



**MOTOROLA**



**CGISS EME Test Laboratory**

8000 West Sunrise Blvd  
Fort Lauderdale, FL. 33322

**MPE/SAR Compliance Test Report**

**Date of Report:** September 17, 2004  
**Report Revision(s):** Rev. A  
**Device Manufacturer:** Motorola  
**Device Description:** XTL5000;UHF 450-520 MHz automobile mobile transceiver;  
5-45watts 450-500MHz, 5-40 watts 500-512Mhz, 5-25 watts 512-520MHz  
**Classification:** Occupational/Controlled Exposure  
**FCC ID:** AZ492FT4867  
**Device Model:** M20SSS9PW1AN

**Test Period:** 6/1/04-6/2/04

**Responsible Engineer:** Stephen Whalen (Sr. EME Engineer)

**Test Engineer:** Stephen Whalen (Sr. EME Engineer)

**Author:** Michael Sailsman (Global EME Regulatory Affairs Liaison)

**Note: Based on the information and the testing results provided herein, the undersigned certifies that when used as stated in the operating instructions supplied, said product complies with all applicable national and international reference standards and guidelines.**

Signature on file

9/17/04

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Ken Enger  
Senior Resource Manager, Laboratory Director, CGISS EME Lab  
Phone: 954-723-6299 Fax: 954-723-3803

Date Approved

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## 12.0 Conclusion

- APPENDIX A: Antenna Location Drawing
- APPENDIX B: Meter/Probe Calibration Certificates
- APPENDIX C: Photos and Descriptive Details of Assessed Antennas
- APPENDIX D: Computational EME SAR Compliance Assessment

## REVISION HISTORY

Date	Revision	Comments
6/15/04	O	Release of Prototype Results
9/17/04	A	Appendix D "Computational EME SAR Compliance Assessment" was revised to satisfy FCC Correspondence 27437.

## 1.0 Product Description



FCC ID: AZ492FT4867, model M20SSS9PW1AN is a mobile transceiver that utilizes frequency modulation (FM) half duplex transmission technology. The modulation could be conventional analog voice, trunked analog voice, tone PL or C4FM modulation. The control data rates are 3600 and 9600 baud on the C4FFM constant envelop carrier. The intended use of the radio is Push-To-Talk (PTT) while the device is properly installed in a vehicle with the offered external antennas 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. Motorola also makes available to its customers training classes on the proper use of two-way radios and wireless data devices. This device 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. The transmit frequency band is 450-520 MHz. The nominal power of the device is 5-45 watts for 450-500MHz, 5-40 watts for 500-512MHz, 5-25 watts for 512-520MHz, with a maximum conducted power output of 54 watts for 450-500MHz, 48 watts for 500-512MHz, and 30 watts for 512-520MHz. (Note that "By-standers" as used herein means people other than operator)

## 2.0 Offered Options and Accessories

### Antenna

HAE4003A	450-470 MHz ¼ wave 2.15dBi antenna; 15.9cm
HAE4004A	470-512 MHz ¼ wave 2.15dBi antenna; 14.7cm
HAE4011A	450-470 MHz ¼ wave 5.65dBi antenna; 73.1cm (Trimmed)
HAE4012A	470-495 MHz ¼ wave 5.65dBi antenna; 68.6cm (Trimmed)
HAE4013A	494-512 MHz ¼ wave 5.65dBi antenna; 64.3cm (Trimmed)
RAE4014ARB	445-470 MHz ¼ wave 7.15dBi antenna; 92.5cm (Trimmed)
RAE4015ARB	470-494 MHz ¼ wave 7.15dBi antenna; 86.8cm (Trimmed)
RAE4016ARB	494-512 MHz ¼ wave 7.15dBi antenna; 84.7cm (Trimmed)
HAE6015A	450-520 MHz ½ wave 4.15dBi antenna; 25.8cm
HAE6016A	450-512 MHz ¼ wave 2.15dBi antenna; 8.3cm

### 3.0 Measurement Standards

Measurements were performed according to FCC Limits Per 47 CFR 2.1091 (d) for General Population/Uncontrolled RF Exposure as well as with the recommended guidelines in IEEE/ANSI C95.1-1999.

For frequencies ranging from 450-520 MHz the MPE (Maximum Permissible Exposure) limit to electromagnetic energy in equivalent plane wave free-space power density ranges from 0.30-0.35 mW/cm<sup>2</sup>.

### 4.0 Data Collection Consideration

Power density testing was performed with DUT installed in a 1991 Ford Taurus (4-door). Measurement data was taken with the vehicle running at idle and the vehicle battery measuring 14.0 volts.

### 5.0 Measurement System Uncertainty Levels

The information below presents an estimate of the possible errors that are associated with the measurement system.

<u>Description</u>	<u>Error</u>
NARDA Survey Meter	± 3%
Repeatability Accuracy	± 7%

### 6.0 Method of Measurement

#### 6.1 EME measurements made on trunk mounted antennas (for reference, see Antenna Location Layout drawings in Appendix)

##### 6.1.1 External vehicle EME measurement (Antenna mounted at trunk center)

With the survey meter and probe, take ten (10) measurements, at the standard test distance of 90 cm to the antenna (60cm distance used for measurements in the low power 512-520MHz band), from the back of the vehicle in a vertical line and then average the results. These measurements are taken and recorded at every twenty (20) centimeters over a range starting at twenty (20) centimeters above ground and ending at 2.0 meters; this would be representative of a person standing behind a vehicle during a mobile radio transmission.

Using the highest MPE configuration from above, repeat additional MPE tests across the TX band at the vehicle's trunk corner (45 degree radial) and side

adjacent to the trunk (90 degree radial, directly opposite center trunk mounted antenna) while maintaining twenty (20) centimeter separation between the probe sensor and vehicle body.

For the current test vehicle, the antenna to probe sensor separation distance is 99.5 cm (45 degree radial) and 104 cm (90 degree radial)

**Note: the distance from the trunk-mounted antenna to the edge of the vehicle is 26cm and the distance from the edge of the vehicle's trunk to the MPE vertical line assessment is 64cm (trunk to edge of bumper is 10cm). The radial distance measured at 45° from corner of trunk to vertical test line is 99.5cm. The radial distance measured at 90° from the side of the trunk is 104cm.**

### **6.1.2 Internal vehicle EME measurement**

(Antenna mounted at trunk center)

While rotating survey meter probe through 180 degrees to ensure that the highest level is found, scan the inside of the vehicle, both front and back seating areas, for the highest level in each location. After the highest level is found, scan vertically making two (2) additional measurements within an area approximately 40 cm wide (representing the width of a person) so as to have a total of three (3) measured points as indicated below that will be averaged.

- a) Head area
- b) Chest area
- c) Lower Trunk area

## **6.2 EME measurements made on center roof mounted antennas**

(for reference, see Antenna Location Layout drawings in Appendix)

### **6.2.1 External vehicle EME measurement**

(Antenna mounted at roof center)

With the survey meter and probe, take ten (10) measurements, at the standard test distance of 90 cm from the vehicle-mounted antenna, in a vertical line and then average the results. These measurements are taken and recorded at every twenty (20) centimeters over a range starting at twenty (20) centimeters above ground and ending at 2.0 meters; this would be representative of a person standing next to a vehicle during a mobile radio transmission.

**Note: Actual test distance was 110cm (60cm from antenna to roof edge; 30cm from roof edge to edge of car door; 20cm vertical test line to car door); this is the closest distance that can be achieved to an antenna mounted to the center of the vehicle used for MPE compliance assessment.**

### **6.2.2 Internal vehicle EME measurement**

(Antenna mounted at roof center)

While rotating survey meter probe through 180 degrees to ensure that the highest level is found, scan the inside of the vehicle, both front and back seating areas, for the highest level in each location. After the highest level is found, scan vertically making two (2) additional measurements within an area approximately 40 cm wide

(representing the width of a person) so as to have a total of three (3) measured points as indicated below that will be averaged.

- a) Head area
- b) Chest area
- c) Lower Trunk area

## **7.0 Test Site**

The test site is the Motorola Commercial Government Industrial Solution Sector (CGISS) world wide electromagnetic exposure (EME) open area test site located at 8000 W. Sunrise Blvd., Plantation, FL. 33322.

## **8.0 Measurement System/Equipment**

The minimum equipment required will mainly consist of a test vehicle, radio frequency radiation test set consisting of an Electromagnetic Radiation Survey Meter, E-Field Test Probes, and typical antenna configurations.

Below are the test equipment used to assess compliance:

- a) Automobile: 1991 Ford Taurus, 4-Door
- b) E-Field Survey Meter - NARDA Model 8718 (01108); Cal. date: 4/7/04
- c) E-Field (Electric Field) Probe - NARDA Model 8722B (12023); Cal. date: 11/5/03
- d) Antennas – ( $\frac{1}{4}$  wave 2.15dBi,  $\frac{1}{4}$  wave 5.65dBi and 7.15dBi,  $\frac{1}{2}$  wave 4.15dBi gain antennas)

## **9.0 Test Unit Description**

Power density measurements were performed on a representative sample of model number M20SSS9PW1AN. The serial number of the tested radio was X09240168. The frequency band of the DUT is 450-520 MHz; the tested frequencies were 450.00, 460.00, 481.00, 485.00, 494.00, 512.05, 520.00 MHz. The  $\frac{1}{4}$  wave 2.15dBi antenna,  $\frac{1}{4}$  wave 5.65dBi and 7.15dBi,  $\frac{1}{2}$  wave 4.15dBi gain antennas listed in section 2.0 were used to assess compliance to the applicable MPE limits.

## **10.0 Test Set-Up Description**

The following are the standard mobile antenna test configurations used for this product. (for reference, see Antenna Location Layout drawings in the Appendix)

- a) The  $\frac{1}{4}$  wave 2.15dBi antenna models HAE4003A, HAE4004A, and HAE6016A,  $\frac{1}{4}$  wave 5.65dBi gain antenna models HAE4011A, HAE4012A, and HAE4013A,  $\frac{1}{4}$  wave 7.15dBi gain antenna models RAE4014ARB, RAE4015ARB, RAE4016ARB, as well as  $\frac{1}{2}$  wave 4.15dBi gain antenna model HAE6015A were mounted at the center of the roof and trunk of the test vehicle. Assessments were made internal and external to the test vehicle at

the specified distances and locations stated in sections 6.0, 11.0, and the APPENDIX A.

### 11.0 Test Results Summary

Summary of assessed Max calc results					
	Frequency	E/H Field	Int./Ext.	Max Calc Pwr Density	% of Uncontrolled limit
Table 1	450	E	Ext	0.12	39.67
Table 2	450	E	Int.	0.07	23.67
Table 3	460	E	Ext	0.12	38.47
Table 4	460	E	Int.	0.09	29.67
Table 5	485	E	Ext	0.12	38.08
Table 6	485	E	Int.	0.09	28.48
Table 7	450	E	Ext	0.08	26.67
Table 8	450	E	Int.	0.02	7.00
Table 9	460	E	Ext	0.09	28.37
Table 10	460	E	Int.	0.02	7.50
Table 11	485	E	Ext	0.09	26.32
Table 12	485	E	Int.	0.03	9.29
Table 13	494	E	Ext	0.10	29.48
Table 14	494	E	Int.	0.04	12.77
Table 15	450	E	Ext	0.07	22.00
Table 16	450	E	Int.	0.02	5.67
Table 17	481	E	Ext	0.06	17.45
Table 18	481	E	Int.	0.02	4.67
Table 19	494	E	Ext	0.09	28.57
Table 20	494	E	Int.	0.04	12.46
Table 21	450	E	Ext	0.13	43.00
Table 22	450	E	Int.	0.07	22.00
Table 23	485	E	Ext	0.12	36.22
Table 24	485	E	Int.	0.08	26.01
Table 25	512	E	Ext	0.07	19.65
Table 26	512	E	Int.	0.03	9.09
Table 27	520	E	Ext	0.07	19.31
Table 28	520	E	Int.	0.04	10.09
Table 29	485	E	Ext	0.11	34.37
Table 30	485	E	Int.	0.08	24.77
Table 31	450	E	Ext	0.14	45.67
Table 32*	450	E	Int.	0.30	99.67
Table 33	460	E	Ext	0.11	37.17
Table 34*	460	E	Int.	0.36	116.73
Table 35	485	E	Ext	0.16	48.61

Table 36	485	E	Int.	0.26	80.19
Table 37	450	E	Ext	0.13	43.00
Table 38	450	E	Int.	0.18	59.67
Table 39	460	E	Ext	0.12	37.50
Table 40	460	E	Int.	0.17	55.43
Table 41	485	E	Ext	0.14	42.11
Table 42	485	E	Int.	0.16	50.77
Table 43	494	E	Ext	0.15	45.29
Table 44	494	E	Int.	0.20	60.79
Table 45	450	E	Ext	0.10	34.67
Table 46	450	E	Int.	0.06	19.67
Table 47	481	E	Ext	0.09	27.10
Table 48	481	E	Int.	0.04	12.15
Table 49	494	E	Ext	0.15	44.07
Table 50	494	E	Int.	0.16	48.94
Table 51	450	E	Ext	0.12	41.00
Table 52*	450	E	Int.	0.34	112.00
Table 53**	485	E	Ext	0.19	58.82
Table 54	485	E	Int.	0.28	86.38
Table 55	512	E	Ext	0.17	48.68
Table 56	512	E	Int.	0.18	52.20
Table 57	520	E	Ext	0.19	54.47
Table 58	520	E	Int.	0.18	51.87
Table 59	485	E	Ext	0.14	44.27
Table 60	485	E	Int.	0.19	57.89
<b>Radial measurements worst case external configuration (table 53)**</b>					
Table 61	485 (45 deg)	E	Ext	0.20	60.68
Table 62	485 (90deg)	E	Ext	0.19	57.59
Table 63	450 (45 deg)	E	Ext	0.14	48.00
Table 64	512 (45 deg)	E	Ext	0.08	22.58
Table 65	520 (45 deg)	E	Ext	0.09	25.94

Note: \* = Results exceeding applicable limits; \*\* = worst case test configuration for radial assessment

## 11.1 Test Results

Below is the raw MPE data for all measured grid points. Results are based on a 50% duty cycle with the radio operating in accordance with the User Manual instructions. The bolded power density results represent the highest MPE results observed.

**Raw MPE Data; Test Frequencies and measured Po (W):**

450.00 MHz (Po=56.0), 460.00 MHz (Po=56.4), 481.00 MHz (Po=56.4), 485.00 MHz (Po=56.3),  
494.00 MHz (Po=56.5), 512.05 MHz (Po=30.7), 520.00 MHz (Po=31.3)

Meter reads in % of controlled limit; controlled limit =  $f/300 \text{ mW/cm}^2$  for 300-1500 MHz  
(Cal factors presented herein are automatically accounted for in the meter used for assessments)

General Population MPE limits =  $f/1500 \text{ mW/cm}^2$

External Vehicle Power Density (Pwr. Den. (cal.)) = average over body/2

Internal Vehicle Power Density (Pwr. Den. (cal.)) = average over (head/chest/lower trunk)/2

If initial power < RF Po max then Pwr Density Max Calc. = (RF Po Max/Initial Power)\*Pwr Density Calc.

Note: The average over the body test methodology is consistent with IEEE/ANSI C95.1-1999 guidelines

Table 1

External Vehicle MPE Assessment @ 450 MHz									
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
Roof (cnt)	HAE4003 A	2.15	90 (actual 110)	E	0.86	0.238	56.0	0.119	0.119
Measurement Grid									
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit
1	20	2.3%		6	120	11.3%		1.50	0.30
2	40	2.5%		7	140	22.3%			
3	60	6.9%		8	160	31.4%			
4	80	9.6%		9	180	34.5%			
5	100	10.4%		10	200	27.6%			
								<b>RF Po (*Max)</b>	
								54	

**Table 2**

Internal Vehicle MPE Assessment @ 450 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Roof (cnt)	HAE4003 A	2.15	Highest Reading	E	0.86	0.142	0.095	56.0	0.071	0.071
Measurement Grid										
Test Position		% of Control Limit Head		% of Control Limit Chest		% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.50
Back Seat		8.9%		12.1%		7.3%		IEEE Uncontrolled Limit:		0.30
Front Seat		4.6%		7.2%		7.1%		<b>RF Po (*Max):</b>		54

**Table 3**

External Vehicle MPE Assessment @ 460 MHz									
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
Roof (cnt)	HAE4003 A	2.15	90 (actual 110)	E	0.86	0.236	56.4	0.118	0.118
Measurement Grid									
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit
1	20	2.3%		6	120	11.7%		1.53	0.31
2	40	2.5%		7	140	21.5%		<b>RF Po (*Max)</b>	54
3	60	4.2%		8	160	32.6%			
4	80	7.7%		9	180	34.3%			
5	100	8.9%		10	200	28.1%			

Table 4

Internal Vehicle MPE Assessment @ 460 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Roof (cnt)	HAE4003A	2.15	Highest Reading	E	0.86	0.181	0.137	56.4	0.091	0.091
Measurement Grid										
Test Position	% of Control Limit Head		% of Control Limit Chest		% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.53	
Back Seat	8.9%		16.5%		10.1%		IEEE Uncontrolled Limit:		0.31	
Front Seat	4.7%		10.7%		11.5%		RF Po (*Max):		54	

Table 5

External Vehicle MPE Assessment @ 485 MHz										
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )	
Roof (cnt)	HAE4004A	2.15	90 (actual 110)	E	0.86	0.246	56.3	0.123	0.123	
Measurement Grid										
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit	
1	20	1.5%		6	120	13.4%		1.62	0.32	
2	40	1.8%		7	140	26.5%			RF Po (*Max)	
3	60	5.2%		8	160	35.7%				
4	80	6.8%		9	180	30.4%				
5	100	7.7%		10	200	23.1%				

Table 6

Internal Vehicle MPE Assessment @ 485 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Roof (cnt)	HAE4004A	2.15	Highest Reading	E	0.86	0.183	0.115	56.3	0.092	0.092
Measurement Grid										
Test Position	% of Control Limit Head		% of Control Limit Chest		% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.62	
Back Seat	11.6%		15.3%		7.1%		IEEE Uncontrolled Limit:		0.32	
Front Seat	3.9%		7.4%		10.1%		RF Po (*Max):		54	

Table 7

External Vehicle MPE Assessment @ 450 MHz										
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )	
Roof (cnt)	HAE4011 A	5.65	90 (actual 110)	E	0.86	0.161	56.0	0.080	0.080	
Measurement Grid										
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit	
1	20	1.1%		6	120	4.9%		1.50	0.30	
2	40	1.6%		7	140	12.8%			RF Po (*Max)	
3	60	2.7%		8	160	26.3%				
4	80	3.0%		9	180	29.8%				
5	100	3.8%		10	200	21.3%			54	

Table 8

Internal Vehicle MPE Assessment @ 450 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Roof (cnt)	HAE4011 A	5.65	Highest Reading	E	0.86	0.041	0.037	56.0	0.021	0.021
Measurement Grid										
Test Position	% of Control Limit Head		% of Control Limit Chest		% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.50	
Back Seat	2.8%		3.1%		2.3%		IEEE Uncontrolled Limit:		0.30	
Front Seat	1.8%		2.7%		2.9%		RF Po (*Max):		54	

Table 9

External Vehicle MPE Assessment @ 460 MHz										
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )	
Roof (cnt)	HAE4011 A	5.65	90 (actual 110)	E	0.86	0.174	56.4	0.087	0.087	
Measurement Grid										
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit	
1	20	1.0%		6	120	4.4%		1.53	0.31	
2	40	1.3%		7	140	13.3%		RF Po (*Max)		
3	60	2.1%		8	160	30.6%				
4	80	2.7%		9	180	34.1%				
5	100	3.0%		10	200	20.8%		54		

**Table 10**

Internal Vehicle MPE Assessment @ 460 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Roof (cnt)	HAE4011 A	5.65	Highest Reading	E	0.86	0.047	0.038	56.4	0.023	0.023
Measurement Grid										
Test Position	% of Control Limit Head		% of Control Limit Chest		% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.53	
Back Seat	2.4%		4.6%		2.1%		IEEE Uncontrolled Limit:		0.31	
Front Seat	1.9%		2.3%		3.2%		RF Po (*Max):		54	

**Table 11**

External Vehicle MPE Assessment @ 485 MHz										
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )	
Roof (cnt)	HAE4012 A	5.65	90 (actual 110)	E	0.86	0.171	56.3	0.085	0.085	
Measurement Grid										
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit	
1	20	1.9%		6	120	6.1%		1.62	0.32	
2	40	1.8%		7	140	14.7%			RF Po (*Max)	
3	60	2.7%		8	160	26.1%				
4	80	3.0%		9	180	27.9%				
5	100	3.7%		10	200	17.6%				

Table 12

Internal Vehicle MPE Assessment @ 485 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Roof (cnt)	HAE4012A	5.65	Highest Reading	E	0.86	0.061	0.049	56.3	0.030	0.030
Measurement Grid										
Test Position	% of Control Limit Head		% of Control Limit Chest		% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.62	
Back Seat	5.4%		3.2%		2.7%		IEEE Uncontrolled Limit:		0.32	
Front Seat	2.2%		2.9%		3.9%		RF Po (*Max):		54	

Table 13

External Vehicle MPE Assessment @ 494 MHz										
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )	
Roof (cnt)	HAE4013 A	5.65	90 (actual 110)	E	0.86	0.194	56.5	0.097	0.097	
Measurement Grid										
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit	
1	20	1.7%		6	120	10.4%		1.65	0.33	
2	40	1.9%		7	140	19.6%		RF Po (*Max)		
3	60	3.4%		8	160	29.1%				
4	80	3.9%		9	180	27.6%				
5	100	5.6%		10	200	14.7%		54		

Table 14

Internal Vehicle MPE Assessment @ 494 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Roof (cnt)	HAE4013 A	5.65	Highest Reading	E	0.86	0.085	0.048	56.5	0.042	0.042
Measurement Grid										
Test Position		% of Control Limit Head	% of Control Limit Chest	% of Control Limit Lower Trunk		IEEE Controlled Limit:			1.65	
Back Seat		6.9%	5.4%	3.1%		IEEE Uncontrolled Limit:			0.33	
Front Seat		1.7%	2.9%	4.2%		RF Po (*Max):			54	

Table 15

External Vehicle MPE Assessment @ 450 MHz										
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )	
										Roof (cnt)
Measurement Grid										
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit	
1	20	1.2%		6	120	1.5%		1.50	0.30	
2	40	1.2%		7	140	3.4%		RF Po (*Max)	54	
3	60	1.5%		8	160	14.7%				
4	80	1.7%		9	180	32.3%				
5	100	1.4%		10	200	29.1%				

Table 16

Internal Vehicle MPE Assessment @ 450 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Roof (cnt)	RAE4014AR B	7.15	Highest Reading	E	0.86	0.033	0.030	56.0	0.017	0.017
Measurement Grid										
Test Position		% of Control Limit Head	% of Control Limit Chest	% of Control Limit Lower Trunk		IEEE Controlled Limit:			1.50	
Back Seat		2.5%	2.3%	1.8%		IEEE Uncontrolled Limit:			0.30	
Front Seat		1.5%	1.7%	2.8%		RF Po (*Max):			54	

Table 17

External Vehicle MPE Assessment @ 481 MHz										
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )	
Roof (cnt)	RAE4015AR B	7.15	90 (actual 110)	E	0.86	0.113	56.4	0.056	0.056	
Measurement Grid										
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit	
1	20	1.1%		6	120	2.0%		1.60	0.32	
2	40	1.3%		7	140	5.0%		RF Po (*Max):	54	
3	60	2.1%		8	160	13.6%				
4	80	2.3%		9	180	21.3%				
5	100	2.1%		10	200	19.4%				

Table 18

Internal Vehicle MPE Assessment @ 481 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Roof (cnt)	RAE4015AR B	7.15	Highest Reading	E	0.86	0.029	0.030	56.4	0.015	0.015
Measurement Grid										
Test Position	% of Control Limit Head	% of Control Limit Chest	% of Control Limit Lower Trunk	IEEE Controlled Limit:		1.60				
Back Seat	1.8%	2.1%	1.6%	IEEE Uncontrolled Limit:		0.32				
Front Seat	1.3%	2.4%	1.9%	RF Po (*Max):		54				

Table 19

External Vehicle MPE Assessment @ 494 MHz									
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
Roof (cnt)	RAE4016AR B	7.15	90 (actual 110)	E	0.86	0.188	56.5	0.094	0.094
Measurement Grid									
Test Position	Height (cm)	% of Control Limit	Test Position	Height (cm)	% of Control Limit	IEEE Controlled Limit	IEEE Uncontrolled Limit		
1	20	2.1%	6	120	8.8%	1.65	0.33		
2	40	1.9%	7	140	16.5%	RF Po (*Max)	54		
3	60	3.7%	8	160	26.7%				
4	80	4.1%	9	180	29.5%				
5	100	4.6%	10	200	16.3%				

Table 20

Internal Vehicle MPE Assessment @ 494 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Roof (cnt)	RAE4016ARB	7.15	Highest Reading	E	0.86	0.081	0.047	56.5	0.041	0.041
Measurement Grid										
Test Position	% of Control Limit Head		% of Control Limit Chest		% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.65	
Back Seat	6.1%		4.3%		4.4%		IEEE Uncontrolled Limit:		0.33	
Front Seat	2.2%		2.8%		3.6%		RF Po (*Max):		54	

Table 21

External Vehicle MPE Assessment @ 450 MHz									
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
Roof (cnt)	HAE6015 A	4.15	90	E	0.86	0.259	56.0	0.129	0.129
Measurement Grid									
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit
1	20	2.5%		6	120	12.8%		1.50	0.30
2	40	2.4%		7	140	27.1%			
3	60	7.9%		8	160	34.3%			
4	80	9.3%		9	180	35.4%			RF Po (*Max)

Table 22

Internal Vehicle MPE Assessment @ 450 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Roof (cnt)	HAE6015 A	4.15	Highest Reading	E	0.86	0.133	0.102	56.0	0.066	0.066
Measurement Grid										
Test Position		% of Control Limit Head	% of Control Limit Chest	% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.50		
Back Seat		7.9%	12.3%	6.3%		IEEE Uncontrolled Limit:		0.30		
Front Seat		5.2%	7.3%	7.8%				<b>RF Po (*Max):</b>	54	

Table 23

External Vehicle MPE Assessment @ 485 MHz											
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )		
Roof (cnt)	HAE6015 A	4.15	90 (actual 110)	E	0.86	0.235	56.3	0.117	0.117		
Measurement Grid											
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit		
1	20	2.1%		6	120	13.6%		1.62	0.32		
2	40	2.3%		7	140	25.4%					
3	60	5.2%		8	160	36.3%					
4	80	6.8%		9	180	28.7%					
5	100	7.9%		10	200	16.9%					
									<b>RF Po (*Max)</b>	54	

**Table 24**

Internal Vehicle MPE Assessment @ 485 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Roof (cnt)	HAE6015 A	4.15	Highest Reading	E	0.86	0.168	0.124	56.3	0.084	0.084
Measurement Grid										
Test Position	% of Control Limit Head		% of Control Limit Chest		% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.62	
Back Seat	11.3%		9.8%		10.1%		IEEE Uncontrolled Limit:		0.32	
Front Seat	4.5%		7.6%		11.0%		RF Po (*Max):		54	

**Table 25**

External Vehicle MPE Assessment @ 512 MHz										
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )	
Roof (cnt)	HAE6015 A	4.15	90 (actual 110)	E	0.86	0.135	30.7	0.067	0.067	
Measurement Grid										
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit	
1	20	1.9%		6	120	8.6%		1.71	0.34	
2	40	2.0%		7	140	12.3%				
3	60	2.7%		8	160	14.6%				
4	80	3.6%		9	180	16.5%				
5	100	5.7%		10	200	11.2%				
									RF Po (*Max)	

**Table 26**

Internal Vehicle MPE Assessment @ 512 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Roof (cnt)	HAE6015 A	4.15	Highest Reading	E	0.86	0.062	0.051	30.7	0.031	0.031
Measurement Grid										
Test Position		% of Control Limit Head	% of Control Limit Chest	% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.71		
Back Seat		5.7%	2.8%	2.4%		IEEE Uncontrolled Limit:		0.34		
Front Seat		2.7%	2.8%	3.5%				<b>RF Po (*Max):</b>	30	

**Table 27**

External Vehicle MPE Assessment @ 520 MHz									
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
Roof (cnt)	HAE6015 A	4.15	90 (actual 110)	E	0.86	0.133	31.3	0.067	0.067
Measurement Grid									
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit
1	20	1.4%		6	120	6.3%		1.73	0.35
2	40	1.9%		7	140	10.3%			
3	60	2.8%		8	160	15.7%			
4	80	3.1%		9	180	17.3%			
5	100	5.7%		10	200	12.5%			
								<b>RF Po (*Max)</b>	30

**Table 28**

Internal Vehicle MPE Assessment @ 520 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Roof (cnt)	HAE6015 A	4.15	Highest Reading	E	0.86	0.070	0.070	31.3	0.035	0.035
Measurement Grid										
Test Position		% of Control Limit Head	% of Control Limit Chest	% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.73		
Back Seat		5.8%	3.6%	2.8%		IEEE Uncontrolled Limit:		0.35		
Front Seat		4.1%	3.7%	4.3%				<b>RF Po (*Max):</b>	30	

**Table 29**

External Vehicle MPE Assessment @ 485 MHz										
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )	
Roof (cnt)	HAE6016 A	2.15	90 (actual 110)	E	0.86	0.222	56.3	0.111	0.111	
Measurement Grid										
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit	
1	20	2.4%		6	120	10.9%		1.62	0.32	
2	40	2.3%		7	140	24.3%				
3	60	4.5%		8	160	31.7%				
4	80	5.8%		9	180	25.5%				
5	100	6.2%		10	200	23.7%				
									<b>RF Po (*Max)</b>	54

Table30

Internal Vehicle MPE Assessment @ 485 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Roof (cnt)	HAE6016 A	2.15	Highest Reading	E	0.86	0.161	0.113	56.3	0.080	0.080
Measurement Grid										
Test Position		% of Control Limit Head	% of Control Limit Chest	% of Control Limit Lower Trunk		IEEE Controlled Limit:			1.62	
Back Seat		9.1%	13.5%	7.2%		IEEE Uncontrolled Limit:			0.32	
Front Seat		3.5%	8.3%	9.2%		<b>RF Po (*Max):</b>			54	

Table 31

External Vehicle MPE Assessment @ 450 MHz											
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )		
Trunk (cnt)	HAE4003 A	2.15	90	E	0.86	0.274	56.0	0.137	0.137		
Measurement Grid											
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit		
1	20	6.1%		6	120	29.7%		1.50	0.30		
2	40	6.3%		7	140	25.4%					
3	60	15.7%		8	160	20.2%					
4	80	21.4%		9	180	15.1%					
5	100	29.3%		10	200	13.4%					
								<b>RF Po (*Max)</b>			54

Table 32\*

Internal Vehicle MPE Assessment @ 450 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Trunk (cnt)	HAE4003 A	2.15	Highest Reading	E	0.86	0.598	0.523	56.0	0.299	<b>0.299</b>
Measurement Grid										
Test Position		% of Control Limit Head	% of Control Limit Chest	% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.50		
Back Seat		56.8%	33.4%	29.3%		IEEE Uncontrolled Limit:		0.30		
Front Seat		37.7%	38.1%	28.7%				<b>RF Po (*Max):</b>	54	

Table 33

External Vehicle MPE Assessment @ 460 MHz									
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
Trunk (cnt)	HAE4003 A	2.15	90	E	0.86	0.229	56.4	0.114	0.114
Measurement Grid									
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit
1	20	4.7%		6	120	25.5%		1.53	0.31
2	40	5.8%		7	140	20.4%			
3	60	12.5%		8	160	14.3%			
4	80	20.7%		9	180	10.9%			
5	100	26.1%		10	200	8.4%			

Table 34\*

Internal Vehicle MPE Assessment @ 460 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Trunk (cnt)	HAE4003 A	2.15	Highest Reading	E	0.86	0.716	0.695	56.4	0.358	<b>0.358</b>
Measurement Grid										
Test Position		% of Control Limit Head		% of Control Limit Chest		% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.53
Back Seat		72.1%		53.3%		14.7%		IEEE Uncontrolled Limit:		0.31
Front Seat		38.9%		43.4%		53.7%		<b>RF Po (*Max):</b>		54

Table 35

Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
Trunk (cnt)	HAE4004 A	2.15	90	E	0.86	0.314	56.3	0.157	0.157
Measurement Grid									
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit
1	20	5.4%		6	120	38.9%		1.62	0.32
2	40	7.8%		7	140	29.7%		<b>RF Po (*Max)</b>	54
3	60	17.6%		8	160	18.6%			
4	80	23.5%		9	180	13.5%			
5	100	34.5%		10	200	4.8%			

**Table 36**

Internal Vehicle MPE Assessment @ 485 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Trunk (cnt)	HAE4004 A	2.15	Highest Reading	E	0.86	0.518	0.303	56.3	0.259	0.259
Measurement Grid										
Test Position		% of Control Limit Head	% of Control Limit Chest	% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.62		
Back Seat		43.6%	40.1%	12.5%		IEEE Uncontrolled Limit:		0.32		
Front Seat		33.7%	12.5%	10.1%		RF Po (*Max):		54		

**Table 37**

External Vehicle MPE Assessment @ 450 MHz										
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )	
Trunk (cnt)	HAE4011 A	5.65	90	E	0.86	0.258	56.0	0.129	0.129	
Measurement Grid										
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit	
1	20	2.9%		6	120	43.7%		1.50	0.30	
2	40	3.5%		7	140	43.3%		RF Po (*Max)		
3	60	5.1%		8	160	18.1%				
4	80	13.6%		9	180	9.0%				
5	100	22.7%		10	200	9.9%		54		

**Table 38**

Internal Vehicle MPE Assessment @ 450 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Trunk (cnt)	HAE4011 A	5.65	Highest Reading	E	0.86	0.357	0.242	56.0	0.179	0.179
Measurement Grid										
Test Position		% of Control Limit Head	% of Control Limit Chest	% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.50		
Back Seat		29.7%	25.3%	16.4%		IEEE Uncontrolled Limit:		0.30		
Front Seat		17.8%	18.1%	12.4%				<b>RF Po (*Max):</b>	54	

**Table 39**

External Vehicle MPE Assessment @ 460 MHz										
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )	
Trunk (cnt)	HAE4011 A	5.65	90	E	0.86	0.231	56.1	0.115	0.115	
Measurement Grid										
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit	
1	20	1.3%		6	120	40.7%		1.53	0.31	
2	40	2.6%		7	140	37.6%				
3	60	2.6%		8	160	16.8%				
4	80	9.4%		9	180	8.1%				
5	100	19.7%		10	200	11.8%				<b>RF Po (*Max)</b>
										54

**Table 40**

Internal Vehicle MPE Assessment @ 460 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Trunk (cnt)	HAE4011 A	5.65	Highest Reading	E	0.86	0.339	0.319	56.4	0.170	0.170
Measurement Grid										
Test Position		% of Control Limit Head	% of Control Limit Chest	% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.53		
Back Seat		31.7%	23.4%	11.3%		IEEE Uncontrolled Limit:		0.31		
Front Seat		15.6%	20.1%	26.7%				<b>RF Po (*Max):</b>	54	

**Table 41**

External Vehicle MPE Assessment @ 485 MHz										
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )	
Trunk (cnt)	HAE4012 A	5.65	90	E	0.86	0.273	56.3	0.136	0.136	
Measurement Grid										
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit	
1	20	1.2%		6	120	49.7%		1.62	0.32	
2	40	1.8%		7	140	44.3%				
3	60	4.9%		8	160	20.2%				
4	80	13.4%		9	180	4.1%				
5	100	25.7%		10	200	3.3%				
									<b>RF Po (*Max)</b>	54

**Table 42**

Internal Vehicle MPE Assessment @ 485 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Trunk (cnt)	HAE4012 A	5.65	Highest Reading	E	0.86	0.328	0.134	56.3	0.164	0.164
Measurement Grid										
Test Position		% of Control Limit Head	% of Control Limit Chest	% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.62		
Back Seat		25.8%	26.0%	9.1%		IEEE Uncontrolled Limit:		0.32		
Front Seat		11.6%	4.3%	9.0%				<b>RF Po (*Max):</b>	54	

**Table 43**

External Vehicle MPE Assessment @ 494 MHz										
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )	
Trunk (cnt)	HAE4013 A	5.65	90	E	0.86	0.297	56.5	0.149	0.149	
Measurement Grid										
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit	
1	20	2.5%		6	120	42.8%		1.65	0.33	
2	40	3.3%		7	140	44.7%				
3	60	7.4%		8	160	16.6%				
4	80	20.1%		9	180	8.2%				
5	100	30.7%		10	200	4.1%		<b>RF Po (*Max)</b>		
									54	

**Table 44**

Internal Vehicle MPE Assessment @ 494 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Trunk (cnt)	HAE4013 A	5.65	Highest Reading	E	0.86	0.400	0.183	56.5	0.200	0.200
Measurement Grid										
Test Position		% of Control Limit Head	% of Control Limit Chest	% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.65		
Back Seat		32.1%	28.3%	12.5%		IEEE Uncontrolled Limit:		0.33		
Front Seat		12.9%	11.8%	8.7%		RF Po (*Max):		54		

**Table 45**

External Vehicle MPE Assessment @ 450 MHz										
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )	
Trunk (cnt)	RAE4014AR B	7.15	90	E	0.86	0.208	56.0	0.104	0.104	
Measurement Grid										
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit	
1	20	3.8%		6	120	21.6%		1.50	0.30	
2	40	3.3%		7	140	35.4%		RF Po (*Max):	54	
3	60	5.5%		8	160	29.7%				
4	80	4.7%		9	180	17.3%				
5	100	7.1%		10	200	10.1%				

Table 46

Internal Vehicle MPE Assessment @ 450 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Trunk (cnt)	RAE4014ARB	7.15	Highest Reading	E	0.86	0.118	0.098	56.0	0.059	0.059
Measurement Grid										
Test Position		% of Control Limit Head	% of Control Limit Chest	% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.50		
Back Seat		12.3%	5.9%	5.3%		IEEE Uncontrolled Limit:		0.30		
Front Seat		6.6%	8.2%	4.8%				<b>RF Po (*Max):</b>		54

Table 47

External Vehicle MPE Assessment @ 481 MHz										
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )	
Trunk (cnt)	RAE4015ARB	7.15	90	E	0.86	0.174	56.4	0.087	0.087	
Measurement Grid										
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit	
1	20	1.2%		6	120	16.1%		1.60	0.32	
2	40	1.1%		7	140	34.3%				
3	60	2.0%		8	160	30.6%				
4	80	3.1%		9	180	11.7%				
5	100	4.9%		10	200	3.3%				
								<b>RF Po (*Max)</b>		54

**Table 48**

Internal Vehicle MPE Assessment @ 481 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Trunk (cnt)	RAE4015ARB	7.15	Highest Reading	E	0.86	0.077	0.043	56.4	0.039	0.039
Measurement Grid										
Test Position		% of Control Limit Head	% of Control Limit Chest	% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.60		
Back Seat		6.4%	5.3%	2.8%		IEEE Uncontrolled Limit:		0.32		
Front Seat		2.4%	3.6%	2.0%		RF Po (*Max):		54		

**Table 49**

External Vehicle MPE Assessment @ 494 MHz										
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )	
Trunk (cnt)	RAE4016ARB	7.15	90	E	0.86	0.290	56.5	0.145	0.145	
Measurement Grid										
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit	
1	20	4.2%		6	120	34.5%		1.65	0.33	
2	40	5.9%		7	140	40.7%		RF Po (*Max)		
3	60	9.7%		8	160	26.3%				
4	80	13.1%		9	180	12.7%				
5	100	22.6%		10	200	6.4%		54		

**Table 50**

Internal Vehicle MPE Assessment @ 494 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Trunk (cnt)	RAE4016ARB	7.15	Highest Reading	E	0.86	0.322	0.171	56.5	0.161	0.161
Measurement Grid										
Test Position		% of Control Limit Head	% of Control Limit Chest	% of Control Limit Lower Trunk		IEEE Controlled Limit:			1.65	
Back Seat		24.7%	24.2%	9.8%		IEEE Uncontrolled Limit:			0.33	
Front Seat		15.6%	9.8%	5.7%		<b>RF Po (*Max):</b>			54	

**Table 51**

External Vehicle MPE Assessment @ 450 MHz										
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )	
Trunk (cnt)	HAE6015A	4.15	90	E	0.86	0.245	56.0	0.123	0.123	
Measurement Grid										
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit	
1	20	7.2%		6	120	28.7%		1.50	0.30	
2	40	7.7%		7	140	27.5%		<b>RF Po (*Max)</b>		
3	60	13.2%		8	160	16.4%				
4	80	19.7%		9	180	11.1%				
5	100	24.8%		10	200	7.2%		54		

**Table 52\***

Internal Vehicle MPE Assessment @ 450 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Trunk (cnt)	HAE6015 A	4.15	Highest Reading	E	0.86	0.673	0.512	56.0	0.336	<b>0.336</b>
Measurement Grid										
Test Position		% of Control Limit Head	% of Control Limit Chest	% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.50		
Back Seat		77.7%	27.1%	29.7%		IEEE Uncontrolled Limit:		0.30		
Front Seat		34.9%	42.1%	25.3%				<b>RF Po (*Max):</b>	54	

**Table 53**

External Vehicle MPE Assessment @ 485 MHz									
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
Trunk (cnt)	HAE6015 A	4.15	90	E	0.86	0.381	56.3	0.190	0.190
Measurement Grid									
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit
1	20	7.9%		6	120	41.6%		1.62	0.32
2	40	8.8%		7	140	44.3%			
3	60	19.4%		8	160	26.7%			
4	80	29.6%		9	180	11.1%			
5	100	41.2%		10	200	4.8%			
								<b>RF Po (*Max)</b>	54

**Table 54**

Internal Vehicle MPE Assessment @ 485 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Trunk (cnt)	HAE6015 A	4.15	Highest Reading	E	0.86	0.558	0.313	56.3	0.279	0.279
Measurement Grid										
Test Position	% of Control Limit Head		% of Control Limit Chest		% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.62	
Back Seat	44.9%		43.8%		14.8%		IEEE Uncontrolled Limit:		0.32	
Front Seat	27.3%		14.6%		16.1%		RF Po (*Max):		54	

**Table 55**

External Vehicle MPE Assessment @ 512 MHz										
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )	
Trunk (cnt)	HAE6015 A	4.15	60	E	0.86	0.332	30.7	0.166	0.166	
Measurement Grid										
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit	
1	20	3.9%		6	120	41.3%		1.71	0.34	
2	40	5.1%		7	140	44.5%				
3	60	9.6%		8	160	25.8%				
4	80	16.4%		9	180	12.2%			RF Po (*Max)	
5	100	28.7%		10	200	6.8%			30	

**Table 56**

Internal Vehicle MPE Assessment @ 512 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Trunk (cnt)	HAE6015 A	4.15	Highest Reading	E	0.86	0.356	0.199	30.7	0.178	0.178
Measurement Grid										
Test Position		% of Control Limit Head	% of Control Limit Chest	% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.71		
Back Seat		30.1%	22.7%	9.7%		IEEE Uncontrolled Limit:		0.34		
Front Seat		14.8%	15.3%	4.8%				<b>RF Po (*Max):</b>	30	

**Table 57**

External Vehicle MPE Assessment @ 520 MHz									
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
Trunk (cnt)	HAE6015 A	4.15	60	E	0.86	0.378	31.3	0.189	0.189
Measurement Grid									
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit
1	20	4.4%		6	120	44.8%		1.73	0.35
2	40	5.9%		7	140	41.7%			
3	60	13.2%		8	160	25.4%			
4	80	23.7%		9	180	13.5%			
5	100	37.6%		10	200	7.6%			
								<b>RF Po (*Max)</b>	30

**Table 58**

Internal Vehicle MPE Assessment @ 520 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Trunk (cnt)	HAE6015 A	4.15	Highest Reading	E	0.86	0.360	0.306	31.3	0.180	0.180
Measurement Grid										
Test Position	% of Control Limit Head		% of Control Limit Chest		% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.73	
Back Seat	33.8%		14.7%		13.8%		IEEE Uncontrolled Limit:		0.35	
Front Seat	22.7%		23.4%		6.8%		RF Po (*Max):		30	

**Table 59**

External Vehicle MPE Assessment @ 485 MHz										
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )	
Trunk (cnt)	HAE6016 A	2.15	90	E	0.86	0.286	56.3	0.143	0.143	
Measurement Grid										
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit	
1	20	3.2%		6	120	35.7%		1.62	0.32	
2	40	5.5%		7	140	31.5%				
3	60	12.3%		8	160	19.7%				
4	80	20.7%		9	180	10.9%				
5	100	32.5%		10	200	5.2%				
								RF Po (*Max)		54

**Table 60**

Internal Vehicle MPE Assessment @ 485 MHz										
Antenna Location	Antenna	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head, Chest, Lower Trunk Back/Front seats (mW/cm <sup>2</sup> )		Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
						Back	Front			
Trunk (cnt)	HAE6016 A	2.15	Highest Reading	E	0.86	0.375	0.234	56.3	0.187	0.187
Measurement Grid										
Test Position		% of Control Limit Head	% of Control Limit Chest	% of Control Limit Lower Trunk		IEEE Controlled Limit:		1.62		
Back Seat		31.9%	27.9%	9.7%		IEEE Uncontrolled Limit:		0.32		
Front Seat		23.4%	10.2%	9.8%				<b>RF Po (*Max):</b>	54	

**Table 61**

External Vehicle MPE Assessment @ 485 MHz (45 assessment)										
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )	
Trunk (cnt)	HAE6015 A	4.15	99.5	E	0.86	0.392	56.3	0.196	0.196	
Measurement Grid										
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit	
1	20	4.1%		6	120	50.1%		1.62	0.32	
2	40	5.2%		7	140	45.5%				
3	60	14.2%		8	160	28.7%				
4	80	23.3%		9	180	17.8%				
5	100	44.2%		10	200	9.5%				<b>RF Po (*Max)</b>
										54

**Table 62**

External Vehicle MPE Assessment @ 485 MHz (90 assessment)									
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
Trunk (cnt)	HAE6015 A	4.15	104	E	0.86	0.371	56.3	0.186	0.186
Measurement Grid									
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit
1	20	7.2%		6	120	48.5%		1.62	0.32
2	40	7.7%		7	140	35.1%			
3	60	16.2%		8	160	27.8%			
4	80	23.4%		9	180	17.6%			
5	100	37.1%		10	200	9.1%			
								<b>RF Po (*Max)</b>	54

**Table 63**

External Vehicle MPE Assessment @ 450 MHz (45 assessment)									
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )
Trunk (cnt)	HAE6015 A	4.15	99.5	E	0.86	0.289	56.0	0.144	0.144
Measurement Grid									
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit
1	20	5.6%		6	120	44.3%		1.50	0.30
2	40	5.1%		7	140	32.6%			
3	60	13.6%		8	160	22.8%			
4	80	15.3%		9	180	11.5%			
5	100	35.7%		10	200	5.9%			
								<b>RF Po (*Max)</b>	54

**Table 64**

External Vehicle MPE Assessment @ 512 MHz (45 assessment)										
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )	
Trunk (cnt)	HAE6015 A	4.15	99.5	E	0.86	0.154	30.7	0.077	0.077	
Measurement Grid										
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit	
1	20	1.0%		6	120	22.4%		1.71	0.34	
2	40	1.1%		7	140	17.4%				
3	60	6.2%		8	160	9.9%				
4	80	8.8%		9	180	4.8%				RF Po (*Max)
5	100	15.9%		10	200	2.5%				30

**Table 65**

External Vehicle MPE Assessment @ 520 MHz (45 assessment)										
Antenna Location	Antenna Model	Gain (dBi)	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Body (mW/cm <sup>2</sup> )	Initial Power (W)	Pwr. Density Calc. (mW/cm <sup>2</sup> )	Pwr. Density Max Calc. (mW/cm <sup>2</sup> )	
Trunk (cnt)	HAE6015 A	4.15	99.5	E	0.86	0.180	31.3	0.090	0.090	
Measurement Grid										
Test Position	Height (cm)	% of Control Limit		Test Position	Height (cm)	% of Control Limit		IEEE Controlled Limit	IEEE Uncontrolled Limit	
1	20	1.3%		6	120	26.5%		1.73	0.35	
2	40	1.4%		7	140	22.1%				
3	60	5.1%		8	160	11.3%				
4	80	9.2%		9	180	5.6%				RF Po (*Max)
5	100	18.7%		10	200	2.9%				30

## 12.0 Conclusion

Depending on the test frequency, compliance assessments were performed with an output power range of 31.3W to 56.5W. The maximum RF power allowable will be equal to the upper limit of the final test factory transmit power specification of 54.0W. The highest power density result scaled to the maximum allowable power output is 0.36mW/cm<sup>2</sup> internal to the vehicle and 0.20mW/cm<sup>2</sup> external to the vehicle.

The MPE results presented herein demonstrate compliance to the applicable Occupational/Controlled exposure limits of 1.5 to 1.73mW/cm<sup>2</sup>.

Compliance to the General population/Uncontrolled limits is demonstrated by S.A.R. computational assessments of specific MPE non-compliant passenger and by-stander test conditions\* (see section 11.0). APPENDIX D presents computational S.A.R. results demonstrating compliance to the applicable General Population/Uncontrolled S.A.R. exposure limit of 1.6mW/g and therefore also demonstrates compliance to the MPE General Population/Uncontrolled limits.

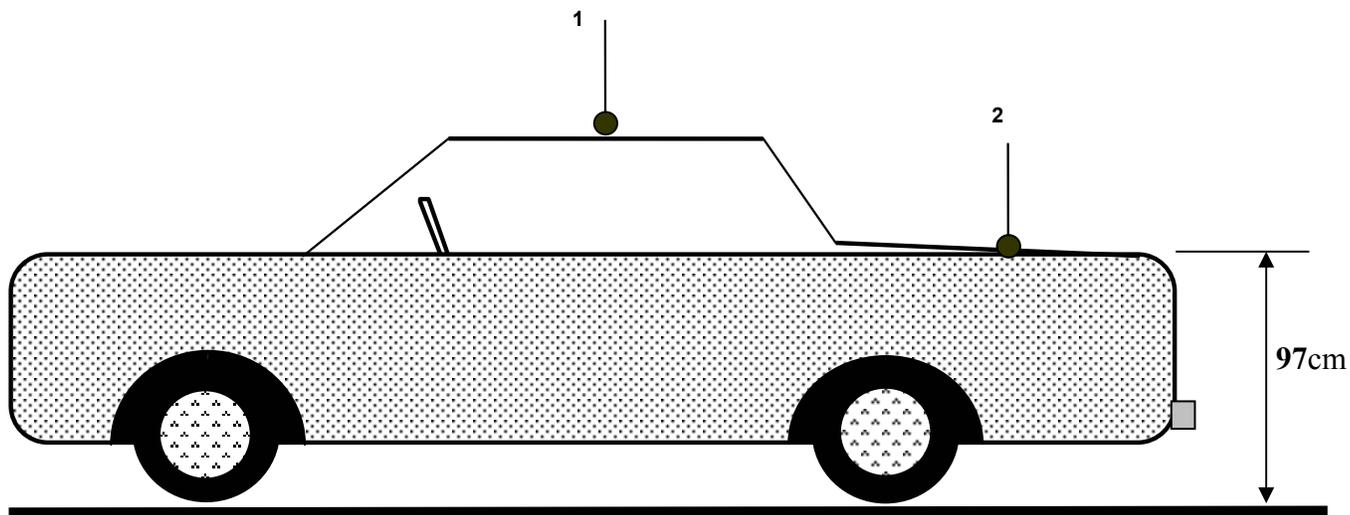
Notes:

1) Table 32, 34, 52, reflect the worst-case passenger test configuration conditions that exceed the applicable MPE power density specification limits. The test condition was analyzed computationally to assess performance to the applicable S.A.R. exposure specification limits. APPENDIX D of this report presents computational EME compliance assessment results for FCC ID: AZ492FT4867 performed by the Motorola Corporate Research Lab located in Plantation Florida using a commercial code based on FDTD (Finite Difference Time Domain) methodology. The computational results are provided herein in order to demonstrate the EME compliance of this device with respect to the IEEE Std C95.1-1999 specific absorption rate (S.A.R.) exposure limits. The computational results show that this device, when used with the offered antennas in accordance with the user manual instructions, exhibits a maximum peak 1-g average S.A.R. of 0.20mW/g for passengers internal to the vehicle.

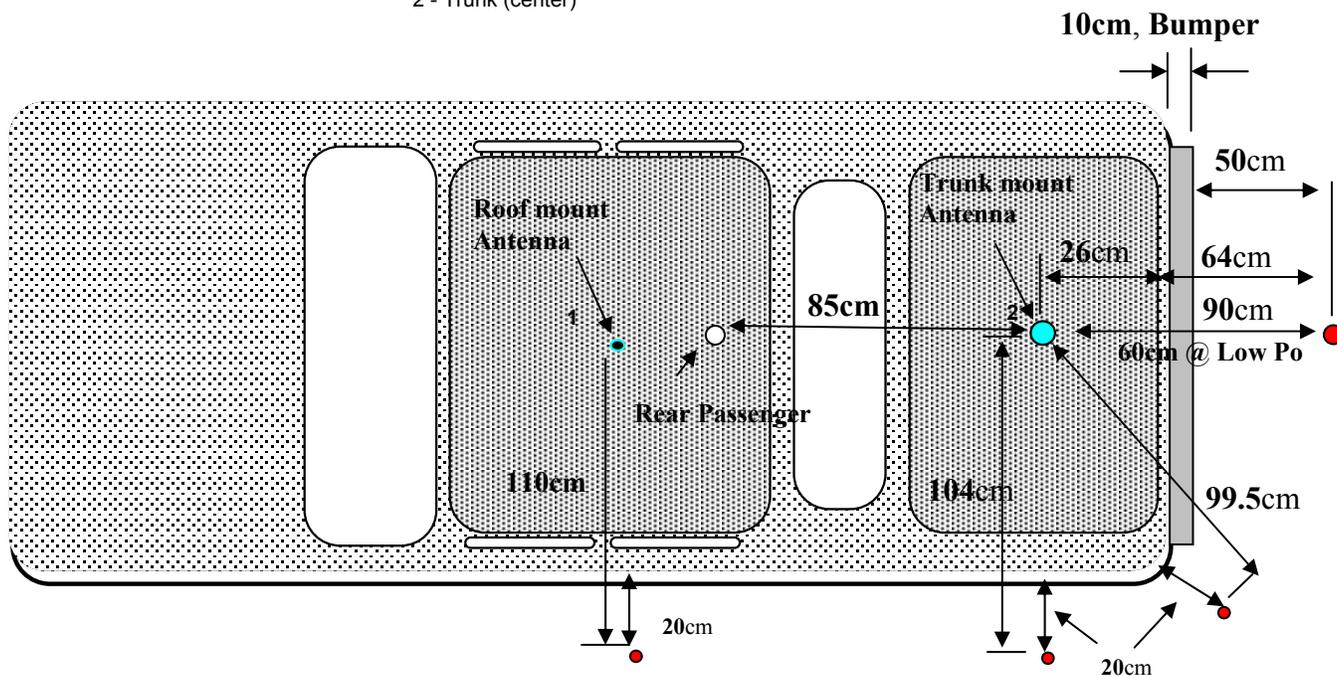
2) Tables 61-65 in section 11.0 above presents MPE measurements performed at the trunk corners (45<sup>0</sup> radial) and on the side of vehicle adjacent to the trunk (90<sup>0</sup> radial) using the worst case configuration from the direct rear of vehicle assessments. Assessment across the band was done in the worst case radial test location.

## APPENDIX A

### Antenna Location Drawing with Test Locations Identified



- 1 - Roof (center)
- 2 - Trunk (center)



Note: ● Test Locations

**APPENDIX B**

**Meter/Probe Calibration Certificates**



**communications**  
Narda Microwave-East

RFMR A002

# Certificate of Calibration

L-3 Communications, Narda Microwave-East, hereby certifies that the referenced RF Radiation Hazard monitoring equipment has been calibrated in accordance with MIL-STD-45662A, ANSI Z540, ISO 10012 and ISO 9001: 2000.

The measured values were determined by comparison with our standards, which are traceable to the National Institute of Standards and Technology to the extent allowed by NIST's calibration facilities.

Customer: MOTOROLA INC  
FORT LAUDERDALE, FL 33322

Certificate #: 44172.1

Model #: 8718-10

Serial #: 01108

Description: METER W/CABLE

PO #: NP1160429-V3

Date Calibrated: 04/07/2004

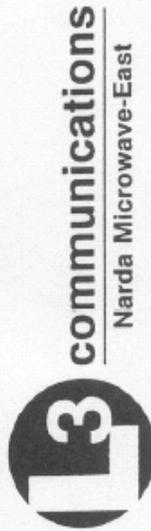
R.O. #: 44172

  
Vince Donovan  
Manager of Instruments Assembly and Test

  
John C. Stine  
Director of Quality Assurance

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DR 11/A 002



NARDA MICROWAVE EAST  
CALIBRATED IN ACCORDANCE  
WITH MIL-STD-4540  
CAL DATE 11-5-03 BY RP  
CAL DUE 11-5-05  
MOD P7249 S/N 12023

# Certificate of Calibration

L-3 Communications, Narda Microwave-East, hereby certifies that the referenced RF Radiation Hazard monitoring equipment has been calibrated in accordance with MIL-STD-45662A, ANSI Z540, ISO 10012 and ISO 9001. The measured values were determined by comparison with our standards, which are traceable to the National Institute of Standards and Technology to the extent allowed by NIST's calibration facilities.

Customer: MOTOROLA  
SCHAUMBURG, IL 60168-0429

Certificate #: 40348 2

Model #: 8722B  
Description: RAD MONITOR 8722B  
Date Calibrated: 11/05/2003  
Serial #: 12023  
PO #: NP984832  
R.O. #: 40348

  
Vince Donovan  
Manager of Instruments Assembly and Test

  
John C. Stine  
Director of Quality Assurance

This certificate shall not be reproduced, except in full, without written approval from L-3 Communications, Narda Microwave-East



DATE 05-Nov-2003  
REL HUMIDITY 42%

RELEASE # R40348  
TEMP 26 DEG. C

NARDA MICROWAVE - EAST

MODEL # 8722B  
SERIAL # 12023

Recal Probe - Date of Previous Probe Data = 11/06/2002

FREQ MHZ	PRE-CAL DATA	FINAL CAL DATA	ELLIPSE RATIO, dB	FINAL CORR. FACTOR	DEVIATION DELTA DB	PREVIOUS FINAL CORR.
.30	1.07	0.98	+/- 0.20	1.02	+0.12	0.96
3.00	1.29	1.18	+/- 0.37	0.85	+0.13	0.80
10.00	0.96	0.88	+/- 0.27	1.14	+0.30	1.12
30.00	0.82	0.75	+/- 0.11	1.33	+0.37	1.33
100.00	1.45	1.33	+/- 0.18	0.75	+0.38	0.75
300.00	1.16	1.06	+/- 0.25	0.94	+0.36	0.94
750.00	1.32	1.21	+/- 0.23	0.83	+1.13	0.98
1000.00	1.41	1.29	+/- 0.31	0.77	+0.89	0.87
1700.00	1.20	1.10	+/- 0.38	0.91	-0.38	0.77
2450.00	1.35	1.28	+/- 0.45	0.78	+1.68	* 1.09
4000.00	1.13	1.07	+/- 0.27	0.94	+0.96	1.10
8200.00	1.24	1.17	+/- 0.48	0.86	+0.74	0.96
10000.00	1.25	1.18	+/- 0.52	0.85	+0.81	0.97
18000.00	1.30	1.22	+/- 0.66	0.82	+0.32	0.83
26500.00	1.16	1.10	+/- 0.83	0.91	+0.13	0.89
40000.00	0.83	0.78	+/- 0.79	1.28	-0.01	1.20

LOW FREQUENCY MULTIPLIER = 0.917      HIGH FREQUENCY MULTIPLIER = 0.945

FREQ. DEV. (3-40000 MHZ) = 2.476 DB

FREQ. DEV. (0.3-40000 MHZ) = 2.48 DB

MAX. ELLIPSE RATIO (0.3-40000 MHZ) = +/- 0.83 DB

PRE-CAL DATA REFLECTS THE MEAN ELLIPSE RATIO OF PROBE AS RECEIVED BY

NARDA CALIBRATION DEPARTMENT, OR IS THE INITIAL, UN-ADJUSTED RATIO.

(PRE-CAL x OLD CORR. FACTOR) - 1 = DEVIATION FROM PREVIOUS (OLD)

CALIBRATION DATA. NOTE: NOT APPLICABLE FOR NEW PROBES.

FINAL CAL DATA IS THE RATIO OF THE DISPLAYED TO THE APPLIED FIELD STRENGTH.

FINAL CORR. FACTOR IS THE RECIPROCAL OF FINAL CAL DATA.

FINAL CORR. FACTOR MULTIPLIED BY THE DISPLAYED FIELD STRENGTH READING

GIVES THE ACTUAL ("CORRECTED") FIELD STRENGTH.

ELLIPSE RATIO IS EXPRESSED IN DB DEVIATION FROM THE MEAN DATA

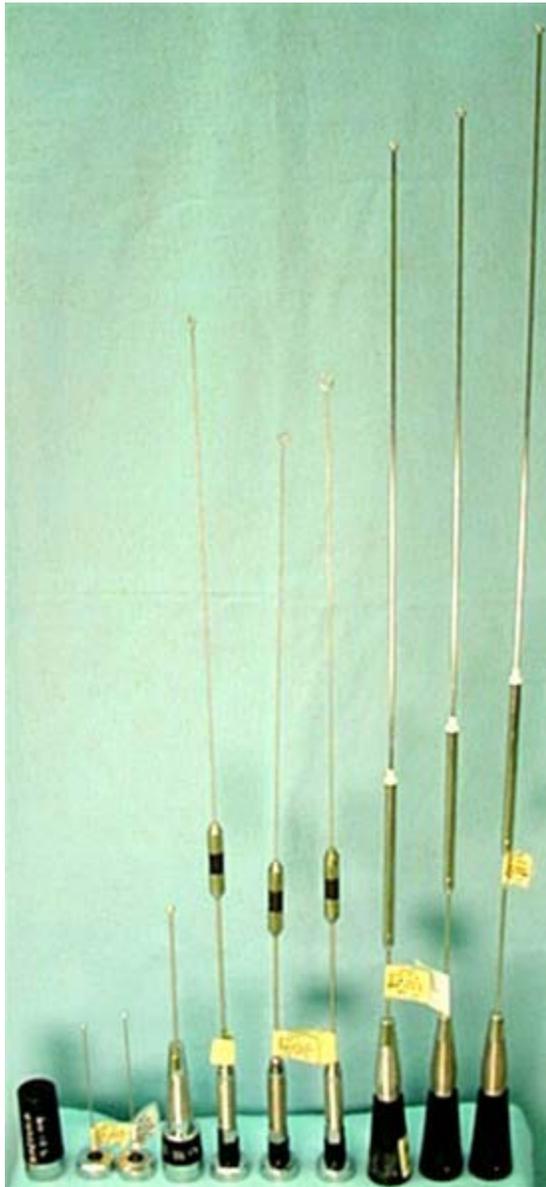
RMS Uncertainty = +/- 0.5db. ATP # = 502120 REV J

TESTER V. M

Q.A. APPROVAL [Signature]



**APPENDIX C**  
**Photos of Assessed Antennas**



**Antenna kit numbers, from left to right; HAE6016A, HAE4004A, HAE4003A, HAE6015A, HAE4011A, HAE4013A, HAE4012A, RAE4016ARB, RAE4015ARB, RAE4014ARB**

**APPENDIX D**  
**Computational EME SAR Compliance Assessment**