MOTOROLA

ACCREDITED
TESTING CERT # 2518.01

DECLARATION OF COMPLIANCE: MPE ASSESSMENT

Enterprise Mobility Solutions
EME Test Laboratory
8000 West Sunrise Blvd
Fort Lauderdale, FL. 33322

Date of Report: February 3, 2011
Report Revision: A
Report ID: SR8954_MPE rpt_APX7500_UHF R2_15W Motorcycle_Rev A_02032011

Responsible Engineer:	Stephen C. Whalen (Principal Staff EME Test Engineer)
Report author:	Stephen C. Whalen (Principal Staff EME Test Engineer)
Date/s Tested:	11/12/2010, 1/28/2011
Manufacturer/Location:	Motorola, Schaumburg, IL
Date submitted for test:	10/21/2010
DUT Description:	APX7500 Single Band UHF R2 15W (450 - 520MHz), Motorcycle Mount Option
Test TX mode(s):	CW
Max. Power output:	18W
TX Frequency Bands:	450-520MHz
Signaling type:	Analog, APCO 25, and TDMA 1:2 (F2)
Model(s) Tested	M30SSS9PW1AN with G67 motorcycle option
Model(s) Certified:	M30SSS9PW1AN with G67 motorcycle option
Serial Number(s):	QMKNJ030
Classification:	Occupational/Controlled Environment

Regulatory Identifications:

FCC ID: AZ492FT4896 – Part 22 & 90 (450-512MHz), MPE results outside of Part 90 are not applicable for FCC compliance demonstration.

IC: 109U-92FT4896 – 450-470MHz

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 3.0 of this report. This report shall not be reproduced without written approval from an officially designated representative of the Motorola EME Laboratory.
I attest to the accuracy of the data and assume full responsibility for the completeness of these measurements.
This reporting format is consistent with the suggested guidelines of the TIA TSB-159 April 2006
The results and statements contained in this report pertain only to the device(s) evaluated herein.

Signature on file – Deanna Zakharia
Deanna Zakharia EMS EME Lab Senior Resource Manager, Laboratory Director,

Approval Date: 2/3/2011

Certification Date: 12/21/2010

Certification No.: L1101215P

Document Revision History

Date	Revision	Comments
12/21/2010	O	Initial release
2/03/2011	A	Updated the following sections; 3.0 Safety code 6 (2009), IEEEC95.1 1992 and FCC Part 47, 6.0 cal due date, 11.2 text, Header SR#, Tables 1, 2, 6, 7, 8 & 9 and Appendix A & D.

Table of Contents

1.0 Introduction

This report details the test setup, test equipment and test results of Maximum Permissible Exposure (MPE) performed at Motorola's outside test site for product model M30SSS9PW1AN with G67 motorcycle option.

2.0 Abbreviations / Definitions

APCO: Association of Public-Safety Communications Officials
BS: Bystander
C4FM: Compatible 4-Level Frequency Modulation
CNR: Calibration Not Required
CQPSK: Compatible Quadrature Phase Shift Keying
CW: Continues Wave
DUT: Device Under Test
EME: Electromagnetic Energy
F2: 2 slot Time Division Multiple Access
FM: Frequency Modulation
MPE: Maximum Permissible Exposure
NA: Not Applicable
OP: Operator
PTT: Push to Talk
TDMA: Time Division Multiple Access

3.0 Referenced Standards and Guidelines

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

- United States Federal Communications Commission, Code of Federal Regulations; Rule Part 47CFR § 1.1310, § 2.1091 (d) and § 2.1093 for RF Exposure, where applicable..
- 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.
- American National Standards Institute (ANSI) / Institute of Electrical and Electronics Engineers (IEEE) C95. 1-1999
- American National Standards Institute (ANSI) / Institute of Electrical and Electronics Engineers (IEEE) C95. 1-1992. Specific to FCC rules and regulations.
- Institute of Electrical and Electronics Engineers (IEEE) C95.1-2005
- Institute of Electrical and Electronics Engineers (IEEE) C95.3-2002
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1998
- Ministry of Health (Canada) Safety Code 6 (2009), Limits of Human Exposure to Radio frequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz

4.0 Power Density Limits

Table 1 – Occupational / Controlled Exposure Limits

Frequency Range (MHz)	FCC OET Bulletin 65 Supplement C	ICNIRP	IEEE C95.1 1992/1999	IEEE C95.1 2005	RSS 102 issue 4 - 2010
	mW/cm^2	W/m^2	mW/cm^2	W/m^2	W/m^2
30 - 300	1.0				*10.0
10 - 400		10.0			
100 - 300			1.0	10.0	
300 - 1,500	f/300				f/30
300 - 3,000			f/300	f/30	
400 - 2,000		f/40			
1,500 - 15,000					50.0
1,500 - 100,000	5.0				
2,000 – 300,000		50.0			
3,000 - 300,000			10.0	100.0	

*Power density limit is applicable at frequencies greater than 100MHz

Table 2 – General Population / Uncontrolled Exposure Limits

Frequency Range (MHz)	FCC OET Bulletin 65 Supplement C	ICNIRP	IEEE C95.1 1992/1999	IEEE C95.1 2005	RSS 102 issue 4 – 2010
	mW/cm^2	W/m^2	mW/cm^2	W/m^2	W/m^2
30 – 300	0.2				*2.0
10 – 400		2.0			
100 – 300			0.2		
100 – 400				2.0	
300 – 1,500	f/1,500				f/150
400 – 2,000		f/200		f/200	
300 – 15,000			f/1,500		
1,500 – 15,000					10.0
1,500 – 100,000	1.0				
2,000 – 100,000				10.0	
2,000 – 300,000		10.0			

*Power density limit is applicable at frequencies greater than 100MHz

5.0 N_c Test Channels

The number of test channels are determined by using Equation 1 below. This equation is available in FCC's KDB 447498. The test channels are appropriately spaced across the antenna's frequency range.

Equation 1 – Number of test channels

$N_c = \text{Round } \{[100(f_{high} - f_{low})/f_c]^{0.5} \times (f_c / 100)^{0.2}\}$

where N_c is the number of test channels, f_{high} and f_{low} are the highest and lowest frequencies within the transmission band, f_c is the mid-band frequency, and frequencies are in MHz.

6.0 Measurement Equipment

Table 3 - Equipment

Equipment Type	Model #	SN	Calibration Date	Calibration Due Data
Motorcycle	2005 Kawasaki KZ1000	NA	NA	NA
Survey Meter Probe – E-Field	ETS Model HI-2200 ETS Model E100	00086887 00126277	07/15/2010	07/15/2011

E-field measurements are in mW/cm^2.

7.0 Measurement System Uncertainty Levels

Table 4 - Uncertainty Budget for Near Field Probe Measurements

	Tol. (± %)	Prob. Dist.	Divisor	u_i (±%)	v_i
Measurement System					
Probe Calibration	6.0	N	1.00	6.0	∞
Survey Meter Calibration	3.0	N	1.00	3.0	∞
Hemispherical Isotropy	8.0	R	1.73	4.6	∞
Linearity	5.0	R	1.73	2.9	∞
Pulse Response	1.0	R	1.73	0.6	∞
RF Ambient Noise	3.0	R	1.73	1.7	∞
RF Reflections	8.0	R	1.73	4.6	∞
Probe Positioning	10.0	R	1.73	5.8	∞
Test sample Related					
Antenna Positioning	3.0	N	1.00	3.0	∞
Power drift	5.0	R	1.73	2.9	∞
Combined Standard Uncertainty		RSS		12.2	∞
Expanded Uncertainty (95% CONFIDENCE LEVEL)		*k*=2		24	

8.0 Product and System Description

Model M30SSS9PW1AN with G67 motorcycle option is a mobile transceiver that utilizes analog, APCO 25 & F2 digital two-way radio communications. The analog modulation scheme uses Frequency Modulation (FM). APCO 25 & F2 digital modes use C4FM of CQPSK family of modulation (Compatible 4-Level Frequency Modulation of Compatible Quadrature Phase Shift Keying). F2 is a TDMA 1:2 protocol that allocates portions of the RF signal by dividing time into two slots (2 slots TDMA). Transmission from a unit or base station is accommodated in time-slot lengths of 30 milliseconds and frame lengths of 60 milliseconds. This product supports voice in analog mode, and both voice and data modes in digital mode.

The maximum duty cycle for TDMA is 1:2 (50%) and is controlled by software. The FM signal is continuous. However, because of hand shaking or Push-To-Talk (PTT) between users and/or base stations a conservative 50% duty cycle is applied. The TDMA mode was not tested because its duty cycle is inherently 50% and would include an additional 50% duty cycle for PTT.

The intended use of the radio is PTT while the device is properly installed on a motorcycle.

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.

Accordingly this product is classified as Occupational/Controlled Exposure. However, in accordance with FCC requirements, the bystanders are evaluated to the General Population/ Uncontrolled Exposure Limits, and the operator is evaluated to the Occupational/Controlled Exposure Limits.

(Note that “Bystanders” as used herein are people other than operator)

9.0 Additional Options and Accessories

Refer to Table 5 for complete list of tested antennas.

10.0 Test Set-Up Description

Assessments were performed with mobile radio installed on the test vehicle while engine was at idle, at the specified distances and test locations indicated in section 11.0 and Appendix A.

All antennas described in Table 5 were considered in order to develop the test plan for this product. Antennas were installed and tested per their defined test channels.

11.0 Method of Measurement for motorcycle mounted antenna(s)

11.1 Bystander vehicle MPE measurements

Antenna is located at the rear of the test vehicle. Refer to Appendix A for antenna location with respect to the bystander.

MPE measurements for bystander (BS) conditions are determined by taking the average of (10) measurements in a 2m vertical line for the bystander test location indicated in Appendix A with 20cm height increments, with antenna to probe sensor separation distance of 60cm directly behind the vehicle. The separation distance used for testing is defined from the antenna where as the RF safety booklet defines the same distance from the vehicle body to ensure that the assessment is applicable to other vehicles The measurement probe is positioned orthogonal to antenna (typically parallel to ground with a vertically mounted antenna) and aimed directly at the antenna's axis. These measurements are representative of persons other than the operator standing next to the vehicle.

11.2 Operator vehicle MPE measurements

Antenna is located at the rear of the test vehicle. Refer to Appendix A for antenna location with respect to the operator.

MPE measurements for operator (OP) conditions are determined by taking the average of the (3) measurements (Head, Chest and Lower Trunk) at the standard test distance of 30cm from the operators' seat area.

The measurement probe is oriented parallel (horizontal) to the ground and positioned above the motorcycle operator's seat. The probe head is pointed towards the back of the vehicle and aimed directly at the antenna's axis while maintaining a twenty (20) centimeter separation distance between the probe sensor and reradiating structures. These (3) measurements are representative of the operator.

Note; Motorola's weather proof enclosures provide 30cm separation distance from the antenna to the enclosure's edge. Refer to the installation manual for universal mounting options.

12.0 MPE Calculations

The final MPE results for this mobile radio are presented in section 14.0 Tables 6 & 7. These results are based on 50% duty cycle for PTT.

Below is an explanation of how the MPE results are calculated. Refer to Appendix D for highest MPE bystander and operator measurement details.

Bystander -10 measurements are averaged over the body (*Avg_over_body*).
Operator - 3 measurements are averaged over the body (*Avg_over_body*).

The Average over Body test methodology is consistent with IEEE/ANSI C95.3-2002 guidelines.

Therefore;

Equation 2 – Power Density Calculation *(Calc._P.D.)*

$$Calc.\_P.D. = (Avg\_over\_body) * (probe\_frequency\_cal\_factor) * (duty\_cycle)$$

Note1: The highest "average" cal factors from the calibration certificates were selected for the applicable frequency range. Linear interpretation was used to determine "probe_frequency_cal_factor" for the specific test frequencies.

Note 2: The E-field probe calibration certificate's frequency cal factors were determined by measuring V/m. The survey meter's results were measured in power density (mW/cm^2) and therefore the "probe_frequency_cal_factor" was squared in equation 2 to account for these results.

Note 3: The H-field probe calibration certificate's frequency cal factors were determined by measuring A/m. The survey meter's results were measured in A/m and therefore the "Avg_over_body" A/m results were converted to power density (mW/cm^2) using the equation 3. H-field measurements are only applicable to frequencies below 300MHz.

Equation 3 – Converting A/m to mW/cm^2

$$mW/cm\text{^}2 = (A/m)\text{^}2 * 37.699$$

Equation 4 – Power Density Maximum Calculation

$$Max\_Calc.\_P.D. = P.D.\_calc * \frac{\max\_output\_power}{initial\_output\_power}$$

Note 4; For initial output power> max_output_power; max_output_power / initial output power = 1

13.0 Antenna Summary

Table 5 below summarizes the tested antennas, overlap of FCC bands and the number of test channels per FCC KDB 447498. This information was used to determine the test configurations presented in this report.

Table 5

#	Antenna Model	Frequency Range (MHz)	Physical Length (cm)	Gain (dBi)	Remarks	Overlap FCC Bands	N_c Test Channels (KDB 447498)
1	HAE6033A	450-482	15.0	2.15	1/4 wave, wire	450-482	4
2	HAE6034A	482-520	14.0	2.15	1/4 wave, wire	482-512	3
3	HAE6035A	450 - 512	8.3	2.15	1/4 wave, cylinder	450-512	5

14.0 Test Results Summary

The following tables below summarize the MPE results for each test configuration: antenna, TX frequency, initial power, maximum output power, E/H field measurements, test positions (BS-Bystander, OP-Operator), max calculated power density results, % of the applicable specification limit, and applicable FCC/IEEE/ICNIRP specification limits.

Table 6 - Bystander MPE assessment for General Population / Uncontrolled Exposure Limits

Test Position	E/H field	Antenna Model	Max Pwr (W)	Initial Pwr (W)	Tx Freq (MHz)	Max Calc. P.D. (mW/ cm^2)	FCC Limit	% To Spec Limit	ICNIRP Limit	% To Spec Limit
BS	E	HAE6033A, 450-482MHz	18	17.4	450.0125	0.08	0.30	28	0.23	37
				17.4	460	0.08	0.31	25	0.23	34
				17.2	471	0.07	0.31	24	0.24	31
				17.5	481.9875	0.08	0.32	26	0.24	34
		HAE6034A, 482-512MHz	18	17.5	482.0125	0.08	0.32	25	0.24	33
				17.5	497	0.10	0.33	29	0.25	39
				17.6	511.9875	0.09	0.34	25	0.26	34
				17.3	512.0125	0.09	NA	NA	0.26	34
				17.4	516.0125	0.09	NA	NA	0.26	33
				17.3	519.9875	0.08	NA	NA	0.26	31
		HAE6035A, 450 - 512MHz	18	17.4	450.0125	0.08	0.30	26	0.23	35
				17.4	465.5	0.08	0.31	26	0.23	35
				17.5	481.0125	0.07	0.32	22	0.24	29
				17.5	496.5	0.07	0.33	21	0.25	28
				17.6	511.9875	0.07	0.34	21	0.26	28

Note that the test frequencies that are outside the relevant FCC frequency allocations are presented in blue font.

Table 7 - Operator MPE assessment for Occupational / Controlled Exposure Limits

Test Position	E/H field	Antenna Model	Max Pwr (W)	Initial Pwr (W)	Tx Freq (MHz)	Max Calc. P.D. (mW/ cm^2)	FCC Limit	% To Spec Limit	ICNIRP Limit	% To Spec Limit
OP	E	HAE6033A, 450-482MHz	18	17.4	450.0125	0.35	1.50	24	1.13	31
				17.4	460	0.40	1.53	26	1.15	34
				17.2	471	0.38	1.57	24	1.18	33
				17.5	481.9875	0.40	1.61	25	1.20	33
		HAE6034A, 482-512MHz	18	17.5	482.0125	0.39	1.61	24	1.21	32
				17.5	497	0.33	1.66	20	1.24	27
				17.6	511.9875	0.41	1.71	24	1.28	32
				17.3	512.0125	0.42	NA	NA	1.28	33
				17.4	516.0125	0.43	NA	NA	1.29	33
				17.3	519.9875	0.42	NA	NA	1.30	32
		HAE6035A, 450 - 512MHz	18	17.4	450.0125	0.36	1.50	24	1.13	32
				17.4	465.5	0.44	1.55	28	1.16	37
				17.5	481.0125	0.42	1.60	26	1.20	35
				17.5	496.5	0.32	1.66	19	1.24	26
				17.6	511.9875	0.37	1.71	22	1.28	29

Note that the test frequencies that are outside the relevant FCC frequency allocations are presented in blue font.

15.0 Conclusion

The assessments for this device were performed with an output power range as indicated in section 14.0 Tables 6 & 7. The maximum allowable output power is equal to the upper limit of the final test factory transmit power specification of 18W. The highest power density results for the mobile device scaled to the maximum allowable power output are indicated in Tables 8 and 9 for operator and bystander to the vehicle.

Table 8: RF Exposure Results for FCC Part 90 (450-512 MHz)

	UHF R2 Band
Operator - Max Calculated Power Density	0.44mW/cm²
Bystander - Max Calculated Power Density	0.10mW/cm²

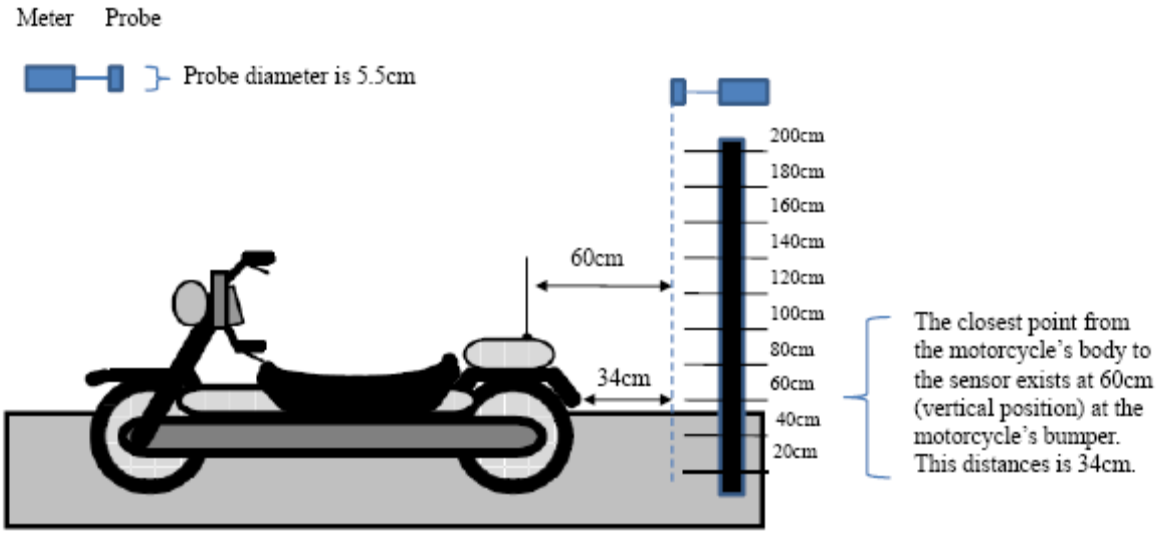
Table 9: RF Exposure Results (512-520MHz)

	UHF R2 Band
Operator - Max Calculated Power Density	0.43mW/cm²
Bystander - Max Calculated Power Density	0.09mW/cm²

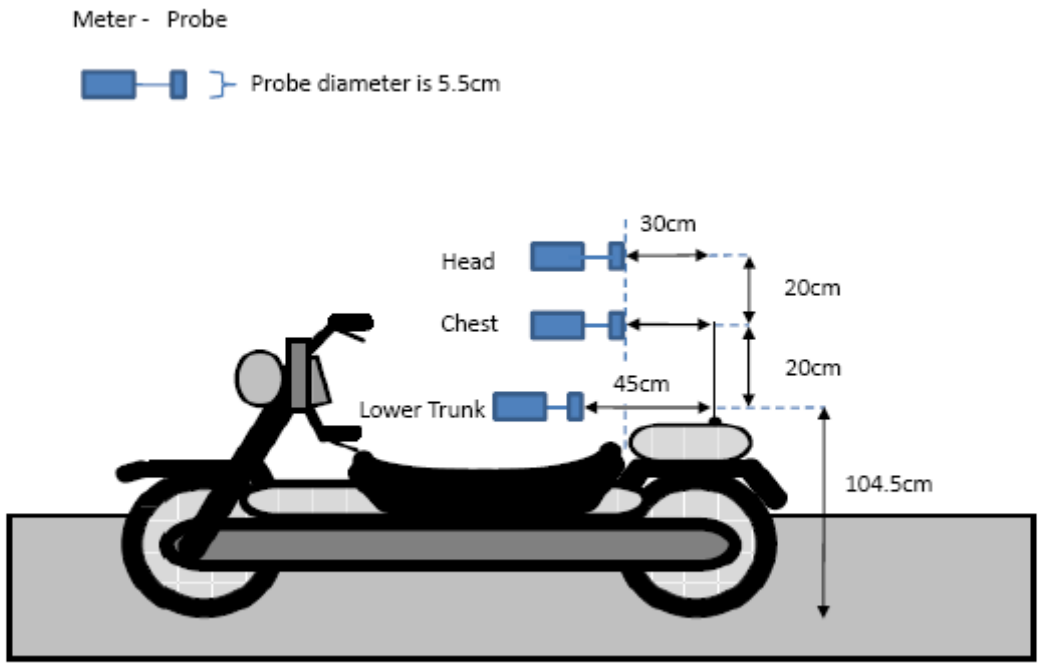
These MPE results herein demonstrate compliance to the FCC/IEEE/ICNIRP Occupational/Controlled Exposure limit. FCC rules require compliance for Bystanders to the FCC General Population/Uncontrolled limits.

Appendix A - Illustration of Antenna Location and Test Distances

Bystander Illustration



Operator Illustration



Note that the Lower Trunk distance measurement distance from the antenna (45cm) allows achieving 20cm distance from reradiating objects.

Appendix B - Probe Calibration Certificates

ACCREDITED
Lab ID:1207.01-Calibration

Cert I.D.: 79630

ETS-LINDGREN
An ESCO Technologies Company
1301 Arrow Point Drive
Cedar Park, Texas 78613
(512) 531-6498

ETS-LINDGREN
An ESCO Technologies Company
Track# S000019628 Ltd Cal ☐
By AS Date 15-Jul-10
Next Cal Due
www.ets-lindgren.com

CALIBRATION
BY AS DATE 7-15-10
DUE 7-15-11 ID S19628

Certificate of Calibration Conformance

The instrument identifed below has been individually calibrated in compliance with the following standard(s):

IEEE 1309 - 2005, Institute of Electrical and Electronics Engineers, Standard for Calibration of Electromagnetic Field Sensors and Probes, Excluding Antennas from 9 kHz to 40 GHz

Environment: Laboratory MTE is maintained in a temperature controlled environment with ambient conditions from 18 to 28 C, relative humidity less than 90%. The instrument under test has been calibrated in a suitable environment using an EMCO TEM Cell 5101C, GTEM! 5305 and an RF Shielded EMC Chamber which is conducive to maintaining accurate and reliable measurement quality.

Manufacturer:	ETS-Lindgren	**Operating Range:**	100kHz - 5GHz
Model Number:	E100	**Instrument Type:**	Isotropic Probe > 1 GHz
Serial Number/ ID:	*00126277*	**Date Code:**	
Tracking Number:	**S000019628**	**Alternate ID:**	
Date Completed:	15-Jul-10	**Customer:**	AGILENT/MOTOROLA (FL)
Test Type:	Standard Field, Field Strength		

Calibration Uncertainty: Std Field Method 10kHz - 18000 MHz, +/-0.7 dB, 26.5GHz - 40GHz,+/- 0.95 dB
k=2, (95% Confidence Level)

Test Remarks: Replaced broken probe head sn 00083370 with sn 00126277. Provided customer specified frequencies.

Calibration Traceability: All Measuring and Test Equipment (M/TE) identified below are traceable to the National Institute for Standards and Technology (NIST). Calibration Laboratory and Quality System controls are compliant with ISO/IEC 17025-2005.

Standards and Equipment Used:
Make / Model / Name / S/N / Recall Date

Hewlett Packard	437B	HP Power Meter	3125U12370	15-Jun-11
Fluke	6060B	RF Signal Generator	5690204	15-Jun-11
Marconi	2022	Signal Generator	119019/077	25-Sep-10
Agilent	E4419B	Power Meter	MY45104171	16-Jun-11
Rohde & Schwarz	857.8008.02	Power Meter NRVD	100451	11-Mar-11
Hewlett Packard	83620B	Signal Generator	3722A00541	25-Sep-10

Condition of Instrument Upon Receipt:
INOP

On Release:
In Tolerance to Internal Quality Standards

Calibration Completed By
Alan Schifferdecker, Calibration Technician

Attested and Issued on 15-Jul-10
Richard Goodlow, Calibration Supervisor

ETS·LINDGREN™

Frequency Response Calibration Factors
Model E100 Serial Number 00126277
Date of Calibration 14 Jul 2010

Frequency	Applied	Probe Reading			Correction Factor			
(MHz)	V/m	X	Y	Z	X	Y	Z	Avg
1.00	7.99	6.73	6.65	6.64	1.19	1.20	1.20	1.20
1.00	19.86	16.88	16.46	16.75	1.18	1.21	1.19	1.19
1.00	69.83	58.57	57.16	57.94	1.19	1.22	1.21	1.21
1.00	124.10	104.33	101.84	103.29	1.19	1.22	1.20	1.20
15.00	7.98	7.87	7.89	7.76	1.01	1.01	1.03	1.02
15.00	20.02	19.90	19.66	19.57	1.01	1.02	1.02	1.02
15.00	69.73	68.75	68.03	67.93	1.01	1.02	1.03	1.02
15.00	125.10	123.58	122.44	121.98	1.01	1.02	1.03	1.02
30.00	7.98	8.00	8.02	7.92	1.00	0.99	1.01	1.00
30.00	20.13	20.26	20.02	19.95	0.99	1.01	1.01	1.00
30.00	70.33	69.96	69.20	69.16	1.01	1.02	1.02	1.01
30.00	125.54	125.61	124.27	124.22	1.00	1.01	1.01	1.01
75.00	8.00	8.02	8.09	7.92	1.00	0.99	1.01	1.00
75.00	19.99	20.13	19.98	19.76	0.99	1.00	1.01	1.00
75.00	70.36	69.86	69.30	68.86	1.01	1.02	1.02	1.01
75.00	125.15	125.40	124.63	123.68	1.00	1.00	1.01	1.00
100.00	7.96	7.97	8.01	7.88	1.00	0.99	1.01	1.00
100.00	19.88	19.91	19.74	19.61	1.00	1.01	1.01	1.01
100.00	69.57	69.51	68.99	68.72	1.00	1.01	1.01	1.01
100.00	124.96	124.36	123.49	122.96	1.00	1.01	1.02	1.01
150.00	8.01	8.06	8.15	7.96	0.99	0.98	1.01	0.99
150.00	19.95	20.28	20.15	19.91	0.98	0.99	1.00	0.99
150.00	69.89	69.62	69.33	68.78	1.00	1.01	1.02	1.01
150.00	124.33	125.18	124.63	123.79	0.99	1.00	1.00	1.00
200.00	8.00	8.45	8.63	8.33	0.95	0.93	0.96	0.95
200.00	20.01	21.13	21.27	20.72	0.95	0.94	0.97	0.95
200.00	69.87	73.33	73.78	72.18	0.95	0.95	0.97	0.96
200.00	124.17	129.74	130.72	127.78	0.96	0.95	0.97	0.96
250.00	8.01	8.19	8.12	8.13	0.98	0.99	0.99	0.98
250.00	20.01	20.51	20.01	20.27	0.98	1.00	0.99	0.99
250.00	69.83	71.26	69.62	70.60	0.98	1.00	0.99	0.99
250.00	125.43	127.92	125.29	127.07	0.98	1.00	0.99	0.99
300.00	8.01	8.15	8.10	8.06	0.98	0.99	0.99	0.99
300.00	19.94	20.39	20.06	20.16	0.98	0.99	0.99	0.99
300.00	69.60	70.46	69.32	69.88	0.99	1.00	1.00	1.00
300.00	125.08	126.92	124.75	125.61	0.99	1.00	1.00	0.99
400.00	8.02	8.14	8.13	8.06	0.98	0.99	0.99	0.99
400.00	19.87	20.24	19.93	19.94	0.98	1.00	1.00	0.99
400.00	69.66	70.49	69.46	69.77	0.99	1.00	1.00	1.00
400.00	124.99	127.20	125.29	125.73	0.98	1.00	0.99	0.99
500.00	8.04	8.01	8.13	7.92	1.00	0.99	1.02	1.00
500.00	19.98	19.97	19.95	19.63	1.00	1.00	1.02	1.01
500.00	70.28	69.96	69.96	69.11	1.00	1.00	1.02	1.01
500.00	124.86	124.41	124.25	122.86	1.00	1.00	1.02	1.01
600.00	8.00	7.72	7.73	7.65	1.04	1.04	1.05	1.04
600.00	19.95	19.30	19.03	19.07	1.03	1.05	1.05	1.04
600.00	69.83	67.03	64.80	65.25	1.04	1.08	1.07	1.06
600.00	125.49	121.42	119.78	120.36	1.03	1.05	1.04	1.04

ETS·LINDGREN™

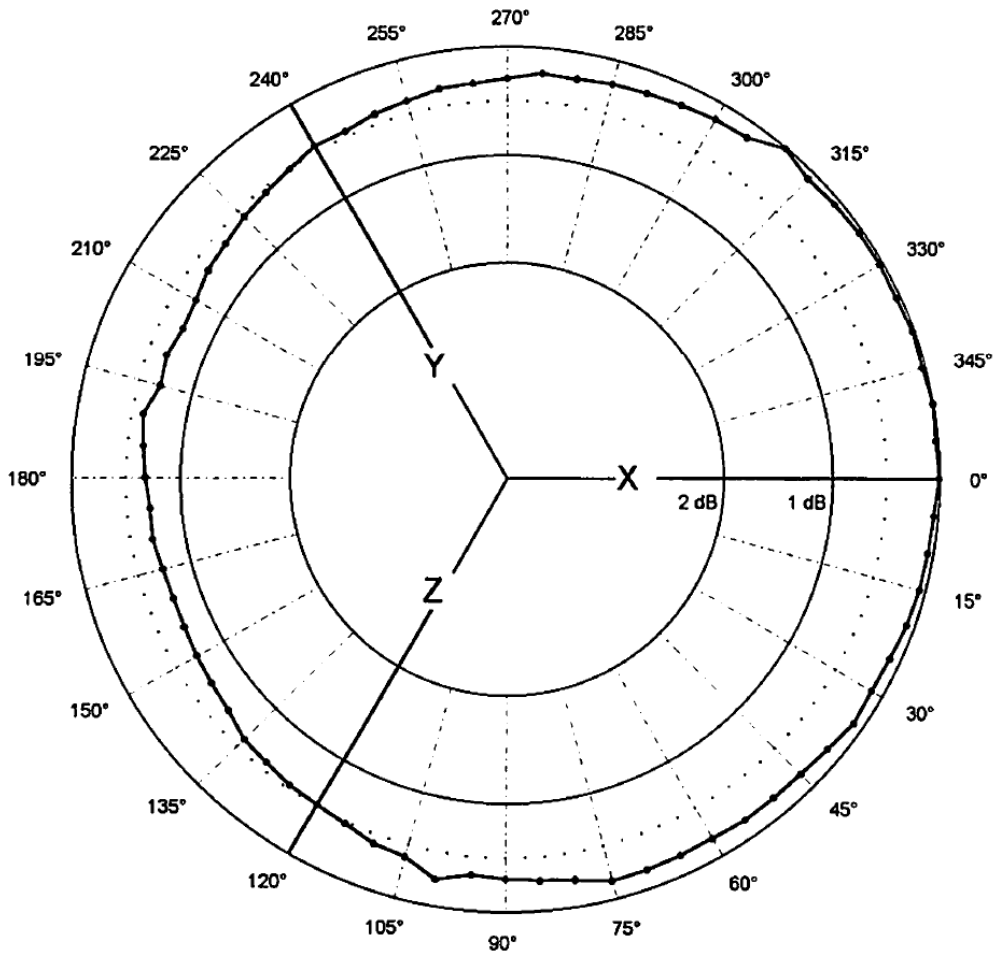
Frequency Response Calibration Factors
Model E100 Serial Number 00126277
Date of Calibration 14 Jul 2010

Frequency	Applied	Probe Reading			Correction Factor			
(MHz)	V/m	X	Y	Z	X	Y	Z	Avg
700.00	8.06	7.63	7.53	7.57	1.06	1.07	1.06	1.06
700.00	20.05	18.94	18.46	18.74	1.06	1.09	1.07	1.07
700.00	70.48	66.13	64.14	65.29	1.07	1.10	1.08	1.08
700.00	124.23	117.32	114.56	116.78	1.06	1.08	1.06	1.07
800.00	7.97	7.37	7.39	7.27	1.08	1.08	1.10	1.09
800.00	19.93	18.50	18.31	18.29	1.08	1.09	1.09	1.09
800.00	69.90	64.64	64.92	64.77	1.08	1.08	1.08	1.08
800.00	124.55	115.81	114.68	114.76	1.08	1.09	1.09	1.08
900.00	8.01	7.85	7.93	7.71	1.02	1.01	1.04	1.02
900.00	19.90	19.74	19.73	19.30	1.01	1.01	1.03	1.02
900.00	70.29	69.02	68.60	67.71	1.02	1.02	1.04	1.03
900.00	124.72	123.49	122.93	121.00	1.01	1.01	1.03	1.02
1000.00	8.00	8.16	8.06	8.08	0.98	0.99	0.99	0.99
1000.00	19.91	20.37	19.74	20.07	0.98	1.01	0.99	0.99
1000.00	69.79	70.93	68.52	69.98	0.98	1.02	1.00	1.00
1000.00	124.52	127.44	123.83	125.80	0.98	1.01	0.99	0.99
2000.00	20.07	19.68	19.26	19.58	1.02	1.04	1.03	1.03
2450.00	20.02	19.58	19.47	18.99	1.02	1.03	1.05	1.03
3000.00	19.99	20.23	18.92	20.34	0.99	1.06	0.98	1.01
3500.00	20.03	20.44	20.24	20.40	0.98	0.99	0.98	0.98
4000.00	20.47	20.59	19.87	20.88	0.99	1.03	0.98	1.00
5000.00	20.07	14.70	15.34	16.37	1.37	1.31	1.23	1.30
5500.00	19.74	15.36	15.43	14.11	1.28	1.28	1.40	1.32
6000.00	19.94	13.34	15.14	14.53	1.49	1.32	1.37	1.39

ETS·LINDGREN™
An ESCO Technologies Company

PROBE ROTATIONAL RESPONSE

Model	E100
S/N	00126277
Date	15-Jul-2010
Time	19:04:45
Variation	0.75 dB



- Isotropic response measured in a 20 V/m field at 400 MHz

Page 4 of 4

Appendix C - Photos of Assessed Antennas

(Refer to Exhibit 7B)

Appendix D – MPE Measurement Results

MPE measurement data for Bystander

D.U.T. Info.							Probe Info.		Test	Bystander (BS) Positions										DUT Max.	Avg. over Body	Calc. P.D.	Max Calc. P.D.
Ant Loc.	Ant. Model/ Desc.	Ant. Gain (dBi)	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	Test Mode	E/H Field	Probe Cal. Factor	Test Pos.	20 cm	40 cm	60 cm	80 cm	100 cm	120 cm	140 cm	160 cm	180 cm	200 cm	TX Factor	(mW/ cm^2)	(mW/ cm^2)	(mW/ cm^2)
MC	HAE6033A, 450-482MHz	2.15	450.0125	18	17.4	CW	E	1.01	BS	0.06	0.07	0.08	0.13	0.27	0.34	0.29	0.19	0.10	0.06	0.5	0.159	0.08	0.08
MC	HAE6033A, 450-482MHz	2.15	460	18	17.4	CW	E	1.01	BS	0.08	0.09	0.08	0.13	0.26	0.31	0.25	0.16	0.09	0.04	0.5	0.149	0.08	0.08
MC	HAE6033A, 450-482MHz	2.15	471	18	17.2	CW	E	1.01	BS	0.08	0.08	0.06	0.13	0.26	0.30	0.23	0.14	0.08	0.04	0.5	0.140	0.07	0.07
MC	HAE6033A, 450-482MHz	2.15	481.9875	18	17.5	CW	E	1.02	BS	0.08	0.07	0.05	0.14	0.29	0.34	0.28	0.17	0.10	0.06	0.5	0.158	0.08	0.08
MC	HAE6034A, 482-512MHz	2.15	482.0125	18	17.5	CW	E	1.02	BS	0.08	0.07	0.06	0.15	0.27	0.32	0.26	0.16	0.10	0.06	0.5	0.153	0.08	0.08
MC	HAE6034A, 482-512MHz	2.15	497	18	17.5	CW	E	1.02	BS	0.05	0.03	0.04	0.18	0.34	0.39	0.33	0.23	0.16	0.09	0.5	0.184	0.09	0.10
MC	HAE6034A, 482-512MHz	2.15	511.9875	18	17.6	CW	E	1.03	BS	0.07	0.03	0.06	0.20	0.32	0.34	0.27	0.17	0.11	0.07	0.5	0.164	0.08	0.09
MC	HAE6034A, 482-512MHz	2.15	512.0125	18	17.3	CW	E	1.03	BS	0.07	0.03	0.06	0.20	0.31	0.34	0.26	0.18	0.11	0.07	0.5	0.163	0.08	0.09
MC	HAE6034A, 482-512MHz	2.15	516.0125	18	17.4	CW	E	1.04	BS	0.06	0.04	0.07	0.21	0.30	0.34	0.24	0.17	0.10	0.06	0.5	0.159	0.08	0.09
MC	HAE6034A, 482-512MHz	2.15	519.9875	18	17.3	CW	E	1.04	BS	0.07	0.05	0.07	0.20	0.31	0.32	0.22	0.13	0.08	0.05	0.5	0.150	0.08	0.08
MC	HAE6035A, 450 - 512MHz	2.15	450.0125	18	17.4	CW	E	1.01	BS	0.08	0.08	0.10	0.12	0.26	0.30	0.27	0.17	0.09	0.05	0.5	0.152	0.08	0.08
MC	HAE6035A, 450 - 512MHz	2.15	465.5	18	17.4	CW	E	1.01	BS	0.10	0.12	0.09	0.13	0.30	0.32	0.24	0.13	0.07	0.04	0.5	0.154	0.08	0.08
MC	HAE6035A, 450 - 512MHz	2.15	481.0125	18	17.5	CW	E	1.02	BS	0.11	0.11	0.06	0.13	0.24	0.27	0.19	0.12	0.07	0.05	0.5	0.135	0.07	0.07
MC	HAE6035A, 450 - 512MHz	2.15	496.5	18	17.5	CW	E	1.02	BS	0.10	0.07	0.04	0.13	0.26	0.25	0.19	0.13	0.10	0.07	0.5	0.134	0.07	0.07
MC	HAE6035A, 450 - 512MHz	2.15	511.9875	18	17.6	CW	E	1.03	BS	0.08	0.04	0.04	0.16	0.25	0.27	0.20	0.14	0.09	0.07	0.5	0.134	0.07	0.07

MPE calculations are defined in section 12.0.

MPE measurement data for Operator

D.U.T. Info.							Probe Info.		Test Pos.	Operator (MC) Positions			DUT Max. TX Factor	Avg. over Body (mW/ cm^2)	Calc. P.D. (mW/ cm^2)	Max Calc. P.D. (mW/ cm^2)
Ant Loc.	Ant. Model/ Desc.	Ant. Gain (dBi)	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	Test Mode	E/H Field	Probe Cal. Factor		Head	Chest	Lower Trunk				
MC	HAE6033A, 450-482MHz	2.15	450.0125	18	17.4	CW	E	1.01	OP	0.34	1.05	0.64	0.5	0.677	0.34	0.35
MC	HAE6033A, 450-482MHz	2.15	460	18	17.4	CW	E	1.01	OP	0.42	1.11	0.74	0.5	0.757	0.38	0.40
MC	HAE6033A, 450-482MHz	2.15	471	18	17.2	CW	E	1.01	OP	0.38	1.05	0.75	0.5	0.727	0.37	0.38
MC	HAE6033A, 450-482MHz	2.15	481.9875	18	17.5	CW	E	1.02	OP	0.44	1.14	0.70	0.5	0.760	0.39	0.40
MC	HAE6034A, 482-512MHz	2.15	482.0125	18	17.5	CW	E	1.02	OP	0.44	1.09	0.69	0.5	0.740	0.38	0.39
MC	HAE6034A, 482-512MHz	2.15	497	18	17.5	CW	E	1.02	OP	0.38	1.01	0.51	0.5	0.633	0.32	0.33
MC	HAE6034A, 482-512MHz	2.15	511.9875	18	17.6	CW	E	1.03	OP	0.47	1.19	0.68	0.5	0.780	0.40	0.41
MC	HAE6034A, 482-512MHz	2.15	512.0125	18	17.3	CW	E	1.03	OP	0.46	1.18	0.69	0.5	0.777	0.40	0.42
MC	HAE6034A, 482-512MHz	2.15	516.0125	18	17.4	CW	E	1.04	OP	0.45	1.23	0.73	0.5	0.803	0.42	0.43
MC	HAE6034A, 482-512MHz	2.15	519.9875	18	17.3	CW	E	1.04	OP	0.44	1.22	0.68	0.5	0.780	0.41	0.42
MC	HAE6035A, 450 - 512MHz	2.15	450.0125	18	17.4	CW	E	1.01	OP	0.36	0.99	0.72	0.5	0.690	0.35	0.36
MC	HAE6035A, 450 - 512MHz	2.15	465.5	18	17.4	CW	E	1.01	OP	0.48	1.18	0.84	0.5	0.833	0.42	0.44
MC	HAE6035A, 450 - 512MHz	2.15	481.0125	18	17.5	CW	E	1.02	OP	0.50	1.20	0.71	0.5	0.803	0.41	0.42
MC	HAE6035A, 450 - 512MHz	2.15	496.5	18	17.5	CW	E	1.02	OP	0.40	0.98	0.47	0.5	0.617	0.31	0.32
MC	HAE6035A, 450 - 512MHz	2.15	511.9875	18	17.6	CW	E	1.03	OP	0.44	1.08	0.59	0.5	0.703	0.36	0.37

MPE calculations are defined in section 12.0.