MOTOROLA

ACCREDITED

Certificate Number: 1449-01

FCC ID: AZ489FT3809
DECLARATION OF COMPLIANCE SAR ASSESSMENT

Networks & Enterprise
EME Test Laboratory
8000 West Sunrise Blvd
Fort Lauderdale, FL. 33322

Date of Report:	**4/10/06**
Report Revision:	**Rev O**
Report ID:	**FCC rpt_Alpha L VHF R1_060410_SR3747**

Responsible Engineer:	Michael Sailsman (Sr. Staff Eng.)
Date/s Tested:	3/10/06-3/17/06
Manufacturer/Location:	Motorola – Penang
Sector/Group/Div.:	NE/GTDG
Date submitted for test:	3/7/06
DUT Description:	136-150MHZ 12.5/25K-16CH
Test TX mode(s):	CW
Max. Power output:	5.5W
Nominal Power:	5.0W
Tx Frequency Bands:	136-150MHz
Signaling type:	FM
Model(s) Tested:	PMUD2221A/AAH84JDJ8AA1AN
Model(s) Certified:	PMUD2221A/AAH84JDJ8AA1AN
Serial Number(s):	0277GD0211, 0277GD0209
Classification:	Occupational/Controlled
Rule Part(s):	90

Approved Accessories:

Antenna(s):
PMAD4050A (136-150MHz ¼ wave, -3dBi); PMAD4050AR (136-150MHz ¼ wave, -3dBi)

Battery(ies):
PMNN4071ARC (Mag One NiMH, 1200mAH: CHN-LBL, Boxed); PMNN4071A (Mag One NiMH, 1200mAH), PMNN4071AR (Mag One NiMH, 1200mAH: Boxed); PMNN4071AC (MAG One NiMH, 1200mAH: CHN-LBL)

Body worn accessory(ies):
PMLN4743A (Spring belt); PMLN4691A (Standard belt clip); PMLN4741A (soft leather carry case); PMLN4742A (hard leather carry case)

Audio/Data cable accessory(ies):
PMMN4008A (Remote speaker microphone); PMLN4442A (Earbud w/ in-line mic and PTT/VOX switch); PMLN4443A (Ear receiver w/ in-line mic and PTT/VOX switch); PMLN4444A (Earphone Boom mic w/ in-line mic and PTT/VOX switch); PMLN4445A (Ultra lightweight headset w/ in-line PTT/VOX switch); PMLN4294C (Earbud w/ combined microphone and PTT); PMLN4606A (2-wire surveillance kit w/ clear acoustic tube); PMLN4658A (D-shell earset w/ boom mic & PTT/VOX switch)

Max. Calc. 1-g/10-g Avg. SAR: 2.10/1.15 W/kg (Body)
Max. Calc. 1-g/10-g Avg. SAR: 1.15/0.86 W/kg (Face)

Based on the information and the testing results provided herein, the undersigned certifies that when used as stated in the operating instructions supplied, said product complies with the national and international reference standards and guidelines listed in section 2.0 of this report. This report shall not be reproduced without written approval from an officially designated representative of the Motorola EME Laboratory.

This reporting format is consistent with the test report guidelines of the TIA TSB-150 December 2004
The results and statements contained in this report pertain only to the device(s) evaluated.

Ken Enger signature on file
Ken Enger GEMS EME Lab Senior Resource Manager,
Laboratory Director,

Approval Date: 4/11/06

Certification Date: 4/11/06

Certification No.: L1060381

APPENDICES

Report REVISION HISTORY

Date	Revision	Comments
4/11/06	O	Pilot release

1.0 Introduction and Overview

This report details the utilization, test setup, test equipment, and test results of the Specific Absorption Rate (SAR) measurements performed at the GEMS EME Test Lab for the model number PMUD2221A/AAH84JDJ8AA1AN of FCC ID: AZ489FT3809. The results herein reflect final pilot results.

The test results presented herein clearly demonstrate compliance with FCC Occupational/Controlled RF Exposure limits of **8.0 W/kg** per the requirements of 47 CFR 2.1093(d).

2.0 Referenced Standards and Guidelines

This product is designed to comply with the following national and international standards and guidelines.

- United States Federal Communications Commission, Code of Federal Regulations; Rule Part 47CFR § 2.1093 sub-part J:1999
- Federal Communications Commission, “Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields”, OET Bulletin 65, Supplement C (Edition 01-01), FCC, Washington, D.C.: June 2001.
- IEEE 1528, 2003 "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques"
- American National Standards Institute (ANSI) / Institute of Electrical and Electronic Engineers (IEEE) C95. 1-1992
- Institute of Electrical and Electronic Engineers (IEEE) C95.1-1999 Edition
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1998
- Ministry of Health (Canada) Safety Code 6. Limits of Human Exposure to Radio frequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz, 1999
- Australian Communications Authority Radiocommunications (Electromagnetic Radiation - Human Exposure) Standard 2003
- ANATEL, Brazil Regulatory Authority, Resolution No. 303 of July 2, 2002 "Regulation of the limitation of exposure to electrical, magnetic, and electromagnetic fields in the radio frequency range between 9KHz and 300 GHz." and “Attachment to resolution # 303 from July 2, 2002”

2.1 SAR Limits

EXPOSURE LIMITS	SAR (W/kg)	
	(General Population / Uncontrolled Exposure Environment)	(Occupational / Controlled Exposure Environment)
Spatial Average - ANSI - (averaged over the whole body)	0.08	0.4
Spatial Peak - ANSI - (averaged over any 1-g of tissue)	1.60	8.0
Spatial Peak – ICNIRP/ANSI - (hands/wrists/feet/ankles averaged over 10-g)	4.0	20.0
Localized SAR - ICNIRP - (Head and Trunk 10-g)	2.0	10.0

3.0 Description of Device Under Test (DUT)

FCC ID: AZ489FT3809 is a VHF portable two-way radio that operates using frequency modulation (FM) incorporating traditional simplex transmission protocol. This radio is intended to be assessed using CW transmission via its' inherent test mode signaling capability. The radio has a removable antenna and does not have a keypad or a display and is capable of transmitting in the 136-150MHz band.

The nominal output power is 5.0 watts with a maximum output power of 5.5 watts as defined by the upper limit of the production line final test station. The intended operating positions are "at the face" with the DUT at least 1 inch from the mouth, and "at the body" by means of the offered body-worn accessories. Body-worn audio and PTT operation is accomplished by means of optional remote accessories that connect to the radio.

This device will be marketed to and used by employees solely for occupational operations, such as public safety agencies, e.g. police, fire and emergency medical. User training is the responsibility of these agencies, which can be expected to employ the usage instructions, safety information and operational cautions set forth in the user's manual, instructional sessions or other means. Motorola also makes available to its customers training classes on the proper use of two-way radios and wireless data devices.

FCC ID: AZ489FT3809 is offered with the options and accessories listed on the coversheet of this report:

Test Output Power

A table of the characteristic power slump versus time is provided in Appendix F.

4.0 Description of Test System

4.1 Descriptions of Robotics/Probes/Readout Electronics

The laboratory utilizes a Dosimetric Assessment System (DASY4™) SAR measurement system Version 4.6 build 23 manufactured by Schmid & Partner Engineering AG (SPEAG™), of Zurich Switzerland. The test system consists of a Stäubli RX90L robot, DAE3V1, and ET3DV6 E-Field probes. Please reference the SPEAG user manual and application notes for detailed probe, robot, and SAR computational procedures. Section 5.0 presents relevant test equipment information. Appendices B and C present the applicable calibration certificates. The E-field probe first scans a coarse grid over a large area inside the phantom in order to locate the interpolated maximum SAR distribution. After the coarse scan measurement, the probe is automatically moved to a position at the interpolated maximum. The subsequent scan can directly use this position as reference for the cube evaluations.

4.2 Description of Phantom(s)

4.2.1 Flat Phantom

Phantom Type	Phantom Material	Phantom Dimensions (cm)	Support structure opening dimensions (cm)	Support structure material	Loss Tangent (wood)
Flat	High Density Polyethylene (HDPE)	80x60x20x0.2	68.58x25.4	Wood	< 0.05

4.2.2 SAM Phantom

Phantom Type	Material Parameters	Material Thickness (mm)	Support structure material	Loss Tangent (wood)
NA	200MHz -3GHz; Er = <5, Loss Tangent = <0.05	2mm +/- 0.2mm	Wood	< 0.05

4.3 Description of Equivalent Tissues

Type of Simulated Tissue

The simulated tissue used is compliant to that specified in FCC Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01) and IEEE 1528, 2003 "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques".

The sugar based simulate tissue is produced by placing the correct measured amount of De-ionized water into a large container. Each of the dried ingredients are weighed and added to the water carefully to avoid clumping. If the solution has a high sugar concentration the water is pre-heated to aid in dissolving the ingredients. For Diacetin and Glycol based simulates, sugar and HEC ingredients are not needed. The solution is mixed thoroughly, covered, and allowed to sit overnight prior to use.

Simulated Tissue Composition

% of listed ingredients	300	
	Head	Body
Sugar	56.0	47.1
DGBE (Glycol)	NA	NA
Diacetin	NA	NA
De ionized -Water	37.5	49.48
Salt	5.4	2.32
HEC	1.0	1.0
Bact.	0.1	0.1

Reference section 6.1 for target parameters

5.0 Additional Test Equipment

Equipment Type	Model Number	Serial Number	Calibration Due Date
Power Meter (HP)	E4419B	MY40330364	1/31/2007
Power Sensor (HP)	8482B	3318A05259	3/28/2006
Power Sensor (HP)	8482B	3318A06774	3/22/2006
Bi-Directional Coupler (NARDA)	3020A	40295	7/18/2006
Signal Generator (HP)	E4421B	US39270649	2/28/2007
AMP (Amplifier Research)	1W1000	16625	CNR
Tissue Station			
Network Analyzer (HP)	8753D	3410A09135	2/22/2007
Dielectric Probe Kit (HP)	85070C	US99360076	CNR
Dipole			
Speag Dipole	D300V2	1002	5/29/2006

6.0 SAR Measurement System Verification

The SAR measurements were conducted with probe model/serial number ET3DV6/SN1393. The system performance check was conducted daily and within 24 hours prior to testing. DASY output files of the probe/dipole calibration certificates and system performance test results are included in appendices B, C, D respectively. The table below summarizes the system performance check results normalized to 1W.
Dipole validation scans at the head from SPEAG are provided in APPENDIX D. The GEMS EME lab validated the dipole to the applicable IEEE system performance targets. Within the same day system validation was performed using FCC body tissue parameters to generate the system performance target values for body at the applicable frequency. The results of the GEMS EME system performance validation are provided herein.

6.1 Equivalent Tissue Test Results

Simulated tissue prepared for SAR measurements is measured daily and within 24 hours prior to actual SAR testing to verify that the tissue is within 5% of target parameters at the center of the transmit band. This measurement is done using the Agilent (HP) probe kit model 85070C and a HP8753D Network Analyzer.

Actual versus Target tissue parameters (3/10/06-3/17/06)

FCC Body				
Frequency (MHz)	Di-electric Constant Target	Di-electric Constant Meas. (Range)	Conductivity Target S/m	Conductivity Meas. (Range) S/m
300	58.2	57.8-59.1	0.92	0.88-0.91
150	61.9	62.5-63.8	0.80	0.76-0.79

IEEE Head				
Frequency (MHz)	**Di-electric Constant Target**	**Di-electric Constant Meas. (Range)**	**Conductivity Target S/m**	**Conductivity Meas. (Range) S/m**
300	45.3	45.8-45.9	0.87	0.87-0.88
150	52.3	53.0-53.1	0.76	0.73-0.74

6.2 System Check Test Results

Probe Serial #	Tissue Type	Probe Cal Date	Dipole Kit / Serial #	System Perf. Result when normalized to 1W (mW/g)	Reference S.A.R @ 1W (mW/g)	Test Date(s)
1393	FCC Body	5/20/05	SPEAG D300V2 /1002	2.685 +/- 0.045	2.79 +/- 10%	3/10/06-3/17/06 (5 test days)
1393	IEEE Head	5/20/05	SPEAG D300V2 /1002	2.92 +/- 0.000	2.85 +/- 10%	3/14/06

Note: See APPENDIX D for an explanation of the reference SAR targets stated above.
(System performance results reflects the median performance +/- ½ of the test date(s) performance ranges)

The DASY4™ system is operated per the instructions in the DASY4™ Users Manual. The complete manual is available directly from SPEAG™. All measurement equipment used to assess EME SAR compliance was calibrated according to 17025 A2LA guidelines.

7.0 DUT Test Strategy and Methodology

7.1 DUT Configuration(s)

The DUT is a portable device with FM transmission signaling operational at the body, and face using the offered accessories. The device is placed in the test positions presented in Appendix G.

Test Plan

All options and accessories listed on the cover page of this report were considered in order to develop the SAR test plan for this product. SAR measurements were performed using a flat phantom with the applicable simulated tissue to assess performance at the body, and face respectively using the relevant transmission mode(s).
Note that a coarse-to-cube approximation methodology was utilized to determine the worst-case SAR performance configuration for each applicable body location. The test configurations that produced the highest SAR results for each body position using the coarse-to-cube approximation methodology were assessed using the full DASY4™ coarse and 7x7x7 cube scans.

Assessments at the Body [Page 11 of 53; Table 1]

- Assessment of the offered body-worn accessories using the offered battery and antenna.
- Assessment of the other offered audio accessories using carry case PMLN4741A. The worst case condition was then assessed with offered belt clip PMLN4743A.
- Assessment of band edges using the worst case configuration from above.
- Assessment using the worst case test configuration at the body overall from above with the back and front of the DUT separated 2.5cm from the phantom.

Assessments at the Face [Page 12 of 53; Table 2]

- Assessment across the band using the offered antenna and battery.

Shortened scan assessment at the Body [APPENDIX E Part 3 of 3]

- A "shortened" scan was performed using the offered battery and test configuration that produced the highest SAR results overall. Note that the shortened scan is obtained by first running a coarse scan to find the peak area and then, using a newly charged battery, a cube scan only was performed. The shortened scan represents the cube scan performance results.

7.2 Device Positioning Procedures

Reference Appendix G for photos of the DUT tested positions.

7.2.1 Body

The DUT was positioned in normal use configuration against the phantom with the offered body worn accessory.
The DUT was positioned with its' front and back housing separated 2.5cm from the phantom.

7.2.2 Head

NA

7.2.3 Face

The DUT was positioned with its' front side separated 2.5cm from the phantom.

8.0 Environmental Test Conditions

The EME Laboratory ambient environment is well controlled resulting in very stable simulated tissue temperature and therefore stable dielectric properties. Simulated tissue temperature is measured prior to each scan to insure it is within +/ - 2°C of the temperature at which the dielectric properties were determined. The liquid depth within the phantom used for measurements was 15cm +/- 0.5cm. Additional precautions are routinely taken to ensure the stability of the simulated tissue such as covering the phantoms when scans are not actively in process in order to minimize evaporation. The lab environment is continuously monitored. The table below presents the range and average environmental conditions during the SAR tests reported herein:

	Target	Measured
Ambient Temperature	20 - 25 ˚C	Range: 21.8-22.5˚C Avg. 22.18˚C
Relative Humidity	30 - 70 %	Range: 45.9-53.1% Avg. 49.89%
Tissue Temperature	NA	Range: 20.5-21.3˚C Avg. 20.9 ˚C

The EME Lab RF environment uses a Spectrum Analyzer to monitor for extraneous large signal RF contaminants that could possibly affect the test results. If such unwanted signals are discovered the S.A.R scans are repeated.

9.0 Test Results Summary

All SAR results obtained by the tests described in Section 7.1 are listed below. As noted in section 7.1, a coarse-to-cube approximation methodology, was utilized to ascertain the worst-case test configuration for each body location. The worst case test configurations observed for each body location were then assessed using the full DASY4™ coarse and 7x7x7 cube methodology, and they are presented as bolded results. The associated SAR plots are provided in APPENDIX E. Appendix E also presents shortened SAR cube scans to assess the validity of the calculated results presented herein. Note: The results of the shortened cube scans presented in Appendix E demonstrate that the scaling methodology used to determine the calculated SAR results presented herein are valid.

Table1

Run Number/ SN	Antenna	Freq. (MHz)	Battery	Test position	Carry Case	Additional attachments	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)
Assessments at the Body												
Assessment of offered Body worn												
MeC-AB-060310-11/0277GD0211	PMAD4050A	143.025	PMNN4071 A	Against phantom	PMLN4743A	PMMN4008A	5.32	-0.663	2.04	1.50	1.23	0.90
MeC-AB-060311-02/0277GD0211	PMAD4050A	143.025	PMNN4071 A	Against phantom	PMLN4691A	PMMN4008A	5.32	-0.308	1.15	0.867	0.64	0.48
MeC-AB-060311-03/0277GD0211	PMAD4050A	143.025	PMNN4071 A	Against phantom	PMLN4742A	PMMN4008A	5.49	-0.42	0.575	0.417	0.32	0.23
MeC-AB-060311-04/0277GD0211	PMAD4050A	143.025	PMNN4071 A	Against phantom	PMLN4741A	PMMN4008A	5.52	-0.581	1.86	1.31	1.06	0.75
Assessment of other offered audio accessories w/ carry case PMLN4741A												
***MeC-AB-060311-05/0277GD0211**	PMAD4050A	143.025	PMNN4071 A	Against phantom	PMLN4741A	PMLN4442A	5.42	-0.564	3.88	2.60	2.24	1.50
MeC-AB-060311-06/0277GD0211	PMAD4050A	143.025	PMNN4071 A	Against phantom	PMLN4741A	PMLN4444A	5.48	0.1490	1.10	0.692	0.55	0.35
MeC-AB-060314-02/0277GD0211	PMAD4050A	143.025	PMNN4071 A	Against phantom	PMLN4741A	PMLN4294C	5.51	-0.632	2.45	1.69	1.42	0.98
MeC-AB-060311-08/0277GD0211	PMAD4050A	143.025	PMNN4071 A	Against phantom	PMLN4741A	PMLN4658A	5.47	-0.672	1.62	1.11	0.95	0.65
MeC-AB-060311-09/0277GD0211	PMAD4050A	143.025	PMNN4071 A	Against phantom	PMLN4741A	PMLN4606A	5.51	-0.653	2.74	1.86	1.59	1.08
WC configuration above with belt clip PMLN4743A												
MeC-AB-060316-06/0277GD0211	PMAD4050A	143.025	PMNN4071 A	Against phantom	PMLN4743A	PMLN4442A	5.51	-0.446	2.41	1.73	1.34	0.96
Assessment of band edges												
MeC-AB-060311-10/0277GD0211	PMAD4050A	136.025	PMNN4071 A	Against phantom	PMLN4741A	PMLN4442A	5.49	-0.0231	1.09	0.709	0.55	0.36
MeC-AB-060311-11/0277GD0211	PMAD4050A	149.975	PMNN4071 A	Against phantom	PMLN4741A	PMLN4442A	5.57	-0.204	0.596	0.412	0.31	0.22
Assessment at 2.5cm												
MeC-AB-060311-13/0277GD0211	PMAD4050A	143.025	PMNN4071 A	Against phantom	Unit back at 2.5cm	PMLN4442A	5.34	-0.649	1.79	1.36	1.07	0.81
MeC-AB-060311-14/0277GD0211	PMAD4050A	143.025	PMNN4071 A	Against phantom	Unit front at 2.5cm	PMLN4442A	5.33	-0.536	1.77	1.34	1.03	0.78

***Assessment with the worst case test configuration above using the full DASY 4 coarse and 7x7x7 cube scan measurements.**												
MeC-AB-060317-03/0277GD0211	PMAD4050A	143.025	PMNN4071 A	Against phantom	PMLN4741A	PMLN4442A	5.57	-0.764	3.36	1.79	2.00	1.07
MeC-AB-060317-06/0277GD0211 (Shortened scan)	PMAD4050A	143.025	PMNN4071 A	Against phantom	PMLN4741A	PMLN4442A	5.41	-0.444	3.73	2.04	**2.10**	**1.15**

Table 2

Assessments at the Face												
Run Number/ SN	Antenna	Freq. (MHz)	Battery	Test position	Carry Case	Additional attachments	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)
Assessment across the band												
MeC-FACE-060312-05/0277GD0211	PMAD4050A	136.025	PMNN4071A	Front at 2.5cm	None	None	5.40	0.0404	0.274	0.208	0.14	0.11
MeC-FACE-060312-06/0277GD0211	PMAD4050A	143.025	PMNN4071A	Front at 2.5cm	None	None	5.40	-0.1770	1.68	1.28	0.89	0.68
***MeC-FACE-060312-07/0277GD0211**	PMAD4050A	149.975	PMNN4071A	Front at 2.5cm	None	None	5.32	-0.635	1.84	1.40	1.10	0.84

*Assessment with the worst case test configuration above using the full DASY 4 coarse and 7x7x7 cube scan measurements.												
MeC-FACE-060312-08/0277GD0211	PMAD4050A	149.975	PMNN4071A	Front at 2.5cm	None	None	5.45	-0.666	1.96	1.46	**1.15**	**0.86**
MeC-FACE-060312-09/0277GD0211 (Shortened scan)	PMAD4050A	149.975	PMNN4071A	Front at 2.5cm	None	None	5.32	-0.343	1.89	1.40	1.06	0.78

9.1 Highest SAR results calculation methodology

The calculated maximum 1-gram and 10-gram averaged SAR results reported herein for the full DASY ™ coarse and 7x7x7 cube measurements are determined by scaling the measured SAR to account for power leveling variations and power slump. For this device the Maximum Calculated 1-gram and 10-gram averaged peak SAR is calculated using the following formula:

Max. Calc. 1-g/10-g Avg. SAR = ((SAR meas. / (10^(Pdrift/10)))*(Pmax/Pint))* DC%
P_{max} = Maximum Power (W)
P_{int} = Initial Power (W)
Pdrift = DASY drift results (dB) - (for conservative results positive drifts are not accounted for)
$SAR_{meas.}$ = Measured 1 gram averaged peak SAR (mW/g)
DC % = Transmission mode duty cycle in % where applicable
50% duty cycle is applied for PTT operation.

10.0 Conclusion

The highest Operational Maximum Calculated 1-gram and 10-gram average SAR values found for FCC ID: AZ489FT3809 models PMUD2221A/AAH84JDJ8AA1AN.

At the Body: 1-g Avg. = 2.10W/kg; 10-g Avg. = 1.15W/kg
At the Face: 1-g Avg. = 1.15W/kg; 10-g Avg. = 0.86W/kg

These test results clearly demonstrate compliance with FCC Occupational/Controlled RF Exposure limits of **8.0W/kg** per the requirements of 47 CFR 2.1093(d).

APPENDIX A
Measurement Uncertainty

Uncertainty Budget for Device Under Test, for 30 MHz to 3 GHz

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	**IEEE 1528 section**	**Tol. (± %)**	**Prob Dist**	**Div.**	**c_i (1 g)**	**c_i (10 g)**	**1 g u_i (±%)**	**10 g u_i (±%)**	**v_i**
Measurement System									
Probe Calibration	E.2.1	5.9	N	1.00	1	1	5.9	5.9	∞
Axial Isotropy	E.2.2	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3	1.0	R	1.73	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	N	1.00	1	1	0.3	0.3	∞
Response Time	E.2.7	1.1	R	1.73	1	1	0.6	0.6	∞
Integration Time	E.2.8	1.1	R	1.73	1	1	0.6	0.6	∞
RF Ambient Conditions - Noise	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	0.0	R	1.73	1	1	0.0	0.0	∞
Probe Positioner Mech. Tolerance	E.6.2	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning w.r.t Phantom	E.6.3	1.4	R	1.73	1	1	0.8	0.8	∞
Max. SAR Evaluation (ext., int., avg.)	E.5	3.4	R	1.73	1	1	2.0	2.0	∞
Test sample Related									
Test Sample Positioning	E.4.2	3.2	N	1.00	1	1	3.2	3.2	29
Device Holder Uncertainty	E.4.1	4.0	N	1.00	1	1	4.0	4.0	8
SAR drift	6.6.2	5.0	R	1.73	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measurement)	E.3.3	3.3	N	1.00	0.64	0.43	2.1	1.4	∞
Liquid Permittivity (target)	E.3.2	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measurement)	E.3.3	1.9	N	1.00	0.6	0.49	1.1	0.9	∞
Combined Standard Uncertainty			RSS				11	11	411
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				22	22	

Uncertainty Budget for System Performance Check (dipole & flat phantom) for 30 MHz to 3 GHz

a	b	c	d	e = f(d,k)	f	g	h = c x f / e	i = c x g / e	k
Uncertainty Component	IEEE 1528 section	**Tol. (± %)**	**Prob. Dist.**	**Div.**	c_i (1 g)	c_i (10 g)	1 g u_i (±%)	10 g u_i (±%)	v_i
Measurement System									
Probe Calibration	E.2.1	5.9	N	1.00	1	1	5.9	5.9	∞
Axial Isotropy	E.2.2	4.7	R	1.73	1	1	2.7	2.7	∞
Spherical Isotropy	E.2.2	9.6	R	1.73	0	0	0.0	0.0	∞
Boundary Effect	E.2.3	1.0	R	1.73	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	N	1.00	1	1	0.3	0.3	∞
Response Time	E.2.7	1.1	R	1.73	1	1	0.6	0.6	∞
Integration Time	E.2.8	0.0	R	1.73	1	1	0.0	0.0	∞
RF Ambient Conditions - Noise	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	0.0	R	1.73	1	1	0.0	0.0	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning w.r.t. Phantom	E.6.3	1.4	R	1.73	1	1	0.8	0.8	∞
Max. SAR Evaluation (ext., int., avg.)	E.5	3.4	R	1.73	1	1	2.0	2.0	∞
Dipole									
Dipole Axis to Liquid Distance	8, E.4.2	2.0	R	1.73	1	1	1.2	1.2	∞
Input Power and SAR Drift Measurement	8, 6.6.2	5.0	R	1.73	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measurement)	E.3.3	3.3	R	1.73	0.64	0.43	1.2	0.8	∞
Liquid Permittivity (target)	E.3.2	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measurement)	E.3.3	1.9	R	1.73	0.6	0.49	0.6	0.5	∞
Combined Standard Uncertainty			RSS				9	9	99999
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				18	17	

Notes for Tables 1 and 2
a) Column headings *a-k* are given for reference.
b) Tol. - tolerance in influence quantity.
c) Prob. Dist. – Probability distribution
d) N, R - normal, rectangular probability distributions
e) Div. - divisor used to translate tolerance into normally distributed standard uncertainty
f) *ci* - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.
g) *ui* – SAR uncertainty
h) *vi* - degrees of freedom for standard uncertainty and effective degrees of freedom for the expanded uncertainty.

Appendix B
Probe Calibration Certificates

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

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

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

Accreditation No.: **SCS 108**

Client **Motorola CGISS**

Certificate No: **ET3-1393_May05**

CALIBRATION CERTIFICATE

Object	ET3DV6 - SN:1393
Calibration procedure(s)	QA CAL-01.v5 and QA CAL-12.v4 Calibration procedure for dosimetric E-field probes
Calibration date:	May 20, 2005
Condition of the calibrated item	In Tolerance

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41495277	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41498087	3-May-05 (METAS, No. 251-00466)	May-06
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-04 (METAS, No. 251-00403)	Aug-05
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-05 (METAS, No. 251-00467)	May-06
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-04 (METAS, No. 251-00404)	Aug-05
Reference Probe ES3DV2	SN: 3013	7-Jan-05 (SPEAG, No. ES3-3013_Jan05)	Jan-06
DAE4	SN: 617	19-Jan-05 (SPEAG, No. DAE4-617_Jan05)	Jan-06

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-04)	In house check: Nov 05

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Laboratory Technician	D. Vetter
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 21, 2005

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

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

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S Swiss Calibration Service

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

Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001

Methods Applied and Interpretation of Parameters:

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

ET3DV6 SN:1393 May 20, 2005

DASY - Parameters of Probe: ET3DV6 SN:1393

Sensitivity in Free Space[A]

NormX	**1.86** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**91** mV
NormY	**1.53** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**91** mV
NormZ	**1.81** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**91** mV

Diode Compression[B]

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

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

Sensor Center to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	8.1	4.3
SAR_{be} [%]	With Correction Algorithm	0.7	0.0

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

Sensor Center to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	13.0	9.0
SAR_{be} [%]	With Correction Algorithm	0.5	0.1

Sensor Offset

Probe Tip to Sensor Center **2.7** mm

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

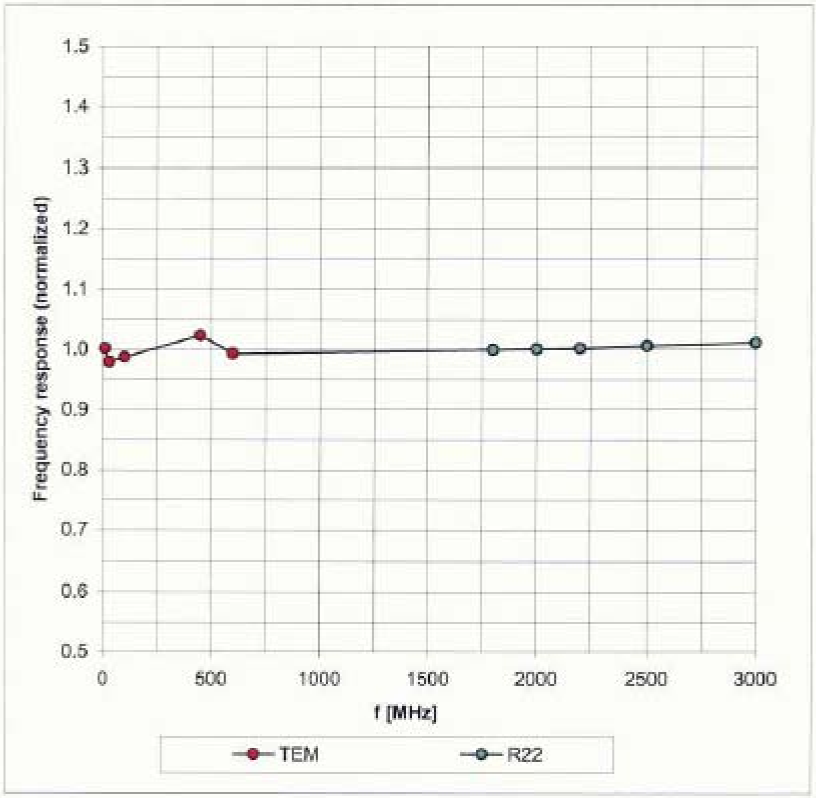
[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Page 8).

[B] Numerical linearization parameter: uncertainty not required.

ET3DV6 SN:1393 May 20, 2005

Frequency Response of E-Field

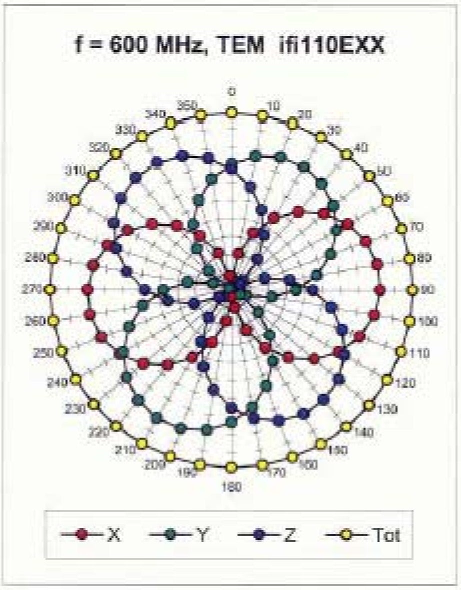
(TEM-Cell:ifi110 EXX, Waveguide: R22)

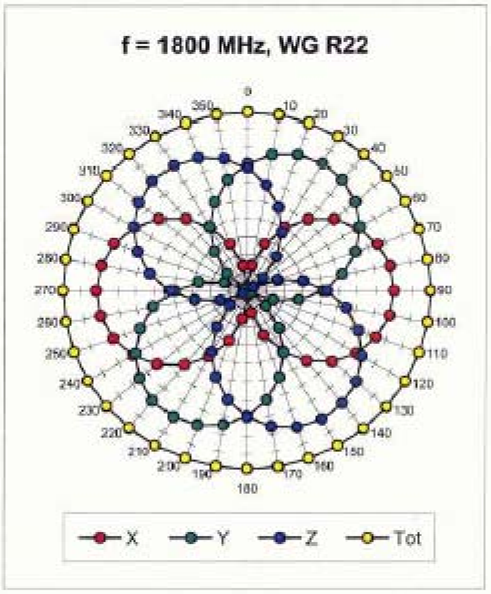


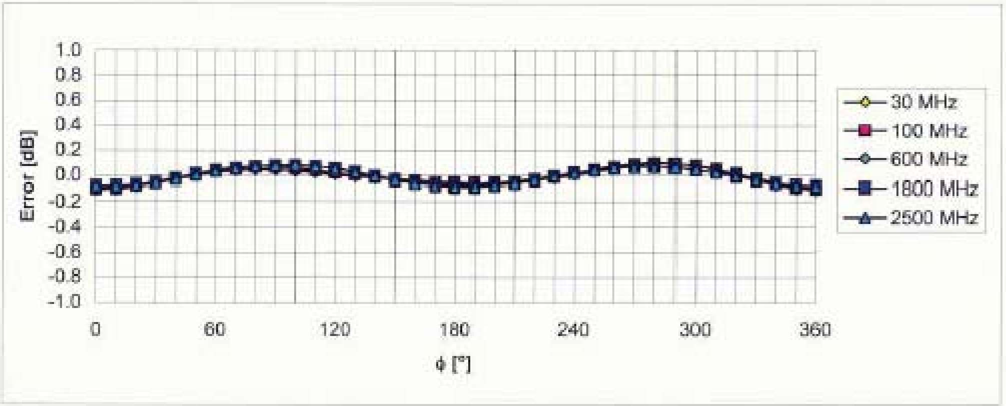
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

ET3DV6 SN:1393 May 20, 2005

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





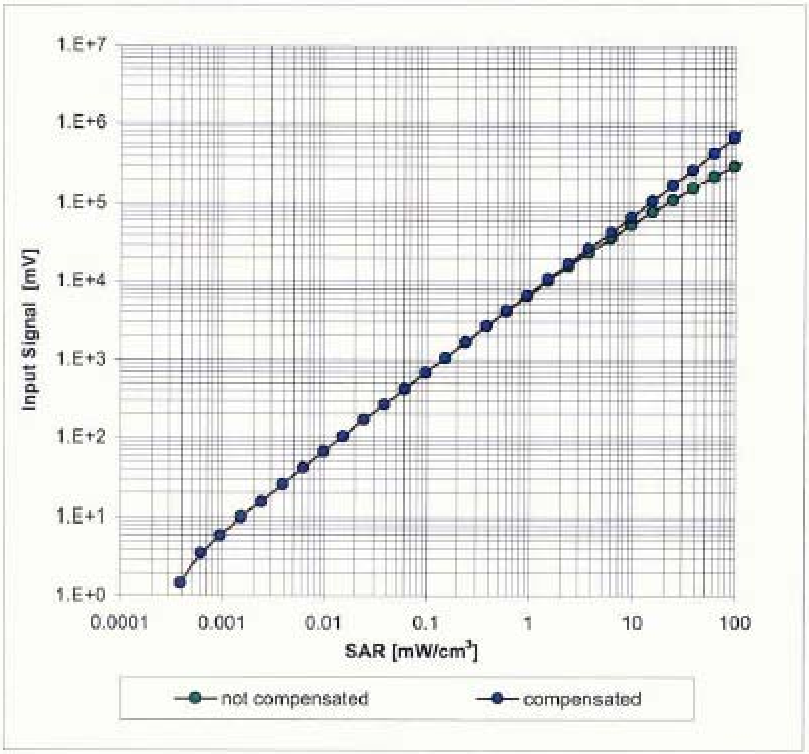


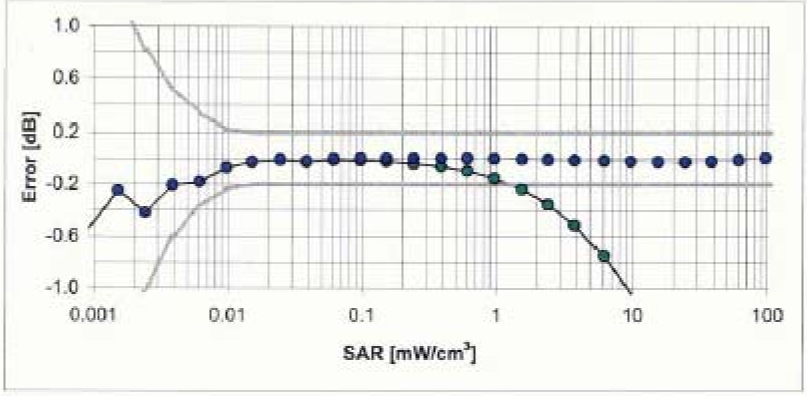
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

ET3DV6 SN:1393 May 20, 2005

Dynamic Range f(SAR_{head})

(Waveguide R22, f = 1800 MHz)

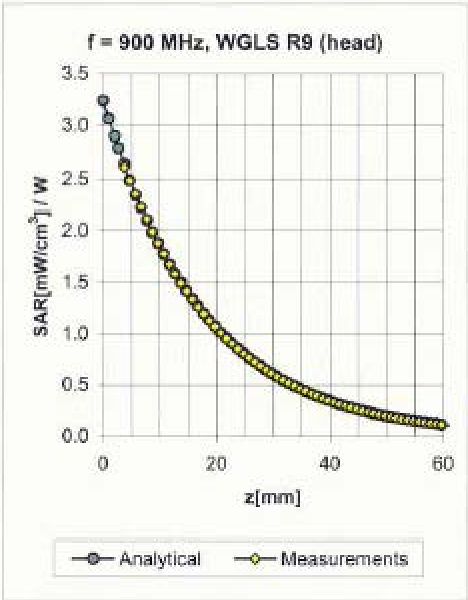


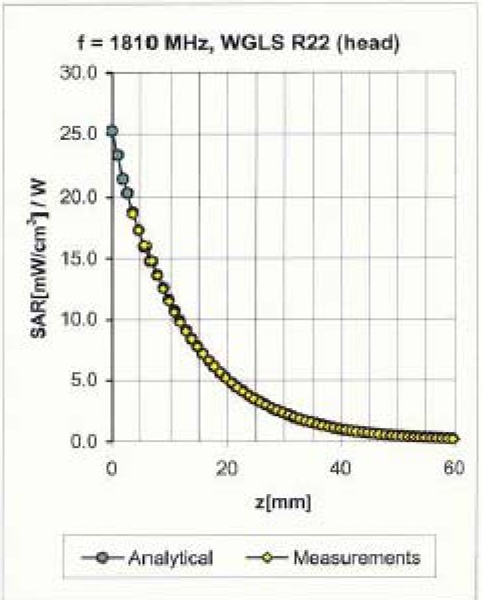


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

ET3DV6 SN:1393 May 20, 2005

Conversion Factor Assessment





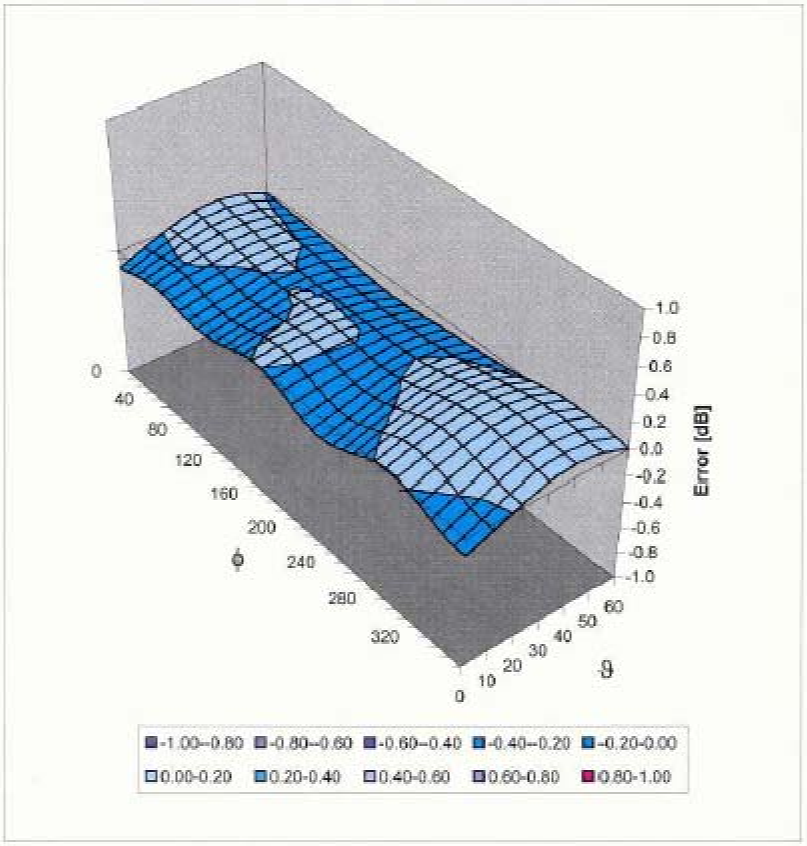
f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
450	± 50 / ± 100	Head	43.5 ± 5%	0.87 ± 5%	0.05	1.05	7.58	± 13.3% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.96	1.50	6.29	± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.49	2.63	5.32	± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.56	2.45	4.40	± 11.8% (k=2)
450	± 50 / ± 100	Body	56.7 ± 5%	0.94 ± 5%	0.05	2.10	7.18	± 13.3% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.52	2.04	6.25	± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.49	2.95	4.66	± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.56	2.37	4.10	± 11.8% (k=2)

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

ET3DV6 SN:1393 May 20, 2005

Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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

Schmid & Partner Engineering AG
s p e a g

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

Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ET3DV6**
Serial Number:	**1393**
Place of Assessment:	**Zurich**
Date of Assessment:	**May 23, 2005**
Probe Calibration Date:	**May 20, 2005**

Schmid & Partner Engineering AG hereby certifies that conversion factor(s) of this probe have been evaluated on the date indicated above. The assessment was performed using the FDTD numerical code SEMCAD of Schmid & Partner Engineering AG. Since the evaluation is coupled with measured conversion factors, it has to be recalculated yearly, i.e., following the re-calibration schedule of the probe. The uncertainty of the numerical assessment is based on the extrapolation from measured value at 900 MHz or at 1800 MHz.

Assessed by: [signature]

Schmid & Partner Engineering AG

s p e a g

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

Dosimetric E-Field Probe ET3DV6 SN:1393

Conversion factor (± standard deviation)

150 MHz	*ConvF*	8.5 ± 10%	ε_r = 52.3 σ = 0.76 mho/m (head tissue)
250 MHz	*ConvF*	7.8 ± 10%	ε_r = 47.6 σ = 0.83 mho/m (head tissue)
300 MHz	*ConvF*	7.7 ± 9%	ε_r = 45.3 σ = 0.87 mho/m (head tissue)
750 MHz	*ConvF*	6.6 ± 7%	ε_r = 41.9 σ = 0.89 mho/m (head tissue)
150 MHz	*ConvF*	8.3 ± 10%	ε_r = 61.9 σ = 0.80 mho/m (body tissue)
250 MHz	*ConvF*	7.8 ± 10%	ε_r = 59.4 σ = 0.88 mho/m (body tissue)
300 MHz	*ConvF*	7.7 ± 9%	ε_r = 58.2 σ = 0.92 mho/m (body tissue)
750 MHz	*ConvF*	6.3 ± 7%	ε_r = 55.5 σ = 0.96 mho/m (body tissue)

Important Note:

For numerically assessed probe conversion factors, parameters Alpha and Delta in the DASY software must have the following entries: Alpha = 0 and Delta = 1.

Please see also Section 4.7 of the DASY4 Manual.

Appendix C
Dipole Calibration Certificates

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

Client **Motorola CGISS**

CALIBRATION CERTIFICATE

Object(s)	D300V2 - SN:1002
Calibration procedure(s)	QA CAL-15.v2 Calibration procedure for dipole validation kits below 800 MHz
Calibration date:	May 29, 2004
Condition of the calibrated item	In Tolerance (according to the specific calibration document)

This calibration statement documents traceability of M&TE used in the calibrationprocedures 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
Power meter EPM E4419B	GB41293874	5-May-04 (METAS, No 251-00388)	May-05
Power sensor E4412A	MY41495277	5-May-04 (METAS, No 251-00388)	May-05
Reference 20 dB Attenuator	SN: 5086 (20b)	3-May-04 (METAS, No 251-00389)	May-05
Fluke Process Calibrator Type 702	SN: 6295803	8-Sep-03 (Sintrel SCS No. E-030020)	Sep-04
Power sensor HP 8481A	MY41092180	18-Sep-02 (SPEAG, in house check Oct-03)	In house check: Oct 05
RF generator HP 8684C	US3642U01700	4-Aug-99 (SPEAG, in house check Aug-02)	In house check: Aug-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-03)	In house check: Oct 05

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

Date issued: May 29, 2004

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.

D300V2- SN:1002

1. Measurement Conditions

The measurements were performed in the 6mm thick flat phantom filled with **head** simulating liquid of the following electrical parameters at 300 MHz:

Relative Dielectricity	**45.8**	± 5%
Conductivity	**0.89 mho/m**	± 5%

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 8.75 at 300 MHz) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center of the flat phantom and the dipole was oriented parallel to the longer side of the phantom. The standard measuring distance was 15mm from dipole center to the liquid surface including the 6mm thick phantom shell. The included distance spacer 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 398 mW ± 3 %. The results are normalized to 1W input power.

2. SAR Measurement with DASY 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: **2.81 mW/g** ± 20.7 % (k=2)[1]

averaged over 10 cm^3 (10 g) of tissue: **1.87 mW/g** ± 20.2 % (k=2)[1]

D300V2- SN:1002

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:	**1.740 ns**	(one direction)
Transmission factor:	**0.994**	(voltage transmission, one direction)

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

Feedpoint impedance at 300 MHz:	Re{Z} = **51.7** Ω
	Im {Z} = **-14.9** Ω
Return Loss at 300 MHz	**-16.8 dB**

4. 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.

5. 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.

6. Power Test

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

Date/Time: 05/29/04 17:07:22

Test Laboratory: SPEAG, Zurich, Switzerland
DUT: Dipole 300 MHz; Serial: D300V2 - SN:1002

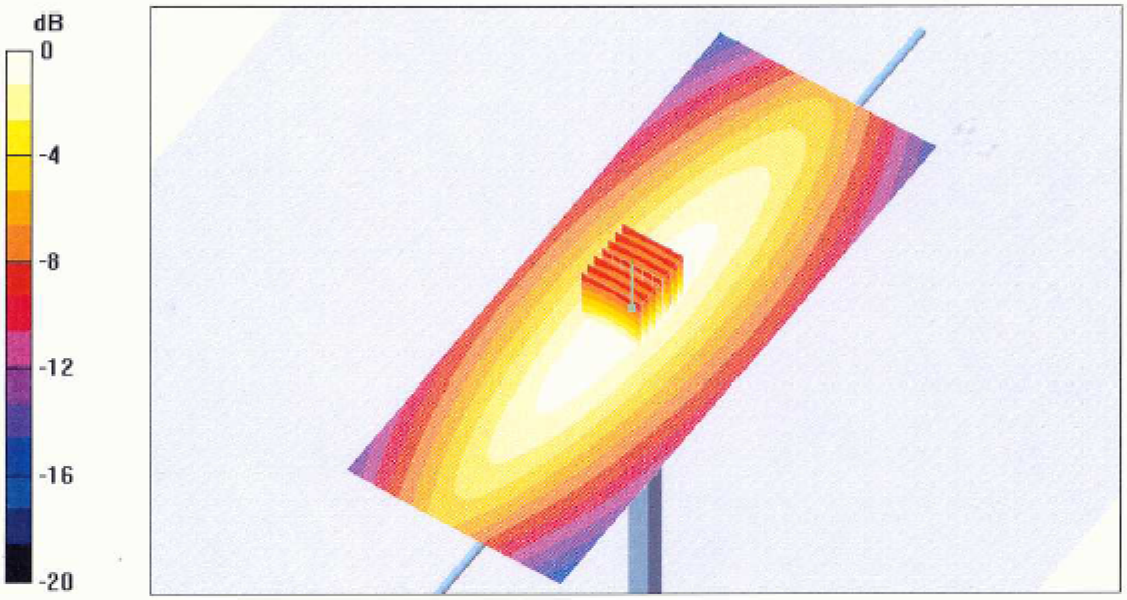
Communication System: CW;Duty Cycle: 1:1; Medium: HSL300
Medium parameters used: f = 300 MHz; σ = 0.89 mho/m; ε_r = 45.8; ρ = 1000 kg/m^3
Phantom: Flat Phantom 4.4; Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (low frequencies); ConvF(8.75, 8.75, 8.75);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 600; Calibrated: 9/30/2003
- Measurement SW: DASY4, V4.2 Build 44;

d=15mm, Pin=398mW/Area Scan (71x181x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 37.6 V/m; Power Drift = -0.2 dB
Maximum value of SAR (interpolated) = 1.19 mW/g

d=15mm, Pin=398mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 37.6 V/m; Power Drift = -0.2 dB
Maximum value of SAR (measured) = 1.19 mW/g
Peak SAR (extrapolated) = 1.77 W/kg
SAR(1 g) = 1.12 mW/g; SAR(10 g) = 0.744 mW/g



0 dB = 1.19mW/g

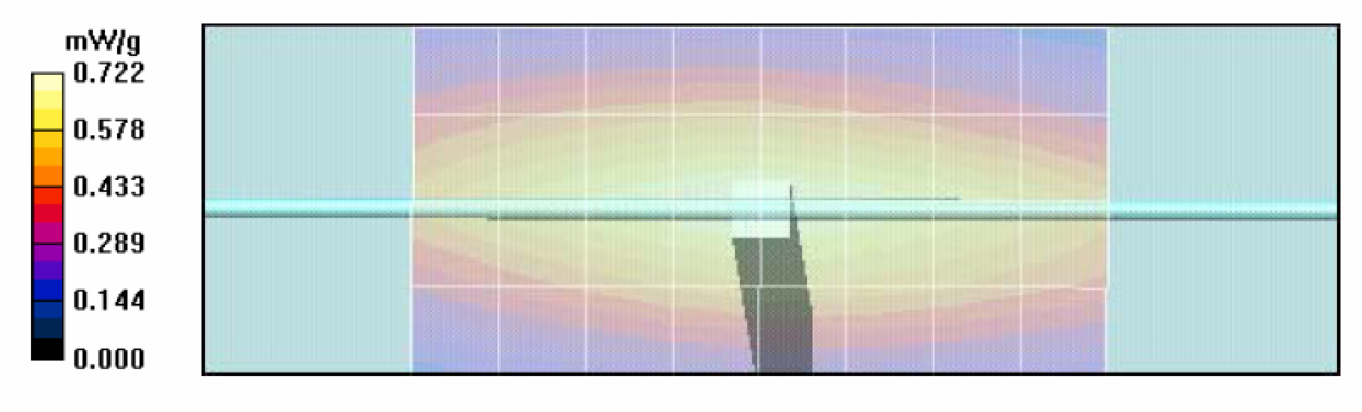
Appendix D
Test System Verification Scans

Note: Dipole validation scans at the head from SPEAG are provided in APPENDIX D. The GEMS EME lab validated the dipole to the applicable IEEE system performance targets. Within the same day system validation was performed using FCC body tissue parameters to generate the system performance target values for body at the applicable frequency. The results of the GEMS EME system performance validation are provided herein. To assess the isotropic characteristics of the measurement probe, two system performance zoom scans (0 and 90 degrees) were measured. The results were averaged together and adjusted to account for the power drift in order to obtain the final calculated 1 and 10 gram results.

Motorola GEMS EME Lab
SPEAG 300 MHz Dipole; Model D300V2, SN 1002; Test Date: 3/10/06
Run #: MeC-Sys Perf-300B-060310-06 Sim.Tissue Temp: 21.4 (C)
TX Freq: 300 (MHz) Start power: 250 (mW)

Target: 2.79 mW/g for 1g SAR 1.83 mW/g for 10g SAR
2.66 mW/g calculated 1g-SAR; -4.68 % from target (including drift)
1.77 mW/g calculated 10g-SAR; -3.48 % from target (including drift)

Probe: ET3DV6 - SN1393, Calibrated: 5/20/2005, ConvF(7.7, 7.7, 7.7)
Duty Cycle: 1:1, Medium: 300 MHz Body, Medium parameters used: f = 300 MHz; σ = 0.9 mho/m; ε_r = 58.3; ρ = 1000 kg/m3; Electronics: DAE3 Sn363, Calibrated: 5/24/2005
System Performance Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid:
dx=7.5mm, dy=7.5mm, dz=5mm; Reference Value = 28.2 V/m; Power Drift = -0.00565 dB
Peak SAR (extrapolated) = 1.15 W/kg
SAR(1 g) = 0.681 mW/g; SAR(10 g) = 0.453 mW/g
Maximum value of SAR (measured) = 0.717 mW/g
System Performance Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid:
dx=7.5mm, dy=7.5mm, dz=5mm; Reference Value = 28.2 V/m; Power Drift = -0.00565 dB
Peak SAR (extrapolated) = 1.09 W/kg
SAR(1 g) = 0.646 mW/g; SAR(10 g) = 0.429 mW/g
Maximum value of SAR (measured) = 0.680 mW/g
System Performance Check/Dipole Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 28.2 V/m; Power Drift = -0.00565 dB



Motorola GEMS EME Lab
SPEAG 300 MHz Dipole; Model D300V2, SN 1002; Test Date: 3/11/06
Run #: MeC-Sys Perf-300B-060311-01 Sim.Tissue Temp: 21.3 (C)
TX Freq: 300 (MHz) Start power: 250 (mW)

Target: 2.79 mW/g for 1g SAR 1.83 mW/g for 10g SAR
2.67 mW/g calculated 1g-SAR; -4.47 % from target (including drift)
1.78 mW/g calculated 10g-SAR; -2.98 % from target (including drift)

Probe: ET3DV6 - SN1393, Calibrated: 5/20/2005, ConvF(7.7, 7.7, 7.7)
Duty Cycle: 1:1, Medium: 300 MHz Body, Medium parameters used: f = 300 MHz; σ = 0.91 mho/m; ε_r = 57.8; ρ = 1000 kg/m^3; Electronics: DAE3 Sn363, Calibrated: 5/24/2005
System Performance Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm; Reference Value = 28.1 V/m; Power Drift = -0.00856 dB
Peak SAR (extrapolated) = 1.15 W/kg
SAR(1 g) = 0.682 mW/g; SAR(10 g) = 0.454 mW/g
Maximum value of SAR (measured) = 0.717 mW/g
System Performance Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm; Reference Value = 28.1 V/m; Power Drift = -0.00856 dB
Peak SAR (extrapolated) = 1.08 W/kg
SAR(1 g) = 0.647 mW/g; SAR(10 g) = 0.431 mW/g
Maximum value of SAR (measured) = 0.683 mW/g
System Performance Check/Dipole Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.715 mW/g