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FCC PART 73.801
LOW POWER FM BROADCAST STATIONS (LPFM)
TEST REPORT

APPLICANT	305 Broadcast LLC
	1315 NW 98 Ct. Suite 10
	Miami, FL 33172 USA
FCC ID	ODKETG150IS
MODEL NUMBER	ETG 150
PRODUCT DESCRIPTION	150W EXCITER
DATE SAMPLE RECEIVED	10/17/2011
DATE TESTED	11/3/2011
TESTED BY	Joe Scoglio
APPROVED BY	Mario R. de Aranzeta
TEST RESULTS	☒ PASS ☐ FAIL

Report Number	Version Number	Description	Issue Date
2401UT11TestReport.doc	Rev.1	Initial Issue	11/30/2011

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GENERAL REMARKS

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

Summary

The device under test does:

☒ fulfill the general approval requirements as identified in this test report
☐ not fulfill the general approval 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: 2005 requirements.

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 C.E.T.
Compliance Engineer/ Lab. Supervisor

Date: 11/3/11

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GENERAL INFORMATION

DUT Specification

DUT Description	150W EXCITER
FCC ID	ODKETG1501IS
Model Number	ETG 150
Operating Frequency	88 – 108 MHz
Type of Emission	180KF3E
Modulation	FM
Output power	150 Watts/10 Watts
DUT Power Source	☒ 110–220Vac/50– 60Hz
	☐ DC Power 12V
	☐ Battery Operated Exclusively
Test Item	☐ Prototype
	☒ Pre-Production
	☐ Production
Type of Equipment	☒ Fixed
	☐ Mobile
	☐ Portable
Test Conditions	The temperature was 26ºC with a relative humidity of 50%.
Modification to the DUT	None
Test Exercise	The DUT was placed in continuous transmit mode.
Applicable Standards	ANSI/TIA 603-C:2004, FCC CFR 47 Part 90
Test Facility	Timco Engineering Inc. at 849 NW State Road 45 Newberry, FL 32669 USA.

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TEST RESULTS SUMMARY

	Rule Part No.	Pass/Fail
Power Output Rating	2.1046, 73.267(b)(2)	Pass
Audio Frequency Response	2.1047(a)(b)	Pass
Audio Input vs Modulation	201047(b), 73	Pass
Occupied Bandwidth	2.1049(c), 73.317 (b-d)	Pass
Spurious Emissions at Antenna Terminals (Conducted)	2.1051(a)	Pass
Field Strength of Spurious Emissions	2.1053	Pass
Frequency Stability	2.1055, 73	Pass

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EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	Listed 5/10/10	5/10/12
AC Voltmeter	HP	400FL	2213A14499	CAL 6/12/11	6/12/13
Antenna: Active Loop	ETS-Lindgren	6502	00062529	CAL 9/23/10	9/23/12
Antenna: Passive Loop	EMC Test Systems	EMCO 6512	9706-1211	CAL. 12/1/09	12/2/11
Frequency Counter	HP	5385A	2730A03025	CAL 8/17/11	8/17/13
Hygro-Thermometer	Extech	445703	0602	CAL 6/15/11	6/15/13
Modulation Analyzer	HP	8901A	3435A06868	CAL 7/18/11	7/18/13
Digital Multimeter	Fluke	FLUKE-77	35053830	CAL 9/9/11	9/9/13
Analyzer Tan Tower Preamplifier	HP	8449B-H02	3008A00372	CAL 11/21/09	11/21/11
Analyzer Tan Tower Quasi-Peak Adapter	HP	85650A	3303A01690	CAL 11/22/09	11/22/11
Analyzer Tan Tower RF Preselector	HP	85685A	3221A01400	CAL 11/21/09	11/21/11
Analyzer Tan Tower Spectrum Analyzer	HP	8566B Opt 462	3138A07786 3144A20661	CAL 11/24/09	11/24/11
Temperature Chamber	Tenney Engineering	TTRC	11717-7	CHAR 4/25/10	4/25/12
Antenna	ETS	3117	41534	9/22/2010	9/22/2012
Antenna	Electro metrics	LPA-25	1122	5/04/2011	5/04/2013
Antenna	Electro metrics	BIA-25	1171	1/15/2010	1/15/2012

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TEST PROCEDURE

Power Line Conducted Interference: The procedure used was ANSI/TIA 603-C: 2004, using a 50uH LISN. Both lines were observed with the DUT 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: The RF power output was measured at the antenna feed point using a peak power meter.

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 pre-selector. The bandwidth (RBW) of the spectrum ANSI/TIA 603-C: 2004, 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.

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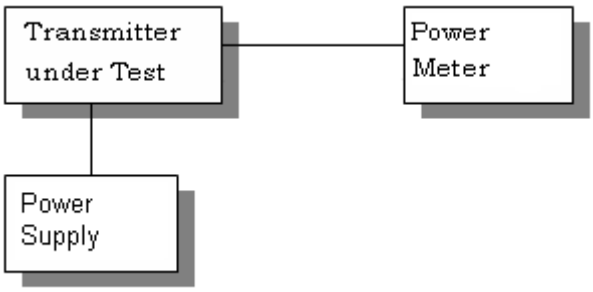
RF POWER OUTPUT

Rule Part No.: Part 2.1046, Part 73.267 (b)(2)

Test Requirements:

Method of Measurement: RF power is measured by direct method power using ANSI/TIA 603-C: 2004

Test Setup Diagram:



Test Data:

OUTPUT POWER: HIGH – 150 Watts
LOW - 10 Watts

DC INPUT POWER Vds = 37.2 V
Ids = 5.7 A
Watts = 212 W

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MODULATION CHARACTERISTICS

Rule Part No.: Part 2.1047(a)(b)

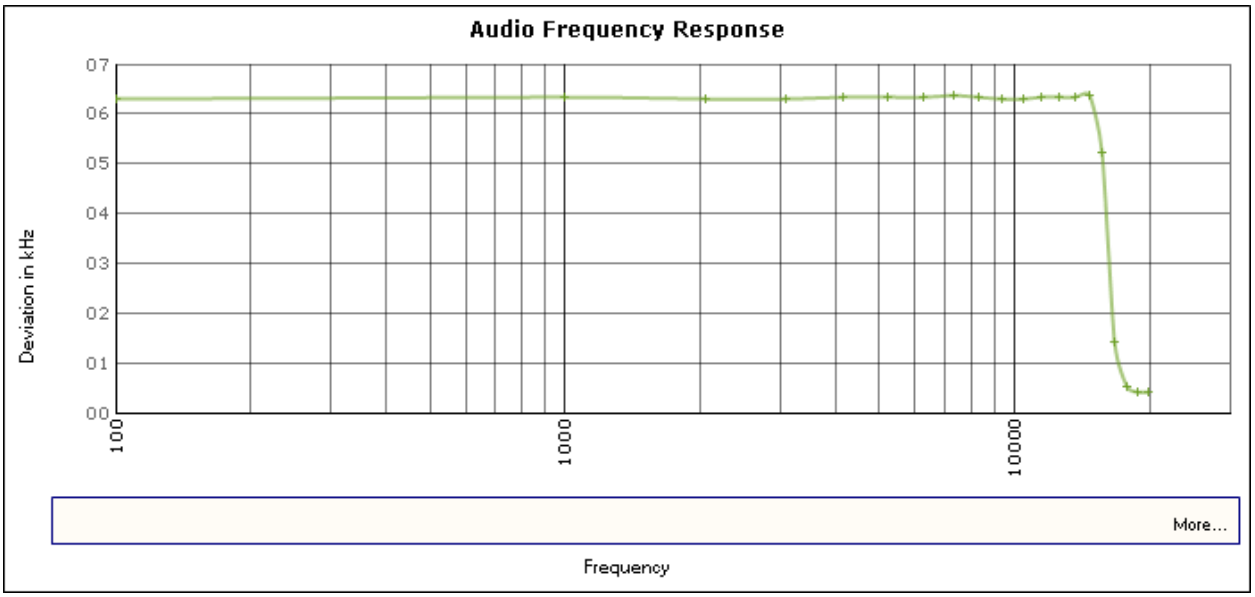
Test Requirements:

Method of Measurement:

Audio frequency response

The audio frequency response was measured in accordance with TIA/EIA Specification 603 with no exception. The audio frequency response curve is shown below.

AUDIO FREQUENCY RESPONSE PLOT



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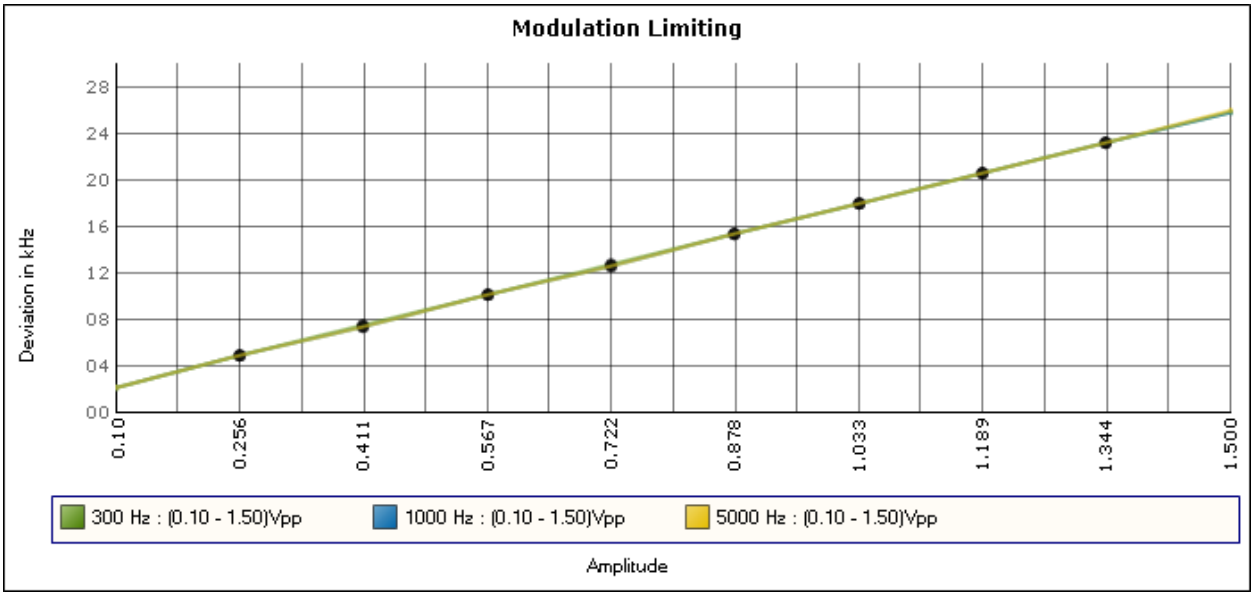
AUDIO INPUT VERSUS MODULATION

Rule Part No.: Part 2.1047(b) & 73

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:



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OTHER MODULATION CHARACTERISTICS

Part 2.1033(c) (4) Type of Emission: 180KF3E

Bn = 2M + 2DK
M = 15000
D = 24 kHz (Peak Deviation)
K = 1
Bn = 2(15k) + 2(75k)(1) = 180K

ALLOWED AUTHORIZED BANDWIDTH = 200 kHz.

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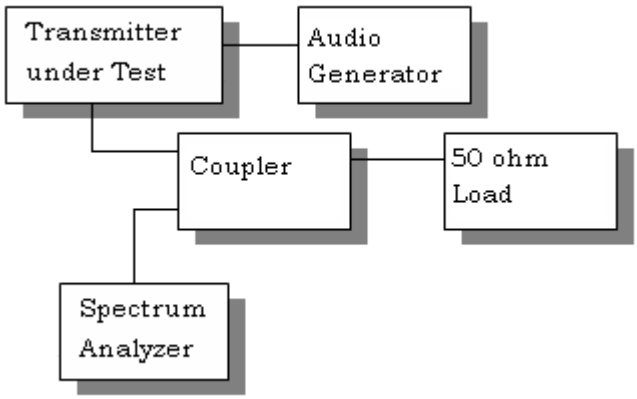
OCCUPIED BANDWIDTH

Part 2.1049(c) EMISSION BANDWIDTH:
Part 73.317(b-d)

Any emission appearing on the frequency removed from the carrier between 120kHz and 240kHz inclusive must be attenuated at least 25 dB below the level of the un-modulated carrier. Compliance with this requirement will be deemed to show occupied bandwidth to be 240kHz or less. Any emission appearing on the frequency removed from the carrier by more than 240 kHz and up to and including 600 kHz must be attenuated at least 35 dB below the level of the un-modulated carrier. Any emission appearing on the frequency removed from the carrier by more than 600 kHz must be attenuated at least 43 + 10 Log(P) dB below the level of the un-modulated carrier, or 80 dB, whichever is the lesser attenuation.

Method of Measurement: ANSI/TIA 603-C: 2004

Test Setup Diagram:



REQUIREMENT: PART 73: 200 kHz EMISSION BANDWIDTH.

Test Data: See the plots below

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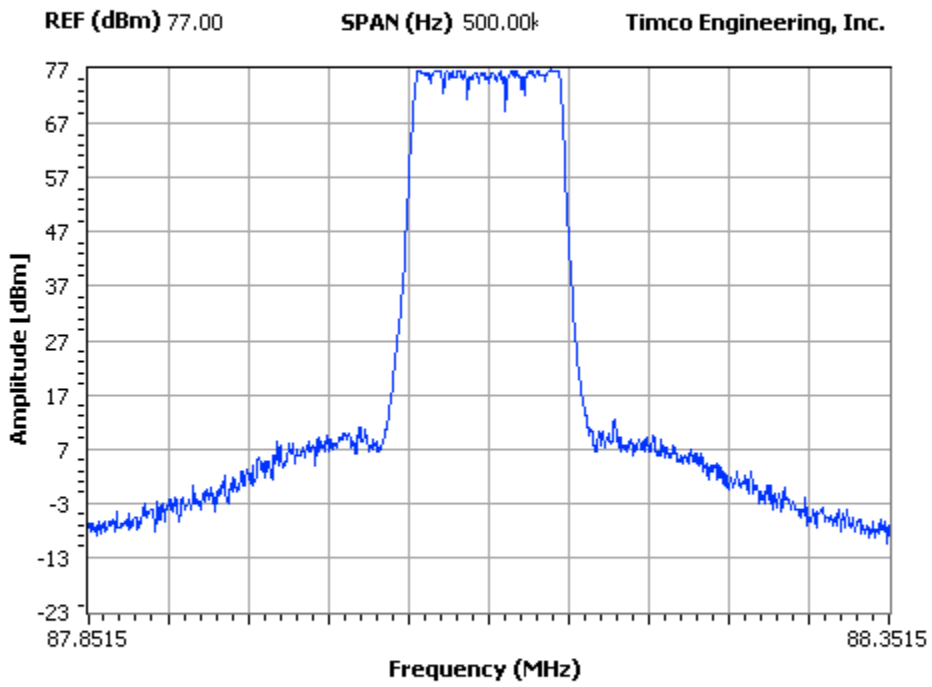
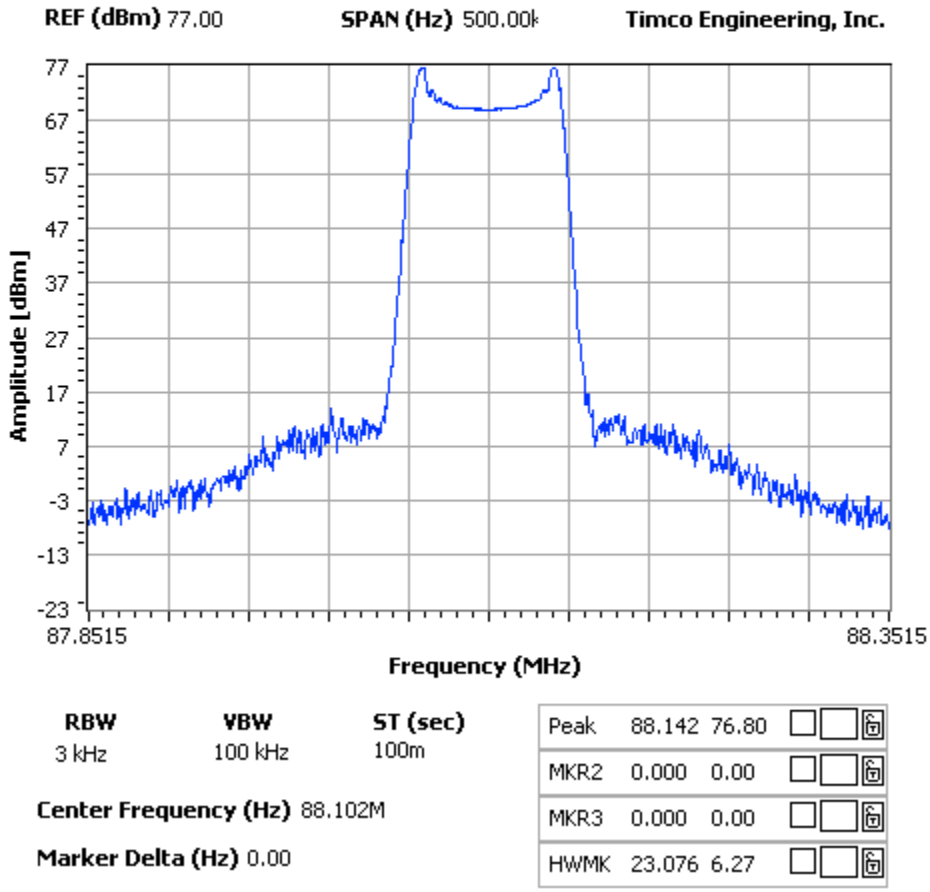
OCCUPIED BANDWIDTH PLOT (50 Hz)

NOTES:
50 Hz



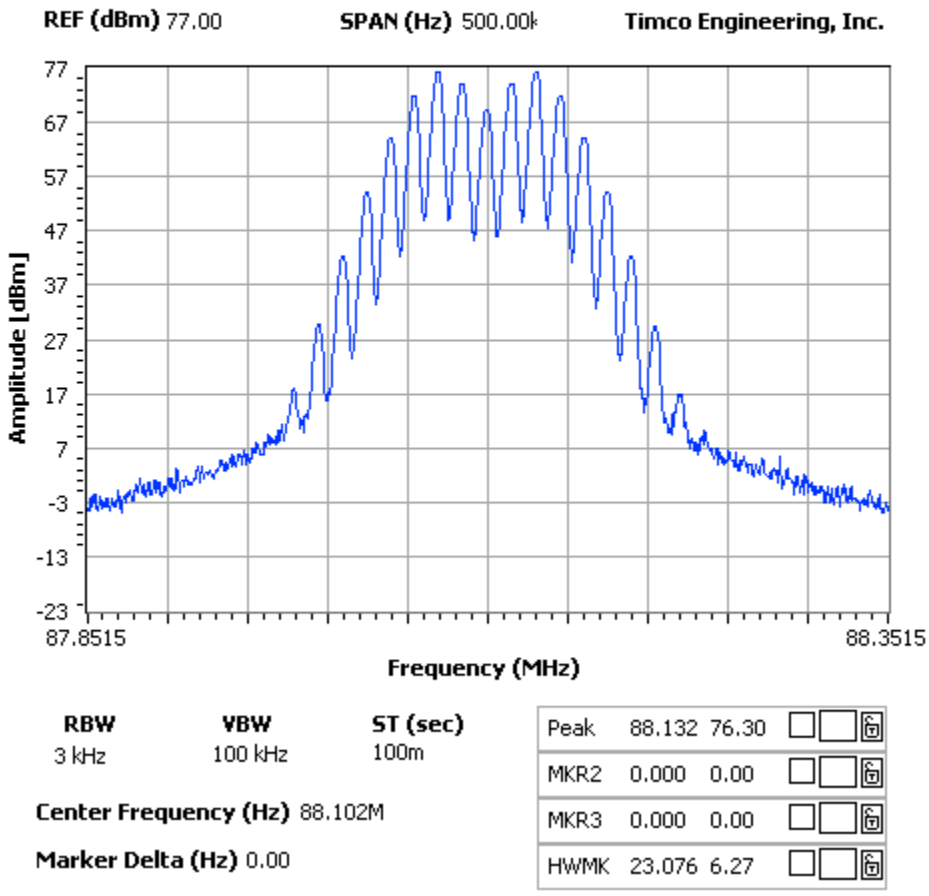
OCCUPIED BANDWIDTH PLOT (1 kHz)

NOTES:
1 kHz



OCCUPIED BANDWIDTH PLOT (15 kHz)

NOTES:
15 kHz



SPURIOUS EMISSIONS AT ANTENNA TERMINALS (CONDUCTED)

Rule Part No.: Part 2.1051(a)

Data on the following page shows the level of conducted spurious responses. The carrier was modulated 100% using 2500Hz tone. The spectrum was scanned from 0.4 to at least the 10th harmonic of the fundamental. The measurements were made in accordance with standard ANSI/TIA-603-C-2004.

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

43 + 10log(150) = 64.7 dB
43 + 10log(10) = 53 dB

Test Data:

TF HIGH POWER	EF	dB below carrier		TF LOW POWER	EF	dB below carrier
88.1	88.1	0		88.1	88.1	0
	176.2	68.5			176.2	63.7
	246.3	95.1			246.3	99.7
	352.4	104.7			352.4	110.2
	440.5	101.1			440.5	110.3
	528.6	105.7			528.6	111.2
	616.7	88.5			616.7	104.8
	704.8	100.9			704.8	110.8
	792.9	97.6			792.9	98.1
	881	89.6			881	98.1

TF HIGH POWER	EF	dB below carrier		TF LOW POWER	EF	dB below carrier
98.1	98.1	0		98.1	98.1	0
	196.2	112.1			196.2	104.4
	294.3	99.1			294.3	105.5
	392.4	112.9			392.4	113.4
	490.5	115.6			490.5	112.6
	588.6	106.5			588.6	113.5
	686.7	107.6			686.7	112.3
	784.8	107.9			784.8	112.8
	882.9	93.9			882.9	103.9
	981	97.2			981	112.3

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TEST DATA CONT'D.

TF HIGH POWER	EF	dB below carrier		TF LOW POWER	EF	dB below carrier
107.9	107.9	0		107.9	107.9	0
	215.8	100.9			215.8	105.1
	323.7	93.2			323.7	100.2
	431.6	112.3			431.6	105.9
	539.5	106.6			539.5	110.6
	647.4	104.9			647.4	107.1
	755.3	102.7			755.3	102.8
	863.2	98.2			863.2	91.4
	971.1	103.8			971.1	103.8
	1079	109.1			1079	108.8

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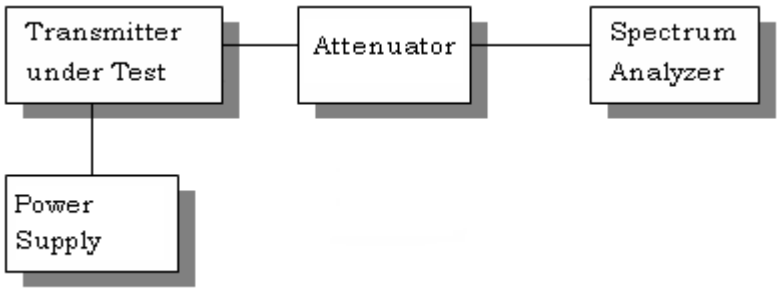
Method of Measuring Conducted Spurious Emissions



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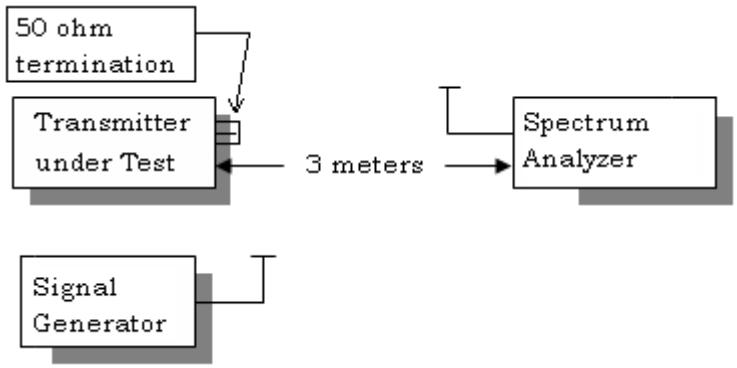
FIELD STRENGTH OF SPURIOUS EMISSIONS

Rule Parts. No.: Part 2.1053

Requirements: Any emission appearing on a frequency removed from the carrier by more than 600 kHz must be attenuated at least 43 + 10log(P) dB below the level of the unmodulated carrier, or 80 dB, whichever is the lesser attenuation.

43 + 10log(150) = 64.7 dB
43 + 10log(10) = 53 dB

Test Setup Diagram:



Test Data:

High Power / Low Power

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)		Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
88.10	V	0		88.10	V	0
176.20	H	128.3		176.20	H	107.0
264.30	H	124.7		264.30	V	105.9
352.40	V	110.2		352.40	H	77.2
440.50	V	119.9		440.50	V	91.4
528.60	H	123.1		528.60	V	82.4
616.70	H	119.1		616.70	H	70.4
704.80	V	121.9		704.80	V	70.6
792.90	H	121.6		792.90	V	72.4
881.00	H	103.6		881.00	H	66.1

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TEST DATA CONT'D.

HIGH POWER **LOW POWER**

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)		Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
98.10	V	0		98.10	V	0
196.20	V	117.1		196.20	H	92.4
294.30	H	109.8		294.30	H	88.6
392.40	V	122.1		392.40	V	80.0
490.50	H	127.1		490.50	H	96.6
588.60	H	114.2		588.60	H	66.9
686.70	V	112.8		686.70	H	78.8
784.80	V	122.0		784.80	H	78.3
882.90	V	105.5		882.90	H	68.3
981.00	V	119.7		981.00	V	72.5

HIGH POWER **LOW POWER**

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)		Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
107.90	V	0		107.90	V	0
215.80	H	129.1		215.80	H	102.2
323.70	V	112.2		323.70	H	90.4
431.60	V	111.7		431.60	V	85.3
539.50	H	117.2		539.50	H	93.6
647.40	H	107.6		647.40	H	76.4
755.30	H	101.8		755.30	V	71.0
863.20	H	98.3		863.20	H	78.0
971.10	V	111.6		971.10	V	82.9
1079.00	V	0				91.5

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FREQUENCY STABILITY

Rule Parts. No.: Part 2.1055, Part 73

Requirements: Temperature and voltage tests were performed to verify that the frequency remains within the 2000Hz, specification limit.

The test was conducted as follows: The transmitter was placed in the temperature chamber at 25º C and allowed to stabilize for one hour. The temperature was then reduced to -30º C after which the transmitter was again allowed to stabilize for one hour. The transmitter was ON continuously because that is how it is used and again frequency readings were noted at 15-second intervals. The worst-case number was recorded for temperature plotting. This procedure was repeated in 10 degree increments up to + 50º C.

Method of Measurements: ANSI/TIA 603-C: 2004.

Test Data:

Assigned Frequency (Ref. Frequency) (MHz)		
Temperature (ºC)	**Frequency (MHz)**	**Frequency Stability (PPM)**
-30	98.100002	-0.06
-20	98.100000	-0.08
-10	98.100021	0.13
0	98.099995	-0.13
+10	98.099997	-0.11
+20	98.100008	0.00
+30	98.100004	-0.04
+40	98.099996	-0.12
+50	98.099991	-0.17

Assigned Frequency (Ref. Frequency) (MHz)		
Battery %	**Frequency (MHz)**	**Frequency Stability (PPM)**
-15%	98.100008	0
0	98.100008	0
+15%	98.100008	0

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