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CGISS EME Test Laboratory
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S.A.R. EME Compliance Test Report
Part 1 of 3

Date of Report:	November 24, 2003
Report Revision:	Rev. O
Manufacturer:	Motorola
Product Description:	Portable 435-480 MHz, 4W, 32 CH w/ display/Limited Keypad
FCC ID:	**ABZ99FT4065**
Device Model:	PMUE2138A

Test Period:	11/17/03 – 11/20/03
EME Technician:	Clint Miller
Responsible Engineer:	Kim Uong (Sr. EME Engineer)
Author:	Kim Uong (Sr. EME Engineer)
Review By:	Michael Sailsman Global 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 all applicable national and international reference standards and guidelines.

Deanna Zakharia Signature on File　　　11/24/03

Ken Enger　　　Date Approved
Senior Resource Manager, Product Safety and EME Director, Phone: 954-723-6299

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REVISION HISTORY

Date	Revision	Comments
11/24/03	O	Release of Pilot results

1.0 Introduction

This report details the utilization, test setup, test equipment, and updated test results of the Specific Absorption Rate (S.A.R.) measurements performed at the CGISS EME Test Lab for model number PMUE2138A, FCC ID: ABZ99FT4065.

The applicable exposure environment is Occupational/Controlled.

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
- 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 Terminal 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 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: ABZ99FT4065, operates using Frequency Modulation (FM) incorporating traditional simplex two-way radio transmission protocol. The intended operating positions are “at the face” with the DUT 1 to 2 inches from the mouth, and “at the body” by means of the offered body-worn accessories. Audio and PTT operation while the radio is at the body is accomplished by means of optional remote accessories that connect to the radio. This device will be marketed to and used by employees solely for work-related operations, such as public safety agencies, e.g. police, fire and emergency medical. User training is the responsibility of these agencies, which can be expected to employ the usage instructions, safety information and operational cautions set forth in the user's manual, instructional sessions or other means. Motorola also makes available to its customers training classes on the proper use of two-way radios and wireless data devices.

FCC ID: ABZ99FT4065 is capable of operating in the 435 - 480 MHz band. The rated power is 4 watts with a maximum output capability of 4.7 watts as defined by the upper limit of the production line final test station.

FCC ID: ABZ99FT4065 is offered with the following options and accessories:

Antenna

PMAE4011A	Helical 435-480 MHz antenna; -10dBd
PMAE4003A	Helical 430-470 MHz antenna; -12dBd
NAE6483A	Whip 403-520 MHz antenna; -4dBd

Batteries

PMNN4046A	Std. NiMH battery

Body-worn Accessories

4285820Z01	Shoulder Strap
HLN9844A	Belt Clip (1.5" belt width)
PMLN4467A	Carry case, Soft Leather Black
PMLN4468A	Carry Holster Case, Neoprene Grey
PMLN4469A	Carry Holster Case, Neoprene Blue
RLN4815A	Fanny Pack Carry Accessory
HLN9985B	Waterproof Bag

Audio attachments

PMLN4294C	Ear Set Mic w/PTT
PMLN4425A	Ear set Boom Mic w/ remote ring PTT
HMN9030A	Remote Speaker Mic
HMN9013A	Lightweight handset w/ Boom Mic

3.1 Test Signal

Test Signal mode:

Test Mode	X	Base Station		Simulator	

Transmission Mode:

CW	**X**
Native Transmission	
TDM:	
Other	

3.2 Test Output Power

Output power was measured before each test. The DASY 3 system's S.A.R. drift function was used to determine the power slump characteristic of the device. A characteristic power slump table based on 50 ohms measurements is provided in APPENDIX A for the battery producing the highest S.A.R. results.

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 SPEAG user manual and application notes for detailed probe, robot, and S.A.R. computational procedures.

The S.A.R. measurements were conducted with probe model/serial number ET3DV6/SN1383. The system performance check was conducted daily and within 24 hours prior to testing. 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(s)
1383	FCC Body	2/26/03	SPEAG D450V2 /1002	4.67 +/- 0.04	4.52 +/- 10%	11/17/03-11/20/03 4 test days
1383	IEEE Head	2/26/03	SPEAG D450V2 /1002	5.01	4.70 +/- 10%	11/19/03

Note: see APPENDIX C for an explanation of the reference S.A.R. targets stated above.

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 was used to assess performance at the body and face. The phantom mounts on a wooden supporting structure having a loss tangent of < 0.05. The support 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 table below shows the flat phantom dimensions used for S.A.R. performance assessment at the body and face.

	Body	Face
Length	80cm	80cm
Width	60cm	30cm
Height	20cm	20cm
Surface Thickness	0.2cm	0.2cm

4.2.2 SAM Phantom

SAM Phantom assessment was not applicable for this filing.

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	Torso
IEEE Head	Face

4.3.2 Simulated Tissue Composition

Tissue Ingredient (%) @ 450 MHz		
	Head	**Body**
Sugar	56	46.5
DGBE (Glycol)	-	-
De ionized -Water	39.1	50.53
Salt	3.8	1.87
HEC	1.0	1.0
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.

Tissue parameters

FCC Body				
Frequency (MHz)	Di-electric Constant Target	Di-electric Constant Meas. (Range)	Conductivity Target S/m	Conductivity Meas. (Range) S/m
450	56.7	54.9 - 55.3	0.94	0.93 - 0.94
458	56.7	54.8 – 55.2	0.94	0.94 - 0.94

IEEE Head				
Frequency (MHz)	Di-electric Constant Target	Di-electric Constant Meas. (Range)	Conductivity Target S/m	Conductivity Meas. (Range) S/m
450	43.5	44.1 – 44.1	0.87	0.89 – 0.89
458	43.5	43.9 – 43.9	0.87	0.89 – 0.89

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. 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: 20.6-23.6˚C Avg. 22.3˚C
Relative Humidity	30 - 70 %	Range: 42.2-50.4% Avg. 45.5%
Tissue Temperature	NA	Range: 20.3 – 21.0˚C Avg. 20.6 ˚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 for this product. S.A.R. measurements were performed using a flat phantom to assess performance at the body and face. All assessments were done using the flat phantom with the DUT in CW mode. Applicable tissue parameters were used for each body location assessment.

DUT assessment at the body; Antenna search

The DUT was assessed against the flat phantom, near the center frequency of each antenna's TX band, with the offered belt clip, using the offered battery, and the Remote Speaker Microphone.

DUT assessment at the body; Other carry case accessories search

The DUT was assessed against the flat phantom, using the configuration above that produced the highest S.A.R. results, along with each of the offered carry case accessories.

DUT assessment at the body; Other audio accessories search

The DUT was assessed using the worst-case configuration from the assessments above with each of the offered audio accessories not previously tested.

DUT assessment at the body; Across the TX band for each offered antenna

The DUT was assessed across each of the offered antenna's TX band, using the worst-case test configuration from the audio assessment above.

DUT assessment at the body; 2.5cm separation

The DUT was assessed with 2.5cm separation from the phantom, using the worst-case test configuration from the antenna assessment above without the associated carry case accessory.

DUT assessment at the body; "Shortened" scan of worst-case test configuration

The DUT was assessed using the worst-case test configuration at the body overall utilizing a shortened cube scan.

DUT assessment at the Face; Across the frequency band of each offered antenna

The DUT was assessed with 2.5cm separation distance from the phantom, across the TX band of each offered antenna.

DUT assessment at the Face; "Shortened" scan of worst-case test configuration

The DUT was assessed using the worst-case test configuration at the face overall utilizing a shortened cube scan.

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 Body

The DUT was positioned such that the applicable carry case accessories were centered against the flat phantom. The DUT back housing and front housing was positioned with 2.5cm separation distance from the flat phantom.

5.1.2 Head

Assessments at the head was not applicable for this filing

5.1.3 Face

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

5.2 Test Position Photographs

Figure 1: Highest S.A.R. Test Position
DUT with carry holster model PMLN4468A against the flat phantom, antenna model PMAE4003A, and attached audio accessory HMN9030A

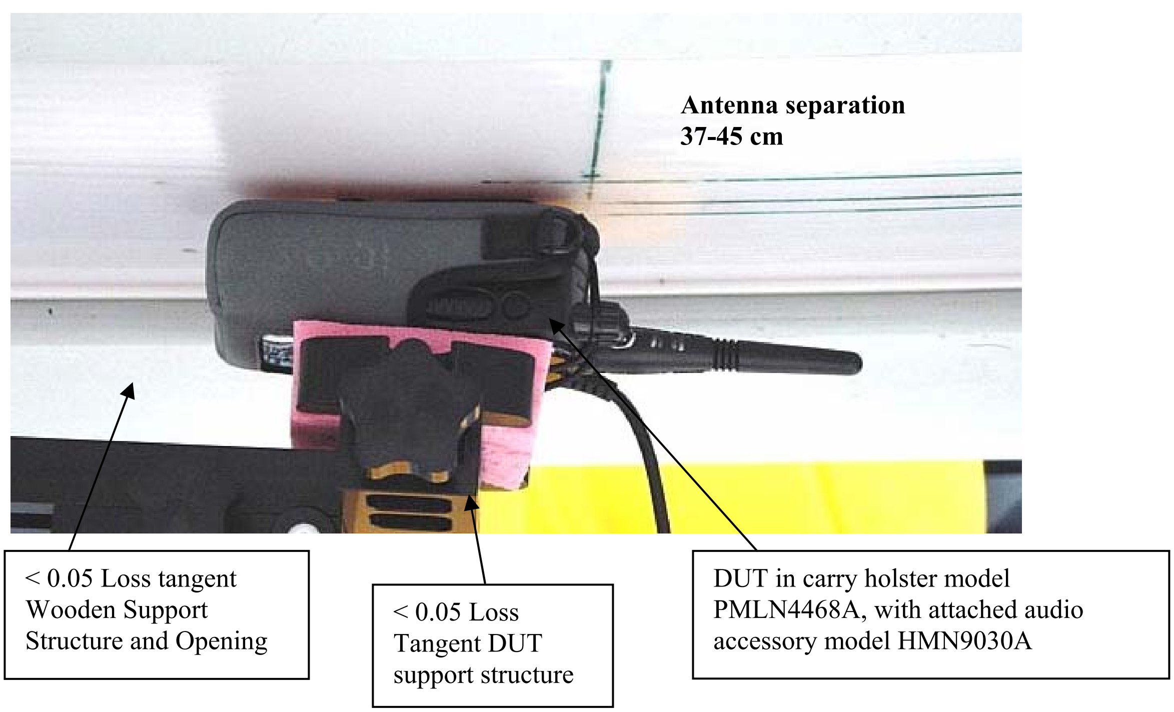


Figure 2. Assessment @ the Body; DUT w/ belt clip model HLN9844A against the flat phantom with antenna model PMAE4003A and attached audio accessory model HMN9030A (Same position used to assess the other offered antennas)

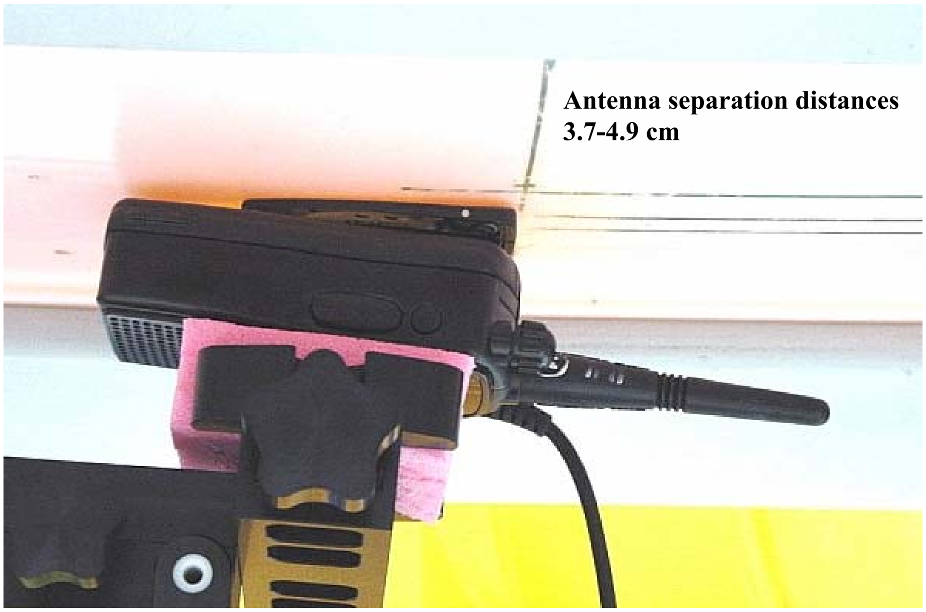


Figure 3. Assessment @ the Body; DUT w/ carry case accessory model RLN4815A, with antenna model PMAE4003A, and audio accessory model HMN9030A

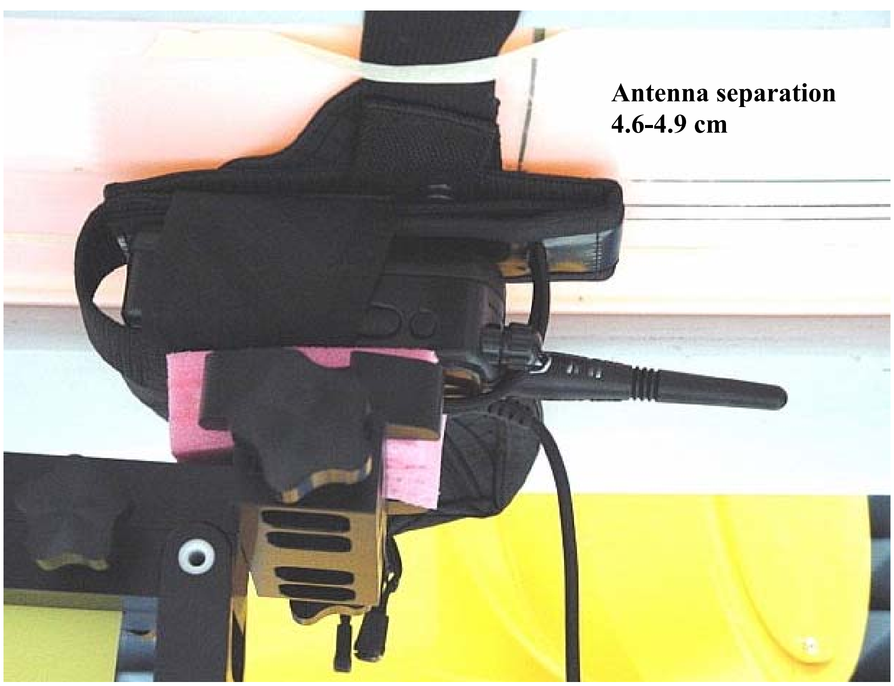


Figure 4. Assessment @ the Body; DUT w/ carry case accessory model PMLN4467A, with antenna model PMAE4003A, and attached audio accessory model HMN9030A

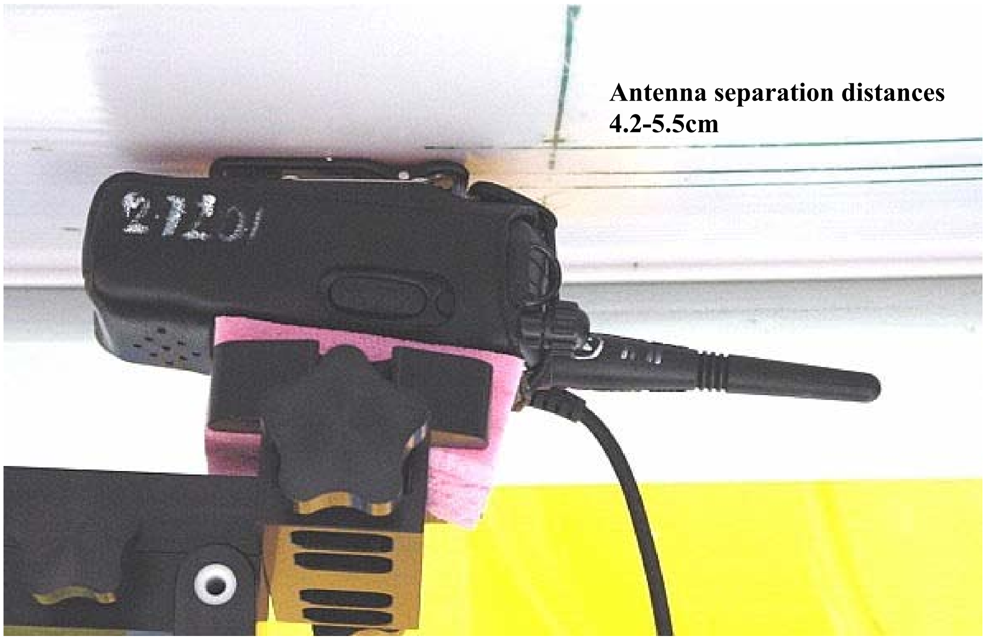


Figure 5: Assessment @ the Body; DUT front towards the phantom separated 2.5cm, with antenna model PMAE4003A and attached audio accessory model HMN9030A

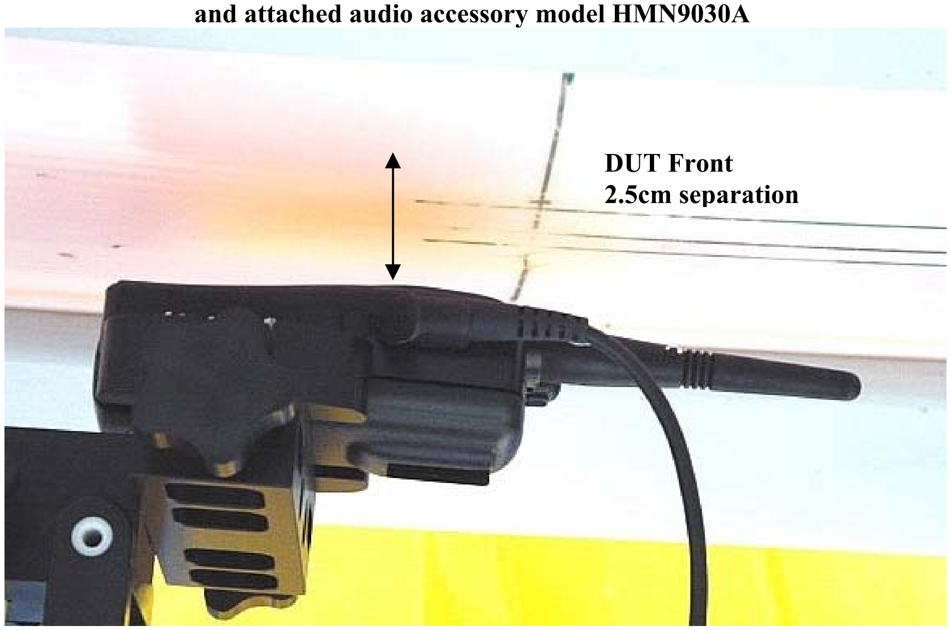


Figure 6: Assessment @ the Body;
DUT back towards the phantom and separated 2.5cm, with antenna model PMAE4003A, and attached audio accessory model HMN9030A

Figure 7: Assessment @ the Face;
DUT Front towards the phantom and separated 2.5cm, with antenna model PMAE4003A

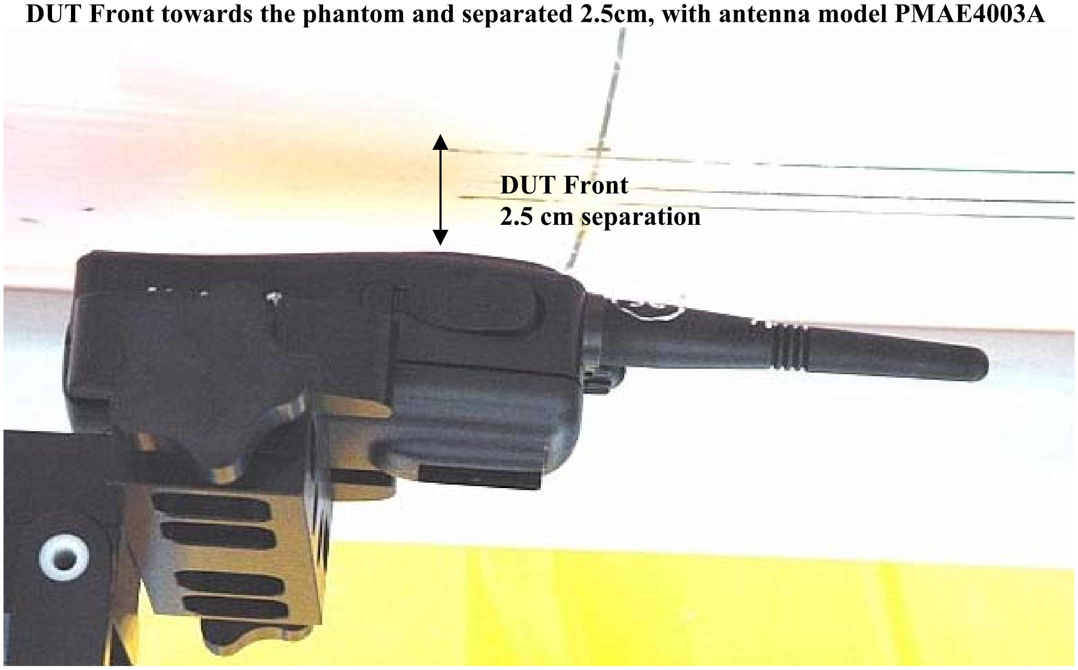
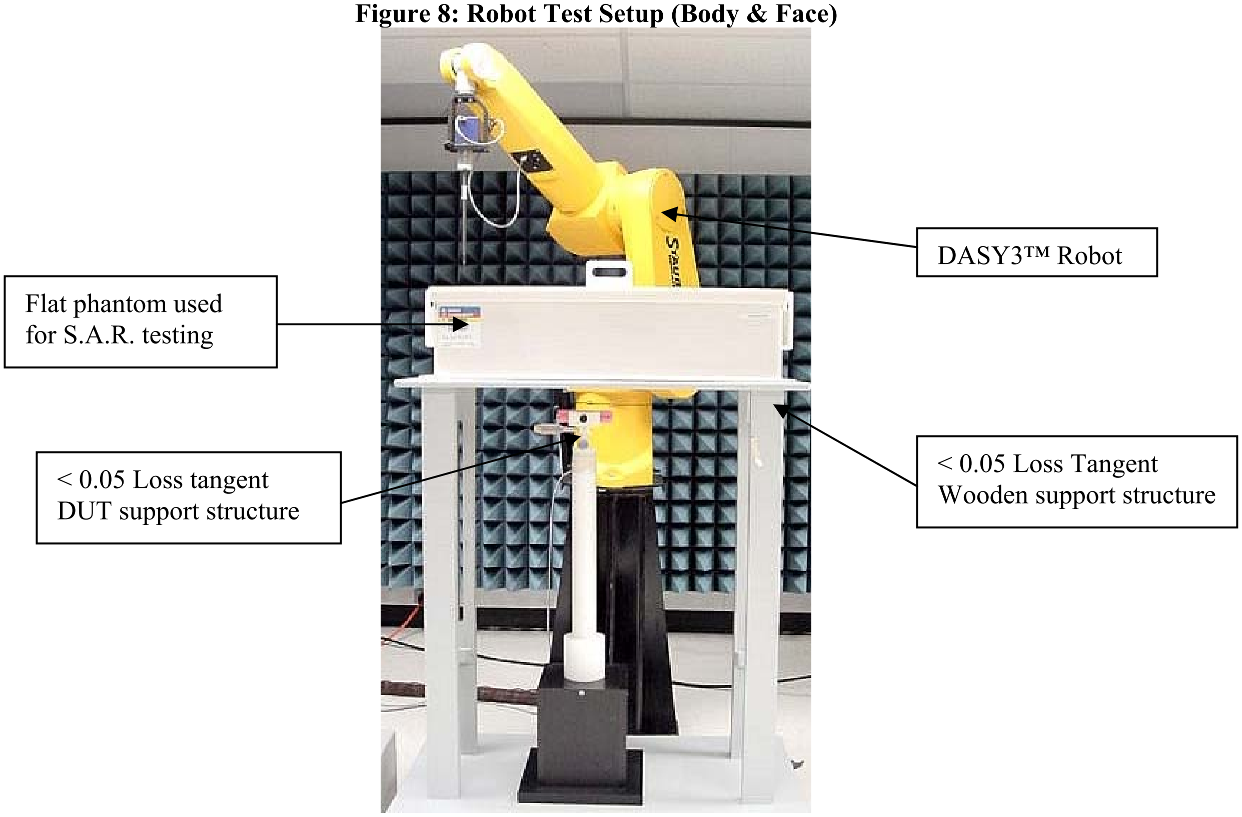


Figure 8: Robot Test Setup (Body & Face)



5.3 Probe Scan Procedures

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.

6.0 Measurement Uncertainty

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.**	**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	∞
Spherical Isotropy	E.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3	5.7	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				12	11	1361
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				23	22	

Uncertainty Budget for System Performance Check (dipole & flat phantom)

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	**Sec.**	**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	5.7	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	9.4	99999
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				20	18	

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. DASY3™ S.A.R. measurement scans are provided in APPENDIX B for the bolded S.A.R. results presented in section 7.1.

7.1 S.A.R. results

Run Number / SN	Freq (MHz)	Antenna/ Pos.	Battery	Test Pos.	Body-worn Acc.	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 Cal 1g S.A.R. (mW/g)	Max Cal 10g S.A.R. (mW/g)
Compliance Assessment at the body; CW mode												
DUT assessment at the body; Antenna search												
KU-R2-031117-02/ 246XDU0031	457.525	PMAE4011A/ Fixed	PMNN4046A	Against phantom	HLN9844A	HMN9030A	4.67	-1.28	2.06	1.44	1.39	0.97
CM-R2-031117-08/ 246XDU0031	449.525	PMAE4003A/ Fixed	PMNN4046A	Against phantom	HLN9844A	HMN9030A	4.50	-0.03	6.74	4.68	**3.54**	2.46
CM-R2-031117-09/ 246XDU0031	457.525	NAE6483A/ Fixed	PMNN4046A	Against phantom	HLN9844A	HMN9030A	4.63	-0.79	3.61	2.53	2.20	1.54
DUT assessment at the body; Other carry case accessories search												
CM-R2-031117-10/ 246XDU0031	449.525	PMAE4003A/ Fixed	PMNN4046A	Against phantom	PMLN4467A	HMN9030A	4.45	0.00	5.24	3.75	2.77	1.98
CM-R2-031117-11/ 246XDU0031	449.525	PMAE4003A/ Fixed	PMNN4046A	Against phantom	PMLN4468A 4285820Z01	HMN9030A	4.55	0.05	7.30	4.90	3.77	2.53
CM-R2-031117-12/ 246XDU0031	449.525	PMAE4003A/ Fixed	PMNN4046A	Against phantom	PMLN4468A	HMN9030A	4.55	-0.05	7.24	4.90	**3.78**	2.56
CM-R2-031117-13/ 246XDU0031	449.525	PMAE4003A/ Fixed	PMNN4046A	Against phantom	RLN4815A	HMN9030A	4.44	-0.03	4.11	3.02	2.19	1.61
DUT assessment at the body; Other audio accessories search												
KU-R2-031118-05/ 246XDU0031	449.525	PMAE4003A/ Fixed	PMNN4046A	Against phantom	PMLN4468A	PMLN4294C	4.58	-0.13	6.64	4.48	3.51	2.37
KU-R2-031118-06/ 246XDU0031	449.525	PMAE4003A/ Fixed	PMNN4046A	Against phantom	PMLN4468A	HMN9013A	4.55	0.06	6.70	4.53	3.46	2.34
KU-R2-031118-07/ 246XDU0031	449.525	PMAE4003A/ Fixed	PMNN4046A	Against phantom	PMLN4468A	PMLN4425A	4.50	-0.08	7.09	4.79	**3.77**	2.55

Compliance Assessment at the body; CW mode; across the TX band w/ worst case configuration from audio accessory assessment												
Run Number / SN	**Freq (MHz)**	**Antenna/ Pos.**	**Battery**	**Test Pos.**	**Body-worn Acc.**	**Additional attachments**	**Initial Power (W)**	**SAR Drift (dB)**	**Meas 1g SAR (mW/g)**	**Meas 10g SAR (mW/g)**	**Max Cal 1g SAR (mW/g)**	**Max Cal 10g SAR (mW/g)**
Antenna assessment across the TX band; PMAE4003A												
KU-R2-031118-08/ 246XDU0031	435.025	PMAE4003A/ Fixed	PMNN4046A	Against phantom	PMLN4468A	HMN9030A	4.55	-0.44	5.92	4.00	3.38	2.29
KU-R2-031118-09/ 246XDU0031	469.525	PMAE4003A/ Fixed	PMNN4046A	Against phantom	PMLN4468A	HMN9030A	4.80	-1.35	6.26	4.19	**4.27**	2.86
Antenna assessment across the TX band; PMAE4011A												
CM-R2-031118-10/ 246XDU0031	435.025	PMAE4011A/ Fixed	PMNN4046A	Against phantom	PMLN4468A	HMN9030A	4.60	-0.43	4.19	2.86	2.36	1.61
CM-R2-031118-11/ 246XDU0031	457.525	PMAE4011A/ Fixed	PMNN4046A	Against phantom	PMLN4468A	HMN9030A	4.71	-1.25	2.05	1.39	1.37	0.93
CM-R2-031118-12/ 246XDU0031	479.975	PMAE4011A/ Fixed	PMNN4046A	Against phantom	PMLN4468A	HMN9030A	4.60	-0.90	1.20	0.80	0.75	0.50
Antenna assessment across the TX band; NAE6483A												
CM-R2-031118-13/ 246XDU0031	435.025	NAE6483A/ Fixed	PMNN4046A	Against phantom	PMLN4468A	HMN9030A	4.45	-0.28	5.38	3.70	3.03	2.08
CM-R2-031118-14/ 246XDU0031	457.525	NAE6483A/ Fixed	PMNN4046A	Against phantom	PMLN4468A	HMN9030A	4.65	-1.14	3.71	2.51	2.44	1.65
CM-R2-031118-15/ 246XDU0031	479.975	NAE6483A/ Fixed	PMNN4046A	Against phantom	PMLN4468A	HMN9030A	4.70	-1.17	2.29	1.55	1.50	1.01

Compliance Assessment at the body; CW mode												
Run Number / SN	**Freq (MHz)**	**Antenna/ Pos.**	**Battery**	**Test Pos.**	**Body-worn Acc.**	**Additional attachments**	**Initial Power (W)**	**SAR Drift (dB)**	**Meas 1g SAR (mW/g)**	**Meas 10g SAR (mW/g)**	**Max Cal 1g SAR (mW/g)**	**Max Cal 10g SAR (mW/g)**
DUT assessment at the body; 2.5cm separation												
CM-R2-031118-17/ 246XDU0031	469.525	PMAE4003A/ Fixed	PMNN4046A	DUT back 2.5cm	None	HMN9030A	4.65	-0.94	3.39	2.49	2.13	1.56
CM-R2-031118-18/ 246XDU0031	469.525	PMAE4003A/ Fixed	PMNN4046A	DUT front 2.5cm	None	HMN9030A	4.65	-0.83	4.03	2.91	**2.47**	1.78

Compliance Assessment at the face; CW mode; across the TX band of each offered antenna												
Run Number / SN	**Freq (MHz)**	**Antenna/ Pos.**	**Battery**	**Test Pos.**	**Body-worn Acc.**	**Additional attachments**	**Initial Power (W)**	**SAR Drift (dB)**	**Meas 1g SAR (mW/g)**	**Meas 10g SAR (mW/g)**	**Max Cal 1g SAR (mW/g)**	**Max Cal 10g SAR (mW/g)**
Antenna assessment across the TX band; PMAE4003A												
KU-R2-031119-03/ 246XDU0031	435.025	PMAE4003A/ Fixed	PMNN4046A	DUT front 2.5cm	None	None	4.66	-0.48	6.18	4.47	3.48	2.52
KU-R2-031119-04/ 246XDU0031	449.525	PMAE4003A/ Fixed	PMNN4046A	DUT front 2.5cm	None	None	4.64	-0.21	6.25	4.50	3.32	2.39
KU-R2-031119-05/ 246XDU0031	469.525	PMAE4003A/ Fixed	PMNN4046A	DUT front 2.5cm	None	None	4.80	-1.12	5.69	4.08	3.68	2.64
CM-R2-031119-13/ 246XDU0031 Shorten scan	469.525	PMAE4003A/ Fixed	PMNN4046A	DUT front 2.5cm	None	None	4.55	-0.79	6.03	4.31	**3.74**	2.67
Antenna assessment across the TX band; PMAE4011A												
KU-R2-031119-06/ 246XDU0031	435.025	PMAE4011A/ Fixed	PMNN4046A	DUT front 2.5cm	None	None	4.62	-0.55	4.11	2.97	2.37	1.71
KU-R2-031119-07/ 246XDU0031	457.525	PMAE4011A/ Fixed	PMNN4046A	DUT front 2.5cm	None	None	4.70	-1.02	2.05	1.47	1.30	0.93
KU-R2-031119-08/ 246XDU0031	479.975	PMAE4011A/ Fixed	PMNN4046A	DUT front 2.5cm	None	None	4.75	-0.94	1.16	0.83	0.72	0.51
Antenna assessment across the TX band; NAE6483A												
KU-R2-031119-09/ 246XDU0031	435.025	NAE6483A/ Fixed	PMNN4046A	DUT front 2.5cm	None	None	4.58	-0.32	5.46	3.95	3.02	2.18
CM-R2-031119-11/ 246XDU0031	457.525	NAE6483A/ Fixed	PMNN4046A	DUT front 2.5cm	None	None	4.66	-1.66	3.41	2.45	2.52	1.81
CM-R2-031119-12/ 246XDU0031	479.975	NAE6483A/ Fixed	PMNN4046A	DUT front 2.5cm	None	None	4.50	-0.35	2.14	1.54	1.21	0.87

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

Max. Calc. 1-g and 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)
$SAR_{meas.}$ = Measured 1 gram averaged peak S.A.R. (mW/g)
DC % = Transmission mode duty cycle in % where applicable
Note that the use of the above formula should consider the relationship between the initial power, max power, and drift in determining conservative results.

8.0 Conclusion

The highest Operational Maximum Calculated 1-gram and 10-gram average S.A.R. values found for FCC ID: ABZ99FT4065

At the Body: 1-g Avg. = 4.27 mW/g; 10-g Avg. = 2.86 mW/g
At the Face: 1-g Avg. = 3.74 mW/g; 10-g Avg. = 2.67 mW/g
At the Head: NA

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