Accredited testing laboratory

DAR registration number: DAT-P-176/94-D1

Test report no. : 2-4918-01-02/08
Type identification : AAC-1052141-BV
Test specification : IEEE P1528/D1.2
FCC-ID : PY7A1052141
IC-ID : 4170B-A1052141

Table of Contents

1 General Information

1.1 Notes

The test results of this test report relate exclusively to the test item specified in 1.5. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM ICT Services GmbH.

1.1.1 Statement of Compliance

The SAR values found for the AAC-1052141-BV **Mobile Phone** are below the maximum recommended levels of 1.6 W/Kg as averaged over any 1 g tissue according to the FCC rule §2.1093, the ANSI/IEEE C 95.1:1999, the NCRP Report Number 86 for uncontrolled environment, according to the Health Canada's Safety Code 6 and the Industry Canada Radio Standards Specification RSS-102 for General Population/Uncontrolled exposure.
For body worn operation, this device has been tested and meets FCC RF exposure guidelines when used with any accessory that contains no metal and that positions the handset a minimum of 15 mm from the body. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.
The measurement together with the test system set-up is described in chapter 2.3 of this test report. A detailed description of the equipment under test can be found in chapter 1.5.

Test engineer:

2008-04-15	**Oleksandr Hnatovskiy**	
Date	Name	Signature

Technical responsibility for area of testing:

2008-04-15	**Thomas Vogler**	
Date	Name	Signature

1.2 Testing laboratory

CETECOM ICT Services GmbH
Untertuerkheimer Straße 6-10,
66117 Saarbruecken
Germany
Telephone: + 49 681 598 - 0
Fax: + 49 681 598 - 8475

e-mail: info@ict.cetecom.de
Internet: http://www.cetecom-ict.de

State of accreditation: The Test laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025. DAR registration number: DAT-P-176/94-D1

Test location, if different from CETECOM ICT Services GmbH

Name: ---
Street: ---
Town: ---
Country: ---
Phone: ---
Fax: ---

1.3 Details of applicant

Name: Sony Ericsson Mobile Communications AB

Street: Nya Vattentornet
Town: 22188 Lund
Country: Sweden

Contact: Mr. Peter Lindeborg
Telephone: +46-46-212-6180

1.4 Application details

Date of receipt of application: 2008-04-01
Date of receipt of test item: 2008-04-01
Start/Date of test: 2008-04-01
End of test: 2008-04-10

Person(s) present during the test: ---

1.5 Test item

Description of the test item: Mobile Phone

Type identification: AAC-1052141-BV

FCC-ID :
Serial number: CB510XTPZ4

Manufacturer:

Name: Sony Ericsson Mobile Communications AB
Street: Nya Vattentornet
Town: 22188 Lund
Country: Sweden

additional information on the DUT:				
device type :	portable device			
IMEI No :	00440107-276241-8			
exposure category:	uncontrolled environment / general population			
test device production information	Production unit			
device operating configurations :				
operating mode(s)	GSM, DCS, PCS, Bluetooth			
modulation	GMSK, 8-PSK			
GPRS mobile station class :	B			
GPRS multislot class :	10		voice mode : ---	
EGPRS multislot class	10		voice mode : ---	
maximum no. of timeslots in uplink :	2			
operating frequency range(s)	PCS 1900 (tested)	PCS 850 (tested)	DCS 1800	GSM 900
- transmitter frequency range :	1850.2 MHz ~ 1909.8 MHz	824.2 MHz ~ 848.8 MHz	1710 MHz ~ 1785 MHz	880 MHz ~ 915 MHz
- receiver frequency range :	1930.2 MHz ~ 1989.8 MHz	869.2 MHz ~ 893.8 MHz	1805 MHz ~ 1880 MHz	925 MHz ~ 960 MHz
Power class :	1, tested with power level 0 (1900 MHz band) 4, tested with power level 5 (850 MHz band)			
measured peak output power (conducted):	850 band: 32.1dBm (GMSK); 30.4dBm(8-PSK) 1900 band: 30.7dBm (GMSK); 29.7dBm(8-PSK)			
test channels (low – mid – high) :	128 – 190 – 251 (850 MHz band) 512 – 661 – 810 (1900 MHz band)			
hardware version :	AP1.1			
software version :	R3AA048			
antenna type :	Integrated antenna PIFA			
accessories / body-worn configurations :	Stereo headset			
battery options :	Sony Ericsson BST-33			

1.6 Test specification(s)

Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01)

IEEE P1528/D1.2 (April 21, 2003)

RSS-102: Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands (Issue 2 of November 2005)

Canada's Safety Code 6: Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz (99-EHD-237)

IEEE Std C95.3 – 1991, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave.

IEEE Std C95.1 – 1999, IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz.

1.6.1 RF exposure limits

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

Table 1: RF exposure limits

The limit applied in this test report is shown in **bold** letters

Notes:

* The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time

** The Spatial Average value of the SAR averaged over the whole body.

*** The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation).

2 Technical test

2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed.	☒
The deviations as specified in 2.5 were ascertained in the course of the tests performed.	☐

2.2 Test environment

General Environment conditions in the test area are as follows:

Ambient temperature: 20°C – 24°C
Tissue simulating liquid: 20°C – 24°C
Humidity: 40% – 50%

Exact temperature values for each test are shown in the table(s) under 2.5. and/or on the measurement plots.

2.3 Measurement and test set-up

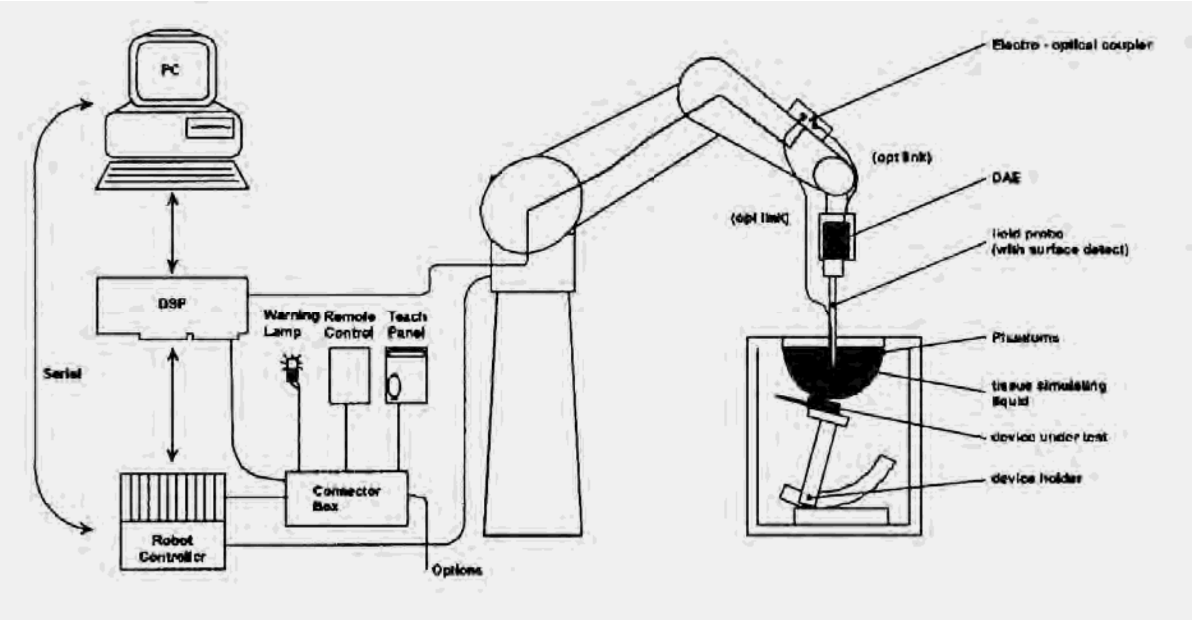
The measurement system is described in chapter 2.4.

The test setup for the system validation can be found in chapter 2.4.14.

A description of positioning and test signal control can be found in chapter 2.5 together with the test results.

2.4 Measurement system

2.4.1 System Description



The DASY4 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Stäubli RX family) with controller 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 electronic (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.
- A unit to operate the optical surface detector which is connected to the EOC.
- The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY4 measurement server.
- The DASY4 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows 2000
- DASY4 software and SEMCAD data evaluation software.
- Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
- The generic twin phantom enabling the testing of left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- System validation dipoles allowing to validate the proper functioning of the system.

2.4.2 Test environment

The DASY4 measurement system is placed at the head end of a room with dimensions:
5 x 2.5 x 3 m³, the SAM phantom is placed in a distance of 75 cm from the side walls and 1.1m from the rear wall. Above the test system a 1.5 x 1.5 m² array of pyramid absorbers is installed to reduce reflections from the ceiling.
Picture 1 of the photo documentation shows a complete view of the test environment.
The system allows the measurement of SAR values larger than 0.005 mW/g.

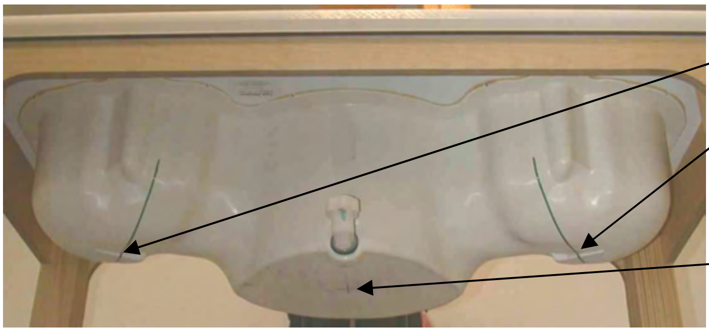
2.4.3 Probe description

Isotropic E-Field Probe ET3DV6 for Dosimetric Measurements

Technical data according to manufacturer information	
Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection system Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., glycolether)
Calibration	In air from 10 MHz to 2.5 GHz In head tissue simulating liquid (HSL) at 900 (800-1000) MHz and 1.8 GHz (1700-1910 MHz) (accuracy ± 9.5%; k=2) Calibration for other liquids and frequencies upon request
Frequency	10 MHz to 3 GHz (dosimetry); Linearity: ± 0.2 dB (30 MHz to 3 GHz)
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.4 dB in HSL (rotation normal to probe axis)
Dynamic range	5 µW/g to > 100 mW/g; Linearity: ± 0.2 dB
Optical Surface Detection	± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces (ET3DV6 only)
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 phones Fast automatic scanning in arbitrary phantoms (ET3DV6)

2.4.4 Phantom description

The used SAM Phantom meets the requirements specified in Edition 01-01 of Supplement C to OET Bulletin 65 for Specific Absorption Rate (SAR) measurements.
The phantom consists of a fibreglass shell integrated in a wooden table. It allows left-hand and right-hand head as well as body-worn measurements with a maximum liquid depth of 18 cm in head position and 22 cm in planar position (body measurements). The thickness of the Phantom shell is 2 mm +/- 0.1 mm.



2.4.5 Device holder description

The DASY4 device holder has two scales for device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of 65°. The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. This device holder is used for standard mobile phones or PDA’s only. If necessary an additional support of polystyrene material is used.

Larger DUT’s (e.g. notebooks) cannot be tested using this device holder. Instead a support of bigger polystyrene cubes and thin polystyrene plates is used to position the DUT in all relevant positions to find and measure spots with maximum SAR values.
Therefore those devices are normally only tested at the flat part of the SAM.

2.4.6 Scanning procedure

The DASY4 installation includes predefined files with recommended procedures for measurements and validation. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

- The „reference“ and „drift“ measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the DUT’s output power and should vary max. +/- 5 %.

- The „surface check“ measurement tests the optical surface detection system of the DASY4 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1mm). To prevent wrong results tests are only executed when the liquid is free of air bubbles. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within ± 30°.)

- The „area scan“ measures the SAR above the DUT or verification dipole on a parallel plane to the surface. It is used to locate the approximate location of the peak SAR with 2D spline interpolation. The robot performs a stepped movement along one grid axis while the local electrical field strenth is measured by the probe. The probe is touching the surface of the SAM during acquisition of measurement values. The standard scan uses large grid spacing for faster measurement. Standard grid spacing for head measurements is 15 mm in x- and y- dimension. If a finer resolution is needed, the grid spacing can be reduced. Grid spacing and orientation have no influence on the SAR result. For special applications where the standard scan method does not find the peak SAR within the grid, e.g. mobile phones with flip cover, the grid can be adapted in orientation.
  Results of this coarse scan are shown in annex 2.

- A „7x7x7 zoom scan” measures the field in a volume around the 2D peak SAR value acquired in the previous „coarse“ scan. This is a fine 7x7 grid where the robot additionally moves the probe in 7 steps along the z-axis away from the bottom of the Phantom. Grid spacing for the cube measurement is 5 mm in x and y-direction and 5 mm in z-direction. DASY4 is also able to perform repeated zoom scans if more than 1 peak is found during area scan. In this document, the evaluated peak 1g and 10g averaged SAR values are shown in the 2D-graphics in annex 2. Test results relevant for the specified standard (see chapter 1.6.) are shown in table form in chapter 2.5.

- A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube 7x7x7 scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 2mm steps. This measurement shows the continuity of the liquid and can - depending in the field strength – also show the liquid depth. A z-axis scan of the measurement with maximum SAR value is shown in annex 2.

2.4.7 Spatial Peak SAR Evaluation

The spatial peak SAR - value for 1 and 10 g is evaluated after the Cube measurements have been done. The basis of the evaluation are the SAR values measured at the points of the fine cube grid consisting of 7 x 7 x 7 points. The algorithm that finds the maximal averaged volume is separated into three different stages.

- The data between the dipole center of the probe and the surface of the phantom are extrapolated. This data cannot be measured since the center of the dipole is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is about 1 mm (see probe calibration sheet). The extrapolated data from a cube measurement can be visualized by selecting 'Graph Evaluated'.

- The maximum interpolated value is searched with a straight-forward algorithm. Around this maximum the SAR - values averaged over the spatial volumes (1g or 10 g) are computed using the 3d-spline interpolation algorithm. If the volume cannot be evaluated (i.e., if a part of the grid was cut off by the boundary of the measurement area) the evaluation will be started on the corners of the bottom plane of the cube.

- All neighboring volumes are evaluated until no neighboring volume with a higher average value is found.

Extrapolation

The extrapolation is based on a least square algorithm [W. Gander, Computermathematik, p.168-180]. Through the points in the first 3 cm along the z-axis, polynomials of order four are calculated. These polynomials are then used to evaluate the points between the surface and the probe tip. The points, calculated from the surface, have a distance of 1 mm from each other.

Interpolation

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 -direction) [Numerical Recipes in C, Second Edition, p.123ff].

Volume Averaging

At First the size of the cube is calculated. Then the volume is integrated with the trapezoidal algorithm. 8000 points (20x20x20) are interpolated to calculate the average.

Advanced Extrapolation

DASY4 uses the advanced extrapolation option which is able to compansate boundary effects on E-field probes.

2.4.8 Data Storage and Evaluation

Data Storage

The DASY4 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DA4". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

Data Evaluation by SEMCAD

The SEMCAD software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters:	- Sensitivity	$Norm_i$, a_{i0}, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$
	- Diode compression point	Dcpi
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	σ
	- Density	ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY4 components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.

If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot cf/dcp_i$$

with	V_i	= compensated signal of channel i	(i = x, y, z)
	U_i	= input signal of channel i	(i = x, y, z)
	cf	= crest factor of exciting field	(DASY parameter)
	dcp_i	= diode compression point	(DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

E-field probes: $$E_i = (V_i / Norm_i \cdot ConvF)^{1/2}$$

H-field probes: $$H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1}f + a_{i2}f^2)/f$$

with	V_i	= compensated signal of channel i	(i = x, y, z)
	$Norm_i$	= sensor sensitivity of channel i [mV/(V/m)^2] for E-field Probes	(i = x, y, z)
	ConvF	= sensitivity enhancement in solution	
	a_{ij}	= sensor sensitivity factors for H-field probes	
	f	= carrier frequency [GHz]	
	E_i	= electric field strength of channel i in V/m	
	H_i	= magnetic field strength of channel i in A/m	

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = (E_x^2 + E_Y^2 + E_z^2)^{1/2}$$

The primary field data are used to calculate the derived field units.

$$SAR = (E_{tot}^2 \cdot \sigma) / (\rho \cdot 1000)$$

with	SAR	= local specific absorption rate in mW/g
	E_{tot}	= total field strength in V/m
	σ	= conductivity in [mho/m] or [Siemens/m]
	ρ	= equivalent tissue density in g/cm^3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid.The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{pwe} = E_{tot}^2 / 3770 \quad \text{or} \quad P_{pwe} = H_{tot}^2 \cdot 37.7$$

with	P_{pwe}	= equivalent power density of a plane wave in mW/cm^2
	E_{tot}	= total electric field strength in V/m
	H_{tot}	= total magnetic field strength in A/m

2.4.9 Test equipment utilized

This table gives a complete overview of the SAR measurement equipment

Devices used during the test described in chapter 2.5. are marked ☒

	Manufacturer	Device	Type	Serial number	Date of last calibration)*
☒	Schmid & Partner Engineering AG	Dosimetric E-Field Probe	ET3DV6	1558	August 23, 2007
☐	Schmid & Partner Engineering AG	Dosimetric E-Field Probe	ET3DV6	1559	January 23, 2008
☒	Schmid & Partner Engineering AG	900 MHz System Validation Dipole	D900V2	102	August 23, 2007
☐	Schmid & Partner Engineering AG	1800 MHz System Validation Dipole	D1800V2	287	August 21, 2007
☒	Schmid & Partner Engineering AG	1900 MHz System Validation Dipole	D1900V2	5d009	August 21, 2007
☐	Schmid & Partner Engineering AG	2450 MHz System Validation Dipole	D2450V2	710	August 20, 2007
☒	Schmid & Partner Engineering AG	Data acquisition electronics	DAE3V1	413	January 18, 2008
☒	Schmid & Partner Engineering AG	Software	DASY 4 V4.5	---	N/A
☒	Schmid & Partner Engineering AG	Phantom	SAM	---	N/A
☒	Rohde & Schwarz	Universal Radio Communication Tester	CMU 200	106826	March 14, 2008
☒	Hewlett Packard)*	Network Analyser 300 kHz to 6 GHz	8753C	2937U00269	March 13, 2007
☒	Hewlett Packard)*	Network Analyser 300 kHz to 6 GHz	85047A	2936A00872	March 13, 2007
☒	Hewlett Packard	Dielectric Probe Kit	85070C	US99360146	N/A
☒	Hewlett Packard	Signal Generator	8665A	2833A00112	November 12, 2007
☒	Amplifier Reasearch	Amplifier	25S1G4 (25 Watt)	20452	N/A
☒	Rohde & Schwarz	Power Meter	NRP	101367	January 9, 2008
☒	Rohde & Schwarz	Power Meter Sensor	NRP Z22	100227	January 9, 2008
☒	Rohde & Schwarz	Power Meter Sensor	NRP Z22	100234	January 9, 2008

)* : Network analyzer probe calibration against air, distilled water and a shorting block performed before measuring liquid parameters.

2.4.10 Tissue simulating liquids: dielectric properties

The following materials are used for producing the tissue-equivalent materials.

(liquids used for tests described in chapter 2.5. are marked with ☒) :

Ingredients (% of weight)	**Frequency (MHz)**					
frequency band	☐ 450	☒ 835	☐ 900	☐ 1800	☒ 1900	☐ 2450
Tissue Type	Head	Head	Head	Head	Head	Head
Water	38.56	41.45	40.92	52.64	54.9	62.7
Salt (NaCl)	3.95	1.45	1.48	0.36	0.18	0.5
Sugar	56.32	56.0	56.5	0.0	0.0	0.0
HEC	0.98	1.0	1.0	0.0	0.0	0.0
Bactericide	0.19	0.1	0.1	0.0	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	36.8
DGBE	0.0	0.0	0.0	47.0	44.92	0.0

Table 2: Head tissue dielectric properties

Ingredients (% of weight)	**Frequency (MHz)**					
frequency band	☐ 450	☒ 835	☐ 900	☐ 1800	☒ 1900	☐ 2450
Tissue Type	Body	Body	Body	Body	Body	Body
Water	51.16	52.4	56.0	69.91	69.91	73.2
Salt (NaCl)	1.49	1.40	0.76	0.13	0.13	0.04
Sugar	46.78	45.0	41.76	0.0	0.0	0.0
HEC	0.52	1.0	1.21	0.0	0.0	0.0
Bactericide	0.05	0.1	0.27	0.0	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0
DGBE	0.0	0.0	0.0	29.96	29.96	26.7

Table 3: Body tissue dielectric properties

Salt: 99+% Pure Sodium Chloride
Sugar: 98+% Pure Sucrose
Water: De-ionized, 16MΩ+ resistivity
HEC: Hydroxyethyl Cellulose
DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]
Triton X-100(ultra pure): Polyethylene glycol mono [4-(1,1,3,3-tetramethylbutyl)phenyl]ether

2.4.11 Tissue simulating liquids: parameters

Used Target Frequency	**Target Head Tissue**		**Measured Head Tissue**		**Measured Date**
[MHz]	Permittivity	Conductivity [S/m]	Permittivity	Conductivity [S/m]	
835	41.5	0.90	42.4	0.89	2008-04-07
900	42.0	0.99	42.0	0.96	2008-04-07
1900	40.0	1.40	41.2	1.43	2008-04-08

Table 4: Parameter of the head tissue simulating liquid

Used Target Frequency	**Target Body Tissue**		**Measured Body Tissue**		**Measured Date**
[MHz]	Permittivity	Conductivity [S/m]	Permittivity	Conductivity [S/m]	
835	55.2	0.97	55.0	0.98	2008-04-03
900	55.0	1.05	54.4	1.05	2008-04-03
1900	53.3	1.52	52.5	1.54	2008-04-01

Table 5: Parameter of the body tissue simulating liquid

Note: The dielectric properties have been measured using the contact probe method at 21°C.

2.4.12 Measurement uncertainty evaluation for SAR test

The overall combined measurement uncertainty of the measurement system is ± 10,3% (K=1).
The expanded uncertainty (k=2) is assessed to be ± 20.6%
This measurement uncertainty budget is suggested by IEEE P1528 and determined by Schmid & Partner Engineering AG. The breakdown of the individual uncertainties is as follows:

Error Sources	Uncertainty Value	Probability Distribution	Divi-sor	c_i 1g	c_i 10g	Standard Uncertainty 1g	Standard Uncertainty 10g	v_i^2 or v_{eff}
Measurement System								
Probe calibration	± 4.8%	Normal	1	1	1	± 4.8%	± 4.8%	∞
Axial isotropy	± 4.7%	Rectangular	√3	0.7	0.7	± 1.9%	± 1.9%	∞
Hemispherical isotropy	± 9.6%	Rectangular	√3	0.7	0.7	± 3.9%	± 3.9%	∞
Spatial resolution	± 0.0%	Rectangular	√3	1	1	± 0.0%	± 0.0%	∞
Boundary effects	± 1.0%	Rectangular	√3	1	1	± 0.6%	± 0.6%	∞
Probe linearity	± 4.7%	Rectangular	√3	1	1	± 2.7%	± 2.7%	∞
System detection limits	± 1.0%	Rectangular	√3	1	1	± 0.6%	± 0.6%	∞
Readout electronics	± 1.0%	Normal	1	1	1	± 1.0%	± 1.0%	∞
Response time	± 0.8%	Rectangular	√3	1	1	± 0.5%	± 0.5%	∞
Integration time	± 2.6%	Rectangular	√3	1	1	± 1.5%	± 1.5%	∞
RF ambient conditions	± 3.0%	Rectangular	√3	1	1	± 1.7%	± 1.7%	∞
Probe positioner	± 0.4%	Rectangular	√3	1	1	± 0.2%	± 0.2%	∞
Probe positioning	± 2.9%	Rectangular	√3	1	1	± 1.7%	± 1.7%	∞
Max. SAR evaluation	± 1.0%	Rectangular	√3	1	1	± 0.6%	± 0.6%	∞
Test Sample Related								
Device positioning	± 2.9%	Normal	1	1	1	± 2.9%	± 2.9%	145
Device holder uncertainty	± 3.6%	Normal	1	1	1	± 3.6%	± 3.6%	5
Power drift	± 5.0%	Rectangular	√3	1	1	± 2.9%	± 2.9%	∞
Phantom and Set-up								
Phantom uncertainty	± 4.0%	Rectangular	√3	1	1	± 2.3%	± 2.3%	∞
Liquid conductivity (target)	± 5.0%	Rectangular	√3	0.64	0.43	± 1.8%	± 1.2%	∞
Liquid conductivity (meas.)	± 2.5%	Normal	1	0.64	0.43	± 1.6%	± 1.1%	∞
Liquid permittivity (target)	± 5.0%	Rectangular	√3	0.6	0.49	± 1.7%	± 1.4%	∞
Liquid permittivity (meas.)	± 2.5%	Normal	1	0.6	0.49	± 1.5%	± 1.2%	∞
Combined Uncertainty						± 10.3%	± 10.0%	330
Expanded Std. Uncertainty						**± 20.6%**	**± 20.1%**	

Table 6: Measurement uncertainties

2.4.13 Measurement uncertainty evaluation for system validation

The overall combined measurement uncertainty of the measurement system is ± 8.4% (K=1).
The expanded uncertainty (k=2) is assessed to be ± 16.8%
This measurement uncertainty budget is suggested by IEEE P1528 and determined by Schmid & Partner Engineering AG. The breakdown of the individual uncertainties is as follows:

Error Sources	Uncertainty Value	Probability Distribution	Divi-sor	c_i 1g	c_i 10g	Standard Uncertainty 1g	Standard Uncertainty 10g	v_i^2 or v_{eff}
Measurement System								
Probe calibration	± 4.8%	Normal	1	1	1	± 4.8%	± 4.8%	∞
Axial isotropy	± 4.7%	Rectangular	√3	0.7	0.7	± 1.9%	± 1.9%	∞
Hemispherical isotropy	± 0.0%	Rectangular	√3	0.7	0.7	± 0.0%	± 3.9%	∞
Boundary effects	± 1.0%	Rectangular	√3	1	1	± 0.6%	± 0.6%	∞
Probe linearity	± 4.7%	Rectangular	√3	1	1	± 2.7%	± 2.7%	∞
System detection limits	± 1.0%	Rectangular	√3	1	1	± 0.6%	± 0.6%	∞
Readout electronics	± 1.0%	Normal	1	1	1	± 1.0%	± 1.0%	∞
Response time	± 0.0%	Rectangular	√3	1	1	± 0.0%	± 0.0%	∞
Integration time	± 0.0%	Rectangular	√3	1	1	± 0.0%	± 0.0%	∞
RF ambient conditions	± 3.0%	Rectangular	√3	1	1	± 1.7%	± 1.7%	∞
Probe positioner	± 0.4%	Rectangular	√3	1	1	± 0.2%	± 0.2%	∞
Probe positioning	± 2.9%	Rectangular	√3	1	1	± 1.7%	± 1.7%	∞
Max. SAR evaluation	± 1.0%	Rectangular	√3	1	1	± 0.6%	± 0.6%	∞
Test Sample Related								
Dipole axis to liquid distance	± 2.0%	Normal	1	1	1	± 1.2%	± 1.2%	∞
Power drift	± 4.7%	Rectangular	√3	1	1	± 2.7%	± 2.7%	∞
Phantom and Set-up								
Phantom uncertainty	± 4.0%	Rectangular	√3	1	1	± 2.3%	± 2.3%	∞
Liquid conductivity (target)	± 5.0%	Rectangular	√3	0.64	0.43	± 1.8%	± 1.2%	∞
Liquid conductivity (meas.)	± 2.5%	Normal	1	0.64	0.43	± 1.6%	± 1.1%	∞
Liquid permittivity (target)	± 5.0%	Rectangular	√3	0.6	0.49	± 1.7%	± 1.4%	∞
Liquid permittivity (meas.)	± 2.5%	Normal	1	0.6	0.49	± 1.5%	± 1.2%	∞
Combined Uncertainty						**± 8.4%**	**± 8.1%**	
Expanded Std. Uncertainty						**± 16.8%**	**± 16.2%**	

Table 7: Measurement uncertainties

2.4.14 System validation

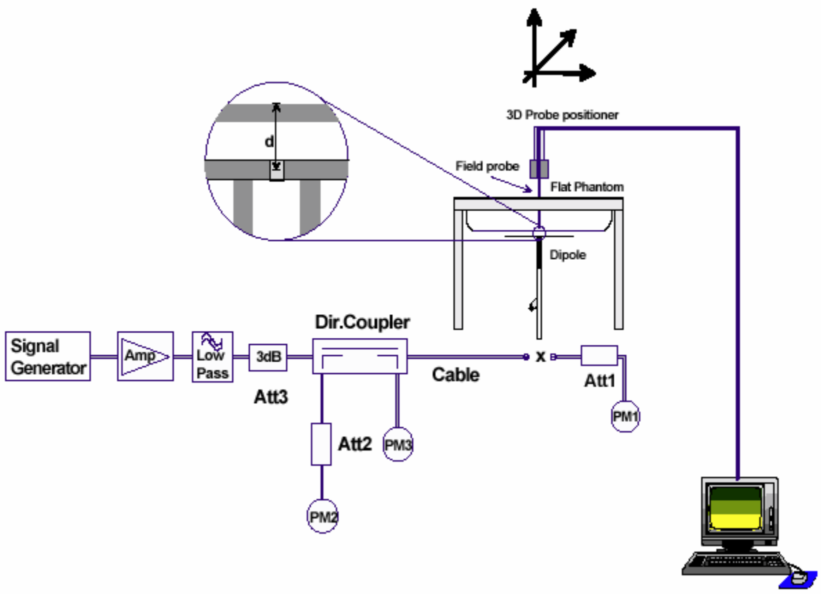
The system validation is performed for verifying the accuracy of the complete measurement system and performance of the software. The system validation is performed with tissue equivalent material according to IEEE P1528 (described above). The following table shows validation results for all frequency bands and tissue liquids used during the tests of the test item described in chapter 1.5.
(graphic plot(s) see annex 1).

Validation Kit	Frequency	Target Peak SAR (1000 mW) (+/- 10%)	Target SAR_{1g} (1000 mW) (+/- 10%)	Measured Peak SAR	Measured SAR_{1g}	Measured date
D900V2 S/N: 102	**900 MHz head**	**15.2 mW/g**	**10.3 mW/g**	**15.3 mW/g**	**10.3 mW/g**	**2008-04-07**
D900V2 S/N: 102	**900 MHz body**	**15.2 mW/g**	**10.6 mW/g**	**15.6 mW/g**	**10.7 mW/g**	**2008-04-03**
D1900V2 S/N: 5d009	**1900 MHz head**	**64.0 mW/g**	**35.9 mW/g**	**64.9 mW/g**	**37.8 mW/g**	**2008-04-08**
D1900V2 S/N: 5d009	**1900 MHz body**	**63.2 mW/g**	**37.7 mW/g**	**68.2 mW/g**	**39.2 mW/g**	**2008-04-01**

Table 8: Results system validation

2.4.15 Validation procedure

The validation is performed by using a validation dipole which is positioned parallel to the planar part of the SAM phantom at the reference point. The distance of the dipole to the SAM phantom is determined by a plexiglass spacer. The dipole is connected to the signal source consisting of signal generator and amplifier via a directional coupler, N-connector cable and adaption to SMA. It is fed with a power of 1000 mW. To adjust this power a power meter is used. The power sensor is connected to the cable before the validation to measure the power at this point and do adjustments at the signal generator. At the outputs of the directional coupler both return loss as well as forward power are controlled during the validation to make sure that emitted power at the dipole is kept constant. This can also be checked by the power drift measurement after the test (result on plot).
Validation results have to be equal or near the values determined during dipole calibration (target SAR in table above) with the relevant liquids and test system.



2.5 Test results (Head and Body SAR)

The table contains the measured SAR values averaged over a mass of 1 g					
Channel / frequency	Position	Left hand position	Right hand position	Limit	Liquid temperature
128 / 824.2 MHz	cheek	0.642 W/kg	0.681 W/kg	1.6 W/kg	20.3/20.4 °C
190 / 836.6 MHz	cheek	1.020 W/kg	1.120 W/kg	1.6 W/kg	20.3/20.4 °C
251 / 848.8 MHz	cheek	1.370 W/kg	**1.450 W/kg**	1.6 W/kg	20.3/20.4 °C
128 / 824.2 MHz	tilted 15°	0.432 W/kg	0.450 W/kg	1.6 W/kg	20.3/20.5 °C
190 / 836.6 MHz	tilted 15°	0.678 W/kg	0.699 W/kg	1.6 W/kg	20.3/20.5 °C
251 / 848.8 MHz	tilted 15°	0.856 W/kg	0.851 W/kg	1.6 W/kg	20.4/20.5 °C

Table 9: Test results (Head SAR 850 MHz)

The table contains the measured SAR values averaged over a mass of 1 g				
Channel / frequency	Position	Body worn	Limit	Liquid temperature
128 / 824.2 MHz	front	0.260 W/kg	1.6 W/kg	21.2 °C
190 / 836.6 MHz	front	0.666 W/kg	1.6 W/kg	21.2 °C
251 / 848.8 MHz	front	0.670 W/kg	1.6 W/kg	21.2 °C
128 / 824.2 MHz	rear	0.643 W/kg	1.6 W/kg	21.2 °C
190 / 836.6 MHz	rear	**0.833 W/kg**	1.6 W/kg	21.2 °C
251 / 848.8 MHz	rear	0.684 W/kg	1.6 W/kg	21.3 °C
190 / 836.6 MHz	rear EGPRS	0.394 W/kg	1.6 W/kg	21.3 °C
190 / 836.6 MHz	rear 1TS	0.650 W/kg	1.6 W/kg	21.3 °C

Table 10: Test results (Body SAR 850 MHz)

Note: The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 0.8 W/kg), testing at the high and low channels is optional.
Tests in body position were performed with 15 mm air gap between DUT and SAM to simulate the use of a non-metallic belt-clip or holster.

The table contains the measured SAR values averaged over a mass of 1 g					
Channel / frequency	Position	Left hand position	Right hand position	Limit	Liquid temperature
512 / 1850.2 MHz	cheek	1.170 W/kg	0.907 W/kg	1.6 W/kg	20.5/20.5 °C
661 / 1880.0 MHz	cheek	1.350 W/kg	1.040 W/kg	1.6 W/kg	20.5/20.5 °C
810 / 1909.8 MHz	cheek	**1.440 W/kg**	1.120 W/kg	1.6 W/kg	20.5/20.5 °C
512 / 1850.2 MHz	tilted 15°	0.840 W/kg	0.657 W/kg	1.6 W/kg	20.5/20.4 °C
661 / 1880.0 MHz	tilted 15°	0.987 W/kg	0.814 W/kg	1.6 W/kg	20.6/20.4 °C
810 / 1909.8 MHz	tilted 15°	1.100 W/kg	0.919 W/kg	1.6 W/kg	20.6/20.4 °C

Table 11: Test results (Head SAR 1900 MHz)

The table contains the measured SAR values averaged over a mass of 1 g				
Channel / frequency	Position	Body worn	Limit	Liquid temperature
512 / 1850.2 MHz	front	0.174 W/kg	1.6 W/kg	20.6 °C
661 / 1880.0 MHz	front	0.203 W/kg	1.6 W/kg	20.6 °C
810 / 1909.8 MHz	front	0.223 W/kg	1.6 W/kg	20.7 °C
512 / 1850.2 MHz	rear	0.415 W/kg	1.6 W/kg	20.8 °C
661 / 1880.0 MHz	rear	0.444 W/kg	1.6 W/kg	20.9 °C
810 / 1909.8 MHz	rear	**0.461 W/kg**	1.6 W/kg	21.0 °C
810 / 1909.8 MHz	rear EGPRS	0.275 W/kg	1.6 W/kg	21.1 °C
810 / 1909.8 MHz	rear 1TS	0.388 W/kg	1.6 W/kg	21.1 °C

Table 12: Test results (Body SAR 1900 MHz)

Note: The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 0.8 W/kg), testing at the high and low channels is optional.
Tests in body position were performed with 15 mm air gap between DUT and SAM to simulate the use of a non-metallic belt-clip or holster.

2.5.1 General description of test procedures

The DUT is tested using a CMU 200 communications tester as controller unit to set test channels and maximum output power to the DUT, as well as for measuring the conducted peak power.
Test positions as described in the tables above are in accordance with the specified test standard.
Tests in body position are performed with the maximum number of timeslots in uplink.
Tests in head position are performed in voice mode with 1 timeslot unless GPRS/EGPRS function allows parallel voice and data traffic on 2 or more timeslots (see chapter 1.5 for details).
Conducted output power was measured using an integrated RF connector and attached RF cable.

2.6 Test results (conducted power measurement)

For the measurements a Rohde & Schwarz Radio Communication Tester CMU 200 was used.
The output power was measured using an integrated RF connector and attached RF cable.
The conducted output power was measured before and after each SAR measurement. The resulting power values were within a 0.2 dB tolerance of the values shown below.

PCS 850		
Channel / frequency	GSM	Edge
128 / 824.2 MHz	32.1 dBm	30.4 dBm
190 / 836.6 MHz	32.1 dBm	30.3 dBm
251 / 848.8 MHz	32.0 dBm	30.3 dBm
PCS 1900		
Channel / frequency	GSM	Edge
512 / 1850.2 MHz	30.5 dBm	29.6 dBm
661 / 1880.0 MHz	30.6 dBm	29.6 dBm
810 / 1909.8 MHz	30.7 dBm	29.7 dBm

Table 13: Test results conducted peak power measurement

Annex 1 System performance verification

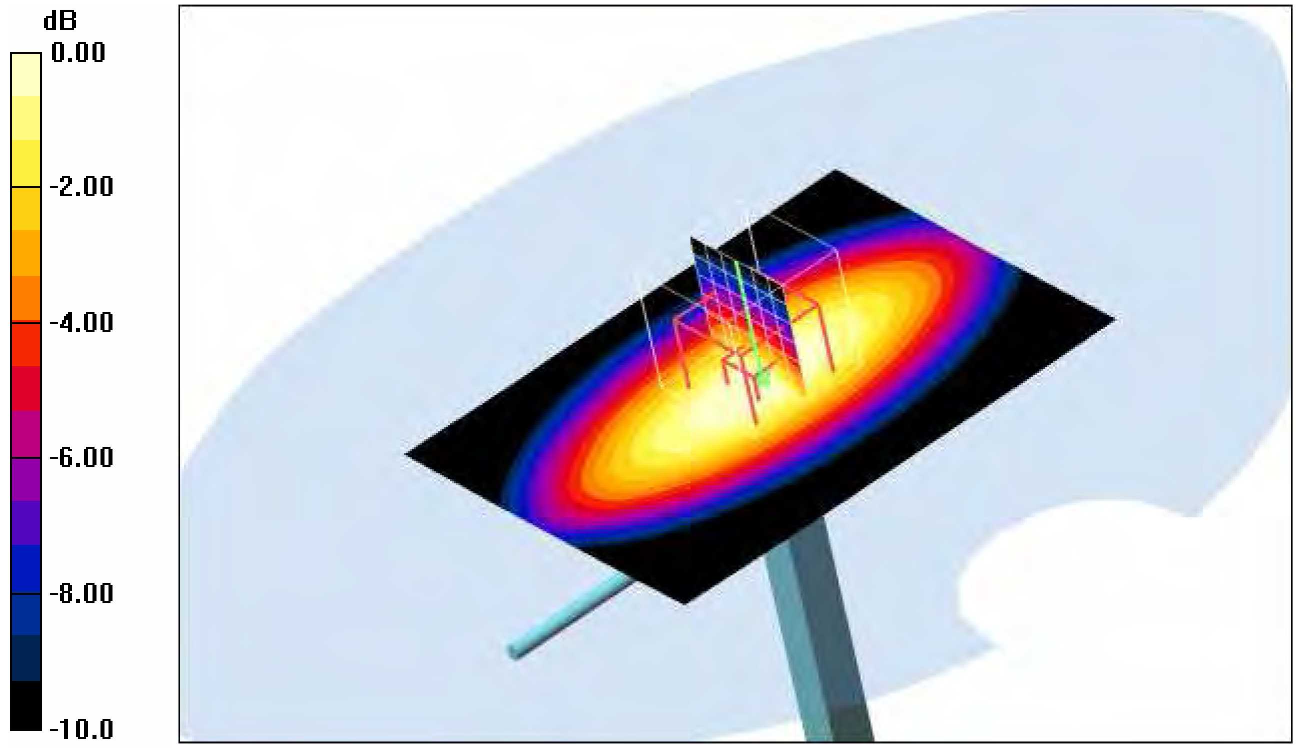
Date/Time: 2008-04-07 13:27:49Date/Time: 2008-04-07 13:34:05

SystemPerformanceCheck-D900 head 2008-04-07

DUT: Dipole 900 MHz; Type: D900V2; Serial: 102
Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1
Medium: HSL850 Medium parameters used: f = 900 MHz; σ = 0.96 mho/m; ε_r = 42; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(6.24, 6.24, 6.24); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

d=15mm, Pin=1000mW/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 11.2 mW/g

d=15mm, Pin=1000mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 111.3 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 15.3 W/kg
SAR(1 g) = 10.3 mW/g; SAR(10 g) = 6.62 mW/g
Maximum value of SAR (measured) = 11.2 mW/g



0 dB = 11.2mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 21.3°C; liquid temperature: 20.3°C

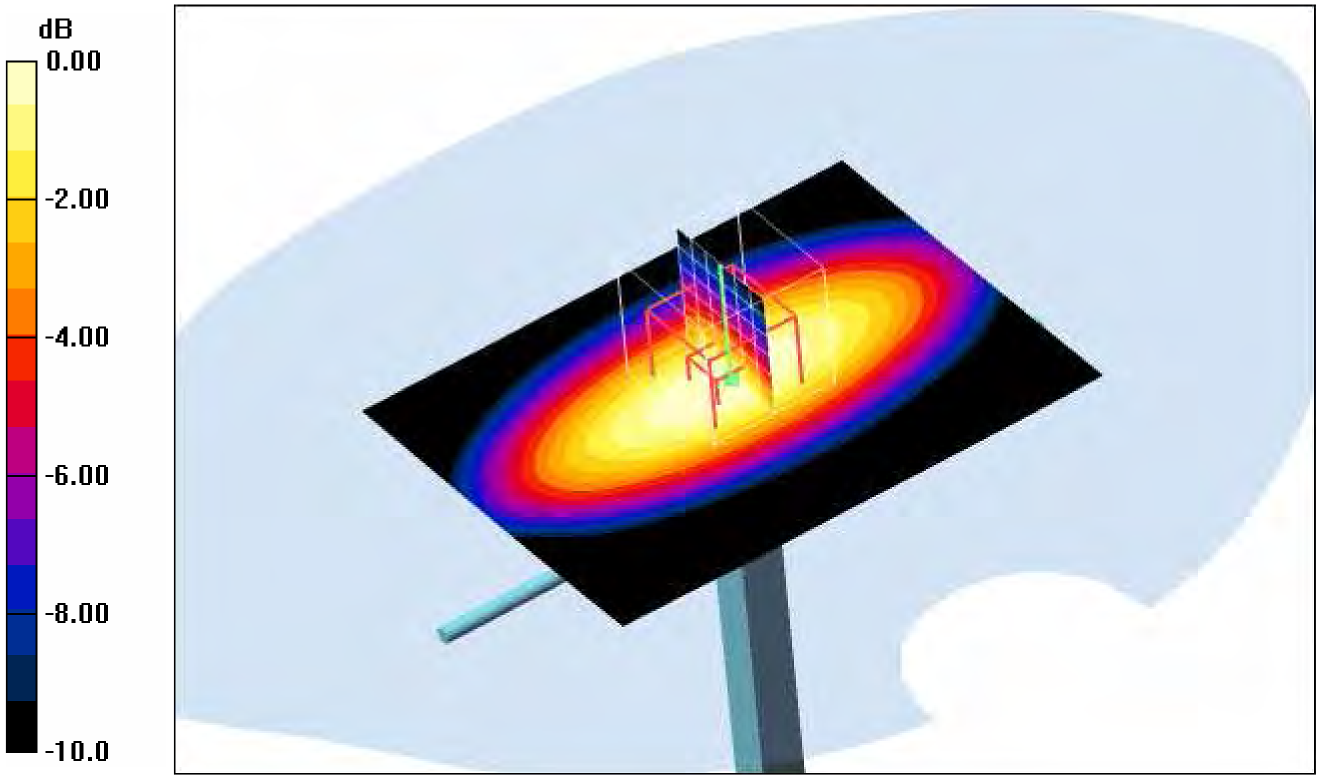
Date/Time: 2008-04-03 09:06:13Date/Time: 2008-04-03 09:12:35

SystemPerformanceCheck-D900 body 2008-04-03

DUT: Dipole 900 MHz; Type: D900V2; Serial: 102
Communication System: CW; Frequency: 900 MHz;Duty Cycle: 1:1
Medium: M900 Medium parameters used: f = 900 MHz; σ = 1.05 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(5.92, 5.92, 5.92); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

d=15mm, Pin=1000mW/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 11.7 mW/g

d=15mm, Pin=1000mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 107.2 V/m; Power Drift = -0.051 dB
Peak SAR (extrapolated) = 15.6 W/kg
SAR(1 g) = 10.7 mW/g; SAR(10 g) = 6.93 mW/g
Maximum value of SAR (measured) = 11.7 mW/g



0 dB = 11.7mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 21.8°C; liquid temperature: 21.3°C

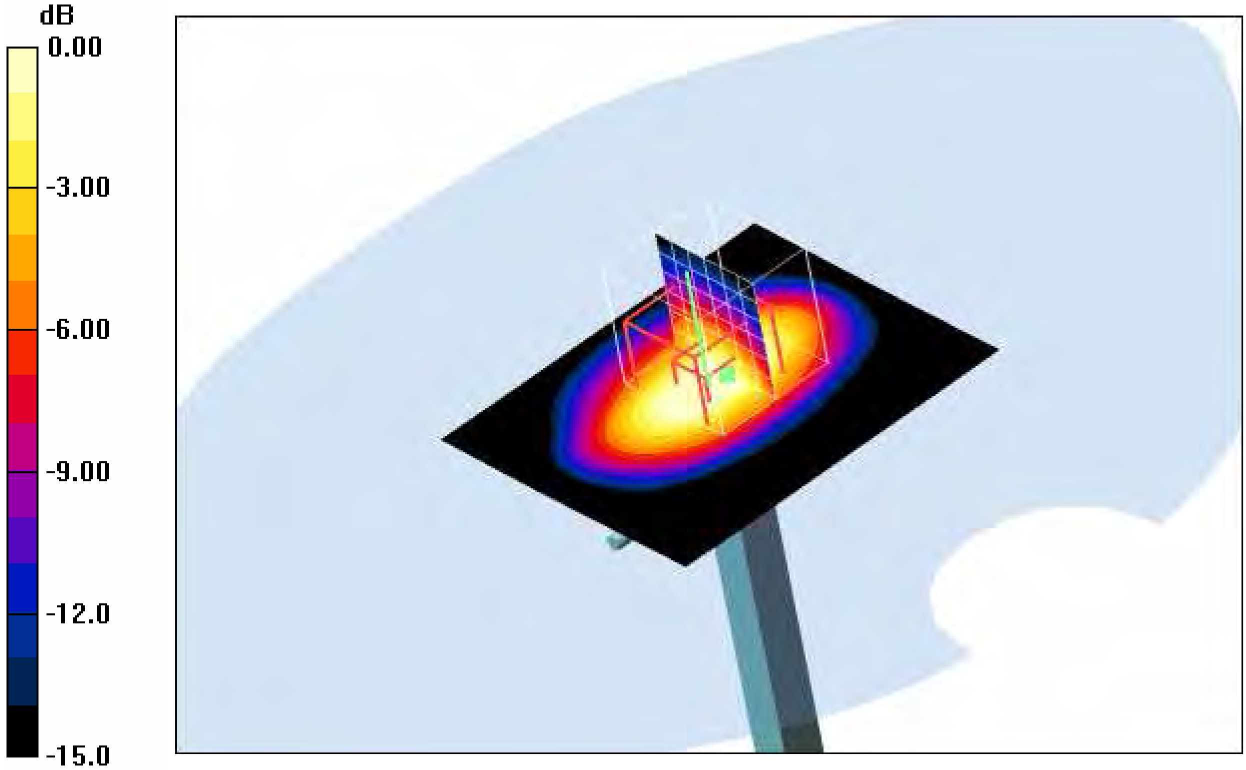
Date/Time: 2008-04-08 10:14:02Date/Time: 2008-04-08 10:18:16

SystemPerformanceCheck-D1900 head 2008-04-08

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d009
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL1900 Medium parameters used (interpolated): f = 1900 MHz; σ = 1.43 mho/m; ε_r = 41.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.9, 4.9, 4.9); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

d=10mm, Pin=1000mW/Area Scan (51x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 46.6 mW/g

d=10mm, Pin=1000mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 169.6 V/m; Power Drift = -0.030 dB
Peak SAR (extrapolated) = 64.9 W/kg
SAR(1 g) = 37.8 mW/g; SAR(10 g) = 19.9 mW/g
Maximum value of SAR (measured) = 42.3 mW/g



0 dB = 42.3mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 21.5°C; liquid temperature: 20.5°C

Date/Time: 2008-04-01 14:02:07Date/Time: 2008-04-01 14:06:20

SystemPerformanceCheck-D1900 body 2008-04-01

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d009

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: M1900 Medium parameters used (interpolated): f = 1900 MHz; σ = 1.54 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(4.46, 4.46, 4.46); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

d=10mm, Pin=1000mW/Area Scan (51x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 50.8 mW/g

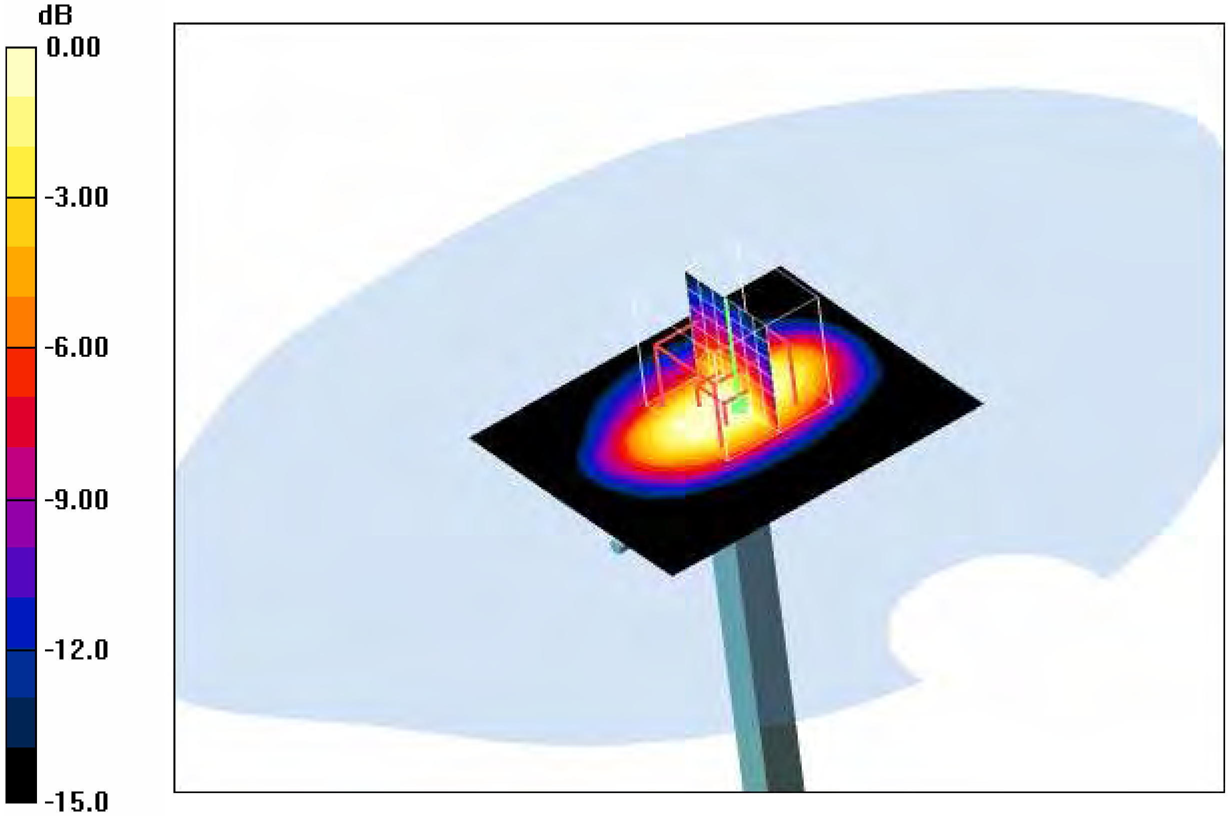
d=10mm, Pin=1000mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 171.8 V/m; Power Drift = 0.051 dB

Peak SAR (extrapolated) = 68.2 W/kg

SAR(1 g) = 39.2 mW/g; SAR(10 g) = 20.7 mW/g

Maximum value of SAR (measured) = 43.7 mW/g



0 dB = 43.7mW/g

Additional information:

position or distance of DUT to SAM (if not standard head positions) :

ambient temperature: 21.1°C; liquid temperature: 20.5°C

Annex 2 Measurement results (printout from DASY TM)

Remark: results of conducted power measurements: see chapter 2.5/2.6 (if applicable)

Annex 2.1 PCS 850 MHz head

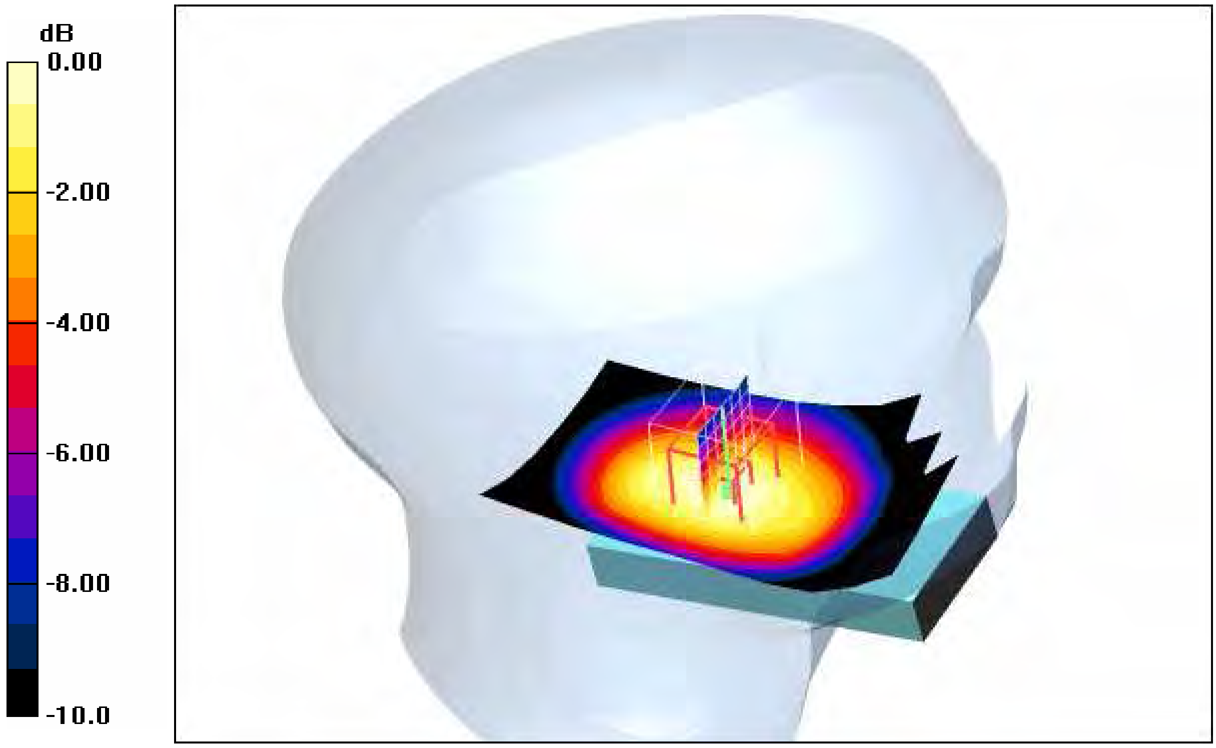
Date/Time: 2008-04-07 13:51:58Date/Time: 2008-04-07 13:58:40

P1528_OET65-LeftHandSide-GSM850

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4
Communication System: PCS 850; Frequency: 824.2 MHz; Duty Cycle: 1:8
Medium: HSL850 Medium parameters used: f = 824.2 MHz; σ = 0.89 mho/m; ε_r = 42.4; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(6.39, 6.39, 6.39); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Touch position - Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.677 mW/g

Touch position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 28.0 V/m; Power Drift = 0.033 dB
Peak SAR (extrapolated) = 0.867 W/kg
SAR(1 g) = 0.642 mW/g; SAR(10 g) = 0.447 mW/g
Maximum value of SAR (measured) = 0.680 mW/g



0 dB = 0.680mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 21.5°C; liquid temperature: 20.3°C

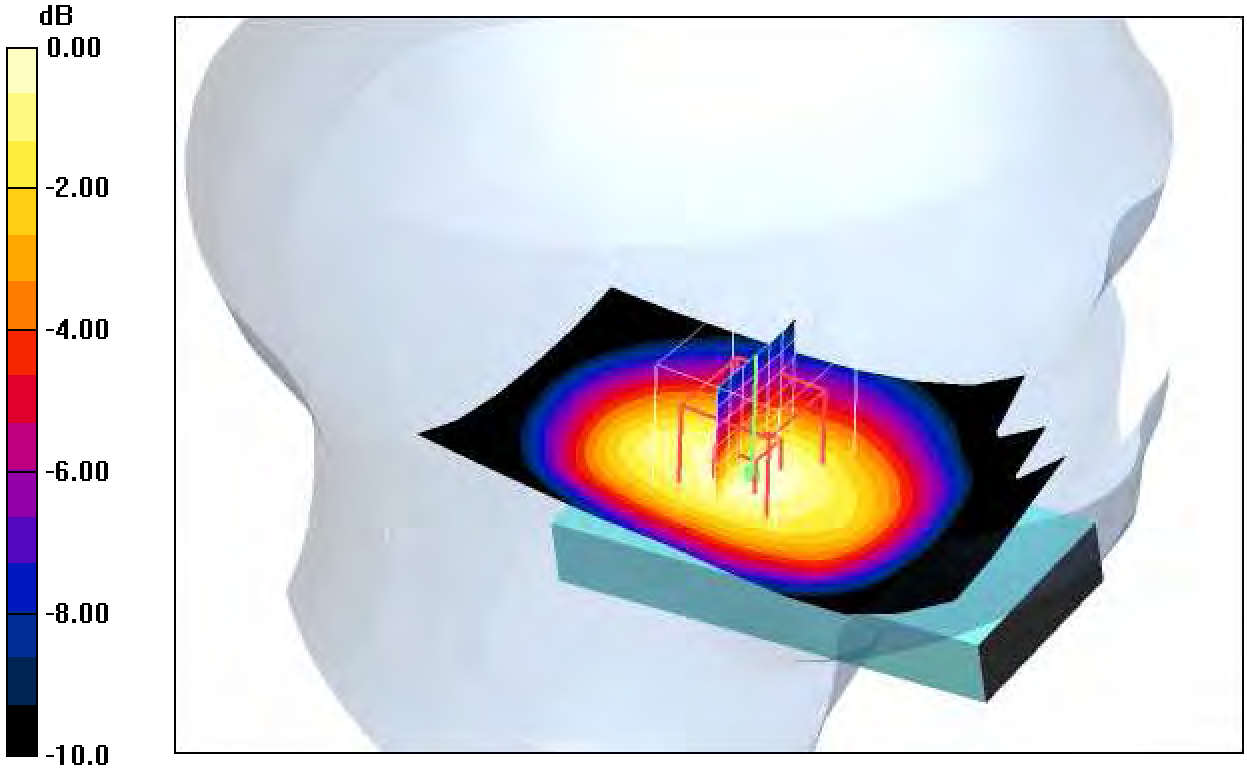
Date/Time: 2008-04-07 14:13:26Date/Time: 2008-04-07 14:20:14

P1528_OET65-LeftHandSide-GSM850

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4
Communication System: PCS 850; Frequency: 836.6 MHz; Duty Cycle: 1:8
Medium: HSL850 Medium parameters used: f = 836.6 MHz; σ = 0.89 mho/m; ε_r = 42.4; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(6.39, 6.39, 6.39); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Touch position - Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.08 mW/g

Touch position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 35.3 V/m; Power Drift = 0.012 dB
Peak SAR (extrapolated) = 1.40 W/kg
SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.705 mW/g
Maximum value of SAR (measured) = 1.10 mW/g



0 dB = 1.10mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 21.4°C; liquid temperature: 20.3°C

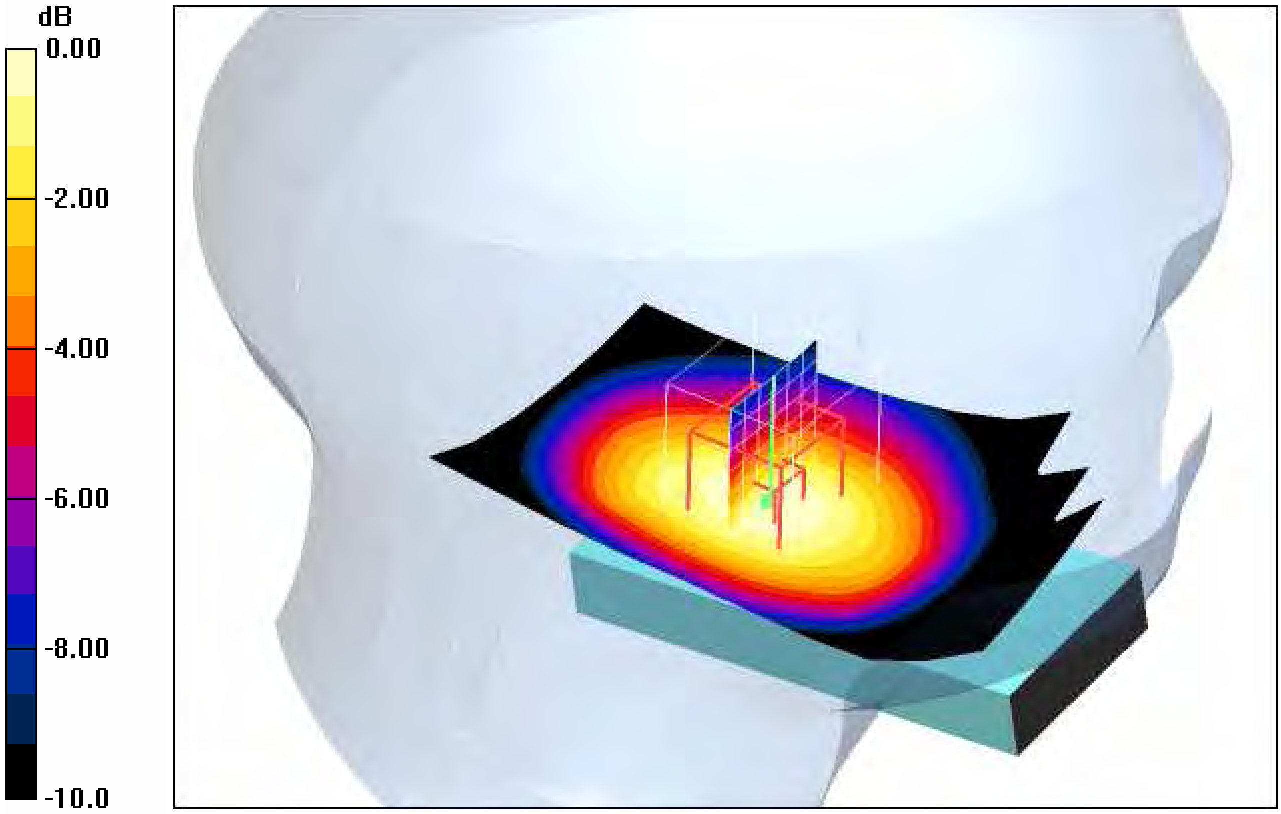
Date/Time: 2008-04-07 14:34:57Date/Time: 2008-04-07 14:41:51

P1528_OET65-LeftHandSide-GSM850

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4
Communication System: PCS 850; Frequency: 848.8 MHz; Duty Cycle: 1:8
Medium: HSL850 Medium parameters used: f = 848.8 MHz; σ = 0.89 mho/m; ε_r = 42.4; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(6.39, 6.39, 6.39); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Touch position - High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.45 mW/g

Touch position - High/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 40.8 V/m; Power Drift = -0.087 dB
Peak SAR (extrapolated) = 1.81 W/kg
SAR(1 g) = 1.37 mW/g; SAR(10 g) = 0.949 mW/g
Maximum value of SAR (measured) = 1.46 mW/g



0 dB = 1.46mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 21.5°C; liquid temperature: 20.3°C

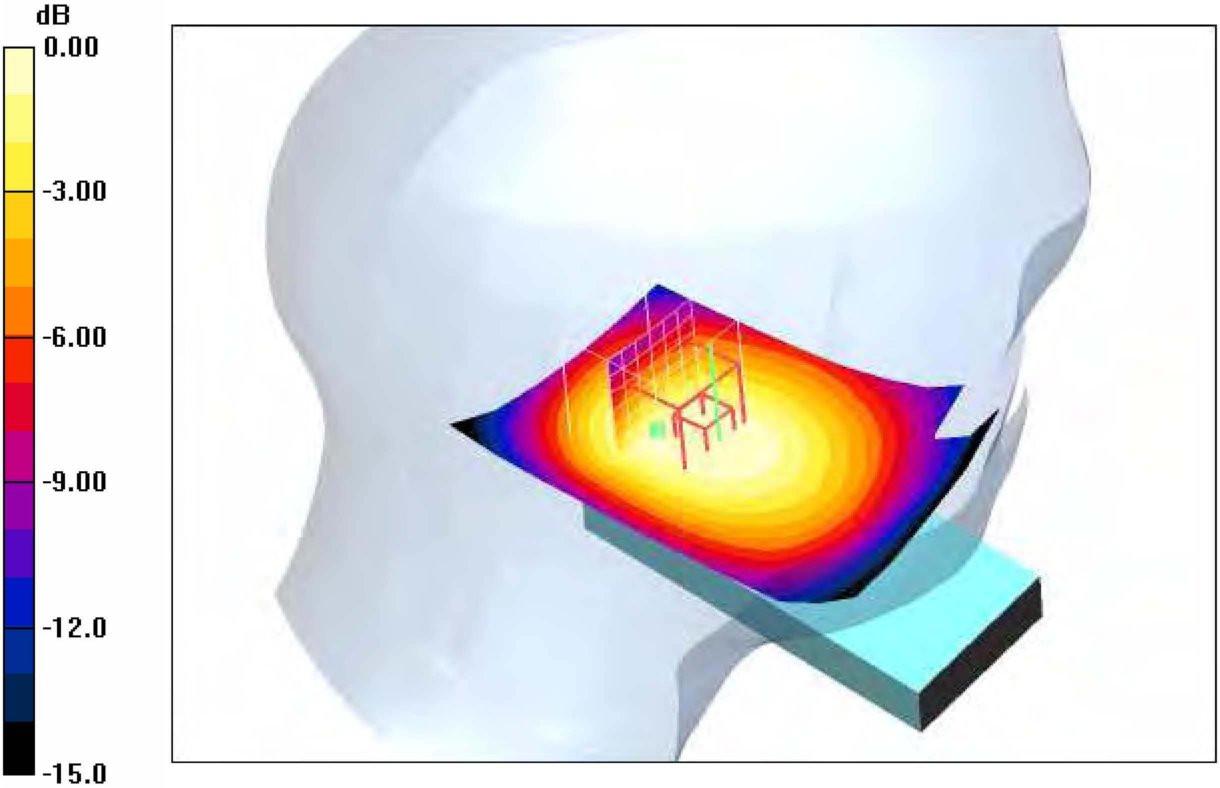
Date/Time: 2008-04-07 14:56:18Date/Time: 2008-04-07 15:03:11

P1528_OET65-LeftHandSide-GSM850

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4
Communication System: PCS 850; Frequency: 824.2 MHz; Duty Cycle: 1:8
Medium: HSL850 Medium parameters used: f = 824.2 MHz; σ = 0.89 mho/m; ε_r = 42.4; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(6.39, 6.39, 6.39); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Tilt position - Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.493 mW/g

Tilt position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.2 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.702 W/kg
SAR(1 g) = 0.432 mW/g; SAR(10 g) = 0.301 mW/g
Maximum value of SAR (measured) = 0.472 mW/g



0 dB = 0.472mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 21.6°C; liquid temperature: 20.3°C

Date/Time: 2008-04-07 15:17:30Date/Time: 2008-04-07 15:24:24

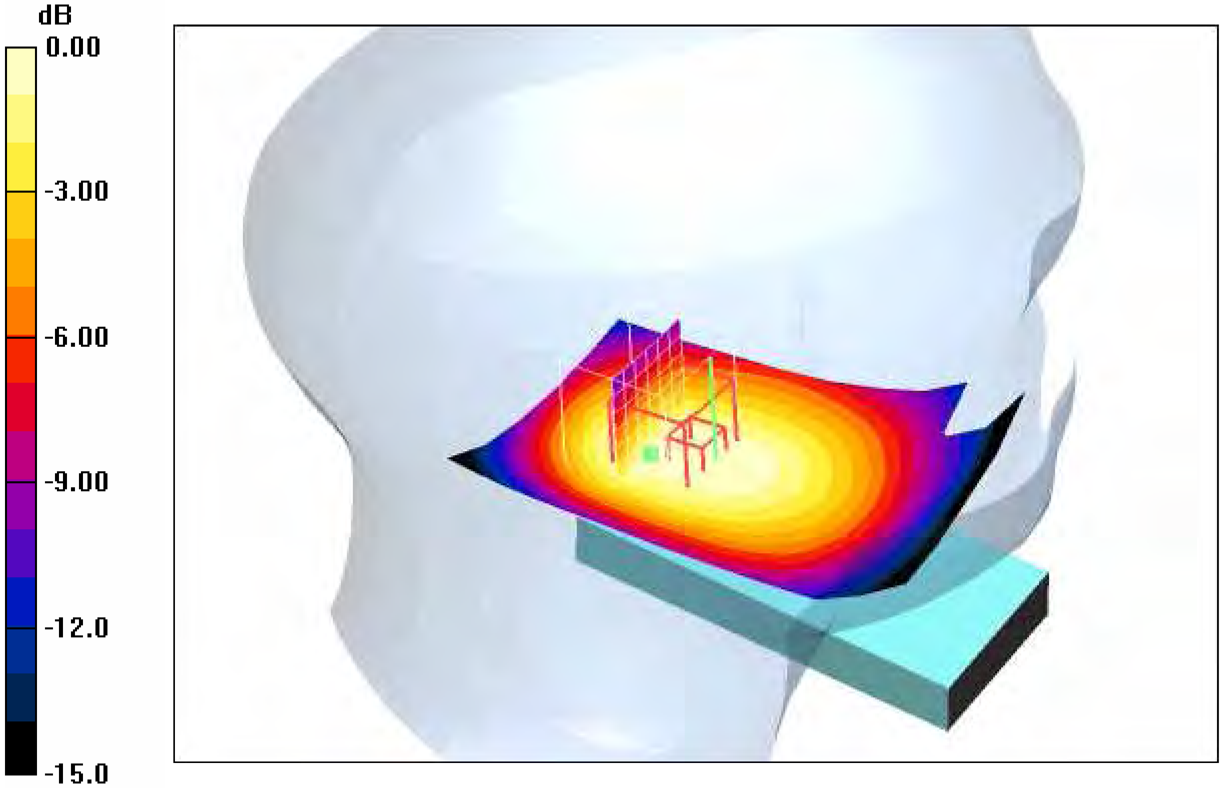
P1528_OET65-LeftHandSide-GSM850

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4

Communication System: PCS 850; Frequency: 836.6 MHz; Duty Cycle: 1:8
Medium: HSL850 Medium parameters used: f = 836.6 MHz; σ = 0.89 mho/m; ε_r = 42.4; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(6.39, 6.39, 6.39); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Tilt position - Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.779 mW/g

Tilt position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 29.1 V/m; Power Drift = -0.010 dB
Peak SAR (extrapolated) = 1.11 W/kg
SAR(1 g) = 0.678 mW/g; SAR(10 g) = 0.469 mW/g
Maximum value of SAR (measured) = 0.749 mW/g



0 dB = 0.749mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 21.6°C; liquid temperature: 20.3°C

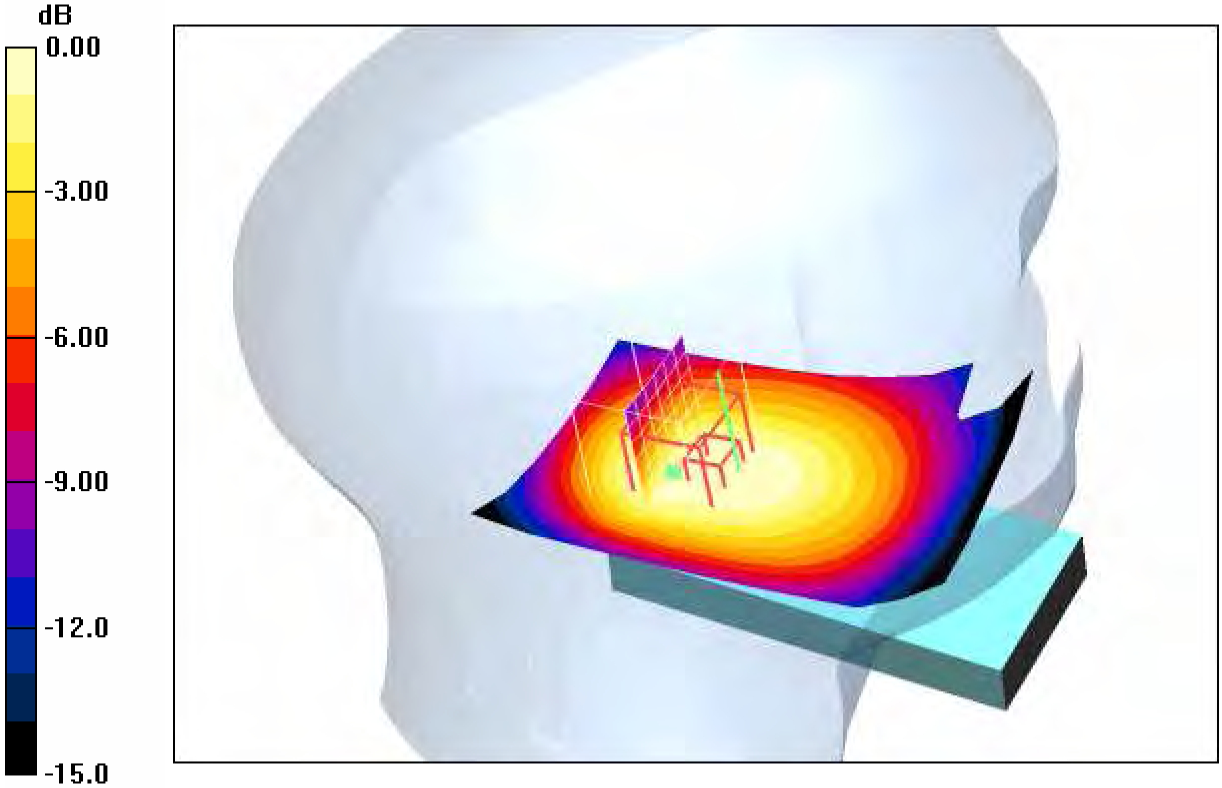
Date/Time: 2008-04-07 15:38:46Date/Time: 2008-04-07 15:45:41

P1528_OET65-LeftHandSide-GSM850

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4
Communication System: PCS 850; Frequency: 848.8 MHz; Duty Cycle: 1:8
Medium: HSL850 Medium parameters used: f = 848.8 MHz; σ = 0.89 mho/m; ε_r = 42.4; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(6.39, 6.39, 6.39); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Tilt position - High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.984 mW/g

Tilt position - High/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 32.6 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.41 W/kg
SAR(1 g) = 0.856 mW/g; SAR(10 g) = 0.590 mW/g
Maximum value of SAR (measured) = 0.934 mW/g



0 dB = 0.934mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 21.7°C; liquid temperature: 20.4°C

Date/Time: 2008-04-07 16:04:40Date/Time: 2008-04-07 16:11:22Date/Time: 2008-04-07 16:23:02

P1528_OET65-RightHandSide-GSM850

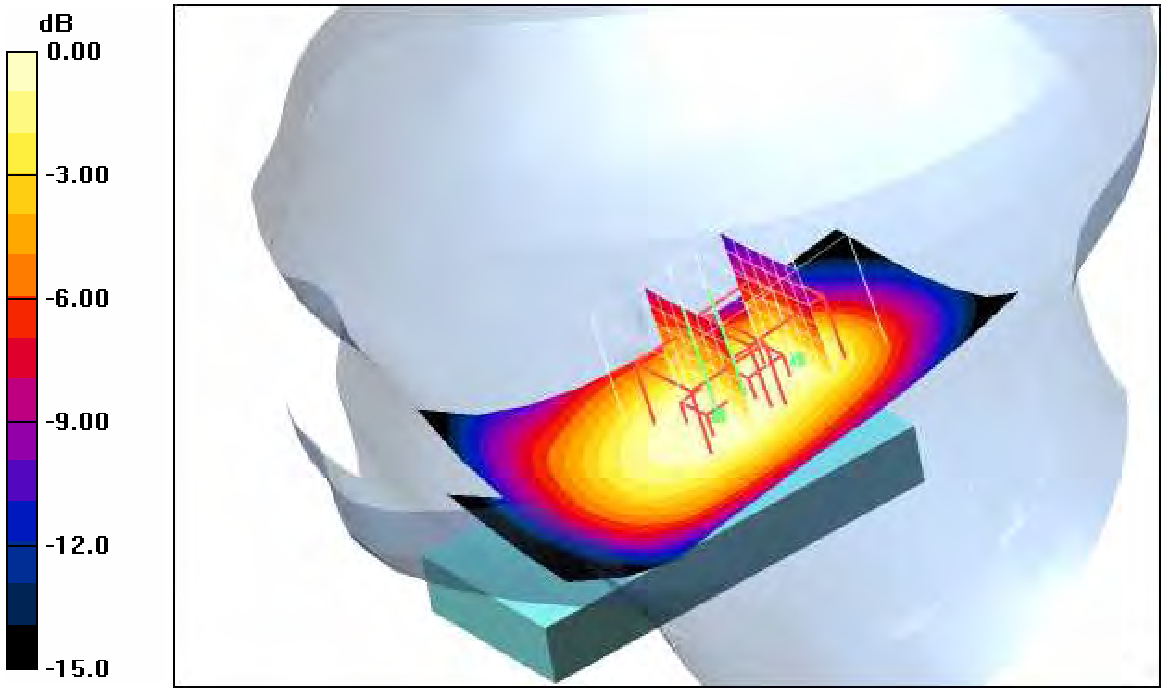
DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4

Communication System: PCS 850; Frequency: 824.2 MHz; Duty Cycle: 1:8
Medium: HSL850 Medium parameters used: f = 824.2 MHz; σ = 0.89 mho/m; ε_r = 42.4; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(6.39, 6.39, 6.39); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Touch position - Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.734 mW/g

Touch position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 29.4 V/m; Power Drift = 0.041 dB
Peak SAR (extrapolated) = 0.924 W/kg
SAR(1 g) = 0.681 mW/g; SAR(10 g) = 0.476 mW/g
Maximum value of SAR (measured) = 0.725 mW/g

Touch position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 29.4 V/m; Power Drift = 0.041 dB
Peak SAR (extrapolated) = 0.855 W/kg
SAR(1 g) = 0.593 mW/g; SAR(10 g) = 0.393 mW/g
Maximum value of SAR (measured) = 0.686 mW/g



0 dB = 0.686mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 21.8°C; liquid temperature: 20.4°C

Date/Time: 2008-04-07 16:37:46Date/Time: 2008-04-07 16:46:08Date/Time: 2008-04-07 16:57:51

P1528_OET65-RightHandSide-GSM850

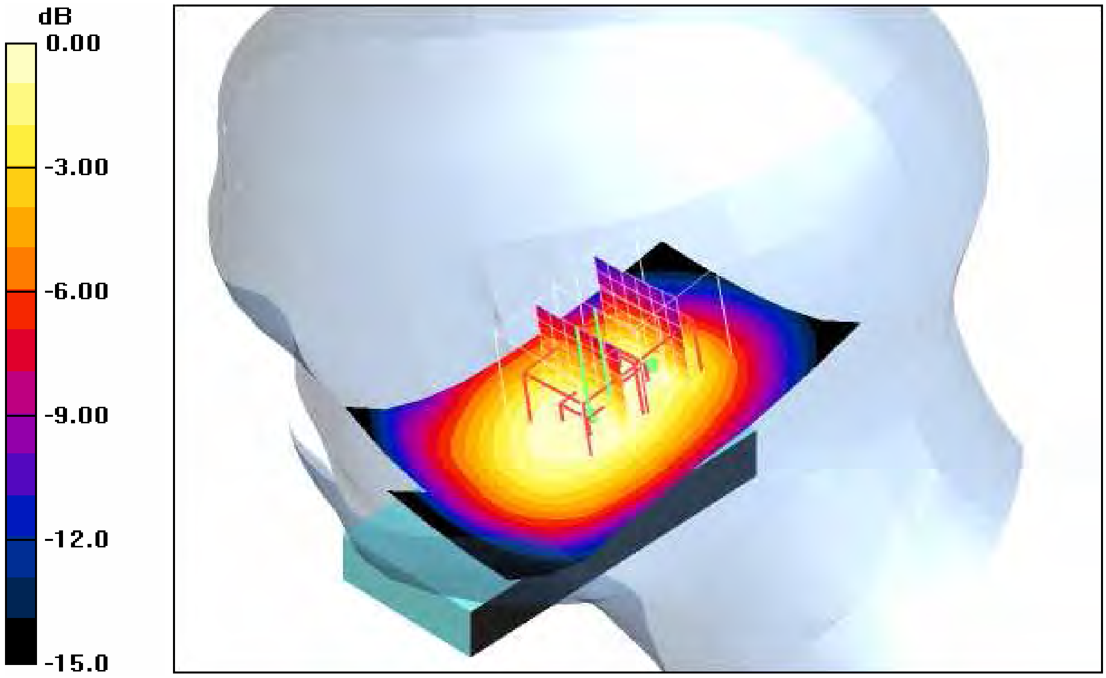
DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4

Communication System: PCS 850; Frequency: 836.6 MHz; Duty Cycle: 1:8
Medium: HSL850 Medium parameters used: f = 836.6 MHz; σ = 0.89 mho/m; ε_r = 42.4; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(6.39, 6.39, 6.39); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Touch position - Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.21 mW/g

Touch position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 37.7 V/m; Power Drift = -0.036 dB
Peak SAR (extrapolated) = 1.50 W/kg
SAR(1 g) = 1.12 mW/g; SAR(10 g) = 0.777 mW/g
Maximum value of SAR (measured) = 1.19 mW/g

Touch position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 37.7 V/m; Power Drift = -0.036 dB
Peak SAR (extrapolated) = 1.44 W/kg
SAR(1 g) = 0.959 mW/g; SAR(10 g) = 0.628 mW/g
Maximum value of SAR (measured) = 1.11 mW/g



0 dB = 1.11mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 21.8°C; liquid temperature: 20.4°C

Date/Time: 2008-04-07 17:16:59Date/Time: 2008-04-07 17:23:45Date/Time: 2008-04-07 17:35:27

P1528_OET65-RightHandSide-GSM850

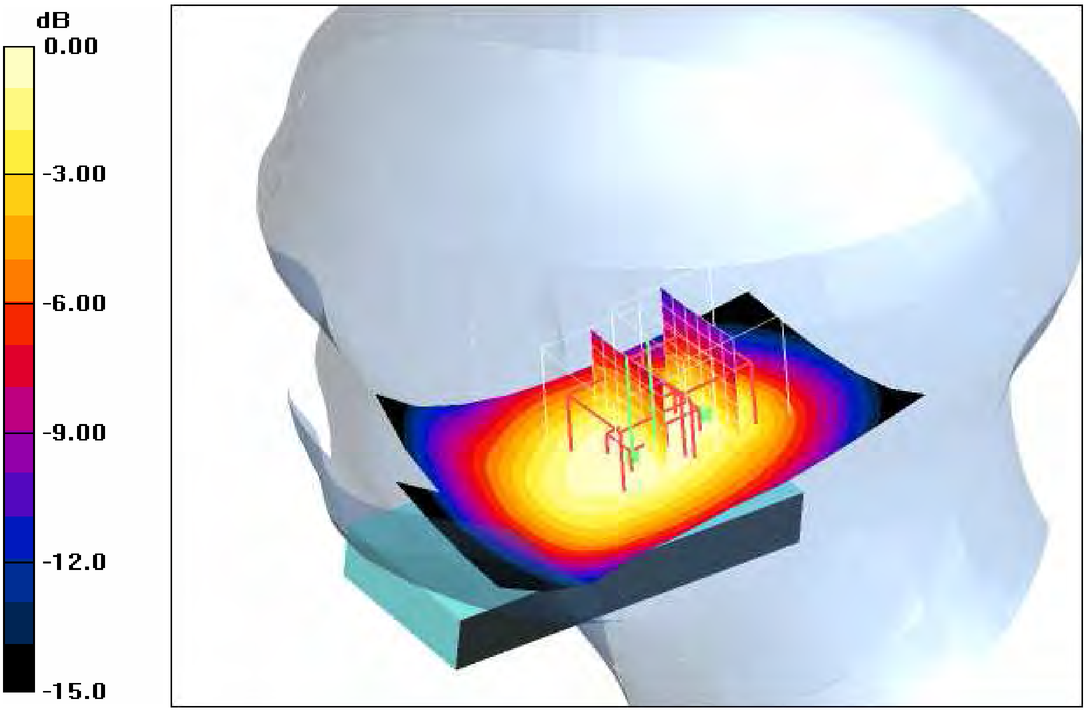
DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4

Communication System: PCS 850; Frequency: 848.8 MHz; Duty Cycle: 1:8
Medium: HSL850 Medium parameters used: f = 848.8 MHz; σ = 0.89 mho/m; ε_r = 42.4; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(6.39, 6.39, 6.39); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Touch position - High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.59 mW/g

Touch position - High/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 42.4 V/m; Power Drift = -0.037 dB
Peak SAR (extrapolated) = 1.88 W/kg
SAR(1 g) = 1.45 mW/g; SAR(10 g) = 1.02 mW/g
Maximum value of SAR (measured) = 1.55 mW/g

Touch position - High 2/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 42.4 V/m; Power Drift = -0.037 dB
Peak SAR (extrapolated) = 1.75 W/kg
SAR(1 g) = 1.26 mW/g; SAR(10 g) = 0.807 mW/g
Maximum value of SAR (measured) = 1.46 mW/g



0 dB = 1.46mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 21.9°C; liquid temperature: 20.4°C

Date/Time: 2008-04-07 17:53:25Date/Time: 2008-04-07 18:00:14Date/Time: 2008-04-07 18:11:43

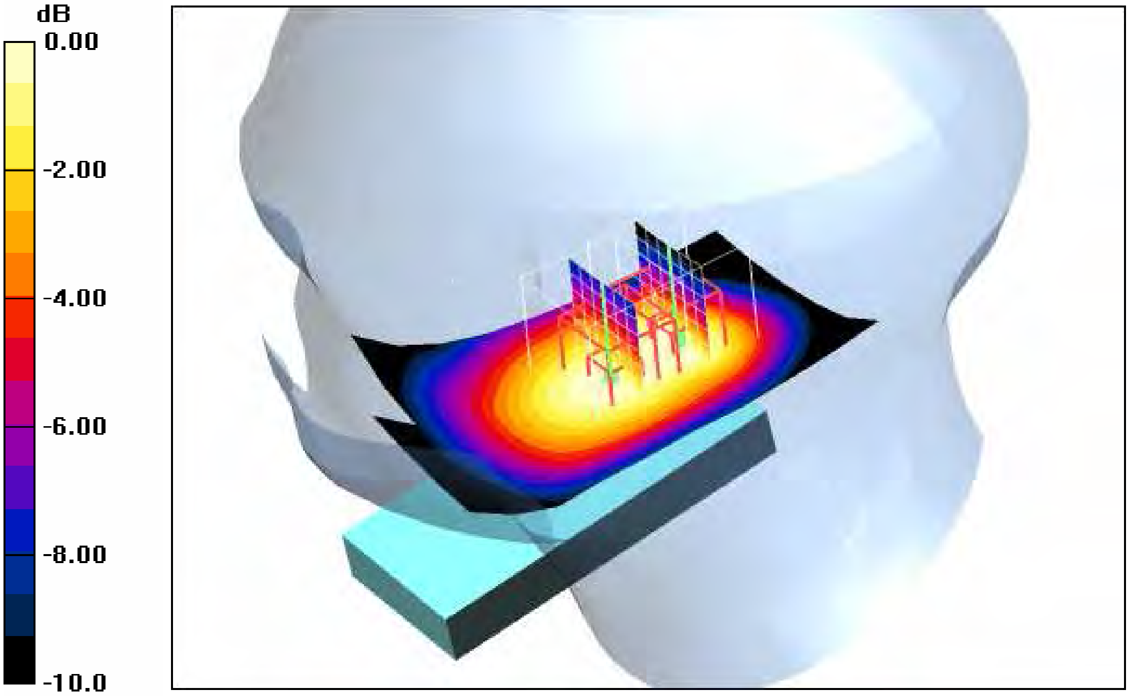
P1528_OET65-RightHandSide-GSM850

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4
Communication System: PCS 850; Frequency: 824.2 MHz; Duty Cycle: 1:8
Medium: HSL850 Medium parameters used: f = 824.2 MHz; σ = 0.89 mho/m; ε_r = 42.4; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(6.39, 6.39, 6.39); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Tilt position - Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.533 mW/g

Tilt position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.5 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.733 W/kg
SAR(1 g) = 0.441 mW/g; SAR(10 g) = 0.298 mW/g
Maximum value of SAR (measured) = 0.479 mW/g

Tilt position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.5 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.598 W/kg
SAR(1 g) = 0.450 mW/g; SAR(10 g) = 0.321 mW/g
Maximum value of SAR (measured) = 0.477 mW/g



0 dB = 0.477mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 21.9°C; liquid temperature: 20.5°C

Date/Time: 2008-04-07 18:26:03Date/Time: 2008-04-07 18:32:53Date/Time: 2008-04-07 18:44:36

P1528_OET65-RightHandSide-GSM850

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4

Communication System: PCS 850; Frequency: 836.6 MHz; Duty Cycle: 1:8

Medium: HSL850 Medium parameters used: f = 836.6 MHz; σ = 0.89 mho/m; ε_r = 42.4; ρ = 1000 kg/m^3

Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(6.39, 6.39, 6.39); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Tilt position - Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.827 mW/g

Tilt position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 29.6 V/m; Power Drift = -0.029 dB

Peak SAR (extrapolated) = 1.15 W/kg

SAR(1 g) = 0.689 mW/g; SAR(10 g) = 0.462 mW/g

Maximum value of SAR (measured) = 0.749 mW/g

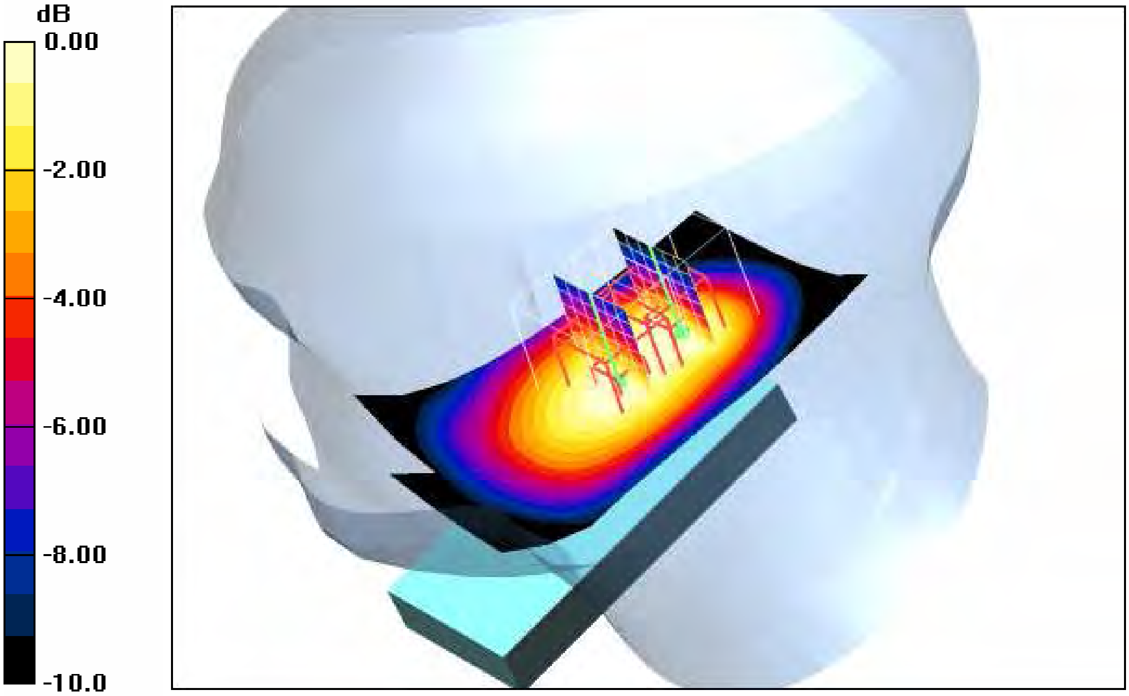
Tilt position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 29.6 V/m; Power Drift = -0.029 dB

Peak SAR (extrapolated) = 0.943 W/kg

SAR(1 g) = 0.699 mW/g; SAR(10 g) = 0.495 mW/g

Maximum value of SAR (measured) = 0.741 mW/g



0 dB = 0.741mW/g

Additional information:

position or distance of DUT to SAM (if not standard head positions) :

ambient temperature: 21.9°C; liquid temperature: 20.5°C

Date/Time: 2008-04-07 19:03:30Date/Time: 2008-04-07 19:10:18Date/Time: 2008-04-07 19:23:33

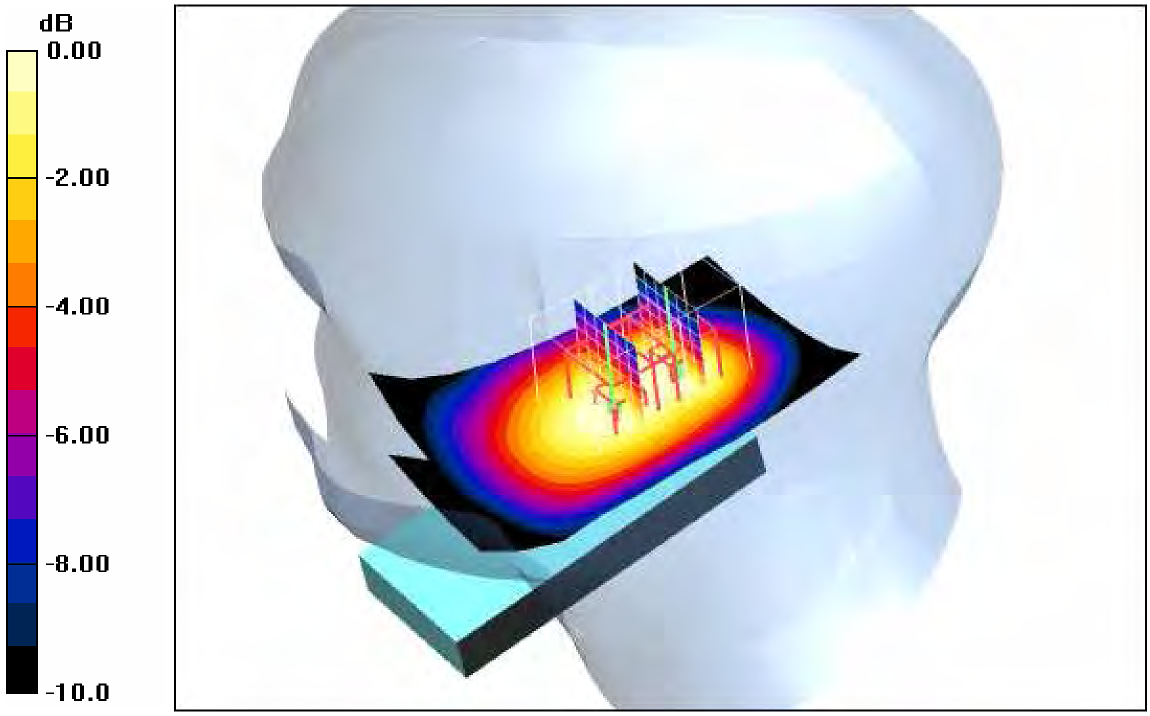
P1528_OET65-RightHandSide-GSM850

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4
Communication System: PCS 850; Frequency: 848.8 MHz; Duty Cycle: 1:8
Medium: HSL850 Medium parameters used: f = 848.8 MHz; σ = 0.89 mho/m; ε_r = 42.4; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(6.39, 6.39, 6.39); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Tilt position - High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.07 mW/g

Tilt position - High/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 32.8 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 1.34 W/kg
SAR(1 g) = 0.837 mW/g; SAR(10 g) = 0.571 mW/g
Maximum value of SAR (measured) = 0.901 mW/g

Tilt position - High/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 32.8 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 1.10 W/kg
SAR(1 g) = 0.851 mW/g; SAR(10 g) = 0.608 mW/g
Maximum value of SAR (measured) = 0.906 mW/g



0 dB = 0.906mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 22.0°C; liquid temperature: 20.5°C

Annex 2.2 PCS 850 MHz body

Date/Time: 2008-04-03 09:30:32Date/Time: 2008-04-03 09:37:02

P1528_OET65-Body-GSM850 GPRS class 10

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4

Communication System: PCS 850 GPRS class 10; Frequency: 824.2 MHz; Duty Cycle: 1:4

Medium: M850 Medium parameters used: f = 824.2 MHz; σ = 0.98 mho/m; ε_r = 55; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(6.17, 6.17, 6.17); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Front position - Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.276 mW/g

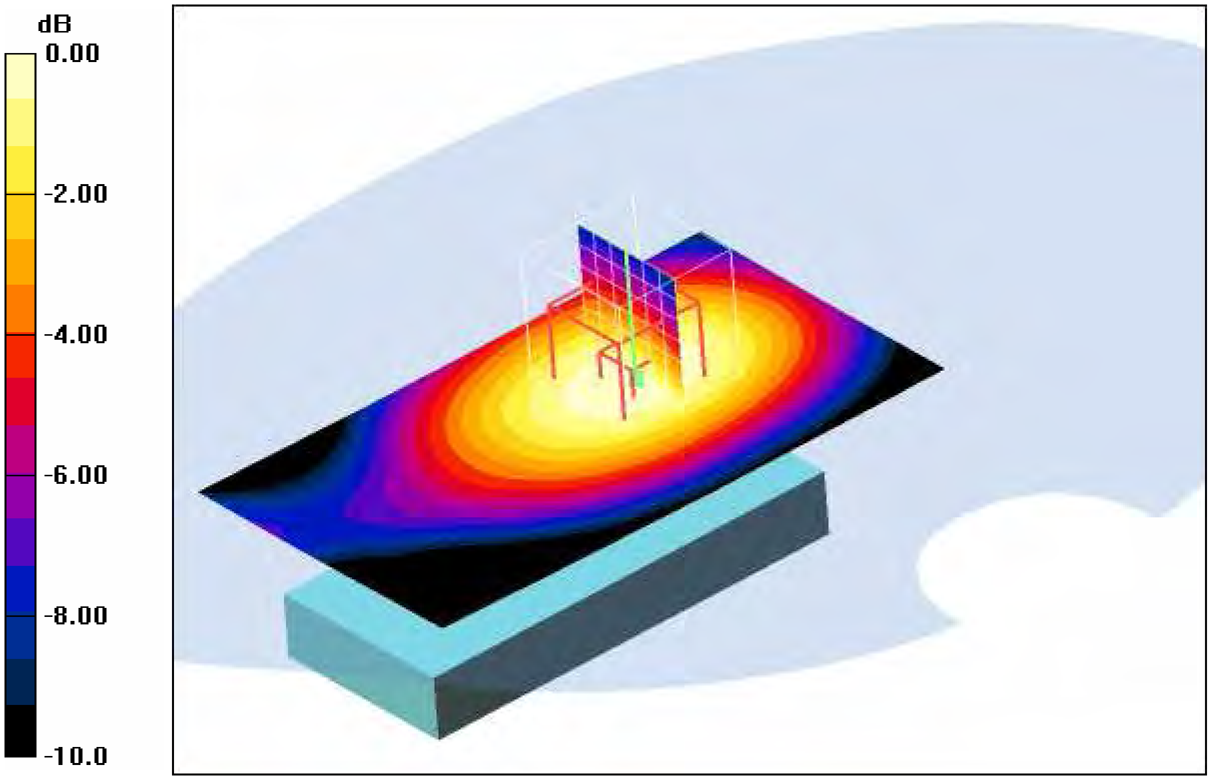
Front position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.5 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.341 W/kg

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

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



0 dB = 0.278mW/g

Additional information:

position or distance of DUT to SAM (if not standard head positions) : 15 mm

ambient temperature: 21.9°C; liquid temperature: 21.2°C

Date/Time: 2008-04-03 09:54:24Date/Time: 2008-04-03 10:09:05

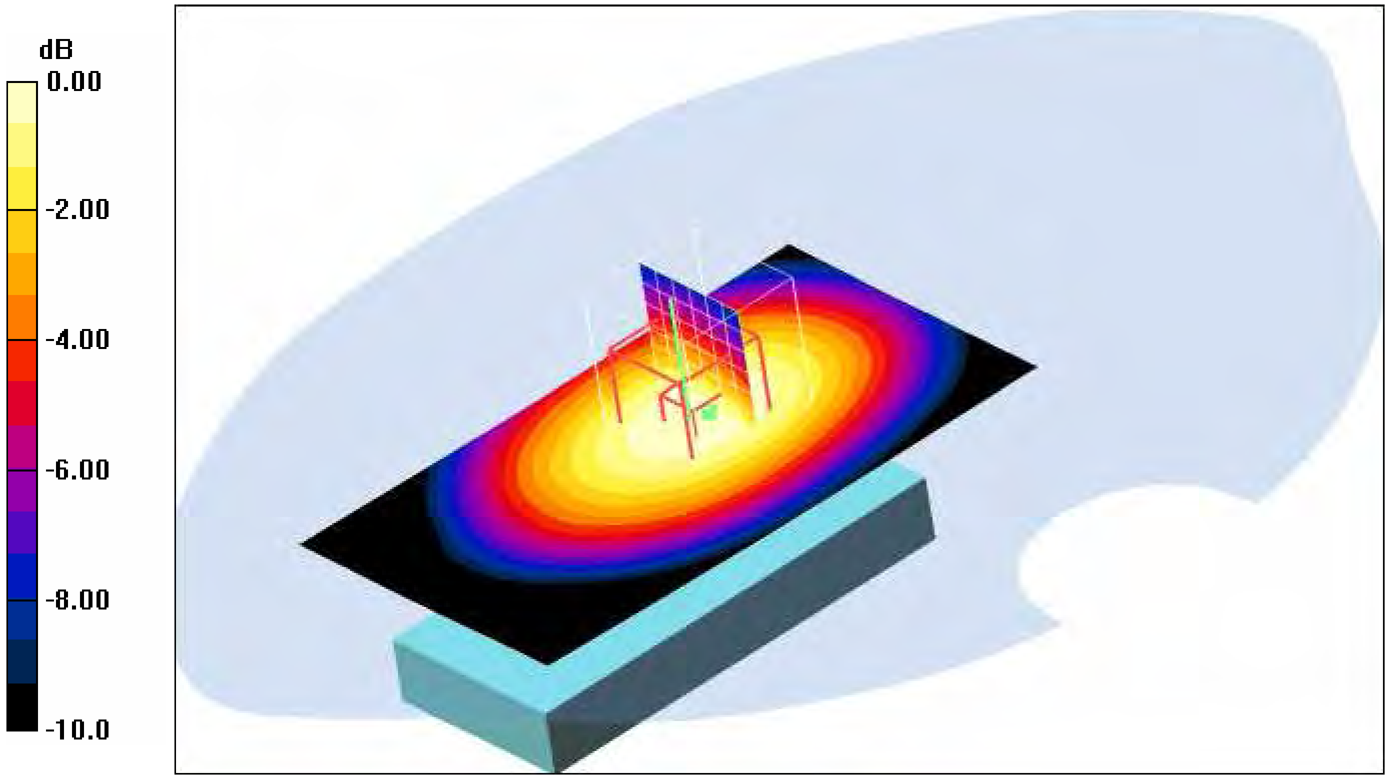
P1528_OET65-Body-GSM850 GPRS class 10

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4

Communication System: PCS 850 GPRS class 10; Frequency: 836.6 MHz; Duty Cycle: 1:4
Medium: M850 Medium parameters used: f = 836.6 MHz; σ = 0.98 mho/m; ε_r = 55; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(6.17, 6.17, 6.17); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Front position - Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.710 mW/g

Front position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 27.3 V/m; Power Drift = 0.033 dB
Peak SAR (extrapolated) = 0.867 W/kg
SAR(1 g) = 0.666 mW/g; SAR(10 g) = 0.477 mW/g
Maximum value of SAR (measured) = 0.704 mW/g



0 dB = 0.704mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) : 15 mm
ambient temperature: 22.0°C; liquid temperature: 21.2°C

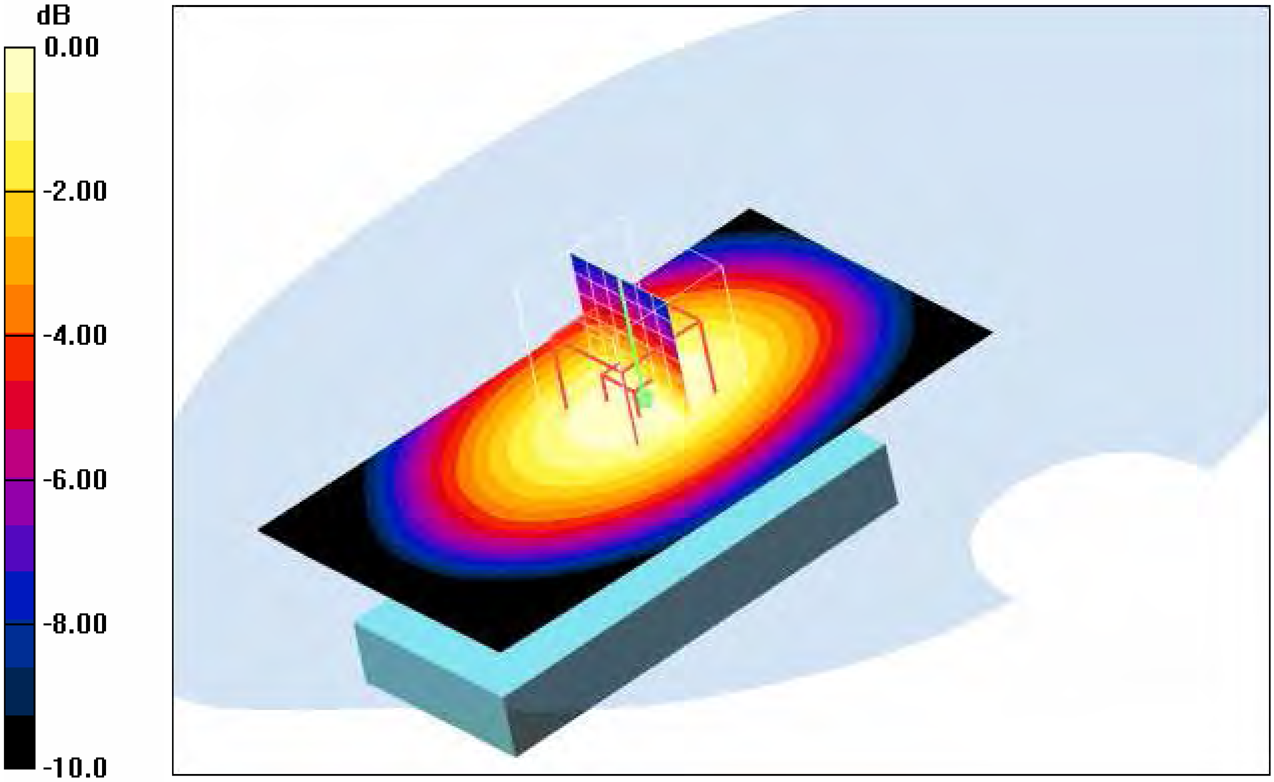
Date/Time: 2008-04-03 10:33:44Date/Time: 2008-04-03 10:48:39

P1528_OET65-Body-GSM850 GPRS class 10

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4
Communication System: PCS 850 GPRS class 10; Frequency: 848.8 MHz; Duty Cycle: 1:4
Medium: M850 Medium parameters used: f = 848.8 MHz; σ = 0.98 mho/m; ε_r = 55; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(6.17, 6.17, 6.17); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Front position - High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.711 mW/g

Front position - High/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 28.0 V/m; Power Drift = -0.028 dB
Peak SAR (extrapolated) = 0.878 W/kg
SAR(1 g) = 0.670 mW/g; SAR(10 g) = 0.482 mW/g
Maximum value of SAR (measured) = 0.715 mW/g



0 dB = 0.715mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) : 15 mm
ambient temperature: 22.0°C; liquid temperature: 21.2°C

Date/Time: 2008-04-03 11:07:54Date/Time: 2008-04-03 11:14:44

P1528_OET65-Body-GSM850 GPRS class 10

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4

Communication System: PCS 850 GPRS class 10; Frequency: 824.2 MHz; Duty Cycle: 1:4

Medium: M850 Medium parameters used: f = 824.2 MHz; σ = 0.98 mho/m; ε_r = 55; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(6.17, 6.17, 6.17); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Rear position - Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.700 mW/g

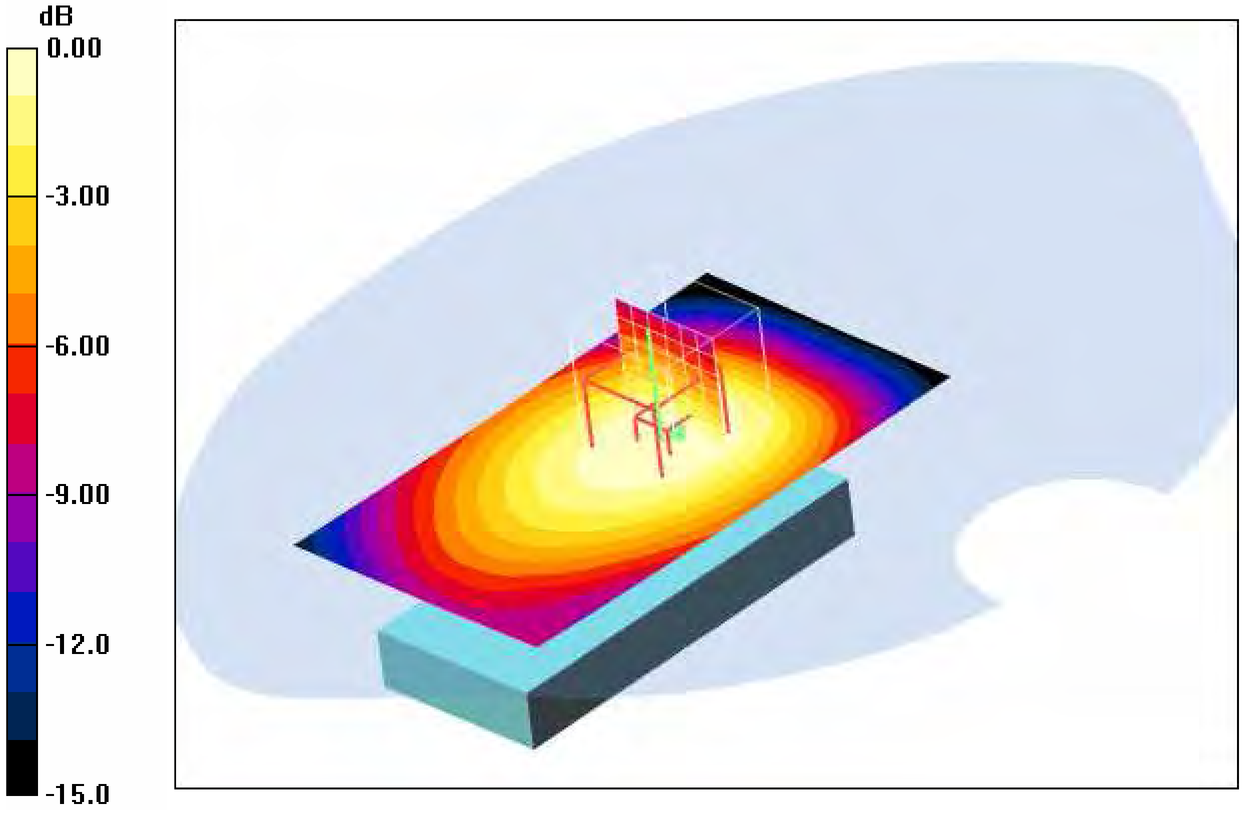
Rear position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 26.3 V/m; Power Drift = 0.033 dB

Peak SAR (extrapolated) = 0.891 W/kg

SAR(1 g) = 0.643 mW/g; SAR(10 g) = 0.460 mW/g

Maximum value of SAR (measured) = 0.681 mW/g



0 dB = 0.681mW/g

Additional information:

position or distance of DUT to SAM (if not standard head positions) : 15 mm

ambient temperature: 22.0°C; liquid temperature: 21.2°C

Date/Time: 2008-04-03 11:30:29Date/Time: 2008-04-03 11:46:03

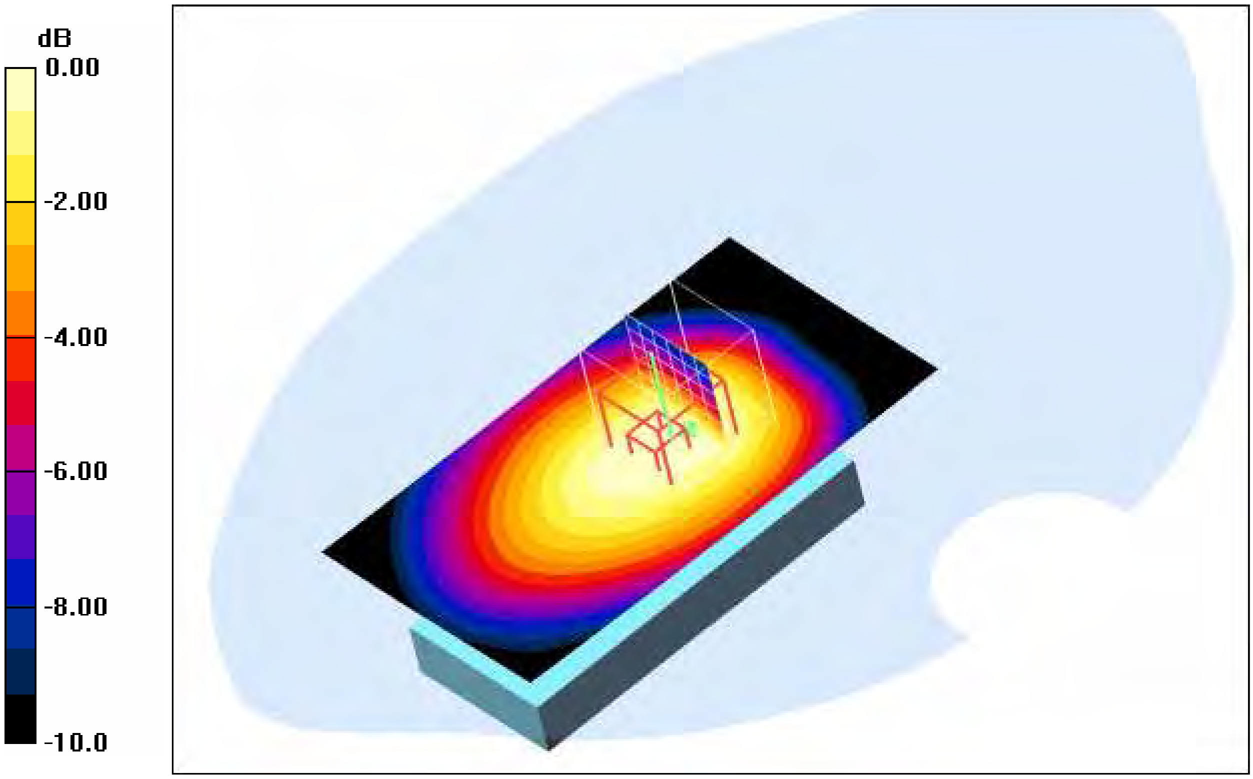
P1528_OET65-Body-GSM850 GPRS class 10

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4

Communication System: PCS 850 GPRS class 10; Frequency: 836.6 MHz;Duty Cycle: 1:4
Medium: M850 Medium parameters used: f = 836.6 MHz; $\sigma = 0.98$ mho/m; $\varepsilon_r = 55$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(6.17, 6.17, 6.17); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Rear position - Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.875 mW/g

Rear position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 30.6 V/m; Power Drift = 0.030 dB
Peak SAR (extrapolated) = 1.09 W/kg
SAR(1 g) = 0.833 mW/g; SAR(10 g) = 0.591 mW/g
Maximum value of SAR (measured) = 0.883 mW/g



0 dB = 0.883mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) : 15 mm
ambient temperature: 22.1°C; liquid temperature: 21.2°C

Date/Time: 2008-04-03 12:04:52Date/Time: 2008-04-03 12:11:30

P1528_OET65-Body-GSM850 GPRS class 10

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4

Communication System: PCS 850 GPRS class 10; Frequency: 848.8 MHz;Duty Cycle: 1:4

Medium: M850 Medium parameters used: f = 848.8 MHz; σ = 0.98 mho/m; ε_r = 55; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(6.17, 6.17, 6.17); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Rear position - High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.734 mW/g

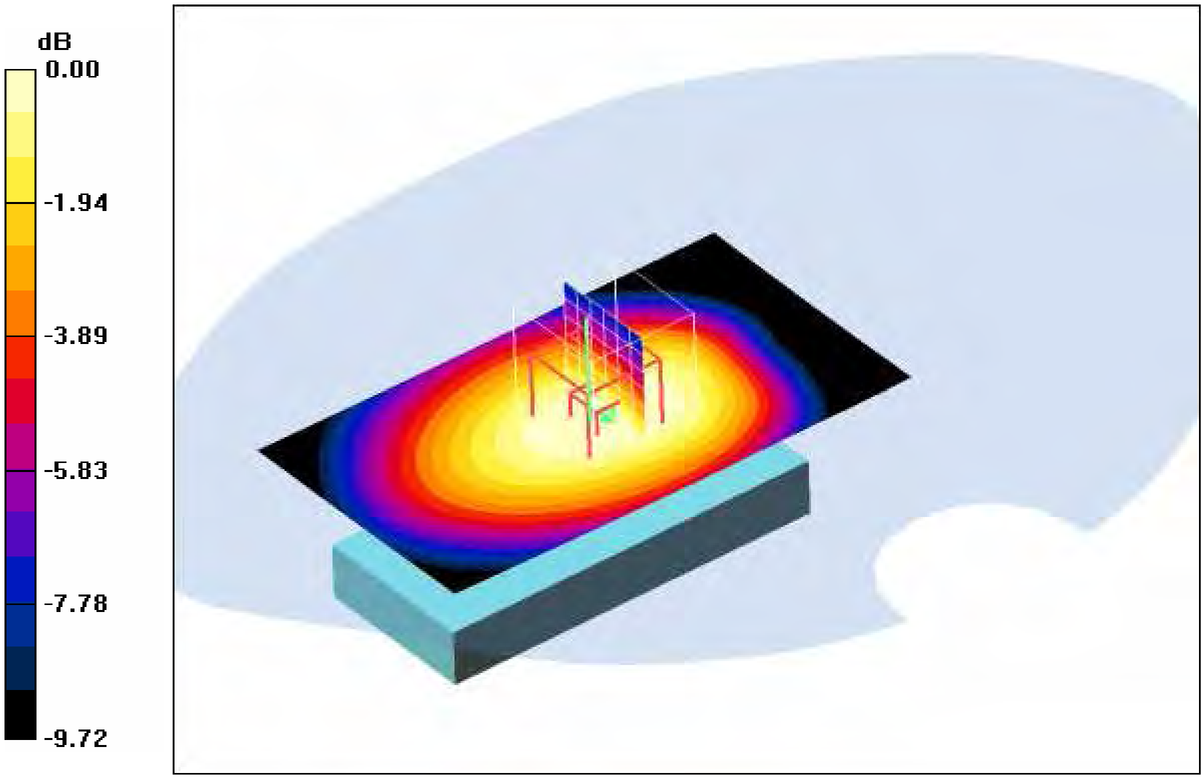
Rear position - High/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 27.9 V/m; Power Drift = 0.065 dB

Peak SAR (extrapolated) = 0.886 W/kg

SAR(1 g) = 0.684 mW/g; SAR(10 g) = 0.496 mW/g

Maximum value of SAR (measured) = 0.724 mW/g



0 dB = 0.724mW/g

Additional information:

position or distance of DUT to SAM (if not standard head positions) : 15 mm

ambient temperature: 22.1°C; liquid temperature: 21.3°C

Date/Time: 2008-04-03 12:30:10Date/Time: 2008-04-03 12:51:11

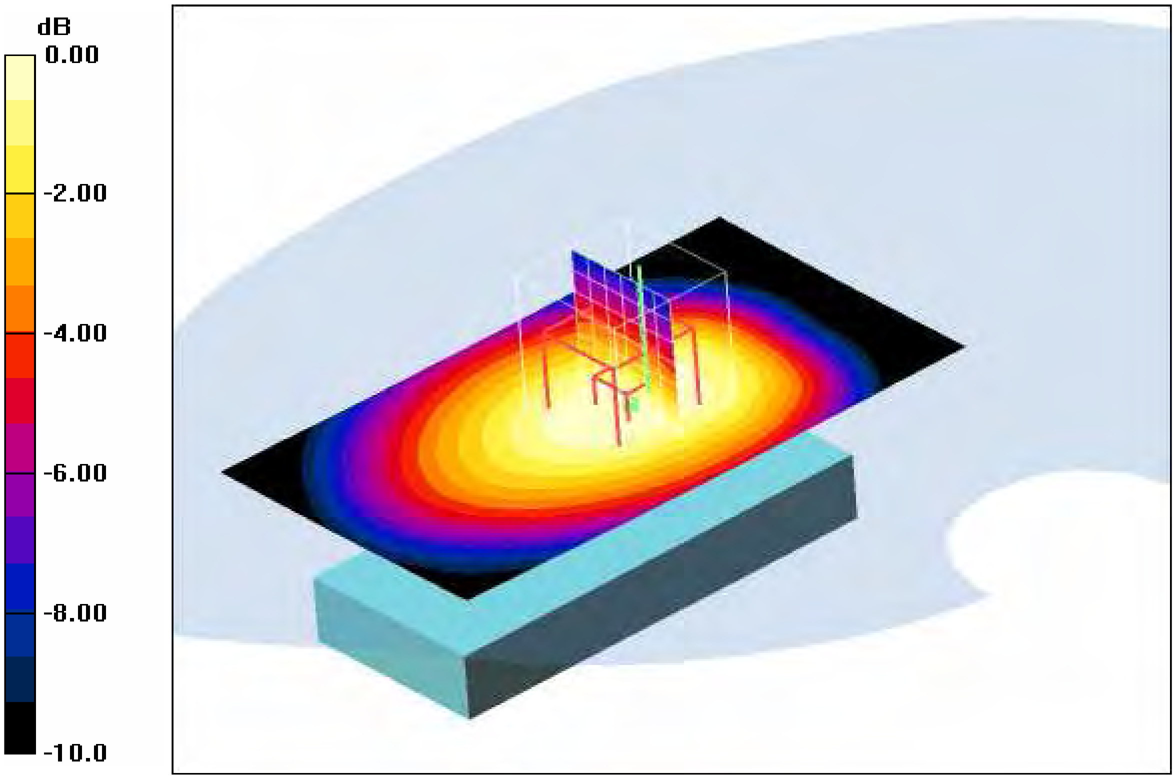
P1528_OET65-Body-GSM850 EGPRS class 10

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4

Communication System: PCS 850 EGPRS class 10; Frequency: 836.6 MHz; Duty Cycle: 1:4
Medium: M850 Medium parameters used: f = 836.6 MHz; σ = 0.98 mho/m; ε_r = 55; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(6.17, 6.17, 6.17); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Rear position - Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.417 mW/g

Rear position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.2 V/m; Power Drift = -0.014 dB
Peak SAR (extrapolated) = 0.519 W/kg
SAR(1 g) = 0.394 mW/g; SAR(10 g) = 0.285 mW/g
Maximum value of SAR (measured) = 0.416 mW/g



0 dB = 0.416mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) : 15 mm
ambient temperature: 22.2°C; liquid temperature: 21.3°C

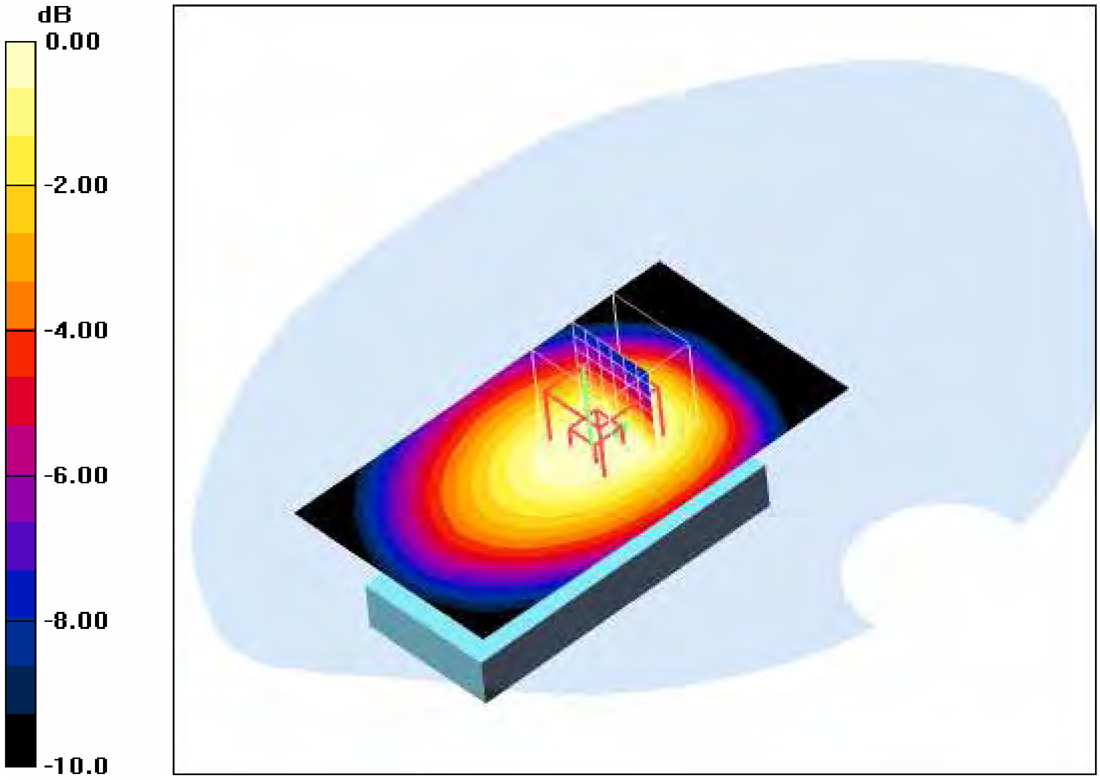
Date/Time: 2008-04-03 13:05:42Date/Time: 2008-04-03 13:12:23

P1528_OET65-Body-GSM850

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4
Communication System: PCS 850; Frequency: 836.6 MHz; Duty Cycle: 1:8
Medium: M850 Medium parameters used: f = 836.6 MHz; σ = 0.98 mho/m; ε_r = 55; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(6.17, 6.17, 6.17); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Rear position - Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.698 mW/g

Rear position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 27.3 V/m; Power Drift = -0.029 dB
Peak SAR (extrapolated) = 0.850 W/kg
SAR(1 g) = 0.650 mW/g; SAR(10 g) = 0.464 mW/g
Maximum value of SAR (measured) = 0.690 mW/g



0 dB = 0.690mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) : 15 mm
ambient temperature: 22.2°C; liquid temperature: 21.3°C

Annex 2.3 PCS 1900 MHz head

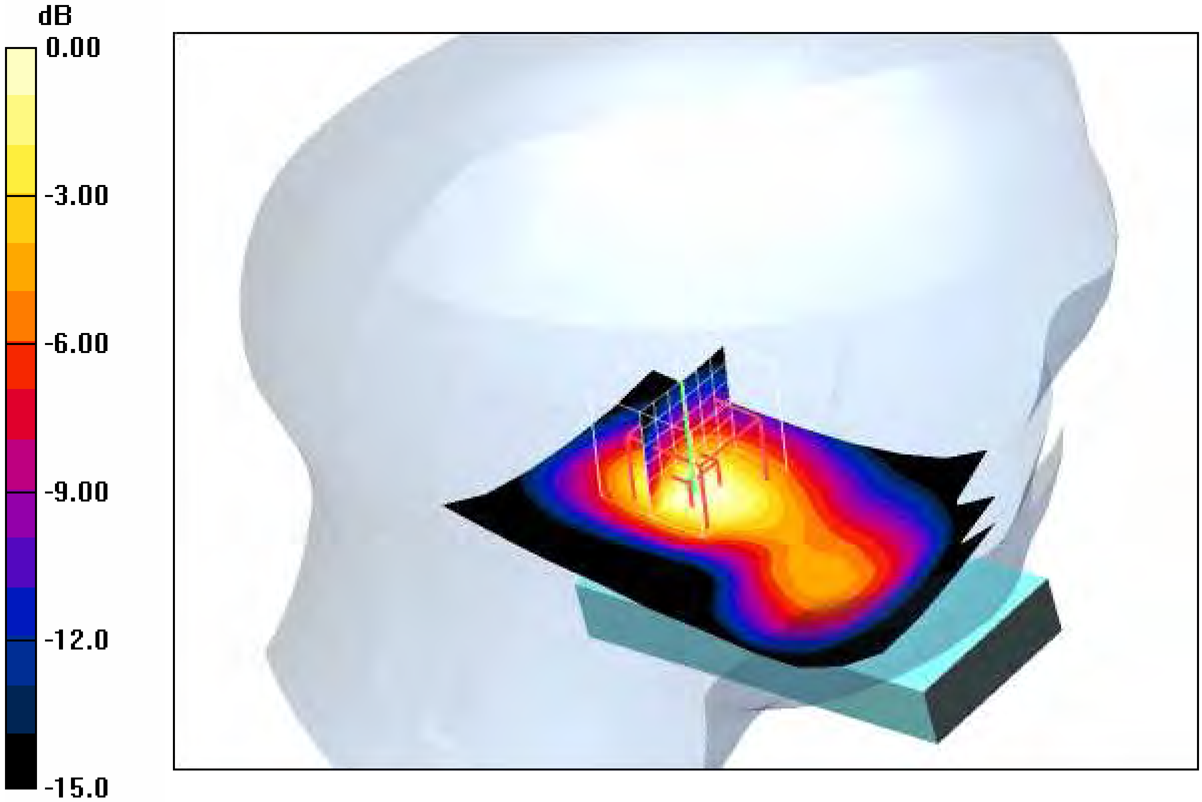
Date/Time: 2008-04-08 10:39:52Date/Time: 2008-04-08 10:46:30

P1528_OET65-LeftHandSide-GSM1900

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4
Communication System: PCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8
Medium: HSL1900 Medium parameters used: f = 1850.2 MHz; σ = 1.43 mho/m; ε_r = 41.2; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.9, 4.9, 4.9); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Touch position - Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.38 mW/g

Touch position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 31.5 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 1.93 W/kg
SAR(1 g) = 1.17 mW/g; SAR(10 g) = 0.612 mW/g
Maximum value of SAR (measured) = 1.30 mW/g



0 dB = 1.30mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 21.5°C; liquid temperature: 20.5°C

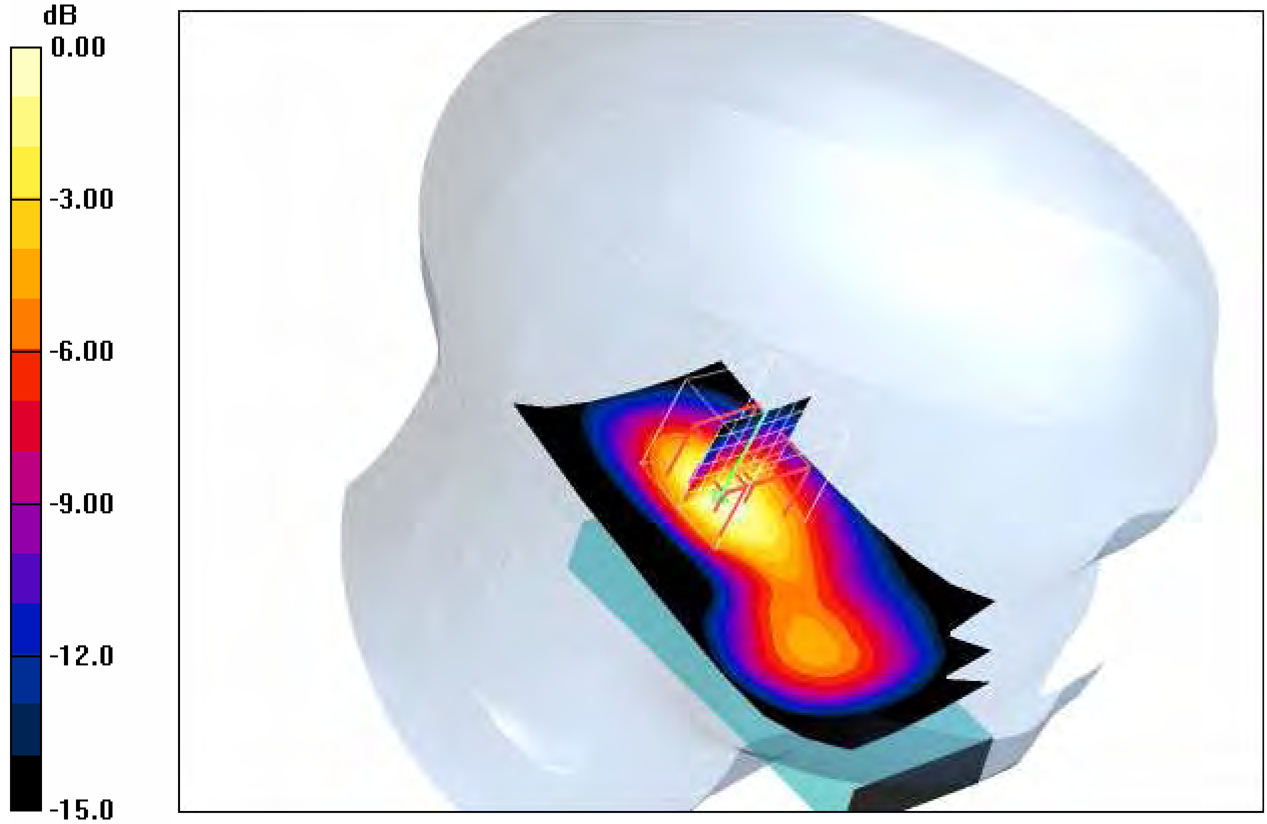
Date/Time: 2008-04-08 11:01:17Date/Time: 2008-04-08 11:08:30

P1528_OET65-LeftHandSide-GSM1900

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4
Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:8
Medium: HSL1900 Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; ε_r = 41.2; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.9, 4.9, 4.9); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Touch position - Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.59 mW/g

Touch position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 28.8 V/m; Power Drift = 0.111 dB
Peak SAR (extrapolated) = 2.23 W/kg
SAR(1 g) = 1.35 mW/g; SAR(10 g) = 0.705 mW/g
Maximum value of SAR (measured) = 1.53 mW/g



0 dB = 1.53mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 21.5°C; liquid temperature: 20.5°C

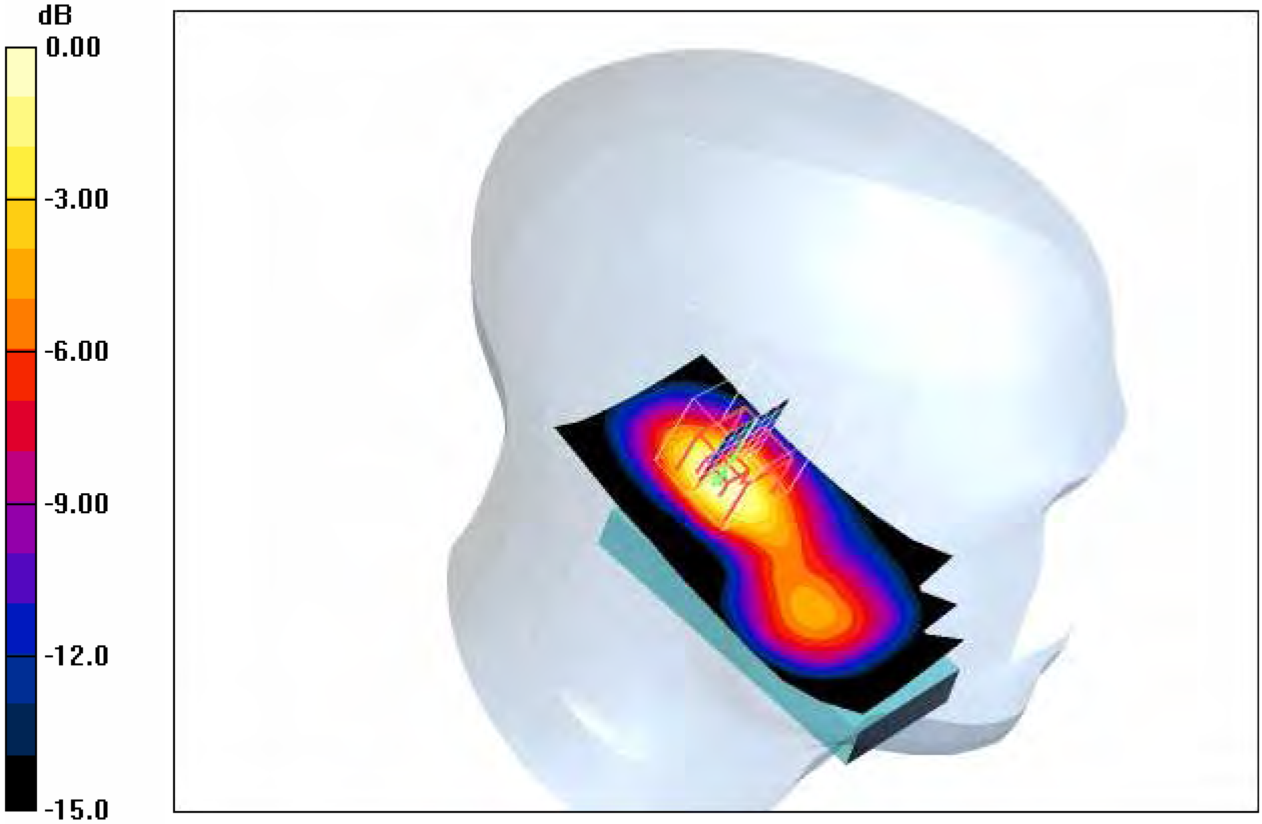
Date/Time: 2008-04-08 11:25:27Date/Time: 2008-04-08 11:32:02

P1528_OET65-LeftHandSide-GSM1900

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4
Communication System: PCS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8
Medium: HSL1900 Medium parameters used: f = 1909.8 MHz; σ = 1.43 mho/m; ε_r = 41.2; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.9, 4.9, 4.9); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Touch position - High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.71 mW/g

Touch position - High/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 29.9 V/m; Power Drift = 0.154 dB
Peak SAR (extrapolated) = 2.37 W/kg
SAR(1 g) = 1.44 mW/g; SAR(10 g) = 0.752 mW/g
Maximum value of SAR (measured) = 1.64 mW/g



0 dB = 1.64mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 21.6°C; liquid temperature: 200.5°C

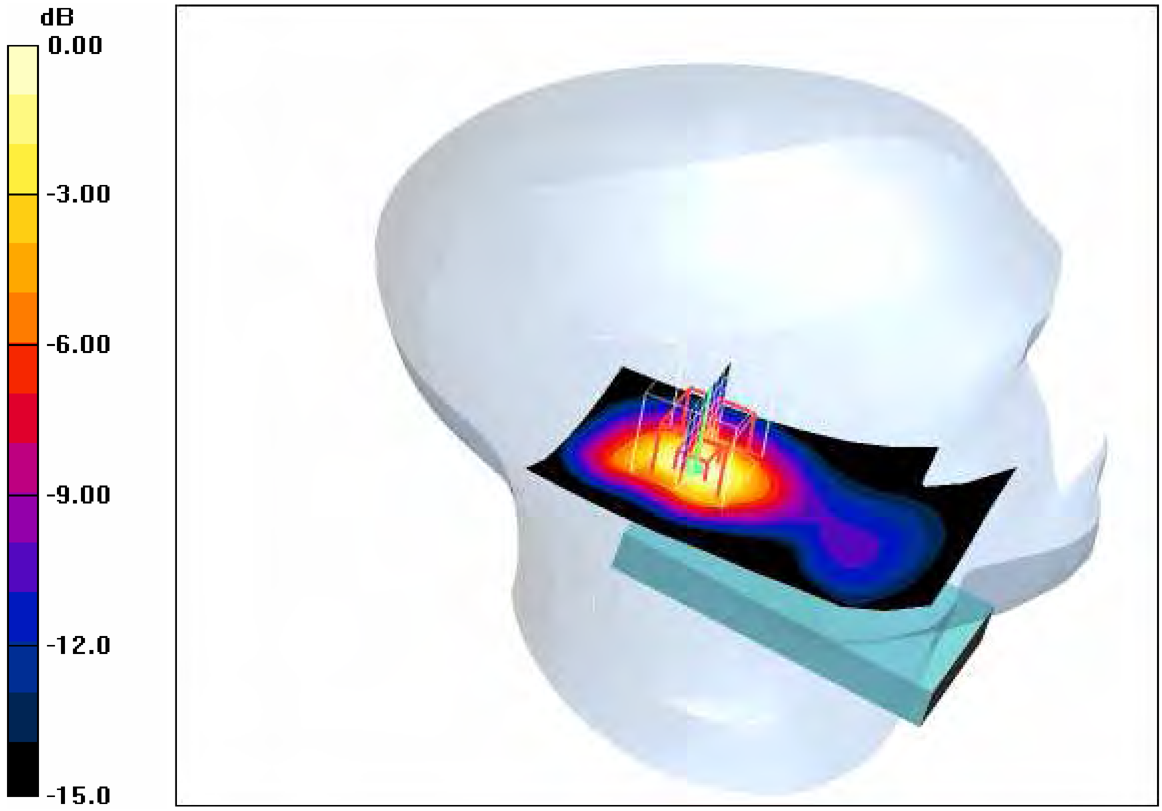
Date/Time: 2008-04-08 11:48:09Date/Time: 2008-04-08 11:55:07

P1528_OET65-LeftHandSide-GSM1900

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4
Communication System: PCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8
Medium: HSL1900 Medium parameters used: f = 1850.2 MHz; σ = 1.43 mho/m; ε_r = 41.2; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.9, 4.9, 4.9); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Tilt position - Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.937 mW/g

Tilt position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.6 V/m; Power Drift = 0.151 dB
Peak SAR (extrapolated) = 1.41 W/kg
SAR(1 g) = 0.840 mW/g; SAR(10 g) = 0.431 mW/g
Maximum value of SAR (measured) = 0.966 mW/g



0 dB = 0.966mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 21.7°C; liquid temperature: 20.5°C

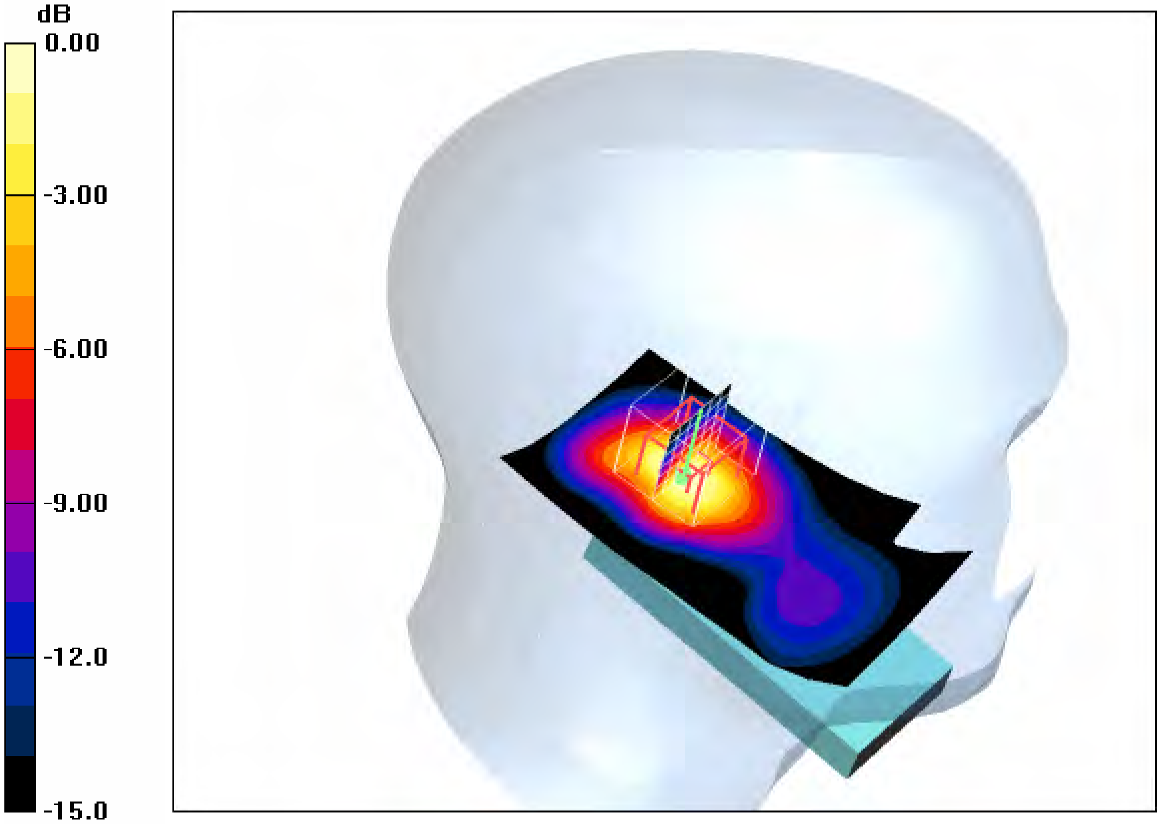
Date/Time: 2008-04-08 12:09:00Date/Time: 2008-04-08 12:16:20

P1528_OET65-LeftHandSide-GSM1900

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4
Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:8
Medium: HSL1900 Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; ε_r = 41.2; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.9, 4.9, 4.9); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Tilt position - Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.11 mW/g

Tilt position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 27.4 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.69 W/kg
SAR(1 g) = 0.987 mW/g; SAR(10 g) = 0.503 mW/g
Maximum value of SAR (measured) = 1.15 mW/g



0 dB = 1.15mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 21.8°C; liquid temperature: 20.6°C

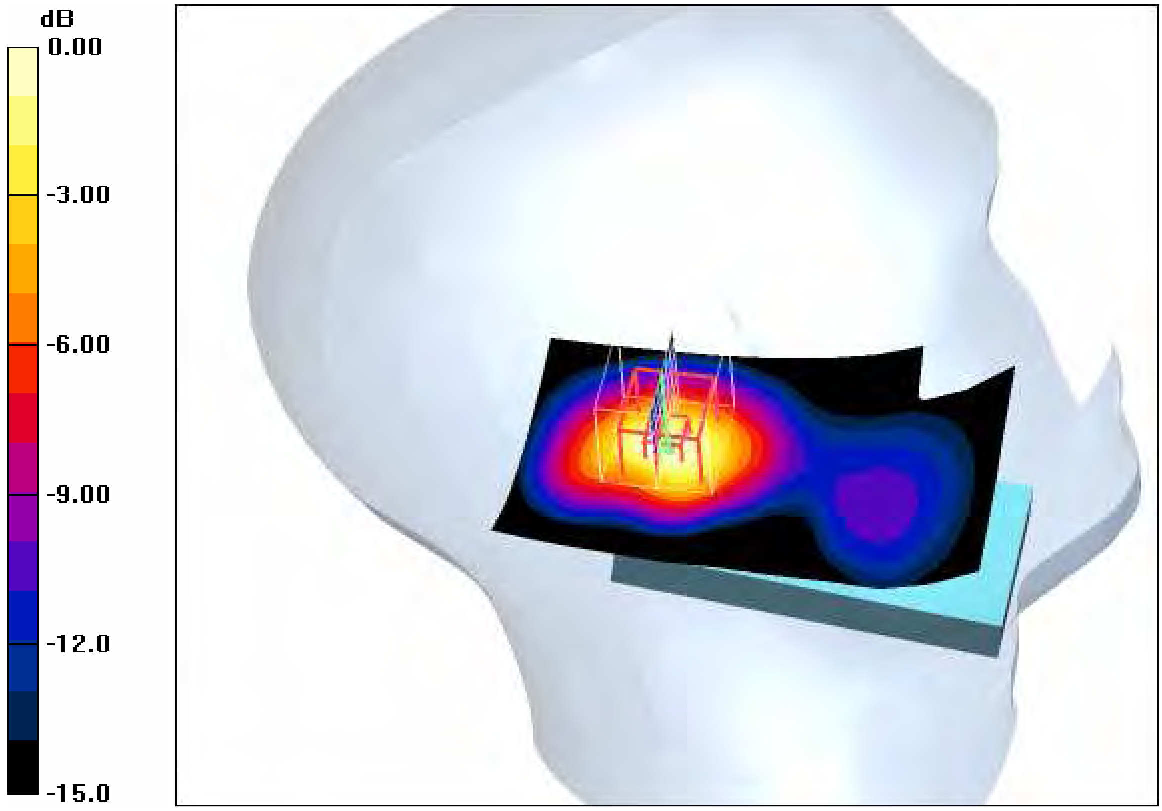
Date/Time: 2008-04-08 12:35:05Date/Time: 2008-04-08 12:41:58

P1528_OET65-LeftHandSide-GSM1900

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4
Communication System: PCS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8
Medium: HSL1900 Medium parameters used: f = 1909.8 MHz; σ = 1.43 mho/m; ε_r = 41.2; ρ = 1000 kg/m^3
Phantom section: Left Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.9, 4.9, 4.9); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Tilt position - High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.24 mW/g

Tilt position - High/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 29.2 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 1.87 W/kg
SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.561 mW/g
Maximum value of SAR (measured) = 1.27 mW/g



0 dB = 1.27mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 22.1°C; liquid temperature: 20.6°C

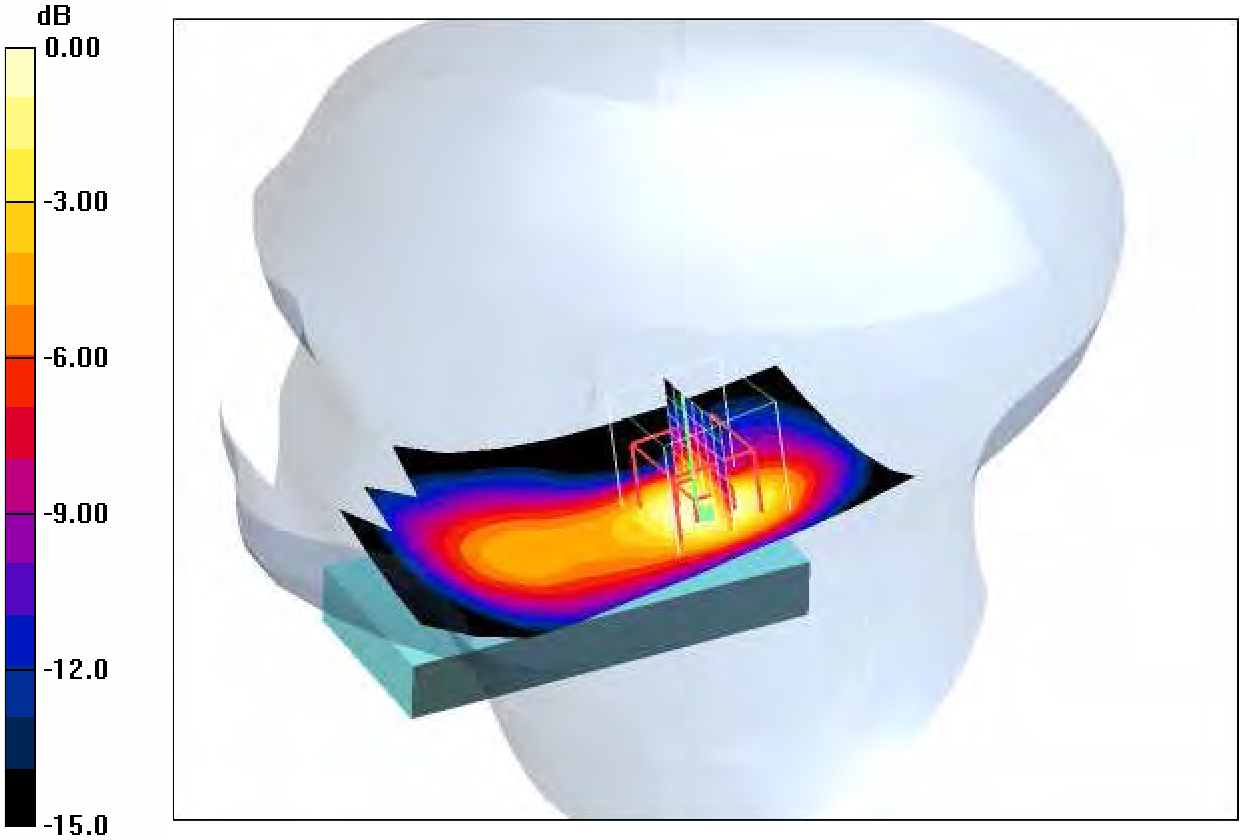
Date/Time: 2008-04-08 13:03:08Date/Time: 2008-04-08 13:10:26

P1528_OET65-RightHandSide-GSM1900

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4
Communication System: PCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8
Medium: HSL1900 Medium parameters used: f = 1850.2 MHz; σ = 1.43 mho/m; ε_r = 41.2; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.9, 4.9, 4.9); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Touch position - Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.992 mW/g

Touch position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 27.8 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.43 W/kg
SAR(1 g) = 0.907 mW/g; SAR(10 g) = 0.495 mW/g
Maximum value of SAR (measured) = 1.01 mW/g



0 dB = 1.01mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 22.7°C; liquid temperature: 20.5°C

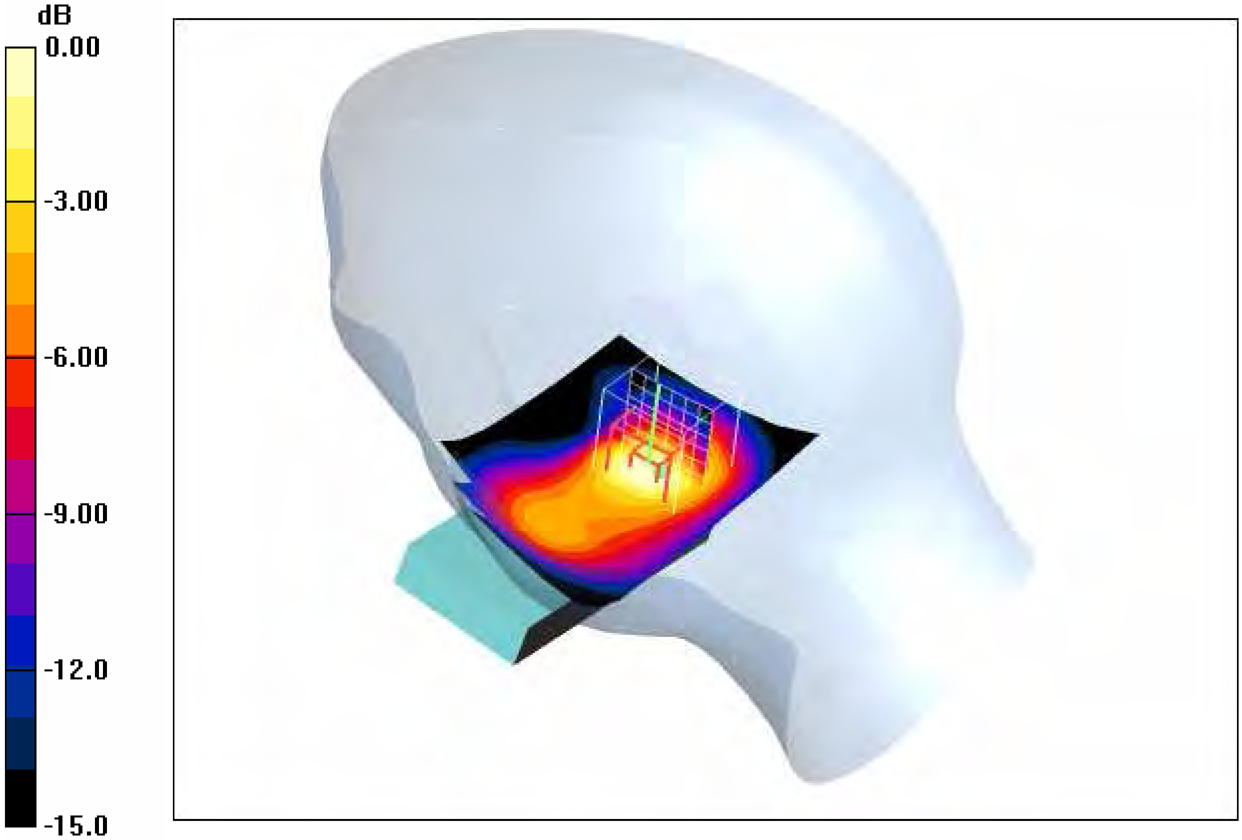
Date/Time: 2008-04-08 13:25:58Date/Time: 2008-04-08 13:32:30

P1528_OET65-RightHandSide-GSM1900

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4
Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:8
Medium: HSL1900 Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; ε_r = 41.2; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.9, 4.9, 4.9); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Touch position - Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.14 mW/g

Touch position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 29.9 V/m; Power Drift = -0.045 dB
Peak SAR (extrapolated) = 1.68 W/kg
SAR(1 g) = 1.04 mW/g; SAR(10 g) = 0.564 mW/g
Maximum value of SAR (measured) = 1.18 mW/g



0 dB = 1.18mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 22.7°C; liquid temperature: 20.5°C

Date/Time: 2008-04-08 13:46:51Date/Time: 2008-04-08 13:53:25

P1528_OET65-RightHandSide-GSM1900

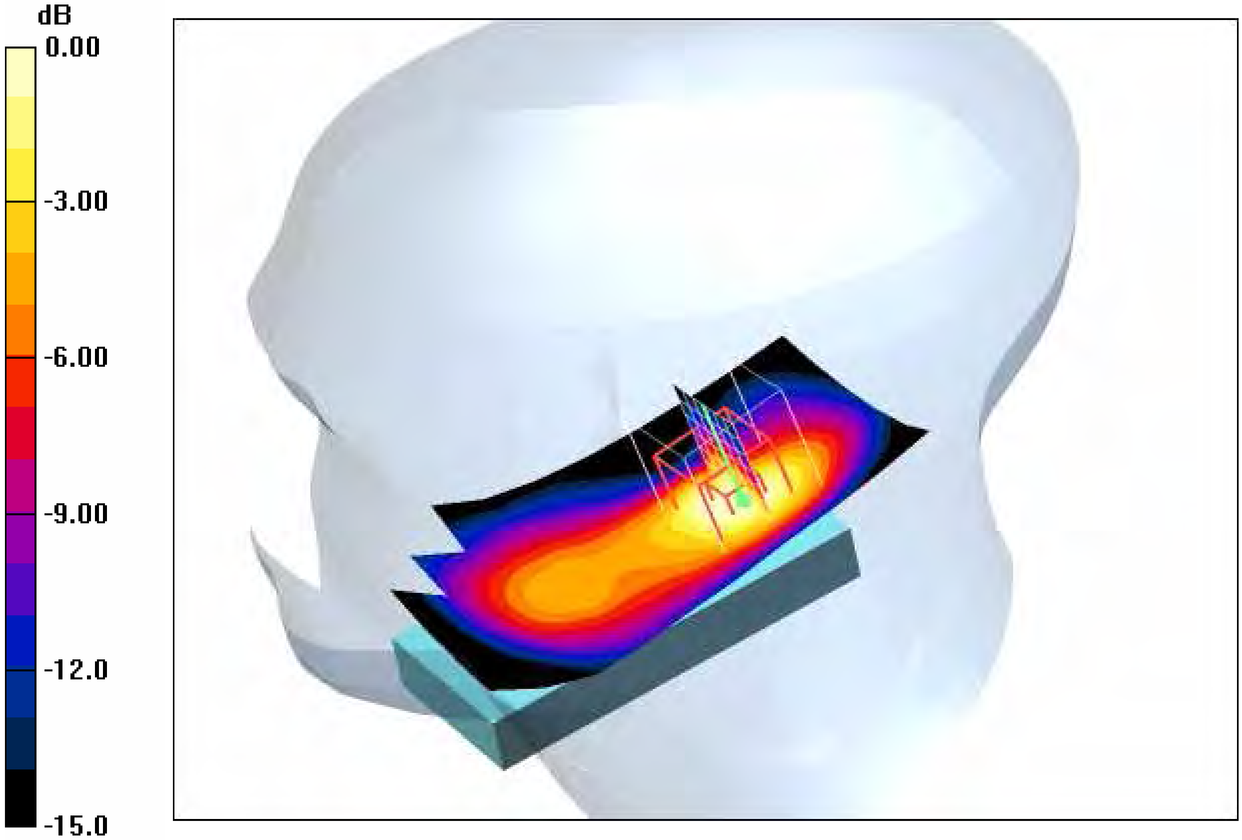
DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4
Communication System: PCS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8
Medium: HSL1900 Medium parameters used: f = 1909.8 MHz; σ = 1.43 mho/m; ε_r = 41.2; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.9, 4.9, 4.9); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Touch position - High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.21 mW/g

Touch position - High/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 30.5 V/m; Power Drift = -0.047 dB
Peak SAR (extrapolated) = 1.80 W/kg
SAR(1 g) = 1.12 mW/g; SAR(10 g) = 0.606 mW/g
Maximum value of SAR (measured) = 1.24 mW/g



0 dB = 1.24mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 22.7°C; liquid temperature: 20.5°C

Date/Time: 2008-04-08 14:20:12Date/Time: 2008-04-08 14:26:57

P1528_OET65-RightHandSide-GSM1900

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4

Communication System: PCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8

Medium: HSL1900 Medium parameters used: f = 1850.2 MHz; σ = 1.43 mho/m; ε_r = 41.2; ρ = 1000 kg/m^3

Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(4.9, 4.9, 4.9); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Tilt position - Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.749 mW/g

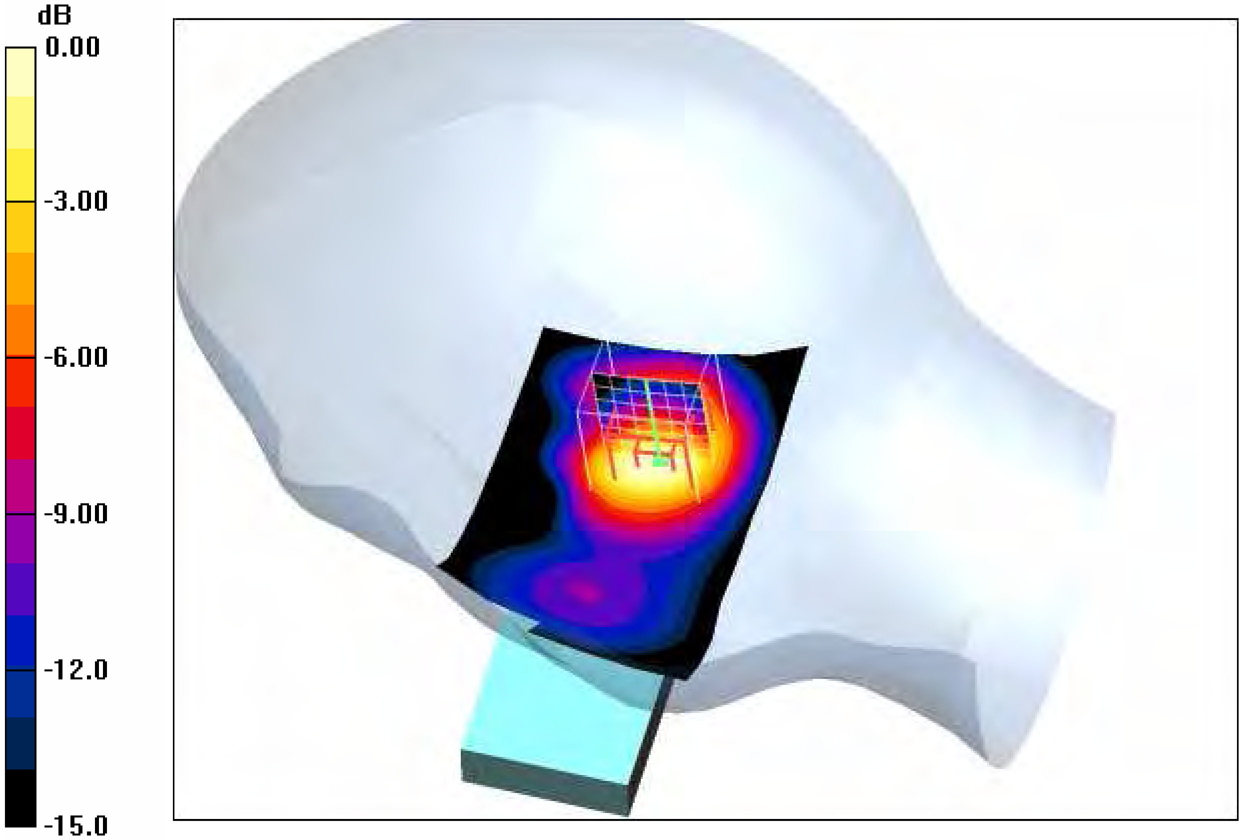
Tilt position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 22.2 V/m; Power Drift = -0.047 dB

Peak SAR (extrapolated) = 1.07 W/kg

SAR(1 g) = 0.657 mW/g; SAR(10 g) = 0.355 mW/g

Maximum value of SAR (measured) = 0.735 mW/g



0 dB = 0.735mW/g

Additional information:

position or distance of DUT to SAM (if not standard head positions) :

ambient temperature: 22.8°C; liquid temperature: 20.4°C

Date/Time: 2008-04-08 14:41:14Date/Time: 2008-04-08 14:47:51

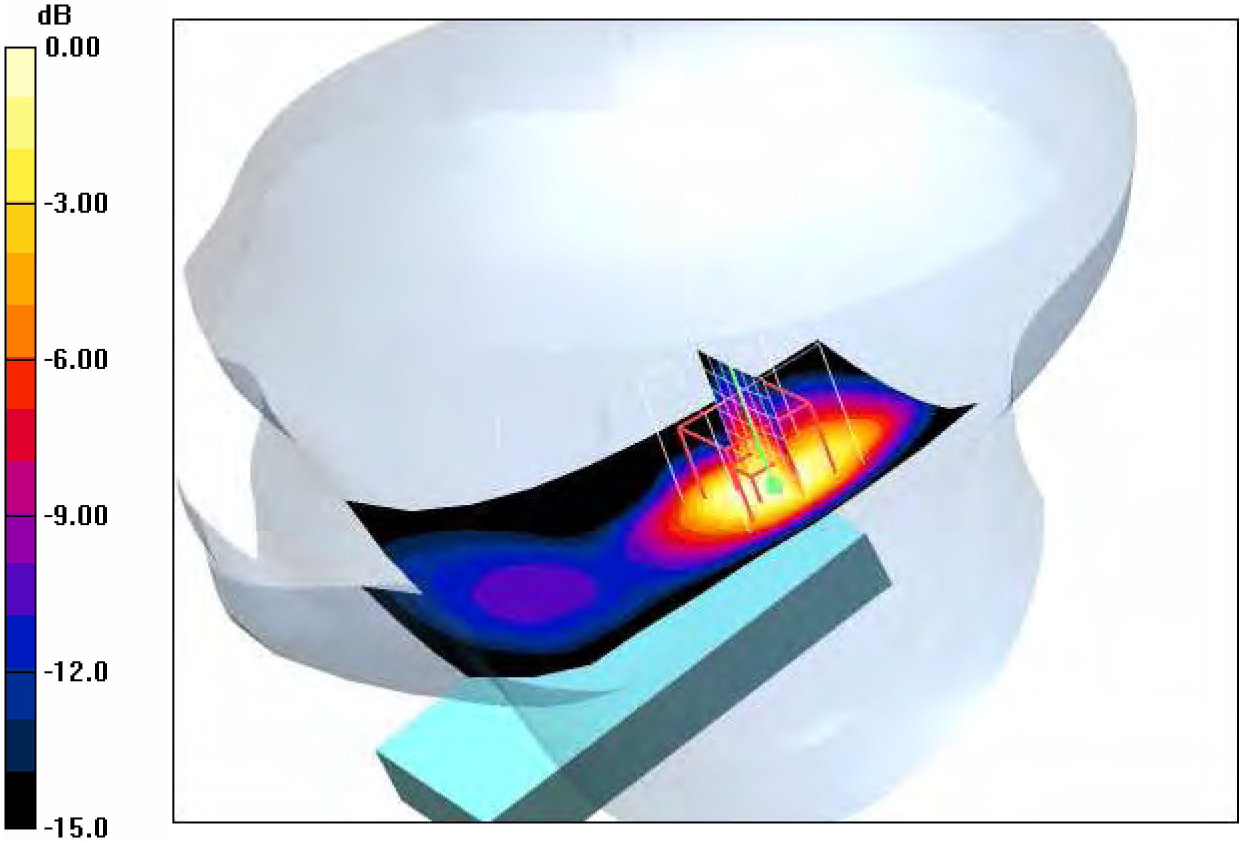
P1528_OET65-RightHandSide-GSM1900

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4

Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:8
Medium: HSL1900 Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; ε_r = 41.2; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.9, 4.9, 4.9); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Tilt position - Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.926 mW/g

Tilt position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.7 V/m; Power Drift = -0.019 dB
Peak SAR (extrapolated) = 1.33 W/kg
SAR(1 g) = 0.814 mW/g; SAR(10 g) = 0.437 mW/g
Maximum value of SAR (measured) = 0.922 mW/g



0 dB = 0.922mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 22.8°C; liquid temperature: 20.4°C

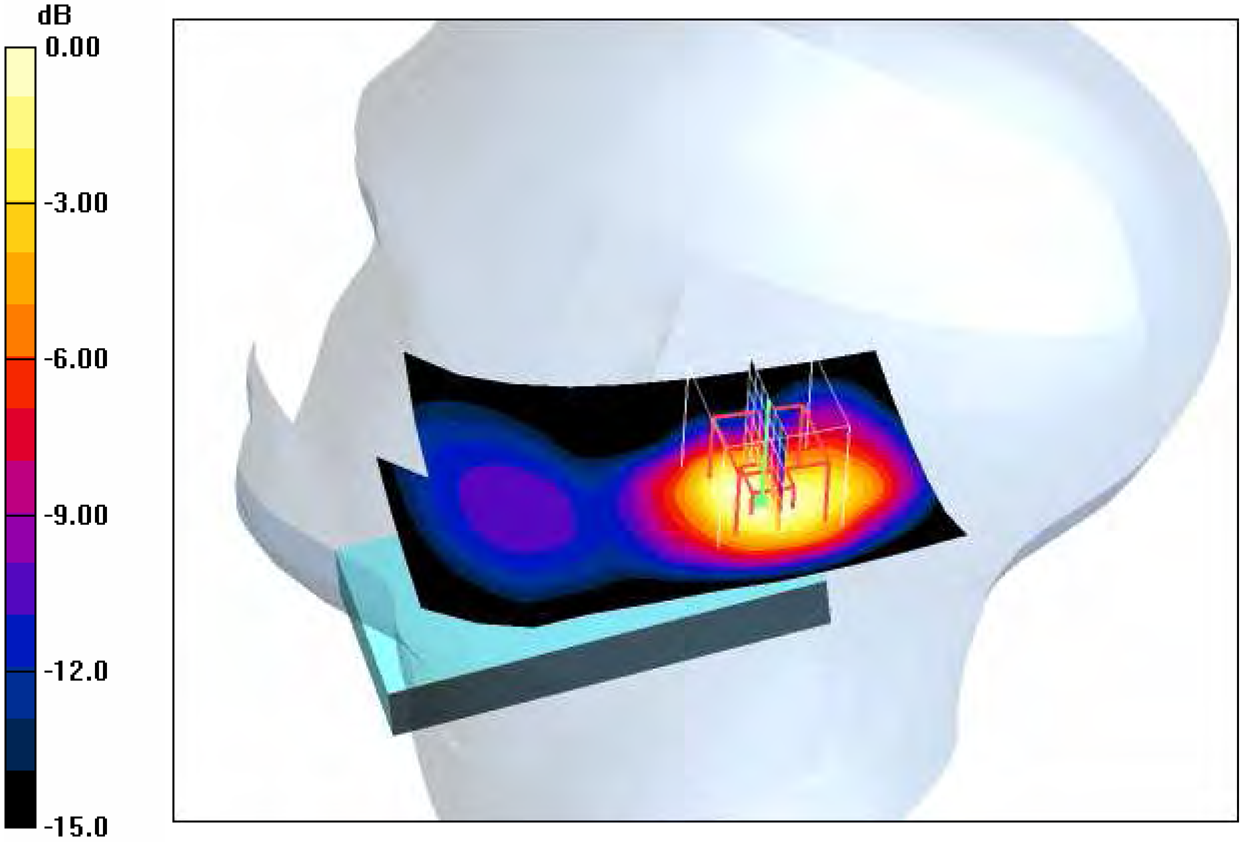
Date/Time: 2008-04-08 15:01:49Date/Time: 2008-04-08 15:08:28

P1528_OET65-RightHandSide-GSM1900

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4
Communication System: PCS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8
Medium: HSL1900 Medium parameters used: f = 1909.8 MHz; σ = 1.43 mho/m; ε_r = 41.2; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.9, 4.9, 4.9); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Tilt position - High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.05 mW/g

Tilt position - High/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 26.2 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.53 W/kg
SAR(1 g) = 0.919 mW/g; SAR(10 g) = 0.492 mW/g
Maximum value of SAR (measured) = 1.05 mW/g



0 dB = 1.05mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 22.8°C; liquid temperature: 20.4°C

Annex 2.4 PCS 1900 MHz body

Date/Time: 2008-04-01 14:45:10Date/Time: 2008-04-01 14:51:35Date/Time: 2008-04-01 15:03:21

P1528_OET65-Body-GSM1900 GPRS class 10

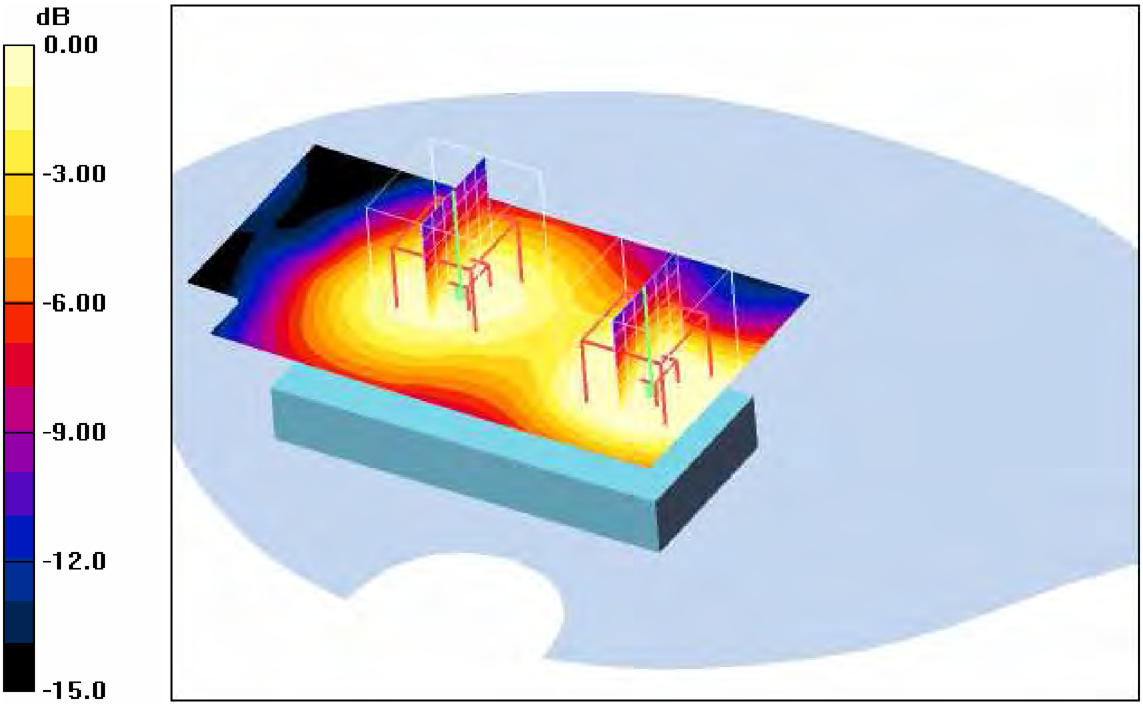
DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4

Communication System: PCS 1900 GPRS class 10; Frequency: 1850.2 MHz; Duty Cycle: 1:4
Medium: M1900 Medium parameters used: f = 1850.2 MHz; σ = 1.54 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.46, 4.46, 4.46); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Front position - Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.193 mW/g

Front position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.8 V/m; Power Drift = -0.042 dB
Peak SAR (extrapolated) = 0.278 W/kg
SAR(1 g) = 0.174 mW/g; SAR(10 g) = 0.103 mW/g
Maximum value of SAR (measured) = 0.190 mW/g

Front position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.8 V/m; Power Drift = -0.042 dB
Peak SAR (extrapolated) = 0.163 W/kg
SAR(1 g) = 0.113 mW/g; SAR(10 g) = 0.074 mW/g
Maximum value of SAR (measured) = 0.122 mW/g



0 dB = 0.122mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) : 15 mm
ambient temperature: 21.3°C; liquid temperature: 20.6°C

Date/Time: 2008-04-01 15:19:30Date/Time: 2008-04-01 15:26:03Date/Time: 2008-04-01 15:37:45

P1528_OET65-Body-GSM1900 GPRS class 10

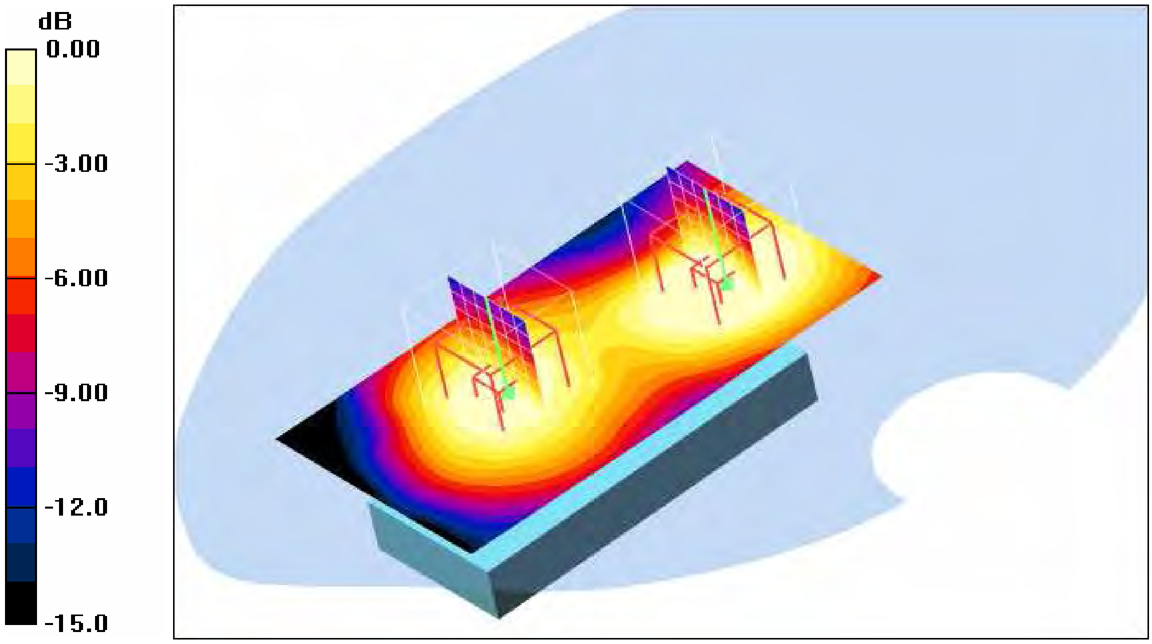
DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4

Communication System: PCS 1900 GPRS class 10; Frequency: 1880 MHz; Duty Cycle: 1:4
Medium: M1900 Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.46, 4.46, 4.46); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Front position - Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.222 mW/g

Front position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.7 V/m; Power Drift = -0.012 dB
Peak SAR (extrapolated) = 0.337 W/kg
SAR(1 g) = 0.203 mW/g; SAR(10 g) = 0.119 mW/g
Maximum value of SAR (measured) = 0.221 mW/g

Front position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.7 V/m; Power Drift = -0.012 dB
Peak SAR (extrapolated) = 0.194 W/kg
SAR(1 g) = 0.133 mW/g; SAR(10 g) = 0.086 mW/g
Maximum value of SAR (measured) = 0.142 mW/g



0 dB = 0.142mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) : 15 mm
ambient temperature: 21.5°C; liquid temperature: 20.6°C

Date/Time: 2008-04-01 15:57:24Date/Time: 2008-04-01 16:03:52Date/Time: 2008-04-01 16:15:16

P1528_OET65-Body-GSM1900 GPRS class 10

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4

Communication System: PCS 1900 GPRS class 10; Frequency: 1909.8 MHz; Duty Cycle: 1:4

Medium: M1900 Medium parameters used: f = 1909.8 MHz; σ = 1.54 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(4.46, 4.46, 4.46); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Front position - High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.249 mW/g

Front position - High/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 13.3 V/m; Power Drift = -0.043 dB

Peak SAR (extrapolated) = 0.375 W/kg

SAR(1 g) = 0.223 mW/g; SAR(10 g) = 0.130 mW/g

Maximum value of SAR (measured) = 0.242 mW/g

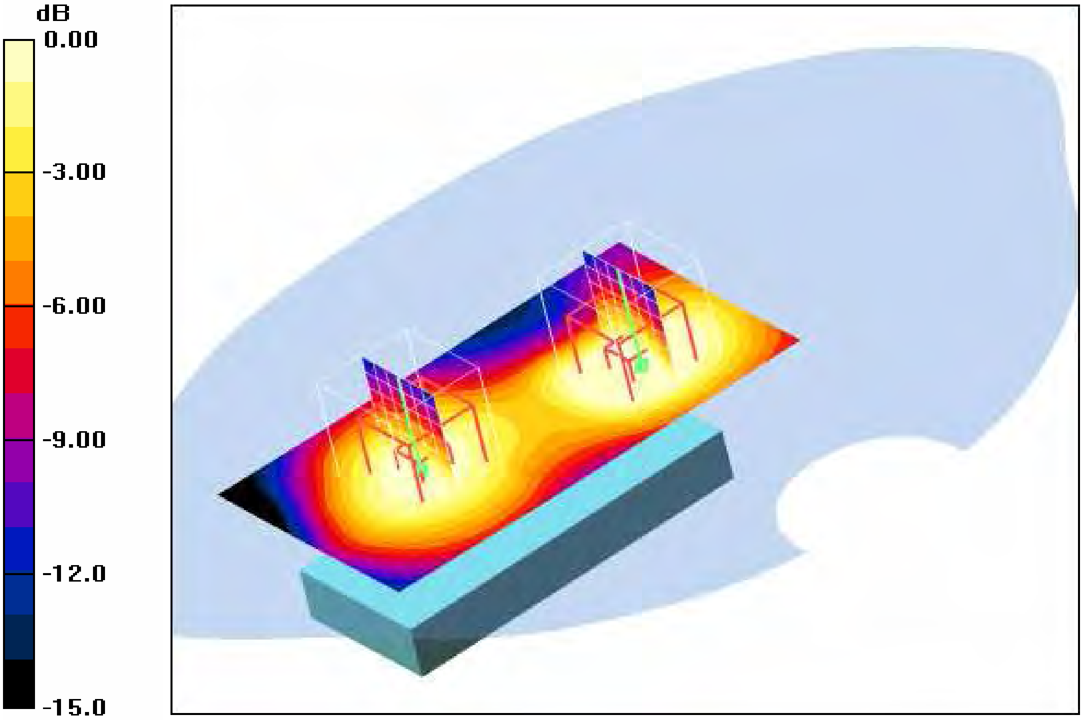
Front position - High/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 13.3 V/m; Power Drift = -0.043 dB

Peak SAR (extrapolated) = 0.230 W/kg

SAR(1 g) = 0.153 mW/g; SAR(10 g) = 0.099 mW/g

Maximum value of SAR (measured) = 0.166 mW/g



0 dB = 0.166mW/g

Additional information:

position or distance of DUT to SAM (if not standard head positions) : 15 mm

ambient temperature: 21.7°C; liquid temperature: 20.7°C

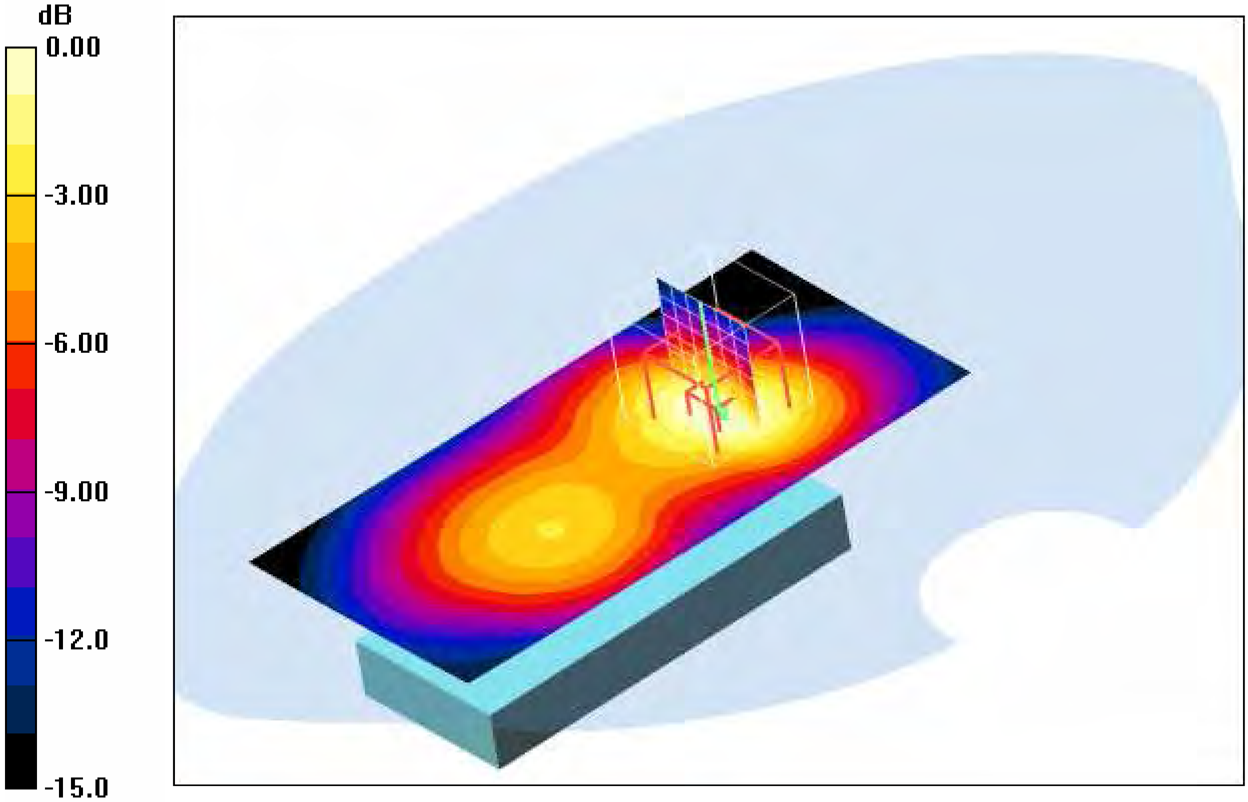
Date/Time: 2008-04-01 16:42:15Date/Time: 2008-04-01 16:54:41

P1528_OET65-Body-GSM1900 GPRS class 10

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4
Communication System: PCS 1900 GPRS class 10; Frequency: 1850.2 MHz; Duty Cycle: 1:4
Medium: M1900 Medium parameters used: f = 1850.2 MHz; σ = 1.54 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.46, 4.46, 4.46); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Rear position - Low/Area Scan (51x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.469 mW/g

Rear position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.3 V/m; Power Drift = -0.059 dB
Peak SAR (extrapolated) = 0.680 W/kg
SAR(1 g) = 0.415 mW/g; SAR(10 g) = 0.239 mW/g
Maximum value of SAR (measured) = 0.454 mW/g



0 dB = 0.454mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) : 15 mm
ambient temperature: 21.9°C; liquid temperature: 20.8°C

Date/Time: 2008-04-01 17:05:08Date/Time: 2008-04-01 17:23:15

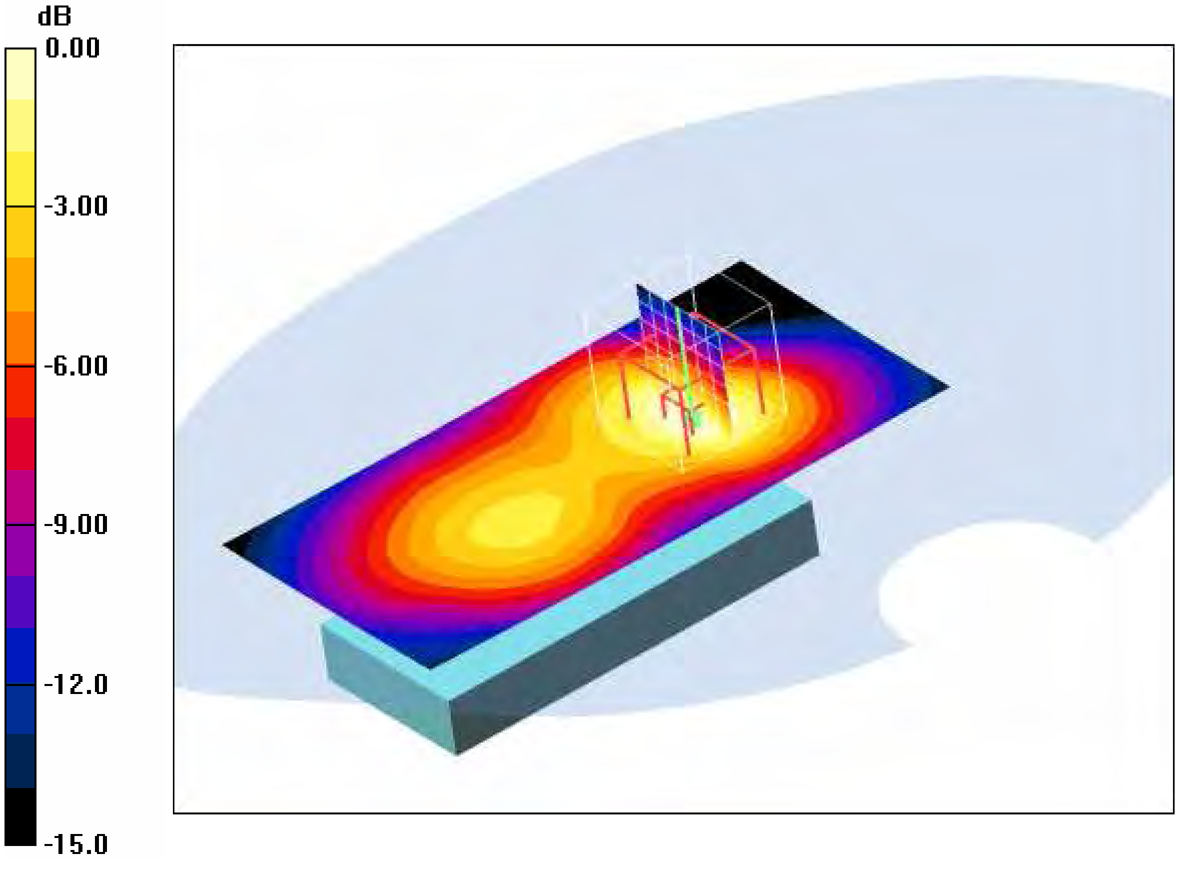
P1528_OET65-Body-GSM1900 GPRS class 10

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4

Communication System: PCS 1900 GPRS class 10; Frequency: 1880 MHz; Duty Cycle: 1:4
Medium: M1900 Medium parameters used: f = 1880 MHz; $\sigma = 1.54$ mho/m; $\varepsilon_r = 52.5$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.46, 4.46, 4.46); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Rear position - Middle/Area Scan (51x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.498 mW/g

Rear position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.7 V/m; Power Drift = -0.045 dB
Peak SAR (extrapolated) = 0.743 W/kg
SAR(1 g) = 0.444 mW/g; SAR(10 g) = 0.254 mW/g
Maximum value of SAR (measured) = 0.489 mW/g



0 dB = 0.489mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) : 15 mm
ambient temperature: 22.0°C; liquid temperature: 20.9°C

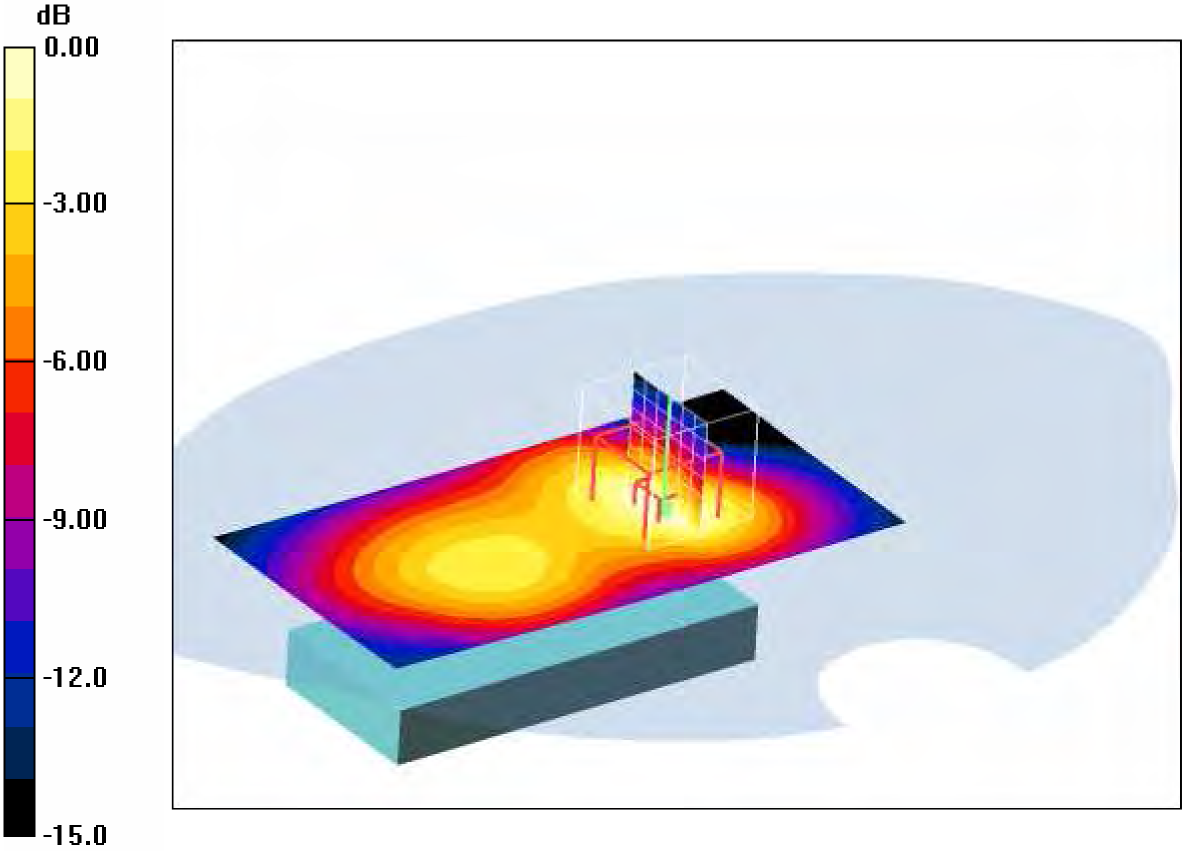
Date/Time: 2008-04-01 17:46:44Date/Time: 2008-04-01 17:53:59

P1528_OET65-Body-GSM1900 GPRS class 10

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4
Communication System: PCS 1900 GPRS class 10; Frequency: 1909.8 MHz; Duty Cycle: 1:4
Medium: M1900 Medium parameters used: f = 1909.8 MHz; σ = 1.54 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.46, 4.46, 4.46); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Rear position -High/Area Scan (51x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.528 mW/g

Rear position -High/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.1 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 0.764 W/kg
SAR(1 g) = 0.461 mW/g; SAR(10 g) = 0.261 mW/g
Maximum value of SAR (measured) = 0.520 mW/g



0 dB = 0.520mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) : 15 mm
ambient temperature: 22.1°C; liquid temperature: 21.0°C

Date/Time: 2008-04-01 18:46:01Date/Time: 2008-04-01 19:05:28

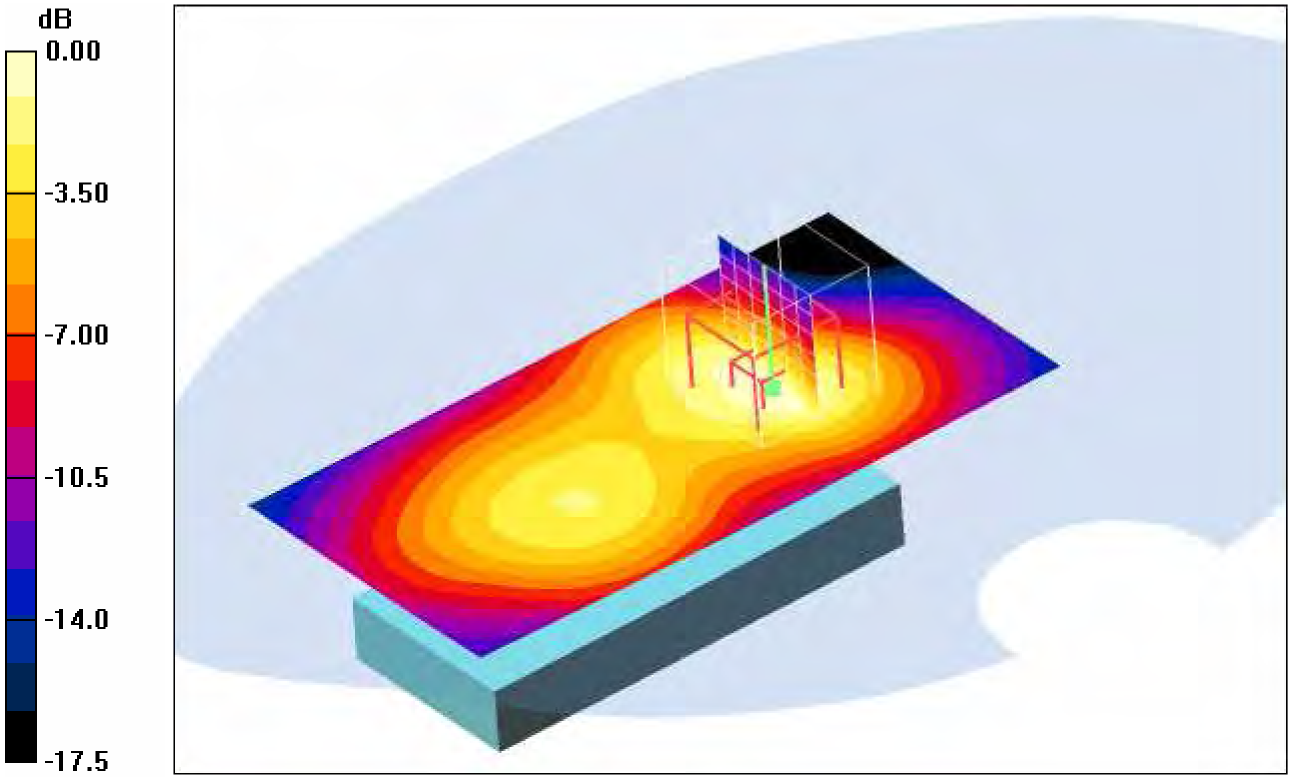
P1528_OET65-Body-GSM1900 EGPRS class 10

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4

Communication System: PCS 1900 EGPRS class 10; Frequency: 1909.8 MHz; Duty Cycle: 1:4
Medium: M1900 Medium parameters used: f = 1909.8 MHz; σ = 1.54 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.46, 4.46, 4.46); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Rear position -High/Area Scan (51x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.307 mW/g

Rear position -High/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.6 V/m; Power Drift = -0.039 dB
Peak SAR (extrapolated) = 0.469 W/kg
SAR(1 g) = 0.275 mW/g; SAR(10 g) = 0.156 mW/g
Maximum value of SAR (measured) = 0.304 mW/g



0 dB = 0.304mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) : 15 mm
ambient temperature: 22.2°C; liquid temperature: 21.1°C

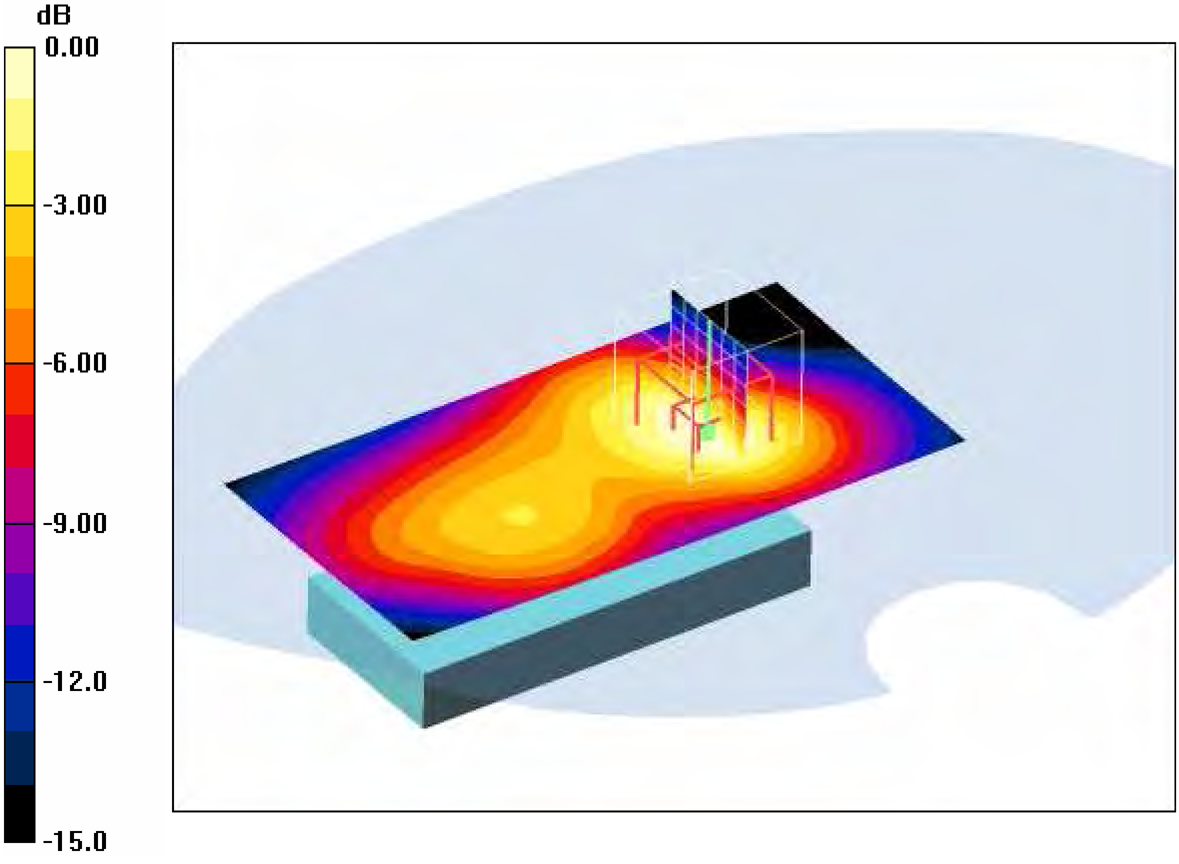
Date/Time: 2008-04-01 19:28:27Date/Time: 2008-04-01 19:35:18

P1528_OET65-Body-GSM1900

DUT: Sony Ericsson; Type: AAC-1052141-BV; Serial: CB510XTPZ4
Communication System: PCS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8
Medium: M1900 Medium parameters used: f = 1909.8 MHz; σ = 1.54 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.46, 4.46, 4.46); Calibrated: 2007-08-23
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn413; Calibrated: 2008-01-18
- Phantom: SAM 12; Type: SAM; Serial: 1043
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Rear position -High/Area Scan (51x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.452 mW/g

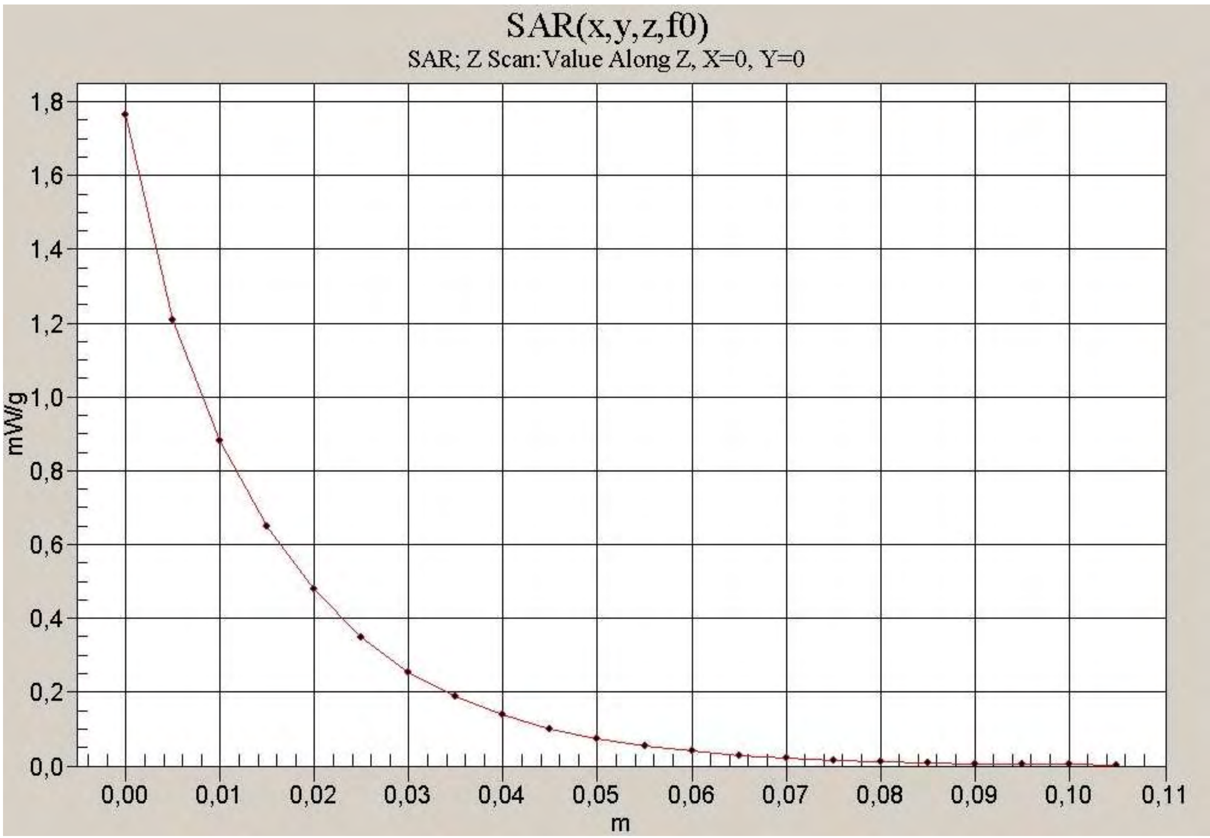
Rear position -High/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.4 V/m; Power Drift = -0.062 dB
Peak SAR (extrapolated) = 0.670 W/kg
SAR(1 g) = 0.388 mW/g; SAR(10 g) = 0.221 mW/g
Maximum value of SAR (measured) = 0.425 mW/g



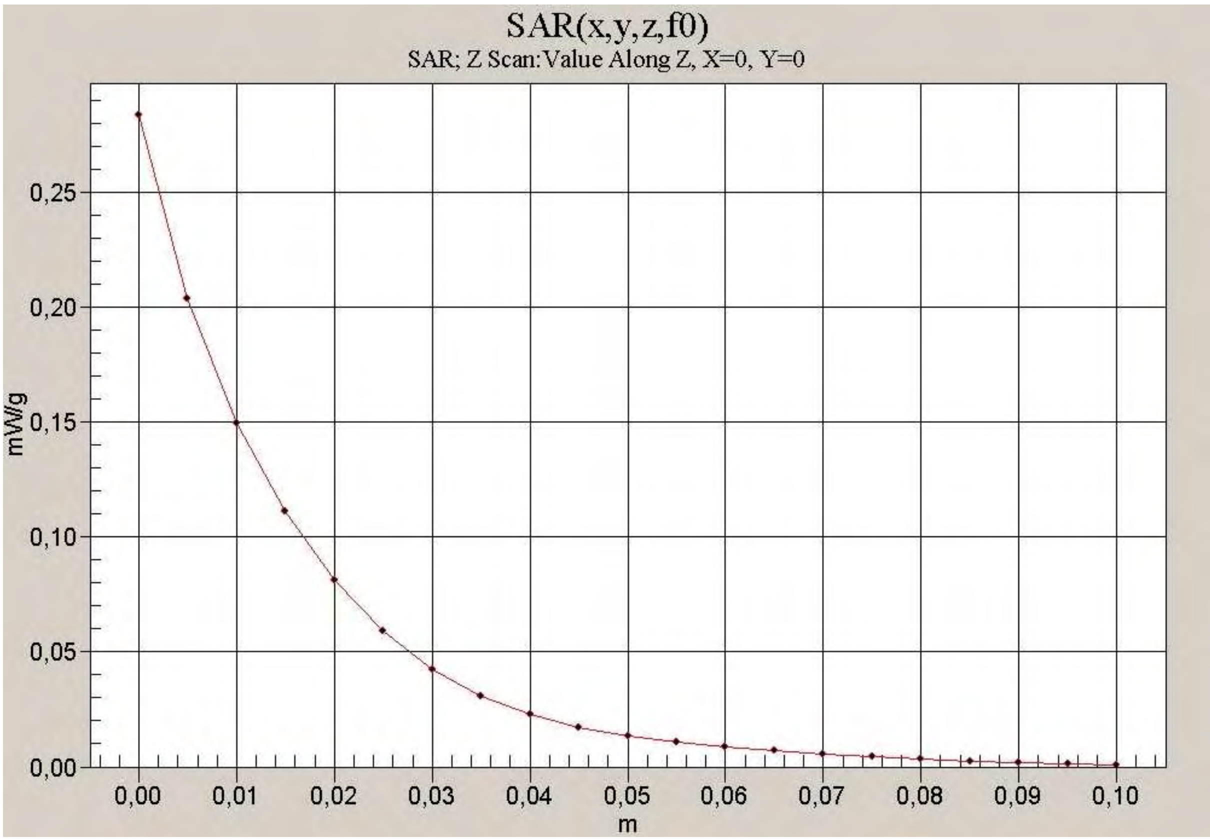
0 dB = 0.425mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) : 15 mm
ambient temperature: 22.3°C; liquid temperature: 21.1°C

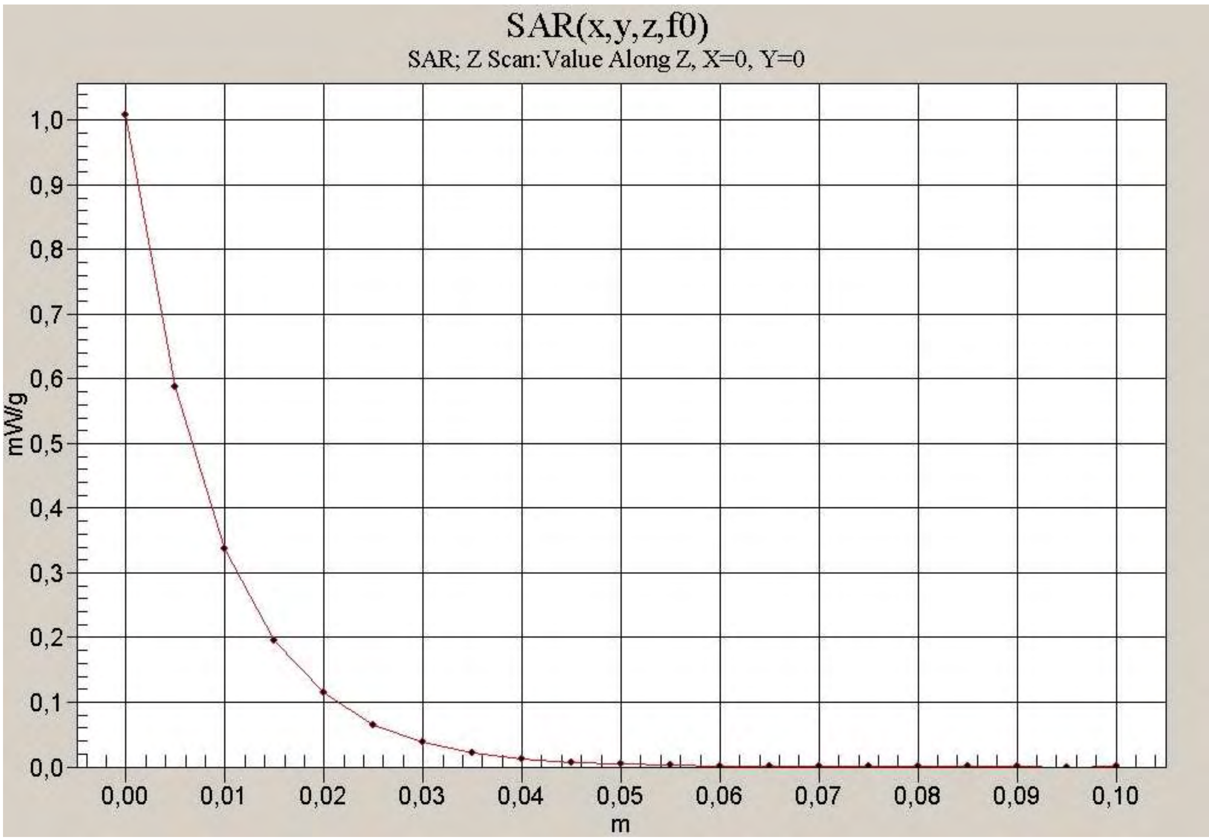
Annex 2.5 Z-axis scans



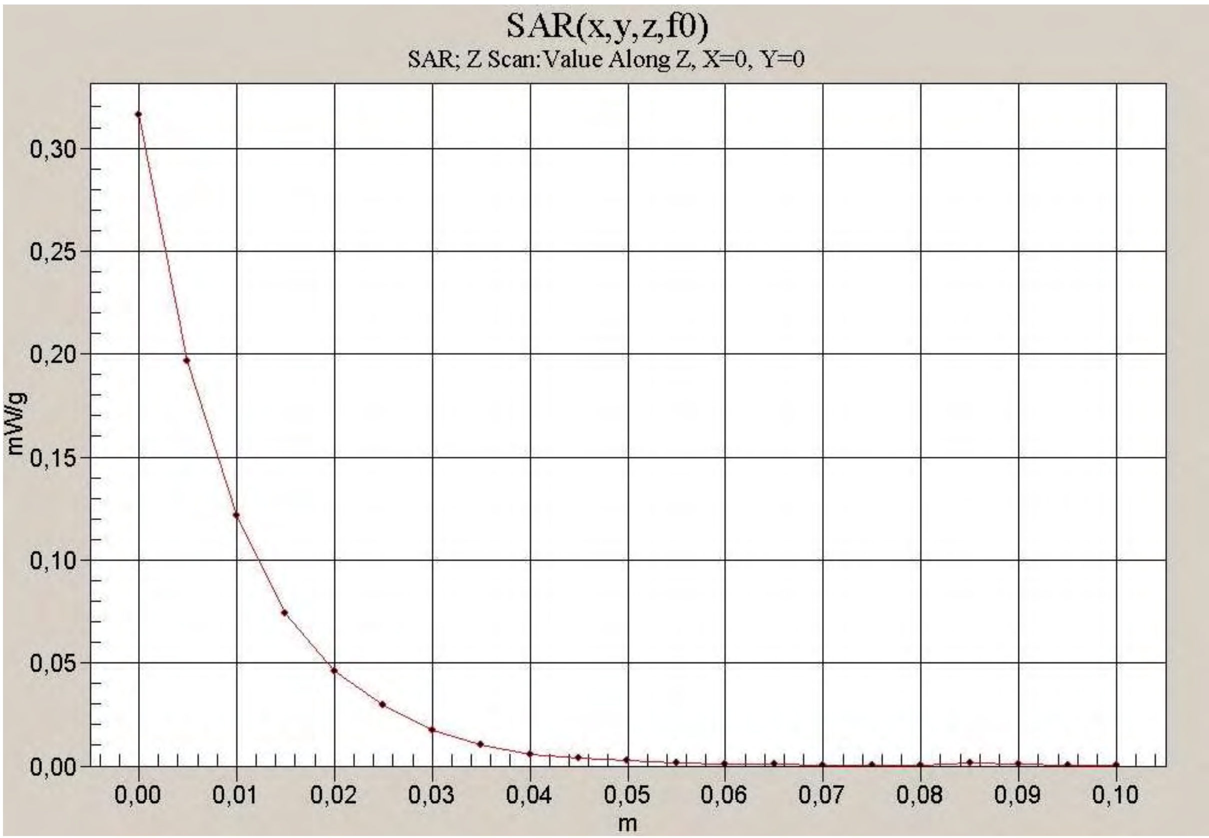
850 head



850 body



1900 head



1900 body

Annex 3 Photo documentation

Photo 1: Measurement System DASY 4

Photo 2: DUT - front view

Photo 3: DUT - side view

Photo 4: DUT - rear view

Photo 5: DUT - rear view (open)

Photo 6: DUT - rear view (open) without battery

Photo 7: DUT - rear view (label)

Photo 8: The battery

Photo 9: Test position left hand touched

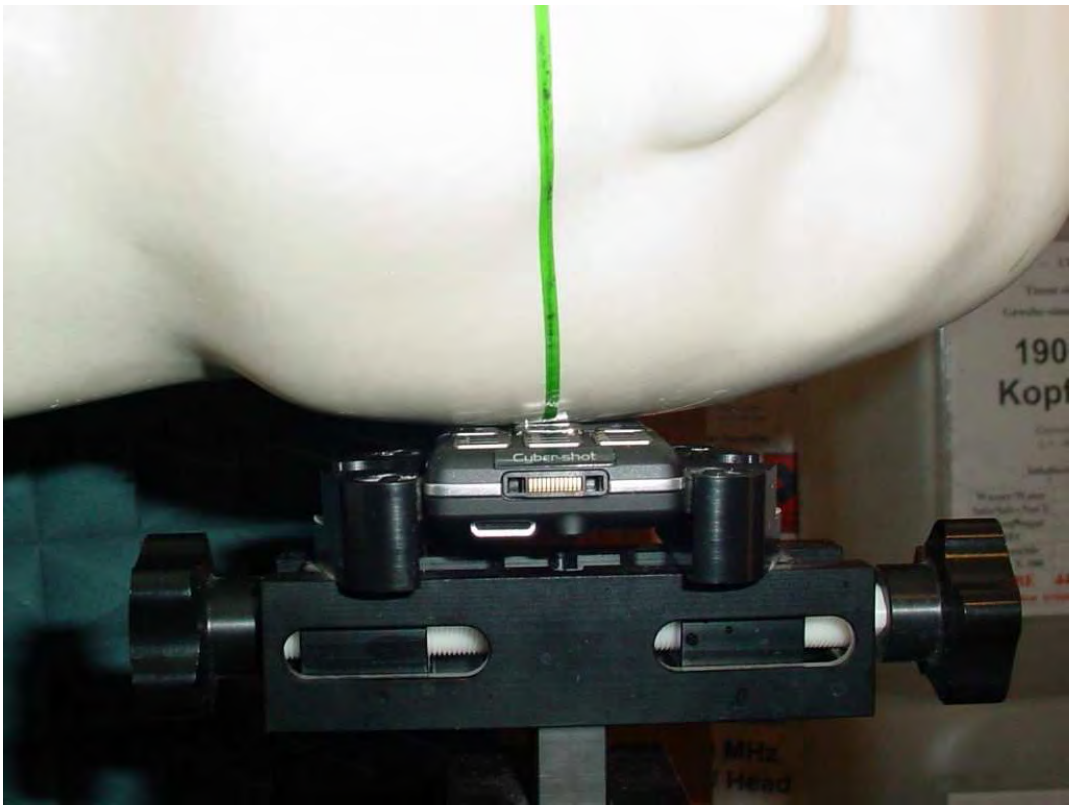


Photo 10: Test position left hand touched

Photo 11: Test position left hand touched

Photo 12: Test position left hand tilted 15°

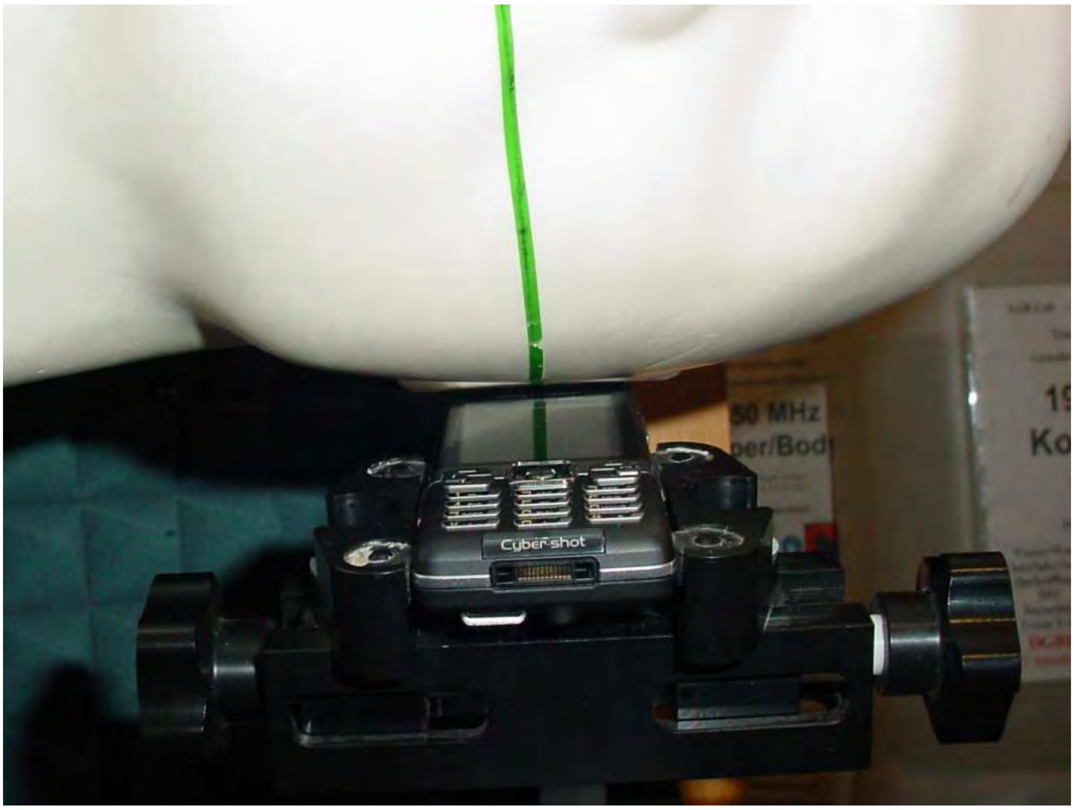


Photo 13: Test position left hand tilted 15°

Photo 14: Test position right hand touched

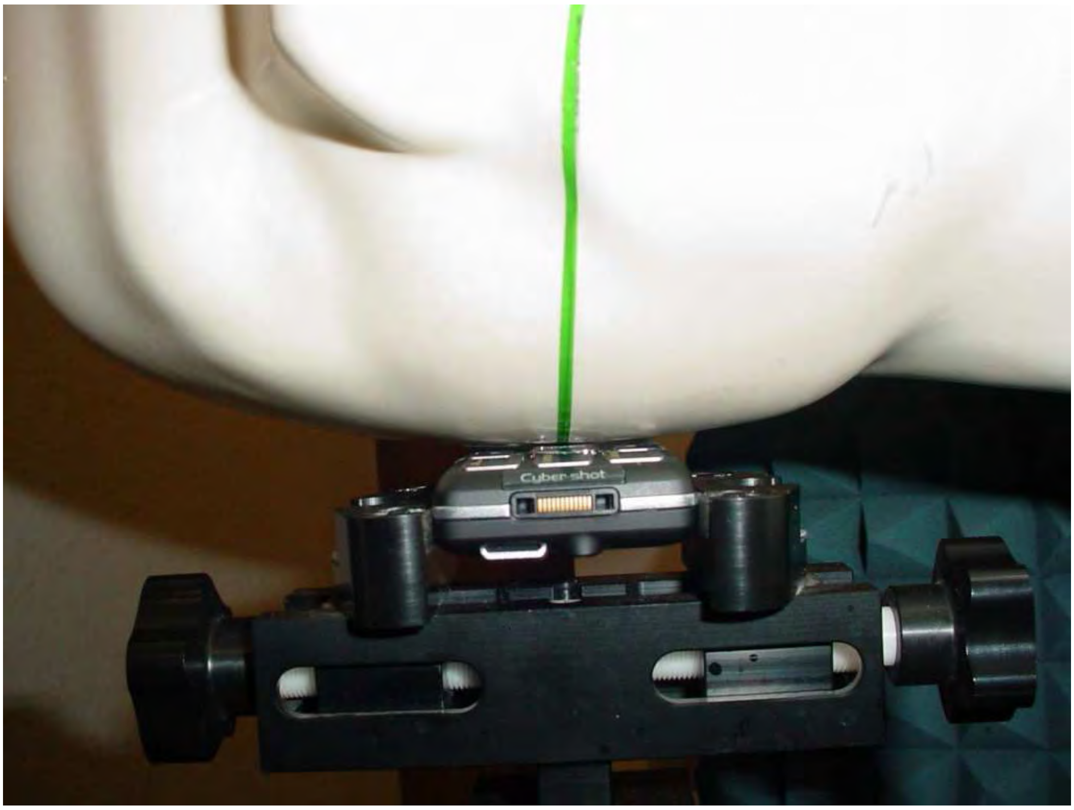


Photo 15: Test position right hand touched

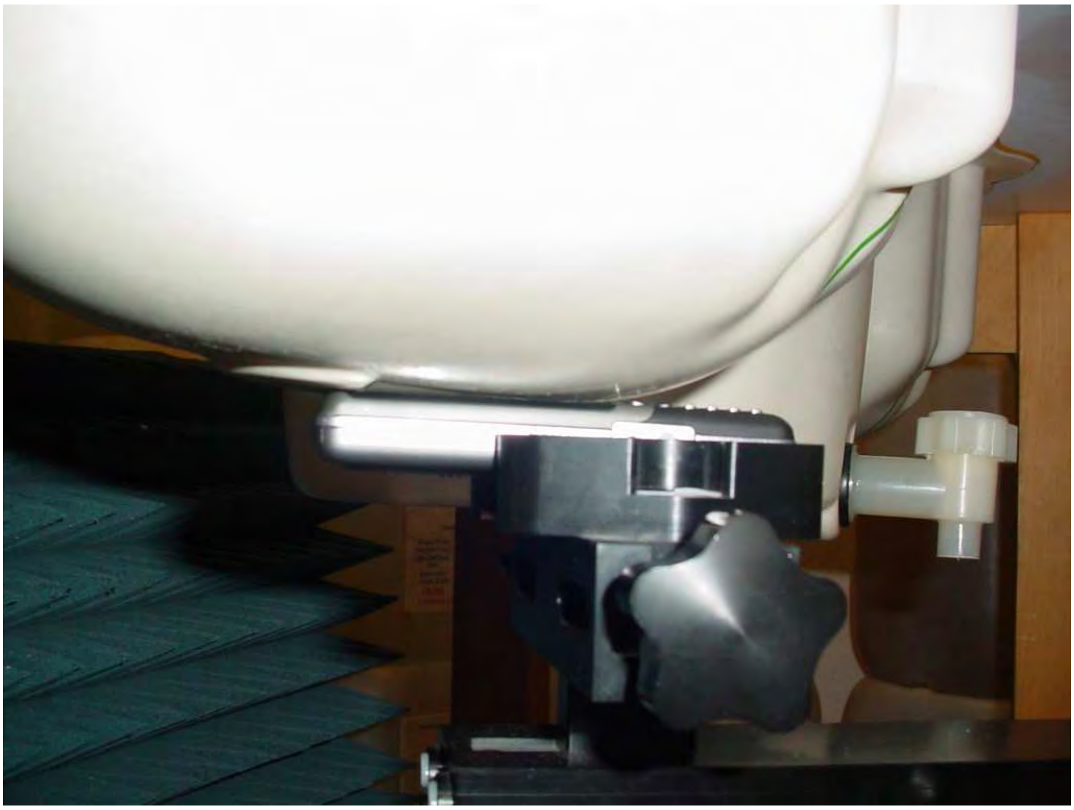


Photo 16: Test position right hand touched

Photo 17: Test position right hand tilted 15°

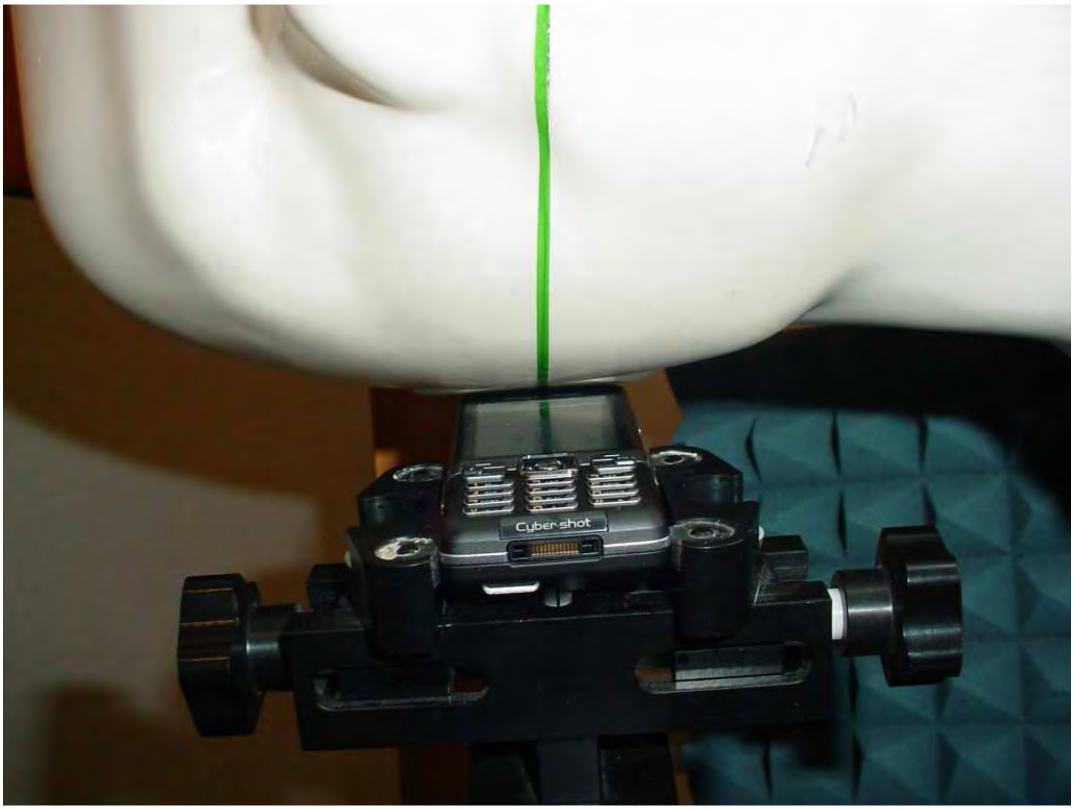


Photo 18: Test position right hand tilted 15°

Photo 19: Test position body worn front side (15 mm distance)

Photo 20: Test position body worn front side (15 mm distance)

Photo 21: Test position body worn rear side (15 mm distance)

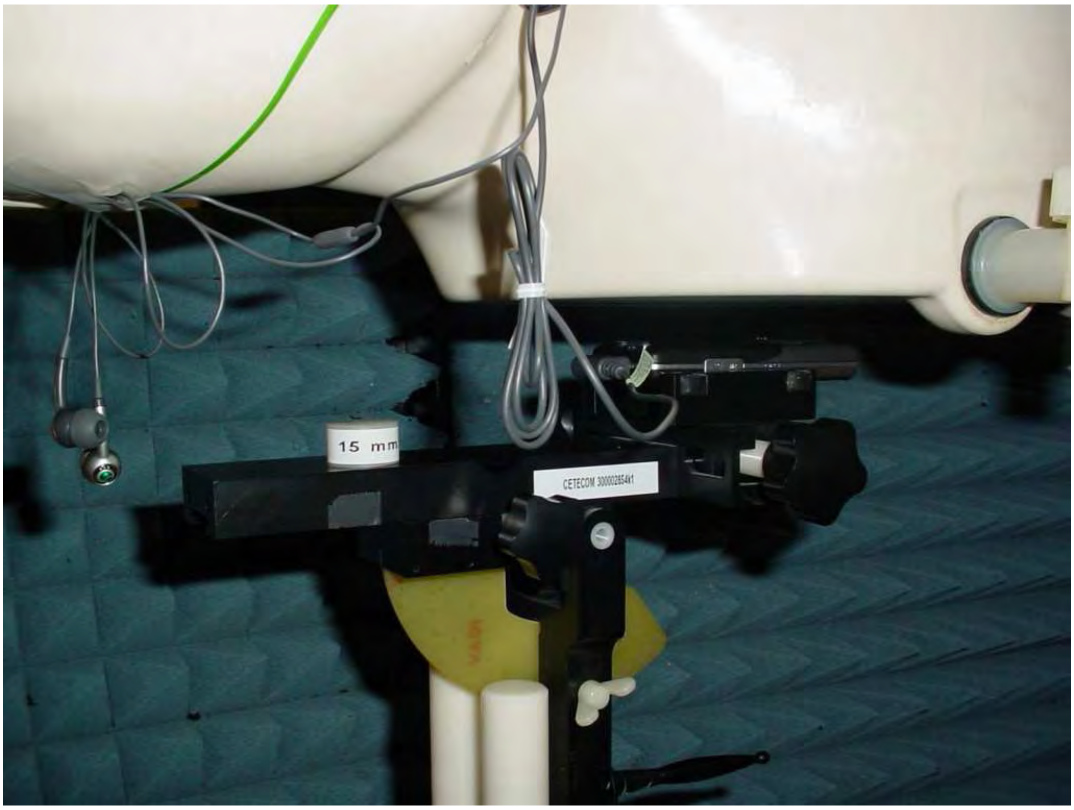


Photo 22: Test position body worn rear side (15 mm distance)

Annex 3.1 Liquid depth

Photo 23: Liquid depth 850 MHz head simulating liquid

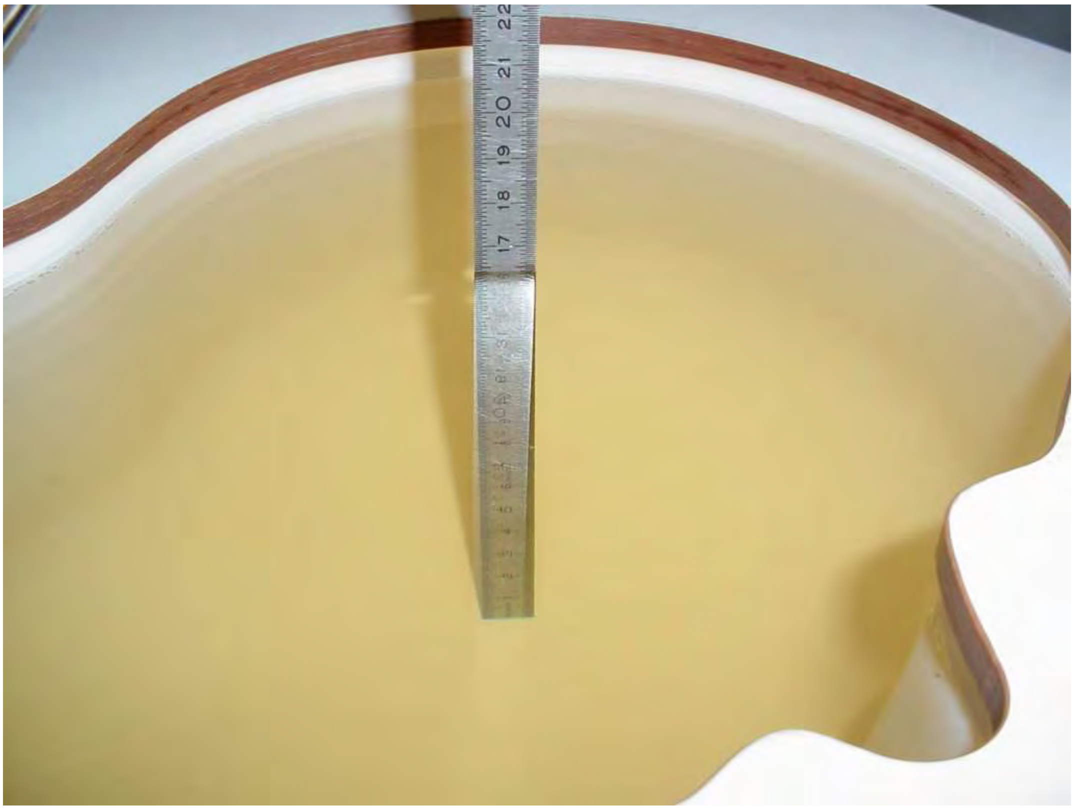


Photo 24: Liquid depth 850 MHz body simulating liquid

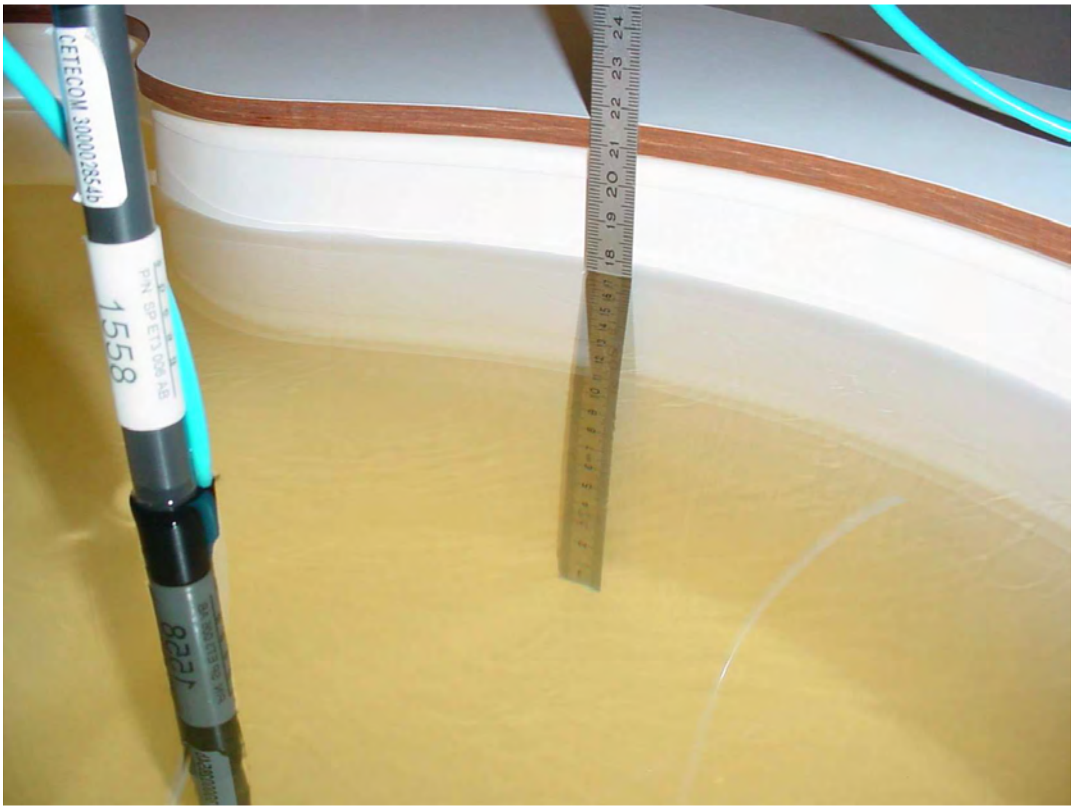


Photo 25: Liquid depth 1900 MHz head simulating liquid

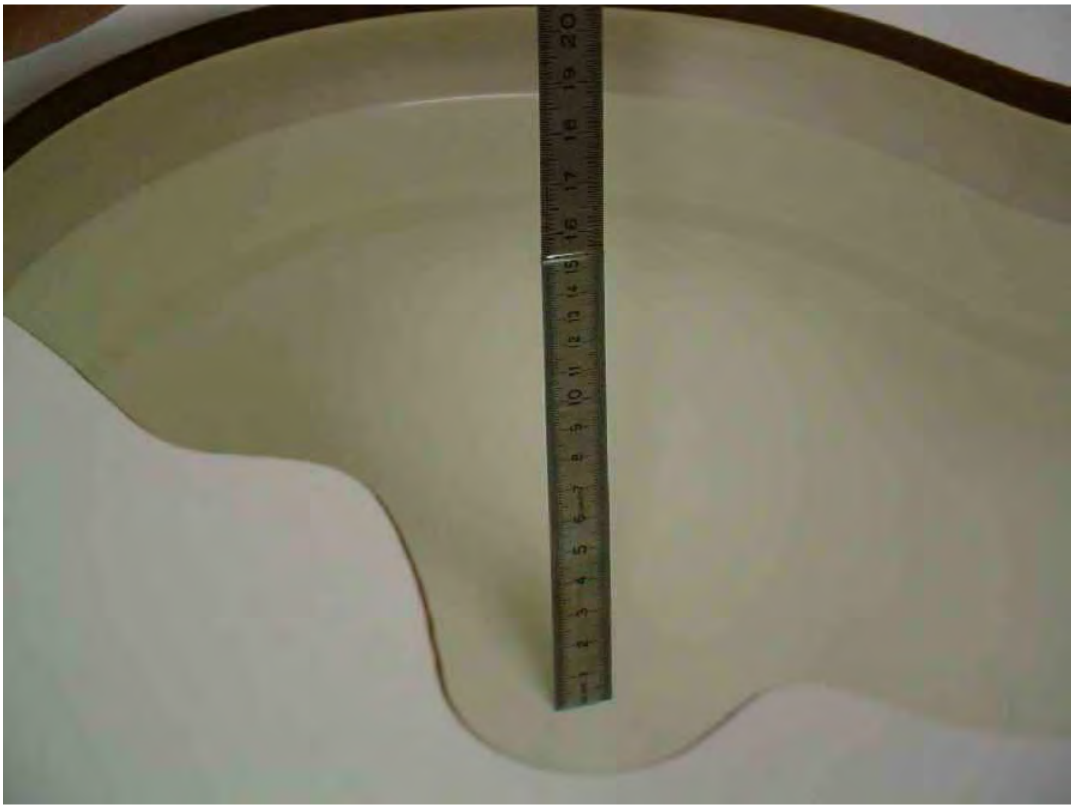
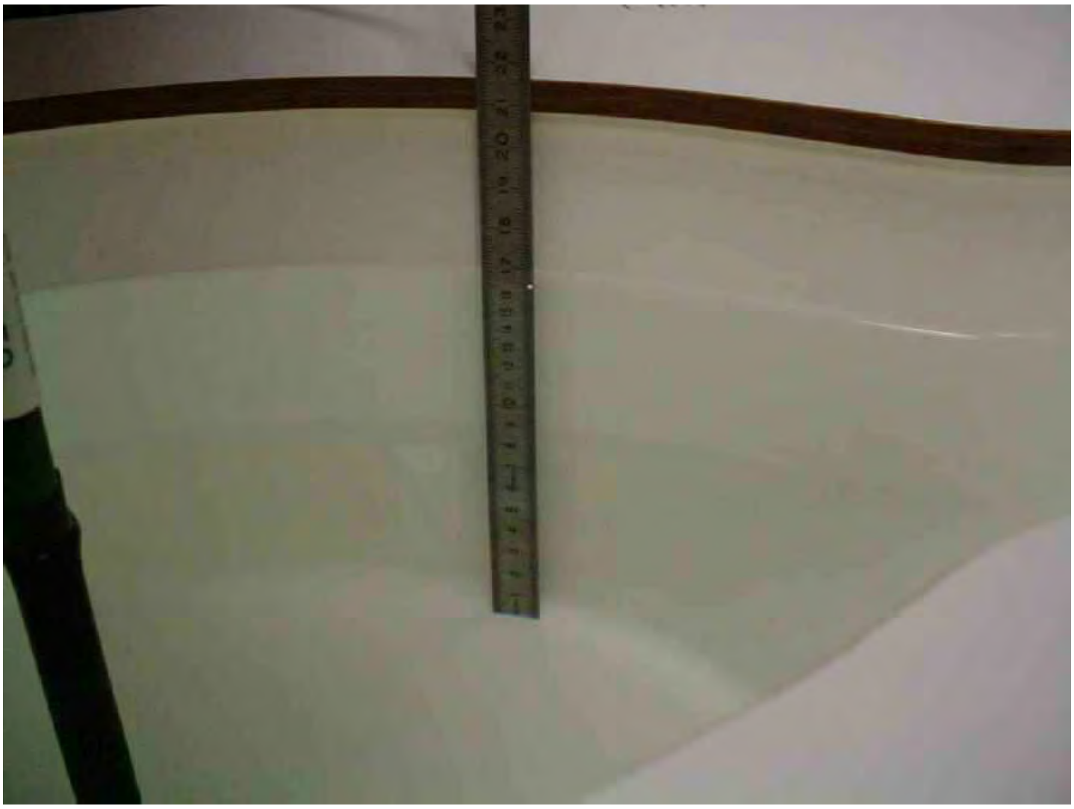


Photo 26: Liquid depth 1900 MHz body simulating liquid



Annex 4 RF Technical Brief Cover Sheet acc. to RSS-102

1. COMPANY NUMBER: 4170B

2. MODEL NUMBER: A1052141

3. MANUFACTURER: Sony Ericsson Mobile Communications AB

4. TYPE OF EVALUATION:

(a) SAR Evaluation: Device used in the Vicinity of the Human Head

- **Multiple transmitters: Yes ☐ No ☒**
- **Evaluated against exposure limits: General Public Use ☒ Controlled Use ☐**
- **Duty cycle used in evaluation: 12.5 %**
- **Standard used for evaluation: RSS-102 Issue 2 (2005-11)**
- **SAR value: 1.450 W/kg. Measured ☒ Computed ☐ Calculated ☐**

(b) SAR Evaluation: Body-worn Device

- **Multiple transmitters: Yes ☐ No ☒**
- **Evaluated against exposure limits: General Public Use ☒ Controlled Use ☐**
- **Duty cycle used in evaluation: 25 %**
- **Standard used for evaluation: RSS-102 Issue 2 (2005-11)**
- **SAR value: 0.833 W/kg. Measured ☒ Computed ☐ Calculated ☐**

Annex 4.1 Declaration of RF Exposure Compliance

ATTESTATION: I attest that the information provided in Annex 4 is correct; that a Technical Brief was prepared and the information it contains is correct; that the device evaluation was performed or supervised by me; that applicable measurement methods and evaluation methodologies have been followed and that the device meets the SAR and/or RF exposure limits of RSS-102.

Signature: Thomas Vog **Date: 2008-04-15**

NAME : Thomas Vogler

TITLE : Dipl.-Ing. (FH)

COMPANY : CETECOM ICT Services GmbH

Annex 5 Calibration parameters

Calibration parameters are described in the additional document :

Appendix to test report no. 2-4918-01-02/08‘
Calibration data, Phantom certificate
and detail information of the DASY4 System

Accredited testing laboratory

DAR registration number: DAT-P-176/94-D1

Federal Motor Transport Authority (KBA)
DAR registration number: KBA-P 00070-97

Appendix to test report 2-4918-01-02/08
Calibration data, Phantom certificate
and detail information of the DASY4 System

Table of Content

1 Calibration report "Probe ET3DV6"

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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 Cetecom

Certificate No: ET3-1558_Aug07

CALIBRATION CERTIFICATE

Object	ET3DV6 - SN:1558
Calibration procedure(s)	QA CAL-01.v6 Calibration procedure for dosimetric E-field probes
Calibration date:	August 23, 2007
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	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Power sensor E4412A	MY41495277	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Power sensor E4412A	MY41498087	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Reference 3 dB Attenuator	SN: S5054 (3c)	8-Aug-07 (METAS, No. 217-00719)	Aug-08
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-07 (METAS, No. 217-00671)	Mar-08
Reference 30 dB Attenuator	SN: S5129 (30b)	8-Aug-07 (METAS, No. 217-00720)	Aug-08
Reference Probe ES3DV2	SN: 3013	4-Jan-07 (SPEAG, No. ES3-3013_Jan07)	Jan-08
DAE4	SN: 654	20-Apr-07 (SPEAG, No. DAE4-654_Apr07)	Apr-08

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: August 24, 2007

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: ET3-1558_Aug07 Page 1 of 9

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

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

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

Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

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

Probe ET3DV6

SN:1558

Manufactured:	September 16, 2003
Last calibrated:	August 30, 2006
Recalibrated:	August 23, 2007

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

ET3DV6 SN:1558 **August 23, 2007**

DASY - Parameters of Probe: ET3DV6 SN:1558

Sensitivity in Free Space[A]

NormX	**2.07** ± 10.1%	$\mu V/(V/m)^2$
NormY	**1.83** ± 10.1%	$\mu V/(V/m)^2$
NormZ	**1.63** ± 10.1%	$\mu V/(V/m)^2$

Diode Compression[B]

DCP X	**97** mV
DCP Y	**92** mV
DCP Z	**94** 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	4.8	1.8
SAR_{be} [%]	With Correction Algorithm	0.8	0.7

TSL **1750 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	12.9	9.0
SAR_{be} [%]	With Correction Algorithm	0.2	0.1

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).

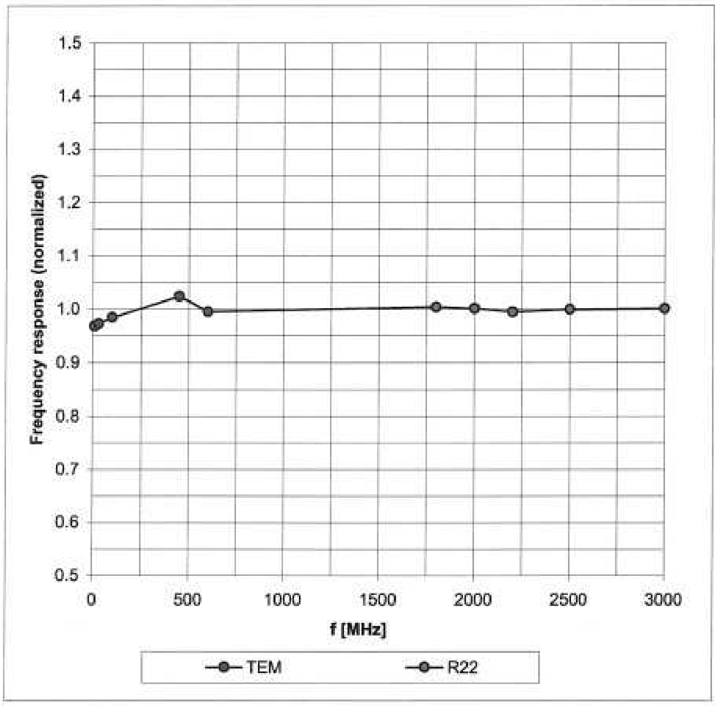
[B] Numerical linearization parameter: uncertainty not required.

Certificate No: ET3-1558_Aug07 Page 4 of 9

ET3DV6 SN:1558 **August 23, 2007**

Frequency Response of E-Field

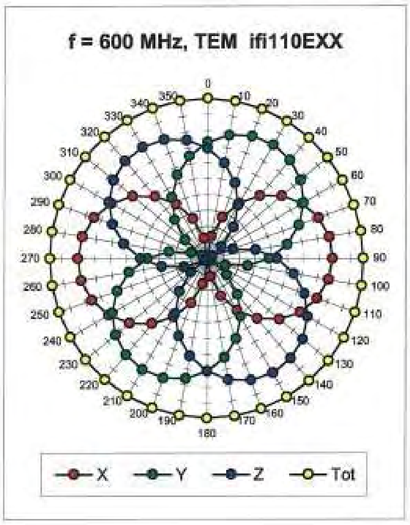
(TEM-Cell:ifi110 EXX, Waveguide: R22)

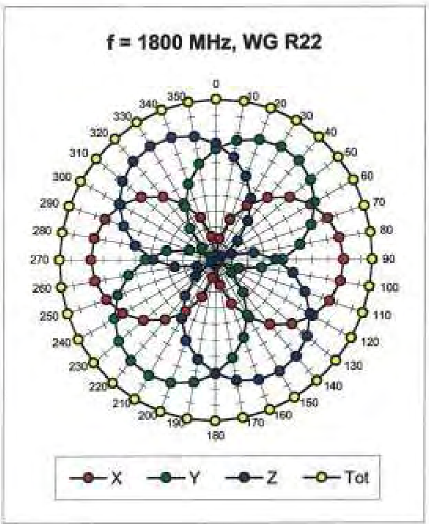


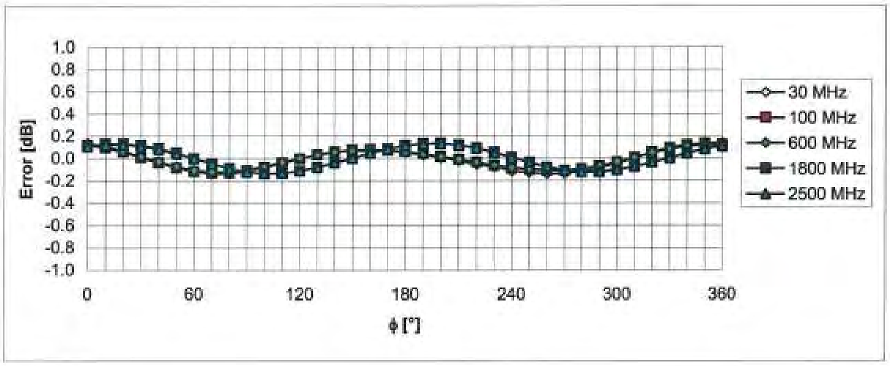
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

ET3DV6 SN:1558 August 23, 2007

Receiving Pattern (ϕ), $\vartheta = 0°$





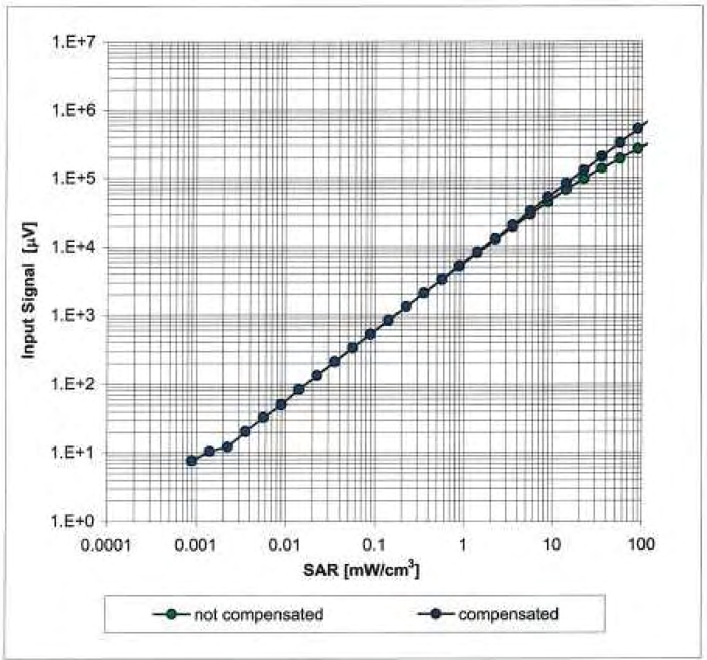


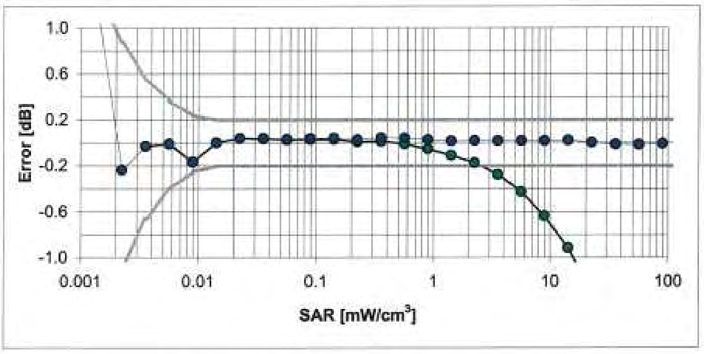
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

ET3DV6 SN:1558 **August 23, 2007**

Dynamic Range f(SAR_{head})

(Waveguide R22, f = 1800 MHz)



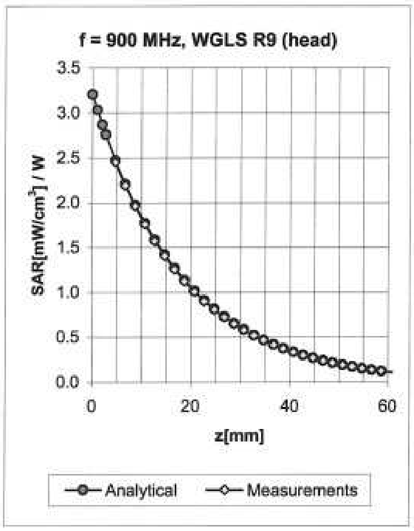


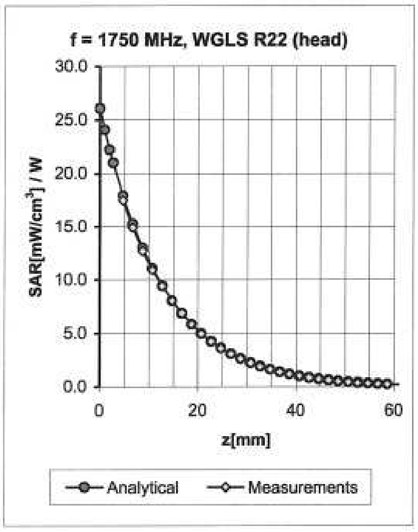
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Certificate No: ET3-1558_Aug07 Page 7 of 9

ET3DV6 SN:1558 August 23, 2007

Conversion Factor Assessment





f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
835	± 50 / ± 99	Head	41.5 ± 5%	0.90 ± 5%	0.35	2.42	6.39	± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.32	2.61	6.24	± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.58	2.76	5.09	± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.54	2.69	4.90	± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.69	1.82	4.47	± 11.8% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.37	2.44	6.17	± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.34	2.73	5.92	± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.64	2.47	4.68	± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.73	2.29	4.46	± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.65	2.15	3.92	± 11.8% (k=2)

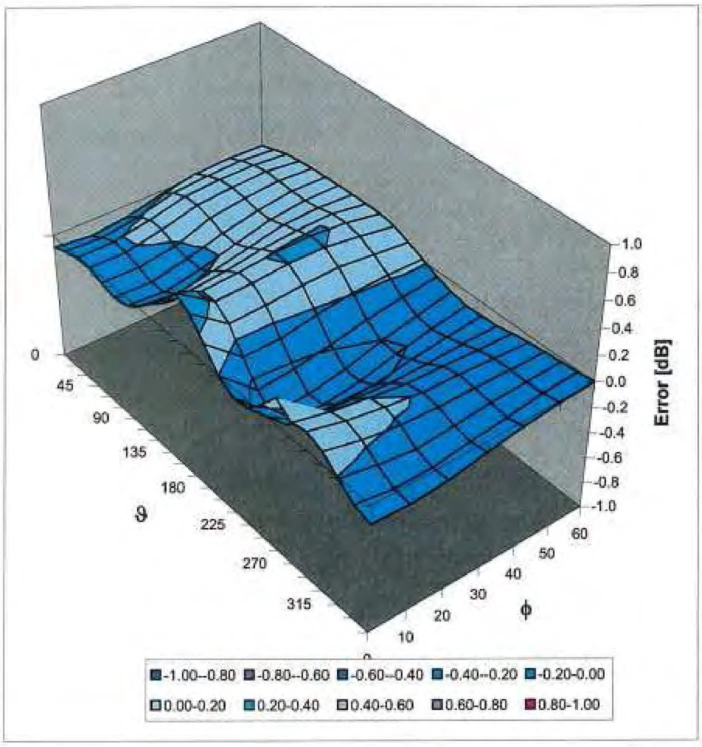
[C] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

Certificate No: ET3-1558_Aug07 Page 8 of 9

ET3DV6 SN:1558 **August 23, 2007**

Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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

Certificate No: ET3-1558_Aug07 Page 9 of 9

2 Calibration report "900 MHz System validation dipole"

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: Cetecom

Certificate No: D900V2-102_Aug07

CALIBRATION CERTIFICATE

Object	D900V2 - SN: 102
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	August 23, 2007
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 EPM-442A	GB37480704	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Power sensor HP 8481A	US37292783	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Reference 20 dB Attenuator	SN: 5086 (20g)	07-Aug-07 (METAS, No 217-00718)	Aug-08
Reference 10 dB Attenuator	SN: 5047.2 (10r)	07-Aug-07 (METAS, No 217-00718)	Aug-08
Reference Probe ET3DV6 (HF)	SN 1507	19-Oct-06 (SPEAG, No. ET3-1507_Oct06)	Oct-07
DAE4	SN 601	30-Jan-07 (SPEAG, No. DAE4-601_Jan07)	Jan-08

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-05)	In house check: Oct-07
RF generator Agilent E4421B	MY41000675	11-May-05 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07

	Name	Function	Signature
Calibrated by:	Mike Meili	Laboratory Technician	M. Meili
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 23, 2007

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D900V2-102_Aug07 Page 1 of 9

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

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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
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

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) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY4	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.97 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.5 ± 6 %	0.94 mho/m ± 6 %
Head TSL temperature during test	(22.2 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.59 mW / g
SAR normalized	normalized to 1W	10.4 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**10.3 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.67 mW / g
SAR normalized	normalized to 1W	6.68 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**6.60 mW /g ± 16.5 % (k=2)**

[1] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.0	1.05 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.6 ± 6 %	1.07 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	condition	
SAR measured	250 mW input power	2.70 mW / g
SAR normalized	normalized to 1W	10.8 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**10.6 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.76 mW / g
SAR normalized	normalized to 1W	7.04 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**6.97 mW /g ± 16.5 % (k=2)**

[2] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Certificate No: D900V2-102_Aug07 Page 4 of 9

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.9 Ω - 5.7 jΩ
Return Loss	- 24.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	44.5 Ω - 7.4 jΩ
Return Loss	- 20.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.408 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	January 24, 2001

DASY4 Validation Report for Head TSL

Date/Time: 15.08.2007 14:51:12

Test Laboratory: SPEAG, Zurich, Switzerland

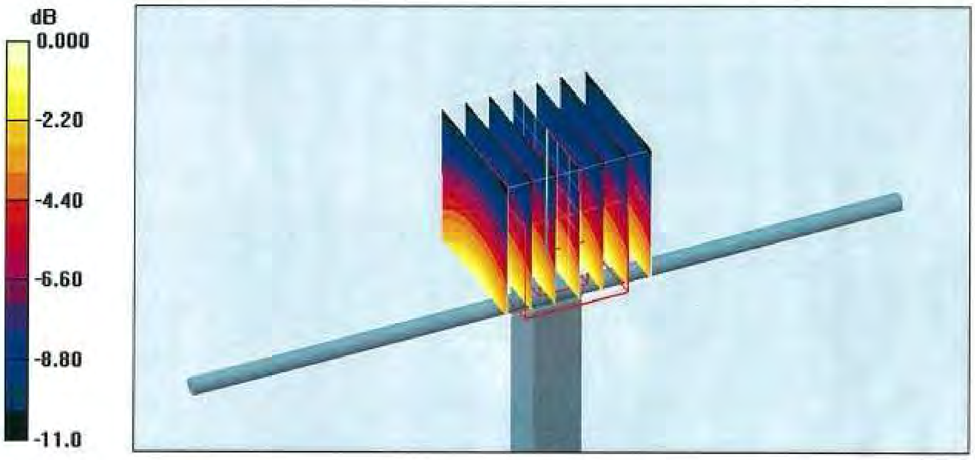
DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:102

Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1
Medium: HSL 900 MHz;
Medium parameters used: f = 900 MHz; σ = 0.94 mho/m; ε_r = 39.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(6.01, 6.01, 6.01); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

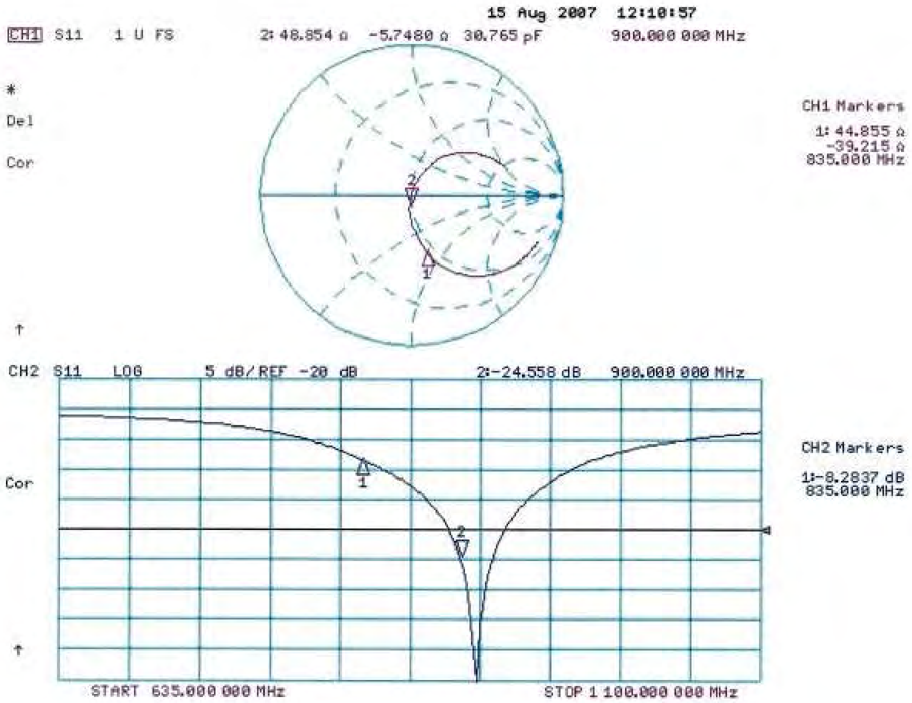
Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.5 V/m; Power Drift = -0.040 dB
Peak SAR (extrapolated) = 3.81 W/kg
SAR(1 g) = 2.59 mW/g; SAR(10 g) = 1.67 mW/g
Maximum value of SAR (measured) = 2.81 mW/g



0 dB = 2.81mW/g

Certificate No: D900V2-102_Aug07 Page 6 of 9

Impedance Measurement Plot for Head TSL



Certificate No: D900V2-102_Aug07 Page 7 of 9

DASY4 Validation Report for Body TSL

Date/Time: 23.08.2007 12:47:26

Test Laboratory: SPEAG, Zurich, Switzerland

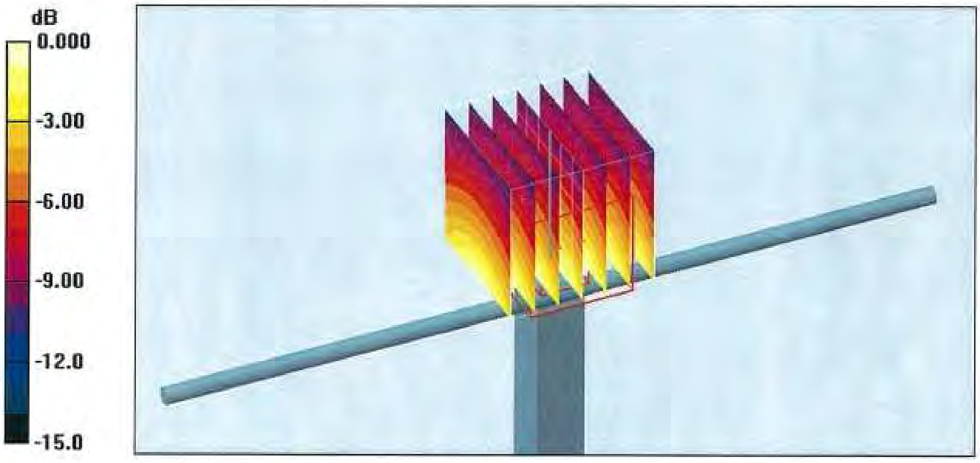
DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:102

Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1
Medium: MSL900;
Medium parameters used: f = 900 MHz; σ = 1.07 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

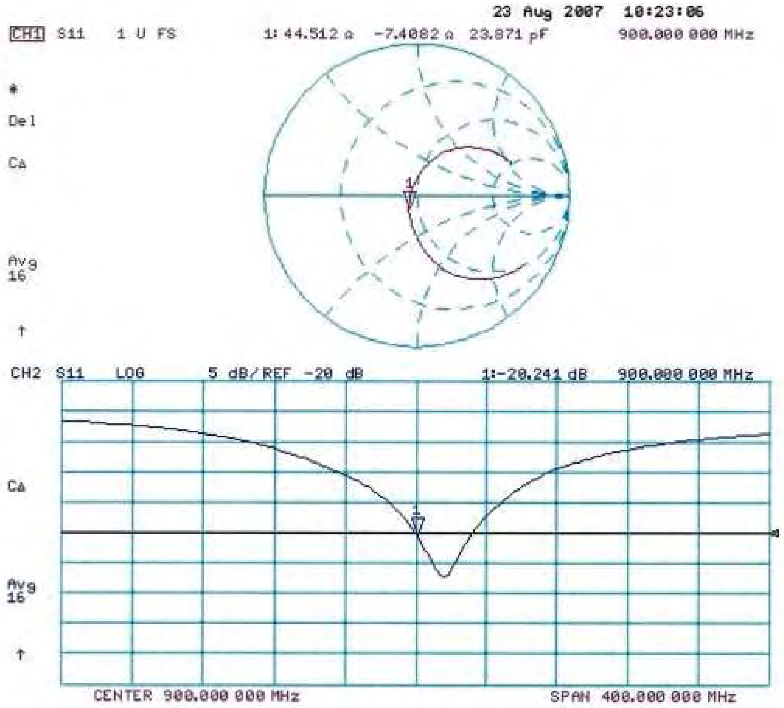
- Probe: ET3DV6 - SN1507 (HF); ConvF(5.8, 5.8, 5.8); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Pin=250mW/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.4 V/m; Power Drift = -0.004 dB
Peak SAR (extrapolated) = 3.81 W/kg
SAR(1 g) = 2.7 mW/g; SAR(10 g) = 1.76 mW/g
Maximum value of SAR (measured) = 2.93 mW/g



0 dB = 2.93mW/g

Impedance Measurement Plot for Body TSL



3 Calibration report "1900 MHz System validation dipole"

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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 **Cetecom**

Certificate No: **D1900V2-5d009_Aug07**

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d009
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	August 21, 2007
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 EPM-442A	GB37480704	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Power sensor HP 8481A	US37292783	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Reference 20 dB Attenuator	SN: 5086 (20g)	07-Aug-07 (METAS, No 217-00718)	Aug-08
Reference 10 dB Attenuator	SN: 5047.2 (10r)	07-Aug-07 (METAS, No 217-00718)	Aug-08
Reference Probe ET3DV6	SN: 1507	19-Oct-06 (SPEAG, No. ET3-1507_Oct06)	Oct-07
Reference Probe ES3DV3	SN: 3025	19-Oct-06 (SPEAG, No. ES3-3025_Oct06)	Oct-07
DAE4	SN 601	30-Jan-07 (SPEAG, No. DAE4-601_Jan07)	Jan-08

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-05)	In house check: Oct-07
RF generator Agilent E4421B	MY41000675	11-May-05 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 24, 2007

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D1900V2-5d009_Aug07 Page 1 of 9

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

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

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) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY4	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.3 ± 6 %	1.47 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	condition	
SAR measured	250 mW input power	9.30 mW / g
SAR normalized	normalized to 1W	37.2 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**35.9 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	4.90 mW / g
SAR normalized	normalized to 1W	19.6 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**19.3 mW / g ± 16.5 % (k=2)**

[1] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Certificate No: D1900V2-5d009_Aug07 Page 3 of 9

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.6 ± 6 %	1.59 mho/m ± 6 %
Body TSL temperature during test	(21.5 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.43 mW / g
SAR normalized	normalized to 1W	37.7 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**37.7 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.06 mW / g
SAR normalized	normalized to 1W	20.2 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**20.4 mW / g ± 16.5 % (k=2)**

[2] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Certificate No: D1900V2-5d009_Aug07 Page 4 of 9

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.5 Ω + 1.9 jΩ
Return Loss	- 30.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.8 Ω + 2.4 jΩ
Return Loss	- 29.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.188 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	February 22, 2002

DASY4 Validation Report for Head TSL

Date/Time: 16.08.2007 16:37:14

Test Laboratory: SPEAG, Zurich, Switzerland

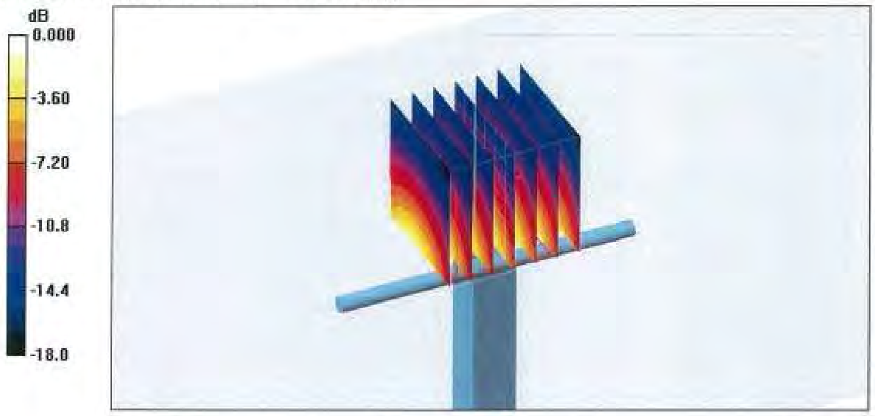
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d009

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL U10 BB;
Medium parameters used: f = 1900 MHz; $\sigma = 1.47$ mho/m; $\varepsilon_r = 39.3$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.97, 4.97, 4.97); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

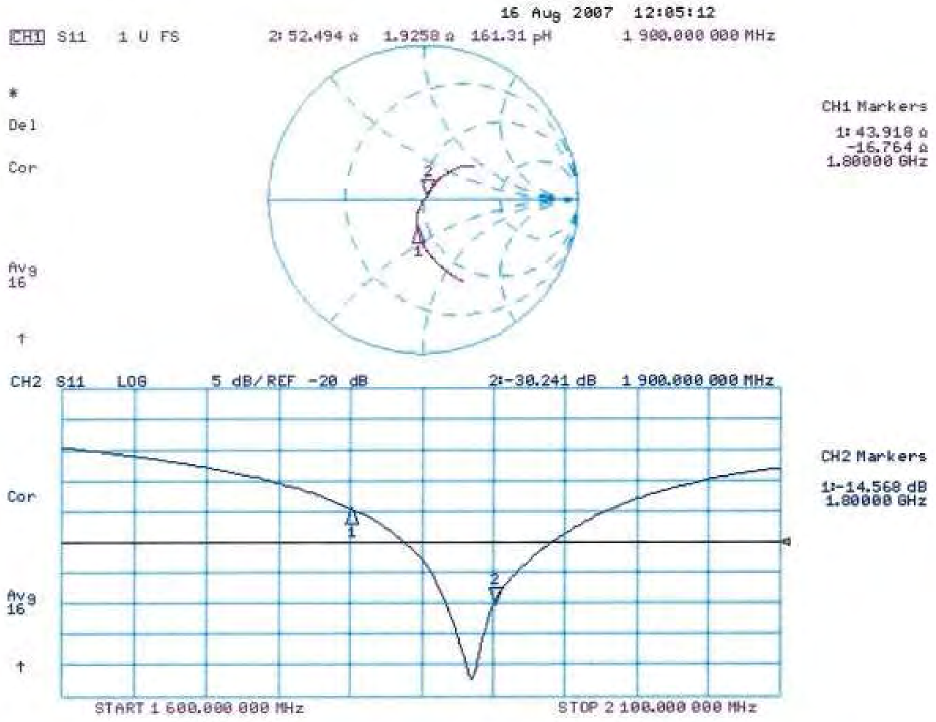
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 86.2 V/m; Power Drift = 0.063 dB
Peak SAR (extrapolated) = 16.0 W/kg
SAR(1 g) = 9.3 mW/g; SAR(10 g) = 4.9 mW/g
Maximum value of SAR (measured) = 10.4 mW/g



0 dB = 10.4mW/g

Certificate No: D1900V2-5d009_Aug07 Page 6 of 9

Impedance Measurement Plot for Head TSL



Certificate No: D1900V2-5d009_Aug07 Page 7 of 9

DASY4 Validation Report for Body TSL

Date/Time: 21.08.2007 11:48:50

Test Laboratory: SPEAG, Zurich, Switzerland

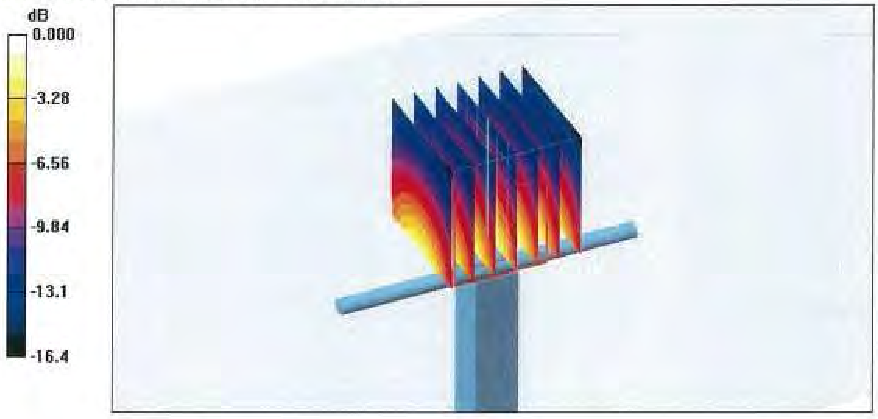
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d009

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: MSL U10 BB;
Medium parameters used: f = 1900 MHz; σ = 1.59 mho/m; ε_r = 55.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.43, 4.43, 4.43); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

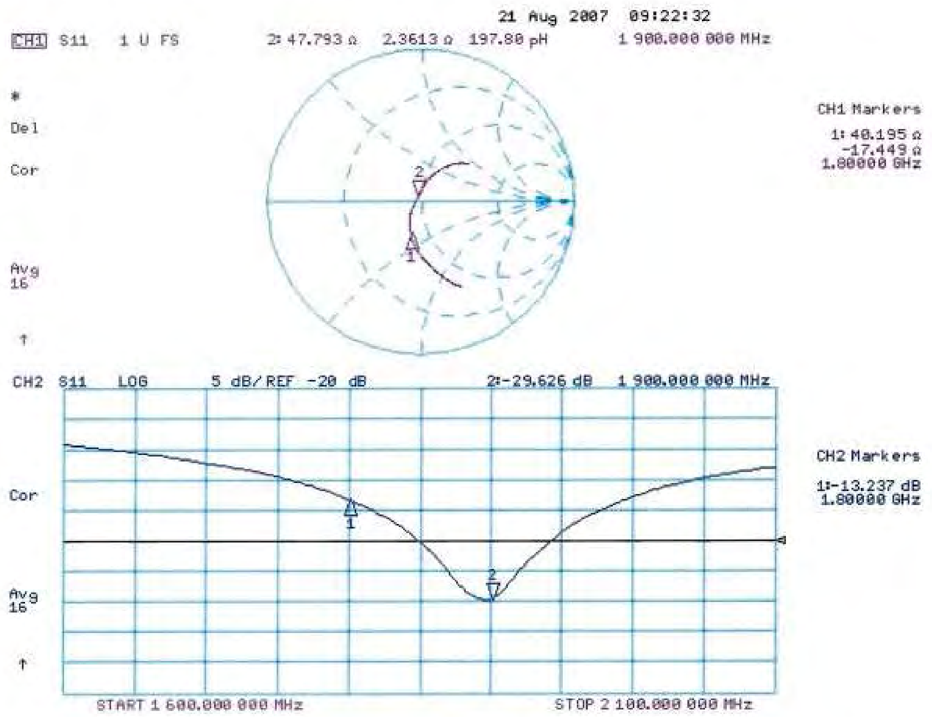
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 88.1 V/m; Power Drift = 0.015 dB
Peak SAR (extrapolated) = 15.8 W/kg
SAR(1 g) = 9.43 mW/g; SAR(10 g) = 5.06 mW/g
Maximum value of SAR (measured) = 10.6 mW/g



0 dB = 10.6mW/g

Certificate No: D1900V2-5d009_Aug07 Page 8 of 9

Impedance Measurement Plot for Body TSL



4 Calibration certificate of Data Aquisition Unit (DAE)

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

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

Accredited by the Swiss Accreditation Service (SAS)
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 Cetecom

Certificate No: DAE3-413_Jan08

CALIBRATION CERTIFICATE

Object	DAE3 - SD 000 D03 AA - SN: 413
Calibration procedure(s)	QA CAL-06.v12 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	January 18, 2008
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
Fluke Process Calibrator Type 702	SN: 6295803	04-Oct-07 (Elcal AG, No: 6467)	Oct-08
Keithley Multimeter Type 2001	SN: 0810278	03-Oct-07 (Elcal AG, No: 6465)	Oct-08
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Calibrator Box V1.1	SE UMS 006 AB 1004	25-Jun-07 (SPEAG, in house check)	In house check Jun-08

	Name	Function	Signature
Calibrated by:	Eric Hainfeld	Technician	
Approved by:	Fin Bomholt	R&D Director	

Issued: January 18, 2008

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: DAE3-413_Jan08 Page 1 of 5

5 Certificate of "SAM Twin Phantom V4.0/V4.0C"

Schmid & Partner
Engineering AG

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

EINGANG
14. Jan. 2002
CETECOM

CETECOM ICT Services GmbH
Bernd Rebmann
Untertürkheimer Str. 6-10
66117 Saarbrücken
Deutschland

Zurich, January 10, 2002

Certificate of Conformity

Dear Bernd

It has been a while since you have received your SAM Twin Phantom V4.0/V4.0C.

Several of our customers have required a document to justify to the authorities that the SAM phantom used for SAR measurements is conformant with the respective standards.

For your documentation please find enclosed a copy of the duly signed "Certificate of Conformity/First Article Inspection" (Document No. 881 - QD 000 P40 BA - B). With this certificate we confirm conformity with the CENELEC EN 50361, IEEE P1528-200x draft 6.5 and the IEC PT 62209 draft 0.9 standards.

Please do not hesitate to contact us in case you have any questions or are in need of further clarification. You can always reach us at +41-1-245 97 00 or by e-mail to info@speag.com.

Best regards,

Schmid & Partner Engineering AG

Sibyl Akrong

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 BA
Series No	TP-1002 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 18.11.2001

Signature / Stamp

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

Doc No 881 – QD 000 P40 BA – B Page 1 (1)

6 Application Note System Performance Check

6.1.1.1 Purpose of system performance check

The system performance check verifies that the system operates within its specifica-tions. System and operator errors can be detected and corrected. It is recommended that the system performance check is performed prior to any usage of the system in order to guarantee reproducible results.
The measurement of the Specific Absorption Rate (SAR) is a complicated task and the result depends on the proper functioning of many components and the correct settings of many param-eters. Faulty results due to drift, failures or incorrect parameters might not be recognized, since they often look similar in distribution to the correct ones. The Dosimetric Assessment System DASY4 incorporates a system performance check procedure to test the proper functioning of the system. The system performance check uses normal SAR measurements in a simplified setup (the at section of the SAM Twin Phantom) with a well characterized source (a matched dipole at a specified distance). This setup was selected to give a high sensitivity to all parameters that might fail or vary over time (e.g., probe, liquid parameters, and software settings) and a low sensitivity to external effects inherent in the system (e.g., positioning uncertainty of the device holder). The system performance check does not replace the calibration of the components. The accuracy of the system performance check is not sufficient for calibration purposes. It is possible to calculate the field quite accurately in this simple setup; however, due to the open field situation some factors (e.g., laboratory re ections) cannot be accounted for. Calibrations in the at phantom are possible
with transfer calibration methods, using either temperature probes or calibrated E-field probes. The system performance check also does not test the system performance for arbitrary field sit-uations encountered during real measurements of mobile phones. These checks are performed at SPEAG by testing the components under various conditions (e.g., spherical isotropy measurements in liquid, linearity measurements, temperature variations, etc.), the results of which are used for an error estimation of the system. The system performance check will indicate situations where the system uncertainty is exceeded due to drift or failure.

6.1.1.2 System Performance check procedure

Preparation

The conductivity should be measured before the validation and the measured liquid parameters must be entered in the software. If the measured values differ from targeted values in the dipole document, the liquid composition should be adjusted. If the validation is performed with slightly different (measured) liquid parameters, the expected SAR will also be different. See the application note about SAR sensitivities for an estimate of possible SAR deviations. Note that the liquid parameters are temperature dependent with approximately – 0.5% decrease in permitivity and + 1% increase in conductivity for a temperature decrease of 1° C. The dipole must be placed beneath the flat phantom section of the Generic Twin Phantom with the correct distance holder in place. The distance holder should touch the phantom surface with a light pressure at the reference marking (little hole) and be oriented parallel to the long side of the phantom. Accurate positioning is not necessary, since the system will search for the peak SAR location, except that the dipole arms should be parallel to the surface. The device holder for mobile phones can be left in place but should be rotated away from the dipole. The forward power into the dipole at the dipole SMA connector should be determined as accurately as possible. See section 4 for a description of the recommended setup to measure the dipole input power. The actual dipole input power level can be between 20mW and several watts. The result can later be normalized to any power level. It is strongly recommended to note the actually used power level in the „comment“-window of the measurement file; otherwise you loose this crucial information for later reference.
System Performance Check

The DASY4 installation includes predefined files with recommended procedures for measurements and validation. They are read-only document files and destined as fully defined but unmeasured masks, so you must save the finished validation under a different name. The validation document requires the Generic Twin Phantom, so this phantom must be properly installed in your system. (You can create your own measurement procedures by opening a new document or editing an existing document file). Before you start the validation, you just have to tell the system with which components (probe, medium, and device) you are performing the validation; the system will take care of all parameters. After the validation, which will take about 20 minutes, the results of each task are displayed in the document window. Selecting all measured tasks and opening the predefined "validation" graphic format displays all necessary information for validation. A description of the different measurement tasks in the predefined document is given below, together with the information that can be deduced from their results:

- The „reference“ and „drift“ measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the amplifier output power. If it is too high (above ± 0.1dB) the validation should be repeated; some amplifiers have very high drift during warm-up. A stable amplifier gives drift results in the DASY4 system below ± 0.02 dB.
- The „surface check“ measurement tests the optical surface detection system of the DASY4 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1mm). In that case it is better to abort the validation and stir the liquid. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within ± 30°.) However, varying breaking indices of different liquid compositions might also influence the distance. If the indicated difference varies from the actual setting, the probe parameter „optical surface distance“ should be changed in the probe settings (see manual). For more information see the application note about SAR evaluation.
- The „area scan“ measures the SAR above the dipole on a parallel plane to the surface. It is used to locate the approximate location of the peak SAR with 2D spline interpolation. The proposed scan uses large grid spacing for faster measurement; due to the symmetric field the peak detection is reliable. If a finer graphic is desired, the grid spacing can be reduced. Grid spacing and orientation have no influence on the SAR result.
- The zoom scan job measures the field in a volume around the peak SAR value assessed in the previous „area“ scan (for more information see the application note on SAR evaluation).

If the validation measurements give reasonable results, the peak 1g and 10g spatial SAR values averaged between the two cubes and normalized to 1W dipole input power give the reference data for comparisons. The next section analyzes the expected uncertainties of these values. Section 6 describes some additional checks for further information or troubleshooting.

6.1.1.3 Uncertainty Budget

Please note that in the following Tables, the tolerance of the following uncertainty components depends on the actual equipment and setup at the user location and need to be either assessed or verified on-site by the end user of the DASY4 system:

- RF ambient conditions
- Dipole Axis to Liquid Distance
- Input power and SAR drift measurement
- Liquid permittivity - measurement uncertainty
- Liquid conductivity - measurement uncertainty

Note: All errors are given in percent of SAR, so 0.1 dB corresponds to 2.3%. The field error would be half of that.

the liquid parameter assessment give the targeted values from the dipole document. All errors are given in percent of SAR, so 0.1dB corresponds to 2.3%. The field error would be half of that.

System validation

In the table below, the system validation uncertainty with respect to the analytically assessed SAR value of a dipole source as given in the P1528 standard is given. This uncertainty is smaller than the expected uncertainty for mobile phone measurements due to the simplified setup and the symmetric field distribution.

Error Sources	Uncertainty Value	Probability Distribution	Divi-sor	c_i 1g	c_i 10g	Standard Uncertainty	Standard Uncertainty	v_i^2 or v_{eff}
Measurement System								
Probe calibration	± 4.8%	Normal	1	1	1	± 4.8%	± 4.8%	∞
Axial isotropy	± 4.7%	Rectangular	√3	0.7	0.7	± 1.9%	± 1.9%	∞
Hemispherical isotropy	± 0.0%	Rectangular	√3	0.7	0.7	± 0.0%	± 0.0%	∞
Boundary effects	± 1.0%	Rectangular	√3	1	1	± 0.6%	± 0.6%	∞
Probe linearity	± 4.7%	Rectangular	√3	1	1	± 2.7%	± 2.7%	∞
System detection limits	± 1.0%	Rectangular	√3	1	1	± 0.6%	± 0.6%	∞
Readout electronics	± 1.0%	Normal	1	1	1	± 1.0%	± 1.0%	∞
Response time	± 0.0%	Rectangular	√3	1	1	± 0.0%	± 0.0%	∞
Integration time	± 0.0%	Rectangular	√3	1	1	± 0.0%	± 0.0%	∞
RF ambient conditions	± 3.0%	Rectangular	√3	1	1	± 1.7%	± 1.7%	∞
Probe positioner	± 0.4%	Rectangular	√3	1	1	± 0.2%	± 0.2%	∞
Probe positioning	± 2.9%	Rectangular	√3	1	1	± 1.7%	± 1.7%	∞
Max. SAR evaluation	± 1.0%	Rectangular	√3	1	1	± 0.6%	± 0.6%	∞
Dipole								
Dipole axis toliquid distance	± 2.0%	Normal	1	1	1	± 1.2%	± 1.2%	∞
Input power and power drift	± 4.7%	Rectangular	√3	1	1	± 2.7%	± 2.7%	∞
Phantom and Set-up								
Phantom uncertainty	± 4.0%	Rectangular	√3	1	1	± 2.3%	± 2.3%	∞
Liquid conductivity (target)	± 5.0%	Rectangular	√3	0.64	0.43	± 1.8%	± 1.2%	∞
Liquid conductivity (meas.)	± 2.5%	Rectangular	1	0.64	0.43	± 1.6%	± 1.1%	∞
Liquid permittivity (target)	± 5.0%	Rectangular	√3	0.6	0.49	± 1.7%	± 1.4%	∞
Liquid permittivity (meas.)	± 2.5%	Rectangular	1	0.6	0.49	± 1.5%	± 1.2%	∞
Combined Uncertainty						**± 8.4%**	**± 8.1%**	∞
Expanded Std. Uncertainty						**± 16.8%**	**± 1.2%**	

Performance check repeatability

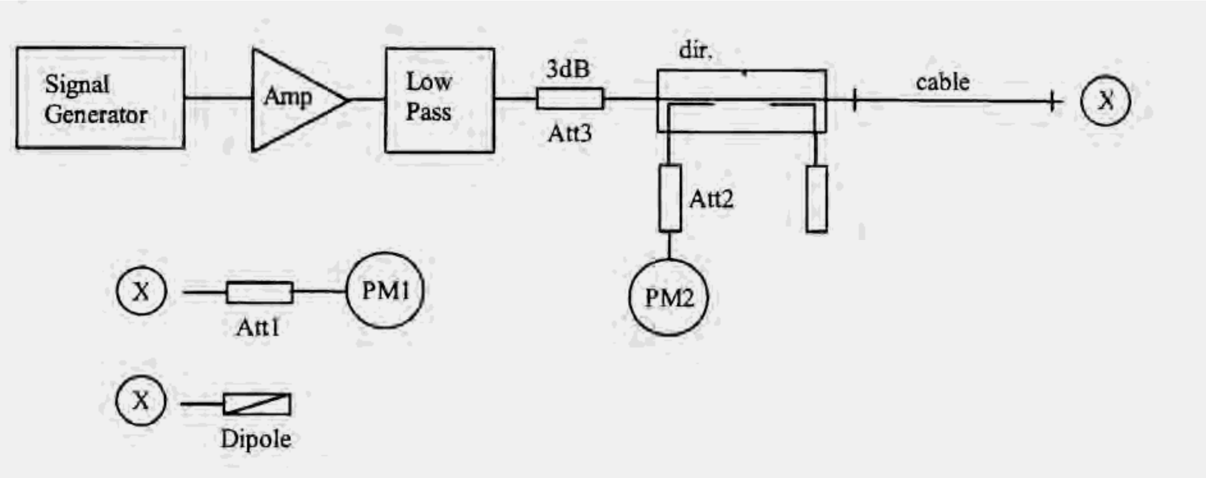
The repeatability check of the validation is insensitive to external effects and gives an indication of the variations in the DASY4 measurement system, provided that the same power reading setup is used for all validations. The repeatability estimate is given in the following table:

Error Sources	Uncertainty Value	Probability Distribution	Divi-sor	c_i 1g	c_i 10g	Standard Uncertainty	Standard Uncertainty	v_i^2 or v_{eff}
Measurement System								
Probe calibration	± 4.8%	Normal	1	1	1	0	0	∞
Axial isotropy	± 4.7%	Rectangular	√3	0.7	0.7	0	0	∞
Hemispherical isotropy	± 0.0%	Rectangular	√3	0.7	0.7	0	0	∞
Boundary effects	± 1.0%	Rectangular	√3	1	1	0	0	∞
Probe linearity	± 4.7%	Rectangular	√3	1	1	0	0	∞
System detection limits	± 1.0%	Rectangular	√3	1	1	0	0	∞
Readout electronics	± 1.0%	Normal	1	1	1	0	0	∞
Response time	± 0.0%	Rectangular	√3	1	1	0	0	∞
Integration time	± 0.0%	Rectangular	√3	1	1	0	0	∞
RF ambient conditions	± 3.0%	Rectangular	√3	1	1	0	0	∞
Probe positioner	± 0.4%	Rectangular	√3	1	1	0	0	∞
Probe positioning	± 2.9%	Rectangular	√3	1	1	0	0	∞
Max. SAR evaluation	± 1.0%	Rectangular	√3	1	1	0	0	∞
Dipole								
Dipole axis toliquid distance	± 2.0%	Normal	1	1	1	± 1.2%	± 1.2%	∞
Input power and power drift	± 4.7%	Rectangular	√3	1	1	± 2.7%	± 2.7%	∞
Phantom and Set-up								
Phantom uncertainty	± 4.0%	Rectangular	√3	1	1	± 2.3%	± 2.3%	∞
Liquid conductivity (target)	± 5.0%	Rectangular	√3	0.64	0.43	± 1.8%	± 1.2%	∞
Liquid conductivity (meas.)	± 2.5%	Rectangular	1	0.64	0.43	± 1.6%	± 1.1%	∞
Liquid permittivity (target)	± 5.0%	Rectangular	√3	0.6	0.49	± 1.7%	± 1.4%	∞
Liquid permittivity (meas.)	± 2.5%	Rectangular	1	0.6	0.49	± 1.5%	± 1.2%	∞
Combined Uncertainty						**± 5.3%**	**± 4.9%**	∞
Expanded Std. Uncertainty						**± 10.6%**	**± 9.7%**	

The expected repeatability deviation is low. Excessive drift (e.g., drift in liquid parameters), partial system failures or incorrect parameter settings (e.g., wrong probe or device settings) will lead to unexpectedly high repeatability deviations. The repeatability gives an indication that the system operates within its initial specifications. Excessive drift, system failure and operator errors are easily detected.

6.1.1.4 Power set-up for validation

The uncertainty of the dipole input power is a significant contribution to the absolute uncertainty and the expected deviation in interlaboratory comparisons. The values in Section 2 for a typical and a sophisticated setup are just average values. Refer to the manual of the power meter and the detector head for the evaluation of the uncertainty in your system. The uncertainty also depends on the source matching and the general setup. Below follows the description of a recommended setup and procedures to increase the accuracy of the power reading:



The figure shows the recommended setup. The PM1 (incl. Att1) measures the forward power at the location of the validation dipole connector. The signal generator is adjusted for the desired forward power at the dipole connector and the power meter PM2 is read at that level. After connecting the cable to the dipole, the signal generator is readjusted for the same reading at power meter PM2. If the signal generator does not allow a setting in 0.01dB steps, the remaining difference at PM2 must be noted and considered in the normalization of the validation results. The requirements for the components are:

- The signal generator and amplifier should be stable (after warm-up). The forward power to the dipole should be above 10mW to avoid the influence of measurement noise. If the signal generator can deliver 15dBm or more, an amplifier is not necessary. Some high power amplifiers should not be operated at a level far below their maximum output power level (e.g. a 100W power amplifier operated at 250mW output can be quite noisy). An attenuator between the signal generator and amplifier is recommended to protect the amplifier input.
- The low pass filter after the amplifier reduces the effect of harmonics and noise from the amplifier. For most amplifiers in normal operation the filter is not necessary.
- The attenuator after the amplifier improves the source matching and the accuracy of the power head. (See power meter manual.) It can also be used also to make the amplifier operate at its optimal output level for noise and stability. In a setup without directional coupler, this attenuator should be at least 10dB.
- The directional coupler (recommended ³ 20dB) is used to monitor the forward power and adjust the signal generator output for constant forward power. A medium quality coupler is sufficient because the loads (dipole and power head) are well matched. (If the setup is used for reflective loads, a high quality coupler with respect to directivity and output matching is necessary to avoid additional errors.)
- The power meter PM2 should have a low drift and a resolution of 0.01dBm, but otherwise its accuracy has no impact on the power setting. Calibration is not required.
- The cable between the coupler and dipole must be of high quality, without large attenuation and phase changes when it is moved. Otherwise, the power meter head PM1 should be brought to the location of the dipole for measuring.
- The power meter PM1 and attenuator Att1 must be high quality components. They should be calibrated, preferably together. The attenuator (³10dB) improves the accuracy of the power reading. (Some higher power

heads come with a built-in calibrated attenuator.) The exact attenuation of the attenuator at the frequency used must be known; many attenuators are up to 0.2dB off from the specified value.

- Use the same power level for the power setup with power meter PM1 as for the actual measurement to avoid linearity and range switching errors in the power meter PM2. If the validation is performed at various power levels, do the power setting procedure at each level.
- The dipole must be connected directly to the cable at location “X”. If the power meter has a different connector system, use high quality couplers. Preferably, use the couplers at the attenuator Att1 and calibrate the attenuator with the coupler.
- Always remember: We are measuring power, so 1% is equivalent to 0.04dB.

6.1.1.5 Laboratory reflections

In near-field situations, the absorption is predominantly caused by induction effects from the magnetic near-field. The absorption from reflected fields in the laboratory is negligible. On the other hand, the magnetic field around the dipole depends on the currents and therefore on the feedpoint impedance. The feedpoint impedance of the dipole is mainly determined from the proximity of the absorbing phantom, but reflections in the laboratory can change the impedance slightly. A 1% increase in the real part of the feedpoint impedance will produce approximately a 1% decrease in the SAR for the same forward power. The possible influence of laboratory reflections should be investigated during installation. The validation setup is suitable for this check, since the validation is sensitive to laboratory reflections. The same tests can be performed with a mobile phone, but most phones are less sensitive to reflections due to the shorter distance to the phantom. The fastest way to check for reflection effects is to position the probe in the phantom above the feedpoint and start a continuous field measurement in the DASY4 multimeter window. Placing absorbers in front of possible reflectors (e.g. on the ground near the dipole or in front of a metallic robot socket) will reveal their influence immediately. A 10dB absorber (e.g. ferrite tiles or flat absorber mats) is probably sufficient, as the influence of the reflections is small anyway. If you place the absorber too near the dipole, the absorber itself will interact with the reactive near-field. Instead of measuring the SAR, it is also possible to monitor the dipole impedance with a network analyzer for reflection effects. The network analyzer must be calibrated at the SMA connector and the electrical delay (two times the forward delay in the dipole document) must be set in the NWA for comparisons with the reflection data in the dipole document. If the absorber has a significant influence on the results, the absorber should be left in place for validation or measurements. The reference data in the dipole document are produced in a low reflection environment.

6.1.1.6 Additional system checks

While the validation gives a good check of the DASY4 system components, it does not include all parameters necessary for real phone measurements (e.g. device modulation or device positioning). For system validation (repeatability) or comparisons between laboratories a reference device can be useful. This can be any mobile phone with a stable output power (preferably a device whose output power can be set through the keyboard). For comparisons, the same device should be sent around, since the SAR variations between samples can be large. Several measurement possibilities in the DASY software allow additional tests of the performance of the DASY system and components. These tests can be useful to localize component failures:

- The validation can be performed at different power levels to check the noise level or the correct compensation of the diode compression in the probe.
- If a pulsed signal with high peak power levels is fed to the dipole, the performance of the diode compression compensation can be tested. The correct crest factor parameter in the DASY software must be set (see manual). The system should give the same SAR output for the same averaged input power.
- The probe isotropy can be checked with a 1D-probe rotation scan above the feedpoint. The automatic probe alignment procedure must be passed through for accurate probe rotation movements (optional DASY4 feature with a robot-mounted light beam unit). Otherwise the probe tip might move on a small circle during rotation, producing some additional isotropy errors in gradient fields.