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SAR Compliace Test Report

APPLICANT NAME & ADDRESS :
LG Electronics Inc.
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DATA & LOCATION OF TESTING
Dates of testing : 2005 12/07 ~ 12/28
Test Site : ESTECH Co., Ltd. Korea

Test Device :

Models : MG300, MG300d

FCC ID : BEJMG300

TYPE : GSM Phone with Bluetooth (Prototype)

Test report no :	ESTSAR0512-011	Number of page :	25
Contact person :	Cheol-Goo Lee	Responsible test Engineer :	K.H.Kang
Testing has been Carried out in Accordance with :	IEEE P1528-200X Draft 6.4 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 : 2005/12/28
Report Prepared By : Engineer/ K.H.Kang
(Signature)
Manager Engineer/ Jay Kim
(Signature)

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1. SUMMARY FOR TEST REPORT

FCC ID	BEJMG300
Date of test	2005/12/07 ~ 2005/12/28
Responsible test engineer	Jay Kim
Measurement performed by	K.H.Kang
EUT Type	GSM Phone with Bluetooth (Prototype)
Tx Frequency	824.2 ~ 848.8MHz(GSM850), 1850.2 ~ 1909.8 MHz(PCS1900)
Rx Frequency	869.2 ~ 893.8MHz(GSM850), 1930.2 ~ 1989.8 MHz(PCS1900)
Max. RF Output Power	GSM (33 dBm), PCS (30 dBm)

Maximum Results Found During SAR Evaluation under phone call and bluetooth function enable

1.1 Head Configuration

Max. SAR Measurement

FREQUENCY		Modulation	Conducted Power(dBm)		Device test position	Antenna position	SAR (W/kg)
MHz	Ch		dBm	Battery			
836.6	190	GSM	33	Standard	Right Touch	–	0.532
1880.0	661	GSM	30	Standard	Right Touch	–	0.514

1.2 Body Worn Configuration

Max. SAR Measurement

FREQUENCY		Modulation	Conducted Power(dBm)		Separation test position	Antenna position	SAR (W/kg)
MHz	Ch		dBm	Battery			
824.2	128	GSM	33	Standard	1.5cm [w/o Holster]	–	0.565
1880.0	661	GSM	30	Standard	1.5cm [w/o Holster]	–	0.299

1.3 Measurement Uncertainty

Combine Standard Uncertainty	± 10.81 (k=1)
Extended Standard Uncertainty	± 21.62 (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 (NCRP) in Biological Effects and Exposure Criteria for Radio Frequency Electromagnetic Fields," NCRP Report No. 86 (c) NCRP, 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. 3.1.).

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

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 : BEJMG300
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 ~ 1909.8 MHz(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 (%)	48

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) using manufacturers test codes.

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. date
DAE	DAE3	551	2004-04-28
E-Field Probe	ET3DV6	1748	2005-01-21
Dipole validation kit	D1900V2	5d058	2005-01-27
Network analyzer	8753ES	NONE	2005-10-17
Signal generator	E4421B	GB40052295	2005-03-03
RF Power meter	EPM-442A	GB37170412	2005-10-05
Power Sensor	8481A	3318A90368	2005-10-05
RF Power meter	E4418A	GB38272722	2005-03-03
Power Sensor	8481A	3318A96478	2005-03-03
Dielectric Probe	85070D	US01440154	-

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 Windows2000 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.

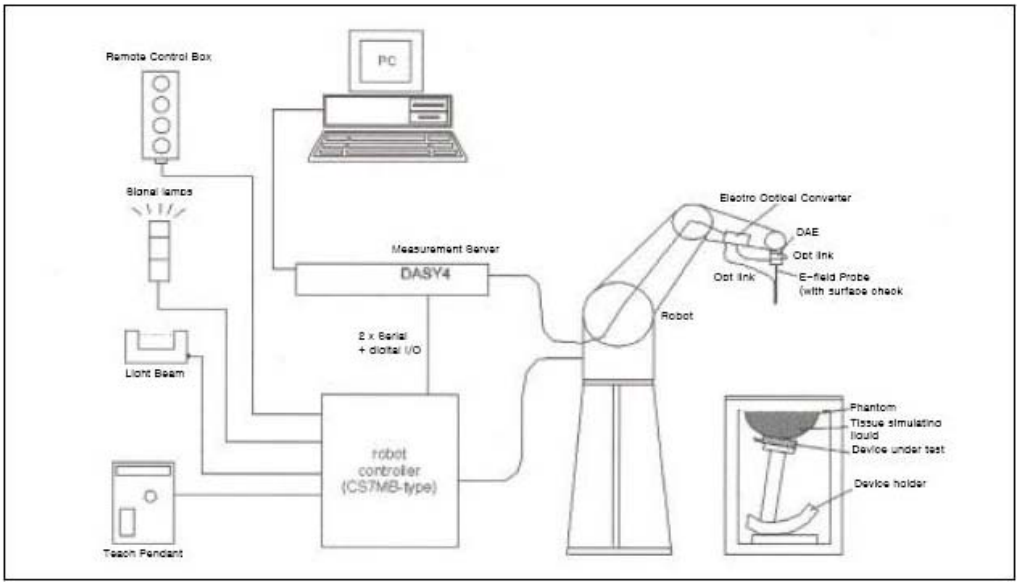

Fig. 5.1 SAR Measurement System Setup

The DAE3 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 PC-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 Table. 5.2). The approach is stopped at reaching the maximum.

	Isotropic E-Field Probe for Dosimetric Measurements	
Isotropic E-Field Probe	**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 Table 5.1). 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 P1528 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].

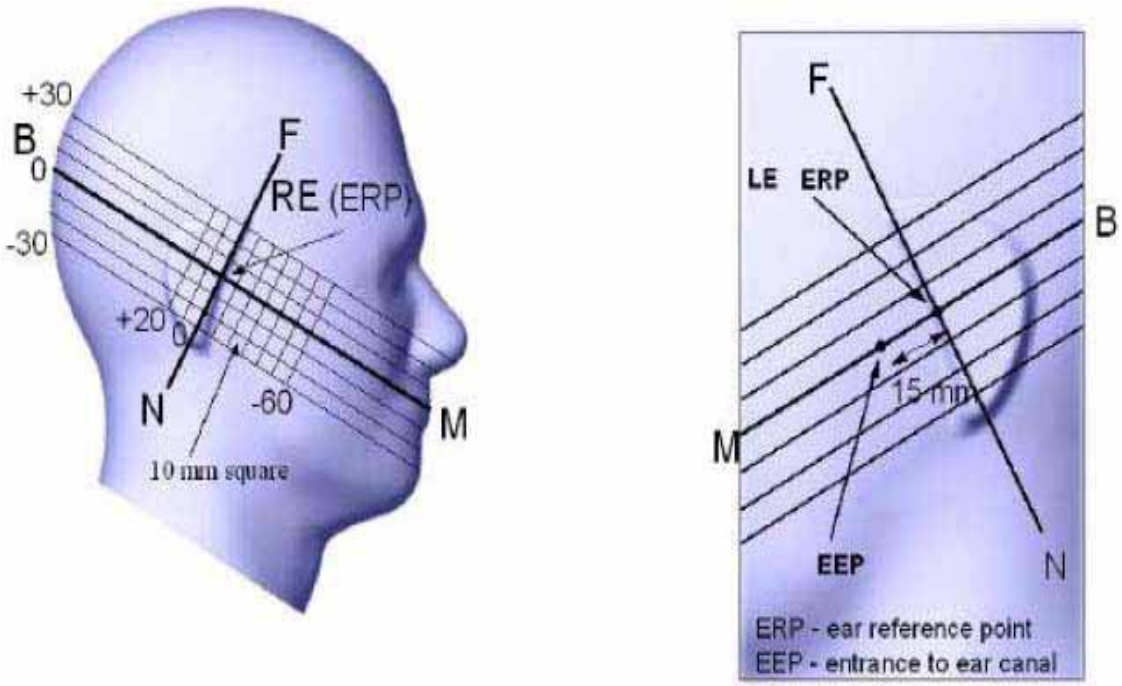

Figure 6.1 Close-up side view of ERP

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)

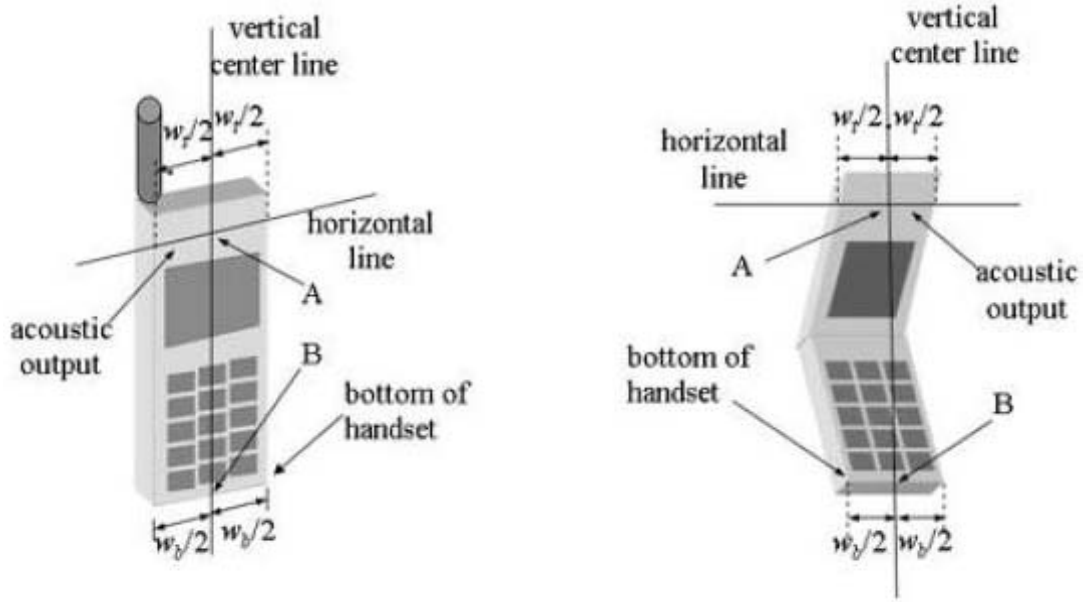

Figure 6.2 Handset Vertical Center & Horizontal Line Reference Points

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

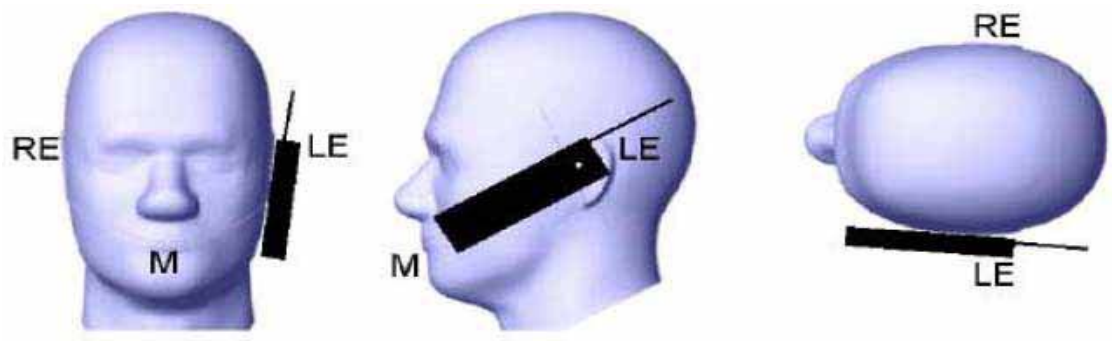

Figure 6.3 “Cheek” or “Touch” Position.

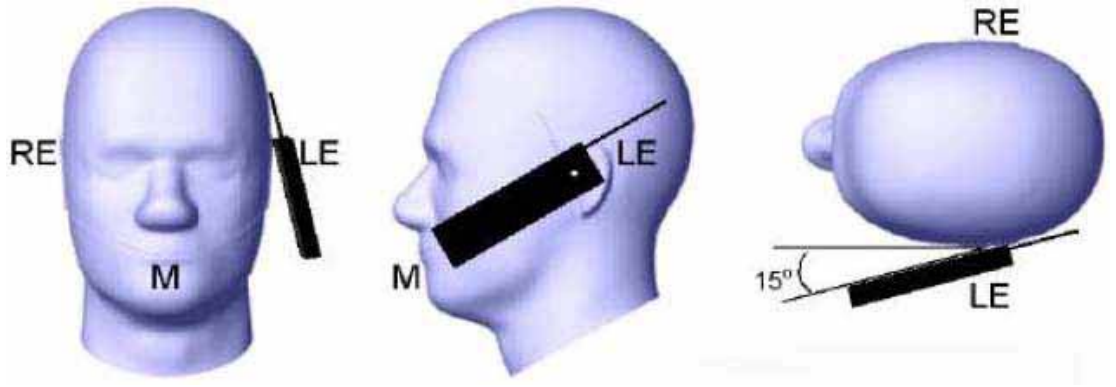

Figure 6.4 “Tilted” Position.

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, 7x7x7 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 value ±%	Probability Distribution	Divisor	ci 1 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	± 2.5	normal	1	0.64	± 1.6%	∞
Liquid permittivity Target - tolerance	± 5.0	rectangular	√3	0.6	± 1.7%	∞
Liquid Permittivity - measurement uncertainty	± 2.5	normal	1	0.6	± 1.5%	∞
Combined Standard Uncertainty					±11.32 %	330
Coverage Factor for 95%				K = 2		
Expanded Standard Uncertainty					± 22.64 %	

8. SYSTEM VERIFICATION

Tissue Verification

Table 8.1 Simulated Tissue Verification [5]

MEASURED TISSUE PARAMETERS										
Liquid Temperature (°C)			22		Liquid Depth(mm)		150			
Date	2005-12-26		2005-12-26		2005-12-27		2005-12-27			
Tissue	1900MHz Brain		1900MHz Muscle		835MHz Brain		835MHz Muscle			
	Target	Measured	Target	Measured	Target	Measured	Target	Measured		
Dielectric Constant: ε	40	38.8	53.3	51.3	41.5	40.6	55.2	53.2		
Conductivity: σ	1.45	1.44	1.52	1.54	0.9	0.91	0.97	0.986		
Deviation (%)	ε : -3.00% σ : -0.69%		ε : -3.75% σ : 1.32%		ε : -2.17% σ : 1.11%		ε : -3.62% σ : 1.65%			

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 (mW)	Targeted SAR1g (mW/g)	Measured SAR1g (mW/g)	Deviation (%)	Test Date
1900MHz Brain	D1900V2(S/N :5d058)	1.0	39.2	40.8	-4.08%	2005-12-26
835MHz Brain	D835V2(S/N :475)	1.0	9.5	9.16	3.58%	2005-12-27

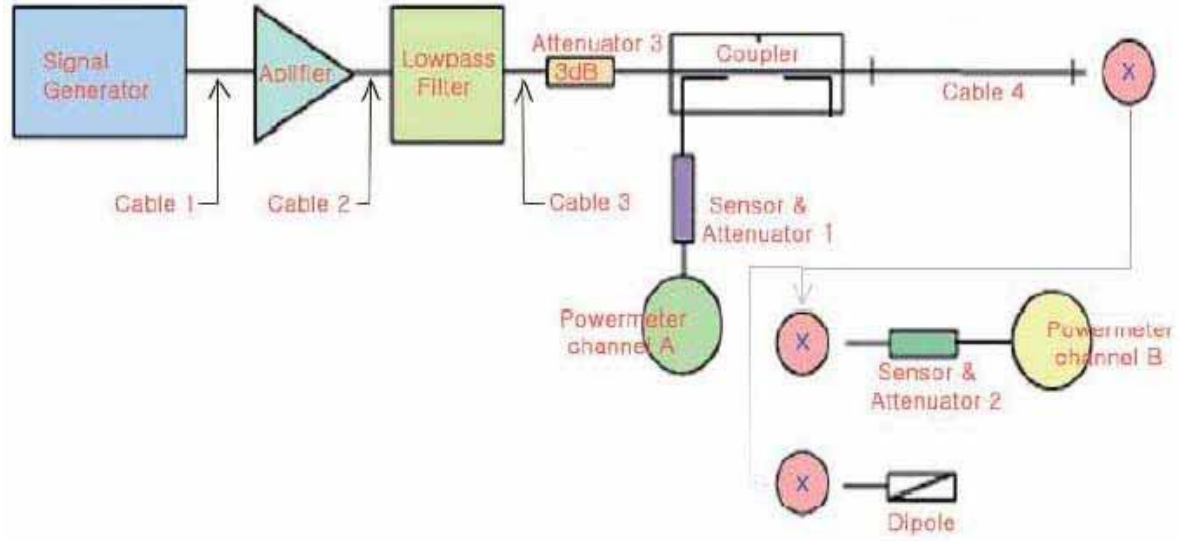

Figure 12.1 Dipole Validation Test Setup

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9. RESULTS(continued)

Ambient TEMPERATURE (C) : 22.0
Relative HUMIDITY (%) : 48
Mixture Type : 835MHz Brain
Dielectric Constant : 40.6
Conductivity: 0.91

Measurement Results (GSM Head SAR-Touch)

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 Left Head SAR – Touch)

Frequency		Moudulation	Conducted Power(dBm)		battery	Device Test position	Antenna Position	SAR (W/kg)
MHz	Ch.		Begin	End				
824.20	128	GSM	33.00	32.92	Standard	Cheek Touch	–	0.480
836.60	190	GSM	33.00	32.86	Standard	Cheek Touch	–	0.522
848.80	251	GSM	33.00	32.97	Standard	Cheek Touch	–	0.451

MEASUREMENT RESULTS (GSM Right Head SAR – Touch)

Frequency		Moudulation	Conducted Power(dBm)		battery	Device Test position	Antenna Position	SAR (W/kg)
MHz	Ch.		Begin	End				
824.20	128	GSM	33.00	32.95	Standard	Cheek Touch	–	0.494
836.60	190	GSM	33.00	32.91	Standard	Cheek Touch	–	0.532
848.80	251	GSM	33.00	32.96	Standard	Cheek Touch	–	0.449

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 Extended-life battery produces lower ERP and EIRP, therefore the Standard-life battery is used in SAR testing.
4. Power Measured : Conducted
5. SAR Measurement System : SPEAG
6. SAR Configuration : Head, Bluetooth function enable

Engineer K.H.Kang
(Signature)

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9. RESULTS(continued)

Ambient TEMPERATURE (C) : 22.0
Relative HUMIDITY (%) : 48
Mixture Type : 835MHz Brain
Dielectric Constant : 40.6
Conductivity: 0.91

Measurement Results (GSM Head SAR-Tilt)

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 Left Head SAR – Tlit)								
Frequency		Moudulation	Conducted Power(dBm)		battery	Device Test position	Antenna Position	SAR (W/kg)
MHz	Ch.		Begin	End				
836.60	190	GSM	33.00	33.00	Standard	Tilt	–	0.140

MEASUREMENT RESULTS (GSM Right Head SAR – Tilt)								
Frequency		Moudulation	Conducted Power(dBm)		battery	Device Test position	Antenna Position	SAR (W/kg)
MHz	Ch.		Begin	End				
836.60	190	GSM	33.00	33.06	Standard	Tilt	–	0.147

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 Extended-life battery produces lower ERP and EIRP, therefore the Standard-life battery is used in SAR testing.
4. Power Measured : Conducted
5. SAR Measurement System : SPEAG
6. SAR Configuration : Head, Bluetooth function enable

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9. RESULTS(continued)

Ambient TEMPERATURE (C) : 22
Relative HUMIDITY (%) : 49
Mixture Type : 835MHz Body
Dielectric Constant : 53.2
Conductivity: 0.986

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		Moudulation	Conducted Power(dBm)		battery	Device Test position	Antenna Position	SAR (W/kg)
MHz	Ch.		Begin	End				
824.20	128	GSM	33.00	32.97	Standard	1.5[w/o Holster]	–	0.565
836.60	190	GSM	33.00	32.95	Standard	1.5[w/o Holster]	–	0.547
848.80	251	GSM	33.00	33.02	Standard	1.5[w/o Holster]	–	0.466

MEASUREMENT RESULTS (GSM Body SAR Without Holster – BT Disable)								
Frequency		Moudulation	Conducted Power(dBm)		battery	Device Test position	Antenna Position	SAR (W/kg)
MHz	Ch.		Begin	End				
824.20	128	GSM	33.00	33.00	Standard	1.5[w/o Holster]	–	0.448

MEASUREMENT RESULTS (GSM Body SAR Without Holster – GPRS)								
Frequency		Moudulation	Conducted Power(dBm)		battery	Device Test position	Antenna Position	SAR (W/kg)
MHz	Ch.		Begin	End				
824.20	128	GSM	33.00	32.94	Standard	1.5[w/o Holster]	–	0.490

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 Extended-life battery produces lower ERP and EIRP, therefore the Standard-life battery is used in SAR testing.
4. Power Measured : Conducted
5. SAR Measurement System : SPEAG
6. SAR Configuration : Body, Bluetooth function enable/disable, GPRS mode

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9. RESULTS(continued)

Ambient TEMPERATURE (C) : 23.0
Relative HUMIDITY (%) : 49
Mixture Type : 1900MHz Brain
Dielectric Constant : 38.8
Conductivity: 1.44

Measurement Results (PCS Head SAR-Touch)

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 (PCS Left Head SAR – Touch)

Frequency		Moudulation	Conducted Power(dBm)		battery	Device Test position	Antenna Position	SAR (W/kg)
MHz	Ch.		Begin	End				
1850.20	512	GSM	30.00	29.97	Standard	Cheek Touch	–	0.399
1880.00	661	GSM	30.00	29.89	Standard	Cheek Touch	–	0.477
1909.80	810	GSM	30.00	30.05	Standard	Cheek Touch	–	0.457

MEASUREMENT RESULTS (PCS Right Head SAR – Touch)

Frequency		Moudulation	Conducted Power(dBm)		battery	Device Test position	Antenna Position	SAR (W/kg)
MHz	Ch.		Begin	End				
1850.20	512	GSM	30.00	30.12	Standard	Cheek Touch	–	0.438
1880.00	661	GSM	30.00	30.07	Standard	Cheek Touch	–	0.514
1909.80	810	GSM	30.00	29.94	Standard	Cheek Touch	–	0.502

MEASUREMENT RESULTS (PCS Right Head SAR – Touch – BT Disable)

Frequency		Moudulation	Conducted Power(dBm)		battery	Device Test position	Antenna Position	SAR (W/kg)
MHz	Ch.		Begin	End				
1880.00	661	GSM	30.00	29.92	Standard	Cheek Touch	–	0.418

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 Extended-life battery produces lower ERP and EIRP, therefore the Standard-life battery is used in SAR testing.

4. Power Measured : Conducted
5. SAR Measurement System : SPEAG
6. SAR Configuration : Head, Bluetooth function enable and Disable

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9. RESULTS(continued)

Ambient TEMPERATURE (C) : 23.0
Relative HUMIDITY (%) : 49
Mixture Type : 1900MHz Brain
Dielectric Constant : 38.8
Conductivity: 1.44

Measurement Results (PCS Head SAR-Tilt)

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 (PCS Left Head SAR – Tlit)

Frequency		Moudulation	Conducted Power(dBm)		battery	Device Test position	Antenna Position	SAR (W/kg)
MHz	Ch.		Begin	End				
1880.00	661	GSM	30.00	30.00	Standard	Tilt	–	0.214

MEASUREMENT RESULTS (PCS Right Head SAR – Tilt)

Frequency		Moudulation	Conducted Power(dBm)		battery	Device Test position	Antenna Position	SAR (W/kg)
MHz	Ch.		Begin	End				
1880.00	661	GSM	30.00	29.98	Standard	Tilt	–	0.17

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 Extended-life battery produces lower ERP and EIRP, therefore the Standard-life battery is used in SAR testing.
4. Power Measured : Conducted
5. SAR Measurement System : SPEAG
6. SAR Configuration : Head, Bluetooth function enable

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9. RESULTS(continued)

Ambient TEMPERATURE (C) : 22
Relative HUMIDITY (%) : 48
Mixture Type : 1900MHz Body
Dielectric Constant : 51.3
Conductivity: 1.54

Measurement Results (PCS 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 (PCS Body SAR Without Holster)

Frequency		Moudulation	Conducted Power(dBm)		battery	Device Test position	Antenna Position	SAR (W/kg)
MHz	Ch.		Begin	End				
1850.20	512	GSM	30.00	30.02	Standard	1.5[w/o Holster]	–	0.218
1880.00	661	GSM	30.00	29.98	Standard	1.5[w/o Holster]	–	0.299
1909.80	810	GSM	30.00	29.94	Standard	1.5[w/o Holster]	–	0.293

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 Extended-life battery produces lower ERP and EIRP, therefore the Standard-life battery is used in SAR testing.
4. Power Measured : Conducted
5. SAR Measurement System : SPEAG
6. SAR Configuration : Body, Bluetooth function enable

Engineer K.H.Kang
(Signature)

10. REFERENCE

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

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APPENDIX A : Validation Test Data of Tissue

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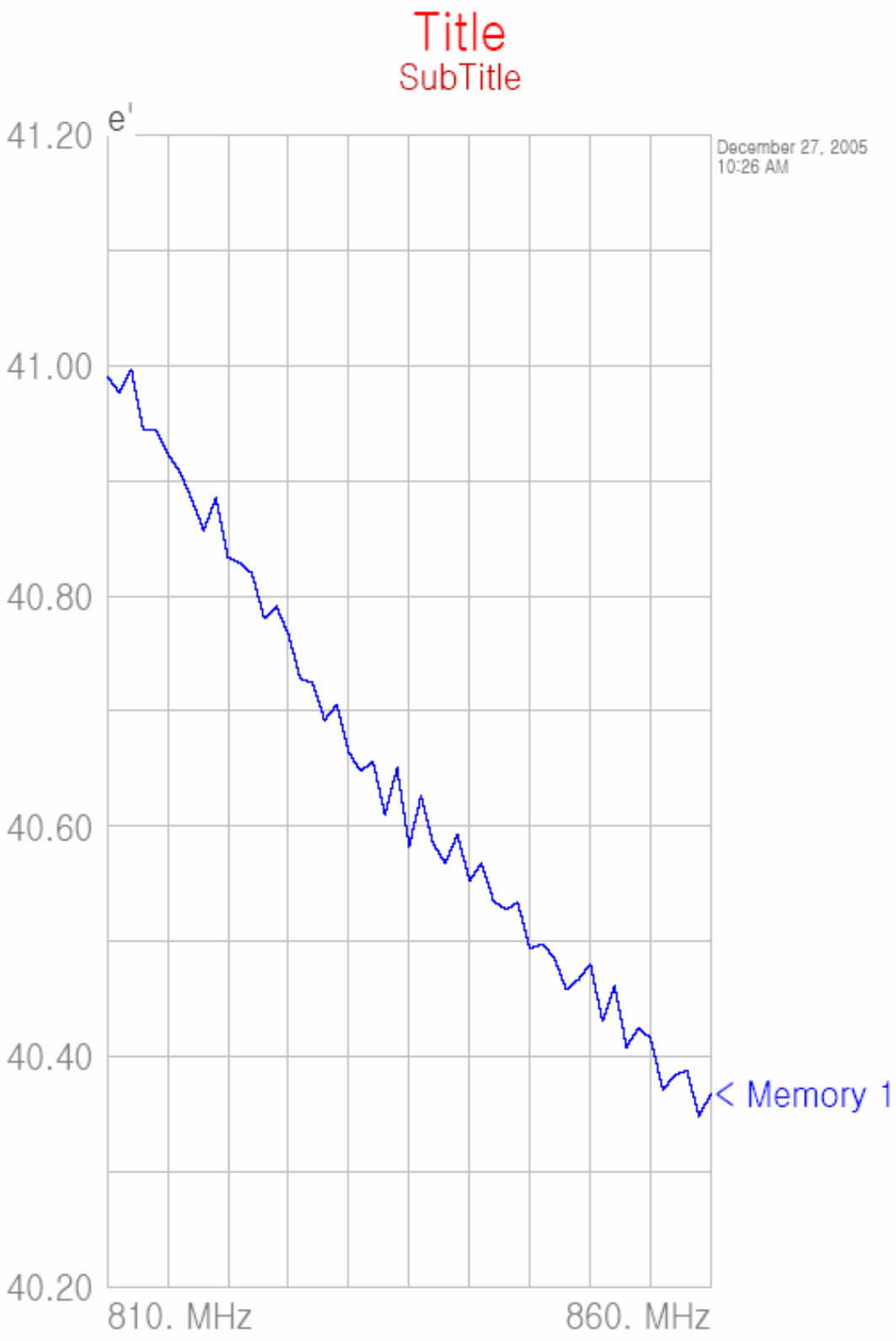
– GSM850 Head Tissue



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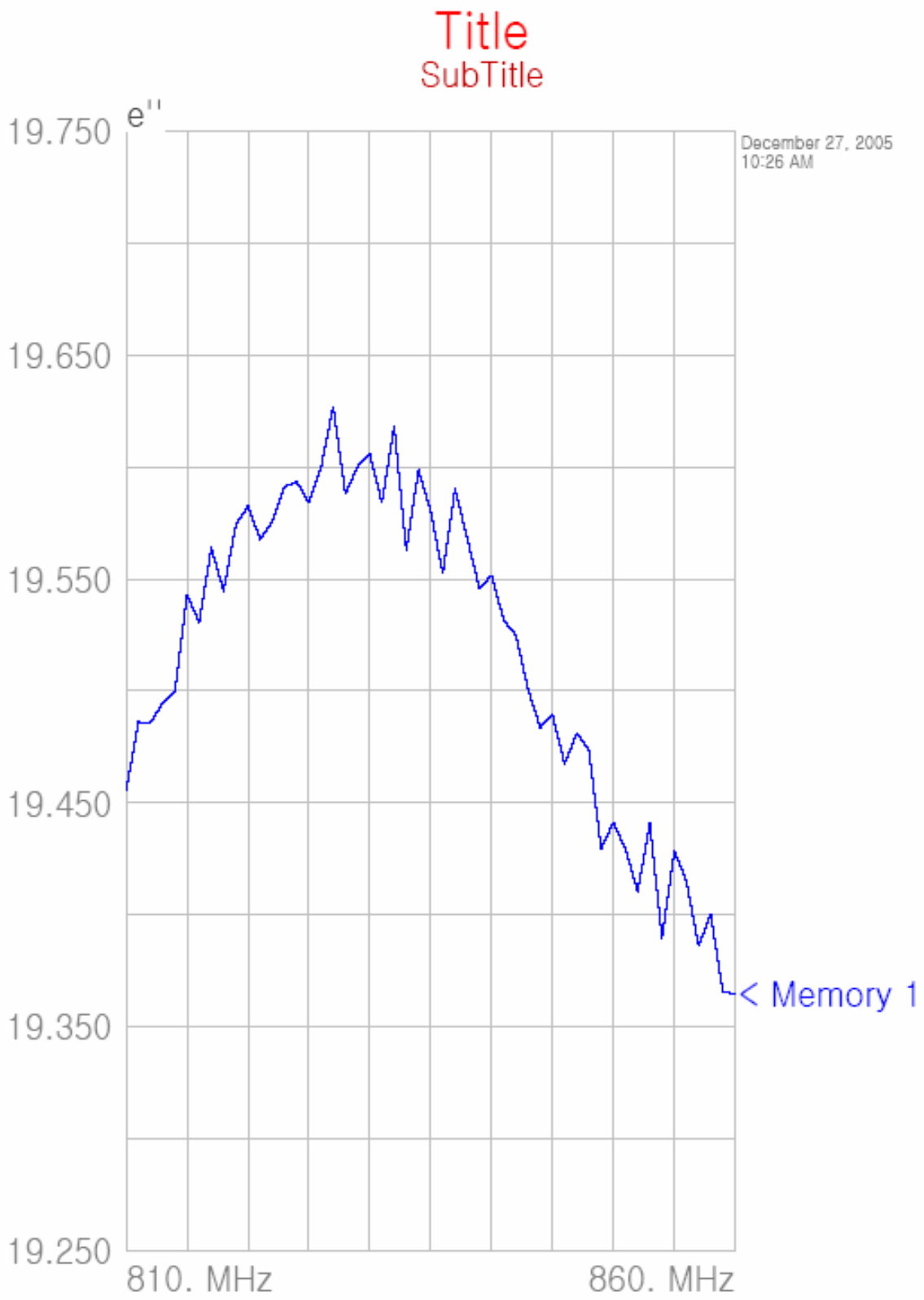

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Title

SubTitle

December 05, 8395 10:25 AM

Frequency	e'	e''
810.000000 MHz	40.9910	19.4553
811.000000 MHz	40.9766	19.4861
812.000000 MHz	40.9969	19.4859
813.000000 MHz	40.9445	19.4946
814.000000 MHz	40.9448	19.4998
815.000000 MHz	40.9233	19.5430
816.000000 MHz	40.9084	19.5308
817.000000 MHz	40.8843	19.5640
818.000000 MHz	40.8568	19.5445
819.000000 MHz	40.8853	19.5741
820.000000 MHz	40.8335	19.5826
821.000000 MHz	40.8287	19.5678
822.000000 MHz	40.8195	19.5755
823.000000 MHz	40.7805	19.5912
824.000000 MHz	40.7911	19.5935
825.000000 MHz	40.7667	19.5841
826.000000 MHz	40.7280	19.5998
827.000000 MHz	40.7243	19.6271
828.000000 MHz	40.6921	19.5881
829.000000 MHz	40.7055	19.6002
830.000000 MHz	40.6644	19.6060
831.000000 MHz	40.6475	19.5841
832.000000 MHz	40.6565	19.6184
833.000000 MHz	40.6094	19.5627
834.000000 MHz	40.6506	19.5987
835.000000 MHz	40.5822	19.5905
836.000000 MHz	40.6268	19.5524
837.000000 MHz	40.5845	19.5902
838.000000 MHz	40.5679	19.5684
839.000000 MHz	40.5929	19.5458
840.000000 MHz	40.5525	19.5516
841.000000 MHz	40.5678	19.5316
842.000000 MHz	40.5346	19.5250
843.000000 MHz	40.5279	19.5008
844.000000 MHz	40.5335	19.4836
845.000000 MHz	40.4935	19.4894
846.000000 MHz	40.4978	19.4674
847.000000 MHz	40.4860	19.4811
848.000000 MHz	40.4580	19.4733
849.000000 MHz	40.4666	19.4294
850.000000 MHz	40.4803	19.4412
851.000000 MHz	40.4305	19.4292
852.000000 MHz	40.4616	19.4103
853.000000 MHz	40.4082	19.4406
854.000000 MHz	40.4252	19.3896
855.000000 MHz	40.4155	19.4284
856.000000 MHz	40.3709	19.4151
857.000000 MHz	40.3836	19.3859
858.000000 MHz	40.3879	19.4002
859.000000 MHz	40.3476	19.3653
860.000000 MHz	40.3683	19.3548

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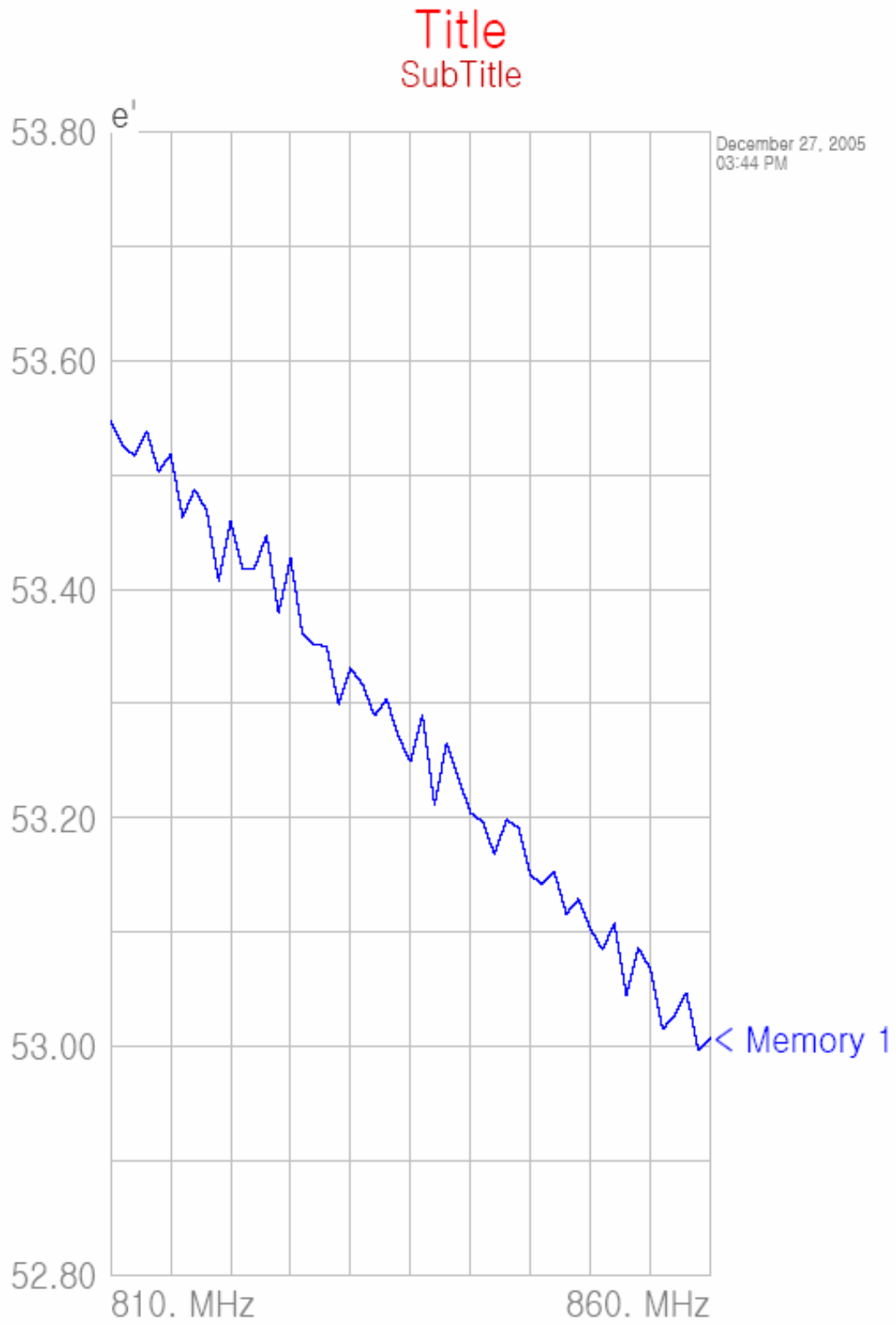
– GSM850 Body Tissue



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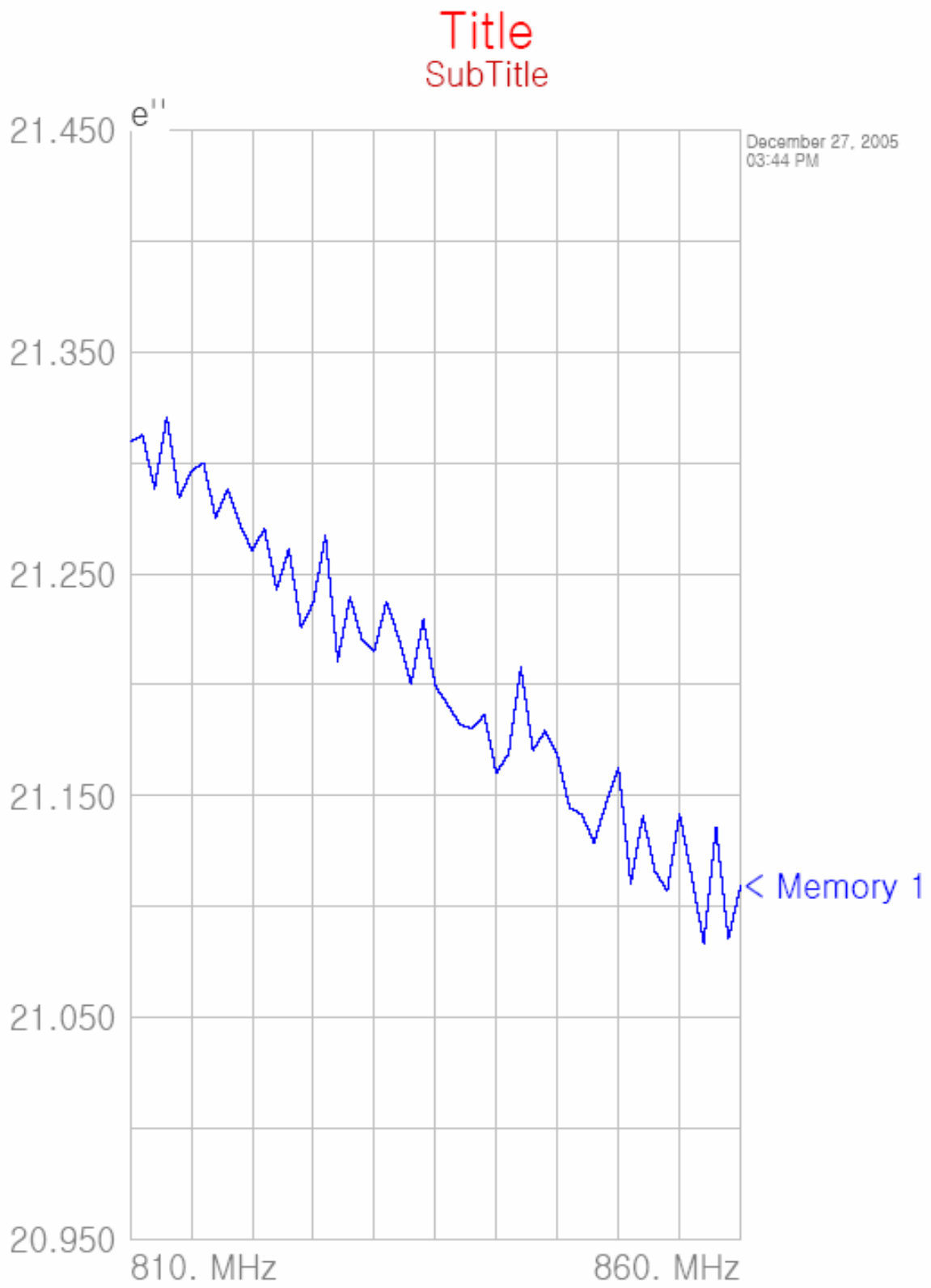

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Title

SubTitle

December 07, 8895 03:44 PM

Frequency	e'	e''
810.000000 MHz	53.5478	21.3095
811.000000 MHz	53.5258	21.3126
812.000000 MHz	53.5167	21.2885
813.000000 MHz	53.5389	21.3210
814.000000 MHz	53.5029	21.2841
815.000000 MHz	53.5181	21.2964
816.000000 MHz	53.4629	21.3000
817.000000 MHz	53.4874	21.2754
818.000000 MHz	53.4693	21.2884
819.000000 MHz	53.4074	21.2721
820.000000 MHz	53.4588	21.2604
821.000000 MHz	53.4175	21.2704
822.000000 MHz	53.4187	21.2430
823.000000 MHz	53.4474	21.2615
824.000000 MHz	53.3789	21.2257
825.000000 MHz	53.4273	21.2371
826.000000 MHz	53.3604	21.2675
827.000000 MHz	53.3512	21.2106
828.000000 MHz	53.3505	21.2395
829.000000 MHz	53.2993	21.2200
830.000000 MHz	53.3309	21.2151
831.000000 MHz	53.3170	21.2376
832.000000 MHz	53.2891	21.2209
833.000000 MHz	53.3039	21.2000
834.000000 MHz	53.2707	21.2294
835.000000 MHz	53.2492	21.1995
836.000000 MHz	53.2905	21.1910
837.000000 MHz	53.2107	21.1823
838.000000 MHz	53.2652	21.1799
839.000000 MHz	53.2350	21.1863
840.000000 MHz	53.2041	21.1600
841.000000 MHz	53.1969	21.1690
842.000000 MHz	53.1678	21.2079
843.000000 MHz	53.1985	21.1703
844.000000 MHz	53.1914	21.1792
845.000000 MHz	53.1498	21.1680
846.000000 MHz	53.1419	21.1445
847.000000 MHz	53.1525	21.1415
848.000000 MHz	53.1159	21.1286
849.000000 MHz	53.1287	21.1466
850.000000 MHz	53.1027	21.1624
851.000000 MHz	53.0845	21.1103
852.000000 MHz	53.1074	21.1408
853.000000 MHz	53.0450	21.1158
854.000000 MHz	53.0861	21.1070
855.000000 MHz	53.0674	21.1419
856.000000 MHz	53.0148	21.1135
857.000000 MHz	53.0263	21.0832
858.000000 MHz	53.0468	21.1359
859.000000 MHz	52.9969	21.0851
860.000000 MHz	53.0070	21.1092

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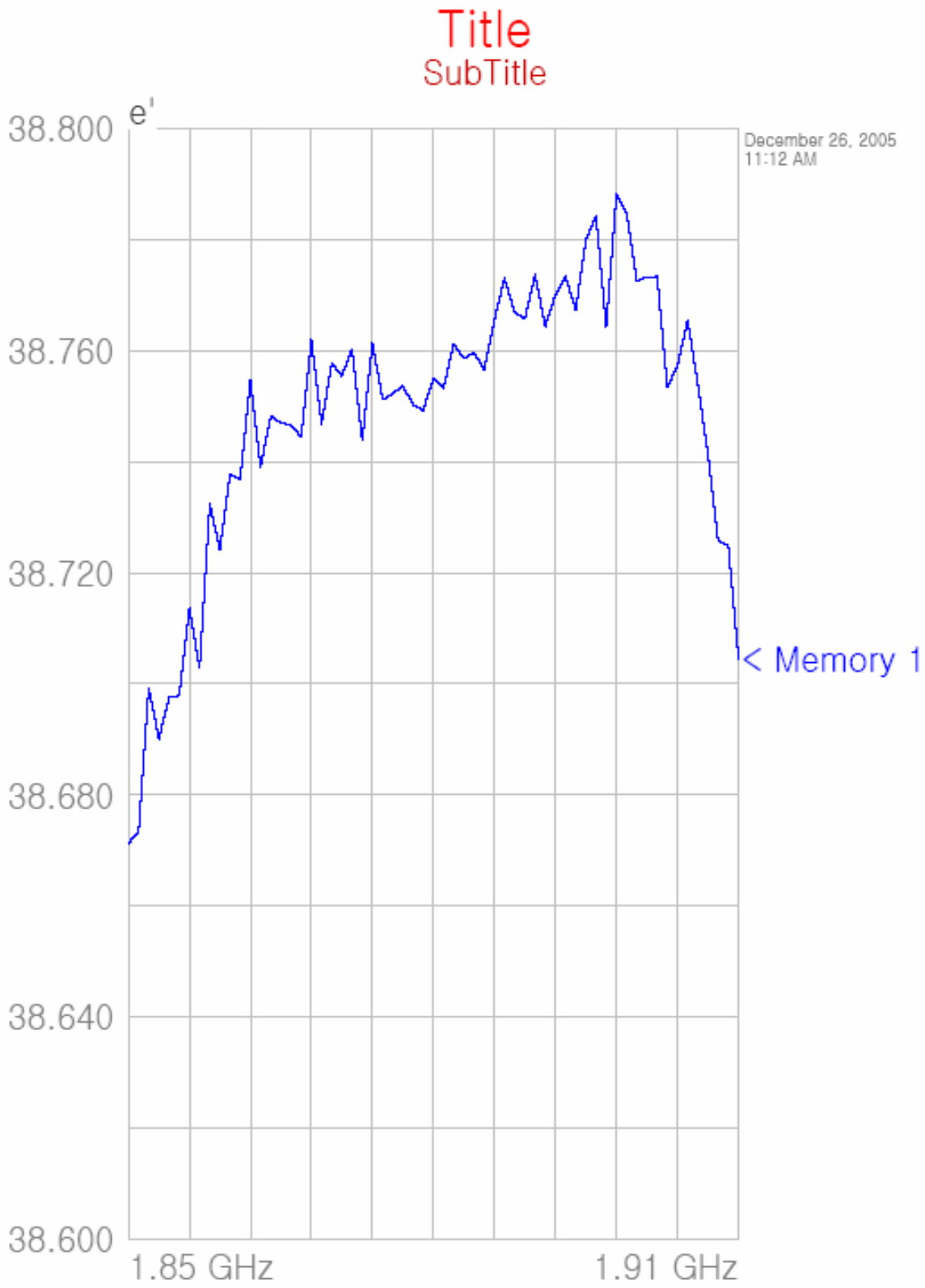
FAX: 82-2-867-3204

- PCS1900 Head Tissue



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FAX: 82-2-867-3204

Title

SubTitle

December 05, 2005 11:12:12 AM

Frequency	e'	e''
1.850000000 GHz	38.6712	13.7703
1.851000000 GHz	38.6734	13.7666
1.852000000 GHz	38.6993	13.7575
1.853000000 GHz	38.6901	13.7695
1.854000000 GHz	38.6975	13.7596
1.855000000 GHz	38.6979	13.7479
1.856000000 GHz	38.7137	13.7419
1.857000000 GHz	38.7028	13.7461
1.858000000 GHz	38.7325	13.7434
1.859000000 GHz	38.7242	13.7371
1.860000000 GHz	38.7378	13.7472
1.861000000 GHz	38.7369	13.7334
1.862000000 GHz	38.7548	13.7260
1.863000000 GHz	38.7391	13.7271
1.864000000 GHz	38.7483	13.7250
1.865000000 GHz	38.7470	13.7203
1.866000000 GHz	38.7467	13.7270
1.867000000 GHz	38.7444	13.7110
1.868000000 GHz	38.7620	13.7275
1.869000000 GHz	38.7468	13.7195
1.870000000 GHz	38.7578	13.7252
1.871000000 GHz	38.7555	13.7092
1.872000000 GHz	38.7604	13.7097
1.873000000 GHz	38.7438	13.6995
1.874000000 GHz	38.7615	13.7159
1.875000000 GHz	38.7512	13.6870
1.876000000 GHz	38.7523	13.6958
1.877000000 GHz	38.7537	13.6954
1.878000000 GHz	38.7503	13.6921
1.879000000 GHz	38.7493	13.6783
1.880000000 GHz	38.7551	13.6752
1.881000000 GHz	38.7533	13.6649
1.882000000 GHz	38.7613	13.6753
1.883000000 GHz	38.7586	13.6538
1.884000000 GHz	38.7597	13.6625
1.885000000 GHz	38.7566	13.6500
1.886000000 GHz	38.7656	13.6331
1.887000000 GHz	38.7731	13.6378
1.888000000 GHz	38.7669	13.6155
1.889000000 GHz	38.7658	13.6492
1.890000000 GHz	38.7737	13.6211
1.891000000 GHz	38.7644	13.6273
1.892000000 GHz	38.7701	13.6242
1.893000000 GHz	38.7734	13.6315
1.894000000 GHz	38.7674	13.6239
1.895000000 GHz	38.7800	13.6461
1.896000000 GHz	38.7844	13.6409
1.897000000 GHz	38.7643	13.6628
1.898000000 GHz	38.7883	13.6512
1.899000000 GHz	38.7847	13.6805
1.900000000 GHz	38.7726	13.6678
1.901000000 GHz	38.7733	13.6944
1.902000000 GHz	38.7734	13.6918
1.903000000 GHz	38.7534	13.7136
1.904000000 GHz	38.7573	13.7264
1.905000000 GHz	38.7655	13.7365
1.906000000 GHz	38.7540	13.7530
1.907000000 GHz	38.7414	13.7583
1.908000000 GHz	38.7258	13.7774
1.909000000 GHz	38.7249	13.8108
1.910000000 GHz	38.7045	13.8034

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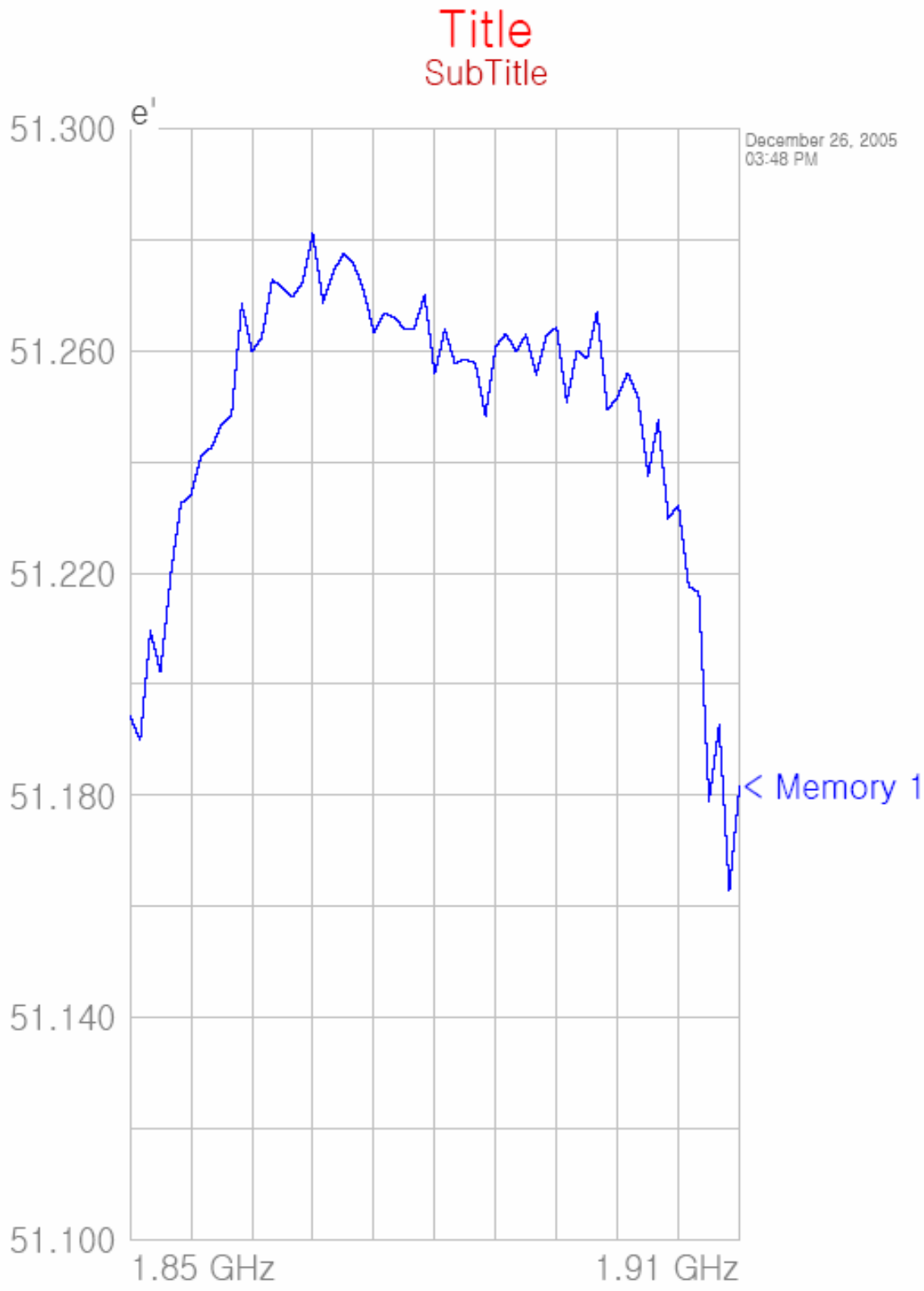
- PCS1900 Body Tissue



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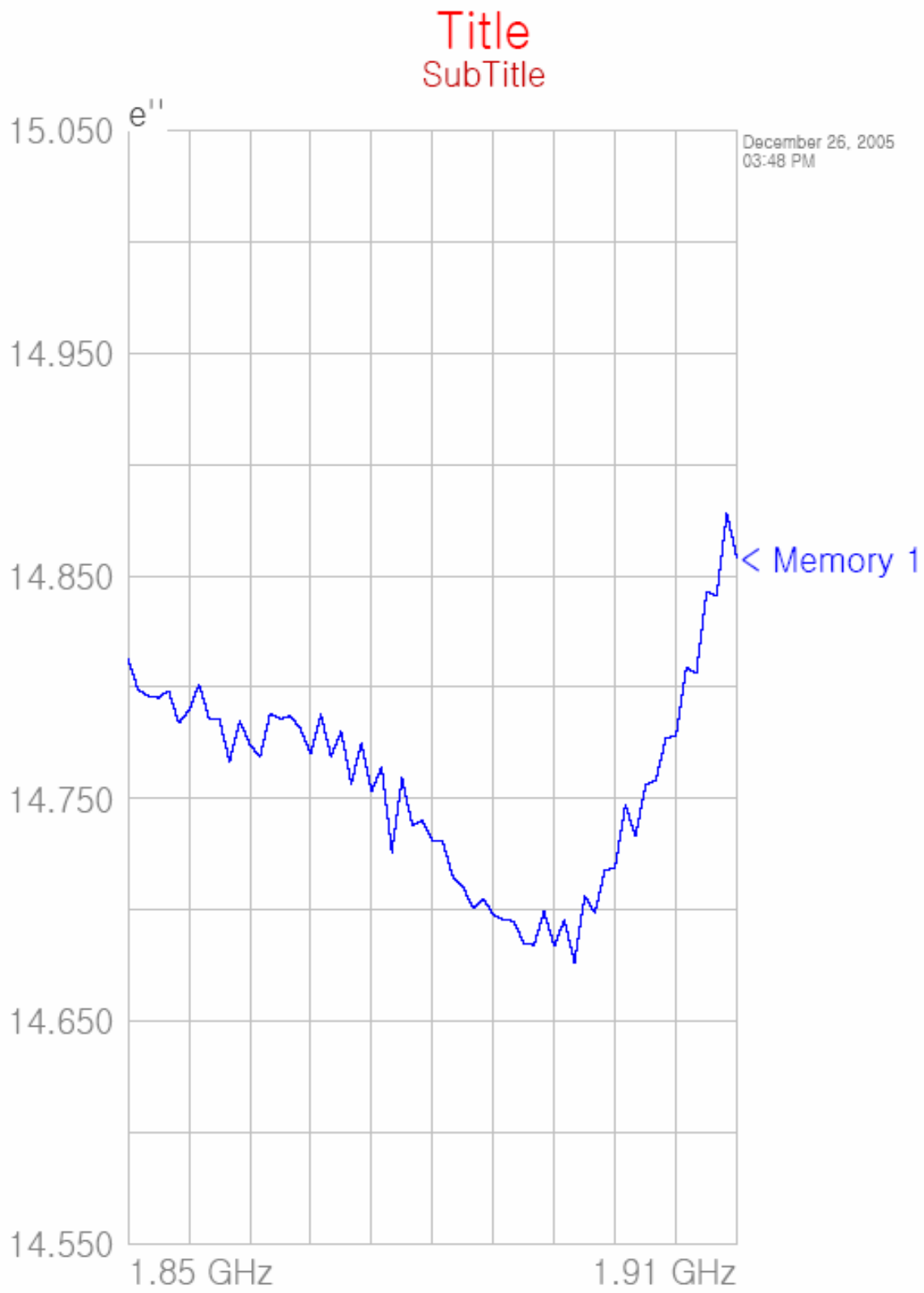

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Title

SubTitle

December 05, 2005 03:48 PM

Frequency	e'	e''
1.850000000 GHz	51.1943	14.8126
1.851000000 GHz	51.1899	14.7986
1.852000000 GHz	51.2096	14.7961
1.853000000 GHz	51.2022	14.7953
1.854000000 GHz	51.2195	14.7984
1.855000000 GHz	51.2325	14.7838
1.856000000 GHz	51.2342	14.7895
1.857000000 GHz	51.2412	14.8013
1.858000000 GHz	51.2426	14.7858
1.859000000 GHz	51.2467	14.7858
1.860000000 GHz	51.2485	14.7664
1.861000000 GHz	51.2685	14.7849
1.862000000 GHz	51.2599	14.7744
1.863000000 GHz	51.2626	14.7685
1.864000000 GHz	51.2729	14.7881
1.865000000 GHz	51.2714	14.7858
1.866000000 GHz	51.2697	14.7872
1.867000000 GHz	51.2724	14.7813
1.868000000 GHz	51.2812	14.7701
1.869000000 GHz	51.2687	14.7879
1.870000000 GHz	51.2742	14.7688
1.871000000 GHz	51.2776	14.7801
1.872000000 GHz	51.2758	14.7567
1.873000000 GHz	51.2710	14.7750
1.874000000 GHz	51.2634	14.7530
1.875000000 GHz	51.2668	14.7643
1.876000000 GHz	51.2661	14.7257
1.877000000 GHz	51.2641	14.7594
1.878000000 GHz	51.2641	14.7380
1.879000000 GHz	51.2701	14.7399
1.880000000 GHz	51.2559	14.7308
1.881000000 GHz	51.2639	14.7309
1.882000000 GHz	51.2578	14.7148
1.883000000 GHz	51.2585	14.7105
1.884000000 GHz	51.2578	14.7005
1.885000000 GHz	51.2484	14.7051
1.886000000 GHz	51.2607	14.6978
1.887000000 GHz	51.2632	14.6956
1.888000000 GHz	51.2599	14.6949
1.889000000 GHz	51.2629	14.6851
1.890000000 GHz	51.2558	14.6841
1.891000000 GHz	51.2628	14.6992
1.892000000 GHz	51.2643	14.6836
1.893000000 GHz	51.2508	14.6954
1.894000000 GHz	51.2601	14.6765
1.895000000 GHz	51.2586	14.7062
1.896000000 GHz	51.2672	14.6986
1.897000000 GHz	51.2494	14.7177
1.898000000 GHz	51.2517	14.7191
1.899000000 GHz	51.2561	14.7472
1.900000000 GHz	51.2518	14.7331
1.901000000 GHz	51.2376	14.7561
1.902000000 GHz	51.2475	14.7580
1.903000000 GHz	51.2299	14.7770
1.904000000 GHz	51.2322	14.7784
1.905000000 GHz	51.2176	14.8089
1.906000000 GHz	51.2165	14.8063
1.907000000 GHz	51.1789	14.8428
1.908000000 GHz	51.1928	14.8411
1.909000000 GHz	51.1628	14.8782
1.910000000 GHz	51.1817	14.8579

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APPENDIX B : Validation Test Data

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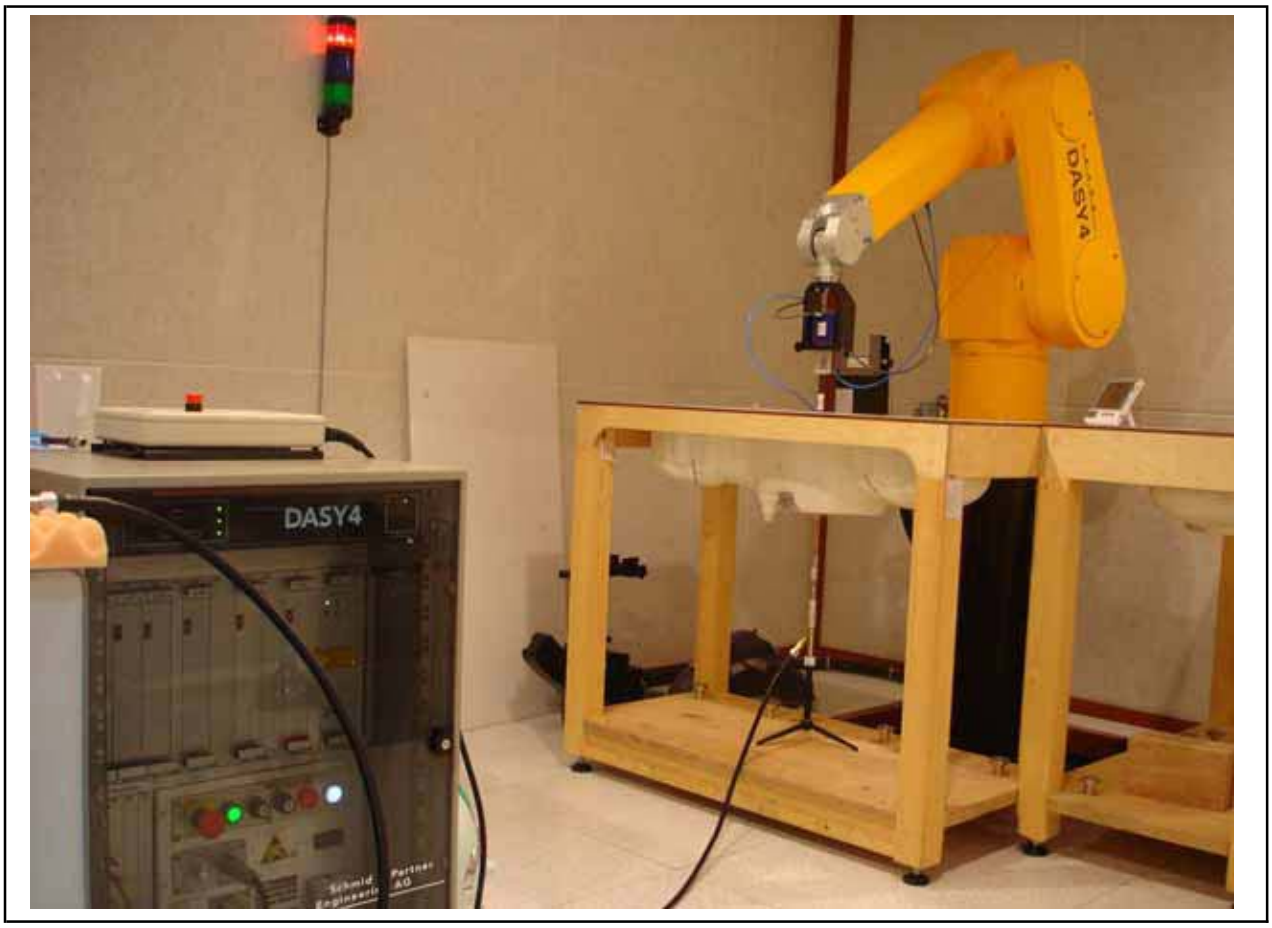
Dipole Validation



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– GSM850 Validation

Date/Time: 12/27/05 10:51:43

Test Laboratory: ESTECH

validation -1227

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

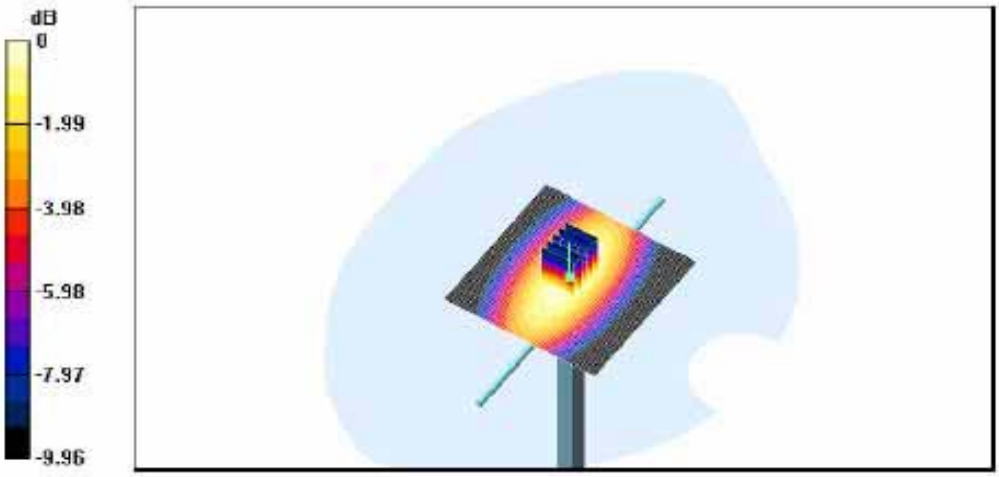
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL 835MHz ;Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(6.57, 6.57, 6.57); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 22℃, Humidity : 48%

Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 53.4 V/m; Power Drift = 0.1 dB
Maximum value of SAR (interpolated) = 2.45 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.4 V/m; Power Drift = 0.1 dB
Maximum value of SAR (measured) = 2.48 mW/g
Peak SAR (extrapolated) = 3.45 W/kg
SAR(1 g) = 2.29 mW/g



0 dB = 2.48mW/g

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– PCS1900 Validation

Date/Time: 12/26/05 11:39:58

Test Laboratory: ESTECH

validation -1226

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

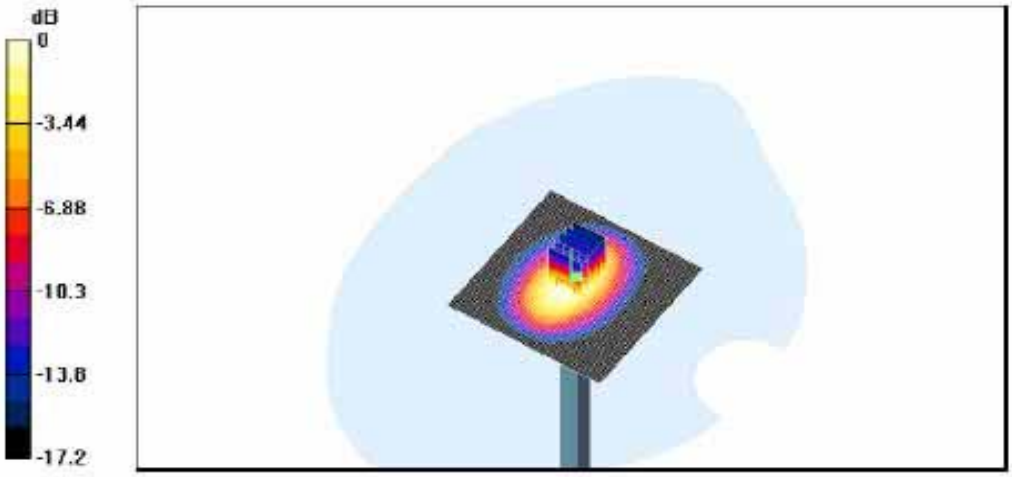
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL1900;Medium parameters used: f = 1900 MHz; σ = 1.44 mho/m; ε_r = 38.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(5.13, 5.13, 5.13); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 23℃, Humidity : 49%

Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 92.3 V/m; Power Drift = 0.0 dB
Maximum value of SAR (interpolated) = 12.1 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.3 V/m; Power Drift = 0.0 dB
Maximum value of SAR (measured) = 11.6 mW/g
Peak SAR (extrapolated) = 18 W/kg
SAR(1 g) = 10.2 mW/g



0 dB = 11.6mW/g

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APPENDIX C : SAR Test Data

ESTECH Co., Ltd.
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FAX: 82-2-867-3204

- GSM850

Date/Time: 12/27/05 13:52:48

Test Laboratory: ESTECH

CH128 LEFT TOUCH

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

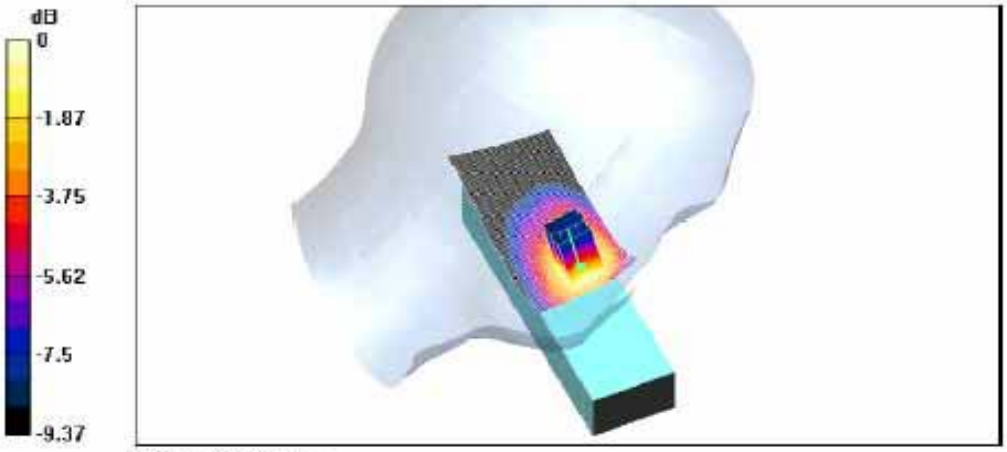
Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium: HSL 835MHz ;Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.899 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(6.57, 6.57, 6.57); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 23℃, Humidity : 48%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 6.04 V/m; Power Drift = -0.1 dB
Maximum value of SAR (interpolated) = 0.516 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.04 V/m; Power Drift = -0.1 dB
Maximum value of SAR (measured) = 0.518 mW/g
Peak SAR (extrapolated) = 0.710 W/kg
SAR(1 g) = 0.480 mW/g



0 dB = 0.518mW/g

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

Date/Time: 12/27/05 11:22:59

Test Laboratory: ESTECH

CH190 LEFT TOUCH

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

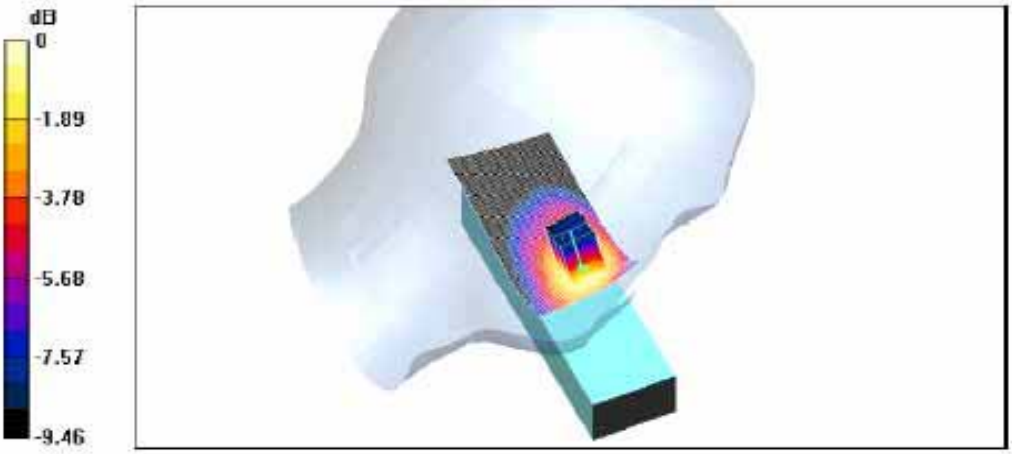
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: HSL 835MHz ;Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.911 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(6.57, 6.57, 6.57); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 22℃, Humidity : 46%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 6.2 V/m; Power Drift = -0.1 dB
Maximum value of SAR (interpolated) = 0.568 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.2 V/m; Power Drift = -0.1 dB
Maximum value of SAR (measured) = 0.558 mW/g
Peak SAR (extrapolated) = 0.758 W/kg
SAR(1 g) = 0.522 mW/g



0 dB = 0.558mW/g

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Date/Time: 12/27/05 14:51:15

Test Laboratory: ESTECH

CH251 LEFT TOUCH

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

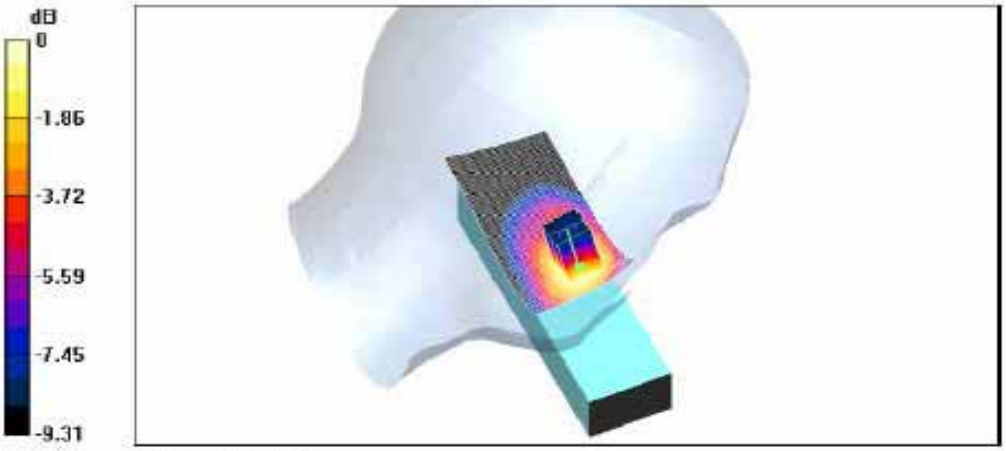
Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:8.3
Medium: HSL 835MHz ;Medium parameters used (interpolated): f = 848.8 MHz; σ = 0.918 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(6.57, 6.57, 6.57); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 23℃, Humidity : 50%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 5.94 V/m; Power Drift = -0.0 dB
Maximum value of SAR (interpolated) = 0.484 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.94 V/m; Power Drift = -0.0 dB
Maximum value of SAR (measured) = 0.483 mW/g
Peak SAR (extrapolated) = 0.658 W/kg
SAR(1 g) = 0.451 mW/g



0 dB = 0.483mW/g

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FAX: 82-2-867-3204

Date/Time: 12/27/05 14:27:46

Test Laboratory: ESTECH

CH128 RIGHT TOUCH

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

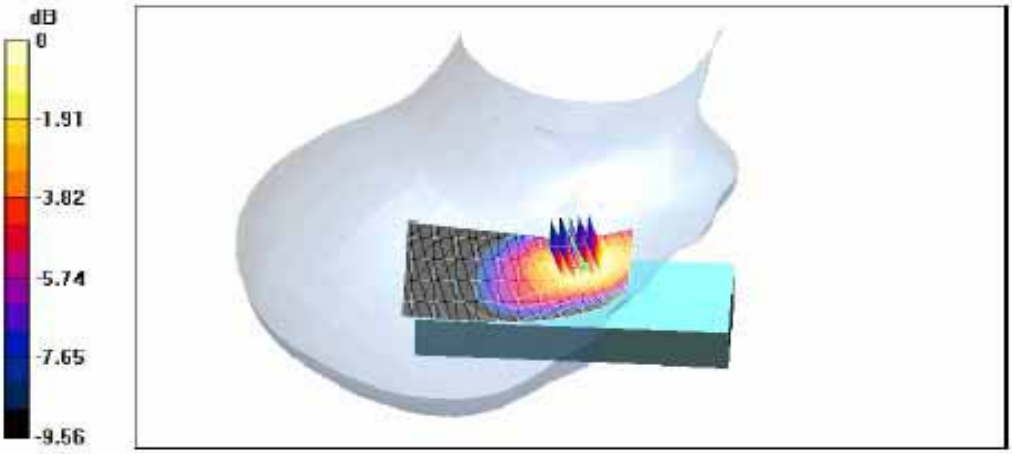
Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium: HSL 835MHz ;Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.899 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(6.57, 6.57, 6.57); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 22℃, Humidity : 47%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 5.51 V/m; Power Drift = -0.0 dB
Maximum value of SAR (interpolated) = 0.534 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.51 V/m; Power Drift = -0.0 dB
Maximum value of SAR (measured) = 0.541 mW/g
Peak SAR (extrapolated) = 0.741 W/kg
SAR(1 g) = 0.494 mW/g



0 dB = 0.541mW/g

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FAX: 82-2-867-3204

Date/Time: 12/27/05 11:47:35

Test Laboratory: ESTECH

CH190 RIGHT TOUCH

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

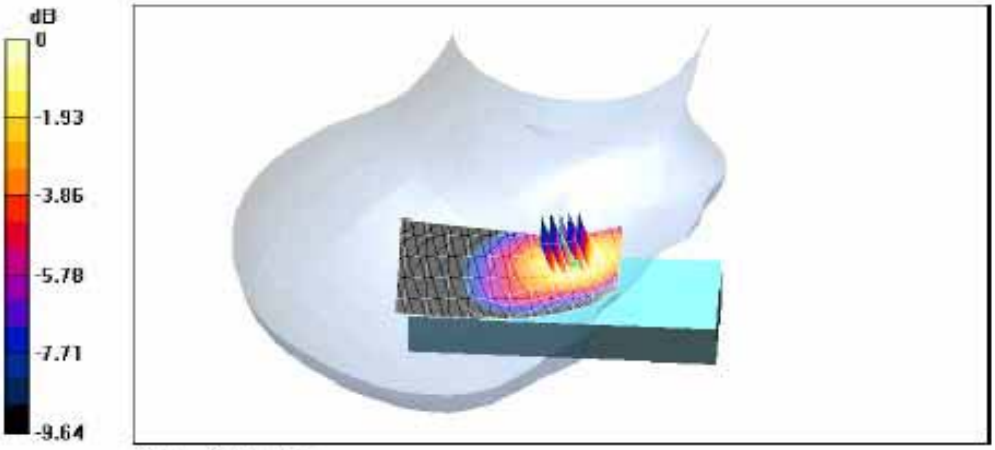
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: HSL 835MHz ;Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.911 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(6.57, 6.57, 6.57); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 23℃, Humidity : 48%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 5.79 V/m; Power Drift = -0.1 dB
Maximum value of SAR (interpolated) = 0.572 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.79 V/m; Power Drift = -0.1 dB
Maximum value of SAR (measured) = 0.584 mW/g
Peak SAR (extrapolated) = 0.808 W/kg
SAR(1 g) = 0.532 mW/g



0 dB = 0.584mW/g

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Date/Time: 12/27/05 15:16:49

Test Laboratory: ESTECH

CH251 RIGHT TOUCH

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

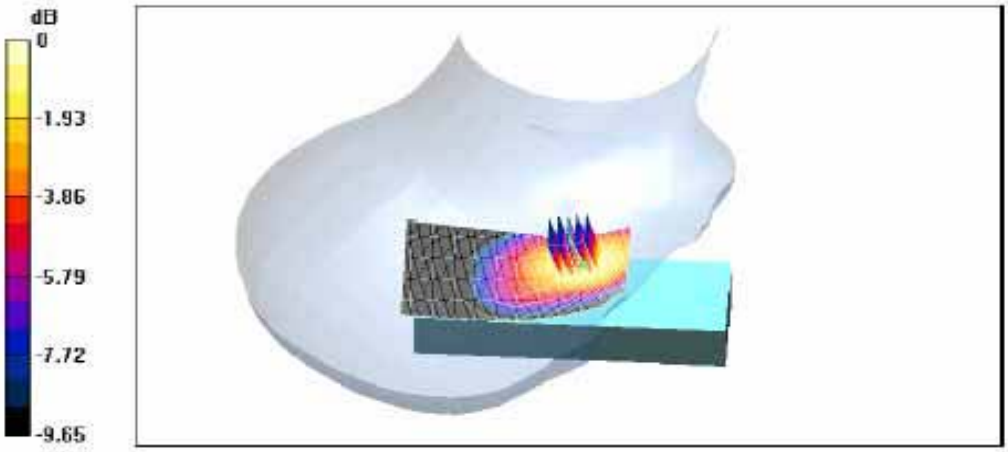
Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:8.3
Medium: HSL 835MHz ;Medium parameters used (interpolated): f = 848.8 MHz; σ = 0.918 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(6.57, 6.57, 6.57); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 22℃, Humidity : 46%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 5.4 V/m; Power Drift = -0.0 dB
Maximum value of SAR (interpolated) = 0.483 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.4 V/m; Power Drift = -0.0 dB
Maximum value of SAR (measured) = 0.489 mW/g
Peak SAR (extrapolated) = 0.677 W/kg
SAR(1 g) = 0.449 mW/g



0 dB = 0.489mW/g

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Date/Time: 12/27/05 12:09:02

Test Laboratory: ESTECH

CH190 LEFT TILT

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

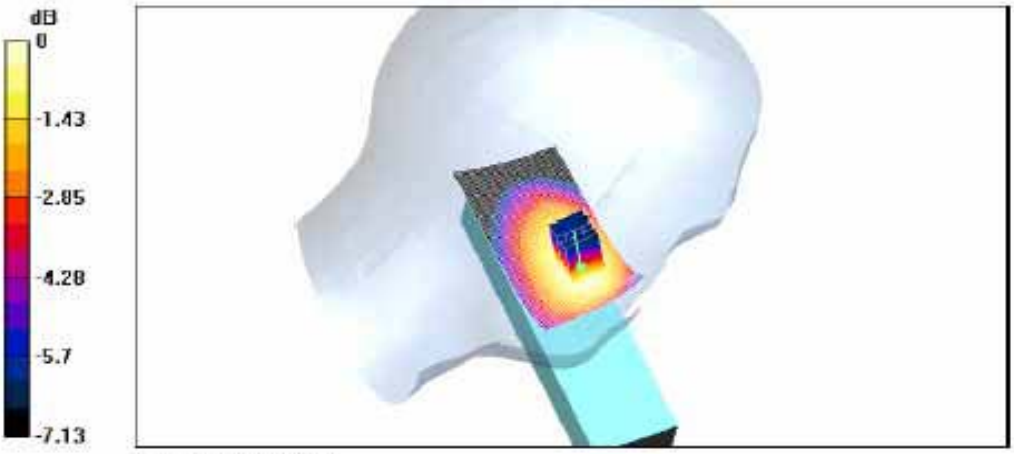
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: HSL 835MHz ;Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.911 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(6.57, 6.57, 6.57); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 22℃, Humidity : 47%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 7.31 V/m; Power Drift = -0.004 dB
Maximum value of SAR (interpolated) = 0.148 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.31 V/m; Power Drift = -0.004 dB
Maximum value of SAR (measured) = 0.146 mW/g
Peak SAR (extrapolated) = 0.180 W/kg
SAR(1 g) = 0.140 mW/g



0 dB = 0.146mW/g

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Test Laboratory: ESTECH

CH190 RIGHT TILT

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

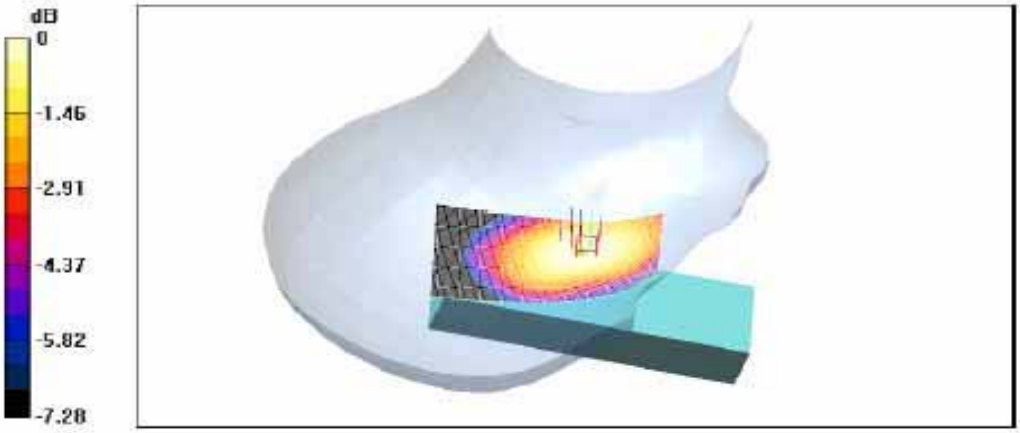
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: HSL 835MHz ;Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.911 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(6.57, 6.57, 6.57); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 23℃, Humidity : 49%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 7.22 V/m; Power Drift = 0.1 dB
Maximum value of SAR (interpolated) = 0.157 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.22 V/m; Power Drift = 0.1 dB
Maximum value of SAR (measured) = 0.154 mW/g
Peak SAR (extrapolated) = 0.191 W/kg
SAR(1 g) = 0.147 mW/g



0 dB = 0.154mW/g

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Date/Time: 12/27/05 11:47:35

Test Laboratory: ESTECH

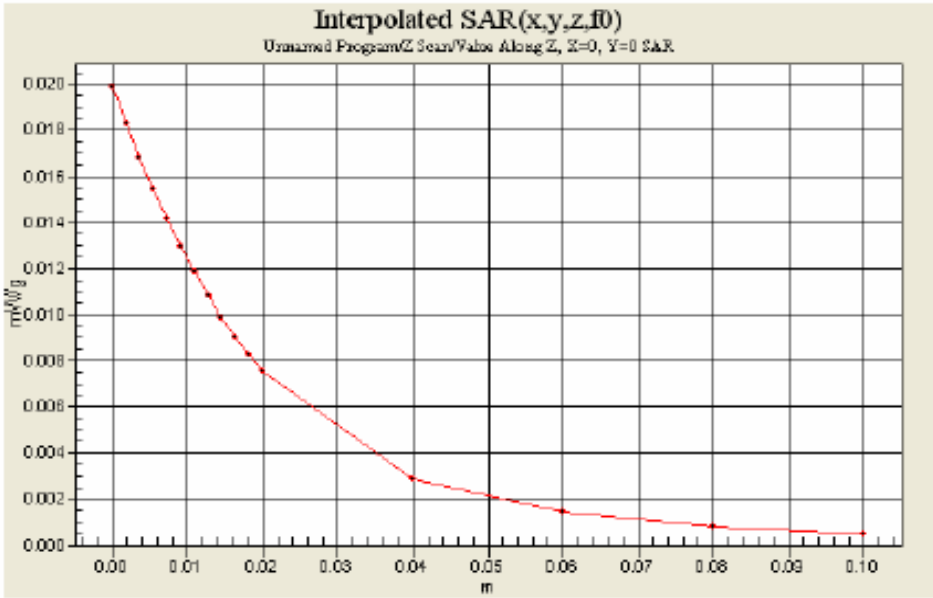
CH190 RIGHT TOUCH-ZSCAN

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: HSL 835MHz ;Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.911 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(6.57, 6.57, 6.57); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 23℃, Humidity : 48%



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Date/Time: 12/27/05 16:35:06

Test Laboratory: ESTECH

CH128 BODY

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

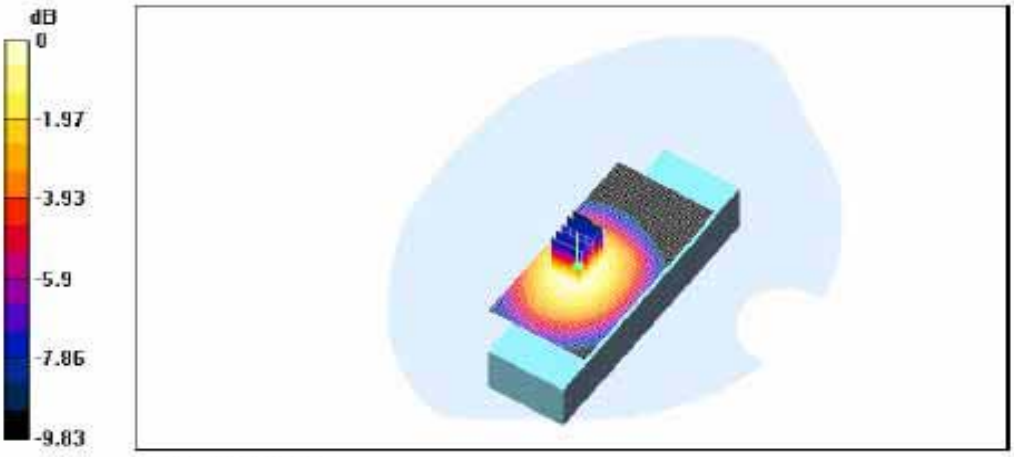
Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium: M900;Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.974 mho/m; ε_r = 53.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(6.03, 6.03, 6.03); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 22℃, Humidity : 49%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 15.5 V/m; Power Drift = -0.0 dB
Maximum value of SAR (interpolated) = 0.606 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.5 V/m; Power Drift = -0.0 dB
Maximum value of SAR (measured) = 0.603 mW/g
Peak SAR (extrapolated) = 0.767 W/kg
SAR(1 g) = 0.565 mW/g



0 dB = 0.603mW/g

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CH190 BODY

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

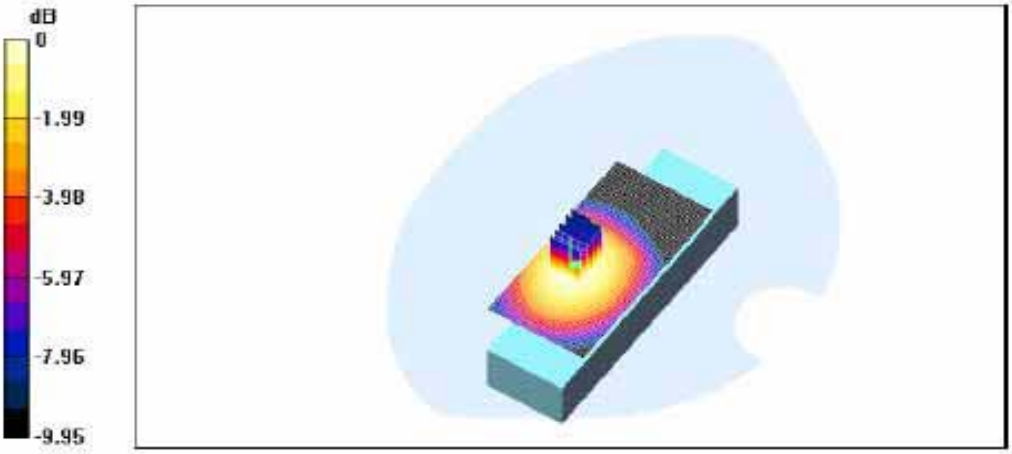
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: M900;Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.986 mho/m; ε_r = 53.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(6.03, 6.03, 6.03); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 22℃, Humidity : 46%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 15.1 V/m; Power Drift = -0.0 dB
Maximum value of SAR (interpolated) = 0.592 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.1 V/m; Power Drift = -0.0 dB
Maximum value of SAR (measured) = 0.583 mW/g
Peak SAR (extrapolated) = 0.743 W/kg
SAR(1 g) = 0.547 mW/g



0 dB = 0.583mW/g

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Test Laboratory: ESTECH

CH251 BODY

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

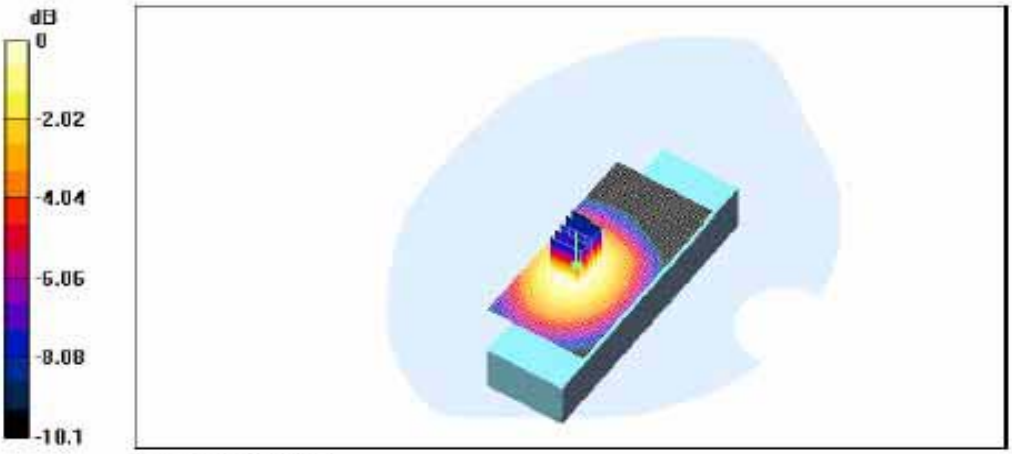
Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:8.3
Medium: M900;Medium parameters used (interpolated): f = 848.8 MHz; σ = 0.998 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(6.03, 6.03, 6.03); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 23℃, Humidity : 49%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 13.6 V/m; Power Drift = 0.0 dB
Maximum value of SAR (interpolated) = 0.500 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.6 V/m; Power Drift = 0.0 dB
Maximum value of SAR (measured) = 0.498 mW/g
Peak SAR (extrapolated) = 0.646 W/kg
SAR(1 g) = 0.466 mW/g



0 dB = 0.498mW/g

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Test Laboratory: ESTECH

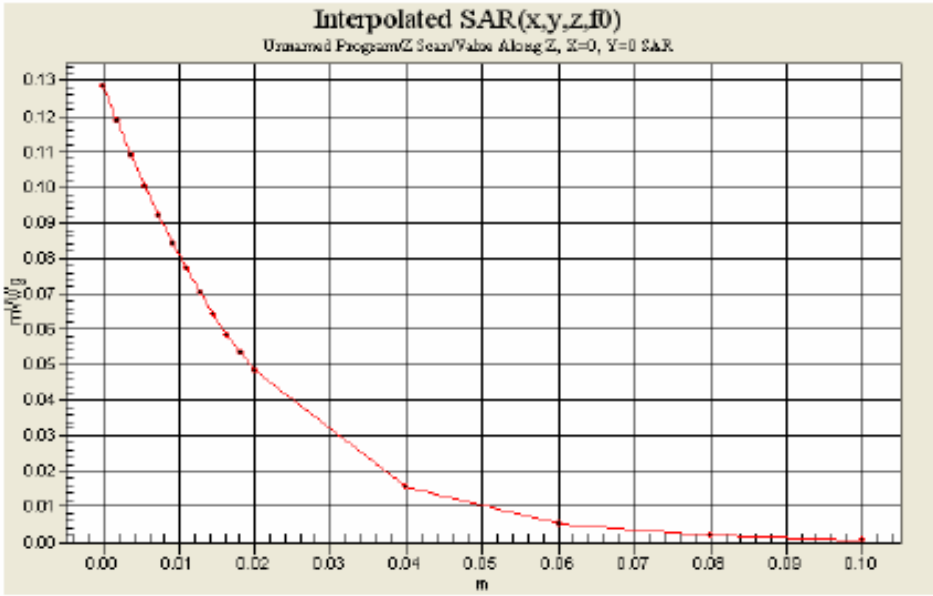
CH128 BODY-ZSCAN

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium: M900;Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.974 mho/m; ε_r = 53.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(6.03, 6.03, 6.03); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 21℃, Humidity : 48%



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Date/Time: 12/27/05 17:28:59

Test Laboratory: ESTECH

CH128 BODY-BT disable

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

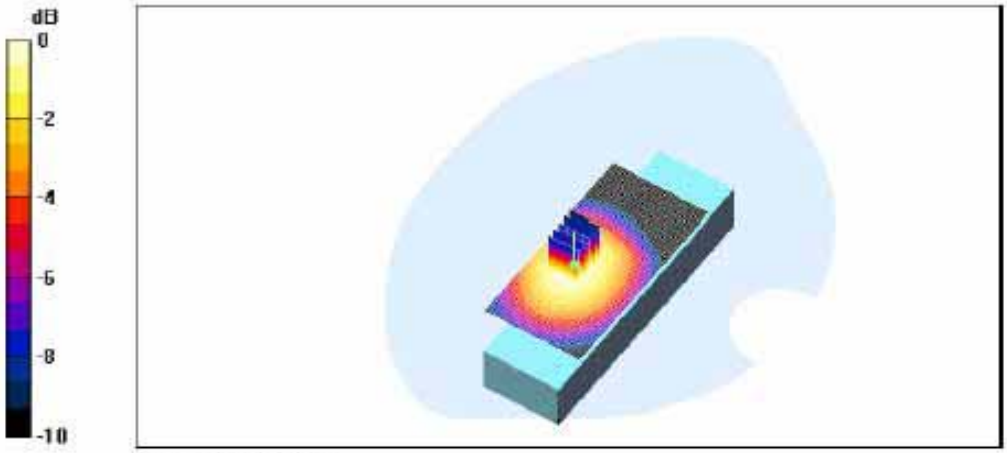
Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium: M900;Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.974 mho/m; ε_r = 53.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(6.03, 6.03, 6.03); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 21℃, Humidity : 48%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 14.5 V/m; Power Drift = -0.0007 dB
Maximum value of SAR (interpolated) = 0.485 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.5 V/m; Power Drift = -0.0007 dB
Maximum value of SAR (measured) = 0.480 mW/g
Peak SAR (extrapolated) = 0.613 W/kg
SAR(1 g) = 0.448 mW/g



0 dB = 0.480mW/g

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Test Laboratory: ESTECH

CH128 BODY GPRS

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

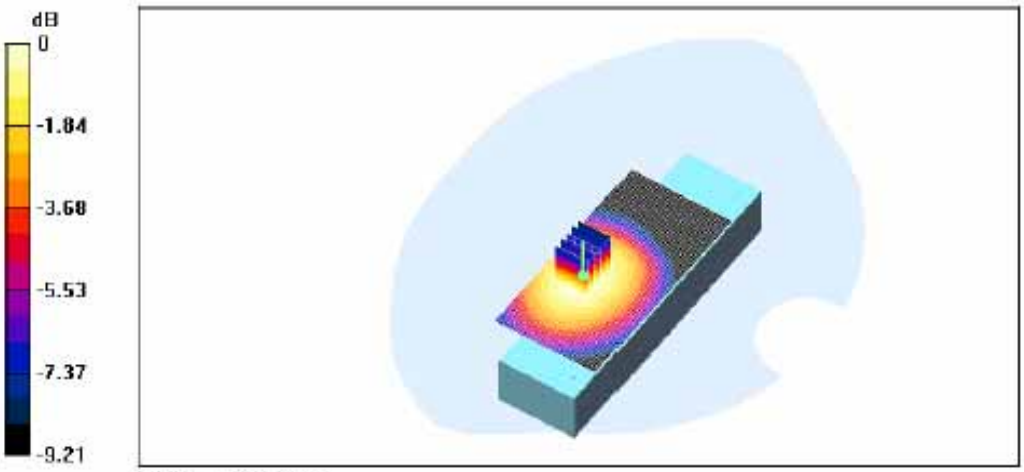
Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:4.15
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.974 mho/m; ε_r = 53.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(6.03, 6.03, 6.03); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM 835MHz; Type: SAM 835MHz; Serial: TP-1262
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 21℃, Humidity : 49%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 14.4 V/m; Power Drift = -0.1 dB
Maximum value of SAR (interpolated) = 0.527 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.4 V/m; Power Drift = -0.1 dB
Maximum value of SAR (measured) = 0.523 mW/g
Peak SAR (extrapolated) = 0.643 W/kg
SAR(1 g) = 0.490 mW/g



0 dB = 0.523mW/g

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-PCS1900

Date/Time: 12/26/05 14:13:39

Test Laboratory: ESTECH

CH512 LEFT TOUCH

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

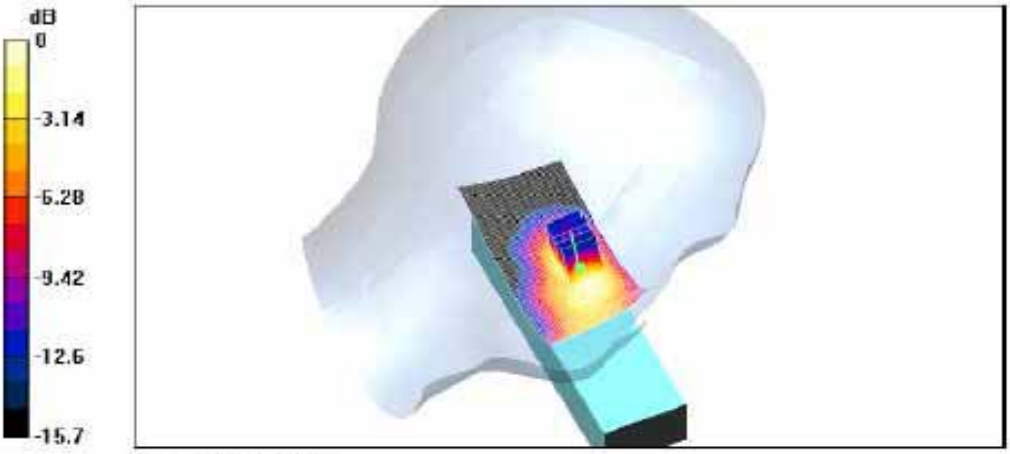
Communication System: GSM1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium: HSL1900;Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.42 mho/m; ε_r = 38.7; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(5.13, 5.13, 5.13); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 22℃, Humidity : 49%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 2.89 V/m; Power Drift = -0.0 dB
Maximum value of SAR (interpolated) = 0.426 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.89 V/m; Power Drift = -0.0 dB
Maximum value of SAR (measured) = 0.454 mW/g
Peak SAR (extrapolated) = 0.617 W/kg
SAR(1 g) = 0.399 mW/g



0 dB = 0.454mW/g

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Date/Time: 12/26/05 12:43:33

Test Laboratory: ESTECH

CH661 LEFT TOUCH

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

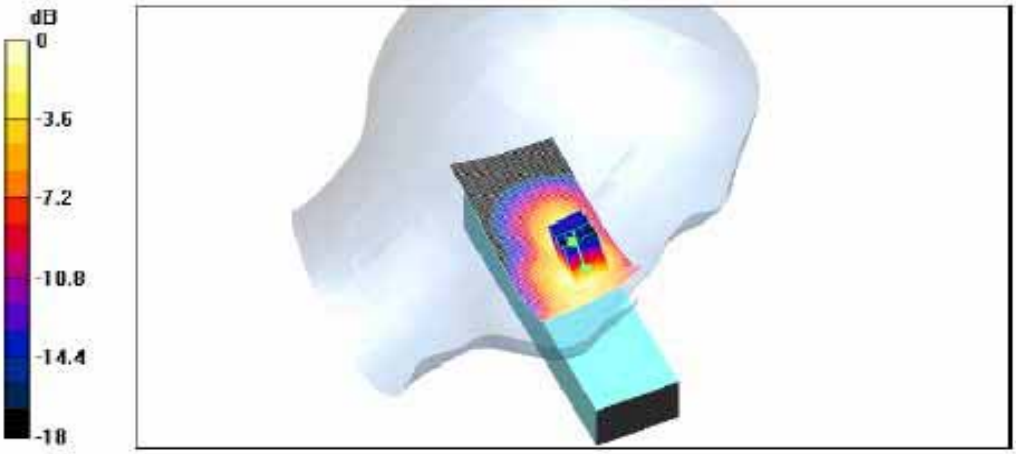
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: HSL1900;Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; ε_r = 38.8; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(5.13, 5.13, 5.13); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 23℃, Humidity : 48%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 3.02 V/m; Power Drift = -0.1 dB
Maximum value of SAR (interpolated) = 0.481 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.02 V/m; Power Drift = -0.1 dB
Maximum value of SAR (measured) = 0.520 mW/g
Peak SAR (extrapolated) = 0.996 W/kg
SAR(1 g) = 0.477 mW/g



0 dB = 0.520mW/g

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Test Laboratory: ESTECH

CH810 LEFT TOUCH

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

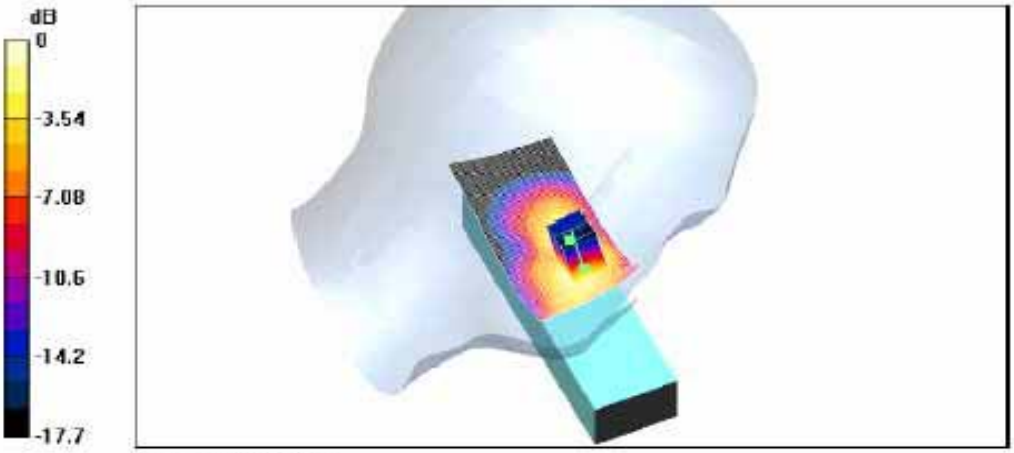
Communication System: GSM1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium: HSL1900;Medium parameters used (interpolated): f = 1909.8 MHz; σ = 1.47 mho/m; ε_r = 38.7; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(5.13, 5.13, 5.13); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 22℃, Humidity : 48%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 3.33 V/m; Power Drift = 0.0 dB
Maximum value of SAR (interpolated) = 0.463 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.33 V/m; Power Drift = 0.0 dB
Maximum value of SAR (measured) = 0.508 mW/g
Peak SAR (extrapolated) = 0.941 W/kg
SAR(1 g) = 0.457 mW/g



0 dB = 0.508mW/g

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Test Laboratory: ESTECH

CH512 RIGHT TOUCH

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

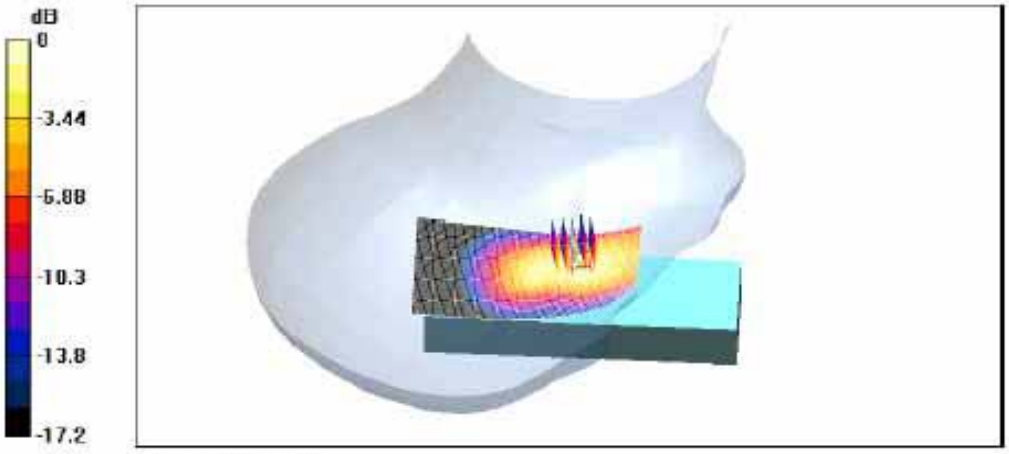
Communication System: GSM1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium: HSL1900;Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.42 mho/m; ε_r = 38.7; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(5.13, 5.13, 5.13); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 22℃, Humidity : 47%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 2.18 V/m; Power Drift = 0.1 dB
Maximum value of SAR (interpolated) = 0.469 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.18 V/m; Power Drift = 0.1 dB
Maximum value of SAR (measured) = 0.501 mW/g
Peak SAR (extrapolated) = 0.843 W/kg
SAR(1 g) = 0.438 mW/g



0 dB = 0.501mW/g

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Test Laboratory: ESTECH

CH661 RIGHT TOUCH

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

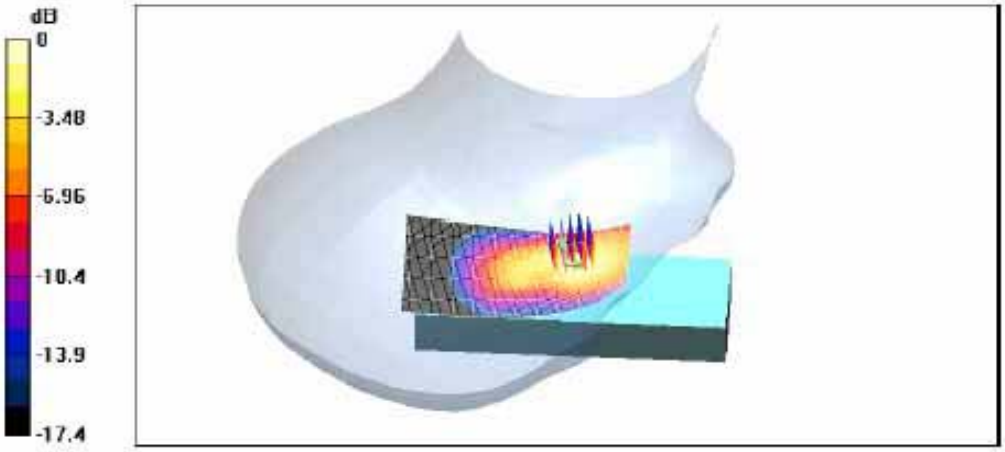
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: HSL1900;Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; ε_r = 38.8; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(5.13, 5.13, 5.13); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 22℃, Humidity : 46%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 2.48 V/m; Power Drift = 0.1 dB
Maximum value of SAR (interpolated) = 0.541 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.48 V/m; Power Drift = 0.1 dB
Maximum value of SAR (measured) = 0.573 mW/g
Peak SAR (extrapolated) = 0.986 W/kg
SAR(1 g) = 0.514 mW/g



0 dB = 0.573mW/g

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Test Laboratory: ESTECH

CH810 RIGHT TOUCH

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

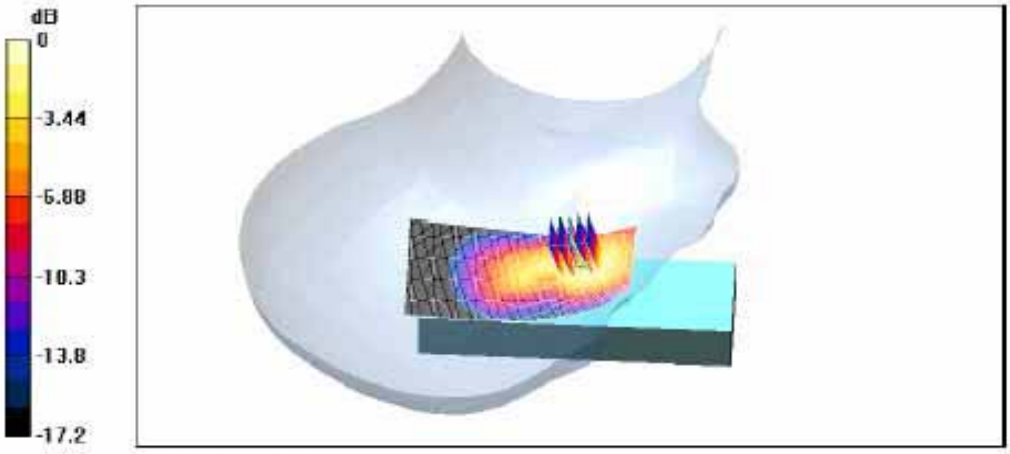
Communication System: GSM1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium: HSL1900;Medium parameters used (interpolated): f = 1909.8 MHz; σ = 1.47 mho/m; ε_r = 38.7; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(5.13, 5.13, 5.13); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 22℃, Humidity : 49%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 2.84 V/m; Power Drift = -0.1 dB
Maximum value of SAR (interpolated) = 0.523 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.84 V/m; Power Drift = -0.1 dB
Maximum value of SAR (measured) = 0.552 mW/g
Peak SAR (extrapolated) = 0.958 W/kg
SAR(1 g) = 0.502 mW/g



0 dB = 0.552mW/g

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Test Laboratory: ESTECH

CH661 LEFT TILT

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

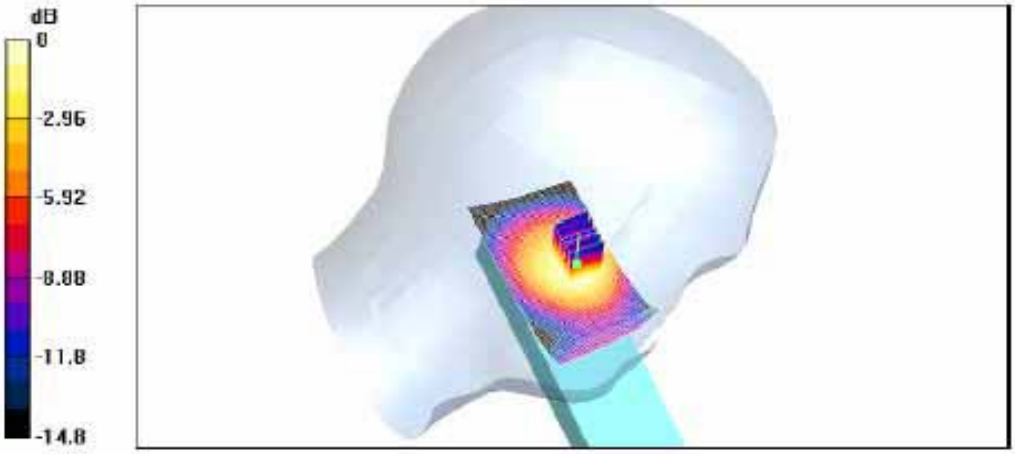
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: HSL1900;Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; ε_r = 38.8; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(5.13, 5.13, 5.13); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 21℃, Humidity : 47%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 6.68 V/m; Power Drift = 0.004 dB
Maximum value of SAR (interpolated) = 0.248 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.68 V/m; Power Drift = 0.004 dB
Maximum value of SAR (measured) = 0.234 mW/g
Peak SAR (extrapolated) = 0.312 W/kg
SAR(1 g) = 0.214 mW/g



0 dB = 0.234mW/g

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CH661 RIGHT TILT

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

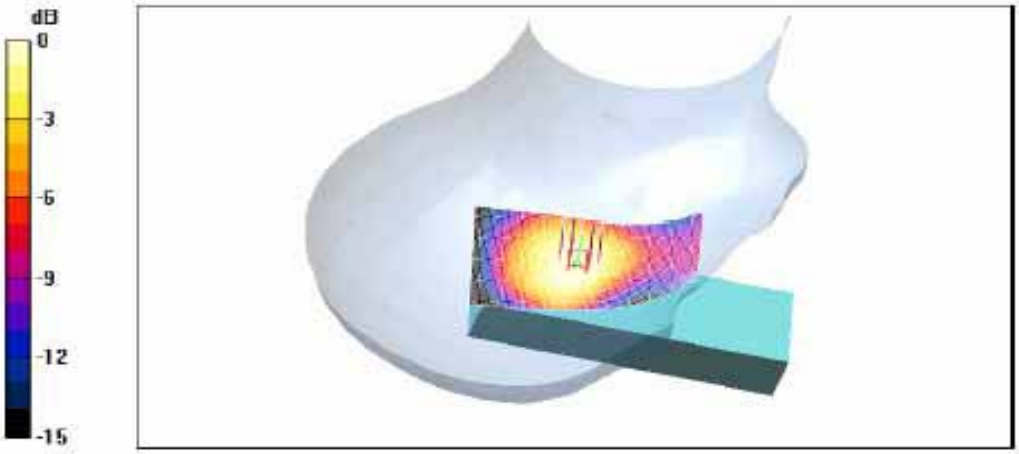
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: HSL1900;Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; ε_r = 38.8; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(5.13, 5.13, 5.13); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 22℃, Humidity : 49%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 6.58 V/m; Power Drift = -0.0 dB
Maximum value of SAR (interpolated) = 0.194 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.58 V/m; Power Drift = -0.0 dB
Maximum value of SAR (measured) = 0.187 mW/g
Peak SAR (extrapolated) = 0.252 W/kg
SAR(1 g) = 0.170 mW/g



0 dB = 0.187mW/g

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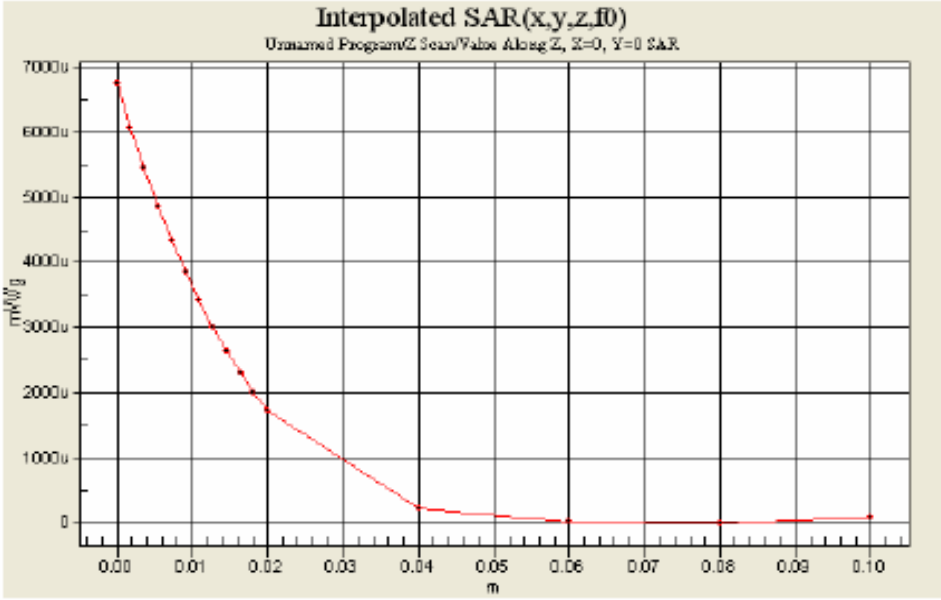
CH661 RIGHT TOUCH-ZSCAN

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: HSL1900;Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; ε_r = 38.8; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(5.13, 5.13, 5.13); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 22℃, Humidity : 46%



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Test Laboratory: ESTECH

CH512 BODY

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

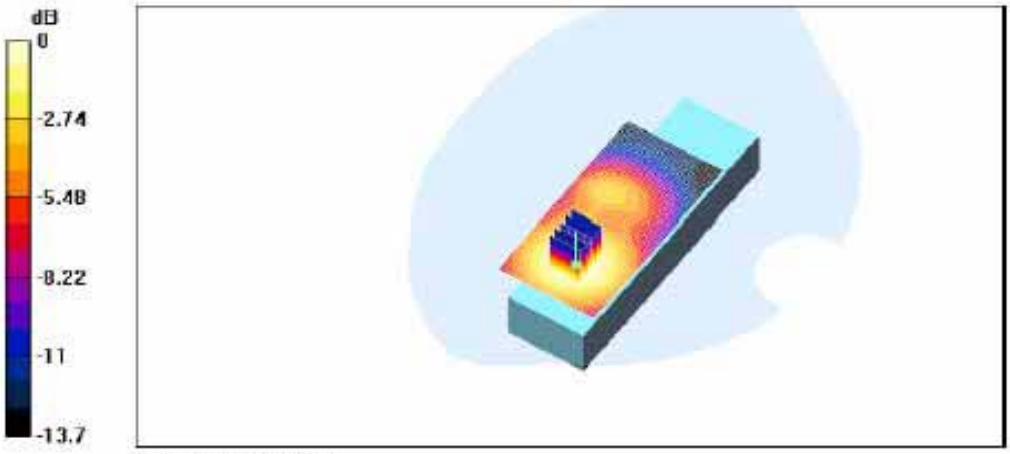
Communication System: GSM1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium: M1900;Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.52 mho/m; ε_r = 51.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(4.45, 4.45, 4.45); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 22℃, Humidity : 48%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 6.5 V/m; Power Drift = 0.0 dB
Maximum value of SAR (interpolated) = 0.242 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.5 V/m; Power Drift = 0.0 dB
Maximum value of SAR (measured) = 0.236 mW/g
Peak SAR (extrapolated) = 0.318 W/kg
SAR(1 g) = 0.218 mW/g



0 dB = 0.236mW/g

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CH661 BODY

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

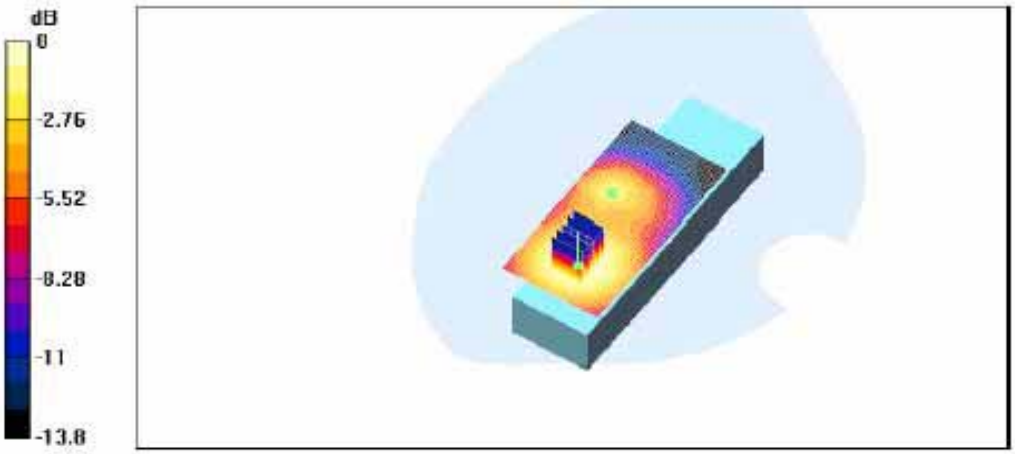
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: M1900;Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(4.45, 4.45, 4.45); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 23℃, Humidity : 48%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 8.29 V/m; Power Drift = -0.0 dB
Maximum value of SAR (interpolated) = 0.330 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.29 V/m; Power Drift = -0.0 dB
Maximum value of SAR (measured) = 0.324 mW/g
Peak SAR (extrapolated) = 0.426 W/kg
SAR(1 g) = 0.299 mW/g



0 dB = 0.324mW/g

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Test Laboratory: ESTECH

CH810 BODY

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

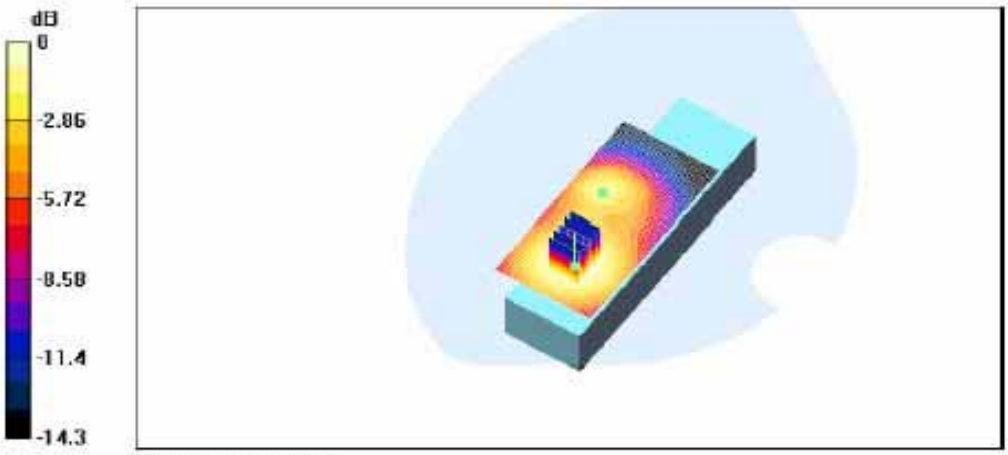
Communication System: GSM1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium: M1900;Medium parameters used (interpolated): f = 1909.8 MHz; σ = 1.58 mho/m; ε_r = 51.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(4.45, 4.45, 4.45); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 22℃, Humidity : 47%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 8.76 V/m; Power Drift = -0.1 dB
Maximum value of SAR (interpolated) = 0.322 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.76 V/m; Power Drift = -0.1 dB
Maximum value of SAR (measured) = 0.321 mW/g
Peak SAR (extrapolated) = 0.436 W/kg
SAR(1 g) = 0.293 mW/g



0 dB = 0.321mW/g

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Test Laboratory: ESTECH

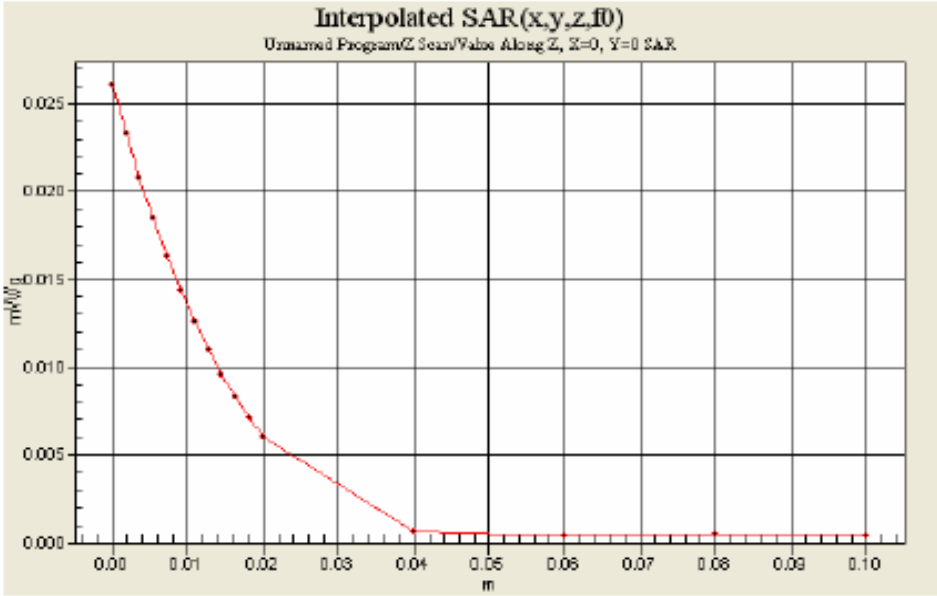
CH661 BODY-ZSCAN

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: M1900;Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(4.45, 4.45, 4.45); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 23℃, Humidity : 48%



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Test Laboratory: ESTECH

CH661 RIGHT TOUCH-BT disable

DUT: MG300, MG300d; Type: FOLDER TYPE; Serial: XXXX

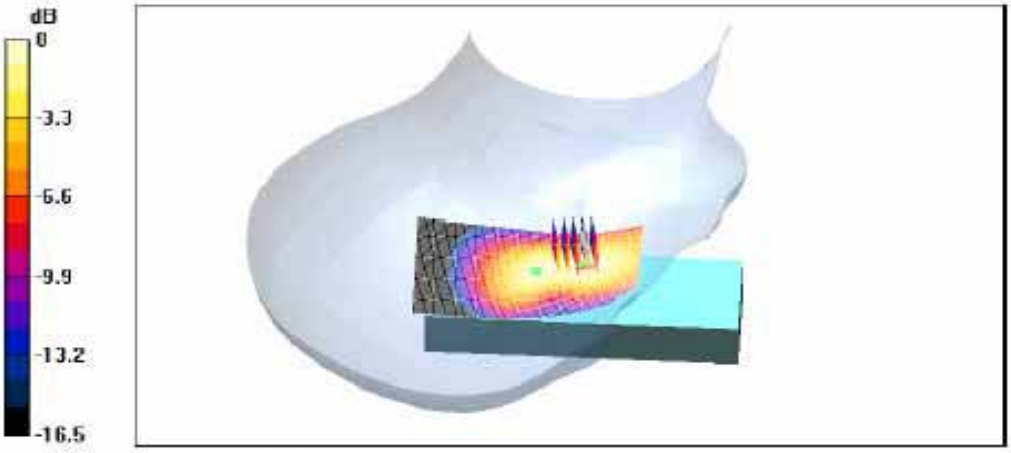
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: HSL1900;Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; ε_r = 38.8; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1748; ConvF(5.13, 5.13, 5.13); Calibrated: 2005-01-21
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn551; Calibrated: 2004-04-28
- Phantom: SAM MIC 1800Mhz; Type: SAM MIC 1800MHz; Serial: TP-1263
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112
- Temperature : 23℃, Humidity : 49%

Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 3.79 V/m; Power Drift = -0.1 dB
Maximum value of SAR (interpolated) = 0.450 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.79 V/m; Power Drift = -0.1 dB
Maximum value of SAR (measured) = 0.458 mW/g
Peak SAR (extrapolated) = 0.760 W/kg
SAR(1 g) = 0.418 mW/g



0 dB = 0.458mW/g