TEST REPORT

Equipment Under Test	**:** SEKITO
Model Number	**:** FOMA N600i
FCC ID	**:** A98-FOMA-N600I
Applicant	**:** NEC America Inc
Address of Applicant	**:** NEC America Inc Wireless Engineering Division 6535 N. State Highway 161 Irving, TX75039, United States
Date of Receipt	**:** 2005.12.09
Date of Test(s)	**:** 2005.12.12.-2005.12.13
Date of Issue	**:** 2005.12.14

Standards:

FCC OET Bulletin 65 supplement C, ANSI / IEEE C95.1 , C95.3, IEEE 1528

In the configuration tested, the EUT complied with the standards specified above.

Remarks:

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS Taiwan E&E Services or testing done by SGS Taiwan E&E Services in connection with distribution or use of the product described in this report must be approved by SGS Taiwan E&E Services in writing.

Tested by : Dikin Yang **Date : 2005.12.14**
DIKIN YANG

Approved by : Robert Chang **Date : 2005.12.14**
ROBERT CHANG

Contents

1. General Information

1.1 Testing Laboratory

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Internet : http://www.sgs.com.tw

1.2 Details of Applicant

Name : NEC America Inc
Address : NEC America Inc Wireless Engineering Division
6535 N. State Highway 161 Irving, TX75039,
United States
Telephone : 214-262-4241
Fax : 214-262-4225

1.3 Description of EUT(s)

EUT Type	SEKITO
Mode of Operation	GSM/UMTS Dual Mode
FCC ID	A98-FOMA-N600I
IMEI	004401200003586
Modulation Mode	GMSK
Maximum RF Conducted Power	29.55 dbm
Duty Cycle	1 / 8.3 on GSM/GPRS
GPRS Class	8 (4 downlink & 1 uplink)
TX Frequency range	1850.2-1909.8MHz
Channel Number (AFRFCN)	512-810
Battery Type	3.7V Lithium-Ion

Antenna Type	PIFA
Antenna Gain	-4.5dbi
HW Version	EP 1.5
SW Version	SKS00G00
Exposure environment	Uncontrolled exposure
Max. SAR Measured (1 g)	1.07 W/kg (At Left-Head Cheek512 Channel)

1.4 Test Environment

Ambient temperature : 22.1° C

Tissue Simulating Liquid : 21.6° C

Relative Humidity : 58 %

1.5 Operation description

The device was controlled by using a Universal Radio Communication Tester (CMU 200). Communication between the device and the tester was established by air link. Measurements were performed on the lowest, middle and highest channels of the operating band. The phone was set to maximum power level during all tests and at the beginning of each test the battery was fully charged.
The 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.

1.6 The SAR Measurement System

A photograph of the SAR measurement System is given in Fig. a. This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (Speag Dasy 4 professional system). A Model ET3DV6 1759 E-field probe is used to determine the internal electric fields. The SAR can be obtained from the equation SAR= $\sigma (|Ei|^2)/ \rho$ where σ and ρ are the conductivity and mass density of the tissue-simulant.
The DASY4 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Stabile RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).

- A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

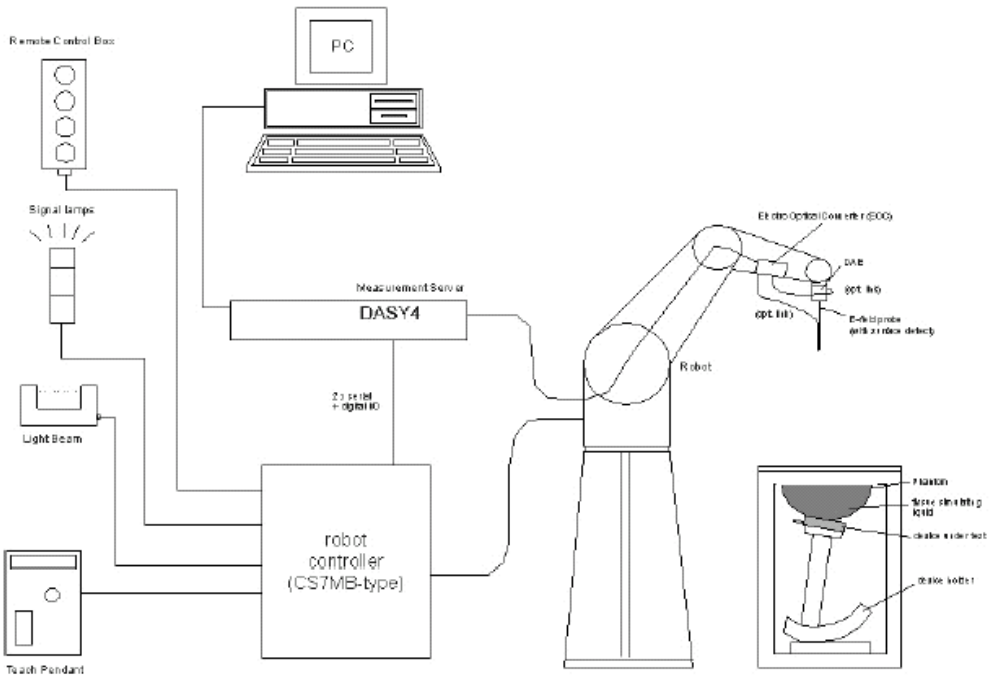


Fig. a The microwave circuit arrangement used for SAR system verification

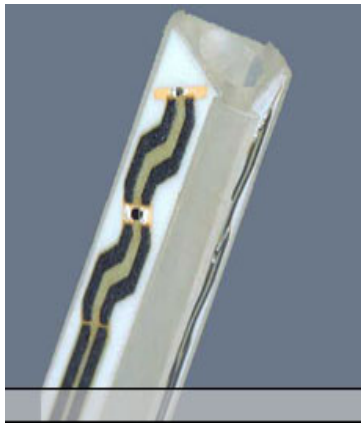
- The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
  - A computer operating Windows 2000 or Windows XP.
  - DASY4 software.
- Remote control with teach pendant and additional circuitry for robot safety such as

warning lamps, etc.

- The SAM twin phantom enabling testing left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validate the proper functioning of the system.

1.7 System Components

ET3DV6 E-Field Probe



ET3DV6 E-Field Probe

Construction:	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g. glycol)
Calibration:	In air from 10 MHz to 2.5 GHz In brain simulating tissue at frequencies of 850 MHz & 1900 MHz (accuracy ± 8%)
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) ±0.4 dB in brain tissue (rotation normal to probe axis)
Dynamic Range:	5 µW/g to >100 mW/g; Linearity: ±0.2 dB
Surface. Detect:	±0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces
Dimensions:	Overall length: 330 mm Tip length: 16 mm Body diameter: 12 mm Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm
Application:	General dosimetry up to 3 GHz Compliance tests of mobile phone

SAM PHANTOM V4.0C

Construction:	The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528-200X, CENELEC 50361 and IEC 62209. It enables the dosimetric evaluation of left and right hand phone

usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points with the robot.

Shell Thickness: 2 ± 0.2 mm
Filling Volume: Approx. 25 liters
Dimensions: Height: 251 mm;
Length: 1000 mm;
Width: 500 mm

DEVICE HOLDER

Construction

In combination with the Twin SAM Phantom V4.0/V4.0C or Twin SAM, the Mounting Device (made from POM) enables the rotation of the mounted transmitter in spherical coordinates, whereby the rotation point is the ear opening. The devices can be easily and accurately positioned according to IEC, IEEE, CENELEC, FCC or other specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).

Device Holder

1.8 SAR System Verification

The microwave circuit arrangement for system verification is sketched in Fig. b. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within +/- 10% from the target SAR values. These tests were done at 1900 MHz. The tests were conducted on the same days as the measurement of the DUT. The obtained results from the system accuracy verification are displayed in the table 1 (SAR values are normalized to 1W forward power delivered to the dipole). During the tests, the ambient temperature of the laboratory was in the range 22.1°C, the relative humidity was in the range 58% and the

liquid depth above the ear reference points was above 15 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.

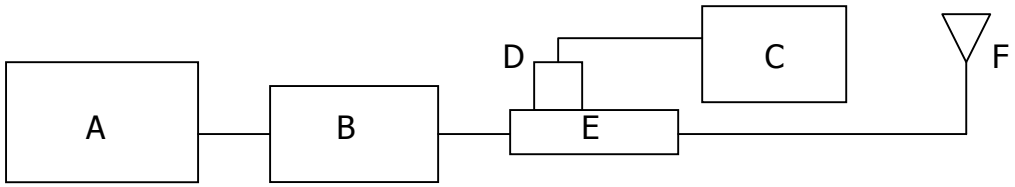
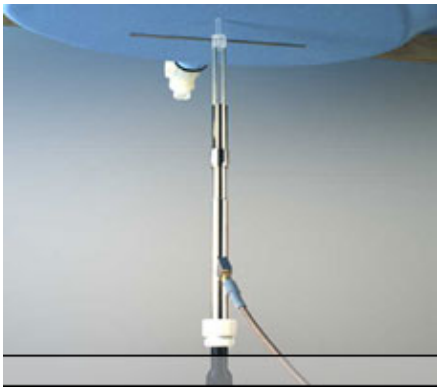


Fig.b The microwave circuit arrangement used for SAR system verification

A. Agilent Model 8648D Signal Generator
B. Mini circuits Model ZHL-42 Amplifier
C. Agilent Model E4416A Power Meter
D. Agilent Model 8481H Power Sensor
E. Agilent Model 778D and 777D
   Dual directional coupling
F. Reference dipole antenna



Photograph of the dipole Antenna

Validation Kit	Frequency (Position)	Target SAR 1g (250mW)	Target SAR 10g (250mW)	Measured SAR 1g	Measured SAR 10g	Measured date
D1900V2 S/N :5d027	1900 MHz (Head)	9.64 m W/g	5.07 m W/g	9.5 m W/g	4.85 m W/g	2005/12/12
	1900 MHz (Body)	9.92 m W/g	5.28 m W/g	9.67 m W/g	5.05 m W/g	2005/12/13

Table 1. Results system validation

1.9 Tissue Simulant Fluid for the Frequency Band

F (Mhz)	Tissue type	Limits/ Measured	Dielectric Parameters		
			ρ	σ (S/m)	Simulated Tissue Temp(° C)
1900	Head	Measured, 2005.12.12	38.48	1.459	21.7
		Recommended Limits	38-42	1.305-1.595	20-24
	Body	Measured, 2005.12.13	53.2	1.56	21.7
		Recommended Limits	50.6-56	1.44-1.6	20-24

Table 2. Dielectric Parameters of Tissue Simulant Fluid

The dielectric properties for this body-simulant fluid were measured by using the HP Model 85070D Dielectric Probe (rates frequence band 200 MHz to 20 GHz) in conjuncation with HP 8753D Network Analyzer(30 KHz-6000 MHz) by using a procedure detailed in Section V.
All dielectric parameters of tissue simulates were measured within 24 hours of SAR measurements. The depth of the tissue simulant in the ear reference point of the phantom was 15cm±5mm during all tests. (Fig .2 & Fig.3)

The composition of the brain tissue simulating liquid for 1900 MHz is:

Ingredient	1900Mhz(Head)	1900Mhz(Body)
DGMBE	444.52 g	300.67
Water	552.42 g	716.56
Salt	3.06 g	4.0
Preventol D-7	X	X
Cellulose	X	X
Sugar	X	X
Total amount	1 L (1.0kg)	1 L (1.0kg)

Table 3. Recipes for tissue simulating liquid

1.10 Test Standards and Limits

According to FCC 47CFR §2.1093(d) The limits to be used for evaluation are based generally on criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate ("SAR") in Section 4.2 of "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," ANSI/IEEE C95.1–1992, Copyright 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. 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 Radiofrequency Electromagnetic Fields," NCRP Report No. 86, Section 17.4.5. Copyright NCRP, 1986, Bethesda, Maryland 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards. The criteria to be used are specified in paragraphs (d)(1) and (d)(2) of this section and shall apply for portable devices transmitting in the frequency range from 100 kHz to 6 GHz. Portable devices that transmit at frequencies above 6 GHz are to be evaluated in terms of the MPE limits specified in § 1.1310 of this chapter. Measurements and calculations to demonstrate

compliance with MPE field strength or power density limits for devices operating above 6 GHz should be made at a minimum distance of 5 cm from the radiating source.

(1) Limits for Occupational/Controlled exposure: 0.4 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 8 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 20 W/kg, as averaged over an 10 grams of tissue (defined as a tissue volume in the shape of a cube). Occupational/Controlled limits apply when persons are exposed as a consequence of their employment provided these persons are fully aware of and exercise control over their exposure. Awareness of exposure can be accomplished by use of warning labels or by specific training or education through appropriate means, such as an RF safety program in a work environment.

(2) Limits for General Population/Uncontrolled exposure: 0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 4 W/kg, as averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). General Population/Uncontrolled limits apply when the general public may be exposed, or when persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or do not exercise control over their exposure. Warning labels placed on consumer devices such as cellular telephones will not be sufficient reason to allow these devices to be evaluated subject to limits for occupational/controlled exposure in paragraph (d)(1) of this section.(Table .4)

Human Exposure	**Uncontrolled Environment General Population**	**Controlled Environment Occupational**
Spatial Peak SAR (Brain)	1.60 m W/g	8.00 m W/g
Spatial Average SAR (Whole Body)	0.08 m W/g	0.40 m W/g
Spatial Peak SAR (Hands/Feet/Ankle/Wrist)	4.00 m W/g	20.00 m W/g

Table .4 RF exposure limits

Notes:

1. Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.
2. Controlled environments are defined as locations where there is potential exposure of individuals who have knowledge of their potential exposure and can exercise control over their exposure.

2.Summary of Results

GSM 1900 MHZ

Right Head (Cheek Position)						
Frequency	Channel	MHz	Conducted Output Power(Average)	Measured(W/kg) 1g/10g	Amb. Temp[˚C]	Liquid Temp[˚C]
1900 MHz	512	1850.2	29.5dbm	0.539/0.291	22.1	21.6
	661	1880	29.55dbm	0.376/0.200	22.1	21.6
	810	1909.8	28.95dbm	0.44/0.213	22.1	21.6
Left Head (Cheek Position)						
Frequency	Channel	MHz	Conducted Output Power(Average)	Measured(W/kg) 1g/10g	Amb. Temp[˚C]	Liquid Temp[˚C]
1900 MHz	512	1850.2	29.5dbm	1.07/0.524	22.1	21.6
	661	1880	29.55dbm	0.925/0.446	22.1	21.6
	810	1909.8	28.95dbm	0.845/0.405	22.1	21.6
Right Head (15° Tilt Position)						
Frequency	Channel	MHz	Conducted Output Power(Average)	Measured(W/kg) 1g/10g	Amb. Temp[˚C]	Liquid Temp[˚C]
1900 MHz	512	1850.2	29.5dbm	0.355/0.202	22.1	21.6
	661	1880	29.55dbm	0.248/0.140	22.1	21.6
	810	1909.8	28.95dbm	0.189/0.106	22.1	21.6
Left Head (15° Tilt Position)						
Frequency	Channel	MHz	Conducted Output Power(Average)	Measured(W/kg) 1g/10g	Amb. Temp[˚C]	Liquid Temp[˚C]
1900 MHz	512	1850.2	29.5dbm	0.334/0.189	22.1	21.6
	661	1880	29.55dbm	0.224/0.127	22.1	21.6
	810	1909.8	28.95dbm	0.165/0.092	22.1	21.6
Body Worn with Headset						
Frequency	Channel	MHz	Conducted Output Power(Average)	Measured(W/kg) 1g/10g	Amb. Temp[˚C]	Liquid Temp[˚C]
1900 MHz	512	1850.2	29.5dbm	0.100/0.052	22.1	21.6
	661	1880	29.55dbm	0.062/0.032	22.1	21.6
	810	1909.8	28.95dbm	0.042/0.021	22.1	21.6

Note:SAR measurement results for the Mobile Phone at maximum output power.

3. Instruments List

Manufacturer	Device	Type	Serial number	Date of last calibration
Schmid & Partner Engineering AG	Dosimetric E-Field Probe	ET3DV6	1759	Aug.30.2005
Schmid & Partner Engineering AG	1900 MHz System Validation Dipole	D1900V2	5d027	Feb.18.2005
Schmid & Partner Engineering AG	Data acquisition Electronics	DAE3	547	Feb.16.2005
Schmid & Partner Engineering AG	Software	DASY 4 V4.4c Build 19	N/A	Calibration isn't necessary
Schmid & Partner Engineering AG	Phantom	SAM	N/A	Calibration isn't necessary
Agilent	Network Analyzer	8753D	3410A05547	Jun.02.2005
Agilent	Dielectric Probe Kit	85070D	US01440168	Calibration isn't necessary
Agilent	Dual-directional coupler	777D 778D	50114 50313	Aug.12.2005 Aug12.2005
Agilent	RF Signal Generator	8648D	3847M00432	Apr.15.2005
Agilent	Power Sensor	8481H	MY41091361	May.27.2005
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	102189	Oct.24.2005

4.Measurements

Right-Head Cheek CH512

Date/Time: 2005/12/12 16:15:46

DUT: N600i; Type: Flip; Serial: **004401200003586**
Program: GSM 1900MHZ

Communication System: GSM 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium: Head 1900MHz Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.4 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Right Section

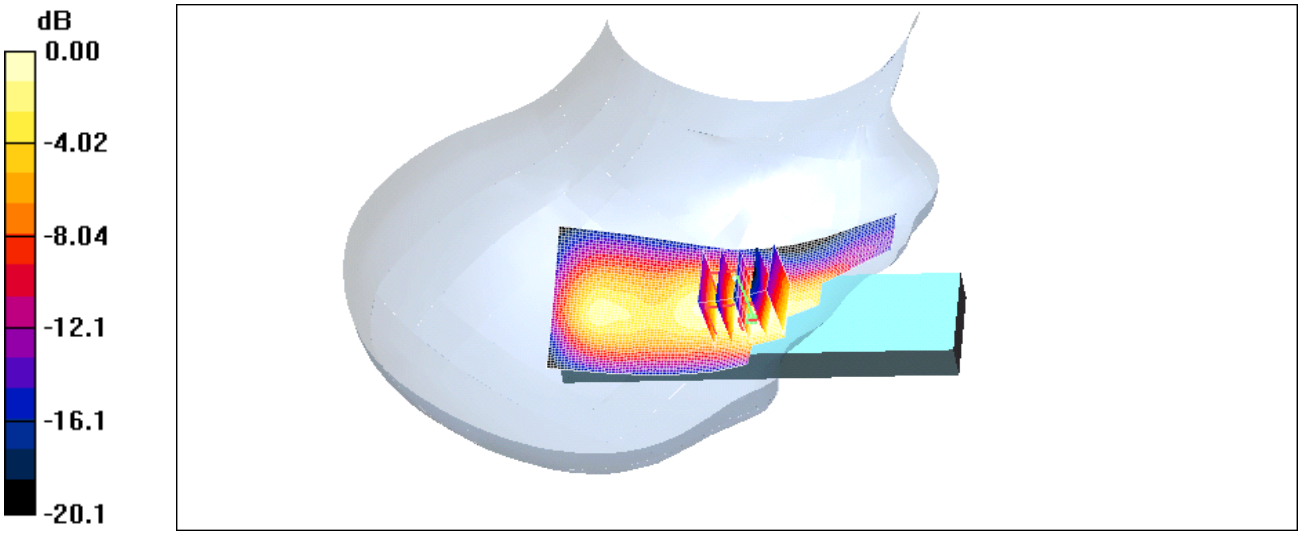
DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(5.11, 5.11, 5.11); Calibrated: 2005/8/30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2005/2/16
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

RightCheek/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.664 mW/g

RightCheek/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.8 V/m; Power Drift = -0.056 dB
Peak SAR (extrapolated) = 1.15 W/kg

SAR(1 g) = 0.539 mW/g; SAR(10 g) = 0.291 mW/g
Maximum value of SAR (measured) = 0.620 mW/g



0 dB = 0.620mW/g

Right-Head Cheek CH661

Date/Time: 2005/12/12 16:36:34

DUT: N600i; Type: Flip; Serial: **004401200003586**
Program: GSM 1900MHZ

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Head 1900MHz Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Right Section

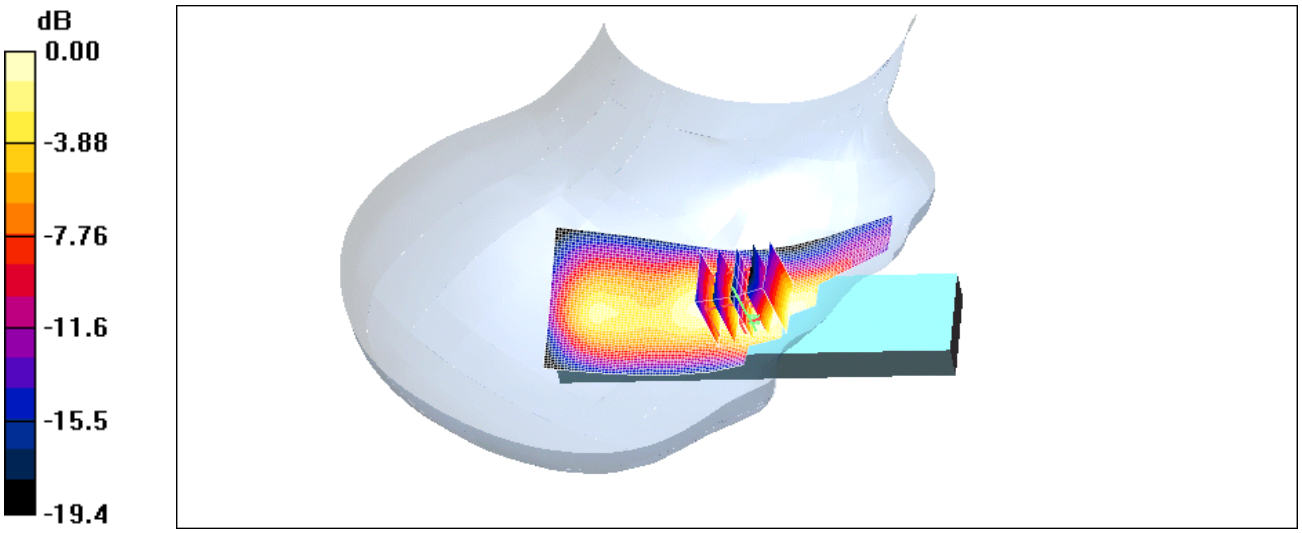
DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(5.11, 5.11, 5.11); Calibrated: 2005/8/30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2005/2/16
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

RightCheek/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.446 mW/g

RightCheek/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.6 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.797 W/kg

SAR(1 g) = 0.376 mW/g; SAR(10 g) = 0.200 mW/g
Maximum value of SAR (measured) = 0.437 mW/g



0 dB = 0.437mW/g

Right-Head Cheek CH810

Date/Time: 2005/12/12 16:55:12

DUT: N600i; Type: Flip; Serial: **004401200003586**
Program: GSM 1900MHZ

Communication System: GSM 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium: Head 1900MHz Medium parameters used (interpolated): f = 1909.8 MHz; σ = 1.46 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Right Section

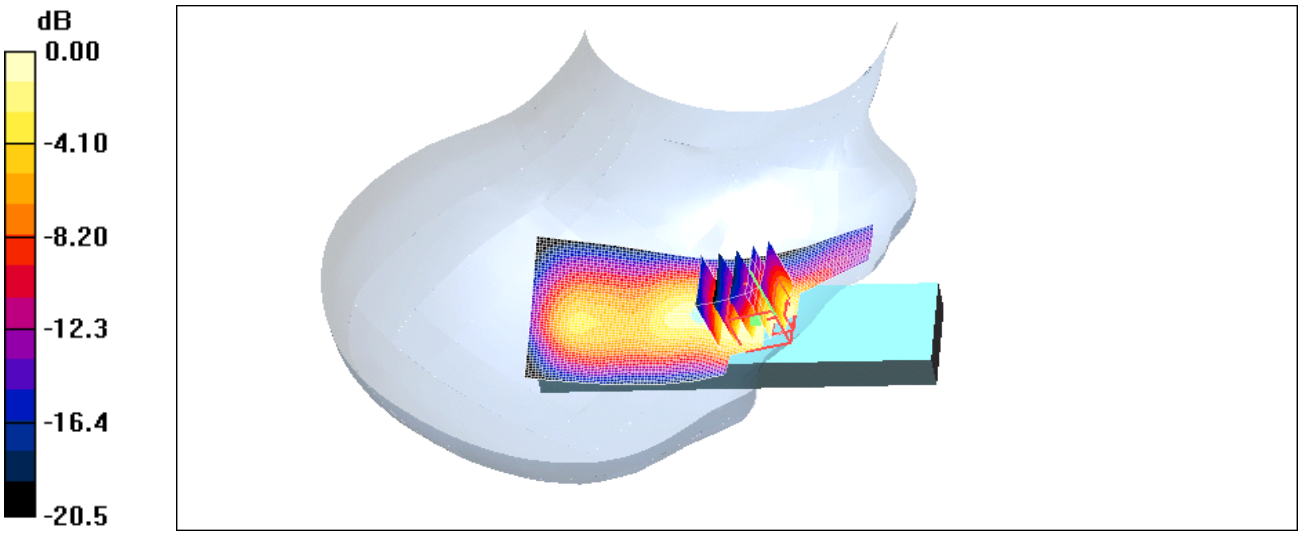
DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(5.11, 5.11, 5.11); Calibrated: 2005/8/30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2005/2/16
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

RightCheek/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.372 mW/g

RightCheek/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.0 V/m; Power Drift = -0.024 dB
Peak SAR (extrapolated) = 0.783 W/kg

SAR(1 g) = 0.440 mW/g; SAR(10 g) = 0.213 mW/g
Maximum value of SAR (measured) = 0.478 mW/g



0 dB = 0.478mW/g

Left-Head Cheek CH512

Date/Time: 2005/12/12 15:29:45

DUT: N600i; Type: Flip; Serial: **004401200003586**
Program: GSM 1900MHZ

Communication System: GSM 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium: Head 1900MHz Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.4 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Left Section

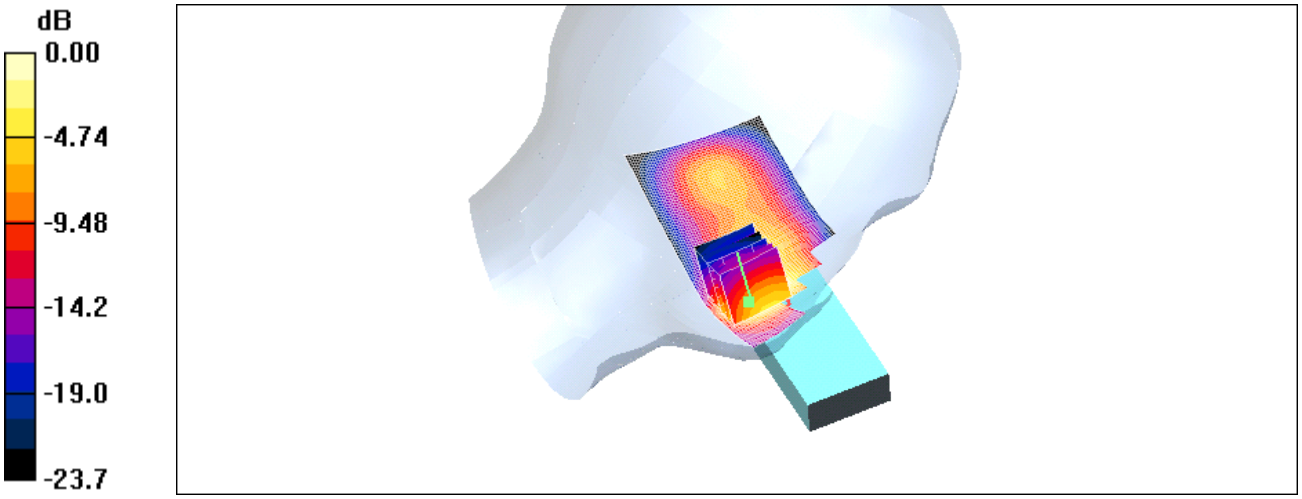
DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(5.11, 5.11, 5.11); Calibrated: 2005/8/30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2005/2/16
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

LeftCheek/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.08 mW/g

LeftCheek/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.0 V/m; Power Drift = -0.096 dB
Peak SAR (extrapolated) = 2.00 W/kg

SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.524 mW/g
Maximum value of SAR (measured) = 1.16 mW/g



0 dB = 1.16mW/g

Left-Head Cheek CH661

Date/Time: 2005/12/12 15:47:32

DUT: N600i; Type: Flip; Serial: **004401200003586**
Program: GSM 1900MHZ

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Head 1900MHz Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Left Section

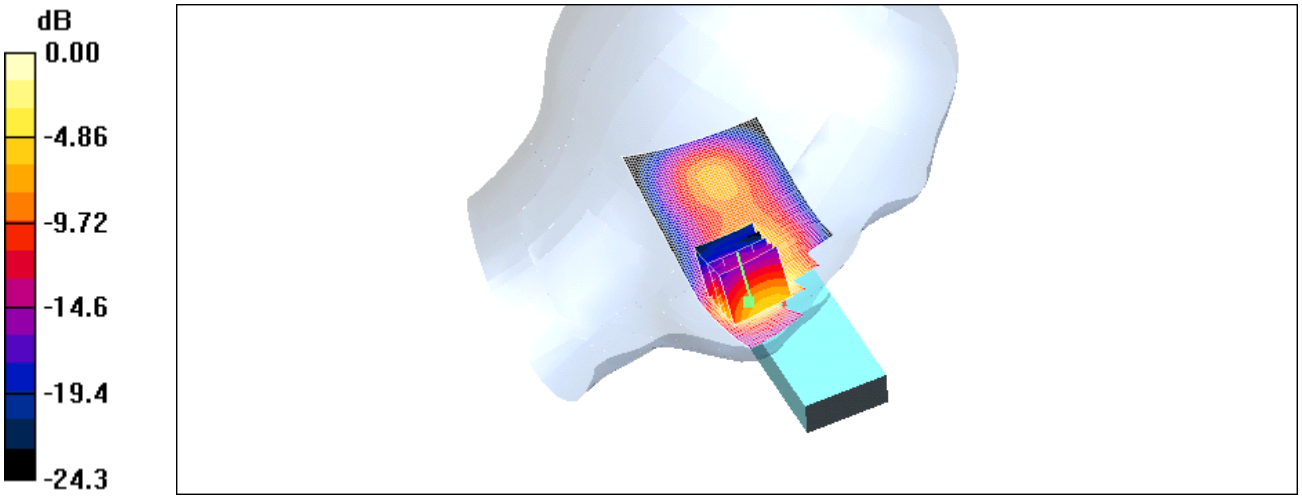
DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(5.11, 5.11, 5.11); Calibrated: 2005/8/30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2005/2/16
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

LeftCheek/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.939 mW/g

LeftCheek/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.9 V/m; Power Drift = -0.021 dB
Peak SAR (extrapolated) = 1.72 W/kg

SAR(1 g) = 0.925 mW/g; SAR(10 g) = 0.446 mW/g
Maximum value of SAR (measured) = 1.03 mW/g



0 dB = 1.03mW/g

Left-Head Cheek CH810

Date/Time: 2005/12/12 15:07:43

DUT: N600i; Type: Flip; Serial: **004401200003586**
Program: GSM 1900MHZ

Communication System: GSM 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium: Head 1900MHz Medium parameters used (interpolated): f = 1909.8 MHz; σ = 1.46 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Left Section

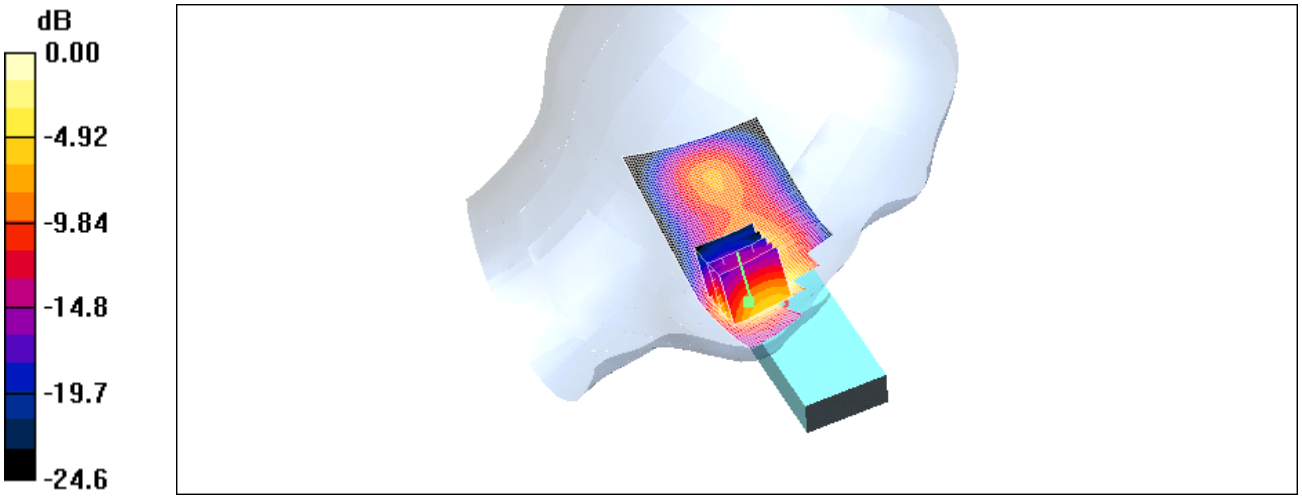
DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(5.11, 5.11, 5.11); Calibrated: 2005/8/30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2005/2/16
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

LeftCheek/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.831 mW/g

LeftCheek/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.58 V/m; Power Drift = -0.014 dB
Peak SAR (extrapolated) = 1.57 W/kg

SAR(1 g) = 0.845 mW/g; SAR(10 g) = 0.405 mW/g
Maximum value of SAR (measured) = 0.941 mW/g



0 dB = 0.941mW/g

Right-Head Tilt CH512

Date/Time: 2005/12/12 17:32:53

DUT: N600i; Type: Flip; Serial: **004401200003586**
Program: GSM 1900MHZ

Communication System: GSM 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium: Head 1900MHz Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.4 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Right Section

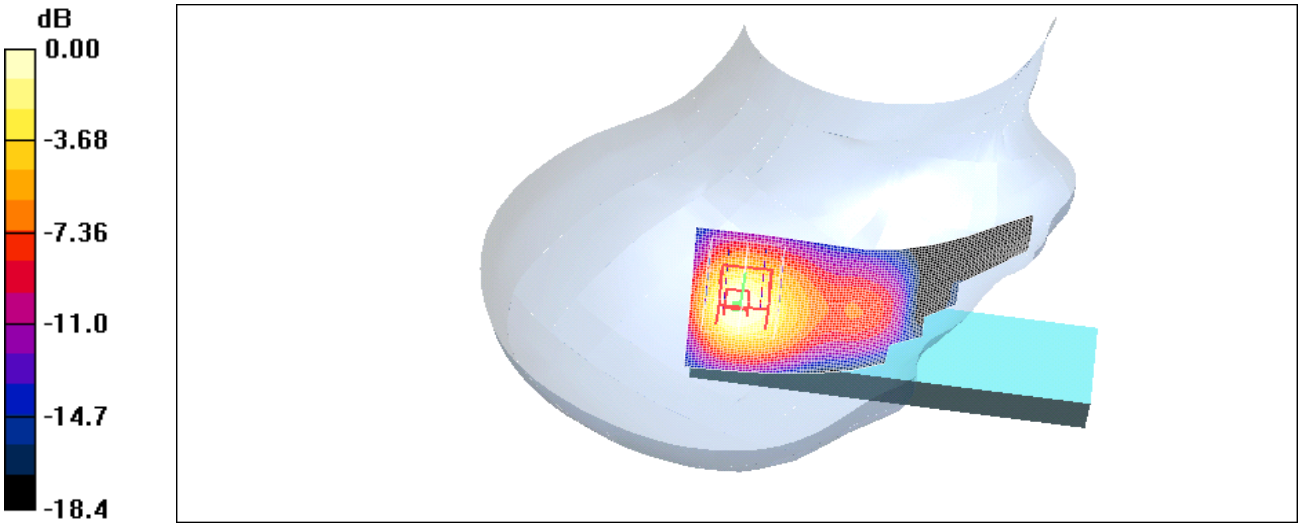
DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(5.11, 5.11, 5.11); Calibrated: 2005/8/30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2005/2/16
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

RightTilt/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.442 mW/g

RightTilt/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.1 V/m; Power Drift = -0.060 dB
Peak SAR (extrapolated) = 0.555 W/kg

SAR(1 g) = 0.355 mW/g; SAR(10 g) = 0.202 mW/g
Maximum value of SAR (measured) = 0.392 mW/g



0 dB = 0.392mW/g

Right-Head Tilt CH661

Date/Time: 2005/12/12 17:50:33

DUT: N600i; Type: Flip; Serial: **004401200003586**
Program: GSM 1900MHZ

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Head 1900MHz Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Right Section

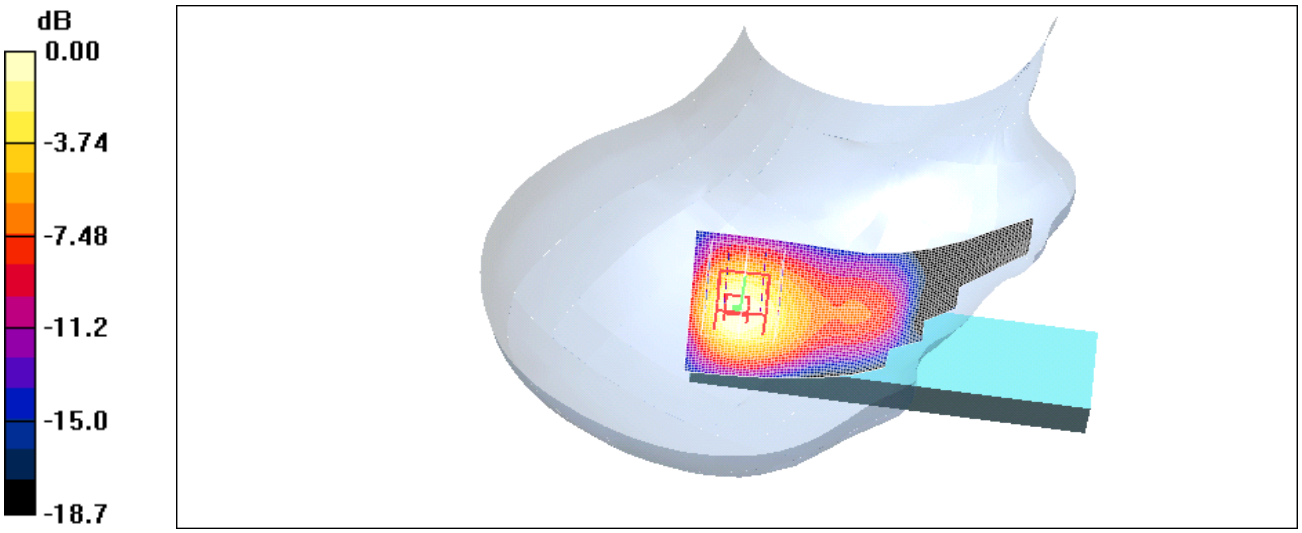
DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(5.11, 5.11, 5.11); Calibrated: 2005/8/30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2005/2/16
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

RightTilt/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.308 mW/g

RightTilt/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.9 V/m; Power Drift = 0.084 dB
Peak SAR (extrapolated) = 0.390 W/kg

SAR(1 g) = 0.248 mW/g; SAR(10 g) = 0.140 mW/g
Maximum value of SAR (measured) = 0.270 mW/g



0 dB = 0.270mW/g

Right-Head Tilt CH810

Date/Time: 2005/12/12 17:15:42

DUT: N600i; Type: Flip; Serial: **004401200003586**
Program: GSM 1900MHZ

Communication System: GSM 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium: Head 1900MHz Medium parameters used (interpolated): f = 1909.8 MHz; σ = 1.46 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Right Section

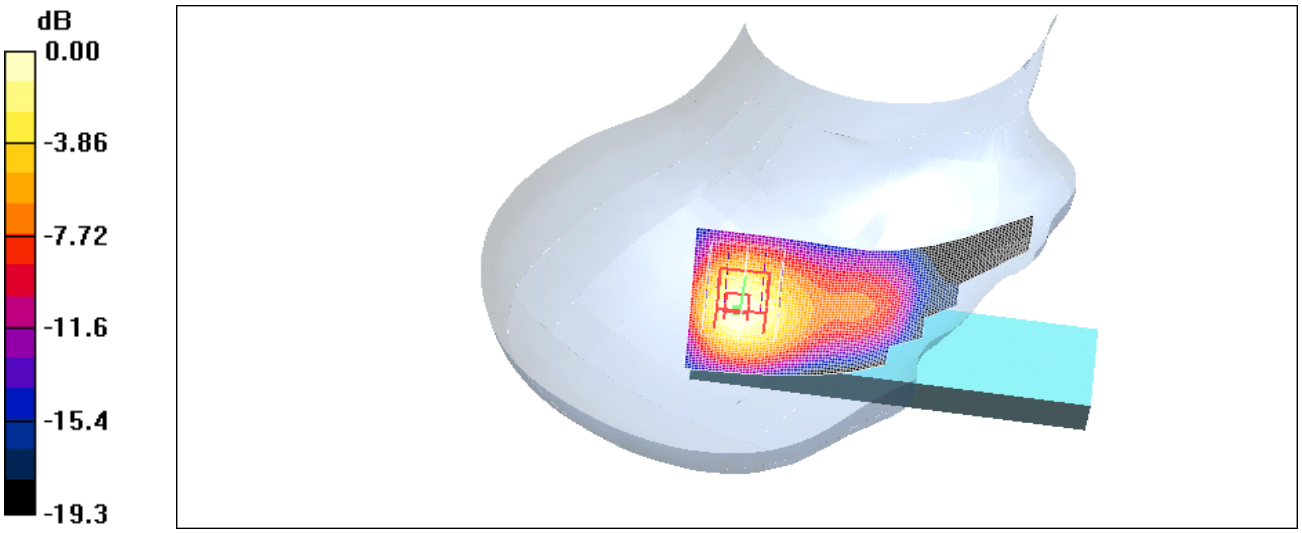
DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(5.11, 5.11, 5.11); Calibrated: 2005/8/30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2005/2/16
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

RightTilt/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.229 mW/g

RightTilt/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.2 V/m; Power Drift = 0.037 dB
Peak SAR (extrapolated) = 0.299 W/kg

SAR(1 g) = 0.189 mW/g; SAR(10 g) = 0.106 mW/g
Maximum value of SAR (measured) = 0.207 mW/g



0 dB = 0.207mW/g

Left-Head Tilt CH512

Date/Time: 2005/12/12 14:10:46

DUT: N600i; Type: Flip; Serial: **004401200003586**
Program: GSM 1900MHZ

Communication System: GSM 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium: Head 1900MHz Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.4 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Left Section

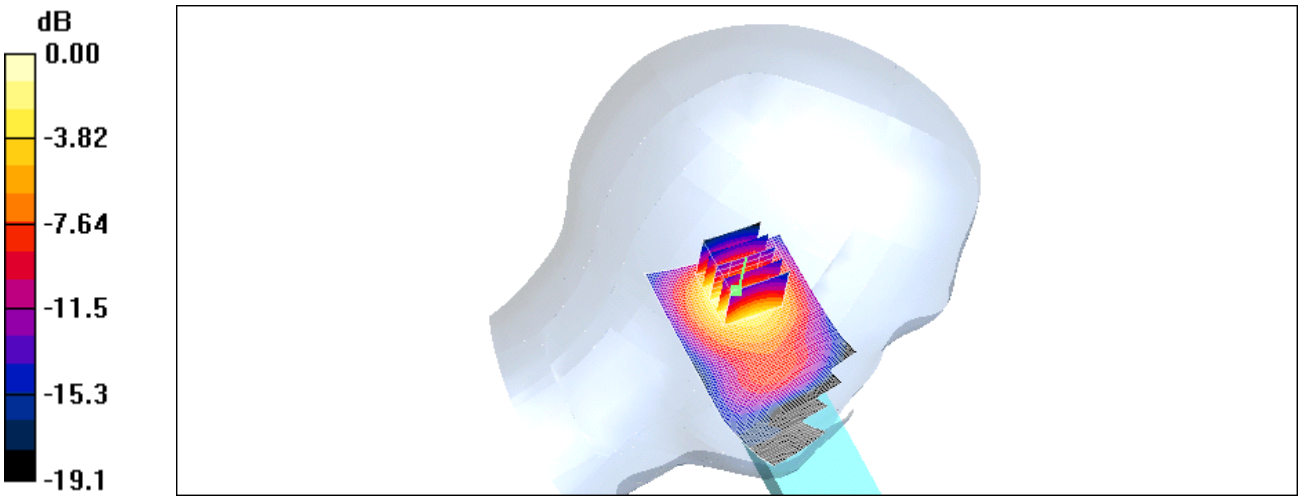
DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(5.11, 5.11, 5.11); Calibrated: 2005/8/30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2005/2/16
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

LeftTIlt/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.406 mW/g

LeftTilt/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.6 V/m; Power Drift = 0.048 dB
Peak SAR (extrapolated) = 0.523 W/kg

SAR(1 g) = 0.334 mW/g; SAR(10 g) = 0.189 mW/g
Maximum value of SAR (measured) = 0.370 mW/g



0 dB = 0.370mW/g

Left-Head Tilt CH661

Date/Time: 2005/12/12 14:30:16

DUT: N600i; Type: Flip; Serial: **004401200003586**
Program: GSM 1900MHZ

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Head 1900MHz Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Left Section

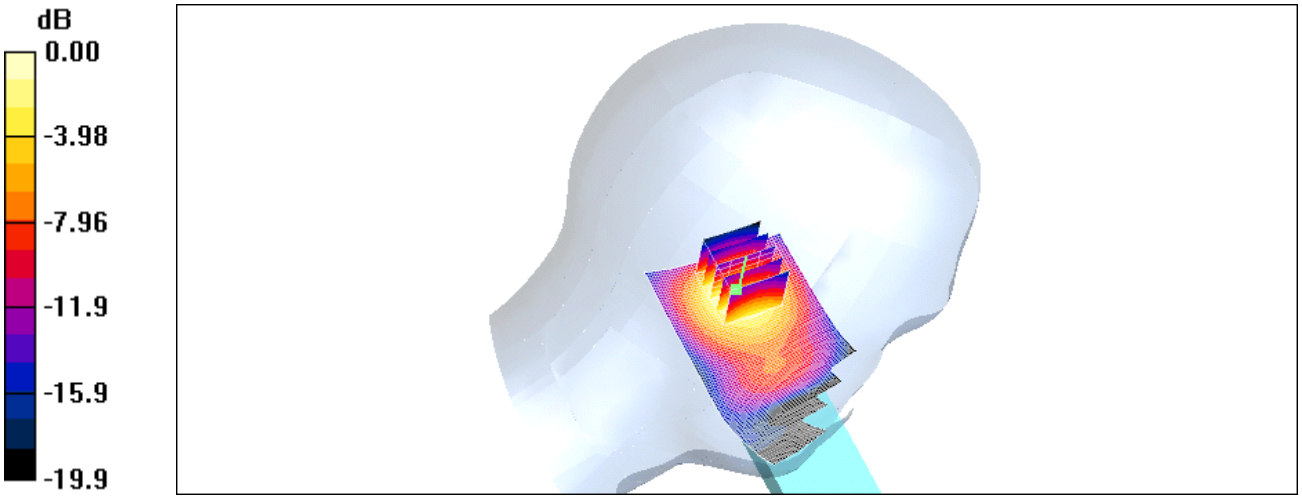
DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(5.11, 5.11, 5.11); Calibrated: 2005/8/30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2005/2/16
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

LeftTilt/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.277 mW/g

LeftTilt/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.8 V/m; Power Drift = -0.059 dB
Peak SAR (extrapolated) = 0.353 W/kg

SAR(1 g) = 0.224 mW/g; SAR(10 g) = 0.127 mW/g
Maximum value of SAR (measured) = 0.246 mW/g



0 dB = 0.246mW/g

Left-Head Tilt CH810

Date/Time: 2005/12/12 14:49:11

DUT: N600i; Type: Flip; Serial: **004401200003586**
Program: GSM 1900MHZ

Communication System: GSM 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium: Head 1900MHz Medium parameters used (interpolated): f = 1909.8 MHz; σ = 1.46 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Left Section

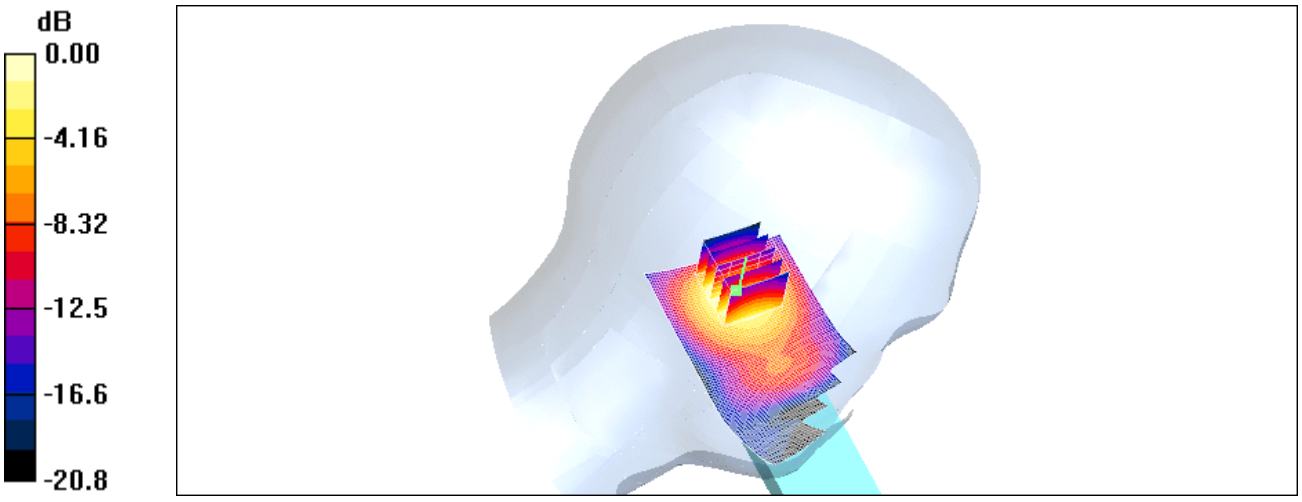
DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(5.11, 5.11, 5.11); Calibrated: 2005/8/30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2005/2/16
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

LeftTilt/Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.203 mW/g

LeftTilt/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.8 V/m; Power Drift = 0.022 dB
Peak SAR (extrapolated) = 0.266 W/kg

SAR(1 g) = 0.165 mW/g; SAR(10 g) = 0.092 mW/g
Maximum value of SAR (measured) = 0.183 mW/g



0 dB = 0.183mW/g

Body CH512

Date/Time: 2005/12/13 14:59:36

DUT: N600i; Type: Flip; Serial: **004401200003586**
Program: GSM 1900MHZ

Communication System: GSM 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium: M1800 & 1900 Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.52 mho/m; ε_r = 53.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

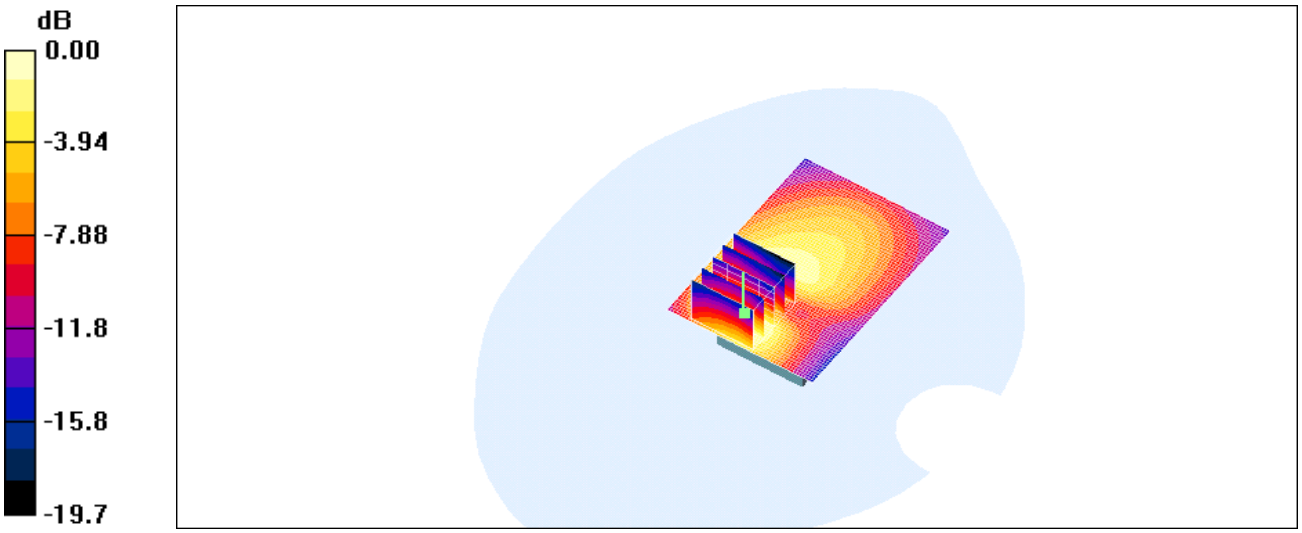
DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.4, 4.4, 4.4); Calibrated: 2005/8/30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2005/2/16
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Body/Area Scan (51x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.113 mW/g

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.52 V/m; Power Drift = -0.011 dB
Peak SAR (extrapolated) = 0.179 W/kg

SAR(1 g) = 0.100 mW/g; SAR(10 g) = 0.052 mW/g
Maximum value of SAR (measured) = 0.113 mW/g



0 dB = 0.113mW/g

Body CH661

Date/Time: 2005/12/13 17:05:19

DUT: N600i; Type: Flip; Serial: **004401200003586**
Program: GSM 1900MHZ

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: M1800 & 1900 Medium parameters used (interpolated): f = 1880 MHz; σ = 1.54 mho/m; ε_r = 53.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

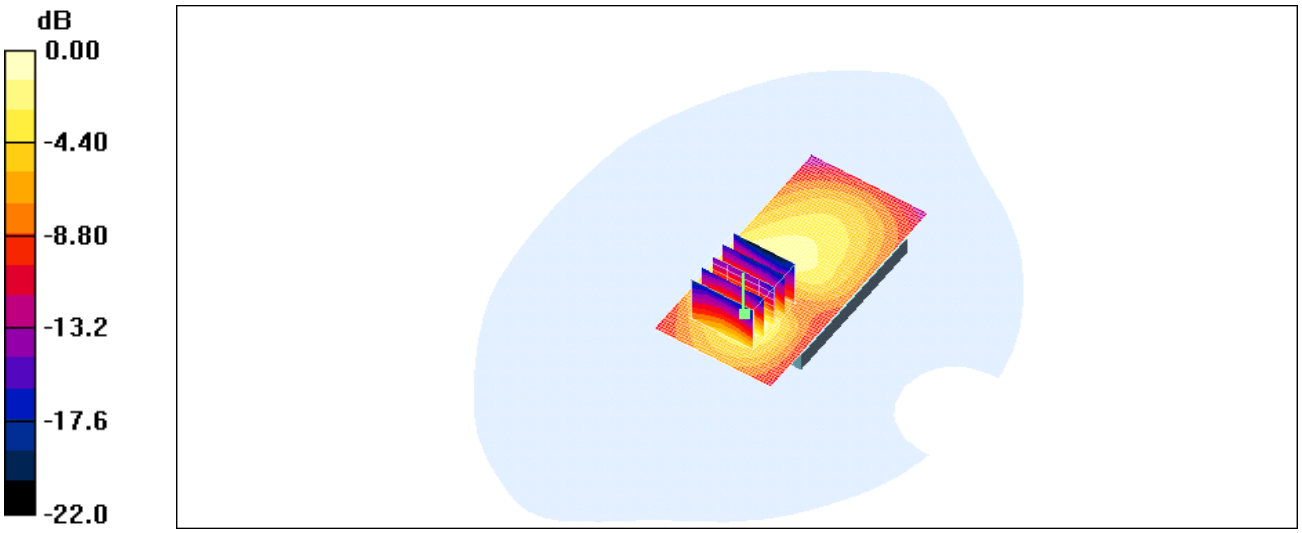
DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.4, 4.4, 4.4); Calibrated: 2005/8/30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2005/2/16
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Body/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.067 mW/g

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.16 V/m; Power Drift = -0.064 dB
Peak SAR (extrapolated) = 0.114 W/kg

SAR(1 g) = 0.062 mW/g; SAR(10 g) = 0.032 mW/g
Maximum value of SAR (measured) = 0.070 mW/g



0 dB = 0.070mW/g

Body CH810

Date/Time: 2005/12/13 17:21:27

DUT: N600i; Type: Flip; Serial: **004401200003586**
Program: GSM 1900MHZ

Communication System: GSM 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium: M1800 & 1900 Medium parameters used (interpolated): f = 1909.8 MHz; σ = 1.57 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

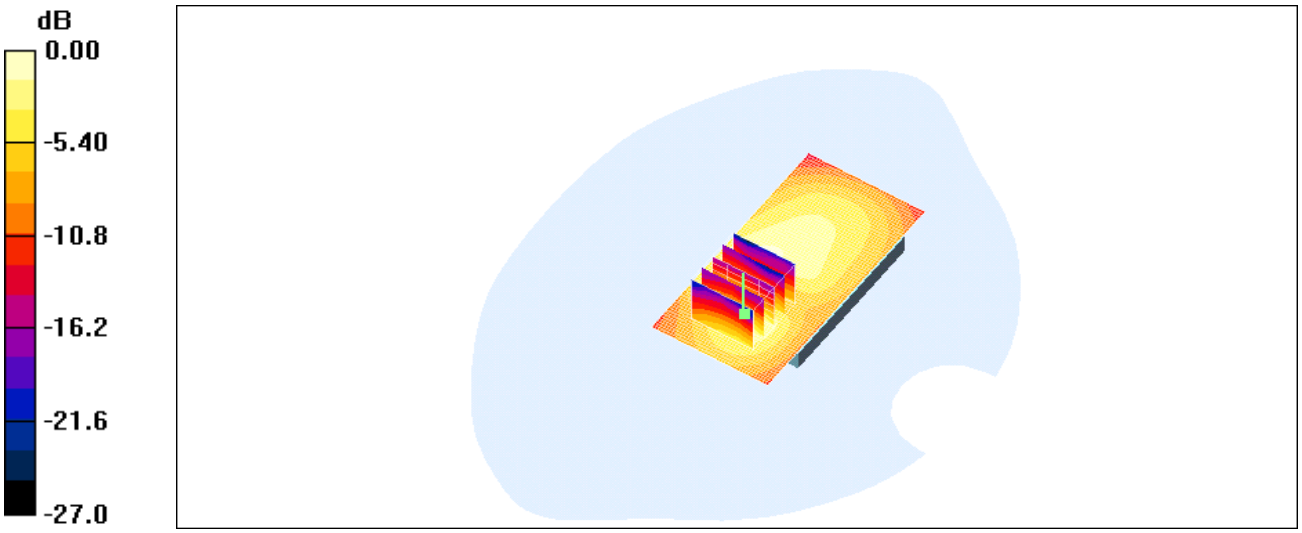
DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.4, 4.4, 4.4); Calibrated: 2005/8/30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2005/2/16
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Body/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.046 mW/g

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.06 V/m; Power Drift = 0.020 dB
Peak SAR (extrapolated) = 0.079 W/kg

SAR(1 g) = 0.042 mW/g; SAR(10 g) = 0.021 mW/g
Maximum value of SAR (measured) = 0.047 mW/g



0 dB = 0.047mW/g

SAR System Performance Verification

Date/Time: 2005/12/12 09:15:15

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 – SN:5d027
Program: 20051212

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: Head 1900MHz Medium parameters used (interpolated): f = 1900 MHz; σ = 1.46 mho/m; ε_r = 38.48; ρ = 1000 kg/m^3
Phantom section: Flat Section

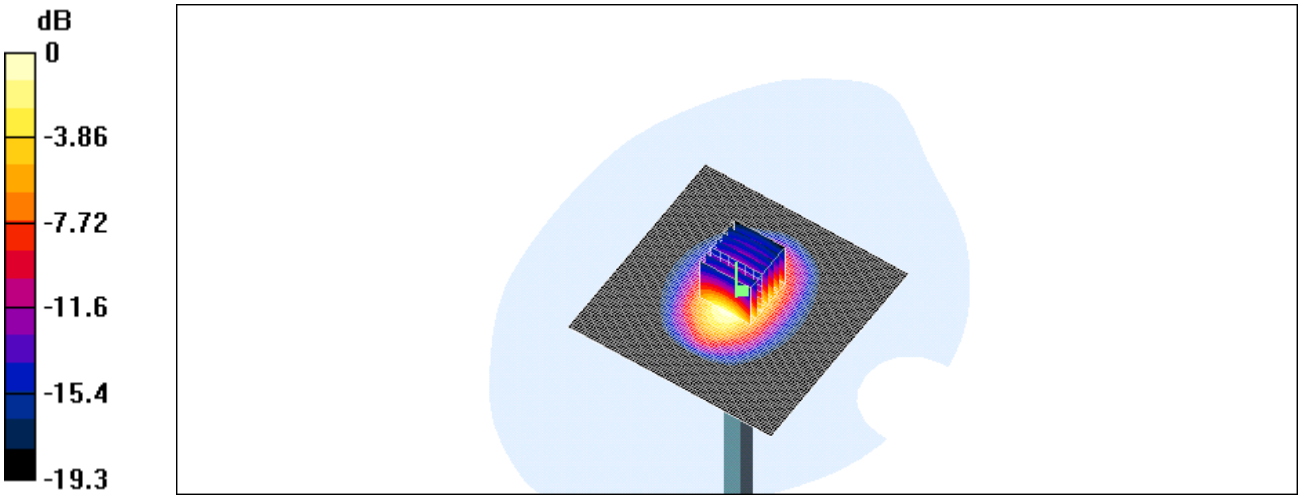
DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.4, 4.4, 4.4); Calibrated: 2005/8/30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2005/2/16
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Pin=250mw/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 11.1 mW/g

Pin=250mw/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89.1 V/m; Power Drift = -0.002 dB
Peak SAR (extrapolated) = 16.5 W/kg

SAR(1 g) = 9.50 mW/g; SAR(10 g) = 4.85 mW/g
Maximum value of SAR (measured) = 10.7 mW/g



0 dB = 10.7mW/g

SAR System Performance Verification

Date/Time: 2005/12/13 13:15:17

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d027
Program: 20051213

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: M1800 & 1900 Medium parameters used (interpolated): f = 1900 MHz; σ = 1.56 mho/m; ε_r = 53.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

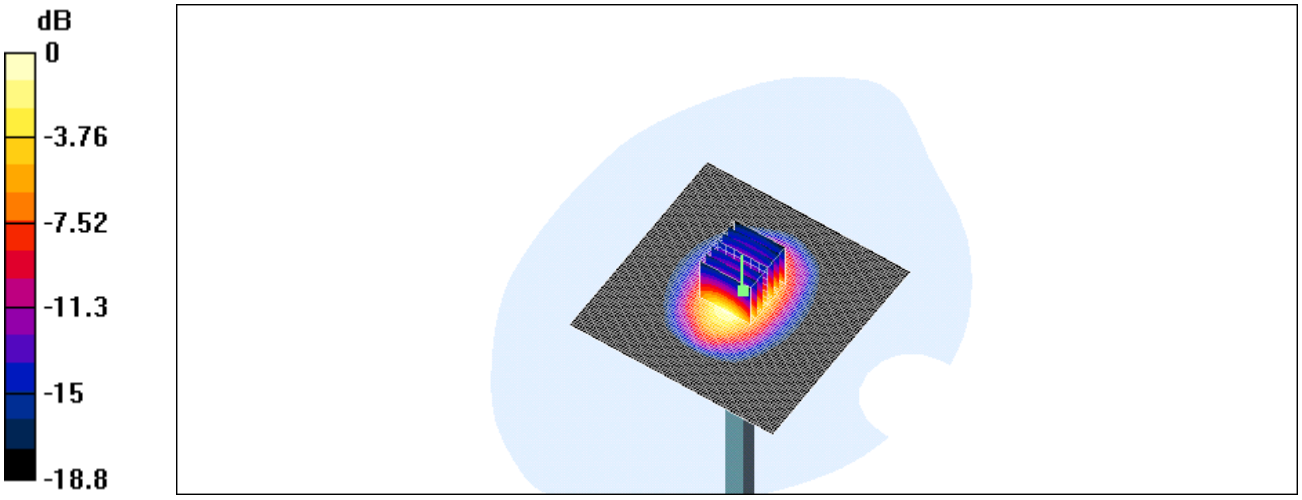
DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.4, 4.4, 4.4); Calibrated: 2005/8/30
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2005/2/16
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Pin=250mw/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.5 mW/g

Pin=250mw/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 90.2 V/m; Power Drift = -0.003 dB
Peak SAR (extrapolated) = 17.5 W/kg

SAR(1 g) = 9.67 mW/g; SAR(10 g) = 5.05 mW/g
Maximum value of SAR (measured) = 12.3 mW/g



0 dB = 12.3mW/g

Probe Calibration certificate

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Federal Office of Metrology and Accreditation
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client SGS (Auden)

Certificate No: ET3-1759_Aug05

CALIBRATION CERTIFICATE

Object	ET3DV6 - SN:1759
Calibration procedure(s)	QA CAL-01.v5 Calibration procedure for dosimetric E-field probes
Calibration date:	August 30, 2005
Condition of the calibrated item	In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41495277	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41498087	3-May-05 (METAS, No. 251-00466)	May-06
Reference 3 dB Attenuator	SN: S5054 (3c)	11-Aug-05 (METAS, No. 251-00499)	Aug-06
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-05 (METAS, No. 251-00467)	May-06
Reference 30 dB Attenuator	SN: S5129 (30b)	11-Aug-05 (METAS, No. 251-00500)	Aug-06
Reference Probe ES3DV2	SN: 3013	7-Jan-05 (SPEAG, No. ES3-3013_Jan05)	Jan-06
DAE4	SN: 654	29-Nov-04 (SPEAG, No. DAE4-654_Nov04)	Nov-05

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

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

Issued: August 30, 2005

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Federal Office of Metrology and Accreditation
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ET3DV6

SN:1759

Manufactured:	November 12, 2002
Last calibrated:	March 23, 2005
Repaired:	July 28, 2005
Recalibrated:	August 30, 2005

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

ET3DV6 SN:1759 **August 30, 2005**

DASY - Parameters of Probe: ET3DV6 SN:1759

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

NormX	**1.97** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**93** mV
NormY	**1.90** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**93** mV
NormZ	**1.93** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**93** mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL **900 MHz** **Typical SAR gradient: 5 % per mm**

Sensor Center to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	8.3	4.7
SAR_{be} [%]	With Correction Algorithm	0.0	0.2

TSL **1810 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	13.4	9.2
SAR_{be} [%]	With Correction Algorithm	0.8	0.2

Sensor Offset

Probe Tip to Sensor Center	**2.7** mm

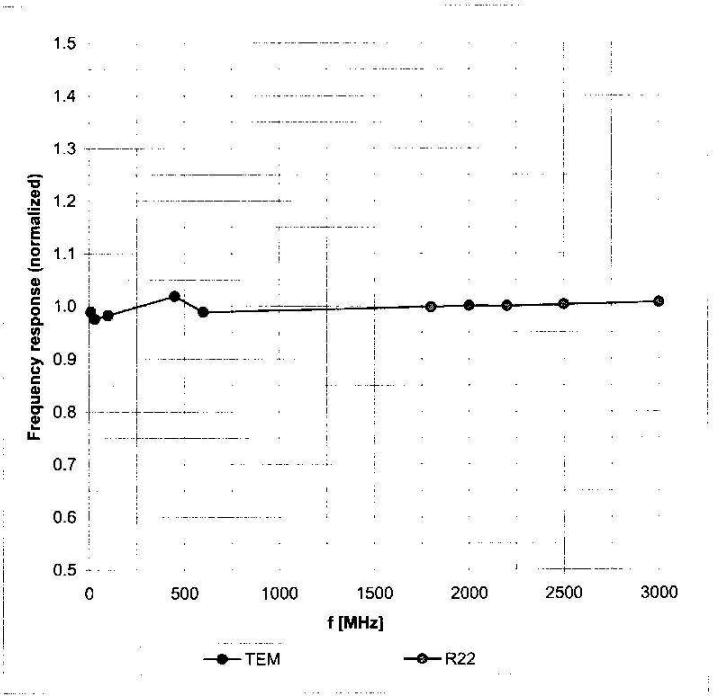
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

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

[B] Numerical linearization parameter: uncertainty not required.

Frequency Response of E-Field

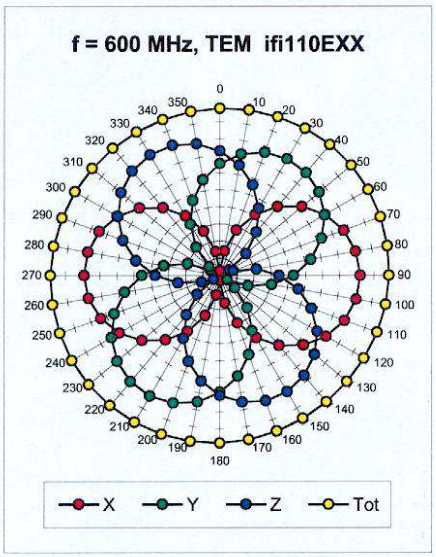
(TEM-Cell:ifi110 EXX, Waveguide: R22)

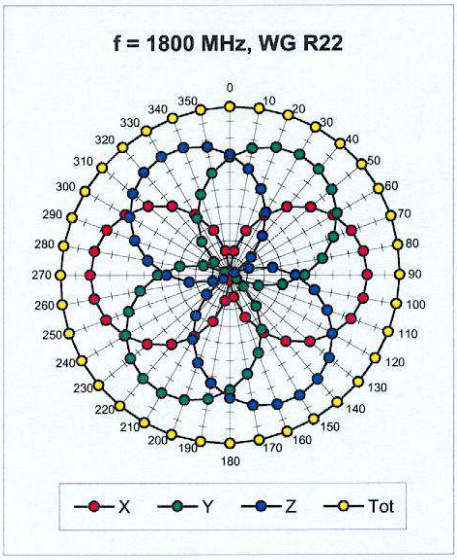


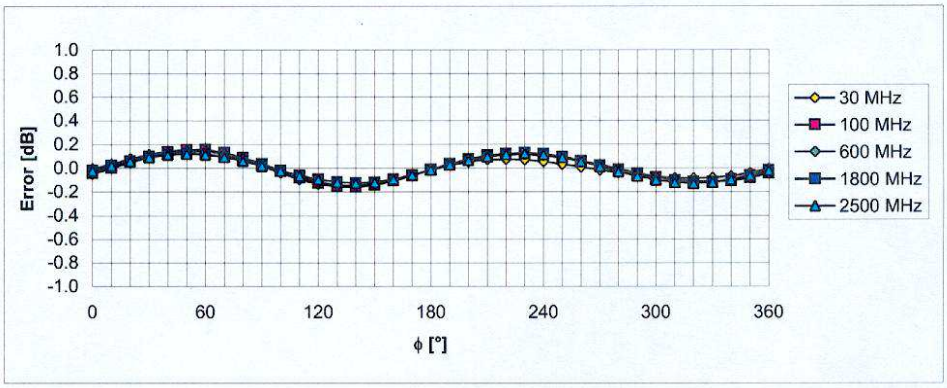
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

ET3DV6 SN:1759 August 30, 2005

Receiving Pattern (ϕ), ϑ = 0°





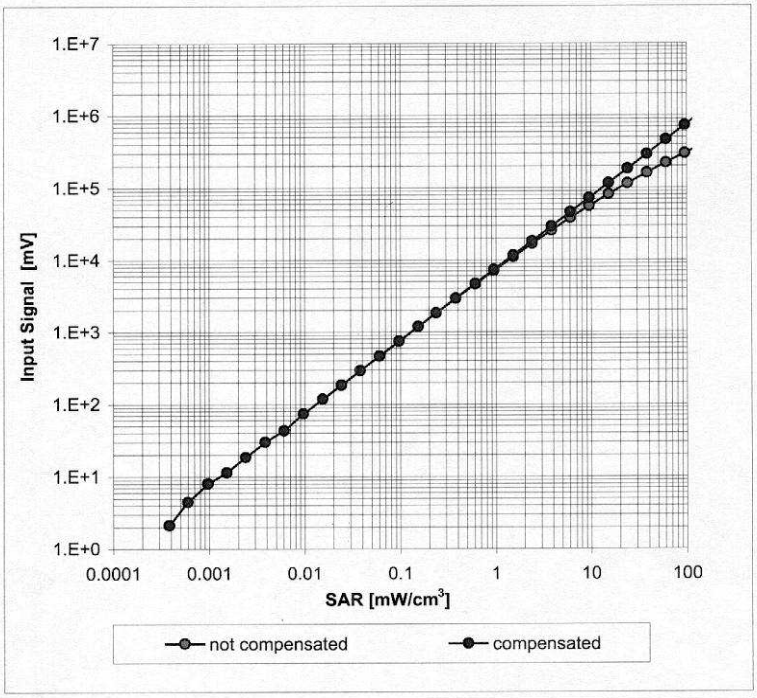


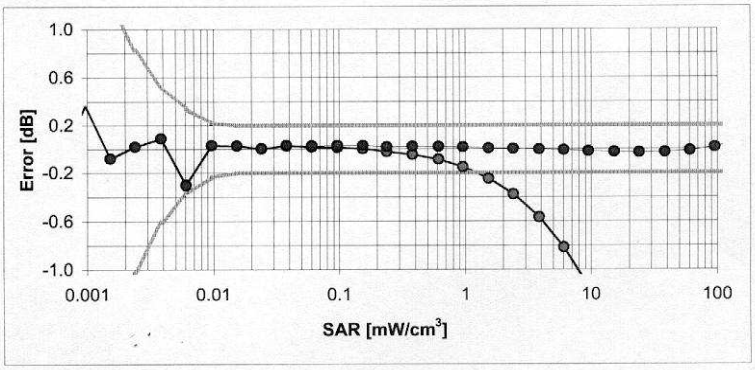
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

ET3DV6 SN:1759 August 30, 2005

Dynamic Range f(SAR_{head})

(Waveguide R22, f = 1800 MHz)

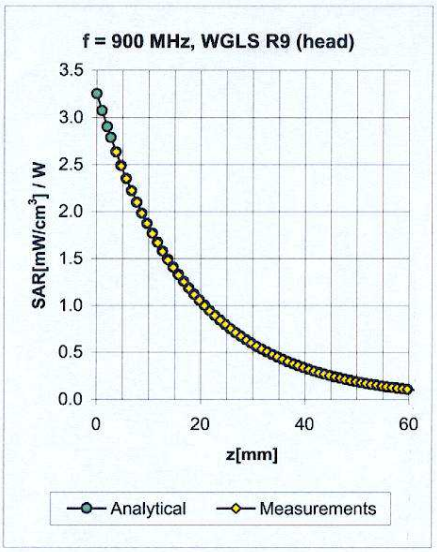


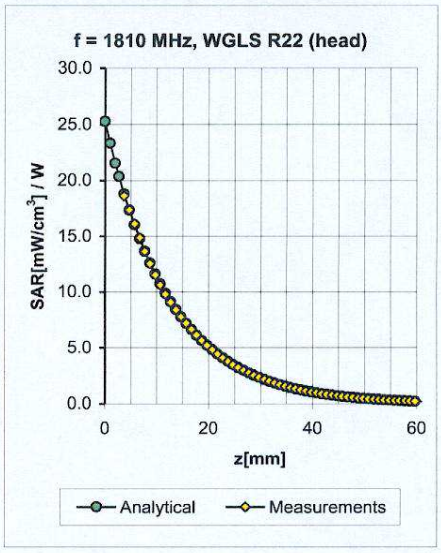


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

ET3DV6 SN:1759 **August 30, 2005**

Conversion Factor Assessment





f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.48	2.00	6.15 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.58	2.42	5.11 ± 11.0% (k=2)
2000	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.58	2.56	4.72 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.69	2.15	4.39 ± 11.8% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.46	2.16	5.93 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.53	2.87	4.40 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.53	2.98	4.33 ± 11.0% (k=2)
2000	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.59	2.54	4.20 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.70	1.95	4.08 ± 11.8% (k=2)

[C] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

Uncertainty Analysis

DASY4 Uncertainty Budget
According to IEEE P1528 [1]

Error Description	Uncertainty value	Prob. Dist.	Div.	(c_i) 1g	(c_i) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(v_i) v_{eff}
Measurement System								
Probe Calibration	±4.8 %	N	1	1	1	±4.8 %	±4.8 %	∞
Axial Isotropy	±4.7 %	R	$\sqrt{3}$	0.7	0.7	±1.9 %	±1.9 %	∞
Hemispherical Isotropy	±9.6 %	R	$\sqrt{3}$	0.7	0.7	±3.9 %	±3.9 %	∞
Boundary Effects	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Linearity	±4.7 %	R	$\sqrt{3}$	1	1	±2.7 %	±2.7 %	∞
System Detection Limits	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Readout Electronics	±1.0 %	N	1	1	1	±1.0 %	±1.0 %	∞
Response Time	±0.8 %	R	$\sqrt{3}$	1	1	±0.5 %	±0.5 %	∞
Integration Time	±2.6 %	R	$\sqrt{3}$	1	1	±1.5 %	±1.5 %	∞
RF Ambient Conditions	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
Probe Positioner	±0.4 %	R	$\sqrt{3}$	1	1	±0.2 %	±0.2 %	∞
Probe Positioning	±2.9 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
Max. SAR Eval.	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Test Sample Related								
Device Positioning	±2.9 %	N	1	1	1	±2.9 %	±2.9 %	875
Device Holder	±3.6 %	N	1	1	1	±3.6 %	±3.6 %	5
Power Drift	±5.0 %	R	$\sqrt{3}$	1	1	±2.9 %	±2.9 %	∞
Phantom and Setup								
Phantom Uncertainty	±4.0 %	R	$\sqrt{3}$	1	1	±2.3 %	±2.3 %	∞
Liquid Conductivity (target)	±5.0 %	R	$\sqrt{3}$	0.64	0.43	±1.8 %	±1.2 %	∞
Liquid Conductivity (meas.)	±2.5 %	N	1	0.64	0.43	±1.6 %	±1.1 %	∞
Liquid Permittivity (target)	±5.0 %	R	$\sqrt{3}$	0.6	0.49	±1.7 %	±1.4 %	∞
Liquid Permittivity (meas.)	±2.5 %	N	1	0.6	0.49	±1.5 %	±1.2 %	∞
Combined Std. Uncertainty						±10.3 %	±10.0 %	331
Expanded STD Uncertainty						**±20.6 %**	**±20.1 %**	

Phantom description

Schmid & Partner Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

Certificate of conformity / First Article Inspection

Item	SAM Twin Phantom V4.0
Type No	QD 000 P40 CA
Series No	TP-1150 and higher
Manufacturer / Origin	Untersee Composites Hauptstr. 69 CH-8559 Fruthwilen Switzerland

Tests

The series production process used allows the limitation to test of first articles.
Complete tests were made on the pre-series Type No. QD 000 P40 AA, Serial No. TP-1001 and on the series first article Type No. QD 000 P40 BA, Serial No. TP-1006. Certain parameters have been retested using further series units (called samples).

Test	Requirement	Details	Units tested
Shape	Compliance with the geometry according to the CAD model.	IT'IS CAD File (*)	First article, Samples
Material thickness	Compliant with the requirements according to the standards	2mm +/- 0.2mm in specific areas	First article, Samples
Material parameters	Dielectric parameters for required frequencies	200 MHz – 3 GHz Relative permittivity < 5 Loss tangent < 0.05.	Material sample TP 104-5
Material resistivity	The material has been tested to be compatible with the liquids defined in the standards	Liquid type HSL 1800 and others according to the standard.	Pre-series, First article

Standards

[1] CENELEC EN 50361
[2] IEEE P1528-200x draft 6.5
[3] IEC PT 62209 draft 0.9
(*) The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of [1] and [3].

Conformity

Based on the sample tests above, we certify that this item is in compliance with the uncertainty requirements of SAR measurements specified in standard [1] and draft standards [2] and [3].

Date 28.02.2002

Signature / Stamp

Schmid & Partner Engineering AG
Zeughausstrasse 43, CH-8004 Zurich
Tel. +41 1 245 97 00, Fax +41 1 245 97 79

System Validation from Original equipment supplier SPEAG Schmid & Partner of 1900 HSL

DASY4 Validation Report for Head TSL

0Date/Time: 18.02.2005 15:19:46

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d027

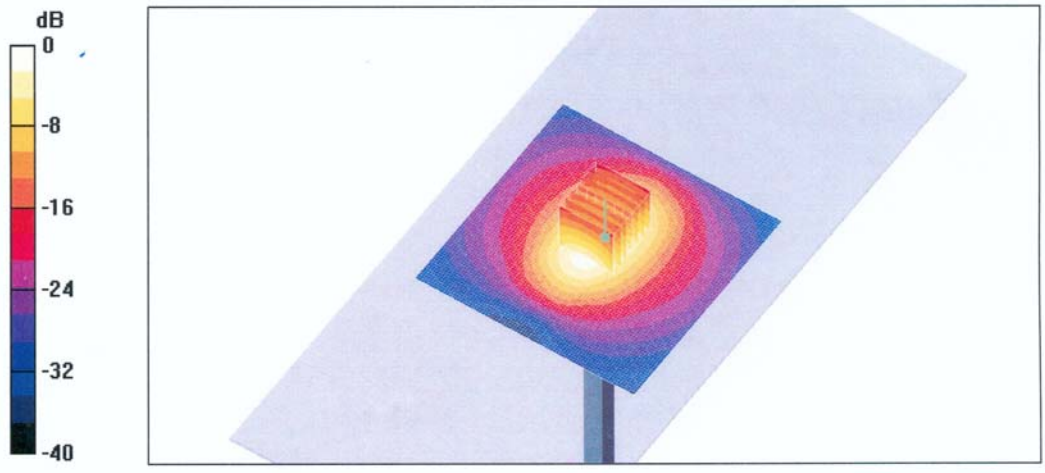
Communication System: CW-1900; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL 1800 MHz;
Medium parameters used: f = 1900 MHz; σ = 1.46 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(4.96, 4.96, 4.96); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 5.0; Type: QD000P50AA; Serial: 1001;
- Measurement SW: DASY4, V4.5 Build 11; Postprocessing SW: SEMCAD, V1.8 Build 144

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 11.3 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 88.4 V/m; Power Drift = 0.034 dB
Peak SAR (extrapolated) = 16.7 W/kg
SAR(1 g) = 9.64 mW/g; SAR(10 g) = 5.07 mW/g
Maximum value of SAR (measured) = 10.9 mW/g



0 dB = 10.9 mW/g

DASY4 Validation Report for Body TSL

Date/Time: 14.02.2005 15:44:15

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d027

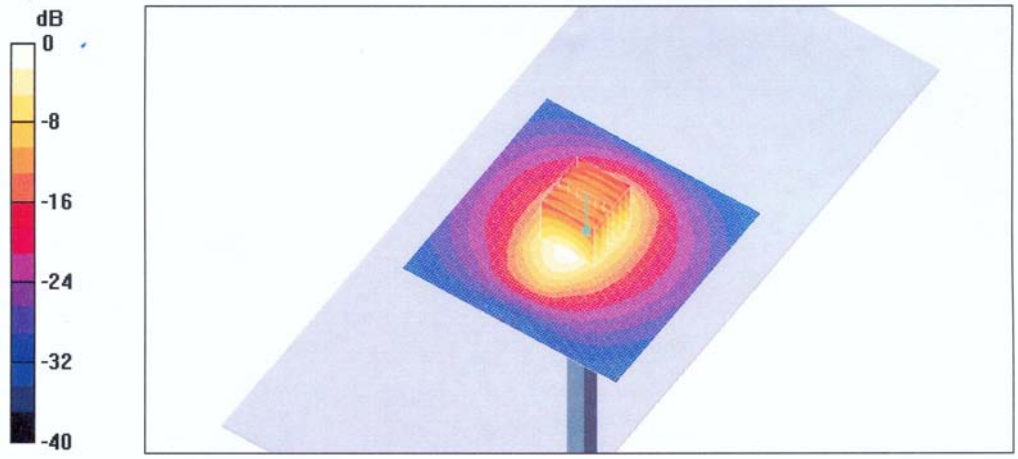
Communication System: CW-1900; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: Muscle 1800 MHz;
Medium parameters used: f = 1900 MHz; σ = 1.57 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(4.43, 4.43, 4.43); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 5.0; Type: QD000P50AA; Serial: 1001;
- Measurement SW: DASY4, V4.5 Build 13; Postprocessing SW: SEMCAD, V1.8 Build 142

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 11.4 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89.7 V/m; Power Drift = -0.006 dB
Peak SAR (extrapolated) = 16.8 W/kg
SAR(1 g) = 9.92 mW/g; SAR(10 g) = 5.28 mW/g
Maximum value of SAR (measured) = 11.3 mW/g



0 dB = 11.3 mW/g