TIMCO ENGINEERING, Inc.

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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	ODK-ETG100010
MODEL NUMBER	ETG1000.10 IS
PRODUCT DESCRIPTION	BROADCAST TRANSMITTER
DATE SAMPLE RECEIVED	8/13/2013
DATE TESTED	8/18/2013
TESTED BY	Mario de Aranzeta
APPROVED BY	Mario de Aranzeta
TIMCO REPORT NO.	1064AUT14TestReport.doc
TEST RESULTS	☒ PASS ☐ FAIL

TABLE OF CONTENTS

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 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: August 19, 2013

GENERAL INFORMATION

DUT Specification

DUT Description	1000W FM BROADCAST TRANSMITTER
FCC ID	ODK-ETG100010
Model Number	ETG1000.10 IS
Operating Frequency	87.9-107.9MHz
Type of Emission	180K0F3E, 180KOF8E
Modulation	FM
Output power	1000 Watts
DUT Power Source	☒ 110–120Vac/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 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 73
Test Facility	Timco Engineering Inc. at 849 NW State Road 45 Newberry, FL 32669 USA.

EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3/10-Meter OATS	TEI	N/A	N/A	12/31/11	12/31/13
3-Meter OATS	TEI	N/A	N/A	12/31/11	12/31/13
AC Voltmeter	HP	400FL	2213A14499	06/20/13	06/20/15
Frequency Counter	HP	5385A	2730A03025	08/17/11	08/17/13
Antenna: Log-Periodic	Electro-Metrics	LPA-25	1122	05/09/13	05/09/15
Measuring Tape-7.5M	Kraftixx	7.5M PROFI		05/20/13	05/20/15
Modulation Analyzer	HP	8901A	3435A06868	06/20/13	07/20/15
Digital Multimeter	Fluke	FLUKE-77-3	79510405	06/20/13	06/20/15
Analyzer Open-Frame Tower Preamplifier	HP	8449B	3008A01075	07/22/09	09/15/13
Analyzer Tan Tower Preamplifier	HP	8449B-H02	3008A00372	11/21/09	10/28/13
Analyzer Tan Tower Quasi-Peak Adapter	HP	85650A	3303A01690	11/22/09	10/28/13
Analyzer Tan Tower RF Preselector	HP	85685A	3221A01400	11/21/09	10/28/13
Analyzer Tan Tower Spectrum Analyzer	HP	8566B Opt 462	3138A07786 3144A20661	11/24/09	10/28/13
Temperature Chamber	Tenney Engineering	TTRC	11717-7	07/03/12	07/03/14
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	12/31/11	12/31/13

TEST PROCEDURES

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.

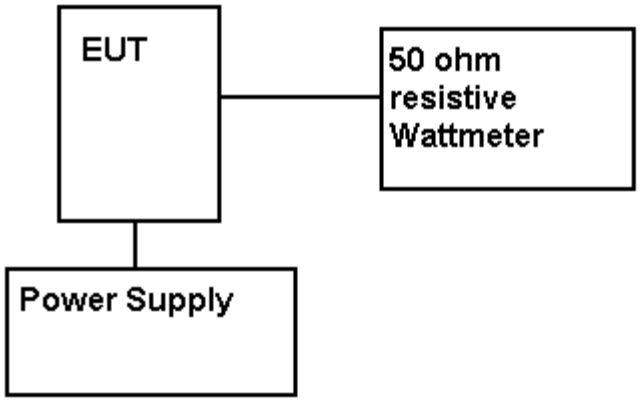
RF POWER OUTPUT

Rule Part No.: Part 2.1046, Part 73.267 (b)(2), BETS-6 Section 6

Test Requirements:

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

Test Setup Diagram:



Test Data:

MEASURED OUTPUT POWER:

	209 V (-5%)	**220 V**	**231 V(+5%)**
Low	37 W	37 W	37 W
High	1071W	1071 W	1071 W

Part 2.1033 (C)(8), BETS-6 DC Input into the final amplifier

POWER SETTING INPUT POWER: 33.2 Volts DC
39.8 Amperes
1321.4 Watts

MODULATION CHARACTERISTICS

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

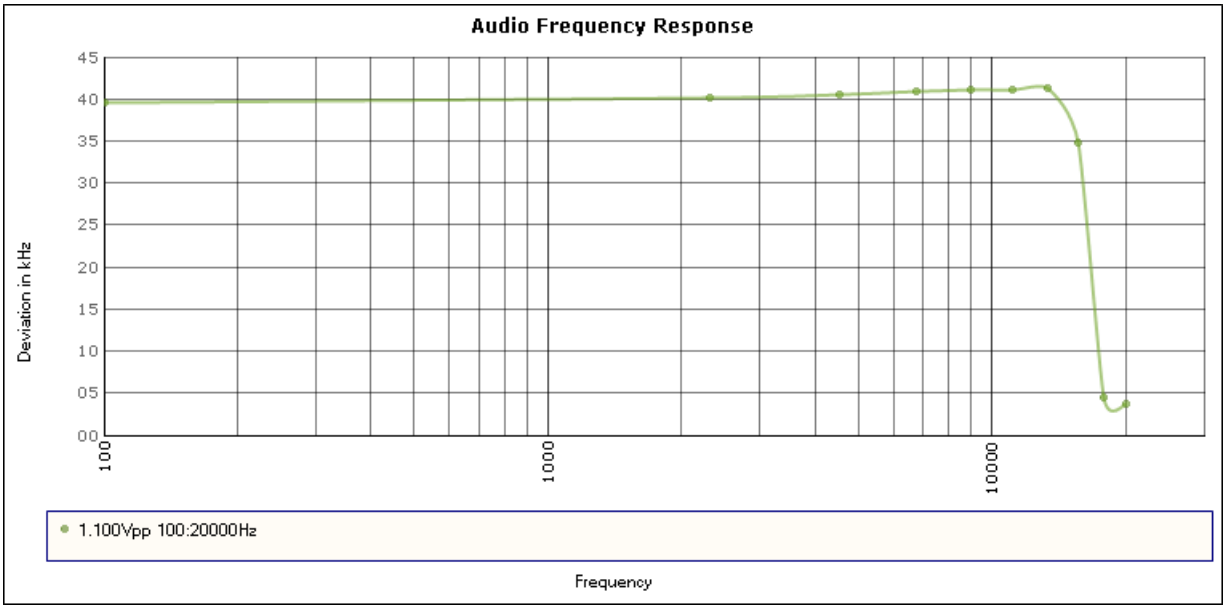
Test Requirements:

Method of Measurement:

Audio frequency response

The audio frequency response was measured in accordance with ANSI/TIA 603-D: 2010. The audio frequency response curve is shown below.

AUDIO FREQUENCY RESPONSE PLOT



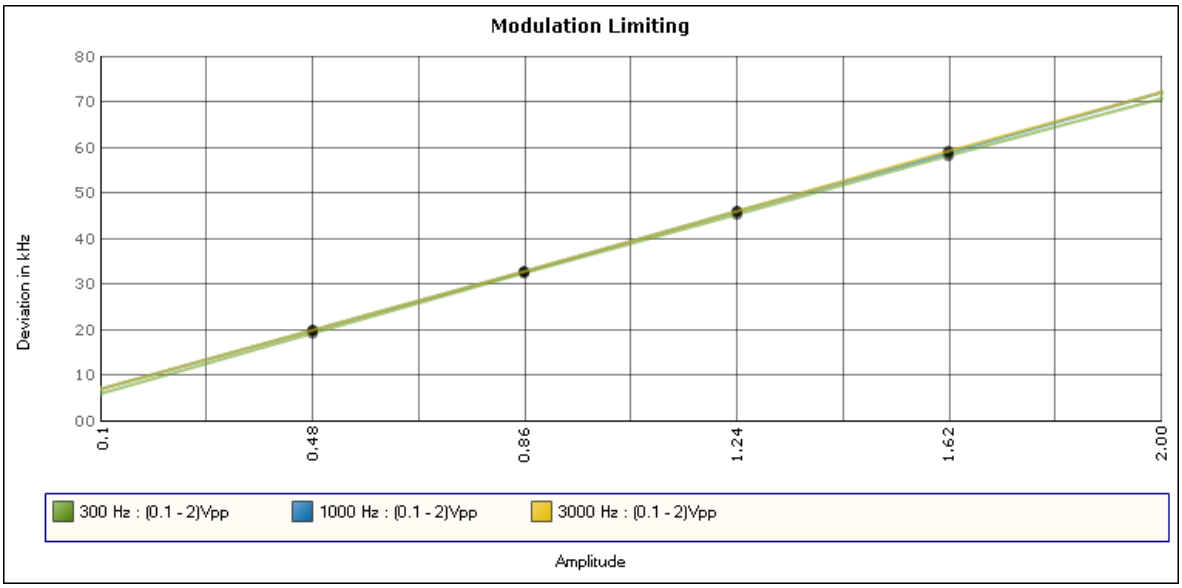
AUDIO INPUT VERSUS MODULATION

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-D: 2010. The audio input curves versus modulation are shown below. Curves are provided for audio input frequencies of 300, 1000, and 3000 Hz.

Test data:



OTHER MODULATION CHARACTERISTICS

Part 2.1033(c) (4), BETS-6 Type of Emission: 180KF3E, 180KF8E

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

ALLOWED AUTHORIZED BANDWIDTH = 200 kHz.

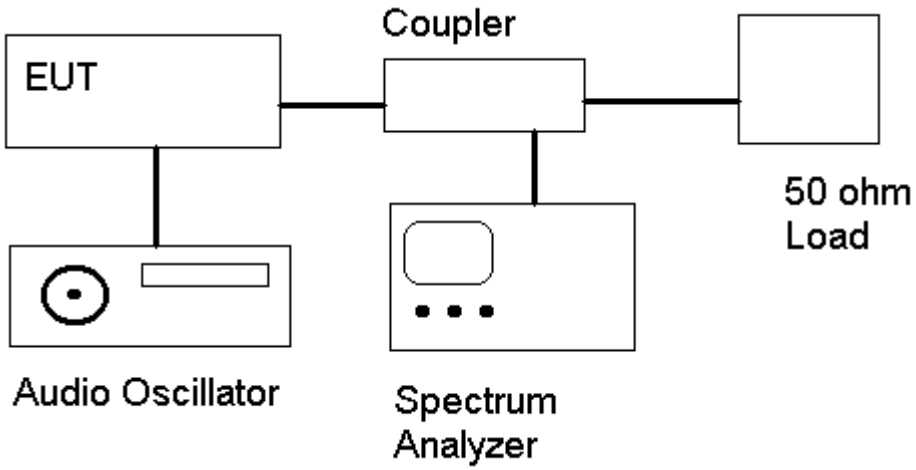
OCCUPIED BANDWIDTH

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

Any emission appearing on the frequency removed from the carrier between 120 kHz and 240 kHz 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 240 kHz 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-D: 2010

Test Setup Diagram:

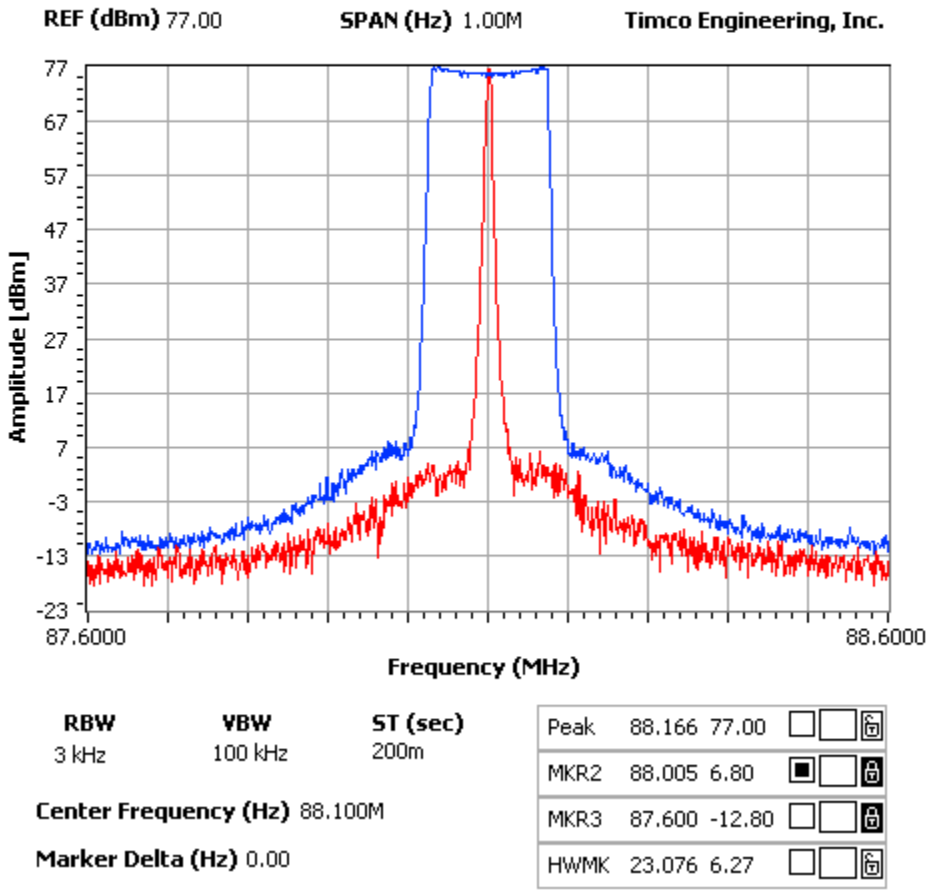


REQUIREMENT: PART 73: 200 kHz EMISSION BANDWIDTH.

Test Data: See the plots below

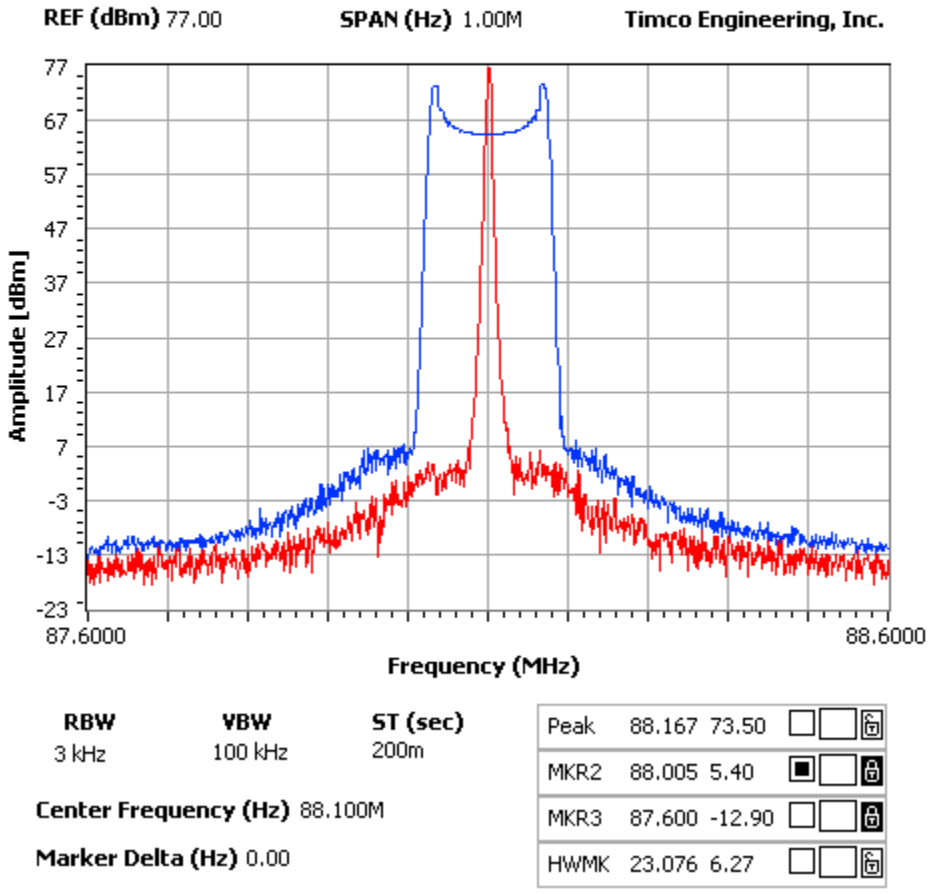
OCCUPIED BANDWIDTH PLOT (50 Hz)

NOTES:
50 Hz 100% modulation



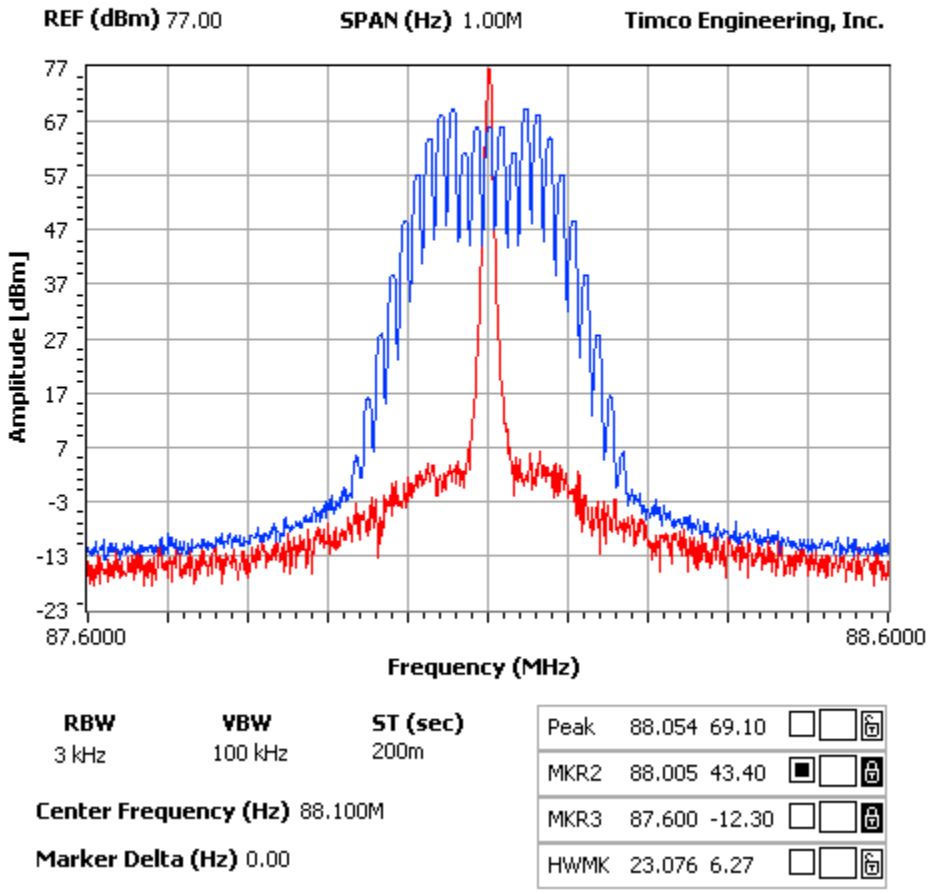
OCCUPIED BANDWIDTH PLOT (1 kHz)

NOTES:
1 kHz 100% modulation



OCCUPIED BANDWIDTH PLOT (15 kHz)

NOTES:
15 kHz 100% modulation



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(40) = 59.0 dB
43 + 10log(1000) = 73 dB

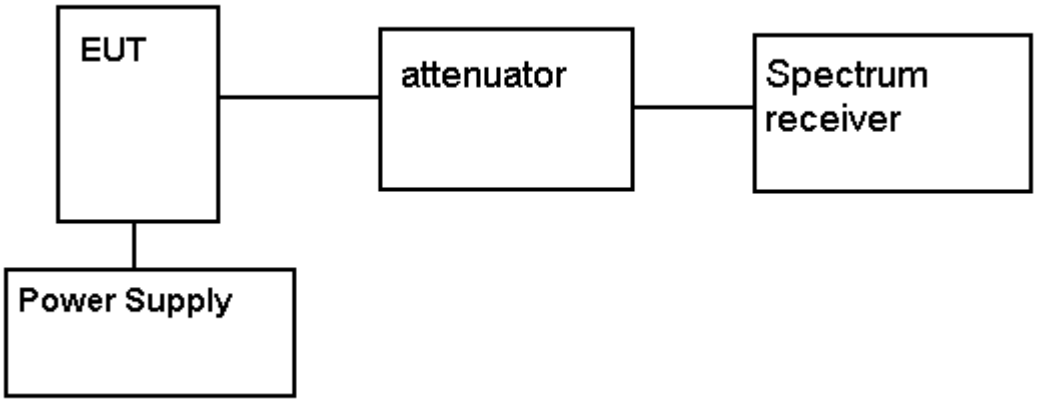
Test Data: Low Power = 40 W, High Power = 1000 W

TF LOW POWER	EF	dB below carrier		TF HIGH POWER	EF	dB below carrier
88.1 MHz	88.1	0		88.1	88.1	0
	176.2	72.6			176.2	78
	264.3	84.4			264.3	74
	352.4	83.4			352.4	84
	440.5	85.4			440.5	83
	528.6	84.1			528.6	84.3
	616.7	84.8			616.7	79.5
	704.8	85.8			704.8	80
	792.9	82.7			792.9	83
	881	85.9			881	83.7

TF LOW POWER	EF	dB below carrier		TF HIGH POWER	EF	dB below carrier
98.1 MHz	98.1	0		98.1	98.1	0
	196.2	77.3			196.2	87.5
	294.3	77.3			294.3	75
	392.4	79.3			392.4	94
	490.5	81.3			490.5	90.7
	585.6	80.3			585.6	86.8
	686.7	79.3			686.7	94
	784.8	80.3			784.8	94
	882.9	79.3			882.9	94
	981	80.3			981	81.3

TF LOW POWER	EF	dB below carrier		TF HIGH POWER	EF	dB below carrier
107.9 MHz	107.9	0		107.9 MHz	107.9	0
	215.8	86.3			215.8	87.5
	323.7	87.3			323.7	76.3
	431.6	89.3			431.6	95
	539.5	90.3			539.5	90.2
	647.4	88.3			647.4	93.1
	755.3	90.3			755.3	93.8
	863.2	89.3			863.2	95
	971.1	90.3			971.1	77.3
	1079	85.3			1079	93.6

Method of Measuring Conducted Spurious Emissions



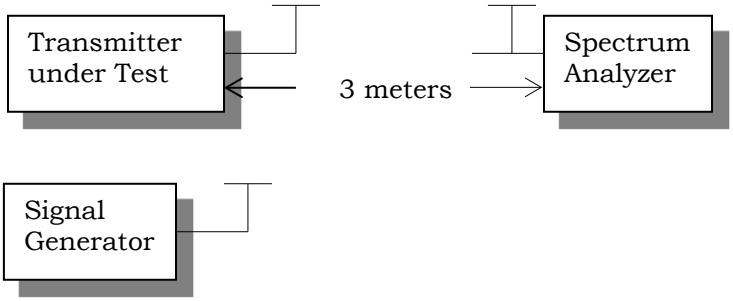
FIELD STRENGTH OF SPURIOUS EMISSIONS

Rule Parts. No.: Part 2.1053, BETS-6

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(40) = 59
43 + 10log(1000) = 73

Test Setup Diagram:



Test Data:

		Low Power					High Power	
TF	**EF**	**ANT Polarity**	**dB below carrier dBc**	**TF**	**EF**	**ANT Polarity**	**dB below carrier dBc**
88.1	88.10	H	0	88.1	88.10	H	0
	176.20	H	100.8		176.20	H	106.3
	264.30	H	80.8		264.30	H	80.9
	352.40	H	100.4		352.40	H	88.7
	440.50	V	100.4		440.50	H	87.6
	528.60	H	116.4		528.60	V	94.2
	616.70	V	96.1		616.70	H	85.8
	704.80	H	117.9		704.80	H	106.4
	792.90	V	115.4		792.90	H	106.8
	881.00	H	107.3		881.00	H	93.9

TEST DATA CONT'D.

Low Power					High Power			
TF	**EF**	**ANT Polarity**	**dB below carrier dBc**		**TF**	**EF**	**ANT Polarity**	**dB below carrier dBc**
98.1	98.10	H	0		98.1	98.10	H	0
	196.20	H	89.7			196.20	H	101.2
	294.30	H	102.7			294.30	H	98.9
	392.40	H	102.5			392.40	H	92.1
	490.50	H	112.9			490.50	H	100.3
	588.60	H	97.7			588.60	V	86.2
	686.70	V	115.6			686.70	H	113.1
	784.80	V	115.1			784.80	H	108.1
	882.90	V	111.3			882.90	H	102.0
	981.00	H	111.3			981.00	H	86.1

Low Power					High Power			
TF	**EF**	**ANT Polarity**	**dB below carrier dBc**		**TF**	**EF**	**ANT Polarity**	**dB below carrier dBc**
107.9	107.90	H	0		107.9	107.90	H	0
	215.80	H	90.2			215.80	H	92.1
	323.70	H	100.3			323.70	H	97.5
	431.60	H	101.9			431.60	H	89.2
	539.50	H	116.6			539.50	H	104.4
	647.40	H	107.4			647.40	H	98.8
	755.30	H	116.3			755.30	H	123.0
	863.20	H	108.7			863.20	H	102.1
	971.10	H	114.3			971.10	H	111.1
	1079.00	V	112.1			1079.00	H	93.1

FREQUENCY STABILITY

Rule Parts. No.: Part 2.1055, BETS-6

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:

Nominal Frequency: 98.1 MHz

Assigned Frequency (Ref. Frequency) (MHz)		
Temperature (ºC)	**Frequency (MHz)**	**Frequency Stability (PPM)**
-30	98.10009	0.6
-20	98.10006	0.3
-10	98.10007	0.4
0	98.10006	0.3
10	98.10005	0.2
20	98.100031	0.0
30	98.100029	-0.1
40	98.10003	0.0
50	98.10003	0.0

Assigned Frequency (Ref. Frequency) (MHz)		
AC Mains %	**Frequency (MHz)**	**Frequency Stability (PPM)**
-15%	98.100031	0
0	98.100032	0
+15%	98.100032	0

	187 V	**220 V**	**253 V**
5 ºC	98.100036	98.100037	98.100036
20 ºC	98.100031	98.100032	98.100032
45 ºC	98.100028	98.100031	98.100030