TIMCO ENGINEERING, Inc.

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FCC PART 73.801 AND IC BETS-6
LOW POWER FM BROADCAST STATIONS (LPFM)
TEST REPORT

APPLICANT	NiCOM USA, INC.
	1690 CACTUS ROAD
	SAN DIEGO, CA 92154
FCC ID	RMYNT1000FP09
IC CERTIFICATION	4788A-NT1000
MODEL NUMBER	NT 1000
PRODUCT DESCRIPTION	1000 W FM EXCITER/TRANSMITTER
DATE SAMPLE RECEIVED	10/3/11
DATE TESTED	10/3/11
TESTED BY	Joe Scoglio
APPROVED BY	Mario de Aranzeta
TIMCO REPORT NO.	2295AT11TestReport.doc
TEST RESULTS	☒ PASS ☐ FAIL

ACCREDITED
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.

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.

ACCREDITED

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

Date: 10/3/11

GENERAL INFORMATION

DUT Specification

DUT Description	1000W FM TRANSMITTER
FCC ID	RMYNT1000FP09
Model Number	NT 1000
Operating Frequency	88-108 MHz
Type of Emission	200K0F3E
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	temperature 26°C relative humidity 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, BETS-6
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-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. 10/1/09	10/2/11
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

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.

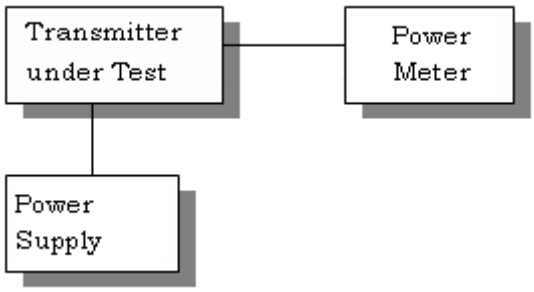
RF POWER OUTPUT

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:

OUTPUT POWER: 1000 Watts

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

POWER SETTING INPUT POWER: (48V)(40A) = 1920 Watts

MODULATION CHARACTERISTICS

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

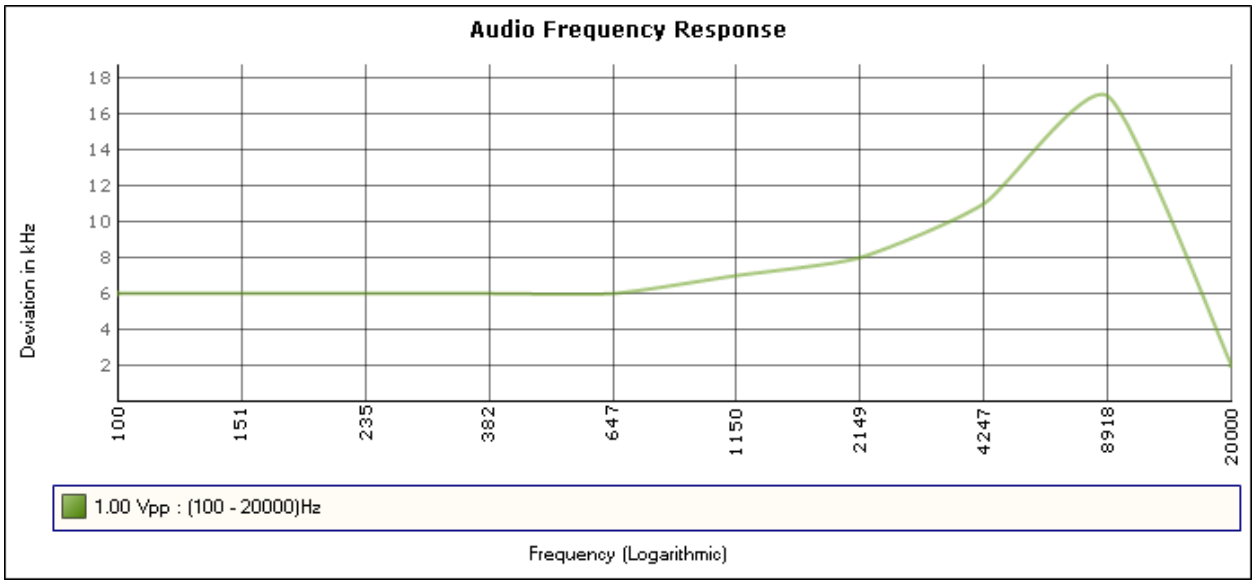
Test Requirements:

Method of Measurement:

Audio frequency response

The audio frequency response was measured in accordance with ANSI/TIA 603-C: 2004. The audio frequency response curve is shown below.

AUDIO FREQUENCY RESPONSE PLOT



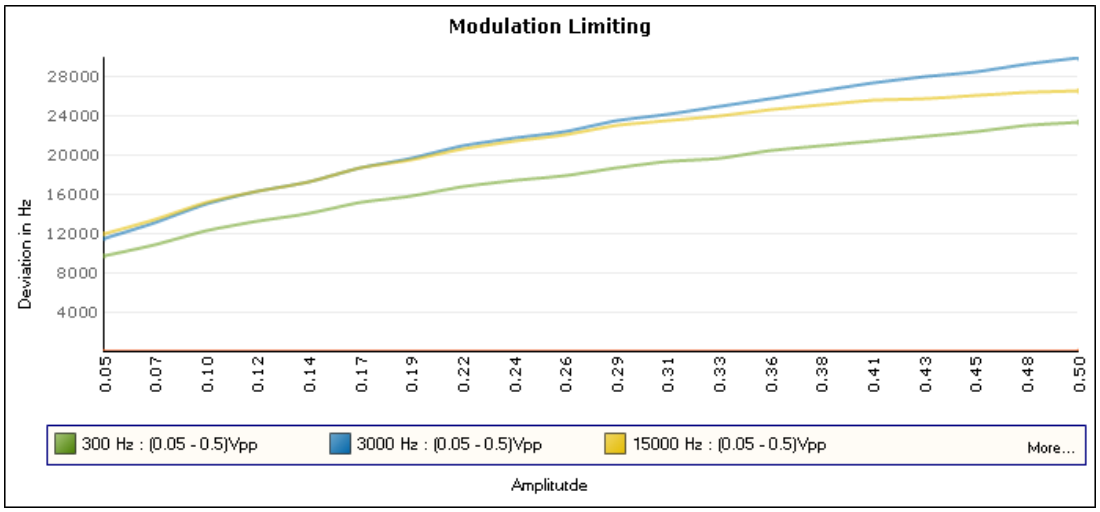
AUDIO INPUT VERSUS MODULATION

Rule Part No.: Part 2.1047(b)

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 15000 Hz.

Test data:



OTHER MODULATION CHARACTERISTICS

Part 2.1033(c) (4), BETS-6 Type of Emission: F3E

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

ALLOWED AUTHORIZED BANDWIDTH = 200 kHz.

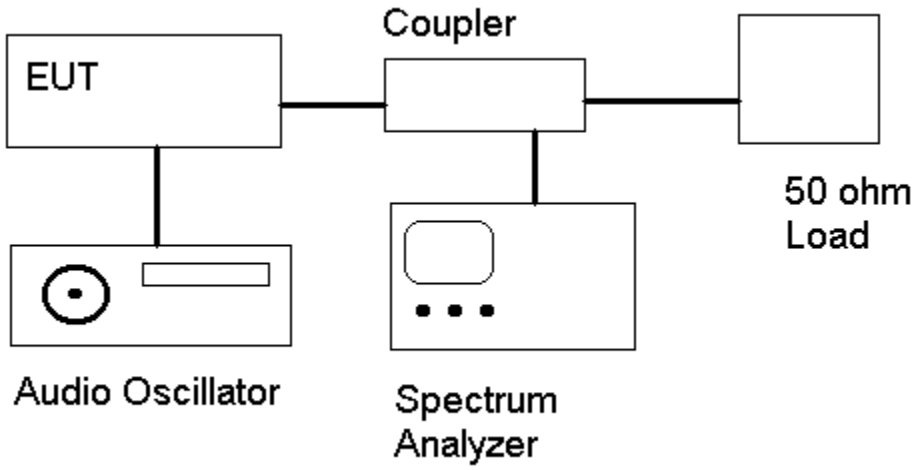
OCCUPIED BANDWIDTH

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-C: 2004

Test Setup Diagram:



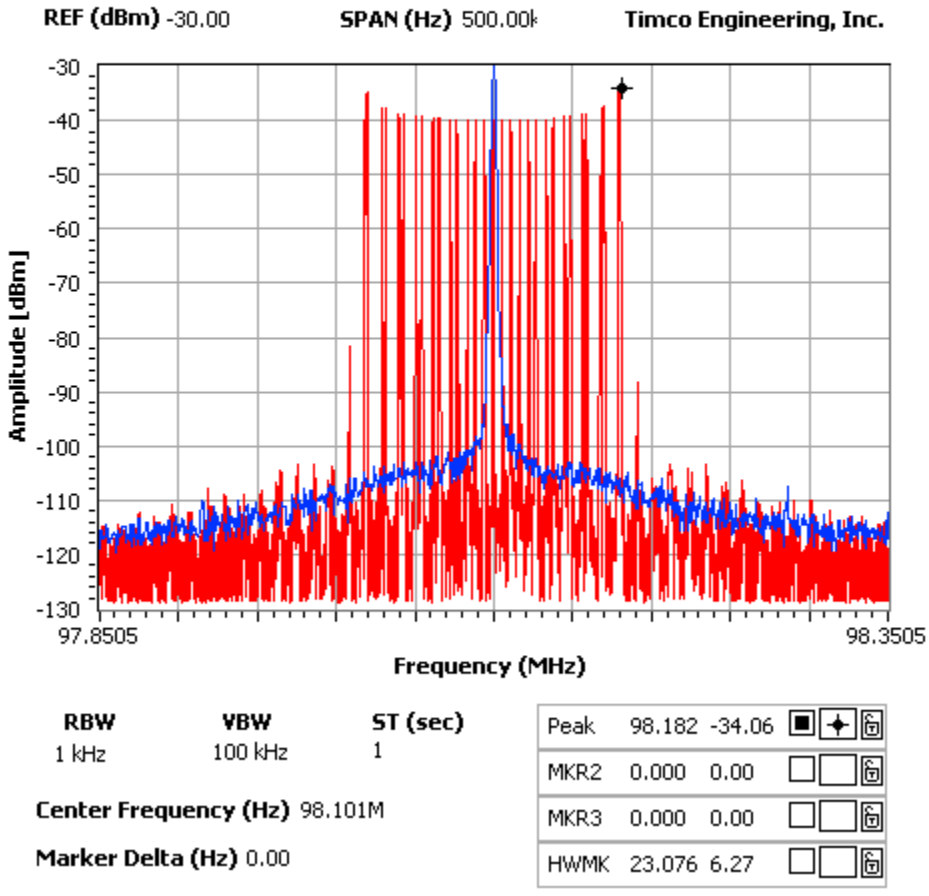
REQUIREMENT PART 73: 200 kHz EMISSION BANDWIDTH.

Test Data: See the plots below

OCCUPIED BANDWIDTH PLOT (50 Hz)

NOTES:

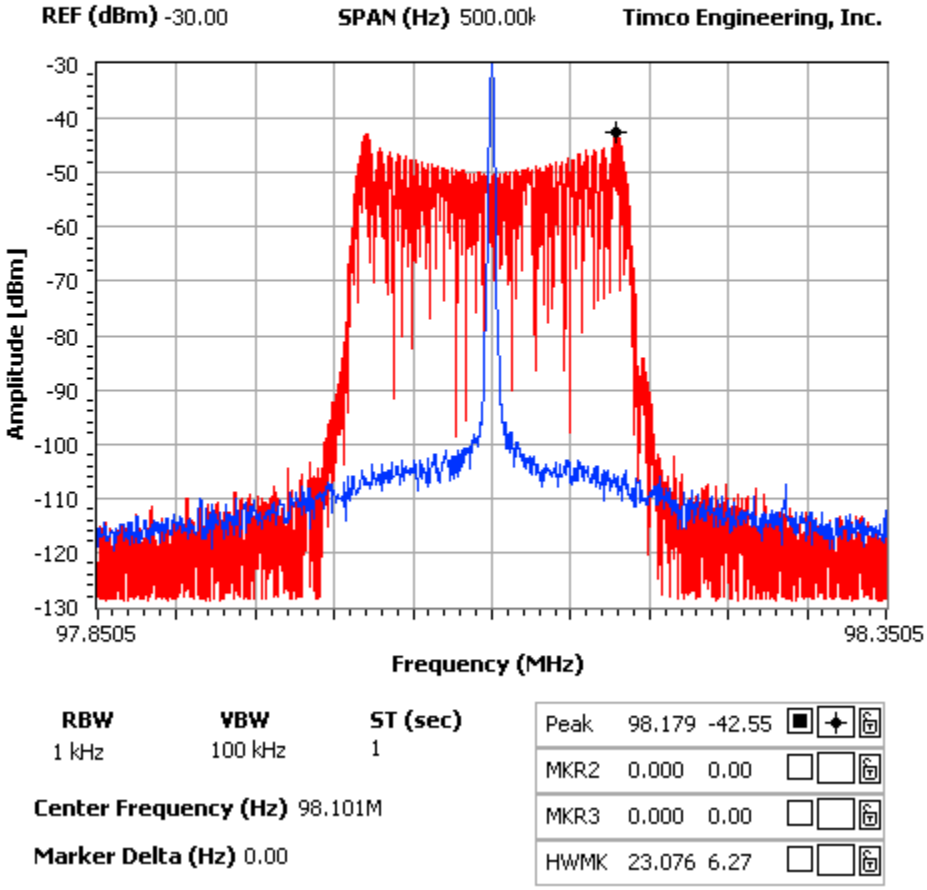
occupied bandwidth 50 Hz



OCCUPIED BANDWIDTH PLOT (1 kHz)

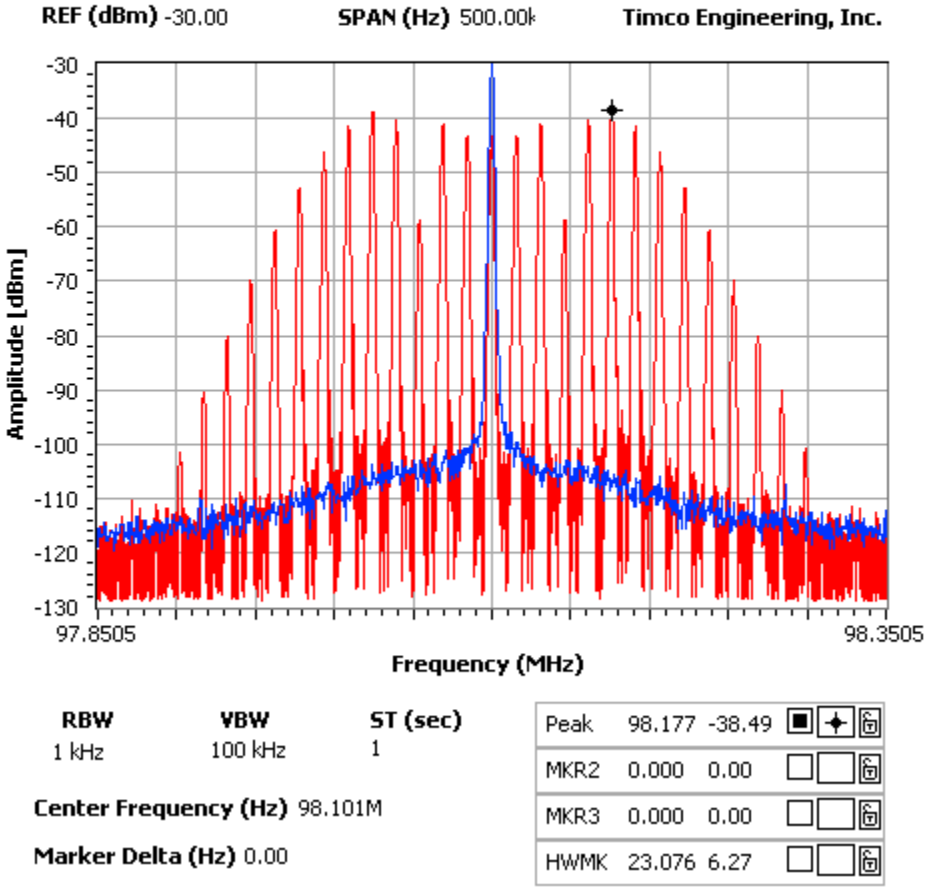
NOTES:

occupied bandwidth 1 kHz



OCCUPIED BANDWIDTH PLOT (15 kHz)

NOTES:
occupied bandwidth 15 kHz



SPURIOUS EMISSIONS AT ANTENNA TERMINALS (CONDUCTED)

Rule Part No.: Part 2.1051(a), BETS-6

Data on the following page shows the level of conducted spurious responses. The carrier was modulated 100% using 2500 Hz 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.

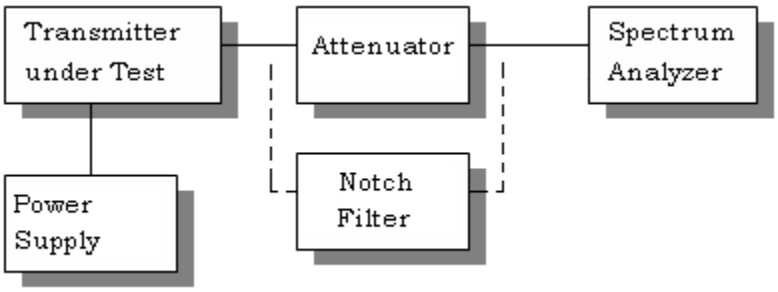
43 + 10log(1000) = 73 dB

Test Data:

TF HIGH POWER	EF	dB below carrier		TF HIGH POWER	EF	dB below carrier
88.1	88.1	0		98.1	98.1	0
	176.2	89.1			196.2	88.8
	264.3	76.3			294.3	76
	352.4	111.3			392.4	112.2
	440.5	91.3			490.5	99
	528.6	106.9			588.6	112.7
	616.7	101.3			686.7	94.4
	704.8	112.4			784.8	115.8
	792.9	113.5			882.9	112.6
	881	114.8			981	113

TF HIGH POWER	EF	dB below carrier
107.9	107.9	0
	215.8	89.5
	323.7	87
	431.6	110.2
	539.5	102.9
	647.4	105.3
	755.3	110.3
	863.2	113.8
	971.1	100.5
	1079	112.5

Method of Measuring Conducted Spurious Emissions



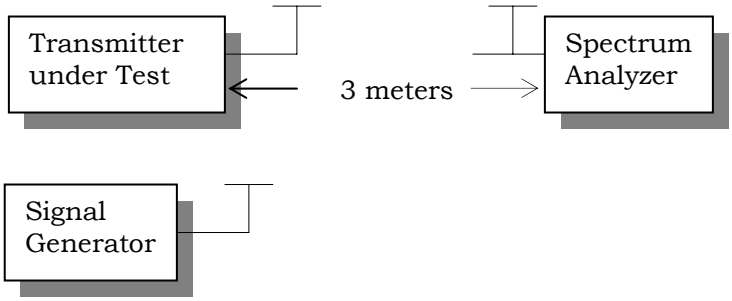
FIELD STRENGTH OF SPURIOUS EMISSIONS

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(1000) = 73 dB

Test Setup Diagram:



Test Data:

TF	EF	ANT POL	dB below carrier		TF	EF	ANT POL	dB below carrier
88.1	176.20	H	121		**98.1**	196.20	V	109.2
	264.30	H	105.5			294.30	H	116.8
	352.40	V	126.2			392.40	V	109.4
	440.50	V	108.3			490.50	H	120.7
	528.60	H	119.2			588.60	H	126.3
	616.70	H	126.0			686.70	H	106.2
	704.80	V	124.4			784.80	H	127.5
	792.9	H	129.7					

TEST DATA CONT'D.

TF	EF	ANT POL	dB below carrier		SWITCHING SUPPLY EMISSIONS	EF	ANT POL	dB below carrier
107.9	215.80	H	105.9			30.90	V	110.9
	323.70	H	122.5			38.20	V	103.4
	431.60	V	108.1			43.80	V	91.8
	539.50	V	112.4			49.80	V	112.3
	647.40	H	115.7			55.50	V	113.7
	755.30	H	118.6					
	863.20	V	126.0					
	971.10	H	118.4					

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. BETS-6 (+-1 kHz)
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 temperature was then reduced to 0° 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 + 50° C.

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

Test Data: transmitter ceases to transmit under 0 °C

Assigned Frequency (Ref. Frequency) (MHz)		
Temperature (°C)	**Frequency (MHz)**	**Frequency Stability (PPM)**
0	98.099939	-0.75
+10	98.099957	-0.57
+20	98.0999981	-0.15
+30	98.1000257	0.13
+40	98.1000346	0.23
+50	98.1000401	0.28

Assigned Frequency (Ref. Frequency) (MHz)		5 and 45 °C
%	**Frequency (MHz)**	**Frequency Stability (PPM)**
85%	98.1000125	0.00
100	98.1000125	
115%	98.1000126	0.00