FCC SAR
Measurement and Test Report

For

TOPICON HK LIMITED

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

Shenzhen, China

FCC ID: 2AHAF-MDT740

FCC Rules:	FCC Part 2.1093 ANSI / IEEE C95.1 :2005+A1:2010 ANSI / IEEE C95.3 :2002(R2008)
Product Description:	GPS
Tested Model:	MDT840
Report No.:	WTX19X05030902W-7
Sample Received Date:	2019-05-16
Tested Date:	2019-05-16 to 2019-08-20
Issued Date:	2019-08-22
Tested By:	Ruler Liu / Engineer
Reviewed By:	Silin Chen / EMC Manager
Approved & Authorized By:	Jandy So / PSQ Manager
Prepared By:	

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1. General Information

1.1 Product Description for Equipment Under Test (EUT)

Client Information

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

General Description of EUT	
Product Name:	GPS
Brand Name:	/
Model No.:	MDT840
Adding Model:	MDT741,MDT742,MDT752,MDT714D, OBC740, M710A, M710AG,M710AB,M710AKB,M740B, MDT840, MDT841, MDT814D
Rated Voltage:	DC 3.7V Battery
Battery Capacity:	6300mAh
Note: The test data is gathered from a production sample, provided by the manufacturer. For more information see the following datasheet. The appearance of others models listed in the report is different from main-test model MDT840, but the circuit and the electronic construction do not change, declared by the manufacturer.	

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

Support Networks:	WCDMA, HSDPA, HSUPA
Support Band:	WCDMA Band II, WCDMA Band V
Uplink Frequency:	WCDMA Band II: 1850~1910MHz WCDMA Band V: 824~849MHz
Downlink Frequency:	WCDMA Band II: 1930~1990MHz WCDMA Band V: 869~894MHz
RF Output Power:	WCDMA Band II: 22.82dBm, WCDMA Band V: 22.81dBm
Type of Modulation:	BPSK, QPSK, 16QAM
Antenna Type:	Integral Antenna
Antenna Gain:	WCDMA Band II: 3.0dBi, WCDMA Band V: 3.0dBi
4G	
Support Networks:	FDD-LTE
Support Band:	FDD-LTE Band 2, 4, 5, 12,17
Uplink Frequency:	FDD-LTE Band 2: Tx: 1850-1910MHz, FDD-LTE Band 4: Tx: 1710-1755MHz, FDD-LTE Band 5: Tx: 824-849MHz, FDD-LTE Band 12: Tx: 699-716MHz, FDD-LTE Band 17: Tx: 704-716MHz
Downlink Frequency:	FDD-LTE Band 2: Rx: 1930-1990MHz, FDD-LTE Band 4: Rx: 2110-2155MHz, FDD-LTE Band 5: Rx: 869-894MHz, FDD-LTE Band 12: Rx: 729-746MHz, FDD-LTE Band 17: Rx: 734-746MHz
RF Output Power:	FDD-LTE Band 2: 23.87dBm, FDD-LTE Band 4: 23.58dBm, FDD-LTE Band 5: 23.38dBm, FDD-LTE Band 12: 23.57dBm, FDD-LTE Band 17: 23.23dBm
Type of Modulation:	QPSK, 16QAM
Antenna Type:	Integral Antenna
Antenna Gain:	FDD-LTE Band 2: 3.0dBi, FDD-LTE Band 4: 3.0dBi, FDD-LTE Band 5: 3.0dBi, FDD-LTE Band 12: 3.0dBi, FDD-LTE Band 17: 3.0dBi,
WIFI	
Support Standards:	802.11b, 802.11g, 802.11n-HT20/40
Frequency Range:	2412-2462MHz for 11b/g/n(HT20), 11n(HT40)
RF Output Power:	15.16m (Conducted)
Type of Modulation:	CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM
Data Rate:	1-11Mbps, 6-54Mbps, up to 72.2Mbps
Quantity of Channels:	11
Channel Separation:	5MHz

Antenna Type:	Integral Antenna
Antenna Gain:	3.0dBi
Bluetooth	
Bluetooth Version:	V4.0
Frequency Range:	2402-2480MHz
RF Output Power:	4.851dBm (Conducted)
Data Rate:	1Mbps, 2Mbps, 3Mbps
Modulation:	GFSK, Pi/4 QDPSK, 8DPSK
Quantity of Channels:	79/40
Channel Separation:	1MHz/2MHz
Antenna Type:	Integral Antenna
Antenna Gain:	3.0dBi
NFC	
Support Standards:	NFC
Frequency Range:	13.56MHz
Max. Field Strength:	46.64dBuV/m (at 3m)/ -8.86dBm
Antenna Type:	Integral Antenna
Antenna Gain:	2.0dBi

MDT840, MDT841, MDT814D are the same antenna, test only carry on MDT840

1.2 Test Standards

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

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

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

1.3 Test Methodology

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

1.4 Test Facility

FCC – Registration No.: 125990

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

Industry Canada (IC) Registration No.: 11464A

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

2. Summary of Test Results

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

Frequency Band	Body (0mm Gap) Maximum SAR_{1g} (W/kg)	SAR_{1g} Limit (W/kg)
GSM850	0.485	1.6
GSM1900	**0.977**	1.6
WCDMA Band V	0.139	1.6
WCDMA Band II	0.861	1.6
LTE Band 2	0.618	1.6
LTE Band 4	0.696	1.6
LTE Band 5	0.067	1.6
LTE Band 12	0.074	1.6
LTE Band 17	0.069	1.6
WLAN 2.4GHz	0.160	1.6
Simultaneous Transmission	**1.137**	1.6

*The highest reported SAR values for body and simultaneous transmission conditions are **0.977W/kg and 1.137 W/kg***

The device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR Part 2.1093 and ANSI/IEEE C95.1 :2005+A1:2010, and had been tested in accordance with the measurement methods and procedure specified in IEEE 1528-2013 and KDB 865664 D01 v01r04 and KDB 865664 D02 v01r02

3. Specific Absorption Rate (SAR)

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 techiques 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:

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

SAR is expressed in units of Watts per kilogram (W/kg)
SAR measurement can be either related to the temperature elevation in tissue by

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

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

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

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

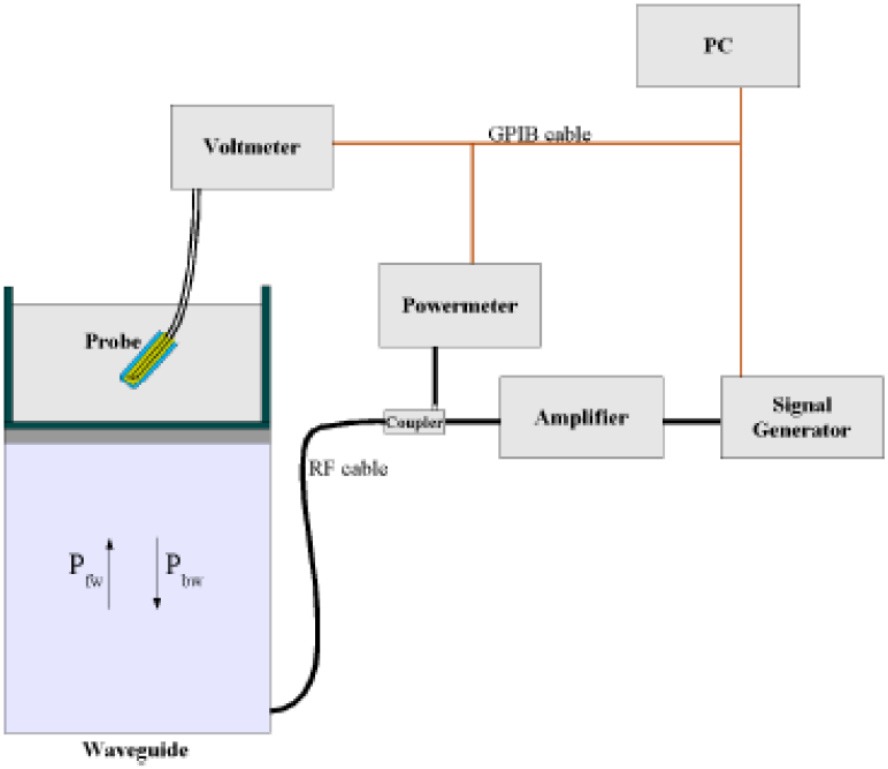
For the measurements the Specific Dosimetric E-Field Probe SSE5 SN 09/13 EP168 with following specifications is used

- 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 suface normal line:1ess 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.

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

Where:

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.

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

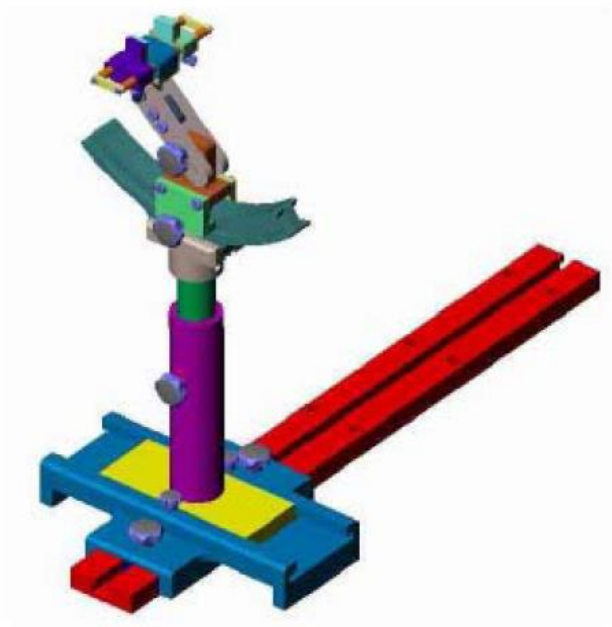
Where:
σ = simulated tissue conductivity,
ρ = Tissue density (1.25 g/cm3 for brain tissue)

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

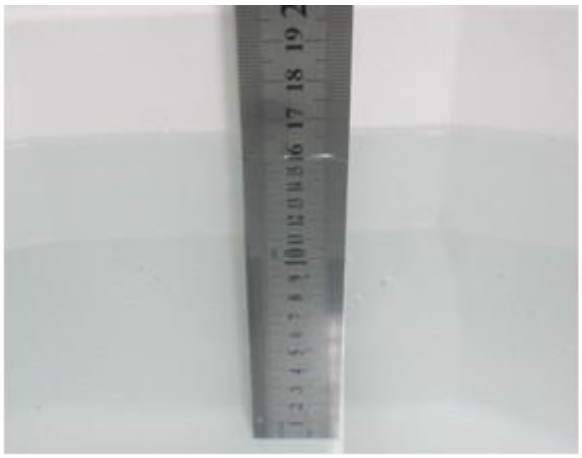
4.6 Test Equipment List

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

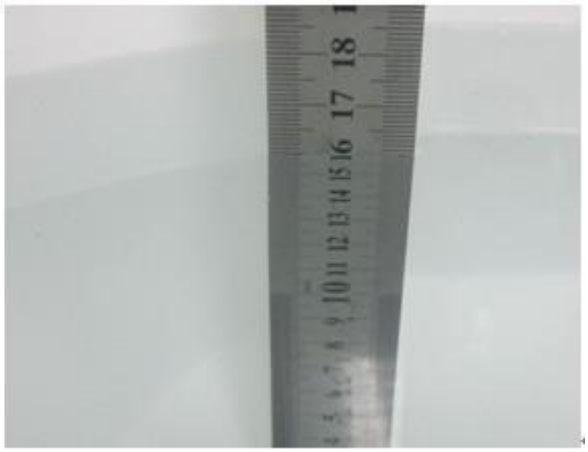
5. Tissue Simulating Liquids

5.1 Composition of Tissue Simulating Liquid

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



Liquid Height for Head SAR



Liquid Height for Body SAR

The Composition of Tissue Simulating Liquid

Frequency (MHz)	Water (%)	Salt (%)	Sugar (%)	HEC (%)	Preventol (%)	DGBE (%)
Body						
750	50.0	0.8	48.8	0.2	0.2	0
835	50.8	0.9	48.2	0	0.1	0.00
1800-1900	70.2	0.4	0	0	0	29.4
2450	68.6	0.1	0	0	0	31.3

5.2 Tissue Dielectric Parameters for Head and Body Phantoms

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

Target Frequency (MHz)	Head		Body	
	Conductivity (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

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

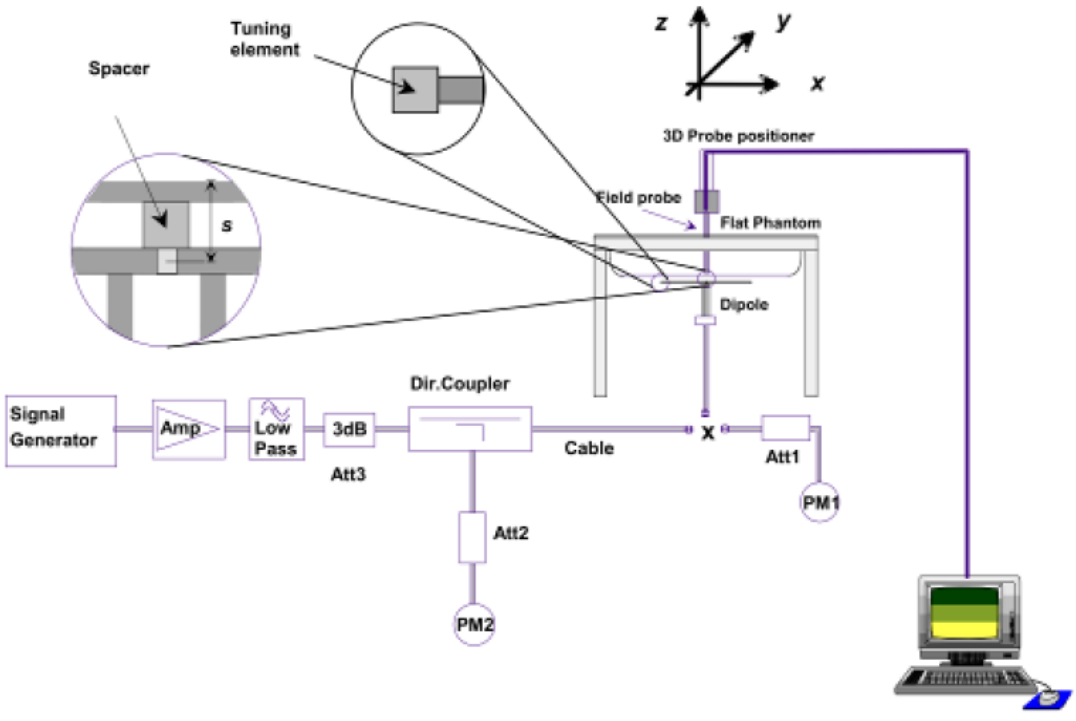
6. SAR Measurement Evaluation

6.1 Purpose of System Performance Check

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

6.2 System Setup

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



System Verification Setup Block Diagram

Setup Photo of Dipole Antenna

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

6.3 Validation Results

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

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

Targeted and Measurement SAR

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

7. EUT Testing Position

7.1 EUT Antenna Position

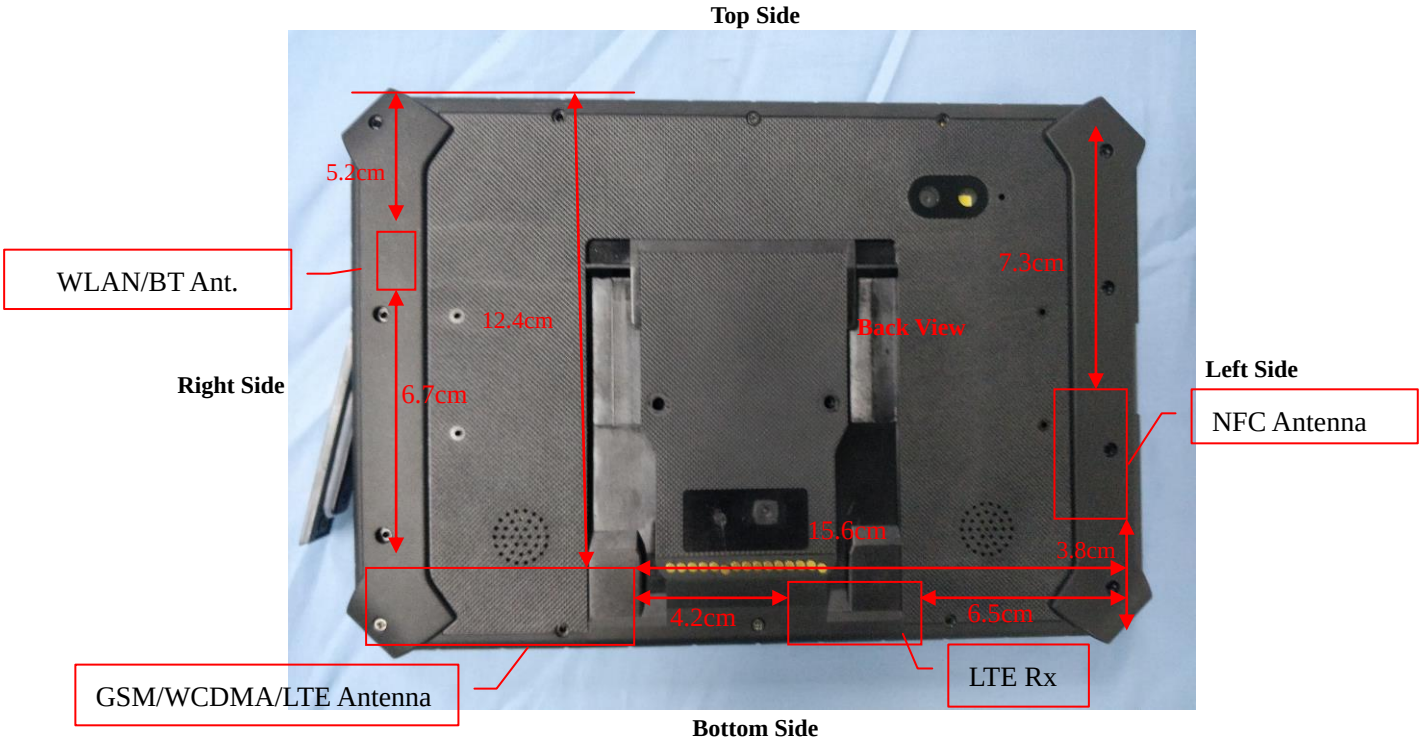


Fig 7.1 Block Diagram for EUT Antenna Position

7.2 EUT Testing Position

Exclusion Distance Calculation				
Frequency Bands	Service	Maximum Tune-up Power	Average Power	Exclusion Distance
GPRS850	GPRS(4slots)	29.5dBm	26.5dBm	110mm
GPRS1900	GPRS(4slots)	27.0dBm	24.0dBm	70mm
WCDMA Band V	RMC 12.2k	23.0dBm	23.0dBm	60mm
WCDMA Band II	RMC 12.2k	23.0dBm	23.0dBm	60mm
LTE Band 2	QPSK(20MHz)	24.0dBm	24.0dBm	70mm
LTE Band 4	QPSK(20MHz)	24.0dBm	24.0dBm	70mm
LTE Band 5	QPSK(10MHz)	23.5dBm	23.5dBm	70mm
LTE Band 12	QPSK(10MHz)	24.0dBm	24.0dBm	70mm
LTE Band 17	QPSK(10MHz)	23.5dBm	23.5dBm	70mm
WLAN	11b	15.5dBm	15.5dBm	20mm
Note: Refer to Chapter 9.1 Conducted RF Output Power				

Remark:

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

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

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

Remark:

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

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

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

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

GSM - Source-Based Time-Average Power (dBm)						
Band	**GSM850**			**PCS1900**		
Channel	**128**	**190**	**251**	**512**	**661**	**810**
Frequency (MHz)	**824.2**	**836.4**	**848.8**	**1850.2**	**1880**	**1909.8**
GSM	23.30	23.30	23.30	20.50	20.50	20.70
GPRS (1 slot)	23.30	23.33	23.29	20.37	20.44	20.64
GPRS (2 slots)	25.70	25.70	25.60	22.83	22.87	23.02
GPRS (3 slots)	25.88	25.81	25.70	23.07	23.09	23.38
GPRS (4 slots)	26.08	25.99	25.86	23.23	23.27	23.51
EGPRS (1 slot)	18.48	18.36	18.21	17.67	17.60	17.62
EGPRS (2 slots)	20.48	20.45	20.42	19.74	19.77	19.74
EGPRS (3 slots)	20.28	20.11	20.18	19.58	19.47	19.49
EGPRS (4 slots)	20.45	20.56	20.34	19.62	19.59	19.58
Note: The source-based time-averaged power is linearly scaled the maximum burst averaged power based on time slots. The calculated method are shown as below: Source based time-average power = Burst averaged power - Duty cycle factor in dB						

Remark:

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

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

Remark:

1. For Body SAR, per KDB 941225 D01 v03r01, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA subset-1 output power is < 1/4 dB higher than RMC, and SAR with RMC 12.2kbps setting is ≦1.2W/kg, HSDPA SAR evaluation can be excluded.

FDD-LTE Band 2:

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.26	0
		1	3	23.31	0
		1	5	23.3	0
		3	0	22.09	0
		3	2	22.11	0
		3	3	22.12	0
		6	0	22.36	1
	MCH	1	0	23.79	0
		1	3	23.6	0
		1	5	23.63	0
		3	0	22.43	0
		3	2	22.39	0
		3	3	22.42	0
		6	0	22.52	1
	HCH	1	0	22.45	0
		1	3	22.39	0
		1	5	22.06	0
		3	0	22.07	0
		3	2	22.61	0
		3	3	22.4	0
		6	0	21.17	1
16QAM	LCH	1	0	22.14	1
		1	3	22.25	1
		1	5	22.16	1
		3	0	22.03	1
		3	2	22.02	1
		3	3	22.02	1
		6	0	21.14	2
	MCH	1	0	22.93	1
		1	3	22.91	1
		1	5	22.96	1
		3	0	22.57	1
		3	2	22.54	1
		3	3	22.59	1
		6	0	21.58	2
	HCH	1	0	21.33	1
		1	3	21.45	1

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

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

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

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

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

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

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

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

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

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

		1	49	22.15	1
		1	99	22.59	1
		50	0	21.28	2
		50	25	21.28	2
		50	50	21.40	2
		100	0	21.37	2
	MCH	1	0	22.69	1
		1	49	22.56	1
		1	99	22.55	1
		50	0	21.19	2
		50	25	21.16	2
		50	50	21.23	2
		100	0	21.16	2
	HCH	1	0	22.41	1
		1	49	21.56	1
		1	99	21.07	1
		50	0	21.42	2
		50	25	20.86	2
		50	50	20.48	2
		100	0	21.04	2

FDD-LTE Band 4:

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	23.29	0
		1	3	23.25	0
		1	5	23.29	0
		3	0	22.25	0
		3	2	22.19	0
		3	3	22.21	0
		6	0	22.33	1
	MCH	1	0	23.47	0
		1	3	23.45	0
		1	5	23.46	0
		3	0	22.50	0
		3	2	22.45	0
		3	3	22.43	0
		6	0	22.49	1
	HCH	1	0	23.30	0
		1	3	23.22	0

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

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

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

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

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

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

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

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

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

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

		50	25	21.47	2
		50	50	21.38	2
		100	0	21.45	2

FDD-LTE Band 5:

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.39	0
		1	3	22.37	0
		1	5	22.41	0
		3	0	22.43	0
		3	2	22.36	0
		3	3	22.42	0
		6	0	21.44	1
	MCH	1	0	22.79	0
		1	3	22.81	0
		1	5	22.82	0
		3	0	22.36	0
		3	2	22.33	0
		3	3	22.33	0
		6	0	21.81	1
	HCH	1	0	23.15	0
		1	3	23.14	0
		1	5	23.19	0
		3	0	22.23	0
		3	2	22.21	0
		3	3	22.23	0
		6	0	22.25	1
16QAM	LCH	1	0	21.7	1
		1	3	21.74	1
		1	5	21.74	1
		3	0	21.36	1
		3	2	21.34	1
		3	3	21.38	1
		6	0	21.36	2
	MCH	1	0	22.07	1
		1	3	22.13	1
		1	5	22.1	1
		3	0	21.89	1
		3	2	21.87	1
		3	3	21.92	1

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

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

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

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

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

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

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

FDD-LTE Band 12:

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

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

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

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

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

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

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

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

FDD-LTE Band 17:

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

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

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

		50	0	21.23	2
	HCH	1	0	22.50	1
		1	24	22.39	1
		1	49	22.36	1
		25	0	21.19	2
		25	12	21.12	2
		25	25	21.17	2
		50	0	21.21	2

Remark:

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≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel. 6 When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

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 ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.

4. Per KDB941225 D05 v02r05, For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in 5.2.1, 5.2.2, and 5.2.3 to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is > ½ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg

WLAN - Maximum Average Power				
Test Mode	**Data Rate**	**Channel**	**Frequency (MHz)**	**Average Power (dBm)**
802.11b	11Mbps	CH 01	2412	15.01
		CH 06	2437	15.16
		CH 11	2462	14.98
802.11g	54Mbps	CH 01	2412	12.91
		CH 06	2437	12.66
		CH 11	2462	12.2
802.11n (20MHz)	MCS7	CH 01	2412	12.72
		CH 06	2437	12.53
		CH 11	2462	12.07
802.11n (40MHz)	MCS7	CH 03	2422	11.71
		CH 06	2437	11.46
		CH 09	2452	11.31

Remark:

1. Per KDB 248227 D01 v02r02, For 802.11b DSSS SAR measurements, DSSS SAR procedure applies to fixed exposure test position and initial test position procedure applies to multiple exposure test positions.

2. Per KDB 248227 D01 v02r02, For 802.11b DSSS SAR measurements ,when the reported SAR of the highest measured maximum output power channel (see 3.1) for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration. When the reported SAR is > 0.8 W/kg, SAR is required for that exposure configuration using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

3 .For OFDM modes (802.11g/n), SAR is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and it is <= 1.2W/kg.

Bluetooth - Maximum Average Power		
Test Mode	**Data Rate**	**Average Power(dBm)**
GFSK	1Mbps	4.787
Pi/4 QDPSK	2Mbps	4.219
8DPSK	3Mbps	4.413

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

NFC - Maximum Average Power			
Test Mode	**Frequency (MHz)**	**Average Power(dBm)**	**Tune-up power (dBm)**
NFC	13.56	-8.86	-8.5

Remark:

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

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 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 calculation17
- The result is rounded to one decimal place for comparison

BT:

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

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

NFC:

Tune-Up Power (dBm)	Max. Power (mW)	Distance (mm)	Frequency (GHz)	Result	Limit
-8.5	0.14	5	0.01356	0.00326	3

The exclusion thresholds is 0.00326< 3, therefore, the RF exposure evaluation is not required.

9.2 Test Results for Standalone SAR Test

Body SAR

GSM850 – Body SAR Test (Gap: 0mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
1.	GPRS_4TX	Back Side	128	824.2	29.08	29.5	1.102	0.440	0.485
2.	GPRS_4TX	Right side	128	824.2	29.08	29.5	1.102	0.102	0.112
3.	GPRS_4TX	Bottom side	128	824.2	29.08	29.5	1.102	0.101	0.111

GSM1900 – Body SAR Test (Gap: 0mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
4.	GPRS_4TX	Back Side	810	1909.8	26.51	27.0	1.119	0.873	0.977
5.	GPRS_4TX	Back Side	512	1850.2	26.23	27.0	1.194	0.381	0.455
6.	GPRS_4TX	Back Side	661	1880.0	26.27	27.0	1.183	0.567	0.671
7.	GPRS_4TX	Right side	810	1909.8	26.51	27.0	1.119	0.567	0.635
8.	GPRS_4TX	Bottom side	810	1909.8	26.51	27.0	1.119	0.720	0.806

WCDMA Band V – Body SAR Test (Gap: 0mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
9.	RMC 12.2k	Back Side	4183	836.6	22.81	23.0	1.045	0.133	0.139
10.	RMC 12.2k	Right side	4183	836.6	22.81	23.0	1.045	0.032	0.033
11.	RMC 12.2k	Bottom side	4183	836.6	22.81	23.0	1.045	0.042	0.044

WCDMA Band II – Body SAR Test (Gap: 0mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
12.	RMC 12.2k	Back Side	9262	1852.4	22.82	23.0	1.042	0.826	0.861
13.	RMC 12.2k	Back Side	9400	1880.0	22.75	23.0	1.059	0.699	0.740
14.	RMC 12.2k	Back Side	9538	1907.6	22.72	23.0	1.067	0.498	0.531
15.	RMC 12.2k	Right side	9262	1852.4	22.82	23.0	1.042	0.432	0.450
16.	RMC 12.2k	Bottom side	9262	1852.4	22.82	23.0	1.042	0.566	0.590

LTE Band 2–Body SAR Test (Gap: 0mm)								
Plot No.	Mode	Test Position	Frequency	Output Power	Rated Limit	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB	Body	MHz	(dBm)	(dBm)			
17.	QPSK 20MHz 1RB	Back Side	1880.0	23.87	24.0	1.030	0.600	0.618
18.	QPSK 20MHz 1RB	Right side	1880.0	23.87	24.0	1.030	0.413	0.426
19.	QPSK 20MHz 1RB	Bottom side	1880.0	23.87	24.0	1.030	0.53	0.546
20.	QPSK 20MHz 50%RB	Back Side	1880.0	23.87	24.0	1.030	0.311	0.320
21.	QPSK 20MHz 50%RB	Right side	1880.0	23.87	24.0	1.030	0.251	0.259
22.	QPSK 20MHz 50%RB	Bottom side	1880.0	23.87	24.0	1.030	0.287	0.296

LTE Band 4–Body SAR Test (Gap: 0mm)								
Plot No.	Mode	Test Position	Frequency	Output Power	Rated Limit	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB	Body	MHz	(dBm)	(dBm)			
23.	QPSK 20MHz 1RB	Back Side	1732.5	23.58	24.0	1.102	0.358	0.394
24.	QPSK 20MHz 1RB	Right side	1732.5	23.58	24.0	1.102	0.336	0.370
25.	QPSK 20MHz 1RB	Bottom side	1732.5	23.58	24.0	1.102	0.632	0.696
26.	QPSK 20MHz 50%RB	Back Side	1732.5	23.58	24.0	1.102	0.198	0.218
27.	QPSK 20MHz 50%RB	Right side	1732.5	23.58	24.0	1.102	0.187	0.206
28.	QPSK 20MHz 50%RB	Bottom side	1732.5	23.58	24.0	1.102	0.312	0.344

LTE Band 5–Body SAR Test (Gap: 0mm)								
Plot No.	Mode	Test Position	Frequency	Output Power	Rated Limit	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB	Body	MHz	(dBm)	(dBm)			
29.	QPSK 10MHz 1RB	Back Side	844.0	23.38	23.5	1.028	0.065	0.067
30.	QPSK 10MHz 1RB	Right side	844.0	23.38	23.5	1.028	0.031	0.032
31.	QPSK 10MHz 1RB	Bottom side	844.0	23.38	23.5	1.028	0.048	0.049
32.	QPSK 10MHz 50%RB	Back Side	844.0	23.38	23.5	1.028	0.036	0.037
33.	QPSK 10MHz 50%RB	Right side	844.0	23.38	23.5	1.028	0.019	0.020
34.	QPSK 10MHz 50%RB	Bottom side	844.0	23.38	23.5	1.028	0.023	0.024

LTE Band 12–Body SAR Test (Gap: 0mm)								
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB		MHz					
35.	10MHz 1RB	Back Side	704.0	23.57	24.0	1.104	0.067	0.074
36.	10MHz 1RB	Right side	704.0	23.57	24.0	1.104	0.022	0.024
37.	10MHz 1RB	Bottom side	704.0	23.57	24.0	1.104	0.028	0.031
38.	10MHz 50%RB	Back Side	704.0	23.57	24.0	1.104	0.034	0.038
39.	10MHz 50%RB	Right side	704.0	23.57	24.0	1.104	0.013	0.014
40.	10MHz 50%RB	Bottom side	704.0	23.57	24.0	1.104	0.018	0.020

LTE Band 17–Body SAR Test (Gap: 0mm)								
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB		MHz					
41.	QPSK 10MHz 1RB	Back Side	709.0	23.23	23.5	1.064	0.065	0.069
42.	QPSK 10MHz 1RB	Right side	709.0	23.23	23.5	1.064	0.021	0.022
43.	QPSK 10MHz 1RB	Bottom side	709.0	23.23	23.5	1.064	0.027	0.029
44.	QPSK 10MHz 50%RB	Back Side	709.0	23.23	23.5	1.064	0.031	0.033
45.	QPSK 10MHz 50%RB	Right side	709.0	23.23	23.5	1.064	0.014	0.015
46.	QPSK 10MHz 50%RB	Bottom side	709.0	23.23	23.5	1.064	0.019	0.020

WLAN 2.4GHz –Body SAR Test(Gap: 0mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
47.	802.11b	Back Side	06	2437	15.16	15.5	1.081	0.148	0.160
48.	802.11b	Right side	06	2437	15.16	15.5	1.081	0.085	0.092

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

Repeated SAR Measurement

GSM1900 – Body SAR Test (Gap: 0mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
49.	GPRS_4TX	Back Side	810	1909.8	26.51	27.0	1.119	0.852	0.954

WCDMA Band II – Body SAR Test (Gap: 0mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
50.	RMC 12.2k	Back Side	9262	1852.4	22.82	23.0	1.042	0.803	0.837

Remark:

SAR repeated measurement procedure:

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

9.3 Simultaneous Multi-band Transmission SAR Analysis

List of Mode for Simultaneous Multi-band Transmission

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

Remark:

1. GSM and WCDMA cannot transmit simultaneously.

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

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

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

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

Bluetooth:

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

NFC:

Tune-Up Power (dBm)	Max. Power (mW)	Distance (mm)	Frequency (GHz)	Result	Limit
-8 dBm	0.1585	5	0.01356	0.00369	3

The exclusion thresholds is 0.00369< 3, therefore, the RF exposure evaluation is not required.

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

Body SAR

WWAN and WLAN

	WWAN		WLAN	Summed SAR (W/kg)
Position	**Band**	**Scaled SAR (W/kg)**	**Scaled SAR (W/kg)**	
Back	GSM850	0.485	0.160	0.645
Front	GSM850	--	--	--
Top side	GSM850	--	--	--
Bottom side	GSM850	0.111	--	0.111
Right side	GSM850	0.112	0.092	0.204
Left side	GSM850	--	--	--
Back	GSM1900	0.977	0.160	**1.137**
Front	GSM1900	--	--	--
Top side	GSM1900	--	--	--
Bottom side	GSM1900	0.806	--	0.806
Right side	GSM1900	0.635	0.092	0.727
Left side	GSM1900	--	--	--
Back	WCDMA Band V	0.139	0.160	0.299
Front	WCDMA Band V	--	--	--
Top side	WCDMA Band V	--	--	--
Bottom side	WCDMA Band V	0.044	--	0.044
Right side	WCDMA Band V	0.033	0.092	0.125
Left side	WCDMA Band V	--	--	--
Back	WCDMA Band II	0.861	0.160	1.021
Front	WCDMA Band II	--	--	--
Top side	WCDMA Band II	--	--	--
Bottom side	WCDMA Band II	0.590	--	0.590
Right side	WCDMA Band II	0.450	0.092	0.542
Left side	WCDMA Band II	--	--	--
Back	LTE Band 2	0.618	0.160	0.778
Front	LTE Band 2	--	--	--
Top side	LTE Band 2	--	--	--
Bottom side	LTE Band 2	0.546	--	0.546
Right side	LTE Band 2	0.426	0.092	0.518
Left side	LTE Band 2	--	--	--
Back	LTE Band 4	0.394	0.160	0.554
Front	LTE Band 4	--	--	--
Top side	LTE Band 4	--	--	--
Bottom side	LTE Band 4	0.696	--	0.696
Right side	LTE Band 4	0.370	0.092	0.462
Left side	LTE Band 4	--	--	--

Back	LTE Band 5	0.067	0.160	0.227
Front	LTE Band 5	--	--	--
Top side	LTE Band 5	--	--	--
Bottom side	LTE Band 5	0.049	--	0.049
Right side	LTE Band 5	0.032	0.092	0.124
Left side	LTE Band 5	--	--	--
Back	LTE Band 12	0.074	0.160	0.234
Front	LTE Band 12	--	--	--
Top side	LTE Band 12	--	--	--
Bottom side	LTE Band 12	0.031	--	0.031
Right side	LTE Band 12	0.024	0.092	0.116
Left side	LTE Band 12	--	--	--
Back	LTE Band 17	0.069	0.160	0.229
Front	LTE Band 17	--	--	--
Top side	LTE Band 17	--	--	--
Bottom side	LTE Band 17	0.029	--	0.029
Right side	LTE Band 17	0.022	0.092	0.114
Left side	LTE Band 17	--	--	--

WWAN and Bluetooth

	WWAN		Bluetooth	Summed SAR (W/kg)
Position	**Band**	**Scaled SAR (W/kg)**	**Scaled SAR (W/kg)**	
Back	GSM850	0.485	0.131	0.616
Front	GSM850	--	0.131	0.131
Top side	GSM850	--	0.131	0.131
Bottom side	GSM850	0.111	0.131	0.242
Right side	GSM850	0.112	0.131	0.243
Left side	GSM850	--	0.131	0.131
Back	GSM1900	0.977	0.131	**1.108**
Front	GSM1900	--	0.131	0.131
Top side	GSM1900	--	0.131	0.131
Bottom side	GSM1900	0.806	0.131	0.937
Right side	GSM1900	0.635	0.131	0.766
Left side	GSM1900	--	0.131	0.131
Back	WCDMA Band V	0.139	0.131	0.270
Front	WCDMA Band V	--	0.131	0.131
Top side	WCDMA Band V	--	0.131	0.131
Bottom side	WCDMA Band V	0.044	0.131	0.175
Right side	WCDMA Band V	0.033	0.131	0.164
Left side	WCDMA Band V	--	0.131	0.131
Back	WCDMA Band II	0.861	0.131	0.992
Front	WCDMA Band II	--	0.131	0.131

Top side	WCDMA Band II	--	0.131	0.131
Bottom side	WCDMA Band II	0.590	0.131	0.721
Right side	WCDMA Band II	0.450	0.131	0.581
Left side	WCDMA Band II	--	0.131	0.131
Back	LTE Band 2	0.618	0.131	0.749
Front	LTE Band 2	--	0.131	0.131
Top side	LTE Band 2	--	0.131	0.131
Bottom side	LTE Band 2	0.546	0.131	0.677
Right side	LTE Band 2	0.426	0.131	0.557
Left side	LTE Band 2	--	0.131	0.131
Back	LTE Band 4	0.394	0.131	0.525
Front	LTE Band 4	--	0.131	0.131
Top side	LTE Band 4	--	0.131	0.131
Bottom side	LTE Band 4	0.696	0.131	0.827
Right side	LTE Band 4	0.370	0.131	0.501
Left side	LTE Band 4	--	0.131	0.131
Back	LTE Band 5	0.067	0.131	0.198
Front	LTE Band 5	--	0.131	0.131
Top side	LTE Band 5	--	0.131	0.131
Bottom side	LTE Band 5	0.049	0.131	0.180
Right side	LTE Band 5	0.032	0.131	0.163
Left side	LTE Band 5	--	0.131	0.131
Back	LTE Band 12	0.074	0.131	0.205
Front	LTE Band 12	--	0.131	0.131
Top side	LTE Band 12	--	0.131	0.131
Bottom side	LTE Band 12	0.031	0.131	0.162
Right side	LTE Band 12	0.024	0.131	0.155
Left side	LTE Band 12	--	0.131	0.131
Back	LTE Band 17	0.069	0.131	0.200
Front	LTE Band 17	--	0.131	0.131
Top side	LTE Band 17	--	0.131	0.131
Bottom side	LTE Band 17	0.029	0.131	0.160
Right side	LTE Band 17	0.022	0.131	0.153
Left side	LTE Band 17	--	0.131	0.131

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	√3	(1_Cp)^1/2	(1_Cp)^1/2	1.02	1.02	∝
Hemispherical Isotropy	E.2.2	4.0	R	√3	(Cp)^1/2	(Cp)^1/2	1.63	1.63	∝
Boundary effect	E.2.3	1.0	R	√3	1	1	0.58	0.58	∝
Linearity	E.2.4	5.0	R	√3	1	1	2.89	2.89	∝
System detection limits	E.2.5	1.0	R	√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	√3	1	1	1.73	1.73	∝
Integration Time	E.2.8	2.0	R	√3	1	1	1.15	1.15	∝
RF ambient Conditions – Noise	E.6.1	3.0	R	√3	1	1	1.73	1.73	∝
RF ambient Conditions - Reflections	E.6.1	3.0	R	√3	1	1	1.73	1.73	∝
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	√3	1	1	1.15	1.15	∝
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	√3	1	1	0.03	0.03	∝
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	E.5	5.0	R	√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	√3	1	1	6.94	6.94	∝
SAR scaling	E6.5	0.0	R	√3	1	1	0.0	0.0	∝
Phantom and Tissue Parameters									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	√3	1	1	0.03	0.03	∝
Uncertainty in SAR correction for deviations in permittivity and conductivity	E3.2	1.9	R	√3	1	0.84	1.10	0.90	∝
Liquid conductivity - deviation	E.3.2	5.00	R	√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	√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	√3	(1_Cp)^1/2	(1_Cp)^1/2	1.02	1.02	∝
Hemispherical Isotropy	E.2.2	4.0	R	√3	(Cp)^1/2	(Cp)^1/2	1.63	1.63	∝
Boundary effect	E.2.3	1.0	R	√3	1	1	0.58	0.58	∝
Linearity	E.2.4	5.0	R	√3	1	1	2.89	2.89	∝
System detection limits	E.2.5	1.0	R	√3	1	1	0.58	0.58	∝
Modulation response	E.2.5	0	R	√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	√3	1	1	1.73	1.73	∝
Integration Time	E.2.8	2.0	R	√3	1	1	1.15	1.15	∝
RF ambient Conditions – Noise	E.6.1	3.0	R	√3	1	1	1.73	1.73	∝
RF ambient Conditions - Reflections	E.6.1	3.0	R	√3	1	1	1.73	1.73	∝
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	√3	1	1	1.15	1.15	∝
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	√3	1	1	0.03	0.03	∝
Extrapolation, interpolation and integration Algoritms for Max.	E.5.2	5.0	R	√3	1	1	2.89	2.89	∝

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

Annex A. Plots of System Performance Check

MEASUREMENT 1

For Head Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/12/2019

Measurement duration: 7 minutes 21 seconds

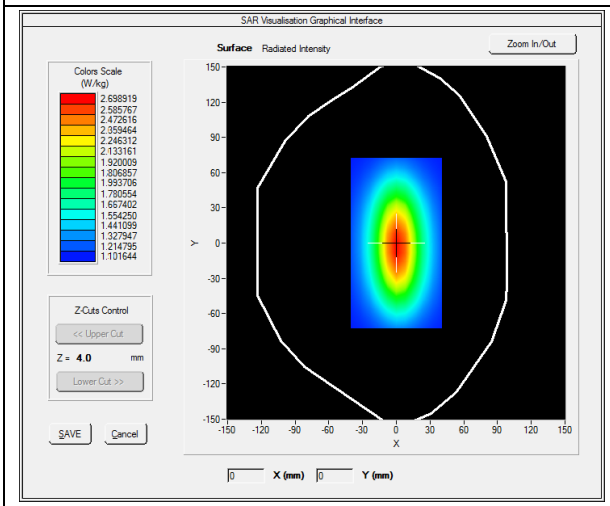
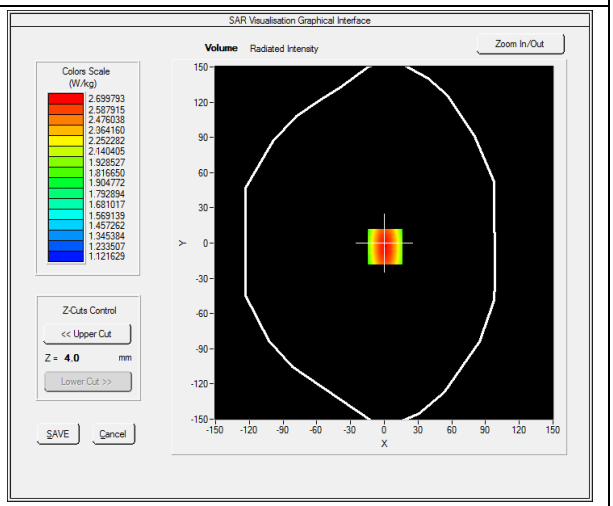
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.99; Calibrated: 05/22/2019

A. Experimental conditions

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

B. SAR Measurement Results

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

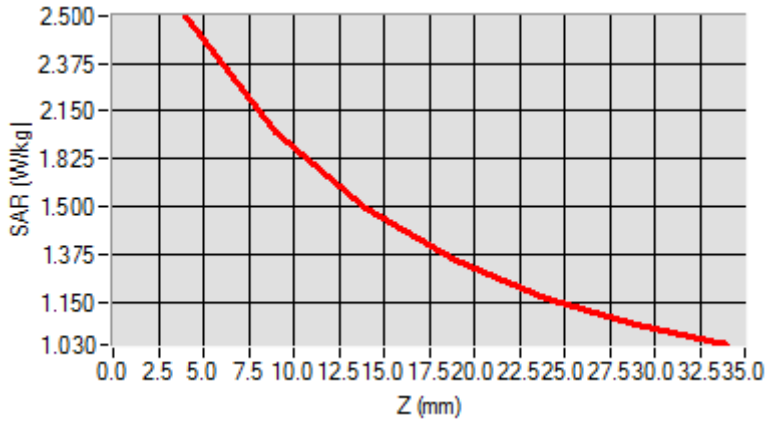
SURFACE SAR	VOLUME SAR
	

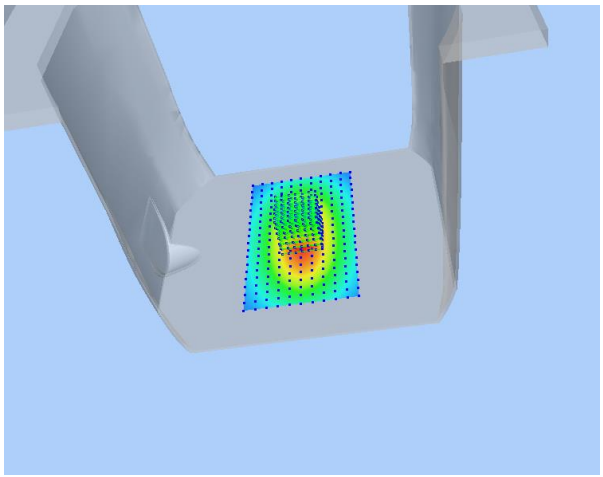
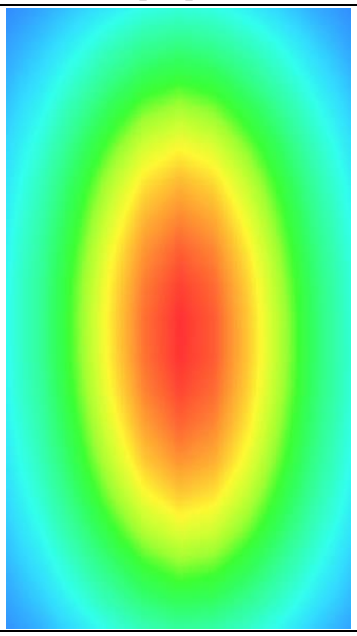
Maximum location: X=0.00, Y=0.00

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

Z Axis Scan

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



3D screen shot	Hot spot position
	

MEASUREMENT 2

For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/12/2019

Measurement duration: 12 minutes 21 seconds

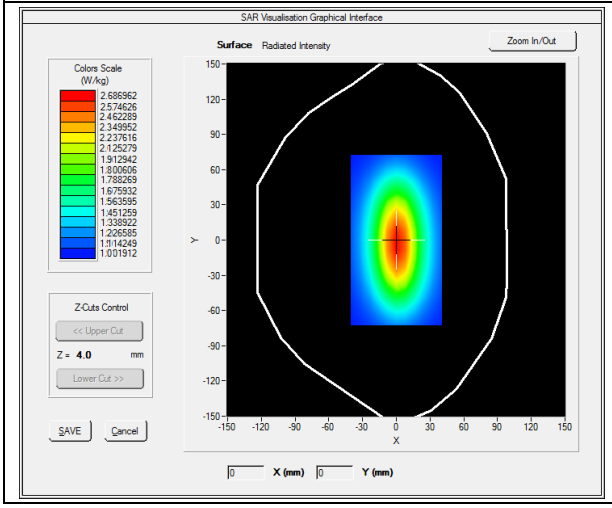
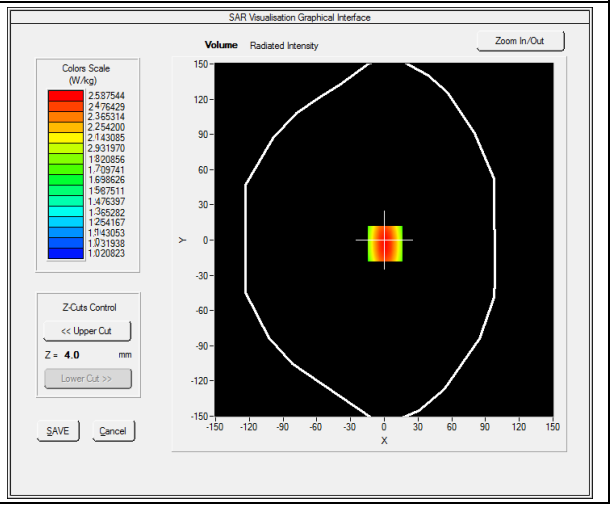
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 05/22/2019

A. Experimental conditions

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

B. SAR Measurement Results

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

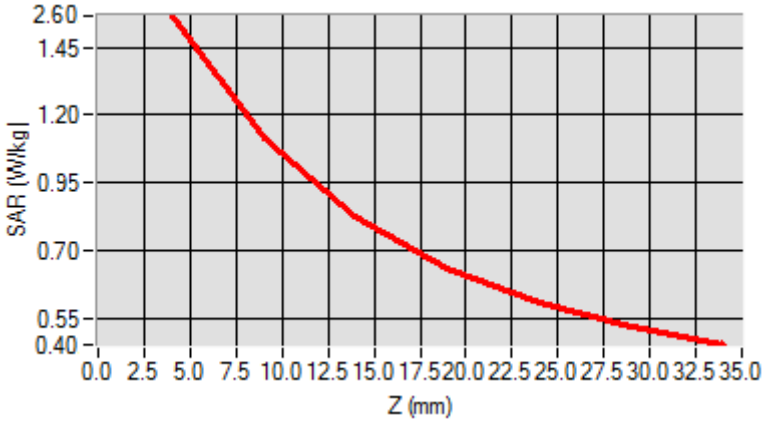
SURFACE SAR	VOLUME SAR
	

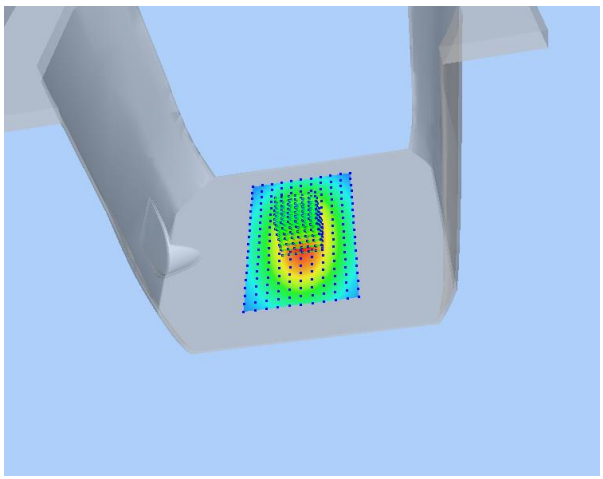
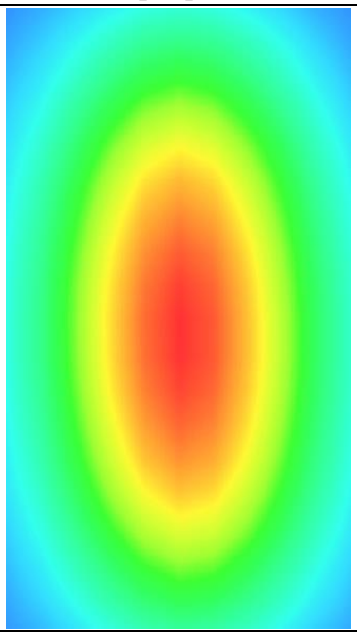
Maximum location: X=0.00, Y=0.00

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

Z Axis Scan

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



3D screen shot	Hot spot position
	

MEASUREMENT 3

For Head Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/13/2019

Measurement duration: 12 minutes 21 seconds

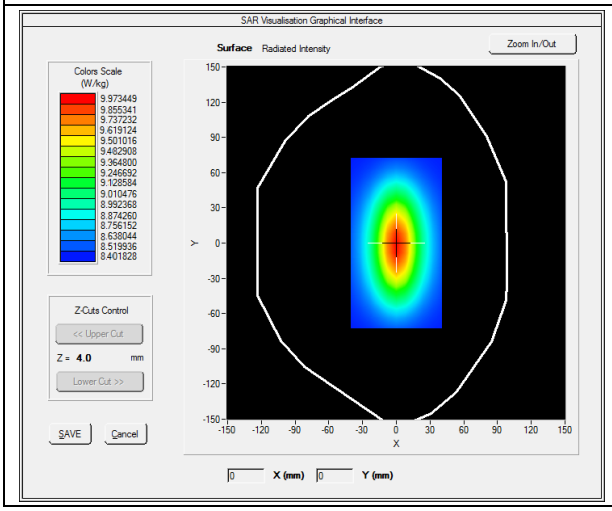
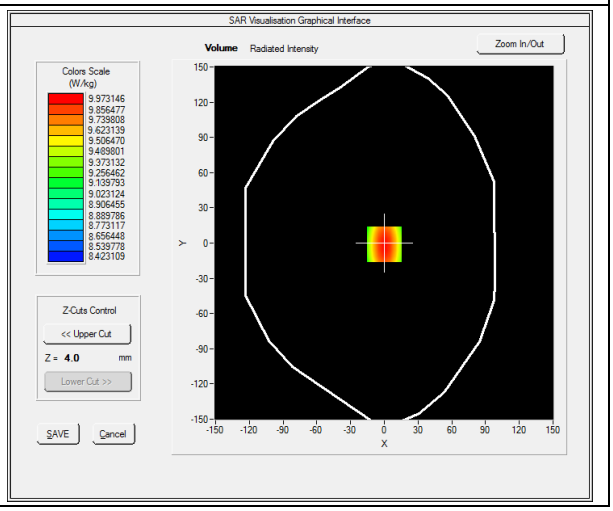
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.84; Calibrated: 05/22/2019

A. Experimental conditions

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

B. SAR Measurement Results

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

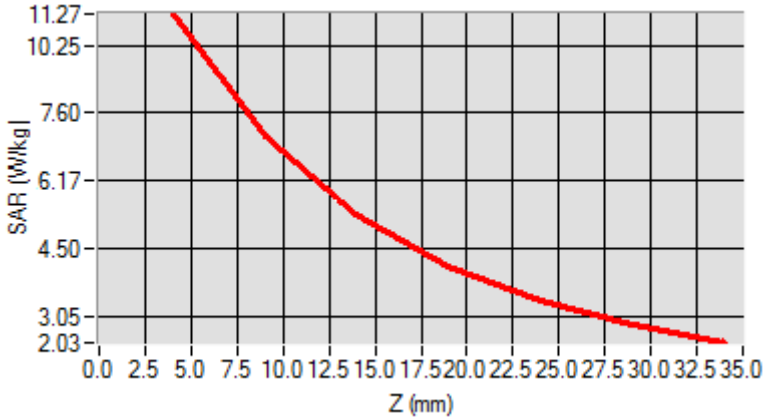
SURFACE SAR	VOLUME SAR
	

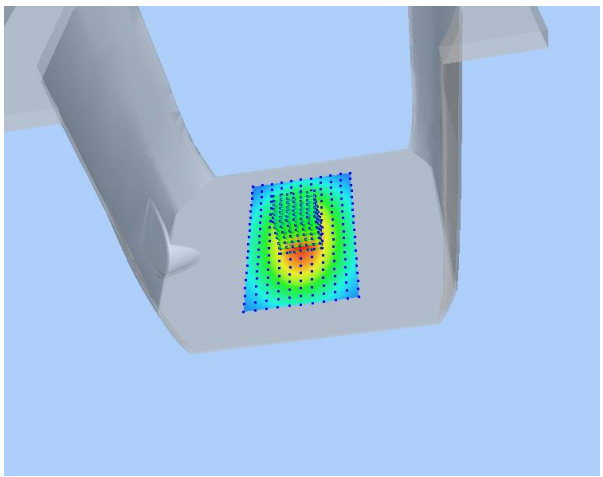
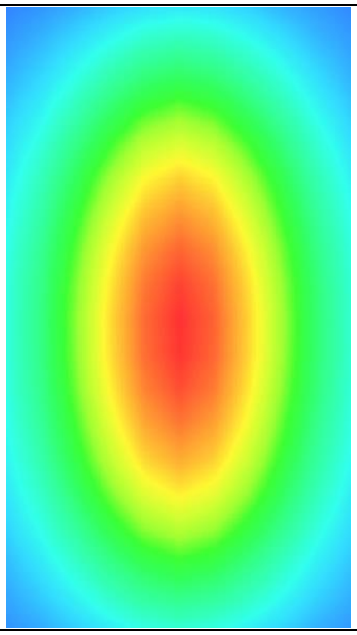
Maximum location: X=0.00, Y=0.00

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

Z Axis Scan

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



3D screen shot	**Hot spot position**
	

MEASUREMENT 4

For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/13/2019

Measurement duration: 12 minutes 21 seconds

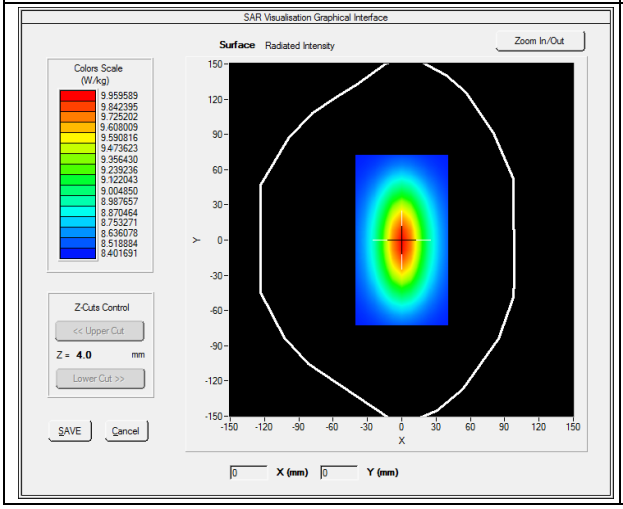
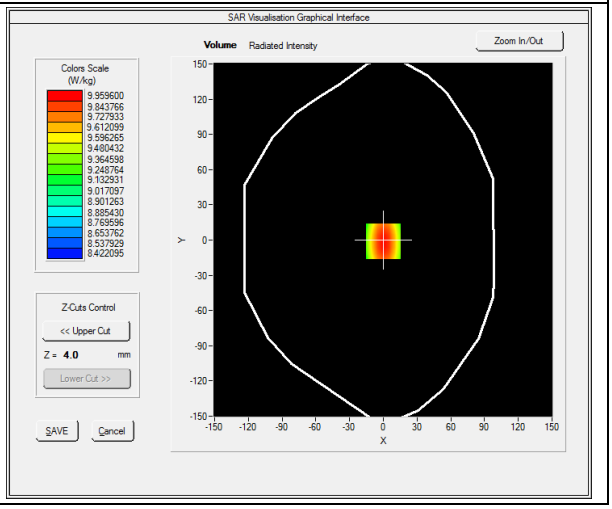
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 05/22/2019

A. Experimental conditions

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

B. SAR Measurement Results

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

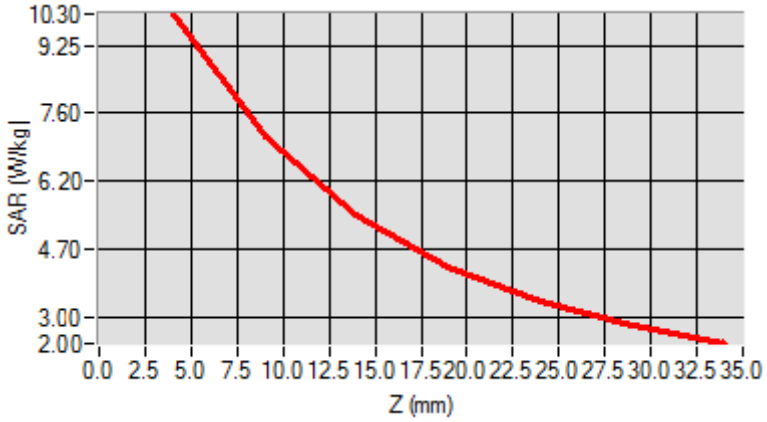
SURFACE SAR	VOLUME SAR
	

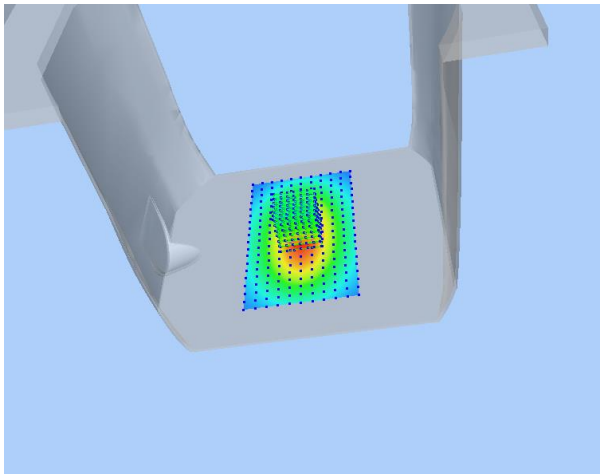
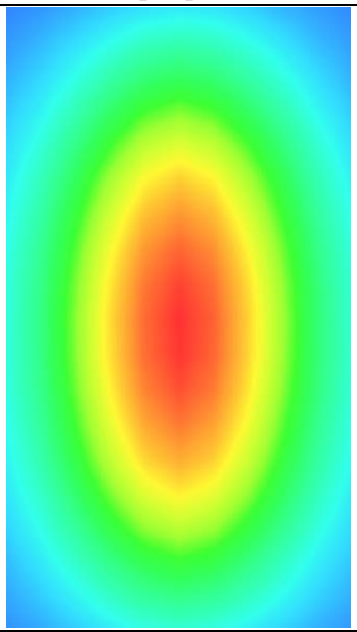
Maximum location: X=0.00, Y=0.00

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

Z Axis Scan

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



3D screen shot	Hot spot position
	

MEASUREMENT 5

For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/14/2019

Measurement duration: 12 minutes 21 seconds

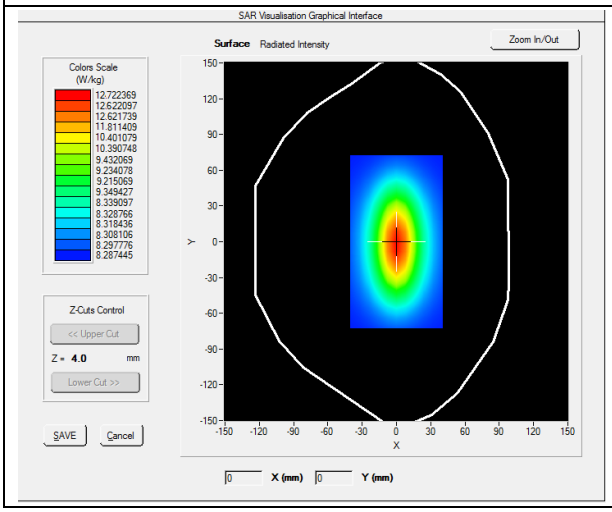
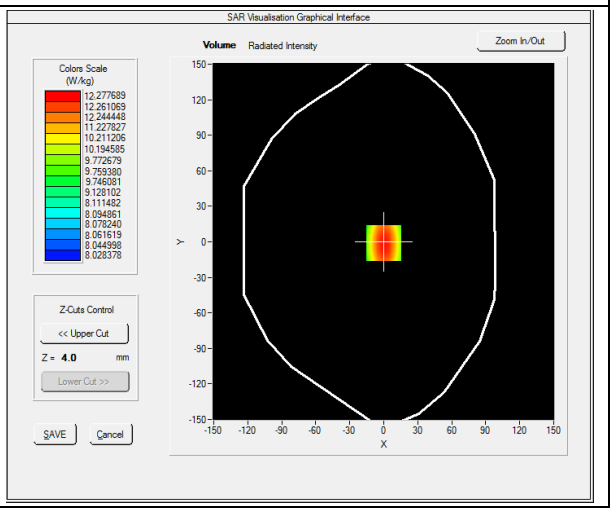
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.80; Calibrated: 05/22/2019

A. Experimental conditions

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

B. SAR Measurement Results

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

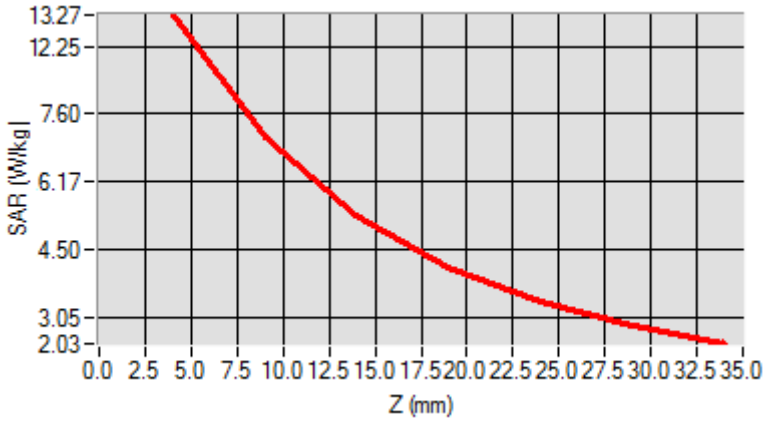
SURFACE SAR	VOLUME SAR
	

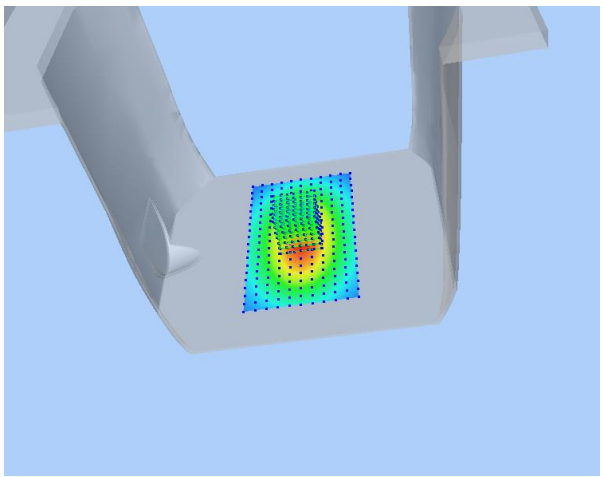
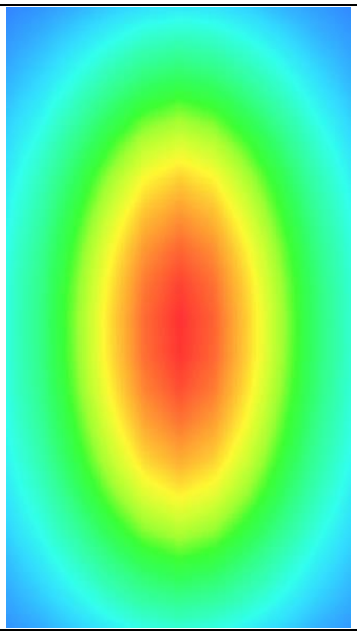
Maximum location: X=0.00, Y=0.00

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

Z Axis Scan

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



3D screen shot	Hot spot position
	

Annex B. Plots of SAR Measurement

TYPE	BAND	PARAMETERS
Tablet	**GPRS850_4TX**	Measurement 1: Flat Plane with Back device position on Low Channel in GPRS mode
Tablet	**GPRS1900_4TX**	Measurement 4: Flat Plane with Back device position on High Channel in GPRS mode
Tablet	**WCDMA850_RMC**	Measurement 9: Flat Plane with Back device position on Middle Channel in WCDMA mode
Tablet	**WCDMA1900_RMC**	Measurement 12: Flat Plane with Back device position on Low Channel in WCDMA mode
Tablet	**LTE Band 2**	Measurement 17: Flat Plane with Back device position on Middle Channel in LTE mode
Tablet	**LTE Band 4**	Measurement 25: Flat Plane with Bottom device position on Middle Channel in LTE mode
Tablet	**LTE Band 5**	Measurement 29: Flat Plane with Back device position on High Channel in LTE mode
Tablet	**LTE Band 12**	Measurement 35: Flat Plane with Back device position on Low Channel in LTE mode
Tablet	**LTE Band 17**	Measurement 41: Flat Plane with Back device position on Low Channel in LTE mode
Tablet	**WIFI_802.11b**	Measurement 47: Flat Plane with Back side device position on Middle Channel in WIFI mode
Remark: SAR plot is showed the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.		

MEASUREMENT 1

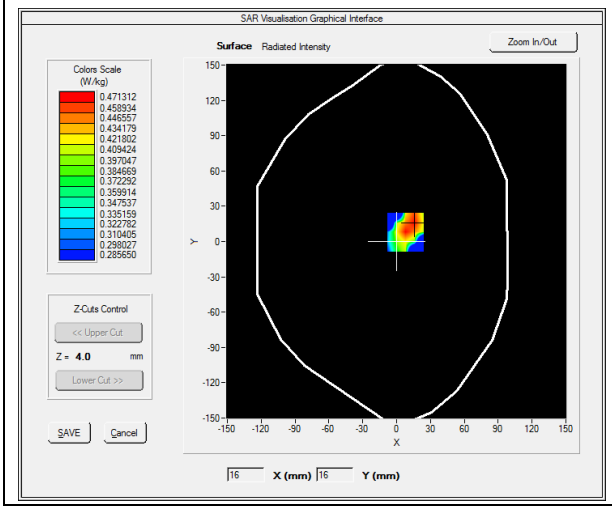
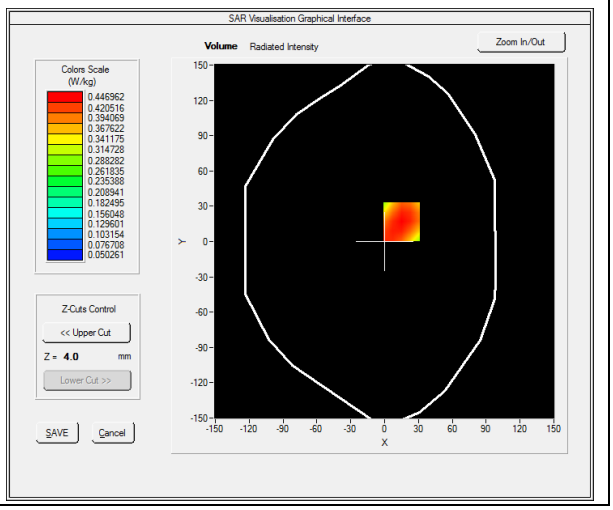
Type: Phone measurement (Complete)
Date of measurement: 08/12/2019
Measurement duration: 12 minutes 3 seconds
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 05/22/2019

A. Experimental conditions

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

B. SAR Measurement Results

Frequency (MHz)	824.200000
Relative Permittivity (real part)	54.851214
Conductivity (S/m)	0.951454
Power Variation (%)	0.562472
Ambient Temperature	21.1
Liquid Temperature	21.3

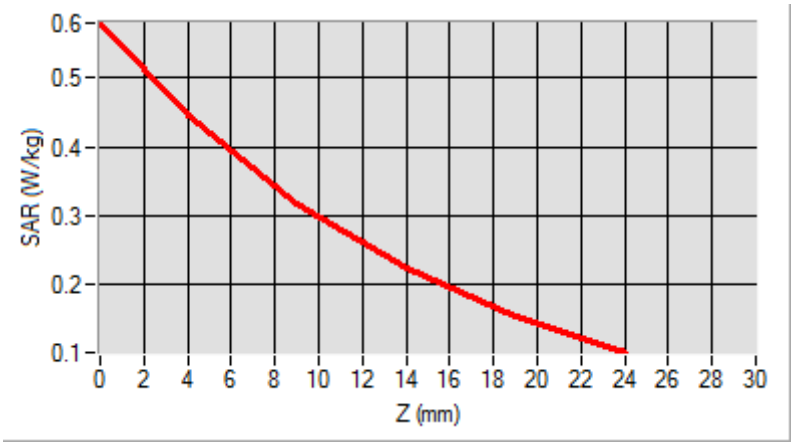
SURFACE SAR	VOLUME SAR
	

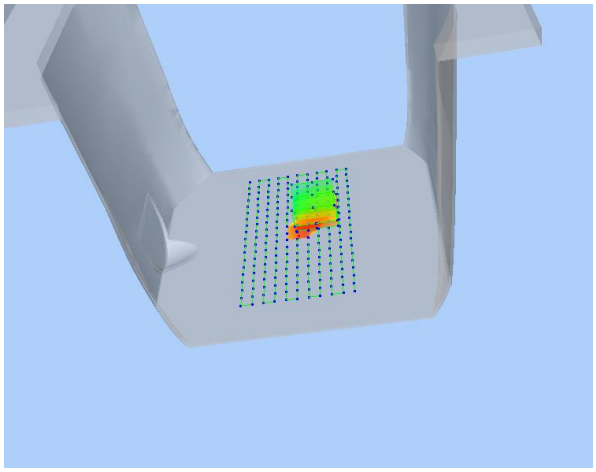
Maximum location: X=15.00, Y=17.00

SAR Peak: 0.66 W/kg

SAR 10g (W/Kg)	**0.301751**
SAR 1g (W/Kg)	**0.440327**

Z (mm)	**0.00**	**4.00**	**9.00**	**14.00**	**19.00**
SAR (W/Kg)	**0.5800**	**0.4470**	**0.3182**	**0.2234**	**0.1539**



3D screen shot	**Hot spot position**
	

MEASUREMENT 4

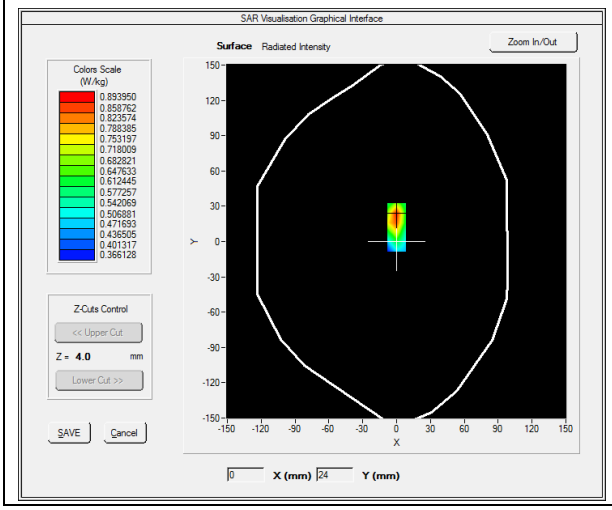
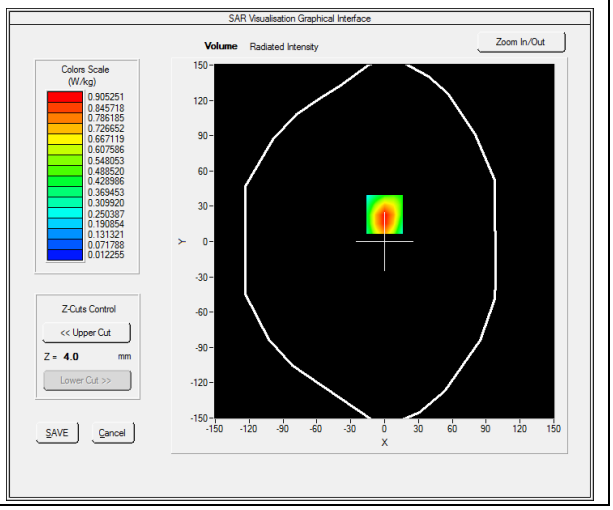
Type: Phone measurement (Complete)
Date of measurement: 08/13/2019
Measurement duration: 12 minutes 3 seconds
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 05/22/2019

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Flat plane
Device Position	Back side
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 (%)	0.986340
Ambient Temperature	21.1
Liquid Temperature	21.3

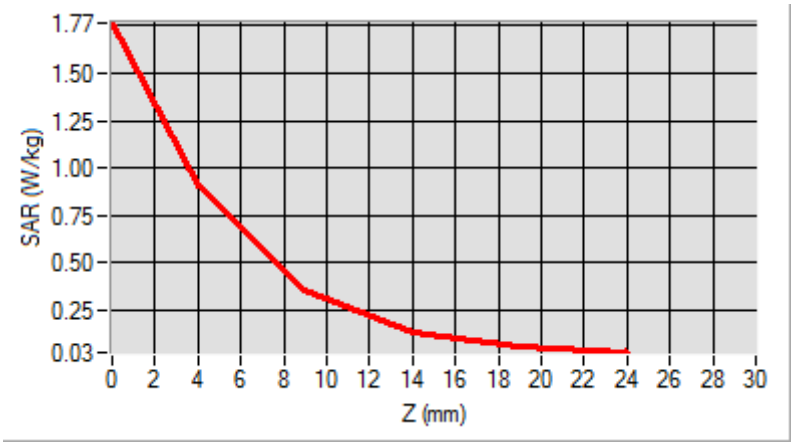
SURFACE SAR	VOLUME SAR
	

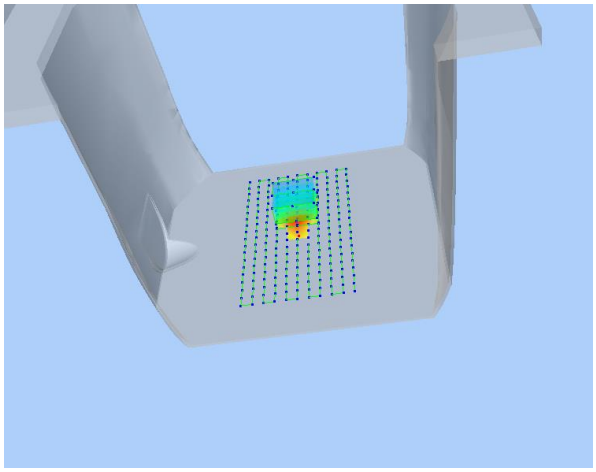
Maximum location: X=0.00, Y=23.00

SAR Peak: 1.80 W/kg

SAR 10g (W/Kg)	0.403196
SAR 1g (W/Kg)	0.872968

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.7651	0.9053	0.3511	0.1293	0.0550



3D screen shot	Hot spot position
	

MEASUREMENT 9

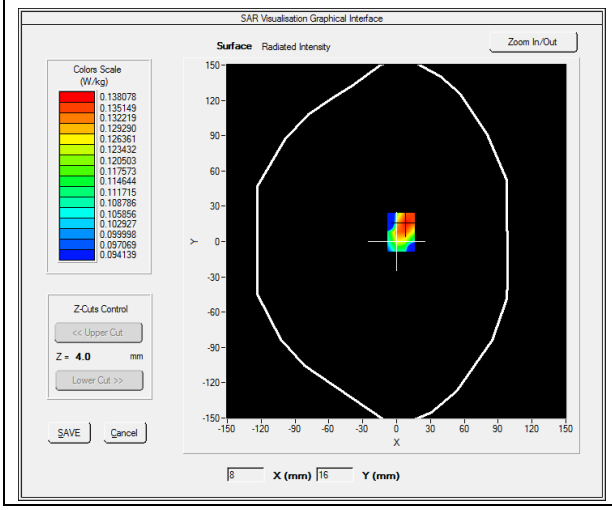
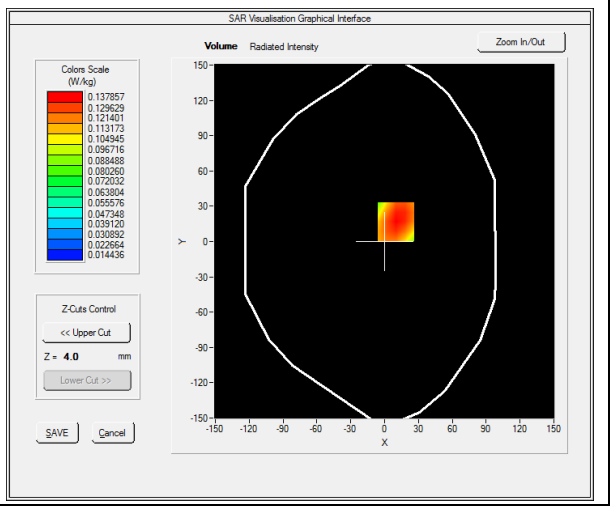
Type: Phone measurement (Complete)
Date of measurement: 08/12/2019
Measurement duration: 12 minutes 3 seconds
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 05/22/2019

A. Experimental conditions

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

B. SAR Measurement Results

Frequency (MHz)	836.600000
Relative Permittivity (real part)	54.851214
Conductivity (S/m)	0.951454
Power Variation (%)	0.986458
Ambient Temperature	21.1
Liquid Temperature	21.3

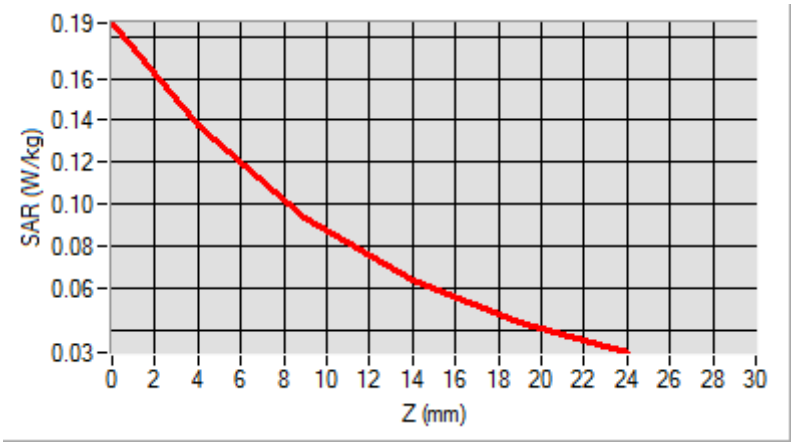
SURFACE SAR	VOLUME SAR
	

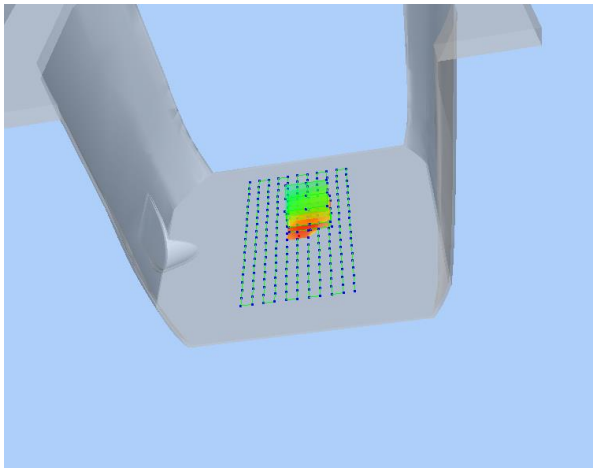
Maximum location: X=10.00, Y=17.00

SAR Peak: 0.19 W/kg

SAR 10g (W/Kg)	0.090135
SAR 1g (W/Kg)	0.132660

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.1866	0.1379	0.0937	0.0638	0.0437



3D screen shot	Hot spot position
	

MEASUREMENT 12

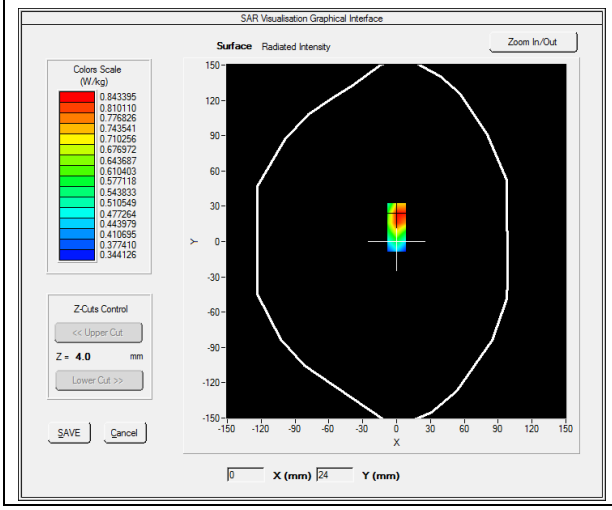
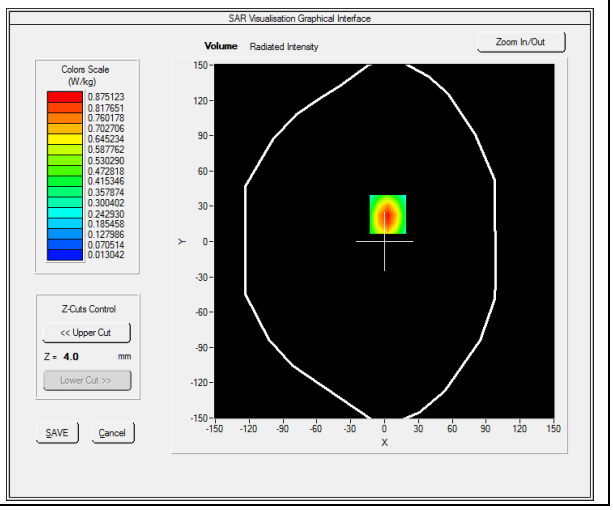
Type: Phone measurement (Complete)
Date of measurement: 08/13/2019
Measurement duration: 12 minutes 3 seconds
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 05/22/2019

A. Experimental conditions

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

B. SAR Measurement Results

Frequency (MHz)	1852.400000
Relative Permittivity (real part)	52.420415
Conductivity (S/m)	1.501966
Power Variation (%)	0.687492
Ambient Temperature	21.1
Liquid Temperature	21.3

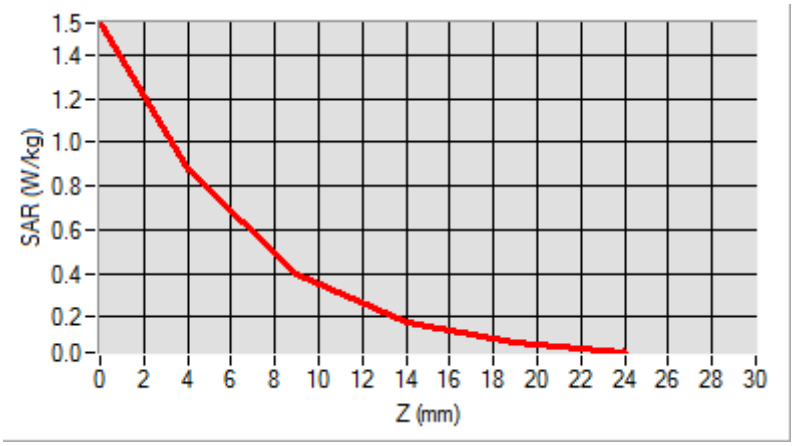
SURFACE SAR	VOLUME SAR
	

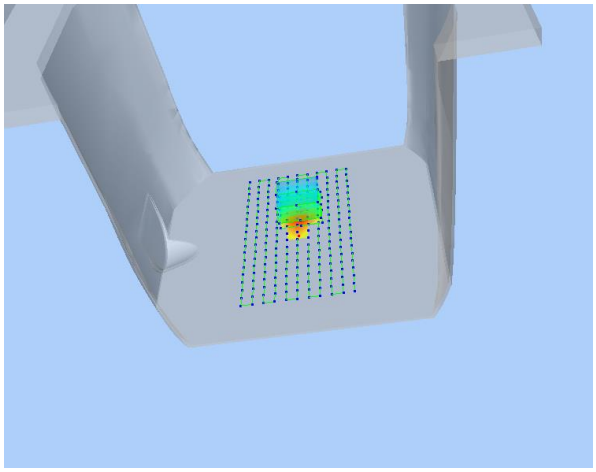
Maximum location: X=3.00, Y=23.00

SAR Peak: 1.56 W/kg

SAR 10g (W/Kg)	0.400471
SAR 1g (W/Kg)	0.825679

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.5472	0.8751	0.4006	0.1778	0.0833



3D screen shot	Hot spot position
	

MEASUREMENT 17

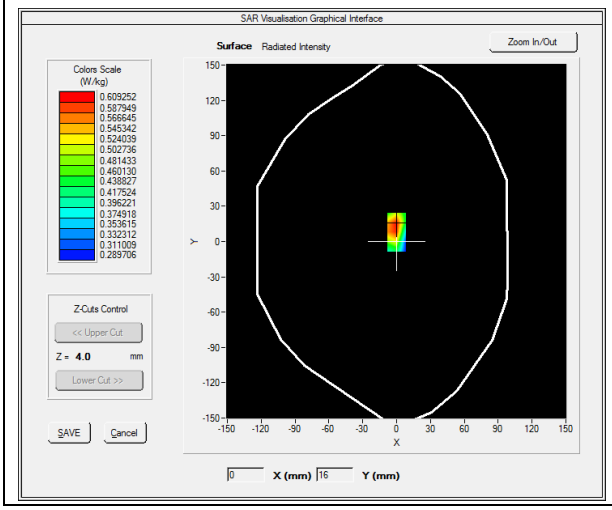
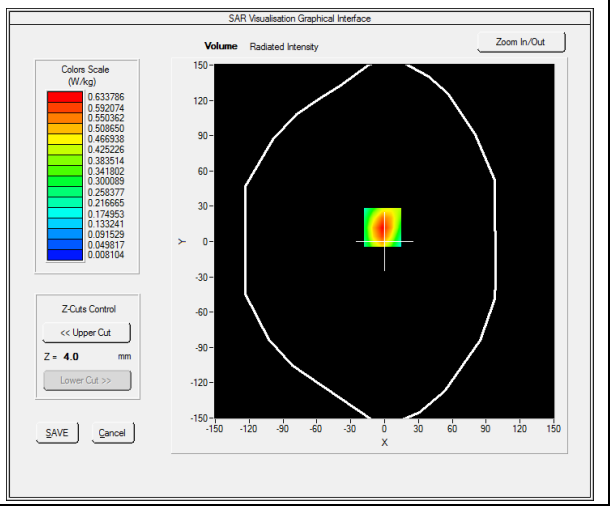
Type: Phone measurement (Complete)
Date of measurement: 08/13/2019
Measurement duration: 12 minutes 3 seconds
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 05/22/2019

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Flat Plane
Device Position	Back
Band	LTE Band 2
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

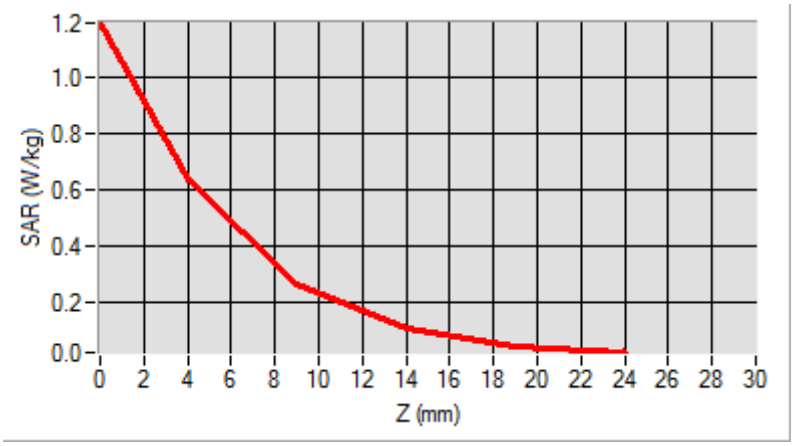
SURFACE SAR	VOLUME SAR
	

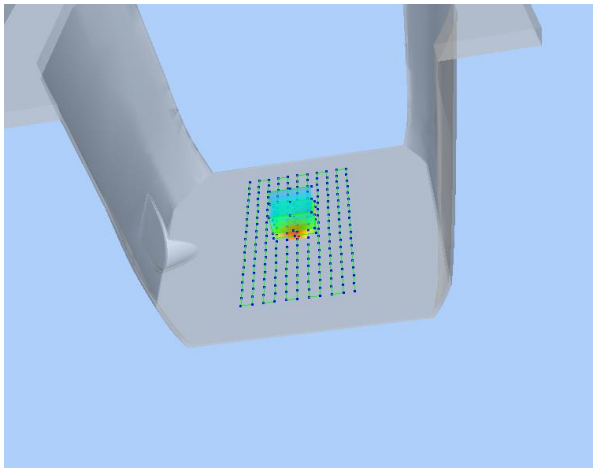
Maximum location: X=-2.00, Y=12.00

SAR Peak: 1.19 W/kg

SAR 10g (W/Kg)	0.284619
SAR 1g (W/Kg)	0.599956

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.1890	0.6338	0.2627	0.1041	0.0454



3D screen shot	Hot spot position
	

MEASUREMENT 25

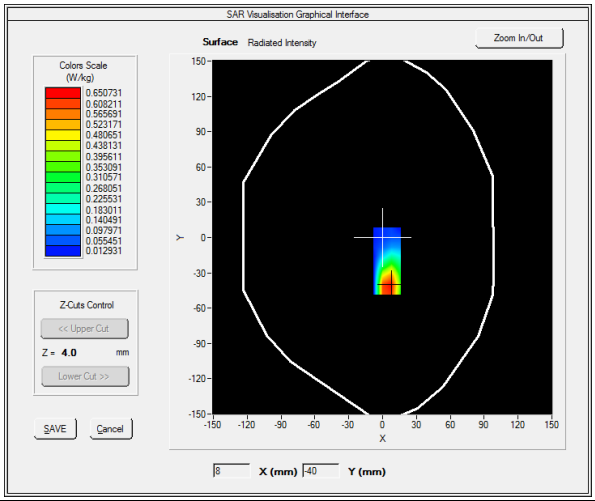
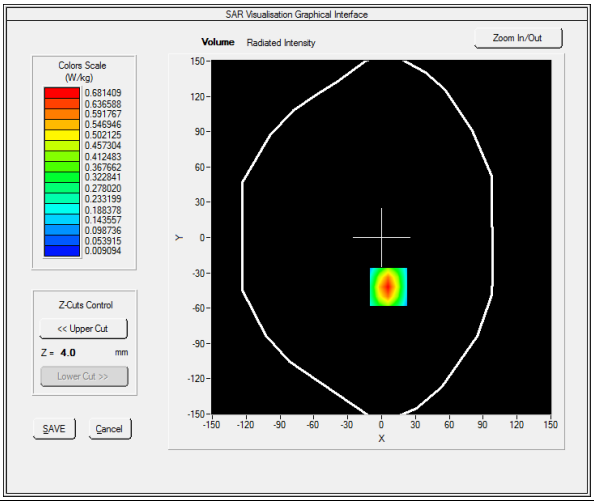
Type: Phone measurement (Complete)
Date of measurement: 08/13/2019
Measurement duration: 12 minutes 3 seconds
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.06; Calibrated: 05/22/2019

A. Experimental conditions

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

B. SAR Measurement Results

Frequency (MHz)	1732.500000
Relative Permittivity (real part)	51.220432
Conductivity (S/m)	1.460124
Power Variation (%)	0.858383
Ambient Temperature	21.1
Liquid Temperature	21.2

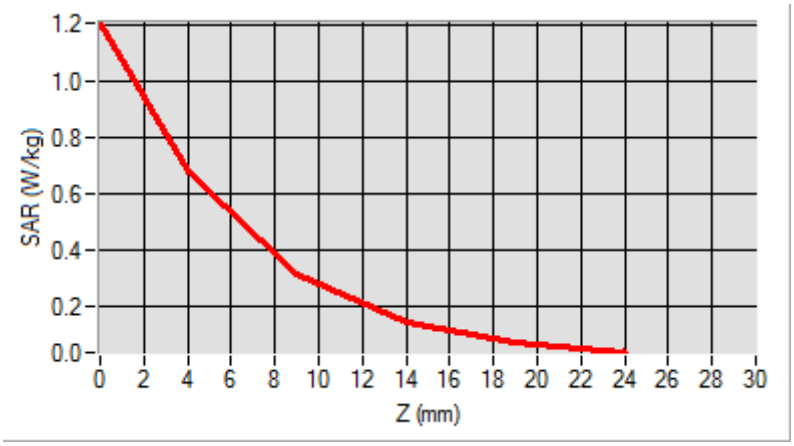
SURFACE SAR	VOLUME SAR
	

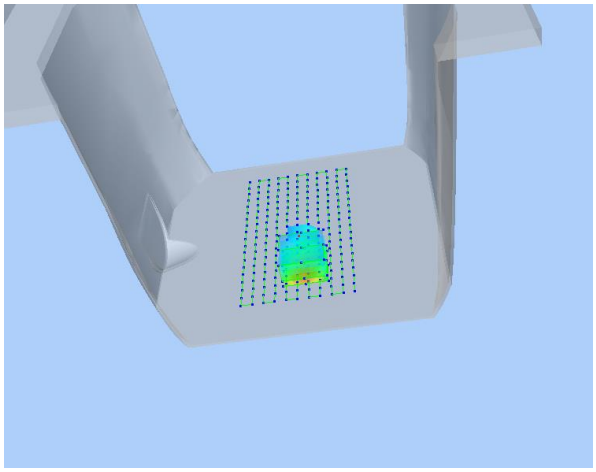
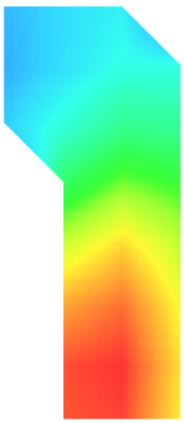
Maximum location: X=6.00, Y=-42.00

SAR Peak: 1.21 W/kg

SAR 10g (W/Kg)	0.293309
SAR 1g (W/Kg)	0.631730

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.2094	0.6814	0.3107	0.1383	0.0661



3D screen shot	Hot spot position
	

MEASUREMENT 29

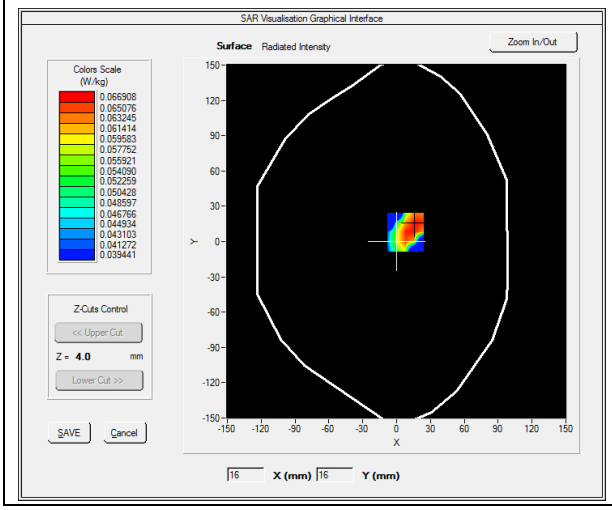
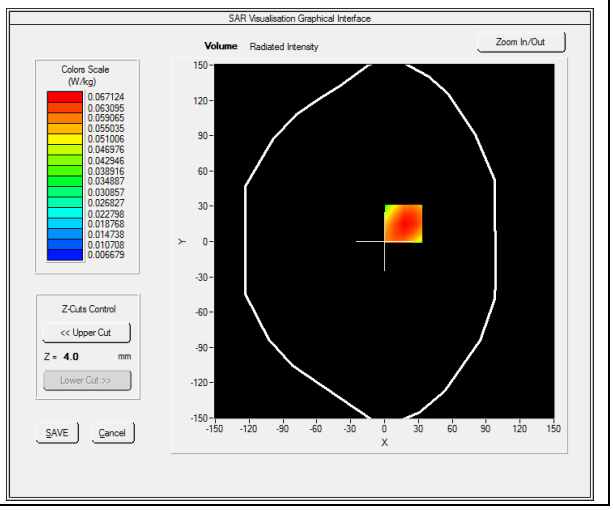
Type: Phone measurement (Complete)
Date of measurement: 08/12/2019
Measurement duration: 12 minutes 3 seconds
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 05/22/2019

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Flat Plane
Device Position	Back
Band	LTE Band 5
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

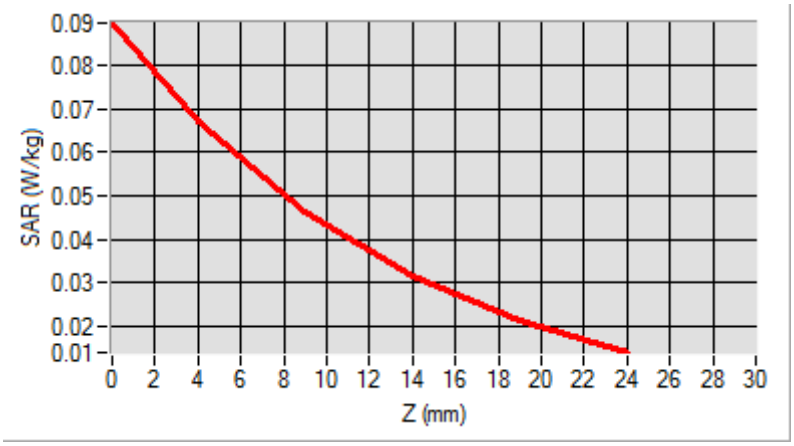
SURFACE SAR	VOLUME SAR
	

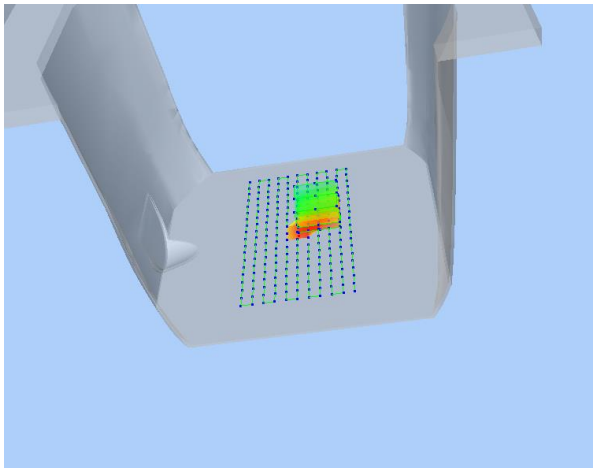
Maximum location: X=17.00, Y=15.00

SAR Peak: 0.09 W/kg

SAR 10g (W/Kg)	**0.044078**
SAR 1g (W/Kg)	**0.064651**

Z (mm)	**0.00**	**4.00**	**9.00**	**14.00**	**19.00**
SAR (W/Kg)	**0.0896**	**0.0671**	**0.0462**	**0.0316**	**0.0215**



3D screen shot	**Hot spot position**
	

MEASUREMENT 35

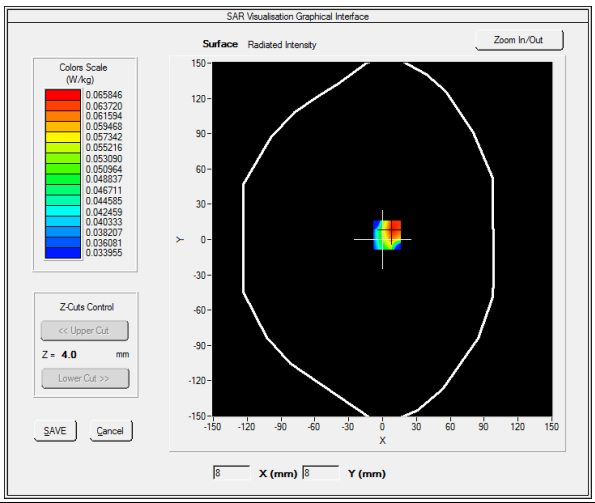
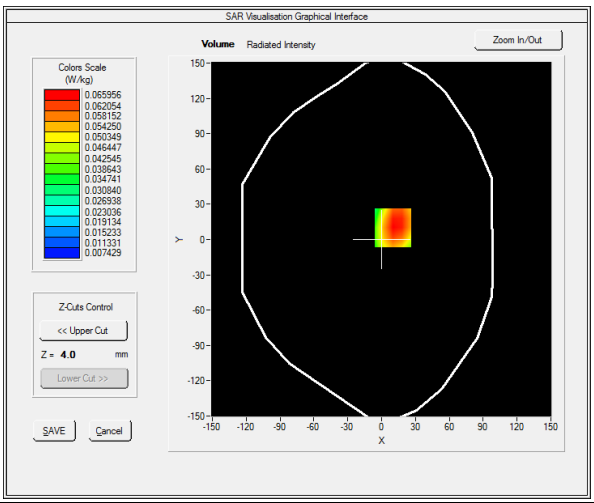
Type: Phone measurement (Complete)
Date of measurement: 08/12/2019
Measurement duration: 12 minutes 3 seconds
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.28; Calibrated: 05/22/2019

A. Experimental conditions

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

B. SAR Measurement Results

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

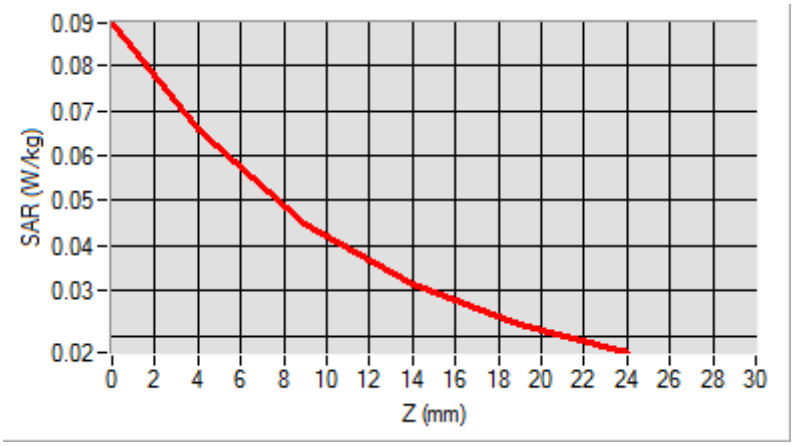
SURFACE SAR	VOLUME SAR
	

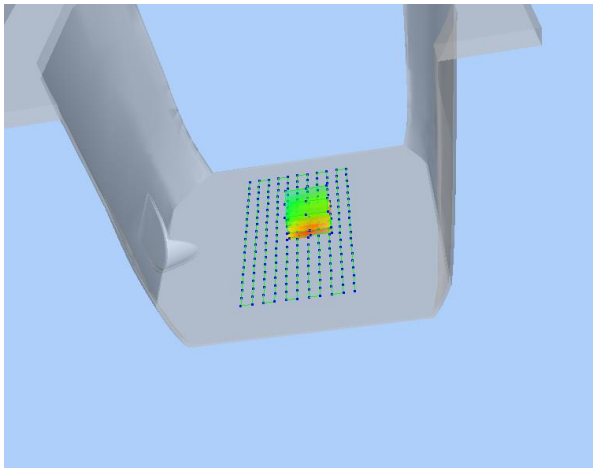
Maximum location: X=10.00, Y=10.00

SAR Peak: 0.09 W/kg

SAR 10g (W/Kg)	**0.045323**
SAR 1g (W/Kg)	**0.067477**

Z (mm)	**0.00**	**4.00**	**9.00**	**14.00**	**19.00**
SAR (W/Kg)	**0.0896**	**0.0660**	**0.0450**	**0.0314**	**0.0226**



3D screen shot	**Hot spot position**
	

MEASUREMENT 41

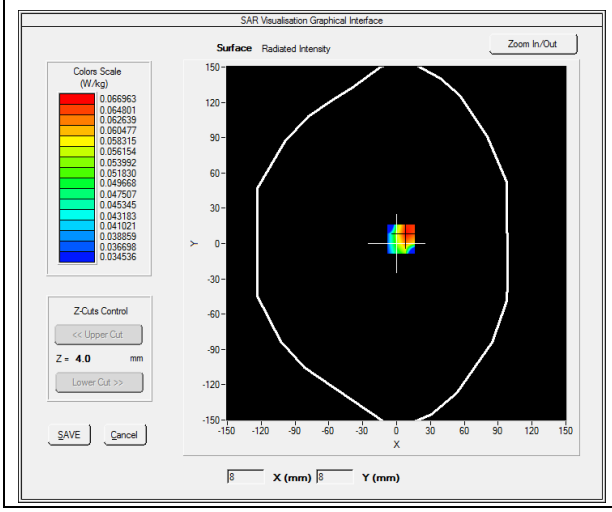
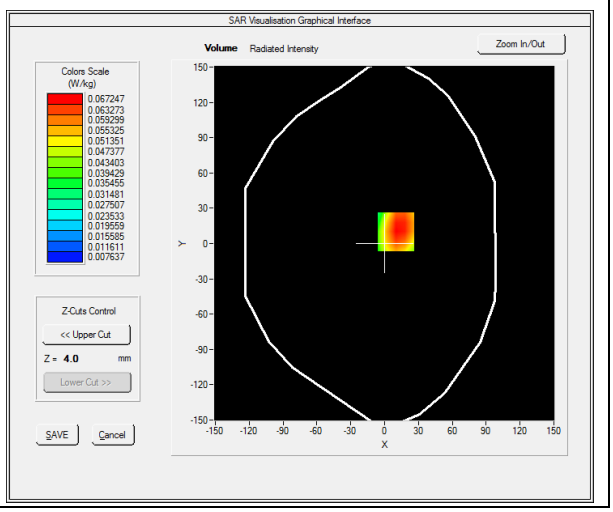
Type: Phone measurement (Complete)
Date of measurement: 08/12/2019
Measurement duration: 12 minutes 3 seconds
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.28; Calibrated: 05/22/2019

A. Experimental conditions

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

B. SAR Measurement Results

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

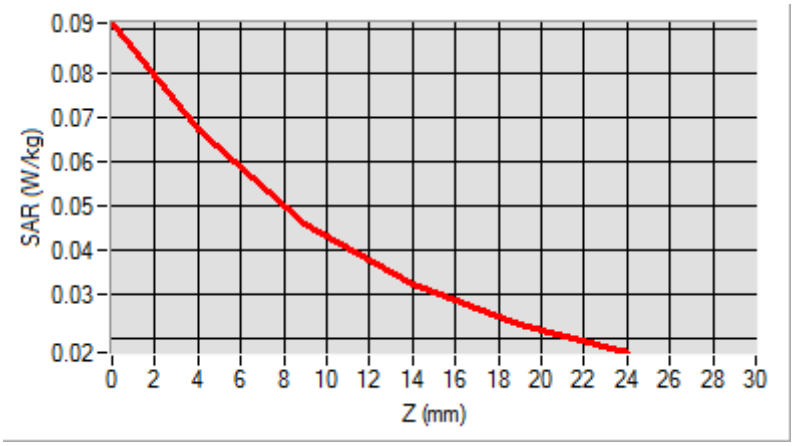
SURFACE SAR	VOLUME SAR
	

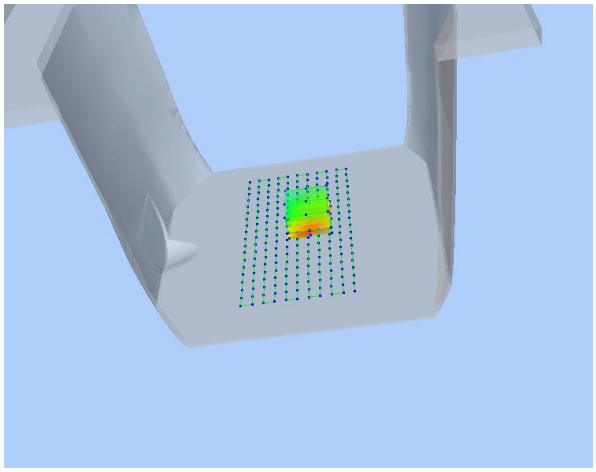
Maximum location: X=10.00, Y=10.00

SAR Peak: 0.09 W/kg

SAR 10g (W/Kg)	0.044172
SAR 1g (W/Kg)	0.065077

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0915	0.0672	0.0458	0.0319	0.0230



3D screen shot	Hot spot position
	

MEASUREMENT 47

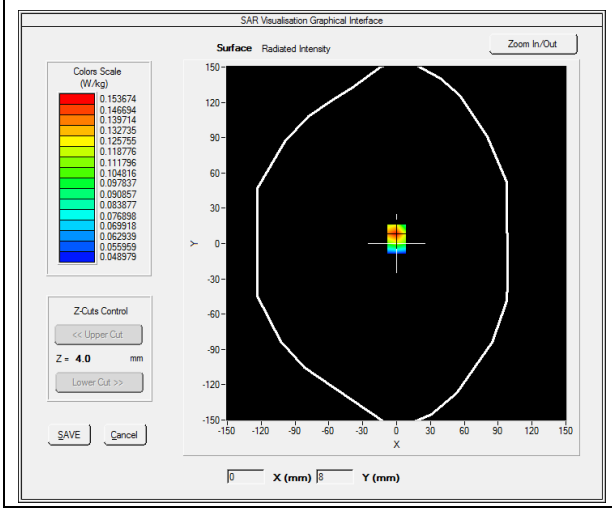
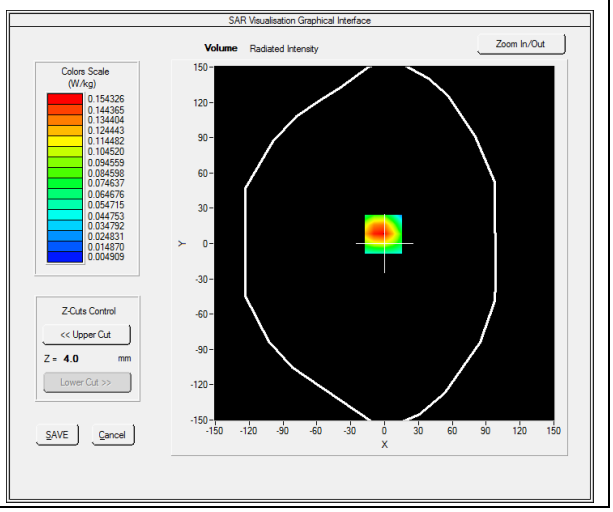
Type: Phone measurement (Complete)
Date of measurement: 08/14/2019
Measurement duration: 12 minutes 3 seconds
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.80; Calibrated: 05/22/2019

A. Experimental conditions

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

B. SAR Measurement Results

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

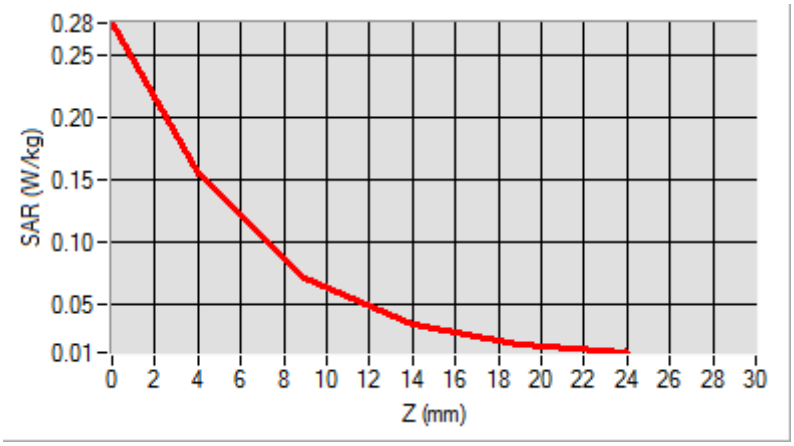
SURFACE SAR	VOLUME SAR
	

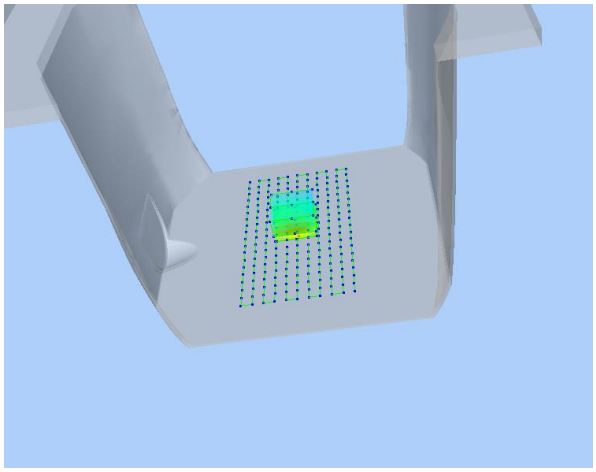
Maximum location: X=-1.00, Y=8.00

SAR Peak: 0.28 W/kg

SAR 10g (W/Kg)	0.074159
SAR 1g (W/Kg)	0.148097

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.2757	0.1543	0.0705	0.0327	0.0176

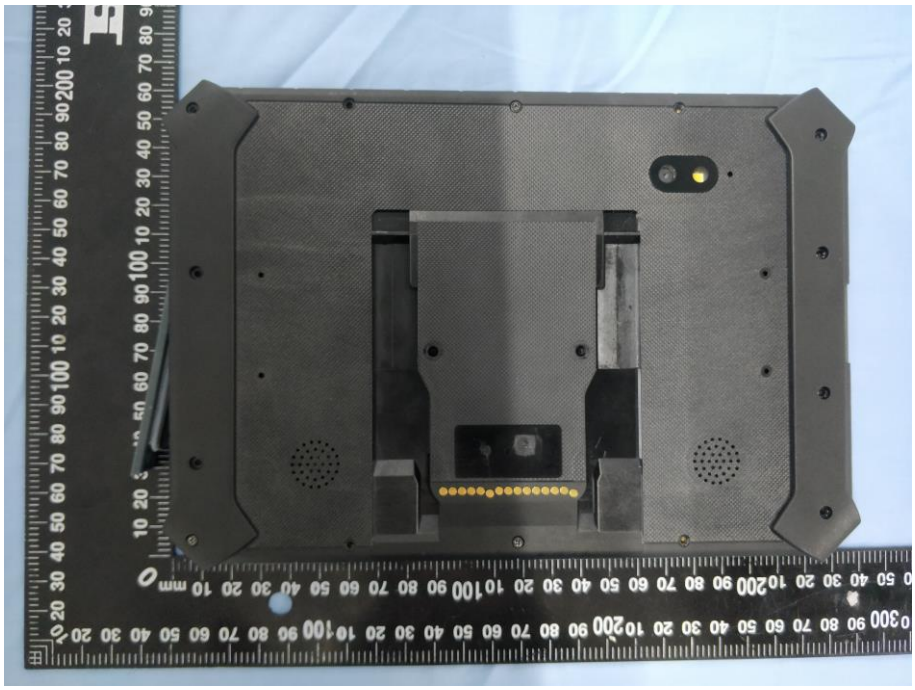


3D screen shot	Hot spot position
	

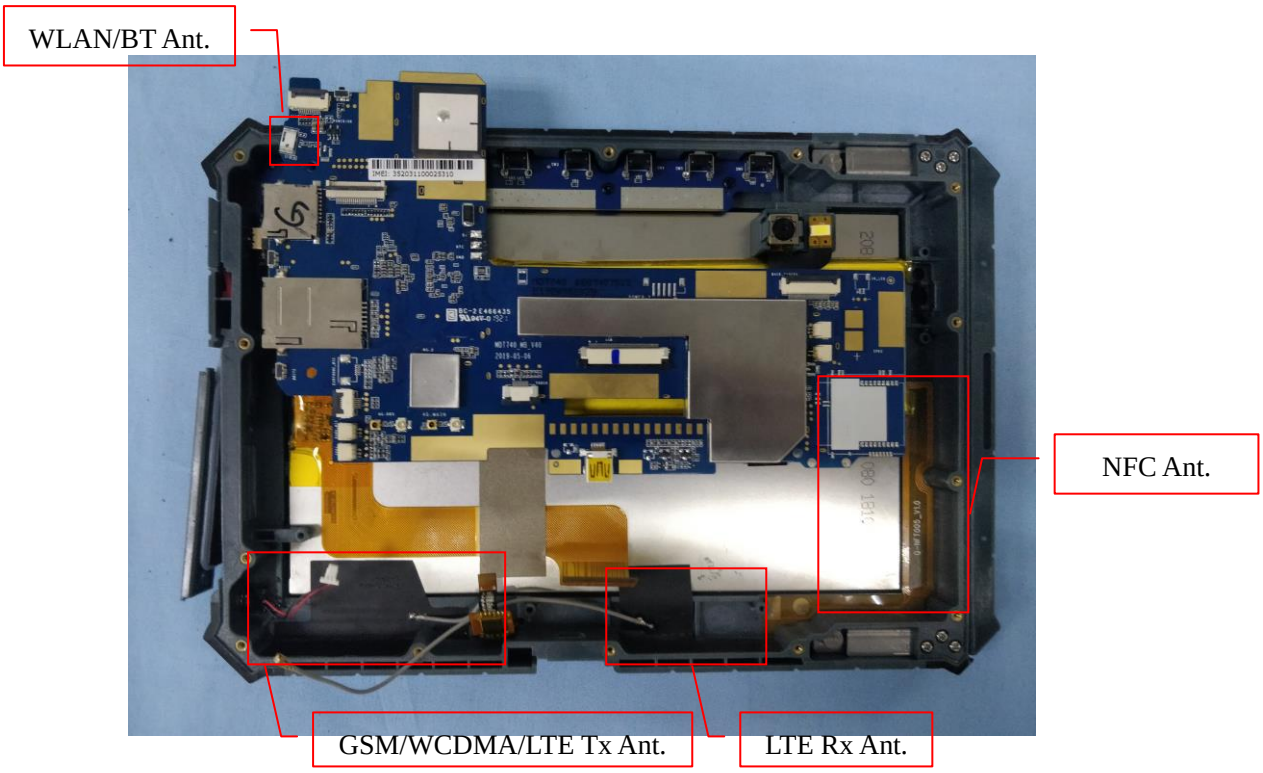
Annex C. EUT Photos

EUT View Front

EUT View Back



Antenna View

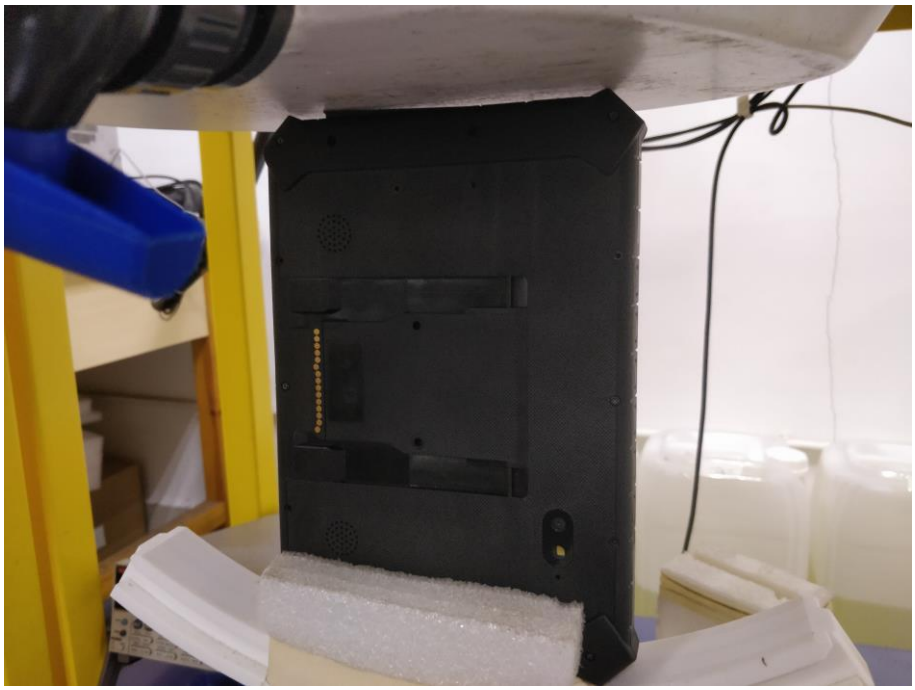


Annex D. Test Setup Photos

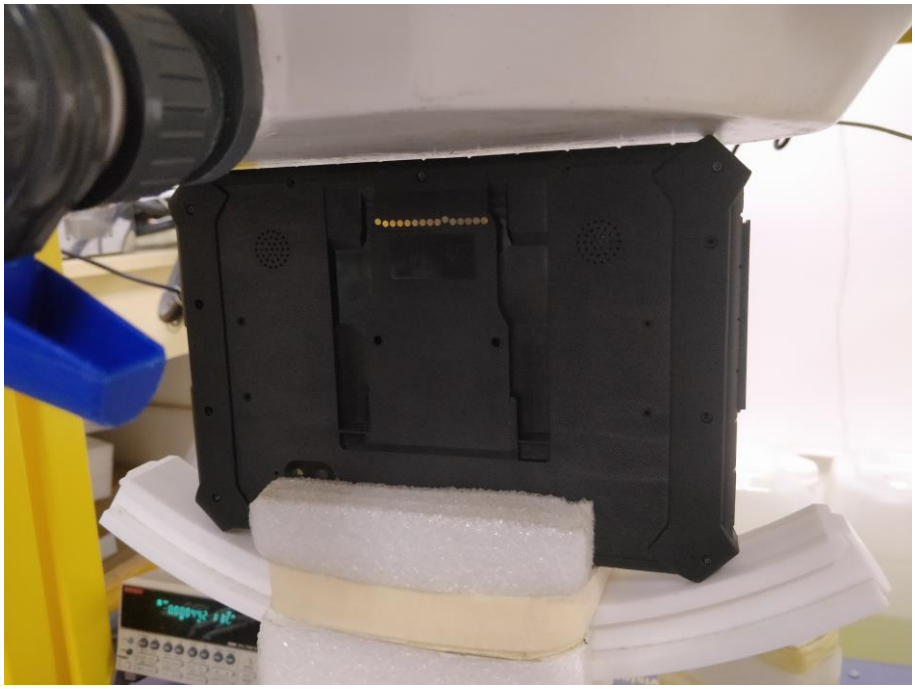
Body mode Exposure Conditions

Body Back

Body Right



Body Bottom



Annex E. Calibration Certificate

Please refer to the Exhibit for the Calibration Certificate

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