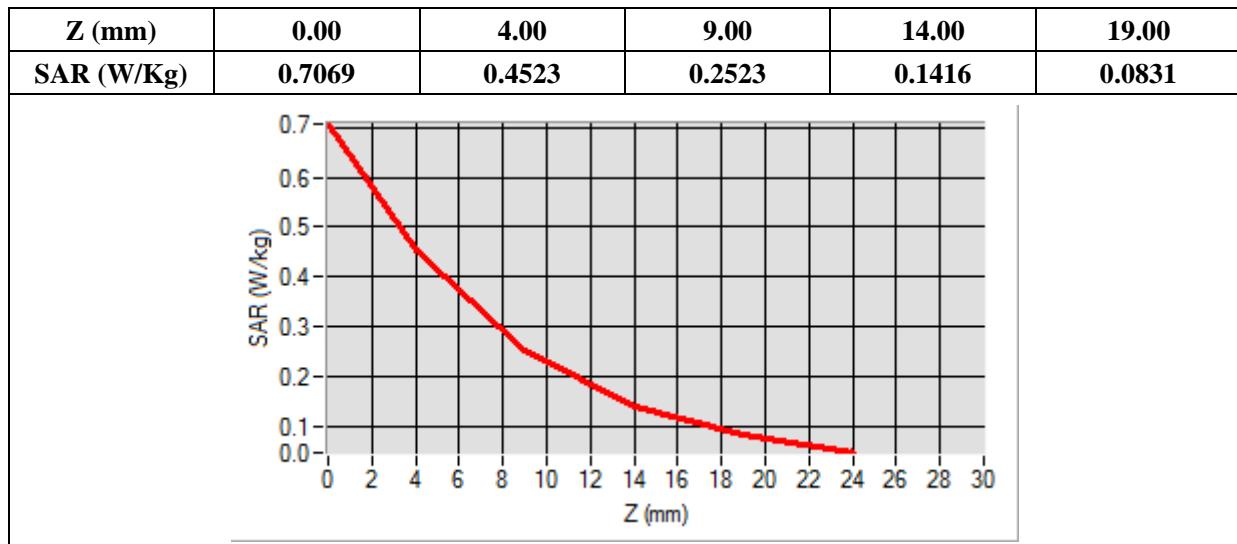
Frequency (MHz)	1880.000000
Relative Permittivity (real part)	38.560124
Conductivity (S/m)	1.380369
Power Variation (%)	1.743564
Ambient Temperature	21.1
Liquid Temperature	21.3



Maximum location: X=-50.00, Y=-56.00

SAR Peak: 0.71 W/kg

SAR 10g (W/Kg)	0.237575
SAR 1g (W/Kg)	0.428330



MEASUREMENT 39

Type: Phone measurement (Complete)

Date of measurement: 09/26/2018

Measurement duration: 12 minutes 3 seconds

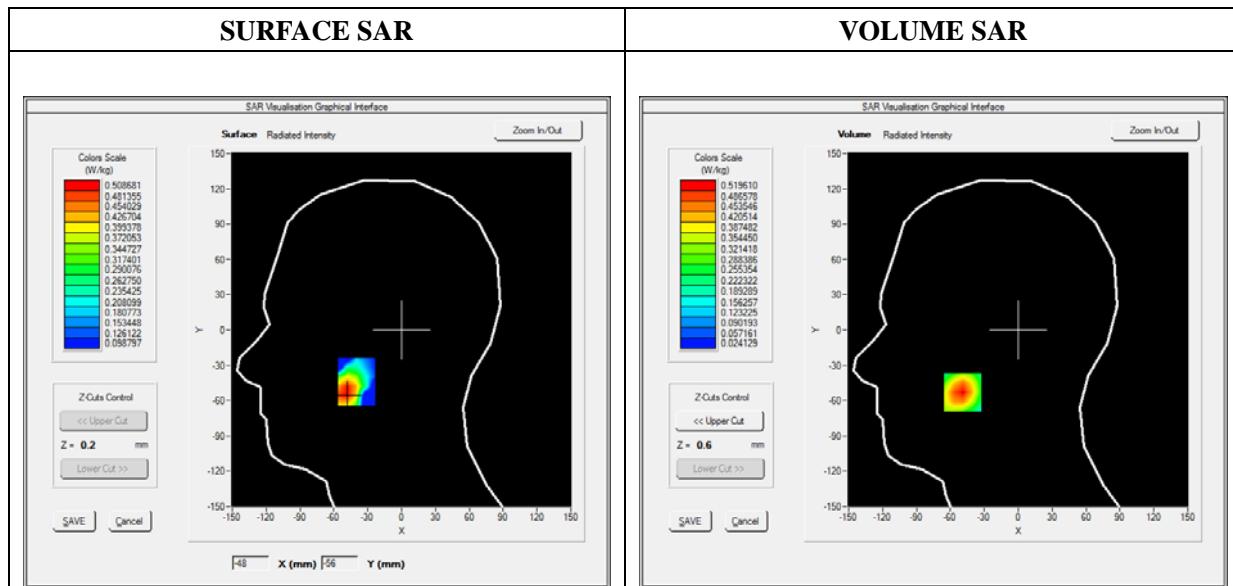
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.84; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

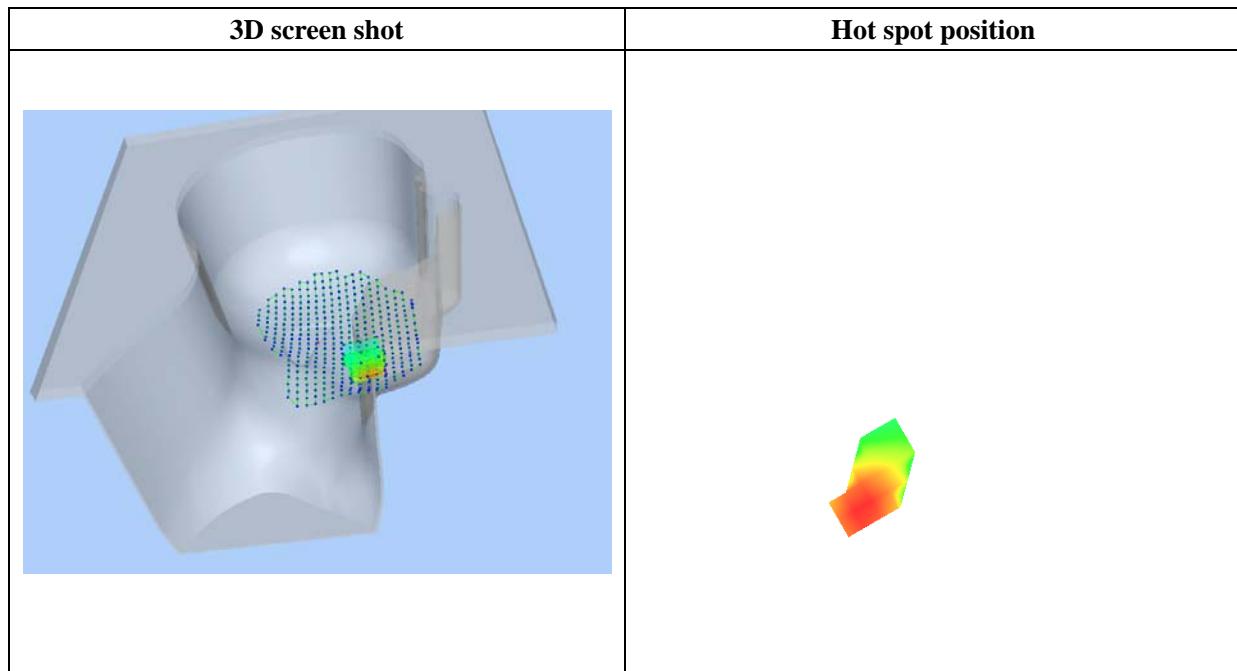
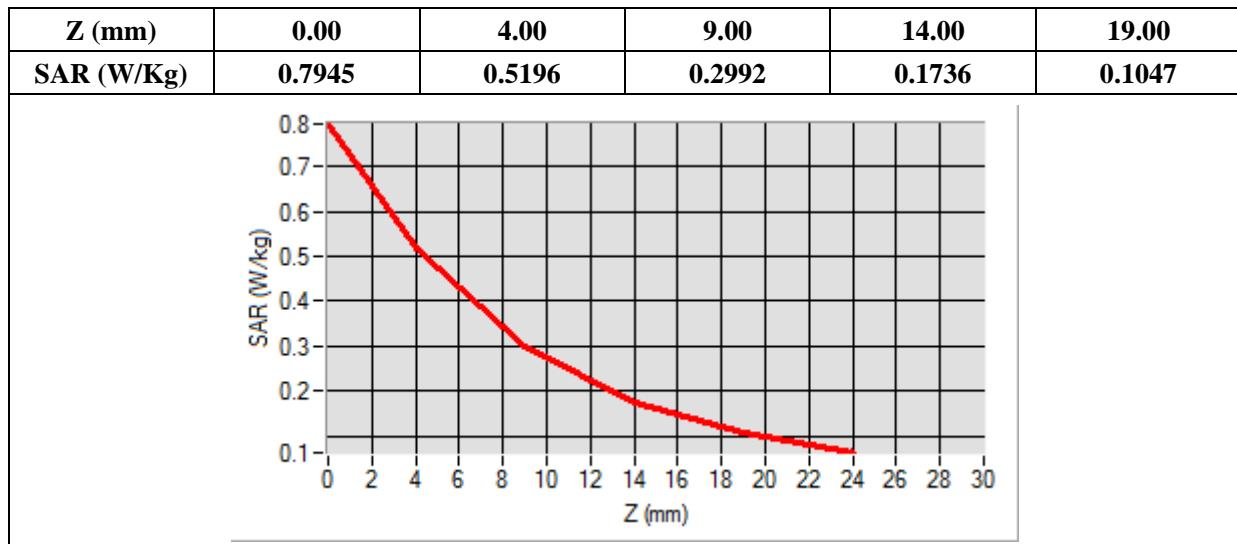
Frequency (MHz)	1732.500000
Relative Permittivity (real part)	39.025421
Conductivity (S/m)	1.370123
Power Variation (%)	1.374628
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=-49.00, Y=-53.00

SAR Peak: 0.80 W/kg

SAR 10g (W/Kg)	0.272986
SAR 1g (W/Kg)	0.489146



MEASUREMENT 45

Type: Phone measurement (Complete)

Date of measurement: 09/25/2018

Measurement duration: 12 minutes 3 seconds

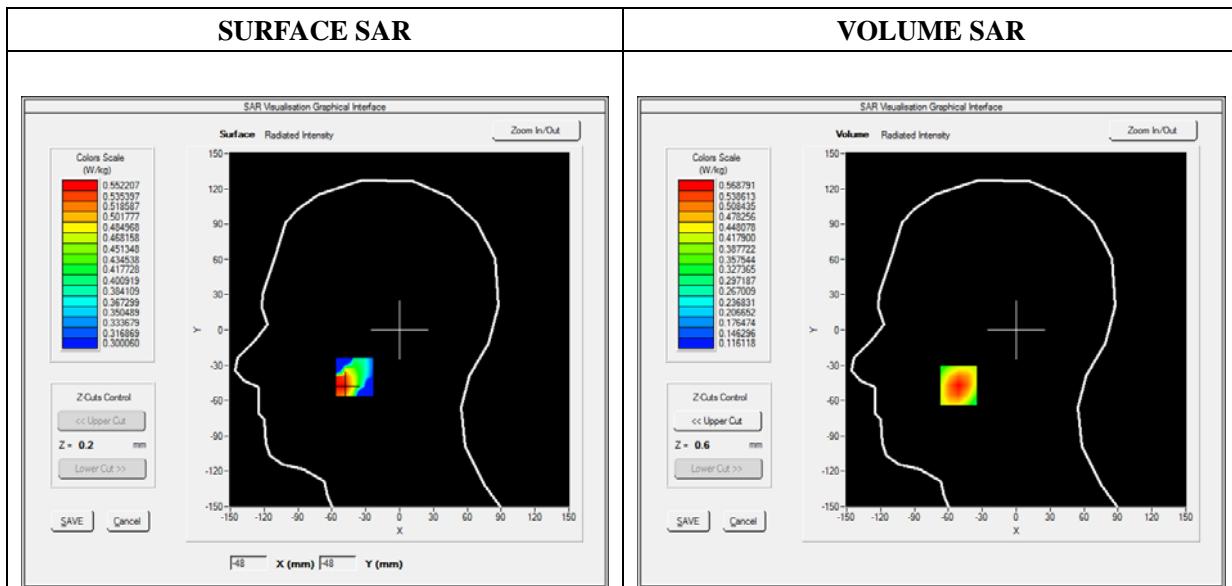
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.93; Calibrated: 06/01/2018

A. Experimental conditions

Area Scan	sam_direct_droit2_surf8mm.txt
Phantom	Right head
Device Position	Cheek
Band	LTE Band 5_RMC
Channels	QPSK, 10MHz, 1RB, High
Signal	Duty Cycle 1:1

B. SAR Measurement Results

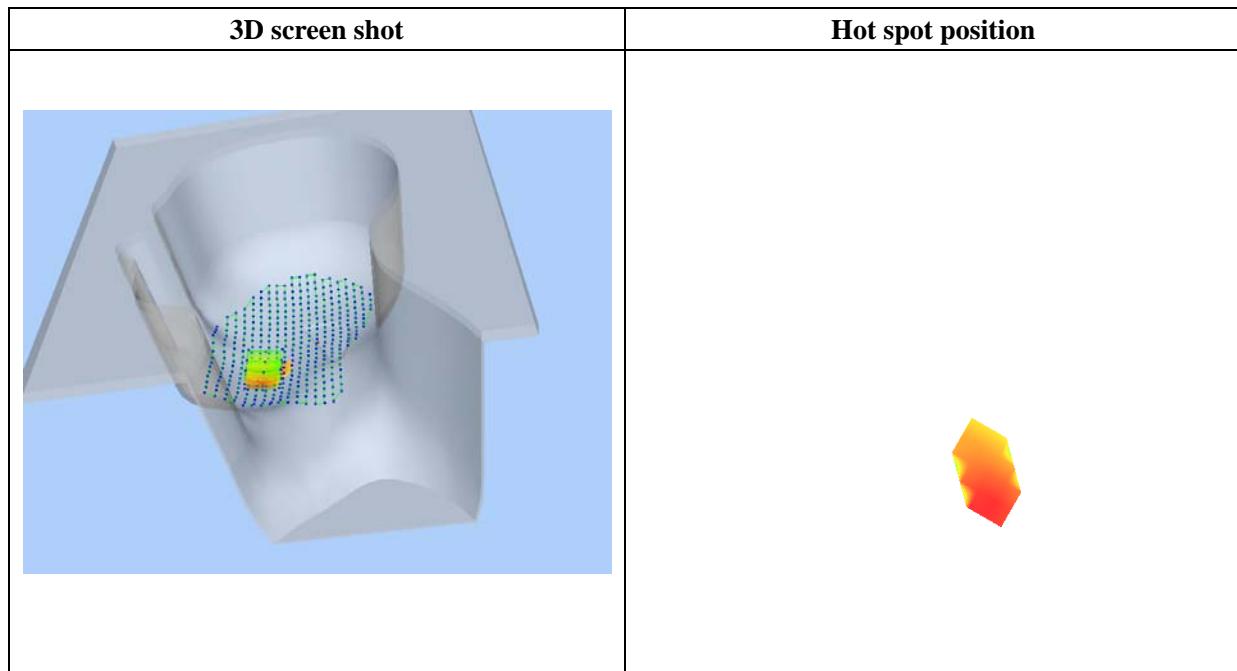
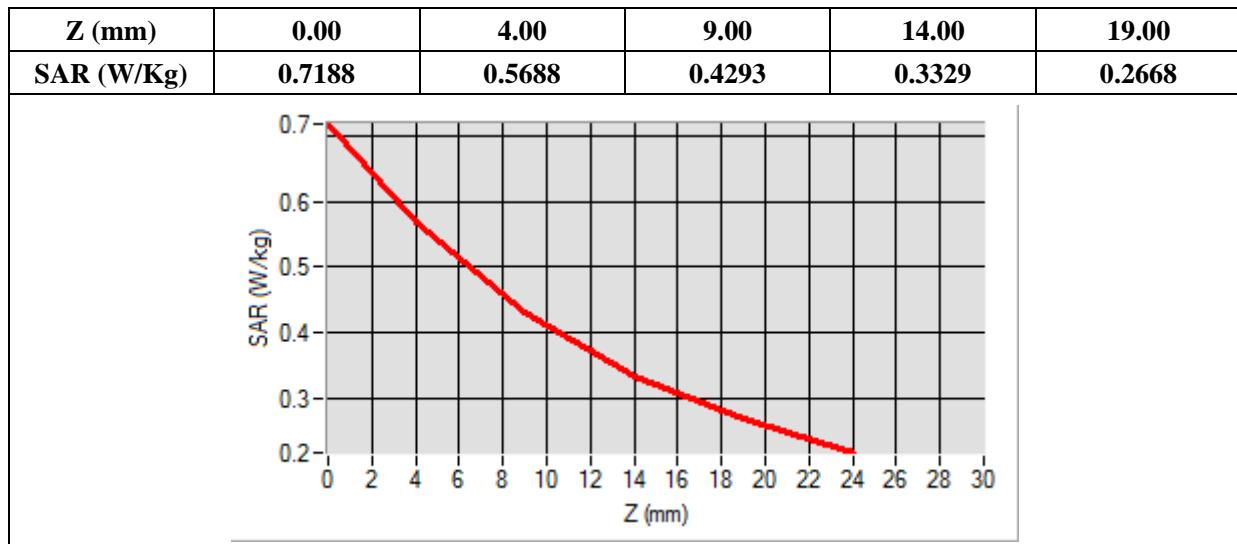
Frequency (MHz)	844.000000
Relative Permittivity (real part)	41.110245
Conductivity (S/m)	0.871245
Power Variation (%)	0.924535
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=-51.00, Y=-47.00

SAR Peak: 0.73 W/kg

SAR 10g (W/Kg)	0.394923
SAR 1g (W/Kg)	0.545012



MEASUREMENT 55

Type: Phone measurement (Complete)

Date of measurement: 09/27/2018

Measurement duration: 12 minutes 3 seconds

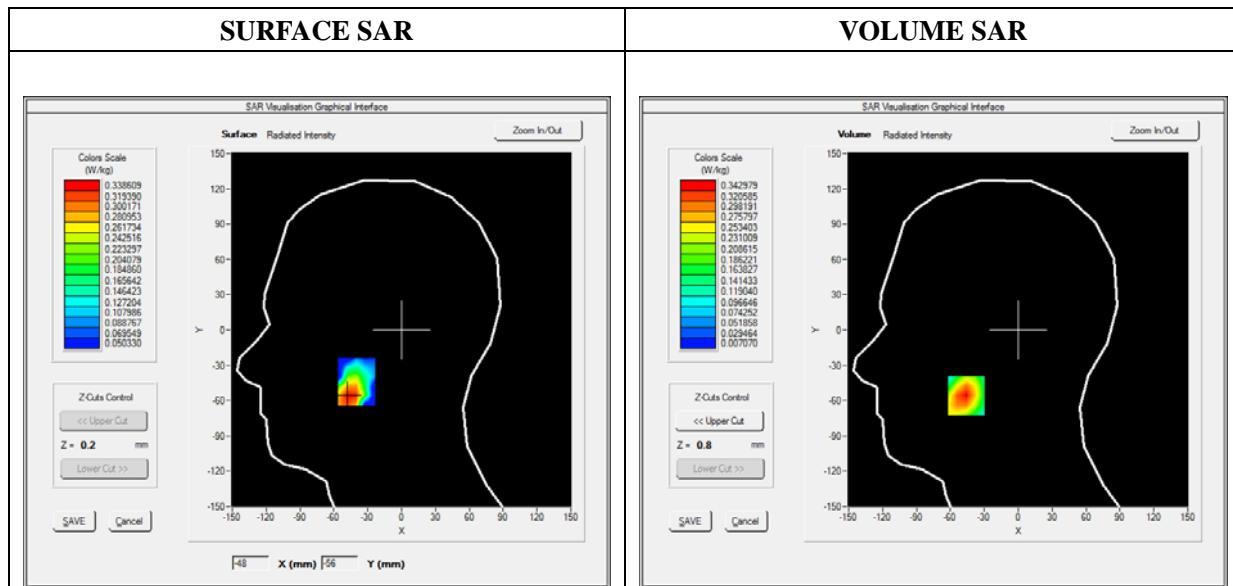
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.37; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

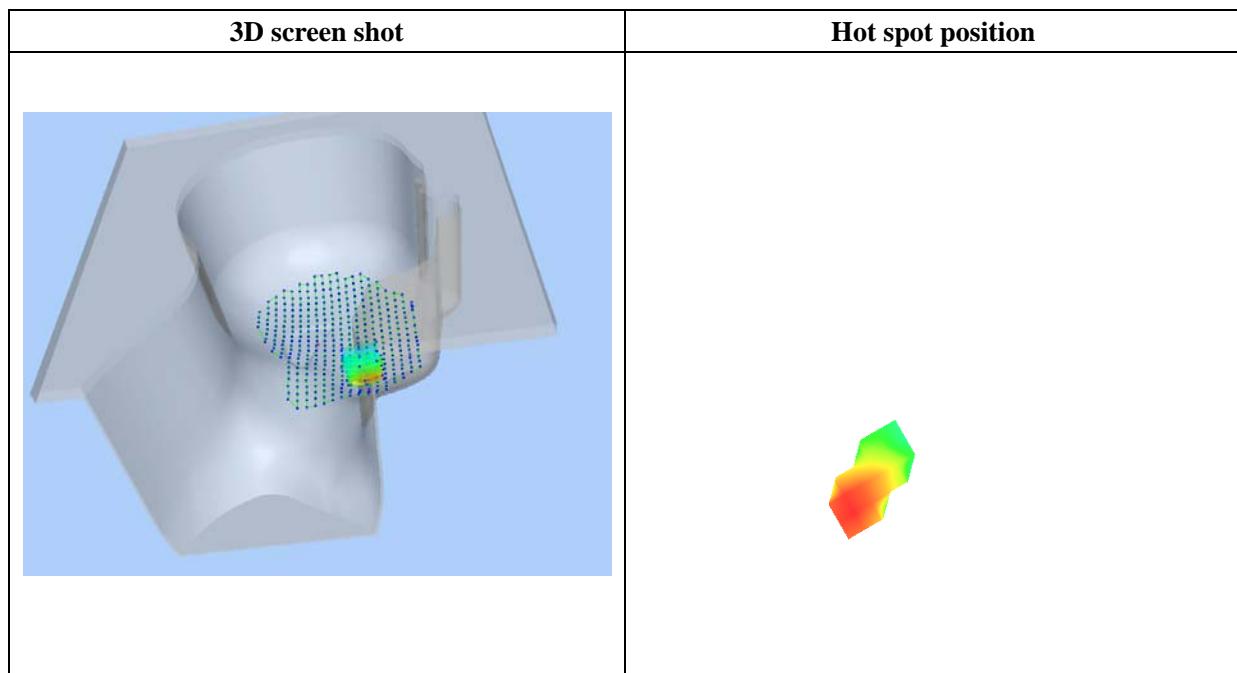
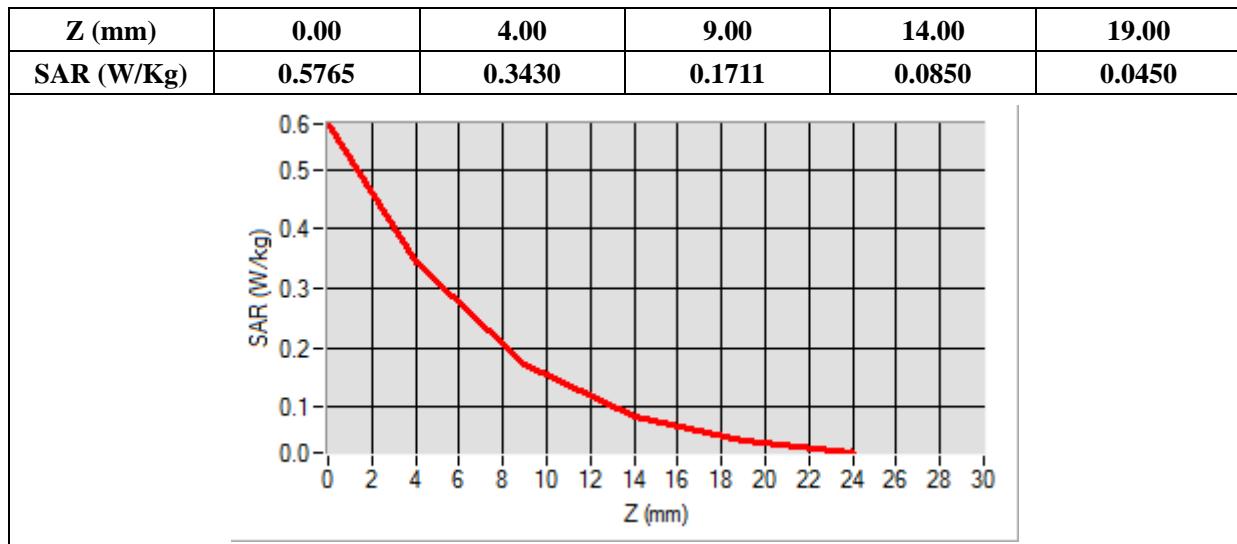
Frequency (MHz)	2560.000000
Relative Permittivity (real part)	38.631092
Conductivity (S/m)	1.930182
Power Variation (%)	0.924535
Ambient Temperature	21.1
Liquid Temperature	21.2



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

SAR Peak: 0.58 W/kg

SAR 10g (W/Kg)	0.165785
SAR 1g (W/Kg)	0.323692



MEASUREMENT 63

Type: Phone measurement (Complete)

Date of measurement: 09/27/2018

Measurement duration: 12 minutes 3 seconds

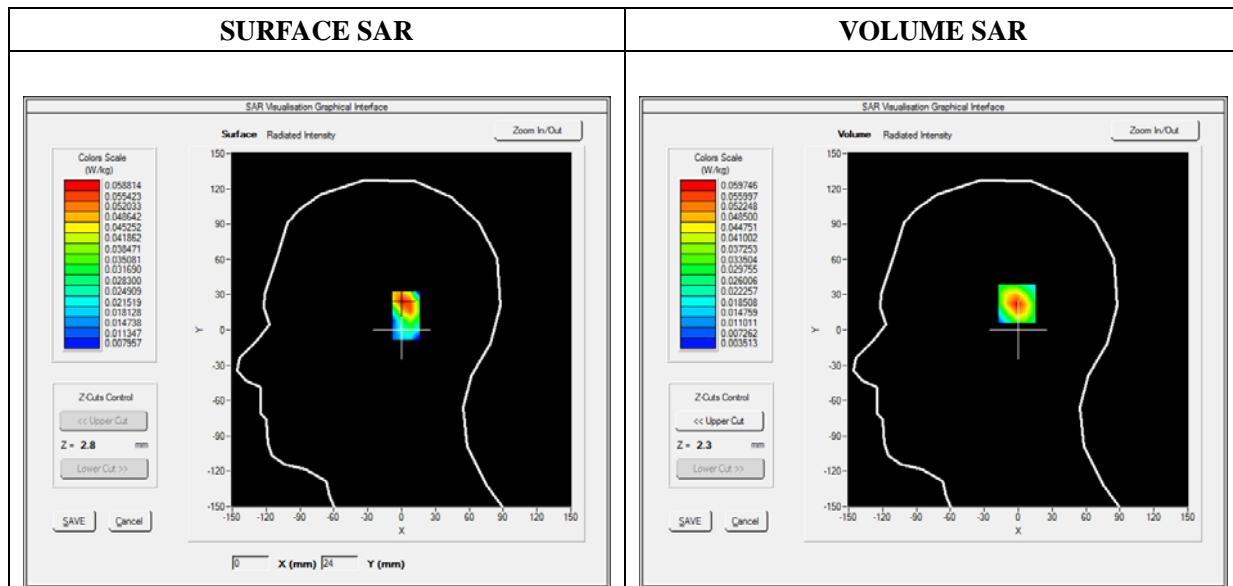
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.64; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

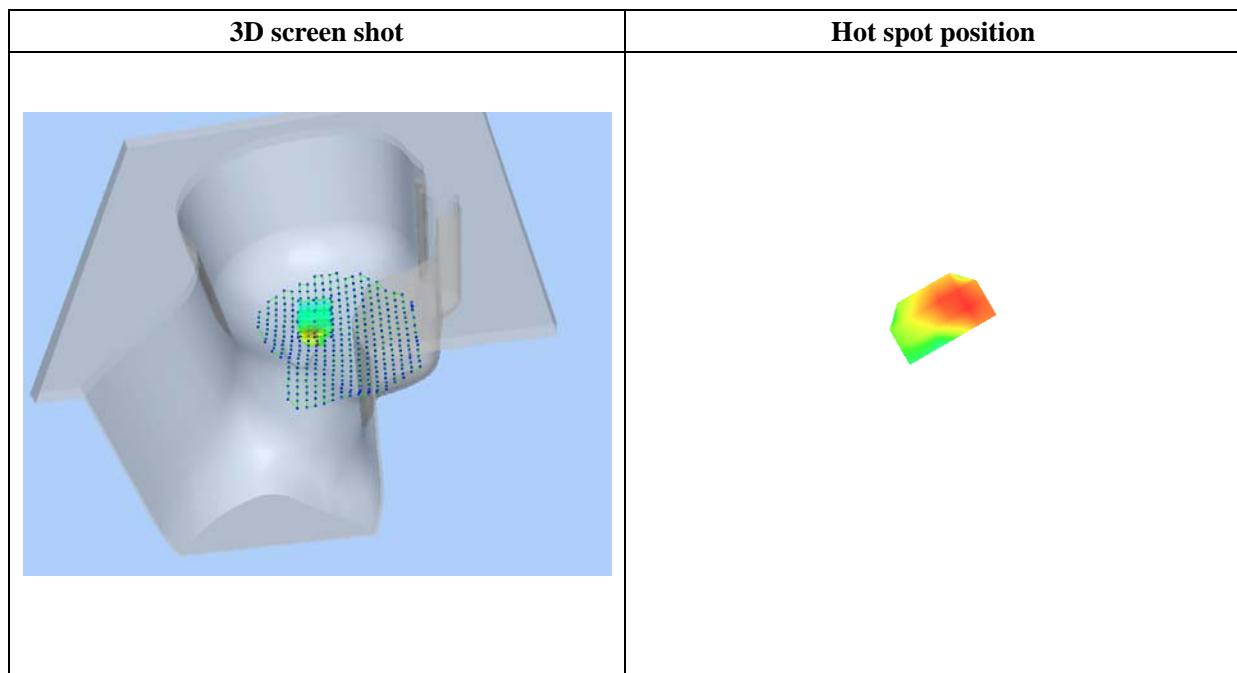
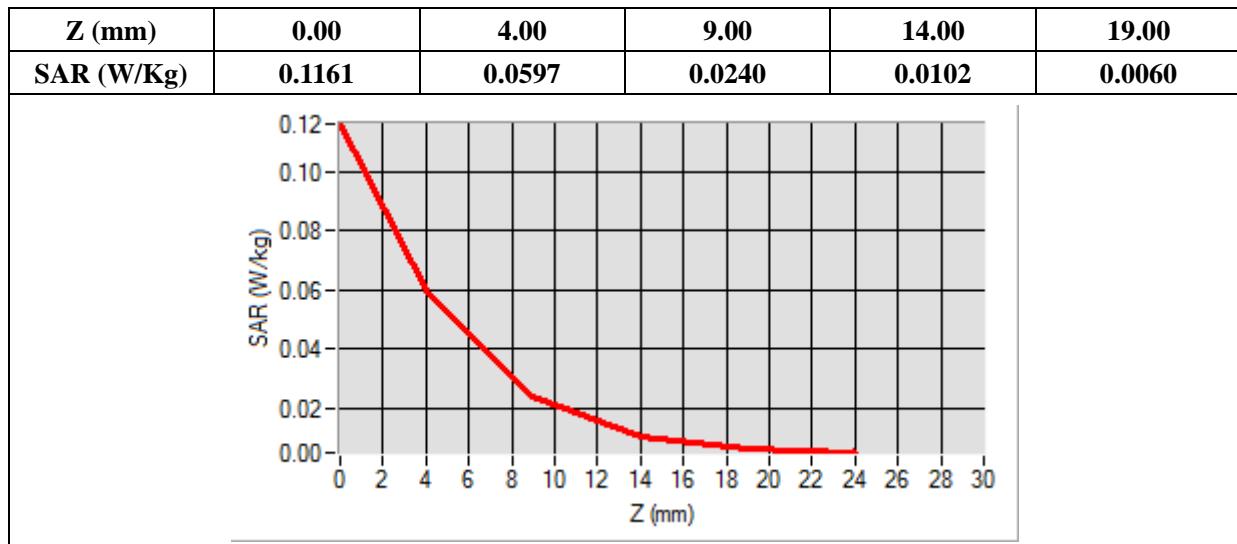
Frequency (MHz)	2412.000000
Relative Permittivity (real part)	38.153660
Conductivity (S/m)	1.740236
Power Variation (%)	3.234772
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=2.00, Y=23.00

SAR Peak: 0.12 W/kg

SAR 10g (W/Kg)	0.027086
SAR 1g (W/Kg)	0.056599



MEASUREMENT 65

Type: Phone measurement (Complete)

Date of measurement: 09/25/2018

Measurement duration: 12 minutes 3 seconds

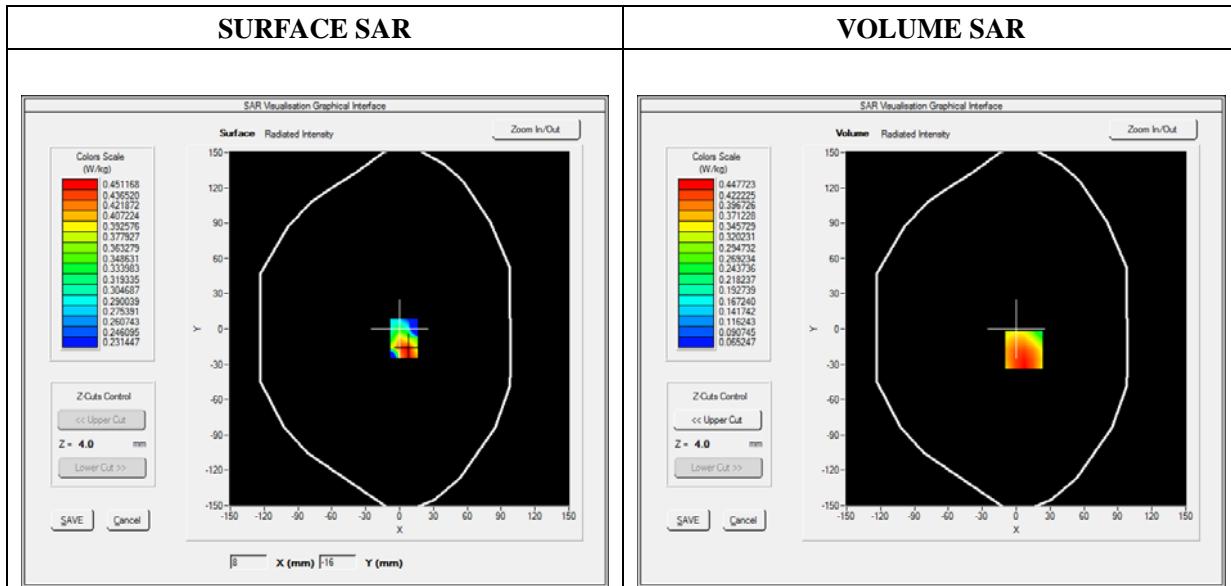
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

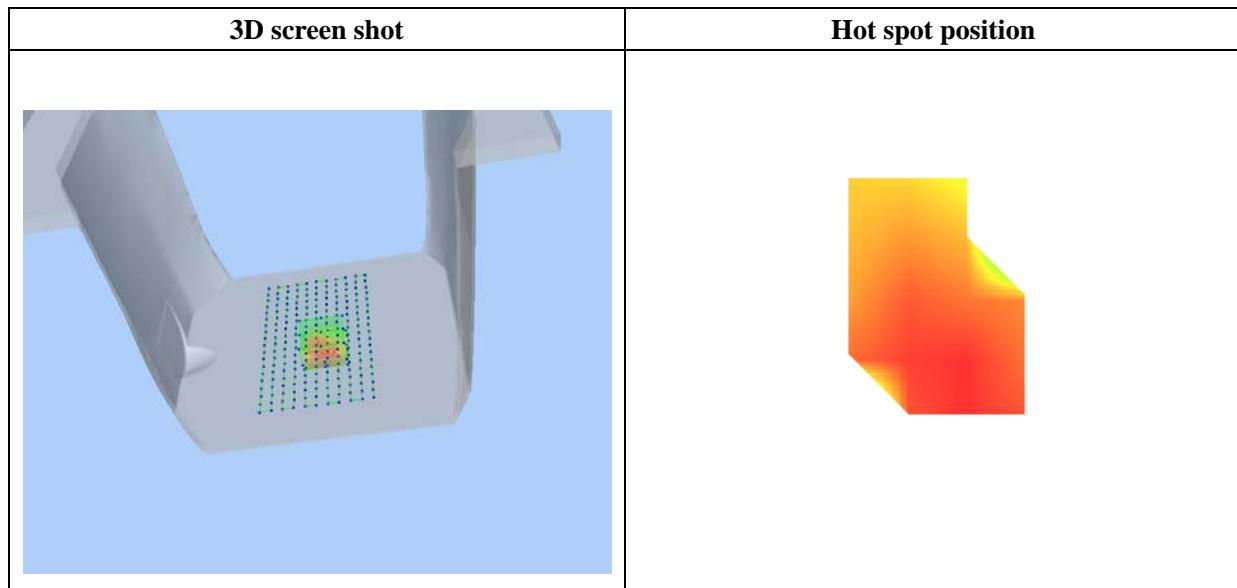
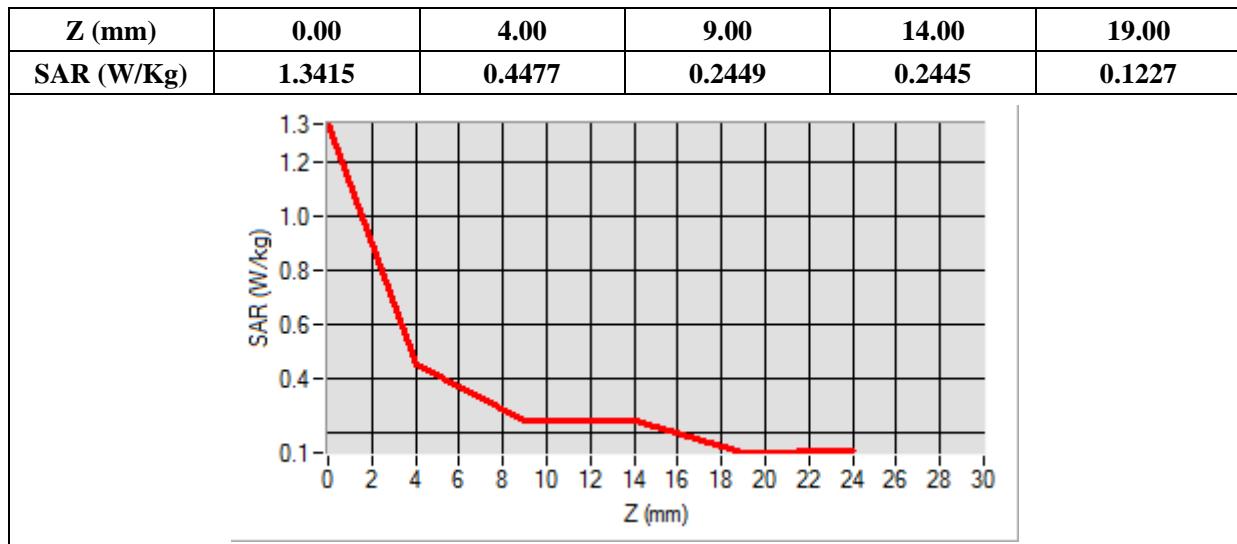
Frequency (MHz)	848.800000
Relative Permittivity (real part)	54.851214
Conductivity (S/m)	0.951454
Power Variation (%)	0.901472
Ambient Temperature	21.1
Liquid Temperature	21.3



Maximum location: X=7.00, Y=-18.00

SAR Peak: 0.57 W/kg

SAR 10g (W/Kg)	0.295764
SAR 1g (W/Kg)	0.426977



MEASUREMENT 67

Type: Phone measurement (Complete)

Date of measurement: 09/26/2018

Measurement duration: 12 minutes 3 seconds

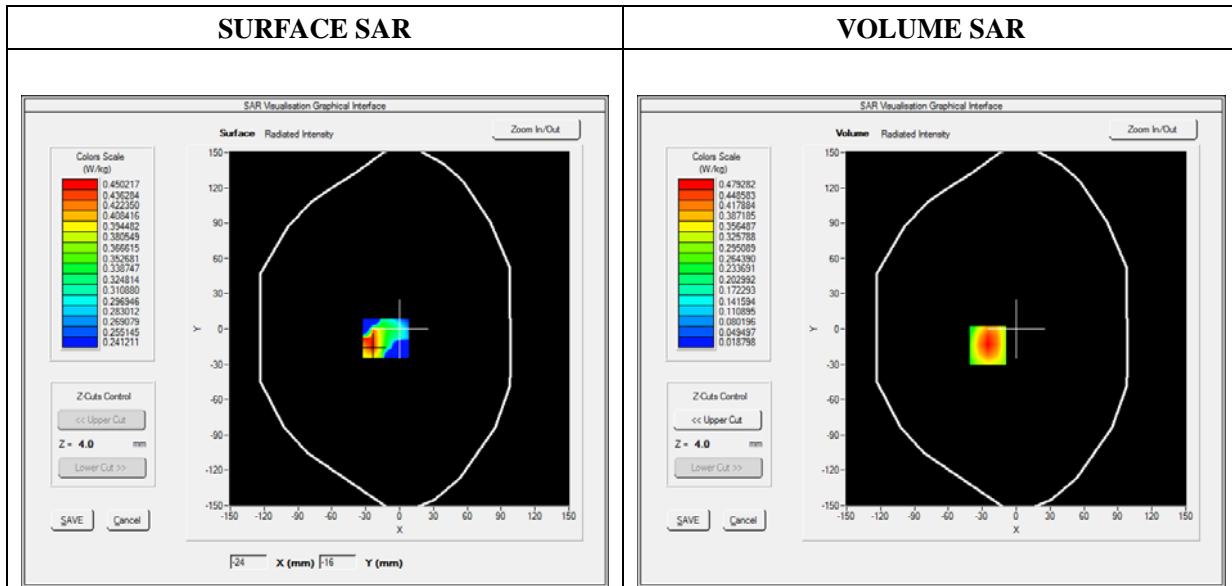
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

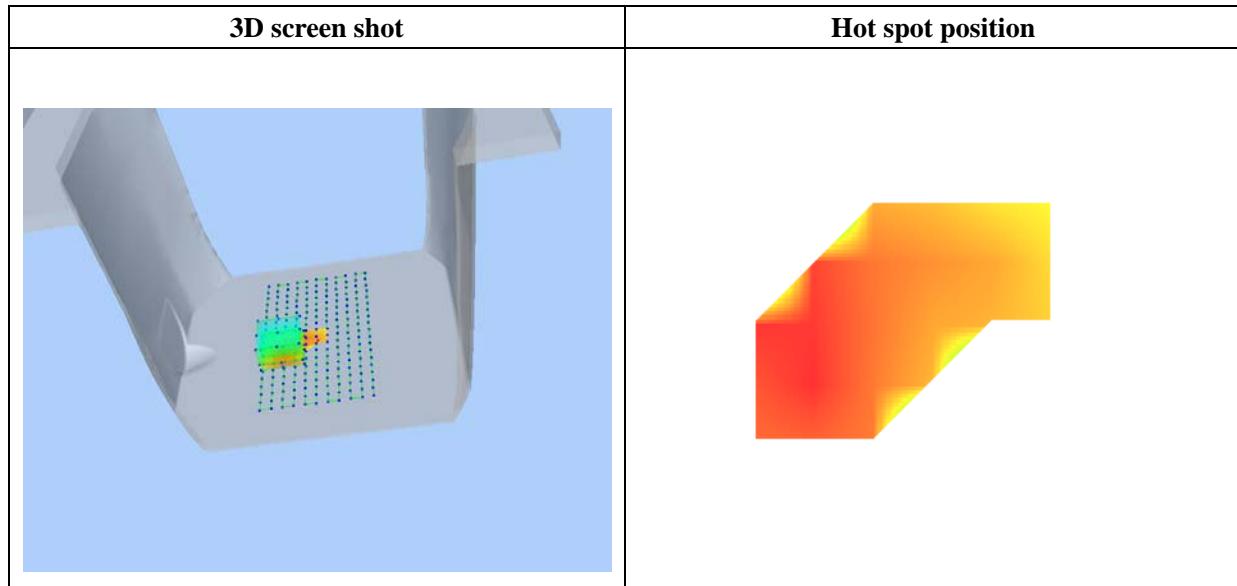
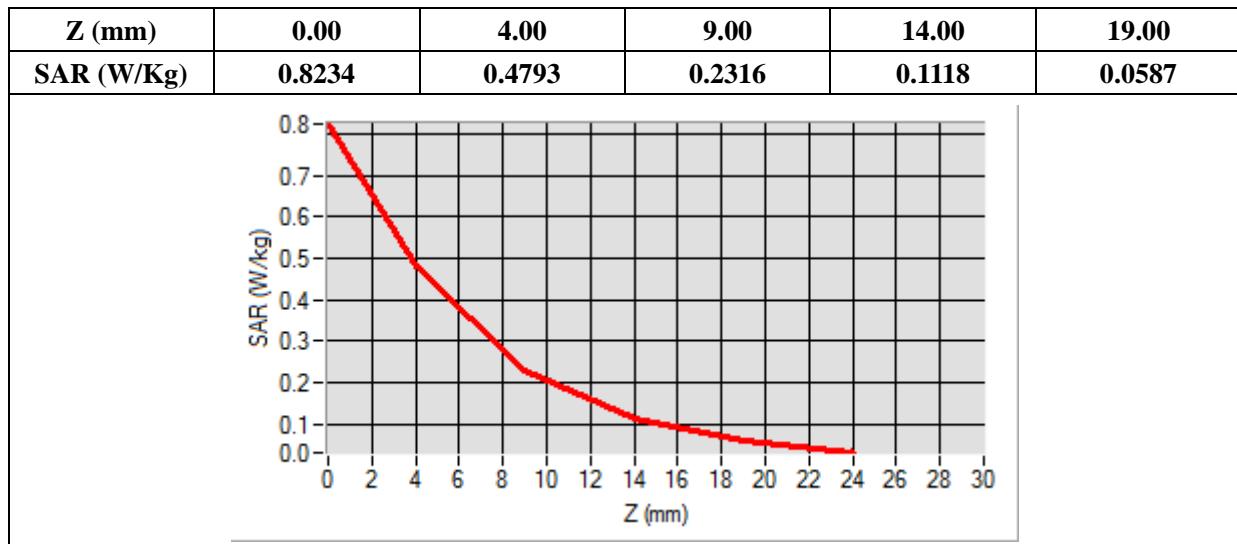
Frequency (MHz)	1909.800000
Relative Permittivity (real part)	52.420415
Conductivity (S/m)	1.501966
Power Variation (%)	1.474622
Ambient Temperature	21.1
Liquid Temperature	21.3



Maximum location: X=-25.00, Y=-14.00

SAR Peak: 0.83 W/kg

SAR 10g (W/Kg)	0.239425
SAR 1g (W/Kg)	0.454989



MEASUREMENT 69

Type: Phone measurement (Complete)

Date of measurement: 09/25/2018

Measurement duration: 12 minutes 3 seconds

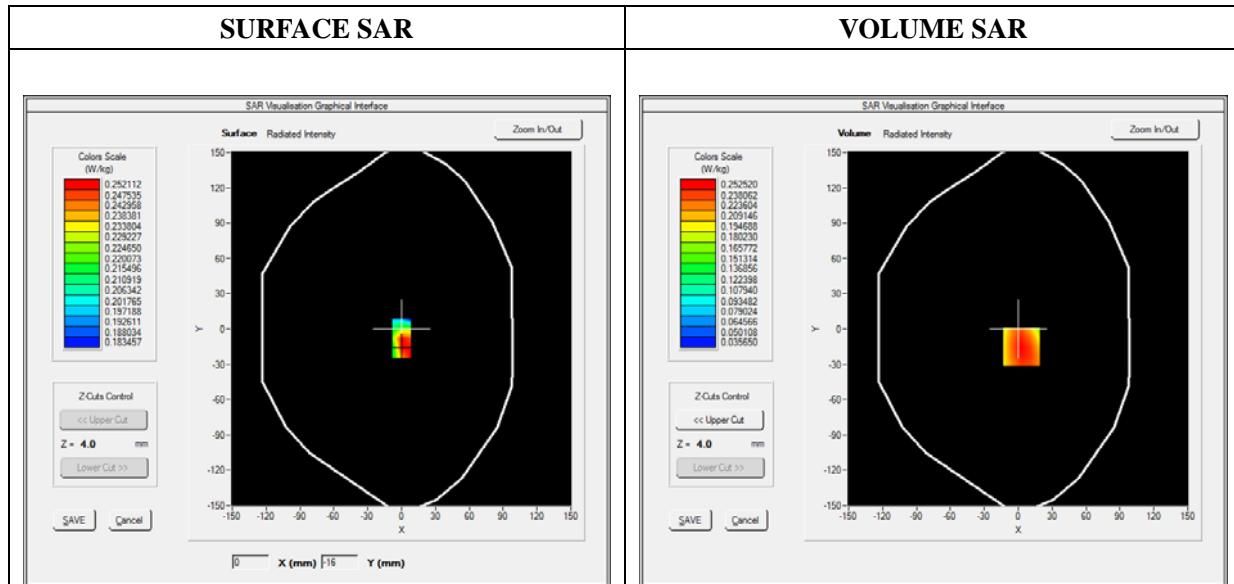
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 06/01/2018

A. Experimental conditions

Area Scan	sam_direct_droit2_surf8mm.txt
Phantom	Flat plane
Device Position	Back
Band	GPRS850_4TX
Channels	High
Signal	Duty Cycle: 1:2

B. SAR Measurement Results

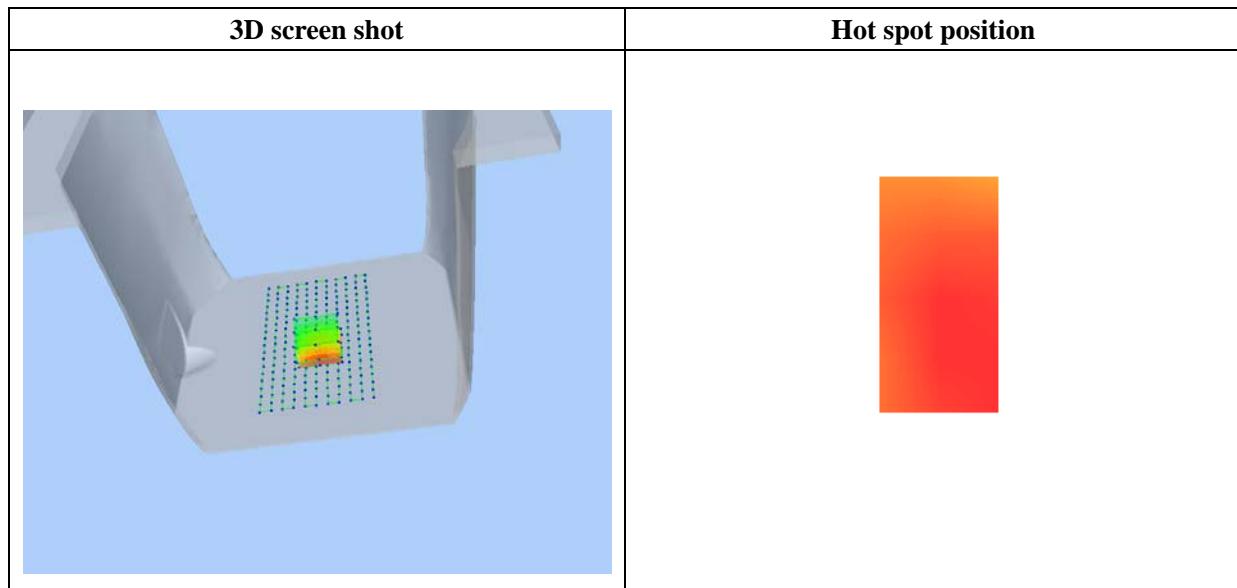
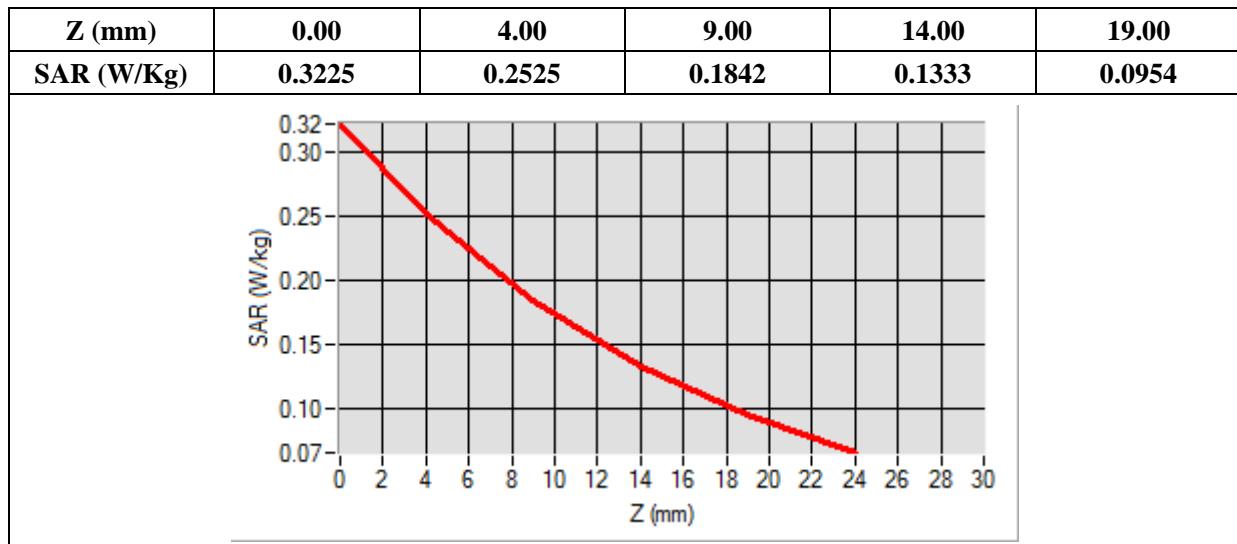
Frequency (MHz)	848.800000
Relative Permittivity (real part)	54.851214
Conductivity (S/m)	0.951454
Power Variation (%)	0.901472
Ambient Temperature	21.1
Liquid Temperature	21.3



Maximum location: X=3.00, Y=-15.00

SAR Peak: 0.33 W/kg

SAR 10g (W/Kg)	0.172240
SAR 1g (W/Kg)	0.243910



MEASUREMENT 75

Type: Phone measurement (Complete)

Date of measurement: 09/26/2018

Measurement duration: 12 minutes 3 seconds

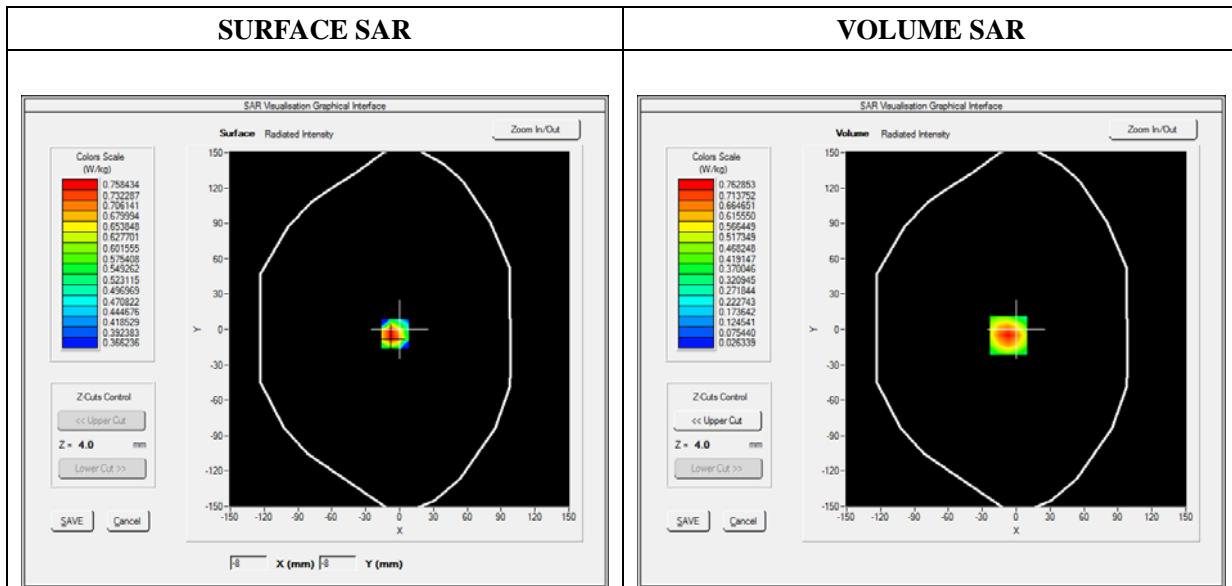
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

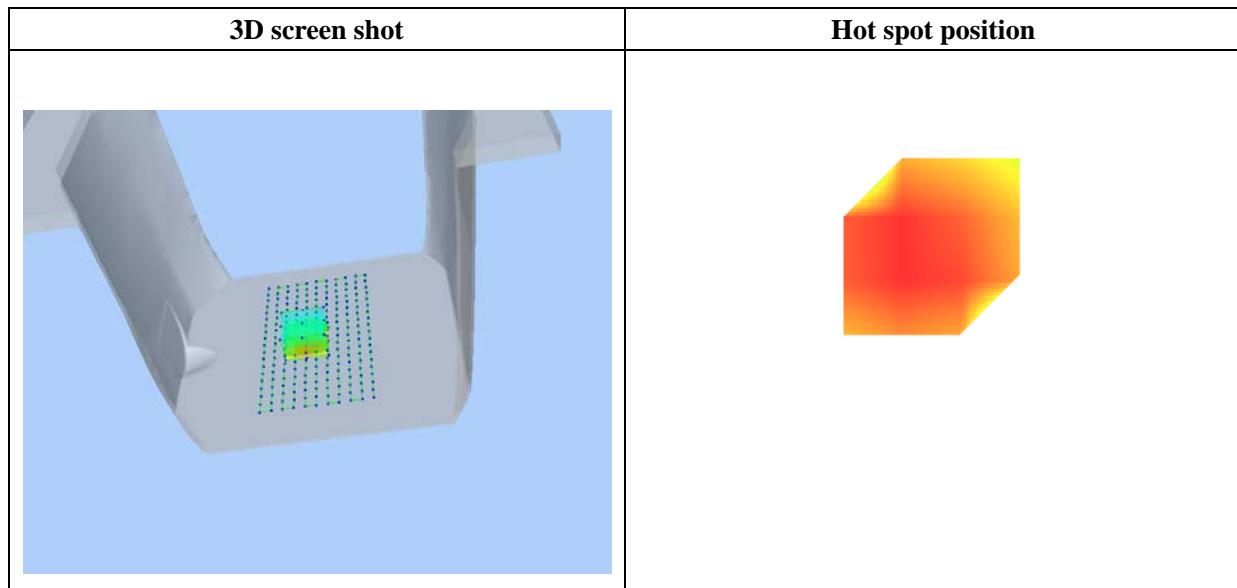
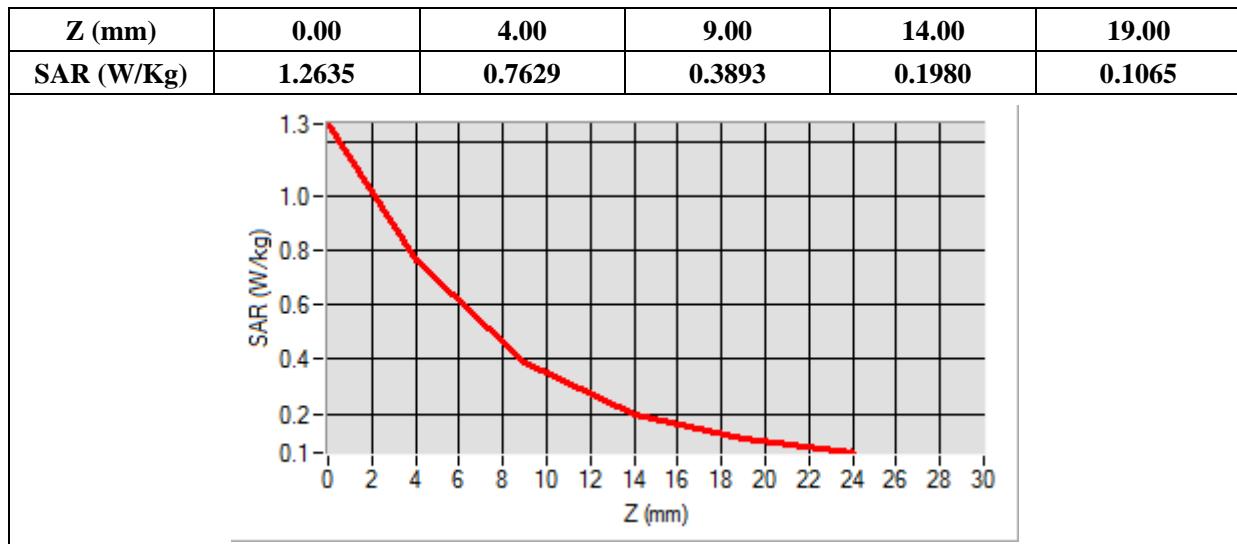
Frequency (MHz)	1909.800000
Relative Permittivity (real part)	52.420415
Conductivity (S/m)	1.501966
Power Variation (%)	2.483762
Ambient Temperature	21.1
Liquid Temperature	21.3



Maximum location: X=-7.00, Y=-5.00

SAR Peak: 1.26 W/kg

SAR 10g (W/Kg)	0.375993
SAR 1g (W/Kg)	0.716209



MEASUREMENT 77

Type: Phone measurement (Complete)

Date of measurement: 09/26/2018

Measurement duration: 12 minutes 3 seconds

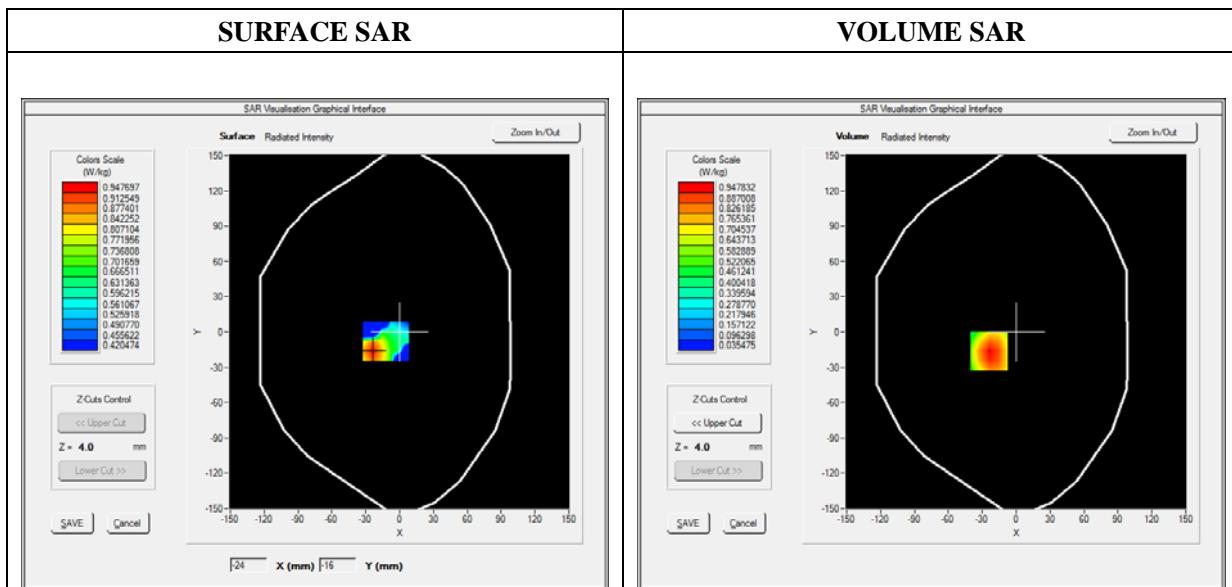
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

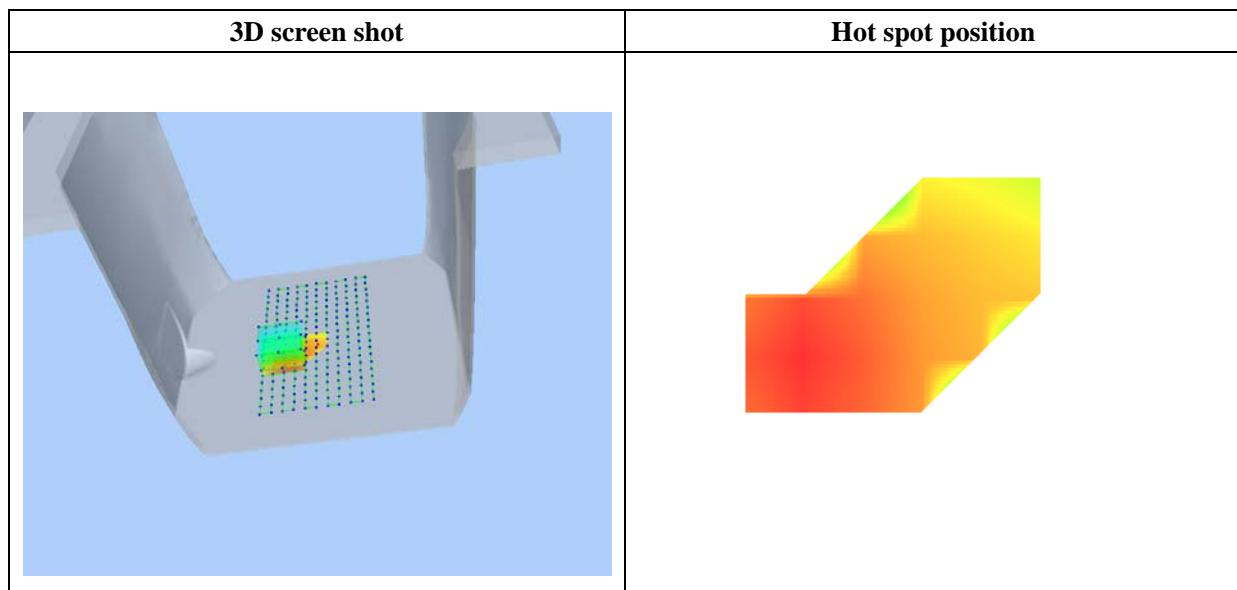
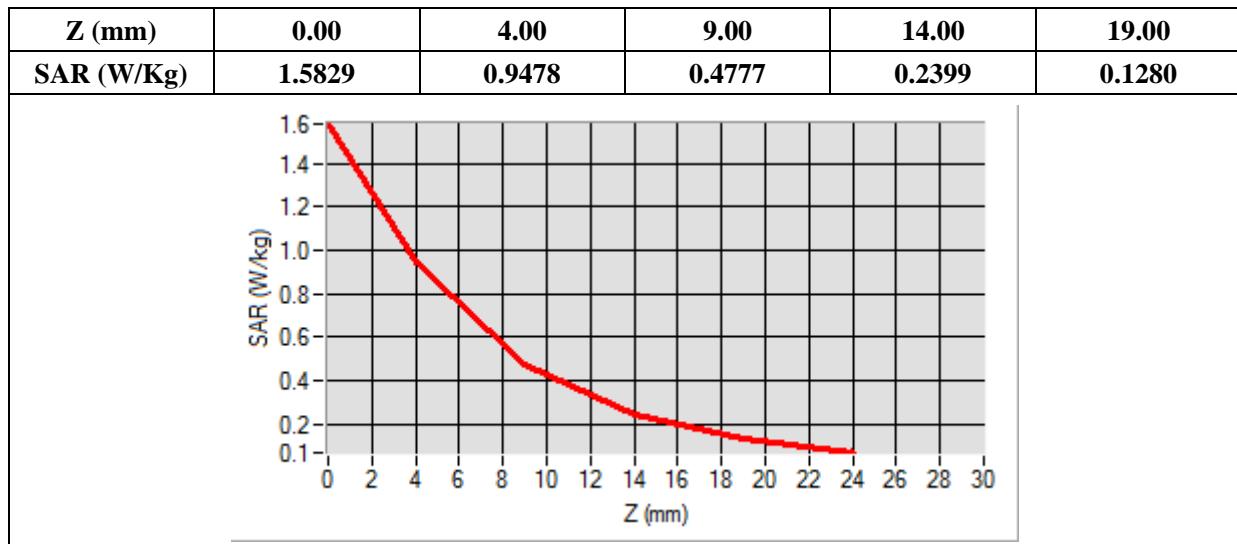
Frequency (MHz)	1907.600000
Relative Permittivity (real part)	52.420415
Conductivity (S/m)	1.501966
Power Variation (%)	1.789272
Ambient Temperature	21.1
Liquid Temperature	21.3



Maximum location: X=-24.00, Y=-16.00

SAR Peak: 1.59 W/kg

SAR 10g (W/Kg)	0.495187
SAR 1g (W/Kg)	0.905875



MEASUREMENT 83

Type: Phone measurement (Complete)

Date of measurement: 09/25/2018

Measurement duration: 12 minutes 3 seconds

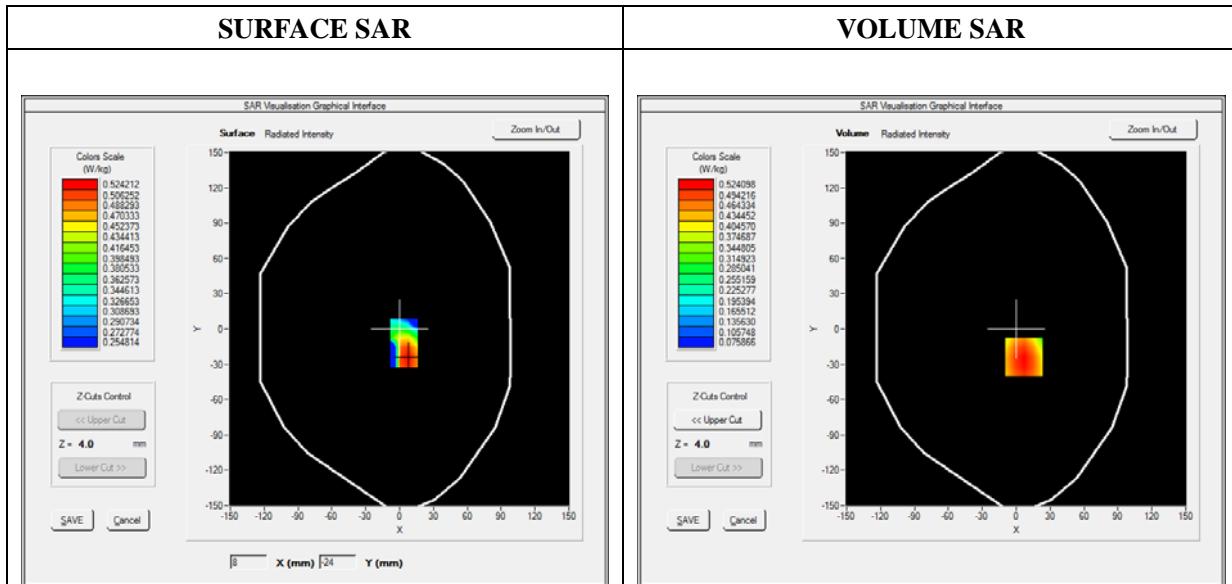
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

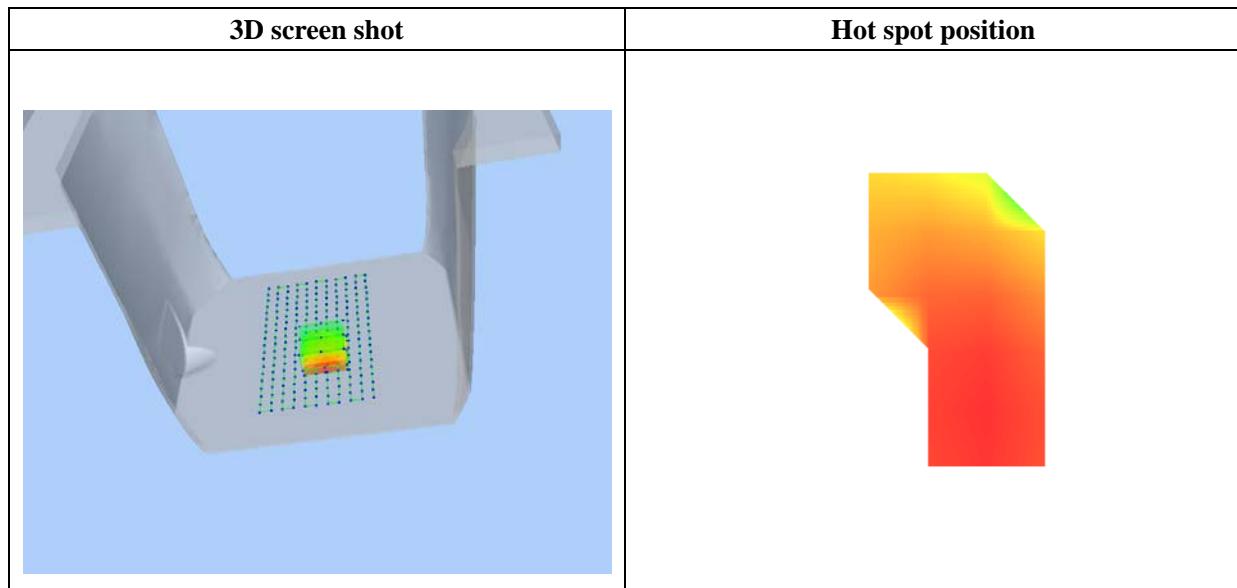
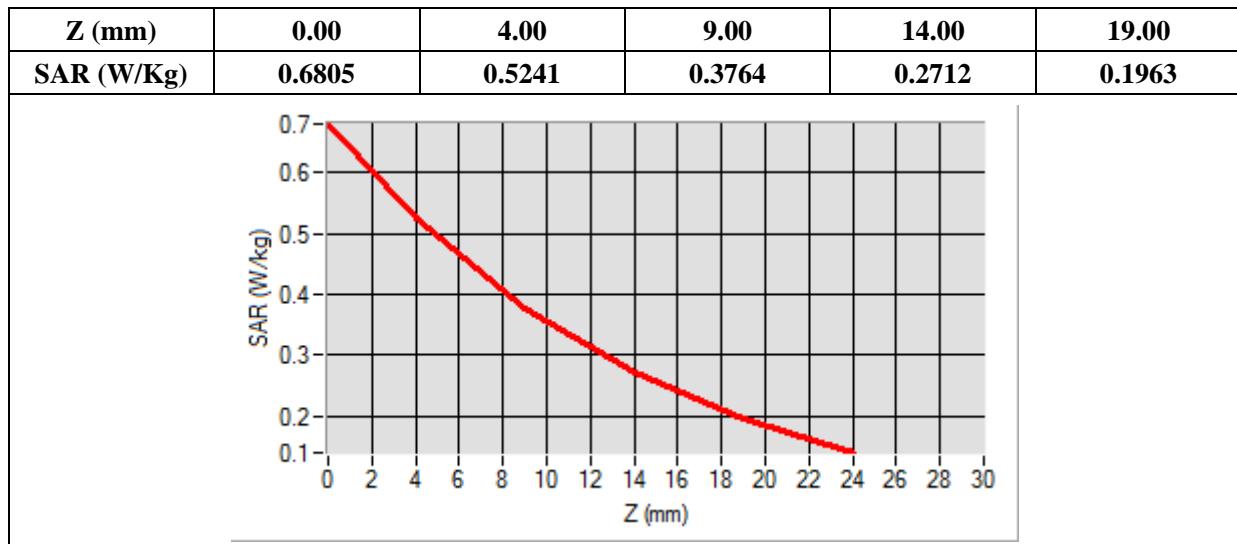
Frequency (MHz)	846.600000
Relative Permittivity (real part)	54.851214
Conductivity (S/m)	0.951454
Power Variation (%)	2.341234
Ambient Temperature	21.1
Liquid Temperature	21.3



Maximum location: X=7.00, Y=-24.00

SAR Peak: 0.68 W/kg

SAR 10g (W/Kg)	0.357035
SAR 1g (W/Kg)	0.506019



MEASUREMENT 87

Type: Phone measurement (Complete)

Date of measurement: 09/26/2018

Measurement duration: 12 minutes 3 seconds

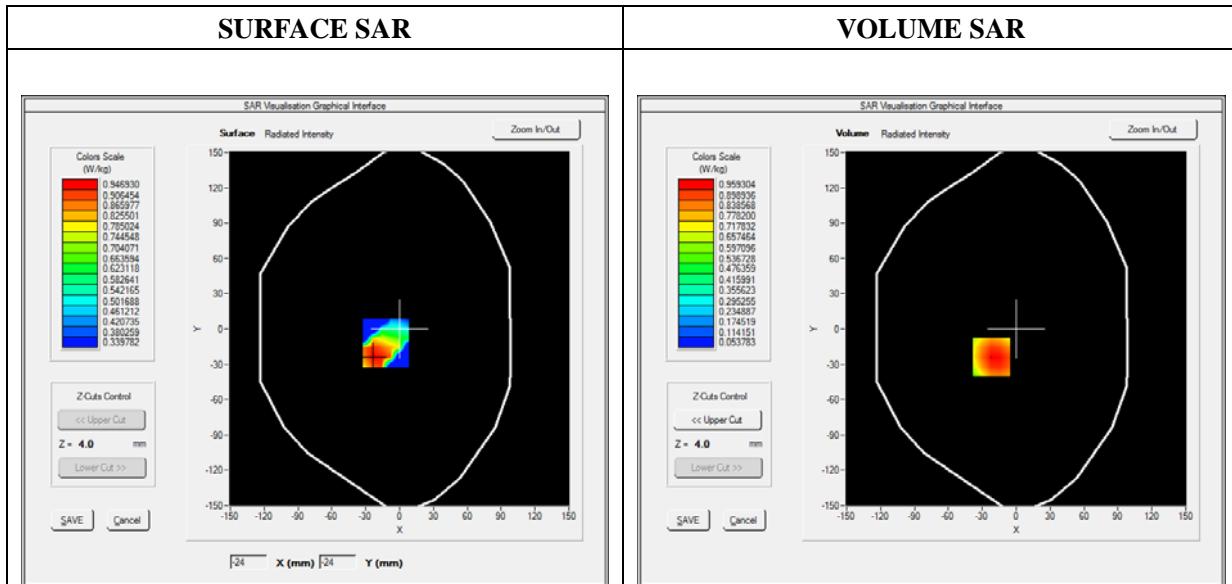
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.06; Calibrated: 06/01/2018

A. Experimental conditions

Area Scan	sam_direct_droit2_surf8mm.txt
Phantom	Flat Plane
Device Position	Back
Band	WCDMA1700_RMC
Channels	Low
Signal	Duty Cycle 1:1

B. SAR Measurement Results

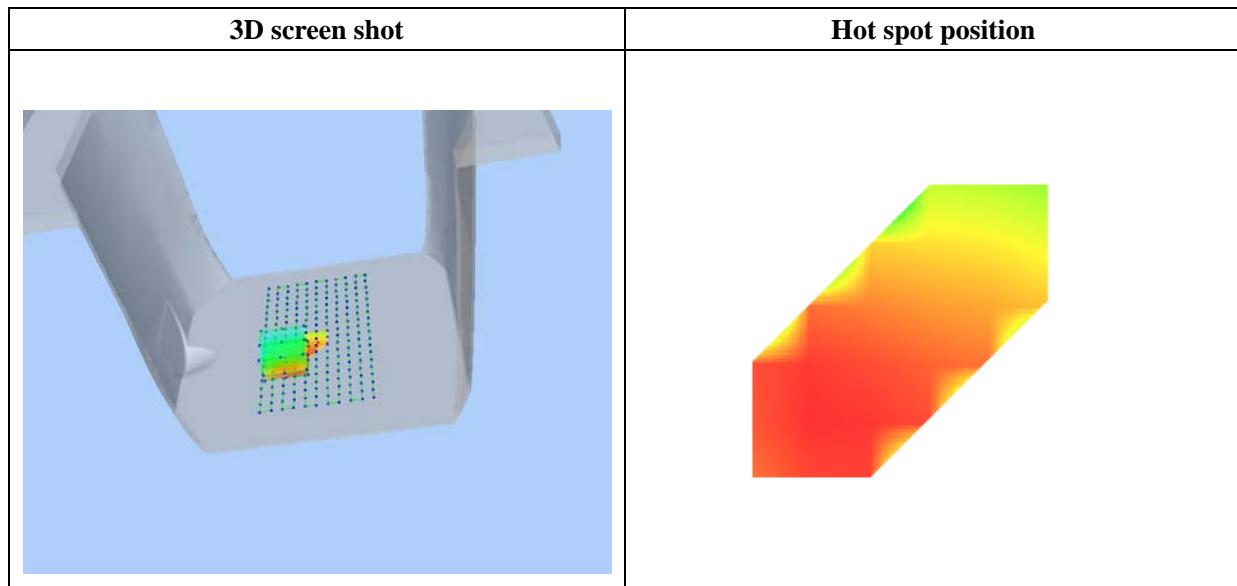
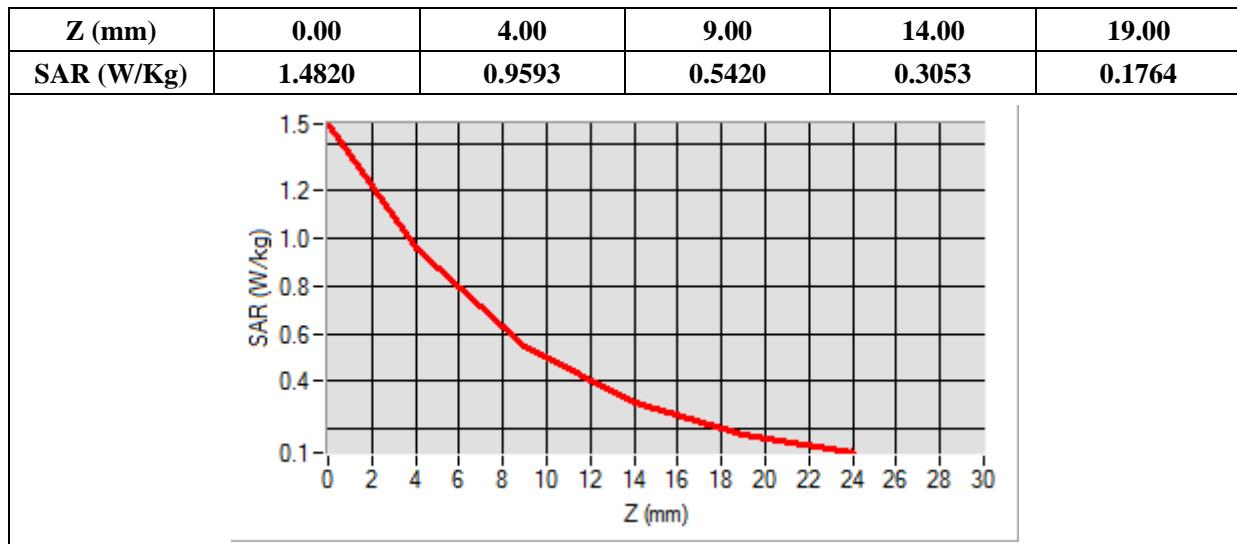
Frequency (MHz)	1712.400000
Relative Permittivity (real part)	51.220432
Conductivity (S/m)	1.460124
Power Variation (%)	2.341221
Ambient Temperature	21.1
Liquid Temperature	21.3



Maximum location: X=-22.00, Y=-24.00

SAR Peak: 1.49 W/kg

SAR 10g (W/Kg)	0.548452
SAR 1g (W/Kg)	0.924437



MEASUREMENT 93

Type: Phone measurement (Complete)

Date of measurement: 09/26/2018

Measurement duration: 12 minutes 3 seconds

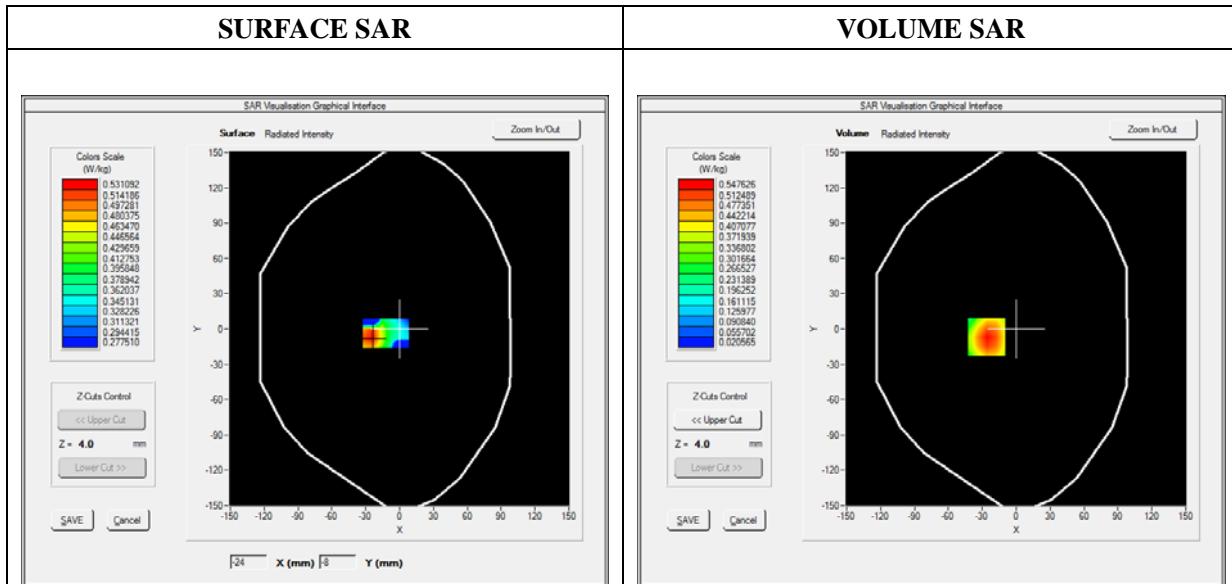
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

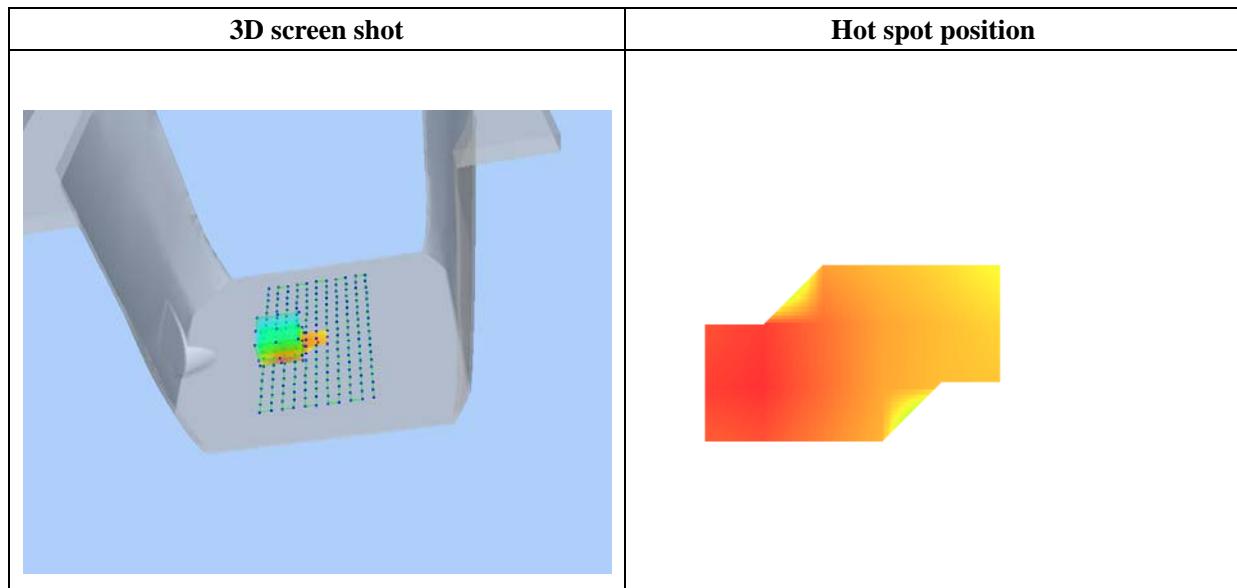
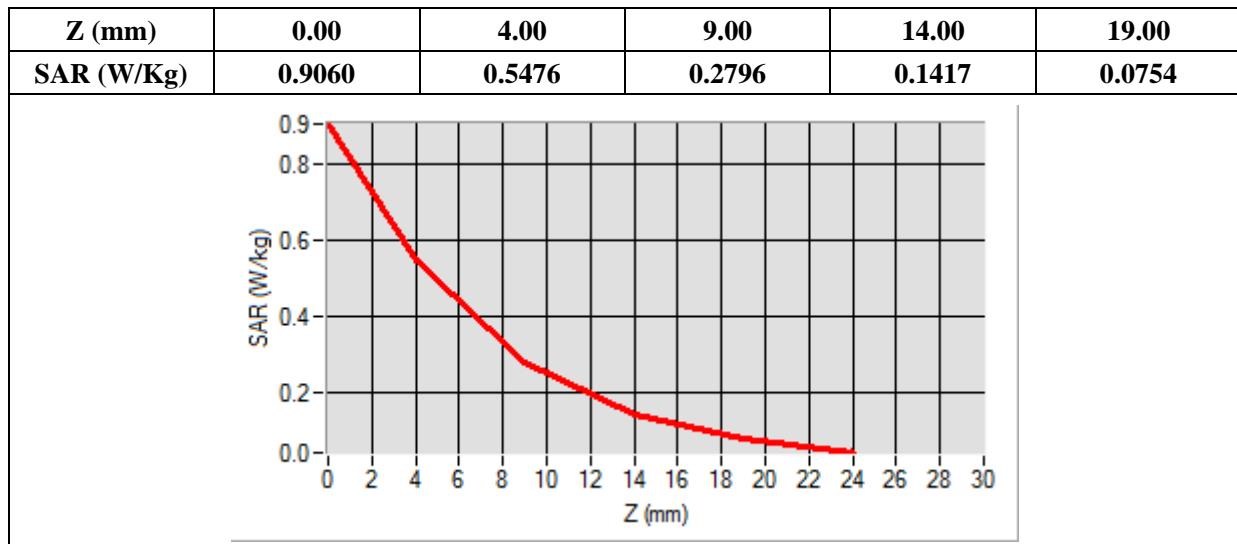
Frequency (MHz)	1880.000000
Relative Permittivity (real part)	52.420415
Conductivity (S/m)	1.501966
Power Variation (%)	1.523573
Ambient Temperature	21.1
Liquid Temperature	21.3



Maximum location: X=-26.00, Y=-7.00

SAR Peak: 0.91 W/kg

SAR 10g (W/Kg)	0.283542
SAR 1g (W/Kg)	0.520722



MEASUREMENT 102

Type: Phone measurement (Complete)

Date of measurement: 09/26/2018

Measurement duration: 12 minutes 3 seconds

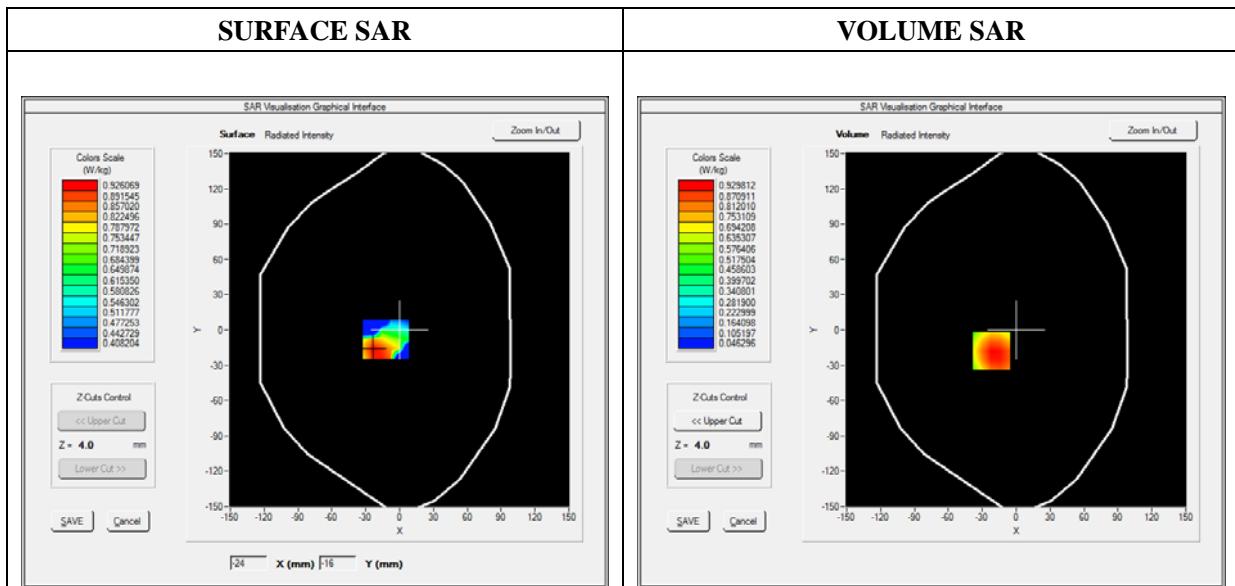
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.06; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

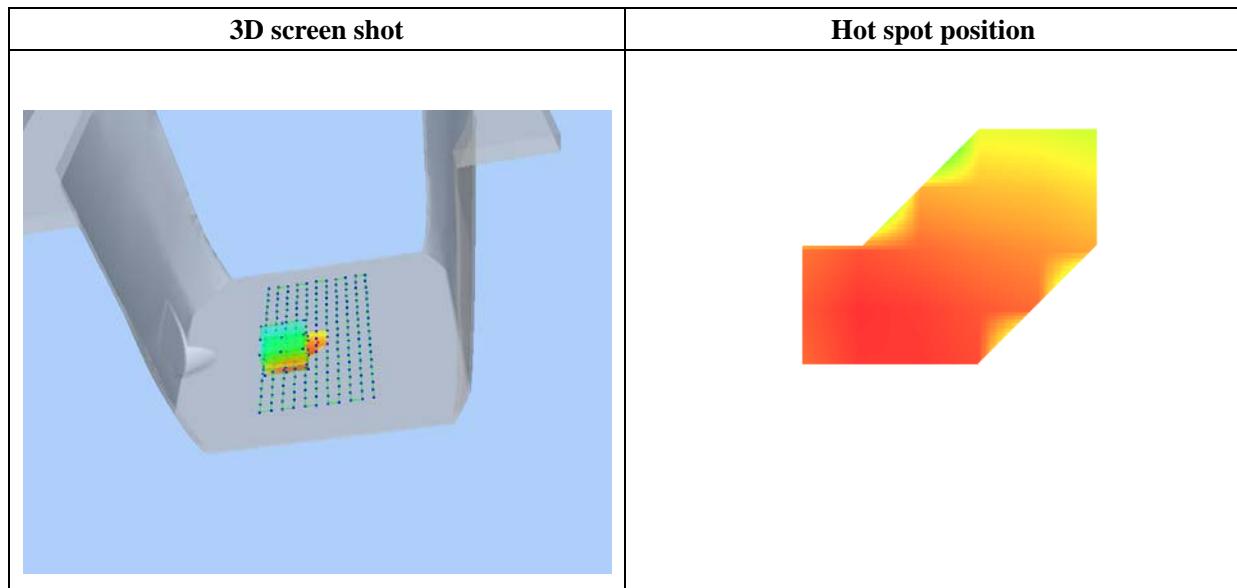
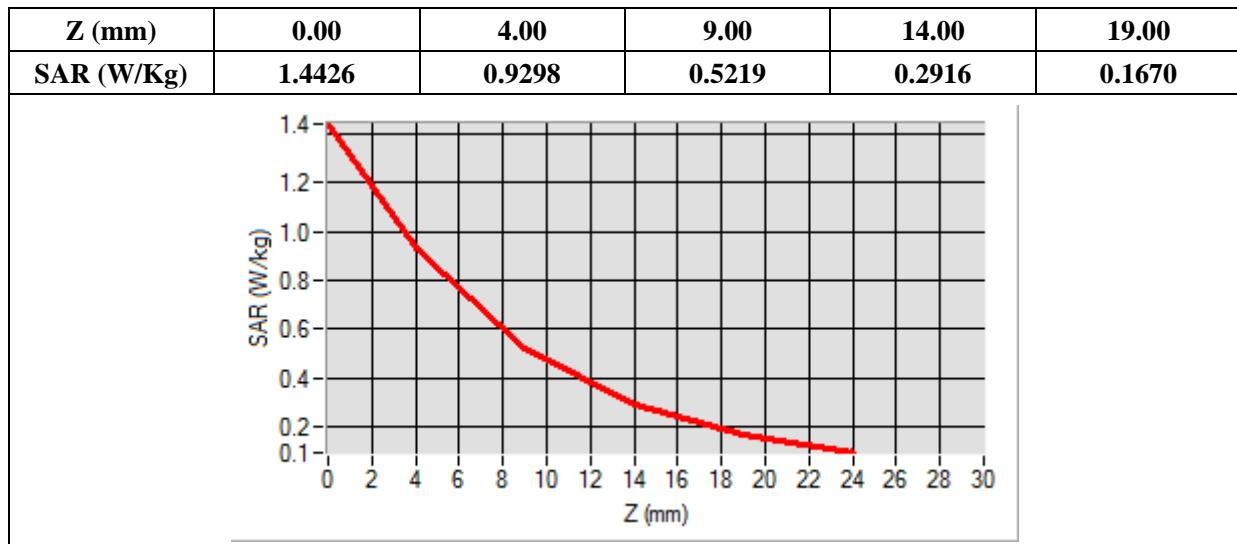
Frequency (MHz)	1720.000000
Relative Permittivity (real part)	51.220432
Conductivity (S/m)	1.460124
Power Variation (%)	0.858383
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=-22.00, Y=-18.00

SAR Peak: 1.45 W/kg

SAR 10g (W/Kg)	0.531895
SAR 1g (W/Kg)	0.898575



MEASUREMENT 112

Type: Phone measurement (Complete)

Date of measurement: 09/25/2018

Measurement duration: 12 minutes 3 seconds

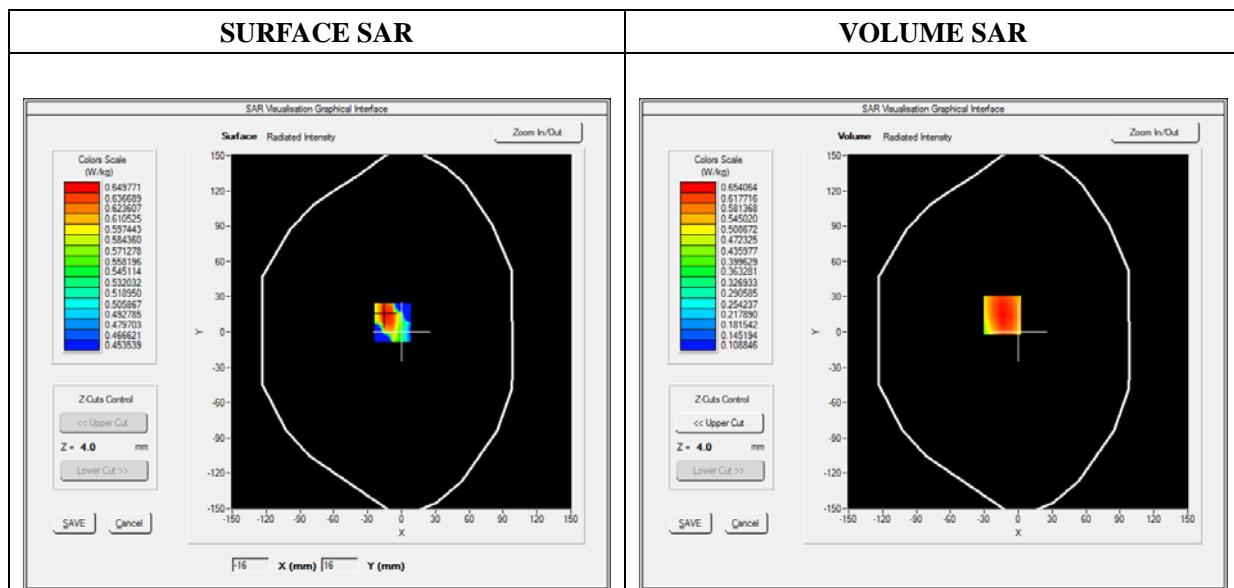
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 06/01/2018

A. Experimental conditions

Area Scan	sam_direct_droit2_surf8mm.txt
Phantom	Flat Plane
Device Position	Back
Band	LTE Band 5_RMC
Channels	QPSK, 10MHz, 1RB, High
Signal	Duty Cycle 1:1

B. SAR Measurement Results

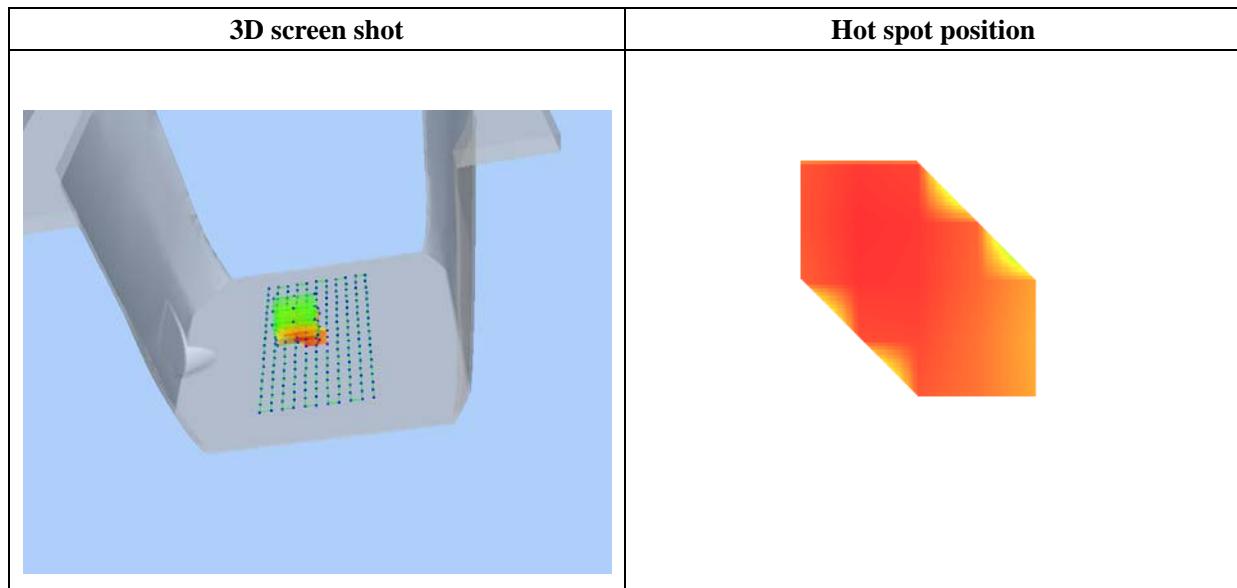
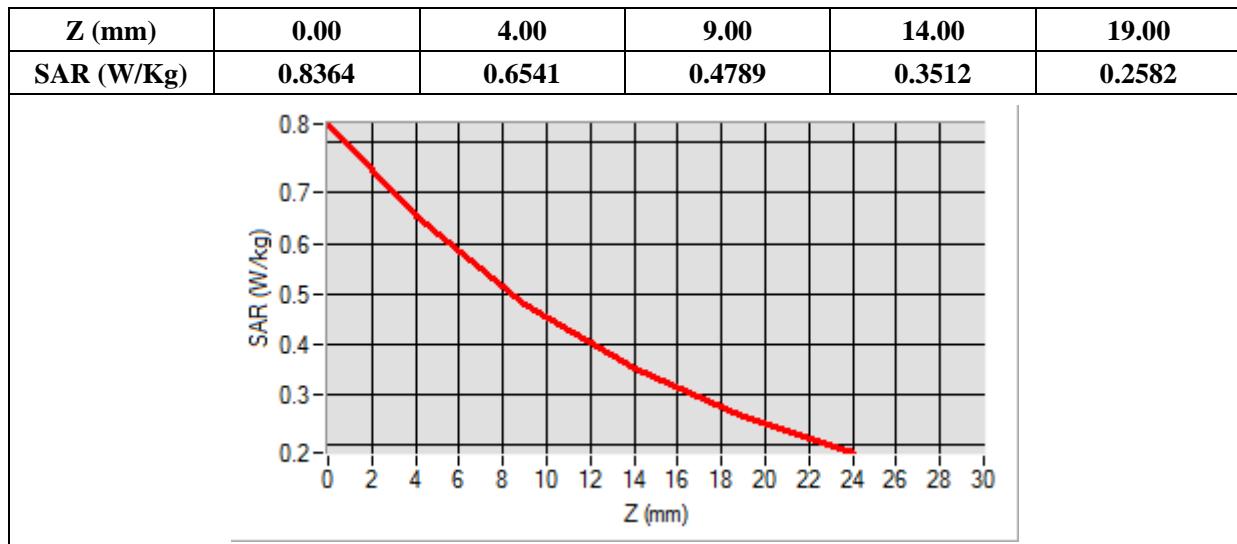
Frequency (MHz)	844.000000
Relative Permittivity (real part)	54.851214
Conductivity (S/m)	0.951454
Power Variation (%)	1.037332
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=-14.00, Y=14.00

SAR Peak: 0.84 W/kg

SAR 10g (W/Kg)	0.450756
SAR 1g (W/Kg)	0.630840



MEASUREMENT 120

Type: Phone measurement (Complete)

Date of measurement: 09/27/2018

Measurement duration: 12 minutes 3 seconds

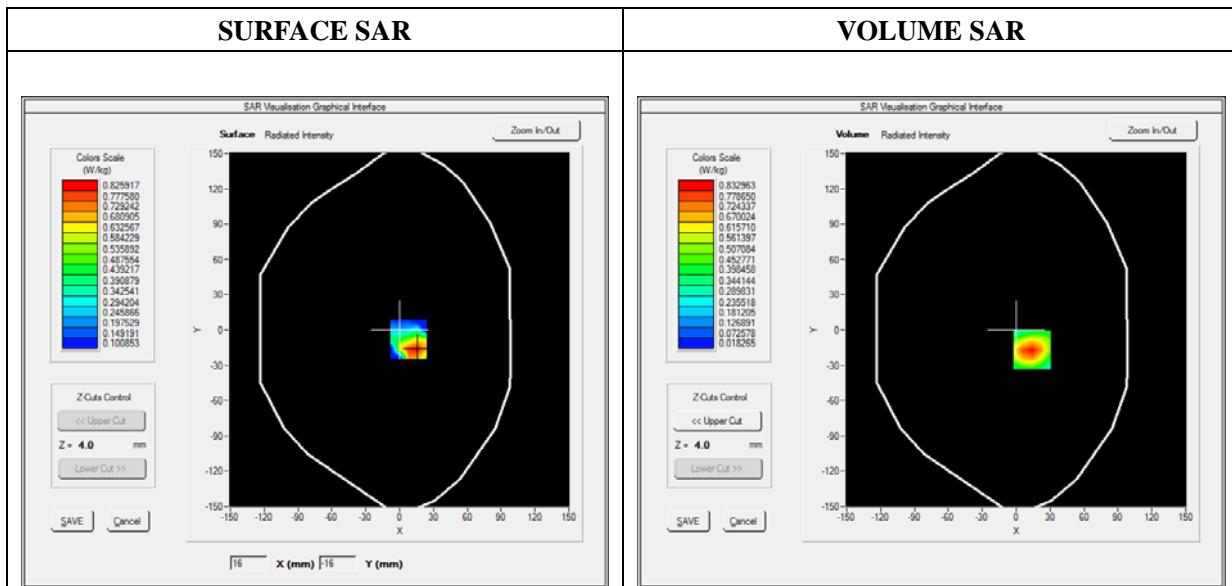
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.58; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

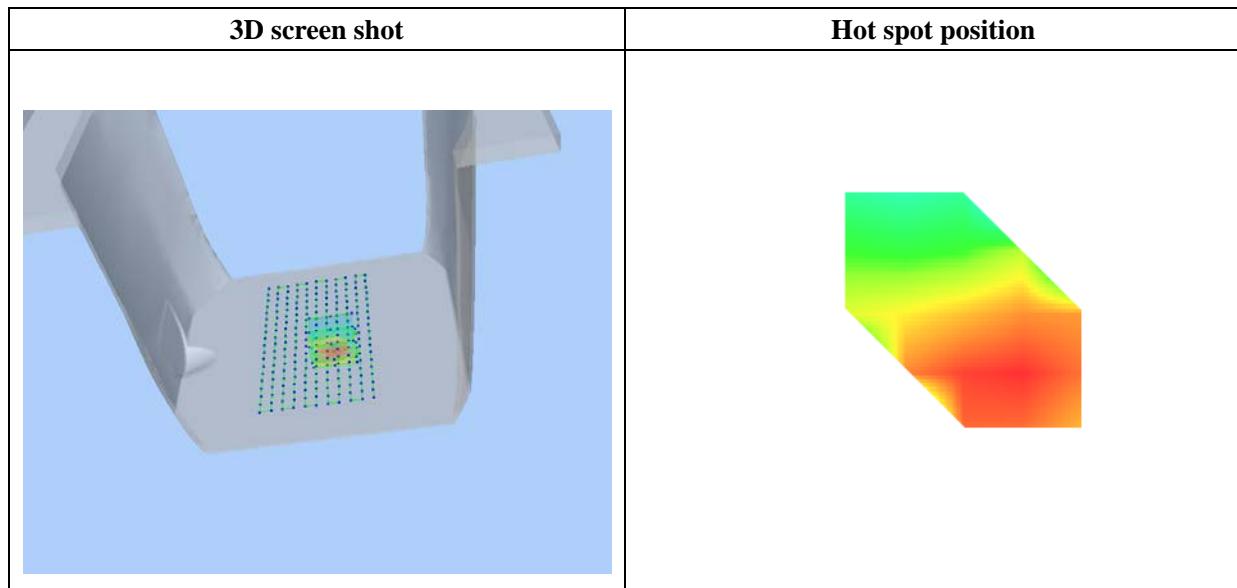
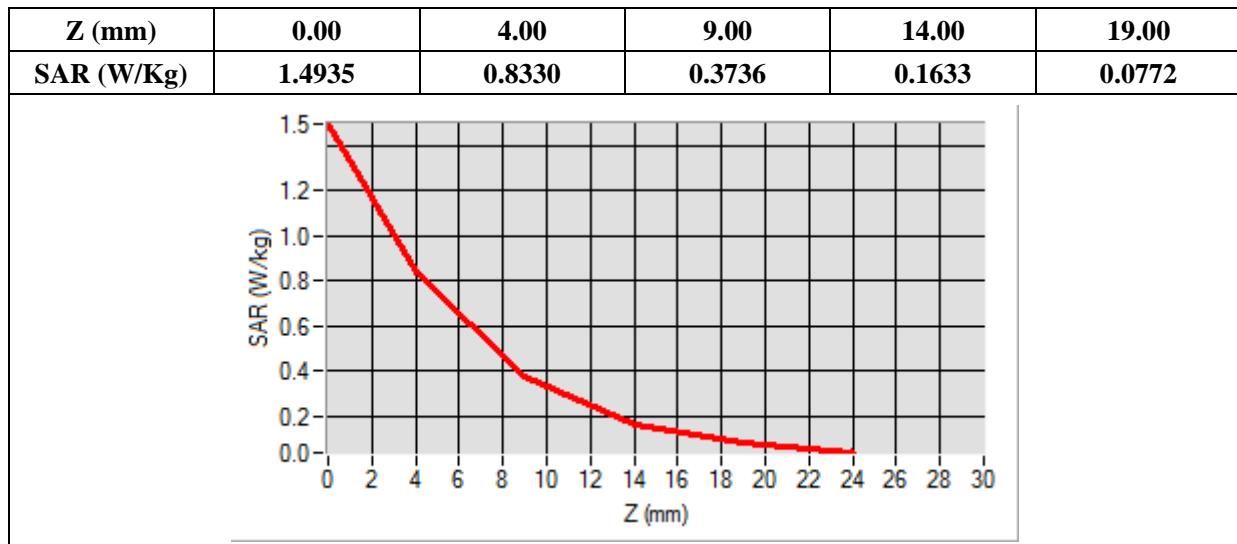
Frequency (MHz)	2560.000000
Relative Permittivity (real part)	52.241202
Conductivity (S/m)	2.120943
Power Variation (%)	3.042611
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=14.00, Y=-17.00

SAR Peak: 1.50 W/kg

SAR 10g (W/Kg)	0.378209
SAR 1g (W/Kg)	0.784584



MEASUREMENT 124

Type: Phone measurement (Complete)

Date of measurement: 09/27/2018

Measurement duration: 12 minutes 3 seconds

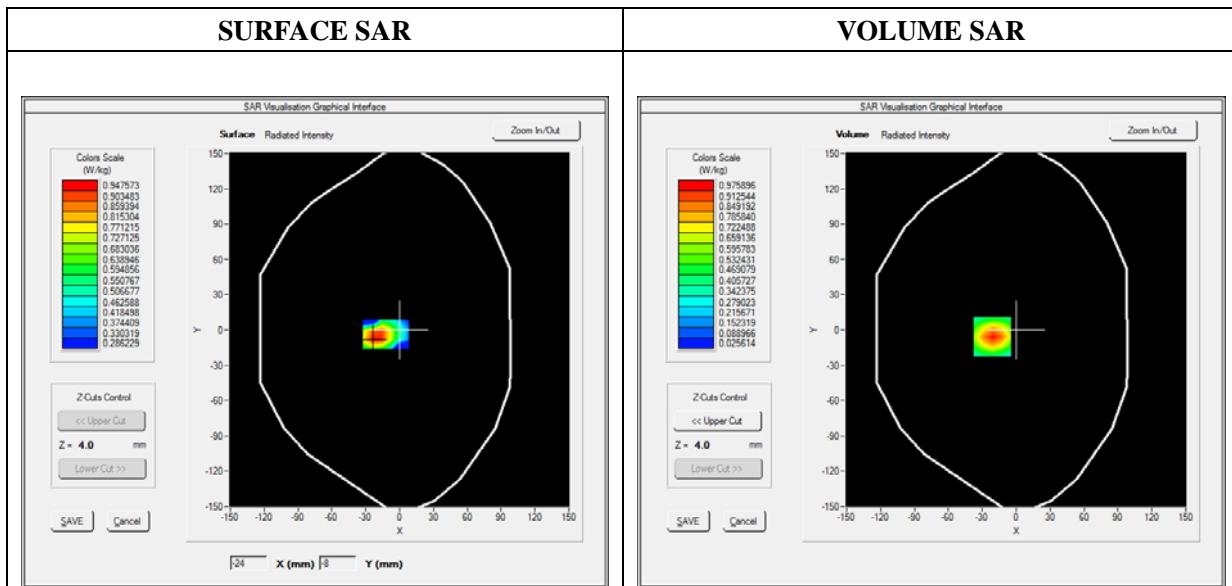
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.58; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

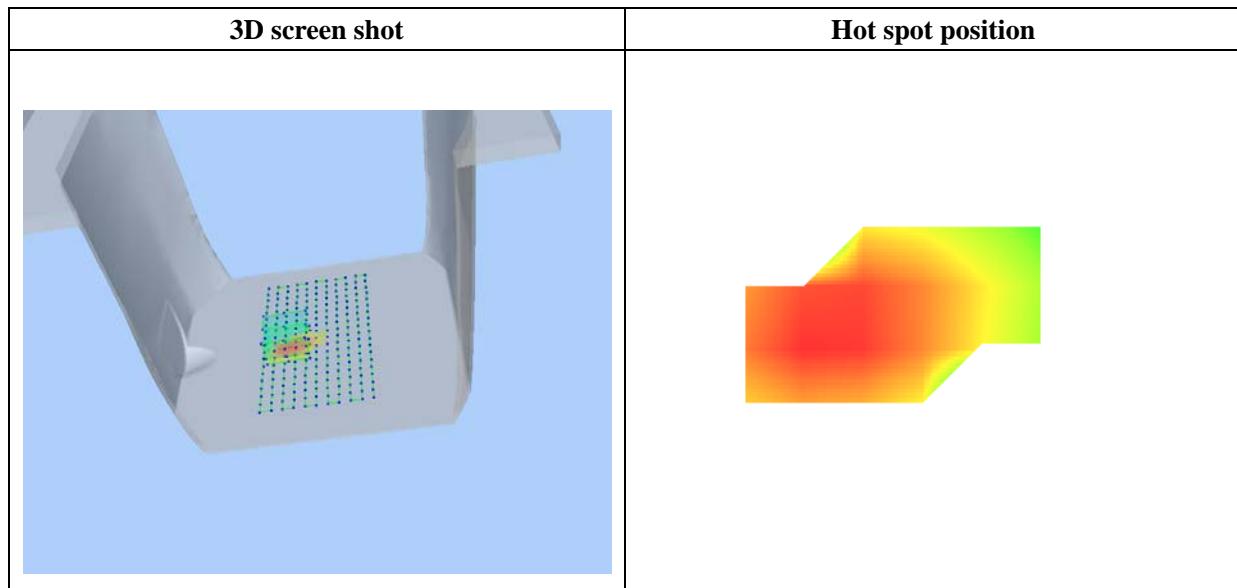
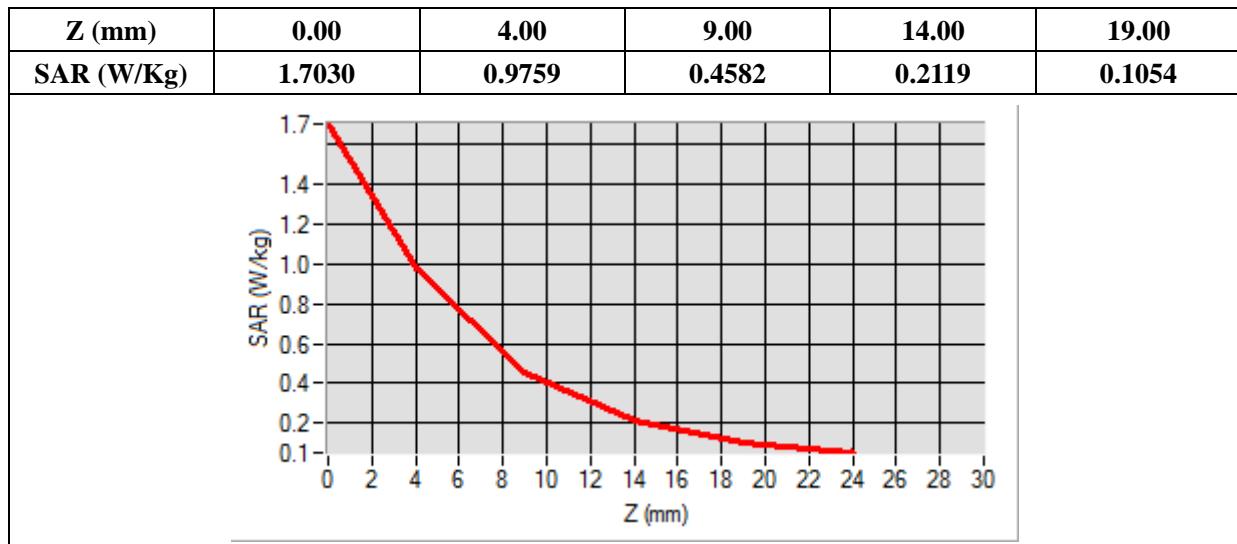
Frequency (MHz)	2560.000000
Relative Permittivity (real part)	52.241202
Conductivity (S/m)	2.120943
Power Variation (%)	3.124788
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=-21.00, Y=-6.00

SAR Peak: 1.70 W/kg

SAR 10g (W/Kg)	0.446621
SAR 1g (W/Kg)	0.911045



MEASUREMENT 134

Type: Phone measurement (Complete)

Date of measurement: 09/27/2018

Measurement duration: 12 minutes 3 seconds

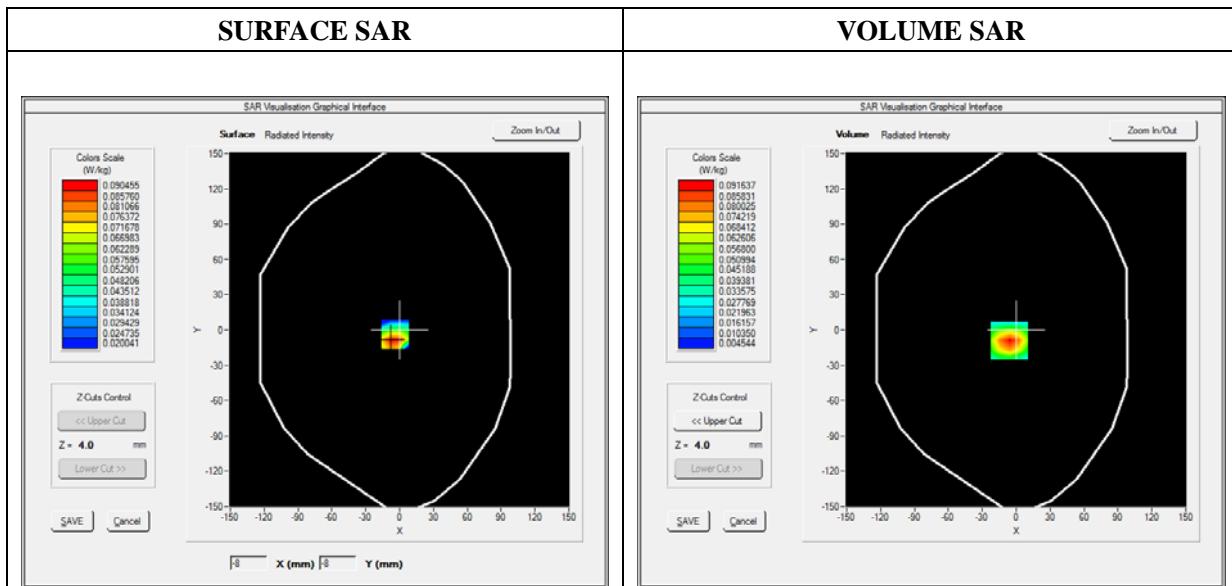
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.80; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

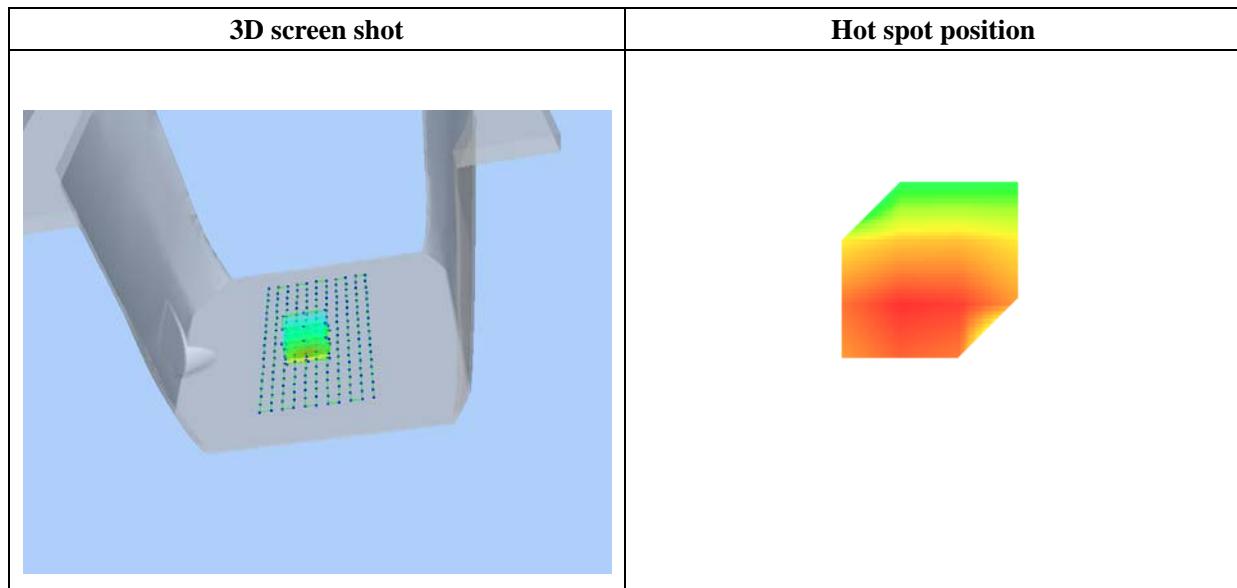
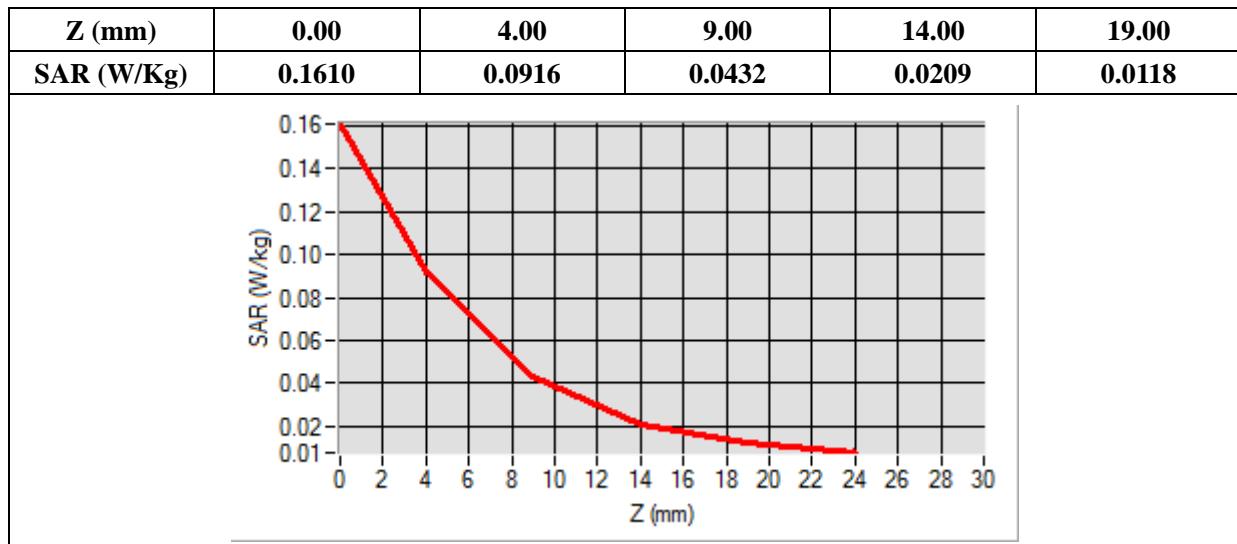
Frequency (MHz)	2412.000000
Relative Permittivity (real part)	52.010212
Conductivity (S/m)	1.910255
Power Variation (%)	2.492743
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=-6.00, Y=-9.00

SAR Peak: 0.16 W/kg

SAR 10g (W/Kg)	0.042118
SAR 1g (W/Kg)	0.085621



MEASUREMENT 147

Type: Phone measurement (Complete)

Date of measurement: 09/27/2018

Measurement duration: 12 minutes 3 seconds

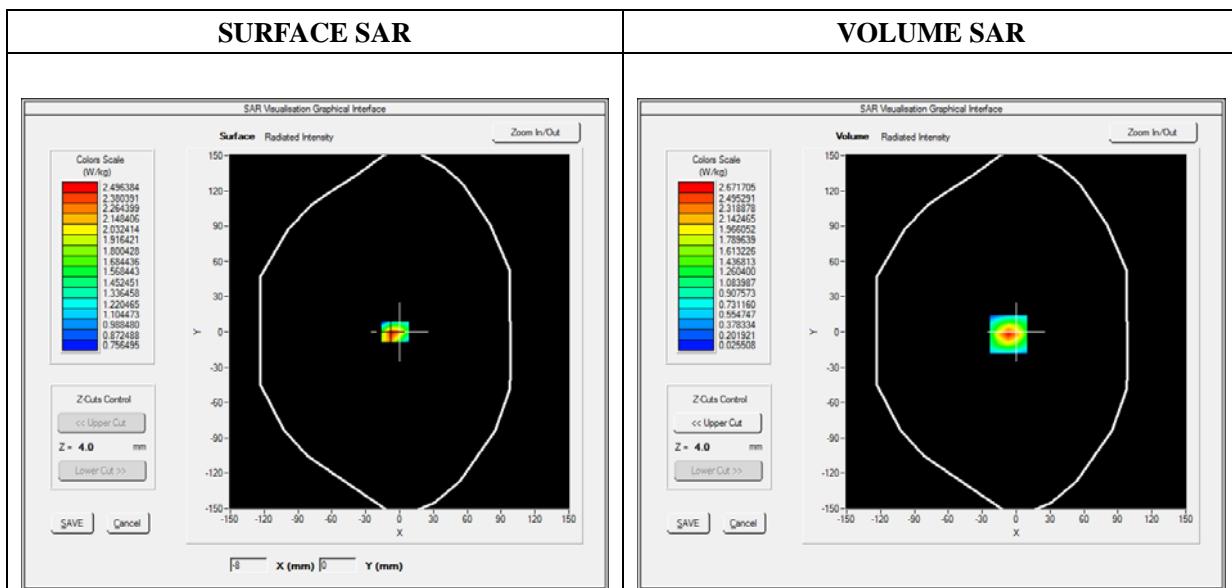
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.58; Calibrated: 06/01/2018

A. Experimental conditions

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

B. SAR Measurement Results

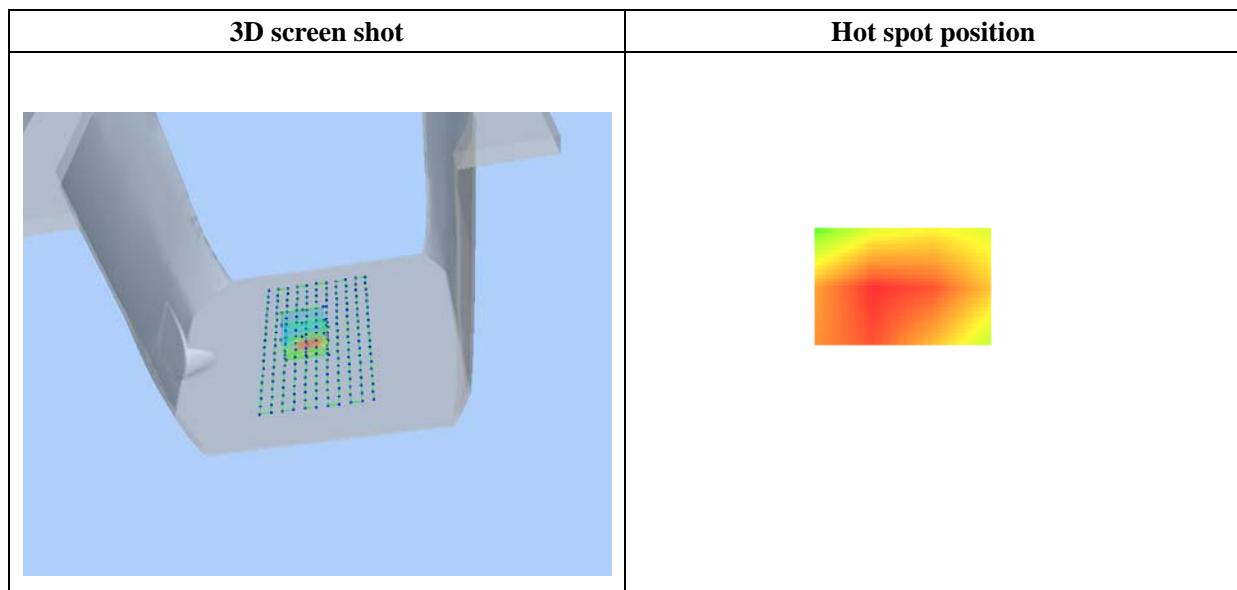
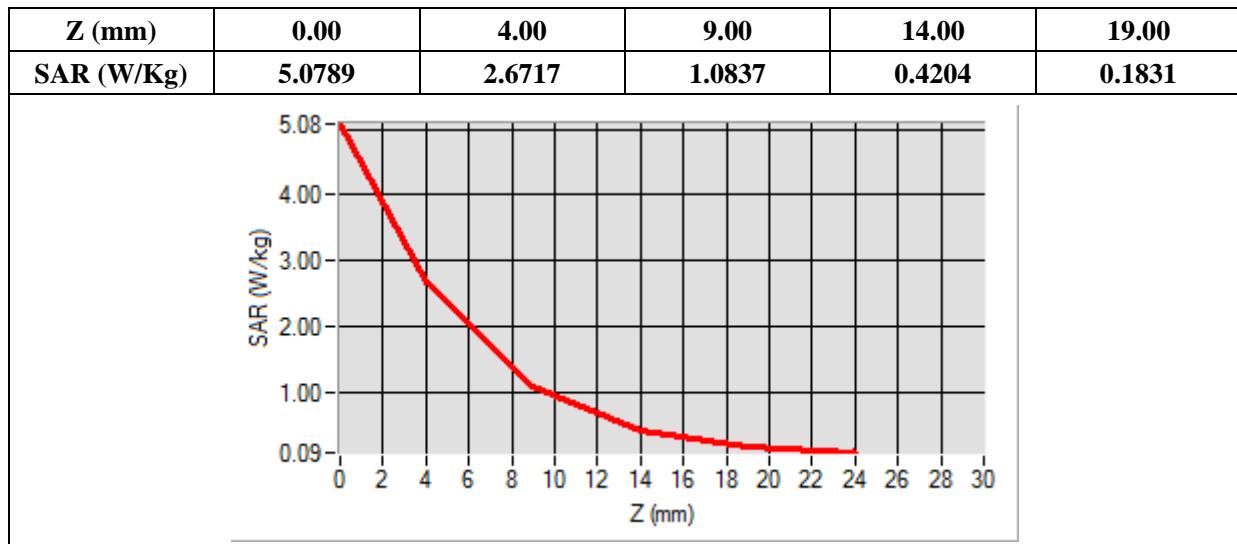
Frequency (MHz)	2510.000000
Relative Permittivity (real part)	52.241202
Conductivity (S/m)	2.120943
Power Variation (%)	3.325754
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=-7.00, Y=-2.00

SAR Peak: 5.06 W/kg

SAR 10g (W/Kg)	1.045381
SAR 1g (W/Kg)	2.443063



Annex C. EUT Photos

EUT View Front



EUT View Back



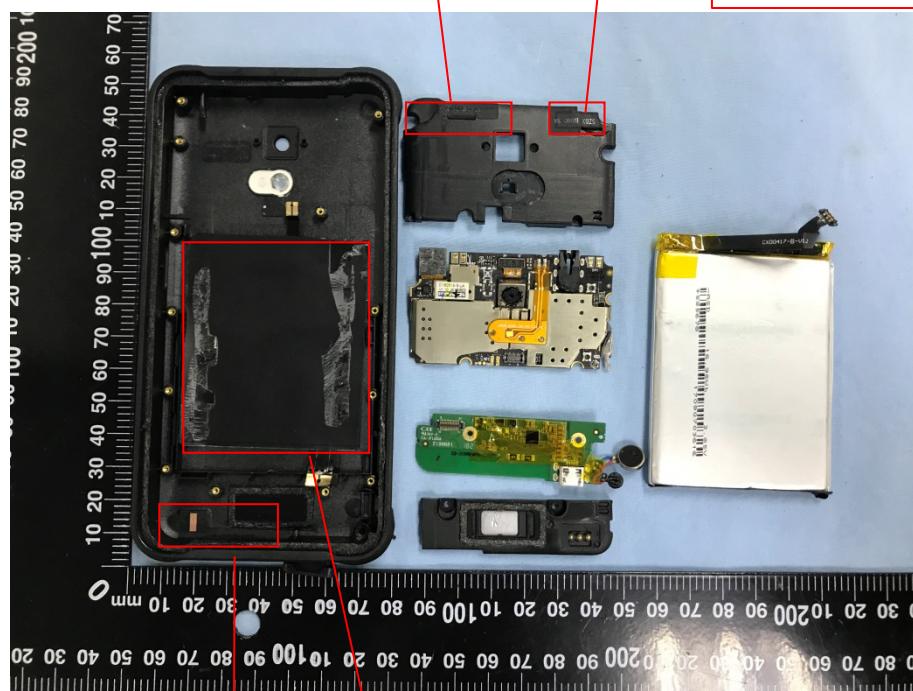
Antenna View

Wi-Fi/BT/GPS Antenna

LTE Rx Ant.

GSM/WCDMA/LTE Ant.

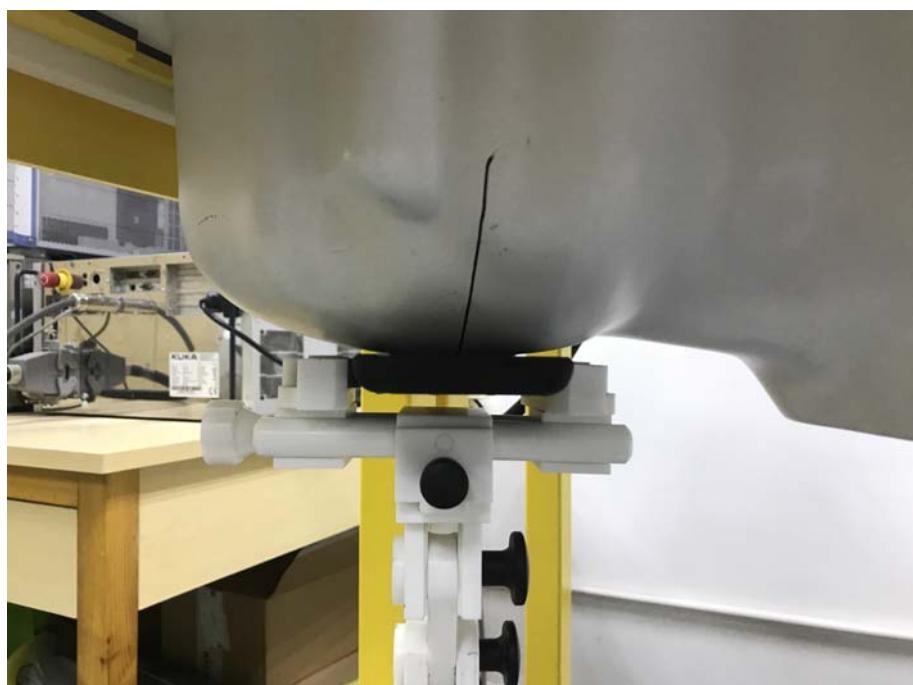
NFC Ant.



Annex D. Test Setup Photos

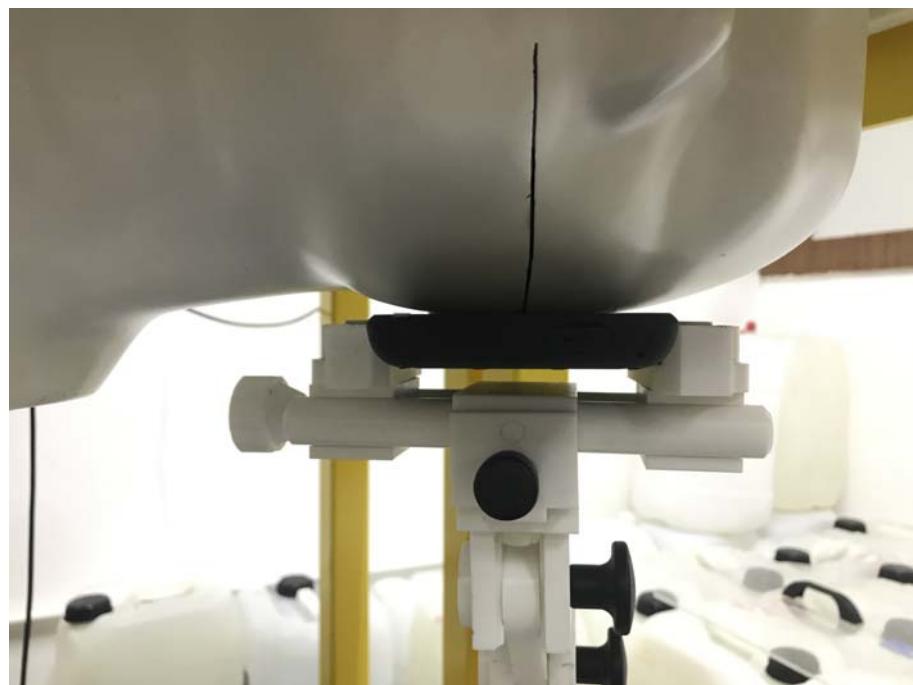
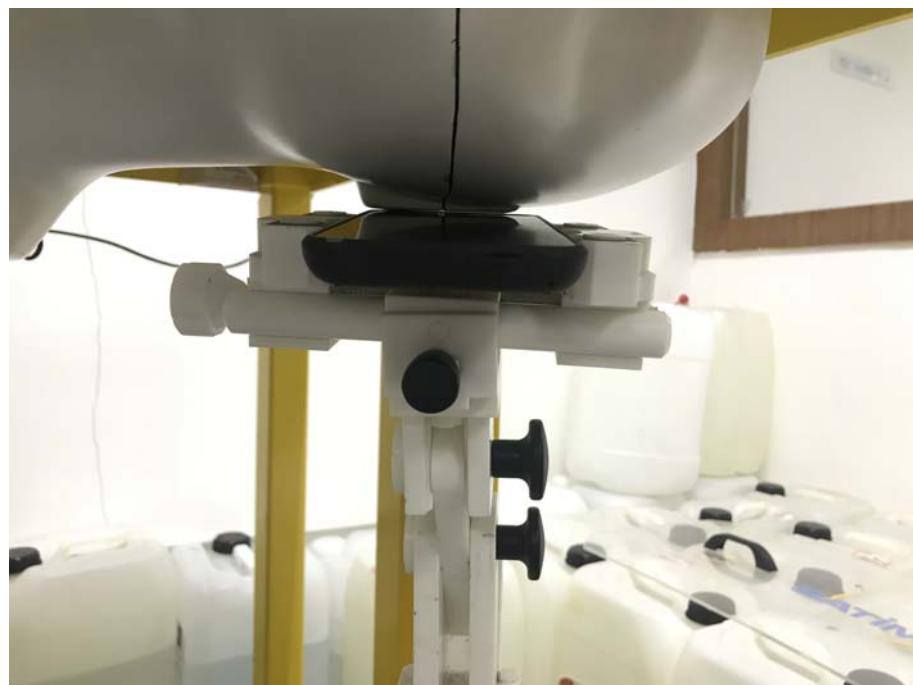
Head Exposure Conditions

Cheek



Tilt

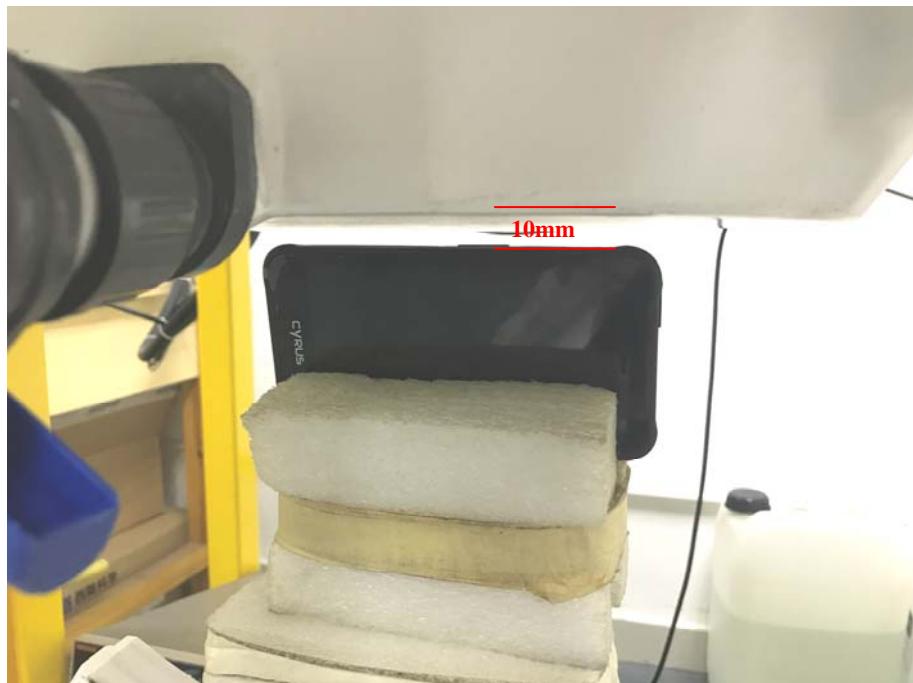


Cheek**Tilt**

Body-worn & Hotspot mode Exposure Conditions**Body Front****Body Back**

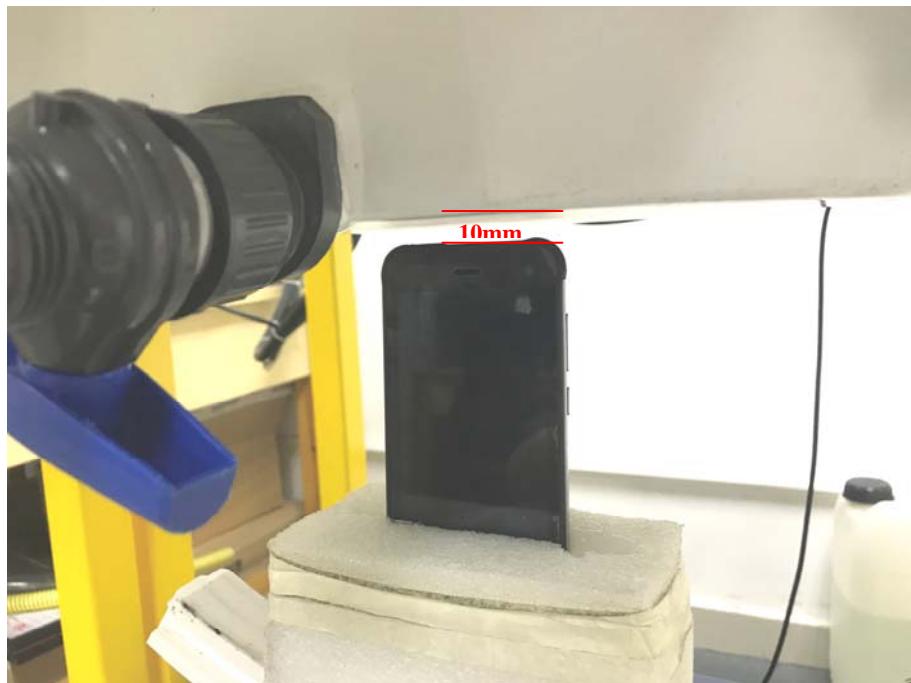
Hotspot Exposure Conditions

Body Left



Body Right



Body Top**Body Bottom**

Annex E. Calibration Certificate

Please refer to the exhibit for the calibration certificate

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