


**MOTOROLA SOLUTIONS**

**TESTING CERT # 2518.01**
**DECLARATION OF COMPLIANCE: MPE ASSESSMENT Part 1 of 2**
**EME Test Laboratory**

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**Date of Report:** February 23, 2011  
**Report Revision:** A  
**Report ID:** SR9117\_MPE rpt\_APX7500\_UHF R2\_45W &  
 7/800\_35W\_Mobile\_Rev A\_02232011

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**Date(s) Tested:** 11/07/2010 – 11/12/2010 & 4/4/2008 – 4/11/2008, 4/21/2008  
**Manufacturer/Location:** Motorola, Schaumburg, IL  
**Date submitted for test:** 12/09/2010  
**DUT Description:** APX7500 Dual Band UHF R2 45W (450 - 485MHz), 40W (485-512MHz) & 30W (700 band), 35W (800 band)  
**Test TX mode(s):** CW  
**Max. Power output:** 54W (450-485MHz), 48W (485-512MHz) and 36W (700 band), 42W (800 band)  
**TX Frequency Bands:** 450-512MHz & 7/800MHz (Talkaround: 764-776MHz & 851-870MHz, Trunked: 794-824MHz)  
**Signaling type:** Analog, APCO 25, and TDMA 1:2 (F2)  
**Model(s) Tested** M30SSS9PW1AN & M30URS9PW1AN  
**Model(s) Certified:** M30TSS9PW1AN (MHUS1006A)  
**Serial Number(s):** QMKNJ033 & 174  
**Classification:** Occupational/Controlled Environment  
**FCC ID: AZ492FT7044** Part 22 & 90 UHF (450-512MHz) & 7/800MHz (764-775MHz, 794-824MHz & 851-869MHz) MPE results outside of Part 90 are not applicable for FCC compliance demonstration.  
**IC: 109U-92FT7044** UHF (450-470MHz) & 7/800MHz (764-776MHz, 794-824MHz & 851-870MHz)

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 Solutions Inc. EME Laboratory.

I attest to the accuracy of the data and assume full responsibility for the completeness of these measurements.

This reporting format is consistent with the suggested guidelines of the TIA TSB-159 April 2006

The results and statements contained in this report pertain only to the device(s) evaluated herein.

*Signature on file – Deanna Zakharia*  
**Deanna Zakharia**  
 EME Lab Senior Resource Manager and  
 Laboratory Director

**Approval Date: 2/23/2011**
**Certification Date:**
**Certification No.:**

**Document Revision History**

<b>Date</b>	<b>Revision</b>	<b>Comments</b>
02/16/2011	O	Initial release
02/23/2011	A	Revised FCC bands from 764-776MHz to 764-775MHz and 851-870MHz to 851-869MHz.

**Part 1 of 2: MPE Assessment for 450-520MHz**  
**Part 2 of 2: MPE Assessment for 7/800MHz**

**Part 1 of 2**

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## 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.

## 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  
 PB: Passenger Backseat  
 PF: Passenger Front seat  
 PTT: Push to Talk  
 SAR: Specific Absorption Rate  
 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) C95.3-2002
- 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	IEEE C95.1 1992/1999	RSS 102 issue 4 - 2010
	mW/cm <sup>2</sup>	mW/cm <sup>2</sup>	W/m <sup>2</sup>
30 - 300	1.0		*10.0
10 - 400			
100 - 300		1.0	
300 - 1,500	f/300		f/30
300 - 3,000		f/300	
400 - 2,000			
1,500 - 15,000			50.0
1,500 - 100,000	5.0		
2,000 – 300,000			
3,000 - 300,000		10.0	

\*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	IEEE C95.1 1992/1999	RSS 102 issue 4 – 2010
	mW/cm <sup>2</sup>	mW/cm <sup>2</sup>	W/m <sup>2</sup>
30 – 300	0.2		*2.0
10 – 400			
100 – 300		0.2	
100 – 400			
300 – 1,500	f/1,500		f/150
400 – 2,000			
300 – 15,000		f/1,500	
1,500 – 15,000			10.0
1,500 – 100,000	1.0		
2,000 – 100,000			
2,000 – 300,000			

\*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 Data
Automobile	2003 Ford Crown Victoria, 4-Door	NA	NA	NA
Survey Meter Probe – E-Field	ETS Model HI-2200 ETS Model E100	00086887 00126277	07/15/2010	07/15/2011

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

## 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 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 in a vehicle with an external antenna mounted at 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 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 in the test vehicle while engine was at idle, at the specified distances and test locations indicated in sections 11.0, 12.0 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 appropriate mount locations (Roof / Trunk) and defined test channels.

## 11.0 Method of Measurement with trunk mounted antenna(s)

### 11.1 External/Bystander vehicle MPE measurements

Antenna is located at the center of the trunk. Refer to Appendix A for antenna location and distance.

MPE measurements for bystander (BS) 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 90 cm directly behind vehicle, 104 cm (45 degree radial) and 110.5 cm (90 degree radial). 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.

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 48cm.**

### 11.2 Internal/Passenger vehicle MPE measurements

Antenna is located toward the center of the trunk at a minimum 85cm from backseat passenger. Users are instructed, per installation manual, to mount antennas on the roof only if a minimum 85cm cannot be achieved. Refer to Appendix A for antenna location and distance.

MPE measurements for passenger front seat (PF) and backseat (PB) 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 backseat is a bench seat and therefore each position (Head, Chest & Lower Trunk) were scanned across (horizontally) the seat starting from the middle of the seat to the edge of the seat stopping 20 cm from the vehicle door. Similar process was used in the front bucket seat.

The probe handle is oriented parallel (horizontal) to the ground and pointed towards the back of the vehicle. The probe handle is not oriented normal to the seat surface. The probe head (incorporating the field sensors) is scanned continuously (using the max-hold function available in the meter) along three test axes which are parallel to the seat angle (intended as the line determined by the intersection of the plane of the seat and the plane of the backrest) and are 20 cm from the seat surface. One test axis is at the Head height, another is at the Chest height, and another is at the Lower Trunk height. The maximum field level value recorded for each test axis is logged. The MPE is determined by averaging these three maximum values regardless of the geometrical location where they were observed. For instance, the locations of the three maxima may lie on different vertical



(relative to ground) lines.

This approach leads to results that are representative of the exposure of vehicle occupants since it is based on an average across the body portions closest to the antenna for both trunk and roof mount positions, and is conservatively biased because the highest results for each test axis are combined, e.g. the highest head exposure could be in the middle of the seat while the highest lower trunk exposure could be closer to the door

## 12.0 Method of Measurement with roof mounted antenna(s)

### 12.1 External/Bystander vehicle MPE measurements

Antenna is located at the center of the roof. Refer to Appendix A for antenna location and distance.

MPE measurements for bystander (BS) 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.**

### 12.2 Internal/Passenger vehicle MPE measurements

Antenna is located at the center of the roof. Refer to Appendix A for antenna location and distance.

MPE measurements for passenger front seat (PF) and backseat (PB) 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 backseat is a bench seat and therefore each position (Head, Chest & Lower Trunk) were scanned across (horizontally) the seat starting from the middle of the seat to the edge of the seat stopping 20 cm from the vehicle door. Similar process was used in the front bucket seat.

The probe handle is oriented parallel (horizontal) to the ground and pointed towards the back of the vehicle. The probe handle is not oriented normal to the seat surface. The probe head (incorporating the field sensors) is scanned continuously (using the max-hold function available in the meter) along three test axes which are parallel to the seat angle (intended as the line determined by the intersection of the plane of the seat and the plane of the backrest) and are 20 cm from the seat surface. One test axis is at the Head height, another is at the Chest height, and another is at the Lower Trunk height. The maximum field level value recorded for each test axis is logged. The MPE is determined by averaging these three maximum values regardless of the geometrical location where they were observed. For instance, the locations of the three maxima may lie on different vertical (relative to ground) lines.

This approach leads to results that are representative of the exposure of vehicle occupants since it is based on an average across the body portions closest to the antenna for both trunk and roof mount positions, and is conservatively biased because the highest results for each test axis are combined, e.g. the highest head exposure could be in the middle of the seat while the highest lower trunk exposure could be closer to the door

### 13.0 MPE Calculations

The final MPE results for this mobile radio are presented in section 15.0 Tables 6 - 9. 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.

External to vehicle (Bystander) - 10 measurements are averaged over the body (*Avg\_over\_body*).  
Internal to vehicle (Passengers) - 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*

## 14.0 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	Mount Location (Roof/Trunk )	Overlap FCC Bands	N <sub>c</sub> Test Channels (KDB447498)
1	HAE4004A	470-512	15.0	2.15	1/4 wave, wire	R/T	470-512	4
2	HAE6016A	450 - 512	8.3	2.15	1/4 wave, cylinder	R/T	450-512	5
3	HAE4011A	450-470	73.2	5.65	1/2 wave, trap-loaded	R/T	450-470	3
4	HAE4012A	470-495	68.5	5.65	1/2 wave, trap-loaded	R/T	470-495	3
5	HAE4013A	494-512	64.2	5.65	1/2 wave, trap-loaded	R/T	494-512	3
6	*RAE4014ARB	445 - 470	92.7 90.5 89.0	7.15	5/8 wave, trap-loaded	R/T	450-470	3
7	*RAE4015ARM	470 - 494	89.0 86.3 85.0	7.15	5/8 wave, trap-loaded	R/T	450-494	3
8	*RAE4016ARB	494 - 512	85.7 83.6 83.3	7.15	5/8 wave, trap-loaded	R/T	494-512	3

\* Antennas trimmed per test frequency.

15.0 Test Results Summary

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

Table 6

Bystander MPE assessment to General Pop. / Uncontrolled Exposure Limits for trunk mounted antennas.

Trunk/ Roof	Test Position	E/H Field	Angle (Degree)	Antenna Model	Max Pwr (W)	Initial Pwr (W)	Tx Freq (MHz)	Max Calc. P.D. (mW/cm <sup>2</sup> )	FCC Limit	% To Spec Limit	
Trunk	BS	E	0	HAE4004A, 470-512MHz	54	53.7	470.0125	0.13	0.31	42	
					54	53.7	482.5	0.10	0.32	33	
					48	46.9	498	0.10	0.33	29	
					48	47.3	511.9875	0.13	0.34	39	
				HAE6016A, 450 - 512MHz	54	53.8	450.0125	0.11	0.30	37	
					54	53.7	465.5	0.14	0.31	45	
					54	53.7	482.5	0.11	0.32	34	
					48	46.9	496.5	0.10	0.33	29	
					48	47.3	511.9875	0.14	0.34	41	
				HAE4011A, 450-470MHz	54	53.8	450.0125	0.10	0.30	32	
					54	53.8	460	0.08	0.31	27	
					54	53.7	469.9875	0.06	0.31	19	
				HAE4012A, 470-495MHz	54	53.7	470.0125	0.09	0.31	29	
					54	53.7	482.5	0.08	0.32	26	
					48	47.2	494.9875	0.06	0.33	18	
				HAE4013A, 494-512MHz	48	47.2	494.9875	0.08	0.33	24	
					48	47	503	0.09	0.34	27	
					48	47.3	511.9875	0.10	0.34	28	
				RAE4014ARB, 445 - 470MHz	54	53.8	450.0125	0.08	0.30	26	
					54	53.8	460	0.08	0.31	27	
					54	53.7	469.9875	0.09	0.31	27	
				RAE4015ARM, 470 - 494MHz	54	53.7	470.0125	0.07	0.31	23	
					54	53.7	482.5	0.07	0.32	23	
					48	47.1	493.9875	0.07	0.33	21	
				RAE4016ARB, 494 - 512MHz	48	47.2	494.9875	0.07	0.33	20	
					48	47	503	0.07	0.34	22	
					48	47.3	511.9875	0.08	0.34	24	
				45	HAE6016A, 450 - 512MHz	54	53.7	465.5	0.12	0.31	37
				90	HAE6016A, 450 - 512MHz	54	53.7	465.5	0.09	0.31	30

**Table 7**

**Passenger MPE assessment to General Pop. / Uncontrolled Exposure Limits for trunk mounted antennas.**

Trunk/ Roof	Test Position	E/H Field	Angle (Degree)	Antenna Model	Max Pwr (W)	Initial Pwr (W)	Tx Freq (MHz)	Max Calc. P.D. (mW/cm <sup>2</sup> )	FCC Limit	% To Spec Limit
Trunk	PB	E	NA	HAE4004A, 470-512MHz	54	53.7	470.0125	0.21	0.31	66
					54	53.7	482.5	0.23	0.32	72
					48	46.9	498	0.26	0.33	79
					48	47.3	511.9875	0.24	0.34	70
				HAE6016A, 450 - 512MHz	54	53.8	450.0125	0.28	0.30	92
					54	53.7	465.5	0.23	0.31	74
					54	53.7	482.5	0.20	0.32	62
					48	46.9	496.5	0.23	0.33	69
					48	47.3	511.9875	0.26	0.34	77
					HAE4011A, 450-470MHz	54	53.8	450.0125	0.19	0.30
				54		53.8	460	0.13	0.31	42
				54		53.7	469.9875	0.10	0.31	33
				HAE4012A, 470-495MHz	54	53.7	470.0125	0.14	0.31	45
					54	53.7	482.5	0.14	0.32	43
					48	47.2	494.9875	0.13	0.33	40
				HAE4013A, 494-512MHz	48	47.2	494.9875	0.22	0.33	66
					48	47	503	0.23	0.34	67
					48	47.3	511.9875	0.17	0.34	50
				RAE4014ARB, 445 - 470MHz	54	53.8	450.0125	0.06	0.30	21
					54	53.8	460	0.07	0.31	23
					54	53.7	469.9875	0.06	0.31	18
				RAE4015ARM, 470 - 494MHz	54	53.7	470.0125	0.02	0.31	6
					54	53.7	482.5	0.06	0.32	19
					48	47.1	493.9875	0.08	0.33	24
				RAE4016ARB, 494 - 512MHz	48	47.2	494.9875	0.05	0.33	16
					48	47	503	0.09	0.34	26
					48	47.3	511.9875	0.08	0.34	22

Table 7 (continued)

## Passenger MPE assessment to General Pop. / Uncontrolled Exposure Limits for trunk mounted antennas.

Trunk/ Roof	Test Position	E/H Field	Angle (Degree)	Antenna Model	Max Pwr (W)	Initial Pwr (W)	Tx Freq (MHz)	Max Calc. P.D. (mW/cm <sup>2</sup> )	FCC Limit	% To Spec Limit
Trunk	PF	E	NA	HAE4004A, 470-512MHz	54	53.7	470.0125	0.09	0.31	28
					54	53.7	482.5	0.12	0.32	38
					48	46.9	498	0.13	0.33	40
					48	47.3	511.9875	0.12	0.34	36
				HAE6016A, 450 - 512MHz	54	53.8	450.0125	0.07	0.30	23
					54	53.7	465.5	0.09	0.31	28
					54	53.7	482.5	0.11	0.32	34
					48	46.9	496.5	0.09	0.33	28
					48	47.3	511.9875	0.11	0.34	33
				HAE4011A, 450-470MHz	54	53.8	450.0125	0.07	0.30	24
					54	53.8	460	0.06	0.31	18
					54	53.7	469.9875	0.03	0.31	11
				HAE4012A, 470-495MHz	54	53.7	470.0125	0.05	0.31	15
					54	53.7	482.5	0.06	0.32	19
					48	47.2	494.9875	0.05	0.33	16
				HAE4013A, 494-512MHz	48	47.2	494.9875	0.08	0.33	25
					48	47	503	0.09	0.34	27
					48	47.3	511.9875	0.06	0.34	19
				RAE4014ARB, 445 - 470MHz	54	53.8	450.0125	0.02	0.30	7
					54	53.8	460	0.03	0.31	9
					54	53.7	469.9875	0.02	0.31	5
				RAE4015ARM, 470 - 494MHz	54	53.7	470.0125	0.01	0.31	3
					54	53.7	482.5	0.02	0.32	7
					48	47.1	493.9875	0.02	0.33	7
				RAE4016ARB, 494 - 512MHz	48	47.2	494.9875	0.02	0.33	6
					48	47	503	0.04	0.34	11
					48	47.3	511.9875	0.03	0.34	8

**Table 8**

**Bystander MPE assessment to General Pop. / Uncontrolled Exposure Limits for roof mounted antennas.**

Trunk/ Roof	Test Position	E/H Field	Angle (Degree)	Antenna Model	Max Pwr (W)	Initial Pwr (W)	Tx Freq (MHz)	Max Calc. P.D. (mW/ cm^2)	FCC Limit	% To Spec Limit
Roof	BS	E	NA	HAE4004A, 470-512MHz	54	53.7	470.0125	0.07	0.31	21
					54	53.7	482.5	0.07	0.32	22
					48	46.9	498	0.06	0.33	19
					48	47.3	511.9875	0.06	0.34	17
				HAE6016A, 450 - 512MHz	54	53.8	450.0125	0.05	0.30	17
					54	53.7	465.5	0.06	0.31	19
					54	53.7	482.5	0.07	0.32	21
					48	46.9	496.5	0.06	0.33	18
					48	47.3	511.9875	0.06	0.34	17
					HAE4011A, 450-470MHz	54	53.8	450.0125	0.05	0.30
				54		53.8	460	0.05	0.31	16
				54		53.7	469.9875	0.04	0.31	12
				HAE4012A, 470-495MHz	54	53.7	470.0125	0.05	0.31	18
					54	53.7	482.5	0.05	0.32	17
					48	47.2	494.9875	0.04	0.33	12
				HAE4013A, 494-512MHz	48	47.2	494.9875	0.06	0.33	17
					48	47	503	0.05	0.34	16
					48	47.3	511.9875	0.04	0.34	13
				RAE4014ARB, 445 - 470MHz	54	53.8	450.0125	0.04	0.30	13
					54	53.8	460	0.04	0.31	13
					54	53.7	469.9875	0.04	0.31	14
				RAE4015ARM, 470 - 494MHz	54	53.7	470.0125	0.03	0.31	11
					54	53.7	482.5	0.04	0.32	13
					48	47.1	493.9875	0.04	0.33	11
				RAE4016ARB, 494 - 512MHz	48	47.2	494.9875	0.04	0.33	11
					48	47	503	0.04	0.34	11
					48	47.3	511.9875	0.03	0.34	10

**Table 9**

**Passenger MPE assessment to General Pop. / Uncontrolled Exposure Limits for roof mounted antennas.**

Trunk/ Roof	Test Position	E/H Field	Angle (Degree)	Antenna Model	Max Pwr (W)	Initial Pwr (W)	Tx Freq (MHz)	Max Calc. P.D. (mW/cm <sup>2</sup> )	FCC Limit	% To Spec Limit				
Roof	PB	E	NA	HAE4004A, 470-512MHz	54	53.7	470.0125	0.03	0.31	10				
					54	53.7	482.5	0.03	0.32	11				
					48	46.9	498	0.05	0.33	16				
					48	47.3	511.9875	0.03	0.34	8				
								HAE6016A, 450 - 512MHz	54	53.8	450.0125	0.03	0.30	9
							54		53.7	465.5	0.02	0.31	8	
							54		53.7	482.5	0.04	0.32	11	
							48		46.9	496.5	0.06	0.33	18	
							48		47.3	511.9875	0.02	0.34	7	
								HAE4011A, 450-470MHz	54	53.8	450.0125	0.00	0.30	1
							54		53.8	460	0.01	0.31	2	
							54		53.7	469.9875	0.01	0.31	2	
								HAE4012A, 470-495MHz	54	53.7	470.0125	0.01	0.31	4
							54		53.7	482.5	0.01	0.32	4	
							48		47.2	494.9875	0.02	0.33	7	
								HAE4013A, 494-512MHz	48	47.2	494.9875	0.03	0.33	10
							48		47	503	0.03	0.34	8	
							48		47.3	511.9875	0.01	0.34	3	
								RAE4014ARB, 445 - 470MHz	54	53.8	450.0125	0.00	0.30	1
							54		53.8	460	0.01	0.31	2	
							54		53.7	469.9875	0.01	0.31	2	
								RAE4015ARM, 470 - 494MHz	54	53.7	470.0125	0.00	0.31	0
							54		53.7	482.5	0.00	0.32	1	
							48		47.1	493.9875	0.01	0.33	3	
								RAE4016ARB, 494 - 512MHz	48	47.2	494.9875	0.00	0.33	1
							48		47	503	0.00	0.34	1	
							48		47.3	511.9875	0.00	0.34	1	



Table 9 (continued)

## Passenger MPE assessment to General Pop. / Uncontrolled Exposure Limits for roof mounted antennas.

Trunk/ Roof	Test Position	E/H Field	Angle (Degree)	Antenna Model	Max Pwr (W)	Initial Pwr (W)	Tx Freq (MHz)	Max Calc. P.D. (mW/cm <sup>2</sup> )	FCC Limit	% To Spec Limit
Roof	PF	E	NA	HAE4004A, 470-512MHz	54	53.7	470.0125	0.02	0.31	5
					54	53.7	482.5	0.01	0.32	4
					48	46.9	498	0.02	0.33	5
					48	47.3	511.9875	0.02	0.34	5
				HAE6016A, 450 - 512MHz	54	53.8	450.0125	0.02	0.30	6
					54	53.7	465.5	0.02	0.31	8
					54	53.7	482.5	0.01	0.32	4
					48	46.9	496.5	0.01	0.33	4
					48	47.3	511.9875	0.02	0.34	5
				HAE4011A, 450-470MHz	54	53.8	450.0125	0.00	0.30	1
					54	53.8	460	0.00	0.31	1
					54	53.7	469.9875	0.00	0.31	1
				HAE4012A, 470-495MHz	54	53.7	470.0125	0.01	0.31	2
					54	53.7	482.5	0.00	0.32	1
					48	47.2	494.9875	0.00	0.33	0
				HAE4013A, 494-512MHz	48	47.2	494.9875	0.01	0.33	2
					48	47	503	0.00	0.34	1
					48	47.3	511.9875	0.00	0.34	0
				RAE4014ARB, 445 - 470MHz	54	53.8	450.0125	0.00	0.30	0
					54	53.8	460	0.00	0.31	1
					54	53.7	469.9875	0.00	0.31	1
				RAE4015ARM, 470 - 494MHz	54	53.7	470.0125	0.00	0.31	0
					54	53.7	482.5	0.00	0.32	0
					48	47.1	493.9875	0.00	0.33	0
				RAE4016ARB, 494 - 512MHz	48	47.2	494.9875	0.00	0.33	0
					48	47	503	0.00	0.34	0
					48	47.3	511.9875	0.00	0.34	0

## 16.0 Conclusion

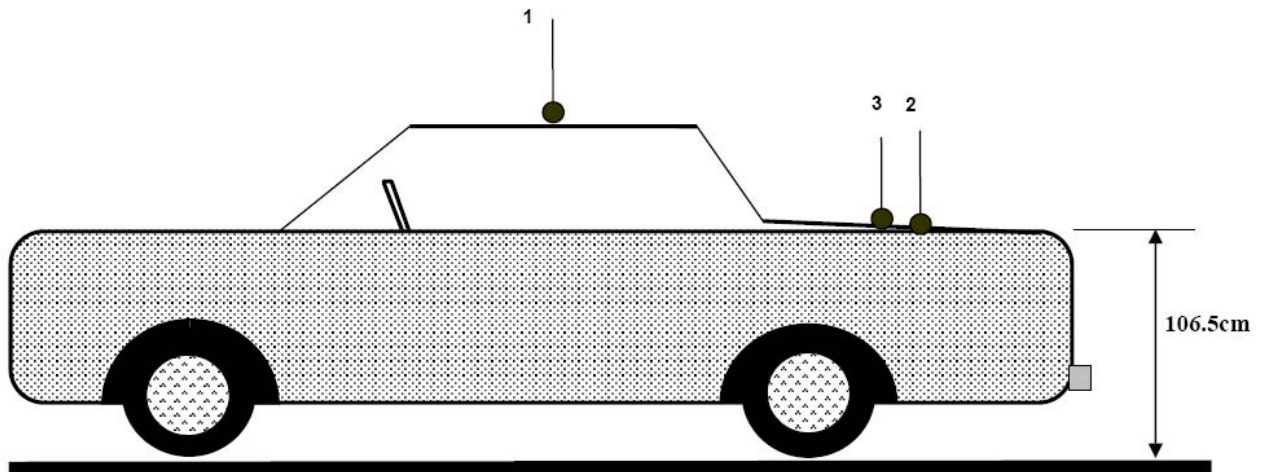
The assessments for this device were performed with an output power range as indicated in section 15.0 Tables 6 thru 9. The maximum allowable output power is equal to the upper limit of the final test factory transmit power specification of 54W (450 - 485MHz) and 48W (485-512MHz). The highest power density results for the mobile device scaled to the maximum allowable power output are indicated in the Table 10 for internal/passenger to the vehicle, and external/bystander to the vehicle.

**Table 10: RF Exposure Results for FCC Part 90 (450-512MHz)**

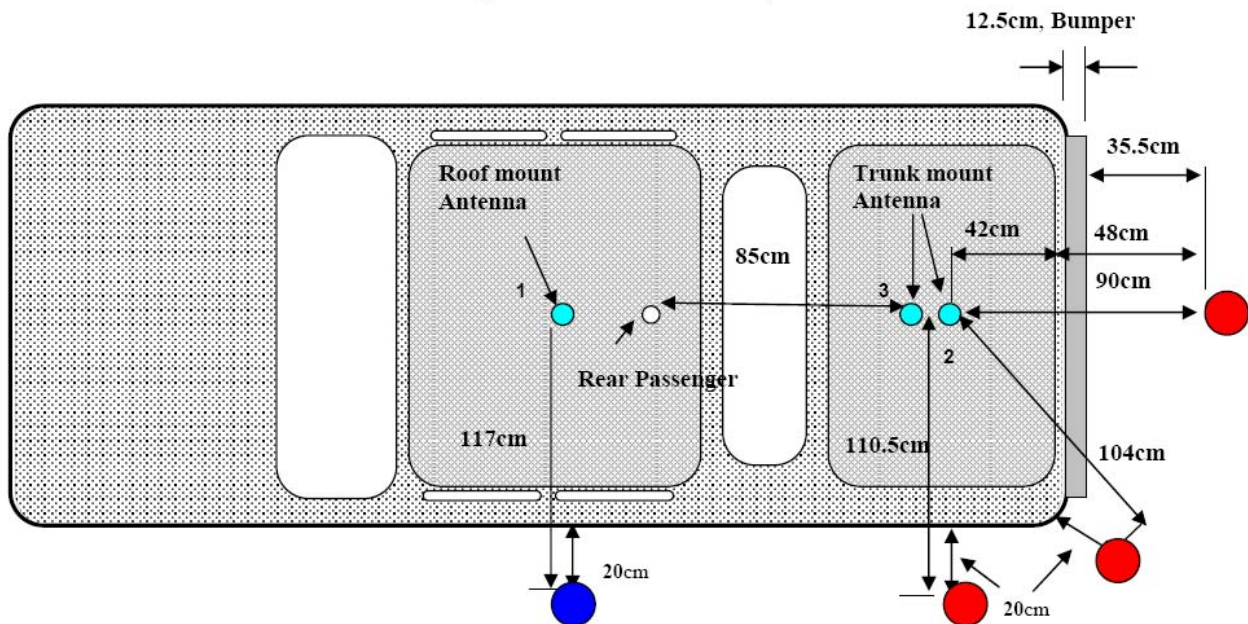
	<b>UHF R2 Band</b>
<b>Passenger - Max Calculated Power Density</b>	0.28mW/cm <sup>2</sup>
<b>Bystander - Max Calculated Power Density</b>	0.14mW/cm <sup>2</sup>

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

**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

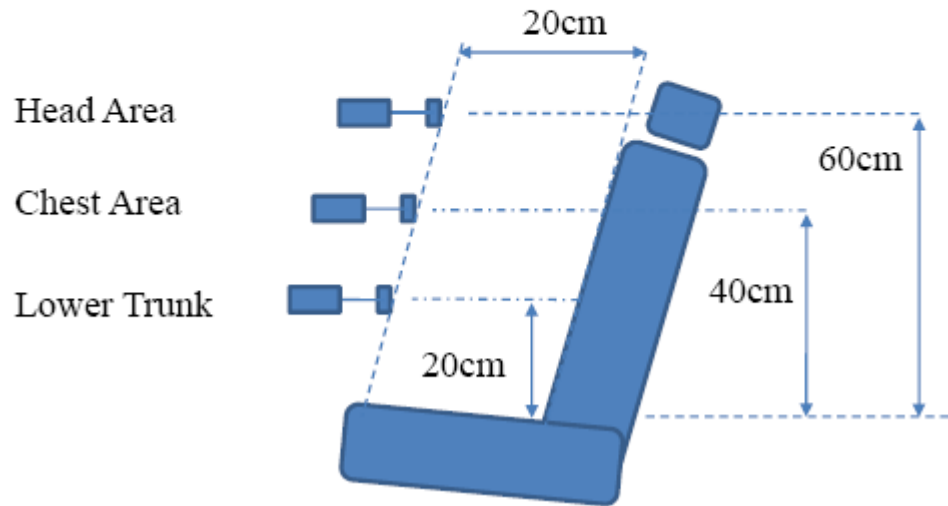
- Roof Mount
- Trunk Mount

**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 48cm.

Seat scan areas  
(Applicable to both front and back seats)

Meter - Probe

 Probe diameter is 5.5cm



**Appendix B - Probe Calibration Certificates**



Cert I.D.: 79630

**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>	00126277	<b>Date Code:</b>	
<b>Tracking Number:</b>	S000019628	<b>Alternate ID:</b>	
<b>Date Completed:</b>	15-Jul-10	<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:** Replaced broken probe head sn 00083370 with sn 00126277. Provided customer specified frequencies.

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

**Standards and Equipment Used:**

Make / Model / Name / S/N / Recall Date					Condition of Instrument Upon Receipt:
Hewlett Packard	437B	HP Power Meter	3125U12370	15-Jun-11	INOP
Fluke	6060B	RF Signal Generator	5690204	15-Jun-11	
Marconi	2022	Signal Generator	119019/077	25-Sep-10	<b>On Release:</b>
Agilent	E4419B	Power Meter	MY45104171	16-Jun-11	In Tolerance to Internal Quality Standards
Rohde & Schwarz	857.8008.02	Power Meter NRVD	100451	11-Mar-11	
Hewlett Packard	83620B	Signal Generator	3722A00541	25-Sep-10	

\_\_\_\_\_  
Calibration Completed By  
Alan Schifferdecker, Calibration Technician

\_\_\_\_\_  
Attested and Issued on 15-Jul-10  
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 00126277**  
**Date of Callbration 14 Jul 2010**

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





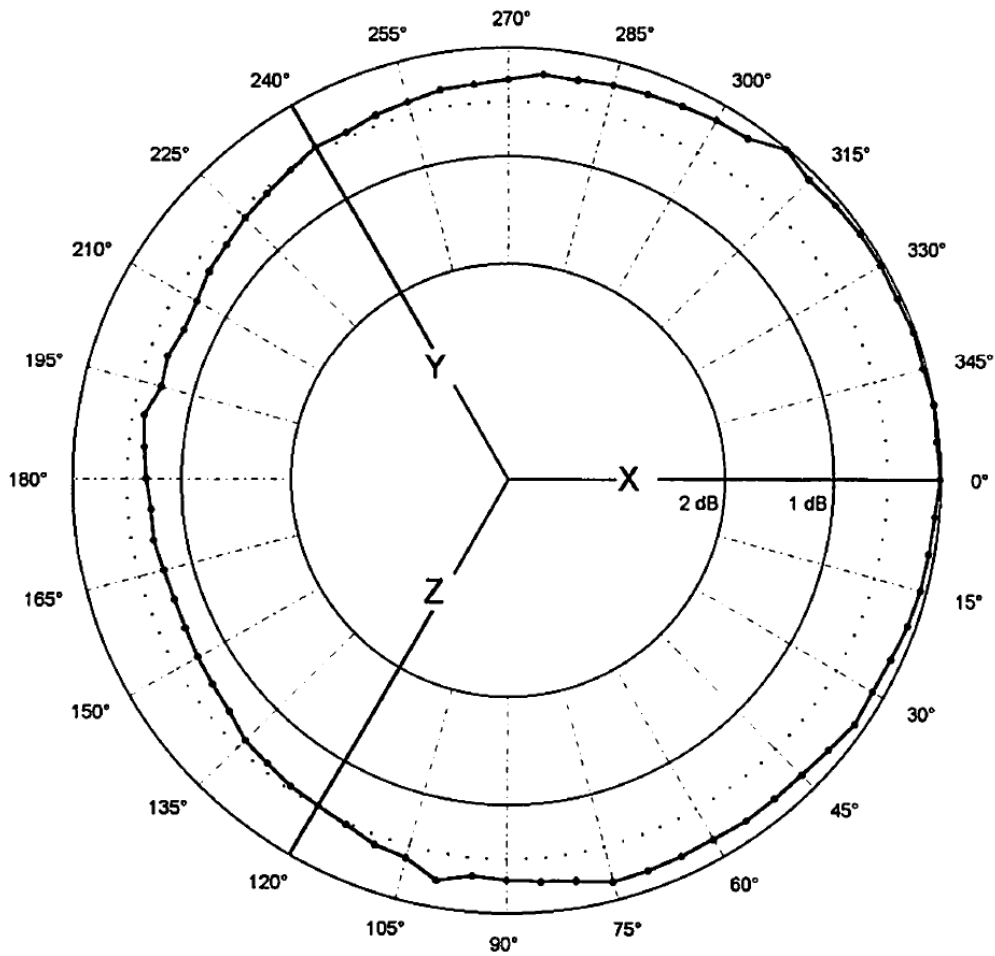
**Frequency Response Calibration Factors**  
**Model E100 Serial Number 00126277**  
**Date of Calibration 14 Jul 2010**

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



### PROBE ROTATIONAL RESPONSE

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



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

**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.		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						
Trunk	HAE4004A, 470-512MHz	2.15	470.0125	54	53.7	CW	E	1.01	BS	0.03	0.04	0.10	0.17	0.29	0.41	0.49	0.45	0.36	0.27	0.5	0.261	0.132	0.13		
Trunk	HAE4004A, 470-512MHz	2.15	482.5	54	53.7	CW	E	1.02	BS	0.02	0.04	0.09	0.15	0.24	0.34	0.38	0.33	0.26	0.19	0.5	0.204	0.104	0.10		
Trunk	HAE4004A, 470-512MHz	2.15	498	48	46.9	CW	E	1.02	BS	0.02	0.04	0.09	0.13	0.21	0.34	0.36	0.30	0.20	0.14	0.5	0.183	0.093	0.10		
Trunk	HAE4004A, 470-512MHz	2.15	511.9875	48	47.3	CW	E	1.03	BS	0.02	0.05	0.09	0.15	0.30	0.48	0.54	0.45	0.29	0.16	0.5	0.253	0.130	0.13		
Trunk	HAE6016A, 450 - 512MHz	2.15	450.0125	54	53.8	CW	E	1.01	BS	0.03	0.03	0.09	0.14	0.26	0.35	0.42	0.39	0.30	0.2	0.5	0.221	0.112	0.11		
Trunk	HAE6016A, 450 - 512MHz	2.15	465.5	54	53.7	CW	E	1.01	BS	0.03	0.04	0.11	0.17	0.31	0.44	0.53	0.49	0.38	0.27	0.5	0.277	0.140	0.14		
Trunk	HAE6016A, 450 - 512MHz	2.15	482.5	54	53.7	CW	E	1.02	BS	0.02	0.04	0.09	0.15	0.24	0.34	0.39	0.36	0.29	0.22	0.5	0.214	0.109	0.11		
Trunk	HAE6016A, 450 - 512MHz	2.15	496.5	48	46.9	CW	E	1.02	BS	0.02	0.04	0.08	0.13	0.20	0.32	0.36	0.31	0.23	0.17	0.5	0.186	0.095	0.10		
Trunk	HAE6016A, 450 - 512MHz	2.15	511.9875	48	47.3	CW	E	1.03	BS	0.02	0.05	0.09	0.15	0.29	0.49	0.57	0.49	0.33	0.19	0.5	0.267	0.138	0.14		
Trunk	HAE4011A, 450-470MHz	5.65	450.0125	54	53.8	CW	E	1.01	BS	0.00	0.00	0.01	0.05	0.23	0.51	0.56	0.33	0.09	0.1	0.5	0.188	0.095	0.10		
Trunk	HAE4011A, 450-470MHz	5.65	460	54	53.8	CW	E	1.01	BS	0.00	0.00	0.01	0.04	0.19	0.43	0.48	0.29	0.09	0.1	0.5	0.163	0.082	0.08		
Trunk	HAE4011A, 450-470MHz	5.65	469.9875	54	53.7	CW	E	1.01	BS	0.00	0.00	0.01	0.04	0.14	0.30	0.34	0.20	0.07	0.09	0.5	0.119	0.060	0.06		
Trunk	HAE4012A, 470-495MHz	5.65	470.0125	54	53.7	CW	E	1.01	BS	0.00	0.00	0.02	0.09	0.26	0.47	0.50	0.26	0.08	0.14	0.5	0.182	0.092	0.09		
Trunk	HAE4012A, 470-495MHz	5.65	482.5	54	53.7	CW	E	1.02	BS	0.00	0.00	0.02	0.07	0.21	0.42	0.47	0.27	0.07	0.1	0.5	0.163	0.083	0.08		
Trunk	HAE4012A, 470-495MHz	5.65	494.9875	48	47.2	CW	E	1.02	BS	0.00	0.00	0.01	0.03	0.13	0.30	0.35	0.20	0.05	0.06	0.5	0.113	0.058	0.06		

MPE calculations are defined in section 13.0.

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				
Trunk	HAE4013A, 494-512MHz	5.65	494.9875	48	47.2	CW	E	1.02	BS	0.00	0.00	0.02	0.06	0.19	0.40	0.50	0.26	0.05	0.06	0.5	0.154	0.079	0.08
Trunk	HAE4013A, 494-512MHz	5.65	503	48	47	CW	E	1.02	BS	0.00	0.01	0.02	0.05	0.21	0.47	0.56	0.31	0.06	0.03	0.5	0.172	0.088	0.09
Trunk	HAE4013A, 494-512MHz	5.65	511.9875	48	47.3	CW	E	1.03	BS	0.00	0.01	0.03	0.07	0.24	0.50	0.57	0.31	0.08	0.04	0.5	0.185	0.095	0.10
Trunk	RAE4014ARB, 445 - 470MHz	7.15	450.0125	54	53.8	CW	E	1.01	BS	0.01	0.00	0.02	0.01	0.03	0.26	0.47	0.43	0.20	0.09	0.5	0.152	0.077	0.08
Trunk	RAE4014ARB, 445 - 470MHz	7.15	460	54	53.8	CW	E	1.01	BS	0.01	0.01	0.02	0.02	0.08	0.31	0.49	0.43	0.18	0.06	0.5	0.161	0.081	0.08
Trunk	RAE4014ARB, 445 - 470MHz	7.15	469.9875	54	53.7	CW	E	1.01	BS	0.01	0.01	0.03	0.05	0.14	0.35	0.49	0.40	0.16	0.05	0.5	0.169	0.085	0.09
Trunk	RAE4015ARM, 470 - 494MHz	7.15	470.0125	54	53.7	CW	E	1.01	BS	0.00	0.01	0.01	0.00	0.04	0.24	0.44	0.40	0.18	0.08	0.5	0.140	0.071	0.07
Trunk	RAE4015ARM, 470 - 494MHz	7.15	482.5	54	53.7	CW	E	1.02	BS	0.00	0.01	0.01	0.02	0.09	0.30	0.45	0.38	0.15	0.04	0.5	0.145	0.074	0.07
Trunk	RAE4015ARM, 470 - 494MHz	7.15	493.9875	48	47.1	CW	E	1.02	BS	0.00	0.01	0.01	0.02	0.09	0.25	0.42	0.36	0.15	0.02	0.5	0.133	0.068	0.07
Trunk	RAE4016ARB, 494 - 512MHz	7.15	494.9875	48	47.2	CW	E	1.02	BS	0.01	0.01	0.02	0.01	0.03	0.21	0.40	0.36	0.14	0.08	0.5	0.127	0.065	0.07
Trunk	RAE4016ARB, 494 - 512MHz	7.15	503	48	47	CW	E	1.02	BS	0.01	0.02	0.02	0.02	0.07	0.30	0.48	0.36	0.10	0.04	0.5	0.142	0.072	0.07
Trunk	RAE4016ARB, 494 - 512MHz	7.15	511.9875	48	47.3	CW	E	1.03	BS	0.01	0.02	0.02	0.02	0.10	0.34	0.51	0.40	0.12	0.02	0.5	0.156	0.080	0.08
45 degree																							
Trunk	HAE6016A, 450 - 512MHz	2.15	465.5	54	53.7	CW	E	1.01	BS	0.05	0.07	0.15	0.12	0.24	0.36	0.44	0.38	0.28	0.19	0.5	0.228	0.115	0.12
90 degree																							
Trunk	HAE6016A, 450 - 512MHz	2.15	465.5	54	53.7	CW	E	1.01	BS	0.07	0.03	0.05	0.04	0.15	0.28	0.38	0.35	0.28	0.19	0.5	0.182	0.092	0.09

MPE calculations are defined in section 13.0.

## MPE measurement data for Passenger

D.U.T. Info.							Probe Info.		Test Pos.	Passenger 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		Head	Chest	Lower Trunk				
Trunk	HAE4004A, 470-512MHz	2.15	470.0125	54	53.7	CW	E	1.01		PB	0.57	0.42				
Trunk	HAE4004A, 470-512MHz	2.15	482.5	54	53.7	CW	E	1.02	PB	0.31	0.74	0.31	0.5	0.453	0.231	0.23
Trunk	HAE4004A, 470-512MHz	2.15	498	48	46.9	CW	E	1.02	PB	0.63	0.70	0.17	0.5	0.500	0.255	0.26
Trunk	HAE4004A, 470-512MHz	2.15	511.9875	48	47.3	CW	E	1.03	PB	0.80	0.38	0.20	0.5	0.460	0.237	0.24
Trunk	HAE6016A, 450 - 512MHz	2.15	450.0125	54	53.8	CW	E	1.01	PB	0.90	0.33	0.40	0.5	0.543	0.274	0.28
Trunk	HAE6016A, 450 - 512MHz	2.15	465.5	54	53.7	CW	E	1.01	PB	0.72	0.29	0.35	0.5	0.453	0.229	0.23
Trunk	HAE6016A, 450 - 512MHz	2.15	482.5	54	53.7	CW	E	1.02	PB	0.31	0.61	0.25	0.5	0.390	0.199	0.20
Trunk	HAE6016A, 450 - 512MHz	2.15	496.5	48	46.9	CW	E	1.02	PB	0.53	0.63	0.15	0.5	0.437	0.223	0.23
Trunk	HAE6016A, 450 - 512MHz	2.15	511.9875	48	47.3	CW	E	1.03	PB	0.78	0.38	0.34	0.5	0.500	0.258	0.26
Trunk	HAE4011A, 450-470MHz	5.65	450.0125	54	53.8	CW	E	1.01	PB	0.70	0.27	0.18	0.5	0.383	0.194	0.19
Trunk	HAE4011A, 450-470MHz	5.65	460	54	53.8	CW	E	1.01	PB	0.36	0.21	0.19	0.5	0.253	0.128	0.13
Trunk	HAE4011A, 450-470MHz	5.65	469.9875	54	53.7	CW	E	1.01	PB	0.24	0.17	0.21	0.5	0.207	0.104	0.10
Trunk	HAE4012A, 470-495MHz	5.65	470.0125	54	53.7	CW	E	1.01	PB	0.31	0.25	0.27	0.5	0.277	0.140	0.14
Trunk	HAE4012A, 470-495MHz	5.65	482.5	54	53.7	CW	E	1.02	PB	0.28	0.41	0.12	0.5	0.270	0.138	0.14
Trunk	HAE4012A, 470-495MHz	5.65	494.9875	48	47.2	CW	E	1.02	PB	0.31	0.35	0.11	0.5	0.257	0.131	0.13
Trunk	HAE4013A, 494-512MHz	5.65	494.9875	48	47.2	CW	E	1.02	PB	0.47	0.57	0.22	0.5	0.420	0.214	0.22
Trunk	HAE4013A, 494-512MHz	5.65	503	48	47	CW	E	1.02	PB	0.56	0.54	0.20	0.5	0.433	0.221	0.23
Trunk	HAE4013A, 494-512MHz	5.65	511.9875	48	47.3	CW	E	1.03	PB	0.55	0.24	0.19	0.5	0.327	0.168	0.17

MPE calculations are defined in section 13.0.

## MPE measurement data for Passenger

D.U.T. Info.							Probe Info.		Test Pos.	Passenger 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		Head	Chest	Lower Trunk				
Trunk	RAE4014ARB, 445 - 470MHz	7.15	450.0125	54	53.8	CW	E	1.01		PB	0.24	0.07				
Trunk	RAE4014ARB, 445 - 470MHz	7.15	460	54	53.8	CW	E	1.01	PB	0.24	0.07	0.10	0.5	0.137	0.069	0.07
Trunk	RAE4014ARB, 445 - 470MHz	7.15	469.9875	54	53.7	CW	E	1.01	PB	0.14	0.11	0.09	0.5	0.113	0.057	0.06
Trunk	RAE4015ARM, 470 - 494MHz	7.15	470.0125	54	53.7	CW	E	1.01	PB	0.06	0.03	0.03	0.5	0.040	0.020	0.02
Trunk	RAE4015ARM, 470 - 494MHz	7.15	482.5	54	53.7	CW	E	1.02	PB	0.13	0.17	0.05	0.5	0.117	0.060	0.06
Trunk	RAE4015ARM, 470 - 494MHz	7.15	493.9875	48	47.1	CW	E	1.02	PB	0.17	0.20	0.08	0.5	0.150	0.077	0.08
Trunk	RAE4016ARB, 494 - 512MHz	7.15	494.9875	48	47.2	CW	E	1.02	PB	0.15	0.14	0.02	0.5	0.103	0.053	0.05
Trunk	RAE4016ARB, 494 - 512MHz	7.15	503	48	47	CW	E	1.02	PB	0.23	0.24	0.04	0.5	0.170	0.087	0.09
Trunk	RAE4016ARB, 494 - 512MHz	7.15	511.9875	48	47.3	CW	E	1.03	PB	0.23	0.12	0.09	0.5	0.147	0.076	0.08
Trunk	HAE4004A, 470-512MHz	2.15	470.0125	54	53.7	CW	E	1.01	PF	0.18	0.09	0.24	0.5	0.170	0.086	0.09
Trunk	HAE4004A, 470-512MHz	2.15	482.5	54	53.7	CW	E	1.02	PF	0.20	0.13	0.38	0.5	0.237	0.121	0.12
Trunk	HAE4004A, 470-512MHz	2.15	498	48	46.9	CW	E	1.02	PF	0.29	0.19	0.29	0.5	0.257	0.131	0.13
Trunk	HAE4004A, 470-512MHz	2.15	511.9875	48	47.3	CW	E	1.03	PF	0.34	0.16	0.20	0.5	0.233	0.120	0.12
Trunk	HAE6016A, 450 - 512MHz	2.15	450.0125	54	53.8	CW	E	1.01	PF	0.17	0.09	0.14	0.5	0.133	0.067	0.07
Trunk	HAE6016A, 450 - 512MHz	2.15	465.5	54	53.7	CW	E	1.01	PF	0.24	0.08	0.20	0.5	0.173	0.088	0.09
Trunk	HAE6016A, 450 - 512MHz	2.15	482.5	54	53.7	CW	E	1.02	PF	0.19	0.15	0.30	0.5	0.213	0.109	0.11
Trunk	HAE6016A, 450 - 512MHz	2.15	496.5	48	46.9	CW	E	1.02	PF	0.26	0.10	0.18	0.5	0.180	0.092	0.09
Trunk	HAE6016A, 450 - 512MHz	2.15	511.9875	48	47.3	CW	E	1.03	PF	0.31	0.14	0.19	0.5	0.213	0.110	0.11

MPE calculations are defined in section 13.0.



## MPE measurement data for Passenger

D.U.T. Info.							Probe Info.		Test Pos.	Passenger 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		Head	Chest	Lower Trunk				
Trunk	HAE4011A, 450-470MHz	5.65	450.0125	54	53.8	CW	E	1.01		PF	0.14	0.18				
Trunk	HAE4011A, 450-470MHz	5.65	460	54	53.8	CW	E	1.01	PF	0.08	0.11	0.14	0.5	0.110	0.056	0.06
Trunk	HAE4011A, 450-470MHz	5.65	469.9875	54	53.7	CW	E	1.01	PF	0.04	0.05	0.11	0.5	0.067	0.034	0.03
Trunk	HAE4012A, 470-495MHz	5.65	470.0125	54	53.7	CW	E	1.01	PF	0.05	0.06	0.16	0.5	0.090	0.045	0.05
Trunk	HAE4012A, 470-495MHz	5.65	482.5	54	53.7	CW	E	1.02	PF	0.10	0.06	0.19	0.5	0.117	0.060	0.06
Trunk	HAE4012A, 470-495MHz	5.65	494.9875	48	47.2	CW	E	1.02	PF	0.09	0.10	0.11	0.5	0.100	0.051	0.05
Trunk	HAE4013A, 494-512MHz	5.65	494.9875	48	47.2	CW	E	1.02	PF	0.18	0.16	0.13	0.5	0.157	0.080	0.08
Trunk	HAE4013A, 494-512MHz	5.65	503	48	47	CW	E	1.02	PF	0.19	0.16	0.18	0.5	0.177	0.090	0.09
Trunk	HAE4013A, 494-512MHz	5.65	511.9875	48	47.3	CW	E	1.03	PF	0.13	0.10	0.14	0.5	0.123	0.064	0.06
Trunk	RAE4014ARB, 445 - 470MHz	7.15	450.0125	54	53.8	CW	E	1.01	PF	0.04	0.05	0.04	0.5	0.043	0.022	0.02
Trunk	RAE4014ARB, 445 - 470MHz	7.15	460	54	53.8	CW	E	1.01	PF	0.03	0.07	0.06	0.5	0.053	0.027	0.03
Trunk	RAE4014ARB, 445 - 470MHz	7.15	469.9875	54	53.7	CW	E	1.01	PF	0.02	0.01	0.07	0.5	0.033	0.017	0.02
Trunk	RAE4015ARM, 470 - 494MHz	7.15	470.0125	54	53.7	CW	E	1.01	PF	0.00	0.02	0.03	0.5	0.017	0.008	0.01
Trunk	RAE4015ARM, 470 - 494MHz	7.15	482.5	54	53.7	CW	E	1.02	PF	0.03	0.03	0.08	0.5	0.047	0.024	0.02
Trunk	RAE4015ARM, 470 - 494MHz	7.15	493.9875	48	47.1	CW	E	1.02	PF	0.03	0.04	0.07	0.5	0.047	0.024	0.02

MPE calculations are defined in section 13.0.

## MPE measurement data for Passenger

D.U.T. Info.							Probe Info.		Test Pos.	Passenger 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		Head	Chest	Lower Trunk				
Trunk	RAE4016ARB, 494 - 512MHz	7.15	494.9875	48	47.2	CW	E	1.02	PF	0.02	0.04	0.05	0.5	0.037	0.019	0.02
Trunk	RAE4016ARB, 494 - 512MHz	7.15	503	48	47	CW	E	1.02	PF	0.06	0.05	0.11	0.5	0.073	0.037	0.04
Trunk	RAE4016ARB, 494 - 512MHz	7.15	511.9875	48	47.3	CW	E	1.03	PF	0.04	0.05	0.07	0.5	0.053	0.027	0.03

MPE calculations are defined in section 13.0.

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
Roof	HAE4004A, 470-512MHz	2.15	470.0125	54	53.7	CW	E	1.01	BS		0.00	0.00	0.01	0.03	0.05	0.10	0.15	0.24					0.34
Roof	HAE4004A, 470-512MHz	2.15	482.5	54	53.7	CW	E	1.02	BS	0.00	0.00	0.02	0.05	0.07	0.10	0.16	0.27	0.35	0.36	0.5	0.138	0.070	0.07
Roof	HAE4004A, 470-512MHz	2.15	498	48	46.9	CW	E	1.02	BS	0.00	0.01	0.03	0.06	0.06	0.08	0.13	0.22	0.29	0.30	0.5	0.118	0.060	0.06
Roof	HAE4004A, 470-512MHz	2.15	511.9875	48	47.3	CW	E	1.03	BS	0.00	0.01	0.03	0.06	0.06	0.07	0.13	0.20	0.26	0.27	0.5	0.109	0.056	0.06
Roof	HAE6016A, 450 - 512MHz	2.15	450.0125	54	53.8	CW	E	1.01	BS	0.00	0.00	0.00	0.03	0.05	0.09	0.13	0.19	0.25	0.29	0.5	0.103	0.052	0.05
Roof	HAE6016A, 450 - 512MHz	2.15	465.5	54	53.7	CW	E	1.01	BS	0.00	0.00	0.01	0.04	0.06	0.08	0.13	0.21	0.30	0.36	0.5	0.119	0.060	0.06
Roof	HAE6016A, 450 - 512MHz	2.15	482.5	54	53.7	CW	E	1.02	BS	0.00	0.00	0.02	0.05	0.06	0.09	0.15	0.25	0.34	0.37	0.5	0.133	0.068	0.07
Roof	HAE6016A, 450 - 512MHz	2.15	496.5	48	46.9	CW	E	1.02	BS	0.00	0.01	0.03	0.06	0.06	0.07	0.13	0.21	0.29	0.30	0.5	0.116	0.059	0.06
Roof	HAE6016A, 450 - 512MHz	2.15	511.9875	48	47.3	CW	E	1.03	BS	0.00	0.01	0.03	0.05	0.05	0.07	0.13	0.21	0.27	0.28	0.5	0.110	0.057	0.06
Roof	HAE4011A, 450-470MHz	5.65	450.0125	54	53.8	CW	E	1.01	BS	0.00	0.00	0.00	0.01	0.01	0.04	0.11	0.23	0.35	0.31	0.5	0.106	0.054	0.05
Roof	HAE4011A, 450-470MHz	5.65	460	54	53.8	CW	E	1.01	BS	0.00	0.00	0.00	0.00	0.02	0.04	0.09	0.21	0.32	0.30	0.5	0.098	0.049	0.05
Roof	HAE4011A, 450-470MHz	5.65	469.9875	54	53.7	CW	E	1.01	BS	0.00	0.00	0.00	0.00	0.01	0.02	0.06	0.16	0.24	0.24	0.5	0.073	0.037	0.04
Roof	HAE4012A, 470-495MHz	5.65	470.0125	54	53.7	CW	E	1.01	BS	0.00	0.00	0.00	0.01	0.02	0.04	0.10	0.23	0.36	0.32	0.5	0.108	0.055	0.05
Roof	HAE4012A, 470-495MHz	5.65	482.5	54	53.7	CW	E	1.02	BS	0.00	0.00	0.00	0.01	0.01	0.03	0.10	0.22	0.35	0.33	0.5	0.105	0.054	0.05
Roof	HAE4012A, 470-495MHz	5.65	494.9875	48	47.2	CW	E	1.02	BS	0.00	0.00	0.00	0.01	0.01	0.02	0.08	0.16	0.25	0.23	0.5	0.076	0.039	0.04
Roof	HAE4013A, 494-512MHz	5.65	494.9875	48	47.2	CW	E	1.02	BS	0.00	0.00	0.01	0.03	0.02	0.05	0.14	0.26	0.33	0.27	0.5	0.111	0.057	0.06
Roof	HAE4013A, 494-512MHz	5.65	503	48	47	CW	E	1.02	BS	0.00	0.00	0.00	0.02	0.02	0.04	0.13	0.22	0.31	0.28	0.5	0.102	0.052	0.05
Roof	HAE4013A, 494-512MHz	5.65	511.9875	48	47.3	CW	E	1.03	BS	0.00	0.00	0.00	0.01	0.02	0.04	0.09	0.18	0.26	0.24	0.5	0.084	0.043	0.04
Roof	RAE4014ARB, 445 - 470MHz	7.15	450.0125	54	53.8	CW	E	1.01	BS	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.13	0.27	0.34	0.5	0.076	0.038	0.04
Roof	RAE4014ARB, 445 - 470MHz	7.15	460	54	53.8	CW	E	1.01	BS	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.12	0.28	0.36	0.5	0.079	0.040	0.04
Roof	RAE4014ARB, 445 - 470MHz	7.15	469.9875	54	53.7	CW	E	1.01	BS	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.14	0.30	0.36	0.5	0.084	0.042	0.04
Roof	RAE4015ARM, 470 - 494MHz	7.15	470.0125	54	53.7	CW	E	1.01	BS	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.09	0.24	0.32	0.5	0.066	0.033	0.03
Roof	RAE4015ARM, 470 - 494MHz	7.15	482.5	54	53.7	CW	E	1.02	BS	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.15	0.30	0.33	0.5	0.081	0.041	0.04
Roof	RAE4015ARM, 470 - 494MHz	7.15	493.9875	48	47.1	CW	E	1.02	BS	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.14	0.25	0.25	0.5	0.069	0.035	0.04
Roof	RAE4016ARB, 494 - 512MHz	7.15	494.9875	48	47.2	CW	E	1.02	BS	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.11	0.26	0.30	0.5	0.068	0.035	0.04
Roof	RAE4016ARB, 494 - 512MHz	7.15	503	48	47	CW	E	1.02	BS	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.13	0.27	0.29	0.5	0.072	0.037	0.04
Roof	RAE4016ARB, 494 - 512MHz	7.15	511.9875	48	47.3	CW	E	1.03	BS	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.11	0.24	0.27	0.5	0.064	0.033	0.03

MPE calculations are defined in section 13.0.

## MPE measurement data for Passenger

D.U.T. Info.							Probe Info.		Test Pos.	Passenger 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		Head/ Top 1/3	Chest/ Middle 1/3	Lower Trunk/ Bottom 1/3				
Roof	HAE4004A, 470-512MHz	2.15	470.0125	54	53.7	CW	E	1.01	PB	0.04	0.07	0.07	0.5	0.060	0.030	0.03
Roof	HAE4004A, 470-512MHz	2.15	482.5	54	53.7	CW	E	1.02	PB	0.04	0.12	0.04	0.5	0.067	0.034	0.03
Roof	HAE4004A, 470-512MHz	2.15	498	48	46.9	CW	E	1.02	PB	0.05	0.20	0.06	0.5	0.103	0.053	0.05
Roof	HAE4004A, 470-512MHz	2.15	511.9875	48	47.3	CW	E	1.03	PB	0.05	0.09	0.02	0.5	0.053	0.027	0.03
Roof	HAE6016A, 450 - 512MHz	2.15	450.0125	54	53.8	CW	E	1.01	PB	0.02	0.03	0.11	0.5	0.053	0.027	0.03
Roof	HAE6016A, 450 - 512MHz	2.15	465.5	54	53.7	CW	E	1.01	PB	0.05	0.04	0.05	0.5	0.047	0.024	0.02
Roof	HAE6016A, 450 - 512MHz	2.15	482.5	54	53.7	CW	E	1.02	PB	0.05	0.12	0.04	0.5	0.070	0.036	0.04
Roof	HAE6016A, 450 - 512MHz	2.15	496.5	48	46.9	CW	E	1.02	PB	0.07	0.20	0.07	0.5	0.113	0.058	0.06
Roof	HAE6016A, 450 - 512MHz	2.15	511.9875	48	47.3	CW	E	1.03	PB	0.05	0.07	0.02	0.5	0.047	0.024	0.02
Roof	HAE4011A, 450-470MHz	5.65	450.0125	54	53.8	CW	E	1.01	PB	0.00	0.01	0.00	0.5	0.003	0.002	0.00
Roof	HAE4011A, 450-470MHz	5.65	460	54	53.8	CW	E	1.01	PB	0.02	0.01	0.01	0.5	0.013	0.007	0.01
Roof	HAE4011A, 450-470MHz	5.65	469.9875	54	53.7	CW	E	1.01	PB	0.01	0.01	0.01	0.5	0.010	0.005	0.01
Roof	HAE4012A, 470-495MHz	5.65	470.0125	54	53.7	CW	E	1.01	PB	0.02	0.02	0.03	0.5	0.023	0.012	0.01
Roof	HAE4012A, 470-495MHz	5.65	482.5	54	53.7	CW	E	1.02	PB	0.02	0.03	0.02	0.5	0.023	0.012	0.01
Roof	HAE4012A, 470-495MHz	5.65	494.9875	48	47.2	CW	E	1.02	PB	0.02	0.09	0.02	0.5	0.043	0.022	0.02
Roof	HAE4013A, 494-512MHz	5.65	494.9875	48	47.2	CW	E	1.02	PB	0.03	0.13	0.03	0.5	0.063	0.032	0.03
Roof	HAE4013A, 494-512MHz	5.65	503	48	47	CW	E	1.02	PB	0.04	0.09	0.02	0.5	0.050	0.026	0.03
Roof	HAE4013A, 494-512MHz	5.65	511.9875	48	47.3	CW	E	1.03	PB	0.02	0.03	0.00	0.5	0.017	0.009	0.01

MPE calculations are defined in section 13.0.

## MPE measurement data for Passenger

D.U.T. Info.							Probe Info.		Test Pos.	Passenger 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		Head/ Top 1/3	Chest/ Middle 1/3	Lower Trunk/ Bottom 1/3				
Roof	RAE4014ARB, 445 - 470MHz	7.15	450.0125	54	53.8	CW	E	1.01	PB	0.00	0.00	0.01	0.5	0.003	0.002	0.00
Roof	RAE4014ARB, 445 - 470MHz	7.15	460	54	53.8	CW	E	1.01	PB	0.01	0.01	0.01	0.5	0.010	0.005	0.01
Roof	RAE4014ARB, 445 - 470MHz	7.15	469.9875	54	53.7	CW	E	1.01	PB	0.01	0.01	0.01	0.5	0.010	0.005	0.01
Roof	RAE4015ARM, 470 - 494MHz	7.15	470.0125	54	53.7	CW	E	1.01	PB	0.00	0.00	0.00	0.5	0.000	0.000	0.00
Roof	RAE4015ARM, 470 - 494MHz	7.15	482.5	54	53.7	CW	E	1.02	PB	0.00	0.01	0.00	0.5	0.003	0.002	0.00
Roof	RAE4015ARM, 470 - 494MHz	7.15	493.9875	48	47.1	CW	E	1.02	PB	0.01	0.03	0.01	0.5	0.017	0.009	0.01
Roof	RAE4016ARB, 494 - 512MHz	7.15	494.9875	48	47.2	CW	E	1.02	PB	0.00	0.02	0.00	0.5	0.007	0.003	0.00
Roof	RAE4016ARB, 494 - 512MHz	7.15	503	48	47	CW	E	1.02	PB	0.01	0.01	0.00	0.5	0.007	0.003	0.00
Roof	RAE4016ARB, 494 - 512MHz	7.15	511.9875	48	47.3	CW	E	1.03	PB	0.01	0.01	0.00	0.5	0.007	0.003	0.00
Roof	HAE4004A, 470-512MHz	2.15	470.0125	54	53.7	CW	E	1.01	PF	0.06	0.01	0.02	0.5	0.030	0.015	0.02
Roof	HAE4004A, 470-512MHz	2.15	482.5	54	53.7	CW	E	1.02	PF	0.03	0.03	0.02	0.5	0.027	0.014	0.01
Roof	HAE4004A, 470-512MHz	2.15	498	48	46.9	CW	E	1.02	PF	0.03	0.03	0.03	0.5	0.030	0.015	0.02
Roof	HAE4004A, 470-512MHz	2.15	511.9875	48	47.3	CW	E	1.03	PF	0.03	0.02	0.04	0.5	0.030	0.015	0.02
Roof	HAE6016A, 450 - 512MHz	2.15	450.0125	54	53.8	CW	E	1.01	PF	0.04	0.04	0.02	0.5	0.033	0.017	0.02
Roof	HAE6016A, 450 - 512MHz	2.15	465.5	54	53.7	CW	E	1.01	PF	0.06	0.01	0.07	0.5	0.047	0.024	0.02
Roof	HAE6016A, 450 - 512MHz	2.15	482.5	54	53.7	CW	E	1.02	PF	0.03	0.03	0.02	0.5	0.027	0.014	0.01
Roof	HAE6016A, 450 - 512MHz	2.15	496.5	48	46.9	CW	E	1.02	PF	0.03	0.03	0.02	0.5	0.027	0.014	0.01
Roof	HAE6016A, 450 - 512MHz	2.15	511.9875	48	47.3	CW	E	1.03	PF	0.03	0.02	0.04	0.5	0.030	0.015	0.02

MPE calculations are defined in section 13.0.

## MPE measurement data for Passenger

D.U.T. Info.							Probe Info.		Test Pos.	Passenger 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		Head/ Top 1/3	Chest/ Middle 1/3	Lower Trunk/ Bottom 1/3				
Roof	HAE4011A, 450-470MHz	5.65	450.0125	54	53.8	CW	E	1.01		PF	0.01	0.00				
Roof	HAE4011A, 450-470MHz	5.65	460	54	53.8	CW	E	1.01	PF	0.00	0.00	0.01	0.5	0.003	0.002	0.00
Roof	HAE4011A, 450-470MHz	5.65	469.9875	54	53.7	CW	E	1.01	PF	0.00	0.00	0.01	0.5	0.003	0.002	0.00
Roof	HAE4012A, 470-495MHz	5.65	470.0125	54	53.7	CW	E	1.01	PF	0.01	0.01	0.02	0.5	0.013	0.007	0.01
Roof	HAE4012A, 470-495MHz	5.65	482.5	54	53.7	CW	E	1.02	PF	0.00	0.00	0.01	0.5	0.003	0.002	0.00
Roof	HAE4012A, 470-495MHz	5.65	494.9875	48	47.2	CW	E	1.02	PF	0.00	0.00	0.00	0.5	0.000	0.000	0.00
Roof	HAE4013A, 494-512MHz	5.65	494.9875	48	47.2	CW	E	1.02	PF	0.01	0.01	0.01	0.5	0.010	0.005	0.01
Roof	HAE4013A, 494-512MHz	5.65	503	48	47	CW	E	1.02	PF	0.01	0.00	0.00	0.5	0.003	0.002	0.00
Roof	HAE4013A, 494-512MHz	5.65	511.9875	48	47.3	CW	E	1.03	PF	0.00	0.00	0.00	0.5	0.000	0.000	0.00
Roof	RAE4014ARB, 445 - 470MHz	7.15	450.0125	54	53.8	CW	E	1.01	PF	0.00	0.00	0.00	0.5	0.000	0.000	0.00
Roof	RAE4014ARB, 445 - 470MHz	7.15	460	54	53.8	CW	E	1.01	PF	0.01	0.00	0.01	0.5	0.007	0.003	0.00
Roof	RAE4014ARB, 445 - 470MHz	7.15	469.9875	54	53.7	CW	E	1.01	PF	0.01	0.00	0.01	0.5	0.007	0.003	0.00
Roof	RAE4015ARM, 470 - 494MHz	7.15	470.0125	54	53.7	CW	E	1.01	PF	0.00	0.00	0.00	0.5	0.000	0.000	0.00
Roof	RAE4015ARM, 470 - 494MHz	7.15	482.5	54	53.7	CW	E	1.02	PF	0.00	0.00	0.00	0.5	0.000	0.000	0.00
Roof	RAE4015ARM, 470 - 494MHz	7.15	493.9875	48	47.1	CW	E	1.02	PF	0.00	0.00	0.00	0.5	0.000	0.000	0.00
Roof	RAE4016ARB, 494 - 512MHz	7.15	494.9875	48	47.2	CW	E	1.02	PF	0.00	0.00	0.00	0.5	0.000	0.000	0.00
Roof	RAE4016ARB, 494 - 512MHz	7.15	503	48	47	CW	E	1.02	PF	0.00	0.00	0.00	0.5	0.000	0.000	0.00
Roof	RAE4016ARB, 494 - 512MHz	7.15	511.9875	48	47.3	CW	E	1.03	PF	0.00	0.00	0.00	0.5	0.000	0.000	0.00

MPE calculations are defined in section 13.0.