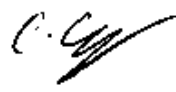



TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: P-07B

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

Test Report Serial No:
RFI/SAR1/RP78096JD05A

This Test Report Is Issued Under The Authority Of Scott D'Adamo, Operations Manager Global Approvals:	 pp
Checked By: Richelieu Quoi 	Report Copy No: PDF01
Issue Date: 23 June 2010	Test Dates: 18 June 2010

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This report may be copied in full. The results in this report apply only to the sample(s) tested.

RFI Global Services Ltd

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1. Customer Information

Company Name:	Panasonic Mobile Comms Dev of Europe Ltd.
Address:	Panasonic House Willoughby Road Bracknell Berkshire RG12 8FP United Kingdom

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2. Equipment Under Test (EUT)

2.1. Identification of Equipment Under Test (EUT)

Description:	UMTS cellular handset
Brand Name:	NTT docomo
Model Name or Number:	P-07B (Sample C4)
Serial Number:	None Stated
IMEI Number:	359783030009078
Hardware Version Number:	Rev C
Software Version Number:	B-D01CS2-00.00.017 D01CS2_Cv78032403
Hardware Revision of GSM Module:	Not Applicable
Software Revision of GSM Module:	Not Applicable
FCC ID Number:	UCE110031A
Country of Manufacture:	None Stated
Date of Receipt:	18 June 2010

2.2. Description of EUT

The equipment under test was a UMTS Cellular Mobile Telephone with UMTS FDD V and UMTS Release 5 HSDPA capabilities. The Cellular Mobile Telephone operates on UMTS/UMTS Release 5 HSDPA 850 MHz Band.

2.3. Modifications Incorporated in the EUT

There had been no modifications incorporated in the EUT.

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2.4. Accessories

The following accessories were supplied with the EUT during testing:

Description:	Battery
Brand Name:	NTT
Model Name or Number:	P20*
Serial Number:	None Stated
Cable Length and Type:	Not Applicable
Country of Manufacture:	None Stated
Connected to Port	3 Pin Unique to Manufacturer

Description:	Micro-SD Memory Card
Brand Name:	None Stated
Model Name or Number:	None Stated
Serial Number:	None Stated
Cable Length and Type:	Not applicable
Country of Manufacture:	None Stated
Connected to Port	Dedicated micro-SD card port

Description:	Personal Hands-Free
Brand Name:	NTT docomo
Model Name or Number:	Stereo Earphone Set 01
Serial Number:	None Stated
Cable Length and Type:	~1.5m
Country of Manufacture:	None Stated
Connected to Port	AV Out Port Unique to Manufacturer

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2.5. Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	Communication Test Set
Brand Name:	Rohde & Schwarz
Model Name or Number:	CMU200
Serial Number:	116284
Cable Length and Type:	~2.0 m Utiflex RF cable
Connected to Port:	RF (Input/Output) Air Link

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2.6. Additional Information Related to Testing

Equipment Category	UMTS Band V		
Type of Unit	Portable Transceiver		
Intended Operating Environment:	Within UMTS Coverage		
Transmitter Maximum Output Power Characteristics:	UMTS Band V	Communication Test Set was configured to allow the EUT to transmit at a maximum power of up to 24dBm average power.	
Transmitter Frequency Range:	UMTS Band V	(826 to 847) MHz	
Transmitter Frequency Allocation of EUT When Under Test:	Channel Number	Channel Description	Frequency (MHz)
	4132	Low	826.4
	4183	Middle	836.6
	4233	High	846.6
Modulation(s):	QPSK (UMTS/HSDPA): 0 Hz		
Modulation Scheme (Crest Factor):	QPSK (UMTS FDD / HSDPA): 1		
Antenna Type:	Internal		
Antenna Length:	Unknown		
Number of Antenna Positions:	1 fixed		
Power Supply Requirement:	3.7 V		
Battery Type(s):	Li-ion		

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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 met the basic restrictions as defined in OET Bulletin 65 Supplement C: (2001-01) using the SAR averaging method as described in the test specification above.

3.2. Methods and Procedures Reference Documentation

The methods and procedures used were as detailed in:

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.

KDB 447498 D01 Mobile Portable RF Exposure v04

KDB 648474 D01 SAR Handsets Multi Xmitter and Ant v01r05

KDB 941225 D01 SAR test for 3G devices v02

3.3. Definition of Measurement Equipment

The measurement equipment used complied with the requirements of the standards referenced in the methods & procedures section above. Appendix 1 contains a list of the test equipment used.

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4. Deviations from the Test Specification

Test was performed as per "KDB 447498 D01 Mobile Portable RF Exposure v04", "KDB 648474 D01 SAR Handsets Multi Xmitter and Ant v01r05" and "KDB 941225 D01 SAR test for 3G devices v02", according to the handset procedures in IEEE Std 1528-2003, OET Bulletin 65 Supplement C 01-01 and the specific FCC test procedures.

3G Body SAR test was performed in the middle channel as the measured SAR levels were < 0.8 W/kg, where the transmission band corresponding to all channels were ≤ 100 MHz. Testing for the other channels were not required as stated in KDB 447498 D01.

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5. Operation and Configuration of the EUT during Testing

5.1. Operating Modes

The EUT was tested in the following operating mode(s) unless otherwise stated:

- UMTS Band V call allocated RMC 12.2kbps
 - UMTS FDD V - RMC 12.2kbps + HSDPA With Test loop mode 1 and TPC bits configured to all "1's", Sub-test 1
 - 3G Body SAR test was performed in the middle channel as the measured SAR levels were < 0.8 W/kg, where the transmission band corresponding to all channels were \leq 100 MHz. Testing for the other channels were not required as stated in KDB 447498 D01.
 - Some points in the 'Right Touch' position could not be fully evaluated therefore the zoom scan was unable to fully enclose the peak SAR location as required by IEEE 1528 and OET Bulletin 65 Supplement C. This scan is repeated in the Mouth / Jaw configuration on the SAM phantom flat section as per KDB 648474 D01.
-

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5.2. Configuration and Peripherals

The EUT was tested in the following configuration(s) unless otherwise stated:

- Standalone Battery Powered
- EUT tested in Head and Body-worn configuration. The applied configurations for body-worn orientations where the corresponding edge(s) is closest to the user with the most conservative exposure condition.

Head Configuration

- a) The EUT 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 EUT 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 EUT 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, and 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 EUT and its antenna.
- h) The EUT was transmitting at full power throughout the duration of the test powered by a fully charged battery.

Body Configuration

- a) The EUT was placed in a normal operating position where the centre of EUT was aligned with the centre reference point on the flat section of the 'SAM' phantom.
 - b) With the EUT touching the phantom at an imaginary centre line. The EUT was aligned with a marked plane (X and Y axis) consisting of two lines.
 - c) For the touch-safe position the EUT was gradually moved towards the flat section of the 'SAM' phantom until any point of the EUT touched the phantom.
 - d) For position(s) greater than 0mm separation the EUT was positioned as per the touch-safe position, and then the vertical height was decreased/adjusted as required.
 - 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 EUT and its antenna.
 - h) The EUT was transmitting at full power throughout the duration of the test powered by a fully charged battery.
-

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6. Summary of Test Results

Test Name	Specification Reference	Result
Specific Absorption Rate-UMTS FDD V Head Configuration 1g	OET Bulletin 65 Supplement C: (2001-01)	Complied
Specific Absorption Rate-UMTS FDD V Body Configuration 1g	OET Bulletin 65 Supplement C: (2001-01)	Complied
Specific Absorption Rate-UMTS FDD V + HSDPA Body Configuration 1g	OET Bulletin 65 Supplement C: (2001-01)	Complied

SAR Individual Transmitter Evaluation

device, mode	Frequency, (MHz)	P _x (mW)	P _{REF} (mW)	single SAR, W/kg	Remarks
WWAN, UMTS	850	214	-	0.547	Routine Evaluation

Note(s):

1. Px: power level measured by RFI.
2. Single SAR value was measured by RFI.

6.1. Location of Tests

All the measurements described in this report were performed at the premises of RFI Global Services Ltd, Pavilion A, Ashwood Park, Ashwood Way, Basingstoke, Hampshire, RG23 8BG United Kingdom

Test of: P-07B

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

7. Measurements, Examinations and Derived Results

7.1. General Comments

This section contains test results only.

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to section 8 for details of measurement uncertainties.

Test of: P-07B

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7.2. Test Results

7.2.1. Specific Absorption Rate - UMTS FDD V Head Configuration 1g

Test Summary:

Tissue Volume:	1g
Maximum Level (W/kg):	0.547

Environmental Conditions:

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

Results:

EUT Position	Phantom Configuration	Channel Number	Level (W/kg)	Limit (W/kg)	Margin (W/kg)	Note(s)	Result
Touch	Left	4183	0.547	1.600	1.053	1	Complied
Tilt	Left	4183	0.151	1.600	1.449	1	Complied
Mouth / Jaw *	Flat (SAM)	4183	0.246	1.600	1.354	1, 2	Complied
Tilt	Right	4183	0.152	1.600	1.448	1	Complied

Note(s):

1. SAR test was performed in the middle channel only as the measured levels were < 50% of the SAR limit as stated in the FCC Public Notice DA 02-1438 by the SCC-34/SC-2.
2. The phone was positioned with the hinge against a smooth edge of the flat phantom where the upper half of the phone was unfolded and extended beyond the phantom side wall. The lower half of the phone was secured in the test device holder at a fixed distance.

*Some point in the Touch Right position could not be fully evaluated therefore the zoom scan was unable to fully enclose the peak SAR location as required by IEEE 1528 and OET Bulletin 65 Supplement C. This scan is repeated in the Mouth / Jaw configuration on the 'SAM' flat section as per section 5 of KDB 648474 D01.

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7.2.2. Specific Absorption Rate - UMTS FDD V Body Configuration 1g**Test Summary:**

Tissue Volume:	1g
Maximum Level (W/kg):	0.328

Environmental Conditions:

Temperature Variation in Lab (°C):	24.0 to 24.0
Temperature Variation in Liquid (°C):	23.5 to 23.5

Results:

EUT Position	Phantom Configuration	Channel Number	Level (W/kg)	Limit (W/kg)	Margin (W/kg)	Note(s)	Result
Front of EUT Facing Phantom	Flat (SAM)	4183	0.209	1.600	1.391	1, 2	Complied
Rear of EUT Facing Phantom	Flat (SAM)	4183	0.328	1.600	1.272	1, 2	Complied
Rear of EUT Facing Phantom With PHF	Flat (SAM)	4183	0.311	1.600	1.289	1, 2	Complied

Note(s):

1. SAR test was performed in the middle channel only as the measured levels were < 50% of the SAR limit as stated in the FCC Public Notice DA 02-1438 by the SCC-34/SC-2.
2. SAR measurements were performed with the EUT at a separation distance of 15mm from the 'SAM' phantom flat section.

Test of: P-07B

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7.2.3.Specific Absorption Rate - UMTS FDD V + HSDPA Body Configuration 1g**Test Summary:**

Tissue Volume:	1g
Maximum Level (W/kg):	0.320

Environmental Conditions:

Temperature Variation in Lab (°C):	24.0 to 24.0
Temperature Variation in Liquid (°C):	23.5 to 23.5

Results:

EUT Position	Phantom Configuration	Channel Number	Level (W/kg)	Limit (W/kg)	Margin (W/kg)	Note(s)	Result
Rear of EUT Facing Phantom	Flat (SAM)	4183	0.320	1.600	1.280	1, 2, 3	Complied

Note(s):

1. SAR test was performed in the middle channel only as the measured levels were < 50% of the SAR limit as stated in the FCC Public Notice DA 02-1438 by the SCC-34/SC-2.
2. SAR measurements were performed with the EUT at a separation distance of 15mm from the 'SAM' phantom flat section.
3. HSDPA Enabled with Test loop mode 1 and TPC bits configured to all "1's", Sub-test 1.

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7.2.4. Conducted Average Power Measurement

Modes		HSDPA – Conducted Average Power				WCDMA
Sets		1	2	3	4	Voice / RMC12.2kbps
Band	Channel	Power (dBm) Avg.	Power (dBm) Avg.	Power (dBm) Avg.	Power (dBm) Avg.	Power (dBm) Avg.
850	4132	23.2	20.9	20.3	20.3	23.2
	4183	23.3	21.1	20.4	20.4	23.3
	4233	23.1	20.6	20.2	20.2	23.1
β_c		2	12	15	15	
β_d		15	15	8	4	
$\Delta_{ACK}, \Delta_{NACK}, \Delta_{CQI}$		8	8	8	8	

Sub-test 1 Setup for Release 5 HSDPA

Sub-test	β_c	β_d	B_d (SF)	β_c / β_d	$\beta_{hs}^{(1)}$	SM (dB) ⁽²⁾
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15 ⁽³⁾	15/15 ⁽³⁾	64	12/15 ⁽³⁾	24/15	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

Note 1: $\Delta_{ACK}, \Delta_{NACK}$ and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$ Note 2: CM = 1 for $\beta_c / \beta_d = 12/15$, $B_{hs}/\beta_c = 24/15$ Note 3: For subtest 2 the β_c / β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$

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8. Measurement Uncertainty

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.

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

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

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”.

Test Name	Confidence Level	Calculated Uncertainty
Specific Absorption Rate- UMTS850 Head Configuration 1g	95%	19.28%
Specific Absorption Rate- UMTS850 Body Configuration 1g	95%	19.41%

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.

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Measurement Uncertainty (Continued)**8.1. Specific Absorption Rate Uncertainty at 850 MHz Head 1g, UMTS Modulation Scheme calculated in accordance with IEC 62209 & IEEE 1528**

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	C _i (10g)	Standard Uncertainty		v _i or v _{eff}
							+ u (%)	- u (%)	
B	Probe calibration	11.000	11.000	normal (k=2)	2.0000	1.0000	5.500	5.500	∞
B	Axial Isotropy	0.500	0.500	normal (k=2)	2.0000	1.0000	0.250	0.250	∞
B	Hemispherical Isotropy	2.600	2.600	normal (k=2)	2.0000	1.0000	1.300	1.300	∞
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	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	∞
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞
B	Readout Electronics	0.320	0.320	normal (k=2)	2.0000	1.0000	0.160	0.160	∞
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	Integration Time	0.000	0.000	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	2.400	2.400	normal (k=1)	1.0000	1.0000	2.400	2.400	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	Drift 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	0.6400	1.848	1.848	∞
A	Liquid Conductivity (measured value)	4.920	4.920	normal (k=1)	1.0000	0.6400	3.149	3.149	5
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	0.6000	1.732	1.732	∞
A	Liquid Permittivity (measured value)	4.970	4.970	normal (k=1)	1.0000	0.6000	2.982	2.982	5
	Combined standard uncertainty			t-distribution			9.84	9.84	>200
	Expanded uncertainty			k = 1.96			19.28	19.28	>200

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8.2. Specific Absorption Rate Uncertainty at 850 MHz Body 1g, UMTS Modulation Scheme calculated in accordance with IEC 62209 & IEEE 1528

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	C _i (10g)	Standard Uncertainty		v _i or v _{eff}
							+ u (%)	- u (%)	
B	Probe calibration	11.000	11.000	normal (k=2)	2.0000	1.0000	5.500	5.500	∞
B	Axial Isotropy	0.500	0.500	normal (k=2)	2.0000	1.0000	0.250	0.250	∞
B	Hemispherical Isotropy	2.600	2.600	normal (k=2)	2.0000	1.0000	1.300	1.300	∞
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	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	∞
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞
B	Readout Electronics	0.320	0.320	normal (k=2)	2.0000	1.0000	0.160	0.160	∞
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	Integration Time	0.000	0.000	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	2.900	2.900	normal (k=1)	1.0000	1.0000	2.900	2.900	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	Drift 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	0.6400	1.848	1.848	∞
A	Liquid Conductivity (measured value)	4.690	4.690	normal (k=1)	1.0000	0.6400	3.002	3.002	5
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	0.6000	1.732	1.732	∞
A	Liquid Permittivity (measured value)	4.860	4.860	normal (k=1)	1.0000	0.6000	2.916	2.916	5
	Combined standard uncertainty			t-distribution			9.91	9.91	>250
	Expanded uncertainty			k = 1.96			19.41	19.41	>250

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Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A034	Narda 20W Termination	Narda	374BNM	8706	Calibrated as part of system	-
A1097	SMA Directional Coupler	MiDISCO	MDC6223-30	None	Calibrated as part of system	-
A1137	3dB Attenuator	Narda	779	04690	Calibrated as part of system	-
A1174	Dielectric Probe Kit	Agilent Technologies	85070C	Us99360072	Calibrated before use	-
A1328	Handset Positioner	Schmid & Partner Engineering AG	Modification	SD 000 H01 DA	-	-
A1182	Handset Positioner	Schmid & Partner Engineering AG	V3.0	None	-	-
A1184	Data Acquisition Electronics	Schmid & Partner Engineering AG	DAE3	394	09 April 2010	12
A1378	Probe	Schmid & Partner Engineering AG	EX3 DV3	3508	26 June 2009	12
A1566	SAM Phantom	Schmid & Partner Engineering AG	SAM a	002	Calibrated before use	-
A1329	900 MHz Dipole Kit	Schmid & Partner Engineering AG	D900V2	185	18 Aug 2009	24
A1474	Amplifier	Mini-Circuits	ZVE-8G	638700305	Calibrated as part of system	-
A1990	Digital Camera	Samsung	E515	A23WC908A 05431K		
A215	20 dB Attenuator	Narda	766-20	9402	Calibrated as part of system	-
A1531	Antenna	AARONIA AG	7025	02458	-	-
C1144	Cable	Rosenberger MICRO-COAX	FA147AF00 1503030	41842-1	Calibrated as part of system	-
C1145	Cable	Rosenberger MICRO-COAX	FA147AF00 3003030	41843-1	Calibrated as part of system	-
C1146	Cable	Rosenberger MICRO-COAX	FA147AF03 0003030	41752-1	Calibrated as part of system	-
G0528	Robot Power Supply	Schmid & Partner Engineering AG	DASY	None	Calibrated before use	-

Test of: P-07B

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

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
G087	PSU	Thurlby Thandar	CPX200	100701	Calibrated before use	-
M1015	Network Analyser	Agilent Technologies	8753ES	US39172406	15 Sept 2009	12
M1047	Robot Arm	Staubli	RX908 L	F00/SD89A1/A/01	Calibrated before use	-
M1159	Signal Generator	Agilent Technologies	E8241A	US42110332	Internal Checked 05 April 2010	4
M1071	Spectrum Analyzer	Agilent	HP8590E	3647U00514	(Monitoring use only)	-
M1044	Diode Power Sensor	Rohde & Schwarz	NRV-Z1	893350/019	26/05/2010	12
M265	Diode Power Sensor	Rohde & Schwarz	NRV-Z1	893350/017	26/05/2010	12
M263	Dual Channel Power Meter	Rohde & Schwarz	NRVD	826558/004	27/05/2010	12
M1270	Temperature/ Humidity/ Pressure Meter	RS Components	None	None	Internal Checked 31 March 2010	12
M1144	Thermometer	Testo 110 Immersion Probe & Thermometer	Testo 110	03100047	27 May 2010	12
S256	SAR Lab	RFI	Site 56	N/A	Calibrated before use	-

Test of: P-07B

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

A.1.1. Calibration Certificates

This section contains the calibration certificates and data for the Probe(s) and Dipole(s) used, which are not included in the total number of pages for this report.



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Client **RFI**

Certificate No: **EX3-3508_Jun09**

CALIBRATION CERTIFICATE

Object **EX3DV3 - SN:3508**

Calibration procedure(s) **QA CAL-01.v6, QA CAL-12.v5 and QA CAL-23.v3**
Calibration procedure for dosimetric E-field probes

Calibration date: **June 26, 2009**

Condition of the calibrated item **In Tolerance**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41495277	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41498087	1-Apr-09 (No. 217-01030)	Apr-10
Reference 3 dB Attenuator	SN: S5054 (3c)	31-Mar-09 (No. 217-01026)	Mar-10
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-09 (No. 217-01028)	Mar-10
Reference 30 dB Attenuator	SN: S5129 (30b)	31-Mar-09 (No. 217-01027)	Mar-10
Reference Probe ES3DV2	SN: 3013	2-Jan-09 (No. ES3-3013_Jan09)	Jan-10
DAE4	SN: 660	9-Sep-08 (No. DAE4-660_Sep08)	Sep-09
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 26, 2009

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



Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA
 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not effect the E²-field uncertainty inside TSL (see below *ConvF*).
- NORM(f)_{x,y,z}** = NORM_{x,y,z} * *frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,y,z} * *ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe EX3DV3

SN:3508

Manufactured:	December 19, 2003
Last calibrated:	June 24, 2008
Recalibrated:	June 26, 2009

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: EX3DV3 SN:3508

Sensitivity in Free Space^A

Diode Compression^B

NormX	0.76 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP X	95 mV
NormY	0.63 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	97 mV
NormZ	0.66 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Z	94 mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

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

Sensor Center to Phantom Surface Distance		2.0 mm	3.0 mm
SAR _{be} [%]	Without Correction Algorithm	7.8	4.6
SAR _{be} [%]	With Correction Algorithm	0.5	0.3

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

Sensor Center to Phantom Surface Distance		2.0 mm	3.0 mm
SAR _{be} [%]	Without Correction Algorithm	5.8	2.7
SAR _{be} [%]	With Correction Algorithm	0.7	0.5

Sensor Offset

Probe Tip to Sensor Center **1.0 mm**

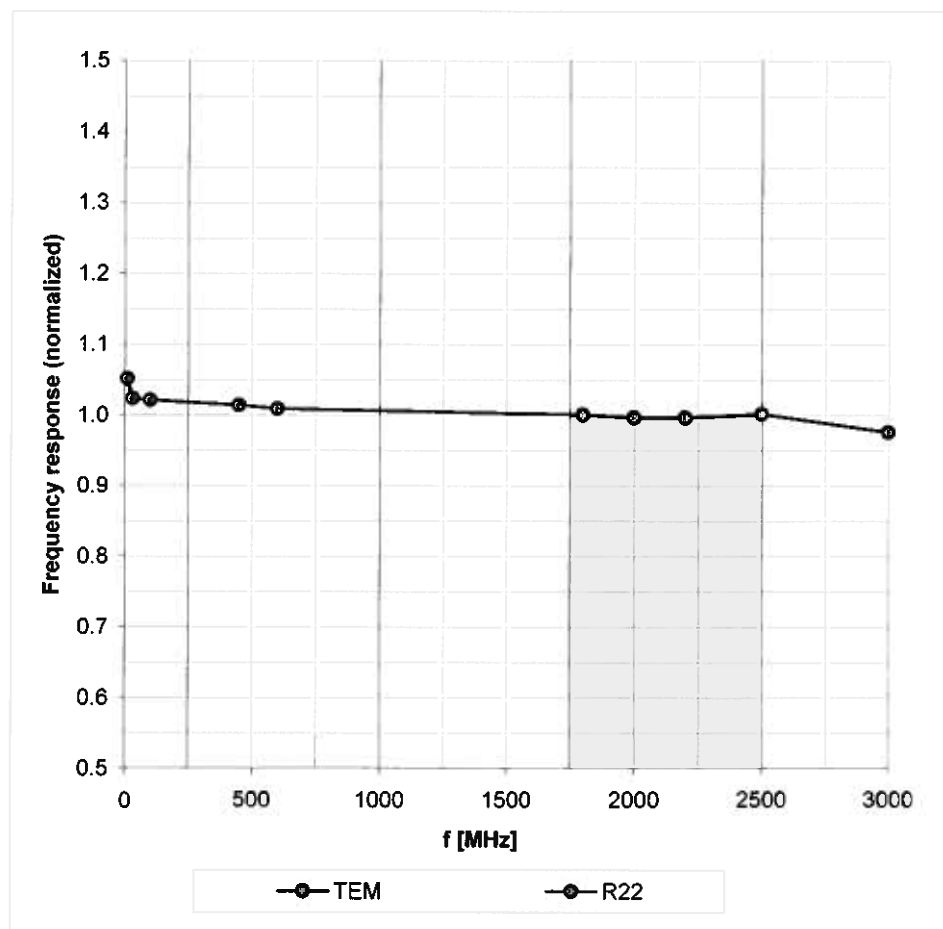
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

^A The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Page 8).

^B Numerical linearization parameter: uncertainty not required.

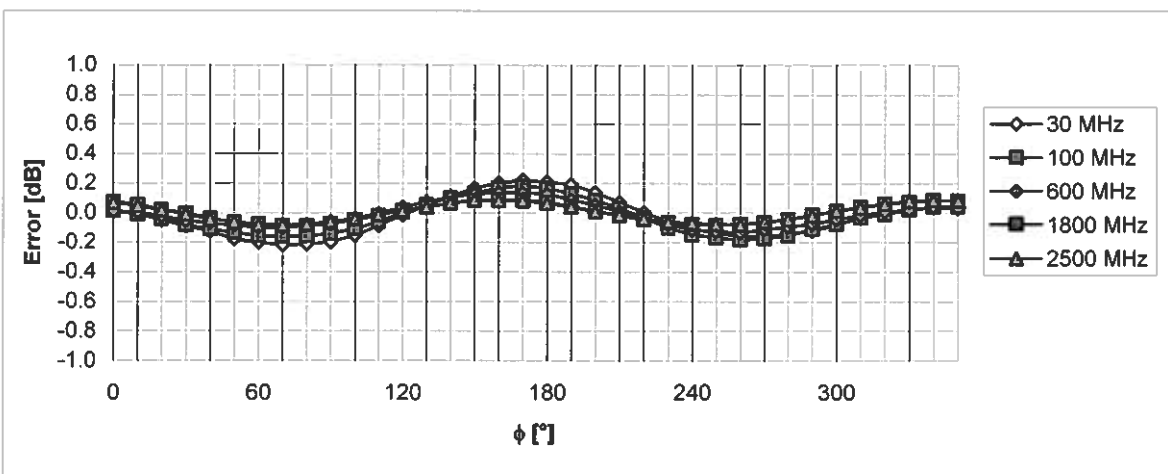
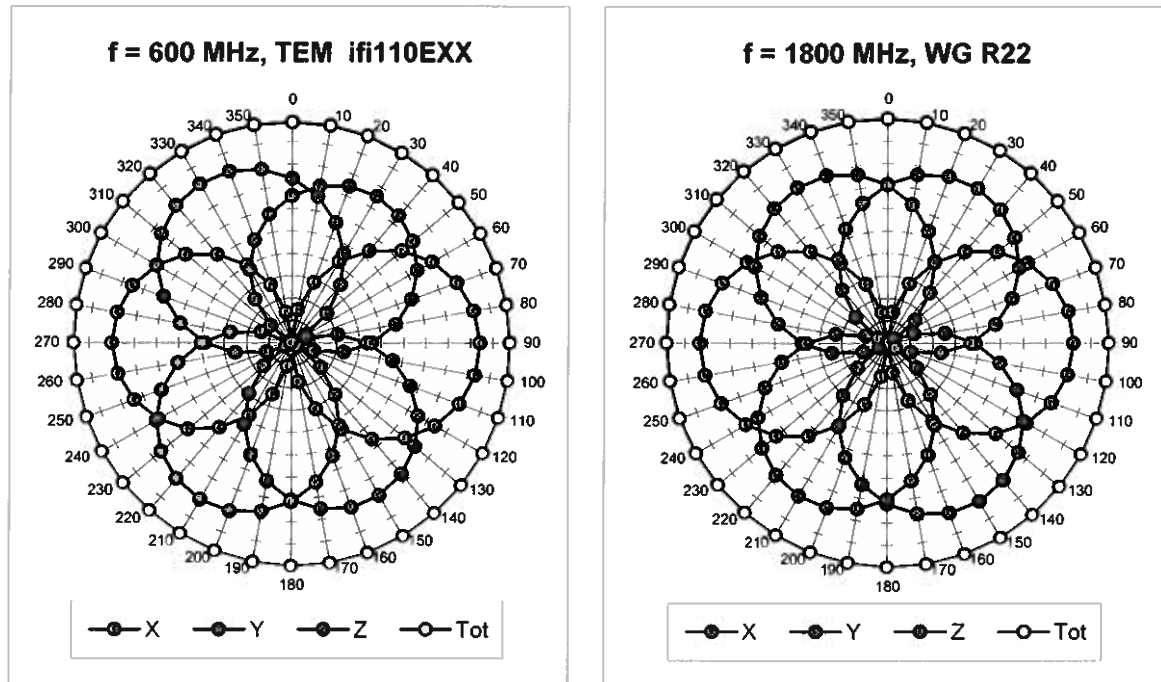
Frequency Response of E-Field

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



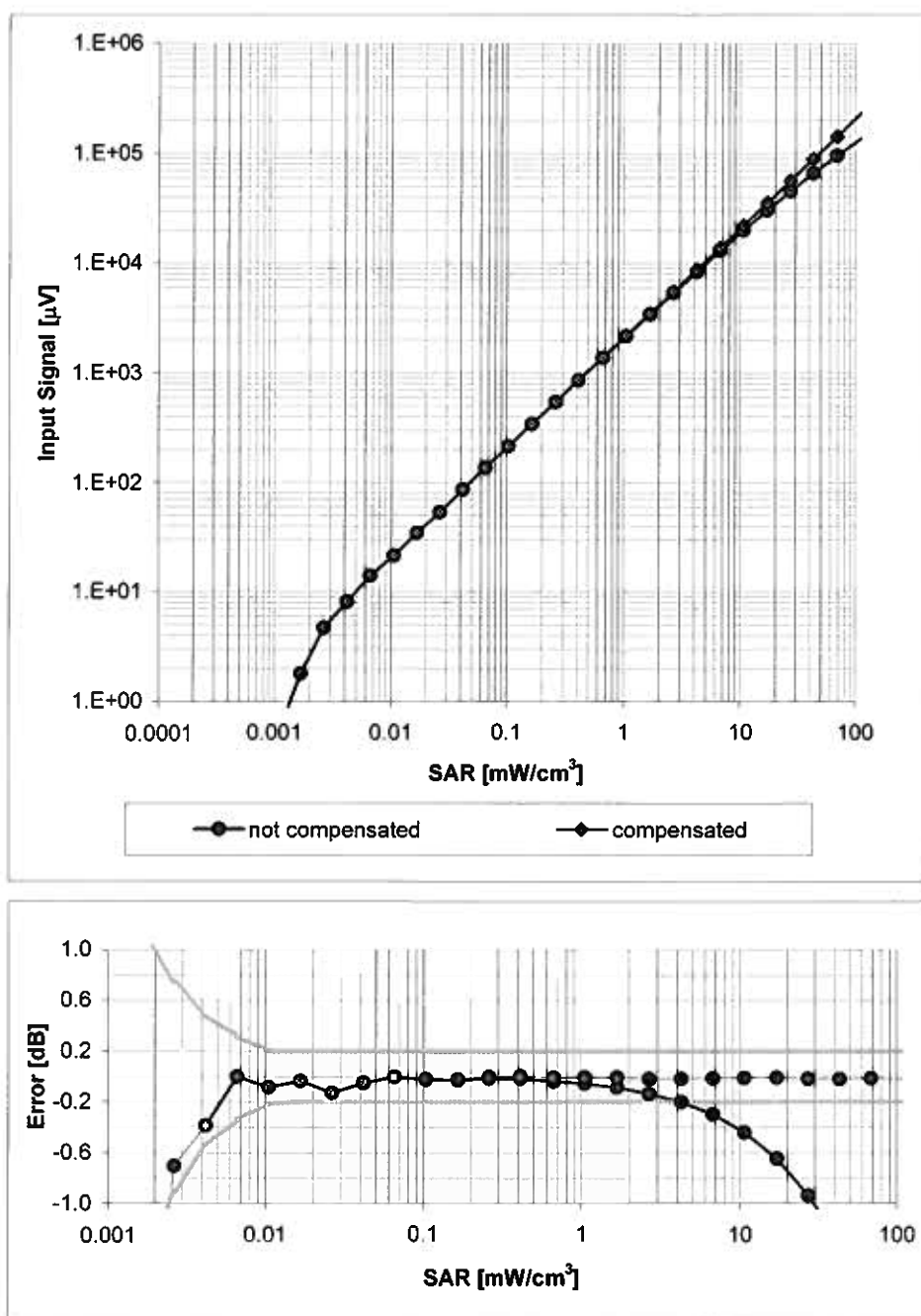
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

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



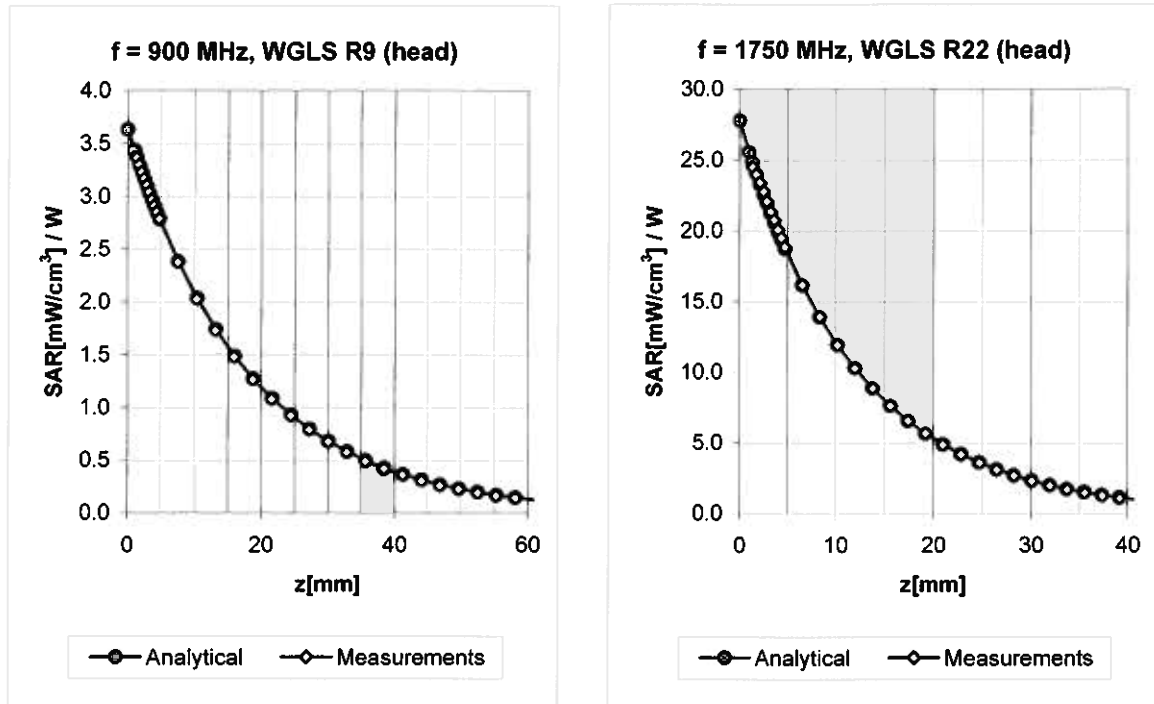
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

Dynamic Range $f(\text{SAR}_{\text{head}})$ (Waveguide R22, $f = 1800 \text{ MHz}$)



Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

Conversion Factor Assessment

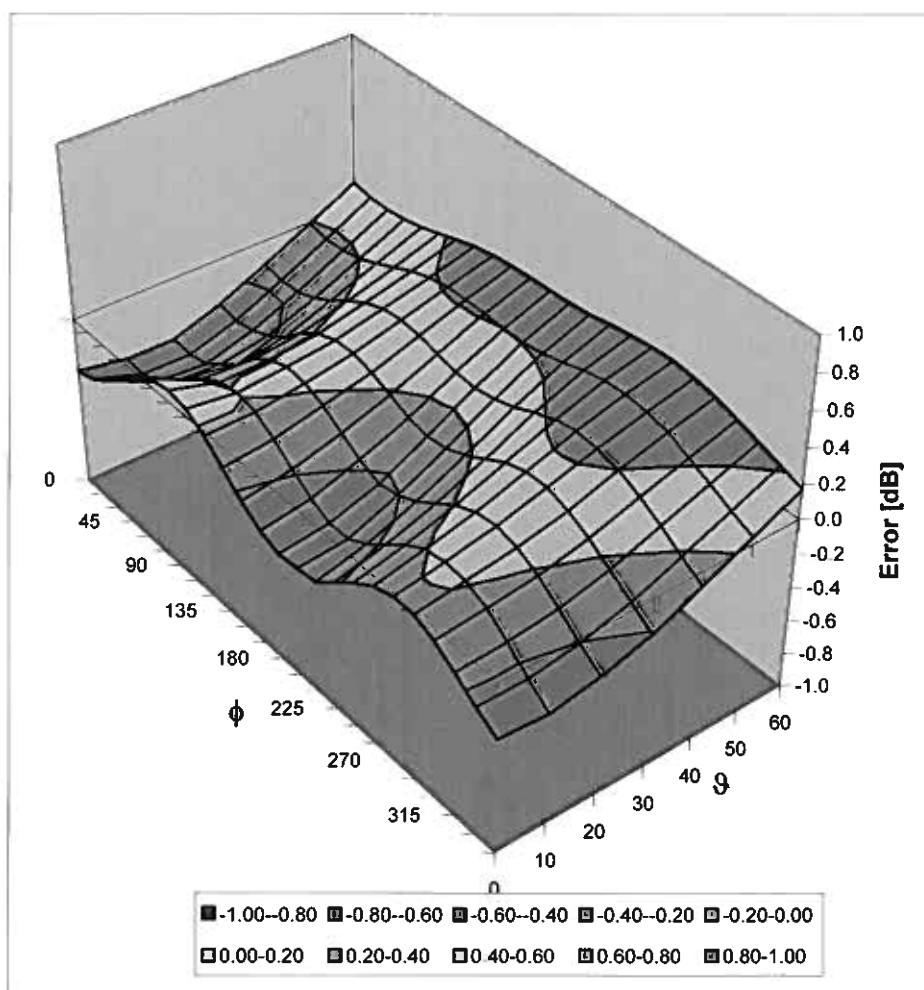


f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
450	$\pm 50 / \pm 100$	Head	$43.5 \pm 5\%$	$0.87 \pm 5\%$	0.23	1.00	$10.49 \pm 13.3\% (k=2)$
900	$\pm 50 / \pm 100$	Head	$41.5 \pm 5\%$	$0.97 \pm 5\%$	0.48	0.72	$9.76 \pm 11.0\% (k=2)$
1750	$\pm 50 / \pm 100$	Head	$40.1 \pm 5\%$	$1.37 \pm 5\%$	0.57	0.63	$8.82 \pm 11.0\% (k=2)$
1900	$\pm 50 / \pm 100$	Head	$40.0 \pm 5\%$	$1.40 \pm 5\%$	0.53	0.65	$8.58 \pm 11.0\% (k=2)$
2150	$\pm 50 / \pm 101$	Head	$39.7 \pm 5\%$	$1.53 \pm 5\%$	0.36	0.69	$8.33 \pm 11.0\% (k=2)$
2450	$\pm 50 / \pm 100$	Head	$39.2 \pm 5\%$	$1.80 \pm 5\%$	0.36	0.75	$7.77 \pm 11.0\% (k=2)$
450	$\pm 50 / \pm 100$	Body	$56.7 \pm 5\%$	$0.94 \pm 5\%$	0.30	0.51	$11.32 \pm 13.3\% (k=2)$
900	$\pm 50 / \pm 100$	Body	$55.0 \pm 5\%$	$1.05 \pm 5\%$	0.45	0.75	$9.99 \pm 11.0\% (k=2)$
1750	$\pm 50 / \pm 100$	Body	$53.4 \pm 5\%$	$1.49 \pm 5\%$	0.55	0.63	$8.59 \pm 11.0\% (k=2)$
1900	$\pm 50 / \pm 100$	Body	$53.3 \pm 5\%$	$1.52 \pm 5\%$	0.48	0.68	$8.23 \pm 11.0\% (k=2)$
2150	$\pm 50 / \pm 100$	Body	$53.0 \pm 5\%$	$1.75 \pm 5\%$	0.30	0.92	$8.27 \pm 11.0\% (k=2)$
2450	$\pm 50 / \pm 100$	Body	$52.7 \pm 5\%$	$1.95 \pm 5\%$	0.25	1.02	$8.06 \pm 11.0\% (k=2)$

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

Deviation from Isotropy in HSL

Error (ϕ , θ), $f = 900$ MHz



Uncertainty of Spherical Isotropy Assessment: $\pm 2.6\%$ ($k=2$)

rechecked by *AKB*
27-05-2010

A1329

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



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

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Accreditation No.: **SCS 108**

Client **RFI**

Certificate No: **D900V2-185_Aug09**

CALIBRATION CERTIFICATE

Object **D900V2 - SN: 185**

Calibration procedure(s) **QA CAL-05.v7**
Calibration procedure for dipole validation kits

Calibration date: **August 18, 2009**

Condition of the calibrated item **In Tolerance**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	08-Oct-08 (No. 217-00898)	Oct-09
Power sensor HP 8481A	US37292783	08-Oct-08 (No. 217-00898)	Oct-09
Reference 20 dB Attenuator	SN: 5086 (20g)	31-Mar-09 (No. 217-01025)	Mar-10
Type-N mismatch combination	SN: 5047.2 / 06327	31-Mar-09 (No. 217-01029)	Mar-10
Reference Probe ES3DV3	SN: 3205	26-Jun-09 (No. ES3-3205_Jun09)	Jun-10
DAE4	SN: 601	07-Mar-09 (No. DAE4-601_Mar09)	Mar-10

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-07)	In house check: Oct-09
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 18, 2009

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Accreditation No.: **SCS 108**

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Glossary:

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

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V5.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	900 MHz \pm 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.97 mho/m
Measured Head TSL parameters	(22.0 \pm 0.2) °C	40.4 \pm 6 %	0.96 mho/m \pm 6 %
Head TSL temperature during test	(22.4 \pm 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.75 mW / g
SAR normalized	normalized to 1W	11.0 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	11.0 mW /g \pm 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.76 mW / g
SAR normalized	normalized to 1W	7.04 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	7.06 mW /g \pm 16.5 % (k=2)

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

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.0	1.05 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.7 ± 6 %	1.06 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.80 mW / g
SAR normalized	normalized to 1W	11.2 mW / g
SAR for nominal Body TSL parameters ²	normalized to 1W	11.0 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.81 mW / g
SAR normalized	normalized to 1W	7.24 mW / g
SAR for nominal Body TSL parameters ²	normalized to 1W	7.16 mW / g ± 16.5 % (k=2)

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

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.5 Ω - 10.3 j Ω
Return Loss	- 19.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.5 Ω - 11.2 j Ω
Return Loss	- 18.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.403 ns
----------------------------------	----------

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	May 27, 2003

DASY5 Validation Report for Head TSL

Date/Time: 18.08.2009 08:57:04

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:185

Communication System: CW-900; Frequency: 900 MHz; Duty Cycle: 1:1

Medium: HSL 900 MHz

Medium parameters used: $f = 900$ MHz; $\sigma = 0.96$ mho/m; $\epsilon_r = 40.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.88, 5.88, 5.88); Calibrated: 26.06.2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

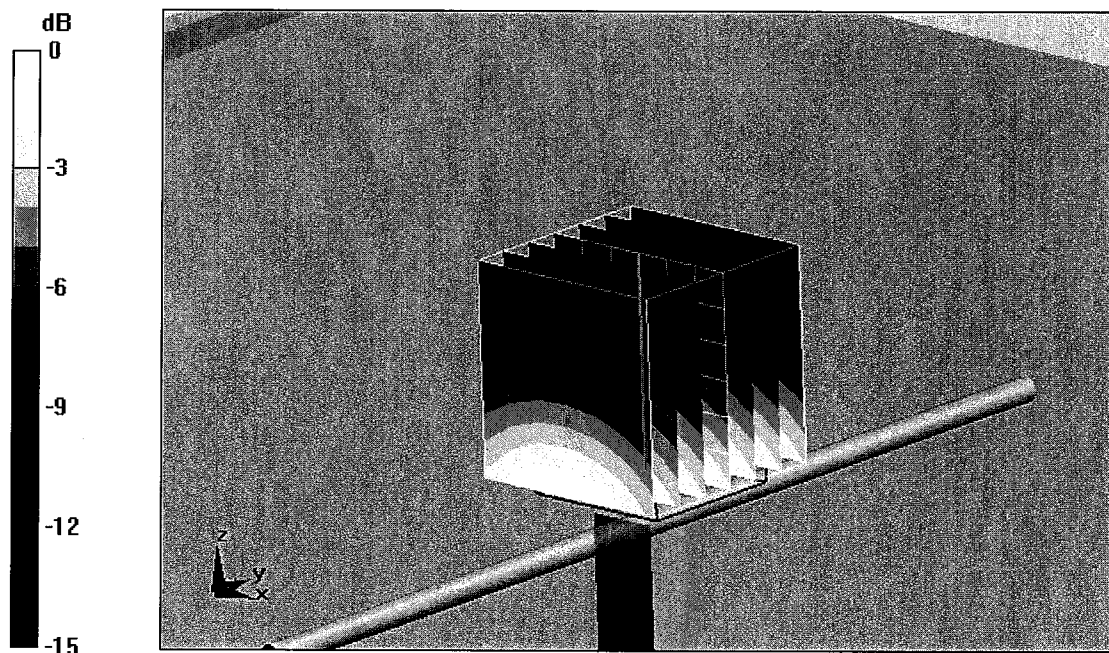
Pin=250mW; dip=15mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 59.7 V/m; Power Drift = 0.015 dB

Peak SAR (extrapolated) = 4.17 W/kg

SAR(1 g) = 2.75 mW/g; SAR(10 g) = 1.76 mW/g

Maximum value of SAR (measured) = 3.23 mW/g

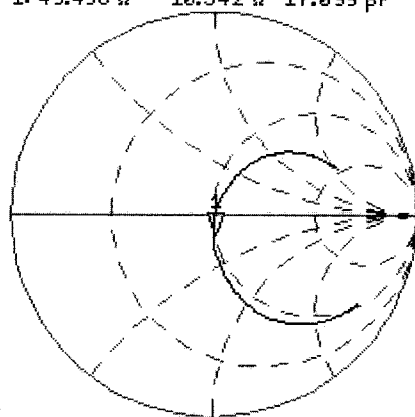


0 dB = 3.23mW/g

Impedance Measurement Plot for Head TSL

18 Aug 2009 08:06:03
 CH1 S11 1 U FS 1: 49.496 Ω -10.342 Ω 17.099 pF 900.000 000 MHz

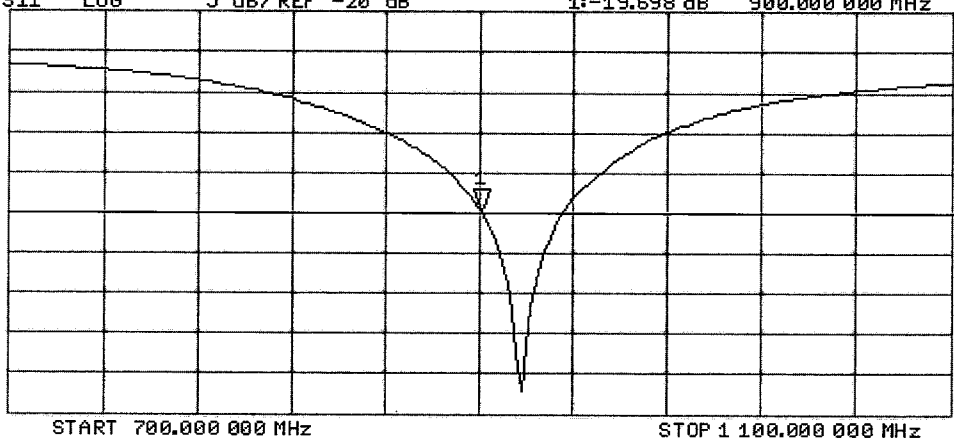
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Avg
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CH2 S11 LOG 5 dB/REF -20 dB 1:-19.698 dB 900.000 000 MHz

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 Avg
 16
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DASY5 Validation Report for Body

Date/Time: 17.08.2009 11:23:13

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:185

Communication System: CW-900; Frequency: 900 MHz; Duty Cycle: 1:1

Medium: MSL900

Medium parameters used: $f = 900 \text{ MHz}$; $\sigma = 1.06 \text{ mho/m}$; $\epsilon_r = 52.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.81, 5.81, 5.81); Calibrated: 26.06.2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

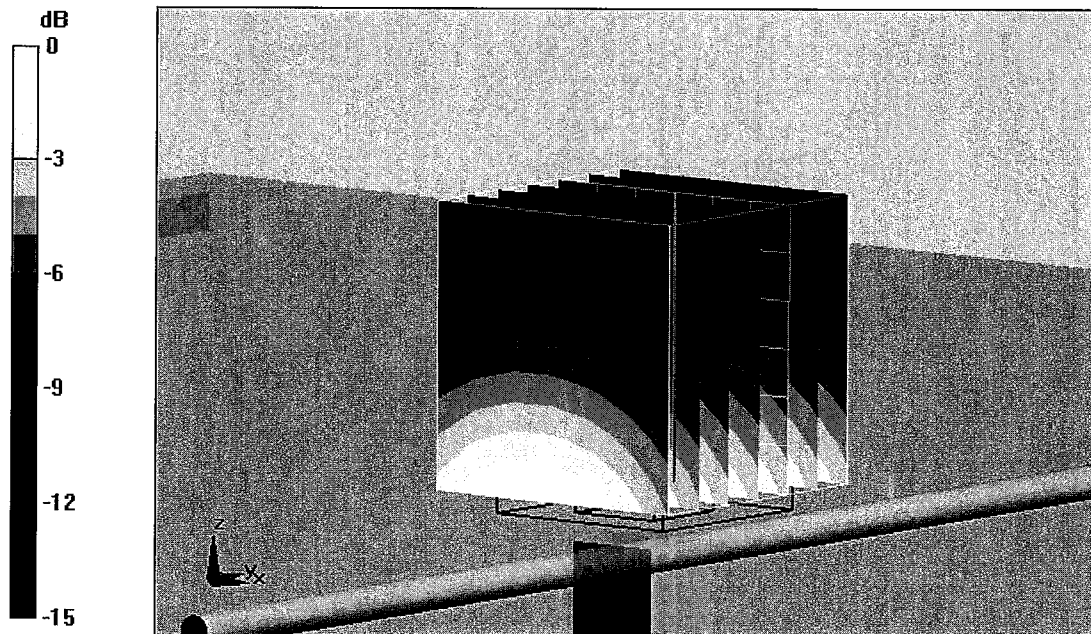
Pin=250mW; dip=15mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 57.2 V/m; Power Drift = 0.00569 dB

Peak SAR (extrapolated) = 4.19 W/kg

SAR(1 g) = 2.8 mW/g; SAR(10 g) = 1.81 mW/g

Maximum value of SAR (measured) = 3.24 mW/g

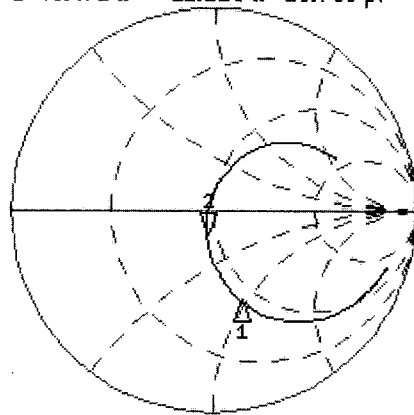


0 dB = 3.24mW/g

Impedance Measurement Plot for Body TSL

17 Aug 2009 08:58:55
 CH1 S11 1 U FS 2: 45.471 Ω -11.215 Ω 15.768 pF 900.000 000 MHz

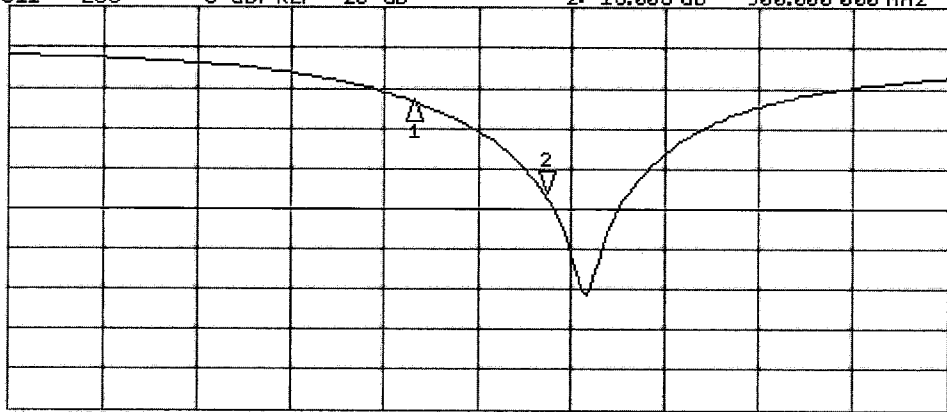
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 16



CH1 Markers
 1: 41.352 Ω
 -46.816 Ω
 835.000 MHz

CH2 S11 LOG 5 dB/REF -20 dB 2: -18.006 dB 900.000 000 MHz

Cor
 Avg
 16



CH2 Markers
 1: -6.6738 dB
 835.000 MHz

START 635.000 000 MHz

STOP 1 1100.000 000 MHz

Test of: P-07B

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

Appendix 2. Measurement Methods

A.2.1. Evaluation Procedure

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 the test specification identified in section 3.1 of this report.

(ii) For body worn devices or devices which can be operated within 20 cm of the body, the flat section of the SAM phantom was used where the size of the device(s) is normal. For bigger devices and base station the 2mm Oval phantom is used for evaluation. 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 5x5x7 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.
-

Test of: P-07B

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

A.2.2. Specific Absorption Rate (SAR) Measurements to OET Bulletin 65 Supplement C: (2001-01)

Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields

SAR measurements were performed in accordance with Appendix D of the standard FCC OET Bulletin 65 Supplement C: 2001, against appropriate limits for each measurement position in accordance with the standard.

The test was performed in a shielded enclosure with the temperature controlled to remain between +18.0°C and +25.0°C. The tissue equivalent material fluid temperature was controlled to give a maximum variation of $\pm 2.0^\circ\text{C}$

Prior to any SAR measurements on the EUT, system validation and material dielectric property measurements were conducted. In the absence of a detailed procedure within the specification, system validation and material dielectric property measurements were performed in accordance with Appendix C and Appendix D of FCC OET Bulletin 65 Supplement C: 2001.

Following the successful system validation and material dielectric property measurements, a SAR versus time sweep shall be performed within 10 mm of the phantom inner surface. If the EUT power output is stable after three minutes then the measurement probe will perform a coarse surface level scan at each test position in order to ascertain the location of the maximum local SAR level. Once this area had been established, a 5x5x7 cube of 343 points (5 mm spacing in each axis $\approx 27\text{g}$) will be centred at the area of concern. Extrapolation and interpolation will then be carried out on the 27g of tissue and the highest averaged SAR over a 10g cube determined.

Once the maximum interpolated SAR measurement is complete; the coarse scan is visually assessed to check for secondary peaks within 50% of the maximum SAR level. If there are any further SAR measurements required, extra 5x5x7 cubes shall be centred on each of these extra local SAR maxima.

At the end of each position test case a second time sweep shall be performed to check whether the EUT has remained stable throughout the test.

Test of: P-07B

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

Appendix 3. SAR Distribution Scans

This appendix contains SAR distribution scans which are not included in the total number of pages for this report.

Scan Reference Number	Title
SCN/78096JD05/001	Touch Left FDD V CH4183
SCN/78096JD05/002	Tilt Left FDD V CH4183
SCN/78096JD05/003	Touch Right Using Flat Section FDD V CH4183
SCN/78096JD05/004	Tilt Right FDD V CH4183
SCN/78096JD05/005	Front of EUT Facing Phantom FDD V CH4183
SCN/78096JD05/006	Rear of EUT Facing Phantom FDD V CH4183
SCN/78096JD05/007	Rear of EUT Facing Phantom With PHF FDD V CH4183
SCN/78096JD05/008	Rear of EUT Facing Phantom FDD V + HSDPA CH4183
SCN/78096JD05/009	System Performance Check 900MHz Head 18 06 10

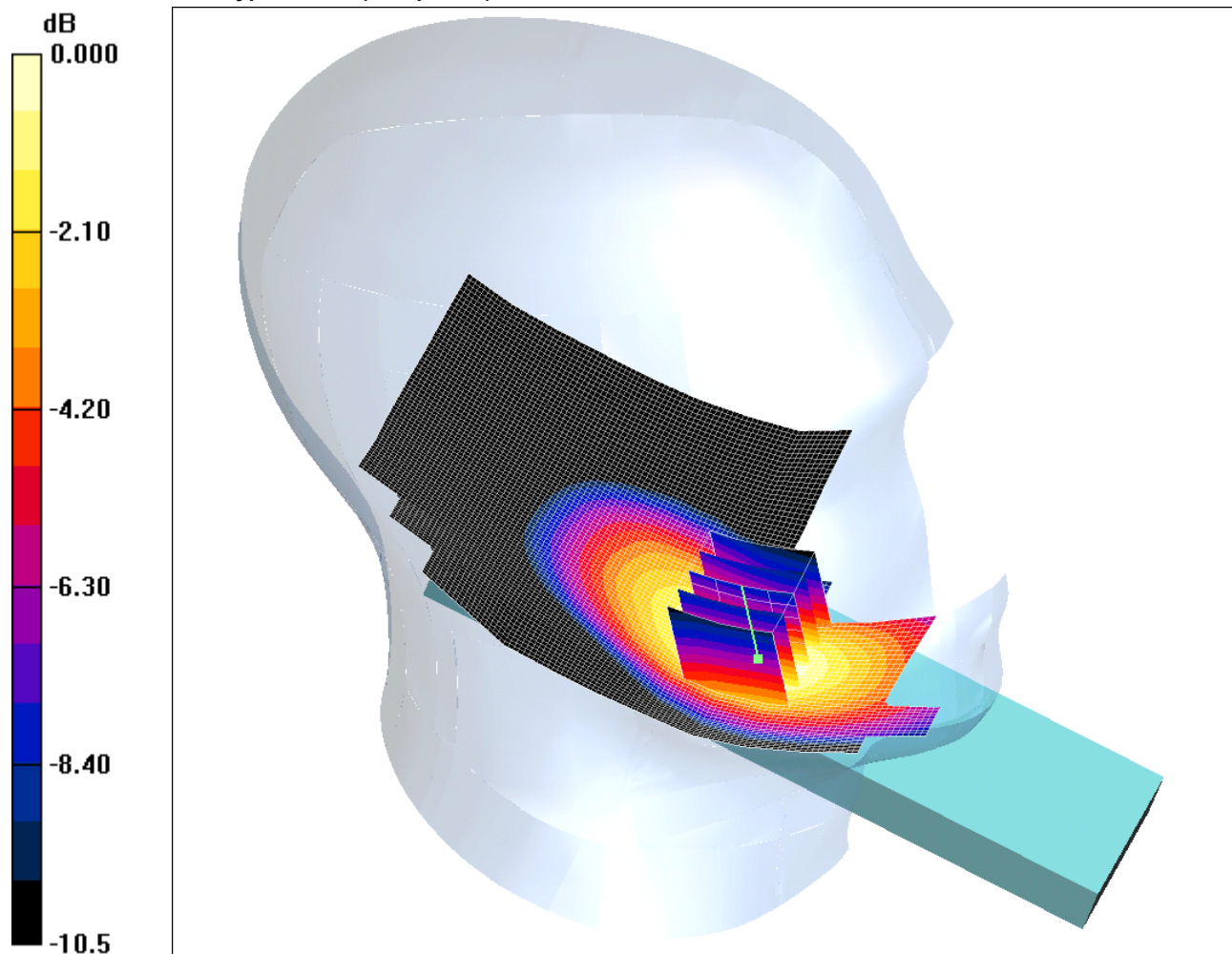
Test of: P-07B

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

SCN/78096JD05/001: Touch Left FDD V CH4183

Date 18/06/2010

DUT: Panasonic P-07B; Type: P-07B (Sample C4); Serial: 359783030009078



0 dB = 0.591mW/g

Communication System: UMTS-FDD V; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 900 MHz HSL Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.918$ mho/m; $\epsilon_r = 42.9$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(9.76, 9.76, 9.76); Calibrated: 26/06/2009

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn394; Calibrated: 19/04/2010

- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193

- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Touch Left - Middle/Area Scan (81x171x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.595 mW/g

Touch Left - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.61 V/m; Power Drift = -0.021 dB

Peak SAR (extrapolated) = 0.809 W/kg

SAR(1 g) = 0.547 mW/g; SAR(10 g) = 0.363 mW/g

Maximum value of SAR (measured) = 0.591 mW/g

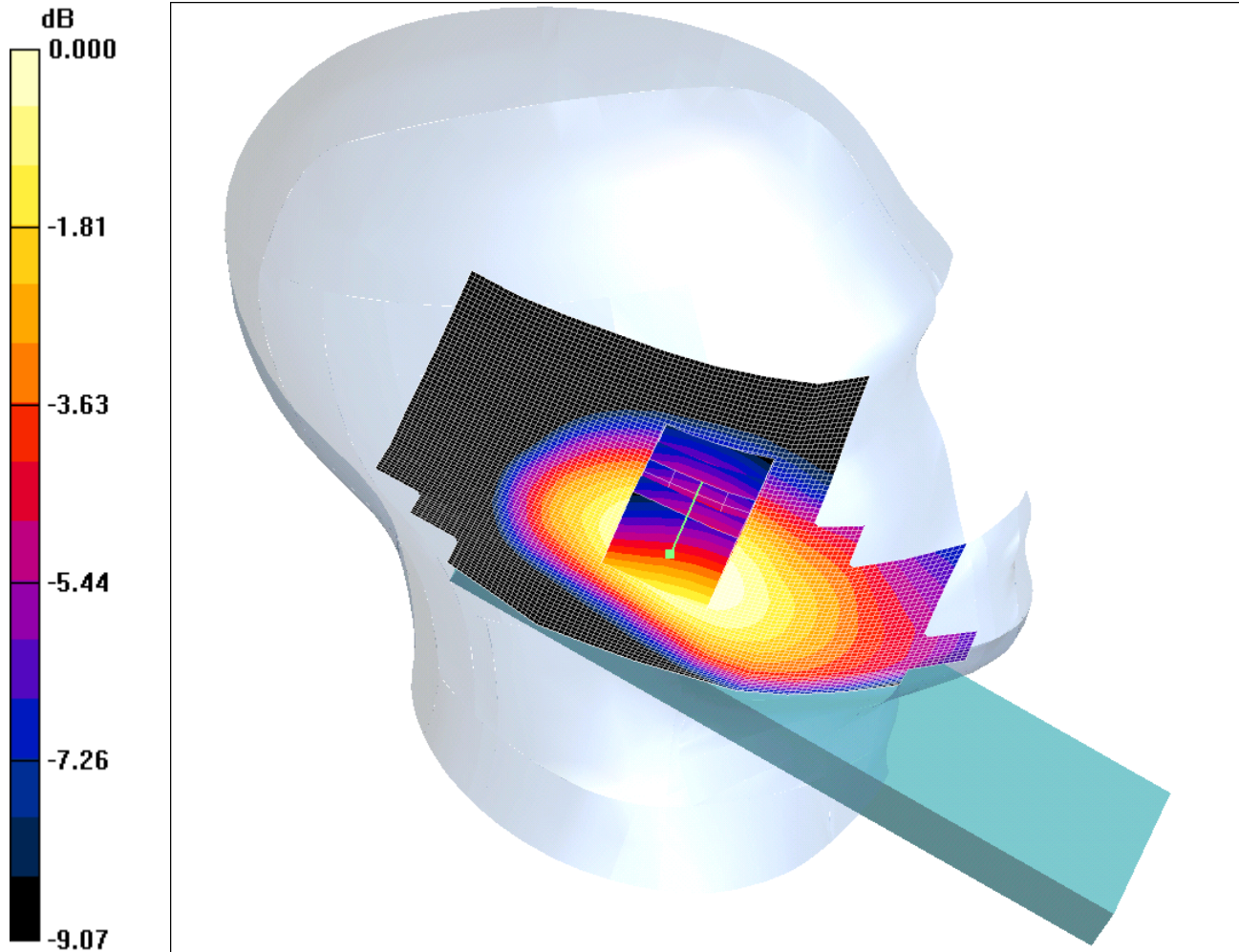
Test of: P-07B

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

SCN/78096JD05/002: Tilt Left FDD V CH4183

Date 18/06/2010

DUT: Panasonic P-07B; Type: P-07B (Sample C4); Serial: 359783030009078



0 dB = 0.158mW/g

Communication System: UMTS-FDD V; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 900 MHz HSL Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.918$ mho/m; $\epsilon_r = 42.9$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(9.76, 9.76, 9.76); Calibrated: 26/06/2009

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn394; Calibrated: 19/04/2010

- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193

- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Tilt Left - Middle/Area Scan (81x171x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.161 mW/g

Tilt Left - Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.38 V/m; Power Drift = 0.041 dB

Peak SAR (extrapolated) = 0.190 W/kg

SAR(1 g) = 0.151 mW/g; SAR(10 g) = 0.114 mW/g

Maximum value of SAR (measured) = 0.158 mW/g

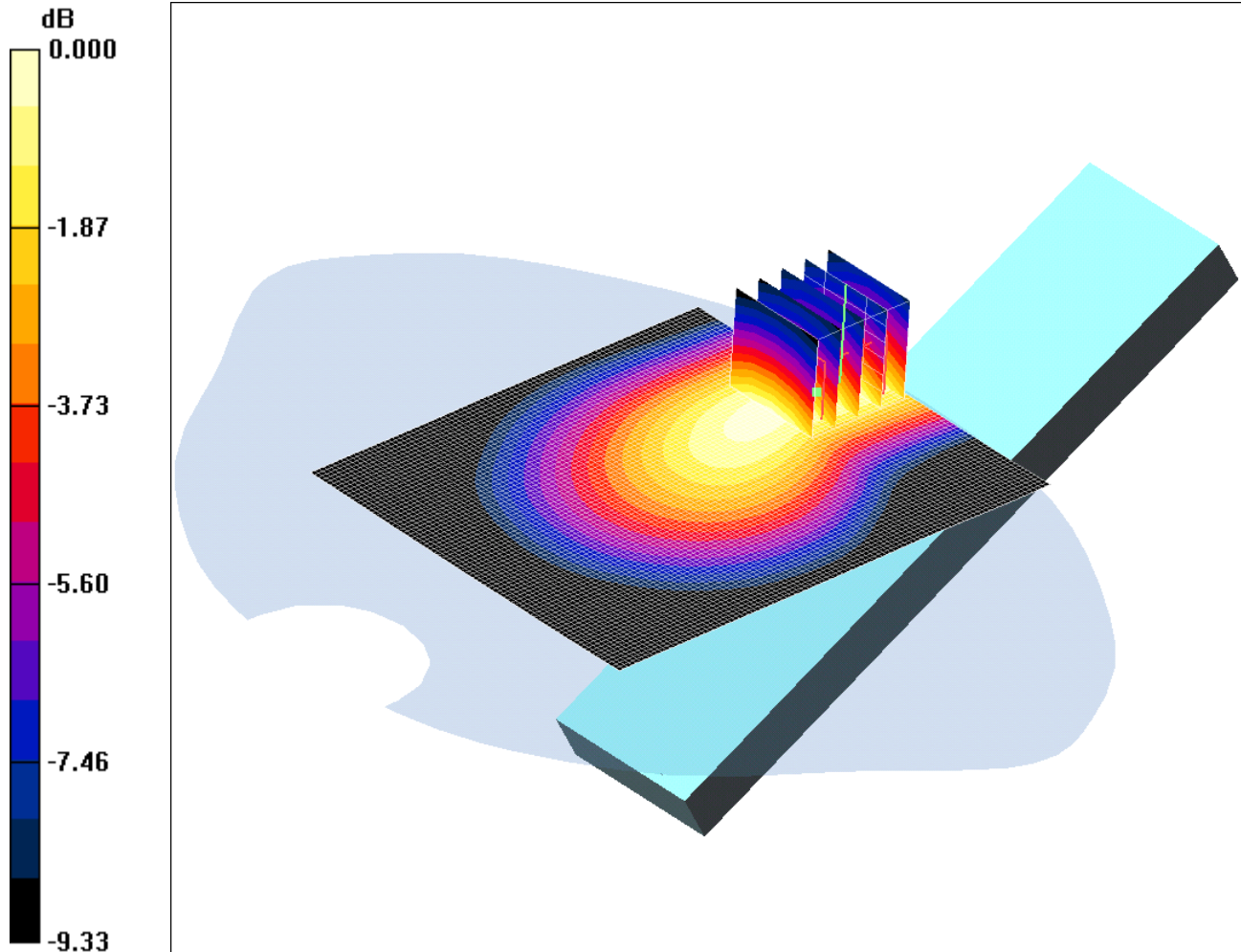
Test of: P-07B

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

SCN/78096JD05/003: Touch Right Using Flat Section FDD V CH4183

Date 18/06/2010

DUT: Panasonic P-07B; Type: P-07B (Sample C4); Serial: 359783030009078



0 dB = 0.262mW/g

Communication System: UMTS-FDD V; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 900 MHz HSL Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.918$ mho/m; $\epsilon_r = 42.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(9.76, 9.76, 9.76); Calibrated: 26/06/2009

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn394; Calibrated: 19/04/2010

- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193

- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Touch Right Using Flat Section - Middle/Area Scan (81x121x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.261 mW/g

Touch Right Using Flat Section - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.93 V/m; Power Drift = -0.047 dB

Peak SAR (extrapolated) = 0.354 W/kg

SAR(1 g) = 0.246 mW/g; SAR(10 g) = 0.169 mW/g

Maximum value of SAR (measured) = 0.262 mW/g

Note: Some points in the 'Right Touch' position could not be fully evaluated therefore the zoom scan was unable to fully enclose the peak SAR location as required by IEEE 1528 and OET Bulletin 65 Supplement C. This scan is repeated in the Mouth / Jaw configuration on the SAM phantom flat section as per KDB 648474 D01.

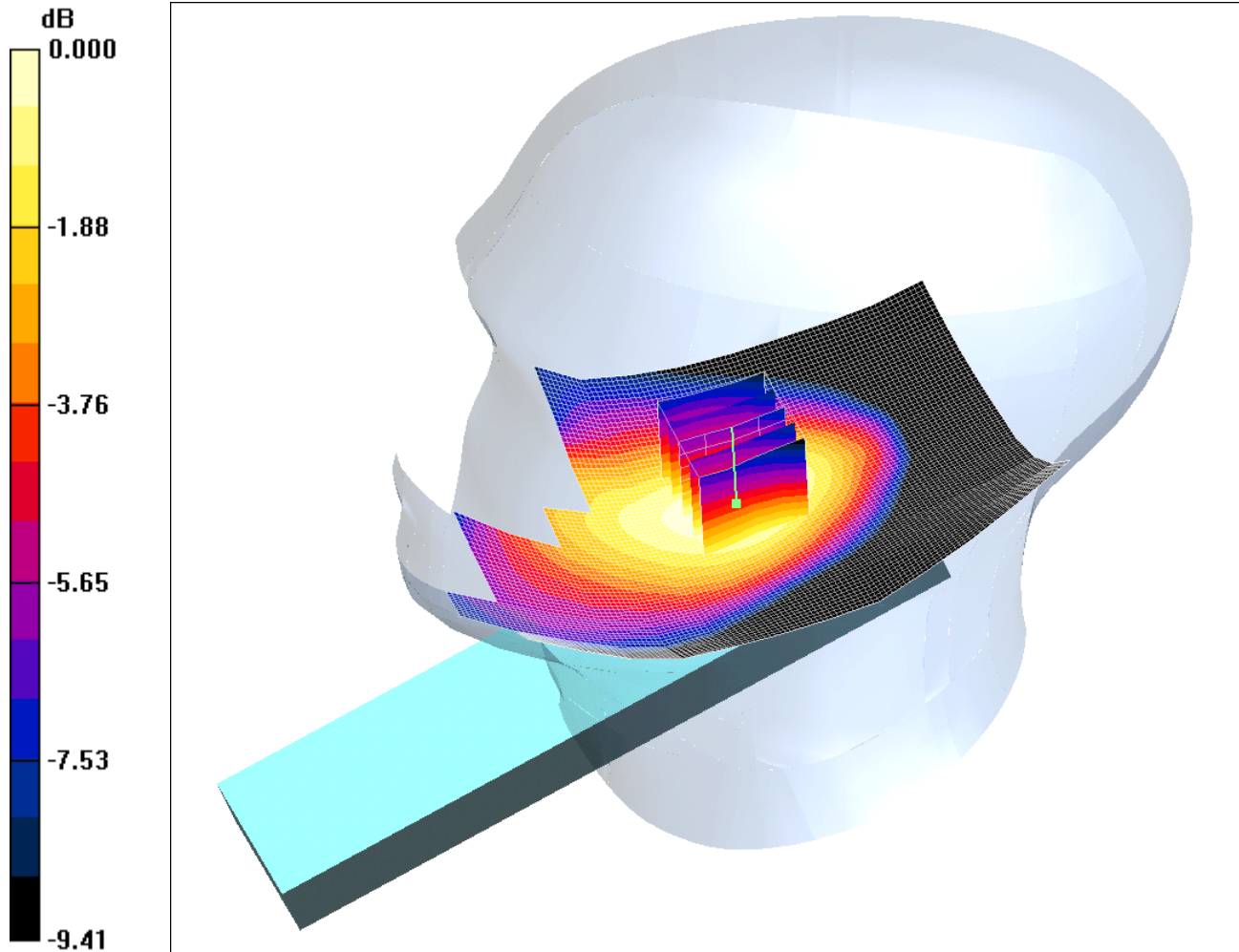
Test of: P-07B

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

SCN/78096JD05/004: Tilt Right FDD V CH4183

Date 18/06/2010

DUT: Panasonic P-07B; Type: P-07B (Sample C4); Serial: 359783030009078



0 dB = 0.160mW/g

Communication System: UMTS-FDD V; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 900 MHz HSL Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.918$ mho/m; $\epsilon_r = 42.9$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(9.76, 9.76, 9.76); Calibrated: 26/06/2009

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn394; Calibrated: 19/04/2010

- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193

- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Tilt Right - Middle/Area Scan (81x171x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.160 mW/g

Tilt Right - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.39 V/m; Power Drift = 0.117 dB

Peak SAR (extrapolated) = 0.197 W/kg

SAR(1 g) = 0.152 mW/g; SAR(10 g) = 0.113 mW/g

Maximum value of SAR (measured) = 0.160 mW/g

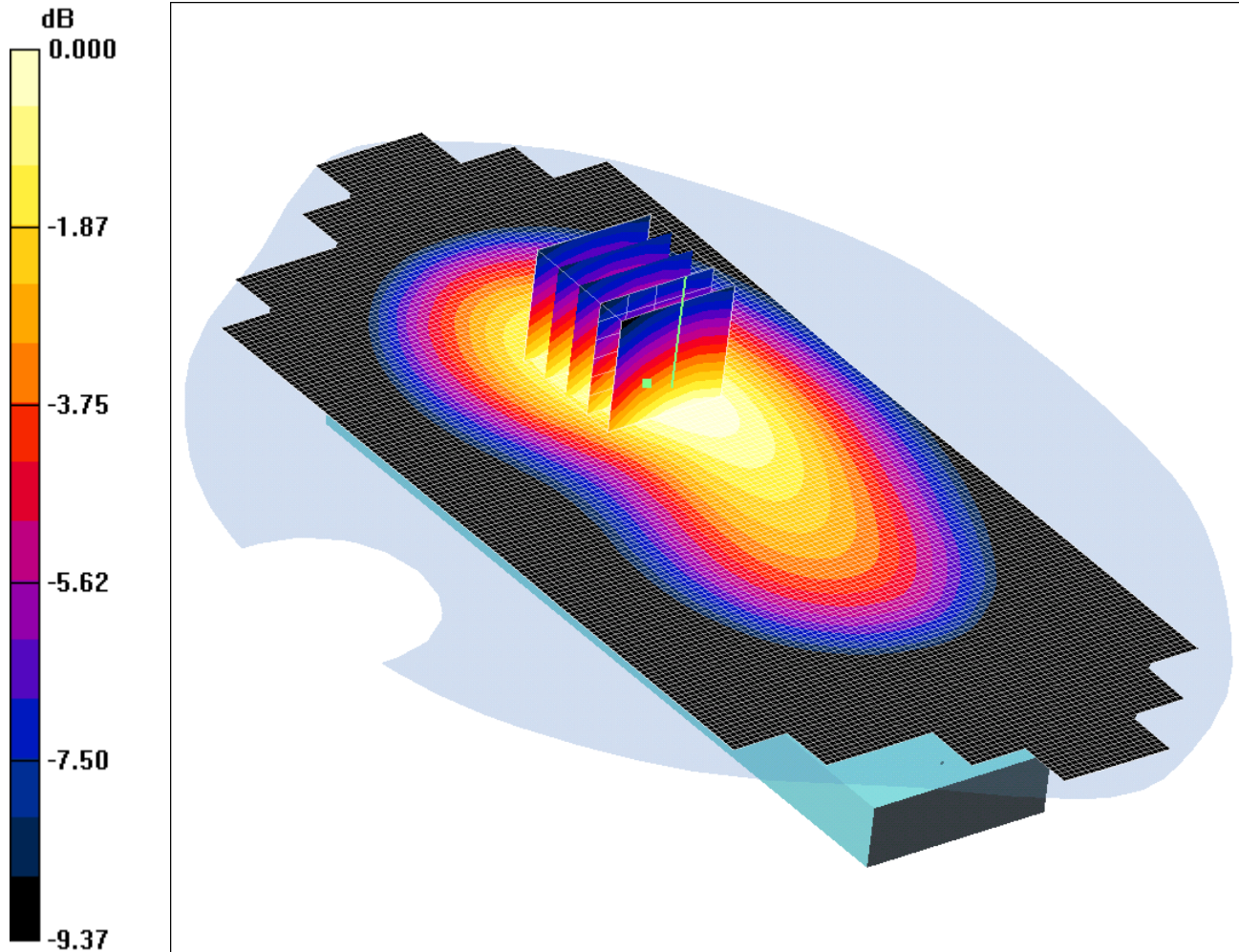
Test of: P-07B

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

SCN/78096JD05/005: Front of EUT Facing Phantom FDD V CH4183

Date 18/06/2010

DUT: Panasonic P-07B; Type: P-07B (Sample C4); Serial: 359783030009078



0 dB = 0.218mW/g

Communication System: UMTS-FDD V; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 900 MHz MSL Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 55.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(9.99, 9.99, 9.99); Calibrated: 26/06/2009

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn394; Calibrated: 19/04/2010

- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207

- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Front of EUT Facing Phantom - Middle/Area Scan (81x191x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.224 mW/g

Front of EUT Facing Phantom - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.1 V/m; Power Drift = -0.195 dB

Peak SAR (extrapolated) = 0.280 W/kg

SAR(1 g) = 0.209 mW/g; SAR(10 g) = 0.151 mW/g

Maximum value of SAR (measured) = 0.218 mW/g

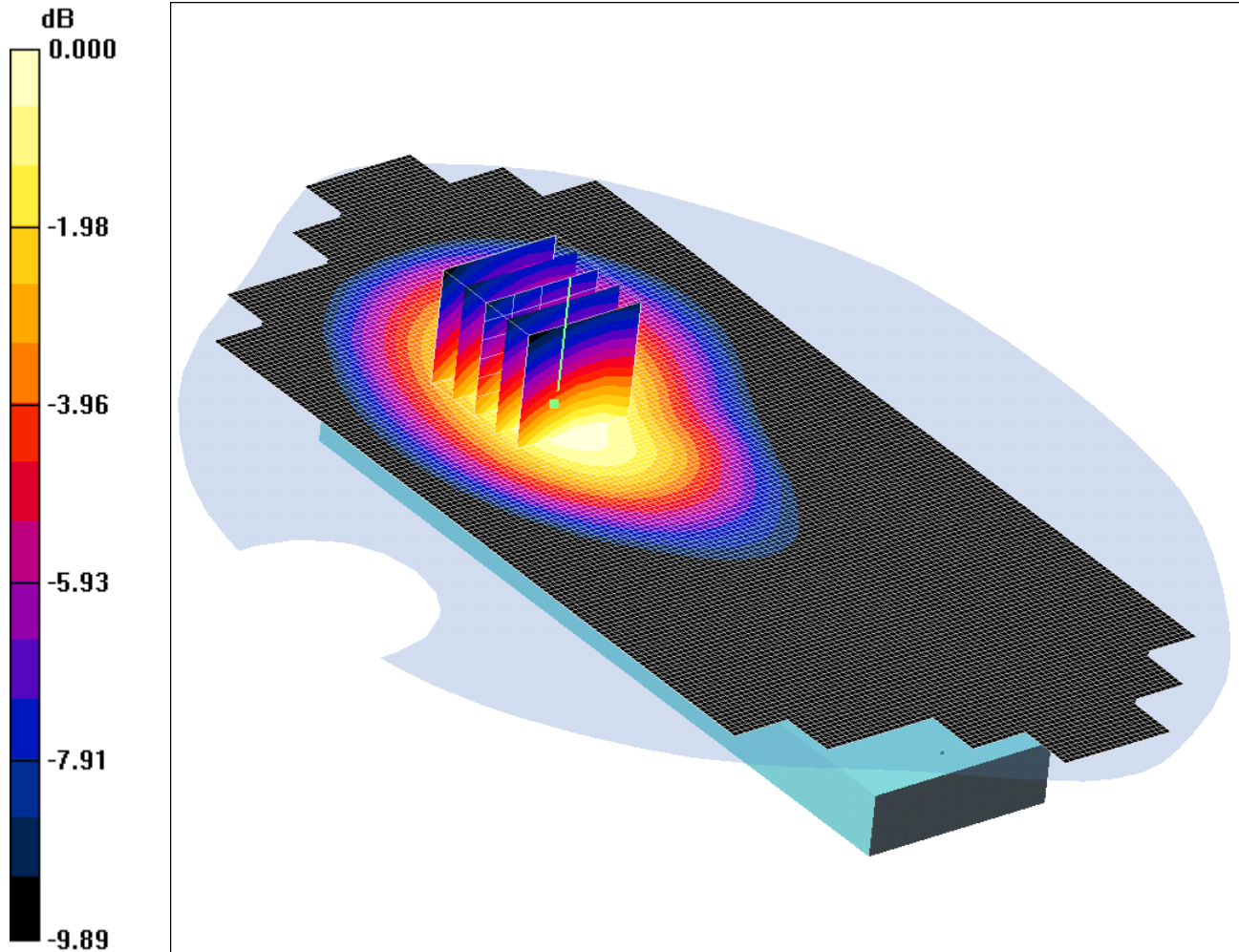
Test of: P-07B

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

SCN/78096JD05/006: Rear of EUT Facing Phantom FDD V CH4183

Date 18/06/2010

DUT: Panasonic P-07B; Type: P-07B (Sample C4); Serial: 359783030009078



0 dB = 0.342mW/g

Communication System: UMTS-FDD V; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 900 MHz MSL Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 55.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(9.99, 9.99, 9.99); Calibrated: 26/06/2009

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn394; Calibrated: 19/04/2010

- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207

- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Rear of EUT Facing Phantom - Middle/Area Scan (81x191x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.349 mW/g

Rear of EUT Facing Phantom - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.8 V/m; Power Drift = -0.147 dB

Peak SAR (extrapolated) = 0.451 W/kg

SAR(1 g) = 0.328 mW/g; SAR(10 g) = 0.231 mW/g

Maximum value of SAR (measured) = 0.342 mW/g

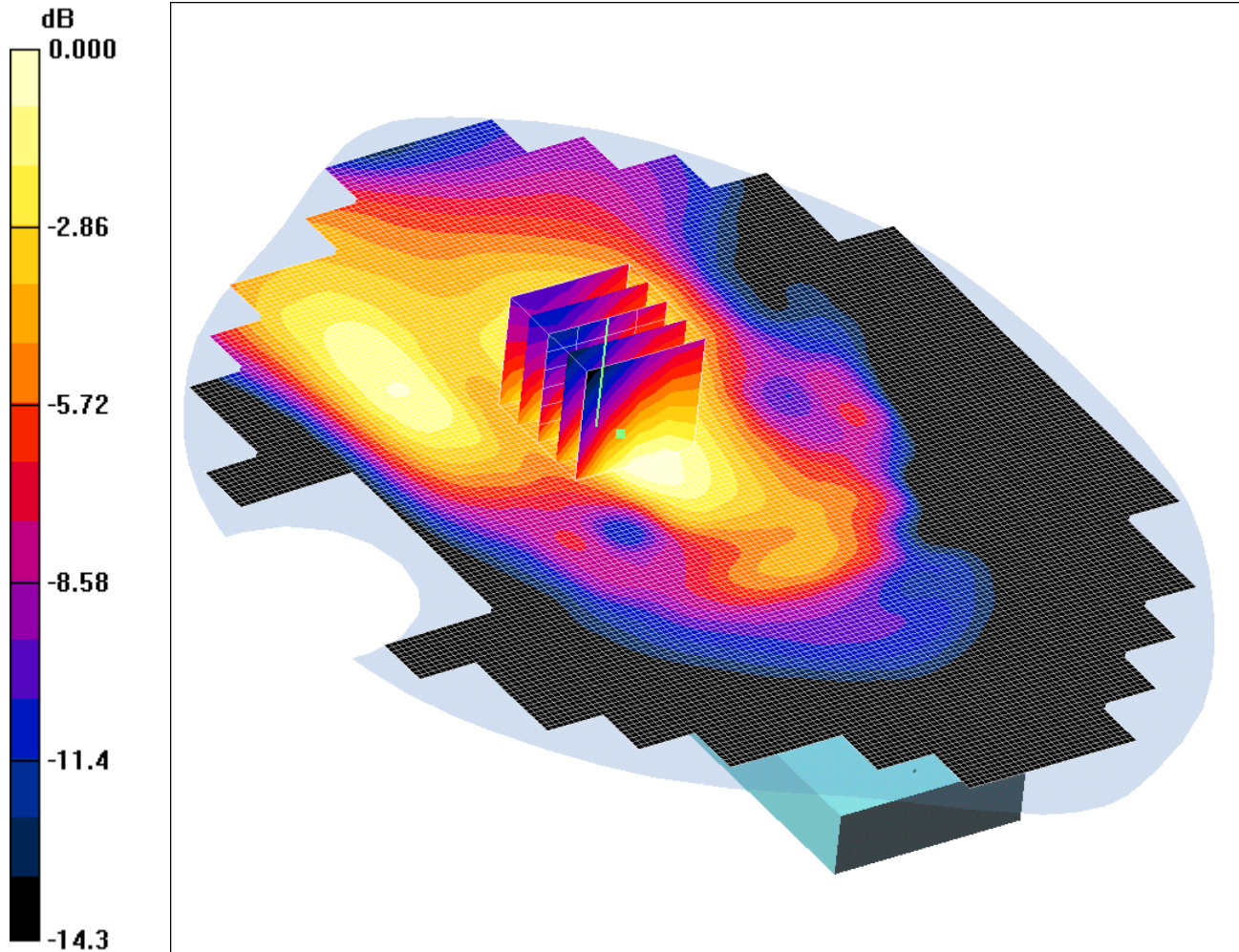
Test of: P-07B

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

SCN/78096JD05/007: Rear of EUT Facing Phantom With PHF FDD V CH4183

Date 18/06/2010

DUT: Panasonic P-07B; Type: P-07B (Sample C4); Serial: 359783030009078



0 dB = 0.325mW/g

Communication System: UMTS-FDD V; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 900 MHz MSL Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 55.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(9.99, 9.99, 9.99); Calibrated: 26/06/2009

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn394; Calibrated: 19/04/2010

- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207

- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Rear of EUT Facing Phantom - Middle/Area Scan (141x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.356 mW/g

Rear of EUT Facing Phantom - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 16.2 V/m; Power Drift = -0.114 dB

Peak SAR (extrapolated) = 0.465 W/kg

SAR(1 g) = 0.311 mW/g; SAR(10 g) = 0.211 mW/g

Maximum value of SAR (measured) = 0.325 mW/g

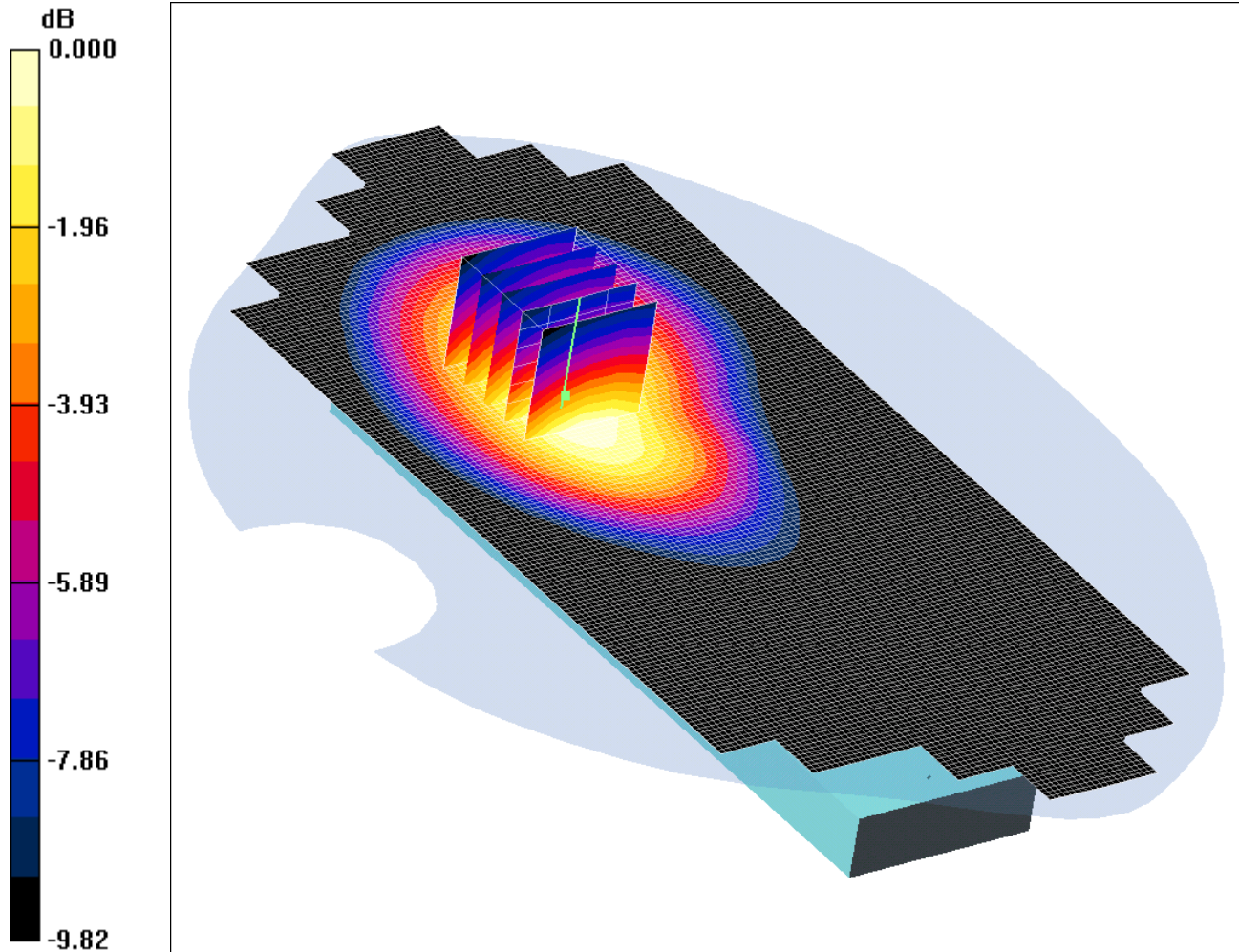
Test of: P-07B

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

SCN/78096JD05/008: Rear of EUT Facing Phantom FDD V + HSDPA CH4183

Date 18/06/2010

DUT: Panasonic P-07B; Type: P-07B (Sample C4); Serial: 359783030009078



Communication System: UMTS-FDD V; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 900 MHz MSL Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 55.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(9.99, 9.99, 9.99); Calibrated: 26/06/2009

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn394; Calibrated: 19/04/2010

- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207

- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Rear of EUT Facing Phantom - Middle/Area Scan (81x191x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.343 mW/g

Rear of EUT Facing Phantom - Middle/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.5 V/m; Power Drift = -0.017 dB

Peak SAR (extrapolated) = 0.441 W/kg

SAR(1 g) = 0.320 mW/g; SAR(10 g) = 0.226 mW/g

Maximum value of SAR (measured) = 0.335 mW/g

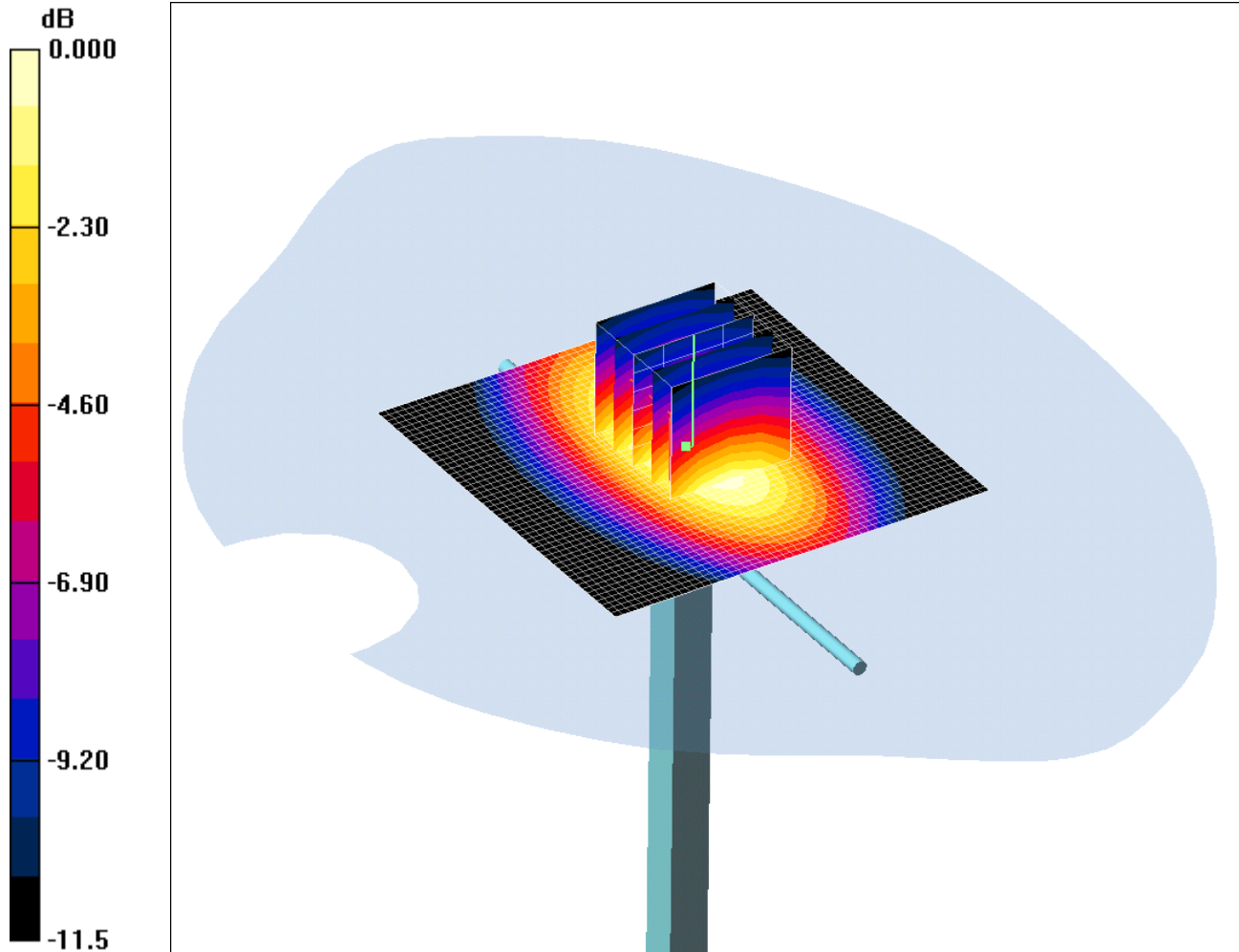
Test of: P-07B

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

SCN/78096JD05/009: System Performance Check 900MHz Head 18 06 10

Date 18/06/2010

DUT: Dipole 900 MHz; Type: D900V2; Serial: SN185



Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1

Medium: 900 MHz HSL Medium parameters used: $f = 900 \text{ MHz}$; $\sigma = 0.993 \text{ mho/m}$; $\epsilon_r = 42.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3508; ConvF(9.76, 9.76, 9.76); Calibrated: 26/06/2009

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn394; Calibrated: 19/04/2010

- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193

- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

d=15mm, Pin=250mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 3.18 mW/g

d=15mm, Pin=250mW/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 55.5 V/m; Power Drift = 0.041 dB

Peak SAR (extrapolated) = 4.42 W/kg

SAR(1 g) = 2.88 mW/g; SAR(10 g) = 1.84 mW/g

Maximum value of SAR (measured) = 3.10 mW/g