MOTOROLA

ACCREDITED

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

EME Compliance Test Report

Attention:	Federal Communication Commission
Date of Report:	July 17, 2002
Report Revision(s):	Rev. O – Initial release Rev. A – Removed references to equivalent S.A.R
Device Manufacturer:	Motorola
Device Description:	CDM1550 LS 1-25 watts Mobile Radio 217-222 MHz Preferred Trunked mini-UHF
Classification:	General Population/Uncontrolled Exposure
FCC ID:	ABZ99FT3081
Device Model:	PMUD1765A

Test Period: 4/29/02

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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.

/s/ Ken Enger — 7/18/02

Senior Resource Manager, Product Safety and EME Director — Date Approved

1.0 Description of Test Sample

The CDM1550 LS, model PMUD1765A is a mobile transceiver that operates on trunked LTR (a transmission based trunking protocol for single site trunking) and Passport systems (an enhanced trunking protocol for wide area dispatch) as well as on conventional (single channel unit to unit communications) radio systems. The intended use of the radio is Push-To-Talk (PTT) while the device is properly installed in a vehicle with an external antenna mounted at the center of the roof or trunk.

The transmit frequency band for the CDM1550 LS is 217-222 MHz. The rated power of the device is 1 to 25 watts with a maximum conducted power output of 30 watts.

2.0 Applicable accessories offered with the CDM1550 LS model PMUD1765A are presented below.

Antenna

HKAD4001A 216-225 MHz ¼ wave whip
HKAD4002A 216-225 MHz 5/8 wave whip

3.0 Measurement Standards

Measurements were performed according to FCC Limits Per 47 CFR 2.1091 (b) for General Population/Uncontrolled RF Exposure.

For frequencies ranging from 217-222 MHz the MPE (Maximum Permissible Exposure) limit to electromagnetic energy in equivalent plane wave free-space power density is 0.20 mW/cm^2.

4.0 Data Collection Consideration

Power density testing was performed with EUT 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 Test Results

Measurements were taken with the antenna located in two areas: the roof center, and trunk center. A summary of the highest power density levels measured in each area is provided in the following table. Also presented below is a table of the raw MPE data for all measured grid points. Results are based on a 50% duty cycle applicable to informed and aware users operating this radio in accordance with the User Manual instructions.

Antenna Location	Antenna	External/ Internal	Highest Result
Roof Center	HKAD4001A	External	0.076 mW/cm^2 (E field)
Trunk Center	HKAD4001A	External	0.178 mW/cm^2 (E field)
Roof Center	HKAD4001A	Internal	0.069 mW/cm^2
Trunk Center	HKAD4001A HKAD4002A	Internal	0.170 mW/cm^2

Raw MPE Data; Test Frequency = 219.500 MHz
Meter reads in % of controlled limit; controlled limit = 1.0 for 30-300MHz
External Vehicle spec. limits = 0.20 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/leg)/2

External Vehicle Measurements (mW/cm^2)

Antenna Type: HKAD4001A, 1/4 wave		Mounted: Roof center			**Length:**	**32.5 cm**
Power Density E/H (mW/cm^2) over body @ 60 cm; 110 cm actual					Comments	
1 (20 cm):	0%	6 (120 cm):	17%	**Average Pwr. Den (%)**	Meter Model:	8718 (01122)
2 (40 cm):	0%	7 (140 cm):	20%	**15.1**	Probe Model:	8722B (12023)
3 (60 cm):	3%	8 (160 cm):	26%		Calib. Factor:	0.95
4 (80 cm):	8%	9 (180 cm):	30%	**Power Density (mW/cm^2)**	E/H-Field:	E
5 (100 cm):	14%	10 (200 cm):	33%	**0.151**	**Pwr. Den. (cal.):**	0.076

Antenna Type: HKAD4001A, 1/4 wave		Mounted: Roof center			**Length:**	**32.5 cm**
Power Density E/H (mW/cm^2) over body @ 60 cm; 110 cm actual					Comments	
1 (20 cm):	0	6 (120 cm):	0.075	**Average Pwr. Den (%)**	Meter Model:	8616 (11126)
2 (40 cm):	0.025	7 (140 cm):	0.12	**0.098**	Probe Model:	8631 (02012)
3 (60 cm):	0.03	8 (160 cm):	0.195		Calib. Factor:	0.95
4 (80 cm):	0.035	9 (180 cm):	0.22	**Power Density (mW/cm^2)**	E/H-Field:	H
5 (100 cm):	0.06	10 (200 cm):	0.22	**0.098 * 0.95 = 0.093**	**Pwr. Den. (cal.):**	0.047

External Vehicle Measurements (mW/cm^2))

Antenna Type: HKAD4001A, 1/4 wave		Mounted: Trunk center			**Length:**	**32.5 cm**
Power Density E/H (mW/cm^2) over body @ 60 cm; 110 cm actual					Comments	
1 (20 cm):	3.00%	6 (120 cm):	70.00%	**Average Pwr. Den (%)**	Meter Model:	8718 (01122)
2 (40 cm):	7.00%	7 (140 cm):	58.00%	**35.40**	Probe Model:	8722B (12023)
3 (60 cm):	20.00%	8 (160 cm):	42.00%		Calib. Factor:	0.95
4 (80 cm):	47.00%	9 (180 cm):	26.00%	**Power Density (mW/cm^2)**	E/H-Field:	E
5 (100 cm):	65.00%	10 (200 cm):	16.00%	**0.354**	**Pwr. Den. (cal.):**	**0.178**

Antenna Type: HKAD4002A, 3dB gain wave		Mounted: Trunk center			**Length:**	**76.5 cm**
Power Density E/H (mW/cm^2) over body @ 60 cm					Comments	
1 (20 cm):	2.00%	6 (120 cm):	52.00%	**Average Pwr. Den (%)**	Meter Model:	8718 (01122)
2 (40 cm):	4.00%	7 (140 cm):	59.00%	**30.5**	Probe Model:	8722B (12023)
3 (60 cm):	6.00%	8 (160 cm):	59.00%		Calib. Factor:	0.95
4 (80 cm):	14.00%	9 (180 cm):	43.00%	**Power Density (mW/cm^2)**	E/H-Field:	E
5 (100 cm):	41.00%	10 (200 cm):	25.00%	**0.305**	**Pwr. Den. (cal.):**	0.153

Antenna Type:	HKAD4001A, 1/4 wave		Mounted:	Trunk (cnt)	**Length:**	**32.5 cm**
Power Density E/H (mW/cm^2) over body @ 60 cm					Comments	
1 (20 cm):	0.03	6 (120 cm):	0.65	**Average Pwr. Den (%)**	Meter Model:	8616 (11126)
2 (40 cm):	0.08	7 (140 cm):	0.50	**0.304**	Probe Model:	8631 (02012)
3 (60 cm):	0.13	8 (160 cm):	0.35		Calib. Factor:	0.95
4 (80 cm):	0.35	9 (180 cm):	0.25	**Power Density (mW/cm^2)**	E/H-Field:	H
5 (100 cm):	0.55	10 (200 cm):	0.15	**0.304 * 0.95 = 0.289**	**Pwr. Den. (cal.):**	0.14

Raw MPE Data continued

Antenna Type: HKAD4002A, 3dB gain wave		Mounted: Trunk center			Length:	76.5 cm
Power Density E/H (mW/cm^2) over body @ 60 cm					Comments	
1 (20 cm):	0.01	6 (120 cm):	0.50	**Average Pwr. Den (%)**	Meter Model:	8616 (11126)
2 (40 cm):	0.04	7 (140 cm):	0.67	**0.287**	Probe Model:	8631 (02012)
3 (60 cm):	0.08	8 (160 cm):	0.60		Calib. Factor:	0.95
4 (80 cm):	0.09	9 (180 cm):	0.40	**Power Density (mW/cm^2)**	E/H-Field:	H
5 (100 cm):	0.23	10 (200 cm):	0.25	**0.287 * 0.95 = 0.273**	**Pwr. Den. (cal.):**	0.136

Internal Vehicle Measurements (mW/cm^2)

E-Field:	HKAD4001A, 1/4 wave		Mounted	Trunk center	**Length:**	**32.5 cm**
Back Seat	Hd: 50%	Ch: 37%	Leg: 15%	**Avg = 34% = 0.34**	**Pwr. Den. (cal.):**	0.17
Front Seat	Hd: 20 %	Ch: 14%	Leg: 18%	**Avg = 17.3% = 0.173**	**Pwr. Den. (cal.):**	0.087
E-Field:	HKAD4002A, 3dB gain wave		Mounted	Trunk center	Length	76.5 cm
Back Seat	Hd:40%	Ch: 23%	Leg:15%	**Avg = 26% = 0.26**	**Pwr. Den. (cal.):**	0.13
Front Seat	Hd:8%	Ch: 10%	Leg: 13%	**Avg = 10.3% = 0.103**	**Pwr. Den. (cal.):**	0.052
H-Field:	HKAD4001A, 1/4 wave		Mounted	Trunk center	**Length:**	**32.5 cm**
Back Seat	Hd: 0.3	Ch: 0.15	Leg: 0.10	**Avg = 0.18**	**Pwr. Den. (cal.):**	0.09
Front Seat	Hd: 0.15	Ch: 0.15	Leg: 0.15	**Avg = 0.15**	**Pwr. Den. (cal.):**	0.075
H-Field:	HKAD4002A, 3dB gain wave		Mounted	Trunk center	**Length:**	**76.5 cm**
Back Seat	Hd: 0.22	Ch: 0.09	Leg: 0.06	**Avg = 0.12**	**Pwr. Den. (cal.):**	0.06
Front Seat	Hd: 0.09	Ch: 0.065	Leg: 0.08	**Avg = 0.08**	**Pwr. Den. (cal.):**	0.04

Internal Vehicle Measurements (mW/cm^2)

E-Field:	HKAD4001A, 1/4 wave		Mounted	Roof center	**Length:**	**32.5 cm**
Back Seat	Hd: 17%	Ch: 14%	Leg: 6%	**Avg. = 12.3% = 0.123**	**Pwr. Den. (cal.):**	0.062
Front Seat	Hd: 15%	Ch: 10%	Leg: 16%	**Avg. = 13.7% = 0.137**	**Pwr. Den. (cal.):**	0.069
H-Field:	HKAD4001A, 1/4 wave		Mounted	Roof center	**Length:**	**32.5 cm**
Back Seat	Hd: 0.075	Ch: 0.045	Leg: 0.015	**Avg = 0.045**	**Pwr. Den. (cal.):**	0.023
Front Seat	Hd: 0.055	Ch: 0.03	Leg: 0.035	**Avg = 0.040**	**Pwr. Den. (cal.):**	0.02

6.0 Conclusion

Although the measured RF power of this radio was 28.2 watts, 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 30 watts. As a result, the calculated power density (mW/cm^2) for the maximum power condition using the highest power density in the above table could be 0.183 mW/cm^2.
The measurement results clearly demonstrate compliance with the FCC Limits Per 47 CFR 2.1091 (b) for General Population/Uncontrolled RF Exposure.

7.0 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%**

8.0 Method of Measurement

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

8.1.1 EXTERNAL VEHICLE EME MEASUREMENT

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; this is the closest distance that can be achieved to a center roof mounted antenna.

8.1.2 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

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

8.2.1 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 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.

8.2.2 INTERNAL VEHICLE EME MEASUREMENT
(Antenna mounted in 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

9.0 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.

10.0 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 Probe, H-Field Test Probe 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

Calibration due date: 10/10/02

c) E-Field (Electric Field) Probe - NARDA Model 8722B (300 kHz - 40 Ghz)

Calibration due date: 10/11/02

d) H-Field Survey Meter – NARDA Model 8616

Calibration due date: 12/12/02

e) H-Field (Magnetic field) Probe – NARDA Model 8631

Calibration due date: 5/22/02

f) Antennas - (1/4 and 5/8 wave)

11.0 Test Unit Description

Power density measurements were performed on a 1-25 watt mobile radio; model number PMUD1765A and serial number XD7VW00U. The frequency band of the mobile was 217-222 MHz; the test frequencies were 219.5 MHz. The ¼ wave 0dB gain and the 5/8 wave 3dB gain mobile antenna were used to assess MPE compliance.

12.0 Test Set-Up Description

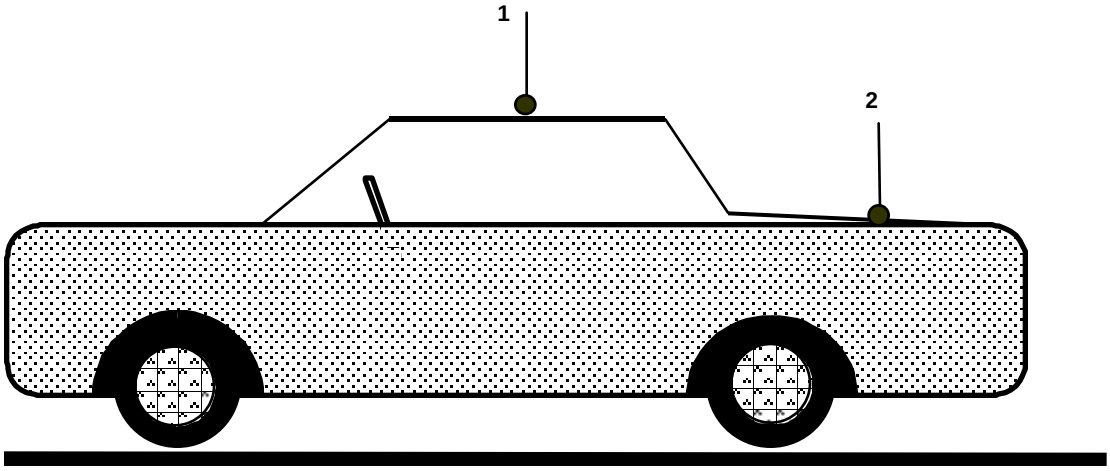
Following are the standard mobile antenna test configurations used for this product. (for reference, see Antenna Location Layout drawings in Appendix)

a) ¼ wave antenna, model HKAD4001A, mounted in the center of the roof.

b) ¼ wave antenna model HKAD4001A, and a 5/8 wave antenna model HKAD4002A mounted in the center of the trunk.

APPENDIX

ANTENNA LOCATION DRAWING



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