TEST REPORT

REPORT NUMBER: I08GE7399-FCC-SAR

ON

Type of Equipment: Windows Mobile Smart Phone
Type of Designation: Vodafone 1231+
Manufacturer: ZTE CORPORATION

ACCORDING TO

FCC Part 2.1093: Radiofrequency radiation exposure evaluation: portable devices, e-CFR March 23, 2006
FCC OET Bulletin 65 Supplement C (Edition 01-01): Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions
IEEE Std 1528™-2003: IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques

China Telecommunication Technology Labs.

Month date, year
Nov 19, 2008

Signature

Ma Xin
Deputy Director

FCC ID:	Q78-VDF1231PLUS
Report Date:	2008-11-19
Test Firm Name:	China Telecommunication Technology Labs
Registration Number:	840587

Statement

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported tests were carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 2.1093. The sample tested was found to comply with the requirements defined in the applied rules.

Table of Contents

1. General Information

1.1 Notes

All reported tests were carried out on a sample equipment to demonstrate limited compliance with the requirements of FCC CFR 47 Part 2.1093.

The test results of this test report relate exclusively to the item(s) tested as specified in section 2.

The following deviations from, additions to, or exclusions from the test specifications have been made. See Annex D.

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Date: 2008-11-19

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1.3 Testing Laboratory information

1.3.1 Location

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1.3.2 Details of accreditation status

Accredited by:	China National Accreditation Service for Conformity Assessment (CNAS)
Registration number:	CNAS Registration No. CNAS L0570
Standard:	ISO/IEC 17025:2005

1.3.3 Test location, where different from section 1.3.1

Name:	------
Street:	------
City:	------
Country:	------
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1.4 Details of applicant or manufacturer

1.4.1 Applicant

Name:	ZTE CORPORATION
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1.4.2 Manufacturer (if different from applicant in section 1.4.1)

Name:	--
Address:	--

1.4.3 Manufactory (if different from applicant in section 1.4.1)

Name:	--
Address:	--

2 Test Item

2.1 General Information

Manufacturer:	ZTE CORPORATION
Name:	Windows Mobile Smart Phone
Model Number:	Vodafone 1231+
Serial Number:	--
Production Status:	Product
Receipt date of test item:	2008-09-02

2.2 Outline of EUT

E.U.T. is a Windows Mobile Smart Phone.

2.3 Modifications Incorporated in EUT

The EUT has not been modified from what is described by the brand name and unique type identification stated above.

2.4 Equipment Configuration

Equipment configuration list:

Item	Generic Description	Manufacturer	Type	Serial No.	Remarks
A	handset	ZTE CORPORATION	Vodafone 1231+	--	None
B	adapter	ZTE CORPORATION	STC-A22O50U5-A	--	None
C	battery	ZTE CORPORATION	Li3711T42P3h513857	--	None
D	Earphone	Merry Electronics Ltd Full-Sound Electrical Products.Ltd	HMZ3-C4-OMTP	--	None

Cables:

Item	Cable Type	Manufacturer	Length	Shield	Quantity	Remarks
1	DC cable on Adapter	Unknown	1.0m	No	1	None

2.5 Other Information

Version of hardware and software:

HW Version: g5hC

SW Version: P180A1V1.0.3

Adaptor information:

Input: 100-240VAC 200mA

Output: 5.0V 700mA

Battery information:

3.7VDC

2.6 EUT Photographs

Front view

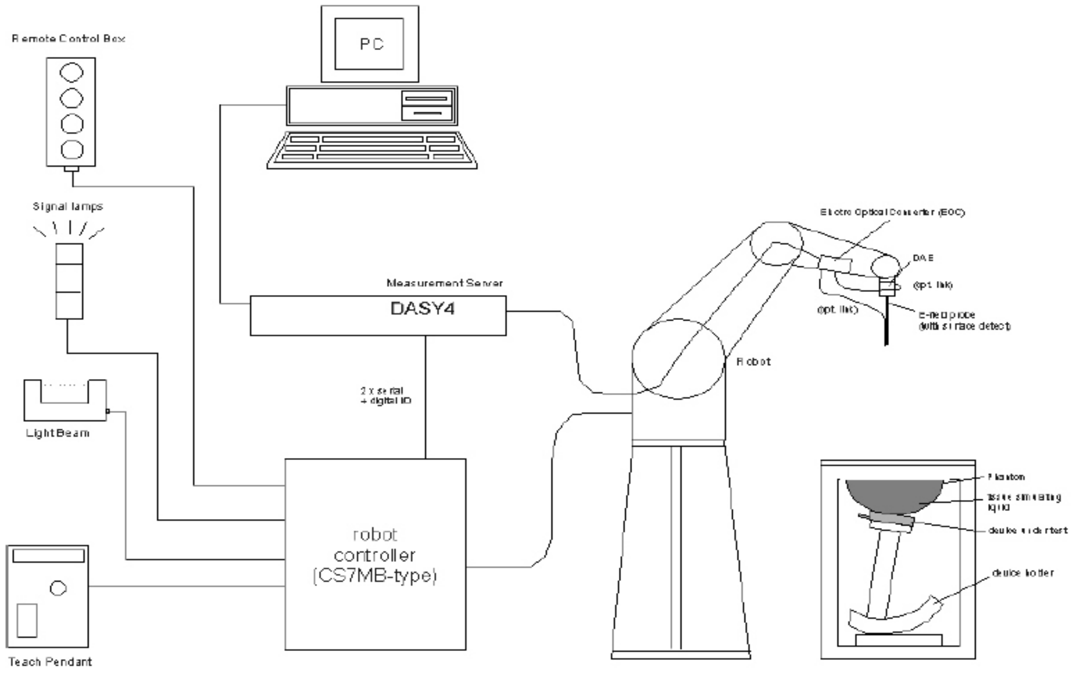
Back view

3 Measurement Systems

3.1 SAR Measurement Systems Setup

All measurements were performed using the automated near-field scanning system, DASY4, from Schmid & Partner Engineering AG (SPEAG). The system is based on a high precision industrial robot which positions the probes with a positional repeatability of better than 0.02mm. Special E- and H-field probes have been developed for measurements close to material discontinuity, the sensors of which are directly loaded with a Schottky diode and connected via highly resistive lines (length =300mm) to the data acquisition unit.

A cell controller system containing the power supply, robot controller, teach pendant (Joystick) and remote control, is used to drive the robot motors. The PC consists of the Micron Pentium III 800 MHz computer with Windows 2000 system and SAR Measurement Software DASY4, A/D interface card, monitor, mouse, and keyboard. The Stäubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc., which is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical signal to digital electric signal of the DAE and transfers data to the PC plug-in card.



Demonstration of measurement system setup

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

3.2 E-field Probe

3.2.1 E-field Probe Description

The SAR measurements were conducted with the dosimetric probe ES3DV3 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe has been calibrated according to the standard procedure with an accuracy of better than ±10%. The spherical isotropy was evaluated and found to be better than ± 0.25dB.

Items	Specification
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., glycol)
Calibration	In air from 10 MHz to 2.5 GHz In brain and muscle simulating tissue at

	frequencies of 450MHz, 900MHz and 1.8GHz (accuracy±8%) Calibration for other liquids and frequencies upon request
Frequency	l 0 MHz to > 6 GHz; Linearity: ±0.2 dB (30 MHz to 3 GHz)
Directivity	±0.2 dB in brain tissue (rotation around probe axis) ±0.4 dB in brain tissue (rotation normal probe axis)
Dynamic Range	5u W/g to > 100mW/g; Linearity: ±0.2dB
Surface Detection	±0.2 mm repeatability in air and clear liquids over diffuse reflecting surface
Dimensions	Overall length: 330mm Tip length: 16mm Body diameter: 12mm Tip diameter: 6.8mm Distance from probe tip to dipole centers: 2.7mm
Application	General dosimetry up to 3GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms

3.2.2 E-field Probe Calibration

The Annex C is the copy of the calibration certificate of the used probes.
Each probe is calibrated according to a dosimetric assessment procedure with accuracy better than ± 10%. The spherical isotropy was evaluated and found to be better than ± 0.25dB. The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested.
The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies bellow 1 GHz, and in a wave guide above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.
E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The free-space E-field measured in the medium correlates to temperature increase in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$SAR = C\frac{\Delta T}{\Delta t}$$

Where: Δt = Exposure time (30 seconds),
C = Heat capacity of tissue (brain or muscle),
ΔT = Temperature increase due to RF exposure.
Or

$$SAR = \frac{|E|^2 \sigma}{\rho}$$

Where:
σ = Simulated tissue conductivity,
ρ = Tissue density (kg/m^3).

3.3 Phantom

The Generic Twin Phantom is constructed of a fiberglass shell integrated in a wooden table. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90% of all users. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents the evaporation of the liquid. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot.

Specifications:
Shell Thickness: 2±0.1mm
Filling Volume: Approx. 20 liters
Dimensions: 810 x l000 x 500 mm (H x L x W)
Liquid depth when testing: at least 150 mm

3.4 Device Holder

In combination with the Generic Twin Phantom V3.0, the Mounting Device (POM) enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation points is the ear opening. The devices can be easily, accurately, and repeat ably positioned according to the FCC and CENELEC specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom etc).

4 Test Results

4.1 Operational Condition

Specifications FCC OET 65C (01-01), IEEE Std 1528™-2003
Date of Tests 2008-09-03/04/05
Operation Mode TX at the highest output peak power level
Method of measurement: FCC OET 65C (01-01), IEEE Std 1528™-2003

4.2 Test Equipment Used

TYPE	ITEM	S/N	CALIBRATION DATE	DUE DATE
CMU200	Wireless Communication Test Set	109172	2008-04-08	2009-04-07
E5515C	Wireless Communication Test Set	GB44400824	N.A	N.A
SD000D04	DAE4	549	2007-12-18	2008-12-17
D835V2	dipole	4d038	2007-11-12	2008-11-11
D1900V2	dipole	5d072	2007-11-13	2008-11-12
NRVD	Power Meter	83584310014	2007-12-14	2008-12-13
SME03	Signal Generator	100029	2007-12-27	2008-12-26
NRV-Z4	Power Sensor	100381	2007-09-27	2008-09-26
NRV-Z2	Power Sensor	100211	2007-09-27	2008-09-26
8491B	Attenuator	MY39262528	NA	NA
8491B	Attenuator	MY39262663	NA	NA
8491B	Attenuator	MY39262640	NA	NA
8491B	Attenuator	MY39262638	NA	NA
778D	Dual directional coupler	20040	NA	NA
85070E	Probe kit	MY44300214	N.A.	N.A.
E5071B	Network Analyzer	MY42404001	2008-06-20	2009-06-20
CMU200	Wireless Communication Test Set	109172	2008-04-08	2009-04-07

4.3 Applicable Limit Regulations

Item	Limit Level
Local Specific Absorption Rate (SAR) (1g)	1.6W/kg

4.4 Test Results

The EUT complies.

Note:

All measurements are traceable to national standards.

4.5 Test Setup and Procedures

The test setup is showed as picture 1 in the annex A.

The evaluation was performed according to the following procedure:

Step 1: The SAR value at a fixed location above the ear point was measured and was used as a reference value for assessing the power drift.

Step 2: The SAR distribution at the exposed side of the head was measured at a distance of 4 mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 10 mm x 10 mm. Based on these data, the area of the maximum absorption was determined by interpolation.

Step 3: Around this point, a volume of 30 mm x 30 mm x 25 mm was assessed by measuring 7 x 7 x 6 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

a. The data at the surface were extrapolated, since the center of the dipoles is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2 mm. The extrapolation was based on the least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.

b. The maximum interpolated value was searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot"-condition (in x ~ y and z-directions). The volume was integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average.

c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

Step 4: Re-measurement the SAR value at the same location as in Step 1. If the value changed by more than 5%, the evaluation should be repeated.

4.6 Test Environment and Liquid Parameters

4.6.1 Test Environment

Date:	Liquid Temperature (℃)	Ambient Temperature (℃)	Ambient Humidity (%)
	20~~24	20~~25	30~~70
2008-9-5	23.4	24	54
2008-9-4	21.6	24	48
2008-9-3	20.7	21	62

4.6.2 Liquid Parameters

Frequency (MHz)	Tissue Type	Description	Dielectric Parameters	
			permittivity	conductivity (S/m)
835	Head	Target	41.5	0.9
		±5% window	39.425~43.575	0.855~0.945
		2008-9-3	42	0.923
1900	Head	Target	40	1.4
		±5% window	38.00~42.00	1.33~1.47
		2008-9-4	38.4	1.46
835	Body	Target	55	0.97
		±5% window	52.25~57.75	0.92~1.02
		2008-9-3	52.6	0.972
1900	Body	Target	53.3	1.52
		±5% window	50.64~55.97	1.44~1.60
		2008-9-5	52.4	1.5

4.7 System Validation Check

Validation Method:

The setup of system validation check or performance check is demonstrated as figure 5. The amplifier, low pass filter and attenuators are optional. The dipole shall be positioned and centered below the phantom, paralleling to the longest side of the phantom. A low loss and low dielectric constant spacer on the dipole may be used to guarantee the correct distance between the dipole top surface and the phantom bottom surface.

The separation d, which is defined as the distance from the liquid bottom surface to the dipole's central axis at location of the feed-point, should be as following: for 835 MHz dipole, d = 15 mm, and for 1900 MHz dipole, d = 10 mm, and this can be obtained using two different size spacer. The dipole arms shall be parallel to the flat phantom surface.

First the power meter PM1 is connected to the cable and it measures the forward power at the location of the dipole connector (X). The signal generator is adjusted for the desired forward power at the dipole connector (taking into account the (Att1) value) and the power meter PM2 is read at that level. Then after connecting the cable to the dipole, the signal generator is readjusted for the same reading at the power meter PM2.

The system validation check procedures are the same as all measurement procedures used for compliance tests. A complete 1 g averaged SAR measurement is performed using the flat part of the phantom. The reference dipole input power is adjusted to produce a 1 g averaged SAR value falling in the range of 0.4 – 10 mW/g. The 1 g averaged SAR is measured at 835 MHz and 1900 MHz using corresponding dipole respectively. Then the results are normalized to 1 W forward input power and compared with the reference SAR values.

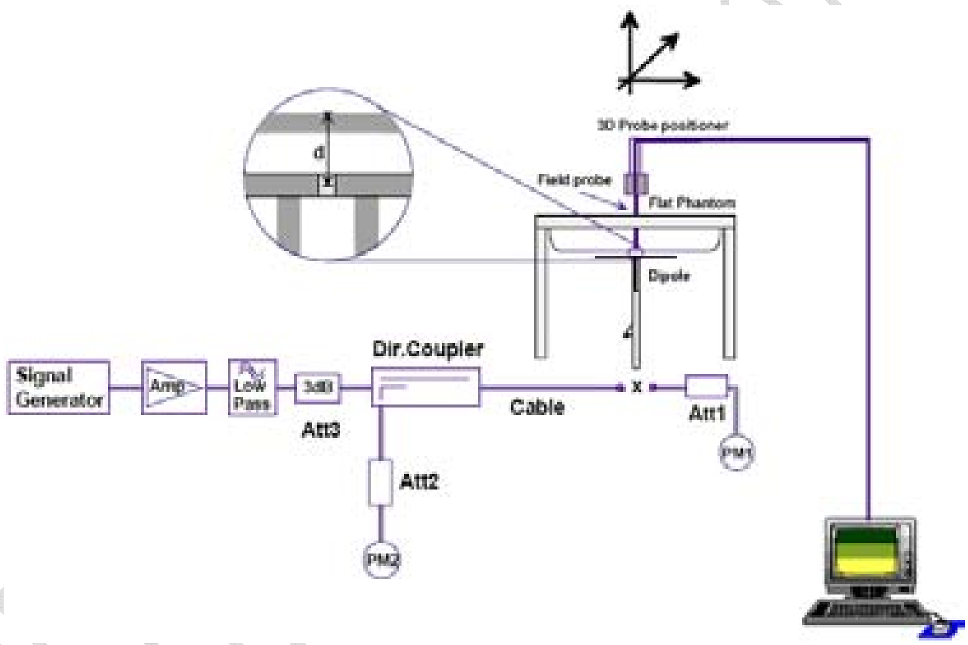


Figure 5 Illustration of system validation test setup

Validation Results

Date:	Frequency (MHz)	Tissue Type	Input Power	Targeted (SAR1g)	Measured (SAR1g)	Deviation (%)
2008-9-3	835	Head	250	2.38	2.45	2.94%
2008-9-4	1900	Head	250	9.85	9.98	1.32%
2008-9-3	835	Body	250	2.39	2.39	0.00%
2008-9-5	1900	Body	250	9.41	10.1	7.33%

4.8 Maximum Output Power Measurement

According to FCC OET 65c, maximum output power shall be measured before and after each SAR test. The test setup and method are described as following.

Test setup

The output power measurement test setup is demonstrated as figure 6.

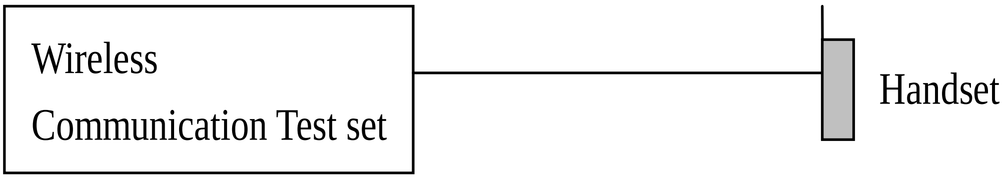


Figure 6 Demonstration of power measurement

The power control level settings and measurement value are as following table.

mode	PCL setting	Permissible max.values	Channel[low]	Channel[mid]	Channel[high]
GSM 850	5	33dBm	32.7dBm	32.8 dBm	32.8 dBm
			824.20MHz	836.60 MHz	848.80 MHz
PCS 1900	0	30dBm	30.2dBm	29.9dBm	29.6dBm
			1850.2 MHz	1880.0 MHz	1909.8 MHz

4.9 Test Data

4.9.1 Test Specifications

(a) Duty Factor and Crest Factor

For GSM mode, the duty factor is 1:8.3, and for GPRS it is 1:4.15.

(b) Test configurations pictures:

Configurations	pictures no. in Annex A
Head SAR touch position:	2,3
Head SAR tilt position:	4,5
Body SAR Back to the phantom:	6
Body SAR Front to the phantom:	7
Body SAR Front to the phantom with earphone	8
Liquid depth for 835 band	9
Liquid depth for 1900 band	10

(c) Test description for body-worn mode

The distance between the handset and the bottom of the flat section is 15 mm.

(d) Liquid recipe

INGREDIENTS	SIMULATING TISSUE			
	835MHz Brain	835MHz Muscle	1900MHz Brain	1900MHz Muscle
Water	40. 29	50. 75	55. 24	70. 17
DGBE	0	0	44. 45	29. 44
Sugar	57. 90	48. 21	0	0
Salt	1. 38	0. 94	0. 31	0. 39
Cellulose	0. 24	0. 00	0	0
Preventol	0. 18	0. 10	0	0

(e) Test procedure for body-worn mode

Step 1: GSM850 band, test the middle channel of each of the front side and back side mode with the 15 mm distance between the handset and the bottom of the phantom, including slip open and close. Find out the worst case.

Step 2: For the worst case of step 1, test the low and high channel.

Step 3: Find out the worst case of step 1 and 2, and for this case, test the mode with Bluetooth on, and then with earphone using voice traffic mode.

Step 4: Repeat all the above steps for PCS 1900 band.

4.9.2 Test Data for Head mode

GSM850

Test configuration	Test position	SAR$_{1g}$ [W/kg] / Power Drift [dB]					
		Channel 128 [low] 824.20 MHz		Channel 190 [Mid] 836.60 MHz		Channel 251 [high] 848.80 MHz	
Left side of Head	Cheek			0.653	-0.00886		
	Tilted			0.47	-0.0975		
Right side of Head	Cheek	0.636	-0.0635	0.778	-0.0789	0.9	-0.0286
	Tilted			0.463	0.0245		

PCS1900

Test configuration	Test position	SAR$_{1g}$ [W/kg] / Power Drift [dB]					
		Channel 512 [low] 1850.2 MHz		Channel 661 [Mid] 1880.0 MHz		Channel 810 [high] 1909.8 MHz	
Left side of Head	Cheek			0.295	-0.068		
	Tilted	0.611	0.0239	0.462	-0.006	0.403	0.0209
Right side of Head	Cheek			0.261	0.152		
	Tilted			0.432	0.0221		

4.9.3 Test Data for Body-Worn mode

GSM850 GPRS

Test configuration	Test position	SAR$_{1g}$ [W/kg] / Power Drift [dB]		
		Channel 128 [low] 824.20 MHz	Channel 190 [Mid] 836.60 MHz	Channel 251 [high] 848.80 MHz
Front side	15 mm		0.718 0.0183	
Back side	15 mm	1.31 -0.0135	1.38 -0.0857	1.37 -0.0751
Back side with earphone	15 mm		1.35 -0.0103	

PCS1900 GPRS

Test configuration	Test position	SAR$_{1g}$ [W/kg] / Power Drift [dB]		
		Channel 512 [low] 1850.2 MHz	Channel 661 [Mid] 1880.0 MHz	Channel 810 [high] 1909.8 MHz
Front side	15mm		0.174 0.0469	
Back side	15 mm	0.464 -0.0112	0.376 -0.0135	0.333 0.0144
Back side with earphone	15 mm		0.282 -0.0026	

4.10 Measurement uncertainty

ERROR SOURCE	Uncertainty value (%)	Probability distribution	Divisor	c_i (1g)	Standard Uncertainty (%)
Measurement equipment					
Probe calibration	5.9	Normal	1	1	5.9
Probe axial isotropy	4.7	Rectangular	$\sqrt{3}$	0.7	1.9
Probe hemispherical isotropy	9.6	Rectangular	$\sqrt{3}$	0.7	3.9
Probe linearity	4.7	Rectangular	$\sqrt{3}$	1	2.7
Detection limits	0.25	Rectangular	$\sqrt{3}$	1	0.6
Boundary effect	0.8	Rectangular	$\sqrt{3}$	1	0.6
Measurement device	0.3	Normal	1	1	0.3
Response time	0.0	Normal	1	1	0
Noise	0.0	Normal	1	1	0
Integration time	1.7	Normal	1	1	2.6
Mechanical constraints					
Scanning system	1.5	Rectangular	$\sqrt{3}$	1	0.2
Positioning of the probe	2.9	Normal	1	1	2.9
Phantom shell	4.0	Rectangular	$\sqrt{3}$	1	2.3
Positioning of the dipole	2.0	Normal	1	1	2.0
Positioning of the phone	2.9	Normal	1	1	2.9
Device holder disturbance	3.6	Normal	1	1	3.6
Physical parameters					
Liquid conductivity (deviation from target)	5.0	Rectangular	$\sqrt{3}$	0.5	1.4
Liquid conductivity (measurement error)	4.3	Rectangular	$\sqrt{3}$	0.5	1.2
Liquid permittivity (deviation from target)	5.0	Rectangular	$\sqrt{3}$	0.5	1.4
Liquid permittivity (measurement error)	4.3	Rectangular	$\sqrt{3}$	0.5	1.2
Drifts in output power of the phone, probe, temperature and humidity	5.0	Rectangular	$\sqrt{3}$	1	2.9
Environment disturbance	3.0	Rectangular	$\sqrt{3}$	1	1.7
Post-processing					
SAR interpolation and extrapolation	0.6	Rectangular	$\sqrt{3}$	1	0.6
Maximum SAR evaluation	1.0	Rectangular	$\sqrt{3}$		0.6
Combined standard uncertainty	$u_c = \sqrt{\sum_{i=1}^{m} c_i^2 \cdot u_i^2}$ =11.08%				
Expanded uncertainty （confidence interval of 95％）	Normal $u_e = 1.96 u_c$ =21.7%				

ANNEX A Photographs

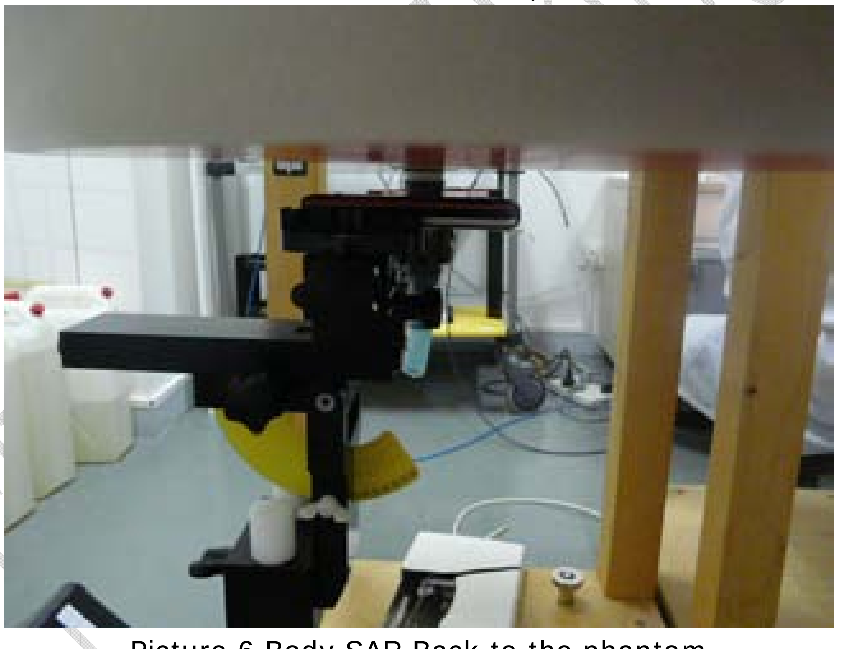
Picture 1 test setup

Picture 2 Head SAR touch position

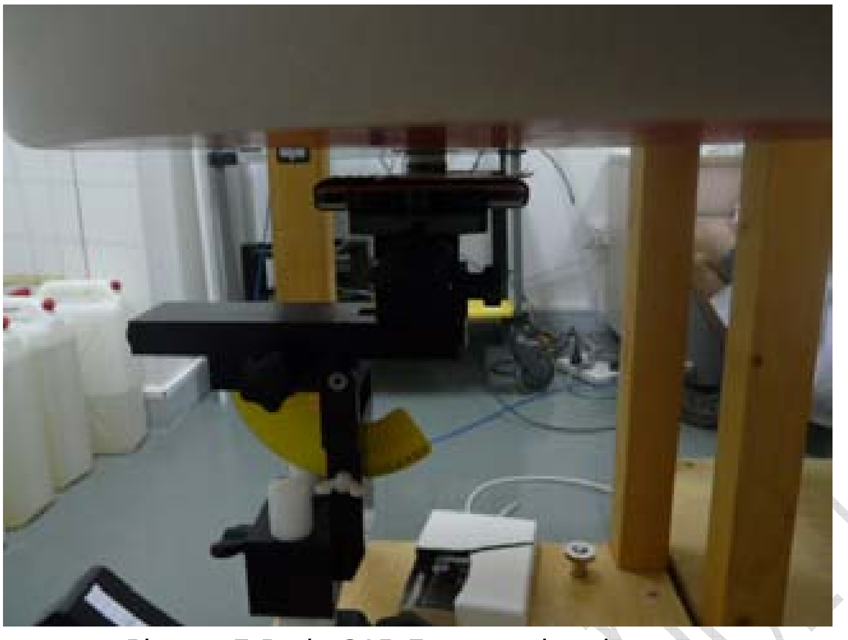
Picture 3 Head SAR touch position

Picture 4Head SAR tilt position

Picture 5 Head SAR tilt position



Picture 6 Body SAR Back to the phantom



Picture 7 Body SAR Front to the phantom

Body SAR Front to the phantom with earphone 8

Picture 9 Liquid Depth at Ear Reference Point for 835MHz Head Liquid

Picture 10 Liquid Depth at Ear Reference Point for 1900MHz Head Liquid

ANNEX B Graphical Results

B.1 Maximum head SAR of GSM 850

File Name: zte0817-50570bc01-GSM850-RC-20080903.da4

DUT: Vodafone 1231+;

Communication System: GSM850; Frequency: 848.8 MHz; Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 848.8 MHz; σ = 0.937 mho/m; ε_r = 41.8; ρ = 1000 kg/m^3 ;
Medium Notes: Ambient humidity:62; Ambient temperature: 21.0; Liquid temperature: 20.7;
Phantom section: Right Section ;Phantom: SAM with Front;Type: QD 000 P40 CA

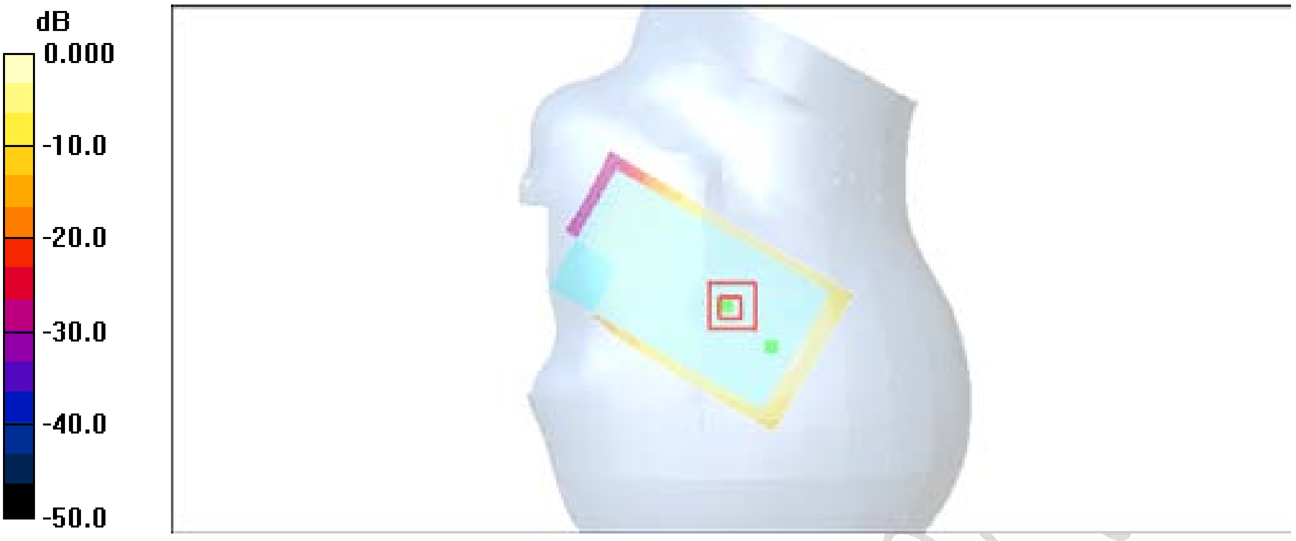
DASY4 Configuration:
- Probe: ES3DV3 - SN3158; ConvF(6.15, 6.15, 6.15); Calibrated: 2008-04-07
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn549; Calibrated: 2007-12-18
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 171

high/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.1 V/m; Power Drift = -0.029 dB
Peak SAR (extrapolated) = 1.10 W/kg
SAR(1 g) = 0.900 mW/g; SAR(10 g) = 0.675 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.952 mW/g

high/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.940 mW/g



0 dB = 0.940mW/g

B.2 Maximum head SAR of GSM 1900

File Name: zte0817-50570bc01-GSM1900-LT-20080904.da4

DUT: Vodafone 1231+;

Communication System: PCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.42 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3 ;
Medium Notes: Ambient humidity:48; Ambient temperature: 24.0; Liquid temperature: 21.6;
Phantom section: Left Section ;Phantom: SAM with Right;Type: QD 000 P40 CA

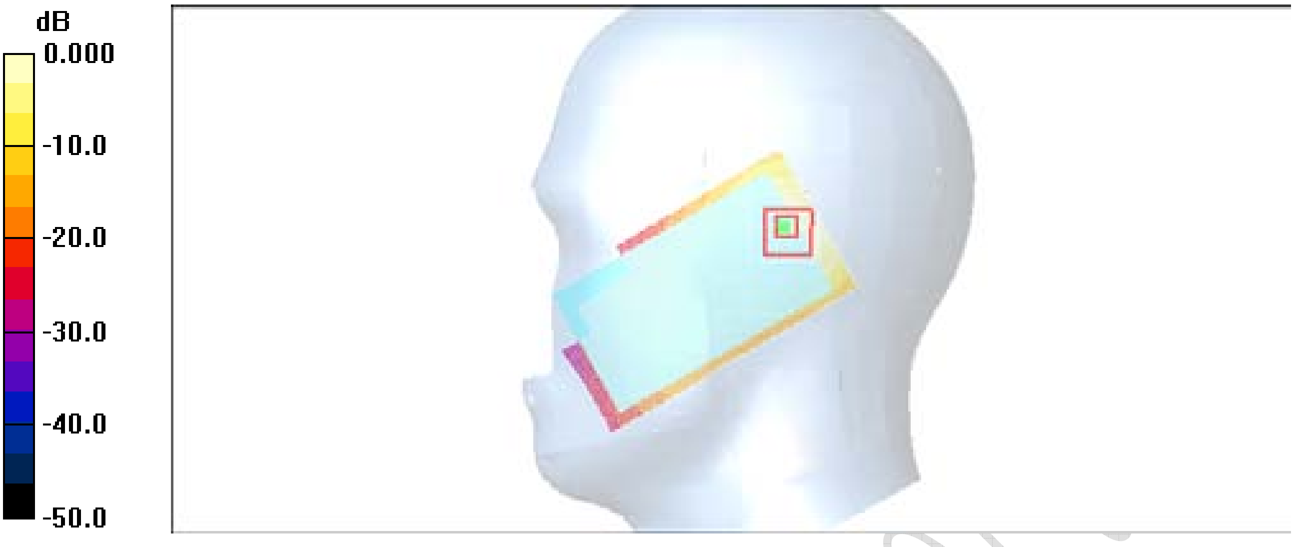
DASY4 Configuration:
- Probe: ES3DV3 - SN3158; ConvF(5.05, 5.05, 5.05); Calibrated: 2008-04-07
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn549; Calibrated: 2007-12-18
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 171

low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.2 V/m; Power Drift = 0.024 dB
Peak SAR (extrapolated) = 1.07 W/kg
SAR(1 g) = 0.611 mW/g; SAR(10 g) = 0.347 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.667 mW/g

low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.708 mW/g



0 dB = 0.708mW/g

B.3 Maximum body SAR of GPRS 850

File Name: zte0817-50570bc01-GPRS850-BB-20080903.da4

DUT: Vodafone 1231+;

Communication System: GPRS850 class 10; Frequency: 836.6 MHz; Duty Cycle: 1:4.15
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.974 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3 ;
Medium Notes: Ambient humidity:62; Ambient temperature: 21.0; Liquid temperature: 20.7;
Phantom section: Flat Section ;Phantom: Flat Phantom ELI4.0;Type: QDOVA001B

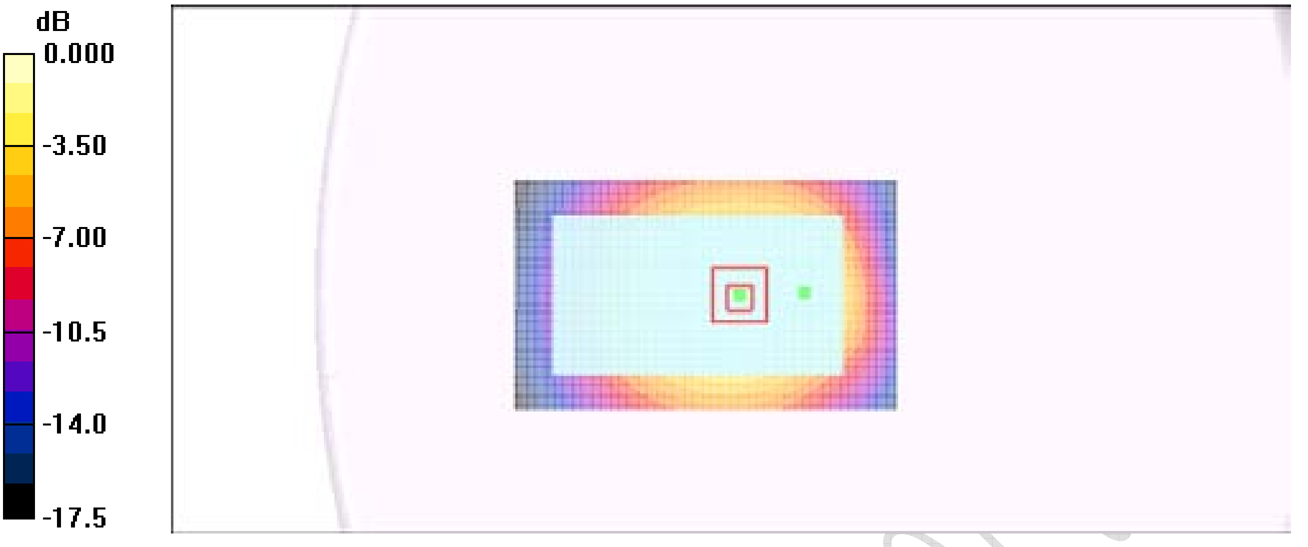
DASY4 Configuration:
- Probe: ES3DV3 - SN3158; ConvF(5.70, 5.70, 5.70); Calibrated: 2008-04-07
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn549; Calibrated: 2007-12-18
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 171

mid/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 34.4 V/m; Power Drift = -0.086 dB
Peak SAR (extrapolated) = 1.76 W/kg
SAR(1 g) = 1.38 mW/g; SAR(10 g) = 1.02 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.45 mW/g

mid/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 1.45 mW/g



0 dB = 1.45mW/g

B.4 Maximum body SAR of GPRS 1900

File Name: zte0817-50570bc01-GPRS1900-BB-20080905.da4

DUT: Vodafone 1231+;

Communication System: GPRS 1900 class 10; Frequency: 1850.2 MHz; Duty Cycle: 1:4.15
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.44 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3 ;
Medium Notes: Ambient humidity:54; Ambient temperature: 24.0; Liquid temperature: 23.4;
Phantom section: Flat Section ;Phantom: Flat Phantom ELI4.0;Type: QDOVA001B

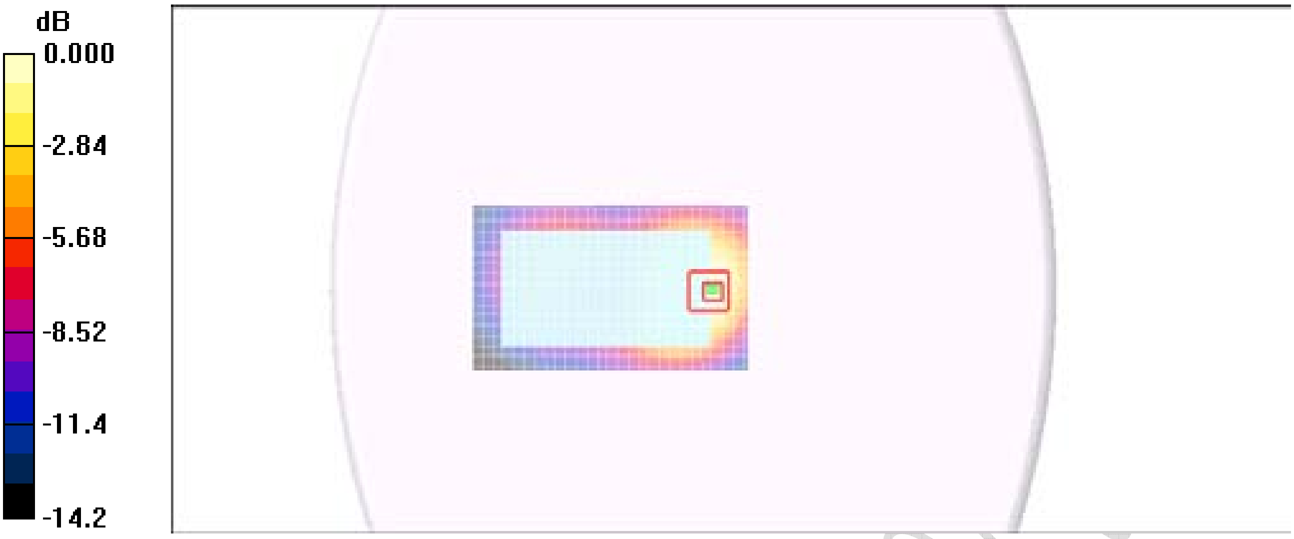
DASY4 Configuration:
- Probe: ES3DV3 - SN3158; ConvF(4.70, 4.70, 4.70); Calibrated: 2008-04-07
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn549; Calibrated: 2007-12-18
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 171

low/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.516 mW/g

low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.2 V/m; Power Drift = -0.011 dB
Peak SAR (extrapolated) = 0.693 W/kg
SAR(1 g) = 0.464 mW/g; SAR(10 g) = 0.289 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.509 mW/g



0 dB = 0.509mW/g

Annex C System Performance Check Graphical Results

C.1 Band 850 Head

File Name: SystemPerformanceCheck-D835Mhz-080903.da4

DUT: Dipole 835 MHz;

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 835 MHz; σ = 0.923 mho/m; ε_r = 42; ρ = 1000 kg/m^3 ;
Medium Notes: Ambient humidity:62; Ambient temperature: 21.0; Liquid temperature: 20.7;
Phantom section: Flat Section ;Phantom: SAM with Front;Type: QD 000 P40 CA

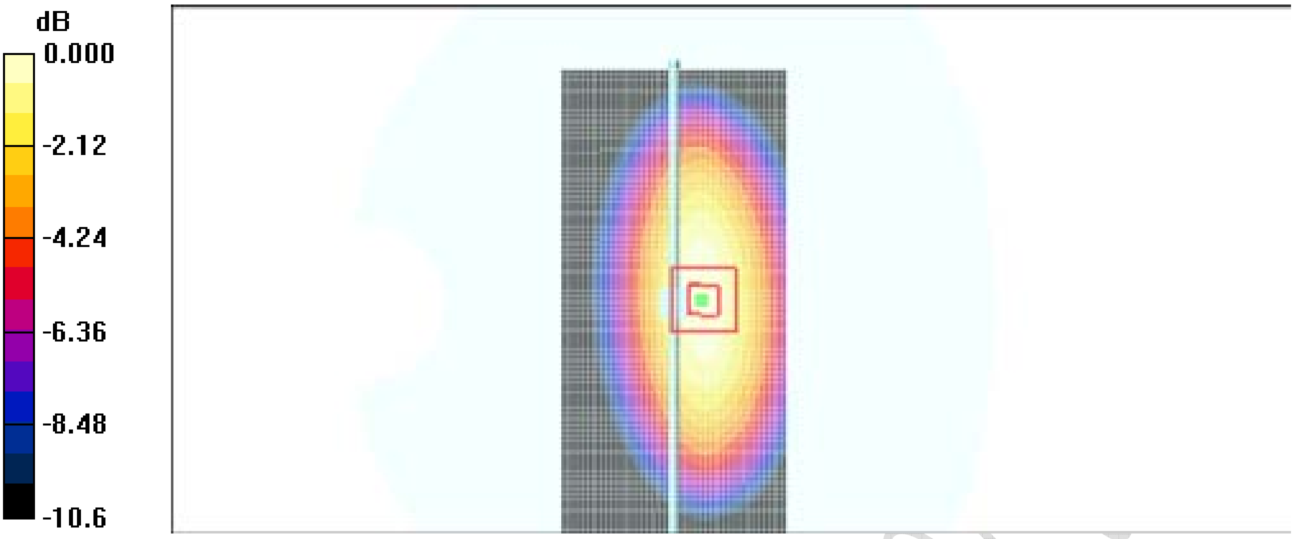
DASY4 Configuration:
- Probe: ES3DV3 - SN3158; ConvF(6.15, 6.15, 6.15); Calibrated: 2008-04-07
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn549; Calibrated: 2007-12-18
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 171

835/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 2.64 mW/g

835/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 48.1 V/m; Power Drift = -0.004 dB
Peak SAR (extrapolated) = 3.68 W/kg
SAR(1 g) = 2.45 mW/g; SAR(10 g) = 1.6 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 2.65 mW/g



0 dB = 2.65mW/g

C.2 Band 1900 Head

File Name: SystemPerformanceCheck-D1900MHz-20080904.da4

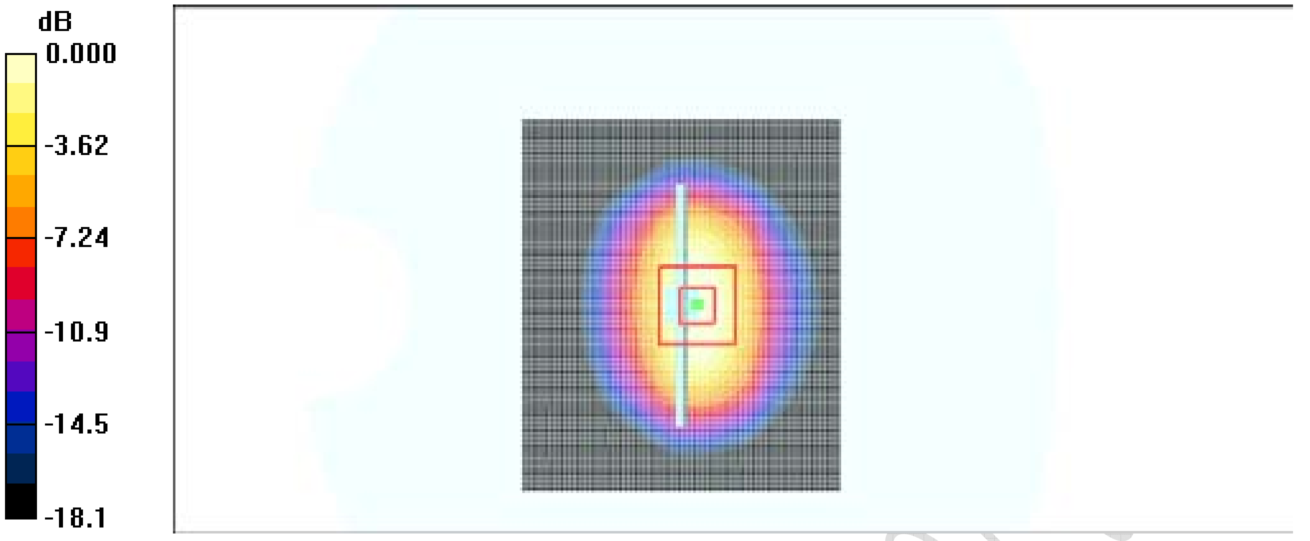
DUT: Dipole 1900 MHz;

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.46 mho/m; ε_r = 38.4; ρ = 1000 kg/m^3 ;
Medium Notes: Ambient humidity:48; Ambient temperature: 24.0; Liquid temperature: 21.6;
Phantom section: Flat Section ;Phantom: SAM with Right;Type: QD 000 P40 CA

DASY4 Configuration:
- Probe: ES3DV3 - SN3158; ConvF(5.05, 5.05, 5.05); Calibrated: 2008-04-07
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn549; Calibrated: 2007-12-18
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 171

head1900/Area Scan (61x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.5 mW/g

head1900/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 84.6 V/m; Power Drift = -0.051 dB
Peak SAR (extrapolated) = 19.0 W/kg
SAR(1 g) = 9.98 mW/g; SAR(10 g) = 5.1 mW/g
Maximum value of SAR (measured) = 11.3 mW/g



0 dB = 11.3mW/g

C.3 Band 850 Body

File Name: SystemPerformanceCheck-body-D835MHz-20080903.da4

DUT: Dipole 835 MHz;

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 835 MHz; σ = 0.972 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3 ;
Medium Notes: Ambient humidity:62; Ambient temperature: 21.0; Liquid temperature: 20.7;
Phantom section: Flat Section ;Phantom: Flat Phantom ELI4.0;Type: QDOVA001B

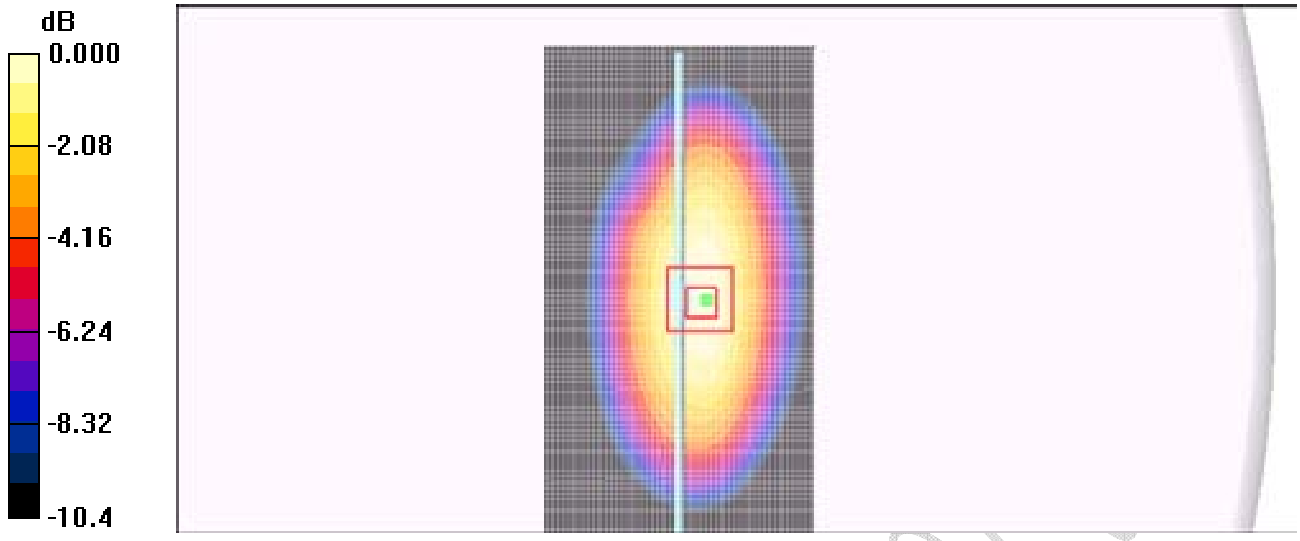
DASY4 Configuration:
- Probe: ES3DV3 - SN3158; ConvF(5.70, 5.70, 5.70); Calibrated: 2008-04-07
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn549; Calibrated: 2007-12-18
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 171

MSL/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 2.50 mW/g

MSL/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.1 V/m; Power Drift = 0.003 dB
Peak SAR (extrapolated) = 3.46 W/kg
SAR(1 g) = 2.39 mW/g; SAR(10 g) = 1.57 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 2.56 mW/g



0 dB = 2.56mW/g

C.4 Band 1900 Body

File Name: SystemPerformanceCheck-Body-D1900MHz-20080905.da4

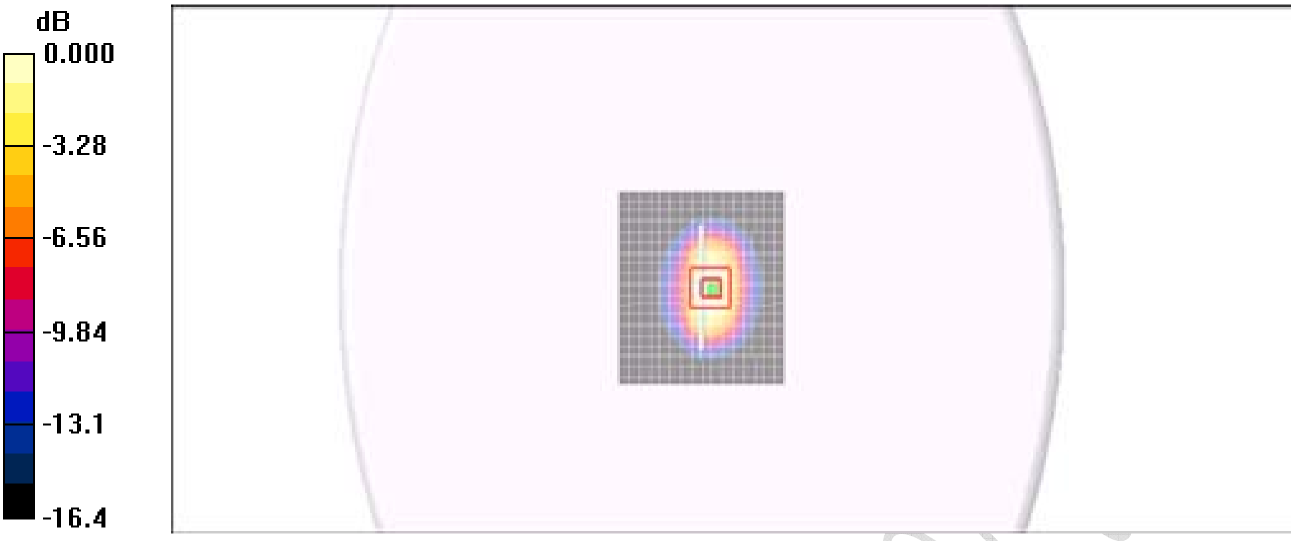
DUT: Dipole 1900 MHz;

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.5 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3 ;
Medium Notes: Ambient humidity:54; Ambient temperature: 24.0; Liquid temperature: 23.4;
Phantom section: Flat Section ;Phantom: Flat Phantom ELI4.0;Type: QDOVA001B

DASY4 Configuration:
- Probe: ES3DV3 - SN3158; ConvF(4.70, 4.70, 4.70); Calibrated: 2008-04-07
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn549; Calibrated: 2007-12-18
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 171

Body1900/Area Scan (61x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.7 mW/g

Body1900/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 81.5 V/m; Power Drift = 0.015 dB
Peak SAR (extrapolated) = 18.0 W/kg
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.35 mW/g
Maximum value of SAR (measured) = 11.4 mW/g



0 dB = 11.4mW/g

ANNEX D Probes Calibration Certificates

The System Validation was conducted following the requirements of standard IEEE 1528: 2003 Clause 8.3.

The scanned copy of the calibration certificate of the probe used is as following.

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
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 **CTTL (MTT)**

Certificate No: **ES3-3158_Apr08**

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3158
Calibration procedure(s)	QA CAL-01.v6 and QA CAL-23.v3 Calibration procedure for dosimetric E-field probes
Calibration date:	April 7, 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 (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41495277	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41498087	1-Apr-08 (No. 217-00788)	Apr-09
Reference 3 dB Attenuator	SN: S5054 (3c)	8-Aug-07 (No. 217-00719)	Aug-08
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-08 (No. 217-00787)	Apr-09
Reference 30 dB Attenuator	SN: S5129 (30b)	8-Aug-07 (No. 217-00720)	Aug-08
Reference Probe ES3DV2	SN: 3013	2-Jan-08 (No. ES3-3013_Jan08)	Jan-09
DAE4	SN: 654	20-Apr-07 (No. DAE4-654_Apr07)	Apr-08

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-07)	In house check: Oct-08

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

Issued: April 7, 2008

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

Certificate No: ES3-3158_Apr08 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 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**

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	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.

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ES3DV3 SN:3158 April 7, 2008

Probe ES3DV3

SN:3158

Manufactured: August 13, 2007
Calibrated: April 7, 2008

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

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ES3DV3 SN:3158 April 7, 2008

DASY - Parameters of Probe: ES3DV3 SN:3158

Sensitivity in Free Space[A]

NormX	**1.11** ± 10.1%	μV/(V/m)^2
NormY	**1.20** ± 10.1%	μV/(V/m)^2
NormZ	**1.16** ± 10.1%	μV/(V/m)^2

Diode Compression[B]

DCP X	**97** mV
DCP Y	**91** mV
DCP Z	**93** mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

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

Sensor Center to Phantom Surface Distance		**3.0 mm**	**4.0 mm**
SAR_{be} [%]	Without Correction Algorithm	9.2	5.2
SAR_{be} [%]	With Correction Algorithm	0.8	0.7

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

Sensor Center to Phantom Surface Distance		**3.0 mm**	**4.0 mm**
SAR_{be} [%]	Without Correction Algorithm	10.8	6.0
SAR_{be} [%]	With Correction Algorithm	0.8	0.7

Sensor Offset

Probe Tip to Sensor Center **2.0** 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.

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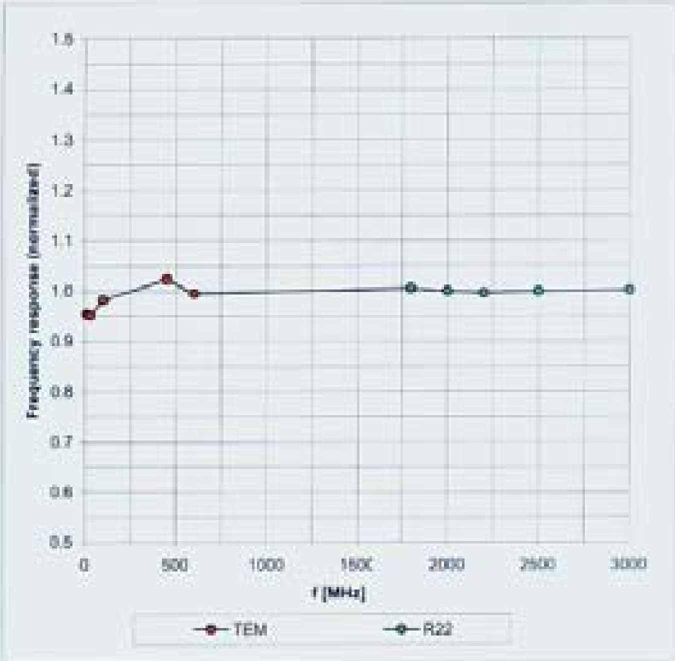
ES3DV3 SN:3158 April 7, 2008

Frequency Response of E-Field

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



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

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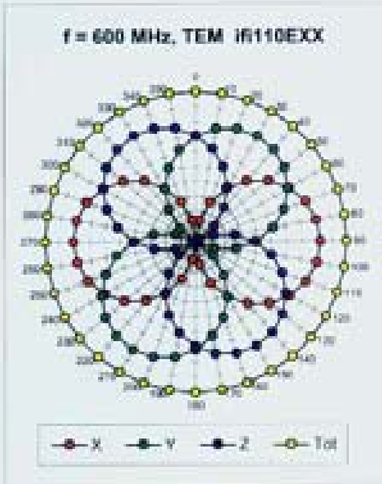
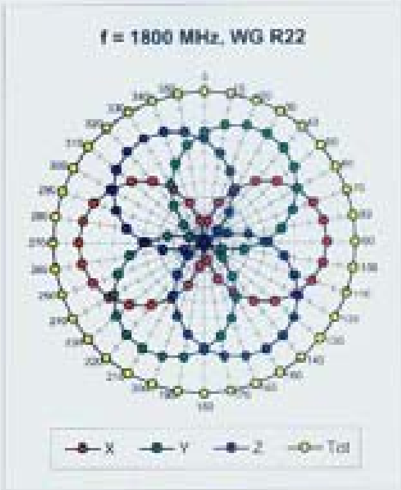
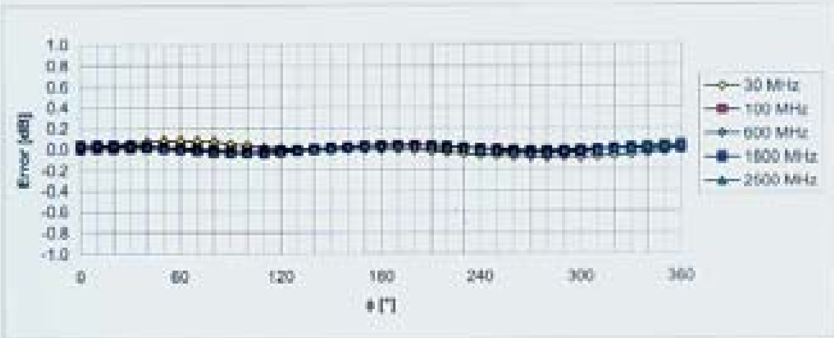
ES3DV3 SN:3158 April 7, 2008

Receiving Pattern (ϕ), ϑ = 0°







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

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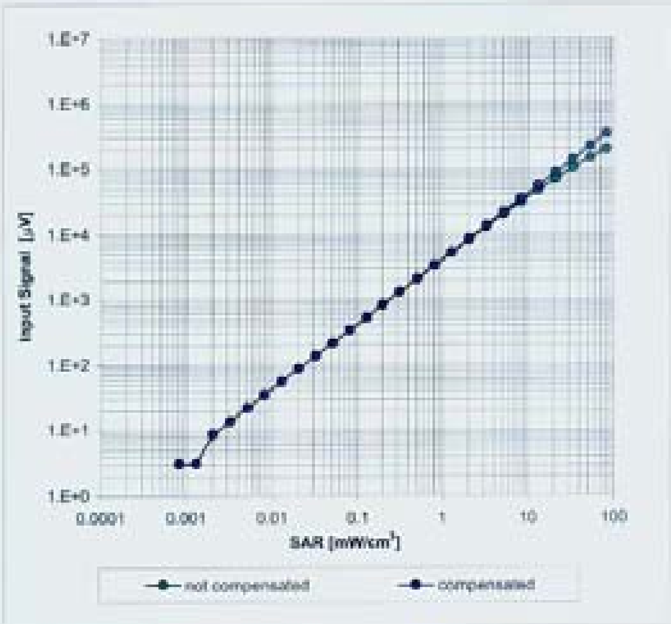
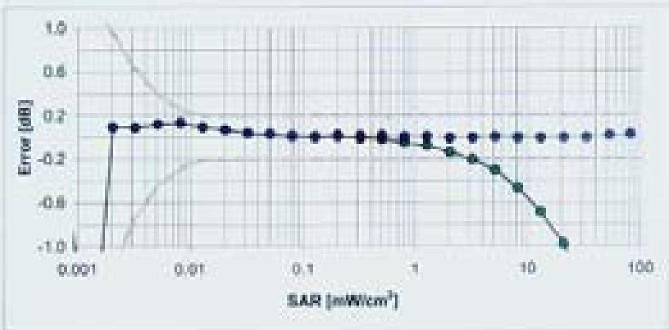
ES3DV3 SN:3158 April 7, 2008

Dynamic Range f(SAR_{head})

(Waveguide R22, f = 1800 MHz)





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

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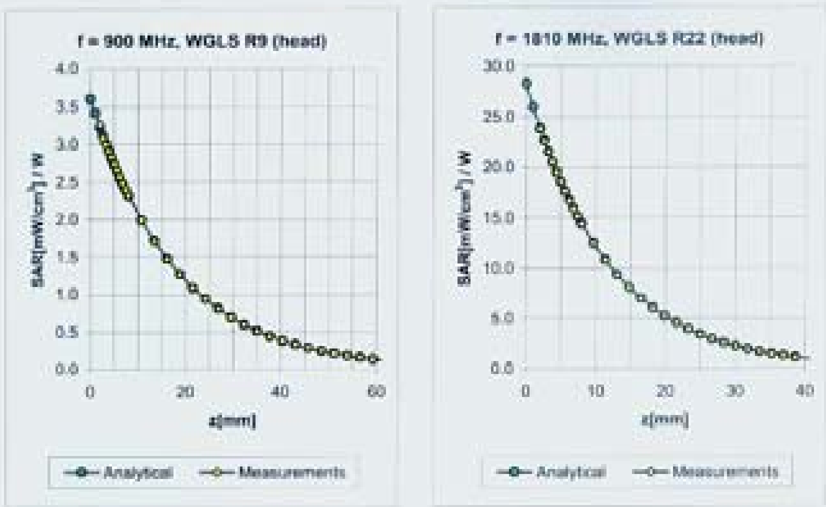
ES3DV3 SN:3158 April 7, 2008

Conversion Factor Assessment



f [MHz]	Validity [MHz][c]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	1.00	1.15	6.15	± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	1.00	1.11	6.16	± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.96	1.12	5.08	± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.82	1.20	5.05	± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.92	1.12	4.83	± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.74	1.29	4.56	± 11.0% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	1.00	1.16	5.70	± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	1.00	1.16	5.69	± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.78	1.20	5.13	± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.87	1.21	4.70	± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.78	1.32	4.91	± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.64	1.50	4.20	± 11.0% (k=2)

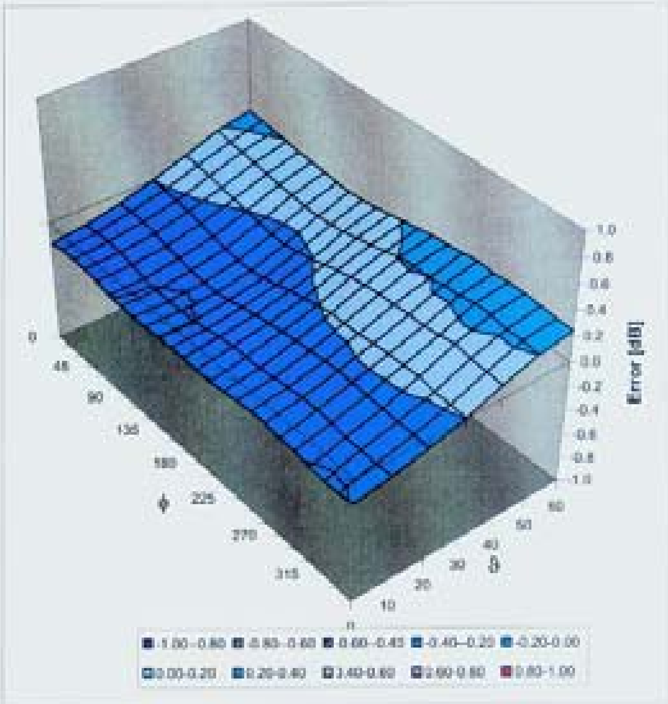
[c] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

Certificate No: ES3-3158_Apr08 Page 8 of 9

ES3DV3 SN:3158 April 7, 2008

Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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

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ANNEX E Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

The End of this Report