Engineering and Testing for EMC and Safety Compliance

TYPE CERTIFICATION REPORT

M/A-COM, Inc.
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Daryl Popowitch
Phone: (434) 455-9527

MODEL: SkyMaster
700 MHz Base Station

FCC ID: BV8MBS700A100

June 4, 2004

STANDARDS REFERENCED FOR THIS REPORT	
PART 2: 2001	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS
PART 15: 2001	RADIO FREQUENCY DEVICES - §15.109: RADIATED EMISSIONS LIMITS
PART 90: 2001	PRIVATE LAND MOBILE RADIO SERVICES
ANSI C63.4-2001	STANDARD FORMAT MEASUREMENT/TECHNICAL REPORT PERSONAL COMPUTER AND PERIPHERALS
ANSI/TIA/EIA603- 2002	LAND MOBILE FM OR PM COMMUNICATIONS EQUIPMENT MEASUREMENT AND PERFORMANCE STANDARDS
ANSI/TIA/EIA 603-1-2002	ADDENDUM TO ANSI/TIA/EIA 603-1992
ANSI/TIA/EIA –102.CAAA; 2002	DIGITAL C4FM/CQPSK TRANSCEIVER MEASUREMENT METHODS

Frequency Range	Maximum Measured Output Power (W) Conducted	Measured Frequency Tolerance (ppm)	Emission Designator
764-767 MHz	100.5	0.0	12K1F9W (4-Level TDMA voice/data)
773-776 MHz	100.5	0.00	12K1F9W (4-Level TDMA voice/data)

REPORT PREPARED BY TEST ENGINEER: DAN BIGGS

Document Number: 2004023

TABLE OF CONTENTS

TABLE OF TABLES

TABLE OF PLOTS

TABLE OF FIGURES

TABLE OF APPENDICES

TABLE OF PHOTOGRAPHS

1 GENERAL INFORMATION

The following Type Certification Report is prepared on behalf of **M/A-COM, Inc**. in accordance with the Federal Communications Commission and Industry Canada Rules and Regulations. The Equipment Under Test (EUT) was the **SkyMaster 700 MHz Base Station; FCC ID: BV8MBS700A100**. 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 Regulations CFR 47, 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, 1994, 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 an original application report.

2 CONFORMANCE STATEMENT

STANDARDS REFERENCED FOR THIS REPORT	
PART 2: 1999	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS
PART 15: 1999	§15.109: RADIATED EMISSIONS LIMITS
PART 90: 1998	PRIVATE LAND MOBILE RADIO SERVICES
ANSI C63.4-2001	STANDARD FORMAT MEASUREMENT/TECHNICAL REPORT PERSONAL COMPUTER AND PERIPHERALS
ANSI/TIA/EIA603- 2002	LAND MOBILE FM OR PM COMMUNICATIONS EQUIPMENT MEASUREMENT AND PERFORMANCE STANDARDS
ANSI/TIA/EIA 603-1-2002	ADDENDUM TO ANSI/TIA/EIA 603-1992
ANSI/TIA/EIA –102.CAAA; 2002	DIGITAL C4FM/CQPSK TRANSCEIVER MEASUREMENT METHODS

Frequency Range	Maximum Measured Output Power (W) Conducted	Measured Frequency Tolerance (ppm)	Emission Designator
764-767 MHz	100.5	0.0	12K1F9W (4-Level TDMA voice/data)
773-776 MHz	100.5	0.0	12K1F9W (4-Level TDMA voice/data)

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. No modifications were made to the equipment during testing in order to achieve compliance with these standards.

Furthermore, there was no deviation from, additions to or exclusions from the above standards for Certification methodology.

Signature:  Date: June 4, 2004

Typed/Printed Name: Rick McMurray Position: Vice President of Operations

Signature:  Date: June 4, 2004

Typed/Printed Name: Daniel W. Biggs Position: Test Engineer

3 TESTED SYSTEM DETAILS

The test sample was received on February 24, 2004. Listed below are the identifiers and descriptions of all equipment, cables, and internal devices used with the EUT for this test, as applicable.

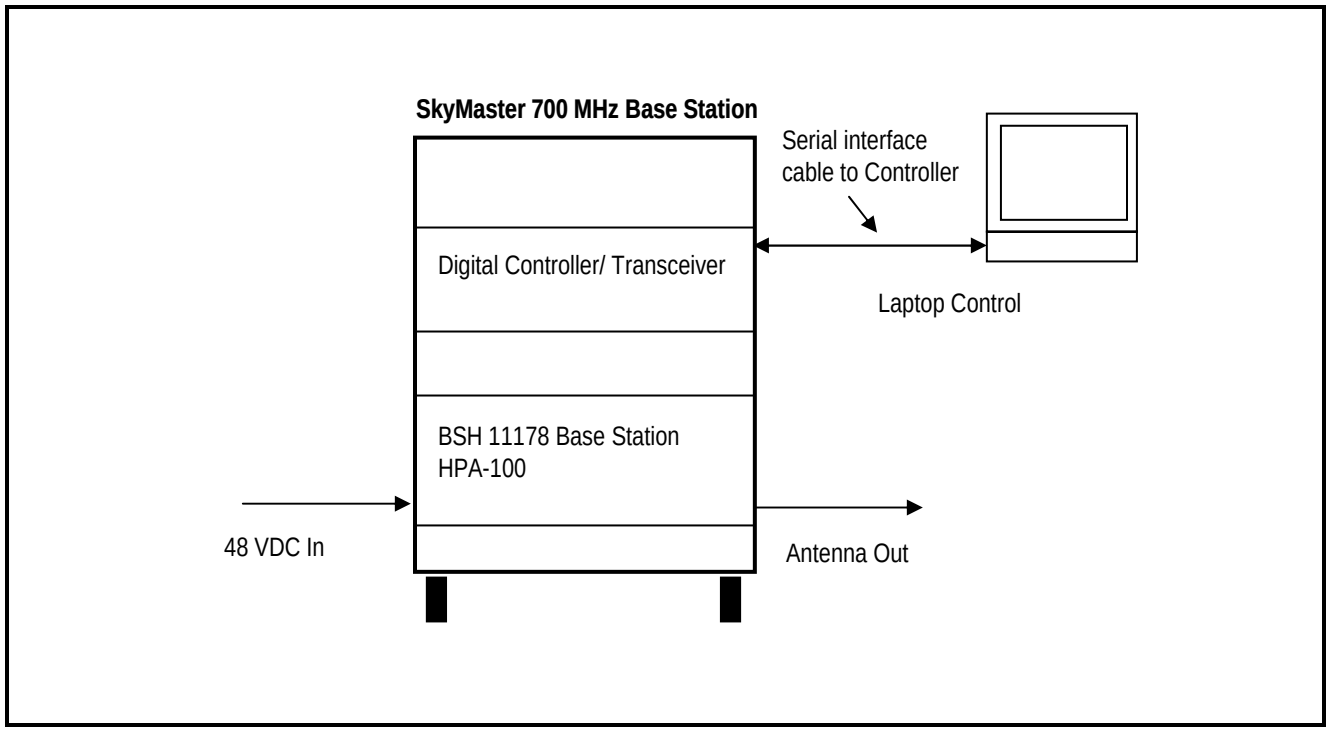
TABLE 3-1: EQUIPMENT UNDER TEST (EUT)

Part	Manufacturer	Model	PN/SN	FCC ID	RTL Bar Code
SKyMaster 700 MHZ Base Station	M/A-COM, Inc.	BSH 11178	HPA-100	BV8MBS700A100	15758
Digital Controller/Transceiver	M/A-COM, Inc.	N/A	N/A	N/A	15758

TABLE 3-2: SUPPORT EQUIPMENT

Part	Manufacturer	Model	PN/SN	FCC ID	RTL Bar Code
Notebook Computer	Hewlett Packard	Omnibook	N/A	N/A	N/A
Serial interface cable	N/A	N/A	N/A	N/A	N/A

FIGURE 3-1: CONFIGURATION OF TESTED SYSTEM



4 FCC RULES AND REGULATIONS PART 2 §2.1033(C)(8) VOLTAGES AND CURRENTS THROUGH THE FINAL AMPLIFYING STAGE

Nominal DC Voltage: 28.0 VDC
Current: 11.0 AMPS

5 FCC RULES AND REGULATIONS PART 90 §90.541 AND PART 2 §2.1046 (A): RF POWER OUTPUT: CONDUCTED

The transmitting power of base, mobile, portable, and control stations operating in the 764-776 MHz and 794-806 MHz frequency band must not exceed the maximum limits in this section, and must also comply with any applicable effective radiated power limits in Section 90.545:

a) The transmitting power of base transmitters must not exceed the limits given in paragraphs (a), (b), and (c) of Sec. 90.635.
b) The transmitter output power of mobile and control transmitters must not exceed 30 Watts.
c) The transmitter output power of portable (hand-held) transmitters must not exceed 3 Watts.
d) Transmitters operating on the narrowband low power channels listed in Secs. 90.531 (b)(3), 90.531(b)(4), must not exceed 2 Watts (ERP).

5.1 TEST PROCEDURE

ANSI/TIA/EIA-603-1992, section 2.2.1

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

5.2 TEST DATA

The following channels (in MHz) were tested: 764.0125, 766.9875, 773.0125, and 775.9875.

TABLE 5-1: RF POWER OUTPUT (HIGH POWER): CARRIER OUTPUT POWER (UNMODULATED)

Channel	Frequency (MHz)	RF Power Measured (Watt)*
1 (High Power)	764.0125	100.5
2 (High Power)	766.9875	100.5
3 (High Power)	773.0125	100.2
4 (High Power)	775.9875	99.8
1 (Low Power)	764.0125	15.1
2 (Low Power)	766.9875	15.1
3 (Low Power)	773.0125	15.0
4 (Low Power)	775.9875	15.0

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

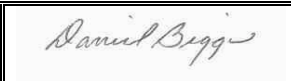
TABLE 5-2: RF POWER OUTPUT (RATED POWER)

Rated Power (W)
15-100

TABLE 5-3: TEST EQUIPMENT USED FOR TESTING (RF POWER OUTPUT - CONDUCTED)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901184/901186	Agilent	E4416A/E9323A	Power Meter/Sensor	GB41050573/US420.52510380	07/30/04

TEST PERSONNEL:

Daniel Biggs		March 1, 2004
Test Technician/Engineer	Signature	Date Of Test

6 FCC RULES AND REGULATIONS PART 90 §90.543 (C) AND PART 2 §2.1051: SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Out of band emission limit: On any frequency outside of the frequency ranges covered by the ACCP tables, the power of any emission must be reduced below the unmodulated carrier power (P) by at least 43 + 10 log (P) dB.

6.1 TEST PROCEDURE

ANSI/TIA/EIA-603-1992, Section 2.2.13

The transmitter is terminated with a 50 Ω load and interfaced with a spectrum analyzer.

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

6.2 TEST DATA

Frequency range of measurement per Part 2.1057: 9 kHz to 10 x Fc

Limits: Mask D (dBm): P(dBm) – (43+10xLOG P(W))

The following channels (in MHz) were investigated: 764.0125 and 775.9875. The worst case (unwanted emissions) channels are shown. The magnitude of emissions attenuated more than 20 dB below the FCC limit need not be recorded.

TABLE 6-1: CONDUCTED SPURIOUS EMISSIONS CHANNEL 1 – 764.0125 MHZ – HIGH POWER

25 kHz channel spacing; Conducted power = 100.5W

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin(dB)
1528.025	102.16	63.02	-39.16
2292.0375	90.00	63.02	-27.00
3056.05	119.00	63.02	-56.00
3820.0625	118.66	63.02	-55.66
4584.075	117.50	63.02	-54.50
5348.0875	113.50	63.02	-50.50
6112.1	118.84	63.02	-55.84
6876.1125	113.17	63.02	-50.17
7640.125	119.37	63.02	-56.37

TABLE 6-2: CONDUCTED SPURIOUS EMISSIONS CHANNEL 1 – 764.0125 MHZ – LOW POWER

25 kHz channel spacing; Conducted power = 15.1W

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin(dB)
1528.025	108.46	54.82	-53.66
2292.0375	100.47	54.82	-45.67
3056.05	111.97	54.82	-57.17
3820.0625	109.63	54.82	-54.83
4584.075	109.47	54.82	-54.67
5348.0875	107.30	54.82	-52.50
6112.1	108.80	54.82	-54.00
6876.1125	105.47	54.82	-50.67
7640.125	111.50	54.82	-56.70

TABLE 6-3: CONDUCTED SPURIOUS EMISSIONS CHANNEL 4 – 775.9875 MHZ – HIGH POWER

25 kHz channel spacing; Conducted power = 99.8W

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin(dB)
1551.975	107.66	62.99	-44.66
2315.9875	91.16	62.99	-28.16
3080	119.84	62.99	-56.84
3844.0125	120.00	62.99	-57.00
4608.025	115.50	62.99	-52.50
5372.0375	106.37	62.99	-43.37
6136.05	120.33	62.99	-57.33
6900.0625	120.17	62.99	-57.17
7664.075	120.00	62.99	-57.00

TABLE 6-4: CONDUCTED SPURIOUS EMISSIONS CHANNEL 4 – 775.9875 MHZ – LOW POWER

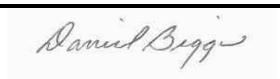
25 kHz channel spacing; Conducted power = 15W

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin(dB)
1551.975	110.58	54.75	-55.83
2315.9875	103.25	54.75	-48.50
3080	111.92	54.75	-57.17
3844.0125	112.42	54.75	-57.67
4608.025	108.08	54.75	-53.33
5372.0375	99.92	54.75	-45.17
6136.05	111.58	54.75	-56.83
6900.0625	111.75	54.75	-57.00
7664.075	112.08	54.75	-57.33

TABLE 6-5: TEST EQUIPMENT (CONDUCTED SPURIOUS EMISSIONS)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	07/15/04
901057	Hewlett Packard	3336B	Synthesizer/Level Generator	2514A02585	08/06/04
901054	Hewlett Packard	HP 3586B	Selective Level Meter	1928A01892	09/09/04

TEST PERSONNEL:

Daniel Biggs		March 18, 2004
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

Out of band emission limit. On any frequency outside of the frequency ranges covered by the ACCP tables, the power of any emission must be reduced below the unmodulated carrier power (P) by at least 43 + 10 log (P) dB.

7.1 TEST PROCEDURE

ANSI/TIA/EIA-603-1992, 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. The magnitude of emissions attenuated more than 20 dB below the FCC limit need not be recorded.

TABLE 7-1: FIELD STRENGTH OF SPURIOUS RADIATION CHANNEL 1 – 764.0125 MHZ; WIDE BAND; HIGH POWER

Limit = 43 + 10 Log P = 63.02 dBc
Conducted Power = 50.02 dBm = 100.5 W

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss* (dB)	Antenna Gain (dBd)	Corrected Signal Generator Level (dBc)	Margin (dB)
1528.025	57.00	-29.2	1.6	4.65	76.1	-13.1
2292.0375	50.17	-36.8	2.1	5.86	83.1	-20.1
3056.05	50.17	-31.2	3.4	7.25	77.3	-14.3
3820.0625	37.83	-46.2	4.0	7.35	92.8	-29.8
4584.075	22.67	-57.8	5.2	7.95	105.1	-42.1
5348.0875	30.67	-48.8	5.0	7.85	96.0	-33.0
6112.1	26.50	-52.7	5.1	8.85	98.9	-35.9
6876.1125	17.00	-62.8	5.5	8.35	110.0	-47.0
7640.125	17.00	-59.5	5.8	8.85	106.5	-43.4

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

TABLE 7-2: FIELD STRENGTH OF SPURIOUS RADIATION CHANNEL 1 – 764.0125 MHZ; WIDE BAND; LOW POWER

Limit = 43 + 10 Log P = 54.82 dBc
Conducted Power = 41.82 dBm = 15.2 W

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss* (dB)	Antenna Gain (dBd)	Corrected Signal Generator Level (dBc)	Margin (dB)
1528.025	58.00	-30.5	1.6	4.65	77.5	-22.7
2292.0375	27.00	-62.6	2.1	5.86	108.8	-54.0
3056.05	35.00	-50.3	3.4	7.25	96.5	-41.7
3820.0625	25.30	-59.8	4.0	7.35	106.5	-51.7
4584.075	18.70	-61.8	5.2	7.95	109.1	-54.3
5348.0875	18.70	-63.0	5.0	7.85	110.2	-55.4
6112.1	15.30	-62.0	5.1	8.85	108.3	-53.5
6876.1125	18.00	-62.2	5.5	8.35	109.3	-54.5
7640.125	17.50	-59.5	5.8	8.85	106.5	-51.7

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

TABLE 7-3: FIELD STRENGTH OF SPURIOUS RADIATION CHANNEL 4 – 775.9875 MHZ; WIDE BAND; HIGH POWER

Limit = 43 + 10 Log P = 62.99 dBc
Conducted Power = 49.99 dBm = 99.8 W

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss* (dB)	Antenna Gain (dBd)	Corrected Signal Generator Level (dBc)	Margin (dB)
1551.975	61.17	-23.3	1.8	4.85	70.3	-7.3
2315.9875	51.50	-38.5	3.0	5.86	85.7	-22.7
3080	51.67	-34.2	4.2	7.25	81.1	-18.1
3844.0125	38.00	-44.3	4.5	7.25	91.6	-28.6
4608.025	16.80	-63.7	4.7	7.85	110.6	-47.6
5372.0375	18.67	-62.3	5.3	7.75	109.9	-46.9
6136.05	17.50	-62.8	5.5	8.75	109.6	-46.6
6900.0625	17.17	-56.0	6.0	8.25	103.8	-40.8
7664.075	17.00	-61.0	5.8	8.85	108.0	-45.0

TABLE 7-4: FIELD STRENGTH OF SPURIOUS RADIATION CHANNEL 4 – 775.9875 MHZ; WIDE BAND; LOW POWER

Limit = 43 + 10 Log P = 54.75 dBc
Conducted Power = 41.75 dBm = 14.96 W

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss* (dB)	Antenna Gain (dBd)	Corrected Signal Generator Level (dBc)	Margin (dB)
1551.975	32.3	-26.5	1.8	4.85	73.5	-18.7
2315.9875	42.7	-63.0	3.0	5.86	110.2	-55.4
3080	31.2	-50.8	4.2	7.25	97.8	-43.1
3844.0125	43.5	-56.7	4.5	7.25	104.0	-49.2
4608.025	41.7	-53.5	4.7	7.85	100.3	-45.6
5372.0375	37.2	-51.6	5.3	7.75	99.2	-44.5
6136.05	38.5	-57.0	5.5	8.75	103.8	-49.1
6900.0625	33.2	-55.2	6.0	8.25	102.9	-48.2
7664.075	31.0	-51.2	5.8	8.85	98.1	-43.4

TABLE 7-5: TEST EQUIPMENT (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	07/03/04
900932	Hewlett Packard	8449B OPT H02	Preamplifier (1 - 26.5 GHz)	3008A00505	N/A
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	07/15/04
900917	Hewlett Packard	8648C	Synthesized. Signal Generator (9 kHz - 3200 MHz)	3537A01741	05/02/04
900928	Hewlett Packard	HP 83752A	Synthesized Sweeper (.01 – 20 GHz)	3610A00866	08/05/04

Test Personnel:

Daniel Biggs		March 8, 2004
Test Technician/Engineer	Signature	Date Of Test

8 FCC RULES AND REGULATIONS PART 90 §90.543 (A): EMISSION LIMITATIONS: ACCP REQUIREMENTS

Transmitters designed to operate in the 764-776 MHz and 794-806 MHz frequency bands must meet the emission limitations of this section.

8.1 TEST PROCEDURE

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

For base transmitter designed to operate with a 25kHz channel bandwidth, the ACCP shall be in accordance to the following table:

Offset from center frequency (kHz)	Measurement Bandwidth (kHz)	Maximum ACCP (dBc)
15.625	6.25	-40
21.875	6.25	-60
37.5	25	-60
62.5	25	-65
87.5	25	-65
150	100	-65
250	100	-65
>400 to receive band	30(s)	(1)
In the receive band	30(s)	-100

[1]-80 (continues @-6dB/oct)

FCC Rules and Regulations Part 90 §90.543 (b)

Setting Reference Level - Part 90 §90.543 (b) (1): Using a spectrum analyzer capable of ACCP measurements, set the measurement bandwidth to the channel size, 25 kHz. Set the frequency offset of the measurement to zero and adjust the center frequency of the spectrum analyzer to give the power level in the measurement bandwidth. Record this power as the reference power level.

Measuring the power level at the frequency offset <600 kHz - Part 90 §90.543 (b) (2): Using a spectrum analyzer capable of ACCP measurements, set the measurement bandwidth as shown in table. Measure ACCP in dBm. These measurements were made at maximum power. Calculate the coupled power by subtracting the measurements made in this step from the reference power level. The absolute ACCP values must be less than the values given in the table for each condition.

Measuring the power level at the frequency offset >600 kHz - Part 90 §90.543 (b) (3): Set the spectrum analyzer to 30 kHz resolution bandwidth, 1 MHz video bandwidth, and sample detection mode. Sweep +/- 6 MHz from the carrier frequency. Set the reference level to the RMS value of the transmitter power and note the power. The response at frequencies >600 kHz must be less than the values listed in the table.

8.2 TEST DATA

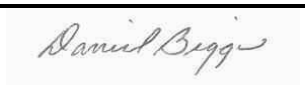
			764.0125 MHz		775.9875 MHz	
Offset from Center Freq. KHz	Measurement BW KHz	Max ACP dBc	Max ACP low offset dBc	Max ACP high offset dBc	Max ACP low offset dBc	Max ACP high offset dBc
(+/-)15.625	6.25	-40	-41.64	-41.83	-40.40	-42.21
(+/-)21.875	6.25	-60	-63.10	-61.26	-62.45	-62.94
(+/-)37.5	25	-60	-67.18	-62.16	-62.78	-61.24
(+/-)62.5	25	-65	-71.88	-68.02	-66.83	-66.32
(+/-)87.5	25	-65	-75.85	-74.22	-77.69	-72.86
(+/-)150	100	-65	-76.96	-78.28	-76.29	-76.99
(+/-)250	100	-65	-77.99	-78.18	-76.31	-81.00

			764.0125 MHz	775.9875 MHz
Offset from Center Freq. KHz	Measurement BW KHz	Max ACP dBc	Max ACP dBc	Max ACP dBc
<400 to receive band	30(s)	-80	<100	<100
In receive band	30(s)	-100	<100	<100

TABLE 8-1: TEST EQUIPMENT (ACCP REQUIREMENTS)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	07/15/04

Test Personnel:

Daniel Biggs		March 9, 2004
Test Technician/Engineer	Signature	Date Of Test

9 FCC RULES AND REGULATIONS PART 90 §90.543 (A) AND 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.

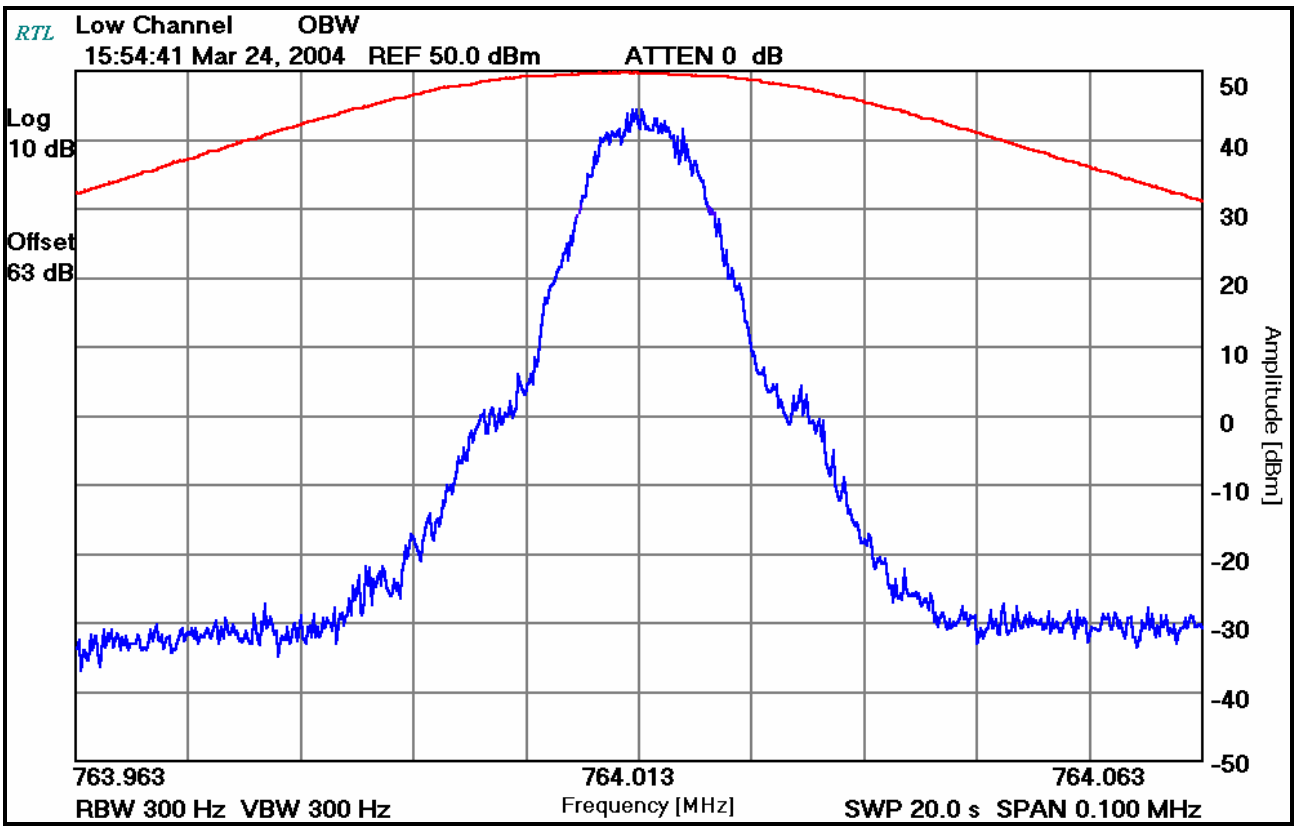
9.1 TEST PROCEDURE

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

ANSI/TIA/EIA-603-1992, section 2.2.11

9.2 TEST DATA

PLOT 9-1: OCCUPIED BANDWIDTH; WIDE BAND; 4-LEVEL OPENSKY TDMA; CHANNEL 1



PLOT 9-2: OCCUPIED BANDWIDTH; WIDE BAND; 4-LEVEL OPENSKY TDMA; CHANNEL 4

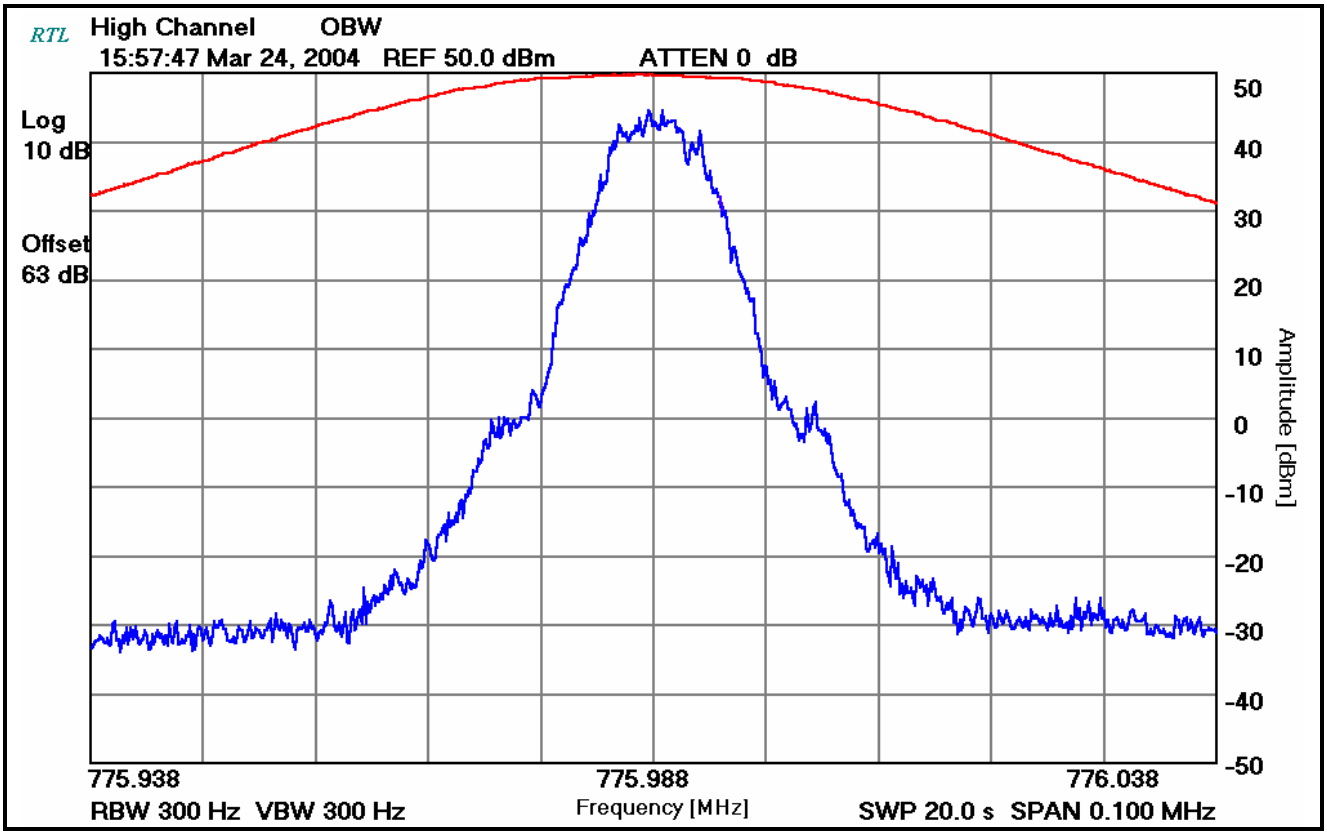


TABLE 9-1: TEST EQUIPMENT (OCCUPIED BANDWIDTH)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	07/15/04
901118	Hewlett Packard	8901A Opt. 002-003	Modulation Analyzer	2406A00178	06/18/04

Test Personnel:

Daniel Biggs	Daniel Biggs	March 24, 2004
Test Technician/Engineer	Signature	Date Of Test

10 FCC RULES AND REGULATION PART 90 §90.539 AND PART 2 §2.1055: FREQUENCY STABILITY

Transmitters designed to operate in the 764-776 MHz and 794-806 MHz frequency band must meet the frequency stability requirements in this section.

a) Mobile, portable, and control transmitters must normally use automatic frequency control (AFC) to lock on to the base station signal.

b) The frequency stability of the base transmitters operating in the narrowband segment must be 100 parts per billion or better.

c) The frequency stability of mobile, portable, and control transmitters operating in the narrowband segment must be 400 parts per billion or better when AFC is locked to the base station. When AFC is not locked to the base station, the frequency stability must be at least 1.0 ppm for 6.25 kHz, 1.5 ppm for 12.5 kHz (2 channel aggregate), and 2.5 ppm for 25kHz (4 channel aggregate).

d) The frequency stability of base transmitters operating in the wideband segment must be 1 part per million or better.

e) The frequency stability of mobile, portable, and control transmitters operating in the wideband segment must be 1.25 parts per million or better when AFC is locked to a base station, and 5 parts per million or better when AFC is not locked.

10.1 TEST PROCEDURE

ANSI/TIA/EIA-603-1992, section 2.2.2

The carrier frequency stability is the ability of the transmitter to maintain an assigned carrier frequency.

The EUT was evaluated over the temperature range -30°C to +60°C.

The temperature was initially set to -30°C and a 2-hour period was observed for stabilization of the EUT. The frequency stability was measured within one minute after application of primary power to the transmitter. The temperature was raised at intervals of 10 degrees centigrade through the range. A ½ hour period was observed to stabilize the EUT at each measurement step and the frequency stability was measured within one minute after application of primary power to the transmitter. Additionally, the power supply voltage of the EUT was varied +/-15% nominal input voltage.

The worst-case test data are shown below in Table 10- 1 and Table 10-3.

10.2 TEST DATA

10.2.1 FREQUENCY STABILITY/TEMPERATURE VARIATION

PLOT 10-1: TEMPERATURE FREQUENCY STABILITY

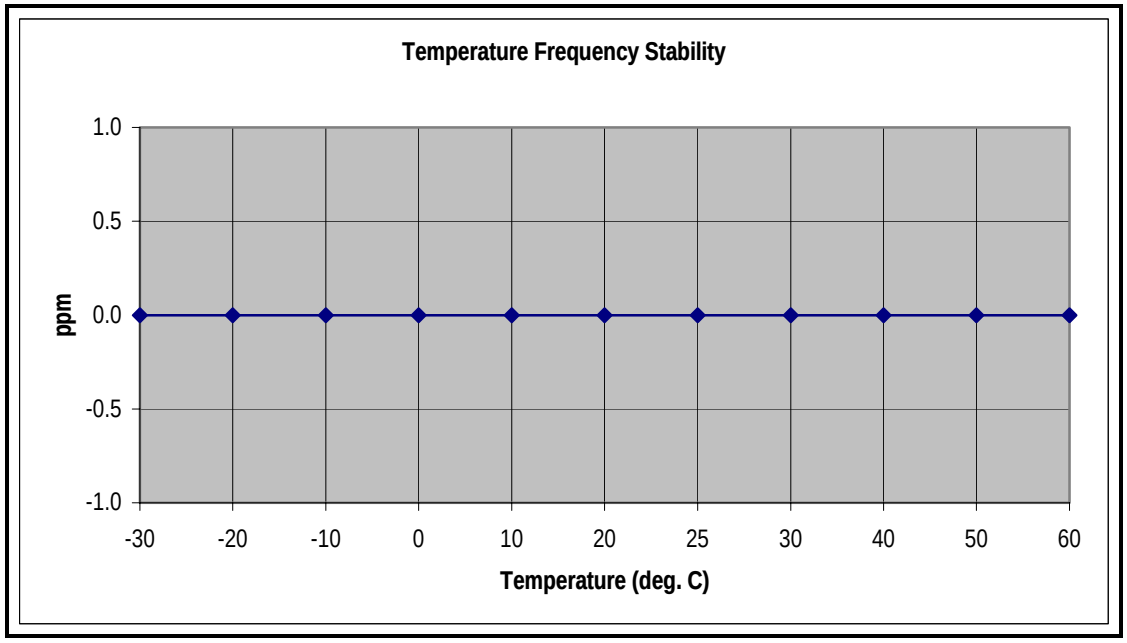


TABLE 10-1: FREQUENCY STABILITY/TEMPERATURE VARIATION - 766.9875 MHZ

Temperature C	Measured Frequency (MHz)	ppm
-30	766.987500	0.0
-20	766.987500	0.0
-10	766.987500	0.0
0	766.987500	0.0
10	766.987500	0.0
20	766.987500	0.0
25	766.987500	0.0
30	766.987500	0.0
40	766.987500	0.0
50	766.987500	0.0
60	766.987500	0.0

TABLE 10-2: TEST EQUIPMENT (FREQUENCY STABILITY/TEMPERATURE)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
900946	Tenney Engineering, Inc.	TH65	Temperature Chamber with Humidity	11380	02/03/05
901118	Hewlett Packard	8901A Opt. 002-003	Modulation Analyzer	2406A00178	06/18/04

Test Personnel:

Daniel Biggs		March 12, 2004
Test Technician/Engineer	Signature	Date Of Test

10.2.2 FREQUENCY STABILITY/VOLTAGE VARIATION

PLOT 10-2: VOLTAGE FREQUENCY STABILITY

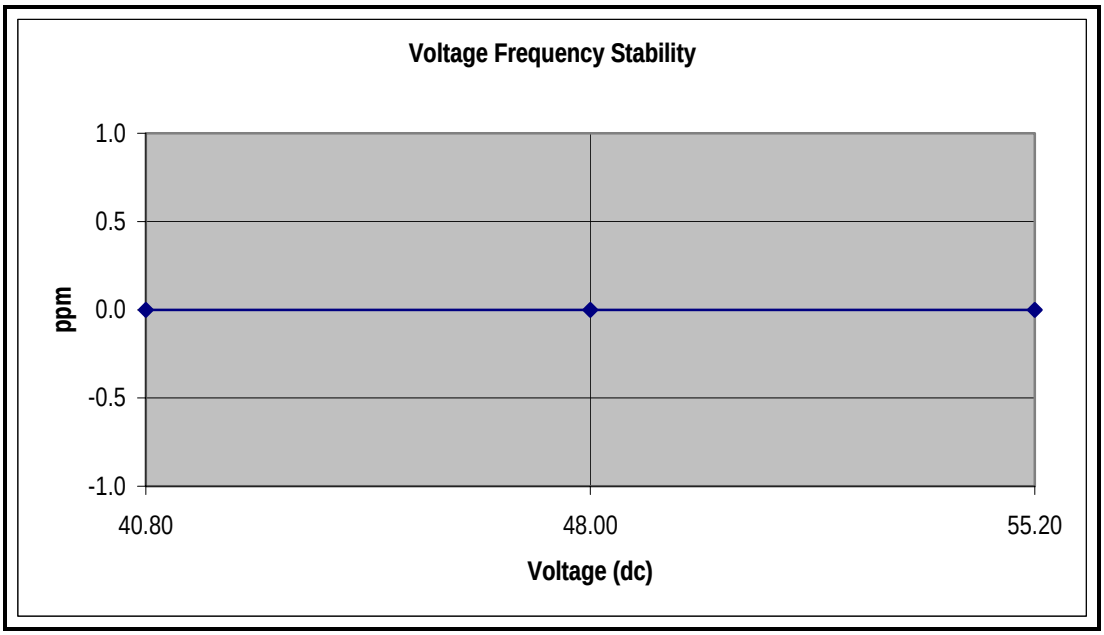


TABLE 10-3: FREQUENCY STABILITY/VOLTAGE VARIATION - 766.9875 MHZ

Voltage (VDC)	Measured Frequency (MHz)	ppm
40.80	766.987500	0.0
48.00	766.987500	0.0
55.20	766.987500	0.0

TABLE 10-4: TEST EQUIPMENT (FREQUENCY STABILITY/VOLTAGE)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	07/15/04
901118	Hewlett Packard	8901A Opt. 002-003	Modulation Analyzer	2406A00178	06/18/04

Test Personnel:

Daniel Biggs	Daniel Biggs	March 12, 2004
Test Technician/Engineer	Signature	Date Of Test

11 FCC RULES AND REGULATIONS PART 90 §90.543 (E): PROTECTION OF 1559-1610 MHZ BAND

For operations in the 764 to 776 MHz and 794 to 806 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to –70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and –80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

11.1 TEST PROCEDURE

Substitution Method:

The EUT was set up at an antenna-to-EUT distance of 3 meters on an open area test site. The EUT was placed on a nonconductive turntable 1.0 meter above the ground plane. The physical arrangement of the EUT was varied through three orthogonal planes in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. At each frequency, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters in order to determine the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarizations. The worst-case, maximum radiated emission was recorded and used as reference for the measurement. The EUT was then replaced by a ½ wave dipole antenna and polarized in accordance with the EUT's antenna polarization. The ½ wave dipole antenna was connected to a RF signal generator with a coaxial cable. The search antenna height, and search antenna polarity, were set to levels that produced the maximum reading obtained. The signal generator was adjusted to a level that produced that maximum radiated emission level. The signal generator level was recorded and corrected by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal ½ wave dipole antenna. The signal generator corrected level is the ERP level.

11.2 TEST DATA

Frequencies tested: 1559-1610 MHz
Carrier Frequencies: 764.0125, 775.9875 MHz

The worst-case Output Power (highest) levels are shown. No discrete or wideband signals were found in GNSS band.

TABLE 11-1: TEST RESULTS - EIRP IN GNSS BAND

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss (dB)*	Antenna Factor (dBd)	EIRP (dBm)	EIRP (dBW)
1590 (Channel 1)	25.3	-54	4.2	7.1	-51.1	-81.1
1590 (Channel 4)	25.4	-54.1	4.5	7.1	-51.5	-81.5

*Cable loss from transmitting antenna to signal generator
*Measurement accuracy is +/- .5 dB

TABLE 11-2: TEST EQUIPMENT (EIRP IN GNSS BAND)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
900878	Rhein Tech Labs	AM3-1197-0005	3 meter antenna mast, polarizing	Outdoor Range 1	not req'd
900917	Hewlett Packard	8648	Signal Generator (100 kHz - 3200 MHz)		08/5/04
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	07/15/04
900814	Electrometrics	RGA-60	Double Ridge Horn (1 – 18 GHz)	2310	02/17/06
901262	ETS	3115	Double Ridge Horn (1 – 18 GHz)	6748	N/A

Test Personnel:

Daniel Biggs		March 23, 2004
Test Technician/Engineer	Signature	Date Of Test

12 FCC RULES AND REGULATIONS PART 2 §2.202: NECESSARY BANDWIDTH AND EMISSION BANDWIDTH

Type of Emission: F9W

Necessary Bandwidth and Emission Bandwidth:

Digital voice and data – 25 kHz separation
19,200 BPS

Calculation:
B(n) = (R/Log{2}S) + 2DK (Log{2} is Log base 2)

where,
R = 19.2 kilobits per second (raw data rate)
S = 4 (4 level FSK)
D = 3.75KHz (FM deviation)
K = .334 (K is calculated as a best fit quadratic to occupied BW measurements; where K = -0.256*d*d + 1.066*d - 0.576, and where d = normalized deviation of factor of 1.2)

Therefore,
B(n) = 12.1 or 12K1
FCC emission designator: 12K1F9W

13 CONCLUSION

The data in this measurement report shows that the **M/A-COM, Inc**. Model **SkyMaster 700 MHz Base Station; FCC ID: BV8MBS700A100** complies with all the requirements of Parts 90, 15 and 2 of the FCC Rules.