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FCC PART 74

AND INDUSTRY CANADA RSS-123

LOW POWER LICENSED TRANSMITTER

TEST REPORT

APPLICANT	AUDIO TECHNICA CORPORATION
ADDRESS	2206 NARUSE, MACHIDA TOKYO, 194 JAPAN
FCC ID	JFZT1802D1
IC CERT	1752B-T1802D
MODEL NUMBER	ATW-T1802
PRODUCT DESCRIPTION	WIRELESS MICROPHONE TRANSMITTER
DATE SAMPLE RECEIVED	10/10/2007
DATE TESTED	10/25/2007
TESTED BY	RICHARD BLOCK
APPROVED BY	Mario de Aranzeta
TIMCO REPORT NO.	3322UT7TestReport.doc
TOTAL PAGES	17
TEST RESULTS	☒ PASS ☐ FAIL

ACCREDITED
Test Certificate # 0955-01

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GENERAL REMARKS

The attached report shall not be reproduced except in full without the written permission of Timco Engineering Inc.

The test results relate only to the items tested.

Summary

The device under test does:
☒ fulfill the requirements as identified in this test report
☐ not fulfill the requirements as identified in this test report

Attestations

This equipment has been tested in accordance with the standards identified in this test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report.

All instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025 requirements.

ACCREDITED

Test Certificate # 0955-01

I attest that the necessary measurements were made, under my supervision, at:

Timco Engineering Inc.
849 NW State Road 45
Newberry, Fl 32669

Authorized Signatory Name: *Mario de Aranzeta*

Mario de Aranzeta C.E.T.
Compliance Engineer/ Lab. Supervisor

Date: October 25, 2007

GENERAL INFORMATION
RULES PART 2.1033

DUT TECHNICAL DESCRIPTION

The test results relate only to the items tested.	
DUT Description	WIRELESS MICROPHONE TRANSMITTER
FCC ID	JFZT1802D1
IC Certification	1752B-
Model Number	T1802D1
Modulation	FM
Type of Emission	130K0F3E Bn = 2M+2DK M = 20000 D = 45 kHz (Peak Deviation) K = 1 Bn = 2(20k) + 2(45k)(1) = 130k
Frequency Range	655.50 – 680.375
Test Frequencies	655.50 MHz, 667.925 MHz, 680.375 MHz
Maximum Output Power	0.030 Watts ERP 0.012 Watts ERP
DUT Power Source	☐ 110–120Vac/50– 60Hz
	☐ DC Power
	☒ Battery Operated Exclusively
Test Item	☐ Prototype
	☒ Pre-Production
	☐ Production
Type of Equipment	☐ Fixed
	☐ Mobile
	☒ Portable

GENERAL INFORMATION

Test Facility	Timco Engineering, Inc. 849 NW State Road 45, Newberry, FL 32669
Test Condition	The temperature was 26°C with a relative humidity of 50%.
Modifications	None
Test Exercise (e.g software description, test signal, etc.)	The DUT was placed in continuous transmit mode of operation.
Applicable Standards	TIA 603, FCC CFR 47 Parts 2 and 74, RSS-123 Issue 1, Rev. 2

TEST PROCEDURES

Power Line Conducted Interference: The procedure used was ANSI/TIA 603:2004 using a 50uH LISN. Both lines were observed with the UUT transmitting. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

Bandwidth 20 dB: The measurements were made with the spectrum analyzer's resolution bandwidth (RBW) = 1 MHz and the video bandwidth (VBW) = 3 MHz and the span set as shown on plot.

Power Output: For a device with a fixed antenna, RF power is measured as ERP as the antenna is permanently attached. The substitution method was used as described in TIA-603-C.

Antenna Conducted Emissions: The RBW = 100 kHz, VBW = 300 kHz and the span set to 10.0 MHz and the spectrum was scanned from 30 MHz to the 10th Harmonic of the fundamental. Above 1 GHz the resolution bandwidth was 1 MHz and the VBW = 3 MHz and the span to 50 MHz.

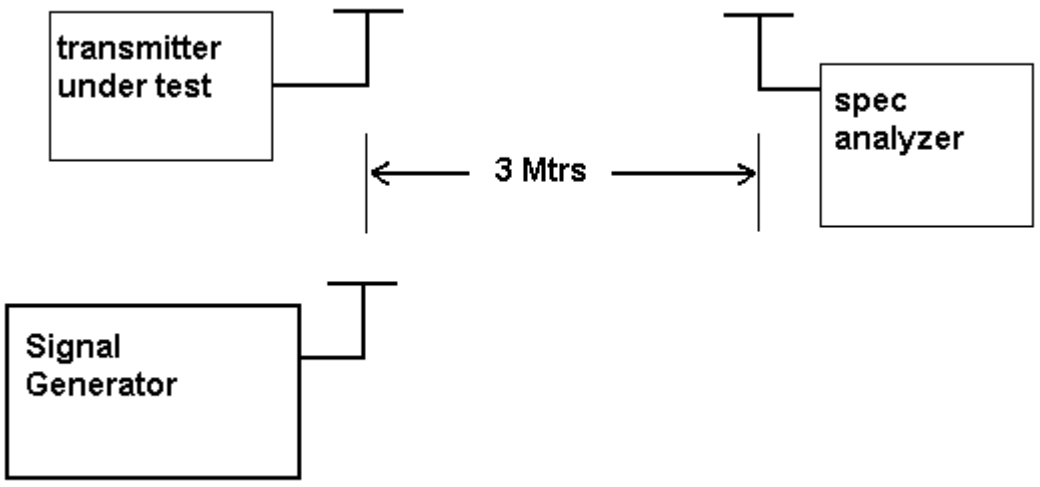
Radiation Interference: The test procedure used was ANSI/TIA 603-C:2004 using an Agilent spectrum receiver with preselector. The bandwidth (RBW) of the spectrum receiver was 100 kHz up to 1 GHz and 1 MHz above 1 GHz with an appropriate sweep speed. The VBW above 1 GHz was 3 MHz. The analyzer was calibrated in dB above a microvolt at the output of the antenna.

RF POWER OUTPUT

Rule Part No.: Part 2.1046(a), Part 74, RSS-123 Issue 1, Rev. 2

Method of Measurement: For a device has a fixed antenna, RF power is measured as ERP as the antenna is permanently attached. The substitution method was used. With a nominal battery voltage, and the transmitter properly adjusted the RF output measures:

Test Setup Diagram:



Test Data:

OUTPUT POWER: High Power: .030 Watts ERP
Low Power: 0.012 Watts ERP

Part 2.1033 (C)(8) DC Input into the final amplifier

INPUT POWER: (3.0V)(0.0.09A) = 0.27 Watts

MODULATION CHARACTERISTICS

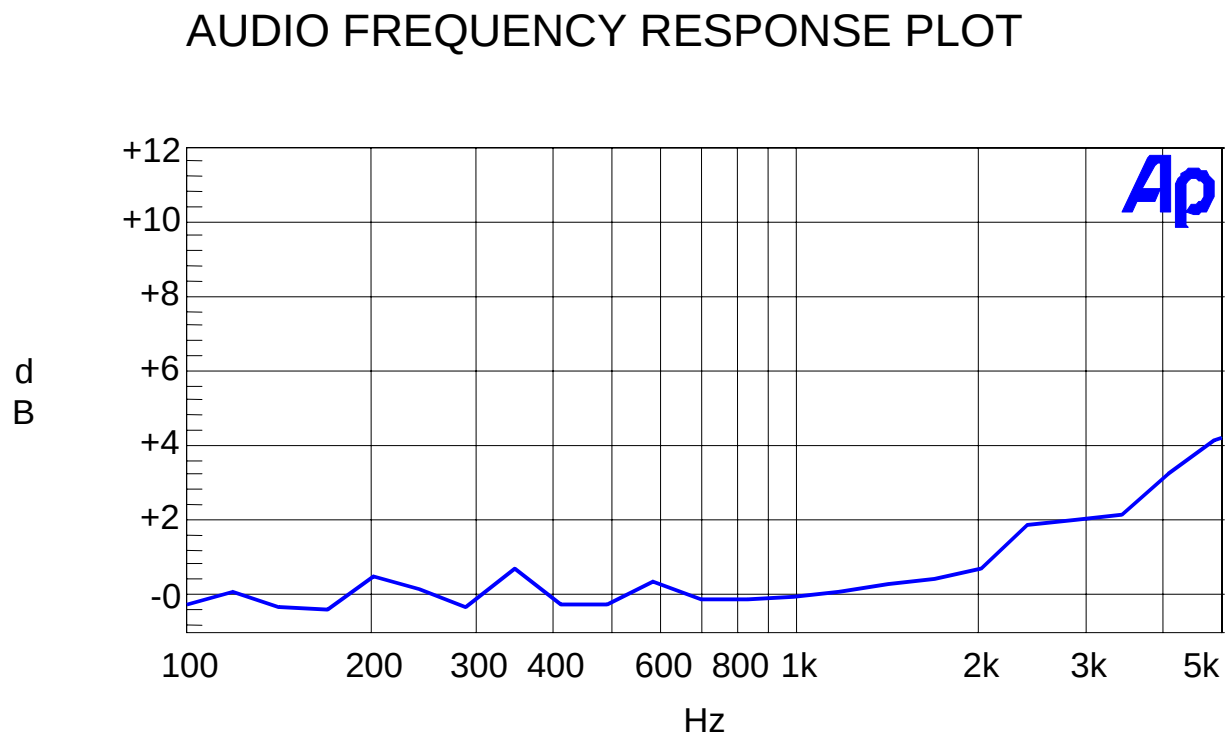
Rule Part No.: Part 2.1047(a)(b), RSS-123 Issue 1, Rev. 2

Method of Measurement:

Audio frequency response

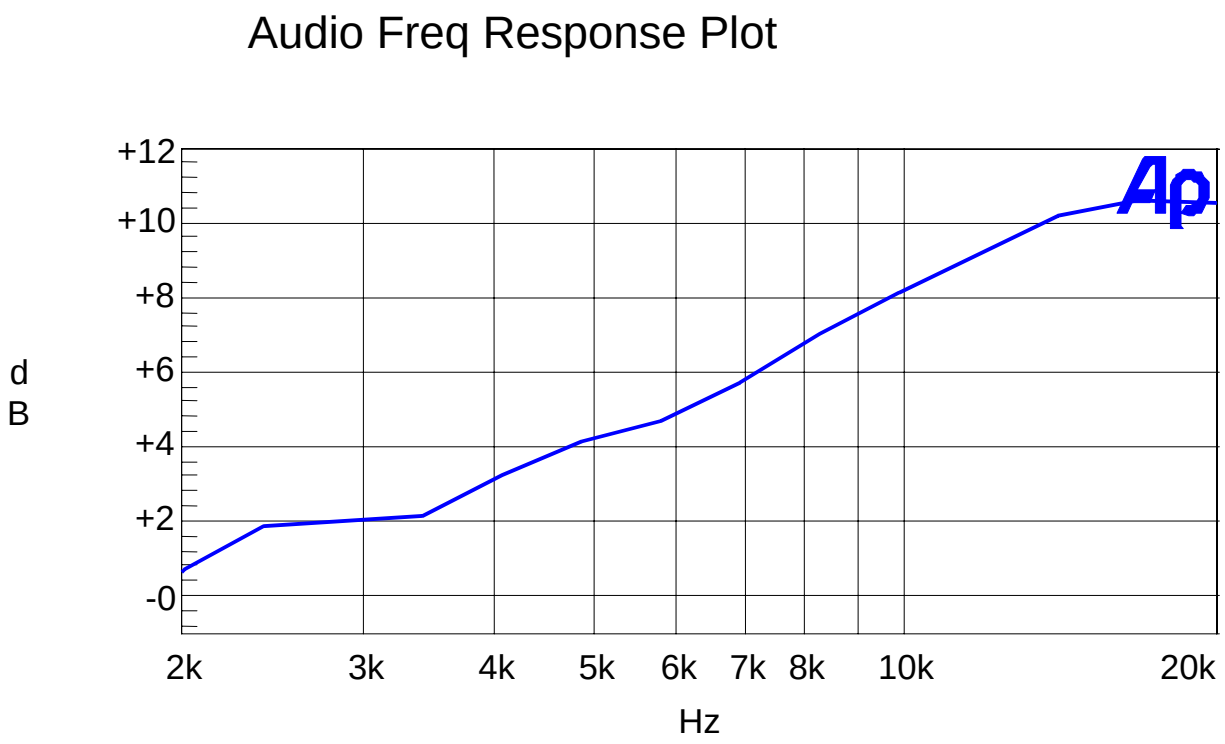
The audio frequency response was measured in accordance with ANSI/TIA 603-C:2004 with no exception. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 – 5000Hz shall be submitted. The audio frequency response curve is shown below.

AUDIO FREQUENCY RESPONSE PLOT



VOICE MODULATED COMMUNICATION EQUIPMENT

Audio frequency response cont'd



AUDIO INPUT VERSUS MODULATION

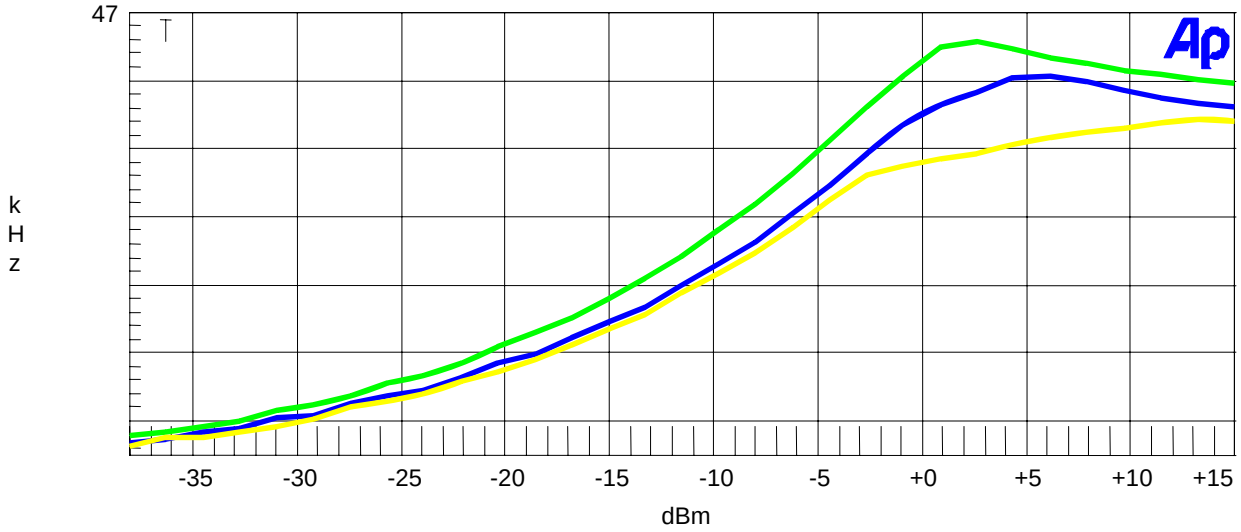
Rule Part No.: Part 2.1047(b) & 74, RSS-123 Issue 1, Rev. 2

Test Requirements:

Method of Measurement: **Modulation cannot exceed 100%,** The audio input level needed for a particular percentage of modulation was measured in accordance with ANSI/TIA 603-C:2004. The audio input curves versus modulation are shown below. Curves are provided for audio input frequencies of 300, 1000, and 3000 Hz.

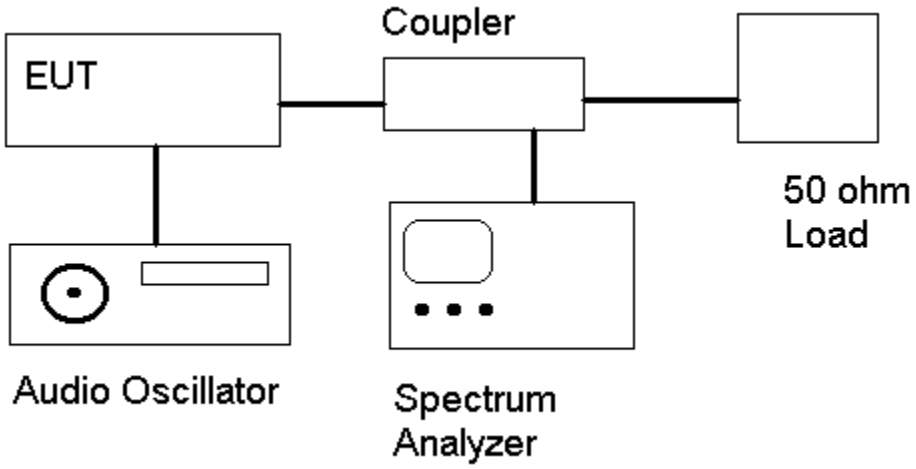
Test data:

MODULATION LIMITING PLOTS
2.5kHz GREEN -- 1.0kHz BLUE -- 300Hz YELLOW



OCCUPIED BANDWIDTH

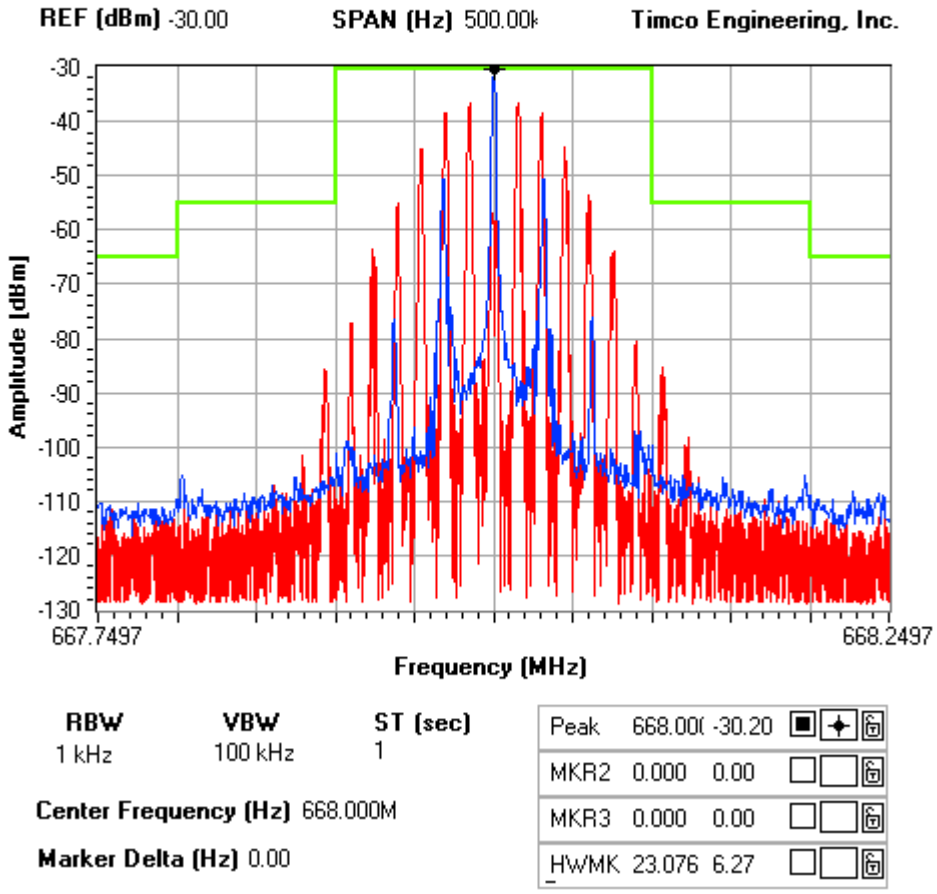
Data in the plots show that all sidebands between 50 & 100% for the authorized bandwidth are attenuated by at least 25dB. From 100 to 250% of the authorized bandwidth they are attenuated by at least 35dB and beyond 250% 43 log(Po) dB. The plot shows the transmitter modulated with 15000 Hz (the highest modulation frequency), adjusted for 50% modulation plus 16 dB. The spectrum analyzer was set with the unmodulated carrier at the top of the screen. The test procedure diagram and occupied bandwidth plot follows.



OCCUPIED BANDWIDTH MEASUREMENT

OCCUPIED BANDWIDTH PLOT

NOTES:
AUDIO TECHNICA CORPORATION - FCC ID: JFZT1802D1
OCCUPIED BANDWIDTH PLOT



SPURIOUS EMISSIONS AT ANTENNA TERMINALS (CONDUCTED)

REQUIREMENTS: Emissions must be 43 +10log(Po) dB below the mean power output of the transmitter.

TEST DATA: Not Applicable no antenna connector.

FIELD STRENGTH OF SPURIOUS EMISSIONS (High Power)

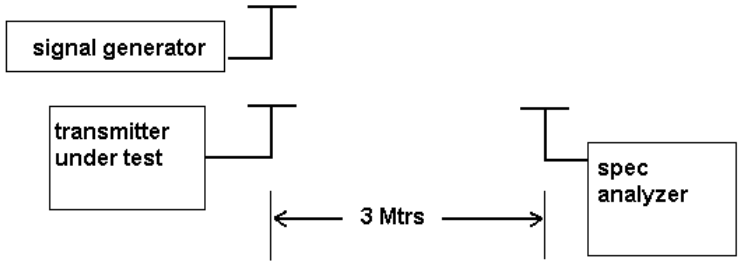
Rule Parts. No.: Part 2.1053, RSS-123 Issue 1, Rev. 2

Requirements: Emissions must be 43 +10log(Po) dB below the mean power output of the transmitter.

43 + 10 log(0.030) = 27.77dB

METHOD OF MEASUREMENTS: The tabulated data shows the results of the radiated field strength emissions test. The spectrum was scanned from 30 MHz to at least the tenth harmonic of the fundamental. This test was conducted per ANSI/TIA 603-C:2004 using the substitution method.

Test Setup Diagram:



Test Data:

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)		Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)		Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
655.500	0	0.00		667.925	0	0.00		680.375	0	0.00
1311.000	H	71.53		1335.850	H	68.13		1360.750	H	68.33
1966.500	V	66.87		2003.775	V	64.47		2041.125	V	58.67
2622.000	H	56.86		2671.700	H	49.66		2721.500	H	54.06
3277.500	V	62.74		3339.625	H	52.14		3401.875	V	55.14
3933.000	H	57.91		4007.550	V	55.51		4082.250	H	46.71
4588.500	H	59.85		4675.475	H	53.25		4762.625	H	50.55
5244.000	H	66.27		5343.400	H	59.67		5443.000	H	53.97
5899.500	H	52.16		6011.325	V	53.96		6123.375	H	57.96
6555.000	H	59.08		6679.250	H	56.78		6803.750	H	57.48

FIELD STRENGTH OF SPURIOUS EMISSIONS (Low Power)

Rule Parts. No.: Part 2.1053, RSS-123 Issue 1, Rev. 2

Requirements: Emissions must be 43 +10log(Po) dB below the mean power output of the transmitter.

43 + 10 log(0.012) = 23.79dB

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)		Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)		Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
655.500		0		668.000		0		680.375		0
1311.000	H	63.33		1336.000	H	64.23		1360.750	H	63.83
2622.000	H	54.46		2004.000	H	50.27		2041.125	H	59.77
3277.500	H	46.94		2672.000	H	57.46		2721.500	V	55.16
3933.000	H	49.61		3340.000	H	51.54		3401.875	H	50.44
4588.500	H	49.45		4008.000	H	48.51		4082.250	V	40.81
5244.000	H	56.87		4676.000	V	48.65		4762.625	H	49.85
5899.500	H	47.86		5344.000	H	56.57		5443.000	V	51.67
6555.000	H	53.98		6012.000	H	46.16		6123.375	V	51.16
				6680.000	H	44.98		6803.750	H	53.88

FREQUENCY STABILITY

Rule Parts. No.: Part 2.1055, Part 74.861, RSS-123 Issue 1, Rev. 2

Requirements: Temperature and voltage tests were performed to verify that the frequency remains within the .0050%,(50 ppm)

Method of Measurements: TIA/EIA 603.

The test was conducted as follows: The transmitter was placed in the temperature chamber at 25 ˚C and allowed to stabilize for one hour. The transmitter was keyed ON for one minute during which four frequency readings were recorded at 15-second intervals. The worse case number used in the table below. The assigned channel frequency was considered to be the reference frequency. The temperature was then reduced to -30 ˚C after which the transmitter was again allowed to stabilize for one hour. The transmitter was keyed ON for one minute, and again frequency readings were noted at 15-second intervals. The worst-case number was again used in the table below. This procedure was repeated in 10-degree increments up to + 50 ˚C.

Test Data:

Assigned Frequency (Ref. Frequency) (MHz)		667.925125
Temperature (ºC)	**Frequency (MHz)**	**Frequency Stability (PPM)**
-30	667.915275	-14.75
-20	667.918510	-9.90
-10	667.920960	-6.24
0	667.922926	-3.29
+10	667.924542	-0.87
+20	667.925322	0.29
+30	667.925504	0.57
+40	667.925890	1.15
+50	667.926766	2.46

Assigned Frequency (Ref. Frequency) (MHz)		
% Battery	**Frequency (MHz)**	**Frequency Stability (PPM)**
-15%	667.925118	- 0.01

EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3/10-Meter OATS	TEI	N/A	N/A	Listed 3/20/07	3/19/10
3-Meter OATS	TEI	N/A	N/A	Listed 1/11/06	1/10/09
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	Listed 5/11/07	5/10/10
Biconnical Antenna	Eaton	94455-1	1057	CAL 12/12/05	12/12/07
Biconnical Antenna	Eaton	94455-1	1096	CAL 8/17/06	8/17/08
Tan Tower Quasi-Peak Adapter	HP	85650A	3303AO1690	CAL 12/8/05	12/8/07
Tan Tower RF Preselector	HP	85685A	32211A01400	CAL 12/7/05	12/7/07
Tan Tower Spectrum Analyzer	HP	8566B Opt 462	3138A07786 3144A20661	CAL 12/7/05	12/7/07
LISN	Electro-Metrics	ANS-25/2	2604	CAL 8/27/06	8/27/08
Log-Periodic Antenna	Eaton	96005	1243	CAL 12/14/05	12/14/07