

APPLICANT: BROADCAST ELECTRONICS INC.  
FCC ID: DDE-RPU-50W-450S

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## GENERAL INFORMATION REQUIRED FOR TYPE ACCEPTANCE

2.1033 BROADCAST ELECTRONICS INC. will manufacture the FCC ID: DDE-RPU-50W-450S in quantity, for use under FCC RULES PART 74.401, REMOTE PICKUP BROADCAST STATION.

## 2.1033 (C4) TECHNICAL DESCRIPTION

(1) Type of Emission: F3E

Bn = 2M + 2DK			
M = 10500	3500	10500	(audio BW)
D = 10000	1500	2000	(Peak Deviation)
Bn = 41 kHz	10 kHz	25 kHz	
K = 1			

Sample Calc.:  $B_n = 2(10.5) + 2(K)(10) = 41 \text{ kHz}$   
ALLOWED AUTHORIZED BANDWIDTH = 10, 25, and 50 kHz.  
74.451

(2) Frequency Range: Part 74: 450-455.99 MHz  
TEST FREQ = 455.025 MHz.

(3) Power Range and Controls: POWER ADJUST potentiometer.

(4) Maximum Output Power Rating: 50 Watts into 50 ohms resistive load.

(5) DC Voltages and Current into Final Amplifier:

## FINAL AMPLIFIER ONLY

V<sub>ce</sub> = 13.0 Volts  
I<sub>ce</sub> = 10.5 Amperes.

2.1033 (C.10)(7) Complete Circuit Diagrams: The circuit diagram is included as EXHIBIT #10. The block diagram is included as EXHIBIT #8.

(8) Instruction book. The instruction manual is included as Exhibit #12.

(9) Tune-up procedure. The tune-up procedure is given in Exhibit #9.

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(10) Description of all circuitry and devices provided for determining and stabilizing frequency.

The transmitter frequency is PLL synthesized and Referenced to a crystal.

(11) Description of any circuits or devices employed for suppression of spurious radiation, for limiting modulation, and for limiting power.

This circuitry is described on pages 22,23.

Limiting Modulation:

The transmitter audio circuitry is contained the included schematics in exhibit #10 pages.

Limiting RF Output Power:

The power is adjustable via the POWER ADJUST potentiometer.

(12) Digital modulation. This unit does not use digital modulation.

2.983(e) The data required by 2.1046 through 2.1057 is submitted below.

2.1046 RF\_power\_output.

OUTPUT POWER: 50 Watts

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R.F. POWER OUTPUT TEST PROCEDURE



2.1047(a)(b)

Modulation characteristics:

AUDIO\_FREQUENCY\_RESPONSE

The audio frequency response was measured in accordance with TIA/EIA Specification 603. The audio frequency response curve is shown on the next pages.

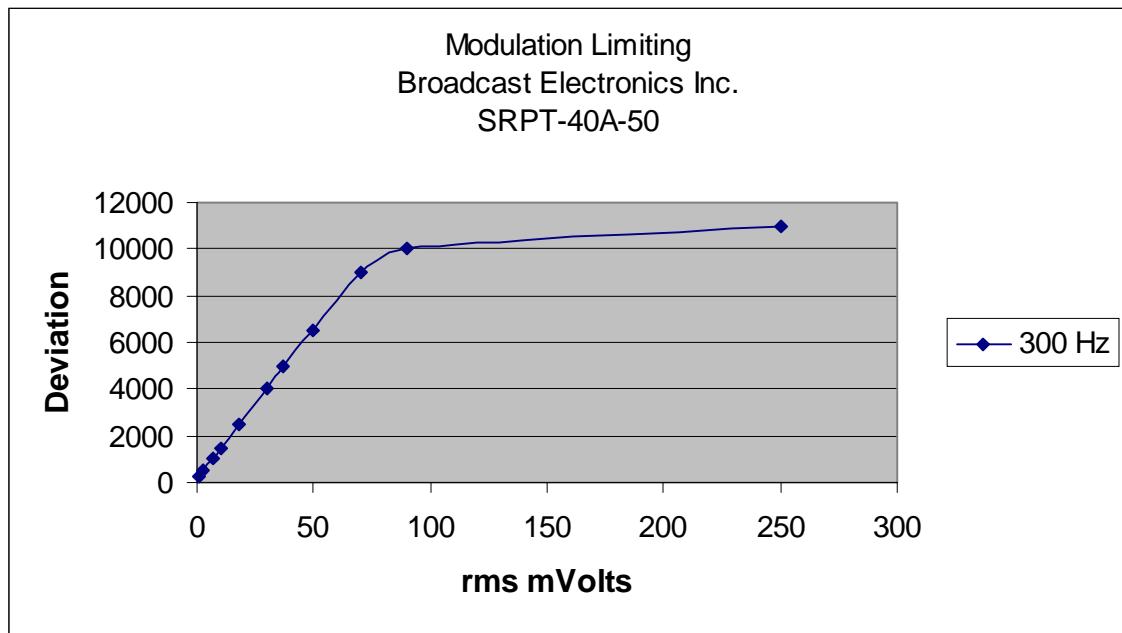
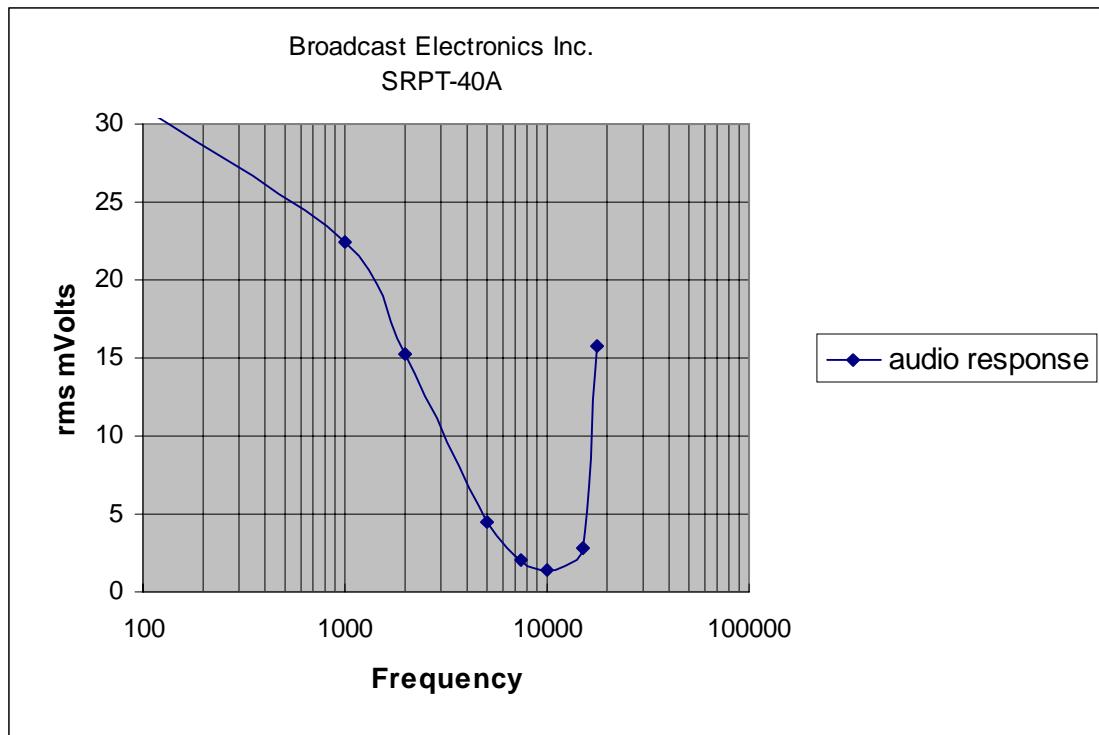
AUDIO\_LOW\_PASS\_FILTER

The audio low pass filter test is not required.

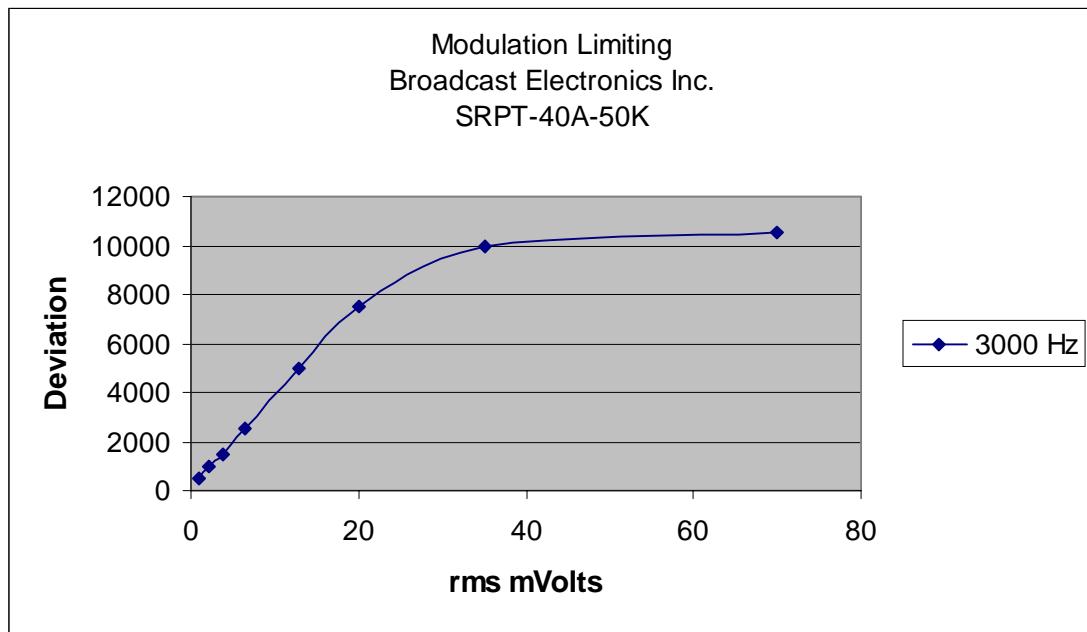
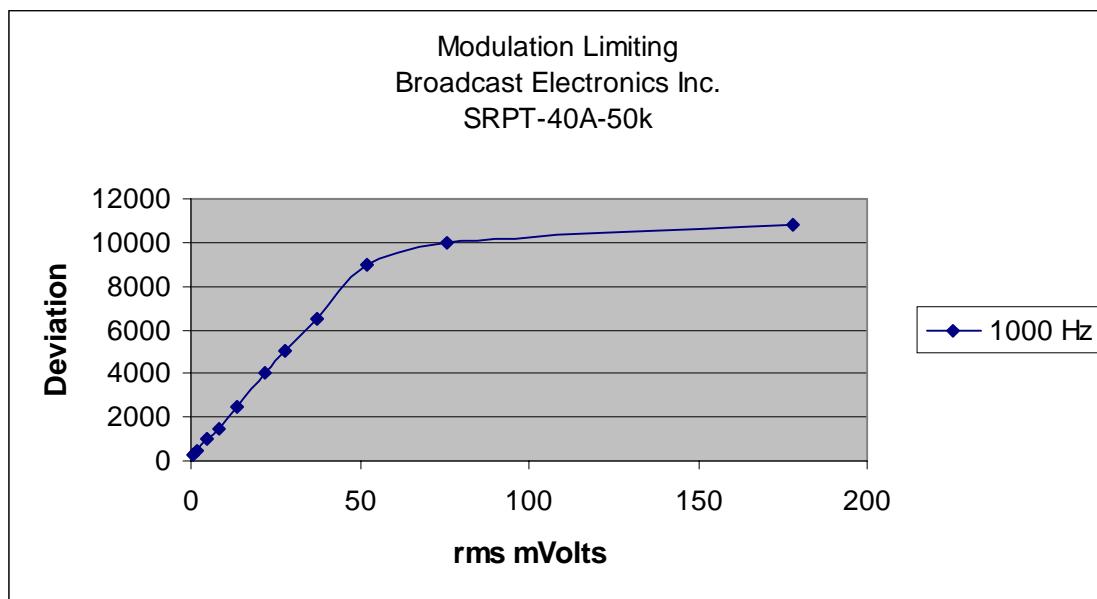
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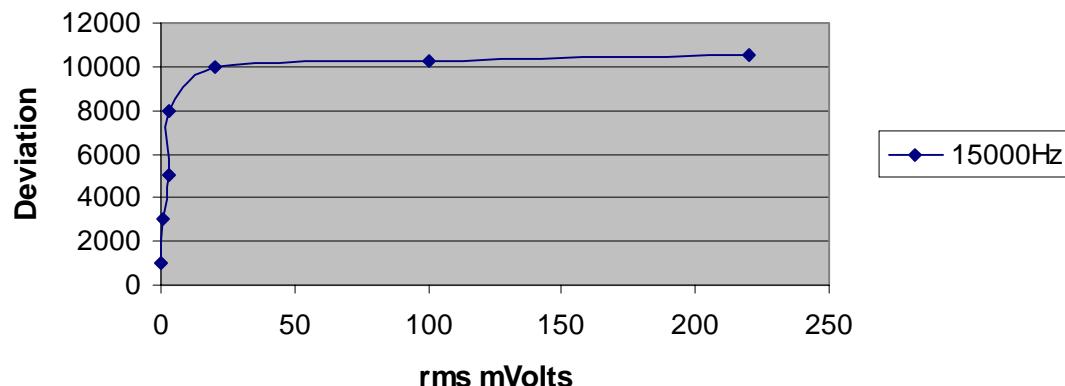
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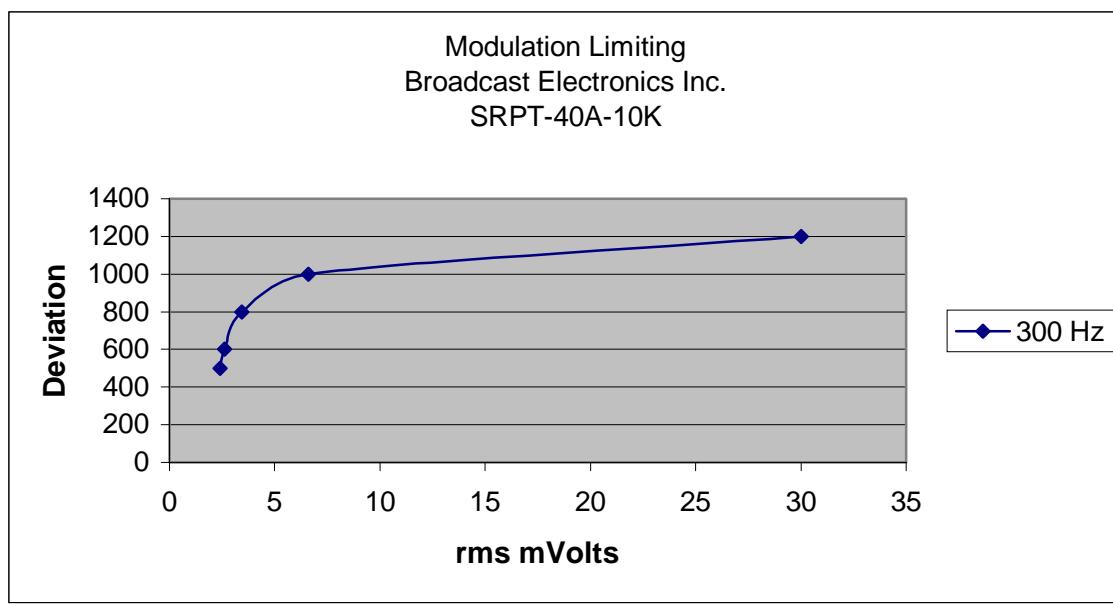
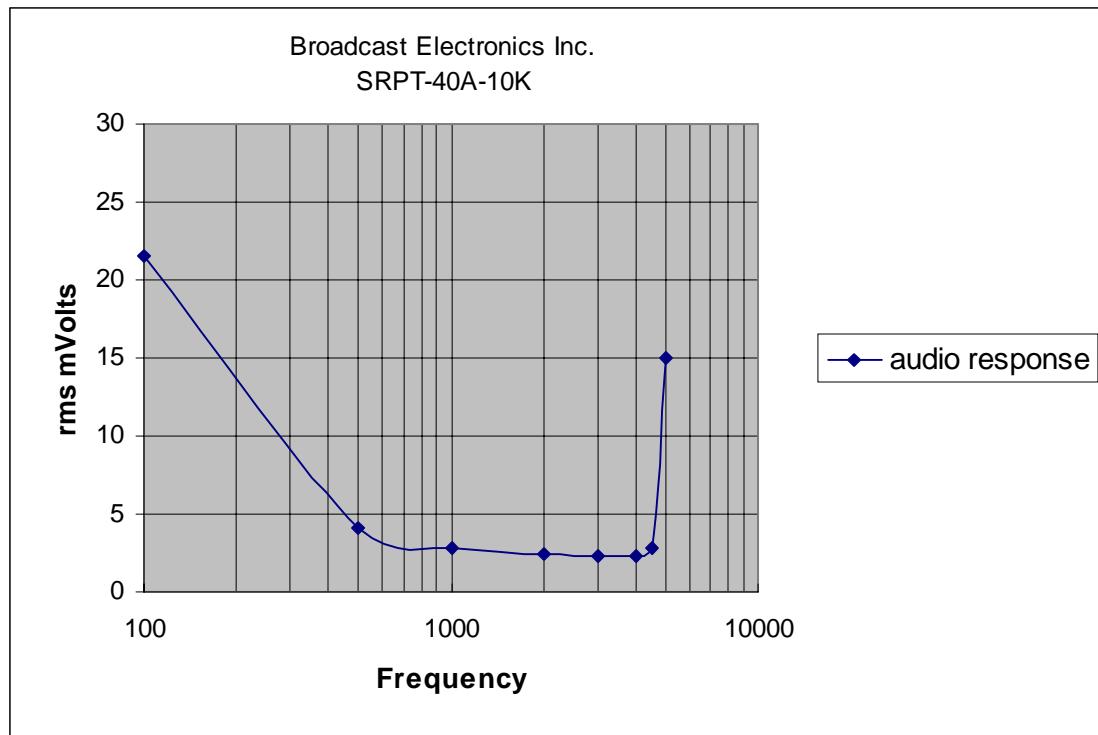
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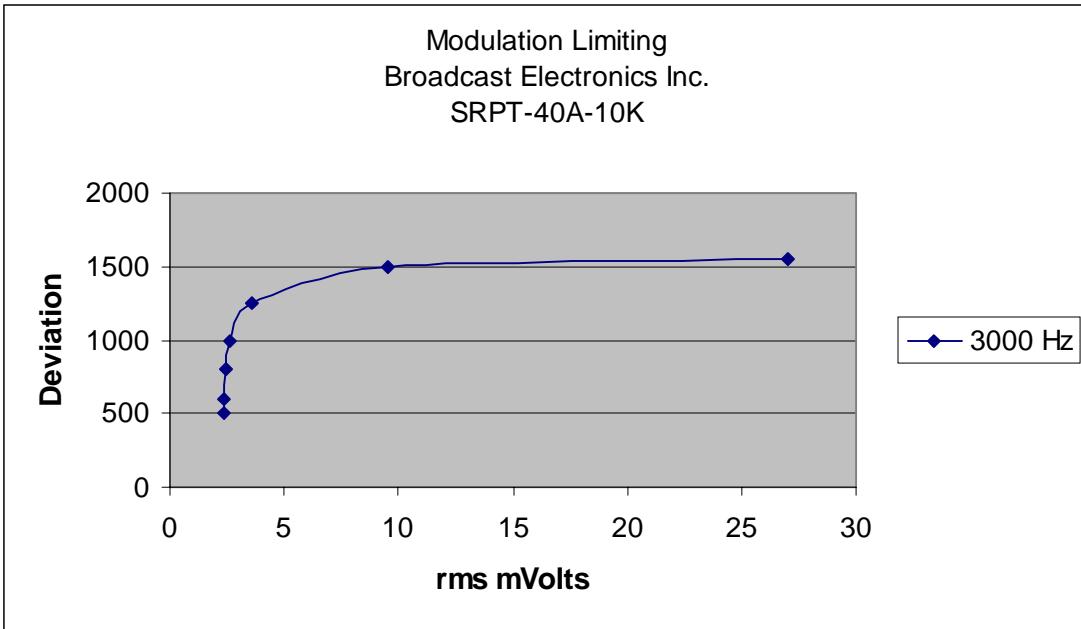
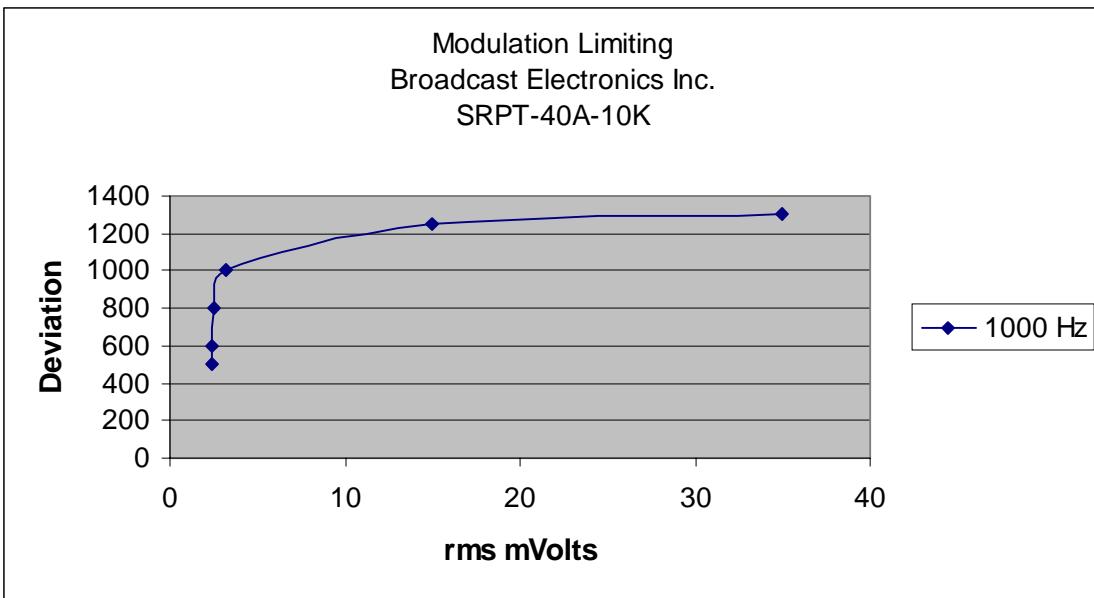
Modulation Limiting  
Broadcast Electronics Inc.  
SRPT-40A



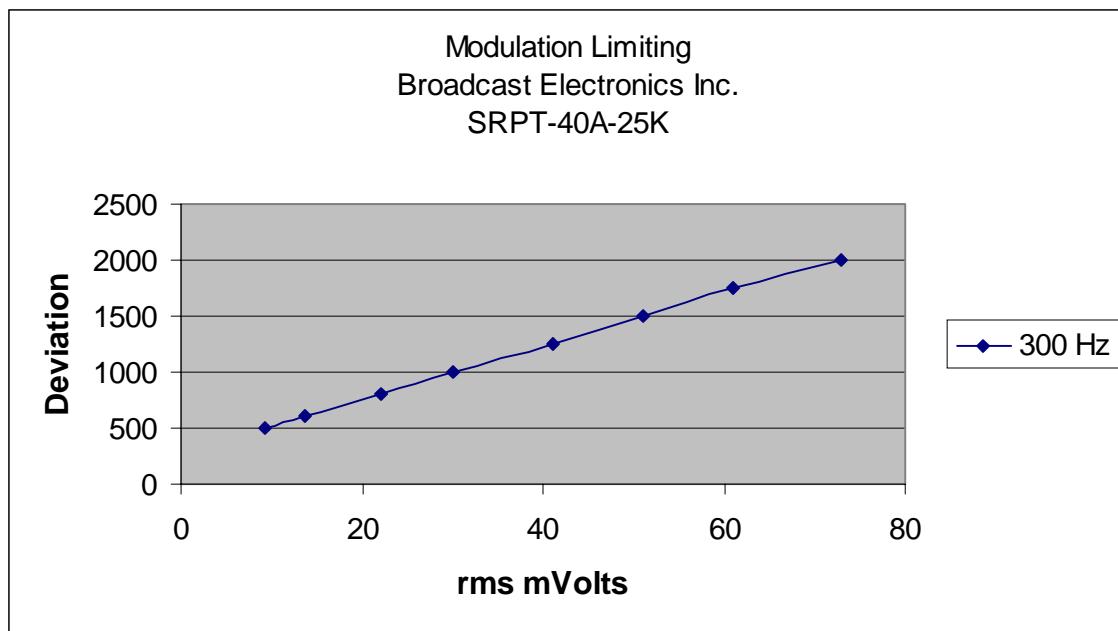
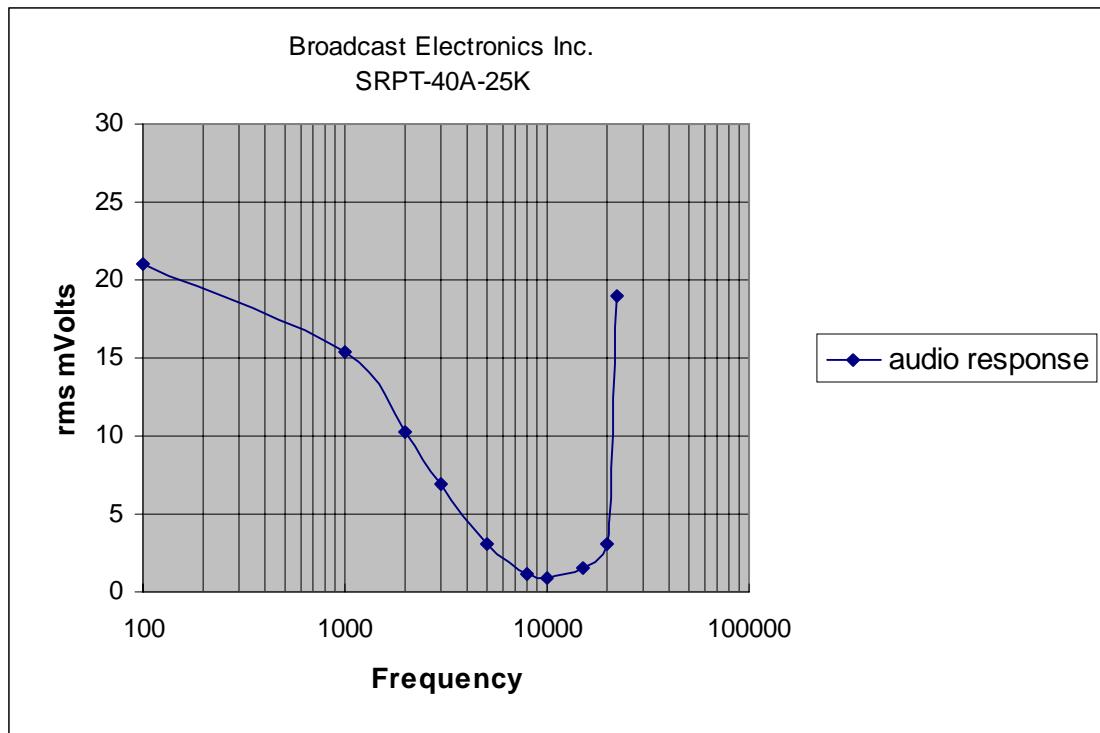
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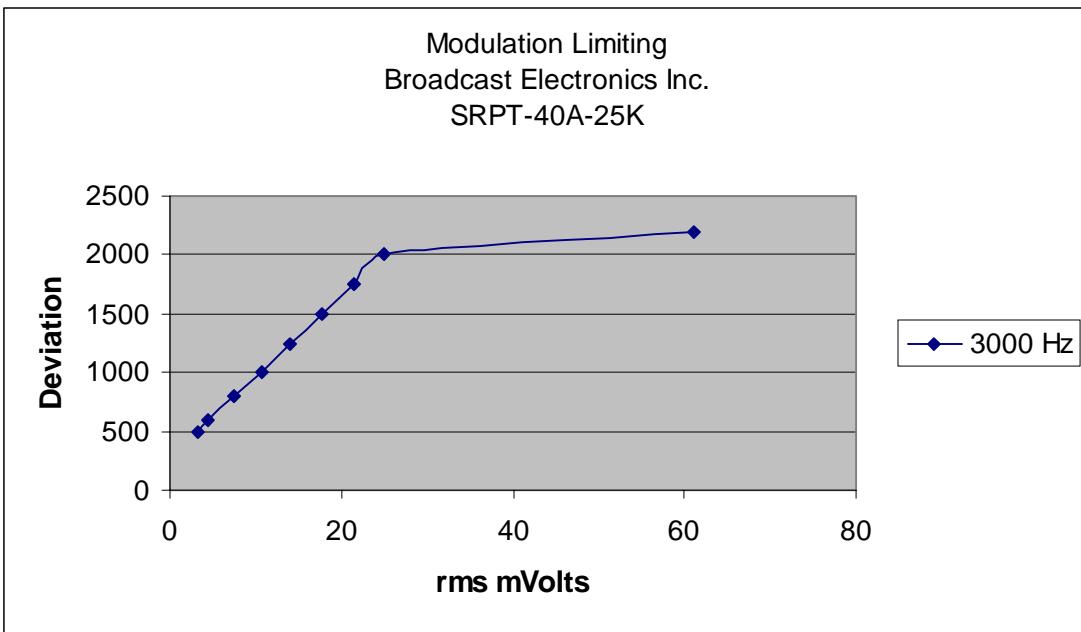
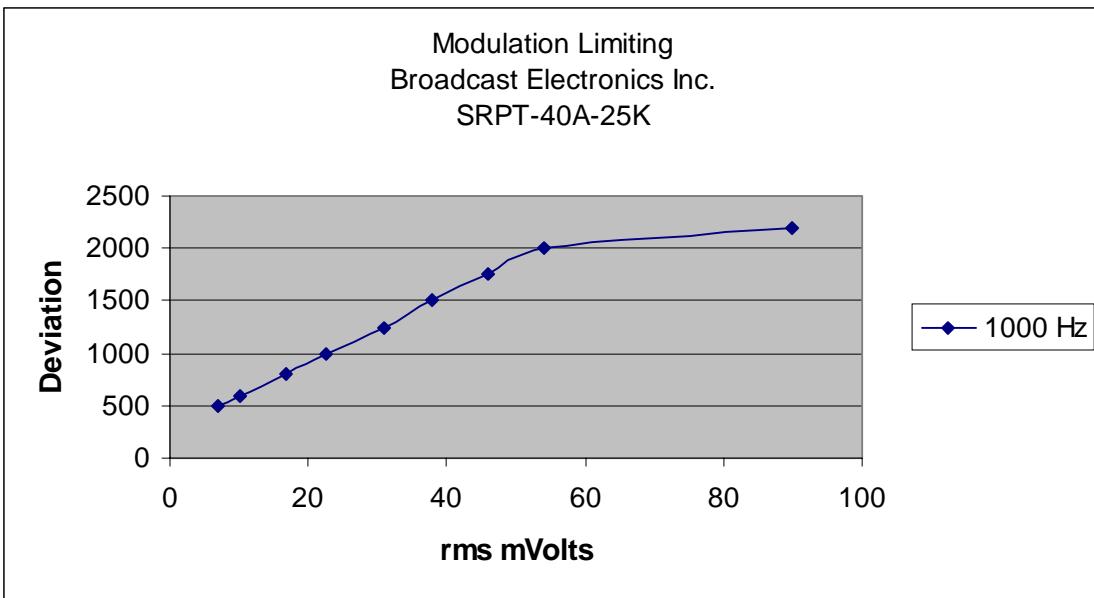
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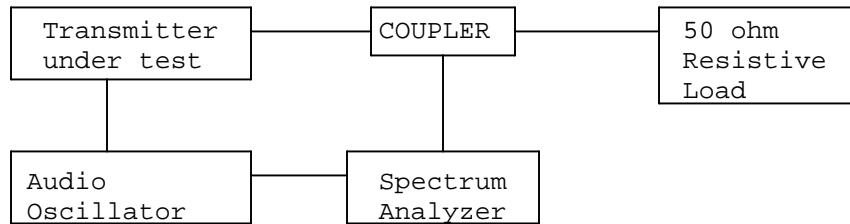
2.1049 Occupied bandwidth:

Data in the plots show that all sidebands between 50 & 100% of the authorized bandwidth are attenuated by at least 25dB. From 100 to 250% of the authorized bandwidth they are attenuated by at least 35dB and beyond 250%  $43 \log(P_o)$  dB. The plot shows the transmitter modulated with 15000 Hz (the highest modulation frequency), adjusted for 50% modulation plus 16 dB. The spectrum analyzer was set with the unmodulated carrier at the top of the screen. The test procedure diagram and occupied bandwidth plots follow.

Microphone transmitter.

### Test procedure diagram

## OCCUPIED BANDWIDTH MEASUREMENT

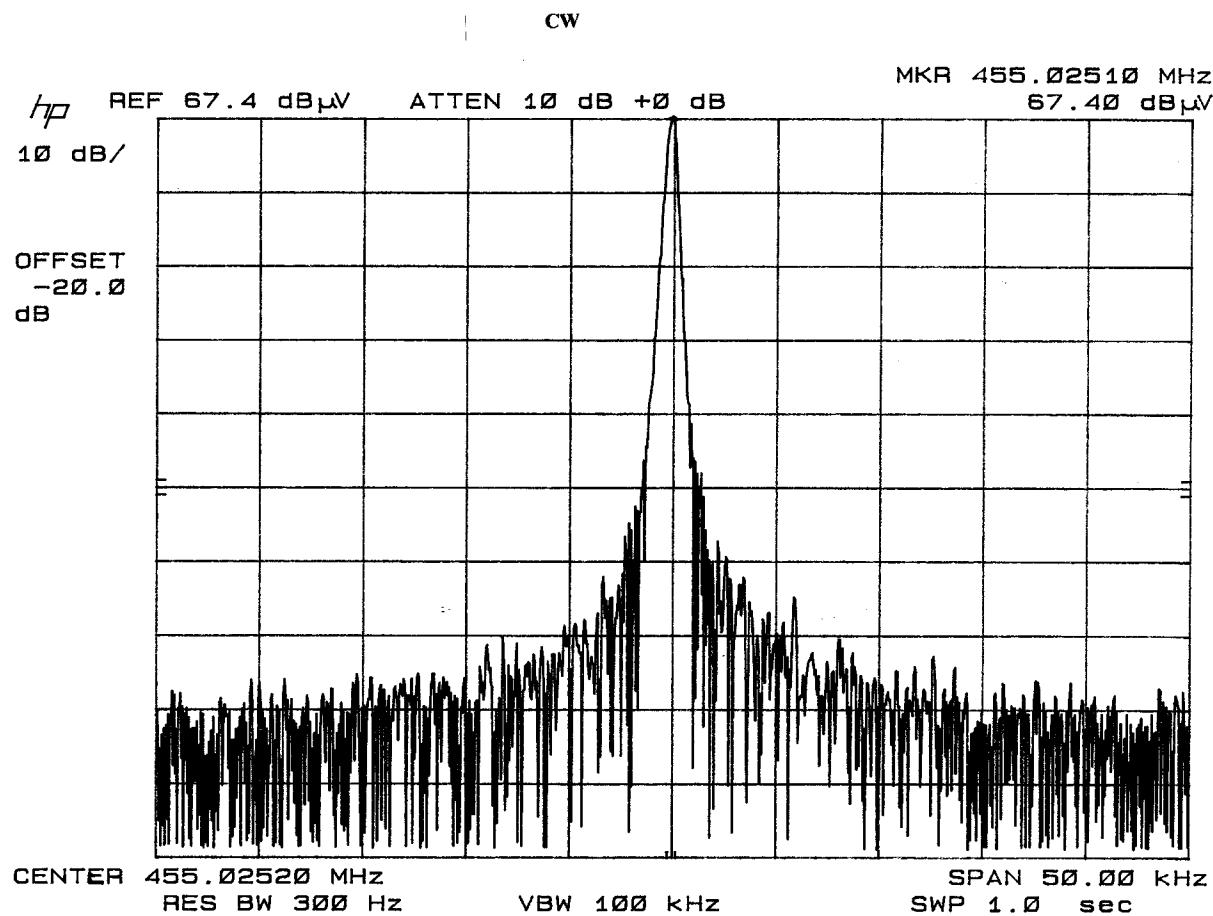


REQUIREMENT: PART 74: 10, 25, and 50 kHz EMISSION BANDWIDTH.

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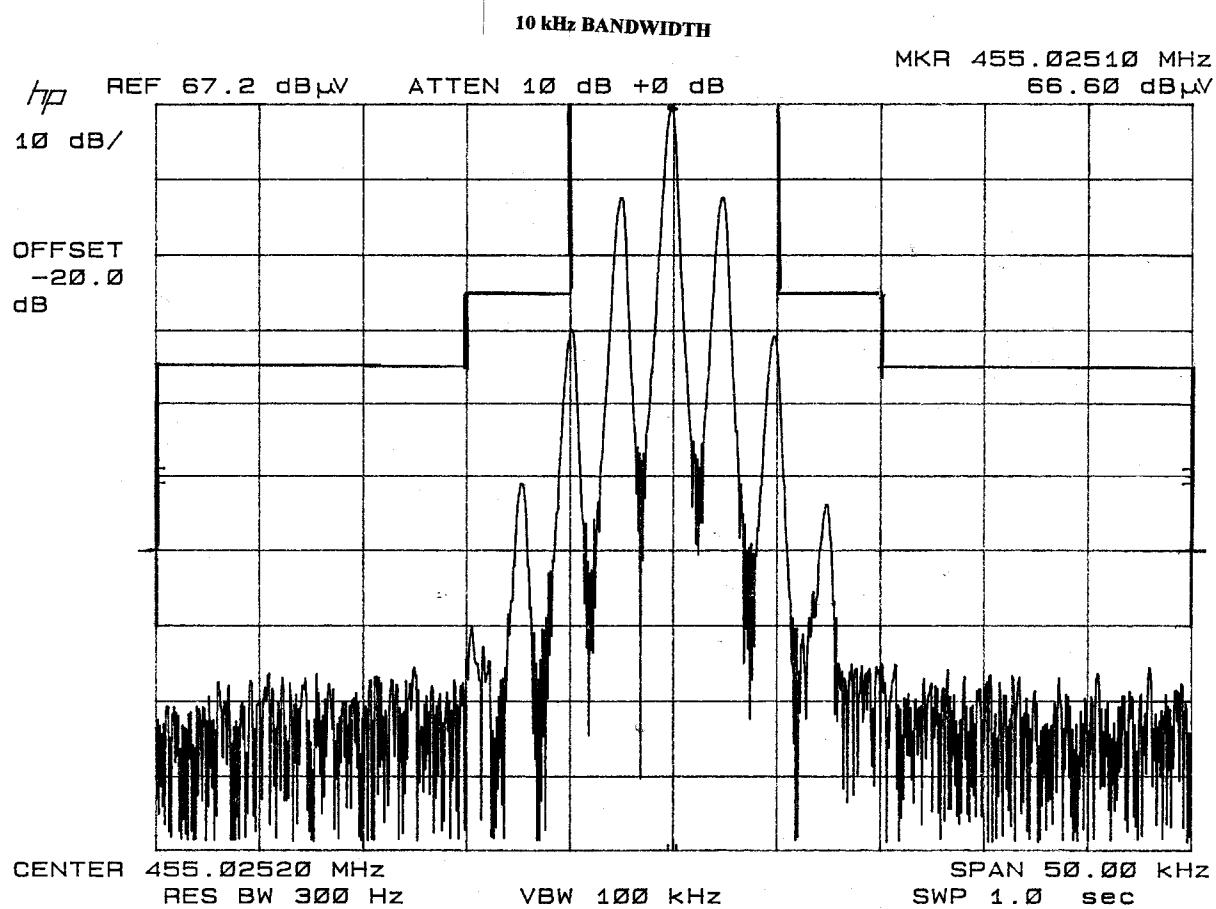


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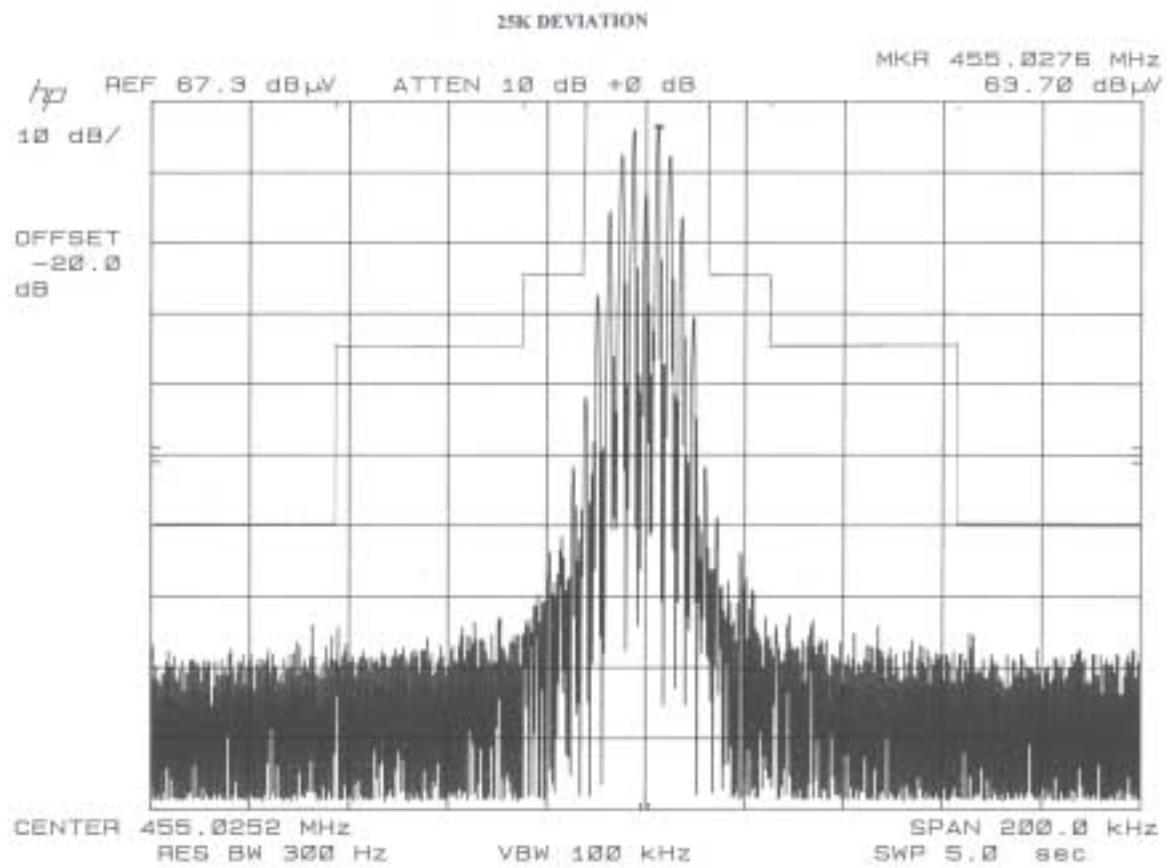


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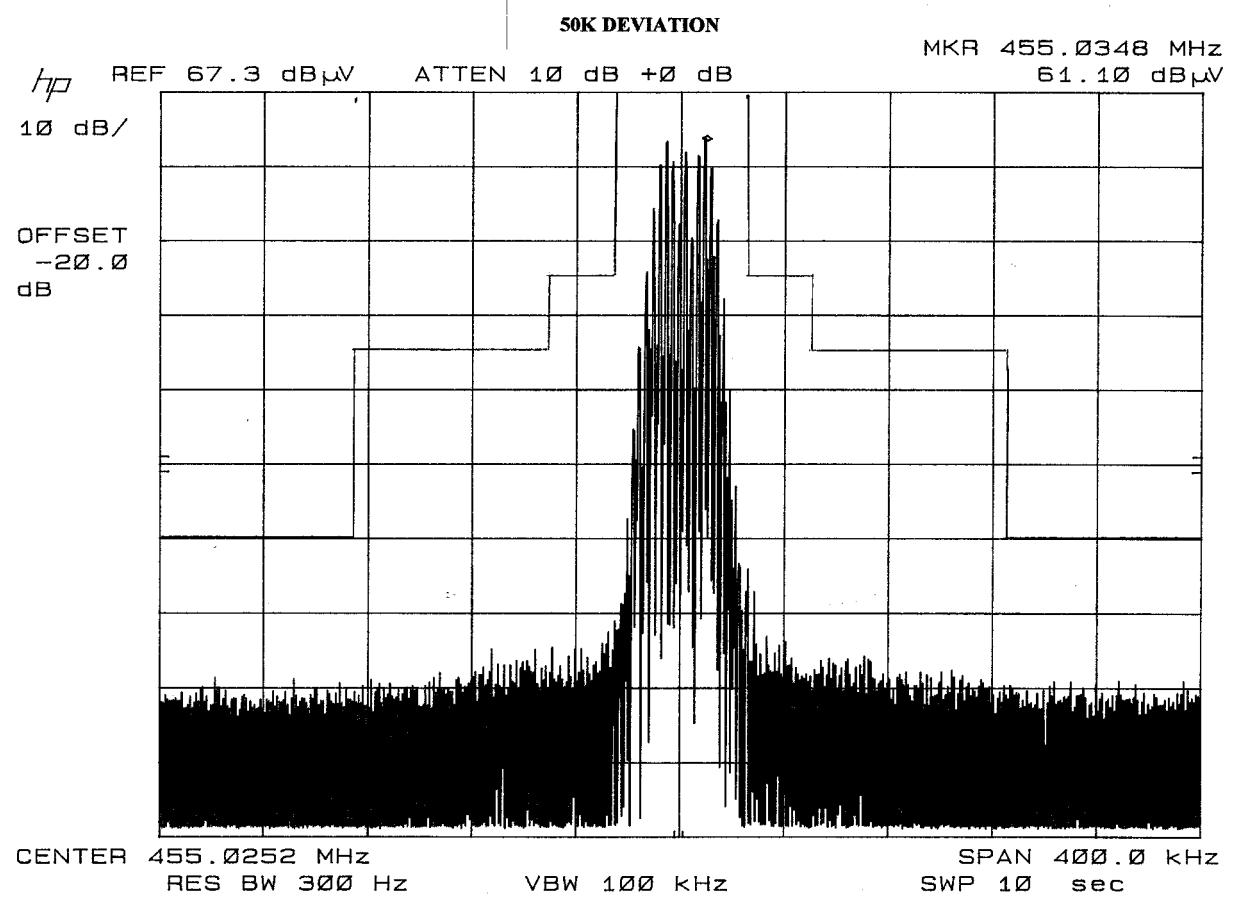


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2.1051

Spurious emissions at antenna terminals (conducted):  
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 0.4 to at least the 10th harmonic of the fundamental. The measurements were made in accordance with standard TIA/EIA-603.

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

$$43 + 10\log(50) = 60 \text{ dB}$$

EMISSION FREQUENCY MHz	DB BELOW CARRIER
455.00	00.0
910.00	-90.7
1365.00	-82.2
1820.10	-98.0
2275.10	-95.3
2730.10	-107.5
3185.10	-98.2
3640.20	-98.6
4095.20	-97.8
4550.20	-103.9

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2.1053(a)(b) Field strength of spurious emissions:

NAME OF TEST: RADIATED SPURIOUS EMISSIONS

REQUIREMENTS: Emissions must be  $43 + 10\log(P_0)$  dB below the mean power output of the transmitter.

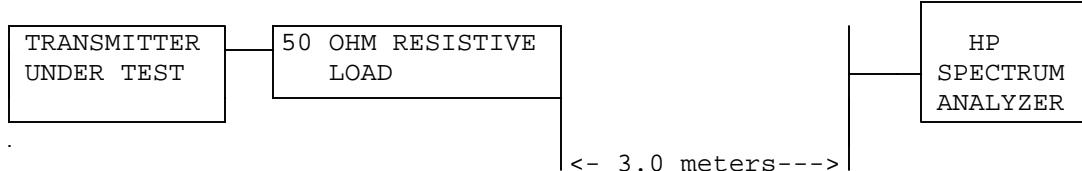
$$43 + 10\log(50) = 60 \text{ dB}$$

TEST DATA:

Tuned Frequency	Emission Frequency	dBc	Margin
Frequency MHz	Frequency MHz		dB
455.03	455.00	00.00	00.00
455.03	910.00	98.60	38.60
455.03	1,365.00	84.51	24.51
455.03	1,820.10	85.30	25.30
455.03	2,275.10	65.45	5.45
455.03	2,730.10	91.30	31.30
455.03	3,185.10	92.75	32.75
455.03	3,640.20	88.70	28.70
455.03	4,095.20	96.14	36.14
455.03	4,550.20	93.07	33.07

METHOD OF MEASUREMENT: The procedure used was TIA/EIA 603 substitution method. The spectrum was scanned from 30 MHz to at least the tenth harmonic of the fundamental using a HP model 8566B spectrum analyzer and an appropriate antenna. Measurements were made at the open field test site of TIMCO ENGINEERING INC. located at 849 NW SR 45 Newberry, Florida 32669.

Method of Measuring Radiated Spurious Emissions



Equipment placed on a rotatable platform, 80 cm above ground.

Tuned Calibrated antenna that may be raised from 1 meter to 4 meters above ground. The antenna was placed in both the horizontal and vertical planes.

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2.1055                   Frequency\_stability:  
S74.464

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Temperature and voltage tests were performed to verify that the frequency remains within the .00025%,(2.5 ppm)(74.464) specification limit.

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.

MEASUREMENT DATA:

Assigned Frequency (Ref. Frequency): 455.025 000

TEMPERATURE°C	FREQUENCY_MHz	PPM
-30	455.026 137	+ 2.50
-20	455.026 039	+ 2.28
-10	455.026 003	+ 2.20
0	455.025 836	+ 1.84
10	455.025 586	+ 1.29
20	455.025 353	+ 0.78
30	455.025 164	+ 0.36
40	455.025 158	+ 0.35
50	455.025 173	+ 0.38
BATT. End-Point 10.2V/dc	455.025 353	+ 0.78
BATT. End-Point 13.8V/dc	455.025 160	+ 0.35

RESULTS OF MEASUREMENTS: The maximum frequency variation over the temperature range was +2.50 ppm. The maximum frequency variation over the battery voltage was +0.78 ppm.

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2.1033 (c.11) Photo or Drawing of Label:  
See EXHIBIT # 1.

2.1033 (c.12) Photos of Equipment:  
See EXHIBIT #'S 3-5.

TEST EQUIPMENT LIST

1. Spectrum Analyzer: HP 8566B-Opt 462, S/N 3138A07786, w/  
preselector HP 85685A, S/N 3221A01400, Quasi-Peak Adapter  
HP 85650A, S/N 3303A01690 & Preamplifier HP 8449B-OPT H02,  
S/N 3008A00372
2. Biconnical Antenna: Eaton Model 94455-1, S/N 1057,
3. Biconnical Antenna: Electro-Metrics Model BIA-25, S/N 1171
4. Log-Periodic Antenna: Electro-Metrics Model EM-6950, S/N 632
5. Log-Periodic Antenna: Electro-Metrics Model LPA-30, S/N 409
6. Double-Ridged Horn Antenna: Electro-Metrics Model RGA-180,  
1-18 GHz, S/N 2319
7. 18-26.3GHz Systron Donner Standard Gain Horn #DBE-520-20
8. Horn 40-60GHz: ATM Part #19-443-6R
9. Line Impedance Stabilization Network: Electro-Metrics Model  
EM-7820, w/NEMA Adapter S/N 2682
10. Temperature Chamber: Tenney Engineering Model TTRC, S/N 11717-7
11. Frequency Counter: HP Model 5385A, S/N 3242A07460
12. Peak Power Meter: HP Model 8900C, S/N 2131A00545,
13. Open Area Test Site #1-3meters
14. Signal Generator: HP 8640B, S/N 2308A21464
15. Signal Generator: HP 8614A, S/N 2015A07428
16. Passive Loop Antenna: EMCO Model 6512, 9KHz to 30MHz, S/N  
9706-1211
17. Dipole Antenna Kit: Electro-Metrics Model TDA-30/1-4, S/N 153
18. AC Voltmeter: HP Model 400FL, S/N 2213A14499
19. Digital Multimeter: Fluke Model 8012A, S/N 4810047
20. Digital Multimeter: Fluke Model 77, S/N 43850817
21. Oscilloscope: Tektronix Model 2230, S/N 300572

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