



TEST REPORT FROM RADIO FREQUENCY INVESTIGATION LTD.




Test of: Marconi Selenia Communications Ltd.
Personal Role Radio - H4855

(Body Measurements Only)

To: OET Bulletin 65 Supplement C: (2001-01)

Measurements were performed on the DASY4 System

Test Report Serial No:
RFI/SARB1/RP45620JD08A

This Test Report Is Issued Under The Authority Of Richard Jacklin, Operations Director: 	Checked By: Joe Lomako 
Tested By: Richelieu Quoi 	Release Version No: PDF001
Issue Date: 23 April 2004	Test Dates: 02 April 2004

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

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TEST REPORT

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1. Client Information

1.1. Client Details

Company Name:	Marconi Selenia Communications Ltd.
Address:	Marconi House New Street Chelmsford Essex CM1 1PL UK
Contact Name:	Mr Keith Starkey

1.2. Test Laboratory

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

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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:	Marconi Selenia Communications
Model Name or Number:	H4855
Unique type Identification:	H110485501
FCC Identification:	RMJPRR0001
Serial Number:	FCC 01
Country Of Manufacture:	United Kingdom
Date of Receipt:	02 April 2004

2.2. Accessories for Equipment Under Test (EUT)

Description:	Lightweight Headset
Brand Name:	Davies Industrial Communications
Model Name or Number:	None Stated
Unique type Identification:	None Stated
Serial Number:	018749
Country of Manufacturer:	None Stated
Date of Receipt:	02 April 2004

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2.3. Description of EUT

Short-range, low powered body worn transceiver (Personal Role Radio) with lightweight headset accessory, for military use.

2.4. Modifications Incorporated In EUT

During the course of testing the EUT was not modified.

2.5 Additional Information Related to the EUT

Equipment Class:	Low Powered Body Worn Transceiver.		
FCC Rule Part(s):	OET Bulletin 65 Supplement C		
Device Category:	Portable		
Application Type:	Certification		
Maximum Power Output:	2450 MHz – 17.0 dBm		
Transmit Frequency Allocation Of EUT When Under Test (Channels):	2	Low	2406.5
	8	Middle	2439.0
	15	High	2474.0
Modulation(s):	0 Hz		
Modulation Scheme (Crest Factor)	CW (Crest Factor 1)		
Battery Type(s):	Alkaline		
Antenna Length and Type:	60mm External		
Number Of Antenna Positions	1 (Fixed)		
Intended Operating Environment:	Military		
Weight:	Approx - 500g (Excluding batteries)		
Dimensions (without Antenna) mm:	Approx - 137 (L) x 25 (H) x 90 (W) mm		
Power Supply Requirement:			
DC Supply (Volts/Amps)	Not Applicable		
AC Supply (Volts/Amps)	Not Applicable		
Internal Battery (Volts/Amps)	3V (2 x 1.5V Alkaline battery)		
Port(s):	Antenna		
	Headset / Mic Jack (Type unique to manufacturer)		
	Dual Switches		

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2.5. Support Equipment

Description:	Spectrum Analyser
Brand Name:	HP
Model Name or Number:	8594A (RFI Asset Number: M1001)
Serial Number:	3212U00338
Cable Length And Type:	Air Link
Connected to Port:	(RF Input) Antenna Port

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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, 2001.

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.

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4. Deviations From The Test Specification

At the request of the client the EUT was tested at specific frequencies, continuous wave.
(2406.5MHz, 2439.0MHz, 2474.0MHz).

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5. Operation Of The EUT During Testing

5.1. Operating Conditions

The EUT was tested in a normal laboratory environment.

During testing, the EUT was powered by an internal battery supply of 3V (2 x 1.5V Alkaline Battery).

5.2. Operating Modes

The EUT was tested in the following operating mode:

Transmit mode; Continuous wave

5.3. Configuration And Peripherals

The EUT was tested in the following configuration:

Fully powered; Stand alone

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6. Summary Of Test Results

6.1. Summary Of Tests

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

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6.2. Test Results For Specific Absorption Rate – 2450 MHz

Environmental Conditions – Body Sample 2

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

EIRP after Test:	Refer to section 6.3
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Position	Section	Frequency Channel No	Distance from EUT to phantom (mm)	SAR Level (W/kg) 1g	SAR Limit (W/kg) 1g	Margin (W/kg) 1g	Result
Rear Facing Phantom	Flat	8	15	0.166	1.6	1.434	Complied
Front Facing Phantom	Flat	8	15	0.172	1.6	1.428	Complied
Front Facing Phantom	Flat	2	15	0.177	1.6	1.423	Complied
Front Facing Phantom	Flat	15	15	0.165	1.6	1.435	Complied

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6.3. EIRP Measurement

EIRP Measurement

The EIRP of the EUT is as follow: -

Frequency Channel	Tx Power After test / dBm
2	18.6
8	19.2
15	18.4

Note: The EIRP measurements were performed post testing.

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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 DASY4 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 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.

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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.

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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 EUT was positioned under the flat section of the phantom.
- b) Measurements were performed with the EUT 15mm distance from the phantom.
- c) 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.
- d) The device was keyed to operate continuously in the transmit mode for the duration of the test.
- e) The location of the maximum spatial SAR distribution (Hot Spot) was determined relative to the handset and its antenna.
- f) The EUT was tested with a fully charged battery

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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.

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11. System Validation

11.1. Prior to the assessment, the system was verified in the flat region of the phantom. A 2450MHz dipole was used. A forward power of 250 mW was applied to the dipole and system was verified to a tolerance of $\pm 5\%$ 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 (02/04/04)	52.1	51.2

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12. Simulated Tissues

12.1. The body mixture consists 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
	2450MHz Muscle
Water	68.64%
DGMBE	31.37%
Salt	0.00%

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13. Tissue Parameters

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

Frequency (MHz)	Equivalent Tissue	Dielectric Constant ϵ_r	Conductivity σ (mho/m)
2450 (12/01/04)	Muscle	53.89	1.98

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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 bit A/D converter for surface detection system serial link to robot direct emergency stop output for robot.
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E-Field Probe

Model:	ET3DV6
Serial No:	1528
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

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15. Validation results

15.1. System Validation – 2450 MHz Body

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 ($\leq 5\%$)
D2450V2 / 725	52.10	51.20	Yes (1.73%)

15.1.2. Liquid Properties

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

Property	Target Value (2450 MHz)	Measured/Calculated Value (2450 MHz)	Percentage Difference ($\leq 5\%$)
Relative Permittivity	52.70	53.89	Yes (2.26%)
Conductivity	1.95	1.98	Yes (1.33%)

15.2. Temperature Variation

15.2.1. The temperature of the laboratory and within the tissue simulating liquid for this test shall not exceed the range +15°C to +30°C.

15.2.2. 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	24.0	24.0

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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%	+17.12%

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.

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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		u_i or u_{eff}
							+ u (%)	- u (%)	
B	Probe calibration	8.900	8.900	normal (k=2)	2.0000	1.0000	4.450	4.450	∞
B	Axial 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 Ambient 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	Dirt 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

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Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Model Number
A1322	2450MHz Dipole	Schmid & Partner	D2450V2
A034	Narda 20W Termination	Narda	374BNM
A1097	SMA Directional Coupler	MiDISCO	MDC6223-30
A1174	Dielectric Probe Kit	Agilent Technologies	85070C
A1185	Probe	Schmid & Partner	ET3 DV6
A1225	Low noise Amplifier	Mini Circuits	ZHL-42
A1234	Data Acquisition Electronics	Schmid & Partner	DAE3
A1238	SAM Phantom	Schmid & Partner	001
A215	20 dB Attenuator	Narda	766-20
C1052	Cable	Utiflex	FA210A0030M3030
C1053	Cable	Utiflex	FA210A0003M3030
C1054	Cable	Utiflex	FA210A0001M3050A
G046	Signal Generator	Gigatronics	7100/.01-20
G0528	Robot Power Supply	Schmid & Partner	DASY
G088	PSU	Thurlby Thandar	CPX200
M011	NRV-Z1 Power Sensor	Rohde & Schwarz	NRV-Z1
M1001	Spectrum Analyser 8594A	Hewlett Packard	8594A
M1015	Network Analyser	Agilent Technologies	8753ES
M103	URY Power Meter	Rohde & Schwarz	URY
M1047	Robot Arm	Staubli	RX908 L
M1130	Rohde & Schwarz	Rohde & Schwarz	URY-Z2
M136	Temperature/Humidity/Pressure Meter	RS Components	None
M509	Thermometer	Testo	110
S256	Site 56	RFI	N/A

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

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Appendix 2. SAR Distribution Scans

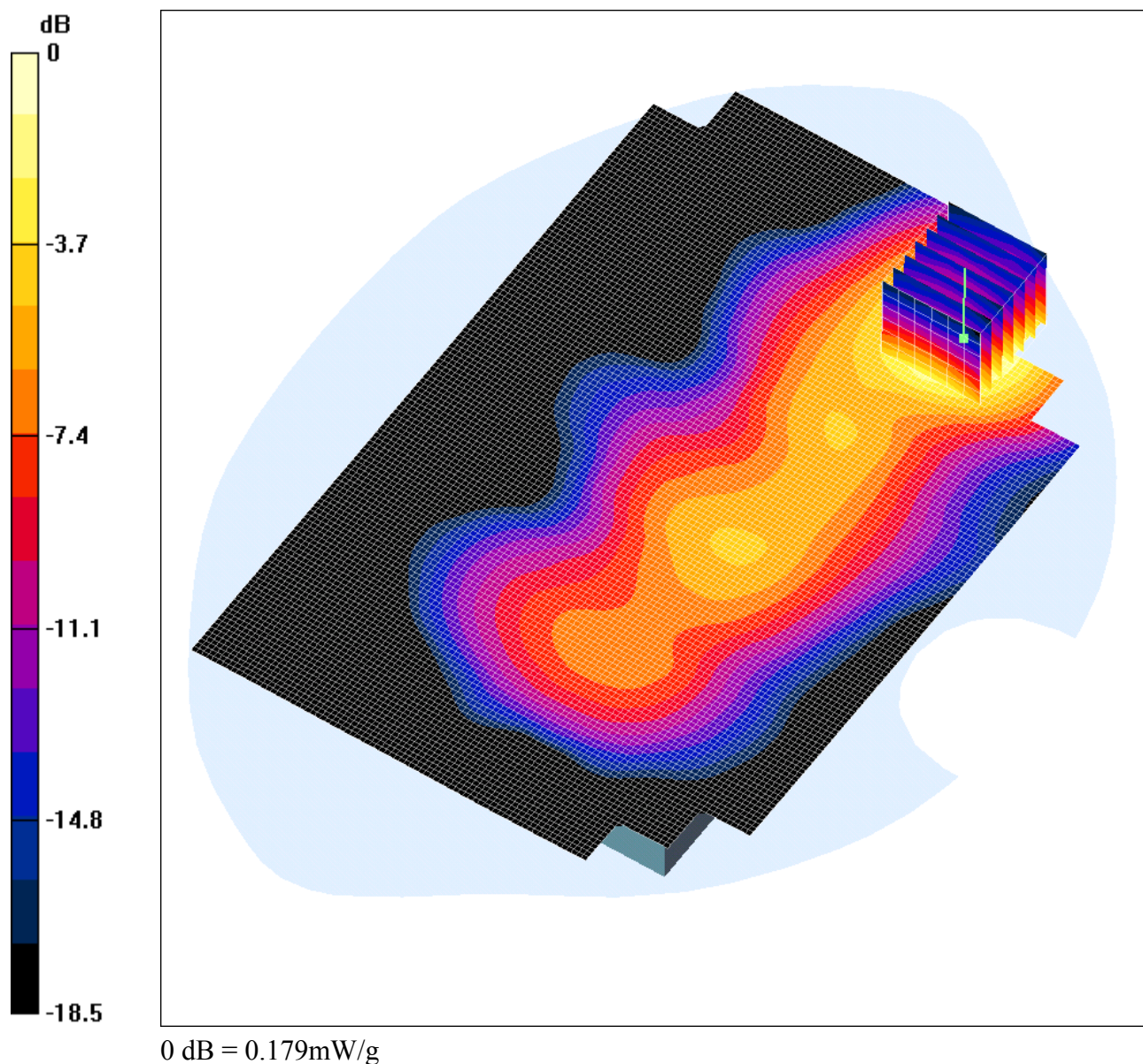
This appendix contains SAR Distribution Scans.

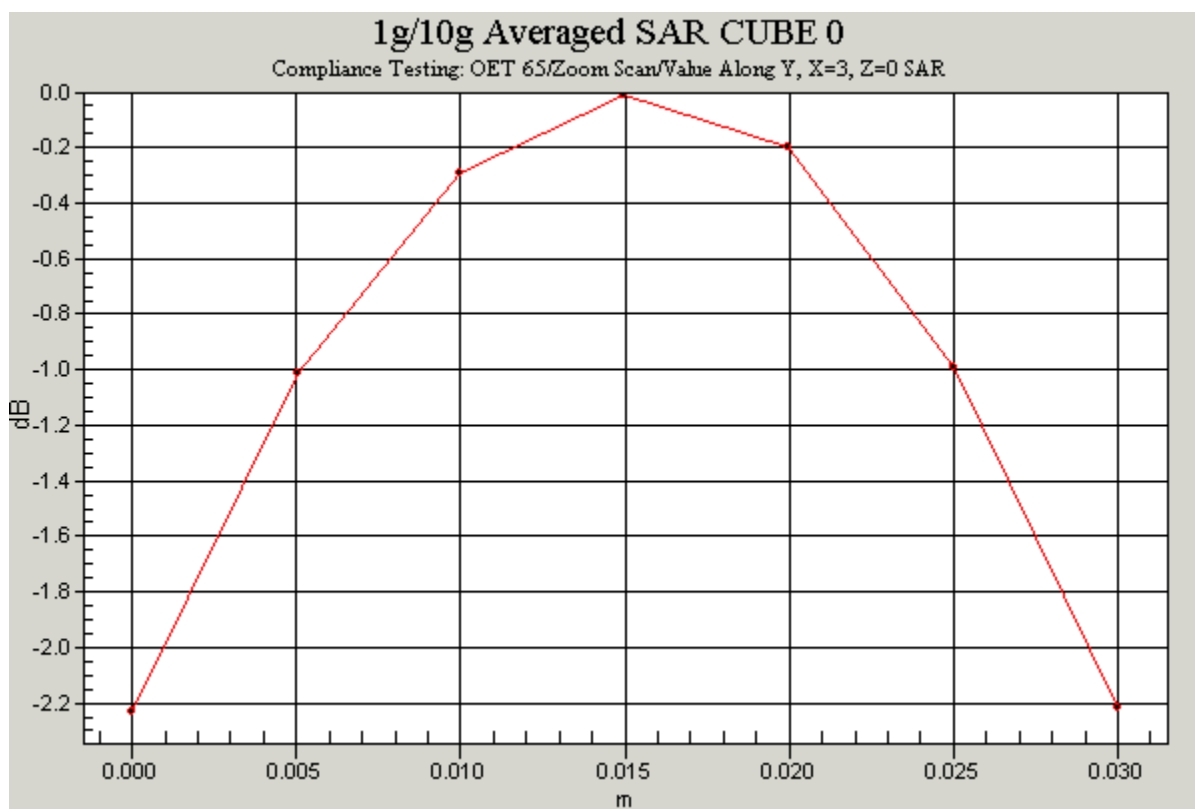
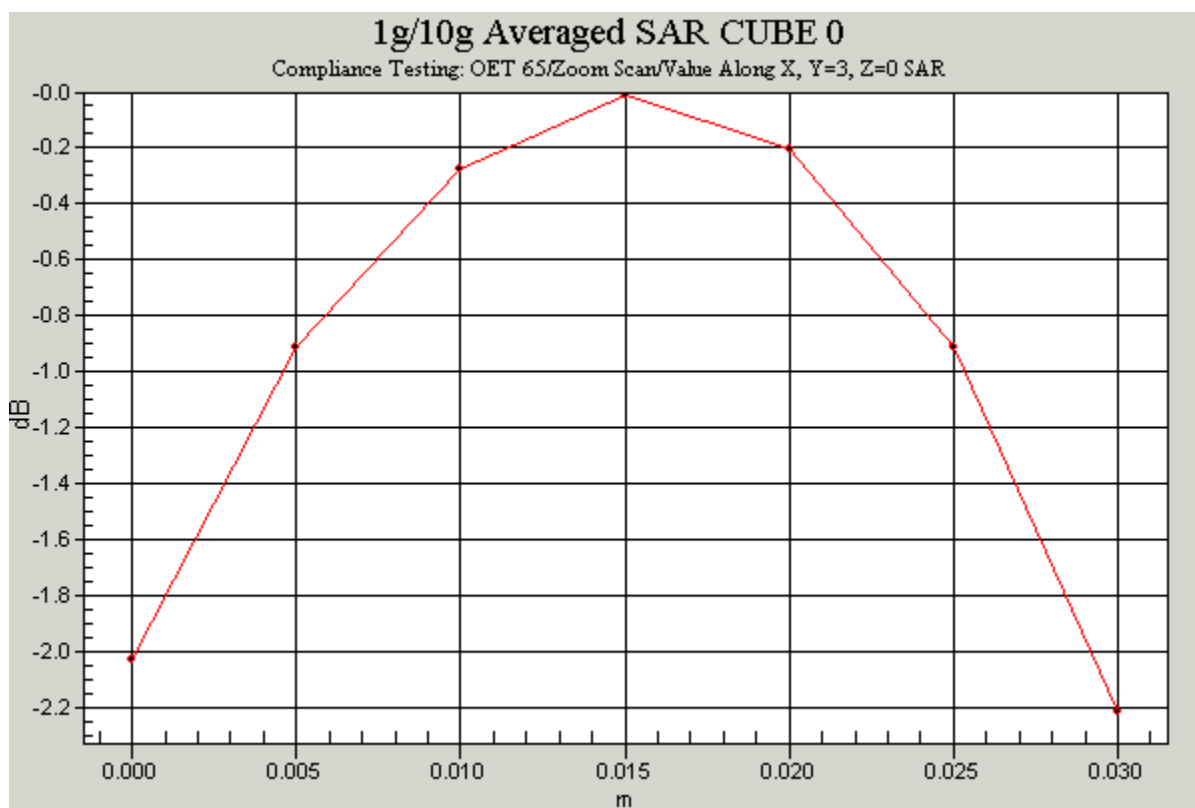
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GPH/45620/JD08/002	Flat Section 2439MHz Group 1 Channel 8 Middle Front Facing Phantom
GPH/45620/JD08/003	Flat Section 2406.5MHz Group 0 Channel 2 Low Front Facing Phantom
GPH/45620/JD08/004	Flat Section 2474MHz Group 1 Channel 15 High Front Facing Phantom
GPH/45620/JD08/Validation 001	System Performance Check – D2450 02 04 04

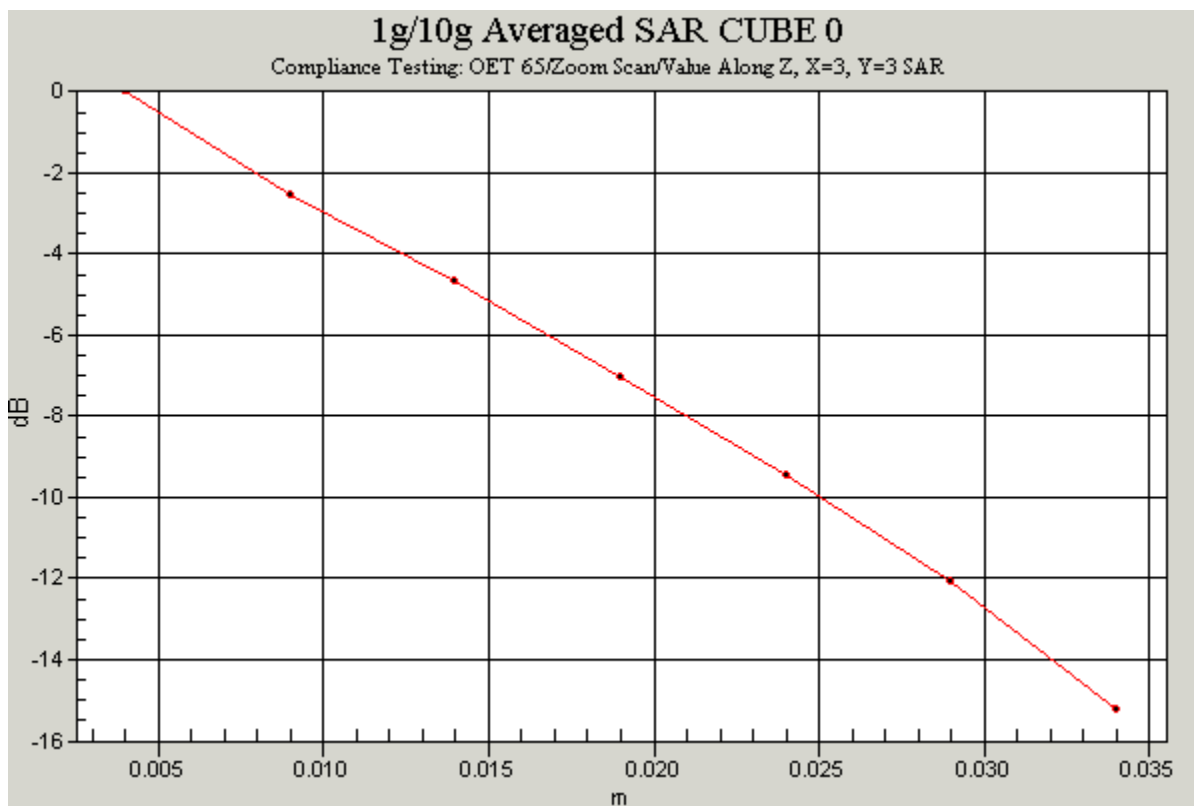
Date: 02/04/04

45620/JD08/001

Test Laboratory: RADIO FREQUENCY INVESTIGATION LTD.

45620_JD08_Flat_Section_2439MHz_Group_1_Channel_8_Middle_Rear_Facing_Phantom**DUT: Marconi Selenia; Type: H4855; Serial: FCC01**





Communication System: 2450 MHz Marconi Configuration; Frequency: 2439 MHz; Duty Cycle: 1:1
 Medium: 2450MHz MSL Medium parameters used (interpolated): $f = 2439$ MHz; $\sigma = 1.96$ mho/m; $\epsilon_r = 53.9$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1528; ConvF(4.3, 4.3, 4.3); Calibrated: 29/07/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 19/05/2003
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

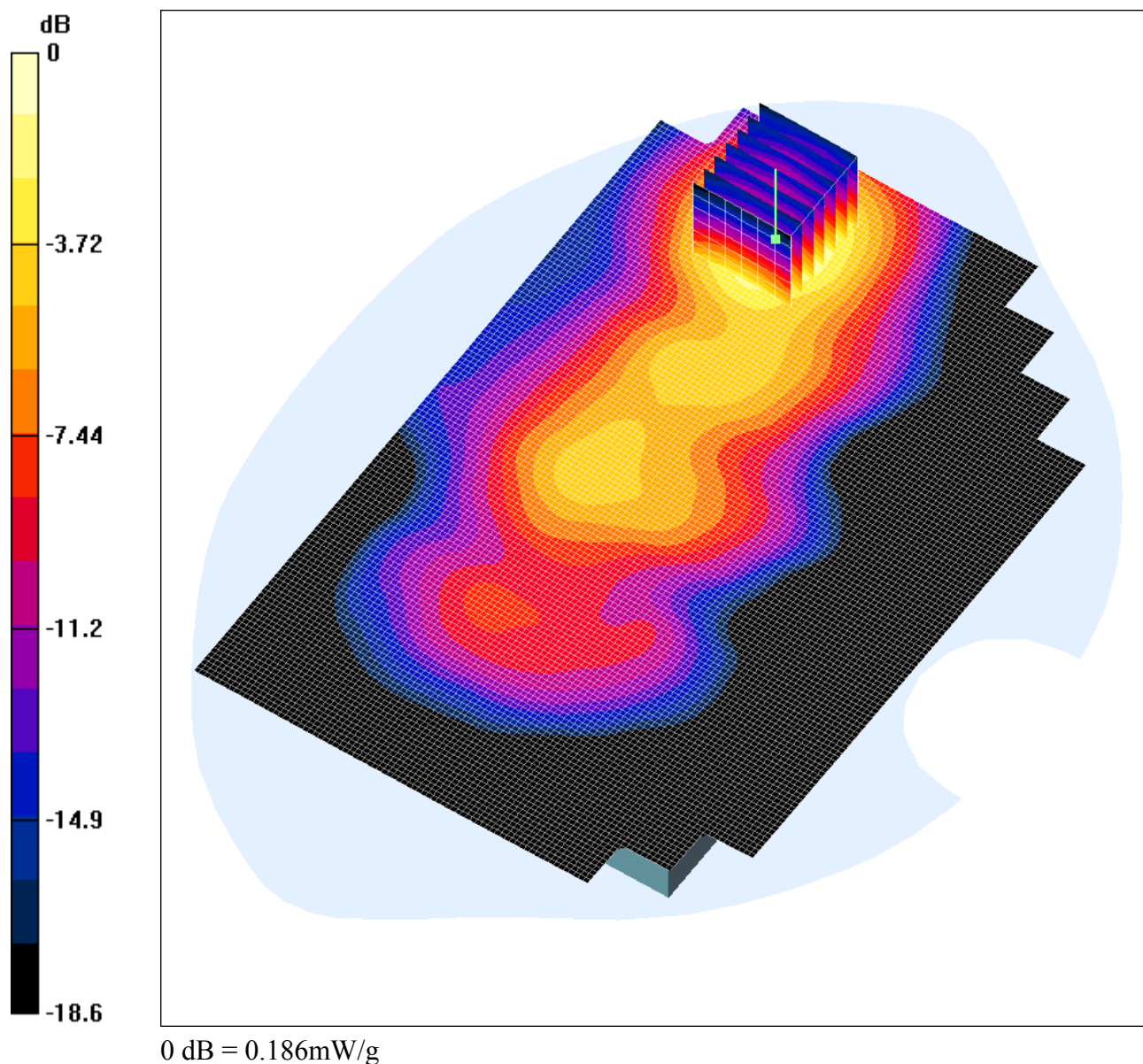
Rear facing phantom, Middle/Area Scan (101x151x1): Measurement grid: dx=15mm, dy=15mm
 Reference Value = 4.92 V/m; Power Drift = 0.1 dB
 Maximum value of SAR (interpolated) = 0.180 mW/g

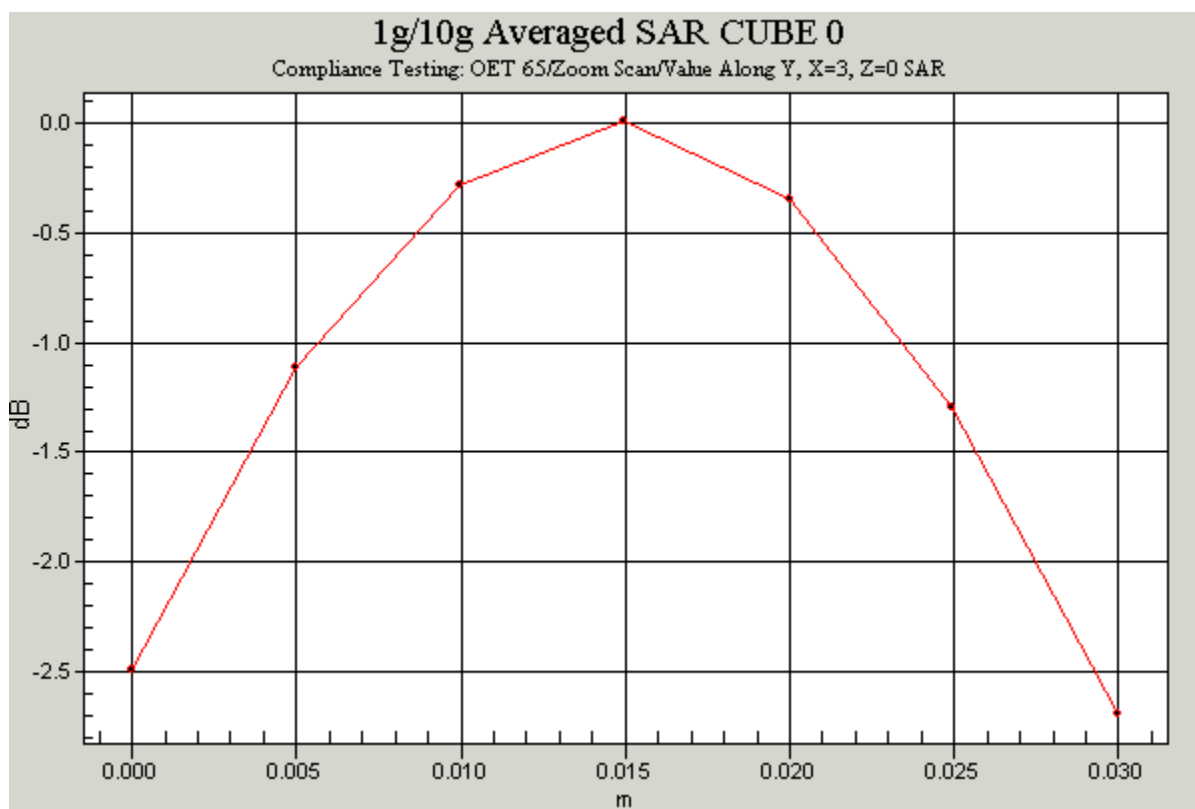
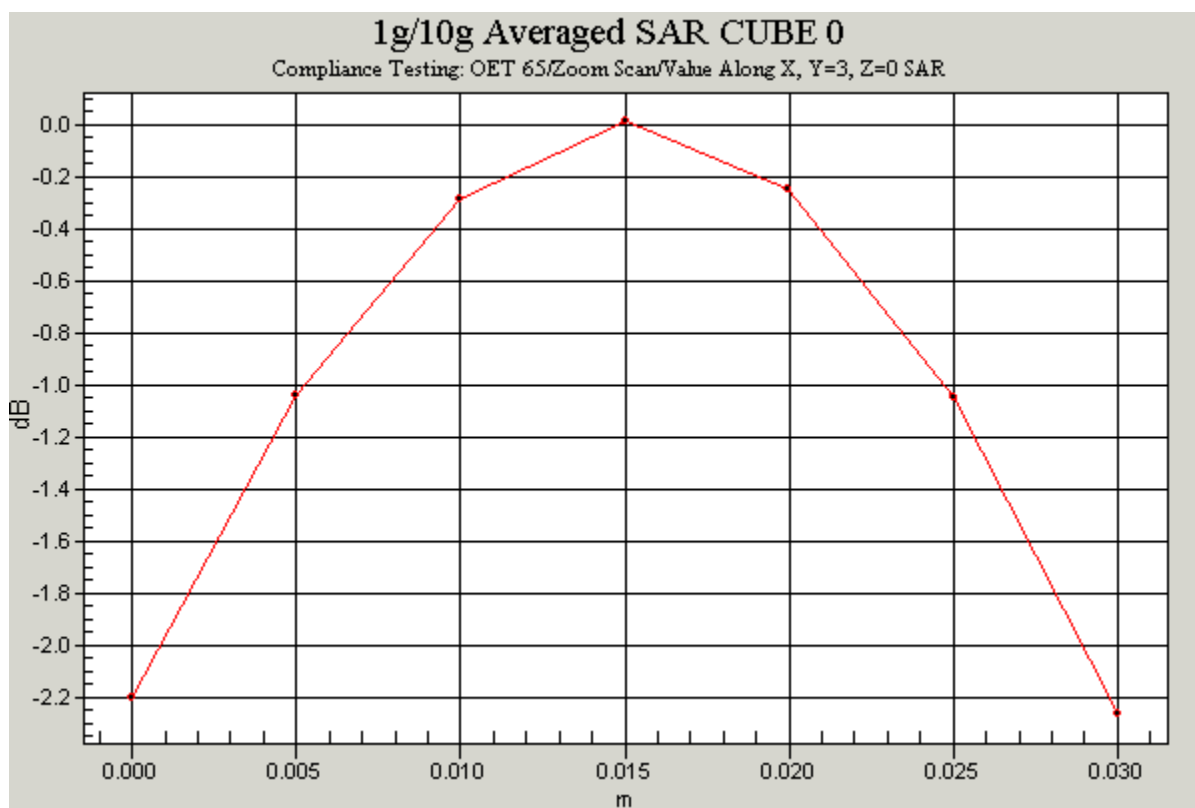
Rear facing phantom, Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
 Reference Value = 4.92 V/m; Power Drift = 0.1 dB
 Maximum value of SAR (measured) = 0.179 mW/g
 Peak SAR (extrapolated) = 0.322 W/kg
SAR(1 g) = 0.166 mW/g; SAR(10 g) = 0.092 mW/g

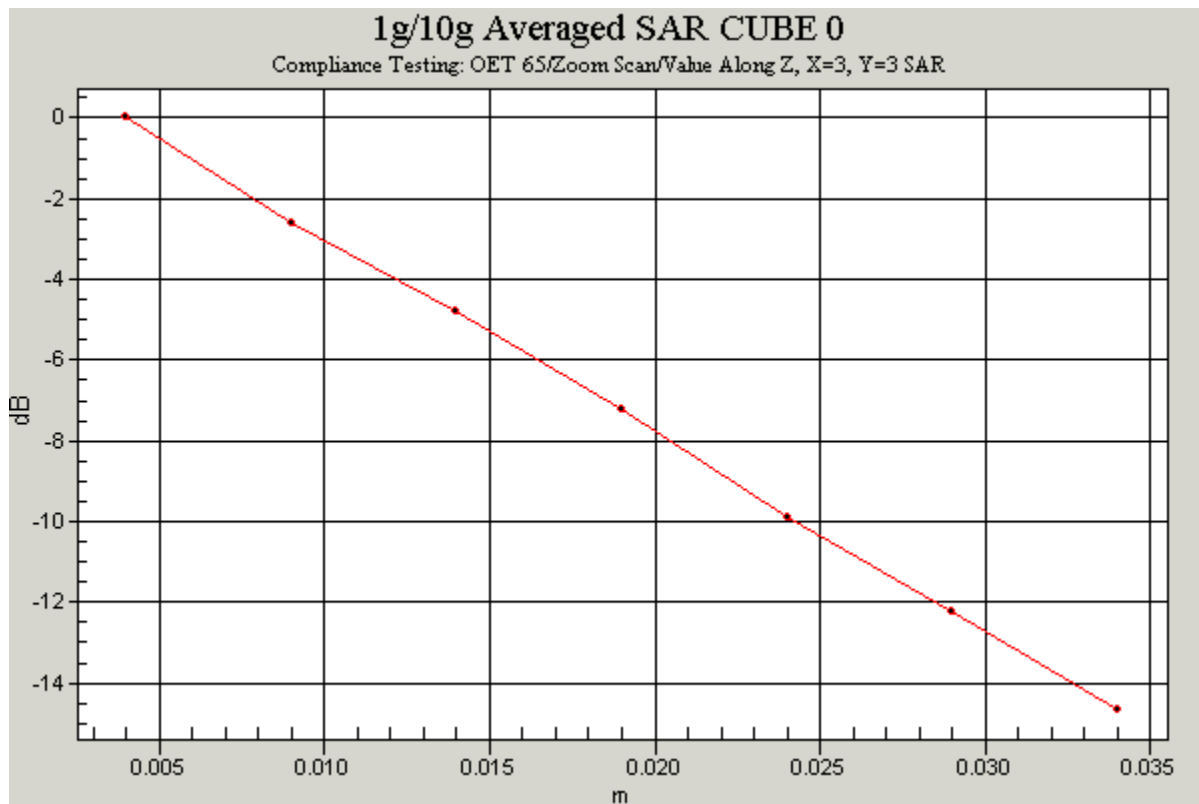
Date: 02/04/04

45620/JD08/002

Test Laboratory: RADIO FREQUENCY INVESTIGATION LTD.

45620_JD08_Flat_Section_2439MHz_Group_1_Channel_8_Middle_Front_Facing_Phantom**DUT: Marconi Selenia; Type: H4855; Serial: FCC01**





Communication System: 2450 MHz Marconi Configuration; Frequency: 2439 MHz; Duty Cycle: 1:1
 Medium: 2450MHz MSL Medium parameters used (interpolated): $f = 2439$ MHz; $\sigma = 1.96$ mho/m; $\epsilon_r = 53.9$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1528; ConvF(4.3, 4.3, 4.3); Calibrated: 29/07/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 19/05/2003
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

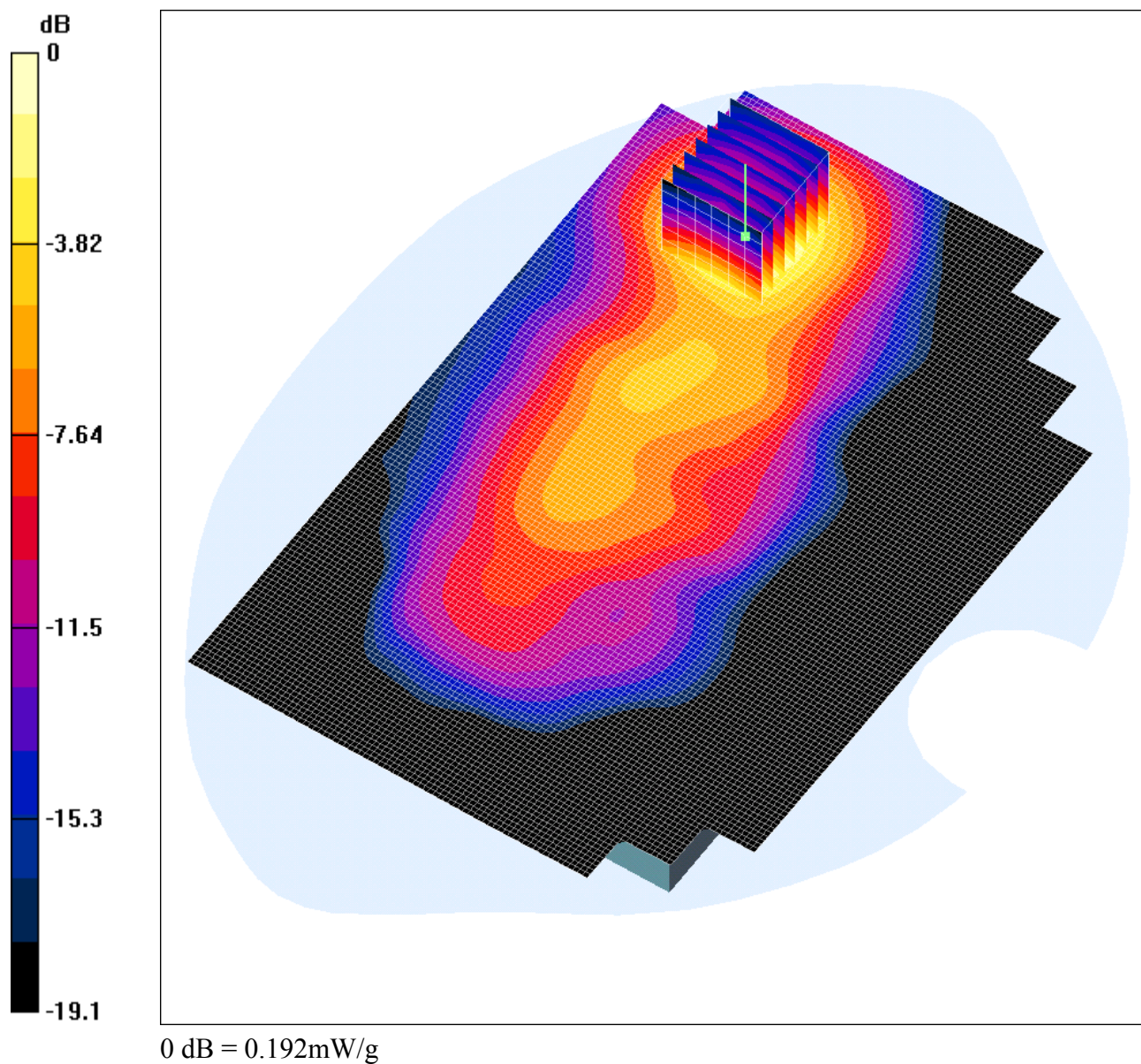
Front facing phantom, Middle/Area Scan (101x151x1): Measurement grid: dx=15mm, dy=15mm
 Reference Value = 5 V/m; Power Drift = 0.0 dB
 Maximum value of SAR (interpolated) = 0.187 mW/g

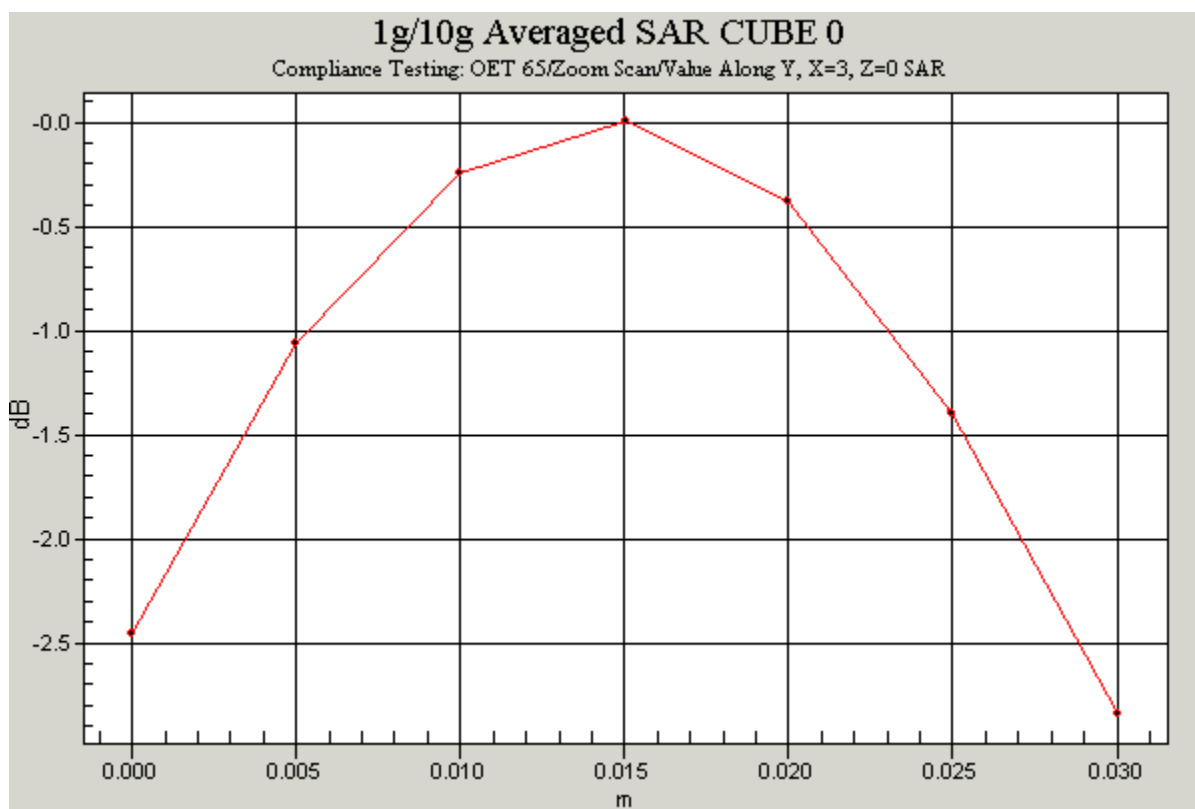
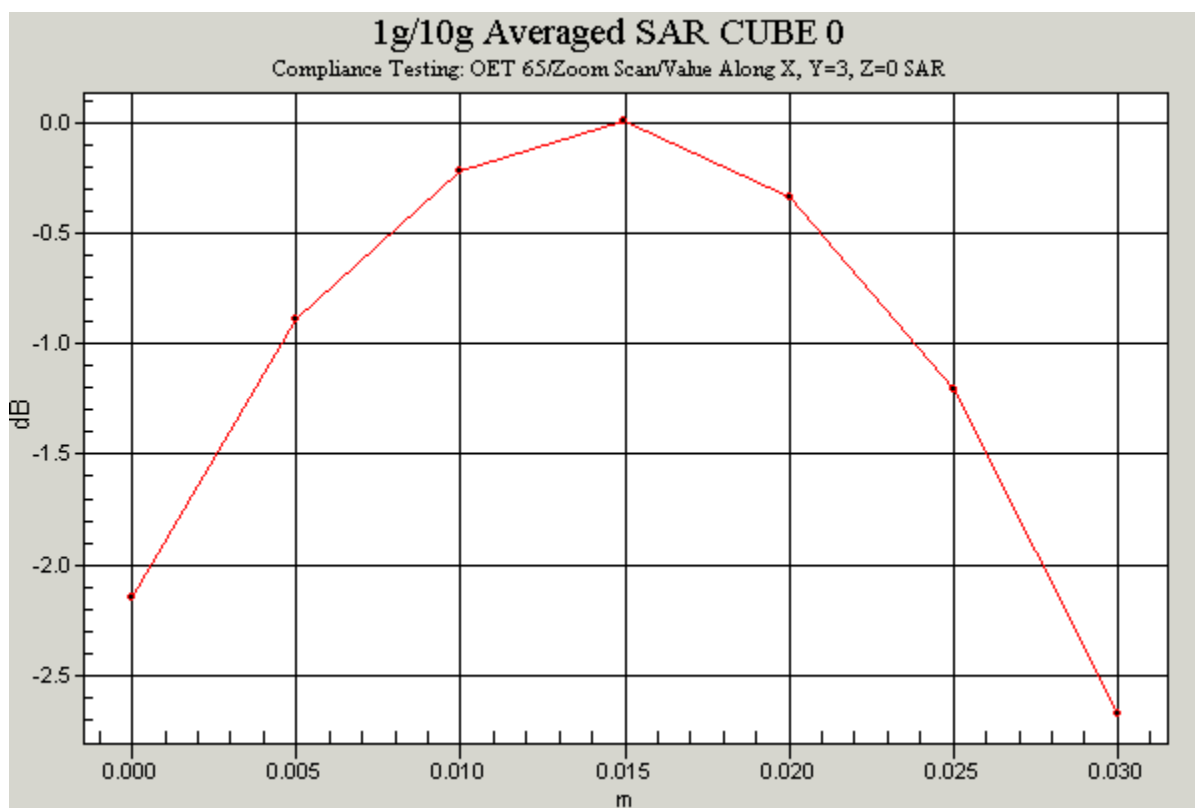
Front facing phantom, Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
 Reference Value = 5 V/m; Power Drift = 0.0 dB
 Maximum value of SAR (measured) = 0.186 mW/g
 Peak SAR (extrapolated) = 0.336 W/kg
SAR(1 g) = 0.172 mW/g; SAR(10 g) = 0.093 mW/g

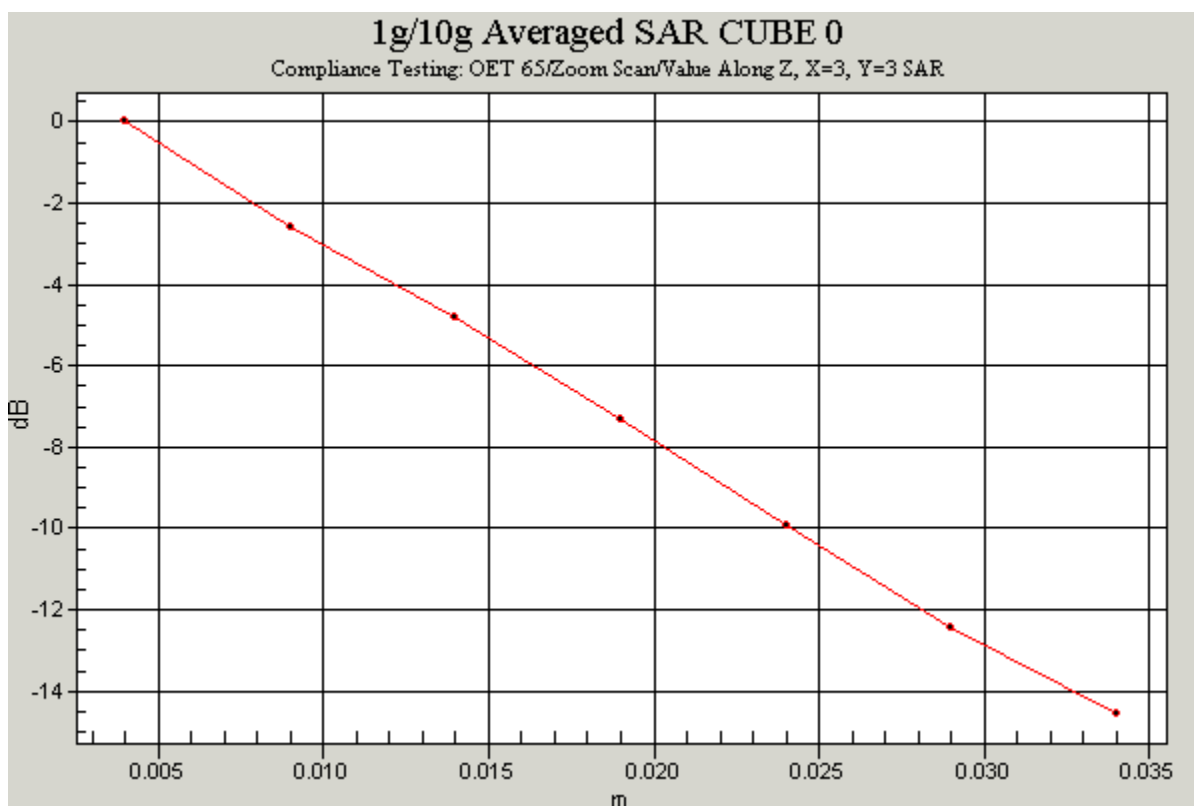
Date: 02/04/04

45620/JD08/003

Test Laboratory: RADIO FREQUENCY INVESTIGATION LTD.

45620_JD08_Flat_Section_2406.5MHz_Group_0_Channel_2_Low_Front_Facing_Phantom**DUT: Marconi Selenia; Type: H4855; Serial: FCC01**





Communication System: 2450 MHz Marconi Configuration; Frequency: 2406.5 MHz; Duty Cycle: 1:1
 Medium: 2450MHz MSL Medium parameters used (interpolated): $f = 2406.5$ MHz; $\sigma = 1.92$ mho/m; $\epsilon_r = 54.1$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1528; ConvF(4.3, 4.3, 4.3); Calibrated: 29/07/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 19/05/2003
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

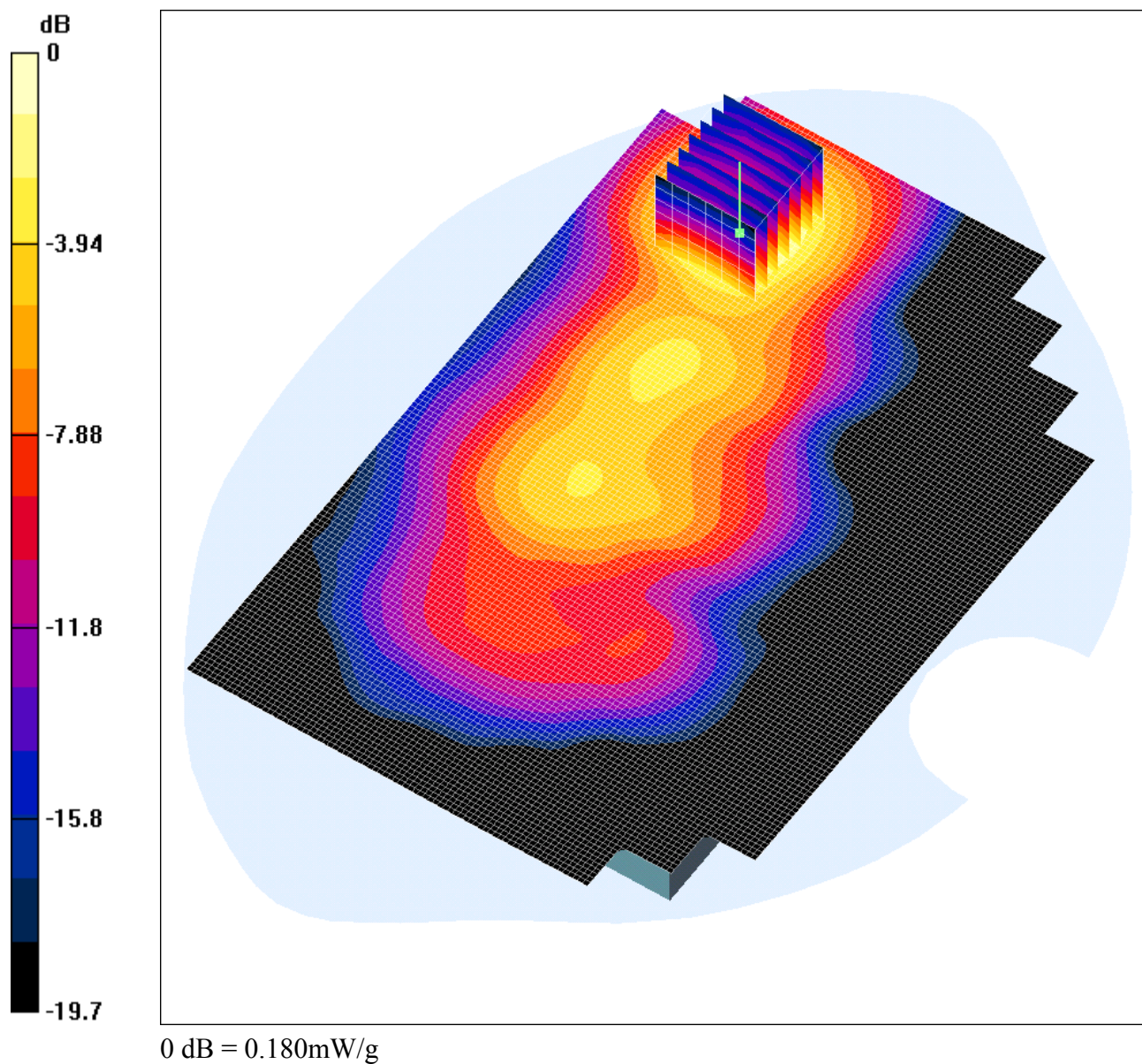
Front facing phantom, Middle/Area Scan (101x151x1): Measurement grid: dx=15mm, dy=15mm
 Reference Value = 4.27 V/m; Power Drift = 0.1 dB
 Maximum value of SAR (interpolated) = 0.199 mW/g

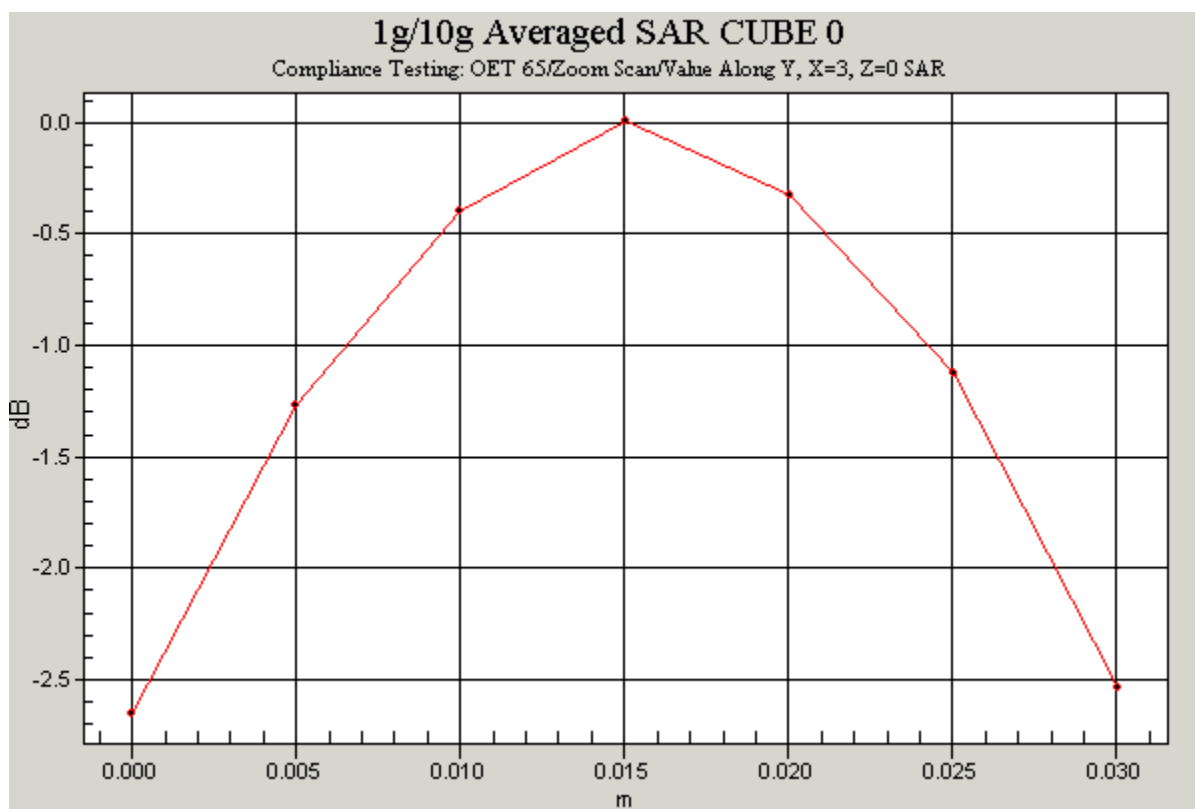
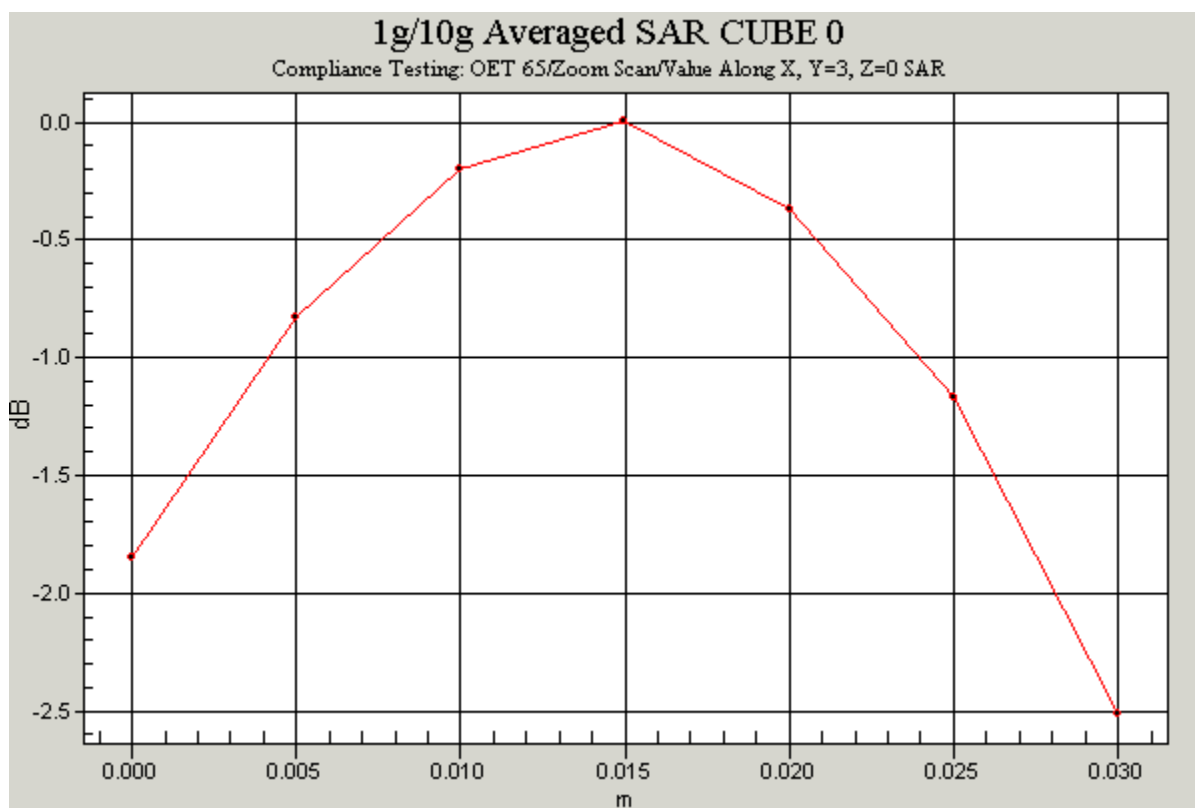
Front facing phantom, Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
 Reference Value = 4.27 V/m; Power Drift = 0.1 dB
 Maximum value of SAR (measured) = 0.192 mW/g
 Peak SAR (extrapolated) = 0.345 W/kg
SAR(1 g) = 0.177 mW/g; SAR(10 g) = 0.096 mW/g

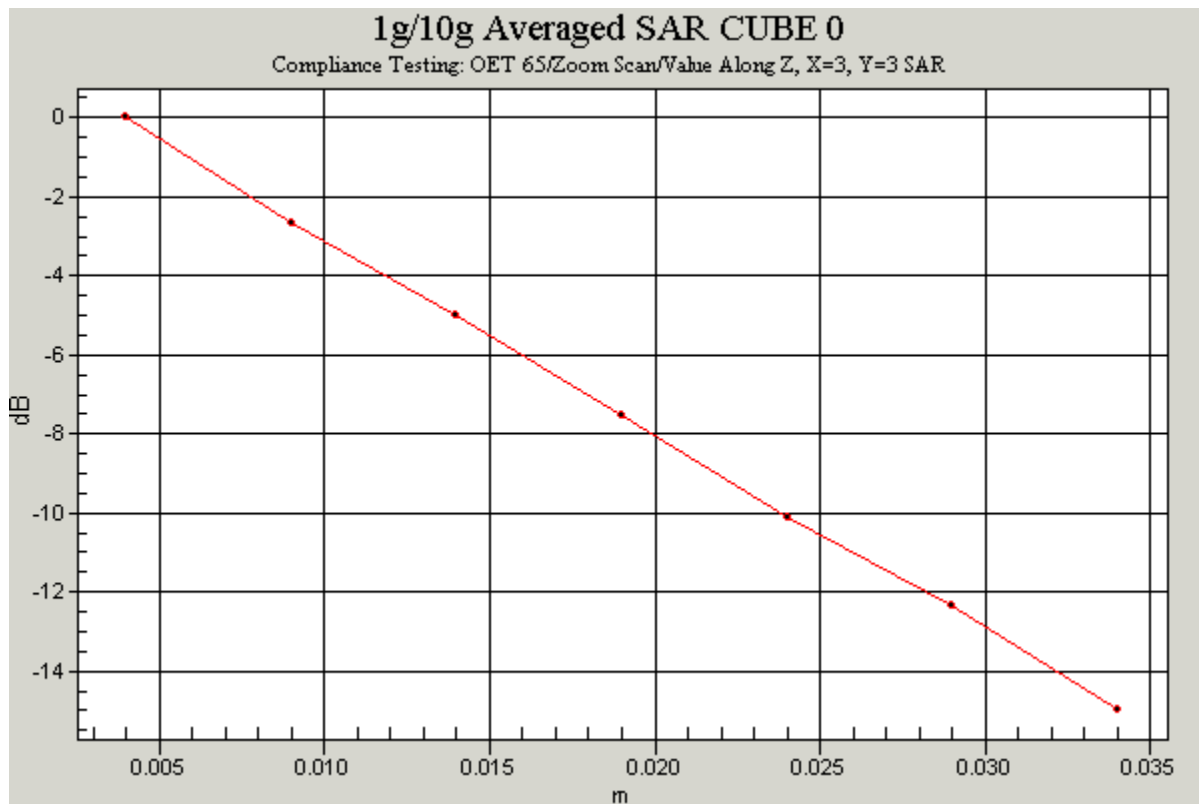
Date: 02/04/04

45620/JD08/004

Test Laboratory: RADIO FREQUENCY INVESTIGATION LTD.

45620_JD08_Flat_Section_2474MHz_Group_1_Channel_15_High_Front_Facing_Phantom**DUT: Marconi Selenia; Type: H4855; Serial: FCC01**





Communication System: 2450 MHz Marconi Configuration; Frequency: 2474 MHz; Duty Cycle: 1:1
 Medium: 2450MHz MSL Medium parameters used (interpolated): $f = 2474$ MHz; $\sigma = 2.01$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1528; ConvF(4.3, 4.3, 4.3); Calibrated: 29/07/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 19/05/2003
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

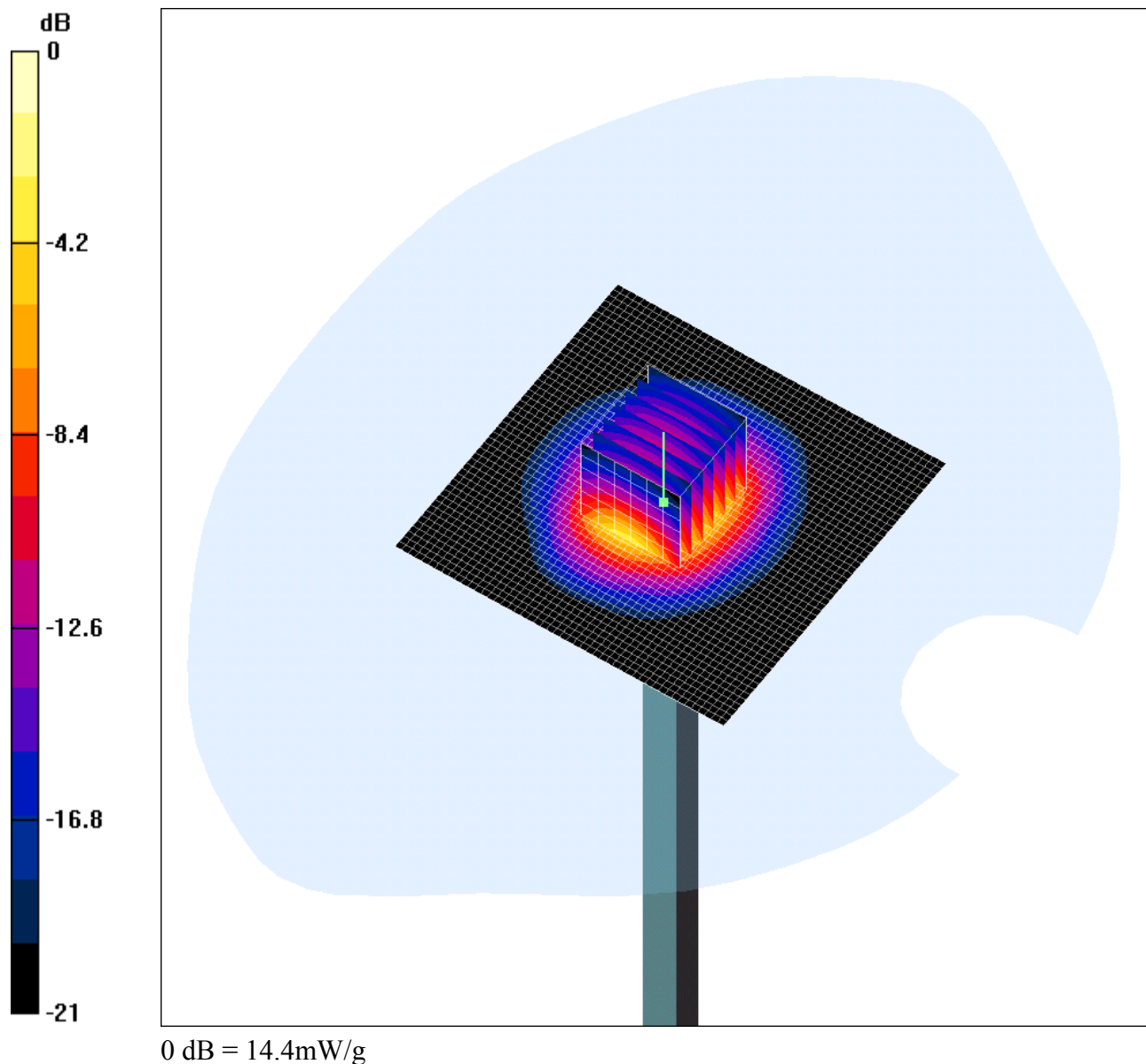
Front facing phantom, Middle/Area Scan (101x151x1): Measurement grid: dx=15mm, dy=15mm
 Reference Value = 4.89 V/m; Power Drift = -0.0005 dB
 Maximum value of SAR (interpolated) = 0.181 mW/g

Front facing phantom, Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
 Reference Value = 4.89 V/m; Power Drift = -0.0005 dB
 Maximum value of SAR (measured) = 0.180 mW/g
 Peak SAR (extrapolated) = 0.326 W/kg
SAR(1 g) = 0.165 mW/g; SAR(10 g) = 0.089 mW/g

Date: 02/04/04

VALIDATION_001

Test Laboratory: RADIO FREQUENCY INVESTIGATION LTD.

System Performance Check-D2450 02 04 04**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN725**

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450MHz MSL Medium parameters used: $f = 2450$ MHz; $\sigma = 1.98$ mho/m; $\epsilon_r = 53.9$; $\rho = 1000$ kg/m^3

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1528; ConvF(4.3, 4.3, 4.3); Calibrated: 29/07/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 19/05/2003
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

d=10mm, Pin=250mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm

Reference Value = 86.9 V/m; Power Drift = -0.0 dB

Maximum value of SAR (interpolated) = 18.3 mW/g

d=10mm, Pin=250mW/Zoom Scan 7x7x7 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 86.9 V/m; Power Drift = -0.0 dB

Maximum value of SAR (measured) = 14.4 mW/g

Peak SAR (extrapolated) = 27.5 W/kg

SAR(1 g) = 12.8 mW/g; SAR(10 g) = 6.03 mW/g

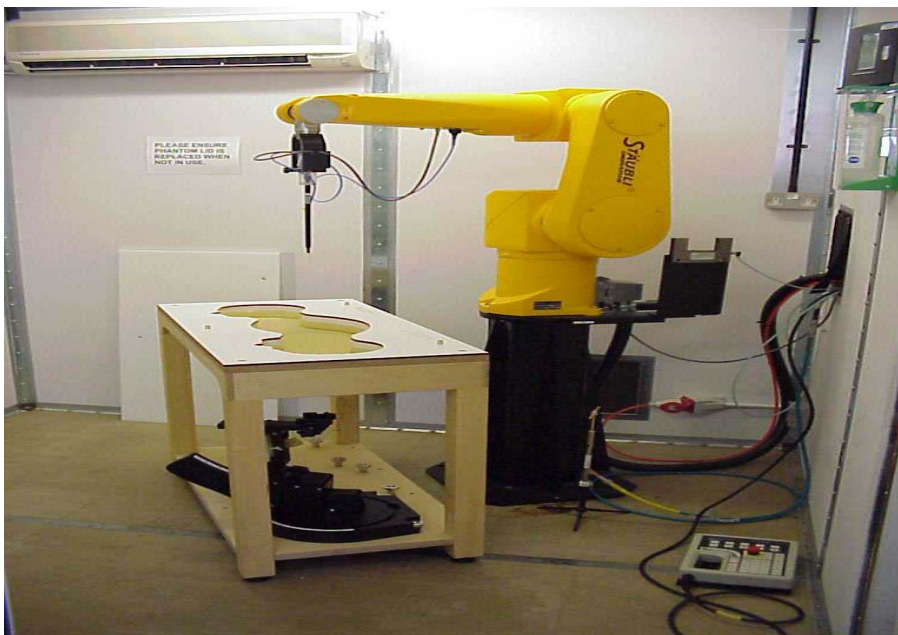
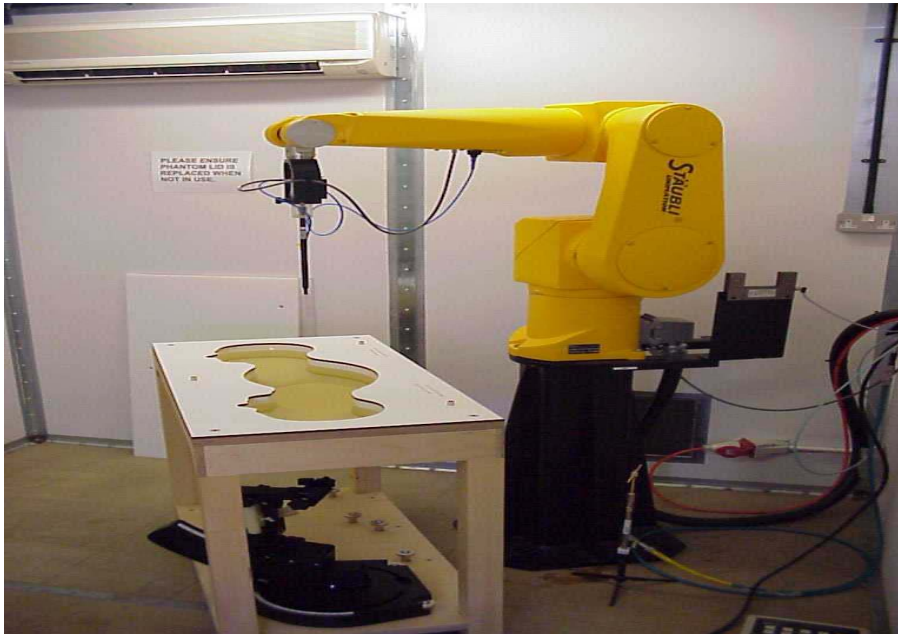
Test Of: Marconi Selenia Communications Ltd.

Personal Role Radio - H4855

To: OET Bulletin 65 Supplement C: (2001-01)

Appendix 3. Test Configuration Photographs

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



Test Of: Marconi Selenia Communications Ltd.

Personal Role Radio - H4855

To: OET Bulletin 65 Supplement C: (2001-01)

Test Configuration Photographs (Continued)



Test Of: Marconi Selenia Communications Ltd.

Personal Role Radio - H4855

To: OET Bulletin 65 Supplement C: (2001-01)

Appendix 4. Calibration Data

This appendix contains the calibration data and certificates.

RADIO FREQUENCY INVESTIGATION LTD.

TEST REPORT

S.No. RFI/SARB1/RP45620JD08A

Page 30 of 46

Issue Date: 23 April 2004

Test Of: Marconi Selenia Communications Ltd.

Personal Role Radio - H4855

To: OET Bulletin 65 Supplement C: (2001-01)

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

Handwritten: 4/11/03
CHECKED
06/08/03

Client

RFI

CALIBRATION CERTIFICATE

Object(s)

ET3DV6 - SN: 1528

Calibration procedure(s)

QA CAL-01 v2
Calibration procedure for dosimetric E-field probes

Calibration date:

July 29, 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:	Nico Vetterli	Technician	<i>N. Vetterli</i>
Approved by:	Katja Pokovic	Laboratory Director	<i>Katja Pokovic</i>

Date issued: July 29, 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.

Probe ET3DV6

SN:1528

Manufactured:	March 21, 2000
Last calibration:	February 6, 2003
Recalibrated:	July 29, 2003

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1528**Sensitivity in Free Space****Diode Compression**

NormX	1.51 $\mu\text{V}/(\text{V}/\text{m})^2$	DCP X	99	mV
NormY	1.28 $\mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	99	mV
NormZ	1.34 $\mu\text{V}/(\text{V}/\text{m})^2$	DCP Z	99	mV

Sensitivity in Tissue Simulating Liquid

Head **900 MHz** $\epsilon_r = 41.5 \pm 5\%$ $\sigma = 0.97 \pm 5\% \text{ mho/m}$
Valid for f=855-945 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	6.3 $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	6.3 $\pm 9.5\%$ (k=2)	Alpha	0.41
ConvF Z	6.3 $\pm 9.5\%$ (k=2)	Depth	2.46

Head **1800 MHz** $\epsilon_r = 40.0 \pm 5\%$ $\sigma = 1.40 \pm 5\% \text{ mho/m}$
Valid for f=1710-1890 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	5.0 $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	5.0 $\pm 9.5\%$ (k=2)	Alpha	0.51
ConvF Z	5.0 $\pm 9.5\%$ (k=2)	Depth	2.62

Boundary Effect

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

Probe Tip to Boundary		1 mm	2 mm
SAR _{be} [%] Without Correction Algorithm		10.2	6.0
SAR _{be} [%] With Correction Algorithm		0.3	0.3

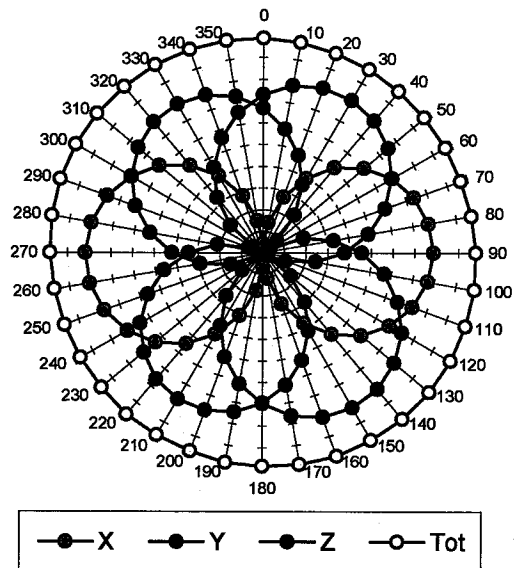
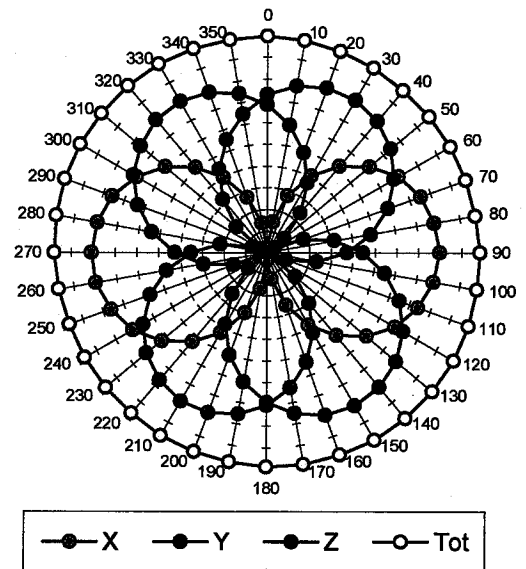
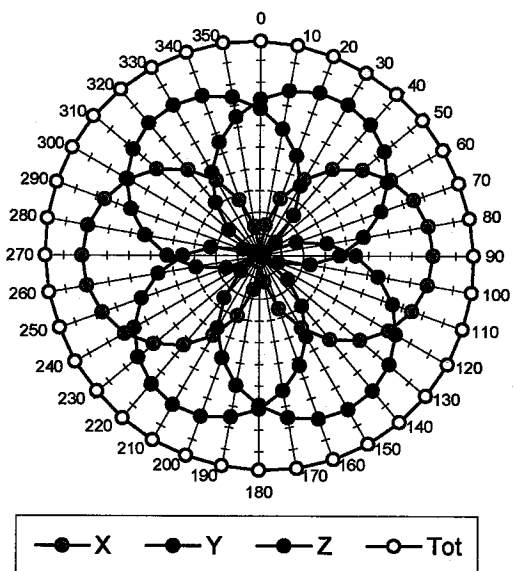
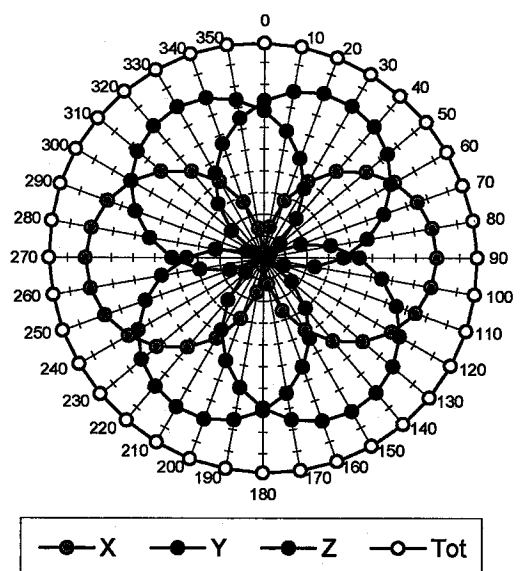
Head **1800 MHz** **Typical SAR gradient: 10 % per mm**

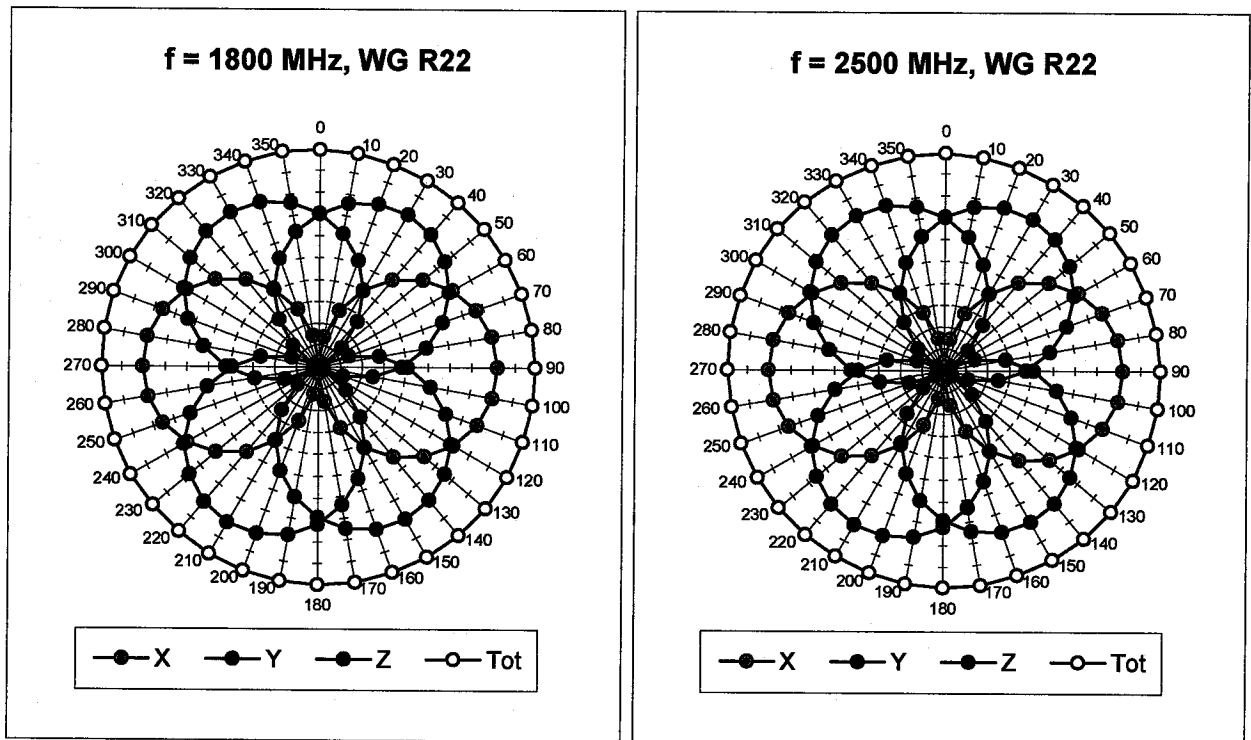
Probe Tip to Boundary		1 mm	2 mm
SAR _{be} [%] Without Correction Algorithm		13.9	9.2
SAR _{be} [%] With Correction Algorithm		0.2	0.0

Sensor Offset

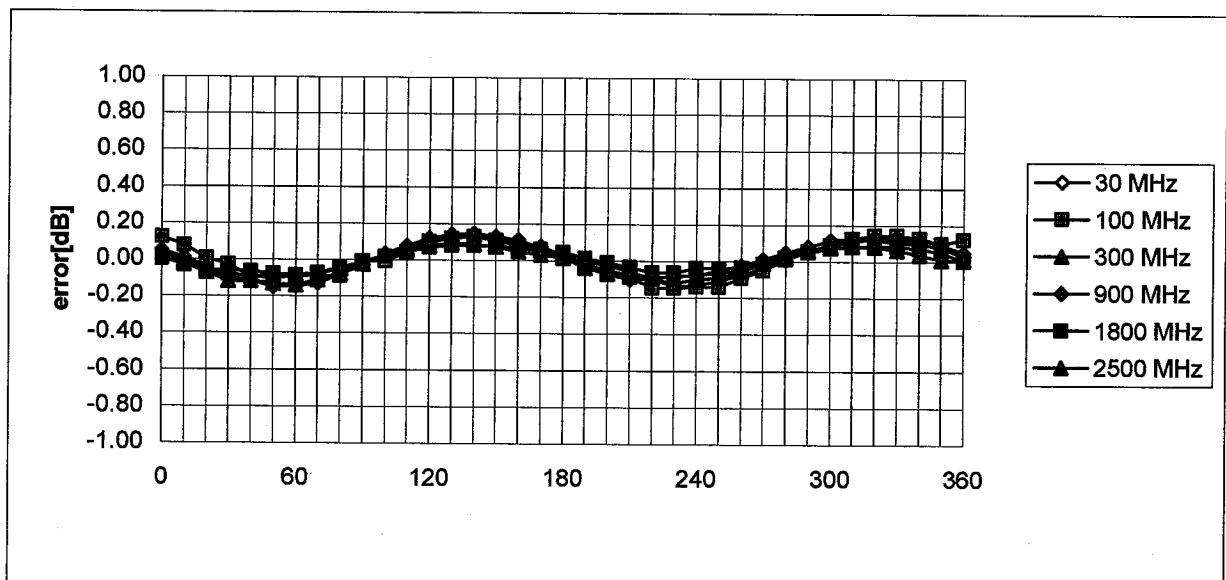
Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.6 \pm 0.2	mm

Receiving Pattern (ϕ , $\theta = 0^\circ$)

f = 30 MHz, TEM cell ifi110**f = 100 MHz, TEM cell ifi110****f = 300 MHz, TEM cell ifi110****f = 900 MHz, TEM cell ifi110**

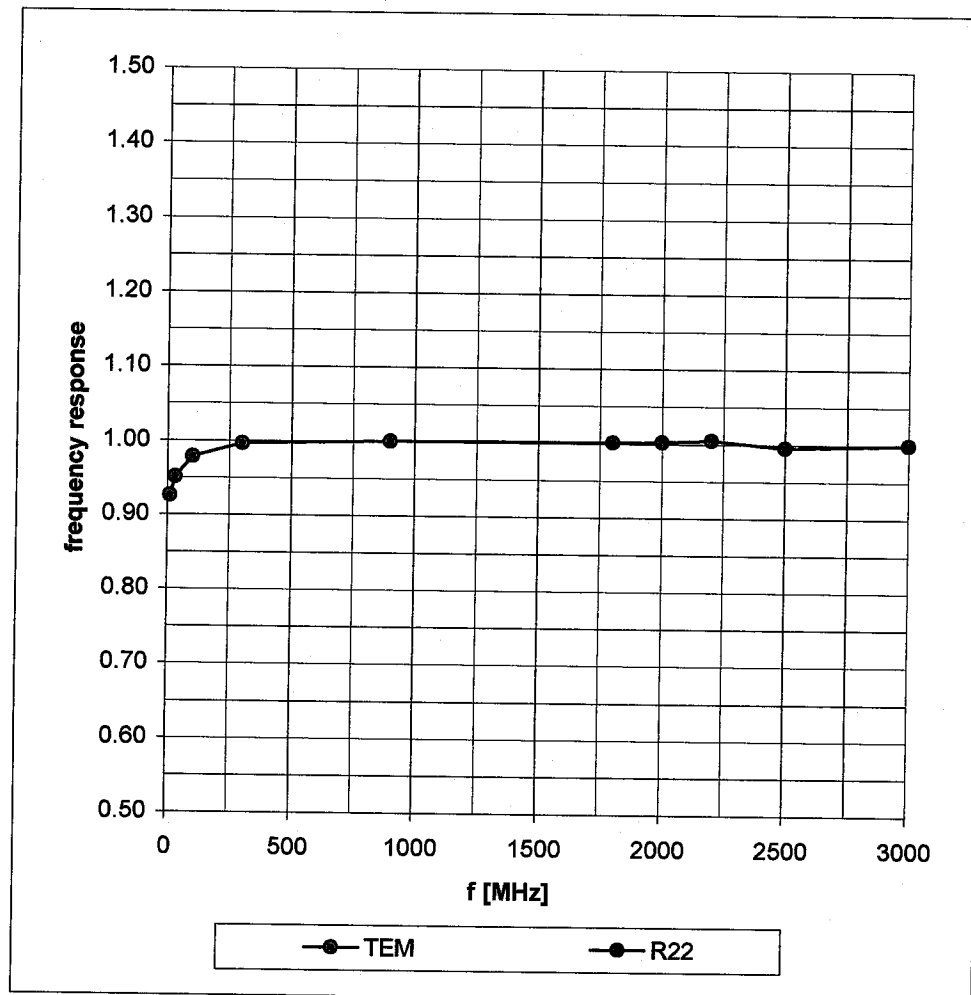


Isotropy Error (ϕ), $\theta = 0^\circ$

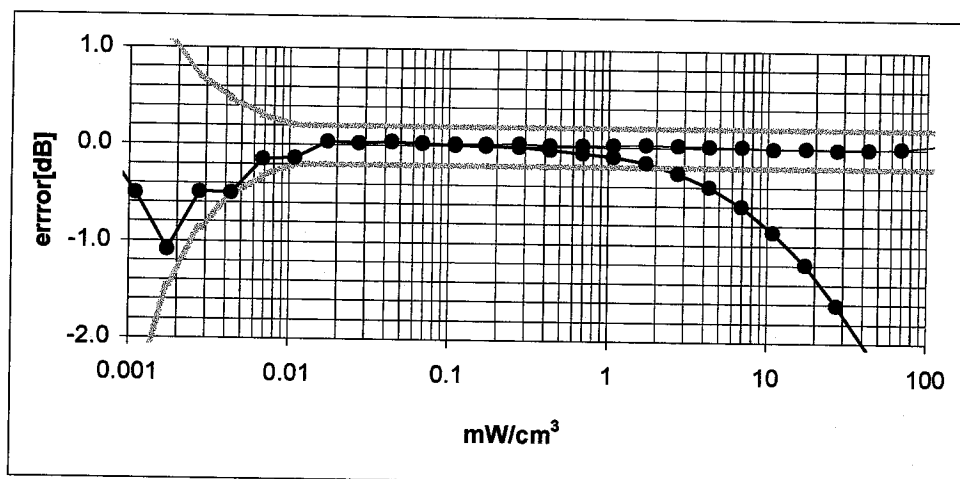
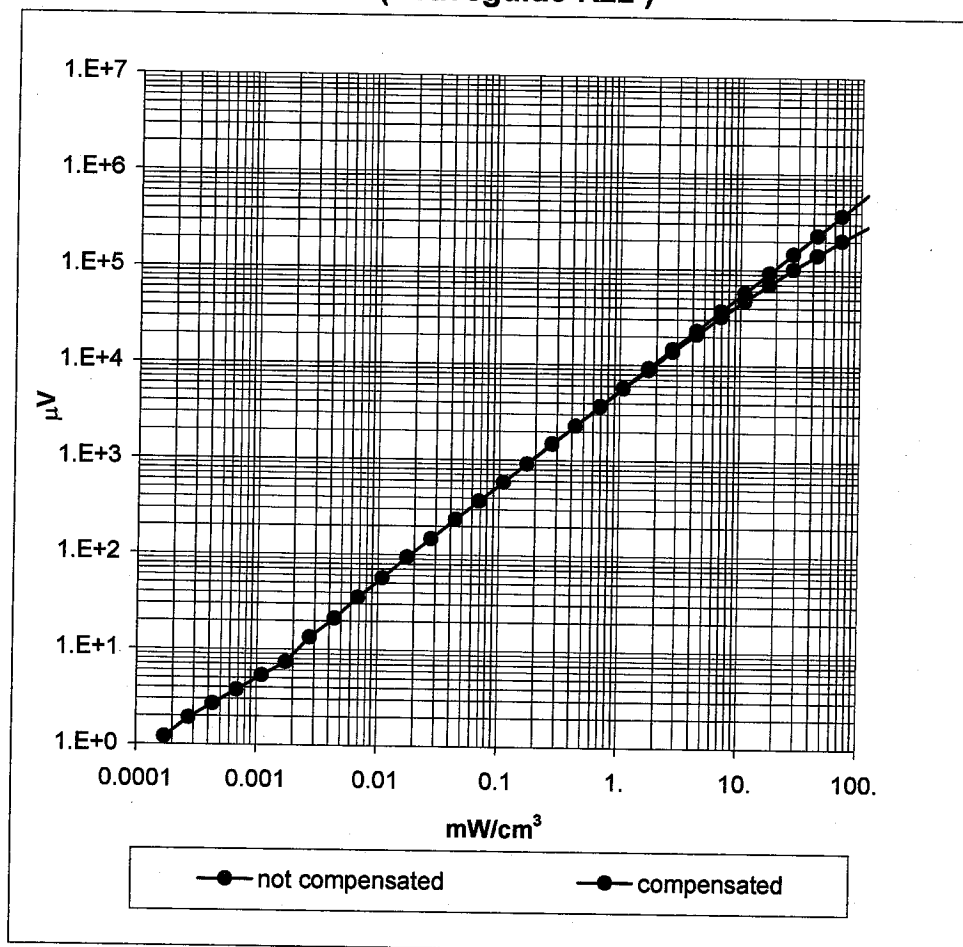


Frequency Response of E-Field

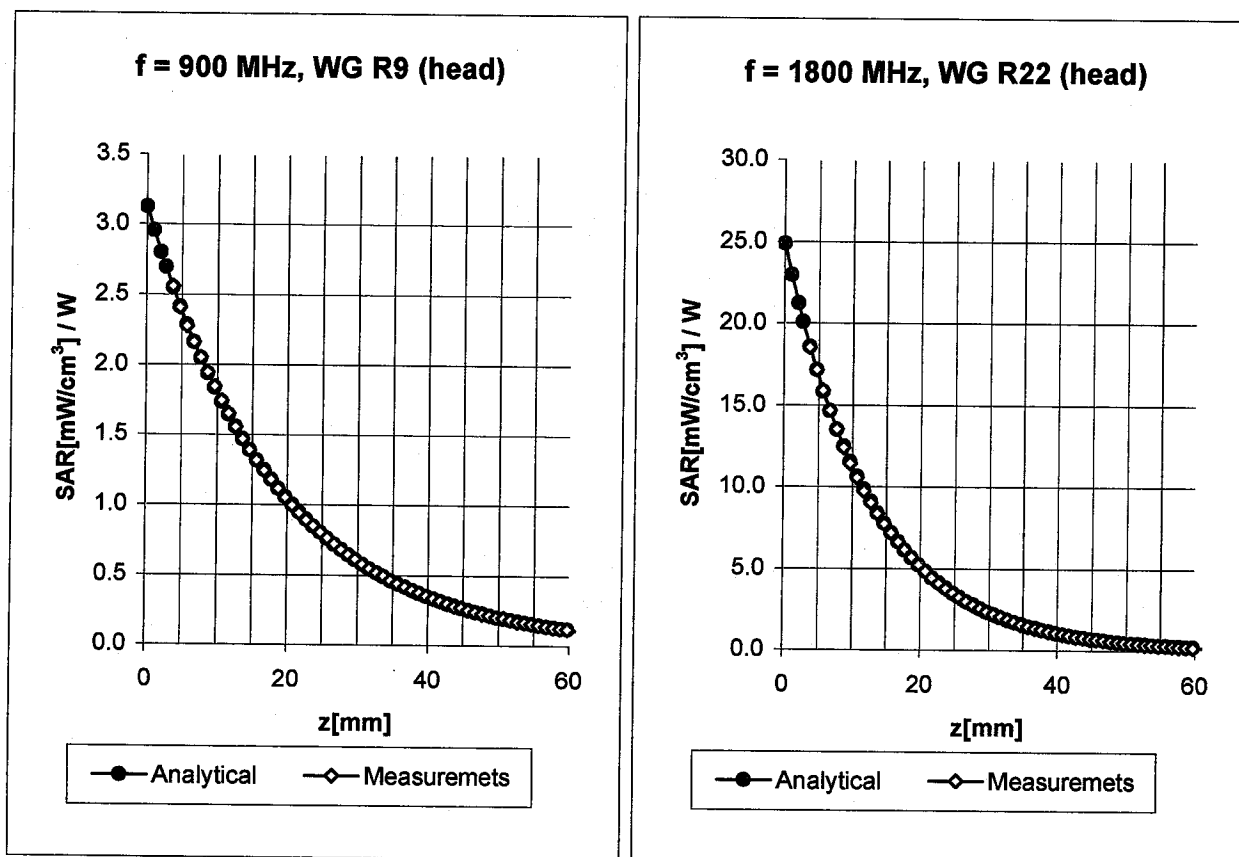
(TEM-Cell:ifi110, Waveguide R22)



Dynamic Range f(SAR_{brain}) (Waveguide R22)



Conversion Factor Assessment



Head **900 MHz** $\epsilon_r = 41.5 \pm 5\%$ $\sigma = 0.97 \pm 5\% \text{ mho/m}$

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

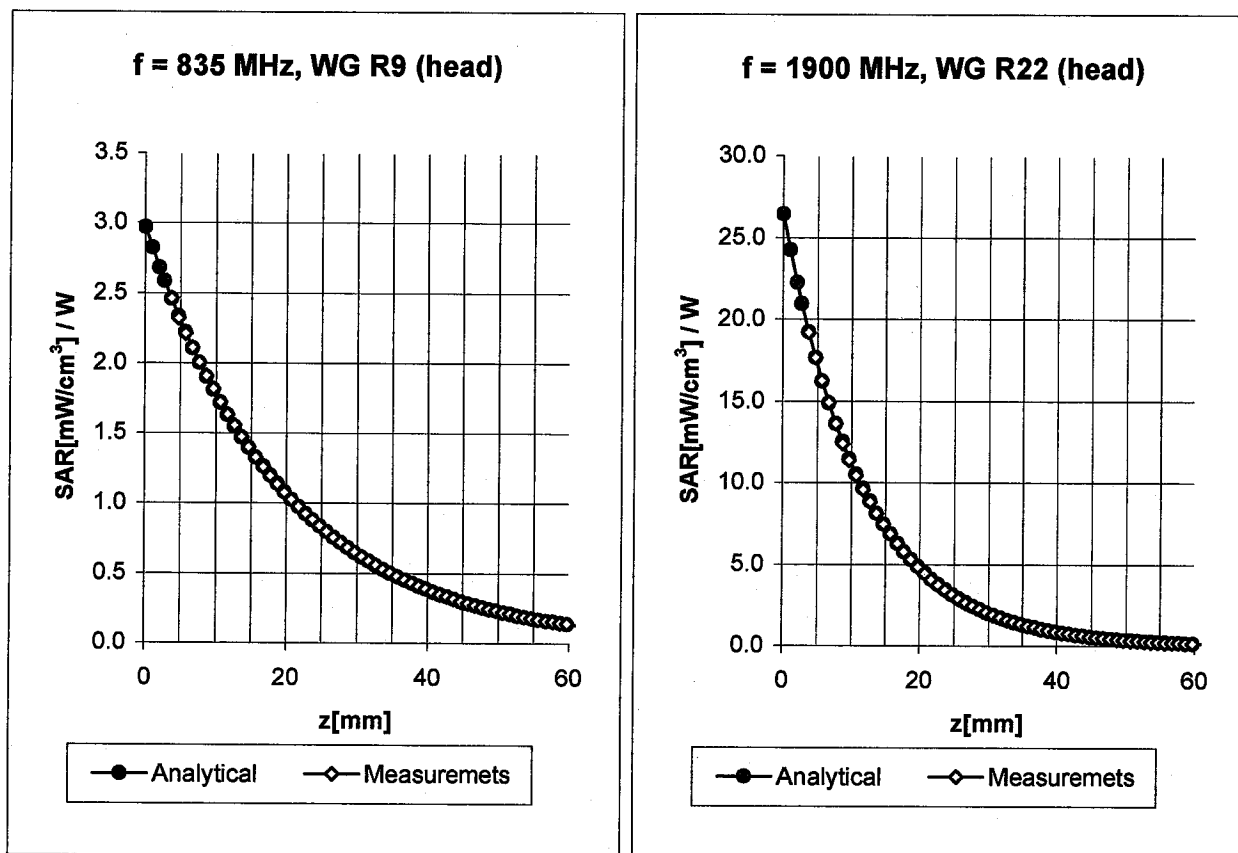
ConvF X	6.3 $\pm 9.5\%$ (k=2)	Boundary effect:
ConvF Y	6.3 $\pm 9.5\%$ (k=2)	Alpha 0.41
ConvF Z	6.3 $\pm 9.5\%$ (k=2)	Depth 2.46

Head **1800 MHz** $\epsilon_r = 40.0 \pm 5\%$ $\sigma = 1.40 \pm 5\% \text{ mho/m}$

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

ConvF X	5.0 $\pm 9.5\%$ (k=2)	Boundary effect:
ConvF Y	5.0 $\pm 9.5\%$ (k=2)	Alpha 0.51
ConvF Z	5.0 $\pm 9.5\%$ (k=2)	Depth 2.62

Conversion Factor Assessment



Head 835 MHz $\epsilon_r = 41.5 \pm 5\%$ $\sigma = 0.90 \pm 5\%$ mho/m

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

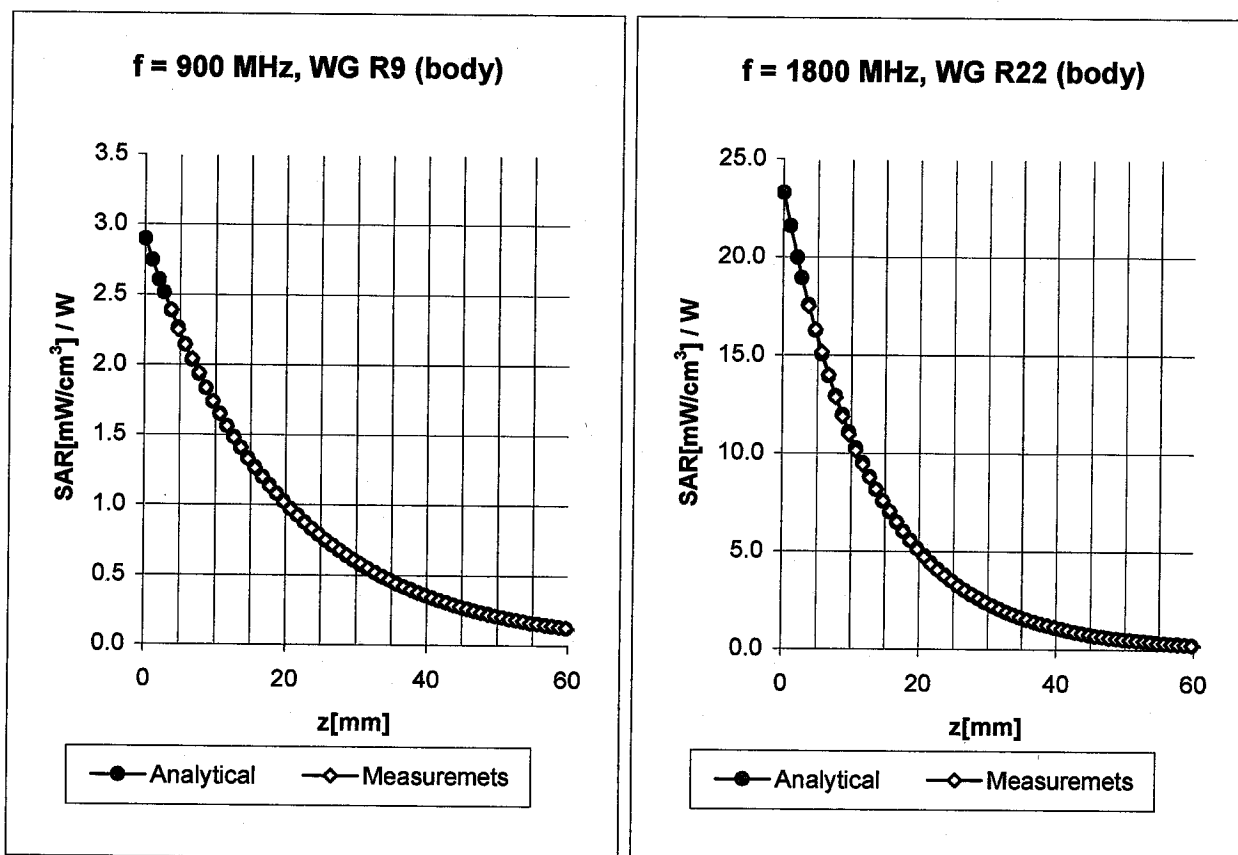
ConvF X	6.4 \pm 9.5% (k=2)	Boundary effect:	
ConvF Y	6.4 \pm 9.5% (k=2)	Alpha	0.46
ConvF Z	6.4 \pm 9.5% (k=2)	Depth	2.20

Head 1900 MHz $\epsilon_r = 40.0 \pm 5\%$ $\sigma = 1.40 \pm 5\%$ mho/m

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

ConvF X	4.8 \pm 9.5% (k=2)	Boundary effect:	
ConvF Y	4.8 \pm 9.5% (k=2)	Alpha	0.54
ConvF Z	4.8 \pm 9.5% (k=2)	Depth	2.58

Conversion Factor Assessment



Body **900 MHz** $\epsilon_r = 55.0 \pm 5\%$ $\sigma = 1.05 \pm 5\%$ mho/m

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

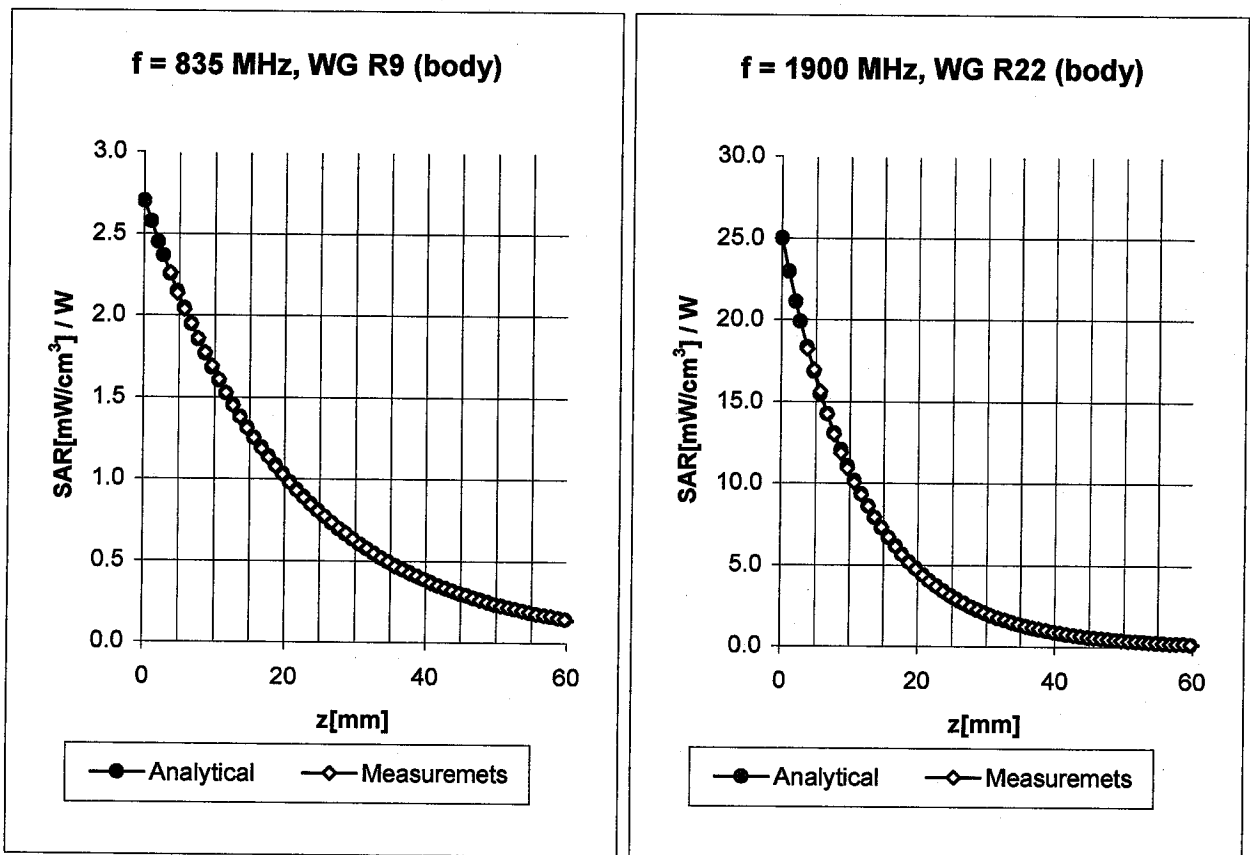
ConvF X	6.2 $\pm 9.5\%$ (k=2)	Boundary effect:
ConvF Y	6.2 $\pm 9.5\%$ (k=2)	Alpha 0.56
ConvF Z	6.2 $\pm 9.5\%$ (k=2)	Depth 2.08

Body **1800 MHz** $\epsilon_r = 53.3 \pm 5\%$ $\sigma = 1.52 \pm 5\%$ mho/m

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

ConvF X	4.7 $\pm 9.5\%$ (k=2)	Boundary effect:
ConvF Y	4.7 $\pm 9.5\%$ (k=2)	Alpha 0.62
ConvF Z	4.7 $\pm 9.5\%$ (k=2)	Depth 2.59

Conversion Factor Assessment



Body **835 MHz** $\epsilon_r = 55.2 \pm 5\%$ $\sigma = 0.97 \pm 5\%$ mho/m

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

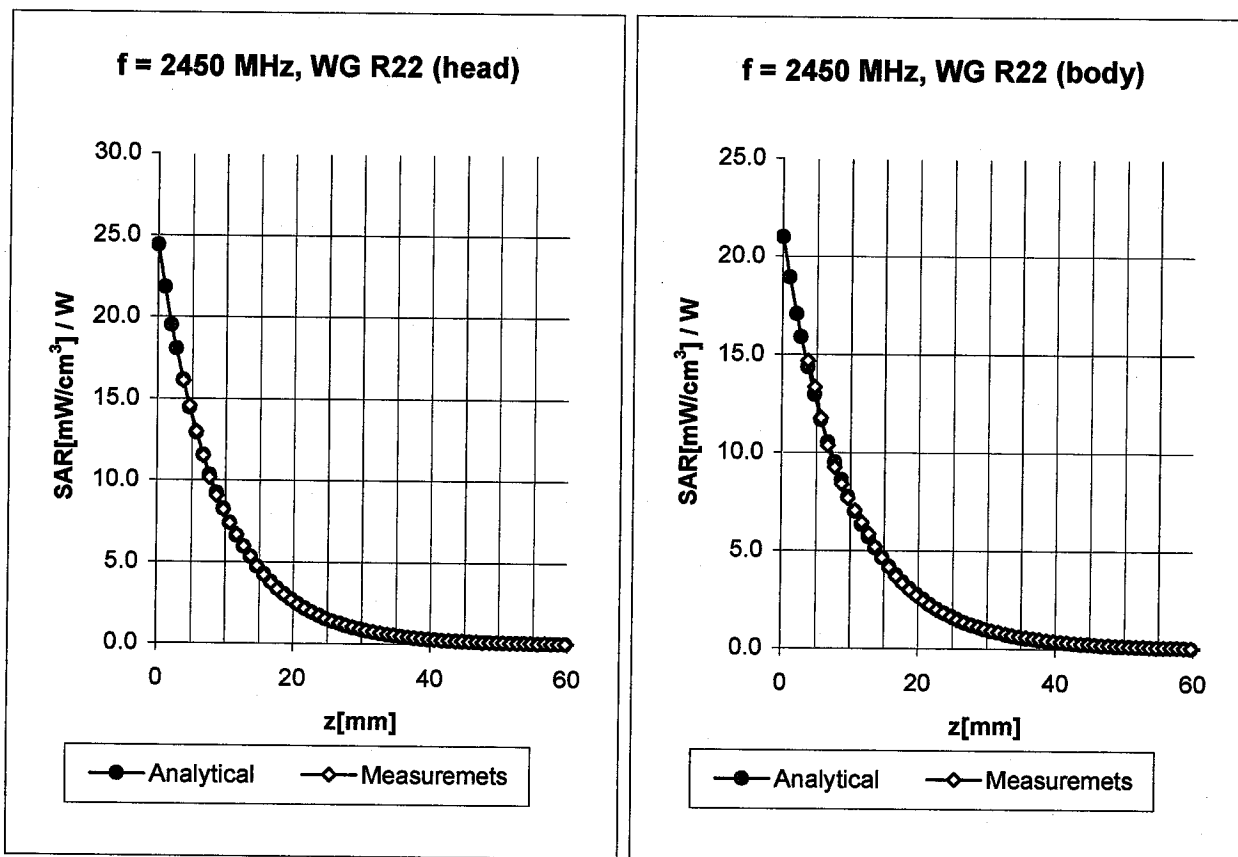
ConvF X	6.3 $\pm 9.5\%$ (k=2)	Boundary effect:
ConvF Y	6.3 $\pm 9.5\%$ (k=2)	Alpha 0.44
ConvF Z	6.3 $\pm 9.5\%$ (k=2)	Depth 2.40

Body **1900 MHz** $\epsilon_r = 53.3 \pm 5\%$ $\sigma = 1.52 \pm 5\%$ mho/m

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

ConvF X	4.6 $\pm 9.5\%$ (k=2)	Boundary effect:
ConvF Y	4.6 $\pm 9.5\%$ (k=2)	Alpha 0.65
ConvF Z	4.6 $\pm 9.5\%$ (k=2)	Depth 2.48

Conversion Factor Assessment



Head 2450 MHz $\epsilon_r = 39.2 \pm 5\%$ $\sigma = 1.80 \pm 5\%$ mho/m

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

ConvF X	4.6 $\pm 8.9\%$ (k=2)	Boundary effect:
ConvF Y	4.6 $\pm 8.9\%$ (k=2)	Alpha 1.04
ConvF Z	4.6 $\pm 8.9\%$ (k=2)	Depth 1.85

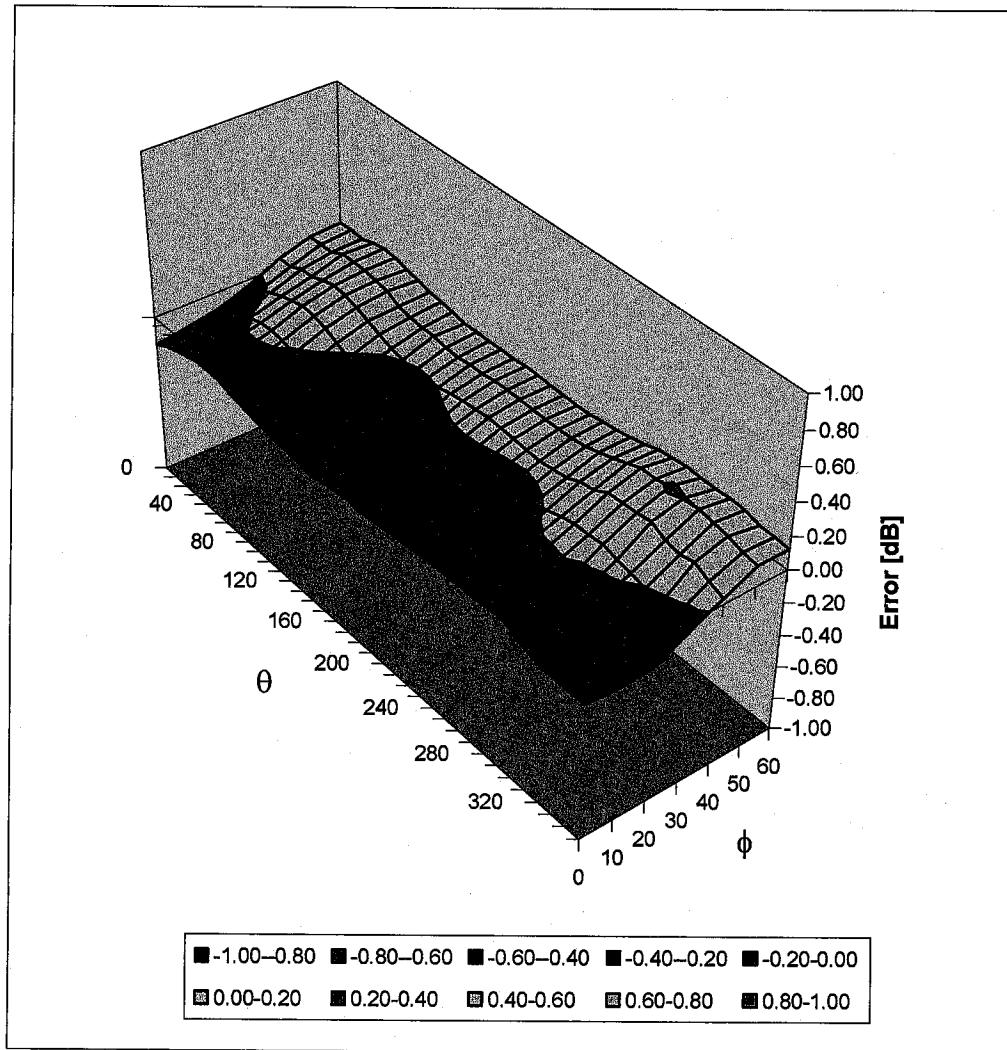
Body 2450 MHz $\epsilon_r = 52.7 \pm 5\%$ $\sigma = 1.95 \pm 5\%$ mho/m

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

ConvF X	4.3 $\pm 8.9\%$ (k=2)	Boundary effect:
ConvF Y	4.3 $\pm 8.9\%$ (k=2)	Alpha 1.10
ConvF Z	4.3 $\pm 8.9\%$ (k=2)	Depth 1.75

Deviation from Isotropy in HSL

Error ($\theta\phi$), $f = 900$ MHz



Checked
29/01/03
[Signature] Adriano

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	<i>[Signature]</i>
Approved by:	Nils Kuster	Quality Manager	<i>[Signature]</i>

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.

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 ($\sigma = 2.05$ mho/m, $\epsilon = 51.05$, $\rho = 1000$ 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

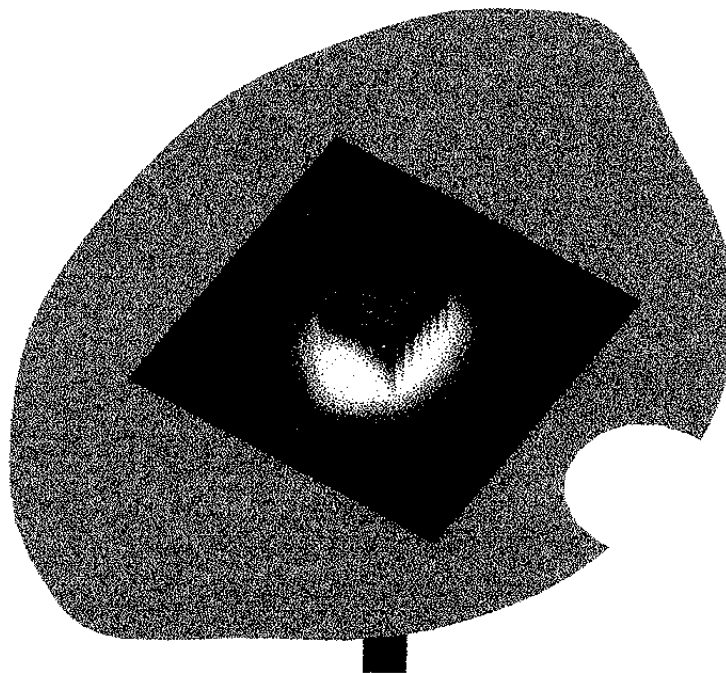
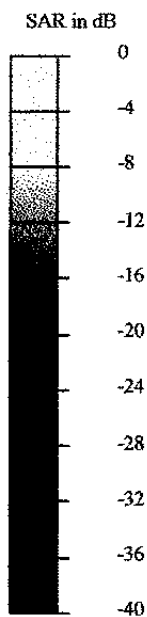
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm

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 pF

2 450.000 000 MHz

Mosche

Del

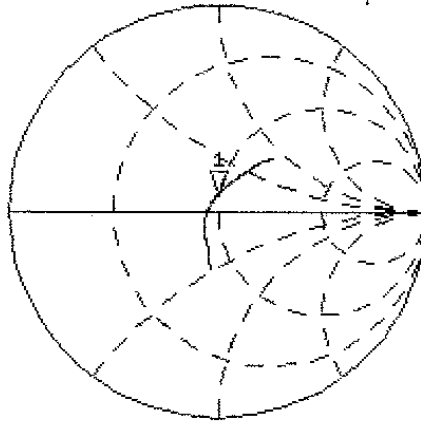
PRm

Cor

Avg

16

↑

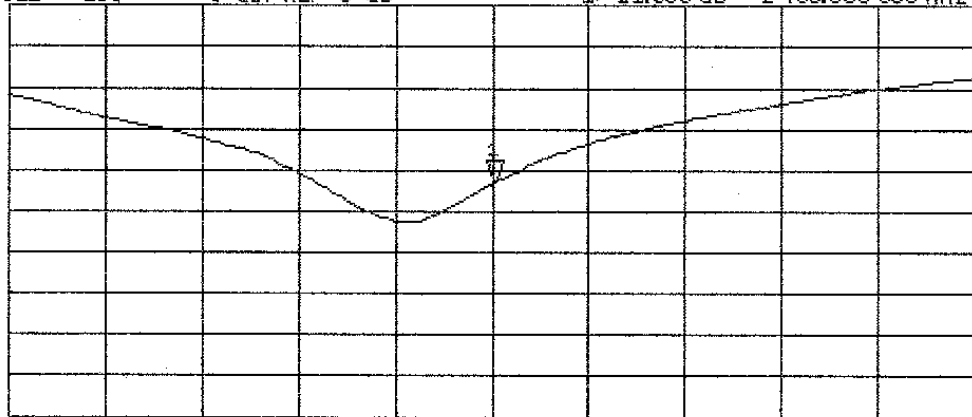


CH2 S11 LOG 5 dB/REF 0 dB 1: -21.668 dB 2 450.000 000 MHz

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 permittivity	37.4	$\pm 5\%$
Conductivity	1.88 mho/m	$\pm 10\%$

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 $263\text{mW} \pm 3\%$. 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:	$\text{Re}\{Z\} = 53.0 \Omega$
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$\text{Im}\{Z\} = 7.0 \Omega$

Return Loss at 2450 MHz	- 22.6 dB
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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 permittivity	51.1	$\pm 5\%$
Conductivity	2.05 mho/m	$\pm 10\%$

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 $263\text{mW} \pm 3\%$. 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 cm³ (1 g) of tissue: **52.1 mW/g**

averaged over 10 cm³ (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

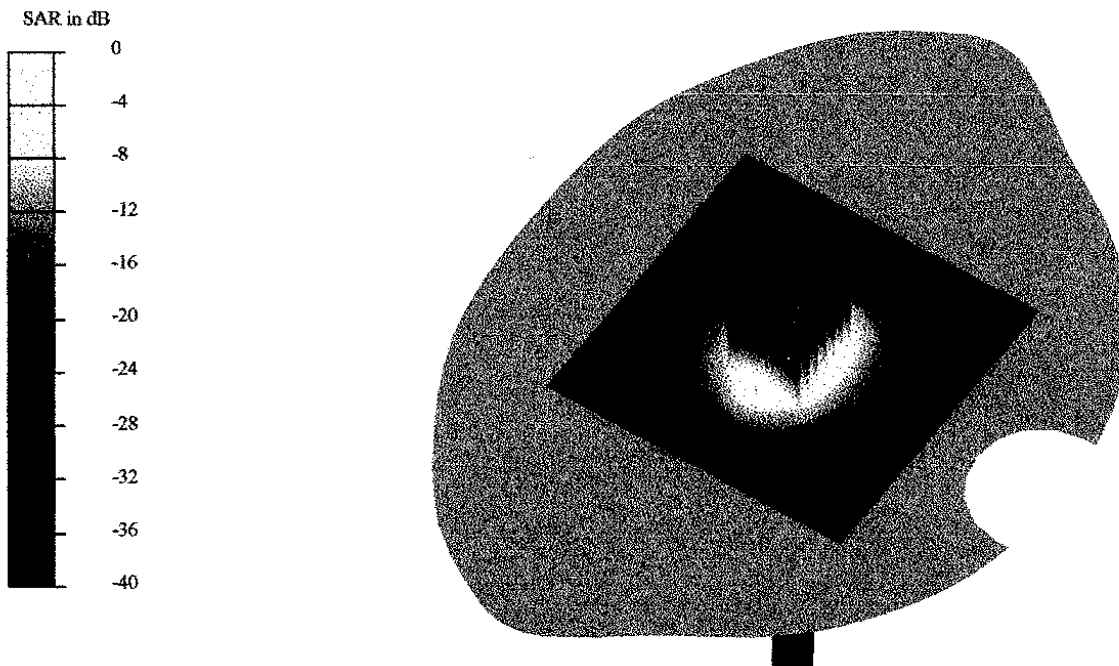
DUT: Dipole 2450 MHz Type & Serial Number: D2450V2 - SN725
Program: Dipole Calibration; Pin = 263 mW; d = 10 mm

Communication System: CW-2450; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: HSL 2450 MHz ($\sigma = 1.88$ mho/m, $\epsilon = 37.4$, $\rho = 1000$ 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 μH

2 450.000 000 MHz

De1

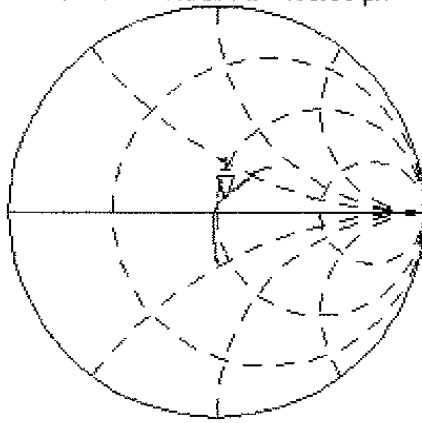
PRM

Cor

Avg

16

↑

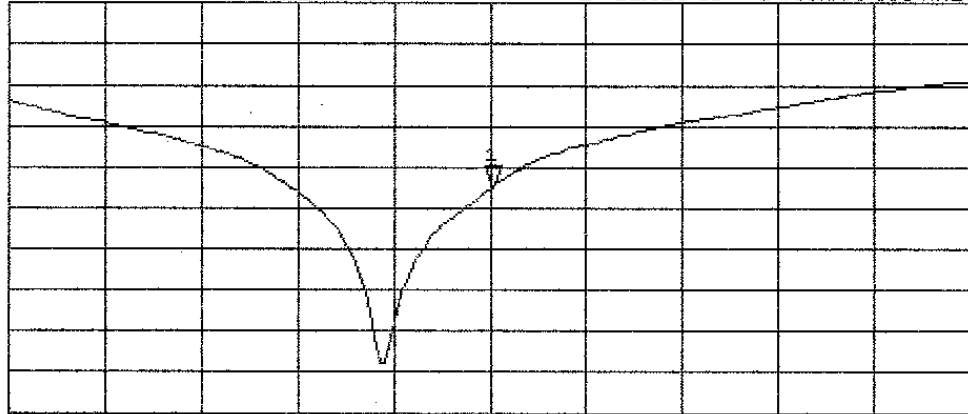


CH2 S11 LOG 5 dB/REF 0 dB 1: -22.610 dB 2 450.000 000 MHz

PRM

Cor

↑



START 2 250.000 000 MHz

STOP 2 650.000 000 MHz

Test Of: Marconi Selenia Communications Ltd.**Personal Role Radio - H4855****To: OET Bulletin 65 Supplement C: (2001-01)**

Appendix 5 Photographs of EUT

This appendix contains the following photographs:

Photo Reference Number	Title
PHT/45620JD08/001	Close up of EUT Front
PHT/45620JD08/002	Close up of EUT Rear
PHT/45620JD08/003	Close up View of Front Facing Phantom
PHT/45620JD08/004	Close up View of Rear Facing Phantom
PHT/45620JD08/005	Fluid Level
PHT/45620JD08/006	Front of EUT Facing Phantom
PHT/45620JD08/007	Front of EUT
PHT/45620JD08/008	Front View of Font Facing Phantom
PHT/45620JD08/009	Front View of Rear facing Phantom
PHT/45620JD08/010	General Set up of Front Facing Phantom
PHT/45620JD08/011	General Set up of Rear Facing Phantom
PHT/45620JD08/012	Headset
PHT/45620JD08/013	Rear of EUT Facing Phantom
PHT/45620JD08/014	Rear of EUT

Test Of: Marconi Selenia Communications Ltd.
Personal Role Radio - H4855

To: OET Bulletin 65 Supplement C: (2001-01)

PHT/45620JD08/001 Close up of EUT Front

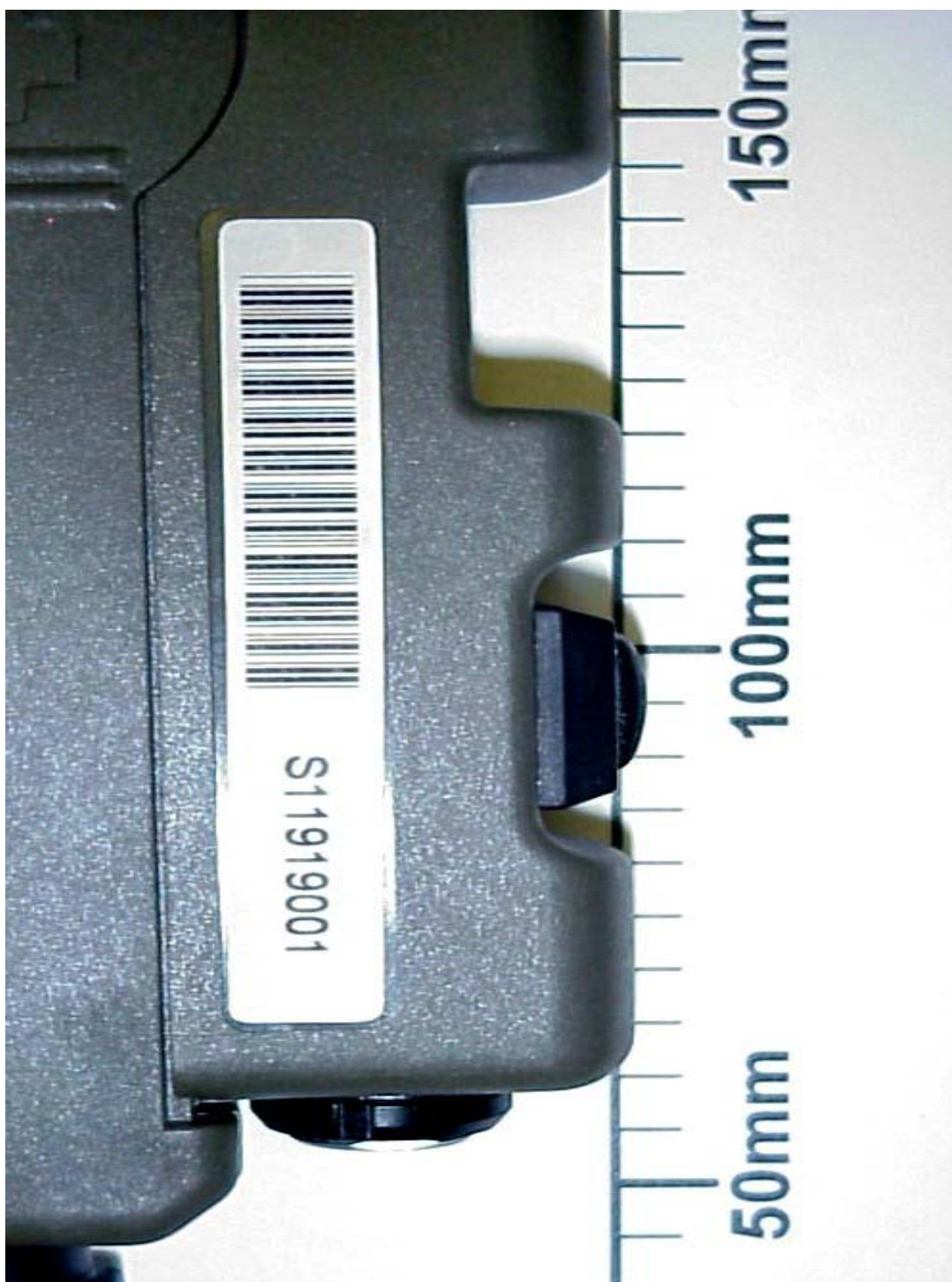


Test Of: Marconi Selenia Communications Ltd.

Personal Role Radio - H4855

To: OET Bulletin 65 Supplement C: (2001-01)

PHT/45620JD08/002 Close up of EUT Rear



Test Of: Marconi Selenia Communications Ltd.

Personal Role Radio - H4855

To: OET Bulletin 65 Supplement C: (2001-01)

PHT/45620JD08/003 Close up View of Front Facing Phantom



Test Of: Marconi Selenia Communications Ltd.

Personal Role Radio - H4855

To: OET Bulletin 65 Supplement C: (2001-01)

PHT/45620JD08/004 Close up View of Rear Facing Phantom

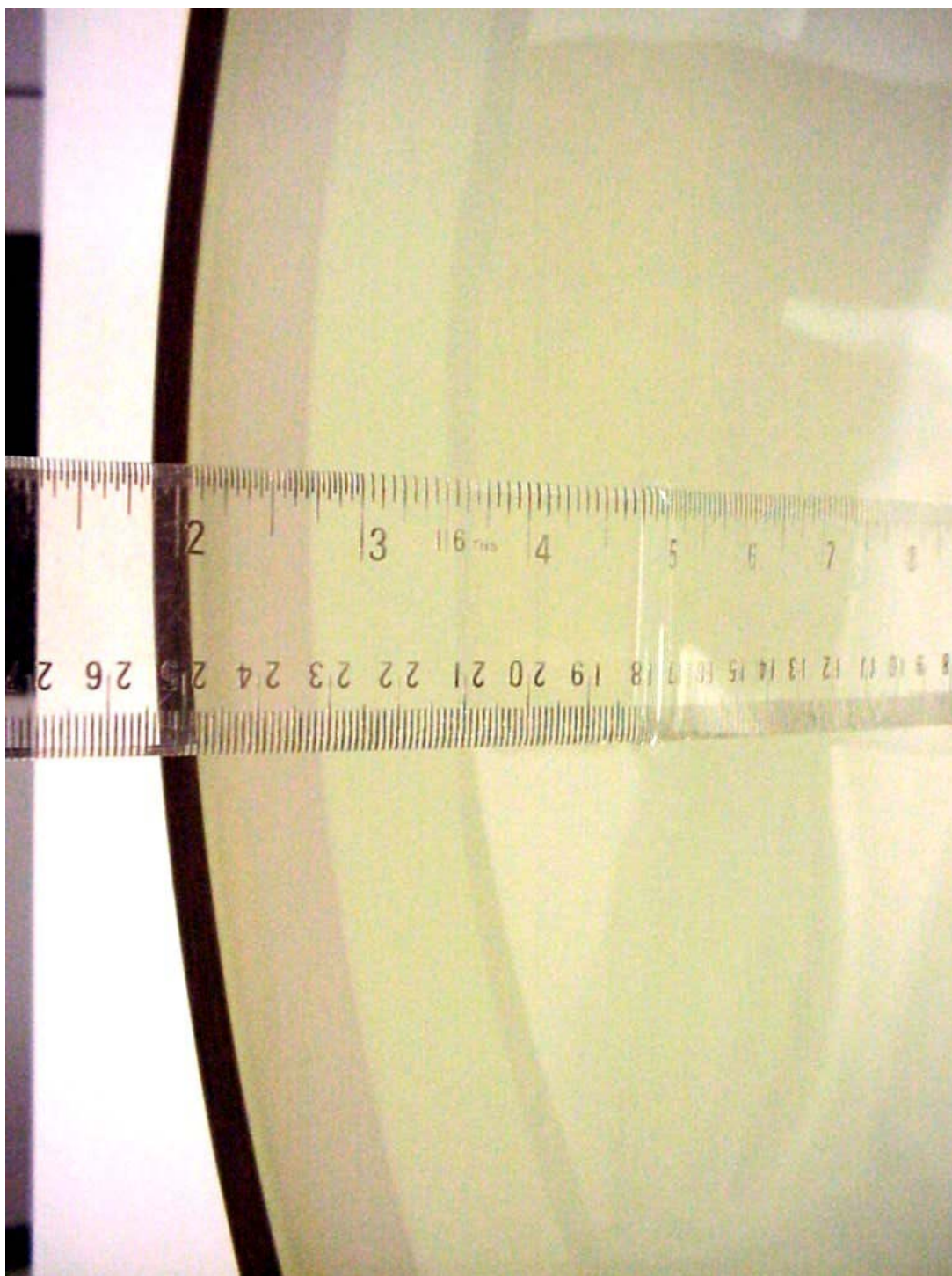


Test Of: Marconi Selenia Communications Ltd.

Personal Role Radio - H4855

To: OET Bulletin 65 Supplement C: (2001-01)

PHT/45620JD08/005 Fluid Level



Test Of: Marconi Selenia Communications Ltd.

Personal Role Radio - H4855

To: OET Bulletin 65 Supplement C: (2001-01)

PHT/45620JD08/006 Front of EUT Facing Phantom



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PHT/45620JD08/007 Front of EUT



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PHT/45620JD08/008 Front View of Font Facing Phantom



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To: OET Bulletin 65 Supplement C: (2001-01)

PHT/45620JD08/009 Front View of Rear facing Phantom



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PHT/45620JD08/010 General Set up of Front Facing Phantom



Test Of: Marconi Selenia Communications Ltd.

Personal Role Radio - H4855

To: OET Bulletin 65 Supplement C: (2001-01)

PHT/45620JD08/011 General Set up of Rear Facing Phantom



Test Of: Marconi Selenia Communications Ltd.

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PHT/45620JD08/012 Headset



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PHT/45620JD08/013 Rear of EUT Facing Phantom



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To: OET Bulletin 65 Supplement C: (2001-01)

PHT/45620JD08/014 Rear of EUT



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TEST REPORT

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Issue Date: 23 April 2004

Test Of: Marconi Selenia Communications Ltd.

Personal Role Radio - H4855

To: OET Bulletin 65 Supplement C: (2001-01)

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