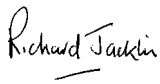
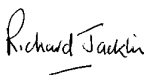
TEST REPORT
FROM
RADIO FREQUENCY
INVESTIGATION LTD.

Test of: Mansella Ltd.
CDP 24 Bluetooth Cordless Data Phone Handset

To: OET Bulletin 65 Supplement C: (2001-01)
Measurements were performed on the DASY4 System

Test Report Serial No:
RFI/SARB3/RP45014JD06A

Supersedes Test Report Serial No:
RFI/SARB1/RP45014JD06A

This Test Report Is Issued Under The Authority Of Richard Jacklin, Operations Director: 	**Checked By:**  **p.p.**
Tested By: 	**Release Version No:** **PDF01**
Issue Date: 29 September 2003	**Test Dates: 09 July 2003**

It should be noted that the standard, OET Bulletin 65 Supplement C: (2001-01) is not listed on RFIs current UKAS schedule and is therefore "not UKAS accredited".

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Test Of: Mansella Ltd.
CDP 24 Bluetooth Cordless Data Phone Handset
To: OET Bulletin 65 Supplement C: (2001-01)

Table of Contents

1. Client Information

1.1. Client Details

Company Name:	Mansella Ltd.
Address:	Stafford House 33-39 Station Road Aldershot Hamsphire GU11 1BA
Contact Name:	Mr W Dewan

1.2. Test Laboratory

Company Name:	Radio Frequency Investigation Ltd.
Address:	Ewhurst Park Ramsdell Basingstoke Hampshire RG26 5RQ.
Contact Name:	Mr J Lomako

2. Equipment Under Test (EUT)

The following information (with the exception of the Date of Receipt) has been supplied by the client:

2.1. Identification Of Equipment Under Test (EUT)

Brand Name	Olympia
Model Name or Number	CDP Handset
Unique Type Identification	BB04AAAA04
IMEI Number	None stated
Battery Serial Number	GP70AAAH3BX
FCC ID:	QSP-CDP24-1-01
Country Of Manufacture	China
Date Of Receipt	08 July 2003

2.2. Modifications Incorporated In EUT

The client has stated that the EUT has not been modified from what is described by the Model Number and Unique Type Identification stated above.

2.3. Additional Information Related to the EUT

Equipment Class:	Handheld Mobile Telephone
FCC Rule Part(s):	OET Bulletin 65 Supplement C
Device Category:	Portable
Application Type:	Certification
Transmitter Frequency Range 2450 MHz Band (MHz):	2400 – 2483.5 MHz
Transmit Frequency Allocation Of EUT When Under Test (Channels):	0 – Bottom Channel – 2402 MHz 39 Middle Channel – 2441 MHz 78 – Top Channel – 2480 MHz
Modulation(s):	Bluetooth
Modulation Scheme (Crest Factor)	Bluetooth (Crest Factor 1)
Battery Type(s):	3.6 V Ni MH
Antenna Length and Type:	Internal
Number Of Antenna Positions	1 (Fixed Antenna)
Intended Operating Environment:	Residential, Commercial
Weight:	Approx. 134g
Dimensions (without Antenna) mm:	Approx. 130 x 50 x 25 mm
Power Supply Requirement:	
DC Supply (Volts/Amps)	Not applicable
AC Supply (Volts/Amps)	Not applicable
Internal Battery (Volts/Amps)	3.6 V
Port(s):	Not applicable

2.4. Support Equipment

Brand Name:	Aglient Bluetooth Test Set
Model Name or Number:	E1852A
Unique Type Identification	None stated
Serial Number:	DK41300172
FCC ID Number:	None Stated
Cable Length And Type:	Not applicable (Air Link)
Connected to Port:	Antenna

Brand Name:	Advent Laptop
Model Name or Number:	6422
Unique Type Identification	N34058
Serial Number:	PZXN3445821201706
FCC ID Number:	None Stated
Cable Length And Type:	2m serial cable
Connected to Port:	Serial Input

3. Test Specification, Methods And Procedures

3.1. Test Specification

Reference:	OET Bulletin 65 Supplement C: (2001-01)
Title:	Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.
Purpose of Test:	To determine whether the equipment complied with the requirements of the specification.

3.2. Methods And Procedures

The methods and procedures used were as detailed in:

EN 50361: 2001
Title: Basic standard for the measurement of specific absorption rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz).

ANSI/IEEE C95.1: 1999
IEEE standard for safety levels with respect to human exposure to radio frequency electromagnetic fields, 3 kHz to 300 GHz.

Federal Communications Commission, “Evaluating compliance with FCC Guidelines for human exposure to radio frequency electromagnetic fields”, OET Bulletin 65 Supplement C, FCC, Washington, D.C, 20554, 1997.

Thomas Schmid, Oliver Egger and Neils Kuster, “Automated E-field scanning system for dosimetric assessments”, IEEE Transaction on microwave theory and techniques, Vol. 44, pp. 105-113, January 1996.

Neils Kuster, Ralph Kastle and Thomas Schmid, “Dosimetric evaluation of mobile communications equipment with know precision”, IEICE Transactions of communications, Vol. E80-B, No.5, pp. 645-652, May 1997.

3.3. Definition Of Measurement Equipment

The measurement equipment used complied with the requirements as detailed in OET Bulletin 65 Supplement C, Appendix D.

4. Deviations From The Test Specification

None

5. Operation Of The EUT During Testing

The equipment under test is a standard production model.

5.1. Operating Modes

The EUT was tested in the following operating configurations:

Bluetooth Transmit Mode at 2450 MHz frequency band (Top, Middle and Bottom Frequencies). The EUT was tested at full transmit power at single frequency continuous wave with a Bluetooth simulator supplied by the client.

6. Summary Of Test Results

6.1. Summary Of Tests

Test Name	Specification Reference	Compliancy Status
Specific Absorption Rate (SAR)	OET Bulletin 65 Supplement C	Complied

6.2. Test Results For Specific Absorption Rate - 2450MHz

6.2.1. Specific Absorption Rate - 2450 MHz Band

Environmental Conditions

Temperature Variation in Lab (°C):	24.0 to 25.0
Temperature Variation in Liquid (°C):	23.1 to 23.2

Conducted Power before Test:	Not applicable (Refer to section 6.3)
Conducted Power after Test:	Not applicable (Refer to section 6.3)

Position	Side of Head	Frequency Channel No	Distance from antenna to phantom (mm)	SAR Level (W/kg) 1g	SAR Limit (W/kg) 1g	Margin (W/kg) 1g	Result
Cheek	Left	39	15	0.062	1.6	1.538	Complied
Tilted	Left	39	10	0.071	1.6	1.529	Complied
Tilted	Left	0	10	0.068	1.6	1.533	Complied
Tilted	Left	78	10	0.076	1.6	1.524	Complied
Cheek	Right	39	15	0.048	1.6	1.552	Complied
Tilted	Right	39	10	0.063	1.6	1.537	Complied

6.3. Conducted Power Measurement

Conducted Output Power – 2450 MHz

The conducted power output of the EUT is as follow: -

Frequency Channel	Tx Power After test / dBm
0	18.37
39	18.63
78	18.51

Note: Conducted power measurements were only performed after testing.

7. SAR Measurement System

7.1. Radio Frequency Investigation SAR measurement facility utilises the Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY system is comprised of the robot controller, computer, near-field probe, probe alignment sensor, and the SAM phantom containing brain or muscle equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF). A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The Staubli robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card. The DAE3 utilises a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching mulitplexer, 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.

8. SAR Safety Limits

Exposure Limits (General populations/Uncontrolled Exposure Environment)	**SAR** (W/Kg)
Spatial Peak (averaged over any 1 g of tissue)	1.60

Notes:

1. The FCC SAR safety limits specified in the table above apply to devices operated in the General Population / Uncontrolled Exposure Environment.

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

9. Details of SAR Evaluation

9.1. The equipment under test was found to be compliant for localised specific absorption rate (SAR) based on the following provisions and conditions:

a) The handset was placed in a normal operating position with the centre of the ear-piece aligned with the ear canal on the phantom.

b) With the ear-piece touching the phantom the centre line of the handset was aligned with an imaginary plane (X and Y axis) consisting of three lines connecting both ears and the mouth.

c) For the cheek position the handset was gradually moved towards the cheek until any point of the mouth-piece or keypad touched the cheek.

d) For the tilted position the EUT was positioned as for the cheek position, then the horizontal angle was increased by fifteen degrees (the phone keypad was moved away from the cheek by fifteen degrees).

e) SAR measurements were evaluated at maximum power and the unit was operated for an appropriate period prior to the evaluation in order to minimise the drift.

f) The device was keyed to operate continuously in the transmit mode for the duration of the test.

g) The location of the maximum spatial SAR distribution (Hot Spot) was determined relative to the handset and its antenna.

h) The EUT was tested with a fully charged battery.

10. Evaluation Procedures

10.1. The Specific Absorption Rate (SAR) evaluation was performed in the following manner:

a) (i) The evaluation was performed in an applicable area of the phantom depending on the type of device being tested. For devices worn about the ear during normal operation, both the left and right ear positions were evaluated at the centre frequency of the band at maximum power. The side, which produced the greatest SAR, determined which side of the phantom would be used for the entire evaluation. The positioning of the head worn device relative to the phantom was dictated by FCC OET bulletin 65 Supplement C.

(ii) For body worn devices or devices which can be operated within 20 cm of the body, the flat section of the phantom was used. The type of device being evaluated dictated the distance of the EUT to the outer surface of the phantom flat section.

b) The SAR was determined by a pre-defined procedure within the DASY4 software. The exposed region of the phantom was scanned near the inner surface with a grid spacing of 20mm x 20mm or appropriate resolution.

c) A 7x7x7 matrix was performed around the greatest spatial SAR distribution found during the area scan of the applicable exposed region. SAR values were then calculated using a 3-D spline interpolation algorithm and averaged over spatial volumes of 1 and 10 grams.

d) If the EUT had any appreciable drift over the course of the evaluation, then the EUT was re-evaluated. Any unusual anomalies over the course of the test also warranted a re-evaluation.

11. System Validation

11.1. Prior to the assessment, the system was verified in the flat region of the phantom. A 2450 MHz dipole was used. A forward power of 250 mW was applied to the dipole and system was verified to a tolerance of ±5 for the 2450 MHz dipole. The applicable verification (normalised to 1 Watt) is as follows:

Dipole Validation Kit	Target SAR 1g (w/kg)	Measured SAR 1g (w/kg)
D2450V2/725	54.7	53.2

12. Simulated Tissues

12.1. The brain and muscle mixtures consist of water and glycol. Visual inspection is made to ensure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the tissue.

Ingredient	Frequency
	2450 MHz Brain
Water	11.25 Litres
DGMBE	13.75 Litres

13. Tissue Parameters

13.1. The dielectric parameters of the fluids were verified prior to the SAR evaluation using an 58070C Dielectric Probe Kit and an 8753E Network Analyser. The dielectric parameters of the fluid are as follows:

Frequency (MHz)	Equivalent Tissue	Dielectric Constant εr	Conductivity ó (mho/m)
2400 – 2483.5	Brain	37.73	1.86

14. DASY4 Systems Specifications

Robot System

Positioner:	Stäubli Unimation Corp. Robot Model: RX90L
Repeatability:	0.025 mm
No. of axis:	6
Serial Number:	F00/SD89A1/A/01
Reach:	1185 mm
Payload:	3.5 kg
Control Unit:	CS7
Programming Language:	V+

Data Acquisition Electronic (DAE) System

Cell Controller

PC:	Dell Precision 340
Operating System:	Windows NT
Data Card:	DASY4 Measurement Server
Serial Number:	1080

Data Converter

Features:	Signal Amplifier, multiplexer, A/D converter and control logic.
Software:	DASY4 Software
Connecting Lines:	Optical downlink for data and status info. Optical uplink for commands and clock.

PC Interface Card

Function:	24 bit (64 MHz) DSP for real time processing Link to DAE3 16 nit A/D converter for surface detection system serial link to robot direct emergency stop output for robot.

E-Field Probe

Model:	ET3DV6
Serial No:	1529
Construction:	Triangular core fibre optic detection system
Frequency:	10 MHz to 3 GHz
Linearity:	±0.2 dB (30 MHz to 3 GHz)
Probe Length (mm):	337
Probe Diameter (mm):	12
Tip Length (mm):	10
Tip Diameter (mm):	6.8
Sensor X Offset (mm):	2.7
Sensor Y Offset (mm):	2.7
Sensor Z Offset (mm):	2.7

Phantom

Phantom:	SAM Phantom
Shell Material:	Fibreglass
Thickness:	2.0 ±0.1 mm

15. Validation results – 2450 MHz

15.1. System Validation

15.1.1. Validation of the system test configuration was carried out prior to testing.

Validation Dipole Type and Serial No.	Calibrated Value of SAR in 1g volume (W/kg) at 2450 MHz	Measured Value of SAR in 1g volume (W/kg) at 2450 MHz	Percentage Difference (≤5%)
D2450V2 / 725	54.7	53.2	Yes

15.2. Liquid Properties - Brain

15.2.1. Properties of the tissue simulating liquid were measured prior to testing.

Property	Target Value (2450 MHz)	Measured/Calculated Value (2450 MHz)	Percentage Difference (≤5%)
Relative Permittivity	39.2	37.73	Yes
Conductivity	1.8	1.86	Yes

15.3. Temperature Variation

15.3.1. The temperature of the laboratory and within the tissue simulating liquid for this test shall not exceed the range +15ºC to +25ºC.

15.3.2. The actual temperature measured at the beginning and end of each test was recorded and the maximum range is shown below:

Measurement	Maximum Temperature	Minimum Temperature
Laboratory	25.0	24.0
Tissue Simulating Liquid	23.2	23.1

16. Measurement Uncertainty

16.1. No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently, the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

16.2. The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

16.3. The uncertainty of the result may need to be taken into account when interpreting the measurement results.

16.4. The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor, such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Measurement Type	Range	Confidence Level	Calculated Uncertainty
Specific Absorption Rate	2450 MHz	95%	± 17.21%

16.5. The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty, the published guidance of the appropriate accreditation body is followed.

16.6. Measurement uncertainties in SAR measurements are difficult to quantify due to several variables including biological, physiological, and environment. However, the estimated measurement uncertainties in SAR are less than 30%.

16.7. According to ANSI/IEEE C95.3, the overall uncertainties are difficult to assess and will vary with the type of meter and usage situation. However, accuracy’s of ±1 to 3 dB can be expected in practice, with greater uncertainties in near-field situations and at higher frequencies (shorter wavelengths), or areas where large reflecting objects are present. Under optimum measurement conditions, SAR measurement uncertainties of at least ±2 dB can be expected.

16.8. According to CENELEC, typical worst-case uncertainty of field measurements is ±5 dB. For well-defined modulation characteristics the uncertainty can be reduced to ±3 dB.

Measurement Uncertainty (Continued)

Specific Absorption Rate Uncertainty at 2400 MHz, Bluetooth Modulation Scheme calculated in accordance with IEEE 1528-200X

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	c_i	Standard Uncertainty		υ_i or υ_{eff}	Note
							+ u (%)	- u (%)		
B	Probe calibration	8.900	8.900	normal (k=2)	2.0000	1.0000	4.450	4.450	∞	
B	Axail Isotropy	0.100	0.100	normal (k=2)	2.0000	1.0000	0.050	0.050	∞	
B	Hemispherical Isotropy	0.100	0.100	normal (k=2)	2.0000	1.0000	0.050	0.050	∞	
B	Spatial Resolution	0.500	0.500	Rectangular	1.7321	1.0000	0.289	0.289	∞	
B	Boundary Effect	0.769	0.769	Rectangular	1.7321	1.0000	0.444	0.444	∞	
B	Linearity	2.330	2.330	Rectangular	1.7321	1.0000	1.345	1.345	∞	
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞	
B	Readout Electronics	0.650	0.650	normal (k=2)	2.0000	1.0000	0.325	0.325	∞	
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞	
B	Integration Time	0.001	0.001	Rectangular	1.7321	1.0000	0.000	0.000	∞	
B	RF Ambinet conditions	3.000	3.000	Rectangular	1.7321	1.0000	1.732	1.732	∞	
B	Probe Positioner Mechanical Restrictions	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞	
B	Probe Positioning with regard to Phantom Shell	2.850	2.850	Rectangular	1.7321	1.0000	1.645	1.645	∞	
B	Extrapolation and integration/ Maximum SAR evaluation	5.080	5.080	Rectangular	1.7321	1.0000	2.933	2.933	∞	
A	Test Sample Positioning	0.584	0.584	normal (k=1)	1.0000	1.0000	0.584	0.584	10	
A	Device Holder uncertainty	0.154	0.154	normal (k=1)	1.0000	1.0000	0.154	0.154	10	
B	Phantom Uncertainty	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞	
B	Drit of output power	5.000	5.000	Rectangular	1.7321	1.0000	2.887	2.887	∞	
B	Liquid Conductivity (target value)	5.000	5.000	Rectangular	1.7321	1.0000	2.887	2.887	∞	
B	Liquid Conductivity (measured value)	2.440	2.440	Rectangular	1.7321	1.0000	1.409	1.409	∞	
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	1.0000	2.887	2.887	∞	
B	Liquid Permittivity (measured value)	2.440	2.440	Rectangular	1.7321	1.0000	1.409	1.409	∞	
	Combined standard uncertainty			t-distribution			8.74	8.74	>500	
	Expanded uncertainty			k = 1.96			17.12	17.12	>500	

Appendix 1. Test Equipment Used

Instrument	Manufacturer	Model Number	RFI No.
URY Power Meter	Rohde & Schwarz	URY	M094
Balun	North Hills	0322BFA1	A1215
Sony MVC FD-81	Sony	MVC - FD81	A1094
SAR Test Site	RFI	N/A	S256
Network Analyser	Agilent Technologies	8753ES	A1174
Dielectric Probe Kit	Agilent Technologies	85070C	M1015
Baro/Hygro/Thermometer	Oregon Scientific	BA888	M292
Dasy4 Handset Positioner	Schmid & Partners	SD 000 H01 DA	A1238
Data Acquisition Electronics	Schmid & Partners	394	A1184
Probe	Schmid & Partners	ET3 DV6	A1186
Robot Arm	Staubli	RX908 L	M1047
High Accuracy Digital Thermometer	Testo	110	M509
Robot Power Supply	Schmid & Partner	DASY4	G0528
Low noise Amplifier	Mini Circuits	ZHL-42	A1225
Cable	Utiflex	FA210A0001M3050A	C1054
Cable	Utiflex	FA210A0003M3030	C1053
RF Insertion Unit	Rohde & Schwarz	URY-Z2	M033
SMGU Signal Generator	Rohde & Schwarz	SMGU	G011
Diode Power Sensor	Rohde & Schwarz	NRV-Z2	M1069
PSU	Thurlby Thandar	CPX200	G088
D2450V2	Schmid & Partner Engineering AG	725	A1322

NB In accordance with UKAS requirements, all the measurement equipment is on a calibration schedule.

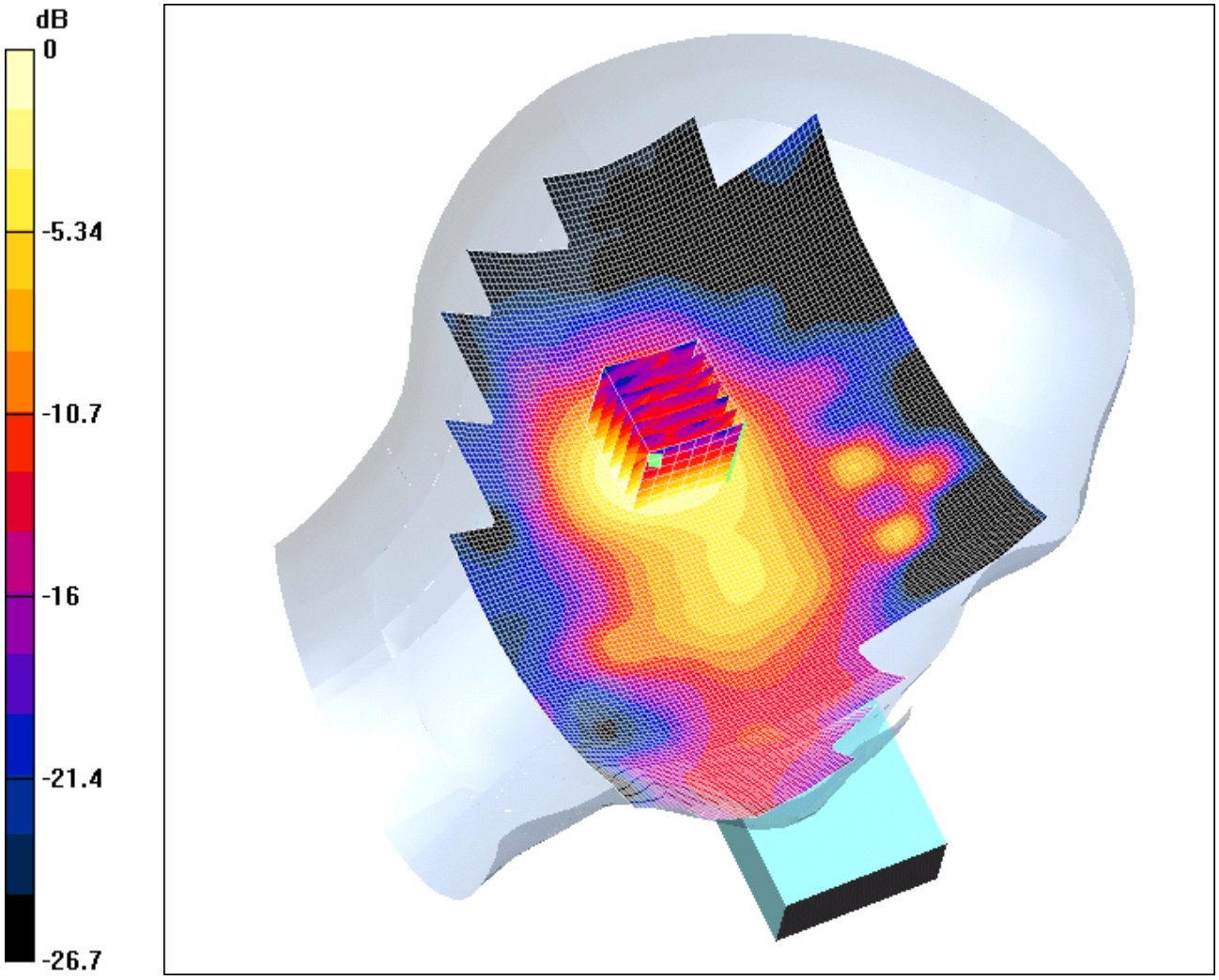
Appendix 2. SAR Distribution Scans

This appendix contains SAR Distribution Scans.

Date/Time: 07/09/03 14:21:28

Test Laboratory: RADIO FREQUENCY INVESTIGATION LTD.

DUT: CDP Handset; Type: HS#04; Serial: BB04AAAA4BB



0 dB = 0.0721mW/g

Communication System: Bluetooth; Frequency: 2402 MHz;Duty Cycle: 1:1
Medium: HSL2450 (σ = 1.82 mho/m, ε_r = 38.2, ρ = 1000 kg/m^3)
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(4.7, 4.7, 4.7); Calibrated: 09/06/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 14/11/2002
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

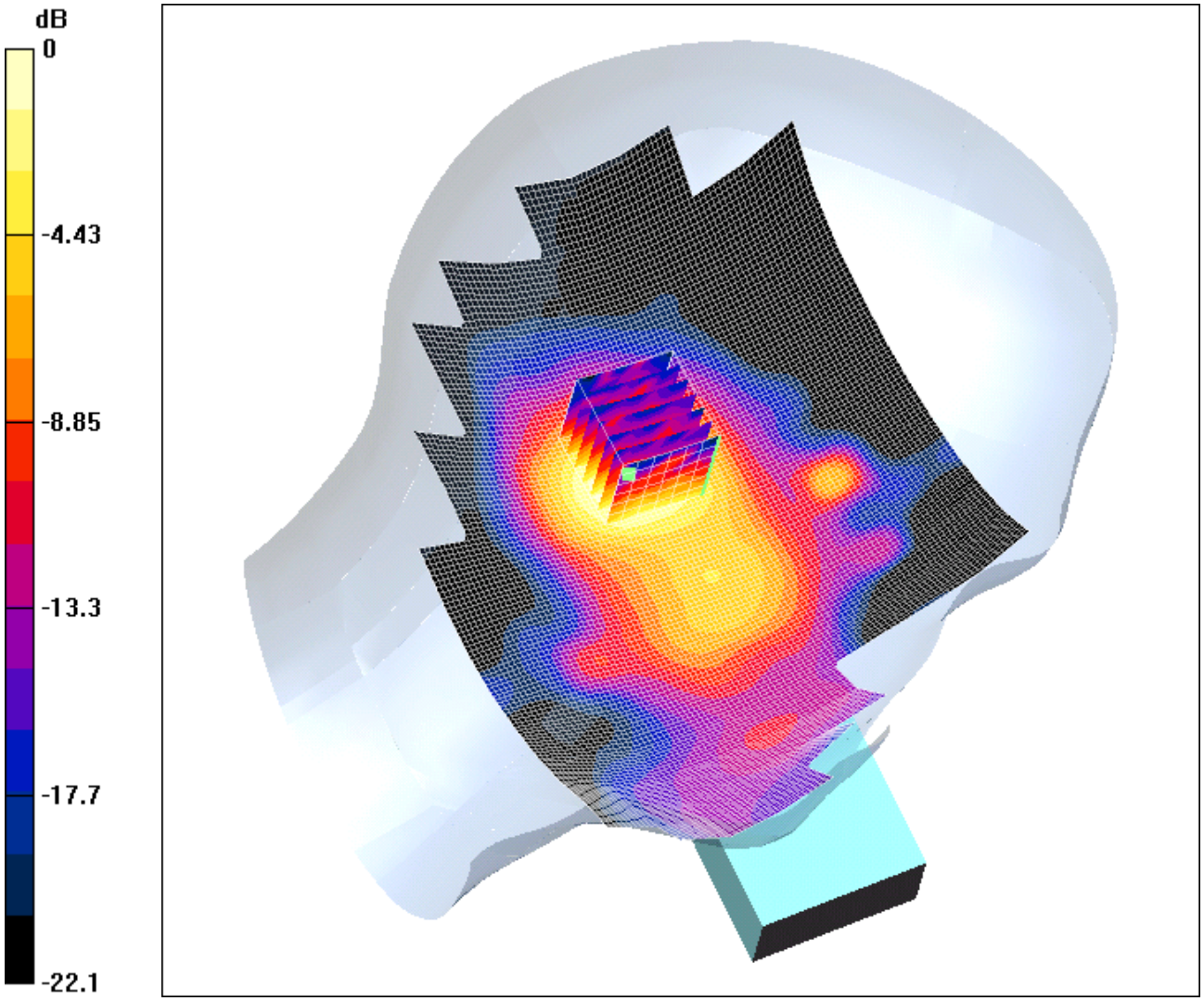
Tilt Position Left 2/Area Scan (101x161x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 5.85 V/m
Power Drift = -0.07 dB
Maximum value of SAR = 0.0741 mW/g

Tilt Position Left 2/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.126 W/kg
SAR(1 g) = 0.0675 mW/g; SAR(10 g) = 0.0343 mW/g
Reference Value = 5.85 V/m
Power Drift = -0.07 dB
Maximum value of SAR = 0.0721 mW/g

Date/Time: 07/09/03 14:21:28

Test Laboratory: RADIO FREQUENCY INVESTIGATION LTD.

DUT: CDP Handset; Type: HS#04; Serial: BB04AAAA4BB



0 dB = 0.0747mW/g

Communication System: Bluetooth; Frequency: 2441 MHz;Duty Cycle: 1:1
Medium: HSL2450 (σ = 1.89 mho/m, ε_r = 38, ρ = 1000 kg/m^3)
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(4.7, 4.7, 4.7); Calibrated: 09/06/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 14/11/2002
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

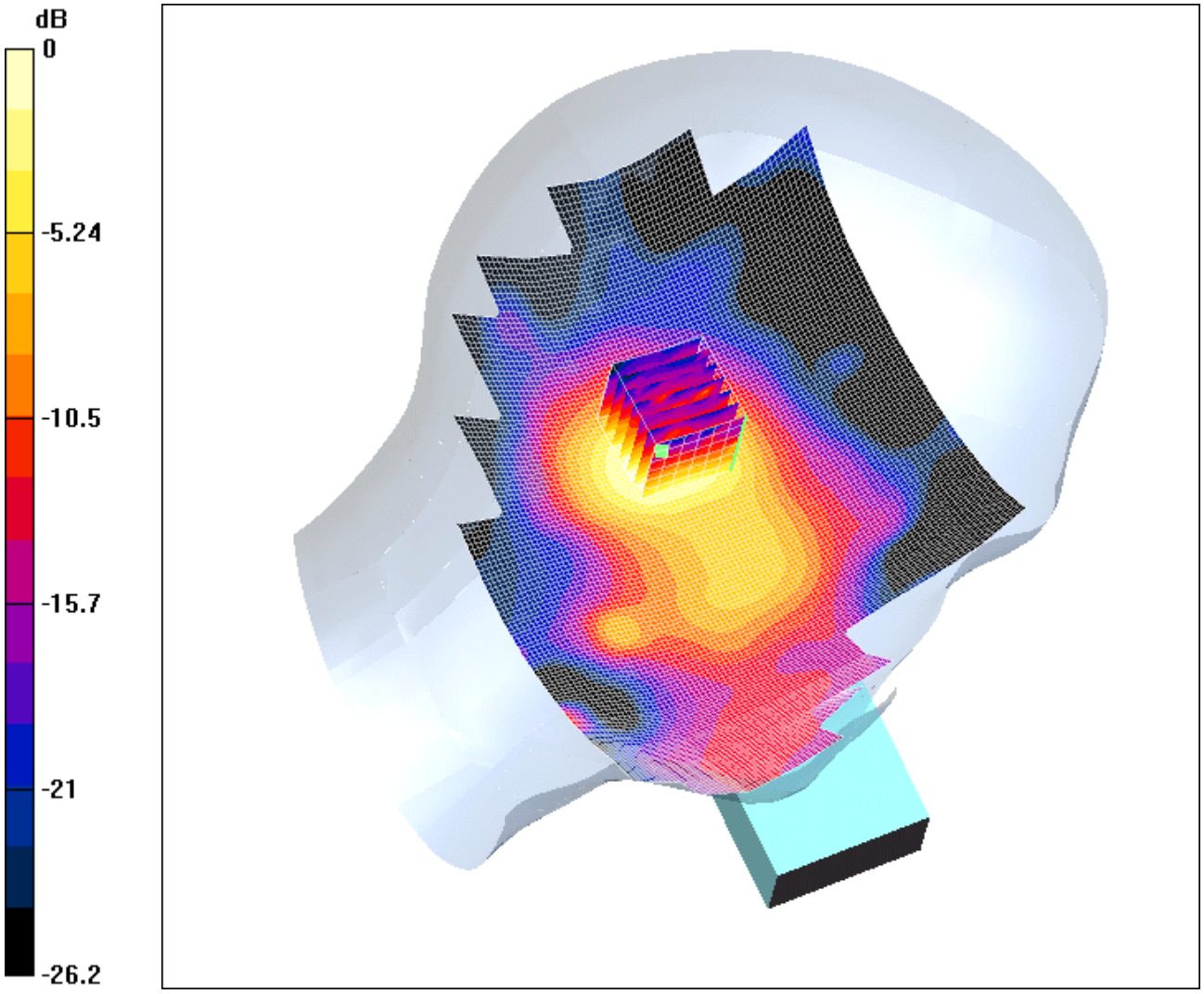
Tilt Position Left/Area Scan (101x161x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 6.08 V/m
Power Drift = -0.4 dB
Maximum value of SAR = 0.0762 mW/g

Tilt Position Left/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.142 W/kg
SAR(1 g) = 0.0712 mW/g; SAR(10 g) = 0.036 mW/g
Reference Value = 6.08 V/m
Power Drift = -0.4 dB
Maximum value of SAR = 0.0747 mW/g

Date/Time: 07/09/03 15:42:42

Test Laboratory: RADIO FREQUENCY INVESTIGATION LTD.

DUT: CDP Handset; Type: HS#04; Serial: BB04AAAA4BB



0 dB = 0.0845mW/g

Communication System: Bluetooth; Frequency: 2480 MHz;Duty Cycle: 1:1
Medium: HSL2450 (σ = 1.95 mho/m, ε_r = 37.7, ρ = 1000 kg/m^3)
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(4.7, 4.7, 4.7); Calibrated: 09/06/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 14/11/2002
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

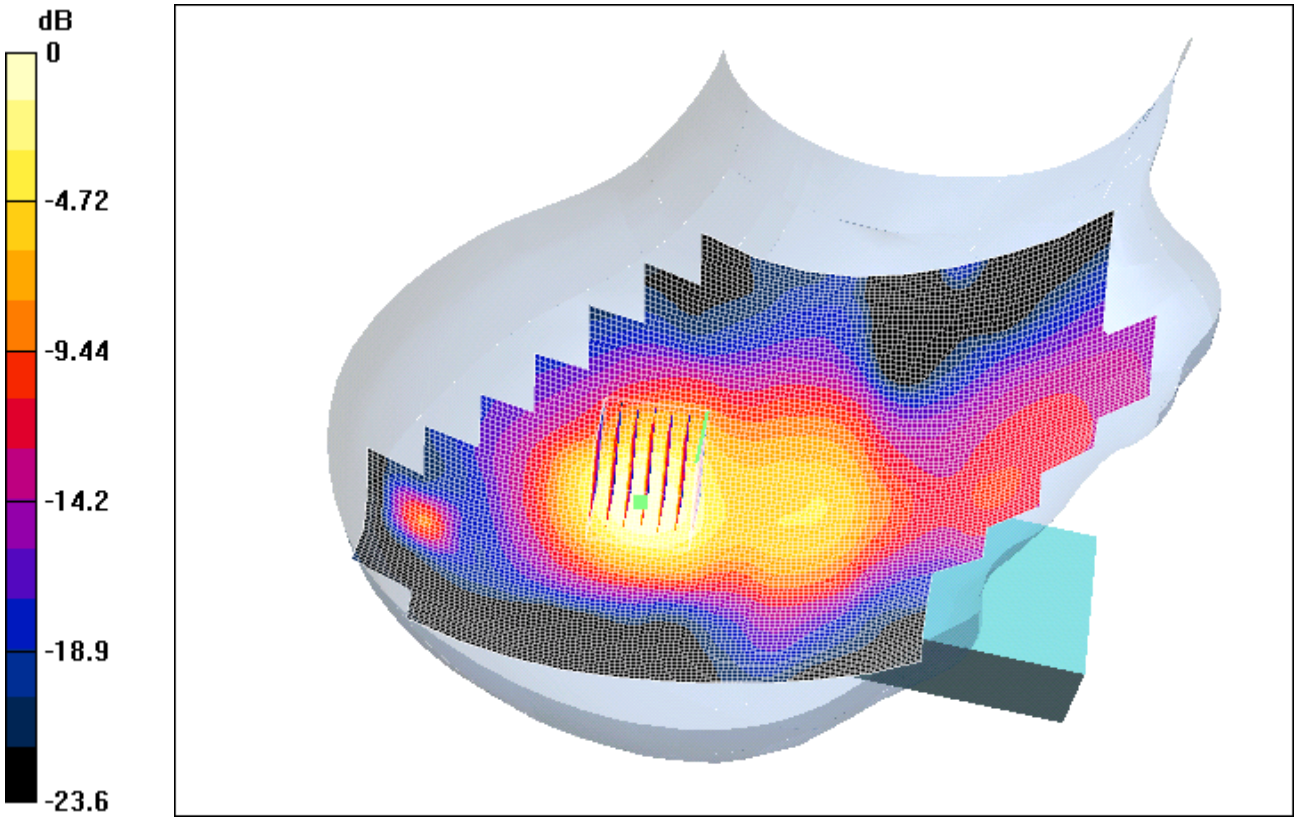
Tilt Position Left 3/Area Scan (101x161x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 6.21 V/m
Power Drift = -0.05 dB
Maximum value of SAR = 0.0792 mW/g

Tilt Position Left 3/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.147 W/kg
SAR(1 g) = 0.0762 mW/g; SAR(10 g) = 0.038 mW/g
Reference Value = 6.21 V/m
Power Drift = -0.05 dB
Maximum value of SAR = 0.0845 mW/g

Date/Time: 07/09/03 13:19:36

Test Laboratory: RADIO FREQUENCY INVESTIGATION LTD.

DUT: CDP Handset; Type: HS#04; Serial: BB04AAAA4BB



0 dB = 0.0665mW/g

Communication System: Bluetooth; Frequency: 2441 MHz;Duty Cycle: 1:1
Medium: HSL2450 (σ = 1.89 mho/m, ε_r = 38, ρ = 1000 kg/m^3)
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(4.7, 4.7, 4.7); Calibrated: 09/06/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 14/11/2002
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Tilt Position Right/Area Scan (101x161x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 5.26 V/m
Power Drift = -0.2 dB
Maximum value of SAR = 0.0687 mW/g

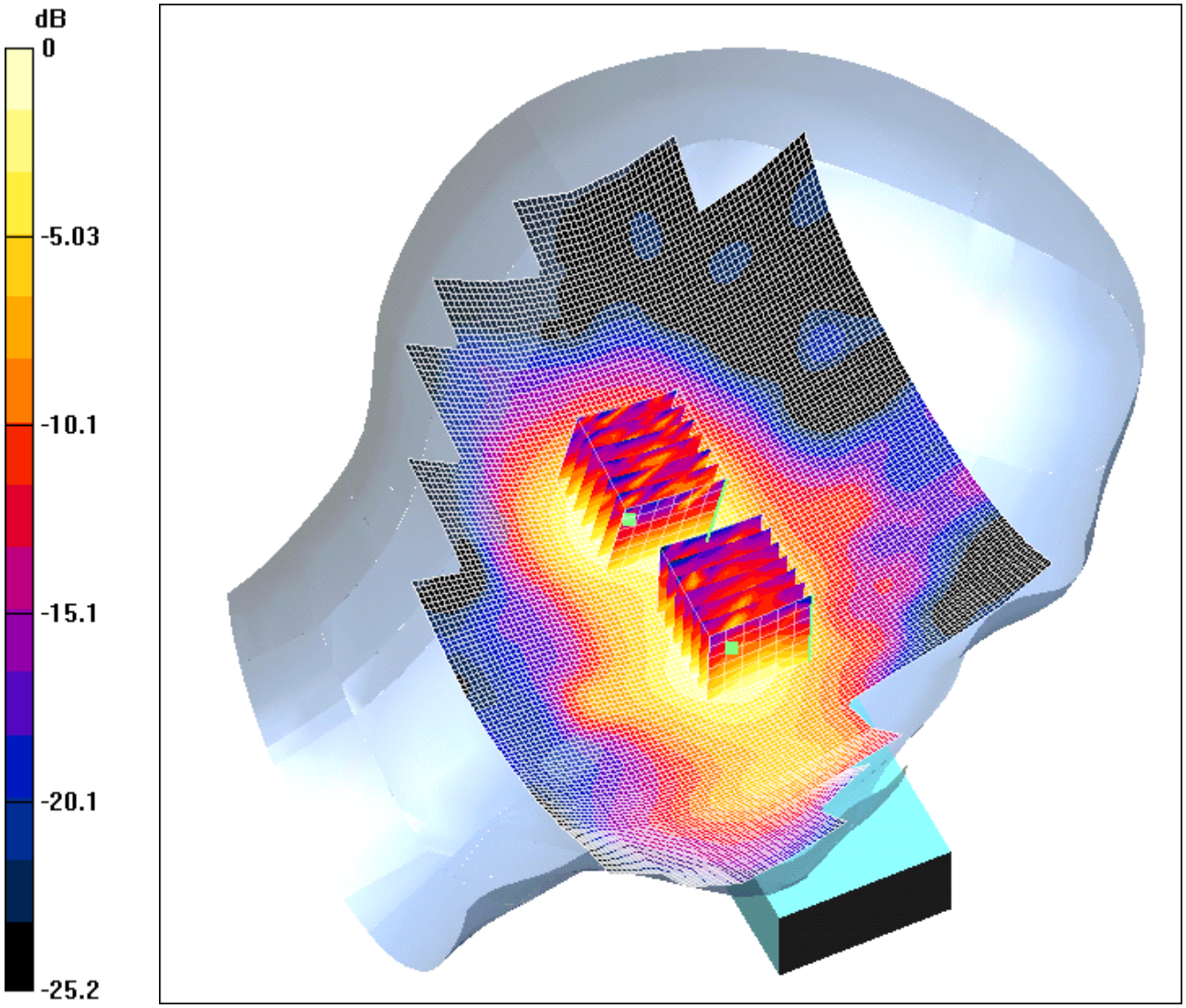
Tilt Position Right/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 0.138 W/kg
SAR(1 g) = 0.063 mW/g; SAR(10 g) = 0.0325 mW/g
Reference Value = 5.26 V/m
Power Drift = -0.2 dB
Maximum value of SAR = 0.0665 mW/g

Date/Time: 07/09/03 12:21:28

Test Laboratory: RADIO FREQUENCY INVESTIGATION LTD.

DUT: CDP Handset; Type: HS#04; Serial: BB04AAAA4BB



0 dB = 0.0607mW/g

Communication System: Bluetooth; Frequency: 2441 MHz;Duty Cycle: 1:1
Medium: HSL2450 (σ = 1.89 mho/m, ε_r = 38, ρ = 1000 kg/m^3)
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(4.7, 4.7, 4.7); Calibrated: 09/06/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 14/11/2002
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Touch Position Left/Area Scan (101x161x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 5.7 V/m
Power Drift = -0.1 dB
Maximum value of SAR = 0.0666 mW/g

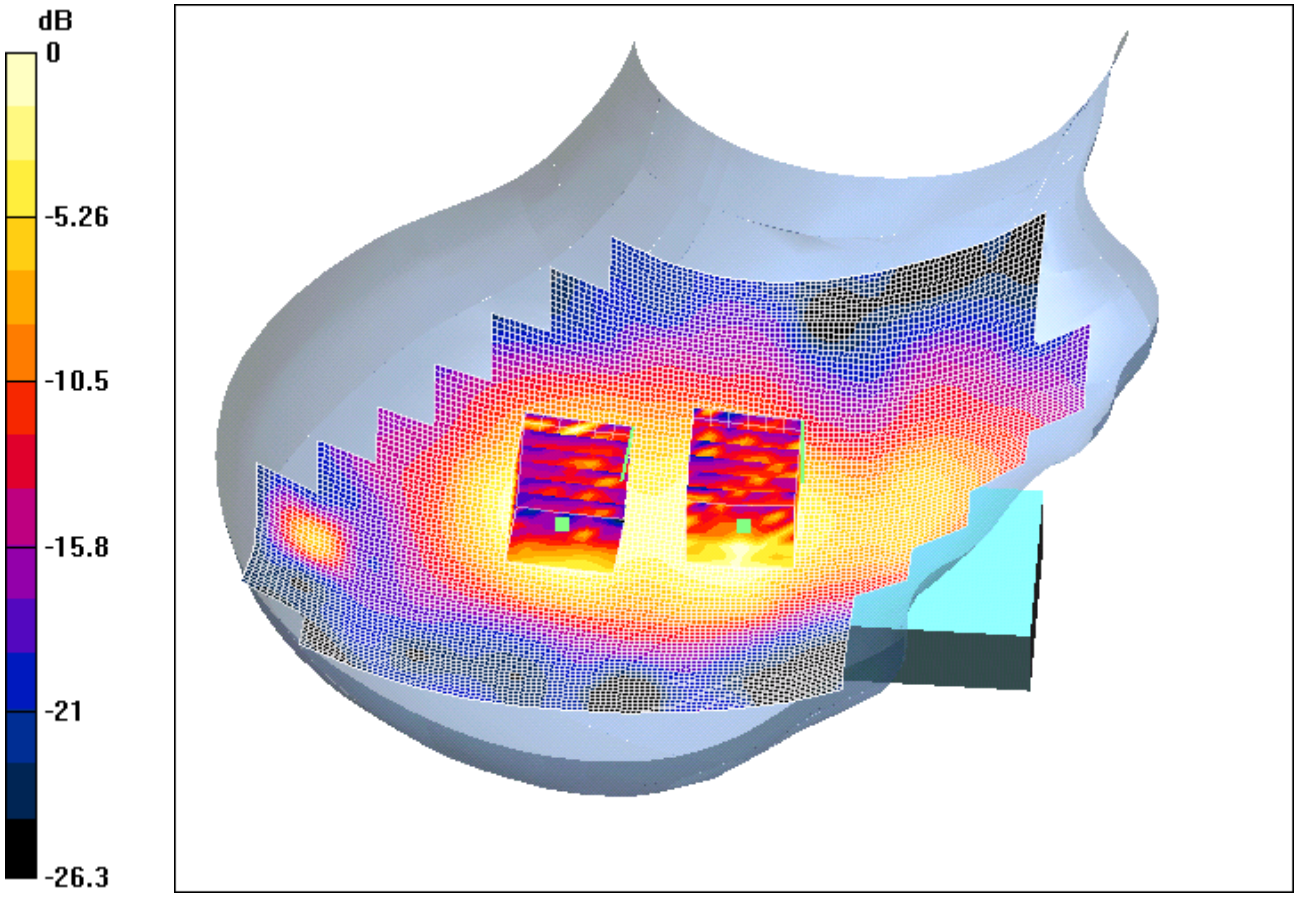
Touch Position Left/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.118 W/kg
SAR(1 g) = 0.0616 mW/g; SAR(10 g) = 0.0318 mW/g
Reference Value = 5.7 V/m
Power Drift = -0.1 dB
Maximum value of SAR = 0.0666 mW/g

Touch Position Left/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.11 W/kg
SAR(1 g) = 0.0566 mW/g; SAR(10 g) = 0.0296 mW/g
Reference Value = 5.7 V/m
Power Drift = -0.1 dB
Maximum value of SAR = 0.0607 mW/g

Date/Time: 07/09/03 13:19:36

Test Laboratory: RADIO FREQUENCY INVESTIGATION LTD.

DUT: CDP Handset; Type: HS#04; Serial: BB04AAAA4BB



0 dB = 0.051mW/g

Communication System: Bluetooth; Frequency: 2441 MHz;Duty Cycle: 1:1
Medium: HSL2450 (σ = 1.89 mho/m, ε_r = 38, ρ = 1000 kg/m^3)
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(4.7, 4.7, 4.7); Calibrated: 09/06/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 14/11/2002
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Touch Position Right/Area Scan (101x161x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 4.88 V/m
Power Drift = 0.5 dB
Maximum value of SAR = 0.0551 mW/g

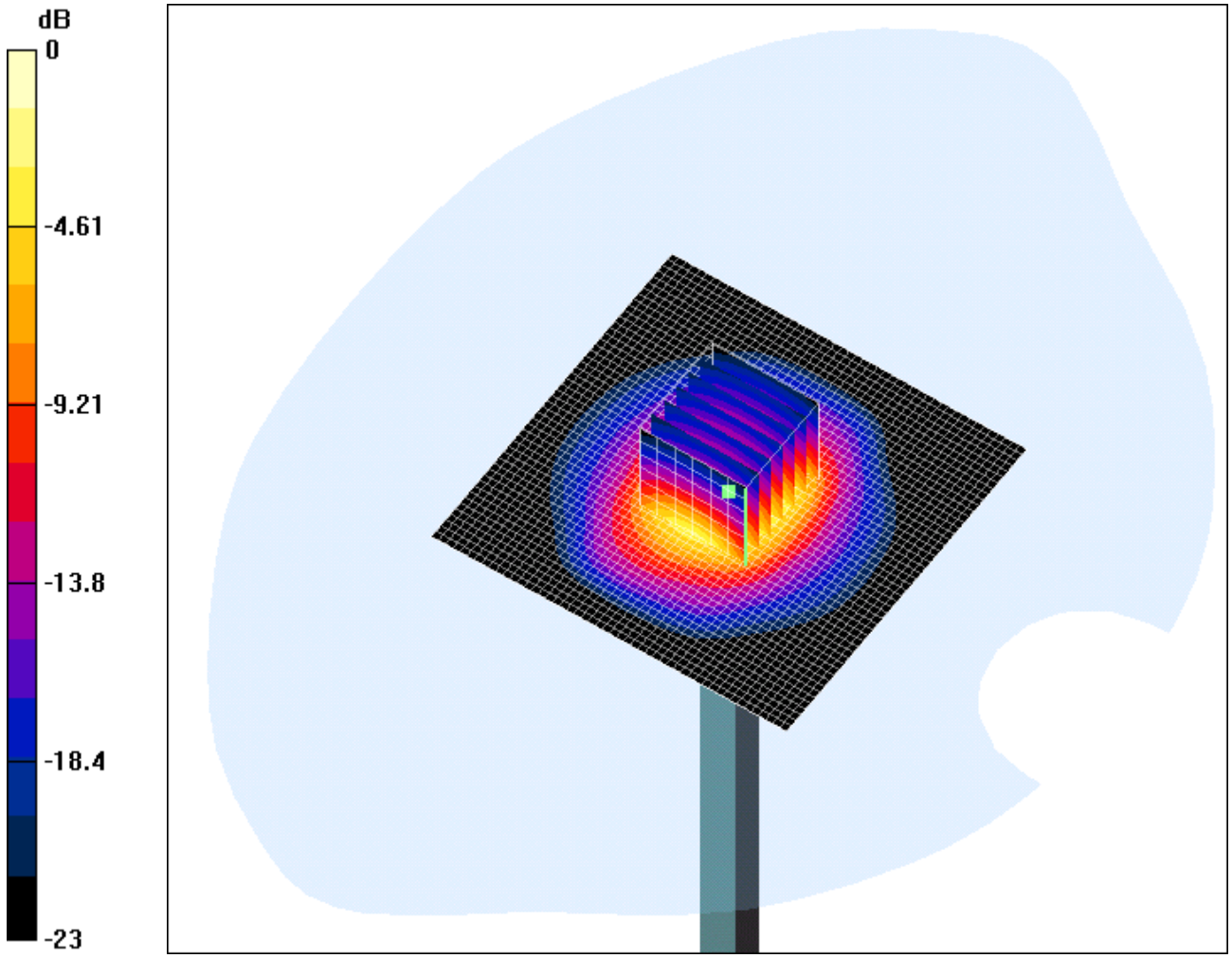
Touch Position Right/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.117 W/kg
SAR(1 g) = 0.0476 mW/g; SAR(10 g) = 0.0257 mW/g
Reference Value = 4.88 V/m
Power Drift = 0.5 dB
Maximum value of SAR = 0.0634 mW/g

Touch Position Right/Zoom Scan (7x7x7) (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.09 W/kg
SAR(1 g) = 0.0452 mW/g; SAR(10 g) = 0.0261 mW/g
Reference Value = 4.88 V/m
Power Drift = 0.5 dB
Maximum value of SAR = 0.051 mW/g

Date/Time: 07/09/03 8:30:34

Test Laboratory: RADIO FREQUENCY INVESTIGATION LTD.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN725



0 dB = 14.6mW/g

Communication System: Bluetooth; Frequency: 2441 MHz;Duty Cycle: 1:1
Medium: HSL2450 (σ = 1.89 mho/m, ε_r = 38, ρ = 1000 kg/m^3)
Phantom section: Flat Section

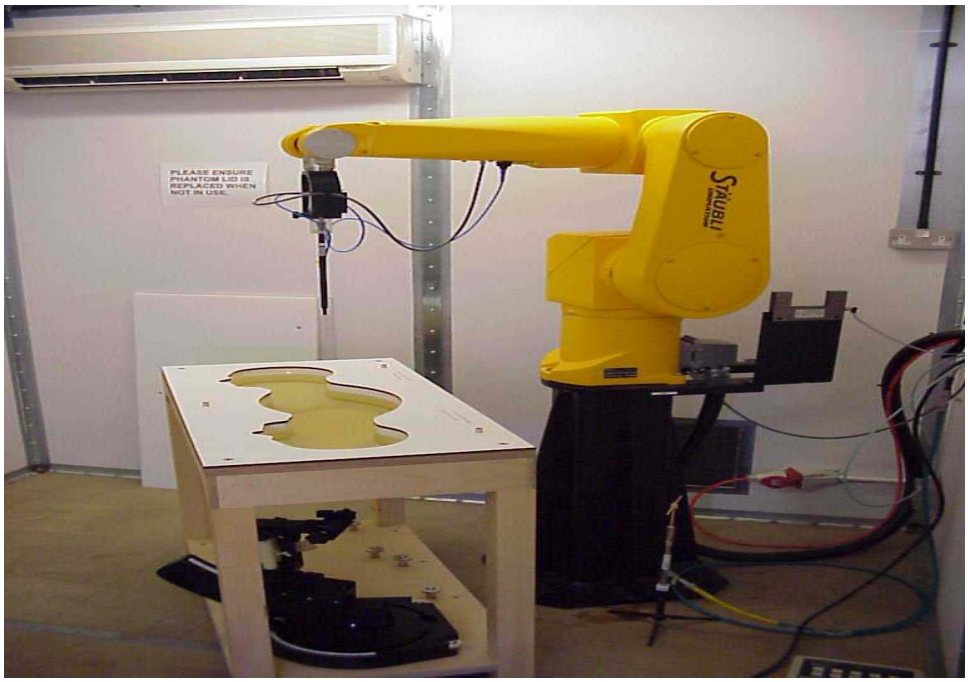
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(4.7, 4.7, 4.7); Calibrated: 09/06/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 14/11/2002
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

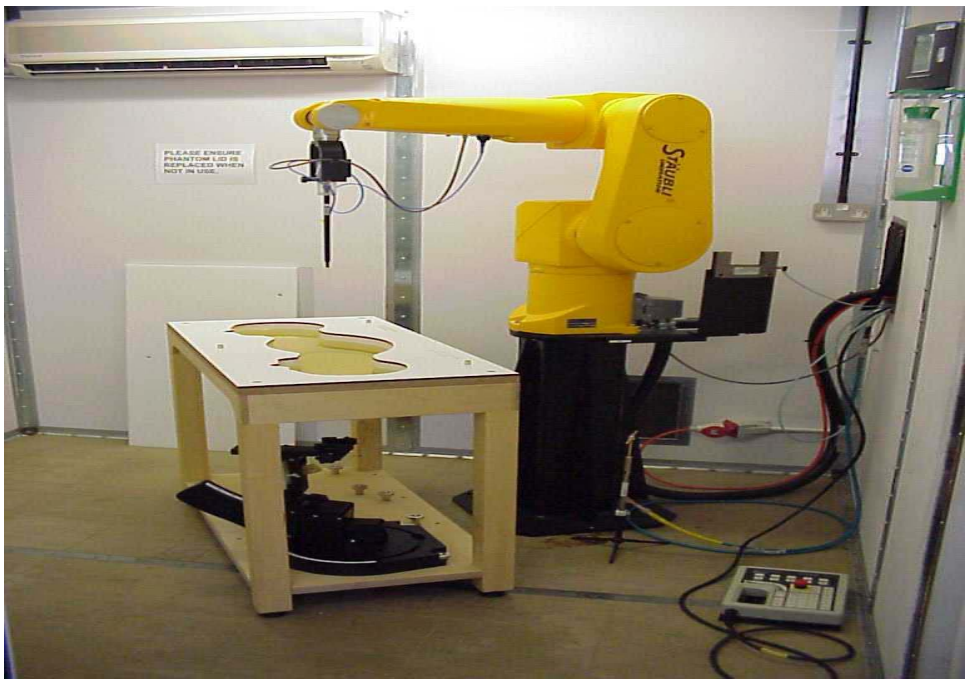
d=10mm, Pin=250mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm
Reference Value = 93.7 V/m
Power Drift = 0.07 dB
Maximum value of SAR = 16.5 mW/g

d=10mm, Pin=250mW/Zoom Scan 7x7x7 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 27.9 W/kg
SAR(1 g) = 13.3 mW/g; SAR(10 g) = 6.03 mW/g
Reference Value = 93.7 V/m
Power Drift = 0.07 dB
Maximum value of SAR = 14.6 mW/g

Appendix 3. Test Configuration Photographs

This appendix contains photographs showing the test configuration for the measurement of Specific Absorption Rate (SAR)





Test Configuration Photographs (Continued)

Appendix 4. Calibration Data

This appendix contains the calibration data and certificates.

A1186

11/06/03 CHECKED

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

Client RFI

CALIBRATION CERTIFICATE

Object(s) ET3DV6 - SN:1529

Calibration procedure(s) QA CAL-01.v2
Calibration procedure for dosimetric E-field probes

Calibration date: June 9, 2003

Condition of the calibrated item In Tolerance (according to the specific calibration document)

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
RF generator HP 8684C	US3642U01700	4-Aug-99 (SPEAG, in house check Aug-02)	In house check: Aug-05
Power sensor E4412A	MY41495277	2-Apr-03 (METAS, No 252-0250)	Apr-04
Power sensor HP 8481A	MY41092180	18-Sep-02 (Agilent, No. 20020918)	Sep-03
Power meter EPM E4419B	GB41293874	2-Apr-03 (METAS, No 252-0250)	Apr-04
Network Analyzer HP 8753E	US37390585	18-Oct-01 (Agilent, No. 24BR1033101)	In house check: Oct 03
Fluke Process Calibrator Type 702	SN: 6295803	3-Sep-01 (ELCAL, No.2360)	Sep-03

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Laboratory Director	
Approved by:	Fin Bomholt	R&D Director	

Date issued: June 9, 2003

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

Schmid & Partner Engineering AG

s p e a g

Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com

Probe ET3DV6

SN:1529

Manufactured:	March 21, 2000
Last calibration:	June 13, 2002
Recalibrated:	June 9, 2003

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1529

Sensitivity in Free Space

Diode Compression

NormX	**1.67**	$\mu V/(V/m)^2$	DCP X	**93**	mV
NormY	**1.95**	$\mu V/(V/m)^2$	DCP Y	**93**	mV
NormZ	**1.71**	$\mu V/(V/m)^2$	DCP Z	**93**	mV

Sensitivity in Tissue Simulating Liquid

Head 900 MHz ε_r = 41.5 ± 5% σ = 0.97 ± 5% mho/m

Valid for f=855-945 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**6.2**	± 8.9% (k=2)	Boundary effect:	
ConvF Y	**6.2**	± 8.9% (k=2)	Alpha	**0.35**
ConvF Z	**6.2**	± 8.9% (k=2)	Depth	**2.88**

Head 1800 MHz ε_r = 40.0 ± 5% σ = 1.40 ± 5% mho/m

Valid for f=1710-1890 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**5.0**	± 8.9% (k=2)	Boundary effect:	
ConvF Y	**5.0**	± 8.9% (k=2)	Alpha	**0.57**
ConvF Z	**5.0**	± 8.9% (k=2)	Depth	**2.44**

Boundary Effect

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

Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	11.3	6.7
SAR_{be} [%]	With Correction Algorithm	0.5	0.7

Head **1800 MHz** **Typical SAR gradient: 10 % per mm**

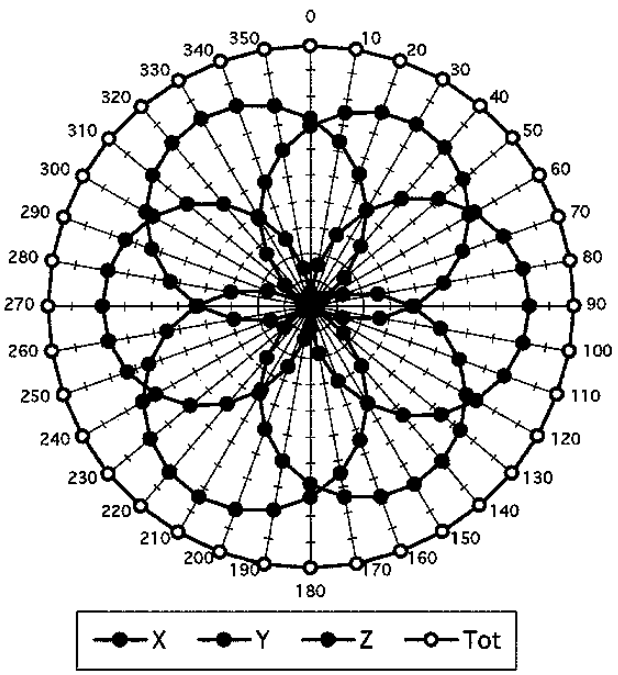
Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	13.8	9.0
SAR_{be} [%]	With Correction Algorithm	0.3	0.0

Sensor Offset

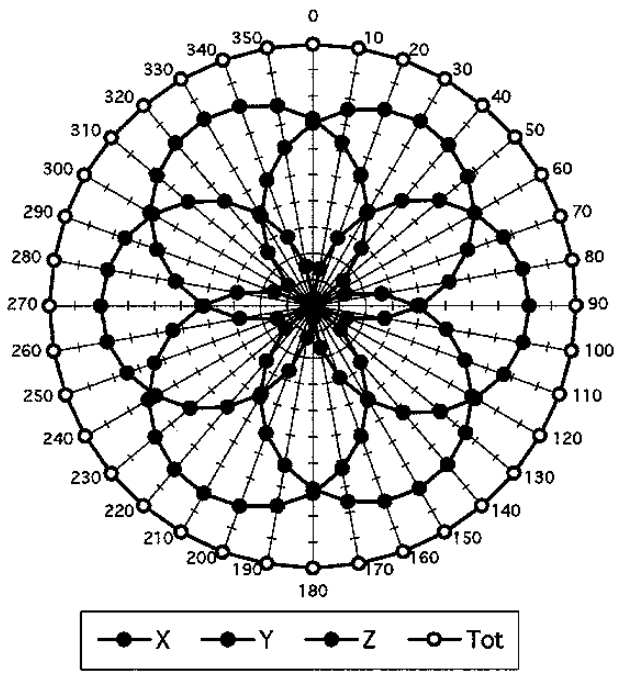
Probe Tip to Sensor Center	**2.7**	mm
Optical Surface Detection	**1.3 ± 0.2**	mm

Receiving Pattern (ϕ), θ = 0°

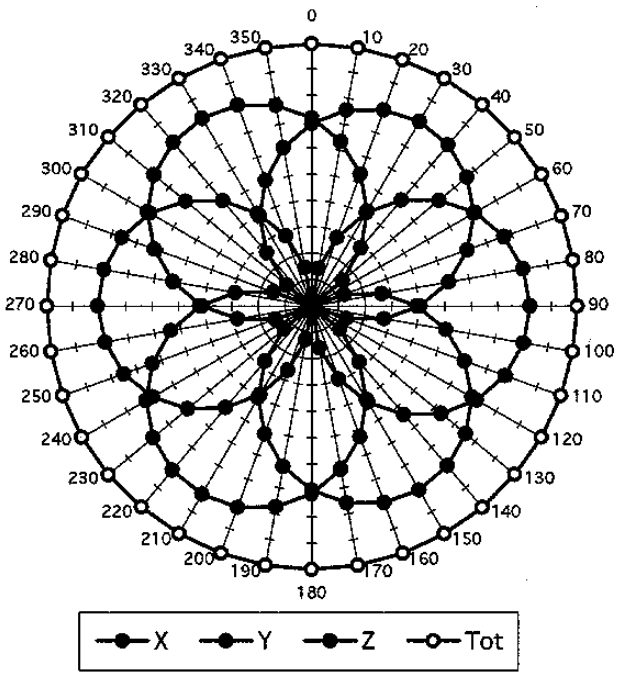
f = 30 MHz, TEM cell ifi110



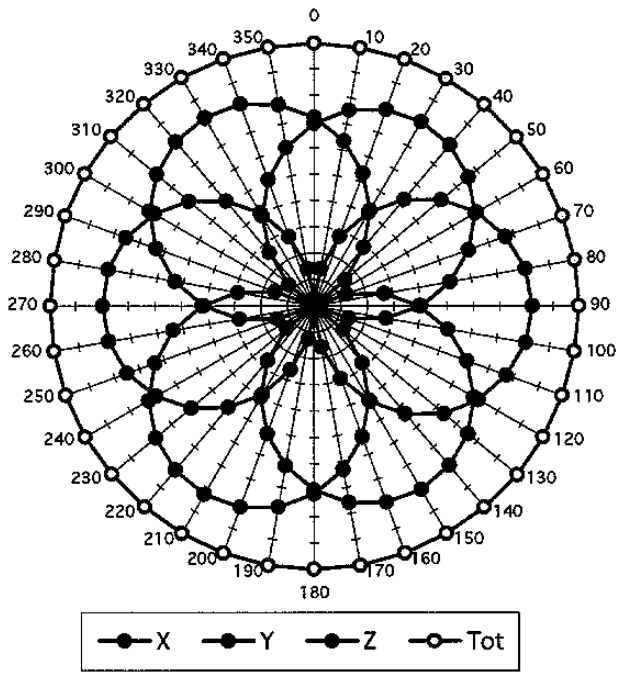
f = 100 MHz, TEM cell ifi110

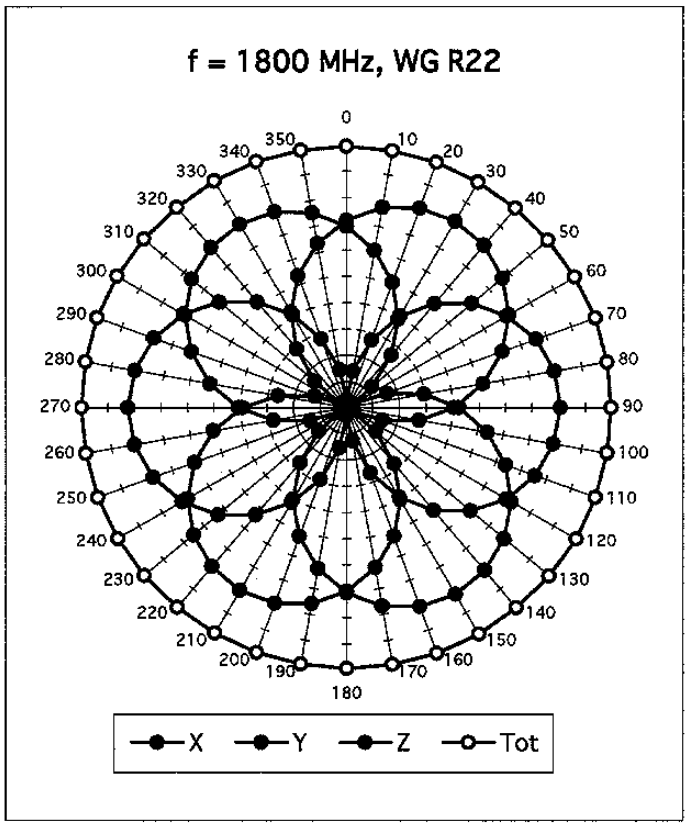


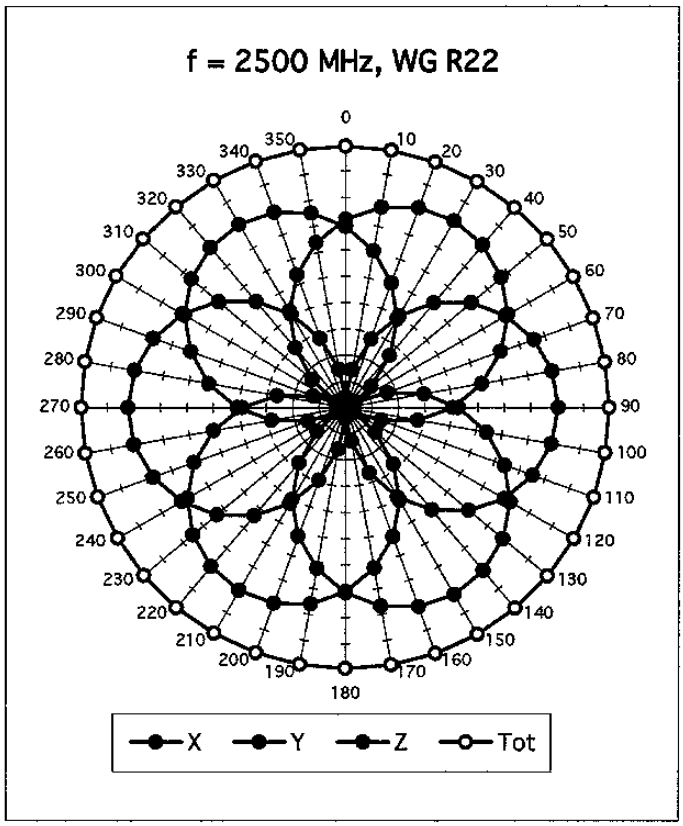
f = 300 MHz, TEM cell ifi110



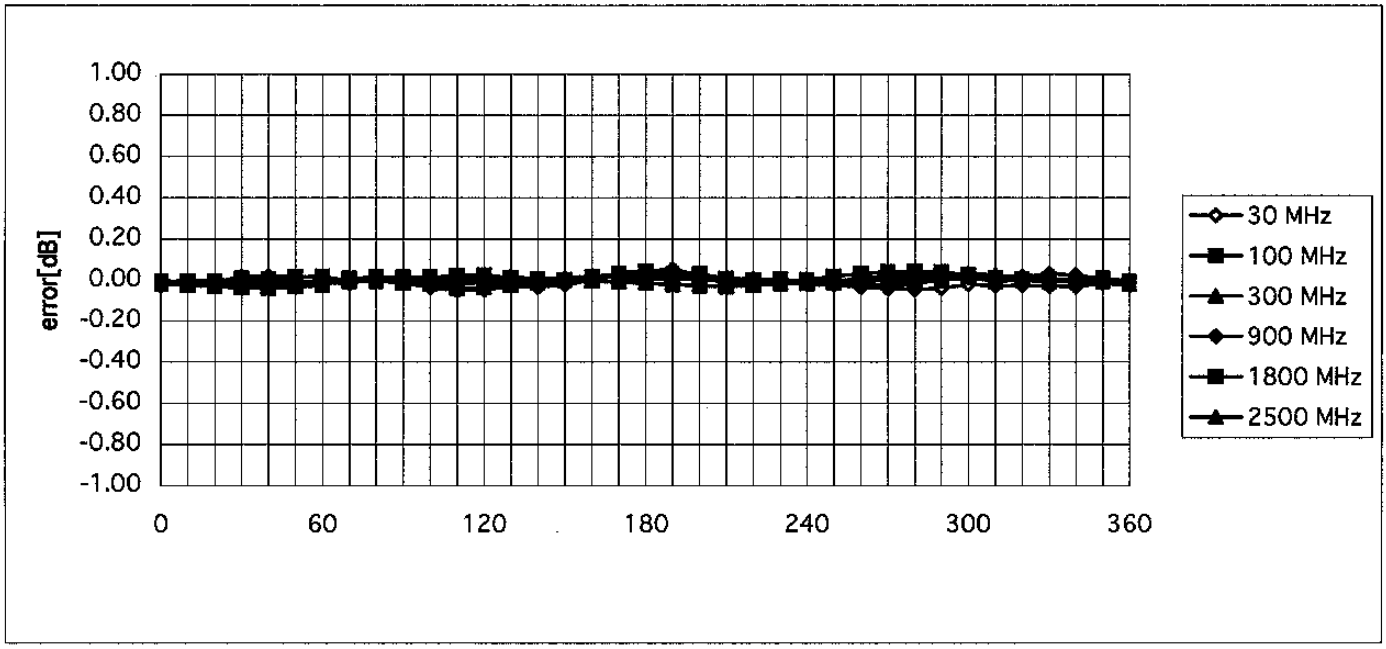
f = 900 MHz, TEM cell ifi110





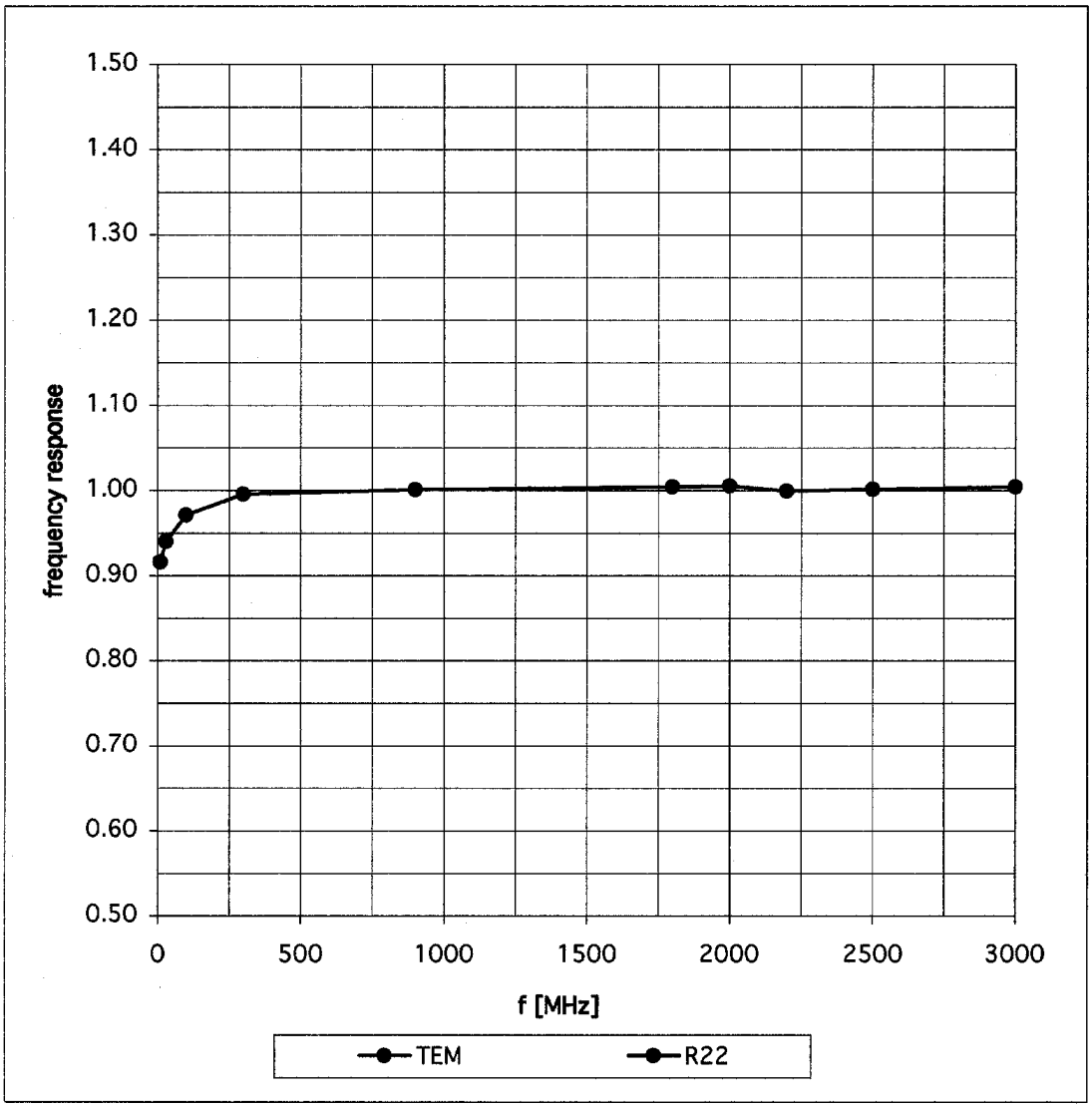


Isotropy Error (ϕ), θ = 0°



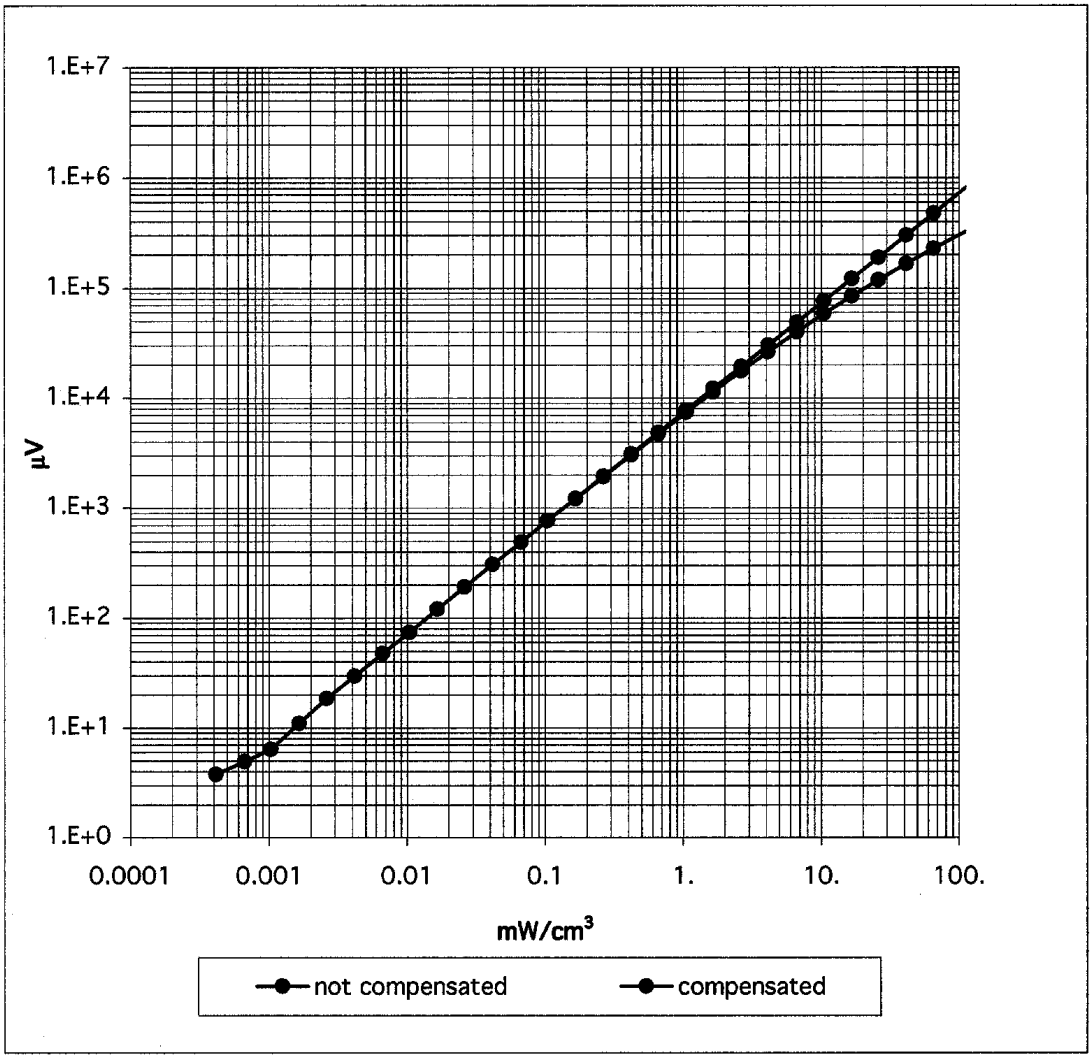
Frequency Response of E-Field

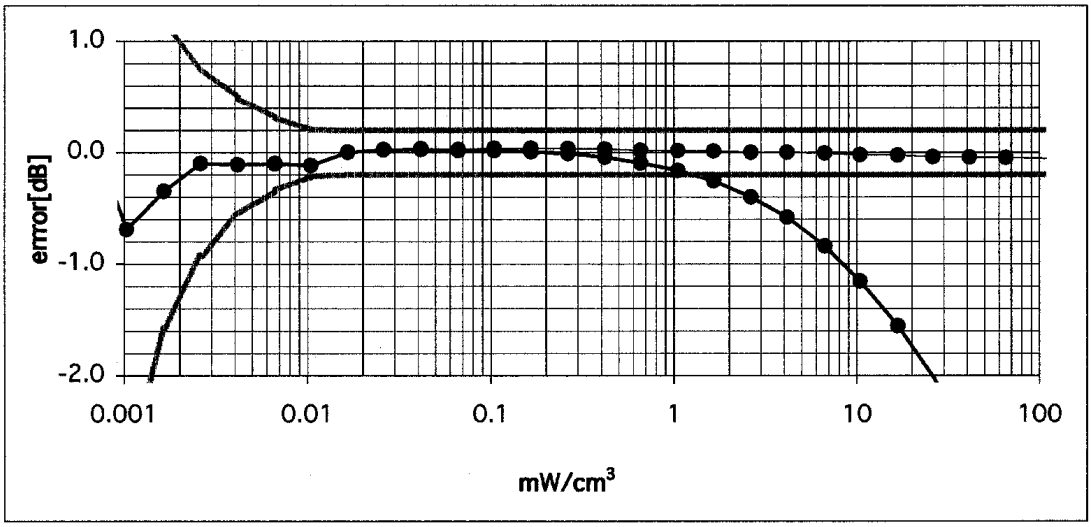
(TEM-Cell:ifi110, Waveguide R22)



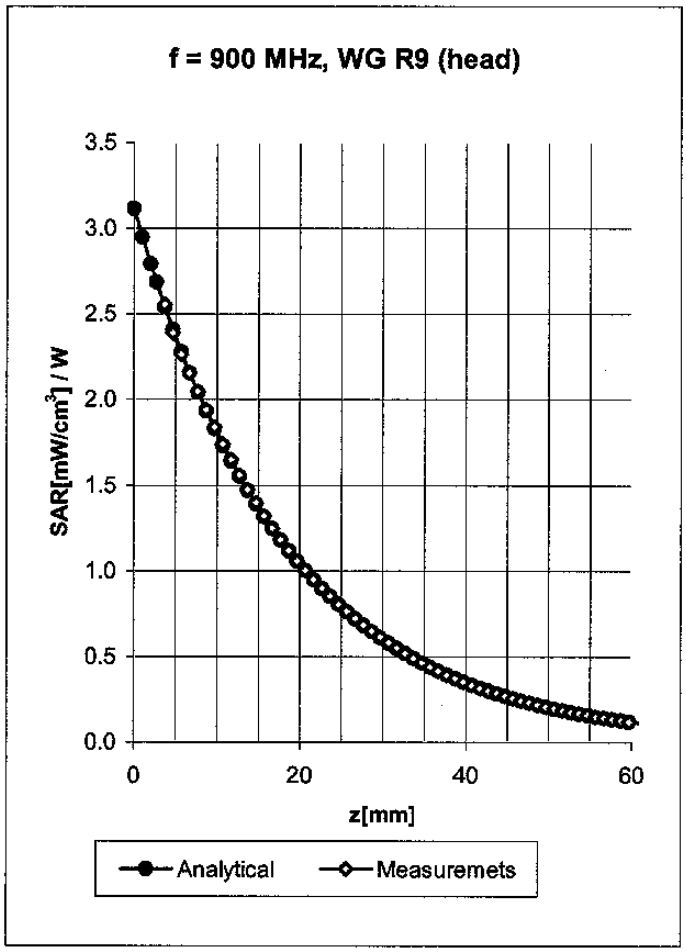
Dynamic Range f(SAR_{brain})

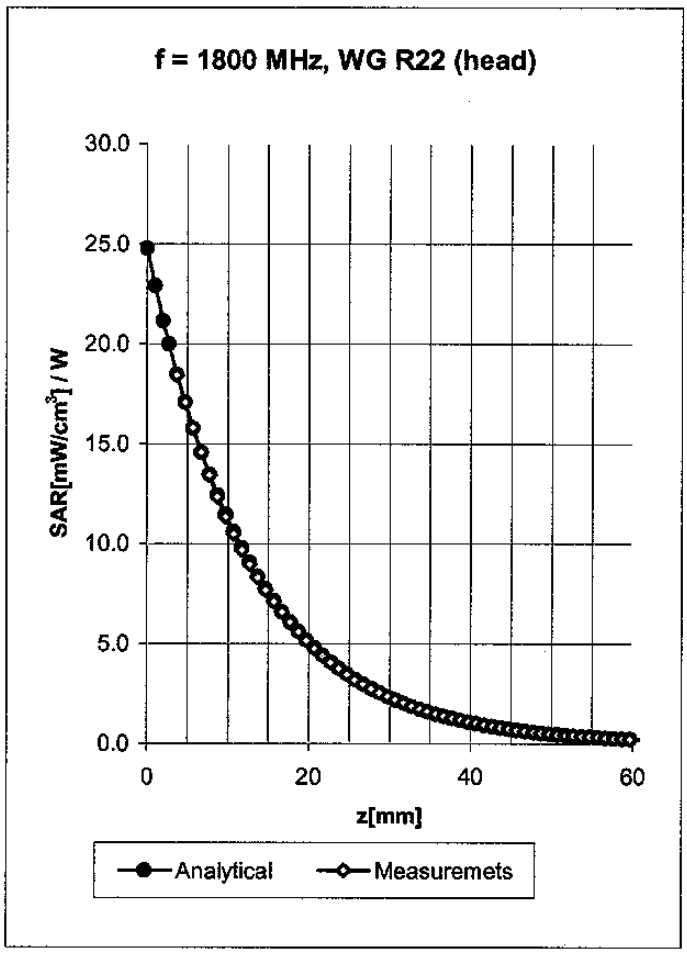
(Waveguide R22)





Conversion Factor Assessment





Head 900 MHz ε_r = 41.5 ± 5% σ = 0.97 ± 5% mho/m

Valid for f=855-945 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

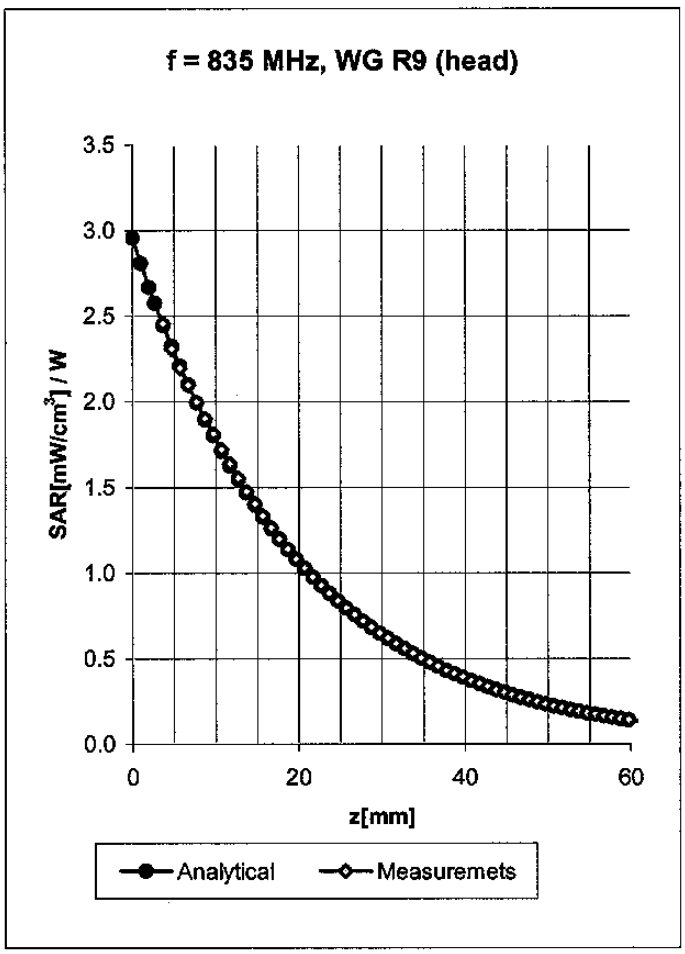
ConvF X	6.2 ± 8.9% (k=2)	Boundary effect:	
ConvF Y	6.2 ± 8.9% (k=2)	Alpha	**0.35**
ConvF Z	6.2 ± 8.9% (k=2)	Depth	**2.88**

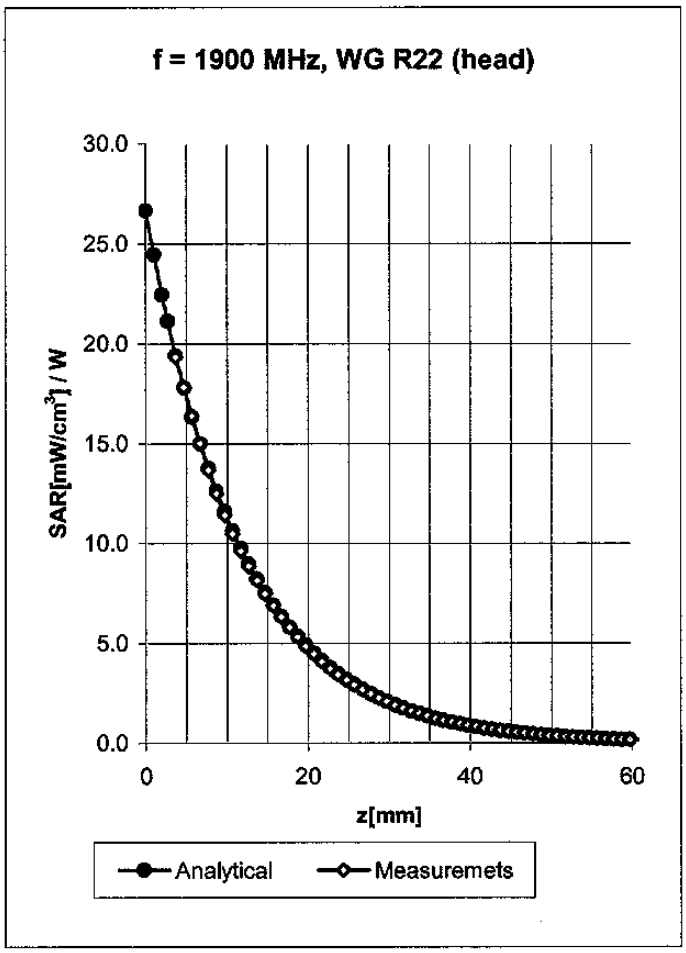
Head 1800 MHz ε_r = 40.0 ± 5% σ = 1.40 ± 5% mho/m

Valid for f=1710-1890 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	5.0 ± 8.9% (k=2)	Boundary effect:	
ConvF Y	5.0 ± 8.9% (k=2)	Alpha	**0.57**
ConvF Z	5.0 ± 8.9% (k=2)	Depth	**2.44**

Conversion Factor Assessment





Head 835 MHz ε_r = 41.5 ± 5% σ = 0.90 ± 5% mho/m

Valid for f=793-877 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

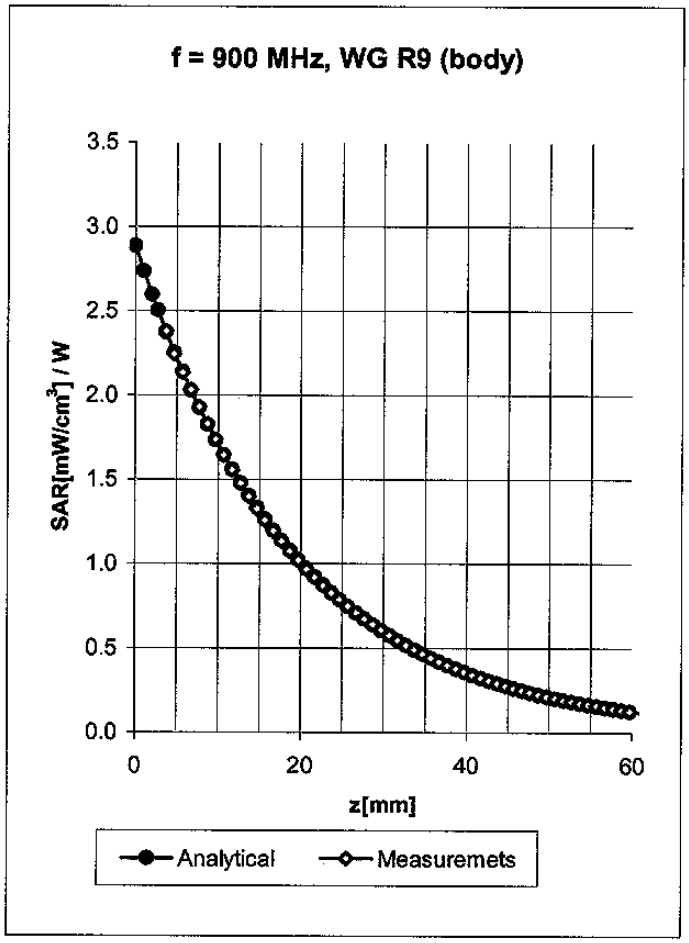
ConvF X	6.3 ± 8.9% (k=2)	Boundary effect:	
ConvF Y	6.3 ± 8.9% (k=2)	Alpha	**0.35**
ConvF Z	6.3 ± 8.9% (k=2)	Depth	**2.72**

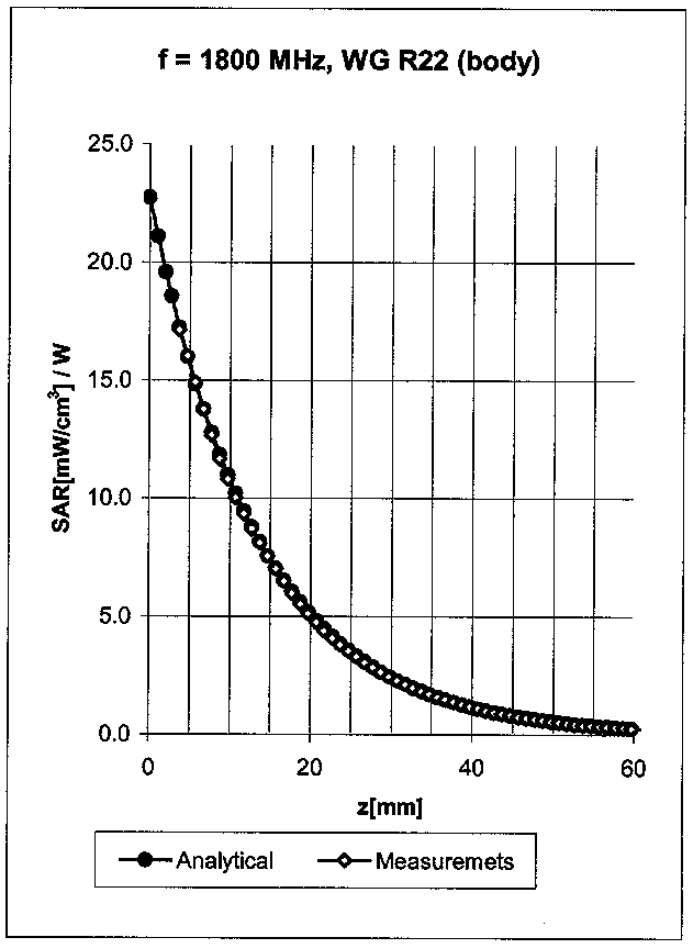
Head 1900 MHz ε_r = 40.0 ± 5% σ = 1.40 ± 5% mho/m

Valid for f=1805-1995 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	4.8 ± 8.9% (k=2)	Boundary effect:	
ConvF Y	4.8 ± 8.9% (k=2)	Alpha	**0.58**
ConvF Z	4.8 ± 8.9% (k=2)	Depth	**2.48**

Conversion Factor Assessment





Body 900 MHz ε_r = 55.0 ± 5% σ = 1.05 ± 5% mho/m

Valid for f=855-945 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

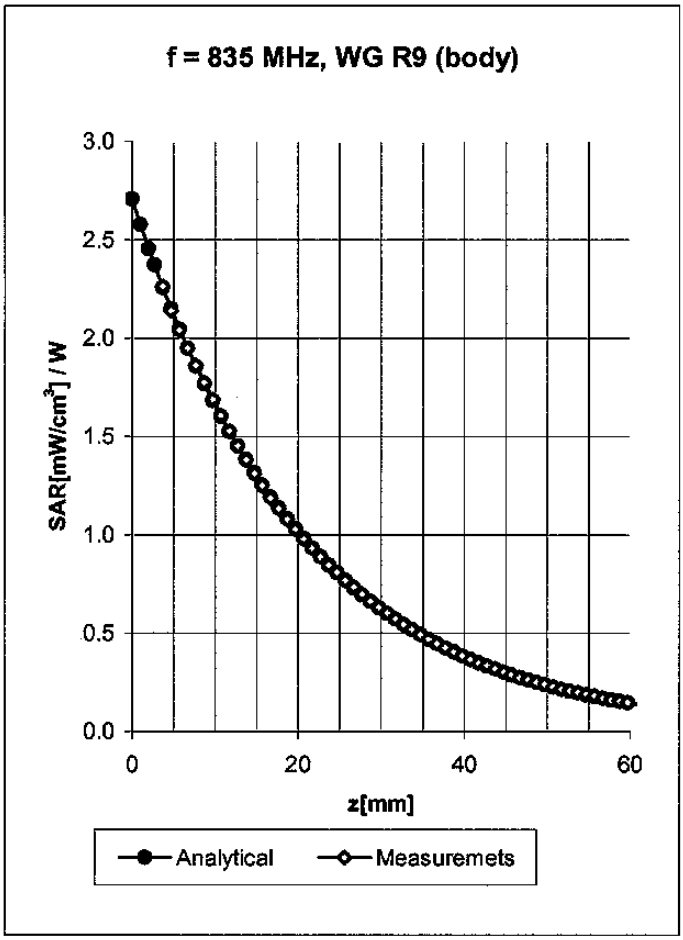
ConvF X	6.1 ± 8.9% (k=2)	Boundary effect:	
ConvF Y	6.1 ± 8.9% (k=2)	Alpha	**0.47**
ConvF Z	6.1 ± 8.9% (k=2)	Depth	**2.28**

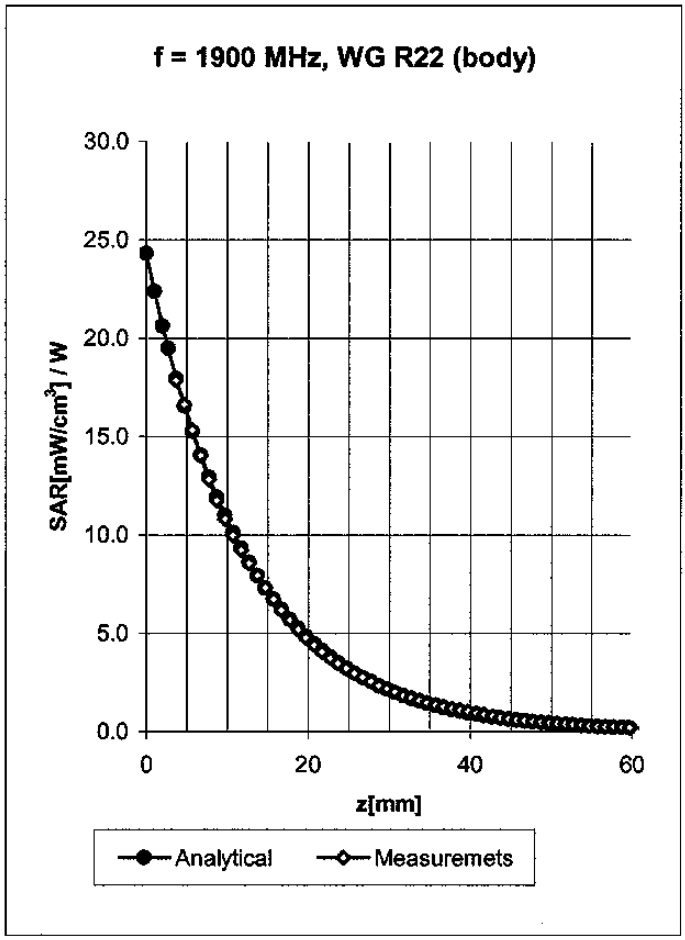
Body 1800 MHz ε_r = 53.3 ± 5% σ = 1.52 ± 5% mho/m

Valid for f=1710-1890 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	4.7 ± 8.9% (k=2)	Boundary effect:	
ConvF Y	4.7 ± 8.9% (k=2)	Alpha	**0.61**
ConvF Z	4.7 ± 8.9% (k=2)	Depth	**2.58**

Conversion Factor Assessment





Body 835 MHz ε_r = 55.2 ± 5% σ = 0.97 ± 5% mho/m

Valid for f=793-877 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

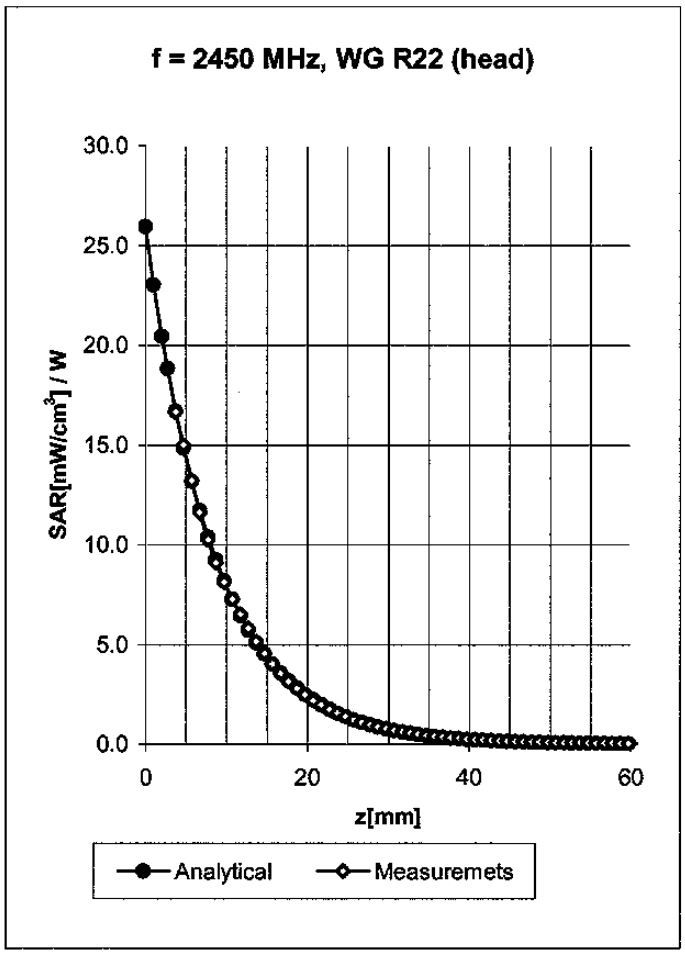
ConvF X	6.2 ± 8.9% (k=2)	Boundary effect:	
ConvF Y	6.2 ± 8.9% (k=2)	Alpha	**0.47**
ConvF Z	6.2 ± 8.9% (k=2)	Depth	**2.26**

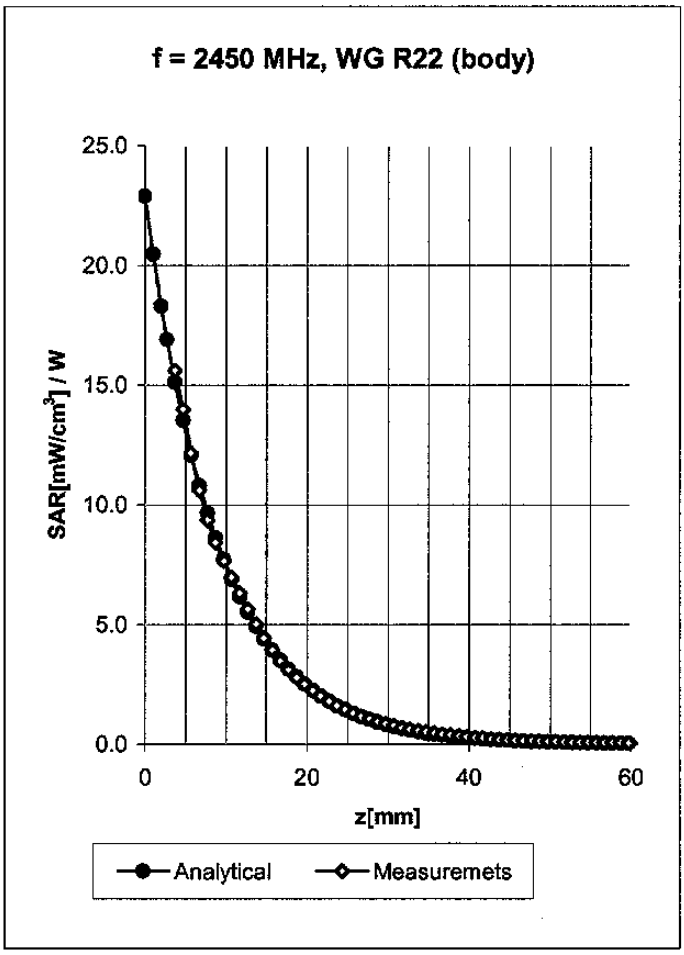
Body 1900 MHz ε_r = 53.3 ± 5% σ = 1.52 ± 5% mho/m

Valid for f=1805-1995 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	4.6 ± 8.9% (k=2)	Boundary effect:	
ConvF Y	4.6 ± 8.9% (k=2)	Alpha	**0.67**
ConvF Z	4.6 ± 8.9% (k=2)	Depth	**2.43**

Conversion Factor Assessment





Head 2450 MHz ε_r = 39.2 ± 5% σ = 1.80 ± 5% mho/m

Valid for f=2328-2573 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	4.7 ± 8.9% (k=2)	Boundary effect:	
ConvF Y	4.7 ± 8.9% (k=2)	Alpha	1.02
ConvF Z	4.7 ± 8.9% (k=2)	Depth	1.87

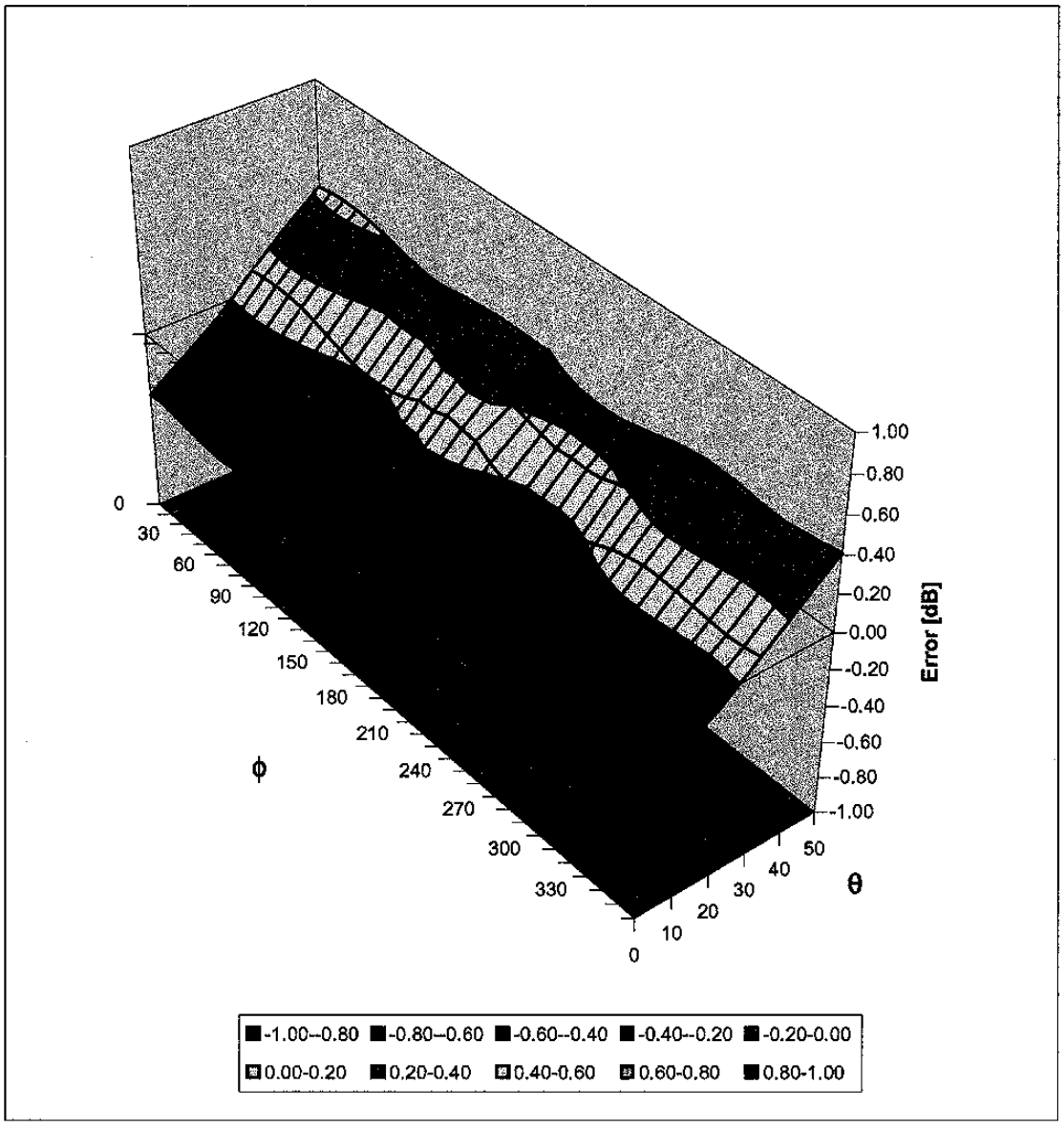
Body 2450 MHz ε_r = 52.7 ± 5% σ = 1.95 ± 5% mho/m

Valid for f=2328-2573 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	4.3 ± 8.9% (k=2)	Boundary effect:	
ConvF Y	4.3 ± 8.9% (k=2)	Alpha	2.00
ConvF Z	4.3 ± 8.9% (k=2)	Depth	1.25

Deviation from Isotropy in HSL

Error (θ,φ), f = 900 MHz



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

Checked 29/1/03

Client RFI

CALIBRATION CERTIFICATE

Object(s) D2450V2 - SN 725

Calibration procedure(s) QA CAL-05 v2
Calibration procedure for dipole validation kits

Calibration date: January 17, 2003

Condition of the calibrated item In Tolerance (according to the specific calibration document)

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date	Scheduled Calibration
RF generator R&S SML-03	100698	27-Mar-2002	In house check: Mar-05
Power sensor HP 8481A	MY41092317	18-Oct-02	Oct-04
Power sensor HP 8481A	US37292783	30-Oct-02	Oct-03
Power meter EPM E442	GB37480704	30-Oct-02	Oct-03
Network Analyzer HP 8753E	US38432426	3-May-00	In house check: May 03

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

Date issued: January 18, 2003

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

Schmid & Partner
Engineering AG

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

DASY

Dipole Validation Kit

Type: D2450V2

Serial: 725

Manufactured: October 16, 2002
Calibrated: January 17, 2003

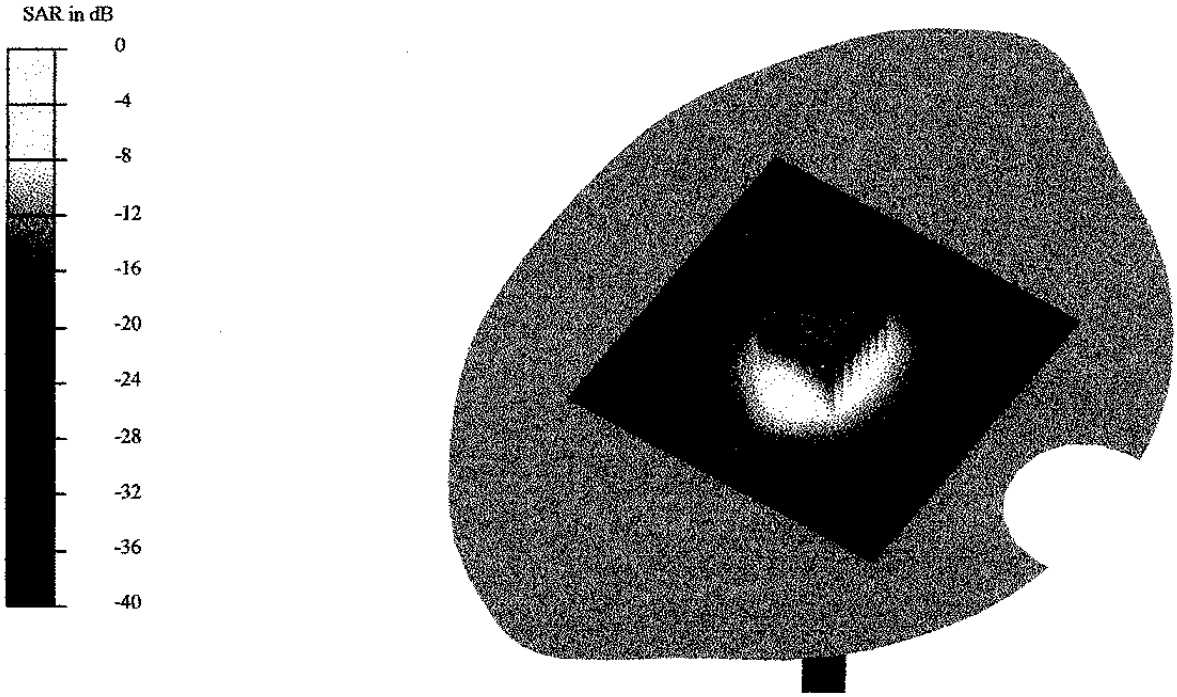
Test Laboratory: SPEAG, Zurich, Switzerland
File Name: SN725_SN1507_M2450_150103.da4

DUT: Dipole 2450 MHz Type & Serial Number: D2450V2 - SN725
Program: Dipole Calibration; Pin = 263 mW; d = 10 mm

Communication System: CW-2450; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: Muscle 2450 MHz (σ = 2.05 mho/m, ε = 51.05, ρ = 1000 kg/m3)
Phantom section: FlatSection

DASY4 Configuration:
- Probe: ET3DV6 - SN1507; ConvF(4.5, 4.5, 4.5); Calibrated: 1/24/2002
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN410; Calibrated: 7/18/2002
- Phantom: SAM 4.0 - TP:1006
- Software: DASY4, V4.0 Build 51

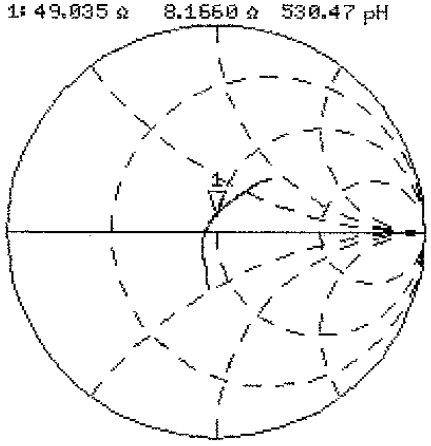
Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm
Reference Value = 94.8 V/m
Peak SAR = 27.2 mW/g
SAR(1 g) = 13.7 mW/g; SAR(10 g) = 6.33 mW/g
Power Drift = -0.02 dB



15 Jan 2003 18:37:14

CH1 S11 1 U FS 1: 49.035 Ω 8.1660 Ω 530.47 pH 2 450.000 000 MHz

Muscle



Del

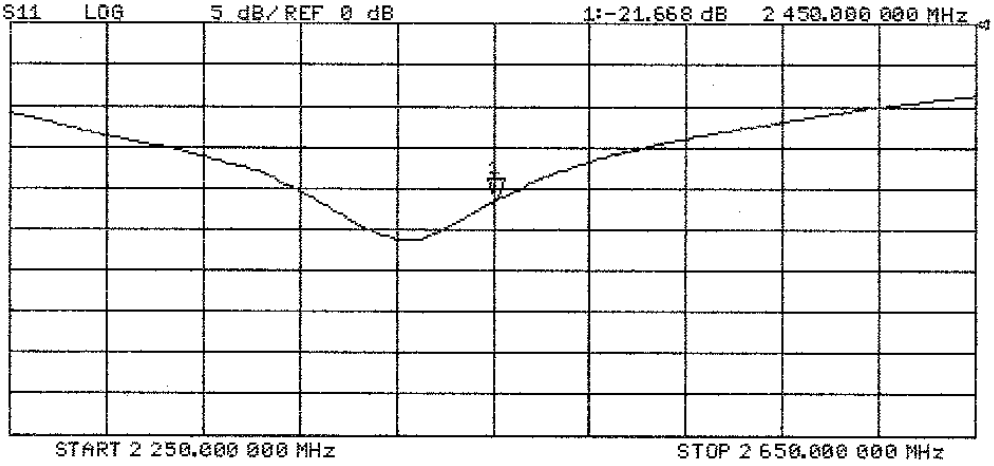
PRm

Cor

Avg

16

CH2 S11 LOG 5 dB/ REF 0 dB 1:-21.668 dB 2 450.000 000 MHz



PRm

Cor

START 2 250.000 000 MHz

STOP 2 650.000 000 MHz

1. Measurement Conditions

The measurements were performed in the flat section of the SAM twin phantom filled with head simulating solution of the following electrical parameters at 2450 MHz:

Relative permitivity	**37.4**	± 5%
Conductivity	**1.88 mho/m**	± 10%

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, conversion factor 5.0 at 2450 MHz) was used for the measurements.

The dipole feedpoint was positioned below the center marking and oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10mm from dipole center to the solution surface. The included distance holder was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 7x7x7 fine cube was chosen for cube integration.
The dipole input power (forward power) was 263mW ± 3 %. The results are normalized to 1W input power.

2. SAR Measurement with DASY4 System

Standard SAR-measurements were performed according to the measurement conditions described in section 1. The results (see figure supplied) have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values measured with the dosimetric probe ET3DV6 SN:1507 and applying the advanced extrapolation are:

averaged over 1 cm^3 (1 g) of tissue:	**54.7 mW/g**
averaged over 10 cm^3 (10 g) of tissue:	**24.5 mW/g**

3. Dipole impedance and return loss

The impedance was measured at the SMA-connector with a network analyzer and numerically transformed to the dipole feedpoint. The transformation parameters from the SMA-connector to the dipole feedpoint are:

Electrical delay:	**1.151 ns**	(one direction)
Transmission factor:	**0.997**	(voltage transmission, one direction)

The dipole was positioned at the flat phantom sections according to section 1 and the distance holder was in place during impedance measurements.

Feedpoint impedance at 2450 MHz:	Re{Z} = **53.0 Ω**
	Im {Z} = **7.0 Ω**
Return Loss at 2450 MHz	**- 22.6 dB**

4. Measurement Conditions

The measurements were performed in the flat section of the SAM twin phantom filled with body simulating solution of the following electrical parameters at 2450 MHz:

Relative permitivity	**51.1**	± 5%
Conductivity	**2.05 mho/m**	± 10%

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, conversion factor 4.5 at 2450 MHz) was used for the measurements.

The dipole feedpoint was positioned below the center marking and oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10mm from dipole center to the solution surface. The included distance holder was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 7x7x7 fine cube was chosen for cube integration.
The dipole input power (forward power) was 263mW ± 3 %. The results are normalized to 1W input power.

5. SAR Measurement with DASY4 System

Standard SAR-measurements were performed according to the measurement conditions described in section 4. The results (see figure supplied) have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values measured with the dosimetric probe ET3DV6 SN:1507 and applying the advanced extrapolation are:

averaged over 1 cm^3 (1 g) of tissue:	**52.1 mW/g**
averaged over 10 cm^3 (10 g) of tissue:	**24.1 mW/g**

6. Dipole impedance and return loss

The dipole was positioned at the flat phantom sections according to section 4 (with body tissue inside the phantom) and the distance holder was in place during impedance measurements.

Feedpoint impedance at 2450 MHz:	Re{Z} = **49.0 Ω**
	Im {Z} = **8.1Ω**
Return Loss at 2450 MHz	**- 21.7 dB**

7. Handling

Do not apply excessive force to the dipole arms, because they might bend. Bending of the dipole arms stresses the soldered connections near the feedpoint leading to a damage of the dipole.

8. Design

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.

Small end caps have been added to the dipole arms in order to improve matching when loaded according to the position as explained in Section 1. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

9. Power Test

After long term use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

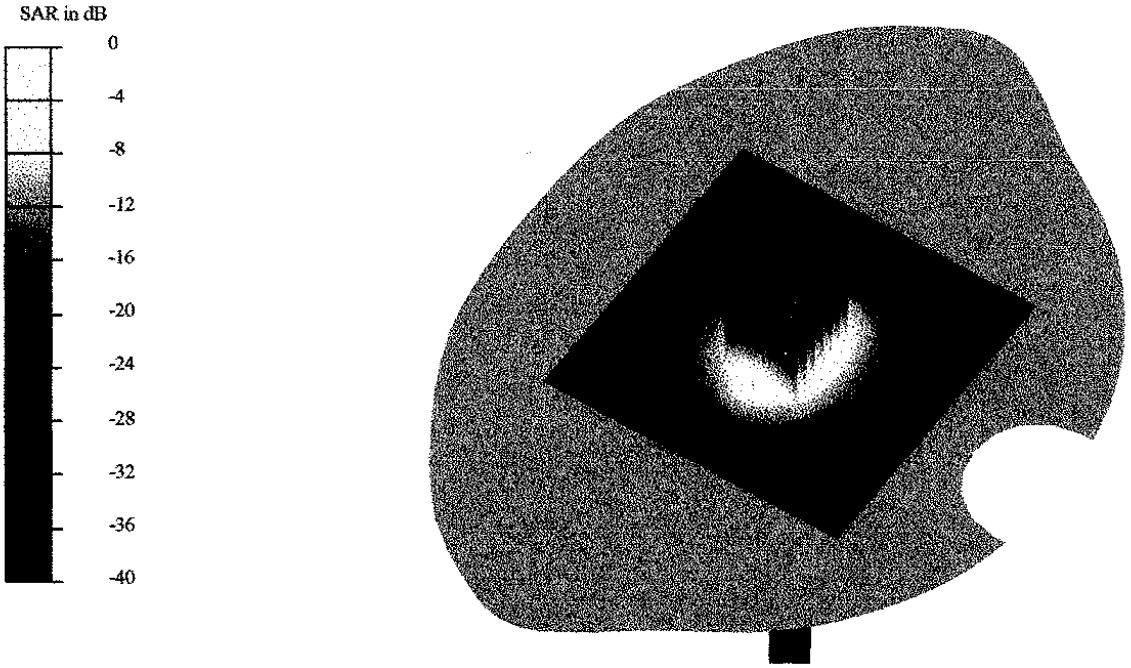
Test Laboratory: SPEAG, Zurich, Switzerland
File Name: SN725_SN1507_HSL2450_150103.da4

DUT: Dipole 2450 MHz Type & Serial Number: D2450V2 - SN725
Program: Dipole Calibration; Pin = 263 mW; d = 10 mm

Communication System: CW-2450; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: HSL 2450 MHz (σ = 1.88 mho/m, ε = 37.4, ρ = 1000 kg/m3)
Phantom section: FlatSection

DASY4 Configuration:
- Probe: ET3DV6 - SN1507; ConvF(5, 5, 5); Calibrated: 1/24/2002
- *Sensor-Surface: 4mm (Mechanical Surface Detection)*
- Electronics: DAE3 - SN410; Calibrated: 7/18/2002
- Phantom: SAM 4.0 - TP:1006
- Software: DASY4, V4.0 Build 51

Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm
Reference Value = 97.1 V/m
Peak SAR = 31.6 mW/g
SAR(1 g) = 14.4 mW/g; SAR(10 g) = 6.45 mW/g
Power Drift = 0.02 dB



15 Jan 2003 13:14:11

CH1 S11 1 U FS 1: 53.010 Ω 7.0254 Ω 456.38 pH 2 450.000 000 MHz

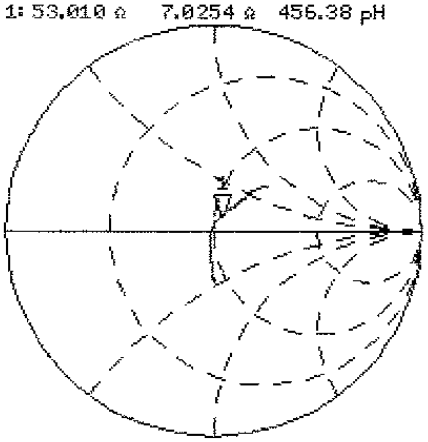
Del

PRm

Cor

Avg

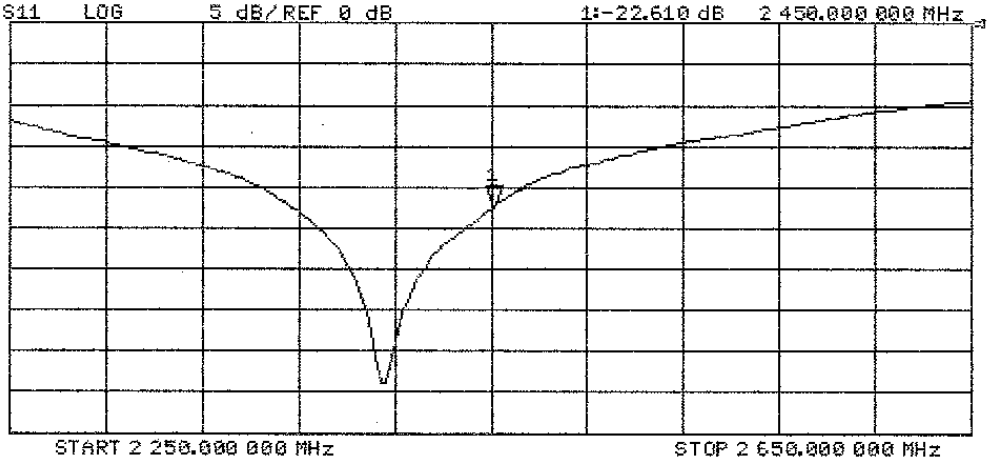
16



CH2 S11 LOG 5 dB/ REF 0 dB 1:-22.610 dB 2 450.000 000 MHz

PRm

Cor



START 2 250.000 000 MHz STOP 2 650.000 000 MHz

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Appendix 5. Photographs of EUT

This appendix contains the following photographs:

Photo Reference Number	Title
PHT/45014JD06/001	Front View of EUT
PHT/45014JD06/002	Rear View of EUT
PHT/45014JD06/003	View of Cheek Position Left
PHT/45014JD06/004	View of Tilted Position Left
PHT/45014JD06/005	View of Cheek Position Right
PHT/45014JD06/006	View of Tilted Position Right
PHT/45014JD06/007	Fluid Level

These pages are not included in the total number of pages for this report.

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Test Of: **Mansella Ltd.**
CDP 24 Bluetooth Cordless Data Phone Handset
To: **OET Bulletin 65 Supplement C: (2001-01)**

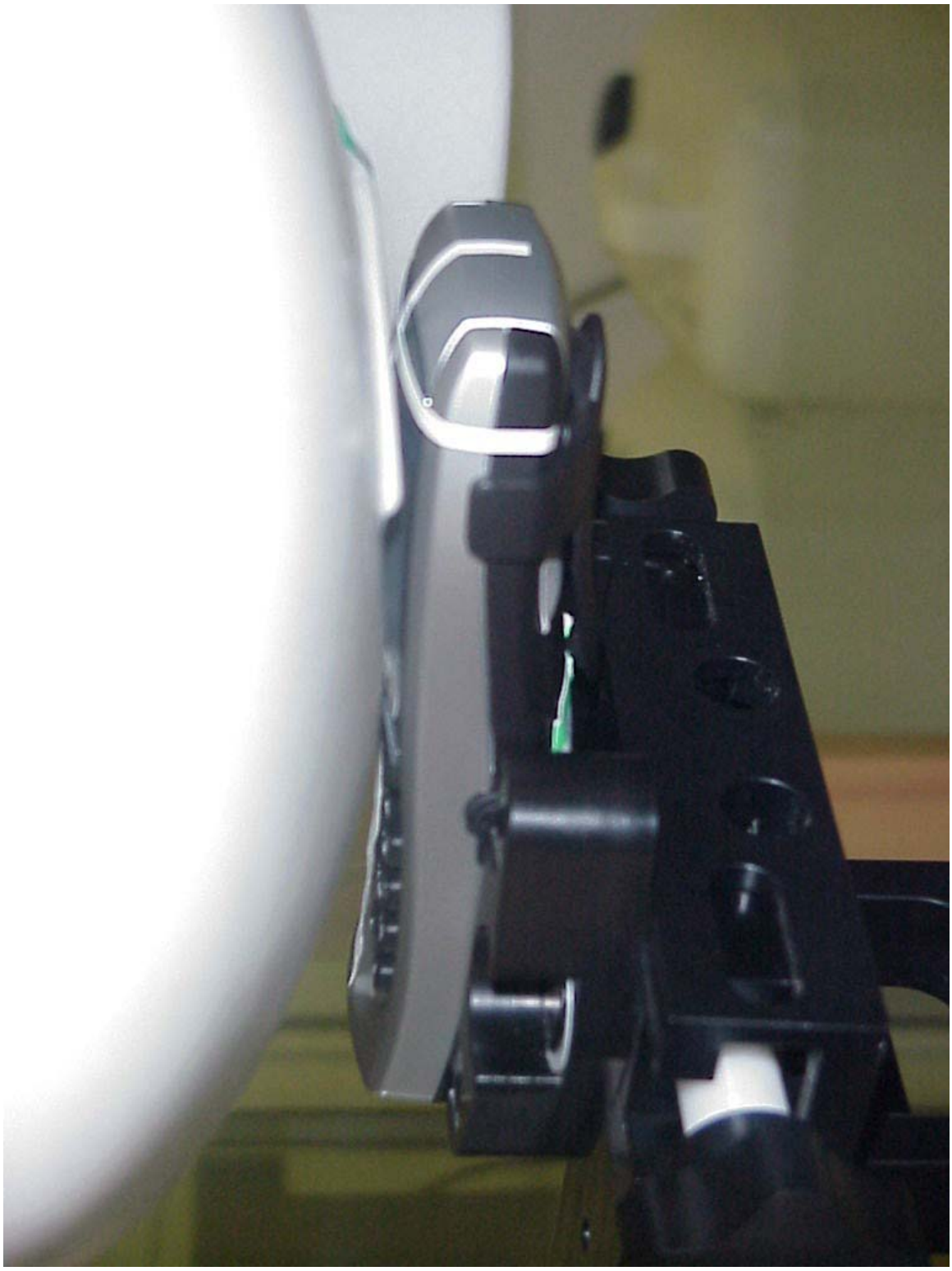
PHT/45014JD06/001 Front View of EUT

Test Of: **Mansella Ltd.**
CDP 24 Bluetooth Cordless Data Phone Handset
To: **OET Bulletin 65 Supplement C: (2001-01)**

PHT/45014JD06/002 Rear View of EUT

Test Of: **Mansella Ltd.**
CDP 24 Bluetooth Cordless Data Phone Handset
To: **OET Bulletin 65 Supplement C: (2001-01)**

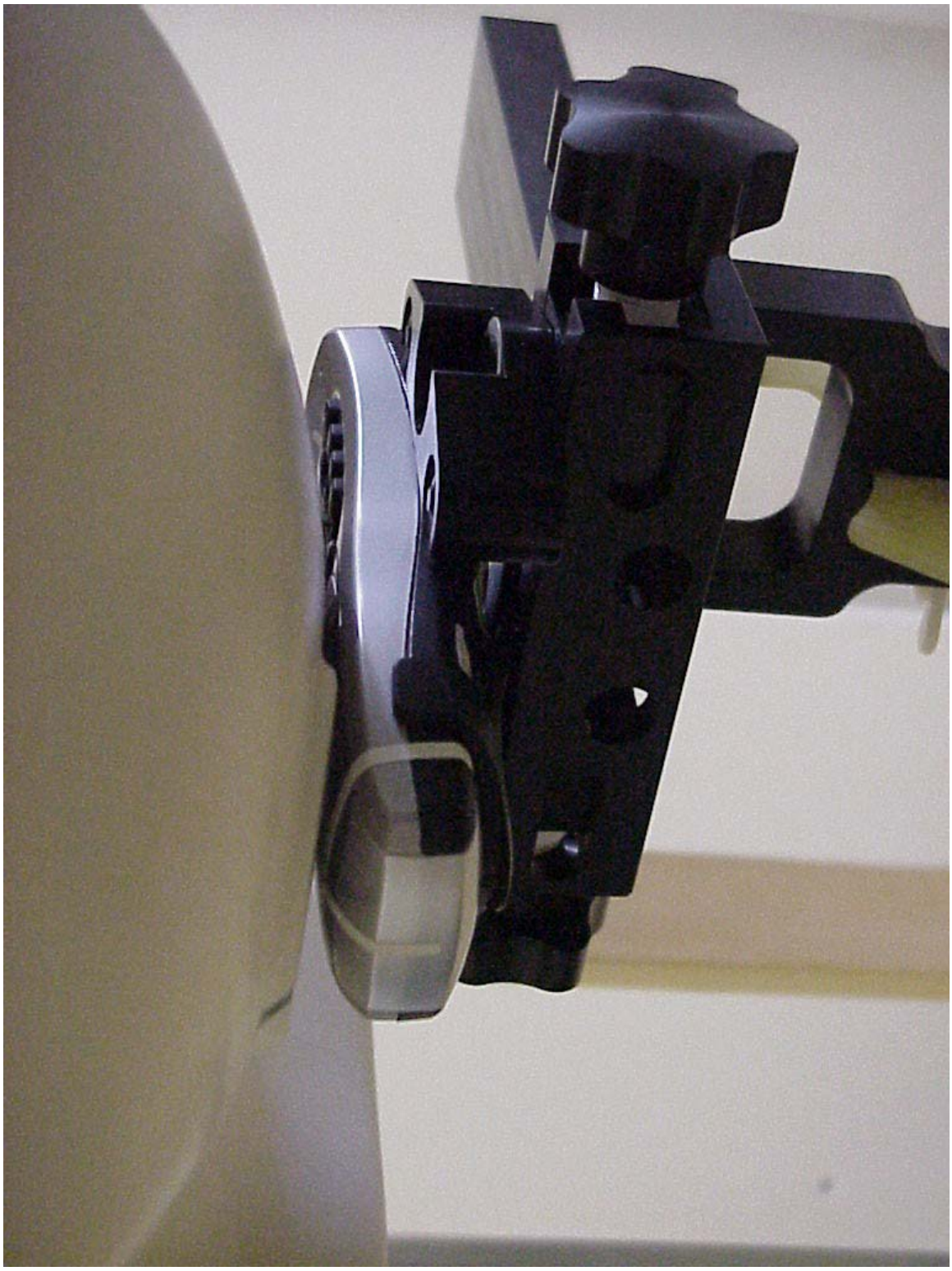
PHT/45014JD06/003 View of Cheek Position Left



Test Of: **Mansella Ltd.**
CDP 24 Bluetooth Cordless Data Phone Handset
To: **OET Bulletin 65 Supplement C: (2001-01)**

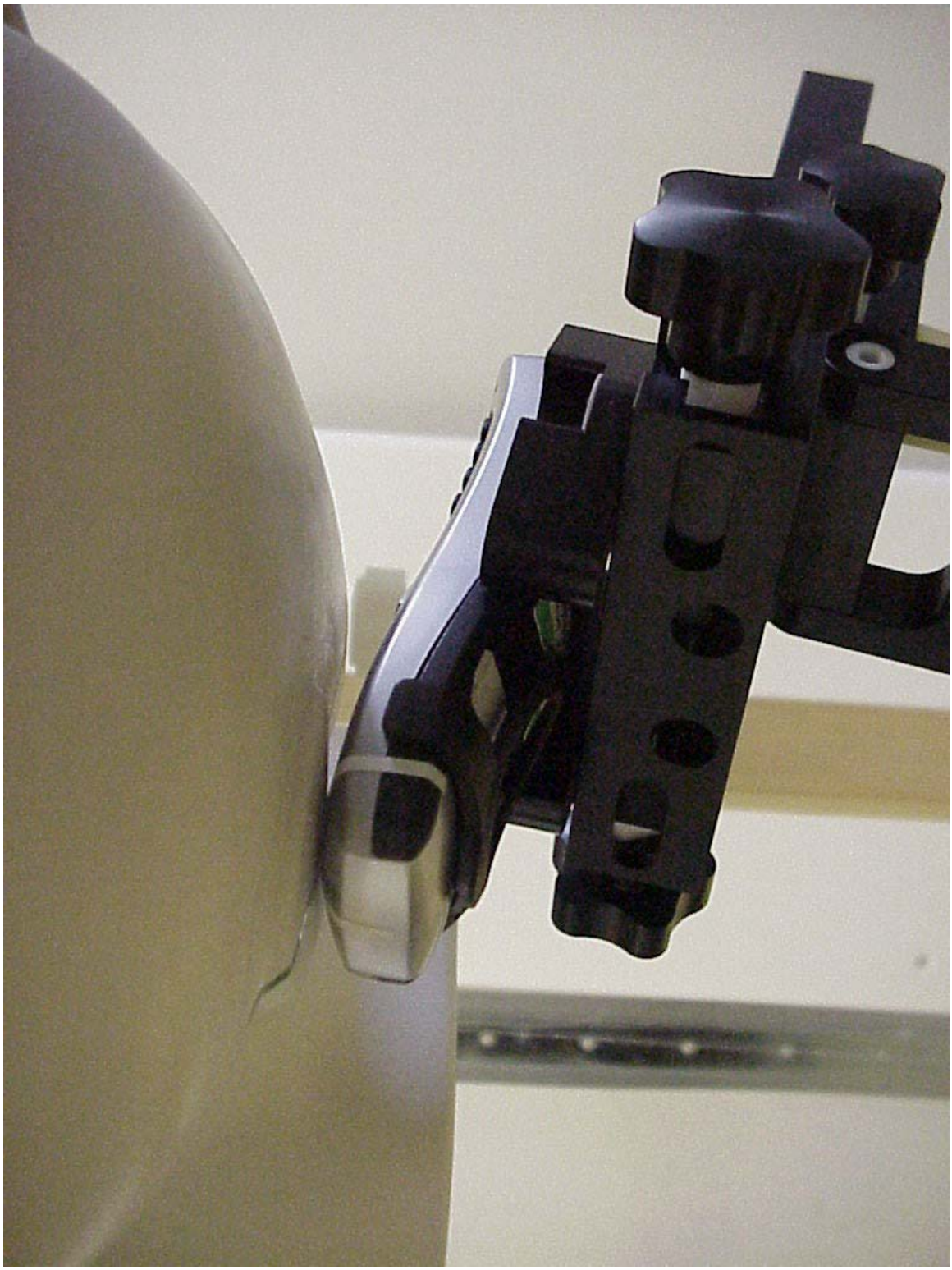
PHT/45014JD06/004 View of Tilted Position Left

PHT/45014JD06/005 View of Cheek Position Right



Test Of: **Mansella Ltd.**
CDP 24 Bluetooth Cordless Data Phone Handset
To: **OET Bulletin 65 Supplement C: (2001-01)**

PHT/45014JD06/006 View of Tilted Position Right



PHT/45014JD06/007 Fluid Level