



MOTOROLA

COMMERCIAL, GOVERNMENT, AND INDUSTRIAL
SOLUTION SECTOR (CGISS)

ELECTROMAGNETIC EXPOSURE (EME)
TESTING LABORATORY

M.P.E. TEST REPORT

Original Issue Date: August 11, 1999

Re-Issue Date: October 22, 1999

Prepared by

Kim Uong, Lead Engineer

Environmental Evaluation for General Population/Uncontrolled RF Exposure Limits - Pursuant 47 CFR 2.1091 (b)

1.0 FCC Limits Per 47 CFR 2.1091 (b) for General Population/Uncontrolled RF Exposure

MPE (Maximum Permissible Exposure) in Uncontrolled Environments. For human exposure in uncontrolled environments to electromagnetic energy at radio frequencies from 806 - 821 MHz, the MPE, in terms of rms electric (E) field strength, the equivalent plane wave free-space power density that can be associated with exposure to such fields is 0.54 mW/cm².

1.1 GENERAL INFORMATION

FCC ID: AZ489FT5797

Device category: Mobile radio

RF exposure environment: Uncontrolled

Test method: Power Density Measurement

1.2 ANTENNA DECSRIPTION

Antenna Kit #	Antenna Desc.	Antenna Gain	Antenna Length (cm)
HAF9067A	Roof Mount	3dB	33.6
FAD5524A	Window Mount	3dB	33.8
RAF4136AMM	Magnetic Mount	3dB	20

2.0 Data Collection Consideration

Power density testing was performed with unit installed in a 1991 Ford Taurus (4-door). Measurement data was taken with vehicle running at idle and vehicle battery measuring 14.4 volts.

3.0 Test Results

Measurements were taken with radio operated in 6:1 mode TDMA, and the antenna located in four areas: the roof center, top center window, top center trunk and center trunk. A summary of results (highest level in each area) is in the following table.

<u>Antenna Location</u>	<u>Antenna</u>	<u>External/Internal</u>	<u>Highest Result</u>
Roof Center	HAF9067A	External	0.004 mW/cm ²
Top Center Window	FAD5524A	External	0.003 mW/cm ²
Center Trunk	HAF9067A	External	0.003 mW/cm ²
Roof Center	HAF9067A	Internal	0.002 mW/cm ²
Top Center Window	FAD5524A	Internal	0.0007 mW/cm ²
Top Center Trunk	RAF4136AMM	Internal	0.002 mW/cm ²

Although the measured RF power of this radio was 0.543 watts pulse average, under any condition of permissible tuning, frequency, voltage, and temperature, the maximum RF power delivered to the antenna connector of this radio can be as high as 0.4725 watts frame average in data packet mode. As a result, the calculated power density (mW/cm²) for the maximum power condition using the highest power density in the above table could be 0.021 mW/cm².

4.0 Measurement System Uncertainty Levels

Table 1.4 below lists 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	± 3%

5.0 Method of Measurement

5.1 EME MEASUREMENTS MADE ON CENTER ROOF MOUNTED ANTENNAS
(for reference, see Antenna Location Layout drawings in Appendix)

5.1.1 EXTERNAL VEHICLE EME MEASUREMENT

With the survey meter and probe, take ten (10) measurements, at the standard test distance of 20 cm, towards the side 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 next to a vehicle during a mobile radio transmission.

5.1.2 INTERNAL VEHICLE EME MEASUREMENT

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

5.2 EME MEASUREMENTS MADE ON WINDOW GLASS MOUNTED ANTENNAS
(for reference, see Antenna Location Layout drawings in Appendix)

5.2.1 EXTERNAL VEHICLE EME MEASUREMENT

With the survey meter and probe, take ten (10) measurements, at the standard test distance of 20 cm, towards the side 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 next to a vehicle during a mobile radio transmission.

5.2.2 INTERNAL VEHICLE EME MEASUREMENT

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

5.3 EME MEASUREMENTS MADE ON TRUNK MOUNTED ANTENNAS (for reference, see Antenna Location Layout drawings in Appendix)

5.3.1 EXTERNAL VEHICLE EME MEASUREMENT (Antenna mounted in trunk center)

With the survey meter and probe, take ten (10) measurements, at the standard test distance of 20 cm, towards 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 next to a vehicle during a mobile radio transmission.

5.3.2 INTERNAL VEHICLE EME MEASUREMENT (Antenna mounted at top center trunk)

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

6.0 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.

7.0 Measurement System/Equipment

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

Below is the specific equipment currently in use by CGISS:

- a) Automobile: 1991 Ford Taurus, 4-Door
- b) Survey Meter - NARDA Model 8718
- c) E-Field (Electric Field) Probe - NARDA Model 8722B (300 kHz - 40 Ghz)
- d) Antenna - (3 dB Gain)

8.0 Test Unit Description

Power density measurements were performed on an iDEN 800 MHz 6:1(16.67%), 3:1(33.3%), Data Packet (67.5%) mode 0.6 watt TDMA pulse average power mobile radio; model number F2582A and serial number 284SZNDJ25. The frequency band of the radio was 806 - 821 MHz; the test frequency was 813.5625 MHz, and the test mode was 6:1 (16.67%) TDMA. The mobile antennas used were 3 dB gain.

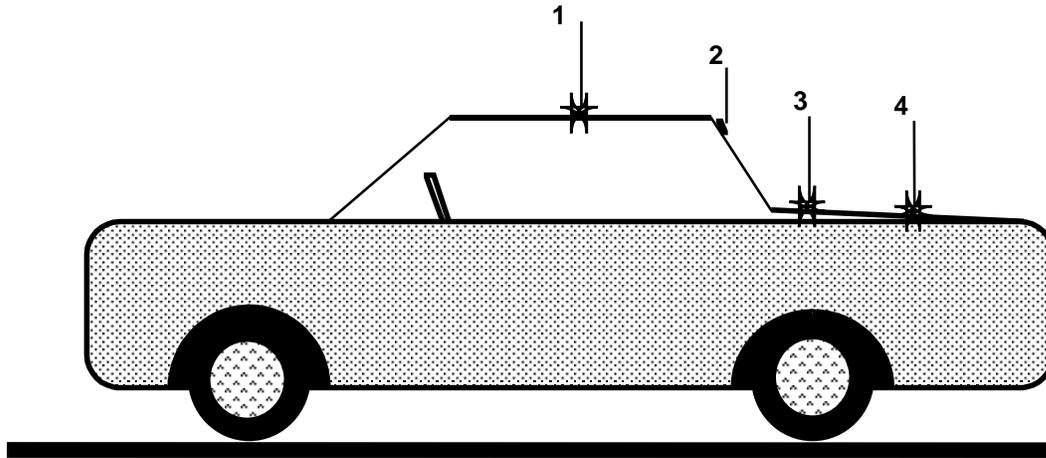
9.0 Test Set-Up Description

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

- a) 3dB gain antenna, HAF9067A, mounted in the center of the roof.
- b) 3dB gain antenna, FAD5524A, mounted in the top center of the window (window glass mounted).
- c) 3dB gain antennas, HAF9067A & RAF4136AMM, mounted in the center of the trunk.
- d) 3dB gain antennas, HAF9067A & RAF4136AMM, mounted in the top center of the trunk for internal vehicle EME measurements only.

APPENDIX

ANTENNA LOCATION DRAWING



- 1 - Roof
- 2 - Glass window
- 3 - Trunk lip mount
- 4 - Trunk

