TEST REPORT

1. Applicant

Name	: Uriver Inc
Address	: 3rd., Fl., Bogwang Bldg, Gaepo-dong, 1238-7 Gangnam-gu, Seoul, Korea

2. Products

Name	: HSDPA USB MODEM
Model	: UM120/UM150
Manufacturer	: Uriver Inc

3. Test Standard	: FCC 47 CFR § 2.1093
4. Test Method	: OET Bulletin 65, Supplement C(July 2001)
5. Test Result	: Positive
6. Date of Application	: January 30th , 2009
7. Date of Issue	: March 10th, 2009

Tested by

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Korea Testing Laboratory

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1. EQUIPMENT UNDER TEST

1.1 General Information

Type of equipment	HDDPA USB MODEM
Device Category	Portable Device
Model Name	UM120/ UM150
FCC ID	UDTUM120
Test Device	Production Unit
Applicant & Address	Uriver Inc / 3rd., Fl., Bogwang Bldg., Gaepo-dong, 1238-7 Gangnam-gu, Seoul, Korea
Contact Person	skchoi@uriver.co.kr
Rule & Test standard	47 CFR § 2.1093; OET Bulletin 65, Supplement C(July 2001) SAR Measurement conditions for 3G divices : KDB #941225
FCC Clasification	PCS Licensed Transmitter worn on body (PCT)
RF exposure Category	General Population/Uncontrolled
Maximum 2G 1g SAR	1.320 W/kg GPRS850 Body / 1.270 W/kg GPRS1900 Body
Maximum 3G 1g SAR	0.767 W/kg WCDMA Band II Body / 0.499 W/kg WCDMA Band V Body

1.2 Description of Device :

Operation Modes	GPRS/EDGE850/1900, WCDMA Band II / V
Max Conducted 2G Power	GPRS850 : 31.70 dBm / GPRS1900 : 29.59 dBm EDGE850 : 27.46 dBm / EDGE1900: 21.24 dBm
Max Conducted 3G Power	WCDMA Band II : 23.41 dBm WCDMA Band V : 23.17 dBm
Tx Frequency Range 2G	824.2 ~ 848.8 MHz (GPRS/EDGE850) 1850.2 ~ 1909.8 MHz (GPRS/EDGE1900)
Tx Frequency Range 3G	826.4 ~ 846.6 MHz (Cellular WCDMA-HSDPA) 1850.2~ 1909.8 MHz (PCS WCDMA-HSDPA)
GPRS/EDGE Multi-slot class	Class 12
Duty Cycle	1: 2.075 (GPRS/EDGE850/1900) 1:1 (Cellular/PCS WCDMA-HSDPA)
Antenna Type	Internal Antenna (PIFA)
Power Supply	No Battery / USB Port

2. INTRODUCTION

The FCC has adopted the guidelines for evaluating the environmental effects of radio frequency(RF) radiation in ET Docket 93-62 on Aug. 6, 1996 to protect the public and workers from the potential hazards of RF emission due to FCC-regulated portable devices.[1]

The safety limits used for the environmental evaluation measurements are based on the criteria published by American National Standards Institude (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. (c) 1992 by the Institute of Electical and Electronics Engineers, Inc., New York, New York 10017.[2] The measurement procedure described in IEEE/ANSI C95.3-1992 Recommended Practice for the Measurement of Potentially Hazardous Electromgnetic Fields – RF and Microwave[3] is used for guidance in measureing SAR due to the RF radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements(NCRP) in Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields "NCRP Report No. 86 (c) NCRP, 1986, Bethesda, MD 20814.[4] SAR is a measure of the rate of energy absorption due to exaposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards.

2.1 SAR Definition

Specific Absortion Rate (SAR) is defined as the time derivative (rate) of the incremental energy (*dU*) absorbed by (dissipated in) an incremental mass (*dm*) contained in a volume element (*dV*) of a given density(*p*). It is also defined as the rate of RF energy absortion per unit mass at a point in an absorbing body. (see Figure.1)

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

Figure 1. SAR Mathematical Equation

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

$$SAR = \sigma E^2 / p$$

Where :

σ = conductivity of the tissue-simulant material (S/m)

p = mass density of the tissue-simulant material (kg/m^3)

E = Total RMS electric field strength (V/m)

Note: The primary factors that control rate or energy absortion were found to be the wavelength of the incident field in realtions to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflectinf surfaces, and whether conductive contact is made by the organism with a ground plane.[4]

3. DESCRIPTION OF SAR MEASREMENT SYSTEM

3.1 SAR Measurement System

These measurements are performed using the DASY4 automated dosimetric assessment system. It is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland and consists of high precision robotics system (Staubli), robot controller, measurement server, Measurement computer, near-field probe, probe alignment sensor, and the SAM twin phantom containing the brain equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF) (see Fig.2).

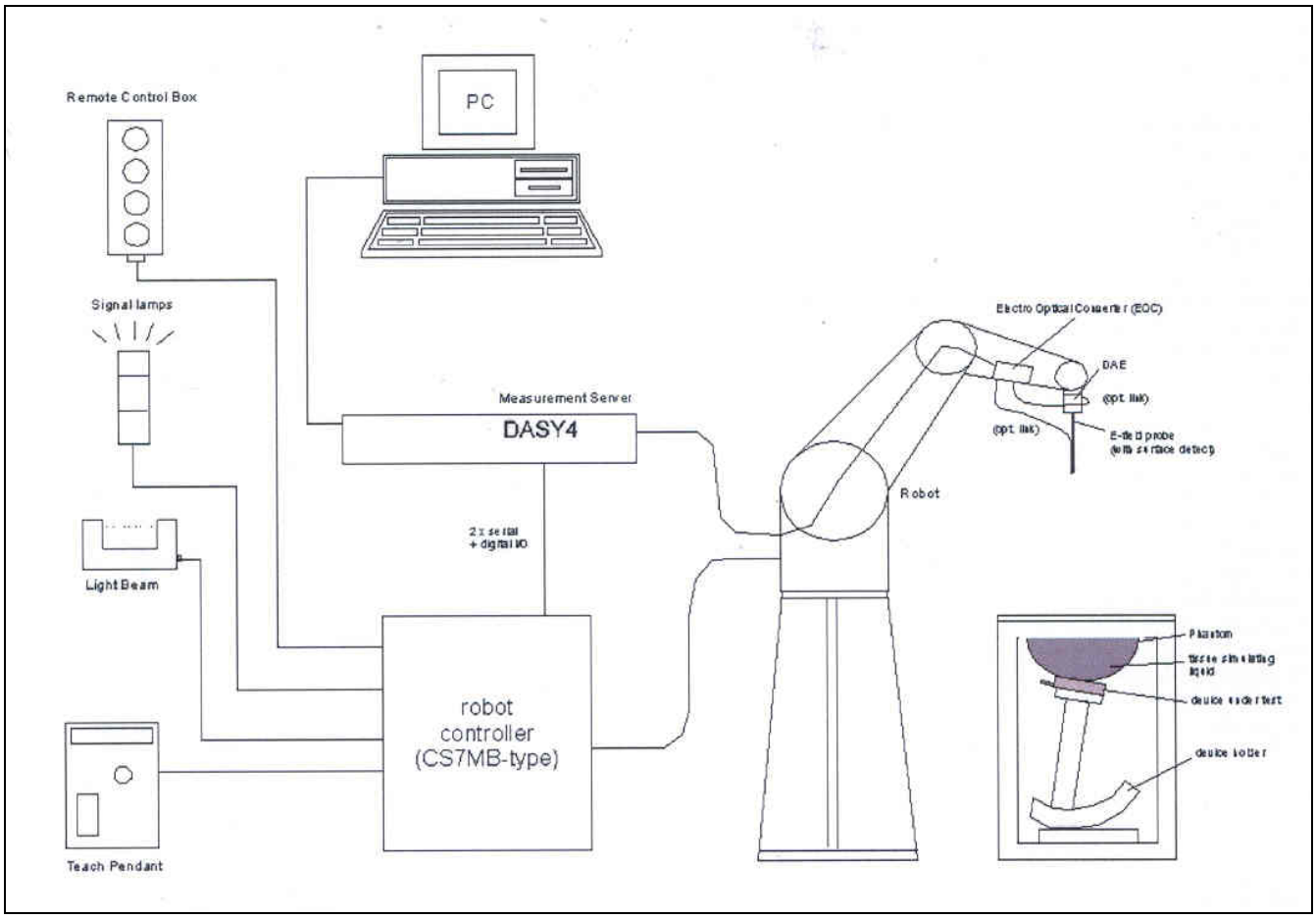


Figure 2. SAR Measurement System

The DAE4 consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer. The system is described in detail in [5].

3.2 E-Field Probe Type and Performance

The SAR measurements were conducted with the dosimetric probe ET3DV6, (see Fifure.4) designed in the classical triangular configuration [5] and optimised for dosimetric evaluation. The probe has been is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical mortifier 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 a 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 DASY4 software reads the reflection during a software approace and looks for the maximum using a 2nd order fitting. The approach is stopped at reaching the maximum.

Figure 3. Probe and DAE

Probe Specifications

Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection System Built-in shielding against static charges
Calibration	In air from 10 MHz to 2.5 GHz In brain and muscle simulating tissue at Frequencies of 450 MHz, 900 MHz and 1.8 GHz (accuracy. 8%)
Frequency	10 MHz to > 6 GHz; Linearity: . 0.2 dB (30 MHz to 3 GHz)
Directivity	. 0.2 dB in brain tissue (rotation around probe axis) . 0.4 dB in brain tissue (rotation normal probe axis)
Dynamic Range Linearity	5 uW/g to > 100 mW/g; 0.2 dB
Surface Detection	0.2 mm repeatability in air and clear liquids Over diffuse reflecting surfaces.
Dimensions	Overall length: 330 mm Tip length: 16 mm Body diameter: 12 mm Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm
Application	General dissymmetry up to 3 GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms

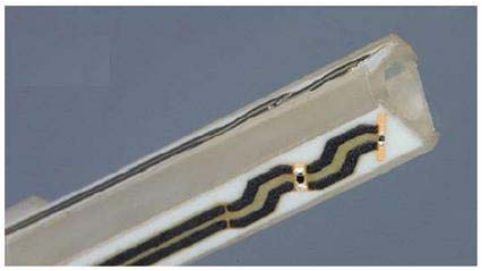


Figure 4. ET3DV6 E-Field Probe

3.3 Probe Calibration Process

Dosimetric Assessment Procedure

Each probe is calibrated according to a dosimetric assessment procedure described [6] with an accuracy better than +/- 10%. The spherical isotropy was evaluated with the procedure described in [7] and found to be better than +/- 0.25dB. The sensitivity parameters (NornX, NornY, NornZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe is tested.

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies bellow 1 GHz, and in a waveguide 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.

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

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

where:

Δt = exposure time (30 seconds),

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

ΔT = temperature increase due to RF exposure.

SAR is proportional to $\Delta T / \Delta t$, the initial rate of tissue heating, before thermal diffusion takes place. Now it's possible to quantify the electric field in the simulated tissue by equating the thermally derived SAR to the E- field;

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

where:

σ = simulated tissue conductivity,

ρ = Tissue density (1.25 g/cm^3 for brain tissue)

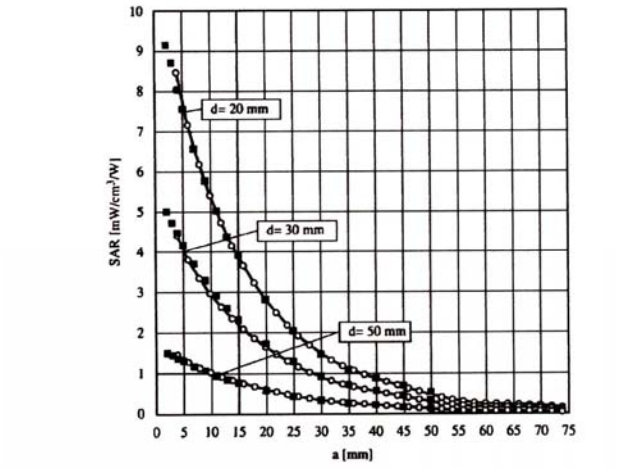


Figure B.1. E-Field and Temperature measurements at 900MHz[5]

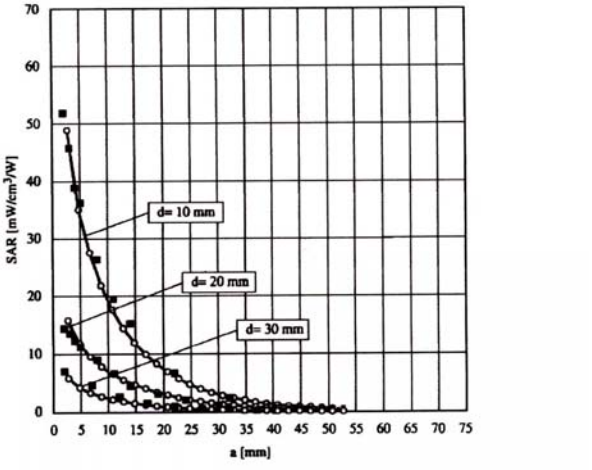
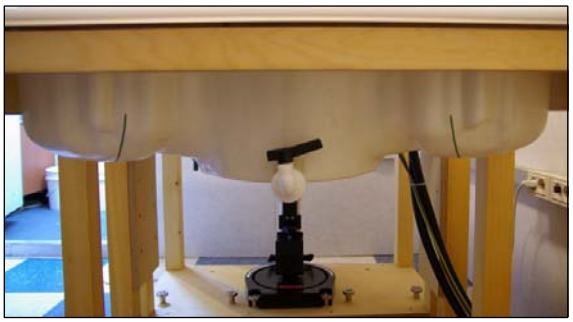


Figure B.2. E -field and temperature measurements at 1.8GHz[5]

3.4 Data Acquisition Electronics

The data acquisition electronics (DAE4) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. The input impedance of the DAE4 box is 200 Mohm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.Transmission to the PC-card 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.

3.5 Phantom Properties



The SAM Phantom is constructed of a fiberglass shell integrated in a wooden table. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90% of all users [9][10]. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents the evaporation of the liquid. 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.

Figure 5. SAM twin phantom

Phantom Properties	Requirement for specific EUT	Measured
Depth of Phantom	> 150 mm	200 mm
Width of flat section	> 10 cm (Twice EUT Width)	20 cm
Length of flat section	> 26 cm (Twice EUT Length)	30 cm
Thickness of flat section	2 mm ± 0.2 mm	2.08 ~ 2.20 mm

Table 1. Flat Section Properties of SAM Twin Phantom

3.6 Device Holder for DASY4

In combination with the SAM Phantom V4.0, the Mounting Device(POM) enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation points is the ear opening. The devices can be easily, accurately, and repeatable positioned according to the FCC CENELEC specifications. The device holder can be locked at different phantom locations(left head, right head, flat phantom).

Note: A simulating human hand is not used due to the complex anatomical and geometrical structure of the hand that may produced infinite number of configurations [10]. To produce the Worst-case condition (the hand absorbs antenna output power), the hand is omitted during the tests.

Figure 4. Device Holder

3.7 Brain & Muscle Simulating Mixture Characteristic

The brain and muscle mixtures consist of a viscous gel using hydroxethylcellulose (HEC) gelling agent and saline solution (see Table 2). Preservation with bacteriacide is added and visual inspection is made to make sure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue. The mixture characterizations used for the brain and muscle tissue simulating liquids are according to the data by C. Gabriel and G. Hartsgrove [11].

Ingredients	835MHz Brain	835MHz Muscle	1900MHz Brain	1900MHz Muscle
Water	40.29%	50.75%	55.24%	70.23%
Sugar	57.90%	48.21%	-	-
Salt	1.38%	0.94%	0.31%	0.29%
DGBE	-	-	44.45%	29.47%
Bacteriacide	0.18%	0.10%	-	-
HEC	0.24%	-	-	-

Table 2 : Composition of Tissue Equivalent Matter

4. System Verification

4.1 Tissue Verification

The dielectric parameters of the brain and muscle simulating liquid were measured prior to SAR assessment using the HP85070D dielectric probe kit and Agilent 8753D Network Analyzer. The actual dielectric parameters are shown in the following table.

Freq. [MHz]	Liquid	Date	Liquid Temp [°C]	parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
835	Head	5th March, 2009	23.2	εr	41.5	40.6	-1.9	± 5
				σ	0.90	0.91	+1.1	± 5
	Body	5th March, 2009	23.4	εr	55.2	54.6	-1.1	± 5
				σ	0.97	0.96	-1.1	± 5
1900	Head	6th March, 2009	22.5	εr	40.0	39.7	-0.8	± 5
				σ	1.40	1.42	+2.1	± 5
	Body	6th March, 2009	22.4	εr	53.3	52.9	-0.8	± 5
				σ	1.52	1.55	+2.0	± 5

Table 3 : Measured Simulating Liquid Dielectric Values

The humidity and dielectric/ambient temperatures are recorded during the assessment of the tissue material dielectric parameters. The difference between the ambient temperature of the liquid during the dielectric measurement and the temperature during tests was less than |2|°C.

4.2 System Validation

Figure 5. Validation setup

Prior to the SAR assessment, the system validation kit was used to verify that the DASY4 was operating within its specifications. The validation dipoles are highly symmetric and matched at the centre frequency for the specified liquid and distance to the phantom. The accurate distance between the liquid surface and the dipole centre is achieved with a distance holder that snaps onto the dipole.
System validation is performed by feeding a known power level into a reference dipole, set at a know distance from the phantom. The measured SAR is compared to the theoretically derived level.

The reference SAR values are derived using a reference dipole and flat phantom suitable. The forward power into the reference dipole for each SAR validation was adjusted to 250 mW.

These reference SAR values are obtained from the IEEE Std 1528 and are normalized to 1 W. The measured 1g(10g) SAR should be within 10 % of the expected target reference values shown in table 4 below.

System Validation Kit	Date	Tissue	Liquid Temp.(˚C)	Ambient Temp.(˚C)	Targeted SAR_{1g} (mW/g)	Measured SAR 1 g (mW/g)	Deviation (%)
D835V2 S/N:481	5th March, 2009	835MHz Brain	23.2	23.0	9.5	9.8	+ 2.7
D1900V2 S/N:5d038	6th March, 2009	1900MHz Brain	22.5	22.0	39.7	40.8	+ 2.8

Table 4 : Deviation from Reference Validation Values

During the SAR measurement process the liquid depth was maintained to a level of a least 15 tolerance of ± 0.2cm.
The following photo shows the depth of the liquid depth of the liquid maintained during the testing.

Figure 6. Liquid Depth

5. SAR MEASUREMENT PROCEDURE USING DASY4

The SAR evaluation was performed with the SPEAG DASY4 system. A summary of the procedure follows ;

a) A measurement of the SAR value at a fixed location is used as a reference value for assessing the power drop of the EUT. The SAR at this point is measured at the start of the test and then again at the end of the test.

b) The SAR distribution at the exposed side of the phantom is measured at a distance of 3.9 mm from the inner surface of the shell. The area covers the entire dimension of the EUT and the horizontal grid spacing is 15 mm x 15 mm(or 20mm x 20mm). The actual Area Scan has dimensions surrounding the test device. Based on this data, the area of the maximum absorption is determined by Spline interpolation.

c) Around this point, a volume is assessed by measuring 5 x 5 x 7 (7 x 7 x 7) points. On the basis of this data set, the spatial peak SAR value is evaluated with the following procedure ;

(i) The data at the surface are extrapolated, since the centre of the dipoles is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2 mm. The extrapolation is based on a least square algorithm[13]. A polynomial of the fourth order is calculated through the points in z-axes. This polynomial is then used to evaluate the points between the surface and the probe tip.

(ii) The maximum interpolated value is searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g and 10 g) are computed using the 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-direction)[13][14]. The volume is integrated with the trapezoidal-algorithm. One thousand points (10 x 10 x 10) are interpolated to calculate the averages.

(iii) All neighbouring volumes are evaluated until no neighbouring volume with a higher average value is found.

(iv) The SAR value at the same location as in Step (a) is again measured (If the value changed by more than 5%, the evaluation is repeatd.)

6. MEASUREMENT UNCERTAINTY

The uncertainty analysis is based on the template listed in the IEEE Std 1528-2003 for both EUT SAR tests and Validation uncertainty. The measurement uncertainty of a specific device is evaluated independently and the total uncertainty for both evaluations (95 % confidence level) must be less than 25 %.

a	b	c	d	e= f(d,k)	f	g	h=cxf/e	i=cxg/e	k
Uncertainty Component	Sec.	Tol. (%)	Prob. Dist.	Div.	Ci (1 g)	Ci (10 g)	1 g Ui (± %)	10 g Ui (± %)	vi
Measurement System									
Probe Calibration (k=1)	E.2.1	5.9	N	1	1	1	5.9	5.9	∞
Axial Isotropy	E.2.2	4.7	R	√ 3	0.7	0.7	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	R	√ 3	0.7	0.7	3.9	3.9	∞
Boundary Effect	E.2.3	1.0	R	√ 3	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	R	√ 3	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	√ 3	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	N	1	1	1	0.3	0.3	∞
Response Time	E.2.7	0.8	R	√ 3	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	√ 3	1	1	1.5	1.5	∞
RF Ambient Noise	E.6.1	3.0	R	√ 3	1	1	1.7	1.7	∞
RF Ambient Refections	E.6.1	3.0	R	√ 3	1	1	1.7	1.7	∞
Probe Positioner	E.6.2	0.4	R	√ 3	1	1	0.2	0.2	∞
Probe Positioning with respect to Phantom Shell	E.6.3	2.9	R	√ 3	1	1	1.7	1.7	∞
Algorithms for Max. SAR Evaluation	E.5	1.0	R	√ 3	1	1	0.6	0.6	∞
Test Sample Related									
Test Sample Positioning	E.4.2	2.9	N	1	1	1	2.9	2.9	145
Device Holder Uncertainty	E.4.1	3.6	N	1	1	1	3.6	3.6	5
Output Power Variation — SAR Drift Measurement	6.6.2	5.0	R	√ 3	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (shape and thickness tolerances)	E.3.1	4.0	R	√ 3	1	1	2.3	2.3	∞
Liquid Conductivity — Deviation from target values	E.3.2	5.0	R	√ 3	0.64	0.43	1.8	1.2	∞
Liquid Conductivity — Measurement uncertainty	E.3.3	2.5	N	1	0.64	0.43	1.6	1.1	∞
Liquid Permititivity — Deviation from target values	E.3.2	5.0	R	√ 3	0.6	0.49	1.7	1.4	∞
Liquid Pemiittivity — Measurement uncertainty	E.3.3	2.5	N	1	0.6	0.49	1.5	1.2	∞
Cornbined standard Uncertainty			RSS				± 10.9	± 10.7	387
Expanded Uncertainty (95% CONFIDENCE LEVEL)			K=2				± 21.9	± 21.4	

Table 5. EUT SAR Test - Uncertainty Budget for DASY4 Version V4.6 Build 19

Estimated total measurement uncertainity for the DASY4 measurement system was ± 10.9 %.
The extended uncertainity (K=2) was assessed to be ± 21.9 % based on 95 % confidence level.
The uncertainity is not added to the measurement result.

7. OPERATIONAL CONDITIONS DURING TEST

7.1 Schematic Test Configuration

SAR measurement are performed according to the KDB 447498 Mobile and Portable Device RF Exposure Equipment Authorization Procedures is referred for the SAR Measurement.

During SAR test of the EUT, it is in Traffic Mode (Channel Allocated) at Normal Voltage Condition. A communication link is set up with a Base Station Simulator (CMU200) by air link for GPRS/EDGE850, GPRS/EDGE1900 and WCDMA Band II / V.

The EUT only has data transmitting function, but not has speech transmitting function. During the test, a HP laptop is used as an assistant to help to setup communication, whose type is HP Compaq nc2400.

The SAR measurements are performed in standard position (USB Dongle is directly connected to the laptop) and also USB cable connected.

7.2 SAR compliance test considerations

Test all USB orientations (Figure 7 – A: Horizontal-Up, B: Horizontal-Down, C: Vertical-Front, and D: Vertical-Back) with device to phantom separation distance of 5 mm or less, according to KDB 447498 requirements. Current generation laptop computers should be used to ensure proper measurement distances. The same test separation distance should be used for all frequency bands and modes in each USB orientation. The typical Horizontal-Up USB connection (A), found in the majority of laptop computers, must be tested using an appropriate laptop computer. A laptop with either Vertical-Front (C) or Vertical-Back(D) USB connection should be used to test one of the vertical USB orientations. If laptop computers are not available for testing the Horizontal-Down (B) or the remaining Vertical USB orientation, a short and high quality USB cable (12 inches or less) may be used for testing other orientations. It should be ensured that the USB cable does not affect device radiation characteristics and output power of the dongle.

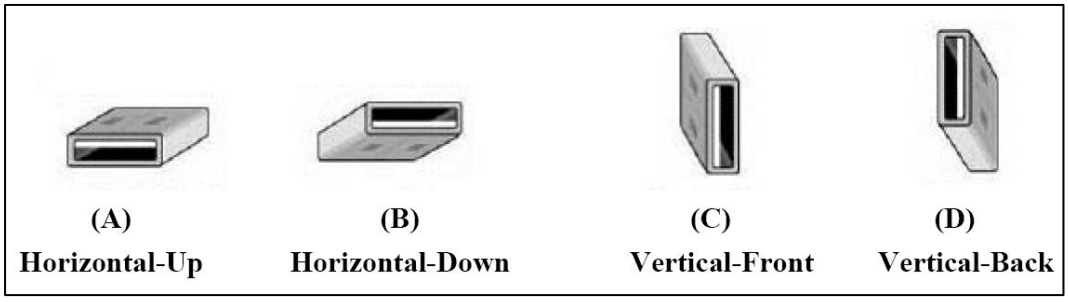


Figure 7. USB Connector Orientations Implemented on Laptop Computers

These test orientations are intended to cover the exposure conditions found in typical laptop computers with either horizontal or vertical USB connector configurations at various locations in the keyboard section of laptop computers. Depending on the design of an individual dongle, if the antenna is not located at the very end of the dongle of there are no other swiveling mechanisms that could increase the exposure potential, the tip of the dongle typically would not require SAR testing. Dongle tip testing is generally determined by the design of the individual device. For swivel connectors or antennas, the test orientations and configurations will need to be considered on a case-by-case

basis because there could be various swiveling combinations and locking mechanisms involved that can affect test considerations. The grantee or its test lab should submit a KDB inquiry to determine the test requirements before conducting the SAR tests. The KDB tracking number should be included in the application for equipment certification to support the test procedures.

USB dongles have a rather small footprint; therefore, smaller SAR scan resolutions may be necessary, as compared to the typically larger resolutions used for cellphones, to keep the uncertainty of the interpolation and extrapolation algorithms used to compute the 1-g SAR at an acceptable level. In addition, USB dongles will need to be embedded in several cm of Styrofoam to reduce measurement uncertainty field by avoiding perturbation due to device holder clamps used to position the dongle for SAR testing.

8. FCC 3G SAR MEASUREMENT PROCEDURES

8.1 SAR Measurement Conditions for 3G Devices

The following procedures were followed according to the "KDB #941225" and "SAR Measurement Procedures for 3G Devices", Oct 2007.

8.2 Procedures Used to Establish RF Signal for SAR

The following procedures are applicable to HSDPA data devices operation under 3GPP Release5. Body exposure conditions are typically required for these devices, including handsets and data modems operating in various electronic devices. HSDPA operates in conjunction with WCDMA and requires an active DPCCH. The default test configuration is to measure SAR in WCDMA without HSDPA, with an established radio link between the DUT and a communication test set using a 12.2 kbps RMC (reference measurement channel) configured in Test Loop Mode 1. SAR for HSDPA is selectively measured using the highest SAR configuration in WCDMA with an FRC(fixed reference channel) in H-set 1 and a 12.2kbps RMC. SAR is selectively confirmed for other physical channel configurations (DPCCH & DPDCHn) according to output power, exposure conditions and device operating capabilities. Maximum output power is verified according to the applicable versions of 3GPP TS 34.121 and SAR must be measured according to these maximum output conditions. The DUT must be tested according to its UE Category and explained in the SAR report.

8.3 Output Power Verification

Maximum output power is verified on the High, Middle and Low channels according to the Release 5 procedures described in section 5.2 of 3GPP TS 34.121, using an FRC with H-set 1 and a 12.2 kbps RMC with TPC (transmit power control) set to all "1's". When HSDPA is active output power is measured according requirements for HS-DPCCH Sub-test 1-4. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HS-DPCCH etc.) with and without HSDPA active, should be tabulated in the SAR report. All configurations that are not supported by the DUT or cannot be measured due to technical or equipment limitations should be clearly identified in the SAR report.

8.4 3G Body SAR Measurements

SAR for body exposure configurations in voice and data modes is measured using a 12.2 kbps RMC with TPC bits configured to all " 1's". 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 12.2 kbps 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 approached with parameters similar to those used in 384 kbps and 768 kbps RMC.

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 HS-DSCH/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 condition, 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. DPCH and DPDCH gain factors (βc,βd), and HS-DPCCH power offset parameters(△ACK, △NACK, △CQI) 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.

Sub-Test 1 Setup for Release 5 HSDPA

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

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

8.5 Maximum Conducted Output Tables

Band	Channel	Peak output power [dBm]
WCDMA Band V	4132	23.34
	4175	23.41
	4233	23.31
WCDMA Band II	9262	23.17
	9400	23.07
	9538	23.03

Table 6. WCDMA Mode Output Power

Band	Channel	Subtest	Peak output power
FDD V UMTS/HSDPA	4132	1	23.04
		2	22.98
		3	21.95
		4	20.91
	4175	1	23.00
		2	22.90
		3	21.98
		4	20.95
	4233	1	23.04
		2	22.88
		3	21.95
		4	20.91

Table 7. HSDPA FDD V mode Output Power

Band	Channel	Subtest	Peak output power
FDD II UMTS/HSDPA	9262	1	23.07
		2	23.02
		3	22.25
		4	20.64
	9400	1	22.96
		2	22.92
		3	22.12
		4	21.02
	9538	1	22.87
		2	22.73
		3	22.00
		4	20.67

Table 8. HSDPA FDD II mode Output Power

Band	Channel	GPRS Data				EDGE Data			
		GPRS 1 TX Slot (dBm)	GPRS 2 TX Slot (dBm)	GPRS 3 TX Slot (dBm)	GPRS 4 TX Slot (dBm)	EDGE 1 TX Slot (dBm)	EDGE 2 TX Slot (dBm)	EDGE 3 TX Slot (dBm)	EDGE 4 TX Slot (dBm)
GSM 850	128	31.81	31.66	31.55	31.36	27.42	27.33	27.46	27.03
	190	31.70	31.54	31.44	31.30	27.35	27.29	27.26	27.21
	251	31.45	31.31	31.21	31.12	27.11	27.05	27.10	27.03
GSM 1900	512	23.63	23.62	23.37	23.31	20.45	20.02	20.03	20.11
	661	23.30	22.98	22.94	23.02	20.11	19.65	19.60	19.60
	810	24.05	23.85	23.66	24.11	21.24	21.19	21.07	21.03

Table. 9 GPRS/EDGE Output Power

9. FCC RF Exposure Limits

HUMAN EXPOSURE	UNCONTROLLED ENVIRONMENT General Population (W/Kg) or (mW/g)	CONTROLLED ENVIRONMENT Occupational (W/Kg) or (mW/g)
SPATIAL PEAK SAR (Brain)	1.60	8.00
SPATIAL AVERAGE SAR (Whole Body)	0.08	0.40
SPATIAL PEAK SAR (Hand / Feet / Ankle / Wrist)	4.00	20.00

Table. 10 Safety Limits for Partial Body Exposure

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

NOTE 2 : At frequencies above 6.0 GHz, SAR limits ajre not applicable and MPE limits for power density should be appoied at 5 cm or more from the transmitting device.

NOTE 3 : The time averaging criteria for field strength and power density do not apply to general population SAR limit of 47 CFR § 2.1093.

10. SAR MEASUREMENT RESULTS

1) GPRS850 Body SAR Measurement Result

Date of Test : 5th March, 2009
Mixture Type : 835MHz Muscle
Ambient Temperature (C) : 23.0
Dielectric Constant : 54.6

Liquid Temperature (C) : 23.4
Humidity (%) : 45
Conductivuty : 0.96

Frequency		Band	Time slots	Spacing Between EUT& Phantom	USB connector Orientation	Power (dBm)		SAR 1g (W/Kg)
MHz	CH					Begin	End	
836.6	190	GPRS850	1slot	0.5 cm	Horizontal-Up	31.70	31.68	0.238
			2slots			31.53	31.51	0.468
			3slots			31.45	31.43	0.675
			4slots			31.30	31.29	1.130
824.2	128	GPRS850	4slots	0.5 cm	Horizontal-Up	31.36	31.35	1.190
848.8	251	GPRS850	4slots	0.5 cm	Horizontal-Up	31.12	31.31	**1.320**
824.2	128	GPRS850	4slots	0.5 cm	Horizontal-Down	31.36	31.34	1.050
836.6	190	GPRS850		0.5 cm		31.30	31.28	1.180
848.8	251	GPRS850		0.5 cm		31.13	31.12	1.230
836.6	190	GPRS850	4slots	0.5 cm	Vertical-Front	31.30	31.29	0.754
836.6	190	GPRS850		0.5 cm	Vertical-Back	31.30	31.30	0.392
848.8	251	GPRS850	4slots	0.7 cm	**Direct Connection to Laptop**	31.13	31.12	0.521
848.8	251	EDGES850	4slots	0.5 cm	Horizontal-Up	27.03	27.01	0.535

NOTES:
1. The test data reported are the worst-case SAR value with the position set in a typical configuration
2. All modes of operation were investigated and the worst-case are reported.
3. Power supply : USB port of Laptop (HP Compaq nc2400)
4. Power Measured : Conducted output powers are recorded at the begin and end of each measurement.
5. SAR test Configuration : According to the measurement procedures given in KDB #447498
6. Test Signal Call mode : Base Station Simulator CMU200
7. USB extension cable length : 30 cm
8. Justification for reduced test configurations: per FCC/OET Supplement C (July,2001), if the SAR measured at the middle channel for each test configuration (Horizontal up/down, Vertical up/down, Top to phantom) is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s). EDGE mode result is measured at the worst SAR configuration because it's power max level is 4dBm lower than GPRS mode.

2) GPRS1900 Body SAR Measurement Result

Date of Test : 6th February, 2009
Mixture Type : 1900MHz Muscle
Ambient Temperature (C) : 22.0
Dielectric Constant : 52.9

Liquid Temperature (C) : 21.4
Humidity (%) : 46
Conductivuty : 1.55

Frequency		Band	Time slots	Spacing Between EUT& Phantom	USB connector Orientation	Power (dBm)		SAR 1g (W/Kg)
MHz	CH					Begin	End	
1880.0	661	GPRS1900	1slot	0.5 cm	Horizontal-Up	23.30	23.28	0.377
			2slots			22.98	22.96	0.725
			3slots			22.94	22.93	0.941
			4slots			23.02	23.00	1.200
1850.2	512	GPRS1900	4slots	0.5 cm	Horizontal-Up	23.31	23.30	**1.270**
1909.8	810	GPRS1900		0.5 cm	Horizontal-Up	24.11	24.10	1.190
1850.2	512	GPRS1900	4slots	0.5 cm	Horizontal-Down	23.31	23.29	0.865
1880.0	661	GPRS1900		0.5 cm		23.02	23.00	0.811
1909.8	810	GPRS1900		0.5 cm		24.11	24.11	0.737
1850.2	512	GPRS1900	4slots	0.5 cm	Vertical-Front	23.31	23.28	0.851
1880.0	661	GPRS1900		0.5 cm		23.01	23.00	0.898
1909.8	810	GPRS1900		0.5 cm		24.11	24.08	0.778
1880.0	661	GPRS1900	4slots	0.5 cm	Vertical-Back	23.00	22.98	0.387
1850.2	512	GPRS1900	4slots	0.7 cm	**Direct Connection to Laptop**	23.31	23.28	1.030
1850.2	512	EDGE1900	4slots	0.5 cm	Horizontal-Up	20.11	20.09	0.656

NOTES:
1. The test data reported are the worst-case SAR value with the position set in a typical configuration
2. All modes of operation were investigated and the worst-case are reported.
3. Power supply : by USB port of Laptop (HP Compaq nc2400)
4. Power Measured : Conducted output powers are recorded at the begin and end of each measurement.
5. SAR test Configuration : According to the measurement procedures given in KDB #447498
6. Test Signal Call mode : Base Station Simulator CMU200
7. USB extension cable length: 30 cm
8. Justification for reduced test configurations: per FCC/OET Supplement C (July,2001), if the SAR measured at the middle channel for each test configuration (Horizontal up/down, Vertical up/down, Top to phantom)is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).
EDGE mode result is measured at the worst SAR configuration because it's power max level is 4dBm lower than GPRS mode.

3) WCDMA BAND Ⅴ Body SAR Measurement Result

Date of Test : 5th March, 2009
Mixture Type : 835MHz Muscle
Ambient Temperature (C) : 23.0
Dielectric Constant : 54.6
Liquid Temperature (C) : 23.4
Humidity (%) : 45
Conductivuty : 0.96

Frequency		Band	Spacing Between EUT& Phantom	USB connector Orientation	Power (dBm)		SAR 1g (W/Kg)
MHz	CH				Begin	End	
826.4	4132	WCDMA BAND V	0.5 cm	Horizontal-Up	--	--	--
835.0	4175				23.41	23.39	0.324
846.6	4233				--	--	--
826.4	4132	WCDMA BAND V	0.5 cm	Horizontal-Down	--	--	--
835.0	4175				23.40	23.38	0.377
846.6	4233				--	--	--
826.4	4132	WCDMA BAND V	0.5 cm	Vertical-Front	--	--	--
835.0	4175				23.41	23.41	0.315
846.6	4233				--	--	--
826.4	4132	WCDMA BAND V	0.5 cm	Vertical-Back	23.34	23.33	**0.499**
835.0	4175	WCDMA BAND V	0.5 cm		23.42	23.40	0.484
846.6	4233	WCDMA BAND V	0.5 cm		23.31	23.29	0.483
826.4	4132	WCDMA BAND V	0.7 cm	**Direct Connection to Laptop**	23.34	23.33	0.359

NOTES:
1. SAR measurement conditions for 3G devices : according to KDB #941225
2. All modes of operation were investigated and the worst-case are reported.
3. Power supply : by USB port of Laptop (HP Compaq nc2400)
4. Power Measured : The base station simulator parameters were set to produce the maximum power from the EUT. 12.2 kbps RMC & TPC set to "All 1"
5. SAR test Configuration : According to the measurement procedures given in KDB #447498
6. Test Signal Call mode : Base Station Simulator CMU200
7. USB extension cable length: 30 cm
8. Body SAR for HSDPA is not measured because the maximum average output of each RF channel with HSDPA active is not 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 not above 75% of the SAR limit.

4) WCDMA BAND II Body SAR Measurement Result

Date of Test : 6th February, 2009
Mixture Type : 1900MHz Muscle
Ambient Temperature (C) : 22.0
Dielectric Constant : 52.9

Liquid Temperature (C) : 21.4
Humidity (%) : 46
Conductivuty : 1.55

Frequency		Band	Spacing Between EUT& Phantom	USB connector Orientation	Power (dBm)		SAR 1g (W/Kg)
MHz	CH				Begin	End	
1850.2	9262	WCDMA BAND II	0.5 cm	Horizontal-Up	23.17	23.15	0.574
1880.0	9400				23.07	23.06	**0.767**
1909.8	9538				23.03	23.02	0.643
1850.2	9262	WCDMA BAND V	0.5 cm	Horizontal-Down	--	--	--
1880.0	9400				23.07	23.06	0.680
1909.8	9538				--	--	--
1850.2	9262	WCDMA BAND V	0.5 cm	Vertical-Front	--	--	--
1880.0	9400				23.07	23.05	0.163
1909.8	9538				--	--	--
1850.2	9262	WCDMA BAND V	0.5 cm	Vertical-Back	--	--	--
1880.0	9400	WCDMA BAND V	0.5 cm		23.07	23.04	0.669
1909.8	9538	WCDMA BAND V	0.5 cm		--	--	--
1880.0	9400	WCDMA BAND V	0.7 cm	**Direct Connection to Laptop**	23.07	23.06	0.527

NOTES:
1. SAR measurement conditions for 3G devices : according to KDB #941225
2. All modes of operation were investigated and the worst-case are reported.
3. Power supply : by USB port of Laptop (HP Compaq nc2400)
4. Power Measured : The base station simulator parameters were set to produce the maximum power from the EUT. 12.2 kbps RMC & TPC set to "All 1"
5. SAR test Configuration : According to the measurement procedures given in KDB #447498
6. Test Signal Call mode : Base Station Simulator CMU200
7. USB extension cable length: 30 cm
8. Body SAR for HSDPA is not measured because the maximum average output of each RF channel with HSDPA active is not 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 not above 75% of the SAR limit.

11. CONCLUSION

The SAR evaluation indicates that UM120/UM150 complies with the RF radiation exposure limits of the FCC. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

12. EQUIPMENT LIST AND CALIBRATION DETAILS

Equipment Type	Manufacturer	Model Number	Serial Number	Calibration Due	Used For this Test?
Robot - Six Axes	Staubli	RX60	N/A	N/A	Yes
Robot Remote Control	SPEAG	CS7MB	F03/5U96A1 /C/01	N/A	Yes
SAM Twin Phantom	SPEAG	TP1276	QD000P40CA	N/A	Yes
Flat Phantom V4.4	SPEAG	QD000P44BA, BB	1001, higher	N/A	No
Data Acquisition Electronics	SPEAG	DAE4	559	2009.03.13	Yes
Probe E-Field	SPEAG	ES3DV3	3020	2009.07.21	Yes
Antenna Dipole 835 MHz	SPEAG	D835V2	481	2009.05.24	Yes
Antenna Dipole 900 MHz	SPEAG	D900V2	194	2009.11.19	No
Antenna Dipole 1800 MHz	SPEAG	D1800V2	2d066	2009.05.23	No
Antenna Dipole 1900 MHz	SPEAG	D1900V2	5d038	2009.11.20	Yes
Antenna Dipole 1950 MHz	SPEAG	D1950V2	1027	2009.03.14	No
Antenna Dipole 2450 MHz	SPEAG	D2450V2	746	2009.02.20	No
High power RF Amplifier	EMPOWER	2057-BBS3Q5KCK	1002D/C0321	2009.10.12	Yes
Universal Radio Communication Tester	R&S	CMU200	110019	2009.08.29	Yes
Signal Generator	Agilent	E8257D	MY44320379	2010.01.02	Yes
RF Power Meter Dual	Hewlett Packard	E4419A	GB37170495	2009.04.24	Yes
RF Power Sensor 0.01 - 18 GHz	Hewlett Packard	8481A	US37299851	2010.01.12	Yes
RF Power Sensor 0.01 - 18 GHz	Hewlett Packard	8481A	3318A92872	2010.01.12	Yes
S-Parameter Network Analyzer	Agilent	8753D	3410A07251	2009.04.06	Yes
Dual Directional Coupler	Hewlett Packard	778D	1144AO4576	2009.10.12	Yes
Directional Coupler	Agilent	773D	MY28390213	2009.10.12	No
Bluetooth Test Set	Anritsu	MT8852B	6K00006994	2009.03.03	No

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Appendix A. SAR PLOTS

Test Laboratory: KTL

835MHz Validation - D835V2; SN:481

***Test Date : 5th/March/2009**

Measured Liquid Temperature(℃) : 23.2, Ambient Temperature(℃) : 23.0

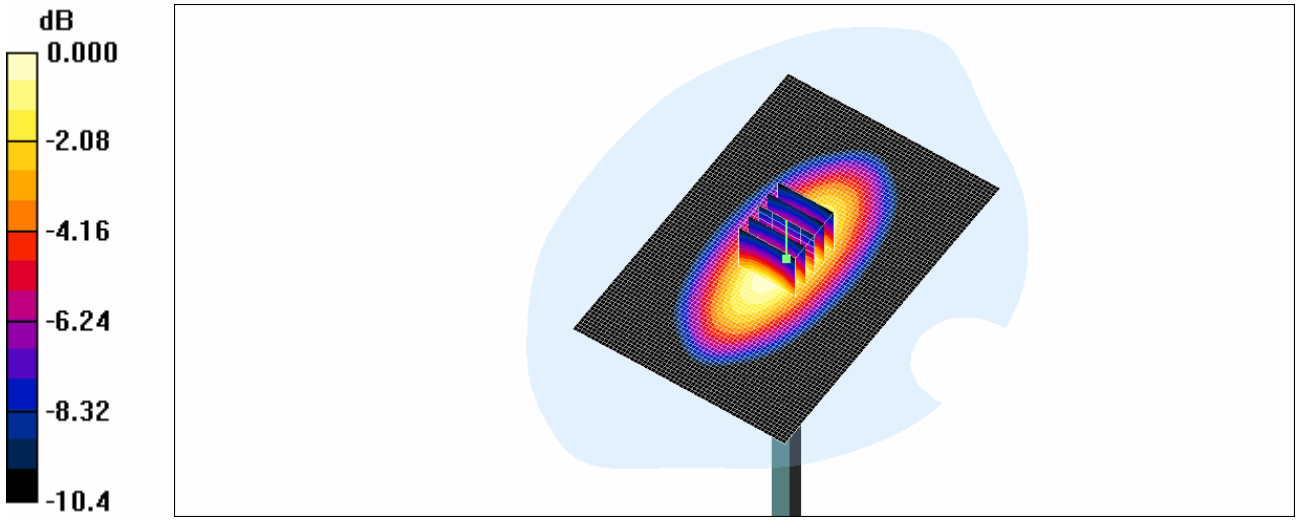
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL835 Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.12, 6.12, 6.12); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (61x91x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 2.69 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 55.1 V/m; Power Drift = -0.036 dB
Peak SAR (extrapolated) = 3.56 W/kg
SAR(1 g) = 2.44 mW/g; SAR(10 g) = 1.60 mW/g
Maximum value of SAR (measured) = 2.64 mW/g



0 dB = 2.64mW/g

Test Laboratory: KTL

UM120 GPRS850 190CH 1SLOT Horizontal-Up 0.5 cm spacing between phantom and EUT

***Test Date : 5th/March/2009**

Measured Liquid Temperature(℃) : 23.4, Ambient Temperature(℃) : 23.0

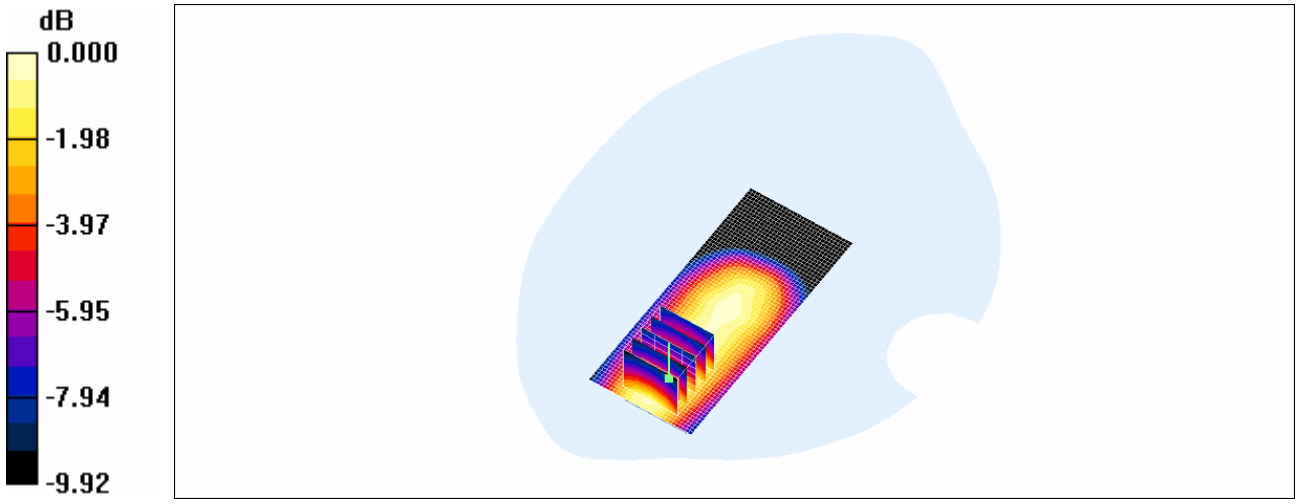
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: MSL835 Medium parameters used: f = 836.6 MHz; σ = 0.96 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.254 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.89 V/m; Power Drift = -0.124 dB
Peak SAR (extrapolated) = 0.334 W/kg
SAR(1 g) = 0.238 mW/g; SAR(10 g) = 0.162 mW/g
Maximum value of SAR (measured) = 0.256 mW/g



0 dB = 0.256mW/g

Test Laboratory: KTL

UM120 GPRS850 190CH 2SLOTS Horizontal-Up 0.5 cm spacing between phantom and EUT

***Test Date : 5th/March/2009**

Measured Liquid Temperature(℃) : 23.4, Ambient Temperature(℃) : 23.0

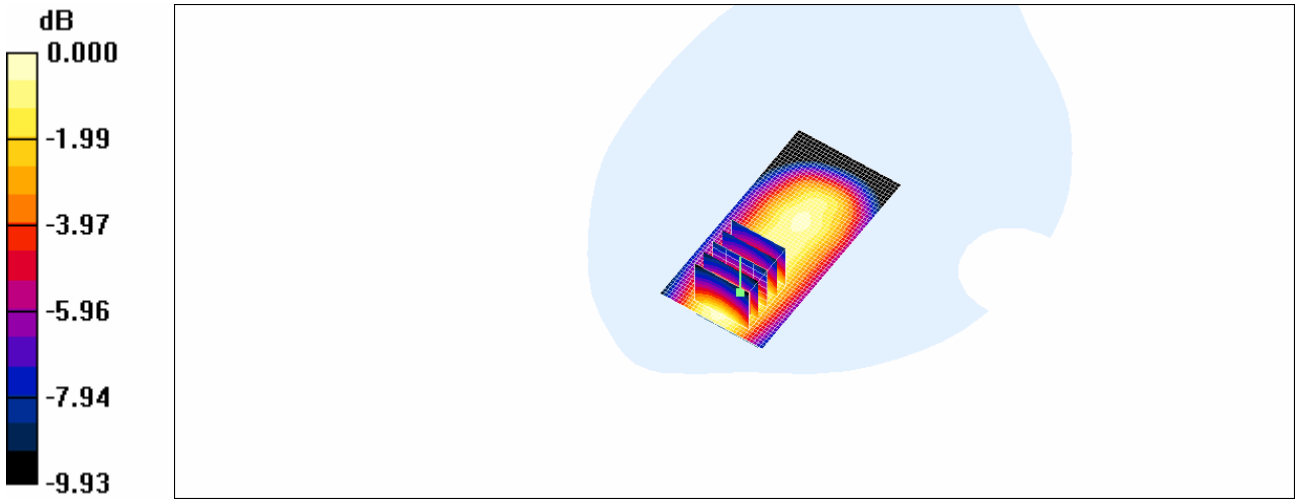
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:4.15
Medium: MSL835 Medium parameters used: f = 836.6 MHz; σ = 0.96 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.513 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.54 V/m; Power Drift = -0.103 dB
Peak SAR (extrapolated) = 0.656 W/kg
SAR(1 g) = 0.468 mW/g; SAR(10 g) = 0.318 mW/g
Maximum value of SAR (measured) = 0.503 mW/g



0 dB = 0.503mW/g

Test Laboratory: KTL

UM120 GPRS850 190CH 3SLOTS Horizontal-Up 0.5 cm spacing between phantom and EUT

***Test Date : 5th/March/2009**

Measured Liquid Temperature(℃) : 23.4, Ambient Temperature(℃) : 23.0

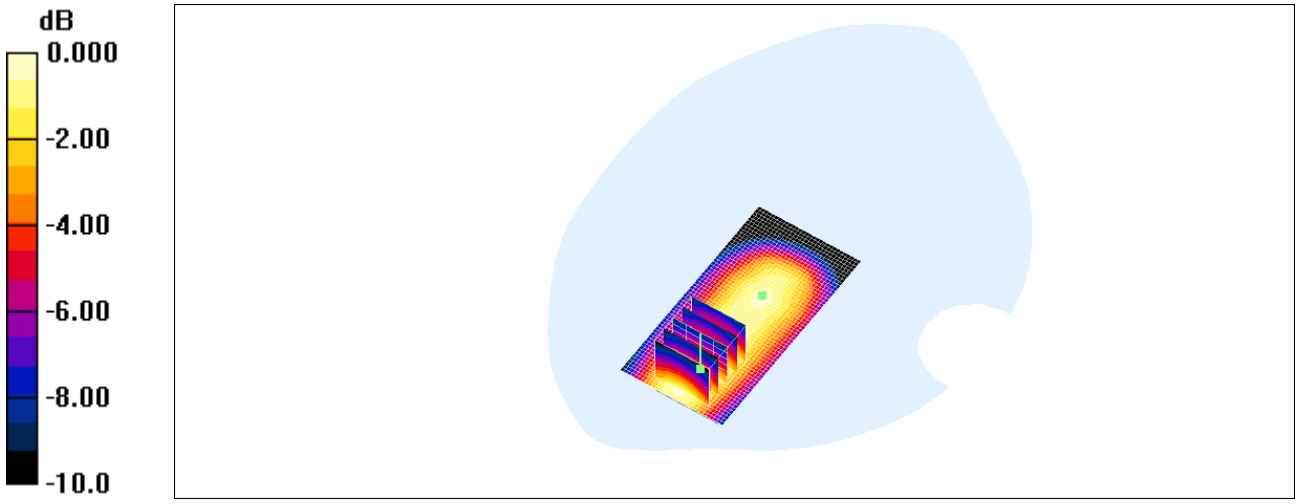
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:2.767
Medium: MSL835 Medium parameters used: f = 836.6 MHz; σ = 0.96 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.729 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.4 V/m; Power Drift = -0.012 dB
Peak SAR (extrapolated) = 0.946 W/kg
SAR(1 g) = 0.675 mW/g; SAR(10 g) = 0.457 mW/g
Maximum value of SAR (measured) = 0.728 mW/g



0 dB = 0.728mW/g

Test Laboratory: KTL

UM120 GPRS850 190CH 4SLOTS Horizontal-Up 0.5 cm spacing between phantom and EUT

***Test Date : 5th/March/2009**

Measured Liquid Temperature(℃) : 23.4, Ambient Temperature(℃) : 23.0

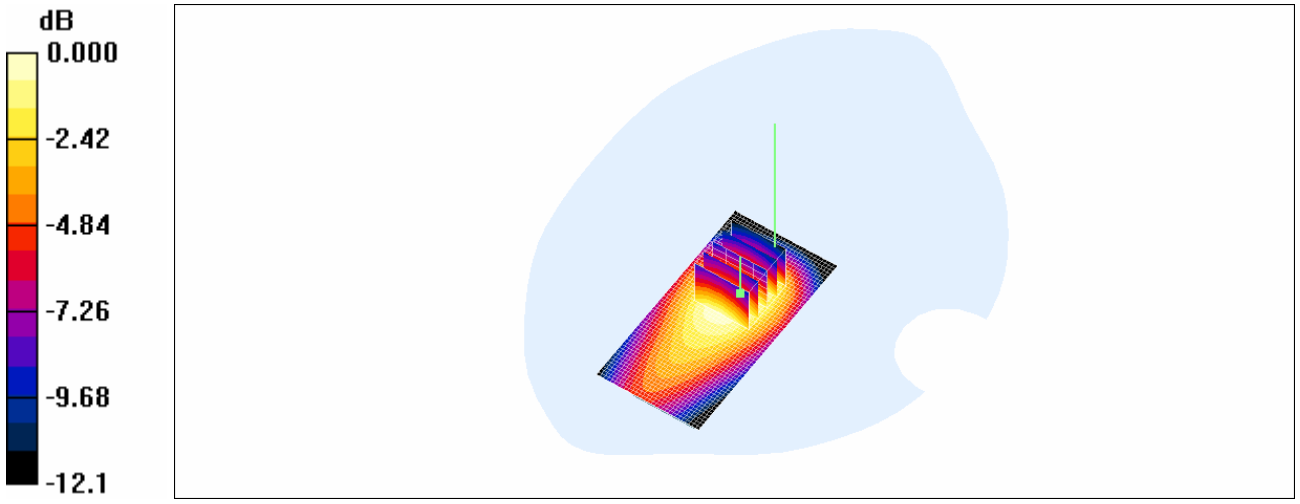
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:2.075
Medium: MSL835 Medium parameters used: f = 836.6 MHz; σ = 0.96 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.39 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.1 V/m; Power Drift = -0.233 dB
Peak SAR (extrapolated) = 1.50 W/kg
SAR(1 g) = 1.13 mW/g; SAR(10 g) = 0.783 mW/g
Maximum value of SAR (measured) = 1.20 mW/g



0 dB = 1.20mW/g

Test Laboratory: KTL

UM120 GPRS850 190CH 4SLOTS Horizontal-Down 0.5 cm spacing between phantom and EUT

***Test Date : 5th/March/2009**

Measured Liquid Temperature(℃) : 23.4, Ambient Temperature(℃) : 23.0

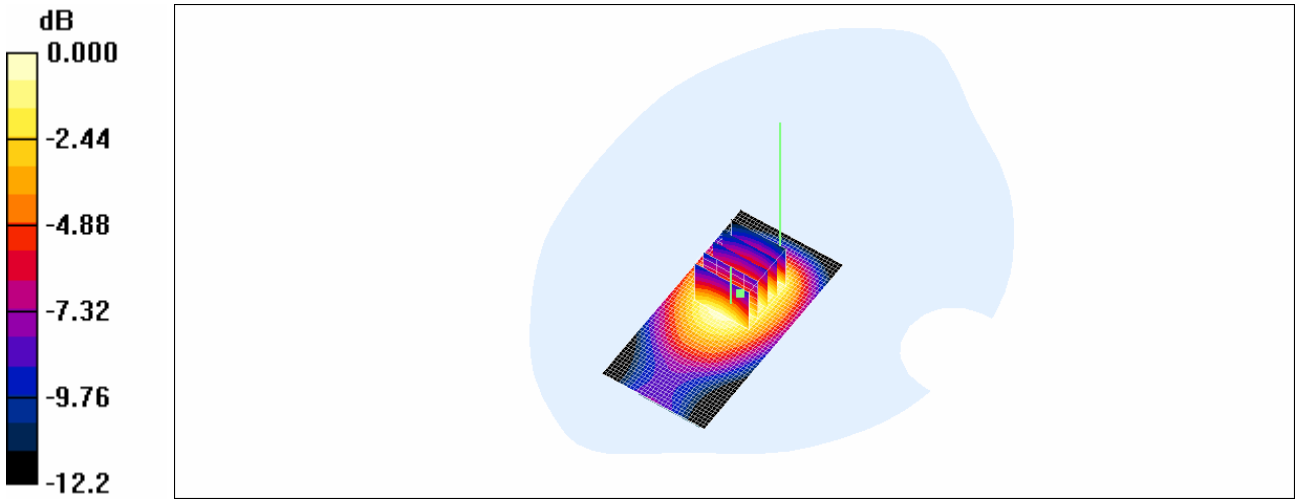
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:2.075
Medium: MSL835 Medium parameters used: f = 836.6 MHz; σ = 0.96 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.43 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.3 V/m; Power Drift = -0.095 dB
Peak SAR (extrapolated) = 1.68 W/kg
SAR(1 g) = 1.18 mW/g; SAR(10 g) = 0.801 mW/g
Maximum value of SAR (measured) = 1.25 mW/g



0 dB = 1.25mW/g

Test Laboratory: KTL

UM120 GPRS850 190CH 4SLOTS Vertical-Front 0.5 cm spacing between phantom and EUT

***Test Date : 5th/March/2009**

Measured Liquid Temperature(℃) : 23.4, Ambient Temperature(℃) : 23.0

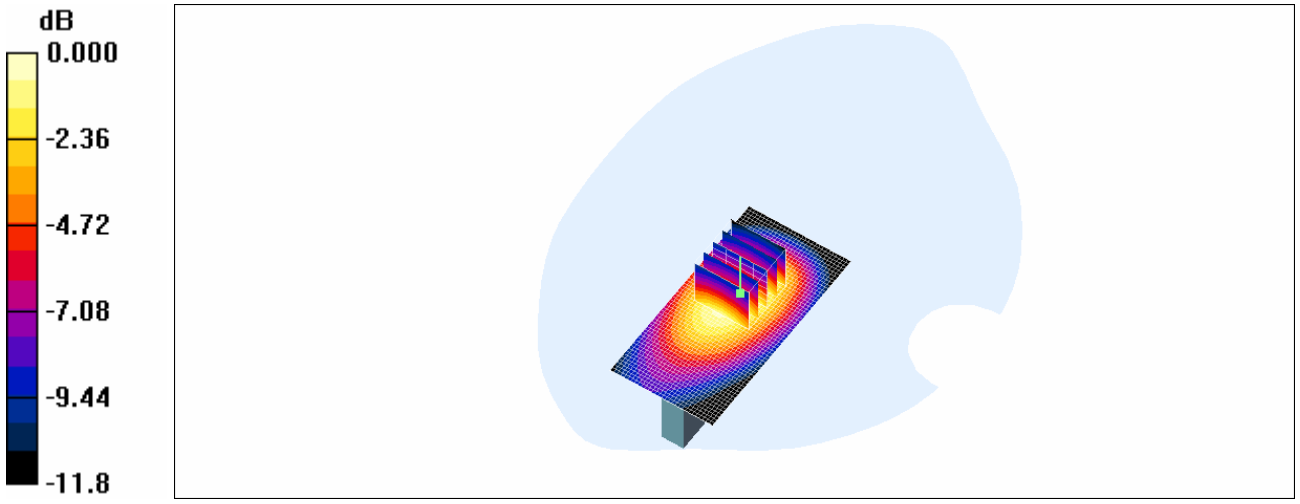
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:2.075
Medium: MSL835 Medium parameters used: f = 836.6 MHz; σ = 0.96 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.897 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.4 V/m; Power Drift = -0.196 dB
Peak SAR (extrapolated) = 0.984 W/kg
SAR(1 g) = 0.754 mW/g; SAR(10 g) = 0.481 mW/g
Maximum value of SAR (measured) = 0.812 mW/g



0 dB = 0.812mW/g

Test Laboratory: KTL

UM120 GPRS850 190CH 4SLOTS Vertical-Back 0.5 cm spacing between phantom and EUT

***Test Date : 5th/March/2009**

Measured Liquid Temperature(℃) : 23.4, Ambient Temperature(℃) : 23.0

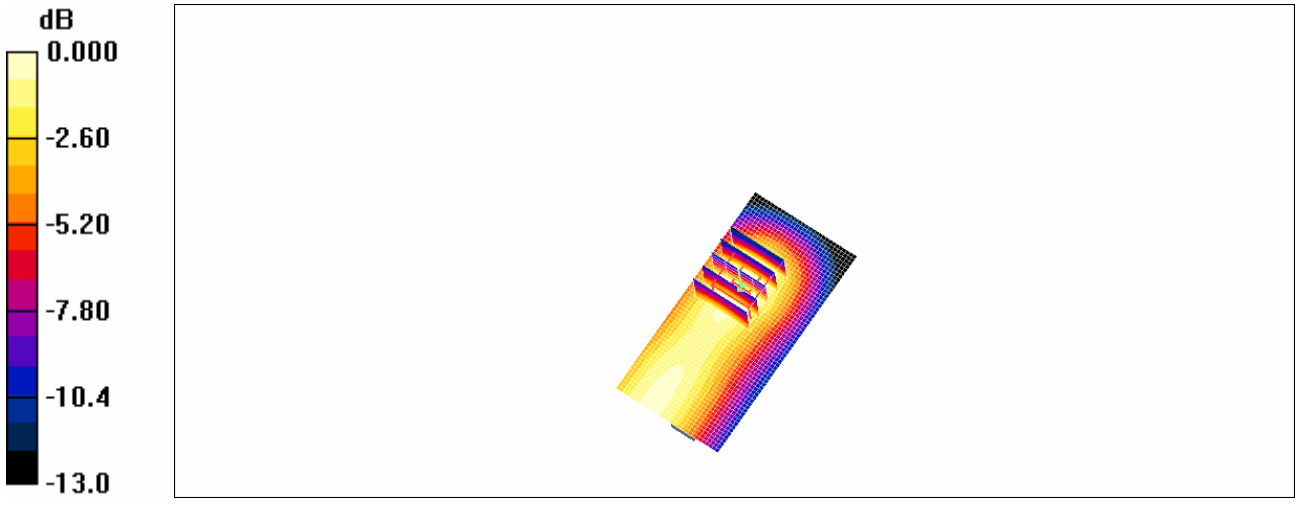
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:2.075
Medium: MSL835 Medium parameters used: f = 836.6 MHz; σ = 0.96 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.443 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.29 V/m; Power Drift = 0.071 dB
Peak SAR (extrapolated) = 0.606 W/kg
SAR(1 g) = 0.392 mW/g; SAR(10 g) = 0.247 mW/g
Maximum value of SAR (measured) = 0.421 mW/g



0 dB = 0.421mW/g

Test Laboratory: KTL

UM120 GPRS850 128CH 4SLOTS Horizontal-Up 0.5 cm spacing between phantom and EUT

***Test Date : 5th/March/2009**

Measured Liquid Temperature(℃) : 23.4, Ambient Temperature(℃) : 23.0

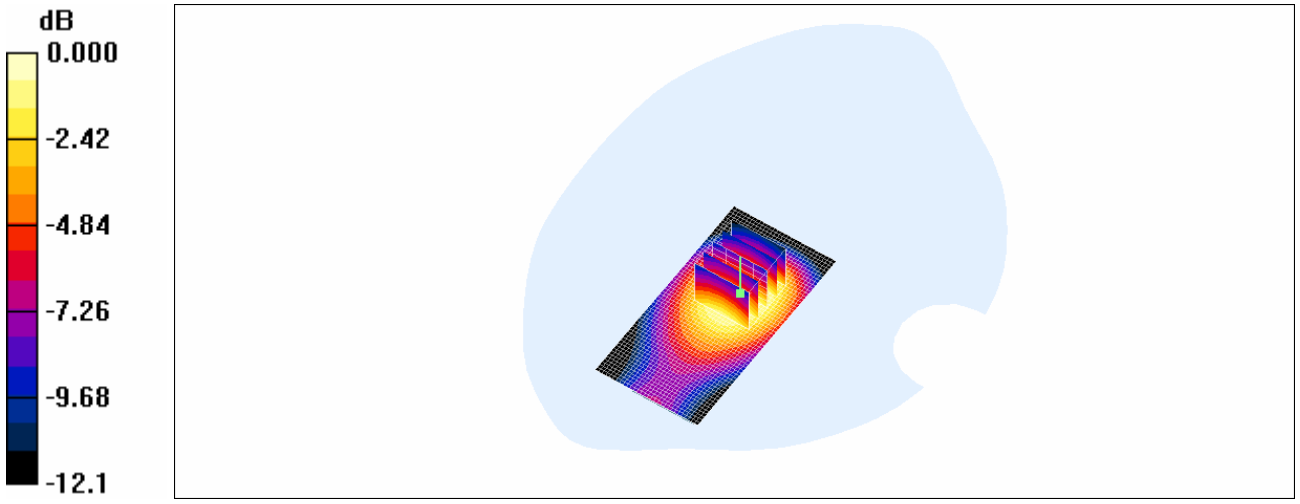
Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:2.075
Medium: MSL835 Medium parameters used: f = 824.2 MHz; σ = 0.95 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.44 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.9 V/m; Power Drift = 0.066 dB
Peak SAR (extrapolated) = 1.57 W/kg
SAR(1 g) = 1.19 mW/g; SAR(10 g) = 0.812 mW/g
Maximum value of SAR (measured) = 1.25 mW/g



0 dB = 1.25mW/g

Test Laboratory: KTL

UM120 GPRS850 251CH 4SLOTS Horizontal-Up 0.5 cm spacing between phantom and EUT

***Test Date : 5th/March/2009**

Measured Liquid Temperature(℃) : 23.4, Ambient Temperature(℃) : 23.0

Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:2.075
Medium: MSL835 Medium parameters used: f = 848.8 MHz; σ = 0.97 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

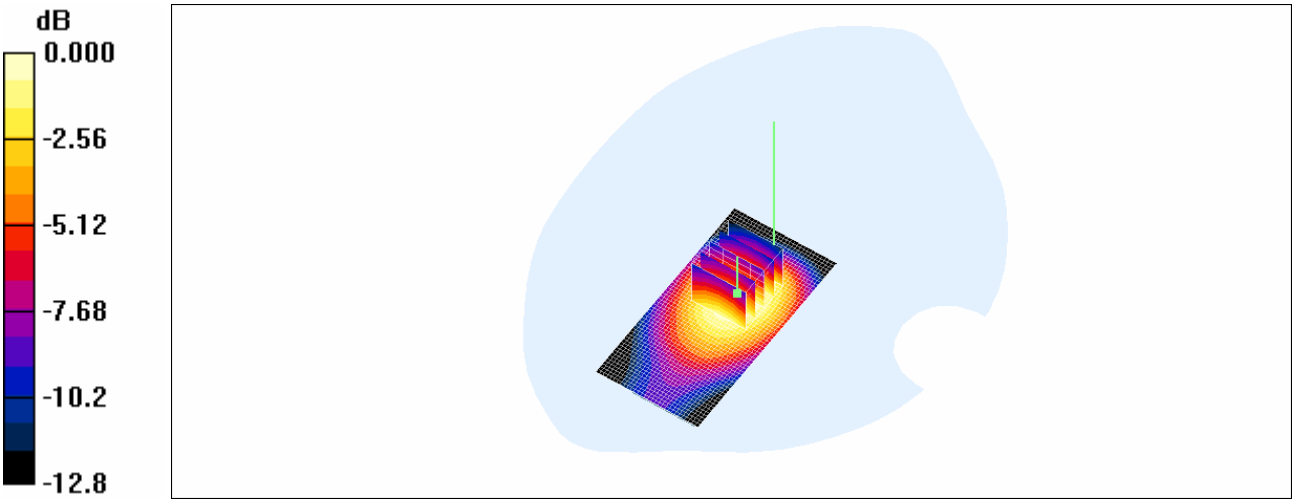
DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

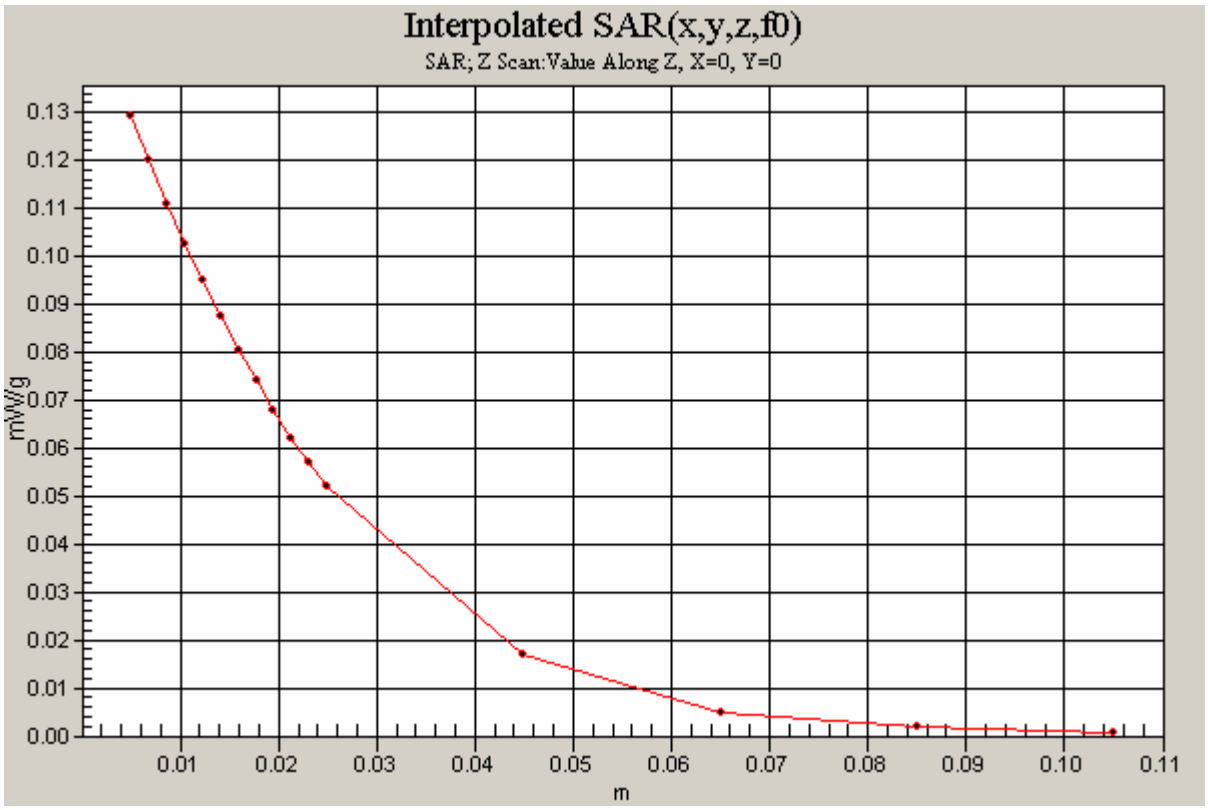
Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.60 mW/g

Z Scan (1x1x16): Measurement grid: dx=20mm, dy=20mm, dz=20mm
Maximum value of SAR (interpolated) = 0.129 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.8 V/m; Power Drift = 0.190 dB
Peak SAR (extrapolated) = 1.73 W/kg
SAR(1 g) = 1.32 mW/g; SAR(10 g) = 0.901 mW/g
Maximum value of SAR (measured) = 1.40 mW/g


dB
0.000
-2.56
-5.12
-7.68
-10.2
-12.8

0 dB = 1.40mW/g


Interpolated SAR(x,y,z,f0)
SAR; Z Scan:Value Along Z, X=0, Y=0
mW/g
m
0.13
0.12
0.11
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
0.11

Test Laboratory: KTL

UM120 GPRS850 128CH 4SLOTS Horizontal-Down 0.5 cm spacing between phantom and EUT

***Test Date : 5th/March/2009**

Measured Liquid Temperature(℃) : 23.4, Ambient Temperature(℃) : 23.0

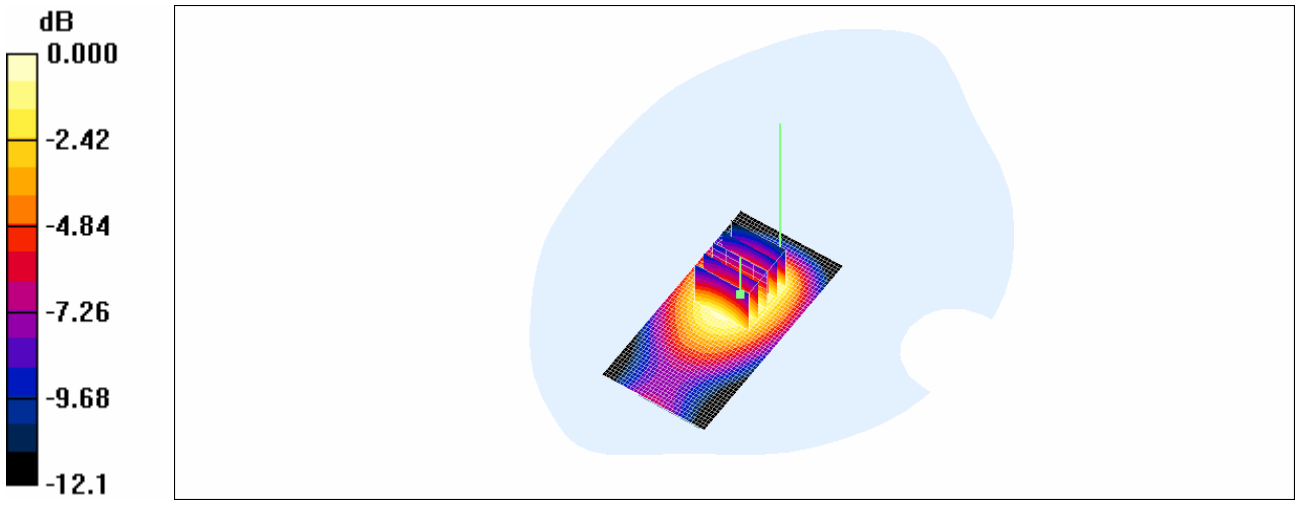
Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:2.075
Medium: MSL835 Medium parameters used: f = 824.2 MHz; σ = 0.95 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.27 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.8 V/m; Power Drift = 0.199 dB
Peak SAR (extrapolated) = 1.49 W/kg
SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.711 mW/g
Maximum value of SAR (measured) = 1.11 mW/g



0 dB = 1.11mW/g

Test Laboratory: KTL

UM120 GPRS850 251CH 4SLOTS Horizontal-Down 0.5 cm spacing between phantom and EUT

***Test Date : 5th/March/2009**

Measured Liquid Temperature(℃) : 23.4, Ambient Temperature(℃) : 23.0

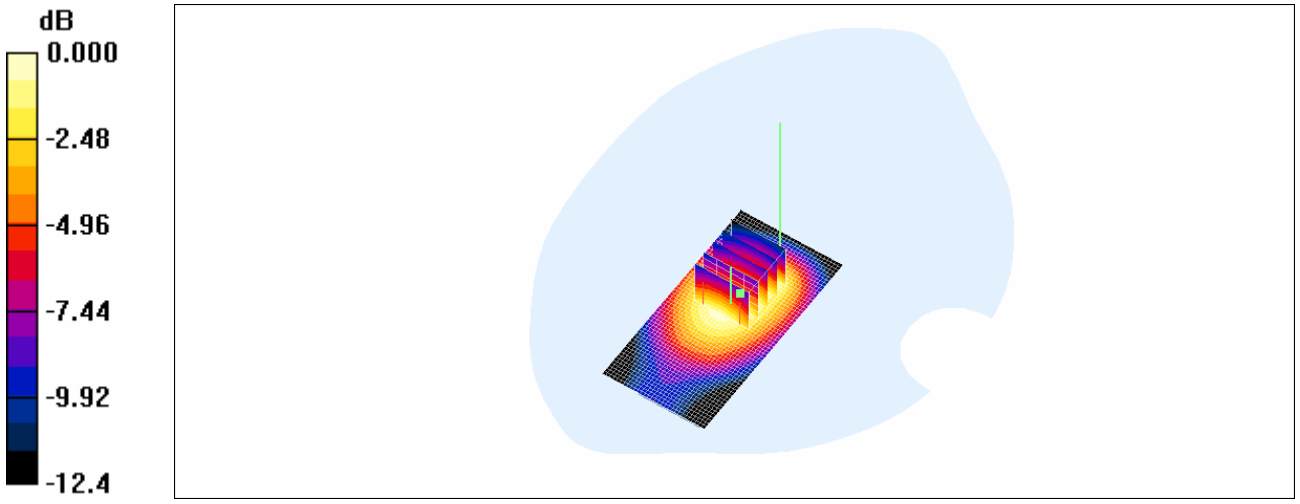
Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:2.075
Medium: MSL835 Medium parameters used: f = 848.8 MHz; σ = 0.97 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.45 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.3 V/m; Power Drift = 0.104 dB
Peak SAR (extrapolated) = 1.75 W/kg
SAR(1 g) = 1.23 mW/g; SAR(10 g) = 0.834 mW/g
Maximum value of SAR (measured) = 1.31 mW/g



0 dB = 1.31mW/g

Test Laboratory: KTL

UM120 GPRS850 251CH 4SLOTS Direct Connection to Laptop

***Test Date : 5th/March/2009**

Measured Liquid Temperature(℃) : 23.4, Ambient Temperature(℃) : 23.0

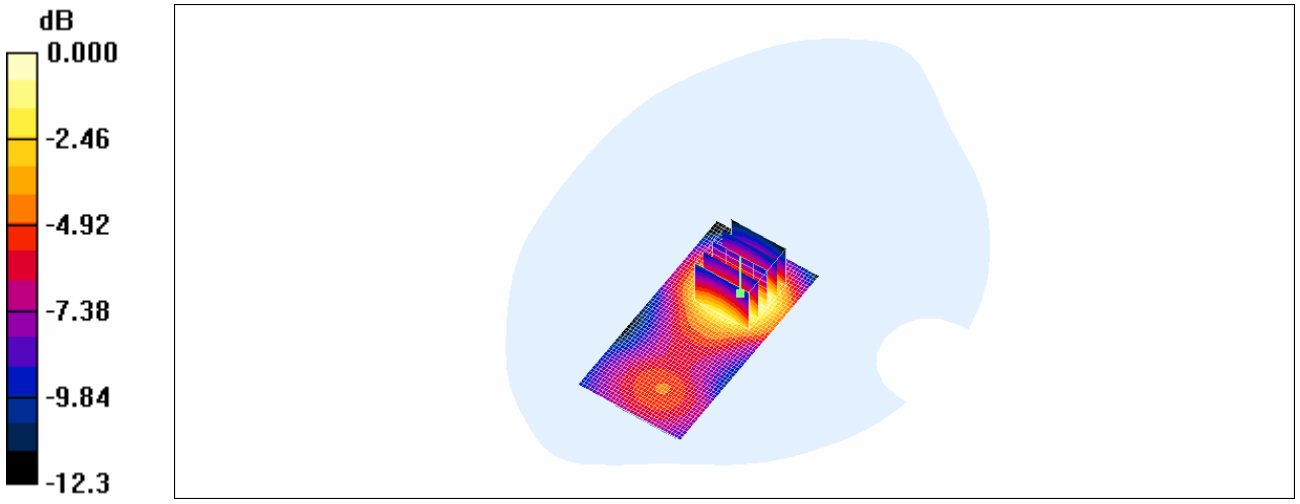
Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:2.075
Medium: MSL835 Medium parameters used: f = 848.8 MHz; σ = 0.97 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.659 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.5 V/m; Power Drift = 0.034 dB
Peak SAR (extrapolated) = 0.705 W/kg
SAR(1 g) = 0.521 mW/g; SAR(10 g) = 0.346 mW/g
Maximum value of SAR (measured) = 0.558 mW/g



0 dB = 0.558mW/g

Test Laboratory: KTL

UM120 EDGE850 251CH 4SLOTS Horizontal-Down 0.5 cm spacing between phantom and EUT

***Test Date : 5th/March/2009**

Measured Liquid Temperature(℃) : 23.4, Ambient Temperature(℃) : 23.0

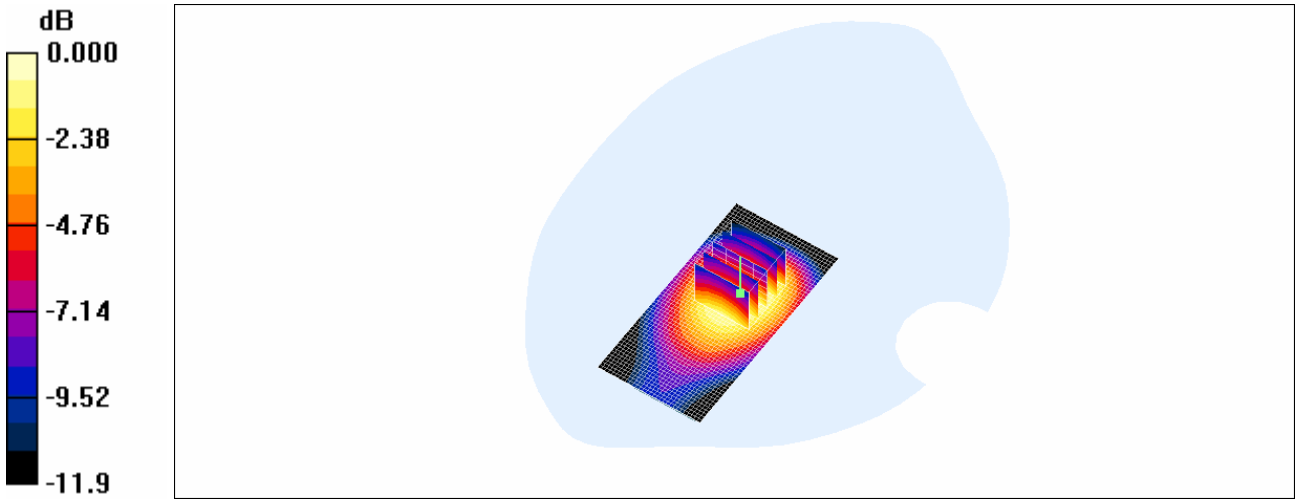
Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:2.075
Medium: MSL835 Medium parameters used: f = 848.8 MHz; σ = 0.97 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.655 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.69 V/m; Power Drift = -0.349 dB
Peak SAR (extrapolated) = 0.706 W/kg
SAR(1 g) = 0.535 mW/g; SAR(10 g) = 0.367 mW/g
Maximum value of SAR (measured) = 0.566 mW/g



0 dB = 0.566mW/g

Test Laboratory: KTL

UM120 WCDMA BAND5 4175CH Horizontal-Up 0.5 cm spacing between phantom and EUT

***Test Date : 5th/March/2009**

Measured Liquid Temperature(℃) : 23.4, Ambient Temperature(℃) : 23.0

Communication System: WCDMA BAND5; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL835 Medium parameters used: f = 835 MHz; σ = 0.96 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

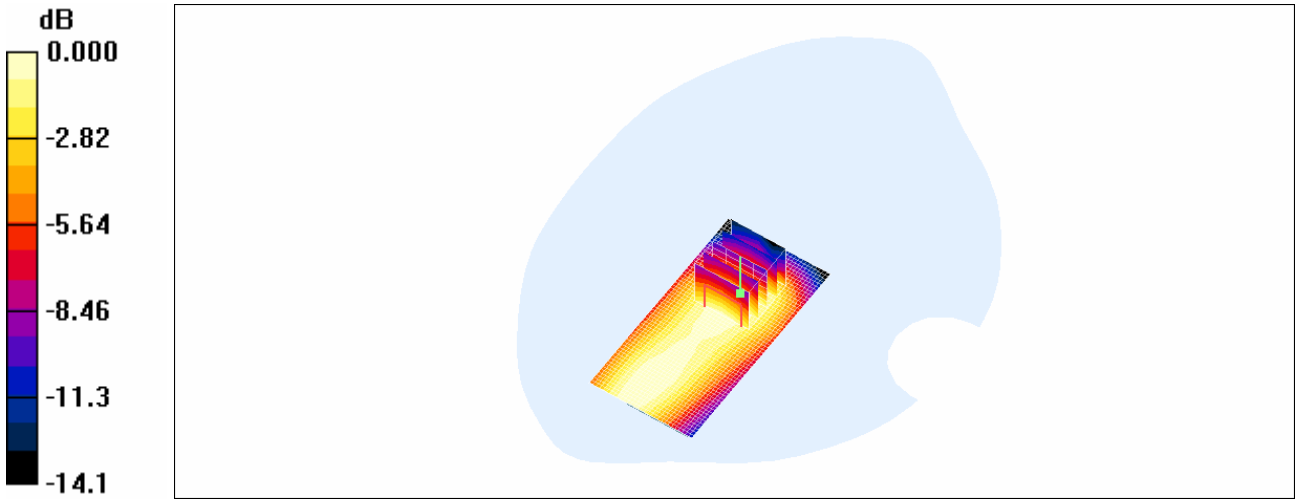
DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.376 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.0 V/m; Power Drift = 0.078 dB
Peak SAR (extrapolated) = 0.435 W/kg
SAR(1 g) = 0.324 mW/g; SAR(10 g) = 0.221 mW/g

Maximum value of SAR (measured) = 0.344 mW/g



0 dB = 0.344mW/g

Test Laboratory: KTL

UM120 WCDMA BAND5 4175CH Horizontal-Down 0.5 cm spacing between phantom and EUT

***Test Date : 5th/March/2009**

Measured Liquid Temperature(℃) : 23.4, Ambient Temperature(℃) : 23.0

Communication System: WCDMA BAND5; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL835 Medium parameters used: f = 835 MHz; σ = 0.96 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

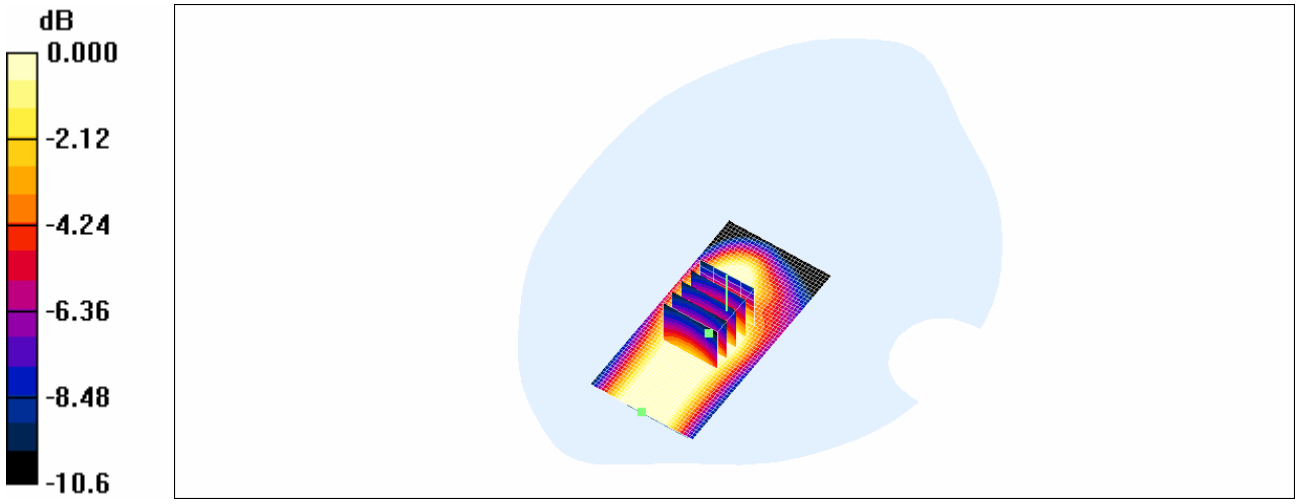
DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.865 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.38 V/m; Power Drift = 0.046 dB
Peak SAR (extrapolated) = 0.537 W/kg
SAR(1 g) = 0.377 mW/g; SAR(10 g) = 0.247 mW/g

Maximum value of SAR (measured) = 0.408 mW/g



0 dB = 0.408mW/g

Test Laboratory: KTL

UM120 WCDMA BAND5 4175CH Vertical-Front 0.5 cm spacing between phantom and EUT

***Test Date : 5th/March/2009**

Measured Liquid Temperature(℃) : 23.4, Ambient Temperature(℃) : 23.0

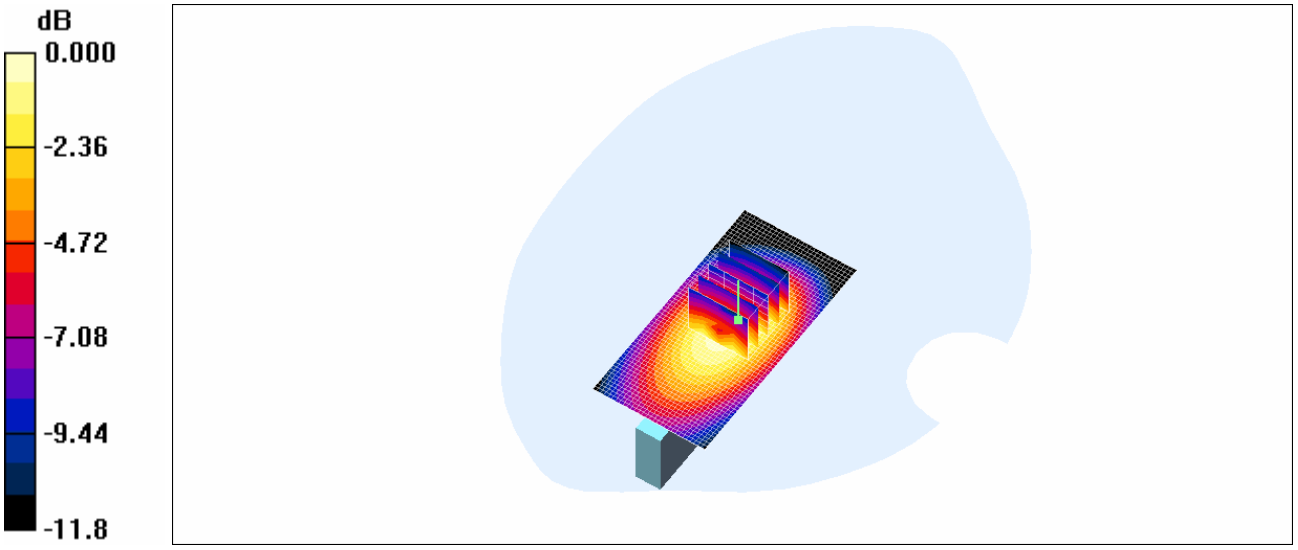
Communication System: WCDMA BAND5; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL835 Medium parameters used: f = 835 MHz; σ = 0.96 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.301 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.1 V/m; Power Drift = 0.019 dB
Peak SAR (extrapolated) = 0.402 W/kg
SAR(1 g) = 0.315 mW/g; SAR(10 g) = 0.209 mW/g
Maximum value of SAR (measured) = 0.340 mW/g



0 dB = 0.340mW/g

Test Laboratory: KTL

UM120 WCDMA BAND5 4175CH Vertical-Back 0.5 cm spacing between phantom and EUT

***Test Date : 5th/March/2009**

Measured Liquid Temperature(℃) : 23.4, Ambient Temperature(℃) : 23.0

Communication System: WCDMA BAND5; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL835 Medium parameters used: f = 835 MHz; σ = 0.96 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

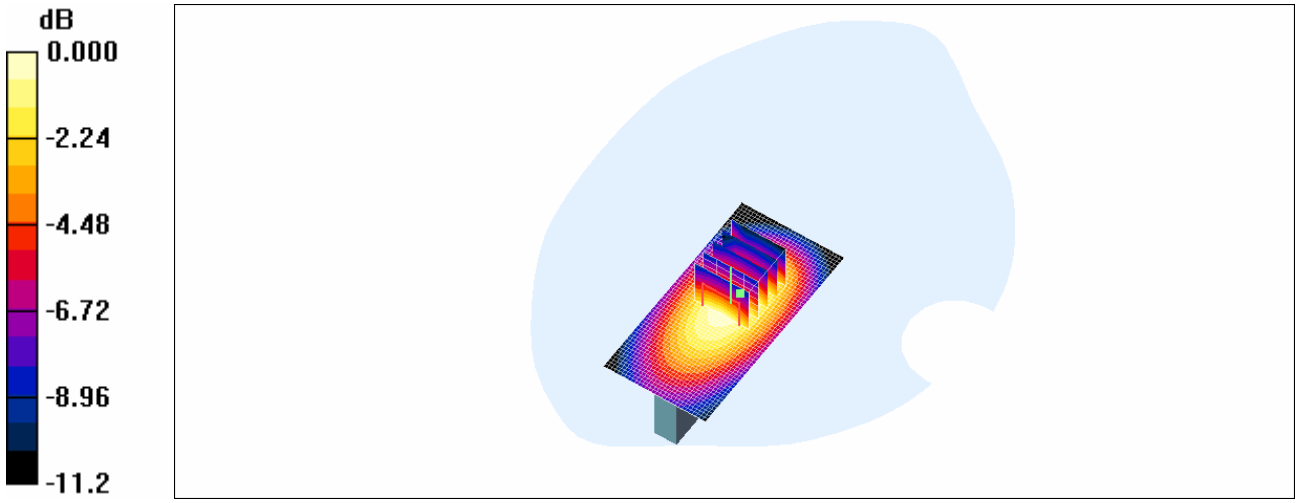
DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.527 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.0 V/m; Power Drift = -0.034 dB
Peak SAR (extrapolated) = 0.695 W/kg
SAR(1 g) = 0.484 mW/g; SAR(10 g) = 0.325 mW/g

Maximum value of SAR (measured) = 0.519 mW/g



0 dB = 0.519mW/g

Test Laboratory: KTL

UM120 WCDMA BAND5 4132CH Vertical-Back 0.5 cm spacing between phantom and EUT

***Test Date : 5th/March/2009**

Measured Liquid Temperature(℃) : 23.4, Ambient Temperature(℃) : 23.0

Communication System: WCDMA BAND5; Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium: MSL835 Medium parameters used: f = 826.4 MHz; σ = 0.95 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

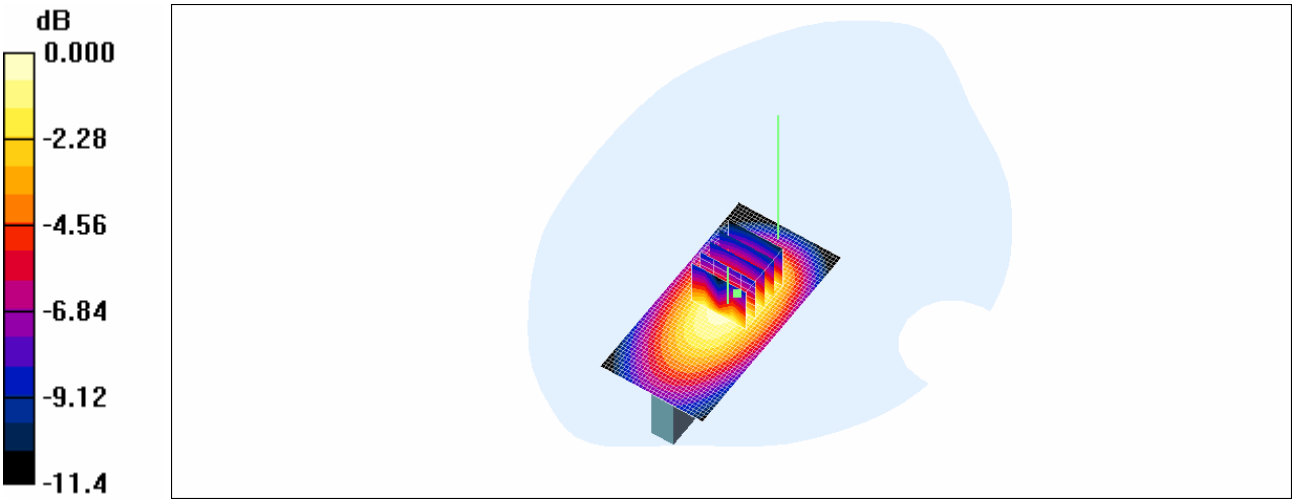
DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

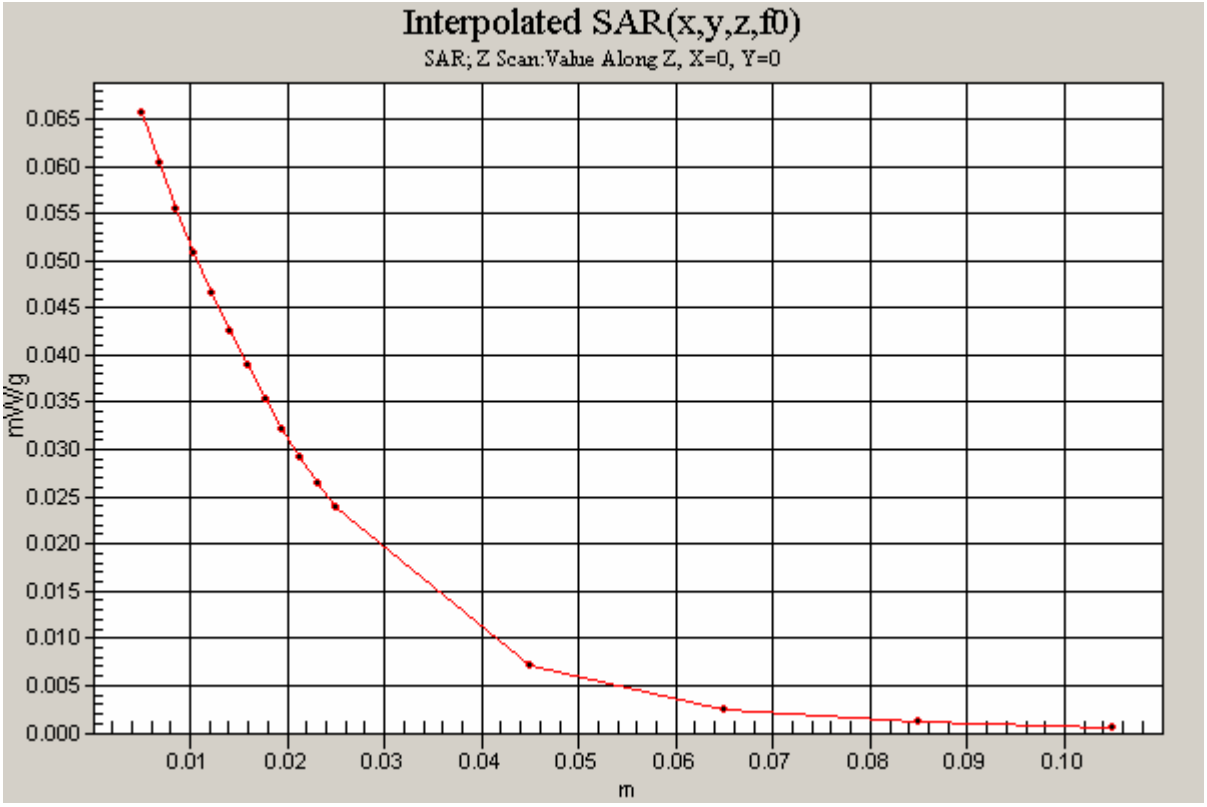
Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.528 mW/g

Z Scan (1x1x16): Measurement grid: dx=20mm, dy=20mm, dz=20mm
Maximum value of SAR (interpolated) = 0.066 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.2 V/m; Power Drift = 0.112 dB
Peak SAR (extrapolated) = 0.791 W/kg
SAR(1 g) = 0.499 mW/g; SAR(10 g) = 0.331 mW/g
Maximum value of SAR (measured) = 0.531 mW/g


dB
0.000
-2.28
-4.56
-6.84
-9.12
-11.4

0 dB = 0.531mW/g


Interpolated SAR(x,y,z,f0)
SAR; Z Scan:Value Along Z, X=0, Y=0
mW/g
0.065
0.060
0.055
0.050
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

Test Laboratory: KTL

UM120 WCDMA BAND5 4233CH Vertical-Back 0.5 cm spacing between phantom and EUT

***Test Date : 5th/March/2009**

Measured Liquid Temperature(℃) : 23.4, Ambient Temperature(℃) : 23.0

Communication System: WCDMA BAND5; Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium: MSL835 Medium parameters used: f = 846.6 MHz; σ = 0.97 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

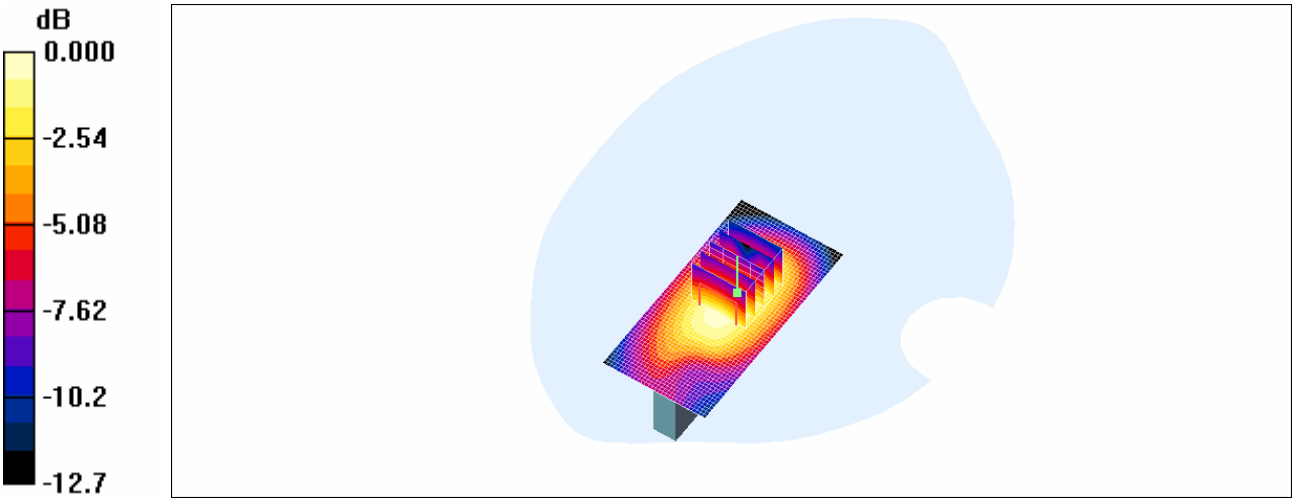
DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.524 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.0 V/m; Power Drift = 0.051 dB
Peak SAR (extrapolated) = 0.698 W/kg
SAR(1 g) = 0.483 mW/g; SAR(10 g) = 0.322 mW/g

Maximum value of SAR (measured) = 0.516 mW/g



0 dB = 0.516mW/g

Test Laboratory: KTL

UM120 WCDMA BAND5 4132CH Direct Connection to Laptop

***Test Date : 5th/March/2009**

Measured Liquid Temperature(℃) : 23.4, Ambient Temperature(℃) : 23.0

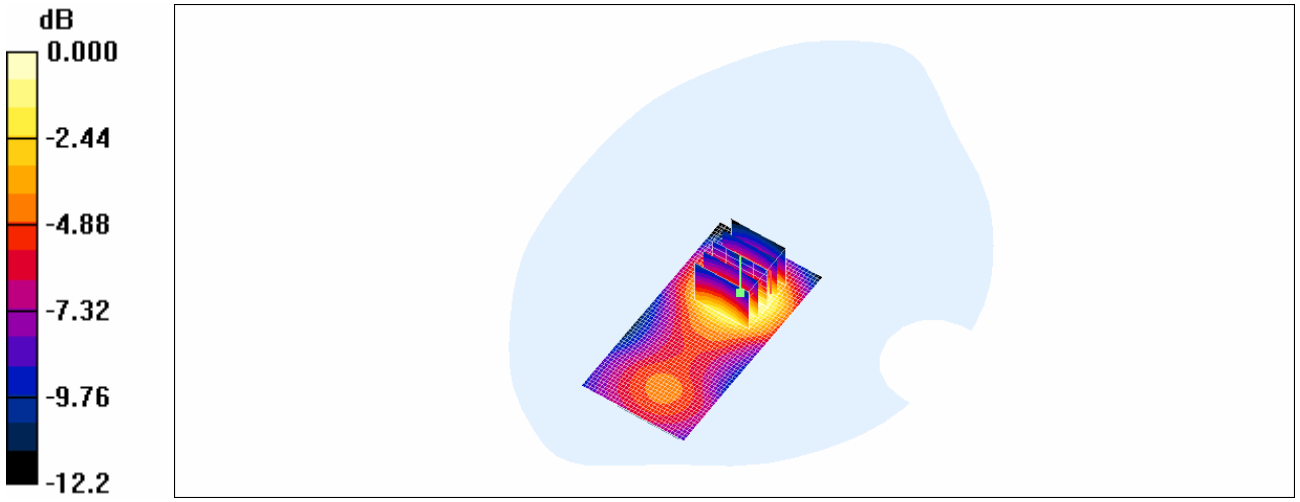
Communication System: WCDMA BAND5; Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium: MSL835 Medium parameters used: f = 826.4 MHz; σ = 0.95 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.292 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.3 V/m; Power Drift = -0.034 dB
Peak SAR (extrapolated) = 0.294 W/kg
SAR(1 g) = 0.229 mW/g; SAR(10 g) = 0.150 mW/g
Maximum value of SAR (measured) = 0.250 mW/g



0 dB = 0.250mW/g

Test Laboratory: KTL

1900MHz Validation – D1900V2; SN:5d038

***Test Date : 6th /March/2009**

Measured Liquid Temperature(℃) : 22.5 , Ambient Temperature(℃) : 22.0

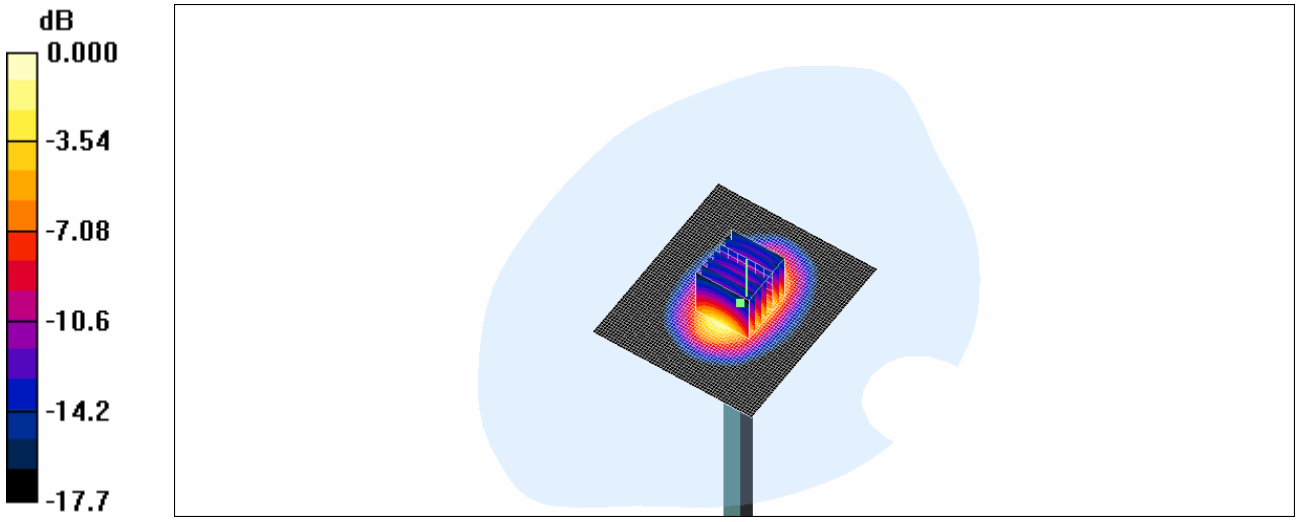
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL1900 Medium parameters used: f = 1900 MHz; σ = 1.42 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(5.03, 5.03, 5.03); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (61x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.7 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 90.7 V/m; Power Drift = 0.002 dB
Peak SAR (extrapolated) = 19.2 W/kg
SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.34 mW/g
Maximum value of SAR (measured) = 11.5 mW/g



0 dB = 11.5mW/g

Test Laboratory: KTL

UM120 GPRS1900 661CH 1SLOT Horizontal-Up 0.5 cm spacing between phantom and EUT

***Test Date : 6th/March/2009**

Measured Liquid Temperature(℃) : 22.4, Ambient Temperature(℃) : 22.0

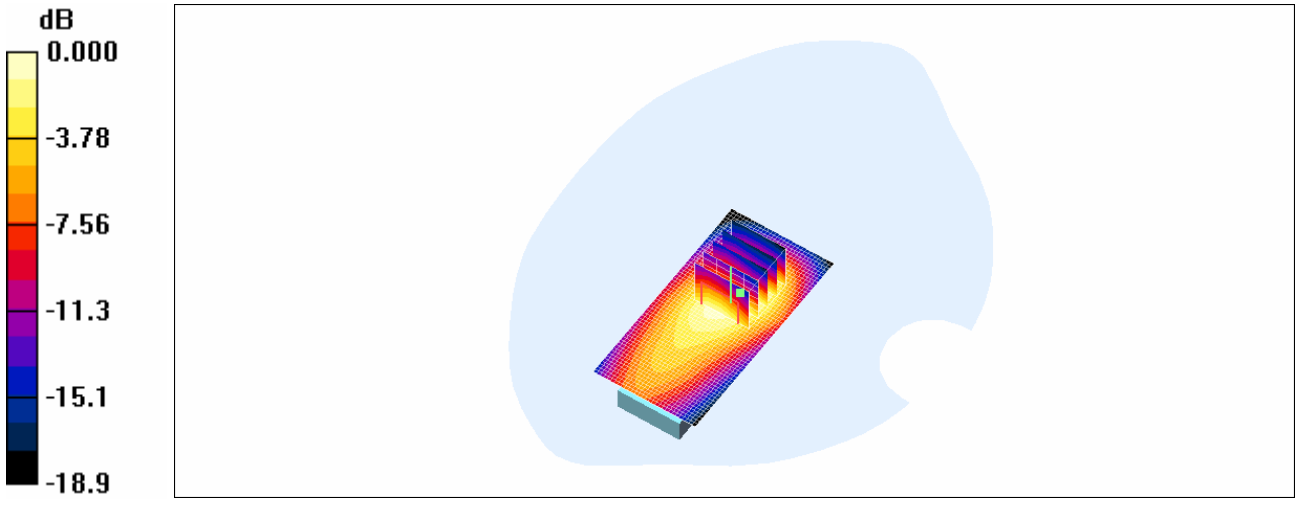
Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.58, 4.58, 4.58); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.463 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.5 V/m; Power Drift = 0.004 dB
Peak SAR (extrapolated) = 0.634 W/kg
SAR(1 g) = 0.377 mW/g; SAR(10 g) = 0.211 mW/g
Maximum value of SAR (measured) = 0.412 mW/g



0 dB = 0.412mW/g

Test Laboratory: KTL

UM120 GPRS1900 661CH 2SLOTS Horizontal-Up 0.5 cm spacing between phantom and EUT

***Test Date : 6th/March/2009**

Measured Liquid Temperature(℃) : 22.4, Ambient Temperature(℃) : 22.0

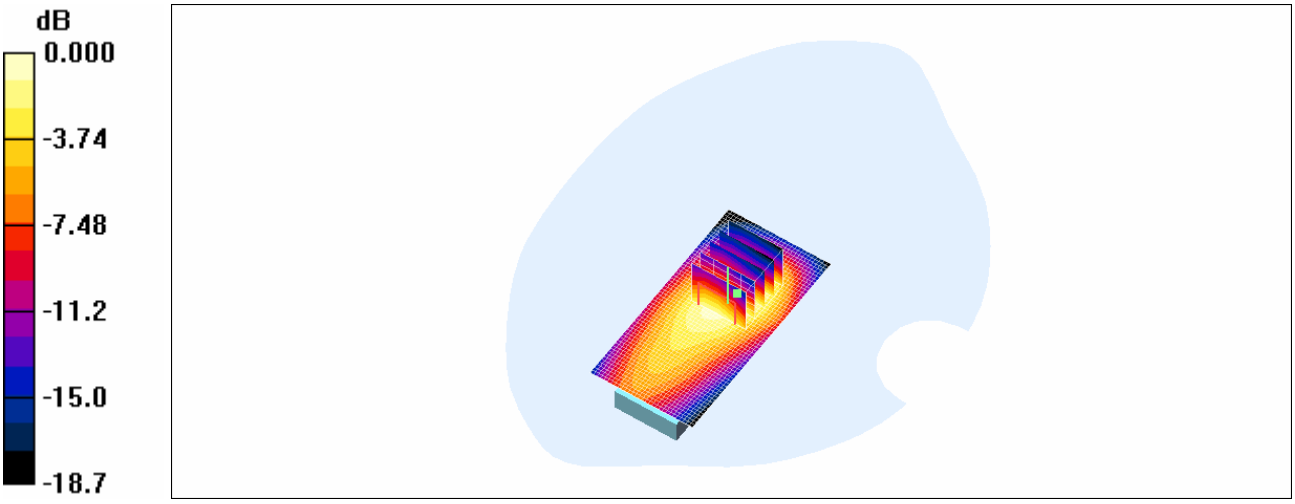
Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.58, 4.58, 4.58); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.886 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.5 V/m; Power Drift = -0.065 dB
Peak SAR (extrapolated) = 1.20 W/kg
SAR(1 g) = 0.725 mW/g; SAR(10 g) = 0.404 mW/g
Maximum value of SAR (measured) = 0.794 mW/g



0 dB = 0.794mW/g

Test Laboratory: KTL

UM120 GPRS1900 661CH 3SLOTS Horizontal-Up 0.5 cm spacing between phantom and EUT

***Test Date : 6th/March/2009**

Measured Liquid Temperature(℃) : 22.4, Ambient Temperature(℃) : 22.0

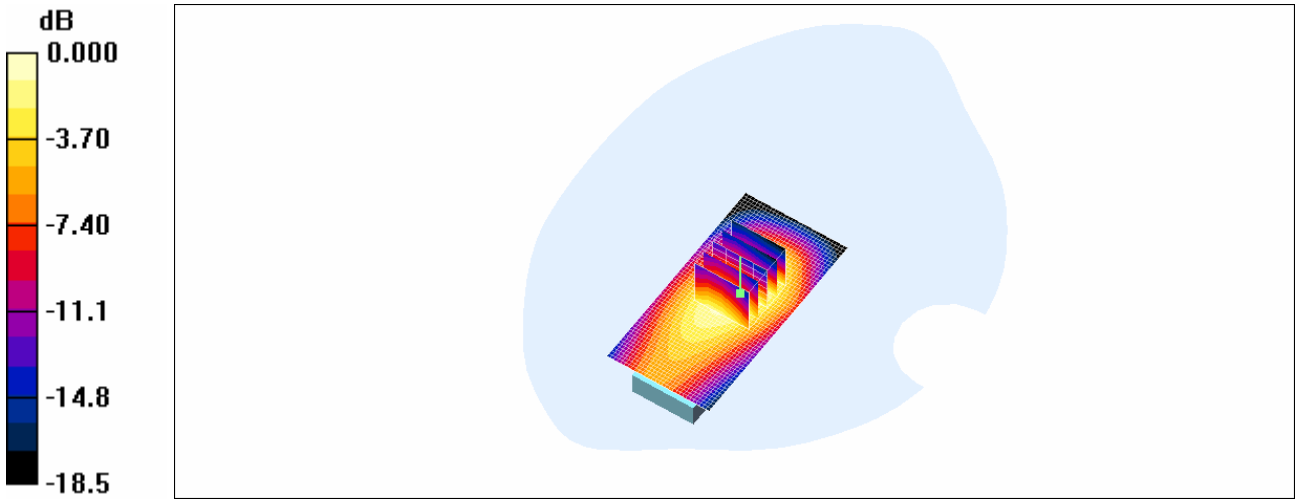
Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:2.767
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.58, 4.58, 4.58); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.01 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.4 V/m; Power Drift = -0.080 dB
Peak SAR (extrapolated) = 1.52 W/kg
SAR(1 g) = 0.941 mW/g; SAR(10 g) = 0.543 mW/g
Maximum value of SAR (measured) = 1.05 mW/g



0 dB = 1.05mW/g

Test Laboratory: KTL

UM120 GPRS1900 661CH 4SLOTS Horizontal-Up 0.5 cm spacing between phantom and EUT

***Test Date : 6th/March/2009**

Measured Liquid Temperature(℃) : 22.4, Ambient Temperature(℃) : 22.0

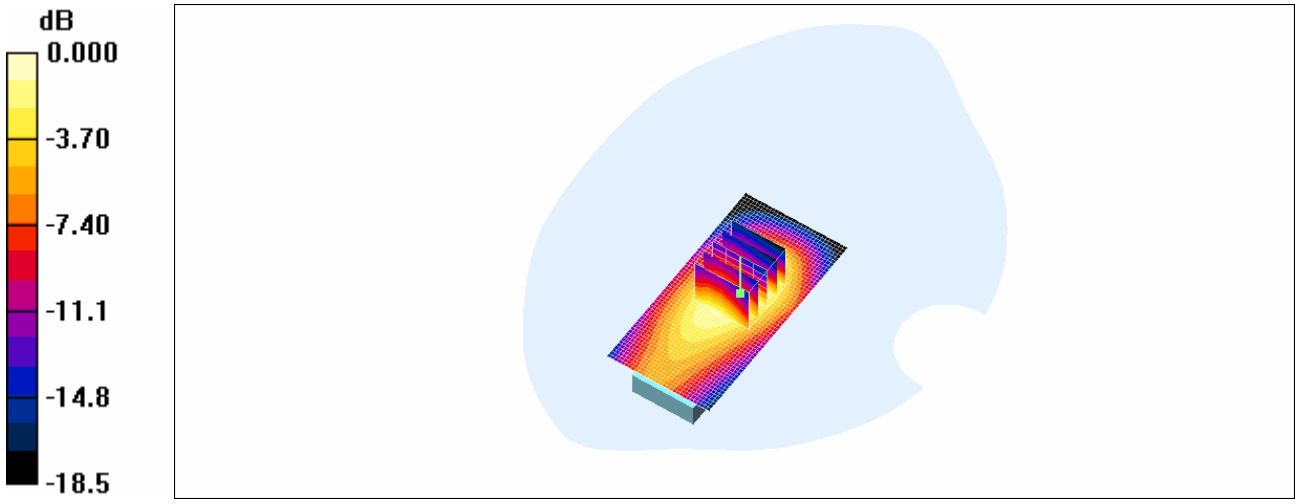
Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:2.075
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.58, 4.58, 4.58); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.28 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.3 V/m; Power Drift = 0.286 dB
Peak SAR (extrapolated) = 1.97 W/kg
SAR(1 g) = 1.2 mW/g; SAR(10 g) = 0.693 mW/g
Maximum value of SAR (measured) = 1.34 mW/g



0 dB = 1.34mW/g

Test Laboratory: KTL

UM120 GPRS1900 661CH 4SLOTS Horizontal-Down 0.5 cm spacing between phantom and EUT

***Test Date : 6th/March/2009**

Measured Liquid Temperature(℃) : 22.4, Ambient Temperature(℃) : 22.0

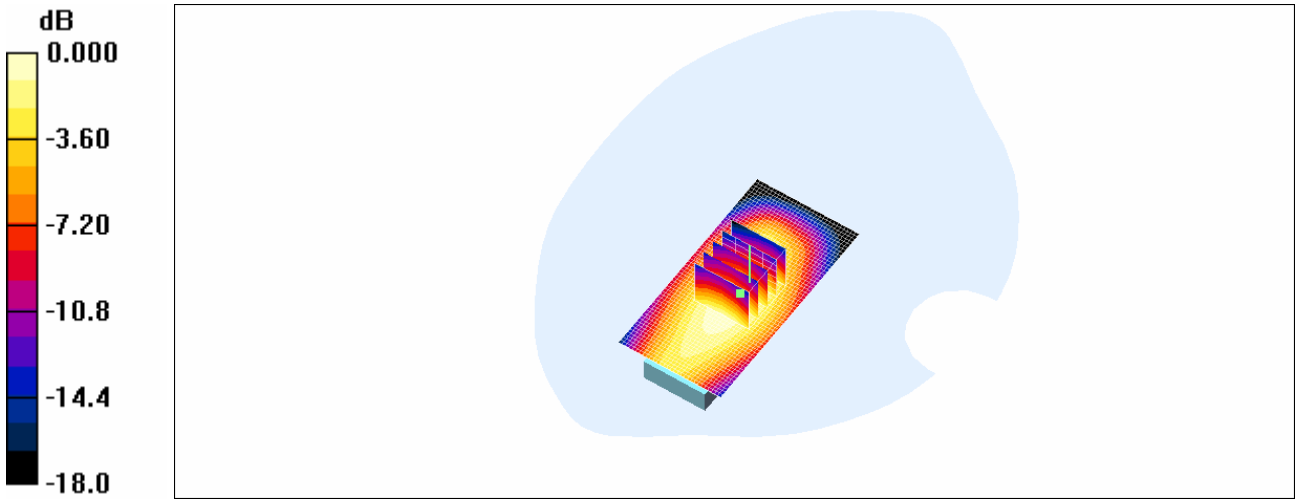
Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:2.075
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.58, 4.58, 4.58); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.910 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.4 V/m; Power Drift = -0.193 dB
Peak SAR (extrapolated) = 1.26 W/kg
SAR(1 g) = 0.811 mW/g; SAR(10 g) = 0.496 mW/g
Maximum value of SAR (measured) = 0.890 mW/g



0 dB = 0.890mW/g

Test Laboratory: KTL

UM120 GPRS1900 661CH 4SLOTS Vertical-Front 0.5 cm spacing between phantom and EUT

***Test Date : 6th/March/2009**

Measured Liquid Temperature(℃) : 22.4, Ambient Temperature(℃) : 22.0

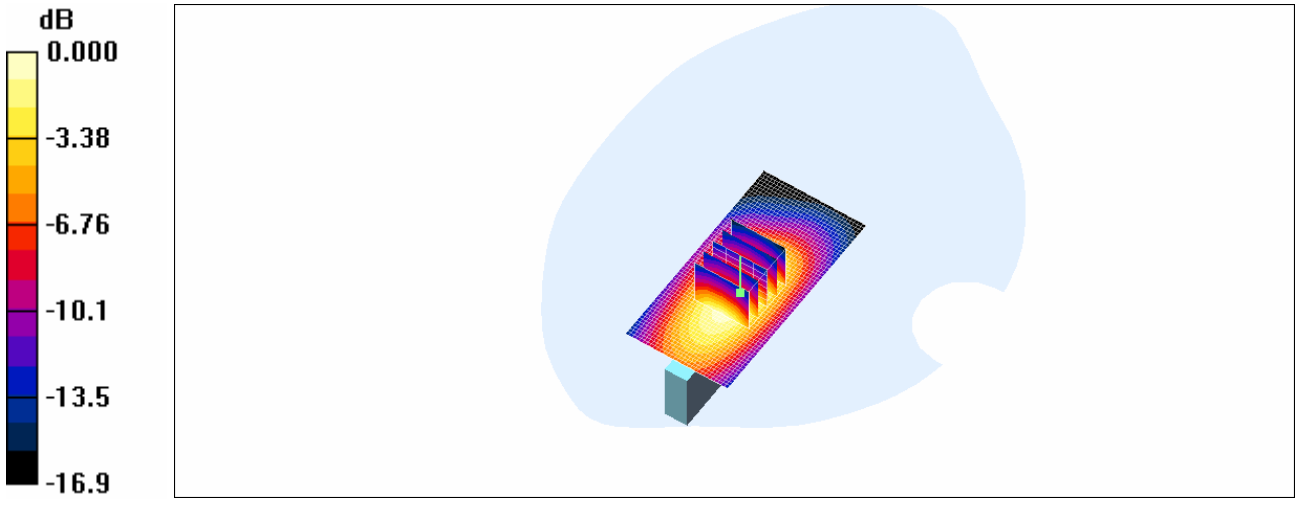
Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:2.075
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.58, 4.58, 4.58); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.02 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.99 V/m; Power Drift = -0.247 dB
Peak SAR (extrapolated) = 1.50 W/kg
SAR(1 g) = 0.898 mW/g; SAR(10 g) = 0.513 mW/g
Maximum value of SAR (measured) = 0.986 mW/g



0 dB = 0.986mW/g

Test Laboratory: KTL

UM120 GPRS1900 661CH 4SLOTS Vertical-Back 0.5 cm spacing between phantom and EUT

***Test Date : 6th/March/2009**

Measured Liquid Temperature(℃) : 22.4, Ambient Temperature(℃) : 22.0

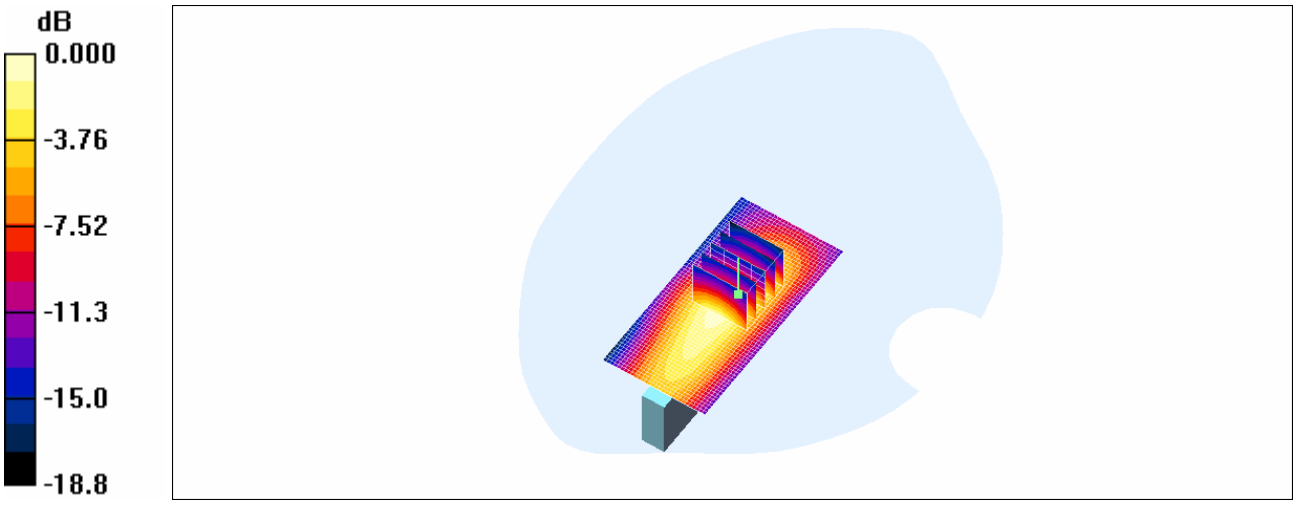
Communication System: DCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:2.075
Medium: MSL1900 Medium parameters used: f = 1909.8 MHz; σ = 1.57 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.58, 4.58, 4.58); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.419 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.63 V/m; Power Drift = -0.345 dB
Peak SAR (extrapolated) = 0.754 W/kg
SAR(1 g) = 0.387 mW/g; SAR(10 g) = 0.198 mW/g
Maximum value of SAR (measured) = 0.435 mW/g



0 dB = 0.435mW/g

Test Laboratory: KTL

UM120 GPRS1900 512CH 4SLOTS Horizontal-Up 0.5 cm spacing between phantom and EUT

***Test Date : 6th/March/2009**

Measured Liquid Temperature(℃) : 22.4, Ambient Temperature(℃) : 22.0

Communication System: DCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:2.075
Medium: MSL1900 Medium parameters used: f = 1850.2 MHz; σ = 1.5 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

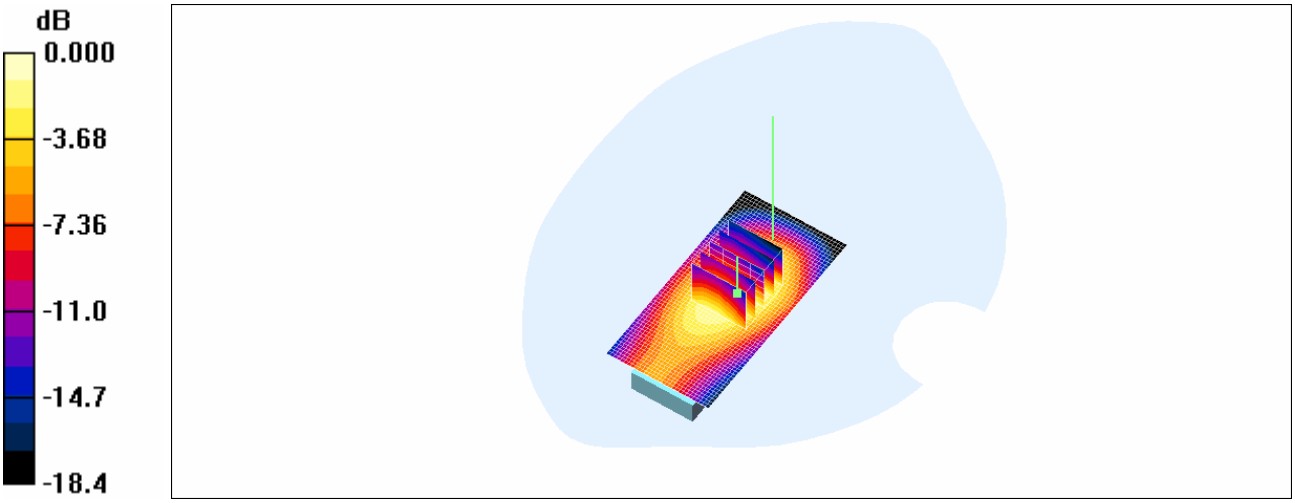
DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.58, 4.58, 4.58); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

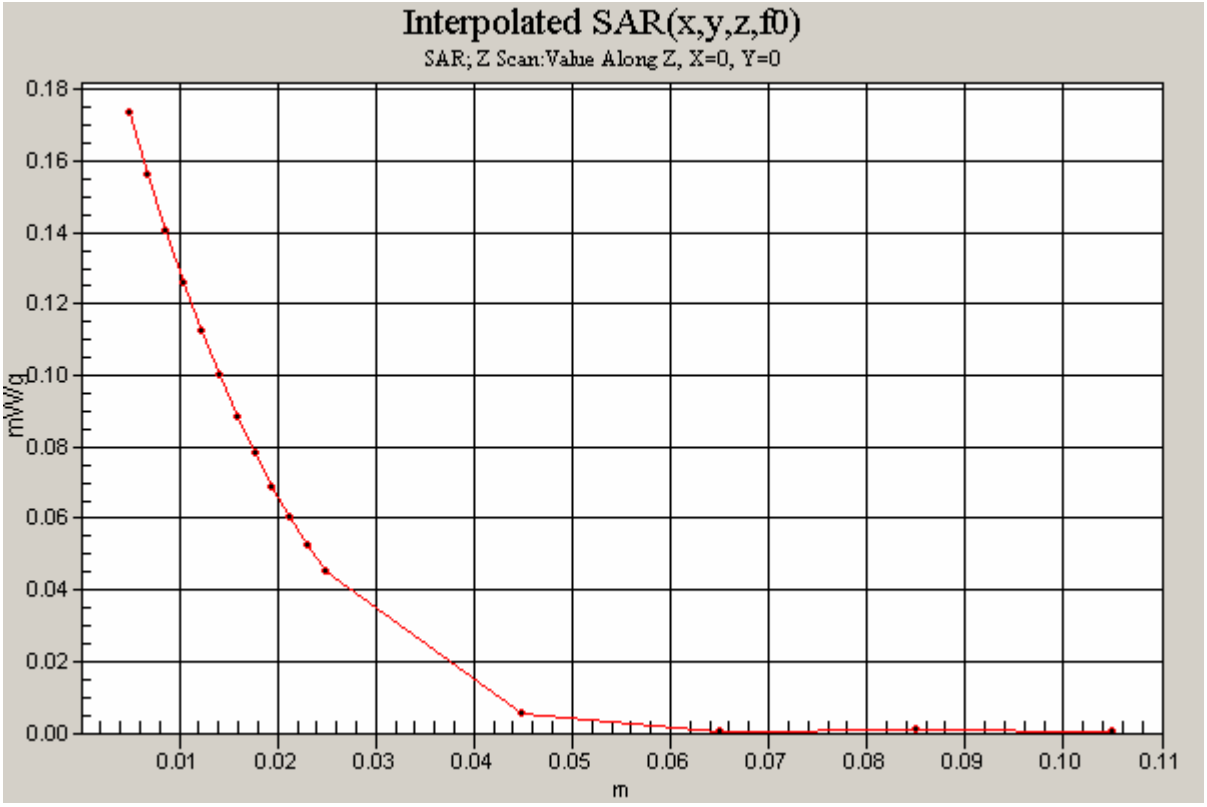
Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.38 mW/g

Z Scan (1x1x16): Measurement grid: dx=20mm, dy=20mm, dz=20mm
Maximum value of SAR (interpolated) = 0.173 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.3 V/m; Power Drift = 0.194 dB
Peak SAR (extrapolated) = 2.08 W/kg
SAR(1 g) = 1.27 mW/g; SAR(10 g) = 0.741 mW/g
Maximum value of SAR (measured) = 1.41 mW/g


dB
0.000
-3.68
-7.36
-11.0
-14.7
-18.4

0 dB = 1.41mW/g


Interpolated SAR(x,y,z,f0)
SAR; Z Scan:Value Along Z, X=0, Y=0
mW/g
m
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
0.11

Test Laboratory: KTL

UM120 GPRS1900 512CH 4SLOTS Horizontal-Down 0.5 cm spacing between phantom and EUT

***Test Date : 6th/March/2009**

Measured Liquid Temperature(℃) : 22.4, Ambient Temperature(℃) : 22.0

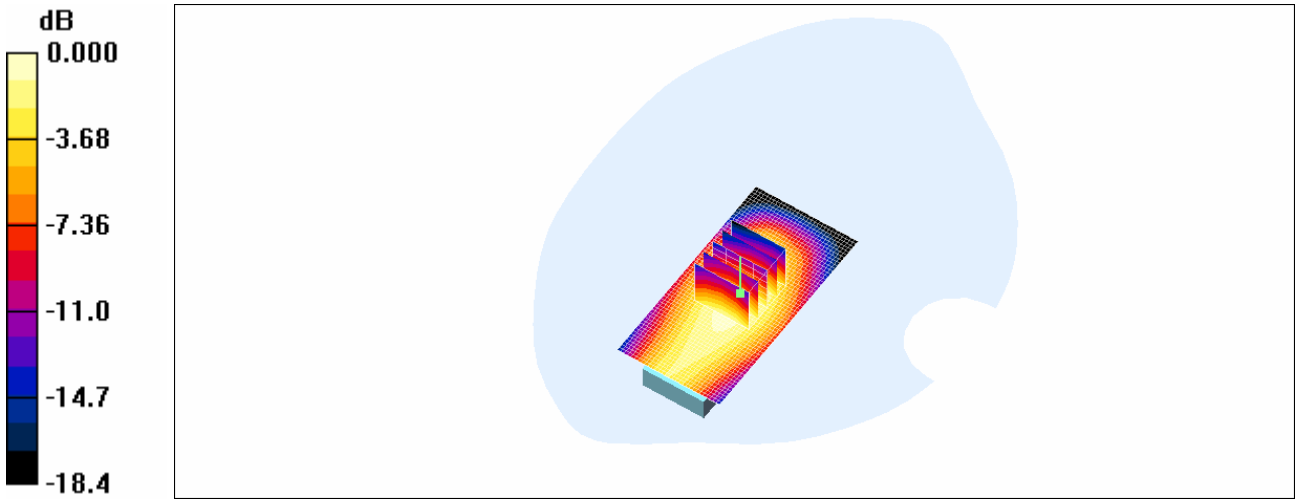
Communication System: DCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:2.075
Medium: MSL1900 Medium parameters used: f = 1850.2 MHz; σ = 1.5 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.58, 4.58, 4.58); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.937 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.0 V/m; Power Drift = -0.171 dB
Peak SAR (extrapolated) = 1.35 W/kg
SAR(1 g) = 0.865 mW/g; SAR(10 g) = 0.522 mW/g
Maximum value of SAR (measured) = 0.917 mW/g



0 dB = 0.917mW/g

Test Laboratory: KTL

UM120 GPRS1900 810CH 4SLOTS Horizontal-Up 0.5 cm spacing between phantom and EUT

***Test Date : 6th/March/2009**

Measured Liquid Temperature(℃) : 22.4, Ambient Temperature(℃) : 22.0

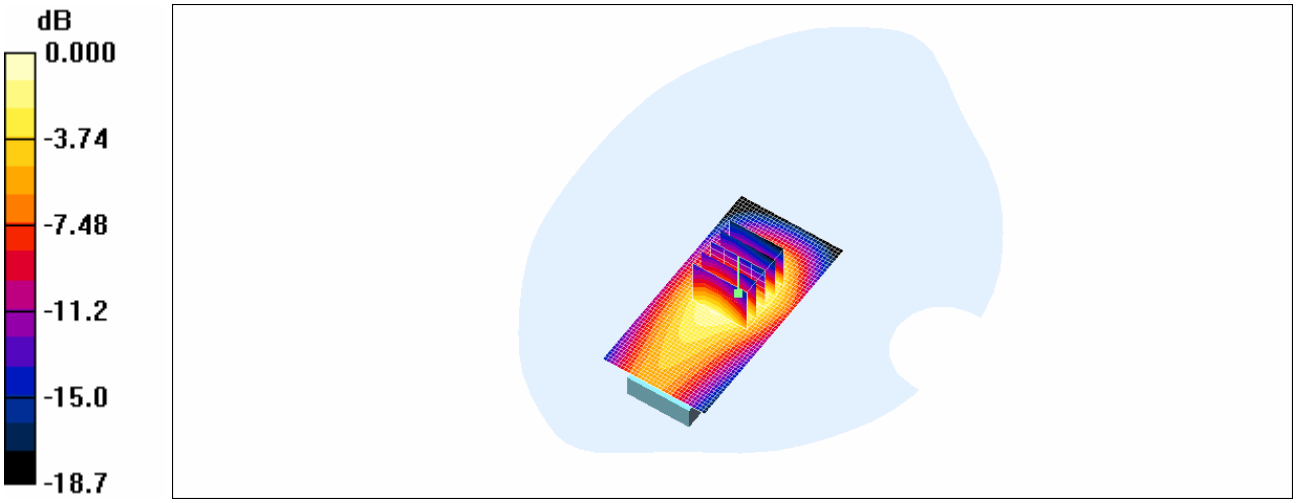
Communication System: DCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:2.075
Medium: MSL1900 Medium parameters used: f = 1909.8 MHz; σ = 1.57 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.58, 4.58, 4.58); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.28 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.3 V/m; Power Drift = 0.034 dB
Peak SAR (extrapolated) = 1.99 W/kg
SAR(1 g) = 1.19 mW/g; SAR(10 g) = 0.676 mW/g
Maximum value of SAR (measured) = 1.33 mW/g



0 dB = 1.33mW/g

Test Laboratory: KTL

UM120 GPRS1900 810CH 4SLOTS Horizontal-Down 0.5 cm spacing between phantom and EUT

***Test Date : 6th/March/2009**

Measured Liquid Temperature(℃) : 22.4, Ambient Temperature(℃) : 22.0

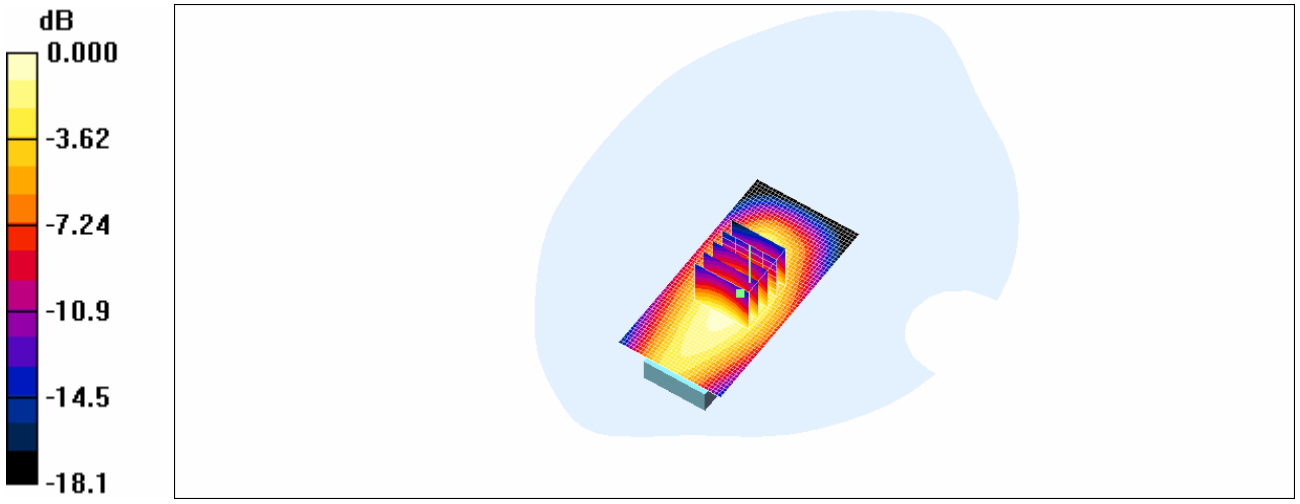
Communication System: DCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:2.075
Medium: MSL1900 Medium parameters used: f = 1909.8 MHz; σ = 1.57 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.58, 4.58, 4.58); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.789 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.5 V/m; Power Drift = 0.197 dB
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.737 mW/g; SAR(10 g) = 0.445 mW/g
Maximum value of SAR (measured) = 0.811 mW/g



0 dB = 0.811mW/g

Test Laboratory: KTL

UM120 GPRS1900 512CH 4SLOTS Vertical-Front 0.5 cm spacing between phantom and EUT

***Test Date : 6th/March/2009**

Measured Liquid Temperature(℃) : 22.4, Ambient Temperature(℃) : 22.0

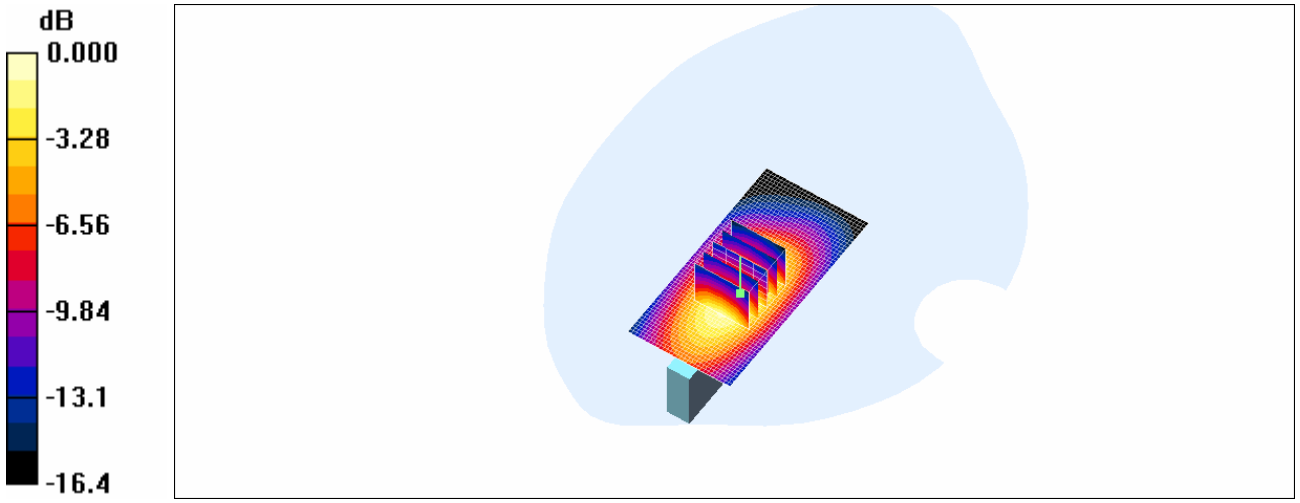
Communication System: DCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:2.075
Medium: MSL1900 Medium parameters used: f = 1850.2 MHz; σ = 1.5 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.58, 4.58, 4.58); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.957 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.74 V/m; Power Drift = -0.004 dB
Peak SAR (extrapolated) = 1.43 W/kg
SAR(1 g) = 0.851 mW/g; SAR(10 g) = 0.487 mW/g
Maximum value of SAR (measured) = 0.936 mW/g



0 dB = 0.936mW/g

Test Laboratory: KTL

UM120 GPRS1900 810CH 4SLOTS Vertical-Front 0.5 cm spacing between phantom and EUT

***Test Date : 6th/March/2009**

Measured Liquid Temperature(℃) : 22.4, Ambient Temperature(℃) : 22.0

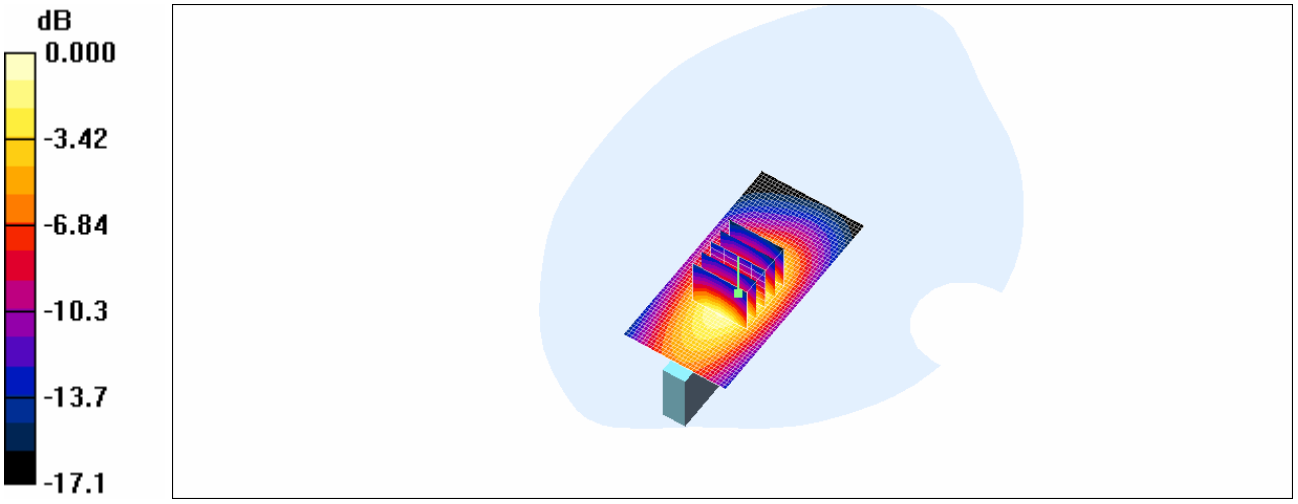
Communication System: DCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:2.075
Medium: MSL1900 Medium parameters used: f = 1909.8 MHz; σ = 1.57 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.58, 4.58, 4.58); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.867 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.59 V/m; Power Drift = 0.080 dB
Peak SAR (extrapolated) = 1.31 W/kg
SAR(1 g) = 0.778 mW/g; SAR(10 g) = 0.442 mW/g
Maximum value of SAR (measured) = 0.862 mW/g



0 dB = 0.862mW/g

Test Laboratory: KTL

UM120 GPRS1900 512CH 4SLOTS Direct Connection to Laptop

***Test Date : 6th/March/2009**

Measured Liquid Temperature(℃) : 22.4, Ambient Temperature(℃) : 22.0

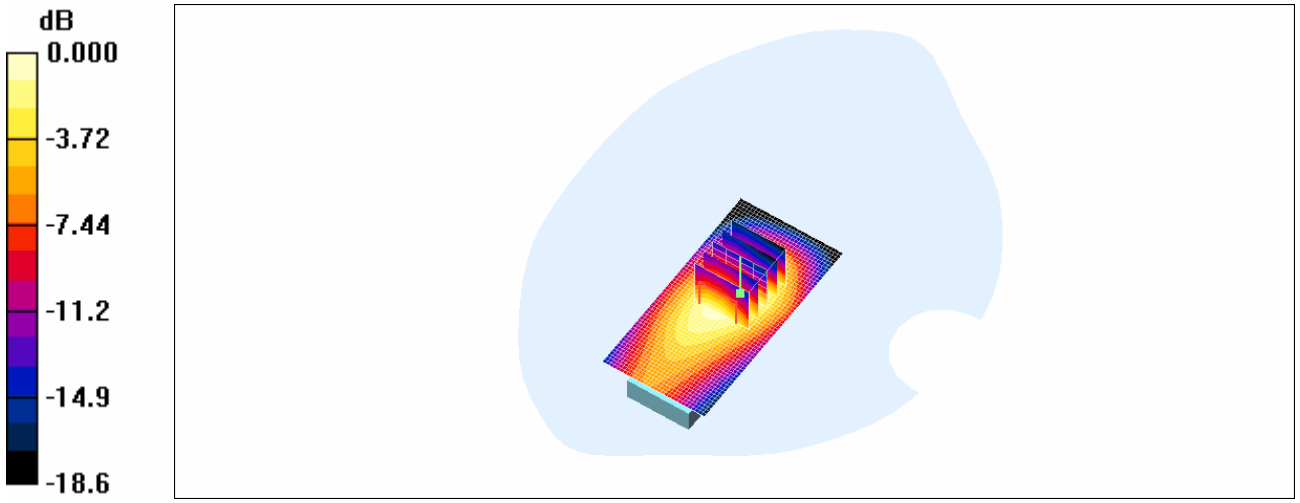
Communication System: DCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:2.075
Medium: MSL1900 Medium parameters used: f = 1850.2 MHz; σ = 1.5 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.58, 4.58, 4.58); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.10 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.2 V/m; Power Drift = -0.072 dB
Peak SAR (extrapolated) = 1.72 W/kg
SAR(1 g) = 1.03 mW/g; SAR(10 g) = 0.586 mW/g
Maximum value of SAR (measured) = 1.10 mW/g



0 dB = 1.10mW/g

Test Laboratory: KTL

UM120 EGPRS1900 512CH 4SLOTS Horizontal-Up 0.5 cm spacing between phantom and EUT

***Test Date : 6th/March/2009**

Measured Liquid Temperature(℃) : 22.4, Ambient Temperature(℃) : 22.0

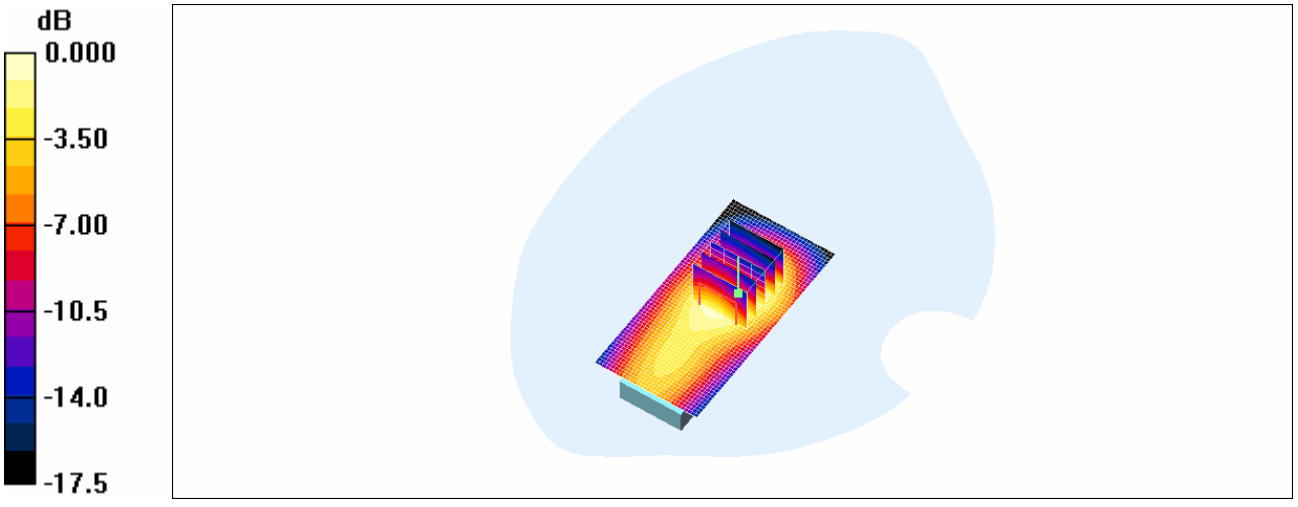
Communication System: DCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:2.075
Medium: MSL1900 Medium parameters used: f = 1850.2 MHz; σ = 1.5 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.58, 4.58, 4.58); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.751 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.3 V/m; Power Drift = -0.541 dB
Peak SAR (extrapolated) = 1.08 W/kg
SAR(1 g) = 0.656 mW/g; SAR(10 g) = 0.381 mW/g
Maximum value of SAR (measured) = 0.705 mW/g



0 dB = 0.705mW/g

Test Laboratory: KTL

UM120 WCDMA BAND2 9400CH Horizontal-Up 0.5 cm spacing between phantom and EUT

***Test Date : 6th/March/2009**

Measured Liquid Temperature(℃) : 22.4, Ambient Temperature(℃) : 22.0

Communication System: WCDMA ; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

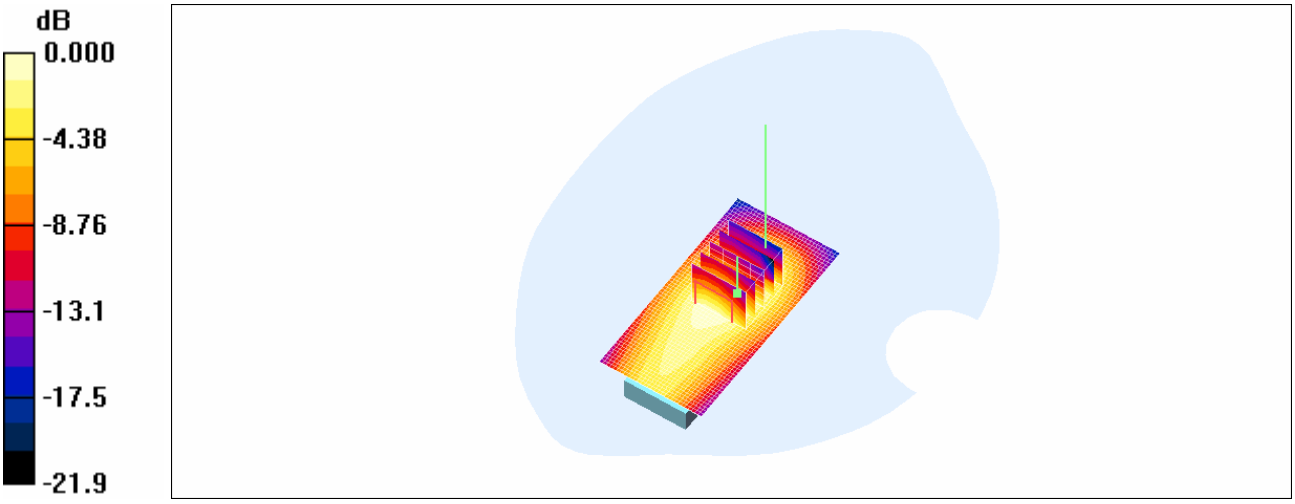
DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.58, 4.58, 4.58); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

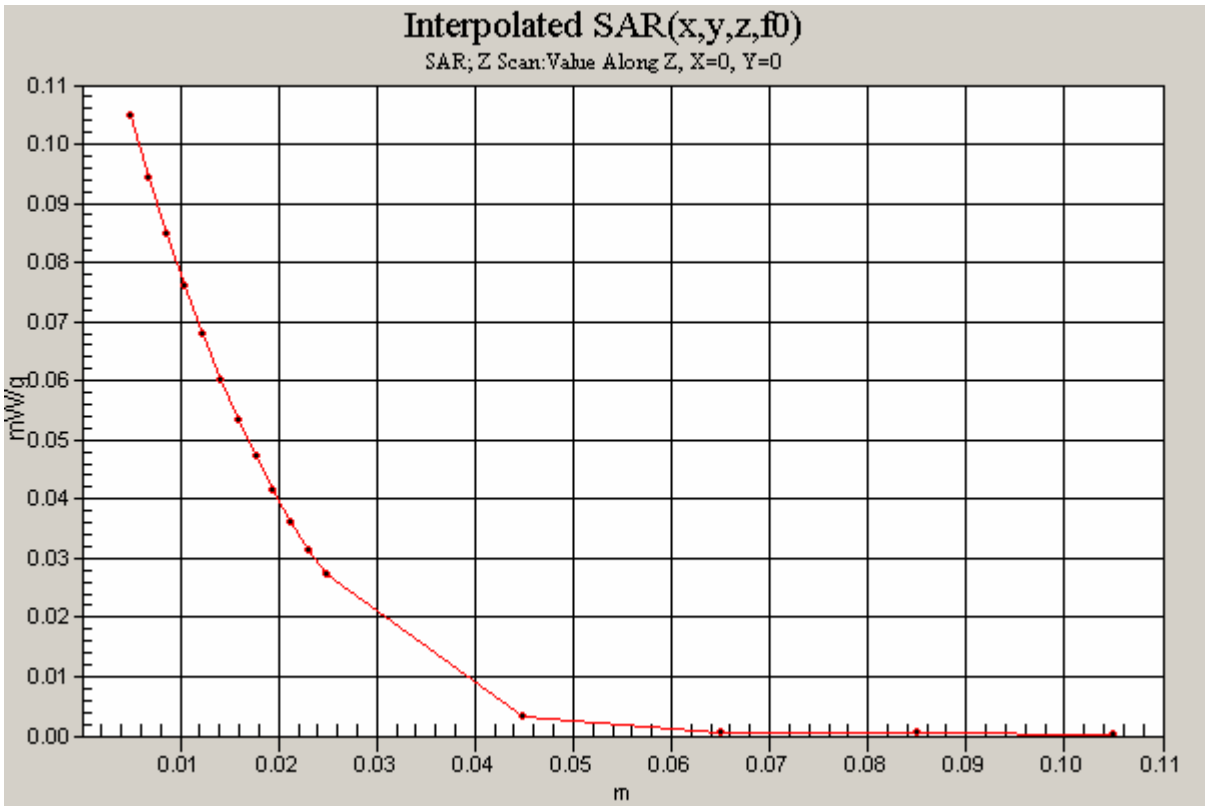
Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.810 mW/g

Z Scan (1x1x16): Measurement grid: dx=20mm, dy=20mm, dz=20mm
Maximum value of SAR (interpolated) = 0.105 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.8 V/m; Power Drift = -0.059 dB
Peak SAR (extrapolated) = 1.21 W/kg
SAR(1 g) = 0.767 mW/g; SAR(10 g) = 0.456 mW/g
Maximum value of SAR (measured) = 0.802 mW/g


dB
0.000
-4.38
-8.76
-13.1
-17.5
-21.9

0 dB = 0.802mW/g


Interpolated SAR(x,y,z,f0)
SAR; Z Scan:Value Along Z, X=0, Y=0
mW/g
m
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
0.11

Test Laboratory: KTL

UM120 WCDMA BAND2 9400CH Horizontal-Down 0.5 cm spacing between phantom and EUT

***Test Date : 6th/March/2009**

Measured Liquid Temperature(℃) : 22.4, Ambient Temperature(℃) : 22.0

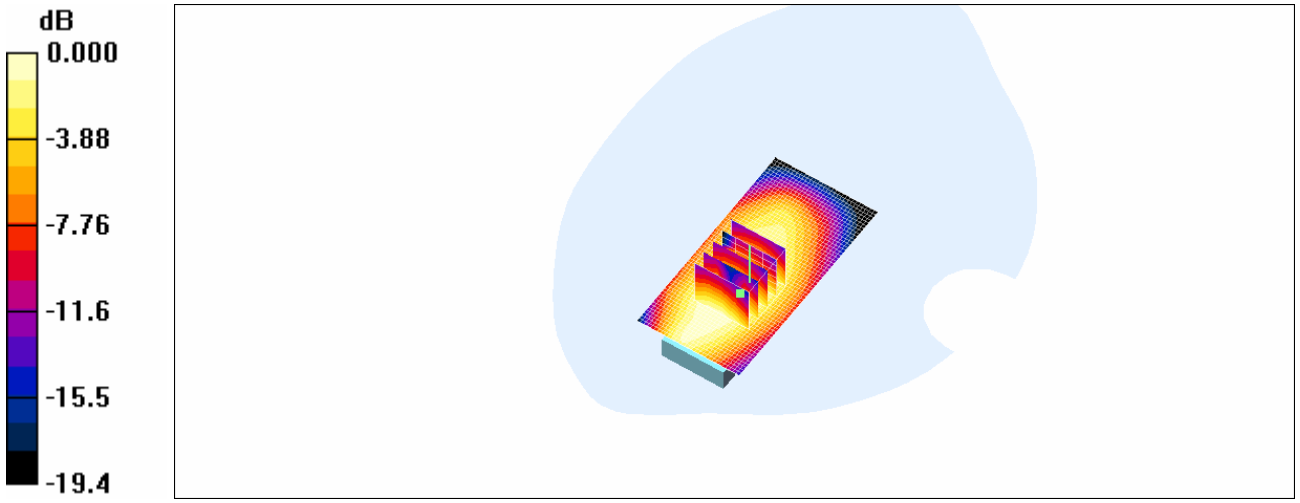
Communication System: WCDMA ; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.58, 4.58, 4.58); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.742 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.7 V/m; Power Drift = 0.027 dB
Peak SAR (extrapolated) = 1.29 W/kg
SAR(1 g) = 0.680 mW/g; SAR(10 g) = 0.385 mW/g
Maximum value of SAR (measured) = 0.708 mW/g



0 dB = 0.708mW/g

Test Laboratory: KTL

UM120 WCDMA BAND2 9400CH Vertical-Front 0.5 cm spacing between phantom and EUT

***Test Date : 6th/March/2009**

Measured Liquid Temperature(℃) : 22.4, Ambient Temperature(℃) : 22.0

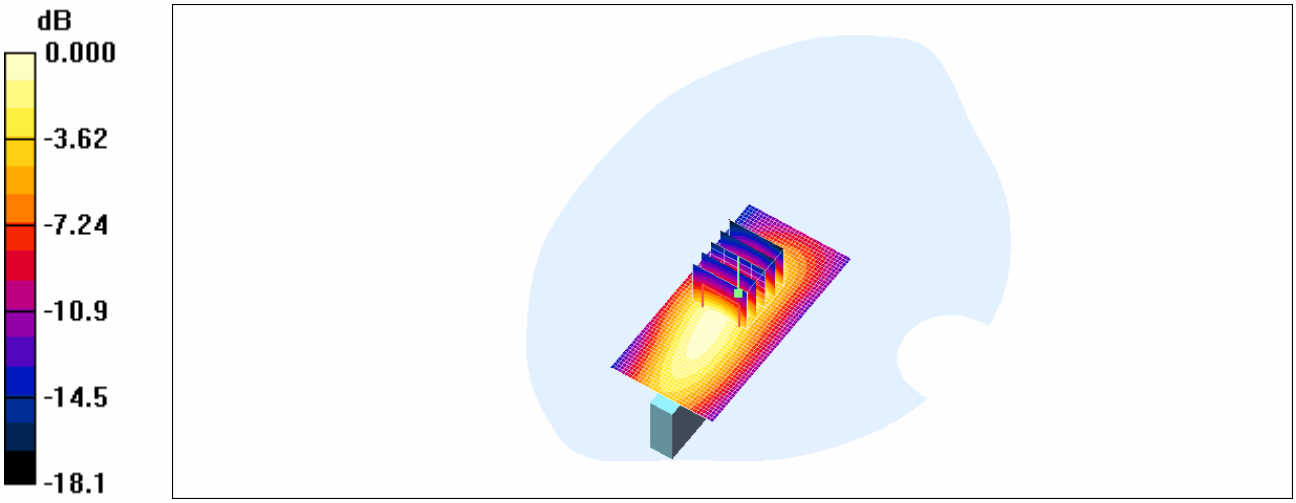
Communication System: WCDMA ; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.58, 4.58, 4.58); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.166 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.87 V/m; Power Drift = 0.401 dB
Peak SAR (extrapolated) = 0.308 W/kg
SAR(1 g) = 0.163 mW/g; SAR(10 g) = 0.089 mW/g
Maximum value of SAR (measured) = 0.182 mW/g



0 dB = 0.182mW/g

Test Laboratory: KTL

UM120 WCDMA BAND2 9400CH Vertical-Back 0.5 cm spacing between phantom and EUT

***Test Date : 6th/March/2009**

Measured Liquid Temperature(℃) : 22.4, Ambient Temperature(℃) : 22.0

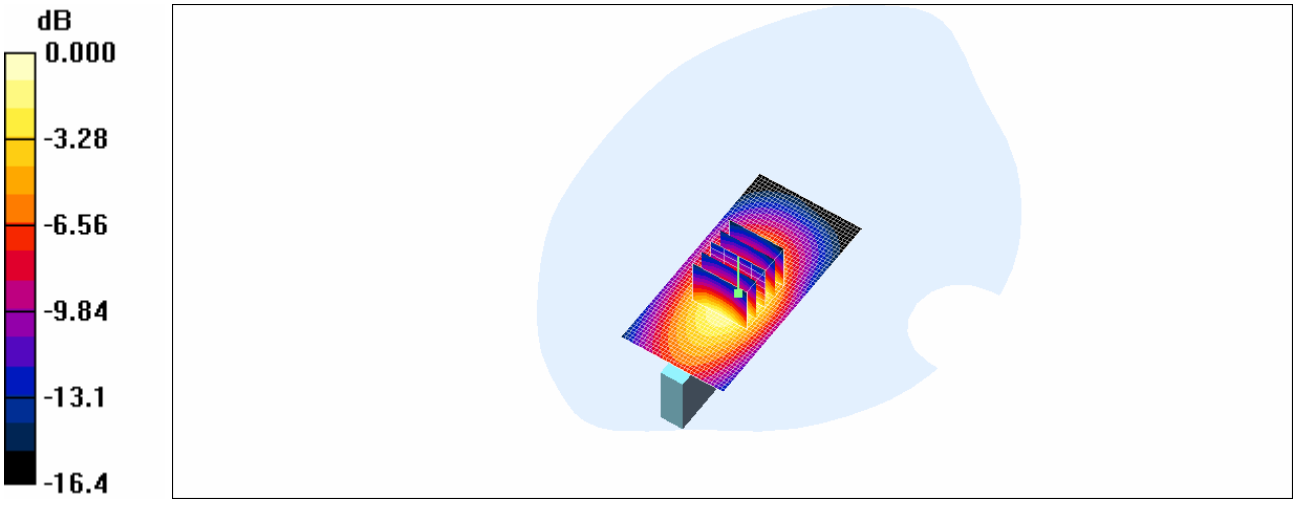
Communication System: WCDMA ; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.58, 4.58, 4.58); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.723 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.17 V/m; Power Drift = 0.268 dB
Peak SAR (extrapolated) = 1.11 W/kg
SAR(1 g) = 0.669 mW/g; SAR(10 g) = 0.386 mW/g
Maximum value of SAR (measured) = 0.737 mW/g



0 dB = 0.737mW/g

Test Laboratory: KTL

UM120 WCDMA BAND2 9262CH Horizontal-Up 0.5 cm spacing between phantom and EUT

***Test Date : 6th/March/2009**

Measured Liquid Temperature(℃) : 22.4, Ambient Temperature(℃) : 22.0

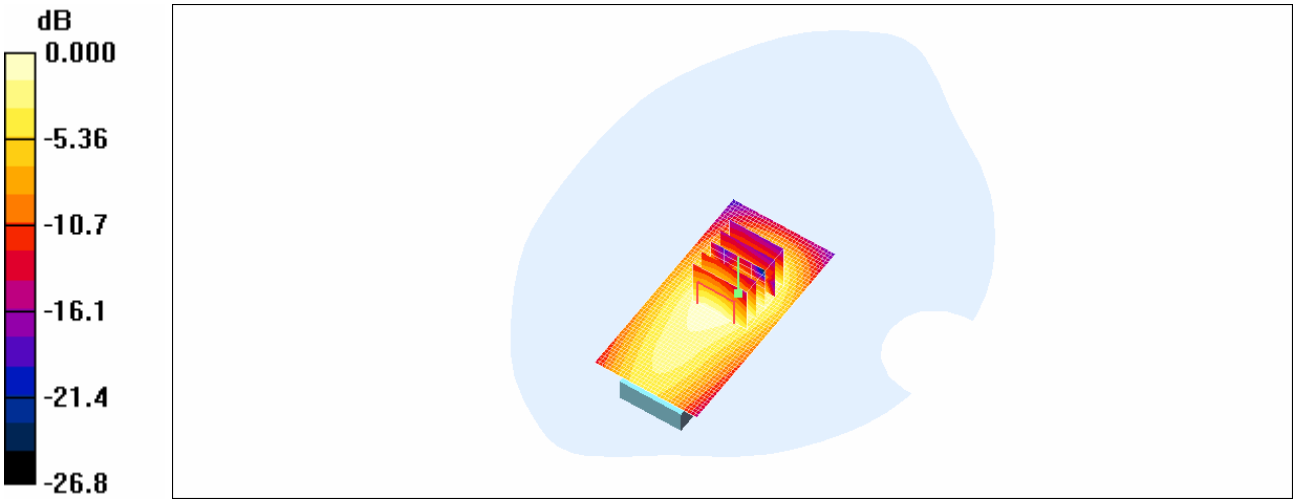
Communication System: WCDMA ; Frequency: 1850.2 MHz;Duty Cycle: 1:1
Medium: MSL1900 Medium parameters used: f = 1850.2 MHz; σ = 1.5 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.58, 4.58, 4.58); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.563 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.6 V/m; Power Drift = -0.001 dB
Peak SAR (extrapolated) = 1.94 W/kg
SAR(1 g) = 0.574 mW/g; SAR(10 g) = 0.315 mW/g
Maximum value of SAR (measured) = 0.562 mW/g



0 dB = 0.562mW/g

Test Laboratory: KTL

UM120 WCDMA BAND2 9538CH Horizontal-Up 0.5 cm spacing between phantom and EUT

***Test Date : 6th/March/2009**

Measured Liquid Temperature(℃) : 22.4, Ambient Temperature(℃) : 22.0

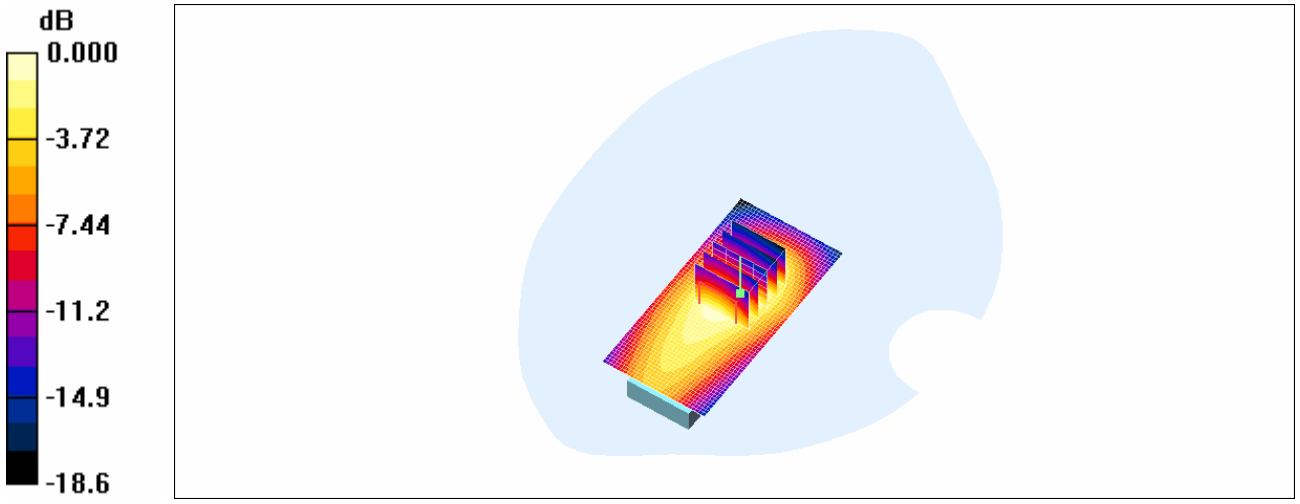
Communication System: WCDMA ; Frequency: 1909.8 MHz;Duty Cycle: 1:1
Medium: MSL1900 Medium parameters used: f = 1909.8 MHz; σ = 1.57 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.58, 4.58, 4.58); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.674 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.6 V/m; Power Drift = 0.009 dB
Peak SAR (extrapolated) = 1.04 W/kg
SAR(1 g) = 0.643 mW/g; SAR(10 g) = 0.376 mW/g
Maximum value of SAR (measured) = 0.696 mW/g



0 dB = 0.696mW/g

Test Laboratory: KTL

UM120 WCDMA BAND2 9400CH Direct Connection to Laptop

***Test Date : 6th/March/2009**

Measured Liquid Temperature(℃) : 22.4, Ambient Temperature(℃) : 22.0

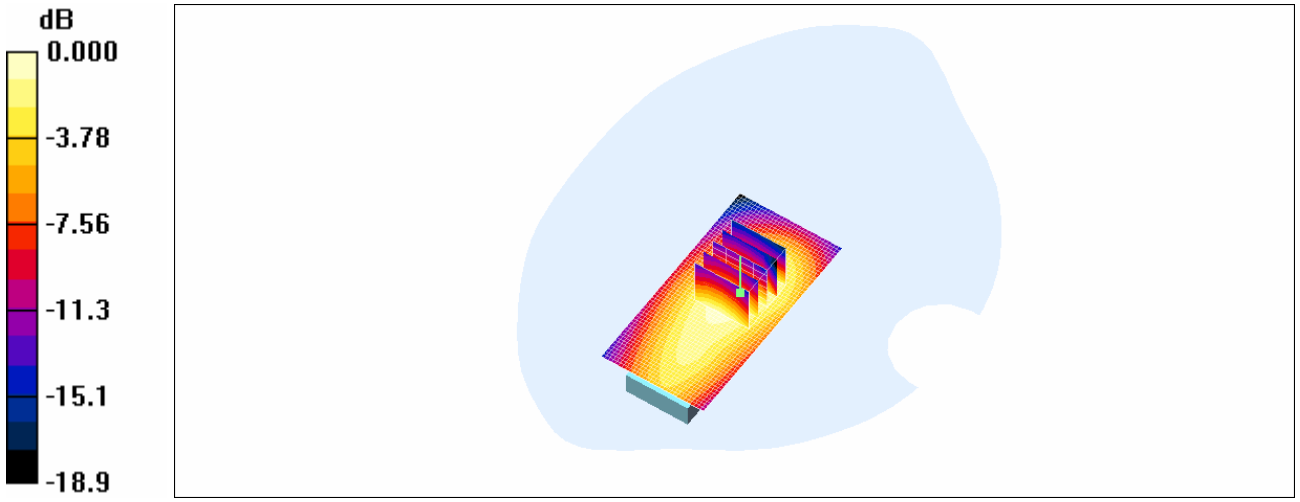
Communication System: WCDMA ; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.58, 4.58, 4.58); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2008-03-13
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (31x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.518 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.9 V/m; Power Drift = -0.028 dB
Peak SAR (extrapolated) = 0.868 W/kg
SAR(1 g) = 0.527 mW/g; SAR(10 g) = 0.314 mW/g
Maximum value of SAR (measured) = 0.567 mW/g



0 dB = 0.567mW/g