

 <b style="font-size: 24pt; margin-left: 10px;">MOTOROLA	 ACCREDITED Certificate Number: 1449-01		
FCC ID: AZ489FT5845 DECLARATION OF COMPLIANCE SAR ASSESSMENT Part 1 of 3			
Government & Enterprise Mobility Solutions EME Test Laboratory 8000 West Sunrise Blvd Fort Lauderdale, FL. 33322	Date of Report: May 25, 2005 Report Revision: Rev. 0 Report ID: FCC rpt_i415_Rev O_050525 SR2383		
<table style="width: 100%; border: none;"> <tr> <td style="width: 65%; border: none;"> <p>Responsible Engineer: Kim Uong (EME lead Eng.) Date/s Tested: 5/11/05 – 5/19/05 & 5/24/2005 Manufacturer/Location: Motorola - Plantation Sector/Group/Div.: iDEN Subscriber Date submitted for test: 5/6/05 DUT Description: i415; TDMA: 1:6, 2:6, 81:120, 1:12; 64QAM, 16 QAM & QPSK Modulation; 0.6W Pulse Avg.; GPS capable Test TX mode(s): 1:3, 1:6, 81:120, Max. Power output: iDEN - 0.640W Nominal Power: iDEN - 0.60W Tx Frequency Bands: iDEN - 806-825, 896-902MHz Signaling type: TDMA: iDEN Model(s) Tested: H80XAH6RR1AN Model(s) Certified: H80XAH6RR1AN Serial Number(s): 364VFEPSR4 Classification: General Population/Uncontrolled Rule Part(s): 90</p> <p>Approved Accessories: Antenna(s): 8515985H01 (806-825MHz Stubby ¼ wave antenna, -1.5dBd; 896-902MHz, 0dBd) Battery(ies): SNN5705C (Hi performance Li Ion); NNTN6368A (Battery cover) Body worn accessory(ies): NNTN4747A (Belt clip) Audio/Data cable accessory(ies): NSN6066A (Light duty RSM), NNTN5004A (PTT headset over ear), NNTN5005A (PTT headset over head), SYN8390B (Privacy earpiece), SYN8146C (Lightweight headset w/ boom mic), NTN8496A (Lightweight headset w/ mic), NNTN4033A (Privacy Earpiece/mic w/ PTT), NNTN5006A (Silver Earbud), SYN7875C (Hearing Aide Neckloop), NTN8513B (Lightweight headband), NNTN5330A (Ear bud accessory), NNTN4620A (Silver ear bud), NNTN5211A (Falcon Surveillance kit); NKN6559A (USB Cable), NKN6560A (RS232), NNTN5405A (USB cable w/ charging), NNTN5406A (RS-232 data cable w/ charging);</p> <p style="text-align: center;">Max. Calc. 1-g Avg. SAR: 1.23 mW/g (Body) Max. Calc. 1-g Avg. SAR: 0.11 mW/g (Face) Max. Calc. 1-g Avg. SAR: 1.45 mW/g (Head)</p> </td> <td style="width: 30%; text-align: center; vertical-align: middle;">  </td> </tr> </table>		<p>Responsible Engineer: Kim Uong (EME lead Eng.) Date/s Tested: 5/11/05 – 5/19/05 & 5/24/2005 Manufacturer/Location: Motorola - Plantation Sector/Group/Div.: iDEN Subscriber Date submitted for test: 5/6/05 DUT Description: i415; TDMA: 1:6, 2:6, 81:120, 1:12; 64QAM, 16 QAM & QPSK Modulation; 0.6W Pulse Avg.; GPS capable Test TX mode(s): 1:3, 1:6, 81:120, Max. Power output: iDEN - 0.640W Nominal Power: iDEN - 0.60W Tx Frequency Bands: iDEN - 806-825, 896-902MHz Signaling type: TDMA: iDEN Model(s) Tested: H80XAH6RR1AN Model(s) Certified: H80XAH6RR1AN Serial Number(s): 364VFEPSR4 Classification: General Population/Uncontrolled Rule Part(s): 90</p> <p>Approved Accessories: Antenna(s): 8515985H01 (806-825MHz Stubby ¼ wave antenna, -1.5dBd; 896-902MHz, 0dBd) Battery(ies): SNN5705C (Hi performance Li Ion); NNTN6368A (Battery cover) Body worn accessory(ies): NNTN4747A (Belt clip) Audio/Data cable accessory(ies): NSN6066A (Light duty RSM), NNTN5004A (PTT headset over ear), NNTN5005A (PTT headset over head), SYN8390B (Privacy earpiece), SYN8146C (Lightweight headset w/ boom mic), NTN8496A (Lightweight headset w/ mic), NNTN4033A (Privacy Earpiece/mic w/ PTT), NNTN5006A (Silver Earbud), SYN7875C (Hearing Aide Neckloop), NTN8513B (Lightweight headband), NNTN5330A (Ear bud accessory), NNTN4620A (Silver ear bud), NNTN5211A (Falcon Surveillance kit); NKN6559A (USB Cable), NKN6560A (RS232), NNTN5405A (USB cable w/ charging), NNTN5406A (RS-232 data cable w/ charging);</p> <p style="text-align: center;">Max. Calc. 1-g Avg. SAR: 1.23 mW/g (Body) Max. Calc. 1-g Avg. SAR: 0.11 mW/g (Face) Max. Calc. 1-g Avg. SAR: 1.45 mW/g (Head)</p>	
<p>Responsible Engineer: Kim Uong (EME lead Eng.) Date/s Tested: 5/11/05 – 5/19/05 & 5/24/2005 Manufacturer/Location: Motorola - Plantation Sector/Group/Div.: iDEN Subscriber Date submitted for test: 5/6/05 DUT Description: i415; TDMA: 1:6, 2:6, 81:120, 1:12; 64QAM, 16 QAM & QPSK Modulation; 0.6W Pulse Avg.; GPS capable Test TX mode(s): 1:3, 1:6, 81:120, Max. Power output: iDEN - 0.640W Nominal Power: iDEN - 0.60W Tx Frequency Bands: iDEN - 806-825, 896-902MHz Signaling type: TDMA: iDEN Model(s) Tested: H80XAH6RR1AN Model(s) Certified: H80XAH6RR1AN Serial Number(s): 364VFEPSR4 Classification: General Population/Uncontrolled Rule Part(s): 90</p> <p>Approved Accessories: Antenna(s): 8515985H01 (806-825MHz Stubby ¼ wave antenna, -1.5dBd; 896-902MHz, 0dBd) Battery(ies): SNN5705C (Hi performance Li Ion); NNTN6368A (Battery cover) Body worn accessory(ies): NNTN4747A (Belt clip) Audio/Data cable accessory(ies): NSN6066A (Light duty RSM), NNTN5004A (PTT headset over ear), NNTN5005A (PTT headset over head), SYN8390B (Privacy earpiece), SYN8146C (Lightweight headset w/ boom mic), NTN8496A (Lightweight headset w/ mic), NNTN4033A (Privacy Earpiece/mic w/ PTT), NNTN5006A (Silver Earbud), SYN7875C (Hearing Aide Neckloop), NTN8513B (Lightweight headband), NNTN5330A (Ear bud accessory), NNTN4620A (Silver ear bud), NNTN5211A (Falcon Surveillance kit); NKN6559A (USB Cable), NKN6560A (RS232), NNTN5405A (USB cable w/ charging), NNTN5406A (RS-232 data cable w/ charging);</p> <p style="text-align: center;">Max. Calc. 1-g Avg. SAR: 1.23 mW/g (Body) Max. Calc. 1-g Avg. SAR: 0.11 mW/g (Face) Max. Calc. 1-g Avg. SAR: 1.45 mW/g (Head)</p>			
<p>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.</p> <p>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.</p>			
Signature on file Ken Enger GEMS EME Lab Senior Resource Manager, Laboratory Director, Approval Date: 5/26/2005	Certification Date: 5/26/2005 Certification No.: L1050510P		

Part 1 of 3

1.0 Introduction and Overview 3
 2.0 References, Standards, and Guidelines 3
 2.1 SAR Limits 4
 3.0 Description of Device Under Test (DUT)..... 4
 4.0 Description of Test System 5
 4.1 Description of Robotics/Probes/Readout Electronics 5
 4.2 Description of Phantom(s) 5
 4.3 Description of Equivalent Tissues 5
 5.0 Additional Test Equipment 7
 6.0 SAR Measurement System Verification 7
 6.1 Equivalent Tissue Test results 7
 6.2 System Check Test results 8
 7.0 DUT Test Strategy and Methodology 8
 7.1 Test Plan..... 8
 7.2 Device Positioning Procedures 9
 8.0 Environmental Test Conditions..... 10
 9.0 Test Results Summary..... 10
 9.1 Highest S.A.R. results calculation methodology..... 14
 10.0 Conclusion 14

APPENDICES

A Measurement Uncertainty.....15
 B Probe Calibration Certificates.....18

Part 2 of 3

C Dipole Calibration Certificates.....2
 D Test System Verification Scans.....7

Part 3 of 3

E DUT Scans (Shortened scans & highest SAR configurations).....2
 F DUT Supplementary Data (e.g. Power Slump).....10
 G DUT Test Position Photos.....12
 H DUT & Accessory Photos.....15
 I DUT Body-worn Separation Distances.....16

REVISION HISTORY

Date	Revision	Comments
5/25/05	O	Initial release

1.0 Introduction and Overview

This report details the utilization, test setup, test equipment, and test results of the Specific Absorption Rate (S.A.R.) measurements performed at the GEMS EME Test Lab for the model number H80XAH6RR1AN of FCC ID: AZ489FT5845.

The test results presented herein clearly demonstrate compliance with FCC General Population/Uncontrolled RF Exposure limits of **1.6 mW/g** per the requirements of 47 CFR 2.1093(d).

2.0 Reference 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: AZ489FT5845 is a data capable device that employs time division multiplexing transmission technology with a duty cycle ranging from 16.67% to 33.33% using M16-QAM modulation for voice or circuit data transmission. There is a Split 1:3 mode that operates using a 16.67% transmission duty cycle. Two 7.5ms pulses occur during the six time slots within the 90-msec frame format. This mode is available in both the 806-825MHz and 896-902MHz bands in the telephone interconnect mode only. Packet data transmission is supported up to a maximum duty cycle of 67.5% using quad QPSK modulation. This device is also GPS capable.

This device will be marketed to and used by the general population. This device may be used while held against the head in voice mode, in front of the face in PTT mode, and against the body in phone, dispatch, and data modes.

This device is capable of operating in the 806-825 MHz and 896-902MHz bands. Packet data transmission is not available while transmitting in the 896-902 MHz band. The rated conducted power is 0.60 watts pulsed averaged in 806-825MHz and 896-902MHz bands. The maximum conducted output power is 0.64 watts pulsed average as defined by the upper limit of the production line final test station.

FCC ID: AZ489FT5845 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™) S.A.R. measurement system Version 4.3 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 S.A.R. 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 S.A.R. 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)	80x30x20x0.2	68.58x20.32	Wood	< 0.05

4.2.2 SAM Phantom

Phantom Type	Material Parameters	Material Thickness (mm)	Support structure material	Loss Tangent (wood)
SAMTP1022 & SAMTP1209	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	900MHz	
	Head	Body
Sugar	56.5	44.9
DGBE (Glycol)	NA	NA
Diacetin	NA	NA
De ionized -Water	40.95	53.06
Salt	1.45	0.94
HEC	1.0	1
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	347B	3125U16028	11/1/2005
Power Meter	347B	3737U26425	9/29/2005
Sensor	8482B	3318A07392	11/22/2005
Sensor	8481H	2703A14631	9/29/2005
Coupler	3020A	40295	7/18/2005
Sig Gen	E4421B	RSHPB02	11/3/2005
Power Meter	E4418B	PMHPL022	11/22/2005
Sensor	8482B	3318A07546	9/27/2005
AMP (Amplifier Research)	10W1000	5924	CNR
AMP (Amplifier Research)	1W1000	16625	CNR
Network Analyzer (HP)	8753D	3410A06417	2/7/06
Dielectric Probe Kit (HP)	85070C	US99360076	CNR

6.0 System Verification

SAR Measurement

The S.A.R. measurements were conducted with probe model/serial number ET3DV6/SN1383. The system performance check was conducted daily and within 24 hours prior to testing. DASYS output files of the system performance test results and the probe/dipole calibration certificates are included in appendices B and C 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 S.A.R. measurements is measured daily and within 24 hours prior to actual S.A.R. 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 (5/11/05-5/19/05 & 5/24/2005)

Frequency (MHz)	FCC Body			
	Di-electric Constant Target	Di-electric Constant Meas. (Range)	Conductivity Target S/m	Conductivity Meas. (Range) S/m
899/900	55.0	53.0-55.2	1.05	1.03-1.04
813	55.3	53.8-54.0	0.97	0.94-0.95

IEEE Head				
Frequency (MHz)	Di-electric Constant Target	Di-electric Constant Meas. (Range)	Conductivity Target S/m	Conductivity Meas. (Range) S/m
899/900	41.5	40.5-42.1	0.97	0.99-1.01
813	41.6	41.6-43.3	0.90	0.91-0.93

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)
1383	FCC Body	2/24/05	SPEAG D900V2 /085	11.44 +/- 0.230	11.41 +/- 10%	5/16/05-5/18/05 & 5/24/2005 (4 test days)
1383	IEEE Head	2/24/05	SPEAG D900V2 /085	11.52 +/- 0.300	11.26 +/- 10%	5/11/05-5/19/05 (4 test days)

Note: See APPENDIX D for an explanation of the reference S.A.R. 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 S.A.R. 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 standard iDEN transmission signaling operational at the body, head, 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 S.A.R. test plan for this product. S.A.R. measurements were performed using a flat phantom and a SAM phantom with the applicable simulated tissue to assess performance at the body, head, and face respectively using the relevant transmission modes.

Note that a coarse-to-cube approximation methodology was utilized to determine the worst-case S.A.R. performance configuration for each applicable body location. The test configurations that produced the highest S.A.R. 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 Head (Phone mode 1:3) [Page 11/12 of 30; Tables 1&2]

- Assessment in the 806-825MHz band of offered batteries using applicable test configurations at the head.
- Assessment at the 806-825MHz band edges using the worst case configuration from above.
- Assessment in the 896-902MHz band using the worst case battery from above, using applicable test configurations at the head.
- Assessment at the 896-902MHz band edges.

Assessments at the Face (PTT mode 1:6) [Page 12 of 30; Table 3]

- Assessment in the 806-825MHz and 896-902MHz bands using the offered battery.

Assessments at the Body (iDEN modes 1:3 and 81:120) [Page 12/13 of 30; Table 4]

- Assessment in the 806-825MHz band using the offered battery and body worn accessory with and without the offered data cables
- Assessment in the 806-825MHz band using the offered audio accessories
- Assessment at the band edges of the 806-825MHz band using the worst case configuration/mode overall at the body from the previous assessments at the body above.
- Assessment using the applicable worst case test configuration at the body overall from above with the back and front housing of the DUT separated 2.5cm from the phantom.

Assessments at the Body (iDEN data mode 81:120) [Page 13 of 30; Table 5]

- Assessment in the 896-902MHz band using the worst case phone mode test configuration from the body assessments above.

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 S.A.R. 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 sides separated 2.5cm from the phantom.

7.2.2 Head

The DUT was placed against the right and left heads of the SAM phantom in the cheek touch and tilt positions.

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’s 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 S.A.R. tests reported herein:

	Target	Measured
Ambient Temperature	20 - 25 °C	Range: 22.0-22.5°C Avg. 22.2°C
Relative Humidity	30 - 70 %	Range: 49.0-55.0% Avg. 51.8%
Tissue Temperature	NA	Range: 21.2-22.2°C Avg. 21.71°C

The EME Lab’s 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 S.A.R. 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 S.A.R. plots are provided in Appendix E.

Appendix E also presents a shortened S.A.R. cube scan to assess the validity of the calculated results presented herein. Note: The results of the shortened cube scan presented in Appendix E demonstrate that the scaling methodology used to determine the calculated S.A.R. results presented herein are valid.

Table 1

Assessments at the Head (Phone mode 1:3) 802-825MHz band										
Run Number/ SN	Antenna Pos.	Freq. (MHz)	Battery	Test position	Carry Case	Additional attachments	Initial Power (W)	S.A.R. Drift (dB)	Meas. 1g- S.A.R. (mW/g)	Max Calc. 1g- S.A.R. (mW/g)
Assessment at the left ear - offered battery										
CM-R2-LEAR-050511-03/364VFEPSR4	Fixed	813.5125	SNN5705C	Cheek touch	None	None	0.669	-	1.420	1.42
CM-R2-LEAR-050511-08/364VFEPSR4	Fixed	813.5125	SNN5705C	15° tilt	None	None	0.666	0.118	0.867	0.87
Assessment at the right ear - offered battery										
CM-R2-REAR-050511-09/364VFEPSR4	Fixed	813.5125	SNN5705C	Cheek touch	None	None	0.668	0.0205	1.330	1.33
CM-R2-REAR-050511-10/364VFEPSR4	Fixed	813.5125	SNN5705C	15° tilt	None	None	0.670	-0.21	0.873	0.92
Assessment at left ear - band edges										
CM-R2-LEAR-050512-02/364VFEPSR4	Fixed	806.0125	SNN5705C	Cheek touch	None	None	0.660	0.0787	1.380	1.38
CM-R2-LEAR-050512-03/364VFEPSR4	Fixed	806.0125	SNN5705C	15° tilt	None	None	0.659	-0.0119	0.842	0.84
*CM-R2-LEAR-050512-04/364VFEPSR4	Fixed	824.9875	SNN5705C	Cheek touch	None	None	0.654	-0.0131	1.420	1.42
CM-R2-LEAR-050512-05/364VFEPSR4	Fixed	824.9875	SNN5705C	15° tilt	None	None	0.651	-0.0559	0.835	0.85
*Assessment with the worst case test configuration above using the full DASY 4 coarse and 7x7x7 cube scan measurements.										
CM-R2-LEAR-050524-05/364VFEPSR4	Fixed	824.9875	SNN5705C	Cheek touch	None	None	0.651	-0.0022	1.450	1.45

Table 2

Assessments at the Head (Phone mode 1:3) 896-902MHz band										
Run Number/ SN	Antenna Pos.	Freq. (MHz)	Battery	Test position	Carry Case	Additional attachments	Initial Power (W)	S.A.R. Drift (dB)	Meas. 1g- S.A.R. (mW/g)	Max Calc. 1g- S.A.R. (mW/g)
Assessment at the left ear - offered battery										
CM-R2-LEAR-050512-07/364VFEPSR4	Fixed	899.66875	SNN5705C	Cheek touch	None	None	0.655	-0.06	1.290	1.31
CM-R2-LEAR-050512-08/364VFEPSR4	Fixed	899.66875	SNN5705C	15° tilt	None	None	0.658	-0.107	0.658	0.67
Assessment at the right ear - offered battery										
CM-R2-REAR-050512-09/364VFEPSR4	Fixed	899.66875	SNN5705C	Cheek touch	None	None	0.659	-0.0004	1.150	1.15
CM-R2-REAR-050512-10/364VFEPSR4	Fixed	899.66875	SNN5705C	15° tilt	None	None	0.660	-0.262	0.599	0.64

Table 2 (continued)

Run Number/ SN	Antenna	Freq. (MHz)	Battery	Test position	Carry Case	Additional attachments	Initial Power (W)	S.A.R. Drift (dB)	Meas. 1g- S.A.R. (mW/g)	Max Calc. 1g- S.A.R. (mW/g)
Assessment at the left ear – band edges										
*CM-R2-LEAR-050512-11/364VFEPSR4	Fixed	896.01875	SNN5705C	Cheek touch	None	None	0.668	-0.0788	1.290	1.31
CM-R2-LEAR-050512-12/364VFEPSR4	Fixed	896.01875	SNN5705C	15° tilt	None	None	0.665	-0.0398	0.656	0.66
CM-R2-LEAR-050513-02/364VFEPSR4	Fixed	901.98125	SNN5705C	Cheek touch	None	None	0.642	-0.136	1.210	1.25
CM-R2-LEAR-050513-03/364VFEPSR4	Fixed	901.98125	SNN5705C	15° tilt	None	None	0.640	-0.0487	0.602	0.61
*Assessment with the worst case test configuration above using the full DASY 4 coarse and 7x7x7 cube scan measurements.										
CM-R2-LEAR-050513-04/364VFEPSR4	Fixed	896.01875	SNN5705C	Cheek touch	None	None	0.666	-0.27	1.250	1.33

Table 3

Assessment at the Face; (iDEN 1:6 mode) 802-825MHz and 896-902MHz bands										
Run Number/ SN	Antenna	Freq. (MHz)	Battery	Test position	Carry Case	Additional attachments	Initial Power (W)	S.A.R. Drift (dB)	Meas. 1g- S.A.R. (mW/g)	Max Calc. 1g- S.A.R. (mW/g)
Assessment at the Face – DUT front 2.5cm separation (full DASY 4 coarse and 7x7x7 cube scan measurements)										
CM-R2-Face-050513-05/364VFEPSR4	Fixed	813.5125	SNN5705C	DUT front 2.5cm	None	None	0.668	0.111	0.210	0.11
CM-R2-Face-050513-06/364VFEPSR4	Fixed	899.66875	SNN5705C	DUT front 2.5cm	None	None	0.660	0.0918	0.203	0.10

Table 4

Assessment at the Body; (iDEN 81:120 and phone mode 1:3) 806-825MHz band										
Run Number/ SN	Antenna	Freq. (MHz)	Battery	Test position	Carry Case	Additional attachments	Initial Power (W)	S.A.R. Drift (dB)	Meas. 1g- S.A.R. (mW/g)	Max Calc. 1g- S.A.R. (mW/g)
Assessment at the body (iDEN 81:120 mode) – with and without offered data cable accessories										
CM-R2-Ab-050513-07/364VFEPSR4	Fixed	813.5125	SNN5705C	Against phantom	NNTN4747A	None	0.642	-0.233	1.110	1.17
CM-R2-Ab-050513-08/364VFEPSR4	Fixed	813.5125	SNN5705C	Against phantom	NNTN4747A	NKN6559A	0.640	-0.0927	0.640	0.65
CM-R2-Ab-050516-02/364VFEPSR4	Fixed	813.5125	SNN5705C	Against phantom	NNTN4747A	NKN6560A	0.650	0.0822	0.487	0.49
CM-R2-Ab-050516-03/364VFEPSR4	Fixed	813.5125	SNN5705C	Against phantom	NNTN4747A	NNTN5405A	0.642	0.0836	0.656	0.66
CM-R2-Ab-050516-04/364VFEPSR4	Fixed	813.5125	SNN5705C	Against phantom	NNTN4747A	NNTN5406A	0.648	0.0373	0.683	0.68
Assessment at the body (Phone mode 1:3) – worst case configuration from above w/ offered audio accessories										
CM-R2-Ab-050516-05/364VFEPSR4	Fixed	813.5125	SNN5705C	Against phantom	NNTN4747A	NNTN5211A	0.674	-0.162	0.452	0.47
CM-R2-Ab-050516-06/364VFEPSR4	Fixed	813.5125	SNN5705C	Against phantom	NNTN4747A	NNTN5004A	0.670	0.0695	0.556	0.56
CM-R2-Ab-050516-07/364VFEPSR4	Fixed	813.5125	SNN5705C	Against phantom	NNTN4747A	NNTN5005A	0.672	0.0278	0.531	0.53

Table 4 (continued)

Run Number/ SN	Antenna	Freq. (MHz)	Battery	Test position	Carry Case	Additional attachments	Initial Power (W)	S.A.R. Drift (dB)	Meas. 1g- S.A.R. (mW/g)	Max Calc. 1g-S.A.R. (mW/g)
CM-R2-Ab-050516-08/364VFEPSR4	Fixed	813.5125	SNN5705C	Against phantom	NNTN4747A	NNTN5006A	0.665	-0.0507	0.537	0.54
CM-R2-Ab-050516-09/364VFEPSR4	Fixed	813.5125	SNN5705C	Against phantom	NNTN4747A	NNTN5330A	0.671	0.00161	0.477	0.48
CM-R2-Ab-050517-02/364VFEPSR4	Fixed	813.5125	SNN5705C	Against phantom	NNTN4747A	NSN6066A	0.670	-0.0601	0.407	0.41
CM-R2-Ab-050517-03/364VFEPSR4	Fixed	813.5125	SNN5705C	Against phantom	NNTN4747A	NNTN4620A	0.674	-0.0671	0.502	0.51
CM-R2-Ab-050517-04/364VFEPSR4	Fixed	813.5125	SNN5705C	Against phantom	NNTN4747A	SYN8390B	0.671	-0.0163	0.499	0.50
CM-R2-Ab-050517-05/364VFEPSR4	Fixed	813.5125	SNN5705C	Against phantom	NNTN4747A	SYN7875C	0.669	0.0377	0.480	0.48
CM-R2-Ab-050517-06/364VFEPSR4	Fixed	813.5125	SNN5705C	Against phantom	NNTN4747A	SYN8146C	0.670	0.0178	0.466	0.47
CM-R2-Ab-050517-07/364VFEPSR4	Fixed	813.5125	SNN5705C	Against phantom	NNTN4747A	NNTN4033A	0.675	-0.0315	0.508	0.51
CM-R2-Ab-050517-08/364VFEPSR4	Fixed	813.5125	SNN5705C	Against phantom	NNTN4747A	NTN8496A	0.672	-0.034	0.585	0.59
CM-R2-Ab-050517-09/364VFEPSR4	Fixed	813.5125	SNN5705C	Against phantom	NNTN4747A	NTN8513B	0.669	-0.0393	0.541	0.55
Assessment at the body (iDEN 81:120 mode) – 800MHz band edges										
*CM-R2-Ab-050517-10/364VFEPSR4	Fixed	806.0125	SNN5705C	Against phantom	NNTN4747A	None	0.644	-0.044	1.260	1.27
CM-R2-Ab-050517-11/364VFEPSR4	Fixed	824.9875	SNN5705C	Against phantom	NNTN4747A	None	0.620	-0.049	1.100	1.15
Assessment at the body (iDEN 81:120 mode) – 2.5cm separation										
CM-R2-Ab-050518-02/364VFEPSR4	Fixed	806.0125	SNN5705C	DUT back 2.5cm	NNTN4747A	None	0.635	-0.055	0.904	0.92
CM-R2-Ab-050518-04/364VFEPSR4	Fixed	806.0125	SNN5705C	DUT front 2.5cm	NNTN4747A	None	0.637	0.012	0.773	0.78
*Assessment with the worst case test configuration above using the full DASY 4 coarse and 7x7x7 cube scan measurements.										
CM-R2-Ab-050518-05/364VFEPSR4	Fixed	806.0125	SNN5705C	Against phantom	NNTN4747A	None	0.636	-0.391	1.120	1.23

Table 5

DUT assessment at the Body; (iDEN 1:3 mode) 896-902MHz band										
Run Number/ SN	Antenna	Freq. (MHz)	Battery	Test position	Carry Case	Additional attachments	Initial Power (W)	S.A.R. Drift (dB)	Meas. 1g-S.A.R. (mW/g)	Max Calc. 1g-S.A.R. (mW/g)
Assessment at the body –worst case configuration from 1:3 mode in the 806-825MHz band										
*CM-R2-Ab-050518-06/364VFEPSR4	Fixed	896.01875	SNN5705C	Against phantom	NNTN4747A	NTN8496A	0.670	-0.0448	0.582	0.59
CM-R2-Ab-050518-07/364VFEPSR4	Fixed	899.66875	SNN5705C	Against phantom	NNTN4747A	NTN8496A	0.663	-0.015	0.496	0.50
CM-R2-Ab-050518-08/364VFEPSR4	Fixed	901.98125	SNN5705C	Against phantom	NNTN4747A	NTN8496A	0.658	-0.0132	0.466	0.47
*Assessment with the worst case test configuration above using the full DASY 4 coarse and 7x7x7 cube scan measurements.										
CM-R2-Ab-050518-09/364VFEPSR4	Fixed	896.01875	SNN5705C	Against phantom	NNTN4747A	NTN8496A	0.664	-0.426	0.537	0.59

9.1 Highest S.A.R. results calculation methodology

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

$$\text{Max. Calc. 1-g Avg. SAR} = ((\text{S.A.R. meas.} / (10^{(\text{Pdrift}/10)})) * (\text{Pmax}/\text{Pint})) * \text{DC}\%$$

P_{max} = Maximum Power (W)

P_{int} = Initial Power (W) Note: If Pint is greater than Pmax then Pmax/Pint=1

Pdrift = DASY drift results (dB) - (for conservative results positive drifts are not accounted for)

SAR_{meas.} = Measured 1 gram averaged peak S.A.R. (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 averaged S.A.R. values found for FCC ID: AZ489FT5845 models H80XAH6RR1AN.

At the Body: 1-g Avg. = 1.23mW/g

At the Face: 1-g Avg. = 0.11mW/g

At the Head: 1-g Avg. = 1.45mW/g

These test results clearly demonstrate compliance with FCC General Population/Uncontrolled RF Exposure limits of **1.6mW/g** per the requirements of 47 CFR 2.1093(d).

APPENDIX A
Measurement Uncertainty

Table 1: Uncertainty Budget for Device Under Test: 75 – 3000 MHz

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e = f(d,k)</i>	<i>f</i>	<i>g</i>	<i>h = c x f / e</i>	<i>i = c x g / e</i>	<i>k</i>
Measurement System									
Probe Calibration	E.2.1	4.8	N	1.00	1	1	4.8	4.8	∞
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	1.0	N	1.00	1	1	1.0	1.0	∞
Response Time	E.2.7	0.8	R	1.73	1	1	0.5	0.5	∞
Integration Time	E.2.8	1.3	R	1.73	1	1	0.8	0.8	∞
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	1.0	R	1.73	1	1	0.6	0.6	∞
Probe Positioning w.r.t Phantom	E.6.3	4.0	R	1.73	1	1	2.3	2.3	∞
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	3.4	N	1.00	1	1	3.4	3.4	29
Device Holder Uncertainty	E.4.1	3.8	N	1.00	1	1	3.8	3.8	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	6.5	N	1.00	0.64	0.43	4.2	2.8	∞
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	4.0	N	1.00	0.6	0.49	2.4	2.0	∞
Combined Standard Uncertainty			RSS				12	11	601
Expanded Uncertainty (95% CONFIDENCE LEVEL)			<i>k=2</i>				23	22	

Table 2: Uncertainty Budget for System Check: 75 – 3000 MHz

a	b	c	d	e = f(d,k)	f	g	h =	i =	k
							cxf/e	c x g / e	
Uncertainty Component	IEEE 1528 section	Tol.	Prob.	Div.	c _i	c _i	1 g	10 g	v _i
		(± %)	Dist.		(1 g)	(10 g)	u _i	u _i	
Measurement System									
Probe Calibration	E.2.1	4.8	N	1.00	1	1	4.8	4.8	∞
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	1.0	N	1.00	1	1	1.0	1.0	∞
Response Time	E.2.7	0.8	R	1.73	1	1	0.5	0.5	∞
Integration Time	E.2.8	1.3	R	1.73	1	1	0.8	0.8	∞
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	6.0	R	1.73	0.64	0.43	2.2	1.5	∞
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	6.0	R	1.73	0.6	0.49	2.1	1.7	∞
Combined Standard Uncertainty			RSS				9	8	99999
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				17	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) c_i - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.
- g) u_i – SAR uncertainty
- h) v_i - degrees of freedom for standard uncertainty and effective degrees of freedom for the expanded uncertainty.

Appendix B
Probe Calibration Certification

**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

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: **ET3-1383_Feb05**

CALIBRATION CERTIFICATE

Object: **ET3DV6 - SN:1383**

Calibration procedure(s): **QA CAL-01.v5
Calibration procedure for dosimetric E-field probes**

Calibration date: **February 24, 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	5-May-04 (METAS, No. 251-00388)	May-05
Power sensor E4412A	MY41495277	5-May-04 (METAS, No. 251-00388)	May-05
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-04 (METAS, No. 251-00389)	May-05
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
Power sensor HP 8481A	MY41092180	18-Sep-02 (SPEAG, in house check Oct-03)	In house check: Oct 05
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

Calibrated by: **Nico Vetterli** (Name), **Laboratory Technician** (Function), *N. Vetterli* (Signature)

Approved by: **Katja Pokovic** (Name), **Technical Manager** (Function), *Katja Pokovic* (Signature)

Issued: February 25, 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



S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
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
NORM _{x,y,z}	sensitivity in free space
ConF	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
- 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:

- 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.

ET3DV6 SN:1383

February 24, 2005

DASY - Parameters of Probe: ET3DV6 SN:1383

Sensitivity in Free Space^A

Diode Compression^B

NormX	1.86 ± 10.1%	$\mu V/(V/m)^2$	DCP X	90 mV
NormY	1.60 ± 10.1%	$\mu V/(V/m)^2$	DCP Y	90 mV
NormZ	1.67 ± 10.1%	$\mu V/(V/m)^2$	DCP Z	90 mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

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

Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
SAR _{be} [%]	Without Correction Algorithm	10.3	5.2
SAR _{be} [%]	With Correction Algorithm	0.7	0.1

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	14.9	9.6
SAR _{be} [%]	With Correction Algorithm	0.9	0.1

Sensor Offset

Probe Tip to Sensor Center	2.7 mm
Optical Surface Detection	very low, but repeatable

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).

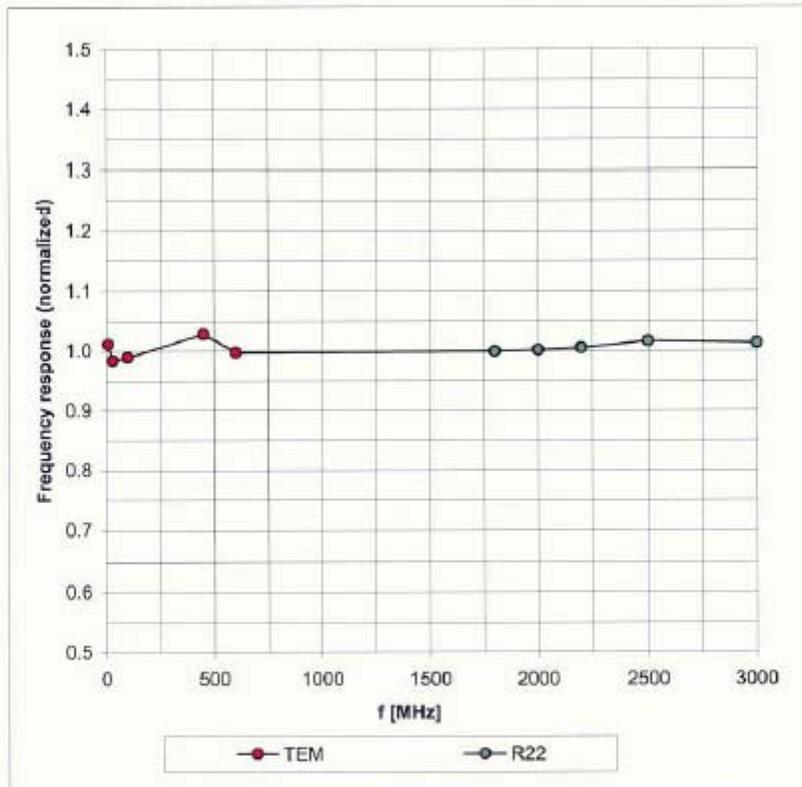
^B Numerical linearization parameter: uncertainty not required.

ET3DV6 SN:1383

February 24, 2005

Frequency Response of E-Field

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

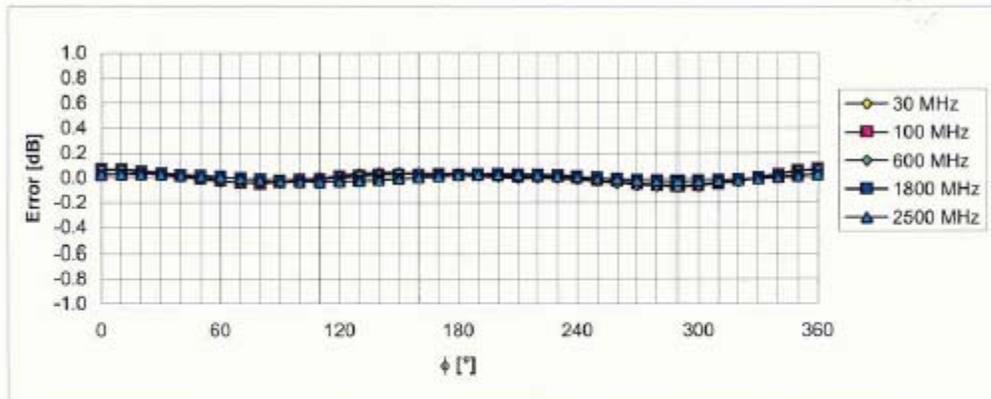
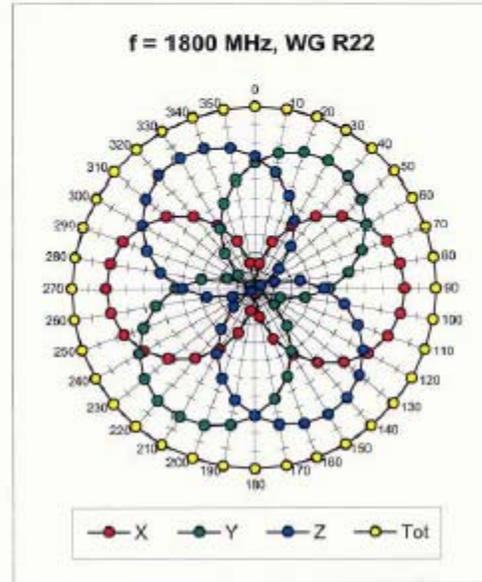
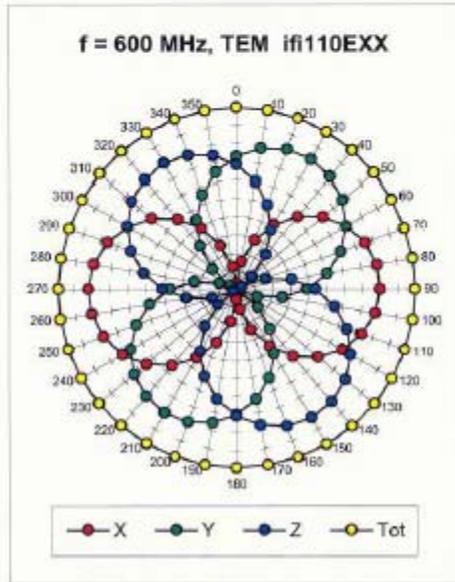


Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

ET3DV6 SN:1383

February 24, 2005

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

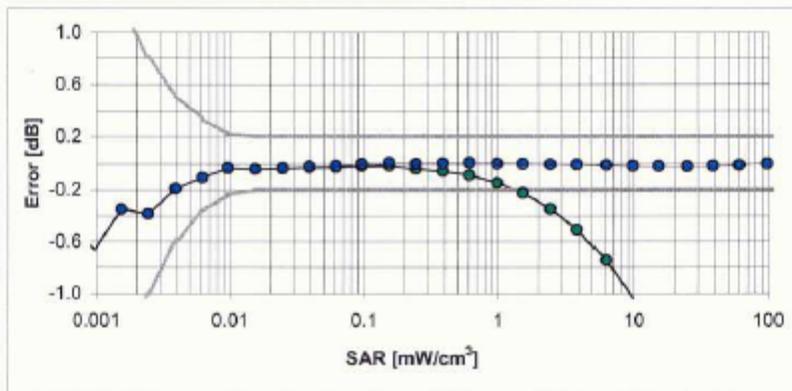
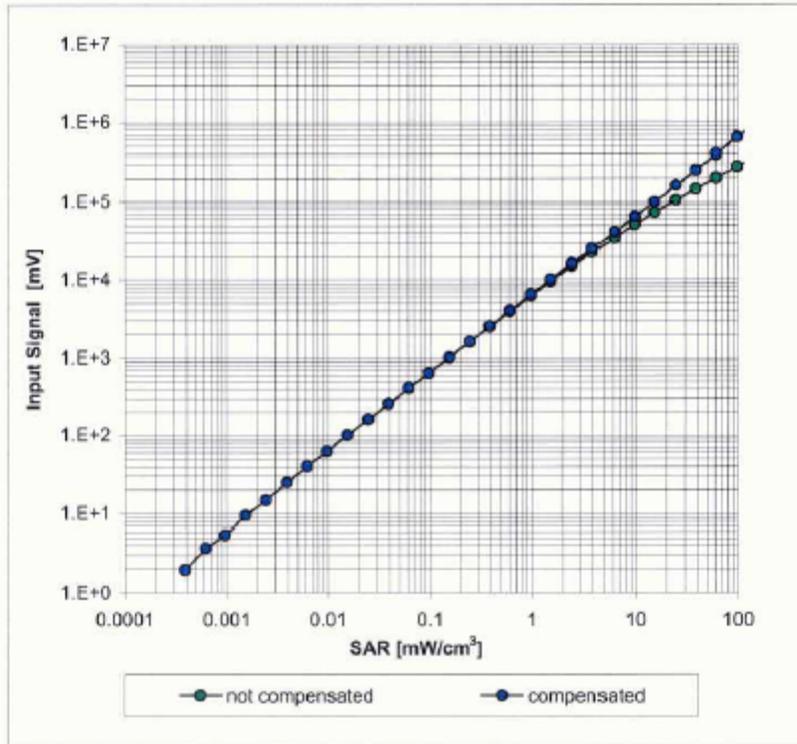


Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

ET3DV6 SN:1383

February 24, 2005

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

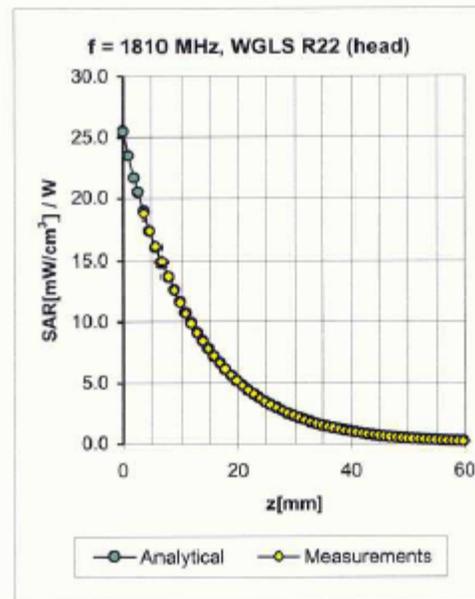
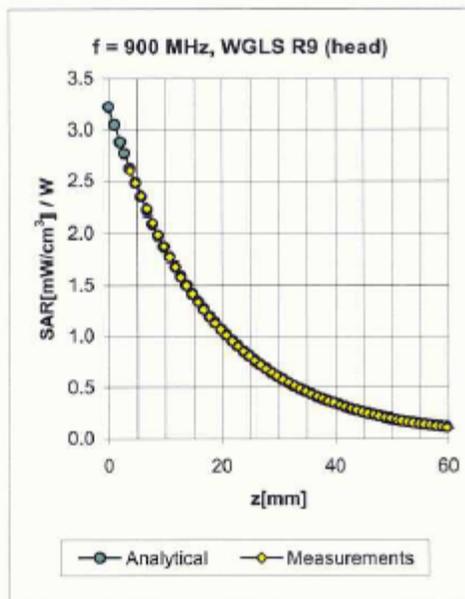


Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

ET3DV6 SN:1383

February 24, 2005

Conversion Factor Assessment



f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
300	± 50 / ± 100	Head	45.3 ± 5%	0.87 ± 5%	0.13	1.55	7.96 ± 13.3% (k=2)
450	± 50 / ± 100	Head	43.5 ± 5%	0.87 ± 5%	0.12	1.15	7.26 ± 13.3% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	1.44	1.38	6.35 ± 11.0% (k=2)
1450	± 50 / ± 100	Head	40.5 ± 5%	1.20 ± 5%	1.03	1.72	5.69 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.76	2.16	5.26 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.87	2.04	4.59 ± 11.8% (k=2)
450	± 50 / ± 100	Body	56.7 ± 5%	0.94 ± 5%	0.09	1.13	7.05 ± 13.3% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	1.40	1.46	6.03 ± 11.0% (k=2)
1450	± 50 / ± 100	Body	54.0 ± 5%	1.30 ± 5%	0.88	2.03	5.22 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.73	2.47	4.71 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	1.05	1.71	4.34 ± 11.8% (k=2)

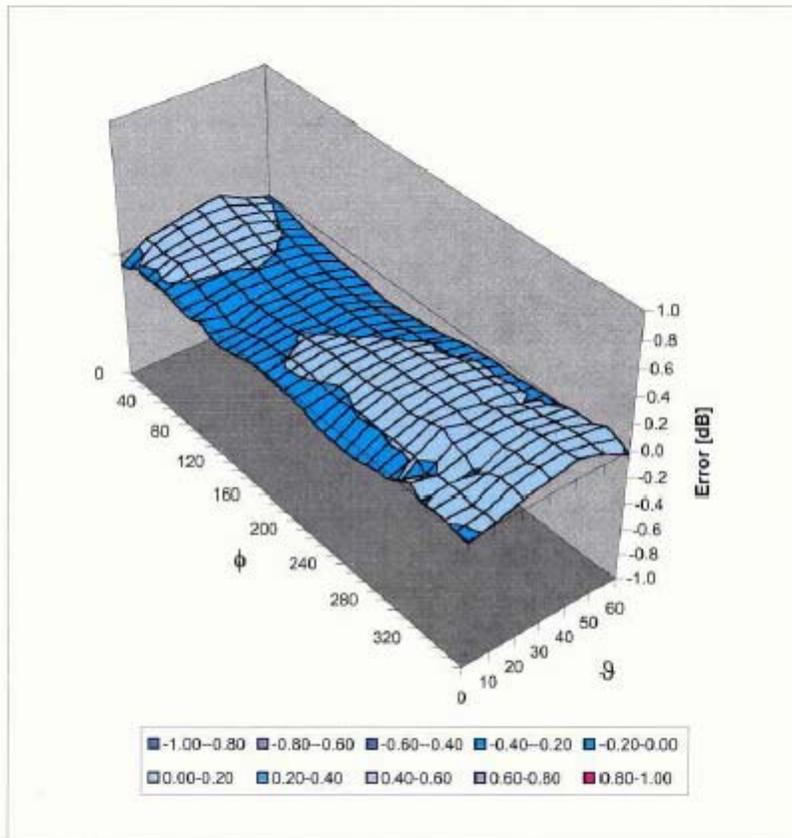
^c The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

ET3DV6 SN:1383

February 24, 2005

Deviation from Isotropy in HSL

Error (ϕ, θ), $f = 900$ MHz



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

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:

1383

Place of Assessment:

Zurich

Date of Assessment:

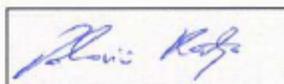
February 28, 2005

Probe Calibration Date:

February 24, 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:



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:1383

Conversion factor (\pm standard deviation)

380 MHz	<i>ConvF</i>	7.6 \pm 9%	$\epsilon_r = 44.3$ $\sigma = 0.87$ mho/m (head tissue)
480 MHz	<i>ConvF</i>	7.3 \pm 8%	$\epsilon_r = 43.3$ $\sigma = 0.87$ mho/m (head tissue)
380 MHz	<i>ConvF</i>	7.5 \pm 9%	$\epsilon_r = 58.2$ $\sigma = 0.92$ mho/m (body tissue)
480 MHz	<i>ConvF</i>	7.3 \pm 8%	$\epsilon_r = 56.7$ $\sigma = 0.94$ 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.

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:1383

Conversion factor (\pm standard deviation)

150 MHz	<i>ConvF</i>	8.6 \pm 10%	$\epsilon_r = 52.3$ $\sigma = 0.76 \text{ mho/m}$ (head tissue)
236 MHz	<i>ConvF</i>	7.9 \pm 10%	$\epsilon_r = 48.2$ $\sigma = 0.82 \text{ mho/m}$ (head tissue)
784 MHz	<i>ConvF</i>	6.6 \pm 7%	$\epsilon_r = 41.8$ $\sigma = 0.90 \text{ mho/m}$ (head 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.

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:1383

Conversion factor (\pm standard deviation)

150 MHz	<i>ConvF</i>	8.2 \pm 10 %	$\epsilon_r = 61.9$ $\sigma = 0.80 \text{ mho/m}$ (body tissue)
236 MHz	<i>ConvF</i>	7.9 \pm 10 %	$\epsilon_r = 59.8$ $\sigma = 0.87 \text{ mho/m}$ (body tissue)
300 MHz	<i>ConvF</i>	7.8 \pm 9 %	$\epsilon_r = 58.2$ $\sigma = 0.92 \text{ mho/m}$ (body tissue)
350 MHz	<i>ConvF</i>	7.6 \pm 9 %	$\epsilon_r = 57.7$ $\sigma = 0.93 \text{ mho/m}$ (body tissue)
784 MHz	<i>ConvF</i>	6.3 \pm 7 %	$\epsilon_r = 55.4$ $\sigma = 0.97 \text{ mho/m}$ (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.