Engineering and Testing for EMC and Safety Compliance

Class II Permissive Change Report

M/A-Com Inc.
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MODEL: OpenSky 800 MHz Portable Radio

FCC ID: BV8P800

October 20, 2004

STANDARDS REFERENCED FOR THIS REPORT	
PART 2: 2003	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS
PART 90: 2003	PRIVATE LAND PORTABLE RADIO SERVICES
ANSI C63.4-2001	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

Frequency Range	Maximum Measured Output Power (W) Conducted	Emission Designator
806-821 / 851-866 MHz	3.0	16K0F3E
821-824 / 866-869 MHz	3.0	12K8F3E

Report Prepared by: Daniel Biggs

Document Number: 2004160/QRTL04-321

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CONFORMANCE STATEMENT

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We, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described in this test report. 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 FCC Part 2, FCC Part 15, FCC Part 90, and ANSI C63.4.

Signature: _____ Date: October 20, 2004

Typed/Printed Name: Desmond A. Fraser Position: President, Rhein Tech Laboratories

Signature: _____ Date: October 20, 2004

Typed/Printed Name: Daniel Biggs Position: EMC Test Engineer

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1 GENERAL INFORMATION

1.1 SCOPE

FCC Rules Part 90: Private Land Mobile Radio Services that are in operation within the bands of 806-824 MHz and 851-869 MHz

1.2 TEST FACILITY

The open area test site and conducted measurement facility used to collect the radiated data is located at 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. This site has been fully described in a report and approved by the Federal Communications Commission to perform AC line conducted and radiated emissions testing (ANSI C63.4 2001).

1.3 RELATED SUBMITTAL(S)/GRANT(S)

This is a Class II permissive change verification report for the original certification for FCC ID: BV8P800.

1.4 DESCRIPTION OF CHANGE IN DEVICE

This Class II application seeks a new emissions designator for OCF analog/voice modulation capability. No hardware changes were implemented.

1.5 PRODUCT DESCRIPTION

The EUT is a handheld transceiver that operates in the 806-824 MHz and 851-869 MHz bands. The rated RF output power is programmable to 3 watts.

TABLE 1-1: EQUIPMENT UNDER TEST (EUT)

Part	Manufacturer	Model	Serial Number	FCC ID	Cable Description	RTL Barcode	Test Sample Received
800 MHz Digital Transceiver	M/A Com, Inc.	P800	A400071000ED	BV8P800	N/A	N/A	08/20/04

2 RF POWER OUTPUT FCC RULES AND REGULATIONS PART 2 §2.1046 (A), PART 90 §90.205(I), PART 90 §90.635(D)

2.1 TEST PROCEDURE

The EUT was connected to a power meter through a calibrated coaxial attenuator having a 50 Ω load impedance. Power was measured with the EUT placed in OCF mode.

2.2 TEST LIMIT

Per FCC Part Rules §90.635(d): The maximum output power of the transmitter for mobile stations is 100 W (20 dBw).

2.3 TEST RESULTS

The following channels (in MHz) were tested: 806.0125 MHz, 816.3625 MHz, 823.9875, 851.0125, 861.3625, and 868.9875 MHz. Peak and Average output power levels are shown.

TABLE 2-1: RF OUTPUT POWER TEST DATA

Frequency (MHz)	Channel	Mode	Average Level (dBm)	Average Level (W)	Peak Level (dBm)	Peak Level (W)
806.0125	A001N	OCF Normal	34.38	2.74	34.70	2.95
816.3625	A415N	OCF Normal	34.37	2.74	34.63	2.90
823.9875	A830N	OCF Normal	34.43	2.77	34.71	2.96
851.0125	A001T	OCF Talkaround	34.30	2.70	34.64	2.91
861.3625	A415T	OCF Talkaround	34.40	2.75	34.68	2.94
868.9875	A830T	OCF Talkaround	34.40	2.75	34.70	2.95

*Measurement accuracy: +/- 3%

2.4 TEST EQUIPMENT

TABLE 2-2: TEST EQUIPMENT - RF POWER OUTPUT

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901184	Agilent Technologies	E4416A	EPM-P Power Meter, single channel	GB41050573	8/2/05
901186	Agilent Technologies	E9323A (50 MHz-6 GHz)	Peak & Average Power Sensor	US40410380	8/2/05

Daniel Biggs		October 7, 2004
Test Engineer	Signature	Date Of Test

3 OCCUPIED BANDWIDTH, BANDWIDTH LIMITATIONS, AND EMISSIONS MASKS: FCC RULES AND REGULATIONS PART 2 §2.1049, PART §90.209(B), AND PART §90.210

3.1 TEST PROCEDURE

The EUT was connected to a spectrum analyzer through a calibrated coaxial attenuator sufficient to prevent overloading of the spectrum analyzer input. The spectrum analyzer was set to peak detector mode

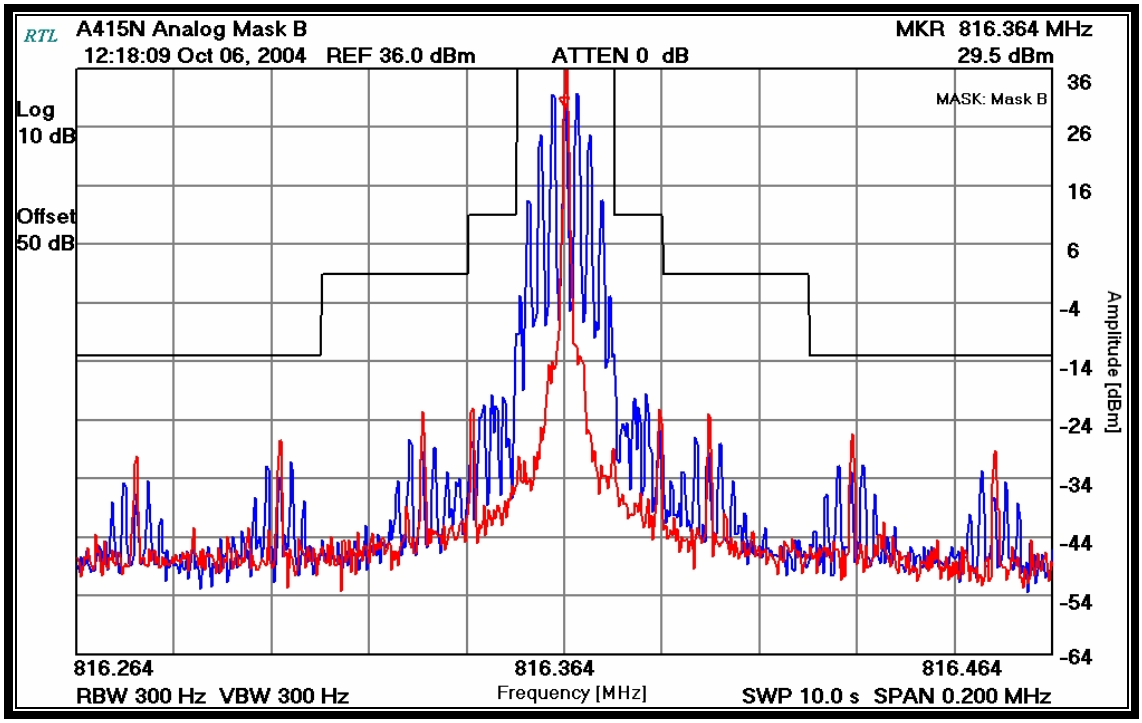
The RBW and VBW were set to 300 Hz and 300 Hz respectively.

3.2 TEST LIMITS

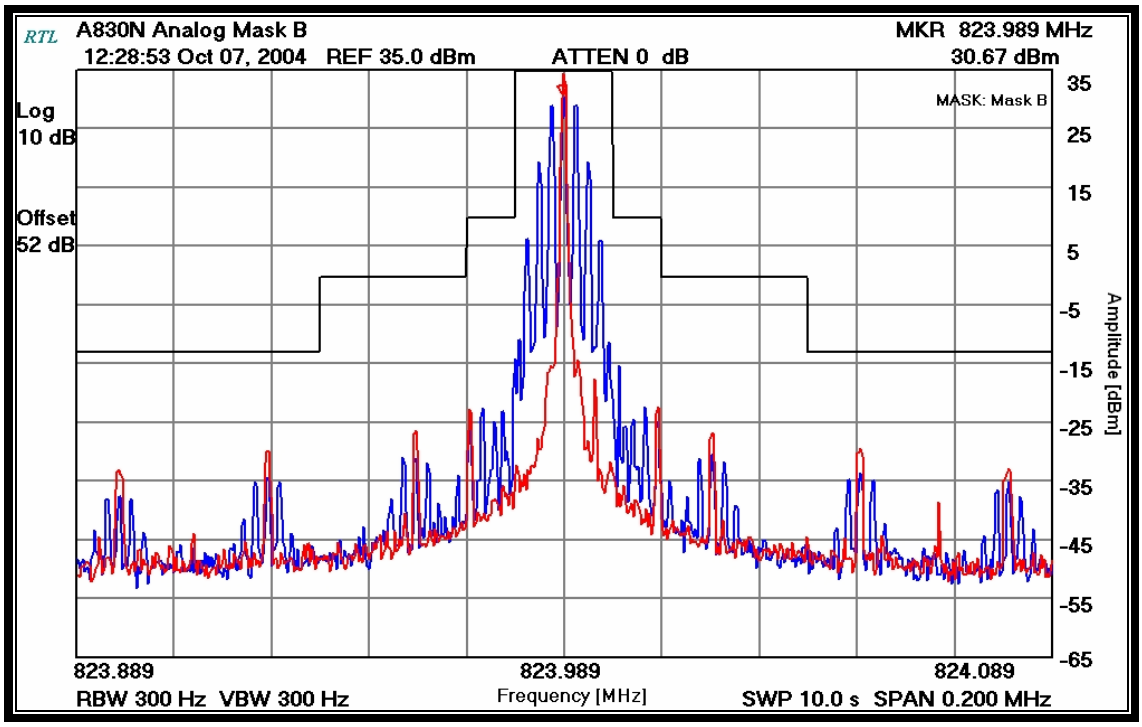
Emissions must meet the requirement of Mask B for bands 806-821 and 851-866 MHz, or Mask B for bands 821-823 and 866–869 MHz. Masks apply to equipment using an audio low pass filter.

3.3 TEST RESULTS

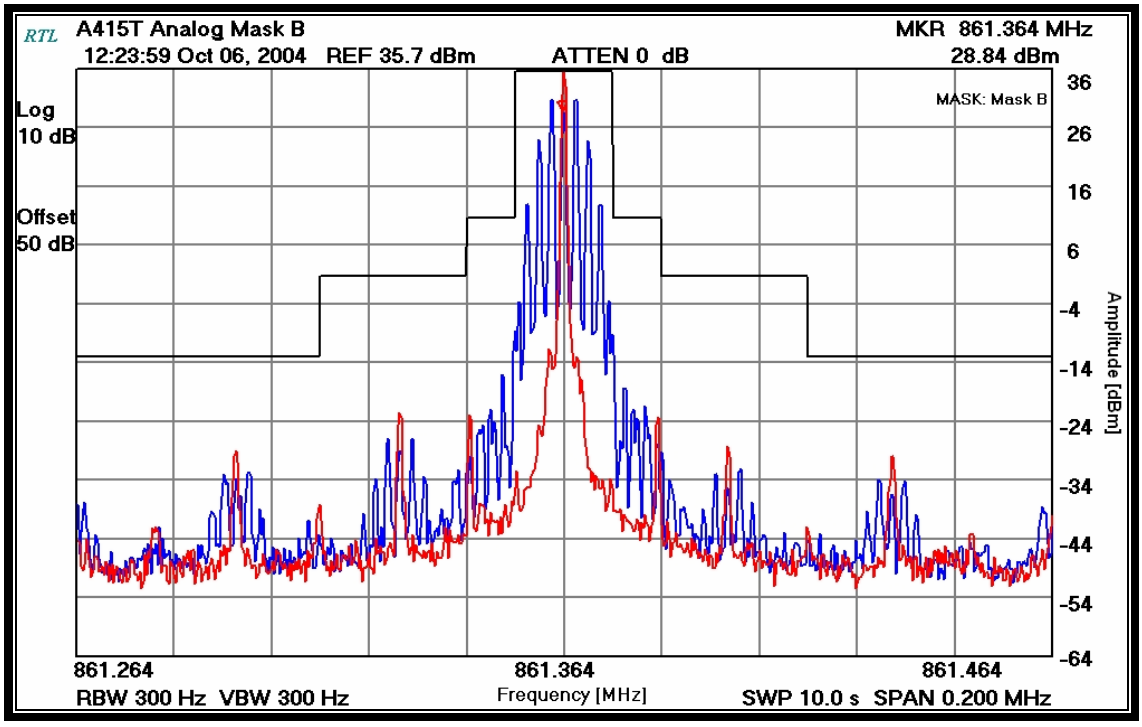
PLOT 3-1: CHANNEL A415N: 816.3625 MHZ OCF NORMAL – MASK B



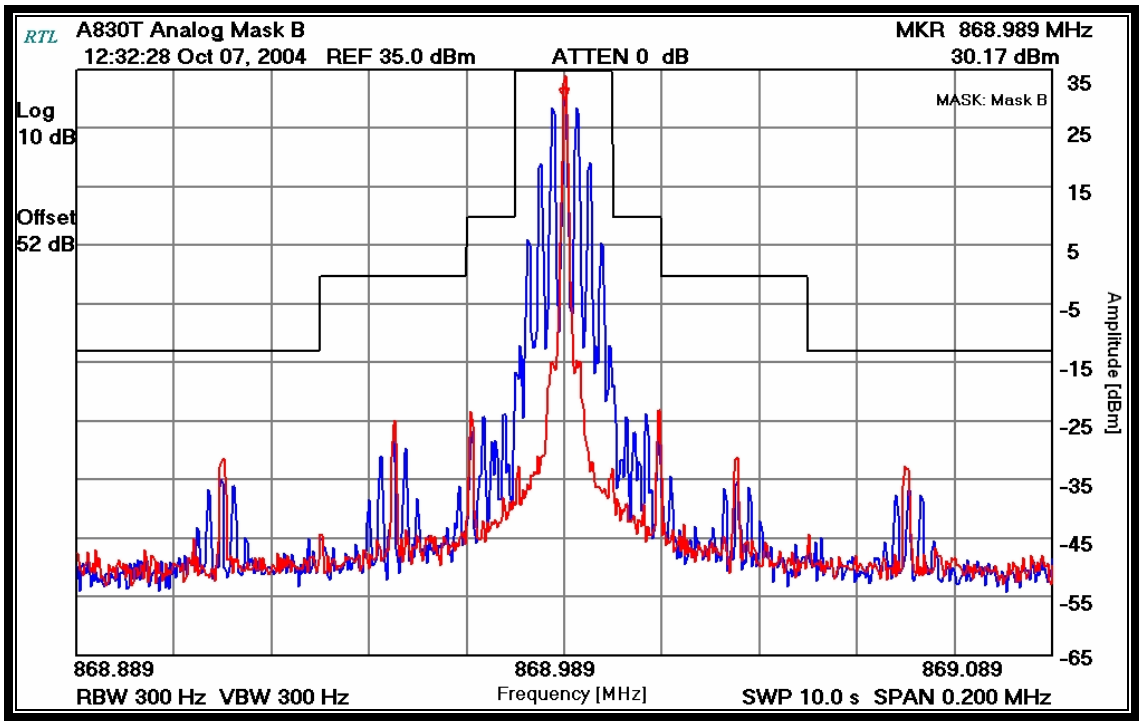
PLOT 3-2: CHANNEL A830N: 823.9875 MHZ OCF NORMAL – MASK B



PLOT 3-3: CHANNEL A415T: 861.3625 MHZ OCF TALKAROUND – MASK B



PLOT 3-4: CHANNEL A830T: 868.9875 MHZ OCF TALKAROUND – MASK B



3.4 TEST EQUIPMENT

TABLE 3-1: TEST EQUIPMENT - BANDWIDTH LIMITATIONS

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	08/11/05
901118	Hewlett Packard	8901A Opt. 002-003	Modulation Analyzer	2406A00178	07/07/05

Daniel Biggs	Daniel Biggs	October 6 & 7, 2004
Test Engineer	Signature	Dates Of Test

4 MODULATION CHARACTERISTICS - AUDIO FREQUENCY RESPONSE - FCC RULES AND REGULATIONS PART 2 §2.1047

4.1 TEST PROCEDURE

ANSI/TIA/EIA-603-2002, section 2.2.6

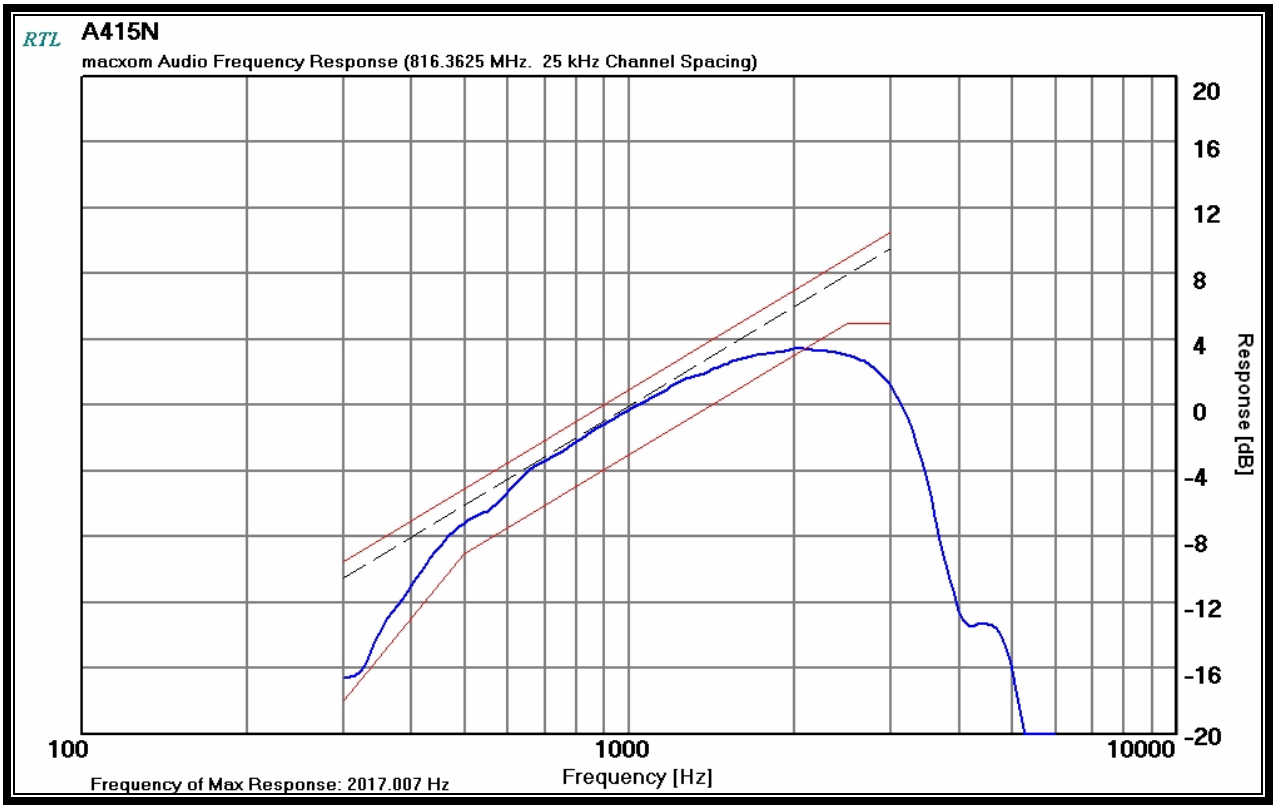
The audio frequency response is the degree of closeness to which the frequency deviation of the transmitter follows a prescribed characteristic.

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 300 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)

4.2 TEST RESULTS

PLOT 4-1: AUDIO FREQUENCY RESPONSE



4.3 TEST EQUIPMENT

TABLE 4-1: TEST EQUIPMENT - AUDIO FREQUENCY RESPONSE

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901057	Hewlett Packard	3336B	Synthesizer/Level Generator	2514A02585	09/08/05
901118	Hewlett Packard	8901A Opt. 002-003	Modulation Analyzer	2406A00178	07/07/05
901054	Hewlett Packard	HP 3586B	Selective Level Meter	1928A01892	09/08/05

Daniel Biggs		October 6, 2004
Test Engineer	Signature	Date Of Test

5 MODULATION CHARACTERISTICS – AUDIO LOW PASS FILTER - FCC RULES AND REGULATIONS PART 2 §2.1047

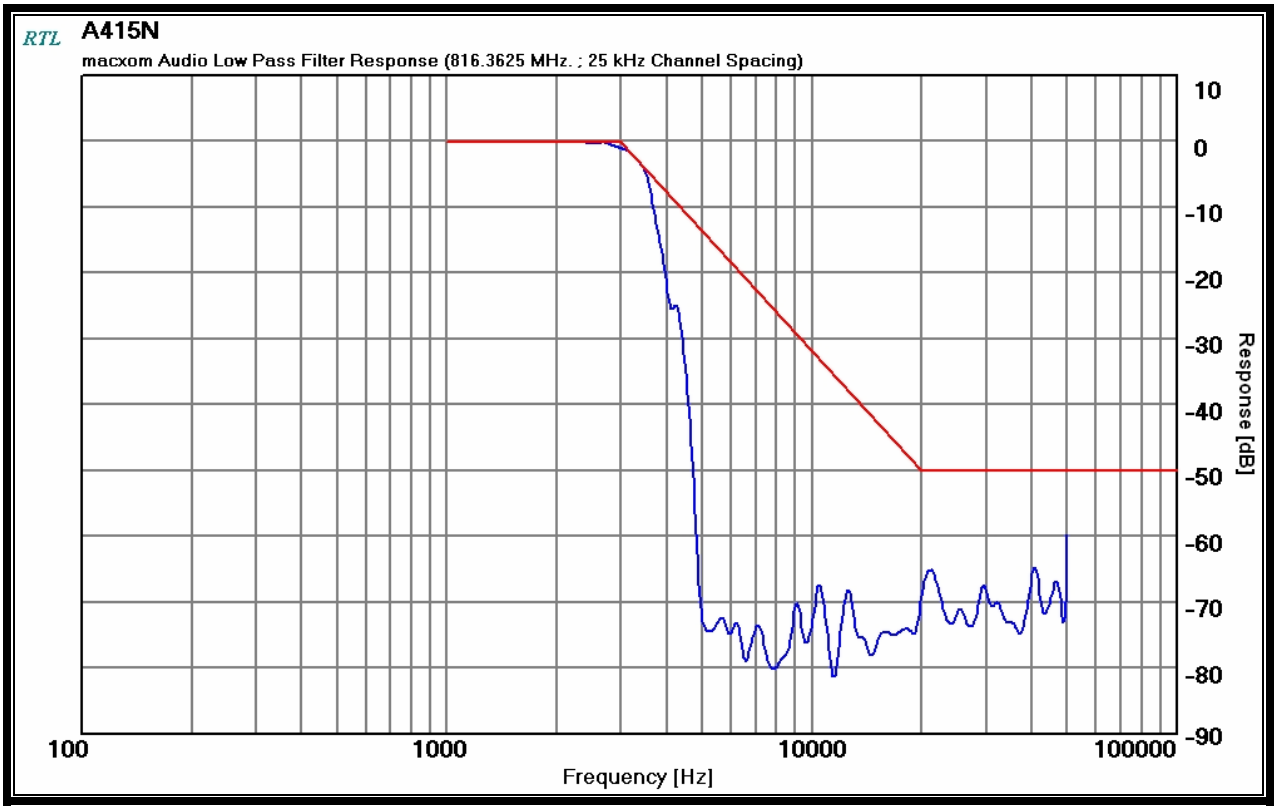
5.1 TEST PROCEDURE

ANSI/TIA/EIA-603-2002, 2.2.15

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

5.2 TEST RESULTS

PLOT 5-1: AUDIO LOW PASS FILTER



5.3 TEST EQUIPMENT

TABLE 5-1: TEST EQUIPMENT - AUDIO LOW PASS

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901057	Hewlett Packard	3336B	Synthesizer/Level Generator	2514A02585	09/08/05
901118	Hewlett Packard	8901A Opt. 002-003	Modulation Analyzer	2406A00178	07/07/05
901054	Hewlett Packard	HP 3586B	Selective Level Meter	1928A01892	09/08/05

Daniel Biggs		October 6, 2004
Test Engineer	Signature	Date Of Test

6 FCC RULES AND REGULATIONS PART 2 §2.1047 (B): MODULATION CHARACTERISTICS - MODULATION LIMITING

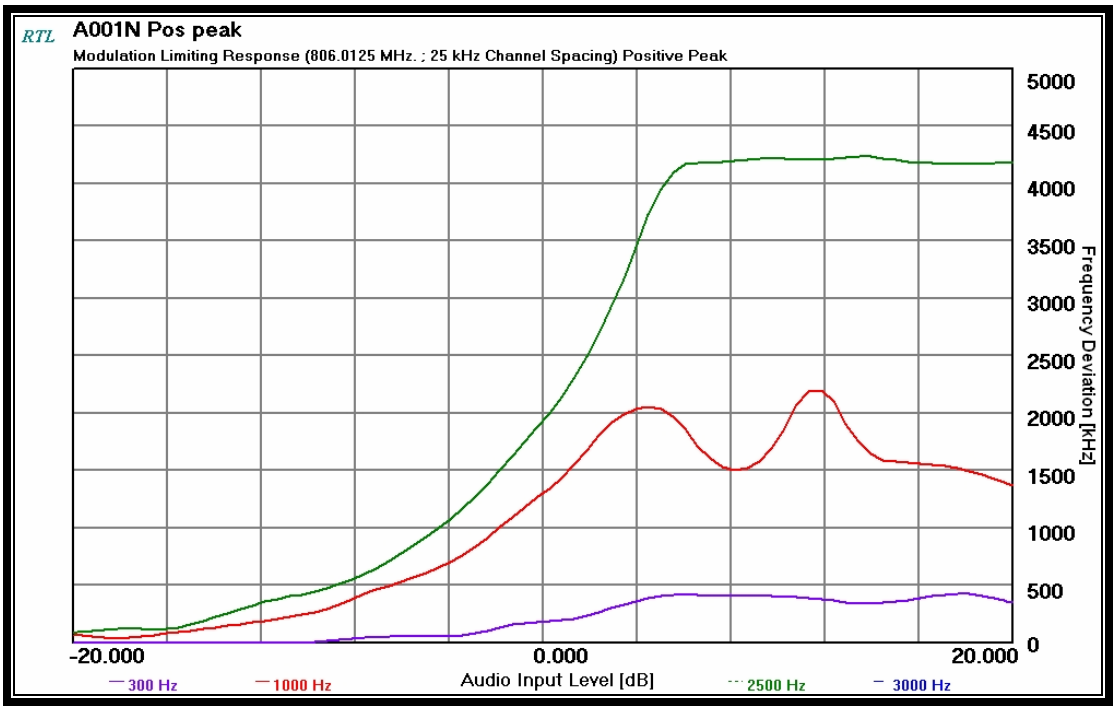
6.1 TEST PROCEDURE

ANSI/TIA/EIA-603-2002, section 2.2.3

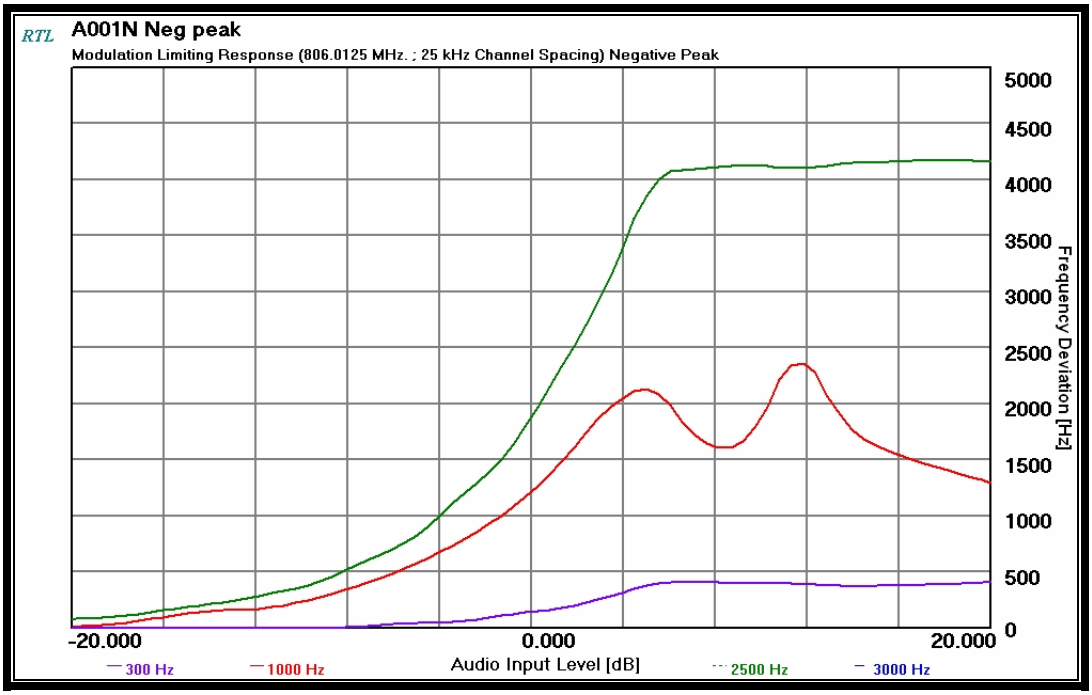
The transmitter was adjusted for full rated system deviation. The audio input level was adjusted for 60% of rated system deviation at 1,000 Hz. Using this level as a reference (0 dB), the audio input level was varied from the reference +/-20 dB for modulation frequencies of 300 Hz, 1,000 Hz, and 2,500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

6.2 TEST RESULTS

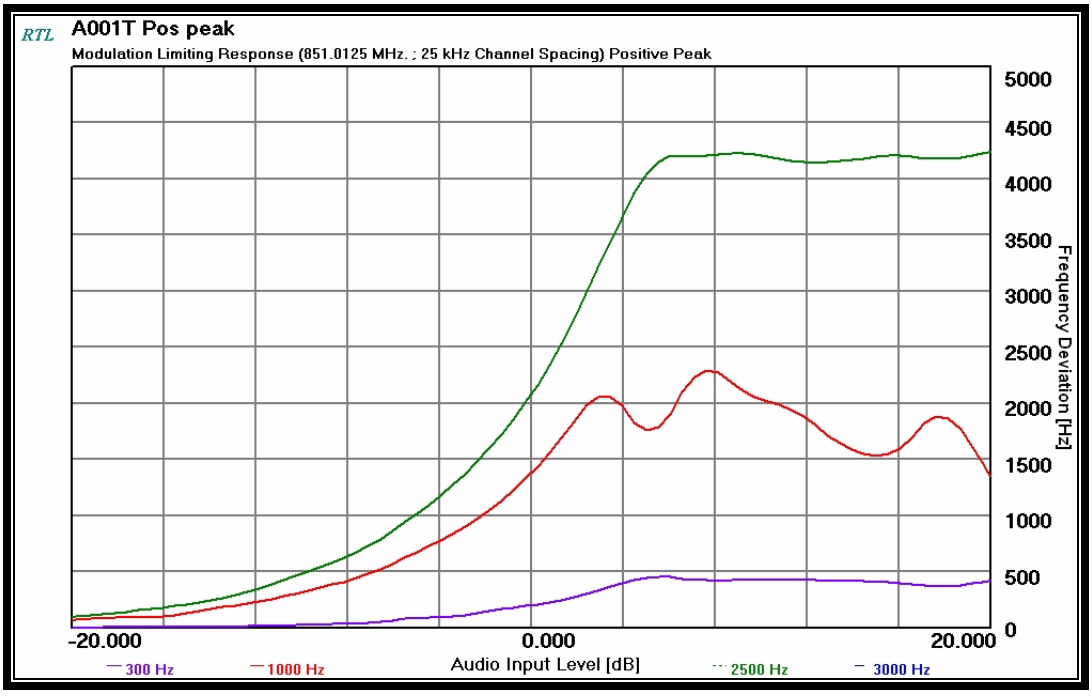
PLOT 6-1: MODULATION LIMITING: A001N - WIDE BAND; POSITIVE PEAK



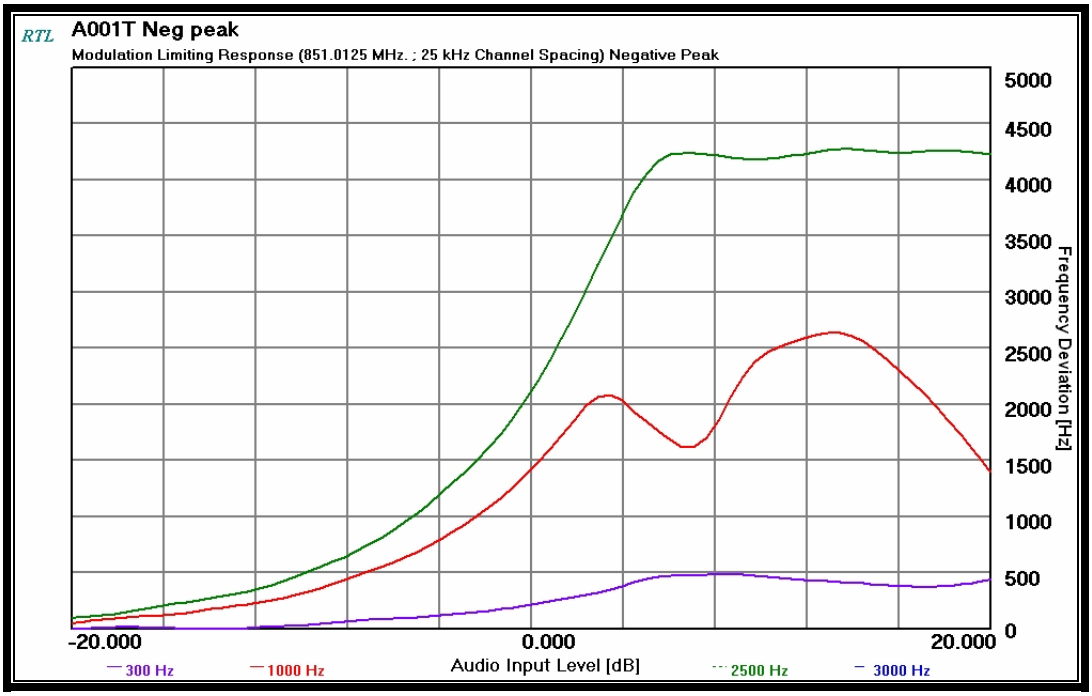
PLOT 6-2: MODULATION LIMITING: A001N - WIDE BAND; NEGATIVE PEAK



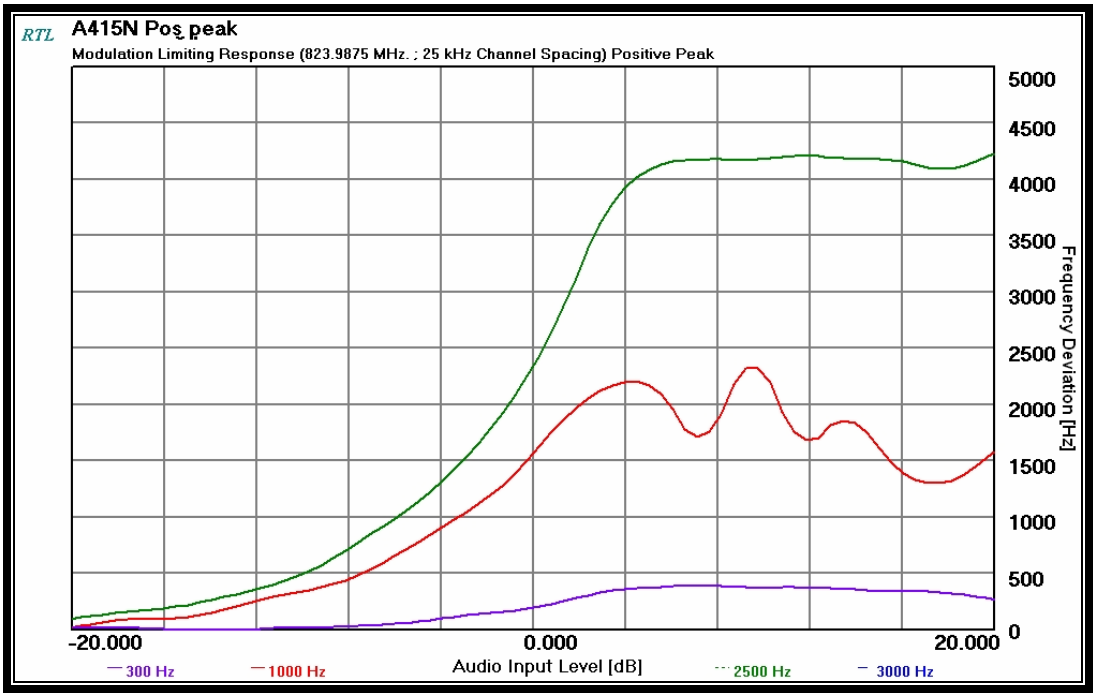
PLOT 6-3: MODULATION LIMITING: A001T - WIDE BAND; POSITIVE PEAK



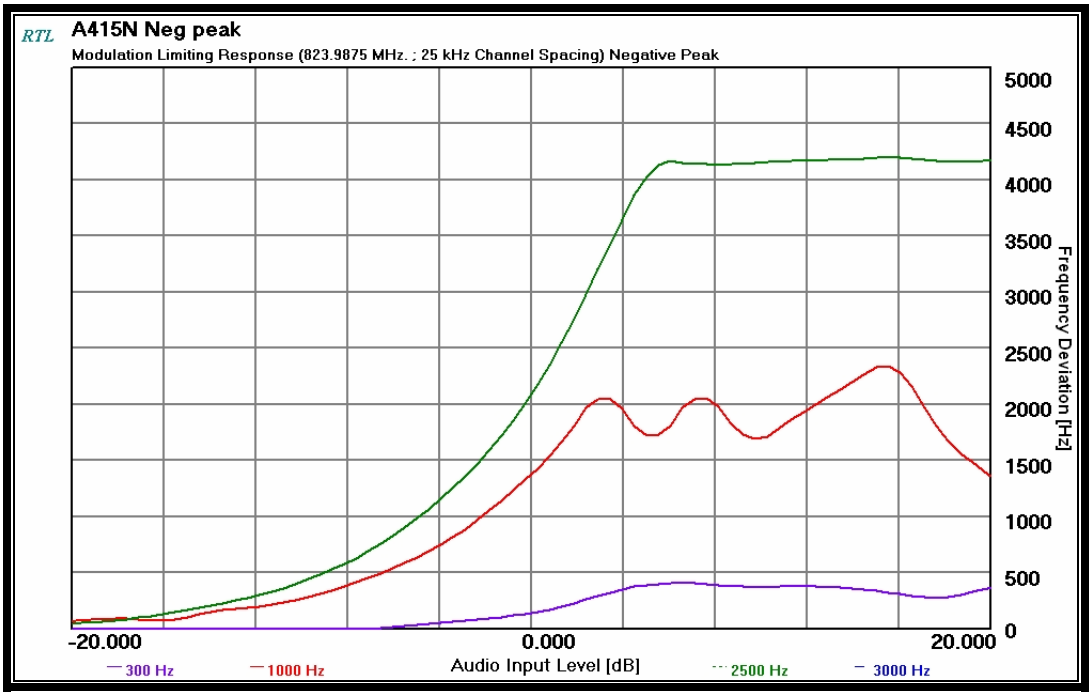
PLOT 6-4: MODULATION LIMITING: A001T - WIDE BAND; NEGATIVE PEAK



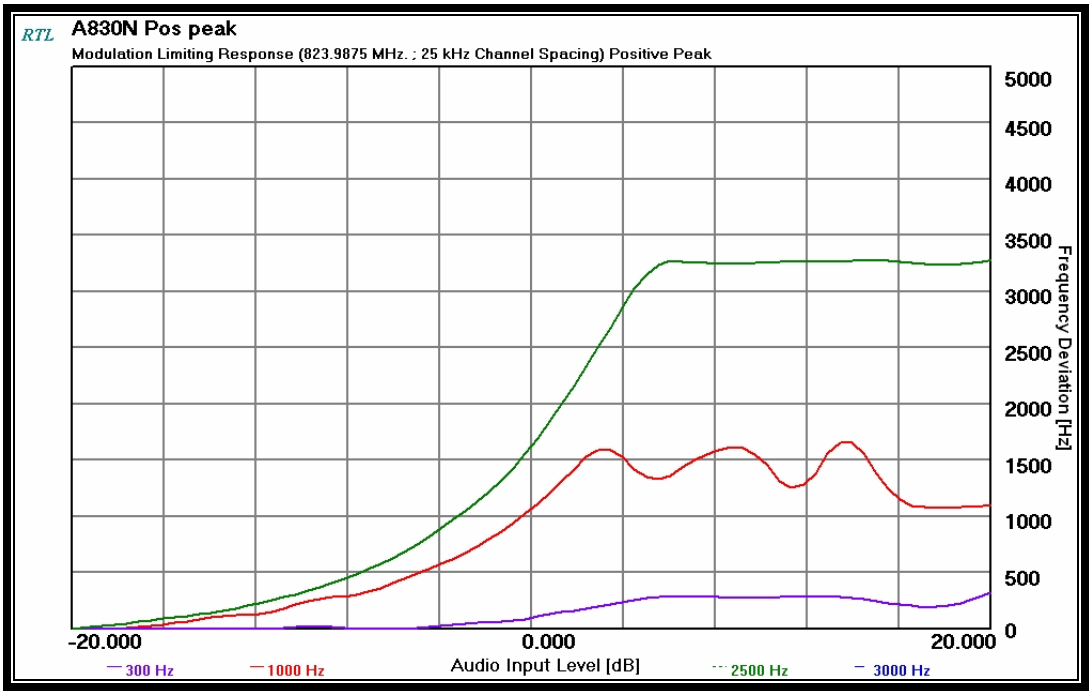
PLOT 6-5: MODULATION LIMITING: A415N - WIDE BAND; POSITIVE PEAK



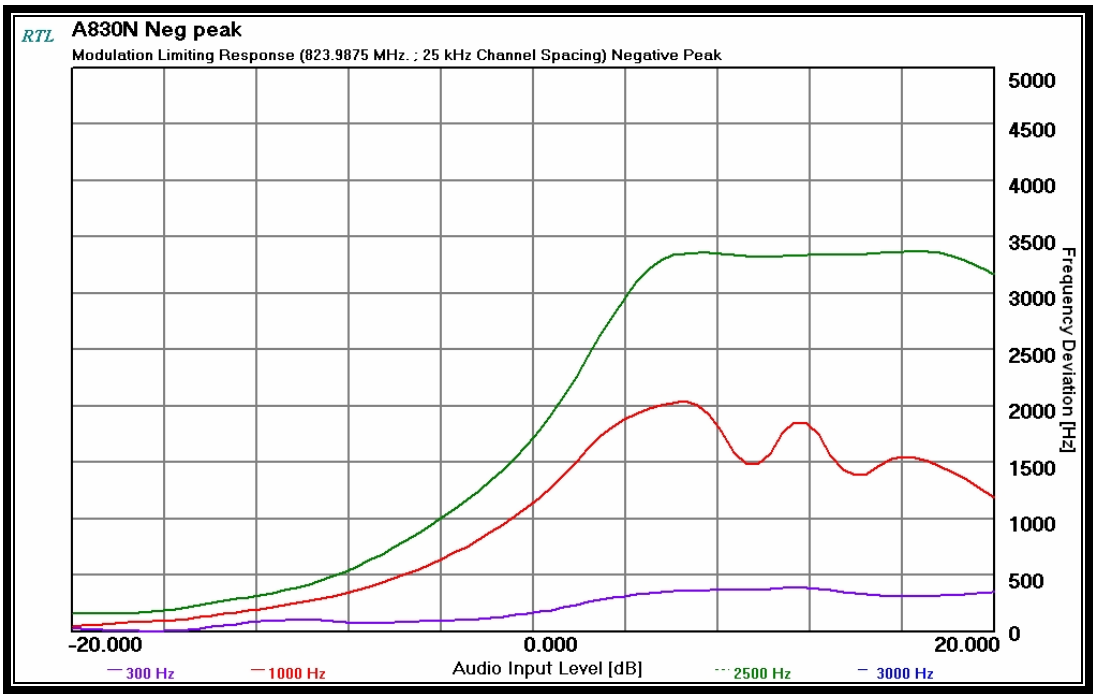
PLOT 6-6: MODULATION LIMITING: A415N - WIDE BAND; NEGATIVE PEAK



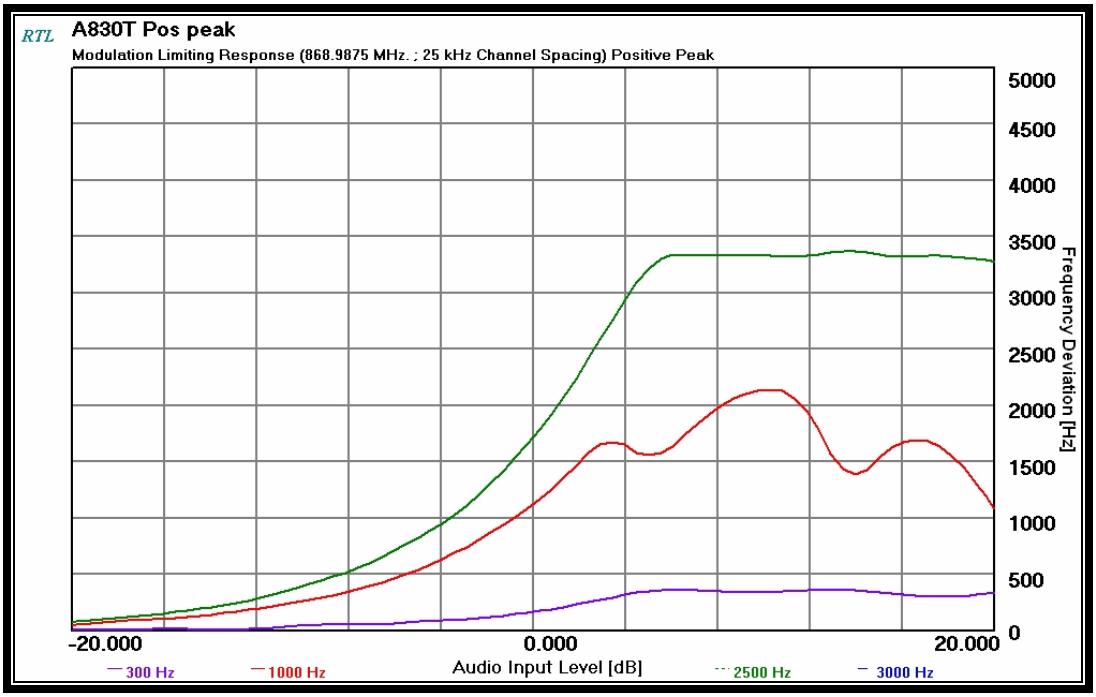
PLOT 6-7: MODULATION LIMITING: A830N - WIDE BAND; POSITIVE PEAK



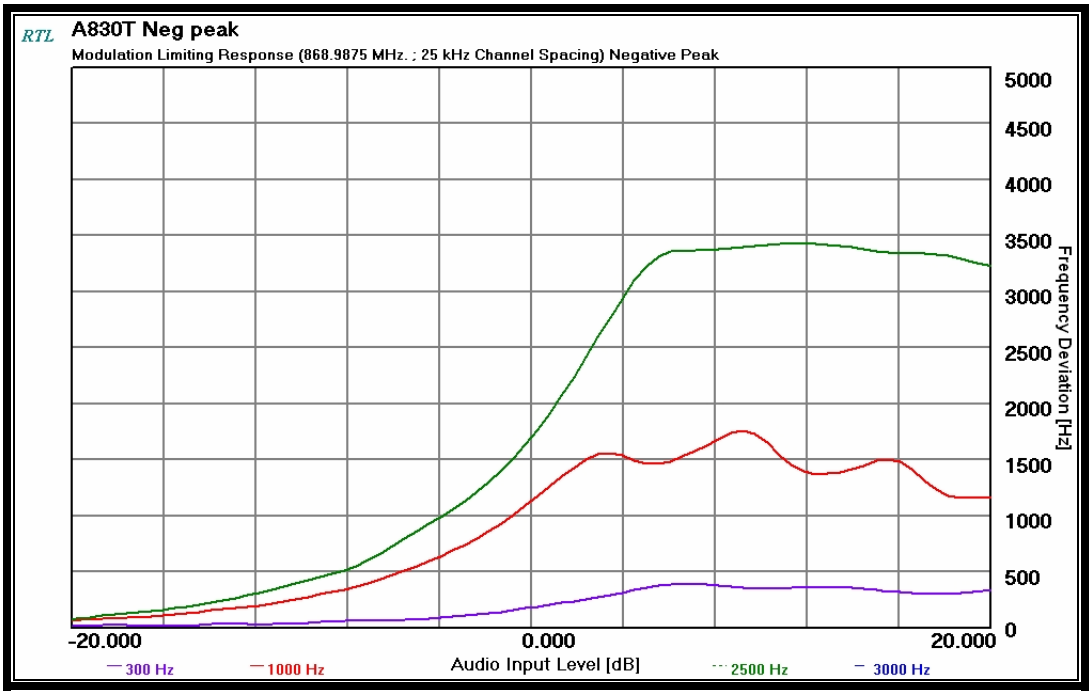
PLOT 6-8: MODULATION LIMITING: A830N - WIDE BAND; NEGATIVE PEAK



PLOT 6-9: MODULATION LIMITING: A830T - WIDE BAND; POSITIVE PEAK



PLOT 6-10: MODULATION LIMITING: A830T - WIDE BAND; NEGATIVE PEAK



6.3 TEST EQUIPMENT

TABLE 6-1: TEST EQUIPMENT – MODULATION LIMITING

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901057	Hewlett Packard	3336B	Synthesizer/Level Generator	2514A02585	09/08/05
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901054	Hewlett Packard	HP 3586B	Selective Level Meter	1928A01892	09/08/05

Daniel Biggs	Daniel Biggs	October 7, 2004
Test Engineer	Signature	Date Of Test

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

Type of Emission: F3E

Necessary Bandwidth and Emission Bandwidth:

Voice – 25 kHz channel spacing - (806-821/861-866 MHz)
Calculation:
Max modulation(M) in kHz: 3.0
Max deviation (D) in kHz: 5
Constant factor (K): 1 (assumed)
Bn = 2xM+2xDK = 16.0 kHz
Emission designator: 16K0F3E

Voice – 12.5 kHz channel spacing - (821-824/866-869 MHz)
Calculation:
Max modulation(M) in kHz: 3.0
Max deviation (D) in kHz: 4
Constant factor (K): 1 (assumed)
Bn = 2xM+2xDK = 13.0 kHz
Emission designator: 13K0F3E

8 CONCLUSION

The data in this measurement report shows that the **M/A-COM, Inc**. Model **OpenSky 800 MHz Portable Radio; FCC ID: BV8P800,** complies with all the requirements of a Class II Permissive Change under Parts 90 of the FCC Rules.