SAR Evaluation Report

FCC ID : TARCMU-300

Project Reference No. : NK08R021-1

Product Type : DBDM(CDMA&Wi-max) USB Modem

Brand Name : C-motech

Model : CMU-300

Tested According to : IEEE Standard C95.1 / OET Bulletin 65 Supplement C

Tested Period : February. 2. 2008 to February. 5. 2008

Tested by	Minchul Shin		date : February. 22. 2008
Verified by	Seonteag.Jin		date : February. 22. 2008

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:	Gil-Sung Bhan

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:	Gil-Sung Bhan

1.3 Description of Device

Category:	DBDM(CDMA & Wi-max) USB Modem
Model Name:	CMU-300
Brand Name:	C-motech
Serial Number:	00000001
Frequency of Operation	2507.5 ~ 2684.5 MHz
Power Output (Radiated Power)	EIRP 0.318 W (25.02 dBm)
Modulation Method	QPSK, QAM
Operating Condition	-20°C ~ +55°C , 85% at 50°C
Power Supply	+5.0 Vdc from USB slot
Antenna Type	Internal monopole antenna
Dimensions	33 mm x 93mm x 12.5 mm
Weight	Approx. 43.8g
Remarks:	-

2. General Test Condition

2.1 Location

Nemko Korea
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	35 ± 15%	20 ~ 75%

2.3 Support Equipment

Equipment	Manufacturer	Model Name	Serial Number
Laptop	SONY	PCG-6C7P	J000RJJB
Laptop	ASUS	F3J	6BN0AS148062
Laptop	SAMSUNG	SENS X10 SE	184C93DY400118T

2.4 Test Frequency

Wimax	
Channel	**Test Frequency (MHz)**
Low	2507.5
Middle	2599.0
High	2684.5

2.5 Position Information

Bottom Position : Laptop - Rear side facing phantom, EUT

Side Position : Laptop - top / bottom side edge facing phantom, EUT

According to the user manual, this device is used with 90 degree angle between USB connector and USB dongle(EUT). And it is used in the laptops with the Horizontal slot only.
All testing were masured with 90 degree angle and Horizontal slot only.

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).

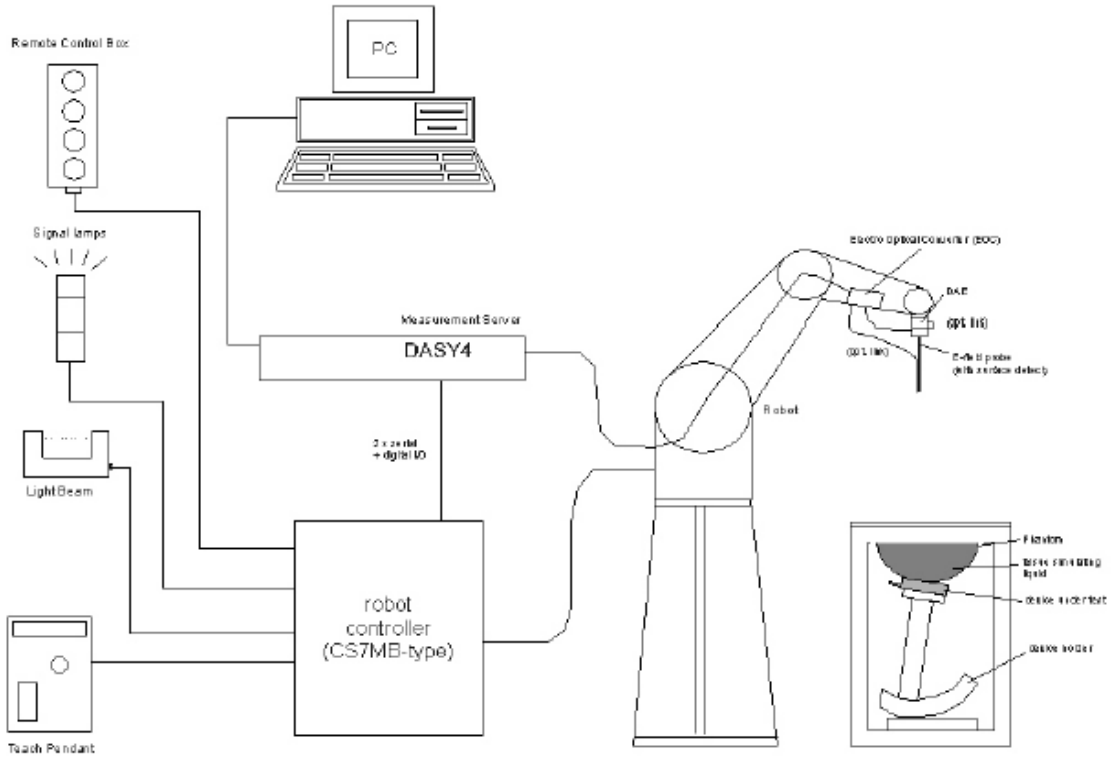


Figure 3.1 SAR Measurement System Setup

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

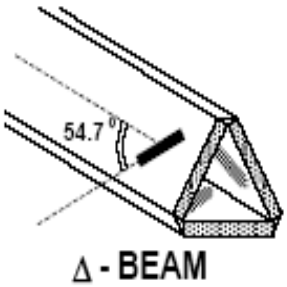


Figure 3.3 Triangular Probe Configuration

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 HSL2600,
MSL2600 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 ±0.22dB.

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

Ingredient (% by weight)	**Frequency (MHz)**
	2600 MHz
Tissue Type	Body
Water	71.30
Salt	0.05
Sugar	0.00
HEC	0.00
DGBE	28.65
Dielectric Constant	52.51
Conductivity (S/m)	2.16

Typical Composition of Ingredients for Liquid Tissue Phantoms

4.2 Tissue Dielectric Parameters for Head and Body Phantoms

The head 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. Definition of Reference Points

5.1 EAR Reference Point

Figure 5.1 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 5.2.

Figure 5.1 Front, back and side view of SAM

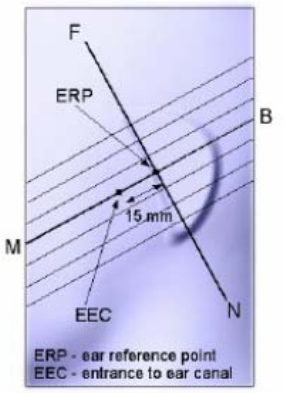


Figure 5.2 Close up side view

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 5.3).
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.

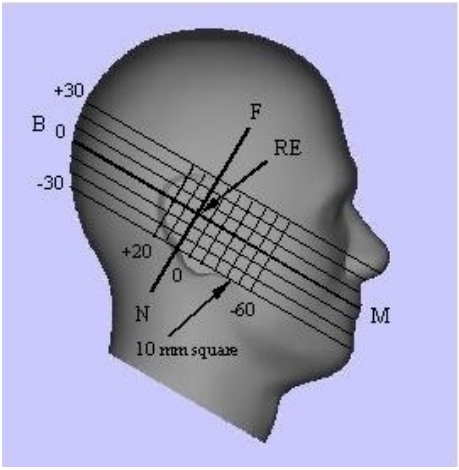


Figure 5.3 Side view of the phantom showing relevant markings

5.2 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. 5.4).
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.

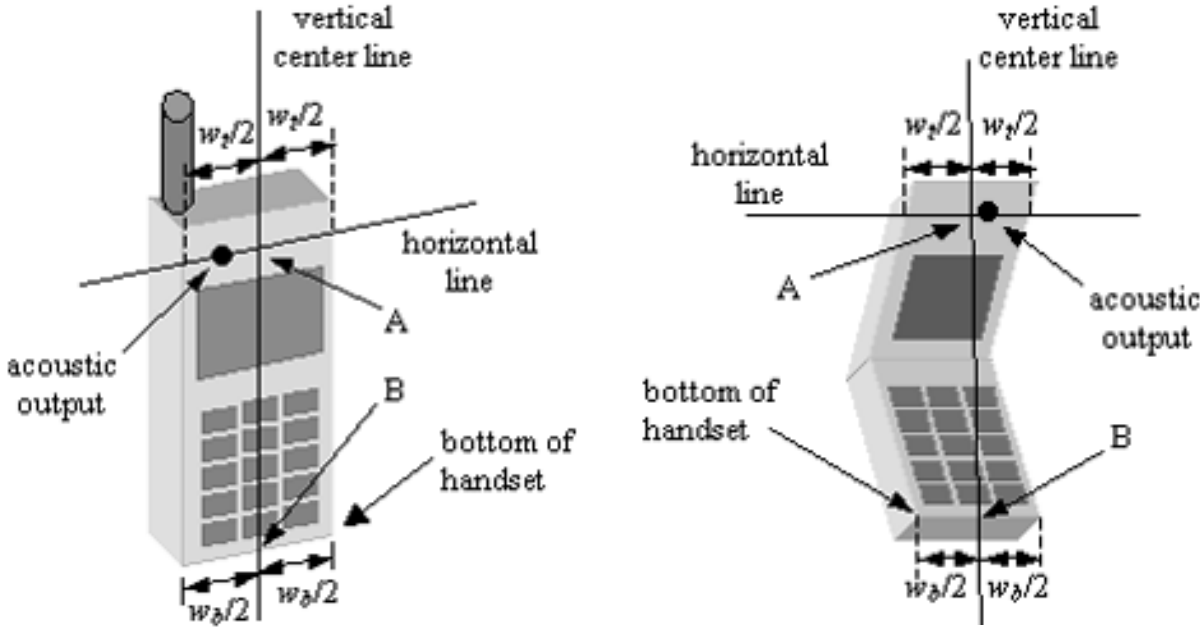


Figure 5.4 Handset vertical and horizontal reference lines

6. Test Configuration Positions

6.1 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 6.1), 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.

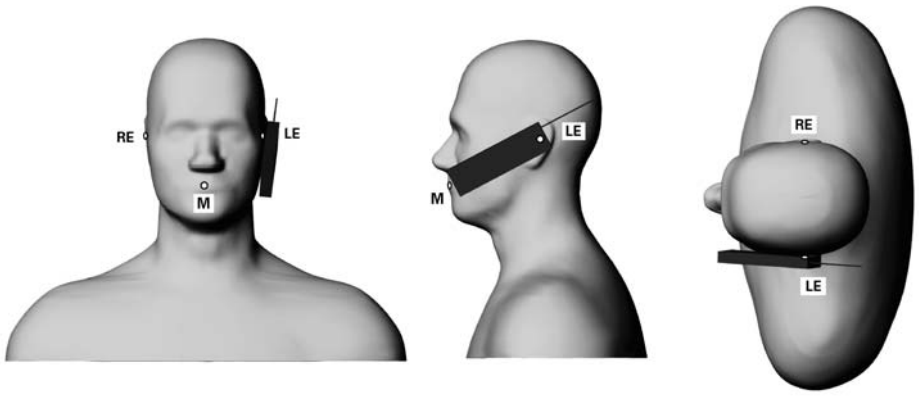


Figure 6.1 Front, Side and Top View of Cheek/Touch Position

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 5.2)

6.2 EAR/Tilt 15° Position

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

Step 1
Repeat steps 1 to 5 of 5.2 to place the device in the “Cheek/Touch Position”

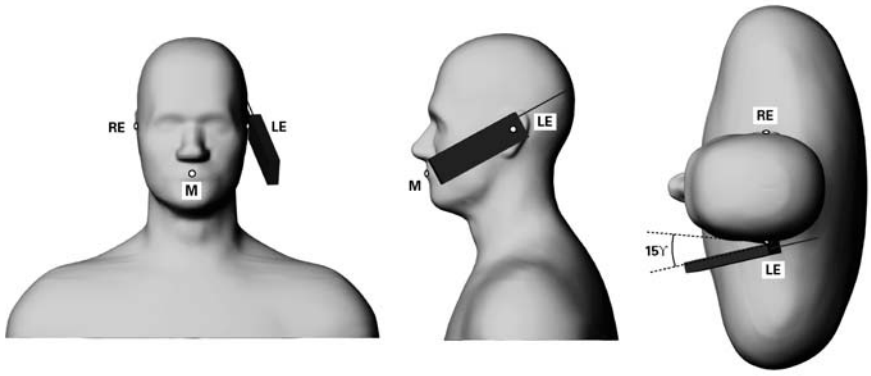


Figure 6.2 Front, side and Top View of Ear/Tilt 15° Position

Step 2
While maintaining the orientation of the phone, the phone was retracted parallel to the rference 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 6.2)

6.3 Body-worn and Other Configurations

6.3.1 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.

6.3.2 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.

6.3.3 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.

7. Measurement Uncertainty

DASY4 Uncertainty Budget
According to IEEE 1528 [1]

Error Description	Uncertainty value	Prob. Dist.	Div.	(c_i) 1g	(c_i) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(v_i) v_{eff}
Measurement System								
Probe Calibration	±5.9%	N	1	1	1	±5.9%	±5.9%	∞
Axial Isotropy	±4.7%	R	$\sqrt{3}$	0.7	0.7	±1.9%	±1.9%	∞
Hemispherical Isotropy	±9.6%	R	$\sqrt{3}$	0.7	0.7	±3.9%	±3.9%	∞
Boundary Effects	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%	∞
Linearity	±4.7%	R	$\sqrt{3}$	1	1	±2.7%	±2.7%	∞
System Detection Limits	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%	∞
Readout Electronics	±0.3%	N	1	1	1	±0.3%	±0.3%	∞
Response Time	±0.8%	R	$\sqrt{3}$	1	1	±0.5%	±0.5%	∞
Integration Time	±2.6%	R	$\sqrt{3}$	1	1	±1.5%	±1.5%	∞
RF Ambient Conditions	±3.0%	R	$\sqrt{3}$	1	1	±1.7%	±1.7%	∞
Probe Positioner	±0.4%	R	$\sqrt{3}$	1	1	±0.2%	±0.2%	∞
Probe Positioning	±2.9%	R	$\sqrt{3}$	1	1	±1.7%	±1.7%	∞
Max. SAR Eval.	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%	∞
Test Sample Related								
Device Positioning	±2.9%	N	1	1	1	±2.9%	±2.9%	145
Device Holder	±3.6%	N	1	1	1	±3.6%	±3.6%	5
Power Drift	±5.0%	R	$\sqrt{3}$	1	1	±2.9%	±2.9%	∞
Phantom and Setup								
Phantom Uncertainty	±4.0%	R	$\sqrt{3}$	1	1	±2.3%	±2.3%	∞
Liquid Conductivity (target)	±5.0%	R	$\sqrt{3}$	0.64	0.43	±1.8%	±1.2%	∞
Liquid Conductivity (meas.)	±2.5%	N	1	0.64	0.43	±1.6%	±1.1%	∞
Liquid Permittivity (target)	±5.0%	R	$\sqrt{3}$	0.6	0.49	±1.7%	±1.4%	∞
Liquid Permittivity (meas.)	±2.5%	N	1	0.6	0.49	±1.5%	±1.2%	∞
Combined Std. Uncertainty						±10.8%	±10.6%	330
Expanded STD Uncertainty						**±21.6%**	**±21.1%**	

8. System Verification

8.1 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 8.1 Measured Tissue Parameters

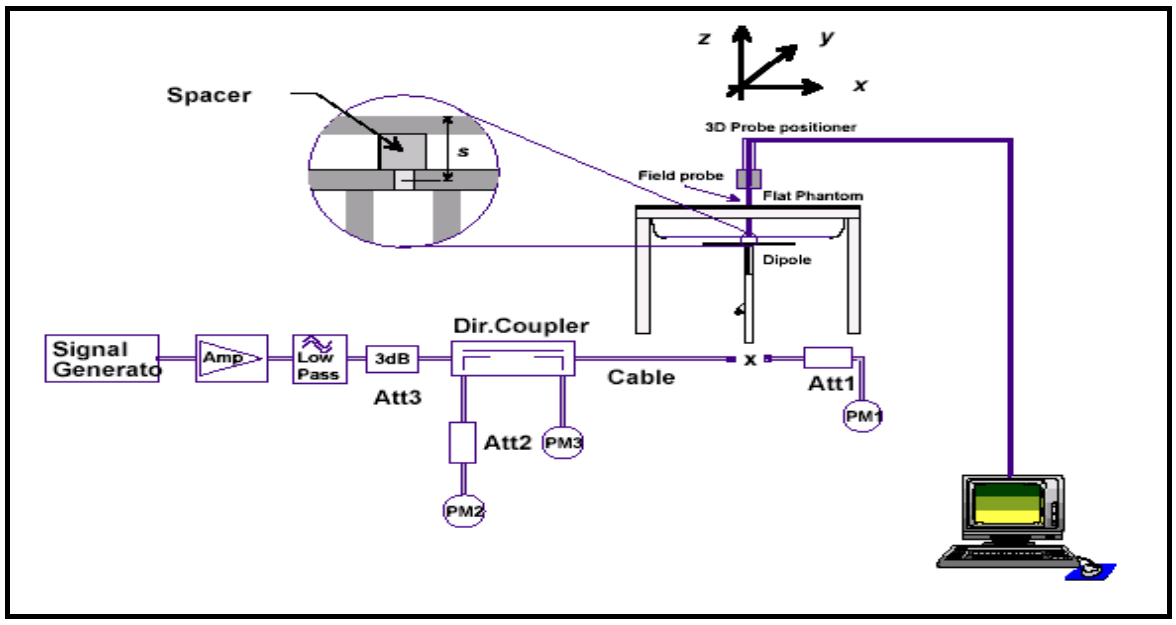
	Wimax body	
Date	February 3, 2008	
Liquid Temperature(°C)	22 .0°C	
	Recommended Value	Measured Value
Dielectric Constant (ε)	52.51±2.6255	**52.6**
Conductivity(σ)	2.16 ±0.108	**2.13**

8.2 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 8.2

Table 8.2 System Validation Results

Tissue	Date	Liquid Temperature (°C)	Targeted SAR (mW/g)	Measured SAR (mW/g)	Deviation (%)
			1g	1g	1g
2600 MHz Body	February 3, 2008	22 .0°C	13.877	**14.80**	**6.65**



Dipole Validation Test Setup

8.3 Measurement Result of Test Data (Wimax Validation)

Date/Time: 2008-02-03 9:56:19

Test Laboratory: Nemko Korea File Name: TARCMU-300 WIBRO Validation.da4

DUT: Dipole 2600 MHz Type: D2600V2 Serial: D2600V2 - SN:1010 Applicant Name: C-motech Co.,Ltd

Communication System: CW Frequency: 2600 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 2600 MHz; σ = 2.13 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

CMU-300 WIBRO Validation/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 16.0 mW/g

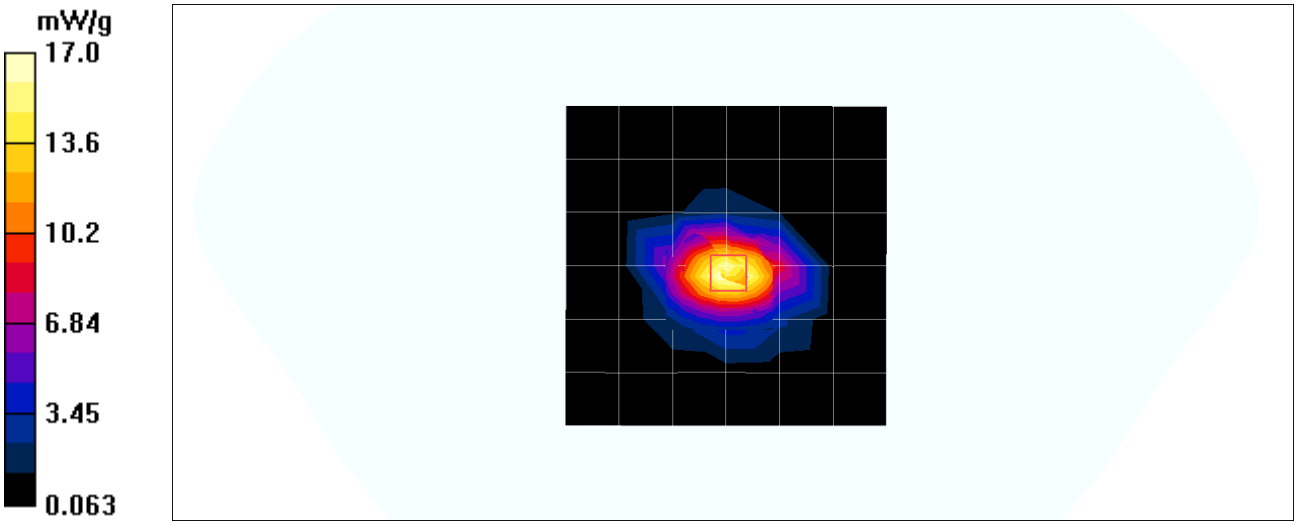
CMU-300 WIBRO Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.0 V/m; Power Drift = 0.063 dB

Peak SAR (extrapolated) = 33.3 W/kg

SAR(1 g) = 14.8 mW/g

Maximum value of SAR (measured) = 17.0 mW/g



9. 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**

Laptop	Frequency (MHz)	Position	SAR Limit (W/kg)	Measured SAR (W/kg)	Result
Samsung SENS X10 SE	2599.0	Bottom	1.6	**0.140**	**Passed**

10. SAR Data Summary

10.1 Laptop 1 [SONY PCG-6C7P]

Date of Test : February 4. 2008 ~ February 5. 2008
Mixture Type: 2600 MHz body
Tissue Depth: 15.0 Cm

Mode	Application	Frequency	Power drift (dB)	Test Position	1g SAR (W/kg)
Wimax	QPSK	2507.5	0.154	Bottom	0.054
		2599.0	-0.153	Bottom	0.072
		2684.5	0.128	Bottom	0.045
	16QAM	2599.0	-0.020	Bottom	0.070
	QPSK	2507.5	0.141	Side	0.071
		2599.0	0.141	Side	0.103
		2684.5	0.164	Side	0.102
	16QAM	2599.0	-0.057	Side	0.101

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: 2008-02-05 10:33:06

Test Laboratory: Nemko Korea File Name: SONY PCG-6C7P Bottom Touch Position 2507.5 MHz.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2507.5 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2507.5 MHz; σ = 2.01 mho/m; ε_r = 52.7; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SONY PCG-6C7P Bottom Touch Position 2507.5 MHz/Area Scan (5x8x1):

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.053 mW/g

SONY PCG-6C7P Bottom Touch Position 2507.5 MHz/Zoom Scan (7x7x7)/Cube 0:

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

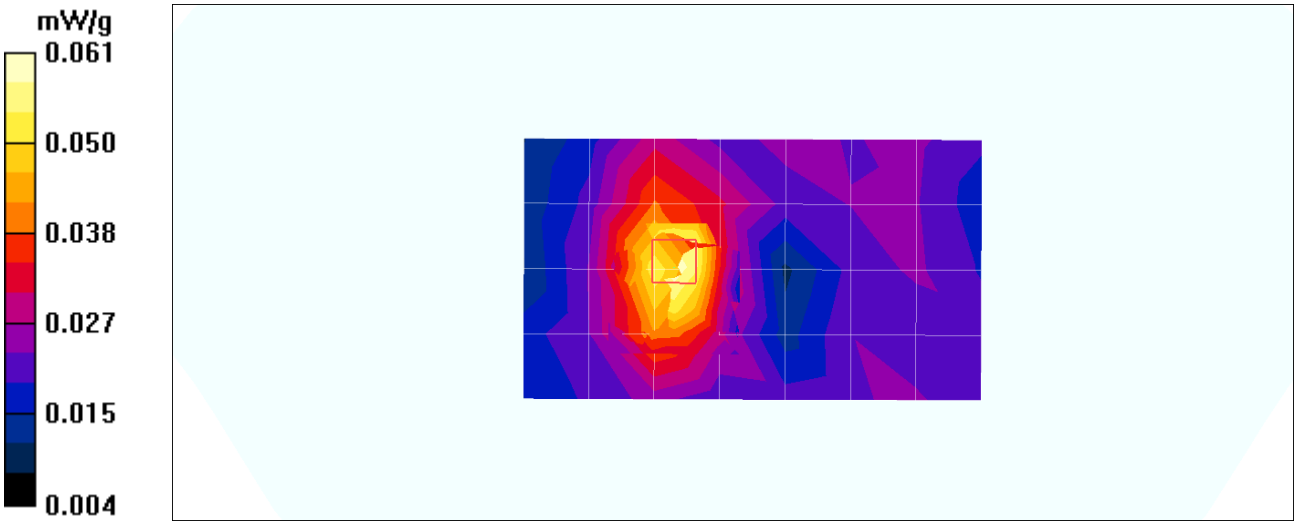
Reference Value = 3.12 V/m; Power Drift = 0.154 dB

Peak SAR (extrapolated) = 0.100 W/kg

SAR(1 g) = 0.054 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.061 mW/g



Date/Time: 2008-02-05 9:18:33

Test Laboratory: Nemko Korea File Name: SONY PCG-6C7P Bottom Touch Position 2599.0 MHz.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2599 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used: f = 2599 MHz; σ = 2.13 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SONY PCG-6C7P Bottom Touch Position 2599.0 MHz/Area Scan (5x8x1):

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

Maximum value of SAR (measured) = 0.065 mW/g

SONY PCG-6C7P Bottom Touch Position 2599.0 MHz/Zoom Scan (7x7x7)/Cube 0:

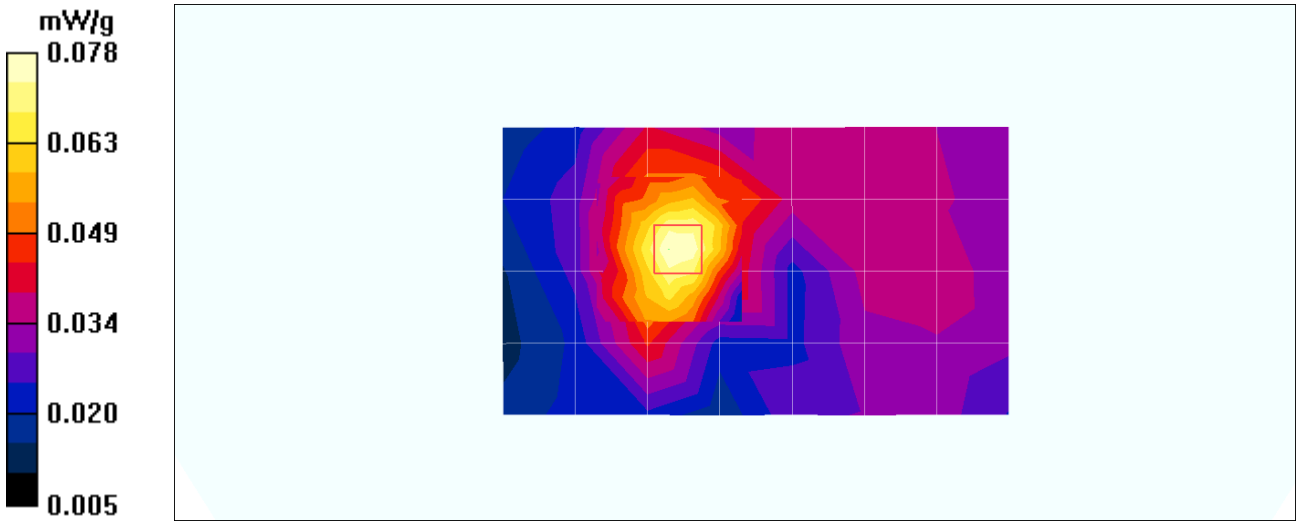
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.83 V/m; Power Drift = -0.153 dB

Peak SAR (extrapolated) = 0.146 W/kg

SAR(1 g) = 0.072 mW/g

Maximum value of SAR (measured) = 0.078 mW/g



Date/Time: 2008-02-05 10:54:21

Test Laboratory: Nemko Korea File Name: SONY PCG-6C7P Bottom Touch Position 2684.5 MHz.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2684.5 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2684.5 MHz; σ = 2.21 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SONY PCG-6C7P Bottom Touch Position 2684.5 MHz/Area Scan (5x8x1):

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.048 mW/g

SONY PCG-6C7P Bottom Touch Position 2684.5 MHz/Zoom Scan (7x7x7)/Cube 0:

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

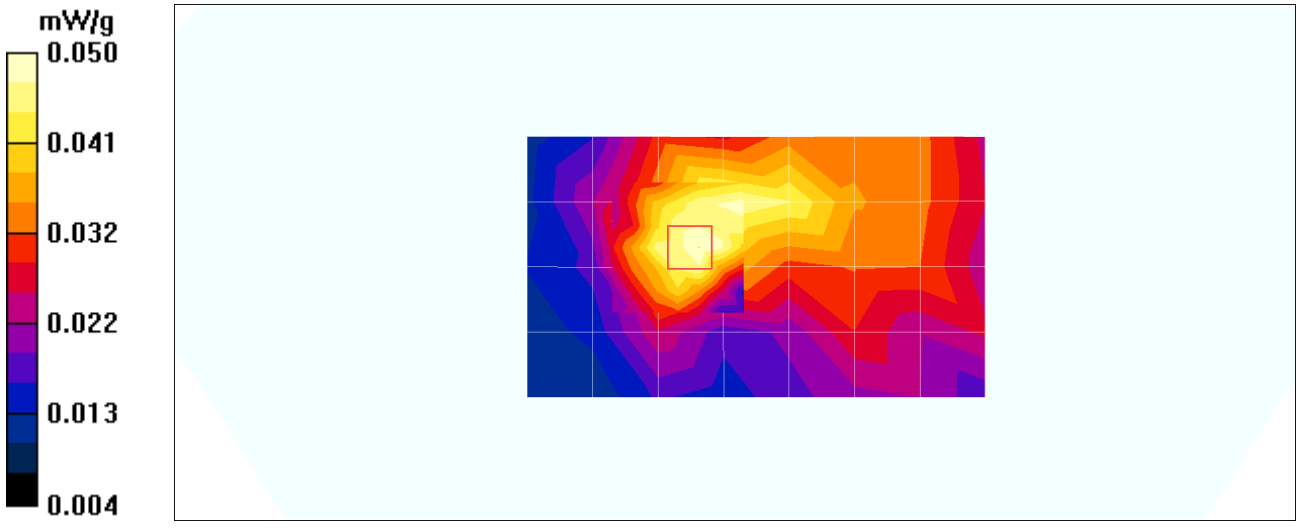
Reference Value = 3.61 V/m; Power Drift = 0.128 dB

Peak SAR (extrapolated) = 0.098 W/kg

SAR(1 g) = 0.045 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.050 mW/g



Date/Time: 2008-02-05 10:13:30

Test Laboratory: Nemko Korea File Name: SONY PCG-6C7P Bottom Touch Position 2599.0 MHz_QAM.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2599 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used: f = 2599 MHz; σ = 2.13 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SONY PCG-6C7P Bottom Touch Position 2599.0 MHz_QAM/Area Scan (5x8x1):

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

Maximum value of SAR (measured) = 0.071 mW/g

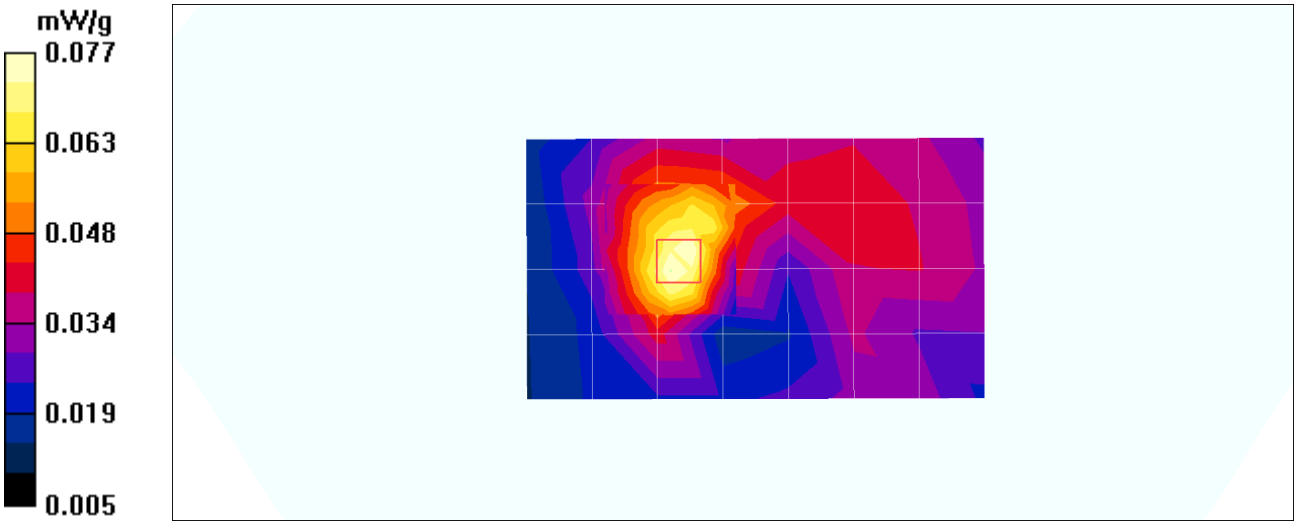
SONY PCG-6C7P Bottom Touch Position 2599.0 MHz_QAM/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.42 V/m; Power Drift = -0.020 dB

Peak SAR (extrapolated) = 0.137 W/kg

SAR(1 g) = 0.070 mW/g

Maximum value of SAR (measured) = 0.077 mW/g



Date/Time: 2008-02-04 7:09:09

Test Laboratory: Nemko Korea File Name: SONY PCG-6C7P Side Position 2507.5 MHz.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2507.5 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2507.5 MHz; σ = 2.01 mho/m; ε_r = 52.7; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SONY PCG-6C7P Side Position 2507.5 MHz/Area Scan (5x8x1): Measurement grid:

dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.071 mW/g

SONY PCG-6C7P Side Position 2507.5 MHz/Zoom Scan (7x7x7)/Cube 0:

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

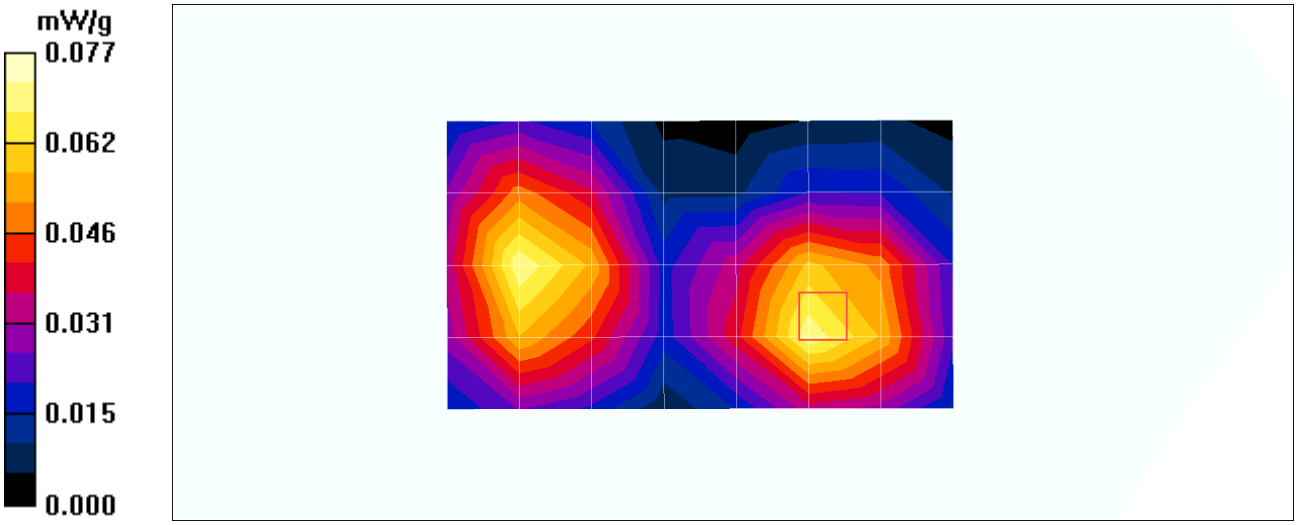
Reference Value = 5.29 V/m; Power Drift = 0.141 dB

Peak SAR (extrapolated) = 0.135 W/kg

SAR(1 g) = 0.071 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.077 mW/g



Date/Time: 2008-02-04 6:09:46

Test Laboratory: Nemko Korea File Name: SONY PCG-6C7P Side Position 2599.0 MHz.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2599 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used: f = 2599 MHz; σ = 2.13 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SONY PCG-6C7P Side Position 2599.0 MHz/Area Scan (5x8x1): Measurement grid:

dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.101 mW/g

SONY PCG-6C7P Side Position 2599.0 MHz/Zoom Scan (7x7x7)/Cube 0:

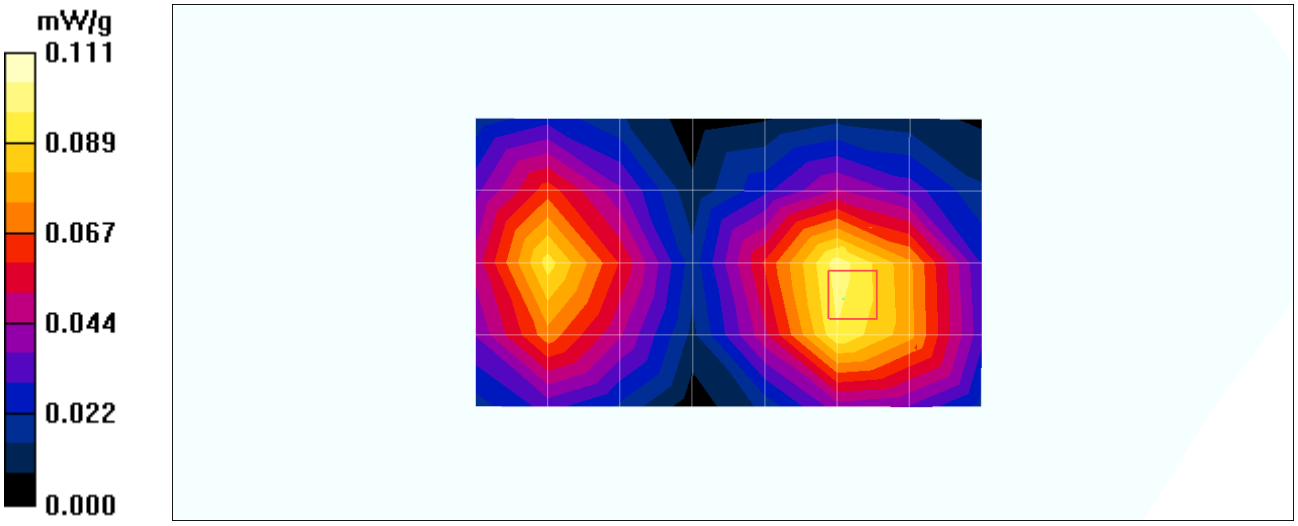
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.26 V/m; Power Drift = 0.141 dB

Peak SAR (extrapolated) = 0.205 W/kg

SAR(1 g) = 0.103 mW/g

Maximum value of SAR (measured) = 0.111 mW/g



Date/Time: 2008-02-04 7:25:56

Test Laboratory: Nemko Korea File Name: SONY PCG-6C7P Side Position 2684.5 MHz.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2684.5 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2684.5 MHz; σ = 2.21 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SONY PCG-6C7P Side Position 2684.5 MHz/Area Scan (5x8x1): Measurement grid:

dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.103 mW/g

SONY PCG-6C7P Side Position 2684.5 MHz/Zoom Scan (7x7x7)/Cube 0:

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

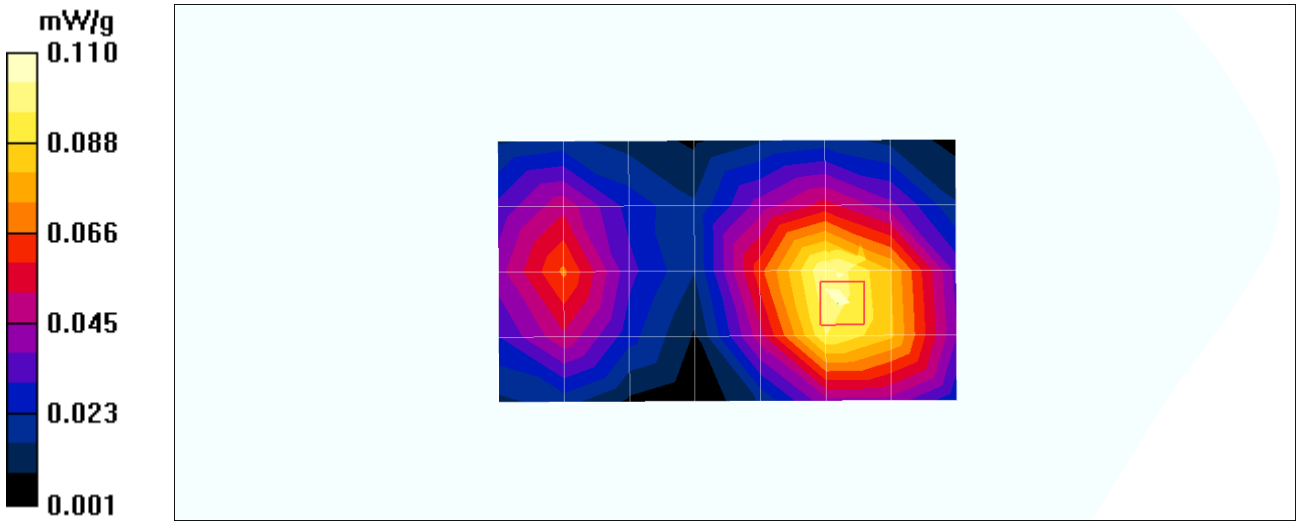
Reference Value = 3.87 V/m; Power Drift = 0.164 dB

Peak SAR (extrapolated) = 0.205 W/kg

SAR(1 g) = 0.102 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.110 mW/g



Date/Time: 2008-02-04 7:44:17

Test Laboratory: Nemko Korea File Name: SONY PCG-6C7P Side Position 2599.0 MHz_QAM.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2599 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used: f = 2599 MHz; σ = 2.13 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SONY PCG-6C7P Side Position 2599.0 MHz_QAM/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.099 mW/g

SONY PCG-6C7P Side Position 2599.0 MHz_QAM/Zoom Scan (7x7x7)/Cube 0:

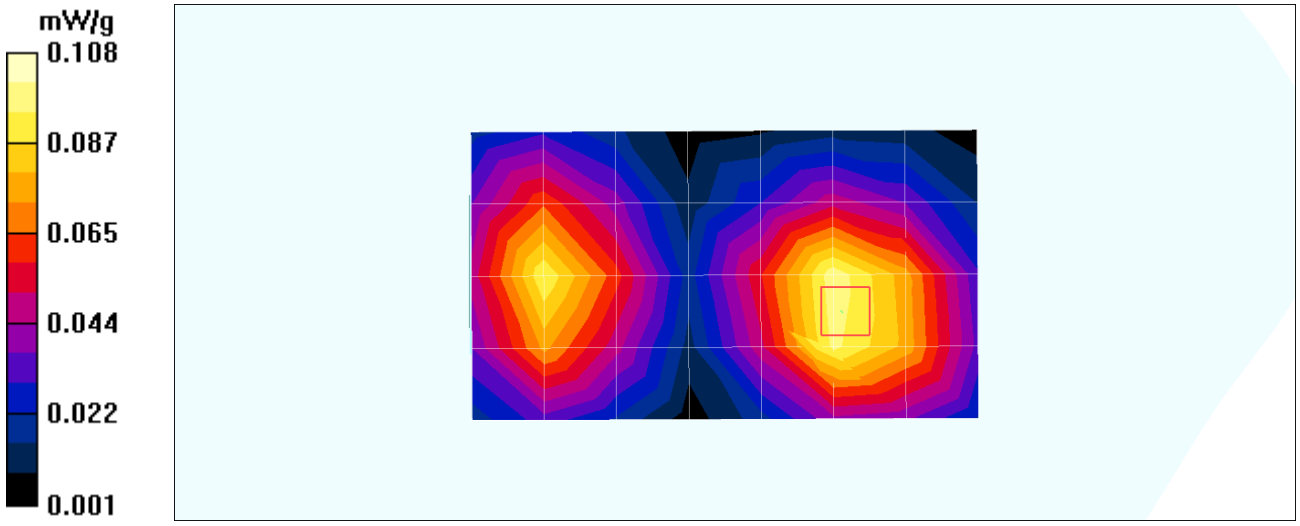
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.44 V/m; Power Drift = -0.057 dB

Peak SAR (extrapolated) = 0.190 W/kg

SAR(1 g) = 0.101 mW/g

Maximum value of SAR (measured) = 0.108 mW/g



Date/Time: 2008-02-04 6:09:46

Test Laboratory: Nemko Korea File Name: SONY PCG-6C7P Side Position 2599.0 MHz.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2599 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used: f = 2599 MHz; σ = 2.13 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SONY PCG-6C7P Side Position 2599.0 MHz/Area Scan (5x8x1): Measurement grid:

dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.101 mW/g

SONY PCG-6C7P Side Position 2599.0 MHz/Zoom Scan (7x7x7)/Cube 0:

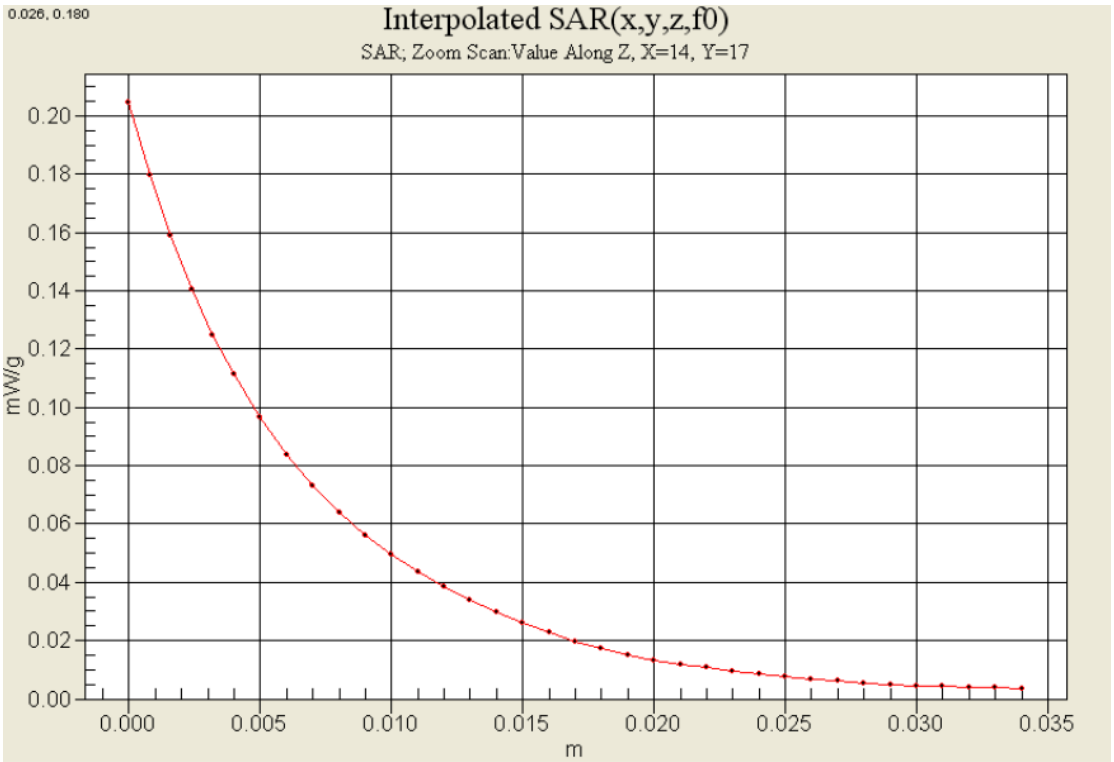
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.26 V/m; Power Drift = 0.141 dB

Peak SAR (extrapolated) = 0.205 W/kg

SAR(1 g) = 0.103 mW/g

Maximum value of SAR (measured) = 0.111 mW/g



10.2 Laptop 2 [ASUS F3J]

Date of Test : February 4. 2008 ~ February 5. 2008
Mixture Type: 2600 MHz body
Tissue Depth: 15.0 Cm

Mode	Application	Frequency	Power drift (dB)	Test Position	1g SAR (W/kg)
Wimax	QPSK	2507.5	0.070	Bottom	0.015
		2599.0	0.100	Bottom	0.027
		2684.5	0.095	Bottom	0.029
	16QAM	2599.0	-0.010	Bottom	0.026
	QPSK	2507.5	-0.094	Side	0.069
		2599.0	0.059	Side	0.083
		2684.5	0.066	Side	0.077
	16QAM	2599.0	0.003	Side	0.083

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: 2008-02-05 4:28:54

Test Laboratory: Nemko Korea File Name: ASUS F3J Bottom Touch Position 2507.5 MHz.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2507.5 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2507.5 MHz; σ = 2.01 mho/m; ε_r = 52.7; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

ASUS F3J Bottom Touch Position 2507.5 MHz/Area Scan (5x8x1): Measurement grid:

dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.015 mW/g

ASUS F3J Bottom Touch Position 2507.5 MHz/Zoom Scan (7x7x7)/Cube 0:

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

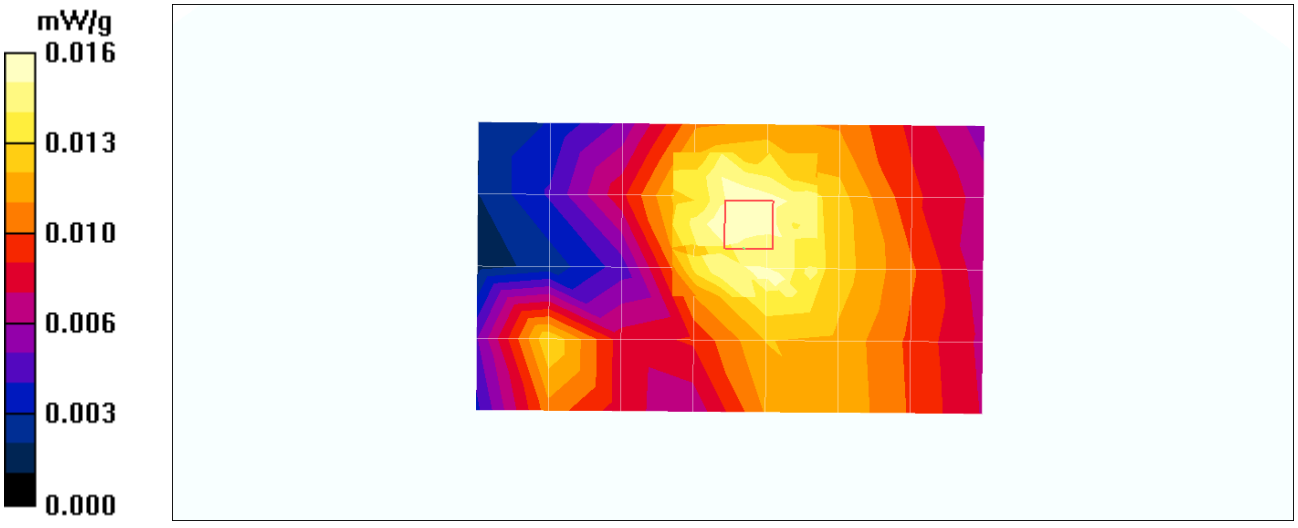
Reference Value = 2.07 V/m; Power Drift = 0.070 dB

Peak SAR (extrapolated) = 0.031 W/kg

SAR(1 g) = 0.015 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.016 mW/g



Date/Time: 2008-02-05 5:46:39

Test Laboratory: Nemko Korea File Name: ASUS F3J Bottom Touch Position 2599.0 MHz.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2599 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used: f = 2599 MHz; σ = 2.13 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

ASUS F3J Bottom Touch Position 2599.0 MHz/Area Scan (5x8x1): Measurement grid:

dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.027 mW/g

ASUS F3J Bottom Touch Position 2599.0 MHz/Zoom Scan (7x7x7)/Cube 0:

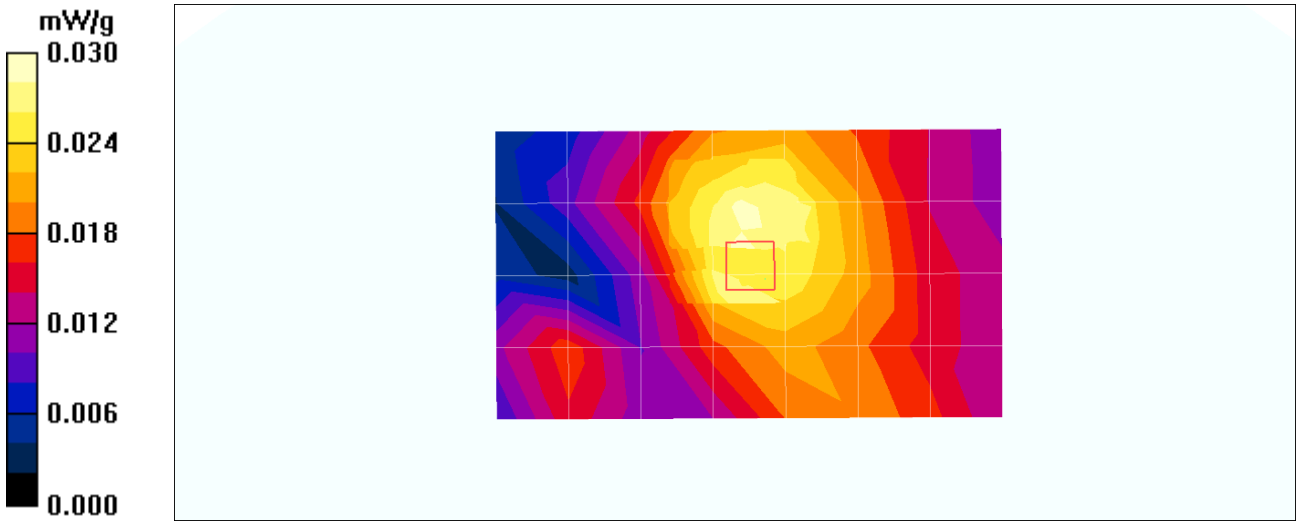
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.71 V/m; Power Drift = 0.100 dB

Peak SAR (extrapolated) = 0.053 W/kg

SAR(1 g) = 0.027 mW/g

Maximum value of SAR (measured) = 0.030 mW/g



Date/Time: 2008-02-05 6:15:53

Test Laboratory: Nemko Korea File Name: ASUS F3J Bottom Touch Position 2684.5 MHz.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2684.5 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2684.5 MHz; σ = 2.21 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

ASUS F3J Bottom Touch Position 2684.5 MHz/Area Scan (5x8x1): Measurement grid:

dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.031 mW/g

ASUS F3J Bottom Touch Position 2684.5 MHz/Zoom Scan (7x7x7)/Cube 0:

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

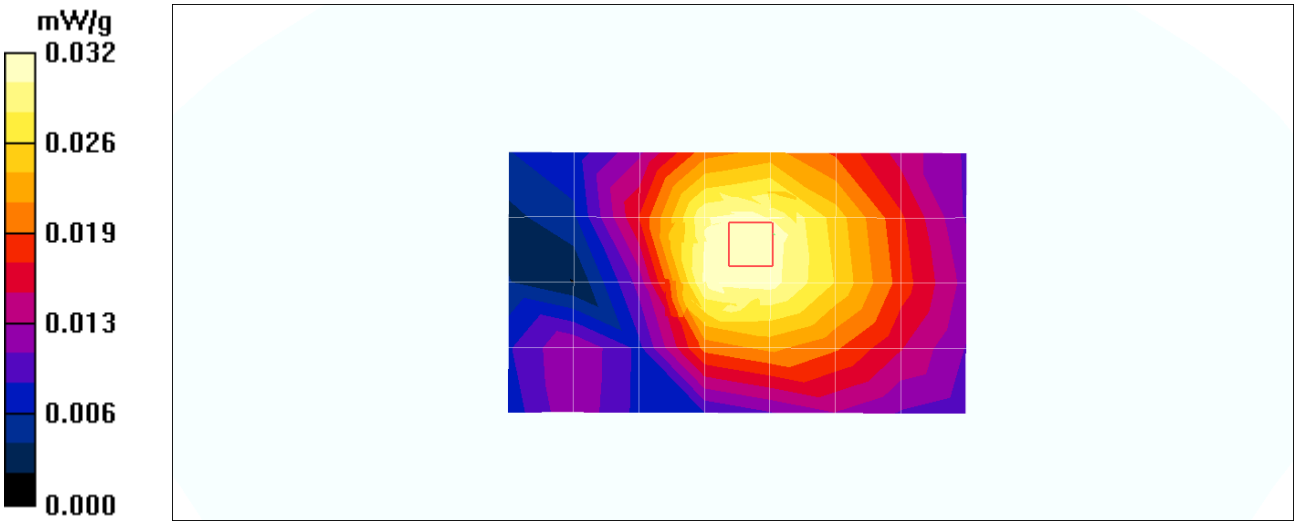
Reference Value = 2.69 V/m; Power Drift = 0.095 dB

Peak SAR (extrapolated) = 0.057 W/kg

SAR(1 g) = 0.029 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.032 mW/g



Date/Time: 2008-02-05 5:02:56

Test Laboratory: Nemko Korea File Name: ASUS F3J Bottom Touch Position 2599.0 MHz_QAM.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2599 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used: f = 2599 MHz; σ = 2.13 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

ASUS F3J Bottom Touch Position 2599.0 MHz_QAM/Area Scan (5x8x1):

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

Maximum value of SAR (measured) = 0.026 mW/g

ASUS F3J Bottom Touch Position 2599.0 MHz_QAM/Zoom Scan (7x7x7)/Cube 0:

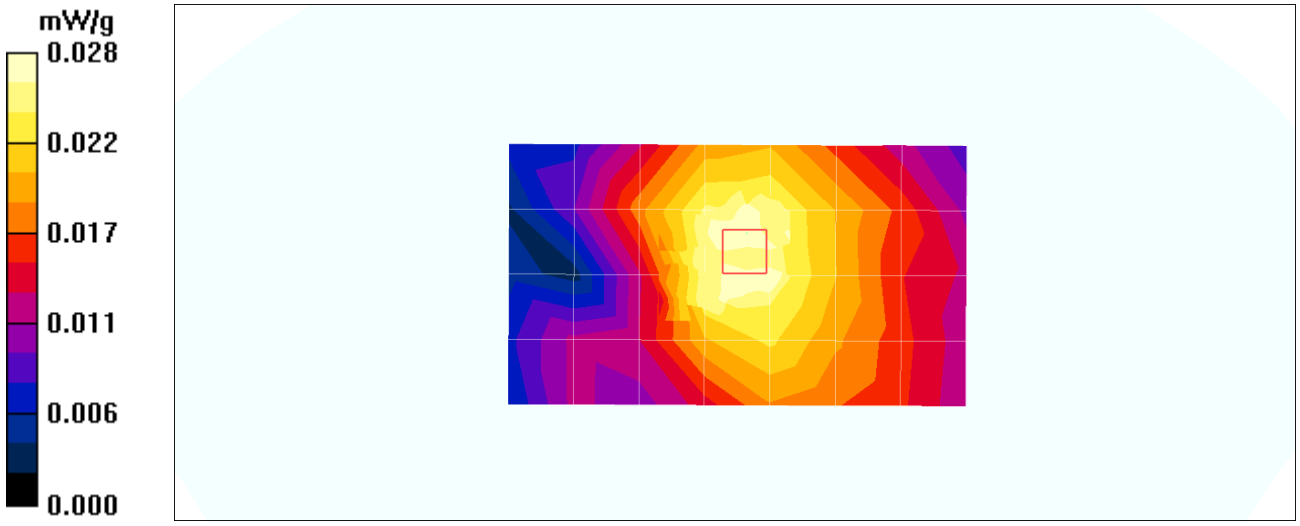
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.01 V/m; Power Drift = -0.010 dB

Peak SAR (extrapolated) = 0.055 W/kg

SAR(1 g) = 0.026 mW/g

Maximum value of SAR (measured) = 0.028 mW/g



Date/Time: 2008-02-04 11:48:47

Test Laboratory: Nemko Korea File Name: ASUS F3J Side Position 2507.5 MHz.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2507.5 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2507.5 MHz; σ = 2.01 mho/m; ε_r = 52.7; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

ASUS F3J Side Position 2507.5 MHz/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.071 mW/g

ASUS F3J Side Position 2507.5 MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm

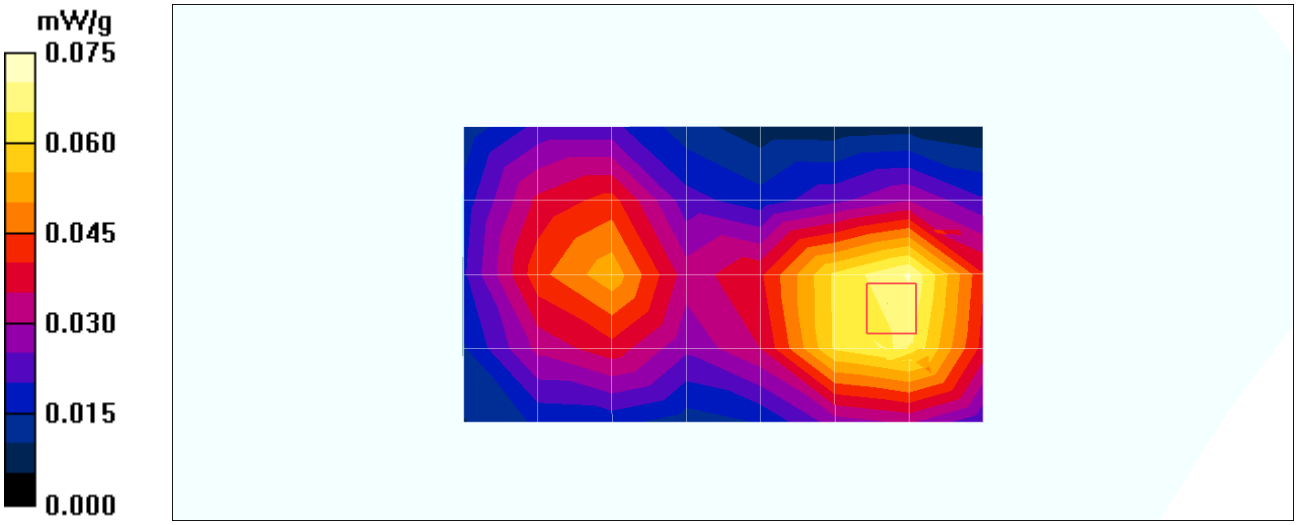
Reference Value = 5.24 V/m; Power Drift = -0.094 dB

Peak SAR (extrapolated) = 0.130 W/kg

SAR(1 g) = 0.069 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.075 mW/g



Date/Time: 2008-02-04 2:34:23

Test Laboratory: Nemko Korea File Name: ASUS F3J Side Position 2599 MHz.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2599 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used: f = 2599 MHz; σ = 2.13 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

ASUS F3J Side Position 2599.0 MHz/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.085 mW/g

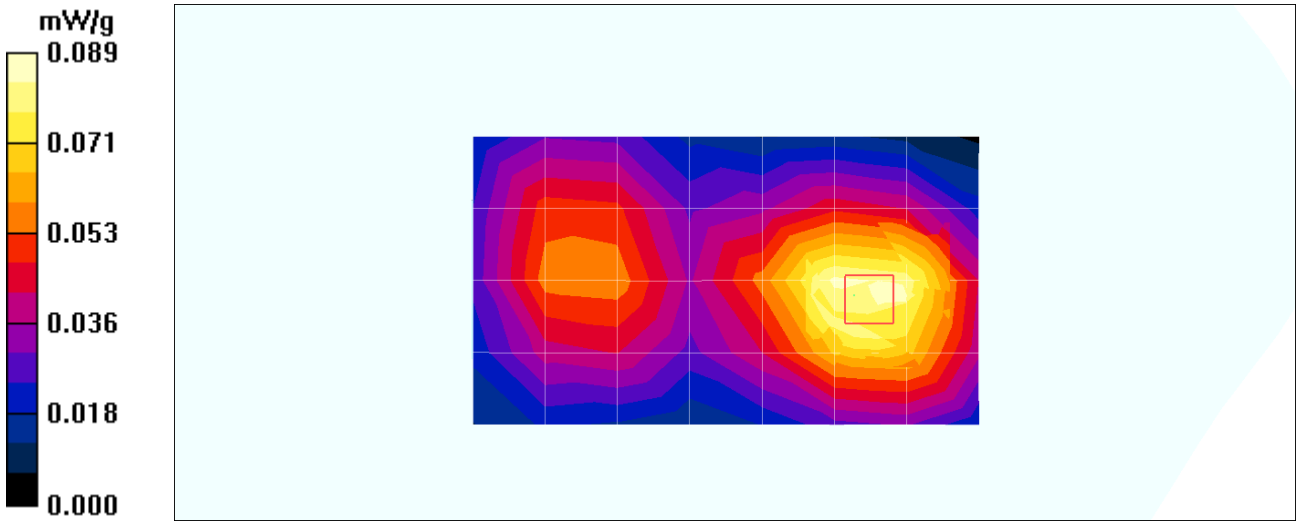
ASUS F3J Side Position 2599.0 MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.20 V/m; Power Drift = 0.059 dB

Peak SAR (extrapolated) = 0.158 W/kg

SAR(1 g) = 0.083 mW/g

Maximum value of SAR (measured) = 0.089 mW/g



Date/Time: 2008-02-04 1:55:14

Test Laboratory: Nemko Korea File Name: ASUS F3J Side Position 2684.5 MHz.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2684.5 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2684.5 MHz; σ = 2.21 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

ASUS F3J Side Position 2684.5 MHz/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.084 mW/g

ASUS F3J Side Position 2684.5 MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

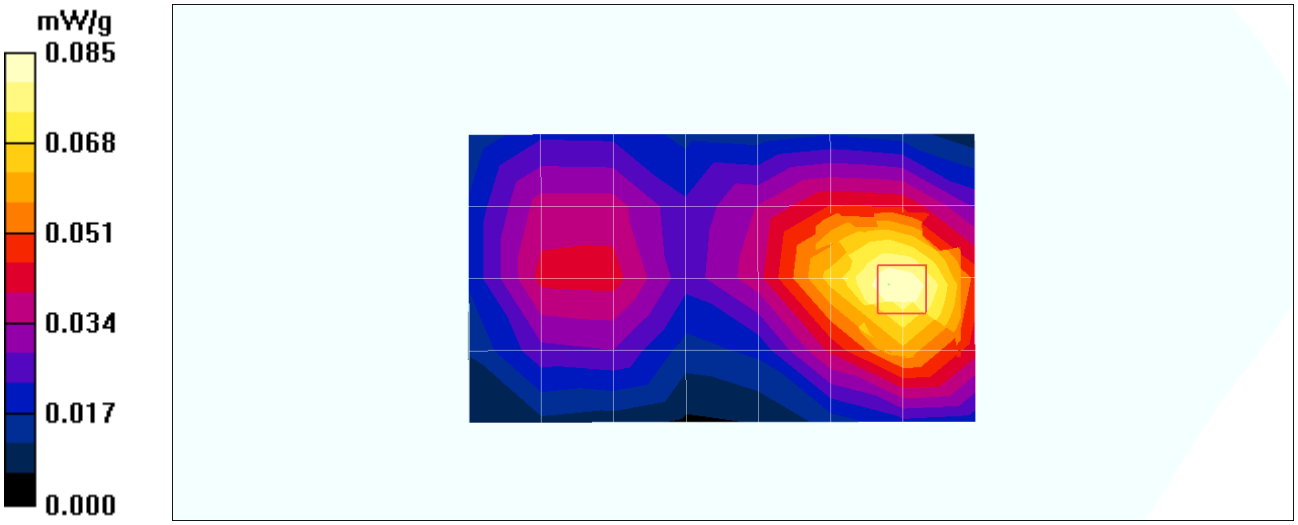
Reference Value = 4.50 V/m; Power Drift = 0.066 dB

Peak SAR (extrapolated) = 0.158 W/kg

SAR(1 g) = 0.077 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.085 mW/g



Date/Time: 2008-02-04 2:14:58

Test Laboratory: Nemko Korea File Name: ASUS F3J Side Position 2599 MHz_QAM.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2599 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used: f = 2599 MHz; σ = 2.13 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

ASUS F3J Side Position 2599.0 MHz_QAM/Area Scan (5x8x1): Measurement grid:

dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.086 mW/g

ASUS F3J Side Position 2599.0 MHz_QAM/Zoom Scan (7x7x7)/Cube 0:

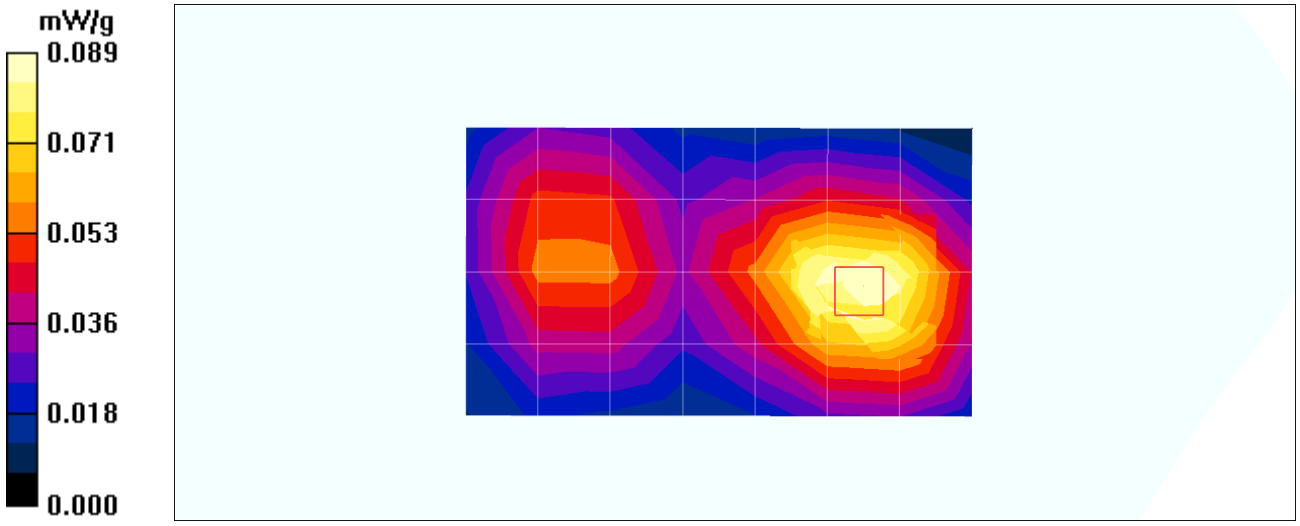
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.25 V/m; Power Drift = 0.003 dB

Peak SAR (extrapolated) = 0.159 W/kg

SAR(1 g) = 0.083 mW/g

Maximum value of SAR (measured) = 0.089 mW/g



Date/Time: 2008-02-04 2:34:23

Test Laboratory: Nemko Korea File Name: ASUS F3J Side Position 2599 MHz.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2599 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used: f = 2599 MHz; σ = 2.13 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

ASUS F3J Side Position 2599.0 MHz/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.085 mW/g

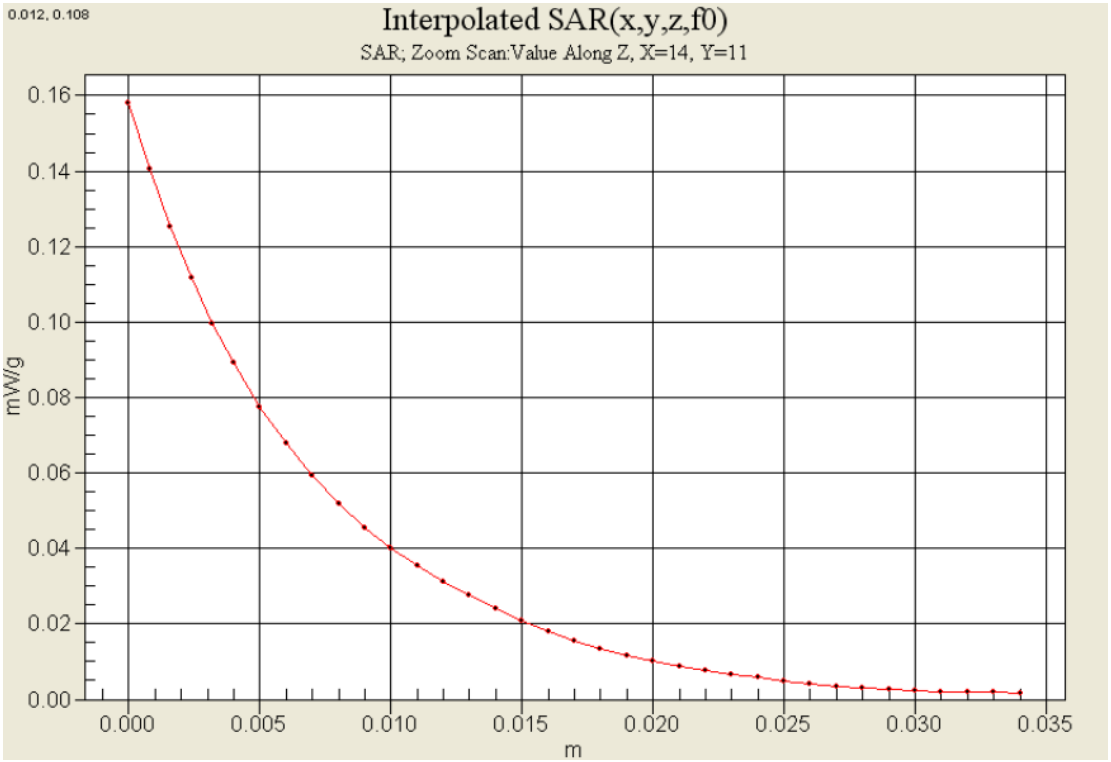
ASUS F3J Side Position 2599.0 MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.20 V/m; Power Drift = 0.059 dB

Peak SAR (extrapolated) = 0.158 W/kg

SAR(1 g) = 0.083 mW/g

Maximum value of SAR (measured) = 0.089 mW/g



10.3 Laptop 3 [SAMSUNG SENS X10 SE]

Date of Test : February 4. 2008 ~ February 5. 2008
Mixture Type: 2600 MHz body
Tissue Depth: 15.0 Cm

Mode	Application	Frequency	Power drift (dB)	Test Position	1g SAR (W/kg)
Wimax	QPSK	2507.5	-0.163	Bottom	0.097
		2599.0	0.119	Bottom	0.140
		2684.5	-0.149	Bottom	0.126
	16QAM	2599.0	0.133	Bottom	0.137
	QPSK	2507.5	-0.166	Side	0.070
		2599.0	-0.109	Side	0.089
		2684.5	0.054	Side	0.086
	16QAM	2599.0	0.098	Side	0.089

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: 2008-02-05 11:46:43

Test Laboratory: Nemko Korea File Name: SAMSUNG SENS X10 SE Bottom Touch Position 2507.5 MHz.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2507.5 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2507.5 MHz; σ = 2.01 mho/m; ε_r = 52.7; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SAMSUNG SENS X10 SE Bottom Touch Position 2507.5 MHz/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.101 mW/g

SAMSUNG SENS X10 SE Bottom Touch Position 2507.5 MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

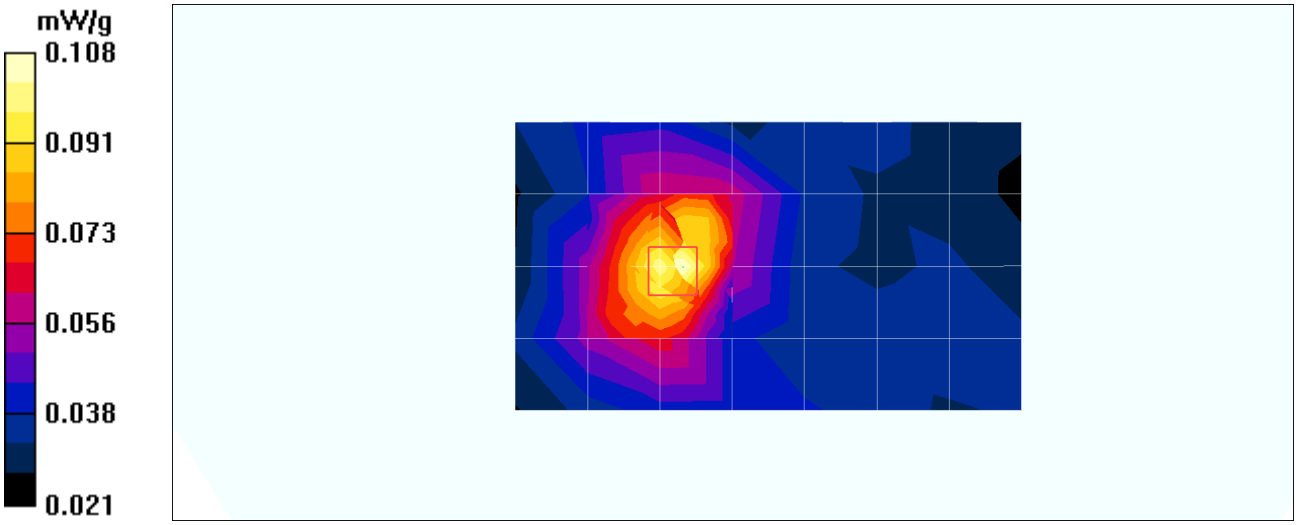
Reference Value = 4.33 V/m; Power Drift = -0.163 dB

Peak SAR (extrapolated) = 0.212 W/kg

SAR(1 g) = 0.097 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.108 mW/g



Date/Time: 2008-02-05 12:16:47

Test Laboratory: Nemko Korea File Name: SAMSUNG SENS X10 SE Bottom Touch Position 2599.0 MHz.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2599 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used: f = 2599 MHz; σ = 2.13 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SAMSUNG SENS X10 SE Bottom Touch Position 2599.0 MHz/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.152 mW/g

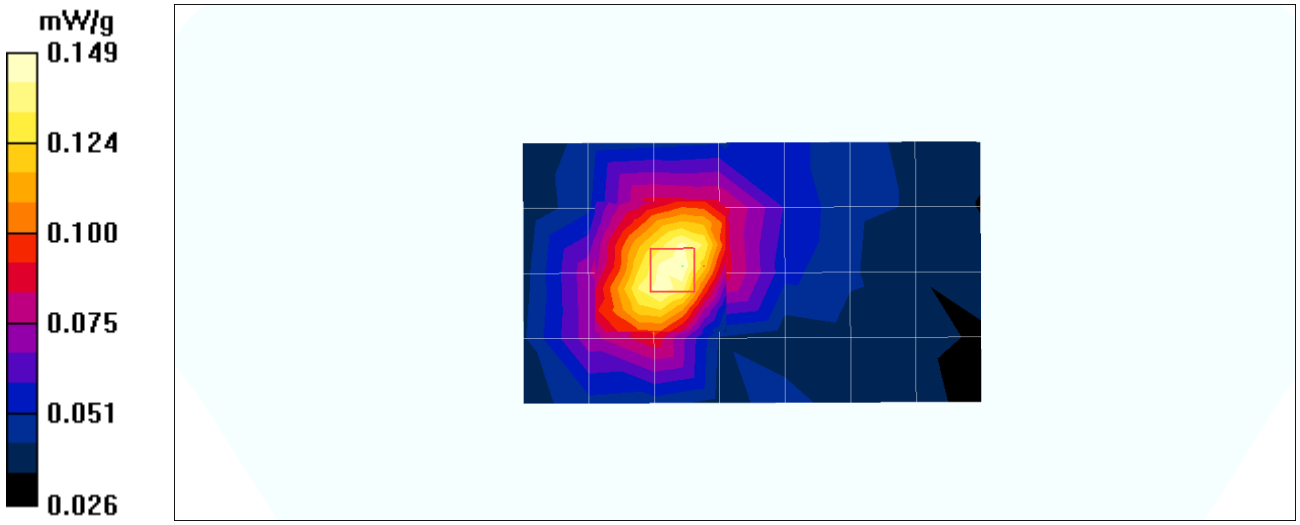
SAMSUNG SENS X10 SE Bottom Touch Position 2599.0 MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.23 V/m; Power Drift = 0.119 dB

Peak SAR (extrapolated) = 0.290 W/kg

SAR(1 g) = 0.140 mW/g

Maximum value of SAR (measured) = 0.149 mW/g



Date/Time: 2008-02-05 11:22:05

Test Laboratory: Nemko Korea File Name: SAMSUNG SENS X10 SE Bottom Touch Position 2684.5 MHz.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2684.5 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2684.5 MHz; σ = 2.21 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SAMSUNG SENS X10 SE Bottom Touch Position 2684.5 MHz/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.130 mW/g

SAMSUNG SENS X10 SE Bottom Touch Position 2684.5 MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

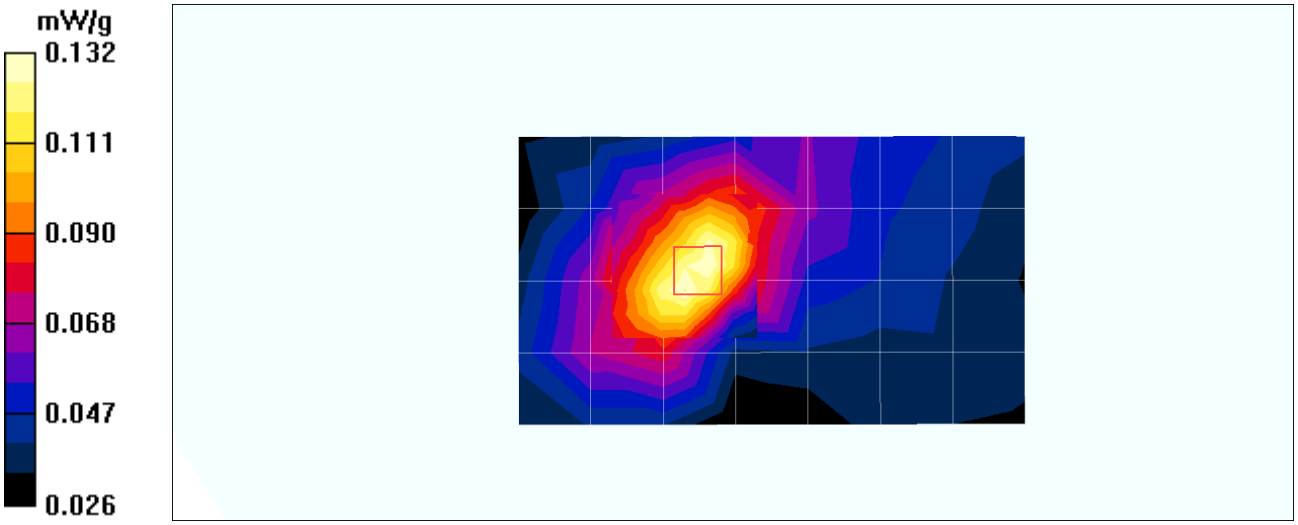
Reference Value = 5.78 V/m; Power Drift = -0.149 dB

Peak SAR (extrapolated) = 0.301 W/kg

SAR(1 g) = 0.126 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.132 mW/g



Date/Time: 2008-02-05 2:19:40

Test Laboratory: Nemko Korea File Name: SAMSUNG SENS X10 SE Bottom Touch Position 2599.0 MHz_QAM.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2599 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used: f = 2599 MHz; σ = 2.13 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SAMSUNG SENS X10 SE Bottom Touch Position 2599.0 MHz_QAM/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.148 mW/g

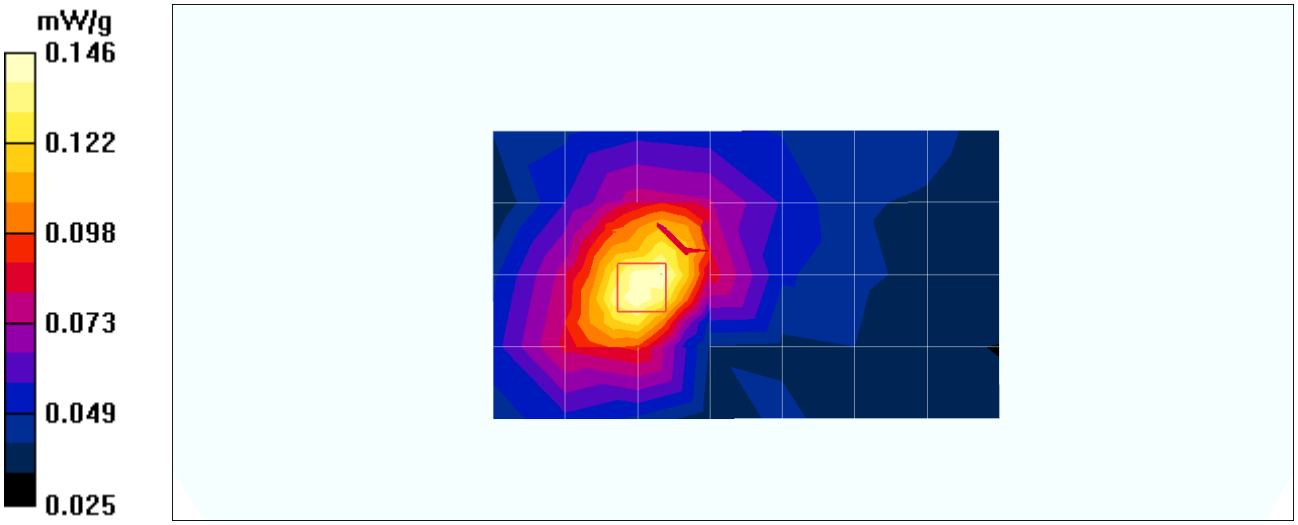
SAMSUNG SENS X10 SE Bottom Touch Position 2599.0 MHz_QAM/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.43 V/m; Power Drift = 0.133 dB

Peak SAR (extrapolated) = 0.285 W/kg

SAR(1 g) = 0.137 mW/g

Maximum value of SAR (measured) = 0.146 mW/g



Date/Time: 2008-02-05 12:16:47

Test Laboratory: Nemko Korea File Name: SAMSUNG SENS X10 SE Bottom Touch Position 2599.0 MHz.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2599 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used: f = 2599 MHz; σ = 2.13 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SAMSUNG SENS X10 SE Bottom Touch Position 2599.0 MHz/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.152 mW/g

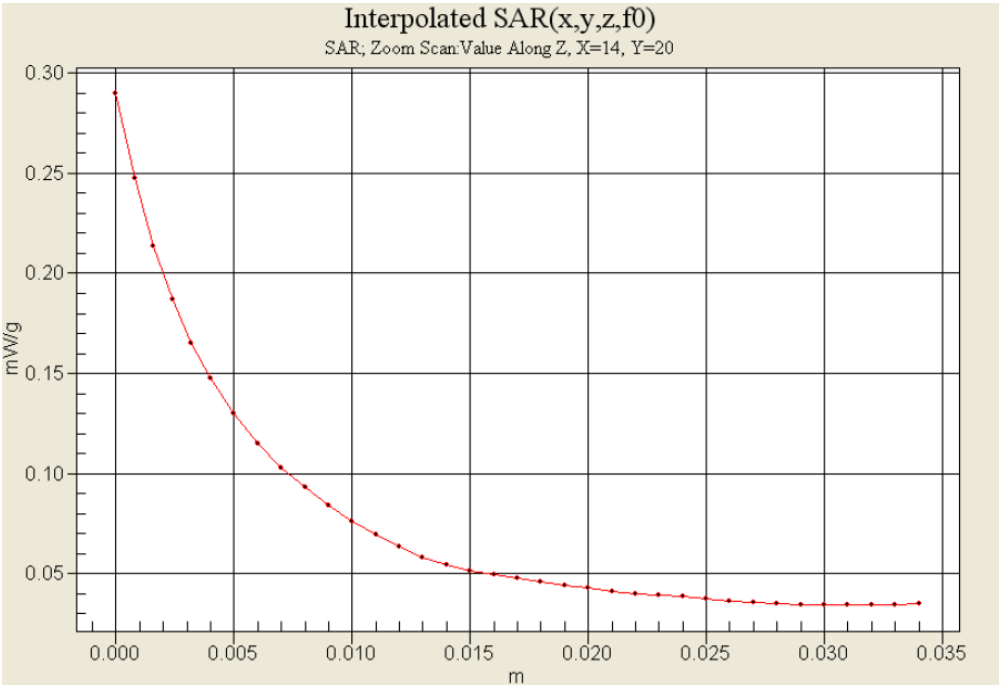
SAMSUNG SENS X10 SE Bottom Touch Position 2599.0 MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.23 V/m; Power Drift = 0.119 dB

Peak SAR (extrapolated) = 0.290 W/kg

SAR(1 g) = 0.140 mW/g

Maximum value of SAR (measured) = 0.149 mW/g



Date/Time: 2008-02-04 3:59:55

Test Laboratory: Nemko Korea File Name: SAMSUNG SENS X10 SE Side Position 2507.5 MHz.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2507.5 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2507.5 MHz; σ = 2.01 mho/m; ε_r = 52.7; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SAMSUNG SENS X10 SE Side Position 2507.5 MHz/Area Scan (5x8x1):

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.075 mW/g

SAMSUNG SENS X10 SE Side Position 2507.5 MHz/Zoom Scan (7x7x7)/Cube 0:

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

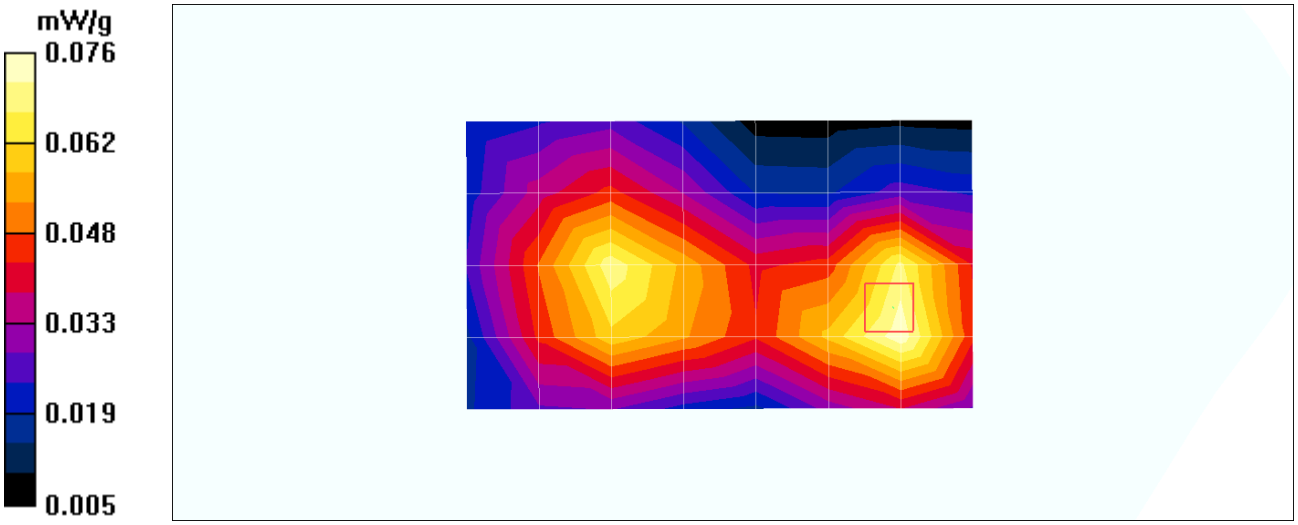
Reference Value = 6.11 V/m; Power Drift = -0.166 dB

Peak SAR (extrapolated) = 0.131 W/kg

SAR(1 g) = 0.070 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.076 mW/g



Date/Time: 2008-02-04 3:22:21

Test Laboratory: Nemko Korea File Name: SAMSUNG SENS X10 SE Side Position 2599 MHz.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2599 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used: f = 2599 MHz; σ = 2.13 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SAMSUNG SENS X10 SE Side Position 2599.0 MHz/Area Scan (5x8x1):

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

Maximum value of SAR (measured) = 0.085 mW/g

SAMSUNG SENS X10 SE Side Position 2599.0 MHz/Zoom Scan (7x7x7)/Cube 0:

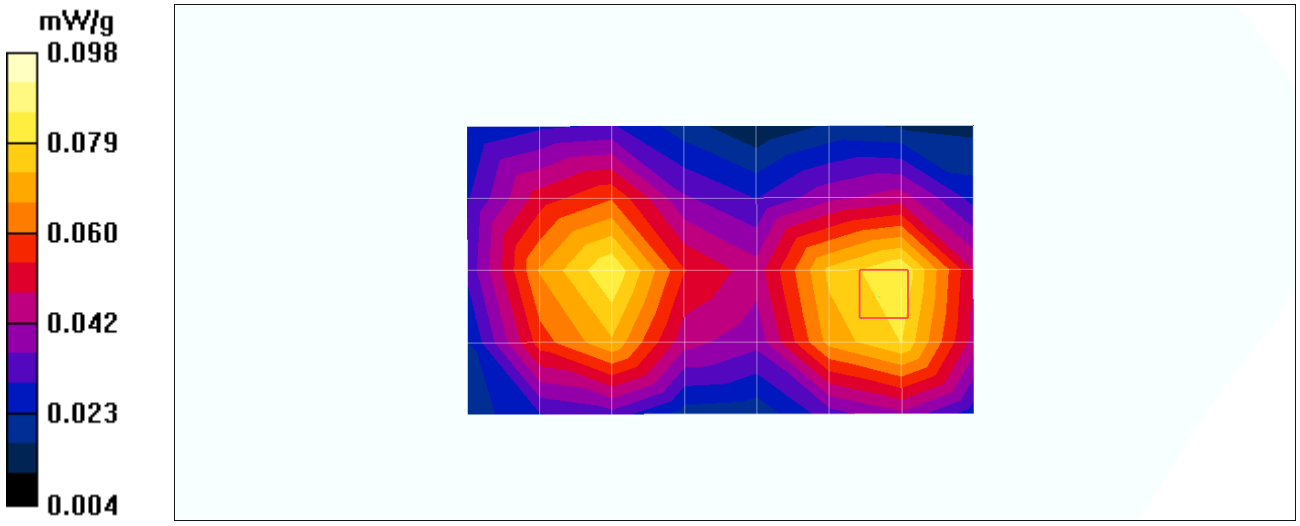
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.51 V/m; Power Drift = -0.109 dB

Peak SAR (extrapolated) = 0.171 W/kg

SAR(1 g) = 0.089 mW/g

Maximum value of SAR (measured) = 0.098 mW/g



Date/Time: 2008-02-04 4:48:15

Test Laboratory: Nemko Korea File Name: SAMSUNG SENS X10 SE Side Position 2684.5 MHz.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2684.5 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2684.5 MHz; σ = 2.21 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SAMSUNG SENS X10 SE Side Position 2684.5 MHz/Area Scan (5x8x1):

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.089 mW/g

SAMSUNG SENS X10 SE Side Position 2684.5 MHz/Zoom Scan (7x7x7)/Cube 0:

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

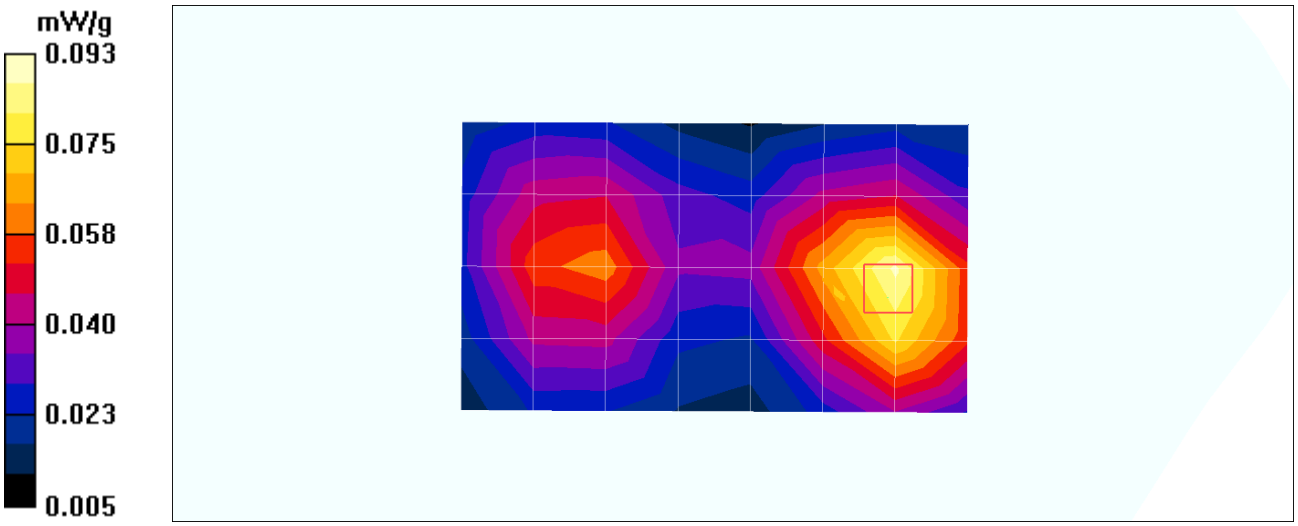
Reference Value = 5.21 V/m; Power Drift = 0.054 dB

Peak SAR (extrapolated) = 0.172 W/kg

SAR(1 g) = 0.086 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.093 mW/g



Date/Time: 2008-02-04 3:39:23

Test Laboratory: Nemko Korea File Name: SAMSUNG SENS X10 SE Side Position 2599 MHz_QAM.da4

DUT: CMU-300 Type: USB Modem Serial: 00000001 Applicant Name: C-motech Co., Ltd

Communication System: Wimax Frequency: 2599 MHz

Duty Cycle: 1:3.17 Phantom section: Flat Section

Medium parameters used: f = 2599 MHz; σ = 2.13 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068add; ConvF(3.65, 3.65, 3.65); Calibrated: 2007-11-19

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2007-04-04

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

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SAMSUNG SENS X10 SE Side Position 2599.0 MHz_QAM/Area Scan (5x8x1):

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

Maximum value of SAR (measured) = 0.089 mW/g

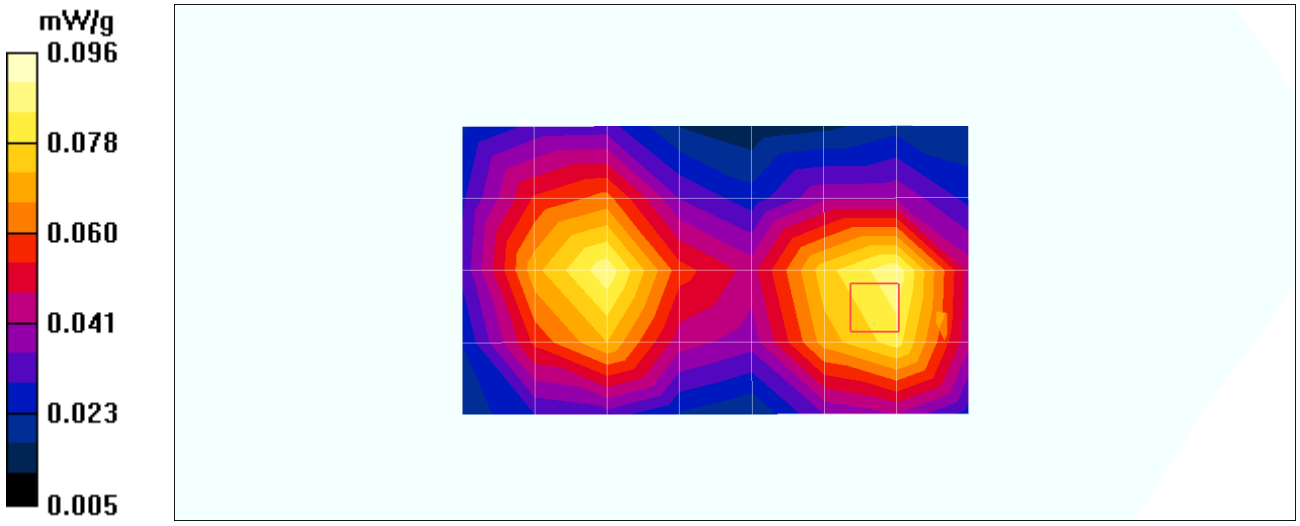
SAMSUNG SENS X10 SE Side Position 2599.0 MHz_QAM/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.51 V/m; Power Drift = 0.098 dB

Peak SAR (extrapolated) = 0.172 W/kg

SAR(1 g) = 0.089 mW/g

Maximum value of SAR (measured) = 0.096 mW/g



12. SAR Test Equipment

Table 12.1 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	April.04. 2007	1 year
E-Field Probe	ES3DV3	3068add	November.19.2007	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	November.21.2006	2 year
Validation Dipole Antenna	D1900V2	5d059	April.29. 2006	2 year
Validation Dipole Antenna	D2600V2	1010	November.06.2007	2 year
VSA Series Transmitter Tester	E4406A	US39480757	August.07.2007	1 year
PSA Series Spectrum Analyzer	E4440A	MY44022567	December.04.2007	1 year
Wireless Communications Test Set	8960 Series 10	GB43193659	June.18. 2007	1 year
Dielectric Probe Kit	85070E	MY44300121	N/A	N/A
Network Analyzer	8753ES	US39171172	Mar.06. 2007	1 year
Power Amplifier	5303075	509/0743	November.05.2007	1 year
Power Meter	437B	2912U01687	December.04.2007	1 year
Power Sensor	8481A	3318A83210	August.08.2007	1 year
Power Meter	NRVS	835360/002	December.04.2007	1 year
Power Sensor	NRV-Z32	836019/028	December.04.2007	1 year
Series Signal Generator	E4436B	US39260598	December.05.2007	1 year
Mobile Wimax Tester	E6651A	KR47220125	July.13.2007	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.

13. 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

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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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: **ES3-3068_Nov07**

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3068
Calibration procedure(s)	QA CAL-01.v6 Calibration procedure for dosimetric E-field probes
Calibration date:	November 19, 2007 (Additional Conversion Factor)
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 E4419B	GB41293874	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Power sensor E4412A	MY41495277	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Power sensor E4412A	MY41498087	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Reference 3 dB Attenuator	SN: S5054 (3c)	8-Aug-07 (METAS, No. 217-00719)	Aug-08
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-07 (METAS, No. 217-00671)	Mar-08
Reference 30 dB Attenuator	SN: S5129 (30b)	8-Aug-07 (METAS, No. 217-00720)	Aug-08
Reference Probe ES3DV2	SN: 3013	4-Jan-07 (SPEAG, No. ES3-3013_Jan07)	Jan-08
DAE4	SN: 654	20-Apr-07 (SPEAG, No. DAE4-654_Apr07)	Apr-08

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, 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: November 20, 2007

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: ES3-3068_Nov07 Page 1 of5

Calibration Laboratory of
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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConF	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 ES3DV3

SN:3068

Additional Conversion Factor

Manufactured:	December 14, 2004
Last calibrated:	March 20, 2007
Recalibrated:	November 19, 2007

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

ES3DV3 SN:3068 **November 19, 2007**

DASY - Parameters of Probe: ES3DV3 SN:3068

Sensitivity in Free Space[A] Diode Compression[B]

NormX	**1.32** ± 10.1%	μV/(V/m)^2	DCP X	**93** mV
NormY	**1.18** ± 10.1%	μV/(V/m)^2	DCP Y	**94** mV
NormZ	**1.18** ± 10.1%	μV/(V/m)^2	DCP Z	**96** mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 5.

Boundary Effect

TSL **2600 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		**3.0 mm**	**4.0 mm**
SAR_{be} [%]	Without Correction Algorithm	6.2	2.7
SAR_{be} [%]	With Correction Algorithm	0.1	0.2

Sensor Offset

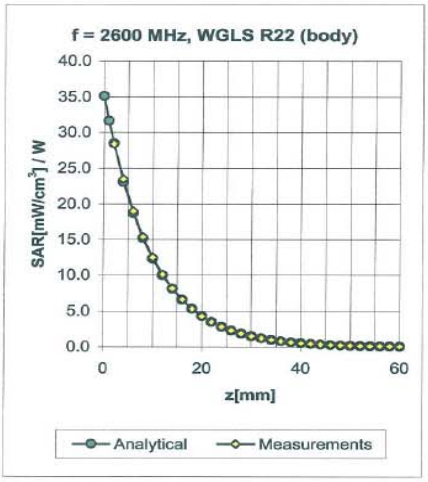
Probe Tip to Sensor Center	**2.0** mm

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.

ES3DV3 SN:3068 November 19, 2007

Conversion Factor Assessment



f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
2600	± 50 / ± 100	Body	52.5 ± 5%	2.16 ± 5%	0.85	1.13	3.65	± 11.8% (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: ES3-3068_Nov07 Page 5 of 5

Appendix C : Dipole Calibrations

Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

Client: Nemko (Dymstec)

Certificate No: D2600V2-1010_Nov07

CALIBRATION CERTIFICATE

Object	D2600V2 - SN: 1010
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	November 06, 2007
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 ES3DV2	SN: 3025	26-Oct-07 (SPEAG, No. ES3-3025_Oct07)	Oct-08
DAE4	SN: 601	30-Jan-07 (SPEAG, No. DAE4-601_Jan07)	Jan-08

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-08
RF generator R&S SMT-06	100005	4-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: November 20, 2007

Calibration Laboratory of
Schmid & Partner
Engineering AG
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 V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.8 ± 6 %	1.92 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	14.3 mW / g
SAR normalized	normalized to 1W	57.2 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**56.8 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.38 mW / g
SAR normalized	normalized to 1W	25.5 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**25.3 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	49.4 Ω - 4.9 jΩ
Return Loss	– 26.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.149 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 12, 2007

DASY4 Validation Report for Head TSL

Date/Time: 06.11.2007 17:07:53

Test Laboratory: SPEAG, Zurich, Switzerland

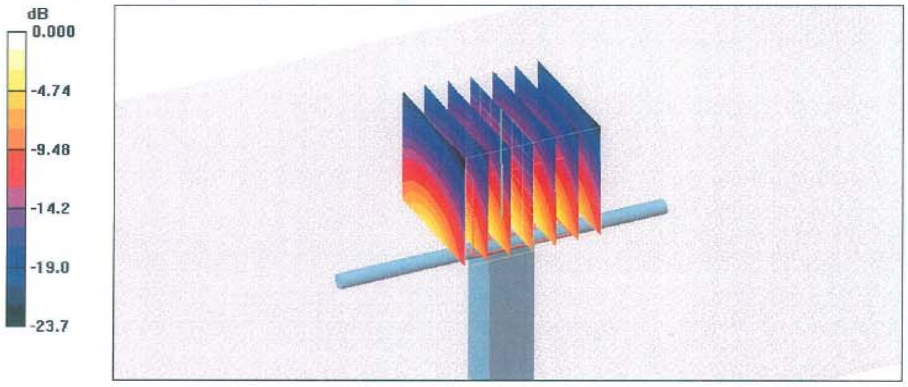
DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN1010

Communication System: CW-2600; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: HSL U10 BB;
Medium parameters used: f = 2600 MHz; σ = 1.92 mho/m; ε_r = 37.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

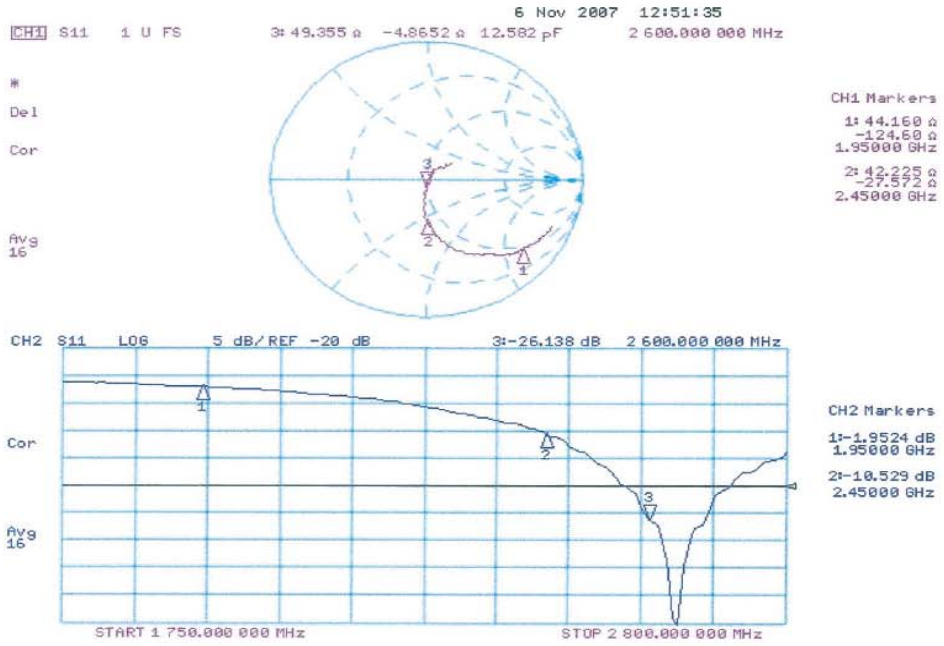
- Probe: ES3DV2 - SN3025 (HF); ConvF(4.24, 4.24, 4.24); Calibrated: 26.10.2007
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

Pin = 250 mW; d = 10 mm/Zoom Scan (dist=3mm) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.8 V/m; Power Drift = -0.023 dB
Peak SAR (extrapolated) = 30.8 W/kg
SAR(1 g) = 14.3 mW/g; SAR(10 g) = 6.38 mW/g
Maximum value of SAR (measured) = 18.3 mW/g



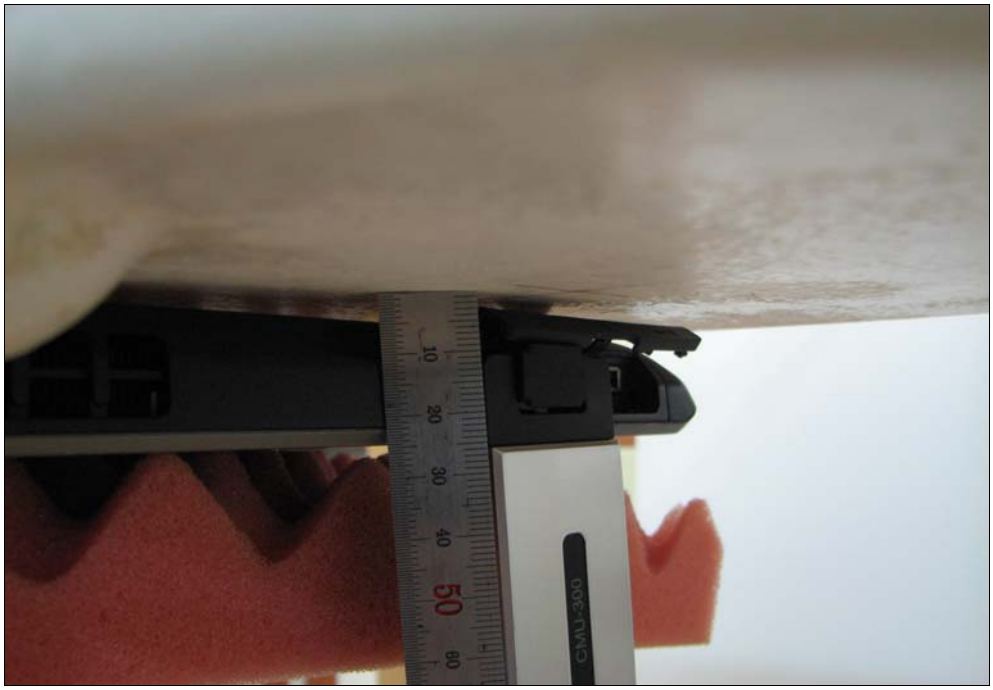
0 dB = 18.3mW/g

Impedance Measurement Plot for Head TSL



Appendix E : Test Position of EUT

SONY PCG-6C7P Bottom Position



SONY PCG-6C7P Side Position

ASUS F3J Bottom Position

ASUS F3J Side Position

SAMSUNG SENS X10 SE Bottom Position

SAMSUNG SENS X10 SE Side Position