MOTOROLA

ACCREDITED
Certificate Number: 1449-01

FCC ID: AZ489FT5844
DECLARATION OF COMPLIANCE SAR ASSESSMENT Part 1 of 3

Government & Enterprise Mobility Solutions
EME Test Laboratory
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Date of Report: March 29, 2005
Report Revision: Rev. O
Report ID: FCC rpt_i850_Rev O_050329 SR2008

Responsible Engineer: Kim Uong (EME lead Eng.)
Date/s Tested: 3/06/05-3/28/05
Manufacturer/Location: Motorola - Plantation
Sector/Group/Div.: iDEN Subscriber
Date submitted for test: 2/21/05
DUT Description: i850; TDMA: 236:310 (76.1%), 1:6, 2:6, 81:120, 1:12; 64QAM, 16 QAM & QPSK Modulation; 0.6W Pulse Avg. MOTOtalk (114:120 8FSK; 0.85 W nominal); GPS capable
Test TX mode(s): 1:3, 1:6, 114:120, 236:310, 81:120,
Max. Power output: Mototalk - 0.891W, iDEN/WiDEN - 0.640W
Nominal Power: MOTOtalk - 0.85W, iDEN/WiDEN - 0.60W
Tx Frequency Bands: MOTOtalk - 902-928MHz, iDEN/WiDEN – 806-825, 896-902MHz
Signaling type: TDMA: iDEN; WiDEN, MOTOtalk - (FHSS 8FSK)
Model(s) Tested: H65XAN6RR4AN/NWF1000A
Model(s) Certified: H65XAN6RR4AN/NWF1000A
Serial Number(s): 364AFA021M
Classification: General Population/Uncontrolled
Rule Part(s): 15 & 90

Approved Accessories:
Antenna(s):
8585744F04 (806-825MHz retractable ¼ wave antenna, -2.4dBd; 896-902MHz, -1.1dBd; 902-925MHz, -1.2dBd)
Battery(ies):
SNN5705C (Hi performance Li Ion); SNN5704C (Slim battery); NNTN5728A (Hi performance battery door); NNTN5727A (Slim battery door)
Body worn accessory(ies):
NNTN6026A (Holster); 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)

Max. Calc. 1-g/10-g Avg. SAR: 1.15/0.84 mW/g (Body)
Max. Calc. 1-g/10-g Avg. SAR: 0.43/0.31 mW/g (Face)
Max. Calc. 1-g/10-g Avg. SAR: 1.05/0.72 mW/g (Head)

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.

Signature on file
Ken Enger GEMS EME Lab Senior Resource Manager,
Laboratory Director,
3/29/05
Approval Date:

Certification Date: 3/29/05

Certification No.: L1050365P

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REVISION HISTORY

Date	Revision	Comments
3/29/05	O	Initial Prototype 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 H65XAN6RR4AN/NWF1000A of FCC ID: AZ489FT5844. The results herein reflect initial prototype results.

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: AZ489FT5844 is a digital multi-service 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. MOTOtalk transmission is also supported and employs a frequency hopping digital spread spectrum format operating in the 900 MHZ ISM band. MOTOtalk has a transmission duty cycle of 114:120 using 8 FSK modulation. MOTOtalk operates only in PTT mode in front of the face or at the abdomen with the applicable offered audio accessories. This device incorporates WiDEN technology with a maximum transmission duty cycle of 236:310 (76.1%). WiDEN uses the standard iDEN modulation modes in 1 to 4 standard 25KHz iDEN channels. WiDEN25, 50, 75, and 100 uses 1, 2, 3, and 4 25KHz channels respectfully. The highest duty cycle is in the WiDEN 25KHz mode. This device supports Circuit Data and Fax operation in either 3:1 or 6:1 modes. No simultaneous transmissions are possible. Packet Data and WiDEN operations are possible with and without connection to an external data device, via a data cable. 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, MOTOtalk, Data, and WiDEN modes.
FCC ID: AZ489FT5844 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. MOTOtalk operates in the 902-928MHz band. WiDEN operates with the 806-825MHz and 896-902MHz bands. The rated conducted power is 0.60 watts pulsed averaged in 806-825MHz and 896-902MHz bands and 0.85 watts in the MOTOtalk band. The maximum conducted output power is 0.64 watts pulsed average and 0.891 watts respectively as defined by the upper limit of the production line final test station.

FCC ID: AZ489FT5844 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	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	YYYYS841	11/1/2005
Power Meter	347B	PMHPJ112	9/29/2005
Sensor	8482B	3318A07392	11/22/2005
Sensor	8481H	2703A14631	9/29/2005
Coupler	3020A	40295	7/18/2005
Sig Gen	E4421B	RSHPBT02	11/3/2005
Power Meter	E4418B	PMHPL022	11/22/2005
Sensor	8482B	3318A07546	9/27/2005
AMP (ComTech PST)	AR88258-10	M3Y6A00-1007	CNR
AMP (Amplifier Research)	10W1000	5924	CNR
AMP (Amplifier Research)	1W1000	16625	CNR

6.0 SAR Measurement System Verification

The S.A.R. 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 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 (3/6/05 – 3/22/05)

FCC Body				
Frequency (MHz)	Di-electric Constant Target	Di-electric Constant Meas. (Range)	Conductivity Target S/m	Conductivity Meas. (Range) S/m
900/899	55.0	52.4-54.7	1.05	1.00-1.06
915	55.0	52.3-54.6	1.06	1.03-1.07
813	55.3	53.1-55.5	0.97	0.94-0.96

IEEE Head				
Frequency (MHz)	Di-electric Constant Target	Di-electric Constant Meas. (Range)	Conductivity Target S/m	Conductivity Meas. (Range) S/m
900/899	41.5	40.2-41.3	0.97	1.0-1.01
915	41.5	40.2-40.8	0.98	1.02-1.02
813	41.6	41.1-41.8	0.90	0.93-0.93

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)
1393	FCC Body	4/28/04	SPEAG D900V2 /084	11.320 +/- 0.320	11.75 +/- 10%	3/6/05-3/22/05 10 test days
1393	IEEE Head	4/28/04	SPEAG D900V2 /084	11.325 +/- 0.075	11.15 +/- 10%	3/7/05-3/17/05 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 iDEN, WiDEN, and MOTOtalk (FHSS 8FSK) 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) **[Pages 11, 12 of 31; Tables 1]**

- 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 13 of 31; Table 2]**

- Assessment in the 806-825MHz band of the worst case battery from the head assessment above with the flip closed.
- Assessment in the 896-902MHz band of the worst case battery from the head assessment above with the flip closed.

Assessments at the Face (MOTOtalk mode 114:120) **[Page 13 of 31; Table 2]**

- Assessment in the 902-928MHz band using the worst case battery from the head assessment above with the flip opened and closed.
- Assessment in the 902-928MHz band of the band edge frequencies.

Assessments at the Body (WiDEN mode 236:310 - 76%) **[Page 14 of 31; Table 3]**

- Assessment in the 806-825MHz and 896-902MHz bands of the offered batteries and body-worn accessories.
- Assessment of the offered data cable options in the worst case band from above.
- Assessment in the 806-825MHz and 896-902MHz bands of the band edge frequencies.

Assessments at the Body (iDEN data mode 81:120) **[Page 15 of 31; Table 3]**

- Assessment in the 806-825MHz band of the low, mid, and high frequencies using the worst case battery and body worn accessories from above.

Assessments at the Body (iDEN MOTOtalk mode 114:120) **[Page 15 & 16 of 31; Table 4]**

- Assessment in the 902-928MHz band of each offered audio accessories using the worst case battery and body worn accessories.
- Assessment in the 902-928MHz band of the band edges using the worst configuration from above.

Assessments at the Body (iDEN phone mode 1:3) **[Page 16 of 31; Table 4]**

- Assessment in the 806-825MHz band using the worst case configuration from the previous assessments at the body above.
- Assessment in the 896-902MHz band using the worst case configuration from the previous assessments at the body above.

Assessments at the Body 2.5cm (WiDEN mode 236:310 - 76%) **[Page 16 of 31; Table 4]**

- Assessment using the 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.

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 with the flip opened and closed.

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 S.A.R. tests reported herein:

	Target	Measured
Ambient Temperature	20 - 25 ˚C	Range: 20.4-23.2˚C Avg. 21.90˚C
Relative Humidity	30 - 70 %	Range: 36.4-58.6% Avg. 48.10%
Tissue Temperature	NA	Range: 20.3-22.0˚C Avg. 21.14 ˚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 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 shortened S.A.R. 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 S.A.R. results presented herein are valid.

Table1

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)**	**Meas. 10g-S.A.R. (mW/g)**	**Max Calc. 1g-S.A.R. (mW/g)**	**Max Calc. 10g-S.A.R. (mW/g)**
Assessment at the left ear - antenna positions, offered batteries												
EC-Lear-R2-050306-16/364AFA021M	In	813.5125	SNN5705C	Cheek touch	None	None	0.665	0.1010	0.863	0.593	0.86	0.59
EC-Lear-R2-050306-18/364AFA021M	Out	813.5125	SNN5705C	Cheek touch	None	None	0.668	0.2280	0.606	0.418	0.61	0.42
EC-Lear-R2-050306-19/364AFA021M	In	813.5125	SNN5704C	Cheek touch	None	None	0.662	-0.0370	0.892	0.615	0.90	0.62
EC-Lear-R2-050306-20/364AFA021M	Out	813.5125	SNN5704C	Cheek touch	None	None	0.664	0.0769	0.612	0.423	0.61	0.42
EC-Lear-R2-050306-21/364AFA021M	In	813.5125	SNN5704C	15◦ Tilt	None	None	0.663	-0.0042	0.241	0.171	0.24	0.17
EC-Lear-R2-050306-22/364AFA021M	Out	813.5125	SNN5704C	15◦ Tilt	None	None	0.665	0.2600	0.168	0.121	0.17	0.12
Assessment at the right ear - antenna positions, worst case battery												
CM-Rear-R2-050307-06/364AFA021M	In	813.5125	SNN5704C	Cheek touch	None	None	0.655	-0.0171	0.915	0.622	0.92	0.62
CM-Rear-R2-050307-07/364AFA021M	Out	813.5125	SNN5704C	Cheek touch	None	None	0.654	-0.0166	0.823	0.564	0.83	0.57
CM-Rear-R2-050307-08/364AFA021M	In	813.5125	SNN5704C	15◦ Tilt	None	None	0.660	-0.5140	0.171	0.123	0.19	0.14
CM-Rear-R2-050307-09/364AFA021M	Out	813.5125	SNN5704C	15◦ Tilt	None	None	0.662	-0.2450	0.113	0.0817	0.12	0.09

Table1 (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)	Meas. 10g-S.A.R. (mW/g)	Max Calc. 1g-S.A.R. (mW/g)	Max Calc. 10g-S.A.R. (mW/g)
Assessments at the Head (Phone mode 1:3) 802-825MHz band												
Assessment at the right ear – band edges												
CM-Rear-R2-050307-10/364AFA021M	In	806.0125	SNN5704C	Cheek touch	None	None	0.666	-0.1110	0.854	0.589	0.88	0.60
CM-Rear-R2-050307-11/364AFA021M	Out	806.0125	SNN5704C	Cheek touch	None	None	0.669	0.0056	0.711	0.481	0.71	0.48
***AG-Rear-R2-050308-02/364AFA021M**	**In**	**824.9875**	**SNN5704C**	**Cheek touch**	**None**	**None**	**0.655**	**-0.3280**	**0.865**	**0.585**	**0.93**	**0.63**
AG-Rear-R2-050308-03/364AFA021M	Out	824.9875	SNN5704C	Cheek touch	None	None	0.641	0.0186	0.600	0.409	0.60	0.41
Assessments at the Head (Phone mode 1:3) 896-902MHz band												
Assessment at the left ear - antenna positions, offered batteries												
CM-Lear-R2-050307-02/364AFA021M	In	898.49375	SNN5704C	Cheek touch	None	None	0.666	-0.2280	0.514	0.341	0.54	0.36
CM-Lear-R2-050307-03/364AFA021M	Out	898.49375	SNN5704C	Cheek touch	None	None	0.676	0.1570	0.382	0.260	0.38	0.26
CM-Lear-R2-050307-04/364AFA021M	In	898.49375	SNN5704C	15◦ Tilt	None	None	0.663	0.0700	0.132	0.094	0.13	0.09
CM-Lear-R2-050307-05/364AFA021M	Out	898.49375	SNN5704C	15◦ Tilt	None	None	0.668	-0.3110	0.094	0.0671	0.10	0.07
Assessment at the right ear - antenna positions, worst case battery												
AG-Rear-R2-050308-04/364AFA021M	In	898.49375	SNN5704C	Cheek touch	None	None	0.644	-0.0641	0.562	0.376	0.57	0.38
AG-Rear-R2-050308-05/364AFA021M	Out	898.49375	SNN5704C	Cheek touch	None	None	0.646	-0.0980	0.387	0.262	0.40	0.27
CM-Rear-R2-050317-04/364AFA021M	In	898.49375	SNN5704C	15◦ Tilt	None	None	0.647	-0.487	0.0865	0.0614	0.10	0.07
CM-Rear-R2-050308-07/364AFA021M	Out	898.49375	SNN5704C	15◦ Tilt	None	None	0.639	-0.1890	0.105	0.074	0.11	0.08
Assessment at the right ear – band edges												
CM-Rear-R2-050308-08/364AFA021M	In	896.01875	SNN5704C	Cheek touch	None	None	0.640	-0.0262	0.61	0.406	0.61	0.41
CM-Rear-R2-050308-09/364AFA021M	Out	896.01875	SNN5704C	Cheek touch	None	None	0.639	0.0463	0.43	0.292	0.43	0.29
CM-Rear-R2-050308-10/364AFA021M	In	901.98125	SNN5704C	Cheek touch	None	None	0.640	-0.0563	0.508	0.342	0.51	0.35
CM-Rear-R2-050308-11/364AFA021M	Out	901.98125	SNN5704C	Cheek touch	None	None	0.639	-0.0964	0.405	0.276	0.41	0.28

***Assessment with the worst case test configuration above using the full DASY 4 coarse and 7x7x7 cube scan measurements.**												
CM-REAR-R2-050316-04 /364AFA021M	In	824.9875	SNN5704C	Cheek touch	None	None	0.659	-0.613	0.913	0.628	1.05	0.72

Table 2

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)	Meas. 10g-S.A.R. (mW/g)	Max Calc. 1g-S.A.R. (mW/g)	Max Calc. 10g-S.A.R. (mW/g)
DUT assessment at the Face; (iDEN 1:6 PTT mode) 802-825MHz and 896-902MHz bands												
Assessment at the face in the 802-825MHz band – antenna configurations and worst case battery – flip closed												
AG-Face-R2-050309-02/364AFA021M	In	813.5125	SNN5704C	Front 2.5cm flip closed	None	None	0.626	-0.0424	0.142	0.102	0.07	0.05
AG-Face-R2-050309-03/364AFA021M	Out	813.5125	SNN5704C	Front 2.5cm flip closed	None	None	0.637	0.0467	0.128	0.091	0.06	0.05
Assessment at the face in the 896-902MHz band - antenna configurations and worst case battery – flip closed												
AG-Face-R2-050309-04/364AFA021M	In	898.49375	SNN5704C	Front 2.5cm flip closed	None	None	0.640	0.0954	0.105	0.074	0.05	0.04
AG-Face-R2-050309-05/364AFA021M	Out	898.49375	SNN5704C	Front 2.5cm flip closed	None	None	0.641	0.0620	0.092	0.065	0.05	0.03
DUT assessment at the Face; (MOTOtalk 114:120 mode) 902-928MHz band												
Assessment at the face in the 902-928MHz band - antenna configurations, worst case battery, band edges – flip opened/closed												
CM-Face-R2-050308-12/364AFA021M	In	915.525	SNN5704C	Front 2.5cm flip open	None	None	0.849	0.0600	0.354	0.251	0.19	0.13
CM-Face-R2-050308-13/364AFA021M	In	915.525	SNN5704C	Front 2.5cm flip closed	None	None	0.850	0.3490	0.713	0.505	0.37	0.26
CM-Face-R2-050308-14/364AFA021M	Out	915.525	SNN5704C	Front 2.5cm flip closed	None	None	0.864	0.1820	0.698	0.496	0.36	0.26
***CM-Face-R2-050308-15/364AFA021M**	**In**	**902.525**	**SNN5704C**	**Front 2.5cm flip closed**	**None**	**None**	**0.837**	**0.1690**	**0.826**	**0.586**	**0.44**	**0.31**
CM-Face-R2-050308-16/364AFA021M	Out	902.525	SNN5704C	Front 2.5cm flip closed	None	None	0.842	0.2900	0.755	0.538	0.40	0.28
CM-Face-R2-050308-17/364AFA021M	In	927.475	SNN5704C	Front 2.5cm flip closed	None	None	0.867	-0.2180	0.592	0.419	0.32	0.23
CM-Face-R2-050308-18/364AFA021M	Out	927.475	SNN5704C	Front 2.5cm flip closed	None	None	0.865	0.5070	0.656	0.465	0.34	0.24

***Assessment with the worst case test configuration above using the full DASY 4 coarse and 7x7x7 cube scan measurements.**												
CM-Face-R2-050328-03/ 364AFA021M	In	902.525	SNN5704C	Front 2.5cm flip closed	None	None	0.860	0.467	0.831	0.591	0.43	0.31

Table 3

DUT assessment at the Body; (WiDEN 236:310-76% 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)**	**Meas. 10g-S.A.R. (mW/g)**	**Max Calc. 1g-S.A.R. (mW/g)**	**Max Calc. 10g-S.A.R. (mW/g)**
Assessment at the body – antenna configurations, offered body worn and battery accessories												
CM-Ab-R2-050309-07/364AFA021M	In	898.49375	SNN5705C	Against phantom	NNTN6026A	None	0.632	-0.0174	0.802	0.552	0.82	0.56
CM-Ab-R2-050309-08/364AFA021M	Out	898.49375	SNN5705C	Against phantom	NNTN6026A	None	0.620	-0.2830	0.645	0.449	0.71	0.49
CM-Ab-R2-050309-09/364AFA021M	In	898.49375	SNN5704C	Against phantom	NNTN6026A	None	0.631	-0.1420	0.811	0.562	0.85	0.59
CM-Ab-R2-050309-10/364AFA021M	Out	898.49375	SNN5704C	Against phantom	NNTN6026A	None	0.623	-0.8490	0.624	0.434	0.78	0.54
***CM-Ab-R2-050309-11/364AFA021M**	**In**	**813.5125**	**SNN5704C**	**Against phantom**	**NNTN6026A**	**None**	**0.617**	**-0.4670**	**0.830**	**0.586**	**0.96**	**0.68**
CM-Ab-R2-050309-12/364AFA021M	Out	813.5125	SNN5704C	Against phantom	NNTN6026A	None	0.621	-0.3460	0.823	0.584	0.92	0.65
CM-Ab-R2-050309-13/364AFA021M	In	813.5125	SNN5704C	Against phantom	NNTN4747A	None	0.622	-0.4620	0.775	0.549	0.89	0.63
CM-Ab-R2-050309-14/364AFA021M	Out	813.5125	SNN5704C	Against phantom	NNTN4747A	None	0.620	-0.5220	0.797	0.561	0.93	0.65
Assessment at the body – antenna configurations, offered data cables												
CM-Ab-R2-050310-02/364AFA021M	In	813.5125	SNN5704C	Against phantom	NNTN6026A	NKN6559A	0.615	-0.5250	0.622	0.434	0.73	0.51
CM-Ab-R2-050310-03/364AFA021M	Out	813.5125	SNN5704C	Against phantom	NNTN6026A	NKN6559A	0.621	-0.4870	0.681	0.481	0.79	0.55
CM-Ab-R2-050310-04/364AFA021M	In	813.5125	SNN5704C	Against phantom	NNTN6026A	NKN6560A	0.620	-0.3690	0.634	0.449	0.71	0.50
CM-Ab-R2-050310-05/364AFA021M	Out	813.5125	SNN5704C	Against phantom	NNTN6026A	NKN6560A	0.618	-0.8200	0.645	0.453	0.81	0.57
CM-Ab-R2-050310-06/364AFA021M	In	813.5125	SNN5704C	Against phantom	NNTN6026A	NNTN5405A	0.625	-0.3640	0.787	0.553	0.88	0.62
CM-Ab-R2-050310-07/364AFA021M	Out	813.5125	SNN5704C	Against phantom	NNTN6026A	NNTN5405A	0.622	-0.8090	0.721	0.496	0.89	0.61
CM-Ab-R2-050310-08/364AFA021M	In	813.5125	SNN5704C	Against phantom	NNTN6026A	NNTN5406A	0.621	-0.7400	0.669	0.470	0.82	0.57
CM-Ab-R2-050310-09/364AFA021M	Out	813.5125	SNN5704C	Against phantom	NNTN6026A	NNTN5406A	0.619	-0.3850	0.729	0.516	0.82	0.58
Assessment at the body – band edges												
***CM-Ab-R2-050310-10/364AFA021M**	**In**	**806.0125**	**SNN5704C**	**Against phantom**	**NNTN6026A**	**None**	**0.612**	**-0.4960**	**0.901**	**0.64**	**1.06**	**0.75**
CM-Ab-R2-050310-11/364AFA021M	Out	806.0125	SNN5704C	Against phantom	NNTN6026A	None	0.613	-0.7580	0.835	0.591	1.04	0.73
***CM-Ab-R2-050311-02/364AFA021M**	**In**	**824.9875**	**SNN5704C**	**Against phantom**	**NNTN6026A**	**None**	**0.623**	**-0.5000**	**0.881**	**0.622**	**1.02**	**0.72**
CM-Ab-R2-050314-02/364AFA021M	Out	824.9875	SNN5704C	Against phantom	NNTN6026A	None	0.629	-1.16	0.659	0.487	0.88	0.65
CM-Ab-R2-050311-04/364AFA021M	In	896.01875	SNN5704C	Against phantom	NNTN6026A	None	0.625	-0.3680	0.814	0.569	0.91	0.63
CM-Ab-R2-050311-05/364AFA021M	Out	896.01875	SNN5704C	Against phantom	NNTN6026A	None	0.627	-0.6010	0.620	0.427	0.73	0.50
CM-Ab-R2-050311-06/364AFA021M	In	901.98125	SNN5704C	Against phantom	NNTN6026A	None	0.624	-0.4000	0.664	0.462	0.75	0.52
CM-Ab-R2-050311-07/364AFA021M	Out	901.98125	SNN5704C	Against phantom	NNTN6026A	None	0.622	-0.7270	0.648	0.453	0.79	0.55

DUT assessment at the Body; (iDEN 81:120 mode) 802-825MHz 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)**	**Meas. 10g-S.A.R. (mW/g)**	**Max Calc. 1g-S.A.R. (mW/g)**	**Max Calc. 10g-S.A.R. (mW/g)**
Assessment at the body – low, mid, and high frequencies with worst case test configuration												
CM-Ab-R2-050321-03/364AFA021M	In	806.0125	SNN5704C	Against phantom	NNTN6026A	None	0.651	-0.4340	0.754	0.530	0.83	0.59
CM-Ab-R2-050321-04/364AFA021M	Out	806.0125	SNN5704C	Against phantom	NNTN6026A	None	0.647	-0.7540	0.622	0.441	0.74	0.52
CM-Ab-R2-050311-10/364AFA021M	In	813.5125	SNN5704C	Against phantom	NNTN6026A	None	0.637	-0.3630	0.607	0.425	0.66	0.46
CM-Ab-R2-050311-11/364AFA021M	Out	813.5125	SNN5704C	Against phantom	NNTN6026A	None	0.632	-0.6960	0.604	0.421	0.72	0.50
CM-Ab-R2-050311-12/364AFA021M	In	824.9875	SNN5704C	Against phantom	NNTN6026A	None	0.638	-0.4370	0.619	0.435	0.69	0.48
CM-Ab-R2-050311-13/364AFA021M	Out	824.9875	SNN5704C	Against phantom	NNTN6026A	None	0.634	-0.6950	0.575	0.393	0.68	0.47

*Assessment with the worst case test configuration above using the full DASY 4 coarse and 7x7x7 cube scan measurements.												
CM-Ab-R2-050318-06/364AFA021M	In	813.5125	SNN5704C	Against phantom	NNTN6026A	None	0.645	-1.25	0.842	0.614	1.12	0.82
CM-Ab-R2-050318-09/364AFA021M	In	806.0125	SNN5704C	Against phantom	NNTN6026A	None	0.641	-0.998	0.788	0.581	0.99	0.73
CM-Ab-R2-050318-04/364AFA021M	In	824.9875	SNN5704C	Against phantom	NNTN6026A	None	0.640	-1.31	0.850	0.621	1.15	0.84

Table 4

DUT assessment at the Body; (iDEN MOTOtalk mode) 902-928MHz band												
Assessment at the body – audio accessories												
CM-Ab-R2-050311-14/364AFA021M	In	915.525	SNN5704C	Against phantom	NNTN6026A	NNTN5211A	0.843	0.2200	1.160	0.801	0.61	0.42
CM-Ab-R2-050311-15/364AFA021M	Out	915.525	SNN5704C	Against phantom	NNTN6026A	NNTN5211A	0.842	0.2170	1.05	0.735	0.56	0.39
EC-Ab-R2-050312-02/364AFA021M	In	915.525	SNN5704C	Against phantom	NNTN6026A	NNTN5004A	0.845	-0.2490	0.837	0.580	0.47	0.32
EC-Ab-R2-050312-03/364AFA021M	Out	915.525	SNN5704C	Against phantom	NNTN6026A	NNTN5004A	0.846	0.3300	0.979	0.681	0.52	0.36
EC-Ab-R2-050312-04/364AFA021M	In	915.525	SNN5704C	Against phantom	NNTN6026A	NNTN5005A	0.844	0.1970	1.070	0.740	0.56	0.39
EC-Ab-R2-050312-05/364AFA021M	Out	915.525	SNN5704C	Against phantom	NNTN6026A	NNTN5005A	0.844	0.3280	1.150	0.795	0.61	0.42
EC-Ab-R2-050312-06/364AFA021M	In	915.525	SNN5704C	Against phantom	NNTN6026A	NNTN5006A	0.847	0.3140	1.110	0.768	0.58	0.40
EC-Ab-R2-050312-07/364AFA021M	Out	915.525	SNN5704C	Against phantom	NNTN6026A	NNTN5006A	0.873	0.2850	1.190	0.828	0.61	0.42
EC-Ab-R2-050312-08/364AFA021M	In	915.525	SNN5704C	Against phantom	NNTN6026A	NNTN5330A	0.875	0.2960	1.080	0.741	0.55	0.38
EC-Ab-R2-050312-09/364AFA021M	Out	915.525	SNN5704C	Against phantom	NNTN6026A	NNTN5330A	0.872	0.2020	1.230	0.855	0.63	0.44
EC-Ab-R2-050312-10/364AFA021M	In	915.525	SNN5704C	Against phantom	NNTN6026A	NSN6066A	0.876	0.0985	0.939	0.651	0.48	0.33
EC-Ab-R2-050312-11/364AFA021M	Out	915.525	SNN5704C	Against phantom	NNTN6026A	NSN6066A	0.874	0.1000	0.890	0.609	0.45	0.31
EC-Ab-R2-050312-12/364AFA021M	In	915.525	SNN5704C	Against phantom	NNTN6026A	NNTN4620A	0.875	0.2990	1.200	0.828	0.61	0.42

EC-Ab-R2-050312-13/364AFA021M	Out	915.525	SNN5704C	Against phantom	NNTN6026A	NNTN4620A	0.873	0.2420	1.180	0.818	0.60	0.42
EC-Ab-R2-050312-14/364AFA021M	In	915.525	SNN5704C	Against phantom	NNTN6026A	SYN8390B	0.874	0.3980	1.230	0.849	0.63	0.43
EC-Ab-R2-050312-15/364AFA021M	Out	915.525	SNN5704C	Against phantom	NNTN6026A	SYN8390B	0.873	0.3040	1.190	0.825	0.61	0.42

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)	Meas. 10g-S.A.R. (mW/g)	Max Calc. 1g-S.A.R. (mW/g)	Max Calc. 10g-S.A.R. (mW/g)
DUT assessment at the Body; (iDEN MOTOtalk mode) 902-928MHz band (audio acc. continued)												
EC-Ab-R2-050312-16/364AFA021M	In	915.525	SNN5704C	Against phantom	NNTN6026A	SYN7875C	0.873	0.2730	1.080	0.744	0.55	0.38
EC-Ab-R2-050312-17/364AFA021M	Out	915.525	SNN5704C	Against phantom	NNTN6026A	SYN7875C	0.875	0.3210	1.120	0.780	0.57	0.40
EC-Ab-R2-050312-18/364AFA021M	In	915.525	SNN5704C	Against phantom	NNTN6026A	SYN8146C	0.874	0.2690	1.180	0.816	0.60	0.42
***EC-Ab-R2-050312-19/364AFA021M**	**Out**	**915.525**	**SNN5704C**	**Against phantom**	**NNTN6026A**	**SYN8146C**	**0.876**	**-0.1040**	**1.210**	**0.840**	**0.63**	**0.44**
EC-Ab-R2-050312-20/364AFA021M	In	915.525	SNN5704C	Against phantom	NNTN6026A	NNTN4033A	0.869	-0.1810	1.160	0.785	0.62	0.42
EC-Ab-R2-050312-21/364AFA021M	Out	915.525	SNN5704C	Against phantom	NNTN6026A	NNTN4033A	0.872	0.2810	1.200	0.833	0.61	0.43
EC-Ab-R2-050312-22/364AFA021M	In	915.525	SNN5704C	Against phantom	NNTN6026A	NTN8496A	0.873	0.1940	1.130	0.782	0.58	0.40
EC-Ab-R2-050312-23/364AFA021M	Out	915.525	SNN5704C	Against phantom	NNTN6026A	NTN8496A	0.870	0.2540	1.220	0.854	0.62	0.44
EC-Ab-R2-050312-24/364AFA021M	In	915.525	SNN5704C	Against phantom	NNTN6026A	NTN8513B	0.874	0.2180	1.050	0.730	0.54	0.37
EC-Ab-R2-050312-25/364AFA021M	Out	915.525	SNN5704C	Against phantom	NNTN6026A	NTN8513B	0.874	-0.1020	1.140	0.789	0.59	0.41
Assessment at the body – band edges												
CM-Ab-R2-050313-02/364AFA021M	In	902.525	SNN5704C	Against phantom	NNTN6026A	SYN8146C	0.847	0.1070	1.09	0.759	0.57	0.40
CM-Ab-R2-050313-03/364AFA021M	Out	902.525	SNN5704C	Against phantom	NNTN6026A	SYN8146C	0.861	0.2680	1.09	0.761	0.56	0.39
CM-Ab-R2-050313-04/364AFA021M	In	927.475	SNN5704C	Against phantom	NNTN6026A	SYN8146C	0.846	0.3010	0.962	0.667	0.51	0.35
CM-Ab-R2-050313-05/364AFA021M	Out	927.475	SNN5704C	Against phantom	NNTN6026A	SYN8146C	0.871	-0.2350	1.16	0.806	0.63	0.44
DUT assessment at the Body; (iDEN phone mode 1:3) 802-825MHz and 896-902MHz bands												
Assessment at the body – worst case test configuration												
CM-Ab-R2-050313-06/364AFA021M	In	813.5125	SNN5704C	Against phantom	NNTN6026A	SYN8146C	0.641	-0.0514	0.349	0.244	0.35	0.25
CM-Ab-R2-050313-07/364AFA021M	Out	813.5125	SNN5704C	Against phantom	NNTN6026A	SYN8146C	0.639	-0.0277	0.347	0.244	0.35	0.25
CM-Ab-R2-050313-08/364AFA021M	In	898.49375	SNN5704C	Against phantom	NNTN6026A	SYN8146C	0.655	-0.0288	0.267	0.188	0.27	0.19
CM-Ab-R2-050313-09/364AFA021M	Out	898.49375	SNN5704C	Against phantom	NNTN6026A	SYN8146C	0.649	0.0176	0.285	0.200	0.29	0.20
DUT assessment at the Body; 2.5cm (WiDEN 236:310-76% mode) 802-825MHz band												
Assessment at the body – front and back housing separated 2.5cm												
CM-Ab-R2-050322-06/364AFA021M	In	824.9875	SNN5704C	Back 2.5 cm	None	None	0.641	-0.3530	0.627	0.442	0.68	0.48
CM-Ab-R2-050322-05/364AFA021M	In	824.9875	SNN5704C	Front 2.5cm	None	None	0.641	-0.4550	0.487	0.346	0.54	0.38

*Assessment with the worst case test configuration above using the full DASY 4 coarse and 7x7x7 cube scan measurements.												
CM-Ab-R2-050321-12/364AFA021M	Out	915.525	SNN5704C	Against phantom	NNTN6026A	SYN8146C	0.868	-0.2530	1.180	0.833	0.64	0.45

9.1 Highest S.A.R. results calculation methodology

The calculated maximum 1-gram and 10-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 and 10-gram averaged peak S.A.R. is calculated using the following formula:

Max. Calc. 1-g/10-g Avg. SAR = ((S.A.R. 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 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 and 10-gram average S.A.R. values found for FCC ID: AZ489FT5844 models H65XAN6RR4AN/NWF1000A.

At the Body: **1-g Avg. = 1.15mW/g; 10-g Avg. = 0.84mW/g**
At the Face: **1-g Avg. = 0.43mW/g; 10-g Avg. = 0.31mW/g**
At the Head: **1-g Avg. = 1.05mW/g; 10-g Avg. = 0.72mW/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

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	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)			*k*=2				23	22	

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

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	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) *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 Certification

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

Client **Motorola CGISS**

CALIBRATION CERTIFICATE

Object(s)	ET3DV6 - SN:1393
Calibration procedure(s)	QA CAL-01.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	April 28, 2004
Condition of the calibrated item	In Tolerance (according to the specific calibration document)

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 +/- 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 E442	GB37480704	6-Nov-03 (METAS, No. 252-0254)	Nov-04
Power sensor HP 8481A	US37292783	6-Nov-03 (METAS, No. 252-0254)	Nov-04
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:	Nico Vetterli	Technician	F. Bomholt
Approved by:	Katja Pokovic	Laboratory Director	

Date issued: April 28, 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.

ET3DV6 SN:1393 April 28, 2004

DASY - Parameters of Probe: ET3DV6 SN:1393

Sensitivity in Free Space

NormX	**1.87** $\mu V/(V/m)^2$
NormY	**1.55** $\mu V/(V/m)^2$
NormZ	**1.86** $\mu V/(V/m)^2$

Diode Compression[A]

DCP X	**94**	mV
DCP Y	**94**	mV
DCP Z	**94**	mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Plese see Page 7.

Boundary Effect

Head **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	8.8	4.8
SAR_{be} [%]	With Correction Algorithm	0.1	0.2

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

Sensor Center to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	12.5	8.6
SAR_{be} [%]	With Correction Algorithm	0.2	0.1

Sensor Offset

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

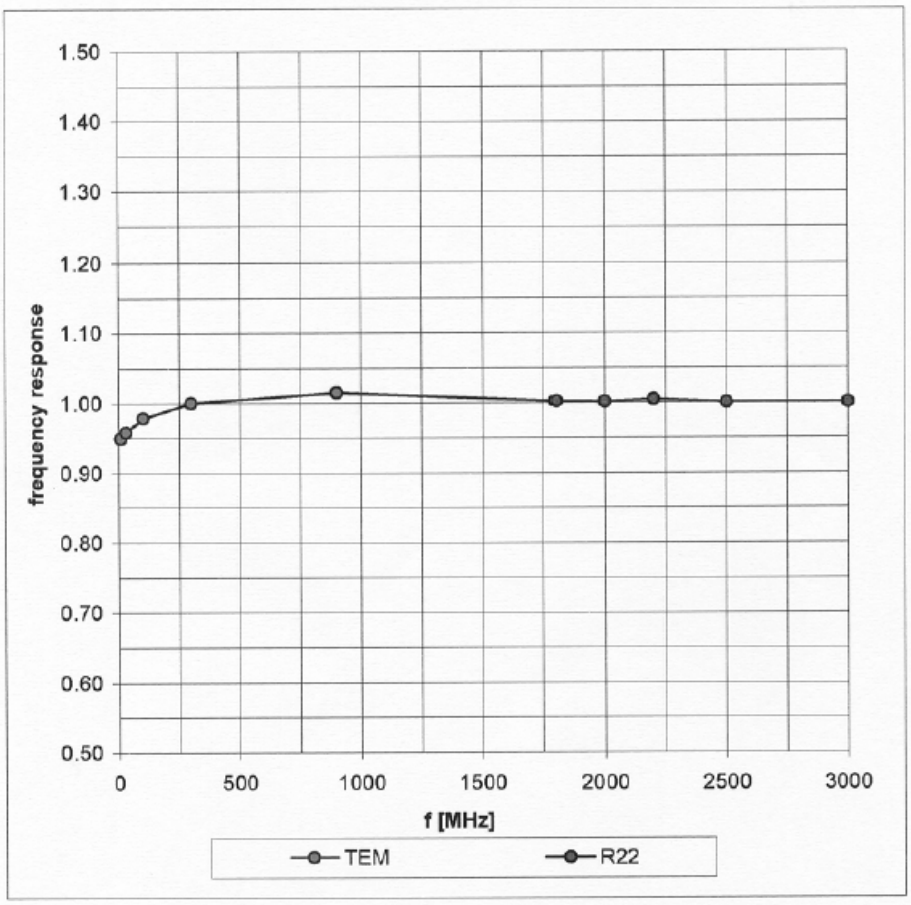
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] numerical linearization parameter: uncertainty not required

ET3DV6 SN:1393 **April 28, 2004**

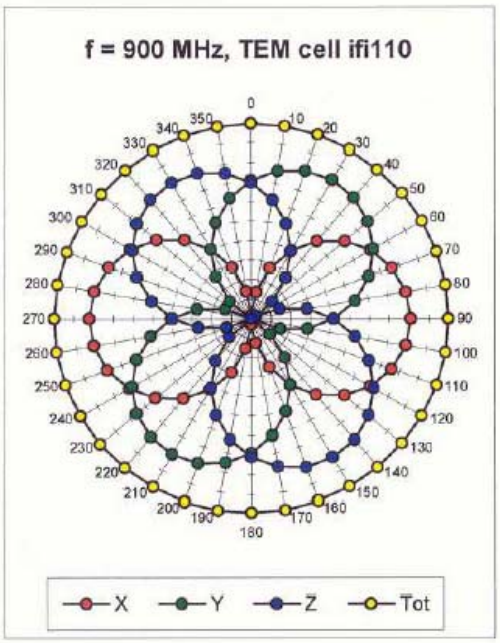
Frequency Response of E-Field

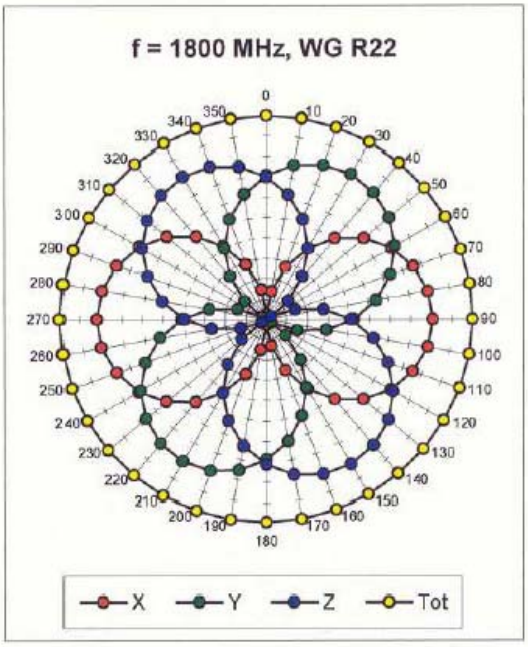
(TEM-Cell:ifi110, Waveguide R22)

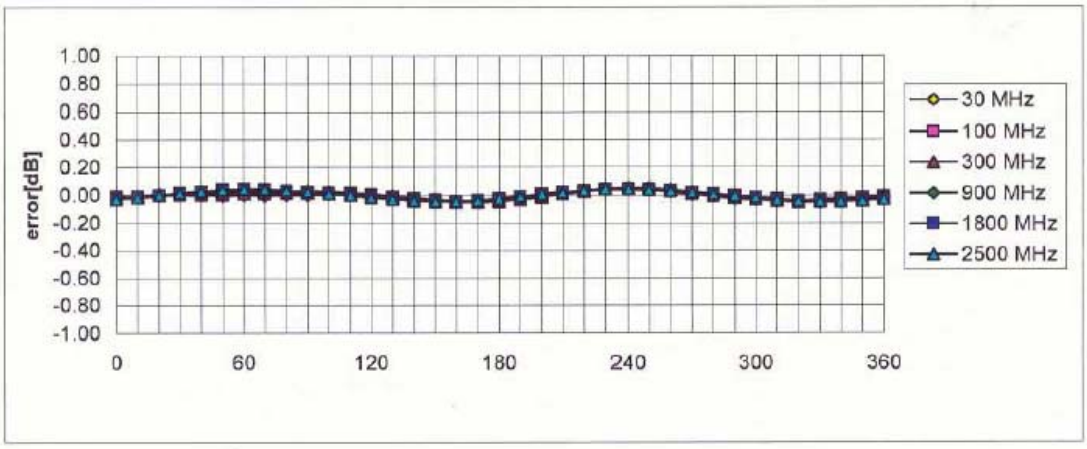


ET3DV6 SN:1393 **April 28, 2004**

Receiving Pattern (ϕ) , θ = 0°





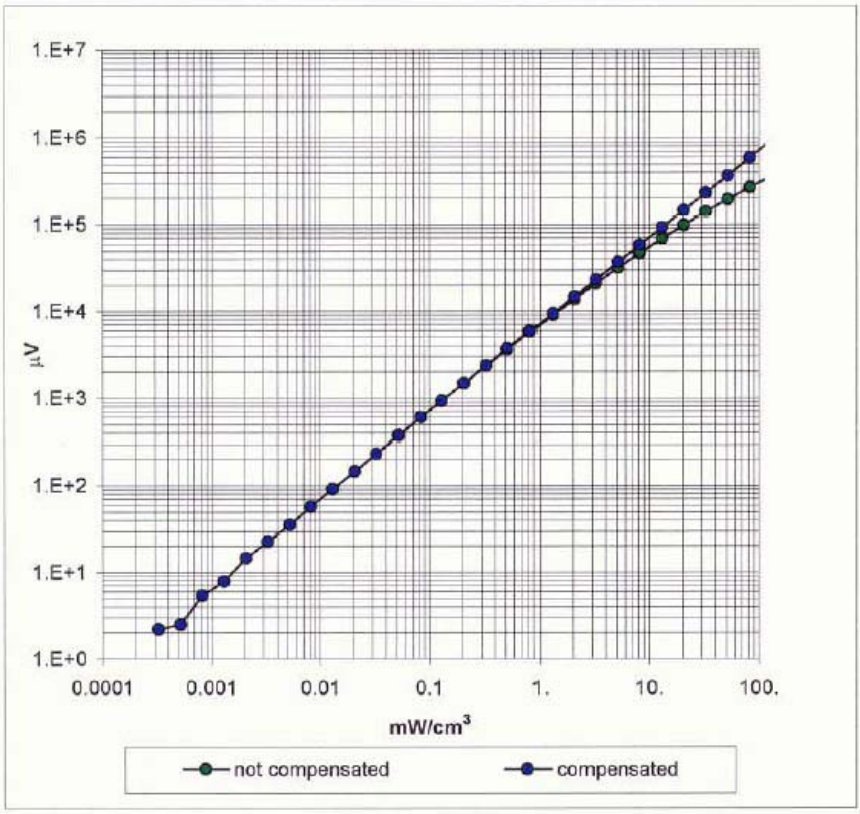


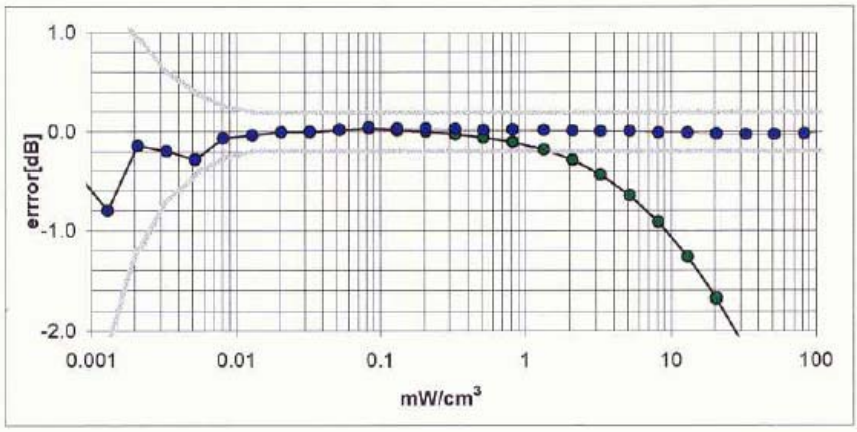
Axial Isotropy Error < ± 0.2 dB

ET3DV6 SN:1393 **April 28, 2004**

Dynamic Range f(SAR_{head})

(Waveguide R22)

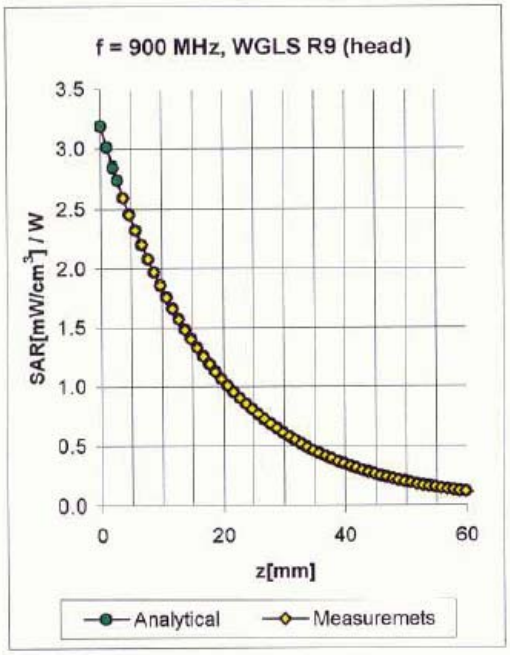


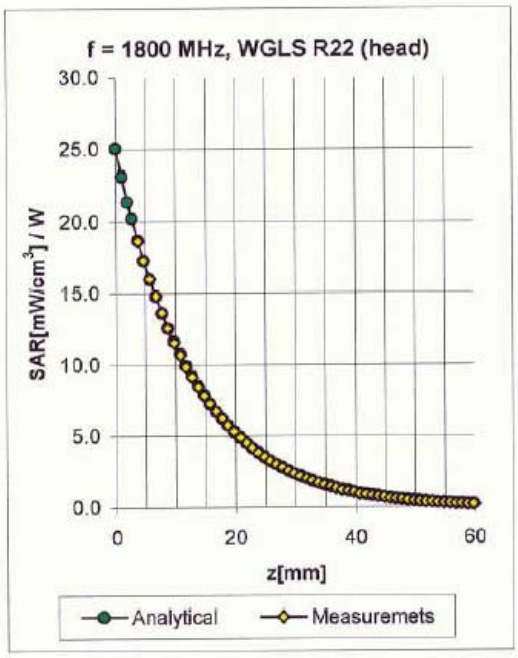


Probe Linearity < ± 0.2 dB

ET3DV6 SN:1393 **April 28, 2004**

Conversion Factor Assessment





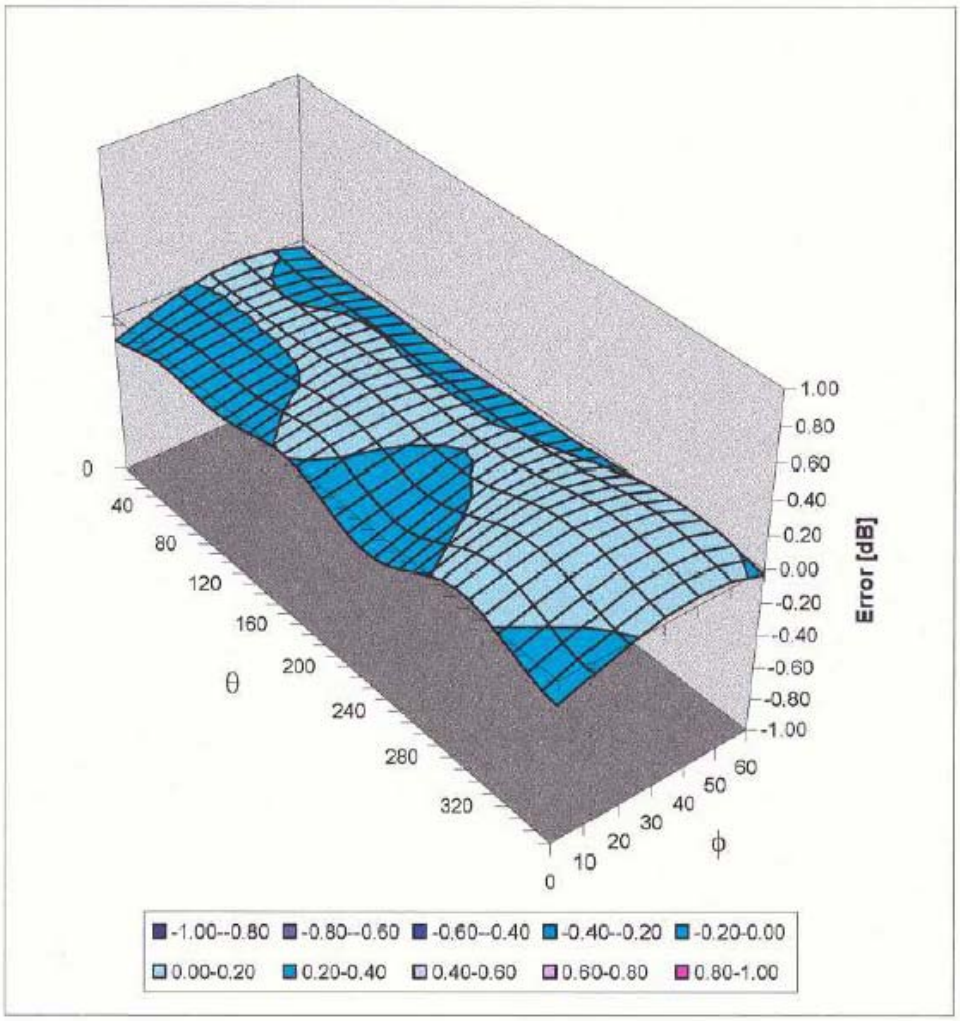
f [MHz]	Validity [MHz][B]	Tissue	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	800-1000	Head	41.5 ± 5%	0.97 ± 5%	0.54	1.95	6.73 ± 9.5% (k=2)
1450	1400-1500	Head	40.5 ± 5%	1.20 ± 5%	0.41	2.78	5.85 ± 9.5% (k=2)
1800	1710-1910	Head	40.0 ± 5%	1.40 ± 5%	0.42	2.79	5.29 ± 9.5% (k=2)
2450	2400-2500	Head	39.2 ± 5%	1.80 ± 5%	0.88	1.95	4.51 ± 9.5% (k=2)
900	800-1000	Body	55.0 ± 5%	1.05 ± 5%	0.45	2.27	6.35 ± 9.5% (k=2)
1450	1400-1500	Body	54.0 ± 5%	1.30 ± 5%	0.43	2.79	5.56 ± 9.5% (k=2)
1800	1710-1910	Body	53.3 ± 5%	1.52 ± 5%	0.51	2.82	4.83 ± 9.5% (k=2)
2450	2400-2500	Body	52.7 ± 5%	1.95 ± 5%	1.01	1.61	4.41 ± 9.5% (k=2)

[B] The stated uncertainty of calibration in according to P1528.

ET3DV6 SN:1393 **April 28, 2004**

Deviation from Isotropy in HSL

Error (θ,ϕ), f = 900 MHz



Spherical Isotropy Error < ± 0.4 dB

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Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ET3DV6**
Serial Number:	**1393**
Place of Assessment:	**Zurich**
Date of Assessment:	**May 3, 2004**
Probe Calibration Date:	**April 28, 2004**

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:

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Dosimetric E-Field Probe ET3DV6 SN:1393

Conversion factor (± standard deviation)

150 MHz	ConvF	**8.4 ± 8%**	ε_r = 61.9 σ = 0.80 mho/m (body tissue)
236 MHz	ConvF	**8.2 ± 8%**	ε_r = 59.8 σ = 0.87 mho/m (body tissue)
300 MHz	ConvF	**8.1 ± 8%**	ε_r = 58.2 σ = 0.92 mho/m (body tissue)
350 MHz	ConvF	**8.0 ± 8%**	ε_r = 57.7 σ = 0.93 mho/m (body tissue)
450 MHz	ConvF	**7.7 ± 8%**	ε_r = 56.7 σ = 0.94 mho/m (body tissue)
784 MHz	ConvF	**6.7 ± 8%**	ε_r = 55.4 σ = 0.97 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

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Dosimetric E-Field Probe ET3DV6 SN:1393

Conversion factor (± standard deviation)

150 MHz	ConvF	**9.3 ± 8%**	ε_r = **52.3** σ = **0.76 mho/m** (head tissue)
236 MHz	ConvF	**8.5 ± 8%**	ε_r = **48.3** σ = **0.82 mho/m** (head tissue)
300 MHz	ConvF	**8.1 ± 8%**	ε_r = **45.3** σ = **0.87 mho/m** (head tissue)
350 MHz	ConvF	**8.0 ± 8%**	ε_r = **44.7** σ = **0.87 mho/m** (head tissue)
400 MHz	ConvF	**7.8 ± 8%**	ε_r = **44.4** σ = **0.87 mho/m** (head tissue - CENELEC)
450 MHz	ConvF	**7.7 ± 8%**	ε_r = **43.5** σ = **0.87 mho/m** (head tissue)
784 MHz	ConvF	**7.0 ± 8%**	ε_r = **41.8** σ = **0.90 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.