Engineering and Testing for EMC and Safety Compliance

TYPE CERTIFICATION REPORT

M/A-COM, Inc.
221 Jefferson Ridge Parkway
Lynchburg, VA 24501
Daryl Popowitch
Phone: (434) 455-9527

MODEL: MastrIII/Sitepro Trunking Base Station Radio

FCC ID: OWDTR-0026-E

October 1, 2003

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 C63.4-1992	STANDARD FORMAT MEASUREMENT/TECHNICAL REPORT PERSONAL COMPUTER AND PERIPHERALS
ANSI/TIA/EIA603- 1992	LAND MOBILE FM OR PM COMMUNICATIONS EQUIPMENT MEASUREMENT AND PERFORMANCE STANDARDS
ANSI/TIA/EIA 603-1-1998	ADDENDUM TO ANSI/TIA/EIA 603-1992
ANSI/TIA/EIA –102.CAAA; 1999	DIGITAL C4FM/CQPSK TRANSCEIVER MEASUREMENT METHODS
RSS-119; Issue 6; 2000	LAND MOBILE AND FIXED RADIO TRANSMITTERS AND RECEIVERS 27.41 TO 960.0 MHZ

Frequency Range	Maximum Measured Output Power (W) Conducted	Frequency Tolerance (ppm)	Emission Designator
425-450 MHz	90.57	1.5	16K0F3E (Voice)
425-450 MHz	90.57	1.5	11K0F3E (Voice)
425-450 MHz	90.57	1.5	5K9F1D (2 level NB 9600) measured
425-450 MHz	90.57	1.5	5K9F1E (2 level NB 9600) measured
425-450 MHz	90.57	1.5	7K1F1D (2 level XNB NB 9600) measured
425-450 MHz	90.57	1.5	7K1F1E (2 level XNB NB 9600) measured
425-450 MHz	90.57	1.5	10K3F1D (2 level WB 9600) measured
425-450 MHz	90.57	1.5	10K3F1E (2 level WB 9600) measured
425-450 MHz	90.57	1.5	8K9F1D (4 Level) measured
425-450 MHz	90.57	1.5	8K9F1E (4 Level) measured

REPORT PREPARED BY TEST ENGINEER: DAN BIGGS

Document Number: 2003085 / QRTL03-802

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 **MastrIII/Sitepro Trunking Base Station Radio; FCC ID: OWDTR-0026-E**. 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, 1992. 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 1992).

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 C63.4-1992	STANDARD FORMAT MEASUREMENT/TECHNICAL REPORT PERSONAL COMPUTER AND PERIPHERALS
ANSI/TIA/EIA603- 1992	LAND MOBILE FM OR PM COMMUNICATIONS EQUIPMENT MEASUREMENT AND PERFORMANCE STANDARDS
ANSI/TIA/EIA 603-1-1998	ADDENDUM TO ANSI/TIA/EIA 603-1992
ANSI/TIA/EIA –102.CAAA; 1999	DIGITAL C4FM/CQPSK TRANSCEIVER MEASUREMENT METHODS
RSS-119; Issue 6; 2000	LAND MOBILE AND FIXED RADIO TRANSMITTERS AND RECEIVERS 27.41 TO 960.0 MHZ

Frequency Range	Maximum Measured Output Power (W) Conducted	Frequency Tolerance (ppm)	Emission Designator
425-450 MHz	90.57	1.5	16K0F3E (Voice)
425-450 MHz	90.57	1.5	11K0F3E (Voice)
425-450 MHz	90.57	1.5	5K9F1D (2 level NB 9600) measured
425-450 MHz	90.57	1.5	5K9F1E (2 level NB 9600) measured
425-450 MHz	90.57	1.5	7K1F1D (2 level XNB NB 9600) measured
425-450 MHz	90.57	1.5	7K1F1E (2 level XNB NB 9600) measured
425-450 MHz	90.57	1.5	10K3F1D (2 level WB 9600) measured
425-450 MHz	90.57	1.5	10K3F1E (2 level WB 9600) measured
425-450 MHz	90.57	1.5	8K9F1D (4 Level) measured
425-450 MHz	90.57	1.5	8K9F1E (4 Level) measured

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: Richard B. McMurray Date: October 1, 2003

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

Signature: Daniel Biggs Date: October 1, 2003

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

3 TESTED SYSTEM DETAILS

Listed below are the identifiers and descriptions of all equipment, cables, and internal devices used with the EUT for this test, as applicable.

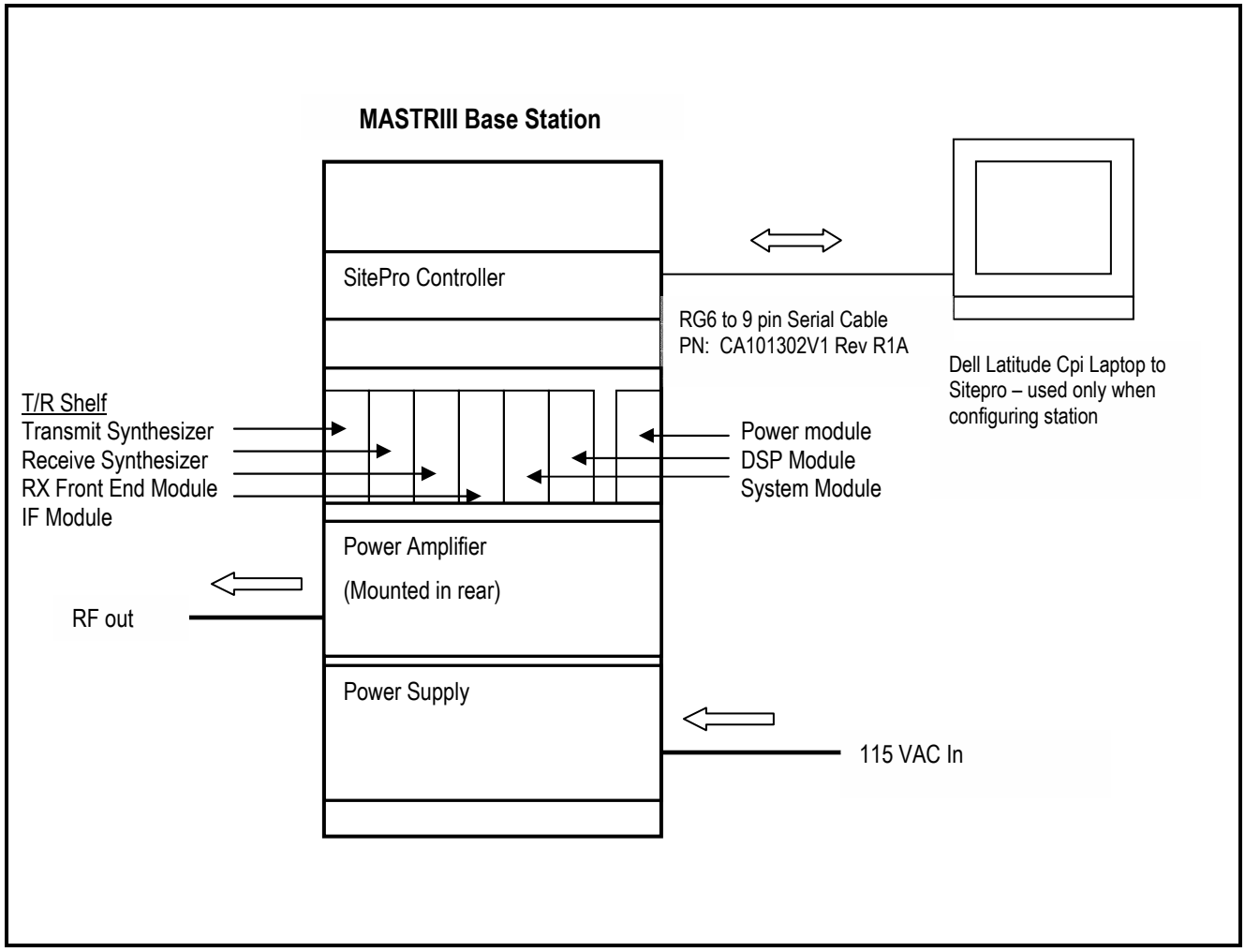
TABLE 3-1: EQUIPMENT UNDER TEST (EUT)

Part	Manufacturer	Model	PN/SN	FCC ID	RTL Bar Code
UHF Base Station Radio	M/A-COM, INC.	SMRMCX, SXRJTX	N/A	OWDTR-0028-E	
T/R Shelf Transmit Synthesizer Receive Synthesizer RX Front End Module IF Module DSP module Power module	M/A-COM, INC.	470-494 MHz	19D902839G7 19D902780G7 19D902781G7 19D902782G7 EA101401V1 EA101800V1 19D902589G2	N/A	15249
T/R Shelf Transmit Synthesizer Receive Synthesizer RX Front End Module IF Module DSP module Power module	M/A-COM, INC.	470-494 MHz	19D902839G9 19D902780G9 19D902781G7 19D902782G9 EA101401V1 EA101800V1 19D902589G2	N/A	15258
Power amplifier	M/A-COM, INC.	470-494 MHz	19D902797G7	N/A	N/A
SitePro Controller	M/A-COM, INC.		EA101209V1	N/A	N/A
Power Supply	M/A-COM, INC.		19A149978P1/ 03109467	N/A	N/A

TABLE 3-2: SUPPORT EQUIPMENT

Part	Manufacturer	Model	Serial Number	FCC ID	RTL Bar Code
Laptop Computer	DELL	Latitude Cpi	N/A	N/A	15218
RG6 to 9 pin Serial Cable			CA101302V1 Rev R1A	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: 115 VAC
Current: 5 AMPS

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

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: 425.025, 437.525, and 449.975

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

Channel	Frequency (MHz)	RF Power Measured (Watt)*
1 (High Power)	425.025	90.16
2 (High Power)	437.525	90.57
3 (High Power)	449.975	90.16
1 (Low Power)	425.025	45.19
2 (Low Power)	437.525	45.50
3 (Low Power)	449.975	46.24

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

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

Rated Power (W)
45-90

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

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

TEST PERSONNEL:

DANIEL BIGGS		JUNE 10, 2003
TEST TECHNICIAN/ENGINEER	SIGNATURE	DATE OF TEST

6 FCC RULES AND REGULATIONS PART 2 §2.1051: SPURIOUS EMISSIONS AT ANTENNA TERMINALS

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.
The transmitter 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

6.2 TEST DATA

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

Limits: Mask D (dBm): P(dBm) – (50+10xLOG P(W))

The following channels (in MHz) were investigated: 425.025, 437.525, and 449.975. 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 – 425.025 MHZ – HIGH POWER

(425.025 MHz); 12.5 kHz channel spacing; Mask D; Conducted power = 90.16 W

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin(dB)
850.05	98.72	69.54	-29.17
1275.075	100.27	69.54	-30.72
1700.1	92.34	69.54	-22.79
2125.125	93.05	69.54	-23.50
2550.15	90.35	69.54	-20.80
2975.175	88.55	69.54	-19.00
3400.2	88.39	69.54	-18.84
3825.225	84.47	69.54	-14.92
4250.25	87.83	69.54	-18.28
4675.275	87.72	69.54	-18.17

TABLE 6-2: CONDUCTED SPURIOUS EMISSIONS CHANNEL 1 – 425.025 MHZ – LOW POWER

(425.025 MHz); 12.5 kHz channel spacing; Mask D; Conducted power = 45.19 W

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin(dB)
850.05	101.12	66.55	-34.57
1275.075	97.38	66.55	-30.83
1700.1	90.36	66.55	-23.81
2125.125	89.20	66.55	-22.65
2550.15	88.05	66.55	-21.50
2975.175	86.22	66.55	-19.67
3400.2	85.22	66.55	-18.67
3825.225	82.55	66.55	-16.00
4250.25	86.29	66.55	-19.74
4675.275	85.29	66.55	-18.74

TABLE 6-3: CONDUCTED SPURIOUS EMISSIONS CHANNEL 2 – 437.525 MHZ – HIGH POWER

(437.525 MHz); 12.5 kHz channel spacing; Mask D; Conducted power = 90.57 W

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin(dB)
875.05	100.06	69.57	-30.49
1312.575	100.55	69.57	-30.98
1750.1	93.03	69.57	-23.46
2187.625	92.83	69.57	-23.26
2625.15	91.98	69.57	-22.41
3062.675	89.43	69.57	-19.86
3500.2	84.98	69.57	-15.41
3937.725	88.36	69.57	-18.79
4375.25	88.99	69.57	-19.42
4812.775	88.08	69.57	-18.51

TABLE 6-4: CONDUCTED SPURIOUS EMISSIONS CHANNEL 2 – 437.525 MHZ - LOW POWER

(437.525 MHz); 12.5 kHz channel spacing; Mask D; Conducted power = 45.50 W

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin(dB)
965.05	101.35	66.59	-34.77
1447.575	99.24	66.59	-32.66
1930.1	91.51	66.59	-24.93
2412.625	89.46	66.59	-22.88
2895.15	87.80	66.59	-21.22
3377.675	86.33	66.59	-19.75
3860.2	84.53	66.59	-17.95
4342.725	86.67	66.59	-20.09
4825.25	85.91	66.59	-19.33
5307.775	84.41	66.59	-17.83

TABLE 6-5: CONDUCTED SPURIOUS EMISSIONS CHANNEL 3 – 449.975 MHZ- HIGH POWER

(449.975 MHz); 12.5 kHz channel spacing; Mask D; Conducted power = 90.16 W

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin(dB)
899.95	98.22	69.53	-28.67
1349.925	100.82	69.53	-31.27
1799.9	91.89	69.53	-22.34
2249.875	92.48	69.53	-22.93
2699.85	89.88	69.53	-20.33
3149.825	88.89	69.53	-19.34
3599.8	84.72	69.53	-15.17
4049.775	86.67	69.53	-17.12
4499.75	88.05	69.53	-18.50
4949.725	88.66	69.53	-19.11

TABLE 6-6: CONDUCTED SPURIOUS EMISSIONS CHANNEL 3 – 449.975 MHZ - LOW POWER

(449.975 MHz); 12.5 kHz channel spacing; Mask D; Conducted power = 46.24 W

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin(dB)
899.95	100.15	66.65	-33.50
1349.925	98.03	66.65	-31.38
1799.9	90.12	66.65	-23.47
2249.875	87.65	66.65	-21.00
2699.85	87.76	66.65	-21.11
3149.825	85.82	66.65	-19.17
3599.8	81.96	66.65	-15.31
4049.775	67.82	66.65	-18.00
4499.75	84.89	66.65	-18.24
4949.725	86.48	66.65	-19.83

TABLE 6-7: 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	08/23/03
901057	Hewlett Packard	3336B	Synthesizer/Level Generator	2514A02585	07/31/03
901054	Hewlett Packard	HP 3586B	Selective Level Meter	1928A01892	09/09/04
900913	Hewlett Packard	85462A	EMI Receiver RF Section (9 kHz – 6.5 GHz)	3325A00159	12/05/03

TEST PERSONNEL:

DANIEL BIGGS		JUNE 20, 2003
TEST TECHNICIAN/ENGINEER	SIGNATURE	DATE OF TEST

7 FCC RULES AND REGULATIONS PART 2 §2.1053 (A): FIELD STRENGTH OF SPURIOUS RADIATION

7.1 TEST PROCEDURE

ANSI/TIA/EIA-603-1992, 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.

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 2 – 437.525 MHZ; NARROW BAND

Radiated Spurious Emissions
Mid Band Channel 2 (437.525 MHz, Narrowband)
Limit = 50 + 10 Log P = 69.57 dBc
Conducted Power = 49.57 dBm = 90.57 W

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss* (dB)	Antenna Gain (dBd)	Corrected Signal Generator Level (dBc)	Margin (dB)
875.1	59.2	-53.8	0.4	-1.2	104.9	-35.4
1312.6	46.3	-56.8	0.4	2.9	103.9	-34.3
1750.1	68.7	-32.9	0.6	4.8	78.3	-8.8
2187.6	35.1	-46.7	0.6	5.0	91.9	-22.3
2625.2	33.5	-48.0	0.7	5.4	92.8	-23.3
3062.7	32	-50.3	0.8	6.2	94.5	-24.9
3500.2	33.2	-47.1	0.8	6.0	91.5	-22.0
3937.7	31.2	-44.6	0.8	6.0	89.0	-19.5
4375.3	35.2	-38.4	0.9	6.8	82.1	-12.6
4812.8	34.6	-38.1	1.0	7.0	81.7	-12.1

*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 2 – 437.525 MHZ; NARROW BAND

Radiated Spurious Emissions
Mid Band Channel 2 (437.525 MHz, Narrowband)
Limit = 50 + 10 Log P = 66.58 dBc
Conducted Power = 46.58 dBm = 45.50 W

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss* (dB)	Antenna Gain (dBd)	Corrected Signal Generator Level (dBc)	Margin (dB)
875.1	58.3	-54.7	0.4	-1.2	102.9	-36.3
1312.6	44.5	-58.6	0.4	2.9	102.7	-36.1
1750.1	67.3	-34.3	0.6	4.8	76.7	-10.2
2187.6	45.2	-36.6	0.6	5.0	78.8	-12.2
2625.2	33.6	-47.9	0.7	5.4	89.7	-23.1
3062.7	32.5	-49.8	0.8	6.2	91.0	-24.4
3500.2	32.1	-48.2	0.8	6.0	89.6	-23.0
3937.7	30.6	-45.2	0.8	6.0	86.7	-20.1
4375.3	32.2	-41.4	0.9	6.8	82.1	-15.5
4812.8	31.7	-41.0	1.0	7.0	81.6	-15.0

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

TABLE 7-3: 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	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	Daniel Biggs	JUNE 19, 2003
TEST TECHNICIAN/ENGINEER	SIGNATURE	DATE OF TEST

8 FCC RULES AND REGULATIONS PART 2 §2.1049 (C) (1): OCCUPIED BANDWIDTH

OCCUPIED BANDWIDTH - COMPLIANCE WITH THE EMISSION MASKS

8.1 TEST PROCEDURE

ANSI/TIA/EIA-603-1992, section 2.2.11 and TIA/EIA-102.CAAA-1999 section 2.2.5

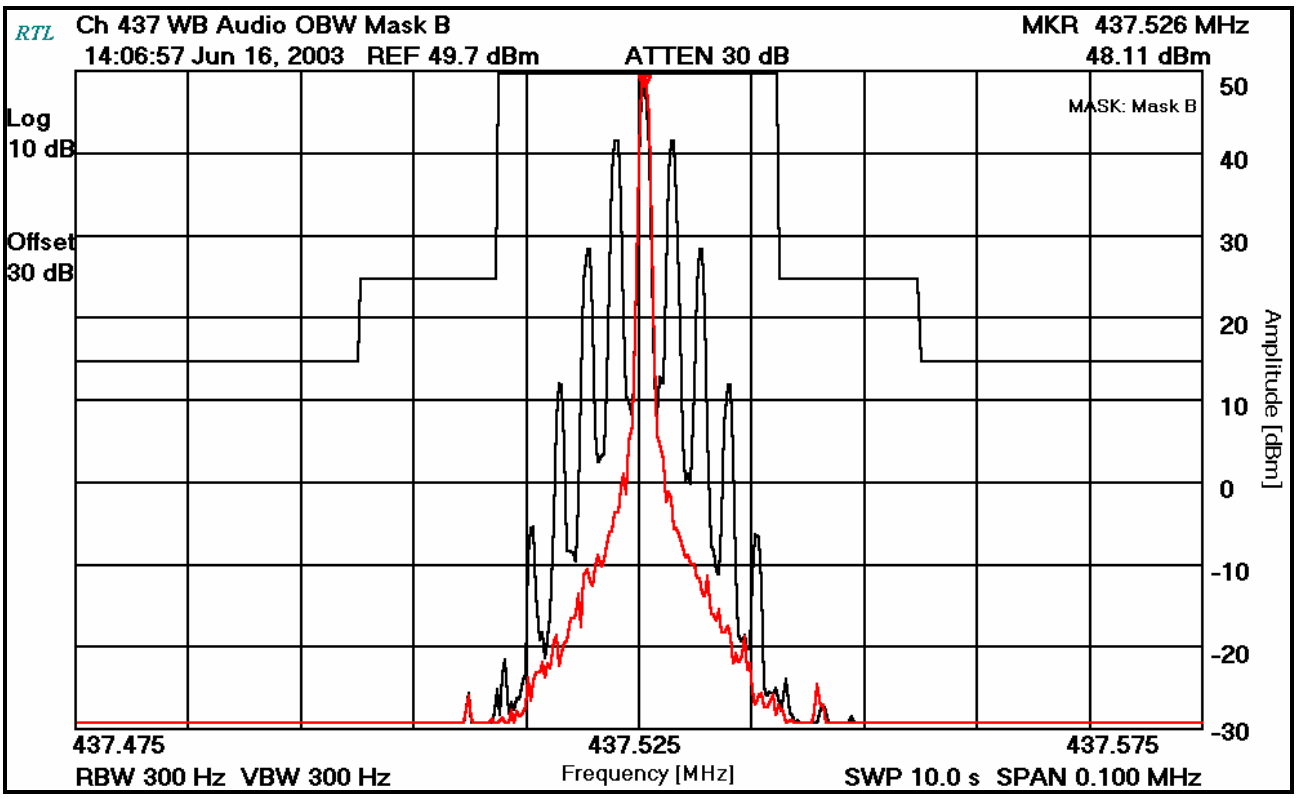
Device with audio modulation: Transmitter was modulated with a 2,500 Hz sine wave at an input level of 16 dB greater than that required to produce 50% of rated system deviation at 1,000 Hz.

Device with digital modulation: Modulated to its maximum extent using a pseudo random data sequence – 9600-bps

8.2 TEST DATA

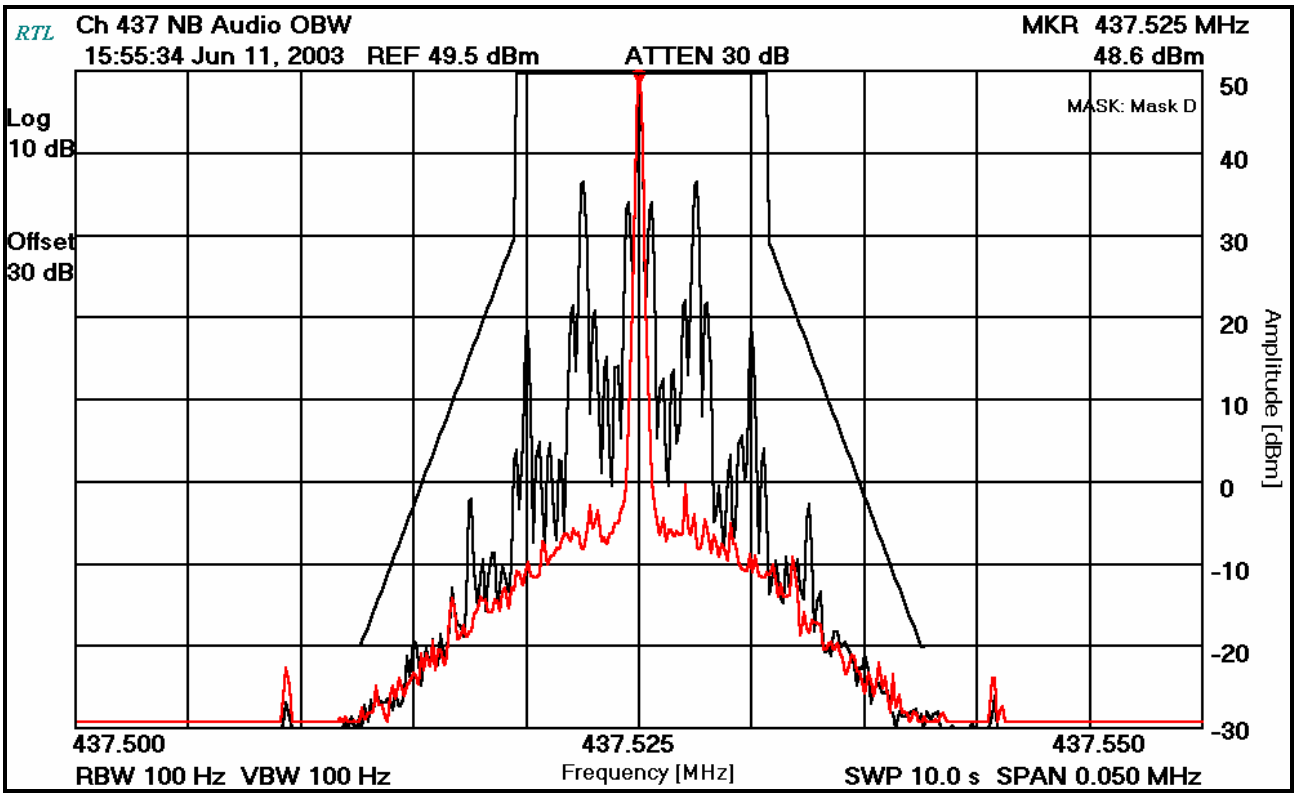
PLOT 8-1: OCCUPIED BANDWIDTH; WIDE BAND; AUDIO MODULATION: 2,500 HZ

MKR 437.525 MHz

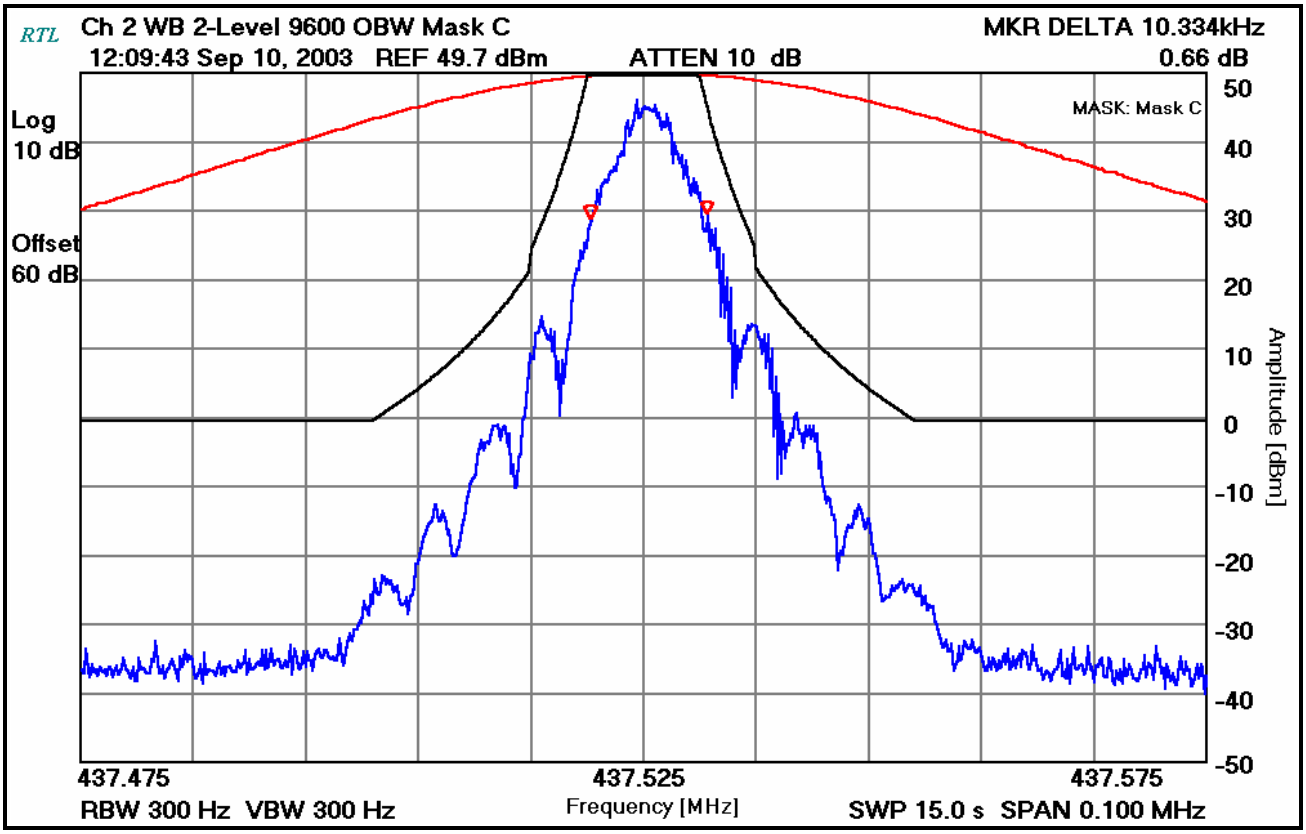


PLOT 8-2: OCCUPIED BANDWIDTH; NARROW BAND; AUDIO MODULATION: 2,500 HZ

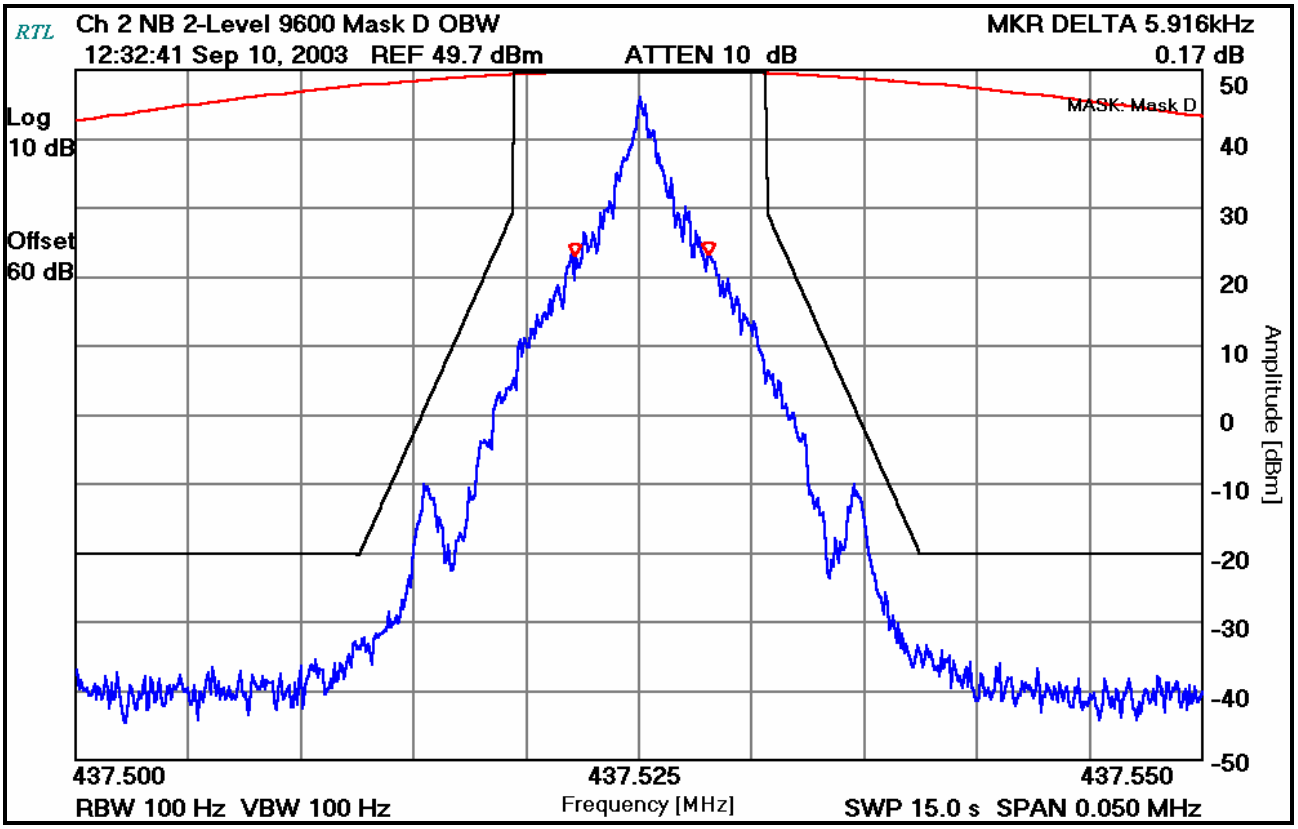
MKR 437.525 MHz



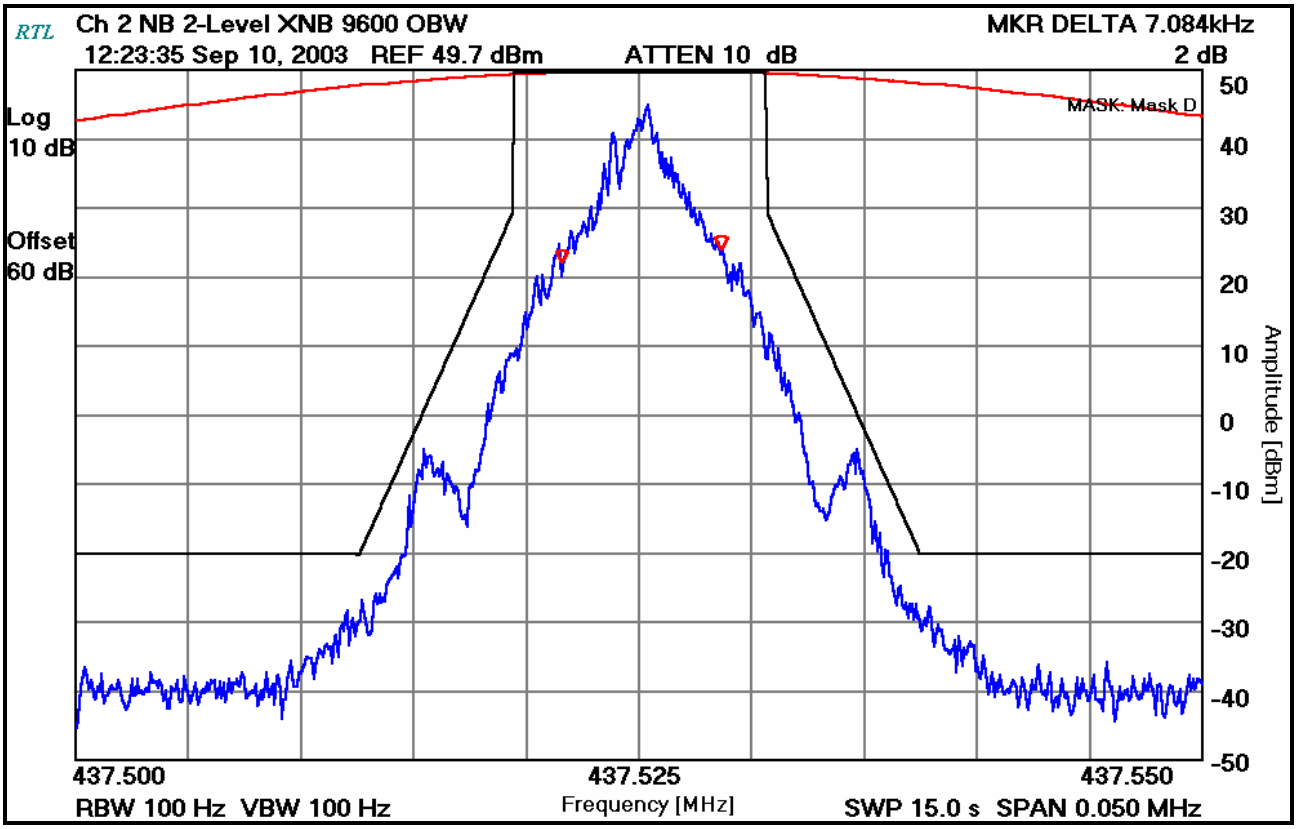
PLOT 8-3: 99% OCCUPIED BANDWIDTH - 2 LEVEL DIGITAL; WIDE BAND; 9600 BAUD



PLOT 8-4: 99% OCCUPIED BANDWIDTH - 2 LEVEL DIGITAL; NARROW BAND; 9600 BAUD



PLOT 8-5: 99% OCCUPIED BANDWIDTH - 2 LEVEL DIGITAL; NARROW BAND; 9600 BAUD; XNB



PLOT 8-6: 99% OCCUPIED BANDWIDTH - C4FM; NARROW BAND; 4800 BAUD

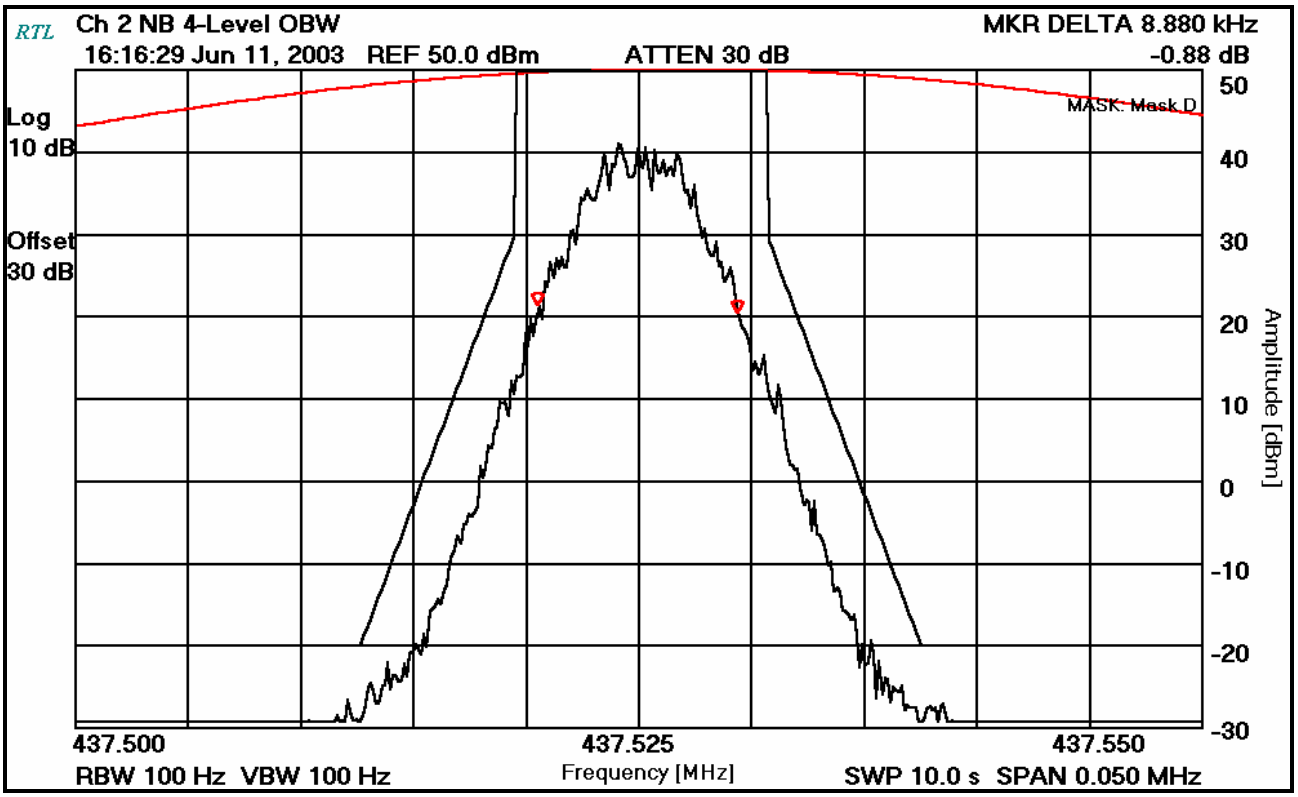


TABLE 8-1: TEST EQUIPMENT USED FOR TESTING (OCCUPIED BANDWIDTH)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Date
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	SEPTEMBER 10, 2003
TEST TECHNICIAN/ENGINEER	SIGNATURE	DATE OF TEST

9 FCC RULES AND REGULATION PART 2 §2.1055: FREQUENCY STABILITY

9.1 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 9-1 and Table 9-3.

9.2 TEST DATA

9.2.1 FREQUENCY STABILITY/TEMPERATURE VARIATION

Limit is 1.5 ppm for a base station device with a 12.5 kHz channel bandwidth. Worst-case deviation was found to be -.97 ppm at 0°C.

PLOT 9-1: TEMPERATURE FREQUENCY STABILITY

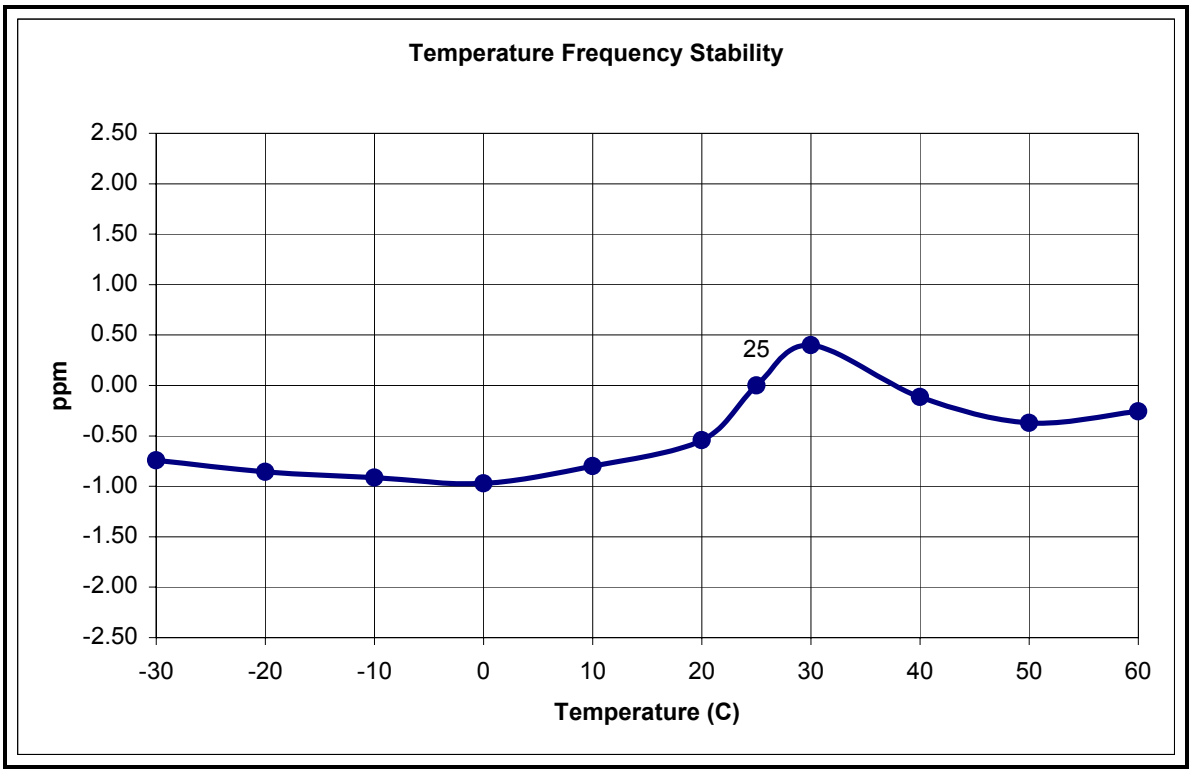


TABLE 9-1: TEMPERATURE FREQUENCY STABILITY CHANNEL 2, 437.525 MHZ

Temperature C	Measured Frequency (MHz)	ppm
-30	437525225	-0.74
-20	437525175	-0.86
-10	437525150	-0.91
0	437525125	-0.97
10	437525200	-0.80
20	437525313	-0.54
25	437525550	0.00
30	437525725	0.40
40	437525500	-0.11
50	437525388	-0.37
60	437525438	-0.26

TABLE 9-2: TEST EQUIPMENT USED FOR TESTING (FREQUENCY STABILITY/TEMPERATURE)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Date
900946	Tenney Engineering, Inc.	TH65	Temperature Chamber with Humidity	11380	12/16/03
901118	Hewlett Packard	8901A Opt. 002-003	Modulation Analyzer	2406A00178	06/18/04

TEST PERSONNEL:

DANIEL BIGGS		JUNE 19, 2003
TEST TECHNICIAN/ENGINEER	SIGNATURE	DATE OF TEST

9.2.2 FREQUENCY STABILITY/VOLTAGE VARIATION

Worst-case variation is .46 ppm at the 102 VAC.

PLOT 9-2: VOLTAGE FREQUENCY STABILITY

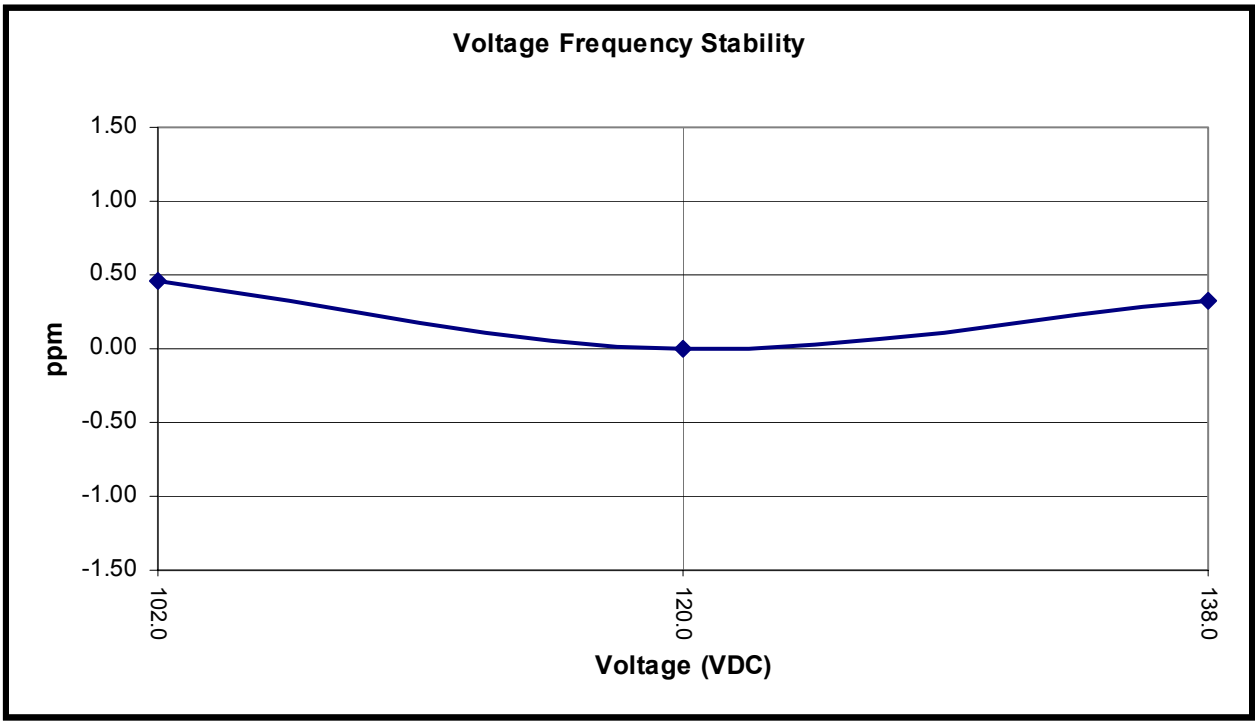


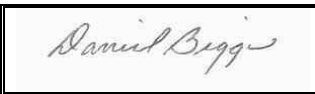
TABLE 9-3: FREQUENCY STABILITY/VOLTAGE VARIATION CHANNEL 2, 437.525 MHZ

Voltage (VAC)	Measured Frequency (MHz)	ppm
102.0	437.525342	0.46
120	437.525426	0.00
138	437.525283	0.32

TABLE 9-4: TEST EQUIPMENT USED FOR TESTING (FREQUENCY STABILITY/VOLTAGE)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Date
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		JUNE 17, 2003
TEST TECHNICIAN/ENGINEER	SIGNATURE	DATE OF TEST

10 FCC PART 2 §2.1047 (A): MODULATION CHARACTERISTICS - AUDIO FREQUENCY RESPONSE

10.1 TEST PROCEDURE

ANSI/TIA/EIA-603-1992, 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)

10.2 TEST DATA

PLOT 10-1: MODULATION CHARACTERISTICS - AUDIO FREQUENCY RESPONSE {12.5 KHZ CHANNEL BANDWIDTH}

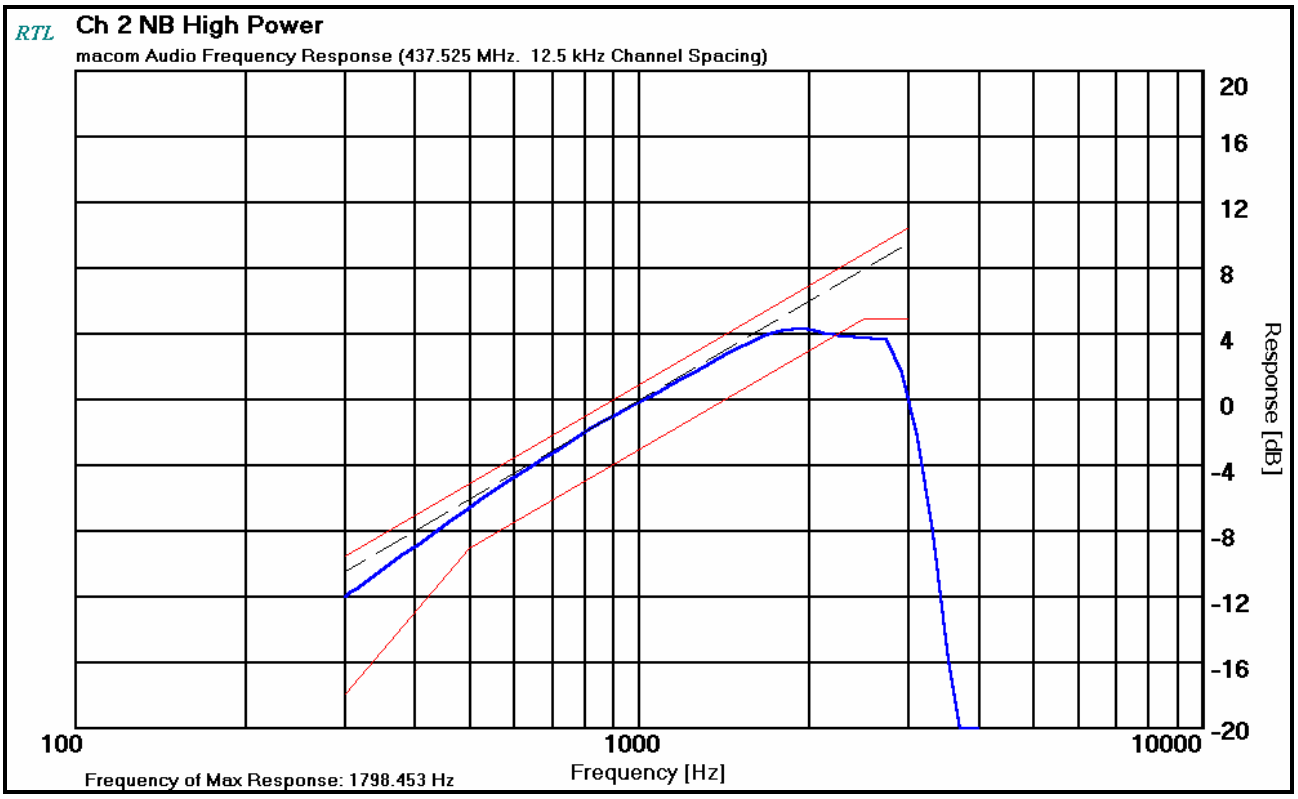


TABLE 10-1: TEST EQUIPMENT USED FOR TESTING (AUDIO FREQUENCY RESPONSE)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Date
901057	Hewlett Packard	3336B	Synthesizer/Level Generator	2514A02585	08/06/04
901118	Hewlett Packard	8901A Opt. 002-003	Modulation Analyzer	2406A00178	06/18/04
901054	Hewlett Packard	HP 3586B	Selective Level Meter	1928A01892	09/09/04

TEST PERSONNEL:

DANIEL BIGGS		JUNE 11, 2003
TEST TECHNICIAN/ENGINEER	SIGNATURE	DATE OF TEST

11 FCC PART 2 §2.1047 (A): MODULATION CHARACTERISTICS – AUDIO LOW PASS FILTER

11.1 TEST PROCEDURE

ANSI/TIA/EIA-603-1992, 2.2.15

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

11.2 TEST DATA

PLOT 11-1: MODULATION CHARACTERISTICS – AUDIO LOW PASS FILTER

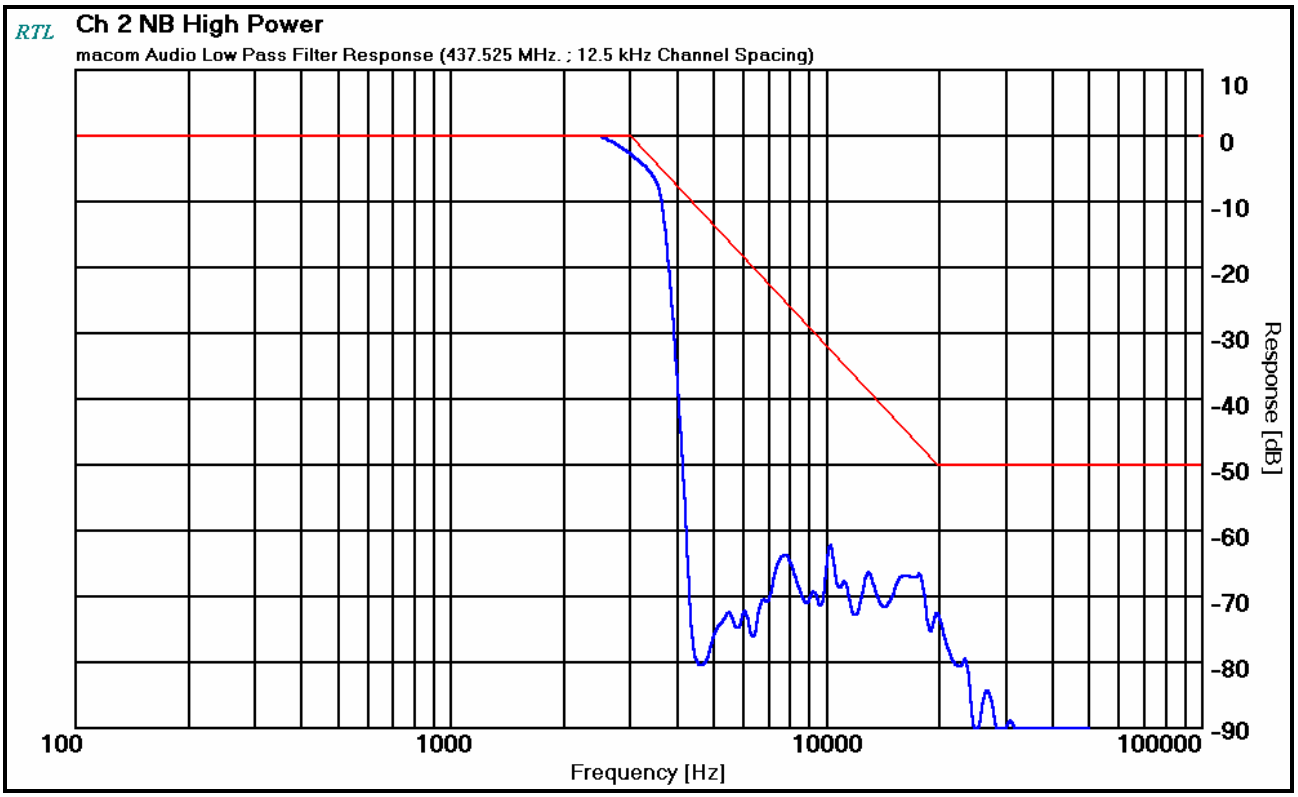


TABLE 11-1: TEST EQUIPMENT USED FOR TESTING (AUDIO LOW PASS FILTER RESPONSE)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Date
901057	Hewlett Packard	3336B	Synthesizer/Level Generator	2514A02585	08/06/04
901118	Hewlett Packard	8901A Opt. 002-003	Modulation Analyzer	2406A00178	06/18/04
901054	Hewlett Packard	HP 3586B	Selective Level Meter	1928A01892	09/09/04

TEST PERSONNEL:

DANIEL BIGGS		JUNE 11, 2003
TEST TECHNICIAN/ENGINEER	SIGNATURE	DATE OF TEST

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

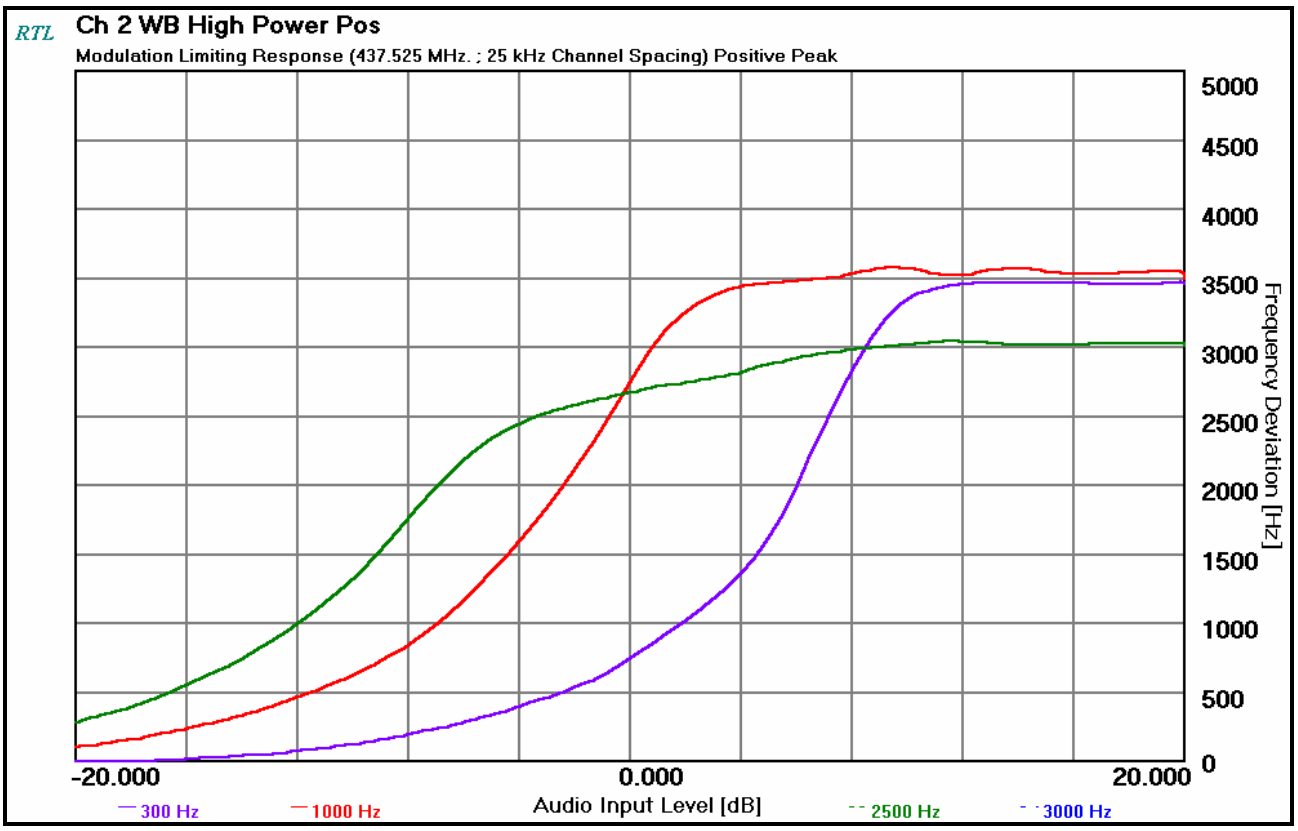
12.1 TEST PROCEDURE

ANSI/TIA/EIA-603-1992, section 2.2.3

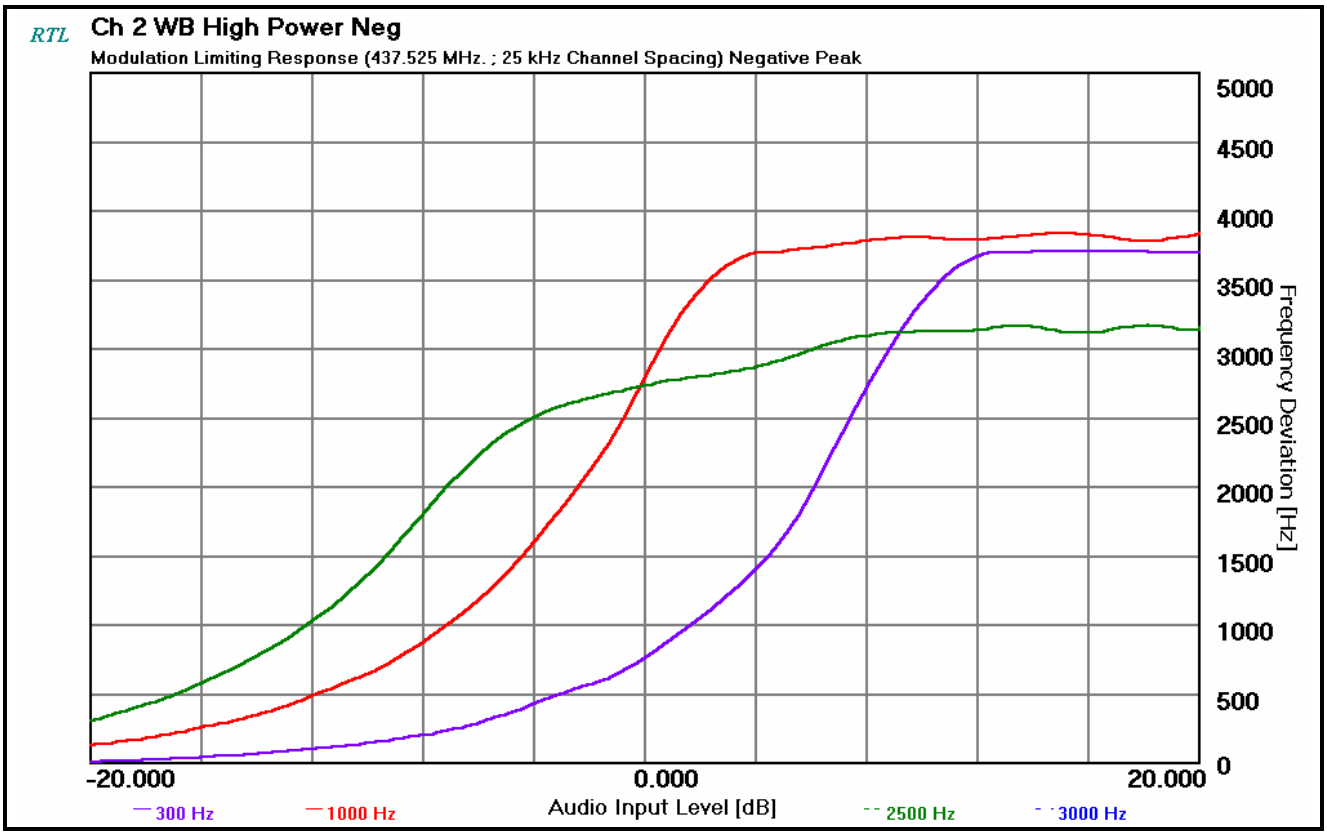
The transmitter was adjusted for full rated system deviation. The audio input level was adjusted for 60% of rated system deviation at 1000 Hz. Using this level as a reference (0dB) the audio input level was varied from the reference +/-20 dB for modulation frequencies of 300 Hz, 1,000 Hz, and 2,500 Hz.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

12.2 TEST DATA

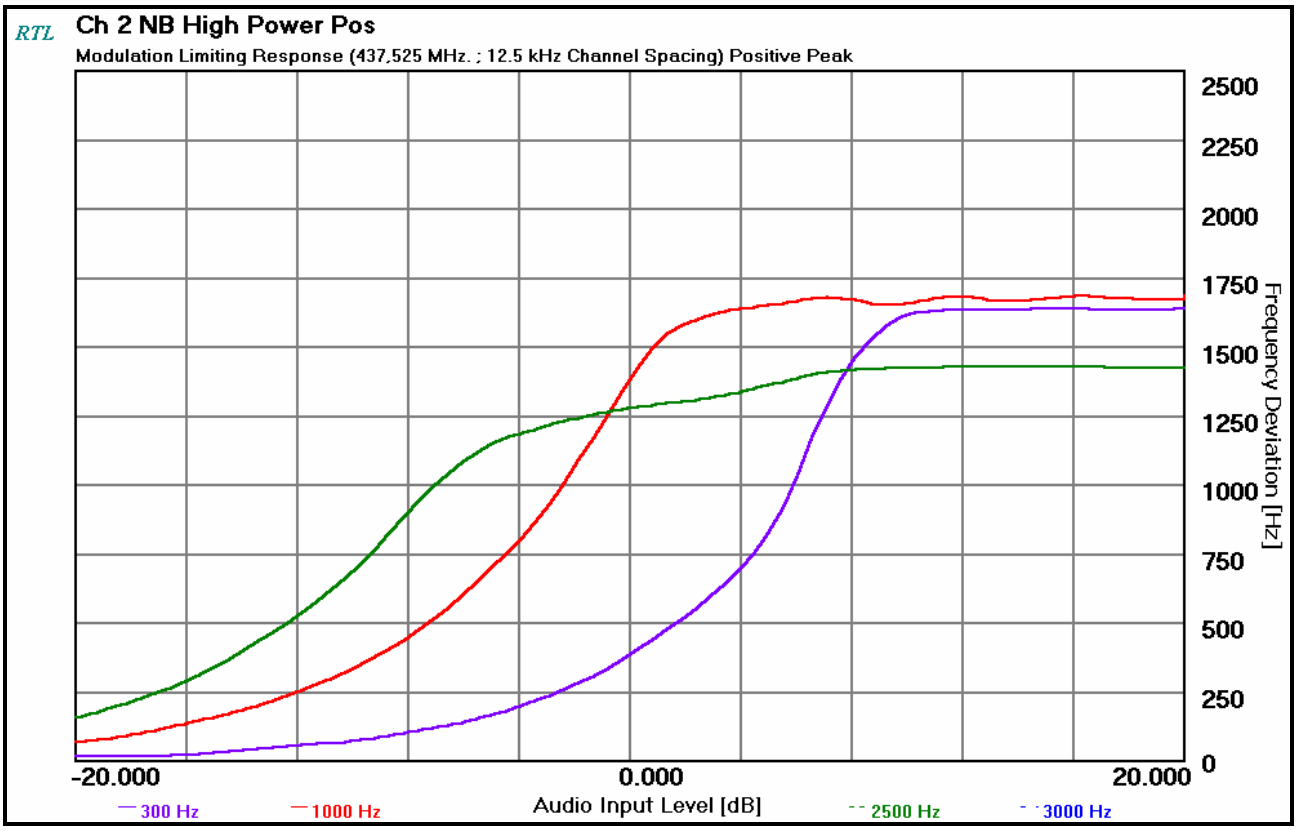
PLOT 12-1: MODULATION CHARACTERISTICS – MODULATION LIMITING: WIDE BAND; POSITIVE PEAK



PLOT 12-2: MODULATION CHARACTERISTICS – MODULATION LIMITING: WIDE BAND; NEGATIVE PEAK



PLOT 12-3: MODULATION CHARACTERISTICS – MODULATION LIMITING: NARROW BAND; POSITIVE PEAK



PLOT 12-4: MODULATION CHARACTERISTICS – MODULATION LIMITING: NARROW BAND; NEGATIVE PEAK

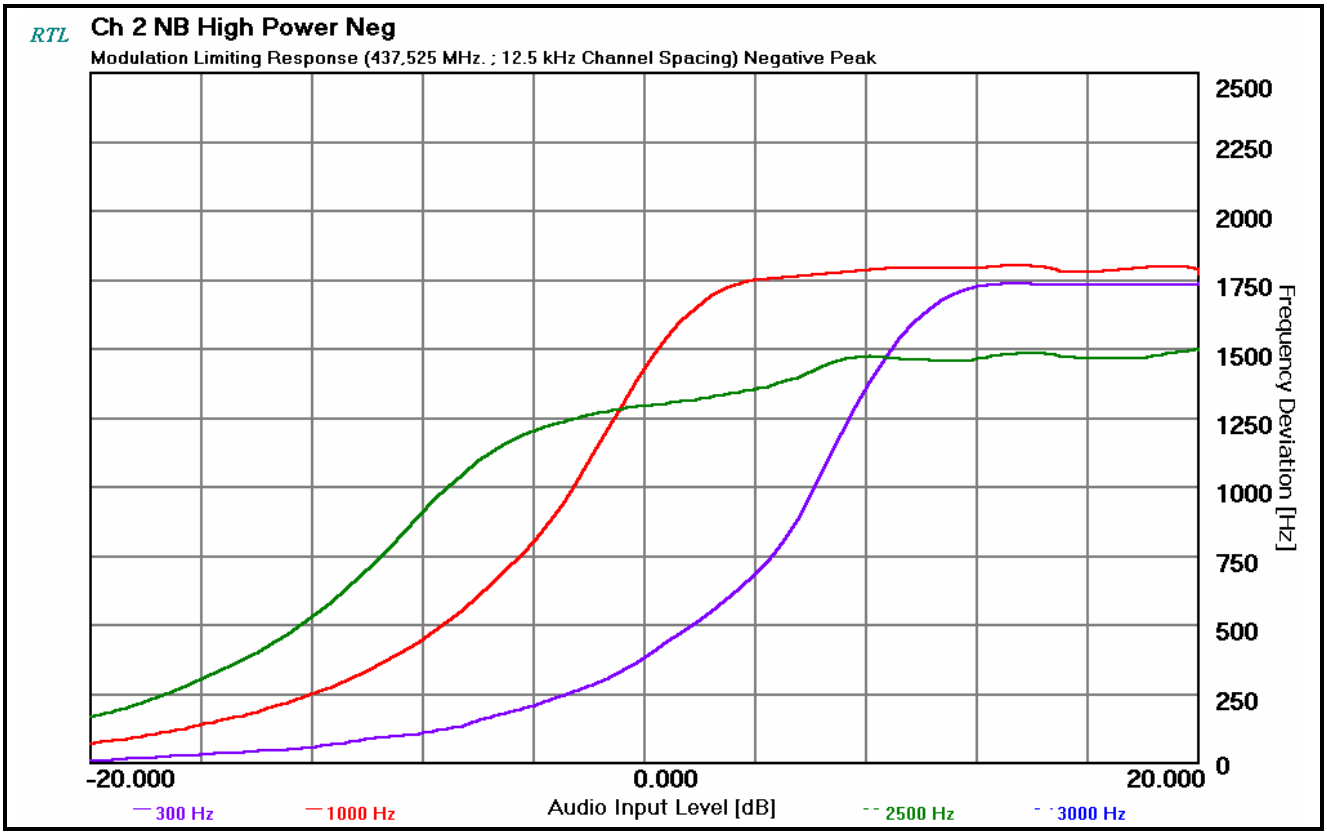


TABLE 12-1: TEST EQUIPMENT USED FOR TESTING (MODULATION LIMITING)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Date
901057	Hewlett Packard	3336B	Synthesizer/Level Generator	2514A02585	08/06/04
901118	Hewlett Packard	8901A Opt. 002-003	Modulation Analyzer	2406A00178	06/18/04
901054	Hewlett Packard	HP 3586B	Selective Level Meter	1928A01892	09/09/04

TEST PERSONNEL:

DANIEL BIGGS	Daniel Biggs	SEPTEMBER 15, 2003
TEST TECHNICIAN/ENGINEER	SIGNATURE	DATE OF TEST

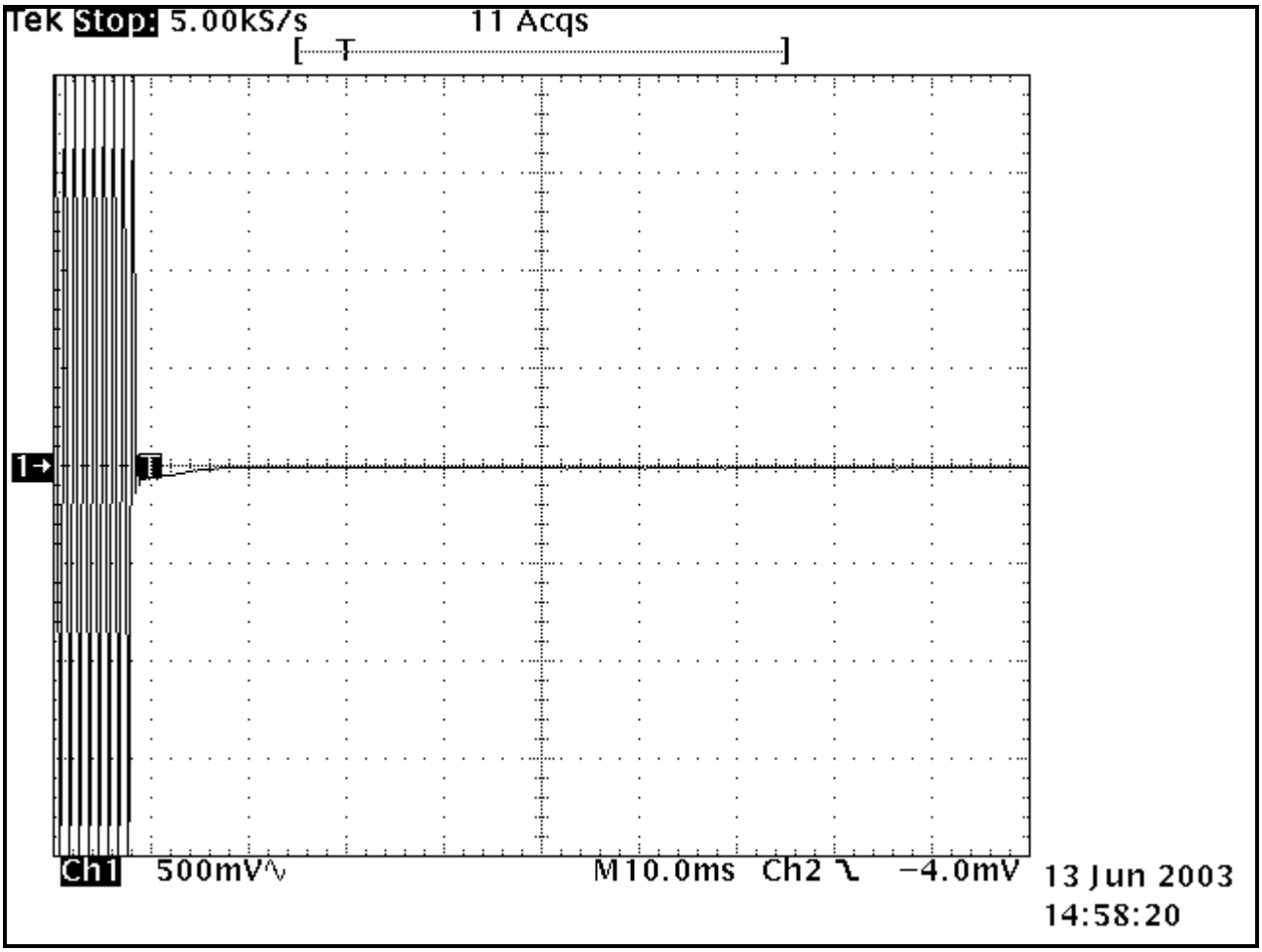
13 FCC RULES AND REGULATIONS PART 90 §90.214: TRANSIENT FREQUENCY BEHAVIOR

13.1 TEST PROCEDURE

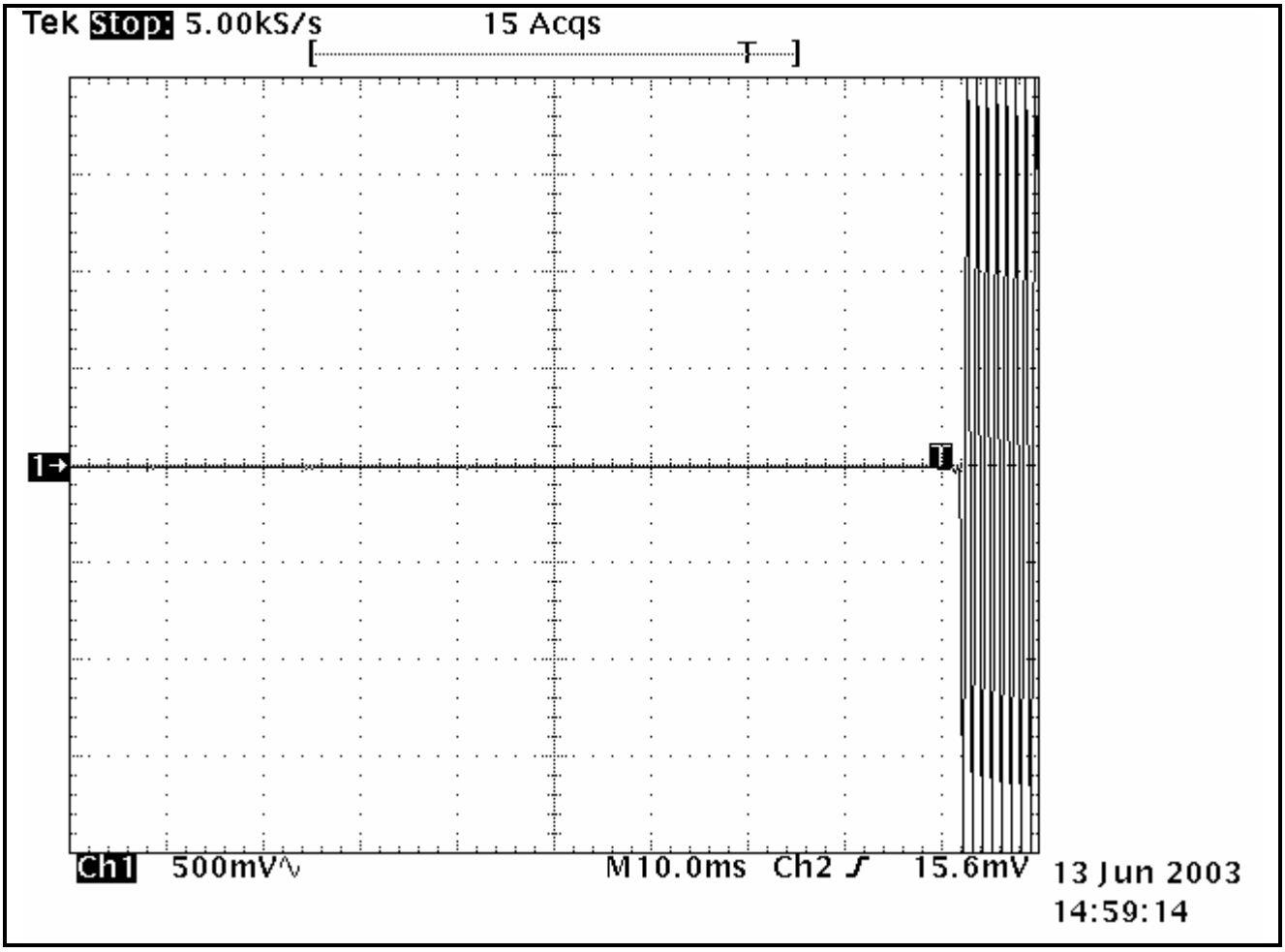
ANSI/TIA/EIA-603-1992, section 2.2.3

13.2 TEST DATA

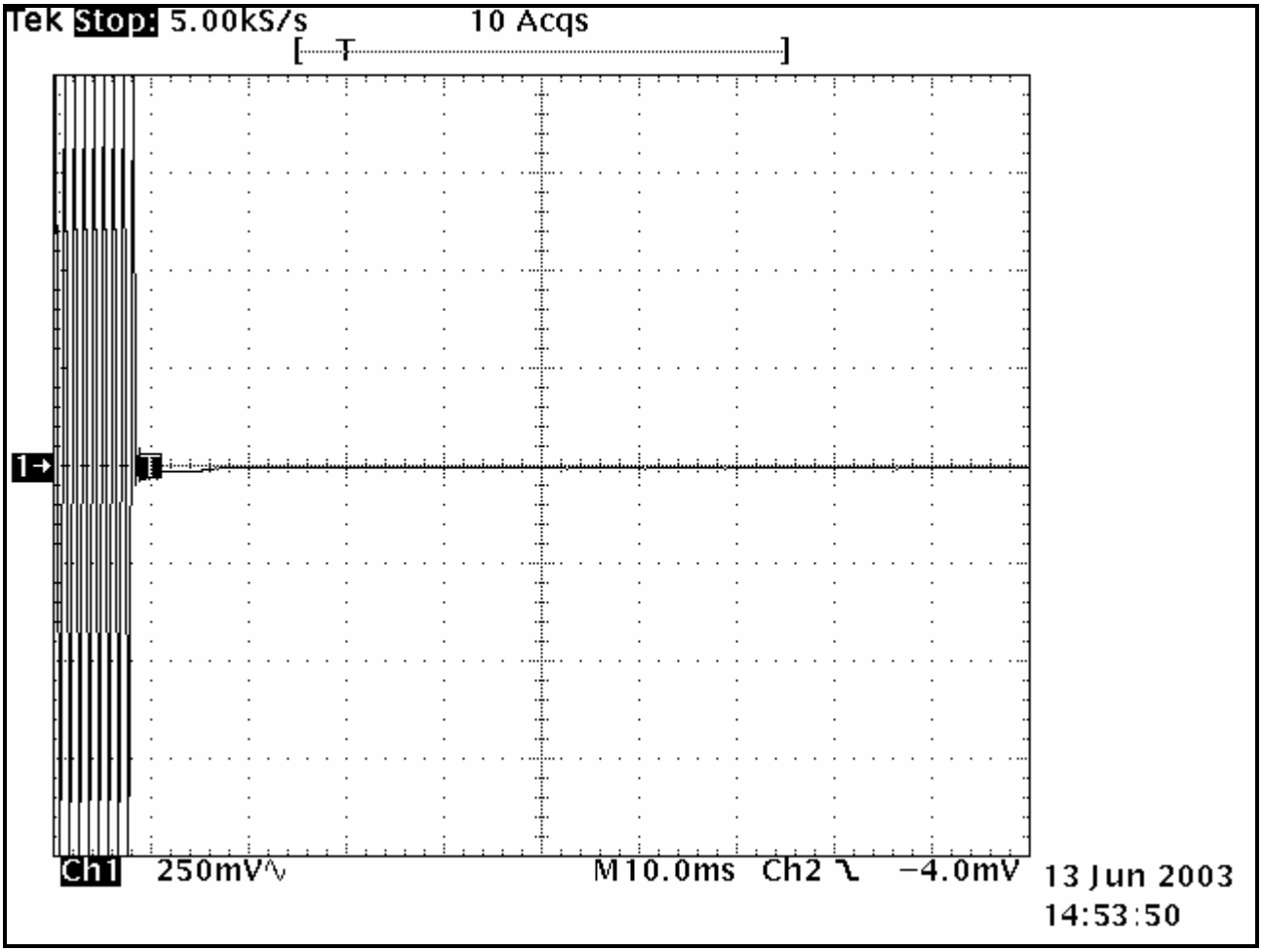
PLOT 13-1: TRANSIENT FREQUENCY BEHAVIOR – 437.525 MHZ; HIGH POWER; WIDE BAND; CARRIER ON TIME



PLOT 13-2: TRANSIENT FREQUENCY BEHAVIOR – 437.525 MHZ; HIGH POWER; WIDE BAND; CARRIER OFF TIME



PLOT 13-3: TRANSIENT FREQUENCY BEHAVIOR – 437.525 MHZ; HIGH POWER; NARROW BAND; CARRIER ON TIME



PLOT 13-4: TRANSIENT FREQUENCY BEHAVIOR – 437.525 MHZ; HIGH POWER; NARROW BAND; CARRIER OFF TIME

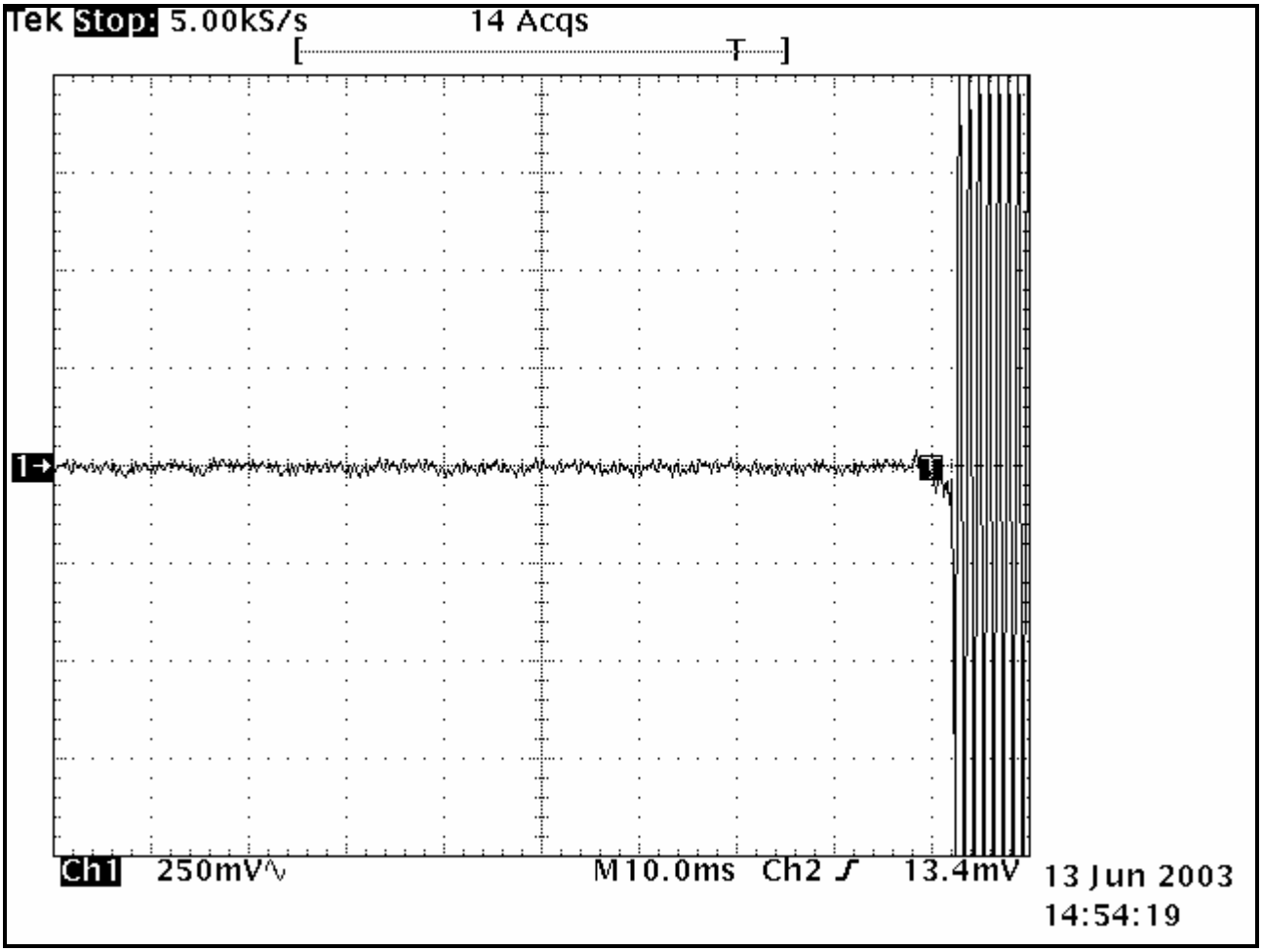


TABLE 13-1: TEST EQUIPMENT USED FOR TESTING (TRANSIENT FREQUENCY BEHAVIOR)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Date
900917	Hewlett Packard	8648C	Signal Generator	3537A01741	05/02/04
901118	Hewlett Packard	8901A Opt. 002-003	Modulation Analyzer	2406A00178	06/18/04
900561	Tektronix	TDS540B	Oscilloscope	B020129	02/19/04
900352	Werlatone	C1795	Directional Coupler	4989	N/A

TEST PERSONNEL:

DANIEL BIGGS	Daniel Biggs	JUNE 13, 2003
TEST TECHNICIAN/ENGINEER	SIGNATURE	DATE OF TEST

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

Type of Emission: F3E, F1D, F1E

Necessary Bandwidth and Emission Bandwidth:

Part 90
Voice – 25 kHz channel separation
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

Part §90.210
Voice – 12.5 kHz channel separation
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

Part §90.210
Digital voice and data – 25 kHz separation
9600 Baud
Measurement: 99.0% Occupied Bandwidth
Bn = 10.334 kHz
Emission designator: 10K3F1D, 10K3F1E

Part §90.210
Digital voice and data – 12.5 kHz separation
9600 Baud
Measurement: 99.0% Occupied Bandwidth
Bn = 5.916 kHz
Emission designator: 5K9F1D, 5K9F1E

Part §90.210
Digital voice and data – 12.5 kHz separation
9600 Baud; XNB Mode
Measurement: 99.0% Occupied Bandwidth
Bn = 7.084 kHz
Emission designator: 7K1F1D, 7K1F1E

Part §90.210
C4FM –
Measurement: 99.0% Occupied Bandwidth
Bn = 8.88 kHz
Emission designator: 8K9F1D, 8K9F1E

15 CONCLUSION

The data in this measurement report shows that the **M/A-COM, Inc**. Model **MASTRIII w/ Sitepro; FCC ID: OWDTR-0028-E,** complies with all the requirements of Parts 90, 15 and 2 of the FCC Rules, and Industry Canada RSS-119, Issue 6, 2000.