TEST REPORT

1. Applicant

Name	: XLmobile
Address	: #905, Byucksan digital vally V, Gasan-dong, Geumchen-gu, Seoul, KOREA

2. Products

Name	: Dual band GSM Phone
Model	: S20/ SU770
Manufacturer	: XLmobile

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	: February 12th, 2009
7. Date of Issue	: April 14th, 2009

Tested by	Approved by
Jong-Gon Ban	Jeong-Min Kim
Telecommunication Center Engineer	Telecommunication Center Manager

The test results contained apply only to the test sample(s) supplied by the applicant, and this test report shall not be reproduced in full or in part without approval of the KTL in advance.

Korea Testing Laboratory

516 Haean-ro, Sa-dong, Sangnok-gu, Ansan-si, Gyeonggi-do, 426-901, KOREA **Tel. : +82-31-500-0133**
http://www.ktl.re.kr **Fax. : +82-31-500-0159**

TABLE OF CONTENTS

1. EQUIPMENT UNDER TEST

1.1 General Information

Type of equipment	Dual band GSM Phone
Device Category	Portable Device
Model Name	S20/ SU770
FCC ID	XLMS20
Test Device	Production Unit
Applicant & Address	Xlmobile #905, Byucksan digital vally V, Gasan-dong, Geumchen-gu, Seoul, Korea
Contact Person	Choi Byung il, Brad,choi@xlmobile.co.kr (Tel: +82-2-575-1612, Fax:82-70-7122-7766)
Rule & Test standard	47 CFR § 2.1093; OET Bulletin 65, Supplement C(July 2001)
FCC Clasification	Licensed Portable Transmitter Held to Ear (PCE)
RF exposure Category	General Population/Uncontrolled
Maximum Head 1g SAR	**1.100 W/kg GSM850 / 0.851 W/kg GSM1900**
Maximum Body1g SAR	**0.804 W/kg GSM850 / 0.240 W/kg GSM1900**

1.2 Description of Device :

Operation Modes	GSM850/GSM1900
Max Conducted 2G Power	GSM850 : 32.11dBm / GSM1900: 29.20 dBm / BT: -2.99 dBm
GSM Tx Frequency Range	824.2 ~ 848.8 MHz (GSM850) 1850.2 ~ 1909.8 MHz (GSM1900)
Bluetooth Tx Frequency Range	2,402 ~ 2,480 MHz
GPRS/EDGE Multi-slot class	N/A
Duty Cycle	1:8.3 (GSM850/1900)
Antenna Type	Internal Antenna
Power Supply	3.7 VDC Battery

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 Absorption 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 absorption per unit mass at a point in an absorbing body. (see Figure.1)

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

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 absorption 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).

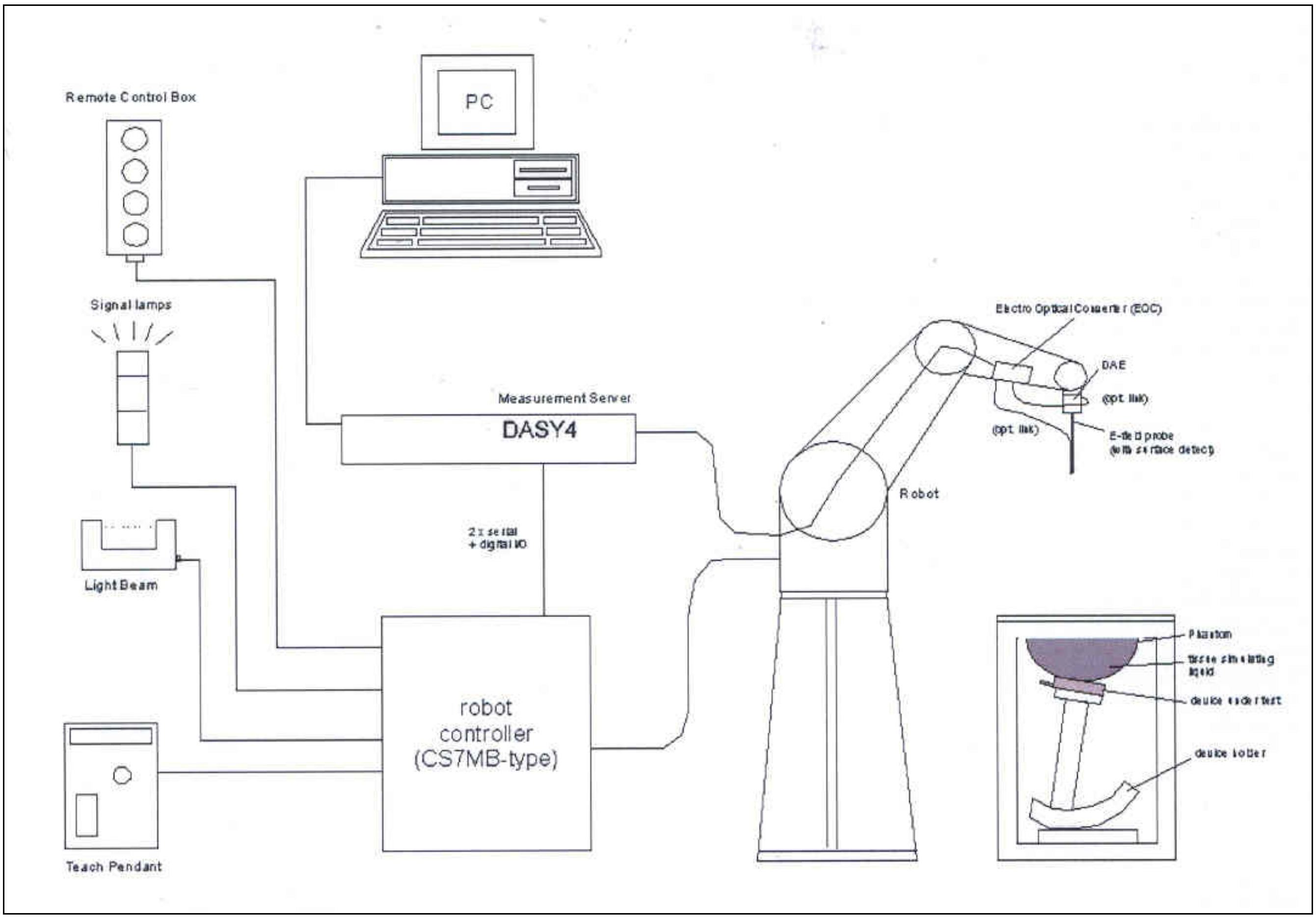


Figure 2. SAR Measurement System

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 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 Surface Detection	5 uW/g to > 100 mW/g; 0.2 dB 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

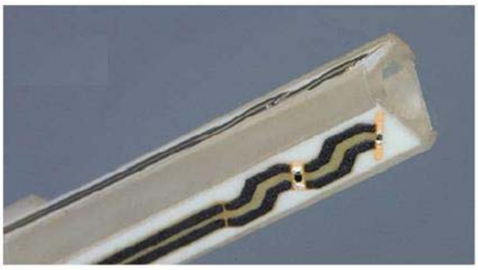


Figure 4. ET3DV6 E-Field Probe

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.

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

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;

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

where:

σ = simulated tissue conductivity,

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

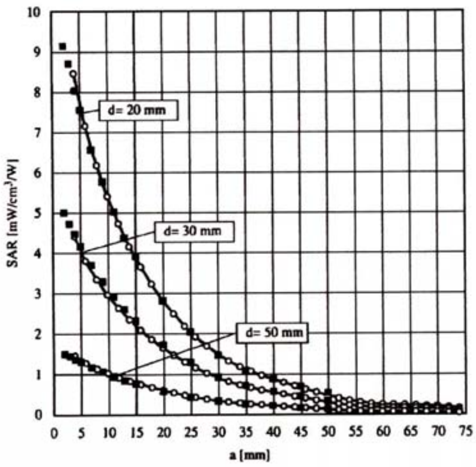


Figure B.1. E-Field and Temperature measurements at 900MHz[5]

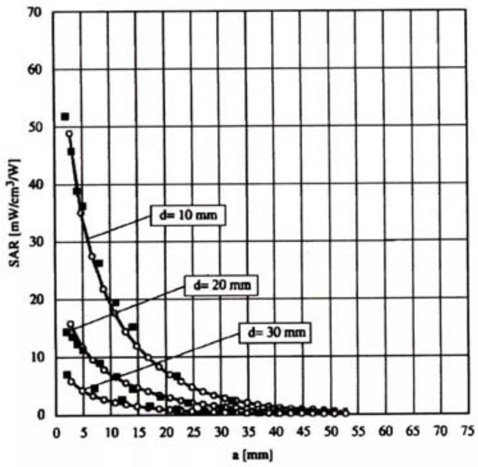


Figure B.2. E -field and temperature measurements at 1.8GHz[5]

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

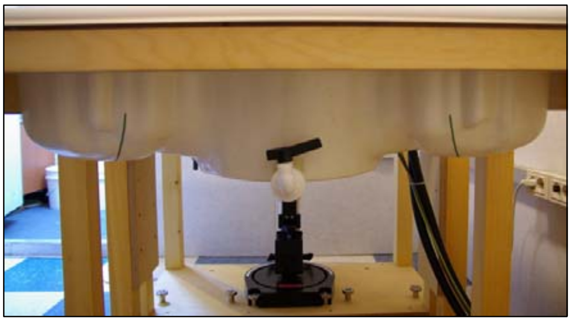


Figure 5. SAM twin phantom

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.

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	Feb. 16th 2009	21.5	εr	41.5	40.9	-1.5	± 5
				σ	0.90	0.91	+1.1	± 5
	Body	Feb. 16th 2009	21.4	εr	55.2	54.7	-1.0	± 5
				σ	0.97	0.97	+0.0	± 5
1900	Head	Feb. 17th 2009	21.3	εr	40.0	39.5	-1.2	± 5
				σ	1.40	1.42	+1.4	± 5
	Body	Feb. 17th 2009	21.4	εr	53.3	52.8	-1.0	± 5
				σ	1.52	1.54	+1.3	± 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	Feb. 16th 2009	835MHz Brain	21.5	21.0	9.5	9.68	+ 1.9
D1900V2 S/N:5d038	Feb. 17th 2009	1900MHz Brain	21.3	21.0	39.7	41.2	+ 3.8

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.

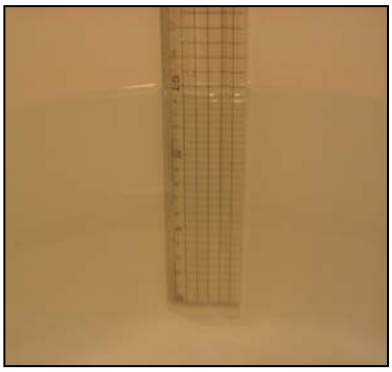


Figure 6. Liquid Depth

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. Description of Test Position

SAR measurements were performed in the "cheek" and "tilted" positions on left and right sides of the phantom. Both were measured in the head section of the SAM Twin Phantom . For the "Belt " position , it was measured in the flat section of the SAM Twin Phantom .

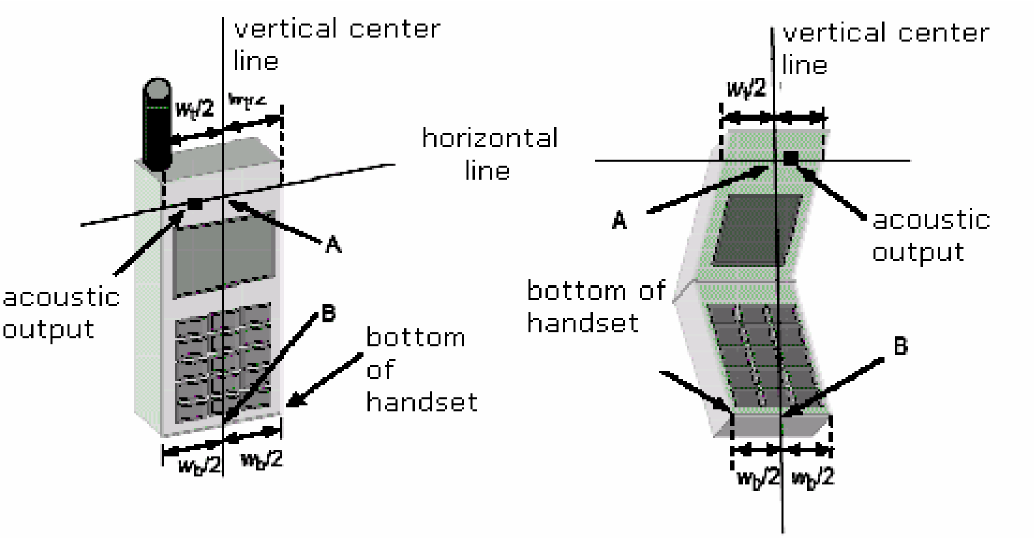


Figure 7. Handset vertical and horizontal reference line

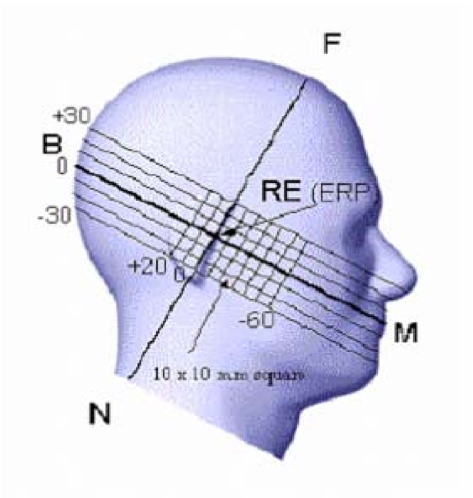


Figure 8. Side view of SAM phantom

7.1 Cheek Position

The device was positioned with the vertical center line of the body of the device and the horizontal line crossing the center (see Figure 7) of the ear piece in a plane parallel to the sagittal plane of the phantom(see Figure 8). While maintaining the device in this plane, it was aligned the vertical center line with the reference plane containing the three ear and mouth reference points(M, RE and LE) and aligned the center of the ear piece with the line RE-LE. Then device was translated towards the phantom with the ear piece aligned with the line LE-RE until it touched the ear. While maintaining the device in the reference plane and maintaining the device contact with the ear, the bottom of the device was moved until any point on the front side is in contact with the cheek of the phantom.(see Figure 9)

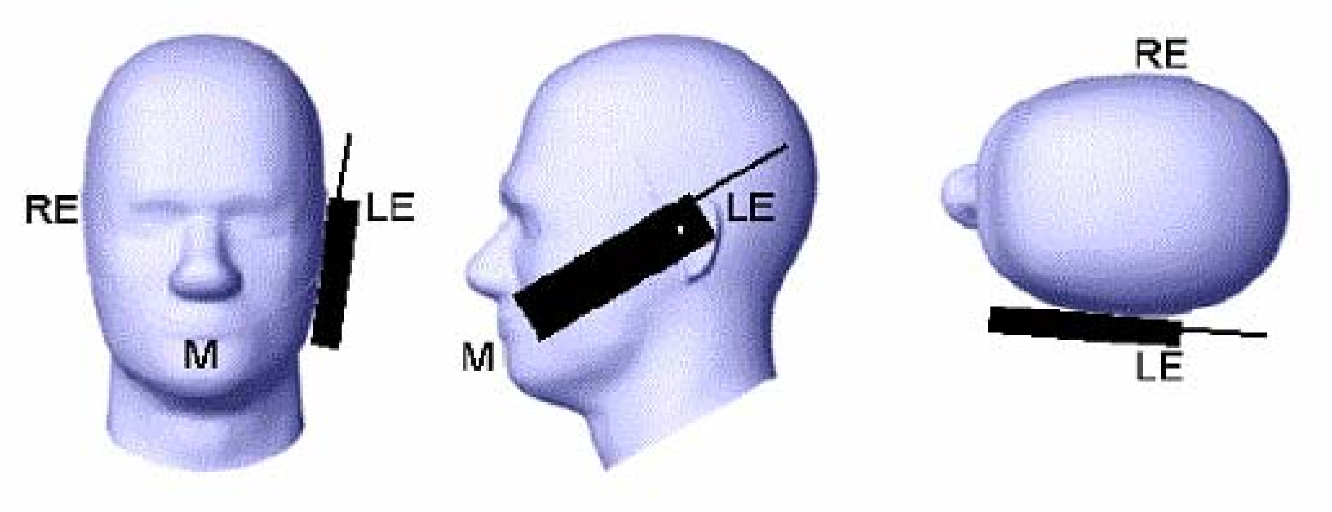


Figure 9. Cheek/Touch Position

2)

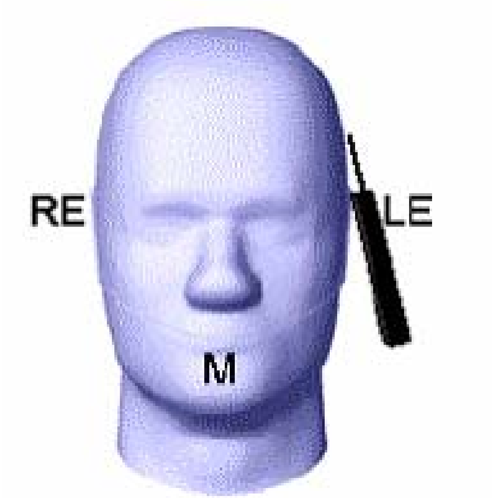


Figure 10. Ear /Tilt Position

Figure 11. Belt Position set up without holster

7.2 Tilt Position

The device was positioned in the "Cheek" position. While maintaining the device in the reference plane described above cheek position and pivoting against the ear, device was moved outward away from the mouth by an angle of 15 degrees. (see Figure 10)

7.3 Body Holster/Belt-Clip Position

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration .A device with a headset output is tested with a headset connectd to the device.
Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that

dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component(i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intented to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented.

Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are test for SAR compliance with the front of the device positioned to face the flat phantom in brain fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

In all cases SAR measurements are performed to investigate the worst-case positioning. Worst-case positioning is then documented and used to perform Body SAR testing.

In this test case, a belt position maintained a distance of approximately 1.5 cm between the device and the flat phantom(see Figure 11). The device was placed under the flat section of the phantom and suspended. The device is not provided with belt-clip.

8. 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. 8 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.

9. FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

9.1 Introduction

The following procedures adopted from “FCC SAR Considerations for Cell Phones with Multiple Transmitters” from February 2008 are applicable to handsets with built-in unlicensed transmitters such as 802.11 a/b/g and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

9.2 FCC Power Tables & Conditions

	2.45	5.15 – 5.35	5.47 – 5.85	GHz
P_{Ref}	**12**	**6**	**5**	**mW**
Device output power should be rounded to the nearest mW to compare with values specified in this table.				

9.3 Output Power Thresholds for Unlicensed Transmitters

	Individual Transmitter	Simultaneous Transmission
Licensed Transmitters	<u>Routine evaluation required</u>	**SAR not required:** <u>**Unlicensed only**</u> o when stand-alone 1-g SAR is not required and antenna is > 5 cm from other antennas <u>**Licensed & Unlicensed**</u> o when the sum of the 1-g SAR is <1.6 W/kg for all simultaneous transmitting antennas o when SAR to antenna separation ratio of simultaneous transmitting antenna pair is < 0.3 **SAR required:** <u>**Licensed & Unlicensed**</u> antenna pairs with SAR to antenna separation ratio ≥ 0.3; test is only required for the configuration that results in the highest SAR in standalone configuration for each wireless mode and exposure condition Note: simultaneous transmission exposure conditions for head and body can be different for different style phones; therefore, different test requirements may apply
Unlicensed Transmitters	**When there is no simultaneous transmission –** o output < 60/f: SAR not required o output ≥ 60/f: stand-alone SAR required **When there is simultaneous transmission –** <u>**Stand-alone SAR not required when**</u> O output ≤ 2.P_{Ref} and antenna is > 5.0 cm from other antennas o output ≤ P_{Ref} and antenna is > 2.5 cm from other antennas, each either output power output ≤ P_{Ref} or 1-g SAR < 1.2 W/Kg <u>**Otherwise stand-alone SAR is required**</u> **When stand-alone SAR is required** o test SAR on highest output channel for each wireless mode and exposure condition o if SAR for highest output channel is > 50% of SAR limit, evaluate all channels according to normal procedures	

For FCC ID: XLMS20, The Separation Distance of Antenna is **5.8 cm**
The RF Conducted Power of Bluetooth is **0.5 mW**

→Based on the output power and antenna separation distance, a stand-alone BT SAR. and a simultaneous SAR evaluations are not required.

10. SAR MEASUREMENT RESULTS

1) GSM850 Head SAR Measurement Result

Date of Test : 16th Feb, 2009
Mixture Type : 835MHz Brain
Ambient Temperature (C) : 21.0
Dielectric Constant : 40.9
Liquid Temperature (C) : 21.5
Humidity (%) : 45
Conductivity : 0.91

Band	Antenna Position	Head Position	Device Position	Frequency		Power (dBm)		SAR 1g (W/kg)
				MHz	CH	Begin	End	
GSM850	Internal Ant.	LEFT	Ear/Tilt	824.2	128	31.98	31.96	0.558
				836.6	190	31.99	31.97	**1.100**
				848.8	251	32.11	32.08	1.070
		LEFT	Cheek /Touch	836.6	190	31.99	31.98	0.614
GSM850	Internal Ant.	RIGHT	Ear/Tilt	824.2	128	-	-	-
				836.6	190	31.99	31.98	0.685
				848.8	251	-	-	-
		RIGHT	Cheek /Touch	836.6	190	31.99	31.97	0.451

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. Battery : Standard Batteries are used and fully charged for all readings
4. Power Measured : Conducted
5. SAR Configuration : Head
6. Test Signal Call mode : Base Station Simulator (CMU200)
7. Justification for reduced test configurations: per FCC/OET Supplement C (July,2001), if the SAR measured at the middle channel for each test configuration (Left, right, cheek/touch, tilt/ear, extended and retracted) 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).

2) GSM850 Body SAR Measurement Result

Date of Test : 17th Feb, 2009
Mixture Type : 835MHz Muscle
Ambient Temperature (C) : 21.0
Dielectric Constant : 54.7
Liquid Temperature (C) : 21.4
Humidity (%) : 45
Conductivity : 0.97

Band	Antenna Position	Device Position & Distance	Body Position	Frequency		Power (dBm)		SAR 1g (W/kg)
				MHz	CH	Begin	End	
GSM850	Internal Ant.	Belt without Holster 1.5 cm	Front facing Phantom	836.6	190	31.99	31.97	0.268
			Rear facing Phantom	824.2	128	31.98	31.97	0.722
				836.6	190	31.99	31.98	**0.804**
				848.8	251	32.11	32.10	0.612

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. Battery : Standard Batteries are used and fully charged for all readings.
4. Power Measured : Conducted
5. SAR Configuration : Body
6. Test Signal Call mode : Base Station Simulator (CMU200)
7. Justification for reduced test configurations: per FCC/OET Supplement C (July,2001), if the SAR measured at the middle channel for each test configuration (Left, right, cheek/touch, tilt/ear, extended and retracted) 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).

3) GSM1900 Head SAR Measurement Result

Date of Test : 17th Feb, 2009
Mixture Type : 1900MHz Brain
Ambient Temperature (C) : 21.0
Dielectric Constant : 39.5
Liquid Temperature (C) : 21.3
Humidity (%) : 46
Conductivity : 1.42

Band	Antenna Position	Head Position	Device Position	Frequency		Power(dBm)		SAR 1g (W/kg)
				MHz	CH	Begin	End	
GSM1900	Internal Ant	LEFT	Cheek /Touch	1850.2	512	29.20	29.18	0.742
				1880.0	661	28.84	28.83	0.745
				1909.8	810	28.93	28.91	**0.851**
		LEFT	Ear/Tilt	1880.0	661	28.84	28.82	0.531
GSM1900	Internal Ant	RIGHT	Cheek /Touch	1850.2	512	-	-	
				1880.0	661	28.85	28.83	0.675
				1909.8	810	-	-	
		RIGHT	Ear/Tilt	1880.0	661	28.84	28.82	0.558

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. Battery : Standard Batteries are used and fully charged for all readings.
4. Power Measured : Conducted
5. SAR Configuration : Head
6. Test Signal Call mode : Base Station Simulator (CMU200)
7. Justification for reduced test configurations: per FCC/OET Supplement C (July,2001), if the SAR measured at the middle channel for each test configuration (Left, right, cheek/touch, tilt/ear, extended and retracted) 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).

4) GSM1900 Body SAR Measurement Result

Date of Test : 19th September 2008
Mixture Type : 1900MHz Muscle
Ambient Temperature (C) : 22.0
Dielectric Constant : 52.8

Liquid Temperature (C) : 22.6
Humidity (%) : 45
Conductivity : 1.54

Band	Antenna Position	Device Position & Distance	Body Position	Frequency		Power (dBm)		SAR 1g (W/kg)
				MHz	CH	Begin	End	
GSM1900	Internal Ant.	Belt without Holster 1.5 cm	Front facing Phantom	1880.0	661	28.84	28.83	0.141
			Rear facing Phantom	1850.2	512	29.20	29.18	0.152
				1880.0	661	28.84	28.83	0.181
				1909.8	810	28.93	28.91	**0.240**

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. Battery : Standard Batteries are used and fully charged for all readings.
4. Power Measured : Conducted
5. SAR Configuration : Body
6. Test Signal Call mode : Base Station Simulator
7. Justification for reduced test configurations: per FCC/OET Supplement C (July,2001), if the SAR measured at the middle channel for each test configuration (Left, right, cheek/touch, tilt/ear, extended and retracted) 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).

11. CONCLUSION

The SAR evaluation indicates that S20/SU770 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	2010.03.03	No

13. REFERENCES

[1] Federal Communications Commission, ET Docket 93-62, Guidelines for Evaluating the Environmental Effects of Radio frequency Radiation, Aug. 1996.

[2] ANSI/IEEE C95.1 - 1991, American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 300kHz to 100GHz, New York: IEEE, Aug. 1992

[3] ANSI/IEEE C95.3 - 1991, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave, New York: IEEE, 1992.

[4] NCRP, National Council on Radiation Protection and Measurements, Biological Effects and Exposure Criteria for Radio Frequency Electromagnetic Fields, NCRP Report No. 86, 1986. Reprinted Feb. 1995.

[5] T. Schmid, O. Egger, N. Kuster, Automated E-field scanning system for dosimetric assessments, IEEE Transaction on Microwave Theory and Techniques, vol. 44, Jan. 1996, pp. 105-113.

[6] K. Pokovic, T. Schmid, N. Kuster, Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies, ICECOM97, Oct. 1997, pp. 120-124.

[7]K. Pokoviº, T. Schmid, and N. Kuster, E-field Probe with improved isotropy in brain simulating liquids, Proceedings of the ELMAR, Zadar, Croatia, June 23-25, 1996, pp. 172-175.

[8] Schmid & Partner Engineering AG, Application Note: Data Storage and Evaluation, June 1998, p2.

[9] V. Hombach, K. Meier, M. Burkhardt, E. Kuhn, N. Kuster, The Dependence of EM Energy Absorption upon Human Head Modeling at 900 MHz, IEEE Transaction on Microwave Theory and Techniques, vol. 44 no. 10, Oct.1996, pp. 1865-1873.

[10] N. Kuster and Q. Balzano, Energy absorption mechanism by biological bodies in the near field of dipole antennas above 300MHz, IEEE Transaction on Vehicular Technology, vol. 41, no. 1, Feb. 1992, pp. 17-23.

[11] G. Hartsgrove, A. Kraszewski, A. Surowiec, Simulated Biological Materials for Electromagnetic Radiation Absorption Studies, University of Ottawa, Bioelectro magnetics, Canada: 1987, pp. 29-36.

[12] Q. Balzano, O. Garay, T. Manning Jr., Electromagnetic Energy Exposure of Simulated Users of Portable Cellular Telephones, IEEE Transactions on Vehicular Technology, vol. 44, no.3, Aug. 1995.

[13] W. Gander, Computer mathematick, Birkhaeuser, Basel, 1992.

[14] W.H. Press, S.A. Teukolsky, W.T. Vetterling, and B.P. Flannery, Numerical Recepies in C, The Art of Scientific Computing, Second edition, Cambridge University Press, 1992.

[15] Federal Communications Commission, OET Bulletin 65, Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields. Supplement C, Dec. 1997.

[16] N. Kuster, R. Kastle, T. Schmid, Dosimetric evaluation of mobile communications equipment with known precision, IEEE Transaction on Communications, vol. E80-B, no. 5, May 1997, pp. 645-652.

[17] CENELEC CLC/SC111B, European Prestandard (prENV 50166-2), Human Exposure to Electromagnetic Field High-frequency: 10kHz-300GHz, Jan. 1995.

[18] Prof. Dr. Niels Kuster, ETH, EidgenØssische Technische Hoschschule Zòrich, Dosimetric Evaluation of the Cellular Phone.

Appendix A. SAR PLOTS

Test Laboratory: KTL

835MHz Validation – D835V2; SN:481

***Test Date : 10th /February/2009**

Measured Liquid Temperature(℃) : 21.5, Ambient Temperature(℃) : 21.0

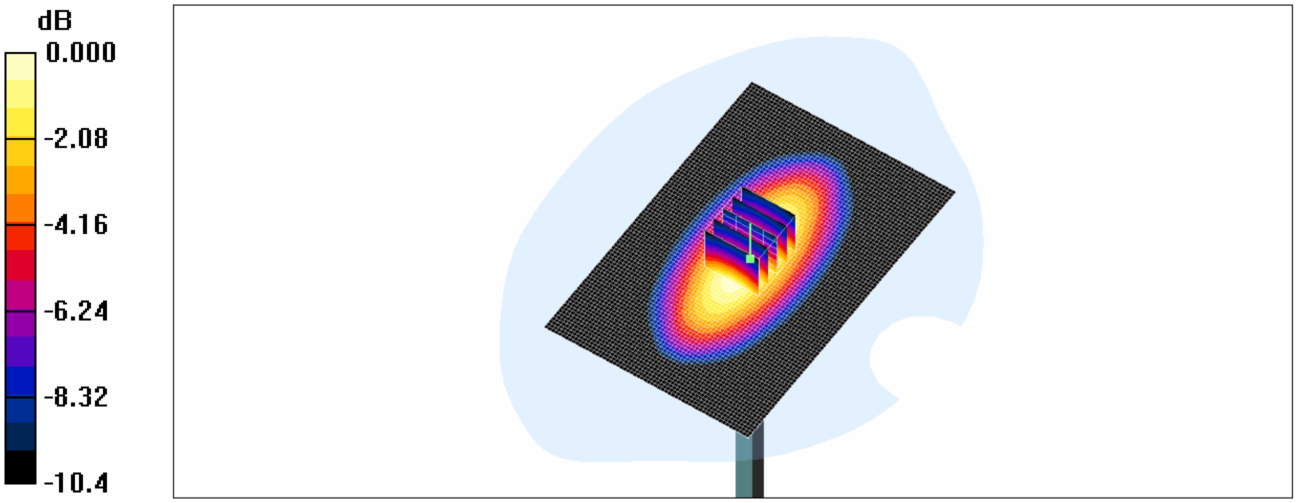
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL835 Medium parameters used: f = 835 MHz; $\sigma = 0.91$ mho/m; $\varepsilon_r = 40.9$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

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) = 2.65 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 54.6 V/m; Power Drift = -0.029 dB
Peak SAR (extrapolated) = 3.52 W/kg
SAR(1 g) = 2.42 mW/g; SAR(10 g) = 1.59 mW/g
Maximum value of SAR (measured) = 2.61 mW/g



0 dB = 2.61mW/g

Test Laboratory: KTL

S20 GSM850 190CH LEFT CHEEK TOUCH

***Test Date : 10th/February/2009**

Measured Liquid Temperature(℃) : 21.5, Ambient Temperature(℃) : 21.0

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: HSL835 Medium parameters used: f = 836.6 MHz; σ = 0.91 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

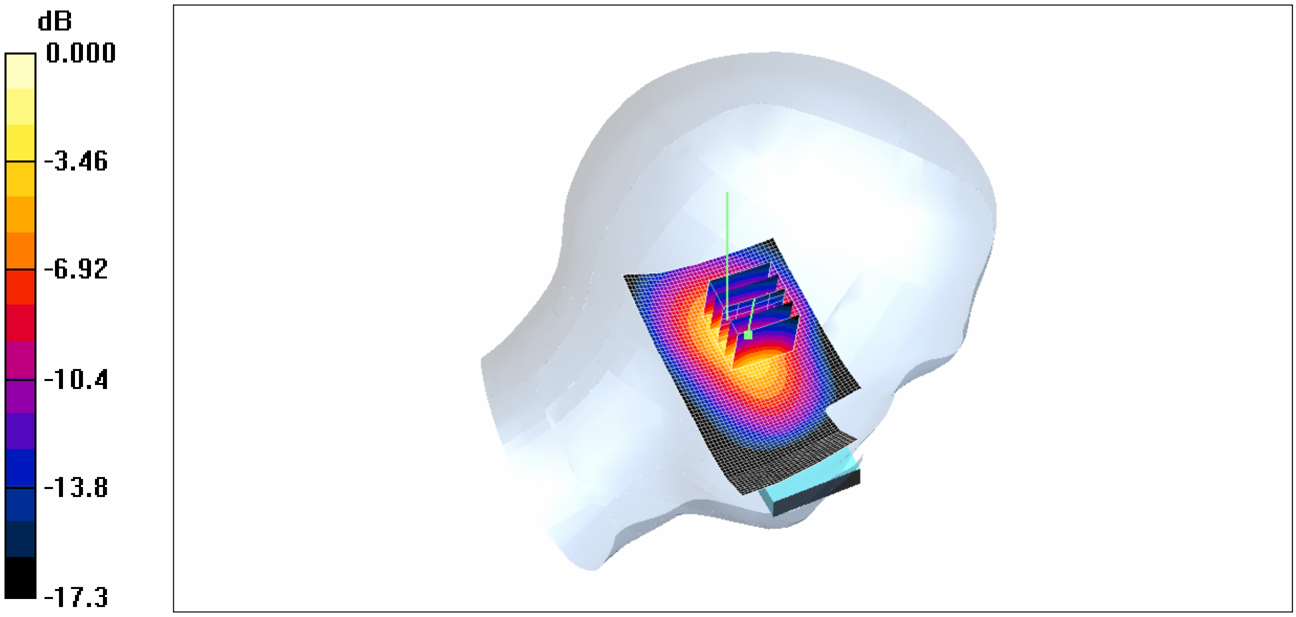
DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.12, 6.12, 6.12); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)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

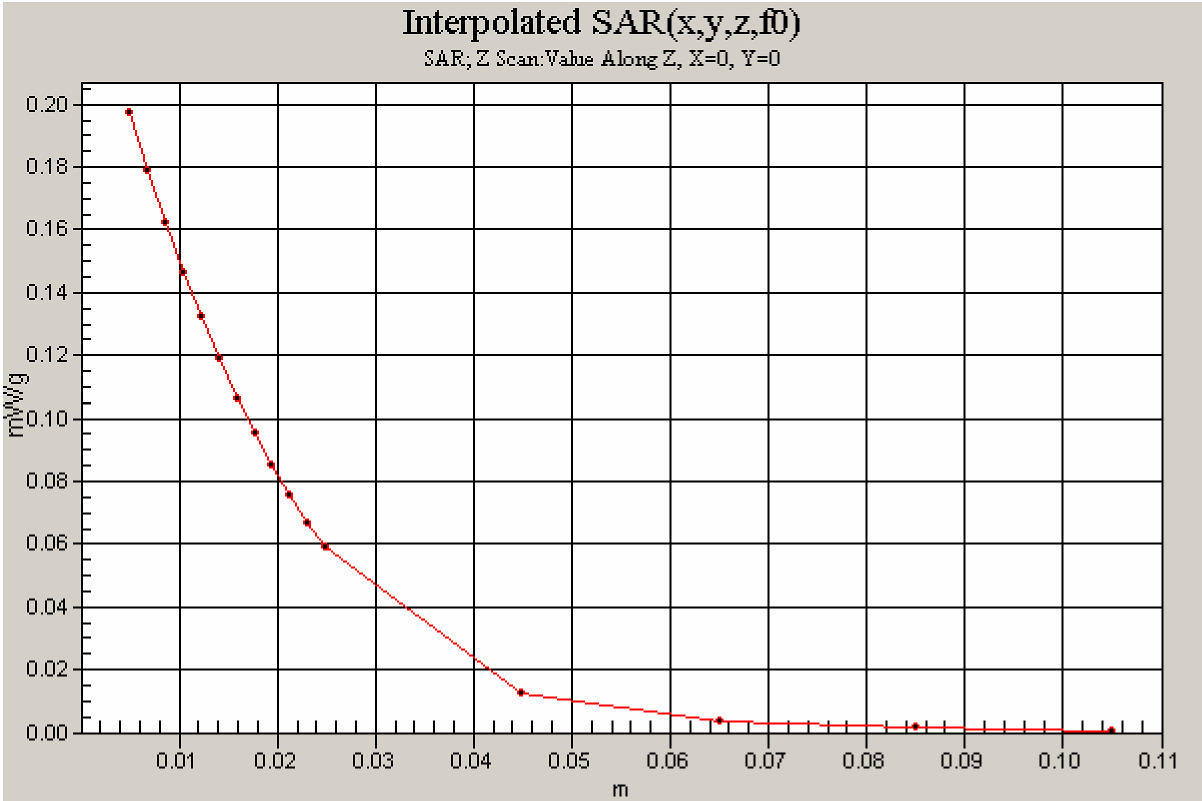
Area Scan (41x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.709 mW/g

Z Scan (1x1x16): Measurement grid: dx=20mm, dy=20mm, dz=20mm
Maximum value of SAR (interpolated) = 0.197 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.8 V/m; Power Drift = -0.275 dB
Peak SAR (extrapolated) = 3.31 W/kg
SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.464 mW/g
Maximum value of SAR (measured) = 1.11 mW/g


dB
0.000
-3.46
-6.92
-10.4
-13.8
-17.3

0 dB = 1.11mW/g


Interpolated SAR(x,y,z,f0)
SAR; Z Scan:Value Along Z, X=0, Y=0
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
mW/g
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
0.11
m

Test Laboratory: KTL

S20 GSM850 190CH LEFT EAR TILT

***Test Date : 10th/February/2009**

Measured Liquid Temperature(℃) : 21.5, Ambient Temperature(℃) : 21.0

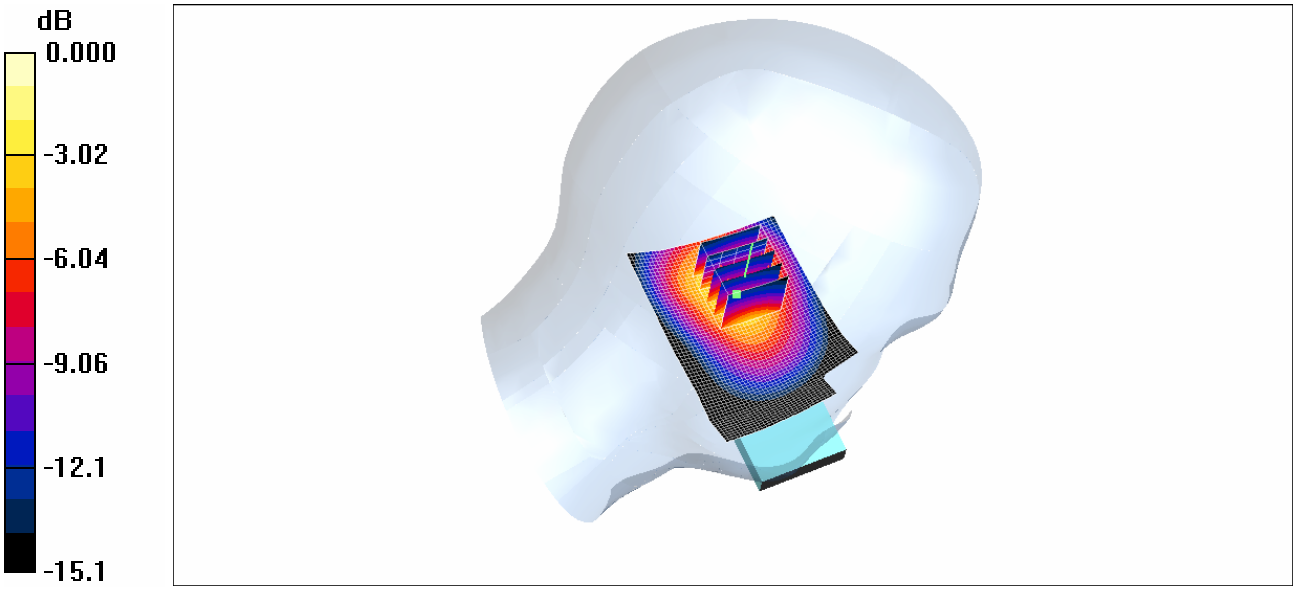
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: HSL835 Medium parameters used: f = 836.6 MHz; σ = 0.91 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

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 (41x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.441 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.9 V/m; Power Drift = 0.004 dB
Peak SAR (extrapolated) = 1.47 W/kg
SAR(1 g) = 0.614 mW/g; SAR(10 g) = 0.295 mW/g
Maximum value of SAR (measured) = 0.671 mW/g



0 dB = 0.671mW/g

Test Laboratory: KTL

S20 GSM850 190CH RIGHT CHEEK TOUCH

***Test Date : 10th/February/2009**

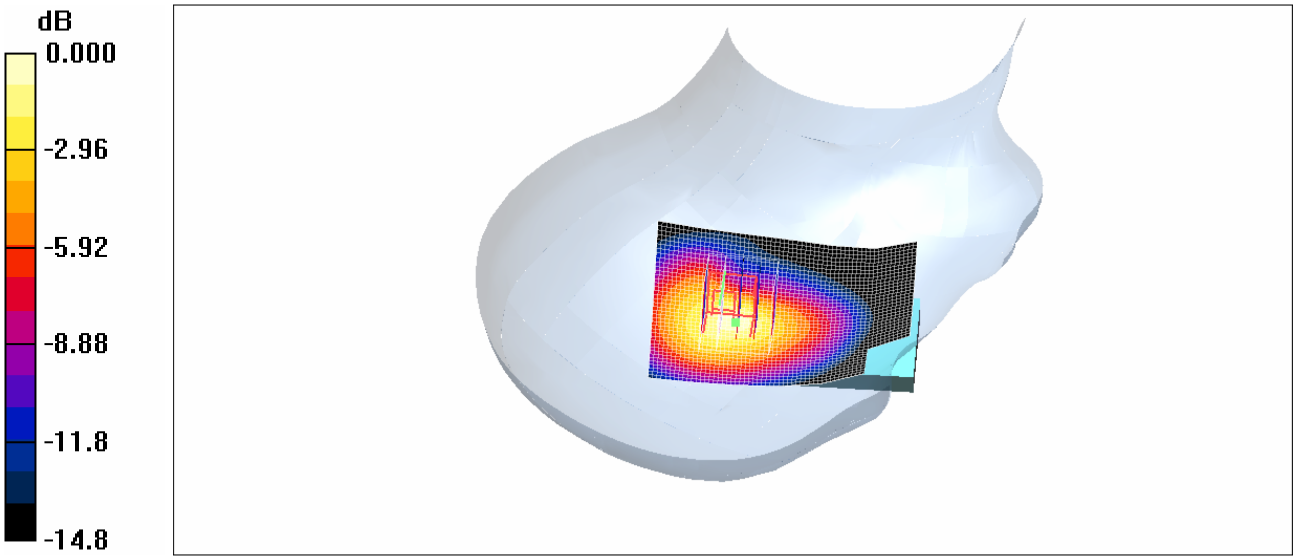
Measured Liquid Temperature(℃) : 21.5, Ambient Temperature(℃) : 21.0

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: HSL835 Medium parameters used: f = 836.6 MHz; σ = 0.91 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Right 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 (41x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.714 mW/g
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.5 V/m; Power Drift = 0.014 dB
Peak SAR (extrapolated) = 1.57 W/kg
SAR(1 g) = 0.685 mW/g; SAR(10 g) = 0.348 mW/g
Maximum value of SAR (measured) = 0.783 mW/g



0 dB = 0.783mW/g

Test Laboratory: KTL

S20 GSM850 190CH RIGHT EAR TILT

***Test Date : 10th/February/2009**

Measured Liquid Temperature(℃) : 21.5, Ambient Temperature(℃) : 21.0

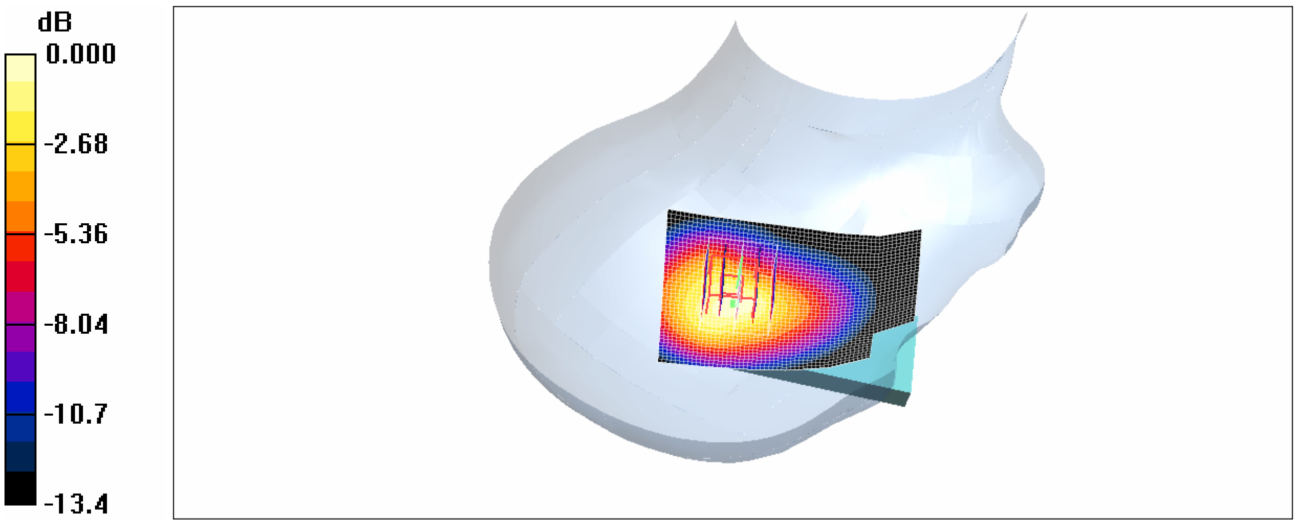
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: HSL835 Medium parameters used: f = 836.6 MHz; σ = 0.91 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

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 (41x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.459 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.3 V/m; Power Drift = -0.228 dB
Peak SAR (extrapolated) = 0.905 W/kg
SAR(1 g) = 0.451 mW/g; SAR(10 g) = 0.246 mW/g
Maximum value of SAR (measured) = 0.497 mW/g



0 dB = 0.497mW/g

Test Laboratory: KTL

S20 GSM850 128CH LEFT CHEEK TOUCH

***Test Date : 10th/February/2009**

Measured Liquid Temperature(℃) : 21.5, Ambient Temperature(℃) : 21.0

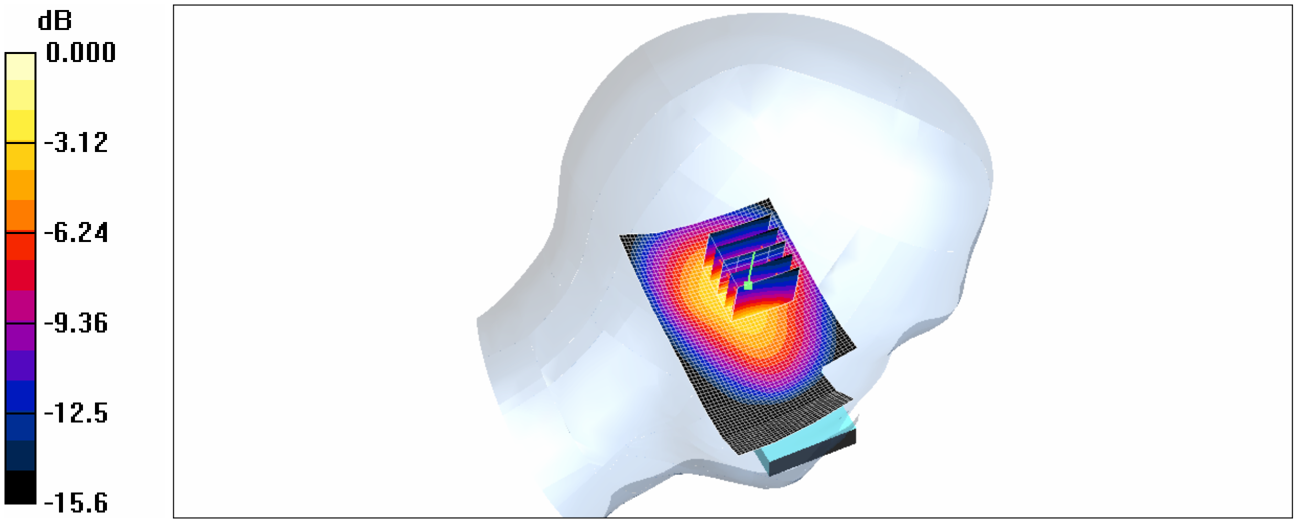
Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium: HSL835 Medium parameters used: f = 824.2 MHz; σ = 0.9 mho/m; ε_r = 41; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

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 (41x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.389 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.1 V/m; Power Drift = 0.034 dB
Peak SAR (extrapolated) = 1.47 W/kg
SAR(1 g) = 0.558 mW/g; SAR(10 g) = 0.261 mW/g
Maximum value of SAR (measured) = 0.658 mW/g



0 dB = 0.658mW/g

Test Laboratory: KTL

S20 GSM850 251CH LEFT CHEEK TOUCH

***Test Date : 10th/February/2009**

Measured Liquid Temperature(℃) : 21.5, Ambient Temperature(℃) : 21.0

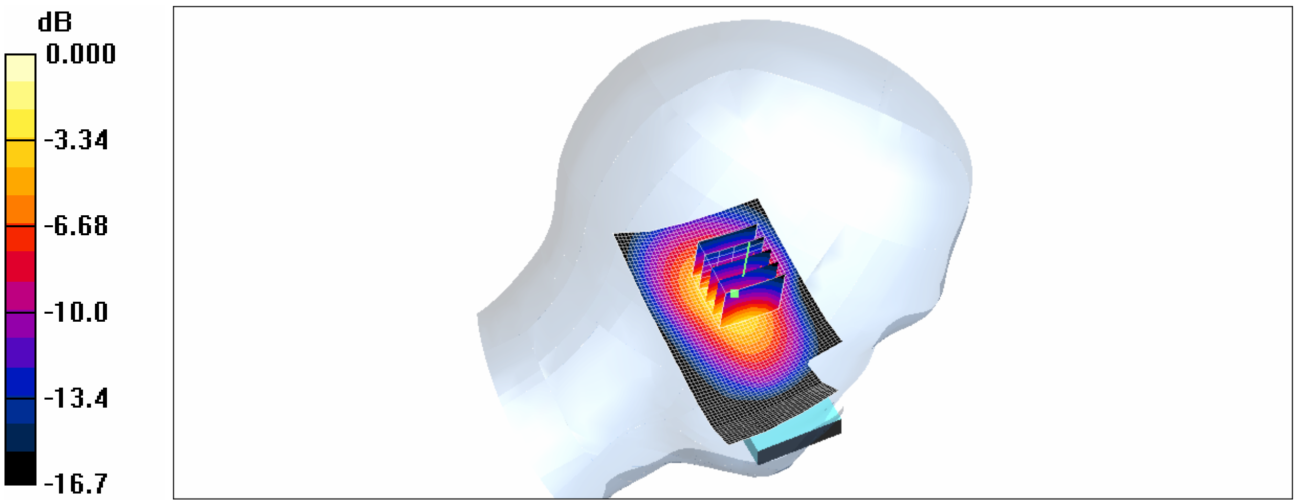
Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:8.3
Medium: HSL835 Medium parameters used: f = 848.8 MHz; σ = 0.93 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

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 (41x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.733 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.1 V/m; Power Drift = 0.082 dB
Peak SAR (extrapolated) = 3.12 W/kg
SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.466 mW/g
Maximum value of SAR (measured) = 1.06 mW/g



0 dB = 1.06mW/g

Test Laboratory: KTL

S20 GSM850 190CH Body FRONT facing to phantom , 1.5 cm spacing
***Test Date : 10th/February/2009**

Measured Liquid Temperature(℃) : 21.5, Ambient Temperature(℃) : 21.0

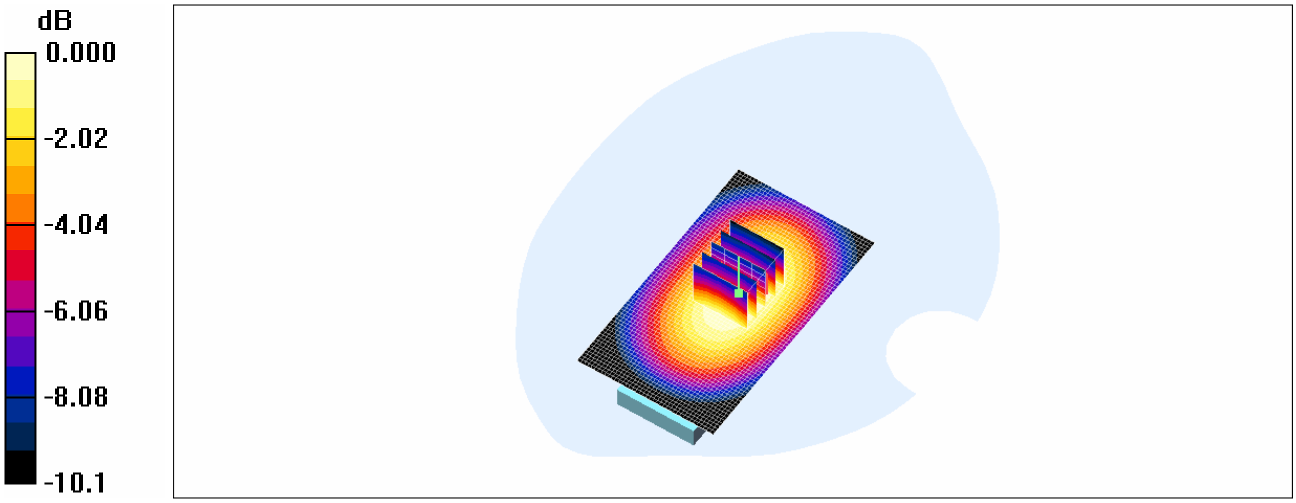
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: MSL835 Medium parameters used: f = 836.6 MHz; σ = 0.97 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

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 (41x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.309 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.5 V/m; Power Drift = -0.396 dB
Peak SAR (extrapolated) = 0.367 W/kg
SAR(1 g) = 0.268 mW/g; SAR(10 g) = 0.187 mW/g
Maximum value of SAR (measured) = 0.289 mW/g



0 dB = 0.289mW/g

Test Laboratory: KTL

S20 GSM850 190CH Body REAR facing to phantom , 1.5 cm spacing
***Test Date : 10th/February/2009**

Measured Liquid Temperature(℃) : 21.5, Ambient Temperature(℃) : 21.0

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: MSL835 Medium parameters used: f = 836.6 MHz; $\sigma = 0.97$ mho/m; $\varepsilon_r = 54.7$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

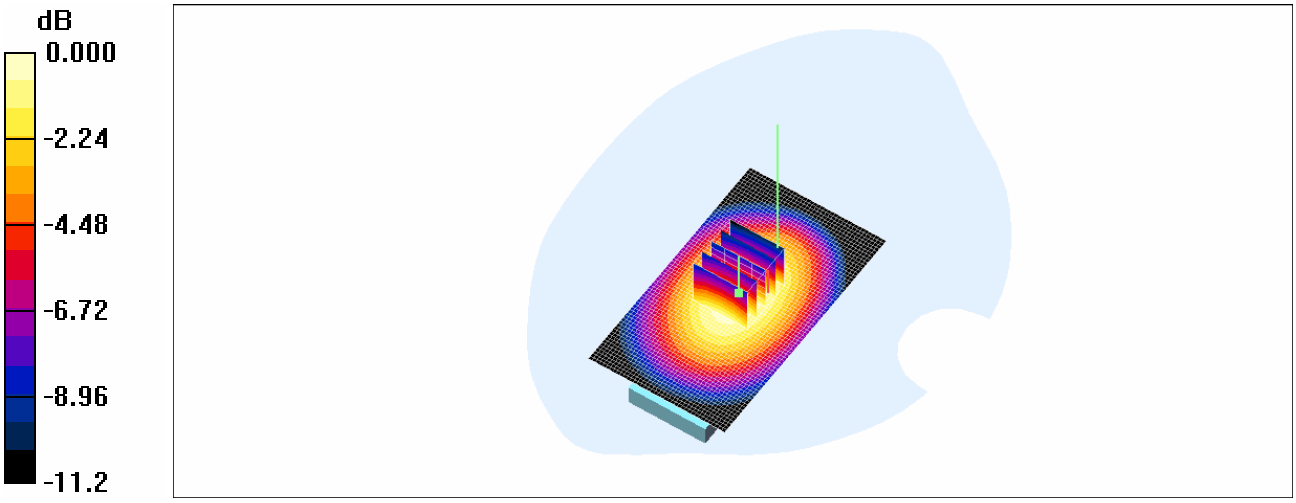
DASY4 Configuration:

- 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

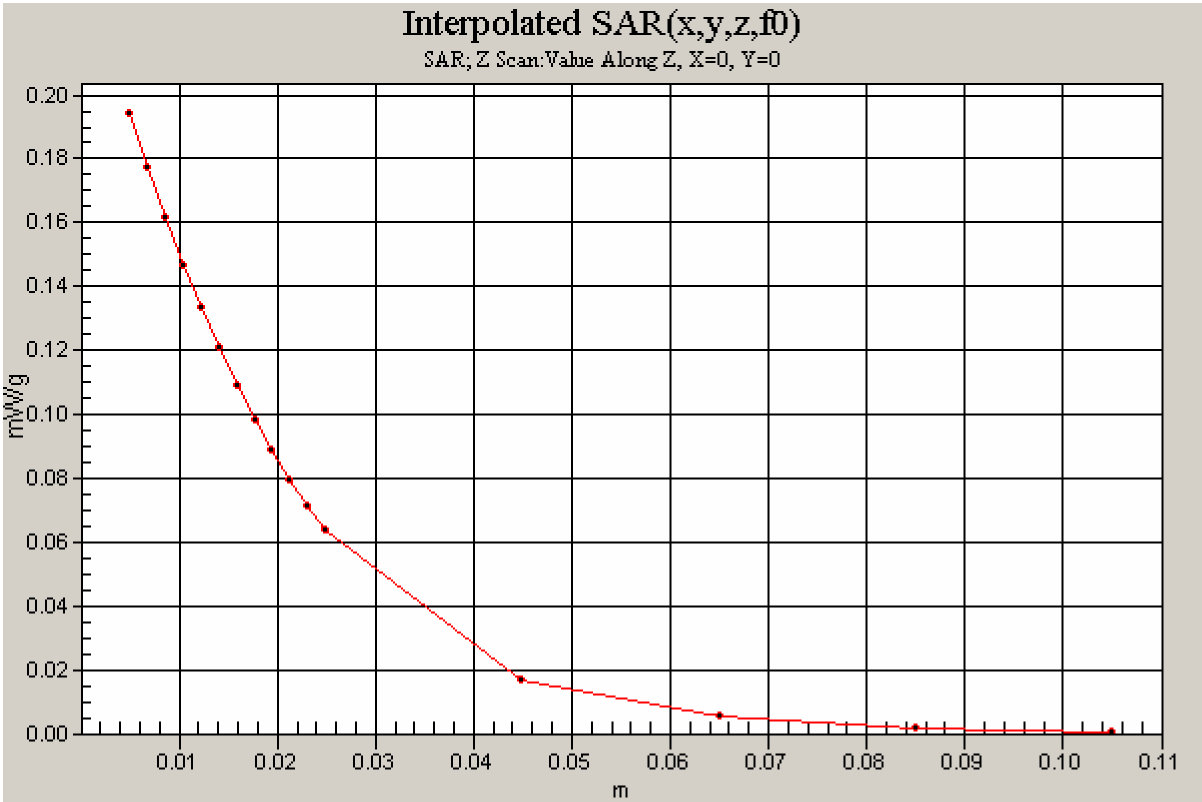
Area Scan (41x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.871 mW/g

Z Scan (1x1x16): Measurement grid: dx=20mm, dy=20mm, dz=20mm
Maximum value of SAR (interpolated) = 0.194 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.9 V/m; Power Drift = -0.383 dB
Peak SAR (extrapolated) = 1.09 W/kg
SAR(1 g) = 0.804 mW/g; SAR(10 g) = 0.561 mW/g
Maximum value of SAR (measured) = 0.857 mW/g


dB
0.000
-2.24
-4.48
-6.72
-8.96
-11.2

0 dB = 0.857mW/g


Interpolated SAR(x,y,z,f0)
SAR; Z Scan:Value Along Z, X=0, Y=0
mW/g
0.20
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
m

Test Laboratory: KTL

S20 GSM850 128CH Body REAR facing to phantom , 1.5 cm spacing
***Test Date : 10th/February/2009**

Measured Liquid Temperature(℃) : 21.5, Ambient Temperature(℃) : 21.0

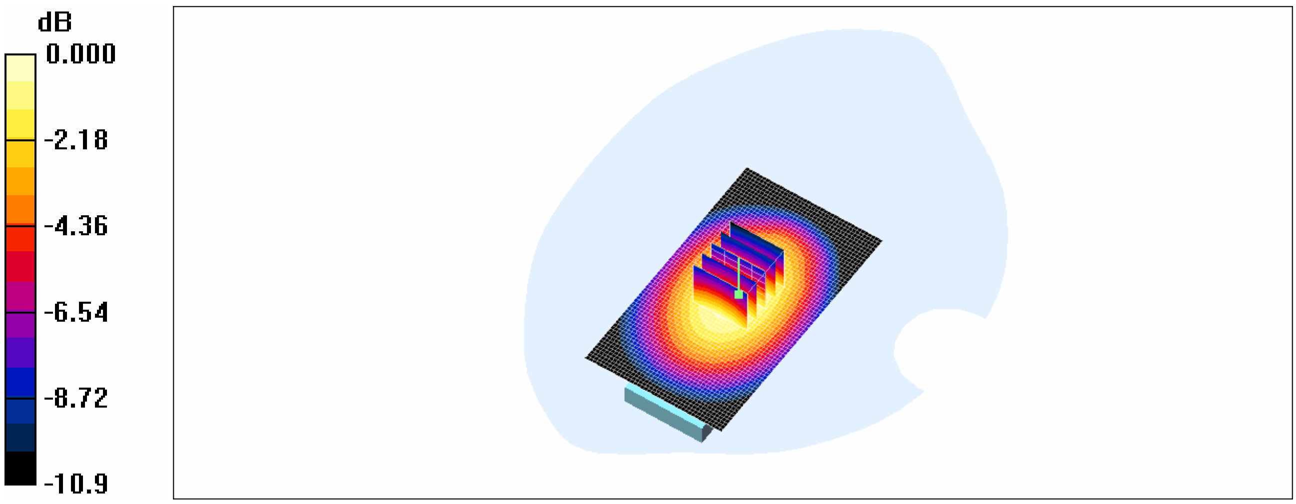
Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium: MSL835 Medium parameters used: f = 824.2 MHz; σ = 0.96 mho/m; ε_r = 54.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

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 (41x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.769 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.7 V/m; Power Drift = 0.056 dB
Peak SAR (extrapolated) = 0.985 W/kg
SAR(1 g) = 0.722 mW/g; SAR(10 g) = 0.504 mW/g
Maximum value of SAR (measured) = 0.771 mW/g



0 dB = 0.771mW/g

Test Laboratory: KTL

S20 GSM850 251CH Body REAR facing to phantom , 1.5 cm spacing

***Test Date : 10th/February/2009**

Measured Liquid Temperature(℃) : 21.5, Ambient Temperature(℃) : 21.0

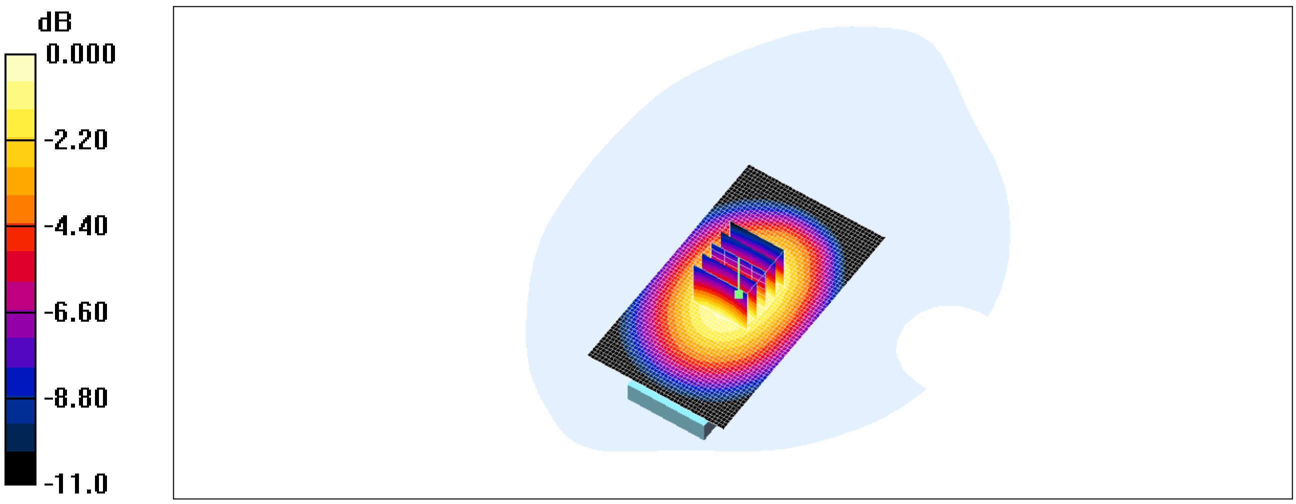
Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:8.3
Medium: MSL835 Medium parameters used: f = 848.8 MHz; σ = 0.98 mho/m; ε_r = 54.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

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 (41x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.647 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.8 V/m; Power Drift = 0.084 dB
Peak SAR (extrapolated) = 0.836 W/kg
SAR(1 g) = 0.612 mW/g; SAR(10 g) = 0.428 mW/g
Maximum value of SAR (measured) = 0.649 mW/g



0 dB = 0.649mW/g

Test Laboratory: KTL

1900MHz Validation – D1900V2; SN:5d038

***Test Date : 11th /February/2009**

Measured Liquid Temperature(℃) : 21.3, Ambient Temperature(℃) : 21.0

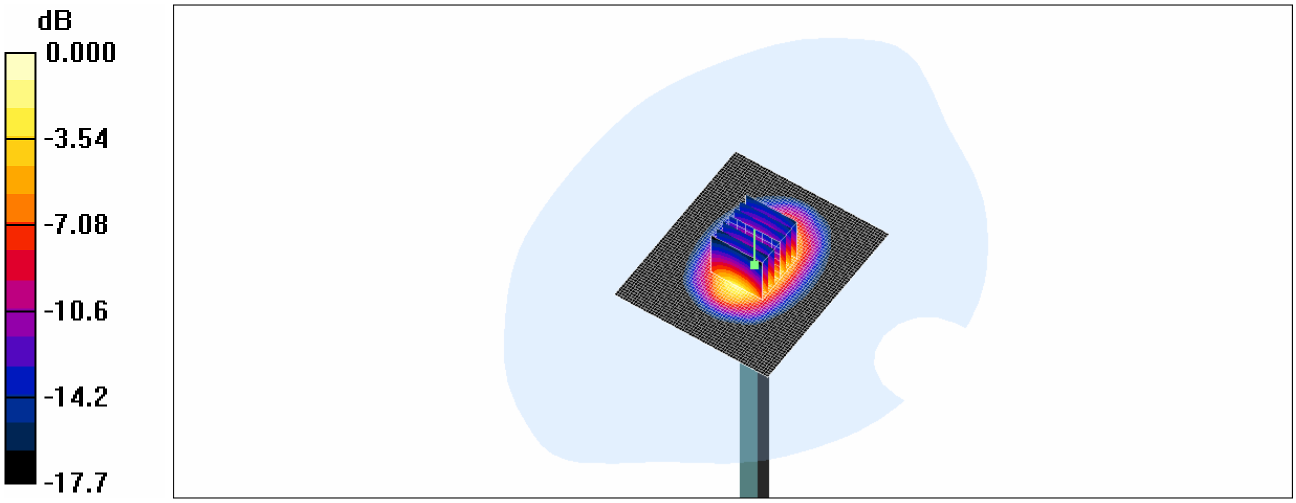
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL1900 Medium parameters used: f = 1900 MHz; σ = 1.42 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

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 = 91.7 V/m; Power Drift = 0.017 dB
Peak SAR (extrapolated) = 19.0 W/kg
SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.38 mW/g
Maximum value of SAR (measured) = 11.6 mW/g



0 dB = 11.6mW/g

Test Laboratory: KTL

S20 GSM1900 661CH LEFT CHEEK TOUCH

***Test Date : 11th/February/2009**

Measured Liquid Temperature(℃) : 21.3, Ambient Temperature(℃) : 21.0

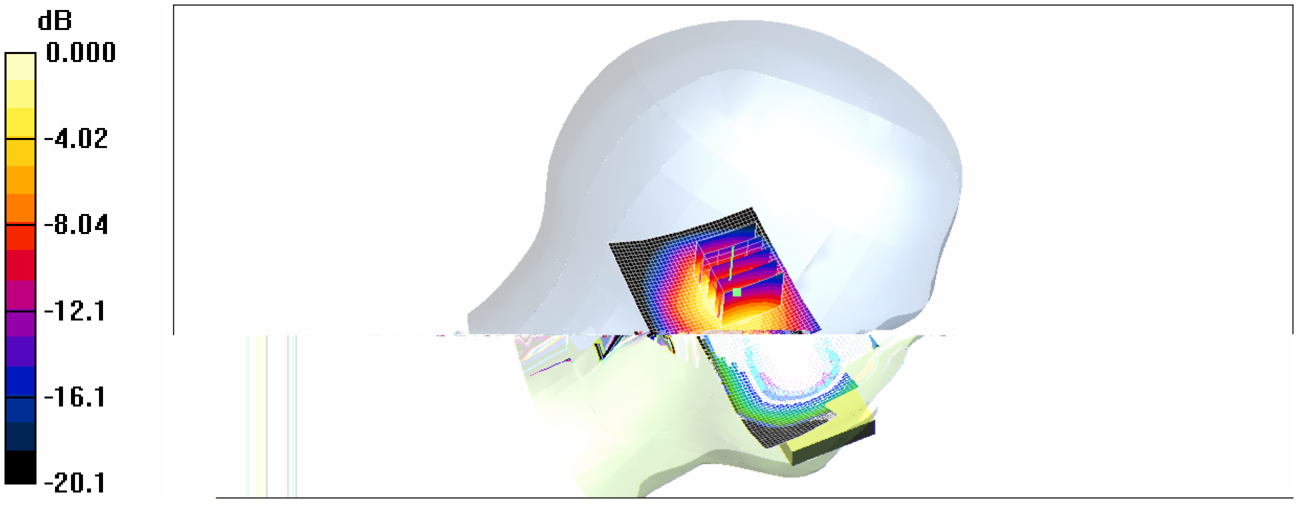
Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: HSL1900 Medium parameters used: f = 1880 MHz; $\sigma = 1.4$ mho/m; $\varepsilon_r = 39.7$; $\rho = 1000$ kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

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 (41x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.887 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.7 V/m; Power Drift = -0.110 dB
Peak SAR (extrapolated) = 1.40 W/kg
SAR(1 g) = 0.745 mW/g; SAR(10 g) = 0.405 mW/g
Maximum value of SAR (measured) = 0.806 mW/g



0 dB = 0.806mW/g

Test Laboratory: KTL

S20 GSM1900 661CH LEFT EAR TILT
***Test Date : 11th/February/2009**

Measured Liquid Temperature(℃) : 21.3, Ambient Temperature(℃) : 21.0

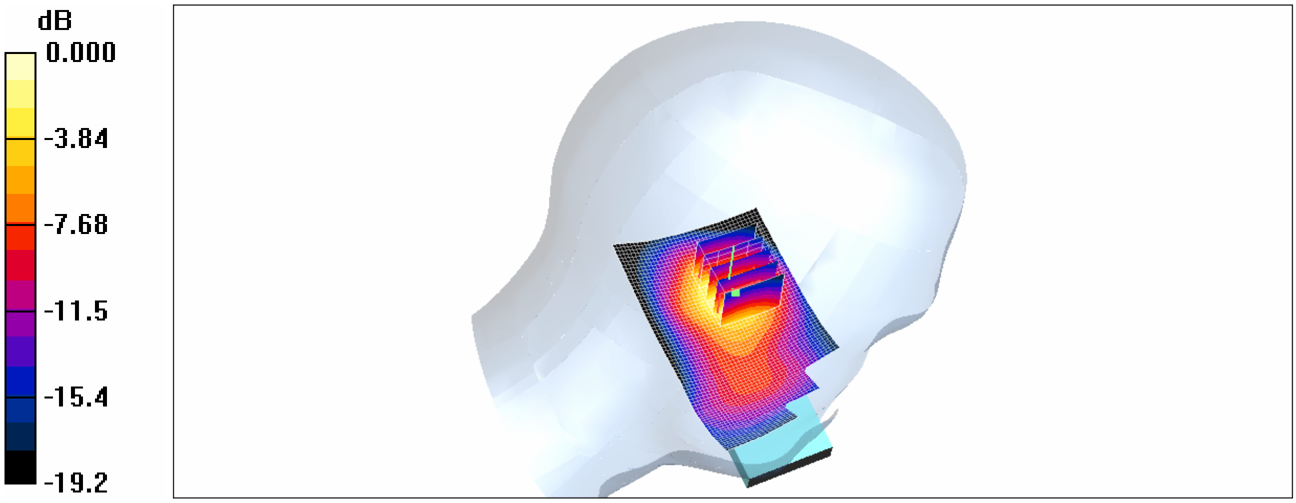
Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: HSL1900 Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

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 (41x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.559 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.7 V/m; Power Drift = -0.031 dB
Peak SAR (extrapolated) = 0.980 W/kg
SAR(1 g) = 0.531 mW/g; SAR(10 g) = 0.280 mW/g
Maximum value of SAR (measured) = 0.566 mW/g



0 dB = 0.566mW/g

Test Laboratory: KTL

S20 GSM1900 661CH RIGHT CHEEK TOUCH

***Test Date : 11th/February/2009**

Measured Liquid Temperature(℃) : 21.3, Ambient Temperature(℃) : 21.0

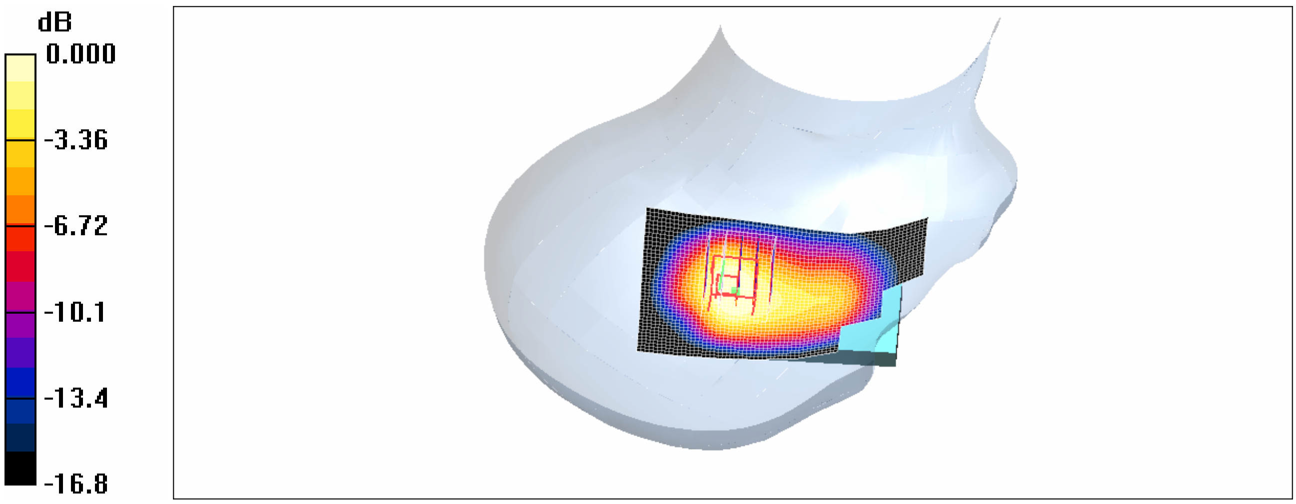
Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: HSL1900 Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

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 (41x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.862 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.5 V/m; Power Drift = -0.271 dB
Peak SAR (extrapolated) = 1.18 W/kg
SAR(1 g) = 0.675 mW/g; SAR(10 g) = 0.400 mW/g
Maximum value of SAR (measured) = 0.707 mW/g



0 dB = 0.707mW/g

Test Laboratory: KTL

S20 GSM1900 661CH RIGHT EAR TILT

***Test Date : 11th/February/2009**

Measured Liquid Temperature(℃) : 21.3, Ambient Temperature(℃) : 21.0

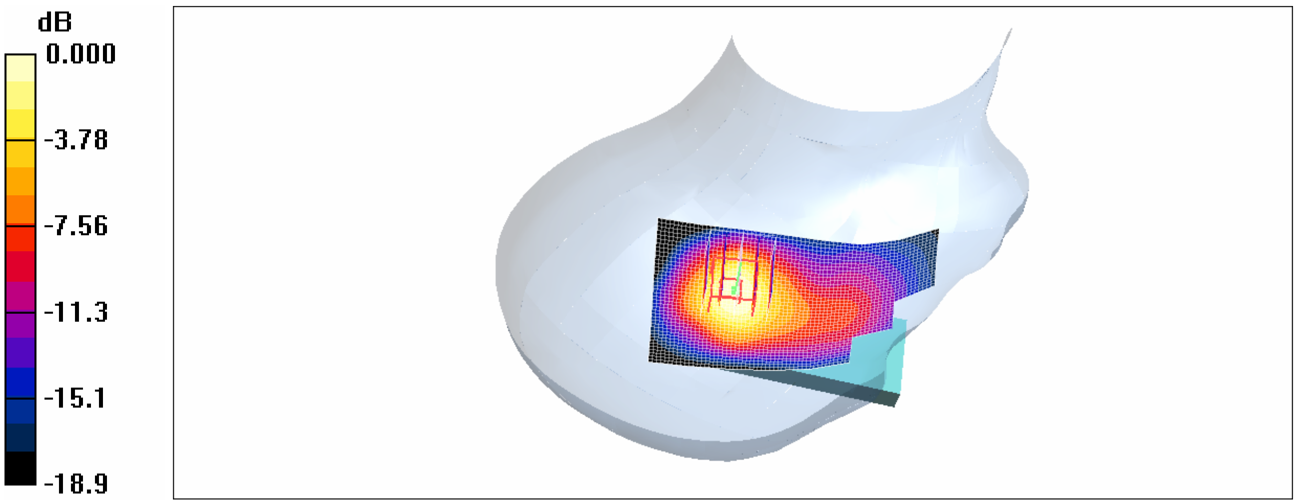
Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: HSL1900 Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

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 (41x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.597 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.3 V/m; Power Drift = -0.126 dB
Peak SAR (extrapolated) = 0.960 W/kg
SAR(1 g) = 0.558 mW/g; SAR(10 g) = 0.307 mW/g
Maximum value of SAR (measured) = 0.587 mW/g



0 dB = 0.587mW/g

Test Laboratory: KTL

S20 GSM1900 512CH LEFT CHEEK TOUCH

***Test Date : 11th/February/2009**

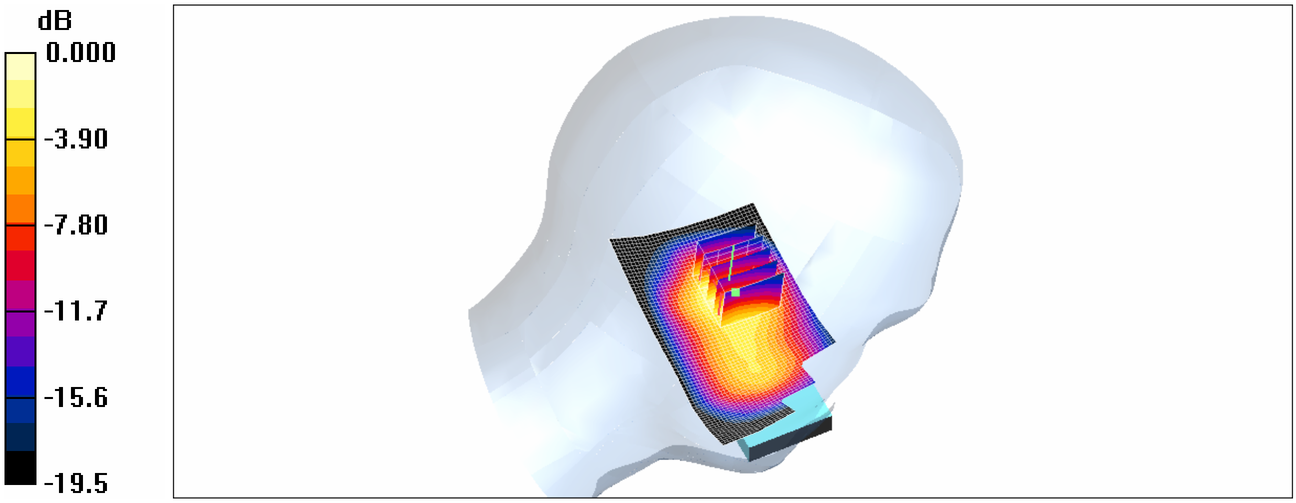
Measured Liquid Temperature(℃) : 21.3, Ambient Temperature(℃) : 21.0

Communication System: DCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium: HSL1900 Medium parameters used: f = 1850.2 MHz; σ = 1.39 mho/m; ε_r = 39.8; ρ = 1000 kg/m^3
Phantom section: Left 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 (41x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.861 mW/g
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.6 V/m; Power Drift = -0.160 dB
Peak SAR (extrapolated) = 1.38 W/kg
SAR(1 g) = 0.742 mW/g; SAR(10 g) = 0.405 mW/g
Maximum value of SAR (measured) = 0.813 mW/g



0 dB = 0.813mW/g

Test Laboratory: KTL

S20 GSM1900 810CH LEFT CHEEK TOUCH

***Test Date : 11th/February/2009**

Measured Liquid Temperature(℃) : 21.3, Ambient Temperature(℃) : 21.0

Communication System: DCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium: HSL1900 Medium parameters used: f = 1909.8 MHz; σ = 1.43 mho/m; ε_r = 39.6; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

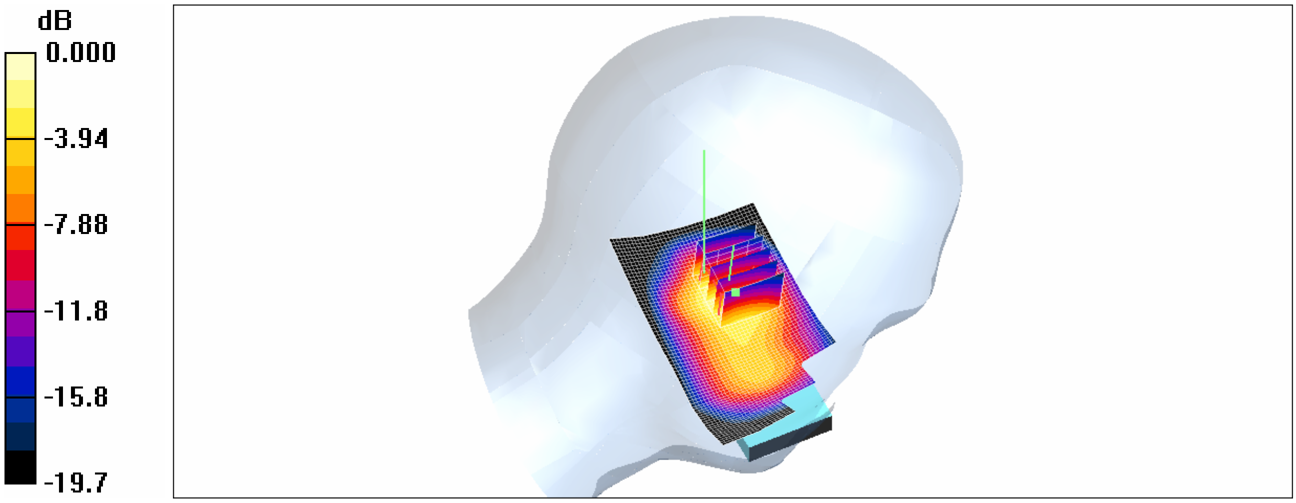
DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(5.03, 5.03, 5.03); Calibrated: 2008-07-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)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

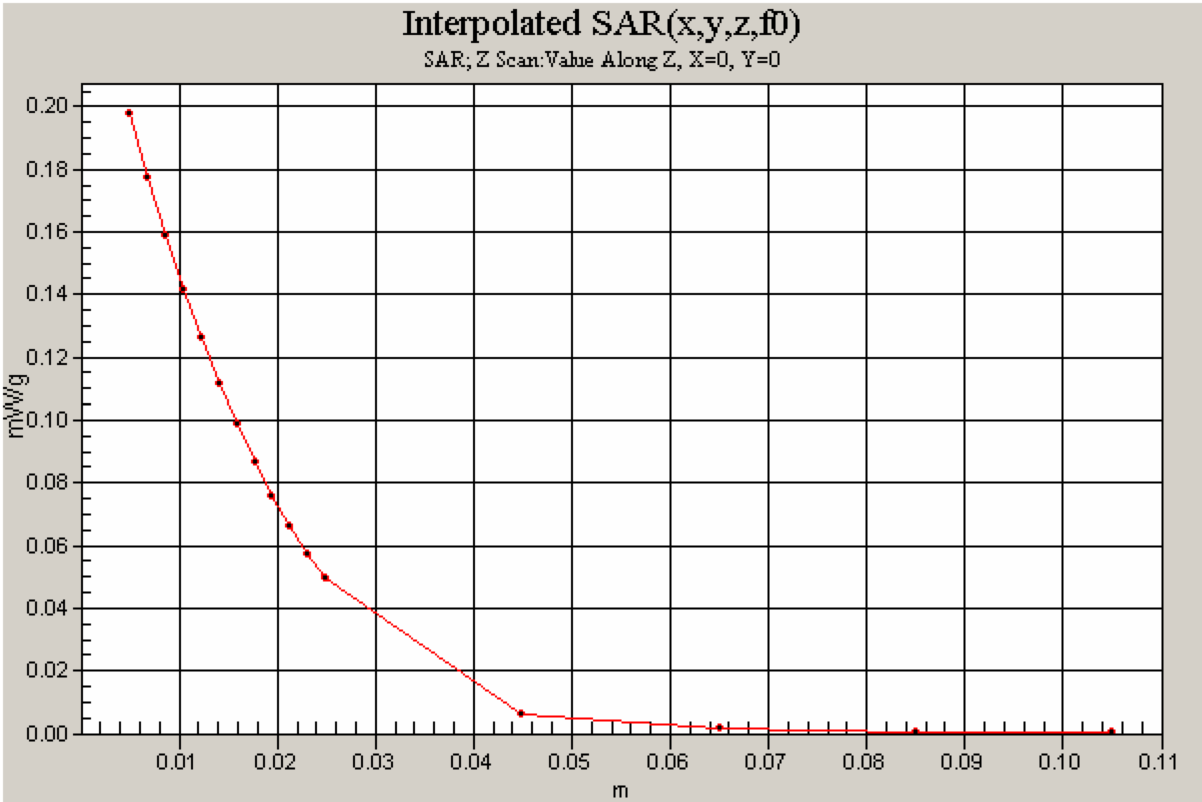
Area Scan (41x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.01 mW/g

Z Scan (1x1x16): Measurement grid: dx=20mm, dy=20mm, dz=20mm
Maximum value of SAR (interpolated) = 0.198 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.5 V/m; Power Drift = 0.032 dB
Peak SAR (extrapolated) = 1.60 W/kg
SAR(1 g) = 0.851 mW/g; SAR(10 g) = 0.459 mW/g
Maximum value of SAR (measured) = 0.930 mW/g


dB
0.000
-3.94
-7.88
-11.8
-15.8
-19.7

0 dB = 0.930mW/g


Interpolated SAR(x,y,z,f0)
SAR; Z Scan:Value Along Z, X=0, Y=0
mW/g
0.20
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
m

Test Laboratory: KTL

S20 GSM1900 661CH Body FRONT facing to phantom , 1.5 cm spacing

***Test Date : 11th/February/2009**

Measured Liquid Temperature(℃) : 21.4, Ambient Temperature(℃) : 21.0

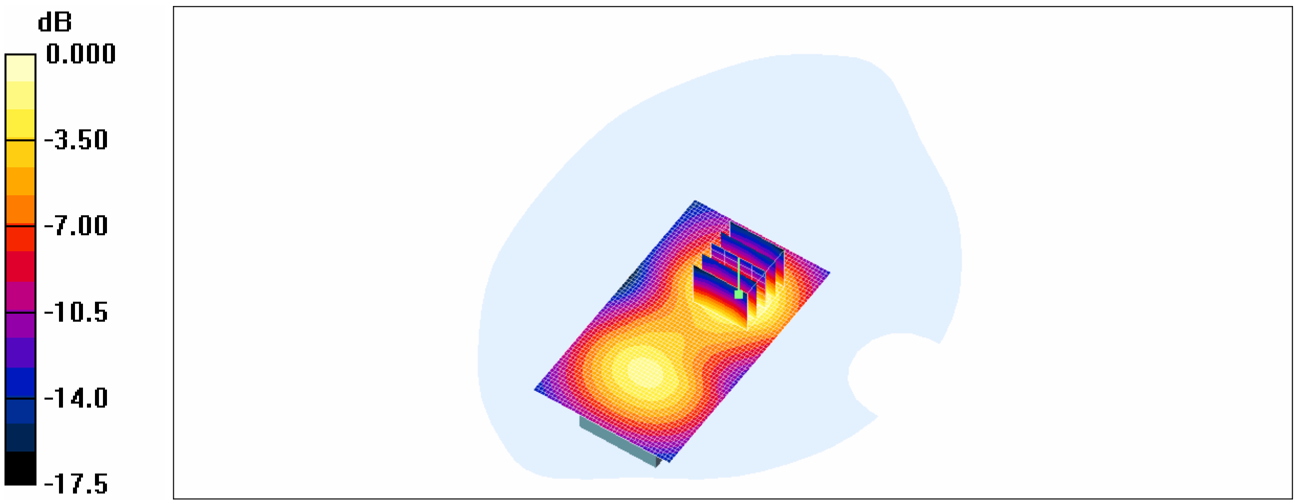
Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

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 (41x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.161 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.02 V/m; Power Drift = -0.084 dB
Peak SAR (extrapolated) = 0.235 W/kg
SAR(1 g) = 0.141 mW/g; SAR(10 g) = 0.081 mW/g
Maximum value of SAR (measured) = 0.155 mW/g



0 dB = 0.155mW/g

Test Laboratory: KTL

S20 GSM1900 661CH Body REAR facing to phantom , 1.5 cm spacing
***Test Date : 11th/February/2009**

Measured Liquid Temperature(℃) : 21.4, Ambient Temperature(℃) : 21.0

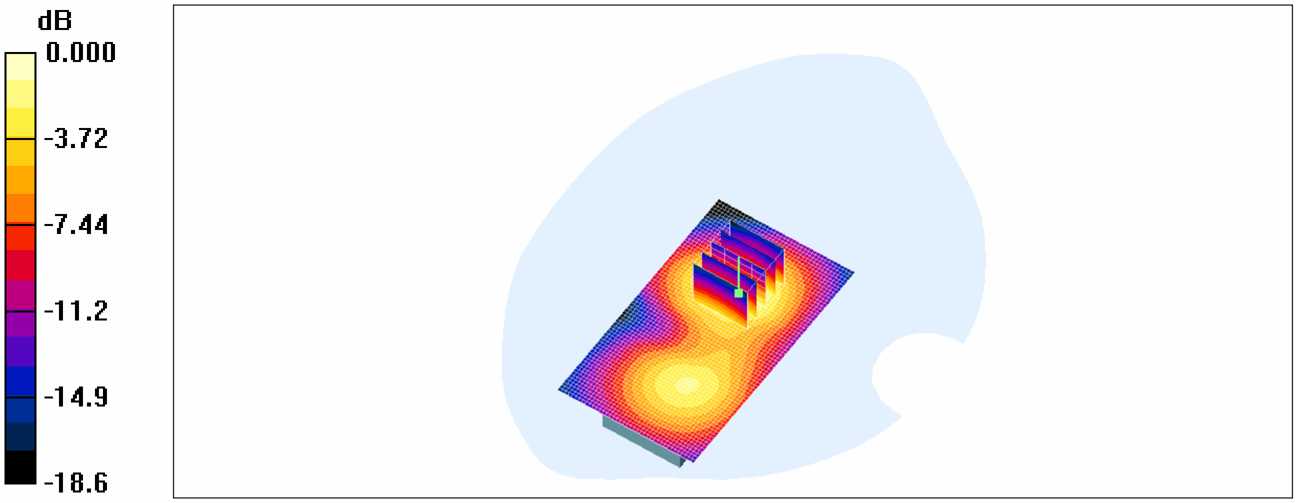
Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

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 (41x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.201 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.3 V/m; Power Drift = 0.019 dB
Peak SAR (extrapolated) = 0.302 W/kg
SAR(1 g) = 0.181 mW/g; SAR(10 g) = 0.102 mW/g
Maximum value of SAR (measured) = 0.194 mW/g



0 dB = 0.194mW/g

Test Laboratory: KTL

S20 GSM1900 512CH Body REAR facing to phantom , 1.5 cm spacing
***Test Date : 11th/February/2009**

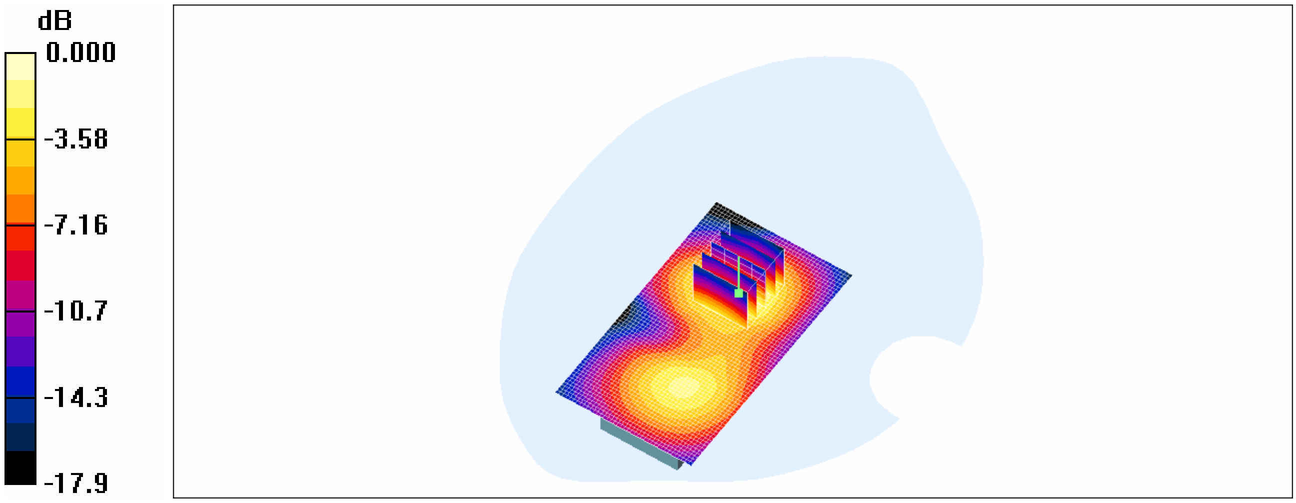
Measured Liquid Temperature(℃) : 21.4, Ambient Temperature(℃) : 21.0

Communication System: DCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium: MSL1900 Medium parameters used: f = 1850.2 MHz; σ = 1.49 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 (41x71x1): 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 = 9.74 V/m; Power Drift = 0.026 dB
Peak SAR (extrapolated) = 0.251 W/kg
SAR(1 g) = 0.152 mW/g; SAR(10 g) = 0.086 mW/g
Maximum value of SAR (measured) = 0.168 mW/g



0 dB = 0.168mW/g

Test Laboratory: KTL

S20 GSM1900 810CH Body REAR facing to phantom , 1.5 cm spacing
***Test Date : 11th/February/2009**

Measured Liquid Temperature(℃) : 21.4, Ambient Temperature(℃) : 21.0

Communication System: DCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium: MSL1900 Medium parameters used: f = 1909.8 MHz; σ = 1.56 mho/m; ε_r = 52.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

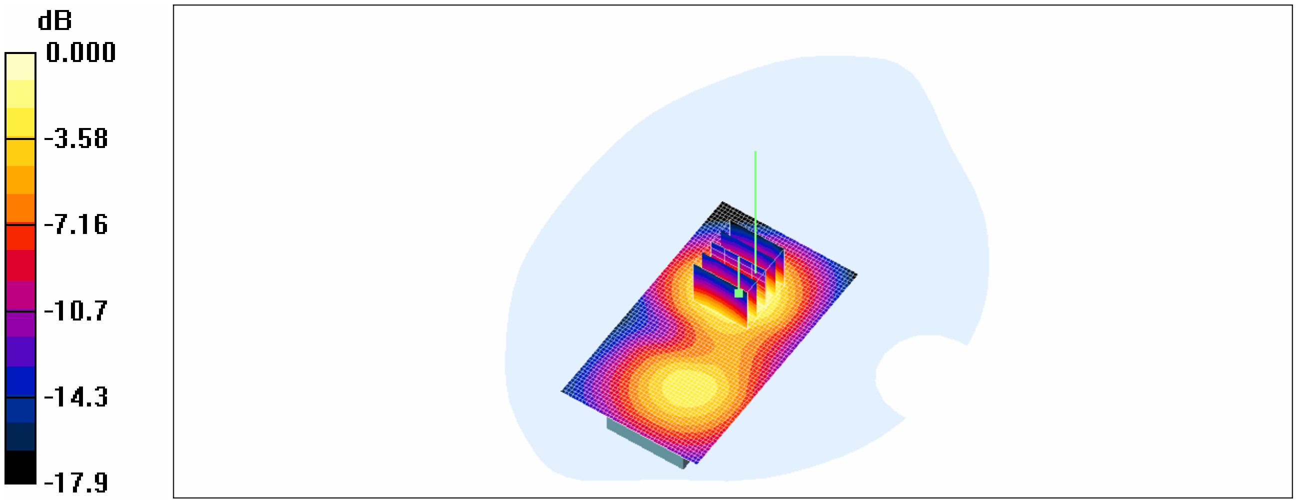
DASY4 Configuration:

- 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

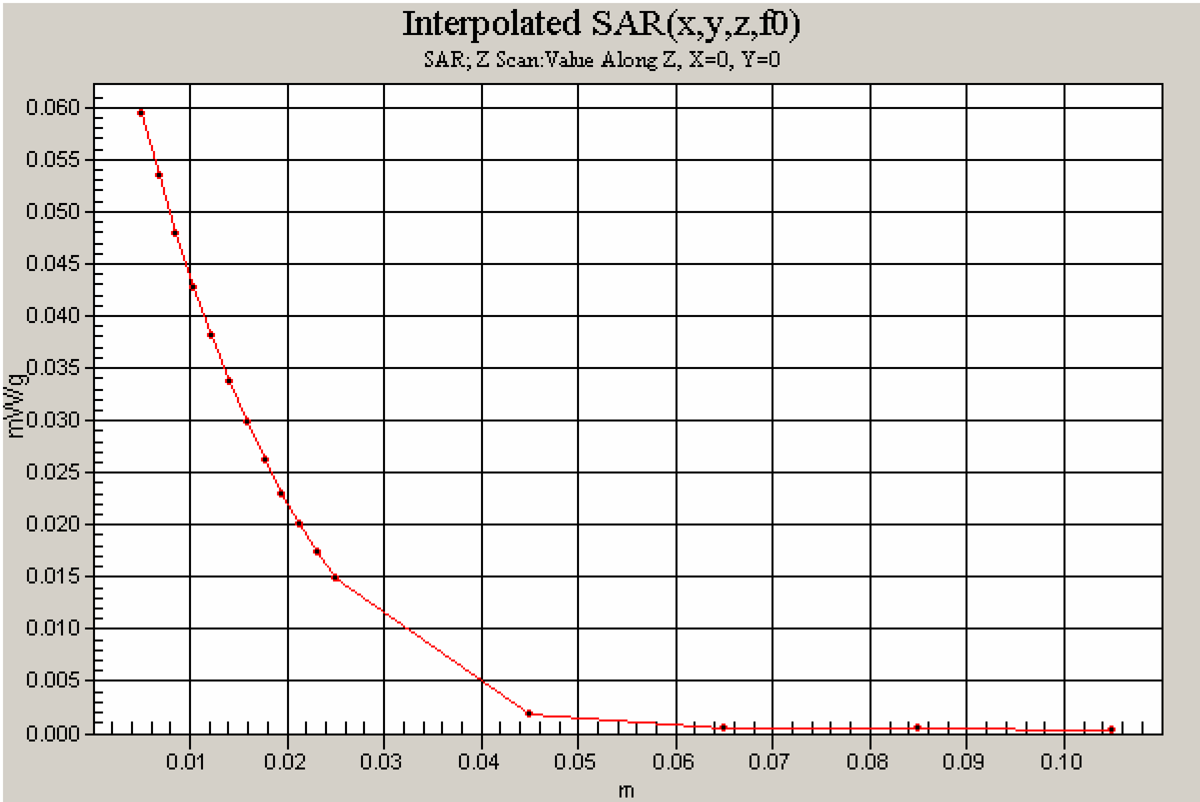
Area Scan (41x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.270 mW/g

Z Scan (1x1x16): Measurement grid: dx=20mm, dy=20mm, dz=20mm
Maximum value of SAR (interpolated) = 0.059 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.6 V/m; Power Drift = -0.043 dB
Peak SAR (extrapolated) = 0.413 W/kg
SAR(1 g) = 0.240 mW/g; SAR(10 g) = 0.136 mW/g
Maximum value of SAR (measured) = 0.258 mW/g


dB
0.000
-3.58
-7.16
-10.7
-14.3
-17.9

0 dB = 0.258mW/g


Interpolated SAR(x,y,z,f0)
SAR; Z Scan:Value Along Z, X=0, Y=0
mW/g
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