FCC SAR REPORT

Applicant:	SUN CUPID TECHNOLOGY（HK）LIMITED
Address of Applicant:	16/F, CEO Tower, 77 Wing Hong Street, Cheung Sha Wan Hong Kong
Equipment Under Test (EUT)	
Product Name:	LTE mobile phone
Model No.:	X3
Trade mark	NUU
FCC ID:	2ADINNUUX3
Applicable standards:	FCC 47 CFR Part 2.1093
Date of Test:	20 Mar., 2015 ~ 07 Apr., 2015
Test Result:	Maximum Reported 1-g SAR (W/kg) Head: 1.194 Body: 0.463 Hotspot: 0.538

Authorized Signature:

Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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2 Version

Version No.	Date	Description
00	*09 Apr., 2015*	*Original*

Prepared by:	Sera Xiang	***Date:***	*09 Apr., 2015*
	Report Clerk		
Reviewed by:	Janet Wei	***Date:***	*09 Apr., 2015*
	Project Engineer		

3 Contents

4 SAR Results Summary

The maximum results of Specific Absorption Rate (SAR) found during test as bellows:

<Highest Reported standalone SAR Summary>

Exposure Position	Frequency Band	Reported 1-g SAR (W/kg)	Equipment Class	Highest Reported 1-g SAR (W/kg)
Head	GSM 850	0.350	PCE	1.194
	GSM 1900	0.033		
	WCDMA Band V	0.276		
	WCDMA Band II	0.088		
	WCDMA Band IV	0.049		
	LTE Band 2	0.177		
	LTE Band 4	0.257		
	LTE Band 17	0.078		
	WLAN 2.4 GHz	1.194	DTS	
Body (10 mm Gap)	GSM 850	0.463	PCE	0.463
	GSM 1900	0.028		
	WCDMA Band V	0.388		
	WCDMA Band II	0.054		
	WCDMA Band IV	0.079		
	LTE Band 2	0.199		
	LTE Band 4	0.448		
	LTE Band 17	0.09		
	WLAN 2.4GHz	0.333	DTS	
Hotspot (10 mm Gap)	GSM 850	0.538	PCE	0.538
	GSM 1900	0.198		
	WCDMA Band V	0.388		
	WCDMA Band II	0.069		
	WCDMA Band IV	0.115		
	LTE Band 2	0.229		
	LTE Band 4	0.448		
	LTE Band 17	0.09		
	WLAN 2.4 GHz	0.333	DTS	

<Highest Reported simultaneous SAR Summary>

Exposure Position	Frequency Band	Reported 1-g SAR (W/kg)	Equipment Class	Highest Reported Simultaneous Transmission 1-g SAR (W/kg)
Head	GSM 850	0.350	PCE	1.544
	WLAN 2.4 GHz	1.194	DTS	

Note:

1. The highest simultaneous transmission is scalar summation of Reported standalone SAR per FCC KDB 690783 D01 v01r02, and scalar SAR summation of all possible simultaneous transmission scenarios are < 1.6W/kg.
2. This device is compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-2005, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013.

5 General Information

5.1 Client Information

Applicant:	SUN CUPID TECHNOLOGY（HK）LIMITED
Address of Applicant:	16/F,CEO Tower,77 Wing Hong Street,Cheung Sha Wan,Hong Kong
Manufacturer:	Suncupid (Shen Zhen) Electronic Ltd
Address of Manufacturer:	Baolong Industrial City, Longgang District, Shenzhen Hi-Tech Road, Building 1, A 7

5.2 General Description of EUT

Product Name:	LTE mobile phone	
Model No.:	X3	
IMEI:	/	
Hardware Version:	S4517-MB-P1	
Software Version:	2.0.U.0.66	
Category of device	Portable device	
Operation Frequency:	GSM850: 824.2 ~ 848.8 MHz PCS 1900: 1850.2 ~ 1909.8 MHz WCDMA Band V: 826.4 ~ 846.6 MHz WCDMA Band II: 1852.4 ~ 1907.6 MHz LTE Band 2 :1850MHz~1910MHz LTE Band 4 :1710MHz~1755MHz LTE Band 17: 704MHz~716MHz Bluetooth: 2402 MHz ~ 2480 MHz Wi-Fi: 802.11b/g/n-HT20: 2412MHz ~ 2462 MHz 802.11n-HT40: 2422MHz~2452MHz	
Modulation technologies:	GSM/GPRS:GMSK WCDMA/HSDPA/HSUPA: QPSK LTE:QPSK/16QAM Bluetooth: GFSK Wi-Fi: 802.11b: DSSS, 802.11g/n: OFDM	
Antenna Type:	Internal Antenna	
Antenna Gain:	GSM 850: 0.8 dBi, PCS 1900: 0.9 dBi WCDMA 850: 0.8dBi, WCDMA 1900: 0.9 dBi, WCDMA 1700: -3.7 Bi LTE Band 2: 0.9 dBi, LTE Band 4: -3.6 dBi, LTE Band 17: -4.4 dBi WIFI/BT: -3.2dBi,	
Release Version:	R99 for GSM, R6 for WCDMA, R12 for LTE	
GPRS Class:	GPRS Class: 12	
Dimensions (L*W*H):	132 mm (L)× 64 mm (W)× 8 mm (H)	
Accessories information:	Adapter: Model: HNFG050100UU Input:110-240V AC,50/60Hz 0.2A Output:5V DC MAX 1A	Battery: Li-ion Battery 3.8V/2000mAh Headset: Support headset

5.3 Maximum RF Output Power

Mode	Average Power (dBm)	
	GSM 850	GSM 1900
GSM (Voice)	32.58	30.48
GPRS (1 TX Slot)	32.54	30.46
GPRS (2 TX Slots)	32.50	30.44
GPRS (3 TX Slots)	32.54	30.29
GPRS (4 TX Slots)	32.51	30.25

Mode	Average Power (dBm)		
	WCDMA Band V	WCDMA Band II	WCDMA Band IV
AMR 12.2 kbps	23.58	23.60	24.34
RMC 12.2 kbps	23.57	23.75	24.46
HSDPA Sub-test 1	22.68	22.82	23.41
HSDPA Sub-test 2	22.48	22.67	23.43
HSDPA Sub-test 3	21.12	21.26	21.61
HSDPA Sub-test 4	20.92	21.07	21.55
HSUPA Sub-test 1	21.93	22.13	22.74
HSUPA Sub-test 2	22.65	22.78	23.43
HSUPA Sub-test 3	21.63	21.77	22.26
HSUPA Sub-test 4	22.57	22.87	23.43
HSUPA Sub-test 5	21.81	22.03	22.65

Mode	Average Power (dBm)		
	LTE Band 2	LTE Band 4	LTE Band 17
BW/1.4 MHz	23.02	22.53	/
BW/3.0 MHz	23.02	22.53	/
BW/5.0 MHz	22.83	22.42	23.50
BW/10 MHz	22.88	22.95	23.54
BW/15 MHz	22.78	22.98	/
BW/20 MHz	22.96	23.30	/

WLAN 2.4 GHz Band Average Power (dBm)				
Mode/Band	b	g	n (HT-20)	n (HT-40)
WLAN 2.4GHz	18.78	17.41	17.05	16.05

Bluetooth Average Power (dBm)	
Mode/Band	LE (BT 4.0)
Bluetooth 2.4 GHz	-0.29

5.4 Environment of Test Site

Temperature:	18°C ~25 °C
Humidity:	35%~75% RH
Atmospheric Pressure:	1010 mbar

5.5 Test Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
Address: No.B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755-23118282
Fax: +86-755-23116366

6 Introduction

6.1 Introduction

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

6.2 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:

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

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

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

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

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

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

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength. However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

7 RF Exposure Limits

7.1 Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

7.2 Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

7.3 RF Exposure Limits

SAR Human Exposure Specified in ANSI/IEEE C95.1-1992 and Health Canada Safety Code 6

HUMAN EXPOSURE LIMITS		
	UNCONTROLLED ENVIRONMENT *General Population* (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT *Occupational* (W/kg) or (mW/g)
SPATIAL PEAK SAR Brain	1.6	8.0
SPATIAL AVERAGE SAR Whole Body	0.08	0.4
SPATIAL PEAK SAR Hands, Feet, Ankles, Wrists	4.0	20

Note:

1. The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
2. The Spatial Average value of the SAR averaged over the whole body.
3. The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

8 SAR Measurement System

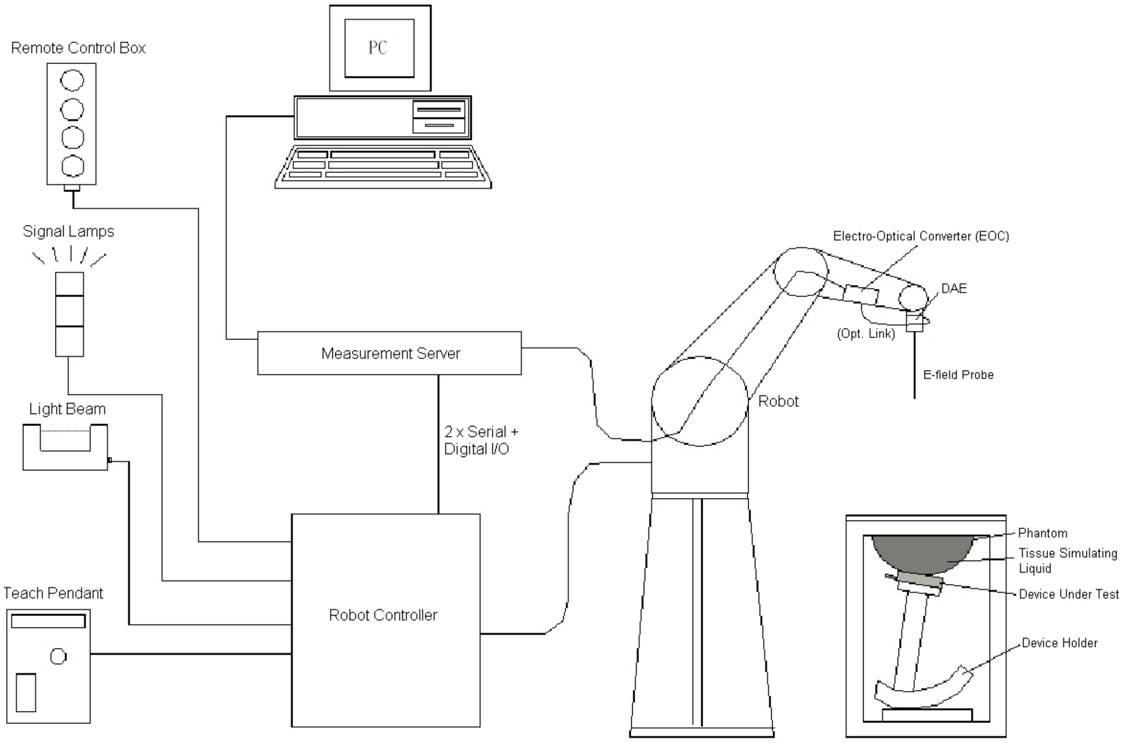

Fig. 8.1 SPEAG DASY System Configurations

The DASY system for performance compliance tests is illustrated above graphically. This system consists of the following items:

- A standard high precision 6-axis robot with controller, a teach pendant and software
- A data acquisition electronic (DAE) attached to the robot arm extension
- A dosimetric probe equipped with an optical surface detector system
- The electro-optical converter (EOC) performs the conversion between optical and electrical signals
- A measurement server performs the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the accuracy of the probe positioning
- A computer operating Windows XP
- DASY software
- Remove control with teach pendant and additional circuitry for robot safety such as warming lamps, etc.
- The SAM twin phantom
- A device holder
- Tissue simulating liquid
- Dipole for evaluating the proper functioning of the system

Component details are described in the following sub-sections.

8.1 E-Field Probe

The SAR measurement is conducted with the dosimetric probe (manufactured by SPEAG). The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. This probe has a built in optical surface detection system to prevent from collision with phantom.

- **E-Field Probe Specification**
  <EX3DV4 Probe>

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency Directivity	10 MHz to 6 GHz; Linearity: ± 0.2 dB ± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)	
Dynamic Range	10 µW/g to 100 mW/g; Linearity: ± 0.2 dB (noise: typically < 1 µW/g)	
Dimensions	Overall length: 330 mm (Tip: 20mm) Tip diameter: 2.5 mm (Body: 12mm) Typical distance from probe tip to dipole centers: 1 mm	**Fig. 8.2 Photo of E-Field Probe**

- **E-Field Probe Calibration**
  Each probe needs to be calibrated according to a dosimetric assessment procedure with accuracy better than ± 10%. The spherical isotropy shall be evaluated and within ± 0.25 dB. The sensitivity parameters (Norm X, Norm Y and Norm Z), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested. The calibration data can be referred to appendix E of this report.

8.2 Data Acquisition Electronics (DAE)

The Data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock. The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Fig. 8.3 Photo of DAE

8.3 Robot

The SPEAG DASY system uses the high precision robots (DASY5: TX60XL) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY5: CS8c) from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability 0.02 mm)
- High reliability (industrial design)
- Low maintenance costs (virtually maintenance free due to direct drive gears; no belt drives)
- Jerk-free straight movements
- Low ELF interference (motor control fields shielded via the closed metallic construction shields)

Fig. 8.4 Photo of Robot

8.4 Measurement Server

The measurement server is based on a PC/104 CPU board with CPU (DASY 5: 400MHz, Intel Celeron), chip-disk (DASY5: 128 MB), RAM (DASY5: 128 MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O board, which is directly connected to the PC/104 bus of the CPU board.
The measurement server performs all the real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operations.

Fig. 8.5 Photo of Server for DASY5

8.5 Light Beam Unit

The light beam switch allows automatic "tooling" of the probe. During the process, the actual position of the probe tip with respect to the robot arm is measured, as well as the probe length and the horizontal probe offset. The software then corrects all movements, such that the robot coordinates are valid for the probe tip.
The repeatability of this process is better than 0.1 mm. If a position has been taught with an aligned probe, the same position will be reached with another aligned probe within 0.1 mm, even if the other probe has different dimensions. During probe rotations, the probe tip will keep its actual position.

Fig. 8.6 Photo of Light Beam

8.6 Phantom

<SAM Twin Phantom>

Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm
Filling Volume Dimensions	Approx. 25 liters Length: 1000mm; Width: 500mm; Height: adjustable feet
Measurement Areas	Left Hand, Right Hand, Flat phantom

Fig. 8.7 Photo of SAM Twin Phantom

The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

<ELI4 Phantom >

The ELI4 phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30MHz to 6 GHz. ELI4 is fully compatible with the latest draft of the standard IEC 62209-2 and all known tissue simulating liquids.

ELI4 has been optimized regarding its performance and can be integrated into a SPEAG standard phantom table. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points

The phantom can be used with the following tissue simulating liquids:

- Water-sugar based liquids can be left permanently in the phantom. Always cover the liquid if the system is not in use; otherwise the parameters will change due to water evaporation.
- DGBE based liquids should be used with care. As DGBE is a softener for most plastics, the liquid should be taken out of the phantom and the phantom should be dried when the system is not in use (desirable at least once a week).
- Do not use other organic solvents without previously testing the phantom resistiveness.

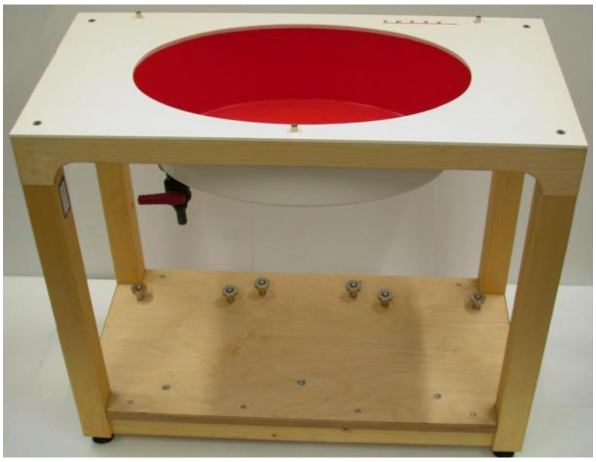

Fig.8.8 Photo of ELI4 Phantom

8.7 Device Holder

<Device Holder for SAM Twin Phantom>

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5 mm distance, a positioning uncertainty of ± 0.5 mm would produce a SAR uncertainty of ± 20 %. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (ERP).

Thus the device needs no repositioning when changing the angles.

The DASY device holder is constructed of low-low POM material having the following dielectric parameters: relative permittivity $\varepsilon = 3$ and loss tangent $\delta = 0.02$. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

Fig. 8.9 Photo of Device Holder

8.8 Data storage and Evaluation

- **Data Storage**

The DASY software stores the assessed data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all the necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files. The post-processing software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verifications of the complete software setup even after the measurement and allows correction of erroneous parameter settings. For example, if a measurement has been performed with an incorrect crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be reevaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type (e.g., [V/m], [mW/g]). Some of these units are not available in certain situations or give meaningless results, e.g., a SAR-output in a non-lose media, will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

- **Data Evaluation**

The DASY post-processing software (SEMCAD) automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe Parameters:	- Sensitivity	$Norm_i$, a_{i0}, a_{i1}, a_{i2}
	- Conversion	$ConvF_i$
	- Diode compression point	dcp_i
Device Parameters:	- Frequency	f
	- Crest	cf
Media Parameters:	- Conductivity	σ
	- Density	ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY components. In the direct measuring mode of the multi-meter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power.

The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}$$

With V_i = compensated signal of channel i, (i = x, y, z)
U_i = input signal of channel i, (i = x, y, z)
cf = crest factor of exciting field (DASY parameter)
dcp^i = diode compression point (DASY parameter)

From the compensated input signals, the primary field data for each channel can be evaluated:

E- Field Probes: $E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$

H-Field Probes: $H_i = \sqrt{V_i} \cdot \frac{a_{i0} + a_{i1} f + a_{i2} f^2}{f}$

With V_i = compensated signal of channel i, (i = x, y, z)
$Norm_i$ = senor sensitivity of channel i, (i = x, y, z), µV/ (V/m) ^{2}
ConvF = sensitivity enhancement in solution
a_{ij} = sensor sensitivity factors for H-field probes
f = carrier frequency (GHz)
E_i = electric field strength of channel i in V/m
Hi = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

The primary field data are used to calculate the derived field units.

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1000}$$

With SAR = local specific absorption rate in mW/g
E_{tot} = total field strength in V/m
σ = conductivity in (mho/m) or (Siemens/m)
ρ = equipment tissue density in g/cm^3

Note that the density is set to 1, to account for actual head tissue density rather than the density of the tissue simulating liquid.

8.9 Test Equipment List

Manufacturer	Equipment Description	Model	S/N	Cal. Information	
				Last Cal.	Due Date
SPEAG	835MHz System Validation Kit	D835V2	4d154	06.06.2013	06.05.2016
SPEAG	750MHz System Validation Kit	D750V3	1118	07.10.2014	07.09.2017
SPEAG	1750MHz System Validation Kit	D1750V2	1021	08.02.2013	08.01.2016
SPEAG	1900MHz System Validation Kit	D1900V2	5d175	06.10.2013	06.09.2016
SPEAG	2450MHz System Validation Kit	D2450V2	910	06.07.2013	06.06.2016
SPEAG	Data Acquisition Electronics	DAE4	1373	06.11.2014	06.10.2015
SPEAG	Dosimetric E-Field Probe	EX3DV4	3924	06.23.2014	06.22.2015
SPEAG	Phantom	Twin Phantom	1765	N.C.R	
SPEAG	Phantom	ELI V5.0	1208	N.C.R	
SPEAG	Phone Positioner	N/A	N/A	N.C.R	
Stäubli	Robot	TX60L	F13/5P6VB1/A/01	N.C.R	
R&S	Universal Radio Communication Tester	CMU200	116766	12.16.2014	12.16.2015
R&S	Universal Radio Communication Tester	CMU200	117042	05.31.2014	05.31.2015
HP	Network Analyzer	8753D	1000596	12.16.2014	12.16.2015
Agilent	EPM Series Power Meter	E4418B	GB39512692	04.20.2014	04.20.2015
Agilent	Power Sensor	8481A	MY41090341	04.20.2014	04.20.2015
R&S	Signal Generator	SMR20	835457/016	05.25.2014	05.24.2015
R&S	Signal Generator	SMX	10080050	04.19.2014	04.19.2015
Huber Suhner	RF Cable	SUCOFLEX	12341	See Note 3	
Huber Suhner	RF Cable	SUCOFLEX	17268	See Note 3	
Huber Suhner	RF Cable	SUCOFLEX	2080	See Note 3	
Weinschel	Attenuator	23-3-34	BL5513	See Note 3	
Anritsu	Directional Coupler	MP654A	100217491	See Note 3	
SPEAG	Dielectric Assessment Kit	3.5 Probe	1119	See Note 4	
Mini-circuits	Power amplifier	ZHL-42W	SC609401309	See Note 5	

Note:

1. The calibration certificate of DASY can be referred to appendix C of this report.
2. Referring to KDB 865664 D01v01r03, the dipole calibration interval can be extended to 3 years with justification. The dipoles are also not physically damaged, or repaired during the interval.
3. The Insertion Loss calibration of Dual Directional Coupler and Attenuator were characterized via the network analyzer and compensated during system check.
4. The dielectric probe kit was calibrated via the network analyzer, with the specified procedure (calibrated in pure water) and calibration kit (standard) short circuit, before the dielectric measurement. The specific procedure and calibration kit are provided by Speag.
5. In system check we need to monitor the level on the power meter, and adjust the power amplifier level to have precise power level to the dipole; the measured SAR will be normalized to 1 W input power according to the ratio of 1 W to the input power to the dipole. For system check, the calibration of the power amplifier is deemed not critically required for correct measurement; the power meter is critical and we do have calibration for it
6. Attenuator insertion loss is calibrated by the network Analyzer, which the calibration is valid, before system check.
7. N.C.R means No Calibration Requirement.

9 Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, 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, which is shown in Fig. 9.1, for body SAR testing, the liquid height from the center of the flat phantom to liquid top surface is larger than 15 cm, which is shown in Fig. 9.2.

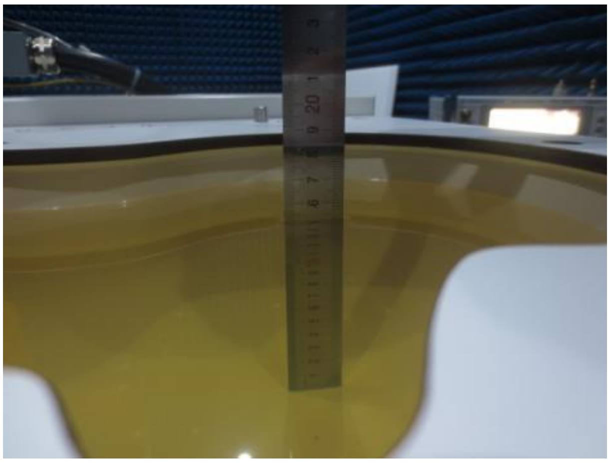

Fig. 9.1 Photo of Liquid Height for Head SAR

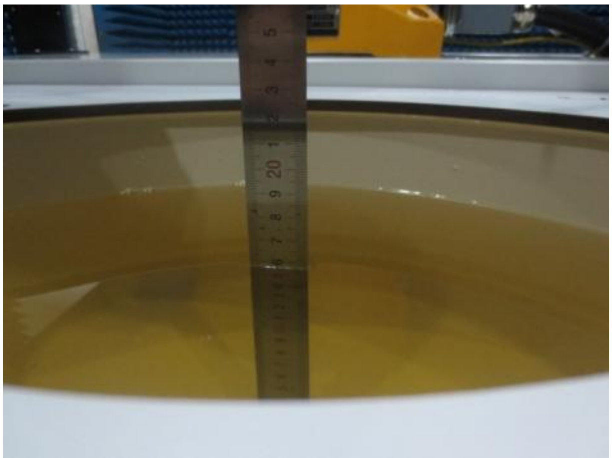

Fig. 9.2 Photo of Liquid Height for Body SAR

The relative permittivity and conductivity of the tissue material should be within ±5% of the values given in the table below recommended by the FCC OET 65 supplement C and RSS 102 Issue 4.

Target Frequency	Head		Body	
(MHz)	εr	σ(S/m)	εr	σ(S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800-2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00

(εr = relative permittivity, σ = conductivity and ρ = 1000 kg/m^3)

The dielectric parameters of liquids were verified prior to the SAR evaluation using a Speag Dielectric Probe Kit and an Agilent Network Analyzer.
The following table shows the measuring results for simulating liquid.

Frequency (MHz)	Liquid Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (εr)	Conductivity Target(σ)	Permittivity Target(εr)	Delta (σ)%	Delta (εr)%	Limit (%)	Date (mm/dd/yy)
750	Head	21.6	0.90	41.82	0.89	41.9	1.12	-0.19	±5	07.04.2015
835	Head	21.5	0.91	42.54	0.9	41.5	1.11	2.51	±5	20.03.2015
1750	Head	21.4	1.39	39.82	1.37	40.1	1.46	-0.7	±5	30.03.2015
1750	Head	21.3	1.38	39.78	1.37	40.1	0.73	-0.8	±5	06.04.2015
1900	Head	21.3	1.44	39.76	1.4	40.0	2.86	-0.6	±5	29.03.2015
1900	Head	21.8	1.45	39.75	1.4	40.0	3.57	-0.63	±5	07.04.2015
2450	Head	21.6	1.81	38.85	1.8	39.2	0.56	-0.89	±5	03.04.2015
750	Body	21.4	0.95	54.83	0.96	55.5	-1.04	-1.21	±5	07.04.2015
835	Body	21.6	0.96	55.85	0.97	55.2	-1.03	1.18	±5	21.03.2015
1750	Body	21.7	1.52	52.05	1.49	53.4	2.01	-2.53	±5	03.04.2015
1750	Body	21.5	1.50	52.11	1.49	53.4	0.67	-2.42	±5	06.04.2015
1900	Body	21.8	1.49	51.98	1.52	53.3	-1.97	-2.48	±5	03.04.2015
1900	Body	21.5	1.50	52.31	1.52	53.3	-1.32	-1.86	±5	06.04.2015
2450	Body	21.7	1.96	53.43	1.95	52.7	0.51	1.39	±5	04.04.2015

10 SAR System Verification

Each DASY system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system performance check and system validation. System validation kit includes a dipole, tripod holder to fix it underneath the flat phantom and a corresponding distance holder.

- **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.

- **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 that comes from a signal generator. 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. The equipment setup is shown below:

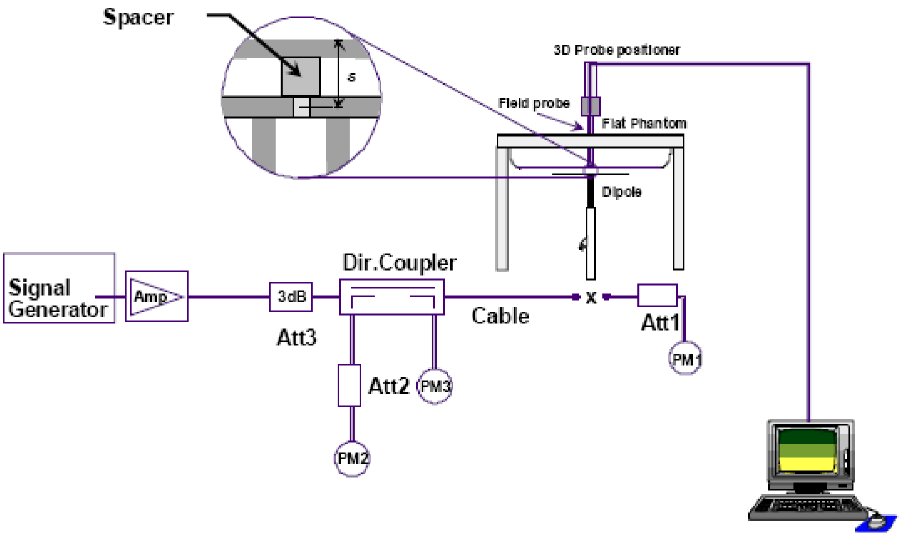

Fig.10.1 System Verification Setup Diagram

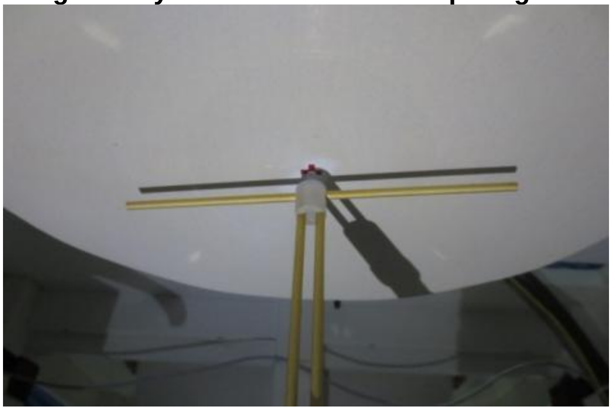

Fig.10.2 Photo of Dipole setup

- **System Verification Results**

  Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10%. The table as below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix C of this report.

Date (mm/dd/yy)	Frequency (MHz)	Liquid Type	Power fed onto dipole (mW)	Measured 1g SAR (W/kg)	Normalized to 250 mW 1g SAR (W/kg)	250 mW Target 1g SAR (W/kg)	Deviation (%)
07.04.2015	750	Head	10	0.083	2.08	2.09	-0.48
20.03.2015	835	Head	10	0.099	2.48	2.47	0.4
30.03.2015	1750	Head	10	0.346	8.65	8.54	1.29
06.04.2015	1750	Head	10	0.349	8.73	8.54	2.22
29.03.2015	1900	Head	10	0.382	9.55	9.76	-2.15
07.04.2015	1900	Head	10	0.405	10.13	9.76	3.79
03.04.2015	2450	Head	10	0.541	13.53	13.5	0.22
07.04.2015	750	Body	10	0.086	2.15	2.19	-1.83
21.03.2015	835	Body	10	0.096	2.4	2.44	-1.64
03.04.2015	1750	Body	10	0.381	9.53	9.52	0.11
06.04.2015	1750	Body	10	0.386	9.65	9.52	1.37
03.04.2015	1900	Body	10	0.403	10.08	10.1	-0.2
06.04.2015	1900	Body	10	0.402	10.05	10.1	-0.5
04.04.2015	2450	Body	10	0.524	13.1	13.2	-0.76

11 EUT Testing Position

This EUT was tested in ten different positions. They are right cheek/right tilted/left cheek/left tilted for head, Front/Back/Right Side/Top Side/Bottom Side of the EUT with phantom 1 cm gap, as illustrated below, please refer to Appendix B for the test setup photos.

11.1 Handset Reference Points

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

Fig.11.1 Illustration for Front, Back and Side of SAM Phantom

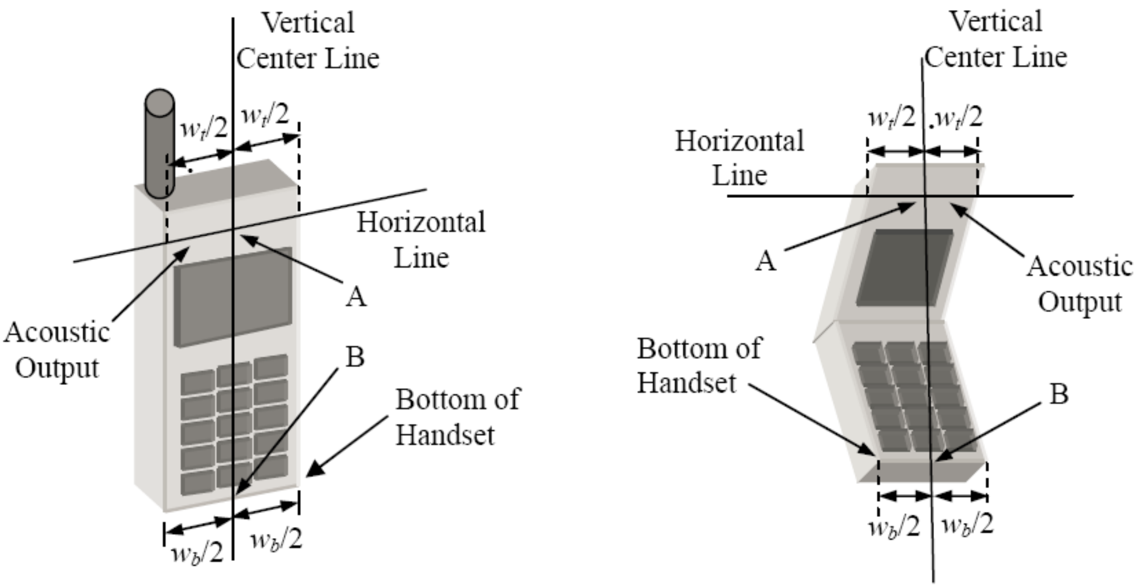

Fig. 11.2 Illustration for Handset Vertical and Horizontal Reference Lines

11.2 Positioning for Cheek / Touch

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

Fig. 11.3 Illustration for Cheek Position

11.3 Positioning for Ear / 15º Tilt

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

Fig.11.4 Illustration for Tilted Position

11.4 SAR Evaluations near the Mouth/Jaw Regions of the SAM Phantom

Antennas located near the bottom of a phone may require SAR measurements around the mouth and jaw regions of the SAM head phantom. This typically applies to clam-shell style phones that are generally longer in the unfolded normal use positions or to certain older style long rectangular phones.

Under these circumstances, the following procedures apply, adopted from the FCC guidance on SAR handsets document FCC KDB Publication 648474 D04v01r02. The SAR required in these regions of SAM should be measured using a flat phantom. The phone should be positioned with a separation distance of 4 mm between the ear reference point (ERP) and the outer surface of the flat phantom shell. While maintaining this distance at the ERP location, the low (bottom) edge of the phone should be lowered from the phantom to establish the same separation distance between the peak SAR locations identified by the truncated partial SAR distribution measured with the SAM phantom. The distance from the peak SAR location to the phone is determined by the straight line passing perpendicularly through the phantom surface. When it is not feasible to maintain 4 mm separation at the ERP while also establishing the required separation at the peak SAR location, the top edge of the phone will be allowed to touch the phantom with a separation < 4 mm at the ERP. The phone should not be tilted to the left or right while placed in this inclined position to the flat phantom.

11.5 Body Worn Accessory Configurations

- To position the device parallel to the phantom surface with either keypad up or down.
- To adjust the device parallel to the flat phantom.
- To adjust the distance between the device surface and the flat phantom to 1.5 cm or holster surface and the flat phantom to 0 cm.

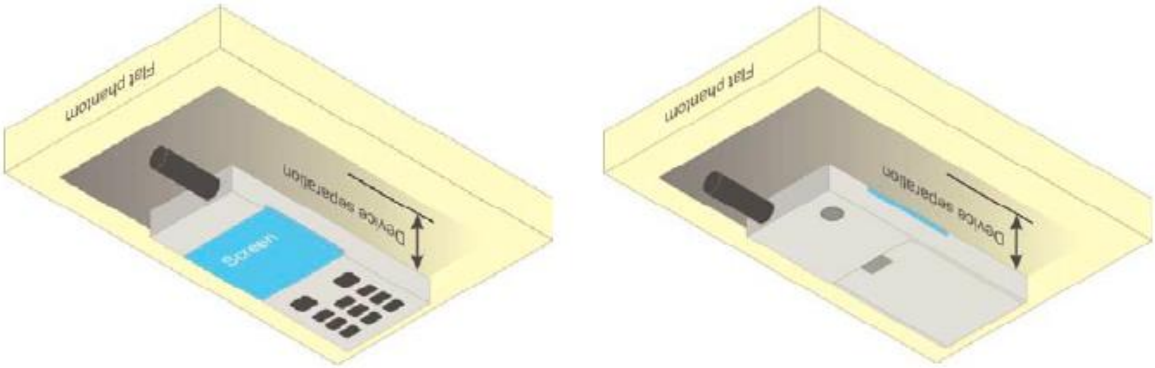

Fig.11.5 Illustration for Body Worn Position

11.6 Wireless Router (Hotspot) Configurations

Some battery-operated handsets have the capability to transmit and receive internet connectivity through simultaneous transmission of WIFI in conjunction with a separate licensed transmitter. The FCC has provided guidance in KDB Publication 941225 D06 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10 mm from the front, back and edges of the device with antennas 2.5 cm or closer to the edge of the device, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions. Therefore, SAR must be evaluated for each frequency transmission and mode separately and summed with the WIFI transmitter according to KDB 648474 publication procedures. The “Portable Hotspot” feature on the handset was NOT activated, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal.

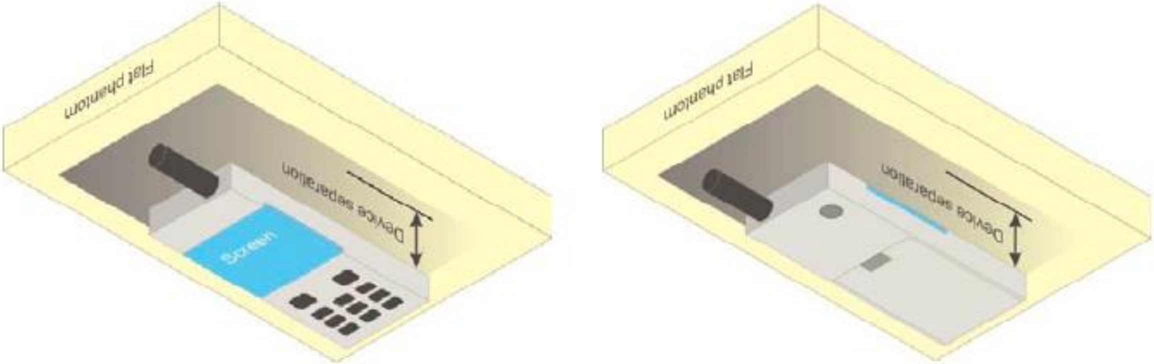

Fig.11.6 Illustration for Hotspot Position

12 Measurement Procedures

The measurement procedures are as bellows:

<Conducted power measurement>

- For WWAN power measurement, use base station simulator to configure EUT WWAN transition in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
- Read the WWAN RF power level from the base station simulator.
- For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band.
- Connect EUT RF port through RF cable to the power meter or spectrum analyzer, and measure WLAN/BT output power.

<Conducted power measurement>

- Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power, in the highest power channel.
- Place the EUT in positions as Appendix B demonstrates.
- Set scan area, grid size and other setting on the DASY software.
- Measure SAR results for the highest power channel on each testing position.
- Find out the largest SAR result on these testing positions of each band.
- Measure SAR results for other channels in worst SAR testing position if the Reported SAR or 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:

- Power reference measurement
- Area scan
- Zoom scan
- Power drift measurement

12.1 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 DASY 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 10 g 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 (SEMCAD). The system always gives the maximum values for 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

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

12.2 Power Reference Measurement

The Power Reference Measurement and Power Drift Measurement are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

12.3 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 is performed around the highest E-field value to determine the averaged SAR-distribution over 10g. Area scan and zoom scan resolution setting follows KDB 865664 D01v01r03 quoted below.

<table>
<tr><th colspan="3"></th><th>≤ 3 GHz</th><th>> 3 GHz</th></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">≤ 1.5·$\Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
* When zoom scan is required and the <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

12.4 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. When all volume scan were completed, the software, SEMCAD post-processor scan combine and subsequently superpose these measurement data to calculating the multiband SAR.

12.5 SAR Averaged Methods

In DASY, the interpolation and extrapolation are both based on the modified Quadratic Shepard's method. The interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1g and 10g cubes, the extrapolation distance should not be larger than 5 mm.

12.6 Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASY 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 drifts more than 5%, the SAR will be retested.

13 Conducted RF Output Power

13.1 GSM Conducted Power

Band: GSM 850	Burst Average Power (dBm)			Frame-Average Power(dBm)		
Channel	128	190	251	128	190	251
Frequency (MHz)	824.2	836.6	848.8	824.2	836.6	848.8
GSM (GMSK, Voice)	32.56	32.56	**32.58**	23.53	23.55	23.53
GPRS (GMSK, 1 TX slot)	32.53	32.54	32.49	23.5	23.51	23.46
GPRS (GMSK, 2 TX slots)	32.50	32.46	32.44	26.48	26.44	26.42
GPRS (GMSK, 3 TX slots)	32.40	32.34	32.54	28.14	28.08	28.28
GPRS (GMSK, 4 TX slots)	32.29	32.32	**32.51**	29.28	29.31	**29.5**

Remark:

1. The frame-averaged power is linearly reported the maximum burst averaged power over 8 time slots. The calculated method are shown as below:
   The duty cycle "x" of different time slots as below:
   1 TX slot is 1/8, 2 TX slots is 2/8, 3 TX slots is 3/8 and 4 TX slots is 4/8
   Based on the calculation formula:
   Frame-averaged power = Burst averaged power + 10 1og (x)
   So,
   Frame-averaged power (1 TX slot) = Burst averaged power (1 TX slot) – 9.03
   Frame-averaged power (2 TX slots) = Burst averaged power (2 TX slots) – 6.02
   Frame-averaged power (3 TX slots) = Burst averaged power (3 TX slots) – 4.26
   Frame-averaged power (4 TX slots) = Burst averaged power (4 TX slots) – 3.01
2. CS1 coding scheme was used in GPRS conducted power measurements and SAR testing, MCS5 coding scheme was used in EGPRS conducted power measurements and SAR testing (if necessary).

Note:

1. For Head SAR testing, GSM Voice mode should be evaluated, therefore the EUT was set in GSM 850 Voice mode.
2. For Body worn SAR testing, GSM Voice mode should be evaluated, therefore the EUT was set in GSM 850 Voice mode.
3. For Hotspot mode SAR testing, GPRS and EGPRS mode should be evaluated, therefore the EUT was set in GPRS 4 TX slots mode due to the highest frame-averaged power.
4. Per KDB447498 D01v05r02, the maximum output power channel is used for SAR testing and for further SAR test reduction.
5. The EUT do not support DTM and VoIP function.

Band: GSM 1900	Burst Average Power (dBm)			Frame-Average Power(dBm)		
Channel	512	661	810	512	661	810
Frequency (MHz)	1850.2	1880.0	1909.8	1850.2	1880.0	1909.8
GSM (GMSK, Voice)	**30.48**	30.37	30.39	21.45	21.34	21.36
GPRS (GMSK, 1 TX slot)	30.46	30.41	30.45	21.43	21.38	21.42
GPRS (GMSK, 2 TX slots)	30.41	30.44	30.33	24.39	24.42	24.31
GPRS (GMSK, 3 TX slots)	30.29	30.16	30.06	26.03	25.9	25.8
GPRS (GMSK, 4 TX slots)	30.09	29.89	**30.25**	27.08	26.88	**27.24**

Remark:

1. The frame-averaged power is linearly reported the maximum burst averaged power over 8 time slots. The calculated method are shown as below:
   The duty cycle "x" of different time slots as below:
   1 TX slot is 1/8, 2 TX slots is 2/8, 3 TX slots is 3/8 and 4 TX slots is 4/8
   Based on the calculation formula:
   Frame-averaged power = Burst averaged power + 10 1og (x)
   So,
   Frame-averaged power (1 TX slot) = Burst averaged power (1 TX slot) – 9.03
   Frame-averaged power (2 TX slots) = Burst averaged power (2 TX slots) – 6.02
   Frame-averaged power (3 TX slots) = Burst averaged power (3 TX slots) – 4.26
   Frame-averaged power (4 TX slots) = Burst averaged power (4 TX slots) – 3.01
2. CS1 coding scheme was used in GPRS conducted power measurements and SAR testing, MCS5 coding scheme was used in EGPRS conducted power measurements and SAR testing (if necessary).

Note:

1. For Head SAR testing, GSM Voice mode should be evaluated, therefore the EUT was set in GSM 1900 Voice mode.
2. For Body worn SAR testing, GSM Voice mode should be evaluated, therefore the EUT was set in GSM Voice 1900 mode.
3. For Hotspot mode SAR testing, GPRS and EGPRS mode should be evaluated, therefore the EUT was set in GPRS 4 TX slots mode due to the highest frame-averaged power.
4. Per KDB447498 D01v05r02, the maximum output power channel is used for SAR testing and for further SAR test reduction.
5. The EUT do not support DTM and VoIP function.

13.2 WCDMA Conducted Power

The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification. A summary of these settings are illustrated below:

HSDPA Setup Configuration:

a. The EUT was connected to Base Station Rohde & Schwarz CMU200 referred to the Setup Configuration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting:
   i. Set Gain Factors (β_c and β_d) and parameters were set according to each
   ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
   iii. Set RMC 12.2kbps + HSDPA mode.
   iv. Set Cell Power = -86 dBm
   v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
   vi. Select HSDPA Uplink Parameters
   vii. Set Delta ACK, Delta NACK and Delta CQI = 8
   viii. Set Ack-Nack Repetition Factor to 3
   ix. Set CQI Feedback Cycle (k) to 4 ms
   x. Set CQI Repetition Factor to 2
   xi. Power Ctrl Mode = All Up bits
d. The transmitted maximum output power was recorded.

Table 1

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	CM (dB) (2)
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15 (3)	15/15 (3)	64	12/15 (3)	24/15	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

Note 1: Δ_{ACK}, Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$
Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$.
Note 3: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.

HSDPA Sub-test setup configuration

HSUPA Setup Configuration:

a. The EUT was connected to Base Station Rohde & Schwarz CMU200 referred to the Setup Configuration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting * :
   i. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
   ii. Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121
   iii. Set Cell Power = -86 dBm
   iv. Set Channel Type = 12.2k + HSPA
   v. Set UE Target Power
   vi. Power Ctrl Mode= Alternating bits
   vii. Set and observe the E-TFCI
   viii. Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI
d. The transmitted maximum output power was recorded.

Table 2

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM (2) (dB)	MPR (dB)	AG (4) Index	E-TFCI
1	11/15 (3)	15/15 (3)	64	11/15 (3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1}: 47/15 β_{ed2}: 47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (4)	15/15 (4)	64	15/15 (4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 8 $\Leftrightarrow$ $A_{hs} = \beta_{hs}/\beta_c = 30/15$ $\Leftrightarrow$ $\beta_{hs} = 30/15 * \beta_c$.
Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.
Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.
Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 14/15 and β_d = 15/15.
Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.
Note 6: β_{ed} cannot be set directly; it is set by Absolute Grant Value.

HSUPA Sub-test setup configuration

WCDMA Conducted Power:

WCDMA Average power (dBm)						
Band	WCDMA Band V			WCDMA Band II		
Channel	4132	4183	4233	9262	9400	9538
Frequency (MHz)	826.4	836.6	846.6	1852.4	1880.0	1907.6
AMR 12.2 kbps	23.58	23.54	23.33	23.60	23.60	23.55
RMC 12.2 kbps	23.54	**23.57**	23.50	23.70	**23.75**	23.57
HSDPA Sub-test 1	22.59	22.68	22.61	22.82	22.78	22.56
HSDPA Sub-test 2	22.39	22.48	22.39	22.51	22.67	22.41
HSDPA Sub-test 3	21.09	21.12	21.05	21.25	21.26	21.07
HSDPA Sub-test 4	20.83	20.92	20.75	20.98	21.07	20.85
HSUPA Sub-test 1	21.83	21.93	21.85	22.11	22.13	21.96
HSUPA Sub-test 2	22.45	22.65	22.52	22.74	22.78	22.59
HSUPA Sub-test 3	21.52	21.63	21.60	21.77	21.76	21.44
HSUPA Sub-test 4	22.51	22.52	22.57	22.84	22.87	22.50
HSUPA Sub-test 5	21.77	21.79	21.81	22.00	22.03	21.72

WCDMA Average power (dBm)			
Band	WCDMA Band IV		
Channel	1312	1413	1513
Frequency (MHz)	1712.4	1732.6	1752.6
AMR 12.2 kbps	24.34	24.19	24.28
RMC 12.2 kbps	24.36	24.31	**24.46**
HSDPA Sub-test 1	23.32	23.21	23.41
HSDPA Sub-test 2	23.09	23.05	23.43
HSDPA Sub-test 3	21.61	21.52	21.56
HSDPA Sub-test 4	21.43	21.34	21.55
HSUPA Sub-test 1	22.64	22.60	22.74
HSUPA Sub-test 2	23.29	23.16	23.43
HSUPA Sub-test 3	22.20	22.17	22.26
HSUPA Sub-test 4	23.23	23.17	23.43
HSUPA Sub-test 5	22.46	22.38	22.65

Note:

1. Applying the subtest setup in Table C.11.1.3 of 3GPP TS 34.121-1
2. Per KDB 941225 D01, RMC 12.2kbps mode is used to evaluate SAR due the highest output power. If AMR 12.2 kbps power is < 0.25dB higher than RMC 12.2kbps, SAR tests with AMR 12.2 kbps can be excluded.
3. AMR, HSDPA RF power will not be larger than RMC 12.2kbps, detailed information is included in Tune-up Procure exhibit.

13.3 LTE Conducted Power

13.3.1 Largest channel bandwidth standalone SAR test requirements

QPSK with 1 RB allocation

Start with the largest channel bandwidth and 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.8 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.

QPSK with 50% RB allocation

The procedures required for 1 RB allocation in section 4.2.1 are applied to measure the SAR for QPSK with 50% RB allocation.9

QPSK with 100% RB allocation

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 sections 4.2.1 and 4.2.2 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.

Higher order modulations

For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in sections 4.2.1, 5.2.2 and 4.2.3 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.

13.3.2 Other channel bandwidth standalone SAR test requirements

For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section 4.2 to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > ½ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg. The equivalent channel configuration for the RB allocation, RB offset and modulation etc. is determined for the smaller channel bandwidth according to the same number of RB allocated in the largest channel bandwidth. For example, 50 RB in 10 MHz channel bandwidth does not apply to 5 MHz channel bandwidth; therefore, this cannot be tested in the smaller channel bandwidth. However, 50% RB allocation in 10 MHz channel bandwidth is equivalent to 100% RB allocation in 5 MHz channel bandwidth; therefore, these are the equivalent configurations to be compared to determine the specific channel and configuration in the smaller channel bandwidth that need SAR testing.

LTE Band 2 part

Frequency (MHz)	Channel No.	Modulation	BW (MHz)	RB Size	RB Offset	Ave. Power (dBm)
1850.70	18607	QPSK	1.4	1	0	22.65
				1	2	22.52
				1	5	22.71
				3	0	23.02
				3	1	22.69
				3	2	22.66
				6	0	22.25
		16QAM		1	0	21.32
				1	2	21.63
				1	5	21.53
				3	0	22.19
				3	1	21.86
				3	2	21.80
				6	0	21.45
1880.00	18900	QPSK	1.4	1	0	22.39
				1	2	22.45
				1	5	22.45
				3	0	23.02
				3	1	22.99
				3	2	22.98
				6	0	22.31
		16QAM		1	0	21.22
				1	2	21.30
				1	5	21.33
				3	0	21.49
				3	1	21.55
				3	2	21.57
				6	0	21.51
1909.30	19193	QPSK	1.4	1	0	21.86
				1	2	21.86
				1	5	21.75
				3	0	21.58
				3	1	21.83
				3	2	21.57
				6	0	21.78
		16QAM		1	0	20.60
				1	2	20.58
				1	5	20.41
				3	0	20.50
				3	1	20.56
				3	2	20.53
				6	0	20.04

Frequency (MHz)	Channel No.	Modulation	BW (MHz)	RB Size	RB Offset	Ave. Power (dBm)
1851.50	18615	QPSK	3.0	1	0	22.21
				1	7	23.02
				1	14	22.78
				8	0	22.28
				8	4	22.26
				8	7	22.16
				15	0	22.23
		16QAM		1	0	21.17
				1	7	21.12
				1	14	20.84
				8	0	21.30
				8	4	21.27
				8	7	21.17
				15	0	21.22
1880.00	18900	QPSK	3.0	1	0	22.23
				1	7	22.55
				1	14	22.64
				8	0	22.18
				8	4	22.31
				8	7	22.29
				15	0	22.22
		16QAM		1	0	21.61
				1	7	22.02
				1	14	22.07
				8	0	21.28
				8	4	21.46
				8	7	21.44
				15	0	21.28
1908.50	19185	QPSK	3.0	1	0	21.58
				1	7	21.96
				1	14	21.51
				8	0	21.69
				8	4	21.75
				8	7	21.68
				15	0	21.85
		16QAM		1	0	20.57
				1	7	20.60
				1	14	20.55
				8	0	20.70
				8	4	20.77
				8	7	20.72
				15	0	20.71

Frequency (MHz)	Channel No.	Modulation	BW (MHz)	RB Size	RB Offset	Ave. Power (dBm)
1852.50	18625	QPSK	5.0	1	0	22.74
				1	12	22.82
				1	24	22.31
				12	0	22.43
				12	6	22.19
				12	11	22.29
				25	0	22.34
		16QAM		1	0	22.31
				1	12	22.39
				1	24	21.90
				12	0	21.52
				12	6	21.25
				12	11	21.39
				25	0	21.36
1880.00	18900	QPSK	5.0	1	0	22.39
				1	12	22.83
				1	24	22.81
				12	0	22.21
				12	6	22.26
				12	11	22.37
				25	0	22.22
		16QAM		1	0	21.42
				1	12	21.94
				1	24	21.95
				12	0	21.25
				12	6	21.35
				12	11	21.44
				25	0	21.25
1907.50	19175	QPSK	5.0	1	0	21.50
				1	12	21.92
				1	24	21.55
				12	0	21.61
				12	6	21.80
				12	11	21.78
				25	0	21.67
		16QAM		1	0	20.57
				1	12	21.04
				1	24	20.68
				12	0	20.68
				12	6	20.88
				12	11	20.86
				25	0	20.72

Frequency (MHz)	Channel No.	Modulation	BW (MHz)	RB Size	RB Offset	Ave. Power (dBm)
1855.00	18650	QPSK	10.0	1	0	22.75
				1	24	22.60
				1	49	21.69
				25	0	22.49
				25	12	22.30
				25	24	22.16
				50	0	22.28
		16QAM		1	0	21.49
				1	24	21.41
				1	49	20.48
				25	0	21.62
				25	12	21.38
				25	24	21.30
				50	0	21.35
1880.00	18900	QPSK	10.0	1	0	22.03
				1	24	22.88
				1	49	22.84
				25	0	21.95
				25	12	22.03
				25	24	22.24
				50	0	22.16
		16QAM		1	0	21.38
				1	24	22.27
				1	49	22.27
				25	0	20.95
				25	12	21.15
				25	24	21.31
				50	0	21.23
1905.00	19150	QPSK	10.0	1	0	21.11
				1	24	21.40
				1	49	21.31
				25	0	21.13
				25	12	21.42
				25	24	21.54
				50	0	21.34
		16QAM		1	0	20.58
				1	24	20.83
				1	49	20.56
				25	0	20.25
				25	12	20.55
				25	24	20.68
				50	0	20.42

Frequency (MHz)	Channel No.	Modulation	BW (MHz)	RB Size	RB Offset	Average (dBm)
1857.50	18675	QPSK	15.0	1	0	22.33
				1	37	22.25
				1	74	21.10
				36	0	22.34
				36	16	22.26
				36	35	21.80
				75	0	22.05
		16QAM		1	0	21.42
				1	37	21.31
				1	74	20.17
				36	0	21.44
				36	16	21.29
				36	35	20.80
				75	0	21.14
1880.00	18900	QPSK	15.0	1	0	21.48
				1	37	22.78
				1	74	22.50
				36	0	21.82
				36	16	22.16
				36	35	22.36
				75	0	22.14
		16QAM		1	0	20.86
				1	37	21.96
				1	74	21.91
				36	0	20.79
				36	16	21.12
				36	35	21.43
				75	0	21.20
1902.50	19125	QPSK	15.0	1	0	21.10
				1	37	21.21
				1	74	21.06
				36	0	21.12
				36	16	21.20
				36	35	21.25
				75	0	21.17
		16QAM		1	0	20.22
				1	37	20.26
				1	74	20.17
				36	0	20.16
				36	16	20.23
				36	35	20.34
				75	0	20.17

Frequency (MHz)	Channel No.	Modulation	BW (MHz)	RB Size	RB Offset	Ave. Power (dBm)
1860.00	18700	QPSK	20.0	1	0	21.64
				1	49	22.02
				1	99	21.46
				50	0	22.02
				50	24	21.99
				50	49	21.42
				100	0	21.68
		16QAM		1	0	20.61
				1	49	20.84
				1	99	20.57
				50	0	21.16
				50	24	21.07
				50	49	20.48
				100	0	20.82
1880.00	18900	QPSK	20.0	1	0	21.88
				1	49	22.96
				1	99	22.06
				50	0	21.87
				50	24	22.42
				50	49	22.49
				100	0	22.27
		16QAM		1	0	20.59
				1	49	22.18
				1	99	21.27
				50	0	20.91
				50	24	21.47
				50	49	21.67
				100	0	21.33
1900.00	19100	QPSK	20.0	1	0	21.44
				1	49	21.25
				1	99	21.6
				50	0	21.48
				50	24	21.30
				50	49	21.03
				100	0	21.22
		16QAM		1	0	20.92
				1	49	20.67
				1	99	20.54
				50	0	20.57
				50	24	20.40
				50	49	20.09
				100	0	20.35

LTE Band 4 part

Frequency (MHz)	Channel No.	Modulation	BW (MHz)	RB Size	RB Offset	Ave. Power (dBm)
1710.70	19957	QPSK	1.4	1	0	21.72
				1	2	21.67
				1	5	21.58
				3	0	21.61
				3	1	21.61
				3	2	21.59
				6	0	21.49
		16QAM		1	0	21.10
				1	2	21.08
				1	5	20.95
				3	0	20.91
				3	1	20.90
				3	2	20.87
				6	0	20.40
1732.50	20175	QPSK	1.4	1	0	22.48
				1	2	22.51
				1	5	22.53
				3	0	22.46
				3	1	22.51
				3	2	22.51
				6	0	21.90
		16QAM		1	0	21.29
				1	2	21.34
				1	5	21.36
				3	0	21.61
				3	1	21.67
				3	2	21.66
				6	0	21.06
1754.30	20393	QPSK	1.4	1	0	21.24
				1	2	21.22
				1	5	21.12
				3	0	21.10
				3	1	21.14
				3	2	21.13
				6	0	21.12
		16QAM		1	0	20.09
				1	2	20.09
				1	5	20.04
				3	0	20.36
				3	1	20.39
				3	2	20.38
				6	0	20.34

Frequency (MHz)	Channel No.	Modulation	BW (MHz)	RB Size	RB Offset	Ave. Power (dBm)
1711.50	19965	QPSK	3.0	1	0	21.25
				1	7	21.28
				1	14	21.10
				8	0	21.25
				8	4	21.27
				8	7	21.21
				15	0	21.25
		16QAM		1	0	20.10
				1	7	20.13
				1	14	19.94
				8	0	20.28
				8	4	21.36
				8	7	20.24
				15	0	20.26
1732.50	20175	QPSK	3.0	1	0	22.48
				1	7	22.53
				1	14	22.45
				8	0	21.85
				8	4	21.84
				8	7	21.84
				15	0	21.87
		16QAM		1	0	21.81
				1	7	21.94
				1	14	21.83
				8	0	21.00
				8	4	21.00
				8	7	20.97
				15	0	20.95
1753.50	20385	QPSK	3.0	1	0	21.28
				1	7	21.27
				1	14	21.06
				8	0	21.25
				8	4	21.25
				8	7	21.16
				15	0	21.22
		16QAM		1	0	20.13
				1	7	20.13
				1	14	19.91
				8	0	20.28
				8	4	20.27
				8	7	20.18
				15	0	20.22

Frequency (MHz)	Channel No.	Modulation	BW (MHz)	RB Size	RB Offset	Ave. Power (dBm)
1712.50	19975	QPSK	5.0	1	0	21.04
				1	12	21.21
				1	24	20.89
				12	0	21.22
				12	6	21.26
				12	11	21.19
				25	0	21.19
		16QAM		1	0	20.64
				1	12	20.82
				1	24	20.50
				12	0	20.32
				12	6	20.37
				12	11	20.30
				25	0	20.21
1732.50	20175	QPSK	5.0	1	0	22.06
				1	12	22.42
				1	24	22.20
				12	0	22.10
				12	6	21.89
				12	11	21.88
				25	0	21.91
		16QAM		1	0	21.20
				1	12	21.56
				1	24	21.35
				12	0	21.04
				12	6	20.93
				12	11	20.96
				25	0	20.98
1752.50	20375	QPSK	5.0	1	0	21.20
				1	12	21.31
				1	24	20.89
				12	0	21.36
				12	6	21.37
				12	11	21.25
				25	0	21.28
		16QAM		1	0	20.80
				1	12	20.92
				1	24	20.49
				12	0	20.46
				12	6	20.48
				12	11	20.37
				25	0	20.31

Frequency (MHz)	Channel No.	Modulation	BW (MHz)	RB Size	RB Offset	Ave. Power (dBm)
1715.00	20000	QPSK	10.0	1	0	21.1
				1	24	21.17
				1	49	21.07
				25	0	22.24
				25	12	21.62
				25	24	21.62
				50	0	21.70
		16QAM		1	0	20.37
				1	24	20.68
				1	49	20.54
				25	0	20.63
				25	12	20.73
				25	24	20.76
				50	0	20.79
1732.50	20175	QPSK	10.0	1	0	22.28
				1	24	22.95
				1	49	22.83
				25	0	21.93
				25	12	21.87
				25	24	21.88
				50	0	21.87
		16QAM		1	0	21.13
				1	24	21.80
				1	49	21.70
				25	0	21.07
				25	12	21.03
				25	24	21.04
				50	0	20.98
1750.00	20350	QPSK	10.0	1	0	22.53
				1	24	22.49
				1	49	21.80
				25	0	21.88
				25	12	21.79
				25	24	21.88
				50	0	21.84
		16QAM		1	0	21.96
				1	24	21.90
				1	49	21.21
				25	0	20.98
				25	12	20.90
				25	24	20.98
				50	0	20.91

Frequency (MHz)	Channel No.	Modulation	BW (MHz)	RB Size	RB Offset	Average (dBm)
1717.50	20025	QPSK	15.0	1	0	22.66
				1	37	22.04
				1	74	21.82
				36	0	21.70
				36	16	21.79
				36	35	21.93
				75	0	21.77
		16QAM		1	0	20.74
				1	37	21.14
				1	74	20.98
				36	0	20.85
				36	16	20.83
				36	35	20.98
				75	0	20.85
1732.50	20175	QPSK	15.0	1	0	22.15
				1	37	22.98
				1	74	22.72
				36	0	22.09
				36	16	21.98
				36	35	21.87
				75	0	21.85
		16QAM		1	0	21.56
				1	37	22.37
				1	74	22.45
				36	0	21.19
				36	16	21.16
				36	35	20.94
				75	0	21.37
1747.50	20325	QPSK	15.0	1	0	22.56
				1	37	22.66
				1	74	21.63
				36	0	21.69
				36	16	22.51
				36	35	21.79
				75	0	21.78
		16QAM		1	0	21.66
				1	37	21.68
				1	74	21.26
				36	0	20.70
				36	16	20.78
				36	35	20.84
				75	0	20.80

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Frequency (MHz)	Channel No.	Modulation	BW (MHz)	RB Size	RB Offset	Ave. Power (dBm)
1720.00	20050	QPSK	20.0	1	0	22.10
				1	49	22.08
				1	99	21.74
				50	0	21.68
				50	24	21.91
				50	49	21.95
				100	0	21.77
		16QAM		1	0	21.43
				1	49	20.95
				1	99	20.64
				50	0	20.84
				50	24	21.10
				50	49	21.12
				100	0	21.19
1732.50	20175	QPSK	20.0	1	0	21.51
				1	49	23.30
				1	99	22.16
				50	0	22.11
				50	24	22.13
				50	49	21.83
				100	0	21.94
		16QAM		1	0	20.85
				1	49	22.34
				1	99	21.59
				50	0	21.20
				50	24	21.20
				50	49	20.91
				100	0	21.01
1745.00	20300	QPSK	20.0	1	0	22.23
				1	49	22.83
				1	99	21.59
				50	0	21.74
				50	24	21.77
				50	49	21.69
				100	0	21.83
		16QAM		1	0	22.43
				1	49	21.81
				1	99	20.59
				50	0	20.90
				50	24	20.93
				50	49	20.85
				100	0	20.97

LTE Band 17 part

Frequency (MHz)	Channel No.	Modulation	BW (MHz)	RB Size	RB Offset	Ave. Power (dBm)
706.50	23755	QPSK	5.0	1	0	22.88
				1	12	23.46
				1	24	23.50
				12	0	22.10
				12	6	22.50
				12	11	22.38
				25	0	22.26
		16QAM		1	0	22.10
				1	12	22.58
				1	24	22.56
				12	0	21.15
				12	6	21.27
				12	11	21.32
				25	0	21.34
710.00	23790	QPSK	5.0	1	0	23.25
				1	12	23.18
				1	24	22.72
				12	0	22.28
				12	6	22.19
				12	11	22.12
				25	0	22.19
		16QAM		1	0	22.72
				1	12	22.61
				1	24	22.23
				12	0	21.37
				12	6	21.29
				12	11	21.27
				25	0	21.22
713.50	23825	QPSK	5.0	1	0	23.22
				1	12	22.98
				1	24	22.72
				12	0	22.29
				12	6	22.15
				12	11	22.12
				25	0	22.11
		16QAM		1	0	22.13
				1	12	21.82
				1	24	21.54
				12	0	21.33
				12	6	21.23
				12	11	21.18
				25	0	21.32

Frequency (MHz)	Channel No.	Modulation	BW (MHz)	RB Size	RB Offset	Ave. Power (dBm)
709.00	23780	QPSK	10.0	1	0	23.10
				1	24	23.31
				1	49	22.93
				25	0	22.18
				25	12	22.17
				25	24	22.10
				50	0	22.12
		16QAM		1	0	22.04
				1	24	22.16
				1	49	21.85
				25	0	21.38
				25	12	21.27
				25	24	21.26
				50	0	21.24
710.00	23790	QPSK	10.0	1	0	23.23
				1	24	23.03
				1	49	23.02
				25	0	22.22
				25	12	22.10
				25	24	21.99
				50	0	22.05
		16QAM		1	0	22.64
				1	24	22.46
				1	49	22.47
				25	0	21.35
				25	12	21.20
				25	24	21.10
				50	0	21.23
711.00	23800	QPSK	10.0	1	0	23.54
				1	24	23.09
				1	49	22.80
				25	0	22.25
				25	12	22.17
				25	24	22.00
				50	0	22.08
		16QAM		1	0	22.34
				1	24	21.96
				1	49	21.56
				25	0	21.41
				25	12	21.33
				25	24	21.10
				50	0	21.18

13.4 WLAN 2.4 GHz Band Conducted Power

Average Power (dBm)				
Channel	Frequency (MHz)	802.11 b	802.11 g	802.11n (HT20)
CH 01	2412	17.40	10.59	10.64
CH 06	2437	**18.78**	17.41	16.83
CH 11	2462	17.81	16.53	17.05

Average Power (dBm)		
Channel	Frequency (MHz)	802.11n (HT40)
CH 03	2422	11.17
CH 06	2437	16.05
CH 09	2452	12.46

Note:

1. Per KDB 447498 D01v05r02, the 1-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, where
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation
   - The result is rounded to one decimal place for comparison

Channel	Frequency (GHz)	Max. Tune-up Power (dBm)	Max. Power (mW)	Test distance (mm)	Result	exclusion thresholds for 1-g SAR
CH 06	2.437	19.0	79.4	5	24.78	3.0

2. Base on the result of note1, RF exposure evaluation is required.
3. Per KDB 248227 D01v01r02, choose the highest output power channel to test SAR and determine further SAR exclusion.
4. For each frequency band, testing at higher data rates and higher order modulations is not required when the maximum average output power for each of these configurations is less than 1/4 dB higher than those measured at the lowest data rate
5. Per KDB 248227 D01v01r02, 11g and 11n-HT20 output power is less than 1/4 dB higher than 11b mode, thus the SAR can be excluded. WLAN SAR was tested on 802.11b 1 Mbps.
6. The output power of all data rate were pre-scan, just the worst case (the lowest data rate) of all mode were shown in report.

13.5 Bluetooth Conducted Power

Average Power (dBm)		
Channel	Frequency (MHz)	BLE (BT 4.0)
CH 00	2402	-1.97
CH 20	2442	**-0.29**
CH 39	2480	-3.32

Note:

1. Per KDB 447498 D01v05r02, the 1-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, where
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation
   - The result is rounded to one decimal place for comparison

Channel	Frequency (GHz)	Max. tune-up Power (dBm)	Max. Power (mW)	Test distance (mm)	Result	exclusion thresholds for 1-g SAR
CH 20	2.442	0	1	5	0.31	3.0

2. The max. tune-up power was provided by manufacturer, base on the result of note 1, RF exposure evaluation is not required.
3. The output power of all data rate were pre-scan, just the worst case of all mode were shown in report.
4. When the minimum *test separation distance* is < 5 mm, a distance of 5 mm according is applied to determine SAR test exclusion.

14 Exposure Positions Consideration

14.1 EUT Antenna Locations

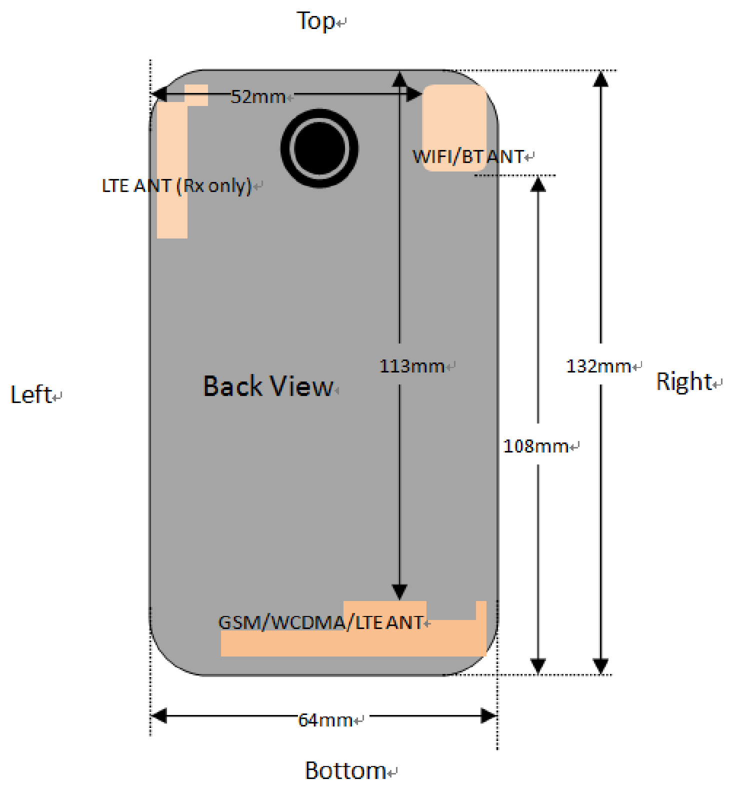


Fig.14.1 EUT Antenna Locations

14.2 Test Positions Consideration

Distance of Antennas to EUT edge/surface Test distance: 10mm						
Antennas	**Back**	**Front**	**Top Side**	**Bottom Side**	**Right Side**	**Left Side**
WWAN	<25mm	<25mm	113mm	<25mm	<25mm	<25mm
WLAN & Bluetooth	<25mm	<25mm	<25mm	108mm	<25mm	52mm

Test Positions Test distance: 10mm						
Antennas	**Back**	**Front**	**Top Side**	**Bottom Side**	**Right Side**	**Left Side**
WWAN	Yes	Yes	No	Yes	Yes	Yes
WLAN & Bluetooth	Yes	Yes	Yes	No	Yes	No

Note:

1. Head/Body-worn/Hotspot mode SAR assessments are required.
2. Referring to KDB 941225 D06v02, when the overall device length and width are ≥ 9cm * 5cm, the test distance is 10mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.
3. Per KDB 447498 D01v05r02, for handsets the test separation distance is determined by the smallest distance between the outer surface of the device and the user, which is 0 mm for head SAR, 10 mm for hotspot SAR, and 10 mm for body-worn SAR.

15 SAR Test Results Summary

15.1 Standalone Head SAR Data

➢ GSM Head SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
1	GSM850/Voice	Right Cheek	251	848.8	32.58	-0.30	33.0	0.318	1.102	0.35
2	GSM850/Voice	Right Tilted	251	848.8	32.58	0.03	33.0	0.193	1.102	0.213
3	GSM850/Voice	Left Cheek	251	848.8	32.58	0.12	33.0	0.293	1.102	0.323
4	GSM850/Voice	Left Tilted	251	848.8	32.58	0.00	33.0	0.177	1.102	0.195
5	GSM1900/Voice	Right Cheek	512	1850.2	30.48	0.20	30.5	0.033	1.005	0.033
6	GSM1900/Voice	Right Tilted	512	1850.2	30.48	0.36	30.5	0.012	1.005	0.012
7	GSM1900/Voice	Left Cheek	512	1850.2	30.48	-0.10	30.5	0.050	1.005	0.05
8	GSM1900/Voice	Left Tilted	512	1850.2	30.48	-0.04	30.5	0.011	1.005	0.011
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ WCDMA Head SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
9	Band V/RMC	Right Cheek	4183	836.6	23.57	0.34	24.0	0.246	1.104	0.272
10	Band V/RMC	Right Tilted	4183	836.6	23.57	0.13	24.0	0.159	1.104	0.176
11	Band V/RMC	Left Cheek	4183	836.6	23.57	-0.29	24.0	0.250	1.104	0.276
12	Band V/RMC	Left Tilted	4183	836.6	23.57	0.05	24.0	0.160	1.104	0.177
13	Band II/RMC	Right Cheek	9400	1880	23.75	0.15	24.0	0.041	1.059	0.043
14	Band II/RMC	Right Tilted	9400	1880	23.75	-0.10	24.0	0.020	1.059	0.021
15	Band II/RMC	Left Cheek	9400	1880	23.75	-0.05	24.0	0.083	1.059	0.088
16	Band II/RMC	Left Tilted	9400	1880	23.75	0.24	24.0	0.018	1.059	0.019
	Band IV/RMC	Right Cheek	1513	1752.6	24.46	0.18	24.5	0.020	1.009	0.02
	Band IV/RMC	Right Tilted	1513	1752.6	24.46	0.18	24.5	0.012	1.009	0.012
	Band IV/RMC	Left Cheek	1513	1752.6	24.46	-0.19	24.5	0.049	1.009	0.049
	Band IV/RMC	Left Tilted	1513	1752.6	24.46	0.10	24.5	0.012	1.009	0.012
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ LTE 20MHz QPSK 1RB Head SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
17	Band2/RB#49	Right Cheek	18900	1880	22.96	0.14	23.0	0.099	1.009	0.100
18	Band2/RB#49	Right Tilted	18900	1880	22.96	0.14	23.0	0.062	1.009	0.063
19	Band2/RB#49	Left Cheek	18900	1880	22.96	0.28	23.0	0.166	1.009	0.167
20	Band2/RB#49	Left Tilted	18900	1880	22.96	-0.01	23.0	0.052	1.009	0.052
21	Band4/RB#49	Right Cheek	20175	1732.5	23.30	0.26	23.5	0.110	1.047	0.115
22	Band4/RB#49	Right Tilted	20175	1732.5	23.30	-0.16	23.5	0.068	1.047	0.071
23	Band4/RB#49	Left Cheek	20175	1732.5	23.30	0.16	23.5	0.245	1.047	0.257
24	Band4/RB#49	Left Tilted	20175	1732.5	23.30	-0.34	23.5	0.063	1.047	0.066
	Band17/RB#0	Right Cheek	23800	711	23.54	-0.28	24.0	0.053	1.112	0.059
	Band17/RB#0	Right Tilted	23800	711	23.54	-0.19	24.0	0.039	1.112	0.043
	Band17/RB#0	Left Cheek	23800	711	23.54	0.26	24.0	0.070	1.112	0.078
	Band17/RB#0	Left Tilted	23800	711	23.54	-0.01	24.0	0.046	1.112	0.051
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ LTE 20MHz QPSK 50%RB Head SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
25	Band2/RB#49	Right Cheek	18900	1880	22.49	0.34	22.5	0.076	1.002	0.076
26	Band2/RB#49	Right Tilted	18900	1880	22.49	-0.02	22.5	0.056	1.002	0.056
27	Band2/RB#49	Left Cheek	18900	1880	22.49	0.27	22.5	0.177	1.002	0.177
28	Band2/RB#49	Left Tilted	18900	1880	22.49	0.32	22.5	0.055	1.002	0.055
29	Band4/RB#24	Right Cheek	20175	1732.5	22.13	0.35	22.5	0.166	1.089	0.181
30	Band4/RB#24	Right Tilted	20175	1732.5	22.13	0.23	22.5	0.050	1.089	0.054
31	Band4/RB#24	Left Cheek	20175	1732.5	22.13	0.15	22.5	0.218	1.089	0.237
32	Band4/RB#24	Left Tilted	20175	1732.5	22.13	-0.02	22.5	0.051	1.089	0.056
	Band17/RB#0	Right Cheek	23800	711	22.25	0.27	22.5	0.047	1.059	0.05
	Band17/RB#0	Right Tilted	23800	711	22.25	-0.29	22.5	0.030	1.059	0.032
	Band17/RB#0	Left Cheek	23800	711	22.25	0.14	22.5	0.057	1.059	0.06
	Band17/RB#0	Left Tilted	23800	711	22.25	-0.24	22.5	0.034	1.059	0.036
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ WLAN 2.4 GHz Head SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
33	2.4GHz/802.11b	Right Cheek	06	2437	18.78	0.10	19.0	0.834	1.052	0.877
	2.4GHz/802.11b	Right Cheek	01	2412	17.40	-0.00	19.0	0.562	1.445	0.812
	2.4GHz/802.11b	Right Cheek	11	2462	17.81	-0.03	19.0	0.903	1.315	1.187
	2.4GHz/802.11b	Right Cheek	11	2462	17.81	0.07	19.0	0.908	1.315	1.194
34	2.4GHz/802.11b	Right Tilted	06	2437	18.78	0.08	19.0	0.733	1.052	0.771
35	2.4GHz/802.11b	Left Cheek	06	2437	18.78	0.20	19.0	0.357	1.052	0.376
36	2.4GHz/802.11b	Left Tilted	06	2437	18.78	-0.01	19.0	0.436	1.052	0.459
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

Note:

1. Per KDB 447498 D01v05r02, for each exposure position, if the highest output power channel Reported SAR ≤ 0.8W/kg, other channels SAR testing is not necessary.
2. Per KDB 865664 D01v01r03, for each frequency band, repeated SAR measurement is required when the measured SAR is ≥ 0.8W/kg.
3. Per KDB 941225 D05v02r03, 100% RB allocation SAR measurement is not required when the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg.

15.2 Standalone Body SAR

➢ GSM Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
37	GSM850/Voice	Front	251	848.8	32.58	-0.04	33.0	0.378	1.102	0.417
38	GSM850/Voice	Back	251	848.8	32.58	-0.08	33.0	0.420	1.102	0.463
39	GSM1900/Voice	Front	512	1850.2	30.48	-0.13	30.5	0.026	1.005	0.026
40	GSM1900/Voice	Back	512	1850.2	30.48	0.10	30.5	0.028	1.005	0.028
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ WCDMA Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	Band V/RMC	Front	4183	836.6	23.57	0.05	24.0	0.323	1.104	0.357
	Band V/RMC	Back	4183	836.6	23.57	0.09	24.0	0.351	1.104	0.388
	Band II/RMC	Front	9400	1880	23.75	0.25	24.0	0.048	1.059	0.051
	Band II/RMC	Back	9400	1880	23.75	-0.07	24.0	0.051	1.059	0.054
	Band IV/RMC	Front	1513	1752.6	24.46	0.01	24.5	0.071	1.009	0.072
	Band IV/RMC	Back	1513	1752.6	24.46	0.10	24.5	0.078	1.009	0.079
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ LTE 20MHz QPSK 1RB Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	Band2/RB#0	Front	18900	1880	22.96	0.15	23.0	0.197	1.009	0.199
	Band2/RB#0	Back	18900	1880	22.96	0.01	23.0	0.151	1.009	0.152
	Band4/RB#0	Front	20175	1732.5	23.30	0.04	23.5	0.229	1.047	0.24
	Band4/RB#0	Back	20175	1732.5	23.30	-0.05	23.5	0.156	1.047	0.163
	Band17/RB#0	Front	23800	711	23.54	0.10	24.0	0.072	1.112	0.08
	Band17/RB#0	Back	23800	711	23.54	-0.33	24.0	0.081	1.112	0.09
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ LTE 20MHz QPSK 50%RB Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	Band2/RB#49	Front	18900	1880	22.49	0.14	22.5	0.150	1.002	0.15
	Band2/RB#49	Back	18900	1880	22.49	-0.09	22.5	0.123	1.002	0.123
	Band4/RB#0	Front	20175	1732.5	22.13	-0.02	22.5	0.411	1.089	0.448
	Band4/RB#0	Back	20175	1732.5	22.13	0.03	22.5	0.208	1.089	0.227
	Band17/RB#0	Front	23800	711	22.25	0.16	22.5	0.059	1.059	0.062
	Band17/RB#0	Back	23800	711	22.25	0.20	22.5	0.060	1.059	0.064
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ WLAN 2.4 GHz Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	2.4GHz/802.11b	Front	06	2437	18.78	0.36	19.0	0.305	1.052	0.321
	2.4GHz/802.11b	Back	06	2437	18.78	-0.22	19.0	0.317	1.052	0.333
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

Note:

1. Body-worn SAR testing was performed at 10mm separation, and this distance is determined by the handset manufacturer that there will be body-worn accessories that users may acquire at the time of equipment certification, to enable users to purchase aftermarket body-worn accessories with the required minimum separation.
2. Per KDB 941225 D06v02, when the same wireless modes and device transmission configurations are required for testing body-worn accessories and hotspot mode, it is not necessary to test body-worn accessory SAR for the same device orientation if the test separation distance for hotspot mode is more conservative than that used for body-worn accessories.
3. Body-worn exposure conditions are intended to voice call operations, therefore GSM voice call is selected to be tested.
4. Per KDB 648474 D04v01r02, when the *Reported* SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.
5. The WLAN SAR perform the front and back position, due considered the simultaneous SAR for body-worn.
6. Per KDB 447498 D01v05r02, for each exposure position, if the highest output channel Reported SAR ≤0.8W/kg, other channels SAR testing is not necessary.
7. Per KDB 865664 D01v01r03, for each frequency band, repeated SAR measurement is required when the measured SAR is ≥0.8W/kg.
8. Per KDB 941225 D05v02r03, 100% RB allocation SAR measurement is not required when the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg.
9. Highlight part of test data means repeated test.

15.3 Body SAR in Hotspot Mode

➢ GSM Body SAR in Hotspot mode

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	GPRS850/4 slots	Front	251	848.8	32.51	0.20	33.0	0.481	1.119	0.538
	GPRS850/4 slots	Back	251	848.8	32.51	-0.12	33.0	0.478	1.119	0.535
	GPRS850/4 slots	Left	251	848.8	32.51	-0.22	33.0	0.271	1.119	0.303
	GPRS850/4 slots	Right	251	848.8	32.51	0.10	33.0	0.329	1.119	0.368
	GPRS850/4 slots	Bottom	251	848.8	32.51	-0.38	33.0	0.081	1.119	0.091
	GPRS1900/4 slots	Front	810	1909.8	30.25	-0.24	30.5	0.184	1.059	0.195
	GPRS1900/4 slots	Back	810	1909.8	30.25	0.21	30.5	0.142	1.059	0.15
	GPRS1900/4 slots	Left	810	1909.8	30.25	0.37	30.5	0.009	1.059	0.01
	GPRS1900/4 slots	Right	810	1909.8	30.25	-0.09	30.5	0.040	1.059	0.042
	GPRS1900/4 slots	Bottom	810	1909.8	30.25	0.09	30.5	0.187	1.059	0.198
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ WCDMA Body SAR in Hotspot mode

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	Band V/RMC	Front	4183	836.6	23.57	0.05	24.0	0.323	1.104	0.357
	Band V/RMC	Back	4183	836.6	23.57	0.09	24.0	0.351	1.104	0.388
	Band V/RMC	Left	4183	836.6	23.57	-0.17	24.0	0.250	1.104	0.276
	Band V/RMC	Right	4183	836.6	23.57	-0.04	24.0	0.202	1.104	0.223
	Band V/RMC	Bottom	4183	836.6	23.57	-0.20	24.0	0.036	1.104	0.04
	Band II/RMC	Front	9400	1880	23.75	0.25	24.0	0.048	1.059	0.051
	Band II/RMC	Back	9400	1880	23.75	-0.07	24.0	0.051	1.059	0.054
	Band II/RMC	Left	9400	1880	23.75	-0.15	24.0	0.006	1.059	0.006
	Band II/RMC	Right	9400	1880	23.75	0.05	24.0	0.028	1.059	0.03
	Band II/RMC	Bottom	9400	1880	23.75	-0.09	24.0	0.065	1.059	0.069
	Band IV/RMC	Front	1513	1752.6	24.46	0.01	24.5	0.071	1.009	0.072
	Band IV/RMC	Back	1513	1752.6	24.46	0.10	24.5	0.078	1.009	0.079
	Band IV/RMC	Left	1513	1752.6	24.46	-0.27	24.5	0.005	1.009	0.005
	Band IV/RMC	Right	1513	1752.6	24.46	-0.05	24.5	0.037	1.009	0.037
	Band IV/RMC	Bottom	1513	1752.6	24.46	0.33	24.5	0.114	1.009	0.115
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ LTE 20MHz QPSK 1RB Body SAR in Hotspot mode

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	Band2/RB#0	Front	18900	1880	22.96	0.15	23.0	0.197	1.009	0.199
	Band2/RB#0	Back	18900	1880	22.96	0.01	23.0	0.151	1.009	0.152
	Band2/RB#0	Left	18900	1880	22.96	0.15	23.0	0.009	1.009	0.009
	Band2/RB#0	Right	18900	1880	22.96	0.04	23.0	0.042	1.009	0.042
	Band2/RB#0	Bottom	18900	1880	22.96	-0.14	23.0	0.227	1.009	0.229
	Band4/RB#0	Front	20175	1732.5	23.30	0.04	23.5	0.229	1.047	0.24
	Band4/RB#0	Back	20175	1732.5	23.30	-0.05	23.5	0.156	1.047	0.163
	Band4/RB#0	Left	20175	1732.5	23.30	0.40	23.5	0.017	1.047	0.018
	Band4/RB#0	Right	20175	1732.5	23.30	0.17	23.5	0.060	1.047	0.063
	Band4/RB#0	Bottom	20175	1732.5	23.30	0.23	23.5	0.258	1.047	0.27
	Band17/RB#0	Front	23800	711	23.54	0.10	24.0	0.072	1.112	0.08
	Band17/RB#0	Back	23800	711	23.54	-0.33	24.0	0.081	1.112	0.09
	Band17/RB#0	Left	23800	711	23.54	0.08	24.0	0.030	1.112	0.033
	Band17/RB#0	Right	23800	711	23.54	-0.12	24.0	0.051	1.112	0.057
	Band17/RB#0	Bottom	23800	711	23.54	-0.32	24.0	0.015	1.112	0.017
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ LTE 20MHz QPSK 50%RB Body SAR in Hotspot mode

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	Band2/RB#49	Front	18900	1880	22.49	0.14	22.5	0.150	1.002	0.15
	Band2/RB#49	Back	18900	1880	22.49	-0.09	22.5	0.123	1.002	0.123
	Band2/RB#49	Left	18900	1880	22.49	0.36	22.5	0.008	1.002	0.008
	Band2/RB#49	Right	18900	1880	22.49	0.07	22.5	0.033	1.002	0.033
	Band2/RB#49	Bottom	18900	1880	22.49	0.18	22.5	0.197	1.002	0.197
	Band4/RB#0	Front	20175	1732.5	22.13	-0.02	22.5	0.411	1.089	0.448
	Band4/RB#0	Back	20175	1732.5	22.13	0.03	22.5	0.208	1.089	0.227
	Band4/RB#0	Left	20175	1732.5	22.13	-0.23	22.5	0.022	1.089	0.024
	Band4/RB#0	Right	20175	1732.5	22.13	0.25	22.5	0.034	1.089	0.037
	Band4/RB#0	Bottom	20175	1732.5	22.13	0.26	22.5	0.263	1.089	0.286
	Band17/RB#0	Front	23800	711	22.25	0.16	22.5	0.059	1.059	0.062
	Band17/RB#0	Back	23800	711	22.25	0.20	22.5	0.060	1.059	0.064
	Band17/RB#0	Left	23800	711	22.25	-0.07	22.5	0.025	1.059	0.026
	Band17/RB#0	Right	23800	711	22.25	-0.03	22.5	0.044	1.059	0.047
	Band17/RB#0	Bottom	23800	711	22.25	0.02	22.5	0.012	1.059	0.013
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ WLAN 2.4GHz Body SAR in Hotspot mode

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	2.4GHz/802.11b	Front	06	2437	18.78	0.36	19.0	0.305	1.052	0.321
	2.4GHz/802.11b	Back	06	2437	18.78	-0.22	19.0	0.317	1.052	0.333
	2.4GHz/802.11b	Right	06	2437	18.78	0.30	19.0	0.300	1.052	0.316
	2.4GHz/802.11b	Top	06	2437	18.78	0.14	19.0	0.184	1.052	0.194
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

Note:

1. Per KDB 447498 D01v05r02, for each exposure position, if the highest output channel Reported SAR ≤0.8W/kg, other channels SAR testing is not necessary.
2. Additional WLAN SAR testing was performed for simultaneous transmission analysis.

3. For Hotspot SAR testing, per KDB 941225 D06v02, for EUT dimension ≥ 9cm*5cm, the test distance is 10mm. SAR must be measured for all surfaces and sides with a transmitting antenna located within 2.5cm from that surface or edge.
4. Per KDB 941225 D01v03, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA output power is < 0.25dB higher than RMC 12.2kbps, or Reported SAR with RMC 12.2kbps setting is ≤ 1.2W/kg, HSDPA SAR evaluation can be excluded.
5. Per KDB 865664 D01v01r03, for each frequency band, repeated SAR measurement is required when the measured SAR is ≥0.8W/kg.
6. Per KDB 865664 D01v01r03, for each frequency band, repeated SAR measurement is required when the measured SAR is ≥0.8W/kg. Per KDB 648474 D04v01r02, when the Reported SAR for a body-worn accessory measured without a headset connected to the handset is ＞ 1.2 W/kg, SAR testing with a headset connected to the handset is required.
7. Per KDB 941225 D05v02r03, 100% RB allocation SAR measurement is not required when the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel.
8. Highlight part of test data means repeated test.

15.4 Repeated SAR measurement

Band/ Mode	Test Position	CH.	Freq. (MHz)	Measured SAR (W/kg)				
				Original	1st Repeated		2nd Repeated	
					Value	Ratio	Value	Ratio
2.4GHz/802.11b	Right Cheek	11	2462	0.903	0.908	0.99	/	/
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population				**1.6 W/kg (mW/g) Averaged over 1g**				

Note:
1. Per KDB 865664 D01v01r03, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8 W/kg
2. Per KDB 865664 D01v01r03, if the ratio of *original* and *repeated* is ≤ 1.2 and the measured SAR <1.45 W/kg, only one repeated measurement is required.

15.5 Multi-Band Simultaneous Transmission Considerations

➢ **Simultaneous Transmission Capabilities**

According to FCC KDB Publication 447498 D01v05r02, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the EUT are shown in below Figure and are color-coded to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another.

Path 1	Path 2
GSM/WCDMA/LTE	Bluetooth/WLAN

Fig.15.1 Simultaneous Transmission Paths

➢ **Simultaneous Transmission Procedures**

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01v05r02, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤ 1.6 W/kg. When standalone SAR is not required to be measured, per FCC KDB 447498 D01v05r02 4.3.2.2), the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter.

$$\text{Estimated SAR} = \frac{\sqrt{f(GHz)}}{7.5} \cdot \frac{\text{Max. power of channel, mW}}{\text{Min. Separation Distance, mm}}$$

Mode	Max. tune-up Power (dBm)	Exposure Position	Head	Body	Hotspot
		Test Distance (mm)	0	10	10
Bluetooth	0	Estimated SAR (W/kg)	0.042	0.021	0.021

Note:

1. When the minimum *test separation distance* is < 5 mm, a distance of 5 mm according is applied to determine estimated SAR.

➢ **Multi-Band simultaneous Transmission Consideration**

	Position	Applicable Combination
Simultaneous Transmission Consideration	Head	WWAN (Voice) + WLAN 2.4 GHz
		WWAN (Voice) + Bluetooth
	Body	WWAN (Voice) + WLAN 2.4 GHz
		WWAN (Voice) + Bluetooth
	Hotspot	WWAN (Data) + WLAN 2.4 GHz
		WWAN (Data) + Bluetooth

Note:

1. WLAN 2.4GHz Band and Bluetooth share the same antenna, and cannot transmit simultaneously.
2. GSM/WCDMA shares the same antenna, and cannot transmit simultaneously.
3. The Report SAR summation is calculated based on the same configuration and test position.
4. Per KDB 447498 D01v05r02, simultaneous transmission SAR is compliant if,
   i. Scalar SAR summation < 1.6 W/kg.
   ii. SPLSR = $(SAR_1 + SAR_2)^{1.5}$ / (*min. separation distance, mm*), and the peak separation distance is determined from the square root of $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$, where (x_1, y_1, z_1) and (x_2, y_2, z_2) are the coordinates of the extrapolated peak SAR locations in the zoom scan If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary
   iii. Simultaneously transmission SAR measurement, and the Reported multi-band SAR < 1.6 W/kg

15.6 SAR Simultaneous Transmission Analysis

➢ **Head Simultaneous Transmission**

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
GSM850	Right Cheek	0.35	1.194	1.544
	Right Tilted	0.213	0.771	0.984
	Left Cheek	0.323	0.376	0.699
	Left Tilted	0.195	0.459	0.654

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	Σ SAR (W/kg)
GSM850	Right Cheek	0.35	0.042	0.392
	Right Tilted	0.213	0.042	0.255
	Left Cheek	0.323	0.042	0.365
	Left Tilted	0.195	0.042	0.237

WWAN Mode	Position	WWAN SAR1g (W/kg)	WLAN SAR1g (W/kg)	Σ SAR (W/kg)
GSM 1900	Right Cheek	0.033	1.194	1.227
	Right Tilted	0.012	0.771	0.783
	Left Cheek	0.05	0.376	0.426
	Left Tilted	0.011	0.459	0.47

WWAN Mode	Position	WWAN SAR1g (W/kg)	Bluetooth Estimated SAR1g (W/kg)	Σ SAR (W/kg)
GSM 1900	Right Cheek	0.033	0.042	0.075
	Right Tilted	0.012	0.042	0.054
	Left Cheek	0.05	0.042	0.092
	Left Tilted	0.011	0.042	0.053

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band V	Right Cheek	0.272	1.194	1.466
	Right Tilted	0.176	0.771	0.947
	Left Cheek	0.276	0.376	0.652
	Left Tilted	0.177	0.459	0.636

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band V	Right Cheek	0.272	0.042	0.314
	Right Tilted	0.176	0.042	0.218
	Left Cheek	0.276	0.042	0.318
	Left Tilted	0.177	0.042	0.219

WWAN Mode	Position	WWAN SAR1g (W/kg)	WLAN SAR1g (W/kg)	Σ SAR (W/kg)
WCDMA Band II	Right Cheek	0.043	1.194	1.237
	Right Tilted	0.021	0.771	0.792
	Left Cheek	0.088	0.376	0.464
	Left Tilted	0.019	0.459	0.478

WWAN Mode	Position	WWAN SAR1g (W/kg)	Bluetooth Estimated SAR1g (W/kg)	Σ SAR (W/kg)
WCDMA Band II	Right Cheek	0.043	0.042	0.085
	Right Tilted	0.021	0.042	0.063
	Left Cheek	0.088	0.042	0.13
	Left Tilted	0.019	0.042	0.061

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band IV	Right Cheek	0.02	1.194	1.214
	Right Tilted	0.012	0.771	0.783
	Left Cheek	0.049	0.376	0.425
	Left Tilted	0.012	0.459	0.471

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band IV	Right Cheek	0.02	0.042	0.062
	Right Tilted	0.012	0.042	0.054
	Left Cheek	0.049	0.042	0.091
	Left Tilted	0.012	0.042	0.054

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 2	Right Cheek	0.100	1.194	1.294
	Right Tilted	0.063	0.771	0.834
	Left Cheek	0.177	0.376	0.553
	Left Tilted	0.055	0.459	0.514

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 2	Right Cheek	0.100	0.042	0.142
	Right Tilted	0.063	0.042	0.105
	Left Cheek	0.177	0.042	0.219
	Left Tilted	0.055	0.042	0.097

WWAN Mode	Position	WWAN SAR1g (W/kg)	WLAN SAR1g (W/kg)	Σ SAR (W/kg)
LTE Band 4	Right Cheek	0.181	1.194	1.375
	Right Tilted	0.071	0.771	0.842
	Left Cheek	0.257	0.376	0.633
	Left Tilted	0.066	0.459	0.525

WWAN Mode	Position	WWAN SAR1g (W/kg)	Bluetooth Estimated SAR1g (W/kg)	Σ SAR (W/kg)
LTE Band 4	Right Cheek	0.181	0.042	0.223
	Right Tilted	0.071	0.042	0.113
	Left Cheek	0.257	0.042	0.299
	Left Tilted	0.066	0.042	0.108

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 17	Right Cheek	0.059	1.194	1.253
	Right Tilted	0.043	0.771	0.814
	Left Cheek	0.078	0.376	0.454
	Left Tilted	0.051	0.459	0.51

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 17	Right Cheek	0.059	0.042	0.101
	Right Tilted	0.043	0.042	0.085
	Left Cheek	0.078	0.042	0.12
	Left Tilted	0.051	0.042	0.093

➢ **Body worn Simultaneous Transmission**

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
GSM850	Front	0.417	0.321	0.738
	Back	0.463	0.333	0.796

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	Σ SAR (W/kg)
GSM850	Front	0.417	0.021	0.438
	Back	0.463	0.021	0.484

WWAN Mode	Position	WWAN SAR1g (W/kg)	WLAN SAR1g (W/kg)	Σ SAR (W/kg)
GSM 1900	Front	0.026	0.321	0.347
	Back	0.028	0.333	0.361

WWAN Mode	Position	WWAN SAR1g (W/kg)	Bluetooth Estimated SAR1g (W/kg)	Σ SAR (W/kg)
GSM 1900	Front	0.026	0.021	0.047
	Back	0.028	0.021	0.049

WWAN Mode	Position	WWAN SAR1g (W/kg)	WLAN SAR1g (W/kg)	Σ SAR (W/kg)
WCDMA Band V	Front	0.357	0.321	0.678
	Back	0.388	0.333	0.721

WWAN Mode	Position	WWAN SAR1g (W/kg)	Bluetooth Estimated SAR1g (W/kg)	Σ SAR (W/kg)
WCDMA Band V	Front	0.357	0.021	0.378
	Back	0.388	0.021	0.409

WWAN Mode	Position	WWAN SAR1g (W/kg)	WLAN SAR1g (W/kg)	Σ SAR (W/kg)
WCDMA Band II	Front	0.051	0.321	0.372
	Back	0.054	0.333	0.387

WWAN Mode	Position	WWAN SAR1g (W/kg)	Bluetooth Estimated SAR1g (W/kg)	Σ SAR (W/kg)
WCDMA Band II	Front	0.051	0.021	0.072
	Back	0.054	0.021	0.075

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band IV	Front	0.072	0.321	0.393
	Back	0.079	0.333	0.412

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band IV	Front	0.072	0.021	0.093
	Back	0.079	0.021	0.1

WWAN Mode	Position	WWAN SAR1g (W/kg)	WLAN SAR1g (W/kg)	Σ SAR (W/kg)
LTE Band 2	Front	0.199	0.321	0.52
	Back	0.152	0.333	0.485

WWAN Mode	Position	WWAN SAR1g (W/kg)	Bluetooth Estimated SAR1g (W/kg)	Σ SAR (W/kg)
LTE Band 2	Front	0.199	0.021	0.22
	Back	0.152	0.021	0.173

WWAN Mode	Position	WWAN SAR1g (W/kg)	WLAN SAR1g (W/kg)	Σ SAR (W/kg)
LTE Band 4	Front	0.448	0.321	0.769
	Back	0.227	0.333	0.56

WWAN Mode	Position	WWAN SAR1g (W/kg)	Bluetooth Estimated SAR1g (W/kg)	Σ SAR (W/kg)
LTE Band 4	Front	0.448	0.021	0.469
	Back	0.227	0.021	0.248

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 17	Front	0.08	0.321	0.401
	Back	0.09	0.333	0.423

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 17	Front	0.08	0.021	0.101
	Back	0.09	0.021	0.111

➢ **Hotspot mode Simultaneous Transmission**

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
GSM850	Front	0.538	0.321	0.859
	Back	0.535	0.333	0.868
	Left	0.303	/	0.303
	Right	0.368	0.316	0.684
	Top	/	0.194	0.194
	Bottom	0.091	/	0.091

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	Σ SAR (W/kg)
GSM850	Front	0.538	0.021	0.559
	Back	0.535	0.021	0.556
	Left	0.303	0.021	0.324
	Right	0.368	0.021	0.389
	Top	/	0.021	0.021
	Bottom	0.091	0.021	0.112

WWAN Mode	Position	WWAN SAR1g (W/kg)	WLAN SAR1g (W/kg)	Σ SAR (W/kg)
GSM 1900	Front	0.195	0.321	0.516
	Back	0.15	0.333	0.483
	Left	0.01	/	0.01
	Right	0.042	0.316	0.358
	Top	/	0.194	0.194
	Bottom	0.198	/	0.198

WWAN Mode	Position	WWAN SAR1g (W/kg)	Bluetooth Estimated SAR1g (W/kg)	Σ SAR (W/kg)
GSM 1900	Front	0.195	0.021	0.216
	Back	0.15	0.021	0.171
	Left	0.01	0.021	0.031
	Right	0.042	0.021	0.063
	Top	/	0.021	0.021
	Bottom	0.198	0.021	0.219

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band V	Front	0.357	0.321	0.678
	Back	0.388	0.333	0.721
	Left	0.276	/	0.276
	Right	0.223	0.316	0.539
	Top	/	0.194	0.194
	Bottom	0.04	/	0.04

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band V	Front	0.357	0.021	0.378
	Back	0.388	0.021	0.409
	Left	0.276	0.021	0.297
	Right	0.223	0.021	0.244
	Top	/	0.021	0.021
	Bottom	0.04	0.021	0.061

WWAN Mode	Position	WWAN SAR1g (W/kg)	WLAN SAR1g (W/kg)	Σ SAR (W/kg)
WCDMA Band II	Front	0.051	0.321	0.372
	Back	0.054	0.333	0.387
	Left	0.006	/	0.006
	Right	0.03	0.316	0.346
	Top	/	0.194	0.194
	Bottom	0.069	/	0.069

WWAN Mode	Position	WWAN SAR1g (W/kg)	Bluetooth Estimated SAR1g (W/kg)	Σ SAR (W/kg)
WCDMA Band II	Front	0.051	0.021	0.072
	Back	0.054	0.021	0.075
	Left	0.006	0.021	0.027
	Right	0.03	0.021	0.051
	Top	/	0.021	0.021
	Bottom	0.069	0.021	0.09

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band IV	Front	0.072	0.321	0.393
	Back	0.079	0.333	0.412
	Left	0.005	/	0.005
	Right	0.037	0.316	0.353
	Top	/	0.194	0.194
	Bottom	0.115	/	0.115

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band IV	Front	0.072	0.021	0.093
	Back	0.079	0.021	0.1
	Left	0.005	0.021	0.026
	Right	0.037	0.021	0.058
	Top	/	0.021	0.021
	Bottom	0.115	0.021	0.136

WWAN Mode	Position	WWAN SAR1g (W/kg)	WLAN SAR1g (W/kg)	Σ SAR (W/kg)
LTE Band 2	Front	0.199	0.321	0.52
	Back	0.152	0.333	0.485
	Left	0.009	/	0.009
	Right	0.042	0.316	0.358
	Top	/	0.194	0.194
	Bottom	0.229	/	0.229

WWAN Mode	Position	WWAN SAR1g (W/kg)	Bluetooth Estimated SAR1g (W/kg)	Σ SAR (W/kg)
LTE Band 2	Front	0.199	0.021	0.22
	Back	0.152	0.021	0.173
	Left	0.009	0.021	0.03
	Right	0.042	0.021	0.063
	Top	/	0.021	0.021
	Bottom	0.229	0.021	0.25

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 4	Front	0.448	0.321	0.769
	Back	0.227	0.333	0.56
	Left	0.024	/	0.024
	Right	0.063	0.316	0.379
	Top	/	0.194	0.194
	Bottom	0.286	/	0.286

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 4	Front	0.448	0.021	0.469
	Back	0.227	0.021	0.248
	Left	0.024	0.021	0.045
	Right	0.063	0.021	0.084
	Top	/	0.021	0.021
	Bottom	0.286	0.021	0.307

WWAN Mode	Position	WWAN SAR1g (W/kg)	WLAN SAR1g (W/kg)	Σ SAR (W/kg)
LTE Band 17	Front	0.08	0.321	0.401
	Back	0.09	0.333	0.423
	Left	0.033	/	0.033
	Right	0.057	0.316	0.373
	Top	/	0.194	0.194
	Bottom	0.017	/	0.017

WWAN Mode	Position	WWAN SAR1g (W/kg)	Bluetooth Estimated SAR1g (W/kg)	Σ SAR (W/kg)
LTE Band 17	Front	0.08	0.021	0.101
	Back	0.09	0.021	0.111
	Left	0.033	0.021	0.054
	Right	0.057	0.021	0.078
	Top	/	0.021	0.021
	Bottom	0.017	0.021	0.038

➢ **Simultaneous Transmission Conclusion**

The above numerical summed SAR results for all the case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v05r02.

15.7 Measurement Uncertainty

The component of uncertainly may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainly by the statistical analysis of a series of observations is termed a Type A evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A Type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience, and knowledge of the behavior and properties of relevant materials and instruments, manufacture's specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in below Table.

Uncertainty Distributions	Normal	Rectangular	Triangular	U-Shape
Multi-plying Factor	1/k(b)	$1/\sqrt{3}$	$1/\sqrt{6}$	$1/\sqrt{2}$

Standard Uncertainty for Assumed Distribution

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is shown in the following tables.

Uncertainty Component	Section	Uncert. Value	Prob. Dist.	Div.	(C_i) (1 g)	(C_i) (10 g)	Std. Unc. (1 g)	Std. Unc. (10 g)	V_i
Measurement System									
Probe Calibration	E.2.1	±6.0%	N	1	1	1	±6.0%	±6.0%	∞
Axial Isotropy	E.2.2	±0.5%	R	$\sqrt{3}$	0.7	0.7	±0.20%	±0.20%	∞
Hemispherical Isotropy	E.2.2	±2.6%	R	$\sqrt{3}$	0.7	0.7	±1.05%	±1.05%	∞
Boundary Effects	E.2.3	±1.0%	R	$\sqrt{3}$	1	1	±0.58%	±0.58%	∞
Linearity	E.2.4	±0.6%	R	$\sqrt{3}$	1	1	±0.35%	±0.35%	∞
System Detection Limits	E.2.5	±0.25%	R	$\sqrt{3}$	1	1	±0.14%	±0.14%	∞
Readout Electronics	E.2.6	±0.3%	N	1	1	1	±0.3%	±0.3%	∞
Response Time	E.2.7	±0.8%	R	$\sqrt{3}$	1	1	±0.46%	±0.46%	∞
Integration Time	E.2.8	±2.6%	R	$\sqrt{3}$	1	1	±1.5%	±1.5%	∞
RF Ambient Noise	E.6.1	±3.0%	R	$\sqrt{3}$	1	1	±1.73%	±1.73%	∞
RF Ambient Reflections	E.6.1	±3.0%	R	$\sqrt{3}$	1	1	±1.73%	±1.73%	∞
Probe positioner mechanical tolerances	E.6.2	±0.4%	R	$\sqrt{3}$	1	1	±0.23%	±0.23%	∞
Probe positioning tolerance with respect to the phantom shell surface	E.6.3	±2.9%	R	$\sqrt{3}$	1	1	±1.67%	±1.67%	∞
Interpolation, extrapolation, and integration algorithm For max. SAR Evaluation.	E.5	±1.0%	R	$\sqrt{3}$	1	1	±0.58%	±0.58%	∞
Test Sample Related									
Device Positioning	E.4.2	±4.6%	N	1	1	1	±4.6%	±4.6%	M-1
Device Holder	E.4.1	±5.2%	N	1	1	1	±5.2%	±5.2%	M-1
Power Drift	6.6.2	±5.0%	R	$\sqrt{3}$	1	1	±2.89%	±2.89%	∞
Phantom and Setup									
Phantom Uncertainty	E.3.1	±4.0%	R	$\sqrt{3}$	1	1	±2.31%	±2.31%	∞
Liquid Conductivity(Target)	E.3.2	±5.0%	R	$\sqrt{3}$	0.64	0.43	±1.85%	±1.24%	∞
Liquid Conductivity(Meas.)	E.3.3	±2.5%	N	1	0.64	0.43	±1.64%	±1.08%	M
Liquid Permittivity(Target)	E.3.2	±5.0%	R	$\sqrt{3}$	0.6	0.49	±1.73%	±1.41%	∞
Liquid Permittivity(Meas.)	E.3.3	±2.5%	N	1	0.6	0.49	±1.5%	±1.23%	M
Combined Standard Uncertainty (RSS)							±11.07%	±10.84%	
Expanded Uncertainty (95% Confidence Level, k = 2)							±22.2%	±21.7%	

Uncertainty Budget for frequency range 300 MHz to 3 GHz according to IEEE1528-2013

15.8 Measurement Conclusion

The SAR evaluation indicates that the EUT complies with the RF radiation exposure limits of the FCC and Industry Canada, with respect to all parameters subject to this test. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested. Please note that the absorption and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because various factors may interact with one another to vary the specific biological outcome of an exposure to electromagnetic fields, any protection guide should consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables.

16 Reference

[1]. FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”

[2]. ANSI/IEEE Std. C95.1-1992, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, September 1992

[3]. IEEE Std. 1528-2013, “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, September2013

[4]. SPEAG DASY52 System Handbook

[5]. FCC KDB 248227 D01 v01r02, “SAR Measurement Procedures for 802.11 a/b/g Transmitters”, May 2007

[6]. FCC KDB 447498 D01 v05r02, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, May 2013

[7]. FCC KDB 648474 D04 v01r02, “SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas”, October 2012

[8]. FCC KDB 941225 D01 v03, “3G SAR MEAUREMENT PROCEDURES”, October 2014

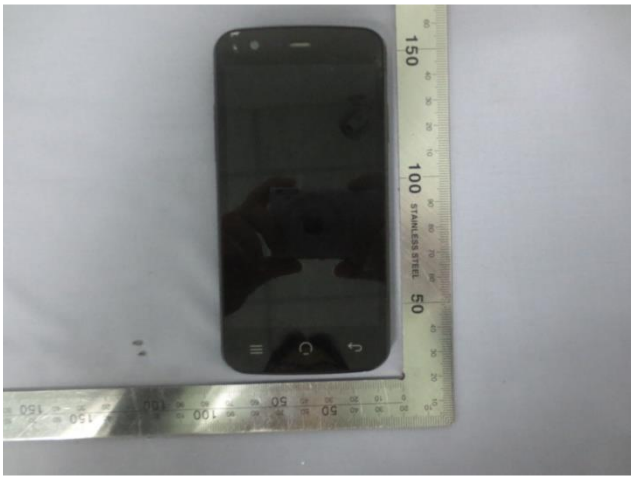
[9]. FCC KDB 941225 D05 v02r03, “SAR Evaluation Considerations for LTE Devices”, Dec 2013

[10]. FCC KDB 941225 D03 v01, “Recommended SAR Test Reduction Procedures for GSM / GPRS / EDGE”, December 2008

[11]. FCC KDB 941225 D06 v02, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", October 2014

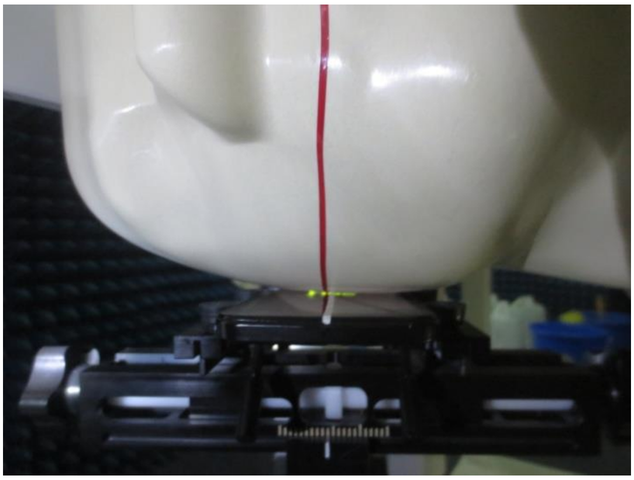
[12]. FCC KDB 865664 D01 v01r03, “SAR Measurement Requirements for 100MHz to 6 GHz”, May 2013

Appendix A: EUT Photos

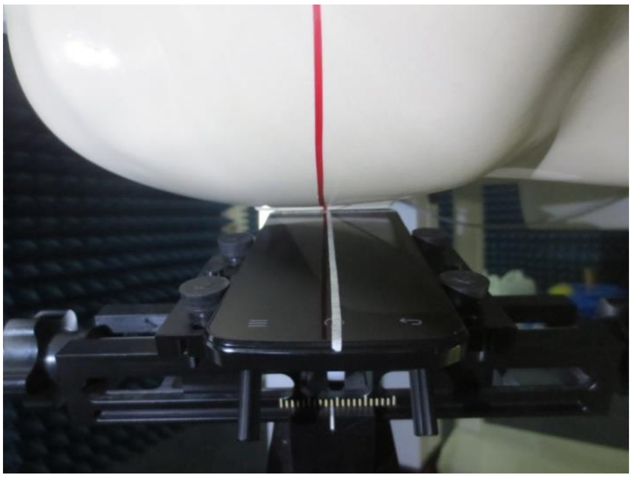


Appendix B: Test Setup Photos

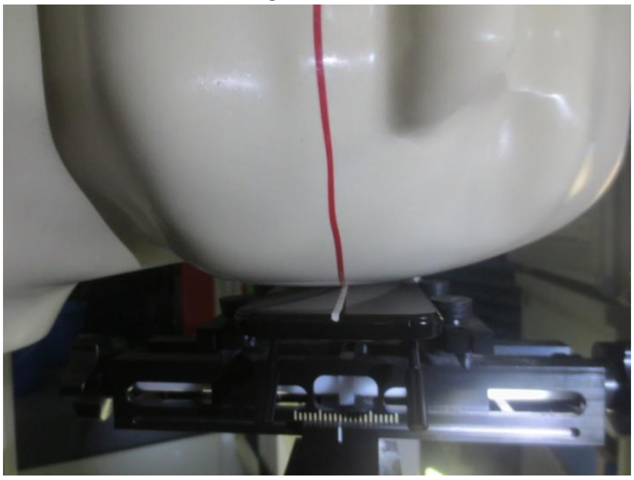
Head



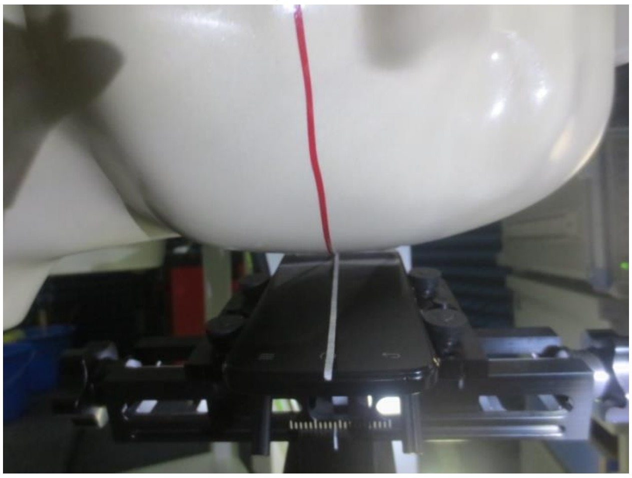
Right Cheek



Right Tilted

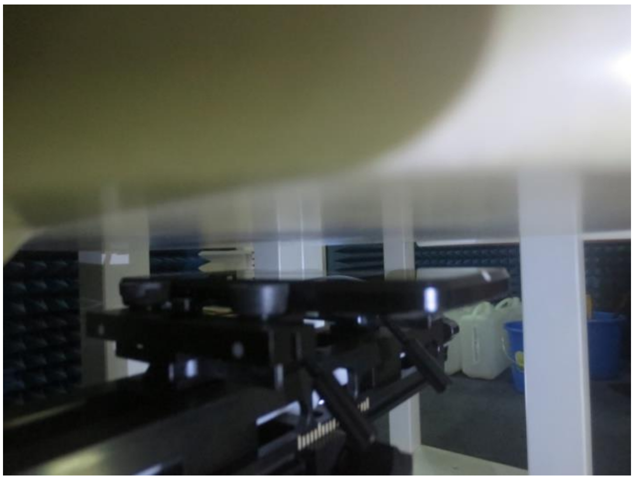


Left Cheek

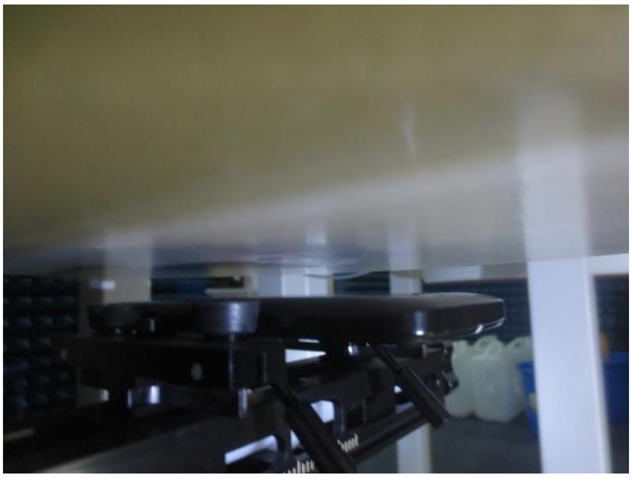


Left Tilted

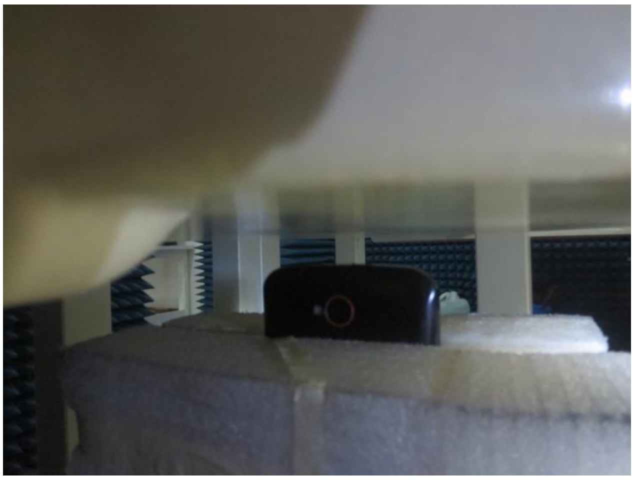
Body



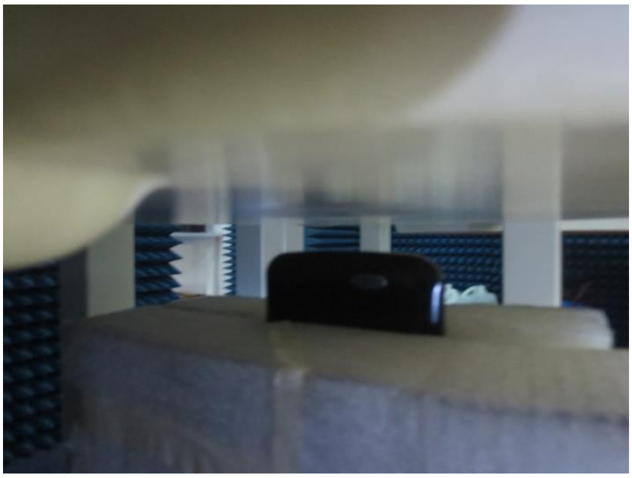
Front side (10mm)



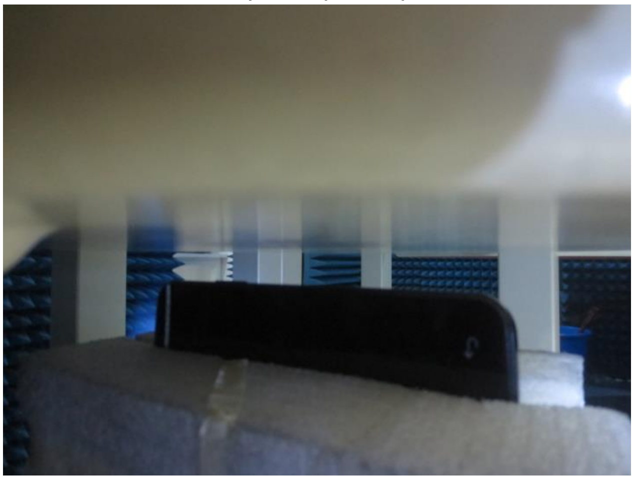
Back side(10mm)



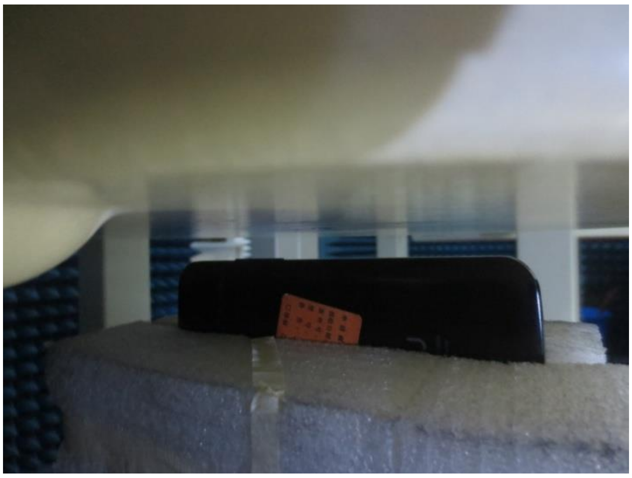
Top side(10mm)



Bottom side(10mm)



Left side(10mm)



Right side(10mm)

Appendix C: Plots of SAR System Check

Test Laboratory: CCIS   Date/Time: 04.07.2015 14:16:29

DUT: Dipole 750 MHz D750V3; Type: D750V3; Serial: D750V3 - SN:1118

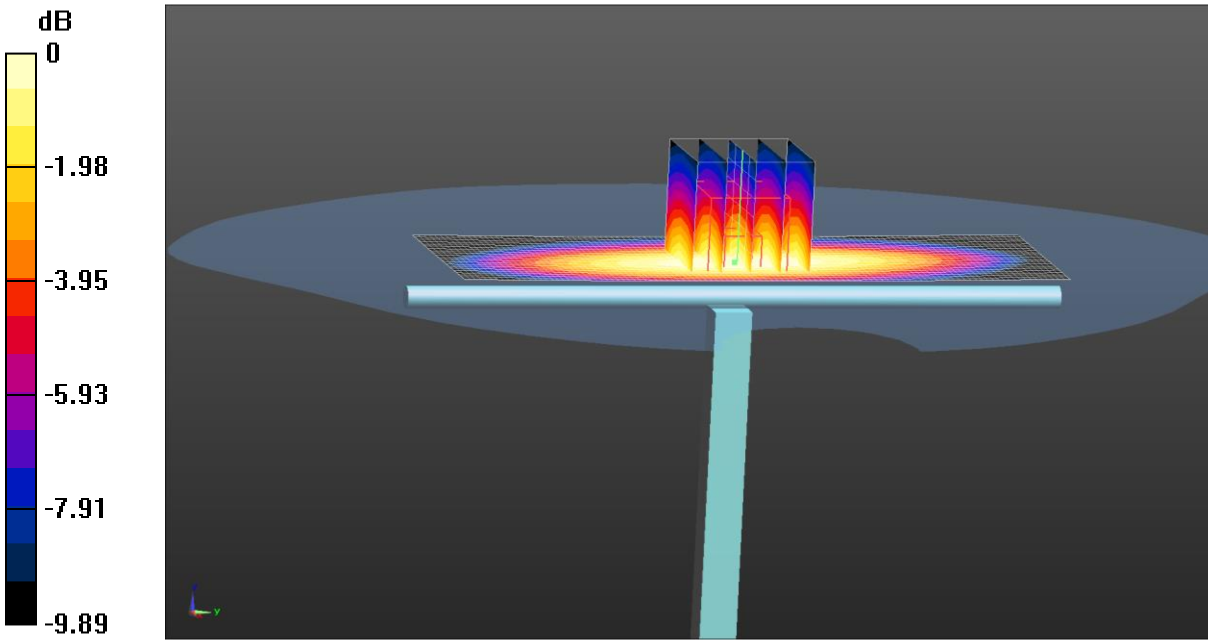
Communication System: UID 0, CW (0); Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.9 S/m; ε_r = 41.82; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: EX3DV4 - SN3924; ConvF(9.97, 9.97, 9.97); Calibrated: 20.06.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 31.0
- Electronics: DAE4 Sn1373; Calibrated: 11.06.2014
- Phantom: SAM with CRP; Type: QD000P40CD; Serial: 1765
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency 750 MHz Head Tissue/d=15mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.806 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.126 W/kg
SAR(1 g) = 0.083 W/kg; SAR(10 g) = 0.052 W/kg
Maximum value of SAR (measured) = 0.108 W/kg

System Performance Check at Frequency 750 MHz Head Tissue/d=15mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Area Scan (41x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.106 W/kg



0 dB = 0.106 W/kg = -9.75 dBW/kg

Test Laboratory: CCIS Date/Time: 03.20.2015 10:47:11

DUT: Dipole 835 MHz D835V2; Type: SAAAD083BB; Serial: D835V2 - SN:4d154

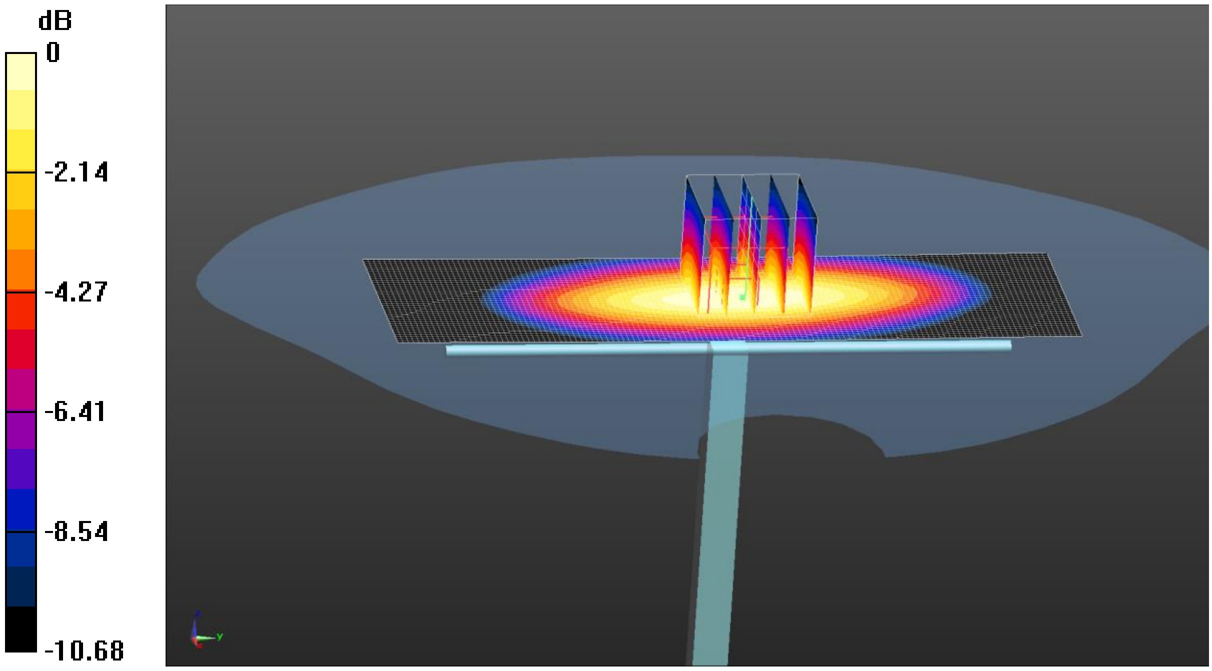
Communication System: UID 0, CW (0); Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.913 S/m; ε_r = 42.531; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: EX3DV4 - SN3924; ConvF(9.46, 9.46, 9.46); Calibrated: 06.20.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 31.0
- Electronics: DAE4 Sn1373; Calibrated: 06.11.2014
- Phantom: SAM with CRP; Type: QD000P40CD; Serial: 1765
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency 835 MHz Head Tissue/d=15mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.248 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.145 W/kg
SAR(1 g) = 0.099 W/kg; SAR(10 g) = 0.065 W/kg
Maximum value of SAR (measured) = 0.124 W/kg

System Performance Check at Frequency 835 MHz Head Tissue/d=15mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Area Scan (41x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.124 W/kg



0 dB = 0.124 W/kg = -9.07 dBW/kg

Test Laboratory: CCIS Date/Time: 03.30.2015 14:33:29

DUT: Dipole 1750 MHz D1750V2; Type: D1750V2; Serial: 1062

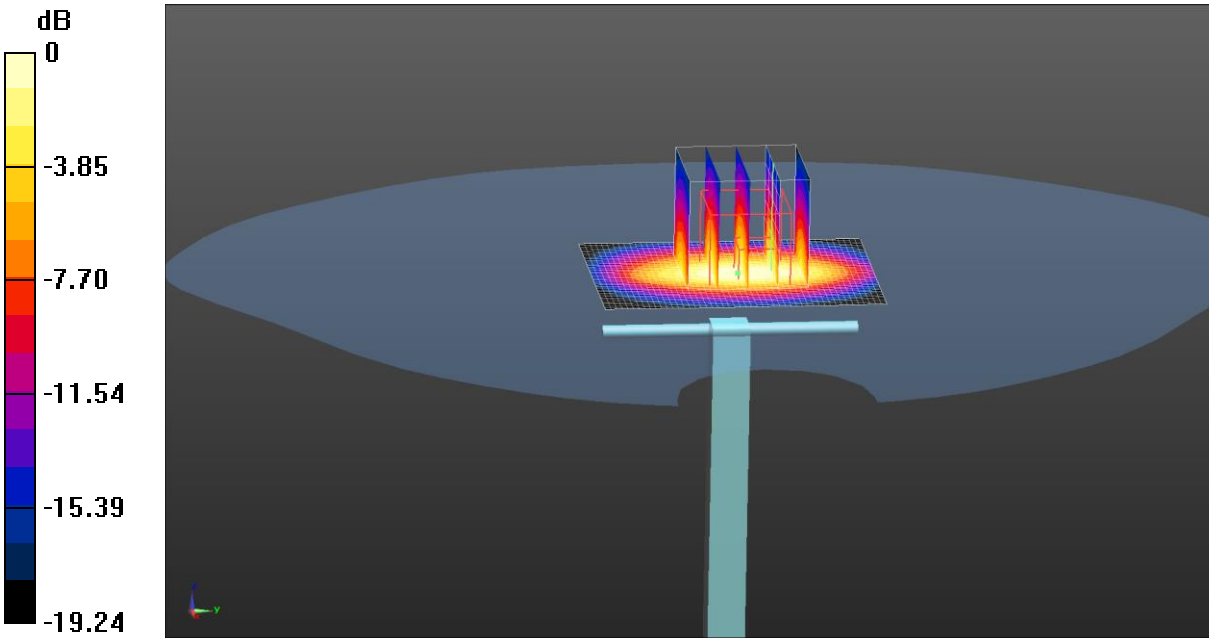
Communication System: UID 0, CW (0); Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.39 S/m; ε_r = 39.82; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: EX3DV4 - SN3924; ConvF(8.49, 8.49, 8.49); Calibrated: 06.20.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 31.0
- Electronics: DAE4 Sn1373; Calibrated: 06.11.2014
- Phantom: SAM with CRP; Type: QD000P40CD; Serial: 1765
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency 1750MHz Head Tissue/d=10mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.503 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 0.679 W/kg
SAR(1 g) = 0.346 W/kg; SAR(10 g) = 0.178 W/kg
Maximum value of SAR (measured) = 0.396 W/kg

System Performance Check at Frequency 1750MHz Head Tissue/d=10mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Area Scan (41x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.344 W/kg



0 dB = 0.354 W/kg = -4.63 dBW/kg

Test Laboratory: CCIS　　　　Date/Time: 04.06.2015 18:08:43

DUT: Dipole 1750 MHz D1750V2; Type: D1750V2; Serial: 1062

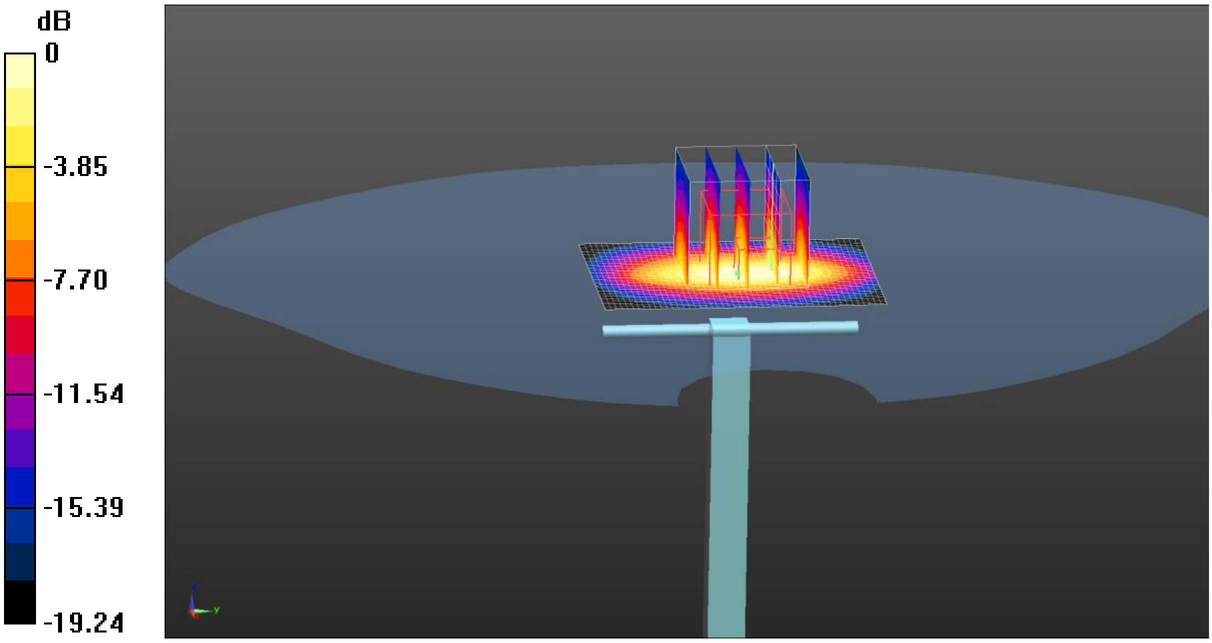
Communication System: UID 0, CW (0); Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.38 S/m; ε_r = 39.78; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: EX3DV4 - SN3924; ConvF(8.49, 8.49, 8.49); Calibrated: 06.20.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 31.0
- Electronics: DAE4 Sn1373; Calibrated: 06.11.2014
- Phantom: SAM with CRP; Type: QD000P40CD; Serial: 1765
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency 1750MHz Head Tissue/d=10mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.693 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 0.679 W/kg
SAR(1 g) = 0.349 W/kg; SAR(10 g) = 0.180 W/kg
Maximum value of SAR (measured) = 0.396 W/kg

System Performance Check at Frequency 1750MHz Head Tissue/d=10mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Area Scan (41x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.354 W/kg



0 dB = 0.354 W/kg = -4.51 dBW/kg

Test Laboratory: CCIS   Date/Time: 03.29.2015 16:38:50

DUT: Dipole 1900 MHz D1900V2; Type: SAAAD190CB; Serial: D1900V2 - SN:5d175

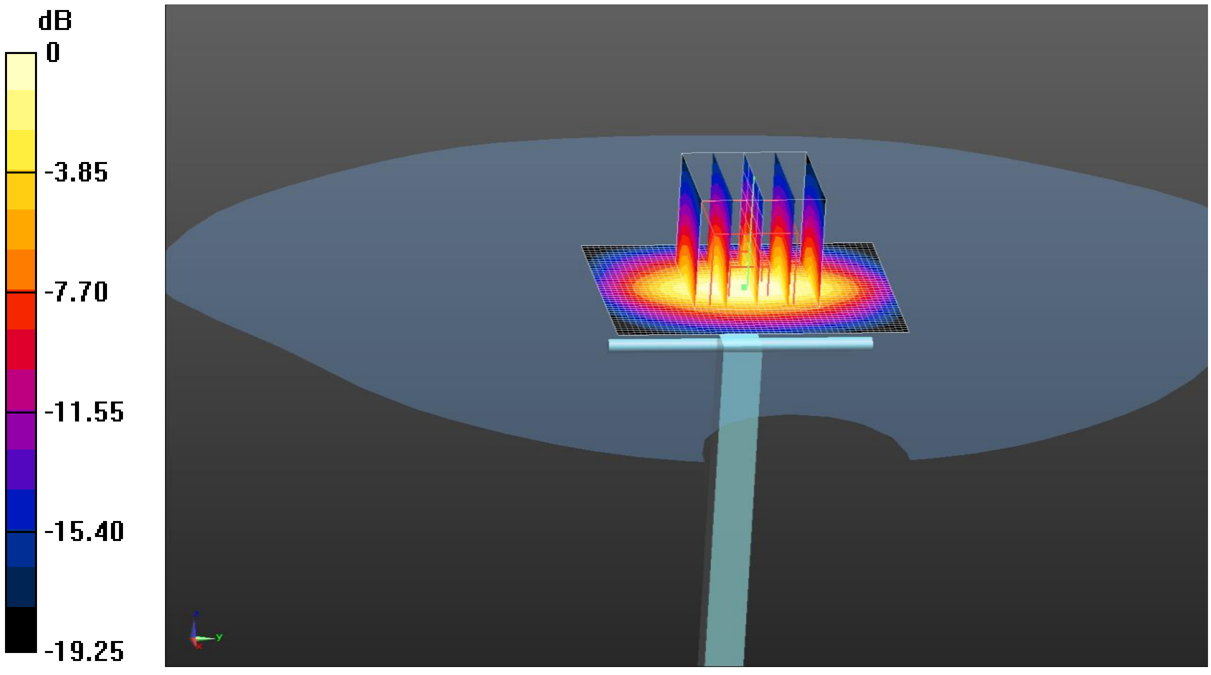
Communication System: UID 0, CW (0); Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.44 S/m; ε_r = 39.76; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: EX3DV4 - SN3924; ConvF(8.03, 8.03, 8.03); Calibrated: 06.20.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 31.0
- Electronics: DAE4 Sn1373; Calibrated: 06.11.2014
- Phantom: SAM with CRP; Type: QD000P40CD; Serial: 1765
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency 1900MHz Head Tissue/d=10mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.040 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.719 W/kg
SAR(1 g) = 0.382 W/kg; SAR(10 g) = 0.193 W/kg
Maximum value of SAR (measured) = 0.545 W/kg

System Performance Check at Frequency 1900MHz Head Tissue/d=10mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Area Scan (41x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.581 W/kg



0 dB = 0.581 W/kg = -2.36 dBW/kg

Test Laboratory: CCIS Date/Time: 04.07.2015 08:13:24

DUT: Dipole 1900 MHz D1900V2; Type: SAAAD190CB; Serial: D1900V2 - SN:5d175

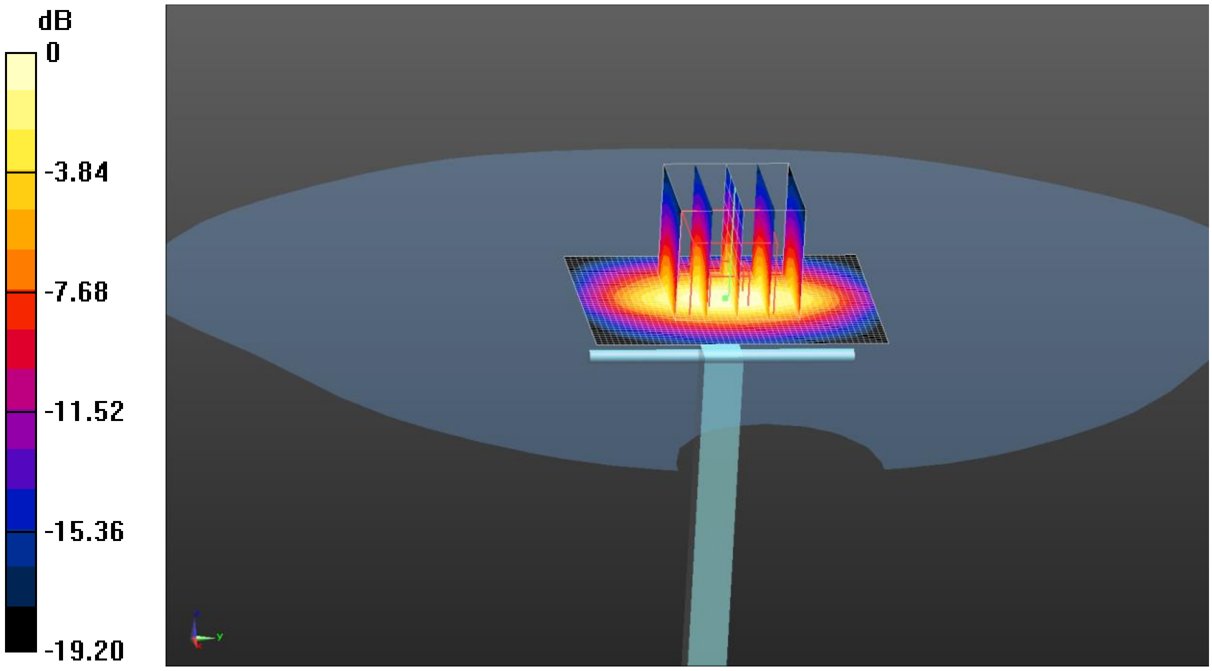
Communication System: UID 0, CW (0); Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.45 S/m; ε_r = 39.75; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: EX3DV4 - SN3924; ConvF(8.03, 8.03, 8.03); Calibrated: 06.20.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 31.0
- Electronics: DAE4 Sn1373; Calibrated: 06.11.2014
- Phantom: SAM with CRP; Type: QD000P40CD; Serial: 1765
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency 1900MHz Head Tissue/d=10mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.532 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.764 W/kg
SAR(1 g) = 0.405 W/kg; SAR(10 g) = 0.205 W/kg
Maximum value of SAR (measured) = 0.590 W/kg

System Performance Check at Frequency 1900MHz Head Tissue/d=10mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Area Scan (41x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.616 W/kg



0 dB = 0.616 W/kg = -2.10 dBW/kg

Test Laboratory: CCIS Date/Time: 04.03.2015 12:11:29

DUT: Dipole 2450 MHz D2450V2; Type: SAAAD245BB; Serial: D2450V2 - SN:910

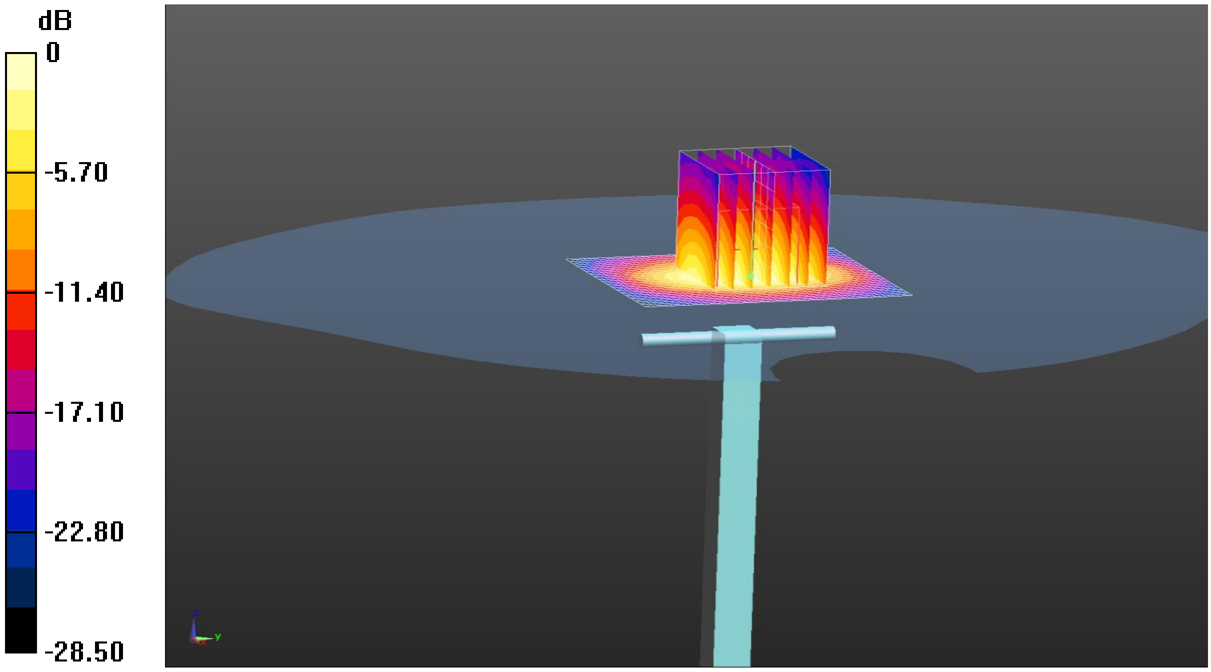
Communication System: UID 0, CW (0); Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.81 S/m; ε_r = 38.858; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: EX3DV4 - SN3924; ConvF(7.5, 7.5, 7.5); Calibrated: 06.20.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 31.0
- Electronics: DAE4 Sn1373; Calibrated: 06.11.2014
- Phantom: SAM with CRP; Type: QD000P40CD; Serial: 1765
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency 2450MHz Head Tissue/d=10mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.561 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.21 W/kg
SAR(1 g) = 0.541 W/kg; SAR(10 g) = 0.239 W/kg
Maximum value of SAR (measured) = 0.816 W/kg

System Performance Check at Frequency 2450MHz Head Tissue/d=10mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Area Scan (51x61x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.826 W/kg



0 dB = 0.826 W/kg = -0.83 dBW/kg

Test Laboratory: CCIS Date/Time: 04.07.2015 11:21:07

DUT: Dipole 750 MHz D750V3; Type: D750V3; Serial: D750V3 - SN:1118

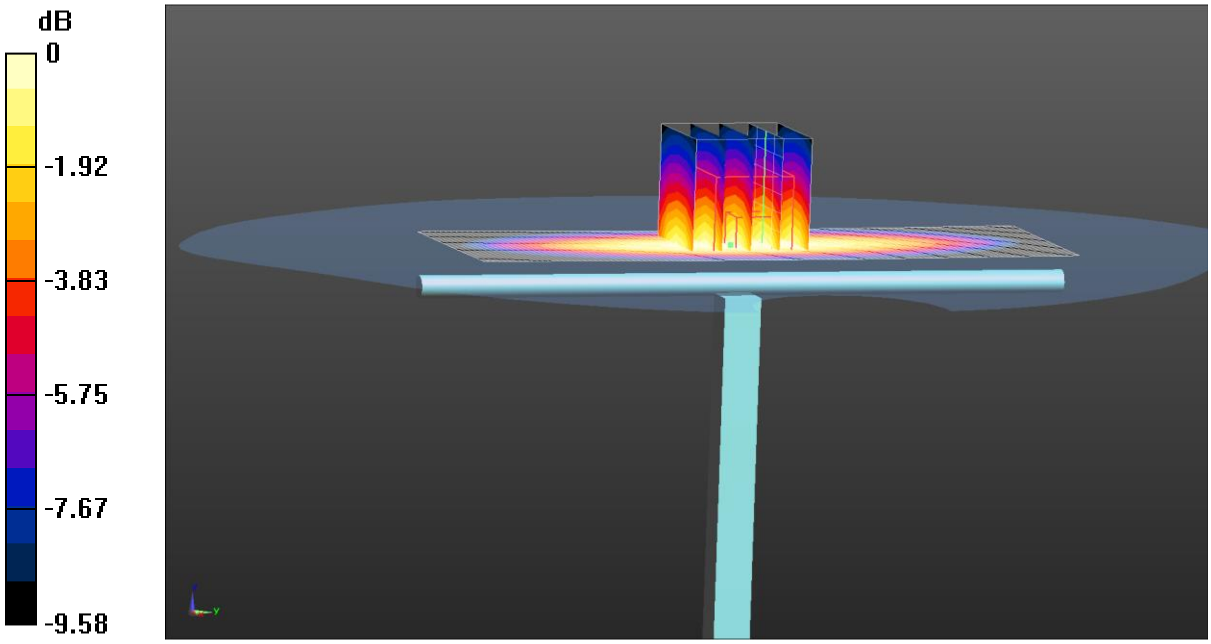
Communication System: UID 0, CW (0); Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.95 S/m; ε_r = 54.83; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: EX3DV4 - SN3924; ConvF(9.99, 9.99, 9.99); Calibrated: 20.06.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 31.0
- Electronics: DAE4 Sn1373; Calibrated: 11.06.2014
- Phantom: SAM with CRP; Type: QD000P40CD; Serial: 1765
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency 750 MHz Body Tissue/d=15mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.764 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.117 W/kg
SAR(1 g) = 0.086 W/kg; SAR(10 g) = 0.057 W/kg
Maximum value of SAR (measured) = 0.101 W/kg

System Performance Check at Frequency 750 MHz Body Tissue/d=15mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Area Scan (41x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.102 W/kg



0 dB = 0.102 W/kg = -9.91 dBW/kg

Test Laboratory: CCIS Date/Time: 03.21.2015 14:43:37

DUT: Dipole 835 MHz D835V2; Type: SAAAD083BB; Serial: D835V2 - SN:4d154

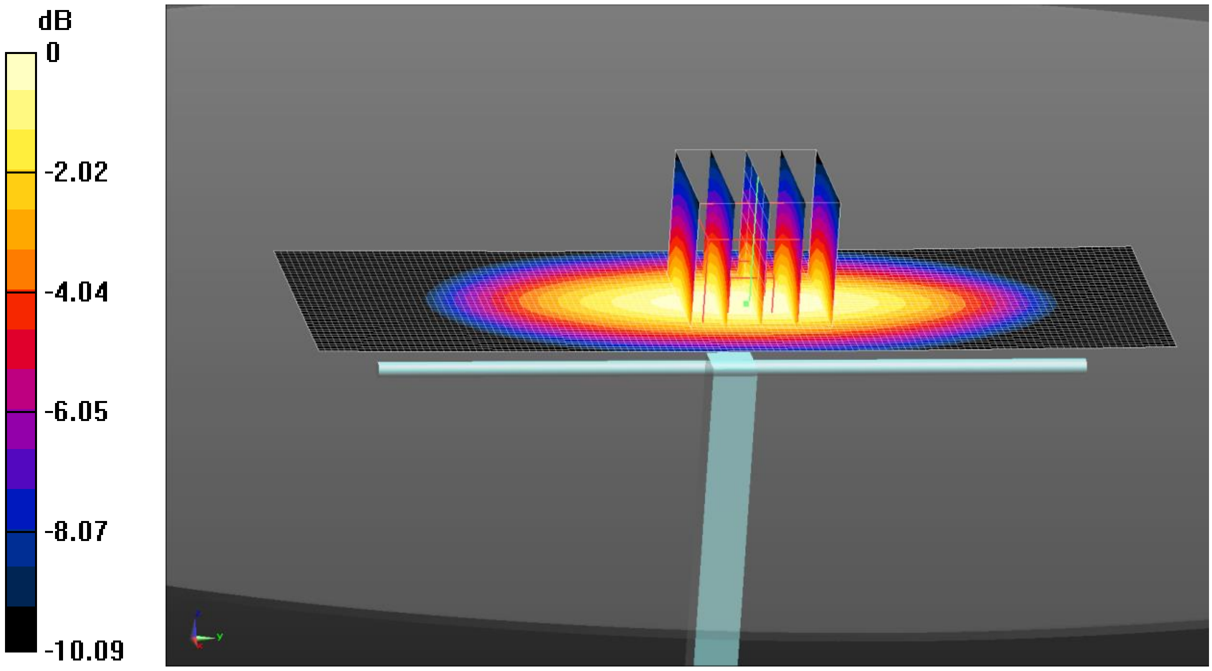
Communication System: UID 0, CW (0); Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.96 S/m; ε_r = 55.87; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: EX3DV4 - SN3924; ConvF(9.62, 9.62, 9.62); Calibrated: 06.20.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1373; Calibrated: 06.11.2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1208
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency 835 MHz Body Tissue/d=15mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Area Scan (41x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.119 W/kg

System Performance Check at Frequency 835 MHz Body Tissue/d=15mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.433 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.139 W/kg
SAR(1 g) = 0.096 W/kg; SAR(10 g) = 0.064 W/kg
Maximum value of SAR (measured) = 0.120 W/kg



0 dB = 0.120 W/kg = -9.21 dBW/kg

Test Laboratory: CCIS Date/Time: 04.03.2015 21:09:49

DUT: Dipole 1750 MHz D1750V2; Type: D1750V2; Serial: 1062

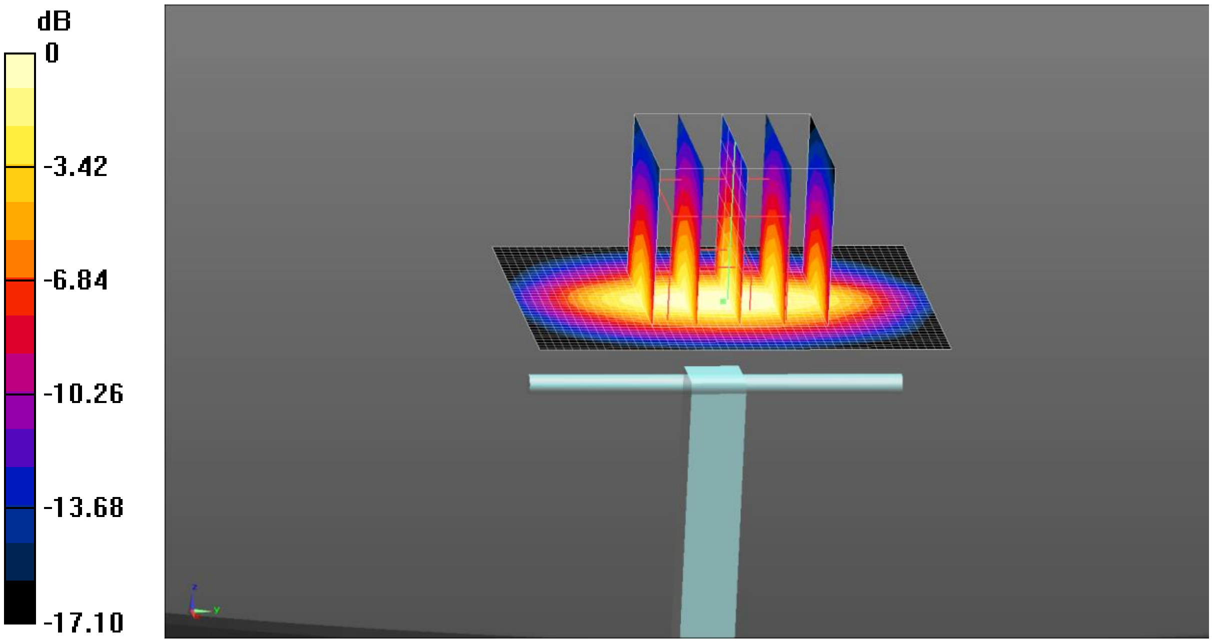
Communication System: UID 0, CW (0); Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.52 S/m; ε_r = 52.05; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: EX3DV4 - SN3924; ConvF(8.13, 8.13, 8.13); Calibrated: 06.20.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1373; Calibrated: 06.11.2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1208
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency 1750MHz Body Tissue/d=10mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Area Scan (41x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.603 W/kg

System Performance Check at Frequency 1750MHz Body Tissue/d=10mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.921 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.703 W/kg
SAR(1 g) = 0.381 W/kg; SAR(10 g) = 0.222 W/kg
Maximum value of SAR (measured) = 0.572 W/kg



0 dB = 0.572 W/kg = -2.43 dBW/kg

Test Laboratory: CCIS Date/Time: 04.06.2015 12:55:43

DUT: Dipole 1750 MHz D1750V2; Type: D1750V2; Serial: 1062

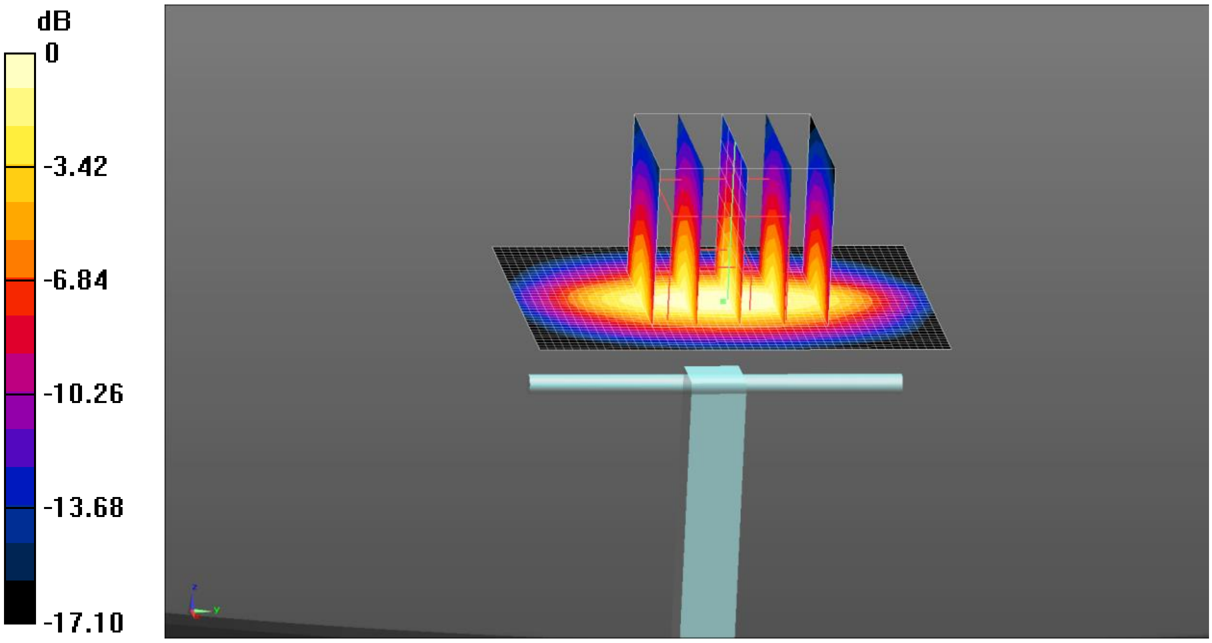
Communication System: UID 0, CW (0); Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.50 S/m; ε_r = 52.11; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: EX3DV4 - SN3924; ConvF(8.13, 8.13, 8.13); Calibrated: 06.20.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1373; Calibrated: 06.11.2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1208
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency 1750MHz Body Tissue/d=10mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Area Scan (41x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.603 W/kg

System Performance Check at Frequency 1750MHz Body Tissue/d=10mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.221 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.703 W/kg
SAR(1 g) = 0.386 W/kg; SAR(10 g) = 0.223 W/kg
Maximum value of SAR (measured) = 0.572 W/kg



0 dB = 0.572 W/kg = -2.43 dBW/kg

Test Laboratory: CCIS Date/Time: 04.03.2015 10:48:22

DUT: Dipole 1900 MHz D1900V2; Type: SAAAD190CB; Serial: D1900V2 - SN:5d175

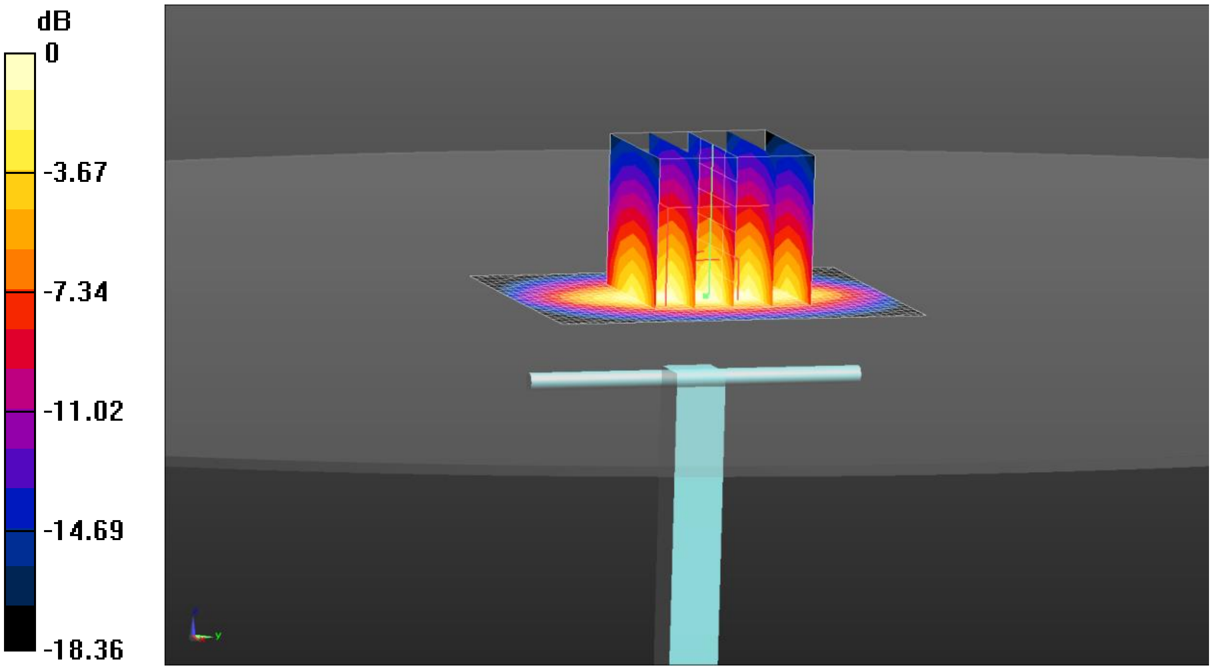
Communication System: UID 0, CW (0); Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.49 S/m; ε_r = 51.98; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: EX3DV4 - SN3924; ConvF(7.63, 7.63, 7.63); Calibrated: 06.20.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1373; Calibrated: 06.11.2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1208
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency 1900MHz Body Tissue/d=10mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Area Scan (41x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.595 W/kg

System Performance Check at Frequency 1900MHz Body Tissue/d=10mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.250 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.697 W/kg
SAR(1 g) = 0.403 W/kg; SAR(10 g) = 0.211 W/kg
Maximum value of SAR (measured) = 0.563 W/kg



0 dB = 0.563 W/kg = -2.49 dBW/kg

Test Laboratory: CCIS Date/Time: 04.06.2015 07:41:00

DUT: Dipole 1900 MHz D1900V2; Type: SAAAD190CB; Serial: D1900V2 - SN:5d175

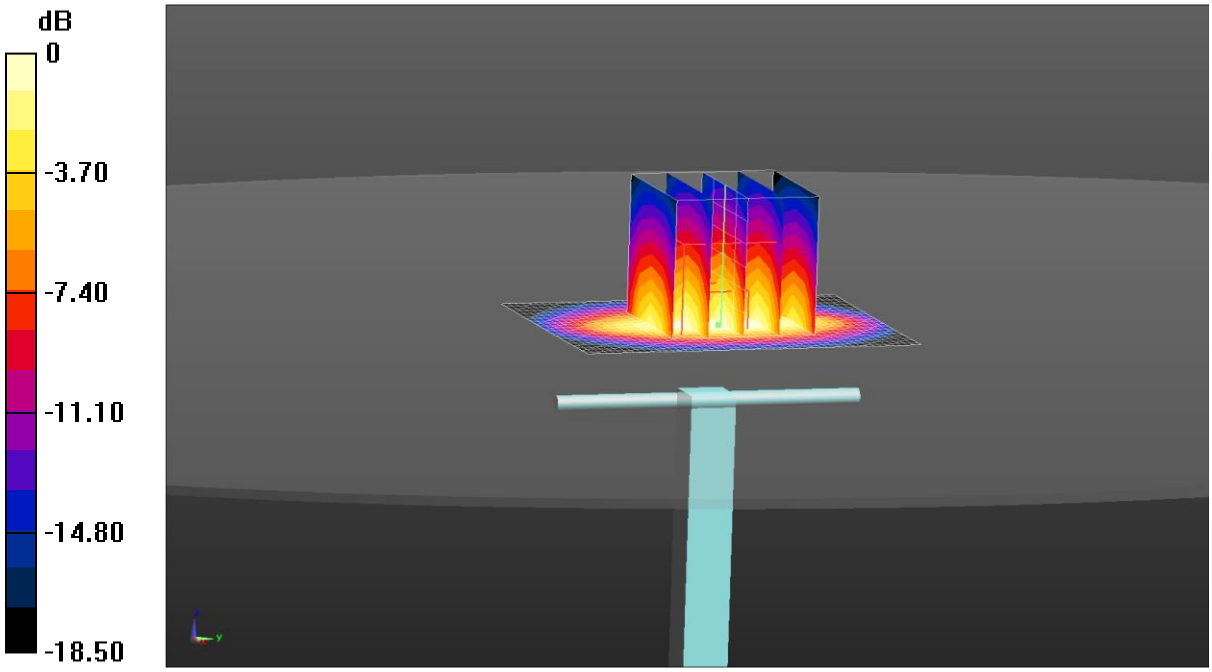
Communication System: UID 0, CW (0); Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.50 S/m; ε_r = 52.31; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: EX3DV4 - SN3924; ConvF(7.63, 7.63, 7.63); Calibrated: 06.20.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1373; Calibrated: 06.11.2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1208
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency 1900MHz Body Tissue/d=10mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Area Scan (41x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.575 W/kg

System Performance Check at Frequency 1900MHz Body Tissue/d=10mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.242 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.694 W/kg
SAR(1 g) = 0.402 W/kg; SAR(10 g) = 0.210 W/kg
Maximum value of SAR (measured) = 0.561 W/kg



0 dB = 0.561 W/kg = -2.51 dBW/kg

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Test Laboratory: CCIS Date/Time: 04.04.2015 08:16:17

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:910

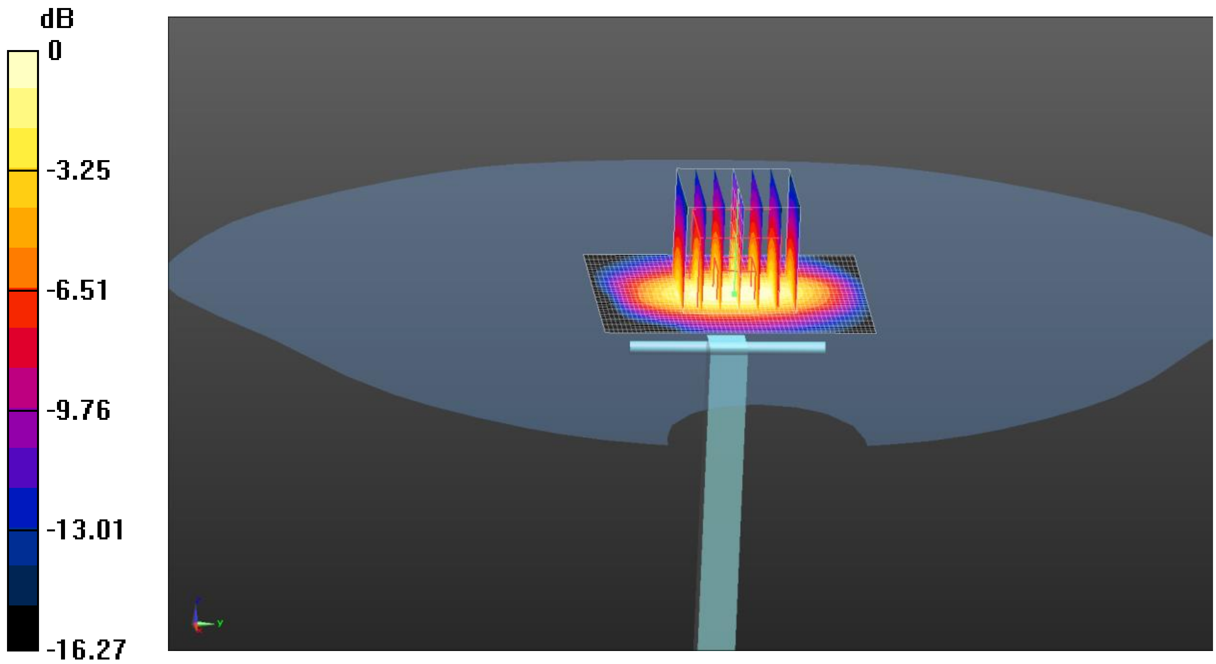
Communication System: UID 0, CW (0); Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.964 S/m; ε_r = 53.438; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: EX3DV4 - SN3924; ConvF(7.42, 7.42, 7.42); Calibrated: 06.20.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 31.0
- Electronics: DAE4 Sn1373; Calibrated: 06.11.2014
- Phantom: SAM with CRP; Type: QD000P40CD; Serial: 1765
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency 2450MHz Body Tissue/d=10mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Area Scan (51x61x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.888 W/kg

System Performance Check at Frequency 2450MHz Body Tissue/d=10mm, Pin=10 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 20.638 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 1.04 W/kg
SAR(1 g) = 0.524 W/kg; SAR(10 g) = 0.250 W/kg
Maximum value of SAR (measured) = 0.787 W/kg



0 dB = 0.787 W/kg = -1.04 dBW/kg