SAR TEST REPORT

For

Haier Telecom (Qingdao) Co., Ltd

LTE Mobile phone

Model No.: L51

FCC ID: SG71507L51

Report No.: 150928051SZN-001

Issue Date: September 30, 2015

Prepared by

Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch

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1 GENERAL INFORMATION

Applicant:	Haier Telecom (Qingdao) Co., Ltd No. 1 Haier Road, Hi-tech Zone, Qingdao, China
Manufacturer:	Haier Telecom (Qingdao) Co., Ltd No. 1 Haier Road, Hi-tech Zone, Qingdao, China
Product Description:	LTE Mobile phone
Model Number:	L51
FCC ID	SG71507L51
File Number:	150928051SZN-001
Date of Test:	September 9, 2015 to September 10, 2015

The above equipment was tested by Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in IEEE 1528-2013 and KDB 865664. This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in ANSI/IEEE C95.1-1992.

The test results of this report relate only to the tested sample identified in this report.

Prepared and Checked by:

Sign on file

Harry Wu
Engineer

Approved by:

Digitally signed by Andy Yan
Location: Intertek Testing Services

Andy Yan
Technical Supervisor
Date: September 30, 2015

2 STATEMENT OF COMPLIANCE

Max. Reported SAR (1g)

Test Position		LTE Band	Channel/Frequency(MHz)	Limit of SAR1g: 1.6W/kg	
				Measured SAR1g (W/kg)	Reported SAR1g (W/kg)
Head	Left Cheek	Band 2	19100/1900	0.191	0.195
	Right Cheek	Band 7	21350/2560	0.069	0.076
Body	Ground Side	Band 2	19100/1900	0.855	0.872
	Ground Side	Band 7	21350/2560	1.320	1.482

The SAR values found for the Mobile Phone are below the maximum recommended levels of 1.6 W/Kg as averaged over any 1g tissue according to the ANSI C95.1-1992.

For body worn operation, this device has been tested and meets FCC RF exposure guidelines when used with any accessory that contains no metal and provide the distance 10mm from the body. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.

Max. Simultaneous SAR (1g)

Simultaneous Transmission SAR (1g)						
Test Position		LTE Band 2	LTE Band 7	WiFi Note2	BT Note2	SUM
Head	Left Cheek	**0.195**		0.088	**0.234**	**0.429**
Body	Ground Side		**1.482**	0.021	**0.117**	**1.599**

For the SUM of Body (Ground side) is 1.599 near the limit. The SAR to peak location separation ratio is calculated as:

Ration= $(SAR_1 + SAR_2)^{1.5}/R_i$ =$(1.482+0.117)^{1.5}/106.19 = 0.019$ **≤ 0.04**

where Ri is the separation distance between the two antennas.

The detail for simultaneous transmission consideration is described in clause 11.4.4.

Note 1: Body Mode include Body-worn Mode and Hotspot Mode
Note 2: The WiFi reported SAR value are obtained from the ECIT report and the report No. is B15D10209-SAR

Modified Information

Rev.	Summary	Date of Rev.	Report No.
Ver.1.0	Original Report	September 30, 2015	150928051SZN-001

3 EQUIPMENT UNDER TEST (EUT) TECHNICAL DESCRIPTION

Characteristics	Description
Description:	LTE Mobile phone
Model name:	L51
Exposure Category:	Uncontrolled Environment/General Population
Test Mode(s):	LTE FDD Band 2/7
Operating Frequency Range:	LTE FDD Band 2: 1850MHz-1910MHz; LTE FDD Band 7: 2500MHz-2570MHz
Modulation:	LTE: QPSK, 16QAM
Power Class:	LTE: 3
Power Level:	Max power
Antenna Type:	Integral Antenna
Antenna Gain:	LTE: 0dBi
Dimensions: Hotspot Mode:	14.4cm×7.2cm Support simultaneous transmission of hotspot and voice (or data)
Power supply:	☒DC supply: DC 3.8V internal rechargeable lithium battery or DC 5V from AC Adapter
	☒Adapter supply: Model: LSD-D05W10 Input: AC 100-240VAC 50/60Hz 350Ma Output: DC 5V 2A
Product Software Version:	HL-L51-H01-S01
Product Hardware Version:	MP
EUT ID*	Z150928051-001

Note:

1. *For more details, please refer to the User's manual of the EUT.*
2. *The sample under test was selected by the Client.*
3. **EUT ID: is used to identify the test sample in the lab internally.*

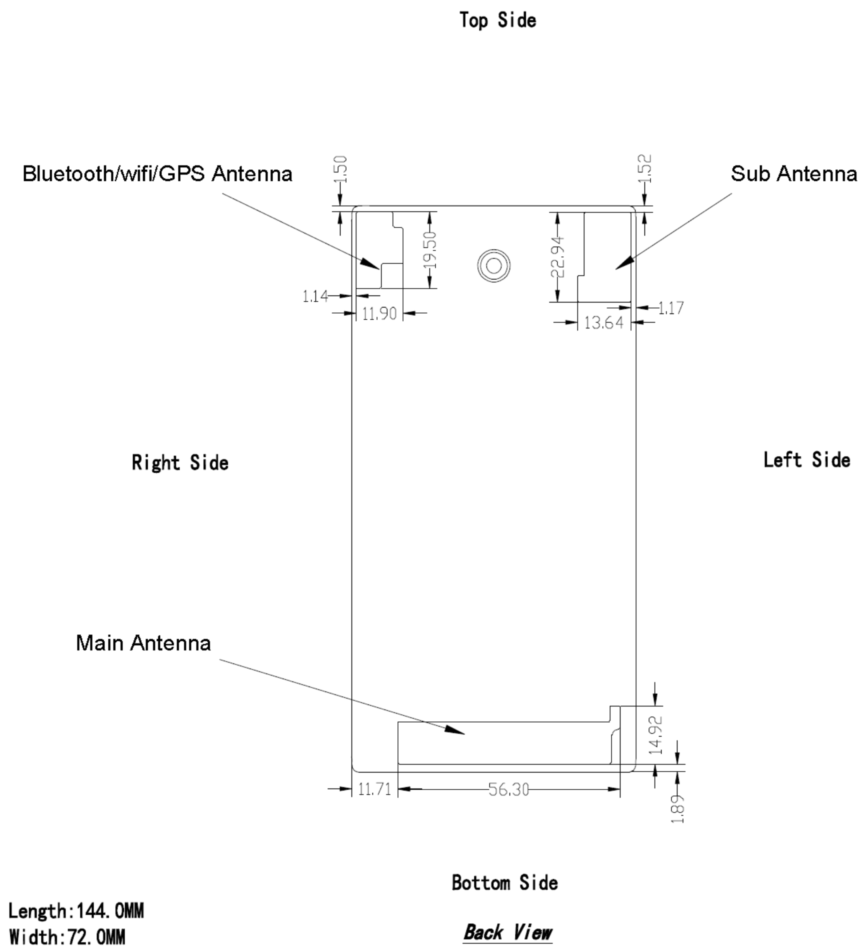
4 AUXILIARY EQUIPMENT DETAILS

AE: Battery	Description
Manufacturer:	/
Model:	/
S/N:	/
capacity:	3950mAh
Voltage:	3.8V

5 TEST FACILITY

Site Description		
EMC Lab.	:	The Laboratory has been assessed and proved to be in compliance with CNAS/CL01: 2006(identical to ISO/IEC17025: 2005) The Certificate Registration Number is L4122
		Accredited by FCC The Certificate Registration Number is 242492 Accredited by Industry Canada The Certificate Registration Number is 2055C
Name of Firm	:	Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch
Site Location	:	6F, D Block, Huahan Building, Langshan Road,Nanshan District, Shenzhen, P. R. China

6 EUT ANTENNA LOCATIONS



Only Main Ant. used for LTE Band

Hotspot Sides for SAR Testing:

Mode	Front	Back	Left Side	Right Side	Top Side	Bottom Side
LTE Band 2	YES	YES	YES	YES	N/A	YES
LTE Band 7	YES	YES	YES	YES	N/A	YES
Note: Per KDB 941225 D06 v02, when the overall device length and width are ≥ 9cm*5cm, the test distance of hotspot is 10 mm and SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.						

7 GUIDANCE STANDARD

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

☒**FCC 47CFR §2.1093** Radiofrequency Radiation Exposure Evaluation: Portable Devices

☒**ANSI C95.1, 1992**: Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.(IEEE Std C95.1-1991)

☒**IEEE Std 1528™-2013**: IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.

☒**KDB 865664 D01** SAR measurement 100 MHz to 6 GHz v01r04: SAR Measurement Requirements for 100 MHz to 6 GHz

☒**KDB 447498 D01** Mobile Portable RF Exposure v05r02: Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies

☒**KDB 648474 D04** Handset SAR v01r02: SAR Evaluation Considerations for Wireless Handsets.

☒**KDB 941225 D05** SAR for LTE Devices v02r03: SAR Evaluation Considerations for LTE Devices

☒**KDB 941225 D06** Hotspot Mode v02: SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities

Remark:
This portable wireless equipment has been measured in all cases requested by the relevant standards. Test results in Chapter 11 of this test report are below limits specified in the relevant standards for the tested bands only.

8 RF EXPOSURE

8.1 LIMITS

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.

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. The 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.

Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and ankles
0.4	8.0	20.0

Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and ankles
0.08	1.6	4.0

Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

8.2 EVALUATION

☒According to §15.247 (i) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:

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

   - $f_{(GHz)}$ is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation[17]
   - The result is rounded to one decimal place for comparison

   The test exclusions are applicable only when the minimum *test separation distance* is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum *test separation distance* is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

Routine SAR evaluation refers to that specifically required by § 2.1093, using measurements or computer simulation. When routine SAR evaluation is not required, portable transmitters with output power greater than the applicable low threshold require SAR evaluation to qualify for TCB approval.

8.3 SAR TESTING FOR TABLET

This device can be used also in full sized tablet exposure conditions, due to its size>20cm. Per FCC KDB 616217, the back surface and edges of the tablet should be tested for SAR compliace with the tablet touching the phantom. The SAR exclusion threshold in KDB 447498 D01v05r02 can be applied to determine SAR test exclusion for adjacent edge configurations. The closest distance from the antenna to an adjacent tablet edge is used to determine if SAR testing is rquired for the adjacent edges, with the adjacent edge positioned against the phantom and the edge containing the antenna positioned perpendicular to the phantom.

9 SPECIFIC ABSORPTION RATE (SAR)

9.1 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.

9.2 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:

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

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

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

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

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

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

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

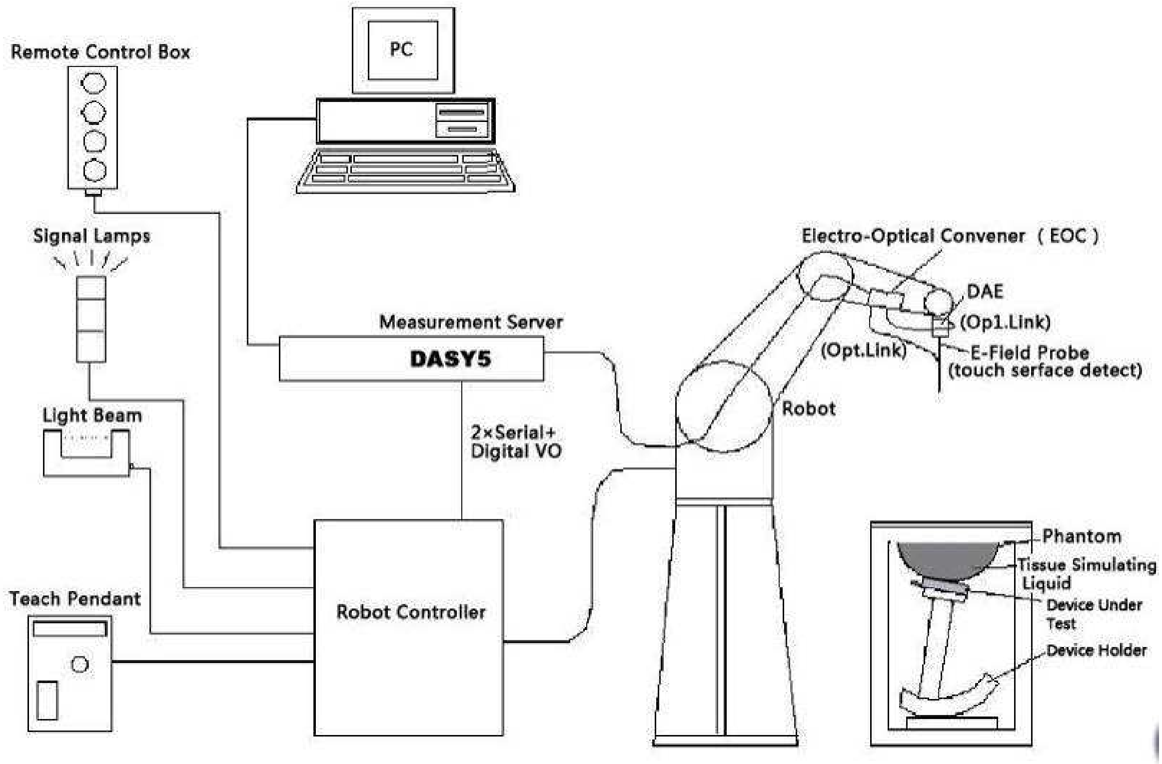
However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

10 SAR MEASUREMENTS SYSTEM CONFIGURATION

10.1 SAR MEASUREMENT SET-UP

The DASY5 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Stäubli TX=RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running Win 7 profesional operating system and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.



Picture 1. SAR Lab Test Measurement Set-up

10.2 DASY5 E-FIELD PROBE SYSTEM

The SAR measurements were conducted with the dosimetric probe designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multifiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY5 software reads the reflection turning a software approach and looks for the maximum using 2nd ord curve fitting. The approach is stopped at reaching the maximum.

Probe Specifications:

Model:	EX3DV4
Calibration:	ISO/IEC 17025 calibration service available
Frequency:	10MHz - 6.0GHz
	Linearity: ±0.2dB(30MHz to 6GHz)
Dynamic Range:	10 µW/g — 100mW/g Linearity:
	± 0.2dB(noise:typically < 1 µW/g)
Probe Length:	330 mm
Probe Tip Length:	20 mm
Body Diameter:	12 mm
Tip Diameter:	2.5 mm
Tip-Center:	1 mm
Application:	High Precision dosimetric measurements in any exposure scenario(e.g., very strong gradient fields).

Picture 2 E-field Probe

Intertek

10.3 E-FIELD PROBE CALIBRATION

Each E-Probe/Probe Amplifier combination has unique calibration parameters. A TEM cell calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm^2) using an RF Signal generator, TEM cell, and RF Power Meter.
The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if the frequency is below 1 GHz and inn a waveguide or other methodologies above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees until the three channels show the maximum reading. The power density readings equates to 1 mw/ cm^2.
E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The E-field in the medium correlates with the temperature rise in the dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

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

Where:
Δt = Exposure time (30 seconds),
C = Heat capacity of tissue (brain or muscle),
ΔT = Temperature increase due to RF exposure.

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

Where:
σ = Simulated tissue conductivity,
ρ = Tissue density (kg/m^3).

10.4 OTHER TEST EQUIPMENT

10.4.1 Data Acquisition Electronics (DAE)

The data acquisition electronics consist 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 with a 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 mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection.
The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Picture 3: DAE

10.4.2 Robot

The SPEAG DASY system uses the high precision robots (DASY5: TX90XL) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version from Stäubli is used. The Stäubli robot series have many features that are important for our application:

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

Picture 4 DASY 5

10.4.3 Measurement Server

The Measurement server is based on a PC/104 CPU broad with CPU (DASY5: 400 MHz, Intel Celeron), chip disk (DASY5: 128MB), RAM (DASY5: 128MB). 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 broad, which is directly connected to the PC/104 bus of the CPU broad.

Picture 5 Server for DASY 5

The measurement server performs all real-time data evaluation of field measurements and surface detection, controls robot movements and handles safety operation. The PC operating system cannot interfere with these time critical processes. All connections are supervised by a watchdog, and disconnection of any of the cables to the measurement server will automatically disarm the robot and disable all program-controlled robot movements. Furthermore, the measurement server is equipped with an expansion port which is reserved for future applications. Please note that this expansion port does not have a standardized pinout, and therefore only devices provided by SPEAG can be connected. Devices from any other supplier could seriously damage the measurement server.

10.4.4 Device Holder for Phantom

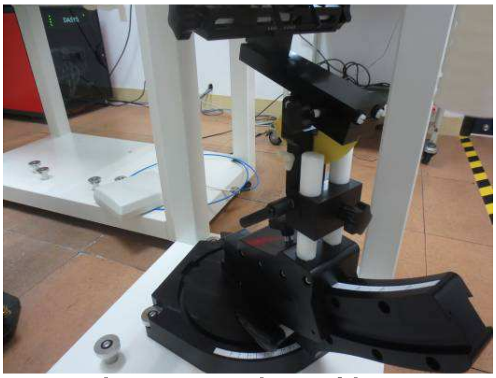
The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5mm distance, a positioning uncertainty of ±0.5mm would produce a SAR uncertainty of ±20%. Accurate device positioning is therefore crucial for accurate 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 the different positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales are the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.

The DASY device holder is constructed of low-loss POM material having the following dielectric parameters: relative permittivity ε=3 and loss tangent δ=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.

<Laptop Extension Kit>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the Mounting Device in place of the phone positioner. The extension is fully compatible with the Twin-SAM and ELI phantoms.



Picture 6: Device Holder

10.4.5 Phantom

The SAM Twin Phantom V4.0 is constructed of a fiberglass shell integrated in a table. The shape of the shell is based on data from an anatomical study designed to Represent the 90th percentile of the population. The phantom enables the dissymmetric evaluation of SAR for both left and right handed handset usage, as well as body-worn usage using the flat phantom region. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot. The shell phantom has a 2mm shell thickness (except the ear region where shell thickness increases to 6 mm).

Shell Thickness: 2 ± 0. 2 mm

Filling Volume: Approx. 25 liters

Dimensions: 810 x l000 x 500 mm (H x L x W)

Available: Special

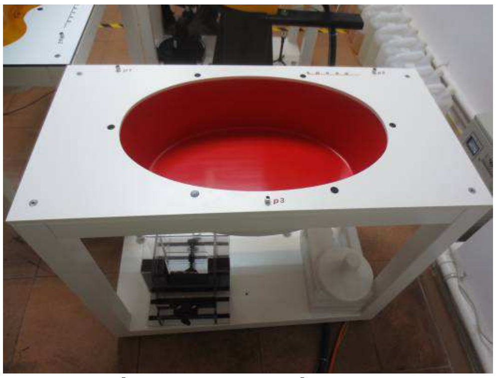
Picture 7: SAM Twin Phantom

Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. 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 is compatible with all SPEAG dosimetric probes and dipoles.

Shell Thickness 2±0.2 mm

Filling Volume Approx. 30 liters

Dimensions 190×600×0 mm (H x L x W)



Picture 8.ELI4 Phantom

10.5 SCANNING PROCEDURE

The DASY5 installation includes predefined files with recommended procedures for measurements and validation. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the DUT’s output power and should vary max. ± 5 %.

The “surface check” measurement tests the optical surface detection system of the DASY5 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1mm). To prevent wrong results tests are only executed when the liquid is free of air bubbles. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within ± 30°.)

Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values before running a detailed measurement around the hot spot. Before starting the area scan a grid spacing is set according to FCC KDB Publication 865664. During scan the distance of the probe to the phantom remains unchanged. After finishing area scan, the field maxima within a range of 2 dB will be ascertained.

Zoom Scan

After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the “Not a knot” condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm.

Spatial Peak Detection

The procedure for spatial peak SAR evaluation has been implemented and can determine values of masses of 1g and 10g, as well as for user-specific masses. The DASY5 system allows evaluations that combine measured data and robot positions, such as:

• maximum search

• extrapolation

• boundary correction

• peak search for averaged SAR

During a maximum search, global and local maxima searches are automatically performed in 2-D after each Area Scan measurement with at least 6 measurement points. It is based on the evaluation of the local SAR gradient calculated by the Quadratic Shepard’s method. The algorithm will find the global maximum and all local maxima within -2 dB of the global maxima for all SAR distributions.

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. Several measurements at different distances are necessary for the extrapolation. Extrapolation routines require at least 10 measurement points in 3-D space.

They are used in the Zoom Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard’s method for extrapolation.

A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 5mm steps.

Table 1: Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01

Frequency	Maximum Area Scan Resolution (mm) (Δxarea, Δyarea)	Maximum Zoom Scan Resolution (mm) (Δxzoom, Δyzoom)	Maximum Zoom Scan Spatial Resolution (mm) Δzzoom(n)	Minimum Zoom Scan Volume (mm) (x,y,z)
≤2 GHz	≤15	≤8	≤5	≥ 30
2-3 GHz	≤12	≤5	≤5	≥30
3-4 GHz	≤12	≤5	≤4	≥28
4-5 GHz	≤10	≤4	≤3	≥25
5-6 GHz	≤10	≤4	≤2	≥22

10.6 DATA STORAGE AND EVALUATION

10.6.1 Data Storage

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DAE4". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device set up, the parameter can be corrected afterwards and the data can be re-evaluated.
The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a loss less media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

10.6.2 Data Evaluation by SEMCAD

The SEMCAD software 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 factor	$ConvF_i$
- Diode compression point	Dcp_i

Device parameters:

- Frequency	f
- Crest factor	cf

Media parameters:
- Conductivity
- Density

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 DASY5 components. In the direct measuring mode of the multimeter 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:

$$\mathbf{V_i = U_i + U_i^2 \cdot c\,f / dcp_i}$$

With $\mathbf{V_i}$ = compensated signal of channel i (i = x, y, z)

$\mathbf{U_i}$ = input signal of channel i (i = x, y, z)

cf = crest factor of exciting field (DASY parameter)

$\mathbf{dcp_i}$ = diode compression point (DASY parameter)

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

E-field probes: $\mathbf{E_i = (V_i / Norm_i \cdot ConvF)^{1/2}}$

H-field probes: $\mathbf{H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1} f + a_{i2} f^2) / f}$

With $\mathbf{V_i}$ = compensated signal of channel i (i = x, y, z)

$\mathbf{Norm_i}$ = sensor sensitivity of channel i (i = x, y, z)

[mV/(V/m)2] for E-field Probes

ConvF = sensitivity enhancement in solution

$\mathbf{a_{ij}}$ **=** sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

$\mathbf{E_i}$ = electric field strength of channel i in V/m

$\mathbf{H_i}$ = magnetic field strength of channel i in A/m

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

$\mathbf{E_{tot} = (E_x^2 + E_Y^2 + E_z^2)^{1/2}}$

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

$\mathbf{SAR = (E_{tot})\ 2 \cdot \sigma / (\rho \cdot 1000)}$

with **SAR** = local specific absorption rate in mW/g

$\mathbf{E_{tot}}$ = total field strength in V/m

= conductivity in [mho/m] or [Siemens/m]

= equivalent tissue density in g/cm^3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.

$\mathbf{P_{pwe} = E_{tot}^2 / 3770}$ **or** $\mathbf{P_{pwe} = H_{tot}^2 \cdot 37.7}$

with $\mathbf{P_{pwe}}$ = equivalent power density of a plane wave in mW/cm^2

$\mathbf{E_{tot}}$ = total electric field strength in V/m ; $\mathbf{H_{tot}}$ = total magnetic field strength in A/m

10.7 TISSUE-EQUIVALENT LIQUID

10.7.1 Tissue-equivalent Liquid Ingredients

The liquid is consisted of water, salt and Glycol. The liquid has previously been proven to be suited for worst-case. The Table 2 & 3 shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the KDB 865664 D01.

Table 2: Composition of the Head Tissue Equivalent Matter

MIXTURE%	FREQUENCY (Head) 1900MHz
Water	55.25
Glycol monobutyl	44.43
Salt	0.32
Dielectric Parameters Target Value	f=1900MHz ε=40.0 σ=1.40

MIXTURE%	FREQUENCY (Head) 2450MHz
Water	62.68
Glycol	36.81
Salt	0.51
Dielectric Parameters Target Value	f=2450MHz ε=39.2 σ=1.80

Table 3: Composition of the Body Tissue Equivalent Matter

MIXTURE%	FREQUENCY (Body) 1900MHz
Water	69.93
Glycol	29.97
Salt	0.1
Dielectric Parameters Target Value	f=1900MHz ε=53.30 σ=1.52

MIXTURE%	FREQUENCY (Body) 2450MHz
Water	73.2
Glycol	26.7
Salt	0.1
Dielectric Parameters Target Value	f=2450MHz ε=52.7 σ=1.95

10.7.2 Tissue-equivalent Liquid Properties

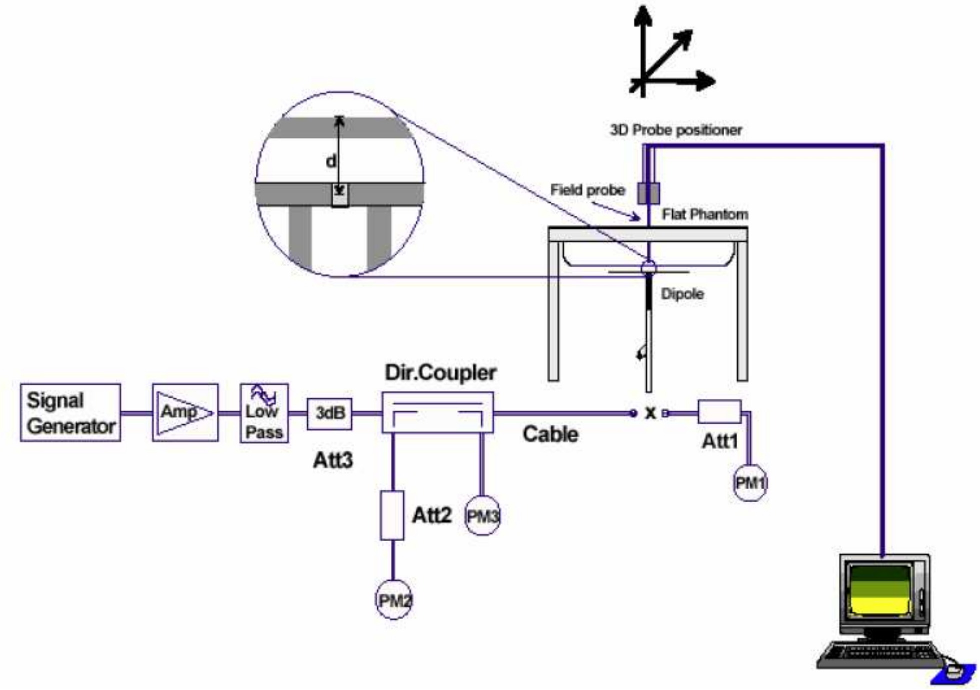
Table 4: Dielectric Performance of Tissue Simulating Liquid

Test Date	Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (εr)	Conductivity Target (σ)	Permittivity Target (εr)	Delta (σ) (%)	Delta (εr) (%)	Limit (%)
2015-09-09	1900	Head	22.1	1.369	41.15	1.400	40.0	-2.21	2.88	±5
2015-09-09	1900	Body	22.3	1.570	51.05	1.520	53.3	3.29	-4.22	±5
2015-09-09	2600	Head	21.9	2.023	38.49	1.960	39.0	3.21	-1.28	±5
2015-09-09	2600	Body	21.8	2.186	50.77	2.160	52.5	1.20	-3.30	±5

10.8 SYSTEM CHECK

10.8.1 Description of System Check

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulants were measured every day using the dielectric probe kit and the network analyzer. A system check measurement was made following the determination of the dielectric parameters of the simulant, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. The system check results (dielectric parameters and SAR values) are given in the table 5. System check results have to be equal or near the values determined during dipole calibration with the relevant liquids and test system (±10 %). System check is performed regularly on all frequency bands where tests are performed with the DASY5 system.



Picture 10. System Check Set-up

Justification for Extended SAR Dipole Calibrations
Usage of SAR dipoles calibrated less than 3 years ago but more than 1 year ago were confirmed in maintaining return loss (< - 20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB 865664 D01:
Table 5: Antenna Parameters with Body Tissue Simulating Liquid

Table 5

Dipole D1900V2 SN: 5d203				
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2015-06-10	-24.1	-	48.5+6.0j	-
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2015-06-10	-24.5	-	52.9+5.4j	-

Table 6

Dipole D2600V2 SN: 1108				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2015-06-10	-24.0	-	49.4-6.3j	-
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2015-06-10	-24.0	-	45.9-4.4j	-

10.8.2 System Check Results

Table 7: System Check for Head Tissue Simulating Liquid

Frequency	Test Date	Dielectric Parameters		250mW Measured SAR1g	1W Normalized SAR1g	1W Target SAR1g	Limit(±10% Deviation)
		εr	σ (s/m)	(W/kg)			
1900	2015-09-09	40.0	1.40	9.68	38.72	39.96	-3.10
2600	2015-09-09	39.0	1.96	13.90	55.60	57.60	-3.47
Note: 1. The graph results see ANNEX B. 2.Target Values used derive from the calibration certificate.							

Table 8: System Check for Body Tissue Simulating Liquid

Frequency	Test Date	Dielectric Parameters		250mW Measured SAR1g	1W Normalized SAR1g	1W Target SAR1g	Limit(±10% Deviation)
		εr	σ (s/m)	(W/kg)			
1900	2015-09-09	53.3	1.52	10.30	41.20	39.80	3.52
2600	2015-09-09	52.5	2.16	13.90	55.60	58.00	-4.14
Note: 1. The graph results see ANNEX B. 2.Target Values used derive from the calibration certificate.							

11 MEASUREMENT PROCEDURES

11.1 GENERAL DESCRIPTION OF TEST PROCEDURES

A communication link is set up with a System Simulator(SS) by air link, and a call is established. Then EUT is commanded to operate at maximum transmitting power.
Connection to the EUT is established via air interface with CMW 500, and the EUT is set to maximum output power by CMW 500. The EUT battery must be fully charged and checked periodically during the test to as certain uniform power output. The antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the EUT. The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the EUT by at least 30 dB.

LTE Test Configuration

LTE modes were tested according to FCC KDB 941225 D05 publication. Please see notes after the tabulated SAR data for required test configurations. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR. The R&S CMW 500 was used for LTE output power measurements and SAR testing. Max power control was used so the UE transmits with maximum output power during the SAR testing. SAR must be measured with the maximum TTI(transmit time interval) supported by the device in each LTE configuration.

A)Spectrum Plots for RB Configurations

A properly configured base station simulator was used for SAR tests and power measurements. Therefore, spectrum plots for RB configurations wee not required to be included in this report.

B)MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (N_{RB})						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

C)A-MPR

A-MPR(Additional MPR) has been disabled for all SAR tests by setting NS=01 on the base station simulator.

D)Largest Channel Bandwidth Standalone SAR Test Requirements

1)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.

2) QPSK with 50% RB allocation

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

3) 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 1) and 2) are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.

4) Higher order modulations
For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in above sections 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.

E) 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 A) 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.

11.2 MEASUREMENT VARIABILITY

Per FCC KDB Publication 865664 D01, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.
SAR Measurement Variability was assessed using the following procedures for each frequency band:

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.

2) When the original highest measured SAR is ⩾ 0.80 W/kg, repeat that measurement once.

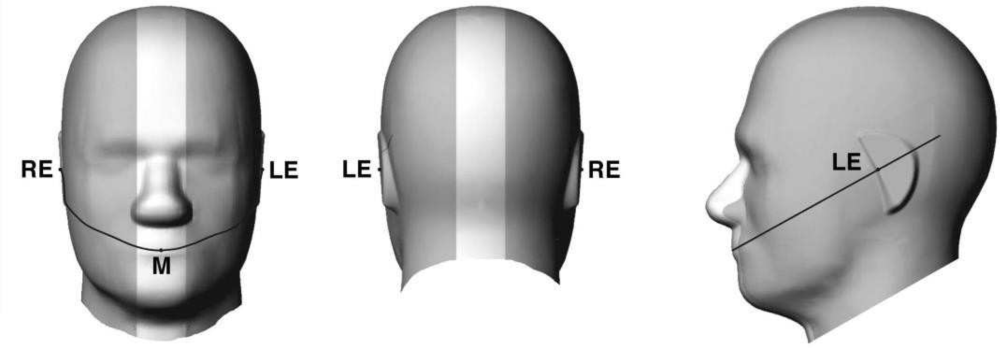
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ⩾ 1.45 W/kg (~ 10% from the 1-g SAR limit).

4) Perform a third repeated measurement only if the original, first or second repeated measurement is ⩾ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

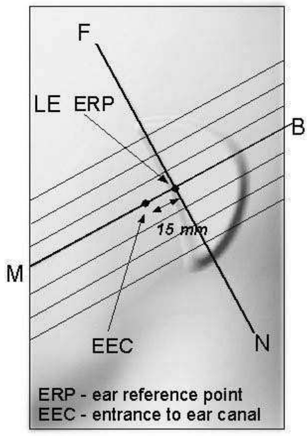
11.3 TEST POSITIONS REQUIREMENTS

(1) Ear and handset reference point
Picture11 shows the front, back, and side views of the SAM phantom. The center-of-mouth reference point is labeled "M," the left ear reference point (ERP) is marked "LE," and the right ERP is marked "RE." Each ERP is 15 mm along the B-M (back-mouth) line behind the entrance-to-ear-canal (EEC) point, as shown in Picture12.The Reference Plane is defined as passing through the two ear reference points and point M. The line N-F (neck-front), also called the reference pivoting line, is normal to the Reference Plane and perpendicular to both a line passing through RE and LE and the B-M line (see Picture13). Both N-F and B-M lines should be marked on the exterior of the phantom shell to facilitate handset positioning. Posterior to the N-F line the ear shape is a flat surface with 6 mm thickness at each ERP, and forward of the N-F line the ear

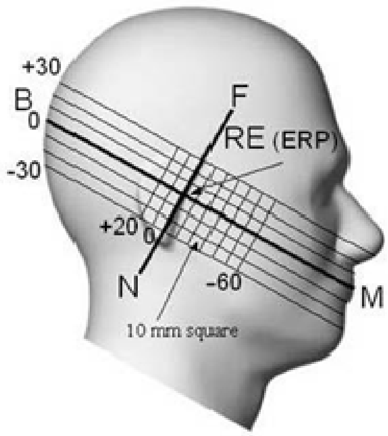
is truncated, as illustrated in Picture12. The ear truncation is introduced to preclude the ear lobe from interfering with handset tilt, which could lead to unstable positioning at the cheek.



Picture11 Front, back, and side views of SAM twin phantom



Picture12 Close-up side view of phantom showing the ear region.



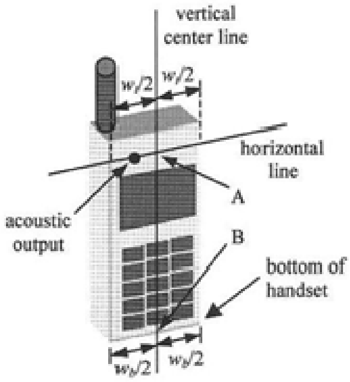
Picture13 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

(2) Definition of the cheek position

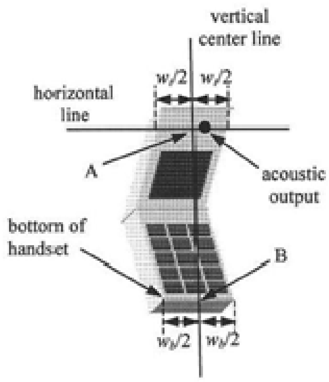
1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. Define two imaginary lines on the handset—the vertical centerline and the horizontal line. The vertical centerline passes through two points on the Phantom Side of the handset—the midpoint of the width wt of the handset at the level of the acoustic output (point A in Picture 14 and Picture 15), and the midpoint of the width wb of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Picture 14). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Picture 15), especially for clamshell handsets, handsets with flip covers, and other irregularly-shaped handsets.
3. Position the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Picture 16), such that the plane defined by the vertical centerline and the horizontal line of the handset is approximately parallel to the sagittal plane of the phantom.
4. Translate the handset towards the phantom along the line passing through RE and LE until handset point A touches the pinna at the ERP.
5. While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to the plane containing B-M and N-F lines, i.e., the Reference Plane.

6. Rotate the handset around the vertical centerline until the handset (horizontal line) is parallel to the N-F line.

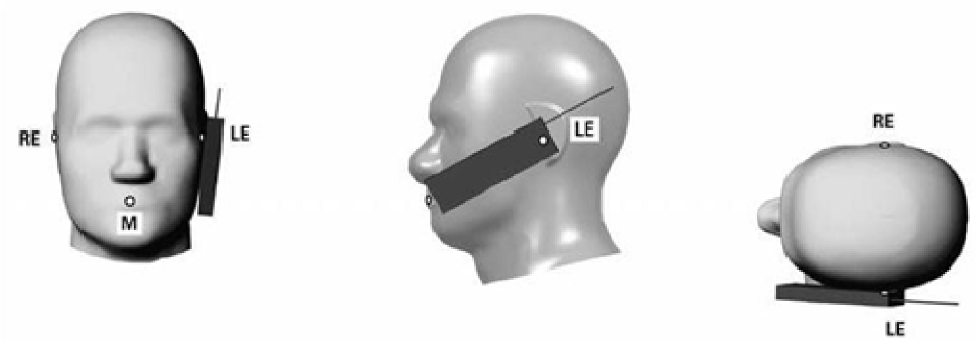
7. While maintaining the vertical centerline in the Reference Plane, keeping point A on the line passing through RE and LE, and maintaining the handset contact with the pinna, rotate the handset about the N-F line until any point on the handset is in contact with a phantom point below the pinna on the cheek. See Picture 16. The actual rotation angles should be documented in the test report.



Picture14 Handset vertical and horizontal reference lines—"fixed case



Picture15 Handset vertical and horizontal reference lines—"clam-shell case"



Picture16 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

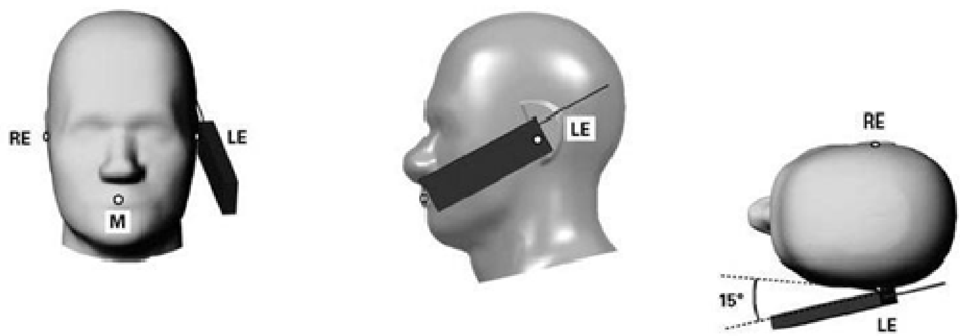
(3) Definition of the tilt position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.

2. While maintaining the orientation of the handset, move the handset away from the pinna along the line passing through RE and LE far enough to allow a rotation of the handset away from the cheek by 15°.

3. Rotate the handset around the horizontal line by 15°.

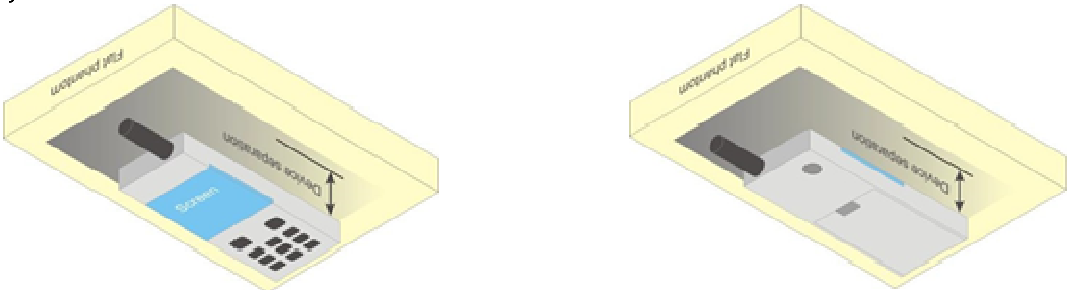
4. While maintaining the orientation of the handset, move the handset towards the phantom on the line passing through RE and LE until any part of the handset touches the ear. The tilt position is obtained when the contact point is on the pinna. See Picture 17. If contact occurs at any location other than the pinna, e.g., the antenna at the back of the phantom head, the angle of the handset should be reduced. In this case, the tilt position is obtained if any point on the handset is in contact with the pinna and a second point



Picture17 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

(4)Body Worn Accessory

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Picture 18). Per KDB 648474 D04v01r02, body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB 447498 D01v05r02 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for body-worn accessory, measured without a headset connected to the handset is < 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a handset attached to the handset.
Accessories for body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are test with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-chip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.



Picture18 Body Worn Position

(5)Wireless Router

Some battery-operated handsets have the capability to transmit and receive user through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC HDB Publication 941225 D06v01r01 where SAR test considerations for handsets (L x W $\geqslant$ 9 cm x 5 cm) are based on a composite test separation distance of 10mm from the front, back and edges of the device containing transmitting antennas within 2.5cm of their edges, determined form 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 due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D01v05r02 publication procedures. The “Portable Hotspot” feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

11.4 TEST RESULTS

11.4.1 Conducted Power Results

LTE Band 2		CONDUCTED POWER		
20MHz BW QPSK		18700	18900	19100
No. of RB	RB Offset	1860MHz	1880MHz	1900MHz
1	0	21.4	21.4	21.9
1	49	21.6	21.5	21.9
1	99	21.4	21.4	21.5
50	0	20.3	20.4	20.9
50	24	20.4	20.6	20.6
50	49	20.2	20.5	20.5
100	0	20.2	20.4	20.6
20MHz BW 16QAM		18700	18900	19100
No. of RB	RB Offset	1860MHz	1880MHz	1900MHz
1	0	20.0	20.8	20.9
1	49	20.2	21.4	20.7
1	99	19.6	20.8	20.9
50	0	19.4	19.5	19.7
50	24	19.4	19.5	19.6
50	49	19.4	19.6	19.5
100	0	19.2	19.6	19.5

LTE Band 2		CONDUCTED POWER		
15MHz BW QPSK		18675	18900	19125
No. of RB	RB Offset	1857.5MHz	1880MHz	1902.5MHz
1	0	21.3	21.4	21.6
1	36	21.2	21.4	21.5
1	74	21.3	21.5	21.4
36	0	20.3	20.5	20.7
36	18	20.3	20.4	20.6
36	37	20.2	20.4	20.4
75	0	20.2	20.4	20.5
15MHz BW 16QAM		18675	18900	19125
No. of RB	RB Offset	1857.5MHz	1880MHz	1902.5MHz
1	0	20.1	20.7	20.7
1	36	20.0	20.6	20.6
1	74	20.1	20.7	20.3
36	0	19.0	19.3	19.7
36	18	19.1	19.4	19.6
36	37	19.1	19.3	19.5
75	0	19.2	19.5	19.7

LTE Band 2		CONDUCTED POWER		
10MHz BW QPSK		18650	18900	19150
No. of RB	RB Offset	1855MHz	1880MHz	1905MHz
1	0	21.3	21.3	21.6
1	24	21.5	21.4	21.6
1	49	21.0	21.4	21.3
25	0	20.2	20.4	20.6
25	12	20.4	20.5	20.5
25	24	20.3	20.5	20.3
50	0	20.2	20.4	20.5
10MHz BW 16QAM		18650	18900	19150
No. of RB	RB Offset	1855MHz	1880MHz	1905MHz
1	0	20.1	20.0	20.6
1	24	20.2	20.2	20.4
1	49	20.0	20.1	20.9
25	0	19.1	19.2	19.7
25	12	19.1	19.3	19.7
25	24	19.0	19.2	19.5
50	0	19.1	19.6	19.5

LTE Band 2		Conducted Power		
5MHz BW QPSK		18625	18900	19175
No. of RB	RB Offset	1852.5MHz	1880MHz	1907.5MHz
1	0	20.9	21.4	21.5
1	12	20.7	21.2	21.4
1	24	21.2	21.3	21.6
12	0	20.2	20.4	20.5
12	7	20.3	20.5	20.5
12	13	20.2	20.4	20.4
25	0	20.1	20.5	20.4
5MHz BW 16QAM		18625	18900	19175
No. of RB	RB Offset	1852.5MHz	1880MHz	1907.5MHz
1	0	19.8	20.2	20.7
1	12	19.0	20.1	20.3
1	24	19.0	20.2	20.2
12	0	19.0	19.3	19.6
12	7	19.0	19.4	19.5
12	13	19.0	19.3	19.6
25	0	19.0	19.4	19.4

LTE Band 2		Conducted Power		
3MHz BW QPSK		18615	18900	19185
No. of RB	RB Offset	1851.5MHz	1880MHz	1908.5MHz
1	0	21.2	21.4	21.5
1	8	21.0	21.1	21.5
1	14	21.4	21.3	21.5
8	0	21.2	21.4	21.5
8	4	20.4	20.5	20.6
8	7	21.1	21.3	21.5
15	0	20.1	20.4	20.4
3MHz BW 16QAM		18615	18900	19185
No. of RB	RB Offset	1851.5MHz	1880MHz	1908.5MHz
1	0	19.8	19.9	20.9
1	8	19.8	19.8	20.9
1	14	19.8	19.9	20.9
8	0	19.1	19.2	19.5
8	4	19.1	19.3	19.4
8	7	19.1	19.3	19.6
15	0	19.1	19.2	19.7

LTE Band 2		CONDUCTED POWER		
1.4MHz BW QPSK		18607	18900	19193
No. of RB	RB Offset	1850.7MHz	1880MHz	1909.3MHz
1	0	21.0	21.4	21.5
1	3	21.1	21.6	21.7
1	5	21.0	21.5	21.5
3	0	21.1	21.5	21.4
3	1	20.3	20.6	20.5
3	3	21.2	21.5	21.4
6	0	20.2	20.4	20.3
1.4MHz BW 16QAM		18607	18900	19193
No. of RB	RB Offset	1850.7MHz	1880MHz	1909.3MHz
1	0	20.3	20.1	20.9
1	3	20.4	20.2	21.0
1	5	20.3	19.9	20.9
3	0	19.8	20.5	20.4
3	1	20.0	20.6	20.4
3	3	19.7	20.6	20.3
6	0	19.0	19.6	19.7

LTE Band 7		CONDUCTED POWER		
20MHz BW QPSK		20850	21100	21350
No. of RB	RB Offset	2510MHz	2535MHz	2560MHz
1	0	21.5	21.5	21.6
1	50	21.3	21.4	21.6
1	99	21.1	21.3	21.5
50	0	20.5	20.4	20.6
50	25	20.4	20.4	20.5
50	50	20.2	20.4	20.3
100	0	20.2	20.4	20.5
20MHz BW 16QAM		20850	21100	21350
No. of RB	RB Offset	2510MHz	2535MHz	2560MHz
1	0	20.8	20.8	20.9
1	50	20.6	20.8	20.6
1	99	20.1	20.7	20.5
50	0	19.5	19.4	19.7
50	25	19.4	19.5	19.6
50	50	19.5	19.3	19.4
100	0	19.2	19.4	19.5

LTE Band 7		Conducted Power		
15MHz BW QPSK		20825	21100	21375
No. of RB	RB Offset	2507.5MHz	2535MHz	2562.5MHz
1	0	21.3	21.4	21.7
1	38	21.1	21.3	21.3
1	74	21.2	21.6	21.3
36	0	20.3	20.4	20.5
36	18	20.3	20.4	20.5
36	39	20.2	20.4	20.5
75	0	20.2	20.4	20.5
15MHz BW 16QAM		20825	21100	21375
No. of RB	RB Offset	2507.5MHz	2535MHz	2562.5MHz
1	0	20.3	20.7	20.9
1	36	20.2	20.3	20.5
1	74	20.2	20.5	20.6
36	0	19.3	19.5	19.5
36	18	19.2	19.4	19.5
36	37	19.1	19.4	19.3
75	0	19.1	19.3	19.5

LTE Band 7		Conducted Power		
10MHz BW QPSK		20800	21100	21400
No. of RB	RB Offset	2505MHz	2535MHz	2565MHz
1	0	21.0	21.4	21.6
1	25	21.4	21.5	21.4
1	49	21.2	21.5	21.4
25	0	20.3	20.5	20.5
25	13	20.4	20.5	20.5
25	25	20.3	20.5	20.4
50	0	20.3	20.5	20.5
10MHz BW 16QAM		20800	21100	21400
No. of RB	RB Offset	2505MHz	2535MHz	2565MHz
1	0	20.4	19.9	20.7
1	25	20.4	20.2	20.7
1	49	20.2	19.9	20.4
25	0	19.1	19.6	19.5
25	13	19.1	19.5	19.4
25	25	19.1	19.5	19.3
50	0	19.1	19.4	19.5

LTE Band 7		CONDUCTED POWER		
5MHz BW QPSK		20775	21100	21425
No. of RB	RB Offset	2502.5MHz	2535MHz	2567.5MHz
1	0	21.0	21.3	21.3
1	13	21.0	21.6	21.3
1	24	21.0	21.4	21.3
12	0	20.2	20.3	20.4
12	6	20.3	20.4	20.5
12	13	20.2	20.4	20.5
25	0	20.1	20.4	20.4
5MHz BW 16QAM		20775	21100	21425
No. of RB	RB Offset	2502.5MHz	2535MHz	2567.5MHz
1	0	20.1	20.5	20.1
1	13	20.1	20.2	19.6
1	24	20.1	20.5	19.7
12	0	19.1	19.2	19.3
12	6	19.3	19.2	19.5
12	13	19.2	19.3	19.5
25	0	19.2	19.4	19.4

Max. Power of Bluetooth: 7.5dBm, so the standalone SAR for BT is not required, because maximum average output power is less than the threshold (9.5mW).

11.4.2 SAR TEST RESULTS

SAR Values (LTE Band 2 / 20MHz)

Test Position	Channel/ Frequency (MHz)	RB Offset	Max. Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit SAR1g : 1.6W/kg			
					Drift(dB)	Measured SAR1g (W/kg)	Scaling Factor	Reort SAR1g (W/kg)	Figure No.
Test Position of Head(QPSK)									
Left/Cheek	19100/ 1900	1RB, 0%	22.0	21.9	0.04	0.191	1.02	0.195	Fig. 1
Left/Cheek	19100/ 1900	50RB, 0%	21.0	20.9	0.09	0.150	1.02	0.153	--
Left/Tilt	19100/ 1900	1RB, 0%	22.0	21.9	0.08	0.062	1.02	0.063	-
Left/Tilt	19100/ 1900	50RB, 0%	21.0	20.9	0.01	0.067	1.02	0.068	-
Right/Cheek	19100/ 1900	1RB, 0%	22.0	21.9	0.03	0.149	1.02	0.152	-
Right/Cheek	19100/ 1900	50RB, 0%	21.0	20.9	0.01	0.121	1.02	0.123	-
Right/Tilt	19100/ 1900	1RB, 0%	22.0	21.9	0.08	0.062	1.02	0.063	-
Right/Tilt	19100/ 1900	50RB, 0%	21.0	20.9	0.08	0.045	1.02	0.046	-
Note: 1.The value with blue color is the maximum SAR Value of each test band.									

Test Position	Channel/ Frequency (MHz)	RB Offset	Max. Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit SAR1g : 1.6W/kg			
					Drift(dB)	Measured SAR1g (W/kg)	Scaling Factor	Reort SAR1g (W/kg)	Figure No.
Test Position of Hotspot(QPSK, Distance 10mm)									
Ground Side	19100/ 1900	1RB, 0%	22.0	21.9	0.03	0.855	1.02	0.872	Fig. 2
Phantom Side	19100/ 1900	1RB, 0%	22.0	21.9	-0.02	0.313	1.02	0.319	-
Left Edge	19100/ 1900	1RB, 0%	22.0	21.9	-0.05	0.174	1.02	0.177	-
Right Edge	19100/ 1900	1RB, 0%	22.0	21.9	-0.02	0.123	1.02	0.125	-
Bottom Edge	19100/ 1900	1RB, 0%	22.0	21.9	0.08	0.285	1.02	0.290	-
Top Edge	19100/ 1900	1RB, 0%	NA	NA	NA	NA	NA	NA	-
Ground Side	19100/ 1900	50RB, 0%	21.0	20.9	-0.02	0.644	1.02	0.657	-
Phantom Side	19100/ 1900	50RB, 0%	21.0	20.9	0.00	0.223	1.02	0.227	--
Left Edge	19100/ 1900	50RB, 0%	21.0	20.9	0.06	0.130	1.02	0.133	-
Right Edge	19100/ 1900	50RB, 0%	21.0	20.9	-0.07	0.096	1.02	0.098	-
Bottom Edge	19100/ 1900	50RB, 0%	21.0	20.9	-0.02	0.220	1.02	0.284	-
Top Edge	19100/ 1900	50RB, 0%	NA	NA	NA	NA	NA	NA	-

Ground Side	19100/ 1900	100RB, 0%	21.0	20.9	0.04	0.567	1.02	0.578	-
Ground Side	18700/ 1860	1RB, 0%	22.0	21.4	0.02	0.561	1.15	0.645	-
Ground Side	18700/ 1860	50RB, 0%	21.0	20.3	0.06	0.444	1.17	0.519	-
Ground Side	18900/ 1880	1RB, 0%	22.0	21.4	0.02	0.676	1.15	0.777	-
Ground Side	18900/ 1880	50RB, 0%	21.0	20.4	0.05	0.497	1.15	0.572	-
Worst Case Position of Body for 1st Repeated SAR(QPSK)									
Ground Side	19100/ 1900	1RB, 0%	22.0	21.9	-0.14	0.845	1.02	0.862	-
Note: 1.The value with blue color is the maximum SAR Value of each test band.									

SAR Measurement Variability Results(LTE Band 2)

Test Position	Channel/Frequency	RB Offset	Measured SAR(1g)	1st Repeated SAR(1g)	Ratio	2nd Repeated SAR(1g)	3rd Repeated SAR(1g)
Ground Side	19100/1900	1RB, 0%	0.855	0.845	1.01	NA	NA

Note:1) When the original highest measured SAR is ≥ 0.80W/kg, the measurement is reprated once.

2) A second repeated measurement is preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg.

3) A third repeated measurement is performed only if the original, first or second repeated measurements is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is >1.20.

4) Repeated measurements are not required when the original highest measured SAR is <0.80W/kg.

SAR Values (LTE Band 7 / 20MHz)

Test Position	Channel/ Frequency (MHz)	RB Offset	Max. Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit SAR1g : 1.6W/kg			
					Drift(dB)	Measured SAR1g (W/kg)	Scaling Factor	Reort SAR1g (W/kg)	Figure No.
Test Position of Head(QPSK)									
Left/Cheek	21350/ 2560	1RB, 0%	22.0	21.6	0.02	0.037	1.10	0.041	-
Left/Cheek	21350/ 2560	50RB, 0%	21.0	20.6	0.04	0.030	1.10	0.033	-
Left/Tilt	21350/ 2560	1RB, 0%	22.0	21.6	-0.03	0.035	1.10	0.039	-
Left/Tilt	21350/ 2560	50RB, 0%	21.0	20.6	0.04	0.026	1.10	0.029	-
Right/Cheek	21350/ 2560	1RB, 0%	22.0	21.6	0.06	0.069	1.10	0.076	Fig. 3
Right/Cheek	21350/ 2560	50RB, 0%	21.0	20.6	0.03	0.055	1.10	0.061	-
Right/Tilt	21350/ 2560	1RB, 0%	22.0	21.6	0.01	0.025	1.10	0.028	-
Right/Tilt	21350/ 2560	50RB, 0%	21.0	20.6	0.06	0.021	1.10	0.023	-
Note: 1.The value with blue color is the maximum SAR Value of each test band.									

Test Position	Channel/ Frequency (MHz)	RB Offset	Max. Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit SAR1g : 1.6W/kg			
					Drift(dB)	Measured SAR1g (W/kg)	Scaling Factor	Reort SAR1g (W/kg)	Figure No.
Test Position of Hotspot(QPSK, Distance 10mm)									
Phantom Side	21350/ 2560	1RB, 0%	22.0	21.6	0.04	0.178	1.10	0.196	-
Phantom Side	21350/ 2560	50RB, 0%	21.0	20.6	-0.02	0.142	1.10	0.156	-
Left Edge	21350/ 2560	1RB, 0%	22.0	21.6	0.05	0.055	1.10	0.061	-
Left Edge	21350/ 2560	50RB, 0%	21.0	20.6	-0.03	0.041	1.10	0.045	-
Right Edge	21350/ 2560	1RB, 0%	22.0	21.6	0.05	0.020	1.10	0.022	-
Right Edge	21350/ 2560	50RB, 0%	21.0	20.6	0.02	0.016	1.10	0.018	-
Bottom Edge	21350/ 2560	1RB, 0%	22.0	21.6	0.04	0.538	1.10	0.592	-
Bottom Edge	21350/ 2560	50RB, 0%	21.0	20.6	-0.04	0.395	1.10	0.435	-
Top Edge	21350/ 2560	1RB, 0%	NA	NA	NA	NA	NA	NA	-
Top Edge	21350/ 2560	50RB, 0%	NA	NA	NA	NA	NA	NA	-
Ground Side	21350/ 2560	1RB, 0%	22.0	21.6	0.08	1.160	1.10	1.276	-
Ground Side	21350/ 2560	50RB, 0%	21.0	20.6	0.02	0.828	1.10	0.911	-
Ground Side	21350/ 2560	100RB, 0%	21.0	20.5	0.05	0.795	1.12	0.890	-
Ground Side	21100/ 2535	1RB, 0%	22.0	21.5	-0.01	1.260	1.12	1.411	-
Ground Side	21100/ 2535	50RB, 0%	21.0	20.4	0.03	0.932	1.15	1.072	-
Ground Side	20850/ 2510	1RB, 0%	22.0	21.5	0.70	1.320	1.12	**1.482**	Fig. 4
Ground Side	20850/ 2510	1RB, 50%	22.0	21.3	-0.04	1.200	1.14	1.368	-
Ground Side	20850/ 2510	1RB, 100%	22.0	21.1	-0.04	1.140	1.23	1.402	-
Ground Side	20850/ 2510	50RB, 0%	21.0	20.5	0.02	1.050	1.12	1.176	-
Position of Body for 1st Repeated SAR(QPSK)									
Ground Side	21350/ 2560	1RB, 0%	22.0	21.6	0.06	1.240	1.10	1.364	-
Ground Side	21350/ 2560	50RB, 0%	21.0	20.6	-0.15	0.879	1.10	0.967	-
Ground Side	21350/ 2560	100RB, 0%	21.0	20.5	0.05	0.830	1.12	0.930	-
Ground Side	21100/ 2535	1RB, 0%	22.0	21.5	0.05	1.130	1.12	1.266	-
Ground Side	21100/ 2535	50RB, 0%	21.0	20.4	0.01	1.030	1.15	1.185	-
Ground Side	20850/	1RB,	22.0	21.5	-0.08	1.320	1.12	1.478	-

	2510	0%							
Ground Side	20850/ 2510	1RB, 50%	22.0	21.3	-0.03	1.200	1.14	1.368	-
Ground Side	20850/ 2510	1RB, 100%	22.0	21.1	0.09	1.150	1.23	1.415	-
Ground Side	20850/ 2510	50RB, 0%	21.0	20.5	0.01	1.000	1.12	1.120	-
Note: 1.The value with blue color is the maximum SAR Value of each test band.									

SAR Values (LTE Band 7 / 15MHz)

Test Position	Channel/ Frequency (MHz)	RB Offset	Max. Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit SAR_{1g} : 1.6W/kg			
					Drift(dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reort SAR_{1g} (W/kg)	Figure No.
Test Position of Hotspot(QPSK, Distance 10mm)									
Ground Side	20850/ 2510	1RB, 0%	22.0	21.5	-0.14	1.300	1.12	**1.456**	Fig. 5
Position of Body for 1st Repeated SAR(QPSK)									
Ground Side	20850/ 2510	1RB, 0%	22.0	21.5	-0.13	1.300	1.12	**1.456**	-
Note: 1.The value with blue color is the maximum SAR Value of each test band.									

SAR Values (LTE Band 7 / 10MHz)

Test Position	Channel/ Frequency (MHz)	RB Offset	Max. Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit SAR_{1g} : 1.6W/kg			
					Drift(dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reort SAR_{1g} (W/kg)	Figure No.
Test Position of Hotspot(QPSK, Distance 10mm)									
Ground Side	20850/ 2510	1RB, 0%	22.0	21.5	0.15	1.210	1.12	**1.355**	Fig. 6
Position of Body for 1st Repeated SAR(QPSK)									
Ground Side	20850/ 2510	1RB, 0%	22.0	21.5	0.14	1.180	1.12	1.321	-
Note: 1.The value with blue color is the maximum SAR Value of each test band.									

SAR Values (LTE Band 7 / 5MHz)

Test Position	Channel/ Frequency (MHz)	RB Offset	Max. Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit SAR_{1g} : 1.6W/kg			
					Drift(dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reort SAR_{1g} (W/kg)	Figure No.
Test Position of Hotspot(QPSK, Distance 10mm)									
Ground Side	20850/ 2510	1RB, 0%	22.0	21.5	0.12	1.100	1.12	**1.232**	Fig. 7
Position of Body for 1st Repeated SAR(QPSK)									
Ground Side	20850/ 2510	1RB, 0%	22.0	21.5	0.14	1.060	1.12	1.187	-
Note: 1.The value with blue color is the maximum SAR Value of each test band.									

SAR Values (LTE Band 7 / 20MHz:16QAM)

Test Position	Channel/ Frequency (MHz)	RB Offset	Max. Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit SAR1g : 1.6W/kg			
					Drift(dB)	Measured SAR1g (W/kg)	Scaling Factor	Reort SAR1g (W/kg)	Figure No.
Test Position of Hotspot(16QAM, Distance 10mm)									
Ground Side	20850/ 2510	1RB, 0%	22.0	21.5	0.03	1.100	1.12	1.232	Fig. 8
Position of Body for 1st Repeated SAR(16QAM)									
Ground Side	20850/ 2510	1RB, 0%	22.0	21.5	0.01	1.100	1.12	1.232	-
Note: 1.The value with blue color is the maximum SAR Value of each test band.									

SAR Measurement Variability Results(LTE Band 7)

Test Position	Channel/Frequency	RB Offset	Measured SAR(1g)	1st Repeated SAR(1g)	Ratio	2nd Repeated SAR(1g)	3rd Repeated SAR(1g)
20MHz, QPSK							
Ground Side	21350/2560	1RB,0%	1.160	1.240	1.07	NA	NA
Ground Side	21350/2560	50RB,0%	0.828	0.879	1.06	NA	NA
Ground Side	21350/2560	100RB,0%	0.795	0.830	1.04	NA	NA
Ground Side	21100/2535	1RB,0%	1.260	1.130	1.12	NA	NA
Ground Side	21100/2535	50RB,0%	0.932	1.030	1.10	NA	NA
Ground Side	20850/2510	1RB,0%	1.320	1.320	1.00	NA	NA
Ground Side	20850/2510	1RB,50%	1.200	1.200	1.00	NA	NA
Ground Side	20850/2510	1RB,100%	1.140	1.150	1.01	NA	NA
Ground Side	20850/2510	50RB,0%	1.050	1.000	1.05	NA	NA
15MHz, QPSK							
Ground Side	20850/2510	1RB,0%	1.300	1.300	1.00	NA	NA
10MHz, QPSK							
Ground Side	20850/2510	1RB,0%	1.210	1.180	1.03	NA	NA
5MHz, QPSK							
Ground Side	20850/2510	1RB,0%	1.100	1.060	1.04	NA	NA
20MHz, 16QAM							
Ground Side	20850/2510	1RB,0%	1.100	1.100	1.00	NA	NA

Note:1) When the original highest measured SAR is ≥ 0.80W/kg, the measurement is reprated once.
2) A second repeated measurement is preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg.
3) A third repeated measurement is performed only if the original, first or second repeated measurements is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is >1.20.
4) Repeated measurements are not required when the original highest measured SAR is <0.80W/kg.

11.4.3 MAXIMUM GRAPH RESULTS

The graph results see ANNEX C.

11.4.4 Simultaneous Transmission Conditions

When standalone SAR is not required to be measured per FCC KDB 447498 D01 v05r02 4.3.1, the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter.

Estimated SAR=(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)∗($\sqrt{\text{Frequency (GHz)}}$ /7.5)

Per FCC KDB 447498 D01v05 r02 4.3.2, simultaneous transmission SAR test exclusion can be applied when the sum of 1-g or 10-g SAR of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit. When the sum is greater than the SAR limit, SAR test exclusion is determined by the SAR to peak location separation ratio.

Ration= $(SAR_1 + SAR_2)^{1.5}/R_i$ **≤ 0.04**

Simultaneous Transmission Configurations	Head	Body	Note
LTE BAND 2/7+ 2.4GHz Wlan	Yes	Yes	N/A
LTE BAND 2/7+ 2.4GHz Bluetooth	Yes	Yes	N/A

Note: Wlan2.4G and Bluetooth share the same antenna, So the Simultaneous SAR are not required for BT and wifi antenna.

SAR head value of BT is 0.236W/Kg. SAR body value of BT is 0.118W/Kg.

Simultaneous Transmission SAR (1g)							
Test	Position		LTE Band 2	LTE Band 7	WiFi Note2	BT Note2	SUM
Head	Left	Cheek	**0.195**	0.041	0.088	**0.234**	**0.429**
		Tilt 15°	**0.068**	0.039	0.057	**0.234**	**0.302**
	Right	Cheek	**0.152**	0.076	0.053	**0.234**	**0.386**
		Tilt 15°	**0.063**	0.028	0.054	**0.234**	**0.297**
Body (Hotspot /Body Worn)	Phantom Side		**0.319**	0.196	0.015	**0.117**	**0.436**
	Ground Side		0.872	**1.482**	0.021	**0.117**	**1.599**
	Left Side		**0.177**	0.061	0.010	**0.117**	**0.294**
	Right Side		**0.125**	0.022	0.010	**0.117**	**0.242**
	Bottom Side		0.290	**0.592**	0.000	**0.117**	**0.709**
	Top Side		N/A	N/A	0.017	**0.117**	N/A

For the SUM of Body (Ground side) is 1.599 near the limit. The SAR to peak location separation ratio is calculated as:

Ration= $(SAR_1 + SAR_2)^{1.5}/R_i$ **=** $(1.482+0.117)^{1.5}/106.19 = 0.019$ **≤ 0.04**

where Ri is the separation distance between the two antennas.

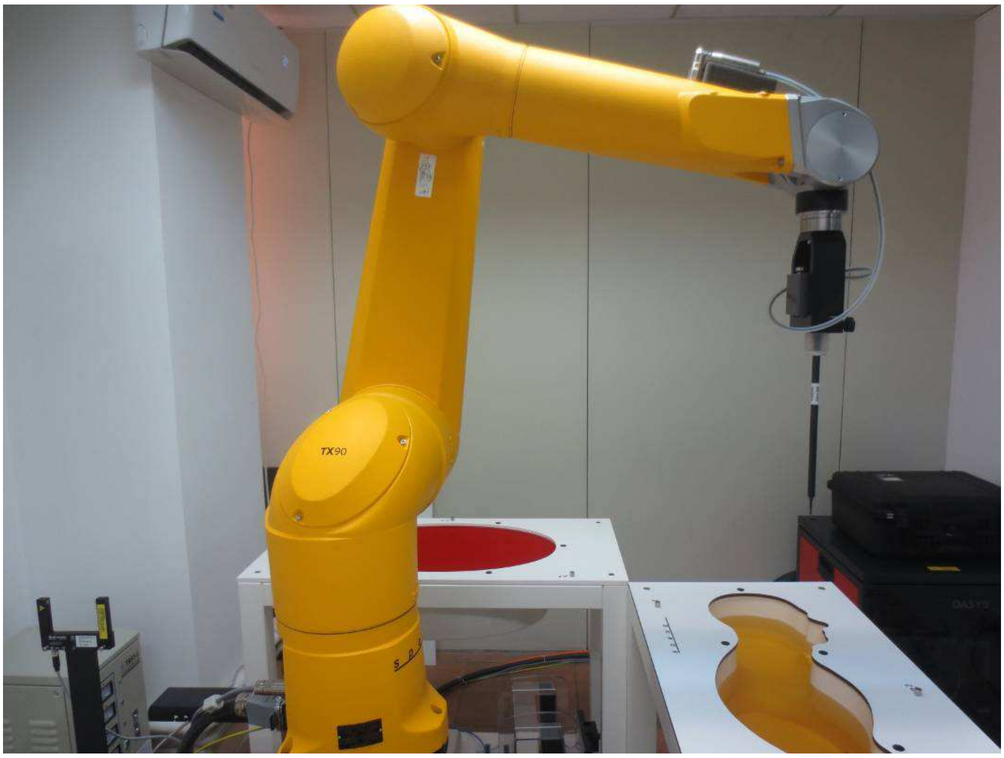
12 MEASUREMENT UNCERTAINTY

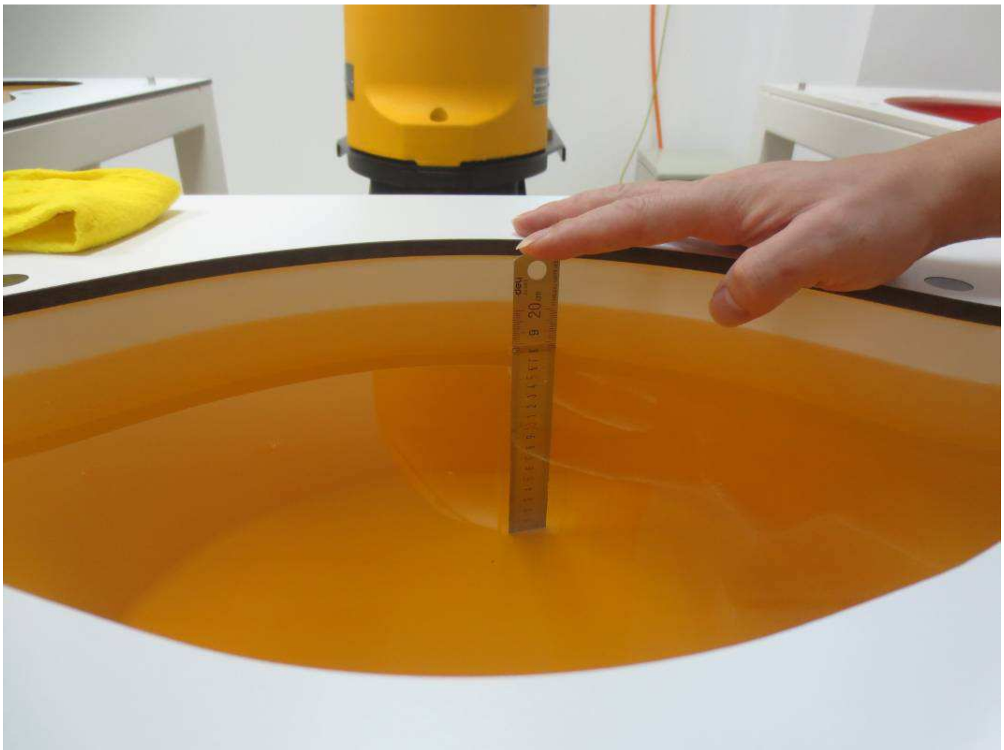
When the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval.

13 MAIN TEST INSTRUMENT

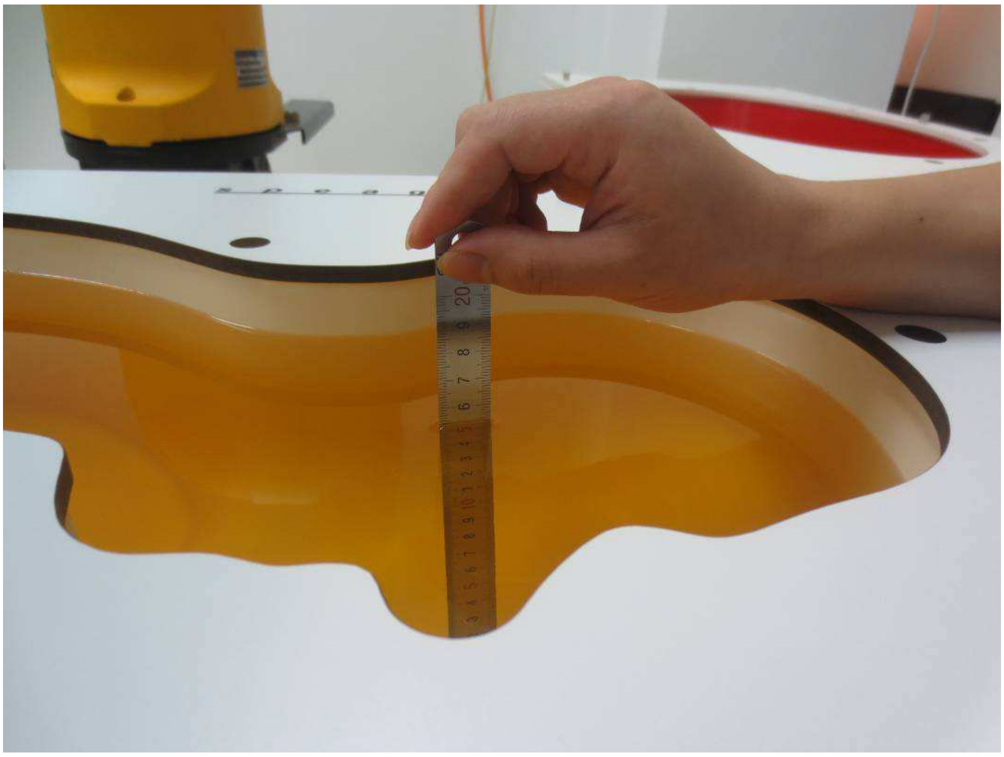
	Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☒	SZ060-01	SAR Test System	SPEAG	DASY52 SAR TX90XL	F14/5YJ0B1/ A/01	6/10/2015	1 year
☒	SZ060-01-01	E-Field Probe	SPEAG	EX3DV4	7322	6/10/2015	1 year
☒	SZ060-01-07	System Validation Dipole	SPEAG	D1900V2	5d203	6/9/2015	2 year
☒	SZ060-01-11	System Validation Dipole	SPEAG	D2600V2	1108	6/10/2015	2 year
☒	SZ060-01-13	Data Acquisition Unit	SPEAG	DAE4	1473	6/2/2015	1 year
☒	SZ060-01-14	Dielectric Assessment Kit	SPEAG	DAKS 3.5	1056	6/2/2015	1 year
☒	SZ060-01-15	Vector Reflectometer	Copper Mountain Technologies	Planar R140	0090614	N/A	N/A
☒	SZ060-01-16	Thermometer	LKM electronics GmbH	DTM3000	3477	8/10/2015	1 year
☒	SZ060-01-17	Power Amplifier	Mini Circuits	ZHL-42W+	QA1449003	7/28/2015	1 year
☒	SZ060-01-18	Power Amplifier	Mini Circuits	ZVE-8G+	111701437	7/28/2015	1 year
☒	SZ060-01-19	SAM Twin Phantom	SPEAG	SAM Twin Phantom V5.0	1888	N/A	N/A
☒	SZ060-01-20	SAM Twin Phantom	SPEAG	SAM Twin Phantom V5.0	1891	N/A	N/A
☒	SZ060-01-21	ELI Phantom	SPEAG	ELI Phantom V6.0	2033	N/A	N/A
☒	SZ180-13	MXG Vector Signal Generator	Keysight	N5182B	MY53051328	11/1/2014	1 year
☒	SZ070-04	Directional Bridge	Agilent	86205A	MY31402141	12/30/2014	1 year
☒	SZ182-02	RF Power Meter	Anritsu	ML2496A	1302005	5/20/2015	1 year
☒	SZ182-03	Average power sensor	R&S	NRP-Z22	101689	7/16/2015	1 year
☒	SZ065-06	Wideband Radio Communication Tester	R&S	CMW500	154161	7/12/2015	1 year
☒	SZ070-01	Attenuator	Huber Suhner	10dB	N/A	6/27/2015	1 year
☒	SZ070-02	Attenuator	Huber Suhner	30dB	N/A	6/27/2015	1 year
☒	N/A	Device Holder	SPEAG	N/A	N/A	N/A	N/A
☒	SZ060-01-22	SAR Test System Software	SPEAG	DASY5.2 SW: 52.8.8.1222	N/A	7/28/2015	1/28/2016

ANNEX A: Test Layout

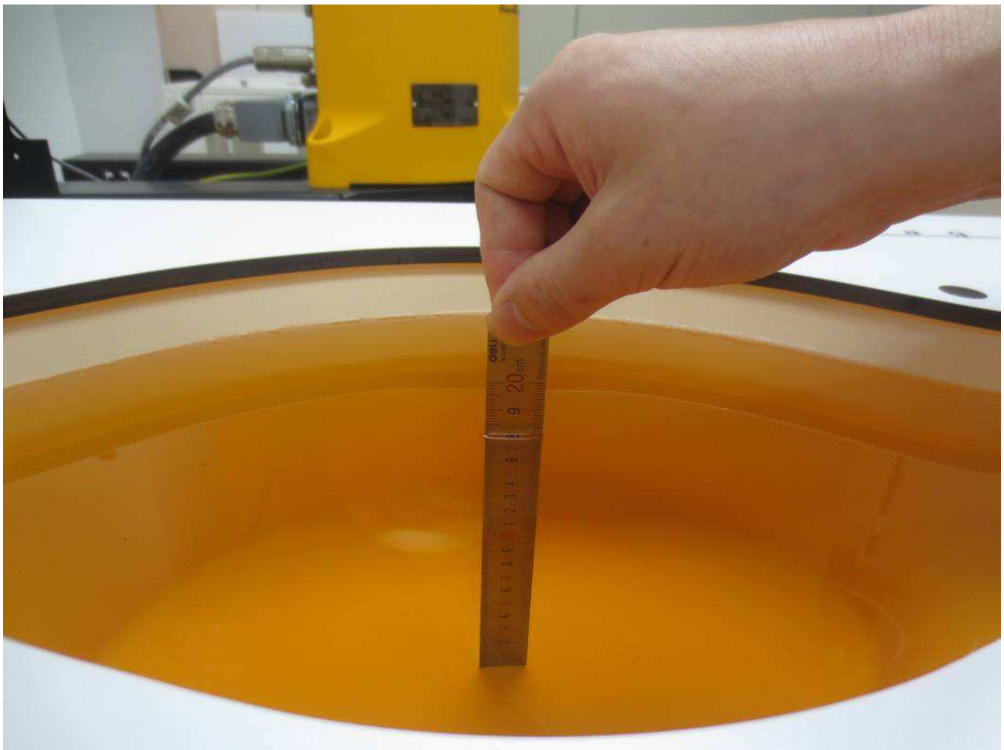




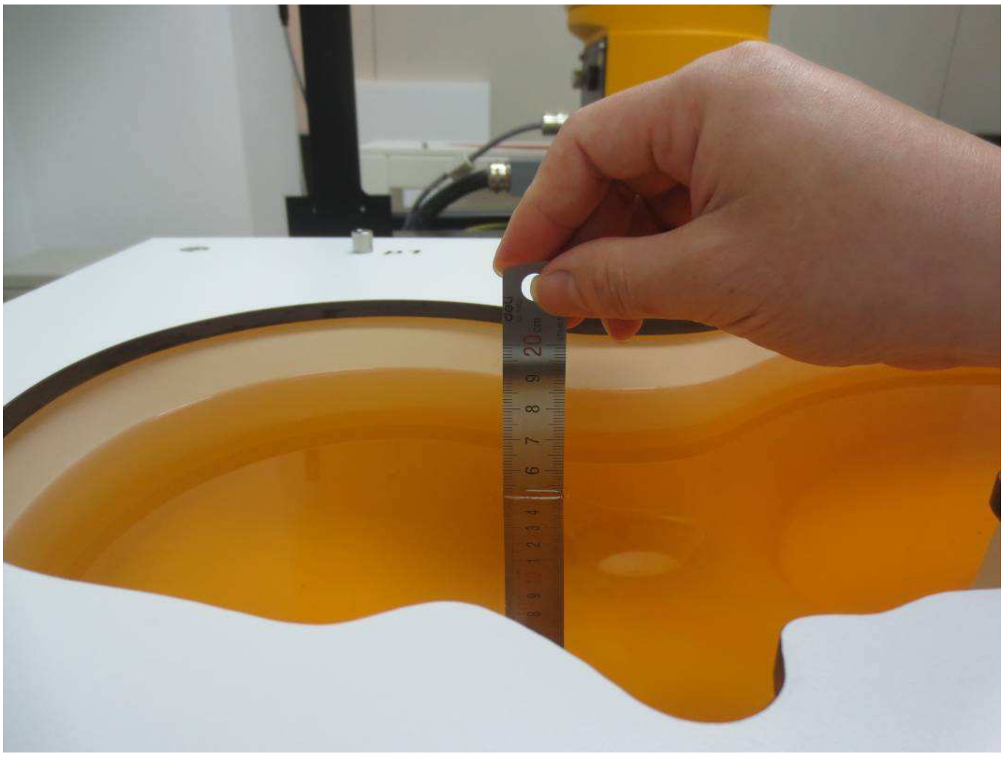
Liquid Depth in the flat phantom (1900MHz, 18.3cm depth)



Liquid Depth in the head phantom (1900MHz, 15.4cm depth)



Liquid Depth in the flat phantom (2600MHz, 18.2cm depth)



Liquid Depth in the head phantom (2600MHz, 15.3cm depth)

ANNEX B System Check Results

System Performance Check at 1900MHz Head TSL

DUT: Dipole 1900MHz; Type: D1900V2; Serial: 5d203
Date: 9/9/2015

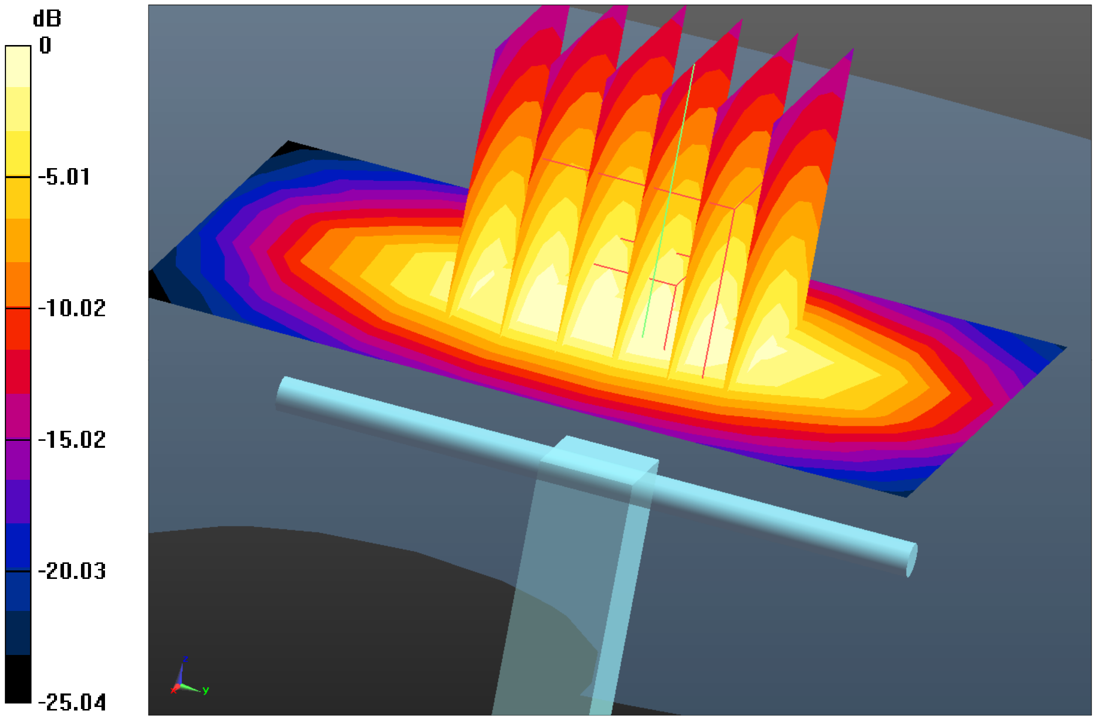
Communication System: UID 0, CW (0);   Frequency: 1900 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1900 MHz; σ = 1.369 S/m; ε_r = 41.15; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 – SN7322; ConvF(7.76, 7.76, 7.76); Calibrated: 6/10/2015;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/2/2015
- Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1888
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/d=10mm, Pin=250 mW, dist=10.0mm (EX-Probe)/Zoom Scan (6x6x7)/Cube 0:
Measurement grid: dx=6mm, dy=6mm, dz=5mm
Reference Value = 94.03 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 17.7 W/kg
SAR(1 g) = 9.68 W/kg; SAR(10 g) = 5.09 W/kg
Maximum value of SAR (measured) = 11.5 W/kg

Configuration/d=10mm, Pin=250 mW, dist=10.0mm (EX-Probe)/Area Scan (6x8x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 10.1 W/kg



0 dB = 10.1 W/kg = 10.04 dBW/kg

System Performance Check at 1900MHz Body TSL

DUT: Dipole 1900MHz; Type: D1900V2; Serial: 5d203
Date: 9/9/2015

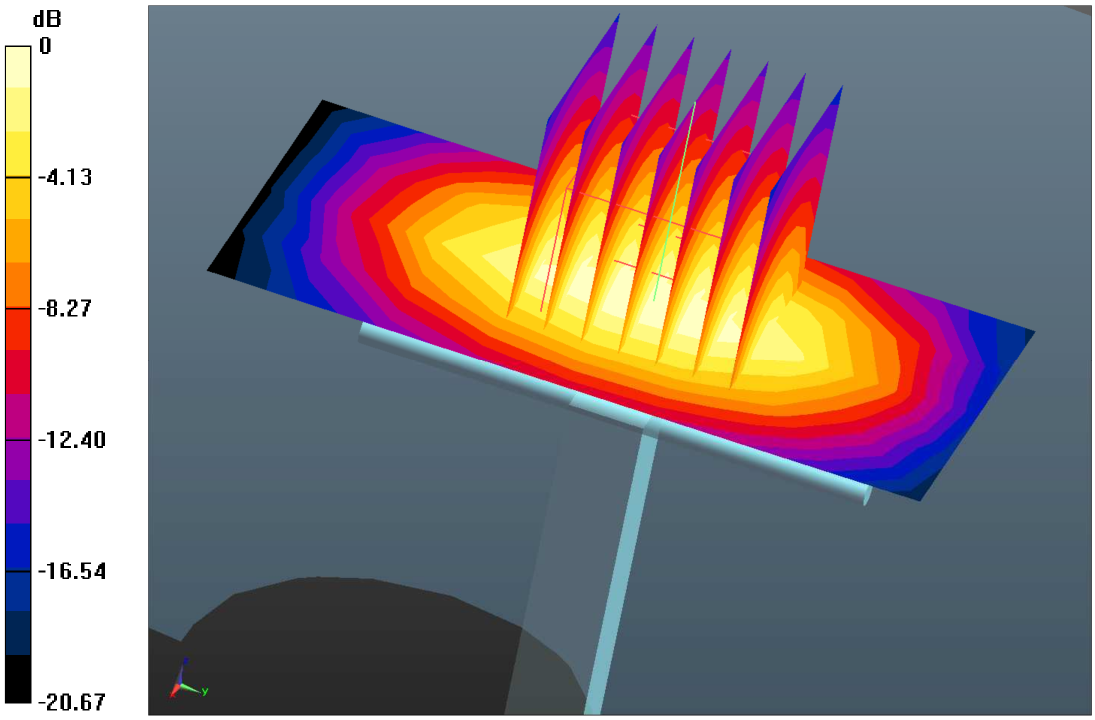
Communication System: UID 0, CW (0); Frequency: 1900 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1900 MHz; σ = 1.57 S/m; εr = 51.05; ρ = 1000 kg/m3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 – SN7322; ConvF(7.49, 7.49, 7.49); Calibrated: 6/10/2015;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/2/2015
- Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1888
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/d=10mm, Pin=250 mW, dist=3.0mm (EX-Probe)/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.65 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 18.3 W/kg
SAR(1 g) = 10.3 W/kg; SAR(10 g) = 5.48 W/kg
Maximum value of SAR (measured) = 13.0 W/kg

Configuration/d=10mm, Pin=250 mW, dist=3.0mm (EX-Probe)/Area Scan (5x9x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 12.5 W/kg



0 dB = 12.5 W/kg = 10.97 dBW/kg

System Performance Check at 2600MHz Head TSL

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1108

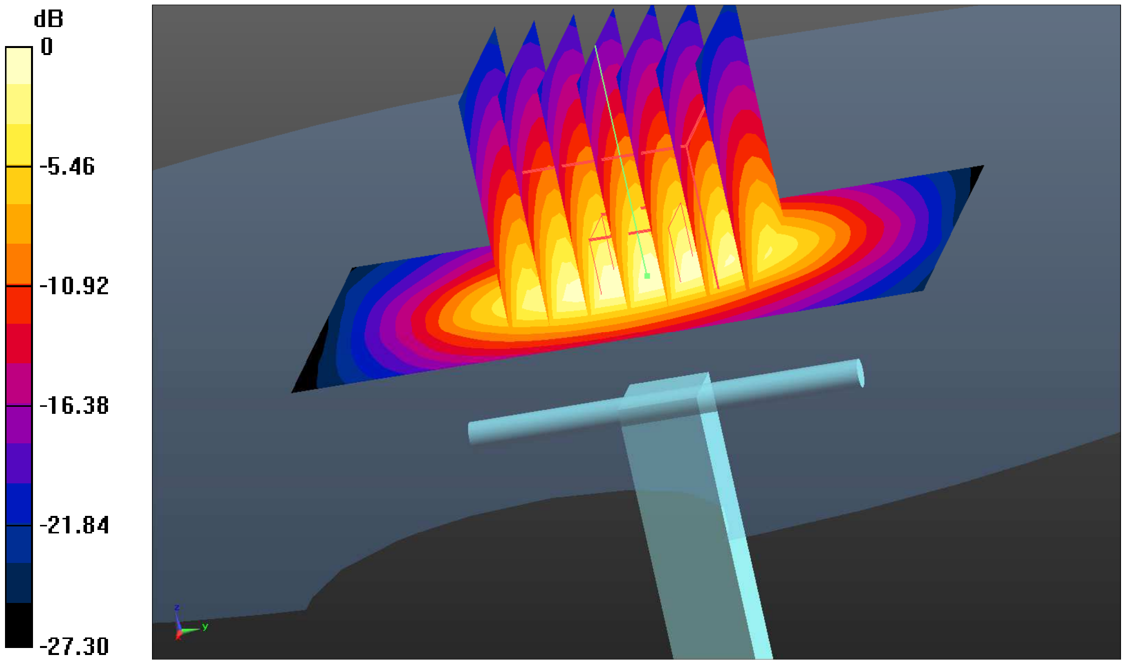
Date: 9/9/2015

Communication System: UID 0, CW (0); Communication System Band: D2600 (2600.0 MHz); Frequency: 2600 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2600 MHz; σ = 2.023 S/m; ε_r = 38.491; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY Configuration:

- Probe: EX3DV4 – SN7322; ConvF(6.73, 6.73, 6.73); Calibrated: 6/10/2015;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 31.0
- Electronics: DAE4 Sn1473; Calibrated: 6/2/2015
- Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1888
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/250mW System check 2600MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.77 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 30.2 W/kg
SAR(1 g) = 13.9 W/kg; SAR(10 g) = 6.21 W/kg
Maximum value of SAR (measured) = 18.6 W/kg

Configuration/250mW System check 2600MHz/Area Scan (51x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 96.77 V/m; Power Drift = -0.02 dB
Fast SAR: SAR(1 g) = 14.3 W/kg; SAR(10 g) = 6.43 W/kg
Maximum value of SAR (interpolated) = 19.2 W/kg



0 dB = 19.2 W/kg = 12.83 dBW/kg

System Performance Check at 2600MHz Body TSL

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1108

Date: 9/9/2015

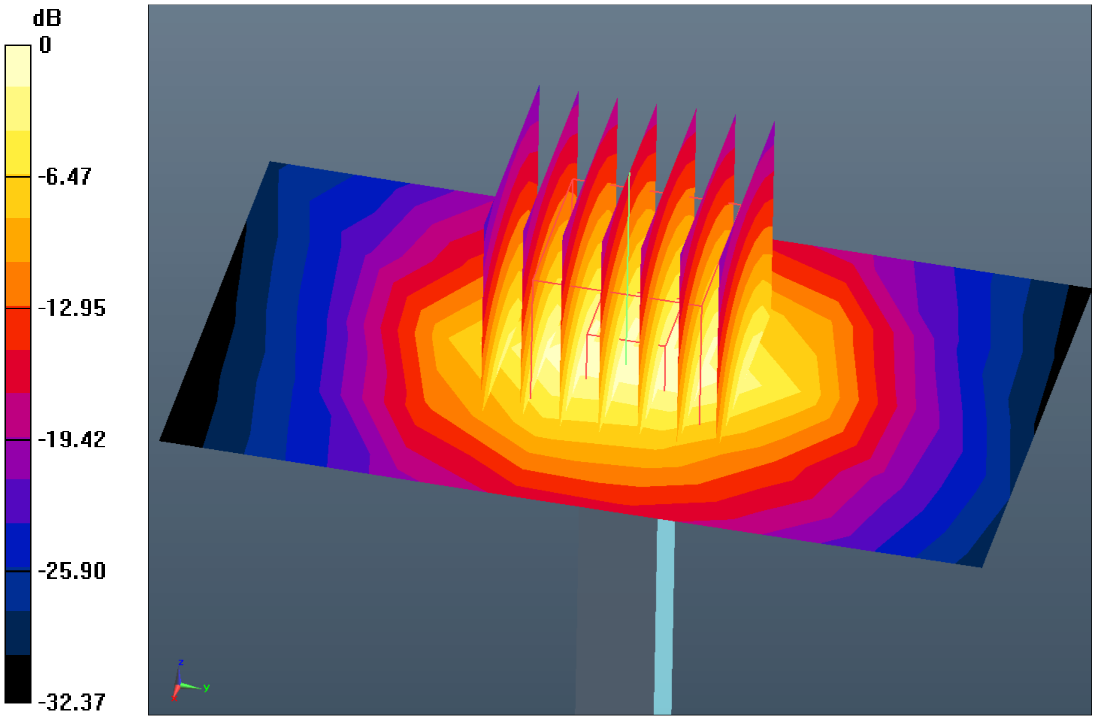
Communication System: UID 0, CW (0);   Frequency: 2600 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2600 MHz; σ = 2.186 S/m; ε_r = 50.765; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 – SN7322; ConvF(6.91, 6.91, 6.91); Calibrated: 6/10/2015;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/2/2015
- Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1888
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/d=10mm, Pin=250 mW, dist=3.0mm (EX-Probe)/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 90.63 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 29.4 W/kg
SAR(1 g) = 13.9 W/kg; SAR(10 g) = 6.2 W/kg
Maximum value of SAR (measured) = 18.4 W/kg

Configuration/d=10mm, Pin=250 mW, dist=3.0mm (EX-Probe)/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 15.5 W/kg



0 dB = 15.5 W/kg = 11.90 dBW/kg

ANNEX C: MAXIMUM GRAPH RESULTS

LTE Band 2, 20MHz, 1RB, Left cheek, High, QPSK
Date: 9/9/2015

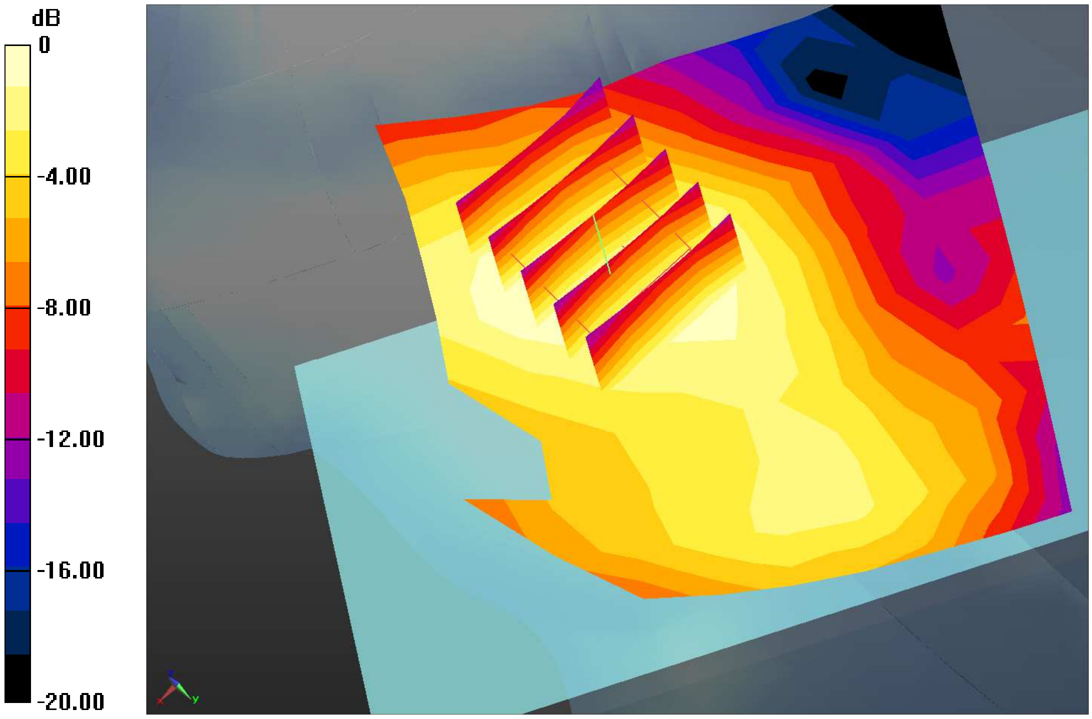
Communication System: UID 0, Generic LTE (0); Frequency: 1900 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1900 MHz; σ = 1.45 S/m; ε_r = 39.75; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(7.76, 7.76, 7.76); Calibrated: 6/10/2015;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/2/2015
- Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1891
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/LTE Band 2 High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.222 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.292 W/kg
SAR(1 g) = 0.191 W/kg; SAR(10 g) = 0.121 W/kg
Maximum value of SAR (measured) = 0.229 W/kg

Configuration/LTE Band 2 High/Area Scan (9x9x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.208 W/kg



0 dB = 0.208 W/kg = -6.82 dBW/kg

Fig. 1 - LTE Band 2, 20MHz, 1RB, Left cheek, High,

LTE Band 2, 20MHz, 1RB, Ground Side , High, QPSK
Date: 9/9/2015

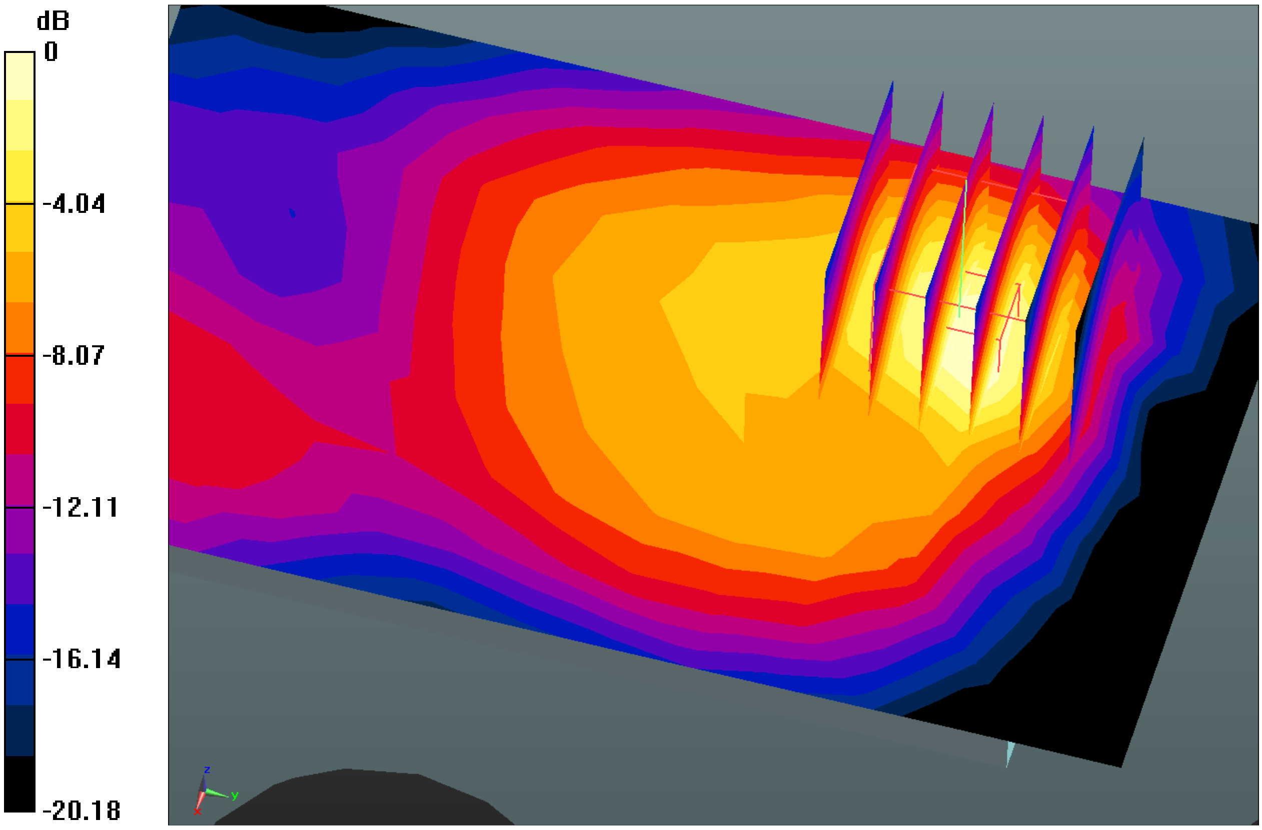
Communication System: UID 0, Generic LTE (0);   Frequency: 1900 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1900 MHz; σ = 1.57 S/m; ε_r = 51.05; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(7.49, 7.49, 7.49); Calibrated: 6/10/2015;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/2/2015
- Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1888
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/LTE Band 2 High/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=7mm, dy=7mm, dz=5mm
Reference Value = 11.97 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.55 W/kg
SAR(1 g) = 0.855 W/kg; SAR(10 g) = 0.432 W/kg
Maximum value of SAR (measured) = 0.999 W/kg

Configuration/LTE Band 2 High/Area Scan (9x14x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.984 W/kg



0 dB = 0.984 W/kg = -0.07 dBW/kg

Fig. 2 - LTE Band 2, 20MHz, 1RB, Ground Side , High

LTE Band 7, 20MHz, 1RB, Right cheek, High, QPSK
Date: 9/9/2015

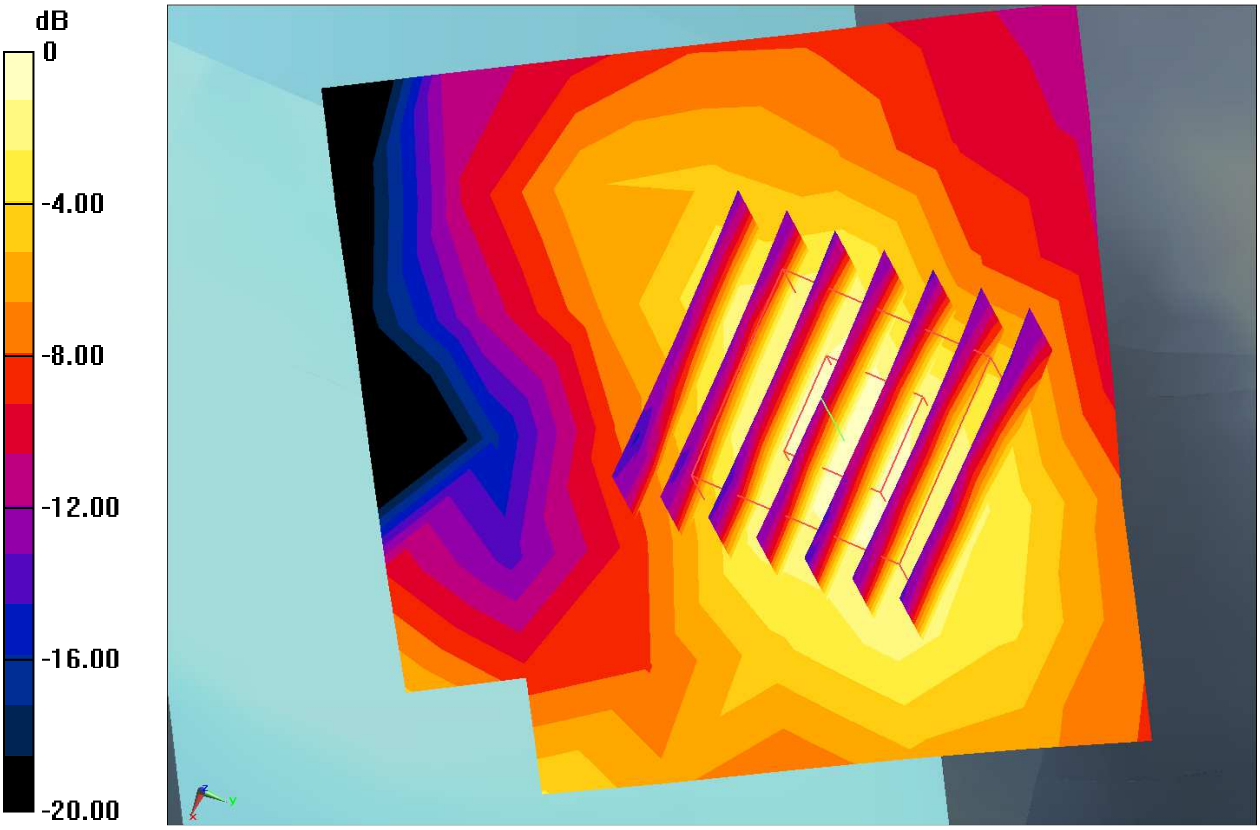
Communication System: UID 0, Generic LTE (0); Frequency: 2560 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2560 MHz; σ = 1.967 S/m; ε_r = 38.749; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(6.73, 6.73, 6.73); Calibrated: 6/10/2015;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/2/2015
- Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1891
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/LTE Band 7 High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.121 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.132 W/kg
SAR(1 g) = 0.069 W/kg; SAR(10 g) = 0.036 W/kg
Maximum value of SAR (measured) = 0.0857 W/kg

Configuration/LTE Band 7 High/Area Scan (7x7x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.0830 W/kg



0 dB = 0.0830 W/kg = -10.81 dBW/kg

Fig. 3- LTE Band 7, 20MHz, 1RB, Right cheek, High

LTE Band 7, 20MHz, 1RB, Ground Side , Low, QPSK
Date: 9/10/2015

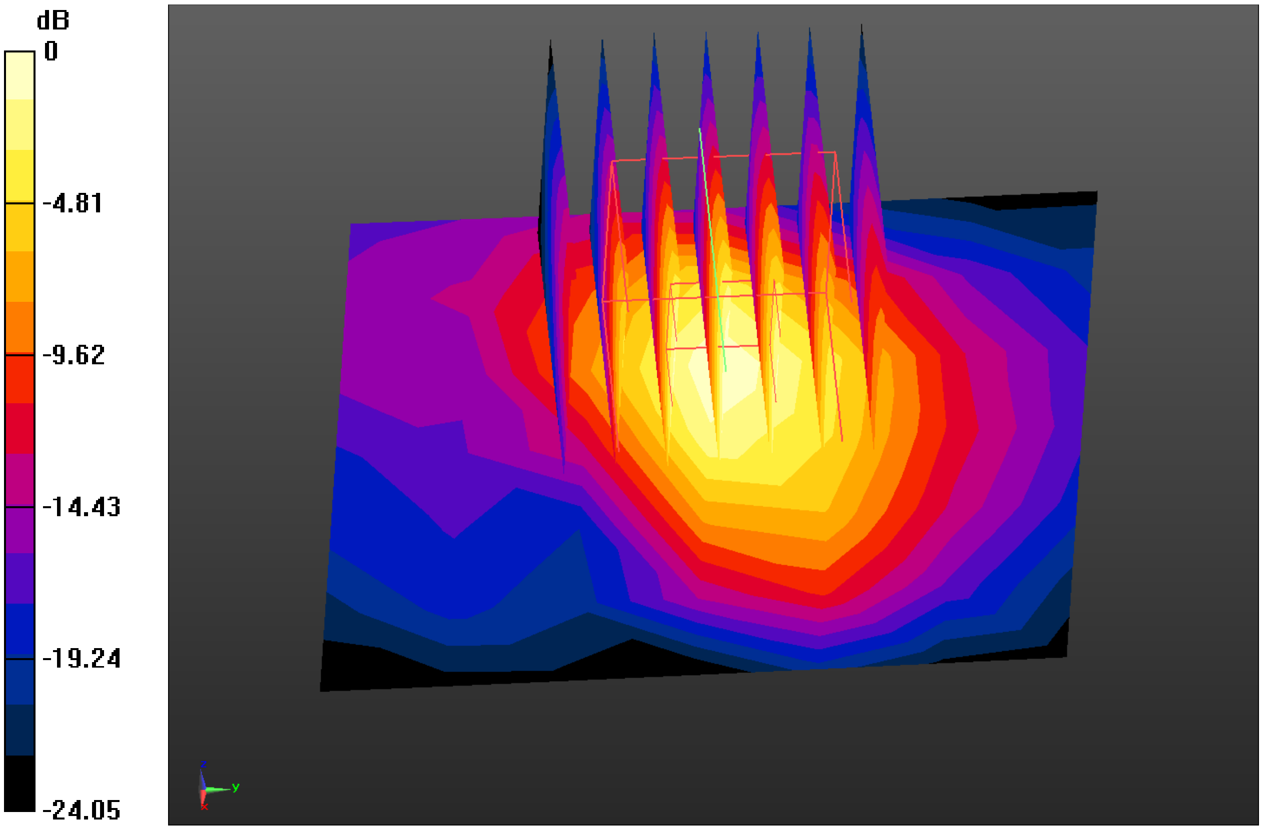
Communication System: UID 0, Generic LTE (0);   Frequency: 2510 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2510 MHz; σ = 2.045 S/m; ε_r = 50.876; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(6.91, 6.91, 6.91); Calibrated: 6/10/2015;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/2/2015
- Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1891
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/LTE Band 7 Low/Area Scan (7x7x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 1.83 W/kg

Configuration/LTE Band 7 Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.863 V/m; Power Drift = 0.70 dB
Peak SAR (extrapolated) = 2.72 W/kg
SAR(1 g) = 1.32 W/kg; SAR(10 g) = 0.570 W/kg
Maximum value of SAR (measured) = 1.78 W/kg



0 dB = 1.78 W/kg = 2.50 dBW/kg

Fig. 4 - LTE Band 7, 20MHz, 1RB, Ground Side , Low,

LTE Band 7, 15MHz, 1RB, Ground Side , Low, QPSK

LTE Band 7, 15MHz, 1RB, Ground Side , Low, QPSK
Date: 9/10/2015

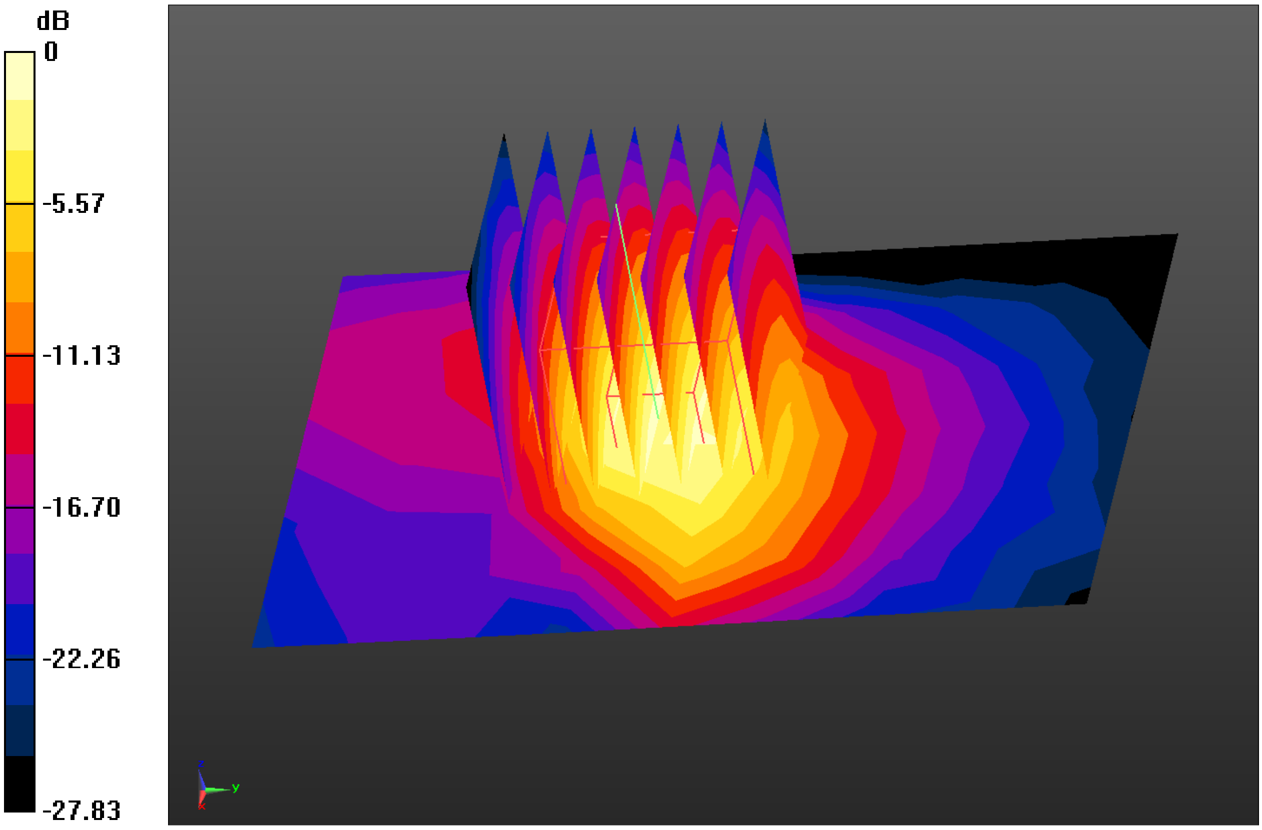
Communication System: UID 0, Generic LTE (0); Frequency: 2507.5 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): f = 2507.5 MHz; σ = 2.036 S/m; ε_r = 50.869; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(6.91, 6.91, 6.91); Calibrated: 6/10/2015;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/2/2015
- Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1891
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/LTE Band 7 Low/Area Scan (7x9x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 1.14 W/kg

Configuration/LTE Band 7 Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.582 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 2.64 W/kg
SAR(1 g) = 1.3 W/kg; SAR(10 g) = 0.563 W/kg
Maximum value of SAR (measured) = 1.71 W/kg



0 dB = 1.71 W/kg = 2.33 dBW/kg

Fig. 5 - LTE Band 7, 15MHz, 1RB, Ground Side , Low

LTE Band 7, 10MHz, 1RB, Ground Side , Low, QPSK
Date: 9/10/2015

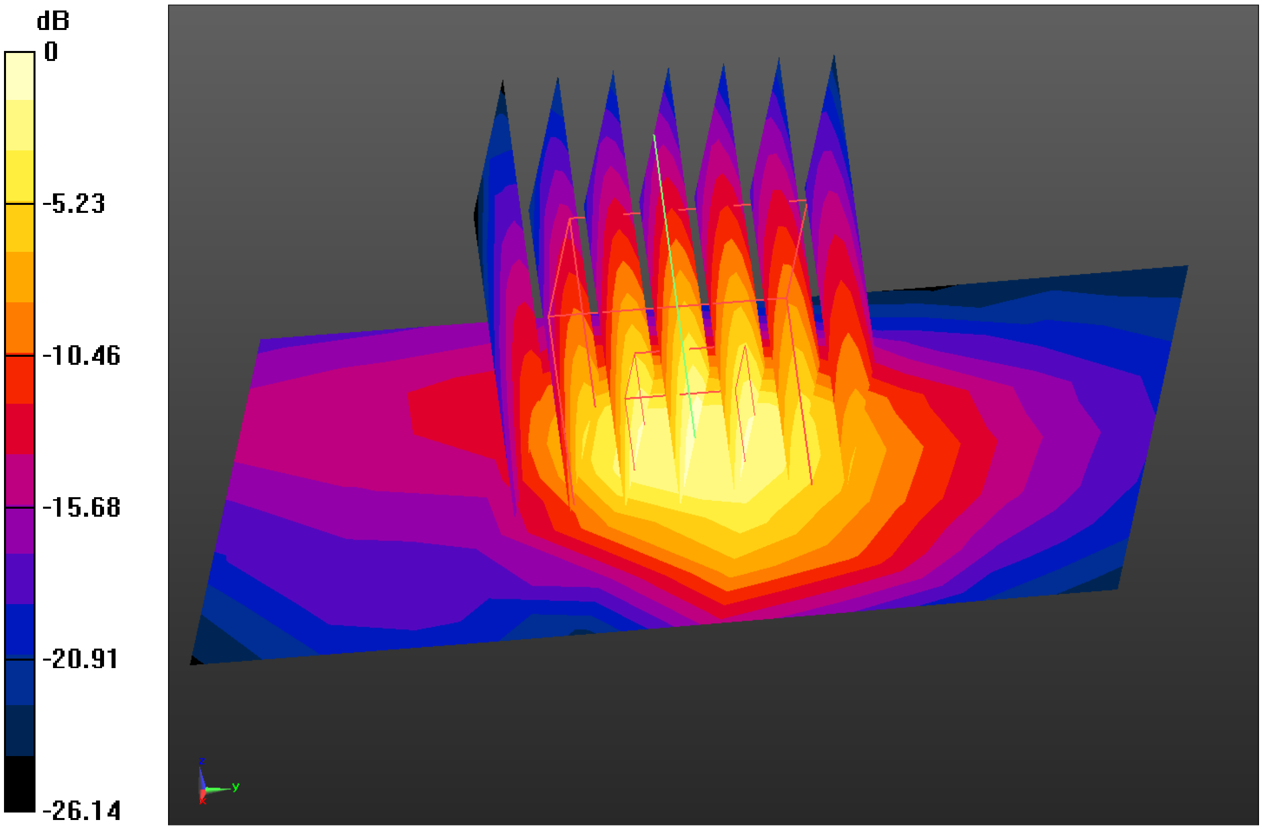
Communication System: UID 0, Generic LTE (0); Frequency: 2505 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2505 MHz; σ = 2.027 S/m; ε_r = 50.862; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(6.91, 6.91, 6.91); Calibrated: 6/10/2015;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/2/2015
- Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1891
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/LTE Band 7 Low/Area Scan (7x8x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 1.06 W/kg

Configuration/LTE Band 7 Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.484 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 2.47 W/kg
SAR(1 g) = 1.21 W/kg; SAR(10 g) = 0.519 W/kg
Maximum value of SAR (measured) = 1.59 W/kg



0 dB = 1.59 W/kg = 2.01 dBW/kg

Fig. 6 - LTE Band 7, 10MHz, 1RB, Ground Side , Low

LTE Band 7, 5MHz, 1RB, Ground Side , Low, QPSK
Date: 9/10/2015

Communication System: UID 0, Generic LTE (0); Frequency: 2502.5 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): f = 2502.5 MHz; σ = 2.025 S/m; ε_r = 50.847; ρ = 1000 kg/m^3
Phantom section: Flat Section

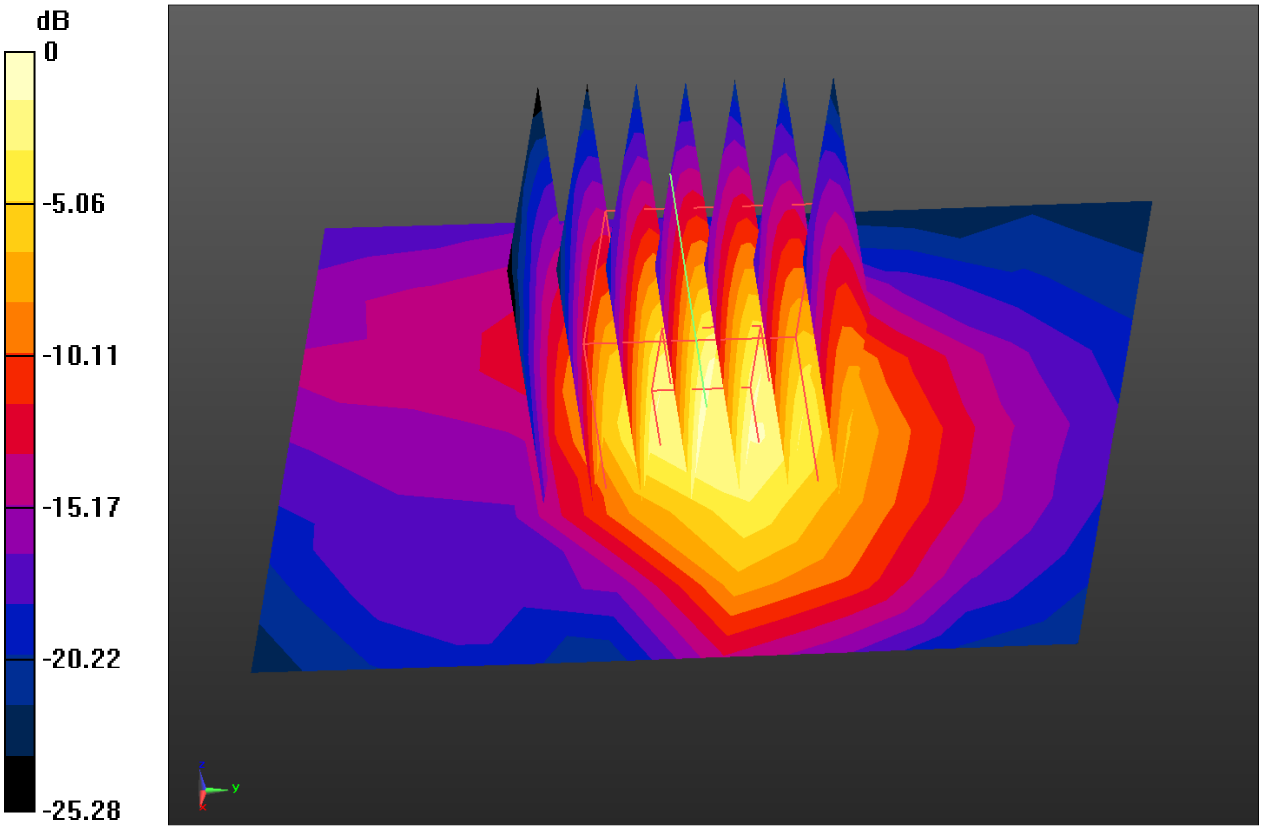
DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(6.91, 6.91, 6.91); Calibrated: 6/10/2015;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/2/2015
- Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1891
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/LTE Band 7 Low/Area Scan (7x8x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 1.07 W/kg

Configuration/LTE Band 7 Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.515 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 2.29 W/kg
SAR(1 g) = 1.1 W/kg; SAR(10 g) = 0.479 W/kg
Maximum value of SAR (measured) = 1.48 W/kg



0 dB = 1.48 W/kg = 1.70 dBW/kg

Fig. 7 - LTE Band 7, 5MHz, 1RB, Ground Side , Low

LTE Band 7, 20MHz, 1RB, Ground Side , Low, 16QAM
Date: 9/10/2015

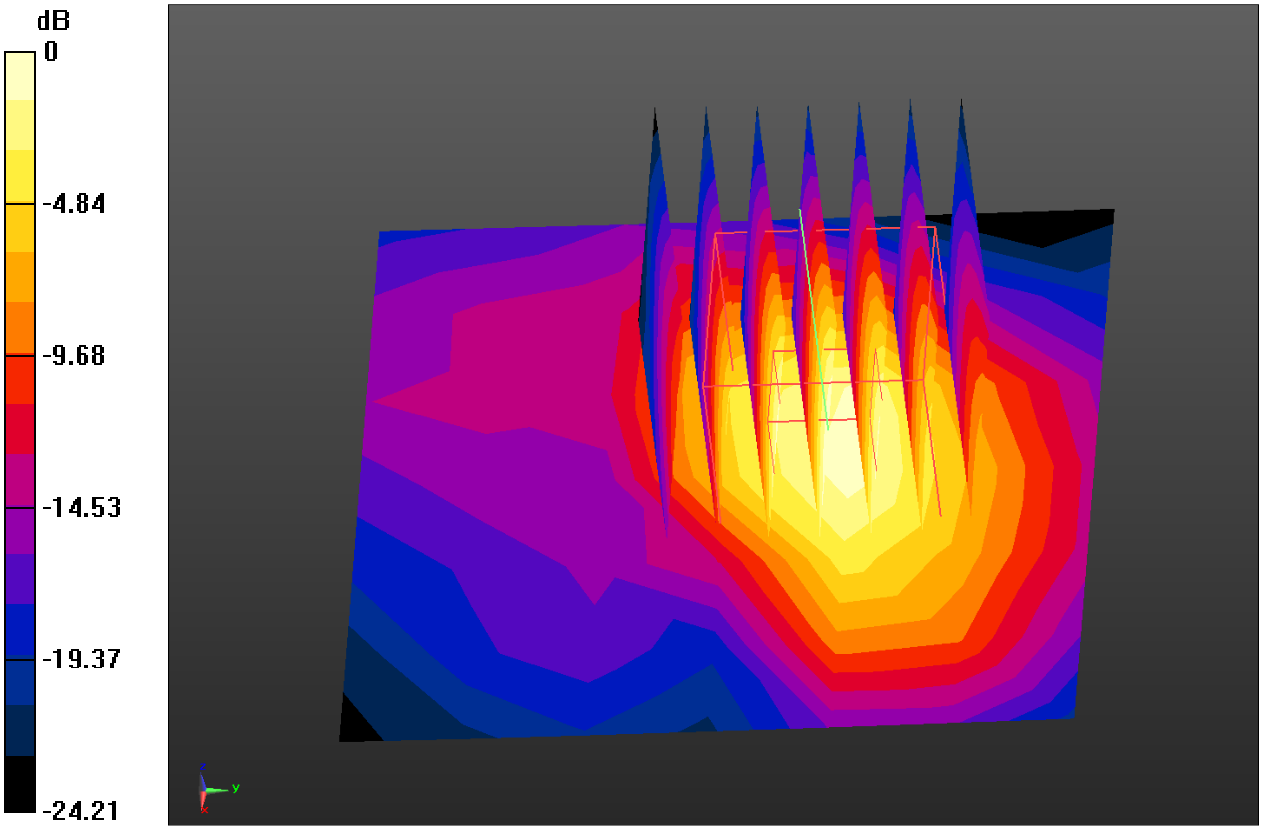
Communication System: UID 0, Generic LTE (0); Frequency: 2510 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2510 MHz; σ = 2.045 S/m; ε_r = 50.876; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(6.91, 6.91, 6.91); Calibrated: 6/10/2015;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/2/2015
- Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1891
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/LTE Band 7 Low/Area Scan (7x7x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 1.27 W/kg

Configuration/LTE Band 7 Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.677 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 2.28 W/kg
SAR(1 g) = 1.1 W/kg; SAR(10 g) = 0.475 W/kg
Maximum value of SAR (measured) = 1.47 W/kg



0 dB = 1.47 W/kg = 1.67 dBW/kg

Fig 8 - LTE Band 7, 20MHz, 1RB, Ground Side , Low

Intertek

ANNEX D: SYSTEM VALIDATION

The SAR system must be validated against its performance specifications before it is deployed. When SAR probes, system components or software are changed, upgraded or recalibrated, these must be validated with the SAR system(s) that operates with such components.

Table D.1: System Validation Part 1

System No.	Probe SN.	Liquid name	Validation date	Frequency point	Permittivity ε	Conductivity σ (S/m)
1	5d203	Head	6/9/2015	1900MHz	38.9	1.37
2	1108	Head	6/10/2015	2600MHz	37.4	2.00
3	5d203	Body	6/9/2015	1900MHz	52.7	1.51
4	1108	Body	6/10/2015	2600MHz	50.3	2.21

Table D.2: System Validation Part 2

CW Validation	**Sensitivity**	**PASS**	**PASS**
	Probe linearity	PASS	PASS
	Probe Isotropy	PASS	PASS
Mod Validation	**MOD.type**	QPSK	QPSK
	Duty factor	PASS	PASS
	PAR	PASS	PASS

ANNEX E PROBE, DAE and DIPOLE CALIBRATION CERTIFICATE

Refer to attached Appendix A

************End The Report************