Nemko USA, Inc.
11696 Sorrento Valley Rd., Suite F
San Diego, CA 92121-1024
Phone (858) 755-5525 Fax (858) 452-1810

CERTIFICATION TEST REPORT

PART 15.239C

FOR THE **PORTABLE AMPLIFIER SYSTEM**
MODEL: **TX3**

FCC ID: VYHTX3-18

PREPARED FOR:

FM Jam
2157 Newcastle Ave
Cardiff by the Sea, CA 92007

Prepared on: **April 22, 2008**

Report Number: **2008 0310433-FCC**

Project Number: **10433-1**

NEx Number: **103222**

Total Pages: 22

DOCUMENT HISTORY

REVISION	DATE	COMMENTS
-	April 22, 2008	Prepared By: Alan Laudani
-	April 22, 2008	Initial Release: Alan Laudani

NOTE: Nemko USA, Inc. hereby makes the following statements so as to conform to Chapter 10 (Test Reports) Requirements of ANSI C63.4 (2003) "Methods and Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz":

- The unit described in this report was received at Nemko USA, Inc.'s facilities on March 6, 2008.
- Testing was performed on the unit described in this report on March 7, 2008 to April 22, 2008
- The Test Results reported herein apply only to the Unit actually tested, and to substantially identical Units.
- This report does not imply the endorsement of the Federal Communications Commission (FCC), Industry Canada, NVLAP or any other government agency.

TABLE OF CONTENTS

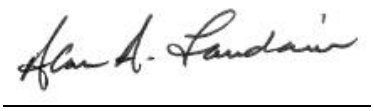
CERTIFICATION

Nemko USA, Inc., an independent Electromagnetic Compatibility (EMC) Test Laboratory, produced this Test Report and performed the Radio Frequency Interference (RFI) testing and data evaluation contained herein.

Nemko USA, Inc.'s measurement facility is currently registered with the United States Federal Communications Commission (FCC) in accordance with the provisions of 47 United States Code (CFR) Part 2, Subpart I, Section 2.948(a). A current description of Nemko USA, Inc.'s measurement facility is on file with the FCC. Nemko USA Inc. has additionally satisfied the FCC that it complies with the requirements set forth in 47 CFR Part 2, Subpart I, Section 2.948(d) regarding the accreditation of EMC laboratories.

The RFI testing, test data collection and test data evaluation were accomplished in accordance with the ANSI C63.4–2003 Standard, and in accordance with the applicable sections of the FCC rules (47 CFR Parts 2 and 15). The testing was also accomplished in accordance with Industry Canada's ICES-003 standard for unintentional radiating device per EMCAB-3, Issue 3 (May 1998). The administrative summary of this test report provides a description of the test sample.

I hereby certify that the test data, test data evaluation, and equipment configurations used to compile this test report are a true and accurate representation of the test sample's radio frequency interference characteristics as of the test date(s), and, for the design of the test sample.



Alan Laudani
EMC Engineer

1. ADMINISTRATIVE DATA AND TEST SUMMARY

1.1. Administrative Data

CLIENT:	FM Jam 2157 Newcastle Ave Cardiff by the Sea, CA 92007
CONTACT: E-Mail:	Jeff Sloane JSloane@imcsd.com
DATE (S) OF TEST:	March 7, 2008 to April 22, 2008
EQUIPMENT UNDER TEST (EUT):	Portable Amplifier System
MODEL:	TX3
CONDITION UPON RECEIPT:	Suitable for Test
TEST SPECIFICATION:	FCC, 15.239 Operation in the band 88–108 MHz.

1.2. Test Summary

The column headed "Required" indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:
N No: not applicable / not relevant
Y Yes: Mandatory i.e. the apparatus shall conform to these test.
N/T Not Tested, mandatory but not assessed. (See section 4.4 Test deleted)
The results contained in this section are representative of the operation of the apparatus as originally submitted.

FCC Part 15	*Test Description*	*Compliance Status*
15.239(b)	Field Strength of Emissions within the Band	PASS
15.239(a)	20dB Bandwidth	PASS
15.239(c)	Field Strength of Emissions outside the Band	PASS
15.107(a) & 15.207(a)	Conducted Emissions	PASS
15.109(a)	Stand- by Spurious Emissions	PASS

Refer to the test results section for further details.

2. SYSTEM CONFIGURATION

2.1. Description and Method of Exercising the EUT

The TX3 is a Portable Amplifier System based on an FM Transmitter. Output is between 88.1 MHz and 89.1 MHz. Antenna is not removable by user. Device is designed to operate in compliance with CFR 47 Part 15.239. It can transmit while plugged into the external power supply.

The EUT's performance during test was evaluated against the performance criterion specified by applicable test standards. Performance results are detailed in the test results section of this report.

2.2. System Components and Power Cables

DEVICE	MANUFACTURER MODEL # SERIAL #	POWER CABLE
EUT - Portable Amplifier System	FM Jam Model: TX3 Serial #: NA	1.5 M coax from Wall Wart 9 VDC
Wall Wart AC Adapter	Wattac Model :BA0101C1-090-A02 SN: WP07108888231	2 prong 100-240 VAC 50/60 Hz 0.3A

2.3. Device Interconnection and I/O Cables

Connection	I/O Cable
Stereo out	2m Belden 8410 coax terminated with 1000 Ohms When installed—EUT will not transmit
Stereo In	1.8 AWM 2725 26awg terminated 68 Ohms both channels
Guitar In	2m Belden 8410 coax terminated with 50 Ohms
Pedal Control	2m Belden 8410 coax terminated with 1000 Ohms

2.4. Design Modifications for Compliance

The following design modifications were made to the EUT during testing.

No design modifications were made to the EUT during testing.

2.5. Theory of Operation

The FM Jam TX-3 is a single-board audio DSP driving a low-power FM Stereo transmitter. The DSP provides audio processing of low and high-level audio signals provided by the user. The user selects "effects" that are applicable to electric guitars. The FM Stereo transmitter has user-selectable frequencies in the U.S. commercial FM Broadcast band, and is designed to meet the requirements of Part 15.239 of the FCC rules and regulations. The device is handheld, and operates from AA batteries or an external AC power supply.

2.6. Technical Specifications of the EUT

Manufacturer:	FM Jam
Operating Frequency:	88.1 to 88.9 MHz in the 88-108 MHz frequency band.
Rated Power:	Not to exceed 250 µV/m at 3m
Modulation:	FM
Antenna Connector:	None
Power Source:	4 "AA" Batteries, 120 Vac Wall Wort Power Supply

3. DESCRIPTION OF TEST SITE AND ENVIRONMENT

3.1. Description of Test Site

The test site is located at 11696 Sorrento Valley Road, Suite F, San Diego, CA 92121. The site is physically located 18 miles Northwest of downtown San Diego. The general area is a valley 1.5 miles east of the Pacific Ocean. This particular part of the valley tends to minimize ambient levels, i.e. radio and TV broadcast stations and land mobile communications. The three and ten-meter Open Area Test Site (OATS) is located behind the office/lab building. It conforms to the normalized site attenuation limits and construction specifications as set in the EN 55022 (1987), CISPR 16 and 22(1985) and ANSI C63.4-2001 documents. The OATS normalized site attenuation characteristics are verified for compliance every year, and registered with the Federal Communications Commission under Registration Number 90579 and Industry Canada under 2040B-1 and 2040B-2.

3.2. Test Environment

All tests were performed under the following environmental conditions:

Temperature range	:	17 – 22 ^{o}C
Humidity range	:	19 - 30%
Pressure range	:	87 - 105 kPa
Power supply range	:	120 Vac 60 Hz $\pm$ 15%

4. DESCRIPTION OF TESTING METHODS

4.1. Introduction

As required in 47 CFR, Parts 2 and 15, the methods employed to test the radiated and conducted emissions (as applicable) of the EUT are those contained within the American National Standards Institute (ANSI) document ANSI C63.4–2003, titled "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz." All applicable FCC Rule Sections that provide further guidance for performance of such testing are also observed.

For General Test Configuration please refer to Figure 1 on the following page.

Digital devices sold in Canada are required to comply with the Interference Causing Equipment Standard for Digital Apparatus, ICES-003. These test methods and limits are specified in the Canadian Standards Association's (CSA) Standard C108.8-M1983 (1-1-94 version) and are "essentially equivalent" with FCC, Part 15 and CISPR 22 (EN55022) rules for unintentional radiators per EMCAB-3, Issue 3 (May 1998). No further testing is required for compliance to ICES-003.

4.2. Configuration and Methods of Measurements for Conducted Emissions

Section 7 of ANSI C63.4 determines the general configuration of the EUT and associated equipment, as well as the test platform for conducted emissions testing. Tabletop devices are placed on a non-conducting surface 80 centimeters above the ground plane floor and 40 centimeters from the ground plane wall. The EUT and associated system are configured to operate continuously, representing a "normally operating" mode. The EUT is powered via a Line Impedance Stabilization Network (LISN). The emissions are recorded using the required bandwidth of 9 kHz in the quasi-peak mode. The average amplitude is also observed employing a 10 kHz bandwidth to determine the presence of broadband RFI. When such interference is caused by broadband sources (as defined by the FCC and ANSI Rules), the deviation guidelines contained in Section 11.3.1 of ANSI C63.4 are employed, which allows a correction factor of 13 dB to be subtracted from the quasi-peak reading. The emission levels are then compared to the applicable FCC limits to determine compliance.

4.3. Configuration and Methods of Measurements for Frequency Identification

When performing all testing of equipment, the actual emissions of the EUT are segregated from ambient signals present within the laboratory or the open-field test range. Preliminary testing is performed to ensure that ambient signals are sufficiently low to allow for proper observation of the emissions from the EUT. Incoming power lines are filtered using a 120 dB, 30-ampere; 115/208-volt filter to assist in reducing ambient signals for tests of levels of conducted emissions. Ambients within the laboratory are compared to those noted at the nearby open-field site to discriminate between signals produced from the EUT and ambient signals. In the event that a significant emission is produced by the EUT at a frequency which is also demonstrating significant ambient signals, the spectrum analyzer is placed in the peak mode, the bandwidth is narrowed, the EUT's signal is centered on the analyzer, the scan width is expanded to 50 kHz while monitoring the audio to ensure that only the EUT signal is present, the analyzer is switched to quasi-peak mode, and the level of the EUT signal is recorded.

4.4. Configuration and Methods of Measurements for Radiated Emissions

Section 8 of ANSI C63.4 determines the general configuration and procedures for measuring the radiated emissions of equipment under test. Initially, the primary emission frequencies are identified inside the test lab by positioning a broadband receive antenna one meter from the EUT to locate frequencies of significant radiation. Next, the EUT and associated system are placed on a turntable on a ten meter open area test site (registered with the FCC in accord with its Rules and ANSI C63.4) and the receive antenna is located at a distance of ten meters from the EUT.

The EUT and associated system are configured to operate continuously, representing a "normally operating" mode. All significant radiated emissions are recorded when maximum radiation on each frequency is observed, in accordance with part 8 of ANSI C63.4–2003 and Section 15.33 of the FCC Rules. To ensure that the maximum emission at each discrete frequency of interest is observed, the receive antenna is varied in height from one to four meters and rotated to horizontal and vertical polarities, and the turntable is also rotated to determine the worst emitting configuration. The numerical results of the test are included herein to demonstrate compliance.

The numerical results that are applied to the emissions limits are arrived at by the following method:
Example: A=RR+CL+AF
A = Amplitude dBµV/m
RR = Receiver Reading dBµV
CL = cable loss dB
AF = antenna factor dB/m

Example Frequency = 110MHz
18.5 dBµV (spectrum analyzer reading)
+3.0 dB (cable loss @ frequency)
21.5 dBµV
+15.4 dB/m (antenna factor @ frequency)
36.9 dBµV/m Final adjusted value

The final adjusted value is then compared to the appropriate emission limit to determine compliance.

5. Test Results

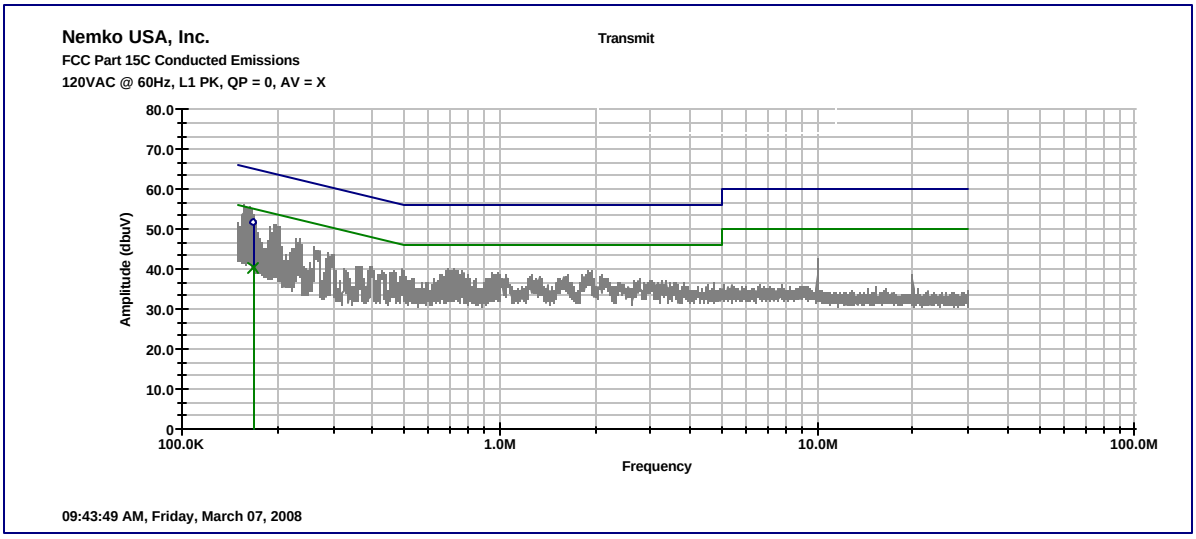
5.1. Conducted Emissions

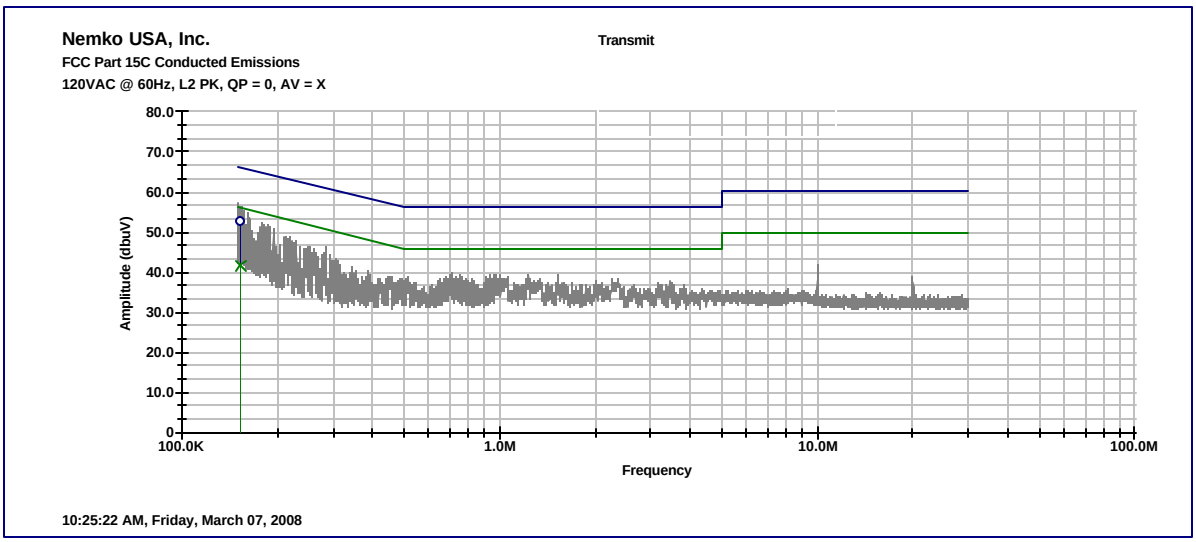
Part 15.207(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

The TX3 Portable Amplifier System passes conducted emissions in both transmit and standby modes when connected to the AC power supply.

5.1.1. Conducted Emissions Test Data – Transmit Mode

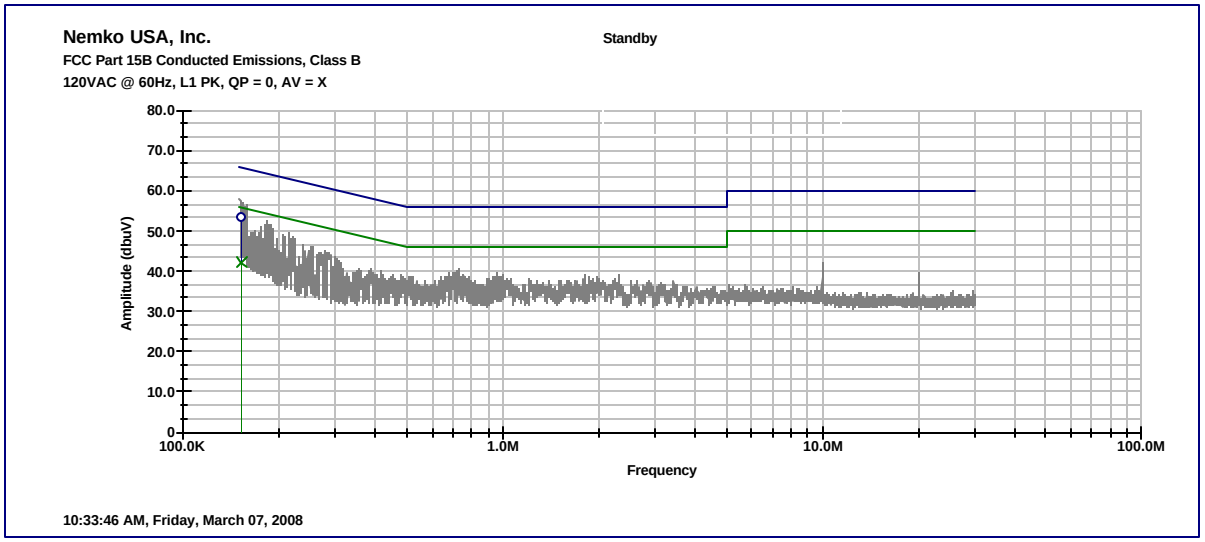
Client	FM Jam	Temperature	72	°F
PAN #	10433-1	Relative Humidity	51	%
EUT Name	Portable Amplifier System	Barometric Pressure	30.41	Hg
EUT Model	TX3	Test Location	Enclosure 1	
Governing Doc	CFR 47, Part 15B	Test Engineer	Alan Laudani	
Basic Standard	Sec. 15.207	Date	3/7/07	
Parameters	Peak RBW: 100kHz VBW: 100kHz Quasi-Peak: RBW 9kHz, VBW 30 kHz Average: RBW 9kHz, VBW 30 kHz Quasi-Peak Limit Blue Line, Average Limit Green Line			

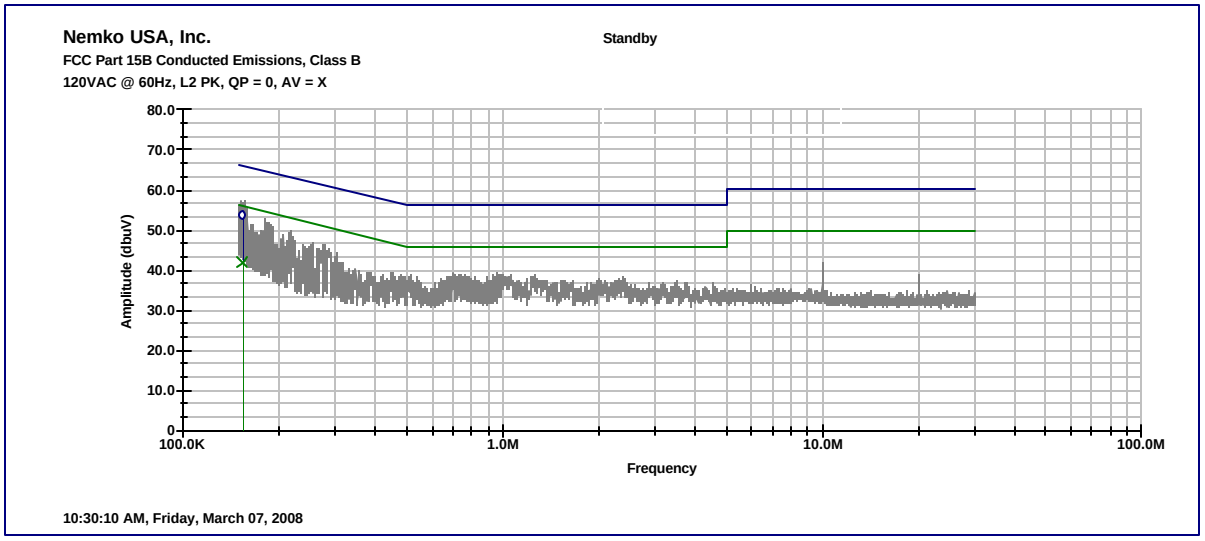




5.1.2. Conducted Emissions Test Data – Stand By

Client	FM Jam	Temperature	72	°F
PAN #	10433-1	Relative Humidity	51	%
EUT Name	Portable Amplifier System	Barometric Pressure	30.41	Hg
EUT Model	TX3	Test Location	Enclosure 1	
Governing Doc	CFR 47, Part 15B	Test Engineer	Alan Laudani	
Basic Standard	Sec. 15.107	Date	3/7/08	
Parameters	Peak RBW: 100kHz VBW: 100kHz Quasi-Peak: RBW 9kHz, VBW 30 kHz Average: RBW 9kHz, VBW 30 kHz			
Legend	.Quasi-Peak Limit Blue Line, Average Limit Green Line			





5.2. Radiated Emissions –Standby Mode

Emissions reported below, Emissions were searched over a range of 9 kHz to 1000 MHz

Example Frequency = 131.9 MHz

54.7 dBµV (spectrum analyzer reading)

+3.4 dB (cable loss @ frequency)

+11.5 dB/m(antenna factor @ frequency)

-32.3 dB (PreAmp Gain @ frequency)

37.3 dBµV/m Final adjusted value

Radiated Emissions Data

Job # : 10433-1 Date : 3-10-08 Page 1 of 1
NEX #: 103222 Time : 1432
Staff : AAL

Client Name : FM Jam
EUT Name : Portable Amplifier System
EUT Model # : TX3
EUT Serial # : NA
EUT Config. : Stand by

EUT Voltage : 120 Vac
EUT Frequency : 60
Phase: 1
NOATS X
SOATS
Distance < 1000 MHz: 3 m
Distance > 1000 MHz: 3 m

Specification : CFR47 Part 15, Subpart B, Class B
Loop Ant. #: NA
Bicon Ant.#: 128 Temp. (°C) :
Log Ant.#: 111 Humidity (%) : 19
DRG Ant. # NA Spec An.#: 711
Cable LF#: NOATS Spec An. Display #: 404
Cable HF#: QP #: 421
Preamp LF#: 902 PreSelect#: NA
Preamp HF#

Quasi-Peak	RBW: 120 kHz
	Video Bandwidth 300 kHz
Peak	RBW: 1 MHz
	Video Bandwidth 3 MHz
Average	RBW: 1 MHz
	Video Bandwidth 10 Hz

Measurements below 1 GHz are Quasi-Peak values, unless otherwise stated.
Measurements above 1 GHz are Average values, unless otherwise stated.

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
131.9	54.7	52.5	Q	B	1.0	54.7	37.3	43.5	-6.2	Pass	standyby
210.7	32.0	34.7	Q	F	1.0	34.7	19.6	43.5	-23.9	Pass	standyby
235.5	35.1	38.4	Q	F	1.0	38.4	22.8	46.0	-23.2	Pass	standyby

5.3. Bandwidth and Channel Tuning Verified

Sample Number:	TX3	**Temperature:**	17
Date:	3/7/08	**Humidity:**	22
Modification State:	Modulated	**Tester:**	Alan Laudani
		Laboratory:	SOATS

(a) Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88–108 MHz.

Radiated measurements were made at 3 meters. The RF fundamental was maximized in the OATS before any reading was made. Analyzer RES BW was set to 10 kHz. A PEAK output reading was noted, a DISPLAY line was drawn 20 dB lower than PEAK level. The bandwidth was determined from where the channel output spectrum intersected the display line.

Test Results: Maximum Audio Input: 200 Hz to 4 kHz Sine wave at 500 mV per client specifications results in a 20 dB Bandwidth = 167.8 kHz

The lowest frequency, 88.1 MHz, results in a noise floor measurement at the bandedge of 88.0 MHz, demonstrating the channel band lies wholly within the frequency range of 88—108 MHz, see table page 19. The highest channel, 89.1 MHz has no effect on the 108 MHz bandedge.

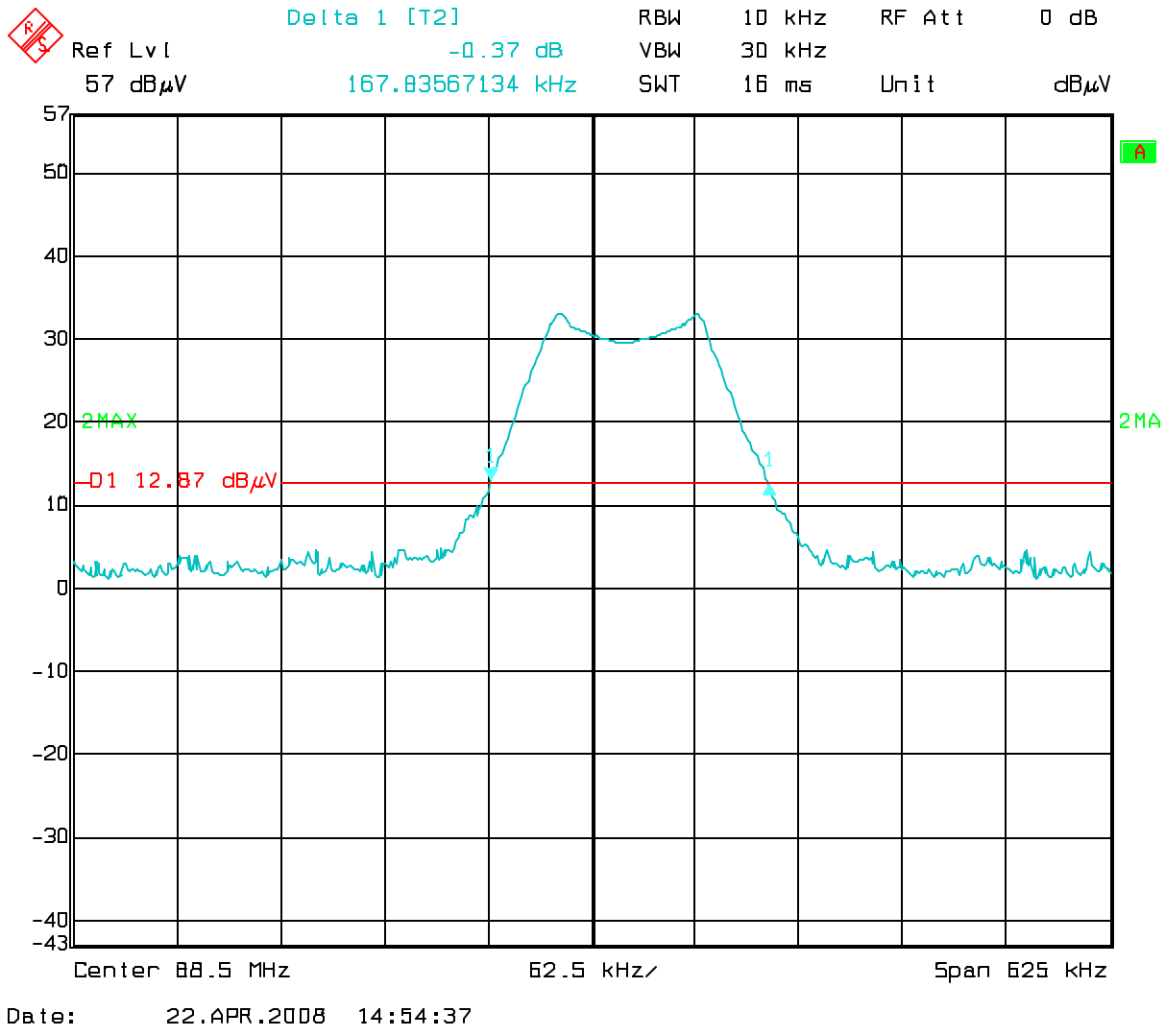
The frequencies were changed during testing by pushing the up and down buttons on the front of the FM Jam. The display shows the last two digits of the transmitted frequency. For example, 88.1 was showed as 8.1, 88.3 as 8.3, up to 88.9 as 8.9.

20 dB Bandwidth = 167.8 kHz

Maximum Audio Input:

Max hold while Sine wave frequency was varied from 200 Hz to 4000 Hz

And input 100 mV to 500 mV per client specifications.



5.4. The field strength of any emissions within the band 88--108 MHz

(b) The field strength of any emissions within the permitted 200 kHz band shall not exceed 250 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

Sample Number:	TX3	**Temperature:**	17
Date:	3/10/08	**Humidity:**	19
Modification State:	Modulated	**Tester:**	Alan Laudani
		Laboratory:	NOATS

Test Results:

The EUT was placed 3m from the receiving antenna. The EUT's was placed on the external power supply. Changing the external power via an autotransformer from 102 to 138 Vac (+/-15%) did not change the transmit power. Investigations were made along three orthogonal axes with the worst-case result presented in the table below. Average detector used for the fundamental measurements and quasi-peak was used for all spurious measurements.

Radiated Emissions Data

Job # : 10433-1 Date : 3-10-08 Page 1 of 1
NEX #: 103222 Time : 1432
Staff : AAL

Client Name : FM Jam
EUT Name : Portable Amplifier System
EUT Model # : TX3
EUT Serial # : na
EUT Config. : Transmit

EUT Voltage : 6 Vdc
EUT Frequency : ---
Phase: --
NOATS X
SOATS
Distance < 1000 MHz: 3 m
Distance > 1000 MHz: 3 m

Specification : CFR47 Part 15, Subpart C, 15.239, 15.209
Loop Ant. #: NA
Bicon Ant.#: 128 Temp. (°C) : 17
Log Ant.#: 111 Humidity (%) : 19
DRG Ant. # NA Spec An.#: 711
Cable LF#: NOATS Spec An. Display #: 404
Cable HF#: NA QP #: 421
Preamp LF#: 902 PreSelect#: NA
Preamp HF# NA

Quasi-Peak	RBW: 120 kHz	Video Bandwidth 300 kHz
Peak	RBW: 1 MHz	Video Bandwidth 3 MHz
Average	RBW: 1 MHz	Video Bandwidth 10 Hz

Measurements below 1 GHz are Quasi-Peak values, unless otherwise stated.
Measurements above 1 GHz are Average values, unless otherwise stated.

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
131.9	54.7	52.5	Q	B	1.0	54.7	37.3	43.5	-6.2	Pass	
177.0	43.1	43.1	Q	F	1.0	43.1	31.4	43.5	-12.1	Pass	
210.7	32.0	34.7	Q	F	1.0	34.7	19.6	43.5	-23.9	Pass	
235.5	35.1	38.4	Q	F	1.0	38.4	22.8	46.0	-23.2	Pass	
88.0	24.7	24.5	Q	R	1.0	24.7	34.7	43.5	-8.8	Pass	lower band edge
88.1	38.6	35.8	A	R	1.0	38.6	47.5	48.0	-0.5	Pass	
88.3	38.6	35.8	A	R	1.0	38.6	47.5	48.0	-0.5	Pass	
88.5	38.9	34.9	A	R	1.0	38.9	47.8	48.0	-0.2	Pass	
88.7	38.9	36.2	A	R	1.0	38.9	47.8	48.0	-0.2	Pass	
88.9	38.9	36.0	A	R	1.0	38.9	47.8	48.0	-0.2	Pass	
88.1	39.7	36.1	P	-	1.0	39.7	49.1	68.0	-18.9	Pass	4/22/2009
88.3	39.5	36.2	P	-	1.0	39.5	48.9	68.0	-19.1	Pass	
88.5	39.2	35.9	P	-	1.0	39.2	48.6	68.0	-19.4	Pass	
88.7	39.1	36.1	P	-	1.0	39.1	48.5	68.0	-19.5	Pass	
88.9	39.5	35.9	P	-	1.0	39.5	48.9	68.0	-19.1	Pass	

5.5. Out-of-band Emissions

(c) The field strength of any emissions radiated on any frequency outside of the specified 200 kHz band shall not exceed the general radiated emission limits in §15.209.

Sample Number:	TX3	**Temperature:**	17
Date:	3/10/08	**Humidity:**	19
Modification State:	Modulated	**Tester:**	Alan Laudani
		Laboratory:	NOATS

Test Results:

No emissions observed other than the results are tabulated on page 19, above.

Additional Observations:

- The Spectrum was searched from 30MHz to the 10th Harmonic, 891 MHz.
- The EUT was investigated on three orthogonal axes, results recorded are the highest measured.
- Radiated Measurements below 1GHz were performed at 3m with a Quasi-Peak detector (RBW 120kHz/VBW 300kHz) while Radiated Peak (RBW 1MHz/VBW 3MHz) and Average (RBW 1MHz/VBW 10Hz) measurements conducted above 1GHz.
- The device has an integral antenna with no conducted measurement capability.

5.6. Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
128	Antenna, Bicon	EMCO	3104	2996	1-10-08	1-10-09
111	Antenna, LPA	EMCO	3146	1382	10-3-07	10-3-08
395	LISN	Solar	9348-50-R-24-BNC	941718	3-9-08	3-9-09
404	Spectrum Analyzer Display	HP	85662A	2648A15448	6-27-07	6-27-08
421	Quasi-Peak Adapter	HP	85650A	3145A01672	2-21-08	2-21-09
574	High Pass Filter	Solar	7801-5.0	853135	7-9-07	7-9-08
685	Transient Limiter	HP	11974A	3107A02637	9-5-07	9-5-08
711	Spectrum Analyzer	HP	8568B	3107A02637	9-5-07	9-5-08
835	Spectrum Analyzer	Rohde & Schwarz	RHDFSEK	829058/005	6-20-07	6-20-08
902	pre amp	Sonoma	310 N	185803	6-10-07	6-10-08
815	Multimeter	Fluke	111	78130066	7-9-2007	07-09-08
NA	Regulating Transformer	TDGC	0-250 Vac	NA	NCR	NCR
903	Function Generator	Agilent	33120A	MY40023900	8-1-07	8-1-08