SAR Evaluation Report

FCC ID : SELTSM401

Project Reference No. : NK2FR246

Product Type : Single Band CDMA Mobile Phone

Brand Name : Sacar

Model : CV340_VTL401

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

Tested Period : December. 12. 2005 to December. 16. 2005

Tested by	Seob.Lee		date : December. 19. 2005
Verified by	Seonteag.Jin		date : December. 19. 2005

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, Mohyun-Myun, Yongin-City, Gyunggi-Do, Korea
Phone : 82-31-322-2333 Fax : 82-31-322-2332

Contents of This Report

Nemko

1.General Information

1.1 Applicant

Company Name:	Vitelcom Mobile Technology,U.S.A. Inc.
Company Address:	2480 Irvine Boulevard #172 Tustin, CA 92782 U.S.A
Phone/Fax:	Phone: 714-389-1169
Contact Name:	Monika Hormaza

1.2 Manufacturer

Company Name:	Vitelcom Mobile Technology,SA.
Company Address:	Avenada Juan Lopez Penalver 37 Malaga, Spain,29590
Phone/Fax:	Phone: 714-389-1169
Contact Name:	Monika Hormaza

1.3 Description of Device

Category:	Single Band CDMA Mobile Phone
Model Name:	CV340_VTL401
Brand Name:	Sacar
Serial Number:	0000001
Frequency of Operation	Tx : 824MHz ~ 849MHz, Rx : 869MHz ~ 894MHz
RF Output Power (Conducted)	23.5dBm
Modulation/Demodulation	OQPSK/QPSK
Channel Spacing	1.23MHz
Receiver Sensitivity	-104dBm
Operating Condition	-20℃ to +60℃
Power Supply	Li-ion Battery: 3.7V DC, 650mAh
Phone Type	Bar Type
Antenna Type	Internal
Dimensions	100.0(H) X44.0(V) X 16.4(T)mm
Weight	68g(with Battery)
Remarks:	-

2. General Test Condition

2.1 Location

Nemko Korea
300-2, Osan-Ri, Mohyun-Myun, Yongin-City, Gyunggi-Do
Phone : 82-31-322-2333 , Fax : 82-31-322-2332

2.2 Operating Environment

Parameters	Recording during test	Accepted deviation
Ambient temperature	20 ~22℃	15 ~ 30℃
Relative humidity	30 ~60%	20 ~ 75%

2.3 Test Frequency

CDMA (Head)		CDMA (Muscle)	
Test Channel	Test Frequency (MHz)	Test Channel	Test Frequency (MHz)
1013	824.70	1013	824.70
363	835.89	363	835.89
777	848.31	777	848.31

2.4 Support Equipment

Equipment	Manufacturer	Model Name	Serial Number
-	-	-	-

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, H/P 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).

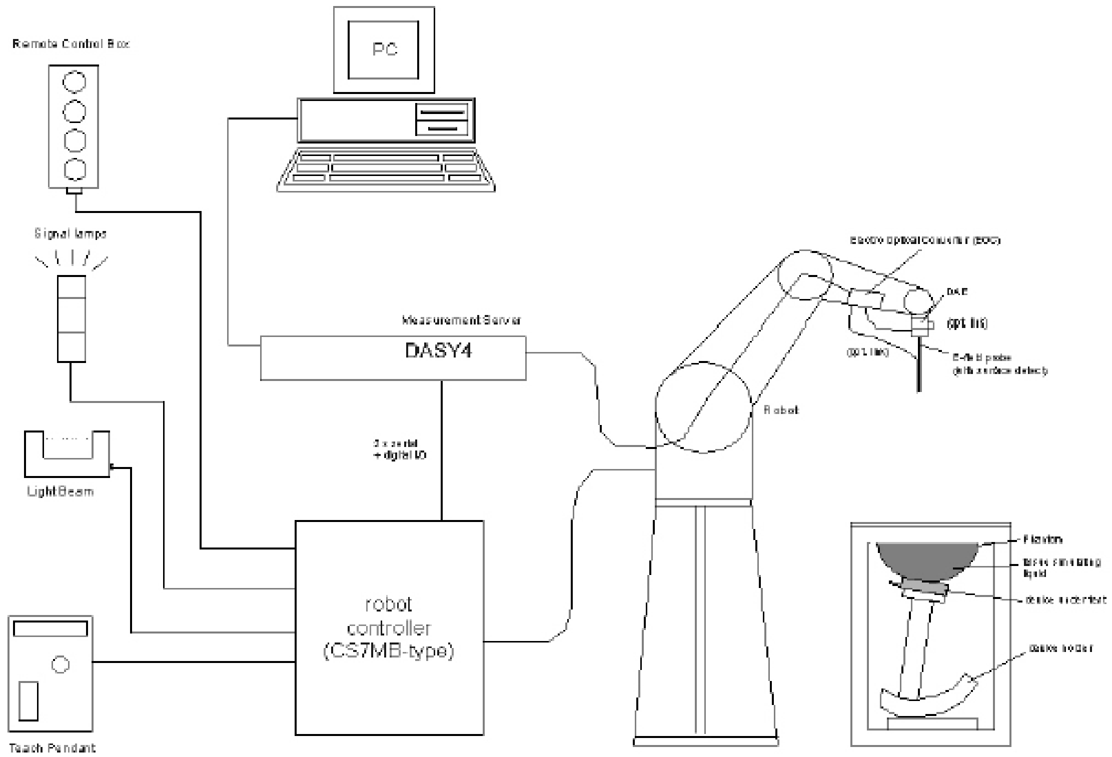


Figure 3.1 SAR Measurement System Setup

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 H/P 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.
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 softwarereads 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

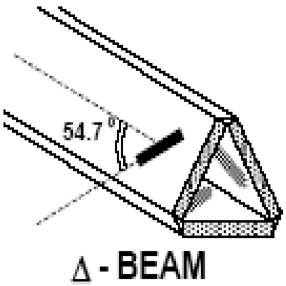


Figure 3.3 Triangular Probe Configuration

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 muscle simulating tissue at Frequencies of HSL900,
HSL1800 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 Head & Muscle Simulating Mixture Characterization

The head and muscle mixture consist of a viscous gel using hydroxethyl-cellullose (HEC) gelling agent and saline solution(see Table 3.1). 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.

Table 3.1 Composition of the Head & Muscle Tissue Equivalent Matter

INGREDIENTS	SIMULATING TISSUE	
	835MHz Head	835MHz Muscle
De-ionised water	41.45%	52.40%
Sugar	56.00%	45.00%
Salt	1.45%	1.40%
Hydroxyethyl Cellulose	1.00%	1.00%
DGBE	-	-
Bacteriacide	0.10%	0.10%
Dielectric Constant Target	41.50	55.20
Conductivity Target (S/M)	0.90	0.97

3.5 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

3.6 Dipole Validation

The reference dipole should have a return loss better than –20dB(measured in the setup) at the resonant frequency to reduce the uncertainty in the power measurement.

835MHz Dipole

Frequency	835MHz
Return Loss	< -20 dB at specified validation position
Dimensions	D835V2: dipole length: 161 mm; overall height: 330 mm

4. Measurement Procedure

The mobile phone operating 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 15 minutes.

The following steps are used for each test position:

STEP1

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.

STEP2

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

STEP3

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 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.

STEP4

Around this points, a cube of 32mm×32mm×30mm is assessed by measuring 5×5×7 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 and repetition of the whole procedure if the two results differ by more than ±0.223dB.

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

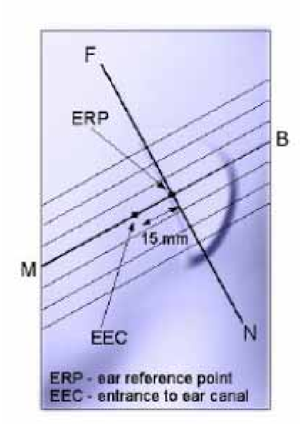


Figure 5.2 Close up side view

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.

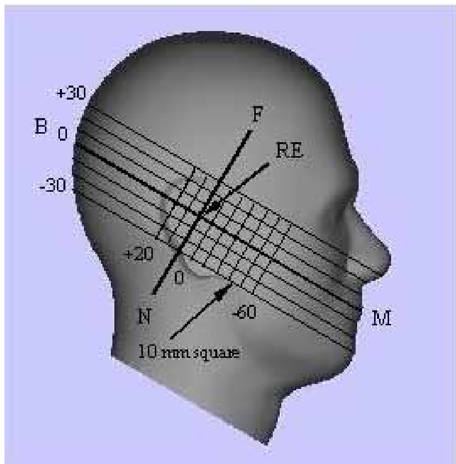


Figure 5.3 Side view of the phantom showing relevant markings

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.

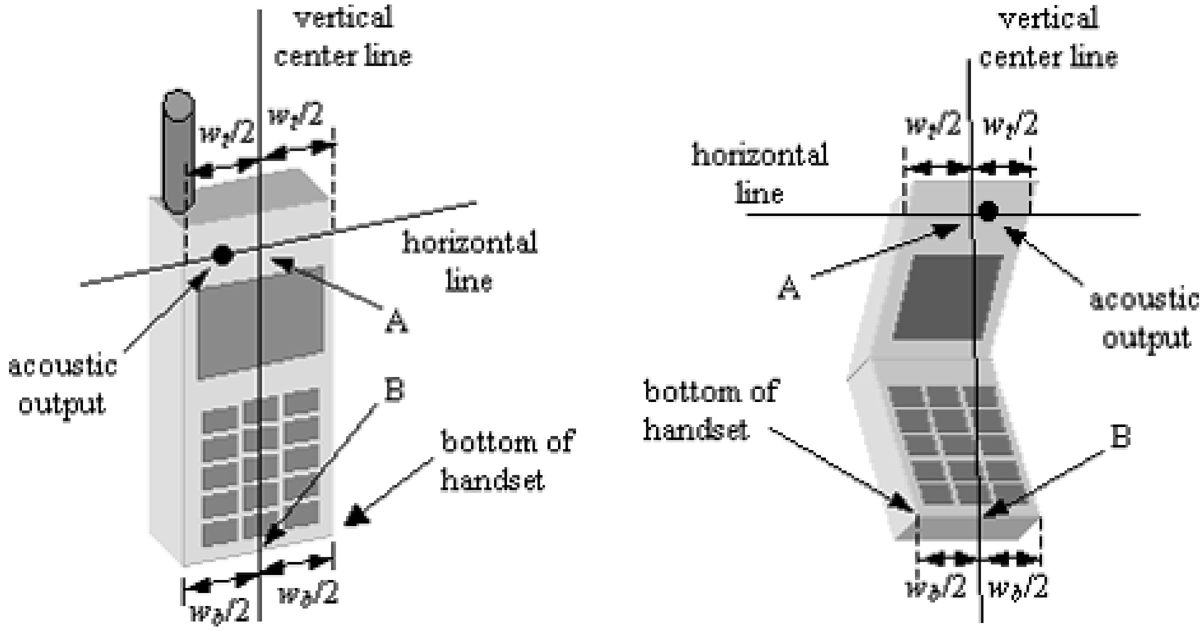


Figure 5.4 Handset vertical and horizontal reference lines

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.

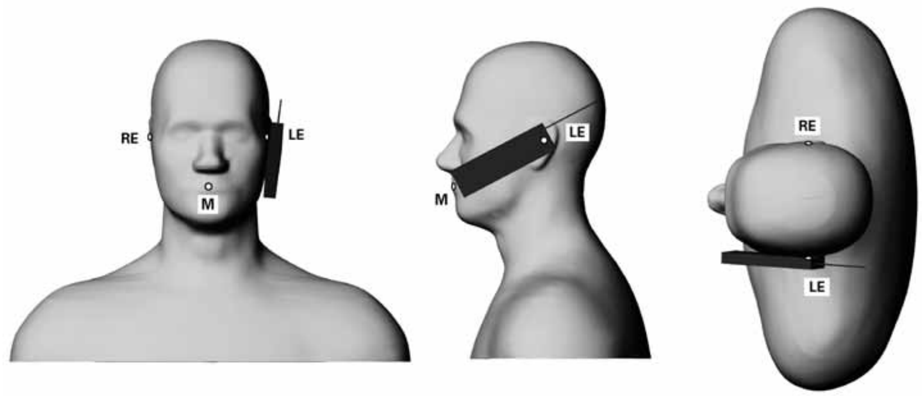


Figure 6.1 Front, Side and Top View of Cheek/Touch Position

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"

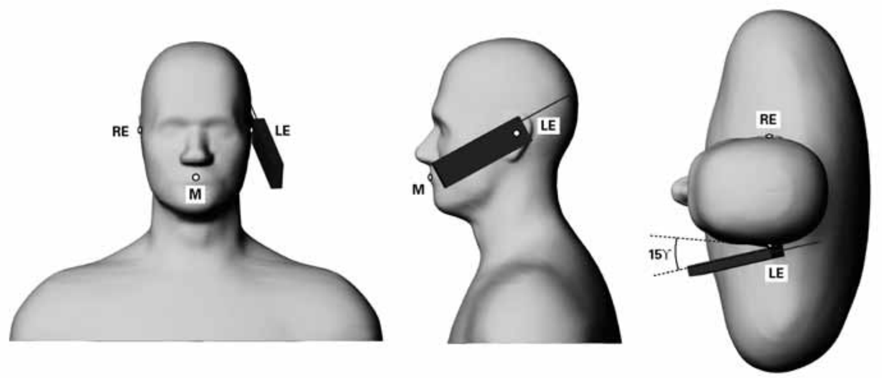


Figure 6.2 Front, side and Top View of Ear/Tilt 15° Position

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

6.3 Body-worn and Other Configurations

6.3.1 Phantom Requirement

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.

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 %**	

Table 21.6: Worst-Case uncertainty budget for DASY4 assessed according to IEEE 1528 [1] . The budget is valid for the frequency range 300 MHz - 3 GHz and represents a worst-case analysis. For specific tests and configurations, the uncertainty could be considerable smaller.

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

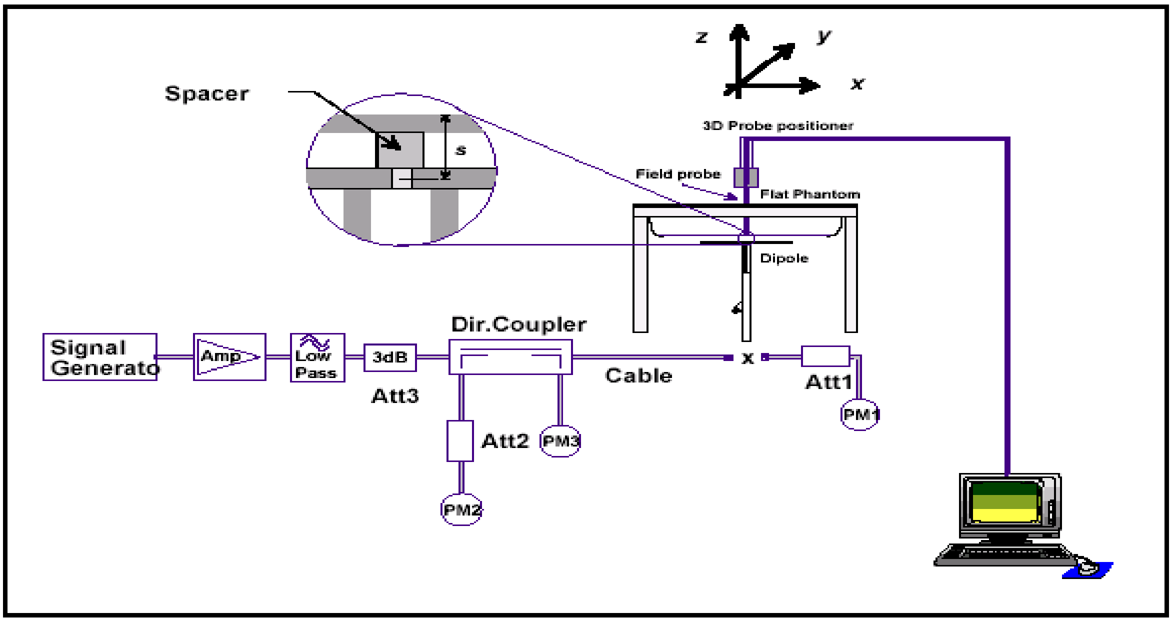
	835MHz Head		835MHz Muscle	
Date	December 12, 2005		December 15, 2005	
Liquid Temperature(°C)	21.1°C		20.6°C	
	Recommended Value	Measured Value	Recommended Value	Measured Value
Dielectric Constant (ε)	41.50±2.075	**41.9**	55.20±2.760	**53.2**
Conductivity(σ)	0.90 ±0.045	**0.891**	0.97 ±0.049	**0.956**

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 (W/Kg)	Measured SAR (W/Kg)	Deviation (%)
			1g	1g	1g
835MHz Head	December 14, 2005	21.1°C	2.375	**2.22**	**6.53**
835MHz Muscle	December 15, 2005	20.6°C	2.375	**2.34**	**1.47**



Dipole Validation Test Setup

8.3 Measurement Result of Test Data (Head Validation)

Date/Time: 2005-12-14 5:28:46

Test Laboratory: Nemko Korea File Name: Validation.da4

DUT: Dipole 835 MHz Type: D835V2 Serial: D835V2 - SN:4d017 FCC ID: SELTSM401

Communication System: CW Frequency: 835 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 835.156 MHz; σ = 0.891 mho/m; ε_r = 41.9; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068; ConvF(5.91, 5.91, 5.91); Calibrated: 2005-04-11

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2005-03-02

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

Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Validation(CV340_VTL401)/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm

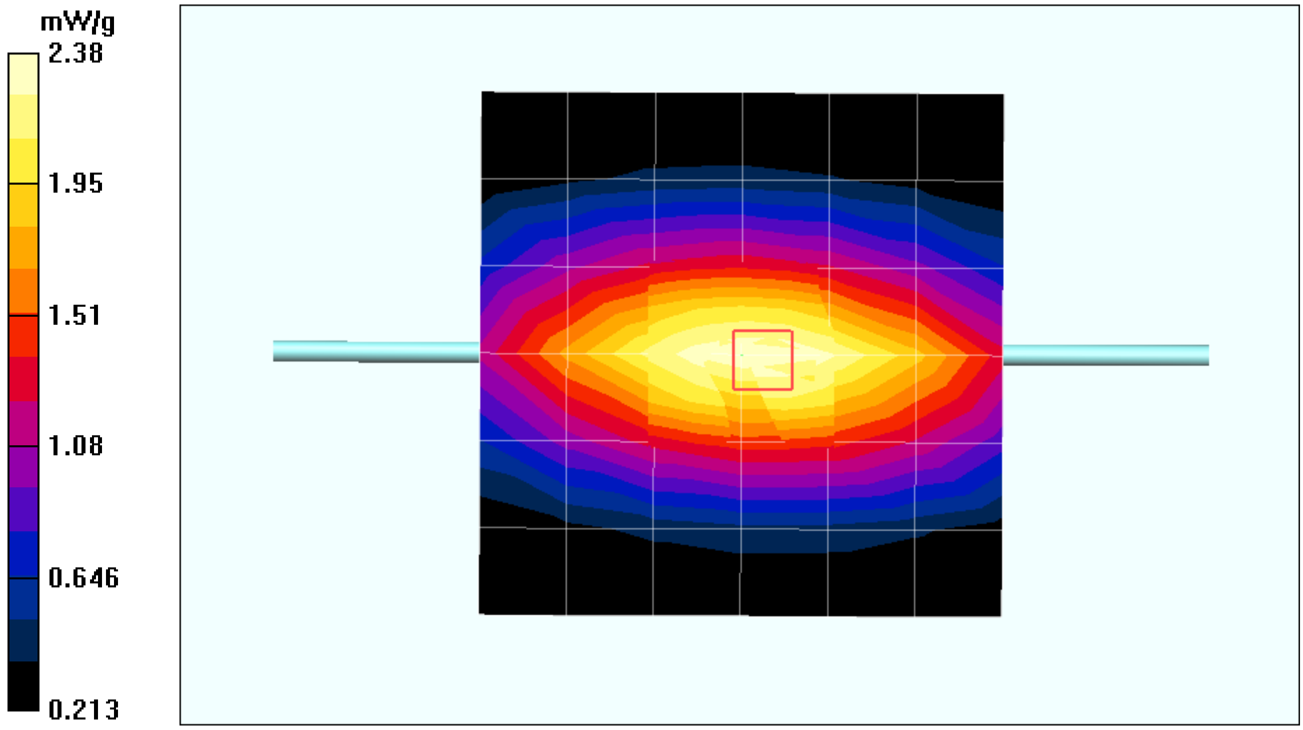
Maximum value of SAR (measured) = 2.38 mW/g

Validation(CV340_VTL401)/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 52.4 V/m; Power Drift = -0.019 dB

Peak SAR (extrapolated) = 3.30 W/kg

SAR(1 g) = 2.22 mW/g



8.4 Measurement Result of Test Data (Muscle Validation)

Date/Time: 2005-12-15 2:13:16

Test Laboratory: Nemko Korea File Name: Validation.da4

DUT: Dipole 835 MHz Type: D835V2 Serial: D835V2 - SN:4d017 FCC ID: SELTSM401

Communication System: CW Frequency: 835 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 835.156 MHz; σ = 0.956 mho/m; ε_r = 53.2; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068; ConvF(5.9, 5.9, 5.9); Calibrated: 2005-04-11

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2005-03-02

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

Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Validation(CV340_VTL401)/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm

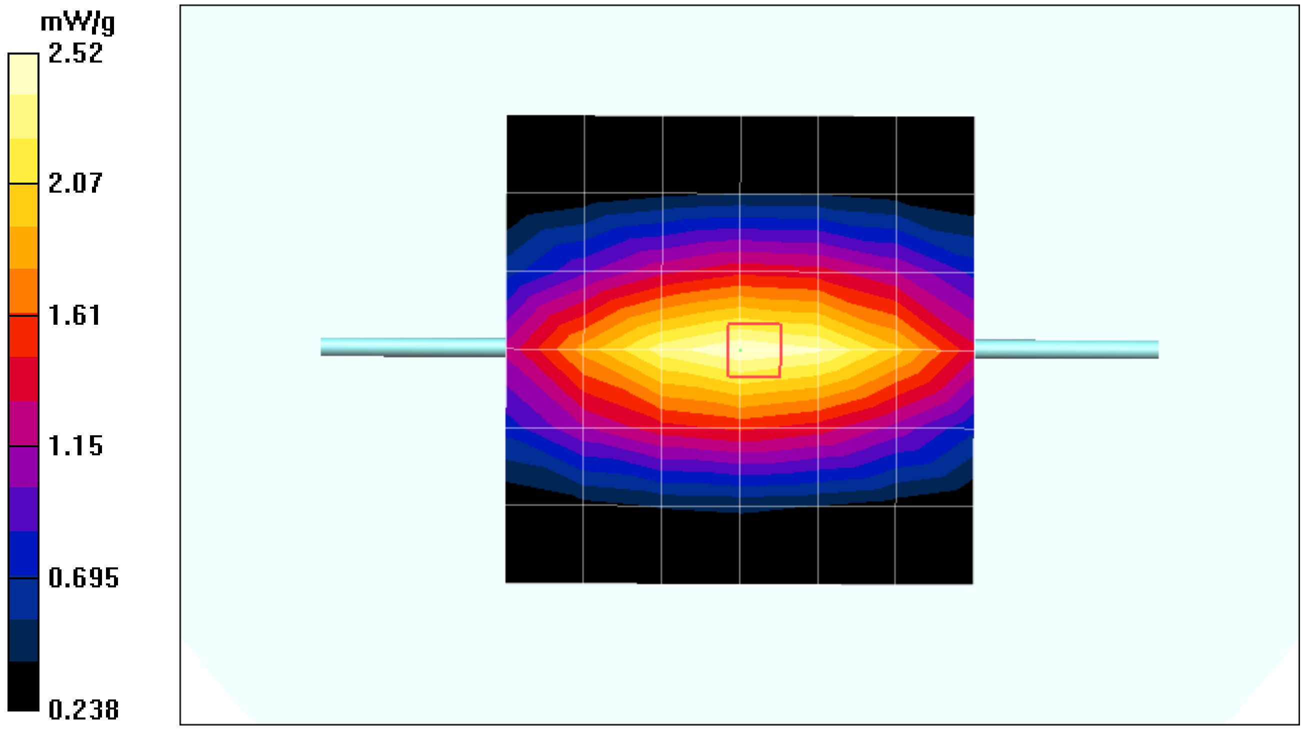
Maximum value of SAR (measured) = 2.52 mW/g

Validation(CV340_VTL401)/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 52.1 V/m; Power Drift = -0.006 dB

Peak SAR (extrapolated) = 3.43 W/kg

SAR(1 g) = 2.34 mW/g



9. SAR Measurement Results

Procedures Used To Establish Test Signal

The handset was placed into simulated call mode (CDMA) using manufacturers test codes. Such test signals offer a consistent means for testing SAR and are recommended for evaluating SAR.

Output Power

Modulation	FREQUENCY		Power (dBm)
	CH	MHz	
CDMA	1013	824.70	23.51
	363	835.89	22.86
	777	848.31	23.61

Maximum SAR

1g

Mode	CH	Frequency	Position	Antenna	SAR Limit W/kg	Measured SAR W/kg	Result
CDMA Head	363	835.89	Left/ Touch	Intenna	1.6	1.14	Passed
CDMA Muscle	777	848.31	Flat/ 15mm	Intenna	1.6	1.47	Passed

Device Test Conditions

The handset is battery operated. Each SAR measurement was taken with a fully charged battery. In order to verify that the device was tested at full power, conducted output power measurements were performed before and after each SAR measurement to confirm the output power.

If a conducted power deviation of more than 5% occurred, the test was repeated.

EUT Handset Reference Points

Figure 9.1 Handset Reference Points

9.1 SAR Measurement Result (Right Head Touch Position)

Date of Test : December. 14. 2005
Mixture Type: Head
Tissue Depth: 15.2 cm

Modulation	FREQUENCY		Power Drift (dB)	Device Test Position	Antenna Position	SAR (W/kg)
	CH	MHz				1g
CDMA	1013	824.70	0.033	Cheek / Touch	Intenna	0.471
	363	835.89	-0.110	Cheek / Touch	Intenna	1.06
	777	848.31	0.050	Cheek / Touch	Intenna	1.06

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. Battery is fully charged for all readings.
4. SAR Measurement System ■ DASY4
5. Phantom Configuration □ Left Head □ Flat Phantom ■ Right Head
6. SAR Configuration ■ Head □ Body □ Hand
7. Test Signal Call Mode □ Manu. Test Codes ■ Base Station Simulator
8. Battery Option ■ Standard Type □ Slim Type

Figure 9.1 Right Head SAR Test Setup
-- Cheek / Touch Position --

Measurement Result of Test Data (Right Head Touch Position)

Date/Time: 2005-12-14 6:19:04

Test Laboratory: Nemko Korea File Name: RH1013 Touch Position.da4

DUT: CV340_VTL401 Type: Bar Type Serial: 0000001 FCC ID: SELTSM401

Communication System: CDMA Frequency: 824.7 MHz

Duty Cycle: 1:1 Phantom section: Right Section

Medium parameters used: f = 824.892 MHz; σ = 0.883 mho/m; ε_r = 42; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068; ConvF(5.91, 5.91, 5.91); Calibrated: 2005-04-11

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2005-03-02

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

Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

RH1013 Touch Position(CV340_VTL401)/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.504 mW/g

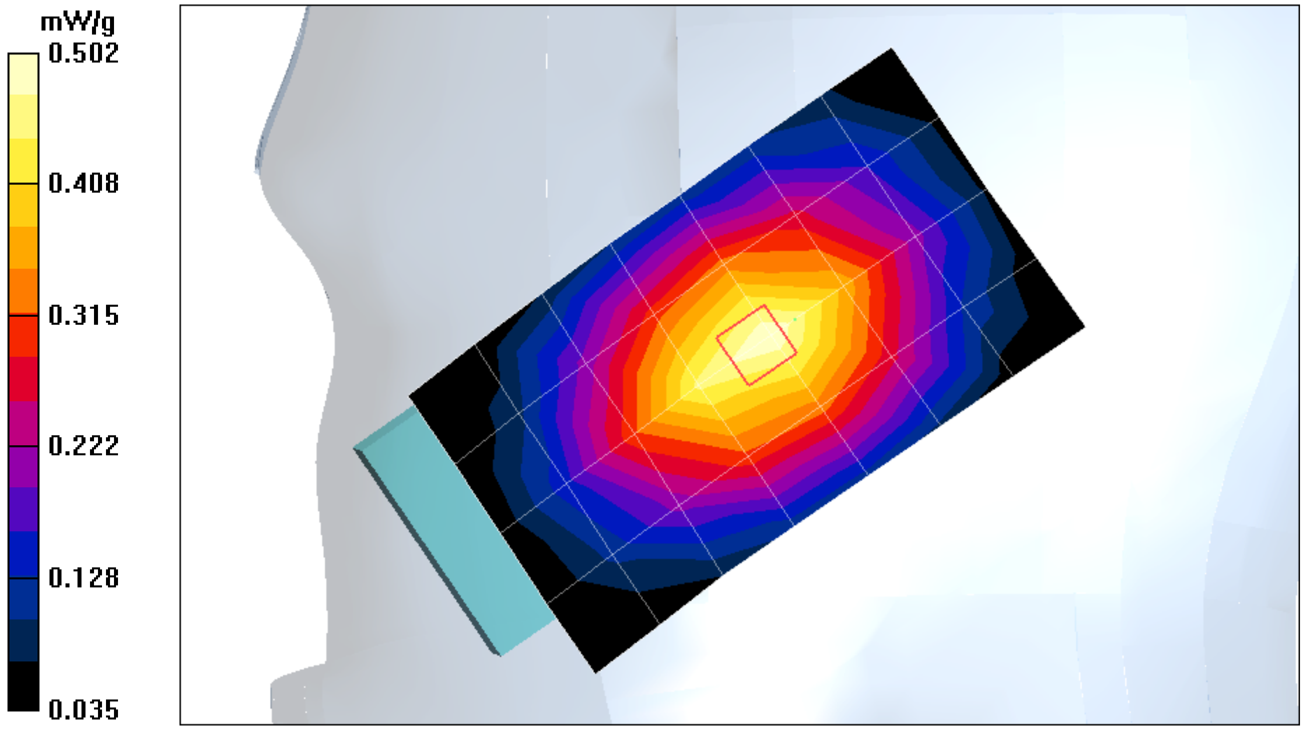
RH1013 Touch Position(CV340_VTL401)/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 17.7 V/m; Power Drift = 0.033 dB

Peak SAR (extrapolated) = 0.664 W/kg

SAR(1 g) = 0.471 mW/g

Maximum value of SAR (measured) = 0.502 mW/g



Date/Time: 2005-12-14 6:04:06

Test Laboratory: Nemko Korea File Name: RH363 Touch Position.da4

DUT: CV340_VTL401 Type: Bar Type Serial: 0000001 FCC ID: SELTSM401

Communication System: CDMA Frequency: 835.89 MHz

Duty Cycle: 1:1 Phantom section: Right Section

Medium parameters used (interpolated): f = 835.89 MHz; σ = 0.893 mho/m; ε_r = 41.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068; ConvF(5.91, 5.91, 5.91); Calibrated: 2005-04-11

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2005-03-02

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

Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

RH363 Touch Position(CV340_VTL401)/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.11 mW/g

RH363 Touch Position(CV340_VTL401)/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

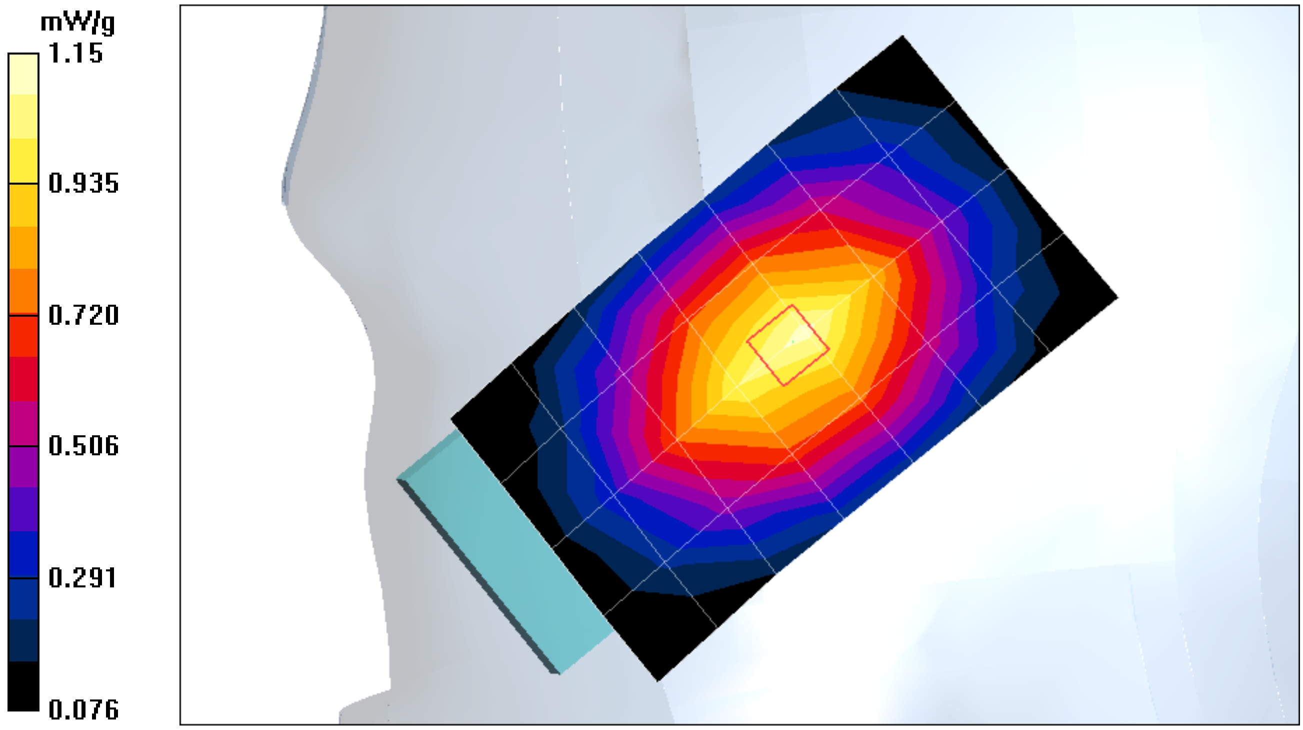
Reference Value = 26.6 V/m; Power Drift = -0.110 dB

Peak SAR (extrapolated) = 1.47 W/kg

SAR(1 g) = 1.06 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.15 mW/g



Date/Time: 2005-12-14 6:29:32

Test Laboratory: Nemko Korea File Name: RH777 Touch Position.da4

DUT: CV340_VTL401 Type: Bar Type Serial: 0000001 FCC ID: SELTSM401

Communication System: CDMA Frequency: 848.31 MHz

Duty Cycle: 1:1 Phantom section: Right Section

Medium parameters used: f = 848.528 MHz; σ = 0.904 mho/m; ε_r = 41.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068; ConvF(5.91, 5.91, 5.91); Calibrated: 2005-04-11

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2005-03-02

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

Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

RH777 Touch Position(CV340_VTL401)/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.08 mW/g

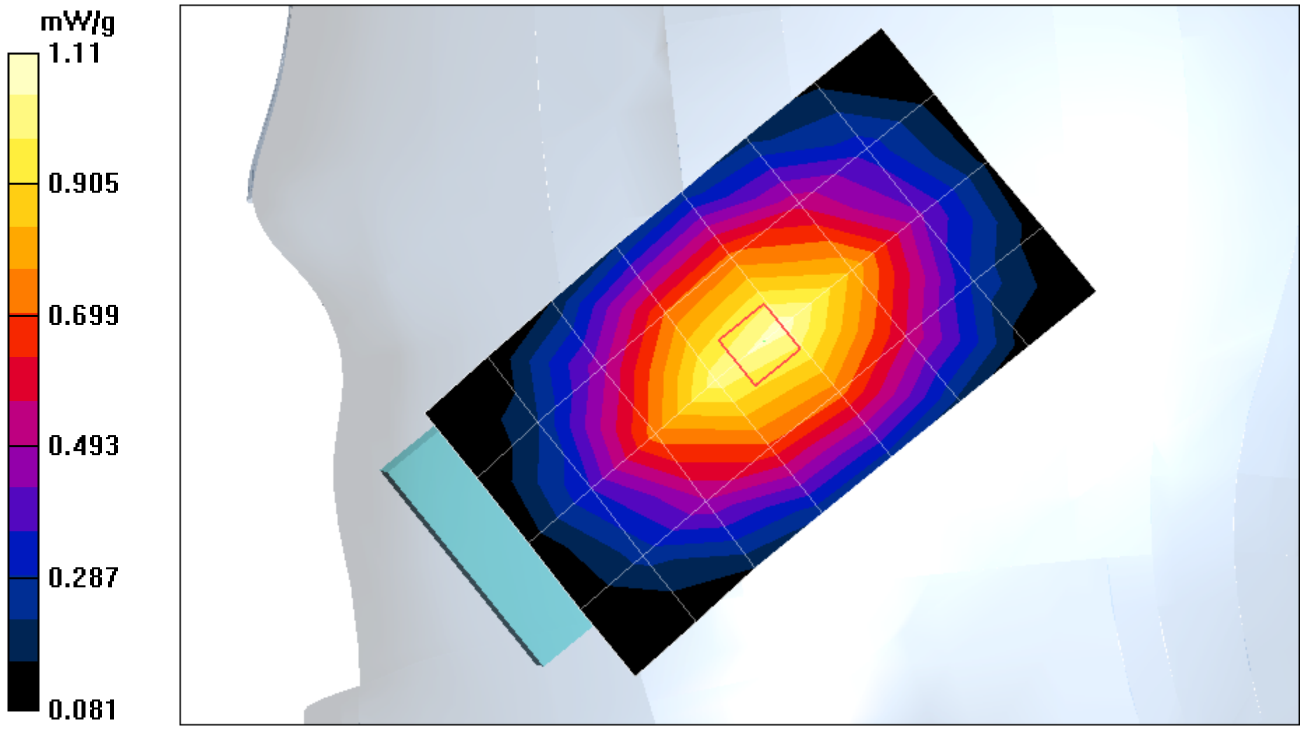
RH777 Touch Position(CV340_VTL401)/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 25.6 V/m; Power Drift = 0.050 dB

Peak SAR (extrapolated) = 1.52 W/kg

SAR(1 g) = 1.06 mW/g

Maximum value of SAR (measured) = 1.11 mW/g



9.2 SAR Measurement Result (Right Head Tilted Position)

Date of Test : December. 14. 2005
Mixture Type: Head
Tissue Depth: 15.2 cm

Modulation	FREQUENCY		Power Drift (dB)	Device Test Position	Antenna Position	SAR (W/kg)
	CH	MHz				1g
CDMA	363	835.89	-0.121	Cheek / Tilted	Intenna	0.643

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. Battery is fully charged for all readings.
4. SAR Measurement System ■ DASY4
5. Phantom Configuration □ Left Head □ Flat Phantom ■ Right Head
6. SAR Configuration ■ Head □ Body □ Hand
7. Test Signal Call Mode □ Manu. Test Codes ■ Base Station Simulator
8. Battery Option ■ Standard Type □ Slim Type

Figure 9.2 Right Head SAR Test Setup
-- Ear / Tilted Position --

Measurement Result of Test Data (Right Head Tilted Position)

Date/Time: 2005-12-14 6:40:56

Test Laboratory: Nemko Korea File Name: RH363 Tilt Position.da4

DUT: CV340_VTL401 Type: Bar Type Serial: 0000001 FCC ID: SELTSM401

Communication System: CDMA Frequency: 835.89 MHz

Duty Cycle: 1:1 Phantom section: Right Section

Medium parameters used (interpolated): f = 835.89 MHz; σ = 0.893 mho/m; ε_r = 41.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068; ConvF(5.91, 5.91, 5.91); Calibrated: 2005-04-11

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2005-03-02

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

Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

RH363 Tilt Position(CV340_VTL401)/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.692 mW/g

RH363 Tilt Position(CV340_VTL401)/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

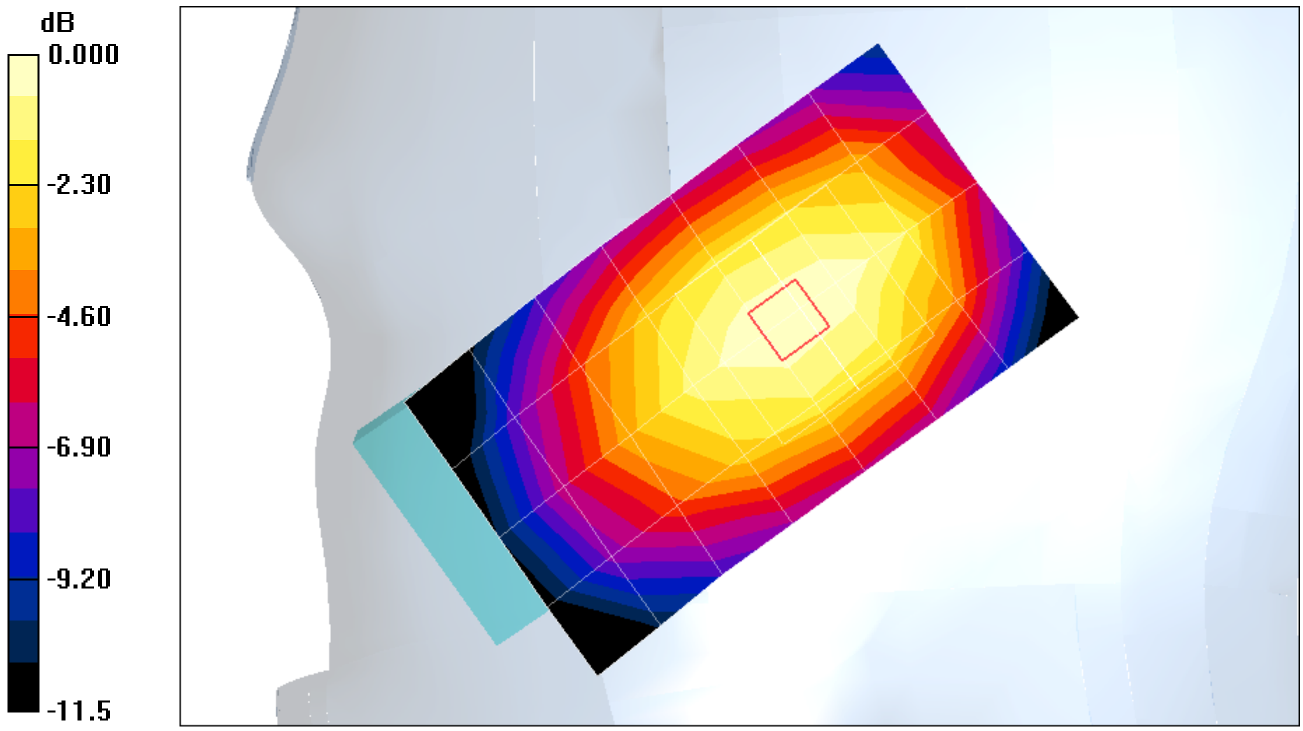
Reference Value = 25.7 V/m; Power Drift = -0.121 dB

Peak SAR (extrapolated) = 0.883 W/kg

SAR(1 g) = 0.643 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.678 mW/g



0 dB = 0.678mW/g

9.3 SAR Measurement Result (Left Head Touch Position)

Date of Test : December. 14. 2005
Mixture Type: Head
Tissue Depth: 15.2 cm

Modulation	FREQUENCY		Power Drift (dB)	Device Test Position	Antenna Position	SAR (W/kg)
	CH	MHz				1g
CDMA	1013	824.70	0.102	Cheek / Touch	Intenna	0.464
	363	835.89	-0.039	Cheek / Touch	Intenna	1.140
	777	848.31	0.095	Cheek / Touch	Intenna	0.961

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. Battery is fully charged for all readings.
4. SAR Measurement System ■ DASY4
5. Phantom Configuration ■ Left Head ☐ Flat Phantom ☐ Right Head
6. SAR Configuration ■ Head ☐ Body ☐ Hand
7. Test Signal Call Mode ☐ Manu. Test Codes ■ Base Station Simulator
8. Battery Option ■ Standard Type ☐ Slim Type

Figure 9.3 Left Head SAR Test Setup
-- Cheek / Touch Position --

Measurement Result of Test Data (Left Head Touch Position)

Date/Time: 2005-12-14 7:07:52

Test Laboratory: Nemko Korea File Name: LH1013 Touch Position.da4

DUT: CV340_VTL401 Type: Bar Type Serial: 0000001 FCC ID: SELTSM401

Communication System: CDMA Frequency: 824.7 MHz

Duty Cycle: 1:1 Phantom section: Left Section

Medium parameters used: f = 824.892 MHz; σ = 0.883 mho/m; ε_r = 42; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068; ConvF(5.91, 5.91, 5.91); Calibrated: 2005-04-11

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2005-03-02

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

Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

LH1013 Touch Position(CV340_VTL401)/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

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

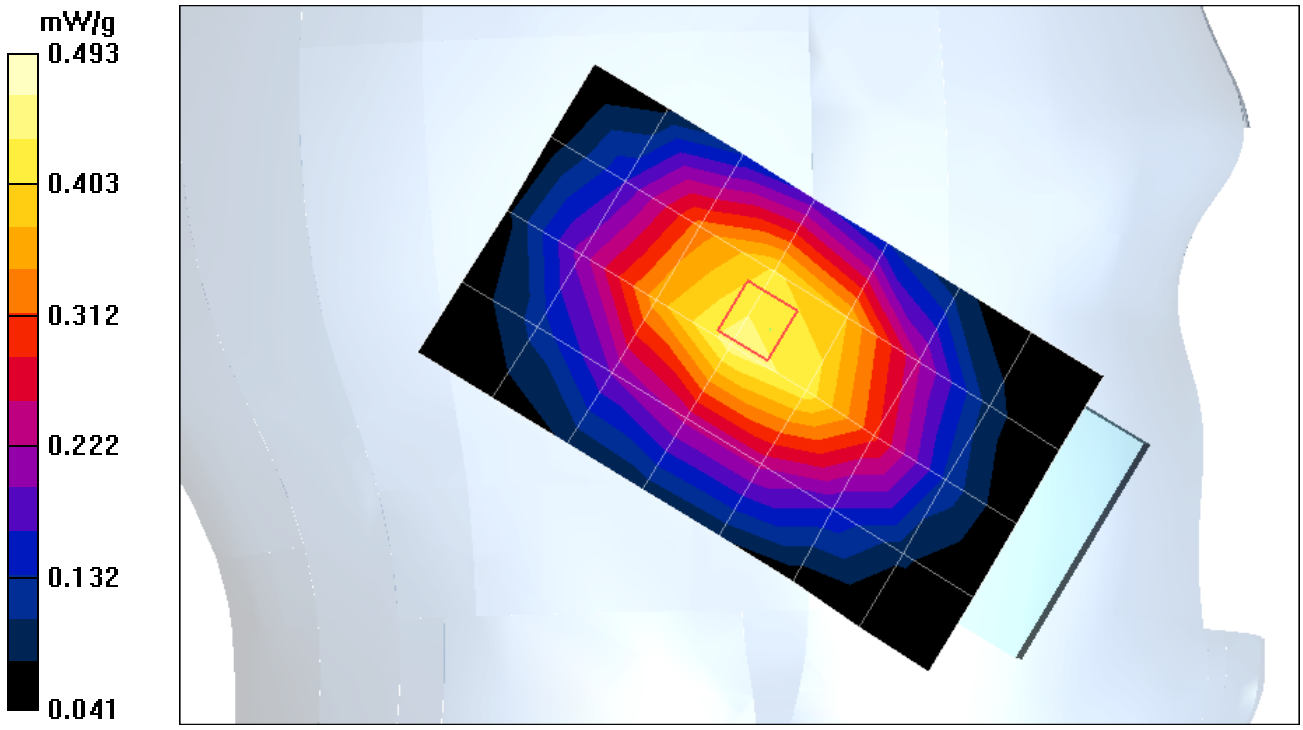
LH1013 Touch Position(CV340_VTL401)/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 17.4 V/m; Power Drift = 0.102 dB

Peak SAR (extrapolated) = 0.645 W/kg

SAR(1 g) = 0.464 mW/g

Maximum value of SAR (measured) = 0.493 mW/g



Date/Time: 2005-12-14 6:56:53

Test Laboratory: Nemko Korea File Name: LH363 Touch Position.da4

DUT: CV340_VTL401 Type: Bar Type Serial: 0000001 FCC ID: SELTSM401

Communication System: CDMA Frequency: 835.89 MHz

Duty Cycle: 1:1 Phantom section: Left Section

Medium parameters used (interpolated): f = 835.89 MHz; σ = 0.893 mho/m; ε_r = 41.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068; ConvF(5.91, 5.91, 5.91); Calibrated: 2005-04-11

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2005-03-02

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

Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

LH363 Touch Position(CV340_VTL401)/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.15 mW/g

LH363 Touch Position(CV340_VTL401)/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

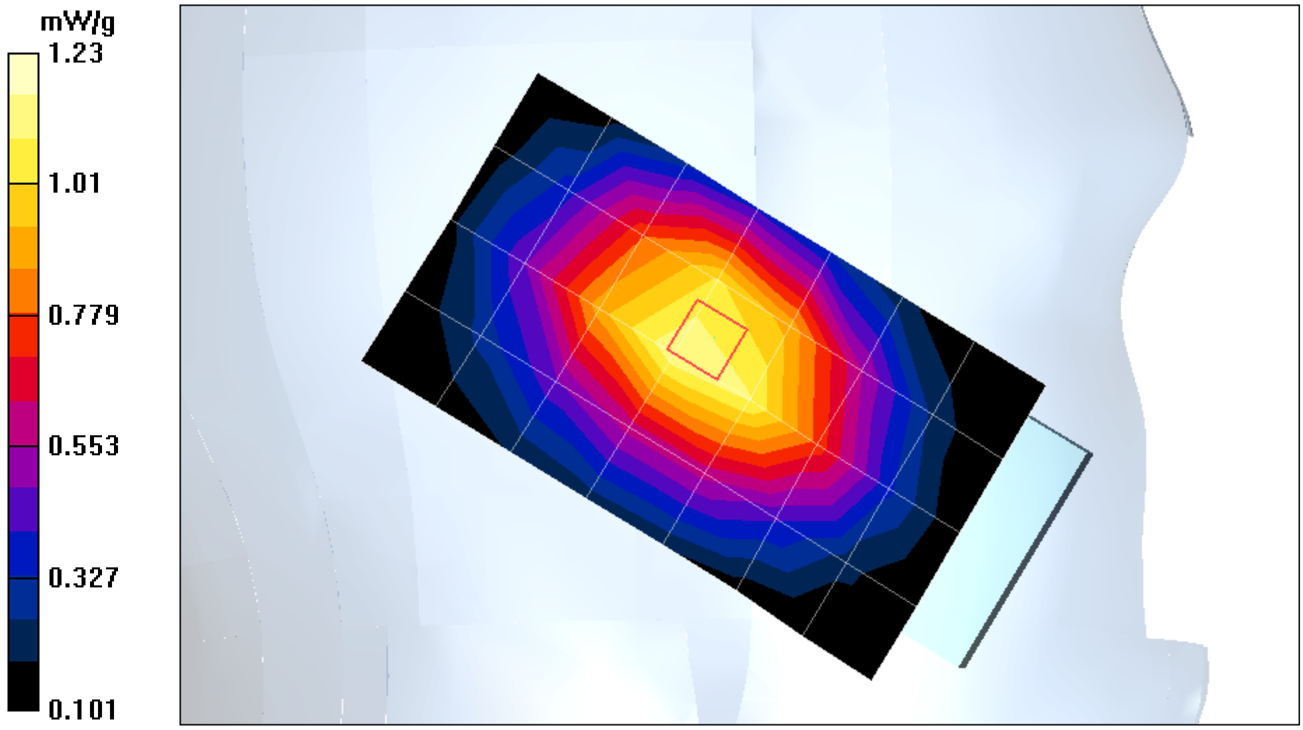
Reference Value = 27.2 V/m; Power Drift = -0.039 dB

Peak SAR (extrapolated) = 1.55 W/kg

SAR(1 g) = 1.14 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.23 mW/g



Date/Time: 2005-12-14   7:22:27

Test Laboratory: Nemko Korea   File Name: LH777 Touch Position.da4

DUT: CV340_VTL401   Type: Bar Type   Serial: 0000001 FCC ID: SELTSM401

Communication System: CDMA   Frequency: 848.31 MHz

Duty Cycle: 1:1 Phantom section: Left Section

Medium parameters used: f = 848.528 MHz; σ = 0.904 mho/m; ε_r = 41.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068; ConvF(5.91, 5.91, 5.91); Calibrated: 2005-04-11

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2005-03-02

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

Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

LH777 Touch Position(CV340_VTL401)/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.960 mW/g

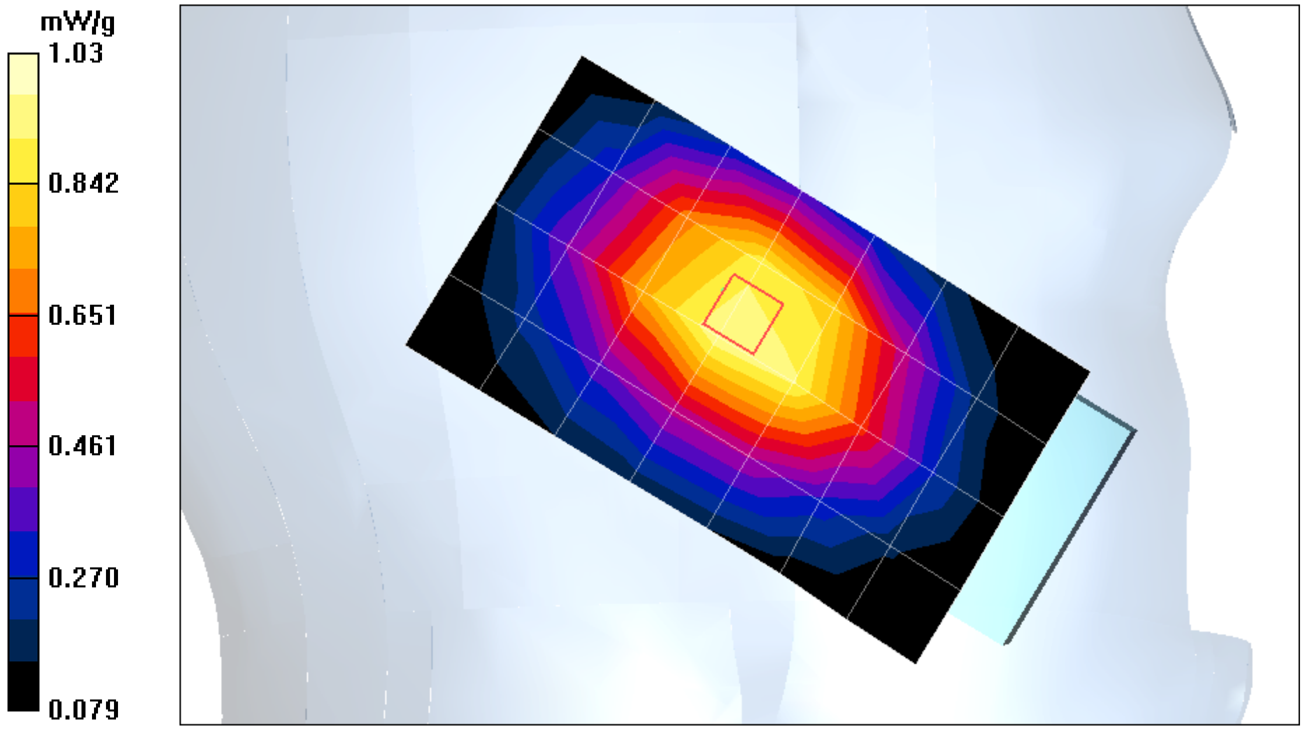
LH777 Touch Position(CV340_VTL401)/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 24.7 V/m; Power Drift = 0.095 dB

Peak SAR (extrapolated) = 1.32 W/kg

SAR(1 g) = 0.961 mW/g

Maximum value of SAR (measured) = 1.03 mW/g



9.4 SAR Measurement Result (Left Head Tilted Position)

Date of Test : December. 14. 2005
Mixture Type: Head
Tissue Depth: 15.2 cm

Modulation	FREQUENCY		Power Drift (dB)	Device Test Position	Antenna Position	SAR (W/kg)
	CH	MHz				1g
CDMA	363	835.89	-0.104	Cheek / Tilted	Intenna	0.690

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. Battery is fully charged for all readings.
4. SAR Measurement System ■ DASY4
5. Phantom Configuration ■ Left Head ☐ Flat Phantom ☐ Right Head
6. SAR Configuration ■ Head ☐ Body ☐ Hand
7. Test Signal Call Mode ☐ Manu. Test Codes ■ Base Station Simulator
8. Battery Option ■ Standard Type ☐ Slim Type

Figure 9.4 Left Head SAR Test Setup
-- Ear / Tilted Position --

Measurement Result of Test Data (Left Head Tilted Position)

Date/Time: 2005-12-14 7:33:40

Test Laboratory: Nemko Korea File Name: LH363Tilt Position.da4

DUT: CV340_VTL401 Type: Bar Type Serial: 0000001 FCC ID: SELTSM401

Communication System: CDMA Frequency: 835.89 MHz

Duty Cycle: 1:1 Phantom section: Left Section

Medium parameters used (interpolated): f = 835.89 MHz; σ = 0.893 mho/m; ε_r = 41.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068; ConvF(5.91, 5.91, 5.91); Calibrated: 2005-04-11

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2005-03-02

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

Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

LH363 Tilt Position(CV340_VTL401)/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.721 mW/g

LH363 Tilt Position(CV340_VTL401)/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

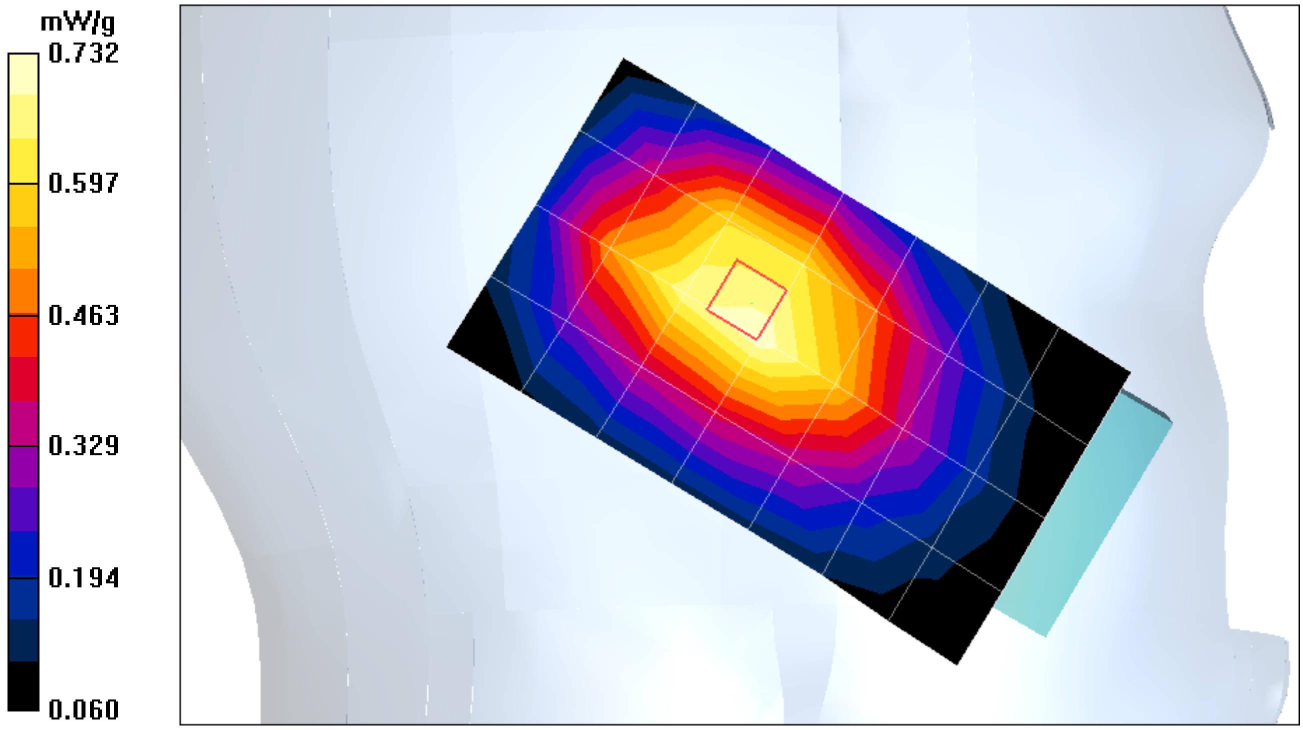
Reference Value = 26.2 V/m; Power Drift = -0.104 dB

Peak SAR (extrapolated) = 0.927 W/kg

SAR(1 g) = 0.690 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.732 mW/g



9.5 SAR Measurement Result (Muscle -15mm Distance- Position)

Date of Test : December. 15. 2005
Mixture Type: Muscle
Tissue Depth: 15.3cm

Modulation	FREQUENCY		Power Drift (dB)	Device Test Position	Antenna Position	SAR (W/kg)
	CH	MHz				1g
CDMA	1013	824.70	**0.027**	15mm Distance From Phantom	Intenna	**1.030**
	363	835.89	**-0.112**	15mm Distance From Phantom	Intenna	**0.887**
	777	848.31	**-0.006**	15mm Distance From Phantom	Intenna	**1.470**

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. Battery is fully charged for all readings.
4. SAR Measurement System ■ DASY4
5. Phantom Configuration □ Left Head ■ Flat Phantom □ Right Head
6. SAR Configuration □ Head ■ Muscle □ Hand
7. Test Signal Call Mode □ Manu. Test Codes ■ Base Station Simulator
8. Battery Option ■ Standard Type □ Slim Type

Figure 9.5 Muscle SAR Test Setup
-- 15mm Distance Position --

Measurement Result of Test Data (Muscle -15mm Distance- Position)

Date/Time: 2005-12-15 3:25:29

Test Laboratory: Nemko Korea File Name: 15mm distance CH1013.da4

DUT: CV340_VTL401 Type: Bar Type Serial: 0000001 FCC ID: SELTSM401

Communication System: CDMA Frequency: 824.7 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 824.892 MHz; σ = 0.944 mho/m; ε_r = 53.3; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068; ConvF(5.9, 5.9, 5.9); Calibrated: 2005-04-11

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2005-03-02

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

Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

15mm distance CH1013(CV340_VTL401)/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.06 mW/g

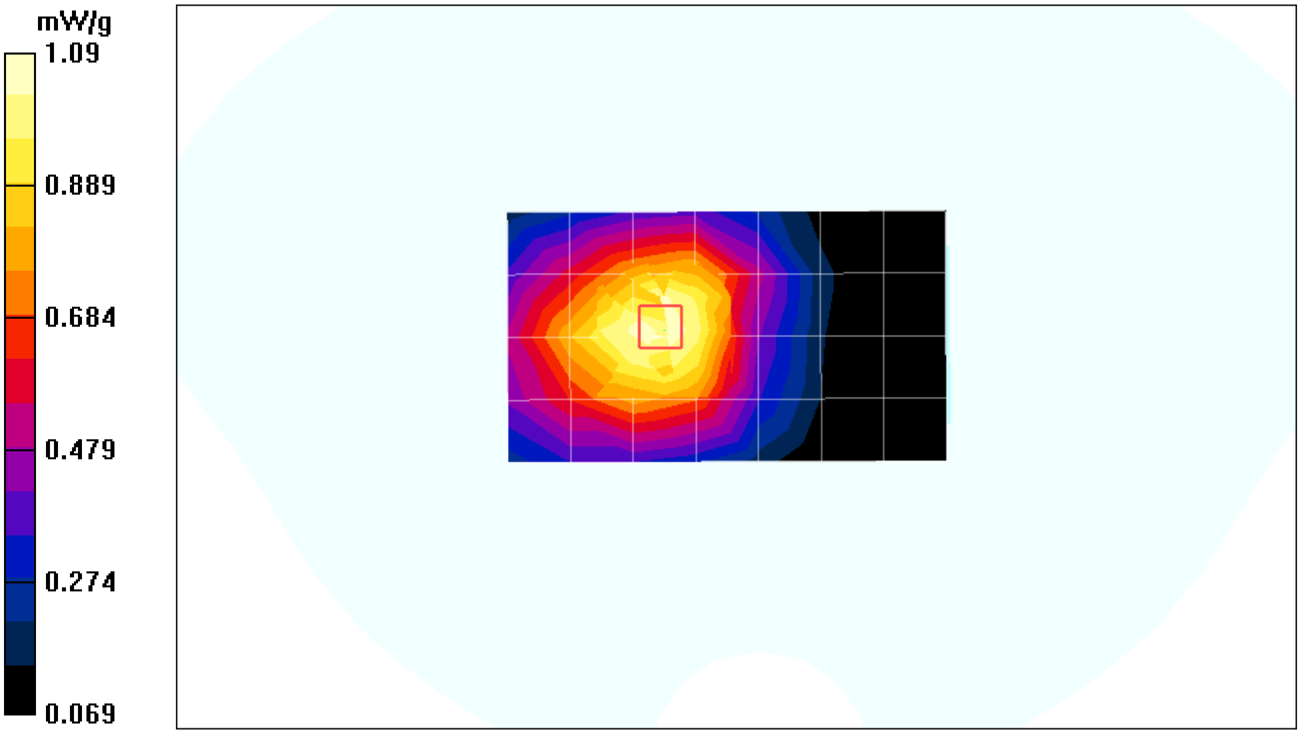
15mm distance CH1013(CV340_VTL401)/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 21.8 V/m; Power Drift = 0.027 dB

Peak SAR (extrapolated) = 1.35 W/kg

SAR(1 g) = 1.03 mW/g

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



Date/Time: 2005-12-15 3:14:41

Test Laboratory: Nemko Korea File Name: [15mm distance CH363.da4]

DUT: CV340_VTL401 Type: Bar Type Serial: 0000001 FCC ID: SELTSM401

Communication System: CDMA Frequency: 835.89 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 835.89 MHz; σ = 0.957 mho/m; ε_r = 53.2; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068; ConvF(5.9, 5.9, 5.9); Calibrated: 2005-04-11

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2005-03-02

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

Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

15mm distance CH363 (CV340_VTL401)/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.924 mW/g

15mm distance CH363 (CV340_VTL401)/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

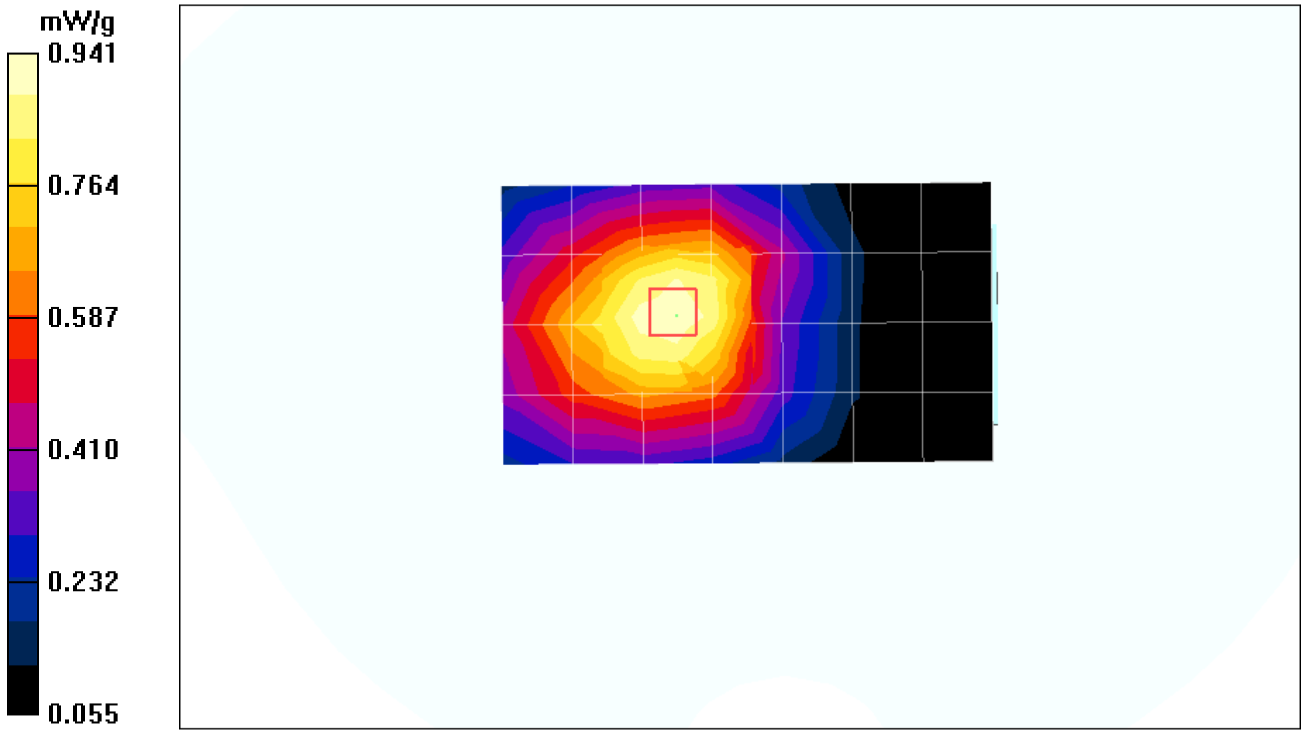
Reference Value = 19.6 V/m; Power Drift = -0.112 dB

Peak SAR (extrapolated) = 1.27 W/kg

SAR(1 g) = 0.887 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.941 mW/g



Date/Time: 2005-12-15 3:35:41

Test Laboratory: Nemko Korea File Name: 15mm distance CH777.da4

DUT: CV340_VTL401 Type: Bar Type Serial: 0000001 FCC ID: SELTSM401

Communication System: CDMA Frequency: 848.31 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 848.528 MHz; σ = 0.973 mho/m; ε_r = 53.2; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068; ConvF(5.9, 5.9, 5.9); Calibrated: 2005-04-11

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2005-03-02

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

Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

15mm distance CH777(CV340_VTL401)/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.49 mW/g

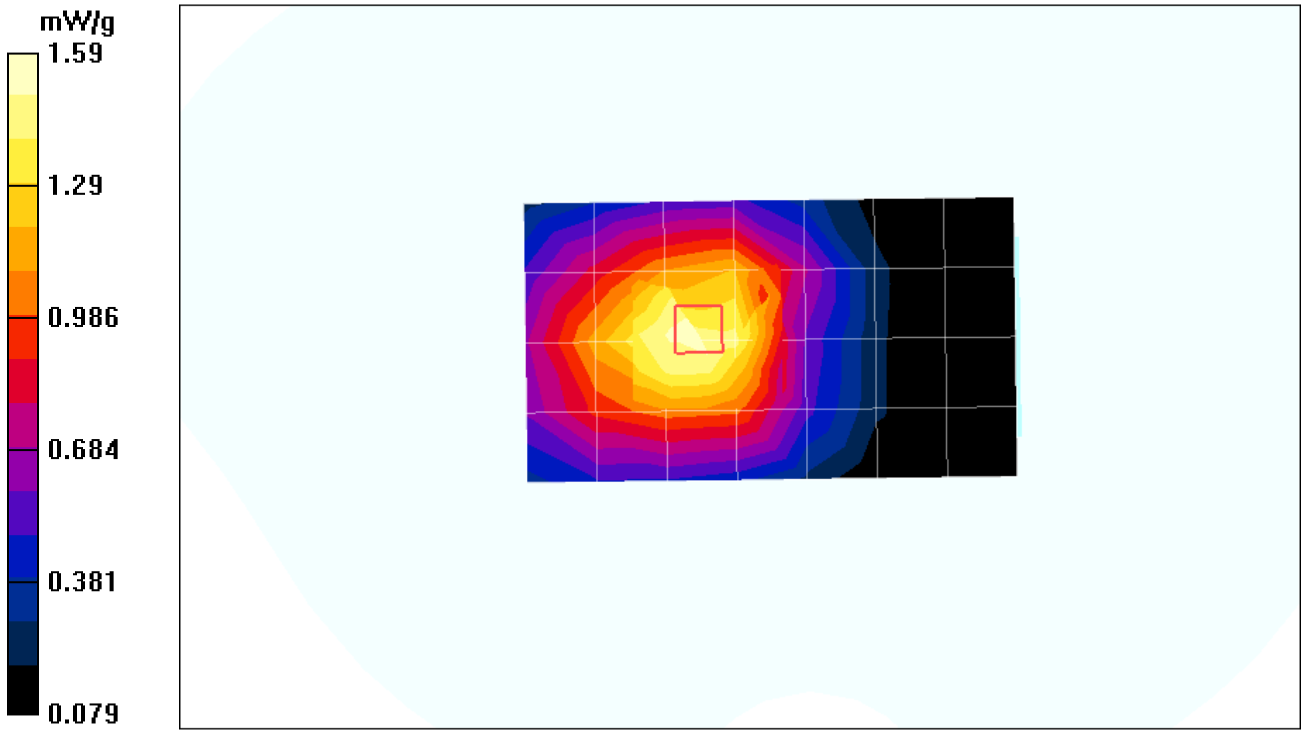
15mm distance CH777(CV340_VTL401)/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 24.4 V/m; Power Drift = -0.006 dB

Peak SAR (extrapolated) = 2.12 W/kg

SAR(1 g) = 1.47 mW/g

Maximum value of SAR (measured) = 1.59 mW/g



9.6 SAR Measurement Result (Muscle -15mm Distance- with headset)

Date of Test : December. 15. 2005
Mixture Type: Muscle
Tissue Depth: 15.3cm

Modulation	FREQUENCY		Power Drift (dB)	Device Test Position	Antenna Position	SAR (W/kg)
	CH	MHz				1g
CDMA	777	848.31	**0.043**	15mm Distance From Phantom with Earphone	Intenna	**0.861**

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. Battery is fully charged for all readings.
4. SAR Measurement System ■ DASY4
5. Phantom Configuration □ Left Head ■ Flat Phantom □ Right Head
6. SAR Configuration □ Head ■ Muscle □ Hand
7. Test Signal Call Mode □ Manu. Test Codes ■ Base Station Simulator
8. Battery Option ■ Standard Type □ Slim Type

Figure 9.6 Muscle SAR Test Setup
-- 15mm Distance with headset Position --

Measurement Result of Test Data (Muscle -15mm Distance- with headset)

Date/Time: 2005-12-15 4:51:09

Test Laboratory: Nemko Korea File Name: 15mm distance (with Earphone)CH777.da4

DUT: CV340_VTL401 Type: Bar Type Serial: 0000001 FCC ID: SELTSM401

Communication System: CDMA Frequency: 848.31 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 848.528 MHz; σ = 0.973 mho/m; ε_r = 53.2; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ES3DV3 - SN3068; ConvF(5.9, 5.9, 5.9); Calibrated: 2005-04-11

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2005-03-02

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

Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

15mm distance(with Earphone) CH777(CV340_VTL401)/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.888 mW/g

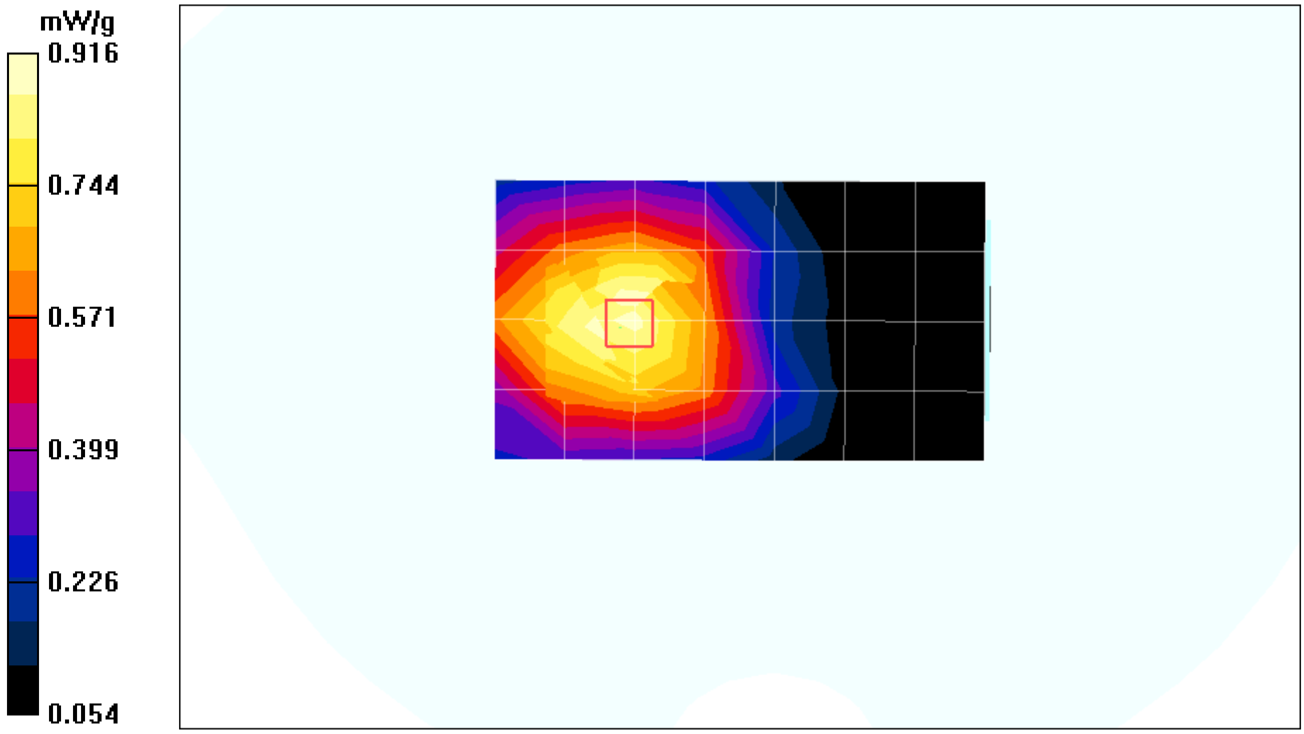
15mm distance(with Earphone) CH777(CV340_VTL401)/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.6 V/m; Power Drift = 0.043 dB

Peak SAR (extrapolated) = 1.18 W/kg

SAR(1 g) = 0.861 mW/g

Maximum value of SAR (measured) = 0.916 mW/g



10. SAR Test Equipment

Equipment Calibration

Table 10.1 Test Equipment Calibration

Description	Model	Serial No.	Calibration Date
Staubli Robot Unit	RX60L	F05/51E1A1/A/01	Mar. 2005
Data Acquisition Electronics	DAE4	672	Mar. 2005
E-Field Probe	ES3DV3	3068	Apr. 2005
Electro-Optical Converter	EOC3	398	Mar. 2005
SAM Twin Phantom V4.0C	TP-1358	SM 00 T02 DA	Mar. 2005
Validation Dipole Antenna	D450V2	1022	Mar. 2005
Validation Dipole Antenna	D835V2	4d017	Apr. 2005
Validation Dipole Antenna	D900V2	1d016	Apr. 2005
Validation Dipole Antenna	D1800V2	2d111	Apr. 2005
Validation Dipole Antenna	D1900V2	5d059	Apr. 2005
Validation Dipole Antenna	D2450V2	774	Apr. 2005
Wireless Communications Test Set	8960 Series 10	GB43193659	Jun. 2005
Dielectric Probe Kit	85070E	MY44300121	Apr. 2005
Network Analyzer	8753ES	US39171172	Mar. 2005
Power Amplifier	NKRFSPA	NK00SP18	May. 2005
Power Meter	437B	2912U01687	Dec. 2005
Power Sensor	8481A	836019/028	Aug. 2005
Power Meter	NRVS	835360/002	Dec. 2005
Power Sensor	NRV-Z32	836019/028	Dec. 2005
Series Signal Generator	E4436B	US39260598	Dec. 2005

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.

11. References

[1] IEEE Standards Coordinating Committee 34 – IEEE Std. 1528-2003 (Draft 6.1 – July 2001), *IEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.*

[2] Federal Communications Commission, OET Bulletin 65 (Edition 97-01), Supplement C (Edition 01-01), *Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields*, July 2001.

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

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

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[10] G.Hartsgrove, A. raszewski, A. Surowiec, *Simulated Biological Materials for Electromagnetic Radiation Absorption Studies*, University of Ottawa, Bioelectromagnetics, Canada: 1987, pp. 29-36

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

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

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

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

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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.

SAR Limit

In this report the comparison between the measured data and exposure limits defined in the ICNIRP Guidelines is made using the spatial peak SAR: the power level of the device under test guarantees that the whole body averaged SAR is not exceeded

Having in mind a worst-case consideration, the SAR limit is valid for general public exposure and for exposure times longer than 6 minutes [ICNIRP 1998].
According to Table 1 the SAR values have to be averaged over a mess of 10g with the shape of a cube

Table .1 Relevant spatial peak SAR limit averaged over a mass of 1g / 10g

Standard	SAR Limit [W/kg]
OET Bulletin 65 Supplement C	1.6

APPENDIX B : Probe Calibration

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 Federal Office of Metrology and Accreditation
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_Apr05

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3068
Calibration procedure(s)	QA CAL-01.v5 and QA CAL-12.v4 Calibration procedure for dosimetric E-field probes
Calibration date:	April 11, 2005
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	5-May-04 (METAS, No. 251-00388)	May-05
Power sensor E4412A	MY41495277	5-May-04 (METAS, No. 251-00388)	May-05
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-04 (METAS, No. 251-00403)	Aug-05
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-04 (METAS, No. 251-00389)	May-05
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-04 (METAS, No. 251-00404)	Aug-05
Reference Probe ES3DV2	SN: 3013	7-Jan-05 (SPEAG, No. ES3-3013_Jan05)	Jan-06
DAE4	SN: 617	19-Jan-05 (SPEAG, No. DAE4-617_Jan05)	Jan-06

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092180	18-Sep-02 (SPEAG, in house check Oct-03)	In house check: Oct 05
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-04)	In house check: Nov 05

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Laboratory Technician	[signature]
Approved by:	Katja Pokovic	Technical Manager	[signature]

Issued: April 12, 2005

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 Federal Office of Metrology and Accreditation
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
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) 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

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

Manufactured: December 14, 2004
Calibrated: April 11, 2005

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

ES3DV3 SN:3068 April 11, 2005

DASY - Parameters of Probe: ES3DV3 SN:3068

Sensitivity in Free Space[A]

NormX	**1.31** ± 10.1%	$\mu V/(V/m)^2$
NormY	**1.18** ± 10.1%	$\mu V/(V/m)^2$
NormZ	**1.19** ± 10.1%	$\mu V/(V/m)^2$

Diode Compression[B]

DCP X	**97** mV
DCP Y	**97** mV
DCP Z	**97** 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	5.8	2.5
SAR_{be} [%]	With Correction Algorithm	0.0	0.2

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	7.9	4.7
SAR_{be} [%]	With Correction Algorithm	0.1	0.3

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%.

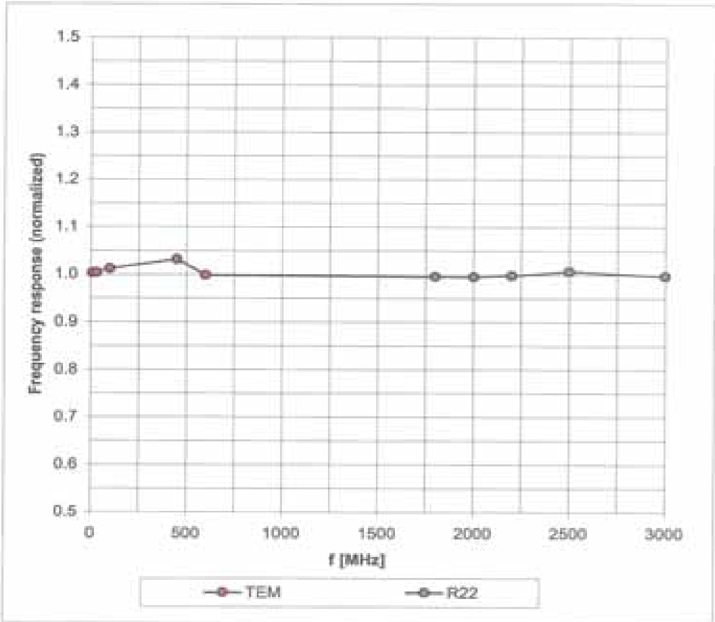
[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Page 8).
[B] Numerical linearization parameter: uncertainty not required.

ES3DV3 SN:3068

April 11, 2005

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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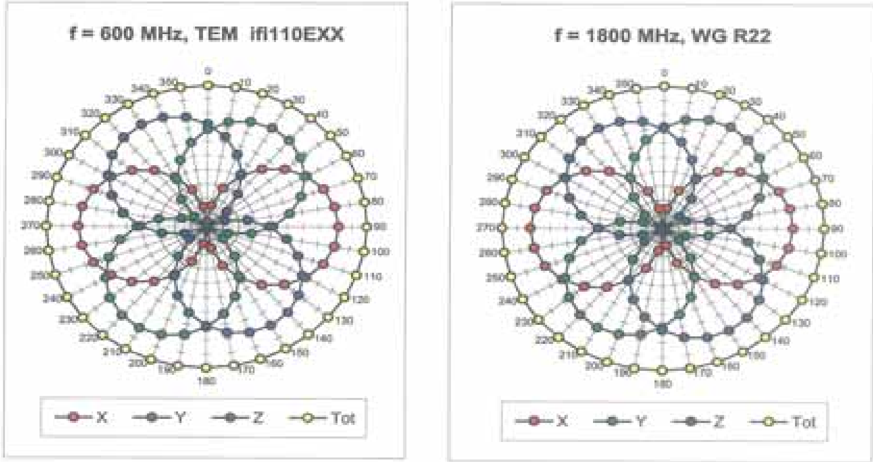
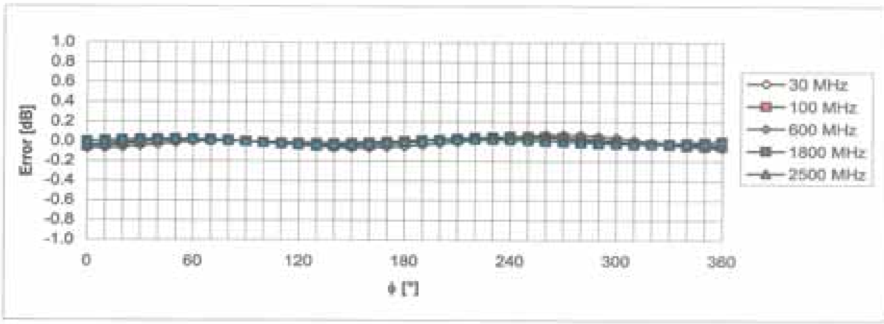
ES3DV3 SN:3068 April 11, 2005

Receiving Pattern (φ), ϑ = 0°





Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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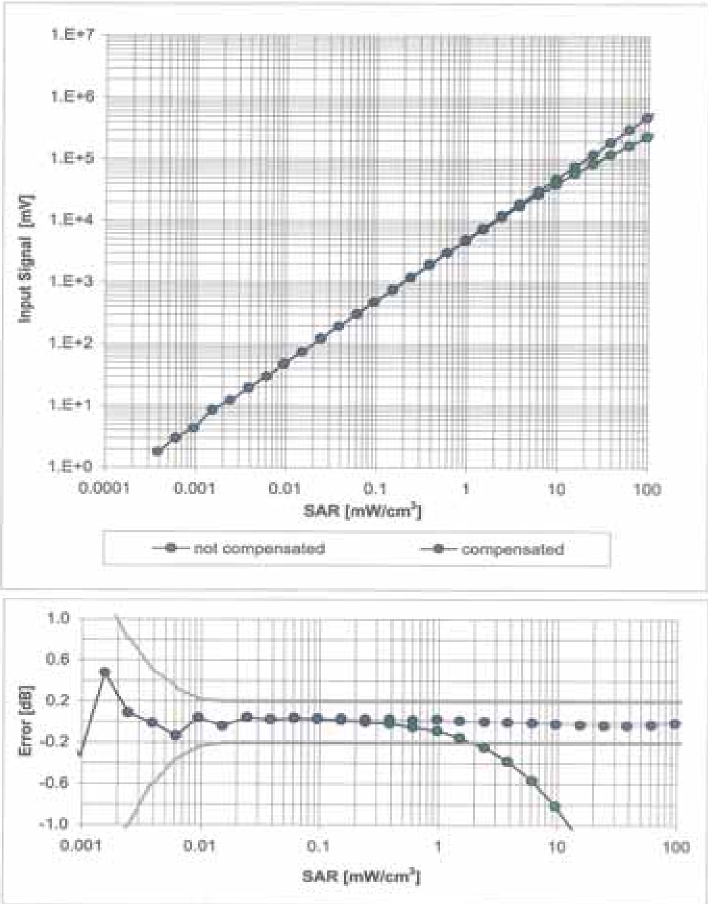
ES3DV3 SN:3068 April 11, 2005

Dynamic Range f(SAR_{head})

(Waveguide R22, f = 1800 MHz)



Uncertainty of Linearity Assessment: ± 0.6% (k=2)

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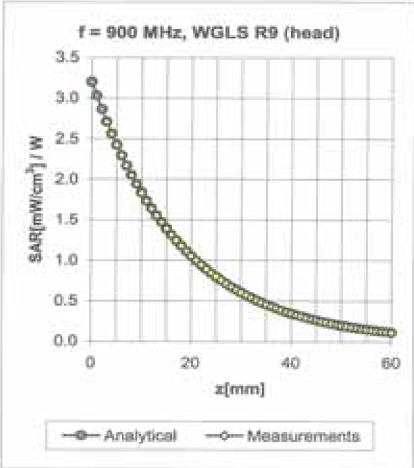
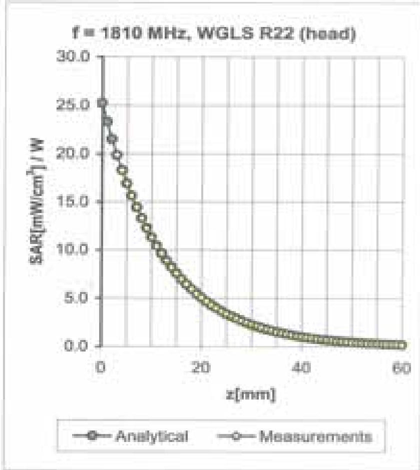
ES3DV3 SN:3068 April 11, 2005

Conversion Factor Assessment





f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
450	± 50 / ± 100	Head	43.5 ± 5%	0.87 ± 5%	0.02	1.20	6.57	± 13.3% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.53	1.32	5.91	± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.25	2.40	4.88	± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.29	2.21	4.67	± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.47	1.55	4.35	± 11.8% (k=2)
450	± 50 / ± 100	Body	56.7 ± 5%	0.94 ± 5%	0.02	1.21	6.33	± 13.3% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.51	1.39	5.90	± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.23	3.29	4.57	± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.71	1.24	4.07	± 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.

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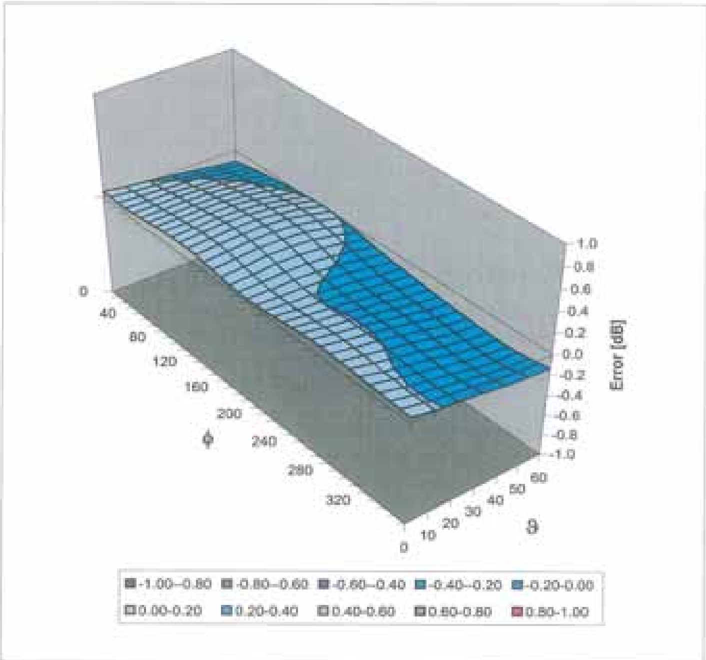
ES3DV3 SN:3068 April 11, 2005

Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

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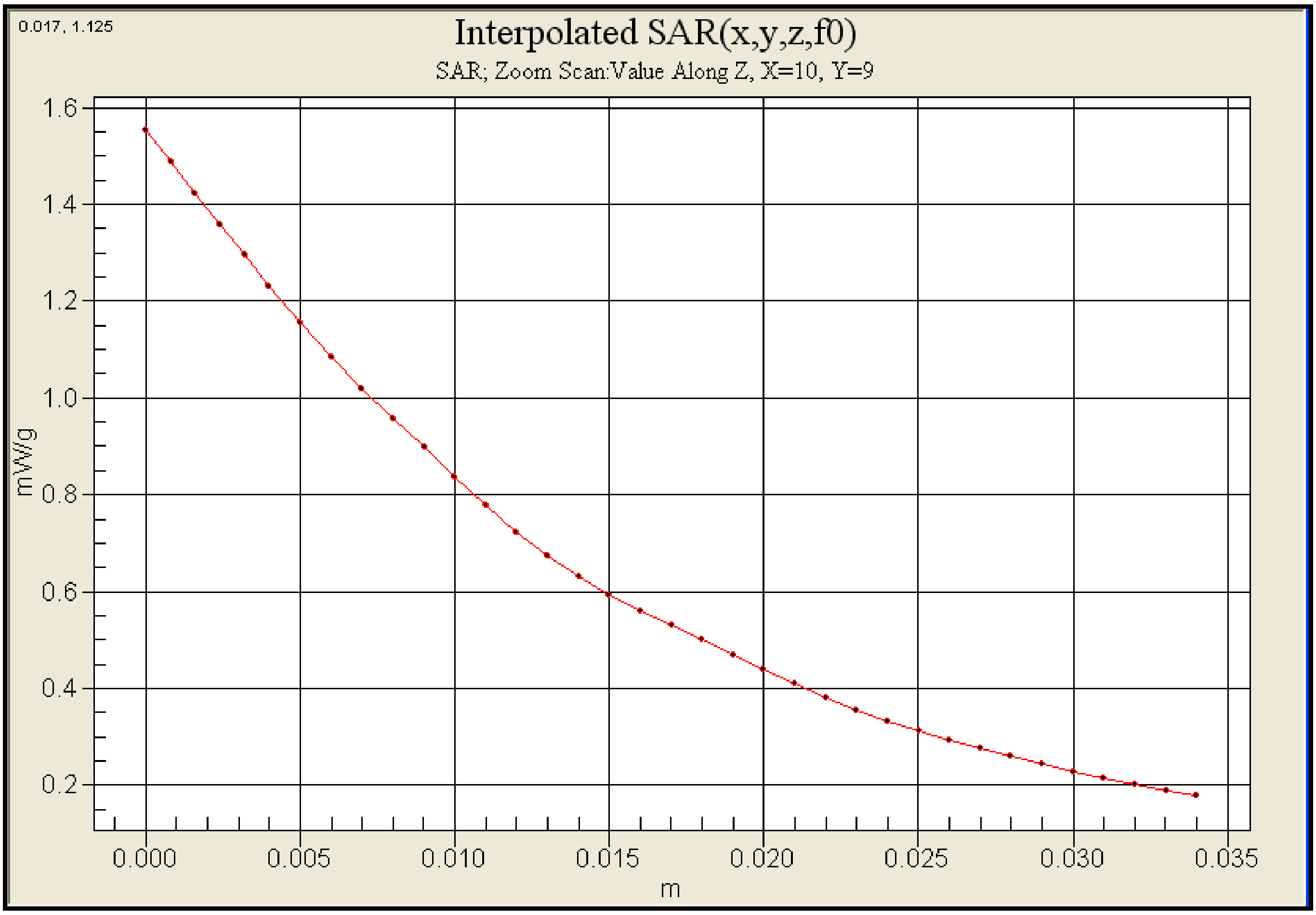
APPENDIX C : Probe Interpolation



APPENDIX D : Photographs of EUT

Front View Of EUT

Rear View Of EUT

Top View Of EUT

Base View Of EUT

Side View Of EUT

Side View Of EUT

Inside View Of EUT

Label View Of EUT