Engineering and Testing for EMC and Safety Compliance

TYPE CERTIFICATION REPORT

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MODEL: P7200 700/800 MHz Portable Radio

FCC ID: BV8P7200
IC: 3670A-P7200

August 31, 2005

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 PORTABLE RADIO SERVICES
ANSI C63.4-2003	AMERICAN NATIONAL STANDARD FOR METHODS OF MEASUREMENT OF RADIO NOISE EMISSIONS FROM LOW – VOLTAGE ELECTRICAL AND ELECTRONIC EQUIPMENT IN THE RANGE OF 9 KHZ – 40 GHZ
ANSI/TIA/EIA603 - 2002	LAND PORTABLE FM OR PM COMMUNICATIONS EQUIPMENT – MEASUREMENT AND PERFORMANCE STANDARDS
ANSI/TIA/EIA – 102.CAAA; 2002	DIGITAL C4FM/CQPSK TRANSCEIVER MEASUREMENT METHODS
RSS-119; Issue 6; 2000	LAND PORTABLE AND FIXED RADIO TRANSMITTERS AND RECEIVERS 27.41 TO 960.0 MHZ
ICES-003: 1997	SPECTRUM MANAGEMENT; INTERFERENCE-CAUSING EQUIPMENT STANDARD – DIGITAL APPARATUS

REPORT PREPARED BY TEST ENGINEER: DANIEL BIGGS

Document Number: 2005120/QRTL05-180

360 Herndon Parkway, Suite 1400
Herndon, VA 20170
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http://www.rheintech.com

Frequency Range (MHz)	Measured Output Power (W) Conducted	Frequency Tolerance (ppm)	Modulation	Mode	Emission Designator
806-824	3.24	1.5	Analog FM (SMR)	OCF Trunked/Conventional	16K0F3E
806-824	3.24	1.5	Analog FM (NPSPAC)	OCF Trunked/Conventional	14K0F3E
851-869	3.16	1.5	Analog FM (SMR)	OCF Talkaround	16K0F3E
851-869	3.16	1.5	Analog FM (NPSPAC)	OCF Talkaround on NPSPAC channels	14K0F3E
806-809, 821-824	3.20	1.5	2-level (digitized data/voice)	NPSPAC Trunked/Conventional	11K9F1D/E
806-824	3.20	1.5	2-level (digitized data/voice)	SMR Trunked/Conventional	14K2F1D/E
851-854, 866-869	3.24	1.5	2-level (digitized data/voice)	NPSPAC T/A	11K9F1D/E
851-869	3.20	1.5	2-level (digitized data/voice)	SMR T/A	14K2F1D/E
806-824	3.31	1.5	P25 (digitized data/voice)	Trunked or Conventional	8K4F1D/E
851-869	3.24	1.5	P25 (digitized data/voice)	Talkaround	8K4F1D/E
806-809, 821-824	3.24	1.5	OTP	NPSPAC Trunked	13K2F9W
806-824	3.20	1.5	OTP	SMR Trunked	13K2F9W
764-767, 773-776	2.82	0.4	P25 (digitized data/voice)	Talkaround	8K4F1D/E
794-797, 803-806	2.82	0.4	P25 (digitized data/voice)	Trunked or Conventional	8K4F1D/E
794-797, 803-806	2.88	0.4	OTP	Trunked	13K2F9W
764-767, 773-776	1.86	0.4	Analog FM (12.5 kHz channel spacing)	Talkaround	11K0F3E
794-797, 803-806	1.91	0.4	Analog FM (12.5 kHz channel spacing)	Trunked or Conventional	11K0F3E

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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 **P7200 700/800 MHz Portable Radio; FCC ID: BV8P7200**. 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, Industry Canada RSS-119, and ANSI C63.4 Methods of Measurement of Radio Noise Emissions, 2003. 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 2003).

1.2 Related Submittal(s)/Grant(s)

N/A

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
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ANSI C63.4-2003	AMERICAN NATIONAL STANDARD FOR METHODS OF MEASUREMENT OF RADIO NOISE EMISSIONS FROM LOW – VOLTAGE ELECTRICAL AND ELECTRONIC EQUIPMENT IN THE RANGE OF 9 KHZ – 40 GHZ
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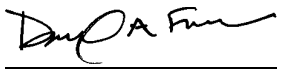
Frequency Range (MHz)	Measured Output Power (W) Conducted	Frequency Tolerance (ppm)	Modulation	Mode	Emission Designator
806-824	3.24	1.5	Analog FM (SMR)	OCF Trunked/Conventional	16K0F3E
806-824	3.24	1.5	Analog FM (NPSPAC)	OCF Trunked/Conventional	14K0F3E
851-869	3.16	1.5	Analog FM (SMR)	OCF Talkaround	16K0F3E
851-869	3.16	1.5	Analog FM (NPSPAC)	OCF Talkaround on NPSPAC channels	14K0F3E
806-809, 821-824	3.20	1.5	2-level (digitized data/voice)	NPSPAC Trunked/Conventional	11K9F1D/E
806-824	3.20	1.5	2-level (digitized data/voice)	SMR Trunked/Conventional	14K2F1D/E
851-854, 866-869	3.24	1.5	2-level (digitized data/voice)	NPSPAC T/A	11K9F1D/E
851-869	3.20	1.5	2-level (digitized data/voice)	SMR T/A	14K2F1D/E
806-824	3.31	1.5	P25 (digitized data/voice)	Trunked or Conventional	8K4F1D/E
851-869	3.24	1.5	P25 (digitized data/voice)	Talkaround	8K4F1D/E
806-809, 821-824	3.24	1.5	OTP	NPSPAC Trunked	13K2F9W
806-824	3.20	1.5	OTP	SMR Trunked	13K2F9W
764-767, 773-776	2.82	0.4	P25 (digitized data/voice)	Talkaround	8K4F1D/E
794-797, 803-806	2.82	0.4	P25 (digitized data/voice)	Trunked or Conventional	8K4F1D/E
794-797, 803-806	2.88	0.4	OTP	Trunked	13K2F9W
764-767, 773-776	1.86	0.4	Analog FM (12.5 kHz channel spacing)	Talkaround	11K0F3E
794-797, 803-806	1.91	0.4	Analog FM (12.5 kHz channel spacing)	Trunked or Conventional	11K0F3E

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. The test results relate only to the item that was tested.

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

Signature: 

Date: August 30, 2005

Typed/Printed Name: Desmond A. Fraser

Position: President

Signature: 

Date: August 30, 2005

Typed/Printed Name: Daniel Biggs

Position: Test Engineer

3 TESTED SYSTEM DETAILS

The test sample was received on July 11, 2005. Listed below are the identifiers and descriptions of all equipment, cables, and internal devices used with the EUT for this test, as applicable. The device was programmed for multiple modes of operation and modulation types.

TABLE 3-1: EQUIPMENT UNDER TEST (EUT)

Part	Manufacturer	Model	PN/SN	FCC ID	RTL Bar Code
Radio	M/A Com, Inc,	P7200 700/800 MHz Portable Radio	MAHROS0050/ A40041001004	BV8P7200	016850
Radio	M/A Com, Inc,	P7200 700/800 MHz Portable Radio	MAHROS0050/ A40041001005	BV8P7200	016851
Battery	M/A Com, Inc,	7.5V NMH	BKB191210/36 R1A	N/A	016855
Antenna	M/A-COM, Inc.	Whip	KRE1011506/1	N/A	016852
Antenna	M/A-COM, Inc.	Whip	KRE1011506/2	N/A	016853

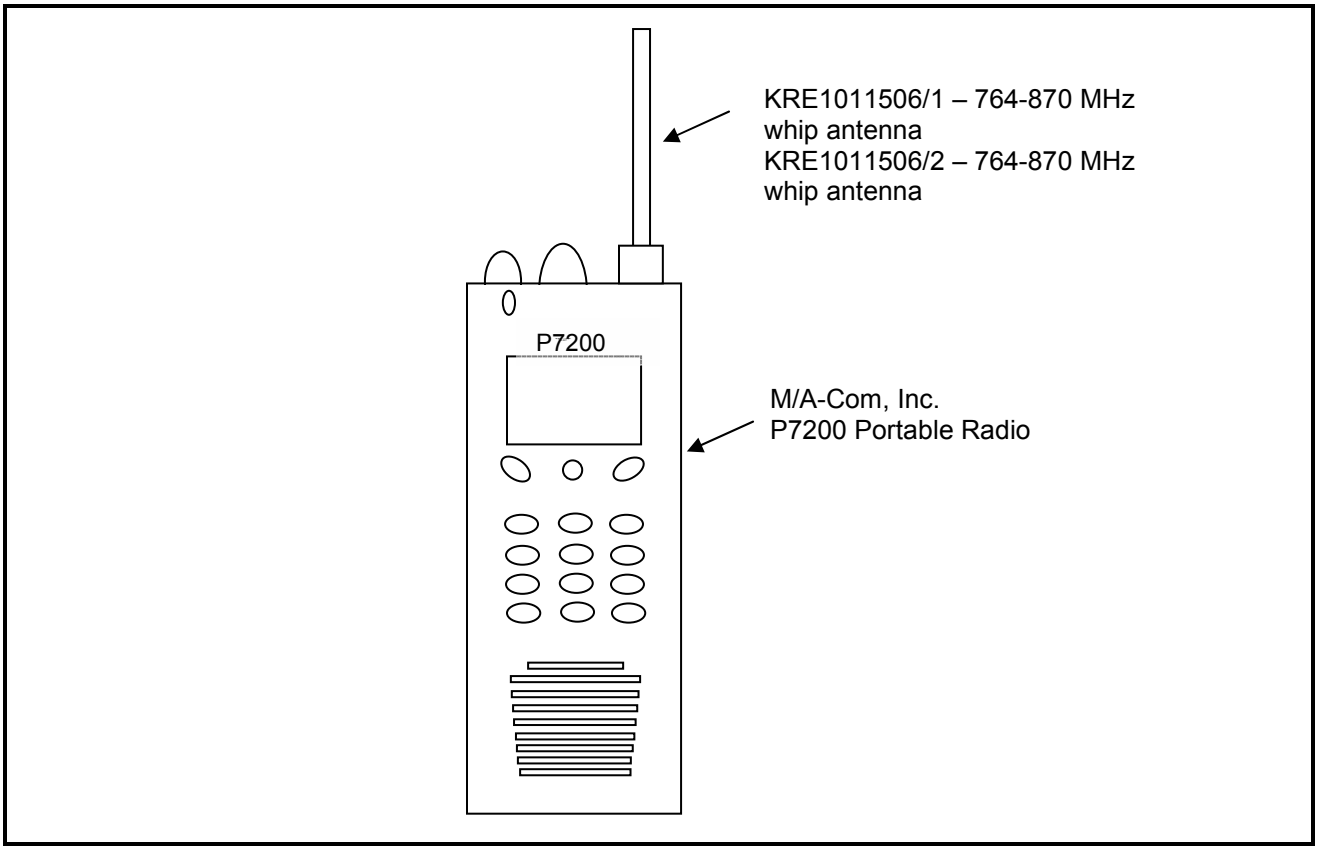


FIGURE 3-1: CONFIGURATION OF TESTED SYSTEM

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

Nominal DC Voltage: 7.5 VDC
Current: 0.9 AMPS

5 FCC RULES AND REGULATIONS PART 2 §2.1046(A): RF POWER OUTPUT: CONDUCTED; PART 90 §90.541(C): TRANSMITTING POWER LIMITS; RSS-119 §6.2: OUTPUT POWER TEST

5.1 Test Procedure

ANSI/TIA/EIA-603-2002, section 2.2.1

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

5.2 Test Data

TABLE 5-1: RF POWER OUTPUT: CARRIER OUTPUT POWER - 800 BAND

Frequency (MHz)	Band	Mode	High Power RF Power Measured (Watt)*	Low Power RF Power Measured (Watt)*
806.0125	SMR/NPSPAC	OCF	3.24	0.102
821.0375	SMR	OCF	3.16	0.100
823.9875	SMR/NPSPAC	OCF	3.16	0.100
851.0125	SMR/NPSPAC	OCF	3.31	0.100
866.0375	SMR	OCF	3.16	0.098
868.9875	SMR/NPSPAC	OCF	3.31	0.100
806.0125	SMR/NPSPAC	P25	3.31	0.102
821.0500	SMR	P25	3.16	0.100
823.9875	SMR/NPSPAC	P25	3.16	0.100
851.0125	SMR/NPSPAC	P25	3.24	0.100
866.0500	SMR	P25	3.24	0.102
868.9875	SMR/NPSPAC	P25	3.24	0.100
806.0125	SMR/NPSPAC	EDACS	3.24	0.105
821.0375	SMR	EDACS	3.16	0.102
823.9875	SMR/NPSPAC	EDACS	3.16	0.102
851.0125	SMR/NPSPAC	EDACS	3.24	0.102
866.0375	SMR	EDACS	3.16	0.100
868.9875	SMR/NPSPAC	EDACS	3.24	0.102
806.0125	SMR/NPSPAC	OTP	3.24	0.105
821.0500	SMR	OTP	3.16	0.102
823.9875	SMR	OTP	3.16	0.100

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

TABLE 5-2: RF POWER OUTPUT: CARRIER OUTPUT POWER - 700 BAND

Frequency (MHz)	Band	Mode	High Power RF Power Measured (Watt)*	Low Power RF Power Measured (Watt)*
764.012500	700	OCF	1.91	.098
775.012500	700	OCF	1.86	.098
794.012500	700	OCF	1.86	.098
805.012500	700	OCF	1.91	.100
764.012500	700	P25 TA	2.82	.100
775.012500	700	P25 TA	2.82	.100
794.012500	700	P25	2.88	.100
805.012500	700	P25	2.88	.100
794.012500	700	OTP	2.88	.100
805.012500	700	OTP	2.88	.105

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

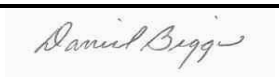
TABLE 5-3: RF POWER OUTPUT (RATED POWER)

Rated Power High Power (W)	Rated Power Low Power (W)
3.15 (800 Band)	0.100 (800 Band),
2.85 (700 Band)	0.100 (700 Band)

TABLE 5-4: TEST EQUIPMENT USED FOR TESTING RF POWER OUTPUT - CONDUCTED

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Date
901184/901186	Agilent	E4416A/E9323A	Power Meter / Sensor	GB41050573/US420.52510380	09/02/06

TEST PERSONNEL:

Daniel Biggs		august 18, 2005
Test Technician/Engineer	Signature	Date Of Test

6 FCC RULES AND REGULATIONS PART 2 §2.1051: SPURIOUS EMISSIONS AT ANTENNA TERMINALS; PART 90 §90.543(B): OUT OF BAND EMISSIONS LIMIT; RSS-119 §6.3: UNWANTED EMISSIONS

6.1 Test Procedure

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

The transmitter is terminated with a 50Ω 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 for OTP and 9,600 bps for P25 and EDACS modes.

6.2 Test Data

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

Limits: (43+10xLOG P(W))

The following channels (in MHz) were investigated: 806.0125, 823.9875, 851.0125, 868.9875, 764.0125, 775.0125, 794.0125 and 805.0125. The worse case (unwanted emissions) channels are shown. The magnitude of emissions attenuated more than 20 dB below the FCC limit need not be recorded.

Both high and low power settings were checked; high power was reported as worst case.

TABLE 6-1: CONDUCTED SPURIOUS EMISSIONS – OCF - 806.0125 MHZ

(806.0125 MHz); 25 kHz channel spacing; Conducted Power = 3.24 W

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin (dB)
1612.025	83.10	48.11	-34.99
2418.0375	81.53	48.11	-33.42
3224.05	106.00	48.11	-57.89
4030.0625	89.80	48.11	-41.69
4836.075	102.10	48.11	-53.99
5642.0875	105.40	48.11	-57.29
6448.1	117.60	48.11	-69.49
7254.1125	109.60	48.11	-61.49
8060.125	116.80	48.11	-68.69

TABLE 6-2: CONDUCTED SPURIOUS EMISSIONS – OCF - 823.9875 MHZ

(823.9875 MHz); 25 kHz channel spacing; Conducted Power = 3.16 W

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin (dB)
1647.975	81.70	48.00	-33.70
2471.9625	87.10	48.00	-39.10
3295.95	97.90	48.00	-49.90
4119.9375	91.60	48.00	-43.60
4943.925	100.10	48.00	-52.10
5767.9125	111.50	48.00	-63.50
6591.9	114.30	48.00	-66.30
7415.8875	113.50	48.00	-65.50
8239.875	114.40	48.00	-66.40

TABLE 6-3: CONDUCTED SPURIOUS EMISSIONS – OCF - 851.0125 MHZ

(851.0125 MHz); 25 kHz channel spacing; Conducted Power = 3.31 W

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin (dB)
1702.025	86.40	48.20	-38.20
2553.0375	82.73	48.20	-34.53
3404.05	96.40	48.20	-48.20
4255.0625	91.40	48.20	-43.20
5106.075	109.60	48.20	-61.40
5957.0875	113.70	48.20	-65.50
6808.1	105.20	48.20	-57.00
7659.1125	115.70	48.20	-67.50
8510.125	116.10	48.20	-67.90

TABLE 6-4: CONDUCTED SPURIOUS EMISSIONS – OCF - 868.9875 MHZ

(868.9875 MHz); 25 kHz channel spacing; Conducted Power = 3.31 W

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin (dB)
1737.9750	85.40	48.20	-37.20
2606.9625	81.06	48.20	-32.86
3475.9500	99.90	48.20	-51.70
4344.9375	95.80	48.20	-47.60
5213.9250	110.37	48.20	-62.17
6082.9125	116.17	48.20	-67.97
6951.9000	112.90	48.20	-64.70
7820.8875	115.60	48.20	-67.40
8689.8750	108.90	48.20	-60.70

TABLE 6-5: CONDUCTED SPURIOUS EMISSIONS – P25 - 794.0125 MHZ

(794.0125 MHz); 12.5 kHz channel spacing; Conducted Power = 2.88 W

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin (dB)
1737.9750	93.73	47.59	-46.14
2606.9625	90.76	47.59	-43.17
3475.9500	117.03	47.59	-69.44
4344.9375	96.57	47.59	-48.98
5213.9250	112.60	47.59	-65.01
6082.9125	85.93	47.59	-38.34
6951.9000	118.70	47.59	-71.11
7820.8875	114.50	47.59	-66.91
8689.8750	116.67	47.59	-69.08

TABLE 6-6: CONDUCTED SPURIOUS EMISSIONS – P25 - 805.0125 MHZ

(805.0125 MHz); 12.5 kHz channel spacing; Conducted Power = 2.82 W

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin (dB)
1610.025	96.93	47.70	-49.23
2415.0375	88.50	47.70	-40.80
3220.05	118.67	47.70	-70.97
4025.0625	117.47	47.70	-69.77
4830.075	118.13	47.70	-70.43
5635.0875	105.30	47.70	-57.60
6440.1	115.47	47.70	-67.77
7245.1125	114.67	47.70	-66.97
8050.125	119.47	47.70	-71.77

TABLE 6-7: CONDUCTED SPURIOUS EMISSIONS – P25 TA - 764.0125 MHZ

(764.0125 MHz); 12.5 kHz channel spacing; Conducted Power = 2.82 W

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin (dB)
1528.025	96.20	47.50	-48.70
2292.0375	112.20	47.50	-64.70
3056.05	120.80	47.50	-73.30
3820.0625	120.10	47.50	-72.60
4584.075	120.80	47.50	-73.30
5348.0875	105.10	47.50	-57.60
6112.1	118.00	47.50	-70.50
6876.1125	115.70	47.50	-68.20
7640.125	118.80	47.50	-71.30

TABLE 6-8: CONDUCTED SPURIOUS EMISSIONS – P25 TA - 775.0125 MHZ

(775.0125 MHz); 12.5 kHz channel spacing; Conducted Power = 2.82 W

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin(dB)
1550.025	94.20	47.50	-46.70
2325.0375	102.90	47.50	-55.40
3100.05	100.20	47.50	-52.70
3875.0625	71.40	47.50	-23.90
4650.075	90.10	47.50	-42.60
5425.0875	96.40	47.50	-48.90
6200.1	109.20	47.50	-61.70
6975.1125	114.50	47.50	-67.00
7750.125	114.60	47.50	-67.10

TABLE 6-9: TEST EQUIPMENT USED FOR TESTING CONDUCTED SPURIOUS EMISSIONS

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Date
901215	Hewlett Packard	8596EM	EMC Analyzer (9 kHz-12.8 GHz)	3826A00144	09/08/05
901057	Hewlett Packard	3336B	Synthesizer/Level Generator	2514A02585	09/08/05
901054	Hewlett Packard	HP 3586B	Selective Level Meter	1928A01892	09/08/05

TEST PERSONNEL:

Daniel Biggs		July 26 & August 8, 2005
Test Technician/Engineer	Signature	Date Of Test

7 FCC RULES AND REGULATIONS PART 2 §2.1053(A): FIELD STRENGTH OF SPURIOUS RADIATION; PART 90 §90.543(B): OUT OF BAND EMISSIONS LIMIT; RSS-119 §6.3: UNWANTED EMISSIONS

7.1 Test Procedure

ANSI/TIA/EIA-603-2002, section 2.2.12

Analog Modulation: The transmitter is terminated with a 50Ω load and is modulated with a 2,500 Hz sine wave at an input level 16 dB greater than that required to produce 50% of the rated system deviation at 1,000 Hz.

Device with digital modulation: Modulated to its maximum extent using a pseudo random data sequence – 19,200 bps for OTP and 9,600 bps for P25 and EDACS modes.

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 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.

Both high and low power settings were checked; high power was reported as worst case.

TABLE 7-1: FIELD STRENGTH OF SPURIOUS RADIATION – OCF - 851.0125 MHZ

Conducted Power = 35.2 dBm = 3.31 W; Limit = 43 + 10 Log P = 47.2 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss* (dB)	Antenna Gain (dBd)	Corrected Signal Generator Level (dBc)	Margin (dB)
1702.025	32.0	-40.5	5.8	5.0	76.5	-28.3
2553.038	38.2	-35.6	7.3	7.1	70.7	-22.5
3404.05	36.2	-28.5	8.8	7.3	72.3	-24.1
4255.063	42.5	-36.2	9.0	7.4	65.3	-17.1
5106.075	34.0	-32.8	9.8	7.5	73.7	-25.5
5957.088	37.5	-36.8	11.0	8.5	70.5	-22.3
6808.1	33.2	-33.0	11.5	8.4	75.1	-26.9
7659.113	34.5	-31.2	12.2	8.3	72.0	-23.8
8510.125	33.8	-35.6	12.8	8.4	70.8	-22.6

*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 – OCF - 866.05 MHZ

Conducted Power = 35.0 dBm = 3.16 W; Limit = 43 + 10 Log P = 48.0 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss* (dB)	Antenna Gain (dBd)	Corrected Signal Generator Level (dBc)	Margin (dB)
1732.1	33	-37.3	5.8	4.8	73.3	-25.3
2598.15	36.7	-31.0	7.2	7.1	66.1	-18.1
3464.2	37.5	-31.5	8.5	7.3	67.7	-19.7
4330.25	33.7	-37.1	9.0	7.5	73.6	-25.6
5196.3	27.7	-43.1	10.0	7.7	80.4	-32.4
6062.35	39	-29.8	10.8	8.7	66.9	-18.9
6928.4	33.7	-38.5	11.3	8.2	76.6	-28.6
7794.45	39.2	-28.1	12.0	7.5	67.6	-19.6
8660.5	66.3	-26.9	12.2	8.4	65.7	-17.7

*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 - OCF – 764.0125 MHZ

Conducted Power = 34.50 dBm = 2.82 W; Limit = 43 + 10 Log P = 47.5 dBc

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	40.2	-28.8	5.3	4.7	63.9	-16.4
2292.038	30.5	-36.5	6.5	6.2	71.3	-23.8
3056.05	28.3	-40.4	7.6	7.4	75.1	-27.6
3820.063	30.2	-38.6	8.3	7.0	74.4	-26.9
4584.075	26.0	-41.3	9.3	7.6	77.5	-30.0
5348.088	26.2	-45.3	10.3	7.8	82.3	-34.8
6112.1	26.2	-43.3	10.7	8.7	79.8	-32.3
6876.113	28.3	-41.4	11.8	8.8	78.9	-31.4
7640.125	29.3	-37.2	12.2	8.0	75.9	-28.4

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

TABLE 7-4: FIELD STRENGTH OF SPURIOUS RADIATION - OTP – 806.0125 MHZ

Conducted Power = 35.10 dBm = 3.24 W; Limit = 43 + 10 Log P = 48.1 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss* (dB)	Antenna Gain (dBd)	Corrected Signal Generator Level (dBc)	Margin (dB)
1612.025	45.9	-23.1	5.40	4.7	58.9	-10.8
2418.0375	35.2	-31.8	6.50	6.2	67.2	-19.1
3224.05	35.1	-33.9	7.80	7.2	69.6	-21.5
4030.0625	34.1	-33.4	8.50	7.1	69.9	-21.8
4836.075	33.9	-34.3	9.50	7.6	71.3	-23.2
5642.0875	34.5	-36.2	10.80	7.8	74.2	-26.1
6448.1	32.3	-39.7	10.50	8.8	76.5	-28.4
7254.1125	38.5	-33.5	12.00	8.3	72.3	-24.2
8060.125	40.8	-30.2	12.50	7.3	70.5	-22.4

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

TABLE 7-5: TEST EQUIPMENT USED FOR TESTING FIELD STRENGTH OF SPURIOUS RADIATION

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Date
901053	Schaffner-Chase	CBL6112	Antenna (25 MHz – 2 GHz)	2648	09/20/05
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	08/11/05
00067	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3643A00657	07/16/06
900928	Hewlett Packard	HP 83752A	Synthesized Sweeper (.01 - 20 GHz)	3610A00866	09/05/05

TEST PERSONNEL:

Daniel Biggs		July 31 & August 26, 2005
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 OTP mode and 9,600 bps for P25 mode.

For mobile transmitter designed to operate with a 25 kHz channel bandwidth, the ACCP shall be in accordance with the values in 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	-65
(+/-)62.5	25	-65
(+/-)87.5	25	-65
(+/-)150	100	-65
(+/-)250	100	-65
(+/-)350	100	-65
>400 to 12 MHz	30(s)	-75
12 MHz to receive band	30(s)	-75
In receive band	30(s)	-100

For mobile transmitter designed to operate with a 12.5 kHz channel bandwidth, the ACCP shall be in accordance with the values in the following table:

Offset From Center Frequency (kHz)	Measurement Bandwidth (kHz)	Maximum ACCP (dBc)
(+/-)9.375	6.25	-40
(+/-)15.625	6.25	-60
(+/-)21.875	6.25	-60
(+/-)37.5	25	-65
(+/-)62.5	25	-65
(+/-)87.5	25	-65
(+/-)150	100	-65
(+/-)250	100	-65
(+/-)350	100	-65
>400 to 12 MHz	30(s)	-75
12 MHz to receive band	30(s)	-75
In receive band	30(s)	-100

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

TABLE 8-1: P25 MODE – HIGH POWER

			764.0125 MHz		775.9875 MHz	
Offset from Center Freq. kHz	**Measurement BW kHz**	**Max ACCP dBc**	**Max ACCP low offset dBc**	**Max ACCP high offset dBc**	**Max ACCP low offset dBc**	**Max ACCP high offset dBc**
(+/-)9.375	6.25	-40	-42.44	-45.01	-44.64	-44.28
(+/-)15.625	6.25	-60	-70.35	-71.55	-72.18	-72.02
(+/-)21.875	6.25	-60	-73.19	-73.73	-74.70	-75.31
(+/-)37.5	25	-60	-67.54	-67.66	-69.00	-67.90
(+/-)62.5	25	-65	-65.47	-65.39	-66.36	-66.86
(+/-)87.5	25	-65	-68.73	-68.97	-66.81	-65.84
(+/-)150	100	-65	-66.25	-66.09	-65.68	-65.12
(+/-)250	100	-65	-68.52	-68.03	-69.58	-69.37
(+/-)350	100	-65	-67.53	-66.80	-68.50	-68.40

			764.0125 MHz	775.9875 MHz
Offset from Center Freq. kHz	**Measurement BW kHz**	**Max ACCP dBc**	**Max ACCP dBc**	**Max ACCP dBc**
>400 to 12 MHz	30(s)	-75	-80.2	-81.2
12 MHz to receive band	30(s)	-75	-81.5	-80.6
In receive band	30(s)	-100	-112.4	-111.5

TABLE 8-2: OTP MODE - HIGH POWER

			794.0125 MHz		805.0125 MHz	
Offset from Center Freq. kHz	Measurement BW kHz	Max ACCP dBc	Max ACCP low offset dBc	Max ACCP high offset dBc	Max ACCP low offset dBc	Max ACCP high offset dBc
(+/-)15.625	6.25	-40	-74.97	-71.53	-68.03	-66.22
(+/-)21.875	6.25	-60	-68.66	-69.15	-68.20	-68.62
(+/-)37.5	25	-60	-67.36	-66.71	-67.10	-66.07
(+/-)62.5	25	-65	-68.48	-67.74	-66.96	-67.05
(+/-)87.5	25	-65	-65.46	-65.53	-65.14	-65.17
(+/-)150	100	-65	-68.85	-69.50	-66.25	-66.05
(+/-)250	100	-65	-68.85	-69.50	-66.25	-66.05
(+/-)350	100	-65	-66.45	-67.30	-66.83	-67.10

			794.0125 MHz	805.0125 MHz
Offset from Center Freq. kHz	Measurement BW kHz	Max ACCP dBc	Max ACCP dBc	Max ACCP dBc
>400 to 12 MHz	30(s)	-75	-82.2	-80.1
12 MHz to receive band	30(s)	-75	-81.0	-80.3
In receive band	30(s)	-100	-110.0	-111.7

TABLE 8-3: P25 MODE – LOW POWER

			764.0125 MHz		775.9875 MHz	
Offset from Center Freq. kHz	Measurement BW kHz	Max ACCP dBc	Max ACCP low offset dBc	Max ACCP high offset dBc	Max ACCP low offset dBc	Max ACCP high offset dBc
(+/-)9.375	6.25	-40	-45.65	-47.58	-47.56	-45.42
(+/-)15.625	6.25	-60	-62.57	-62.52	-64.51	-63.90
(+/-)21.875	6.25	-60	-67.36	-63.48	-67.08	-66.72
(+/-)37.5	25	-60	-65.20	-65.22	-65.80	-67.01
(+/-)62.5	25	-65	-66.11	-65.45	-65.58	-65.64
(+/-)87.5	25	-65	-65.51	-65.74	-66.35	-67.16
(+/-)150	100	-65	-66.38	-66.30	-65.54	-65.87
(+/-)250	100	-65	-66.00	-65.23	-65.56	-66.09
(+/-)350	100	-65	-69.82	-69.67	-68.69	-67.26

			764.0125 MHz	775.9875 MHz
Offset from Center Freq. kHz	Measurement BW kHz	Max ACCP dBc	Max ACCP dBc	Max ACCP dBc
>400 to 12 MHz	30(s)	-75	-83.5	-81.2
12 MHz to receive band	30(s)	-75	-82.5	-80.6
In receive band	30(s)	-100	-111.2	-110.5

TABLE 8-4: OTP MODE – LOW POWER

			794.0125 MHz		805.0125 MHz	
Offset from Center Freq. kHz	Measurement BW kHz	Max ACCP dBc	Max ACCP low offset dBc	Max ACCP high offset dBc	Max ACCP low offset dBc	Max ACCP high offset dBc
(+/-)15.625	6.25	-40	-52.30	-51.10	-54.57	-53.24
(+/-)21.875	6.25	-60	-64.71	-63.43	-64.54	-64.97
(+/-)37.5	25	-60	-65.20	-65.38	-65.25	-66.65
(+/-)62.5	25	-65	-65.14	-67.23	-65.53	-65.19
(+/-)87.5	25	-65	-66.60	-66.32	-66.26	-65.63
(+/-)150	100	-65	-65.56	-65.24	-65.09	-65.53
(+/-)250	100	-65	-65.17	-65.77	-65.25	-65.15
(+/-)350	100	-65	-67.21	-68.17	-66.29	-65.70

			794.0125 MHz	805.0125 MHz
Offset from Center Freq. kHz	Measurement BW kHz	Max ACCP dBc	Max ACCP dBc	Max ACCP dBc
>400 to 12 MHz	30(s)	-75	-82.6	-81.5
12 MHz to receive band	30(s)	-75	-81.4	-80.7
In receive band	30(s)	-100	-110.2	-110.6

TABLE 8-5: OCF MODE – HIGH POWER

			764.0125 MHz		775.9875 MHz	
Offset from Center Freq. kHz	Measurement BW kHz	Max ACCP dBc	Max ACCP low offset dBc	Max ACCP high offset dBc	Max ACCP low offset dBc	Max ACCP high offset dBc
(+/-)9.375	6.25	-40	-72.13	-68.09	-67.87	-70.31
(+/-)15.625	6.25	-60	-70.83	-69.85	-72.65	-72.32
(+/-)21.875	6.25	-60	-72.65	-72.98	-72.22	-74.24
(+/-)37.5	25	-60	-68.83	-69.04	-69.46	-67.95
(+/-)62.5	25	-65	-67.67	-67.99	-66.87	-67.64
(+/-)87.5	25	-65	-69.77	-69.41	-70.81	-70.49
(+/-)150	100	-65	-64.63	-64.05	-61.09	-63.41
(+/-)250	100	-65	-65.92	-66.37	-68.17	-68.33
(+/-)350	100	-65	-73.58	-73.86	-71.71	-72.12

			764.0125 MHz	775.9875 MHz
Offset from Center Freq. kHz	Measurement BW kHz	Max ACCP dBc	Max ACCP dBc	Max ACCP dBc
>400 to 12 MHz	30(s)	-75	-80.2	-80.4
12 MHz to receive band	30(s)	-75	-81.7	-82.3
In receive band	30(s)	-100	-110.8	-111.3

TABLE 8-6: OCF MODE – HIGH POWER

			794.0125 MHz		805.0125 MHz	
Offset from Center Freq. kHz	**Measurement BW kHz**	**Max ACCP dBc**	**Max ACCP low offset dBc**	**Max ACCP high offset dBc**	**Max ACCP low offset dBc**	**Max ACCP high offset dBc**
(+/-)9.375	6.25	-40	-59.24	-60.10	-60.89	-62.31
(+/-)15.625	6.25	-60	-69.15	-69.86	-71.67	-69.59
(+/-)21.875	6.25	-60	-74.40	-73.94	-73.39	-73.32
(+/-)37.5	25	-60	-68.86	-69.06	-69.79	-70.50
(+/-)62.5	25	-65	-66.42	-67.52	-67.68	-68.61
(+/-)87.5	25	-65	-71.32	-71.14	-66.83	-66.12
(+/-)150	100	-65	-63.77	-65.69	-65.93	-66.35
(+/-)250	100	-65	-66.52	-65.92	-72.20	-70.86
(+/-)350	100	-65	-72.13	-71.57	-73.55	-72.60

			794.0125 MHz	805.0125 MHz
Offset from Center Freq. kHz	**Measurement BW kHz**	**Max ACCP dBc**	**Max ACCP dBc**	**Max ACCP dBc**
>400 to 12 MHz	30(s)	-75	-80.5	-80.3
12 MHz to receive band	30(s)	-75	-81.5	-80.8
In receive band	30(s)	-100	-110.8	-112.0

TABLE 8-7: OCF MODE – LOW POWER

			764.0125 MHz		775.9875 MHz	
Offset from Center Freq. KHz	**Measurement BW KHz**	**Max ACCP dBc**	**Max ACCP low offset dBc**	**Max ACCP high offset dBc**	**Max ACCP low offset dBc**	**Max ACCP high offset dBc**
(+/-)9.375	6.25	-40	-66.20	-66.11	-67.00	-67.09
(+/-)15.625	6.25	-60	-69.04	-68.11	-67.19	-67.46
(+/-)21.875	6.25	-60	-68.49	-69.65	-68.56	-69.15
(+/-)37.5	25	-60	-66.23	-68.00	-67.53	-66.32
(+/-)62.5	25	-65	-66.00	-64.17	-63.98	-67.02
(+/-)87.5	25	-65	-65.94	-66.59	-66.43	-66.31
(+/-)150	100	-65	-64.67	-65.36	-60.10	-61.53
(+/-)250	100	-65	-65.20	-65.31	-64.59	-64.81
(+/-)350	100	-65	-68.01	-67.69	-66.61	-66.18

			764.0125 MHz	775.9875 MHz
Offset from Center Freq. kHz	**Measurement BW kHz**	**Max ACCP dBc**	**Max ACCP dBc**	**Max ACCP dBc**
>400 to 12 MHz	30(s)	-75	-82.1	-80.5
12 MHz to receive band	30(s)	-75	-80.7	-81.2
In receive band	30(s)	-100	-110.8	-111.1

TABLE 8-8: OCF MODE – LOW POWER

			794.0125 MHz		805.0125 MHz	
Offset from Center Freq. kHz	**Measurement BW kHz**	**Max ACCP dBc**	**Max ACCP low offset dBc**	**Max ACCP high offset dBc**	**Max ACCP low offset dBc**	**Max ACCP high offset dBc**
(+/-)9.375	6.25	-40	-60.45	-60.13	-58.97	-57.22
(+/-)15.625	6.25	-60	-67.06	-67.95	-65.07	-65.66
(+/-)21.875	6.25	-60	-70.20	-68.31	-67.66	-68.47
(+/-)37.5	25	-60	-67.64	-66.10	-66.25	-68.39
(+/-)62.5	25	-65	-64.23	-66.39	-64.61	-66.36
(+/-)87.5	25	-65	-65.57	-67.59	-66.66	-67.21
(+/-)150	100	-65	-62.00	-62.22	-64.18	-66.99
(+/-)250	100	-65	-63.61	-62.01	-63.53	-63.34
(+/-)350	100	-65	-69.11	-68.07	-63.79	-64.30

			794.0125 MHz	805.0125 MHz
Offset from Center Freq. kHz	**Measurement BW kHz**	**Max ACCP dBc**	**Max ACCP dBc**	**Max ACCP dBc**
>400 to 12 MHz	30(s)	-75	-81.5	-80.5
12 MHz to receive band	30(s)	-75	-79.8	-80.3
In receive band	30(s)	-100	-111.6	-110.5

TABLE 8-9: TEST EQUIPMENT USED FOR ACCP REQUIREMENTS

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	08/11/06
00067	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3643A00657	07/16/06

TEST PERSONNEL:

Daniel Biggs		July 30 & August 30, 2005
Test Technician/Engineer	Signature	Dates Of Test