


**MOTOROLA SOLUTIONS**


TESTING CERT # 2518.01

**DECLARATION OF COMPLIANCE: MPE ASSESSMENT Part 2 of 2**
**EME Test Laboratory**

 8000 West Sunrise Blvd  
 Fort Lauderdale, FL. 33322

**Date of Report:** June 29, 2011

**Report Revision:** 0

**Report ID:** SR9298\_MPE rpt\_APX7500\_UHF R2 &  
 VHF\_15W Motorcycle\_Rev O\_06292011

**Responsible Engineer:** Stephen C. Whalen (Principal Staff EME Test Engineer)  
**Report author:** Stephen C. Whalen (Principal Staff EME Test Engineer)  
**Date(s) Tested:** UHF R2 - 11/12/2010 & 1/28/2011; VHF - 5/9/2011  
**Manufacturer/Location:** Motorola, Schaumburg, IL  
**Date submitted for test:** 03/01/2011  
**DUT Description:** APX7500 Dual Band UHF R2 15W (450 - 520MHz) & VHF 15W  
 (136-174MHz) Motorcycle Mount Option  
**Test TX mode(s):** CW  
**Max. Power output:** 18W  
**TX Frequency Bands:** 450-520MHz & 136-174MHz  
**Signaling type:** Analog, APCO 25, and TDMA 1:2 (F2)  
**Model(s) Tested** M30SSS9PW1AN with G67 motorcycle option  
 M30KSS9PW1AN with G67 motorcycle option  
**Model(s) Certified:** M30TSS9PW1AN (MHUT1010A) with G67 motorcycle option  
**Serial Number(s):** CAI09018Z9 (M30KSS9PW1AN with G67 motorcycle option)  
 QMKNJ030 (M30SSS9PW1AN with G67 motorcycle option)  
**Classification:** Occupational/Controlled Environment  
**FCC ID: AZ492FT7047** Part 22 & 90 UHF (450-512MHz) & VHF (150.8-173.4MHz) MPE  
 results outside of Part 90 & 22 are not applicable for FCC  
 compliance demonstration.  
**IC: 109U-92FT7047** UHF (450-470MHz) & VHF (138-174MHz)

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  
 EME Lab Senior Resource Manager and  
 Laboratory Director

Approval Date: 06/30/2011

Certification Date: 06/30/2011

Certification No.: L1110639P

**Document Revision History**

<b>Date</b>	<b>Revision</b>	<b>Comments</b>
06/29/2011	O	Initial release

**Part 1 of 2: MPE Assessment for 450-520MHz**  
**Part 2 of 2: MPE Assessment for 136-174MHz**

**Part 2 of 2**

**Table of Contents**

1.0 Introduction..... 4

2.0 Abbreviations / Definitions..... 4

3.0 Referenced Standards and Guidelines ..... 4

4.0 Power Density Limits ..... 5

5.0 N<sub>c</sub> Test Channels..... 6

6.0 Measurement Equipment ..... 6

7.0 Measurement System Uncertainty Levels ..... 6

8.0 Product and System Description..... 7

9.0 Additional Options and Accessories..... 7

10.0 Test Set-Up Description..... 7

11.0 Method of Measurement for motorcycle mounted antenna(s)..... 8

    11.1 Bystander vehicle MPE measurements ..... 8

    11.2 Operator vehicle MPE measurements ..... 8

12.0 MPE Calculations ..... 9

13.0 Antenna Summary ..... 10

14.0 Test Results Summary ..... 10

15.0 Conclusion ..... 17

    Appendix A - Illustration of Antenna Location and Test Distances..... 18

    Appendix B - Probe Calibration Certificates..... 20

    Appendix C - Photos of Assessed Antennas..... 28

    Appendix D – MPE Measurement Results ..... 29

## 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 M30TSS9PW1AN (MHUT1010A) 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 <sup>2</sup>	W/m <sup>2</sup>	mW/cm <sup>2</sup>	W/m <sup>2</sup>	W/m <sup>2</sup>
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 <sup>2</sup>	W/m <sup>2</sup>	mW/cm <sup>2</sup>	W/m <sup>2</sup>	W/m <sup>2</sup>
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

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

where  $N_c$  is the number of test channels,  $f_{\text{high}}$  and  $f_{\text{low}}$  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 Date
Motorcycle	2005 Kawasaki KZ1000	NA	NA	NA
Survey Meter	ETS Model HI-2200	00086316	01/04/2011	01/04/2012
Probe – E-Field	ETS Model E100	00109011		
Probe – H-Field	ETS Model H200	00084230		

E-field measurements are in mW/cm<sup>2</sup>.

H-field measurements are in A/m

## 7.0 Measurement System Uncertainty Levels

**Table 4 - Uncertainty Budget for Near Field Probe Measurements**

	Tol. (± %)	Prob. Dist.	Divisor	$u_i$ (±%)	$v_i$
<b>Measurement System</b>					
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	∞
<b>Test sample Related</b>					
Antenna Positioning	3.0	N	1.00	3.0	∞
Power drift	5.0	R	1.73	2.9	∞
<b>Combined Standard Uncertainty</b>		RSS		12.2	∞
<b>Expanded Uncertainty (95% CONFIDENCE LEVEL)</b>		$k=2$		24	

## 8.0 Product and System Description

Model M30TSS9PW1AN (MHUT1010A) 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 MPE measurement results and calculations.

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.*)

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

*Note 1: 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<sup>2</sup>) 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<sup>2</sup>) using the equation 3. H-field measurements are only applicable to frequencies below 300MHz.*

Equation 3 – Converting A/m to mW/cm<sup>2</sup>

$$mW / cm^2 = (A / m)^2 * 37.699$$

Equation 4 – Power Density Maximum Calculation

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

*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 <sub>c</sub> Test Channels (KDB 447498)
1	HAD4026A	162-174	44.0	2.15	1/4 wave, wire	162-173.4	3
2	HAD4025A	150.8-162	47.5	2.15	1/4 wave, wire	150.8-162	3
3	HAD4024A	144-150.8	51.5	2.15	1/4 wave, wire	NA	2
4	HAD4023A	136-144	55.0	2.15	1/4 wave, wire	NA	3
5	RAD4005ARB	162-174	42.8	2.15	1/4 wave, wire	162-173.4	3
6	RAD4004ARB	150.8-162	45.6	2.15	1/4 wave, wire	150.8-162	3
7	RAD4003ARB	144-150.8	49.0	2.15	1/4 wave, wire	NA	2
8	RAD4002ARB	136-144	52.0	2.15	1/4 wave, wire	NA	3

### 14.0 Test Results Summary

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

**Table 6 - Bystander MPE assessment to 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 <sup>2</sup> )	FCC & ICNIRP Limit	% To Spec Limit	
BS	E	HAD4026A, (162-174MHz)	18	17.7	162.0000	0.05	0.20	25	
				17.6	168.0000	0.06	0.20	28	
				17.6	173.0125	0.06	0.20	32	
		HAD4025A, (150.8-162MHz)	18	17.7	150.8000	0.09	0.20	43	
				17.7	156.4000	0.07	0.20	33	
				17.7	162.0000	0.06	0.20	28	
		HAD4024A, (144-150.8MHz)	18	17.7	144.0000	0.09	0.20	45	
				17.7	147.4000	0.08	0.20	39	
				17.7	150.8000	0.07	0.20	35	
		HAD4023A, (136-144MHz)	18	17.6	136.0125	0.09	0.20	45	
				17.7	140.0000	0.09	0.20	46	
				17.7	144.0000	0.08	0.20	40	
		RAD4005ARB (162-174 MHz)	18	17.7	162.0000	0.05	0.20	24	
				17.6	168.0000	0.06	0.20	29	
				17.6	173.0125	0.07	0.20	35	
		RAD4004ARB (150.8-162 MHz)	18	17.7	150.8000	0.08	0.20	41	
17.7	156.4000			0.07	0.20	34			
17.7	162.0000			0.06	0.20	28			

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

Table 6 (continued) - Bystander MPE assessment to 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 & ICNIRP Limit	% To Spec Limit	
BS	E	RAD4003ARB (144 -150.8 MHz)	18	17.7	144.0000	0.10	0.20	48	
				17.7	147.4000	0.09	0.20	47	
				17.7	150.8000	0.09	0.20	43	
		RAD4002ARB (136 - 144 MHz)	18	17.6	136.0125	0.09	0.20	46	
				17.7	140.0000	0.11	0.20	53	
	17.7			144.0000	0.10	0.20	51		
	H	HAD4026A, (162-174MHz)	18	17.7	162.0000	0.04	0.20	20	
				17.6	168.0000	0.05	0.20	23	
				17.6	173.0125	0.05	0.20	24	
		HAD4025A, (150.8-162MHz)	18	17.7	150.8000	0.07	0.20	37	
				17.7	156.4000	0.05	0.20	27	
				17.7	162.0000	0.05	0.20	25	
		HAD4024A, (144-150.8MHz)	18	17.7	144.0000	0.08	0.20	42	
				17.7	147.4000	0.08	0.20	39	
				17.7	150.8000	0.07	0.20	33	
		HAD4023A, (136-144MHz)	18	17.6	136.0125	0.10	0.20	48	
17.7				140.0000	0.09	0.20	46		
17.7				144.0000	0.08	0.20	39		

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

Table 6 (continued) - Bystander MPE assessment to 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 <sup>2</sup> )	FCC & ICNIRP Limit	% To Spec Limit	
BS	H	RAD4005ARB (162-174 MHz)	18	17.7	162.0000	0.04	0.20	20	
				17.6	168.0000	0.05	0.20	23	
				17.6	173.0125	0.05	0.20	23	
		RAD4004ARB (150.8-162 MHz)	18	17.7	150.8000	0.07	0.20	37	
				17.7	156.4000	0.06	0.20	31	
				17.7	162.0000	0.05	0.20	25	
		RAD4003ARB (144 -150.8 MHz)	18	17.7	144.0000	0.09	0.20	44	
				17.7	147.4000	0.08	0.20	42	
				17.7	150.8000	0.08	0.20	40	
		RAD4002ARB (136 - 144 MHz)	18	17.6	136.0125	0.09	0.20	43	
				17.7	140.0000	0.10	0.20	49	
				17.7	144.0000	0.09	0.20	46	

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

**Table 7 - Operator MPE assessment to 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 <sup>2</sup> )	FCC & ICNIRP Limit	% To Spec Limit	
OP	E	HAD4026A, (162-174MHz)	18	17.7	162.0000	0.48	1.00	48	
				17.6	168.0000	0.65	1.00	65	
				17.6	173.0125	0.92	1.00	92	
		HAD4025A, (150.8-162MHz)	18	17.7	150.8000	0.41	1.00	41	
				17.7	156.4000	0.42	1.00	42	
				17.7	162.0000	0.54	1.00	54	
		HAD4024A, (144-150.8MHz)	18	17.7	144.0000	0.42	1.00	42	
				17.7	147.4000	0.40	1.00	40	
				17.7	150.8000	0.37	1.00	37	
		HAD4023A, (136-144MHz)	18	17.6	136.0125	0.49	1.00	49	
				17.7	140.0000	0.43	1.00	43	
				17.7	144.0000	0.38	1.00	38	
		RAD4005ARB (162-174 MHz)	18	17.7	162.0000	0.47	1.00	47	
				17.6	168.0000	0.62	1.00	62	
				17.6	173.0125	0.86	1.00	86	
		RAD4004ARB (150.8-162 MHz)	18	17.7	150.8000	0.41	1.00	41	
17.7	156.4000			0.44	1.00	44			
17.7	162.0000			0.54	1.00	54			

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

**Table 7 (continued) - Operator MPE assessment to 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 <sup>2</sup> )	FCC & ICNIRP Limit	% To Spec Limit	
OP	E	RAD4003ARB (144 -150.8 MHz)	18	17.7	144.0000	0.45	1.00	45	
				17.7	147.4000	0.43	1.00	43	
				17.7	150.8000	0.43	1.00	43	
		RAD4002ARB (136 - 144 MHz)	18	17.6	136.0125	0.49	1.00	49	
				17.7	140.0000	0.49	1.00	49	
				17.7	144.0000	0.47	1.00	47	
		H	HAD4026A, (162-174MHz)	18	17.7	162.0000	0.24	1.00	24
	17.6				168.0000	0.33	1.00	33	
	17.6				173.0125	0.38	1.00	38	
	HAD4025A, (150.8-162MHz)		18	17.7	150.8000	0.40	1.00	40	
				17.7	156.4000	0.32	1.00	32	
				17.7	162.0000	0.29	1.00	29	
	HAD4024A, (144-150.8MHz)		18	17.7	144.0000	0.44	1.00	44	
				17.7	147.4000	0.40	1.00	40	
				17.7	150.8000	0.37	1.00	37	
	HAD4023A, (136-144MHz)		18	17.6	136.0125	0.54	1.00	54	
17.7				140.0000	0.49	1.00	49		
17.7				144.0000	0.44	1.00	44		

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

**Table 7 (continued) - Operator MPE assessment to 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 <sup>2</sup> )	FCC & ICNIRP Limit	% To Spec Limit	
OP	H	RAD4005ARB (162-174 MHz)	18	17.7	162.0000	0.24	1.00	24	
				17.6	168.0000	0.33	1.00	33	
				17.6	173.0125	0.35	1.00	35	
		RAD4004ARB (150.8-162 MHz)	18	17.7	150.8000	0.40	1.00	40	
				17.7	156.4000	0.33	1.00	33	
				17.7	162.0000	0.28	1.00	28	
		RAD4003ARB (144 -150.8 MHz)	18	17.7	144.0000	0.44	1.00	44	
				17.7	147.4000	0.47	1.00	47	
				17.7	150.8000	0.40	1.00	40	
		RAD4002ARB (136 - 144 MHz)	18	17.6	136.0125	0.58	1.00	58	
				17.7	140.0000	0.60	1.00	60	
				17.7	144.0000	0.51	1.00	51	

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 (150.8-173.4 MHz)**

	VHF Band
<b>Operator - Max Calculated Power Density</b>	0.92mW/cm <sup>2</sup>
<b>Bystander - Max Calculated Power Density</b>	0.09mW/cm <sup>2</sup>

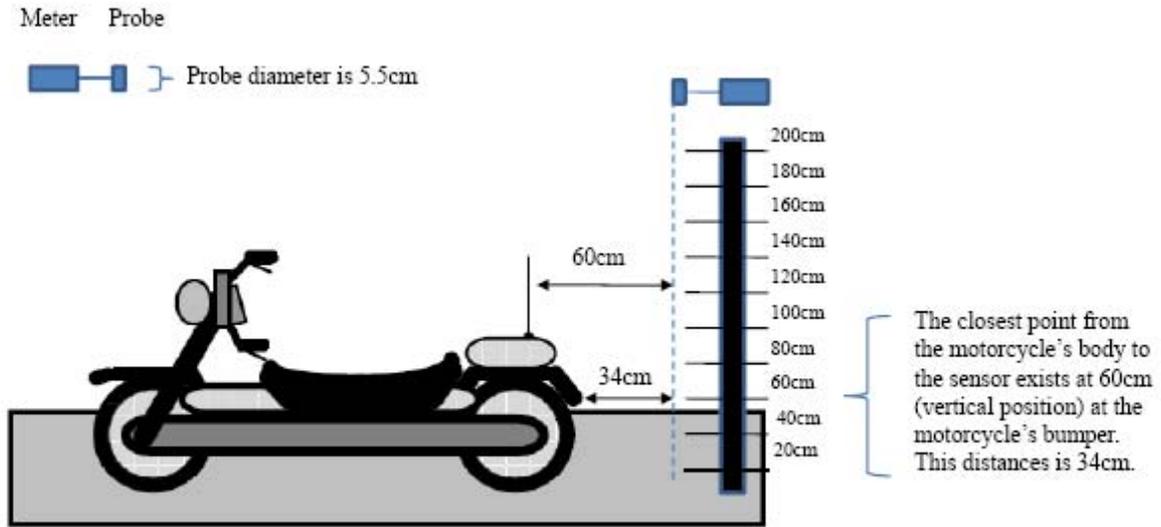
**Table 9: RF Exposure Results (136-174MHz)**

	VHF Band
<b>Operator - Max Calculated Power Density</b>	0.92mW/cm <sup>2</sup>
<b>Bystander - Max Calculated Power Density</b>	0.11mW/cm <sup>2</sup>

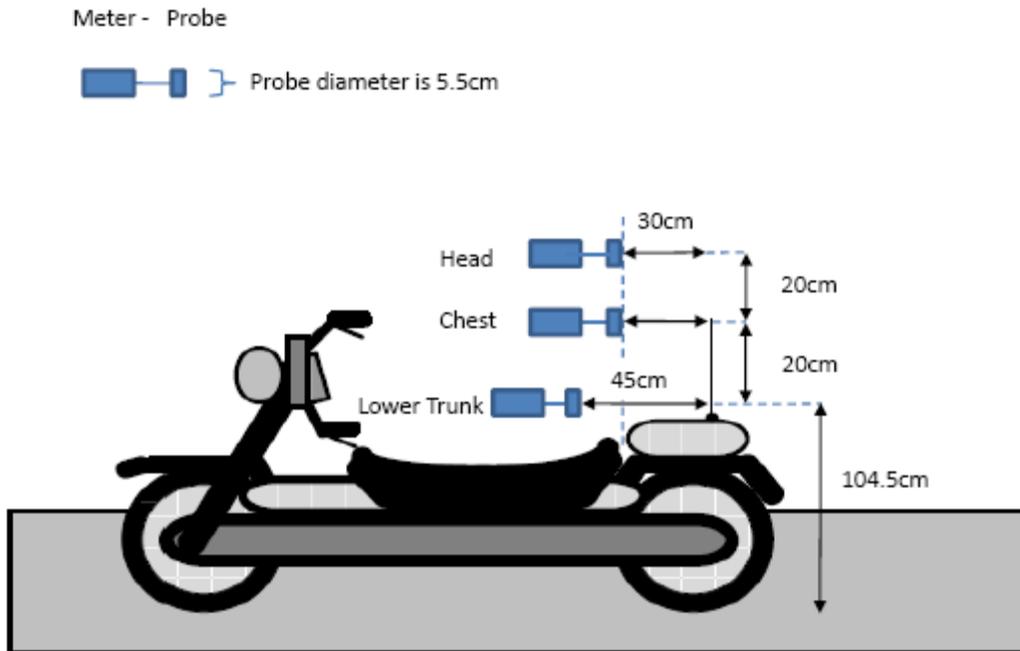
These MPE results herein demonstrate compliance to the FCC/IEEE/ICNIRP Occupational/Controlled Exposure limit. FCC rules require compliance for Bystanders to the FCC General Population/Uncontrolled limits.

**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**

Service Test Report  
QAF 1126, 06/07  
Report ID: 82515



**Certificate of Test Conformance**  
Page 1 of 1

Reference: S 000021039

Customer: AGILENT/MOTOROLA (FL)

The instrument listed below has been tested and verified to Internal Quality Standards. Test data is Not Applicable. Equipment used during instrument testing is controlled by laboratory compliance with ISO/IEC 17025-2005 using ETS-Lindgren Quality Management System internal procedures.

<u>Manufacturer</u>	ETS-Lindgren	<u>Status In</u>	In Tolerance
<u>Instrument Type</u>	RF Survey Meter	<u>Date Completed</u>	04-Jan-11
<u>Model</u>	HI-2200	<u>Status Out</u>	Compliant with Internal Quality Standards
<u>Serial Number/ID</u>	00086316		

Remarks

Performed functional test with customer probes.

I would like to take this opportunity to express our appreciation for using ETS-Lindgren for your EMI test equipment services and I am looking forward to continued business with your organization. Please feel free to contact our offices at (512) 531-6400, if you have any questions regarding this report.

Sincerely,

Richard Goodlow

Calibration Supervisor

Date Attested: 04-Jan-11



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

**ETS-LINDGREN**  
 An ESCO Technologies Company  
 Track# S000021039 Ltd Cal   
 By AS Date 04-Jan-11  
 Next Cal Due \_\_\_\_\_  
 www.ets-lindgren.com

Cert I.D.: 82513

**Certificate of Calibration Conformance**

Page 1 of 4

The instrument identified 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.

<b>Manufacturer:</b>	ETS-Lindgren	<b>Operating Range:</b>	100kHz - 5GHz
<b>Model Number:</b>	E100	<b>Instrument Type:</b>	Isotropic Probe > 1 GHz
<b>Serial Number/ ID:</b>	00109011	<b>Date Code:</b>	
<b>Tracking Number:</b>	S000021039	<b>Alternate ID:</b>	
<b>Date Completed:</b>	04-Jan-11	<b>Customer:</b>	AGILENT/MOTOROLA (FL)
<b>Test Type:</b>	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:** Provided specific frequencies per customer request.

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				Condition of Instrument	
				Upon Receipt:	
Hewlett Packard	437B	HP Power Meter	3125U12370	15-Jun-11	In Tolerance to Internal Quality Standards
Fluke	6060B	RF Signal Generator	5690204	15-Jun-11	
Marconi	2022	Signal Generator	119019/077	23-Sep-11	On Release: In Tolerance to Internal Quality Standards
Agilent	E4419B	Power Meter	MY45104171	23-Sep-11	
Rohde & Schwarz	857.8008.02	Power Meter NRVD	100451	11-Mar-11	
Hewlett Packard	83650L	Synthesized Sweep Gen	3844A00422	29-Jan-11	

Calibration Completed By  
 Alan Schifferdecker, Calibration Technician

Attested and Issued on 04-Jan-11  
 Richard Goodlow, Calibration Supervisor

This document provides traceability of measurements to recognized national standards using controlled processes at the ETS-Lindgren Calibration Laboratory. Uncertainties listed are derived from the methods described by NIST Tech Note 1297. This certificate and report may not be reproduced, except in full, without the written approval of ETS-Lindgren Calibration Laboratory in accordance with ISO/IEC 17025-2005. QAF 1127 (06/07)



**Frequency Response Calibration Factors**  
**Model E100 Serial Number 00109011**  
**Date of Calibration 4 Jan 2011**

Frequency (MHz)	Applied V/m	Probe Reading			Correction Factor			Avg
		X	Y	Z	X	Y	Z	
1.00	8.01	6.72	6.81	6.79	1.19	1.18	1.19	1.18
1.00	19.91	16.99	17.06	16.81	1.18	1.16	1.18	1.17
1.00	69.94	57.57	58.72	57.39	1.21	1.19	1.22	1.21
1.00	124.57	101.46	104.06	102.37	1.23	1.20	1.22	1.21
15.00	7.96	7.86	7.90	7.83	1.01	1.01	1.02	1.01
15.00	20.05	19.63	19.82	19.48	1.02	1.01	1.03	1.02
15.00	70.00	69.10	69.69	68.73	1.01	1.00	1.02	1.01
15.00	124.88	122.58	123.22	122.40	1.02	1.01	1.02	1.02
30.00	7.98	8.01	8.05	7.96	1.00	0.99	1.00	1.00
30.00	19.92	19.97	19.95	19.75	1.00	1.00	1.01	1.00
30.00	70.27	70.84	71.25	70.61	0.99	0.99	1.00	0.99
30.00	125.59	125.86	126.38	125.94	1.00	0.99	1.00	1.00
75.00	7.98	8.06	8.10	8.14	0.99	0.98	0.98	0.98
75.00	19.98	20.08	20.34	20.37	0.99	0.98	0.98	0.99
75.00	69.66	71.26	71.78	71.67	0.98	0.97	0.97	0.97
75.00	124.36	126.52	127.22	126.98	0.98	0.98	0.98	0.98
100.00	8.00	8.31	8.35	8.32	0.97	0.96	0.95	0.96
100.00	19.94	20.43	20.62	20.69	0.98	0.97	0.96	0.97
100.00	69.60	71.97	72.44	72.45	0.97	0.96	0.96	0.96
100.00	124.78	129.20	129.68	129.76	0.97	0.96	0.96	0.96
150.00	8.03	8.22	8.28	8.36	0.98	0.97	0.96	0.97
150.00	20.04	20.29	20.56	20.74	0.99	0.97	0.97	0.98
150.00	69.71	71.24	71.85	72.06	0.98	0.97	0.97	0.97
150.00	124.96	127.79	128.59	128.81	0.98	0.97	0.97	0.97
200.00	7.96	8.42	8.54	8.67	0.95	0.93	0.92	0.93
200.00	19.94	20.85	21.26	21.50	0.96	0.94	0.93	0.94
200.00	69.91	73.96	75.03	75.43	0.94	0.93	0.93	0.93
200.00	125.22	132.74	134.34	135.14	0.94	0.93	0.93	0.93
250.00	8.01	8.24	8.23	8.39	0.97	0.97	0.96	0.97
250.00	19.97	20.34	20.44	20.74	0.98	0.98	0.96	0.97
250.00	69.73	72.74	71.86	72.46	0.97	0.97	0.96	0.96
250.00	124.77	129.17	128.53	129.40	0.97	0.97	0.97	0.97
300.00	7.99	8.19	8.22	8.40	0.97	0.97	0.95	0.97
300.00	19.98	20.29	20.42	20.78	0.99	0.98	0.96	0.98
300.00	69.98	72.15	72.24	72.93	0.97	0.97	0.96	0.97
300.00	125.38	130.27	130.16	131.02	0.96	0.96	0.96	0.96
400.00	7.98	8.15	8.17	8.34	0.98	0.98	0.95	0.97
400.00	19.89	20.07	20.26	20.67	0.99	0.98	0.96	0.98
400.00	69.66	71.58	71.93	72.74	0.97	0.97	0.96	0.97
400.00	124.82	128.40	128.45	129.35	0.97	0.97	0.96	0.97
500.00	8.01	7.90	8.00	8.20	1.01	1.00	0.98	1.00
500.00	20.01	19.58	19.94	20.36	1.02	1.00	0.98	1.00
500.00	70.01	69.21	70.57	70.91	1.01	1.00	0.98	1.00
500.00	124.92	123.45	124.93	125.25	1.01	1.00	0.99	1.00
600.00	8.00	7.74	7.78	7.97	1.03	1.03	1.00	1.02
600.00	19.99	19.16	19.35	19.81	1.04	1.03	1.01	1.03
600.00	69.71	67.99	68.18	68.96	1.03	1.02	1.01	1.02
600.00	125.01	121.68	121.62	123.11	1.03	1.03	1.02	1.02



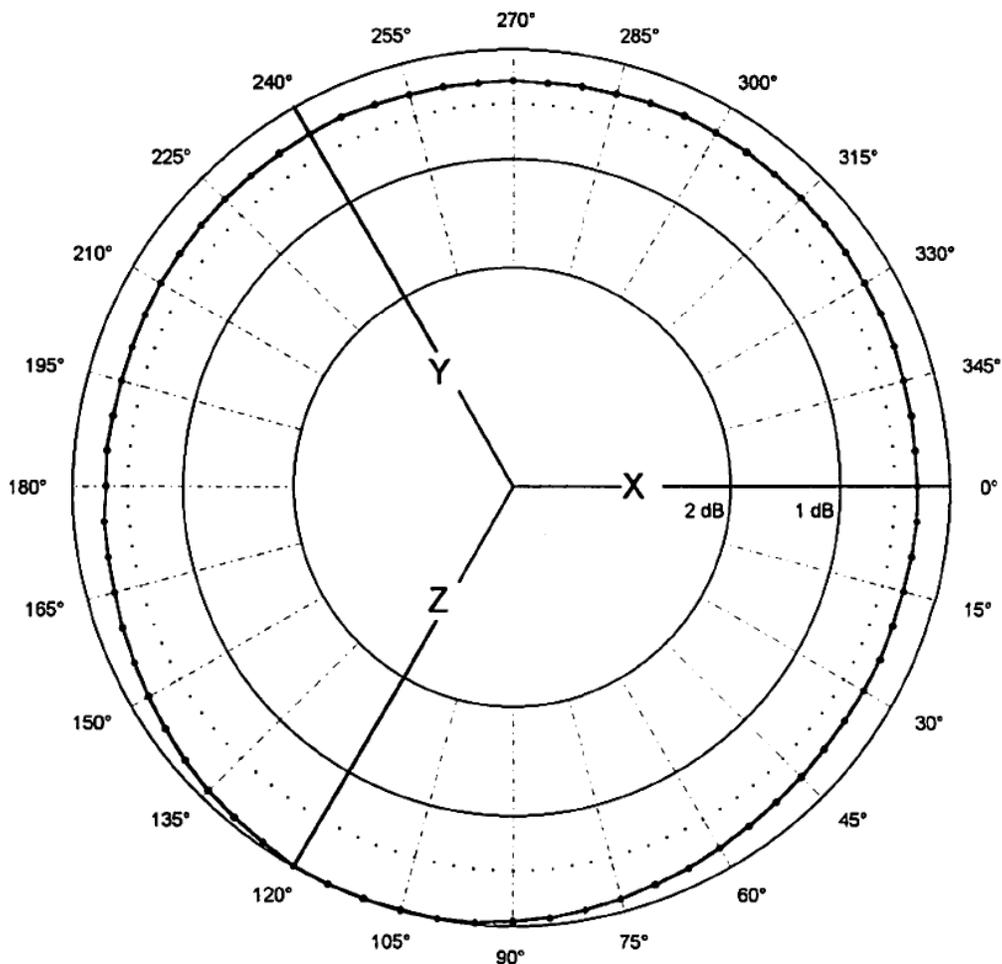
**Frequency Response Calibration Factors**  
**Model E100 Serial Number 00109011**  
**Date of Calibration 4 Jan 2011**

Frequency (MHz)	Applied V/m	Probe Reading			Correction Factor			Avg
		X	Y	Z	X	Y	Z	
700.00	7.98	7.54	7.55	7.75	1.06	1.06	1.03	1.05
700.00	19.95	18.65	18.77	19.21	1.07	1.06	1.04	1.06
700.00	70.29	66.67	66.74	67.70	1.05	1.05	1.04	1.05
700.00	125.03	118.33	118.33	119.37	1.05	1.06	1.05	1.05
800.00	8.02	7.36	7.46	7.65	1.09	1.08	1.05	1.07
800.00	20.01	18.20	18.51	18.79	1.10	1.09	1.06	1.08
800.00	70.11	64.66	65.16	66.08	1.09	1.08	1.06	1.07
800.00	124.54	114.33	115.44	115.49	1.09	1.08	1.08	1.08
900.00	8.01	7.73	7.90	8.11	1.04	1.01	0.99	1.01
900.00	20.03	19.06	19.57	20.19	1.05	1.02	1.00	1.02
900.00	70.05	67.21	68.79	69.68	1.04	1.02	1.01	1.02
900.00	125.46	120.34	121.90	123.03	1.05	1.03	1.02	1.03
1000.00	8.01	8.03	8.09	8.31	1.00	0.99	0.96	0.98
1000.00	19.92	19.81	19.86	20.44	1.01	1.00	0.98	0.99
1000.00	69.72	69.27	70.09	71.56	1.00	1.00	0.97	0.99
1000.00	125.71	124.36	124.64	125.68	1.01	1.01	1.00	1.01
2000.00	20.37	20.04	19.84	20.46	1.02	1.03	1.00	1.01
2450.00	20.04	18.11	19.40	19.62	1.11	1.03	1.02	1.05
3000.00	19.97	19.95	19.47	19.27	1.00	1.03	1.04	1.02
3500.00	19.93	20.40	22.00	20.96	0.98	0.91	0.95	0.94
4000.00	20.05	20.37	19.96	20.00	0.98	1.00	1.00	1.00
5000.00	19.80	14.46	15.77	14.64	1.37	1.26	1.35	1.33
5500.00	19.98	15.05	15.28	15.18	1.33	1.31	1.32	1.32
6000.00	20.07	13.45	15.63	15.58	1.49	1.28	1.29	1.35



### PROBE ROTATIONAL RESPONSE

**Model** E100  
**S/N** 00109011  
**Date** 04-Jan-2011  
**Time** 14:33:16  
**Variation** 0.31 dB



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



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



Cert I.D.: 82514

*Certificate of Calibration Conformance*  
 Page 1 of 2

The instrument identified 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.

<b>Manufacturer:</b>	ETS-Lindgren	<b>Operating Range:</b>	5-300MHz / 30mA/m-10A/m
<b>Model Number:</b>	H200	<b>Instrument Type:</b>	Isotropic Magnetic Field Probe (2)
<b>Serial Number/ ID:</b>	00084230	<b>Date Code:</b>	
<b>Tracking Number:</b>	S000021039	<b>Alternate ID:</b>	
<b>Date Completed:</b>	04-Jan-11	<b>Customer:</b>	AGILENT/MOTOROLA (FL)
<b>Test Type:</b>	Standard Field, Field Strength		
<b>Calibration Uncertainty:</b>	Direct Field Method	1.15dB	
k=2, (95% Confidence Level)			

**Test Remarks:** Provided specified frequencies per customer request.

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	Condition of Instrument Upon Receipt:
Hewlett Packard 8648C Signal Generator 3836A04299 23-Sep-11	In Tolerance to Internal Quality Standards
Agilent E9304A Agilent Power Sensor MY41497694 11-Feb-11	
Hewlett Packard E4419B Power Meter US39250717 22-Sep-11	<b>On Release:</b> In Tolerance to Internal Quality Standards

Calibration Completed By  
 Alan Schifferdecker, Calibration Technician

Attested and Issued on 04-Jan-11  
 Richard Goodlow, Calibration Supervisor

This document provides traceability of measurements to recognized national standards using controlled processes at the ETS-Lindgren Calibration Laboratory. Uncertainties listed are derived from the methods described by NIST Tech Note 1297. This certificate and report may not be reproduced, except in full, without the written approval of ETS-Lindgren Calibration Laboratory in accordance with ISO/IEC 17025-2005. QAF 1127 (06/07)



**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 Pos.	Bystander (BS) Positions									DUT Max. TX Factor	Avg. over Body (mW/cm2)	Calc. P.D. (mW/cm2)	Max Calc. P.D. (mW/cm2)
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	20 cm		40 cm	60 cm	80 cm	100 cm	120 cm	140 cm	160 cm	180 cm	200 cm				
MC	HAD4026A, (162-174MHz)	2.15	162.0	18	17.7	CW	E	0.94	BS		0.07	0.14	0.14	0.11	0.14	0.18	0.14	0.08	0.04				
MC	HAD4026A, (162-174MHz)	2.15	168.0	18	17.6	CW	E	0.93	BS	0.09	0.15	0.17	0.16	0.20	0.21	0.12	0.05	0.02	0.01	0.5	0.118	0.055	0.06
MC	HAD4026A, (162-174MHz)	2.15	173.0125	18	17.6	CW	E	0.92	BS	0.11	0.20	0.24	0.23	0.24	0.20	0.09	0.03	0.01	0.01	0.5	0.136	0.063	0.06
MC	HAD4025A, (150.8-162MHz)	2.15	150.8	18	17.7	CW	E	0.96	BS	0.12	0.25	0.26	0.18	0.15	0.21	0.23	0.18	0.11	0.06	0.5	0.175	0.084	0.09
MC	HAD4025A, (150.8-162MHz)	2.15	156.4	18	17.7	CW	E	0.95	BS	0.10	0.19	0.20	0.14	0.14	0.20	0.18	0.11	0.06	0.04	0.5	0.136	0.065	0.07
MC	HAD4025A, (150.8-162MHz)	2.15	162.0	18	17.7	CW	E	0.94	BS	0.08	0.15	0.15	0.12	0.16	0.21	0.14	0.09	0.04	0.02	0.5	0.116	0.055	0.06
MC	HAD4024A, (144-150.8MHz)	2.15	144.0	18	17.7	CW	E	0.96	BS	0.12	0.26	0.29	0.21	0.15	0.19	0.22	0.20	0.13	0.07	0.5	0.184	0.088	0.09
MC	HAD4024A, (144-150.8MHz)	2.15	147.4	18	17.7	CW	E	0.96	BS	0.10	0.22	0.23	0.17	0.13	0.17	0.20	0.19	0.11	0.06	0.5	0.158	0.076	0.08
MC	HAD4024A, (144-150.8MHz)	2.15	150.8	18	17.7	CW	E	0.96	BS	0.09	0.19	0.22	0.14	0.13	0.17	0.19	0.15	0.09	0.05	0.5	0.142	0.068	0.07
MC	HAD4023A, (136-144MHz)	2.15	136.0125	18	17.6	CW	E	0.95	BS	0.12	0.24	0.31	0.23	0.15	0.16	0.20	0.21	0.14	0.09	0.5	0.185	0.088	0.09
MC	HAD4023A, (136-144MHz)	2.15	140.0	18	17.7	CW	E	0.96	BS	0.12	0.25	0.30	0.23	0.15	0.17	0.23	0.21	0.14	0.08	0.5	0.188	0.090	0.09
MC	HAD4023A, (136-144MHz)	2.15	144.0	18	17.7	CW	E	0.96	BS	0.11	0.21	0.26	0.19	0.14	0.17	0.19	0.17	0.11	0.07	0.5	0.162	0.078	0.08

MPE calculations are defined in section 12.0.

MPE measurement data for Bystander

D.U.T. Info.							Probe Info.			Test Pos.	Bystander (BS) Positions									DUT Max. TX Factor	Avg. over Body (mW/cm <sup>2</sup> )	Calc. P.D. (mW/cm <sup>2</sup> )	Max Calc. P.D. (mW/cm <sup>2</sup> )
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	20 cm		40 cm	60 cm	80 cm	100 cm	120 cm	140 cm	160 cm	180 cm	200 cm				
MC	RAD4005ARB (162-174 MHz)	2.15	173.0125	18	17.6	CW	E	0.92	BS		0.11	0.21	0.25	0.25	0.27	0.22	0.11	0.04	0.01				
MC	RAD4004ARB (150.8-162)	2.15	150.8	18	17.7	CW	E	0.96	BS	0.11	0.24	0.27	0.18	0.15	0.21	0.22	0.16	0.09	0.05	0.5	0.168	0.081	0.08
MC	RAD4004ARB (150.8-162)	2.15	156.4	18	17.7	CW	E	0.95	BS	0.09	0.19	0.20	0.14	0.15	0.21	0.20	0.12	0.05	0.04	0.5	0.139	0.066	0.07
MC	RAD4004ARB (150.8-162)	2.15	162.0	18	17.7	CW	E	0.94	BS	0.07	0.14	0.16	0.13	0.16	0.21	0.16	0.08	0.03	0.02	0.5	0.116	0.055	0.06
MC	RAD4003ARB (144 -150.8)	2.15	144.0	18	17.7	CW	E	0.96	BS	0.13	0.28	0.32	0.24	0.17	0.20	0.23	0.20	0.12	0.07	0.5	0.196	0.094	0.10
MC	RAD4003ARB (144 -150.8)	2.15	147.4	18	17.7	CW	E	0.96	BS	0.12	0.27	0.32	0.24	0.17	0.21	0.24	0.19	0.11	0.06	0.5	0.193	0.093	0.09
MC	RAD4003ARB (144 -150.8)	2.15	150.8	18	17.7	CW	E	0.96	BS	0.12	0.25	0.28	0.19	0.15	0.21	0.23	0.17	0.11	0.06	0.5	0.177	0.085	0.09
MC	RAD4002ARB (136 - 144 MHz)	2.15	136.0125	18	17.6	CW	E	0.95	BS	0.13	0.25	0.33	0.26	0.15	0.17	0.21	0.20	0.14	0.07	0.5	0.191	0.091	0.09
MC	RAD4002ARB (136 - 144 MHz)	2.15	140.0	18	17.7	CW	E	0.96	BS	0.14	0.29	0.37	0.29	0.19	0.21	0.25	0.21	0.15	0.09	0.5	0.219	0.105	0.11
MC	RAD4002ARB (136 - 144 MHz)	2.15	144.0	18	17.7	CW	E	0.96	BS	0.14	0.30	0.35	0.25	0.18	0.20	0.25	0.21	0.13	0.08	0.5	0.209	0.100	0.10

MPE calculations are defined in section 12.0.

MPE measurement data for Bystander

D.U.T. Info.							Probe Info.		Test Pos.	Bystander (BS) Positions										DUT Max. TX Factor	Avg. over Body (mW/cm2)	Calc. P.D. (mW/cm2)	Max Calc. P.D. (mW/cm2)
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		20 cm	40 cm	60 cm	80 cm	100 cm	120 cm	140 cm	160 cm	180 cm	200 cm				
MC	HAD4026A, (162-174MHz)	2.15	162.0	18	17.7	CW	H	0.86	BS	0.04	0.04	0.08	0.09	0.09	0.08	0.05	0.03	0.02	0.01	0.5	0.053	0.039	0.04
MC	HAD4026A, (162-174MHz)	2.15	168.0	18	17.6	CW	H	0.85	BS	0.05	0.06	0.09	0.10	0.10	0.08	0.05	0.03	0.01	0	0.5	0.057	0.044	0.05
MC	HAD4026A, (162-174MHz)	2.15	173.0125	18	17.6	CW	H	0.84	BS	0.06	0.07	0.10	0.11	0.10	0.07	0.04	0.02	0.01	0.01	0.5	0.059	0.046	0.05
MC	HAD4025A, (150.8-162MHz)	2.15	150.8	18	17.7	CW	H	0.87	BS	0.06	0.06	0.07	0.10	0.11	0.10	0.08	0.06	0.04	0.03	0.5	0.071	0.072	0.07
MC	HAD4025A, (150.8-162MHz)	2.15	156.4	18	17.7	CW	H	0.86	BS	0.05	0.05	0.07	0.09	0.10	0.09	0.07	0.05	0.03	0.02	0.5	0.062	0.054	0.05
MC	HAD4025A, (150.8-162MHz)	2.15	162.0	18	17.7	CW	H	0.86	BS	0.05	0.05	0.08	0.10	0.10	0.08	0.06	0.04	0.02	0.01	0.5	0.059	0.049	0.05
MC	HAD4024A, (144-150.8MHz)	2.15	144.0	18	17.7	CW	H	0.87	BS	0.07	0.06	0.07	0.09	0.11	0.11	0.09	0.07	0.05	0.04	0.5	0.076	0.082	0.08
MC	HAD4024A, (144-150.8MHz)	2.15	147.4	18	17.7	CW	H	0.87	BS	0.06	0.06	0.07	0.09	0.11	0.10	0.09	0.07	0.05	0.03	0.5	0.073	0.076	0.08
MC	HAD4024A, (144-150.8MHz)	2.15	150.8	18	17.7	CW	H	0.87	BS	0.05	0.05	0.07	0.09	0.10	0.10	0.08	0.06	0.04	0.03	0.5	0.067	0.064	0.07
MC	HAD4023A, (136-144MHz)	2.15	136.0125	18	17.6	CW	H	0.88	BS	0.07	0.07	0.07	0.09	0.11	0.11	0.10	0.08	0.06	0.04	0.5	0.080	0.093	0.10
MC	HAD4023A, (136-144MHz)	2.15	140.0	18	17.7	CW	H	0.87	BS	0.07	0.06	0.08	0.09	0.11	0.11	0.10	0.08	0.06	0.04	0.5	0.080	0.091	0.09
MC	HAD4023A, (136-144MHz)	2.15	144.0	18	17.7	CW	H	0.87	BS	0.06	0.06	0.07	0.09	0.10	0.10	0.09	0.07	0.05	0.04	0.5	0.073	0.076	0.08

MPE calculations are defined in section 12.0.

MPE measurement data for Bystander

D.U.T. Info.									Probe Info.		Bystander (BS) Positions										DUT Max. TX Factor	Avg. over Body (mW/cm2)	Calc. P.D. (mW/cm2)	Max Calc. P.D. (mW/cm2)
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					
MC	RAD4005ARB (162-174 MHz)	2.15	162.0	18	17.7	CW	H	0.86	BS	0.05	0.05	0.07	0.09	0.09	0.07	0.05	0.03	0.02	0.01	0.5	0.053	0.039	0.04	
MC	RAD4005ARB (162-174 MHz)	2.15	168.0	18	17.6	CW	H	0.85	BS	0.05	0.06	0.09	0.10	0.10	0.07	0.05	0.03	0.02	0.01	0.5	0.058	0.046	0.05	
MC	RAD4005ARB (162-174 MHz)	2.15	173.0125	18	17.6	CW	H	0.84	BS	0.06	0.07	0.09	0.11	0.10	0.07	0.04	0.02	0.01	0.01	0.5	0.058	0.045	0.05	
MC	RAD4004ARB (150.8-162)	2.15	150.8	18	17.7	CW	H	0.87	BS	0.06	0.05	0.08	0.10	0.11	0.10	0.08	0.06	0.04	0.03	0.5	0.071	0.072	0.07	
MC	RAD4004ARB (150.8-162)	2.15	156.4	18	17.7	CW	H	0.86	BS	0.05	0.06	0.08	0.10	0.11	0.09	0.07	0.05	0.03	0.02	0.5	0.066	0.061	0.06	
MC	RAD4004ARB (150.8-162)	2.15	162.0	18	17.7	CW	H	0.86	BS	0.05	0.06	0.08	0.10	0.10	0.08	0.06	0.03	0.02	0.01	0.5	0.059	0.049	0.05	
MC	RAD4003ARB (144 -150.8)	2.15	144.0	18	17.7	CW	H	0.87	BS	0.07	0.07	0.08	0.10	0.11	0.11	0.09	0.07	0.05	0.03	0.5	0.078	0.087	0.09	
MC	RAD4003ARB (144 -150.8)	2.15	147.4	18	17.7	CW	H	0.87	BS	0.06	0.06	0.08	0.10	0.11	0.11	0.09	0.07	0.05	0.03	0.5	0.076	0.082	0.08	
MC	RAD4003ARB (144 -150.8)	2.15	150.8	18	17.7	CW	H	0.87	BS	0.06	0.06	0.08	0.10	0.11	0.11	0.09	0.06	0.04	0.03	0.5	0.074	0.078	0.08	
MC	RAD4002ARB (136 - 144 MHz)	2.15	136.0125	18	17.6	CW	H	0.88	BS	0.06	0.06	0.07	0.09	0.10	0.11	0.10	0.08	0.05	0.04	0.5	0.076	0.084	0.09	
MC	RAD4002ARB (136 - 144 MHz)	2.15	140.0	18	17.7	CW	H	0.87	BS	0.07	0.07	0.08	0.10	0.11	0.11	0.10	0.08	0.06	0.04	0.5	0.082	0.096	0.10	
MC	RAD4002ARB (136 - 144 MHz)	2.15	144.0	18	17.7	CW	H	0.87	BS	0.07	0.06	0.08	0.10	0.11	0.11	0.10	0.08	0.05	0.04	0.5	0.080	0.091	0.09	

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 <sup>2</sup> )	Calc. P.D. (mW/cm <sup>2</sup> )	Max Calc. P.D. (mW/cm <sup>2</sup> )
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	HAD4026A, (162-174MHz)	2.15	162.0	18	17.7	CW	E	0.94		OP	0.45	1.26				
MC	HAD4026A, (162-174MHz)	2.15	168.0	18	17.6	CW	E	0.93	OP	0.44	1.57	2.07	0.5	1.360	0.632	0.65
MC	HAD4026A, (162-174MHz)	2.15	173.0125	18	17.6	CW	E	0.92	OP	0.46	1.97	3.43	0.5	1.953	0.899	0.92
MC	HAD4025A, (150.8-162MHz)	2.15	150.8	18	17.7	CW	E	0.96	OP	0.76	1.03	0.70	0.5	0.830	0.398	0.41
MC	HAD4025A, (150.8-162MHz)	2.15	156.4	18	17.7	CW	E	0.95	OP	0.63	1.10	0.88	0.5	0.870	0.413	0.42
MC	HAD4025A, (150.8-162MHz)	2.15	162.0	18	17.7	CW	E	0.94	OP	0.51	1.41	1.45	0.5	1.123	0.528	0.54
MC	HAD4024A, (144-150.8MHz)	2.15	144.0	18	17.7	CW	E	0.96	OP	0.98	0.95	0.68	0.5	0.870	0.418	0.42
MC	HAD4024A, (144-150.8MHz)	2.15	147.4	18	17.7	CW	E	0.96	OP	0.80	0.93	0.72	0.5	0.817	0.392	0.40
MC	HAD4024A, (144-150.8MHz)	2.15	150.8	18	17.7	CW	E	0.96	OP	0.71	0.87	0.68	0.5	0.753	0.362	0.37
MC	HAD4023A, (136-144MHz)	2.15	136.0125	18	17.6	CW	E	0.95	OP	1.26	1.02	0.74	0.5	1.007	0.478	0.49
MC	HAD4023A, (136-144MHz)	2.15	140.0	18	17.7	CW	E	0.96	OP	1.05	0.96	0.66	0.5	0.890	0.427	0.43
MC	HAD4023A, (136-144MHz)	2.15	144.0	18	17.7	CW	E	0.96	OP	0.81	0.91	0.64	0.5	0.787	0.378	0.38

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 <sup>2</sup> )	Calc. P.D. (mW/cm <sup>2</sup> )	Max Calc. P.D. (mW/cm <sup>2</sup> )
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	RAD4005ARB (162-174 MHz)	2.15	162.0	18	17.7	CW	E	0.94		OP	0.50	1.21				
MC	RAD4005ARB (162-174 MHz)	2.15	168.0	18	17.6	CW	E	0.93	OP	0.49	1.57	1.88	0.5	1.313	0.611	0.62
MC	RAD4005ARB (162-174 MHz)	2.15	173.0125	18	17.6	CW	E	0.92	OP	0.48	1.94	3.09	0.5	1.837	0.845	0.86
MC	RAD4004ARB (150.8-162)	2.15	150.8	18	17.7	CW	E	0.96	OP	0.74	1.07	0.70	0.5	0.837	0.402	0.41
MC	RAD4004ARB (150.8-162)	2.15	156.4	18	17.7	CW	E	0.95	OP	0.63	1.20	0.89	0.5	0.907	0.431	0.44
MC	RAD4004ARB (150.8-162)	2.15	162.0	18	17.7	CW	E	0.94	OP	0.51	1.42	1.46	0.5	1.130	0.531	0.54
MC	RAD4003ARB (144 -150.8)	2.15	144.0	18	17.7	CW	E	0.96	OP	0.98	1.08	0.68	0.5	0.913	0.438	0.45
MC	RAD4003ARB (144 -150.8)	2.15	147.4	18	17.7	CW	E	0.96	OP	0.83	1.05	0.75	0.5	0.877	0.421	0.43
MC	RAD4003ARB (144 -150.8)	2.15	150.8	18	17.7	CW	E	0.96	OP	0.81	1.09	0.73	0.5	0.877	0.421	0.43
MC	RAD4002ARB (136 - 144 MHz)	2.15	136.0125	18	17.6	CW	E	0.95	OP	1.25	1.06	0.71	0.5	1.007	0.478	0.49
MC	RAD4002ARB (136 - 144 MHz)	2.15	140.0	18	17.7	CW	E	0.96	OP	1.18	1.14	0.71	0.5	1.010	0.485	0.49
MC	RAD4002ARB (136 - 144 MHz)	2.15	144.0	18	17.7	CW	E	0.96	OP	1.01	1.11	0.75	0.5	0.957	0.459	0.47

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 <sup>2</sup> )	Calc. P.D. (mW/cm <sup>2</sup> )	Max Calc. P.D. (mW/cm <sup>2</sup> )
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	HAD4026A, (162-174MHz)	2.15	162.0	18	17.7	CW	H	0.86		OP	0.08	0.13				
MC	HAD4026A, (162-174MHz)	2.15	168.0	18	17.6	CW	H	0.85	OP	0.11	0.15	0.20	0.5	0.153	0.320	0.33
MC	HAD4026A, (162-174MHz)	2.15	173.0125	18	17.6	CW	H	0.84	OP	0.11	0.15	0.24	0.5	0.167	0.369	0.38
MC	HAD4025A, (150.8-162MHz)	2.15	150.8	18	17.7	CW	H	0.87	OP	0.13	0.19	0.18	0.5	0.167	0.396	0.40
MC	HAD4025A, (150.8-162MHz)	2.15	156.4	18	17.7	CW	H	0.86	OP	0.11	0.16	0.18	0.5	0.150	0.314	0.32
MC	HAD4025A, (150.8-162MHz)	2.15	162.0	18	17.7	CW	H	0.86	OP	0.10	0.14	0.19	0.5	0.143	0.286	0.29
MC	HAD4024A, (144-150.8MHz)	2.15	144.0	18	17.7	CW	H	0.87	OP	0.14	0.20	0.18	0.5	0.173	0.429	0.44
MC	HAD4024A, (144-150.8MHz)	2.15	147.4	18	17.7	CW	H	0.87	OP	0.14	0.19	0.17	0.5	0.167	0.396	0.40
MC	HAD4024A, (144-150.8MHz)	2.15	150.8	18	17.7	CW	H	0.87	OP	0.13	0.18	0.17	0.5	0.160	0.365	0.37
MC	HAD4023A, (136-144MHz)	2.15	136.0125	18	17.6	CW	H	0.88	OP	0.17	0.23	0.17	0.5	0.190	0.527	0.54
MC	HAD4023A, (136-144MHz)	2.15	140.0	18	17.7	CW	H	0.87	OP	0.15	0.22	0.18	0.5	0.183	0.480	0.49
MC	HAD4023A, (136-144MHz)	2.15	144.0	18	17.7	CW	H	0.87	OP	0.15	0.20	0.17	0.5	0.173	0.429	0.44

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 <sup>2</sup> )	Calc. P.D. (mW/cm <sup>2</sup> )	Max Calc. P.D. (mW/cm <sup>2</sup> )
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	RAD4005ARB (162-174 MHz)	2.15	162.0	18	17.7	CW	H	0.86		OP	0.17	0.13				
MC	RAD4005ARB (162-174 MHz)	2.15	168.0	18	17.6	CW	H	0.85	OP	0.11	0.15	0.20	0.5	0.153	0.320	0.33
MC	RAD4005ARB (162-174 MHz)	2.15	173.0125	18	17.6	CW	H	0.84	OP	0.10	0.15	0.23	0.5	0.160	0.340	0.35
MC	RAD4004ARB (150.8-162)	2.15	150.8	18	17.7	CW	H	0.87	OP	0.13	0.19	0.18	0.5	0.167	0.396	0.40
MC	RAD4004ARB (150.8-162)	2.15	156.4	18	17.7	CW	H	0.86	OP	0.11	0.17	0.18	0.5	0.153	0.328	0.33
MC	RAD4004ARB (150.8-162)	2.15	162.0	18	17.7	CW	H	0.86	OP	0.09	0.14	0.19	0.5	0.140	0.273	0.28
MC	RAD4003ARB (144 -150.8)	2.15	144.0	18	17.7	CW	H	0.87	OP	0.14	0.20	0.18	0.5	0.173	0.429	0.44
MC	RAD4003ARB (144 -150.8)	2.15	147.4	18	17.7	CW	H	0.87	OP	0.15	0.20	0.19	0.5	0.180	0.462	0.47
MC	RAD4003ARB (144 -150.8)	2.15	150.8	18	17.7	CW	H	0.87	OP	0.13	0.19	0.18	0.5	0.167	0.396	0.40
MC	RAD4002ARB (136 - 144 MHz)	2.15	136.0125	18	17.6	CW	H	0.88	OP	0.17	0.24	0.18	0.5	0.197	0.565	0.58
MC	RAD4002ARB (136 - 144 MHz)	2.15	140.0	18	17.7	CW	H	0.87	OP	0.17	0.24	0.20	0.5	0.203	0.590	0.60
MC	RAD4002ARB (136 - 144 MHz)	2.15	144.0	18	17.7	CW	H	0.87	OP	0.15	0.22	0.19	0.5	0.187	0.497	0.51

MPE calculations are defined in section 12.0.