



Engineering and Testing for EMC and Safety Compliance



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## Class II Permissive Change Test Report

**M/A-COM, Inc.**  
221 Jefferson Ridge Parkway  
Lynchburg, VA 24501  
Phone: (434) 455-9527  
Daryl Popowitch  
E-Mail: [popowitda@tycoelectronics.com](mailto:popowitda@tycoelectronics.com)

**MODEL: SkyMastr 800 MHz Base Station**

**FCC ID: BV8MBS800A075**

**February 7, 2008**

<b>Standards Referenced for this Report</b>	
Part 2: 2007	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
Part 90: 2007	Private Land Mobile Radio Services
ANSI/TIA/EIA 603-2002	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA/EIA – 102.CAAA; 2002	Digital C4FM/CQPSK Transceiver Measurement Methods

<b>Frequency Range (MHz)</b>	<b>Maximum Measured Output Power (W) Conducted</b>	<b>Frequency Tolerance (ppm)</b>	<b>Emission Designator</b>
854-869	40	0.1	13K1F9W
866-869	75	1.0	12K1F9W
851-866	75	1.0	12K1F9W
866-869	75	1.0	11K0F9W
851-869	75	1.0	11K3F1D

*\*Mode of operation for all of the above is OpenSky protocol.*

**Report prepared by: Daniel Baltzell, Test Engineer**

**Document Number: 2008018/QRTL08-115**

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360 Herndon Parkway  
Suite 1400  
Herndon, VA 20170  
Tel: 703-689-0368 Fax: 703-689-2056

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Rhein Tech Laboratories, Inc.  
360 Herndon Parkway  
Suite 1400  
Herndon, VA 20170  
<http://www.rheintech.com>

Client: M/A-COM, Inc.  
Model: SkyMastr 800 MHz Base Station  
FCC ID: BV8MBS800A075  
Standards: FCC Part 90  
Report #: 2008018

## 1 General Information

This Class II Permissive Change Report is prepared on behalf of **M/A-COM, Inc.** in accordance with the Federal Communications Commission. The Equipment Under Test (EUT) was the **SkyMastr 800 MHz Base Station; FCC ID: BV8MBS800A075**. 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 the applicable FCC Rules and Regulations in CFR 47. 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 submitted to and approved by the Federal Communications Commission to perform AC line conducted and radiated emissions testing.

### 1.2 Related Submittal(s)/Grant(s)

This is a Class II permissive change report for FCC ID: BV8MBS800A075, originally certified August 18, 1999, with Class II permissive changes granted on January 16, 2005, July 15, 2005, and May 25, 2006.

### 1.3 Description of Change in Device

This Class II permissive change request is a result of a power amplifier replacement.

## 2 Tested System Details

The test sample was received on November 29, 2007. Listed below are the identifiers and descriptions of all equipment, cables, and internal devices used with the EUT for this test, as applicable.

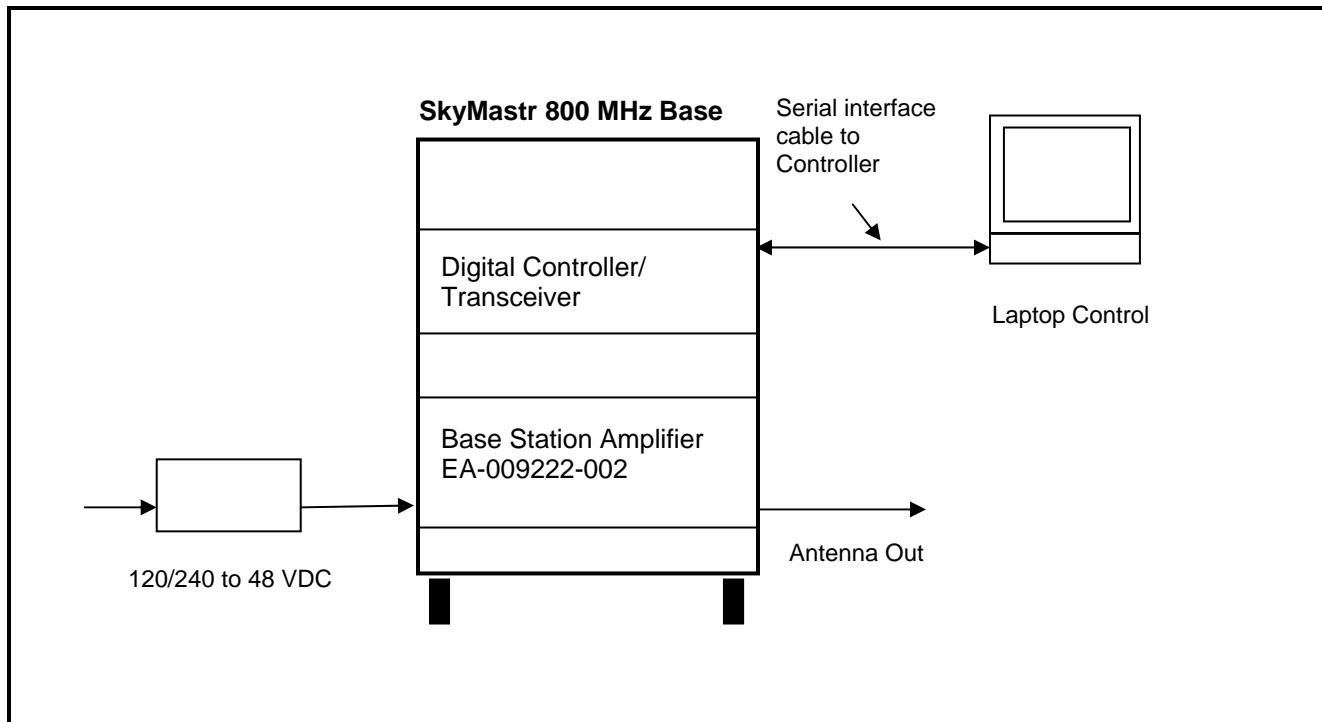
**Table 2-1: Equipment Under Test (EUT)**

Part	Manufacturer	Model	PN/SN	FCC ID	RTL Bar Code
SkyMastr 800 MHz Base Station HPA-75	M/A-COM, Inc.	BSH 1010	EA-009222-002/A400D0000009	BV8MBS800A075	18259
Digital Controller/Transceiver	M/A-COM, Inc.	N/A	BS90-0001-000/A400A61E8501	N/A	18260
Power Supply	MW	SE-600-48	CA4429177	N/A	18261

**Table 2-2: Support Equipment**

Part	Manufacturer	Model	PN/SN	FCC ID	RTL Bar Code
Notebook computer	Dell	Latitude	0008206D-12800-9AK-0353	N/A	18262
Serial interface cable	N/A	DB-9	N/A	N/A	N/A

**Figure 2-1: Configuration of Tested System**



### 3 FCC Rules and Regulations Part 2 §2.1033(C)(8) Voltages and Currents Through The Final Amplifying Stage

**Nominal DC Voltage:** 28 VDC

**Current:** 10 AMPS

### 4 FCC Rules and Regulations Part 2 §2.1046 (a): RF Power Output: Conducted

#### 4.1 Test Procedure

ANSI/TIA/EIA-603-2002, Section 2.2.1.

The EUT was connected to a coaxial attenuator having a  $50 \Omega$  load impedance.

#### 4.2 Test Data

The following channels (in MHz) were tested: 860.0125 and 861.4875.

**Table 4-1: RF Power Output (High Power): Carrier Output Power (Unmodulated)**

Channel	Frequency (MHz)	RF Power Measured (Watt)*
361	860.0125	75.0
420	861.4875	40.2

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

**Table 4-2: RF Power Output (Rated Power)**

Rated Power (W)
75 and 40

**Table 4-3: Test Equipment For Testing RF Power Output - Conducted**

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901184/901186	Agilent Technologies	E4416A/E9323A	Power Meter/ Sensor	GB41050573/US420. 52510380	10/24/08

#### Test Personnel:

Daniel Baltzell		January 29, 2008
Test Technician/Engineer	Signature	Date Of Test

## 5 FCC Rules and Regulations Part 2 §2.1051: Spurious Emissions at Antenna Terminals

### 5.1 Test Procedure

ANSI/TIA/EIA-603-2002, Section 2.2.13.

The transmitter is terminated with a  $50 \Omega$  load and interfaced with a cable, notch filter, and spectrum analyzer. The level shown (dBc) has been corrected with the notch insertion loss and cable loss added.

Device with digital modulation: Modulated to its maximum extent using a pseudo random data sequence – 19,200 bps.

### 5.2 Test Data

Frequency range of measurement per Part 2.1057: 9 kHz to  $10 \times F_c$ .

Limits: Mask D (dBm):  $P(\text{dBm}) - (43 + 10 \times \text{LOG } P(\text{W}))$

The following channels (in MHz) were investigated: 860.0125 and 861.4875. The worst case (unwanted emissions) channels are shown. Per 2.1051, the magnitude of emissions attenuated more than 20 dB below the FCC limit need not be recorded.

All conducted spurious emissions were greater than 20 dB below the limit.

**Table 5-1: Test Equipment For Testing Conducted Spurious Emissions**

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901215	Hewlett Packard	8596EM	EMC Analyzer (9 kHz-12.8 GHz)	3826A00144	10/17/08
901132	Par Electronics	UHF SN(806-902)	UHF Notch Filter	N/A	02/1/09
901425	Insulated Wire, Inc.	KPS-1503-2400-KPS	RF cable, 20'	NA	10/08/08
901358	Aeroflex/Weinschel	47-3-34	Attenuator, 3 dB0, (1-18 GHz)	BS0146	12/17/08
900928	Hewlett Packard	83752A	Synthesized Sweeper, (0.01-20 GHz)	3610A00866	12/7/08

### Test Personnel:

Daniel Baltzell		January 29, 2008
Test Technician/Engineer	Signature	Date Of Test

## 6 FCC Rules and Regulations Part 2 §2.1049(c)(1): Occupied Bandwidth

Occupied Bandwidth: provided that the ACCP requirements are met, the applicants may request any authorized bandwidth that does not exceed the channel size.

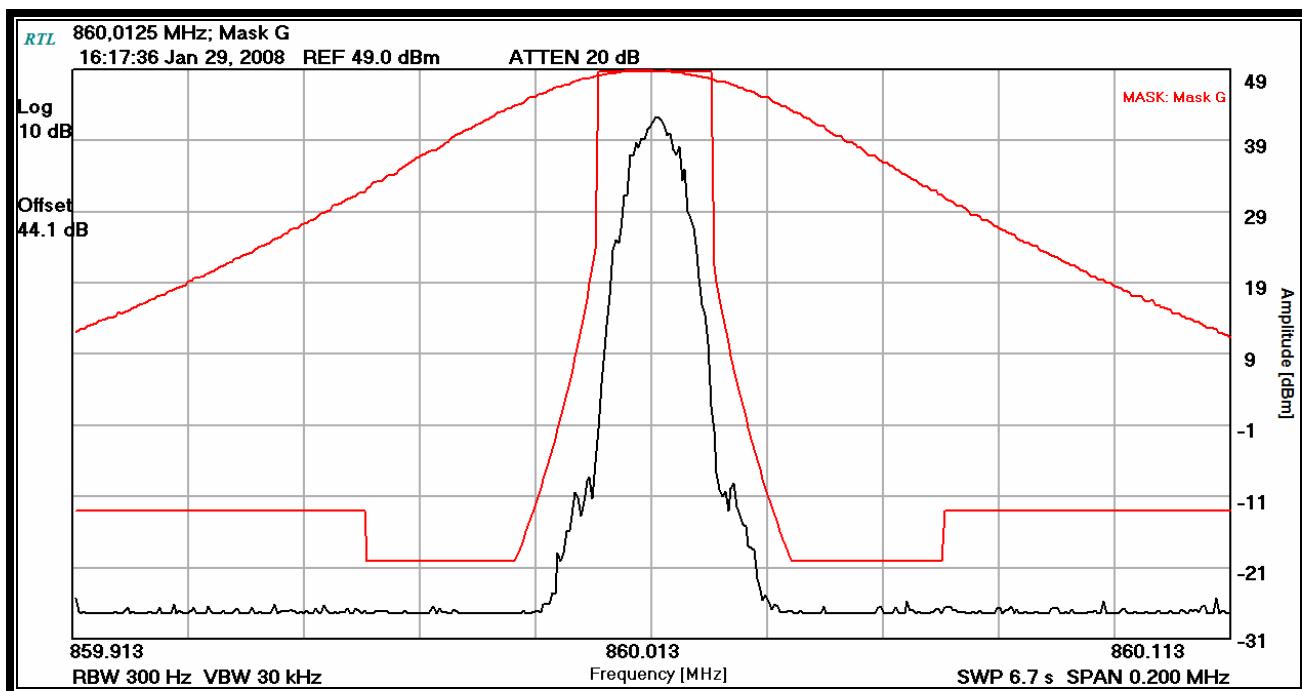
### 6.1 Test Procedure

Device with digital modulation: Modulated to its maximum extent using a pseudo random data sequence – 19,200 bps.

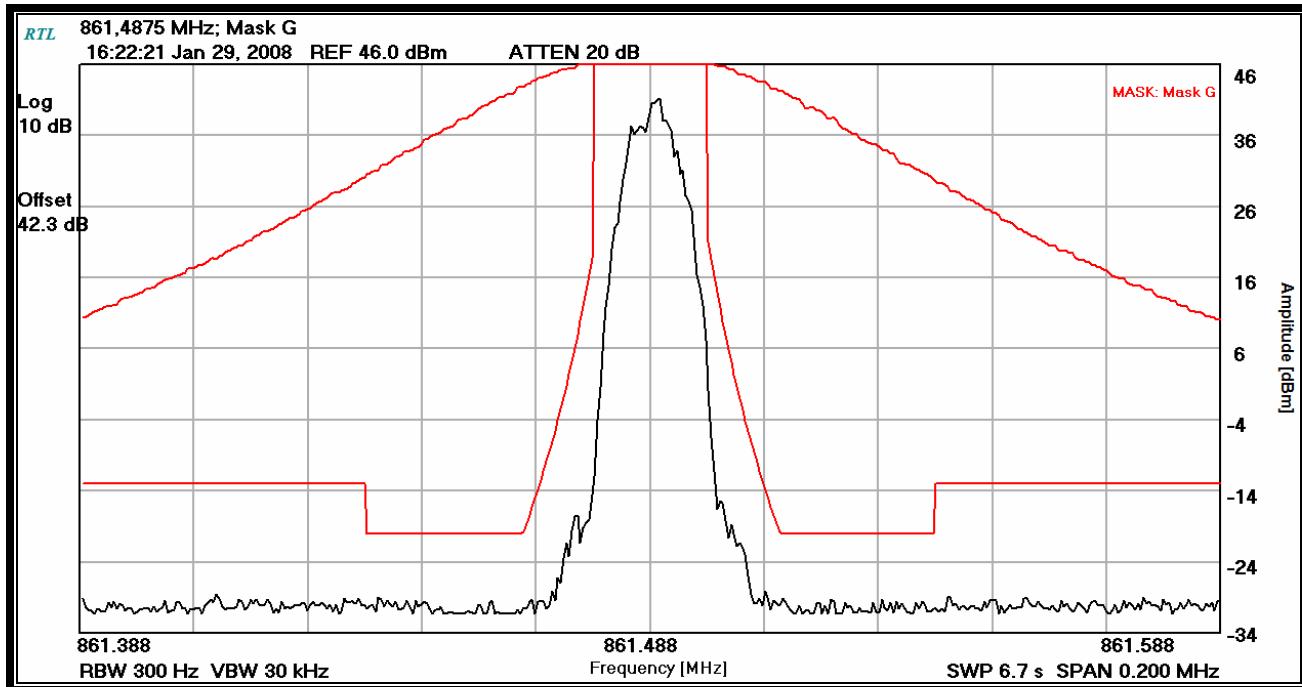
ANSI/TIA/EIA-603-2002, Section 2.2.11.

### 6.2 Test Data

Plot 6-1: Occupied Bandwidth; Wideband; 860.0125 MHz



**Plot 6-2: Occupied Bandwidth; Wideband; 861.4875 MHz**



**Table 6-1: Test Equipment For Testing Occupied Bandwidth**

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901425	Insulated Wire, Inc.	KPS-1503-2400-KPS	RF cable, 20'	NA	10/08/08
901358	Aeroflex/Weinschel	47-3-34	Attenuator, 3 dB0, (1-18 GHz)	BS0146	12/17/08
901215	Hewlett Packard	8596EM	EMC Analyzer (9 kHz-12.8 GHz)	3826A00144	10/17/08

**Test Personnel:**

Daniel Baltzell		January 29, 2008
Test Technician/Engineer	Signature	Date Of Test

## 7 FCC Rules and Regulations Part 90 §90.543(C) and Part 2 §2.1053(a): Field Strength of Spurious Radiation

### 7.1 Test Procedure

ANSI/TIA/EIA-603-2002, Section 2.2.12.

Device with digital modulation: Modulated to its maximum extent using a pseudo random data sequence – 19,200 bps.

The spurious emissions levels were measured and the device under test was replaced by a substitution antenna connected to a signal generator. This signal generator level was then corrected by subtracting the cable loss from the substitution antenna to the signal generator, and the gain of the antenna was further corrected to a half wave dipole.

### 7.2 Test Data

#### 7.2.1 CFR 47 Part 90.210 Requirements

The worst-case emissions test data are shown.

**Table 7-1: Field Strength of Spurious Radiation Channel 361 – 860.0125 MHz; Wideband; High Power**

Limit =  $43 + 10 \log P = 61.8$  dBc; Conducted Power = 48.8 dBm = 75 W

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Polarity	Azimuth	Height (m)	Signal Generator Level (dBm)	Cable Loss* (dB)	Antenna Gain (dBd)	Corrected Signal Generator Level (dBc)	Margin (dB)
1720.0250	H	76.0	185	1.0	-19.4	7.9	7.6	68.5	-6.7
1720.0250	V	77.0	170	1.1	-16.2	7.9	7.6	65.3	-3.5
2580.0375	H	78.4	20	1.0	-14.5	9.7	9.3	63.7	-1.9
2580.0375	V	76.3	330	1.0	-17.4	9.7	9.3	66.6	-4.8
3440.0500	H	65.3	330	1.0	-25.9	11.2	9.6	76.3	-14.5
3440.0500	V	59.1	20	1.0	-31.0	11.2	9.6	81.4	-19.6
4300.0625	H	37.9	0	1.0	-46.4	12.6	10.2	97.6	-35.8
4300.0625	V	38.0	180	1.0	-46.0	12.6	10.2	97.2	-35.4
5160.0750	V	21.2	160	1.0	-61.1	0.0	0.0	109.9	-48.1
6020.0875	H	30.1	10	1.0	-53.9	14.3	11.0	106.0	-44.2
6020.0875	V	30.1	170	1.0	-50.8	14.3	11.0	102.9	-41.1

\*This insertion loss corresponds to the cable connecting the RF Signal Generator to the 1/2 wave dipole antenna.

**Table 7-2: Field Strength of Spurious Radiation Channel 420 – 861.4875 MHz; Wideband; High Power**

Limit =  $43 + 10 \log P = 59.1$  dBc; Conducted Power = 46.1.dBm = 40 W

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Polarity	Azimuth	Height (m)	Signal Generator Level (dBm)	Cable Loss* (dB)	Antenna Gain (dBd)	Corrected Signal Generator Level (dBc)	Margin (dB)
1722.9750	70.2	H	0	1.0	-24.7	7.9	7.6	71.1	-12.0
1722.9750	74.9	V	20	1.0	-17.8	7.9	7.6	64.2	-5.1
2584.4625	73.5	H	0	1.0	-16.3	9.7	9.4	62.7	-3.6
2584.4625	72.9	V	10	1.2	-22.7	9.7	9.4	69.1	-10.0
3445.9500	57.2	H	20	1.0	-29.1	11.2	9.6	76.8	-17.7
3445.9500	50.1	V	25	1.1	-40.7	11.2	9.6	88.4	-29.3
4307.4375	35.9	H	0	1.0	-49.5	12.6	10.2	98.0	-38.9
4307.4375	33.2	V	180	1.1	-51.1	12.6	10.2	99.6	-40.5
6030.4125	21.8	H	180	1.0	-62.4	14.4	11.0	111.9	-52.8
6030.4125	21.8	V	175	1.1	-59.8	14.4	11.0	109.3	-50.2

\*This insertion loss corresponds to the cable connecting the RF Signal Generator to the ½ wave dipole

**Table 7-3: Test Equipment For Testing Field Strength of Spurious Radiation**

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901053	Schaffner-Chase	CBL6112	Antenna (25 MHz–2 GHz)	2648	12/20/08
900814	Electro-Metrics	EM-6961 (RGA-60)	Double Ridge Guide Antenna (1-18 GHz)	2310	3/30/09
901365	MITEQ	JS4-00102600-41-5P	Amplifier, 0.1-26 GHz, 30dB gain	N/A	10/8/08
901215	Hewlett Packard	8596EM	Spectrum Analyzer (9 kHz-12.8 GHz)	3826A00144	10/17/08
900928	Hewlett Packard	HP 83752A	Synthesized Sweeper (.01-20 GHz)	3610A00866	12/7/08
901424	Insulated Wire Inc.	KPS-1503-360-KPS	RF cable 36"	NA	10/5/08
901425	Insulated Wire, Inc.	KPS-1503-2400-KPS	RF cable, 20'	NA	10/5/08
901426	Insulated Wire Inc.	KPS-1503-3600-KPS	RF cable, 30'	NA	10/5/08
900772	EMCO	3161-02	Horn Antenna (2-4 GHz)	9804-1044	6/14/10
900321	EMCO	3161-03	Horn Antenna (4.0-8.2 GHz)	9508-1020	6/14/10
900323	EMCO	3160-07	Horn Antenna (8.2-12.4 GHz)	9605-1054	6/14/10

Rhein Tech Laboratories, Inc.  
360 Herndon Parkway  
Suite 1400  
Herndon, VA 20170  
<http://www.rheintech.com>

Client: M/A-COM, Inc.  
Model: SkyMastr 800 MHz Base Station  
FCC ID: BV8MBS800A075  
Standards: FCC Part 90  
Report #: 2008018

**Test Personnel:**

Daniel Baltzell		January 30, 2008
Test Technician/Engineer	Signature	Date Of Test

**8 Conclusion**

The data in this measurement report shows that the **M/A-COM, Inc.** Model **SkyMastr 800 MHz Base Station Radio; FCC ID: BV8MBS800A075**, complies with applicable requirements of Parts 90 and 2 of the FCC Rules.