SAR TEST REPORT

OF

SP-5050

MODEL No.: Siragon SP-5050

Trade Mark: N/A

REPORT NO.: ES140807080H

ISSUE DATE: September 19, 2014

Prepared for

Síragon Corporation.

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Prepared by

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Table of Contents

GENERAL SUMMARY

Applicant:	Síragon Corporation. 8501 NW 17th Street Suite 128 Miami, Florida 33126.
Product Description:	SP-5050
Model Number:	Siragon SP-5050

We hereby certify that:

The above equipment was tested by SHENZHEN EMTEK CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the following Reference 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™-2003: 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 v01r02: SAR Measurement Requirements for 100 MHz to 6 GHz

KDB 447498 D01 General RF Exposure Guidance v05r02: Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies

KDB 616217 D04 SAR for laptop and tablets v01r01: SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers

KDB 248227 D01 SAR meas for 802 11 a b g v01r02: SAR Measurement Procedures for 802.11a/b/g Transmitters.

KDB 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r02

KDB 941225 D01 SAR test for 3G devices v02

KDB 941225 D02 HSPA and 1x Advanced v02r02

KDB 941225 D03 SAR Test Reduction GSM GPRS EDGE v01

KDB 941225 D04 SAR for GSM E GPRS Dual Xfer Mode v01

KDB 941225 D06 Hotspot Mode SAR v01r01

This portable wireless equipment has been measured in all cases requested by the relevant standards. Test results in Chapter 4 of this test report are below limits specified in the relevant standards for the tested bands only. The test results of this report relate only to the tested sample identified in this report.

Date of Test : August 08, 2014 to September 19, 2014

Prepared by : Jack Li

Jack Li/Editor

Reviewer : Joe Xia

Joe Xia /Supervisor

Approve & Authorized Signer :

Lisa Wang/Manager

General Information

1.1 Product Description

Device Type:	Mobile Device
Exposure Category:	Uncontrolled Environment/General Population
Product Name:	SP-5050
Model Number:	Siragon SP-5050
Power supply:	3.7V internal rechargeable lithium battery or DC 5V from AC adapter
Adapter:	Model: A31-501000 Input: 100-240V~, 50/60Hz, 0.2A Output: DC 5.0V, 1000mA
IMEI1:	351372098150251
IMEI2:	351372098150269
Hardware Version:	1405411548
Software Version:	Android 4.4.2
Operating Mode(s) & Operating Frequency Range(s):	802.11b/g/n(HT20):2412MHz-2462MHz; 802.11n(HT40): 2422MHz-2452MHz; Bluetooth: 2402-2480MHz; GSM850: TX824.2MHz~848.8MHz/RX869.2MHz~893.8MHz; PCS1900: TX1850.2MHz~1909.8MHz/RX1930.2MHz~1989.8MHz; WCDMA Band II: TX 1852.4 MHz ~ 1907.6 MHz /RX 1932.4 MHz ~1987.6 MHz;
Number of Channels:	11 Channels for 802.11b/g/n HT20; 7 Channels for 802.11n HT40; 79 Channels for Bluetooth 4.0 DSS; 40 Channels for Bluetooth 4.0 DTS; 124 Channels for GSM850; 299 Channels for PCS1900; 276 Channels for WCDMA II;
Test Modulation:	OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n HT20/n HT40, DSSS with DBPSK/DQPSK/CCK for 802.11b; GFSK ,1/4Π-DQPSK; 8DPSK for Bluetooth4.0 DSS; GFSK for Bluetooth 4.0 DTS; GMSK for GPRS/GSM; 8PSK for EDGE; QPSK/BPSK for WCDMA;
Antenna Type, Gain:	Ceramic Chip Antenna 1dBi for GSM/WCDMA, 1dBi for Bluetooth/Wifi;

Test Channel:	802.11b channel 1; GSM850; PCS1900; WCDMA Band II

Note:
1. The sample under test was selected by the Client.
2. Components list please refer to documents of the manufacturer.
3. Only a single prototype Wwan antenna, two SIM card can't work at the same time; Output power of Two SIM have been measurement, SAR measurement based on maximum power SIM test.

1.2 The Maximum SAR1g Value

Mode	channel	Position	Separation distance	Measured SAR 1g (W/kg)	Reported SAR 1g (W/kg)
GSM850	251	Back	10mm	1.32	1.437

1.3 Special Accessories

Battery
Model: HD395460P
Manufacturer: Dongguan blue special electronic co., Ltd.

1.4 Test Facility

Site Description
EMC Lab. : Accredited by CNAS, 2013.10.29
The certificate is valid until 2016.10.28
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 L2291

Accredited by TUV Rheinland Shenzhen 2010.5.25
The Laboratory has been assessed according to the requirements ISO/IEC 17025

Accredited by FCC, October 28, 2010
The Certificate Registration Number is 406365.

Accredited by Industry Canada, March 05, 2010
The Certificate Registration Number is 46405-4480.

Name of Firm : SHENZHEN EMTEK CO., LTD.
Site Location : Bldg 69, Majialong Industry Zone,
Nanshan District, Shenzhen, Guangdong, China

Specific Absorption Rate (SAR)

1.5 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.

1.6 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

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

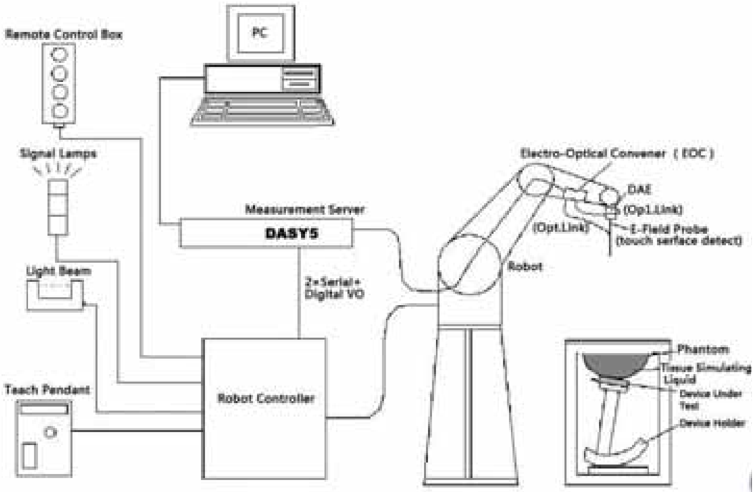
Where: σ is the conductivity of the tissue ρ is the mass density of tissue and E is the RMS electrical field strength.

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

SAR Measurements System Configuration

1.7 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 WinXP and the DASY5 software.
Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
The generic twin phantom enabling the testing of left-hand and right-hand usage.
The device holder for handheld mobile phones.
Tissue simulating liquid mixed according to the given recipes.
System validation dipoles allowing to validate the proper functioning of the system.



Picture 1. SAR Lab Test Measurement Set-up

1.8 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 2^{nd} ord curve fitting. The approach is stopped at reaching the maximum.

Probe Specifications:

Model: **EX3DV4**

Frequency Range: **10MHz — 6.0GHz (EX3DV4)**

Calibration: **In head and body simulating tissue at Frequencies from 835 up to 5800MHz**

Linearity: **± 0.2 dB (30 MHz to 6 GHz) for EX3DV4**

Dynamic Range: 10 mW/kg — 100W/kg

Probe Length: **330 mm**

Probe Tip Length: 20 mm

Body Diameter: **12 mm**

Tip Diameter: **2.5 mm**

Tip-Center: **1 mm**

Application: **SAR Dosimetry Testing**
Compliance tests of mobile phones
Dosimetry in strong gradient fields

Picture 2 E-field Probe

1.9 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).

1.10 Other Test Equipment

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

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

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.

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

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.

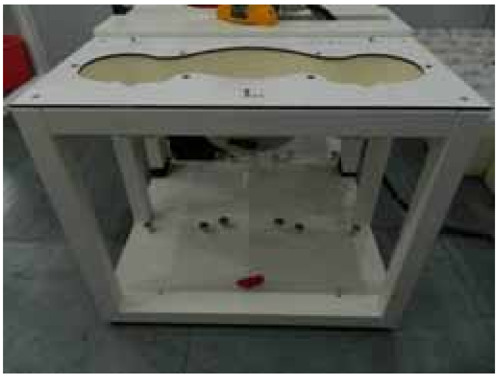
The phantom enables the dissymmetric evaluation of SAR for both left and right handed handset usage, as well as body-worn usage using the flat phantom region. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three 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 I000 x 500 mm (H x L x W)

Available: Special



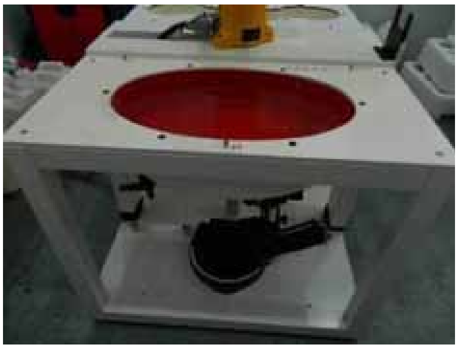
Picture 7: SAM Twin Phantom

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

6). 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

1.11 Data Storage and Evaluation

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.

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 Normi, ai0, ai1, ai2

- Conversion factor ConvFi

- Diode compression point Dcpi

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)

dcpi = 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):

$\mathbf{E_{tot}}$ **= (Ex2+ EY2+ Ez2)1/2**

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

SAR = ($\mathbf{E_{tot}}$**) 2 · σ / (ρ· 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

1.12 Tissue-equivalent Liquid

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 and Table 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 (Brain) 835MHz
Water	41.52
Glycol	55.94
Salt	1.44
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=835MHz ε=41.5 σ=0.9

MIXTURE%	FREQUENCY (Brain) 900MHz
Water	41.52
Glycol	55.94
Salt	1.44
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=900MHz ε=41.5 σ=0.9

MIXTURE%	FREQUENCY (Brain) 1900MHz
Water	55.25
Glycol monobutyl	44.43
Salt	0.32
Dielectric Parameters Target Value	f=1900MHz ε=40.1 σ=1.40

MIXTURE%	FREQUENCY (Brain) 1950MHz
Water	55.25
Glycol	44.43
Salt	0.32
Dielectric Parameters Target Value	f=1950MHz ε=40.1 σ=1.40

MIXTURE%	FREQUENCY (Brain) 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) 835MHz
Water	52.3
Glycol	45.1
Salt	1.5
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=835MHz ε=55.2 σ=0.97

MIXTURE%	FREQUENCY (Body) 900MHz
Water	52.3
Glycol	45.1
Salt	1.5
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=900MHz ε=55.2 σ=0.97

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) 1950MHz
Water	69.93
Glycol monobutyl	29.97
Salt	0.1
Dielectric Parameters Target Value	f=1950MHz 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=52.70 σ=1.95

2).Tissue-equivalent Liquid Properties

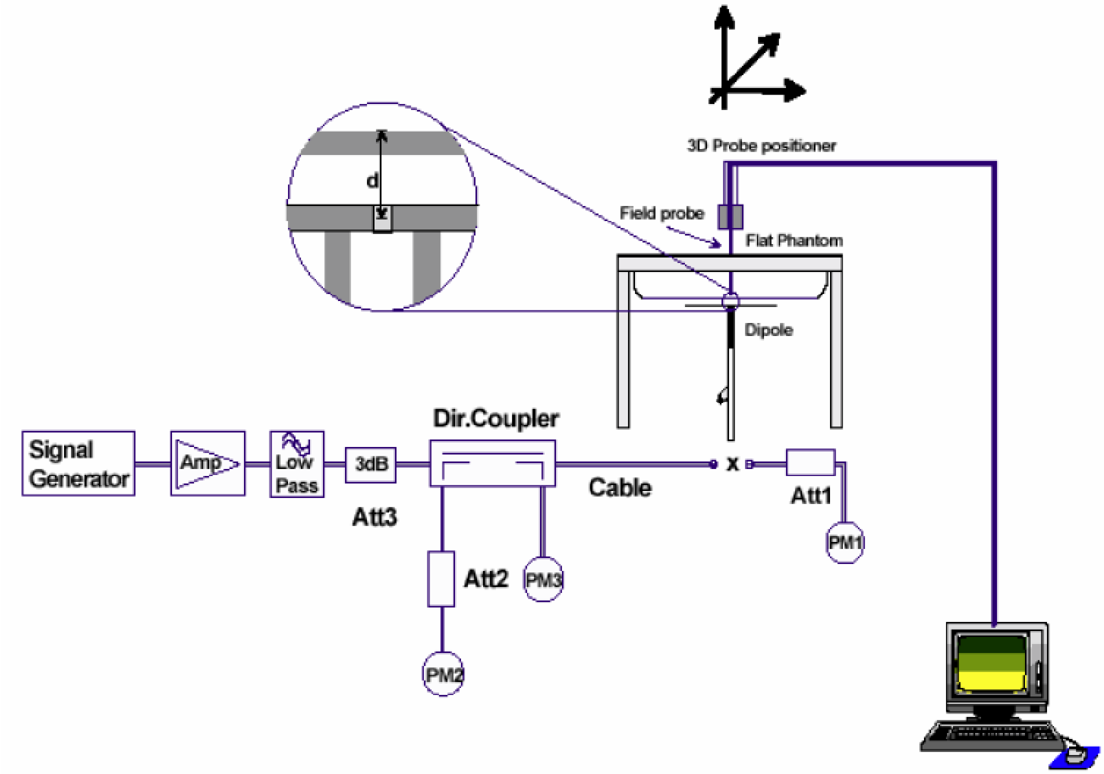
Table 4: Dielectric Performance of Tissue Simulating Liquid

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (εr)	Conductivity Target (σ)	Permittivity Target (εr)	Delta (σ) (%)	Delta (εr) (%)	Limit (%)	Date
835	Head	22.6	0.897	41.950	0.90	41.50	-0.33	1.08	±5	2014/10/16
900	Head	22.6	0.957	41.260	0.90	41.50	-1.34	-0.58	±5	2014/10/16
1900	Head	22.7	1.400	39.322	1.40	40.00	0.00	-1.70	±5	2014/9/11
1950	Head	22.7	1.410	39.700	1.40	40.00	0.71	-0.75	±5	2014/9/11
2450	Head	22.7	1.786	40.406	1.80	39.20	-0.78	3.08	±5	2014/9/16
835	Body	22.8	0.992	55.471	0.97	55.20	2.27	0.49	±5	2014/10/16
900	Body	22.8	1.058	54.756	0.97	55.20	0.76	-0.44	±5	2014/10/16
1900	Body	22.6	1.532	53.756	1.52	53.30	0.79	0.86	±5	2014/9/16
1950	Body	22.6	1.510	53.450	1.52	53.30	-0.66	0.28	±5	2014/9/16
2450	Body	22.5	2.026	52.800	1.95	52.70	3.90	0.19	±5	2014/9/17

1.13 System Check

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

Dipole D900V2 SN:1d162				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2014-1-14	-30.7	/	52.5	/
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2014-1-14	-28.6	/	47.9	/

Dipole D1950V3 SN: 1151				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2014-1-10	-33.5	/	49.9	/
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2014-1-10	-26.5	/	45.8	/

Dipole D2450V2 SN: 927				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2014-1-13	-24.9	/	55.2	/
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2014-1-13	-26.3	/	51.4	/

2). System Check Results

Table 6: System Check for Head /BodyTissue Simulating Liquid

Date	Frequency (MHz)2	Tissue Type2	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2014/10/16	900	Head	250	1d162	3970	1418	2.52	10.40	10.08	-3.08
2014/9/11	1950	Head	250	1151	3970	1418	10.74	41.10	42.96	4.53
2014/9/16	2450	Head	250	927	3970	1418	13.97	53.20	55.88	5.04
2014/10/16	900	Body	250	1d162	3970	1418	2.76	10.70	11.04	3.18
2014/9/16	1950	Body	250	1151	3970	1418	9.93	38.80	39.72	2.37
2014/9/17	2450	Body	250	927	3970	1418	12.21	50.40	48.84	-3.10

1.14 Measurement Procedures

1). General Description of Test Procedures

For WLAN SAR testing, WLAN engineering testing software installed on the EUT can provide continuous transmitting RF signal. The Tx power is set to 15 for 802.11 b mode by software. This RF signal utilized in SAR measurement has almost 100% duty cycle and its crest factor is 1.

For the 802.11b/g/n SAR tests, a communication link is set up with the test mode software for WIFI mode test. During the test, at the each test frequency channel, the EUT is operated at the RF continuous emission mode. Each channel should be tested at the lowest data rate. Testing at higher data rates is not required when the maximum average output power is less than 0.25dB higher than those measured at the lowest data rate. 802.11b/g/n operating modes are tested independently according to the service requirements in each f requency band. 802.11b/g/n modes are tested on the maximum average output channel. SAR is not required for 802.11a/g/n channels when the maximum average output power is less than 0.25dB higher than that measured on the corresponding 802.11b channels.

For the body SAR tests for GSM 900 and GSM 1800, a communication link is set up with a System Simulator (SS) by air link. Using CMW 500 the power level is set to “5” for GSM 900, set to “0” for GSM 1800. The GPRS class is 12 for this EUT; it has at most 4Timesolts in uplink and at most 4Timesolts in downlink, the maximum total Timesolts is 5. The EGPRS class is 12 for this EUT; it has at most 4 Timesolts in uplink and at most 4 Timesolts in downlink, the maximum total Timesolts is 5.

When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.

According to specification 3GPP TS 51.010, the maximum power of the GSM can do the power reduction for the multi-slot. The allowed power reduction in the multi-slot configuration is as following:

Table 8: The allowed power reduction in the multi-slot configuration:

Number of timeslots in uplink assignment	Permissible nominal reduction of maximum output power (dB)
1	0
2	0 to 3,0
3	1,8 to 4,8
4	3,0 to 6,0

For the UMTS Test configuration:

Maximum output power is verified on the High, Middle and Low channel according to the procedures described in section 5.2 of 3GPP TS 34. 121, using the appropriate RMC or AMR with TPC(transmit power control) set to all up bits for WCDMA/HSDPA or applying the required inner loop power control procedures to the maximum output power while HSUPA is active. Results for all applicable physical channel configuration (DPCCH, DPDCHn and spreading codes, HSDPA, HSPA) should be tabulated in the SAR report. All configuration that are not supported by the DUT or can not be measured due to technical or equipment limitations should be clearly identified.

SAR for head exposure configurations in voice mode is measured using a 12.2kbps RMC with TPC bits configured to all up bits. SAR in AMR configurations is not required when the maximum average output of each RF channel for 12.2kbps AMR is less than 1/4 dB higher than that measured in 12.2 kbps RMC. Otherwise, SAR is measured on the maximum output channel in 12.2kbps AMR with a 3.4 kbps SRB(Signaling radio bearer) using the exposure configuration that results in the highest SAR in 12.2kbps RMC for that RF channel.

SAR for body exposure configurations in voice and data modes is measured using 12.2kbps RMC with TPC bits configured to all up bits. SAR for other spreading codes and multiple DPDCHn, when supported by the DUT, are not required when the maximum average output of each RF channel, for each spreading code and DPDCHn configuration, are less than 1/4 dB higher than those measured in 12.2kbps RMC. Otherwise, SAR is measured on the maximum output channel with an applicable RMC configuration for the corresponding spreading code or DPDCHn using the exposure configuration that results in the highest SAR with 12.2 kbps RMC. When more than 2 DPDCHn are supported by the DUT, it may be necessary to configure additional DPDCHn for a DUT using FTM (Factory Test Mode) or other chipset based test approaches with parameters similar to those used in 384 kbps and 768 kbps RMC.

For the HSDPA Test configuration:

SAR for body exposure configurations is measured according to the ‘Body SAR Measurements’ procedures of that section. In addition,body SAR is also measured for HSDPA when the maximum average output of each RF channel with HSDPA active is at least ¼ dB higher than that measured without HSDPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is above 75% of the SAR limit. Body SAR for HSDPA is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration in 12.2 kbps RMC without HSDPA.

HSDPA should be configured according to the UE category of a test device.The number of HSDSCH/ HS-PDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission conditions, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4 ms with a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors(βc, βd), and HS-DPCCH power offset parameters (ΔACK, ΔNACK, ΔCQI) should be set according to values indicated in the Table below. The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the H-set.

Table 9: Subtests for UMTS Release 5 HSDPA

Sub-set	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (note 1, note 2)	CM(dB) (note 3)	MPR(dB)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (note 4)	15/15 (note 4)	64	12/15 (note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note1: $\triangle_{ACK}$, $\triangle_{NACK}$ and $\triangle_{CQI}$= 8 ⇔ $A_{hs} = \beta_{hs}/\beta_c$=30/15 ⇔ β_{hs}=30/15*β_c

Note2:For the HS-DPCCH power mask requirement test in clause 5.2C,5.7A,and the Error Vector Magnitude(EVM) with HS-DPCCH test in clause 5.13.1.A,and HSDPA EVM with phase discontinuity in clause 5.13.1AA, $\triangle_{ACK}$ and $\triangle_{NACK}$= 8 (A_{hs}=30/15) with β_{hs}=30/15*β_c,and $\triangle_{CQI}$= 7 (A_{hs}=24/15) with β_{hs}=24/15*β_c.

Note3: CM=1 forβ_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4:For subtest 2 the $\beta_c\beta_d$ 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 (TFC1,TF1) to β_c=11/15 and β_d=15/15.

Table 10: Settings of required H-Set 1 QPSK in HSDPA mode

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	534
Inter-TTI Distance	TTI's	3
Number of HARQ Processes	Processes	2
Information Bit Payload (N_{INF})	Bits	3202
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	4800
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	9600
Coding Rate	/	0.67
Number of Physical Channel Codes	Codes	5
Modulation	/	QPSK

For the HSDPA Test configuration:

Body SAR is also measured for HSPA when the maximum average output of each RF channel with HSPA active is at least ¼ dB higher than that measured without HSPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is above 75% of the SAR limit. Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 with power control algorithm 2, according to the highest body SAR configuration in 12.2 kbps RMC without HSPA.

Due to inner loop power control requirements in HSPA, a commercial communication test set should be used for the output power and SAR tests. The 12.2 kbps RMC, FRC H-set 1 and E- DCH configurations for HSPA should be configured according to the β values indicated below as well as other applicable procedures described in the 'WCDMA Handset' and 'Release 5 HSDPA Data Devices' sections of 3 G device.

Table 11: Sub-Test 5 Setup for Release 6 HSUPA

Sub-set	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{hs}^{(1)}$	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}, ΔNACK and Δ_{CQI} = 8 ⇔ $A_{hs} = \beta_{hs}/\beta_c = 30/15$ ⇔ $\beta_{hs} = 30/15 * \beta_c$.
Note 2: CM = 1 for βc/βd =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 βc/βd 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 βc = 10/15 and βd = 15/15.
Note 4: For subtest 5 the βc/βd 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 βc = 14/15 and βd = 15/15.
Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Figure 5.1g.
Note 6: βed can not be set directly; it is set by Absolute Grant Value.

Table 12: HSUPA UE category

UE E-DCH Category	Maximum E-DCH Codes Transmitted	Number of HARQ Processes	E-DCH TTI (ms)	Minimum Spreading Factor	Maximum E-DCH Transport Block Bits	Max Rate (Mbps)
1	1	4	10	4	7110	0.7296
2	2	8	2	4	2798	1.4592
	2	4	10	4	14484	
3	2	4	10	4	14484	1.4592
4	2	8	2	2	5772	2.9185
	2	4	10	2	20000	2.00
5	2	4	10	2	20000	2.00
6 (No DPDCH)	4	8	2	2 SF2 & 2 SF4	11484	5.76
	4	4	10		20000	2.00
7 (No DPDCH)	4	8	2	2 SF2 & 2 SF4	22996	?
	4	4	10		20000	?

NOTE: When 4 codes are transmitted in parallel, two codes shall be transmitted with SF2 and two with SF4.
UE Categories 1 to 6 supports QPSK only. UE Category 7 supports QPSK and 16QAM. (TS25.306-7.3.0)

1.15 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) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.

2) A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).

3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 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 < 0.80 W/kg

1.16 Test Position

1). Test Positions Requirements

The overall diagonal dimension of the display section of a tablet is 23 cm > 20 cm, Per FCC KDB 616217, the back surface and edges of the tablet should be tested for SAR compliance with the tablet touching the phantom. SAR evaluation for the front surface of tablet display screens are generally not necessary. The SAR Exclusion Threshold in KDB 447498 D01 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 required for the adjacent edges, with the adjacent edge positioned against the phantom and the edge containing the antenna positioned perpendicular to the phantom.

2). SAR test reduction and exclusion guidance

(1) The SAR exclusion threshold for distances <50mm is defined by the following equation:

(max. power of channel, including tune-up tolerance, mW)/ (min. test separation distance, mm).

$\sqrt{\text{Frequency (GHz)}}$ **≤3.0**

(2) The SAR exclusion threshold for distances >50mm is defined by the following equation, as illustrated in KDB 447498 D01 Appendix B:

a) at 100 MHz to 1500 MHz

[(Power allowed at numeric Threshold at 50 mm in step 1) + (test separation distance

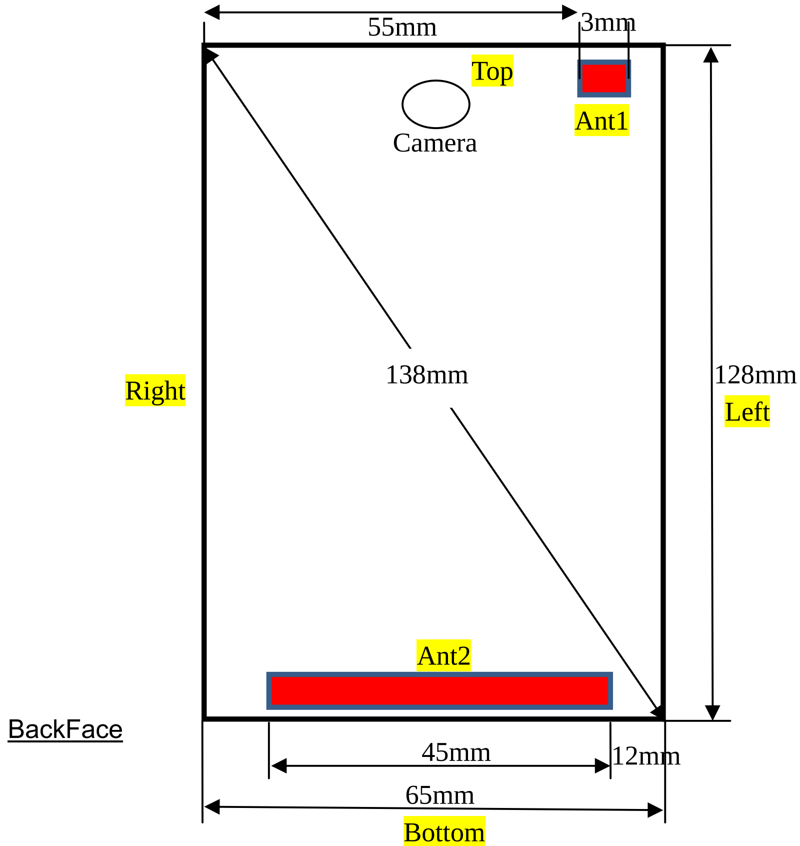
- 50 mm) · (f (MHz)/150)] mW

b) at > 1500 MHz and ≤ 6 GHz

[Power allowed at numeric Threshold at 50 mm in step 1) + (test separation distance-50 mm) ·10] mW

Note: The location of the antennas inside EUT and test positions is shown in ANNEX G:

Note:
Ant2: 2G & 3G Antenna
Ant1: Bluetooth & Wifi Antenna



Test Position 1: The back surface of the EUT towards to the bottom of the flat phantom. (ANNEX G Picture 1)
Test Position 1 Evaluation (wifi 2.412 GHz~2.462GHz) = [10^(14.25/10)/5] * ($2.412^{1/2}$) =8.26＞3.0
Test Position 1 Evaluation GSM850 = [10^(26.08/10)/5] * ($0.8242^{1/2}$) =73.63＞3.0
Test Position 1 Evaluation EGPRS850 = [10^(24.59/10)/5] * ($0.8242^{1/2}$) =52.25＞3.0
Test Position 1 Evaluation PCS1900 = [10^(23.06/10)/5] * ($1.8502^{1/2}$) =55.04＞3.0
Test Position 1 Evaluation EGPRS1900 = [10^(18.83/10)/5] * ($1.8502^{1/2}$) =20.78＞3.0
Test Position 1 Evaluation WCDMA Band II = [10^(22.12/10)/5] * ($0.8264^{1/2}$) =29.62＞3.0
Test Position 1 Evaluation (BT) = [10^(-0.748/10)/5] *($2.412^{1/2}$) =0.26＜3.0
SAR is required for wifi 2.4G antenna & GSM/WCDMA antenna in this position.
SAR is not required for BT in this position.

Test Position 2: The left edge of the EUT towards the bottom of the flat phantom. (ANNEX G Picture 2).
Test Position 2 Evaluation (wifi 2.412 GHz~2.462GHz) = [10^(14.25/10)/5] * ($2.412^{1/2}$) =8.26＞3.0
Test Position 2 Evaluation GSM850 = [10^(26.08/10)/5] * ($0.8242^{1/2}$) =73.63＞3.0
Test Position 2 Evaluation EGPRS850 = [10^(24.59/10)/5] * ($0.8242^{1/2}$) =52.25＞3.0
Test Position 2 Evaluation PCS1900 = [10^(23.06/10)/5] * ($1.8502^{1/2}$) =55.04＞3.0
Test Position 2 Evaluation EGPRS1900 = [10^(18.83/10)/5] * ($1.8502^{1/2}$) =20.78＞3.0
Test Position 2 Evaluation WCDMA Band II = [10^(22.12/10)/5] * ($0.8264^{1/2}$) =29.62＞3.0
Test Position 2 Evaluation (BT) = [10^(-0.748/10)/5] *($2.412^{1/2}$) =0.26＜3.0
SAR is required for wifi 2.4G antenna & GSM/WCDMA antenna in this position.
SAR is not required for BT in this position.

Test Position 3: The right edge of the EUT towards the bottom of the flat phantom. (ANNEX G Picture 3).
Test Position 3 Evaluation (wifi 2.412 GHz~2.462GHz) =96+ (60-50)*10=196mW=22.92dBm>14.25dBm (max.power)
Test Position 3 Evaluation GSM850 =[10^(26.08/10)/5] * ($0.8242^{1/2}$) =73.63＞3.0
Test Position 3 Evaluation EGPRS850 = [10^(24.59/10)/5] * ($0.8242^{1/2}$) =52.25＞3.0
Test Position 3 Evaluation PCS1900 = [10^(23.06/10)/5] * ($1.8502^{1/2}$) =55.04＞3.0
Test Position 3 Evaluation EGPRS1900 = [10^(18.83/10)/5] * ($1.8502^{1/2}$) =20.78＞3.0
Test Position 3 Evaluation WCDMA Band II = [10^(22.12/10)/5] * ($0.8264^{1/2}$) =29.62＞3.0
Test Position 3 Evaluation (BT) = [10^(-0.748/10)/5] *($2.412^{1/2}$) =0.26＜3.0
SAR is required for GSM/WCDMA antenna in this position.
SAR is not required for wifi (2.4G) & BT antenna in this position.

Test Position 4: The top edge of the EUT towards the bottom of the flat phantom. (ANNEX G Picture 4).
Test Position 4 Evaluation (wifi 2.412 GHz~2.462GHz) = [10^(14.25/10)/5] * ($2.412^{1/2}$) =8.26＞3.0
Test Position 4 Evaluation (GSM850) =96+ (110-50)*10=696mW=28.43dBm>26.08dBm (max.power)
Test Position 4 Evaluation (EGPRS850) =96+ (110-50)*10=696mW=28.43dBm>24.59dBm (max.power)
Test Position 4 Evaluation (PCS1900) =96+ (110-50)*10=696mW=28.43dBm>23.06dBm (max.power)
Test Position 4 Evaluation (EGPRS1900) =96+ (110-50)*10=696mW=28.43dBm>18.83dBm (max.power)
Test Position 4 Evaluation (WCDMA Band II) =96+ (110-50)*10=696mW=28.43dBm>22.12dBm (max.power)
Test Position 4 Evaluation (BT) = [10^(-0.748/10)/5] *($2.412^{1/2}$) =0.26＜3.0
SAR is required for wifi 2.4G antenna in this position.
SAR is not required for BT antenna & GSM/WCDMA antenna in this position.

Test Position 5: The bottom edge of the EUT towards the bottom of the flat phantom. (ANNEX G Picture 5).
Test Position 5 Evaluation (wifi 2.412 GHz~2.462GHz) =96+ (123-50)*10=169mW=22.28dBm>14.25dBm (max.power)
Test Position 5 Evaluation GSM850 = [10^(26.08/10)/5] * ($0.8242^{1/2}$) =73.63＞3.0
Test Position 5 Evaluation EGPRS850 = [10^(24.59/10)/5] * ($0.8242^{1/2}$) =52.25＞3.0
Test Position 5 Evaluation PCS1900 = [10^(23.06/10)/5] * ($1.8502^{1/2}$) =55.04＞3.0
Test Position 5 Evaluation EGPRS1900 = [10^(18.83/10)/5] * ($1.8502^{1/2}$) =20.78＞3.0
Test Position 5 Evaluation WCDMA Band II = [10^(22.12/10)/5] * ($0.8264^{1/2}$) =29.62＞3.0
Test Position 5 Evaluation ((BT)) =96+ (123-50)*10=169mW=22.28dBm>-0.748dBm (max.power)
SAR is required for GSM/WCDMA antenna in this position.
SAR is not required for wifi (2.4G) & BT antenna in this position.

Test Position 6: The Front surface of the EUT towards to the bottom of the flat phantom. (ANNEX G Picture 6)
Test Position 1 Evaluation (wifi 2.412 GHz~2.462GHz) = [10^(14.25/10)/5] * ($2.412^{1/2}$) =8.26＞3.0
Test Position 1 Evaluation GSM850 = [10^(26.08/10)/5] * ($0.8242^{1/2}$) =73.63＞3.0
Test Position 1 Evaluation EGPRS850 = [10^(24.59/10)/5] * ($0.8242^{1/2}$) =52.25＞3.0
Test Position 1 Evaluation PCS1900 = [10^(23.06/10)/5] * ($1.8502^{1/2}$) =55.04＞3.0
Test Position 1 Evaluation EGPRS1900 = [10^(18.83/10)/5] * ($1.8502^{1/2}$) =20.78＞3.0
Test Position 1 Evaluation WCDMA Band II = [10^(22.12/10)/5] * ($0.8264^{1/2}$) =29.62＞3.0
Test Position 1 Evaluation (BT) = [10^(-0.748/10)/5] *($2.412^{1/2}$) =0.26＜3.0
SAR is required for wifi 2.4G antenna & GSM/WCDMA antenna in this position.
SAR is not required for BT in this position.

3). Test Results

Worse Conducted Power Results

The output average power of WiFi 2.4G is as following:

Mode	Channel	Data rate (Mbps)	AV Power (dBm)
11b	1	1	14.25
	6	1	13.55
	11	1	13.26
11g	1	6	11.17
	6	6	11.56
	11	6	10.51
11n HT20	1	MCS0	11.11
	6	MCS0	11.66
	11	MCS0	10.63
11n HT40	3	MCS0	8.63
	6	MCS0	8.62
	9	MCS0	8.48

The output average power of BT (DSS) is as following:

Mode	Channel	Channel 0 (dBm)	Channel 39 (dBm)	Channel 78 (dBm)
GFSK	DH1	**-0.748**	-2.022	-2.240
	DH2	-0.784	-2.134	-2.341
	DH3	-0.790	-2.206	-2.443
π/4DQPSK	2DH1	-1.173	-2.948	-3.117
	2DH2	-1.232	-2.951	-3.202
	2DH3	-1.319	2.955	-3.214
8DPSK	3DH1	-1.690	-2.948	-3.112
	3DH2	-1.705	-2.955	-3.204
	3DH3	-1.713	-2.959	-3.223

The output average power of BT (DSS) is as following:

Mode	Channel 0 (dBm)	Channel 39 (dBm)	Channel 78 (dBm)
GFSK	-8.55	-10.09	-10.31

The Averaged conducted power for GSM 850/1900 is as following:

For SIM 1 Card:

Burst Average Power test result as bellowing:

Band	GSM 850			GSM 1900		
Channel	128	189	251	512	661	810
Frequency(MHz)	824.2	836.4	848.8	1850.2	1880	1909.8
GSM Voice	32.21	32.06	31.95	29.90	29.31	29.10
GPRS Multi-Slot Class8 (1 Uplink)	32.19	32.01	31.93	29.81	29.27	29.07
GPRS Multi-Slot Class10 (2 Uplink)	31.30	31.05	31.01	28.81	28.21	28.05
GPRS Multi-Slot Class11 (3 Uplink)	29.81	29.57	29.44	26.99	26.49	26.36
GPRS Multi-Slot Class12 (4 Uplink)	28.89	28.72	28.63	26.06	25.58	25.49
EDGE Multi-Slot Class8 (1 Uplink)	27.58	27.44	27.40	26.27	26.25	26.29
EDGE Multi-Slot Class10 (2 Uplink)	25.92	25.88	25.87	24.83	24.79	24.88
EDGE Multi-Slot Class11 (3 Uplink)	24.58	24.51	24.46	22.28	22.04	22.08
EDGE Multi-Slot Class12 (4 Uplink)	24.39	24.34	24.30	20.55	20.50	20.49

Note:
GPRS, CS1 coding scheme.
Multi-Slot Class 8 , Support Max 4 downlink, 1 uplink , 5 working link
Multi-Slot Class 10 , Support Max 4 downlink, 2 uplink , 6 working link
Multi-Slot Class 11 , Support Max 4 downlink, 3 uplink , 7 working link
Multi-Slot Class 12 , Support Max 4 downlink, 4 uplink , 8 working link

EDGE, MCS5 coding scheme.
Multi-Slot Class 8 , Support Max 4 downlink, 1 uplink , 5 working link
Multi-Slot Class 10 , Support Max 4 downlink, 2 uplink , 6 working link
Multi-Slot Class 11 , Support Max 4 downlink, 3 uplink , 7 working link
Multi-Slot Class 12 , Support Max 4 downlink, 4 uplink , 8 working link

For SIM2:
Burst Average Power test result as bellowing:

Band	GSM 850			GSM 1900		
Channel	**128**	**189**	**251**	**512**	**661**	**810**
Frequency(MHz)	**824.2**	**836.4**	**848.8**	**1850.2**	**1880**	**1909.8**
GSM Voice	32.19	32.07	32.01	29.88	29.30	29.09
GPRS Multi-Slot Class8 (1 Uplink)	32.18	31.99	31.92	29.77	29.25	29.02
GPRS Multi-Slot Class10 (2 Uplink)	31.27	31.00	30.98	28.76	28.18	28.01
GPRS Multi-Slot Class11 (3 Uplink)	29.75	29.53	29.42	26.97	26.48	26.32
GPRS Multi-Slot Class12 (4 Uplink)	28.86	28.67	28.57	26.01	25.55	25.46
EDGE Multi-Slot Class8 (1 Uplink)	27.46	27.38	27.36	26.25	26.20	26.27
EDGE Multi-Slot Class10 (2 Uplink)	25.74	25.85	25.82	24.77	24.75	24.83
EDGE Multi-Slot Class11 (3 Uplink)	24.43	24.44	24.45	22.25	22.03	22.02
EDGE Multi-Slot Class12 (4 Uplink)	24.33	24.27	24.28	20.53	20.46	20.48

Note:
GPRS, CS1 coding scheme.
Multi-Slot Class 8 , Support Max 4 downlink, 1 uplink , 5 working link
Multi-Slot Class 10 , Support Max 4 downlink, 2 uplink , 6 working link
Multi-Slot Class 11 , Support Max 4 downlink, 3 uplink , 7 working link
Multi-Slot Class 12 , Support Max 4 downlink, 4 uplink , 8 working link

EDGE, MCS5 coding scheme.
Multi-Slot Class 8 , Support Max 4 downlink, 1 uplink , 5 working link
Multi-Slot Class 10 , Support Max 4 downlink, 2 uplink , 6 working link
Multi-Slot Class 11 , Support Max 4 downlink, 3 uplink , 7 working link
Multi-Slot Class 12 , Support Max 4 downlink, 4 uplink , 8 working link

Source-based Time Averaged Burst Power as bellowing:

Band	GSM 850				GSM 1900			
Channel	**128**	**189**	**251**	Time average factor	**512**	**699**	**885**	Time average factor
Frequency(MHz)	**824.2**	**836.4**	**848.8**		**1850.2**	**1880**	**1909.8**	
GSM Voice	23.21	23.06	22.95	-9.03	20.90	20.31	20.10	-9.03
GPRS Multi-Slot Class8 (1 Uplink)	23.19	23.01	22.93	-9.03	20.81	20.27	20.07	-9.03
GPRS Multi-Slot Class10 (2 Uplink)	25.30	25.05	25.01	-6.02	22.81	22.21	22.05	-6.02
GPRS Multi-Slot Class11 (3 Uplink)	25.55	25.31	25.18	-3.26	22.73	22.23	22.10	-3.26
GPRS Multi-Slot Class12 (4 Uplink)	25.89	25.72	25.63	-3.01	23.06	22.58	22.49	-3.01
EDGE Multi-Slot Class8 (1 Uplink)	18.58	18.44	18.40	-9.03	17.27	17.25	17.29	-9.03
EDGE Multi-Slot Class10 (2 Uplink)	19.92	19.88	19.87	-6.02	18.83	18.79	18.88	-6.02
EDGE Multi-Slot Class11 (3 Uplink)	20.32	20.25	20.20	-3.26	18.02	17.78	17.82	-3.26
EDGE Multi-Slot Class12 (4 Uplink)	21.39	21.34	21.30	-3.01	17.55	17.50	17.49	-3.01

Note: 1 uplink , Time average factor =10*log(1/8)=-9.03dB,
2 uplink , Time average factor =10*log(2/8)=-6.02dB,
3 uplink, Time average factor =10*log(3/8)=-4.26dB,
4 uplink, Time average factor =10*log(4/8)=-3.01dB,
Source based time average power = Burst Average power + Time Average factor

The Averaged conducted power for UMTS Band II is as following:

For SIM1 Card:

Band			WCDMA II		
TX Channel			9262	9400	9538
Frequency (MHz)			1852.4	1880	1907.6
3GPP MPR (dB)	3GPP Rel 99	AMR 12.2Kbps	21.68	21.65	21.55
	3GPP Rel 99	RMC 12.2Kbps	21.70	21.67	21.58
0	3GPP Rel 6	HSDPA Subtest-1	21.69	21.43	21.36
0	3GPP Rel 6	HSDPA Subtest-2	21.61	21.41	21.34
0.5	3GPP Rel 6	HSDPA Subtest-3	21.61	21.29	21.17
0.5	3GPP Rel 6	HSDPA Subtest-4	21.66	21.33	21.17
0	3GPP Rel 6	HSUPA Subtest-1	21.62	21.37	21.28
2	3GPP Rel 6	HSUPA Subtest-2	21.60	21.28	21.36
1	3GPP Rel 6	HSUPA Subtest-3	21.58	21.30	21.13
2	3GPP Rel 6	HSUPA Subtest-4	21.57	21.24	21.26
0	3GPP Rel 6	HSUPA Subtest-5	21.56	21.31	21.14

For SIM2 Card:

Band			WCDMA II		
TX Channel			9262	9400	9538
Frequency (MHz)			1852.4	1880	1907.6
3GPP MPR (dB)	3GPP Rel 99	AMR 12.2Kbps	21.69	21.67	21.59
	3GPP Rel 99	RMC 12.2Kbps	21.70	21.68	21.55
0	3GPP Rel 6	HSDPA Subtest-1	21.66	21.46	21.37
0	3GPP Rel 6	HSDPA Subtest-2	21.63	21.45	21.38
0.5	3GPP Rel 6	HSDPA Subtest-3	21.64	21.33	21.14
0.5	3GPP Rel 6	HSDPA Subtest-4	21.65	21.31	21.16
0	3GPP Rel 6	HSUPA Subtest-1	21.61	21.32	21.25
2	3GPP Rel 6	HSUPA Subtest-2	21.63	21.29	21.32
1	3GPP Rel 6	HSUPA Subtest-3	21.55	21.33	21.17
2	3GPP Rel 6	HSUPA Subtest-4	21.59	21.20	21.29
0	3GPP Rel 6	HSUPA Subtest-5	21.58	21.30	21.18

SAR Test Results

SAR Values [GSM 850 (GSM/GPRS/EGPRS)]

Plot No.	Mode	Test Position	Gap (cm)	Headset	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	4 Tx slots	Right Cheek	-		128	824.2	28.89	29	1.026	-0.01	0.581	0.596
	4 Tx slots	Right Tilted	-		128	824.2	28.89	29	1.026	-0.03	0.326	0.334
	4 Tx slots	Left Cheek	-		128	824.2	28.89	29	1.026	0.09	0.529	0.543
	4 Tx slots	Left Tilted	-		128	824.2	28.89	29	1.026	0.11	0.363	0.372
	4 Tx slots	Front	1		128	824.2	28.89	29	1.026	-0.02	0.927	0.951
	4 Tx slots	Back	1		128	824.2	28.89	29	1.026	0.05	1.32	1.354
	4 Tx slots	Left Side	1		128	824.2	28.89	29	1.026	0.07	0.892	0.915
	4 Tx slots	Right Side	1		128	824.2	28.89	29	1.026	-0.06	0.905	0.928
	4 Tx slots	Bottom Side	1		128	824.2	28.89	29	1.026	-0.02	0.116	0.119
	4 Tx slots	Front	1		189	836.4	28.72	29	1.067	0.10	1.04	1.109
87	4 Tx slots	Front	1		251	848.8	28.63	29	1.089	-0.03	1.05	1.143
	4 Tx slots	Back	1		189	836.4	28.72	29	1.067	0.09	1.34	1.429
	4 Tx slots	Back	1		189	836.4	28.72	29	1.067	0.02	1.33	1.419
89	4 Tx slots	Back	1		251	848.8	28.63	29	1.089	0.11	1.32	1.437
	4 Tx slots	Left Side	1		189	836.4	28.72	29	1.067	-0.01	0.896	0.956
	4 Tx slots	Left Side	1		251	848.8	28.63	29	1.089	0.03	0.891	0.970
	4 Tx slots	Right Side	1		189	836.4	28.72	29	1.067	0.07	0.962	1.026
	4 Tx slots	Right Side	1		251	848.8	28.63	29	1.089	-0.03	1.01	1.100
94	4 Tx slots	Back	1	Headset	251	848.8	28.63	29	1.089	-0.07	1.22	1.328
	4 Tx slots	Back	1	Headset	189	836.4	28.72	29	1.067	0.01	1.13	1.205
	4 Tx slots	Back	1	Headset	128	824.2	28.89	29	1.026	-0.05	1.20	1.231

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).
3. When multiple slots can be used, SAR should be tested to account for the maximum source-based time-averaged output power.
4. When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.
5. When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
6. A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
7. A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
8. Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

SAR Values [GSM 1900 (GSM/GPRS/EGPRS)]

Plot No.	Mode	Test Position	Gap (cm)	Headset	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	4 Tx slots	Right Cheek	-		512	1850.2	26.06	26.50	1.107	-0.15	0.326	0.361
	4 Tx slots	Right Tilted	-		512	1850.2	26.06	26.50	1.107	0.11	0.15	0.166
	4 Tx slots	Left Cheek	-		512	1850.2	26.06	26.50	1.107	0.01	0.316	0.350
	4 Tx slots	Left Tilted	-		512	1850.2	26.06	26.50	1.107	0.08	0.078	0.086
41	4 Tx slots	Front	1		512	1850.2	26.06	26.50	1.107	-0.05	0.612	0.677
	4 Tx slots	Back	1		512	1850.2	26.06	26.50	1.107	0.08	0.729	0.807
	4 Tx slots	Left Side	1		512	1850.2	26.06	26.50	1.107	-0.15	0.191	0.211
	4 Tx slots	Right Side	1		512	1850.2	26.06	26.50	1.107	-0.06	0.144	0.159
	4 Tx slots	Bottom Side	1		512	1850.2	26.06	26.50	1.107	-0.04	0.77	0.852
	4 Tx slots	Back	1		661	1880	25.58	26.50	1.236	-0.02	0.676	0.836
47	4 Tx slots	Back	1		810	1909.8	25.49	26.50	1.262	-0.05	0.738	0.931
48	4 Tx slots	Bottom Side	1		661	1880	25.58	26.50	1.236	-0.04	0.697	0.861
	4 Tx slots	Bottom Side	1		810	1909.8	25.49	26.50	1.262	-0.07	0.626	0.790

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).
3. When multiple slots can be used, SAR should be tested to account for the maximum source-based time-averaged output power.
4. When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.
5. When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
6. A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
7. A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
8. Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

SAR Values [UMTS Band II (WCDMA/HSDPA/HSUPA)]

Plot No.	Mode	Test Position	Gap (cm)	Headset	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	RMC 12.2K	Right Cheek	-		9262	1852.4	21.70	22.00	1.072	-0.1	0.299	0.320
	RMC 12.2K	Right Tilted	-		9262	1852.4	21.70	22.00	1.072	-0.09	0.132	0.141
	RMC 12.2K	Left Cheek	-		9262	1852.4	21.70	22.00	1.072	-0.17	0.298	0.319
	RMC 12.2K	Left Tilted	-		9262	1852.4	21.70	22.00	1.072	0.11	0.123	0.132
51	RMC 12.2K	Front	1		9262	1852.4	21.70	22.00	1.072	0.04	0.562	0.602
52	RMC 12.2K	Back	1		9262	1852.4	21.70	22.00	1.072	0.04	0.689	0.738
	RMC 12.2K	Left Side	1		9262	1852.4	21.70	22.00	1.072	-0.02	0.177	0.190
	RMC 12.2K	Right Side	1		9262	1852.4	21.70	22.00	1.072	-0.1	0.127	0.136
55	RMC 12.2K	Bottom Side	1		9262	1852.4	21.70	22.00	1.072	0.01	0.713	0.764

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).
3. WCDMA mode were tested under RMC 12.2kbps without HSPA (HSDPA/HSUPA) inactive per KDB Publication 941225 D01. HSPA (HSDPA/HSUPA) SAR for body was required since the maximum SAR for 12.2kbps RMC was above 75% SAR limit.
4. When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.
5. When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
6. A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
7. A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
8. Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

SAR Values [WIFI (802.11b/g/n)]

Plot No.	Mode	Test Position	Gap (cm)	Headset	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	802.11b	Right Cheek	-		1	2412	14.25	14.50	1.059	-0.02	1.1	1.165
	802.11b	Right Cheek	-		1	2412	14.25	14.50	1.059	-0.03	1.07	1.133
	802.11b	Right Tilted	-		1	2412	14.25	14.50	1.059	0.07	0.666	0.705
	802.11b	Left Cheek	-		1	2412	14.25	14.50	1.059	-0.08	0.455	0.482
	802.11b	Left Tilted	-		1	2412	14.25	14.50	1.059	-0.02	0.351	0.372
	802.11b	Right Cheek	-		6	2437	13.55	14.50	1.245	0.09	0.893	1.111
66	802.11b	Right Cheek	-		11	2462	13.56	14.50	1.563	-0.08	0.76	1.188
71	802.11b	Front	1		1	2412	14.25	14.50	1.059	-0.06	0.149	0.158
72	802.11b	Back	1		1	2412	14.25	14.50	1.059	-0.06	0.21	0.222
	802.11b	Left Side	1		1	2412	14.25	14.50	1.059	0.08	0.048	0.051
	802.11b	Top Side	1		1	2412	14.25	14.50	1.059	0.11	0.141	0.149
	802.11b	Back	1	Headset	1	2412	14.25	14.50	1.059	-0.02	0.161	0.171

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).
3. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the highest output power channel for each test configuration is ≤ 2 W/kg then testing at the other channels is not required for such test configuration(s).

Simultaneous Transmission Conditions

When standalone SAR is not required to be measured per FCC KDB 447498 D01v05 4.3.2 2), 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 IV.C.1.iii, 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 the sum is greater than the SAR limit, SAR test exclusion is determined by the SAR to peak location separation ratio.

$$\text{Ration}=(\text{SAR1} + \text{SAR2})^{1.5}/\text{Ri} \quad \leq 0.04$$

Estimated $SAR_{BT.Head\ test\ position}$= [(10^(-0.59/10))/5] * ($2.48^{1/2}$/7.5)=0.037 W/kg
Estimated $SAR_{BT.Hotspot\ test\ position}$= [(10^(-0.59/10))/10] * ($2.48^{1/2}$/7.5)=0.018 W/kg
Estimated $SAR_{BT.Body\ worn\ test\ position}$ = [(10^(-0.59/10))/10] * ($2.48^{1/2}$/7.5)= 0.018 W/kg

About Bluetooth DSS and GSM antenna(Head):

WWAN Band		Test Position	WWAN	WLAN DSS	Max, Σ SAR	SPLSR Results
			SAR (W/kg)	SAR (W/kg)		
GSM	GSM850	Right Cheek	0.596	0.037	0.633	
		Right Tilted	0.334	0.037	0.371	
		Left Cheek	0.543	0.037	0.580	
		Left Tilted	0.372	0.037	0.409	
	GSM1900	Right Cheek	0.361	0.037	0.398	
		Right Tilted	0.166	0.037	0.203	
		Left Cheek	0.350	0.037	0.387	
		Left Tilted	0.086	0.037	0.123	

About WIFI and GSM antenna(Head):

WWAN Band		Test Position	WWAN	WLAN DTS	Max, Σ SAR	SPLSR Results
			SAR (W/kg)	SAR (W/kg)		
GSM	GSM850	Right Cheek	0.596	1.188	1.784	0.04
		Right Tilted	0.334	1.133	1.467	
		Left Cheek	0.543	0.482	1.025	
		Left Tilted	0.372	0.372	0.744	
	GSM1900	Right Cheek	0.361	1.165	1.526	
		Right Tilted	0.166	1.133	1.299	
		Left Cheek	0.350	0.482	0.832	
		Left Tilted	0.086	0.372	0.458	

About Bluetooth DSS and GSM antenna(Body):

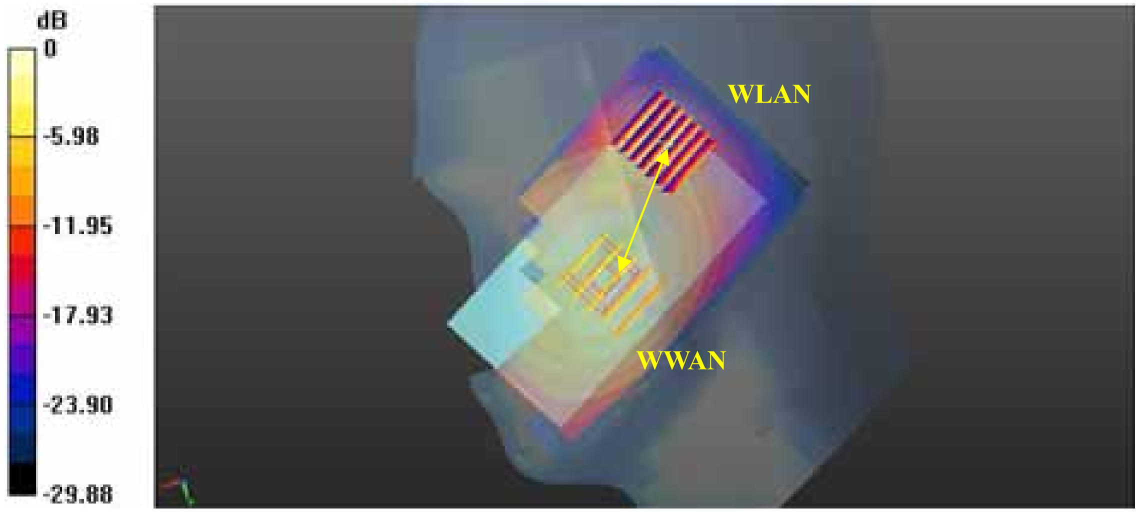
WWAN Band		Test Position	WWAN SAR (W/kg)	WLAN DSS SAR (W/kg)	Max, Σ SAR	SPLSR Results
GSM	GSM850	Front	1.143	0.018	1.161	
		Back	1.437	0.018	1.455	
		Back with Headset	1.328	0.018	1.346	
	GSM1900	Front	0.677	0.018	0.695	
		Back	0.931	0.018	0.949	

About WIFI and GSM antenna(Body):

WWAN Band		Test Position	WWAN SAR (W/kg)	WLAN DTS SAR (W/kg)	Max, Σ SAR	SPLSR Results
GSM	GSM850	Front	1.143	0.158	1.301	
		Back	1.437	0.222	1.659	0.02
		Back with Headset	1.328	0.171	1.499	
	GSM1900	Front	0.677	0.158	0.835	
		Back	0.931	0.222	1.153	

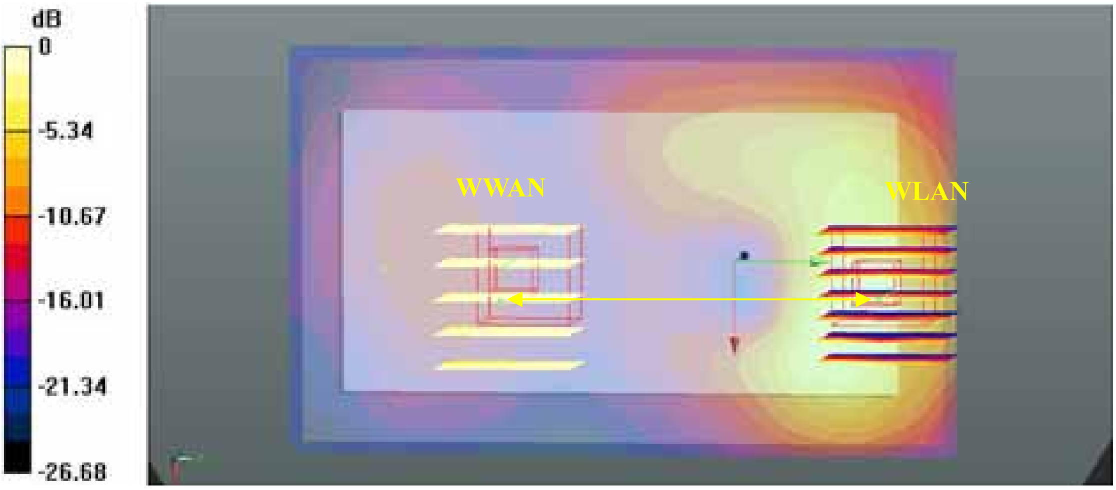
SPLSR Evaluation and Analysis:

Case 1 / Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
77	GSM850	Right Cheek	0.596	0	0.0747	-0.270	-0.172	67.0	1.78	0.04	Not required
66	WLAN2.4G		1.188	0	0.027	-0.317	-0.172				



Case 2 / Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
89	GSM850	Back	1.437	1	-0.0055	-0.0285	-0.205	88.5	1.66	0.02	Not required
72	WLAN2.4G		0.222	1	-0.006	0.06	-0.204				

					2						



Note:1. SPLSR=$(SAR_1 + SAR_2)^{1.5}$ / (min. Separation distance,mm).If SPLSR ≦ 0.04,simultaneously transmission SAR measurement is not necessary.

700MHz to 3GHz Measurement Uncertainty

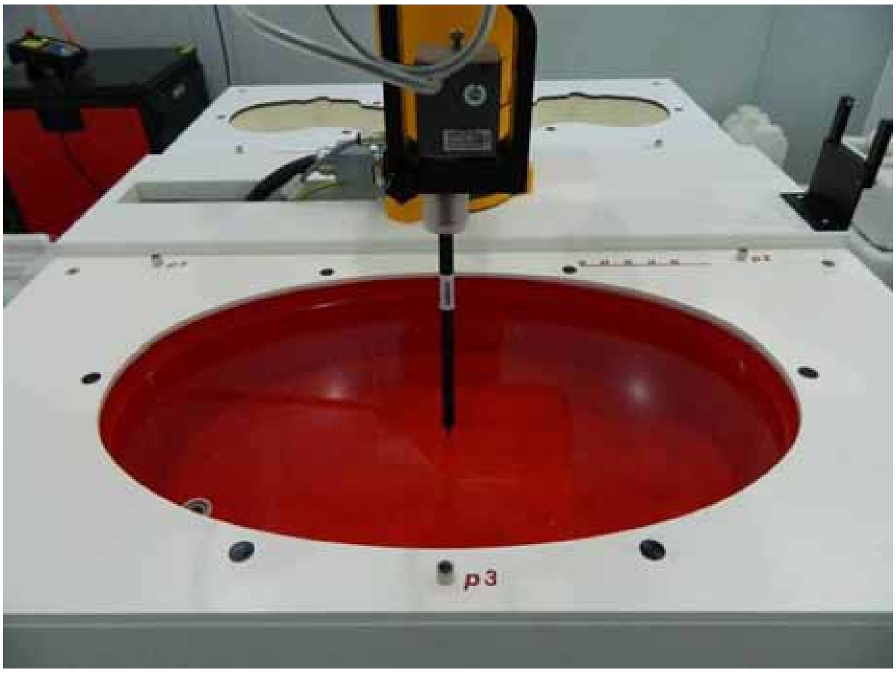
No.	Description	Type	Uncertainty Value(%)	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	5.5	N	1	1	1	5.5	5.5	∞
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	N	1	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	∞
10	RF ambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	∞
11	Probe positioned mech. restrictions	B	0.4	R	$\sqrt{3}$	1	1	0.2	0.2	∞
12	Probe positioning with respect to phantom shell	B	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
13	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Test sample related										
14	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
15	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
16	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up										
17	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
18	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
19	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
20	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
21	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521
continue										
Combined standard uncertainty		$u_c^{'} = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$						9.25	9.12	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						18.5	18.2	\

MAIN TEST INSTRUMENTS

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Signal Generator	Agilent	N5181A	MY50145187	Nov 04, 2013	1year
2	RF Power Meter. Dual Channel	BOONTON	4232A	10539	May 17, 2014	1year
3	Power Sensor	BOONTON	51011EMC	34236/34238	May 17, 2014	1year
4	Wideband Radio Communication Tester	R&S	CMW500	1201.0002K50-140822zk	2013-12-16	1year
5	E-Field Probe	SPEAG	EX3DV4	3970	2014-1-15	1year
6	DAE	SPEAG	DAE4	1418	2014-1-03	1year
7	Validation Kit 900MHz	SPEAG	D900V2	1d162	2014-1-13	2year
8	Validation Kit 1950MHz	SPEAG	D1950V3	1151	2014-1-13	2year
9	Validation Kit 5GHz	SPEAG	D5GHzV2	1169	2014-1-13	2year
10	Validation Kit 2450MHz	SPEAG	D2450V2	927	2014-1-13	2year

END OF REPORT BODY

ANNEX A TEST LAYOUT



ANNEX B SYSTEM CHECK RESULT

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date: 16.10.2014

System Check_Head_900MHz_141016

DUT: Dipole 900 MHz D900V2

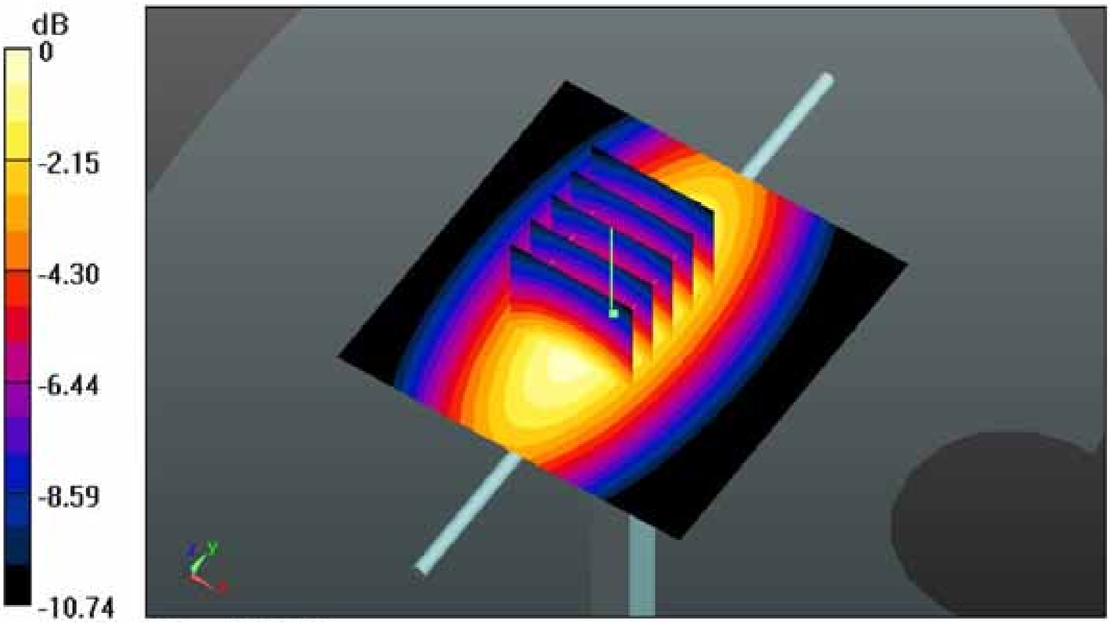
Communication System: UID 0, CW (0); Frequency: 900 MHz;Duty Cycle: 1:1
Medium: HSL_900_141016Medium parameters used: f = 900 MHz; σ = 0.957 S/m; ε_r = 41.26; ρ = 1000 kg/m^3
Ambient Temperature: 23.3 ℃; Liquid Temperature: 22.6 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(9.99, 9.99, 9.99); Calibrated: 15.01.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 03.01.2014
- Phantom: SAM; Type: QD000P40CD; Serial: TP:1794
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Pin=250 mW/Area Scan (41x111x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 3.10 W/kg

Pin=250 mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.958 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 3.69 W/kg
SAR(1 g) = 2.52 W/kg; SAR(10 g) = 1.57 W/kg
Maximum value of SAR (measured) = 3.11 W/kg



0 dB = 3.11 W/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date: 11.09.2014

System Check_Head_1950MHz_140911

DUT: Dipole 1950 MHz D1950V3

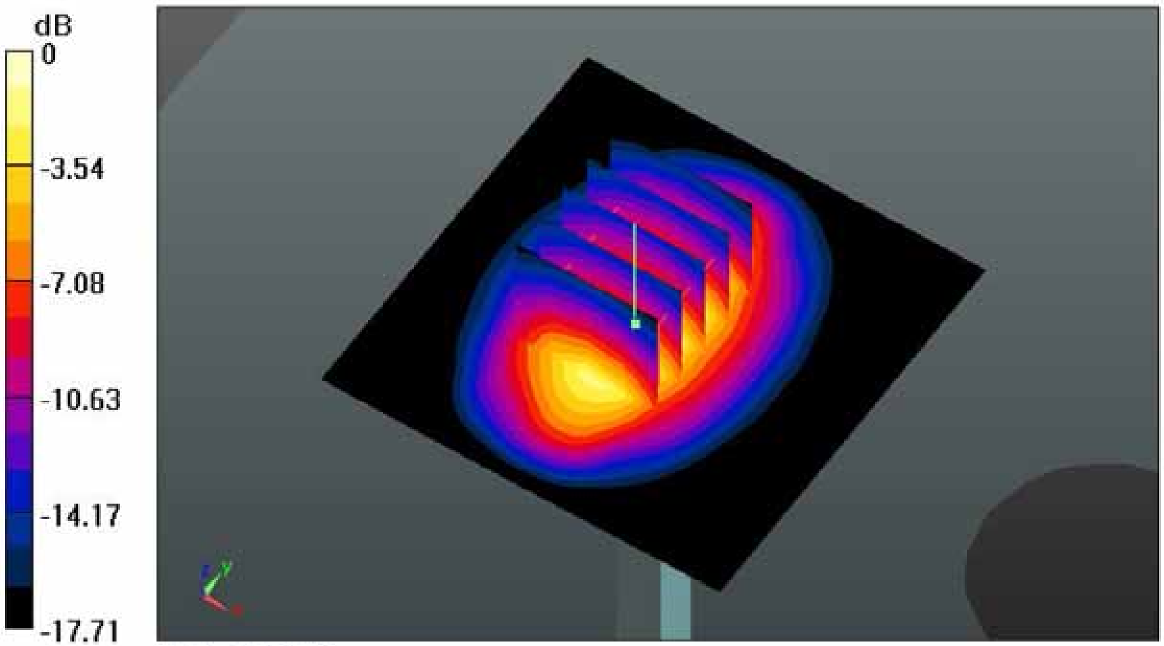
Communication System: UID 0, CW (0); Frequency: 1950 MHz;Duty Cycle: 1:1
Medium: HSL_1950_140911Medium parameters used: f = 1950 MHz; σ = 1.41 S/m; ε_r = 39.7; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃; Liquid Temperature: 22.7 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(7.76, 7.76, 7.76); Calibrated: 15.01.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 03.01.2014
- Phantom: SAM; Type: QD000P40CD; Serial: TP:1794
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Pin=250 mW/Area Scan (41x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 15.9 W/kg

Pin=250 mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 106.2 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 20.7 W/kg
SAR(1 g) = 10.74 W/kg; SAR(10 g) = 5.67 W/kg
Maximum value of SAR (measured) = 15.9 W/kg



0 dB = 15.9 W/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date: 2014.09.16

System Check_Head_2450MHz_140916

DUT: Dipole 2450 MHz

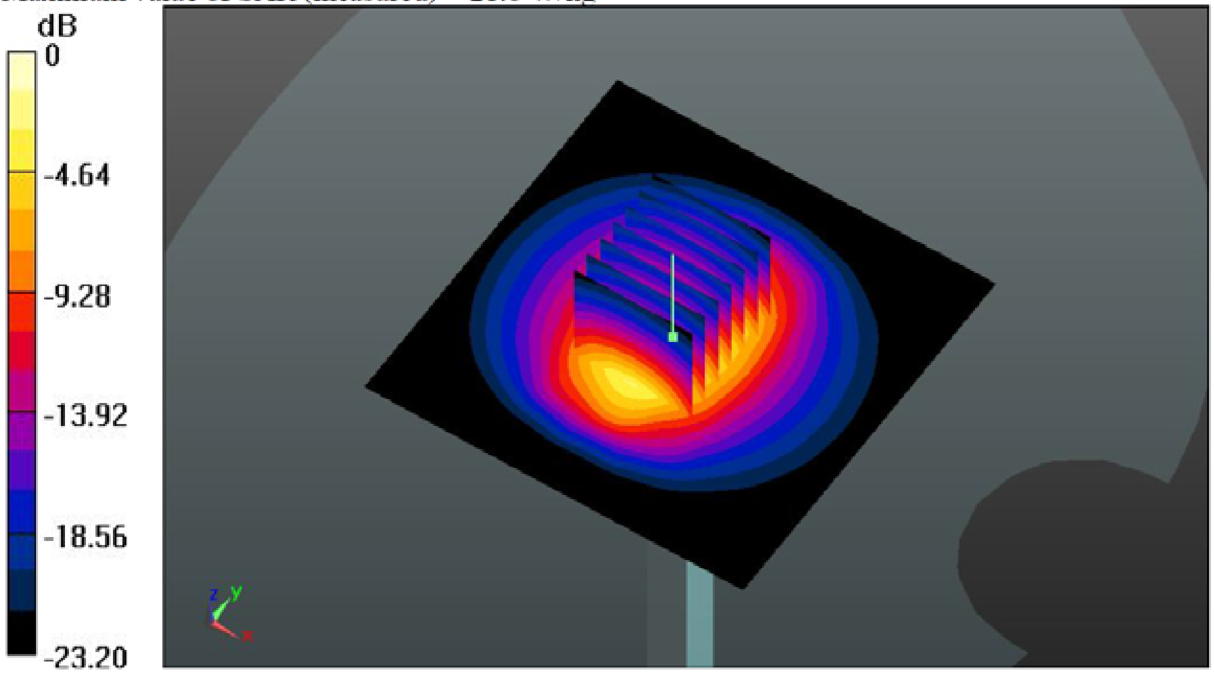
Communication System: UID 0, CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: HSL_2450_140916 Medium parameters used: f = 2450 MHz; σ = 1.786 S/m; ε_r = 40.406; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.7 ℃

DASY5 Configuration:

- Probe: EX3DV4 - SN3970; ConvF(7.31, 7.31, 7.31); Calibrated: 15.01.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 03.01.2014
- Phantom: SAM; Type: QD000P40CD; Serial: TP:1794
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 21.5 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.711 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 30.1 W/kg
SAR(1 g) = 13.97 W/kg; SAR(10 g) = 6.29 W/kg
Maximum value of SAR (measured) = 21.6 W/kg



0 dB = 21.6 W/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date: 16.10.2014

System Check_Body_900MHz_141016

DUT: Dipole 900 MHz D900V2

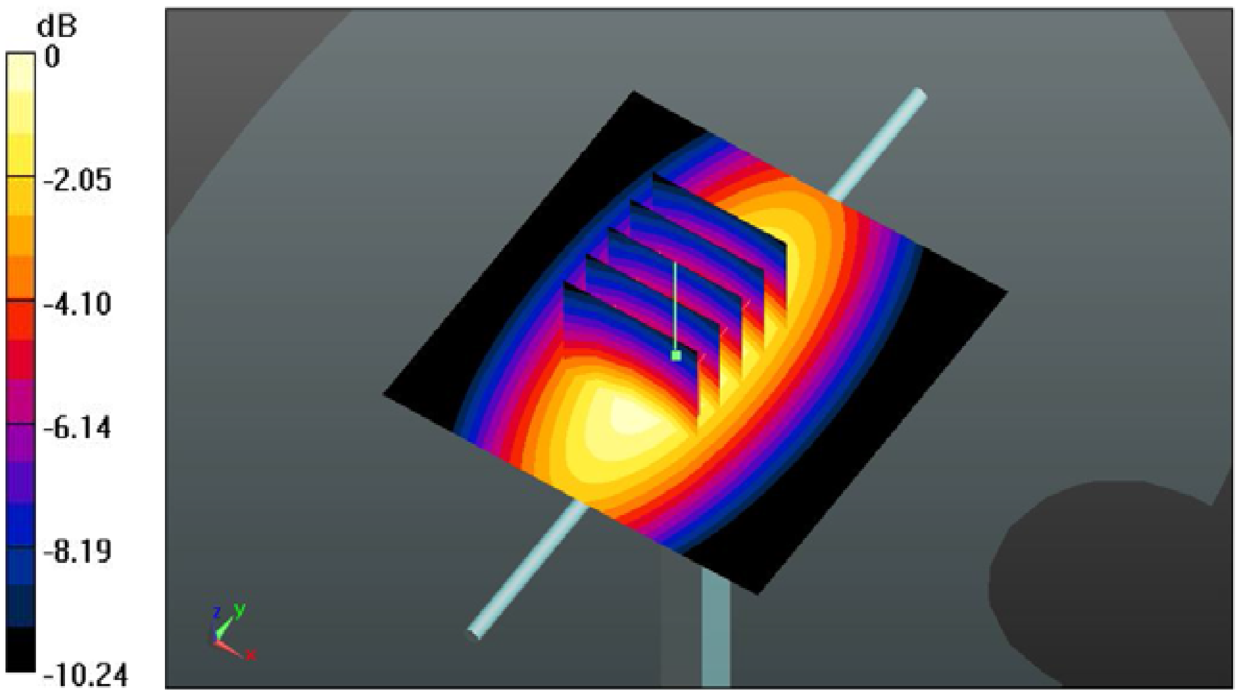
Communication System: UID 0, CW (0); Frequency: 900 MHz;Duty Cycle: 1:1
Medium: MSL_900_141016Medium parameters used: f = 900 MHz; σ = 1.058 S/m; ε_r = 54.756; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃; Liquid Temperature: 22.8 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(9.69, 9.69, 9.69); Calibrated: 15.01.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 03.01.2014
- Phantom: SAM; Type: QD000P40CD; Serial: TP:1794
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Pin=250 mW/Area Scan (41x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 3.63 W/kg

Pin=250 mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 59.635 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 4.33 W/kg
SAR(1 g) = 2.76 W/kg; SAR(10 g) = 1.85 W/kg
Maximum value of SAR (measured) = 3.64 W/kg



0 dB = 3.64 W/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date: 16.09.2014

System Check_Body_1950MHz_140916

DUT: Dipole 1950 MHz D1950V3

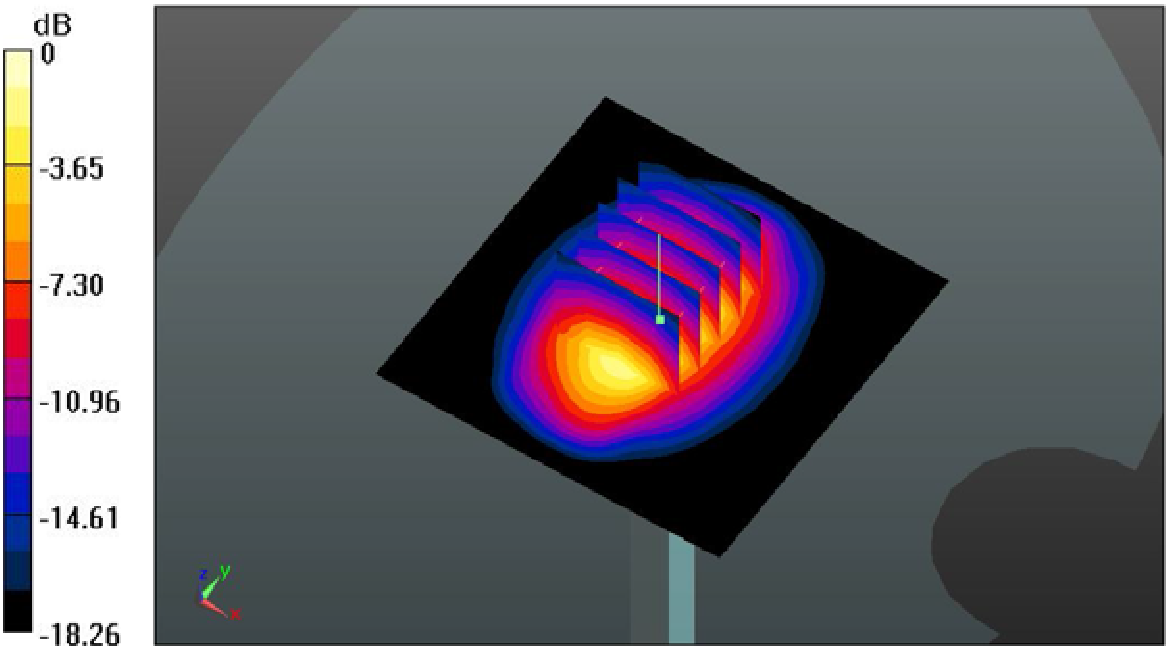
Communication System: UID 0, CW (0); Frequency: 1950 MHz;Duty Cycle: 1:1
Medium: MSL_1950_140916Medium parameters used: f = 1950 MHz; σ = 1.51 S/m; ε_r = 53.45; ρ = 1000 kg/m^3
Ambient Temperature: 23.3 ℃; Liquid Temperature: 22.6 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(8.06, 8.06, 8.06); Calibrated: 15.01.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 03.01.2014
- Phantom: SAM; Type: QD000P40CD; Serial: TP:1794
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Pin=250 mW/Area Scan (41x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 14.7 W/kg

Pin=250 mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.439 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 17.8 W/kg
SAR(1 g) = 9.93 W/kg; SAR(10 g) = 5.21 W/kg
Maximum value of SAR (measured) = 14.1 W/kg



0 dB = 14.1 W/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date: 2014.09.17

System Check_Body_2450MHz_140917

DUT: Dipole 2450 MHz

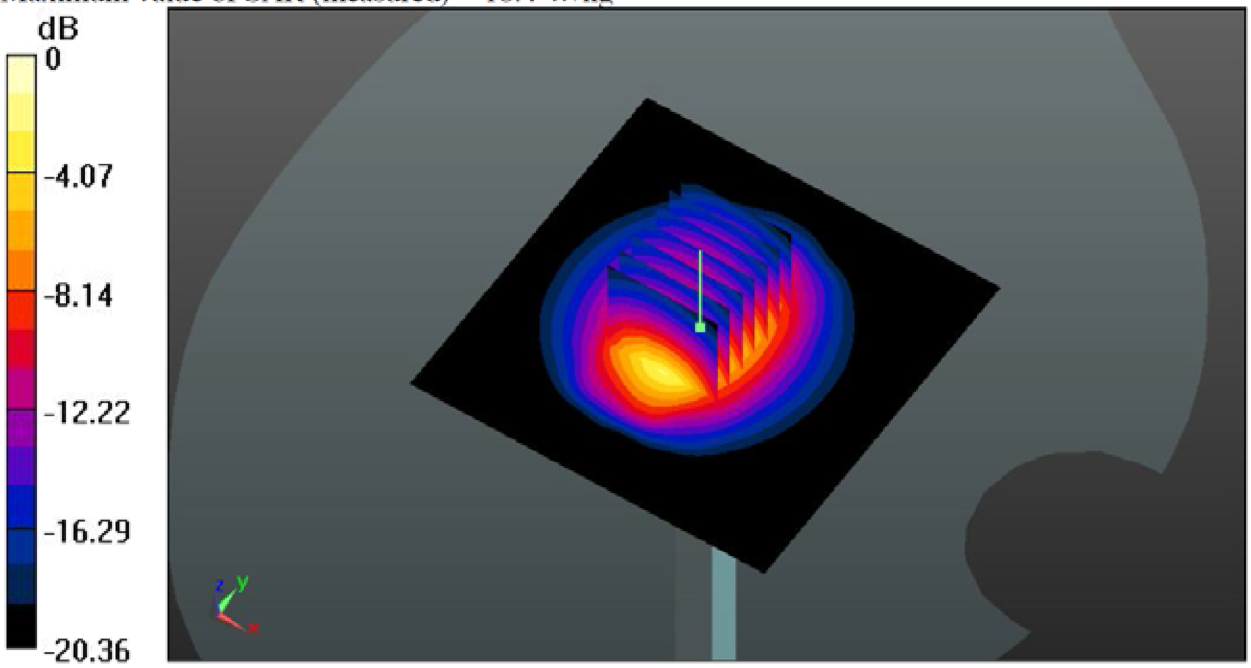
Communication System: UID 0, CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: MSL_2450_140917 Medium parameters used: f = 2450 MHz; σ = 2.026 S/m; ε_r = 52.8; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.5 ℃

DASY5 Configuration:

- Probe: EX3DV4 - SN3970; ConvF(7.46, 7.46, 7.46); Calibrated: 15.01.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 03.01.2014
- Phantom: SAM; Type: QD000P40CD; Serial: TP:1794
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 18.3 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 82.934 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 24.5 W/kg
SAR(1 g) = 12.21 W/kg; SAR(10 g) = 5.79 W/kg
Maximum value of SAR (measured) = 18.4 W/kg



0 dB = 18.4 W/kg

ANNEX C GRAPH Result

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date: 16.10.2014

87 GSM850_GPRS(4 Tx slots)_Front_1cm_Ch251

DUT: SP-5050

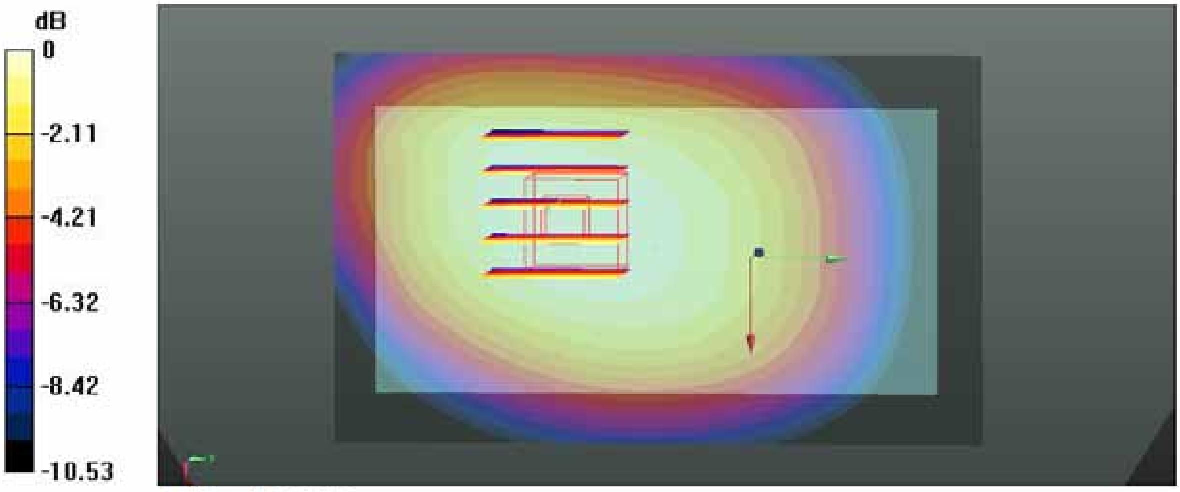
Communication System: UID 0, GPRS/EDGE12 (0); Frequency: 848.8 MHz;Duty Cycle: 1:2.08
Medium: MSL_835_141016Medium parameters used: f = 849 MHz; σ = 1.005 S/m; ε_r = 55.256; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃; Liquid Temperature: 22.8 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(9.92, 9.92, 9.92); Calibrated: 15.01.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 03.01.2014
- Phantom: SAM; Type: QD000P40CD; Serial: TP:1794
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Ch251/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.16 W/kg

Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.135 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.27 W/kg
SAR(1 g) = 1.05 W/kg; SAR(10 g) = 0.768 W/kg
Maximum value of SAR (measured) = 1.15 W/kg



0 dB = 1.15 W/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date: 16.10.2014

89 GSM850_GPRS(4 Tx slots)_Back_1cm_Ch251

DUT: SP-5050

Communication System: UID 0, GPRS/EDGE12 (0); Frequency: 848.8 MHz;Duty Cycle: 1:2.08
Medium: MSL_835_141016Medium parameters used: f = 849 MHz; σ = 1.005 S/m; ε_r = 55.256; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃; Liquid Temperature: 22.8 ℃

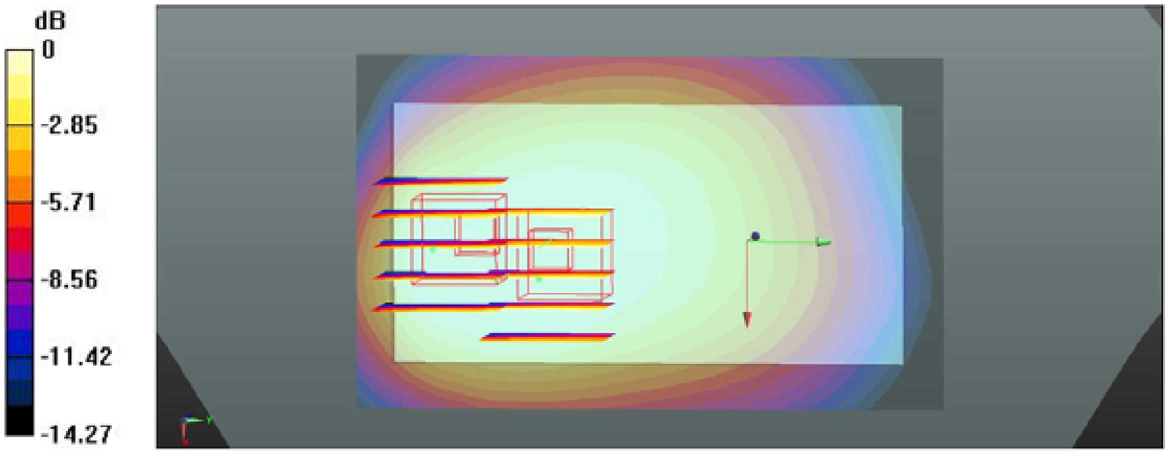
DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(9.92, 9.92, 9.92); Calibrated: 15.01.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 03.01.2014
- Phantom: SAM; Type: QD000P40CD; Serial: TP:1794
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Ch251/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.61 W/kg

Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 32.765 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 1.77 W/kg
SAR(1 g) = 1.32 W/kg; SAR(10 g) = 0.937 W/kg
Maximum value of SAR (measured) = 1.53 W/kg

Ch251/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 32.765 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 1.60 W/kg
SAR(1 g) = 0.937 W/kg; SAR(10 g) = 0.653 W/kg
Maximum value of SAR (measured) = 1.35 W/kg



0 dB = 1.35 W/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date: 16.10.2014

94 GSM850_GPRS(4 Tx slots)_Back_1cm_Ch251_Headset

DUT: SP-5050

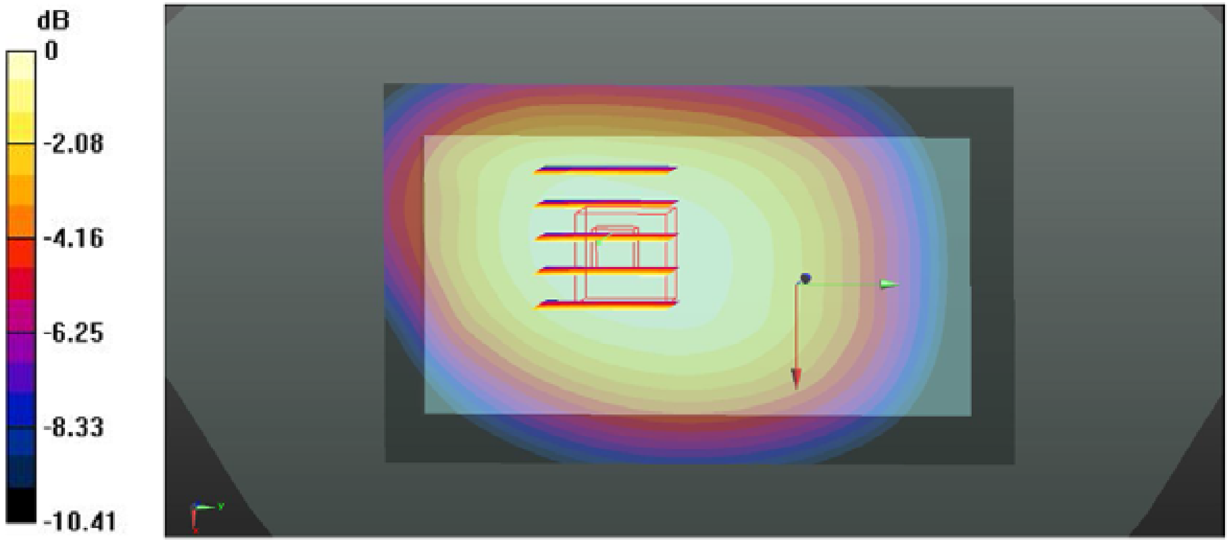
Communication System: UID 0, GPRS/EDGE12 (0); Frequency: 848.8 MHz;Duty Cycle: 1:2.08
Medium: MSL_835_141016Medium parameters used: f = 849 MHz; σ = 1.005 S/m; ε_r = 55.256; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃; Liquid Temperature: 22.8 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(9.92, 9.92, 9.92); Calibrated: 15.01.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 03.01.2014
- Phantom: SAM; Type: QD000P40CD; Serial: TP:1794
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Ch251/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.27 W/kg

Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 32.613 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 1.41 W/kg
SAR(1 g) = 1.22 W/kg; SAR(10 g) = 0.876 W/kg
Maximum value of SAR (measured) = 1.29 W/kg



0 dB = 1.29 W/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date: 16.09.2014

41 GSM1900_GPRS(4 Tx slots)_Front_1cm_Ch512

DUT: SP-5050

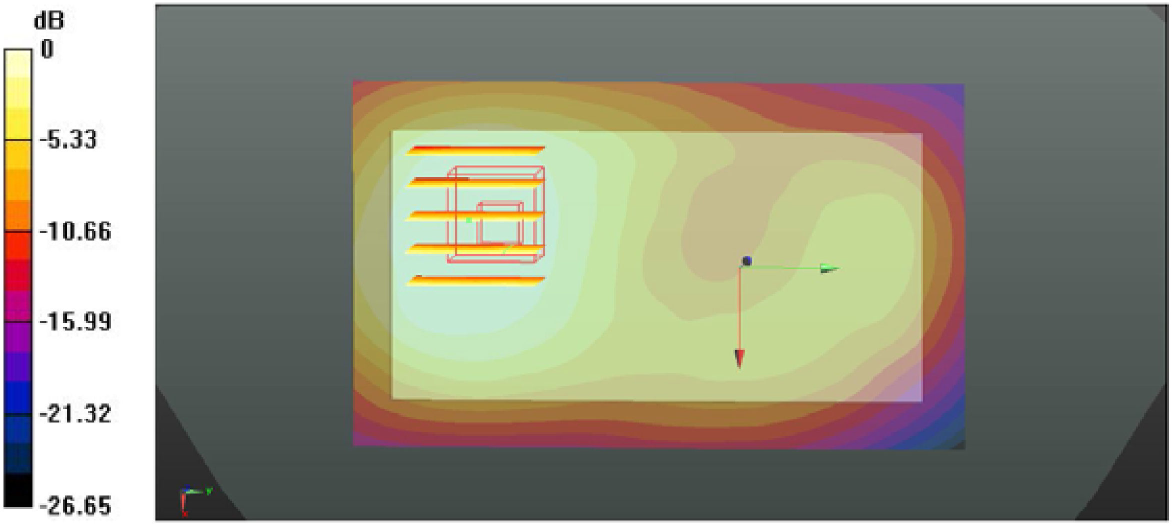
Communication System: UID 0, GPRS/EDGE12 (0); Frequency: 1850.2 MHz;Duty Cycle: 1:2.08
Medium: MSL_1900_140916Medium parameters used: f = 1850.2 MHz; σ = 1.469 S/m; ε_r = 53.947; ρ = 1000 kg/m^3
Ambient Temperature: 23.3 ℃; Liquid Temperature: 22.6 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(8.01, 8.01, 8.01); Calibrated: 15.01.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 03.01.2014
- Phantom: SAM; Type: QD000P40CD; Serial: TP:1794
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Ch512/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.800 W/kg

Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.690 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.961 W/kg
SAR(1 g) = 0.612 W/kg; SAR(10 g) = 0.391 W/kg
Maximum value of SAR (measured) = 0.786 W/kg



0 dB = 0.786 W/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date: 16.09.2014

47 GSM1900_GPRS(4 Tx slots)_Back_1cm_Ch810

DUT: SP-5050

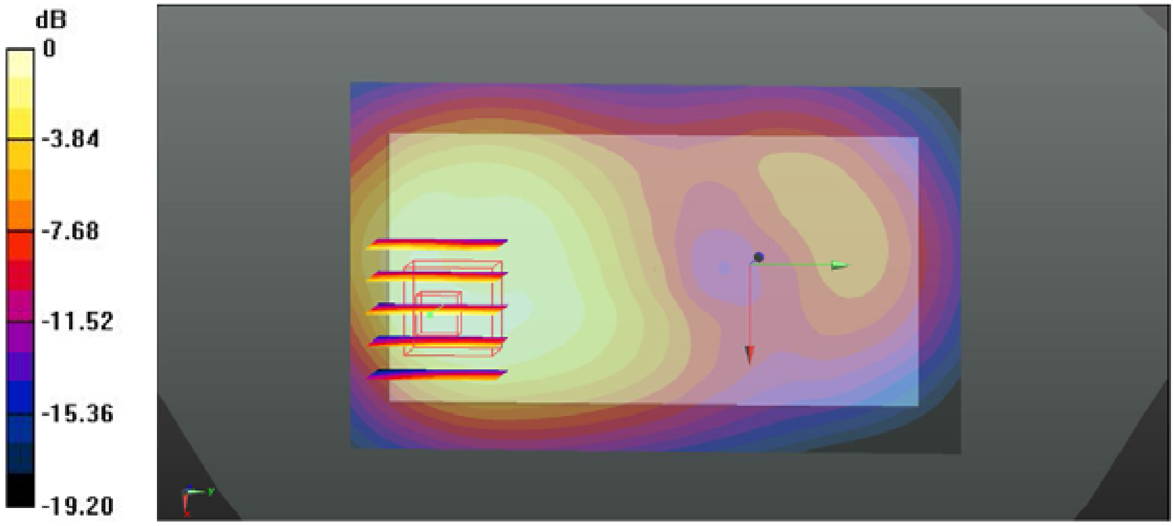
Communication System: UID 0, GPRS/EDGE12 (0); Frequency: 1909.8 MHz;Duty Cycle: 1:2.08
Medium: MSL_1900_140916Medium parameters used: f = 1910 MHz; σ = 1.545 S/m; ε_r = 53.721; ρ = 1000 kg/m^3
Ambient Temperature: 23.3 ℃; Liquid Temperature: 22.6 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(8.01, 8.01, 8.01); Calibrated: 15.01.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 03.01.2014
- Phantom: SAM; Type: QD000P40CD; Serial: TP:1794
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Ch810/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.00 W/kg

Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.431 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.24 W/kg
SAR(1 g) = 0.738 W/kg; SAR(10 g) = 0.430 W/kg
Maximum value of SAR (measured) = 1.02 W/kg



0 dB = 1.02 W/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date: 16.09.2014

48 GSM1900_GPRS(4 Tx slots)_Bottom Side_1cm_Ch661

DUT: SP-5050

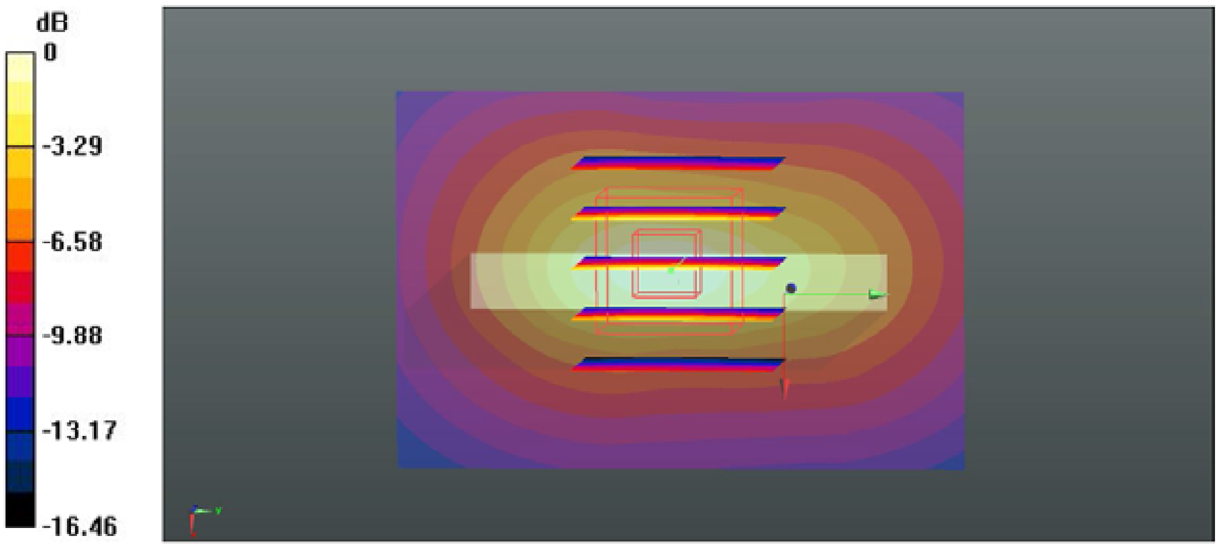
Communication System: UID 0, GPRS/EDGE12 (0); Frequency: 1880 MHz;Duty Cycle: 1:2.08
Medium: MSL_1900_140916Medium parameters used: f = 1880 MHz; σ = 1.506 S/m; ε_r = 53.828; ρ = 1000 kg/m^3
Ambient Temperature: 23.3 ℃; Liquid Temperature: 22.6 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(8.01, 8.01, 8.01); Calibrated: 15.01.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 03.01.2014
- Phantom: SAM; Type: QD000P40CD; Serial: TP:1794
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Ch661/Area Scan (41x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.935 W/kg

Ch661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.526 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.697 W/kg; SAR(10 g) = 0.376 W/kg
Maximum value of SAR (measured) = 0.960 W/kg



0 dB = 0.960 W/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date: 16.09.2014

51 WCDMA II_RMC 12.2K_Front_1cm_Ch9262

DUT: SP-5050

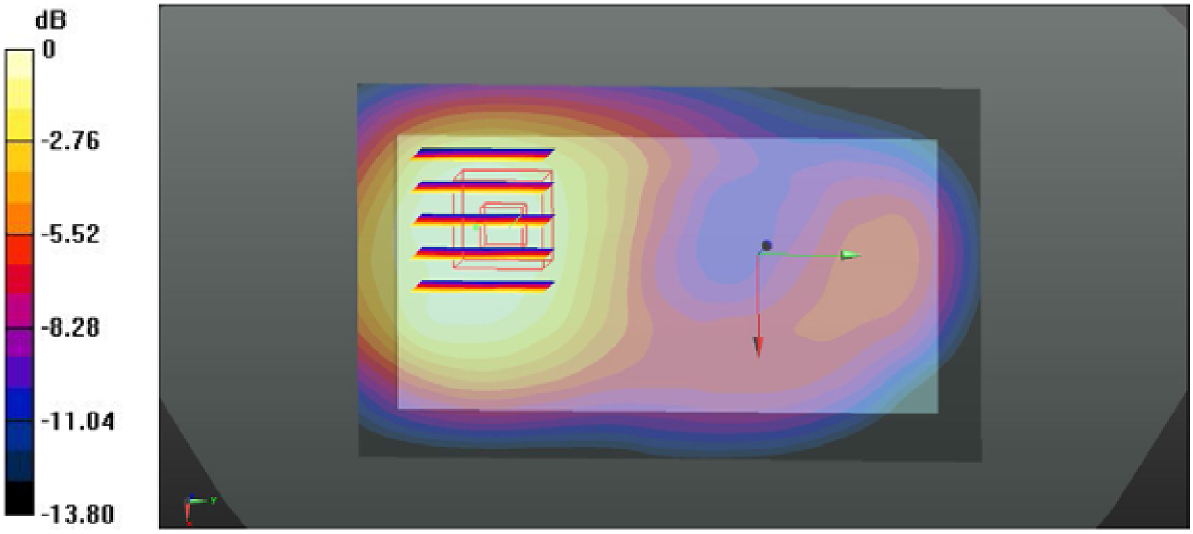
Communication System: UID 0, UMTS (0); Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium: MSL_1900_140916Medium parameters used: f = 1852.4 MHz; σ = 1.471 S/m; ε_r = 53.939; ρ = 1000 kg/m^3
Ambient Temperature: 23.3 ℃; Liquid Temperature: 22.6 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(8.01, 8.01, 8.01); Calibrated: 15.01.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 03.01.2014
- Phantom: SAM; Type: QD000P40CD; Serial: TP:1794
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Ch9262/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.735 W/kg

Ch9262/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.143 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.886 W/kg
SAR(1 g) = 0.562 W/kg; SAR(10 g) = 0.358 W/kg
Maximum value of SAR (measured) = 0.718 W/kg



0 dB = 0.718 W/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date: 16.09.2014

52 WCDMA II_RMC 12.2K_Back_1cm_Ch9262

DUT: SP-5050

Communication System: UID 0, UMTS (0); Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium: MSL_1900_140916Medium parameters used: f = 1852.4 MHz; σ = 1.471 S/m; ε_r = 53.939; ρ = 1000 kg/m^3
Ambient Temperature: 23.3 ℃; Liquid Temperature: 22.6 ℃

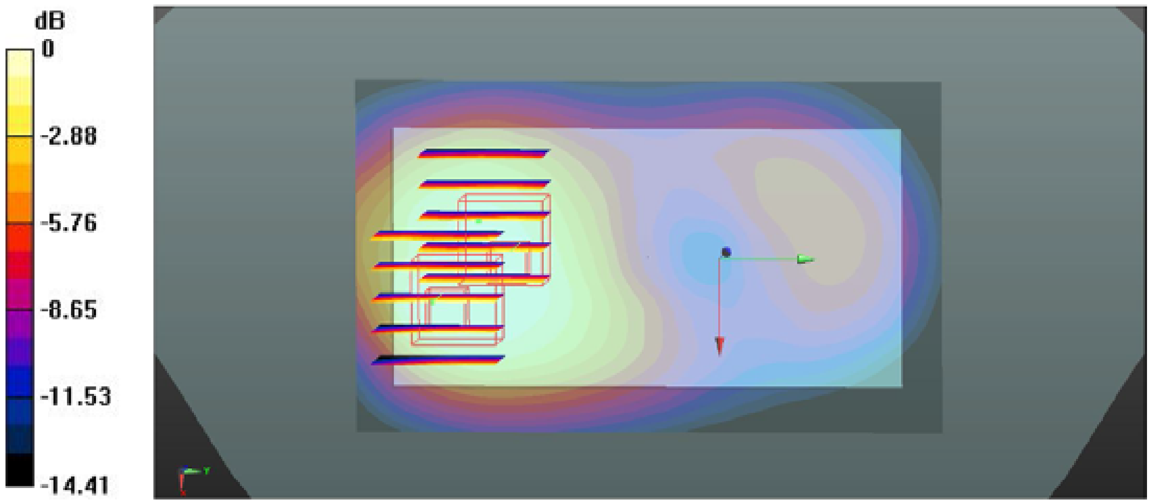
DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(8.01, 8.01, 8.01); Calibrated: 15.01.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 03.01.2014
- Phantom: SAM; Type: QD000P40CD; Serial: TP:1794
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Ch9262/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.941 W/kg

Ch9262/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.622 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.12 W/kg
SAR(1 g) = 0.689 W/kg; SAR(10 g) = 0.416 W/kg
Maximum value of SAR (measured) = 0.914 W/kg

Ch9262/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.622 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.03 W/kg
SAR(1 g) = 0.655 W/kg; SAR(10 g) = 0.394 W/kg
Maximum value of SAR (measured) = 0.838 W/kg



0 dB = 0.838 W/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date: 16.09.2014

55 WCDMA II_RMC 12.2K_Bottom Side_1cm_Ch9262

DUT: SP-5050

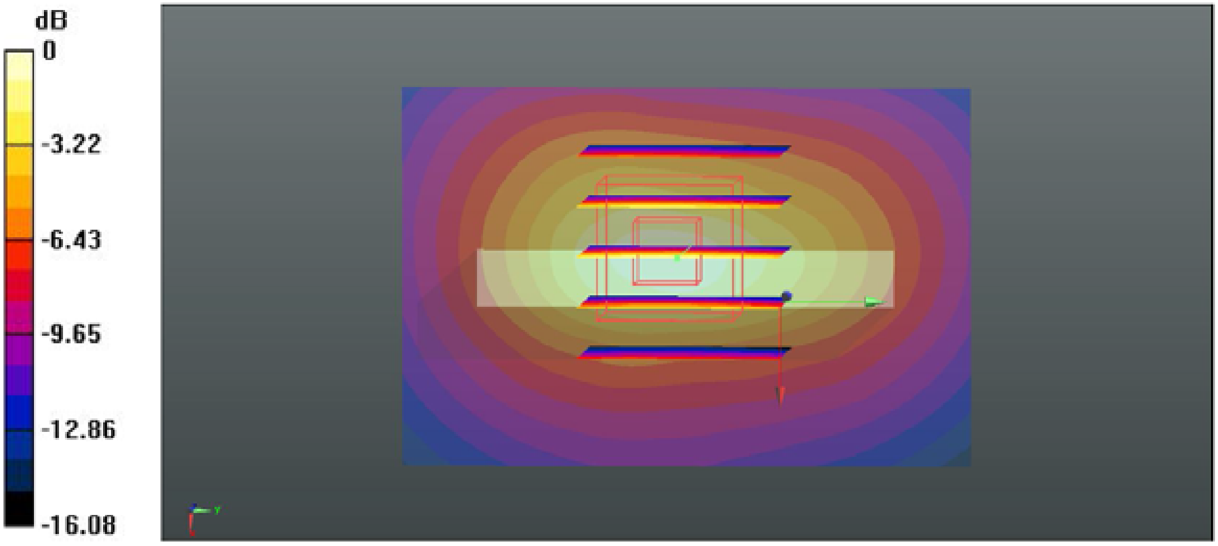
Communication System: UID 0, UMTS (0); Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium: MSL_1900_140916Medium parameters used: f = 1852.4 MHz; σ = 1.471 S/m; ε_r = 53.939; ρ = 1000 kg/m^3
Ambient Temperature: 23.3 ℃; Liquid Temperature: 22.6 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(8.01, 8.01, 8.01); Calibrated: 15.01.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 03.01.2014
- Phantom: SAM; Type: QD000P40CD; Serial: TP:1794
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Ch9262/Area Scan (41x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.910 W/kg

Ch9262/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.073 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.713 W/kg; SAR(10 g) = 0.392 W/kg
Maximum value of SAR (measured) = 0.971 W/kg



0 dB = 0.971 W/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date: 16.09.2014

66 WLAN2.4G_802.11b_Right Cheek_Ch11

DUT: SP-5050

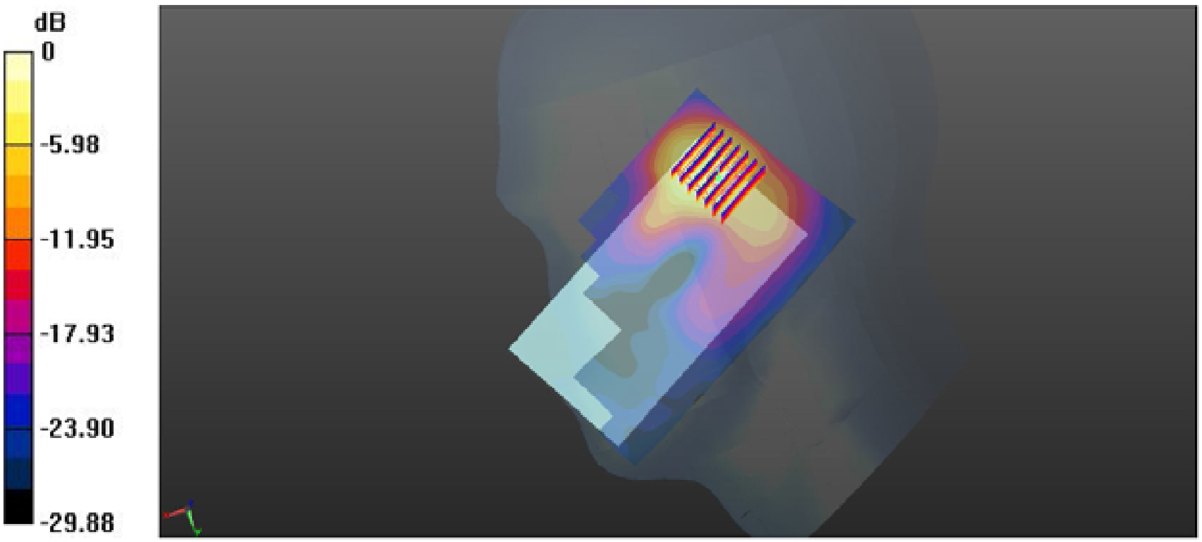
Communication System: UID 0, WIFI (0); Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: HSL_2450_140916Medium parameters used: f = 2462 MHz; σ = 1.803 S/m; ε_r = 40.386; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃; Liquid Temperature: 22.7 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(7.31, 7.31, 7.31); Calibrated: 15.01.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 03.01.2014
- Phantom: SAM; Type: QD000P40CD; Serial: TP:1794
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Ch11/Area Scan (81x131x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.60 W/kg

Ch11/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.120 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 2.58 W/kg
SAR(1 g) = 0.760 W/kg; SAR(10 g) = 0.298 W/kg
Maximum value of SAR (measured) = 1.55 W/kg



0 dB = 1.55 W/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date: 17.09.2014

71 WLAN2.4G_802.11b_Front_1cm_Ch1

DUT: SP-5050

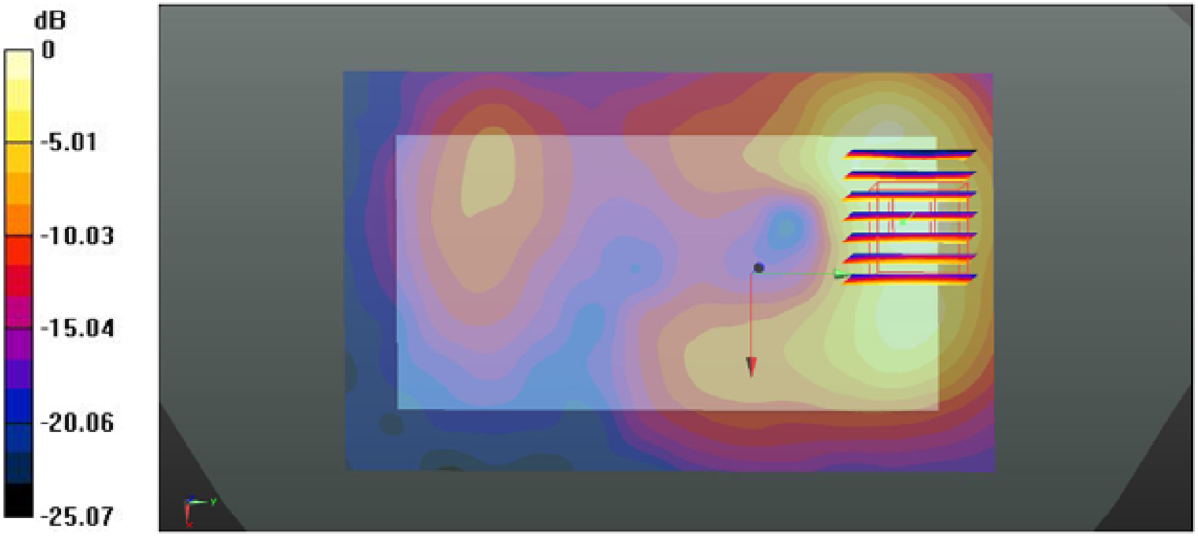
Communication System: UID 0, WIFI (0); Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: MSL_2450_140917Medium parameters used: f = 2412 MHz; σ = 1.971 S/m; ε_r = 52.892; ρ = 1000 kg/m^3
Ambient Temperature: 23.4 ℃; Liquid Temperature: 22.5 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(7.46, 7.46, 7.46); Calibrated: 15.01.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 03.01.2014
- Phantom: SAM; Type: QD000P40CD; Serial: TP:1794
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Ch1/Area Scan (81x131x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.228 W/kg

Ch1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.110 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.375 W/kg
SAR(1 g) = 0.149 W/kg; SAR(10 g) = 0.067 W/kg
Maximum value of SAR (measured) = 0.230 W/kg



0 dB = 0.230 W/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date: 17.09.2014

72 WLAN2.4G_802.11b_Back_1cm_Ch1

DUT: SP-5050

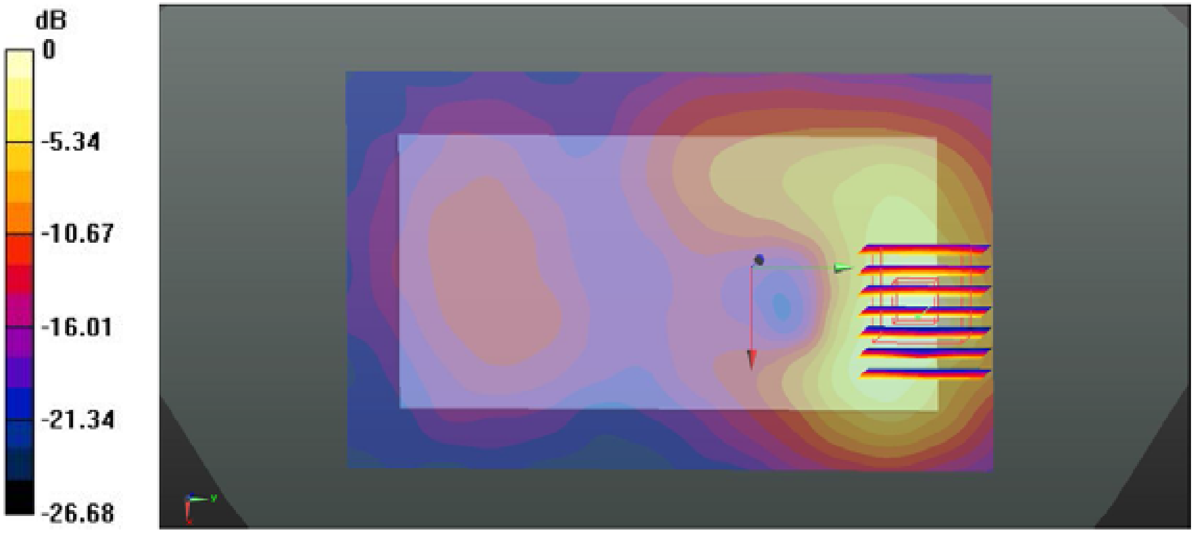
Communication System: UID 0, WIFI (0); Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: MSL_2450_140917Medium parameters used: f = 2412 MHz; σ = 1.971 S/m; ε_r = 52.892; ρ = 1000 kg/m^3
Ambient Temperature: 23.4 ℃; Liquid Temperature: 22.5 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(7.46, 7.46, 7.46); Calibrated: 15.01.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 03.01.2014
- Phantom: SAM; Type: QD000P40CD; Serial: TP:1794
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Ch1/Area Scan (81x131x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.309 W/kg

Ch1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.787 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.524 W/kg
SAR(1 g) = 0.210 W/kg; SAR(10 g) = 0.088 W/kg
Maximum value of SAR (measured) = 0.326 W/kg



0 dB = 0.326 W/kg