SAR Evaluation Report

FCC ID : TARCDU-685

Project Reference No. : NK09R046

Product Type : CDMA 1x EVDO USB MODEM

Brand Name : C-motech

Model : CDU-685

Tested According to : FCC Part 2(Section 2.1093) / OET Bulletin 65 Supplement C

Tested Period : April. 05. 2009 to April. 10. 2009

Tested by	Seob Lee		date : April. 17. 2009
Verified by	Seonteag.Jin		date : April. 17. 2009

This test results are only related to the item tested.
This test report is only limited to the client company and the product.
This report must not be used by the client to claim product endorsement by any agency of the U.S. Government.

Lab Address : Nemko Korea Co., Ltd
300-2, Osan-Ri, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, Korea
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Contents of This Report

1. General Information

1.1 Applicant

Company Name:	C-motech. Co.,Ltd
Company Address:	8,9F BLD. Yongsan Bldg. Yoido-dog, Youngdungpo-gu, Seoul Korea (150-871)
Phone/Fax:	Phone: +82-2-369-9881 / +82-2-785-5740
Contact Name:	Brian Song

1.2 Manufacturer

Company Name:	C-motech. Co.,Ltd
Company Address:	8,9F BLD. Yongsan Bldg. Yoido-dog, Youngdungpo-gu, Seoul Korea (150-871)
Phone/Fax:	Phone: +82-2-369-9881 / +82-2-785-5740
Contact Name:	Brian Song

1.3 Description of Device

Category:	CDMA 1x EVDO USB Modem
Model Name:	CDU-685
Brand Name:	C-motech
Serial Number:	00000001
Frequency of Operation:	CDMA835 : Tx : 824MHz ~ 849MHz, Rx : 869MHz ~ 894MHz PCS :Tx : 1850MHz ~ 1910MHz, Rx : 1930MHz ~ 1990MHz
Power Output: (Radiated Power)	Cellular : ERP 0.197 W(22.95dBm) US PCS : EIRP 0.277 W(24.43 dBm)
Type of Oscillation:	PLL Synthesizer & VCTCXO (19.2MHz)
Modulation Method:	OQPSK, QPSK
Channel Spacing:	1.23MHz
Operating Condition:	-20°C ~ +55°C , 85% at 50°C
Power Supply:	+5.0Vdc from USB slot
Antenna Type:	FIFA Antenna (Internal)
Dimensions:	32.1 mm x 72.1mm x 11.9 mm
Weight:	Approx. 23.2 g
Type of EUT production:	Sample

2. General Test Condition

2.1 Location

Nemko Korea Co.,Ltd
300-2, Osan-Ri, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, Korea
Phone : 82-31-322-2333 , Fax : 82-31-322-2332

2.2 Operating Environment

Parameters	Recording during test	Accepted deviation
Ambient temperature	21 ± 2℃	25 ~ 55℃
Relative humidity	40 ± 15%	20 ~ 75%

2.3 Support Equipment

Equipment	Manufacturer	Model Name	Serial Number
Laptop	HP	HSTNN-A25C	CNC64300PW
Laptop	Samsung	NT-X20	955C93DY800185K
Laptop	Samsung	NT-R70	BD0093CQ100230F

2.4 Test Frequency

Cellular		PCS	
Test Channel	Test Frequency (MHz)	Test Channel	Test Frequency (MHz)
1013	824.70	25	1851.25
384	836.52	600	1880.00
777	848.31	1175	1908.75

3. Description of Test Equipment

3.1 SAR Measurement Setup

Robotic System

Measurements are performed using the DASY4 automated dosimetric assessment system. Which is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland and consists of high precision robotics system (Stäubli), robot controller, measurement server, DELL computer, nearfield 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. 3.1).

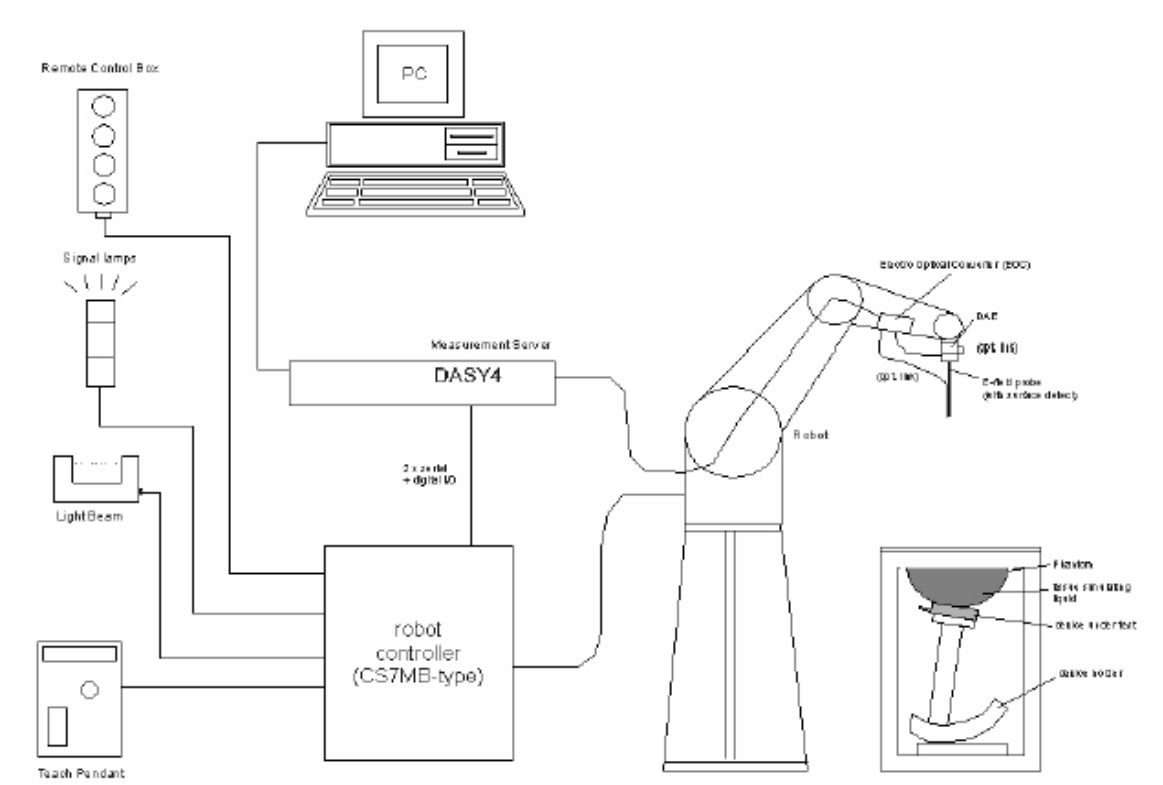


Figure 3.1 SAR Measurement System Setup

System Hardware

A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and a remote control is used to drive the robot motors. The PC consists of the DELL computer with Windows XP system and SAR Measurement Software DASY4, LCD monitor, mouse and keyboard. The Stäubli Robot is connected to the cell controller to allow software manipulation of the robot.
A Data Acquisition Electronic (DAE) circuit that performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc.
This is connected to the Electro-Optical Coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the measurement server.

System Electronics

The DAE4 consists of a highly sensitive electrometer-grade preamplifier with autozeroing, a channel and gain-switching multiplexer, a fast 16-bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information 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.

3.2 E-field Probe

The SAR measurement were conducted with the dosimetric probe ES3DV3, designed in the classical triangular configuration (see Fig.3.3) and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates.

The probe is equipped with an optical multi-fiber line ending at the front of the probe tip (see Fig.3.4). 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 System 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 approach and looks for the maximum using a 2nd order fitting (see Fig.3.2). The approach is stopped at reaching the maximum.

Figure3.2 DAE System

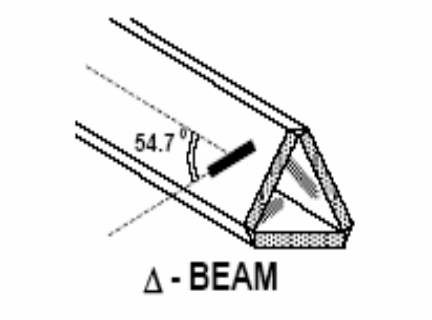


Figure 3.3 Triangular Probe Configuration

Figure 3.4 Probe Thick-Film Technique

Probe Specifications

Construction : Symmetrical design with triangular core
Interleaved sensors
Built-in shielding against static charges
PEEK enclosure material (resistant to organic DGBE)

Calibration : Basic Broad Band Calibration In air from 10 MHz to 3.0 GHz
In brain and body simulating tissue at Frequencies of MSL835,
MSL1900 MHz, Calibration certificates please find attached.

Frequency : 10 MHz to > 6 GHz; Linearity: ±0.2 dB (30 MHz to 3 GHz)

Directivity ±0.2 dB in HSL (rotation around probe axis)
±0.3 dB in HSL (rotation normal to probe axis)

Dynamic Range 5μW/g to > 100mW/g; Linearity: ±0.2dB

Dimensions Overall length: 330mm (Tip : 20mm)
Tip diameter: 4.0mm (Body : 12mm)
Distance from probe tip to dipole centers: 2.0mm

Application General dosimetry up to 3 GHz
Compliance tests of mobile phones
Fast automatic scanning in arbitrary phantoms

Optical Surface Detection
± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces

3.3 SAM Phantom

The SAM Twin Phantom V4.0C 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.
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.
(See Figure 3.5)

Figure 3.5 SAM Twin Phantom

Phantom Specification

Construction : The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528-200X, CENELEC 50361 and IEC 62209. 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 evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.

Shell Thickness : 2 ± 0.2 mm
Filling Volume : Approx. 25 liters
Dimensions : Height; 830 mm; Length: 1000 mm; Width: 500 mm

3.4 Device Holder for Transmitters

In combination with the SAM Twin Phantom V4.0, the Mounting Device (see Fig. 3.6) enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation point is the ear opening.
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 produce infinite number of configurations .
To produce the worst-case condition (the hand absorbs antenna output power), the hand is omitted during the tests.

Figure 3.6Device Holder

4. Measurement Procedure

EUT at the maximum power level is placed by a non metallic device
holder in the above described positions at a shell phantom of a human being.
The distribution of the electric field strength *E* is measured in the tissue simulating liquid within the shell phantom.
For this miniaturized field probes with high sensitivity and low field disturbance are used.
Afterwards the corresponding SAR values are calculated with the known electrical conductivity σ and the mass density *p* of the tissue in the SEMCAD software.
The software is able to determine the averaged SAR values (averaging region 1g or 10g) for compliance testing.

The measurements are done by two scans: first a coarse scan determines the region of the maximum SAR, afterwards the averaged SAR is measured in a second scan within the sharp of a cube. The measurement times takes about 20 minutes.

The following steps are used for each test position:

STEP 1
Establish a call with the maximum output power with a base station simulator.
The connection between the mobile phone and the base station simulator is established via air interface.

STEP 2
Measurement of the local E-Field value at a fixed location (P1).
This value serves as a reference value for calculating a possible power drift.

STEP 3
Measurement of the SAR distribution with a grid spacing of 15mm × 15mm and a constant distance to the inner surface of the phantom.
Since the sensors cannot directly measure at the inner surface of the phantom.
Since the sensors can not directly measure at the inner phantom surface, the values between the sensors and the inner phantom surface are extrapolated. With this values the area of the maximum SAR is calculated by a interpolation scheme (combination of a least-square fitted function and a weighted average method). Additional peaks within 3dB of the maximum SAR are searched.

STEP 4
Around this points, a cube of 30mm×30mm×30mm is assessed by measuring 5×5×5 points. With these data, the peak spatial-average SAR value can be calculated with the SEMCAD software.

STEP 5
The used extrapolation and interpolation routines are all based on the modified Quadratic Shepard's method [DASY4].

STEP 6
Repetition of the E-Field measurement at the fixed location(P1) and repetition of the whole procedure if the two results differ by more than ±0.223dB.

4.1 Head / Body Simulating Mixture Characterization

The brain mixture consists of a viscous gel using hydroxethyl-cellullose (HEC) gelling agent and saline solution. Preservation with a 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.

Ingredients (% by weight)	**Frequency (MHz)**	
	835	1900
Tissue Type	Body	Body
Water	52.4	40.4
Salt (NaCl)	1.4	0.5
Sugar	45.0	58.0
HEC	1.0	1.0
Bactericide	0.1	0.1
Triton X-100	0.0	0.0
DGBE	0.0	0.0
Dielectric Constant	56.1	54.0
Conductivity (S/m)	0.95	1.45

Composition of Ingredients for Liquid Tissue Phantoms

4.2 Tissue Dielectric Parameters for Head and Body Phantoms

The tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in P1528 have been incorporated in the following table.

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

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

4.3 FCC Limits for Specific Absorption Rate (SAR)

Limits for Occupational/Controlled Exposure (W/kg)

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

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

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

NOTE 1: See Section 1 for discussion of exposure categories.

NOTE 2: Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1 gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

NOTE 3: At frequencies above 6.0 GHz, SAR limits are not applicable and MPE limits for power density should be applied at 5 cm or more from the transmitting device.

Note 4: The time averaging criteria for field strength and power density do not apply to general population SAR limit of 47 CFR §2.1093.

5. Description of Test Modes and Configurations

5.1 Description of Antenna Location

- Please refer to SAR Test Setup Photographs and Photographs of EUT -

5.2 Description of Test Position

The following test configurations have been applied in this report.

- Please refer to SAR Test Setup Photographs and Photographs of EUT –

Horizontal Top : The front of EUT face to the Phantom with 5mm separation distance.

- Please refer to SAR Test Setup Photographs and Photographs of EUT -

Horizontal Bottom : The bottom of EUT face to the Phantom with 5mm separation distance.

- Please refer to SAR Test Setup Photographs and Photographs of EUT –

Vertical Right : The right edge of EUT face to the Phantom with 5mm separation distance.

- Please refer to SAR Test Setup Photographs and Photographs of EUT –

Vertical Left : The left edge of EUT face to the Phantom with 5mm separation distance.

- Please refer to SAR Test Setup Photographs and Photographs of EUT –

Vertical Top : The front Top side of EUT face to the Phantom with 5mm separation distance.

- Please refer to SAR Test Setup Photographs and Photographs of EUT –

Laptop(Horizontal) : The front of EUT face to the Phantom with 10mm separation distance.

- Please refer to SAR Test Setup Photographs and Photographs of EUT –

Laptop(Vertical) : The right edge of EUT face to the Phantom with 7mm separation distance.

Body Tissue Depth

5.3 Description of Test Mode

Communication	Test Mode	Test Position	Test Channel
Cellular	1x RTT	Horizontal Top	L,M,H
	1x RTT	Horizontal Bottom	L,M,H
	1x RTT	Vertical Right	L,M,H
	1x RTT	Vertical Left	L,M,H
	1x RTT	Vertical Top	M
	1x RTT	Laptop(Horizontal)	L,M,H
	1x RTT	Laptop(Vertical)	L,M,H
	EVDO	Horizontal Top	L,M,H
PCS	1x RTT	Horizontal Top	L,M,H
	1x RTT	Horizontal Bottom	L,M,H
	1x RTT	Vertical Right	L,M,H
	1x RTT	Vertical Left	L,M,H
	1x RTT	Vertical Top	M
	1x RTT	Laptop(Horizontal)	L,M,H
	1x RTT	Laptop(Vertical)	L,M,H
	EVDO	Horizontal Bottom	L,M,H

6. Definition of Reference Points

6.1 EAR Reference Point

Figure 6.1 shows the front, back and side views of SAM. The point “M” is the reference point For the center of mouth, “LE” is the left ear reference point (ERP), and “RE” is the right ERP. The ERPs are 15 mm posterior to the entrance to ear canal (EEC) along the B-M line (Back-Mouth), as shown in Figure 6.2.

Figure 6.1 Front, back and side view of SAM

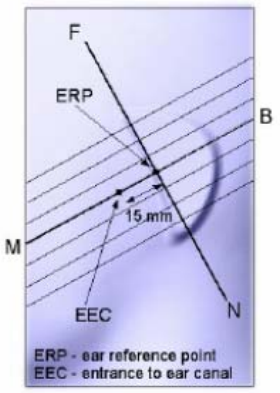


Figure6.2 Close up side view

The plane passing through the two ear canals and M is defined as the Reference Plane. The line N-F (Neck-Front) perpendicular to the reference plane and passing through the RE(or LE) is called the Reference Pivoting Line (see Figure 6.3).
Line B-M is perpendicular to the N-F line. Both N-F and B-M Lines should be marked on the external phantom shell to Facilitate handset positioning. Posterior to the N-F line, the thickness of the phantom shell with the shape of an ear is a flat surface 6 mm thick at the ERPs.

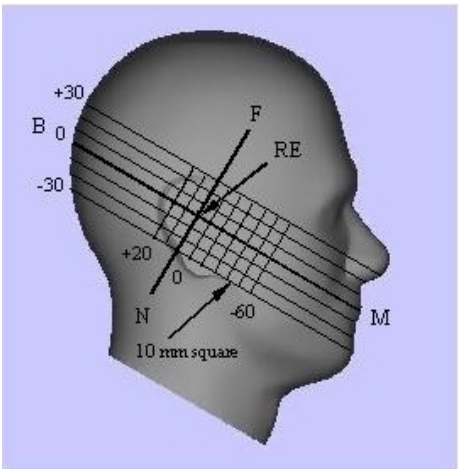


Figure 6.3 Side view of the phantom showing relevant markings

6.2 Handset Reference Points

Two imaginary lines on the handset were established: the vertical centerline and the horizontal line. The test device was placed in a normal operating position with the “test device reference point” located along the “vertical centerline” on the front of the device aligned to the “ear reference point” (see Fig. 6.4).
The “test device reference point” was than located at the same level as the center of the eat reference point. The test device was positioned so that the “vertical centerline” was bisecting the front surface of the handset at it’s tip and bottom edges, positioning the “ear reference point” on the outer surface of the both the left and right head phantoms on the ear reference point.

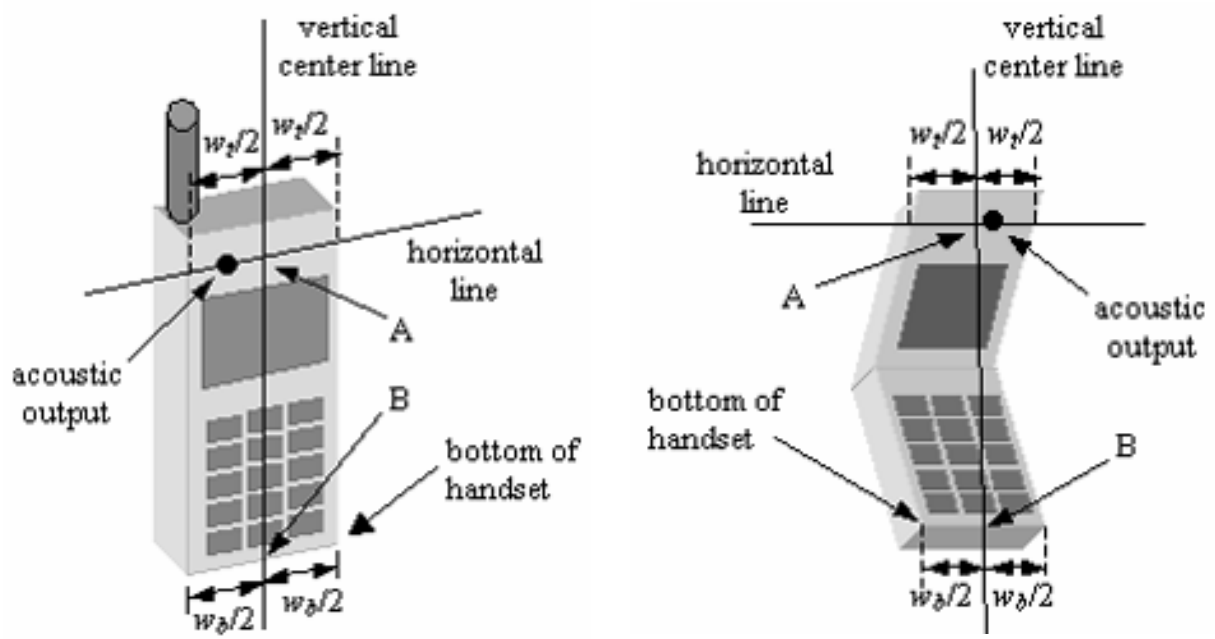


Figure 6.4 Handset vertical and horizontal reference lines

7. Test Configuration Positions

7.1 Cheek/Touch Position

Step 1
The test device was positioned with the handset close to the surface of the phantom such that point. A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 7.1), such that the plane defined by the vertical center line and the horizontal line of the phone is approximately parallel to the sagittal plane of the phantom.

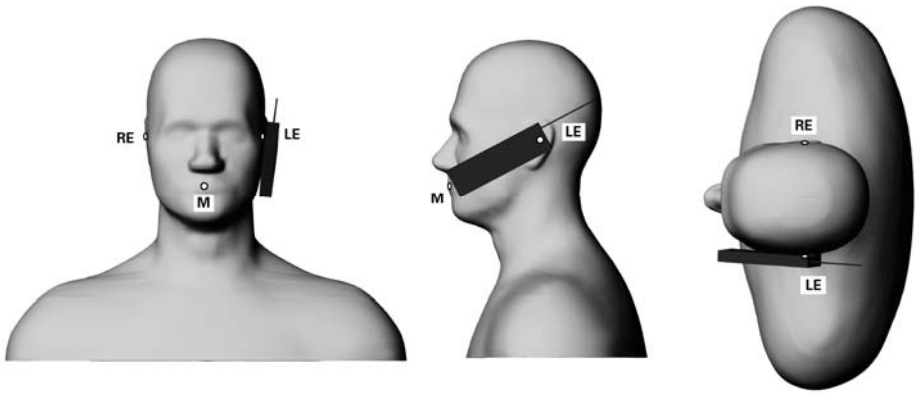


Figure 7.1 Front, Side and Top View of Cheek/Touch Position

Step 2
The handset was translated towards the phantom along the line passing through RE & LE until the handset touches the ear.

Step 3
While maintaining the handset in this plane, the handset was rotated around the LE-RE line Until the vertical centerline was in the plane normal to MB-NF including the line MB (reference plane).

Step 4
Rotate the handset around the vertical centerline until the phone (horizontal line) was symmetrical was respect to the line NF.

Step 5
While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE, and maintaining the phone contact with the ear, the handset was rotated about the line NF until any point on the handset made contact with a phantom point below the ear cheek.(See Figure 7.2)

7.2 EAR/Tilt 15° Position

With the test device aligned in the “Cheek/Touch Position”:

Step 1
Repeat steps 1 to 5 of 7.1 to place the device in the “Cheek/Touch Position”

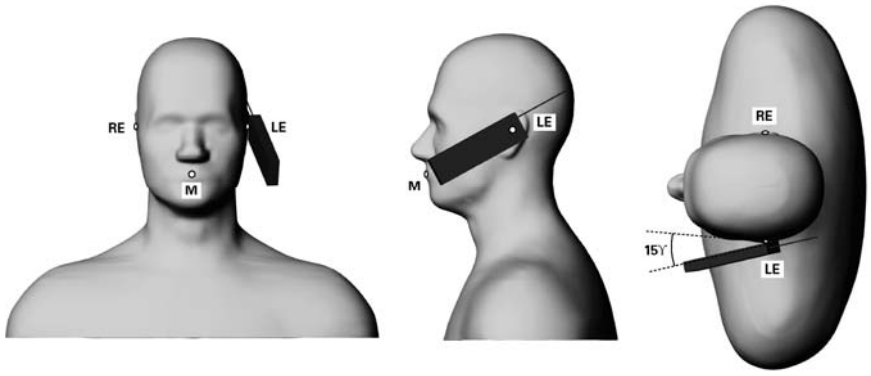


Figure7.2 Front, side and Top View of Ear/Tilt 15° Position

Step 2
While maintaining the orientation of the phone, the phone was retracted parallel to the reference plane far enough to enable a rotation of the phone by 15 degree.

Step 3
The phone was then rotated around the horizontal line by 15 degree.

Step 4
While maintaining the orientation of the phone, the phone was moved parallel to the reference plane until any part of the phone touches the head.
(In this position, point A was located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact was at any location other than the pinna, the angle of the phone would then be reduced.
The tilted position was obtained when any part of the phone was in contact of the ear as well as a second part of the phone was in contact with the head. (See Figure 7.2)

7.3 Body-worn and Other Configurations

7.3.1 Phantom Requirements

For body-worn and other configurations a flat phantom shall be used which is comprised of material with electrical properties similar to the corresponding tissues.

8.3.2 Test Position

The body-worn configurations shall be tested with the supplied accessories (belt-clips, holsters, etc.) attached to the device in normal use configuration. Devices with a headset output shall be tested with a connected headset. Since the Supplement C to OET Bulletin 65 was mainly issued for mobile phones it is only a guideline and therefore some requirements are not usable or practical for devices other than mobile phones.

7.3.3 Test to be Performed

For purpose of determining test requirements, accessories may be divided into two categories: those that do not contain metallic components and those that do. For multiple accessories that do not contain metallic components, the device may be tested only with that accessory which provides the closet spacing to the body.
For multiple accessories that contain metallic components, the device must be tested with each accessory that contains a unique metallic component. If multiple accessories share an identical metallic component, only the accessory that provides the closet spacing to the body must be tested.
If the manufacturer provides none body accessories, a separation distance of 1.5 cm between the back of the device and the flat phantom is recommended. Other separation distances may be used, but they shall not exceed 2.5cm. In these cases, the device may use body-worn accessories that provide a separation distance greater than that tested for the device provided however that the accessory contains no metallic components.
For devices with retractable antenna, the SAR test shall be performed with the antenna fully extended and fully retracted. Other factors that may affect the exposure shall also be tested. For example, optional antennas or optional battery packs which may significantly change the volume, lengths, flip open/closed, etc. of the device or any other accessories which might have the potential to considerably increase the peak spatial-average SAR value.
The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at the middle channel for each test configuration is at least 3.0dB lower than the SAR limit, testing at the high and low channel is optional.

* In this test, This Device is with belt-clip but only used for the holster covering USB DONGLE connection part and this USB DONGLE can’t be attached to computer with this holster. So it’s impossible to perform test with the holster.

8. Measurement Uncertainty

Error Description	Tolerance (±%)	Prob. Dist.	Divisor	(Ci)		Standard Uncertainty		(Vi)
				(1g)	(10g)	(1g)	(10g)	
Measurement System								
Probe Calibration	5.5	Normal	1	1	1	5.5	5.5	∞
Axial Isotropy	4.7	Rectangular	1.73	0.7	0.7	1.9	1.9	∞
Hemispherical Isotropy	9.6	Rectangular	1.73	0.7	0.7	3.9	3.9	∞
Hboundary Effects	1.0	Rectangular	1.73	1	1	0.6	0.6	∞
Linearity	4.7	Rectangular	1.73	1	1	2.7	2.7	∞
System Detection Limits	1.0	Rectangular	1.73	1	1	0.6	0.6	∞
Readout Electronics	0.3	Normal	1	1	1	0.3	0.3	∞
Response Time	0.8	Rectangular	1.73	1	1	0.5	0.5	∞
Intergration Time	2.6	Rectangular	1.73	1	1	1.5	1.5	∞
RF Ambient Conditions	3.0	Rectangular	1.73	1	1	1.7	1.7	∞
Probe Positioner	0.4	Rectangular	1.73	1	1	0.2	0.2	∞
Probe Positioning	2.9	Rectangular	1.73	1	1	1.7	1.7	∞
Max. SAR Eval.	1.0	Rectangular	1.73	1	1	0.6	0.6	∞
Test Sample Related								
Device Positioning	2.9	Normal	1	1	1	2.9	2.9	145
Device Holder	3.6	Normal	1	1	1	3.6	3.6	5
Power Drift	5.0	Rectangular	1.73	1	1	2.9	2.9	∞
Phantom and Setup								
Phantom Uncertainty	4.0	Rectangular	1.73	1	1	2.3	2.3	∞
Liquid Conductivity(target)	5.0	Rectangular	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity(Meas.)	2.5	Normal	1	0.64	0.43	1.6	1.1	∞
Liquid Permittivity(target)	5.0	Rectangular	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity(meas.)	2.5	Normal	1	0.6	0.49	1.5	1.2	∞
Combined Std. Uncertainty						**10.6**	**10.3**	
Expanded STD Uncertainty (k=2)						**21.2**	**20.7**	

9. System Verification

9.1 Tissue Verification

For the measurement of the following parameters the HP 85070E dielectric probe kit is used, representing the open-ended slim form probe measurement procedure. The measured values should be within ±5% of the recommended values given by the IEEE Standard C95.1 / OET Bulletin 65 Supplement C.

Table 9.1 Measured Tissue Parameters

	Cellular Body		Cellular Body	
Date	April 06, 2009		April 07, 2009	
Liquid Temperature(°C)	21.5°C		22.1°C	
	Recommended Value	Measured Value	Recommended Value	Measured Value
Dielectric Constant (ε)	55.2±2.76	**53.7**	55.2±2.76	**54.3**
Conductivity(σ)	0.97 ±0.048	**0.949**	0.97 ±0.048	**0.952**

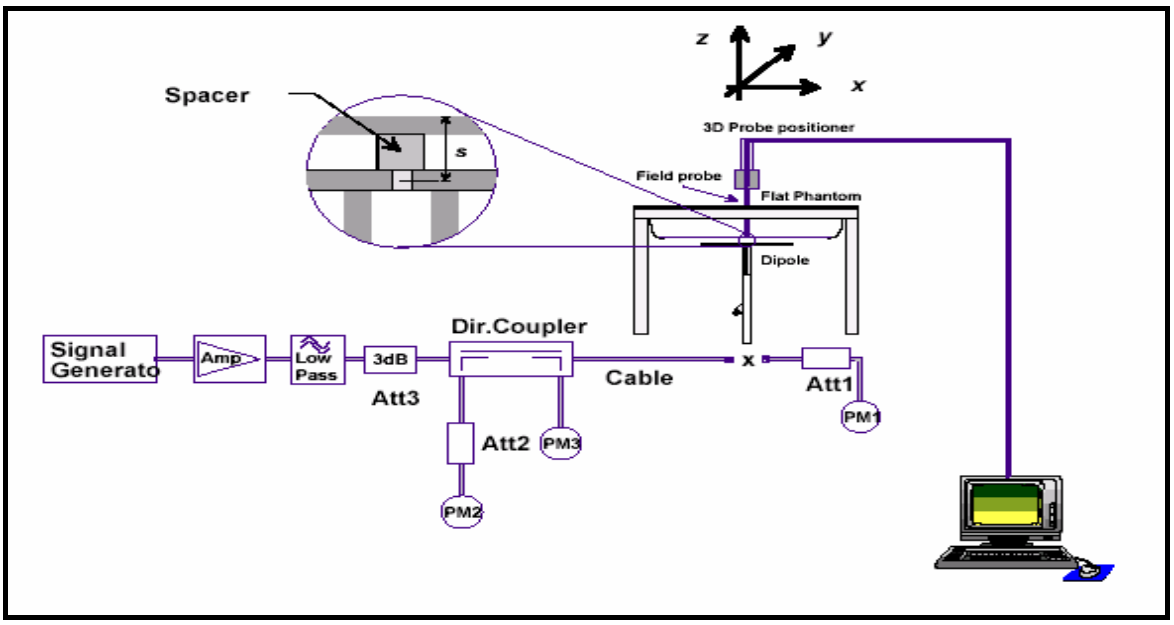
	PCS Body	
Date	April 09, 2009	
Liquid Temperature(°C)	21.7°C	
	Recommended Value	Measured Value
Dielectric Constant (ε)	53.3±2.660	**54.8**
Conductivity(σ)	1.52 ±0.076	**1.53**

9.2 Test System Validation

The simplified performance check was realized using the dipole validation kits.
The input power of the dipole antennas were 250mW and they were placed under the flat Part of the SAM phantoms.
The target and measured results are listed in the table 9.2

Table 9.2 System Validation Results

Tissue	Date	Liquid Temperature (°C)	Targeted SAR (mW/g)	Measured SAR (mW/g)	Deviation (%)
			1g	1g	1g
835MHz Body	April 06, 2009	21.5 °C	2.375	**2.50**	**5.26**
835MHz Body	April 07, 2009	22.1 °C	2.375	**2.41**	**1.47**
1900MHz Body	April 09, 2009	21.7 °C	9.925	**10.7**	**7.81**



Dipole Validation Test Setup

9.3 Measurement Result of Test Data (Cellular Validation)

Date/Time: 2009-04-06 PM 4:13:21

Test Laboratory: Nemko Korea File Name: CDU-685 Cellular System Validation.da4

DUT: Dipole 835 MHz Type: D835V2 Serial: D835V2 - SN:4d017 Applicant Name: C-motech Co.,Ltd

Communication System: CW Frequency: 835 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 835 MHz; σ = 0.949 mho/m; ε_r = 53.7; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Cellular System Validation/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 2.69 mW/g

CDU-685 Cellular System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

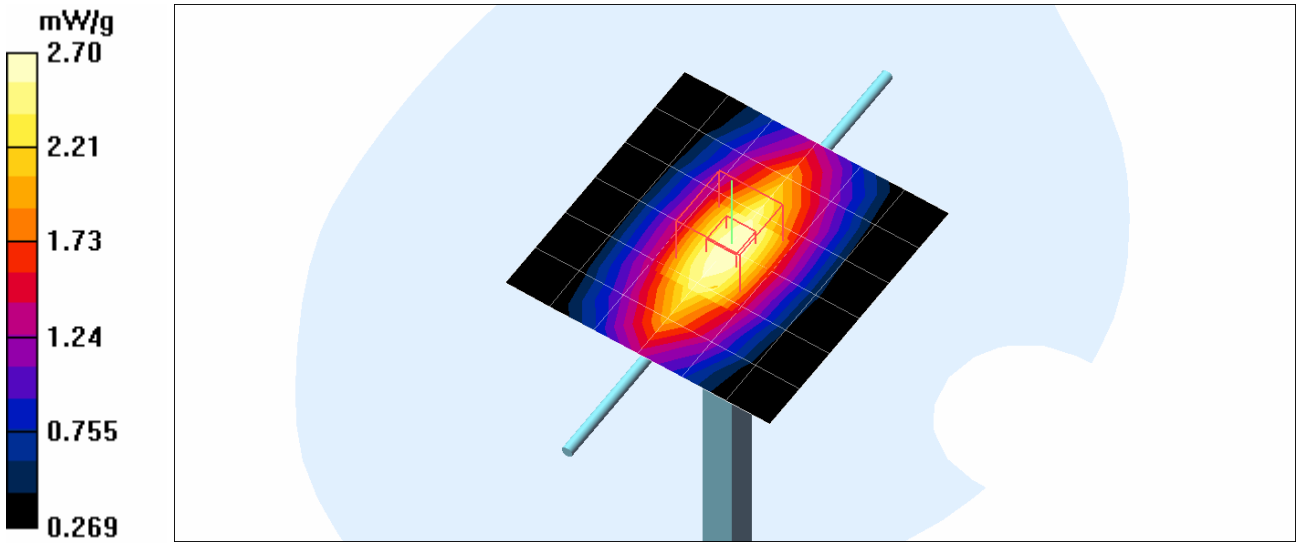
Reference Value = 54.2 V/m; Power Drift = -0.030 dB

Peak SAR (extrapolated) = 3.61 W/kg

SAR(1 g) = 2.5 mW/g; SAR(10 g) = 1.66 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 2.70 mW/g



Date/Time: 2009-04-07 AM 9:43:19

Test Laboratory: Nemko Korea File Name: CDU-685 Cellular System Validation-2.da4

DUT: Dipole 835 MHz Type: D835V2 Serial: D835V2 - SN:4d017 Applicant Name: C-motech Co.,Ltd

Communication System: CW Frequency: 835 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 835 MHz; σ = 0.952 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Cellular System Validation/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 2.58 mW/g

CDU-685 Cellular System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

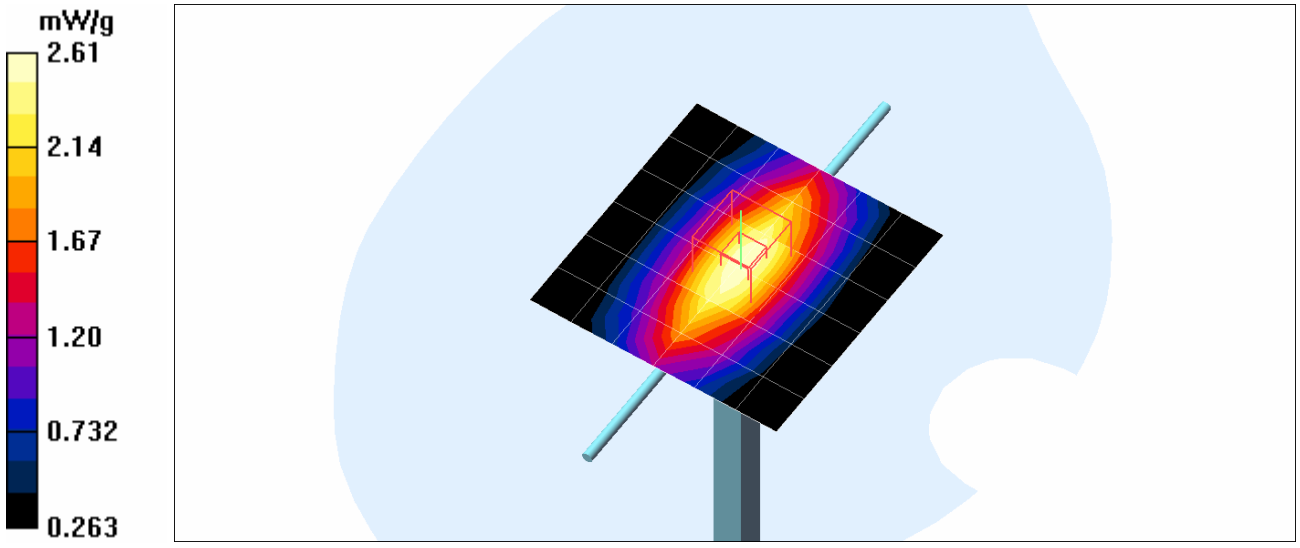
Reference Value = 53.0 V/m; Power Drift = 0.020 dB

Peak SAR (extrapolated) = 3.50 W/kg

SAR(1 g) = 2.41 mW/g; SAR(10 g) = 1.6 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 2.61 mW/g



9.4 Measurement Result of Test Data (PCS Validation)

Date/Time: 2009-04-09 PM 3:56:25

Test Laboratory: Nemko Korea File Name: CDU-685 PCS System Validation.da4

DUT: Dipole 1900 MHz Type: D1900V2 Serial: D1900V2 - SN:5d059 Applicant Name: C-motech Co.,Ltd

Communication System: CW Frequency: 1900 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 1900 MHz; σ = 1.53 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 PCS System Validation/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 13.2 mW/g

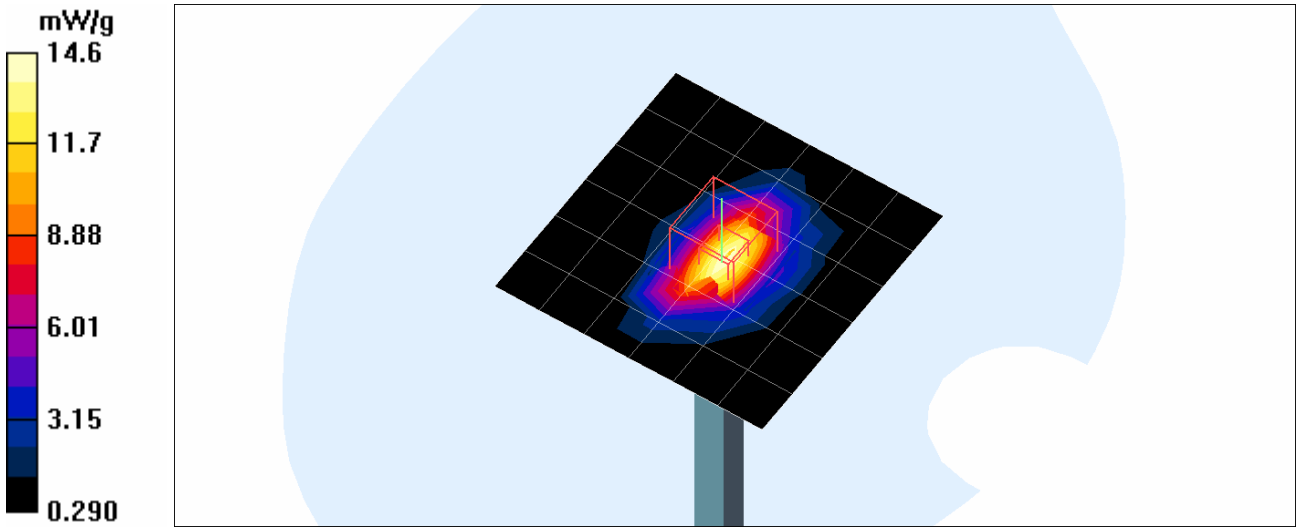
CDU-685 PCS System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 94.2 V/m; Power Drift = -0.011 dB

Peak SAR (extrapolated) = 19.5 W/kg

SAR(1 g) = 10.7 mW/g; SAR(10 g) = 5.59 mW/g

Maximum value of SAR (measured) = 14.6 mW/g



10. SAR Measurement Procedures for 3G Devices

10.1 Procedures Used To Establish Test Signal

The CDMA & Wi-max USB Modem was placed into simulated call mode using a base station simulator in a shielded chamber. Such test signals offer a consistent means for testing SAR and are recommended for evaluating SAR.

10.2 Device Test Condition

The CDMA & Wi-max USB Modem was operated by laptop. So eah SAR measurement was taken with a laptop. In order to verify that the device was tested at full power, conducted output power measurements were performed befored and after each SAR measurement to confirm the output power. If a conducted power deviation of more than 5% occurred, the test was repeated.

10.3 SAR measurement Conditions for CDMA2000

The following procedures were followed according to FCC “SAR Measurement Procedures for 3G Devices”, October 2007

10.3.1 Output Power Verification

See 3GPP2 C.S0011/TIA-98-E as recommended by “SAR Measurement Procedures for 3G Devices” May 2006. Maximum Output Power is verified on the High, Middle, Low channels according to procedures in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E.
SO55 tests were measured with power control bits in “ ALL Up” condition.

1. If the mobile station supports Reverse TCH RC1 and Forward TCH RC 1, set-up a call using Fundamental Channel Test Mode 1 (RC 1/1) with 9600bps data rate only.
2. Under RC1, C.S0011 Table 4.4.5.2-1, Table 9-1 parameters were applied.
3. If the mobile station supports the RC3 Reverse FCH, RC3 Reverse SCH0 and demodulation of RC3, RC4, RC5, set-up a call using Supplemental Channel Test Mode 3 (RC 3/3) with 9600bps fundamental channel and 9600bps SCH0 data rate.
4. Under RC3 C.S0011 Table 4.4.5.2-2, Table 9-2 was applied.
5. FCHs were configured at full rate for maximum SAR with “ALL-Up” power control bits.

Table 10-1 Test Parameters for Maximum RF Output Power for RC 1

Parameter	Units	Value
$\hat{I}_{or}$	dBm/1.23 MHz	-104
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7.4

Table 10-2 Test Parameters for Maximum RF Output Power for RC 3

Parameter	Units	Value
$\hat{I}_{or}$	dBm/1.23 MHz	-86
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7.4

10.3.2 Head SAR Measurements

SAR for head exposure configurations is measured in RC3 with the EUT configured to transmit at full rate using Loopback Service Option SO55. SAR for RC1 is not required when the maximum average output of each channel is less than 1/4dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel in RC1 using the exposure configuration that results in the highest SAR for that channel in RC3.

10.3.3 Body SAR Measurements

SAR for body exposure configurations is measured in RC3 with the DUT configured using TDSO / SO32, to transmit at full rate on FCH with all other code channels disabled. SAR for multiple code channels (FCH + SCHn) is not required when the maximum average output of each RF channel is less than 1/4dB higher than that measured with FCH only. Otherwise, SAR is measured on the maximum output channel (FCH + SCHn) with FCH at full rate and SCH0 enabled at 9600 bps, using the exposure configuration that results in the highest SAR with FCH only for that channel. When multiple code channels are enabled, the DUT output may shift by more than 0.5 dB and lead to higher SAR drifts and SCH dropouts.
Body SAR in RC1 is not required when the maximum average output of each channel is less than 1/4dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel in RC1; with Loopback Service Option SO55, at full rate, using the body exposure configuration that results in the highest SAR for that channel in RC3.

10.3.4 Handset with EV-DO

For handsets with Ev-Do capabilities, when the maximum average output of each channel in Rev. 0 is less than 1/4 dB higher than that measured in RC3 (1x RTT), body SAR for Ev-Do is not required. Otherwise, SAR for Rev. 0 is measured on the maximum output channel, at 153.6 kbps using the body exposure configuration that results in the highest SAR for that channel in RC3. SAR for Rev. A is not required when the maximum average output of each channel is less than that measured in Rev. 0 or less than 1/4dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel for Rev. A using a Reverse Data Channel payload size of 4096 bits and a Termination Target of 16 slots defined for Subtype 2 Physical Layer configurations. A Forward Traffic Channel data rate corresponding to the 2-slot version of 307.2 kbps with the ACK Channel transmitting in all slots should be configured in the downlink for both Rev. 0 and Rev. A.

10.4 SAR measurement Conditions for 1x Ev-Do Data Devices

The following procedures apply to Access Terminals (AT) operating under CDMA 2000 High Rate packet Data, Rev. 0 and Rev. A, 1x Ev-Do protocols. SAR for body exposure conditions are typically required devices with Ev-Do capabilities, including handsets and data modems operating in various electronic devices. When VOIP is available for Ev-Do devices to operate in configurations next to the ear, head exposure conditions are applicable. The default test configuration is to measure SAR with an established radio link between the AT and a communication test set according to 3GPP2 Test Application Protocols (TAP), FTAP/RTAP for Rev. 0 and FETAP/RETAP for Rev. A. The code channel power levels, RF channel output power (All Bits Up) and other operating parameters should be actively monitored and controlled by the communication test set during the SAR measurement. The use of FTM should be avoided. Maximum output power is verified according to procedures defined in 3GPP2 C.S0033 and TIA-866, and SAR must be measured according to these maximum output conditions.

10.4.1 Output Power Verification

Maximum output power is verified on the High, Middle and Low channels according to procedures in section 3.1.2.3.4 of 3GPP2 C.S0033-0/TIA-866 for Rev. 0 and section 4.3.4 of 3GPP2 C.S0033-A for Rev. A. For Rev. A, maximum output power for both Subtype 0/1 and Subtype 2 Physical Layer configurations should be measured. The device operating configurations under TAP/ETAP should be documented in the test report; including power control, code channel and RF channel output power levels. The measurement results should be tabulated in the SAR report with any measurement difficulties and equipment limitations clearly identified.

10.4.2 SAR Measurements

SAR is measured using FTAP/RTAP and FETAP/RETAP respectively for Rev. 0 and Rev. A devices. The AT is tested with a Reverse Data Channel rate of 153.6 kbps in Subtype 0/1 Physical Layer configurations; and a Reverse Data Channel payload size of 4096 bits and Termination Target of 16 slots in Subtype 2 Physical Layer configurations. Both FTAP and FETAP are configured with a Forward Traffic Channel data rate corresponding to the 2-slot version of 307.2 kbps with the ACK Channel transmitting in all slots. AT power control should be in “All Bits Up” conditions for TAP/ETAP.
Body SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0. SAR for Subtype 2 Physical layer configurations is not required for Rev. A when the maximum average output of each RF channels is less than that measured in Subtype 0/1 Physical layer configurations. Otherwise, SAR is measured on the maximum output channel for Rev. A using the exposure configuration that results in the highest SAR for that RF channels in Rev. 0.
Head SAR is required for Ev-Do devices that support operations next to the ear; for example, with VOIP, using Subtype 2 Physical Layer configurations according to the required handset configurations.

10.4.3 1x RTT Support

For Ev-Do devices that also support 1x RTT voice and/or data operations, SAR is not required for 1x RTT when the maximum average output of each channel is less than 1/4dB higher than that measured in Subtype 0/1 Physical Layer configurations for Rev. 0. Otherwise, the ‘Body SAR Measurements’ procedures in the ‘CDMA 2000 1x Handsets’ section should be applied.

10.4.4 Conducted power

1x RTT Power Measurement

Band	Channel	SO2 (dBm)	SO2 (dBm)	SO2 (dBm)	SO55 (dBm)	SO55 (dBm)	SO9 (dBm)	SO9 (dBm)	SO55 (dBm)	TDSO SO32 FCH Only (dBm)	TDSO SO32 FCH +SCH (dBm)
	F-RC	RC1	RC3	RC4	RC1	RC3	RC2	RC5	RC2	RC3	RC3
	Vocoder Rate	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full
Cellular	1013	23.53	23.50	23.52	23.55	23.50	23.50	23.52	23.51	23.51	23.48
	384	23.50	23.45	23.53	23.58	23.47	23.59	23.51	23.55	23.46	23.51
	777	23.67	23.72	23.58	23.64	23.73	23.57	23.34	23.52	23.78	23.52
PCS	25	23.42	23.32	23.35	23.42	23.35	23.44	23.39	23.43	23.40	23.35
	600	23.35	23.32	23.33	23.47	23.32	23.42	23.47	23.42	23.42	23.42
	1175	23.21	23.20	23.20	23.25	23.24	23.24	23.20	23.25	23.24	23.24

EvDO Rev. 0 Power Measurement

EvDO Rev.0 (dBm) – FTAP Rate = 2Slot Version 307.2 kbps						
Band	RTAP Rate / Channel	9.6 kbps	19.2 kbps	38.4 kbps	76.8 kbps	153.6 kbps
Cellular	1013	23.43	23.43	23.45	23.44	23.49
	384	23.43	23.53	23.50	23.50	23.54
	777	23.72	23.66	23.64	23.61	23.64
PCS	25	23.38	23.41	23.35	23.36	23.40
	600	23.28	23.30	23.38	23.36	23.45
	1175	23.29	23.26	23.19	23.20	23.23

EvDO Rev. A Power Measurement

EvDO Rev.A (dBm) – FETAP Rate = 2Slot Version 307.2 kbps													
Band	RETAP Payload / Channel	128 bits	256 bits	512 bits	768 bits	1024 bits	1536 bits	2048 bits	3072 bits	4096 bits	6144 bits	8192 bits	12288 bits
Cellular	1013	23.62	23.60	23.59	23.50	23.54	23.62	23.58	23.61	23.61	23.54	23.61	23.60
	384	23.55	23.52	23.48	23.47	23.56	23.46	23.51	23.51	23.55	23.53	23.53	23.51
	777	23.62	23.59	23.62	23.60	23.53	23.53	23.52	23.58	23.57	23.51	23.54	23.52
PCS	25	23.60	23.58	23.55	23.55	23.49	23.52	23.38	33.55	23.47	23.41	23.53	23.44
	600	23.46	23.40	23.43	23.38	23.34	23.43	23.46	23.47	23.45	23.48	23.48	23.47
	1175	23.25	23.21	23.25	23.15	23.16	23.25	23.26	23.25	23.17	23.17	23.21	23.12

Note:

For conducted power measurement, connected the EUT to Cell site E5515C directly.
Set the EUT transmit the maximum power at the wanted channel by controlled E5515C.
Using the average power measure function with E5515C, measure the average power

11. SAR Measurement Results

Procedures Used To Establish Test Signal

The device was placed into continuous transmit mode using a base station simulator. Such test signals offer a consistent means for testing SAR and are recommended for evaluating SAR

♦ **Maximum SAR (Cellular)**

Test Position	CH	Frequency (MHz)	SAR Limit (W/kg)	Measured SAR (W/kg)	Result
Horizontal Top	777	848.31	1.6	0.449	Passed

♦ **Maximum SAR (PCS)**

Test Position	CH	Frequency (MHz)	SAR Limit (W/kg)	Measured SAR (W/kg)	Result
Horizontal Bottom	600	1880.00	1.6	0.858	Passed

12. SAR Data Summary (Cellular)

12.1 Test Results

Date of Test : April 05. 2009 ~ April 07. 2009
Mixture Type: 835 MHz body
Tissue Depth: 15.1 Cm

Mode	Channel	Frequency (MHz)	Power drift (dB)	Test Position	1g SAR (W/kg)
Cellular	CH1013	824.70	**0.184**	Horizontal Top	**0.293**
	CH384	836.52	**0.077**	Horizontal Top	**0.343**
	CH777	848.31	**-0.093**	Horizontal Top	**0.449**
	CH1013	824.70	**0.092**	Horizontal Bottom	**0.290**
	CH384	836.52	**-0.120**	Horizontal Bottom	**0.297**
	CH777	848.31	**-0.178**	Horizontal Bottom	**0.387**
	CH1013	824.70	**0.057**	Vertical Left	**0.124**
	CH384	836.52	**-0.107**	Vertical Left	**0.161**
	CH777	848.31	**0.094**	Vertical Left	**0.228**
	CH1013	824.70	**0.088**	Vertical Right	**0.264**
	CH384	836.52	**-0.085**	Vertical Right	**0.250**
	CH777	848.31	**-0.136**	Vertical Right	**0.297**
	CH384	836.52	**0.088**	Vertical Top	**0.130**

Test Results – continued

Mode	Channel	Frequency (MHz)	Power drift (dB)	Test Position	1g SAR (W/kg)
Cellular	CH1013	824.70	**0.066**	Vertical Laptop (Sens X20)	**0.192**
	CH384	836.52	**0.023**	Vertical Laptop (Sens X20)	**0.309**
	CH777	848.31	**0.063**	Vertical Laptop (Sens X20)	**0.293**
	CH1013	824.70	**-0.146**	Horizontal Laptop (Sens R70)	**0.293**
	CH384	836.52	**0.101**	Horizontal Laptop (Sens R70)	**0.403**
	CH777	848.31	**-0.099**	Horizontal Laptop (Sens R70)	**0.447**
	CH1013	824.70	**0.158**	EVDO Horizontal Top	**0.276**
	CH384	836.52	**-0.131**	EVDO Horizontal Top	**0.336**
	CH777	848.31	**-0.131**	EVDO Horizontal Top	**0.446**

Notes:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. SAR Measurement System ■ DASY4
4. Phantom Configuration ☐ Left Head ■ Flat Phantom ☐ Right Head
5. SAR Configuration ☐ Head ■ Body ☐ Hand
6. Test Signal Call Mode ☐ Manu. Test Codes ■ Base Station Simulator

Date/Time: 2009-04-06 PM 5:03:22

Test Laboratory: Nemko Korea File Name: CDU-685 Horizontal Top Position CH1013.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: CDMA Frequency: 824.7 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 824.8 MHz; σ = 0.942 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Horizontal Top Position CH1013/Area Scan (6x9x1): Measurement grid:

dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.277 mW/g

CDU-685 Horizontal Top Position CH1013/Zoom Scan (7x7x7)/Cube 0: Measurement

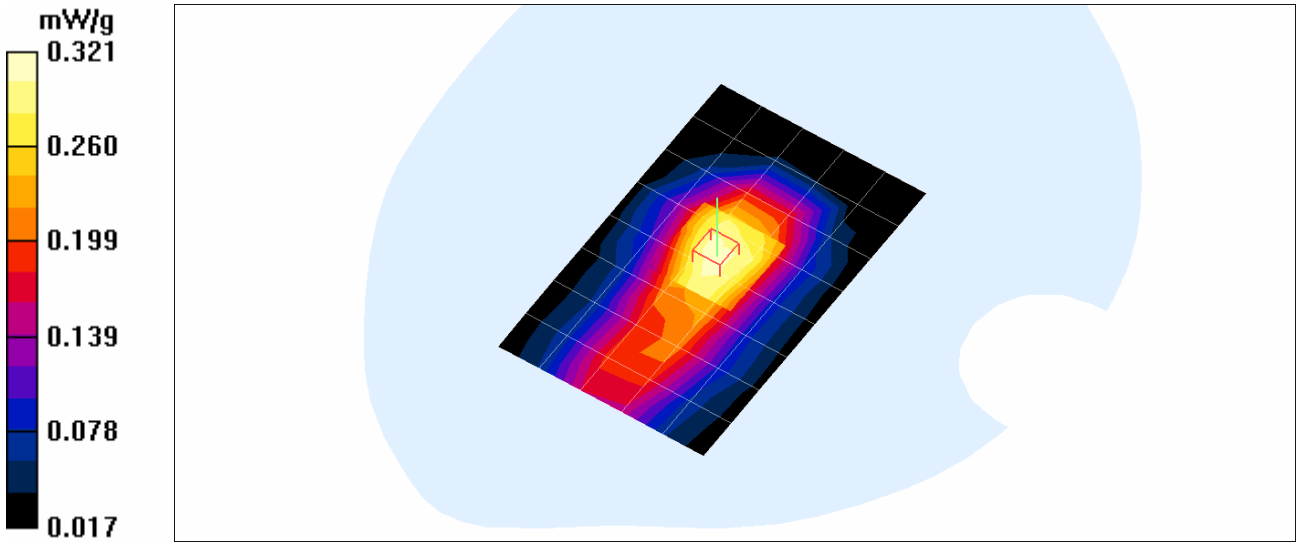
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 15.3 V/m; Power Drift = 0.184 dB

Peak SAR (extrapolated) = 0.468 W/kg

SAR(1 g) = 0.293 mW/g

Maximum value of SAR (measured) = 0.321 mW/g



Date/Time: 2009-04-06 PM 5:37:24

Test Laboratory: Nemko Korea File Name: CDU-685 Horizontal Top Position CH384.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: CDMA Frequency: 836.52 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.951 mho/m; ε_r = 53.7; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Horizontal Top Position CH384/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.373 mW/g

CDU-685 Horizontal Top Position CH384/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

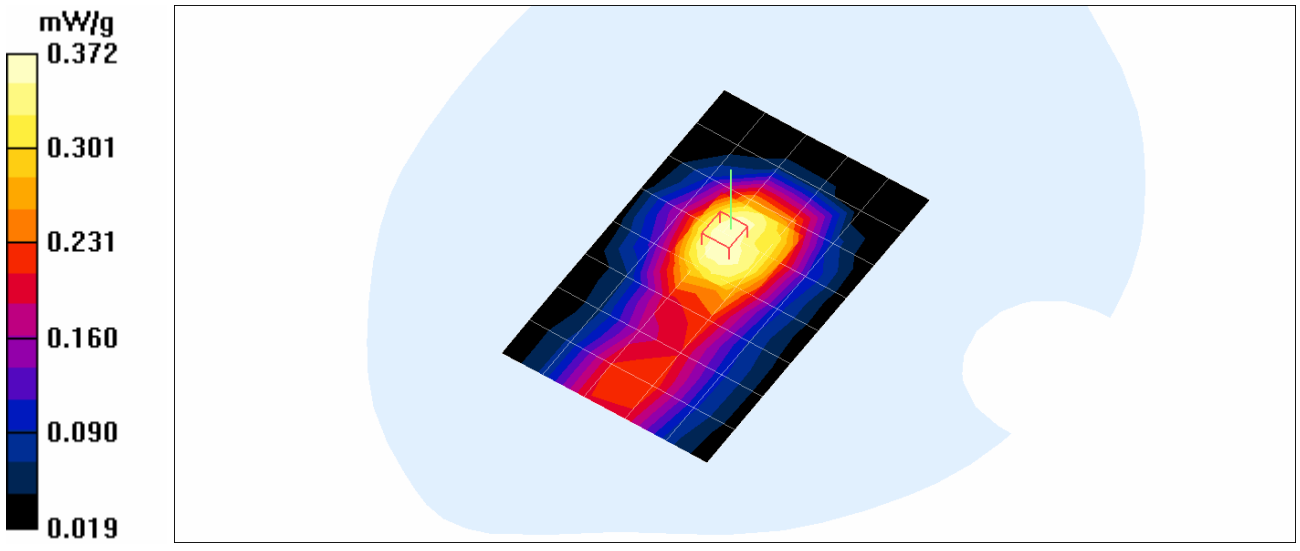
Reference Value = 17.6 V/m; Power Drift = 0.077 dB

Peak SAR (extrapolated) = 0.575 W/kg

SAR(1 g) = 0.343 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.372 mW/g



Date/Time: 2009-04-06 PM 5:55:30

Test Laboratory: Nemko Korea File Name: CDU-685 Horizontal Top Position CH777.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: CDMA Frequency: 848.31 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 848.4 MHz; σ = 0.96 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Horizontal Top Position CH777/Area Scan (6x9x1): Measurement grid:

dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.505 mW/g

CDU-685 Horizontal Top Position CH777/Zoom Scan (7x7x7)/Cube 0: Measurement

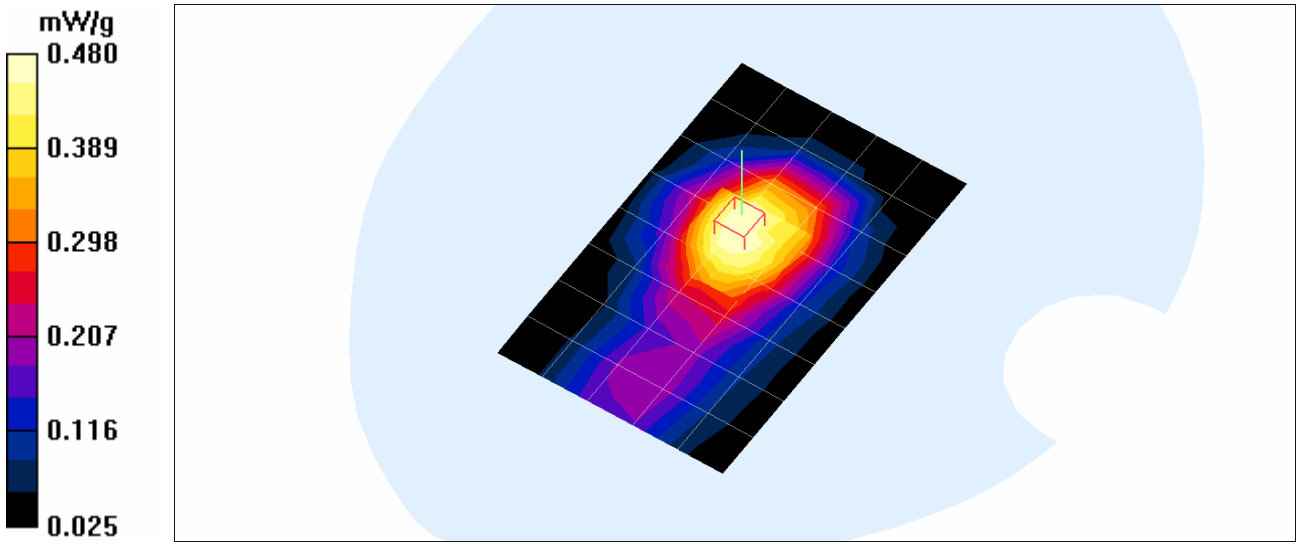
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 20.2 V/m; Power Drift = -0.093 dB

Peak SAR (extrapolated) = 0.754 W/kg

SAR(1 g) = 0.449 mW/g

Maximum value of SAR (measured) = 0.480 mW/g



Date/Time: 2009-04-06 PM 5:55:30

Test Laboratory: Nemko Korea File Name: CDU-685 Horizontal Top Position CH777.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: CDMA Frequency: 848.31 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 848.4 MHz; σ = 0.96 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Horizontal Top Position CH777/Area Scan (6x9x1): Measurement grid:

dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.505 mW/g

CDU-685 Horizontal Top Position CH777/Zoom Scan (7x7x7)/Cube 0: Measurement

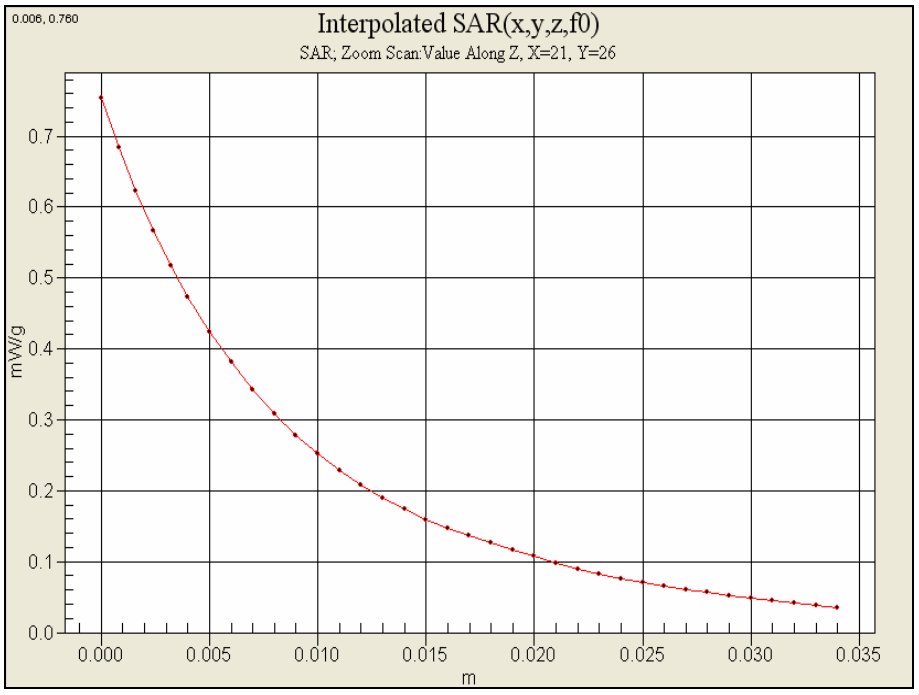
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 20.2 V/m; Power Drift = -0.093 dB

Peak SAR (extrapolated) = 0.754 W/kg

SAR(1 g) = 0.449 mW/g

Maximum value of SAR (measured) = 0.480 mW/g



Date/Time: 2009-04-06 PM 6:53:51

Test Laboratory: Nemko Korea File Name: CDU-685 Horizontal Bottom Position CH1013.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: CDMA Frequency: 824.7 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 824.8 MHz; σ = 0.942 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Horizontal Bottom Position CH1013/Area Scan (6x9x1): Measurement grid:

dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.292 mW/g

CDU-685 Horizontal Bottom Position CH1013/Zoom Scan (7x7x7)/Cube 0:

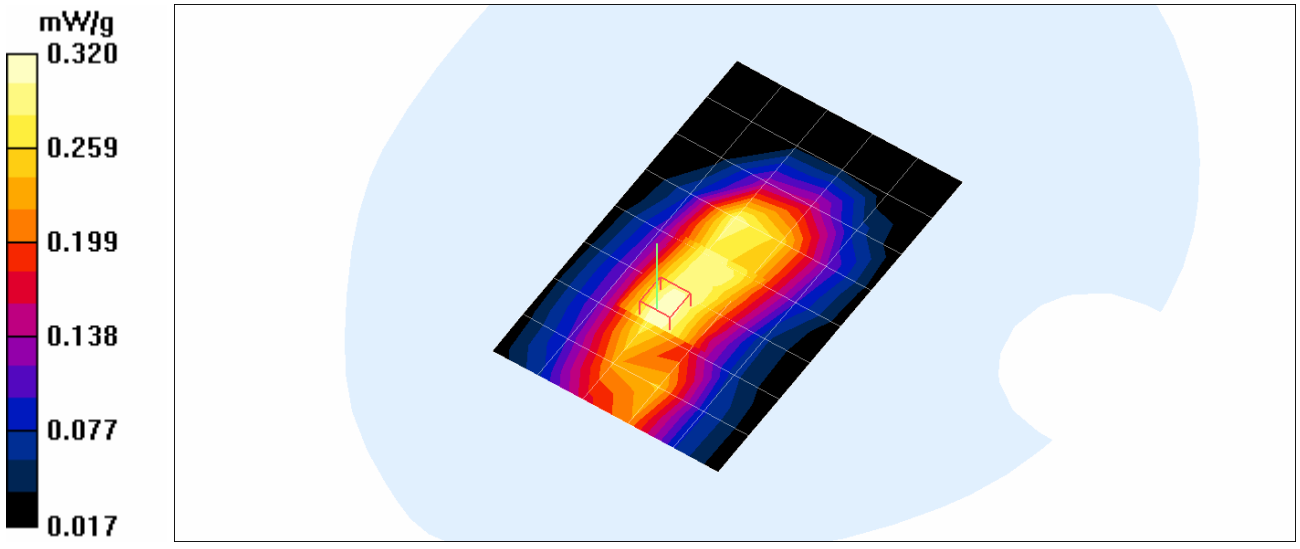
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.6 V/m; Power Drift = 0.092 dB

Peak SAR (extrapolated) = 0.431 W/kg

SAR(1 g) = 0.290 mW/g

Maximum value of SAR (measured) = 0.320 mW/g



Date/Time: 2009-04-06 PM 6:34:16

Test Laboratory: Nemko Korea File Name: CDU-685 Horizontal Bottom Position CH384.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: CDMA Frequency: 836.52 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.951 mho/m; ε_r = 53.7; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Horizontal Bottom Position CH384/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.326 mW/g

CDU-685 Horizontal Bottom Position CH384/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

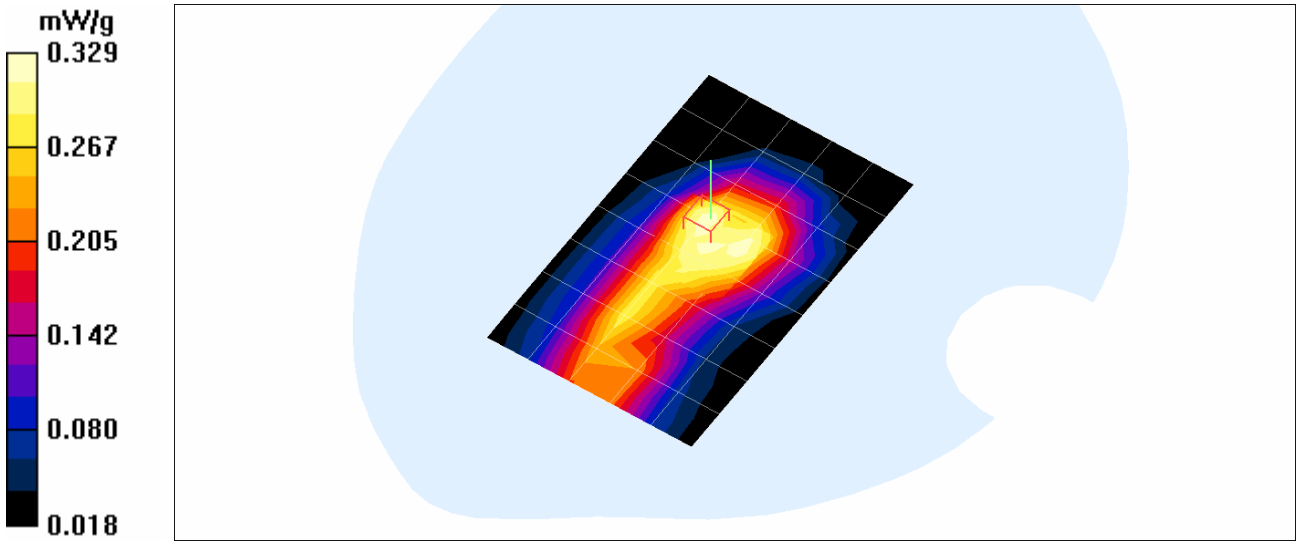
Reference Value = 14.5 V/m; Power Drift = -0.120 dB

Peak SAR (extrapolated) = 0.552 W/kg

SAR(1 g) = 0.297 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.329 mW/g



Date/Time: 2009-04-06 PM 6:15:48

Test Laboratory: Nemko Korea File Name: CDU-685 Horizontal Bottom Position CH777.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: CDMA Frequency: 848.31 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 848.4 MHz; σ = 0.96 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Horizontal Bottom Position CH777/Area Scan (6x9x1): Measurement grid:

dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.413 mW/g

CDU-685 Horizontal Bottom Position CH777/Zoom Scan (7x7x7)/Cube 0:

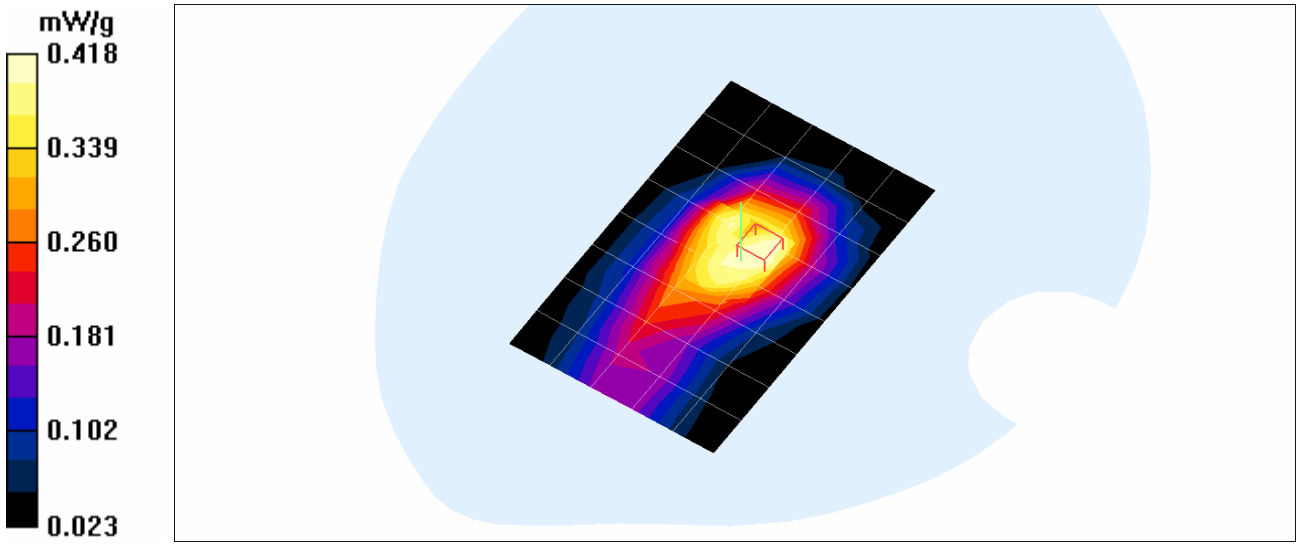
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 16.0 V/m; Power Drift = -0.178 dB

Peak SAR (extrapolated) = 0.729 W/kg

SAR(1 g) = 0.387 mW/g

Maximum value of SAR (measured) = 0.418 mW/g



Date/Time: 2009-04-06 PM 9:57:29

Test Laboratory: Nemko Korea File Name: CDU-685 Vertical Left side Position CH1013.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: CDMA Frequency: 824.7 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 824.8 MHz; σ = 0.942 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Vertical Left side Position CH1013/Area Scan (6x9x1): Measurement grid:

dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.120 mW/g

CDU-685 Vertical Left side Position CH1013/Zoom Scan (7x7x7)/Cube 0:

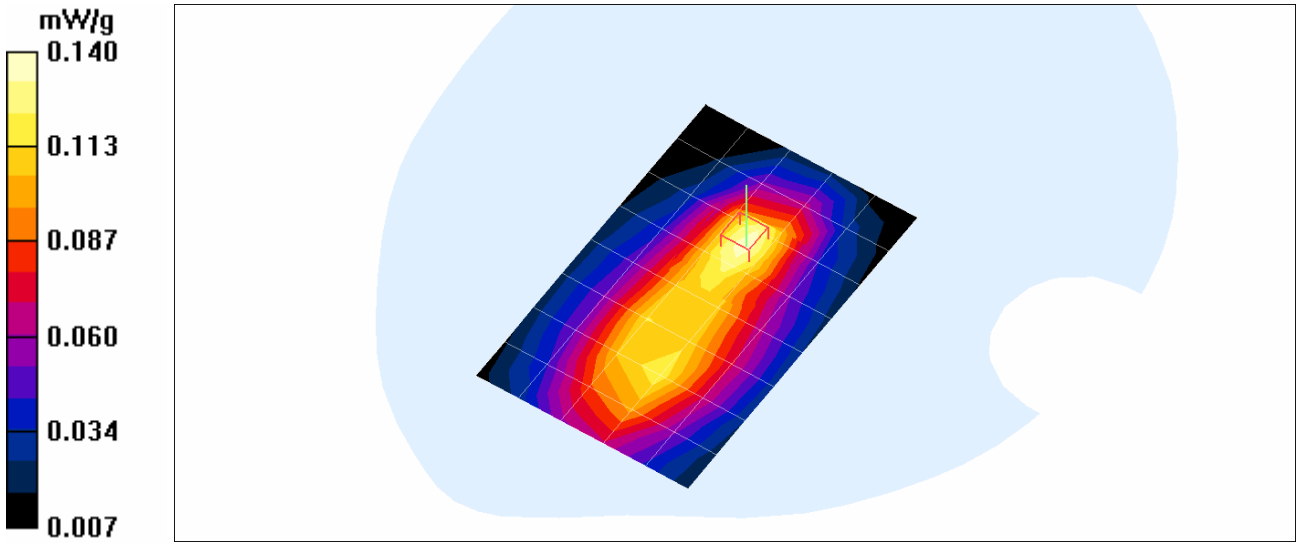
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.42 V/m; Power Drift = 0.057 dB

Peak SAR (extrapolated) = 0.213 W/kg

SAR(1 g) = 0.124 mW/g

Maximum value of SAR (measured) = 0.140 mW/g



Date/Time: 2009-04-06 PM 10:13:44

Test Laboratory: Nemko Korea File Name: CDU-685 Vertical Left side Position CH384.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: CDMA Frequency: 836.52 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.951 mho/m; ε_r = 53.7; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Vertical Left side Position CH384/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.144 mW/g

CDU-685 Vertical Left side Position CH384/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

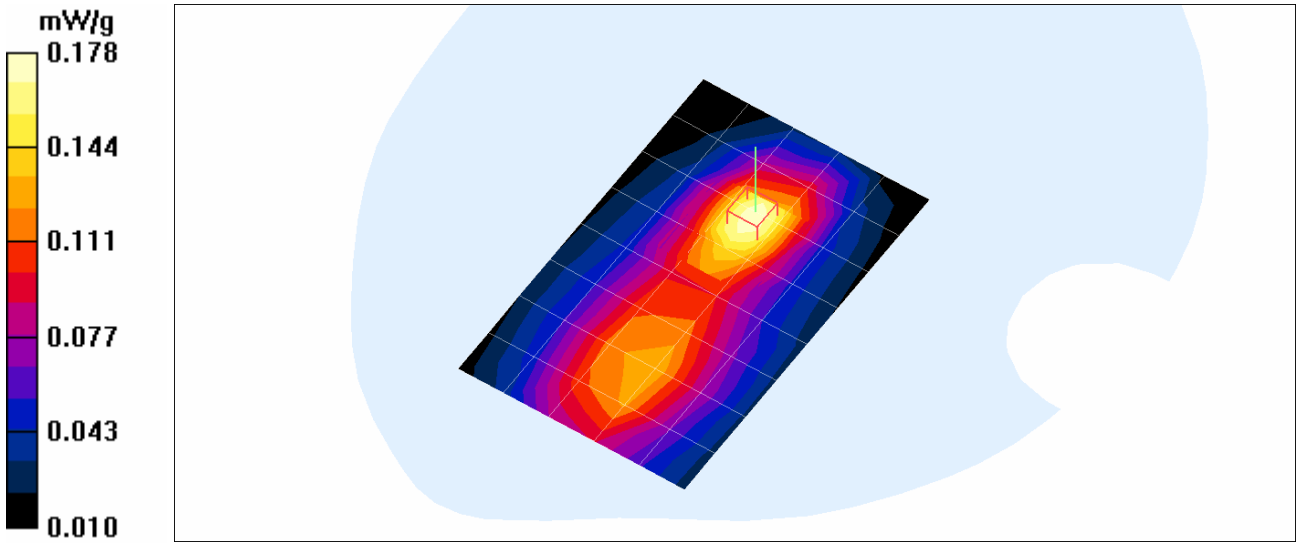
Reference Value = 9.08 V/m; Power Drift = -0.107 dB

Peak SAR (extrapolated) = 0.269 W/kg

SAR(1 g) = 0.161 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.178 mW/g



Date/Time: 2009-04-06 PM 10:31:38

Test Laboratory: Nemko Korea File Name: CDU-685 Vertical Left side Position CH777.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: CDMA Frequency: 848.31 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 848.4 MHz; σ = 0.96 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Vertical Left side Position CH777/Area Scan (6x9x1): Measurement grid:

dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.206 mW/g

CDU-685 Vertical Left side Position CH777/Zoom Scan (7x7x7)/Cube 0:

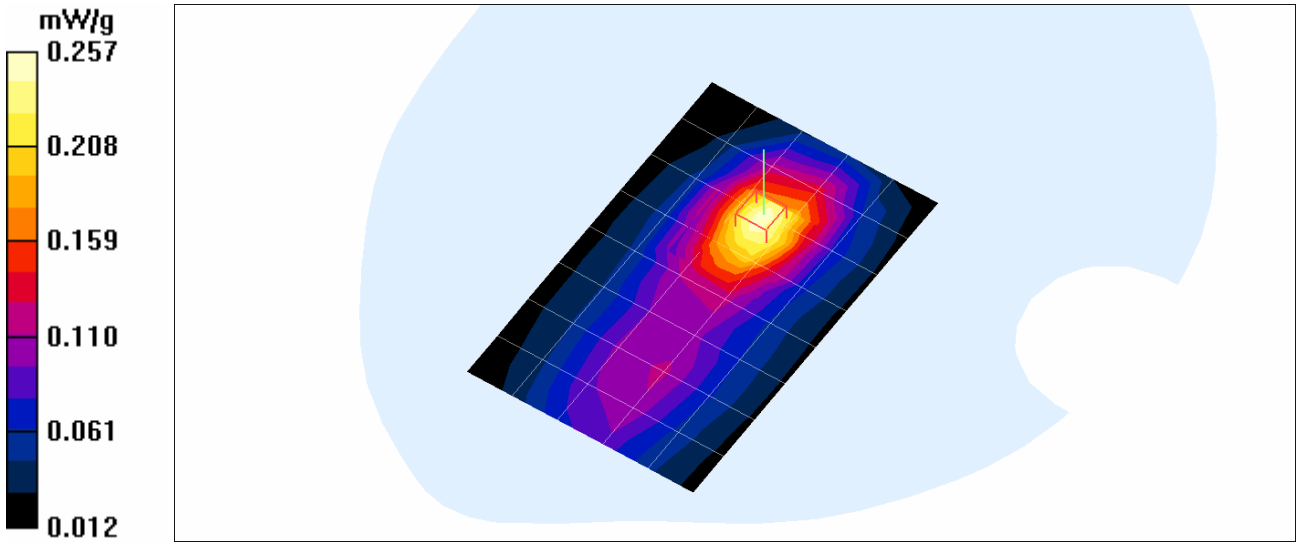
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.7 V/m; Power Drift = 0.094 dB

Peak SAR (extrapolated) = 0.379 W/kg

SAR(1 g) = 0.228 mW/g

Maximum value of SAR (measured) = 0.257 mW/g



Date/Time: 2009-04-06 PM 11:46:59

Test Laboratory: Nemko Korea File Name: CDU-685 Vertical Right side Position CH1013.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: CDMA Frequency: 824.7 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 824.8 MHz; σ = 0.942 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Vertical Right side Position CH1013/Area Scan (6x9x1): Measurement grid:

dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.230 mW/g

CDU-685 Vertical Right side Position CH1013/Zoom Scan (7x7x7)/Cube 0:

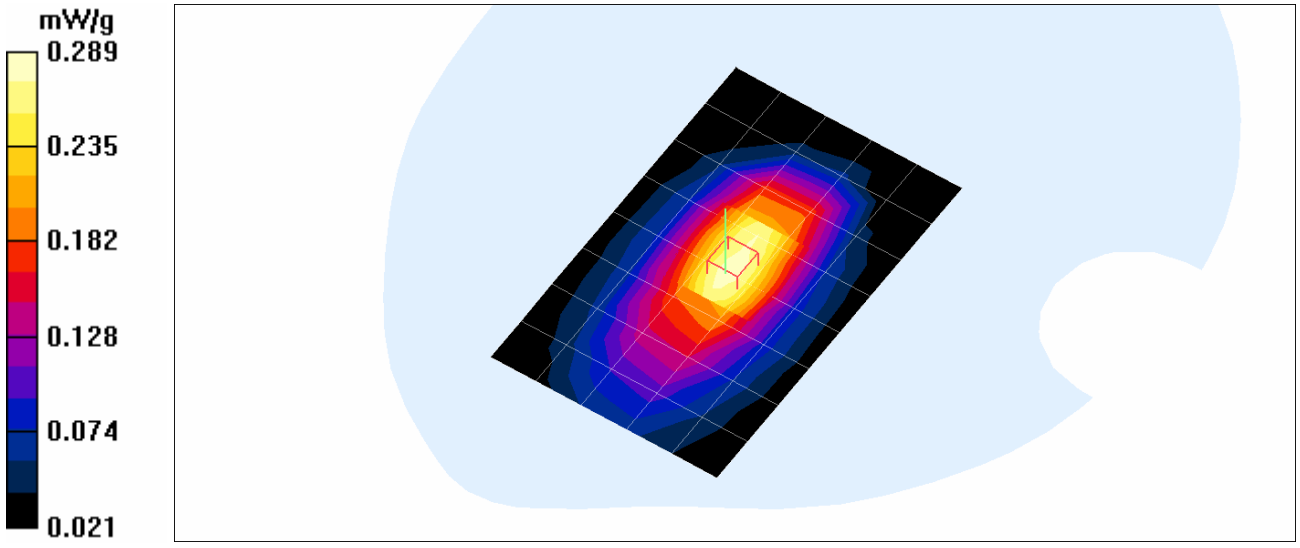
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.96 V/m; Power Drift = 0.088 dB

Peak SAR (extrapolated) = 0.416 W/kg

SAR(1 g) = 0.264 mW/g

Maximum value of SAR (measured) = 0.289 mW/g



Date/Time: 2009-04-06 PM 11:11:54

Test Laboratory: Nemko Korea File Name: CDU-685 Vertical Right side Position CH384.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: CDMA Frequency: 836.52 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.951 mho/m; ε_r = 53.7; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Vertical Right side Position CH384/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.232 mW/g

CDU-685 Vertical Right side Position CH384/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

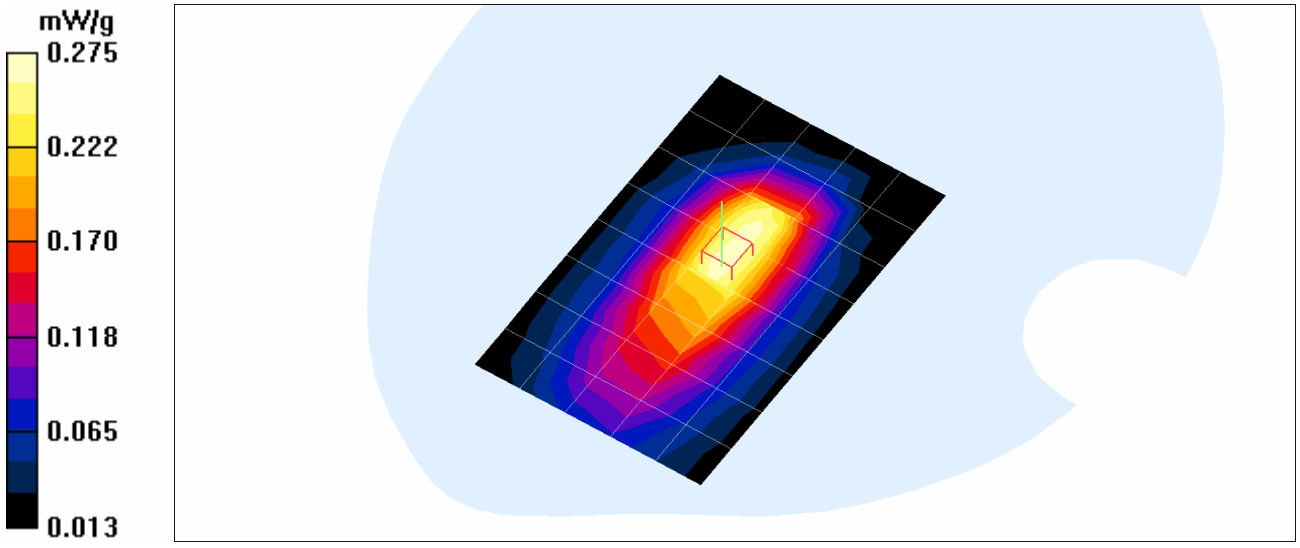
Reference Value = 6.51 V/m; Power Drift = -0.085 dB

Peak SAR (extrapolated) = 0.372 W/kg

SAR(1 g) = 0.250 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.275 mW/g



Date/Time: 2009-04-06 PM 10:52:45

Test Laboratory: Nemko Korea File Name: CDU-685 Vertical Right side Position CH777.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: CDMA Frequency: 848.31 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 848.4 MHz; σ = 0.96 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Vertical Right side Position CH777/Area Scan (6x9x1): Measurement grid:

dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.285 mW/g

CDU-685 Vertical Right side Position CH777/Zoom Scan (7x7x7)/Cube 0:

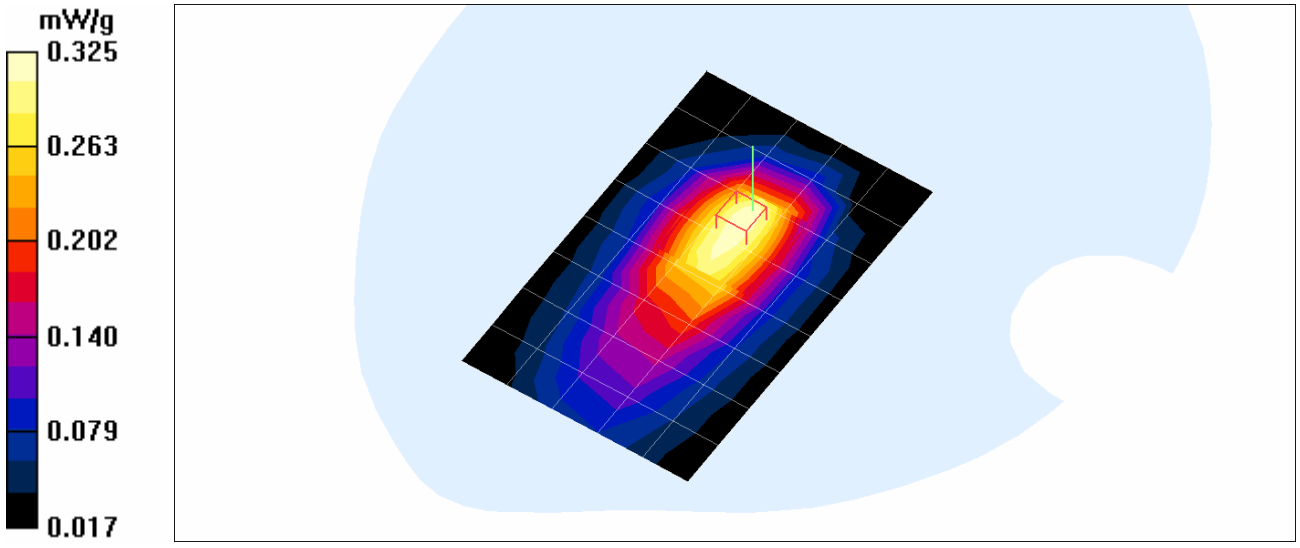
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.48 V/m; Power Drift = -0.136 dB

Peak SAR (extrapolated) = 0.470 W/kg

SAR(1 g) = 0.297 mW/g

Maximum value of SAR (measured) = 0.325 mW/g



Date/Time: 2009-04-07 PM 12:32:21

Test Laboratory: Nemko Korea File Name: CDU-685 Vertical Top side Position CH384.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: CDMA Frequency: 836.52 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.951 mho/m; ε_r = 53.7; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Vertical Top side Position CH384/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.121 mW/g

CDU-685 Vertical Top side Position CH384/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

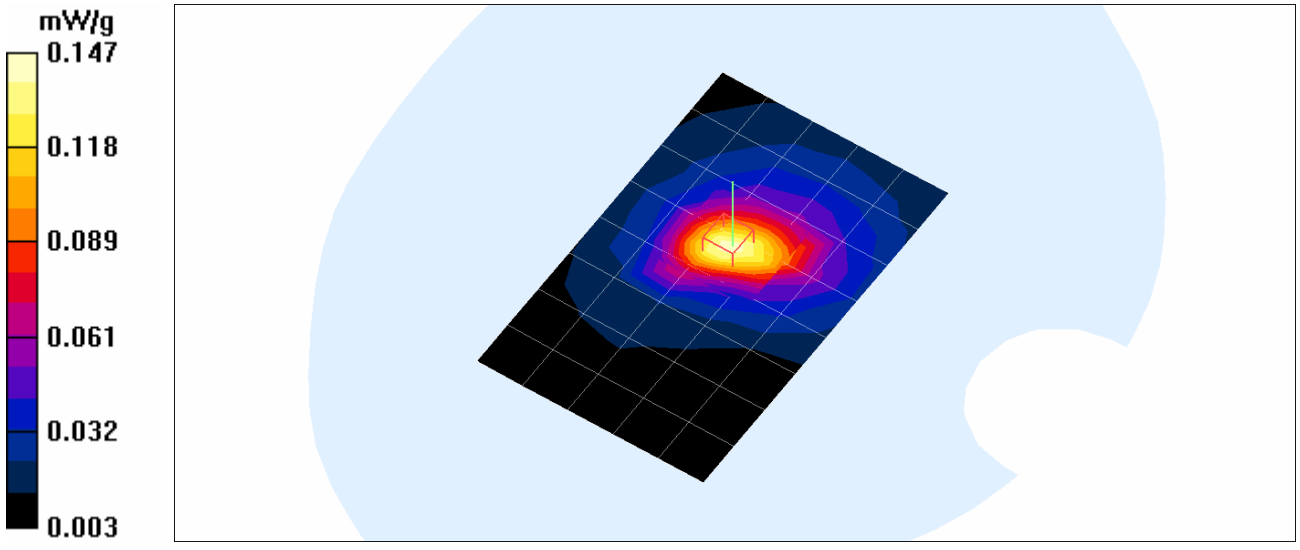
Reference Value = 10.3 V/m; Power Drift = 0.088 dB

Peak SAR (extrapolated) = 0.294 W/kg

SAR(1 g) = 0.130 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.147 mW/g



Date/Time: 2009-04-07 AM 11:12:31

Test Laboratory: Nemko Korea File Name: CDU-685 Samsung SENS X20 Vertical Type USB Slot CH1013.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: CDMA Frequency: 824.7 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 824.8 MHz; σ = 0.942 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Samsung SENS X20 Vertical Type USB Slot CH1013/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.172 mW/g

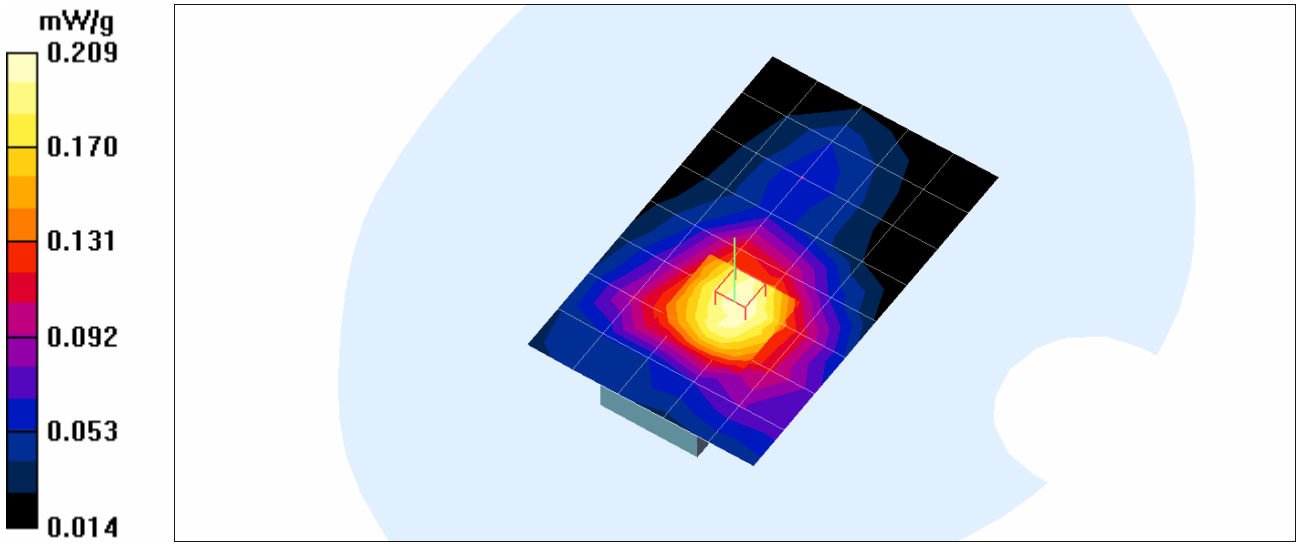
CDU-685 Samsung SENS X20 Vertical Type USB Slot CH1013/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.49 V/m; Power Drift = 0.066 dB

Peak SAR (extrapolated) = 0.293 W/kg

SAR(1 g) = 0.192 mW/g

Maximum value of SAR (measured) = 0.209 mW/g



Date/Time: 2009-04-07 AM 10:54:01

Test Laboratory: Nemko Korea File Name: CDU-685 Samsung SENS X20 Vertical Type USB Slot CH384.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: CDMA Frequency: 836.52 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.953 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Samsung SENS X20 Vertical Type USB Slot CH384/Area Scan (6x9x1):

Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.321 mW/g

CDU-685 Samsung SENS X20 Vertical Type USB Slot CH384/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

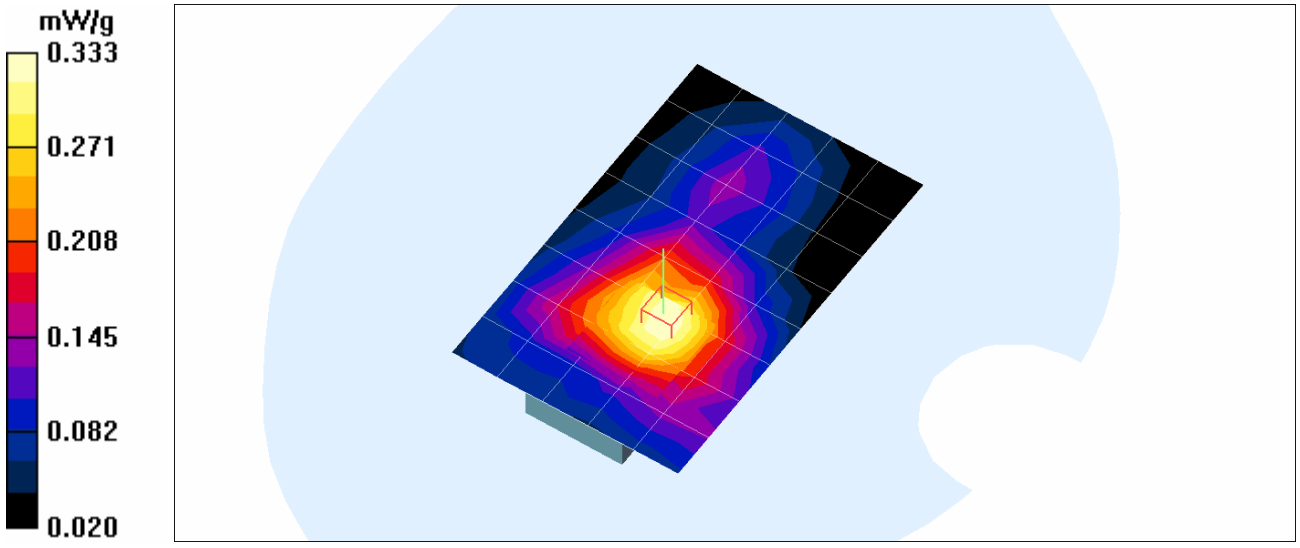
Reference Value = 12.2 V/m; Power Drift = 0.023 dB

Peak SAR (extrapolated) = 0.469 W/kg

SAR(1 g) = 0.309 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.333 mW/g



Date/Time: 2009-04-07 AM 11:46:44

Test Laboratory: Nemko Korea File Name: CDU-685 Samsung SENS X20 Vertical Type USB Slot CH777.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: CDMA Frequency: 848.31 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 848.4 MHz; σ = 0.967 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Samsung SENS X20 Vertical Type USB Slot CH777/Area Scan (6x9x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.309 mW/g

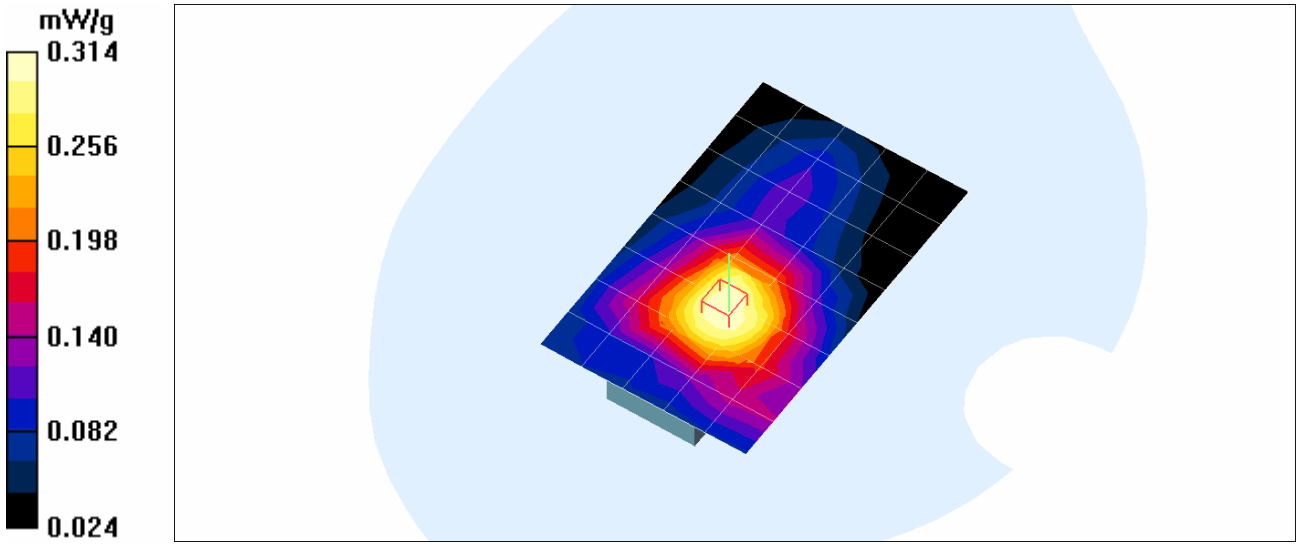
CDU-685 Samsung SENS X20 Vertical Type USB Slot CH777/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.1 V/m; Power Drift = 0.063 dB

Peak SAR (extrapolated) = 0.412 W/kg

SAR(1 g) = 0.293 mW/g

Maximum value of SAR (measured) = 0.314 mW/g



Date/Time: 2009-04-07 PM 1:47:45

Test Laboratory: Nemko Korea File Name: CDU-685 Samsung SENS R70 Horizontal Type USB Slot CH1013.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: CDMA Frequency: 824.7 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 824.8 MHz; σ = 0.942 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Samsung SENS R70 Horizontal Type USB Slot CH1013/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.310 mW/g

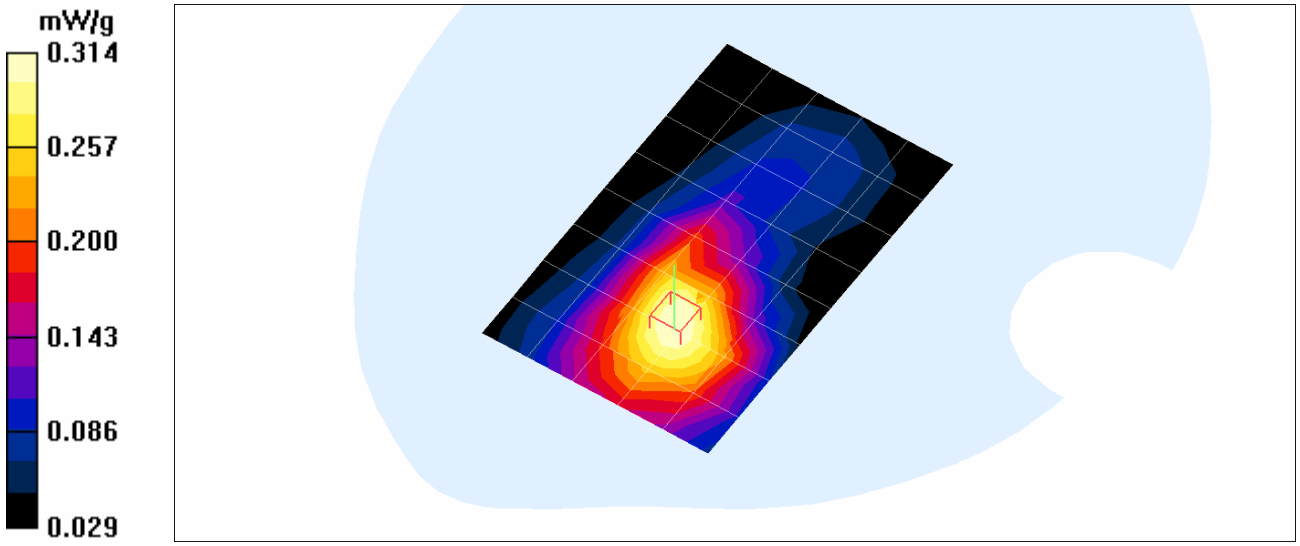
CDU-685 Samsung SENS R70 Horizontal Type USB Slot CH1013/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.91 V/m; Power Drift = -0.146 dB

Peak SAR (extrapolated) = 0.427 W/kg

SAR(1 g) = 0.293 mW/g

Maximum value of SAR (measured) = 0.314 mW/g



Date/Time: 2009-04-07 PM 1:30:44

Test Laboratory: Nemko Korea File Name: CDU-685 Samsung SENS R70 Horizontal Type USB Slot CH384.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: CDMA Frequency: 836.52 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.953 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Samsung SENS R70 Horizontal Type USB Slot CH384/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.467 mW/g

CDU-685 Samsung SENS R70 Horizontal Type USB Slot CH384/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

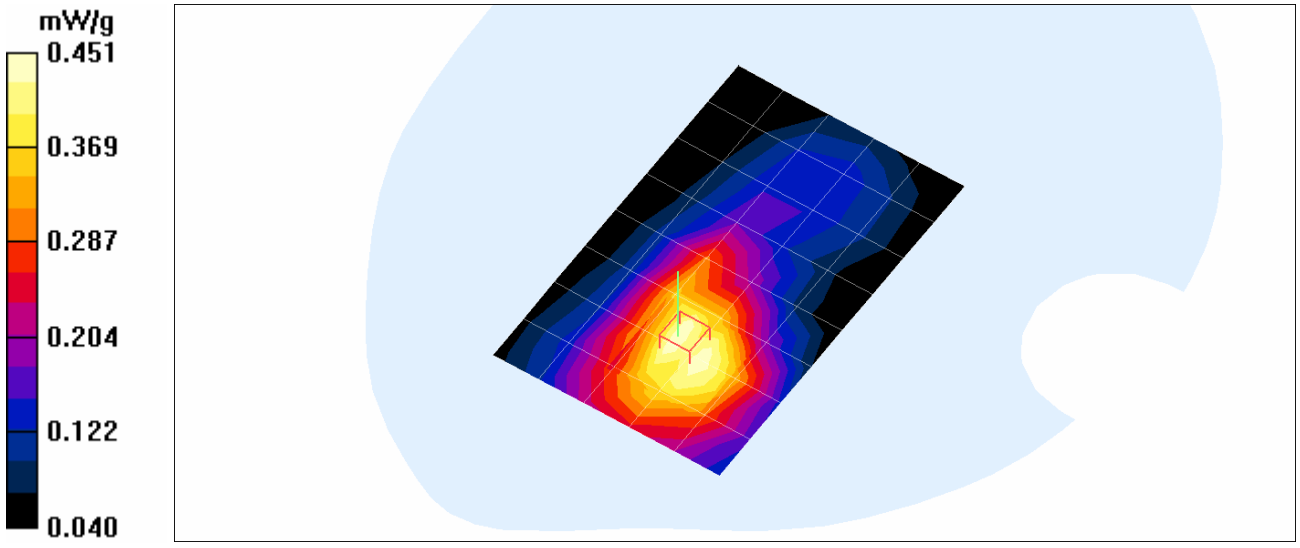
Reference Value = 12.6 V/m; Power Drift = 0.101 dB

Peak SAR (extrapolated) = 0.610 W/kg

SAR(1 g) = 0.403 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.451 mW/g



Date/Time: 2009-04-07 PM 1:13:43

Test Laboratory: Nemko Korea File Name: CDU-685 Samsung SENS R70 Horizontal Type USB Slot CH777.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: CDMA Frequency: 848.31 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 848.4 MHz; σ = 0.967 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Samsung SENS R70 Horizontal Type USB Slot CH777/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.485 mW/g

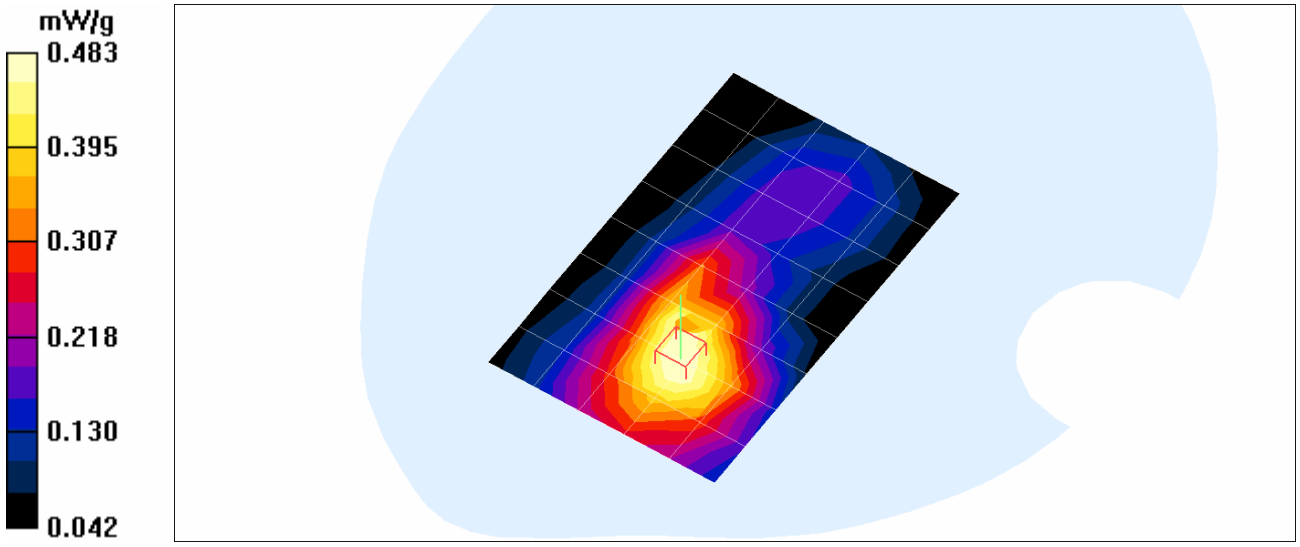
CDU-685 Samsung SENS R70 Horizontal Type USB Slot CH777/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 13.8 V/m; Power Drift = -0.099 dB

Peak SAR (extrapolated) = 0.635 W/kg

SAR(1 g) = 0.447 mW/g

Maximum value of SAR (measured) = 0.483 mW/g



Date/Time: 2009-04-07 PM 3:12:12

Test Laboratory: Nemko Korea File Name: CDU-685 Horizontal Top Position EV-DO CH1013.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: CDMA Frequency: 824.7 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 824.8 MHz; σ = 0.942 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Horizontal Top Position EV-DO CH1013/Area Scan (6x9x1): Measurement

grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.280 mW/g

CDU-685 Horizontal Top Position EV-DO CH1013/Zoom Scan (7x7x7)/Cube 0:

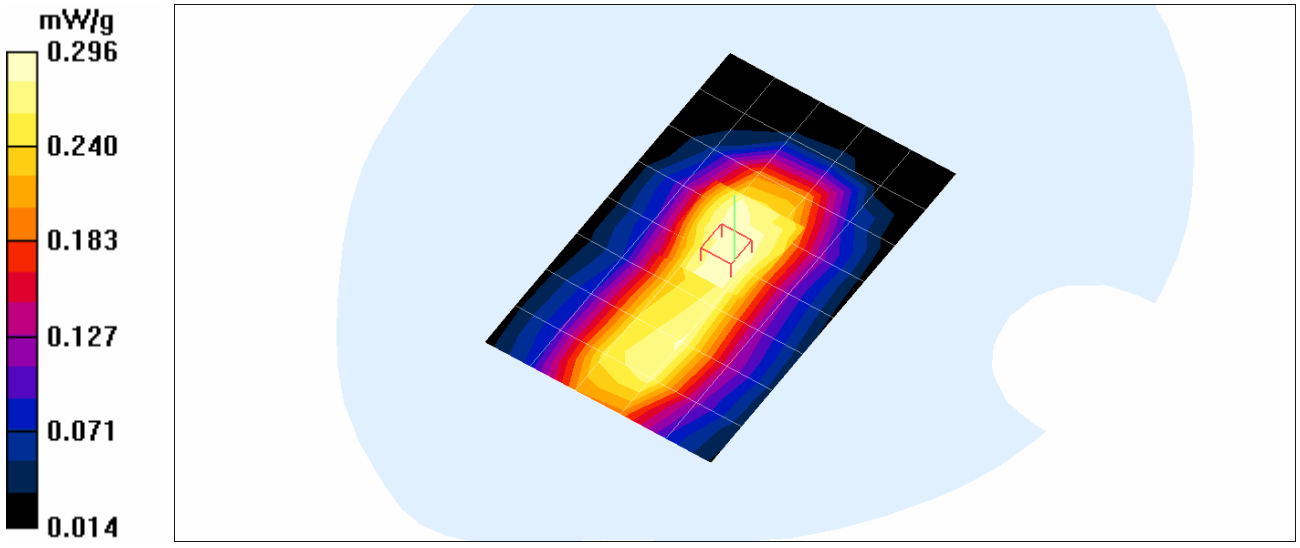
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 15.0 V/m; Power Drift = 0.158 dB

Peak SAR (extrapolated) = 0.436 W/kg

SAR(1 g) = 0.276 mW/g

Maximum value of SAR (measured) = 0.296 mW/g



Date/Time: 2009-04-07 PM 2:55:03

Test Laboratory: Nemko Korea File Name: CDU-685 Horizontal Top Position EV-DO CH384.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: CDMA Frequency: 836.52 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.953 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Horizontal Top Position EV-DO CH384/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.364 mW/g

CDU-685 Horizontal Top Position EV-DO CH384/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

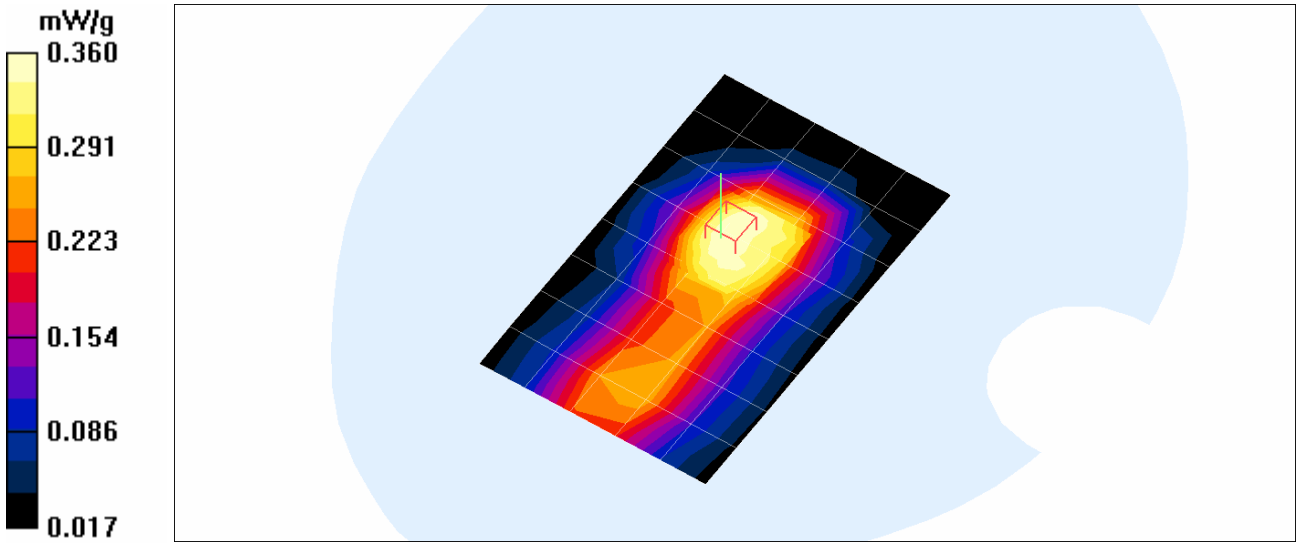
Reference Value = 17.9 V/m; Power Drift = -0.131 dB

Peak SAR (extrapolated) = 0.571 W/kg

SAR(1 g) = 0.336 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.360 mW/g



Date/Time: 2009-04-07 PM 2:36:05

Test Laboratory: Nemko Korea File Name: CDU-685 Horizontal Top Position EV-DO CH777.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: CDMA Frequency: 848.31 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 848.4 MHz; σ = 0.967 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV2 - SN3020; ConvF(6.21, 6.21, 6.21); Calibrated: 2008-07-21

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Horizontal Top Position EV-DO CH777/Area Scan (6x9x1): Measurement

grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.477 mW/g

CDU-685 Horizontal Top Position EV-DO CH777/Zoom Scan (7x7x7)/Cube 0:

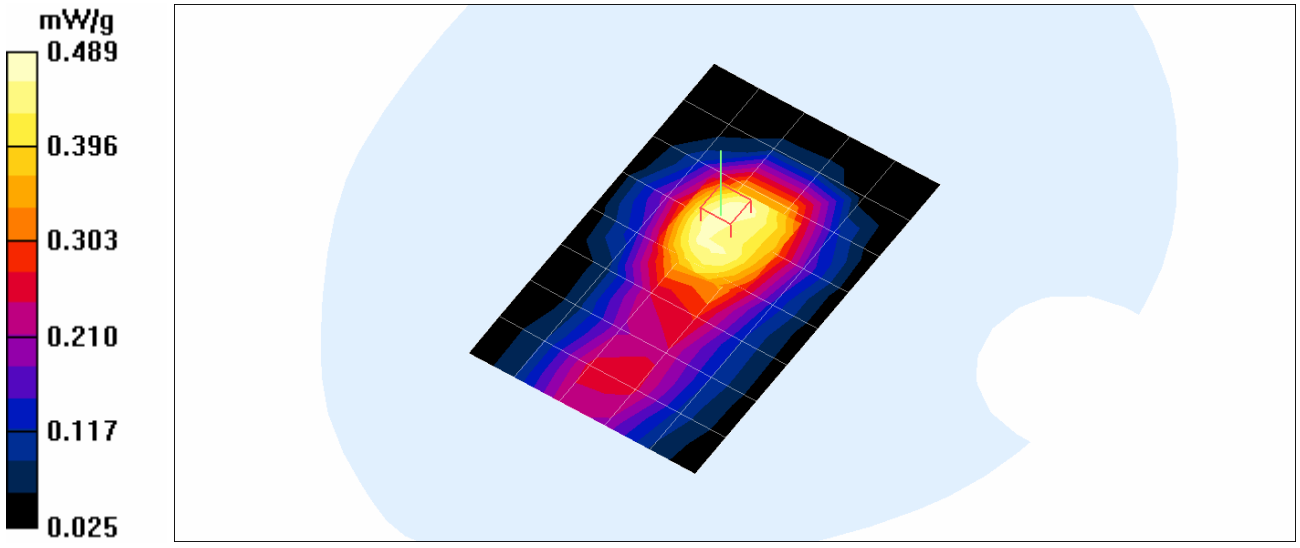
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 20.8 V/m; Power Drift = -0.131 dB

Peak SAR (extrapolated) = 0.781 W/kg

SAR(1 g) = 0.446 mW/g

Maximum value of SAR (measured) = 0.489 mW/g



13. SAR Data Summary (PCS)

13.1 Test Results

Date of Test : April 07. 2009 ~ April 09. 2009
Mixture Type: 1900 MHz body
Tissue Depth: 15.2 Cm

Mode	Channel	Frequency (MHz)	Power drift (dB)	Test Position	1g SAR (W/kg)
PCS	CH25	1851.25	**-0.151**	Horizontal Top	**0.701**
	CH600	1880.00	**-0.165**	Horizontal Top	**0.840**
	CH1175	1908.75	**-0.159**	Horizontal Top	**0.633**
	CH25	1851.25	**-0.114**	Horizontal Bottom	**0.665**
	CH600	1880.00	**0.077**	Horizontal Bottom	**0.858**
	CH1175	1908.75	**0.187**	Horizontal Bottom	**0.640**
	CH25	1851.25	**0.039**	Vertical Left	**0.433**
	CH600	1880.00	**0.143**	Vertical Left	**0.547**
	CH1175	1908.75	**0.018**	Vertical Left	**0.514**
	CH25	1851.25	**-0.062**	Vertical Right	**0.370**
	CH600	1880.00	**0.108**	Vertical Right	**0.423**
	CH1175	1908.75	**-0.120**	Vertical Right	**0.306**
	CH600	1880.00	**-0.201**	Vertical Top	**0.132**

Test Results – continued

Mode	Channel	Frequency (MHz)	Power drift (dB)	Test Position	1g SAR (W/kg)
PCS	CH25	1851.25	**0.206**	Vertical Laptop (Sens X20)	**0.552**
	CH600	1880.00	**-0.037**	Vertical Laptop (Sens X20)	**0.592**
	CH1175	1908.75	**-0.073**	Vertical Laptop (Sens X20)	**0.505**
	CH25	1851.25	**0.186**	Horizontal Laptop (Sens R70)	**0.395**
	CH600	1880.00	**-0.182**	Horizontal Laptop (Sens R70)	**0.443**
	CH1175	1908.75	**-0.061**	Horizontal Laptop (Sens R70)	**0.322**
	CH25	1851.25	**-0.133**	EVDO Horizontal Bottom	**0.664**
	CH600	1880.00	**-0.136**	EVDO Horizontal Bottom	**0.822**
	CH1175	1908.75	**-0.003**	EVDO Horizontal Bottom	**0.613**

Notes:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. SAR Measurement System ■ DASY4
4. Phantom Configuration ☐ Left Head ■ Flat Phantom ☐ Right Head
5. SAR Configuration ☐ Head ■ Body ☐ Hand
6. Test Signal Call Mode ☐ Manu. Test Codes ■ Base Station Simulator

Date/Time: 2009-04-09 PM 5:12:39

Test Laboratory: Nemko Korea File Name: CDU-685 Horizontal Top Position CH25.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: PCS Frequency: 1851.25 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 1851.25 MHz; σ = 1.48 mho/m; ε_r = 55.3; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Horizontal Top Position CH25/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.740 mW/g

CDU-685 Horizontal Top Position CH25/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

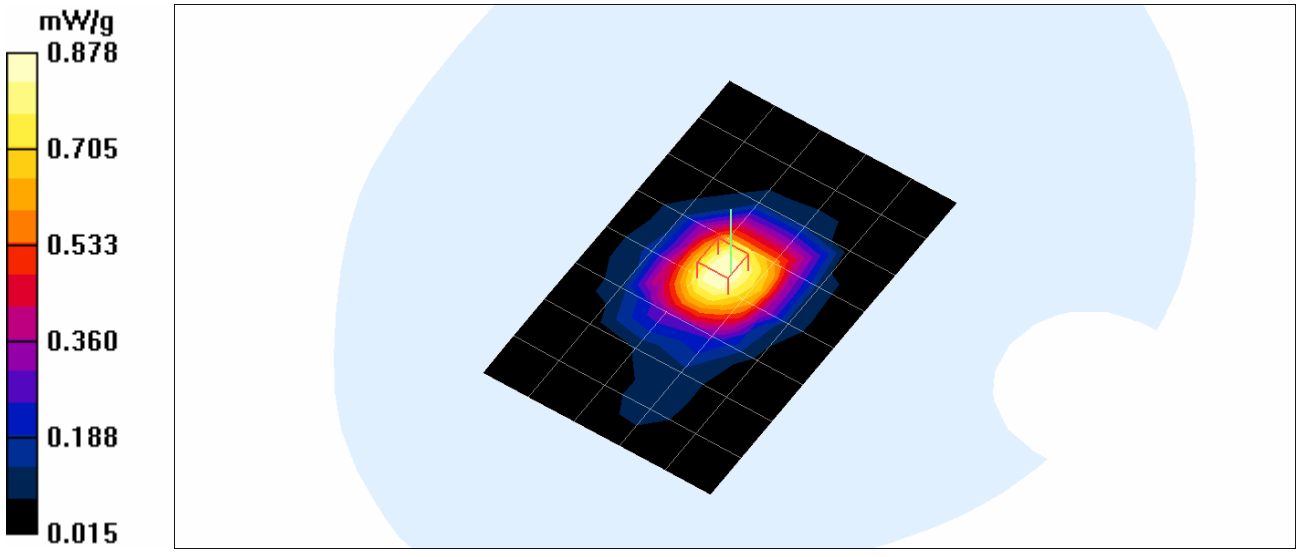
Reference Value = 11.0 V/m; Power Drift = -0.151 dB

Peak SAR (extrapolated) = 1.17 W/kg

SAR(1 g) = 0.701 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.878 mW/g



Date/Time: 2009-04-09 PM 4:32:18

Test Laboratory: Nemko Korea File Name: CDU-685 Horizontal Top Position CH600.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: PCS Frequency: 1880 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Horizontal Top Position CH600/Area Scan (6x9x1): Measurement grid:

dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.788 mW/g

CDU-685 Horizontal Top Position CH600/Zoom Scan (7x7x7)/Cube 0: Measurement

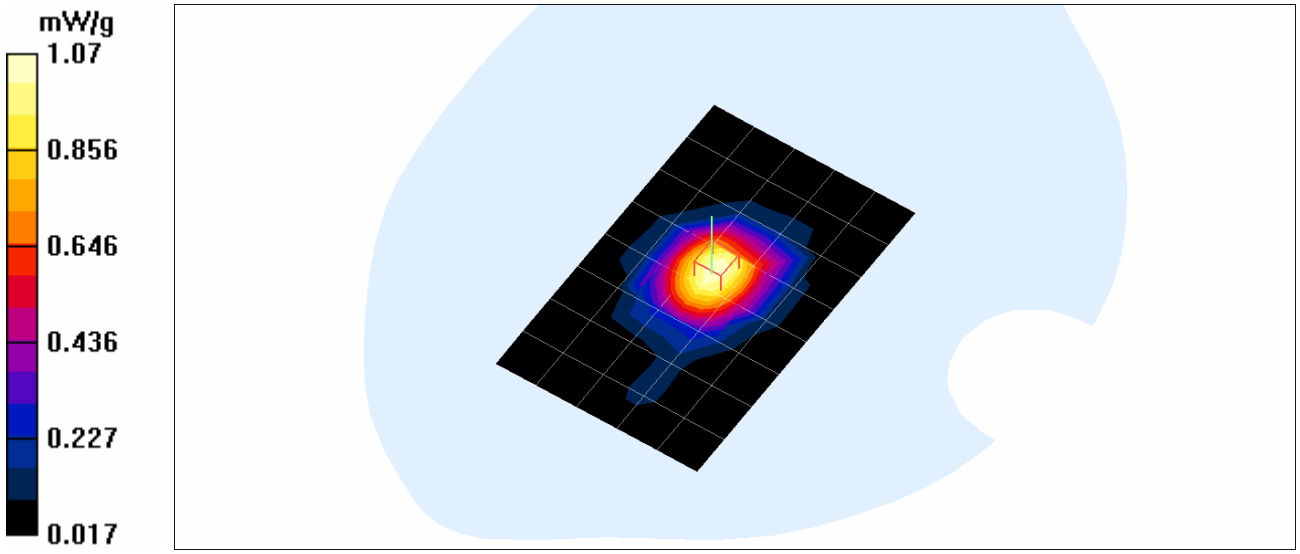
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.5 V/m; Power Drift = -0.165 dB

Peak SAR (extrapolated) = 1.36 W/kg

SAR(1 g) = 0.840 mW/g

Maximum value of SAR (measured) = 1.07 mW/g



Date/Time: 2009-04-09 6:18:07

Test Laboratory: Nemko Korea File Name: CDU-685 Horizontal Top Position CH1175.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: PCS Frequency: 1908.75 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 1908.75 MHz; σ = 1.54 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Horizontal Top Position CH1175/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.642 mW/g

CDU-685 Horizontal Top Position CH1175/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

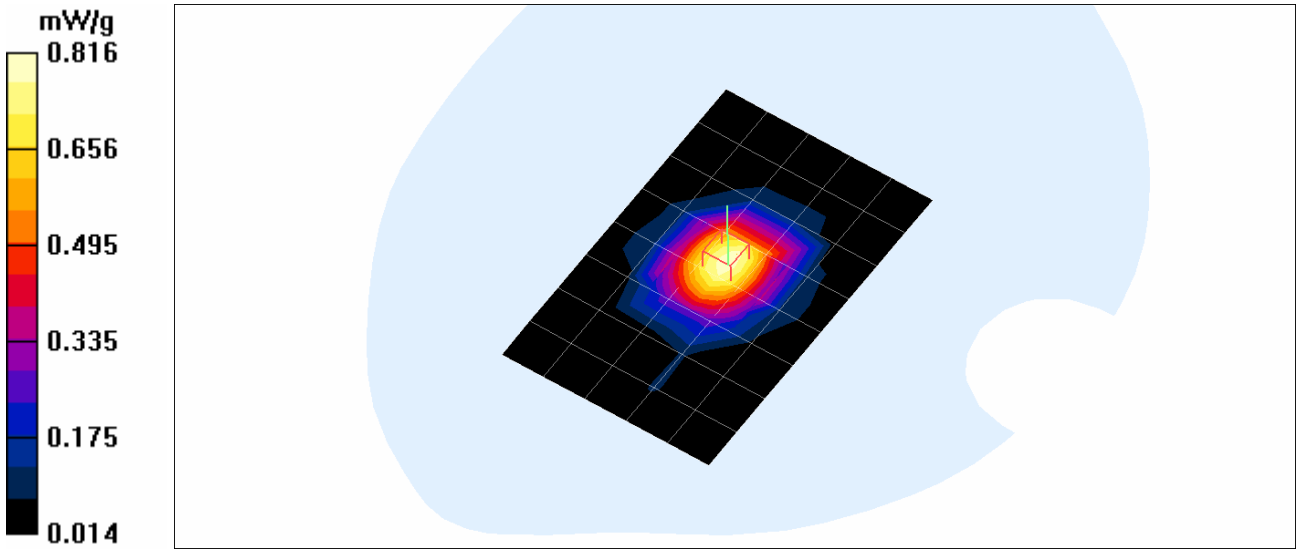
Reference Value = 10.5 V/m; Power Drift = -0.159 dB

Peak SAR (extrapolated) = 1.04 W/kg

SAR(1 g) = 0.633 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.816 mW/g



Date/Time: 2009-04-09 PM 8:27:34

Test Laboratory: Nemko Korea File Name: CDU-685 Horizontal Bottom Position CH25.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: PCS Frequency: 1851.25 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 1851.25 MHz; σ = 1.48 mho/m; ε_r = 55.3; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Horizontal Bottom Position CH25/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.671 mW/g

CDU-685 Horizontal Bottom Position CH25/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

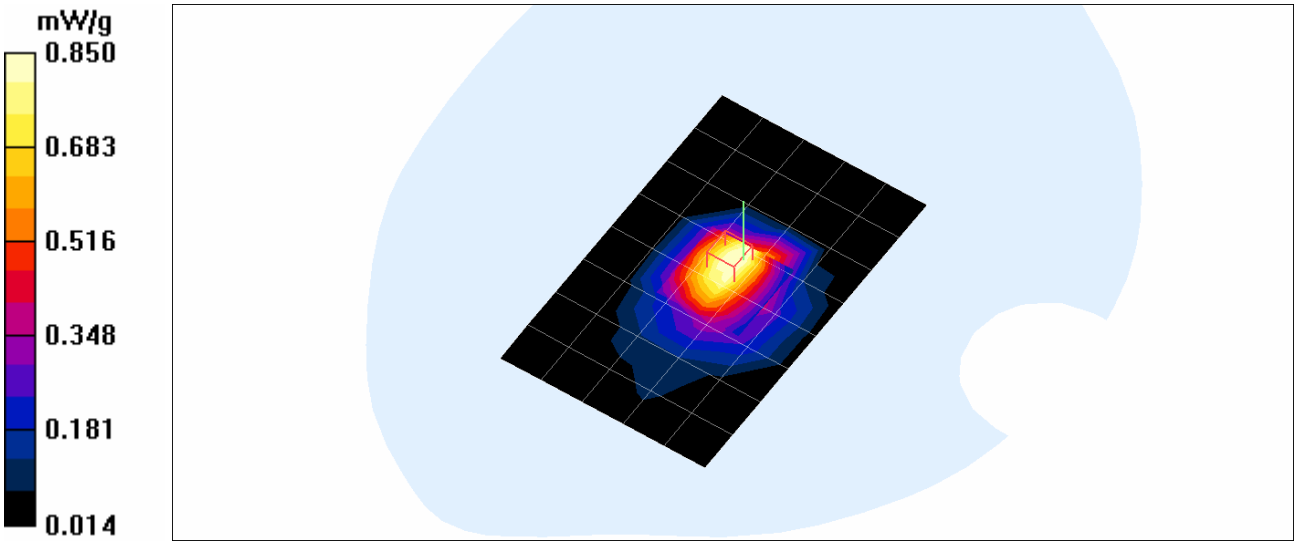
Reference Value = 7.37 V/m; Power Drift = -0.114 dB

Peak SAR (extrapolated) = 1.21 W/kg

SAR(1 g) = 0.665 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.850 mW/g



Date/Time: 2009-04-09 PM 7:14:24

Test Laboratory: Nemko Korea File Name: CDU-685 Horizontal Bottom Position CH600.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: PCS Frequency: 1880 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Horizontal Bottom Position CH600/Area Scan (6x9x1): Measurement grid:

dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.04 mW/g

CDU-685 Horizontal Bottom Position CH600/Zoom Scan (7x7x7)/Cube 0:

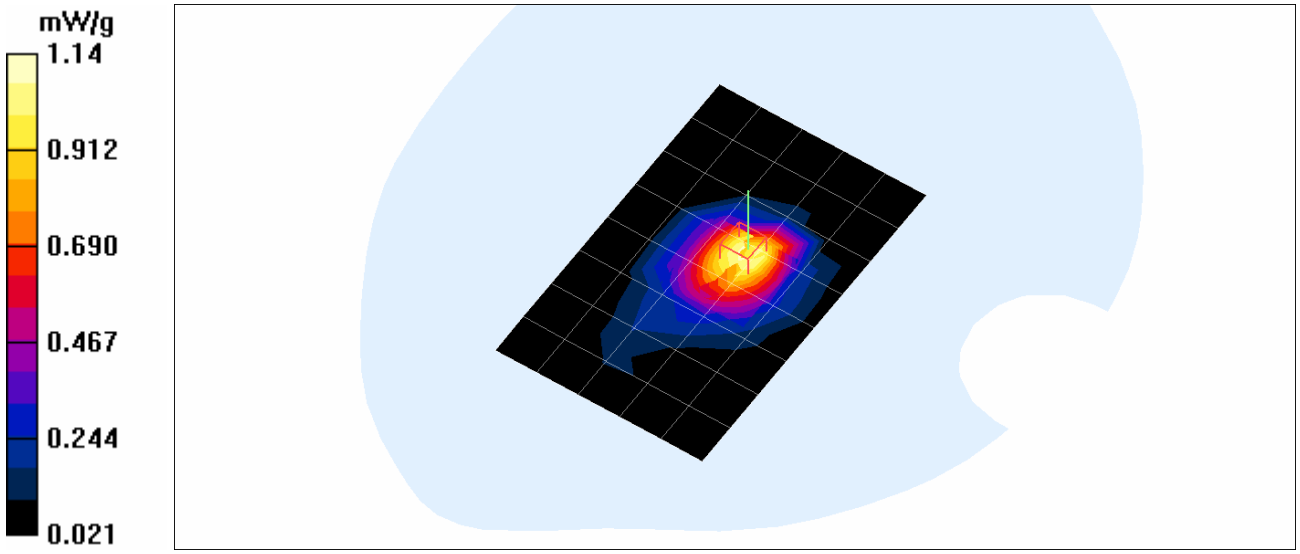
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.4 V/m; Power Drift = 0.077 dB

Peak SAR (extrapolated) = 1.54 W/kg

SAR(1 g) = 0.858 mW/g

Maximum value of SAR (measured) = 1.14 mW/g



Date/Time: 2009-04-09 PM 7:14:24

Test Laboratory: Nemko Korea File Name: CDU-685 Horizontal Bottom Position CH600.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: PCS Frequency: 1880 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Horizontal Bottom Position CH600/Area Scan (6x9x1): Measurement grid:

dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.04 mW/g

CDU-685 Horizontal Bottom Position CH600/Zoom Scan (7x7x7)/Cube 0:

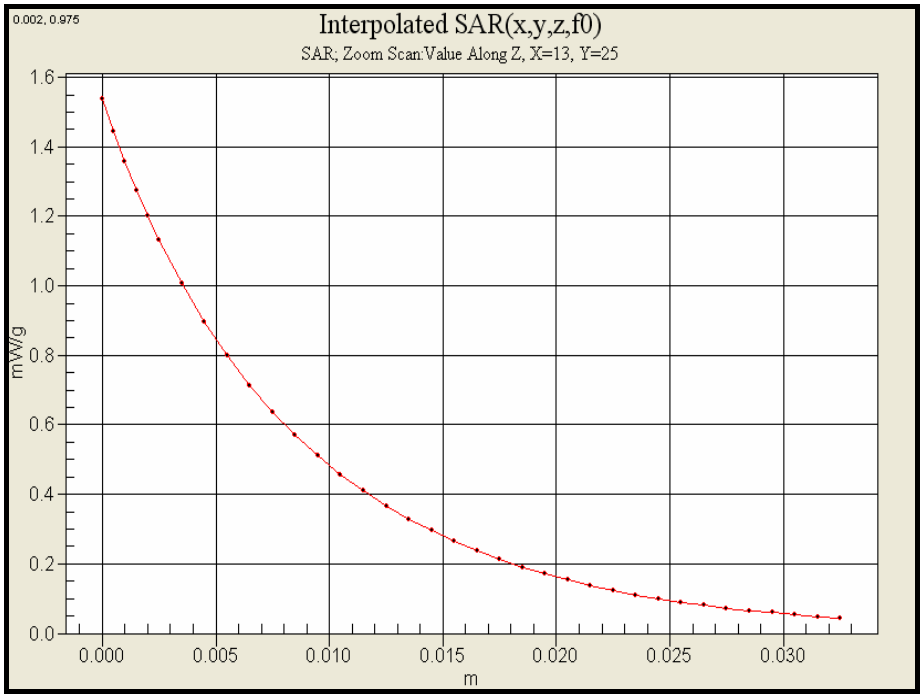
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.4 V/m; Power Drift = 0.077 dB

Peak SAR (extrapolated) = 1.54 W/kg

SAR(1 g) = 0.858 mW/g

Maximum value of SAR (measured) = 1.14 mW/g



Date/Time: 2009-04-09 PM 6:36:39

Test Laboratory: Nemko Korea File Name: CDU-685 Horizontal Bottom Position CH1175.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: PCS Frequency: 1908.75 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 1908.75 MHz; σ = 1.54 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Horizontal Bottom Position CH1175/Area Scan (6x9x1): Measurement grid:

dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.776 mW/g

CDU-685 Horizontal Bottom Position CH1175/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

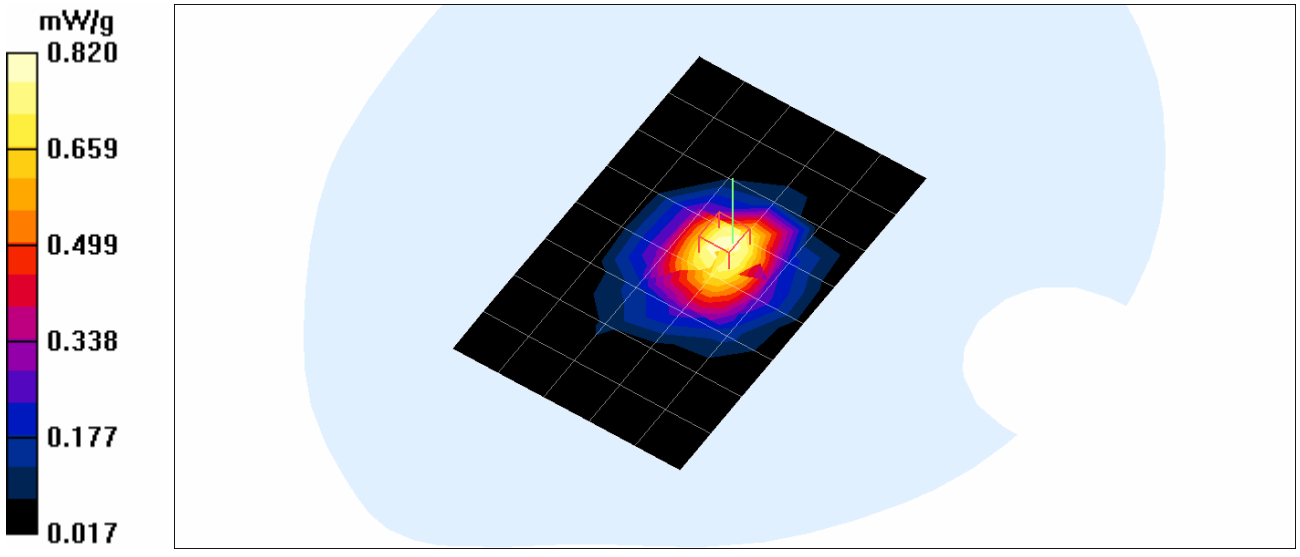
Reference Value = 8.85 V/m; Power Drift = 0.187 dB

Peak SAR (extrapolated) = 1.08 W/kg

SAR(1 g) = 0.640 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.820 mW/g



Date/Time: 2009-04-09 PM 9:02:36

Test Laboratory: Nemko Korea File Name: CDU-685 Vertical Left Position CH25.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: PCS Frequency: 1851.25 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 1851.25 MHz; σ = 1.48 mho/m; ε_r = 55.3; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Vertical Left Position CH25/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.397 mW/g

CDU-685 Vertical Left Position CH25/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

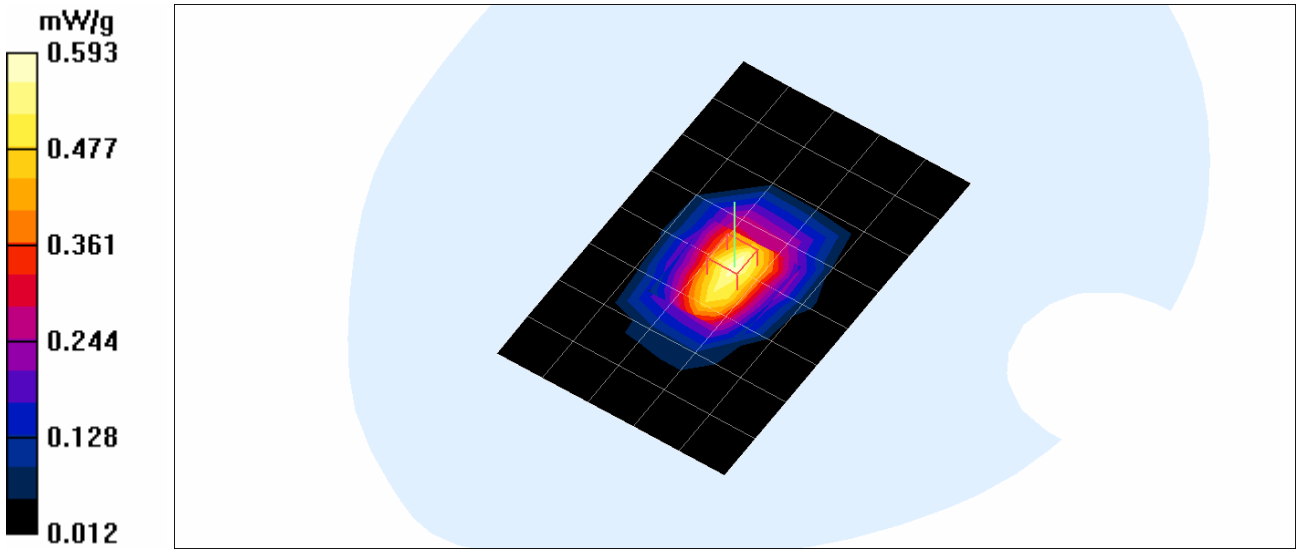
Reference Value = 5.41 V/m; Power Drift = 0.039 dB

Peak SAR (extrapolated) = 0.786 W/kg

SAR(1 g) = 0.433 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.593 mW/g



Date/Time: 2009-04-09 PM 9:45:50

Test Laboratory: Nemko Korea File Name: CDU-685 Vertical Left Position CH600.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: PCS Frequency: 1880 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Vertical Left Position CH600/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.573 mW/g

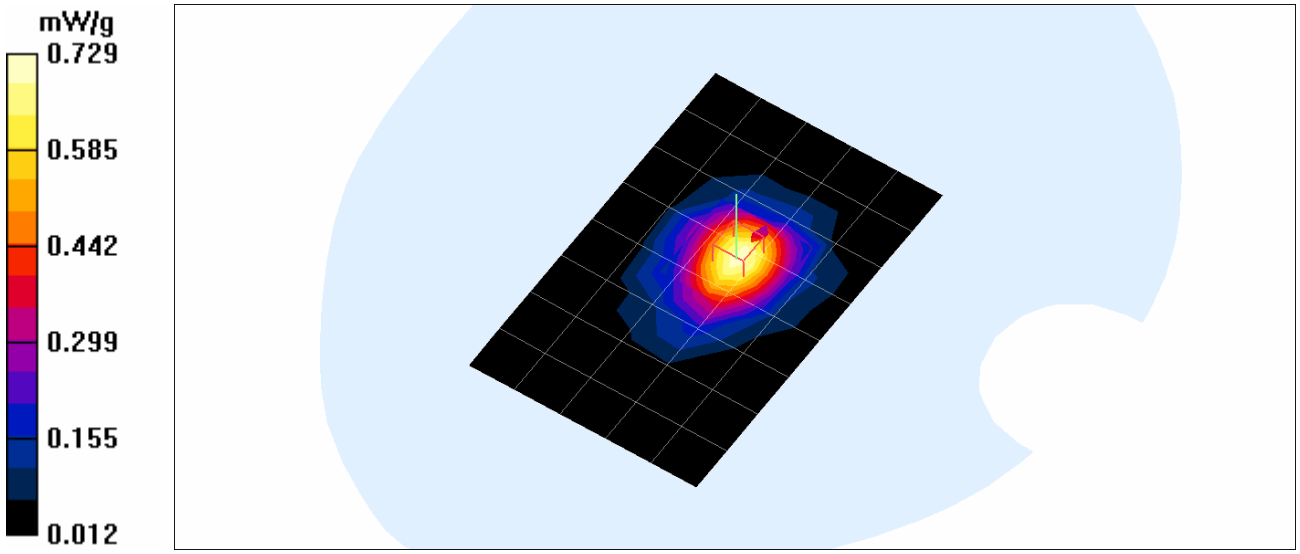
CDU-685 Vertical Left Position CH600/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.1 V/m; Power Drift = 0.143 dB

Peak SAR (extrapolated) = 0.971 W/kg

SAR(1 g) = 0.547 mW/g

Maximum value of SAR (measured) = 0.729 mW/g



Date/Time: 2009-04-09 PM 10:02:20

Test Laboratory: Nemko Korea File Name: CDU-685 Vertical Left Position CH1175.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: PCS Frequency: 1908.75 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 1908.75 MHz; σ = 1.54 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Vertical Left Position CH1175/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.566 mW/g

CDU-685 Vertical Left Position CH1175/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

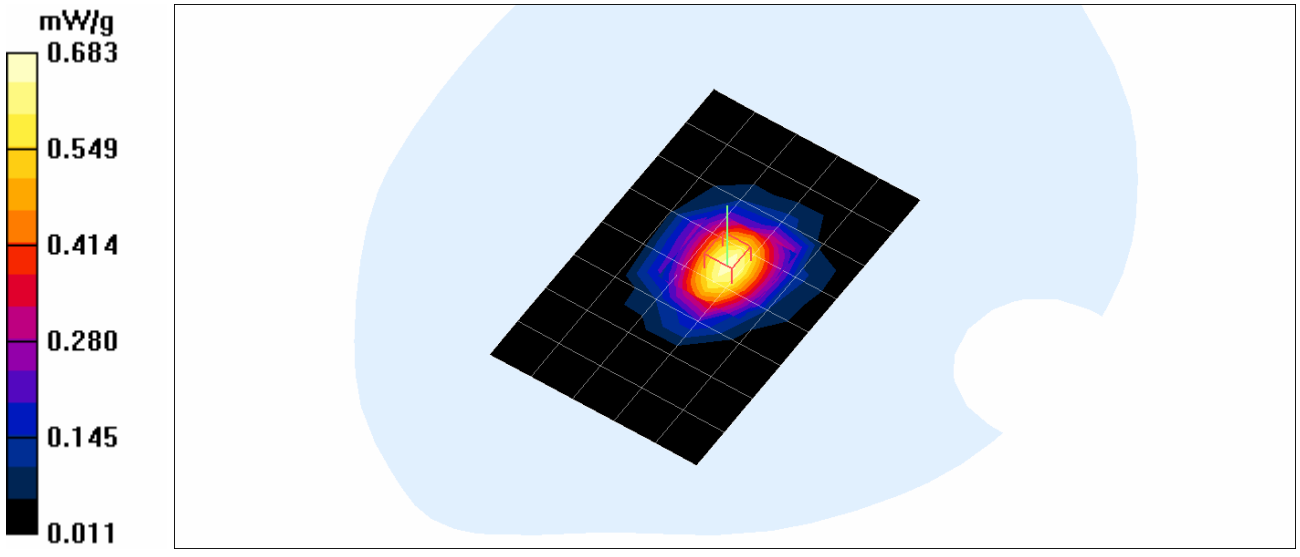
Reference Value = 9.44 V/m; Power Drift = 0.018 dB

Peak SAR (extrapolated) = 0.902 W/kg

SAR(1 g) = 0.514 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.683 mW/g



Date/Time: 2009-04-09 PM 11:22:17

Test Laboratory: Nemko Korea File Name: CDU-685 Vertical Right Position CH25.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: PCS Frequency: 1851.25 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 1851.25 MHz; σ = 1.48 mho/m; ε_r = 55.3; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Vertical Right Position CH25/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.360 mW/g

CDU-685 Vertical Right Position CH25/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

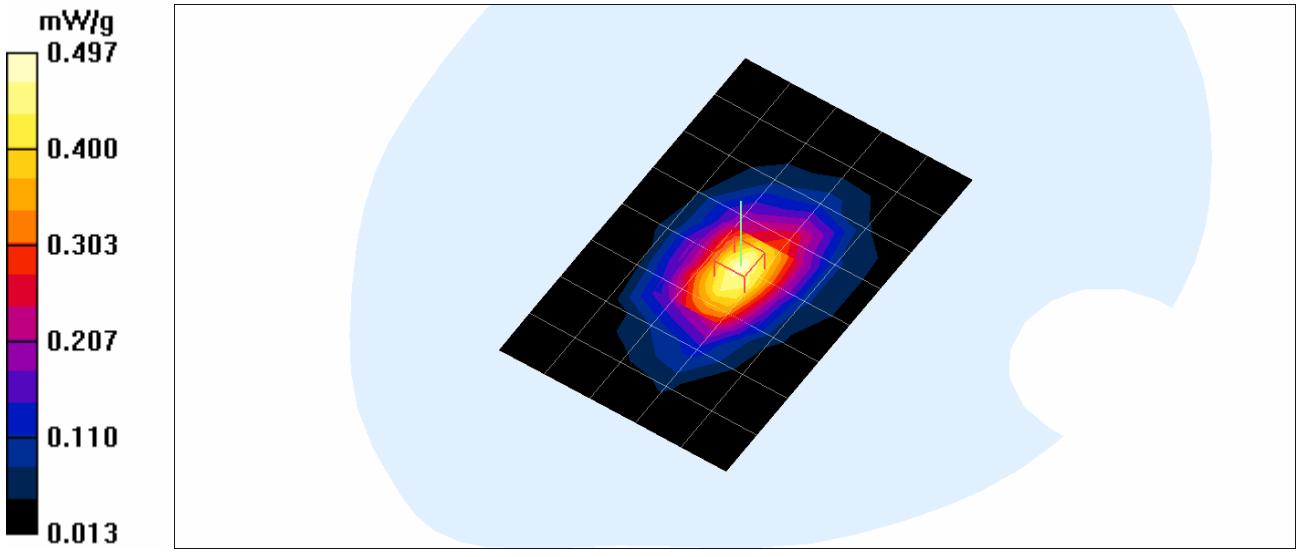
Reference Value = 8.04 V/m; Power Drift = -0.062 dB

Peak SAR (extrapolated) = 0.638 W/kg

SAR(1 g) = 0.370 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.497 mW/g



Date/Time: 2009-04-09 PM 11:04:18

Test Laboratory: Nemko Korea File Name: CDU-685 Vertical Right Position CH600.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: PCS Frequency: 1880 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Vertical Right Position CH600/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.455 mW/g

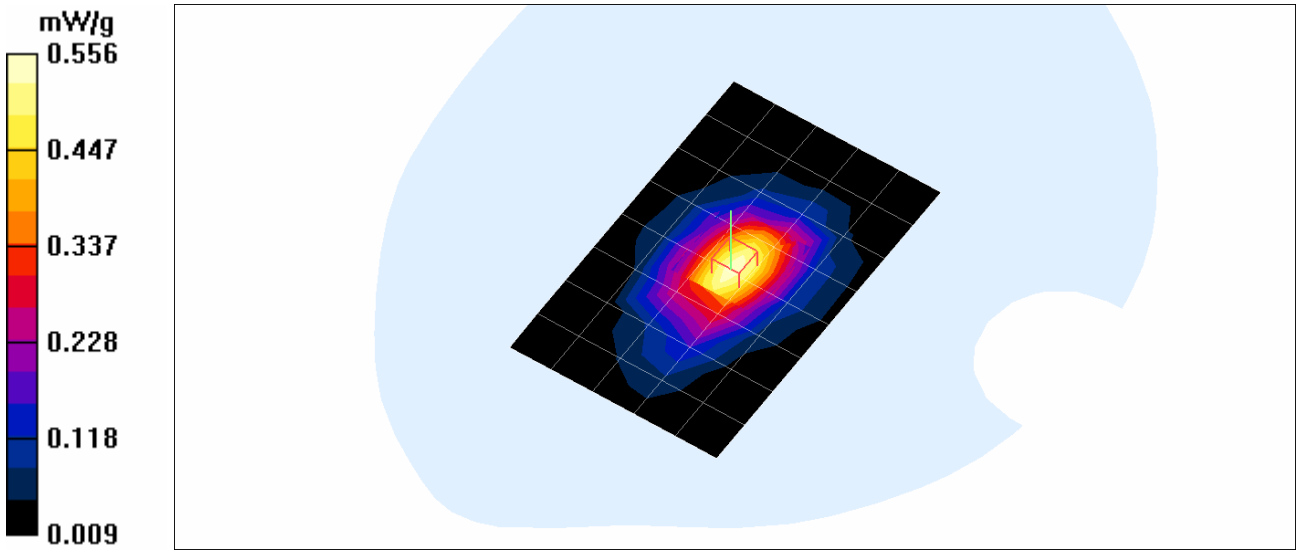
CDU-685 Vertical Right Position CH600/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.88 V/m; Power Drift = 0.108 dB

Peak SAR (extrapolated) = 0.720 W/kg

SAR(1 g) = 0.423 mW/g

Maximum value of SAR (measured) = 0.556 mW/g



Date/Time: 2009-04-09 PM 10:30:35

Test Laboratory: Nemko Korea File Name: CDU-685 Vertical Right Position CH1175.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: PCS Frequency: 1908.75 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 1908.75 MHz; σ = 1.54 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Vertical Right Position CH1175/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.335 mW/g

CDU-685 Vertical Right Position CH1175/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

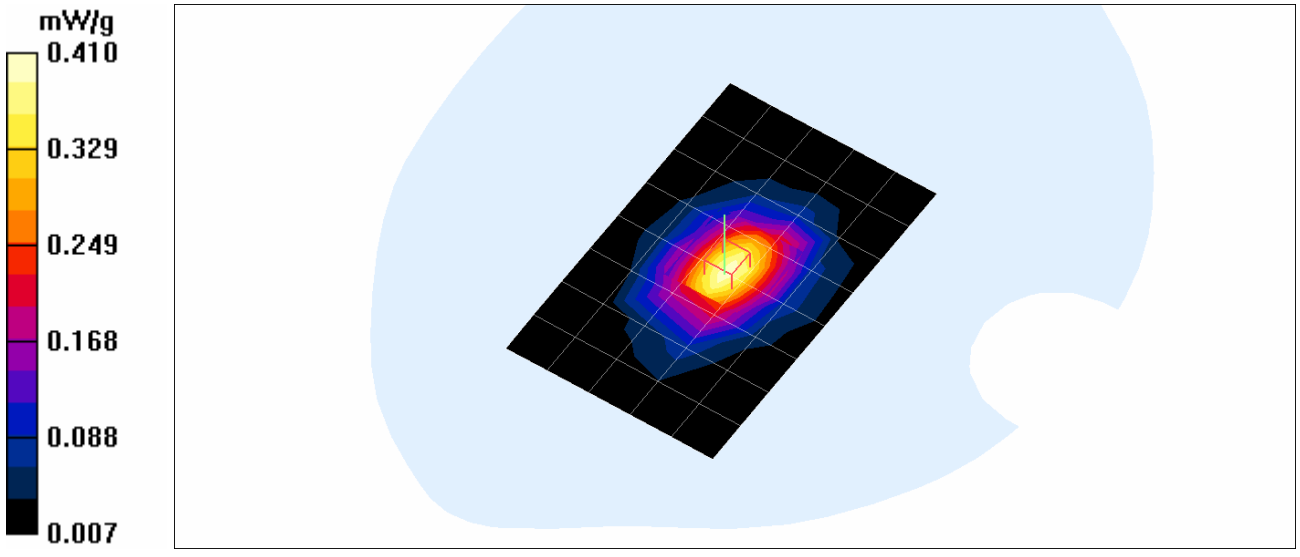
Reference Value = 7.32 V/m; Power Drift = -0.120 dB

Peak SAR (extrapolated) = 0.547 W/kg

SAR(1 g) = 0.306 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.410 mW/g



Date/Time: 2009-04-09 pm 11:40:11

Test Laboratory: Nemko Korea File Name: CDU-685 Vertical Top Position CH600.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: PCS Frequency: 1880 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Vertical Top Position CH600/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.176 mW/g

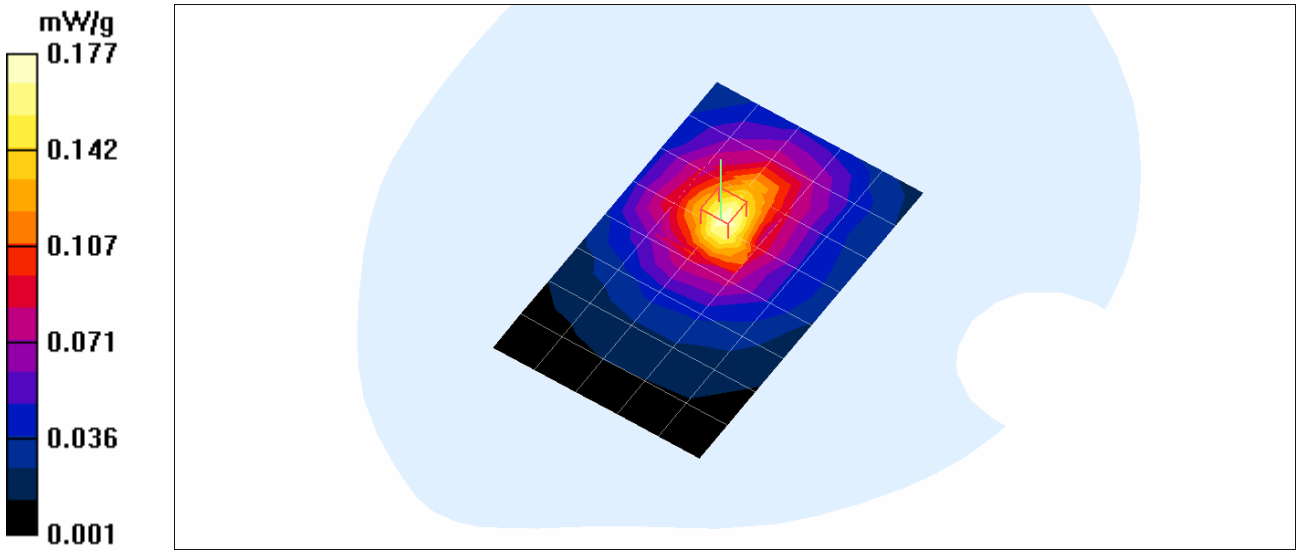
CDU-685 Vertical Top Position CH600/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.90 V/m; Power Drift = -0.201 dB

Peak SAR (extrapolated) = 0.241 W/kg

SAR(1 g) = 0.132 mW/g

Maximum value of SAR (measured) = 0.177 mW/g



Date/Time: 2009-04-10 AM 1:12:08

Test Laboratory: Nemko Korea File Name: CDU-685 Samsung SENS X20 Vertical Type USB Slot CH25.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: PCS Frequency: 1851.25 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 1851.25 MHz; σ = 1.48 mho/m; ε_r = 55.3; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Samsung SENS X20 Vertical Type USB Slot CH25/Area Scan (6x9x1):

Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.560 mW/g

CDU-685 Samsung SENS X20 Vertical Type USB Slot CH25/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

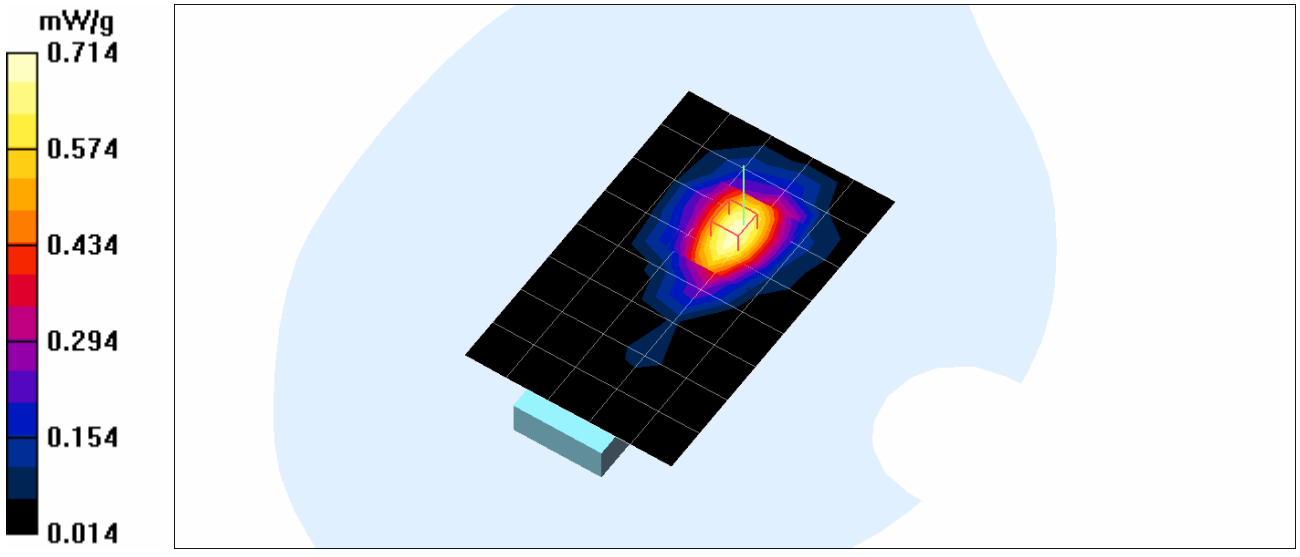
Reference Value = 11.6 V/m; Power Drift = 0.206 dB

Peak SAR (extrapolated) = 0.939 W/kg

SAR(1 g) = 0.552 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.714 mW/g



Date/Time: 2009-04-10 AM 12:28:35

Test Laboratory: Nemko Korea File Name: CDU-685 Samsung SENS X20 Vertical Type USB Slot CH600.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: PCS Frequency: 1880 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Samsung SENS X20 Vertical Type USB Slot CH600/Area Scan (6x9x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.706 mW/g

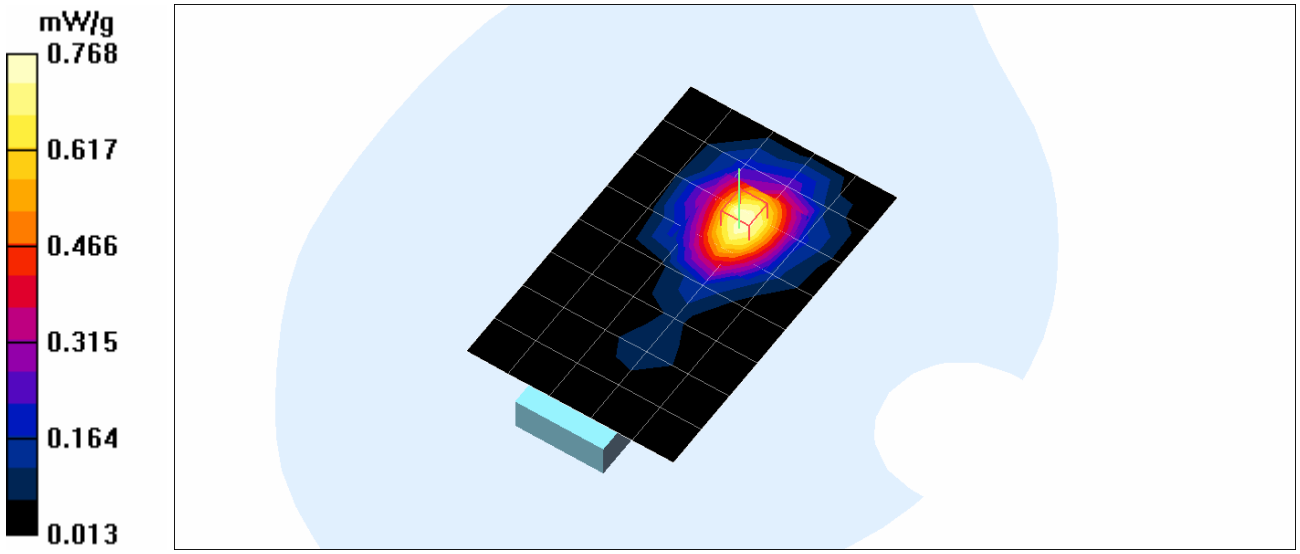
CDU-685 Samsung SENS X20 Vertical Type USB Slot CH600/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.54 V/m; Power Drift = -0.037 dB

Peak SAR (extrapolated) = 1.04 W/kg

SAR(1 g) = 0.592 mW/g

Maximum value of SAR (measured) = 0.768 mW/g



Date/Time: 2009-04-10 AM 12:55:05

Test Laboratory: Nemko Korea File Name: CDU-685 Samsung SENS X20 Vertical Type USB Slot CH1175.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: PCS Frequency: 1908.75 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 1908.75 MHz; σ = 1.54 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Samsung SENS X20 Vertical Type USB Slot CH1175/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.590 mW/g

CDU-685 Samsung SENS X20 Vertical Type USB Slot CH1175/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

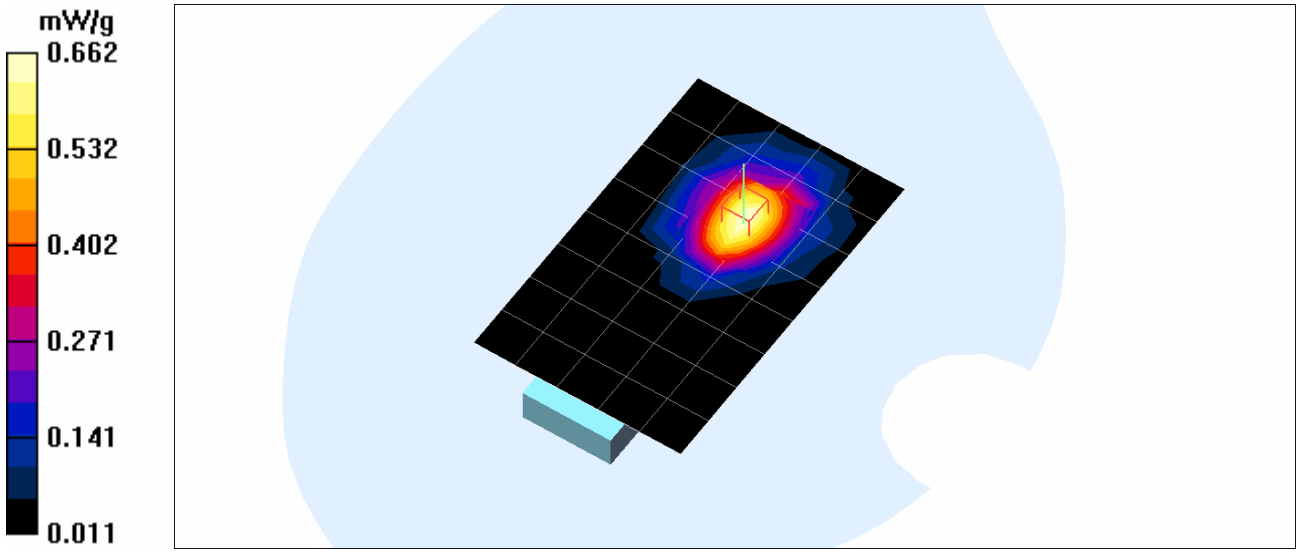
Reference Value = 10.2 V/m; Power Drift = -0.073 dB

Peak SAR (extrapolated) = 0.898 W/kg

SAR(1 g) = 0.505 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.662 mW/g



Date/Time: 2009-04-10 AM 1:31:20

Test Laboratory: Nemko Korea File Name: CDU-685 Samsung SENS R70 Horizontal Type USB Slot CH25.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: PCS Frequency: 1851.25 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 1851.25 MHz; σ = 1.48 mho/m; ε_r = 55.3; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Samsung SENS R70 Horizontal Type USB Slot CH25/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.389 mW/g

CDU-685 Samsung SENS R70 Horizontal Type USB Slot CH25/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

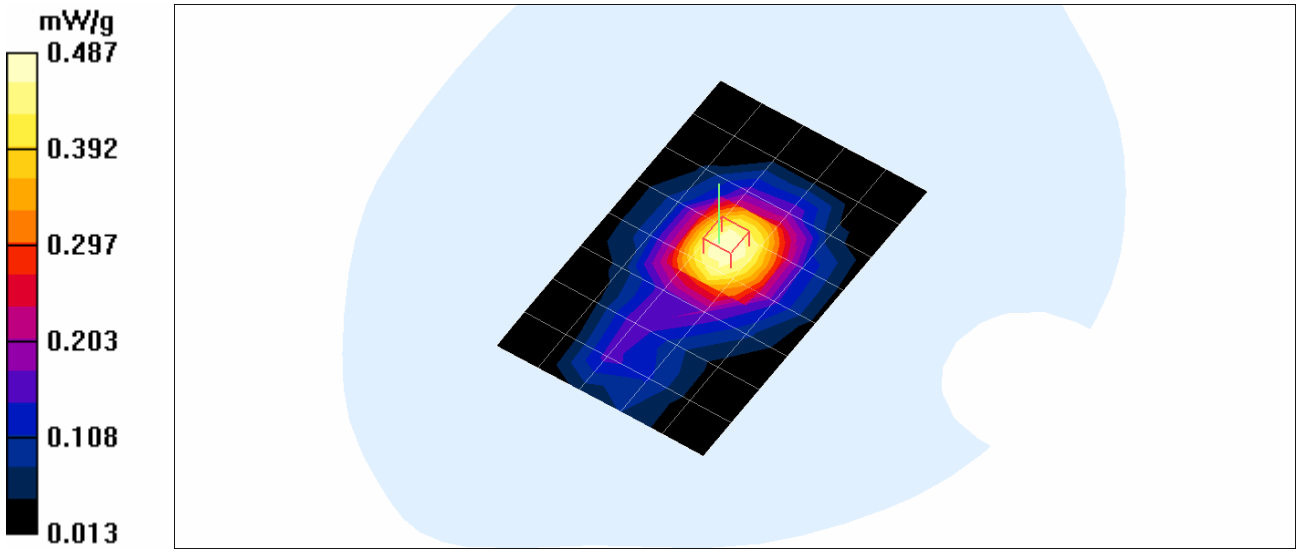
Reference Value = 16.1 V/m; Power Drift = 0.186 dB

Peak SAR (extrapolated) = 0.614 W/kg

SAR(1 g) = 0.395 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.487 mW/g



Date/Time: 2009-04-10 AM 1:49:55

Test Laboratory: Nemko Korea File Name: CDU-685 Samsung SENS R70 Horizontal Type USB Slot CH600.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: PCS Frequency: 1880 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Samsung SENS R70 Horizontal Type USB Slot CH600/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.473 mW/g

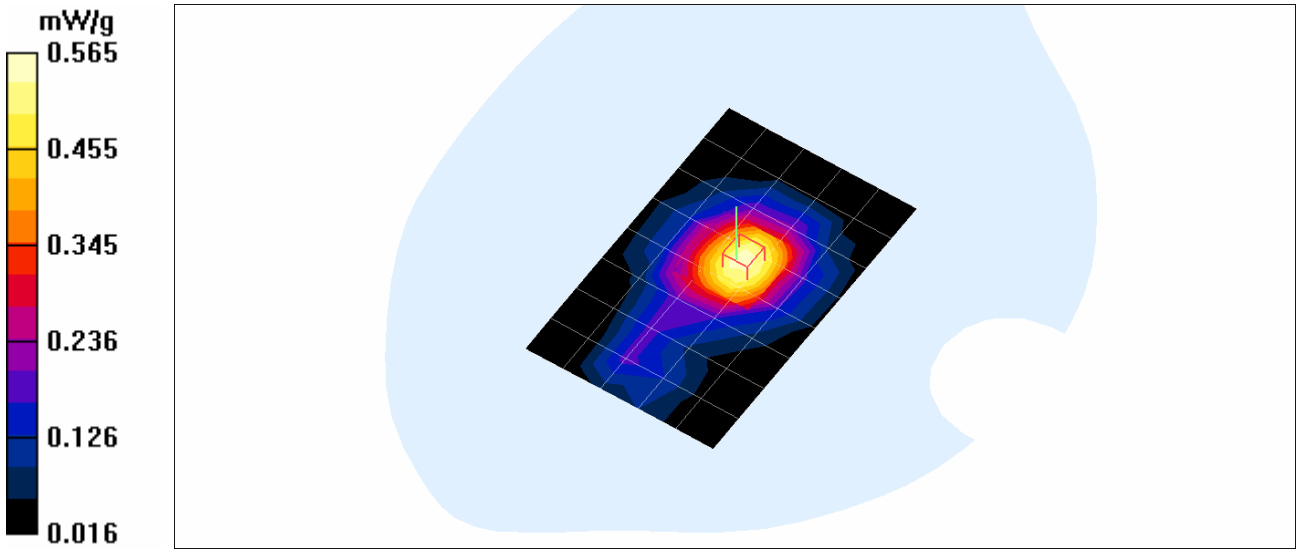
CDU-685 Samsung SENS R70 Horizontal Type USB Slot CH600/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.5 V/m; Power Drift = -0.182 dB

Peak SAR (extrapolated) = 0.716 W/kg

SAR(1 g) = 0.443 mW/g

Maximum value of SAR (measured) = 0.565 mW/g



Date/Time: 2009-04-10 AM 2:07:17

Test Laboratory: Nemko Korea File Name: CDU-685 Samsung SENS R70 Horizontal Type USB Slot CH1175.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: PCS Frequency: 1908.75 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 1908.75 MHz; σ = 1.54 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Samsung SENS R70 Horizontal Type USB Slot CH1175/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.377 mW/g

CDU-685 Samsung SENS R70 Horizontal Type USB Slot CH1175/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

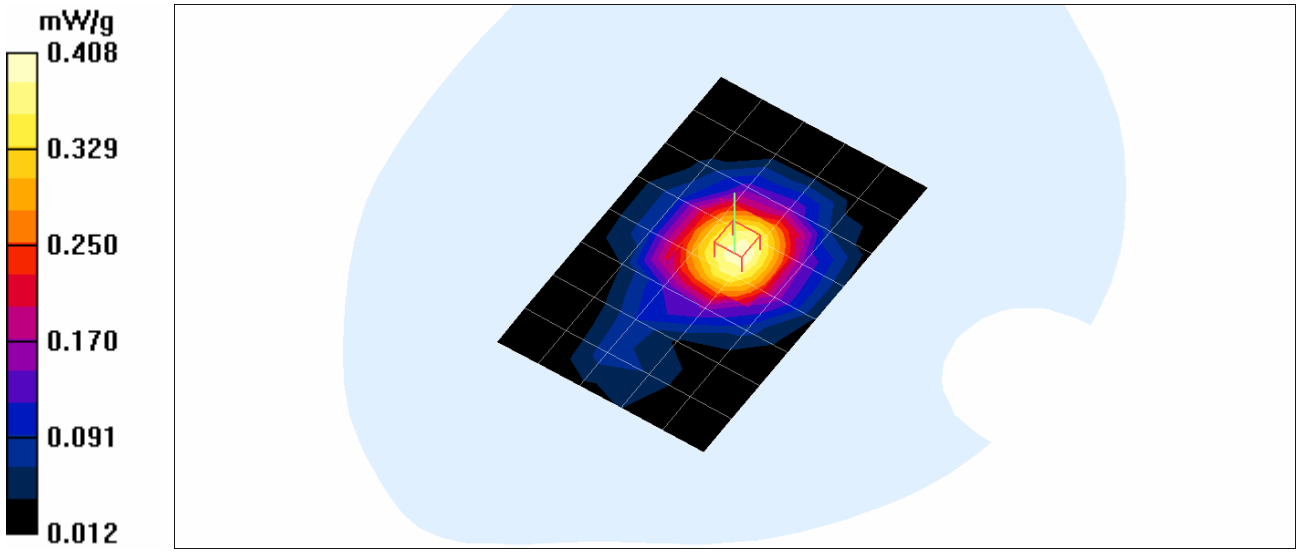
Reference Value = 14.7 V/m; Power Drift = -0.061 dB

Peak SAR (extrapolated) = 0.521 W/kg

SAR(1 g) = 0.322 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

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



Date/Time: 2009-04-10 AM 3:16:22

Test Laboratory: Nemko Korea File Name: CDU-685 Horizontal Bottom Position EV-DO CH25.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: PCS Frequency: 1851.25 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 1851.25 MHz; σ = 1.48 mho/m; ε_r = 55.3; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Horizontal Bottom Position EV-DO CH25/Area Scan (6x9x1): Measurement

grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.659 mW/g

CDU-685 Horizontal Bottom Position EV-DO CH25/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

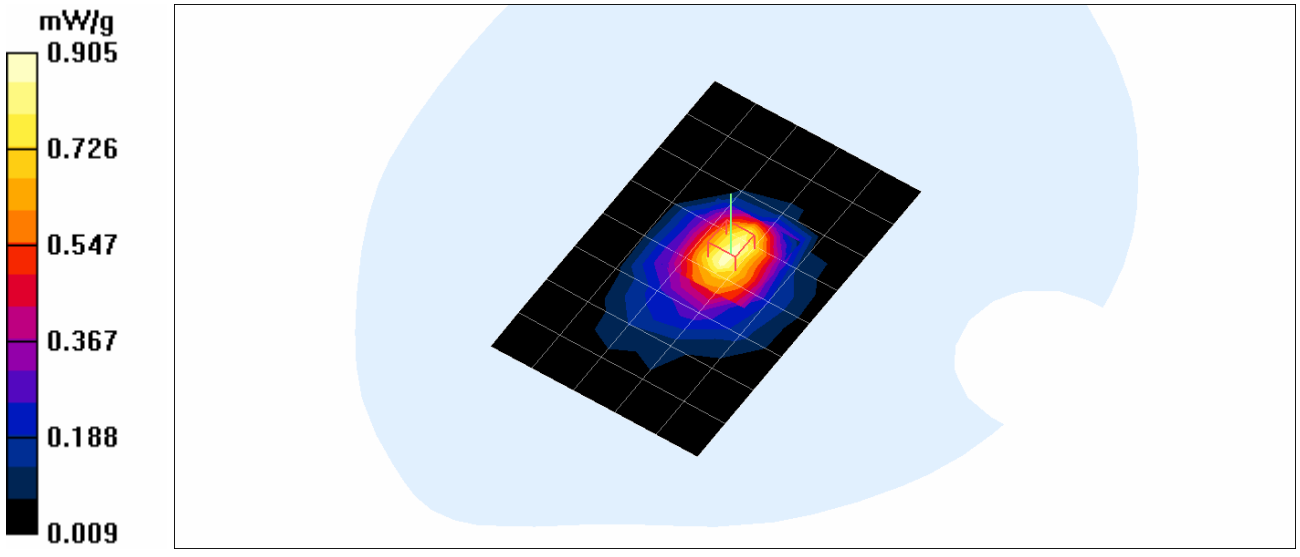
Reference Value = 8.96 V/m; Power Drift = -0.133 dB

Peak SAR (extrapolated) = 1.20 W/kg

SAR(1 g) = 0.664 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.905 mW/g



Date/Time: 2009-04-10 AM 2:48:46

Test Laboratory: Nemko Korea File Name: CDU-685 Horizontal Bottom Position EV-DO CH600.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: PCS Frequency: 1880 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Horizontal Bottom Position EV-DO CH600/Area Scan (6x9x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.955 mW/g

CDU-685 Horizontal Bottom Position EV-DO CH600/Zoom Scan (7x7x7)/Cube 0:

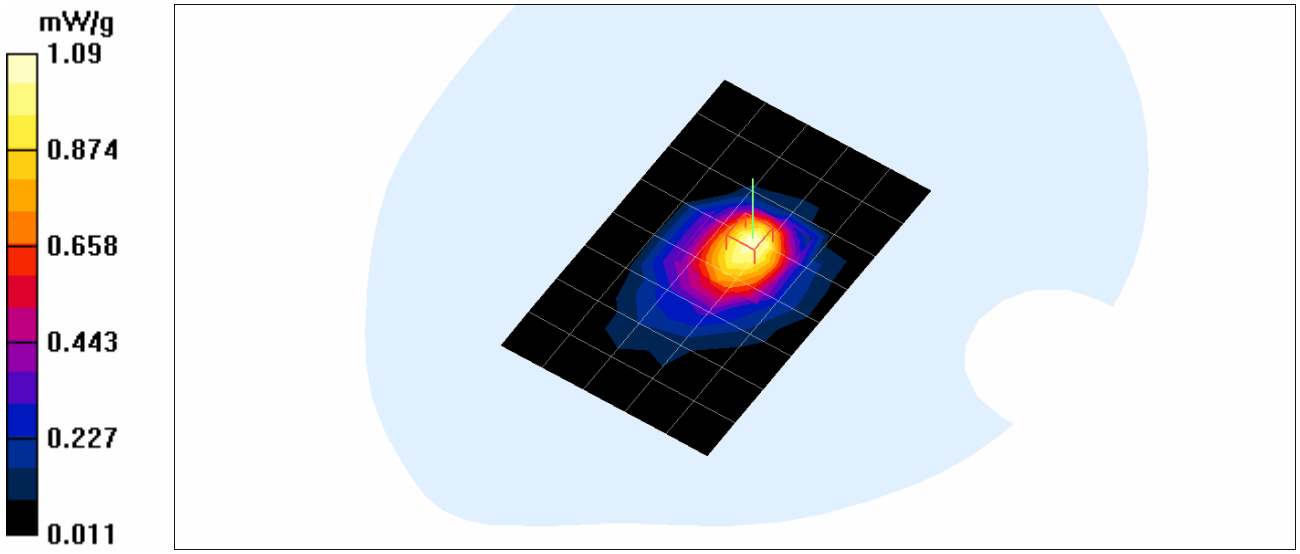
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.8 V/m; Power Drift = -0.136 dB

Peak SAR (extrapolated) = 1.49 W/kg

SAR(1 g) = 0.822 mW/g

Maximum value of SAR (measured) = 1.09 mW/g



Date/Time: 2009-04-10 AM 2:31:57

Test Laboratory: Nemko Korea File Name: CDU-685 Horizontal Bottom Position EV-DO CH1175.da4

DUT: CDU-685 Type: USB Serial: 000000001 Applicant Name: C-motech Co.,Ltd

Communication System: PCS Frequency: 1908.75 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 1908.75 MHz; σ = 1.54 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.69, 7.69, 7.69); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2009-02-13

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

CDU-685 Horizontal Bottom Position EV-DO CH1175/Area Scan (6x9x1):

Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.744 mW/g

CDU-685 Horizontal Bottom Position EV-DO CH1175/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

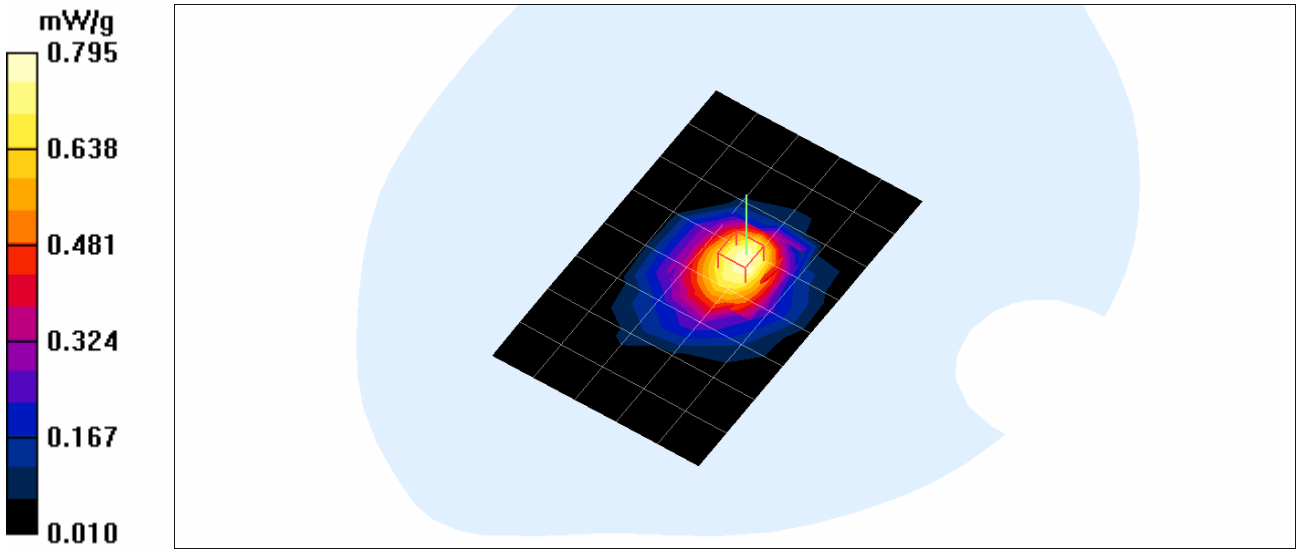
Reference Value = 9.29 V/m; Power Drift = -0.003 dB

Peak SAR (extrapolated) = 1.07 W/kg

SAR(1 g) = 0.613 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.795 mW/g



14. SAR Test Equipment

Table 13.1 Test Equipment Calibration

Description	Model	Serial No.	Calibration Date	Calibration Interval
Staubli Robot Unit	RX60L	F05/51E1A1/A/01	N/A	N/A
Data Acquisition Electronics	DAE4	672	February.13. 2009	1 year
E-Field Probe	EX3DV4	3682	September.30. 2008	1 year
E-Field Probe	ES3DV2	3020	July.21. 2008	1 year
Electro-Optical Converter	EOC3	398	N/A	N/A
SAM Twin Phantom V4.0C	TP-1358	SM 00 T02 DA	N/A	N/A
Validation Dipole Antenna	D835V2	4d016	January.28.2008	2 year
Validation Dipole Antenna	D1900V2	5d059	July.22. 2008	2 year
VSA Series Transmitter Tester	E4406A	US39480757	July.21.2008	1 year
PSA Series Spectrum Analyzer	E4440A	MY44022567	September.09.2008	1 year
Wireless Communications Test Set	8960 Series 10	GB43193659	May.20. 2008	1 year
Dielectric Probe Kit	85070E	MY44300121	N/A	N/A
Network Analyzer	8753ES	US39171172	February.12. 2009	1 year
Power Amplifier	5303075	509/0743	November.11.2008	1 year
Power Meter	437B	2912U01687	November.11.2008	1 year
Power Sensor	8481A	3318A83210	July.24.2008	1 year
Power Meter	NRVS	835360/002	February.12. 2009	1 year
Power Sensor	NRV-Z32	836019/028	February.12. 2009	1 year
Series Signal Generator	E4438C	US45092564	February.12. 2009	1 year

Note:

The E-field probe was calibrated by SPEAG, by waveguide technique procedure. Dipole Validation measurement is performed by Nemkokorea Lab. before each test. The brain simulating material is calibrated by Nemkokorea using the dielectric probe system and network analyzer to determine the conductivity and permittivity (dielectric constant) of the brain-equivalent material.

15. Statement of Compliance

The Maximum SAR results found during testing for the C-motech Co.,Ltd. CDMA 1x EVDO USB Modem CDU-685 are as follows :

Band	Position	SAR (W/kg)
Cellular	**Body**	**0.449**
PCS	**Body**	**0.858**

They are in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1999 and had been tested in accordance with the measurement methods and procedures specified in OET Bulletin 65 Supplement C (Edition 01-01).

16. References

[1] IEEE 1528-2003, “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques, December 2003

[2] EN 50361:2001, “Basic standard fields from mobile phones (200MHz – 3 GHz)”, July 2001

[3] IEC 62209 - 1, “Specific Absorption Rate (SAR) in the frequency range of 300 MHz to 3 GHz

[4] IEC 62209 - 2, Draft Version 0.9, “Evaluation of Human Exposure to Radio Frequency Fields from Handheld and Body - Mounted Wireless Communication Devices in the Frequency Range of 30 MHz to 6 GHz: Human models, Instrumentation and Procedures
Part 2: Procedure to determine the Specific Absorption Rate (SAR) for … including accessories and multiple transmitters”, December 2004

[5] OET Bulletin 65, Supplement C, “Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields”, Edition 01-01

[6] ANSI-PC63.19-2001, Draft 3.6, “American National Standard for Methods of Measurement of Compatibility between Wireless Communication Devices and Hearing Aids”, April 2005

Appendix A

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 pet unit mass at a point in an absorbing body (see Fig. A.1).

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

Figure A.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/m3)
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 relations 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 reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.

Appendix B : Probe Calibration

EX3DV4

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client: Nemko (Dymstec)

Certificate No: EX3-3682_Sep08

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3682
Calibration procedure(s)	QA CAL-01.v6 and QA CAL-23.v3 Calibration procedure for dosimetric E-field probes
Calibration date:	September 30, 2008
Condition of the calibrated item	In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41495277	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41498087	1-Apr-08 (No. 217-00788)	Apr-09
Reference 3 dB Attenuator	SN: S5054 (3c)	1-Jul-08 (No. 217-00865)	Jul-09
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-08 (No. 217-00787)	Apr-09
Reference 30 dB Attenuator	SN: S5129 (30b)	1-Jul-08 (No. 217-00866)	Jul-09
Reference Probe ES3DV2	SN: 3013	2-Jan-08 (No. ES3-3013_Jan08)	Jan-09
DAE4	SN: 660	9-Sep-08 (No. DAE4-660_Sep08)	Sep-09

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-07)	In house check: Oct-08

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: October 13, 2008

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: EX3-3682_Sep08 Page 1 of 9

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe EX3DV4

SN:3682

Manufactured: September 24, 2008
Calibrated: September 30, 2008

Calibrated for DASY Systems
(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: EX3DV4 SN:3682

Sensitivity in Free Space[A] | Diode Compression[B]

NormX	**0.49** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**89** mV
NormY	**0.48** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**91** mV
NormZ	**0.62** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**85** mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL **900 MHz** **Typical SAR gradient: 5 % per mm**

Sensor Center to Phantom Surface Distance		**2.0 mm**	**3.0 mm**
SAR_{be} [%]	Without Correction Algorithm	8.0	4.2
SAR_{be} [%]	With Correction Algorithm	0.3	0.1

TSL **1810 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		**2.0 mm**	**3.0 mm**
SAR_{be} [%]	Without Correction Algorithm	7.8	4.0
SAR_{be} [%]	With Correction Algorithm	0.3	0.3

Sensor Offset

Probe Tip to Sensor Center	**1.0** mm

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

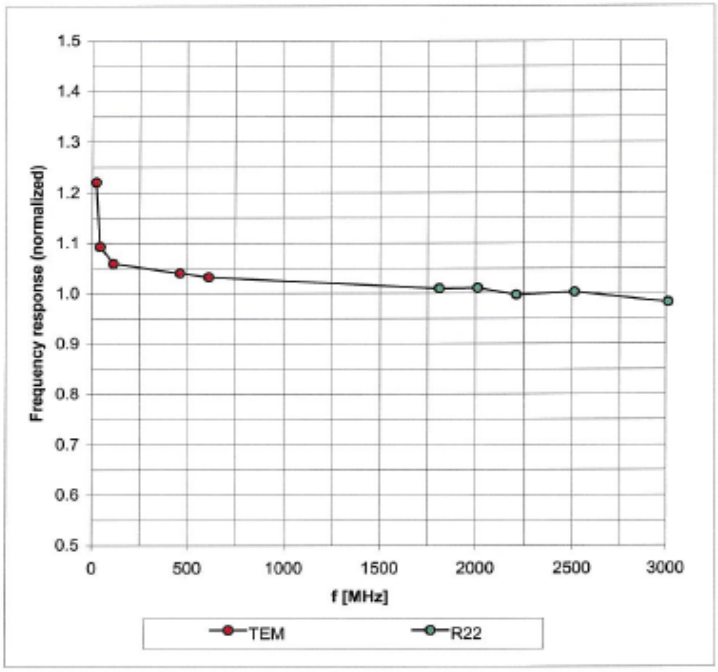
[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Page 8).

[B] Numerical linearization parameter: uncertainty not required.

EX3DV4 SN:3682 September 30, 2008

Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

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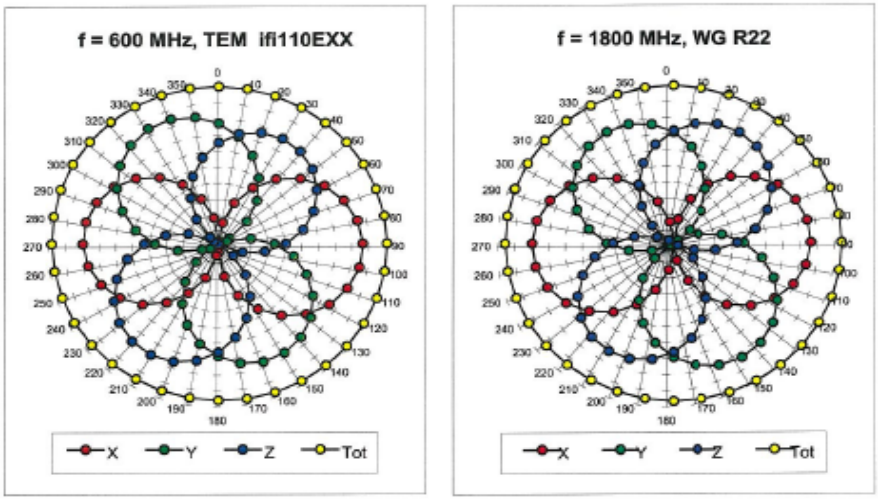
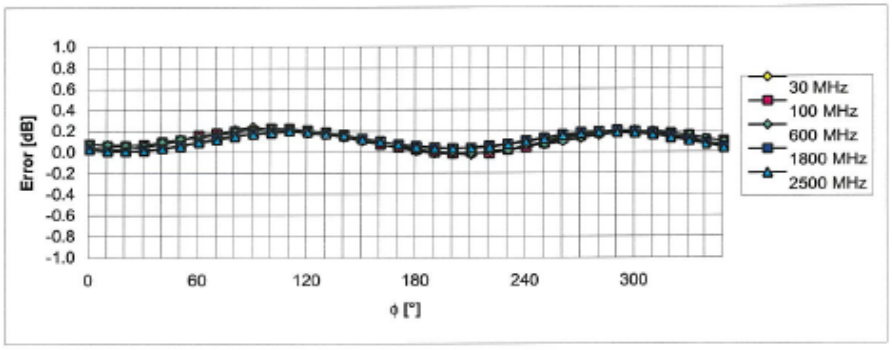
EX3DV4 SN:3682 September 30, 2008

Receiving Pattern (ϕ), ϑ = 0°





Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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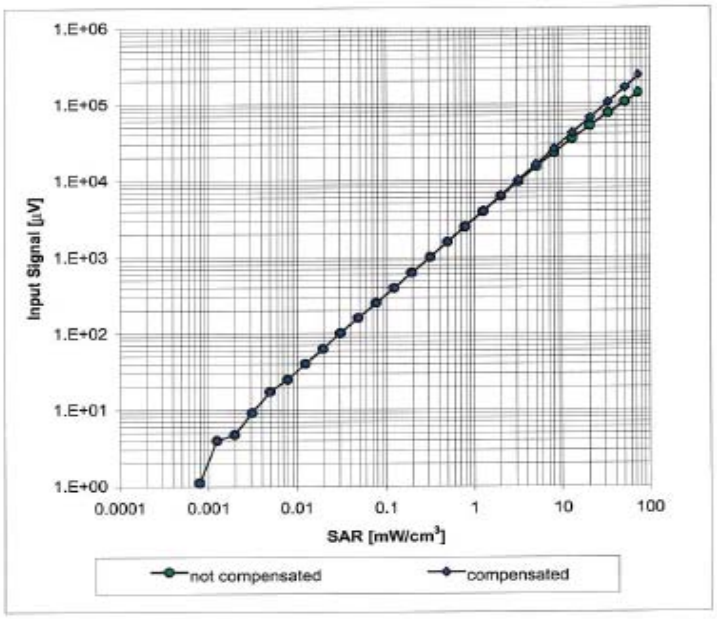
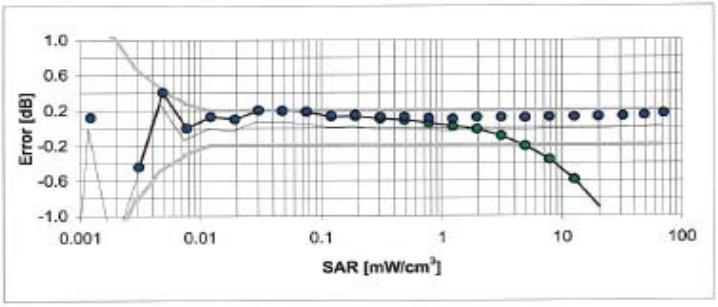
EX3DV4 SN:3682 September 30, 2008

Dynamic Range f(SAR_{head})

(Waveguide R22, f = 1800 MHz)



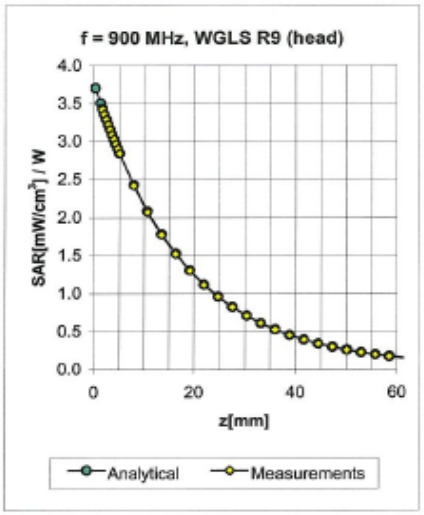


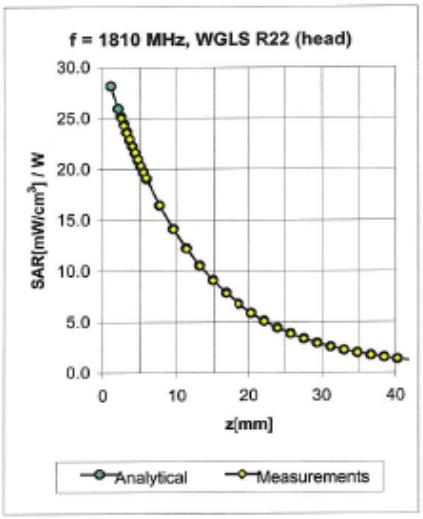
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Certificate No: EX3-3682_Sep08 Page 7 of 9

EX3DV4 SN:3682 September 30, 2008

Conversion Factor Assessment





f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.69	0.62	9.37 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.39	0.81	7.96 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.41	0.79	7.79 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.19	1.20	7.37 ± 11.0% (k=2)
2600	± 50 / ± 100	Head	39.0 ± 5%	1.96 ± 5%	0.24	1.03	7.33 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.56	0.74	9.33 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.15	1.27	7.69 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.19	1.15	7.79 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.32	0.94	7.15 ± 11.0% (k=2)
2600	± 50 / ± 100	Body	52.5 ± 5%	2.16 ± 5%	0.36	0.91	7.06 ± 11.0% (k=2)

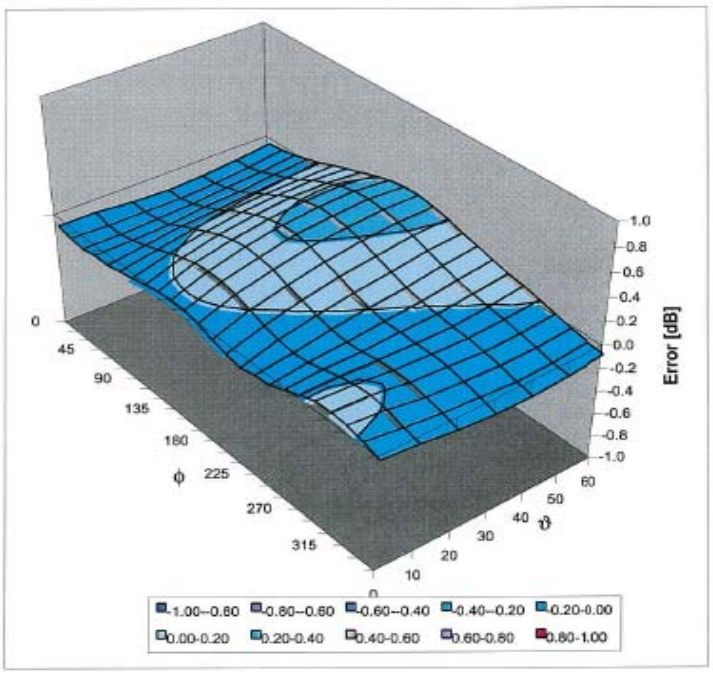
[C] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

Certificate No: EX3-3682_Sep08 Page 8 of 9

EX3DV4 SN:3682 September 30, 2008

Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Certificate No: EX3-3682_Sep08 Page 9 of 9

ES3DV

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

Client: KTL (Dymstec)

Certificate No: ES3-3020_Jul08

CALIBRATION CERTIFICATE

Object: ES3DV2 - SN:3020

Calibration procedure(s): QA CAL-01.v6 and QA CAL-23.v3
Calibration procedure for dosimetric E-field probes

Calibration date: July 21, 2008

Condition of the calibrated item: In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41495277	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41498087	1-Apr-08 (No. 217-00788)	Apr-09
Reference 3 dB Attenuator	SN: S5054 (3c)	1-Jul-08 (No. 217-00665)	Jul-09
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-08 (No. 217-00787)	Apr-09
Reference 30 dB Attenuator	SN: S5129 (30b)	1-Jul-08 (No. 217-00666)	Jul-09
Reference Probe ES3DV2	SN: 3013	2-Jan-08 (No. ES3-3013_Jan08)	Jan-09
DAE4	SN: 660	3-Sep-07 (No. DAE4-660_Sep07)	Sep-08

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-07)	In house check: Oct-08

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: July 21, 2008

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Certificate No: ES3-3020_Jul08 Page 1 of 9

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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S Swiss Calibration Service

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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ES3DV2

SN:3020

Manufactured:	December 5, 2002
Last calibrated:	July 18, 2007
Recalibrated:	July 21, 2008

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

ES3DV2 SN:3020 **July 21, 2008**

DASY - Parameters of Probe: ES3DV2 SN:3020

Sensitivity in Free Space[A] Diode Compression[B]

NormX	**1.10** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**95** mV
NormY	**0.99** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**95** mV
NormZ	**1.03** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**95** mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL **900 MHz** **Typical SAR gradient: 5 % per mm**

Sensor Center to Phantom Surface Distance		**3.0 mm**	**4.0 mm**
SAR_{be} [%]	Without Correction Algorithm	7.1	4.3
SAR_{be} [%]	With Correction Algorithm	0.8	0.5

TSL **1810 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		**3.0 mm**	**4.0 mm**
SAR_{be} [%]	Without Correction Algorithm	6.8	4.1
SAR_{be} [%]	With Correction Algorithm	0.8	0.6

Sensor Offset

Probe Tip to Sensor Center	**2.1** mm

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

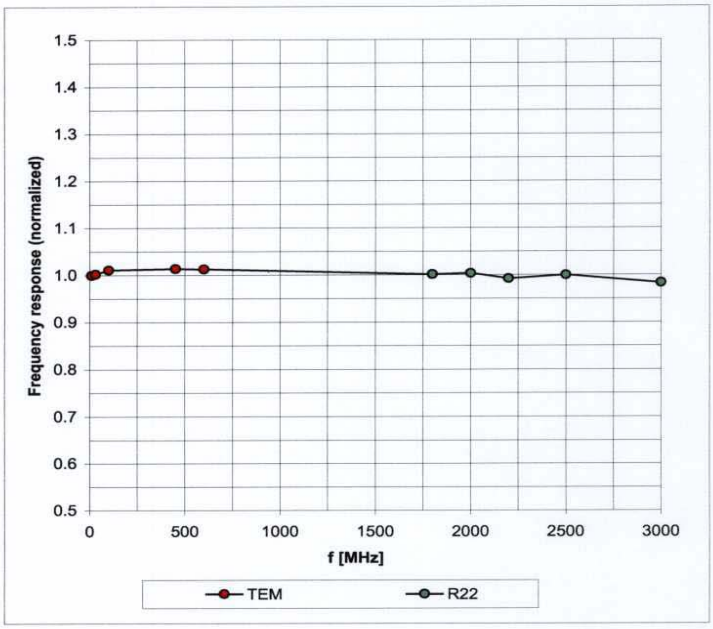
[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Page 8).

[B] Numerical linearization parameter: uncertainty not required.

ES3DV2 SN:3020 July 21, 2008

Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)

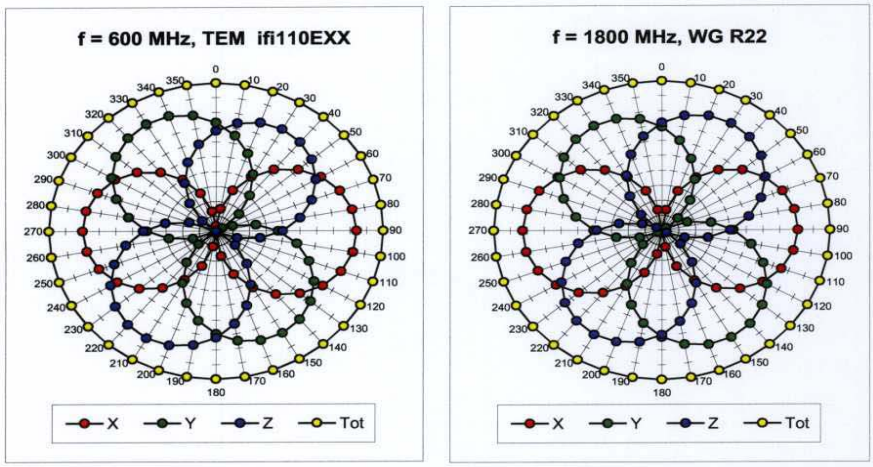


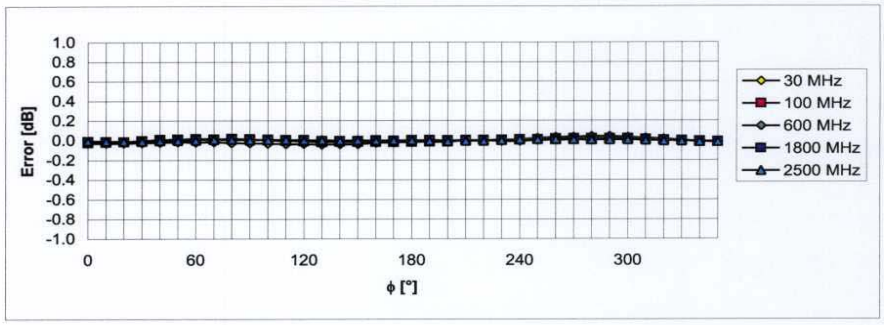
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Certificate No: ES3-3020_Jul08 Page 5 of 9

ES3DV2 SN:3020 July 21, 2008

Receiving Pattern (ϕ), ϑ = 0°





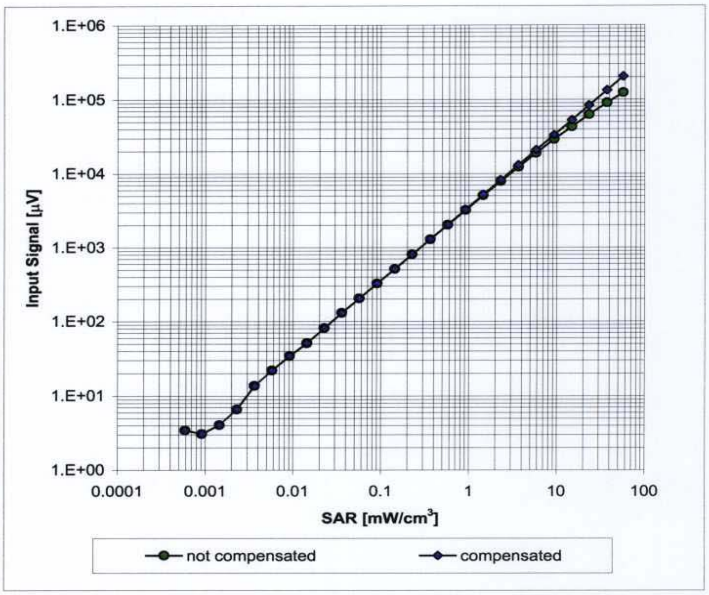
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

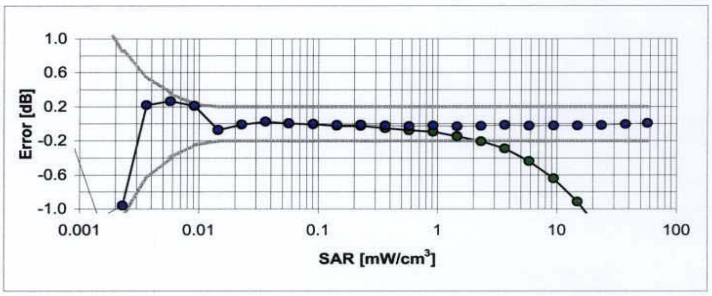
Certificate No: ES3-3020_Jul08 Page 6 of 9

ES3DV2 SN:3020 July 21, 2008

Dynamic Range f(SAR_{head})

(Waveguide R22, f = 1800 MHz)



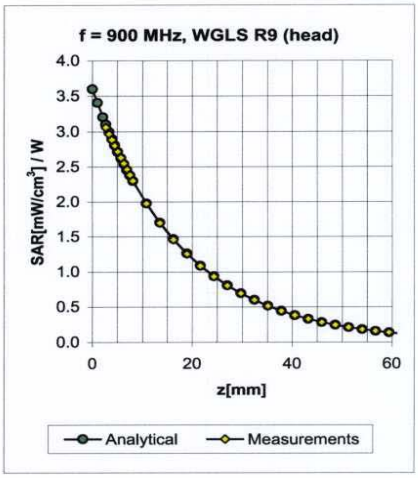


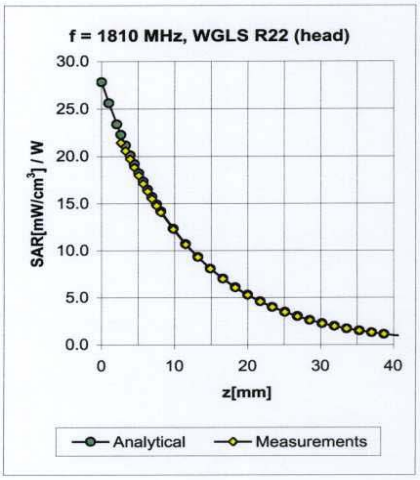
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Certificate No: ES3-3020_Jul08 Page 7 of 9

ES3DV2 SN:3020 **July 21, 2008**

Conversion Factor Assessment





f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.52	1.43	6.12 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.48	1.48	5.03 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.51	1.38	4.77 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.52	1.31	4.33 ± 11.0% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.54	1.37	6.21 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.38	1.84	4.58 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.45	1.42	3.82 ± 11.0% (k=2)

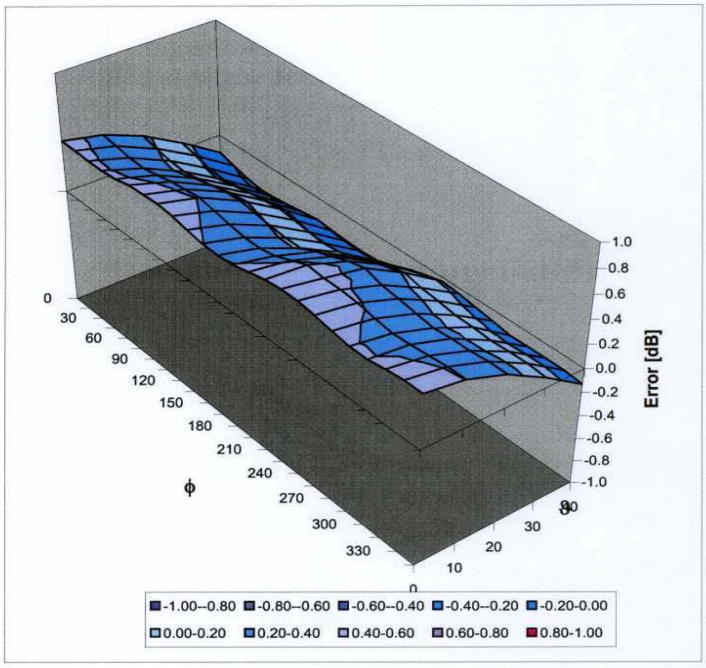
[C] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

Certificate No: ES3-3020_Jul08 Page 8 of 9

ES3DV2 SN:3020 July 21, 2008

Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Certificate No: ES3-3020_Jul08 Page 9 of 9

Appendix C : Dipole Calibrations

Calibration Laboratory of
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Accreditation No.: SCS 108

Client: Nemko (Dymstec)

Certificate No: D835V2-4d017_Jan08

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d017
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	January 28, 2008
Condition of the calibrated item	In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	04-Oct-07 (METAS, No. 217-00736)	Oct-08
Power sensor HP 8481A	US37292783	04-Oct-07 (METAS, No. 217-00736)	Oct-08
Reference 20 dB Attenuator	SN: 5086 (20g)	07-Aug-07 (METAS, No 217-00718)	Aug-08
Reference 10 dB Attenuator	SN: 5047.2 (10r)	07-Aug-07 (METAS, No 217-00718)	Aug-08
Reference Probe ET3DV6 (HF)	SN 1507	26-Oct-07 (SPEAG, No. ET3-1507_Oct07)	Oct-08
DAE4	SN 601	03-Jan-08 (SPEAG, No. DAE4-601_Jan08)	Jan-09

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-07)	In house check: Oct-09
RF generator R&S SMT-06	100005	04-Aug-99 (SPEAG, in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Oct-07)	In house check: Oct-08

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 28, 2008

Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY4	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	43.1 ± 6 %	0.92 mho/m ± 6 %
Head TSL temperature during test	(21.5 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.40 mW / g
SAR normalized	normalized to 1W	9.60 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**9.68 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.57 mW / g
SAR normalized	normalized to 1W	6.28 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**6.34 mW / g ± 16.5 % (k=2)**

[1] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.6 Ω - 4.1 jΩ
Return Loss	- 26.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.390 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	April 22, 2004

DASY4 Validation Report for Head TSL

Date/Time: 28.01.2008 14:10:14

Test Laboratory: SPEAG, Zurich, Switzerland

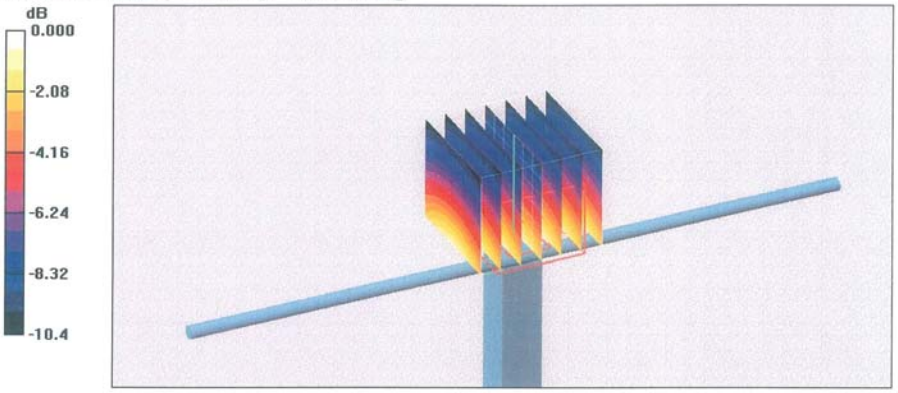
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d017

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL 900 MHz;
Medium parameters used: f = 835 MHz; σ = 0.92 mho/m; ε_r = 42.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

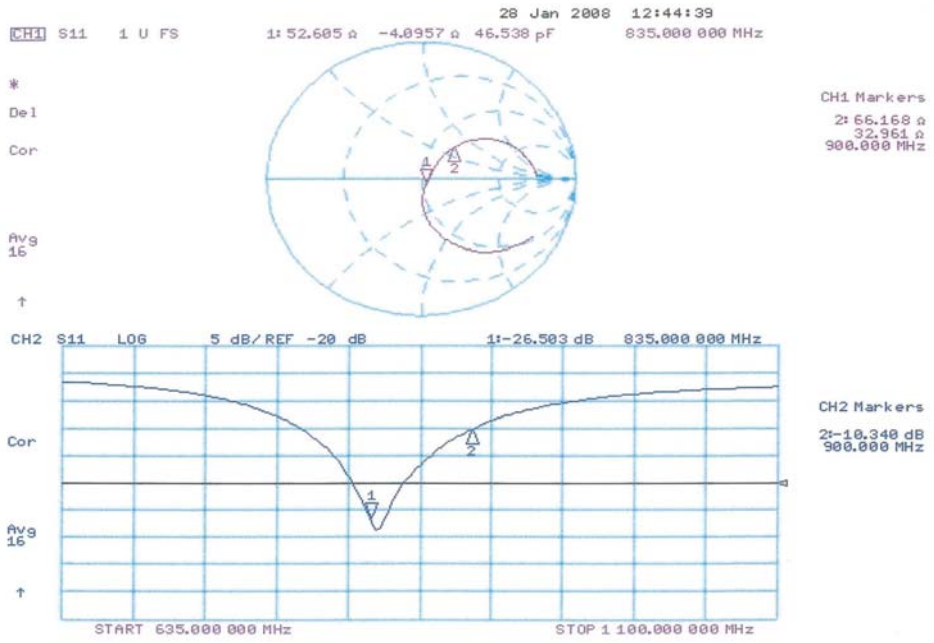
- Probe: ET3DV6 - SN1507 (HF); ConvF (6.01, 6.01, 6.01); Calibrated: 26.10.2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 03.01.2008
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.3 V/m; Power Drift = -0.027 dB
Peak SAR (extrapolated) = 3.54 W/kg
SAR(1 g) = 2.4 mW/g; SAR(10 g) = 1.57 mW/g
Maximum value of SAR (measured) = 2.60 mW/g



0 dB = 2.60mW/g

Impedance Measurement Plot for Head TSL



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Accreditation No.: SCS 108

Client Nemko (Dymstec)

Certificate No: D1900V2-5d059-Jul08

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d059
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	July 22, 2008
Condition of the calibrated item	In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	04-Oct-07 (No. 217-00736)	Oct-08
Power sensor HP 8481A	US37292783	04-Oct-07 (No. 217-00736)	Oct-08
Reference 20 dB Attenuator	SN: 5086 (20g)	01-Jul-08 (No. 217-00864)	Jul-09
Type-N mismatch combination	SN: 5047.2 / 06327	01-Jul-08 (No. 217-00867)	Jul-09
Reference Probe ES3DV2	SN: 3025	28-Apr-08 (No. ES3-3025_Apr08)	Apr-09
DAE4	SN: 601	14-Mar-08 (No. DAE4-601_Mar08)	Mar-09

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-07)	In house check: Oct-09
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-07)	In house check: Oct-08

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 22, 2008

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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

Certificate No: D1900V2-5d059_Jul06 Page 2 of 6

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY4	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.8 ± 6 %	1.47 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) °C	----	----

.

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	condition	
SAR measured	250 mW input power	9.74 mW / g
SAR normalized	normalized to 1W	39.0 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**37.4 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.01 mW / g
SAR normalized	normalized to 1W	20.0 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**19.6 mW / g ± 16.5 % (k=2)**

[1] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.7 Ω + 2.7 jΩ
Return Loss	- 25.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.194 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	March 19, 2004

DASY4 Validation Report for Head TSL

Date/Time: 22.07.2008 10:28:29

Test Laboratory: SPEAG, Zurich, Switzerland

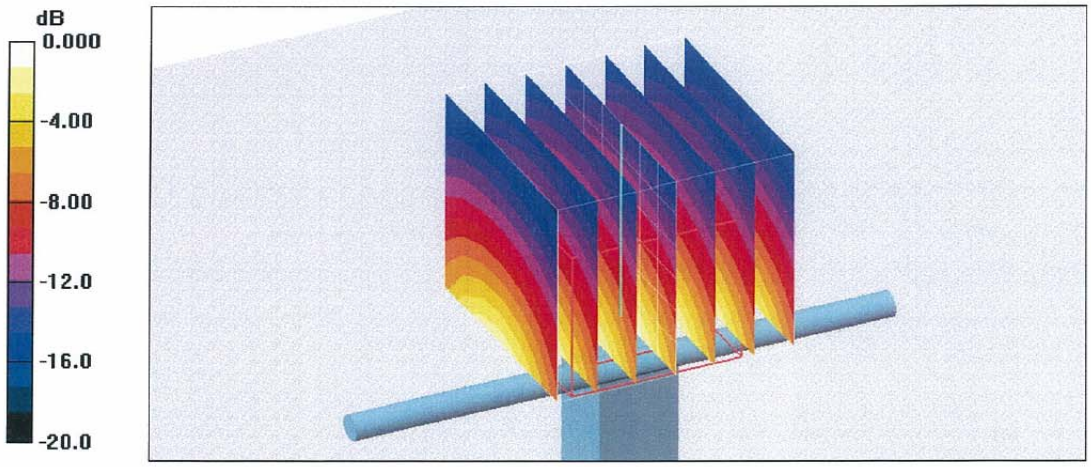
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d059

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL U10 BB;
Medium parameters used: f = 1900 MHz; σ = 1.47 mho/m; ε_r = 38.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

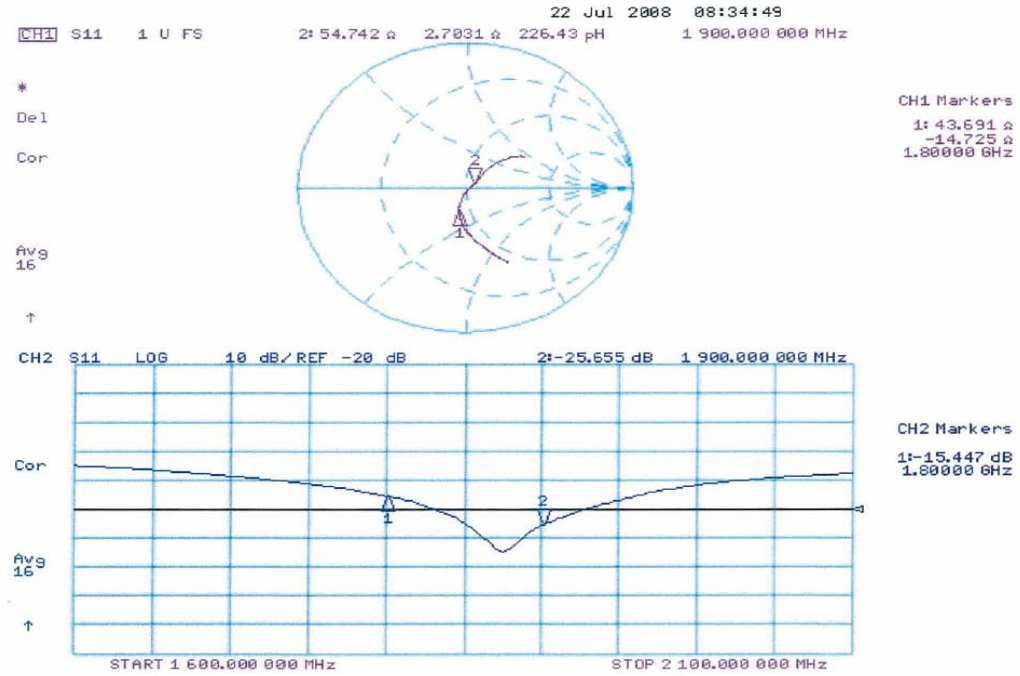
- Probe: ES3DV2 - SN3025; ConvF(4.9, 4.9, 4.9); Calibrated: 28.04.2008
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 14.03.2008
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Pin = 250 mW; dip = 10 mm, scan at 3.4mm/Zoom Scan (dist=3.4mm, probe 0deg) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.9 V/m; Power Drift = 0.027 dB
Peak SAR (extrapolated) = 18.1 W/kg
SAR(1 g) = 9.74 mW/g; SAR(10 g) = 5.01 mW/g
Maximum value of SAR (measured) = 11.8 mW/g



0 dB = 11.8mW/g

Impedance Measurement Plot for Head TSL



Appendix D : Photographs of EUT

- **Please refer to SAR Test Setup Photographs and Photographs of EUT -**