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SAR Compliance 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 : 26 January 2007 ~ 14 February 2007
Test Site : ESTECH Co., Ltd. Korea

Test Device :

Models : ME550d, ME550c, KE500

FCC ID : BEJME550D

TYPE : GSM Phone with Bluetooth (Prototype)

Test report no :

ESTSAR0702-001

Number of page :

24

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 receipt in full, without written approval of the laboratory.

Date and Signatures : 14 February 2007

Report Prepared By : Engineer/ I.K.Hong

(Signature)

Engineering Manager/ Jay Kim

(Signature)

Test report no : ESTSAR0702-001

FCC ID : BEJME550D

Web : www. estech. co. kr

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1. SUMMARY FOR TEST REPORT

FCC ID	BEJME550D
Date of test	26 January 2007 ~ 14 February 2007
Responsible test engineer	Jay Kim
Measurement performed by	I.K.Hong
EUT Type	GSM Phone with Bluetooth (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(32.5 dBm) PCS1900 (29.5 dBm)

1.1 Head Configuration

Max. SAR Measurement

FREQUENCY		Modulation	Conducted Power(dBm)		Device test position	SAR (W/kg)
MHz	Ch		dBm	Battery		
836.6	190	GSM/GPRS	32.5	Standard	Right touch	0.762
1880.00	661	GSM/GPRS	29.5	Standard	Right touch	0.41

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/GPRS	32.5	Standard	2cm [w/o Holster]	1.12
1880.0	661	GSM/GPRS	29.5	Standard	2cm [w/o Holster]	0.257

1.3 Measurement Uncertainty

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



2. INTRODUCTION

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 hazards of RF emissions due to FCC-regulated portable device.[1]

The safety limits used for the environmental evaluation measurements are the 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/ANSI C95.3-1992 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 radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (IC NRP) in Biological Effects and Exposure Criteria for Radio Frequency Electromagnetic Fields,” IC NRP Report No. 86 (c) IC NRP, 1986, Bethesda, MD 20814.[6] SAR is a measure 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/m³)

ρ = Total RMS electric field strength (V/m)

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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 devices 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 : BEJME550D
Serial numbers	-
Exposure environment	Uncontrolled exposure
Device category	Portable device
Mode(s) of Operation	GSM/GPRS
Modulation Mode(s)	GSM/GPRS
Duty Cycle	8.3/4.15
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)	21
Tissue simulating liquid temperature (°C)	21
Humidity (%)	46

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.

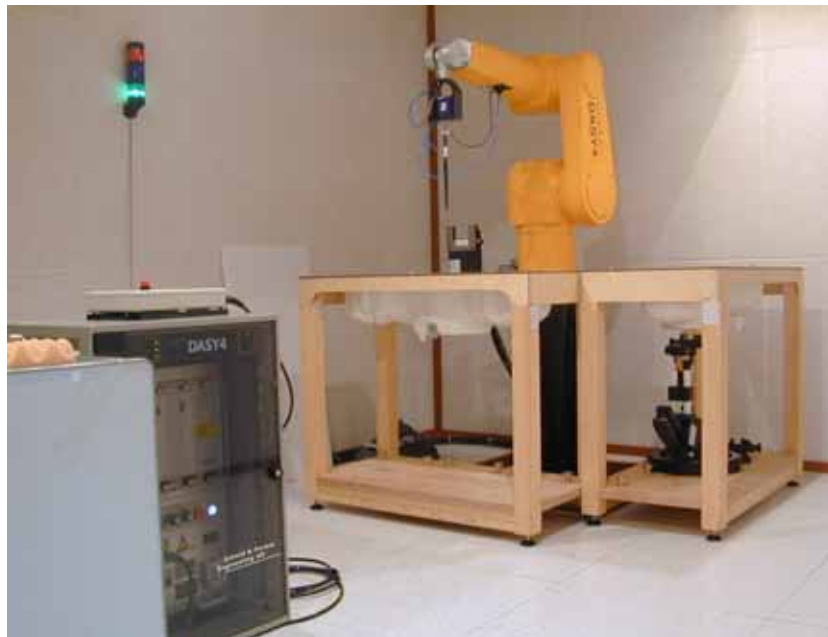


Fig. 4.1 SAR Measurement System



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	ET3DV3	3123	2007-10-17
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	2008-02-07

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.

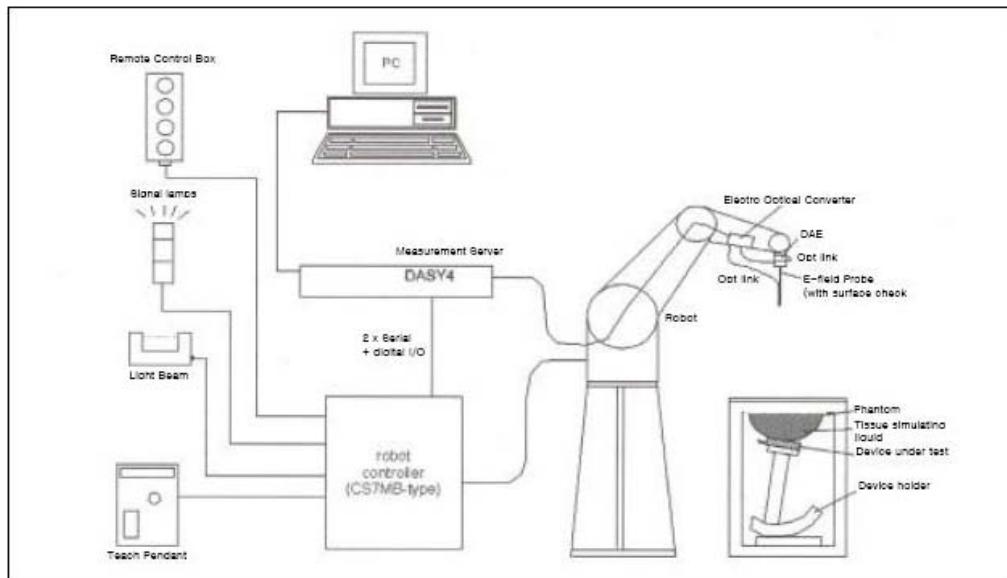


Fig. 5.1 SAR Measurement System Setup

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 $\pm 8\%$) 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 μ W/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 hydroxethylcellulose(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)	ϵ_r	σ (S/m)	ϵ_r	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(diethylene 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	$41.0 \pm 5\%$	$55.2 \pm 5\%$	ϵ	$40.0 \pm 5\%$	$53.3 \pm 5\%$
σ	$0.89 \pm 10\%$	$0.97 \pm 10\%$	σ	$1.45 \pm 10\%$	$1.52 \pm 10\%$

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].

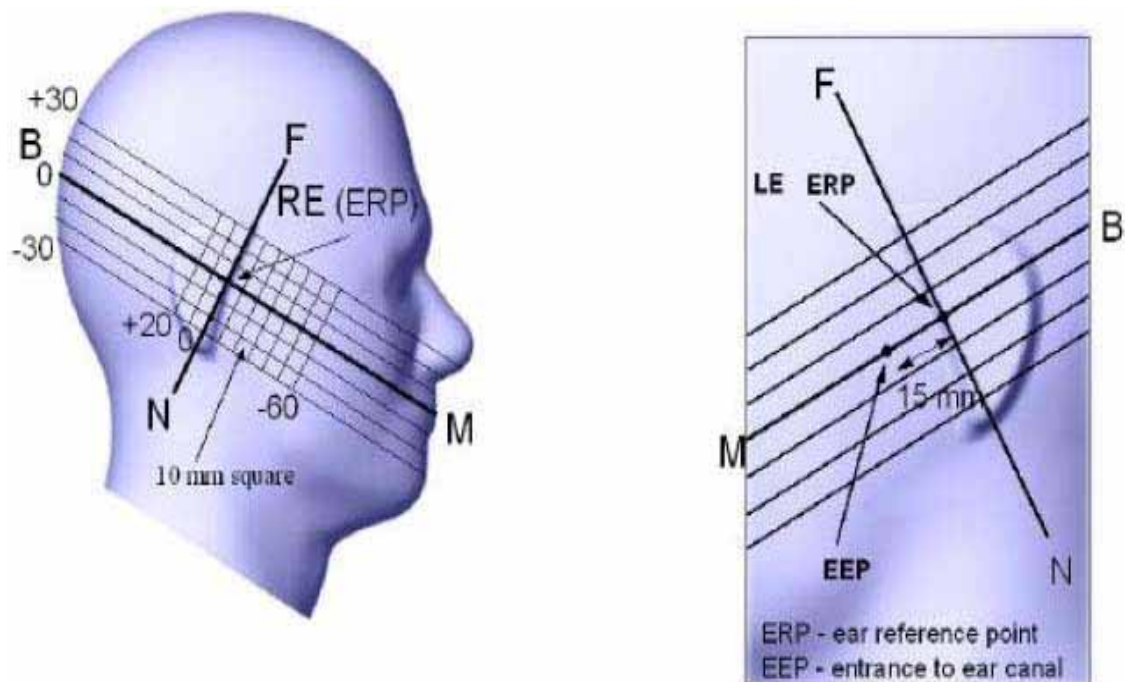


Figure 6.1 Close-up side view of ERP

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 then 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 its 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.

6. DESCRIPTION OF THE TEST PROCEDURE(continued)

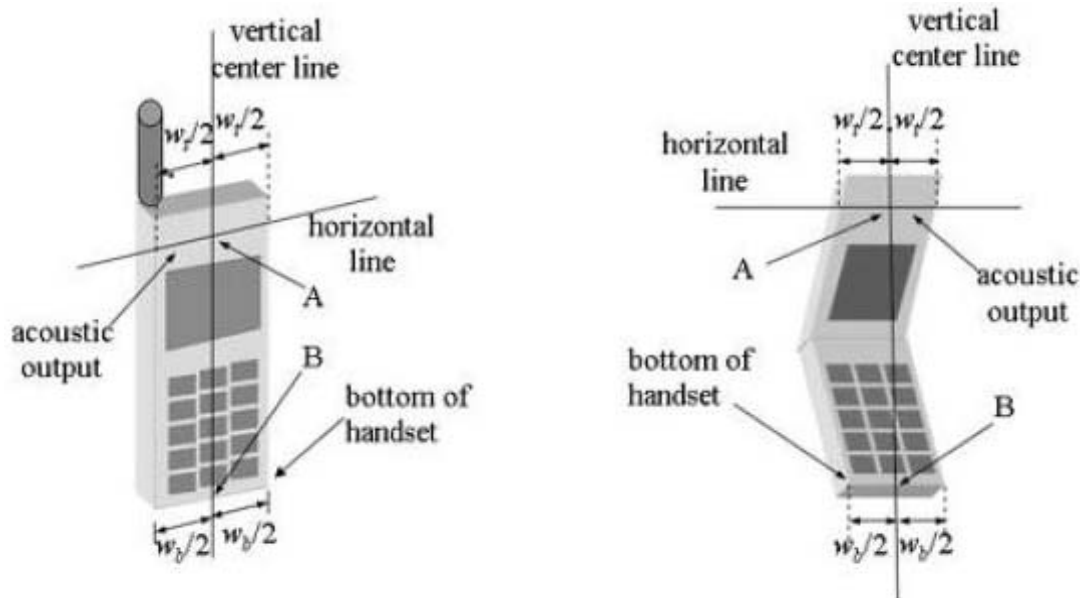


Figure 6.2 Handset Vertical Center & Horizontal Line Reference Points

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 w_t of the handset at the level of the acoustic output (point A on Figures 6.2), and the midpoint of the width w_b 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 necessarily 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

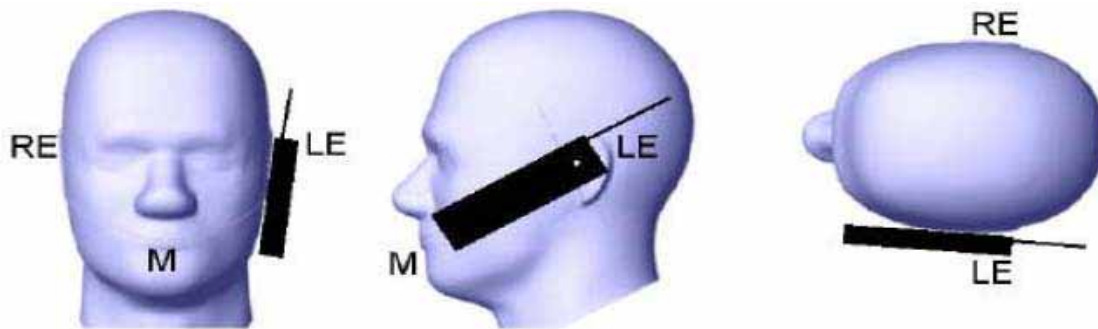


Figure 6.3 "Cheek" or "Touch" Position.

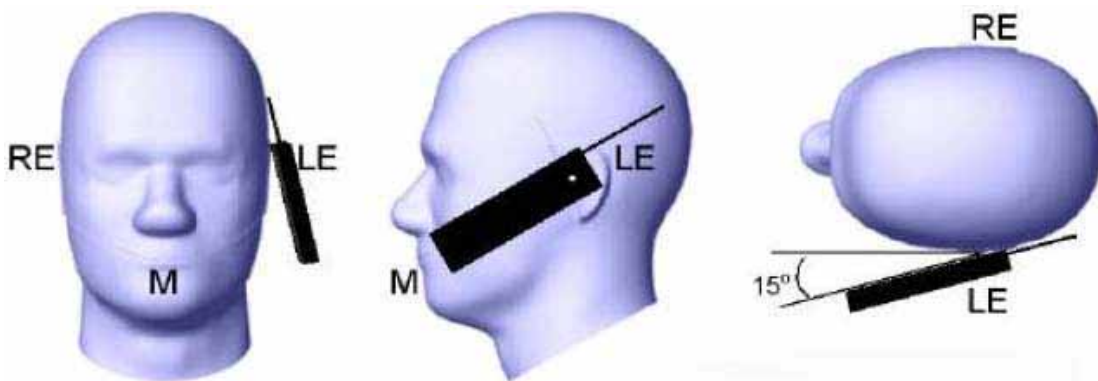


Figure 6.4 "Tilted" Position.



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, Computermathematik, 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	Probability	Divisor	ci 1	Standard unc.	vi or
	value ±%	Distribution		1g	(1g)	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]

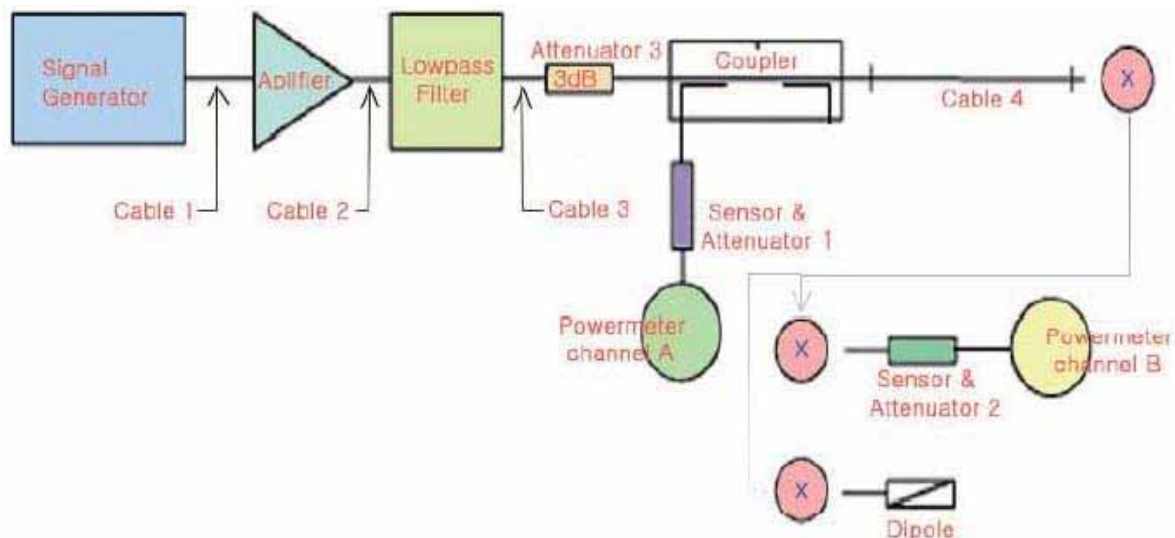
MEASURED TISSUE PARAMETERS										
Liquid Temperature (°C)			21		Liquid Depth(mm)		150			
Date	2007-02-13		2007-02-13		2007-02-13		2007-02-13			
Tissue	1900MHz Brain		1900MHz Muscle		835MHz Brain		835MHz Muscle			
	Target	Measured	Target	Measured	Target	Measured	Target	Measured	Target	Measured
Dielectric Constant: ϵ	40	39.7	53.3	51.4	41.5	40.9	55.2	53.6		
Conductivity: σ	1.4	1.42	1.52	1.53	0.9	0.92	0.97	0.967		
Deviation (%)	ϵ : -0.75% σ : 1.42%		ϵ : -3.56% σ : 1.31%		ϵ : -1.47% σ : 1.89%		ϵ : -2.89% σ : -0.41%			

Test System Validation

- Prior to assessment, the system is verified to the $\pm 10\%$ 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	38.68	-2.57%	2007-02-13
835MHz Brain	D835V2(S/N:475)	1.0	9.5	9.44	-0.63%	2007-02-13





8. SYSTEM VERIFICATION

Tissue Verification

Table 8.1 Simulated Tissue Verification [5]

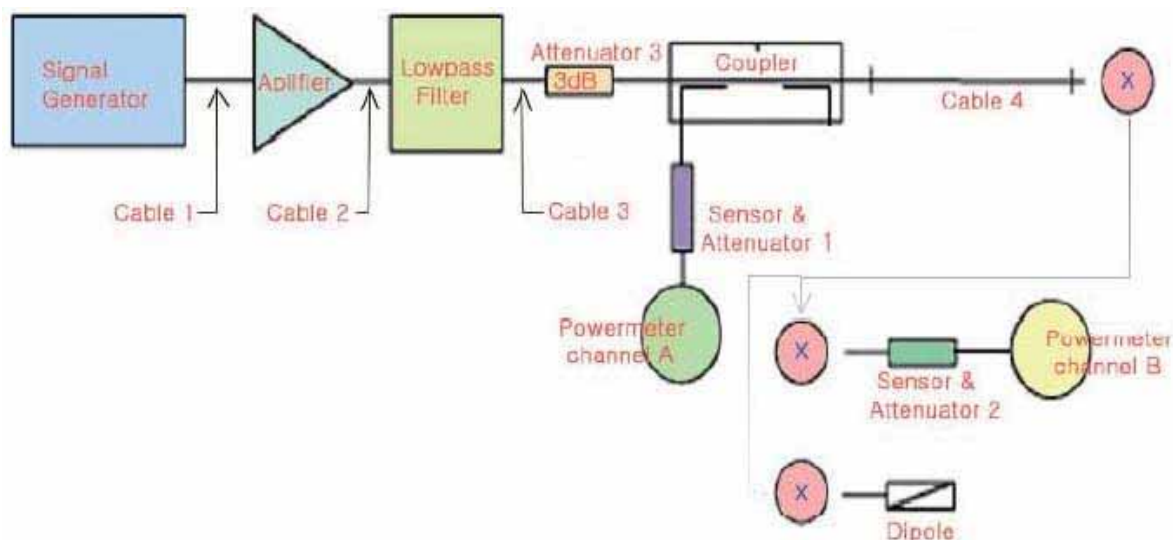
MEASURED TISSUE PARAMETERS										
Liquid Temperature (°C)		21		Liquid Depth(mm)		150				
Date	2007-02-21		2007-02-21							
Tissue	835MHz Brain		835MHz Muscle							
	Target	Measured	Target	Measured	Target	Measured	Target	Measured	Target	Measured
Dielectric Constant: ϵ	41.5	40.9	55.2	53.6						
Conductivity: σ	0.9	0.915	0.97	0.968						
Deviation (%)	ϵ : -1.45%		ϵ : -2.90%							
	σ : 1.67 %		σ : -0.21%							

Test System Validation

- Prior to assessment, the system is verified to the $\pm 10\%$ 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
835MHz Brain	D835V2(S/N:475)	1.0	9.5	9.56	0.63%	2007-02-21





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9. RESULTS(continued)

Ambient TEMPERATURE (C) : **21.0**

Relative HUMIDITY (%) : **46**

Mixture Type : **835MHz Brain**

Dielectric Constant : **40.9**

Conductivity: **0.92**

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	32.5	32.61	Standrd	Left Touch	IN	–	Fixed	0.289
836.60	190	GSM	32.5	32.51	Standrd	Left Touch	UP	–	Fixed	0.687
836.60	190	GSM	32.5	32.48	Standrd	Right Touch	IN	–	Fixed	0.289
836.60	190	GSM	32.5	32.44	Standrd	Right Touch	UP	–	Fixed	0.715
836.60	190	GSM	32.5	32.50	Standrd	Right Touch	UP	ON	Fixed	0.762
836.60	190	GSM	32.5	32.53	Standrd	Left Tiilt	IN	–	Fixed	0.300
836.60	190	GSM	32.5	32.43	Standrd	Left Tiilt	UP	–	Fixed	0.235
836.60	190	GSM	32.5	32.62	Standrd	Right Tilt	IN	–	Fixed	0.260
836.60	190	GSM	32.5	32.45	Standrd	Right Tilt	UP	–	Fixed	0.242

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**

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

Test report no : ESTSAR0702-001

FCC ID : BEJME550D

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426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, KoreaTEL: 82-2-867-3201
FAX: 82-2-867-3204**9. RESULTS(continued)**Ambient TEMPERATURE (C) : **21.0**Relative HUMIDITY (%) : **46**Mixture Type : **835MHz Body**Dielectric Constant : **53.6**Conductivity: **0.967****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)

Frequency		Mod	Conducted Power(dBm)		battery	Device Test position	Slider	BT	Antenna Position	SAR (W/kg)
MHz	Ch.		Begin	End						
836.60	190	GSM	32.5	32.48	Standard	2[w/o Holster]FRONT	IN	–	Fixed	0.112
836.60	190	GSM	32.5	32.54	Standard	2[w/o Holster]FRONT	UP	–	Fixed	0.435
836.60	190	GSM	32.5	32.55	Standard	2[w/o Holster]REAR	IN	–	Fixed	0.345
836.60	190	GSM	32.5	32.60	Standard	2[w/o Holster]REAR	UP	–	Fixed	0.776

MEASUREMENT RESULTS (GSM Body SAR Without Holster – GPRS)

Frequency		Mod	Conducted Power(dBm)		battery	Device Test position	Slider	BT	Antenna Position	SAR (W/kg)
MHz	Ch.		Begin	End						
836.60	128	GSM	32.5	32.38	Standard	2[w/o Holster]REAR	UP	ON	Fixed	0.950
836.60	190	GSM	32.5	32.45	Standard	2[w/o Holster]REAR	UP	ON	Fixed	1.120
836.60	256	GSM	32.5	32.61	Standard	2[w/o Holster]REAR	UP	ON	Fixed	0.638

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**

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 configuration(s).

4. Power Measured : **Conducted**

5. SAR Measurement System : **SPEAG**

6. SAR Configuration : **Body, GPRS mode function enable, Class 10 (multi slot mode)**

Engineer I.K.Hong

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Test report no : ESTSAR0702-001

FCC ID : BEJME550D

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426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, KoreaTEL: 82-2-867-3201
FAX: 82-2-867-3204**9. RESULTS(continued)**Ambient TEMPERATURE (C) : **21.0**Relative HUMIDITY (%) : **46**Mixture Type : **1900MHz Brain**Dielectric Constant : **39.7**Conductivity: **1.42****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	29.50	29.40	Standard	Left Touch	IN	–	Fixed	0.272
1880.00	661	GSM	29.50	29.43	Standard	Left Touch	UP	–	Fixed	0.126
1880.00	661	GSM	29.50	29.43	Standard	Right Touch	IN	–	Fixed	0.276
1880.00	661	GSM	29.50	29.45	Standard	Right Touch	UP	–	Fixed	0.140
1880.00	661	GSM	29.50	29.51	Standard	Left Tilt	IN	–	Fixed	0.347
1880.00	661	GSM	29.50	29.48	Standard	Left Tilt	IN	ON	Fixed	0.410
1880.00	661	GSM	29.50	29.61	Standard	Left Tilt	UP	–	Fixed	0.089
1880.00	661	GSM	29.50	29.50	Standard	Right Tilt	IN	–	Fixed	0.339
1880.00	661	GSM	29.50	29.58	Standard	Right Tilt	UP	–	Fixed	0.093

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**

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 configuration(s).

4. Power Measured : **Conducted**

5. SAR Measurement System : **SPEAG**

6. SAR Configuration : **Head**

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9. RESULTS(continued)

Ambient TEMPERATURE (C) : 21Relative HUMIDITY (%) : 46Mixture Type : 1900MHz BodyDielectric Constant : 51.4Conductivity: 1.53

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)

Frequency		Mod	Conducted Power(dBm)		battery	Device Test position	Slider	BT	Antenna Position	SAR (W/kg)
MHz	Ch.		Begin	End						
1880.00	661	GSM	29.50	29.48	Standard	2[w/o Holster]FRONT	IN	-	Fixed	0.060
1880.00	661	GSM	29.50	29.61	Standard	2[w/o Holster]FRONT	UP	-	Fixed	0.039
1880.00	661	GSM	29.50	29.48	Standard	2[w/o Holster]REAR	IN	-	Fixed	0.129
1880.00	661	GSM	29.50	29.63	Standard	2[w/o Holster]REAR	UP	-	Fixed	0.151

MEASUREMENT RESULTS (GSM Body SAR Without Holster – GPRS)

Frequency		Mod	Conducted Power(dBm)		battery	Device Test position	Slider	BT	Antenna Position	SAR (W/kg)
MHz	Ch.		Begin	End						
1880.00	661	GSM	29.50	29.62	Standard	2[w/o Holster]REAR	UP	ON	Fixed	0.257

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

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 configuration(s).

4. Power Measured : Conducted

5. SAR Measurement System : SPEAG

6. SAR Configuration : Body, GPRS mode function enable, Class 10 (multi slot mode)

Engineer I.K.Hong

Test report no : ESTSAR0702-001

FCC ID : BEJME550D

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10. REFERENCE

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APPENDIX A : Validation Test Data of Tissue



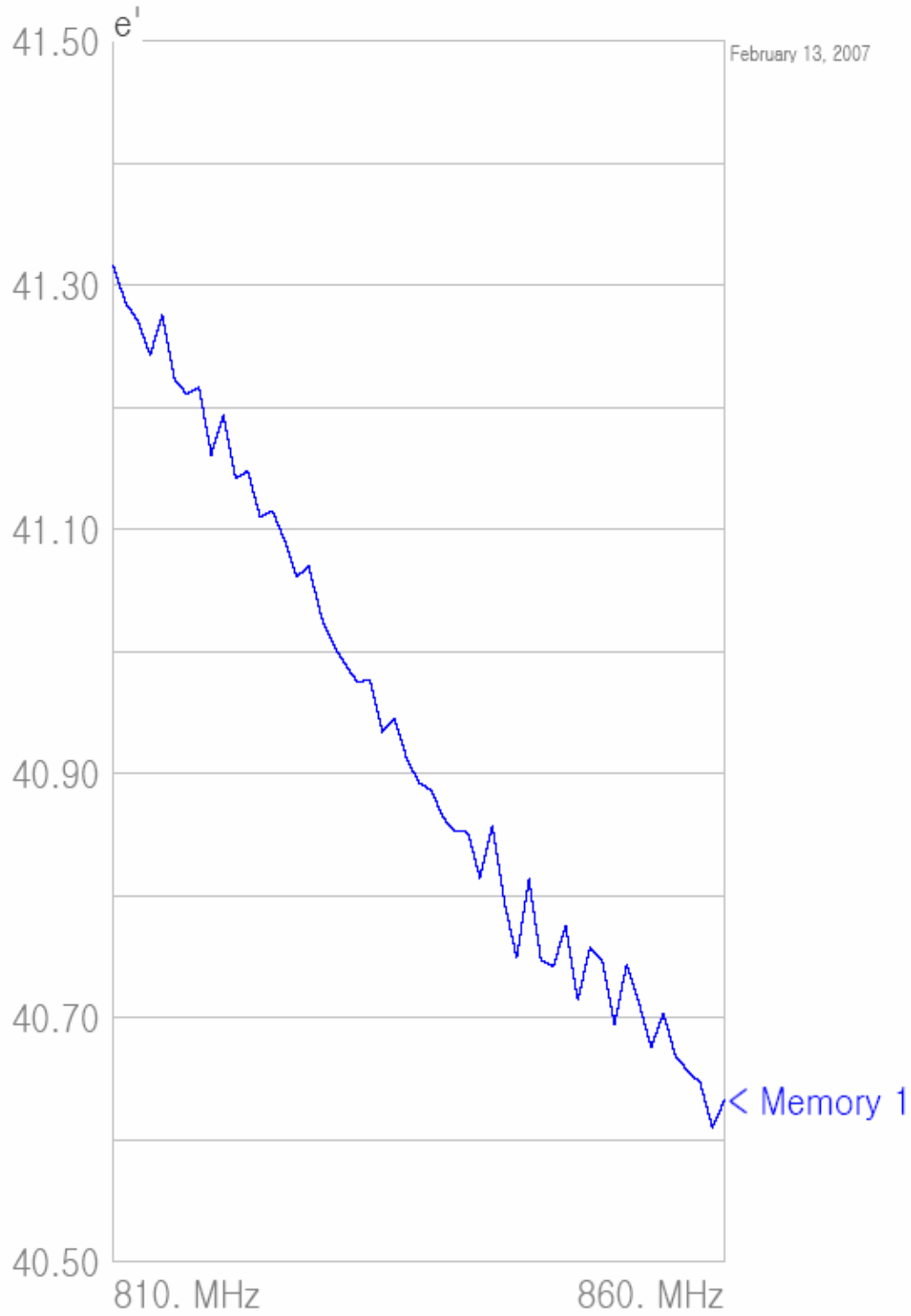
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- Head Tissue(GSM850)

Title
SubTitle



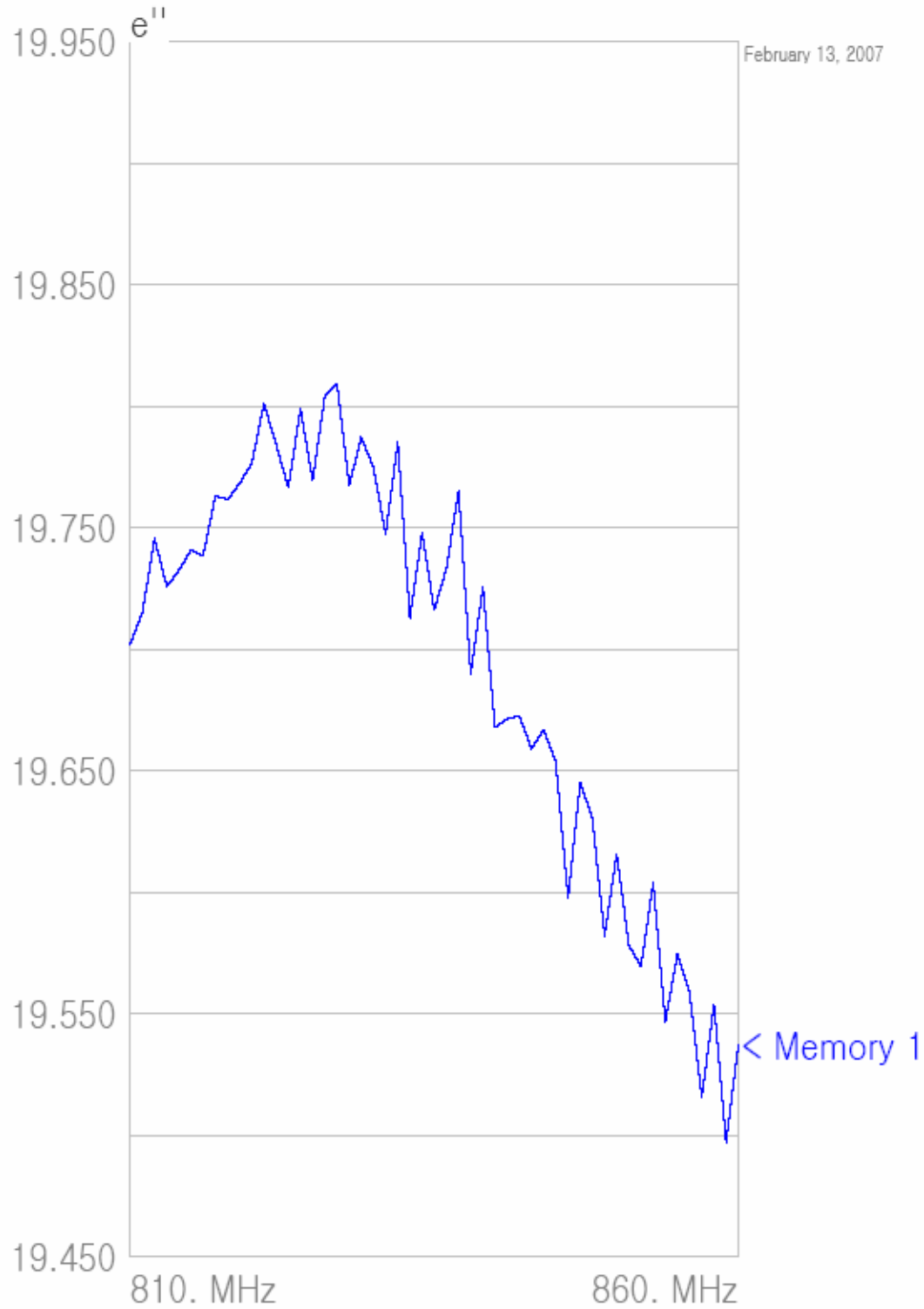


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Title

SubTitle

February 13, 2007

Frequency	e'	e''
810.000000 MHz	41.3159	19.7022
810.973262 MHz	41.2858	19.7153
811.946524 MHz	41.2712	19.7457
812.919785 MHz	41.2431	19.7259
813.893047 MHz	41.2760	19.7326
814.866309 MHz	41.2234	19.7410
815.845418 MHz	41.2109	19.7386
816.824527 MHz	41.2165	19.7634
817.803636 MHz	41.1615	19.7617
818.782745 MHz	41.1944	19.7684
819.761854 MHz	41.1422	19.7767
820.740845 MHz	41.1480	19.8013
821.731836 MHz	41.1105	19.7843
822.716828 MHz	41.1154	19.7665
823.701819 MHz	41.0916	19.7991
824.686810 MHz	41.0815	19.7696
825.677719 MHz	41.0701	19.8040
826.668628 MHz	41.0284	19.8095
827.659537 MHz	41.0057	19.7675
828.650446 MHz	40.9893	19.7874
829.641354 MHz	40.9748	19.7751
830.638216 MHz	40.9773	19.7475
831.635078 MHz	40.9343	19.7853
832.631941 MHz	40.9456	19.7131
833.628803 MHz	40.9126	19.7482
834.625665 MHz	40.8929	19.7163
835.628516 MHz	40.8866	19.7334
836.631367 MHz	40.8636	19.7656
837.634218 MHz	40.8528	19.6895
838.637068 MHz	40.8521	19.7260
839.639919 MHz	40.8147	19.6679
840.648795 MHz	40.8573	19.6714
841.657671 MHz	40.7947	19.6728
842.666547 MHz	40.7489	19.6590
843.675423 MHz	40.8135	19.6669
844.684299 MHz	40.7471	19.6537
845.693236 MHz	40.7418	19.5976
846.714173 MHz	40.7757	19.6451
847.729110 MHz	40.7144	19.6307
848.744047 MHz	40.7578	19.5820
849.758984 MHz	40.7465	19.6160
850.780018 MHz	40.6945	19.5784
851.801053 MHz	40.7438	19.5696
852.822087 MHz	40.7120	19.6040
853.843122 MHz	40.6754	19.5469
854.864157 MHz	40.7039	19.5748
855.891325 MHz	40.6685	19.5587
856.918494 MHz	40.6565	19.5155
857.945663 MHz	40.6468	19.5540
858.972831 MHz	40.6104	19.4972
860.000000 MHz	40.6321	19.5371



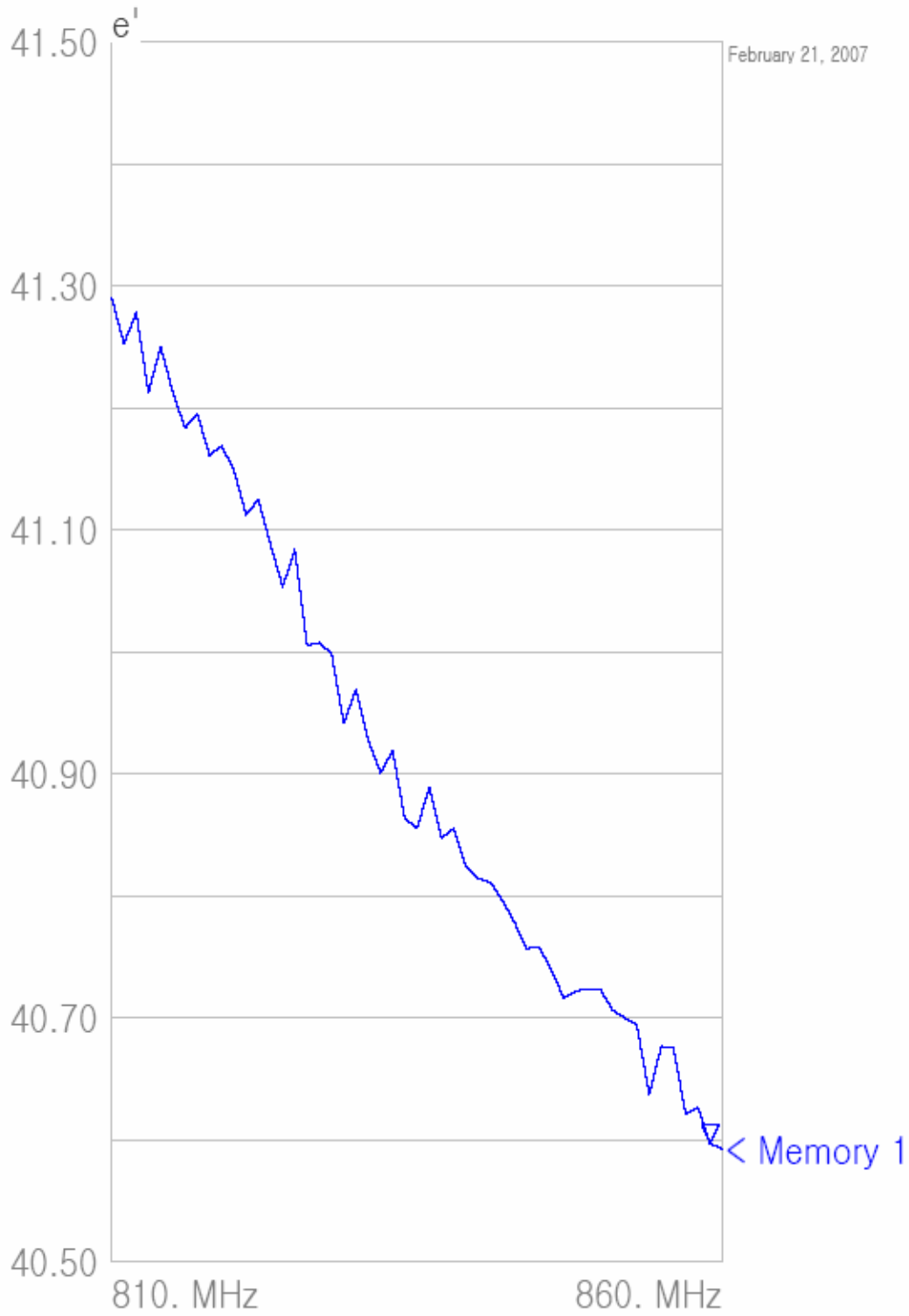
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- Head Tissue(GSM850)

Title
SubTitle



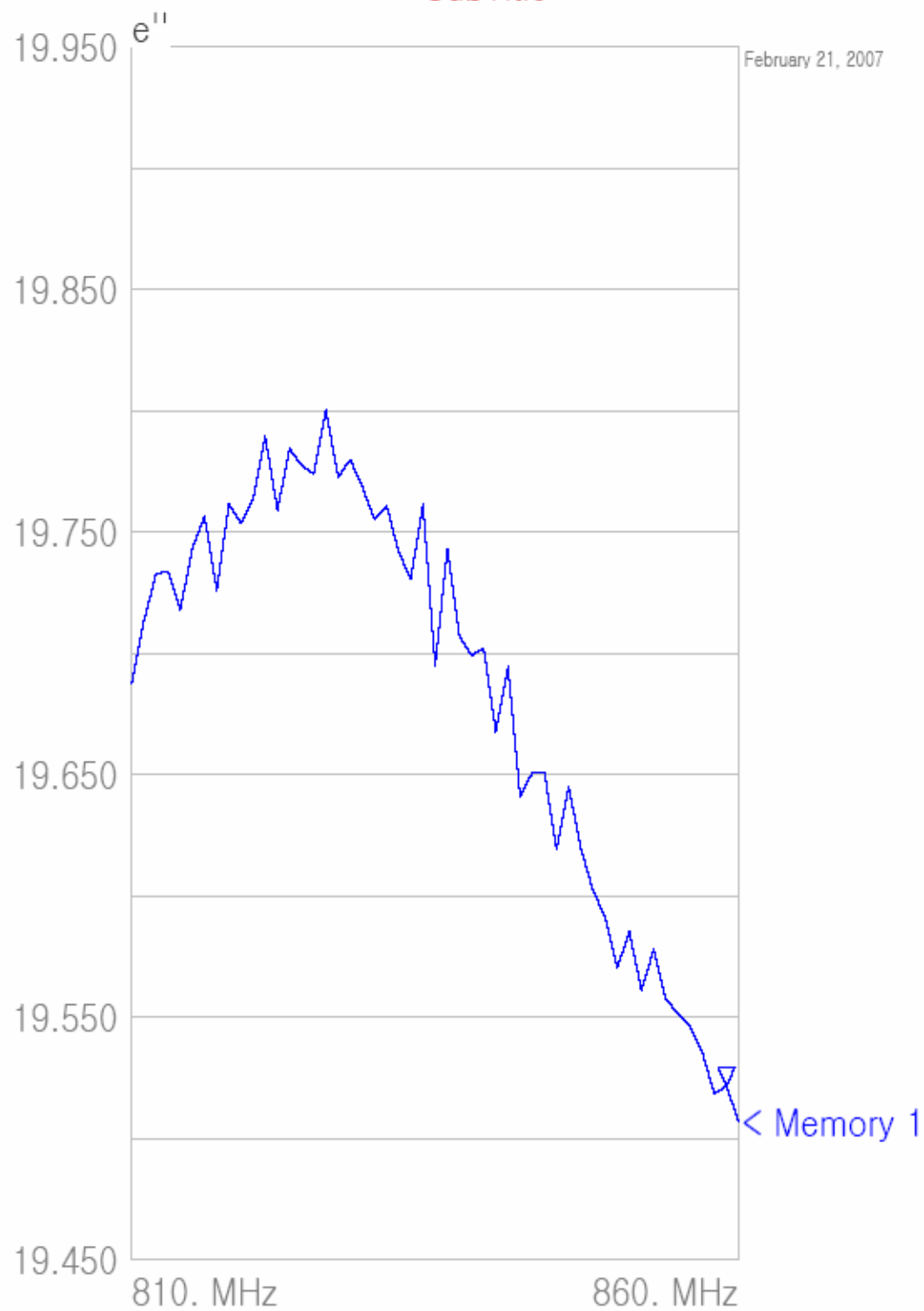


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Title
SubTitle
February 21, 2007

Frequency	e'	e''
810.000000 MHz	41.2904	19.6875
810.973262 MHz	41.2529	19.7134
811.946524 MHz	41.2785	19.7329
812.919785 MHz	41.2130	19.7340
813.893047 MHz	41.2505	19.7180
814.866309 MHz	41.2134	19.7437
815.845418 MHz	41.1836	19.7567
816.824527 MHz	41.1957	19.7261
817.803636 MHz	41.1615	19.7617
818.782745 MHz	41.1690	19.7539
819.761854 MHz	41.1495	19.7640
820.740845 MHz	41.1128	19.7895
821.731836 MHz	41.1249	19.7591
822.716828 MHz	41.0884	19.7845
823.701819 MHz	41.0537	19.7775
824.686810 MHz	41.0840	19.7741
825.677719 MHz	41.0054	19.8004
826.668628 MHz	41.0078	19.7727
827.659537 MHz	40.9985	19.7801
828.650446 MHz	40.9418	19.7687
829.641354 MHz	40.9694	19.7554
830.638216 MHz	40.9281	19.7610
831.635078 MHz	40.9011	19.7416
832.631941 MHz	40.9189	19.7310
833.628803 MHz	40.8636	19.7616
834.625665 MHz	40.8554	19.6950
835.628516 MHz	40.8893	19.7432
836.631367 MHz	40.8475	19.7070
837.634218 MHz	40.8555	19.6992
838.637068 MHz	40.8245	19.7022
839.639919 MHz	40.8147	19.6678
840.648795 MHz	40.8114	19.6946
841.657671 MHz	40.7963	19.6409
842.666547 MHz	40.7780	19.6509
843.675423 MHz	40.7570	19.6512
844.684299 MHz	40.7584	19.6193
845.693236 MHz	40.7394	19.6451
846.714173 MHz	40.7167	19.6199
847.729110 MHz	40.7221	19.6025
848.744047 MHz	40.7241	19.5913
849.758984 MHz	40.7235	19.5705
850.780018 MHz	40.7068	19.5853
851.801053 MHz	40.7000	19.5611
852.822087 MHz	40.6944	19.5779
853.843122 MHz	40.6371	19.5576
854.864157 MHz	40.6767	19.5514
855.891325 MHz	40.6754	19.5464
856.918494 MHz	40.6209	19.5357
857.945663 MHz	40.6265	19.5185
858.972831 MHz	40.5967	19.5216
860.000000 MHz	40.5928	19.5071



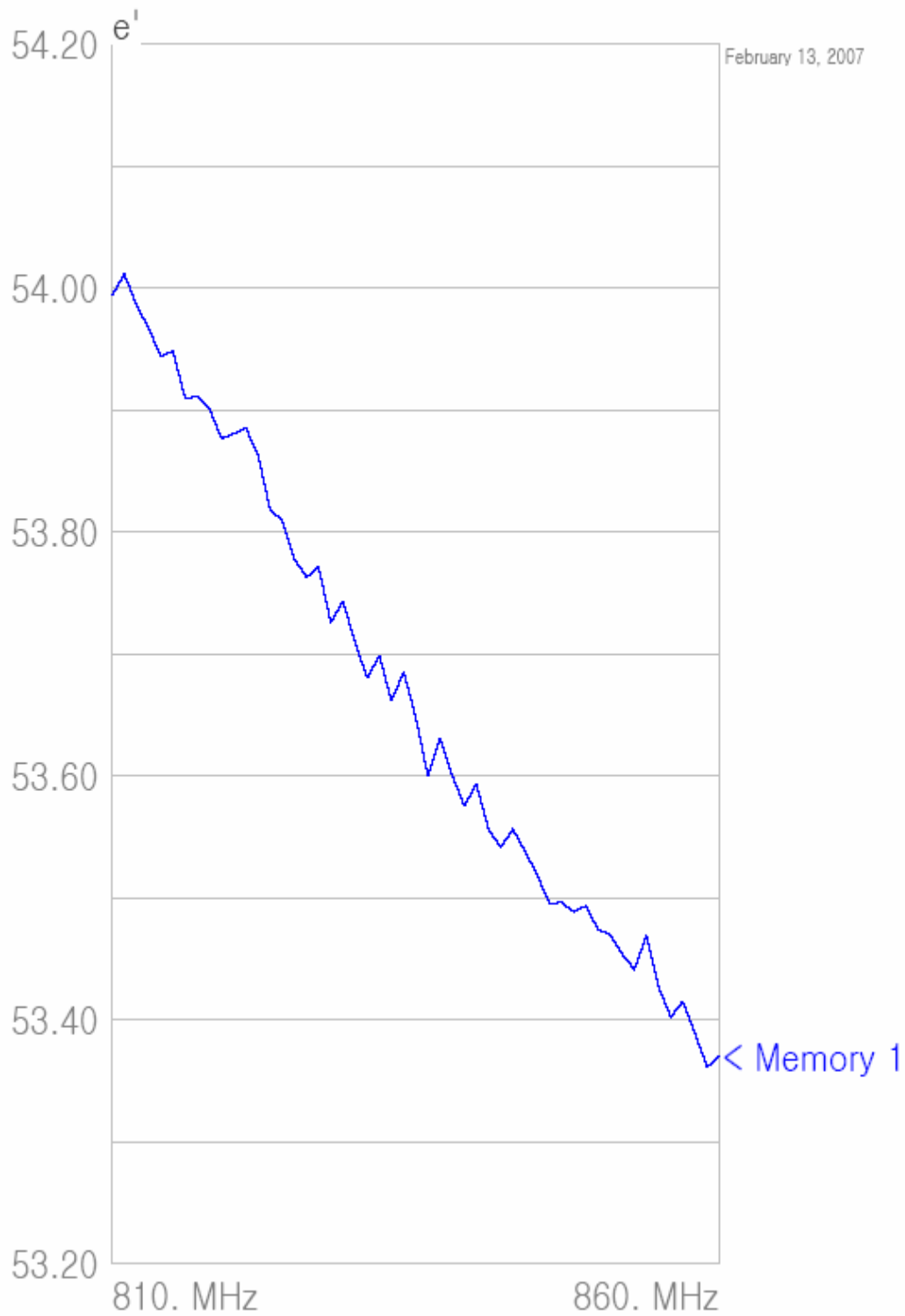
ESTECH Co., Ltd.

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

Title
SubTitle



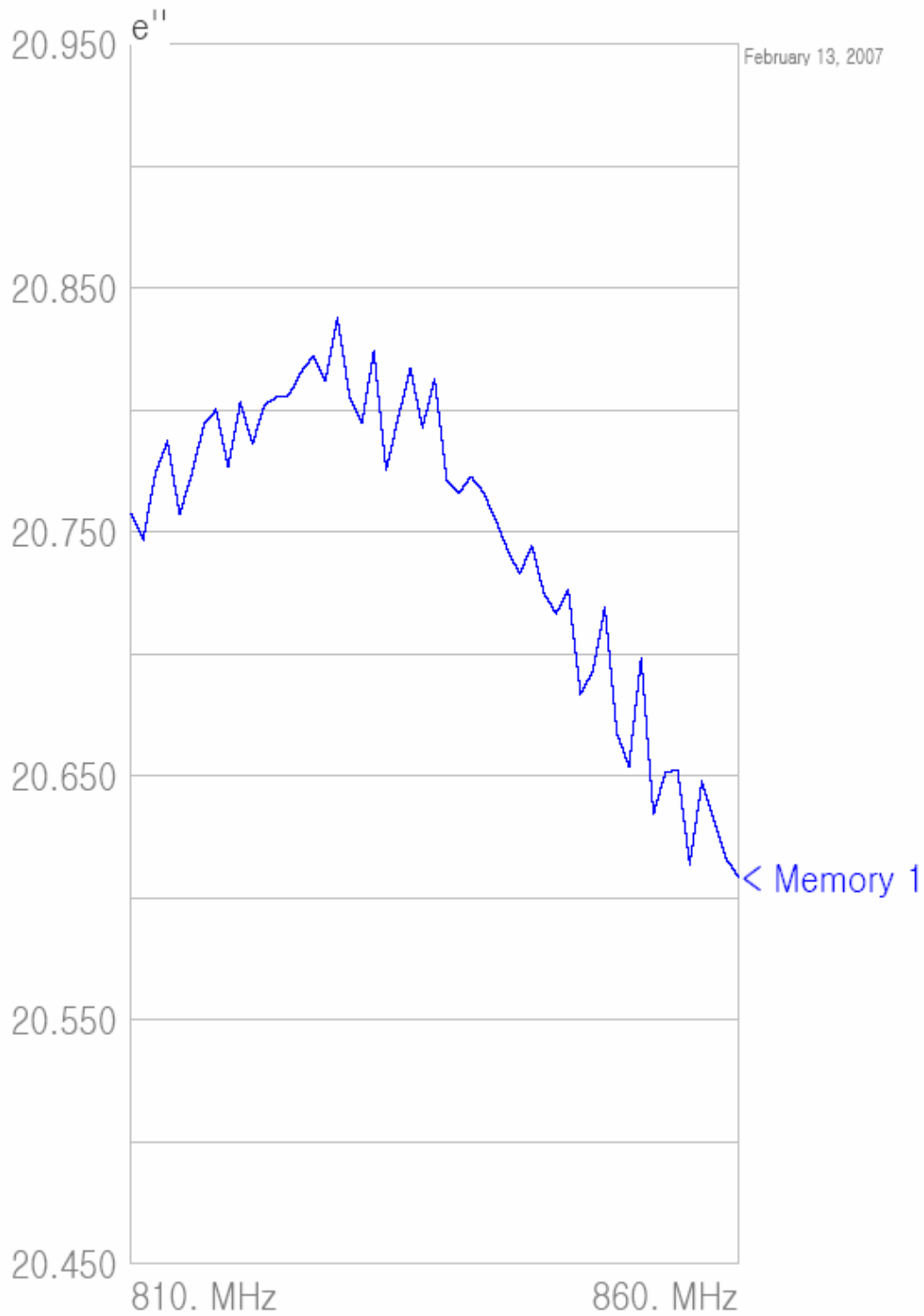


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Seoul, 153-803, Korea

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SubTitle



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Title

SubTitle

February 13, 2007

Frequency	e ⁱ	e ⁱⁱ
810.000000 MHz	53.9945	20.7577
810.973262 MHz	54.0118	20.7470
811.946524 MHz	53.9863	20.7740
812.919785 MHz	53.9673	20.7874
813.893047 MHz	53.9442	20.7574
814.866309 MHz	53.9488	20.7736
815.845418 MHz	53.9101	20.7941
816.824527 MHz	53.9112	20.8003
817.803636 MHz	53.9017	20.7767
818.782745 MHz	53.8768	20.8034
819.761854 MHz	53.8808	20.7862
820.746845 MHz	53.8856	20.8022
821.731836 MHz	53.8636	20.8055
822.716826 MHz	53.8184	20.8061
823.701819 MHz	53.8100	20.8156
824.686810 MHz	53.7784	20.8224
825.677719 MHz	53.7630	20.8123
826.668828 MHz	53.7716	20.8379
827.659537 MHz	53.7260	20.8055
828.650446 MHz	53.7436	20.7946
829.641354 MHz	53.7097	20.8244
830.638216 MHz	53.6804	20.7753
831.635078 MHz	53.6989	20.7971
832.631941 MHz	53.6617	20.8171
833.628803 MHz	53.6855	20.7929
834.625665 MHz	53.6485	20.8129
835.628516 MHz	53.6000	20.7710
836.631367 MHz	53.6310	20.7662
837.634218 MHz	53.6003	20.7729
838.637068 MHz	53.5758	20.7664
839.639919 MHz	53.5936	20.7554
840.648795 MHz	53.5560	20.7428
841.657671 MHz	53.5414	20.7328
842.666547 MHz	53.5566	20.7446
843.675423 MHz	53.5385	20.7249
844.684299 MHz	53.5191	20.7167
845.693236 MHz	53.4956	20.7264
846.714173 MHz	53.4963	20.6836
847.729110 MHz	53.4889	20.6928
848.744047 MHz	53.4934	20.7192
849.758984 MHz	53.4745	20.6675
850.780018 MHz	53.4698	20.6541
851.801053 MHz	53.4541	20.6988
852.822087 MHz	53.4413	20.6342
853.843122 MHz	53.4697	20.6517
854.864157 MHz	53.4271	20.6523
855.891325 MHz	53.4024	20.6139
856.918494 MHz	53.4155	20.6478
857.945663 MHz	53.3885	20.6320
858.972831 MHz	53.3615	20.6161
860.000000 MHz	53.3700	20.6086



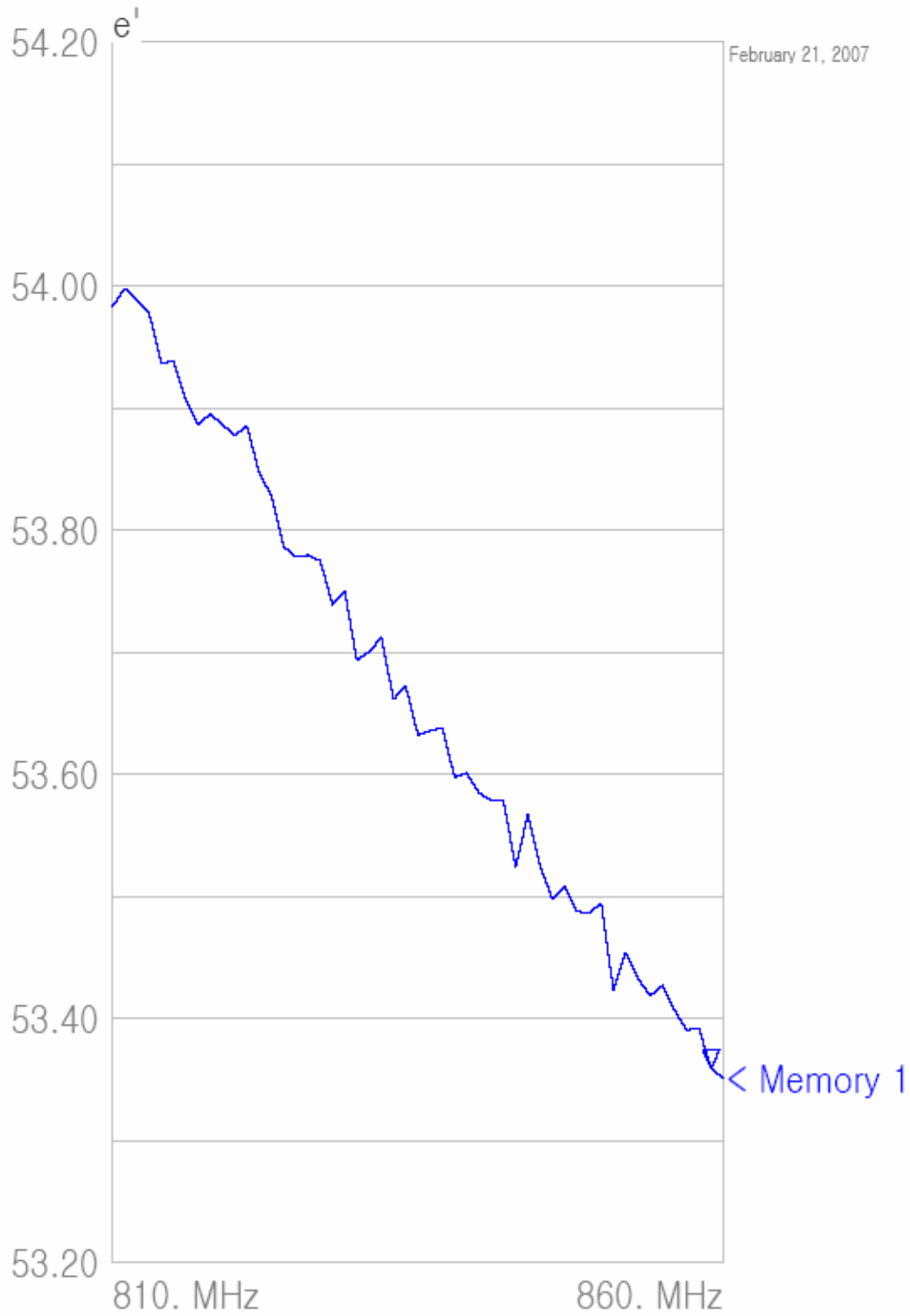
ESTECH Co., Ltd.

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426-5, Gasan-dong, Geumcheon-gu,
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TEL: 82-2-867-3201
FAX: 82-2-867-3204

– Body Tissue(GSM850)

Title
SubTitle



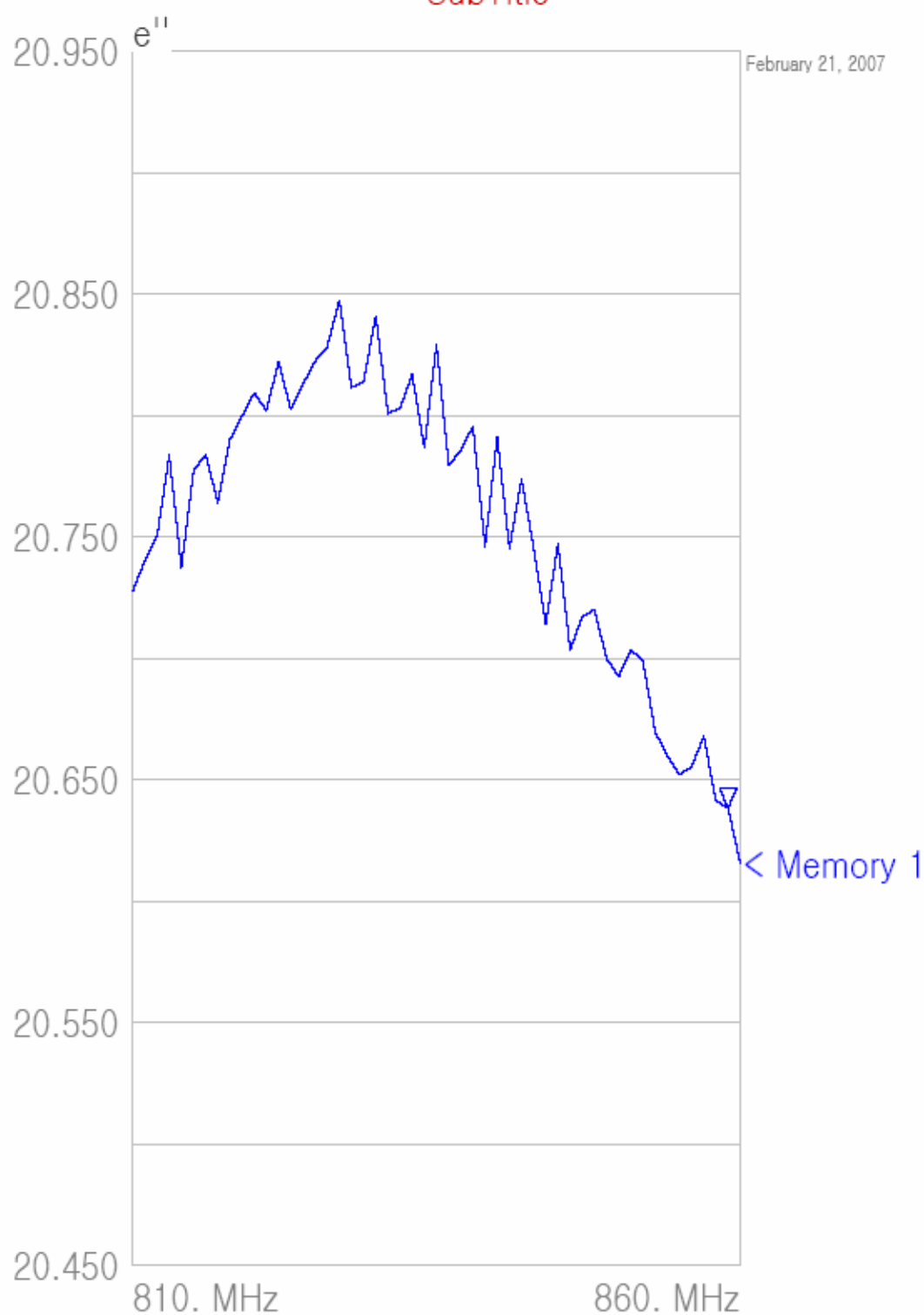


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Title

SubTitle

February 21, 2007

Frequency	e'	e''
810.000000 MHz	53.9839	20.7277
810.973262 MHz	53.9983	20.7406
811.946524 MHz	53.9892	20.7505
812.919785 MHz	53.9773	20.7838
813.893047 MHz	53.9371	20.7376
814.866309 MHz	53.9388	20.7772
815.845418 MHz	53.9066	20.7841
816.824527 MHz	53.8871	20.7642
817.803636 MHz	53.8954	20.7902
818.782745 MHz	53.8867	20.7999
819.761854 MHz	53.8780	20.8095
820.746845 MHz	53.8856	20.8022
821.731836 MHz	53.8474	20.8225
822.716828 MHz	53.8283	20.8025
823.701819 MHz	53.7868	20.8129
824.686810 MHz	53.7784	20.8224
825.677719 MHz	53.7799	20.8284
826.668628 MHz	53.7751	20.8477
827.659537 MHz	53.7393	20.8118
828.650446 MHz	53.7507	20.8141
829.641354 MHz	53.6937	20.8413
830.638216 MHz	53.7007	20.8010
831.635078 MHz	53.7122	20.8033
832.631941 MHz	53.6617	20.8171
833.628803 MHz	53.6723	20.7867
834.625665 MHz	53.6326	20.8296
835.628516 MHz	53.6362	20.7798
836.631367 MHz	53.6380	20.7856
837.634218 MHz	53.5977	20.7958
838.637068 MHz	53.6013	20.7461
839.639919 MHz	53.5849	20.7914
840.648795 MHz	53.5788	20.7454
841.657671 MHz	53.5783	20.7739
842.666547 MHz	53.5242	20.7455
843.675423 MHz	53.5673	20.7143
844.684299 MHz	53.5249	20.7473
845.699236 MHz	53.4981	20.7037
846.714173 MHz	53.5086	20.7171
847.729110 MHz	53.4881	20.7202
848.744047 MHz	53.4864	20.7001
849.758984 MHz	53.4946	20.6926
850.780018 MHz	53.4231	20.7038
851.801053 MHz	53.4541	20.6968
852.822087 MHz	53.4328	20.6698
853.843122 MHz	53.4187	20.6598
854.864157 MHz	53.4271	20.6523
855.891325 MHz	53.4070	20.6554
856.918494 MHz	53.3906	20.6679
857.945663 MHz	53.3920	20.6414
858.972831 MHz	53.3591	20.6385
860.000000 MHz	53.3511	20.6156



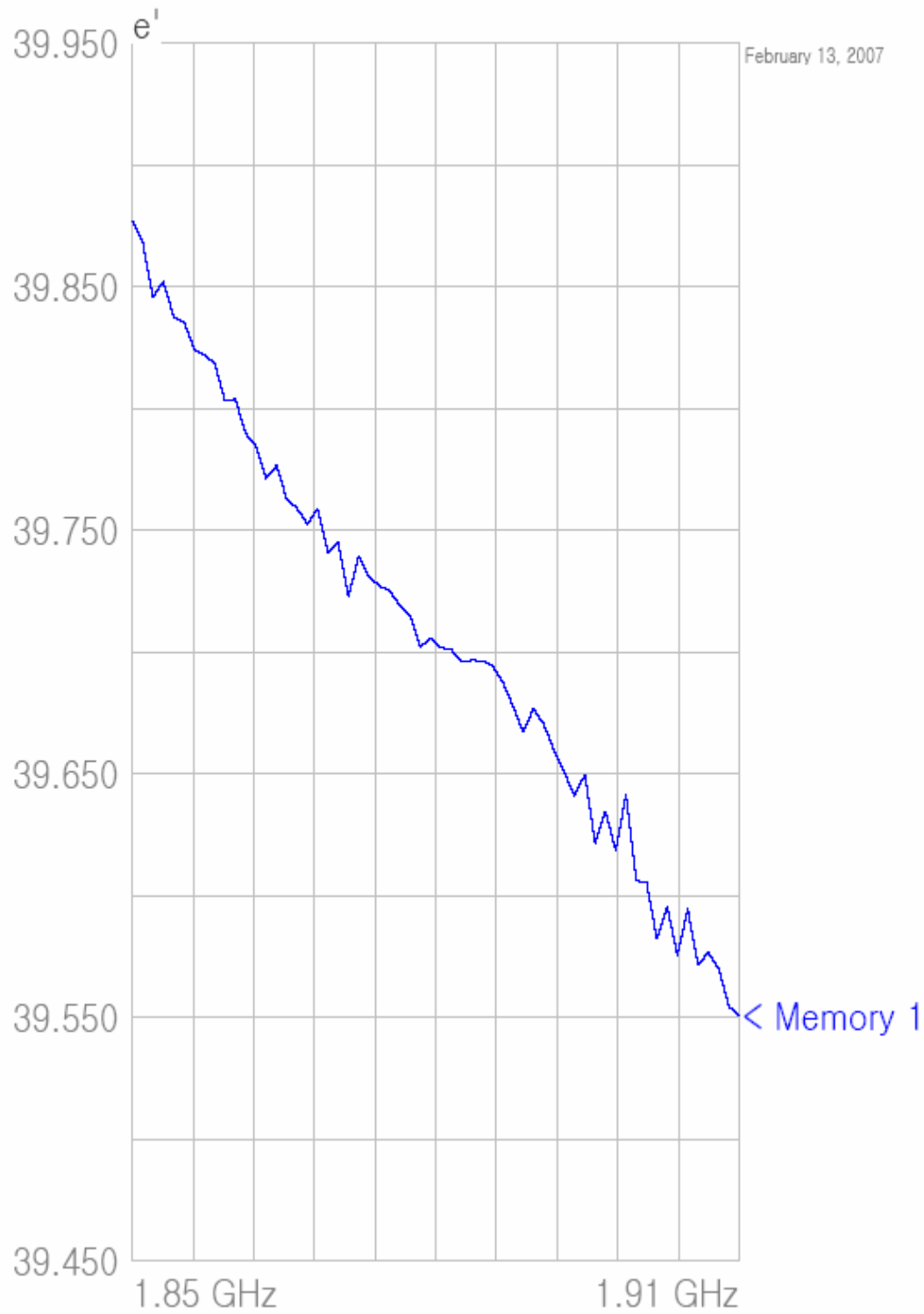
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– Head Tissue(PCS1900)

Title
SubTitle



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Title
SubTitle



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FAX: 82-2-867-3204

Title

SubTitle

February 10, 2007

Frequency	e ¹	e ¹¹
1.850000000 GHz	39.8771	13.5041
1.851016949 GHz	39.8883	13.5032
1.852033898 GHz	39.8459	13.5048
1.853050847 GHz	39.8523	13.4944
1.854067797 GHz	39.8379	13.4941
1.855084746 GHz	39.8357	13.5132
1.856101695 GHz	39.8245	13.5229
1.857118644 GHz	39.8220	13.5271
1.858135593 GHz	39.8186	13.5108
1.859152542 GHz	39.8032	13.5232
1.860169492 GHz	39.8040	13.5133
1.861186441 GHz	39.7899	13.5279
1.862203390 GHz	39.7850	13.5186
1.863220339 GHz	39.7715	13.5147
1.864237288 GHz	39.7767	13.5262
1.865254237 GHz	39.7829	13.5315
1.866271186 GHz	39.7592	13.5336
1.867288136 GHz	39.7527	13.5313
1.868305085 GHz	39.7589	13.5301
1.869322034 GHz	39.7409	13.5381
1.870338983 GHz	39.7456	13.5438
1.871355932 GHz	39.7227	13.5250
1.872372881 GHz	39.7397	13.5409
1.873389831 GHz	39.7312	13.5400
1.874406780 GHz	39.7273	13.5511
1.875423729 GHz	39.7252	13.5461
1.876440678 GHz	39.7194	13.5495
1.877457627 GHz	39.7152	13.5458
1.878474576 GHz	39.7024	13.5476
1.879491525 GHz	39.7057	13.5512
1.880508475 GHz	39.7019	13.5623
1.881525424 GHz	39.7012	13.5594
1.882542373 GHz	39.6960	13.5684
1.883559322 GHz	39.6967	13.5676
1.884576271 GHz	39.6966	13.5703
1.885593220 GHz	39.6946	13.5653
1.886610169 GHz	39.6879	13.5812
1.887627119 GHz	39.6779	13.5872
1.888644068 GHz	39.6872	13.5967
1.889661017 GHz	39.6770	13.5961
1.890677966 GHz	39.6704	13.6120
1.891694915 GHz	39.6597	13.5886
1.892711864 GHz	39.6506	13.6239
1.893728814 GHz	39.6411	13.6118
1.894745763 GHz	39.6498	13.6328
1.895762712 GHz	39.6214	13.6237
1.896779661 GHz	39.6347	13.6238
1.897796610 GHz	39.6187	13.6248
1.898813559 GHz	39.6417	13.6307
1.899830508 GHz	39.6061	13.6382
1.900847458 GHz	39.6055	13.6353
1.901864407 GHz	39.5823	13.6528
1.902881356 GHz	39.5957	13.6529
1.903898305 GHz	39.5755	13.6566
1.904915254 GHz	39.5946	13.6470
1.905932203 GHz	39.5715	13.6645
1.906949153 GHz	39.5767	13.6519
1.907966102 GHz	39.5702	13.6766
1.908983051 GHz	39.5546	13.6595
1.910000000 GHz	39.5508	13.6884



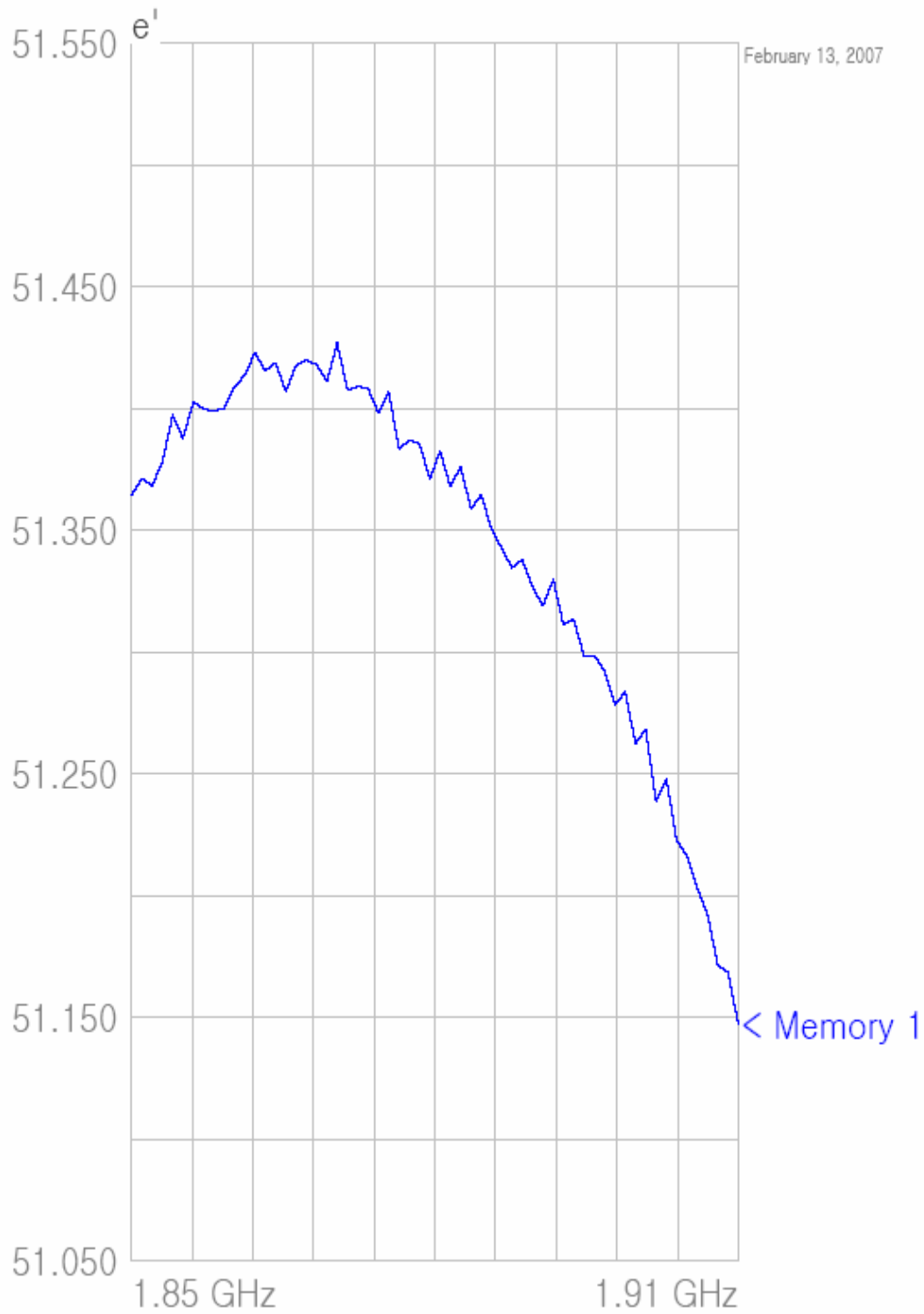
ESTECH Co., Ltd.

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

Title
SubTitle



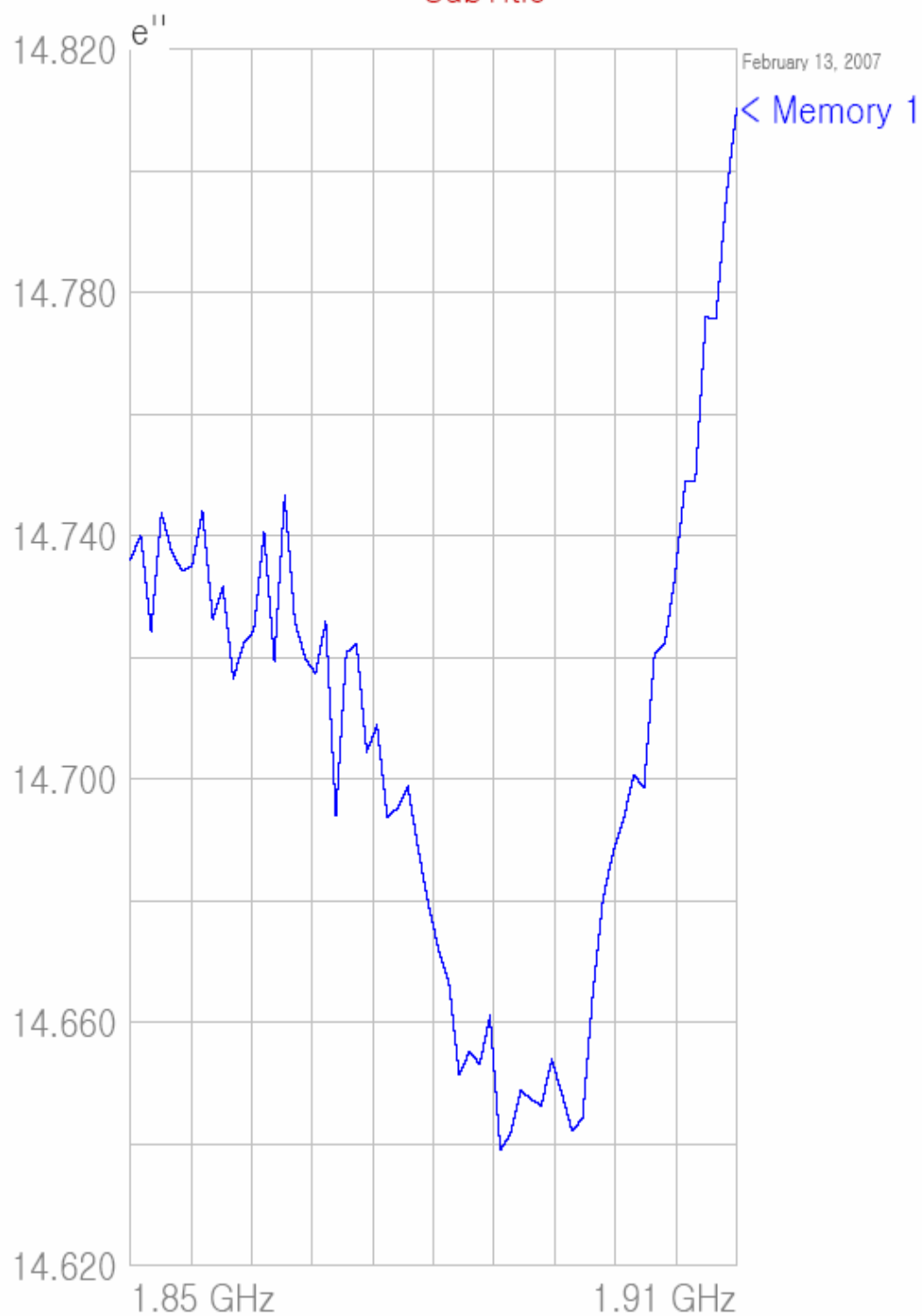


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SubTitle



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FAX: 82-2-867-3204

Title

SubTitle

February 10, 2007

Frequency	e ⁱ	e ⁱⁱ
1.850000000 GHz	51.3644	14.7362
1.851016949 GHz	51.3714	14.7402
1.852033898 GHz	51.3685	14.7243
1.853050847 GHz	51.3781	14.7439
1.854067797 GHz	51.3975	14.7374
1.855084746 GHz	51.3878	14.7343
1.856101695 GHz	51.4028	14.7351
1.857118644 GHz	51.3999	14.7440
1.858135593 GHz	51.3990	14.7263
1.859152542 GHz	51.4003	14.7317
1.860169492 GHz	51.4088	14.7166
1.861186441 GHz	51.4138	14.7223
1.862203390 GHz	51.4230	14.7244
1.863220339 GHz	51.4157	14.7407
1.864237288 GHz	51.4189	14.7194
1.865254237 GHz	51.4071	14.7467
1.866271186 GHz	51.4179	14.7260
1.867288136 GHz	51.4201	14.7199
1.868305085 GHz	51.4181	14.7174
1.869322034 GHz	51.4115	14.7259
1.870338983 GHz	51.4270	14.6940
1.871355932 GHz	51.4077	14.7208
1.872372881 GHz	51.4092	14.7222
1.873389831 GHz	51.4084	14.7045
1.874406780 GHz	51.3984	14.7089
1.875423729 GHz	51.4069	14.6937
1.876440678 GHz	51.3837	14.6953
1.877457627 GHz	51.3871	14.6988
1.878474576 GHz	51.3858	14.6886
1.879491525 GHz	51.3711	14.6794
1.880508475 GHz	51.3828	14.6720
1.881525424 GHz	51.3879	14.6666
1.882542373 GHz	51.3764	14.6513
1.883559322 GHz	51.3589	14.6553
1.884576271 GHz	51.3647	14.6531
1.885593220 GHz	51.3507	14.6611
1.886610169 GHz	51.3426	14.6390
1.887627119 GHz	51.3348	14.6417
1.888644068 GHz	51.3380	14.6488
1.889661017 GHz	51.3267	14.6474
1.890677966 GHz	51.3191	14.6463
1.891694915 GHz	51.3299	14.6539
1.892711864 GHz	51.3113	14.6483
1.893728814 GHz	51.3136	14.6421
1.894745763 GHz	51.2983	14.6442
1.895762712 GHz	51.2988	14.6644
1.896779661 GHz	51.2921	14.6803
1.897796610 GHz	51.2784	14.6861
1.898813559 GHz	51.2837	14.6934
1.899830508 GHz	51.2625	14.7008
1.900847458 GHz	51.2883	14.6986
1.901864407 GHz	51.2387	14.7205
1.902881356 GHz	51.2480	14.7222
1.903898305 GHz	51.2229	14.7331
1.904915254 GHz	51.2163	14.7489
1.905932203 GHz	51.2032	14.7492
1.906949153 GHz	51.1922	14.7760
1.907966102 GHz	51.1716	14.7758
1.908983051 GHz	51.1686	14.7956
1.910000000 GHz	51.1471	14.8104



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APPENDIX B : Validation Test Data

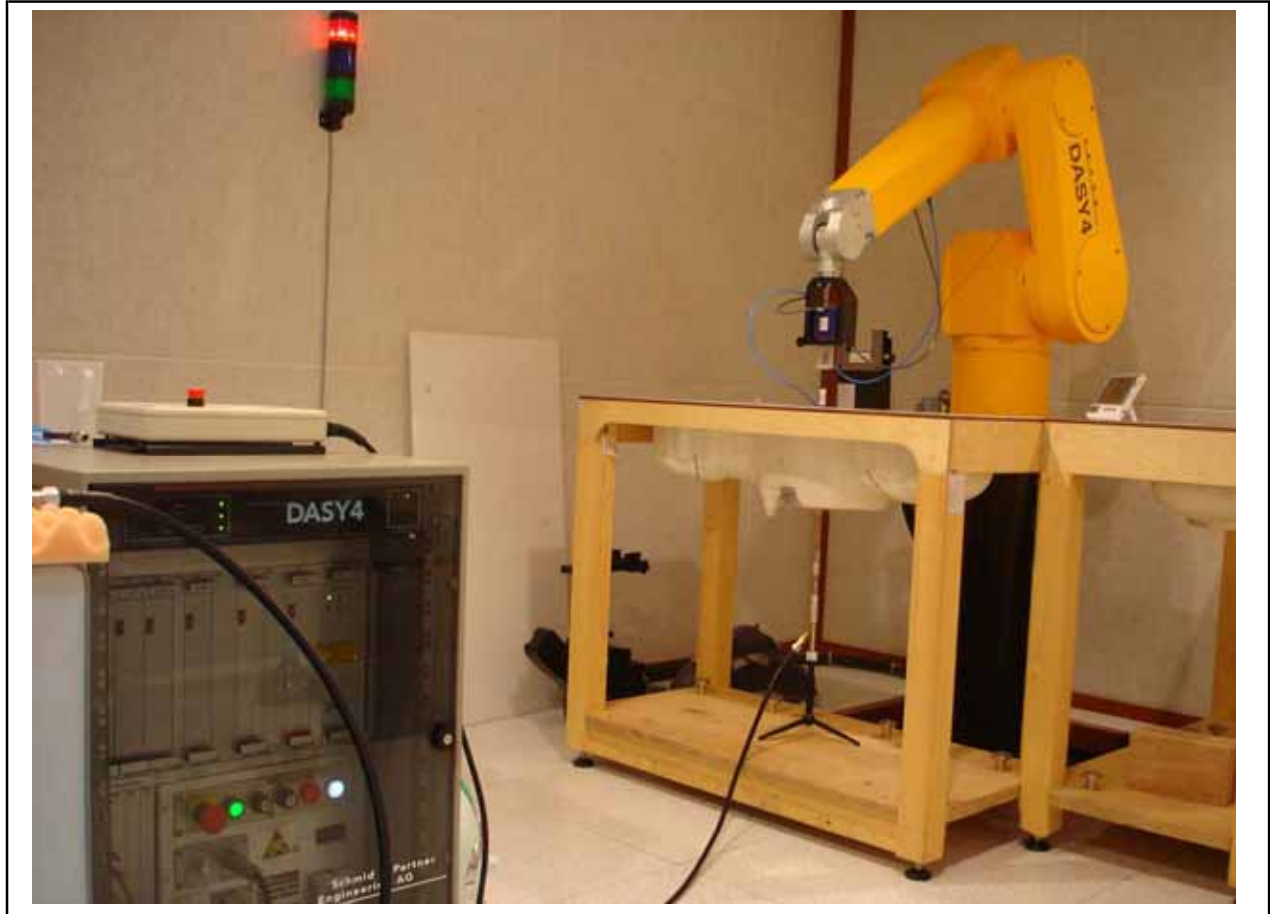


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Dipole Validation



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

- GSM850 Validation

Date: 2007-02-13

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: $f = 835 \text{ MHz}$; $\sigma = 0.916 \text{ mho/m}$; $\epsilon_r = 40.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.42, 6.42, 6.42); Calibrated: 2006-10-17
- 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 : 21 °C, Humidity : 46%

Area Scan (61x61x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 2.55 mW/g

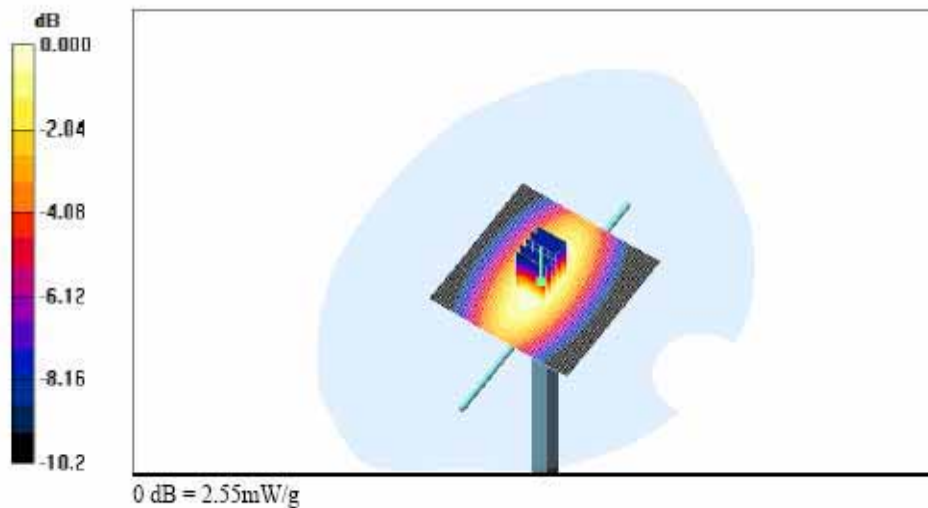
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 53.3 V/m; Power Drift = -0.269 dB

Peak SAR (extrapolated) = 3.54 W/kg

SAR(1 g) = 2.36 mW/g

Maximum value of SAR (measured) = 2.55 mW/g





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

- GSM850 Validation

Date: 2007-02-21

Test Laboratory: ESTECH

VALIDATION-02-21

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; $\sigma = 0.915$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.42, 6.42, 6.42); Calibrated: 2006-10-17
- 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 : 21 °C, Humidity : 45%

Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.60 mW/g

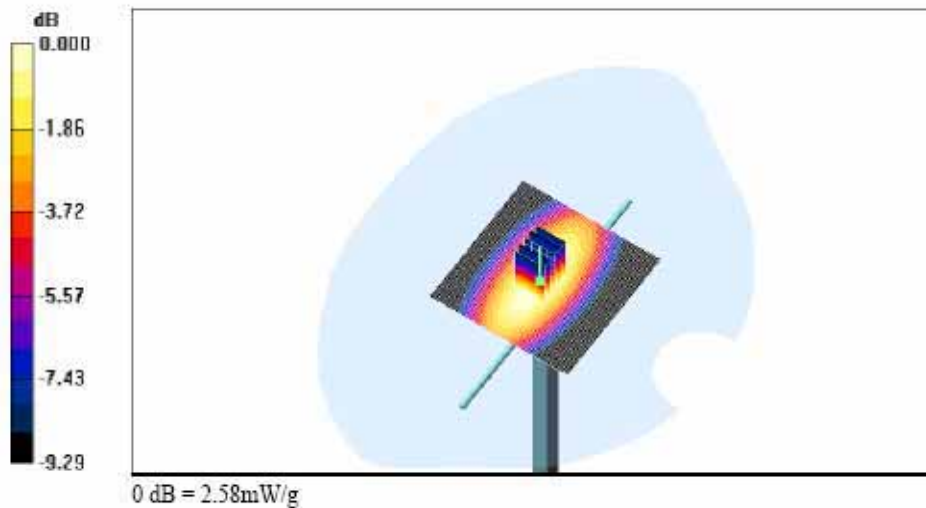
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.6 V/m; Power Drift = -0.018 dB

Peak SAR (extrapolated) = 3.51 W/kg

SAR(1 g) = 2.39 mW/g

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



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FAX: 82-2-867-3204

- PCS1900 Validation

Date: 2007-02-13

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): $f = 1900 \text{ MHz}$; $\sigma = 1.44 \text{ mho/m}$; $\epsilon_r = 39.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(5.08, 5.08, 5.08); Calibrated: 2006-10-17
- 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 : 21 °C, Humidity : 46%

Area Scan (61x61x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 11.6 mW/g

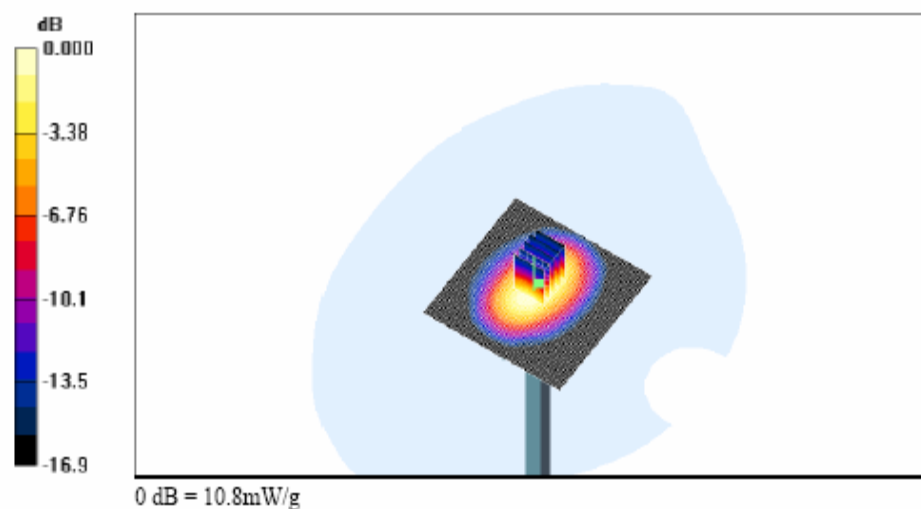
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 85.2 V/m; Power Drift = -0.018 dB

Peak SAR (extrapolated) = 18.4 W/kg

SAR(1 g) = 9.67 mW/g

Maximum value of SAR (measured) = 10.8 mW/g





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APPENDIX C : SAR Test Data

**ESTECH Co., Ltd.**

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426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea

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

– GSM850

Date: 2007-02-13

Test Laboratory: ESTECH

LEFT TOUCH SLIDE IN 190

DUT: ME550d; Type: SLIDE ; Serial: XXXX

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 837$ MHz; $\sigma = 0.92$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.42, 6.42, 6.42); Calibrated: 2006-10-17
- 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 : 21 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.302 mW/g

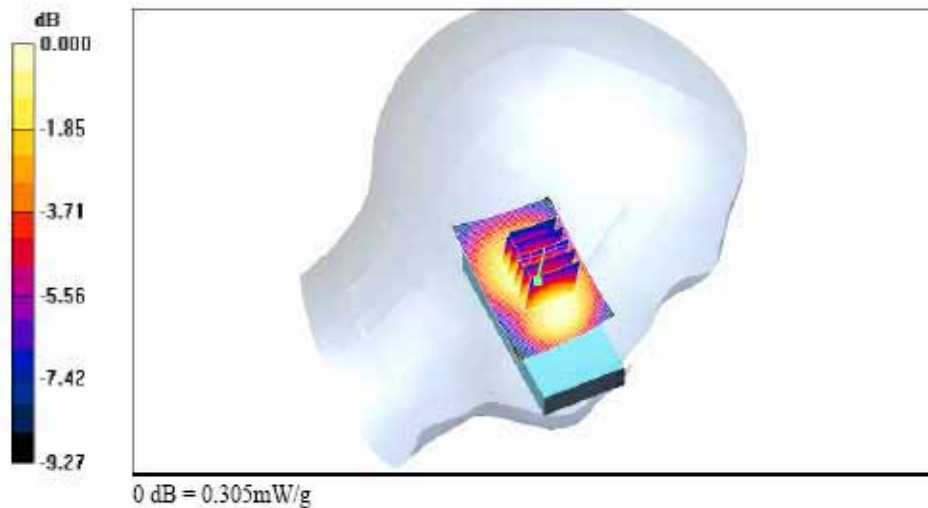
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 14.3 V/m; Power Drift = 0.114 dB

Peak SAR (extrapolated) = 0.371 W/kg

SAR(1 g) = 0.289 mW/g; SAR(10 g) = 0.214 mW/g

Maximum value of SAR (measured) = 0.305 mW/g



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LEFT TOUCH SLIDE UP 190

DUT: ME550d; Type: SLIDE; Serial: XXXX

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 837 \text{ MHz}$; $\sigma = 0.92 \text{ mho/m}$; $\epsilon_r = 40.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.42, 6.42, 6.42); Calibrated: 2006-10-17
- 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 : 21 °C, Humidity : 46%

Area Scan (41x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.719 mW/g

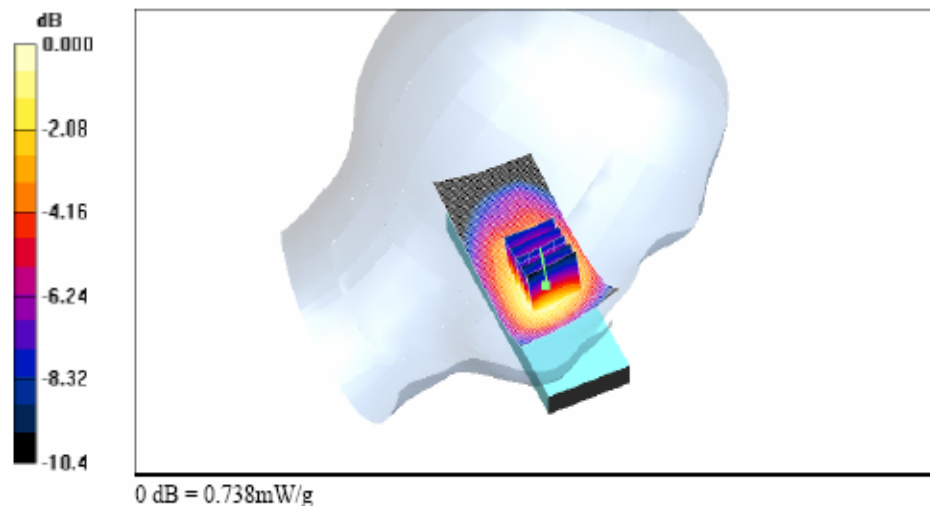
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 12.0 V/m; Power Drift = 0.013 dB

Peak SAR (extrapolated) = 0.995 W/kg

SAR(1 g) = 0.687 mW/g; SAR(10 g) = 0.464 mW/g

Maximum value of SAR (measured) = 0.738 mW/g



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RIGHT TOUCH SLIDE IN 190

DUT: ME550d; Type: SLIDE ; Serial: XXXX

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 837$ MHz; $\sigma = 0.92$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.42, 6.42, 6.42); Calibrated: 2006-10-17
- 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 : 21 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

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

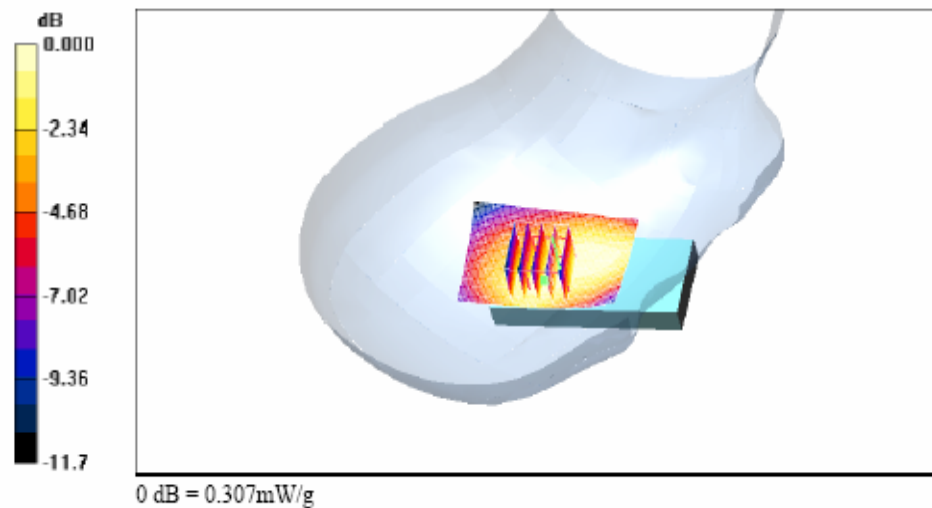
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 14.0 V/m; Power Drift = -0.021 dB

Peak SAR (extrapolated) = 0.419 W/kg

SAR(1 g) = 0.289 mW/g; SAR(10 g) = 0.206 mW/g

Maximum value of SAR (measured) = 0.307 mW/g



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RIGHT TOUCH SLIDE UP 190

DUT: ME550d; Type: SLIDE; Serial: XXXX

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 837$ MHz; $\sigma = 0.92$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DAS4 (High Precision Assessment)

DAS4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.42, 6.42, 6.42); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DAS4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 21 °C, Humidity : 46%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.821 mW/g

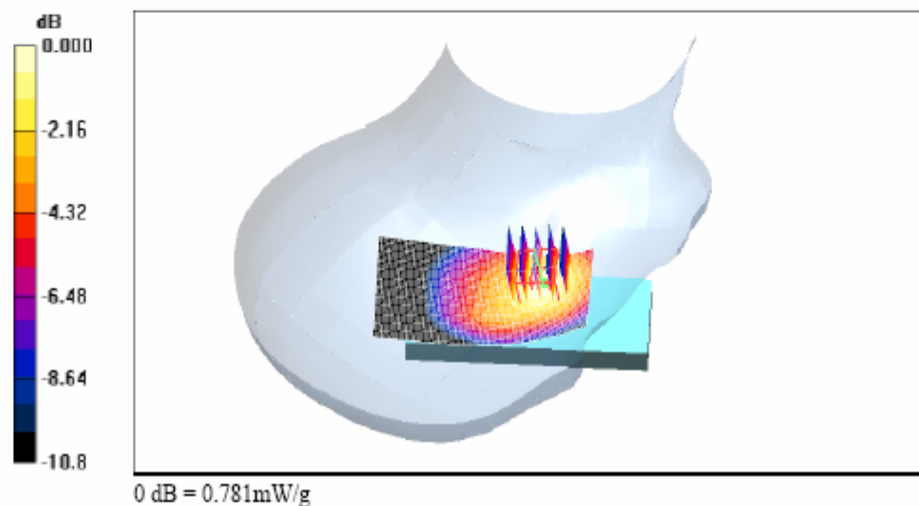
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 10.5 V/m; Power Drift = -0.055 dB

Peak SAR (extrapolated) = 1.10 W/kg

SAR(1 g) = 0.715 mW/g; SAR(10 g) = 0.463 mW/g

Maximum value of SAR (measured) = 0.781 mW/g



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RIGHT TOUCH SLIDE UP BT ON 190**DUT: ME550d; Type: SLIDE; Serial: XXXX**

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 837$ MHz; $\sigma = 0.92$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.42, 6.42, 6.42); Calibrated: 2006-10-17
- 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 : 21 °C, Humidity : 46%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.798 mW/g

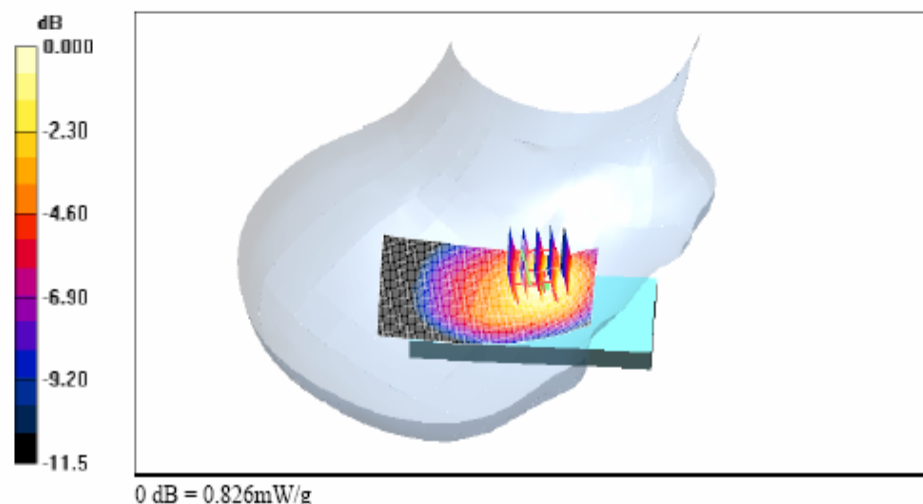
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 12.4 V/m; Power Drift = 0.003 dB

Peak SAR (extrapolated) = 1.25 W/kg

SAR(1 g) = 0.762 mW/g; SAR(10 g) = 0.476 mW/g

Maximum value of SAR (measured) = 0.826 mW/g



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RIGHT TOUCH SLIDE UP BT ON 190

DUT: ME550d; Type: SLIDE; Serial: XXXX

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

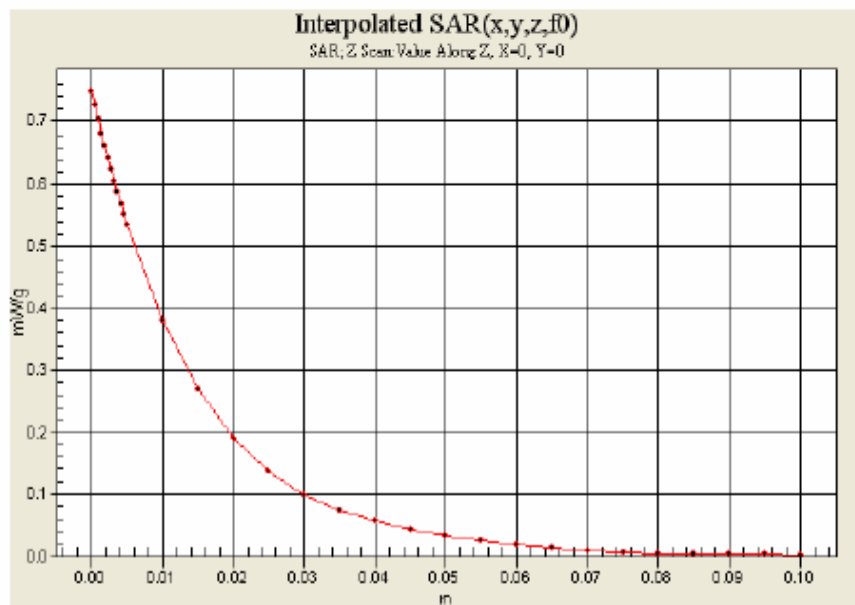
Medium parameters used: $f = 837$ MHz; $\sigma = 0.92$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.42, 6.42, 6.42); Calibrated: 2006-10-17
- 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 : 21 °C, Humidity : 46%



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LEFT TILT SLIDE IN 190

DUT: ME550d; Type: SLIDE ; Serial: XXXX

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 837$ MHz; $\sigma = 0.92$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.42, 6.42, 6.42); Calibrated: 2006-10-17
- 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 : 21 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

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

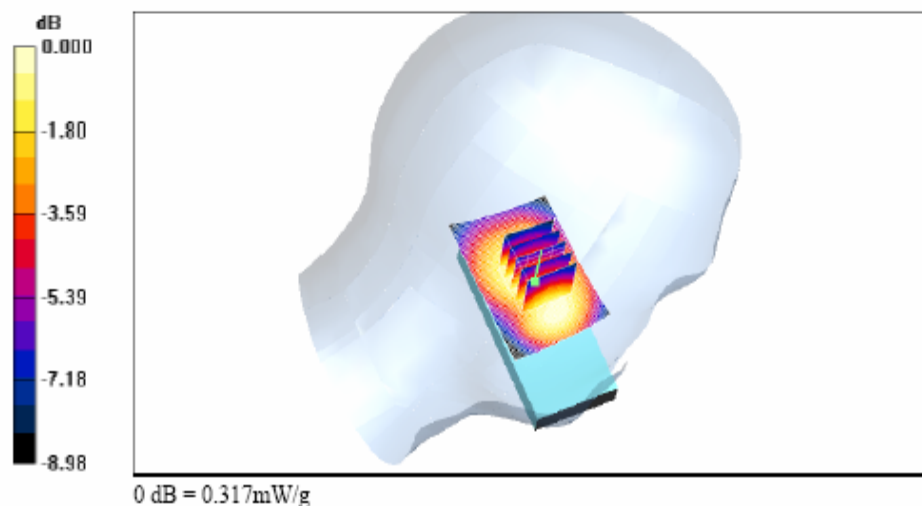
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 14.7 V/m; Power Drift = 0.031 dB

Peak SAR (extrapolated) = 0.374 W/kg

SAR(1 g) = 0.300 mW/g; SAR(10 g) = 0.223 mW/g

Maximum value of SAR (measured) = 0.317 mW/g



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LEFT TILT SLIDE UP 190

DUT: ME550d; Type: SLIDE ; Serial: XXXX

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 837$ MHz; $\sigma = 0.92$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.42, 6.42, 6.42); Calibrated: 2006-10-17
- 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 : 21°C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.243 mW/g

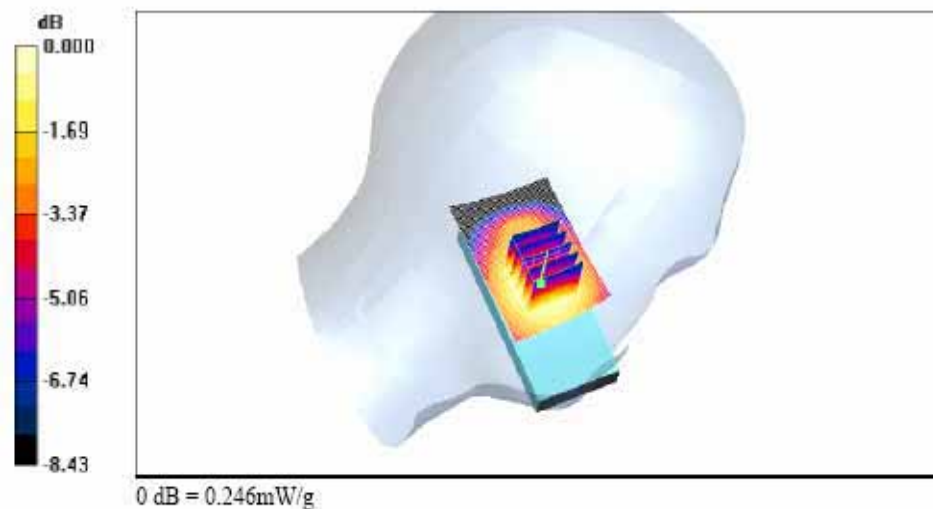
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 12.5 V/m; Power Drift = -0.069 dB

Peak SAR (extrapolated) = 0.295 W/kg

SAR(1 g) = 0.235 mW/g; SAR(10 g) = 0.176 mW/g

Maximum value of SAR (measured) = 0.246 mW/g



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RIGHT TILT SLIDE IN 190

DUT: ME550d; Type: SLIDE ; Serial: XXXX

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 837$ MHz; $\sigma = 0.92$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.42, 6.42, 6.42); Calibrated: 2006-10-17
- 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 : 21°C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.278 mW/g

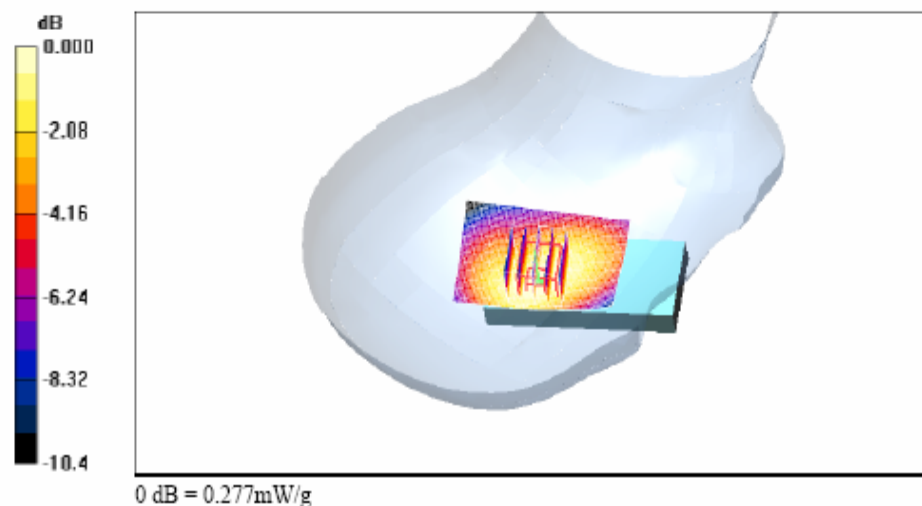
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 13.8 V/m; Power Drift = 0.122 dB

Peak SAR (extrapolated) = 0.346 W/kg

SAR(1 g) = 0.260 mW/g; SAR(10 g) = 0.185 mW/g

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



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RIGHT TILT SLIDE UP 190

DUT: ME550d; Type: SLIDE; Serial: XXXX

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 837$ MHz; $\sigma = 0.92$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.42, 6.42, 6.42); Calibrated: 2006-10-17
- 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 : 21°C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.252 mW/g

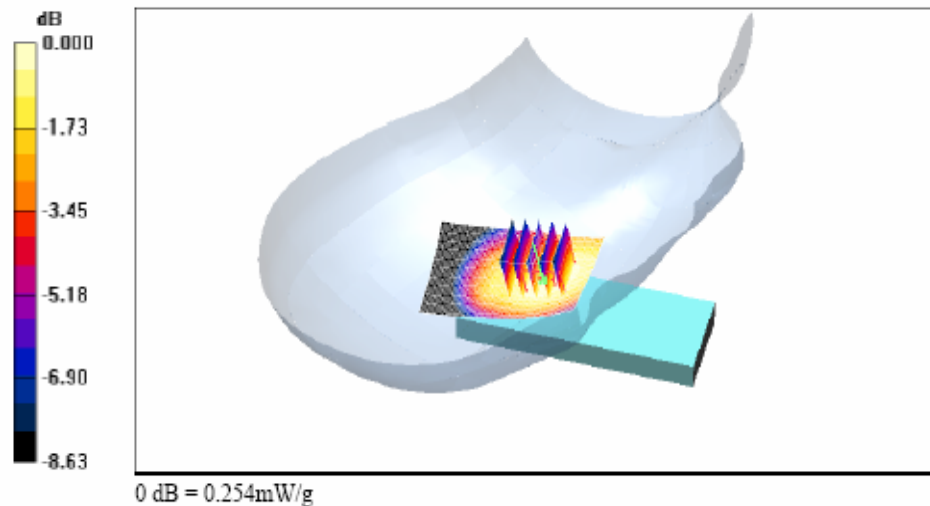
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 12.4 V/m; Power Drift = -0.046 dB

Peak SAR (extrapolated) = 0.299 W/kg

SAR(1 g) = 0.242 mW/g; SAR(10 g) = 0.182 mW/g

Maximum value of SAR (measured) = 0.254 mW/g



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Date: 2007-02-13

Test Laboratory: ESTECH

BODY FRONT SLIDE IN 190

DUT: ME550d; Type: SLIDE ; Serial: XXXX

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 837$ MHz; $\sigma = 0.967$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.32, 6.32, 6.32); Calibrated: 2006-10-17
- 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 : 21 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.118 mW/g

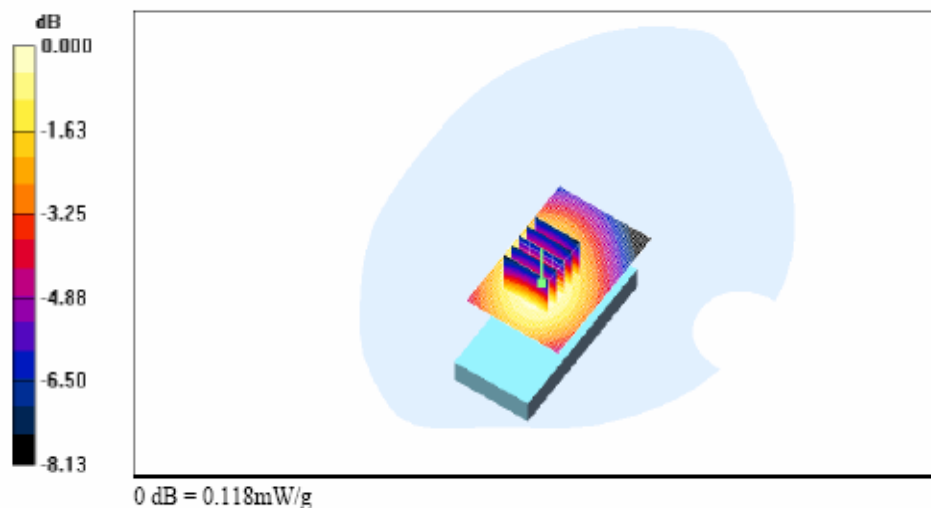
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 7.89 V/m; Power Drift = -0.022 dB

Peak SAR (extrapolated) = 0.140 W/kg

SAR(1 g) = 0.112 mW/g; SAR(10 g) = 0.084 mW/g

Maximum value of SAR (measured) = 0.118 mW/g



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Test Laboratory: ESTECH

BODY FRONT SLIDE UP 190

DUT: ME550d; Type: SLIDE; Serial: XXXX

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 837$ MHz; $\sigma = 0.967$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.32, 6.32, 6.32); Calibrated: 2006-10-17
- 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 : 21 °C, Humidity : 46%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.453 mW/g

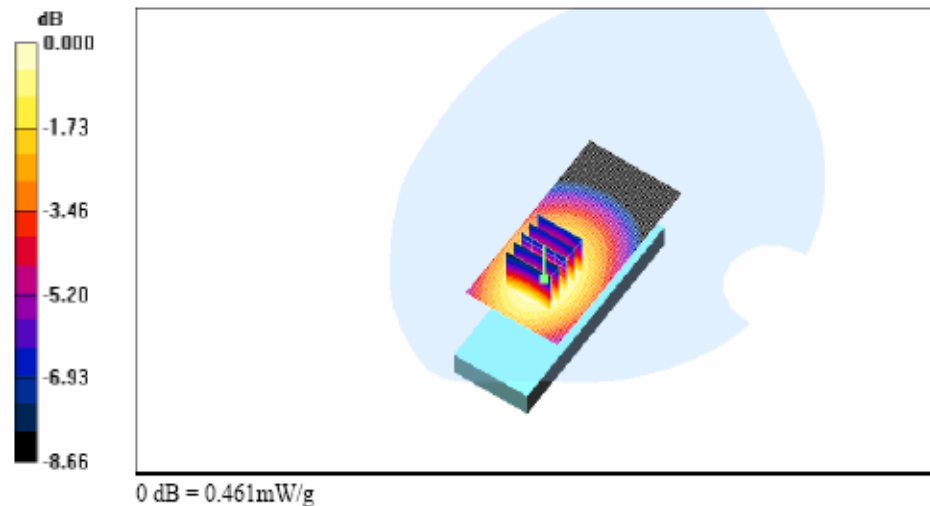
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 8.01 V/m; Power Drift = 0.038 dB

Peak SAR (extrapolated) = 0.554 W/kg

SAR(1 g) = 0.435 mW/g; SAR(10 g) = 0.320 mW/g

Maximum value of SAR (measured) = 0.461 mW/g



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Test Laboratory: ESTECH

BODY REAR SLIDE IN 190

DUT: ME550d; Type: SLIDE ; Serial: XXXX

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 837$ MHz; $\sigma = 0.967$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.32, 6.32, 6.32); Calibrated: 2006-10-17
- 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 : 21 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.357 mW/g

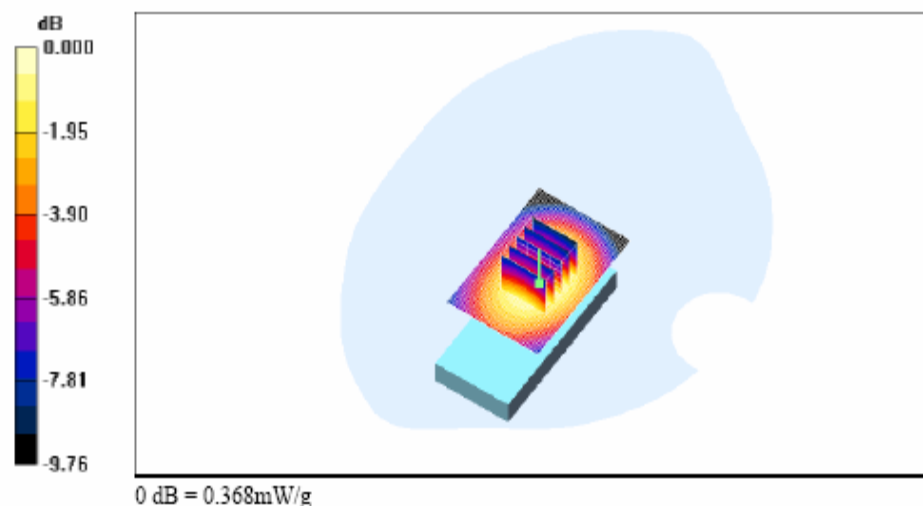
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 15.1 V/m; Power Drift = 0.052 dB

Peak SAR (extrapolated) = 0.457 W/kg

SAR(1 g) = 0.345 mW/g; SAR(10 g) = 0.244 mW/g

Maximum value of SAR (measured) = 0.368 mW/g



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BODY REAR SLIDE UP 190

DUT: ME550d; Type: SLIDE; Serial: XXXX

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 837$ MHz; $\sigma = 0.967$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.32, 6.32, 6.32); Calibrated: 2006-10-17
- 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 : 21 °C, Humidity : 46%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm

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

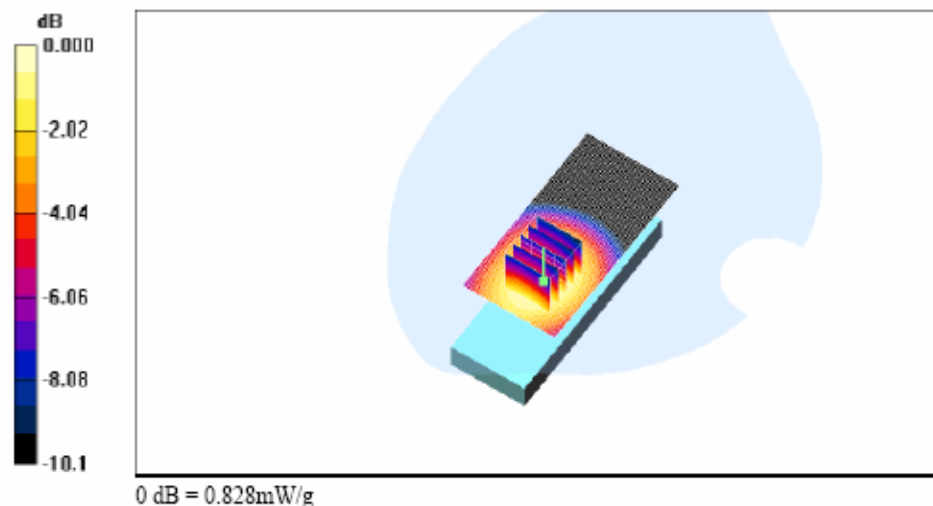
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 3.81 V/m; Power Drift = 0.102 dB

Peak SAR (extrapolated) = 1.01 W/kg

SAR(1 g) = 0.776 mW/g; SAR(10 g) = 0.551 mW/g

Maximum value of SAR (measured) = 0.828 mW/g



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Date: 2007-02-13

Test Laboratory: ESTECH

BODY REAR SLIDE UP GPRS BT ON 190

DUT: ME550d; Type: SLIDE; Serial: XXXX

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:4.15

Medium parameters used: $f = 837$ MHz; $\sigma = 0.967$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.32, 6.32, 6.32); Calibrated: 2006-10-17
- 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 : 21°C, Humidity : 46%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.20 mW/g

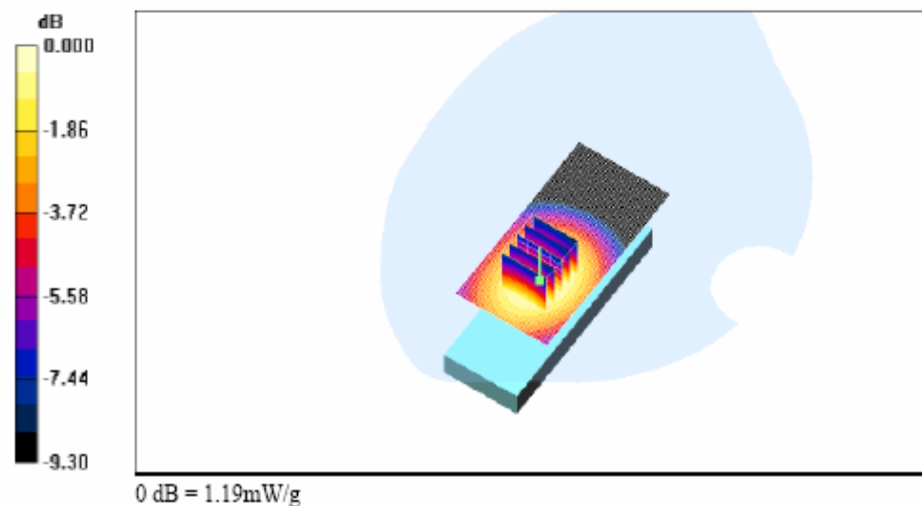
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 7.68 V/m; Power Drift = -0.050 dB

Peak SAR (extrapolated) = 1.45 W/kg

SAR(1 g) = 1.12 mW/g; SAR(10 g) = 0.805 mW/g

Maximum value of SAR (measured) = 1.19 mW/g



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BODY REAR SLIDE UP GPRS BT ON 190

DUT: ME550d; Type: SLIDE; Serial: XXXX

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:4.15

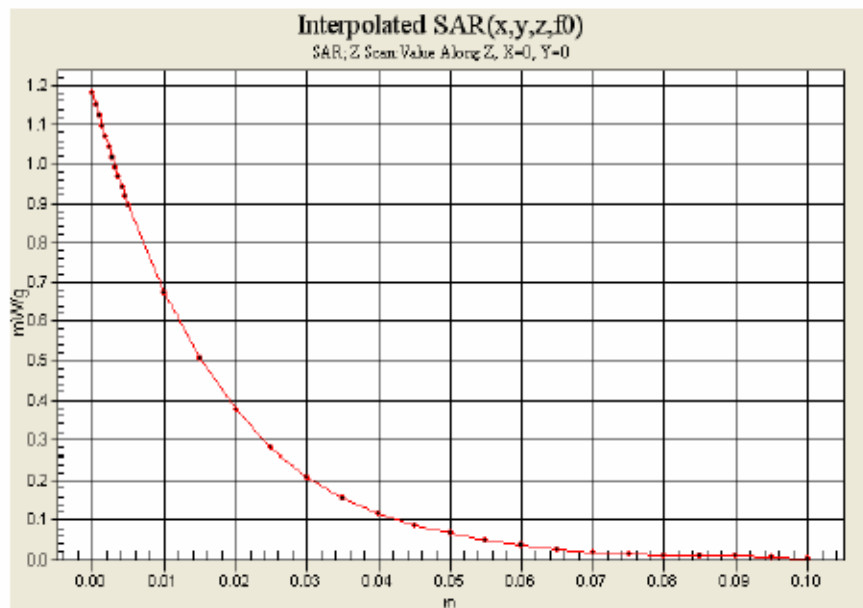
Medium parameters used: $f = 837$ MHz; $\sigma = 0.967$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.32, 6.32, 6.32); Calibrated: 2006-10-17
- 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 : 21 °C, Humidity : 46%



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Test Laboratory: ESTECH

BODY REAR SLIDE UP GPRS BT ON 128

DUT: ME550d; Type: SLIDE; Serial: XXXX

Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:4.15

Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.954$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DAS4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.32, 6.32, 6.32); Calibrated: 2006-10-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn551; Calibrated: 2006-04-27
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DAS4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161
- Temperature : 21 °C, Humidity : 45%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.01 mW/g

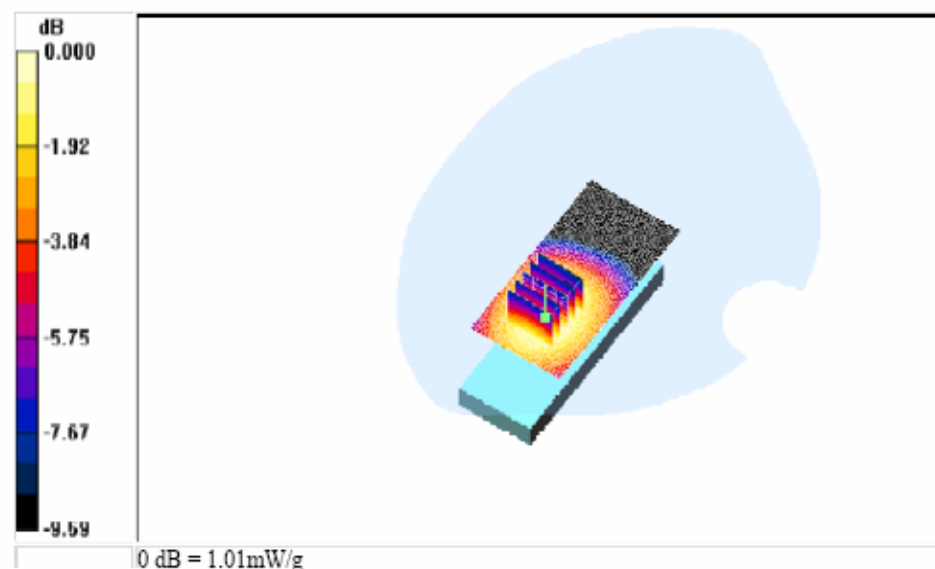
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 7.35 V/m; Power Drift = -0.121 dB

Peak SAR (extrapolated) = 1.23 W/kg

SAR(1 g) = 0.950 mW/g; SAR(10 g) = 0.684 mW/g

Maximum value of SAR (measured) = 1.01 mW/g



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Test Laboratory: ESTECH

BODY REAR SLIDE UP GPRS BT ON 251

DUT: ME550d; Type: SLIDE; Serial: XXXX

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:4.15

Medium parameters used: $f = 849$ MHz; $\sigma = 0.978$ mho/m; $\epsilon_r = 53.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(6.32, 6.32, 6.32); Calibrated: 2006-10-17
- 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 : 21 °C, Humidity : 45%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.661 mW/g

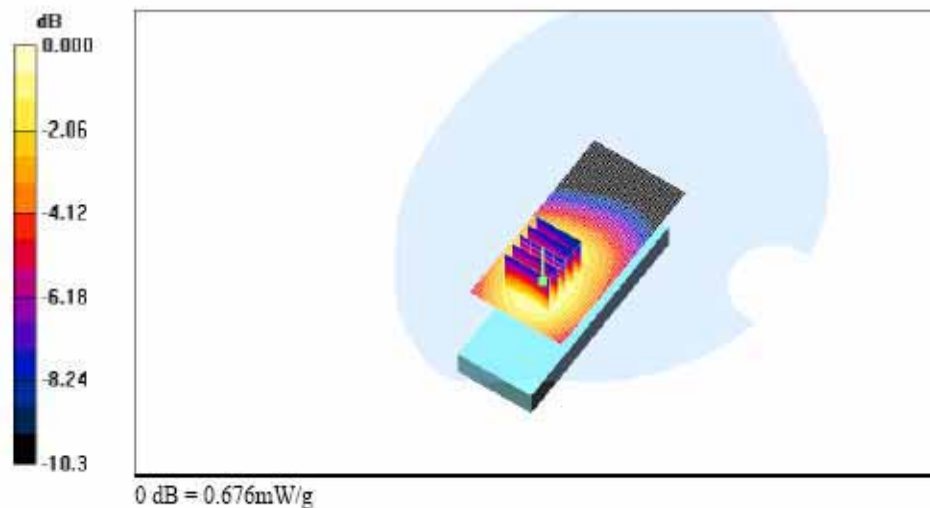
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 7.94 V/m; Power Drift = 0.109 dB

Peak SAR (extrapolated) = 0.830 W/kg

SAR(1 g) = 0.638 mW/g; SAR(10 g) = 0.457 mW/g

Maximum value of SAR (measured) = 0.676 mW/g



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Test Laboratory: ESTECH

LEFT TOUCH SLIDE IN 661

DUT: ME550d; Type: SLIDE ; Serial: XXXX

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used (interpolated): $f = 1880$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(5.08, 5.08, 5.08); Calibrated: 2006-10-17
- 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 : 21 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.304 mW/g

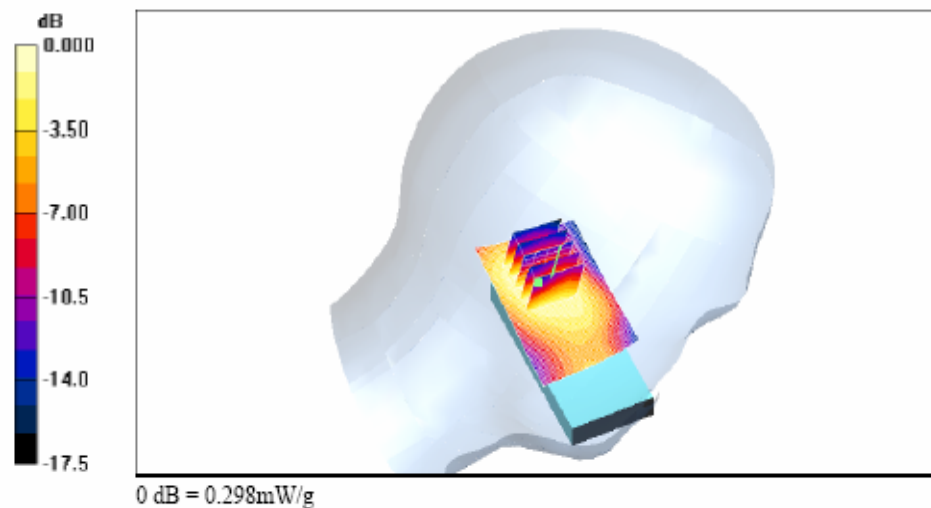
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 14.5 V/m; Power Drift = -0.096 dB

Peak SAR (extrapolated) = 0.428 W/kg

SAR(1 g) = 0.272 mW/g; SAR(10 g) = 0.166 mW/g

Maximum value of SAR (measured) = 0.298 mW/g



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Test Laboratory: ESTECH

LEFT TOUCH SLIDE UP 661

DUT: ME550d; Type: SLIDE; Serial: XXXX

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used (interpolated): $f = 1880$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(5.08, 5.08, 5.08); Calibrated: 2006-10-17
- 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 : 21 °C, Humidity : 46%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.141 mW/g

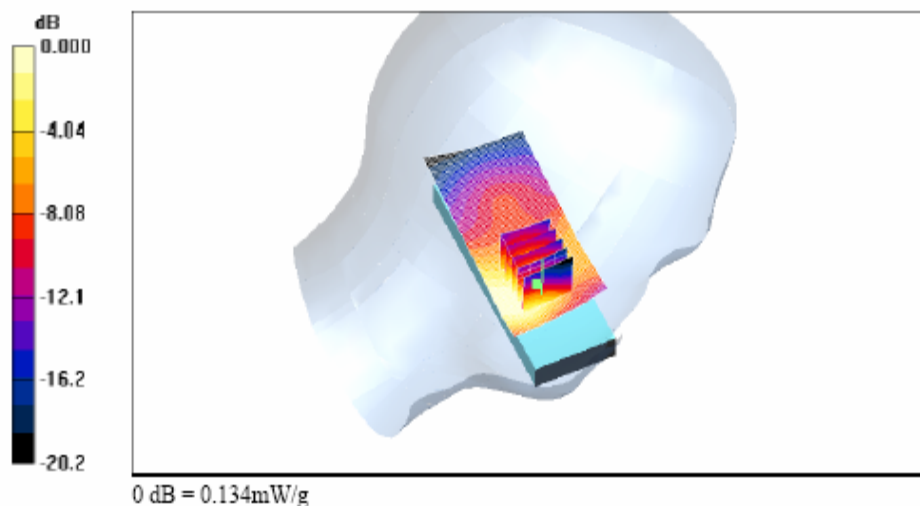
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 3.67 V/m; Power Drift = -0.004 dB

Peak SAR (extrapolated) = 0.191 W/kg

SAR(1 g) = 0.126 mW/g; SAR(10 g) = 0.073 mW/g

Maximum value of SAR (measured) = 0.134 mW/g



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Test Laboratory: ESTECH

RIGHT TOUCH SLIDE IN 661

DUT: ME550d; Type: SLIDE ; Serial: XXXX

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used (interpolated): $f = 1880$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(5.08, 5.08, 5.08); Calibrated: 2006-10-17
- 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 : 21 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

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

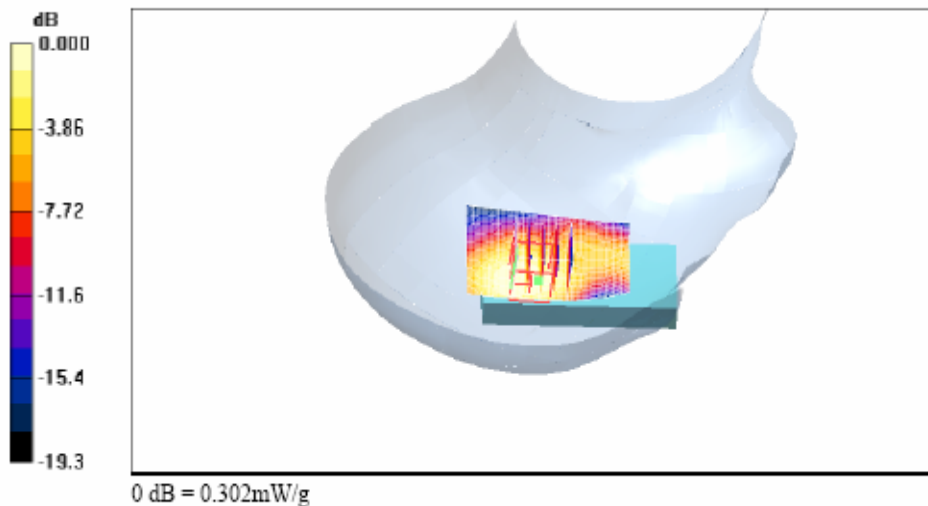
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 11.8 V/m; Power Drift = -0.074 dB

Peak SAR (extrapolated) = 0.493 W/kg

SAR(1 g) = 0.276 mW/g; SAR(10 g) = 0.160 mW/g

Maximum value of SAR (measured) = 0.302 mW/g



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Test Laboratory: ESTECH

RIGHT TOUCH SLIDE UP 661

DUT: ME550d; Type: SLIDE; Serial: XXXX

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used (interpolated): $f = 1880 \text{ MHz}$; $\sigma = 1.42 \text{ mho/m}$; $\epsilon_r = 39.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(5.08, 5.08, 5.08); Calibrated: 2006-10-17
- 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 : 21 °C, Humidity : 46%

Area Scan (41x71x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.168 mW/g

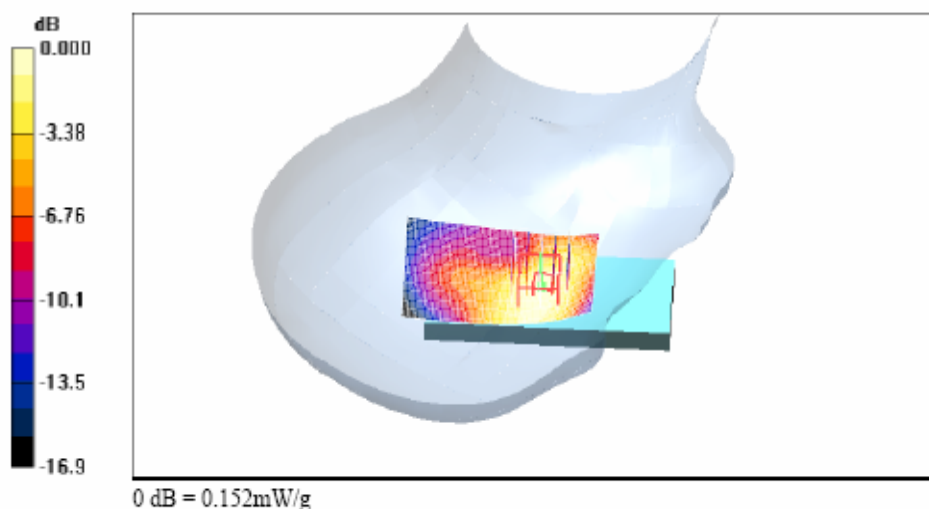
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 4.94 V/m; Power Drift = -0.049 dB

Peak SAR (extrapolated) = 0.193 W/kg

SAR(1 g) = 0.140 mW/g; SAR(10 g) = 0.087 mW/g

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



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Test Laboratory: ESTECH

LEFT TILT SLIDE IN 661

DUT: ME550d; Type: SLIDE ; Serial: XXXX

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used (interpolated): $f = 1880$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(5.08, 5.08, 5.08); Calibrated: 2006-10-17
- 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 : 21 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.409 mW/g

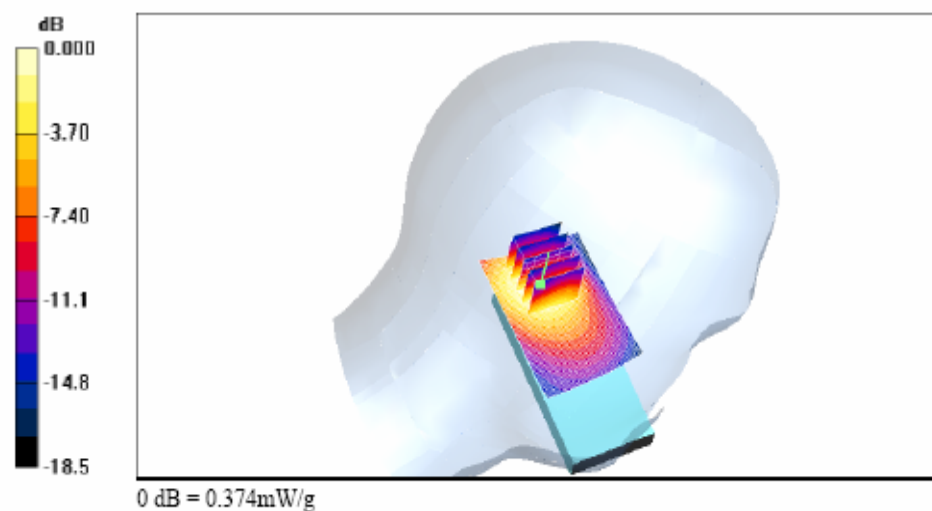
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 16.5 V/m; Power Drift = 0.013 dB

Peak SAR (extrapolated) = 0.602 W/kg

SAR(1 g) = 0.347 mW/g; SAR(10 g) = 0.195 mW/g

Maximum value of SAR (measured) = 0.374 mW/g



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Test Laboratory: ESTECH

LEFT TILT SLIDE IN BT ON 661

DUT: ME550d; Type: SLIDE ; Serial: XXXX

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used (interpolated): $f = 1880$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3123; ConvF(5.08, 5.08, 5.08); Calibrated: 2006-10-17
- 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 : 21 °C, Humidity : 46%

Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

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

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 18.0 V/m; Power Drift = -0.022 dB

Peak SAR (extrapolated) = 0.727 W/kg

SAR(1 g) = 0.410 mW/g; SAR(10 g) = 0.226 mW/g

Maximum value of SAR (measured) = 0.448 mW/g

