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APPLICANT: BG TECH

FCC ID: QFRWM200

TEST REPORT:

EXHIBIT CONTAINING:

GENERAL_INFORMATION_REQUIRED FOR_TYPE_ACCEPTANCE

2.1033(c) BG TECH will sell the FCC ID: QFRWM200 VHF Marine transmitter in quantity, for use under FCC RULES PART 80.

TECHNICAL_DESCRIPTION

(1) Type of Emission: 15K2G3E/15K2F3E For 20KHz

Bn = 2M + 2DK
M = 3000
D = 4.6KHz (Peak Deviation)
K = 1
Bn = 2(3.0K) + 2(4.6K)(1) = 6.0K + 9.2 = 15.2K

80.205(A) ALLOWED AUTHORIZED BANDWIDTH = 20.00KHz.

2.1033(c)(5) Frequency Range: 156.05-157.40 MHz

2.1003(c)(6) Power Range and Controls: There is a user Power switch for High/Med/Low Power.

Maximum Output Power Rating:
HIGH POWER – 4.5 Watts Conducted (+36.5 dBm)
MEDIUM POWER – 1 Watt Conducted (+30 dBm)
LOW POWER - .5 Watt Conducted (+27 dBm)

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

POWER INPUT

High VCE = 9 Volts ICE = 1.33A PIN = 11.97 Watts
Med VCE = 9 Volts ICE = .510A PIN = 4.59 Watts
Low VCE = 9 Volts ICE = .360A PIN = 3.24 Watts

Function of each electron tube or semiconductor device or other active circuit device: - SEE EXHIBIT# 9

2.1033(c)(10) Complete Circuit Diagrams: The circuit diagram is included as EXHIBIT 7. The block diagram is included as EXHIBIT 6.

2.1033(c)(3) Instruction book. The instruction manual is included as EXHIBIT #8.

2.1033(c) (9) Tune-up procedure. The tune-up procedure is given in EXHIBIT #10.

Description of all circuitry and devices provided for determining and stabilizing frequency is included in the circuit description Exhibit 9.

2.1033(c)(13) Digital modulation. This unit does NOT use digital modulation.

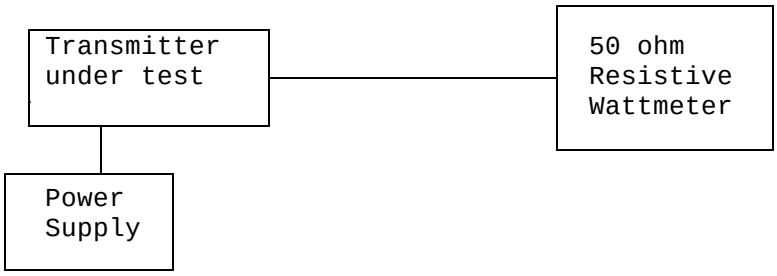
The data required by 2.1046 through 2.1055 is submitted below.

2.1046 80.215(e)(1) RF_power_output.

RF power is measured by connecting a 50 ohm, resistive wattmeter to the RF output connector. With a nominal battery voltage of 9 V, and the transmitter properly adjusted the RF output measures:

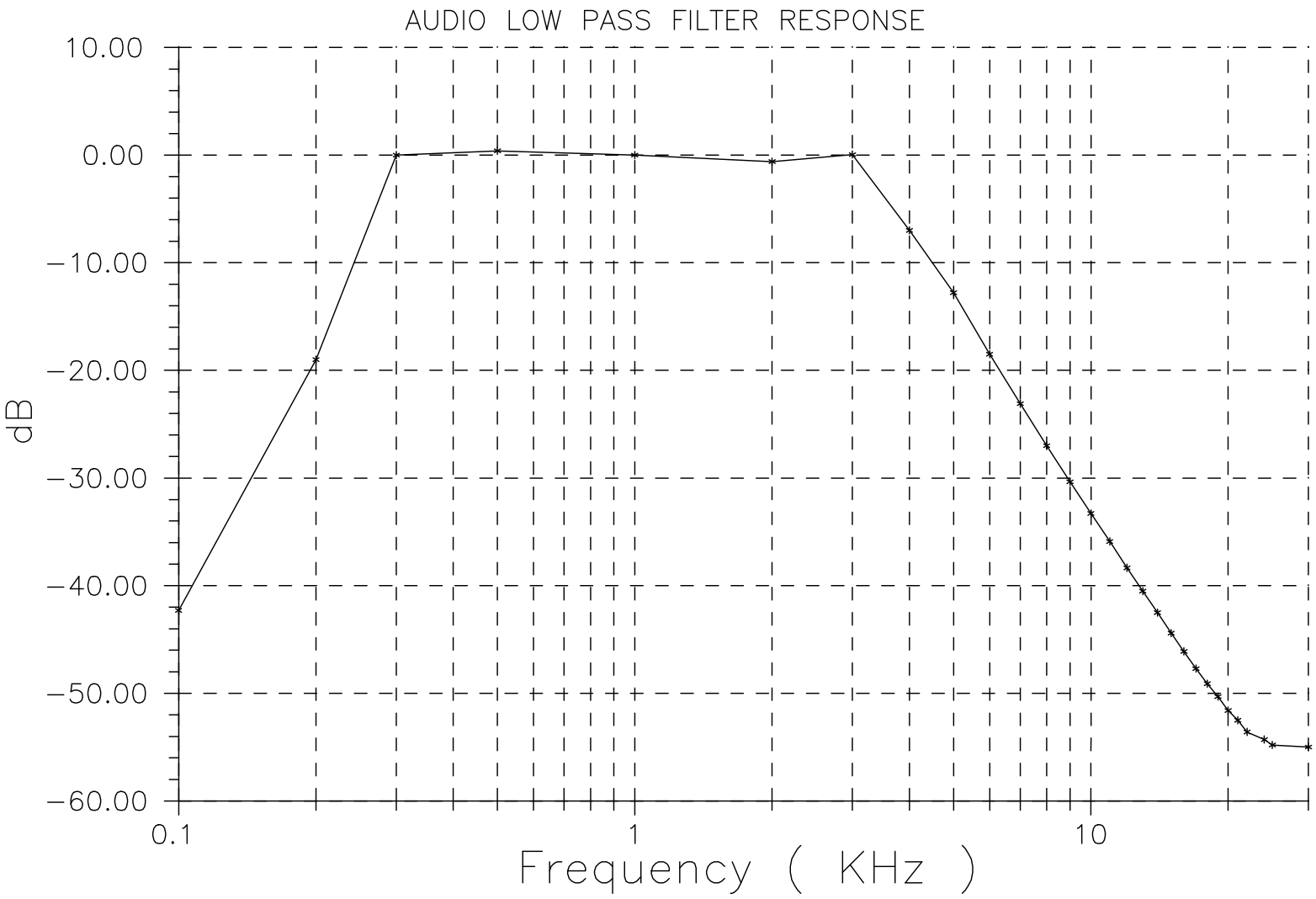
HIGH POWER – 4.5 Watts Conducted (+36.5 dBm)
MEDIUM POWER – 1 Watt Conducted (+30 dBm)
LOW POWER - .5 Watt Conducted (+27 dBm)

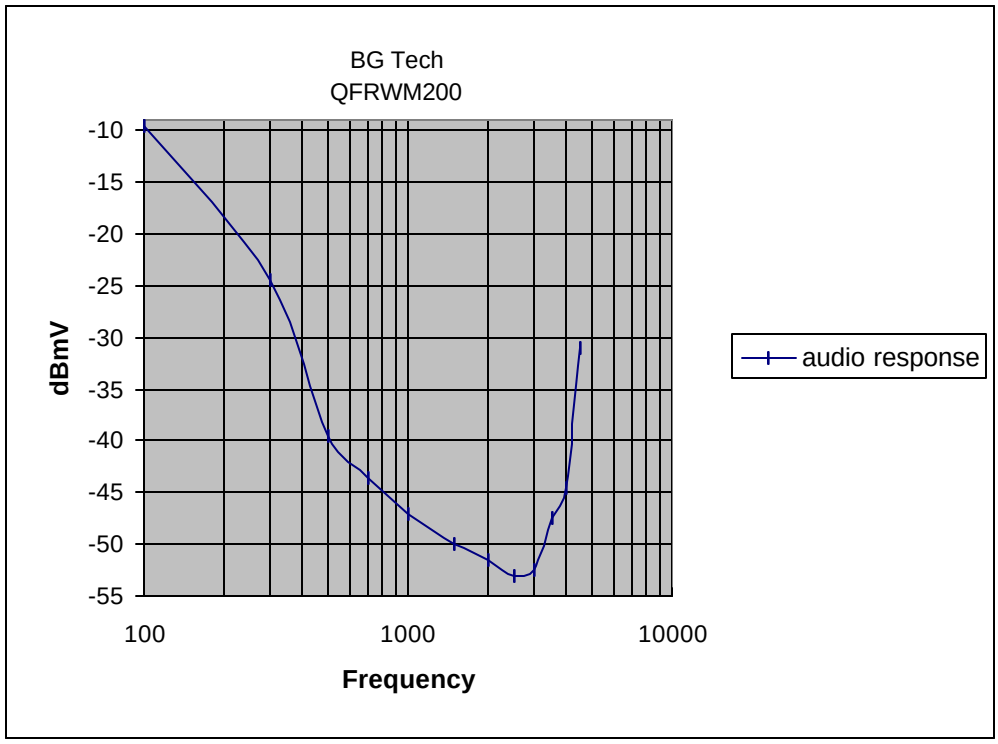
METHOD OF MEASURING RF POWER OUTPUT

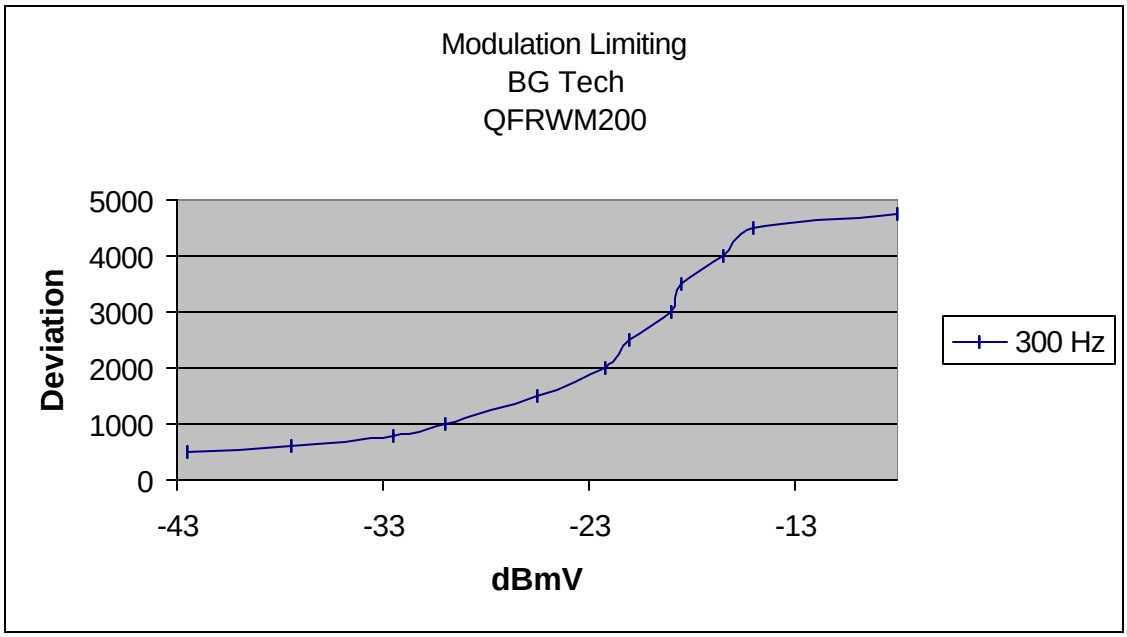


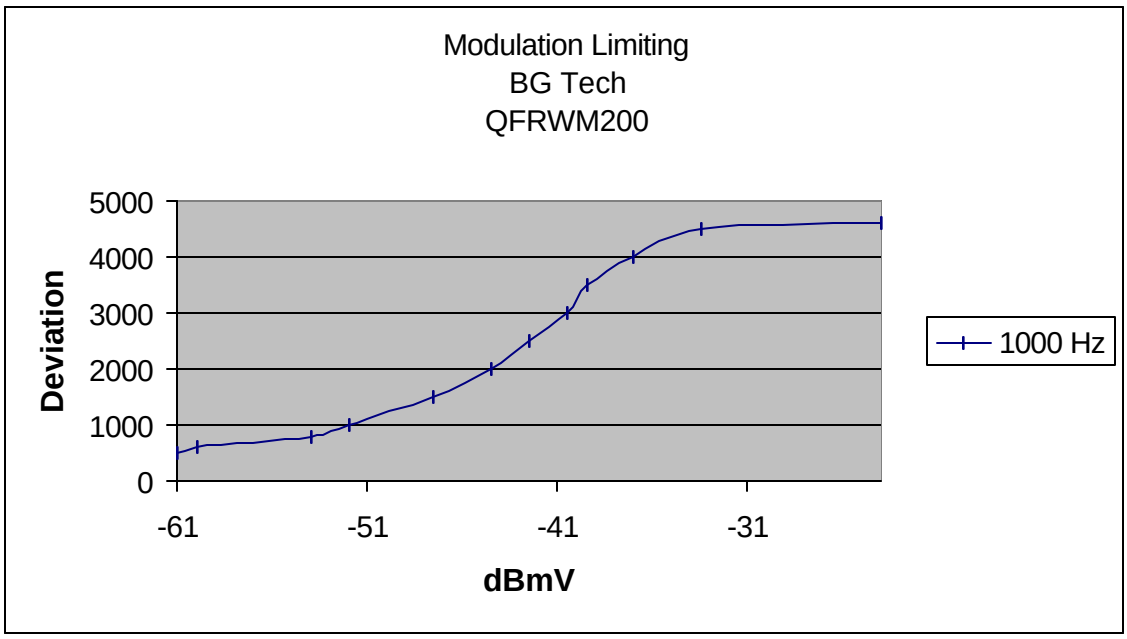
80.203(n) DSC Capability: Not required for hand-held portable Transmitters.

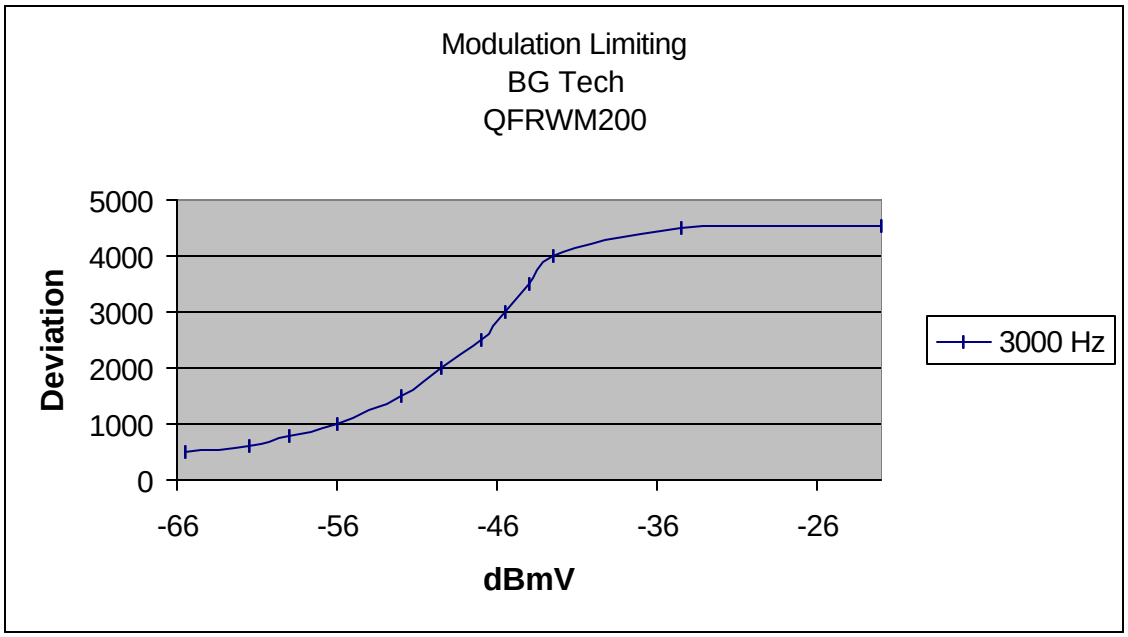
2.1047(a)	Voice Modulation_characteristics:	
(b)	AUDIO_FREQUENCY_RESPONSE	See Page #5.
2.1047(a)	AUDIO_LOW_PASS_FILTER The audio low pass filter is included and the plot is shown in Page #4. Rules 80.213(e) for ship stations with a low pass filter.	
2.1047(b) 80.213(d)	Audio_input_versus_modulation Plots of the audio input versus deviation are shown in Pages 6-7.	


AUDIO LOW PASS FILTER RESPONSE
10.00
0.00
−10.00
−20.00
−30.00
−40.00
−50.00
−60.00
dB
0.1
1
10
Frequency (KHz)


BG Tech
QFRWM200
-10
-15
-20
-25
-30
-35
-40
-45
-50
-55
dBmV
100
1000
10000
Frequency
audio response


Modulation Limiting
BG Tech
QFRWM200
Deviation
5000
4000
3000
2000
1000
0
-43
-33
-23
-13
dBmV
300 Hz


Modulation Limiting
BG Tech
QFRWM200
Deviation
5000
4000
3000
2000
1000
0
-61
-51
-41
-31
dBmV
1000 Hz


Modulation Limiting
BG Tech
QFRWM200
Deviation
5000
4000
3000
2000
1000
0
-66
-56
-46
-36
-26
dBmV
3000 Hz

2.1049(c) Occupied_bandwidth:

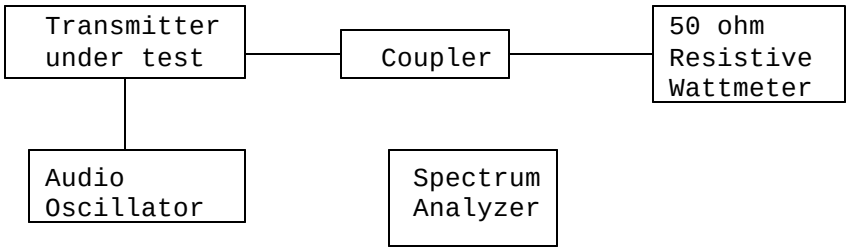
80.211(f)
Data in the plots shows that on any frequency removed from the assigned frequency by more than 50%, but not more than 100%: At least 25dB. On any frequency removed from the assigned frequency by more than 100%, but not more than 250%: At least 35dB. On any frequency removed from the assigned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

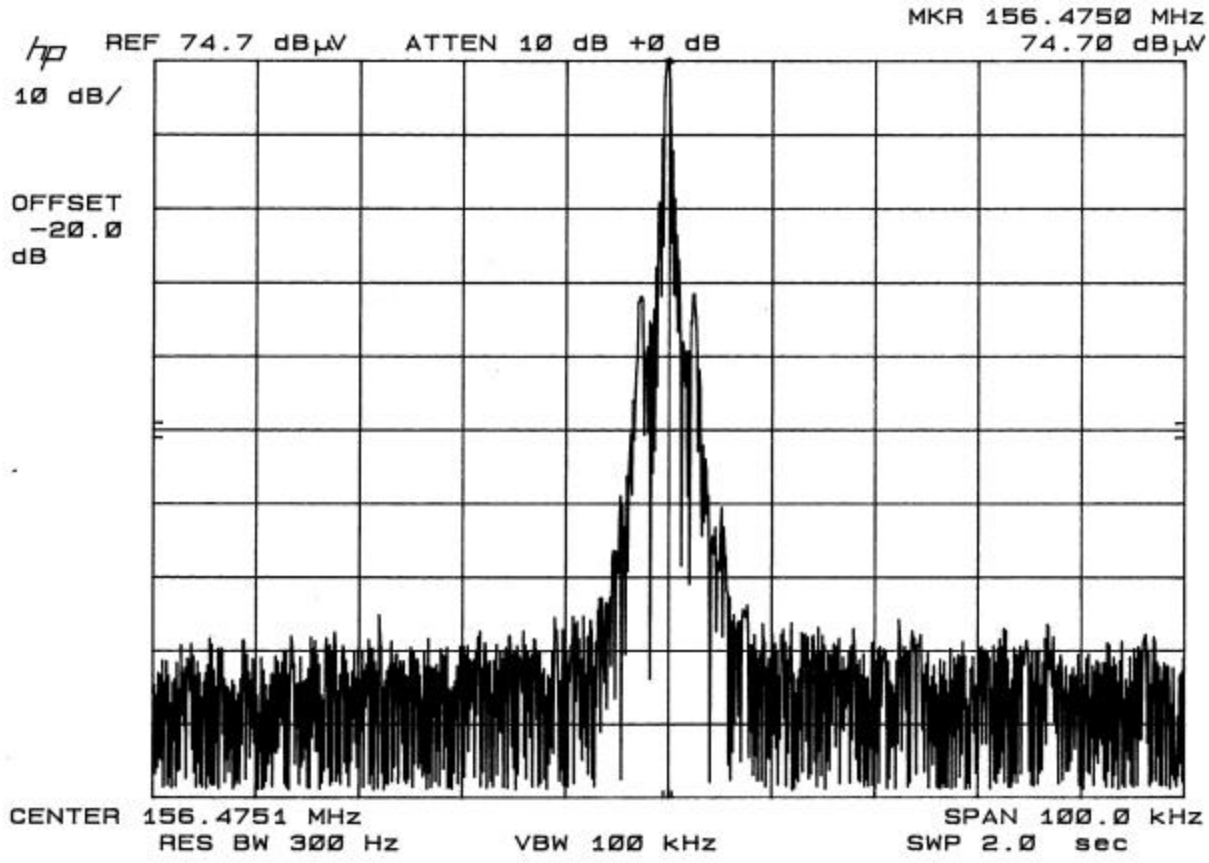
Radiotelephone transmitter with modulation limiter.

Test procedure: TIA/EIA-603 para 2.2.11 , with the exception that various tones were used.

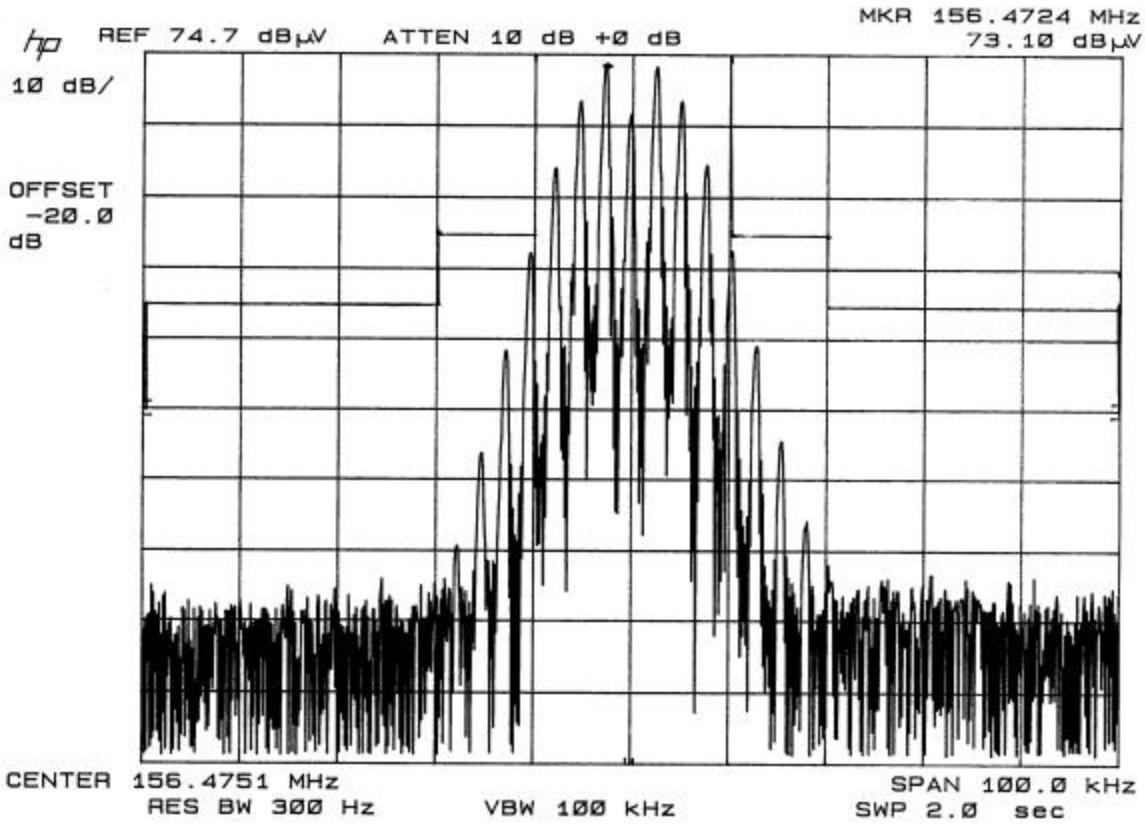
Test procedure diagram

OCCUPIED BANDWIDTH MEASUREMENT





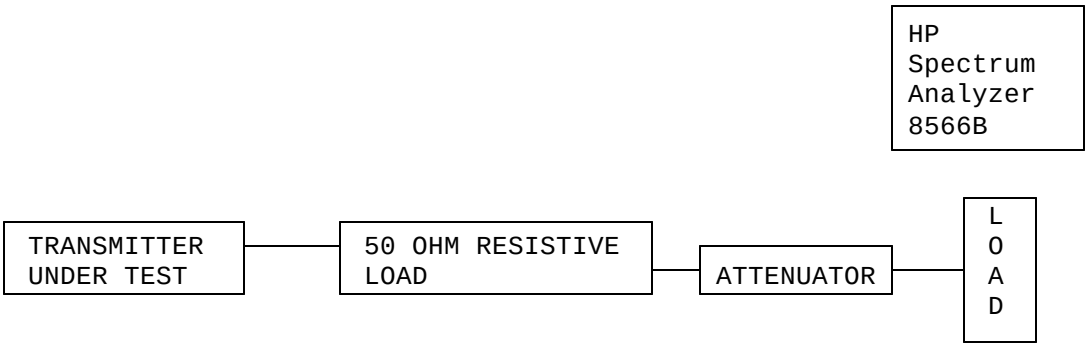
OCCUPIED BANDWIDTH PLOT - CW



OCCUPIED BANDWIDTH PLOT

2.1051 Spurious_emissions_at_antenna_terminals(conducted):
80.211 The data on the following page shows the level of conducted spurious responses. The carrier was modulated 100% using a 2500Hz tone. The spectrum was scanned from 30 MHz to at least the 10th harmonic of the fundamental. The measurements were made in accordance with standard TIA/EIA-603.

Method of Measuring Conducted Spurious Emissions



2.1051 Continued Spurious_Emissions_at_the_Antenna_Terminals:

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

HIGH POWER 43 + 10log(5) = 50 dB
MEDIUM POWER 43 + 10log(1) = 43 dB
LOW POWER 43 + 10lOG(.5) = 40.0 dB

EMISSION FREQUENCY MHz	DB BELOW CARRIER HIGH POWER	DB BELOW CARRIER MEDIUM POWER	DB BELOW CARRIER LOW POWER
156.9	0.00	0.00	0.00
313.8	61.6	51.3	47.6
470.7	83.4	88.3	86.8
627.6	93.7	91.3	89.0
784.6	93.8	97.4	94.7
941.5	99.1	100.5	97.1
1098.4	98.4	98.8	95.2
1255.3	99.8	99.8	104.2
1412.2	97.8	98.2	104.8
1569.2	99.0	97.7	104.2

METHOD OF MEASUREMENT: The procedure used was TIA/EIA-603 STANDARD without any exceptions. An audio generator was connected to the UUT through a dummy microphone circuit and the output of the transmitter connected to a standard load and from the standard load through a pre-selector filter of the spectrum analyzer. The spectrum was scanned from 30MHz to at least the tenth harmonic of the fundamental using a HP model 8566B spectrum analyzer. The measurements were made using the shielded room located at TIMCO ENGINEERING INC. 849 STATE ROAD, NEWBERRY FLORIDA 32669.

2.1053(a) Field_strength_of_spurious_emissions:

NAME OF TEST: RADIATED SPURIOUS EMISSIONS

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

HIGH POWER	43 + 10log(4.5) = 50 dB
MEDIUM POWER	43 + 10log(1) = 43 dB
LOW POWER	43 + 10lOG(.5) = 40.0 dB

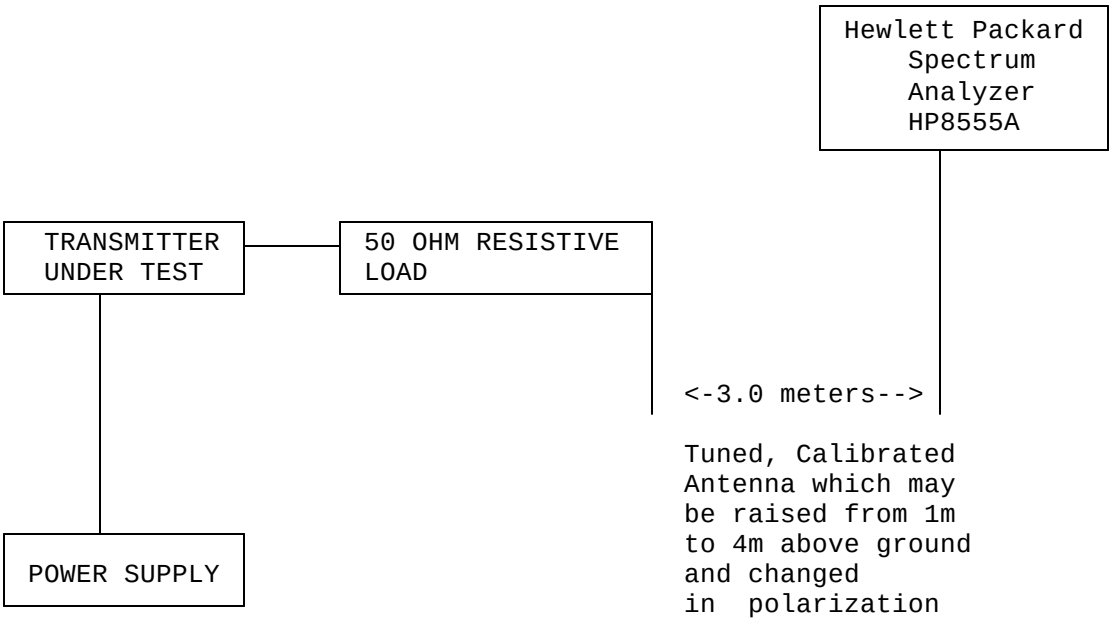
TEST DATA:

Emission Frequency MHz	ATTN dBc	Margin dB
LOW POWER		
156.70	**0.00**	**0.00**
313.80	**73.59**	**33.59**
470.70	**77.44**	**37.44**
627.60	**85.51**	**45.51**
784.60	**88.48**	**48.48**
941.50	**91.72**	**51.72**
MED POWER		
156.80	**0.00**	**0.00**
313.80	**57.28**	**27.09**
470.70	**77.94**	**34.94**
627.60	**88.31**	**45.31**
784.60	**85.08**	**42.08**
941.50	**93.32**	**50.32**
1,098.40	**40.27**	**44.10**
HIGH POWER		
156.90	**0.00**	**0.00**
313.80	**60.69**	**7.79**
470.70	**67.74**	**17.74**
627.60	**60.86**	**23.51**
784.60	**78.18**	**28.18**
941.50	**90.72**	**40.72**
1,098.40	**86.10**	**36.10**
1,255.30	**90.01**	**40.10**
1,412.20	**91.13**	**41.13**
1,569.20	**88.17**	**38.17**

METHOD OF MEASUREMENT: 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 N.W. State Road 45, Newberry, FL 32669.

2.1053(a) Continued Field_strength_of_spurious_emissions:

Method of Measuring Radiated Spurious Emissions



Equipment placed 80 cm above ground
on a rotatable platform.

Frequency_stability:

2.1055(a)
80.209(a)

Temperature and voltage tests were performed to verify that the frequency remains within the .0010%, 10.0 ppm specification limit, for 20kHz spacing. The test was conducted as follows: The transmitter was placed in the temperature chamber at 25 degrees 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 was taken for temperature plotting. The assigned channel frequency was considered to be the reference frequency. The temperature was then reduced to -30 degrees 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 recorded for temperature plotting. This procedure was repeated in 10 degree increments up to + 50 degrees C.

Readings were also taken at minus 15% of the battery voltage of 9 V, which we estimate to be the battery endpoint.

MEASUREMENT DATA:

Assigned Frequency (Ref. Frequency): 156.925 120

TEMPERATURE_C	FREQUENCY_MHz	PPM
REFERENCE_____	156.925 120	00.0
-30_____	156.924 744	-2.40
-20_____	156.925 294	+1.11
-10_____	156.925 365	+1.56
0_____	156.925 466	+2.20
+10_____	156.925 423	+1.93
+20_____	156.925 226	+0.68
+30_____	156.924 998	-0.78
+40_____	156.924 816	-1.94
+50_____	156.924 754	-2.33
6.75VDC Battery Voltage	156.925 116	-0.03

RESULTS OF MEASUREMENTS: The maximum frequency variation over the temperature range was -2.40 to +2.20 ppm. The maximum frequency variation over the voltage range was -0.03 ppm.

Equipment List

	DEVICE	MFGR	MODEL	SERNO	CAL/CHAR DATE	DUE DATE or STATUS
X	3-Meter OATS	TEI	N/A	N/A	Listed 12/22/99	12/22/02
	3/10-Meter OATS	TEI	N/A	N/A	Listed 3/26/01	3/26/04
X	Receiver, Beige Tower					
X	Spectrum Analyzer (Tan)	HP	8566B Opt 462	3138A07786 3144A20661	CAL 8/31/01	8/31/02
X	RF Preselector (Tan)	HP	85685A	3221A01400	CAL 8/31/01	8/31/02
X	Quasi-Peak Adapter (Tan)	HP	85650A	3303A01690	CAL 8/31/01	8/31/02
	Receiver, Blue Tower					
	Spectrum Analyzer (Blue)	HP	8568B	2928A04729 2848A18049	CHAR 10/22/01	10/22/02
	RF Preselector (Blue)	HP	85685A	2926A00983	CHAR 10/22/01	10/22/02
	Quasi-Peak Adapter (Blue)	HP	85650A	2811A01279	CHAR 10/22/01	10/22/02
	Biconnical Antenna	Electro-Metrics	BIA-25	1171	CAL 4/26/01	4/26/03
X	Biconnical Antenna	Eaton	94455-1	1096	CAL 10/1/01	10/1/02
	Biconnical Antenna	Eaton	94455-1	1057	CHAR 3/15/00	3/15/01
	BiconiLog Antenna	EMCO	3143	9409-1043		
X	Log-Periodic Antenna	Electro-Metrics	LPA-25	1122	CAL 10/2/01	10/2/02
	Log-Periodic Antenna	Electro-Metrics	EM-6950	632	CHAR 10/15/01	10/15/02
	Log-Periodic Antenna	Electro-Metrics	LPA-30	409	CHAR 10/16/01	10/16/02
	Dipole Antenna Kit	Electro-Metrics	TDA-30/1-4	152	CAL 3/21/01	3/21/02
	Dipole Antenna Kit	Electro-Metrics	TDA-30/1-4	153	CHAR 11/24/00	11/24/01
	Double-Ridged Horn Antenna	Electro-Metrics	RGA-180	2319	CAL 12/19/01	12/19/02

	DEVICE	MFGR	MODEL	SERNO	CAL/CHAR DATE	DUE DATE or STATUS
	Horn Antenna	Electro-Metrics	EM-6961	6246	CAL 3/21/01	3/21/02
	Horn Antenna	ATM	19-443-6R	None	No Cal Required	
	Passive Loop Antenna	EMC Test Systems	EMCO 6512	9706-1211	CHAR 7/10/01	7/10/02
	Line Impedance Stabilization . . .	Electro-Metrics	ANS-25/2	2604	CAL 10/9/01	10/9/02
	Line Impedance Stabilization . . .	Electro-Metrics	EM-7820	2682	CAL 3/16/01	3/16/02
	Termaline Wattmeter	Bird Electronic Corporation	611	16405	CAL 5/25/99	(5/25/00)
	Termaline Wattmeter	Bird Electronic Corporation	6104	1926	CAL 12/12/01	12/12/02
	Oscilloscope	Tektronix	2230	300572	CHAR 2/1/01	2/1/02
X	Temperature Chamber	Tenney Engineering	TTRC	11717-7	CHAR 1/22/02	1/22/03
X	AC Voltmeter	HP	400FL	2213A14499	CAL 10/9/01	10/9/02
	AC Voltmeter	HP	400FL	2213A14261	CHAR 10/15/01	10/15/02
	AC Voltmeter	HP	400FL	2213A14728	CHAR 10/15/01	10/15/02
X	Digital Multimeter	Fluke	77	35053830	CHAR 1/8/02	1/8/03
	Digital Multimeter	Fluke	77	43850817	CHAR 1/8/02	1/8/03
	Digital Multimeter	HP	E2377A	2927J05849	CHAR 1/8/02	1/8/03
	Multimeter	Fluke	FLUKE-77-3	79510405	CAL 9/26/01	9/26/02
	Peak Power Meter	HP	8900C	2131A00545	CHAR 1/26/01	1/26/02
	Digital Thermometer	Fluke	2166A	42032	CAL 1/16/02	1/16/03
	Thermometer	Traulsen	SK-128		CHAR 1/22/02	1/22/03

	DEVICE	MFGR	MODEL	SERNO	CAL/CHAR DATE	DUE DATE or STATUS
X	Temp/Humidity gauge	EXTech	44577F	E000901	CHAR 1/22/02	1/22/03
	Frequency Counter	HP	5352B	2632A00165	CAL 11/28/01	11/28/02
	Power Sensor	Agilent Technologies	84811A	2551A02705	CAL 1/26/01	1/26/02
	Injection Probe	Fischer Custom Communications	F-120-9A	270	CAL 6/1/01	6/1/02
	Service Monitor	IFR	FM/AM 500A	5182	CAL 11/22/00	11/22/01
	Comm. Serv. Monitor	IFR	FM/AM 1200S	6593	CAL 11/12/99	11/12/00
	Signal Generator	HP	8640B	2308A21464	CAL 11/15/01	11/15/02
	Modulation Analyzer	HP	8901A	3435A06868	CAL 9/5/01	9/5/02
	Power Line Coupling/ Decoupling Network	Fischer Custom Communications	FCC-801-M2-16A	01048	CAL 8/29/01	8/29/02
	Power Line Coupling/ Decoupling Network	Fischer Custom Communications	FCC-801-M3-16A	01060	CAL 8/29/01	8/29/02
	VHF/UHF Current Probe	Fischer Custom Communications	F-52	130	CAL 8/30/01	8/30/02
	Passive Impedance Adapter	Fischer Custom Communications	FCC-801-150-50-CDN	01117 & 01118	CAL 8/29/01	8/29/02
	Radiating Field Coil	Fischer Custom Communications	F-1000-4-8/9/10-L-1M	9859	CAL 10/15/98	10/15/99
	Near Field Probe	HP	HP11940A	2650A02748	CHAR 2/1/01	2/1/02
	BandReject Filter	Lorch Microwave	5BR4-2400/ 60-N	Z1	CHAR 3/2/01	3/2/02
	BandReject Filter	Lorch Microwave	6BR6-2442/ 300-N	Z1	CHAR 3/2/01	3/2/02
	BandReject Filter	Lorch Microwave	5BR4-10525/ 900-S	Z1	CHAR 3/2/01	3/2/02
	High Pas Filter	Microlab	HA-10N		CHAR 10/4/01	10/4/02
	Audio Oscillator	HP	653A	832-00260	CHAR 3/1/01	3/1/02

	DEVICE	MFGR	MODEL	SERNO	CAL/CHAR DATE	DUE DATE or STATUS
	Frequency Counter	HP	5382A	1620A03535	CHAR 3/2/01	3/2/02
	Frequency Counter	HP	5385A	3242A07460	CHAR 12/11/01	12/11/02
	Preamplifier	HP	8449B-H02	3008A00372	CHAR 3/4/01	3/4/02
	Amplifier	HP	11975A	2738A01969	CHAR 3/1/01	3/1/02
	Egg Timer	Unk			CHAR 2/28/01	2/28/02
	Measuring Tape, 20M	Kraftixx	0631-20		CHAR 2/28/01	2/28/02
	Measuring Tape, 7.5M	Kraftixx	7.5M PROFI		CHAR 2/28/01	2/28/02
	EMC Immunity Test System	Keytek	CEMASTER	9810210		
	AC Power Source	California Instruments	1251RP	L05865		
	AC Power Source	California Instruments	PACS-1	X71484		
	Isotropic Field Probe	Amplifier Research	FP5000	22839		
	Isotropic Field Probe	Amplifier Research	FP5000	300103		
	Capacitor Clamp	Keytek	CM-CCL	9811359	No Cal Required	
	Amplifier	Amplifier Research	10W1000B	23117	No Cal Required	
	Field Monitor	Amplifier Research	FM5004	22288	No Cal Required	
	ELF Meter	F. W. Bell	4060	Not serialized		
	Coaxial Cable #51	Insulated Wire Inc.	NPS 2251-2880	Timco #51	CHAR 1/23/02	1/23/03
	Coaxial Cable #64	Semflex Inc.	60637	Timco #64	CHAR 1/24/02	1/24/03
	Coaxial Cable #65	General Cable Co.	E9917 RG233/U	Timco #65	CHAR 1/23/02	1/23/03

	DEVICE	MFGR	MODEL	SERNO	CAL/CHAR DATE	DUE DATE or STATUS
	Coaxial Cable #106	Unknown	Unknown	Timco #106	CHAR 1/23/02	1/23/03