Certificate Number: 1449-02

MOTOROLA

ACCREDITED

CGISS EME Test Laboratory
8000 West Sunrise Blvd
Fort Lauderdale, FL. 33322

MPE Compliance Test Report

Date of Report:	September 19, 2003
Report Revision(s):	Rev. O
Device Manufacturer:	Motorola
Device Description:	25W 32 channel Mobile Radio 403-440 MHz
Classification:	Occupational/Controlled Exposure
FCC ID:	ABZ99FT4047
Device Model:	PMUE2003A

Test Period:	9/5/03
Test Engineer:	Jim Fortier (Elect. Principle Staff 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 — 9/19/03

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Date Approved

TABLE OF CONTENTS

REVISION HISTORY

Date	Revision	Comments
9/19/03	O	Release of Pilot Results

1.0 Product Description

FCC ID: ABZ99FT4047, model PMUE2003A is a mobile transceiver that utilizes frequency modulation (FM) half duplex transmission technology. 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, who 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 403-440 MHz. The rated power of the device is 25 watts with a maximum conducted power output of 28 watts.

2.0 Offered Options and Accessories

Antenna

HAE4002A	403-430 MHz ¼ wave 0dB antenna; 17.5cm
RAE4151A	403-430 MHz ¼ wave 0dB antenna; 17.5cm
TAE6053A	430-450 MHz ¼ wave 0dB antenna; 16.5cm

3.0 Measurement Standards

Measurements were performed according to FCC Limits Per 47 CFR 2.1091 (d) for General Population/Uncontrolled RF Exposure.
For frequencies ranging from 403-440 MHz the MPE (Maximum Permissible Exposure) limit to electromagnetic energy in equivalent plane wave free-space power density is from 0.268-0.293 mW/cm^2.

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.

Description	Error
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 60 cm to the antenna, 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.

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 34cm (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 60 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); Calibration date: 4/14/03

c) E-Field (Electric Field) Probe - NARDA Model 8722B (13001);

Calibration date: 5/6/03

d) Antennas - (1/4 wave 0dB antennas)

9.0 Test Unit Description

Power density measurements were performed on a 25 watts mobile radio; model number PMUE2003A serial number 18182D36. The frequency band of the mobile was 403-440 MHz; the test frequencies were 403.025, 413.500, and 430.000, and 439.975 MHz. The ¼ wave 0dB mobile antennas listed in section 2.0 were used to assess MPE compliance.

10.0 Test Set-Up Description

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

a) ¼ wave antenna models HAE4002A, RAE4151A, and TAE6053A mounted on the center of the roof and trunk.

11.0 Test Results

Measurements were taken with the antenna located in two areas: the roof center, and trunk center. 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 represents the highest MPE results observed.

Raw MPE Data; Test Frequencies and measured Po (W):
403.025 MHz (Po=27.40), 413.500 MHz (Po=27.4), 430.000 MHz (Po=26.8) 439.975 MHz (Po=26.9)
Meter reads in % of controlled limit; controlled limit = 1.46-1.57 mW/cm^2 for f/300
(Cal factors presented herein are automatically accounted for in the meter used for assessments)
General Population MPE limits = 0.268-0.293 mW/cm^2 / 1.6mW/g (Bystanders & Passengers)
External Vehicle Power Density (Pwr. Den. (cal.)) = average over body/2
Internal Vehicle Power Density (Pwr. Den. (cal.)) = average over (head/chest/leg)/2

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

Table 1

External Vehicle MPE Assessment @ 403.025 MHz									
Antenna Location	**Antenna Model**	**Gain (dBd)**	**Meas. Distance (cm)**	**E/H Field**	**Calib. Factor**	**Average over Body (mW/cm^2)**	**Intial Power (W)**	**Pwr. Density cal (mW/cm^2)**	**Pwr. Density max cal (mW/cm^2)**
Trunk (cnt)	HAE4002A/RAE4151 A	0	60	E	0.97	0.276	27.4	0.14	0.14
Measurement grid									
Test Position	**Height (cm)**	**% of Control Limit**	**Test Position**	**Height (cm)**	**% of Control Limit**			IEEE Controlled Limit	IEEE Uncontrolled Limit
1	20	7.5%	6	120	39.0%			1.343	0.269
2	40	5.5%	7	140	28.0%				
3	60	12.5%	8	160	22.0%				
4	80	22.0%	9	180	19.0%				
5	100	36.0%	10	200	14.0%				

Table 2.

Internal Vehicle MPE Assessment @ 403.025 MHz										
Antenna Location	**Antenna**	**Gain (dBd)**	**Meas. Distance (cm)**	**E/H Field**	**Calib. Factor**	**Average over Head, Chest, Lower trunk Back/Front seats (mW/cm^2)**		**Intial Power (W)**	**Pwr. Density cal (mW/cm^2)**	**Pwr. Density max cal (mW/cm^2)**
						Back	**Front**			
Trunk (cnt)	HAE4002A/RAE4151 A	0	Highest Reading	E	0.97	0.376	0.143	27.4	0.19	0.19
Measured grid										
Test Position		**% of control limit Head**		**% of control limit Chest**		**% of control limit Lower Trunk**		IEEE Controlled Limit:		1.343
Back Seat		35.0%		24.0%		25.0%		IEEE Uncontrolled Limit:		0.269
Front Seat		19.0%		7.0%		6.0%				

Table 3

External Vehicle MPE Assessment @ 413.5MHz									
Antenna Location	**Antenna Model**	**Gain (dBd)**	**Meas. Distance (cm)**	**E/H Field**	**Calib. Factor**	**Average over Body (mW/cm^2)**	**Intial Power (W)**	**Pwr. Density cal (mW/cm^2)**	**Pwr. Density max cal (mW/cm^2)**
Trunk (cnt)	HAE4002A/RAE4151 A	0	60	E	0.96	0.303	27.4	0.15	0.15
Measurement grid									
Test Position	**Height (cm)**	**% of Control Limit**	**Test Position**	**Height (cm)**	**% of Control Limit**			IEEE Controlled Limit	IEEE Uncontrolled Limit
1	20	7.0%	6	120	48.0%			1.378	0.276
2	40	4.0%	7	140	38.0%				
3	60	10.0%	8	160	21.0%				
4	80	24.0%	9	180	16.0%				
5	100	40.0%	10	200	12.0%				

Table 4

Internal Vehicle MPE Assessment @ 413.5MHz										
Antenna Location	**Antenna**	**Gain (dBd)**	**Meas. Distance (cm)**	**E/H Field**	**Calib. Factor**	**Average over Head, Chest, Lower trunk Back/Front seats (mW/cm^2)**		**Intial Power (W)**	**Pwr. Density cal (mW/cm^2)**	**Pwr. Density max cal (mW/cm^2)**
						Back	**Front**			
Trunk (cnt)	HAE4002A/RAE4151 A	0	Highest Reading	E	0.96	0.326	0.138	27.4	0.16	0.17
Measured grid										
Test Position		**% of control limit Head**		**% of control limit Chest**		**% of control limit Lower Trunk**		IEEE Controlled Limit:		1.378
Back Seat		31.0%		25.0%		15.0%		IEEE Uncontrolled Limit:		0.276
Front Seat		18.0%		5.0%		7.0%				

Table 5

External Vehicle MPE Assessment @ 430 MHz									
Antenna Location	**Antenna Model**	**Gain (dBd)**	**Meas. Distance (cm)**	**E/H Field**	**Calib. Factor**	**Average over Body (mW/cm^2)**	**Intial Power (W)**	**Pwr. Density cal (mW/cm^2)**	**Pwr. Density max cal (mW/cm^2)**
Trunk (cnt)	HAE4002A/RAE4151 A	0	60	E	0.96	0.231	26.8	0.12	0.12
Measurement grid									
Test Position	**Height (cm)**	**% of Control Limit**	**Test Position**	**Height (cm)**	**% of Control Limit**			IEEE Controlled Limit	IEEE Uncontrolled Limit
1	20	4.5%	6	120	32.0%			1.433	0.287
2	40	2.5%	7	140	24.0%				
3	60	8.0%	8	160	19.0%				
4	80	17.0%	9	180	13.0%				
5	100	29.0%	10	200	12.0%				

Table 6

Internal Vehicle MPE Assessment @ 430 MHz										
Antenna Location	**Antenna**	**Gain (dBd)**	**Meas. Distance (cm)**	**E/H Field**	**Calib. Factor**	**Average over Head, Chest, Lower trunk Back/Front seats (mW/cm^2)**		**Intial Power (W)**	**Pwr. Density cal (mW/cm^2)**	**Pwr. Density max cal (mW/cm^2)**
						Back	**Front**			
Trunk (cnt)	HAE4002A/RAE4151 A	0	Highest Reading	E	0.96	0.459	0.205	26.8	**0.23**	**0.24**
Measured grid										
Test Position		**% of control limit Head**		**% of control limit Chest**		**% of control limit Lower Trunk**		IEEE Controlled Limit:		1.433
Back Seat		50.0%		30.0%		16.0%		IEEE Uncontrolled Limit:		0.287
Front Seat		23.0%		12.0%		8.0%				

Table 7

External Vehicle MPE Assessment @ 430 MHz									
Antenna Location	**Antenna Model**	**Gain (dBd)**	**Meas. Distance (cm)**	**E/H Field**	**Calib. Factor**	**Average over Body (mW/cm^2)**	**Intial Power (W)**	**Pwr. Density cal (mW/cm^2)**	**Pwr. Density max cal (mW/cm^2)**
Trunk (cnt)	TAE6053A	0	60	E	0.96	0.261	26.8	0.13	0.14
Measurement grid									
Test Position	**Height (cm)**	**% of Control Limit**	**Test Position**	**Height (cm)**	**% of Control Limit**			IEEE Controlled Limit	IEEE Uncontrolled Limit
1	20	6.0%	6	120	38.0%			1.433	0.287
2	40	2.0%	7	140	31.0%				
3	60	8.0%	8	160	20.0%				
4	80	16.0%	9	180	16.0%				
5	100	31.0%	10	200	14.0%				

Table 8

Internal Vehicle MPE Assessment @ 430 MHz										
Antenna Location	**Antenna**	**Gain (dBd)**	**Meas. Distance (cm)**	**E/H Field**	**Calib. Factor**	**Average over Head, Chest, Lower trunk Back/Front seats (mW/cm^2)**		**Intial Power (W)**	**Pwr. Density cal (mW/cm^2)**	**Pwr. Density max cal (mW/cm^2)**
						Back	**Front**			
Trunk (cnt)	TAE6053A	0	Highest Reading	E	0.96	0.435	0.201	26.8	0.22	0.23
Measured grid										
Test Position		**% of control limit Head**		**% of control limit Chest**		**% of control limit Lower Trunk**		IEEE Controlled Limit:		1.433
Back Seat		39.0%		40.0%		12.0%		IEEE Uncontrolled Limit:		0.287
Front Seat		18.0%		15.0%		9.0%				

Table 9

External Vehicle MPE Assessment @ 439.975MHz									
Antenna Location	**Antenna Model**	**Gain (dBd)**	**Meas. Distance (cm)**	**E/H Field**	**Calib. Factor**	**Average over Body (mW/cm^2)**	**Intial Power (W)**	**Pwr. Density cal (mW/cm^2)**	**Pwr. Density max cal (mW/cm^2)**
Trunk (cnt)	TAE6053A	0	60	E	0.95	0.205	26.9	0.10	0.11
Measurement grid									
Test Position	**Height (cm)**	**% of Control Limit**		**Test Position**	**Height (cm)**	**% of Control Limit**		IEEE Controlled Limit	IEEE Uncontrolled Limit
1	20	6.5%		6	120	30.0%		1.467	0.293
2	40	3.0%		7	140	21.0%			
3	60	6.0%		8	160	13.0%			
4	80	11.0%		9	180	10.0%			
5	100	30.0%		10	200	9.0%			

Table 10

Internal Vehicle MPE Assessment @ 439.975MHz										
Antenna Location	**Antenna**	**Gain (dBd)**	**Meas. Distance (cm)**	**E/H Field**	**Calib. Factor**	**Average over Head, Chest, Lower trunk Back/Front seats (mW/cm^2)**		**Intial Power (W)**	**Pwr. Density cal (mW/cm^2)**	**Pwr. Density max cal (mW/cm^2)**
						Back	**Front**			
Trunk (cnt)	TAE6053A	0	Highest Reading	E	0.95	0.401	0.259	26.9	0.20	0.21
Measured grid										
Test Position		**% of control limit Head**		**% of control limit Chest**		**% of control limit Lower Trunk**		IEEE Controlled Limit:		1.467
Back Seat		44.0%		26.0%		12.0%		IEEE Uncontrolled Limit:		0.293
Front Seat		18.0%		30.0%		5.0%				

Table 11

External Vehicle MPE Assessment @ 413.5MHz (45° radial)									
Antenna Location	**Antenna Model**	**Gain (dBd)**	**Meas. Distance (cm)**	**E/H Field**	**Calib. Factor**	**Average over Body (mW/cm^2)**	**Intial Power (W)**	**Pwr. Density cal (mW/cm^2)**	**Pwr. Density max cal (mW/cm^2)**
Trunk (cnt)	HAE4002A/RAE4151A	0	99.5	E	0.96	0.172	27.4	0.09	0.09
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	22.0%		1.378	0.276
2	40	4.0%		7	140	18.0%			
3	60	10.5%		8	160	14.0%			
4	80	15.5%		9	180	10.0%			
5	100	20.0%		10	200	8.0%			

Table 12

External Vehicle MPE Assessment @ 413.5MHz (90° radial)									
Antenna Location	**Antenna Model**	**Gain (dBd)**	**Meas. Distance (cm)**	**E/H Field**	**Calib. Factor**	**Average over Body (mW/cm^2)**	**Intial Power (W)**	**Pwr. Density cal (mW/cm^2)**	**Pwr. Density max cal (mW/cm^2)**
Trunk (cnt)	HAE4002A/RAE4151A	0	104	E	0.96	0.150	27.4	0.08	0.08
Measurement grid									
Test Position	**Height (cm)**	**% of Control Limit**		**Test Position**	**Height (cm)**	**% of Control Limit**		IEEE Controlled Limit	IEEE Uncontrolled Limit
1	20	5.0%		6	120	16.0%		1.378	0.276
2	40	5.0%		7	140	17.0%			
3	60	7.0%		8	160	15.0%			
4	80	9.0%		9	180	13.0%			
5	100	12.0%		10	200	10.0%			

Table 13

External Vehicle MPE Assessment @ 403.025MHz									
Antenna Location	**Antenna Model**	**Gain (dBd)**	**Meas. Distance (cm)**	**E/H Field**	**Calib. Factor**	**Average over Body (mW/cm^2)**	**Intial Power (W)**	**Pwr. Density cal (mW/cm^2)**	**Pwr. Density max cal (mW/cm^2)**
Roof (cnt)	HAE4002A/RAE4151 A	0	110	E	0.97	0.122	27.4	0.06	0.06
Measurement grid									
Test Position	**Height (cm)**	**% of Control Limit**	**Test Position**	**Height (cm)**	**% of Control Limit**			IEEE Controlled Limit	IEEE Uncontrolled Limit
1	20	0.0%	6	120	8.5%			1.343	0.269
2	40	0.0%	7	140	13.0%				
3	60	1.5%	8	160	18.0%				
4	80	3.0%	9	180	21.0%				
5	100	6.0%	10	200	20.0%				

Table 14

Internal Vehicle MPE Assessment @ 403.025MHz										
Antenna Location	**Antenna**	**Gain (dBd)**	**Meas. Distance (cm)**	**E/H Field**	**Calib. Factor**	**Average over Head, Chest, Lower trunk Back/Front seats (mW/cm^2)**		**Intial Power (W)**	**Pwr. Density cal (mW/cm^2)**	**Pwr. Density max cal (mW/cm^2)**
						Back	**Front**			
Roof (cnt)	HAE4002A/RAE4151 A	0	Highest Reading	E	0.97	0.067	0.058	27.4	0.03	0.03
Measured grid										
Test Position		**% of control limit Head**		**% of control limit Chest**		**% of control limit Lower Trunk**		IEEE Controlled Limit:		1.343
Back Seat		5.0%		6.0%		4.0%		IEEE Uncontrolled Limit:		0.269
Front Seat		3.0%		6.0%		4.0%				

Table 15

External Vehicle MPE Assessment @ 413.5MHz									
Antenna Location	**Antenna Model**	**Gain (dBd)**	**Meas. Distance (cm)**	**E/H Field**	**Calib. Factor**	**Average over Body (mW/cm^2)**	**Intial Power (W)**	**Pwr. Density cal (mW/cm^2)**	**Pwr. Density max cal (mW/cm^2)**
Roof (cnt)	HAE4002A/RAE4151 A	0	110	E	0.96	0.111	27.4	0.06	0.06
Measurement grid									
Test Position	**Height (cm)**	**% of Control Limit**	**Test Position**	**Height (cm)**	**% of Control Limit**			IEEE Controlled Limit	IEEE Uncontrolled Limit
1	20	0.5%	6	120	8.0%			1.378	0.276
2	40	0.5%	7	140	12.0%				
3	60	1.5%	8	160	16.0%				
4	80	3.0%	9	180	16.0%				
5	100	6.0%	10	200	17.0%				

Table 16

Internal Vehicle MPE Assessment @ 413.5MHz										
Antenna Location	**Antenna**	**Gain (dBd)**	**Meas. Distance (cm)**	**E/H Field**	**Calib. Factor**	**Average over Head, Chest, Lower trunk Back/Front seats (mW/cm^2)**		**Intial Power (W)**	**Pwr. Density cal (mW/cm^2)**	**Pwr. Density max cal (mW/cm^2)**
						Back	**Front**			
Roof (cnt)	HAE4002A/RAE4151 A	0	Highest Reading	E	0.96	0.064	0.069	27.4	0.03	0.04
Measured grid										
Test Position		**% of control limit Head**		**% of control limit Chest**		**% of control limit Lower Trunk**		IEEE Controlled Limit:		1.378
Back Seat		4.0%		6.0%		4.0%		IEEE Uncontrolled Limit:		0.276
Front Seat		5.0%		3.0%		7.0%				

Table 17

External Vehicle MPE Assessment @ 430 MHz									
Antenna Location	**Antenna Model**	**Gain (dBd)**	**Meas. Distance (cm)**	**E/H Field**	**Calib. Factor**	**Average over Body (mW/cm^2)**	**Intial Power (W)**	**Pwr. Density cal (mW/cm^2)**	**Pwr. Density max cal (mW/cm^2)**
Roof (cnt)	HAE4002A/RAE4151 A	0	110	E	0.96	0.101	26.8	0.05	0.05
Measurement grid									
Test Position	**Height (cm)**	**% of Control Limit**	**Test Position**	**Height (cm)**	**% of Control Limit**			IEEE Controlled Limit	IEEE Uncontrolled Limit
1	20	0.0%	6	120	6.5%			1.433	0.287
2	40	0.0%	7	140	9.0%				
3	60	1.7%	8	160	14.0%				
4	80	4.5%	9	180	15.0%				
5	100	6.0%	10	200	13.5%				

Table 18

Internal Vehicle MPE Assessment @ 430 MHz										
Antenna Location	**Antenna**	**Gain (dBd)**	**Meas. Distance (cm)**	**E/H Field**	**Calib. Factor**	**Average over Head, Chest, Lower trunk Back/Front seats (mW/cm^2)**		**Intial Power (W)**	**Pwr. Density cal (mW/cm^2)**	**Pwr. Density max cal (mW/cm^2)**
						Back	**Front**			
Roof (cnt)	HAE4002A/RAE4151 A	0	Highest Reading	E	0.96	0.124	0.072	26.8	0.06	0.06
Measured grid										
Test Position		**% of control limit Head**		**% of control limit Chest**		**% of control limit Lower Trunk**		IEEE Controlled Limit:		1.433
Back Seat		6.0%		13.0%		7.0%		IEEE Uncontrolled Limit:		0.287
Front Seat		3.0%		4.0%		8.0%				

Table 19

External Vehicle MPE Assessment @ 430 MHz									
Antenna Location	**Antenna Model**	**Gain (dBd)**	**Meas. Distance (cm)**	**E/H Field**	**Calib. Factor**	**Average over Body (mW/cm^2)**	**Intial Power (W)**	**Pwr. Density cal (mW/cm^2)**	**Pwr. Density max cal (mW/cm^2)**
Roof (cnt)	TAE6053A	0	110	E	0.96	0.106	26.8	0.05	0.06
Measurement grid									
Test Position	**Height (cm)**	**% of Control Limit**		**Test Position**	**Height (cm)**	**% of Control Limit**		IEEE Controlled Limit	IEEE Uncontrolled Limit
1	20	0.0%		6	120	7.0%		1.433	0.287
2	40	0.0%		7	140	10.0%			
3	60	1.7%		8	160	14.0%			
4	80	5.0%		9	180	15.0%			
5	100	7.0%		10	200	14.0%			

Table 20

Internal Vehicle MPE Assessment @ 430 MHz										
Antenna Location	**Antenna**	**Gain (dBd)**	**Meas. Distance (cm)**	**E/H Field**	**Calib. Factor**	**Average over Head, Chest, Lower trunk Back/Front seats (mW/cm^2)**		**Intial Power (W)**	**Pwr. Density cal (mW/cm^2)**	**Pwr. Density max cal (mW/cm^2)**
						Back	**Front**			
Roof (cnt)	TAE6053A	0	Highest Reading	E	0.96	0.191	0.072	26.8	0.10	0.10
Measured grid										
Test Position		**% of control limit Head**		**% of control limit Chest**		**% of control limit Lower Trunk**		IEEE Controlled Limit:		1.433
Back Seat		7.0%		21.0%		12.0%		IEEE Uncontrolled Limit:		0.287
Front Seat		3.0%		5.0%		7.0%				

Table 21

External Vehicle MPE Assessment @ 439.975MHz									
Antenna Location	**Antenna Model**	**Gain (dBd)**	**Meas. Distance (cm)**	**E/H Field**	**Calib. Factor**	**Average over Body (mW/cm^2)**	**Intial Power (W)**	**Pwr. Density cal (mW/cm^2)**	**Pwr. Density max cal (mW/cm^2)**
Roof (cnt)	TAE6053A	0	110	E	0.95	0.103	26.9	0.05	0.05
Measurement grid									
Test Position	**Height (cm)**	**% of Control Limit**		**Test Position**	**Height (cm)**	**% of Control Limit**		IEEE Controlled Limit	IEEE Uncontrolled Limit
1	20	0.0%		6	120	6.0%		1.467	0.293
2	40	1.0%		7	140	10.0%			
3	60	2.5%		8	160	14.0%			
4	80	4.0%		9	180	15.0%			
5	100	5.0%		10	200	13.0%			

Table 22

Internal Vehicle MPE Assessment @ 439.975MHz										
Antenna Location	**Antenna**	**Gain (dBd)**	**Meas. Distance (cm)**	**E/H Field**	**Calib. Factor**	**Average over Head, Chest, Lower trunk Back/Front seats (mW/cm^2)**		**Intial Power (W)**	**Pwr. Density cal (mW/cm^2)**	**Pwr. Density max cal (mW/cm^2)**
						Back	**Front**			
Roof (cnt)	TAE6053A	0	Highest Reading	E	0.95	0.100	0.056	26.9	0.05	0.05
Measured grid										
Test Position		**% of control limit Head**		**% of control limit Chest**		**% of control limit Lower Trunk**		IEEE Controlled Limit:		1.467
Back Seat		4.5%		10.0%		6.0%		IEEE Uncontrolled Limit:		0.293
Front Seat		2.0%		4.5%		5.0%				

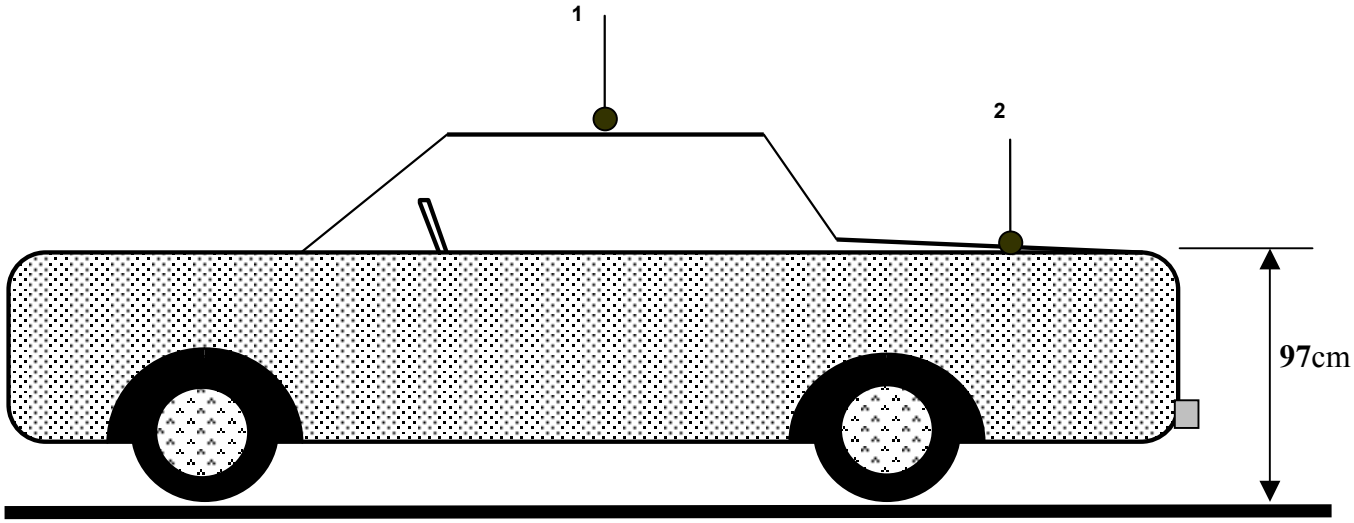
12.0 Conclusion

Depending on the test frequency, compliance assessments were performed with an output power range of 26.8W to 27.4W. The maximum RF power allowable will be equal to the upper limit of the final test factory transmit power specification of 28W. The highest power density result scaled to the maximum allowable power output is 0.24mW/cm^2.

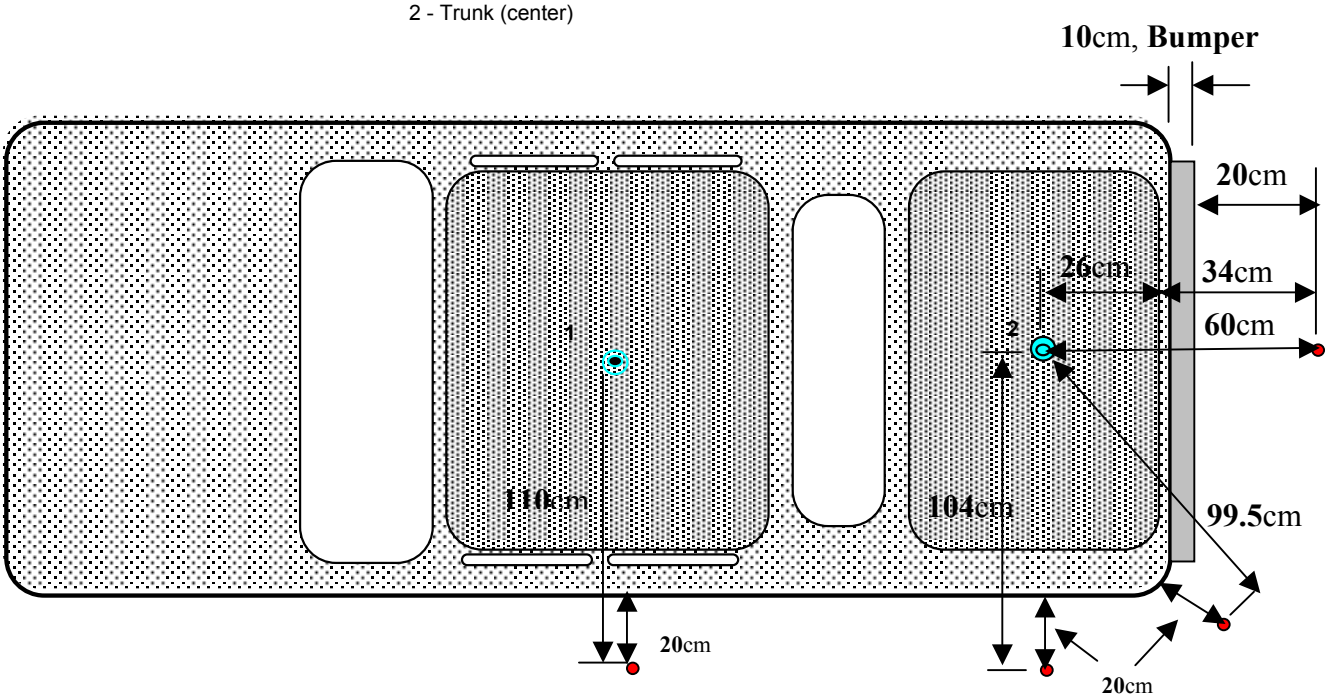
The measurement results clearly demonstrate compliance with the FCC limits (frequency/1500 = 0.268-0.293 mW/cm^2 for the frequency band of 403-440 MHz) Per 47 CFR 2.1091(d) for General Population/Uncontrolled RF Exposure

APPENDIX A

Antenna Location Drawing with Test Locations Identified



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



Note: ● Test Locations