



May 5, 2003

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FCC RF EXPOSURE EXHIBIT

PART 1.1310 ENVIRONMENTAL ASSESSMENT FOR A MOBILE TRANSMITTER

849 NW State Road 45 • P. O. Box 370 • Newberry, Florida 32669 USA
Telephone (352) 472-5500 • (888) 472-2424 • FAX (352) 472-2030 • email: info@timcoengr.com



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1. TEST REPORT INFORMATION

- a) Laboratory:
Timco Engineering, Inc
849 N.W. State Road 45
Newberry, Florida 32669
- b) FCC Correspondence Reference Number: 7355
- c) Client:
Midland Radio Company
1120 Clay Street
North Kansas City, MO 64116
- d) Identification: FCC ID: MMA700671A
- e) Description: 30-36 MHz Transceiver
- f) EUT Condition: Not required unless specified in individual tests.
- g) Report Date: May 5, 2003
- h) EUT Received: April 28, 2003
- i) Sampling method: No sampling procedure used.
- j) Uncertainty: In accordance with Timco's internal quality manual.
- k) Test results: The results presented in this report relate only to the item tested.
- l) Reproduction: This report must not be reproduced, except in full, without written permission from this laboratory.



2. IDENTIFICATION OF THE EQUIPMENT UNDER TEST

NAME AND ADDRESS OF APPLICANT:

Midland Radio Corporation
1120 Clay Street
North Kansas City, MO 64116

MANUFACTURER: Applicant

FCC ID: MMA700671A

MODEL NO: 70-0671A

DESCRIPTION: 30-36 MHz Transceiver

TYPE OF EMISSION: 15K0F3E

FREQUENCY RANGE, MHz: 30 to 36 MHz

POWER RATING, Watts: Maximum Conducted 130 Watts

Switchable or Variable: N/A

MODULATION: Frequency Modulation

ANTENNA: Midland Radio Resonant Mobile Whip Antenna ID: 18327C
With 15 feet of RG 58U. Attenuation at 30 MHz:
Nominal Value: 1.8 dB/100 feet. (typical antenna for this radio)

NOTE: RF Power set to highest output across all probe readings/heights.



3. STANDARD TEST CONDITIONS

Except as noted herein, the following conditions and procedures were observed during the testing:

In accordance with ANSI C63.4-1992/2000, section 6.1.9, and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10 to 40 degrees C (50 to 104 degrees F) unless the particular equipment requirements specify testing over a different temperature range.

Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Prior to testing, the EUT was tuned up in accordance with the manufacturer's alignment procedures. All external gain controls were maintained at the position of maximum and/or optimum gain throughout the testing.

Measurement results, unless otherwise noted, are worst-case measurements.

Temperature: 89.5°F

Humidity: 51%

4. PART 1.1310 ENVIRONMENTAL ASSESSMENT

Specification: FCC: 47 CFR 1.1310

Measurement Guide: ANSI/IEEE C95.1 1992

Test Equipment: Maximum Permissible Exposure (MPE)
measurement system, consisting of:

Amplifier Research Model FM-5004

Amplifier Research, Isotropic Field Probe Model FP-5000
10 kHz – 1000 MHz

Bird Wattmeter Model 43 (with 25-60 MHz, 100 Watt slug)



Measurement Procedure:

1. The following measurements were performed with an Amplifier Research Field Probe using ANSI/IEEE C95.1 as a guide.
2. Prior to making any measurements, the measurements system was calibrated in accordance with the manufacturer's procedures.
3. The EUT's radiating element (antenna) was placed on a 1996 Ford Contour roof. The approximate height from ground level to the top of the roofline was measured at 142 cm. The vertical whip antenna was mounted in a typical operational manner, namely the center of the Ford roof.
4. The remaining equipment necessary to operate the EUT was maintained at a distance from the measurement arrangement suitable to minimize interference with the measurements.
5. The minimum safe distance was calculated from the formula $\text{Power Density} = \text{EIRP} / 4\pi R^2$ (Peak Watts/m²). The calculation is shown with the measurement data.
6. With the EUT operating at maximum power, a search was initiated for worst case emissions with the probe raised and lowered over a range of the Ford roof line to 2 meters in height and over a horizontal plane of 0 to 360 degrees. Worst case emissions were found to be at point perpendicular from the antenna base to the center of the vehicle door. Readings were equivalent for both driver side and passenger side.
7. Bird Wattmeter/Antenna measurements: 130 Watts conducted into a 50 Ohm

Results follow:

FCC Rules: 1.1307, 1.1310, 2.1091

Description, EUT: Midland Model 70-0671A Transceiver

Test Frequency, MHz = 34 MHz.

Antenna Gain = 0 dBd

Antenna Model: Midland Radio Resonant Mobile Whip Antenna 18327C

Rated Probe: Amplifier Research FM-5004 Probe



LIMITS: Uncontrolled Exposure 47 CFR 1.1310

0.3-1.234 MHz: Limit [mW/cm²] = 100

1.34-30 MHz: Limit [mW/cm²] = (180/f²)

30-300 MHz: Limit [mW/cm²] = 0.2

300-1500 MHz Limit [mW/cm²] = f/1500

1500-100,000 MHz: Limit [mW/cm²] = 1.0

Power, measured @ 50% Duty Cycle = 65 Watts in 50 Ohm

Limit: Uncontrolled Exposure = 0.2 mW/cm²

Tested Distance: 94 cm from antenna base

Probe Height: 0 cm corresponds to roofline.

Results: at tested distance of 94 cm and 130Watts conducted output power

Probe Height(cm)	Evolts	E ² Volts	E ² / 1.2p	Pd mW/cm ²	Pd/2* mW/cm ² (50% DCCF)
120	27.1	734.41	194.5353889	0.194535389	0.097268
100	23.5	552.25	146.2836406	0.146283641	0.073142
80	23.9	571.21	151.3058911	0.151305891	0.075653
60	25.5	650.25	172.2425302	0.172242530	0.086121
40	29.3	858.49	227.4025217	0.227402522	0.113701
20	34.1	1162.81	308.0128205	0.308012821	0.154006
0	37.3	1391.29	368.5341174	0.368534117	0.184267
	Distance 94 cm.		Maximum Pd	0.37	0.18

* 50% Operational Duty Cycle Correction Factor

Conclusion: The installation of a 0 dBd vertically mounted antenna at a separation distance of 94cm meets the maximum permissible exposure limits as set forth in IEEE C95.1 and FCC OET Bulletin 65.

TEST ENGINEER: Frank De Nuzzo

SUPERVISED BY: Bruno Clavier



5. STATEMENT OF COMPLIANCE

This is to declare:

1. THAT the report was prepared either by, and/or under the direct supervision of, the undersigned staff.
2. THAT the data was obtained on representative units, randomly selected.
4. THAT, to the best of our knowledge and belief, the facts set forth in this report and accompanying technical data are true and correct.

TEST ENGINEER: Frank De Nuzzo

SUPERVISING ENGINEER: Bruno Clavier