ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

SAR Compliace Test Report

APPLICANT NAME & ADDRESS :
LG Electronics Inc.
459-9, Kasan-dong, Keumchun-ku,
Seoul 153-023, Korea

DATA & LOCATION OF TESTING
Dates of testing : 03 January 2007 ~ 15 January 2007
Test Site : ESTECH Co., Ltd. Korea

Test Device :

Models : MG160a

FCC ID : BEJMG160A

TYPE : GSM Phone (Prototype)

Test report no :	ESTSAR0701-002	Number of page :	23
Contact person :	Bong Hyo, Han	Responsible test Engineer :	I.K.Hong
Testing has been Carried out in Accordance with :	IEEE 1528(Dec.2003) Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate(SAR) in the Human Body Due to Wireless Communications Device : Experimental Techniques		
Applicant Type :	Certification		
FCC CLASSIFICATION :	Licensed Non-Broadcast Transmitter Held to Ear (TNE) Licensed Portable Transmitter Held to Ear (PCE)		
FCC Rule Part(s)	§2.1093; FCC/OET Bulletin 65 Supplement C (July 2001)		
Test results :	The Tested device complies with the requirements in respect of all parameters subject to the test. The test results and statements relate only to the items tested. The test report shall not be reproduced recept in full, without written approval of the laboratory.		

Date and Signatures : 15 January2007
Report Prepared By : Engineer/ I.K.Hong
(Signature)

Engineering Manager/ Jay Kim
(Signature)

Table of Contents

1. SUMMARY FOR TEST REPORT

FCC ID	BEJMG160A
Date of test	03 January 2007 ~ 15 January 2007
Responsible test engineer	Jay Kim
Measurement performed by	I.K.Hong
EUT Type	GSM Phone (Prototype)
Tx Frequency	824.2~848.8MHz(GSM850), 1850.2~1909.8MHz(PCS1900)
Rx Frequency	869.2~893.8MHz(GSM850), 1930.2~1989.8MHz(PCS1900)
Max. RF Output Power	GSM850(33 dBm) PCS1900 (30 dBm)

1.1 Head Configuration

Max. SAR Measurement

FREQUENCY		Modulation	Conducted Power(dBm)		Device test position	SAR (W/kg)
MHz	Ch		dBm	Battery		
848.8	251	GSM	33	Standard	Left Touch	1.08
1850.2	512	GSM	30	Standard	Left Tilt	1.20

1.2 Body Worn Configuration

Max. SAR Measurement

FREQUENCY		Modulation	Conducted Power(dBm)		Separation test position	SAR (W/kg)
MHz	Ch		dBm	Battery		
836.6	190	GSM	33	Standard	1.5cm [w/o Holster]	0.749
1880.0	661	GSM	30	Standard	1.5cm [w/o Holster]	0.352

1.3 Measurement Uncertainty

Combine Standard Uncertainty	± 11.00 (k=1)
Extended Standard Uncertainty	± 22.00 (k=2, 95% CONFIDENCE LEVEL)

2. INTRODUCATION

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

The safety limits used for the environmental evaluation measurements arethe criteria published by the based on American National Standards Institute (ANSI) For localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for safety Levels with Respect to Human Exposure to Radio Frequency Electronic Fields, 3 kHz to 300 GHz. (c) 1992 by the institute of Electrical and Electronics Engineers, Inc., New York, New York 10017.[2] The measurement procedure described in IEEE/ANSIC95.3-1992 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave[3] is used for guidance in measuring SAR due to the RF radiationexposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (IC NIRP) in Biological Effects and Exposure Criteria for Radio Frequency Electromagnetic Fields," IC NIRP Report No. 86 (c) IC NIRP, 1986, Bethesda, MD20814.[6] SAR is ameasure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards.

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 (ρ). it is also defined as the rate of rf energy absorption per unit mass at a point in an absorbing body (see Fig. 2.1.).

$$SAR = \frac{d}{dt}\left(\frac{dU}{dm}\right) = \frac{d}{dt}\left(\frac{dU}{\rho\, dv}\right)$$

Figure 2.1 SAR Mathematical Equation

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

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

Where:

σ = conductivity of the tissue-simulant material (S/m)
E = mass density of the tissue-simulant material (kg/㎥)
ρ = Total RMS electric field strength (V/m)

3. DESCRIPTION OF THE DEVICE UNDER TEST

The FCC rules for evaluating portable devices for RF exposure compliance are contained in 47 CFR §2.1093. For purposes of RF exposure evaluation, a portable device is defined as a transmitting device designed to be used with any part of its radiating structure in direct contact with the user's body or within 20 centimeters of the body of a user or bystanders under normal operating conditions. This category of devices would include hand-held cellular and PCS telephones that incorporate the radiating antenna into the hand-piece and wireless transmitters that are carried next to the body. Portable sevices are evaluated with respect to SAR limits for RF exposure. The applicable SAR limit for portable transmitters used by consumers is 1.6 watts/kg, which is averaged over any one gram of tissue defined as a tissue volume in the shape of a cube.

2.1 Antenna Description

Type	Internal Antenna
Location	the Top of the device
Radiator Material	Copper

2.2 Device Description

FCC ID	FCC ID : BEJMG160A
Serial numbers	-
Exposure environment	Uncontrolled exposure
Device category	Portable device
Mode(s) of Operation	GSM
Modulation Mode(s)	GSM
Duty Cycle	8.3
Transmitting FreQuency Range(s)	824.2~848.8MHz(GSM850), 1850.2~1909.8MHz(PCS1900)
test signal method	■ Base station simulator □ Internal test code

2.3 Battery Options

There is only one battery option available for tested device,

4. TEST CONDITIONS

4.1 Ambient Conditions

Ambient Temperature (°C)	22
Tissue simulating liquid temperature (°C)	22
Humidity (%)	45

4.2 RF Characteristics of The Test Site

Tests were performed in a fully enclosed RF Shielded environment

4.3 Test Signal, Frequencies, And Output Power

The handset was placed into simulated call mode (850MHz GSM,1900MHz PCS modes)

In all operation bands the measurements were performed on lowest, middle and highest channels.

The phone was set to maximum power level during the all tests and at the beginning of the each test the battery was fully charged.

DASY4 system measures power drift during SAR testing by comparing e-field in the same location at the beginning and at the end of measurement. These records were used to monitor stability of power output.

Fig. 4.1 SAR Measurement System

5. DESCRIPTION OF THE TEST EQUIPMENT

An SAR measurement system usually consists of a small diameter isotropic electric field probe, a multiple axis probe positioning system, a test device holder, one or more phantom models, the field probe instrumentation, a computer and other electronic equipment for controlling the probe and making the measurements. Other supporting equipment, such as a network analyzer, power meters and RF signal generators, are also required to measure the dielectric parameters of the simulated tissue media and to verify the measurement accuracy of the SAR system.

5.1 Test System Specifications

Test Equipment	Model	Serial Number	Cal.Due Date
DAE	DAE4	551	2007-04-27
E-Field Probe	ET3D6	1750	2007-01-24
Dipole validation kit	D1900V2	5d058	2007-09-13
	D835V2	475	2007-09-12
Network analyzer	8753ES	MY40000609	2007-10-09
Signal generator	E4432B	GB40050840	2007-03-03
RF Power meter	EPM-442A	GB37170412	2007-10-11
Power Sensor	8481A	3318A90368	2007-03-08
RF Power meter	E4418A	GB38272722	2007-03-03
Power Sensor	8481A	3318A90368	2007-03-08
Dielectric Probe	85070D	US01440154	-
Power Amplifier	BBS3Q7ECK	NONE	2007-12-16
LP Filter	LA-15N	NONE	2007-10-30
	LA-30N	NONE	2007-10-30
Attenuator	8491B	21828	2007-06-03
Dual Directional Coupler	778D	17575	2007-05-02
Wireless Communications Test Set	E5515C	GB42230119	2007-02-06

5.2 SAR Measurement Setup

Measurement are performed using the DASY4 dosimetric assessment system. The DASY4 is made by Schmid & Partner Engineering AG(SPEAG) in Zurich, Switzerland and consists of high precision robotics system (Staubli), robot controller, Pentium IV computer, near-field probe, probe alignment sensor, and the SAM twin phantom containing the brain equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field(EMF) (see Fig. 5.1) A cell controller system contains the power supply, robot controller, teach pendant(Joystick), and a remote control used to drive the robot motors. The pc consists of the Intel Pentium IV 2.4 GHz computer with WindowsXP system and SAR measurement Software DASY4, A/D interface card, monitor, mouse, and keyboard. The Staubli Robot data acquisition electronic (DAE) circuit that performs the signal amplification, signal multiplexing,
AD-conversion, offset measurements, mechanical surface detection, collision detection, etc.

5. DESCRIPTION OF THE TEST EQUIPMENT(continued)

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 PC plug-in card.

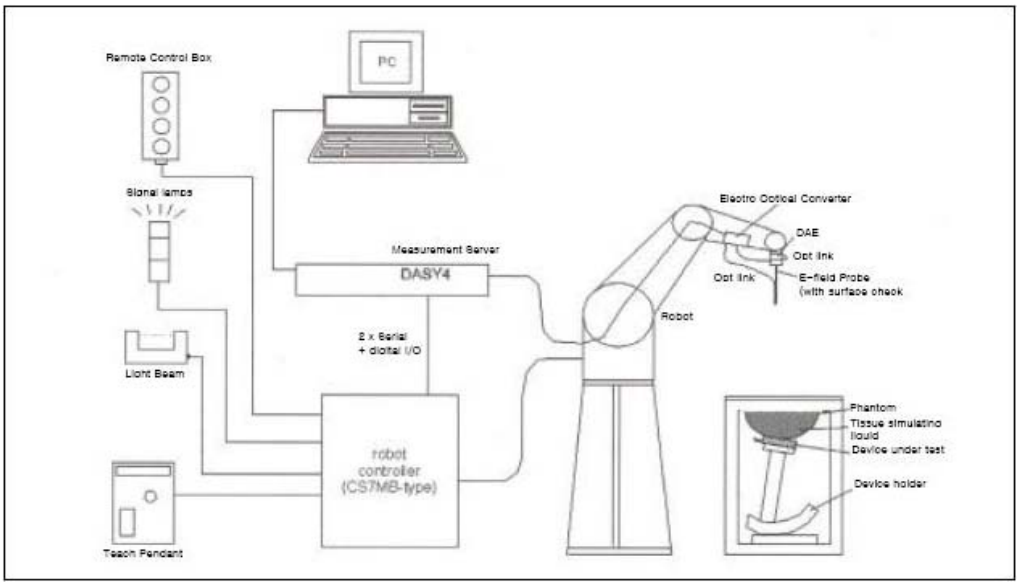


Fig. 5.1 SAR Measurement System Setup

The DAE4 consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gainswitching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the Ethernet Card is accomplished through an optical downlink for data and status
information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer. The system is described in detail in [7].

5.3 DASY4 E-Field Probe System

The SAR measurements were conducted with the dosimetric probe ET3DV6, designed in the classical triangular configuration [7] (see Fig.5.2) 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 multifiber line ending at the front of the probe tip. It is connected to the EOC box in the robot arm and provides an automatic detection transmitter, the other half to a synchronized receiver.

5. DESCRIPTION OF THE TEST EQUIPMENT(continued)

As the probe approach 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 coupling is zero. The distance of the coupling maximum to the surface is probe angle. The DASY4 software reads the reflection during a software approach and looks for the maximum using a 2nd order fitting (see Fig. 5.2). The approach is stopped at reaching the maximum.

Isotropic E-Field Probe

Isotropic E-Field Probe for Dosimetric Measurements	
Construction	Symmetrical design with triangular core Interleafed sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., glycol)
Calibration	In air from 10 MHz to 3 GHz In brain and muscle simulating tissue at frequencies of 450 MHz, 900 MHz and 1.8 GHz (accuracy ± 8%) Calibration for other liquids and frequencies upon request
Frequency	10 MHz to > 6 GHz; Linearity: ± 0.2 dB (30 MHz to 3 GHz)
Directivity	± 0.2 dB in brain tissue (rotation around probe axis) ± 0.3 dB in brain tissue (rotation normal to probe axis)
Dynamic Range	5 µW/g to > 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm Tip length: 20 mm Body diameter: 12 mm Tip diameter: 3.9 mm Distance from probe tip to dipole centers: 2.7 mm

Fig. 5.2 Probe Specifications

5. DESCRIPTION OF THE TEST EQUIPMENT(continued)

5.4 Phantom & Equivalent Tissues

SAM Phantom

The SAM Twin Phantom V4.0 is constructed of the 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 [11][12]. 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.

Head & Muscle simulation Mixture Characterization

The brain and muscle mixtures consist of a viscous gel using hydroxethlcellullose(HEC) gelling agent and saline solution (see Fig 5.3). Preservation with a bactericide 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 specified in 1528(Dec.2003) are derived from the issue dielectric parameters computed from
the 4-Cole-Cole equations The mixture characterizations used for the brain and muscle tissue simulation liquids are according to the data by C. Gabriel and G. Hartagrove [13]. (see Fig. 5.3)

Frequency	Head		Body	
(MHz)	εr	σ (S/m)	εr	σ (S/m)
150	52.3	0.76	61.9	0.8
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.9	55.2	0.97
900	41.5	0.97	55	1.05
915	41.5	0.98	55	1.06
1450	40.5	1.2	54	1.3
1610	40.3	1.29	53.8	1.4
1800-2000	40	1.4	53.3	1.52
2450	39.2	1.8	52.7	1.95
3000	38.5	2.4	52	2.73
5800	35.3	5.27	48.2	6

Fig.5.3 Head and body tissue parameters by the IEEE SCC-34/SC-2 in P1528

5. DESCRIPTION OF THE TEST EQUIPMENT(continued)

835MHz			1900MHz		
	Head	Body		Head	Body
Sugar	47.31%	34.31%	DGBE(diethyene Glycol buty Ether)	44.91%	29.96%
Deionized water	51.07%	65.45%	Deionized water	54.88%	69.91%
Salt	1.15%	0.62%	Salt	0.21%	0.13%
HEC (hydroxyethy cellulose)	0.24%				
Preventol	0.24%	0.10%			
ε	41.0±5%	55.2±5%	ε	40.0±5%	53.3±5%
σ	0.89±10%	0.97±10%	σ	1.45±10%	1.52±10%

Fig. 5.4 Composition of the Tissue Equivalent Matter

Device Holder for Transmitters

In combination with the SAM Twin Phantom V4.0, the Mounting Device enables the rotation of the accurately, and repeatably be positioned according to the FCC specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).

Note : A simulating human hand is not used due to the complex anatomical and geometrical structure of the hand that may produce infinite number of configurations [12]. To produce the worst-case condition (the hand absorbs antenna output power), the hand is omitted during the tests.

6. DESCRIPTION OF THE TEST PROCEDURE

6.1 Definition of Reference Point

EAR Reference point

The point "M" is the reference point for the center of the mouth, "ERP" is the ear reference point. The ERP are 15mm posterior to the entrance to the ear canal(EEC) along the B-M line (Back-Mouth), as shown is figure 6.1. The plane passing through the two ear canals and M is defined as the Reference Plane. The line N-F (Neck-Front) is perpendicular to the reference plane and passing through the ERP is called the Reference Pivoting Line (see Figure 6.1) B-M is perpendicular to the N-F line. Both N-F and B-M lines are marked on the external phantom shell to facilitate handset positioning [5].

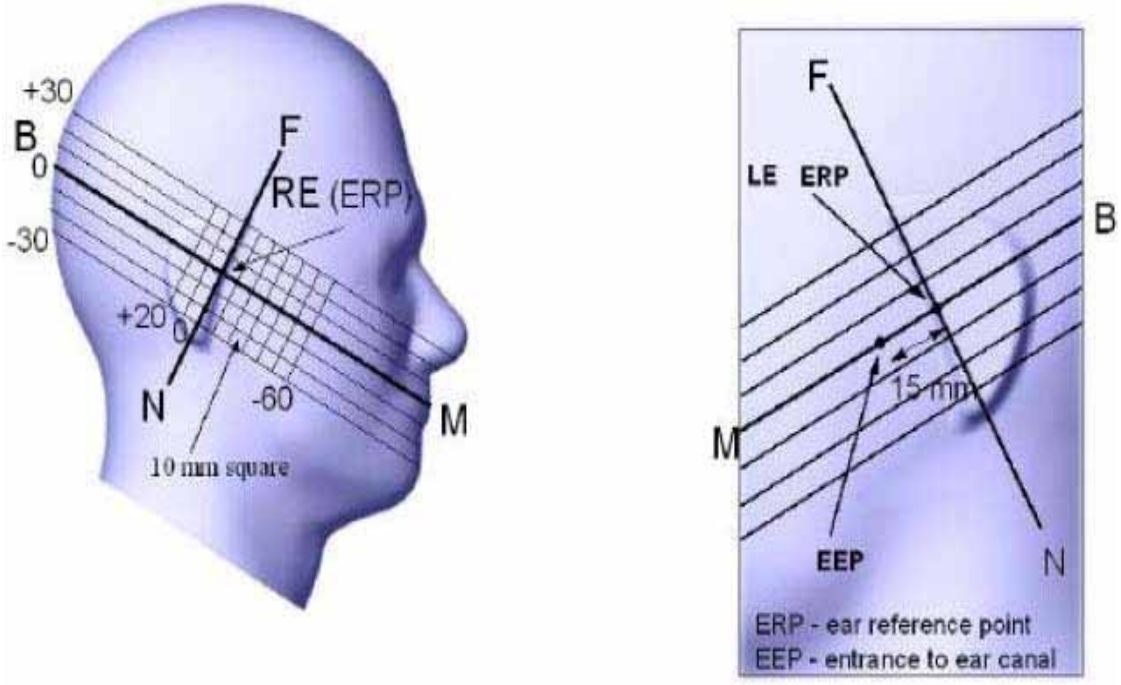


Figure 6.1 Close-up side view of ERP

Handset Reference Points

Two imaginary lines on the handset were established: the vertical centerline and the horizontal line. The test device was placed in a normal operating position with the "test device reference point" located along the "vertical centerline" on the front of the device aligned to the "ear reference point" (see Fig. 6.2). The "test device reference point" was than located at the same level as the center of the ear reference point. The test device was positioned so that the "vertical centerline" was bisecting the front surface of the handset at it's top 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" on the outer surface of the both the left and right head phantoms on the ear reference point.

6. DESCRIPTION OF THE TEST PROCEDURE(continued)

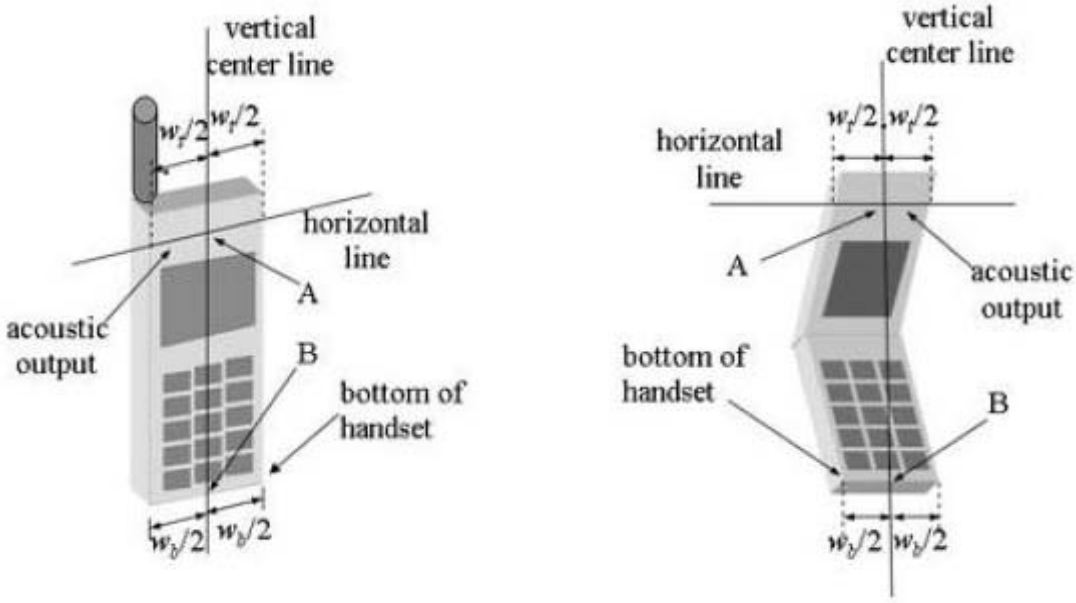


Figure 6.2 Handset Vertical Center & Horizontal Line Reference Points

6.2 Test Configuration Positions
Positioning for Cheek/Touch

1) Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece, open the cover . (If the phone can also be used with the cover closed ,both configurations must be tested.)
2) Define two imaginary lines on the handset: the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset: the midpoint of the width wt of the handset at the level of the acoustic output (point A on Figures 6.2), and the midpoint of the width wb of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Figure 6.2). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output. However, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not ecessarily parallel to the front face of the handset (see Figure 6.2), especially for clamshell handsets, handsets with lip pieces, and other irregularly-shaped handsets.
3) Position the handset close to the surface of the phantom touch that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 6.3), 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.

6. DESCRIPTION OF THE TEST PROCEDURE(continued)

4) Translate the handset towards the phantom along the line passing through RE and LE until the handset touches the ear.
5) While maintaining the handset in this plane, rotate it around the LE–RE line until the vertical centerline is in the plane normal to MB–NF including the line MB (called the reference plane).
6) Rotate the phone around the vertical centerline until the phone (horizontal line) is symmetrical with respect to the line NF.
7) 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, rotate the handset about the line NF until any point on the handset is in contact with a phantom point

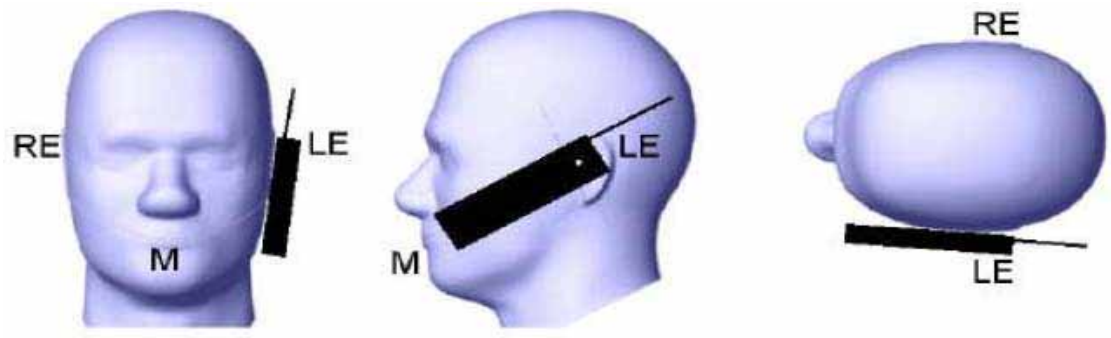


Figure 6.3 “Cheek” or “Touch” Position.

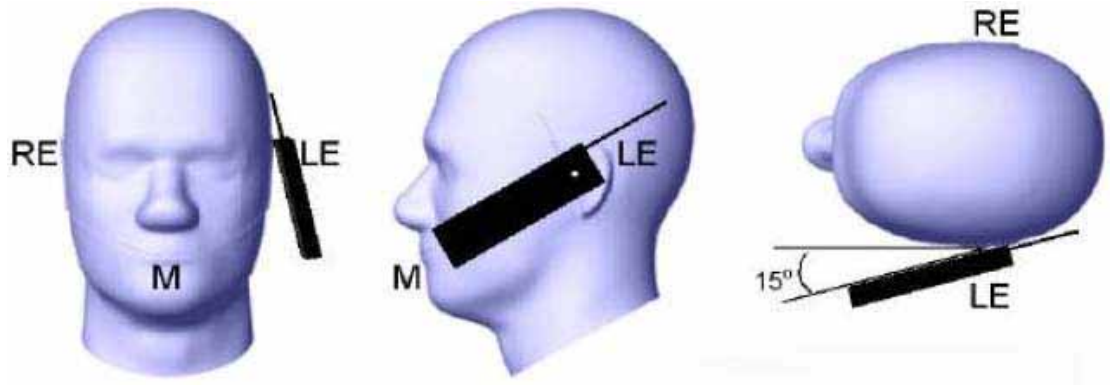


Figure 6.4 “Tilted” Position.

6. DESCRIPTION OF THE TEST PROCEDURE(continued)

Positioning for Ear / 15° Tilted

1) Repeat steps 1 to 7 of 6.2(Positioning for Cheek/Touch) to place the device in the "cheek position."
2) While maintaining the orientation of the phone retract the phone parallel to the reference plane far enough to enable a rotation of the phone by 15 degree.
3) Rotate the phone around the horizontal line by 15 degree.
4) While maintaining the orientation of the phone, move the phone parallel to the reference plane until any part of the phone touches the head. (In this position, point A will be located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact is at any location other than the pinna, the angle of the phone shall be reduced. The tilted position is obtained if any part of the phone is in contact of the ear as well as a second part of the phone is contact with the head.

Body Holder / Belt Clip Configurations

Body-worn operation configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration. A device with a headset output is tested with a headset connected to the device. Body dielectric parameters are used.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are supplied with the device, the device is tested with each accessory that contains a unique metallic component. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied of available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration where a separation distance between the back of the device and the flat phantom is used. All test position spacings are documented. Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance is tested with the accessory(ies), including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration. In all case SAR measurements are performed to investigate the worst case positioning. Worst-case positioning is then documented and used to perform Body SAR testing.

In order for users to be aware of the body-worn operation requirements for meeting RF exposure compliance, operation instructing instructions and cautions statements are included in the user's manual.

6. DESCRIPTION OF THE TEST PROCEDURE(continued)

6.3 Scan Procedures

First coarse scans are used for quick determination of the field distribution. Nest cube scan, 5x5x7 points; spacing between each point 5x5x5 mm, is performed around the highest E-field value to determine the averaged SAR-distribution over 1g.

6.4 SAR Averaging Methods

The maximum SAR value is averaged over its volume using interpolation and extrapolation.
The interpolation of the points is done with a 3d-Spline. The 3d-Spline is composed of three one-dimensional splines with the “Not a Knot” ?condition [W.Gander, Computerma-thematik, p. 141-150](x, y and z directions) [Numerical Recipes in C, Second Edition, p 123].
The extrapolation is based on least square algorithm [W.Gander, Computermathematik, p. 168-180]. Through the points in the first 30 mm in all z-axis, polynomials of order four are calculated₩. This polynomial is then used to evaluate the points between the surface and the probe tip. The points calculated from the surface, have a distance of 1mm from one another.

7. MEASUREMENT UNCERTAINTY

According to CENELEC [17], typical worst-case uncertainty of field measurements is 5 dB.
For well-defined modulation characteristics the uncertainty can be reduced to 3 dB.

ERROR Description	Uncertainty value ±%	Probability Distribution	Divisor	ci 1g	Standard unc. (1g)	vi or Veff
MEASUREMENT SYSTEM						
Probe Calibration	± 11.7 %	normal	1	1	± 4.8 %	∞
Axial Isotropy	± 4.7	rectangular	√3	$(1-cp)^{1/2}$	± 1.9%	∞
Hemispherical Isotropy	± 9.6	rectangular	√3	$(cp)^{1/2}$	± 3.9%	∞
Boundary Effects	± 1.0	rectangular	√3	1	± 0.6%	∞
Linearity	± 4.7	rectangular	√3	1	± 2.7%	∞
System Detection Limits	± 1.0	rectangular	√3	1	± 0.6%	∞
Readout Electronics	± 1.0	normal	1	1	± 1.0%	∞
Response time	± 0.8	rectangular	√3	1	± 0.5%	∞
Integration time	± 2.6	rectangular	√3	1	± 1.5%	∞
RF Amnient Conditions	± 3.0	rectangular	√3	1	± 1.7%	∞
Probe Positioner Mechanical Tolerance	± 0.4	rectangular	√3	1	± 0.2%	∞
Probe Positioning with respect to Phantom Shell	± 2.9	rectangular	√3	1	± 1.7%	∞
Extrapolation, Interpolation and Integration Algorithms for Max. SAR Evaluation	± 1.0	rectangular	√3	1	± 0.6%	∞
Test Sample Related						
Test Sample Positioning	± 2.9	normal	1	1	± 2.97%	145
Device Holder Uncertainty	± 3.6	normal	0.84	1	± 3.69%	5
Output Power Validation - SAR drift measurement	± 5.0	rectangular	√3	1	± 2.9%	∞
Phantom and Tissue Parameters						
Phantom Uncertainty (shape and thickness tolerances)	± 4.0	rectangular	√3	1	± 2.3%	∞
Liquid conductivity Target - tolerance	± 5.0	rectangular	√3	0.64	± 1.8%	∞
Liquid Conductivity - measurement uncertainty	± 5.0	normal	1	0.64	± 3.2%	∞
Liquid permittivity Target - tolerance	± 5.0	rectangular	√3	0.6	± 1.7%	∞
Liquid Permittivity - measurement uncertainty	± 5.0	normal	1	0.6	± 3.0%	∞
Combined Standard Uncertainty					±11.00 %	330
Coverage Factor for 95%				K = 2		
Expanded Standard Uncertainty					± 22.00 %	

8. SYSTEM VERIFICATION

Tissue Verification

Table 8.1 Simulated Tissue Verification [5]

MEASURED TISSUE PARAMETERS										
Liquid Temperature (°C)			22		Liquid Depth(mm)		150			
Date	2007-01-08		2007-01-08		2007-01-08		2007-01-08			
Tissue	1900MHz Brain		1900MHz Muscle		835MHz Brain		835MHz Muscle			
	Target	Measured	Target	Measured	Target	Measured	Target	Measured	Target	Measured
Dielectric Constant: ε	40	39.4	53.3	51.23	40	40.9	55.2	53.64		
Conductivity: σ	1.45	1.44	1.52	1.56	0.9	0.916	0.97	0.966		
Deviation (%)	ε : -1.5% σ : -0.69%		ε : -3.88% σ : -2.63%		ε : 2.25% σ : 1.78%		ε : -2.83% σ : -0.41%			

Test System Validation

- Prior to assessment, the system is verified to the ±10% of the specifications at 835MHz,1900MHz (Graphic Plots Attached)
- The results are nominalized to 1W input power

Table 8.2 System Validation [5]

SYSTEM DIPOLE VALIDATION TARGET & MEASURED						
Tissue	System Validation Kit:	Forward Power (W)	Targeted SAR1g (mW/g)	Measured SAR1g (mW/g)	Deviation (%)	Test Date
1900MHz Brain	D1900V2(S/N :5d058)	1.0	39.7	39.28	-1.06%	2007-01-08
835MHz Brain	D835V2(S/N:475)	1.0	9.5	9.16	-3.58%	2007-01-08

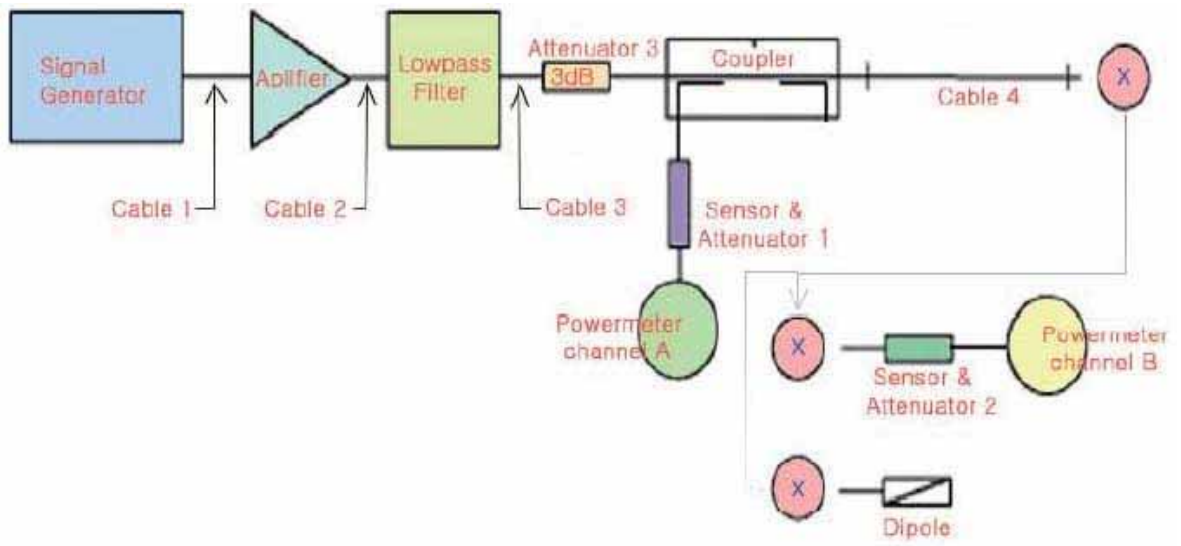


Figure 12.1 Dipole Validation Test Setup

9. RESULTS(continued)

Ambient TEMPERATURE (C) : 22.0
Relative HUMIDITY (%) : 45
Mixture Type : 835MHz Brain
Dielectric Constant : 40.9
Conductivity: 0.916

Measurement Results (GSM Head SAR)

ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population	Brain 1.6 W/kg (mW/g) averaged over 1 gram

MEASUREMENT RESULTS (GSM Head SAR)

Frequency		Mod	Conducted Power(dBm)		battery	Device Test position	Slider	BT	Antenna Position	SAR (W/kg)
MHz	Ch.		Begin	End						
836.60	190	GSM	33.00	32.93	Standard	Left Touch	-	-	Fixed	1.070
836.60	190	GSM	33.00	33.02	Standard	Right Touch	-	-	Fixed	1.060
836.60	190	GSM	33.00	32.92	Standard	Left Tilt	-	-	Fixed	0.635
836.60	190	GSM	33.00	32.96	Standard	Right Tilt	-	-	Fixed	0.650
824.20	128	GSM	33.00	32.92	Standard	Left Touch	-	-	Fixed	1.050
824.20	128	GSM	33.00	32.89	Standard	Right Touch	-	-	Fixed	1.070
848.80	251	GSM	33.00	32.93	Standard	Left Touch	-	-	Fixed	1.080
848.80	251	GSM	33.00	32.94	Standard	Right Touch	-	-	Fixed	1.050

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 the worst-case are reported.
3. Battery Type : Standard
Radiated measurements indicate that the Standard-life battery produces lower ERP and EIRP, therefore the Standard-life battery is used in SAR testing.
Justification for reduced test configuration: Per FCC/OET Bulletin 65 Supplement C[July 2001], if the SAR measured at the middle channel for each test configuration (left,light,cheek/touch,tilt/ear, extended and retracted)is at least 3.0dB lower than the SAR limit, testing at the hiah and low
4. Power Measured : Conducted
5. SAR Measurement System : SPEAG
6. SAR Configuration : Head

Engineer I.K.Hong (Signature)

9. RESULTS(continued)

Ambient TEMPERATURE (C) : 22.0
Relative HUMIDITY (%) : 45
Mixture Type : 835MHz Body
Dielectric Constant : 53.64
Conductivity: 0.966

Measurement Results (GSM BODY SAR without Holster)

ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population	Brain 1.6 W/kg (mW/g) averaged over 1 gram

MEASUREMENT RESULTS (GSM Body SAR Without Holster – Front)

Frequency		Mod	Conducted Power(dBm)		battery	Device Test position	Slider	BT	Antenna Position	SAR (W/kg)
MHz	Ch.		Begin	End						
836.60	190	GSM	33.00	32.96	Standard	1.5[w/o Holster]	-	-	Fixed	0.367

MEASUREMENT RESULTS (GSM Body SAR Without Holster – Rear)

Frequency		Mod	Conducted Power(dBm)		battery	Device Test position	Slider	BT	Antenna Position	SAR (W/kg)
MHz	Ch.		Begin	End						
836.60	190	GSM	33.00	32.94	Standard	1.5[w/o Holster]	-	-	Fixed	0.749

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 the worst-case are reported.
3. Battery Type : Standard
Radiated measurements indicate that the Standard-life battery produces lower ERP and EIRP, therefore the Standard-life battery is used in SAR testing.
Justification for reduced test configuration: Per FCC/OET Bulletin 65 Supplement C[July 2001], if the SAR measured at the middle channel for each test configuration (left,light,cheek/touch,tilt/ear, extended and retracted)is at least 3.0dB lower than the SAR limit, testing at the hiah and low channels is optional for such test configration(s).
4. Power Measured : Conducted
5. SAR Measurement System : SPEAG
6. SAR Configuration : Body

Engineer I.K.Hong

(Signature) 

9. RESULTS(continued)

Ambient TEMPERATURE (C) : 22.0
Relative HUMIDITY (%) : 45
Mixture Type : 1900MHz Brain
Dielectric Constant : 39.4
Conductivity: 1.44

Measurement Results (GSM Head SAR)

ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population	Brain 1.6 W/kg (mW/g) averaged over 1 gram

MEASUREMENT RESULTS (GSM Head SAR)

Frequency		Mod	Conducted Power(dBm)		battery	Device Test position	Slider	BT	Antenna Position	SAR (W/kg)
MHz	Ch.		Begin	End						
1880.00	661	GSM	30.00	29.96	Standard	Left Touch	-	-	Fixed	1.010
1880.00	661	GSM	30.00	29.90	Standard	Right Touch	-	-	Fixed	0.918
1880.00	661	GSM	30.00	29.97	Standard	Left Tilt	-	-	Fixed	1.090
1880.00	661	GSM	30.00	29.93	Standard	Right Tilt	-	-	Fixed	1.040
1850.20	512	GSM	30.00	29.93	Standard	Left Touch	-	-	Fixed	1.170
1850.20	512	GSM	30.00	29.93	Standard	Right Touch	-	-	Fixed	0.991
1850.20	512	GSM	30.00	29.95	Standard	Left Tilt	-	-	Fixed	1.200
1850.20	512	GSM	30.00	29.97	Standard	Right Tilt	-	-	Fixed	1.170
1909.80	810	GSM	30.00	29.94	Standard	Left Touch	-	-	Fixed	0.957
1909.80	810	GSM	30.00	29.89	Standard	Right Touch	-	-	Fixed	0.819
1909.80	810	GSM	30.00	29.96	Standard	Left Tilt	-	-	Fixed	0.956
1909.80	810	GSM	30.00	29.90	Standard	Right Tilt	-	-	Fixed	0.909

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 the worst-case are reported.
3. Battery Type : Standard
Radiated measurements indicate that the Standard-life battery produces lower ERP and EIRP, therefore the Standard-life battery is used in SAR testing.
Justification for reduced test configuration: Per FCC/OET Bulletin 65 Supplement C[July 2001], if the SAR measured at the middle channel for each test configuration (left,light,cheek/touch,tilt/ear, extended and retracted)is at least 3.0dB lower than the SAR limit, testing at the hiah and low channels is optional for such test configration(s).
4. Power Measured : Conducted
5. SAR Measurement System : SPEAG
6. SAR Configuration : Head

Engineer I.K.Hong (Signature)

9. RESULTS(continued)

Ambient TEMPERATURE (C) : 22
Relative HUMIDITY (%) : 45
Mixture Type : 1900MHz Body
Dielectric Constant : 51.2
Conductivity: 1.56

Measurement Results (GSM BODY SAR without Holster)

ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population	Body 1.6 W/kg (mW/g) averaged over 1 gram

MEASUREMENT RESULTS (GSM Body SAR Without Holster – Front)

Frequency		Mod	Conducted Power(dBm)		battery	Device Test position	Slider	BT	Antenna Position	SAR (W/kg)
MHz	Ch.		Begin	End						
1880.00	661	GSM	30.00	29.41	Standard	1.5[w/o Holster]	-	-	Fixed	0.331

MEASUREMENT RESULTS (GSM Body SAR Without Holster – Rear)

Frequency		Mod	Conducted Power(dBm)		battery	Device Test position	Slider	BT	Antenna Position	SAR (W/kg)
MHz	Ch.		Begin	End						
1880.00	661	GSM	30.00	29.89	Standard	1.5[w/o Holster]	-	-	Fixed	0.352

NOTES:
1. The test data were reported the worst-case SAR value with the antenna-head position set in a typical configuration.
2. All modes of operation were investigated and the worst-case are reported.
3. Battery Type : Standard
Radiated measurements indicate that the Extended-life battery produces lower ERP and EIRP, therefore the Standard-life battery is used in SAR testing.
Justification for reduced test configuration: Per FCC/OET Bulletin 65 Supplement C[July 2001], if the SAR measured at the middle channel for each test configuration (left,light,cheek/touch,tilt/ear, extended and retracted)is at least 3.0dB lower than the SAR limit, testing at the hiah and low channels is optional for such test configration(s).
4. Power Measured : Conducted
5. SAR Measurement System : SPEAG
6. SAR Configuration : Body

Engineer I.K.Hong
(Signature) 

10. REFERENCE

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

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

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

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

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

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

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

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

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

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

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

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

[13] W. Gander, Computermathematick, Birkhaeuser, Basel, 1992.

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

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

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

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

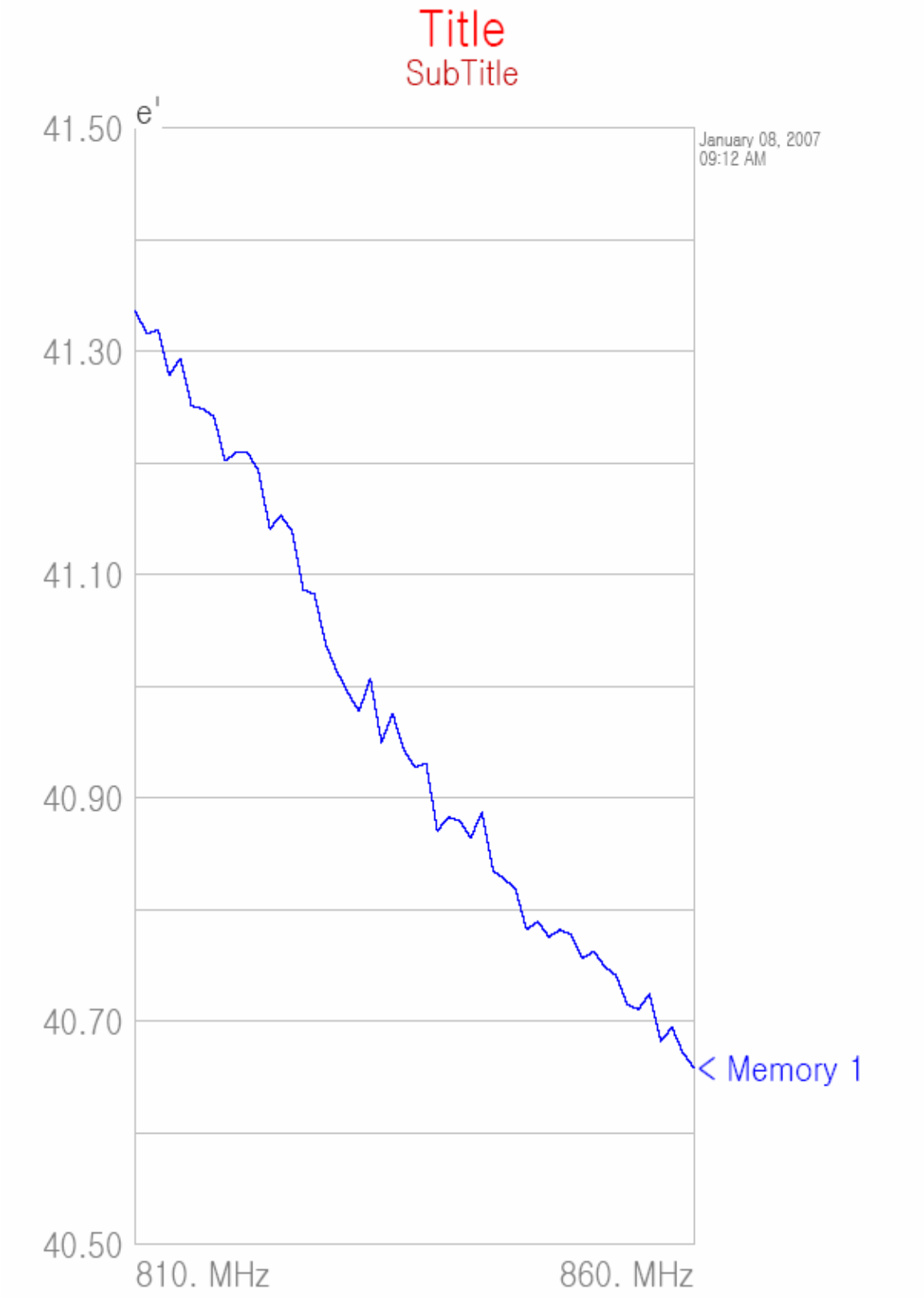
[18] Prof. Dr. Niels Kuster, ETH, Eidgen o ssische Technische Hoschschule Z u rich, Dosimetric Evaluation of the Cellular Phone.

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

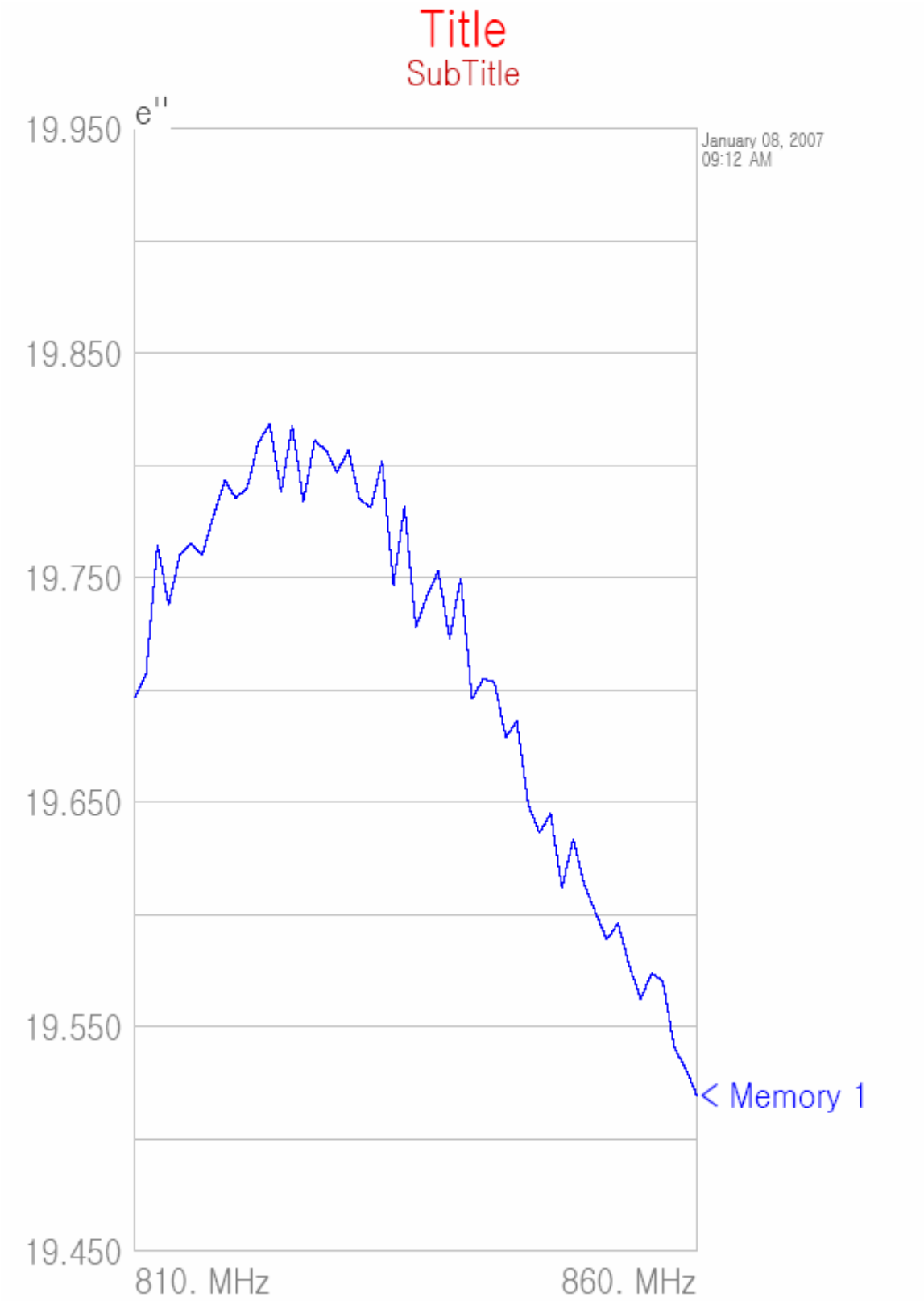
APPENDIX A : Validation Test Data of Tissue

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

- Head Tissue(GSM850)



ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204



ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Title

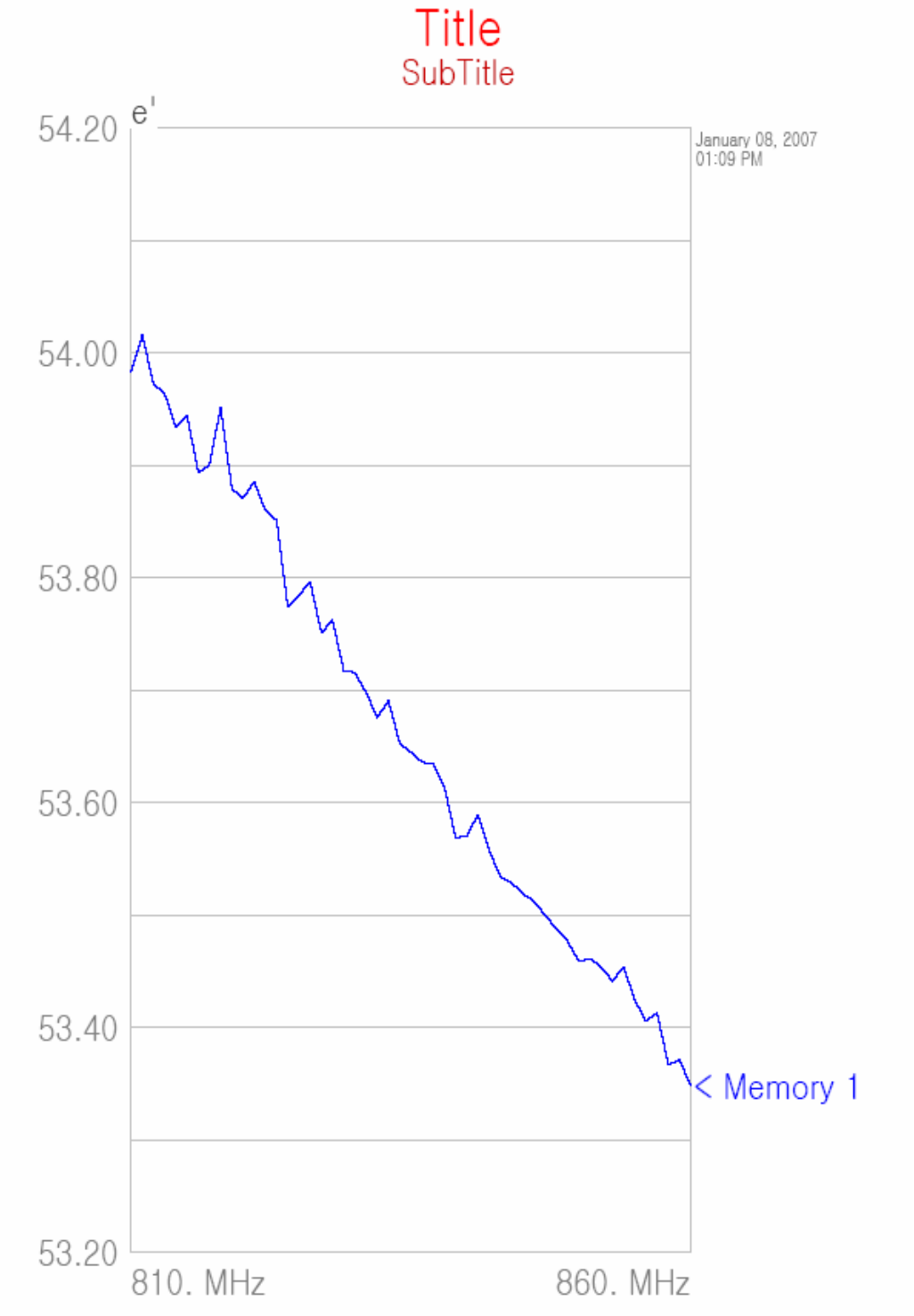
SubTitle

January 08, 2007 09:12 AM

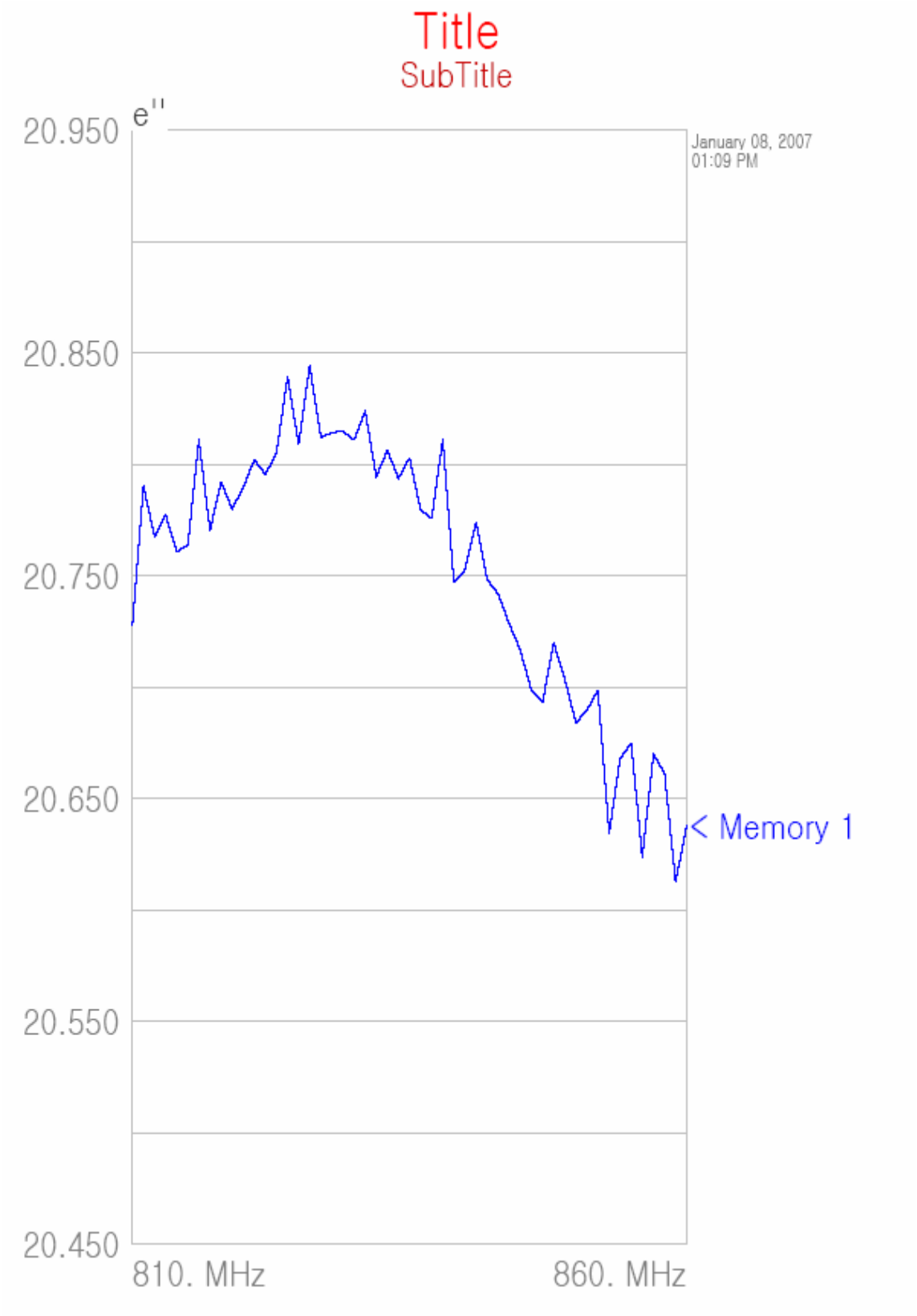
Frequency	e'	e''
810.000000 MHz	41.3361	19.6968
810.973262 MHz	41.3159	19.7072
811.946524 MHz	41.3195	19.7650
812.919785 MHz	41.2786	19.7378
813.893047 MHz	41.2941	19.7600
814.866309 MHz	41.2515	19.7656
815.845418 MHz	41.2490	19.7604
816.824527 MHz	41.2419	19.7779
817.803636 MHz	41.2022	19.7935
818.782745 MHz	41.2097	19.7856
819.761854 MHz	41.2100	19.7903
820.746845 MHz	41.1932	19.8104
821.731836 MHz	41.1412	19.8187
822.716828 MHz	41.1533	19.7882
823.701819 MHz	41.1393	19.8181
824.686810 MHz	41.0867	19.7840
825.677719 MHz	41.0827	19.8112
826.668628 MHz	41.0383	19.8069
827.659537 MHz	41.0136	19.7971
828.650446 MHz	40.9947	19.8072
829.641354 MHz	40.9775	19.7849
830.638216 MHz	41.0077	19.7815
831.635078 MHz	40.9495	19.8023
832.631941 MHz	40.9760	19.7470
833.628803 MHz	40.9430	19.7820
834.625665 MHz	40.9276	19.7278
835.628516 MHz	40.9311	19.7422
836.631367 MHz	40.8707	19.7532
837.634218 MHz	40.8830	19.7231
838.637068 MHz	40.8796	19.7499
839.639919 MHz	40.8644	19.6960
840.648795 MHz	40.8875	19.7050
841.657671 MHz	40.8345	19.7036
842.666547 MHz	40.8275	19.6790
843.675423 MHz	40.8189	19.6863
844.684299 MHz	40.7823	19.6491
845.699236 MHz	40.7890	19.6365
846.714173 MHz	40.7757	19.6451
847.729110 MHz	40.7819	19.6119
848.744047 MHz	40.7774	19.6336
849.758984 MHz	40.7561	19.6133
850.780018 MHz	40.7629	19.6007
851.801053 MHz	40.7491	19.5888
852.822087 MHz	40.7406	19.5960
853.843122 MHz	40.7148	19.5771
854.864157 MHz	40.7106	19.5625
855.891325 MHz	40.7243	19.5739
856.918494 MHz	40.6821	19.5701
857.945663 MHz	40.6945	19.5406
858.972831 MHz	40.6714	19.5314
860.000000 MHz	40.6580	19.5196

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

- GSM850 Body Tissue



ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204



ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Title

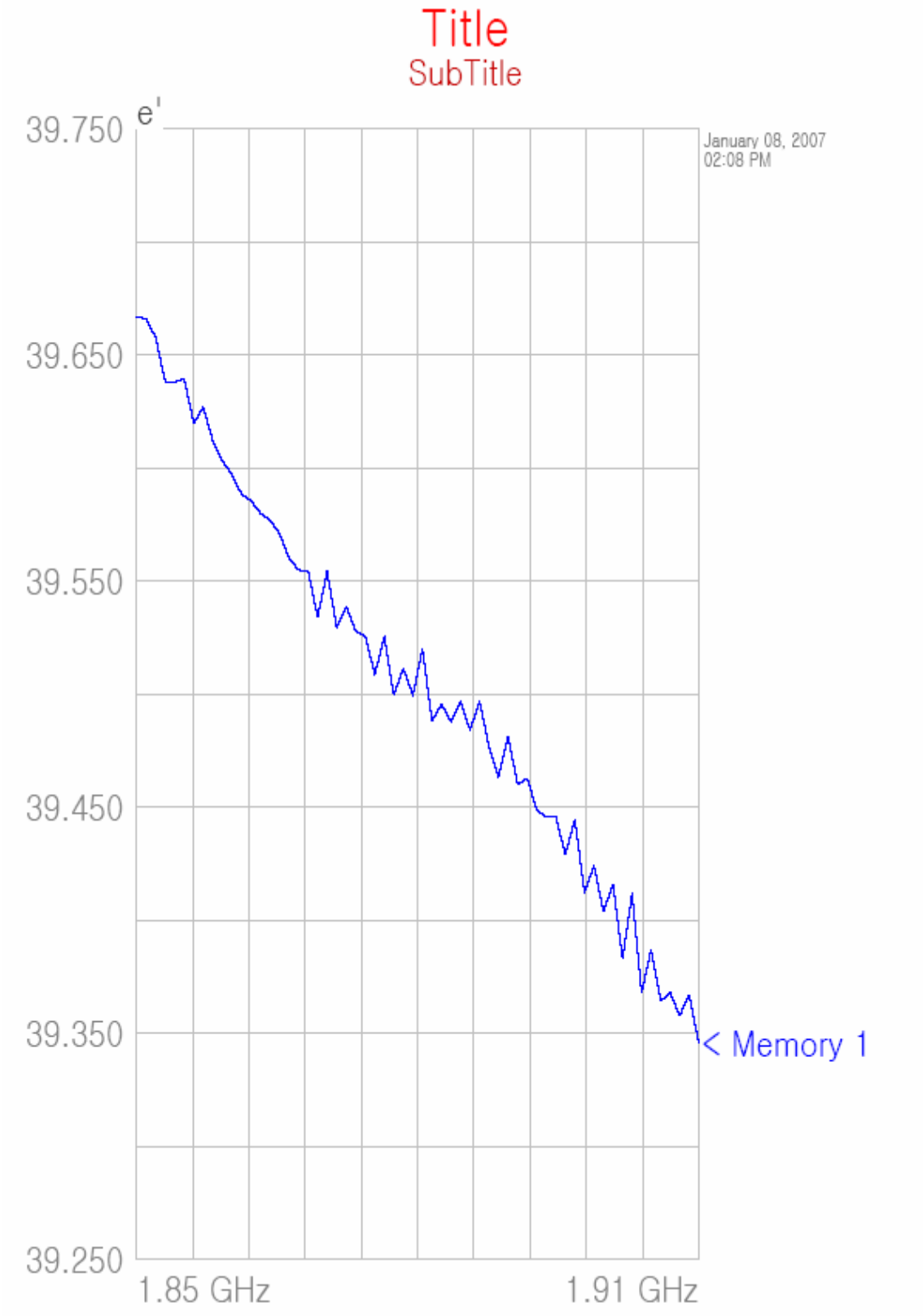
SubTitle

January 08, 2007 01:09 PM

Frequency	e'	e''
810.000000 MHz	53.9839	20.7277
810.973262 MHz	54.0160	20.7904
811.946524 MHz	53.9728	20.7676
812.919785 MHz	53.9638	20.7774
813.893047 MHz	53.9342	20.7610
814.866309 MHz	53.9452	20.7637
815.845418 MHz	53.8938	20.8111
816.824527 MHz	53.9006	20.7705
817.803636 MHz	53.9520	20.7922
818.782745 MHz	53.8796	20.7801
819.761854 MHz	53.8709	20.7898
820.746845 MHz	53.8856	20.8022
821.731836 MHz	53.8600	20.7957
822.716828 MHz	53.8515	20.8053
823.701819 MHz	53.7742	20.8396
824.686810 MHz	53.7847	20.8091
825.677719 MHz	53.7968	20.8445
826.668628 MHz	53.7511	20.8121
827.659537 MHz	53.7625	20.8145
828.650446 MHz	53.7178	20.8150
829.641354 MHz	53.7159	20.8111
830.638216 MHz	53.6981	20.8241
831.635078 MHz	53.6759	20.7945
832.631941 MHz	53.6909	20.8065
833.628803 MHz	53.6529	20.7938
834.625665 MHz	53.6449	20.8031
835.628516 MHz	53.6362	20.7798
836.631367 MHz	53.6345	20.7759
837.634218 MHz	53.6144	20.8116
838.637068 MHz	53.5687	20.7471
839.639919 MHz	53.5707	20.7528
840.648795 MHz	53.5894	20.7743
841.657671 MHz	53.5581	20.7485
842.666547 MHz	53.5338	20.7420
843.675423 MHz	53.5289	20.7285
844.684299 MHz	53.5191	20.7167
845.699236 MHz	53.5125	20.6984
846.714173 MHz	53.4998	20.6932
847.729110 MHz	53.4882	20.7202
848.744047 MHz	53.4768	20.7037
849.758984 MHz	53.4590	20.6841
850.780018 MHz	53.4613	20.6897
851.801053 MHz	53.4541	20.6968
852.822087 MHz	53.4413	20.6342
853.843122 MHz	53.4542	20.6662
854.864157 MHz	53.4246	20.6748
855.891325 MHz	53.4059	20.6234
856.918494 MHz	53.4130	20.6703
857.945663 MHz	53.3871	20.6614
858.972831 MHz	53.3710	20.6126
860.000000 MHz	53.3487	20.6380

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

- Head Tissue(PCS1900)



ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea

TEL: 82-2-867-3201
FAX: 82-2-867-3204

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Title

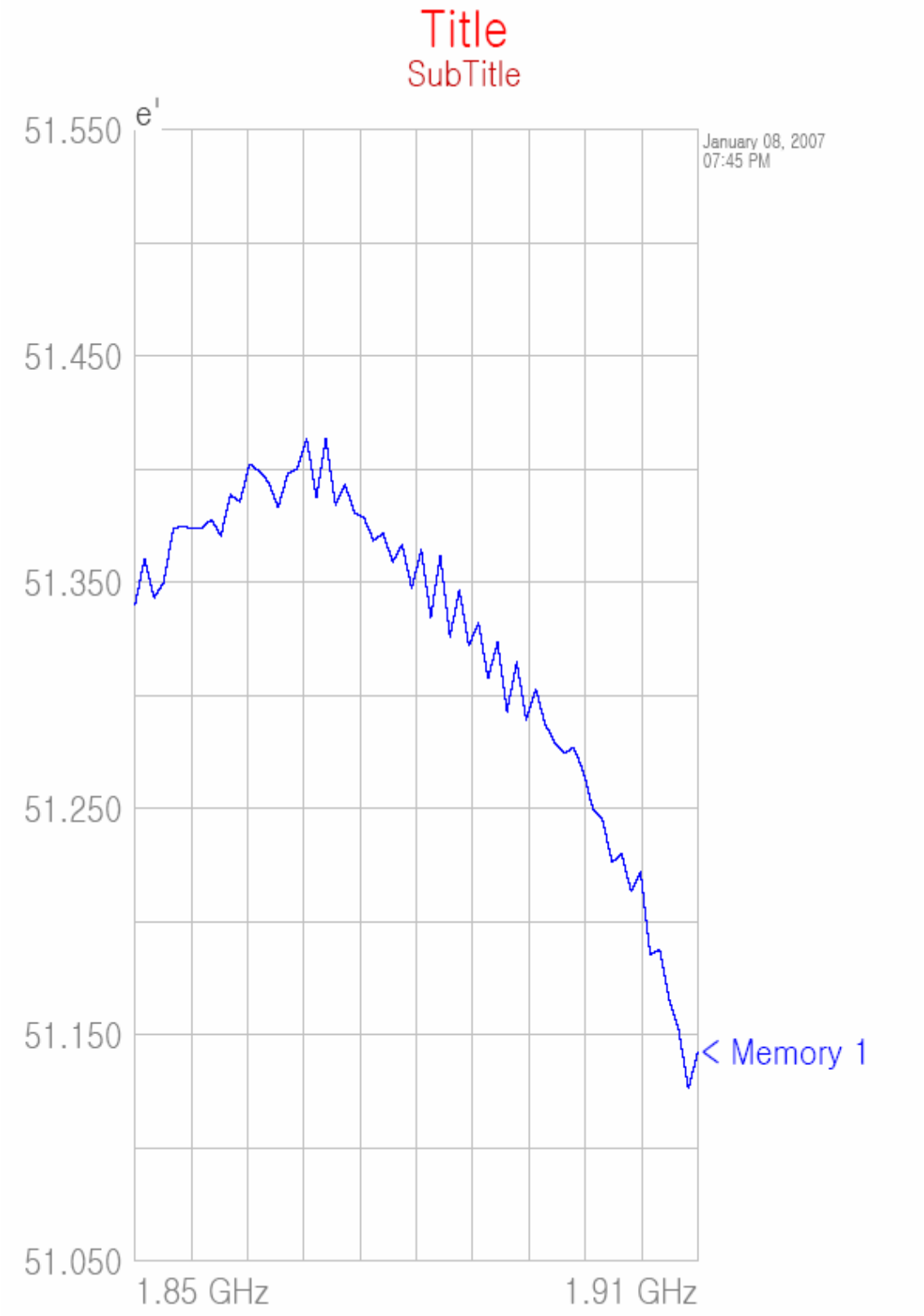
SubTitle

January 08, 2007 02:58 PM

Frequency	e'	e''
1.850000000 GHz	39.6672	13.4963
1.851016949 GHz	39.6661	13.5028
1.852033898 GHz	39.6579	13.5077
1.853050847 GHz	39.6384	13.4895
1.854067797 GHz	39.6381	13.4924
1.855084746 GHz	39.6397	13.5032
1.856101695 GHz	39.6199	13.5183
1.857118644 GHz	39.6270	13.5137
1.858135593 GHz	39.6121	13.5077
1.859152542 GHz	39.6032	13.5161
1.860169492 GHz	39.5973	13.5195
1.861186441 GHz	39.5887	13.5187
1.862203390 GHz	39.5858	13.5173
1.863220339 GHz	39.5802	13.5115
1.864237288 GHz	39.5770	13.5193
1.865254237 GHz	39.5712	13.5227
1.866271186 GHz	39.5602	13.5324
1.867288136 GHz	39.5550	13.5415
1.868305085 GHz	39.5547	13.5204
1.869322034 GHz	39.5341	13.5241
1.870338983 GHz	39.5544	13.5261
1.871355932 GHz	39.5296	13.5326
1.872372881 GHz	39.5388	13.5265
1.873389831 GHz	39.5260	13.5361
1.874406780 GHz	39.5257	13.5403
1.875423729 GHz	39.5089	13.5357
1.876440678 GHz	39.5255	13.5460
1.877457627 GHz	39.4996	13.5412
1.878474576 GHz	39.5116	13.5394
1.879491525 GHz	39.4995	13.5468
1.880508475 GHz	39.5203	13.5544
1.881525424 GHz	39.4981	13.5536
1.882542373 GHz	39.4956	13.5636
1.883559322 GHz	39.4878	13.5663
1.884576271 GHz	39.4968	13.5713
1.885593220 GHz	39.4842	13.5731
1.886610169 GHz	39.4970	13.5678
1.887627119 GHz	39.4765	13.5805
1.888644068 GHz	39.4635	13.6005
1.889661017 GHz	39.4813	13.5890
1.890677966 GHz	39.4600	13.6052
1.891694915 GHz	39.4628	13.5794
1.892711864 GHz	39.4489	13.6118
1.893728814 GHz	39.4456	13.6047
1.894745763 GHz	39.4459	13.6312
1.895762712 GHz	39.4291	13.6028
1.896779661 GHz	39.4448	13.6254
1.897796610 GHz	39.4123	13.6191
1.898813559 GHz	39.4242	13.6262
1.899830508 GHz	39.4040	13.6299
1.900847458 GHz	39.4159	13.6370
1.901864407 GHz	39.3831	13.6487
1.902881356 GHz	39.4119	13.6450
1.903898305 GHz	39.3680	13.6580
1.904915254 GHz	39.3871	13.6485
1.905932203 GHz	39.3644	13.6479
1.906949153 GHz	39.3679	13.6604
1.907966102 GHz	39.3578	13.6517
1.908983051 GHz	39.3670	13.6545
1.910000000 GHz	39.3456	13.6651

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

– PCS1900 Body Tissue



ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Title

SubTitle

January 08, 2007 07:45 PM

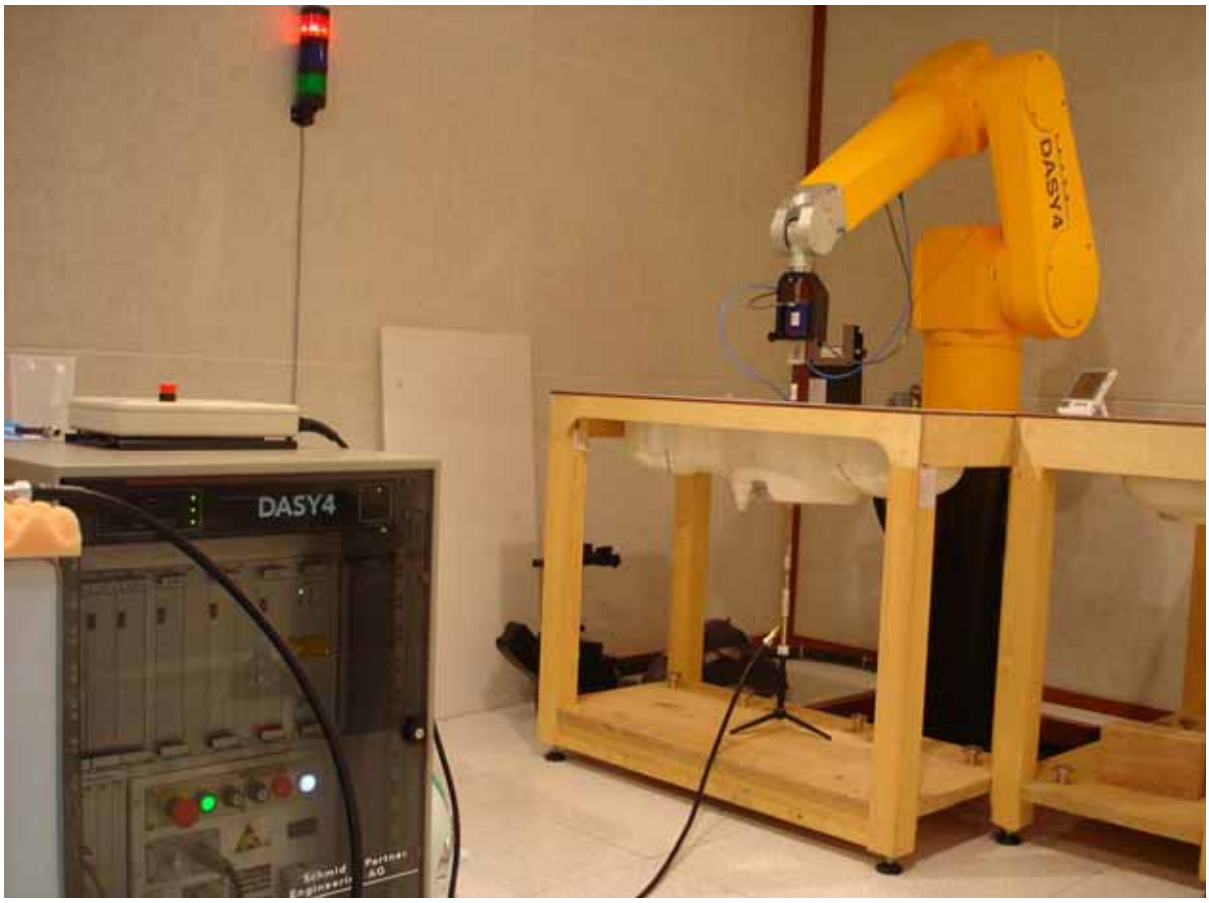
Frequency	e'	e''
1.850000000 GHz	51.3402	14.7496
1.851016949 GHz	51.3607	14.7528
1.852033898 GHz	51.3432	14.7280
1.853050847 GHz	51.3502	14.7570
1.854067797 GHz	51.3737	14.7470
1.855084746 GHz	51.3749	14.7525
1.856101695 GHz	51.3737	14.7366
1.857118644 GHz	51.3743	14.7516
1.858135593 GHz	51.3779	14.7515
1.859152542 GHz	51.3706	14.7428
1.860169492 GHz	51.3888	14.7265
1.861186441 GHz	51.3857	14.7393
1.862203390 GHz	51.4024	14.7420
1.863220339 GHz	51.3993	14.7548
1.864237288 GHz	51.3943	14.7405
1.865254237 GHz	51.3831	14.7602
1.866271186 GHz	51.3980	14.7360
1.867288136 GHz	51.4002	14.7299
1.868305085 GHz	51.4134	14.7285
1.869322034 GHz	51.3876	14.7395
1.870338983 GHz	51.4136	14.7196
1.871355932 GHz	51.3843	14.7267
1.872372881 GHz	51.3935	14.7287
1.873389831 GHz	51.3810	14.7139
1.874406780 GHz	51.3785	14.7189
1.875423729 GHz	51.3686	14.6948
1.876440678 GHz	51.3718	14.7021
1.877457627 GHz	51.3591	14.6911
1.878474576 GHz	51.3668	14.6872
1.879491525 GHz	51.3475	14.6891
1.880508475 GHz	51.3646	14.6878
1.881525424 GHz	51.3345	14.6814
1.882542373 GHz	51.3620	14.6674
1.883559322 GHz	51.3258	14.6663
1.884576271 GHz	51.3467	14.6652
1.885593220 GHz	51.3220	14.6648
1.886610169 GHz	51.3323	14.6516
1.887627119 GHz	51.3076	14.6512
1.888644068 GHz	51.3236	14.6649
1.889661017 GHz	51.2929	14.6698
1.890677966 GHz	51.3150	14.6498
1.891694915 GHz	51.2894	14.6645
1.892711864 GHz	51.3030	14.6591
1.893728814 GHz	51.2874	14.6650
1.894745763 GHz	51.2792	14.6467
1.895762712 GHz	51.2747	14.6855
1.896779661 GHz	51.2770	14.6793
1.897796610 GHz	51.2663	14.6987
1.898813559 GHz	51.2496	14.6950
1.899830508 GHz	51.2454	14.7299
1.900847458 GHz	51.2262	14.7072
1.901864407 GHz	51.2301	14.7350
1.902881356 GHz	51.2134	14.7313
1.903898305 GHz	51.2219	14.7481
1.904915254 GHz	51.1853	14.7620
1.905932203 GHz	51.1877	14.7557
1.906949153 GHz	51.1652	14.7856
1.907966102 GHz	51.1521	14.7859
1.908983051 GHz	51.1261	14.8117
1.910000000 GHz	51.1426	14.8214

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

APPENDIX B : Validation Test Data

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Dipole Validation



ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

- GSM850 Validation

Date: 2007-01-08

Test Laboratory: ESTECH

VALIDATION

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:xxx

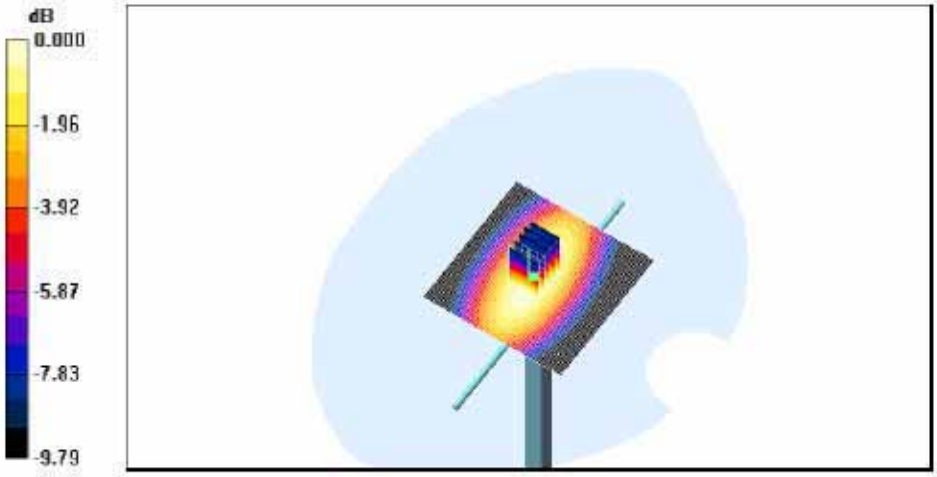
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.916 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(6.57, 6.57, 6.57); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.47 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.3 V/m; Power Drift = -0.013 dB
Peak SAR (extrapolated) = 3.41 W/kg
SAR(1 g) = 2.29 mW/g; SAR(10 g) = n.a.
Maximum value of SAR (measured) = 2.47 mW/g



0 dB = 2.47mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

– PCS1900 Validation

Date: 2007-01-08

Test Laboratory: ESTECH

VALIDATION

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:xxx

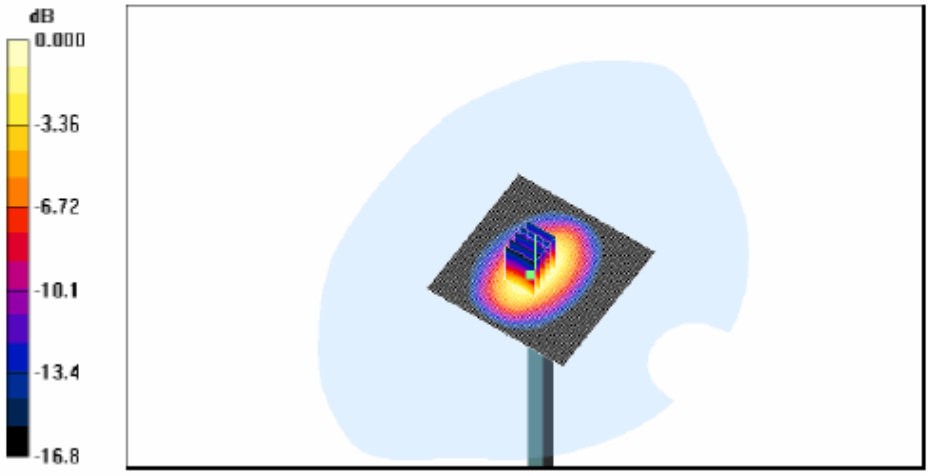
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1900 MHz; σ = 1.44 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(5.14, 5.14, 5.14); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 11.8 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.7 V/m; Power Drift = -0.031 dB
Peak SAR (extrapolated) = 17.3 W/kg
SAR(1 g) = 9.82 mW/g; SAR(10 g) = n.a.
Maximum value of SAR (measured) = 11.0 mW/g



0 dB = 11.0mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

APPENDIX C : SAR Test Data

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

– GSM850

Date: 2007-01-08

Test Laboratory: ESTECH

LEFT TOUCH 190

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

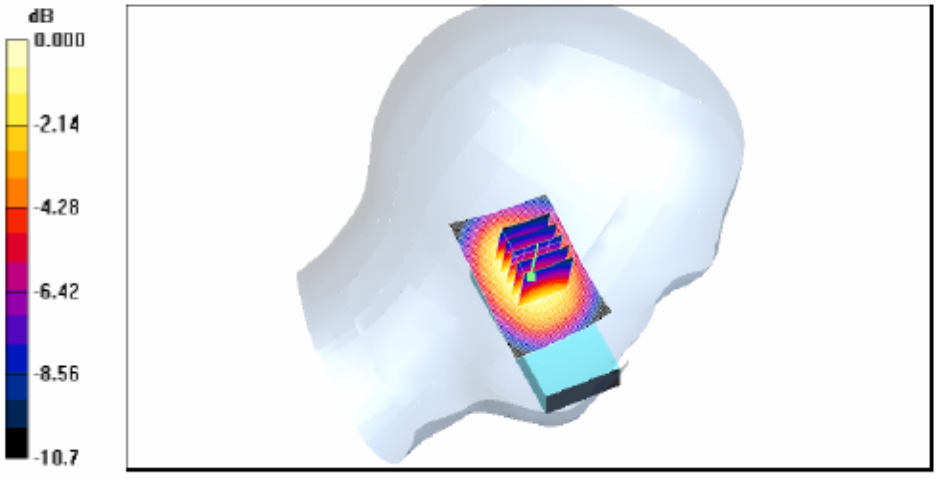
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 837 MHz; σ = 0.92 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(6.57, 6.57, 6.57); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.16 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 30.0 V/m; Power Drift = -0.067 dB
Peak SAR (extrapolated) = 1.45 W/kg
SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.726 mW/g
Maximum value of SAR (measured) = 1.14 mW/g



0 dB = 1.14mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

RIGHT TOUCH 190

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

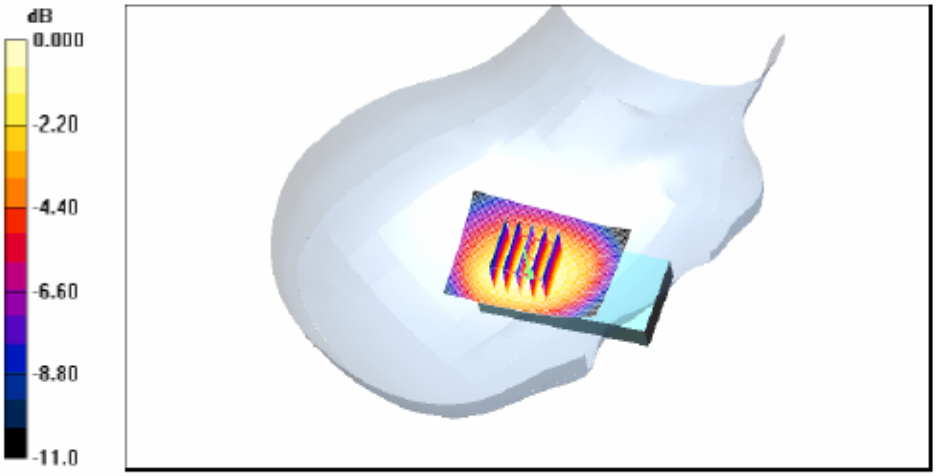
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 837 MHz; σ = 0.92 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(6.57, 6.57, 6.57); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.14 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 27.7 V/m; Power Drift = 0.020 dB
Peak SAR (extrapolated) = 1.50 W/kg
SAR(1 g) = 1.06 mW/g; SAR(10 g) = 0.721 mW/g
Maximum value of SAR (measured) = 1.13 mW/g



0 dB = 1.13mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

LEFT TILT 190

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

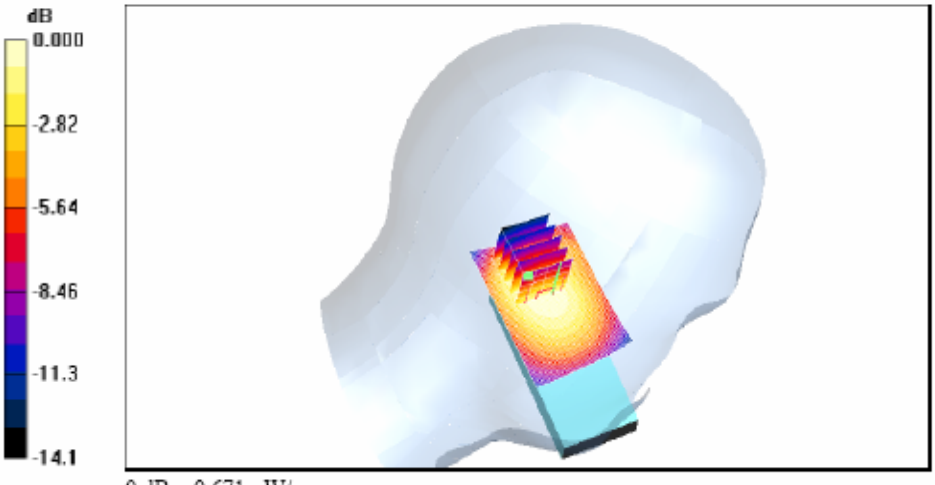
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 837 MHz; σ = 0.92 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(6.57, 6.57, 6.57); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.679 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 26.5 V/m; Power Drift = -0.078 dB
Peak SAR (extrapolated) = 0.906 W/kg
SAR(1 g) = 0.635 mW/g; SAR(10 g) = 0.405 mW/g
Maximum value of SAR (measured) = 0.671 mW/g



0 dB = 0.671mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

RIGHT TILT 190

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

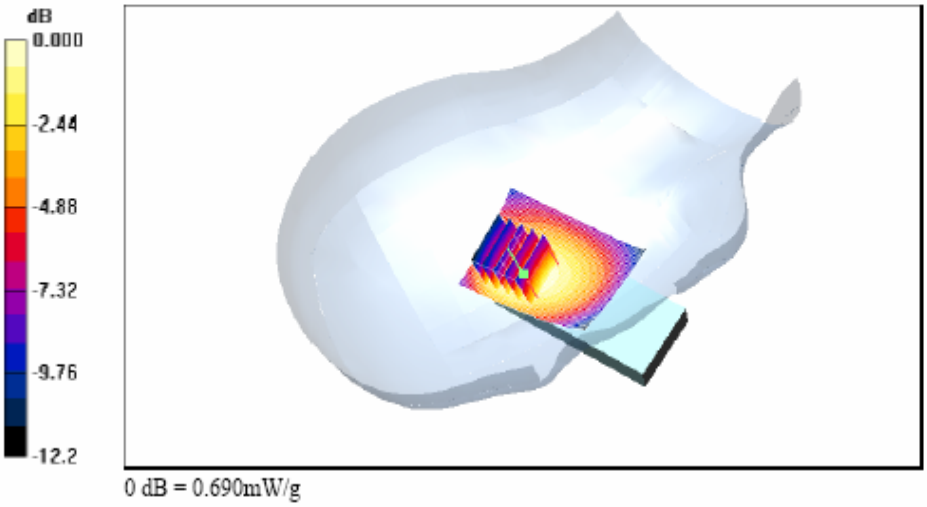
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 837 MHz; σ = 0.92 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(6.57, 6.57, 6.57); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.714 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 24.4 V/m; Power Drift = -0.036 dB
Peak SAR (extrapolated) = 0.909 W/kg
SAR(1 g) = 0.650 mW/g; SAR(10 g) = 0.441 mW/g
Maximum value of SAR (measured) = 0.690 mW/g



0 dB = 0.690mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

LEFT TOUCH 128

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

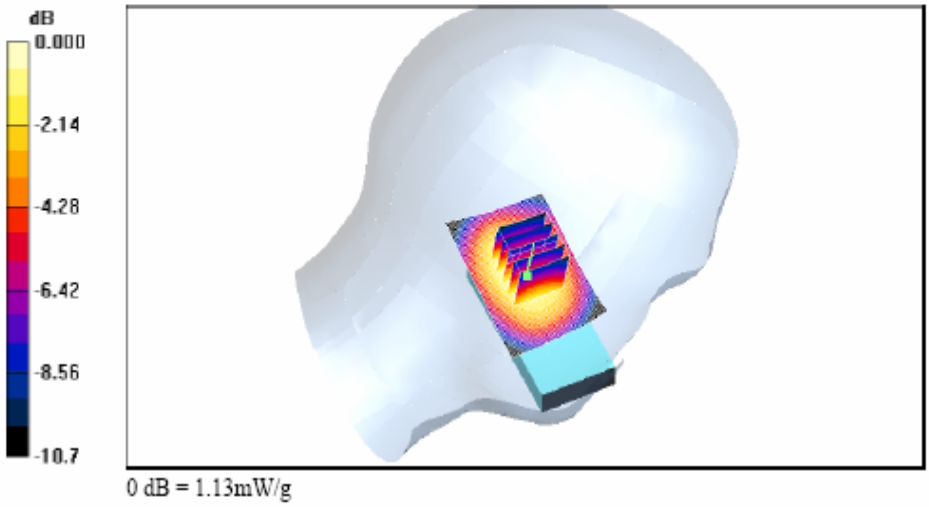
Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.908 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(6.57, 6.57, 6.57); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.13 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 30.0 V/m; Power Drift = -0.077 dB
Peak SAR (extrapolated) = 1.43 W/kg
SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.712 mW/g
Maximum value of SAR (measured) = 1.13 mW/g



0 dB = 1.13mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

RIGHT TOUCH 128

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

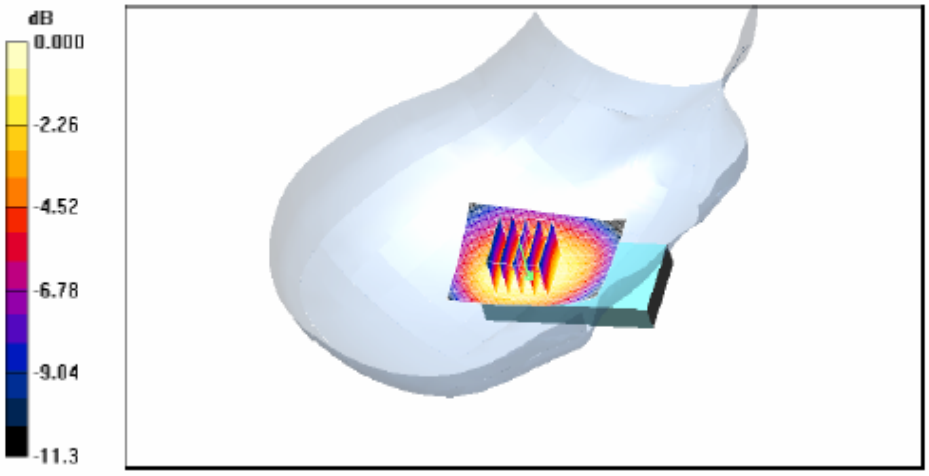
Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.908 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(6.57, 6.57, 6.57); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.15 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 27.6 V/m; Power Drift = -0.115 dB
Peak SAR (extrapolated) = 1.51 W/kg
SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.720 mW/g
Maximum value of SAR (measured) = 1.14 mW/g



0 dB = 1.14mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

LEFT TOUCH 251

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

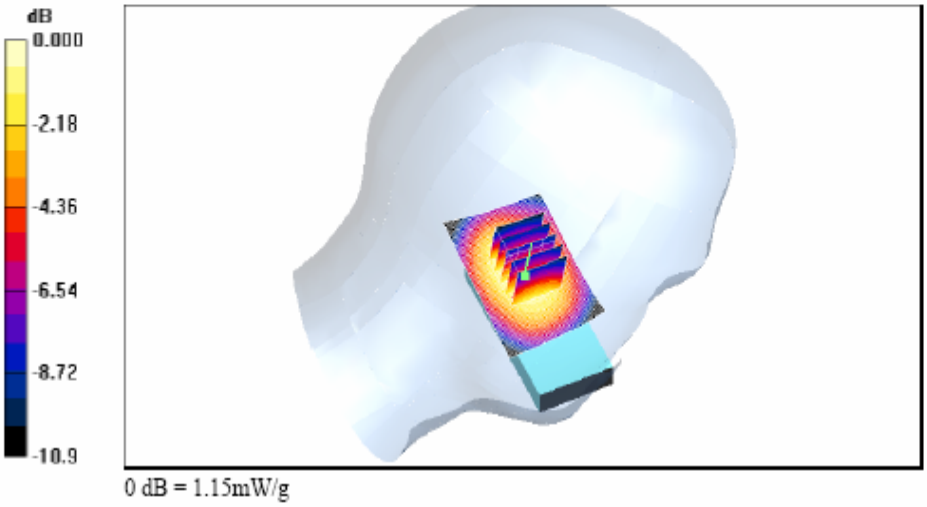
Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 849 MHz; σ = 0.927 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(6.57, 6.57, 6.57); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.15 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 29.9 V/m; Power Drift = -0.069 dB
Peak SAR (extrapolated) = 1.47 W/kg
SAR(1 g) = 1.08 mW/g; SAR(10 g) = 0.732 mW/g
Maximum value of SAR (measured) = 1.15 mW/g



0 dB = 1.15mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

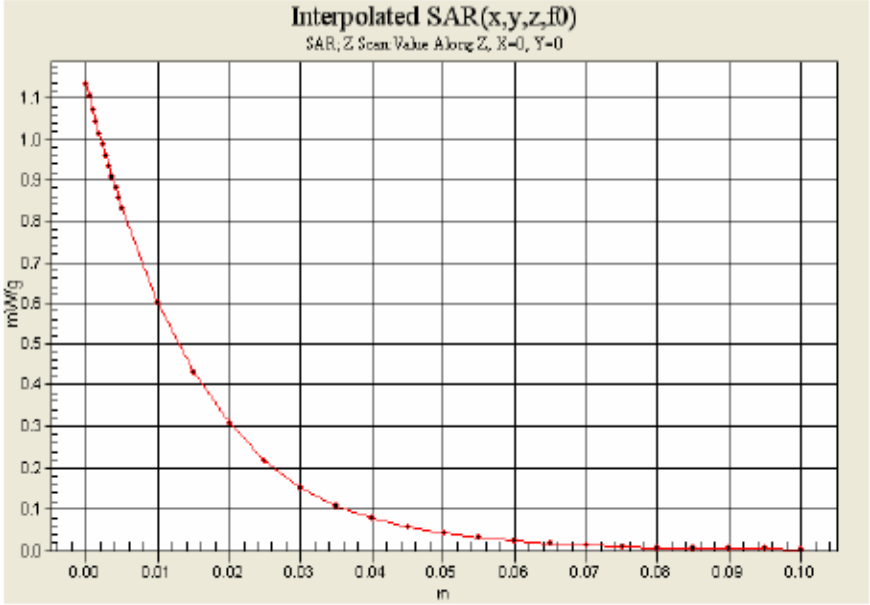
LEFT TOUCH 251

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 849 MHz; σ = 0.927 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(6.57, 6.57, 6.57); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%



ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

RIGHT TOUCH 251

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

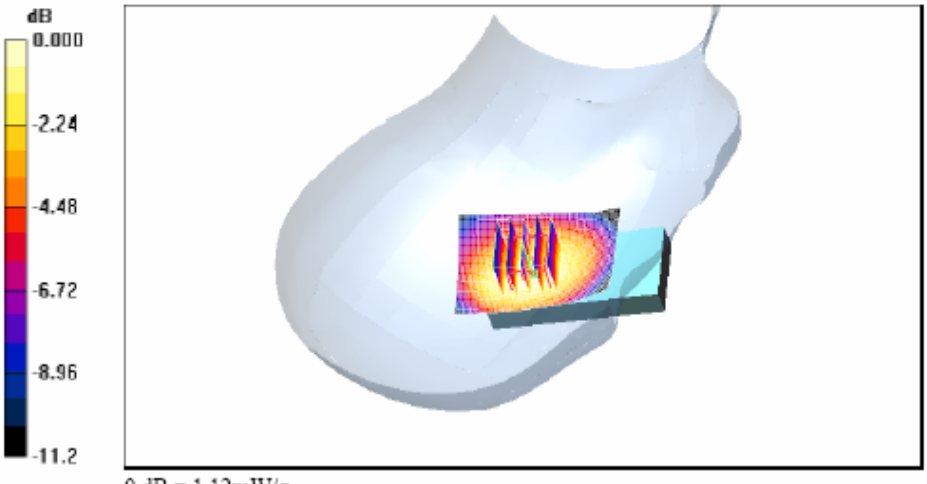
Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 849 MHz; σ = 0.927 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(6.57, 6.57, 6.57); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.12 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 28.2 V/m; Power Drift = -0.060 dB
Peak SAR (extrapolated) = 1.47 W/kg
SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.709 mW/g
Maximum value of SAR (measured) = 1.12 mW/g



0 dB = 1.12mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

BODY 190-FRONT

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

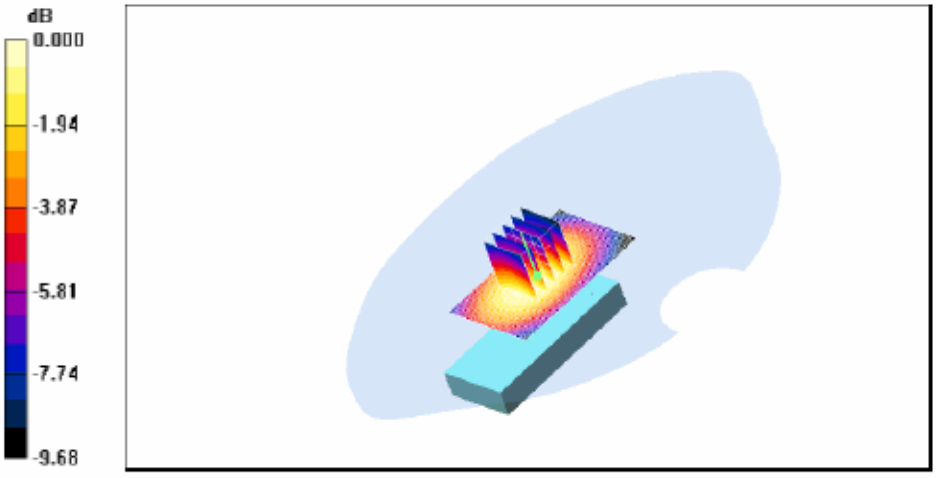
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 837 MHz; σ = 0.967 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(6.17, 6.17, 6.17); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.391 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 15.7 V/m; Power Drift = -0.043 dB
Peak SAR (extrapolated) = 0.481 W/kg
SAR(1 g) = 0.367 mW/g; SAR(10 g) = 0.261 mW/g
Maximum value of SAR (measured) = 0.389 mW/g



0 dB = 0.389mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

BODY 190-REAR

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

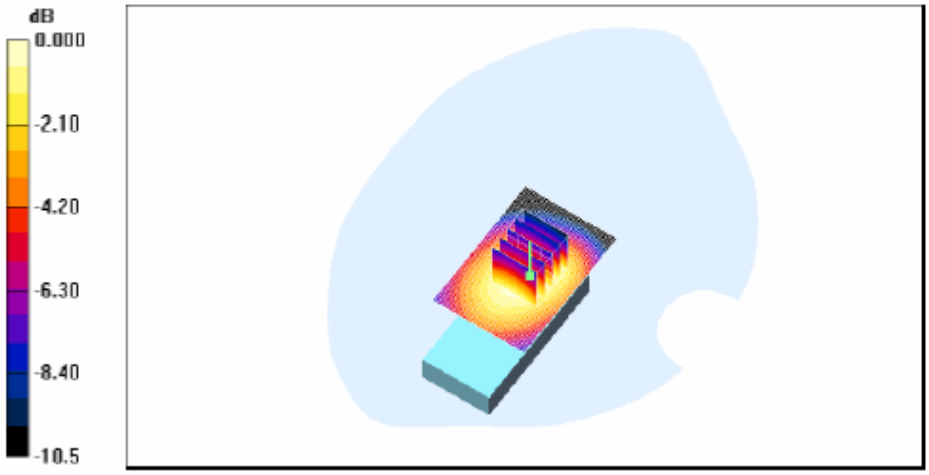
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 837 MHz; σ = 0.967 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(6.17, 6.17, 6.17); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.805 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 18.5 V/m; Power Drift = -0.060 dB
Peak SAR (extrapolated) = 0.964 W/kg
SAR(1 g) = 0.749 mW/g; SAR(10 g) = 0.536 mW/g
Maximum value of SAR (measured) = 0.792 mW/g



0 dB = 0.792mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

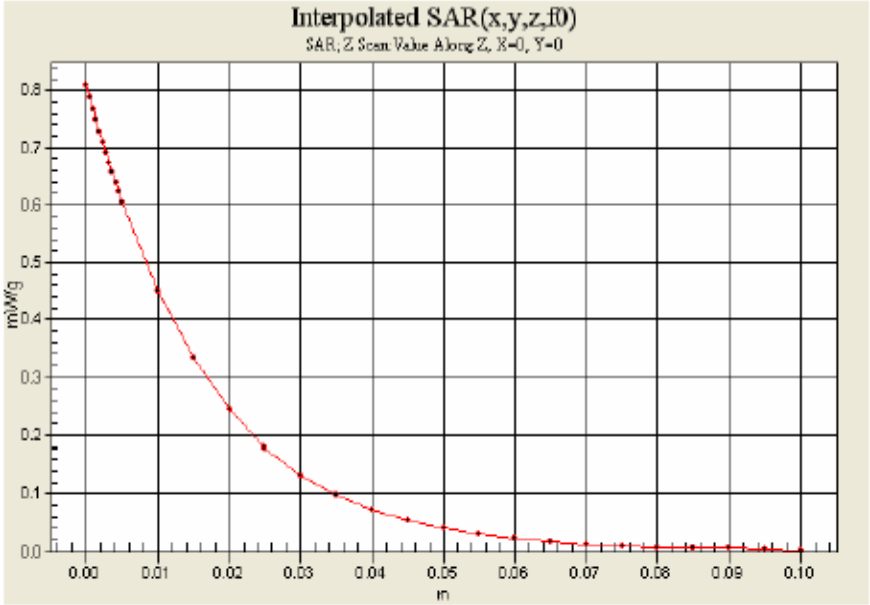
BODY 190-REAR

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 837 MHz; σ = 0.967 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(6.17, 6.17, 6.17); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%



ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

LEFT TOUCH 661

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

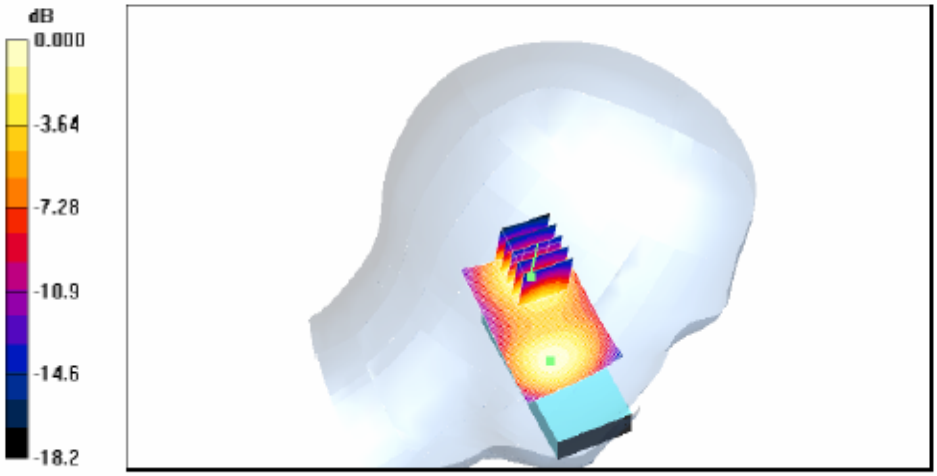
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 1880 MHz; σ = 1.42 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(5.14, 5.14, 5.14); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.13 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 27.0 V/m; Power Drift = -0.044 dB
Peak SAR (extrapolated) = 1.80 W/kg
SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.550 mW/g
Maximum value of SAR (measured) = 1.10 mW/g



0 dB = 1.10mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

RIGHT TOUCH 661

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

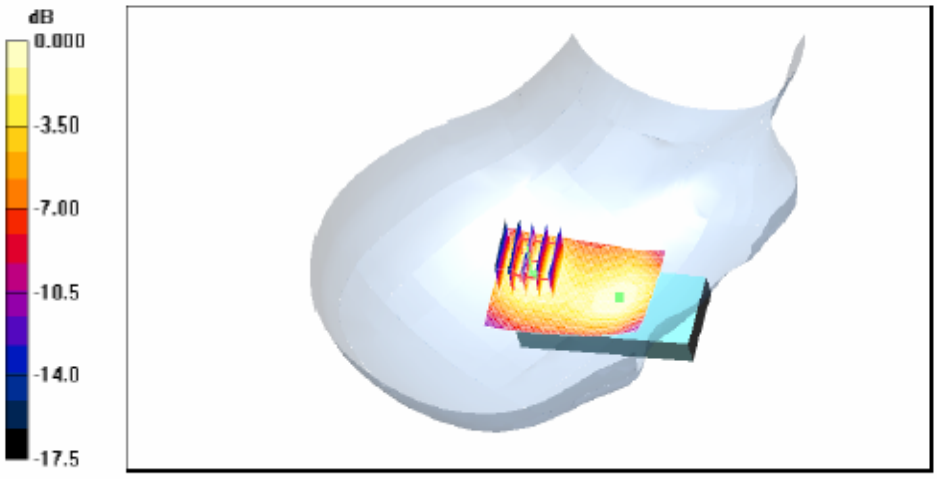
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 1880 MHz; σ = 1.42 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(5.14, 5.14, 5.14); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.08 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 27.2 V/m; Power Drift = -0.098 dB
Peak SAR (extrapolated) = 1.62 W/kg
SAR(1 g) = 0.918 mW/g; SAR(10 g) = 0.523 mW/g
Maximum value of SAR (measured) = 1.00 mW/g



0 dB = 1.00mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

LEFT TILT 661

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

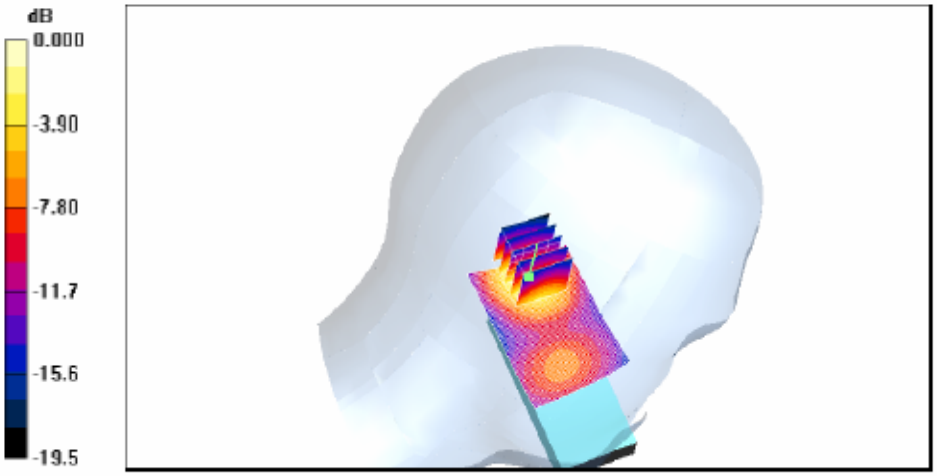
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 1880 MHz; σ = 1.42 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(5.14, 5.14, 5.14); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.22 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 25.8 V/m; Power Drift = -0.033 dB
Peak SAR (extrapolated) = 2.05 W/kg
SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.553 mW/g
Maximum value of SAR (measured) = 1.22 mW/g



0 dB = 1.22mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

RIGHT TILT 661

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

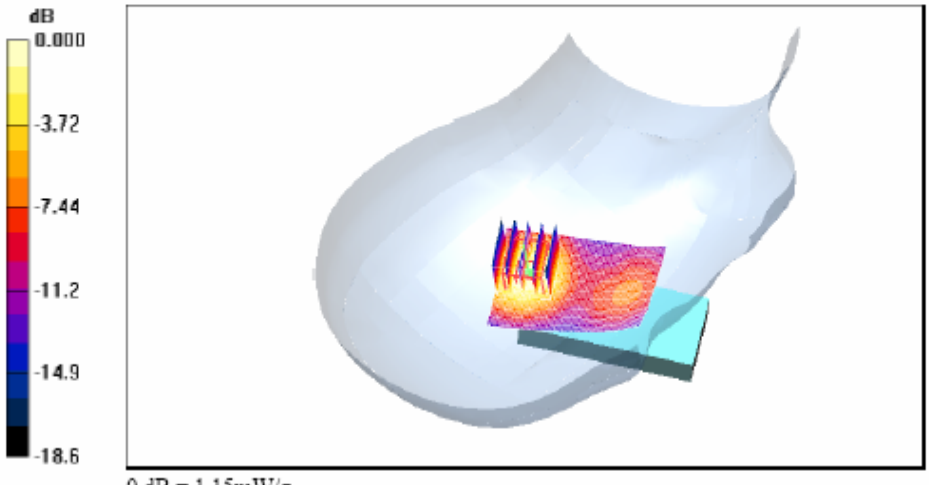
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 1880 MHz; σ = 1.42 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(5.14, 5.14, 5.14); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.22 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 28.4 V/m; Power Drift = -0.067 dB
Peak SAR (extrapolated) = 1.93 W/kg
SAR(1 g) = 1.04 mW/g; SAR(10 g) = 0.540 mW/g
Maximum value of SAR (measured) = 1.15 mW/g



0 dB = 1.15mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

LEFT TOUCH 512

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

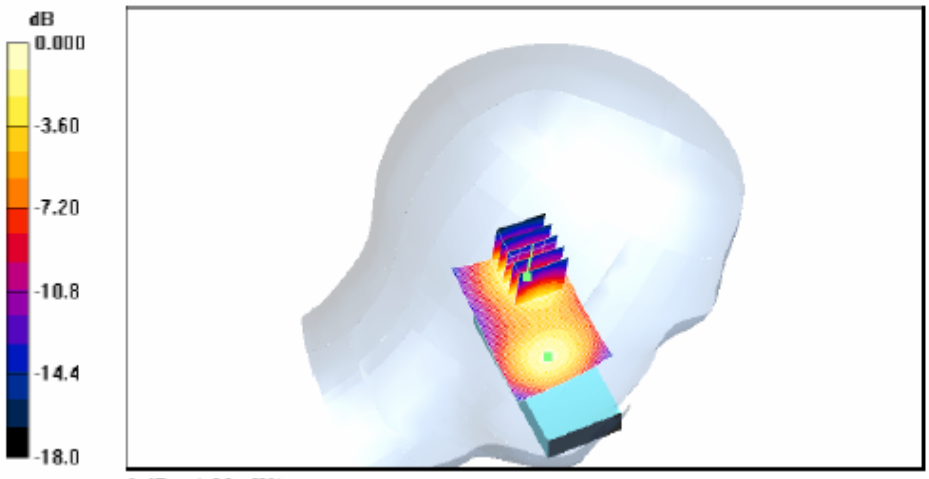
Communication System: GSM1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.39 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(5.14, 5.14, 5.14); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.35 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 27.5 V/m; Power Drift = -0.065 dB
Peak SAR (extrapolated) = 2.06 W/kg
SAR(1 g) = 1.17 mW/g; SAR(10 g) = 0.632 mW/g
Maximum value of SAR (measured) = 1.29 mW/g



0 dB = 1.29mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

RIGHT TOUCH 512

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

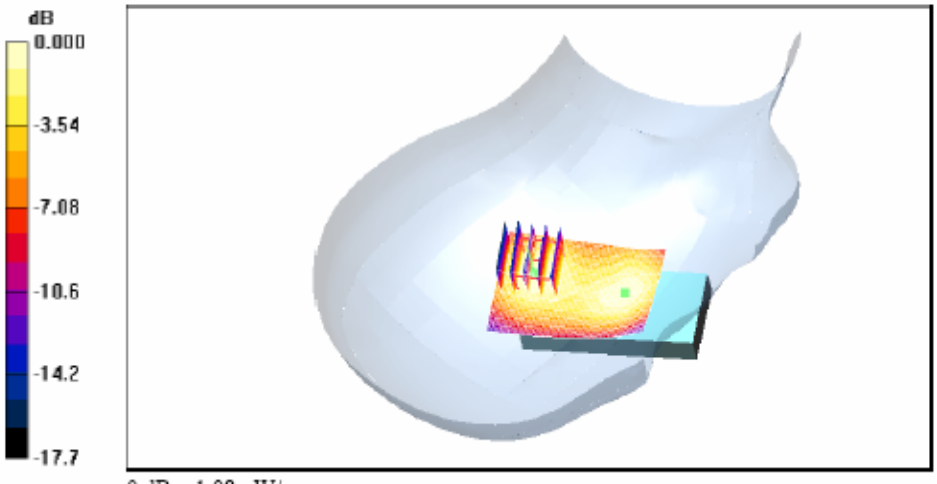
Communication System: GSM1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.39 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(5.14, 5.14, 5.14); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.17 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 26.9 V/m; Power Drift = -0.074 dB
Peak SAR (extrapolated) = 1.73 W/kg
SAR(1 g) = 0.991 mW/g; SAR(10 g) = 0.566 mW/g
Maximum value of SAR (measured) = 1.08 mW/g



0 dB = 1.08mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

LEFT TILT 512

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

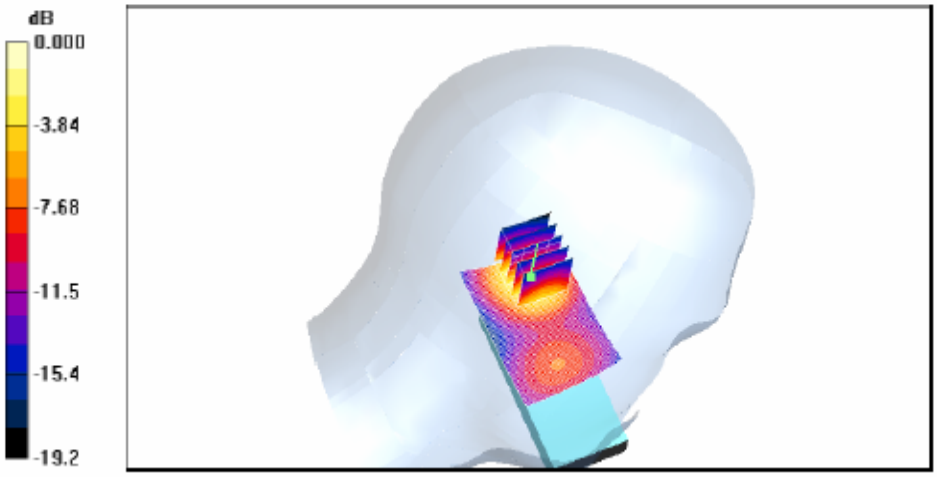
Communication System: GSM1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.39 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(5.14, 5.14, 5.14); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.38 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 27.2 V/m; Power Drift = -0.046 dB
Peak SAR (extrapolated) = 2.25 W/kg
SAR(1 g) = 1.2 mW/g; SAR(10 g) = 0.606 mW/g
Maximum value of SAR (measured) = 1.34 mW/g



0 dB = 1.34mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

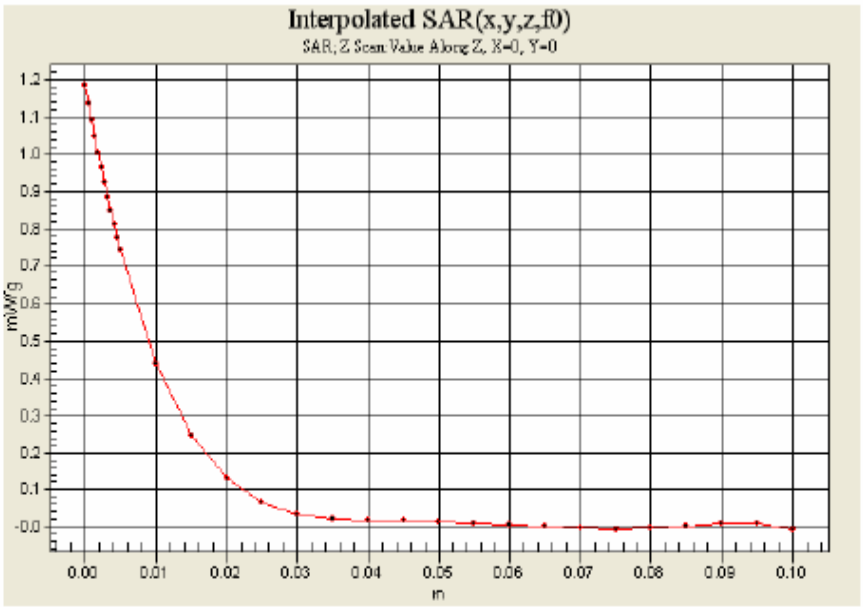
LEFT TILT 512

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

Communication System: GSM1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.39 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(5.14, 5.14, 5.14); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%



ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

RIGHT TILT 512

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

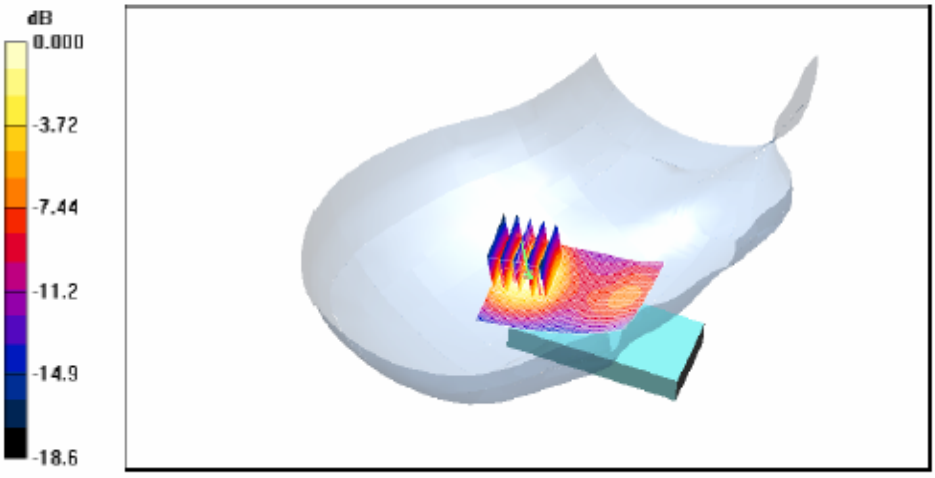
Communication System: GSM1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.39 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(5.14, 5.14, 5.14); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.41 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 29.2 V/m; Power Drift = -0.033 dB
Peak SAR (extrapolated) = 2.14 W/kg
SAR(1 g) = 1.17 mW/g; SAR(10 g) = 0.610 mW/g
Maximum value of SAR (measured) = 1.30 mW/g



0 dB = 1.30mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

LEFT TOUCH 810

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

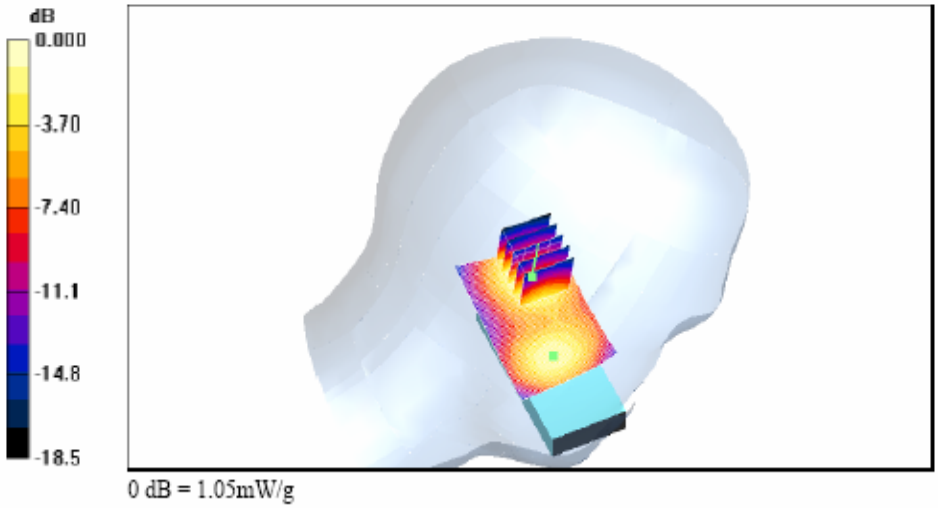
Communication System: GSM1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1910 MHz; σ = 1.45 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(5.14, 5.14, 5.14); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.13 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 25.0 V/m; Power Drift = -0.058 dB
Peak SAR (extrapolated) = 1.73 W/kg
SAR(1 g) = 0.957 mW/g; SAR(10 g) = 0.519 mW/g
Maximum value of SAR (measured) = 1.05 mW/g



0 dB = 1.05mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

RIGHT TOUCH 810

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

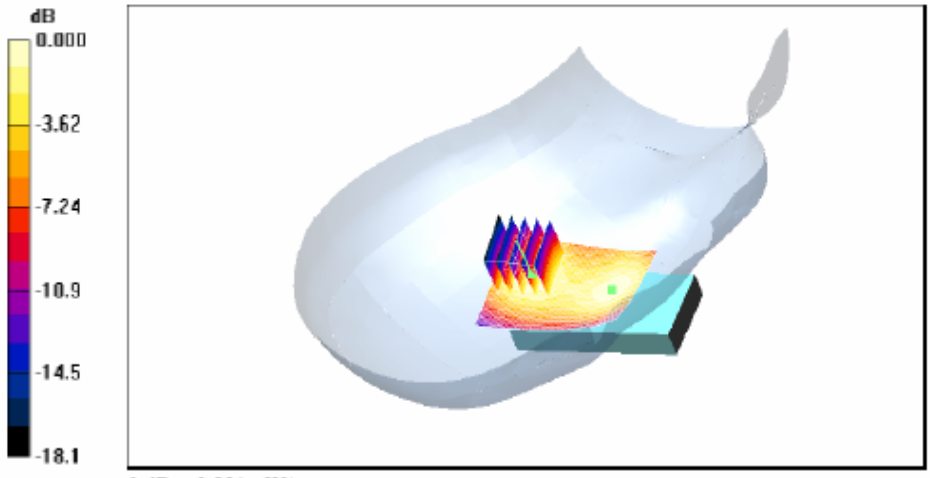
Communication System: GSM1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1910 MHz; σ = 1.45 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(5.14, 5.14, 5.14); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.957 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 24.0 V/m; Power Drift = -0.115 dB
Peak SAR (extrapolated) = 1.47 W/kg
SAR(1 g) = 0.819 mW/g; SAR(10 g) = 0.464 mW/g
Maximum value of SAR (measured) = 0.891 mW/g



0 dB = 0.891mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

LEFT TILT 810

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

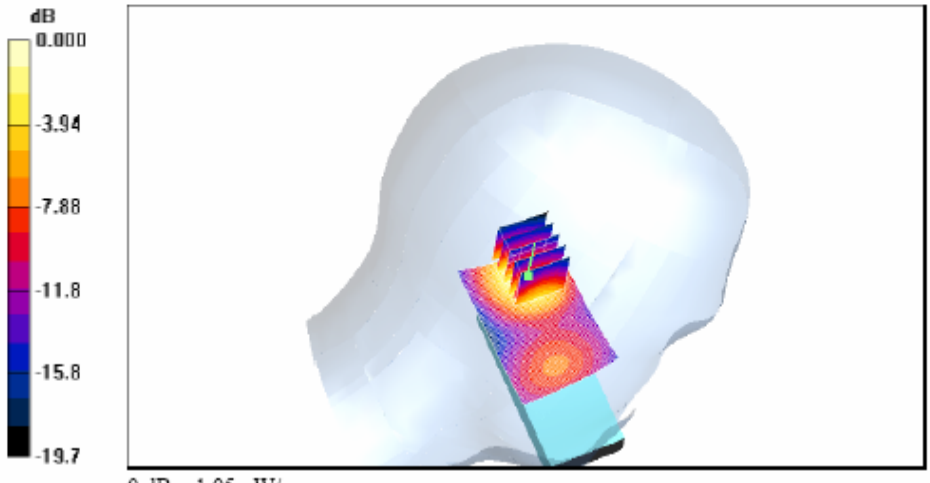
Communication System: GSM1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1910 MHz; σ = 1.45 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(5.14, 5.14, 5.14); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.09 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 24.1 V/m; Power Drift = -0.037 dB
Peak SAR (extrapolated) = 1.86 W/kg
SAR(1 g) = 0.956 mW/g; SAR(10 g) = 0.483 mW/g
Maximum value of SAR (measured) = 1.05 mW/g



0 dB = 1.05mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

RIGHT TILT 810

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

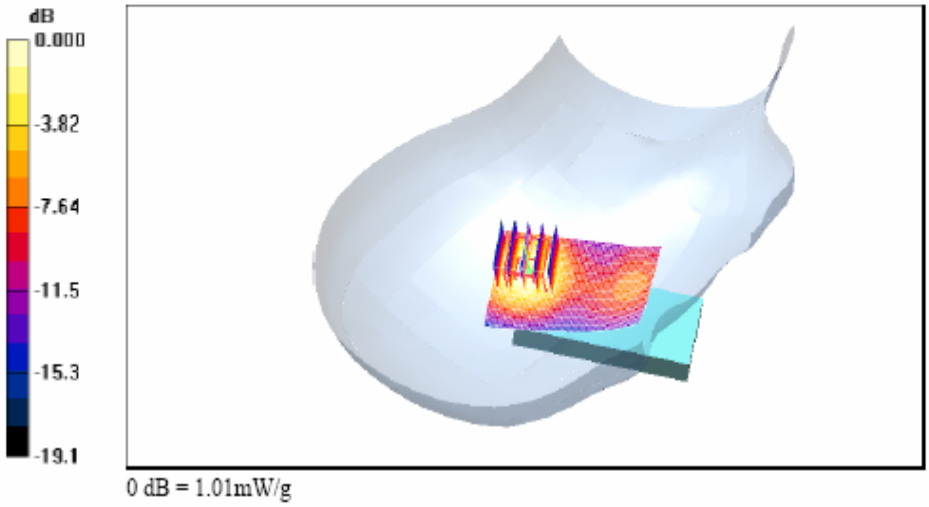
Communication System: GSM1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1910 MHz; σ = 1.45 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(5.14, 5.14, 5.14); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.11 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 25.4 V/m; Power Drift = -0.098 dB
Peak SAR (extrapolated) = 1.71 W/kg
SAR(1 g) = 0.909 mW/g; SAR(10 g) = 0.472 mW/g
Maximum value of SAR (measured) = 1.01 mW/g



0 dB = 1.01mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

BODY 661-FRONT

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

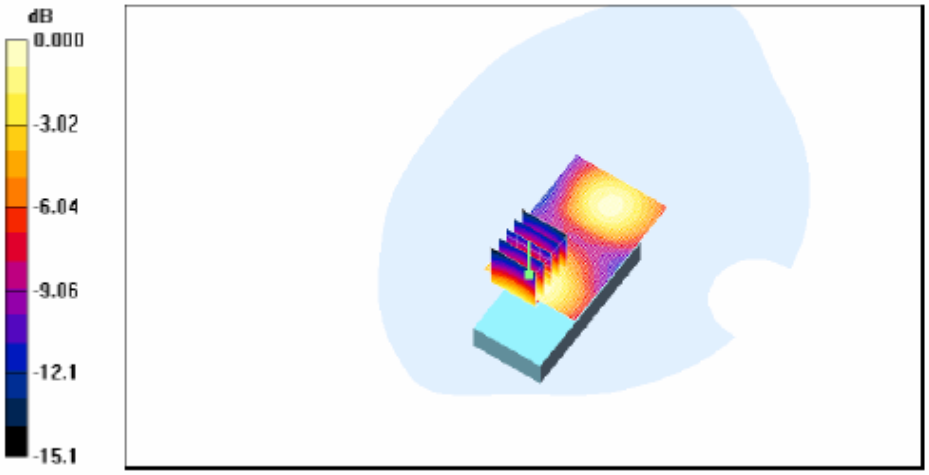
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(4.54, 4.54, 4.54); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.379 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 15.0 V/m; Power Drift = -0.059 dB
Peak SAR (extrapolated) = 0.504 W/kg
SAR(1 g) = 0.331 mW/g; SAR(10 g) = 0.204 mW/g
Maximum value of SAR (measured) = 0.358 mW/g



0 dB = 0.358mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

BODY 661-REAR

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

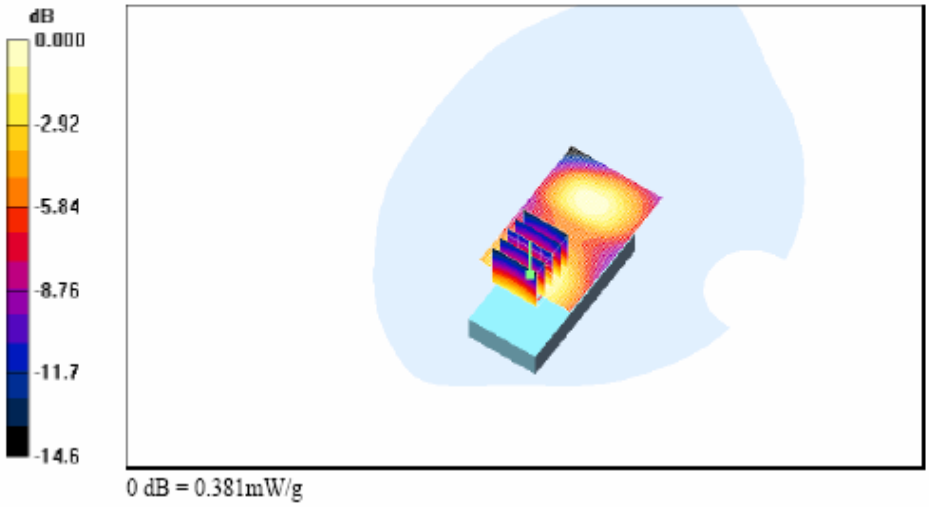
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(4.54, 4.54, 4.54); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.393 mW/g

Zoom Scan (5x5x6)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=6mm
Reference Value = 16.2 V/m; Power Drift = -0.114 dB
Peak SAR (extrapolated) = 0.539 W/kg
SAR(1 g) = 0.352 mW/g; SAR(10 g) = 0.218 mW/g
Maximum value of SAR (measured) = 0.381 mW/g



0 dB = 0.381mW/g

ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea
TEL: 82-2-867-3201
FAX: 82-2-867-3204

Date: 2007-01-08

Test Laboratory: ESTECH

BODY 661-REAR

DUT: MG160a; Type: BAR TYPE; Serial: XXXX

Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1750; ConvF(4.54, 4.54, 4.54); Calibrated: 2006-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 22℃, Humidity : 45%