Engineering and Testing for EMC and Safety Compliance

Certification Report

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MODEL: P5300 900 MHz Portable Radio

FCC ID: OWDTR-0047-E
IC: 3636B-0047

May 16, 2007

Standards Referenced for this Report	
Part 2: 2006	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
Part 15: 2006	Radio Frequency Devices - §15.109: Radiated Emissions Limits
Part 90: 2006	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-603-C-2004	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

Frequency Range (MHz)	Rated Transmit Power (W) (Conducted)	Frequency Tolerance (ppm)	Emission Designator
896-901	3.0	.63	11K0F3E (Analog Voice)
935-940	2.5	.63	11K0F3E (Analog Voice)
896-901	3.0	.63	11K7F1D/E (2 level FSK NB 9600bps)
935-940	2.5	.63	11K7F1D/E (2 level FSK NB 9600bps)
896-901	3.0	.63	7K7F1D/E (2 level FSK NB 4800bps)
935-940	2.5	.63	7K7F1D/E (2 level FSK NB 4800bps)
896-901	3.0	.63	8K4F1D/E (4-level FSK P25)
935-940	2.5	.63	8K4F1D/E (4-level FSK P25)
896-901	3.0	.63	8K8F1D/E (4-level FSK OTP)

Report Prepared by Test Engineer: Daniel Biggs

Document Number: 2007144/QRTL07-069

Table of Contents

Table of Figures

Table of Tables

Table of Plots

Table of Appendixes

Table of Photographs

1 General Information

This following 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 **P5300 900 MHz Portable Radio; FCC ID: OWDTR-0047-E, IC: 3636B-0047**. 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 Industry Canada RSS-119. 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 an original application report.

2 Tested System Details

The test sample was received on March 28, 2007. Listed below are the identifiers and descriptions of all equipment, cables, and internal devices used with the EUT for this testing, as applicable.

Table 2-1: Equipment under Test (EUT)

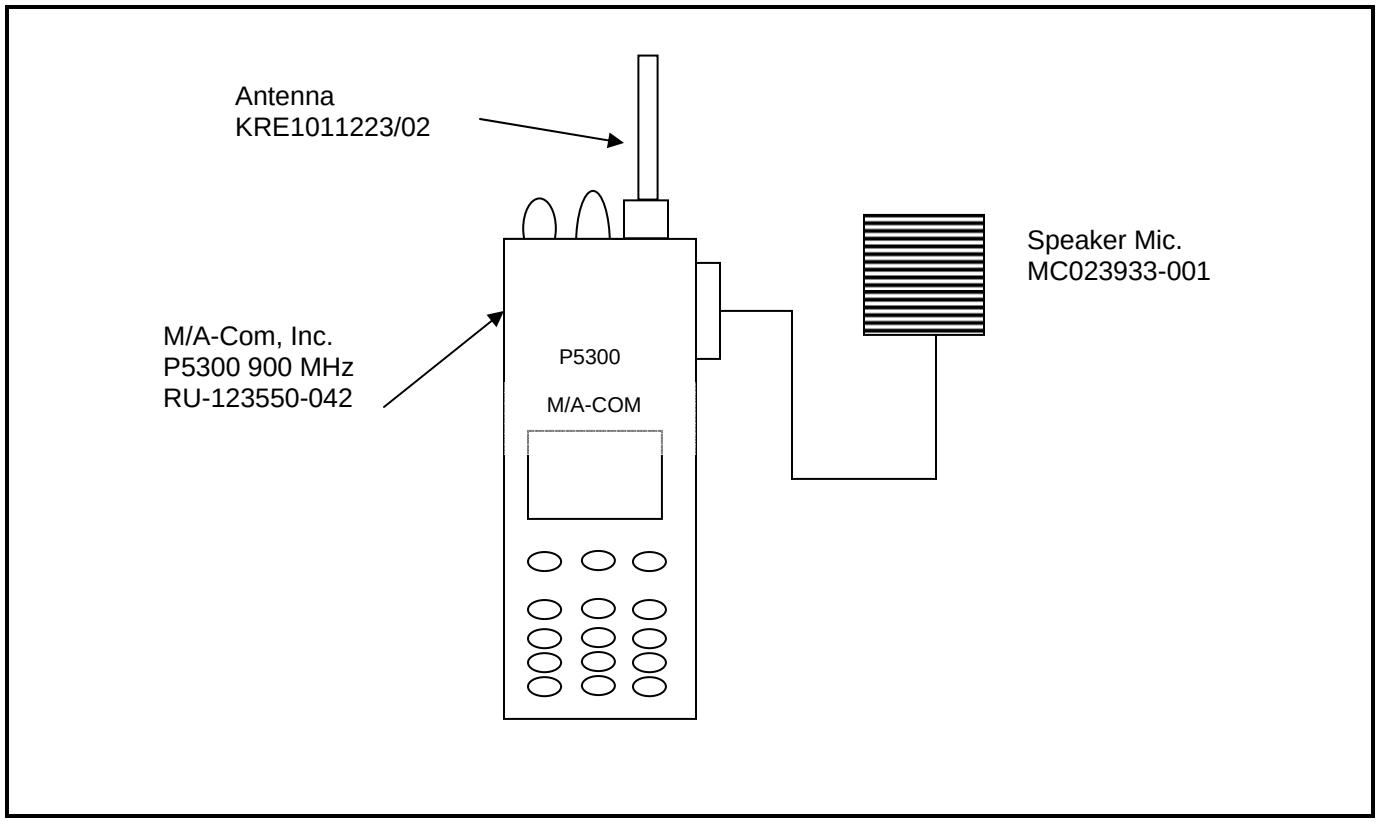
The test system contains the following components:

Part	Manufacturer	Model	PN/SN	FCC ID	RTL Bar Code
Radio	M/A-Com, Inc.	P5300	RU-123550-042	OWDTR-0047-E	17864
Battery	M/A-Com, Inc.	NiMH	BT-023406-003	N/A	N/A
Battery	M/A-Com, Inc.	NiCd	BT-023406-001	N/A	N/A
Battery	M/A-Com, Inc.	Li-Ion	BT-023406-005	N/A	N/A
Microphone	M/A-Com, Inc.	Speaker Mic	MC023933-001	N/A	017868
Microphone	M/A-Com, Inc.	Speaker Mic	MC023933-002	N/A	017869
Antenna	M/A-Com, Inc.	¼ Wave Whip	KRE1011223/02	N/A	N/A

Table 2-2: Support Equipment

Part	Manufacturer	Model	PN/SN	FCC ID	RTL Bar Code
Test Box	M/A-Com, Inc.	P5300	N/A	N/A	017870
Test Cable	M/A-Com, Inc.		N/A	N/A	017869

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:
NiCd: 6.0 to 9.0 (7.5 nom.)
NiMH: 6.0 to 9.0 (7.5 nom.)
Li Ion: 6.0 to 9.0 (7.5 nom.)
Alkaline: 6.0 to 9.2 (7.5 nom.)

Current: 2.5 A

4 FCC Rules and Regulations Part 2 §2.1046(a): RF Power Output: Conducted; RSS-119 §6.2: Output Power Test

4.1 Test Procedure

ANSI TIA-603-C-2004, section 2.2.1

The EUT was connected with a power sensor/meter through an appropriate 50 ohm attenuator. Attenuator loss was accounted for.

4.2 Test Data

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

Channel	Frequency (MHz)	RF Power Measured (Watt)*
1 (High Power)	896.0125	3.1
2 (High Power)	898.5000	3.1
3 (High Power)	900.9875	3.1
4 (High Power)	935.0125	2.7
5 (High Power)	937.5000	2.7
6 (High Power)	939.9875	2.7

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

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

Channel	Frequency (MHz)	Rated Power (Watt)*
1 (High Power)	896.0125	3.0
2 (High Power)	898.5000	3.0
3 (High Power)	900.9875	3.0
4 (High Power)	935.0125	2.5
5 (High Power)	937.5000	2.5
6 (High Power)	939.9875	2.5

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

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

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901184	Agilent Technologies	E4416A	EPM-P Power Meter, Single Channel	GB41050573	10/3/07
901356	Agilent Technologies	E9323A	Power Sensor	31764-264	10/3/07
900819	Weinschel Corporation	BF0830	Attenuator 10 db	N/A	12/2/08

Test Personnel:

Dan Biggs		March 28, 2007
Test Engineer	Signature	Date Of Test

5 FCC Rules and Regulations Part 2 §2.1051: Spurious Emissions at Antenna Terminals; Part 90 §90.210: Emissions Masks; RSS-119 §5.8: Transmitter Unwanted Emissions

5.1 Test Procedure

ANSI TIA-603-C-2004, Section 2.2.13.

The transmitter was interfaced with a spectrum analyzer through an appropriate 50 ohm attenuator and a notch filter. The transmitter was operated at maximum power. Attenuator and cable losses were accounted for.

Analog Modulation: The transmitter is terminated with a 50 Ω 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.

Digital Modulation: Modulated to its maximum extent using a pseudo random data sequence – 9600 bps.

5.2 Test Data

Frequency range of measurement per Part 2.1057: 9 kHz to 10xFc.

Limit = 50 + 10 Log (P) dB or 70 dB, whichever is greater.

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 5-1: Conducted Spurious Emissions – 896.0125 MHz; Narrow Band; High Power

Freq = 896.0125 MHz - Limit = 50 + 10 Log P = 54.8 dBc - Conducted Power = 34.85 dBm = 3.1 W

Frequency (MHz)	SA Level w/ Notch (dBm)	Level (dBc)	Limit (dBc)	Margin(dB)
1792.025	-48.4	83.3	54.8	-28.4
2688.038	-48.1	83.0	54.8	-28.1
3584.050	-62.3	97.2	54.8	-42.3
4480.063	-61.9	96.8	54.8	-41.9
5376.075	-64.5	99.4	54.8	-44.5
6272.088	-64.0	98.9	54.8	-44.0
7168.100	-60.3	95.2	54.8	-40.3
8064.113	-58.4	93.3	54.8	-38.4
8960.125	-57.5	92.4	54.8	-37.5

Table 5-2: Conducted Spurious Emissions – 898.5000 MHz; Narrow Band; High Power

Freq = 898.5 MHz - Limit = 50 + 10 Log P = 47.9 dBc - Conducted Power = 54.9 dBm = 3.1 W

Frequency (MHz)	SA Level w/ Notch (dBm)	Level (dBc)	Limit (dBc)	Margin(dB)
1797.000	-50.3	85.2	54.9	-30.3
2695.500	-51.3	86.2	54.9	-31.3
3594.000	-60.9	95.8	54.9	-40.9
4492.500	-62.9	97.8	54.9	-42.9
5391.000	-63.6	98.5	54.9	-43.6
6289.500	-65.8	100.7	54.9	-45.8
7188.000	-60.5	95.4	54.9	-40.5
8086.500	-55.4	90.3	54.9	-35.4
8985.000	-58.0	92.9	54.9	-38.0

Table 5-3: Conducted Spurious Emissions – 900.9875 MHz; Narrow Band; High Power

Freq = 900.9875 MHz - Limit = 50 + 10 Log P = 54.9 dBc - Conducted Power = 34.86 dBm = 3.1 W

Frequency (MHz)	SA Level w/ Notch (dBm)	Level (dBc)	Limit (dBc)	Margin(dB)
1801.975	-45.2	79.5	54.9	-24.7
2702.963	-50.2	84.5	54.9	-29.7
3603.950	-62.5	96.8	54.9	-42.0
4504.938	-65.4	99.7	54.9	-44.9
5405.925	-64.6	98.9	54.9	-44.1
6306.913	-64.4	98.7	54.9	-43.9
7207.900	-59.6	93.9	54.9	-39.1
8108.888	-57.7	92.0	54.9	-37.2
9009.875	-58.9	93.2	54.9	-38.4

Table 5-4: Conducted Spurious Emissions – 935.0125 MHz; Narrow Band; High Power

Freq = 935.0125 MHz - Limit = 50 + 10 Log P = 54.3 dBc - Conducted Power = 34.3 dBm = 2.7 W

Frequency (MHz)	Notch/Cable Loss (dB)	Level (dBc)	Limit (dBc)	Margin(dB)
1870.025	-61.1	94.3	54.3	-39.9
2805.038	-50.2	79.4	54.3	-25.1
3740.050	-63.8	98.0	54.3	-43.7
4675.063	-65.7	96.7	54.3	-42.4
5610.075	-67.3	101.1	54.3	-46.8
6545.088	-60.5	91.1	54.3	-36.8
7480.100	-58.1	84.6	54.3	-30.3
8415.113	-58.6	91.8	54.3	-37.5
9350.125	-59.6	88.9	54.3	-34.6

Table 5-5: Conducted Spurious Emissions – 937.5000 MHz; Narrow Band; High Power

Freq = 937.5 MHz - Limit = 50 + 10 Log P = 54.3 dBc - Conducted Power = 34.3 dBm = 2.7 W

Frequency (MHz)	Notch/Cable Loss (dB)	Level (dBc)	Limit (dBc)	Margin(dB)
1875.000	-63.6	96.6	54.3	-42.3
2812.500	-50.2	80.9	54.3	-26.6
3750.000	-63.5	97.3	54.3	-43.0
4687.500	-66.2	98.3	54.3	-44.0
5625.000	-66.3	100.1	54.3	-45.8
6562.500	-59.2	91.0	54.3	-36.7
7500.000	-59.1	87.5	54.3	-33.2
8437.500	-57.6	90.8	54.3	-36.5
9375.000	-56.9	84.5	54.3	-30.2

Table 5-6: Conducted Spurious Emissions – 939.9875 MHz; Narrow Band; High Power

Freq = 939.9875 MHz - Limit = 50 + 10 Log P = 54.3 dBc - Conducted Power = 34.3 dBm = 2.7 W

Frequency (MHz)	Notch/Cable Loss (dB)	Level (dBc)	Limit (dBc)	Margin(dB)
1879.975	-63.8	97.3	54.3	-43.0
2819.963	-49.9	82.7	54.3	-28.4
3759.950	-64.0	97.9	54.3	-43.6
4699.938	-67.0	100.3	54.3	-46.0
5639.925	-67.7	101.5	54.3	-47.2
6579.913	-59.3	90.1	54.3	-35.8
7519.900	-59.1	90.2	54.3	-35.9
8459.888	-57.7	91.8	54.3	-37.5
9399.875	-59.3	81.6	54.3	-27.3

Table 5-7: 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	10/16/07
901396	MCE Weinschel	48-40-34	Attenuator, 40 dB, DC-18 GHz, 100 W	93453	1/13/09
901424	Insulated Wire Inc.	KPS-1503-360-KPS	RF cable 36"	NA	12/5/07

Test Personnel:

Daniel Biggs		March 29, 2007
Test Engineer	Signature	Date Of Test

6 FCC Rules and Regulations Part 2 §2.1053(a): Field Strength of Spurious Radiation; RSS-119 §6.3: Unwanted Emissions

6.1 Test Procedure

ANSI TIA-603-C-2004, Section 2.2.12

Analog Modulation: The transmitter is terminated with a 50 Ω 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.

Digital Modulation: Modulated to its maximum extent using a pseudo random data sequence – 9600 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.

P_d(dBm) = P_g(dBm) – cable loss (dB) + antenna gain (dB)

where:

P_d is the dipole equivalent power
P_g is the generator output power into the substitution antenna

6.2 Test Data

6.2.1 CFR 47 Part 90.210 Requirements

Limit = 50 + 10 Log (P) dB or 70 dB. whichever is greater. 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 6-1: Field Strength of Spurious Radiation – 898.5MHz; Narrow Band; High Power

Freq = 898.5 MHz - Limit = 50 + 10 Log P = 47.9 dBc - Conducted Power = 34.9 dBm = 3.1 W

Frequency (MHz)	Measured Level (dBuv)		Signal Gen. Level (db)		Cable Loss (dB)	Antenna Gain (dBd)		Corrected Level (dBc)		Limit (dBc)	Margin (dB)	
898.5	H	V	H	V		H	V	H	V		H	V
1797.00	44.5	48.4	-58.7	-54.1	5.5	4.8	5.0	94.3	89.5	54.9	-39.4	-34.6
2695.50	30.0	35.0	-67.6	-66.5	6.7	6.9	7.1	102.3	101.0	54.9	-47.4	-46.1
3594.00	29.6	30.8	-67.2	-64.7	8.0	7.3	7.7	102.8	99.9	54.9	-48.0	-45.1
4492.50	25.1	26.5	-68.5	-66.6	9.2	7.9	8.2	104.7	102.5	54.9	-49.8	-47.7
5391.00	26.4	25.3	-64.6	-66.4	10.2	7.9	8.0	101.8	103.5	54.9	-47.0	-48.7
6289.50	26.3	25.8	-64.5	-65.4	11.2	8.8	8.8	101.8	102.7	54.9	-47.0	-47.8
7188.00	29.8	28.7	-58.1	-60.8	12.1	8.4	8.5	96.7	99.3	54.9	-41.9	-44.4
8086.50	32.0	31.3	-52.8	-54.3	12.8	7.4	7.5	93.1	94.5	54.9	-38.3	-39.6
8985.00	29.8	29.2	-51.4	-53.1	14.0	8.6	8.4	91.7	93.6	54.9	-36.8	-38.7

Table 6-2: Field Strength of Spurious Radiation – 937.5 MHz; Narrow Band; High Power

Freq = 937.5 MHz - Limit = 50 + 10 Log P = 54.3 dBc - Conducted Power = 34.3 dBm = 2.7 W

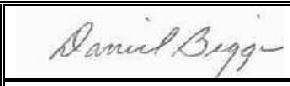
Frequency (MHz)	Measured Level (dBuv)		Signal Gen. Level (db)		Cable Loss (dB)	Antenna Gain (dBd)		Corrected Level (dBc)		Limit (dBc)	Margin (dB)	
937.5	H	V	H	V		H	V	H	V		H	V
1875.00	53.5	55.2	-49.7	-46.3	5.5	4.8	5.0	84.7	81.1	54.3	-30.4	-26.8
2812.50	36.4	38.7	-63.5	-63.6	6.5	6.9	7.1	97.4	97.3	54.3	-43.1	-43.0
3750.00	30.8	32.7	-65.8	-66.0	8.3	7.2	7.3	101.2	101.3	54.3	-46.9	-47.0
4687.50	26.3	26.2	-67.6	-67.2	9.2	7.8	7.8	103.3	102.9	54.3	-49.0	-48.6
5625.00	25.2	25.3	-66.8	-66.4	10.6	8.2	8.2	103.5	103.1	54.3	-49.2	-48.8
6562.50	31.0	32.5	-60.2	-59.4	11.6	8.6	8.8	97.5	96.5	54.3	-43.2	-42.2
7500.00	30.3	30.7	-57.6	-58.8	12.4	8.7	8.9	95.6	96.6	54.3	-41.3	-42.3
8437.50	31.2	32.4	-53.6	-53.2	13.0	8.0	8.3	92.9	92.2	54.3	-38.6	-37.9
9375.00	28.4	28.6	-52.8	-53.7	14.2	8.6	8.8	92.7	93.4	54.3	-38.4	-39.1

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

Table 6-3: Test Equipment for Testing Field Strength of Spurious Radiation

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
900791	Schaffner-Chase	CBL6112	Antenna (25 MHz – 2 GHz)	2099	6/12/07
900772	EMCO	3161-02	Horn Antennas (2 – 4 GHz)	9504-1044	5/20/07
900321	EMCO	3161-03	Horn Antennas (4 – 8 GHz)	9508-1020	5/20/07
900323	EMCO	3160-07	Horn Antennas (8.2 – 12 GHz)	9605-1054	7/31/09
900814	Electro-Metrics	EM-6961 (RGA-60)	Double Ridges Guide Antenna (1-18 GHz)	2310	3/30/09
901215	Hewlett Packard	8596EM	EMC Analyzer (9 kHz – 12.8 GHz)	3826A00144	10/16/07
901426	Insulated Wire Inc.	KPS-1503-3600-KPS	RF Cable, 30'	NA	12/6/07
901425	Insulated Wire, Inc.	KPS-1503-2400-KPS	RF Cable, 20'	NA	12/5/07
901424	Insulated Wire Inc.	KPS-1503-360-KPS	RF Cable 36"	NA	12/5/07

Test Personnel:

Daniel Biggs		March 29, 2007
Test Engineer	Signature	Date Of Test

7 FCC Rules and Regulations Part 2 §2.1049: Occupied Bandwidth; Part 90 §90.210(i)&(j): Emissions Masks; RSS-119 §5.8: Transmitter Unwanted Emissions

7.1 Test Procedure

ANSI TIA-603-C-2004, Section 2.2.11.

The transmitter was interfaced with a spectrum analyzer through an appropriate 50 ohm attenuator and a notch filter. The transmitter was operated at maximum power. Attenuator losses were accounted for.

Analog Modulation: The transmitter is terminated with a 50 Ω 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.

The device uses digital modulation modulated to its maximum extent using a pseudo-random data sequence of 9600 bps.

Limit Mask I:

Emission Mask I for transmitters that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power of the transmitter (P) as follows:

(1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency fd in kHz) of more than 6.8 kHz, but not more than 9.0 kHz: at least 25 dB;

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency of more than 9.0 kHz, but not more than 15 kHz: at least 35 dB;

(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency of more than 15 kHz: at least 43 + 10 log (P) dB, or 70 dB, whichever is the lesser attenuation.

Limit Mask J:

Emission Mask J for transmitters that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power of the transmitter (P) as follows:

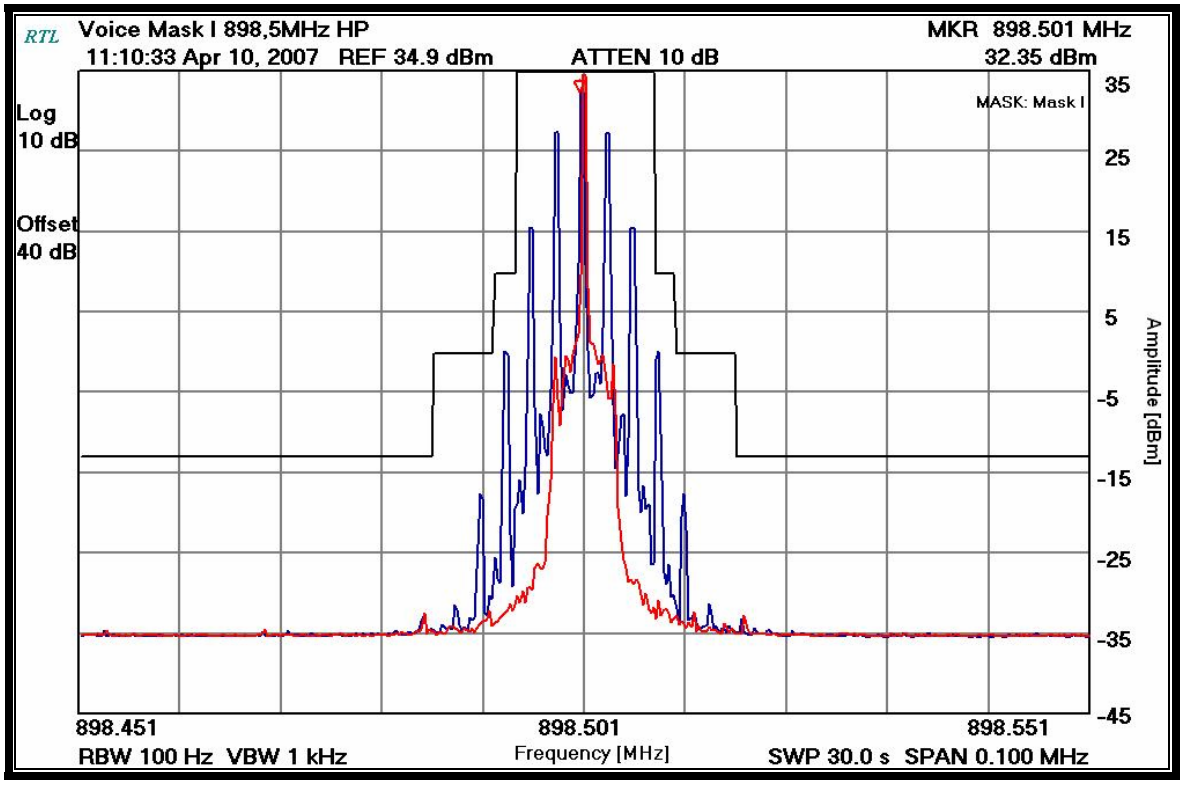
(1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 2.5 kHz, but not more than 6.25 kHz: at least 53 log (f_d/2.5) dB;

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 6.25 kHz, but not more than 9.5 kHz: at least 103 log (f_d/3.9) dB;

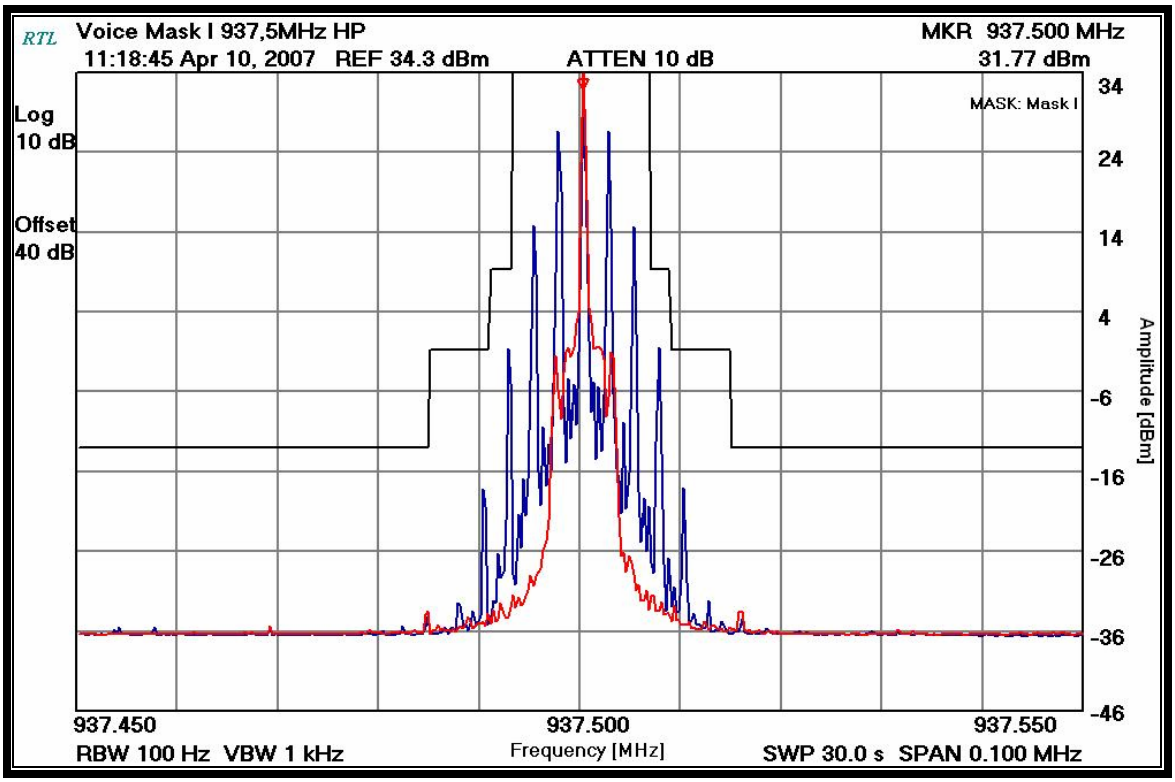
(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 9.5 kHz: at least 157 log (fd/5.3) dB, or 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation.

7.2 Test Data

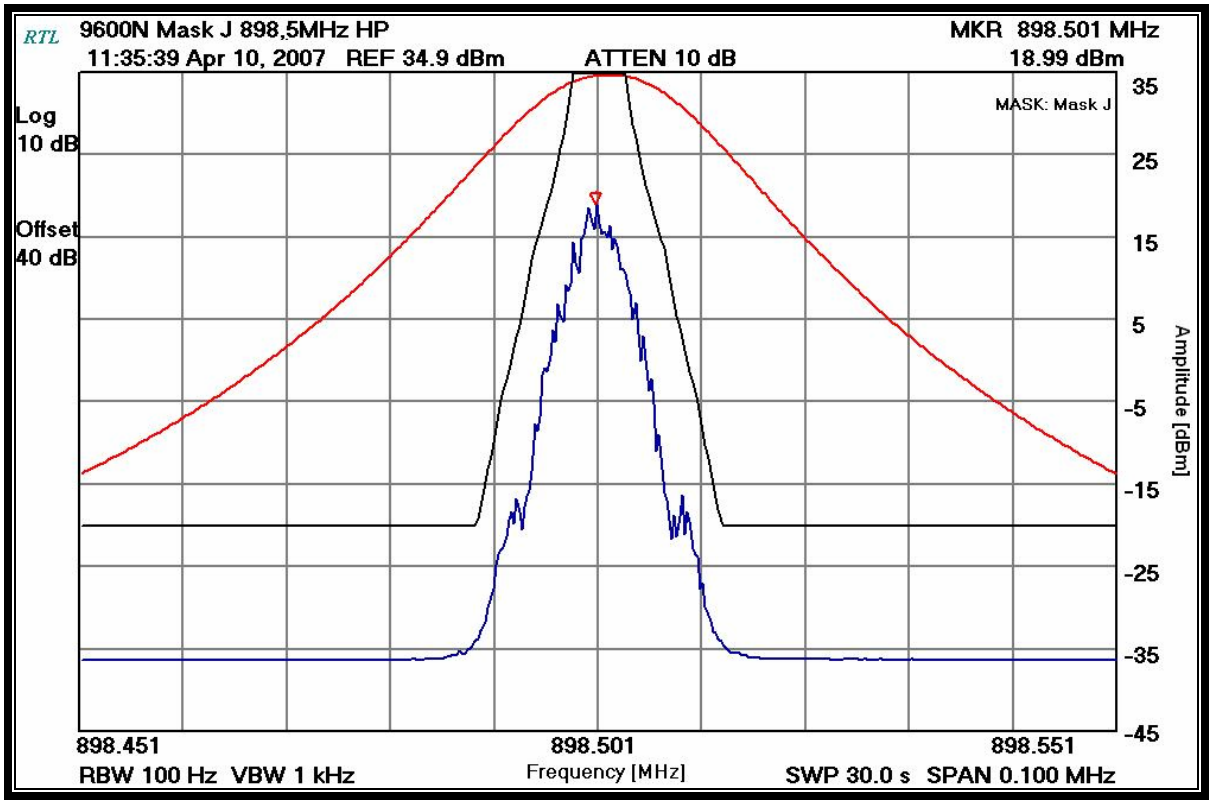
Plot 7-1: Occupied Bandwidth – 898.5 MHz; Mask I; Analog; High Power



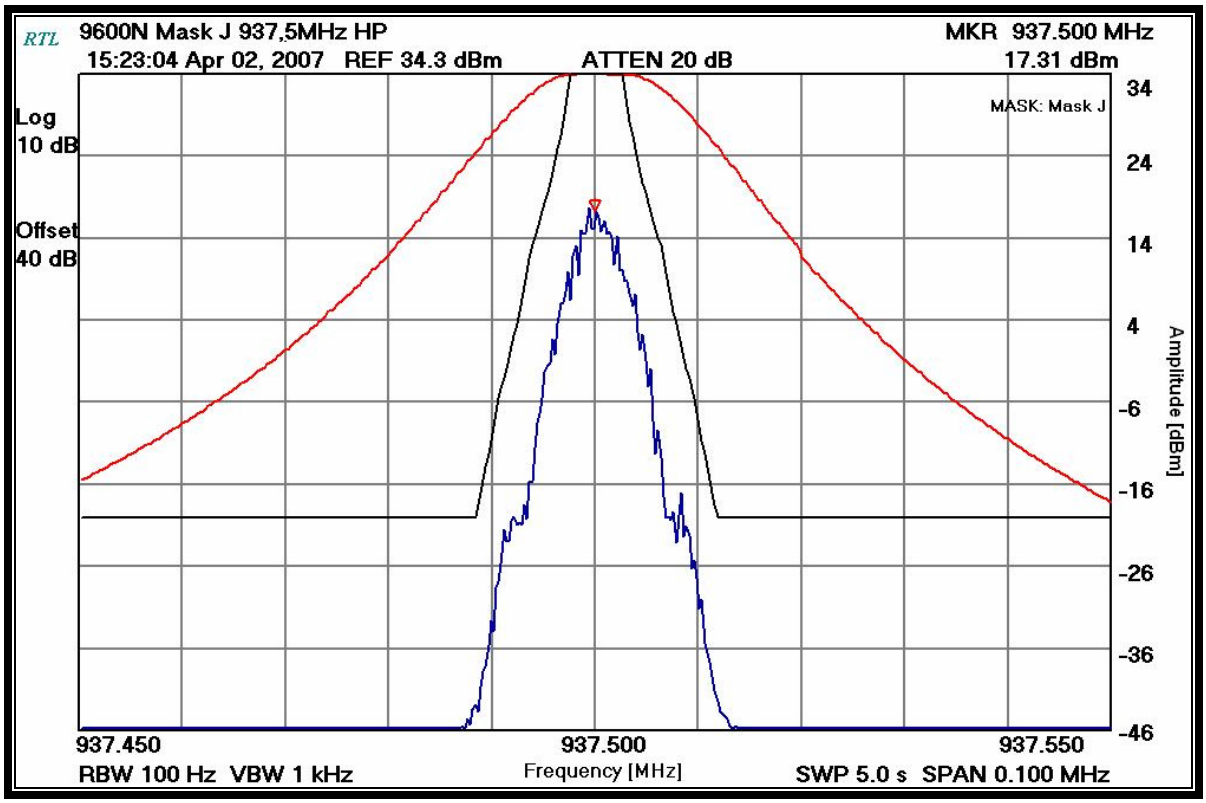
Plot 7-2: Occupied Bandwidth – 937.5 MHz; Mask I; Analog; High Power



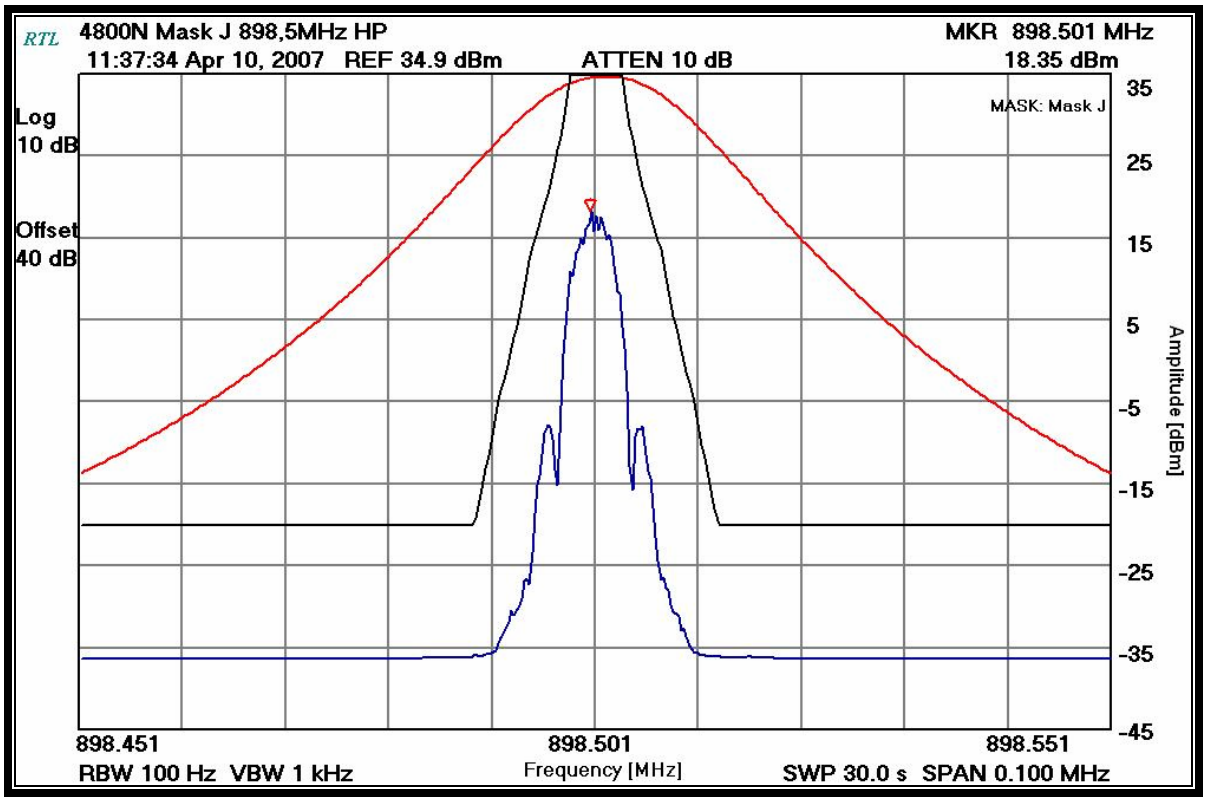
Plot 7-3: Occupied Bandwidth – 898.5 MHz; Mask J; 2-level FSK; 9600 BPS



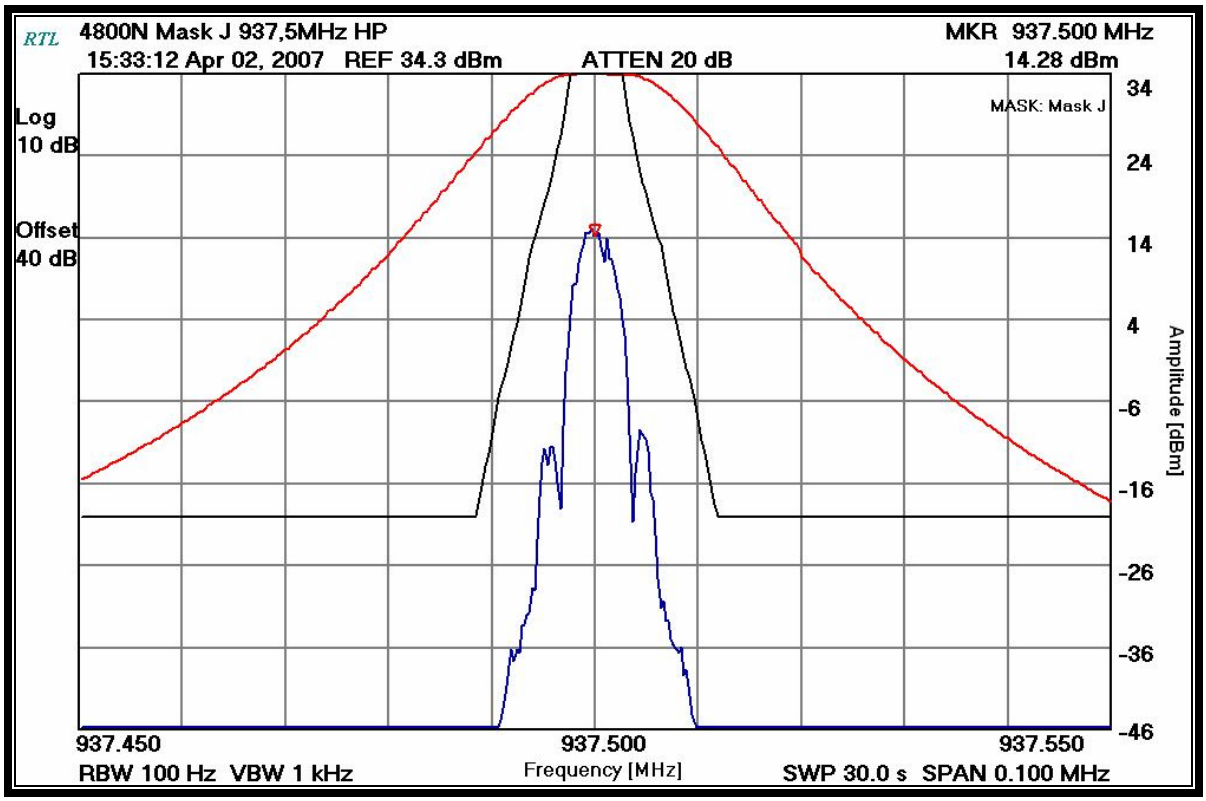
Plot 7-4: Occupied Bandwidth – 937.5 MHz; Mask J; 2-level FSK; 9600 BPS



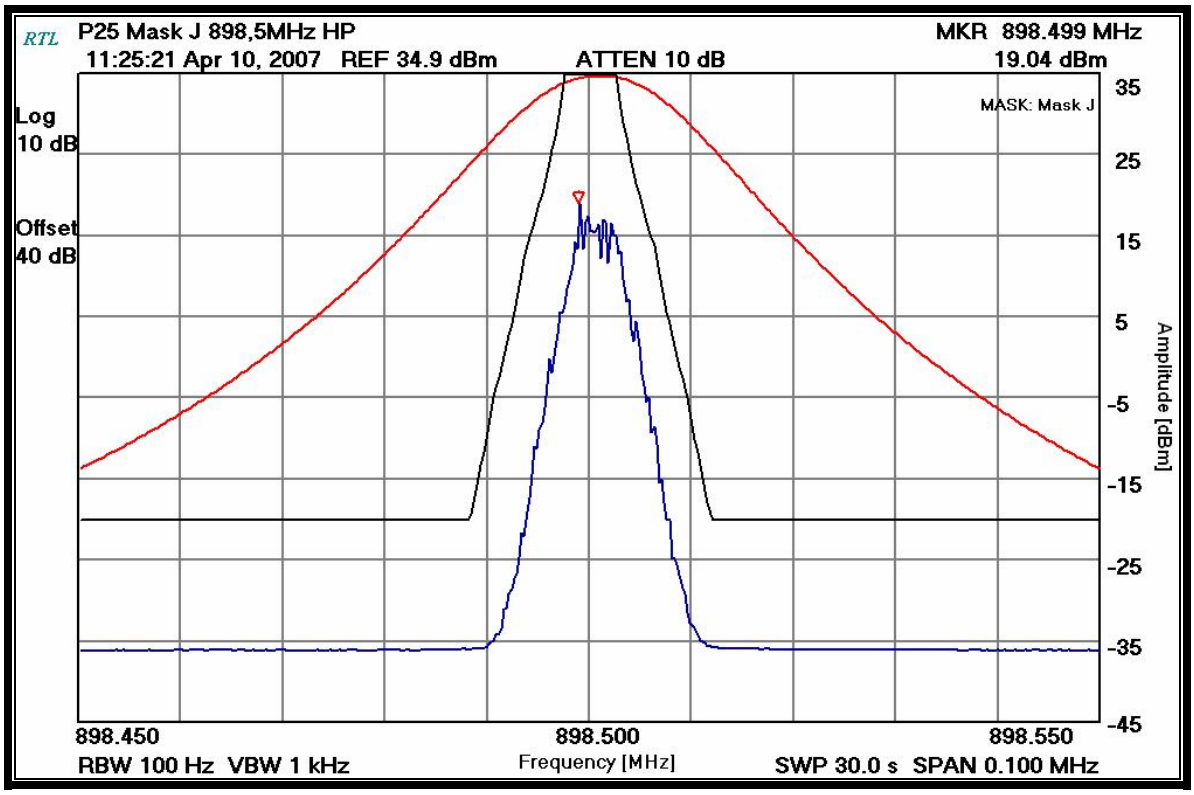
Plot 7-5: Occupied Bandwidth – 898.5 MHz; Mask J; 2-level FSK; 4800 BPS



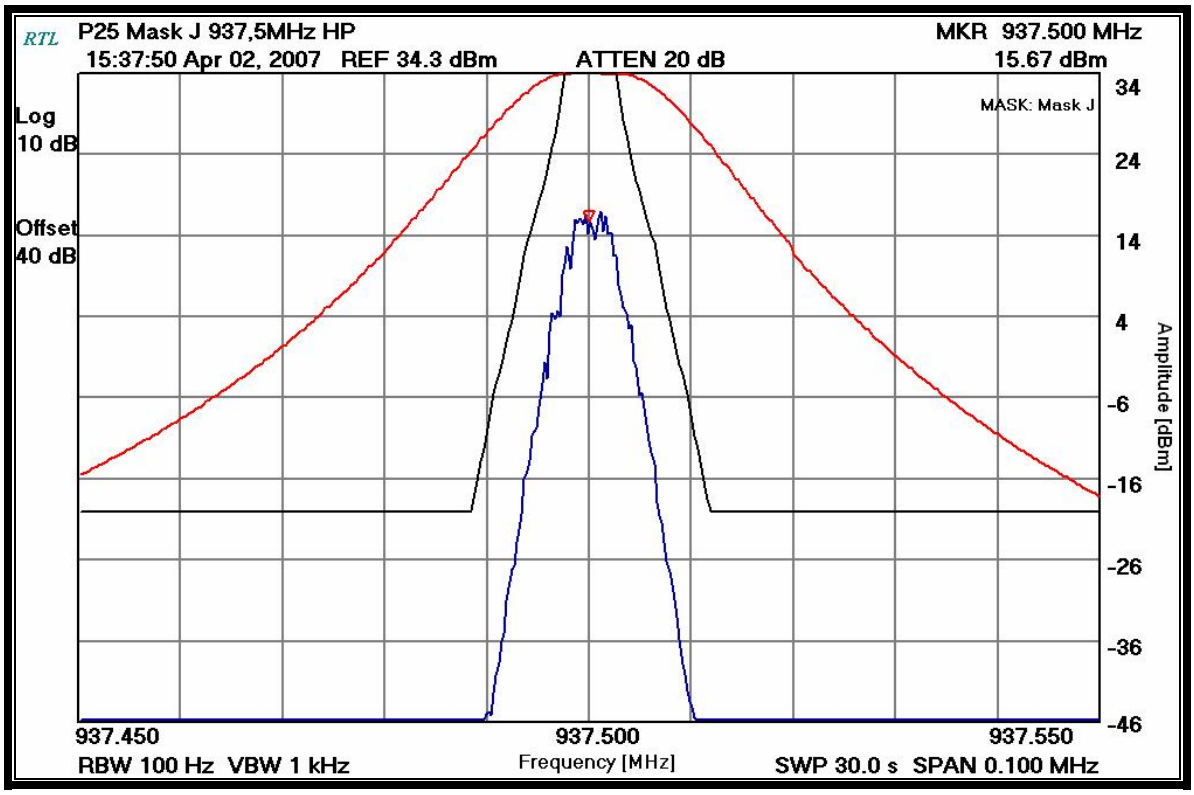
Plot 7-6: Occupied Bandwidth – 937.5 MHz; Mask J; 2-level FSK; 4800 BPS



Plot 7-7: Occupied Bandwidth – 898.5 MHz; Mask J; 4-level FSK (P25 mode); 4800 SPS



Plot 7-8: Occupied Bandwidth – 937.5 MHz; Mask J; 4-level FSK (P25 mode); 4800 SPS



Plot 7-9: Occupied Bandwidth – 898.5 MHz; Mask J; 4-level FSK (NB OTP mode); 4800 SPS

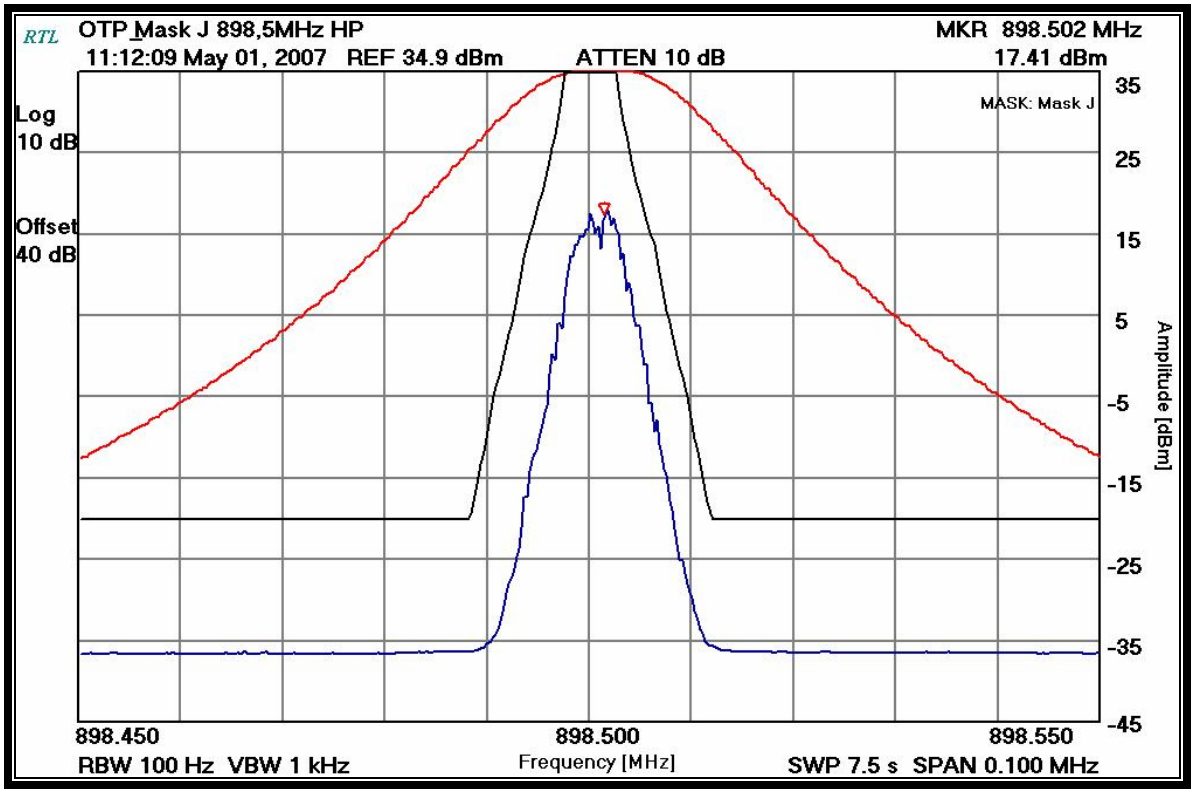


Table 7-1: Test Equipment for Testing Occupied Bandwidth

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901215	Hewlett Packard	8596EM	EMC Analyzer (9 kHz – 12.8 GHz)	3826A00144	10/16/07
900912	Hewlett Packard	85662A	EMI Receiver	2542A12739	3/21/08
901396	MCE Weinschel	48-40-34	Attenuator, 40 dB, DC-18 GHz, 100 W	93453	12/02/08

Test Personnel:

Daniel Biggs	Daniel Biggs	April 2 & 10 & May 1, 2007
Test Technician/Engineer	Signature	Dates of Tests

8 FCC Rules and Regulations Part 90 §90.213 and Part 2 §2.1055: Frequency Stability

8.1 Test Procedure

ANSI/TIA-603-C-2004, 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°C 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 from the battery operating end point to 122.7% of nominal value.

The worst-case test data are shown below in Table 8-1 and Table 8-3.

8.2 Test Data

8.2.1 CFR 47 Part 90.213 Requirements

For transmitters over 2 Watts output power:

896 - 901 MHz band: 1.5 ppm
902 - 928 MHz band: 2.5 ppm
935 - 940 MHz band: 1.5 ppm

8.2.2 Frequency Stability/Temperature Variation

Plot 8-1: Temperature Frequency Stability – 937.5 MHz Channel

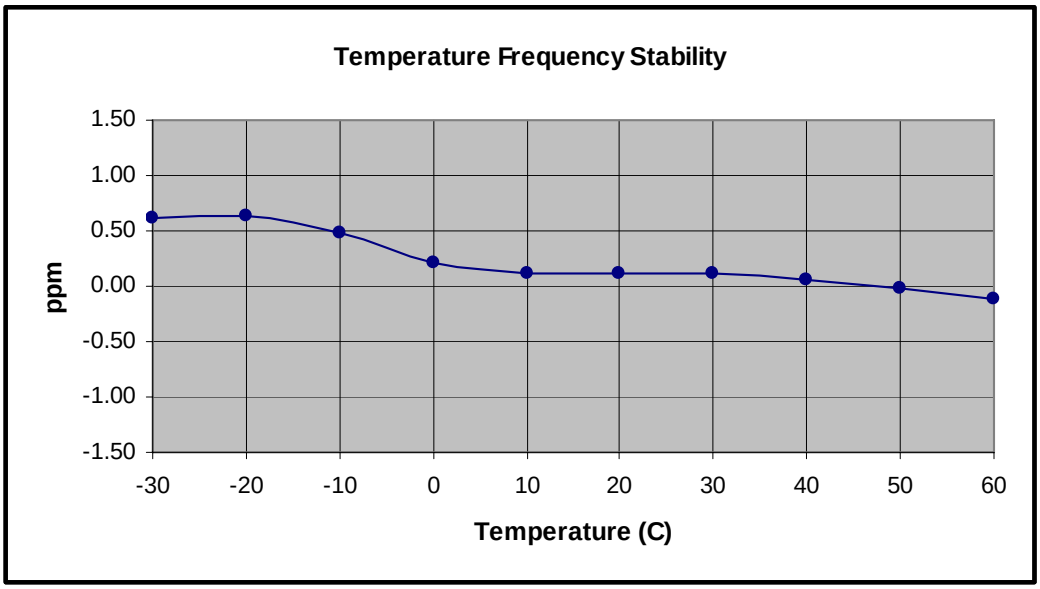


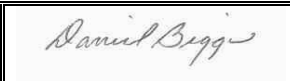
Table 8-1: Frequency Stability/Temperature Variation – 937.5 MHz

Temperature °C	Measured Frequency (MHz)	ppm
-30	937.500568	0.61
-20	937.500593	0.63
-10	937.500458	0.49
0	937.500196	0.21
10	937.500110	0.12
20	937.500105	0.11
30	937.500109	0.12
40	937.500055	0.06
50	937.499975	-0.03
60	937.499889	-0.12

Table 8-2: Test Equipment for Testing Frequency Stability/Temperature

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
900946	Tenney Engineering, Inc.	TH65	Temperature Chamber with Humidity	11380	01/20/08
901396	MCE Weinschel	48-40-34	Attenuator, 40 dB, DC-18 GHz, 100 W	93453	12/2/08
901424	Insulated Wire Inc.	KPS-1503-360-KPS	RF Cable 36"	NA	12/12/07
901300	Agilent Technologies	53131A	Frequency Counter	MY40001345	12/15/2007

Test Personnel:

Daniel Biggs		March 30, 2007
Test Engineer	Signature	Date Of Test

8.2.3 Frequency Stability/Voltage Variation

Plot 8-2: Temperature Frequency Stability – 937.5 MHz Channel

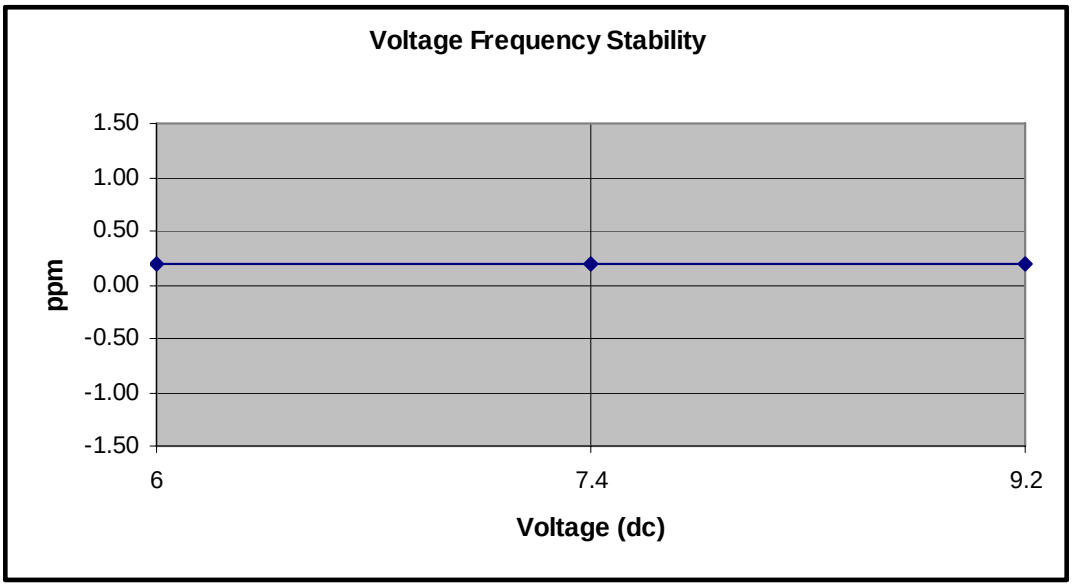


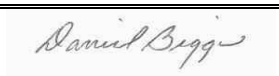
Table 8-3: Frequency Stability/Voltage Variation – 937.5 MHz

Voltage (VDC)	Measured Frequency (MHz)	ppm
6.0	937.500190	0.20
7.2	937.500187	0.20
9.2	937.500188	0.20

Table 8-4: Test Equipment for Testing Frequency Stability/Voltage

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901300	Agilent Technologies	53131A	Frequency Counter	MY40001345	12/15/07
901396	MCE Weinschel	48-40-34	Attenuator, 40 dB, DC-18 GHz, 100 W	93453	12/2/08
901424	Insulated Wire Inc.	KPS-1503-360-KPS	RF cable 36"	N/A	12/12/07
901247	Wavetek	DM25XT	Digital Multimeter	40804098	12/7/07

Test Personnel:

Daniel Biggs		March 30, 2007
Test Engineer	Signature	Date Of Test

9 FCC Rules and Regulations Part 2 §2.1047(a): Modulation Characteristics - Audio Frequency Response

9.1 Test Procedure

ANSI TIA-603-C-2004, section 2.2.6.

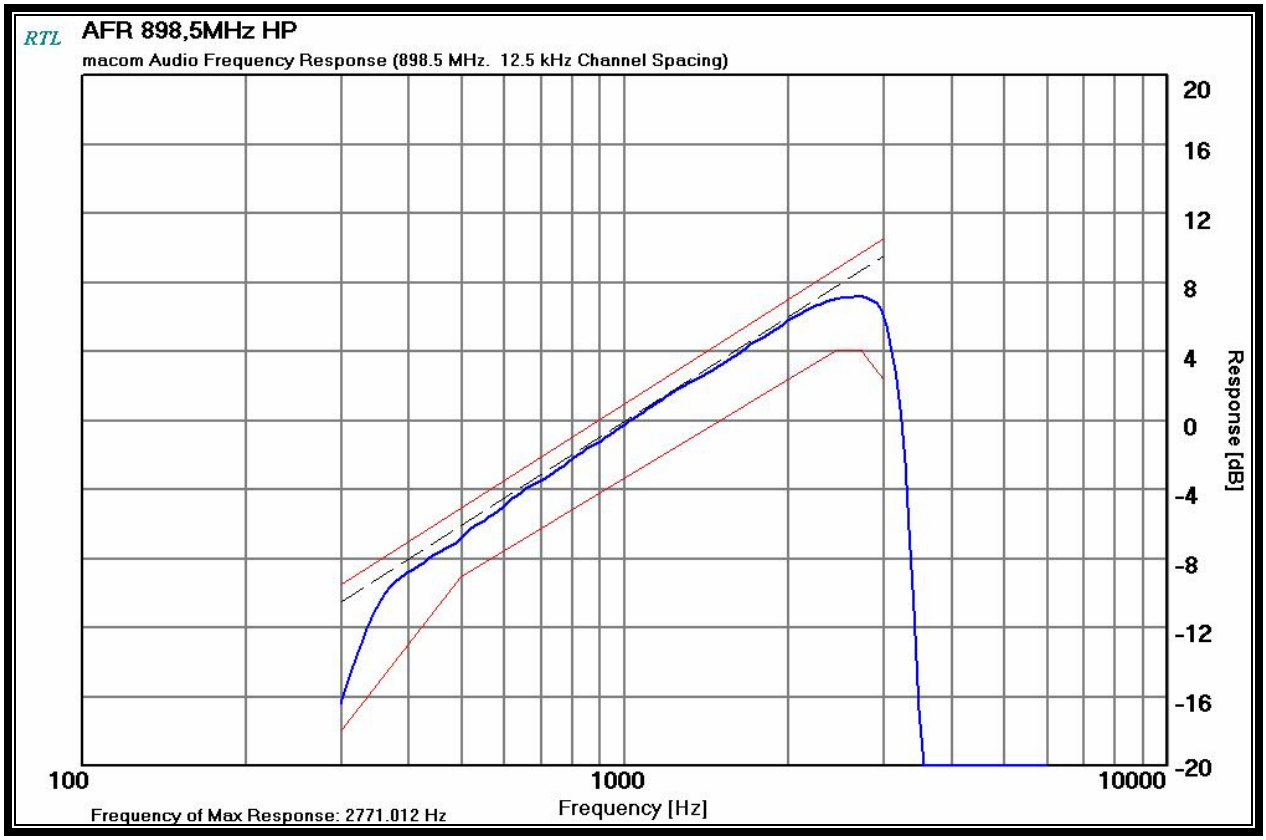
The audio frequency response is the degree of closeness to which the frequency deviation of the transmitter follows a prescribed characteristic.

The input audio level at 1000 Hz was set to produce 20% of the rated system deviation. This point is shown as the 0 dB reference level, noted DEVref. The audio signal generator was varied from 100 Hz to 5 kHz with the input level held constant. The deviation in kHz was recorded using a modulation analyzer as DEVfreq. The response in dB relative to 1 kHz was calculated as follows:

Audio Frequency Response = 20 LOG (DEVfreq/DEVref)

9.2 Test Data

Plot 9-1: Modulation Characteristics - Audio Frequency Response; 898.5 MHz



Plot 9-2: Modulation Characteristics - Audio Frequency Response; 937.5 MHz

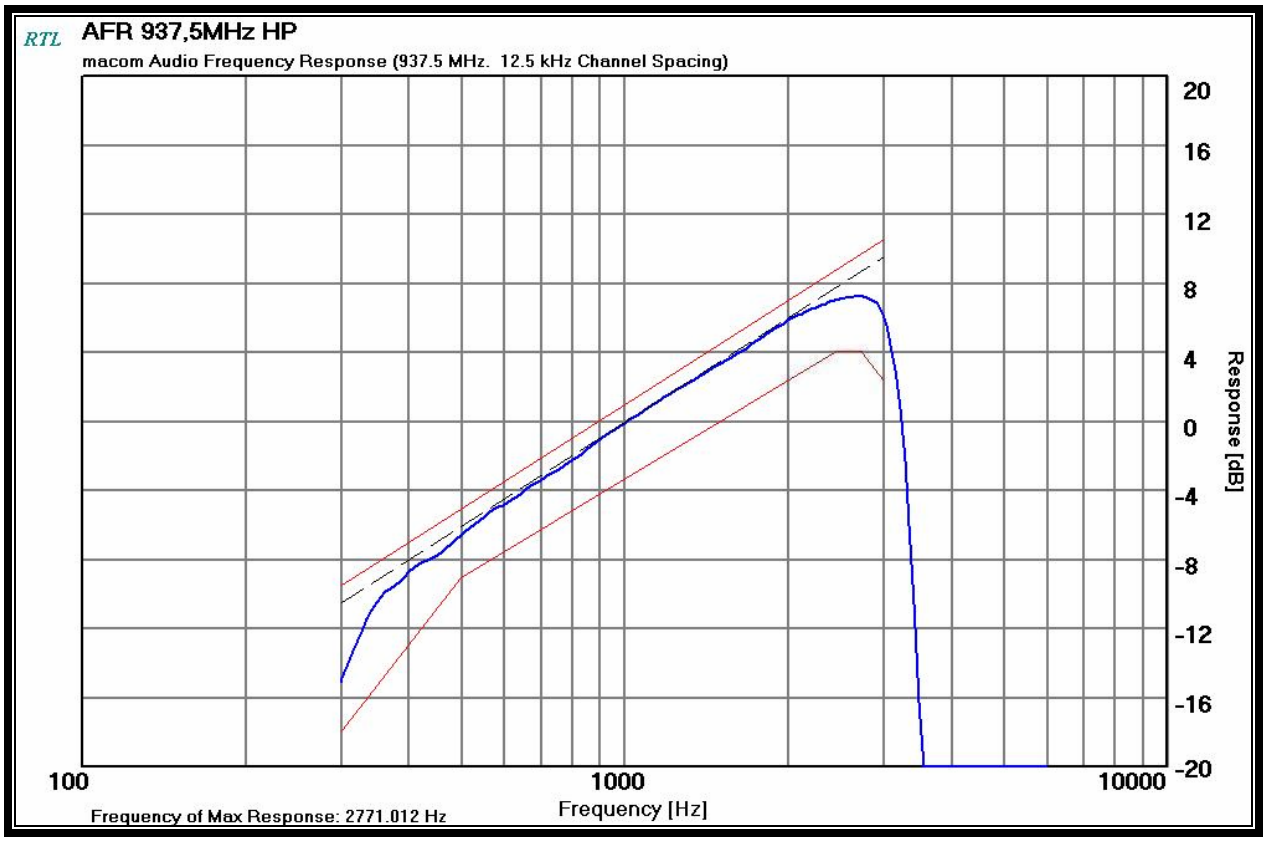


Table 9-1: Test Equipment for Testing Audio Frequency Response

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901057	Hewlett Packard	3336B	Synthesizer/Level Generator	2514A02585	12/19/07
901118	Hewlett Packard	8901A Opt. 002-003	Modulation Analyzer	2406A00178	07/21/07
901054	Hewlett Packard	3586B	Selective Level Meter	1928A01892	10/19/07

Test Personnel:

Daniel Biggs	Daniel Biggs	May 3, 2007
Test Technician/Engineer	Signature	Date Of Test

10 FCC Rules and Regulations Part 2 §2.1047(a): Modulation Characteristics – Audio Low Pass Filter

10.1 Test Procedure

2.1047(a) Voice modulated communication equipment. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter, or of all circuitry installed between the modulation limiter and the modulated stage, shall be submitted.

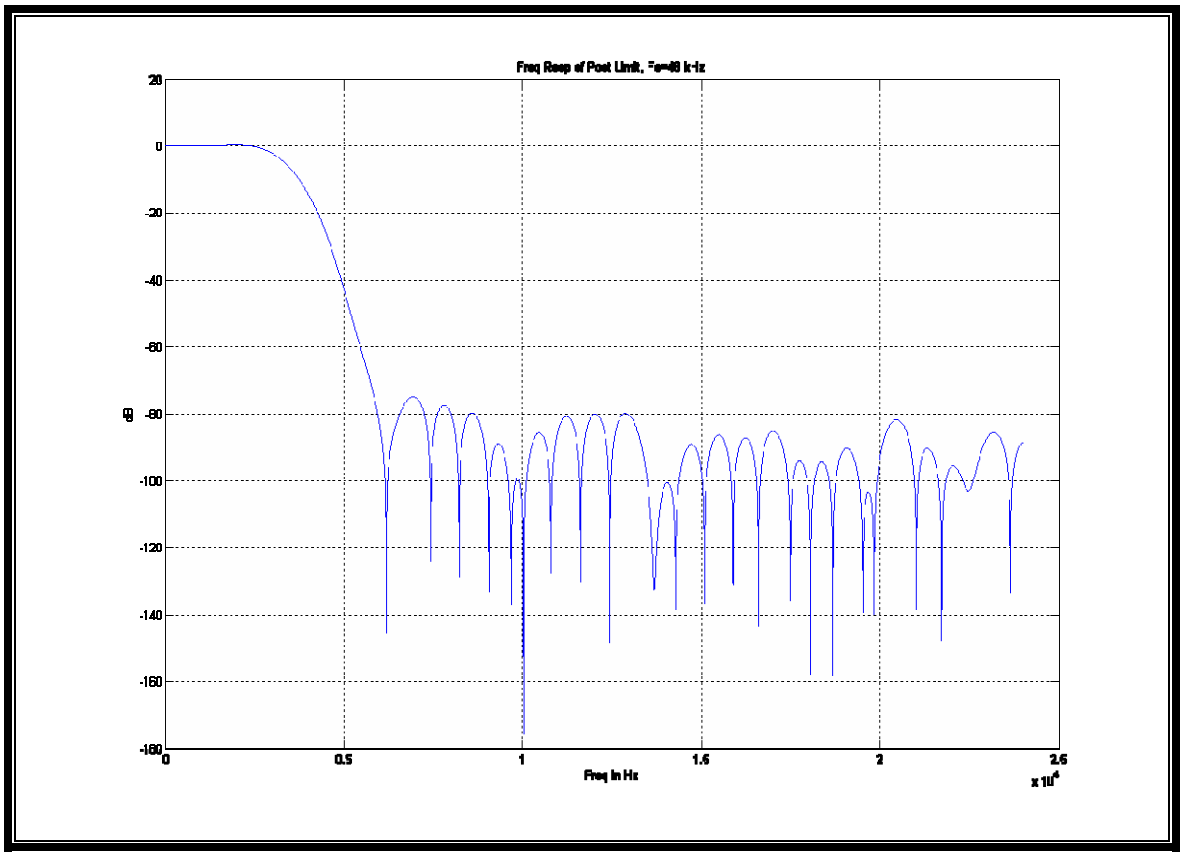
ANSI TIA-603-C-2004, 2.2.15

The Audio Low Pass Filter Response is the frequency response of the post limiter low pass filter circuit above 3000 Hz.

The audio frequency response of the post-limiter filter can not be measured directly as it is embedded within DSP code. The following plot is a simulation of the audio low pass filter circuitry, and is deemed "equivalent data" per 2.1047(a).

10.2 Test Data

Plot 10-1: Modulation Characteristics – Audio Low Pass Filter (Post Limited Frequency Response)



11 FCC Rules and Regulations Part 2 §2.1047(b): Modulation Characteristics - Modulation Limiting

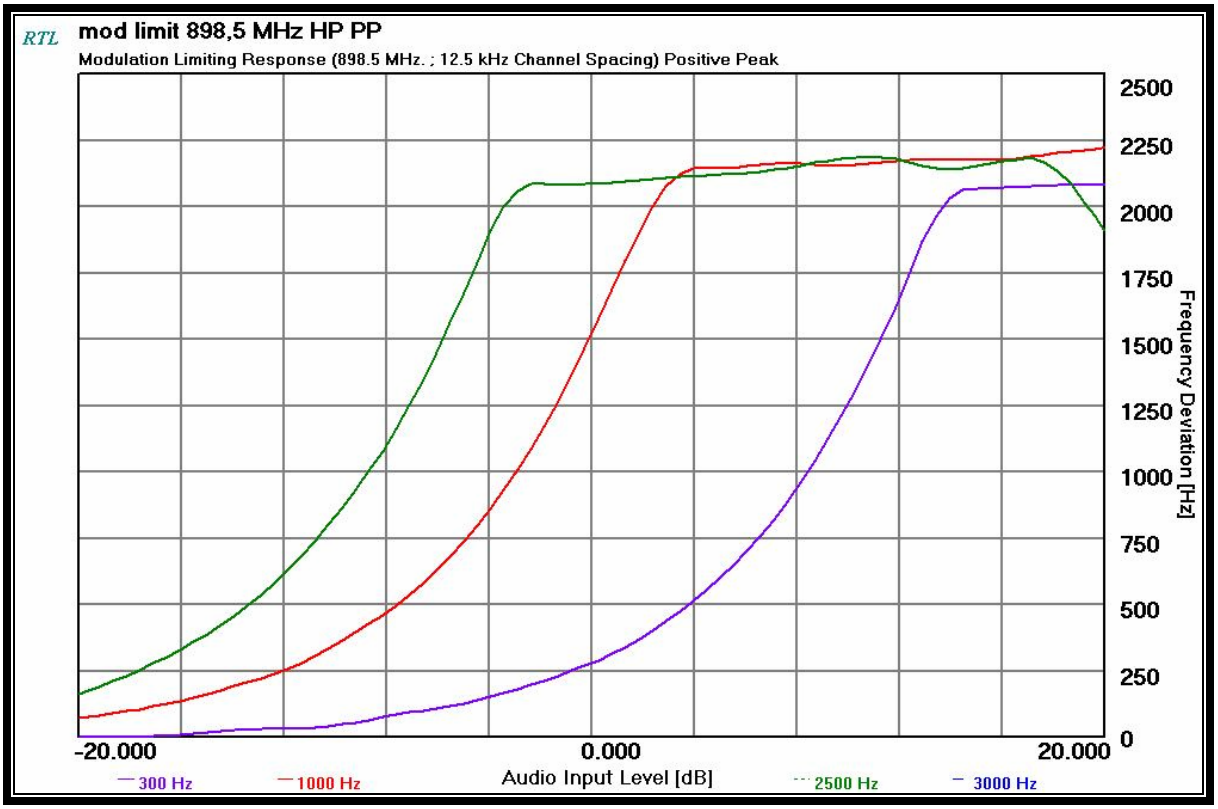
11.1 Test Procedure

ANSI TIA-603-C-2004, section 2.2.3.

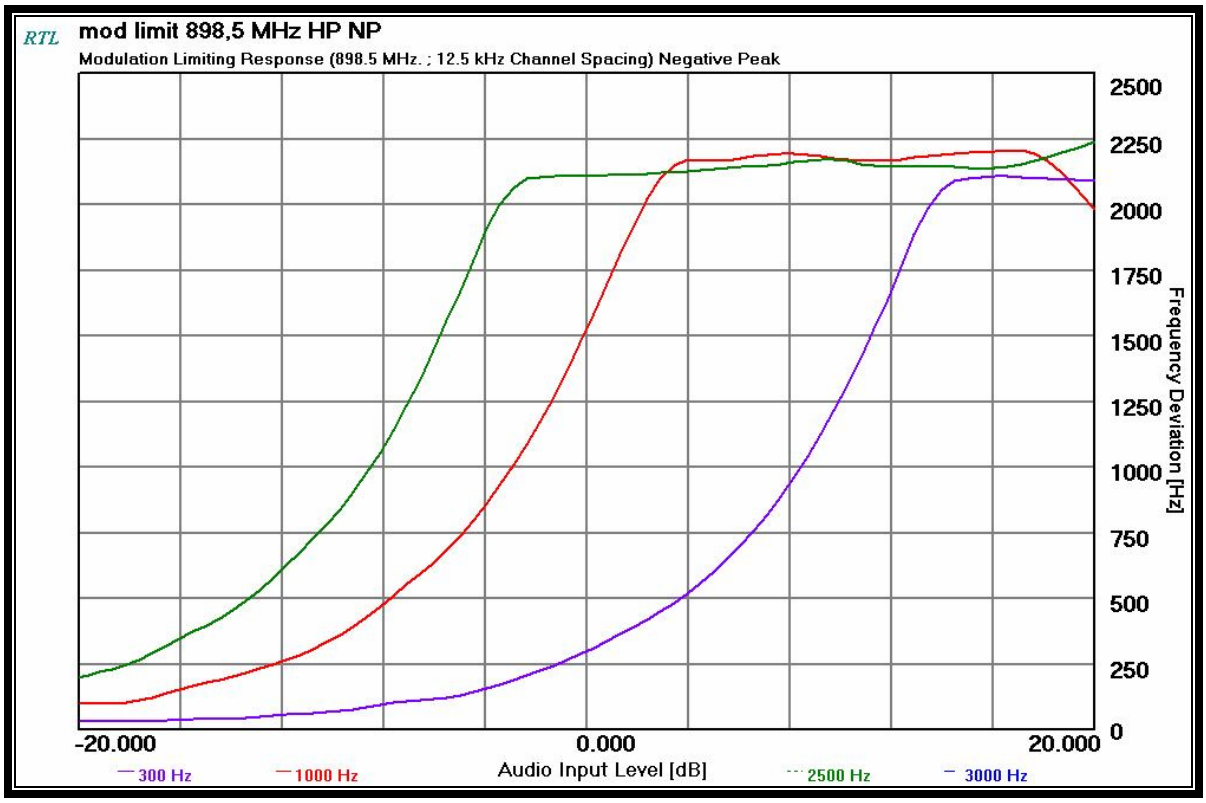
The transmitter was adjusted for full rated system deviation. The audio input level was adjusted for 60% of rated system deviation at 1000 Hz. Using this level as a reference (0 dB), the audio input level was varied from the reference +/-20 dB for modulation frequencies of 300 Hz, 1,000 Hz, and 2,500 Hz. The system deviation obtained as a function of the input level was recorded. Both positive and negative peak deviations were recorded.

11.2 Test Data

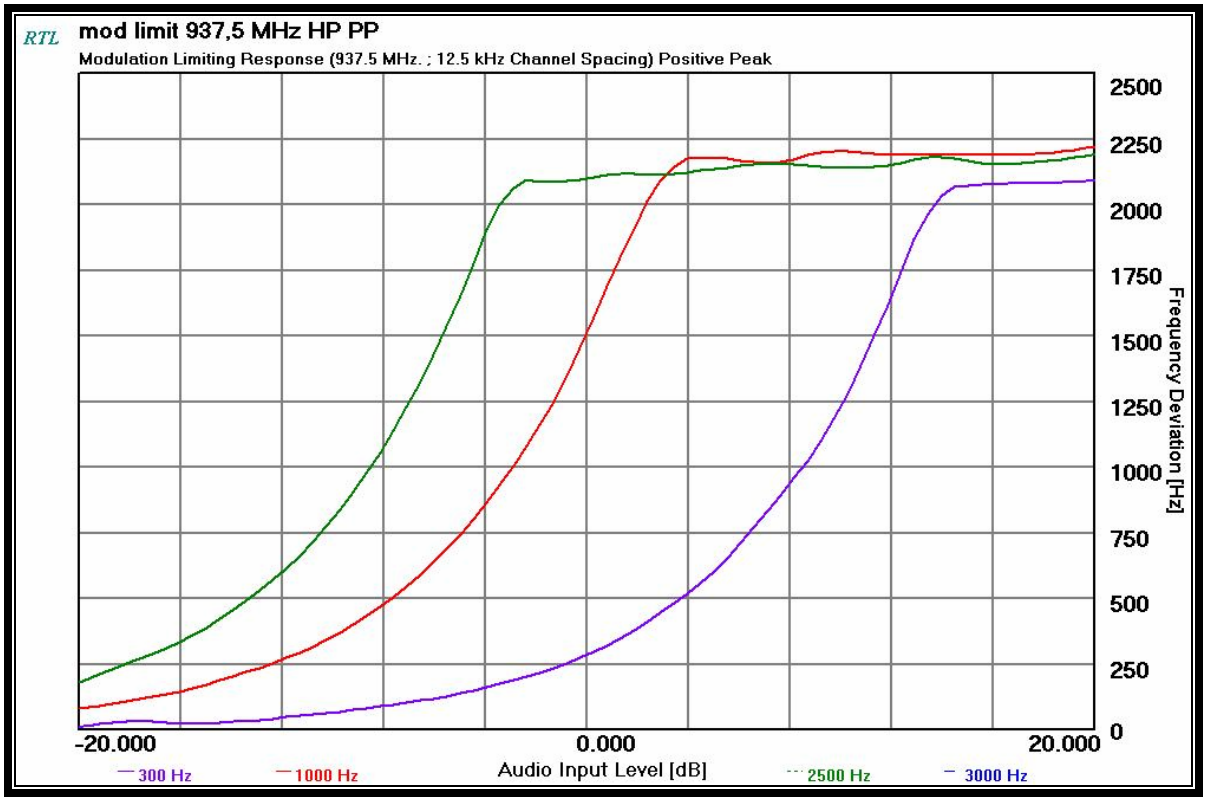
Plot 11-1: Modulation Characteristics – Modulation Limiting: 898.5 MHz; Narrow Band; Positive Peak



Plot 11-2: Modulation Characteristics – Modulation Limiting: 898.5 MHz; Narrow Band; Negative Peak



Plot 11-3: Modulation Characteristics – Modulation Limiting: 937.5 MHz; Narrow Band; Positive Peak



Plot 11-4: Modulation Characteristics – Modulation Limiting: 937.5 MHz; Narrow Band; Negative Peak

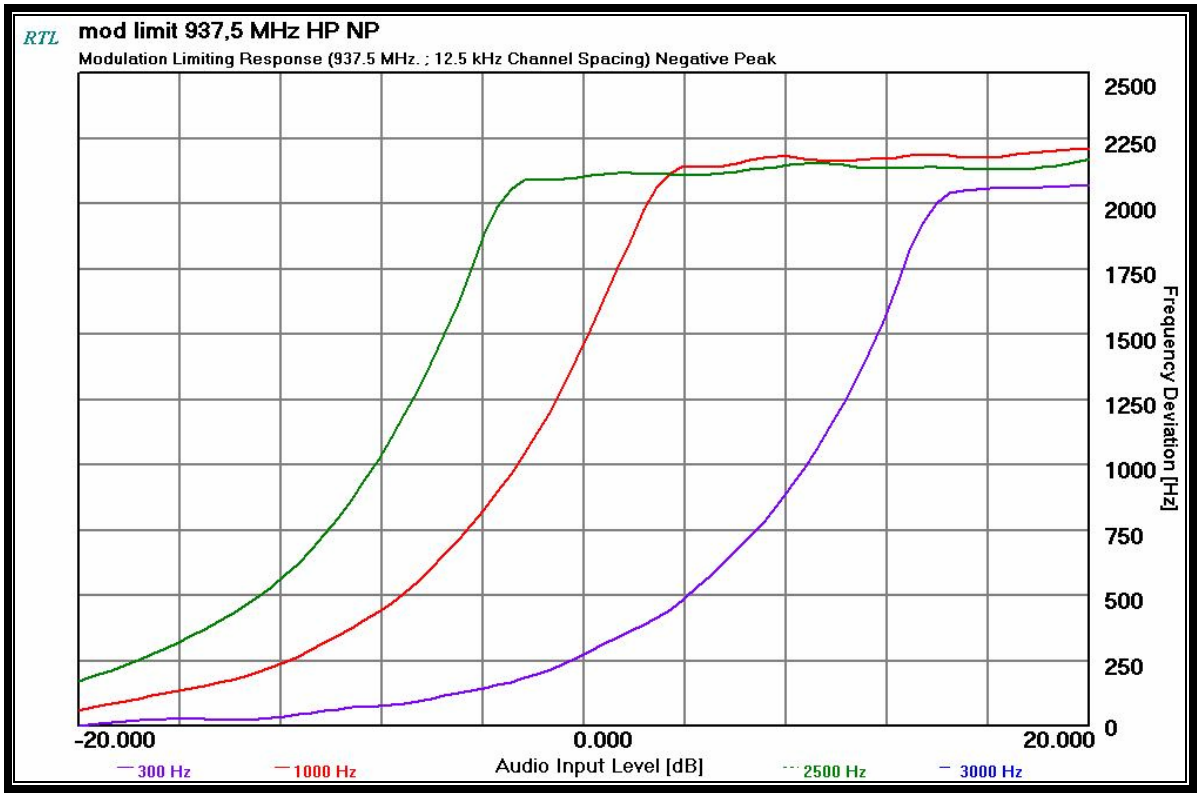


Table 11-1: Test Equipment for Testing Modulation Limiting

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901057	Hewlett Packard	3336B	Synthesizer/Level Generator	2514A02585	12/19/07
901118	Hewlett Packard	8901A Opt. 002-003	Modulation Analyzer	2406A00178	07/21/07
901054	Hewlett Packard	3586B	Selective Level Meter	1928A01892	10/19/07

Test Personnel:

Daniel Biggs	Daniel Biggs	May 4, 2007
Test Technician/Engineer	Signature	Date Of Test

12 FCC Rules and Regulations Part 2 §2.202: Necessary Bandwidth and Emission Bandwidth

Type of Emission: F3E, F1D, F1E

Voice – Narrow Band; 12.5 kHz Channel Spacing
Calculation:
Max modulation (M) in kHz: 3.0
Max deviation (D) in kHz: 2.5
Constant factor (K): 1 (assumed)
Bn = 2xM+2xDK = 11.0 kHz
Emission designator: 11K0F3E

Digital Voice and Data - 2 level FSK; 9600 bps; Narrow Band; 12.5 kHz Channel Spacing
Calculation:
Data rate in bps (R) = 9600
Peak deviation of carrier (D) = 2350
Bn = 3.86D + 0.27R = 3.86(2350) + 0.27(9600) = 11.663 kHz
Emission designator: 11K7F1D, 11K7F1E

Digital Voice and Data - 2 level FSK; 4800 bps; Narrow Band; 12.5 kHz Channel Spacing
Calculation:
Data rate in bps (R) = 4800
Peak deviation of carrier (D) = 1500
Bn = 3.86D + 0.27R = 3.86(1500) + 0.27(4800) = 7.086 kHz
Emission designator: 7K1F1D, 7K1F1E

Digital Data – 4 level FSK (P25 Standard); 4800 bps; Narrow Band; 12.5 kHz Channel Spacing
Calculation:
Data rate in bps (R) = 9600
Peak deviation of carrier (D) = +/-1.8 kHz
Number of states in each symbol (S) = 2
Bn = $[4800/\log_2(2) + 2(1800)(1)]$ = 8.400 kHz
Emission designator: 8K4F1D, 8K4F1E

Digital Data – 4 level FSK (NB OTP); 4800 bps; Narrow Band; 12.5 kHz Channel Spacing
Calculation:
Data rate in bps (R) = 9600
Peak deviation of carrier (D) = +/-1.8 kHz
Number of states in each symbol (S) = 2
Bn = $[4800/\log_2(2) + 2(2000)(1)]$ = 8.800 kHz
Emission designator: 8K8F1D, 8K8F1E

13 Conclusion

The data in this measurement report shows that the **M/A-COM, Inc**. Model **P5300 900 MHz Portable Radio, FCC ID: OWDTR-0047-E, IC: 3636B-0047**, complies with all the applicable requirements of Parts 90, 15 and 2 of the FCC Rules and Regulations, and Industry Canada RSS-119, Issue 6, 2000.