Certificate Number: 1449-02

MOTOROLA

ACCREDITED

CGISS EME Test Laboratory
8000 West Sunrise Blvd
Fort Lauderdale, FL. 33322

S.A.R. EME Compliance Test Report

Attention:	FCC
Date of Report:	August 27, 2002
Report Revision:	Rev. O
Manufacturer:	Motorola
Product Description:	iDEN Portable; Voice and Data
FCC ID:	**AZ489FT5820**
Device Model:	H44WCH6RJ6AN

Test Period:	7/30/02 – 8/14/02
Test Engineer:	Stephen Whalen Sr. Test Engineer
Author:	Michael Sailsman EME Regulatory Affairs Liaison

Note: 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.

Ken Enger
Senior Resource Manager, Laboratory Director, CGISS EME Lab

Date Approved

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REVISION HISTORY

Date	Revision	Comments
8/27/02	O	Initial release Prototype results

1.0 Introduction

This report details the utilization, test setup, test equipment, and test results of the Specific Absorption Rate (S.A.R.) measurements performed at the CGISS EME Test Lab for model number H44WCH6RJ6AN, FCC ID: AZ489FT5820.

The applicable exposure environment is General Population/Uncontrolled.

The test results included herein represent the highest S.A.R. levels applicable to this product and 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; 47CFR part 2 sub-part J
- 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 Terminal frequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz, 1999
- Australian Communications Authority Terminal communications (Electromagnetic Radiation - Human Exposure) Standard 2001
- ANATEL, Brazil Regulatory Authority, Resolution 256 (April 11, 2001) "additional requirements for SMR, cellular and PCS product certification."

3.0 Description of Test Sample

The portable handheld transceiver, FCC ID: AZ489FT5820, is a trunked radio transceiver that operates on a “receive first” basis. “Receive first” means that the radio transmits only after it has acquired and locked onto a control channel from a predefined set of channels assigned by the system’s base station. This product uses the following three digital modulation techniques: Quad-16QAM, Quad-64QAM, and Quad-QPSK. Voice mode uses Quad-16QAM only. Data mode uses any one of the three modulation techniques in any given TDM slot. The system limits transmission of the service request bursts to the digitally modulated reverse control channel. The system protocol uses a 90ms frame divided into six 15ms TDM slots which are allocated depending on the user requested transmission mode. PTT mode is allocated 1 time slot at 16.67% duty cycle. Phone mode is allocated 2 time slots at 33.33% duty cycle. Packet-Switched Data mode is allocated up to 81 out of 120 contiguous slots with a maximum duty cycle of 67.5%. The intended use is by the general public in uncontrolled environments. The intended operating positions are “at the face” with the microphone 1 to 2 inches from the mouth, “at the head” in touch or tilted positions, “at the abdomen” by means of the offered body-worn accessories, or in mobile operation with the device directly connected (no additional amplification) to the offered vehicle mounted antennas. Audio and PTT operation while the radio is at the abdomen is accomplished by means of optional remote accessories that connect to the radio.

FCC ID: ABZ99FT5820 is capable of operating in the 896-901MHz band. The rated power is 1.0 watts with a maximum output capability of 1.2 watts as defined by the upper limit of the production line final test station.

FCC ID: AZ489FT5820 is offered with the following options and accessories:

Antenna

NAF5038A	896-941 MHz ½ wave Monopole; -3dBd
RAF4003ARM	890-960 MHz ½ wave Mobile gain antenna; -1dBd
RRA 4935A	890-960 MHz ½ wave Mobile antenna; -1dBd

Batteries

NTN9037A	4.8V Nickel Metal Hybrid Battery 1450mAH
NTN9038A	4.8V FM Nickel Metal Hybrid battery 1350mAH

Body-worn Accessories

HLN9714A	Large Belt Clip
HLN9844A	Belt Clip
FLN9580A	Carry case
FLN5372A	Leather Carry Case

Other attachments

FLN2800A	Remote Speaker Microphone (RSM)
NTN8496A	Lightweight Headset
NTN8497A	Over-the-head Headset
NTN8513A	Heavy Duty Headset
NTN8367A	Earpiece with Microphone
FLN2854A	Audio Adapter
NKN6503A	Y Data Cable

3.1 Test Signal

Test Signal mode:

Test Mode	X	Base Station		Simulator	

Transmission Mode:

CW	
Native Transmission	**X**
TDM: 81:120, 2:6, 1:6	**X**
Other	

3.2 Test Output Power

Output power was measured before and after each test. A characteristic power slump table is provided in Appendix A for the battery producing the highest S.A.R. results. Appendix A also presents a shortened S.A.R. cube scan performed with the highest S.A.R. producing configuration to assess the validity of the calculated results presented herein.
Note that the results of the shortened cube scans presented in Appendix A demonstrate that the scaling methodology used to determine the calculated S.A.R. results presented herein are valid.

4.0 Description of Test Equipment

4.1 Descriptions of S.A.R. Measurement System

The laboratory utilizes a Dosimetric Assessment System (DASY3™) S.A.R. measurement system manufactured by Schmid & Partner Engineering AG (SPEAG™), of Zurich Switzerland. The test system consists of a Stäubli RX90L robot with an ET3DV6 E-Field probe. Please reference the following websites for detailed specifications of the robot and E-Field probe: http://www.speag.com/robot_acc.html, http://www.speag.com/probes.html.
The S.A.R. measurements were conducted with probe model/serial number ET3DV6/SN1547. 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 C and D respectively. The table below summarizes the system performance check results normalized to 1W.

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
1547	FCC Body	11/16/01	D900V2 SN - 084	12.545 +/- 0.105	11.63 +/-10%	7/31/02 – 8/05/02 4 test days
1547	IEEE Head	11/16/01	D900V2 SN - 084	12.085 +/- 0.095	11.96 +/-10%	8/6/02 – 8/14/02

The DASY3™ system is operated per the instructions in the DASY3™ 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.

4.2 Description of Phantom

4.2.1 Flat Phantom

A rectangular shaped box made of high-density polyethylene (HDPE) with a dielectric constant of 2.26 and a loss tangent of less than 0.00031. The phantom is mounted on a wooden supporting structure that has a loss tangent of < 0.05. The structure has a 68.58 cm x 25.4 cm opening at its center to allow positioning the DUT to the phantom’s surface. The supporting structure is assembled with wooden pegs and glue. The table below shows the flat phantom dimensions used for S.A.R. performance assessment.

Length	80cm
Width	30cm
Height	20cm
Surface Thickness	0.2cm

4.2.2 SAM Phantom

A SAM TP1021 phantom supplied by SPEAG was used to assess S.A.R. performance at the head

4.3 Simulated Tissue Properties

4.3.1 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).

Simulated Tissue	Body Position
FCC Body	Abdomen
IEEE Head	Head (Left & Right Ear)
IEEE Head	Face

4.3.2 Simulated Tissue Composition

Tissue Ingredient % @ 900MHz		
	Head	**Body**
Sugar	57.00	44.90
DGBE (Glycol)	-	-
De ionized -Water	40.45	53.06
Salt	1.45	0.94
HEC	1	1
Bact.	0.1	0.1

Characterization of Simulated tissue materials and ambient conditions:

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.

Target tissue parameters

FCC Body				
Frequency (MHz)	Di-electric Constant Target	Di-electric Constant Meas. (Range)	Conductivity Target S/m	Conductivity Meas. S/m
899	55.0	52.5 – 52.8	1.05	1.06 - 1.06
900	55.0	52.5 – 52.8	1.05	1.06 - 1.07

IEEE Head				
Frequency (MHz)	Di-electric Constant Target	Di-electric Constant Meas. (Range)	Conductivity Target S/m	Conductivity Meas. (Range) S/m
899	41.5	40.6 – 41.8	0.97	0.94 - 0.98
900	41.5	40.6 – 41.8	0.97	0.95 - 0.98

4.4 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^{o}C of the temperature at which the dielectric properties were determined. 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 21.9 - 23.3 ˚C Avg. 22.8˚C
Relative Humidity	30 - 70 %	Range 44.7 - 53.7 % Avg. 48.4%
Tissue Temperature	NA	Range 21.4 - 22.3 ˚C Avg. 21.85 ˚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. However, the lab environment is sufficiently protected such that no S.A.R. impacting interference has been experienced to date.

5.0 Description of Test Procedure

All options and accessories listed in section 3.0 were considered in order to develop the S.A.R. test plan determine for this product. S.A.R. measurements were performed using a flat phantom to assess performance at the abdomen and face. S.A.R. measurements were performed using a SAM phantom to assess performance at the head. Each S.A.R. scan was commenced with a fully charged battery. Using the flat phantom the DUT was tested with all applicable body-worn accessories, cable attachments, batteries, and antennas at the center of the transmit band in data and phone mode. The configuration producing the highest S.A.R. results above was used to assess performance at the band edges. The flat phantom was used to assess center frequency performance at the face with the offered batteries, applicable antenna and 2.5cm separation distance from the flat portion of the phantom in PTT mode. Using a SAM phantom the DUT was tested at the center of the transmit band at the left and right ear in both touch and tilted positions using the standard antenna and offered batteries in phone mode. Band edge assessment was necessary only at the left ear because the center band results were within 3dB of the specification limit.

5.1 Device Test Positions

Reference figure 1 for the device orientation and position which exhibited the highest S.A.R. performance.

5.1.1 Abdomen

The DUT was positioned such that it was centered against the flat phantom with the applicable body-worn accessories or with 5cm separation distance from the phantom.

5.1.2 Head

The DUT was placed in the touch and tilt positions against the left and right ear of the SAM phantom in accordance with the guidelines in section 6.4.2 d of IEEE Std. 1528-200X.

5.1.3 Face

The DUT was positioned with 2.5cm separation distance from the center of the flat phantom.

5.2 Test Position Photographs

Figure 1: Highest S.A.R. Test Position
(Left ear Tilt)

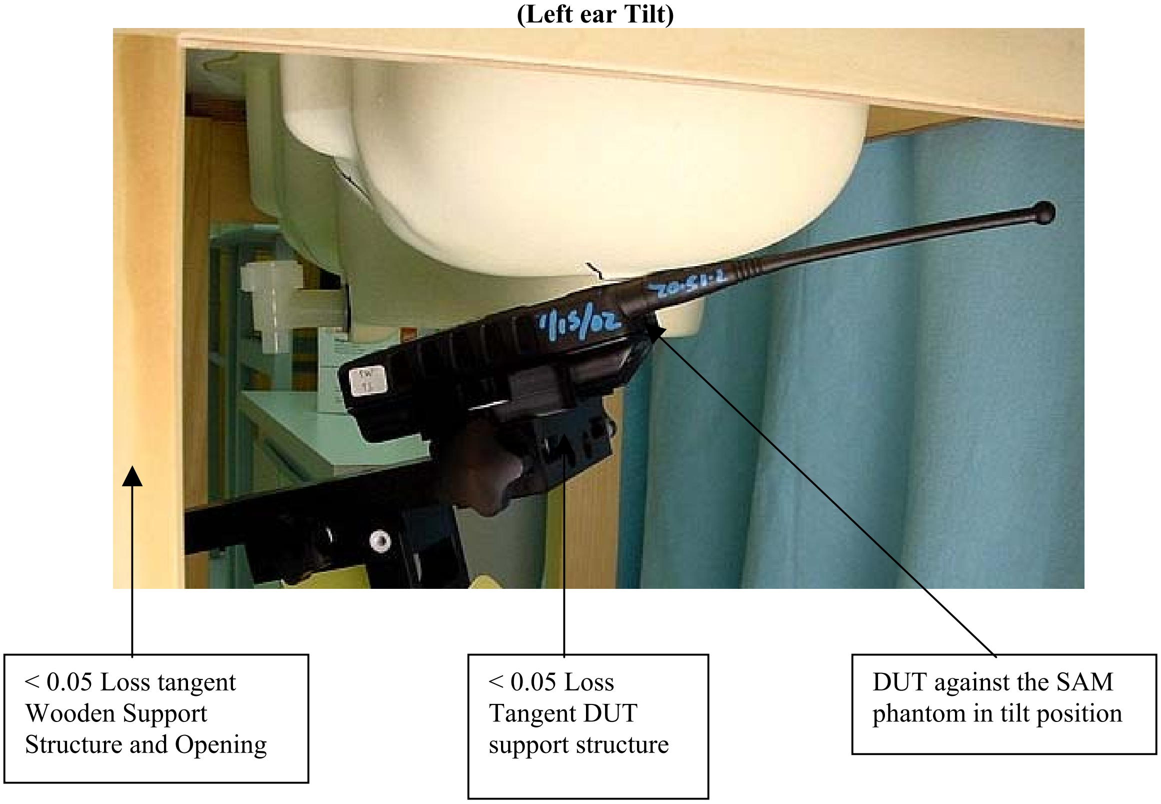


Figure 2. DUT Left ear Touch position

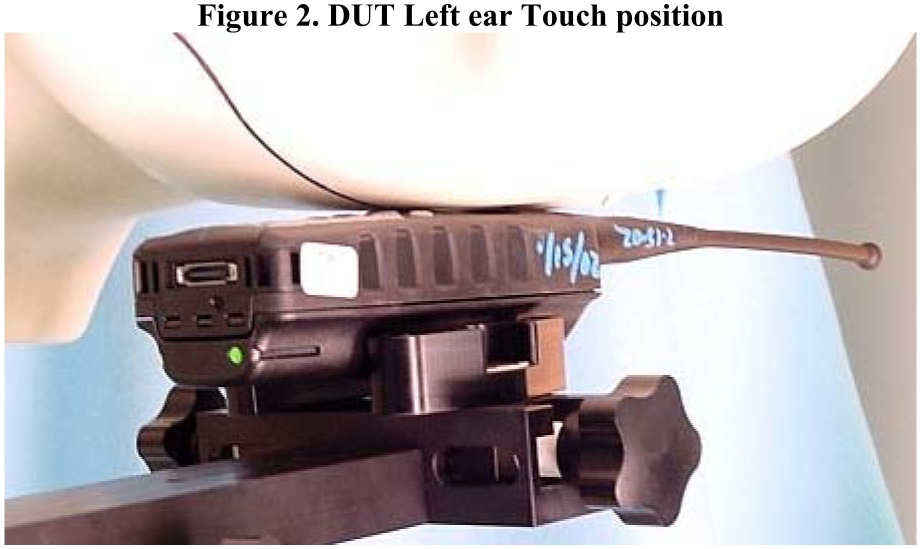


Figure 3. DUT Right ear Touch position

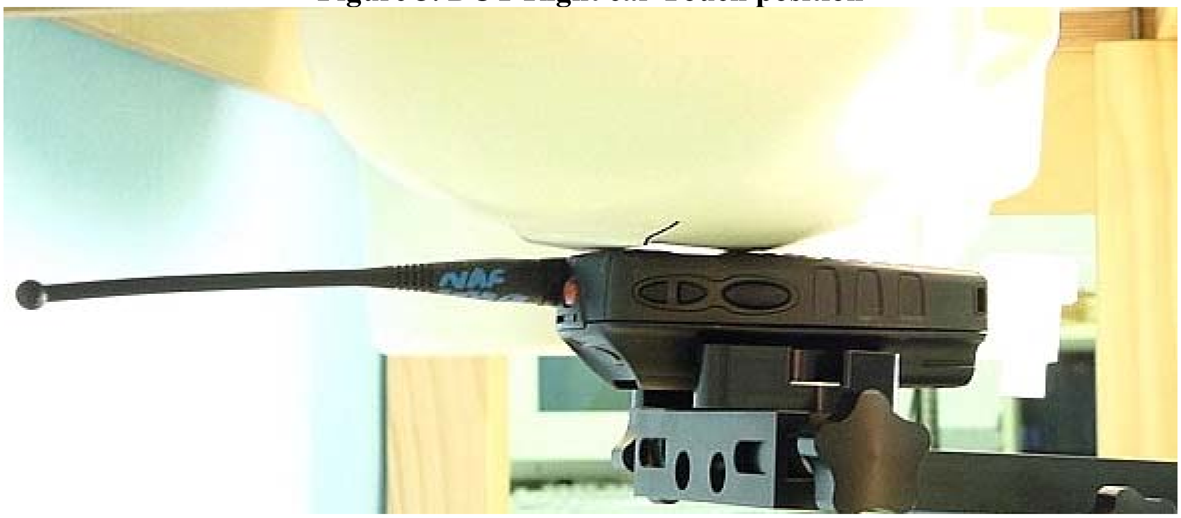


Figure 4. DUT Right ear Tilt position

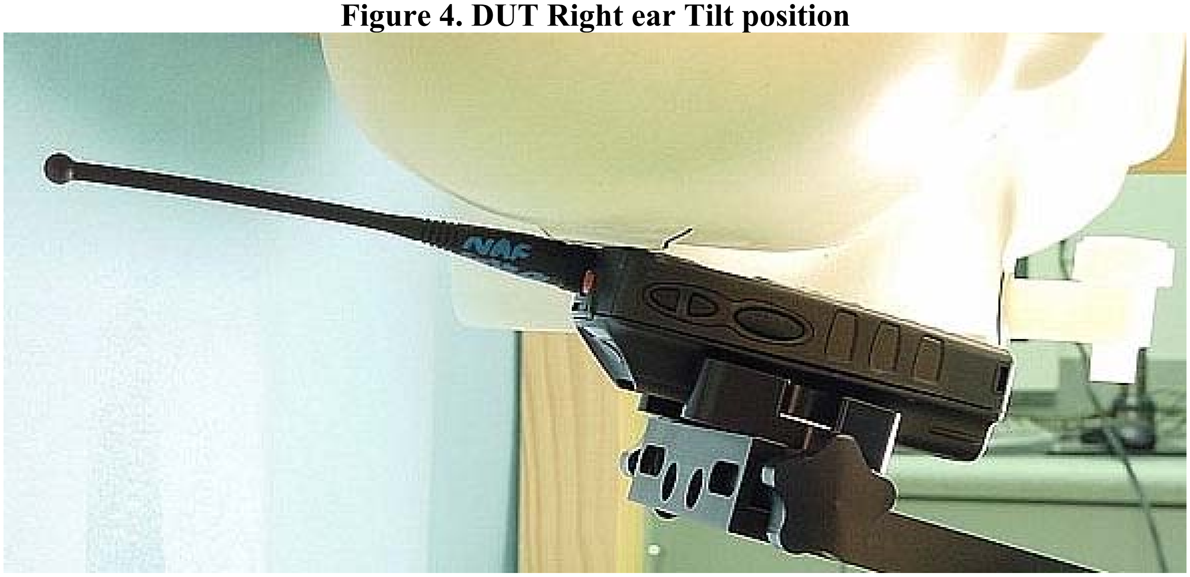


Figure 5. (2.5)cm separation from the flat phantom Face position

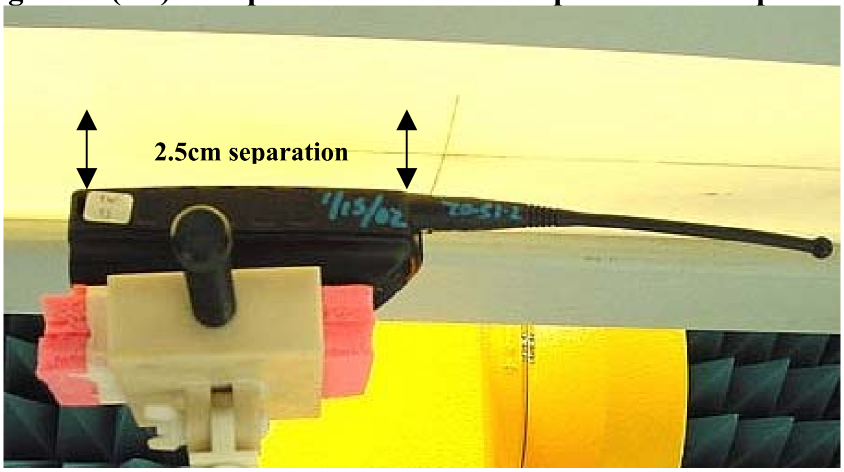


Figure 6. (5)cm separation from the flat phantom Abdomen position

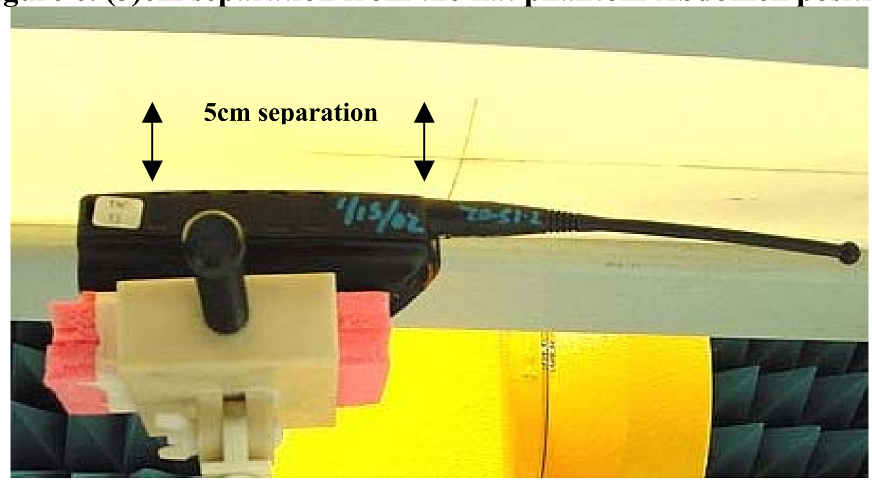
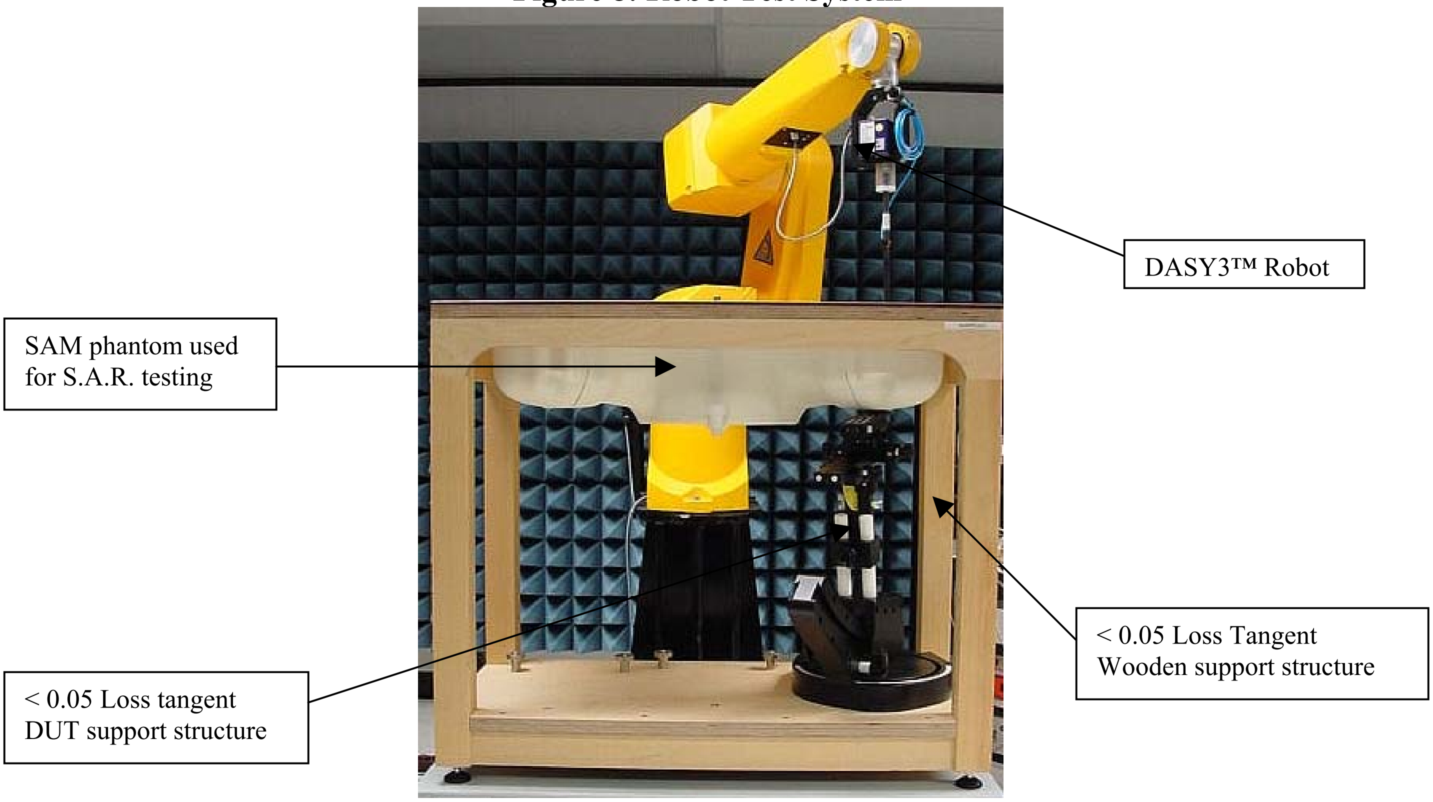


Figure 7. DUT against Flat Phantom w/ HLN9714A&NKN6503B attached

Figure 8: Robot Test System



5.3 Probe Scan Procedures

The E-field probe is first scanned in 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.

6.0 Measurement Uncertainty

Table 1: Uncertainty Budget for Device Under Test

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	**Section of IEEE P1528**	**Tol. (± %)**	**Prob. Dist.**	**Divisor**	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	∞
Spherical Isotropy	E.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3	5.8	R	1.73	1	1	3.3	3.3	∞
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	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.3	R	1.73	1	1	0.2	0.2	∞
Probe Positioning with respect to Phantom Shell	E.6.3	1.1	R	1.73	1	1	0.6	0.6	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E.5	3.9	R	1.73	1	1	2.3	2.3	∞
Test sample Related									
Test Sample Positioning	E.4.2	3.6	N	1.00	1	1	3.6	3.6	29
Device Holder Uncertainty	E.4.1	2.8	N	1.00	1	1	2.8	2.8	8
Output Power Variation - SAR drift measurement	6.6.2	5.0	R	1.73	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (shape and thickness tolerances)	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity - measurement uncertainty	E.3.3	10.0	R	1.73	0.64	0.43	3.7	2.5	∞
Liquid Permittivity - deviation from target values	E.3.2	10.0	R	1.73	0.6	0.49	3.5	2.8	∞
Liquid Permittivity - measurement uncertainty	E.3.3	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
Combined Standard Uncertainty			RSS				11.72	11.09	1363
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				22.98	21.75	

Table 2: Uncertainty Budget for System Performance Check

a	*b*	*c*	*d*	*e* = *f(d,k)*	*f*	*g*	*h* = *c x f / e*	*i* = *c x g / e*	*k*
Uncertainty Component	Section of IEEE P1528	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	5.8	R	1.73	1	1	3.3	3.3	∞
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	0.0	R	1.73	1	1	0.0	0.0	∞
Integration Time	E.2.8	0.0	R	1.73	1	1	0.0	0.0	∞
RF Ambient Conditions	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.3	R	1.73	1	1	0.2	0.2	∞
Probe Positioning with respect to Phantom Shell	E.6.3	1.1	R	1.73	1	1	0.6	0.6	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E.5	3.9	R	1.73	1	1	2.3	2.3	∞
Dipole									
Dipole Axis to Liquid Distance	8, E.4.2	1.0	R	1.73	1	1	0.6	0.6	∞
Input Power and SAR Drift Measurement	8, 6.6.2	4.7	R	1.73	1	1	2.7	2.7	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (shape and thickness tolerances)	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity - measurement uncertainty	E.3.3	10.0	R	1.73	0.64	0.43	3.7	2.5	∞
Liquid Permittivity - deviation from target values	E.3.2	10.0	R	1.73	0.6	0.49	3.5	2.8	∞
Liquid Permittivity - measurement uncertainty	E.3.3	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
Combined Standard Uncertainty			RSS				10.16	9.43	∞
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				19.92	18.48	

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.

7.0 S.A.R. Test Results

All S.A.R. results obtained by the tests described in Section 5.0 are listed in section 7.1 below. The bolded result indicates the highest observed S.A.R. performance. DASY3™ S.A.R. measurement scans are provided in APPENDIX B for the highest observed S.A.R.

7.1 S.A.R. results

Compliance assessment at the abdomen										
Run Number/ SN	**Freq. (MHz)**	**Antenna**	**Battery**	**Test position**	**Carry Case**	**Additional attachments**	**Initial Power (mW)**	**End Power (mW)**	**Measured 1g-S.A.R. (mW/g)**	**Max Calc. 1g-S.A.R. (mW/g)**
Data mode; 67.5% DC										
Ab_R1_020801-04/ 173SCN0055	899	NAF5038A	NTN9037A	Against phantom	HLN9714A belt clip	NKN6503B data cable	1.220	1.040	0.672	**0.78**
Ab_R1_020801-06/ 173SCN0055	899	NAF5038A	NTN9038A	Against phantom	HLN9714A belt clip	NKN6503B data cable	1.190	0.980	0.599	0.73
Ab_R1_020801-07/ 173SCN0055	899	NAF5038A	NTN9037A	Against phantom	HLN9844A belt clip	NKN6503B data cable	1.220	0.995	0.553	0.67
Ab_R1_020801-08/ 173SCN0055	899	NAF5038A	NTN9037A	Against phantom	FLN9580A carry case	NKN6503B data cable	1.220	0.999	0.100	0.12
Phone mode; 33.33%DC										
Ab_R1_020801-09/ 173SCN0055	899	NAF5038A	NTN9037A	Against phantom	HLN9714A belt clip	FLN2854A NTN8367A	1.240	1.180	0.311	0.32
Ab_R1_020801-10/ 173SCN0055	899	NAF5038A	NTN9037A	Against phantom	HLN9714A belt clip	FLN2854A NTN8513A	1.210	1.180	0.314	0.32
Ab_R1_020802-02/ 173SCN0055	899	NAF5038A	NTN9037A	Against phantom	HLN9714A belt clip	FLN2854A NTN8496A	1.210	1.190	0.330	0.33
Ab_R1_020802-03/ 173SCN0055	899	NAF5038A	NTN9037A	Against phantom	HLN9714A belt clip	FLN2854A NTN8497A	1.220	1.180	0.325	0.33
Ab_R1_020802-04/ 173SCN0055	899	NAF5038A	NTN9037A	Against phantom	HLN9714A belt clip	FLN2800A RSM	1.210	1.170	0.339	0.35
Data mode; 67.5%DC										
Ab_R1_020805-02/ 173SCN0055	899	NAF5038A	NTN9037A	DUT back 5cm separation	None	NKN6503B data cable	1.210	1.030	0.656	0.76
Ab_R1_020805-03/ 173SCN0055	899	NAF5038A	NTN9037A	DUT Front 5cm separation	None	NKN6503B data cable	1.220	1.040	0.555	0.64
Ab_R1_020805-04/ 173SCN0055	896	NAF5038A	NTN9037A	DUT back 5cm separation	None	NKN6503B data cable	1.150	0.977	0.598	0.73
Ab_R1_020805-05/ 173SCN0055	901	NAF5038A	NTN9037A	DUT back 5cm separation	None	NKN6503B data cable	1.230	1.020	0.641	0.75

Compliance assessment at the Face (Flat phantom); PTT mode 1:6; 50%DC applied										
Run Number/ SN	**Freq. (MHz)**	**Antenna**	**Battery**	**Test position**	**Carry Case**	**Additional attachments**	**Initial Power (mW)**	**End Power (mW)**	**Measured 1g-S.A.R. (mW/g)**	**Max Calc. 1g-S.A.R. 50% DC (mW/g)**
Face_R1_020808-02/ 173SCN0055	899	NAF5038A	NTN9037A	2.5cm separation	None	None	1.200	1.240	0.282	**0.141**
Face_R1_020808-03/ 173SCN0055	899	NAF5038A	NTN9038A	2.5cm separation	None	None	1.190	1.140	0.258	0.136

Compliance assessment at the Left Ear; Phone mode 33.33% DC										
Run Number/ SN	**Freq. (MHz)**	**Antenna**	**Battery**	**Test position**	**Carry Case**	**Additional attachments**	**Initial Power (mW)**	**End Power (mW)**	**Measured 1g-S.A.R. (mW/g)**	**Max Calc. 1g-S.A.R. (mW/g)**
LEAR_R1_020806-02/ 173SCN0055	899	NAF5038A	NTN9037A	Touch	None	None	1.240	1.170	0.353	0.36
LEAR_R1_020806-03/ 173SCN0055	899	NAF5038A	NTN9038A	Touch	None	None	1.200	1.170	0.367	0.38
LEAR_R1_020806-04/ 173SCN0055	899	NAF5038A	NTN9038A	10˚ Tilt	None	None	1.230	1.140	1.220	1.28
LEAR_R1_020807-03/ 173SCN0055	896	NAF5038A	NTN9038A	10˚ Tilt	None	None	1.240	1.120	1.110	1.19
LEAR_R1_020807-04/ 173SCN0055	901	NAF5038A	NTN9038A	10˚ Tilt	None	None	1.180	1.090	1.200	**1.32**

Compliance assessment at the Right Ear; Phone mode 33.33% DC										
Run Number/ SN	**Freq. (MHz)**	**Antenna**	**Battery**	**Test position**	**Carry Case**	**Additional attachments**	**Initial Power (mW)**	**End Power (mW)**	**Measured 1g-S.A.R. (mW/g)**	**Max Calc. 1g-S.A.R. (mW/g)**
REAR_R1_020806-05/ 173SCN0055	899	NAF5038A	NTN9037A	Touch	None	None	1.210	1.180	0.268	0.27
REAR_R1_020806-06/ 173SCN0055	899	NAF5038A	NTN9038A	Touch	None	None	1.230	1.080	0.268	0.30
REAR_R1_020807-02/ 173SCN0055	899	NAF5038A	NTN9038A	10˚ Tilt	None	None	1.190	1.030	0.641	**0.75**

7.2 Peak S.A.R. location

Refer to APPENDIX B for detailed S.A.R. scan distributions.

7.3 Highest S.A.R. results calculation methodology

The calculated maximum 1-gram averaged S.A.R. value is determined by scaling the measured S.A.R. to account for power leveling variations and power output slump below the reported maximum power during the S.A.R. measurements. For this device the Maximum Calculated 1-gram averaged peak S.A.R. is calculated using the following formula:

Max. Calc. 1-g Avg. SAR = (Pmax/Pint) x ((Pint/Pend) x DC % x S.A.R. meas.)
P_{max} = Maximum Power (W)
P_{int} = Initial Power (W)
P_{end} = End Power (W)
$SAR_{meas.}$ = Measured 1 gram averaged peak S.A.R. (mW/g)
DC % = Transmission mode duty cycle in % where applicable

@ the face: Max. Calc. 1-g Avg. SAR = (Pmax/Pint) x ((Pint/Pend) x 0.50 x S.A.R. meas.)

Highest Max. Calc. 1-g Avg. SAR = (1.200/1.180) x ((1.180/1.090) x 1.200) = 1.32 mW/g

8.0 Conclusion

The highest Operational Maximum Calculated 1-gram average S.A.R. values found for FCC ID: AZ489FT5820 were:

At the abdomen: 0.78 mW/g
At the Face: 0.14 mW/g
At the Head: 1.32 mW/g

These test results 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)

APPENDIX A

Power Slump Data/Shortened Scan

DUT Power versus time data

Unit	r750 1.2 w
Freq(MHz)	898.4875
Mode	Data
Battery	NTN9037A

Start Date and Time:8/15/2002 9:08:59 AM
Stop Date and Time: 8/15/2002 9:49:04 AM

Time	Power(watts)
0	1.159
2	1.209
4	1.217
6	1.126
8	1.136
10	1.142
12	1.146
14	1.140
16	1.097
18	1.099
20	1.101
22	1.103
24	1.104
26	1.106
28	1.107
30	1.108
32	1.105
34	1.096
36	1.095
38	1.075
40	1.055

Unit	r750 1.2 w
Freq(MHz)	898.4875
Mode	Data
Battery	NTN9038A

Start Date and Time:8/15/2002 10:19:20 AM
Stop Date and Time: 8/15/2002 10:59:25 AM

Time	Power (watts)
0	1.279
2	1.209
4	1.156
6	1.119
8	1.126
10	1.075
12	1.079
14	1.083
16	1.076
18	1.048
20	1.000
22	1.011
24	1.002
26	1.003
28	0.995
30	0.996
32	0.996
34	0.997
36	0.998
38	0.998
40	0.985

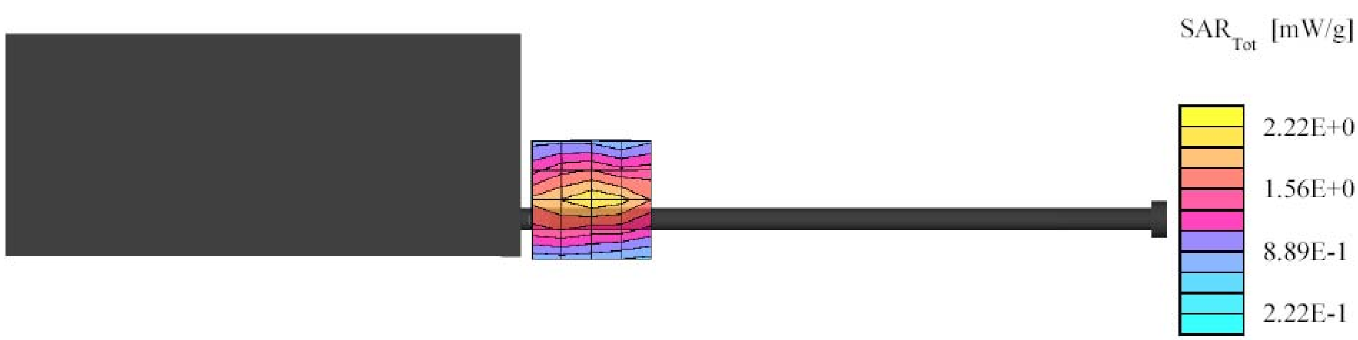
Shortened Scan Results

FCC ID: AZ489FT5820; Test Date: 08/01/02
Motorola CGISS EME Laboratory
Run #: LEAR-R1-020814-03
Model #: H44WCH6RJ6AN SN:173SCN0055
TX Freq: 901MHz
Sim Tissue Temp: 21.9 (Celsius)

- Accessories -
Antenna: NAF5038A
Battery Kit: NTN9038A
Carry: None
Audio Acc.: None

6 minute shortened scan.
Respective normal scan was approximately 25 minutes (Highest Max Calc. 1.32mW/g)

DUT 10 ˚ tilt position
SAM Phantom; Left Hand Section; Position: (90°,59°);
Probe: ET3DV6 - SN1547; ConvF(6.20,6.20,6.20); Probe cal date: 11/16/01; Crest factor: 3.0; IEEE Head 899 MHz : σ = 0.98 mho/m ε = 40.2 ρ = 1.00 g/cm3; DAE3: 363-V1 DAE Cal Date: 5/23/02
Cube 5x5x7: SAR (1g): 1.20 mW/g, SAR (10g): 0.675 mW/g, (Worst-case extrapolation)
Cube 5x5x7: Dx = 8.0, Dy = 8.0, Dz = 5.0; SAR (1g): 1.20 mW/g, SAR (10g): 0.675 mW/g

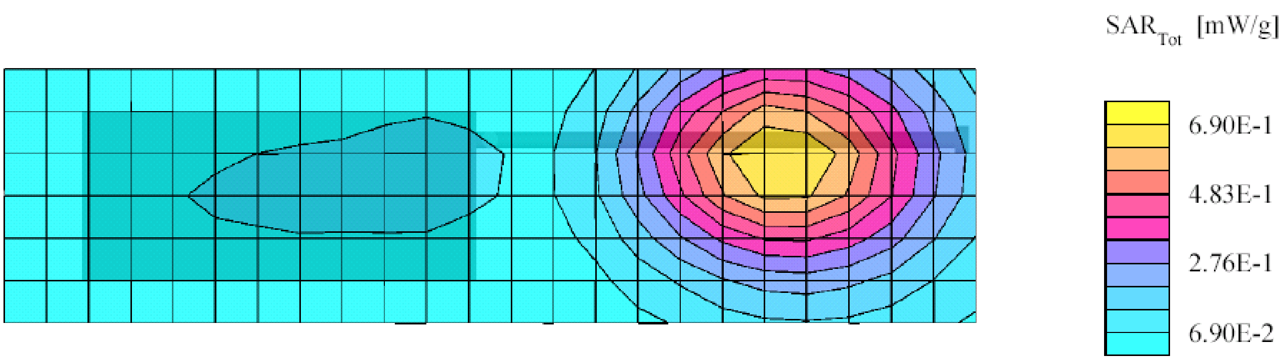


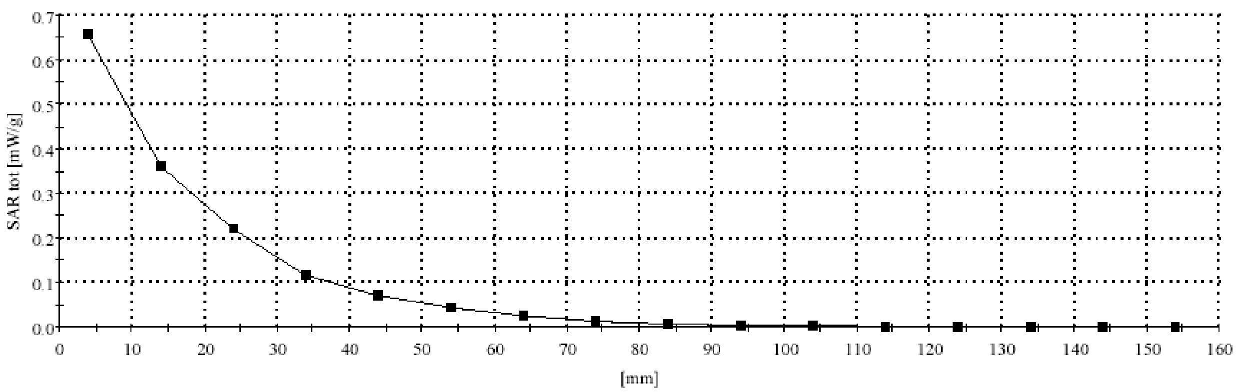
APPENDIX B
Data Results

FCC ID: AZ489FT5820; Test Date: 08/14/02
Motorola CGISS EME Laboratory
Run #: Ab_R1_020801-04
Model #: H44WCH6RJ6AN SN:173SCN0055
TX Freq: 899MHz
Sim Tissue Temp: 21.4 (Celsius)

- Accessories -
Antenna: NAF5038A
Battery Kit: NTN9037A
Carry: HLN9714A belt clip
Audio Acc.: NKN6503B, Y data cable

DUT in data mode; at Abdomen
Flat Phantom; Device Section; Position: (90°,90°);
Probe: ET3DV6 - SN1547; ConvF(6.00,6.00,6.00); Probe cal date: 11/16/01; Crest factor: 1.5; FCC Body_899MHz: σ = 1.06 mho/m ε = 52.8 ρ = 1.00 g/cm3; DAE3: 363-V1 DAE Cal Date: 5/23/02
Cube 7x7x7: SAR (1g): 0.672 mW/g, SAR (10g): 0.481 mW/g * Max outside, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 33.0, 279.0, 4.0

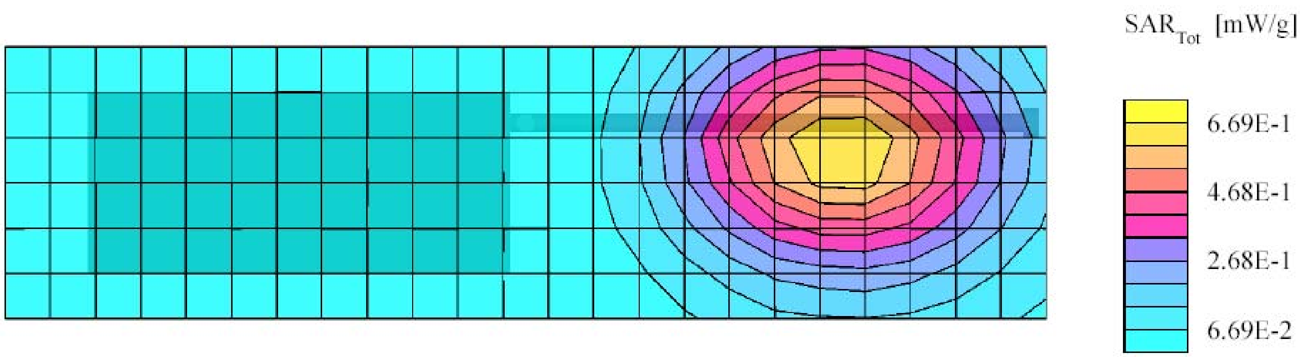


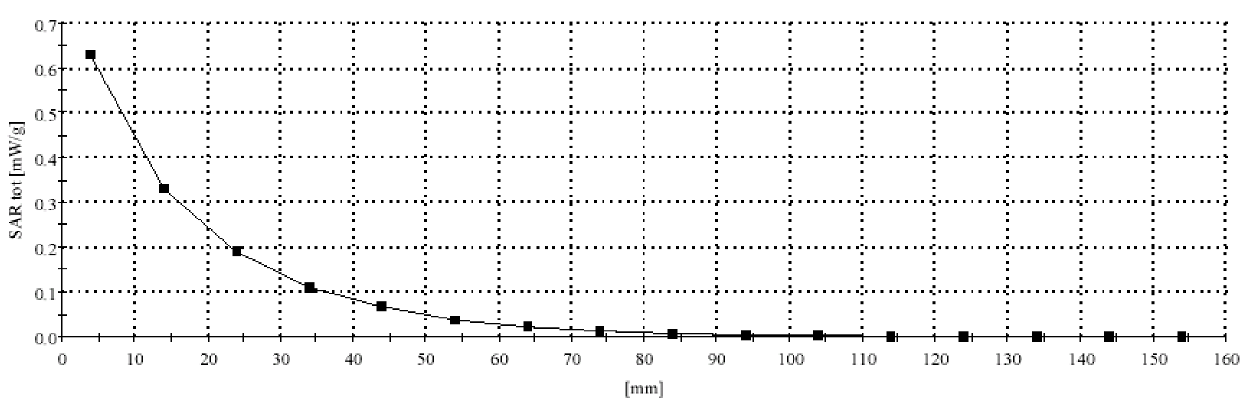


FCC ID: AZ489FT5820; Test Date: 08/05/02
Motorola CGISS EME Laboratory
Run #: Ab_R1_020805-02
Model #: H44WCH6RJ6AN SN:173SCN0055
TX Freq: 899MHz
Sim Tissue Temp: 22.3 (Celsius)

- Accessories -
Antenna: NAF5038A
Battery Kit: NTN9037A
Carry: None
DUT back @ 5cm
Audio Acc. NKN6503A Y-Data cable

DUT in data mode; at Abdomen
Flat Phantom; Device Section; Position: (90°,90°);
Probe: ET3DV6 - SN1547; ConvF(6.00,6.00,6.00); Probe cal date: 11/16/01; Crest factor: 1.5; FCC Body_899MHz: σ = 1.06 mho/m ε = 52.6 ρ = 1.00 g/cm3; DAE3: 363-V1 DAE Cal Date: 5/23/02
Cube 7x7x7: SAR (1g): 0.656 mW/g, SAR (10g): 0.468 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 34.5, 279.0, 4.0

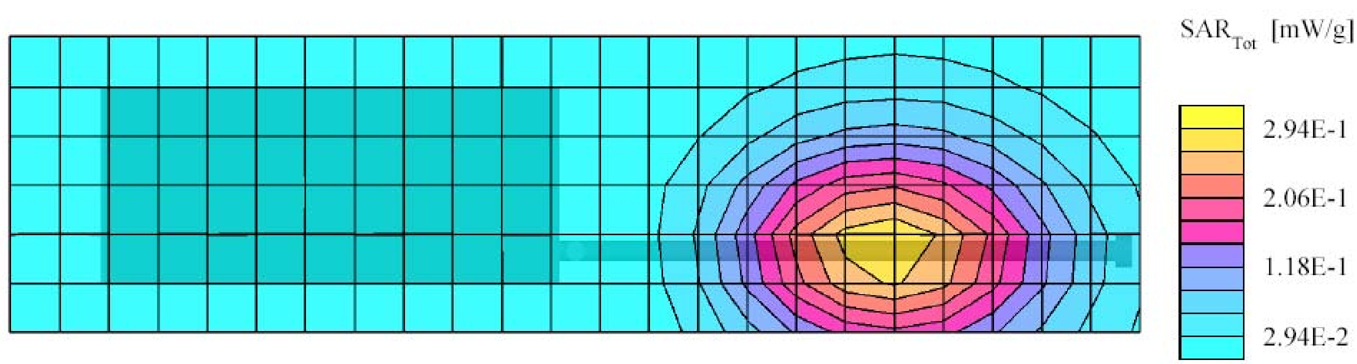


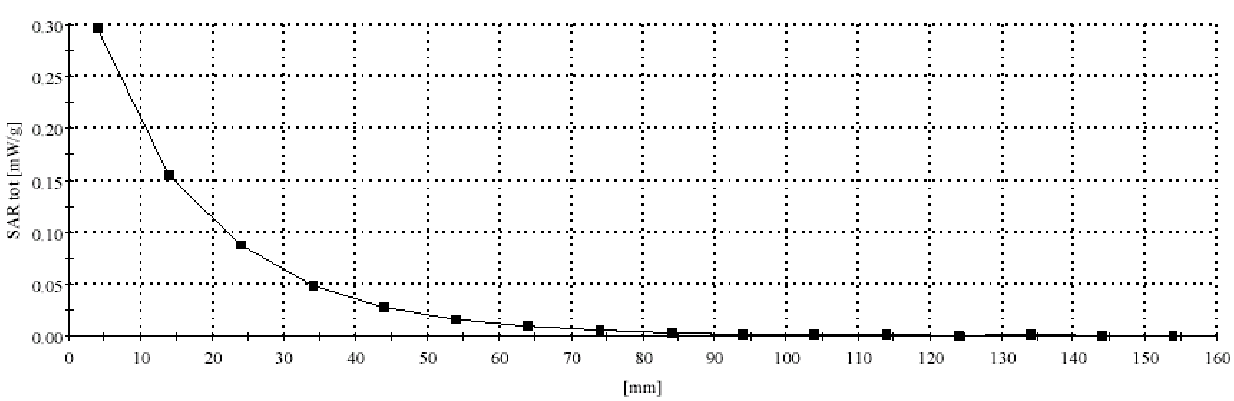


FCC ID: AZ489FT5820; Test Date: 08/08/02
Motorola CGISS EME Laboratory
Run #: Face-R1-020808-02
Model #: H44WCH6RJ6AN SN:173SCN0055
TX Freq: 899MHz
Sim Tissue Temp: 21.7 (Celsius)

- Accessories -
Antenna: NAF5038A
Battery Kit: NTN9037A
Carry: None
Audio Acc.: None
DUT @ 2.5cm from phantom

DUT in PTT mode; at the face
Flat Phantom Phantom; Device Section; Position: (90°,90°);
Probe: ET3DV6 - SN1547; ConvF(6.20,6.20,6.20); Probe cal date: 11/16/01; Crest factor: 6.0; IEEE Head 899 MHz : σ = 0.94 mho/m ε = 41.8 ρ = 1.00 g/cm3; DAE3: 363-V1 DAE Cal Date: 5/23/02
Cube 7x7x7: SAR (1g): 0.282 mW/g, SAR (10g): 0.199 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 64.5, 268.5, 4.0

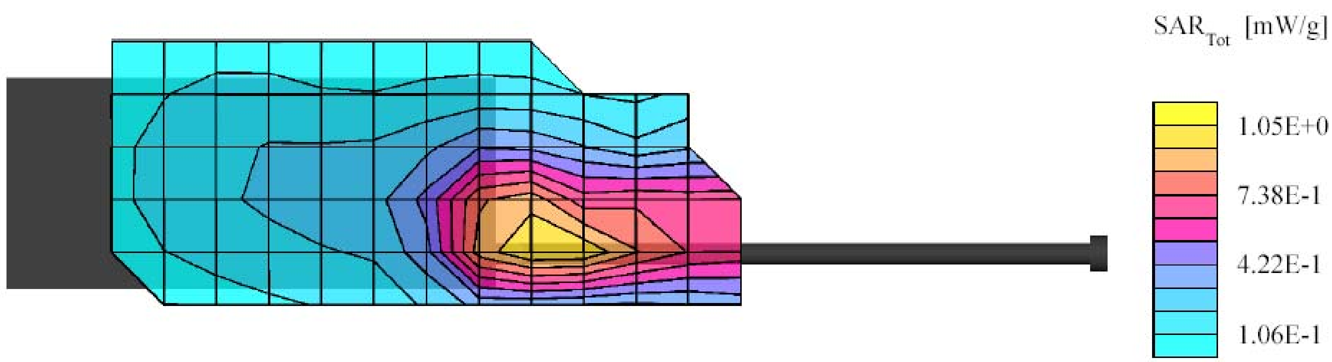


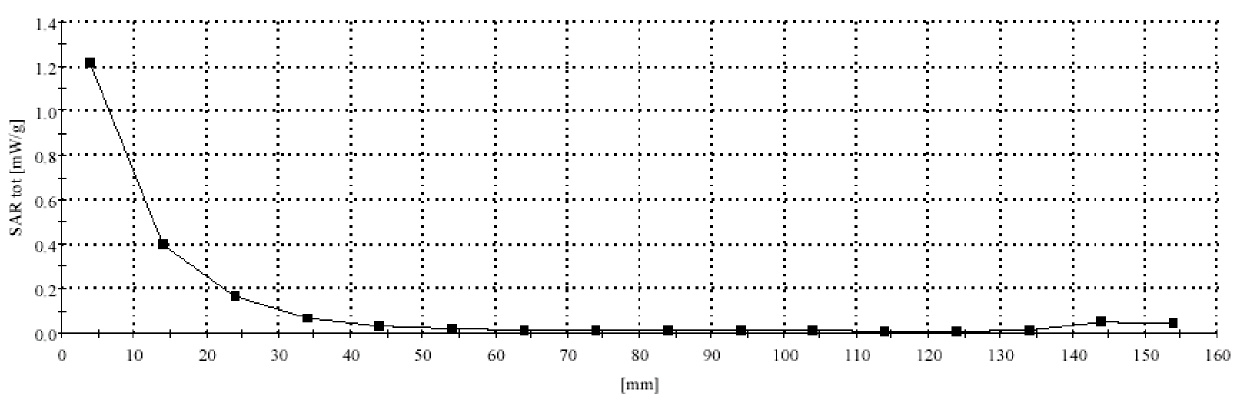


FCC ID: AZ489FT5820; Test Date: 08/07/02
Motorola CGISS EME Laboratory
Run #: LEAR-R1-020807-04
Model #: H44WCH6RJ6AN SN:173SCN0055
TX Freq: 901MHz
Sim Tissue Temp: 21.9 (Celsius)

- Accessories -
Antenna: NAF5038A
Battery Kit: NTN9038A
Carry: None
Audio Acc.: None

DUT in phone mode; 10 degree tilt position; left head
SAM Phantom; Left Hand Section; Position: (90°,59°);
Probe: ET3DV6 - SN1547; ConvF(6.20,6.20,6.20); Probe cal date: 11/16/01; Crest factor: 3.0; IEEE Head 899 MHz : σ =0.98 mho/m ε = 40.6 ρ = 1.00 g/cm3; DAE3: 363-V1 DAE Cal Date: 5/23/02
Cube 7x7x7: SAR (1g): 1.20 mW/g, SAR (10g): 0.668 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 118.5, 19.5, 4.0

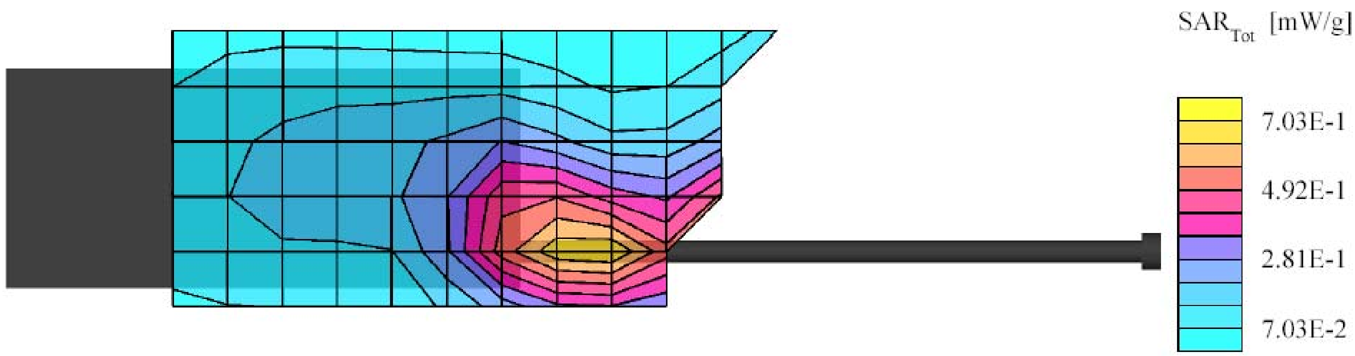


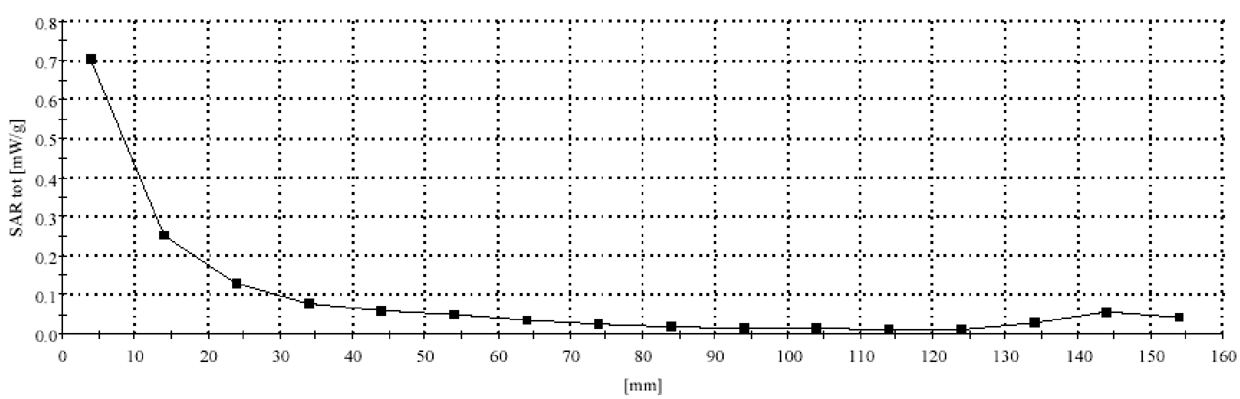


FCC ID: AZ489FT5820; Test Date: 08/07/02
Motorola CGISS EME Laboratory
Run #: REAR-R1-020807-02
Model #: H44WCH6RJ6AN SN:173SCN0055
TX Freq: 899MHz
Sim Tissue Temp: 21.9 (Celsius)

- Accessories -
Antenna: NAF5038A Battery Kit: NTN9038A
Carry: None Audio Acc. None

DUT in phone mode; 10 degree tilt position; right head
SAM Phantom; Righ Hand Section; Position: (90°,301°);
Probe: ET3DV6 - SN1547; ConvF(6.20,6.20,6.20); Probe cal date: 11/16/01; Crest factor: 3.0; IEEE Head 899 MHz : σ = 0.98 mho/m ε= 40.6 ρ = 1.00 g/cm3; DAE3: 363-V1 DAE Cal Date: 5/23/02
Cube 7x7x7: SAR (1g): 0.641 mW/g, SAR (10g): 0.385 mW/g * Max outside, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 117.0, 12.0, 4.0





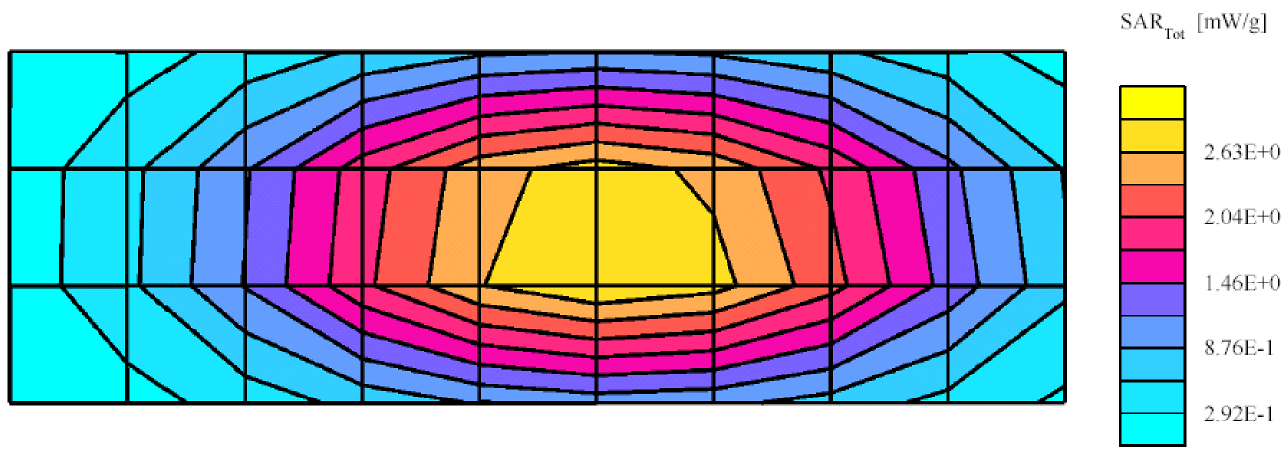
APPENDIX C

Dipole System Performance Check Results

SPEAG Dipole D900 V2 SN 084; Test Date:08/01/02
Motorola CGISS EME Lab
Run #: Sys Perf_R1_020801-01
TX Freq: 900 MHz
Sim Tissue Temp: 21.4 (Celsius)
Start Power; 250mW

- Comments-
Target at 1W is 11.63 (including drift) (1g)
SAR calculated is 12.44mW/g, Percent from target (including drift) for 1g is 6.9%

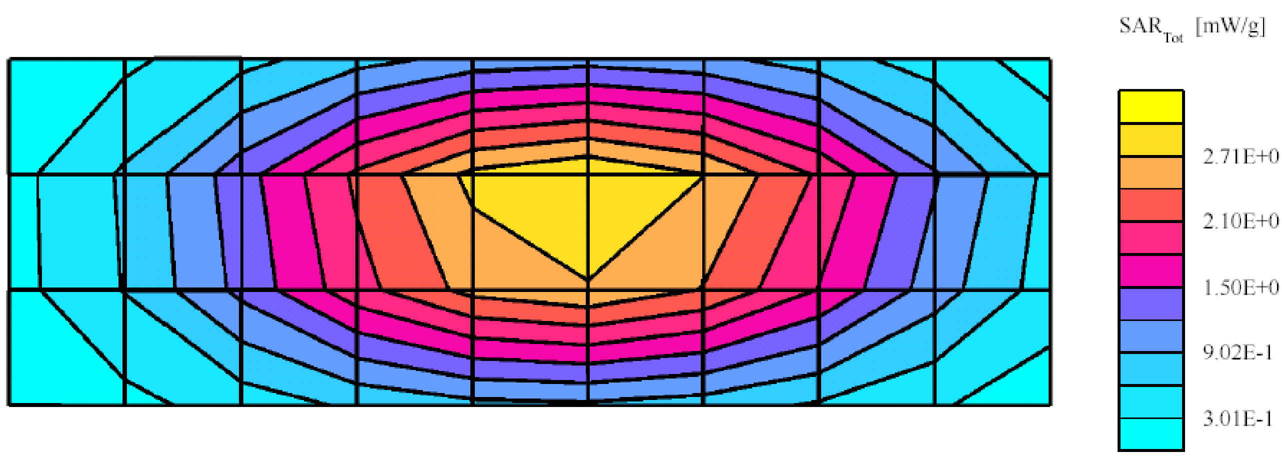
Flat Phantom; Probe: ET3DV6 - SN1547;Probe Cal Date: 11/16/01ConvF(6.00,6.00,6.00); Crest factor: 1.0; FCC Body_900 MHz: σ = 1.06 mho/m ε = 52.7 ρ = 1.00 g/cm3; DAE3: SN363-V1 DAE Cal Date: 05/23/02
Cubes (2): Peak: 5.00 mW/g ± 0.05 dB, SAR (1g): 3.11 mW/g ± 0.03 dB, SAR (10g): 1.95 mW/g ± 0.02 dB, (Worst-case extrapolation) Penetration depth: 11.8 (10.5, 13.6) [mm]
Power drift: -0.00 dB



SPEAG Dipole D900 V2 SN 084; Test Date:08/02/02
Motorola CGISS EME Lab
Run #: Sys Perf_R1_020802-01
TX Freq: 900 MHz
Sim Tissue Temp: 21.4 (Celsius)
Start Power; 250mW

- Comments-
Target at 1W is 11.63 (including drift) (1g)
SAR calculated is 12.51mW/g, Percent from target (including drift) for 1g is 7.56%

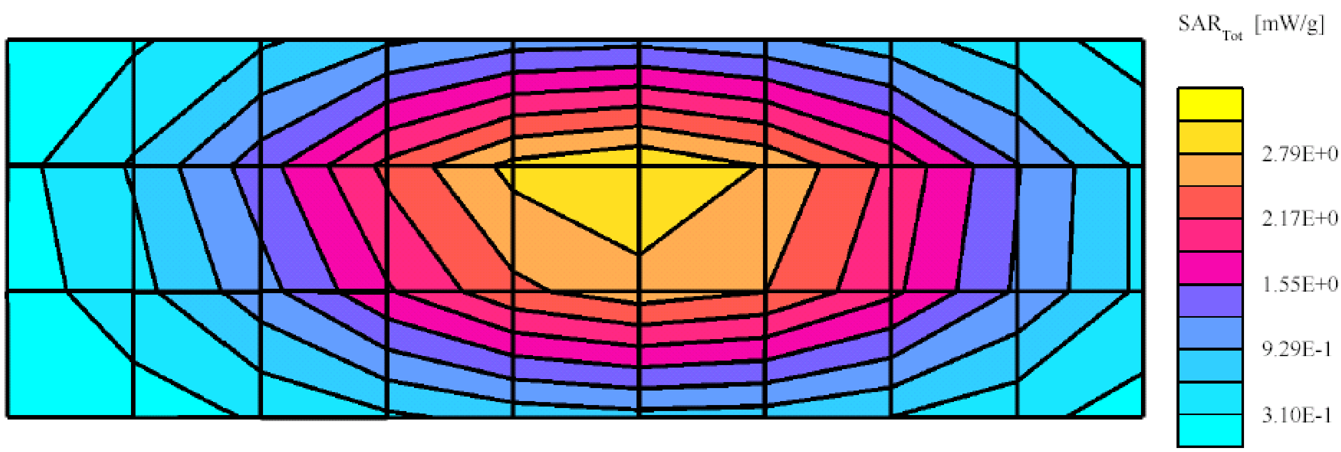
Flat Phantom; Probe: ET3DV6 - SN1547;Probe Cal Date: 11/16/01ConvF(6.00,6.00,6.00); Crest factor: 1.0; FCC Body_900 MHz: σ = 1.06 mho/m ε = 52.5 ρ = 1.00 g/cm3; DAE3: SN363-V1 DAE Cal Date: 05/23/02
Cubes (2): Peak: 5.02 mW/g ± 0.00 dB, SAR (1g): 3.12 mW/g ± 0.00 dB, SAR (10g): 1.96 mW/g ± 0.00 dB, (Worst-case extrapolation) Penetration depth: 11.8 (10.5, 13.6) [mm]
Power drift: -0.01 dB



SPEAG Dipole D900 V2 SN 084; Test Date:08/05/02
Motorola CGISS EME Lab
Run #: Sys Perf_R1_020805-01
TX Freq: 900 MHz
Sim Tissue Temp: 22.3 (Celsius)
Start Power; 250mW

- Comments-
Target at 1W is 11.63 (including drift) (1g)
SAR calculated is 12.6mW/g, Percent from target (including drift) for 1g is 8.34%

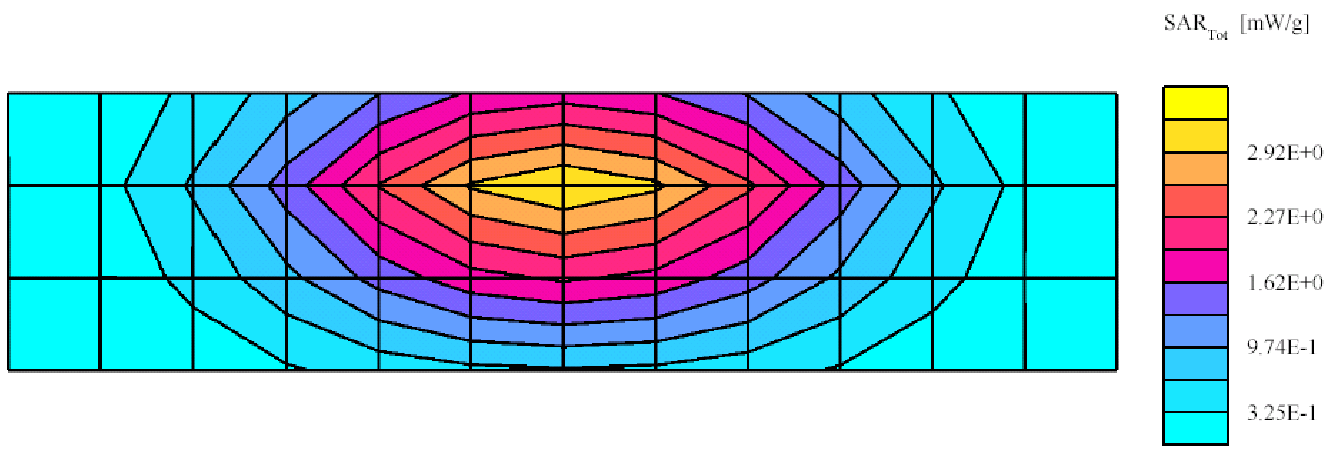
Flat Phantom;Probe: ET3DV6 - SN1547;Probe Cal Date: 11/16/01ConvF(6.00,6.00,6.00); Crest factor: 1.0; FCC Body_900 MHz: σ = 1.07 mho/m ε = 52.6 ρ = 1.00 g/cm3; DAE3: SN363-V1 DAE Cal Date: 05/23/02
Cubes (2): Peak: 5.08 mW/g ± 0.00 dB, SAR (1g): 3.15 mW/g ± 0.01 dB, SAR (10g): 1.98 mW/g ± 0.01 dB, (Worst-case extrapolation) Penetration depth: 11.8 (10.5, 13.6) [mm]
Power drift: -0.00 dB



SPEAG Dipole D900 V2 SN 084; Test Date:08/06/02
Motorola CGISS EME Lab
Run #: Sys Perf_R1_020806-01
TX Freq: 900 MHz
Sim Tissue Temp: 21.9 (Celsius)
Start Power; 250mW

- Comments-
Target at 1W is 11.96 (including drift) (1g)
SAR calculated is 12.03mW/g, Percent from target (including drift) for 1g is 0.57%

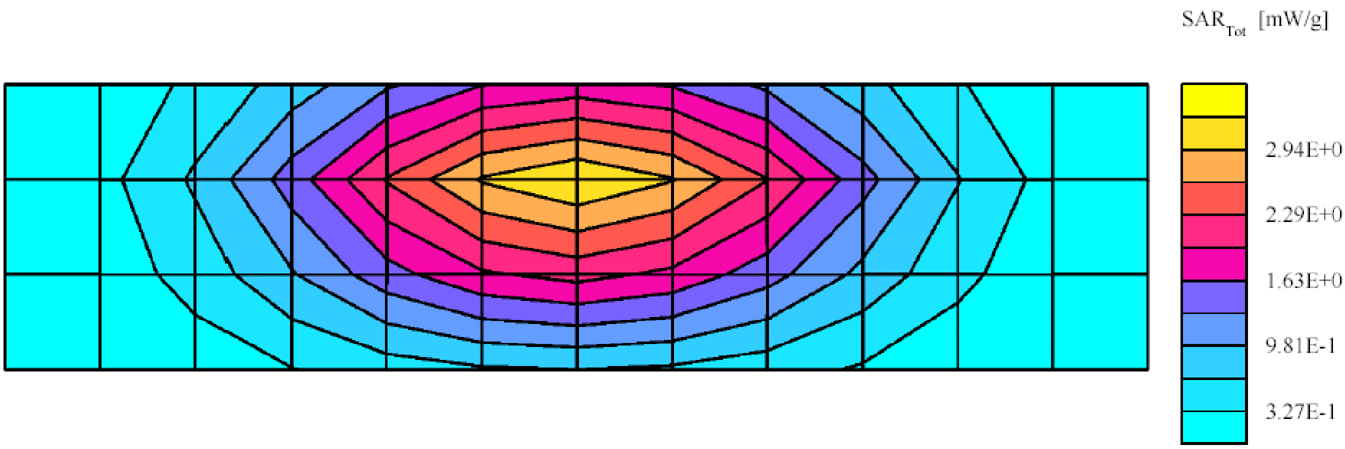
SAM; Probe: ET3DV6 - SN1547;Probe Cal Date: 11/16/01ConvF(6.20,6.20,6.20); Crest factor: 1.0; IEEE Head_900 MHz: σ = 0.98 mho/m ε = 40.8 ρ = 1.00 g/cm3; DAE3: SN363-V1 DAE Cal Date: 05/23/02
Cubes (2): Peak: 4.88 mW/g ± 0.01 dB, SAR (1g): 3.00 mW/g ± 0.01 dB, SAR (10g): 1.88 mW/g ± 0.00 dB, (Worst-case extrapolation)Penetration depth: 11.4 (10.2, 12.9) [mm]
Power drift: -0.01 dB



SPEAG Dipole D900 V2 SN 084; Test Date:08/07/02
Motorola CGISS EME Lab
Run #: Sys Perf_R1_020807-01
TX Freq: 900 MHz
Sim Tissue Temp: 21.9 (Celsius)
Start Power; 250mW

- Comments-
Target at 1W is 11.96 (including drift) (1g)
SAR calculated is 12.16mW/g, Percent from target (including drift) for 1g is 1.7%

SAM; Probe: ET3DV6 - SN1547;Probe Cal Date: 11/16/01ConvF(6.20,6.20,6.20); Crest factor: 1.0; IEEE Head_900 MHz: σ = 0.98 mho/m ε = 40.6 ρ = 1.00 g/cm3; DAE3: SN363-V1 DAE Cal Date: 05/23/02
Cubes (2): Peak: 4.90 mW/g ± 0.01 dB, SAR (1g): 3.02 mW/g ± 0.01 dB, SAR (10g): 1.89 mW/g ± 0.00 dB, (Worst-case extrapolation)Penetration depth: 11.4 (10.2, 13.0) [mm]
Power drift: -0.03 dB

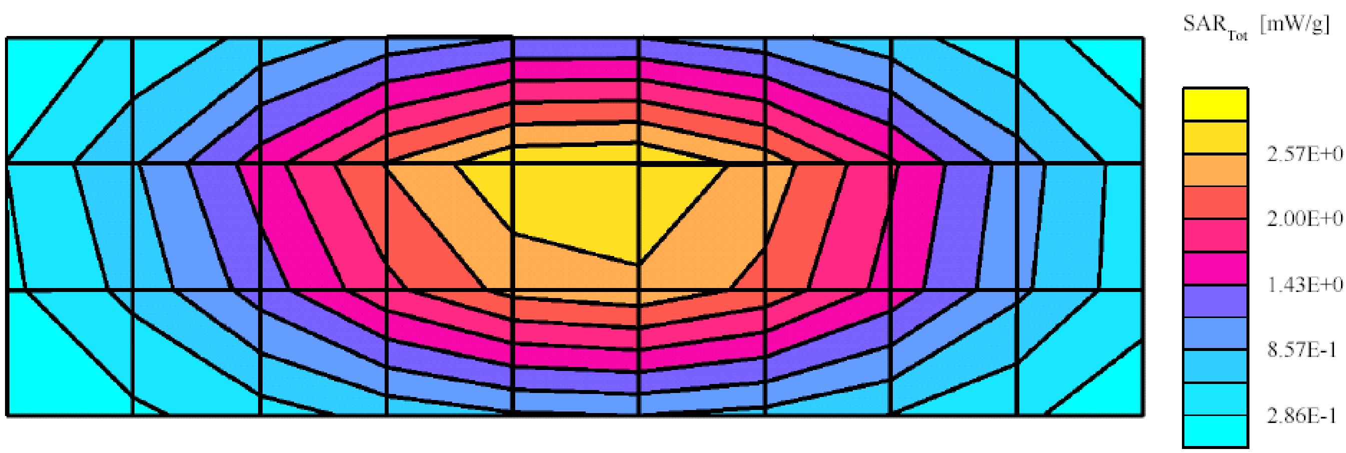


SPEAG Dipole D900 V2 SN 084; Test Date:08/08/02
Motorola CGISS EME Lab

Run #: Sys Perf_R1_020808-01
Model #: D900V2 SN: 084
TX Freq: 900 MHz
Sim Tissue Temp: 21.7 (Celsius)
Start Power; 250mW

- Comments-
Target at 1W is 11.96 (including drift) (1g)
SAR calculated is 11.99mW/g, Percent from target (including drift) for 1g is 0.25%

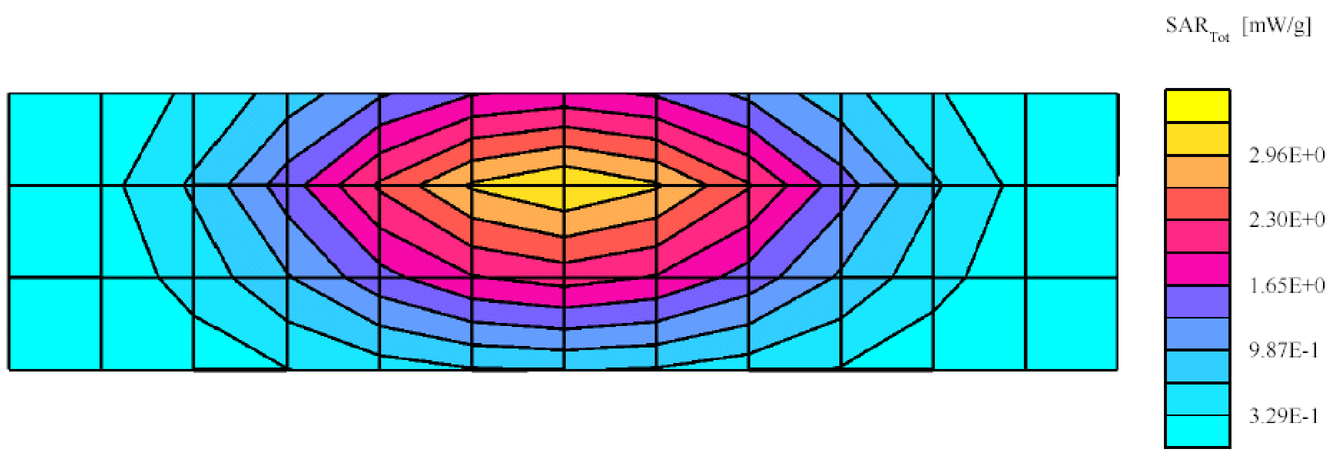
Flat Phantom; Probe: ET3DV6 - SN1547;Probe Cal Date: 11/16/01ConvF(6.20,6.20,6.20); Crest factor: 1.0; IEEE Head_900 MHz: σ = 0.95 mho/m ε = 41.8 ρ = 1.00 g/cm^3; DAE3: SN363-V1 DAE Cal Date: 05/23/02
Cubes (2): Peak: 4.80 mW/g ± 0.05 dB, SAR (1g): 2.97 mW/g ± 0.05 dB, SAR (10g): 1.87 mW/g ± 0.05 dB, (Worst-case extrapolation)Penetration depth: 11.7 (10.4, 13.3) [mm]
Power drift: -0.04 dB



SPEAG Dipole D900 V2 SN 084; Test Date:08/14/02
Motorola CGISS EME Lab
Run #: Sys Perf_R1_020814-02
Model #: D900V2 SN: 084
TX Freq: 900 MHz
Sim Tissue Temp: 21.9 (Celsius)
Start Power; 250mW

- Comments-
Target at 1W is 11.96 (including drift) (1g)
SAR calculated is 12.18mW/g, Percent from target (including drift) for 1g is 1.8%

SAM;Probe: ET3DV6 - SN1547;Probe Cal Date: 11/16/01ConvF(6.20,6.20,6.20); Crest factor: 1.0; IEEE Head_900 MHz: σ = 0.98 mho/m ε = 40.2 ρ = 1.00 g/cm3; DAE3: SN363-V1 DAE Cal Date: 05/23/02
Cubes (2): Peak: 4.90 mW/g ± 0.01 dB, SAR (1g): 3.03 mW/g ± 0.02 dB, SAR (10g): 1.90 mW/g ± 0.02 dB, (Worst-case extrapolation) Penetration depth: 11.5 (10.3, 13.0) [mm]
Power drift: -0.02 dB



SYSTEM VALIDATION

Date: 03/05/02
Lab Location: CGISS
Robot System: CGISS-2
Probe Serial #: 1383
DAE Serial #: DAE3V1 SN374

Frequency (MHz): 900
Mixture Type: 900-IEEE Head
Ambient Temp.(°C): 22.0
Tissue Temp.(°C): 21.1

Tissue Characteristics
Permitivity: 40.1
Conductivity: 0.98

Phantom Type/SN: SAMTP1022
Distance (mm): 15

Reference Source: Dipole (Dipole/Handset)
Reference SN: 084

Power to Dipole: 250 mW
Power Output (radio): ______ mW

Target SAR Value: 11.2 mW/g, 7.12 mW/g (10g avg.)
(normalized to 1.0 W)

Measured SAR Value: 2.97 mW/g, 1.86 mW/g (10g avg.)
Power Drift: -0.03 dB

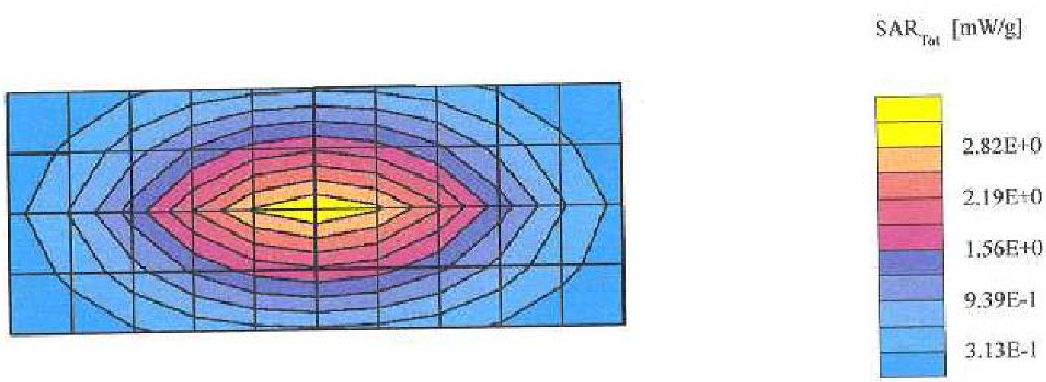
Measured SAR Value: 11.96 mW/g, 7.49 mW/g (10g avg.)
(normalized to 1.0 W,
with drift compensation)

Percent Difference From Target (must be within System Uncertainty): 6.8 % (1g avg)
5.2 % (10g avg)

Test performed by: Kim Uong Initial: KU 3-5-02

Dipole D900V2 SN084; Test date:03/05/02

Run #: 02030501 Phantom #: SAMTP1022
Model#: SPEAG dipole D900V2 SN084
Robot#: CGISS-2 Tester: Kim Uong
Tx Freq: 900MHz Simulated tissue temp: 21.1C
Start power: 250mW
Target: 11.2mW/g as indicated in 900MHz System validation diploe for D900V2 SN084 (dated 2/11/02)
SAM; Probe: ET3DV6 - SN1383; ConvF(6.60,6.60,6.60); Crest factor: 1.0; IEEE HEAD 900MHz: σ = 0.98 mho/m ε_r = 40.1 ρ = 1.00 g/cm^3
Cubes (2): Peak: 4.83 mW/g ± 0.00 dB, SAR (1g): 2.97 mW/g ± 0.00 dB, SAR (10g): 1.86 mW/g ± 0.01 dB, (Worst-case extrapolation)
Penetration depth: 11.2 (10.1, 12.7) [mm]
Powerdrift: -0.03 dB



Motorola CGISS EME Lab

SYSTEM VALIDATION

Date: 03/05/02
Lab Location: CGISS
Robot System: CGISS-2
Probe Serial #: 1383
DAE Serial #: DAE3V1 SN374

Frequency (MHz): 900
Mixture Type: 900-FCC Body
Ambient Temp.(°C): 22.0
Tissue Temp.(°C): 21.1

Tissue Characteristics
Permitivity: 52.5
Conductivity: 1.04

Phantom Type/SN: ACL40232002A
Distance (mm): 15

Reference Source: Dipole (Dipole/Handset)
Reference SN: 084

Power to Dipole: 250 mW
Power Output (radio): ____________ mW

Target SAR Value: 11.8 mW/g, 7.52 mW/g (10g avg.)
(normalized to 1.0 W)

Measured SAR Value: 2.86 mW/g, 1.81 mW/g (10g avg.)
Power Drift: -0.07 dB

Measured SAR Value: 11.63 mW/g, 7.36 mW/g (10g avg.)
(normalized to 1.0 W,
with drift compensation)

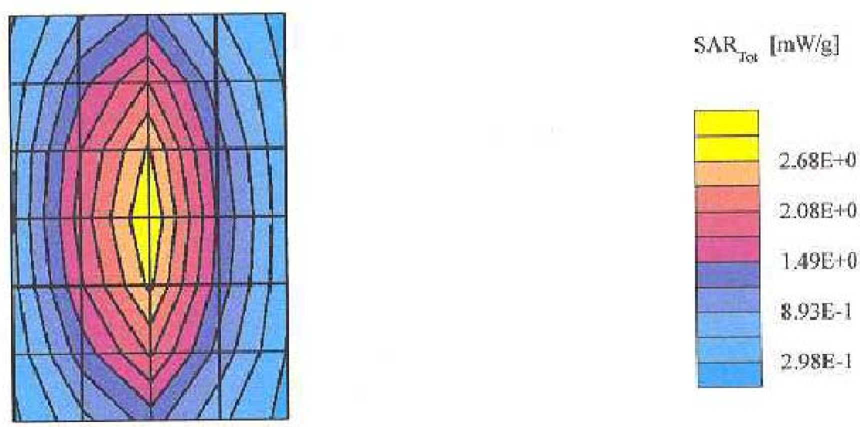
Percent Difference From Target (must be within System Uncertainty): 1.4 % (1g avg)
2.1 % (10g avg)

Test performed by: Kim Uong Initial: KU 3-5-02

JF 2/14/02

Dipole D900V2 SN084; Test date:03/05/02

Run #: 02030502 Phantom #:ACL40232002A
Model#: SPEAG dipole D900V2 SN084
Robot#: CGISS-2 Tester: Kim Uong
Tx Freq: 900MHz Simulated tissue temp: 21.5C
Start power: 250mW
Target: 11.8mW/g as indicated in 900MHz System validation diploe for D900V2 SN084 (dated 2/11/02)
Flat; Probe: ET3DV6 - SN1383; ConvF(6.40,6.40,6.40); Crest factor: 1.0; FCC Body 900: σ = 1.04 mho/m ε_r = 52.5 ρ = 1.00 g/cm^3
Cubes (2): Peak: 4.55 mW/g ± 0.01 dB, SAR (1g): 2.86 mW/g ± 0.01 dB, SAR (10g): 1.81 mW/g ± 0.01 dB, (Worst-case extrapolation)
Penetration depth: 11.8 (10.7, 13.3) [mm]
Powerdrift: -0.07 dB



Motorola CGISS EME Lab

APPENDIX D

Calibration Certificates

Schmid & Partner
Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

Calibration Certificate

Dosimetric E-Field Probe

Type	**ET3DV6**
Serial Number:	**1547**
Place of Calibration:	**Zurich**
Date of Calibration:	**November 16, 2001**
Calibration Interval	**12 months**

Schmid & Partner Engineering AG hereby certifies, that this device has been calibrated on the date indicated above. The calibration was performed in accordance with specifications and procedures of Schmid & Partner Engineering AG.

Wherever applicable, the standards used in the calibration process are traceable to international standards. In all other cases the standards of the Laboratory for EMF and Microwave Electronics at the Swiss Federal Institute of Technology (ETH) in Zurich, Switzerland have been applied.

Calibrated by:	Nikoloski Neviana
Approved by	Katja

ET3DV6 SN:1547

DASY3 - Parameters of Probe: ET3DV6 SN:1547

Sensitivity in Free Space

NormX	1.37 $\mu V/(V/m)^2$
NormY	1.25 $\mu V/(V/m)^2$
NormZ	1.24 $\mu V/(V/m)^2$

Diode Compression

DCP X	92 mV
DCP Y	92 mV
DCP Z	92 mV

Sensitivity in Tissue Simulating Liquid

Head **450 MHz** ε_r **= 43.5 ± 5%** σ **= 0.87 ± 10% mho/m**

ConvF X	6.86	extrapolated	Boundary effect:	
ConvF Y	6.86	extrapolated	Alpha	0.33
ConvF Z	6.86	extrapolated	Depth	2.54

Head **800 - 1000 MHz** ε_r **= 39.0 - 43.5** σ **= 0.80 - 1.10 mho/m**

ConvF X	6.30	± 9.5% (k=2)	Boundary effect:	
ConvF Y	6.30	± 9.5% (k=2)	Alpha	0.41
ConvF Z	6.30	± 9.5% (k=2)	Depth	2.45

Head **1500 MHz** ε_r **= 40.4 ± 5%** σ **= 1.23 ± 10% mho/m**

ConvF X	5.54	interpolated	Boundary effect:	
ConvF Y	5.54	interpolated	Alpha	0.52
ConvF Z	5.54	interpolated	Depth	2.33

Head **1700 - 1910 MHz** ε_r **= 39.5 - 41.0** σ **= 1.20 - 1.55 mho/m**

ConvF X	5.17	± 9.5% (k=2)	Boundary effect:	
ConvF Y	5.17	± 9.5% (k=2)	Alpha	0.57
ConvF Z	5.17	± 9.5% (k=2)	Depth	2.27

Sensor Offset

Probe Tip to Sensor Center	2.7
Optical Surface Detection	1.4 ± 0.2

Schmid & Partner
Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	ET3DV6
Serial Number:	1547
Place of Assessment:	Zurich
Date of Assessment:	November 17, 2001
Probe Calibration Date:	November 16, 2001

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:

Dosimetric E-Field Probe ET3DV6 SN:1547

Conversion factor (± standard deviation)

150 MHz	ConvF	**7.9 ± 8%**	**ε_r = 61.9** **σ = 0.80 mho/m** (muscle tissue)
236 MHz	ConvF	**7.7 ± 8%**	ε_r = 59.8 σ = 0.87 mho/m (muscle tissue)
300 MHz	ConvF	**7.6 ± 8%**	**ε_r = 58.2** **σ = 0.92 mho/m** (muscle tissue)
350 MHz	ConvF	**7.4 ± 8%**	**ε_r = 57.7** **σ = 0.93 mho/m** (muscle tissue)
450 MHz	ConvF	**7.2 ± 8%**	ε_r = 56.7 σ = 0.94 mho/m (muscle tissue)
784 MHz	ConvF	**6.3 ± 8%**	**ε_r = 55.4** **σ = 0.97 mho/m** (muscle tissue)
835 MHz	ConvF	**6.2 ± 8%**	**ε_r = 55.2** **σ = 0.97 mho/m** (muscle tissue)
925 MHz	ConvF	**6.0 ± 8%**	ε_r = 55.0 σ = 1.06 mho/m (muscle tissue)
1450 MHz	ConvF	**5.5 ± 8%**	**ε_r = 54.0** **σ = 1.30 mho/m** (muscle tissue)
1900 MHz	ConvF	**4.8 ± 8%**	ε_r = 53.3 σ = 1.52 mho/m (muscle tissue)
2450 MHz	ConvF	**4.0 ± 8%**	ε_r = 52.7 σ = 1.95 mho/m (muscle tissue)

Dosimetric E-Field Probe ET3DV6 SN:1547

Conversion factor (± standard deviation)

150 MHz	ConvF	**8.6 ± 8%**	ε_r = 52.3 σ = 0.76 mho/m (head tissue)
236 MHz	ConvF	**7.8 ± 8%**	ε_r = 48.3 σ = 0.82 mho/m (head tissue)
300 MHz	ConvF	**7.4 ± 8%**	ε_r = 45.3 σ = 0.87 mho/m (head tissue)
350 MHz	ConvF	**7.3 ± 8%**	ε_r = 44.7 σ = 0.87 mho/m (head tissue)
400 MHz	ConvF	**7.2 ± 8%**	ε_r = 44.4 σ = 0.87 mho/m (head tissue - CENELEC)
450 MHz	ConvF	**7.1 ± 8%**	ε_r = 43.5 σ = 0.87 mho/m (head tissue)
784 MHz	ConvF	**6.5 ± 8%**	ε_r = 41.8 σ = 0.90 mho/m (head tissue)
835 MHz	ConvF	**6.4 ± 8%**	ε_r = 41.5 σ = 0.90 mho/m (head tissue)
835 MHz	ConvF	**6.4 ± 8%**	ε_r = 42.5 σ = 0.98 mho/m (head tissue - CENELEC)
925 MHz	ConvF	**6.2 ± 8%**	ε_r = 41.5 σ = 0.98 mho/m (head tissue)
900 MHz	ConvF	**6.3 ± 8%**	ε_r = 42.3 σ = 0.99 mho/m (head tissue - CENELEC)

Dosimetric E-Field Probe ET3DV6 SN:1547

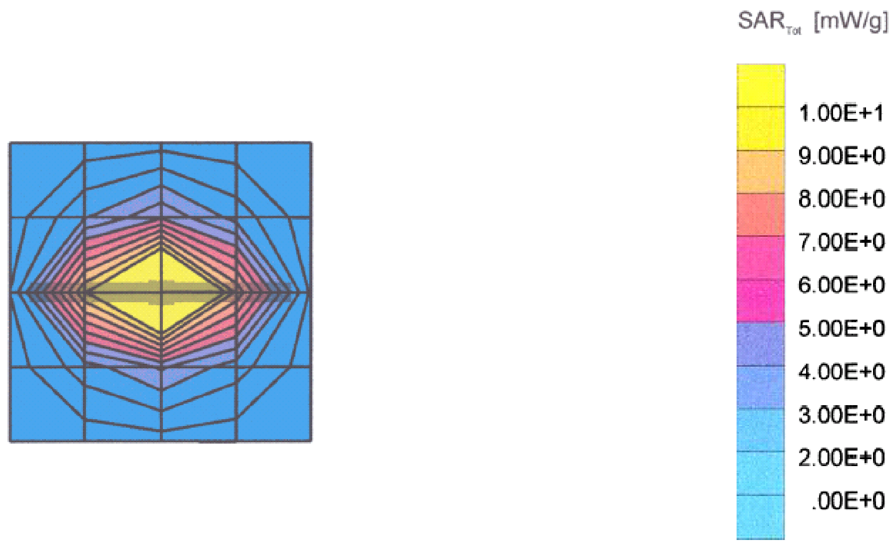
Conversion factor (± standard deviation)

1500 MHz	ConvF	**5.8 ± 8%**	ε_r = 40.4 σ = 1.23 mho/m (head tissue)
1900 MHz	ConvF	**5.2 ± 8%**	ε_r = 40.0 σ = 1.40 mho/m (head tissue)
2450 MHz	ConvF	**4.4 ± 8%**	ε_r = 39.2 σ = 1.80 mho/m (head tissue)

04/23/01

Validation Dipole D2450V2 SN:703, d = 10 mm

Frequency: 2450 MHz; Antenna Input Power: 250 [mW]
Generic Twin Phantom; Flat Section; Grid Spacing: Dx = 15.0, Dy = 15.0, Dz = 10.0
Probe: ET3DV6 - SN1507; ConvF(5.32,5.32,5.32) at 2450 MHz; IEEE1528 2450 MHz ; σ = 2.09 mho/m ε_r = 37.2 ρ = 1.00 g/cm³
Cubes (2): Peak: 32.3 mW/g ± 0.05 dB, SAR (1g): 14.9 mW/g ± 0.04 dB, SAR (10g): 6.61 mW/g ± 0.02 dB, (Worst-case extrapolation)
Penetration depth: 5.9 (5.6, 6.5) [mm]
Powerdrift: 0.02 dB



Calibration Certificate

900 MHz System Validation Dipole

Type:	**D900V2**
Serial Number:	**084**
Place of Calibration:	**Zurich**
Date of Calibration:	**February 11, 2002**
Calibration Interval:	**24 months**

Schmid & Partner Engineering AG hereby certifies, that this device has been calibrated on the date indicated above. The calibration was performed in accordance with specifications and procedures of Schmid & Partner Engineering AG.

Wherever applicable, the standards used in the calibration process are traceable to international standards. In all other cases the standards of the Laboratory for EMF and Microwave Electronics at the Swiss Federal Institute of Technology (ETH) in Zurich, Switzerland have been applied.

Calibrated by:

Approved by:

1. Measurement Conditions

The measurements were performed in the flat section of the SAM twin phantom filled with head simulating solution of the following electrical parameters at 900 MHz:

Relative Dielectricity	**41.1**	± 5%
Conductivity	**0.95 mho/m**	± 5%

The DASY3 System (Software version 3.1d) with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 6.5) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 15mm from dipole center to the solution surface. The included distance holder was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 20mm was aligned with the dipole. The 5x5x7 fine cube was chosen for cube integration. Probe isotropy errors were cancelled by measuring the SAR with normal and 90° turned probe orientations and averaging.
The dipole input power (forward power) was 250mW ± 3 %. The results are normalized to 1W input power.

2. SAR Measurement

Standard SAR-measurements were performed with the phantom according to the measurement conditions described in section 1. The results have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values are:

averaged over 1 cm^3 (1 g) of tissue:	**11.2 mW/g**
averaged over 10 cm^3 (10 g) of tissue:	**7.12 mW/g**

Note: If the liquid parameters for validation are slightly different from the ones used for initial calibration, the SAR-values will be different as well.

3. Dipole Impedance and Return Loss

The impedance was measured at the SMA-connector with a network analyzer and numerically transformed to the dipole feedpoint. The transformation parameters from the SMA-connector to the dipole feedpoint are:

Electrical delay:	**1.389 ns**	(one direction)
Transmission factor:	**0.997**	(voltage transmission, one direction)

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

Feedpoint impedance at 900 MHz:	Re{Z} = **52.1 Ω**
	Im {Z} = **-4.3 Ω**
Return Loss at 900 MHz	**-26.5 dB**

4. Measurement Conditions

The measurements were performed in the flat section of the SAM twin phantom filled with body simulating solution of the following electrical parameters at 900 MHz:

Relative Dielectricity	**54.8**	± 5%
Conductivity	**1.03 mho/m**	± 5%

The DASY3 System (Software version 3.1d) with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 6.2) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 15mm from dipole center to the solution surface. The included distance holder was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 20mm was aligned with the dipole. The 5x5x7 fine cube was chosen for cube integration. Probe isotropy errors were cancelled by measuring the SAR with normal and 90° turned probe orientations and averaging.
The dipole input power (forward power) was 250mW ± 3 %. The results are normalized to 1W input power.

5. SAR Measurement

Standard SAR-measurements were performed with the phantom according to the measurement conditions described in section 4. The results have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values are:

averaged over 1 cm^3 (1 g) of tissue:	**11.8 mW/g**
averaged over 10 cm^3 (10 g) of tissue:	**7.52 mW/g**

6. Dipole Impedance and Return Loss

The dipole was positioned at the flat phantom sections according to section 4 and the distance holder was in place during impedance measurements.

Feedpoint impedance at 900 MHz:	Re{Z} = **47.6 Ω**
	Im {Z} = **-6.0 Ω**
Return Loss at 900 MHz	**-23.6 dB**

7. Handling

Do not apply excessive force to the dipole arms, because they might bend. Bending of the dipole arms stresses the soldered connections near the feedpoint leading to a damage of the dipole.

8. Design

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

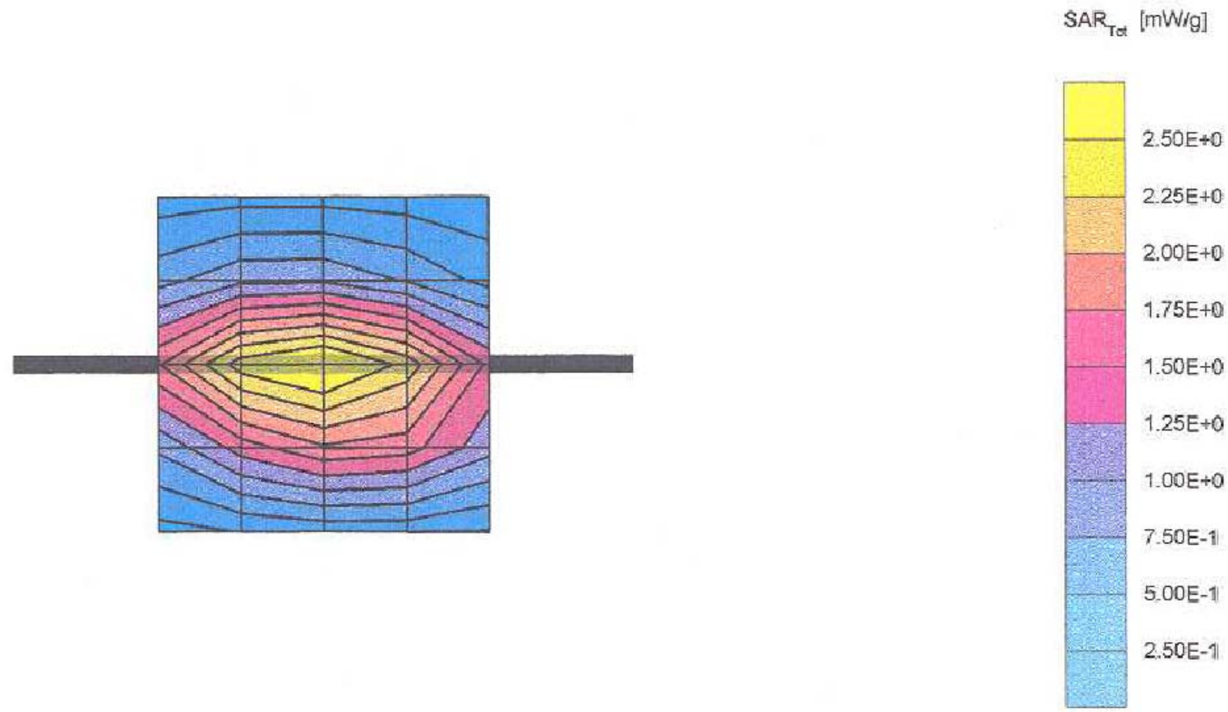
9. Power Test

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

02/11/02

Validation Dipole D900V2 SN:084, d = 15 mm

Frequency: 900 MHz; Antenna Input Power: 250 [mW]
SAM Phantom; Flat Section; Grid Spacing: Dx = 20.0, Dy = 20.0, Dz = 10.0
Probe: ET3DV6 - SN1507; ConvF(6.50,6.50,6.50) at 900 MHz; IEEE1528 900 MHz; σ = 0.95 mho/m ε_r = 41.1 ρ = 1.00 g/cm^3
Cubes (2): Peak: 4.54 mW/g ± 0.03 dB, SAR (1g): 2.81 mW/g ± 0.02 dB, SAR (10g): 1.78 mW/g ± 0.02 dB, (Worst-case extrapolation)
Penetration depth: 11.5 (10.3, 13.2) [mm]
Powerdrift: -0.01 dB

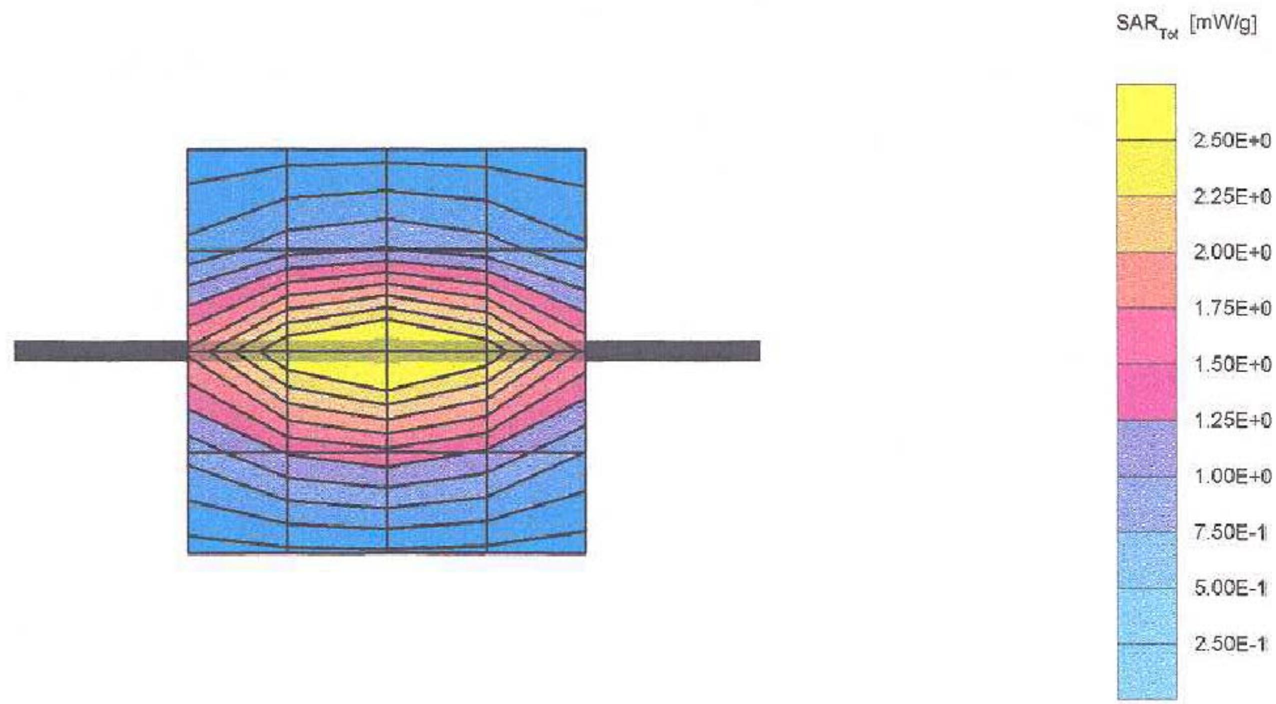


Schmid & Partner Engineering AG, Zurich, Switzerland

02/11/02

Validation Dipole D900V2 SN:084, d = 15 mm

Frequency: 900 MHz; Antenna Input Power: 250 [mW]
SAM Phantom; Flat Section; Grid Spacing: Dx = 20.0, Dy = 20.0, Dz = 10.0
Probe: ET3DV6 - SN1507; ConvF(6.20,6.20,6.20) at 900 MHz; Muscle 900 MHz; σ = 1.03 mho/m ε_r = 54.8 ρ = 1.00 g/cm^3
Cubes (2): Peak: 4.72 mW/g ± 0.02 dB, SAR (1g): 2.95 mW/g ± 0.01 dB, SAR (10g): 1.88 mW/g ± 0.00 dB, (Worst-case extrapolation)
Penetration depth: 12.0 (10.7, 13.7) [mm]
Powerdrift: -0.01 dB



Schmid & Partner Engineering AG, Zurich, Switzerland

APPENDIX E
Illustration of Body-Worn Accessories

The purpose of this appendix is to illustrate the body-worn carry accessories for FCC ID: AZ489FT5820. The sample that was used in the following photos represents the product used to obtain the results presented herein and was used in section to demonstrate the different body-worn accessories.

Photo 1.
Model FLN9580A
Back View

Photo 2.
Model FLN9580A
Front View

Photo 3.
Model FLN9580A
Side View

Photo 4.
Model FLN5372A
Back View

Photo 5.
Model FLN5372A
Front View

Photo 6.
Model FLN5372A
Side View

Photo 7.
Model HLN9714A
Side View

Photo 8.
Model HLN9714A
Back View

Photo 9.
Model HLN9844A
Side View

Photo 10.
Model HLN9844A
Back View

Appendix F
Accessories and options test status and separation distances

The following table summarizes the body spacing distance provided by each of the body-worn accessories:

Carry Case Model	Tested ?	Separation distance between device and phantom surface. (mm)	Comments
HLN9714A	Yes	39	NA
HLN9844A	Yes	40	NA
FLN9580A	Yes	72	NA
FLN5372A	No	72	Same metalic components and separation distance

Audio Acc. Model	Tested ?	Separation distance between device and phantom surface. (mm)	Comments
FLN2854A	Yes	NA	NA
FLN2800A	Yes	NA	NA
NTN8513A	Yes	NA	Tested w/ FLN2854A
NTN8496A	Yes	NA	Tested w/ FLN2854A
NTN8497A	Yes	NA	Tested w/ FLN2854A

Other options	Tested ?	Separation distance between device and phantom surface. (mm)	Comments
NKN6503B	Yes	NA	NA
RAF4003ARM	No	NA	Mobile antenna option for intended use > 20cm. The mobile antenna uses the PA of the DUT as the only drive source. Testing not performed because S.A.R. assessments for portable use < 20cm using the offered standard antenna produces the most conservative results.
RRA 4935A	No	NA	Mobile antenna option for intended use > 20cm. The mobile antenna uses the PA of the DUT as the only drive source. Testing not performed because S.A.R. assessments for portable use < 20cm using the offered standard antenna produces the most conservative results.