

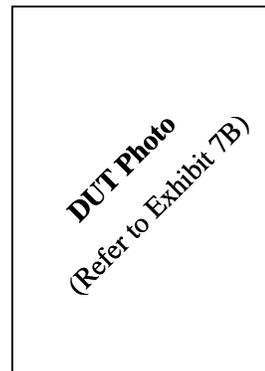


**DECLARATION OF COMPLIANCE: MPE ASSESSMENT Part 3 of 3**

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

**Date of Report:** October 25, 2010  
**Report Revision:** O  
**Report ID:** SR8722\_MPE\_rpt\_APX7500\_UHFR1\_and 7/800 Mobile\_Rev O\_101025

**Responsible Engineer:** Stephen C. Whalen (Principal Staff EME Test Engineer)  
**Date/s Tested:** 5/27/2010, 6/2/2010, 6/3/2010, 6/22/2010, 6/25/2010 & 7/1/2010  
4/4/08 – 4/11/08, 4/21/08  
**Manufacturer/Location:** Motorola Penang  
**Date submitted for test:** 9/2/2010  
**DUT Description:** APX7500Dual Band Mobile UHFR1 (40W) & 700/800MHz (35W)  
**Test TX mode(s):** CW  
**Max. Power output:** UHF 48W; 764-806MHz 36W; 806-870MHz 42W  
**TX Frequency Bands:** 700MHz bands: 764-776MHz (talk around); 794-806MHz (Trunked);  
800MHz bands: 806-824MHz (Trunked); 851-870MHz (talk around);  
**Signaling type:** Analog, APCO 25, and TDMA 1:2 (F2)  
**Model(s) Tested:** M30QSS9PW1AN (UHF), M30URS9PW1AN (7/800MHz)  
**Model(s) Certified:** M30TSS9PW1AN (MHUS1008A)  
**Serial Number(s):** 123ABC4567 (M30QSS9PW1AN)  
174 (M30URS9PW1AN)  
**Classification:** Occupational/Controlled Environment



**Regulatory Identifications:**  
FCC ID AZ492FT7043 – Part 22 & 90 (406.1-470 MHz & 763-775MHz; 793-805MHz; 806-824MHz; 851-869MHz), MPE results outside of Part 90 are not applicable for FCC compliance  
IC 109U-92FT7043 – RSS-102

**Approved Accessories:**  
**Antenna(s):**

Antennas for UHFR1 band	Antennas for 700/800MHz bands
<p><b>Report part 1 of 3</b> HAE6012A (Vehicular Roof Mount, 380-433 MHz, 1/4 Wave, 2.15dBi) HAE6011A (Vehicular Mount, 380-433 MHz, 5/8 Wave, 7.15dBi) HAE4003A (Vehicular Roof Mount, 450-470 MHz, 1/4 Wave, 2.15dBi) HAE4011A (Vehicular Mount, 450-470 MHz, 1/2 Wave, 5.65dBi) RAE4014ARB (Vehicular Mount, 445-470 MHz, 5/8 Wave, 7.15dBi)</p> <p><b>Report part 2 of 3</b> HAE6010A (Vehicular Mount, 380-433 MHz, 1/2 Wave, 5.65dBi) HAE6013A (Vehicular Mount, 380-470 MHz, 1/2 Wave, 4.15dBi) HAE6031A (Vehicular Mount, 380-520 MHz, 1/2 Wave, 4.15dBi)</p>	<p><b>Report part 3 of 3</b> HAF4016A (Thru-hole Mount 764-870MHz, 1/4 wave, 2.15dBi) HAF4014A (Thru-hole Mount 764-870 MHz, 1/4 wave, 5.15dBi) HAF4013A (Thru-hole Mount 764-870 MHz, 1/4 wave, 5.15dBi) HAF4017A (Thru-hole Mount 764-870 MHz, 1/4 wave, 5.15dBi) RRA4914B (Thru-hole Mount 806 - 900 MHz, 1/4 wave, 5.15dBi) HAF4002A (Thru-hole Mount 806 - 900 MHz, 1/4 wave, 2.15dBi)</p>

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 – Kim Uong for Deanna Zakharia*  
**Deanna Zakharia EMS EME Lab Senior Resource Manager,  
Laboratory Director,**

**Approval Date: 10/26/2010**

**Certification Date:**  
**Certification No.:**

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(Addendum report to include data for additional offered antennas)

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### Part 3 of 3

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### REVISION HISTORY

Date	Revision	Comments
10/25/2010	O	Initial release

## 1.0 Product and System Description

Model M30TSS9PW1AN (MHUS1008A) 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 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 Push-To-Talk (PTT) while the device is properly installed in a vehicle with an external antenna mounted at the center of the roof or trunk.

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 passengers inside the vehicle and the bystanders external to the vehicle are evaluated to the General Population/Uncontrolled Exposure Limits.

(Note that "Bystanders" as used herein mean people other than operator)

## 2.0 Additional Options and Accessories

NA

## 3.0 Measurement and Limit Standards

Measurements were performed according to the recommended guidelines in IEEE/ANSI C95.3-2002 and compared to FCC Limits Per 47 CFR 2.1091 (d) for General Population/ Uncontrolled RF Exposure.

For test frequencies ranging from 764-870MHz the MPE (Maximum Permissible Exposure) limit to electromagnetic energy in equivalent plane wave free-space power density is  $0.51 - 0.58 \text{mW/cm}^2$  and calculated using the formula  $f/1500$ .

## 4.0 Measurement System Uncertainty Levels

### 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</b> (95% CONFIDENCE LEVEL)		$k=2$		24	

## 5.0 Method of Measurement

### 5.1 EME measurements made with trunk mounted antenna(s) (Refer to APPENDIX A for antenna location and test distances)

#### 5.1.1 External/Bystander vehicle EME measurement (Antenna mounted at trunk center)

MPE measurements for bystander conditions are determined by taking the average of (10) measurements in a 2 m vertical line for each of the (3) bystander test locations indicated in Appendix A with 20 cm height increments, with antenna to probe sensor separation distances of 62 cm (directly behind vehicle), 104 cm (45 degree radial) and 110.5 cm (90 degree radial). 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.

Each of the offered antennas mounted at the center of the trunk were assessed at the rear of the vehicle while maintaining a minimum of twenty (20) centimeter separation distance between the probe sensor and vehicle body. The worst case antenna was then tested at a 45° radial at the corner of the trunk, and 90° radial at the side of the trunk.

**Note: The distance from the centered trunk-mounted antenna to the rear edge of the vehicle is 42cm and the distance from the rear edge of the vehicle to the survey probe sensor is 20cm.**

### **5.1.2 Internal/Passenger vehicle EME measurement** (Antenna mounted at trunk center)

MPE measurements for passenger conditions are determined by taking the average of the (3) measurements (Head, Chest, and Lower Trunk) inside the vehicle for both the front and back seats. 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 while the antenna is at 85cm from the back of the backseat passenger's head. These measurements are representative of operator and passengers sitting in the front and back seat of the vehicle.

## **5.2 EME measurements made with roof mounted antenna(s)** (Refer to APPENDIX A for antenna location and test distances)

### **5.2.1 External/Bystander vehicle EME measurement** (Antenna mounted at roof center)

MPE measurements for bystander conditions are determined by taking the average of (10) measurements in a 2m vertical line for the test location indicated in APPENDIX A with 20cm increments at the test distance of 117cm from the antenna under test. 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.

**Note: Actual test distance was approximately 117cm from centered roof-mounted antenna to the probe element (97cm from antenna to edge of car door and 20cm from the edge of the car door to the survey probe sensor); this is the closest distance that can be achieved to a centered roof-mounted antenna used for MPE compliance assessment herein.**

### 5.2.2 Internal/Passenger vehicle EME measurement

(Antenna mounted at roof center)

MPE measurements for passenger conditions are determined by taking the average of the (3) measurements (Head, Chest, and Lower Trunk) inside the vehicle for both the front and back seats. 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 operator and passengers sitting in the front and back seat of the vehicle.

## 6.0 Test Site

The test site is the Motorola open area test site located at 8000 W. Sunrise Blvd., Plantation, FL. 33322.

## 7.0 Measurement System/Equipment

Equipment Type	Model #	SN	Calibration Date
Automobile	2003 Ford Crown Victoria, 4-Door	NA	NA
Survey Meter	ETS Model HI-2200	00086316	2/20/2008
Probe: E-Field (Electric Field)	ETS Model E100	00084254	2/20/2008

ETS equipments measured Power Density in mW/cm<sup>2</sup>.

## 8.0 DUT Output Power

Power density measurements were performed with the test frequencies and associated power levels presented in the table below.

Test frequencies were chosen to include (approximately) the low, middle and high channels of the DUT band and applicable antenna bands.

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

Test Frequencies (MHz)	Measured Initial Power (W)
764.0875	36.2
770.0125	36.6
775.9125	36.3
794.0875	36.9
806.0125	42.9
815.0125	42.9
823.9875	42.7
851.0125	42.6
860.0125	42.4
868.8875	42.3

## 9.0 Test Set-Up Description

All antennas listed on the cover page of this report were considered in order to develop the test plan for this product.

Assessments were performed with DUT (Device Under Test) installed on a test vehicle, while engine was at idle, at the specified distances and test locations indicated in sections 5.0, and the APPENDIX A.

## 10.0 Test Results Summary

The tables below summarized the MPE measurement results for each test configuration: antenna (model and description), TX frequency, maximum output power, initial power, E/H field measurements, probe frequency cal factor, test positions (BS-Bystander, PB-Passenger Back, PF-Passenger Front), average over body results, calculated power density results, max calculated power density results, % of the applicable specification limit, and applicable FCC specification limits.

MPE results for this mobile radio are based on 50% duty cycle which is in accordance with the User Manual instructions.

Below is an explanation of how the MPE results are calculated.

External to vehicle (Bystander) - 10 measurements are averaged over the body (*body\_avg*).

Internal to vehicle (Passengers) - 3 measurements are averaged over the body (*body\_avg*).

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

Therefore;

$$Pwr\_density\_calc = body\_avg * (probe\_frequency\_cal\_factor)^2 * duty\_cycle$$

$$Pwr\_density\_max\_calc = pwr\_density\_calc * \frac{max\_output\_power}{initial\_output\_power}$$

*Note1; For initial output power > max\_output\_power; max\_output\_power / initial output power = 1*

*Note2: The probe frequency cal factors used for MPE evaluation of this product are based on the worse case.*

*Note 3: The calibration certificate's frequency cal factors were determined by measuring V/m for E-field probe and A/m for H-field probe. The results presented herein are power density (mW/cm<sup>2</sup>) and therefore the cal factors were squared as indicated in the formula above.*

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

**Table 1: MPE assessment data with antennas mounted on the roof**

Ant. Model/ Desc.	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	E/H Field	Probe Freq. Cal Factor (P.D.)	Test Pos.	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> )	% of FCC Spec Limit	FCC Spec Limit (mW/cm <sup>2</sup> )
HAF4016A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	BS	0.08	0.06	0.06	12	0.51
HAF4016A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	PB	0.05	0.04	0.04	7	0.51
HAF4016A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	PF	0.02	0.01	0.01	2	0.51
HAF4016A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	BS	0.08	0.06	0.06	11	0.51
HAF4016A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	PB	0.05	0.03	0.03	7	0.51
HAF4016A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	PF	0.01	0.00	0.00	1	0.51
HAF4016A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	BS	0.07	0.05	0.05	10	0.52
HAF4016A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	PB	0.03	0.02	0.02	5	0.52
HAF4016A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	PF	0.01	0.01	0.01	1	0.52
HAF4016A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	BS	0.08	0.06	0.06	12	0.53
HAF4016A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	PB	0.03	0.02	0.02	4	0.53
HAF4016A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	PF	0.00	0.00	0.00	0	0.53
HAF4016A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	BS	0.08	0.06	0.06	11	0.54
HAF4016A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PB	0.03	0.02	0.02	5	0.54
HAF4016A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PF	0.02	0.02	0.02	3	0.54
HAF4016A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	BS	0.10	0.07	0.07	12	0.55
HAF4016A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PB	0.03	0.02	0.02	4	0.55
HAF4016A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PF	0.01	0.01	0.01	2	0.55
HAF4016A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	BS	0.08	0.06	0.06	11	0.57
HAF4016A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PB	0.03	0.02	0.02	4	0.57
HAF4016A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PF	0.00	0.00	0.00	0	0.57

Table 1(cont): MPE assessment data with antennas mounted on the roof

Ant. Model/ Desc.	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	E/H Field	Probe Freq. Cal Factor (P.D.)	Test Pos.	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> )	% of FCC Spec Limit	FCC Spec Limit (mW/cm <sup>2</sup> )
HAF4016A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	BS	0.07	0.05	0.05	8	0.57
HAF4016A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	PB	0.03	0.02	0.02	3	0.57
HAF4016A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	PF	0.01	0.00	0.00	1	0.57
HAF4016A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	BS	0.07	0.05	0.05	8	0.58
HAF4016A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PB	0.04	0.03	0.03	5	0.58
HAF4016A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PF	0.01	0.01	0.01	1	0.58
HAF4002A (806-900MHz, ¼ wave)	806.0125	42	42.9	E	1.46	BS	0.08	0.06	0.06	11	0.54
HAF4002A (806-900MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PB	0.03	0.02	0.02	5	0.54
HAF4002A (806-900MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PF	0.02	0.02	0.02	3	0.54
HAF4002A (806-900MHz, ¼ wave)	815.0125	42	42.9	E	1.45	BS	0.10	0.07	0.07	13	0.54
HAF4002A (806-900MHz, ¼ wave)	815.0125	42	42.9	E	1.45	PB	0.05	0.03	0.03	6	0.54
HAF4002A (806-900MHz, ¼ wave)	815.0125	42	42.9	E	1.45	PF	0.03	0.02	0.02	4	0.54
HAF4002A (806-900MHz, ¼ wave)	823.9875	42	42.7	E	1.44	BS	0.10	0.07	0.07	13	0.55
HAF4002A (806-900MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PB	0.04	0.03	0.03	5	0.55
HAF4002A (806-900MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PF	0.02	0.01	0.01	2	0.55
HAF4002A (806-900MHz, ¼ wave)	851.0125	42	42.6	E	1.42	BS	0.09	0.06	0.06	11	0.57
HAF4002A (806-900MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PB	0.03	0.02	0.02	4	0.57
HAF4002A (806-900MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PF	0.00	0.00	0.00	0	0.57

Table 1(cont): MPE assessment data with antennas mounted on the roof

Ant. Model/ Desc.	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	E/H Field	Probe Freq. Cal Factor (P.D.)	Test Pos.	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> )	% of FCC Spec Limit	FCC Spec Limit (mW/cm <sup>2</sup> )
HAF4002A (806-900MHz, ¼ wave)	862.0125	42	42.4	E	1.41	BS	0.07	0.05	0.05	8	0.57
HAF4002A (806-900MHz, ¼ wave)	862.0125	42	42.4	E	1.41	PB	0.03	0.02	0.02	4	0.57
HAF4002A (806-900MHz, ¼ wave)	862.0125	42	42.4	E	1.41	PF	0.01	0.00	0.00	1	0.57
HAF4002A (806-900MHz, ¼ wave)	868.8875	42	42.3	E	1.40	BS	0.06	0.04	0.04	8	0.58
HAF4002A (806-900MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PB	0.03	0.02	0.02	4	0.58
HAF4002A (806-900MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PF	0.01	0.01	0.01	1	0.58
HAF4014A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	BS	0.10	0.07	0.07	14	0.51
HAF4014A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	PB	0.07	0.05	0.05	10	0.51
HAF4014A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	PF	0.02	0.01	0.01	3	0.51
HAF4014A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	BS	0.10	0.07	0.07	14	0.51
HAF4014A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	PB	0.08	0.06	0.06	12	0.51
HAF4014A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	PF	0.02	0.02	0.02	3	0.51
HAF4014A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	BS	0.10	0.07	0.07	13	0.52
HAF4014A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	PB	0.08	0.06	0.06	11	0.52
HAF4014A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	PF	0.02	0.01	0.01	3	0.52
HAF4014A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	BS	0.11	0.08	0.08	15	0.53
HAF4014A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	PB	0.06	0.04	0.04	8	0.53
HAF4014A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	PF	0.05	0.03	0.03	6	0.53

Table 1(cont): MPE assessment data with antennas mounted on the roof

Ant. Model/ Desc.	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	E/H Field	Probe Freq. Cal Factor (P.D.)	Test Pos.	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> )	% of FCC Spec Limit	FCC Spec Limit (mW/cm <sup>2</sup> )
HAF4014A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	BS	0.10	0.07	0.07	14	0.54
HAF4014A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PB	0.05	0.04	0.04	7	0.54
HAF4014A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PF	0.03	0.02	0.02	5	0.54
HAF4014A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	BS	0.12	0.09	0.09	16	0.55
HAF4014A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PB	0.05	0.04	0.04	7	0.55
HAF4014A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PF	0.03	0.02	0.02	4	0.55
HAF4014A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	BS	0.10	0.07	0.07	12	0.57
HAF4014A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PB	0.05	0.04	0.04	7	0.57
HAF4014A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PF	0.02	0.01	0.01	2	0.57
HAF4014A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	BS	0.08	0.05	0.05	9	0.57
HAF4014A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	PB	0.04	0.03	0.03	5	0.57
HAF4014A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	PF	0.00	0.00	0.00	0	0.57
HAF4014A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	BS	0.07	0.05	0.05	9	0.58
HAF4014A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PB	0.04	0.03	0.03	5	0.58
HAF4014A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PF	0.01	0.00	0.00	1	0.58
HAF4013A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	BS	0.08	0.06	0.06	11	0.51
HAF4013A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	PB	0.04	0.03	0.03	6	0.51
HAF4013A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	PF	0.01	0.01	0.01	2	0.51

Table 1(cont): MPE assessment data with antennas mounted on the roof

Ant. Model/ Desc.	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	E/H Field	Probe Freq. Cal Factor (P.D.)	Test Pos.	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> )	% of FCC Spec Limit	FCC Spec Limit (mW/cm <sup>2</sup> )
HAF4013A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	BS	0.08	0.06	0.06	11	0.51
HAF4013A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	PB	0.04	0.03	0.03	6	0.51
HAF4013A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	PF	0.01	0.01	0.01	1	0.51
HAF4013A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	BS	0.07	0.05	0.05	10	0.52
HAF4013A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	PB	0.04	0.03	0.03	6	0.52
HAF4013A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	PF	0.01	0.01	0.01	2	0.52
HAF4013A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	BS	0.08	0.06	0.06	11	0.53
HAF4013A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	PB	0.03	0.02	0.02	4	0.53
HAF4013A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	PF	0.03	0.02	0.02	4	0.53
HAF4013A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	BS	0.08	0.06	0.06	10	0.54
HAF4013A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PB	0.03	0.02	0.02	4	0.54
HAF4013A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PF	0.02	0.01	0.01	3	0.54
HAF4013A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	BS	0.09	0.07	0.07	12	0.55
HAF4013A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PB	0.04	0.03	0.03	5	0.55
HAF4013A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PF	0.02	0.01	0.01	2	0.55
HAF4013A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	BS	0.09	0.06	0.06	11	0.57
HAF4013A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PB	0.04	0.03	0.03	5	0.57
HAF4013A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PF	0.00	0.00	0.00	0	0.57

Table 1(cont): MPE assessment data with antennas mounted on the roof

Ant. Model/ Desc.	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	E/H Field	Probe Freq. Cal Factor (P.D.)	Test Pos.	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> )	% of FCC Spec Limit	FCC Spec Limit (mW/cm <sup>2</sup> )
HAF4013A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	BS	0.07	0.05	0.05	8	0.57
HAF4013A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	PB	0.04	0.03	0.03	5	0.57
HAF4013A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	PF	0.01	0.00	0.00	1	0.57
HAF4013A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	BS	0.07	0.05	0.05	8	0.58
HAF4013A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PB	0.05	0.03	0.03	6	0.58
HAF4013A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PF	0.01	0.01	0.01	1	0.58
HAF4017A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	BS	0.05	0.03	0.03	6	0.51
HAF4017A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	PB	0.00	0.00	0.00	0	0.51
HAF4017A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	PF	0.00	0.00	0.00	0	0.51
HAF4017A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	BS	0.04	0.03	0.03	6	0.51
HAF4017A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	PB	0.00	0.00	0.00	0	0.51
HAF4017A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	PF	0.00	0.00	0.00	0	0.51
HAF4017A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	BS	0.05	0.04	0.04	7	0.52
HAF4017A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	PB	0.00	0.00	0.00	0	0.52
HAF4017A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	PF	0.00	0.00	0.00	0	0.52
HAF4017A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	BS	0.07	0.05	0.05	10	0.53
HAF4017A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	PB	0.00	0.00	0.00	0	0.53
HAF4017A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	PF	0.00	0.00	0.00	0	0.53

Table 1(cont): MPE assessment data with antennas mounted on the roof

Ant. Model/ Desc.	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	E/H Field	Probe Freq. Cal Factor (P.D.)	Test Pos.	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> )	% of FCC Spec Limit	FCC Spec Limit (mW/cm <sup>2</sup> )
HAF4017A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	BS	0.07	0.05	0.05	10	0.54
HAF4017A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PB	0.01	0.01	0.01	1	0.54
HAF4017A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PF	0.01	0.01	0.01	1	0.54
HAF4017A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	BS	0.10	0.07	0.07	12	0.55
HAF4017A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PB	0.02	0.01	0.01	3	0.55
HAF4017A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PF	0.01	0.00	0.00	1	0.55
HAF4017A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	BS	0.08	0.06	0.06	10	0.57
HAF4017A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PB	0.03	0.02	0.02	3	0.57
HAF4017A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PF	0.01	0.00	0.00	1	0.57
HAF4017A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	BS	0.08	0.06	0.06	10	0.57
HAF4017A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	PB	0.04	0.03	0.03	4	0.57
HAF4017A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	PF	0.01	0.01	0.01	1	0.57
HAF4017A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	BS	0.07	0.05	0.05	9	0.58
HAF4017A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PB	0.03	0.02	0.02	4	0.58
HAF4017A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PF	0.01	0.00	0.00	1	0.58
RRA4914B (806-900MHz, ¼ wave)	806.0125	42	42.9	E	1.46	BS	0.12	0.09	0.09	16	0.54
RRA4914B (806-900MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PB	0.04	0.03	0.03	5	0.54
RRA4914B (806-900MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PF	0.04	0.03	0.03	5	0.54

Table 1(cont): MPE assessment data with antennas mounted on the roof

Ant. Model/ Desc.	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	E/H Field	Probe Freq. Cal Factor (P.D.)	Test Pos.	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> )	% of FCC Spec Limit	FCC Spec Limit (mW/cm <sup>2</sup> )
RRA4914B (806-900MHz, ¼ wave)	815.0125	42	42.9	E	1.45	BS	0.12	0.08	0.08	15	0.54
RRA4914B (806-900MHz, ¼ wave)	815.0125	42	42.9	E	1.45	PB	0.05	0.04	0.04	7	0.54
RRA4914B (806-900MHz, ¼ wave)	815.0125	42	42.9	E	1.45	PF	0.05	0.04	0.04	7	0.54
RRA4914B (806-900MHz, ¼ wave)	823.9875	42	42.7	E	1.44	BS	0.13	0.09	0.09	17	0.55
RRA4914B (806-900MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PB	0.05	0.04	0.04	7	0.55
RRA4914B (806-900MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PF	0.02	0.02	0.02	3	0.55
RRA4914B (806-900MHz, ¼ wave)	851.0125	42	42.6	E	1.42	BS	0.13	0.09	0.09	16	0.57
RRA4914B (806-900MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PB	0.06	0.04	0.04	8	0.57
RRA4914B (806-900MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PF	0.02	0.01	0.01	3	0.57
RRA4914B (806-900MHz, ¼ wave)	862.0125	42	42.4	E	1.41	BS	0.10	0.07	0.07	13	0.57
RRA4914B (806-900MHz, ¼ wave)	862.0125	42	42.4	E	1.41	PB	0.06	0.04	0.04	7	0.57
RRA4914B (806-900MHz, ¼ wave)	862.0125	42	42.4	E	1.41	PF	0.01	0.01	0.01	1	0.57
RRA4914B (806-900MHz, ¼ wave)	868.8875	42	42.3	E	1.40	BS	0.10	0.07	0.07	11	0.58
RRA4914B (806-900MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PB	0.06	0.04	0.04	7	0.58
RRA4914B (806-900MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PF	0.01	0.00	0.00	1	0.58

Table 2: MPE assessment data with antennas mounted on the trunk

Ant. Model/ Desc.	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	E/H Field	Probe Freq. Cal Factor (P.D.)	Test Pos.	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> )	% of FCC Spec Limit	FCC Spec Limit (mW/cm <sup>2</sup> )
HAF4016A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	BS	0.28	0.20	0.20	40	0.51
HAF4016A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	PB	0.28	0.20	0.20	39	0.51
HAF4016A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	PF	0.10	0.07	0.07	14	0.51
HAF4016A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	BS	0.30	0.21	0.21	42	0.51
HAF4016A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	PB	0.25	0.18	0.18	35	0.51
HAF4016A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	PF	0.10	0.07	0.07	14	0.51
HAF4016A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	BS	0.29	0.21	0.21	41	0.52
HAF4016A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	PB	0.25	0.18	0.18	34	0.52
HAF4016A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	PF	0.10	0.07	0.07	13	0.52
HAF4016A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	BS	0.31	0.22	0.22	42	0.53
HAF4016A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	PB	0.33	0.24	0.24	46	0.53
HAF4016A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	PF	0.11	0.08	0.08	16	0.53
HAF4016A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	BS	0.28	0.21	0.21	38	0.54
HAF4016A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PB	0.33	0.24	0.24	45	0.54
HAF4016A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PF	0.08	0.06	0.06	11	0.54
HAF4016A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	BS	0.30	0.21	0.21	39	0.55
HAF4016A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PB	0.44	0.32	0.32	58	0.55
HAF4016A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PF	0.10	0.07	0.07	13	0.55

Table 2 (cont): MPE assessment data with antennas mounted on the trunk

Ant. Model/ Desc.	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	E/H Field	Probe Freq. Cal Factor (P.D.)	Test Pos.	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> )	% of FCC Spec Limit	FCC Spec Limit (mW/cm <sup>2</sup> )
HAF4016A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	BS	0.25	0.18	0.18	31	0.57
HAF4016A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PB	0.25	0.18	0.18	31	0.57
HAF4016A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PF	0.07	0.05	0.05	9	0.57
HAF4016A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	BS	0.21	0.15	0.15	25	0.57
HAF4016A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	PB	0.22	0.15	0.15	27	0.57
HAF4016A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	PF	0.07	0.05	0.05	9	0.57
HAF4016A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	BS	0.22	0.15	0.15	26	0.58
HAF4016A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PB	0.24	0.17	0.17	29	0.58
HAF4016A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PF	0.07	0.05	0.05	9	0.58
HAF4002A (806-900MHz, ¼ wave)	806.0125	42	42.9	E	1.46	BS	0.29	0.21	0.21	39	0.54
HAF4002A (806-900MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PB	0.31	0.23	0.23	43	0.54
HAF4002A (806-900MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PF	0.07	0.05	0.05	10	0.54
HAF4002A (806-900MHz, ¼ wave)	815.0125	42	42.9	E	1.45	BS	0.33	0.24	0.24	44	0.54
HAF4002A (806-900MHz, ¼ wave)	815.0125	42	42.9	E	1.45	PB	0.30	0.22	0.22	40	0.54
HAF4002A (806-900MHz, ¼ wave)	815.0125	42	42.9	E	1.45	PF	0.10	0.07	0.07	13	0.54
HAF4002A (806-900MHz, ¼ wave)	823.9875	42	42.7	E	1.44	BS	0.31	0.22	0.22	41	0.55
HAF4002A (806-900MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PB	0.50	0.36	0.36	65	0.55
HAF4002A (806-900MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PF	0.10	0.07	0.07	13	0.55

Table 2 (cont): MPE assessment data with antennas mounted on the trunk

Ant. Model/ Desc.	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	E/H Field	Probe Freq. Cal Factor (P.D.)	Test Pos.	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> )	% of FCC Spec Limit	FCC Spec Limit (mW/cm <sup>2</sup> )
HAF4002A (806-900MHz, ¼ wave)	851.0125	42	42.6	E	1.42	BS	0.28	0.20	0.20	34	0.57
HAF4002A (806-900MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PB	0.28	0.20	0.20	35	0.57
HAF4002A (806-900MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PF	0.09	0.06	0.06	11	0.57
HAF4002A (806-900MHz, ¼ wave)	862.0125	42	42.4	E	1.41	BS	0.23	0.16	0.16	28	0.57
HAF4002A (806-900MHz, ¼ wave)	862.0125	42	42.4	E	1.41	PB	0.26	0.18	0.18	32	0.57
HAF4002A (806-900MHz, ¼ wave)	862.0125	42	42.4	E	1.41	PF	0.08	0.06	0.06	10	0.57
HAF4002A (806-900MHz, ¼ wave)	868.8875	42	42.3	E	1.40	BS	0.23	0.16	0.16	28	0.58
HAF4002A (806-900MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PB	0.22	0.15	0.15	27	0.58
HAF4002A (806-900MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PF	0.08	0.06	0.06	10	0.58
HAF4014A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	BS	0.29	0.21	0.21	40	0.51
HAF4014A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	PB	0.33	0.24	0.24	47	0.51
HAF4014A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	PF	0.13	0.09	0.09	18	0.51
HAF4014A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	BS	0.31	0.23	0.23	44	0.51
HAF4014A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	PB	0.40	0.29	0.29	56	0.51
HAF4014A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	PF	0.16	0.11	0.11	22	0.51
HAF4014A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	BS	0.30	0.22	0.22	42	0.52
HAF4014A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	PB	0.44	0.32	0.32	61	0.52
HAF4014A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	PF	0.16	0.12	0.12	22	0.52

Table 2 (cont): MPE assessment data with antennas mounted on the trunk

Ant. Model/ Desc.	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	E/H Field	Probe Freq. Cal Factor (P.D.)	Test Pos.	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> )	% of FCC Spec Limit	FCC Spec Limit (mW/cm <sup>2</sup> )
HAF4014A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	BS	0.30	0.22	0.22	42	0.53
HAF4014A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	PB	0.49	0.36	0.36	67	0.53
HAF4014A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	PF	0.17	0.12	0.12	23	0.53
HAF4014A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	BS	0.21	0.16	0.16	29	0.54
HAF4014A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PB	0.63	0.46	0.46	86	0.54
HAF4014A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PF	0.13	0.09	0.09	17	0.54
HAF4014A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	BS	0.24	0.17	0.17	31	0.55
HAF4014A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PB	0.74	0.53	0.53	97	0.55
HAF4014A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PF	0.17	0.12	0.12	22	0.55
HAF4014A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	BS	0.23	0.16	0.16	28	0.57
HAF4014A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PB	0.30	0.21	0.21	38	0.57
HAF4014A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PF	0.13	0.09	0.09	16	0.57
HAF4014A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	BS	0.19	0.14	0.14	24	0.57
HAF4014A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	PB	0.29	0.20	0.20	35	0.57
HAF4014A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	PF	0.09	0.06	0.06	11	0.57
HAF4014A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	BS	0.20	0.14	0.14	24	0.58
HAF4014A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PB	0.22	0.15	0.15	27	0.58
HAF4014A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PF	0.08	0.06	0.06	10	0.58

Table 2 (cont): MPE assessment data with antennas mounted on the trunk

Ant. Model/ Desc.	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	E/H Field	Probe Freq. Cal Factor (P.D.)	Test Pos.	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> )	% of FCC Spec Limit	FCC Spec Limit (mW/cm <sup>2</sup> )
HAF4013A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	BS	0.33	0.24	0.24	46	0.51
HAF4013A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	PB	0.26	0.19	0.19	36	0.51
HAF4013A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	PF	0.09	0.06	0.06	13	0.51
HAF4013A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	BS	0.34	0.24	0.24	47	0.51
HAF4013A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	PB	0.27	0.19	0.19	38	0.51
HAF4013A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	PF	0.10	0.07	0.07	14	0.51
HAF4013A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	BS	0.33	0.23	0.23	45	0.52
HAF4013A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	PB	0.25	0.18	0.18	34	0.52
HAF4013A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	PF	0.10	0.07	0.07	14	0.52
HAF4013A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	BS	0.37	0.27	0.27	51	0.53
HAF4013A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	PB	0.37	0.27	0.27	51	0.53
HAF4013A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	PF	0.11	0.08	0.08	15	0.53
HAF4013A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	BS	0.30	0.22	0.22	40	0.54
HAF4013A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PB	0.37	0.27	0.27	50	0.54
HAF4013A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PF	0.08	0.06	0.06	11	0.54
HAF4013A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	BS	0.31	0.22	0.22	41	0.55
HAF4013A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PB	0.43	0.31	0.31	56	0.55
HAF4013A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PF	0.10	0.07	0.07	13	0.55

Table 2 (cont): MPE assessment data with antennas mounted on the trunk

Ant. Model/ Desc.	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	E/H Field	Probe Freq. Cal Factor (P.D.)	Test Pos.	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> )	% of FCC Spec Limit	FCC Spec Limit (mW/cm <sup>2</sup> )
HAF4013A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	BS	0.28	0.20	0.20	35	0.57
HAF4013A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PB	0.22	0.15	0.15	27	0.57
HAF4013A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PF	0.07	0.05	0.05	9	0.57
HAF4013A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	BS	0.23	0.16	0.16	28	0.57
HAF4013A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	PB	0.21	0.15	0.15	26	0.57
HAF4013A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	PF	0.06	0.04	0.04	7	0.57
HAF4013A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	BS	0.25	0.17	0.17	30	0.58
HAF4013A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PB	0.19	0.14	0.14	23	0.58
HAF4013A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PF	0.05	0.04	0.04	6	0.58
HAF4017A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	BS	0.20	0.14	0.14	28	0.51
HAF4017A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	PB	0.09	0.07	0.07	13	0.51
HAF4017A (764-870MHz, ¼ wave)	764.0875	36	36.2	E	1.43	PF	0.03	0.02	0.02	4	0.51
HAF4017A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	BS	0.19	0.13	0.13	26	0.51
HAF4017A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	PB	0.11	0.08	0.08	16	0.51
HAF4017A (764-870MHz, ¼ wave)	770.0125	36	36.6	E	1.44	PF	0.04	0.03	0.03	5	0.51
HAF4017A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	BS	0.20	0.14	0.14	27	0.52
HAF4017A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	PB	0.13	0.09	0.09	18	0.52
HAF4017A (764-870MHz, ¼ wave)	775.9125	36	36.3	E	1.44	PF	0.05	0.03	0.03	6	0.52

Table 2 (cont): MPE assessment data with antennas mounted on the trunk

Ant. Model/ Desc.	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	E/H Field	Probe Freq. Cal Factor (P.D.)	Test Pos.	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> )	% of FCC Spec Limit	FCC Spec Limit (mW/cm <sup>2</sup> )
HAF4017A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	BS	0.22	0.16	0.16	30	0.53
HAF4017A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	PB	0.23	0.17	0.17	32	0.53
HAF4017A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	PF	0.09	0.07	0.07	12	0.53
HAF4017A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	BS	0.17	0.13	0.13	24	0.54
HAF4017A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PB	0.32	0.24	0.24	44	0.54
HAF4017A (764-870MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PF	0.07	0.05	0.05	10	0.54
HAF4017A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	BS	0.25	0.18	0.18	33	0.55
HAF4017A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PB	0.54	0.39	0.39	71	0.55
HAF4017A (764-870MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PF	0.12	0.08	0.08	15	0.55
HAF4017A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	BS	0.32	0.23	0.23	40	0.57
HAF4017A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PB	0.24	0.17	0.17	30	0.57
HAF4017A (764-870MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PF	0.10	0.07	0.07	13	0.57
HAF4017A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	BS	0.33	0.23	0.23	41	0.57
HAF4017A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	PB	0.25	0.18	0.18	31	0.57
HAF4017A (764-870MHz, ¼ wave)	862.0125	42	42.4	E	1.41	PF	0.08	0.05	0.05	9	0.57
HAF4017A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	BS	0.31	0.22	0.22	38	0.58
HAF4017A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PB	0.23	0.16	0.16	28	0.58
HAF4017A (764-870MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PF	0.09	0.06	0.06	10	0.58

Table 2 (cont): MPE assessment data with antennas mounted on the trunk

Ant. Model/ Desc.	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	E/H Field	Probe Freq. Cal Factor (P.D.)	Test Pos.	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> )	% of FCC Spec Limit	FCC Spec Limit (mW/cm <sup>2</sup> )
RRA4914B (806-900MHz, ¼ wave)	806.0125	42	42.9	E	1.46	BS	0.22	0.16	0.16	29	0.54
RRA4914B (806-900MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PB	0.45	0.33	0.33	62	0.54
RRA4914B (806-900MHz, ¼ wave)	806.0125	42	42.9	E	1.46	PF	0.15	0.11	0.11	20	0.54
RRA4914B (806-900MHz, ¼ wave)	815.0125	42	42.9	E	1.45	BS	0.22	0.16	0.16	29	0.54
RRA4914B (806-900MHz, ¼ wave)	815.0125	42	42.9	E	1.45	PB	0.54	0.39	0.39	72	0.54
RRA4914B (806-900MHz, ¼ wave)	815.0125	42	42.9	E	1.45	PF	0.13	0.09	0.09	17	0.54
RRA4914B (806-900MHz, ¼ wave)	823.9875	42	42.7	E	1.44	BS	0.25	0.18	0.18	33	0.55
RRA4914B (806-900MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PB	0.70	0.50	0.50	92	0.55
RRA4914B (806-900MHz, ¼ wave)	823.9875	42	42.7	E	1.44	PF	0.16	0.12	0.12	21	0.55
RRA4914B (806-900MHz, ¼ wave)	851.0125	42	42.6	E	1.42	BS	0.26	0.19	0.19	33	0.57
RRA4914B (806-900MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PB	0.36	0.26	0.26	45	0.57
RRA4914B (806-900MHz, ¼ wave)	851.0125	42	42.6	E	1.42	PF	0.19	0.13	0.13	24	0.57
RRA4914B (806-900MHz, ¼ wave)	862.0125	42	42.4	E	1.41	BS	0.24	0.17	0.17	30	0.57
RRA4914B (806-900MHz, ¼ wave)	862.0125	42	42.4	E	1.41	PB	0.37	0.26	0.26	45	0.57
RRA4914B (806-900MHz, ¼ waver)	862.0125	42	42.4	E	1.41	PF	0.17	0.12	0.12	21	0.57
RRA4914B (806-900MHz, ¼ wave)	868.8875	42	42.3	E	1.40	BS	0.23	0.16	0.16	28	0.58
RRA4914B (806-900MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PB	0.34	0.24	0.24	41	0.58
RRA4914B (806-900MHz, ¼ wave)	868.8875	42	42.3	E	1.40	PF	0.12	0.08	0.08	14	0.58
----- 45 Degree -----											
HAF4013A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	BS	0.17	0.13	0.13	24	0.53
----- 90 Degree -----											
HAF4013A (764-870MHz, ¼ wave)	794.0875	36	36.9	E	1.46	BS	0.12	0.09	0.09	16	0.53

## 11.0 Conclusion

Depending on the test frequency for the 764-870MHz band, the assessments for this device were performed with an output power range as indicated in section 8. The maximum allowable output power is equal to the upper limit of the final test factory transmit power specification of 36W for frequency range of 764-806MHz, and 42W for frequency range of 806-870MHz. The highest power density results for the mobile device scaled to the maximum allowable power output is 0.53mW/cm<sup>2</sup> for internal/passenger to the vehicle, and 0.27mW/cm<sup>2</sup> for external/bystander to the vehicle.

These MPE results demonstrate compliance to the FCC Occupational/Controlled Exposure limit. These MPE results also demonstrate compliance to the FCC General Population/Uncontrolled limits as required by FCC rules for passengers and bystanders

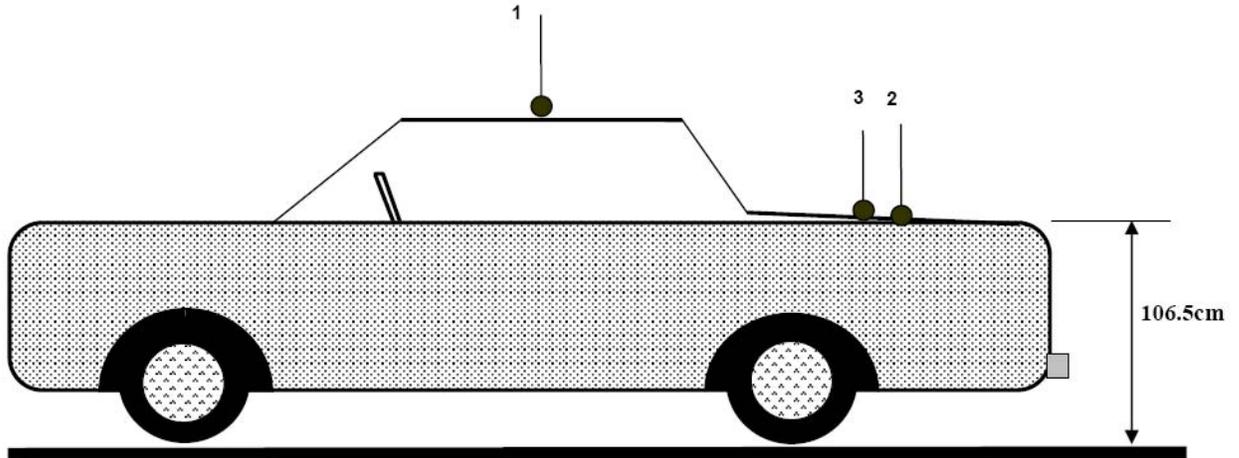
### RF Exposure Results (764-870MHz)

	7/800 Bands
Passenger - Max Calculated Power Density	0.53 mW/cm <sup>2</sup>
Bystander - Max Calculated Power Density	0.27 mW/cm <sup>2</sup>

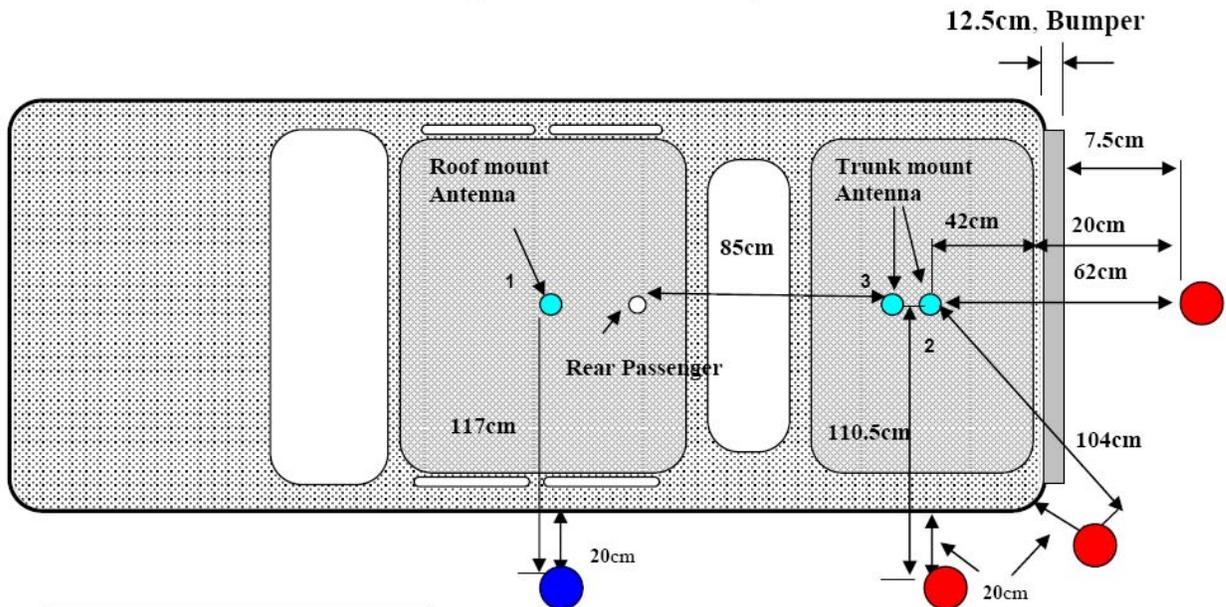
### RF Exposure Results for FCC Part 90 Bands

	7/800 Bands
Passenger - Max Calculated Power Density	0.53 mW/cm <sup>2</sup>
Bystander - Max Calculated Power Density	0.27 mW/cm <sup>2</sup>

### APPENDIX A Illustration of Antenna Locations and Test Distances



- 1 - Roof (center)
- 2 - Trunk (center)
- 3 - Trunk (85cm from back of the back seat)



By-Stander Test Locations

- Roof Mount
- Trunk Mount

**Note:** The distance from the centered trunk-mounted antenna to the edge of the vehicle is 42cm and the distance from the edge of the vehicle to the survey probe sensor is 20cm.

**APPENDIX B**  
**Meter/Probe Calibration Certificates**

**LOCKHEED MARTIN**  
MISSION SERVICES



**Stennis Integrated Metrology Center  
Certificate of Calibration**



Certificate No: AGIL700384/2240985

Mfr: ETS-LINDGREN	Description: ELECTRICAL FIELD PROBE
Model: E100	LMTO No: AGIL700384
Serial No: 00084254	Asset No: 1-1215598145B
	Cycle: 12 Months

Customer: AGILENT TECHNOLOGIES INC.  
AGIL, MOTOROLA  
8000 WEST SUNRISE BLVD  
PLANTATION, FL 33322

PO No:

As Found: IN TOLERANCE	Performed By: SP9597
As Shipped: IN TOLERANCE	
Date Calibrated: 20-FEB-2008	Temperature: 24C
Date Cal Due: 20-FEB-2009	Humidity: 17%

Procedure: VEN PRO - VENDOR CALIBRATION PROCEDURE

Comments: REFER TO LIBERTY LABS INC CERT # 2008021504 DATED 2.20.08. CERT INCLUDES SNs 00084254 & 00086316

**STANDARDS USED**

**TRACEABILITY**

All measurements were performed using standards traceable to the National Institute of Standards and Technology, an internationally recognized standard, an intrinsic standard or ratio method. Calibration was performed in compliance with our Laboratory Quality System that is based upon conformance to ISO/IEC 17025:1999. Unless otherwise noted, the accuracy ratios are equal or greater than 4:1 in accordance with ANSI/NCSL Z540-1-1994, paragraph 10.2.b.

This certificate may not be reproduced, except in full, without written permission from this laboratory.

**MAIL: Stennis Integrated Metrology Center**  
Building 5100  
Stennis Space Center, MS 39529  
PHONE: (228) 813-2069  
EMAIL: JOHN.A.BOYEA@LMCO.COM

**SHIP: Stennis Integrated Metrology Center**  
Building 5100  
Stennis Space Center, MS 39529  
FAX: (228) 813-2073

**CERTIFICATION OF CALIBRATION CONFORMANCE**

LIBERTY LABS, INC. 1346 Yellowwood Road Kimballton, IA 51543  
 EMAIL: mhoward@liberty-labs.com TEL: (712) 773-2199 FAX: (712)773-2299

This probe has been individually calibrated using IEEE Standard for Calibration of Electromagnetic Field Sensors and Probes, Excluding Antennas, from 9 kHz to 40 GHz; IEEE Std. 1309(1996 and/or 2005). All results of this calibration relate only to the items that were calibrated.

**ACCREDITATION NOTES:**

A complete copy of the scope of our A2LA accreditation is available upon request.

Instrumentation Environment:	TEMP: 24°C	RH: 17%
Calibration Environment:	TEMP: 24°C	RH: 17%

Barometric Pressure (inches): 30.58

CERTIFICATE NO.: 2008021504

CLIENT: Lockheed Martin IMC, Bldg. 5100, Stennis Space Center, MS, 39529, USA

MANUFACTURER: ETS

MODEL NUMBER: E100 & HI-2200

SERIAL NUMBER: 00084254 & 00086316

ASSET NUMBER: BBBBD051 & BBBBD050

DATE OF CALIBRATION: Wednesday, February 20, 2008

NAME OF CALIBRATING ORGANIZATION Liberty Labs, Inc.

CALIBRATED BY: DGB *D56*

RE-CALIBRATION DATE: Re-calibration interval is at customer discretion.

**RECEIVED STATUS**

Received in tolerance:

**RETURNED STATUS**

Returned in tolerance:

Returned limited cal.:

**NOTES:** Below 1 GHz Liberty Labs uses a transfer standard calibrated to IEEE1309 Standards. Liberty Labs uses this transfer standard via the substitute method outlined in IEEE 1309 in a triplate test cell to calibrate probes. The uncertainty between the TEM and Triplate is minimal in this application. Client declined isotropic response testing. In/Out of tolerance based on alignment/mounting position and not on manufacturer's specifications. A probe position document is included with this certificate. Data above 5GHz is for reference only per manufacturer's specifications of 100kHz-5GHz.



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*Michael W. Howard*

ENGINEER IN CHARGE  
 MICHAEL W. HOWARD  
 NARTE CERTIFIED EMC ENGINEER, NO. EM C-000102-NE



**CERTIFICATE NO: 2008021504**

**IN TOLERANCE/OUT OF TOLERANCE EXPLANATION:**

The In Tolerance/Out of Tolerance criteria are based on one of the following conditions, of judgement of this laboratory:

1. If the manufacturer has a specified tolerance for the antenna or item under test, then the calibration results, with our uncertainty value added, are compared to this tolerance, and the combined value must fall within the manufacturer's tolerance. The tolerance may be obtained from the manufacturer's web site, catalogs specification sheets, manuals, etc.
2. In the case where the manufacturer does not have any specified tolerances, the calibration results, with our uncertainty value added, are compared to typical curves provided by the manufacturer or historical in-house data with a  $\pm 3$  dB tolerance.
3. Where results are compared to published specifications from a standard, the calibration results, with our uncertainty value added, are compared to this tolerance, and the combined value must fall within the standard's tolerance.
4. In the situation that this laboratory's uncertainty of measurement is larger than the manufacturer's specified tolerance, the comparison criteria will be based on historical in-house data as defined above. This judgement will only be made using accredited calibration methods.

**INTERPRETATION TO THE GUIDANCE AND USE OF CALIBRATION DATA:**

The calibration values supplied with this certificate apply to measurements made under the physical (geometric) arrangements with respect to the distances to reference points on the probe. Use of these probes under other conditions will result in additional sources of error of which is the responsibility of the user.

**CALIBRATION TRACEABILITY:**

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and is available for examination upon request. Measurement procedure per Military Handbook 52A as guidance for Military Standard (MIL-STD) 45662A, ANSI/NCSL Z540-1-1994, ISO/IEC 17025, and Liberty Labs, Inc. procedure CP-10.

**ALIGNMENT/MOUNTING POSITION:**

This calibration is valid only for the alignment/mounting position specified in this report. Any other alignment/mounting position of this probe will invalidate the correction factors given in this report. We have found the manufacturer's tolerances are only applicable to a very specific alignment/mounting position at the manufacturer's test frequencies. Alignment/mounting position of this probe is critical and deviation from alignment/mounting position indicated in this report can produce errors in excess of 6 dB.

CERTIFICATE NO: 2008021504

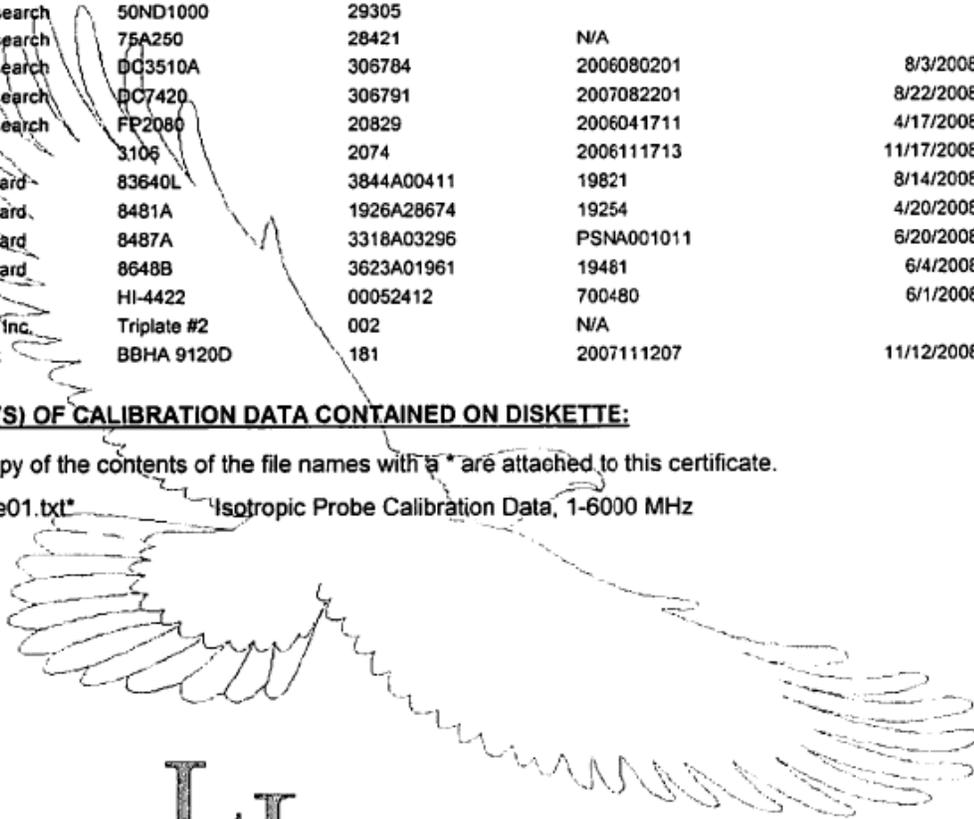
**CALIBRATION EQUIPMENT USED**

<u>Manufacturer</u>	<u>Model Number</u>	<u>Serial Number</u>	<u>Trace Number</u>	<u>Cal Due Date</u>
Agilent	E4419B	GB39511080	19256	4/17/2008
Agilent Technologies	E4419B	GB40202746	19802	8/2/2008
Agilent Technologies	E9304A	MY41495576	20015	8/27/2008
Agilent Technologies	E9304A	MY41495575	20016	8/27/2008
Amplifier Research	10ST1G18	306136	N/A	
Amplifier Research	50ND1000	29305		
Amplifier Research	75A250	28421	N/A	
Amplifier Research	DC3510A	306784	2006080201	8/3/2008
Amplifier Research	DC7420	306791	2007082201	8/22/2008
Amplifier Research	FP2080	20829	2006041711	4/17/2008
Emco	3105	2074	2006111713	11/17/2008
Hewlett Packard	83640L	3844A00411	19821	8/14/2008
Hewlett Packard	8481A	1926A28674	19254	4/20/2008
Hewlett Packard	8487A	3318A03296	PSNA001011	6/20/2008
Hewlett Packard	8648B	3623A01961	19481	6/4/2008
Holiday	HI-4422	00052412	700480	6/1/2008
Liberty Labs, Inc.	Triplate #2	002	N/A	
Schwarzbeck	BBHA 9120D	181	2007111207	11/12/2008

**FILENAME(S) OF CALIBRATION DATA CONTAINED ON DISKETTE:**

A printed copy of the contents of the file names with a \* are attached to this certificate.

Probe01.txt\* Isotropic Probe Calibration Data, 1-6000 MHz



**LL, Inc.**

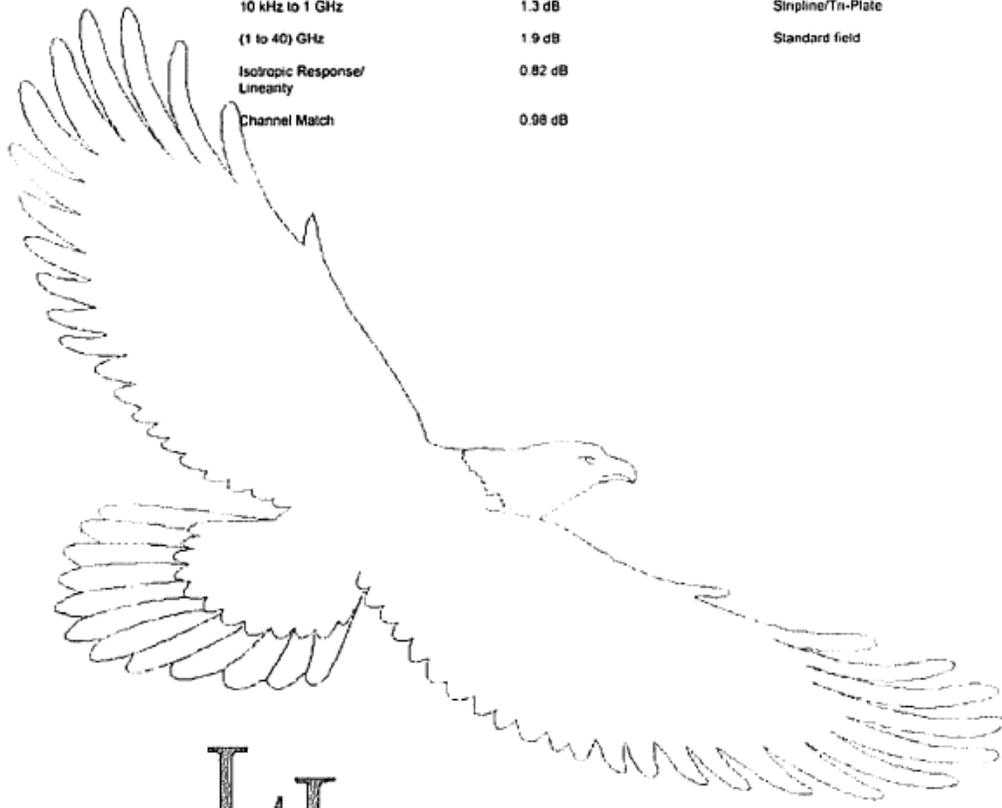
CERTIFICATE NO: 2008021504

**Calibration Uncertainty:**

Actual uncertainty (Expanded)

Typical uncertainties are shown below and checked for those that apply to this calibration. Best uncertainty equals our typical Muc in most cases. Best uncertainty is based on type A evaluations of at least 10 data sets or more.

Parameter/Equipment:	Range:	Best Uncertainty** (+/-):	Comments:
RF Isotropic Probes*****	10 kHz to 1 GHz	0.71 dB	GTEM/TEM coil
	(0.1 to 18) GHz	0.76 dB	GTEM/Open Ended Wave Guide
	10 kHz to 1 GHz	1.3 dB	SimpLine/Tri-Plate
	(1 to 40) GHz	1.9 dB	Standard field
	Isotropic Response/Linearity	0.82 dB	
	Channel Match	0.98 dB	



**LL, Inc.**

\* This laboratory offers commercial calibration service.  
 \*\* Best Uncertainties represents an expanded uncertainty corresponding to a 95.45 % level of confidence using a coverage factor, k. Values of k other than 2 were approximated by a t-distribution with the effective degrees of freedom,  $\nu_{eff}$ , obtained from the Welch-Satterthwaite formula  
 \*\*\* "Best Uncertainty" is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards of nearly ideal measuring equipment. Best uncertainties represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of k = 2. The best uncertainty of a specific calibration performed by the laboratory may be greater than the best uncertainty due to the behavior of the customer's device, to the environment (if the calibration is performed in the field) and to influences from the circumstances of the specific calibration.  
 \*\*\*\*\* In the statement of best uncertainty, M is the Mismatch error due to connections of device to other devices in actual use.  
 \*\*\*\*\* On-site calibration service is available for this calibration. The uncertainties achievable on a customer's site can normally be expected to be larger than the Best Measurement Capabilities (BMC) that the accredited laboratory has been assigned as Best Uncertainty on the A2LA Scope. Allowance must be made for aspects such as the environment at the place of calibration and for other possible adverse effects such as those caused by transportation of the calibration equipment. The usual allowance for the uncertainty introduced by the item being calibrated, (e.g. resolution) must also be considered and this, on its own, could result in the calibration uncertainty being larger than the BMC.

Probe01.txt

Date of Calibration: 20-February-2008  
 Date Printed: Wednesday, February 20, 2008  
 Customer Name: Lockheed Martin IMC  
 Probe Manufacturer: ETS  
 Probe Model: E100 & HI-2200  
 Probe Serial No.: 00084254 & 00086316  
 Temperature (Deg C): 24  
 Humidity (%): 17  
 Notes:  
 CAL CERT #: 2008021504

## Correction Factors

Frequency in MHz	15V/m Applied Field		125V/m Applied Field	
	Multiplier	dB	Multiplier	dB
1	1.15	1.22	1.17	1.36
15	1.06	0.52	1.09	0.79
30	1.08	0.69	1.10	0.81
75	1.09	0.77	1.13	1.07
100	1.12	0.98	1.13	1.03
150	1.12	1.00	1.17	1.33
200	1.11	0.89	1.15	1.18
250	1.13	1.03	1.19	1.48
300	1.05	0.42	1.14	1.15
400	1.07	0.59	1.10	0.79
500	1.05	0.44	1.09	0.74
600	1.07	0.63	1.14	1.18
700	1.14	1.16	1.17	1.36
800	1.15	1.24	1.21	1.66
900	1.13	1.06	1.17	1.37
1000	1.01	0.05	1.00	0.04

Frequency in MHz	15V/m Applied Field		50V/m Applied Field	
	Multiplier	dB	Multiplier	dB
2000	0.82	-1.72	0.86	-1.33
2450	0.93	-0.64	0.95	-0.44
3000	0.93	-0.60	0.95	-0.40
3500	1.02	0.16	1.02	0.13
4000	1.20	1.57	1.22	1.73
5000	0.86	-1.32	0.88	-1.14
5500	1.31	2.34	1.34	2.53
6000	5.83	15.31	5.62	15.00

**APPENDIX C**  
**DUT Photos**  
**(Refer to Exhibit 7B)**