

FCC PART 95
EMI MEASUREMENT AND TEST REPORT

For

Midland Radio Corporation

1120 Clay Street
North Kansas City, MO 64116

FCC ID: MMA77321

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| This Report Concerns: <input checked="" type="checkbox"/> Permissive Class II Change Report | Equipment Type: Transceiver, CB Radio with Weather Alert |
| Test Engineer: Oscar Au/ Snell Leong |  |
| Report Number: R0602063 | |
| Report Date: 2006-02-17 | |
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Note: The test report is specially limited to the use of the above client company and the product model only. It may not be duplicated without prior written consent of Bay Area Compliance Laboratory Corporation. This report **must not** be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the U.S. Government.

TABLE OF CONTENTS

GENERAL INFORMATION.....3

- PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)3
- OBJECTIVE3
- RELATED GRANT/SUBMISSION.....3
- TEST METHODOLOGY3
- TEST FACILITY4

SYSTEM TEST CONFIGURATION.....5

- JUSTIFICATION5
- EUT TEST CONFIGURATION.....5
- SPECIAL ACCESSORIES.....5
- SCHEMATICS / BLOCK DIAGRAM.....5
- EQUIPMENT MODIFICATIONS5
- TEST SETUP BLOCK DIAGRAM.....5

REQUIREMENTS OF PROVISIONS6

§2.1053, §95.635(B)(1), §95.635(B)(3), §95.635(B)(8) AND §95.635(B)(9) - RADIATED EMISSION.....7

- STANDARD APPLICABLE7
- TEST PROCEDURE7
- TEST EQUIPMENT.....7
- ENVIRONMENTAL CONDITIONS8
- TEST RESULT AT 3 METER8

GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Midland Radio Corporation*'s product, FCC ID: *MMA77321*, Model: *77-321* or the "EUT" as referred to in this report is a transceiver, CB radio with weather alert. The EUT was composed of two parts, the radio part, which measures approximately 155mmL x 90mmW x 20mmH and the head unit part, which measures approximately 250mmL x 212mmW x 65mmH.

The EUT operates at the frequency range of 26.965 – 27.405 MHz, maximum output power 3.98W, frequency tolerance 0.0007% and emission designator 6K00A3E.

* *The test data gathered are from production sample, serial number: #1, provided by the manufacturer.*

Objective

This report is prepared on behalf of *Midland Radio Corporation* in accordance with Part 95 Subpart D and Subpart E of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules for effective radiated power, modulation characteristics, occupied bandwidth, radiated spurious emissions, AC line conducted emissions and frequency stability.

This is Permissive Class II Change report. The changes are described as following:

| Old circuit | New circuit |
|--|---|
| Audio through L26 to C179@1000pF | Audio through R60@4.7k ohms to C179 @ 4700pF |
| From there through L25 and R135 @ 0 ohms | From there through R135 @ 4.7k ohms |
| To AM and FM modulator inputs C92 and R120 | To C77 @ 0.1 uF to gnd and R62 @ 470 Ohms to gnd. |
| | To AM and FM modulator inputs C92 and R120 |

The new circuit reduces the input level received from the head unit and provides some roll-off of high frequency noise. Testing in the field indicated that the overall microphone gain was too high causing noise pickup and reduced intelligibility. The deleted inductors were intended to guaranty EMC and static discharge compliance. The resistors that were substituted provide the same protection.

The Radiated Emission Test was re-tested due to the changes above. For detail information, please refer to BACL Midland Radio Corporation Test report R0503081.

Related Grant/Submission

For detail information, please refer to BACL Midland Radio Corporation Test report R0503081. The original grant was granted on 2005-04-15.

Test Methodology

Measurements contained in this report were also conducted with TIA/EIA 603A, Telecommunications Industry Association Land Mobile AM Communications Equipment Measurement and Performance Standards.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by BACL to collect radiated and conducted emission measurement data is located in the chamber of the building at 1274 Anvilwood Ave., Sunnyvale, California 94089, USA.

Test site at BACL has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC registration number: 90464 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200367-0). The current scope of accreditations can be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm>

SYSTEM TEST CONFIGURATION

Justification

The EUT was tested according to TIA/EIA 603A to represent the worst-case results during the final qualification test.

EUT Test Configuration

The EUT was powered and fully operated by pushing buttons on the headset which controls the CB radio.

Special Accessories

As shown in following test block diagram setup, interface cable used for compliance testing is shielded as normally supplied by customer and its respective support equipment manufacturers.

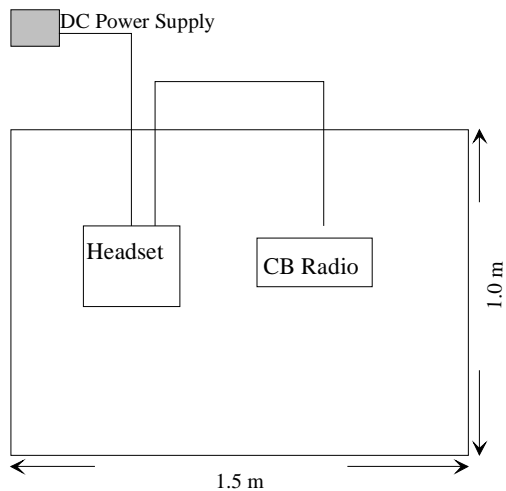
Schematics / Block Diagram

Please refer to Appendix D.

Equipment Modifications

No modifications were made to the EUT.

Test Setup Block Diagram



REQUIREMENTS OF PROVISIONS

Results reported relate only to the product tested, serial number: #1.

| FCC Rules | Rules Description | Requirement | Result |
|---|---|--------------------------------------|----------|
| 2.1046 95.639 (c) (1) | Conducted Output Power | 4W | N/A |
| 2.1047 95.637 (d) 95.637 (c) | Modulation Characteristics A3E analog device Audio Frequency Response Modulation Limiting Over Modulation Transient Response | 85% < Amplitude Modulation < 100% | N/A |
| 2.1049 95.633 (a) | Occupied Bandwidth | 8KHz | N/A |
| §2.1053 §95.635(b)(1) §95.635(b)(3) §95.635(b)(8) §95.635(b)(9) | Spurious Radiation | Worst Case < -23dBm | Complied |
| 95.635(a) 2.1053 (a) | Spurious Emission at Antenna Port | Complied | N/A |
| 2.1055 95.625 (b) | Frequency Stability Vs. Temperature Vs. Voltage | < 0.005% | N/A |

§2.1053, §95.635(b)(1), §95.635(b)(3), §95.635(b)(8) and §95.635(b)(9) - RADIATED EMISSION

Standard Applicable

According to FCC §2.1053, measurements shall be made to detect spurious emission that may be radiated directly from the cabinet, control circuits, power leads, or intermediated circuit elements under normal condition of installation and operation. Information submitted shall include the relative radiated power of spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from a half wave dipole antenna.

According to FCC §95.635(b)(1), at least 25 dB (decibels) on any frequency removed from the center of the authorized bandwidth by more than 50% up to and including 100% of the authorized bandwidth.

According to FCC §95.635(b)(3), at least 35 dB on any frequency removed from the center of the authorized bandwidth by more than 100% up to and including 250% of the authorized bandwidth.

According to FCC §95.635(b)(8), at least $53 + 10 \log_{10}(T)$ dB on any frequency removed from the center of the authorized bandwidth by more than 250%.

According to FCC §95.635(b)(9), at least 60 dB on any frequency twice or greater than twice the fundamental frequency.

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Test Equipment

| Manufacturer | Description | Model | Serial Number | Cal. Date |
|---------------------|--------------------|-------------------|----------------------|------------------|
| Sunol | Antenna, Bi-log | JB1 | A013105-3 | 2005-2-11 |
| R&S | Receiver, EMI Test | ESCI 1166.5950K03 | 100044 | 2005-12-29 |
| Com-Power | Antenna, Dipole | AD-100 | 2219 | 2005-09-26 |
| R&S | Generator, Signal | SMIQ03 | DE23746 | 2005-07-03 |

* **Statement of Traceability: BACL Corp.** certifies that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Environmental Conditions

| | |
|--------------------|-----------|
| Temperature: | 19 °C |
| Relative Humidity: | 45% |
| ATM Pressure: | 1013 mbar |

The testing was performed by Oscar Au on 2006-02-14.

Test Result At 3 meter

Worst Case readings:

-10.9 dB at 650.00 MHz in the Horizontal polarization

Run # 1: Primary scan. 10 - 2000MHz. At 3 meter

| Frequency | Reading | Direction | Height | Polar | SG output power | Cable Loss | Corrected factor | FCC Part 95 | FCC Part 95 |
|-----------|---------|-----------|--------|-------|-----------------|------------|------------------|-------------|-------------|
| MHz | dBuV | Degree | Meter | H / V | dBm | dB | dB | Limit(dBm) | Margin (dB) |
| 26.94 | | | | | | | | | |
| 26.94 | | | | | | | | | |
| 650.00 | 40.8 | 320 | 2.0 | H | -35.6 | 1.7 | -33.9 | -23 | -10.9 |
| 620.20 | 42.0 | 320 | 2.0 | H | -36.5 | 1.5 | -35.0 | -23 | -12.0 |
| 350.00 | 41.5 | 220 | 2.0 | H | -38.1 | 1.8 | -36.3 | -23 | -12.3 |
| 350.00 | 40.6 | 140 | 2.0 | V | -39.6 | 1.8 | -37.8 | -23 | -13.8 |
| 620.20 | 39.8 | 360 | 2.2 | V | -39.4 | 1.5 | -37.9 | -23 | -14.9 |
| 323.50 | 41.5 | 160 | 2.4 | V | -39.8 | 1.0 | -38.8 | -23 | -15.8 |
| 650.00 | 34.3 | 290 | 1.8 | V | -41.0 | 1.7 | -39.3 | -23 | -16.3 |
| 377.50 | 39.3 | 220 | 1.5 | H | -41.5 | 1.1 | -40.4 | -23 | -17.4 |
| 377.50 | 37.6 | 160 | 1.3 | V | -42.3 | 1.1 | -41.2 | -23 | -18.2 |
| 323.50 | 39.0 | 60 | 2.2 | H | -44.4 | 1.0 | -43.4 | -23 | -20.4 |
| 296.60 | 34.7 | 120 | 2.0 | V | -48.5 | 1.0 | -47.5 | -23 | -24.5 |
| 296.60 | 34.2 | 210 | 2.1 | H | -48.7 | 1.0 | -47.7 | -23 | -24.7 |
| 53.89 | 39.3 | 0 | 1.0 | V | -48.7 | 0.4 | -48.3 | -23 | -25.3 |
| 80.87 | 32.0 | 80 | 2.0 | H | -54.2 | 1.0 | -53.2 | -23 | -30.2 |
| 80.87 | 35.2 | 0 | 1.0 | V | -55.1 | 1.0 | -54.1 | -23 | -31.1 |
| 53.89 | 28.6 | 0 | 2.8 | H | -59.0 | 0.4 | -58.6 | -23 | -35.6 |

Note: No preamplifier used.