



Engineering and Testing for EMC and Safety Compliance

CLASS II PERMISSIVE CHANGE REPORT

FCC PART 90

AMCO Automated Systems, LLC
107 Erskine Lane
Scott Depot, WV 25560

MODEL: Mini-Mobile Interrogator

FCC ID: G8JMMI01

July 7, 2004

Standards Referenced for this Report	
Part 2: 2003	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
Part 15: 2003	Radio frequency devices - §15.109: Radiated Emissions Limits
Part 90: 2003	Private Land Mobile Radio Services
ANSI C63.4-2001	Standard Format Measurement/Technical Report Personal Computer and Peripherals

Frequency Range	Output Power (W) Conducted	Frequency Tolerance (ppm)	Emission Designator
450-460	7.44	5	6K00A3D

REPORT PREPARED BY TEST ENGINEER: Daniel Baltzell

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1 GENERAL INFORMATION

The following Permissive Change Report is prepared on behalf of AMCO Automated Systems, LLC in accordance with the Federal Communications Commission's Rules and Regulations. The Equipment Under Test (EUT) was Model: MINI-MOBILE INTERROGATOR; FCC ID: G8JMMI01. The test results reported in this document relate only to the item that was tested.

All measurements contained in this application were conducted in accordance with FCC Rules, and ANSI C63.4 Methods of Measurement of Radio Noise Emissions, 2001. The instrumentation utilized for the measurements conforms to the ANSI C63.4 standard for EMI and Field Strength Instrumentation. Calibration checks are performed regularly on the instruments, and all accessories including high pass filter, coaxial attenuator, preamplifier and cables.

1.1 TEST FACILITY

The open area test site and conducted measurement facility used to collect the radiated data is located on the parking lot of Rhein Tech Laboratories, Inc. 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. This site has been fully described in a report dated March 3, 2000, submitted to and approved by the Federal Communications Commission to perform AC line conducted and radiated emissions testing (ANSI C63.4 2001).

1.2 RELATED SUBMITTAL(S)/GRANT(S)

This is a Class II Permissive Change application per FCC Part 2.1043(b)(2). The change is a new enclosure. The original circuitry and PCB have not changed since the original certification.

2 CONFORMANCE STATEMENT

STANDARDS REFERENCED FOR THIS REPORT	
PART 2: 2003	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS
PART 15: 2003	RADIO FREQUENCY DEVICES - §15.109: RADIATED EMISSIONS LIMITS
PART 90: 2003	PRIVATE LAND MOBILE RADIO SERVICES
ANSI C63.4-2001	STANDARD FORMAT MEASUREMENT/TECHNICAL REPORT PERSONAL COMPUTER AND PERIPHERALS

Frequency Range	Output Power (W) Conducted	Frequency Tolerance (ppm)	Emission Designator
450-460	7.44	5	6K00A3D

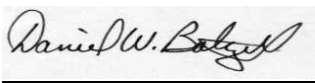
We, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described in this attached test record. There was no deviation from, additions to, or exclusions from, the above standards for Certification methodology. In order to achieve compliance with digital emissions during testing, a FerriShield ferrite clamp P/N CS28B1805 was added to the rear +5V Power Supply Line.

Signature: 

Date: July 7, 2004

Typed/Printed Name: Desmond Fraser

Position: President

Signature: 

Date: July 7, 2004

Typed/Printed Name: Daniel Baltzell

Position: Test Engineer



Accredited by the National Voluntary Accreditation Program for the specific scope of accreditation under Lab Code 200061-0.

Note: This report may not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

3 TESTED SYSTEM DETAILS

The test equipment was received on July 6, 2004. Listed below are the identifiers and descriptions of all equipment, cables, and internal devices used with the EUT for this test, as applicable. A FerriShield Ferrite clamp P/N CS28B1805 was added to the rear +5V Power Supply Line to pass digital emissions.

TABLE 3-1: EQUIPMENT UNDER TEST (EUT)

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO.	FCC ID	CABLE DESCRIPTIONS	RTL BAR CODE
Mini-Mobile Interrogator	AMCO Automated Systems, LLC	Mini-Mobile Interrogator	0000350	G8JMMI01	3m unshielded power	16046
Whip Antenna	MaxRad	MUFL	N/A	N/A	0.73 m shielded I/O	16042
Controller	AMCO Automated Systems, LLC	TouchGraf	274465	N/A	1m unshielded I/O	16044
GPS	Garmin	35-HVS	7195394	N/A	5m shielded I/O	16045

TABLE 3-2: AUXILIARY TEST EQUIPMENT

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO.	FCC ID	CABLE DESCRIPTIONS	RTL BAR CODE
Termination	Bird Electronic Corp.	8141	4005	N/A	1m shielded I/O	900714
DC Power Supply	Radio Shack	22-506	900176	N/A	2m Unshielded Power	16043

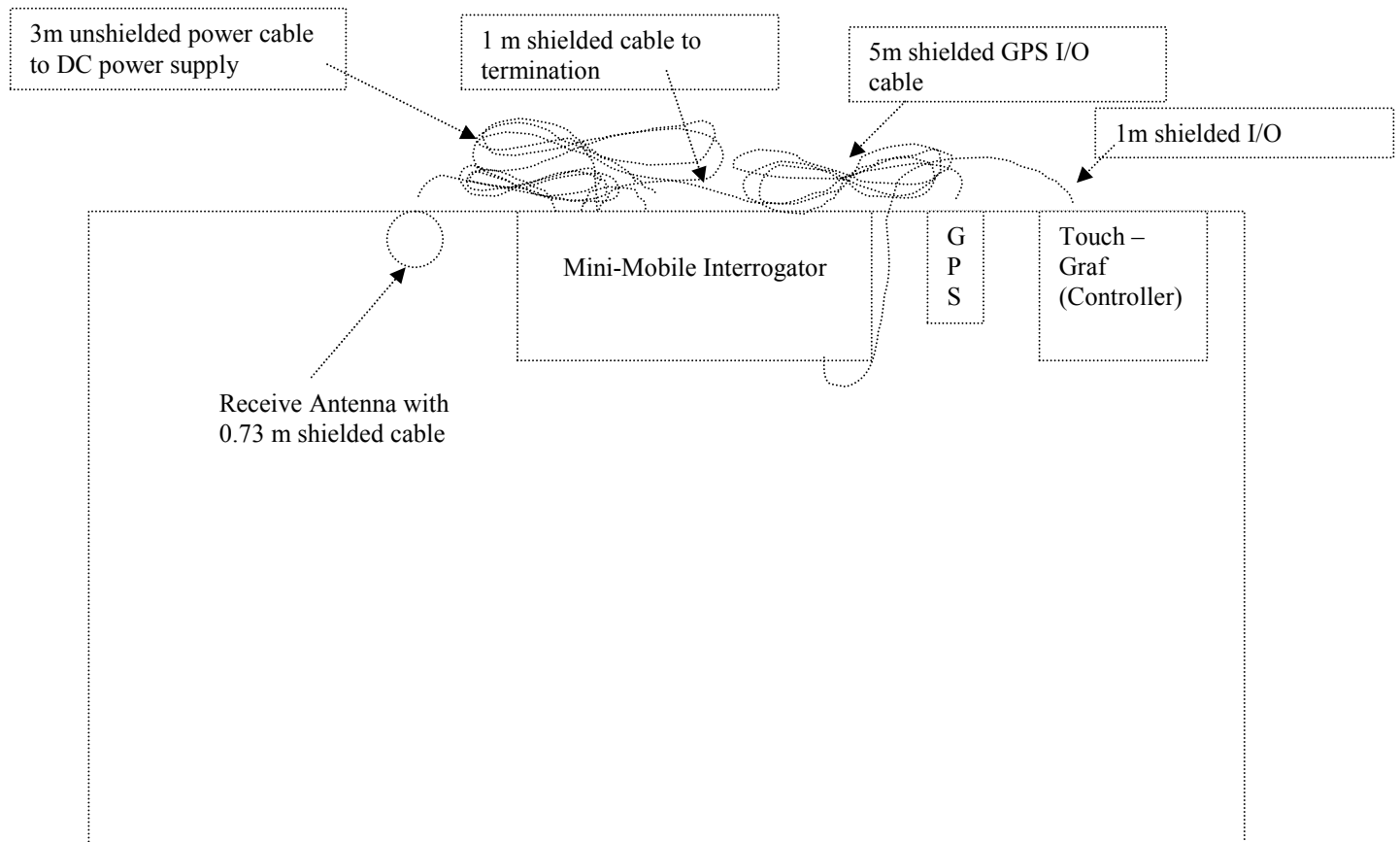


FIGURE 3-1: CONFIGURATION OF TESTED SYSTEM

4 FCC RULES AND REGULATIONS PART 2 §2.1046 (A): RF POWER OUTPUT: CONDUCTED

4.1 TEST PROCEDURE

ANSI 63.4

The EUT was connected to a coaxial attenuator having a 50Ω load impedance.

4.2 TEST DATA

The carrier (in MHz) was tested: 451.35 MHz

TABLE 4-1: RF POWER OUTPUT: CARRIER OUTPUT POWER (UNMODULATED)

Frequency (MHz)	RF Power Measured (Watt)*
451.35	7.44

* Measurement accuracy: +/- .02 dB (logarithmic mode)

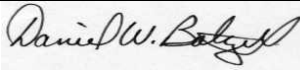
TABLE 4-2: RF POWER OUTPUT (RATED POWER)

Rated Power (W)
7.44

TABLE 4-3: TEST EQUIPMENT USED FOR TESTING RF POWER OUTPUT - CONDUCTED

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901184/901186	Agilent	E4416A/E9323A	Power Meter / Sensor	GB41050573/US40410380	07/30/04

TEST PERSONNEL:

DANIEL W. BALTZELL		July 6, 2004
TEST TECHNICIAN/ENGINEER	SIGNATURE	DATE OF TEST

5 FCC RULES AND REGULATIONS PART 2 §2.1053 (A): FIELD STRENGTH OF SPURIOUS RADIATION

5.1 TEST PROCEDURE

ANSI 63.4; the transmitter is terminated with a 50 Ω rated termination. The spurious emissions levels were measured and the device under test was replaced by a substitution antenna connected to a signal generator. The signal generator level was then corrected by subtracting the cable loss between the substitution antenna and the signal generator. The gain of the antenna was further corrected to a half wave dipole.

TRANSMITTER INPUT MODULATION: The test signal was modulated using the EUT.

5.2 TEST DATA

5.2.1 CFR 47 PART 90.210 REQUIREMENTS

The worst-case emissions test data are shown. The magnitude of emissions attenuated more than 20 dB below the FCC limit need not be recorded.

TABLE 5-1: FIELD STRENGTH OF SPURIOUS HARMONIC-CARRIER AT 451.35 MHZ

Radiated Spurious Emissions; Carrier 451.35 MHz; Limit = $43 + 10 \log P = 51.7$ dBc; Conducted Power = 7.44 W

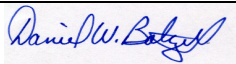
Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd)	Corrected Signal Generator Level (dBc)	Limit (dBc)	Margin (dB)
902.700	69.3	-45.8	0.5	-1.1	86.1	51.7	-34.4
1354.050	57.1	-46.4	1.0	3.3	82.8	51.7	-31.1
1805.400	56.0	-44.6	1.0	4.8	79.5	51.7	-27.8
2256.750	45.7	-47.5	0.9	5.0	82.1	51.7	-30.4
2708.100	51.7	-39.3	1.1	5.6	73.5	51.7	-21.8
3159.450	47.0	-45.7	1.0	6.2	79.2	51.7	-27.5
3610.800	31.8	-60.0	1.1	5.9	93.9	51.7	-42.2
4062.150	31.8	-55.6	1.0	6.0	89.3	51.7	-37.6
4513.500	31.0	-57.5	1.0	7.1	90.1	51.7	-38.4

*This insertion loss corresponds to the cable connecting the RF Signal Generator to the $\frac{1}{2}$ wave dipole antenna, or horn antenna.

TABLE 5-2: TEST EQUIPMENT USED FOR TESTING FIELD STRENGTH OF SPURIOUS RADIATION

RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER	CALIBRATION DUE DATE
901053	Schaffner-Chase	CBL6112	Antenna (25 MHz – 2 GHz)	2648	09/03/04
900151	Rhode and Schwarz	HFH2-Z2	Loop Antenna (9 kHz - 30 MHz)	827525/019	8/25/06
900932	Hewlett Packard	8449B OPT H02	Preamplifier (1 - 26.5 GHz)	3008A00505	5/05/05
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	07/15/04
900928	Hewlett Packard	HP 83752A	Synthesized Sweeper (.01 – 20 GHz)	3610A00866	08/05/04
900811	Rhein Tech Labs	PR-1040	Amplifier	1003	2/23/05
900878	Rhein Tech Labs	AM3-1197-0005	3 meter antenna mast, polarizing	Outdoor Range 1	Not Required
901231	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	9/05/04
901232	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	9/05/04
901235	IW Microwave Products	KPS-1503-360-KPS	High frequency RF cables	36"	9/05/04
901242	Rhein Tech Labs	WRT-000-0003	Wood rotating table	N/A	Not Required
900772	EMCO	3161-02	Horn Antenna (2 - 4 GHz)	9804-1044	5/20/07
900321	EMCO	3161-03	Horn Antennas (4 - 8,2 GHz)	9508-1020	5/20/07
900889	Hewlett Packard	85685A	RF Preselector for HP 8566B (20 Hz - 2 GHz)	3146A01309	3/10/05
900896	Hewlett Packard	85662A	Display Section	2816A16471	2/27/05
900901	Hewlett Packard	85650A	Quasi-Peak Adapter (30 Hz - 40 GHz)	3145A01599	2/27/05
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	6/23/05
901053	Schaffner Chase	CBL6112B	Bi-Log Antenna (20 MHz - 2 GHz)	2648	9/03/04
900154	Compliance Design	Roberts Dipole	Adjustable Elements Dipole Antenna (30 - 1000 MHz)	N/A	10/6/04
900814	Electro-Metrics	EM-6961 (RGA-60)	Double Ridged Guide Antenna (1 - 18 GHz)	2310	2/17/06

TEST PERSONNEL:

DAN BALTZELL		July 7, 2004
TEST TECHNICIAN/ENGINEER	SIGNATURE	DATE OF TEST

6 RADIATED EMISSION FOR DIGITAL EMISSIONS - §15.209

6.1 RADIATED EMISSION TEST PROCEDURE FOR DIGITAL EMISSIONS

Radiated spurious emissions for digital interface are subject to the limits of FCC §15.109.

6.2 RADIATED EMISSION TEST DATA - DIGITAL INTERFACE

TABLE 6-1: RADIATED EMISSIONS

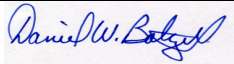
Temperature: 30°F Humidity: 46%									
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
112.000	Qp	H	270	1.5	40.3	-17.0	23.3	43.5	-20.2
160.000	Qp	H	0	1.0	26.0	-18.8	7.2	43.5	-36.3
180.000	Qp	H	0	1.0	26.0	-19.6	6.4	43.5	-37.1
220.000	Qp	H	0	1.0	25.9	-18.8	7.1	46.0	-38.9
240.000	Qp	H	0	1.0	25.9	-16.6	9.3	46.0	-36.7
400.000	Qp	H	0	1.0	25.9	-11.7	14.2	46.0	-31.8

QP: RES. =100 kHz, VID= 100 kHz

TABLE 6-2: TEST EQUIPMENT USED FOR TESTING DIGITAL EMISSIONS RADIATION

RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER	CALIBRATION DUE DATE
900811	Rhein Tech Labs	PR-1040	Amplifier	1003	2/23/05
900878	Rhein Tech Labs	AM3-1197-0005	3 meter antenna mast, polarizing	Outdoor Range 1	Not Required
900889	Hewlett Packard	85685A	RF Preselector for HP 8566B (20 Hz - 2 GHz)	3146A01309	3/10/05
900896	Hewlett Packard	85662A	Display Section	2816A16471	2/27/05
900901	Hewlett Packard	85650A	Quasi-Peak Adapter (30 Hz - 40 GHz)	3145A01599	2/27/05
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	6/23/05
901053	Schaffner Chase	CBL6112B	Bi-Log Antenna (20 MHz - 2 GHz)	2648	9/03/04
901231	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	9/05/04
901232	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	9/05/04
901235	IW Microwave Products	KPS-1503-360-KPS	High frequency RF cables	36"	9/05/04
901242	Rhein Tech Labs	WRT-000-0003	Wood rotating table	N/A	Not Required

TEST PERSONNEL:

DAN BALTZELL		July 7, 2004
TEST TECHNICIAN/ENGINEER	SIGNATURE	DATE OF TEST

7 CONCLUSION

The data in this measurement report shows that the AMCO Automated Systems, LLC, Model: Mini-Mobile Interrogator, FCC ID: G8JMMI01, complies with all the applicable requirements of Parts 90, 15 and 2 of the FCC Rules and Regulations.