



Engineering and Testing for EMC and Safety Compliance

Test Report

DoC for a Class B digital device

MODEL: Jaguar 725M Mobile Radio

Prepared for:

M/A COM Private Radio Systems, Inc.

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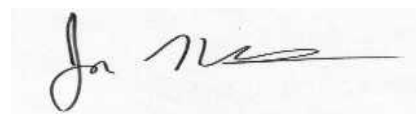
Report Prepared by: Daniel Biggs

Report Number: 2002162-002

Radiated and Conducted Emissions Conformance Statement

We, the undersigned, hereby state that the proper standards and procedures were followed as detailed in this test record. Furthermore, we attest that the data contained within this report is accurate and concise within the bounds of the standards and our company procedures. There were no modifications made to the equipment under test in order to achieve compliance with these standards. Furthermore, there was no deviation from, additions to or exclusions from the ANSI C63.4 test methodology.

Signature:



Title:

Test Engineer

EMC Lab Coordinator
(NVLAP Signatory)

Date:

October 22, 2002

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October 22, 2002

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Accredited by the National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under laboratory code 200061-0

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TABLE OF CONTENTS

1	GENERAL INFORMATION.....	4
1.1	EXECUTIVE SUMMARY.....	4
1.2	TEST FACILITY INFORMATION	4
1.3	CLIENT RESPONSIBILITIES	4
1.4	PRODUCT LABELING	5
1.4.1	<i>DoC LABEL</i>	5
1.4.2	<i>Location of Label on EUT (To be provided by manufacturer)</i>	5
2	SYSTEM TEST CONFIGURATION.....	6
2.1	TESTED CONFIGURATION.....	6
2.1.1	<i>System Components Table</i>	6
2.1.2	<i>Test Configuration Diagram</i>	6
2.2	MODIFICATIONS TO EUT	6
3	TEST RESULTS	7
3.1	AMENDMENTS TO EMISSIONS TEST METHODOLOGY	7
3.1.1	<i>Deviations from Test Methodology</i>	7
3.2	RADIATED EMISSIONS MEASUREMENTS	7
3.2.1	<i>Site and Test Description</i>	7
3.2.2	<i>Field Strength Calculations</i>	8
3.2.3	<i>Measurement Uncertainty</i>	9
3.2.4	<i>Test Limits</i>	9
3.2.5	<i>Radiated Emissions Data</i>	9
4	TEST PHOTOGRAPHS	10
5	TEST EQUIPMENT USED	12

1 General Information

1.1 Executive Summary

The following DoC of a Class B Digital Device is prepared on behalf of M/A COM Private Radio Systems, Inc. in accordance with the rules of the Federal Communications Commission (47 CFR 15).

This report covers testing for the **725M Mobile Radio**. All testing was performed on September 19, 2002.

All equipment configurations and measurements contained in this report were performed in accordance with the revision of the standards listed in this report. Also, the instrumentation and facilities utilized for the measurements conform to all appropriate standards. Calibration checks are performed regularly on all test equipment by a local calibration lab, with traceability to the National Institute of Standards and Technology (NIST).

1.2 Test Facility Information

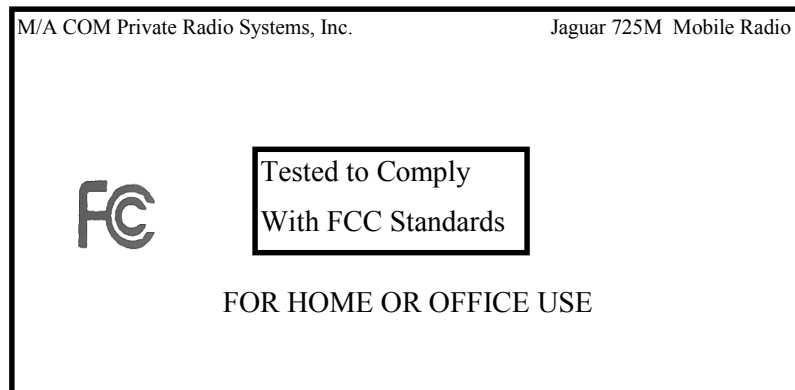
All radiated and conducted emission measurements were performed manually at Rhein Tech Laboratories, Inc. The radiated emissions measurements required by the rules were performed on an open area test site (OATS) maintained by Rhein Tech Laboratories, Inc., 360 Herndon Parkway, Suite 1400, Herndon, VA, USA. Complete site descriptions and site attenuation measurement data have been placed on file with the Federal Communications Commission (FCC) and can be made available upon request.

1.3 Client Responsibilities

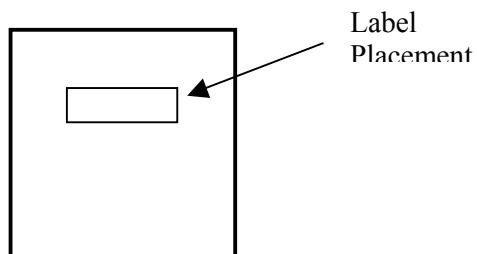
It is the responsibility of M/A COM Private Radio Systems, Inc. to supply Rhein Tech Laboratories, Inc. with the information necessary to complete the documentation. This information includes, but is not limited to, the user's manual, EUT schematics, etc.

1.4 Product Labeling

1.4.1 DoC LABEL



1.4.2 Location of Label on EUT (To be provided by manufacturer)



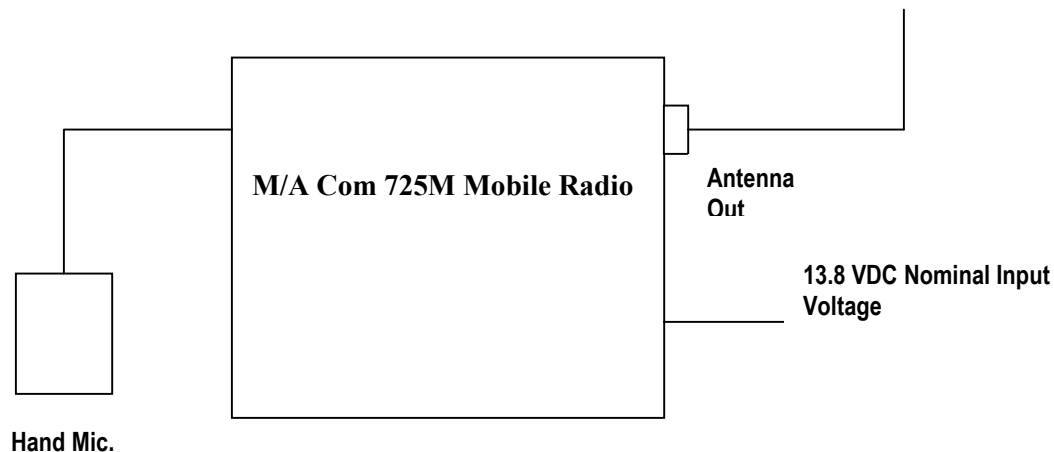
2 System Test Configuration

2.1 Tested Configuration

2.1.1 System Components Table

PART	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID	BAR CODE
725M UHF Mobile Radio	M/A COM PRIVATE RADIO SYSTEMS, INC.	RU101188V31 R2A	9798396	OWDTR-0012-E	14722
Hand Microphone	M/A COM PRIVATE RADIO SYSTEMS, INC.	344A4528P55	N/A	N/A	013698

2.1.2 Test Configuration Diagram



2.2 Modifications to EUT

There were no modifications made to the EUT before or during testing.

3 Test Results

3.1 Amendments to Emissions Test Methodology

3.1.1 Deviations from Test Methodology

There was no deviation from, additions to, or exclusions from, ANSI C63.4:1992.

3.2 Radiated Emissions Measurements

3.2.1 Site and Test Description

Before final radiated emissions measurements were made on the OATS, the EUT was scanned indoors at both one and three meter distances. This was done in order to determine its emission spectrum signal. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. This process was repeated during final radiated emission measurements on the OATS, at each frequency, in order to ensure that maximum emission amplitudes were measured.

Final radiated emissions measurements were made on the OATS at a distance of 3 meters. The EUT was placed on a nonconductive turntable at a height of 1m.

At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the emissions maximum levels. Measurements were taken using both horizontal and vertical antenna polarization. The spectrum analyzer's 6 dB bandwidth was set to 120 kHz, and the analyzer was operated in the quasi-peak detection mode. No video filter less than 10 times the resolution bandwidth was used. The highest emission amplitudes relative to the appropriate limit were measured and recorded in this report.

3.2.2 Field Strength Calculations

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FI(dB\mu V / m) = SAR(dB\mu V) + SCF(dB / m)$$

FI=Field Intensity

SAR=Spectrum Analyzer Reading

SCF=Site Correction Factor

The Site Correction Factor (SCF) used in the above equation is determined empirically, and is expressed in the following equation:

$$SCF(dB / m) = -PG(dB) + AF(dB / m) + CL(dB)$$

SCF=Site Correction Factor

PG=Pre-Amplifier Gain

AF=Antenna Factor

CL=Cable Loss

The field intensity in microvolts per meter can then be determined according to the following equation:

$$FI(\mu V / m) = 10^{FI(dB\mu V / m) / 20}$$

For example, assume a signal frequency of 125 MHz has a received level measured as 49.3 dBuV. The total Site Correction Factor (antenna factor plus cable loss minus preamplifier gain) for 125 MHz is -11.5 dB/m. The actual radiated field strength is calculated as follows:

$$49.3dB\mu V - 11.5dB / m = 37.8dB\mu V / m$$

$$10^{37.8 / 20} = 10^{1.89} = 77.6\mu V / m$$

3.2.3 Measurement Uncertainty

Rhein Tech Laboratories, Inc. has implemented procedures to minimize errors that occur from test instruments, calibration, procedures, and test setups. Test instrument and calibration errors are documented from the manufacturer or calibration lab. Other errors have been defined and calculated within the Rhein Tech quality manual, section 6.1. Rhein Tech implements the following procedures to minimize errors that may occur: yearly as well as daily calibration methods, technician training, and emphasis to employees on avoiding error.

3.2.4 Test Limits

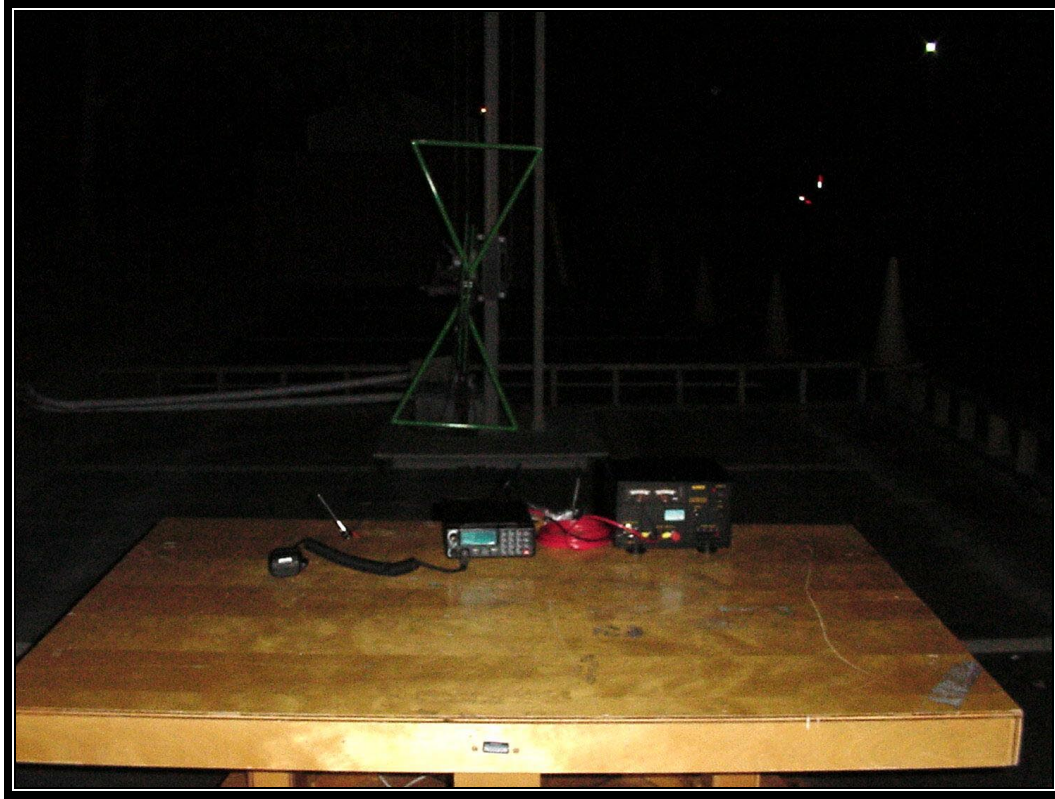
FCC Class B Radiated Emissions	
Frequency (MHz)	At 3m (dBμV/m)
30-88	40.0
88-216	43.5
216-960	46.0
> 1000	54.0

3.2.5 Radiated Emissions Data

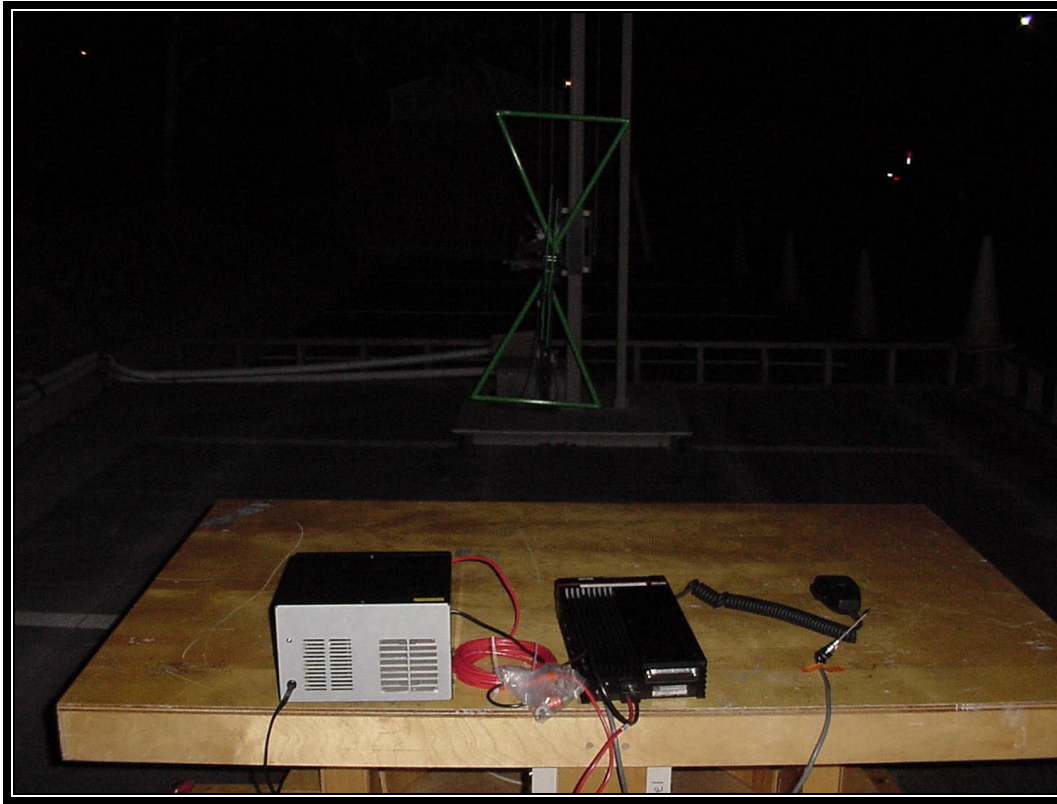
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
86.030	Qp	H	145	1.0	41.5	-9.4	32.1	40.0	-7.9
116.946	Qp	H	180	1.0	36.7	-9.2	27.5	43.5	-16.0
287.000	Qp	V	145	1.0	34.8	-9.7	25.1	46.0	-20.9
309.658	Qp	V	45	1.0	36.8	-9.5	27.3	46.0	-18.7
320.700	Qp	V	90	1.0	35.2	-9.4	25.8	46.0	-20.2
332.100	Qp	V	145	1.0	33.6	-9.4	24.2	46.0	-21.8
786.788	Qp	V	0	1.0	36.5	-6.0	30.5	46.0	-15.5

**All readings are quasi-peak unless, stated otherwise.*

4 Test Photographs



Photograph 1: Radiated Front View



Photograph 2: Radiated Rear View

5 Test Equipment Used

RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER	CALIBRATION DUE
900901	Hewlett Packard	85650A	Quasi-Peak Adapter (30 Hz – 40 GHz)	3145A01599	11/09/02
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz – 22 GHz)	3138A07771	05/10/03
901053	Schaffner –Chase	CBL6112B	Bilog Chase antenna (200 MHz – 2 GHz)	2648	06/17/03
900930	Hewlett Packard	85662A	Spectrum Analyzer Display	3144A20839	05/10/03
900268	Taylor	5565	Hygrometer / Thermometer	N/A	09/17/03
900339	Hewlett Packard	85650A	Quasi peak adapter	2521A00743	04/10/03
900970	Hewlett Packard	85662A	Spectrum Analyzer Display	2542A11239	04/10/03
900968	Hewlett Packard	8567A	Spectrum Analyzer	2602A00160	04/10/03