TIMCO ENGINEERING INC.
849 NW State Road 45
Newberry, Florida 32669
http://www.timcoengr.com
888.472.2424 F 352.472.2030 email: sid@timcoengr.com

Test Report

Product Name: MOBILE TWO-WAY RADIO

FCC ID: H7C-M10B

Applicant:

TAD RADIO OF CANADA INC.
3663 OPIE CRESCENT
PRINCE GEORGE BRITISH COLUMBIA V2N 1B9
CANADA

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APPLICANT: TAD RADIO OF CANADA INC.

FCC ID: H7C-M10B

TEST REPORT:

EXHIBITS CONTAINING:

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GENERAL INFORMATION REQUIRED
FOR CERTIFICATION OF A LICENSED TRANSMITTER

Part 2.1033(c)(1)(2) TAD RADIO OF CANADA INC. will manufacture the FCCID: H7C-M10 TRANSCEIVER in quantity, for use under FCC RULES PART 90.

TAD RADIO OF CANADA INC.
3663 OPIE CRESCENT
PRINCE GEORGE, BRITISH COLUMBIA V2N 1B9 CANADA

Part 2.1033(c) TECHNICAL DESCRIPTION

Part 2.1033(c)(3) Instruction book. A draft copy of the instruction Manual is included.

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

Part 90.209
Part 90.207

FOR WIDE BAND – 16K0F3E

Bn = 2M + 2DK
M = 3000
D = 5000
Bn = 2(3000)+2(5000) = 16K

FOR NARROW BAND – 11K0F3E

Bn = 2M + 2DK
M = 3000
D = 2500
Bn = 2(3000)+2(2500) = 11K

Part 2.1033(c)(5) Frequency Range: 138-174 MHz
Part 90.209 (b)(5)

Part 2.1033(c)(6)(7) Power Output shall not exceed 59 Watts into a 50 ohm
Part 90.205 resistive load. There are no user power controls.

Part 2.1033(c)(8) DC Voltages and Current into Final Amplifier:
POWER INPUT:

FINAL AMPLIFIER ONLY
INPUT POWER – HIGH: (13.6V)(4.59A) = 62.42 Watts
INPUT POWER – LOW: (13.6V)(1.76A) = 23.93 Watts

Part 2.1033(c)(9) Tune-up procedure. The tune-up procedure is included.

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Part 2.1033(c)(10) Complete Circuit Diagrams: The circuit diagram is included. The block diagram is included.

Part 2.1033(c)(10): Description of all circuitry and devices provided for determining and stabilizing frequency is included.

Part 2.1033(c)(11) A photograph or drawing of the equipment identification label is included.

Part 2.1033(c)(12) Photographs of the equipment of sufficient clarity to reveal equipment construction and layout and label location are included.

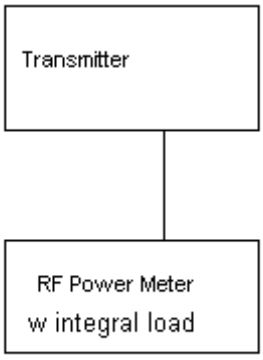
Part 2.1033(c)(13): For equipment employing digital modulation, a detailed description of the modulation technique. Digital Modulation is not allowed.

Part 2.1033(c)(14) The data required for 2.1046 through 2.1057 is submitted below.

Part 2.1046(a) RF POWER OUTPUT

RF power is measured by connecting a 50-ohm, resistive wattmeter to the RF output connector. With a nominal battery voltage, and the transmitter properly adjusted the RF output measures:

OUTPUT POWER: HIGH – 30 Watts
LOW - 5 Watts



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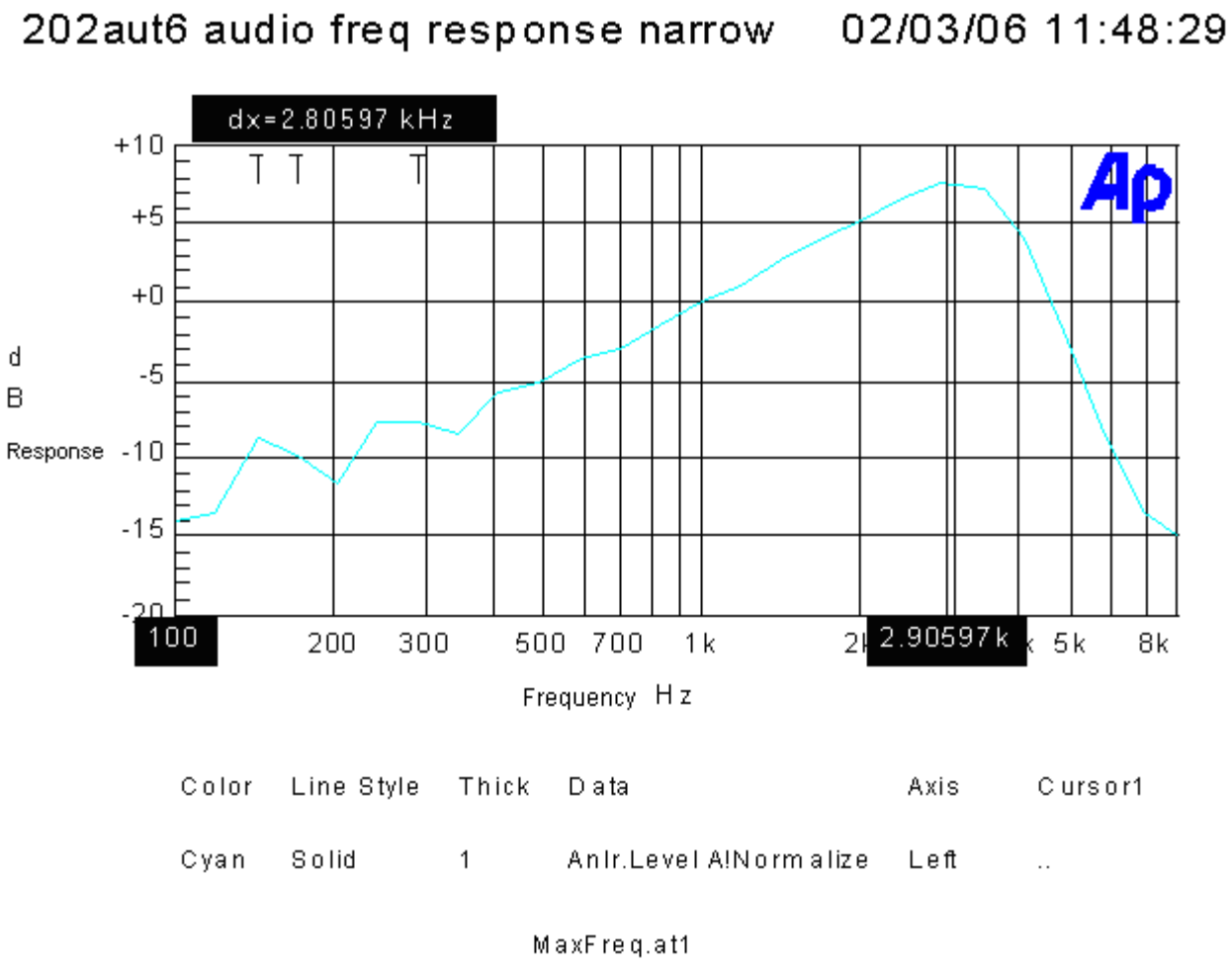
Part 2.1047(a)(b) Modulation characteristics:

AUDIO FREQUENCY RESPONSE

The audio frequency response was measured in accordance with TIA/EIA Specification 603. 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 PLOTS



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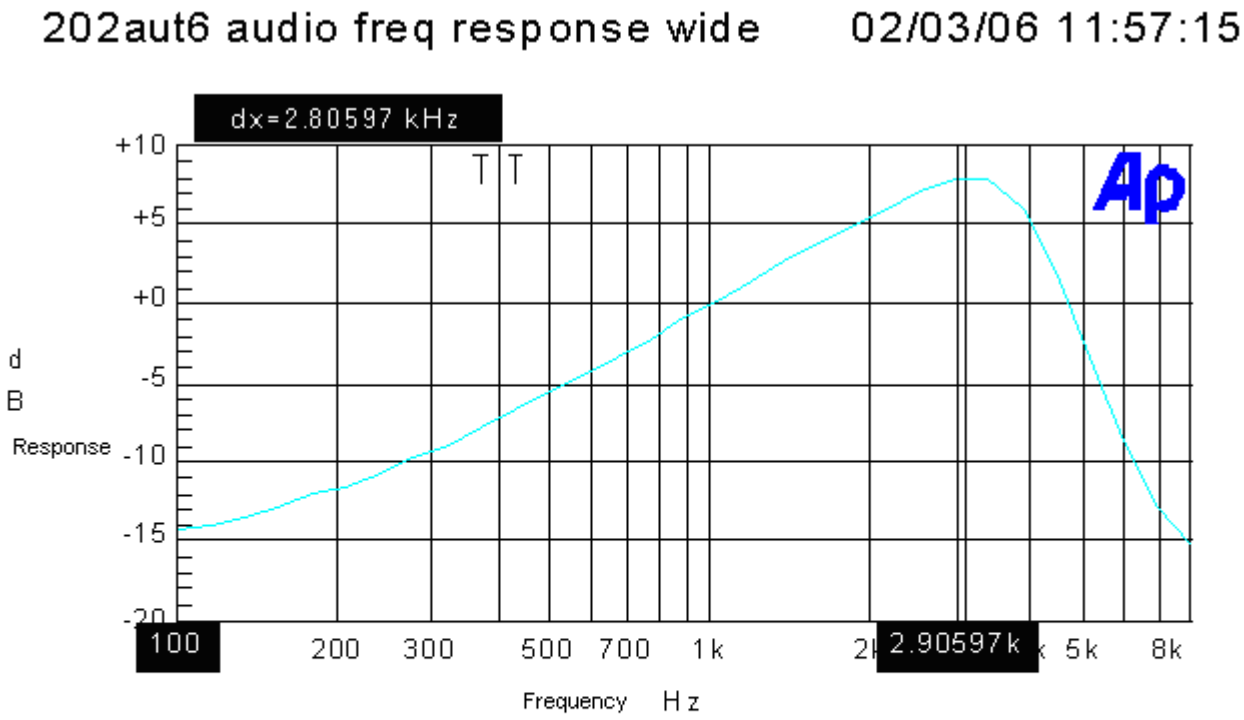
AUDIO FREQUENCY RESPONSE PLOTS



Color	Line Style	Thick	Data	Axis	Cursor1
Cyan	Solid	1	Anlr.Level A!Normalize	Left	..

MaxFreq.at1

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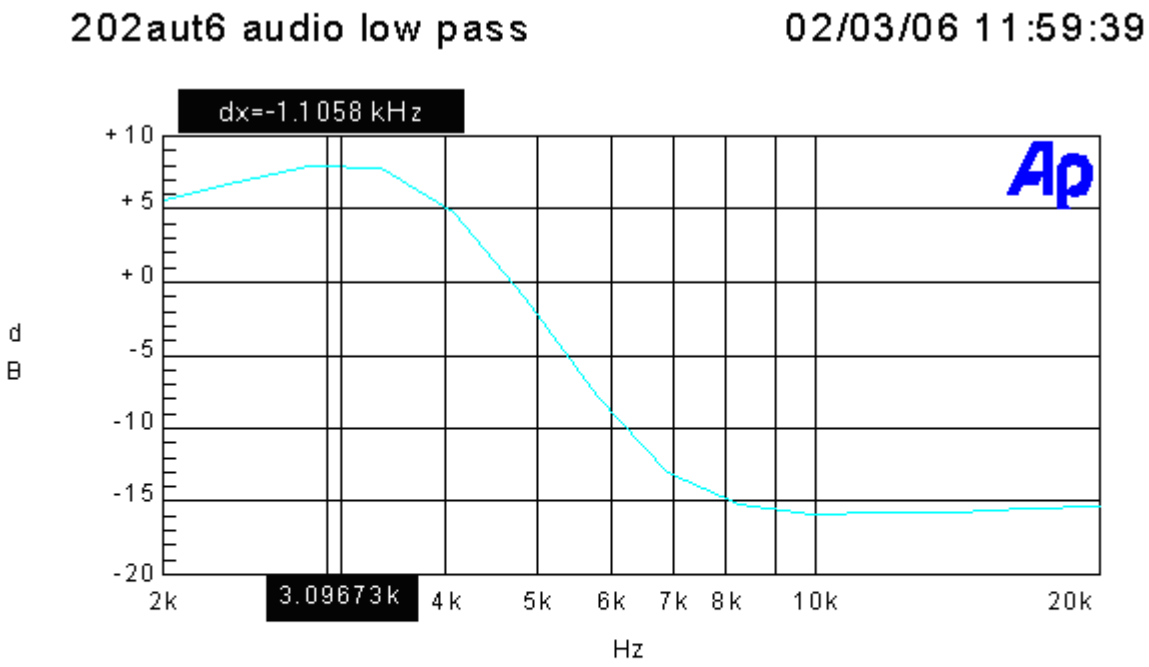
Part 2.1047(a) Voice modulated communication equipment: For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter, or of all the circuitry installed between the modulation limiter and the modulated stage shall be submitted.

AUDIO LOW PASS FILTER PLOT



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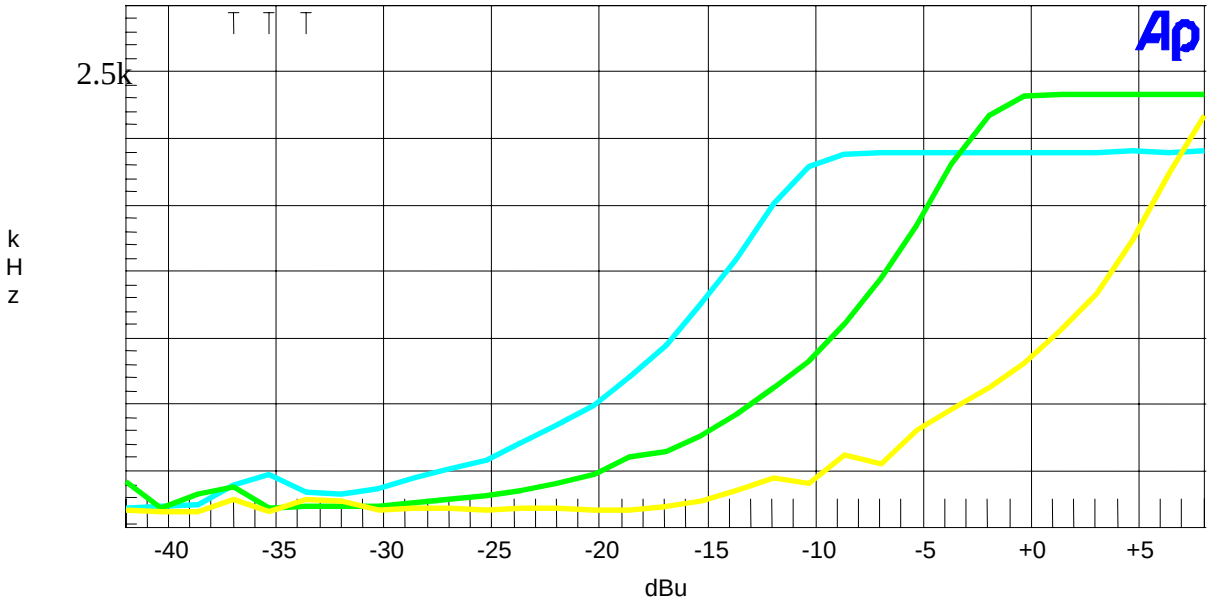
Part 2.1047(b) Audio input versus modulation

The audio input level needed for a particular percentage of modulation was measured in accordance with TIA/EIA Specification 603. The audio input curves versus modulation are shown below. Curves are provided for audio input frequencies of 300, 1000, and 2500 Hz.

MODULATION LIMITING PLOTS

202aut6 modulation limiting narrow



Color	Line Style	Thick	Data	Axis
Cyan	Solid	3	Anlr.Level A	Left
Green	Solid	3	Anlr.Level A	Left
Yellow	Solid	3	Anlr.Level A	Left

modulation limiting.at1

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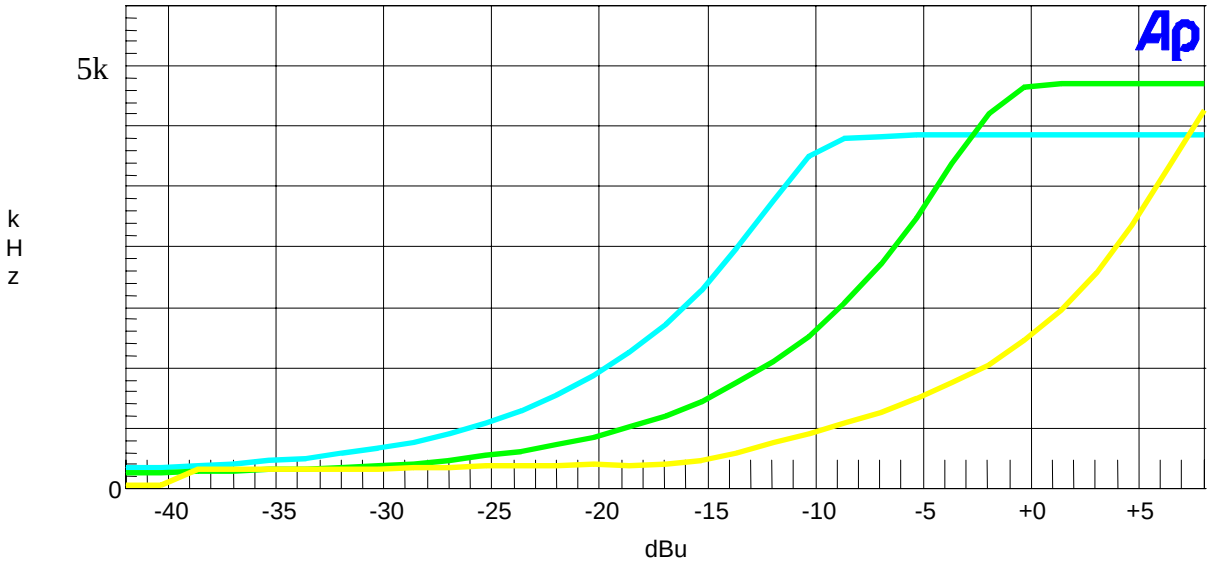
MODULATION LIMITING PLOTS

202aut6 modulation limiting wide
blue 2.5khz green 1khz yel 300hz



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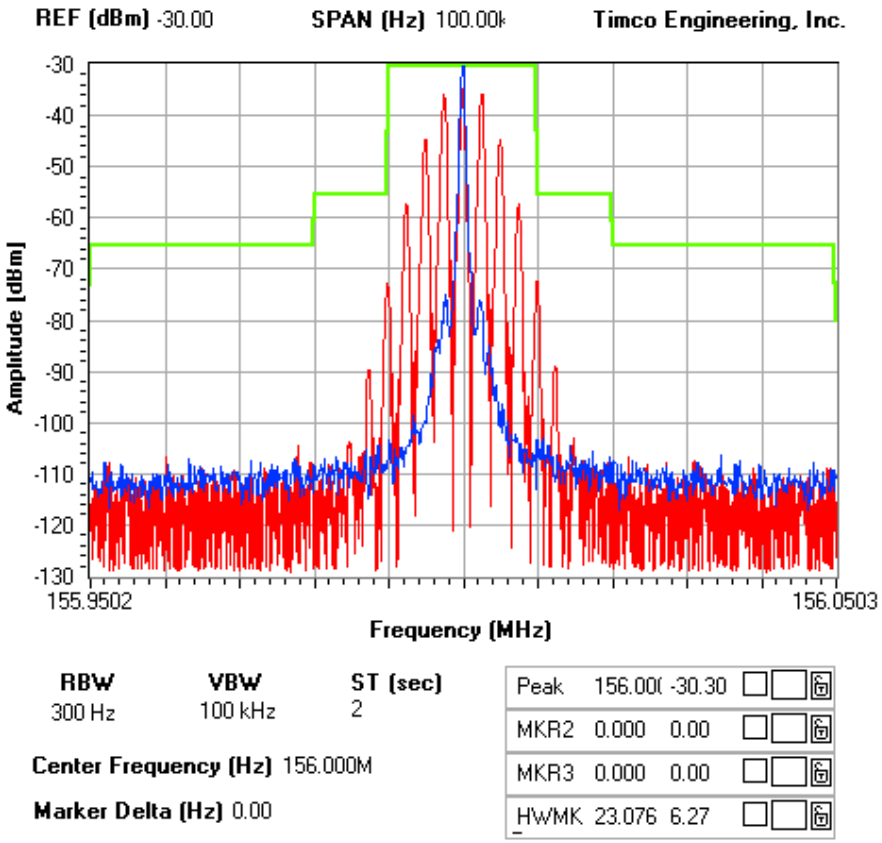
Part 2.1049 Occupied bandwidth:

Part 2.1049(c) EMISSION BANDWIDTH:
Part 90.210(b) 25kHz Channel Spacing

Data in the plots show that on any frequency removed from the assigned frequency by more than 50%, but not more than 100%: At least 25dB. On any frequency removed from the assigned frequency by more than 100%, but not more than 250%: At least 35 dB. On any frequency removed from the assigned frequency by more than 250%, of the authorized bandwidth: At least 43 + 10log(P)dB.

NOTES:
202aut6 occupied bandwidth wide

FCC 90 Mask C



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Part 90.210(d) Emission Mask D - 12.5 kHz channel BW equipment.

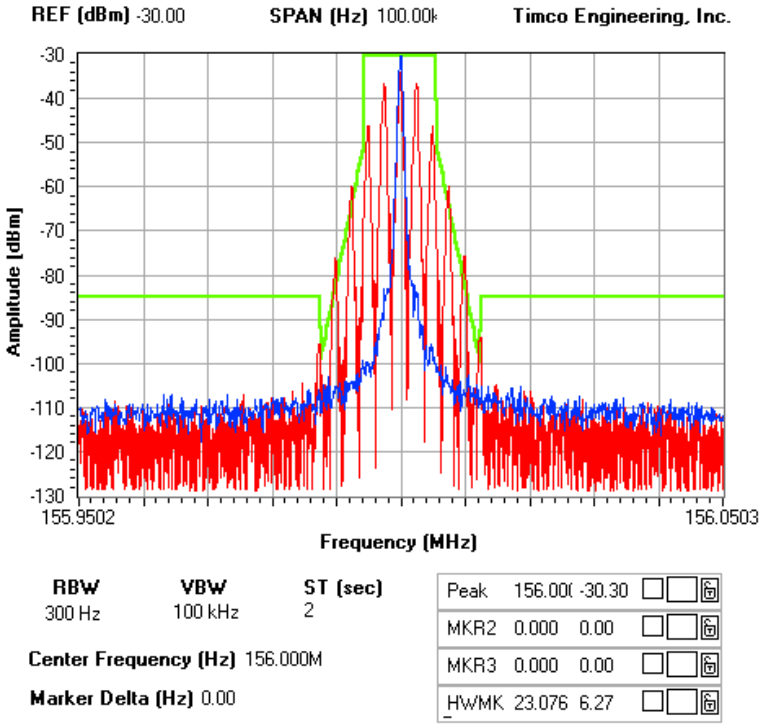
For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

(1) On any frequency from the center of the authorized bandwidth f0 to 5.625 kHz removed from f0: Zero dB.

(2) On any frequency from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least 7.27 (fd - 2.88 kHz) dB.

(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 12.5 kHz: At least 50 + 10log(P) dB or 70 dB, whichever is the lesser attenuation.

NOTES:
202aut6 occupied bandwidth narrow
12.5 k d mask



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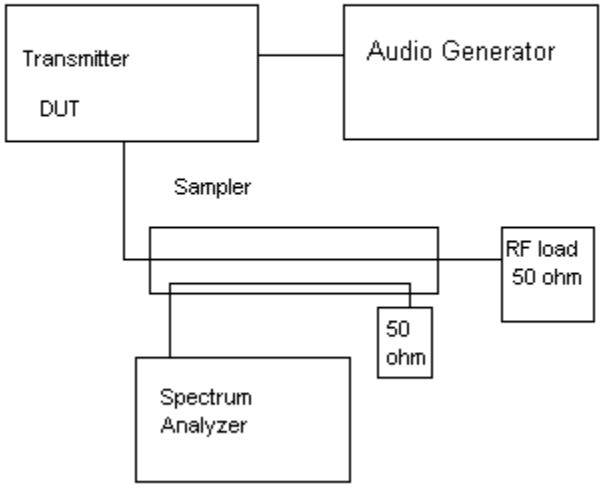
Radiotelephone transmitter with modulation limiter:

Test procedure diagram

OCCUPIED BANDWIDTH MEASUREMENT

Occupied BW Test Equipment Setup



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Part 2.1051(a) Spurious emissions at antenna terminals (conducted):

Data below shows the level of conducted spurious responses. The carrier was modulated 100% using a 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 TIA/EIA-603.

FCC Limit for:

25kHz Channel Spacing	= 43+10Log(30)	= 57 dB
	43+10Log(5)	= 50 dB
12.5kHz Channel Spacing	= 50+10Log(30)	= 65 dB
	50+10Log(5)	= 57 dB

TF HIGH POWER	EF	dB below carrier	TF LOW POWER	EF	dB below carrier
138	**138.00**	0	138	**138.00**	0
	276.00	82.1		**276.00**	82.5
	414.00	71.7		**414.00**	80.1
	552.00	90.3		**552.00**	98.8
	690.00	88.5		**690.00**	95
	828.00	94.9		**828.00**	95
	966.00	91.2		**966.00**	93.7
	1104.00	97.5		**1104.00**	96.7
	1242.00	95.5		**1242.00**	98.7
	1380.00	99.8		**1380.00**	103

TF HIGH POWER	EF	dB below carrier	TF LOW POWER	EF	dB below carrier
174	**174.00**	0	138	**174.00**	0
	348.00	82.4		**348.00**	80.4
	522.00	75.6		**522.00**	84.3
	696.00	98.6		**696.00**	91.3
	870.00	85.4		**870.00**	91.8
	1044.00	99.3		**1044.00**	98.8
	1218.00	92.3		**1218.00**	98.4
	1392.00	100		**1392.00**	100.2
	1566.00	103.3		**1566.00**	97.8
	1740.00	93.9		**1740.00**	98.1

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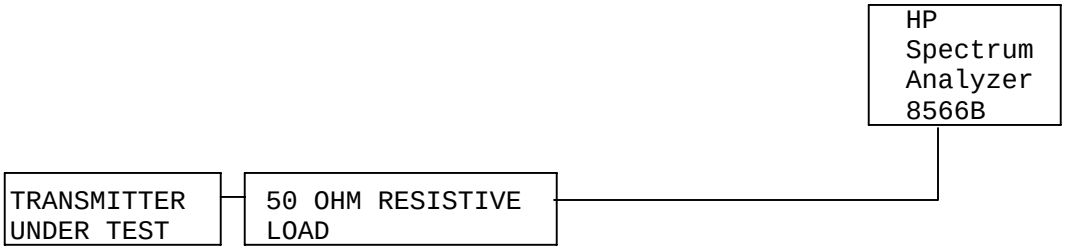
Method of Measuring Conducted Spurious Emissions



METHOD OF MEASUREMENT: The procedure used was TIA/EIA-603 STANDARD without any exceptions. The measurements were made at TIMCO ENGINEERING INC. 849 N.W. State Road 45, Newberry, Florida 32669.

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Part 2.1053 Field strength of spurious emissions:

REQUIREMENTS: 25kHz Channel Spacing = 43+10Log(30) = 57 dB
43+10Log(5) = 50 dB
12.5kHz Channel Spacing = 50+10Log(30) = 65 dB
50+10Log(5) = 57 dB

TEST DATA – HIGH POWER – 138 MHz:

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
276.00	H	70.63
414.00	V	59.46
552.00	H	68.93
690.00	H	78.81
828.00	H	77.29
966.00	H	68.67
1104.00	V	77.94
1242.00	H	87.83
1380.00	H	87.8

TEST DATA – LOW POWER – 138 MHz:

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
138.00	0	0
276.00	H	61.66
414.00	V	59.89
552.00	H	64.16
690.00	V	79.14
828.00	H	84.22
966.00	V	70.6
1104.00	V	81.07
1242.00	V	86.06
1380.00	H	89.73

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Part 2.1053 Field strength of spurious emissions:

REQUIREMENTS: 25kHz Channel Spacing = 43+10Log(30) = 57 dB
43+10Log(5) = 50 dB
12.5kHz Channel Spacing = 50+10Log(30) = 65 dB
50+10Log(5) = 57 dB

TEST DATA – HIGH POWER – 174 MHz:

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
174.00	0	0
348.00	V	68.65
522.00	H	59.56
696.00	V	84.57
870.00	H	62.29
1044.00	V	85.45
1218.00	V	76.18
1392.00	H	82.98
1566.00	H	82.16
1740.00	H	82.76

TEST DATA – LOW POWER – 174 MHz:

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
174.00	0	0
348.00	V	62.72
522.00	H	62.13
696.00	V	77.74
870.00	H	67.66
1044.00	V	77.92
1218.00	H	84.25
1392.00	V	87.55
1566.00	H	85.33
1740.00	H	79.43

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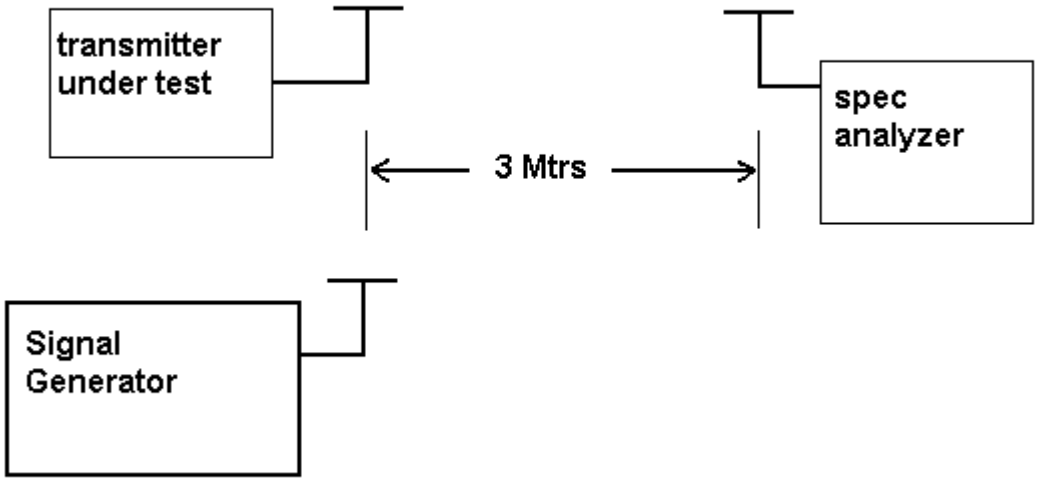
Method of Measuring Radiated Spurious Emissions



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 TIA/EIA STANDARD 603 using the substitution method. Measurements were made at the open field test site of TIMCO ENGINEERING, INC. located at 849 NW State Road 45, Newberry, FL 32669.

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Part 2.1055 Frequency stability:
Part 90.213(a)(1) 90.266(b)(3)

Frequency Stability Requirement:

Temperature range requirements: -30 to +50° C.

Voltage Variation +,- 15%.

Measurement procedure per TIA/EIA 603.

MEASUREMENT DATA:

Ref. Freq.
156.000090

TEMPERATURE °C	FREQUENCY MHz	PPM
-30C	156.000074	-0.10
-20C	156.000210	0.77
-10C	156.000311	1.42
0C	156.000304	1.37
10C	156.000206	0.74
20C	156.0001	0.06
30C	155.999987	-0.66
40C	156.00002	-0.45
50C	156.000067	-0.15

Batt. Volts	Batt. Data	PPM
-15%	156.000079	-0.07
+15%	156.000083	-0.04

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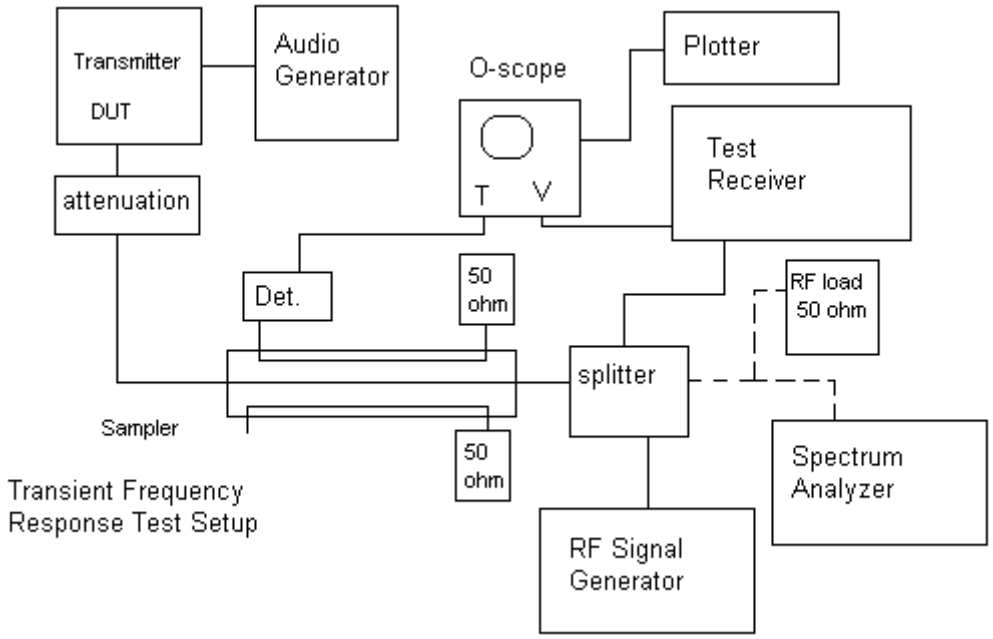
Part 2.1055(a)(1) **Frequency stability:**
Part 90.214 Transient Frequency Behavior

REQUIREMENTS: Transmitters designed to operate in the 150-174 MHz and 421-512 MHz frequency bands must maintain transient frequencies within the maximum transient frequencies within the maximum frequency difference limits during the time intervals indicated:

Time Intervals	Maximum frequency difference	All Equipment	
		150-174 MHz	421-512 MHz
Transient Frequency Behavior for Equipment Designed to Operate on 25 kHz Channels			
t_1[4]	±25.0 kHz	5.0 mS	10.0 mS
t_2	±12.5 kHz	20.0 mS	25.0 mS
t_3[4]	±25.0 kHz	5.0 mS	10.0 mS
Transient Frequency Behavior for Equipment Designed to Operate on 12.5 kHz Channels			
t_1[4]	±12.5 kHz	5.0 mS	10.0 mS
t_2	±6.25 kHz	20.0 mS	25.0 mS
t_3[4]	±12.5 kHz	5.0 mS	10.0 mS
Transient Frequency Behavior for Equipment Designed to Operate on 6.25 kHz Channels			
t_1[4]	±6.25 kHz	5.0 mS	10.0 mS
t_2	±3.125 kHz	20.0 mS	25.0 mS
t_3[4]	±6.25 kHz	5.0 mS	10.0 mS

TEST PROCEEDURE: TIA/EIA TS603 PARA 2.2.19, the levels were set as follows;

1. Using the variable attenuator the transmitter level was set to 40 dB below the test receivers maximum input level, then the transmitter was turned off.
2. With the transmitter off the signal generator was set 20dB below the level of the transmitter in the above step, this level will be maintained with the signal generator through-out the test.
3. Reduce the attenuation between the transmitter and the RF detector by 30 dB.
4. With the levels set as above the transient frequency behavior was observed & recorded.



Transient Frequency Response Test Setup

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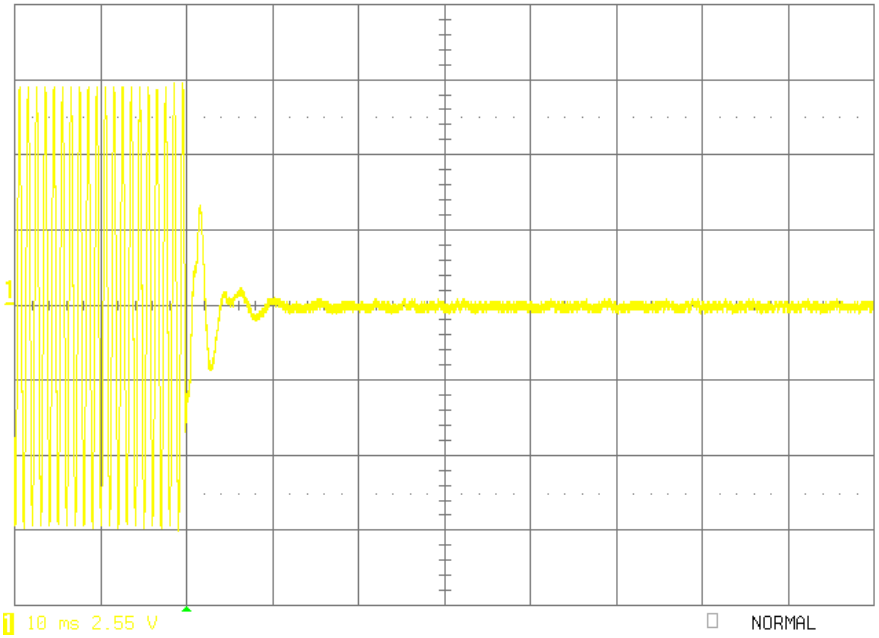
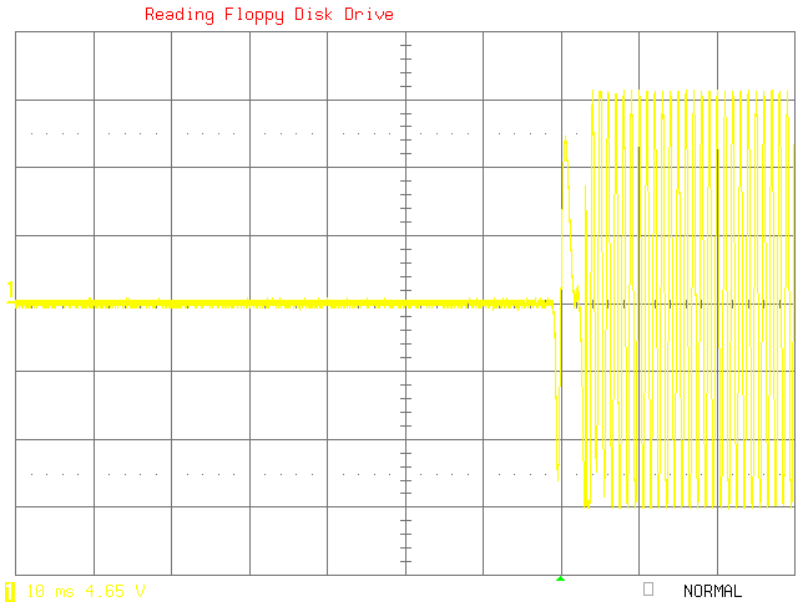
TRANSIENT FREQUENCY RESPONSE PLOTS

12.5 kHz – ON



12.5 kHz – OFF



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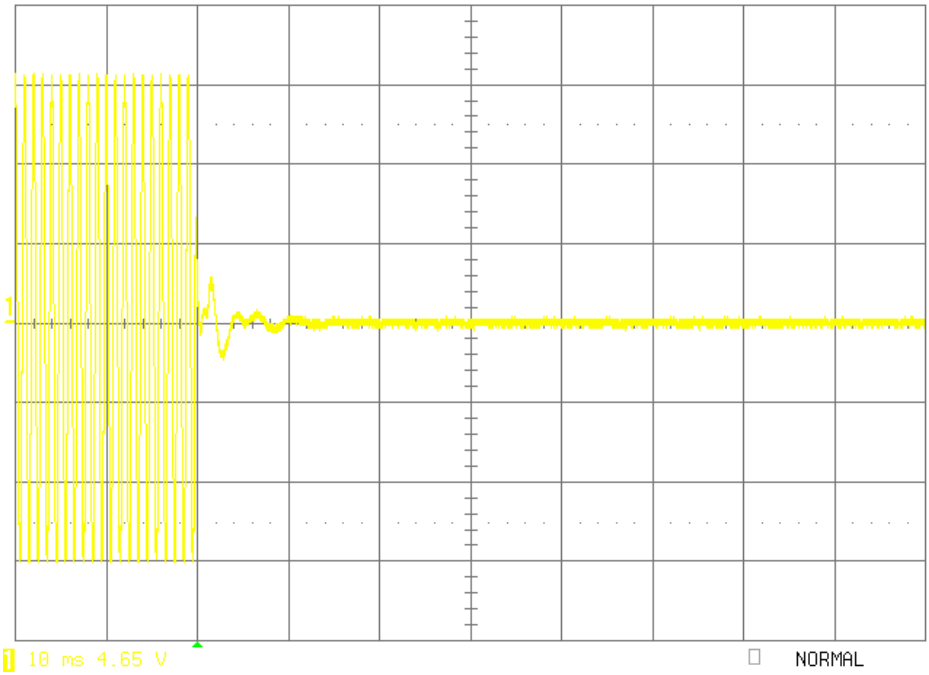
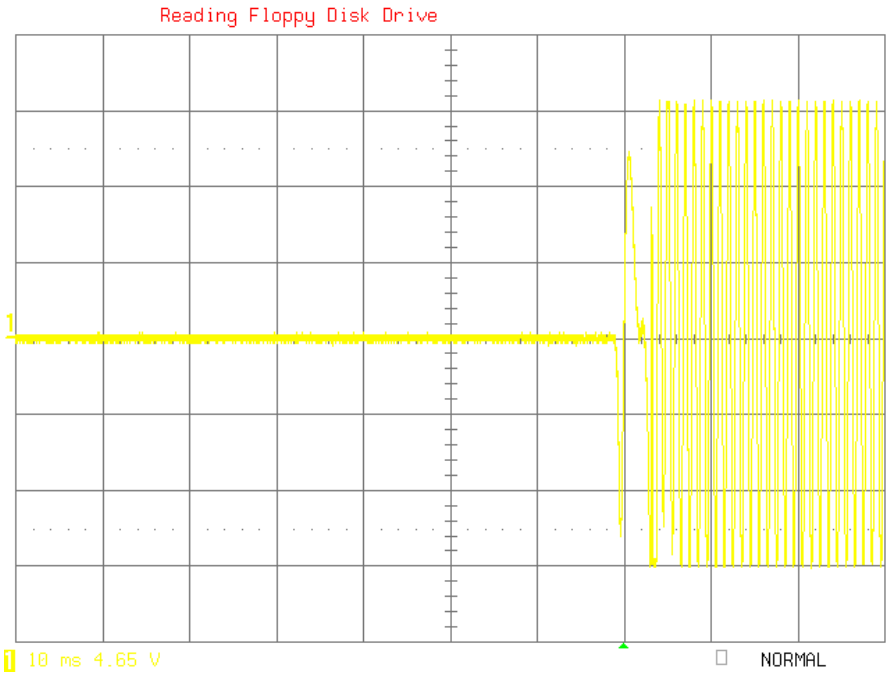
25 kHz – ON



25 kHz – OFF



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EMC Equipment List

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3/10-Meter OATS	TEI	N/A	N/A	Listed 3/27/04	3/26/07
3-Meter OATS	TEI	N/A	N/A	Listed 1/11/06	1/10/09
Biconnical Antenna	Eaton	94455-1	1057	CAL 12/12/05	12/12/07
Biconnical Antenna	Eaton	94455-1	1096	CAL 8/17/04	8/17/06
Biconnical Antenna	Electro-Metrics	BIA-25	1171	CAL 4/29/05	4/29/07
Blue Tower Quasi-Peak Adapter	HP	85650A	2811A01279	CAL 4/13/05	4/13/07
Blue Tower RF Preselector	HP	85685A	2926A00983	CAL 9/5/05	9/5/07
Blue Tower Spectrum Analyzer	HP	8568B	2928A04729 2848A18049	CAL 4/13/05	4/13/07
LISN	Electro-Metrics	ANS-25/2	2604	CAL 8/27/04	8/27/06
LISN	Electro-Metrics	EM-7820	2682	CAL 4/28/05	4/28/07
Log-Periodic Antenna	Eaton	96005	1243	CAL 12/14/05	12/14/07