TEST REPORT

Below is the data required by 2.1046 through 2.1057.

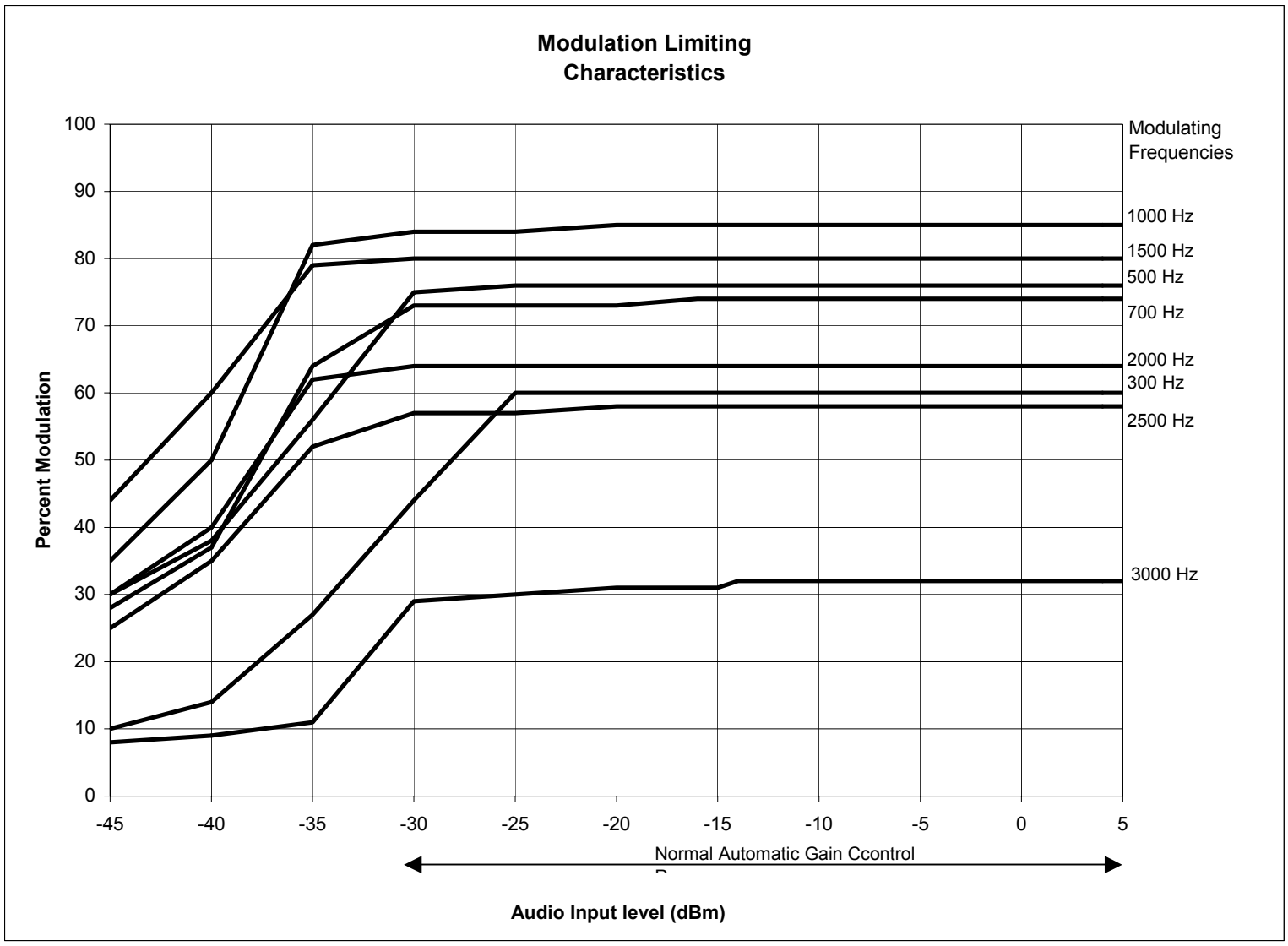
2.1046 Measurements required: RF output power.
A Tektronix TAS 475 oscilloscope was used to verify the proper RF Power at the transmitter's output terminals terminated into a 50 Ohm Non Inductive dummy load. Power was calculated using the formula Watts = $(Vpp/(2\cdot\sqrt{2}))^2/50$. The system operating frequency was 320 Khz

Description of below chart column headers:
Watts = Calculated output power at 50 Ohm non inductive load
Vpp = Peak to Peak Voltage read across an external 50 Ohm non inductive load

Watts	Vpp
5	45
10	63
15	77
20	89
25	100

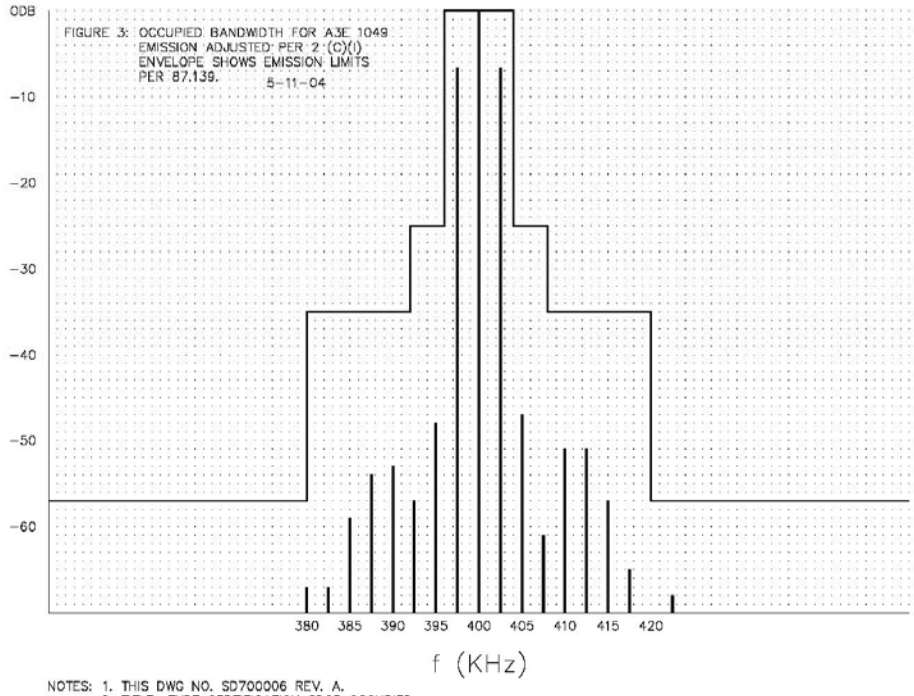
2.1047 Measurements required: Modulation characteristics.
(a) The Hewlett Packard 3585B Spectrum analyzer was connected to the input of the pulse width modulator on the Digital I/O board. The tracking generator output was connected to the audio input terminals. The system was setup per the manual and the frequency was swept from 0 to 6000 Hz. Figure 1 in Appendix A shows this curve. Figure 2 in Appendix A shows the audio band-pass filter.

(b) The transmitter was set up for 25 Watts into a 50 Ohm dummy load. The voice circuitry was adjusted for an 85% modulated signal at 1000 Hz with an input of –17dBm. The frequency was adjusted from 300 Hz to 3000 Hz while adjusting the audio input level from –45dBm to +5dBm. The "Modulation Limiting Characteristics" graph below shows the modulating limiting capability of the Automatic Gain Control circuit. The roll off in percent modulation at the different frequencies is due to the in line band-pass filter.

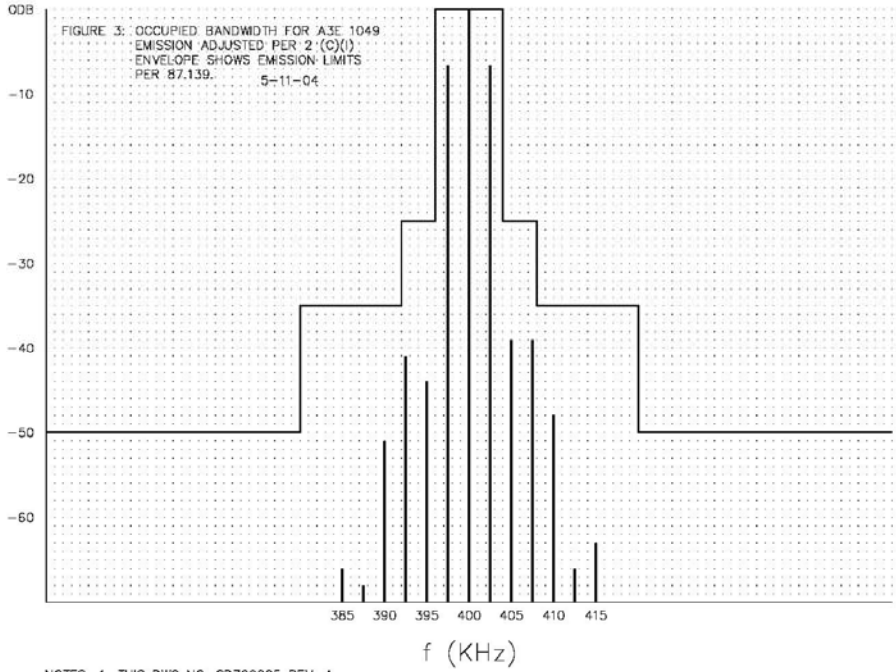


2.1049 Measurements required: Occupied bandwidth.

A3E emission - The transmitter was set to 25, 50, 100 and 250 Watts into a 50 Ohm non inductive dummy load. The system was adjusted for 50% modulation with an input of (-17dBm) at 2500Hz. The input was increased by 16 dBm with the Automatic Gain Control (AGC) circuit adjusted to limit at 95% modulation. The measurements for the spectrum shown below were made using a Hewlett Packard 3585B Spectrum Analyzer. The subsequent figure shows the same information for 5 Watts.

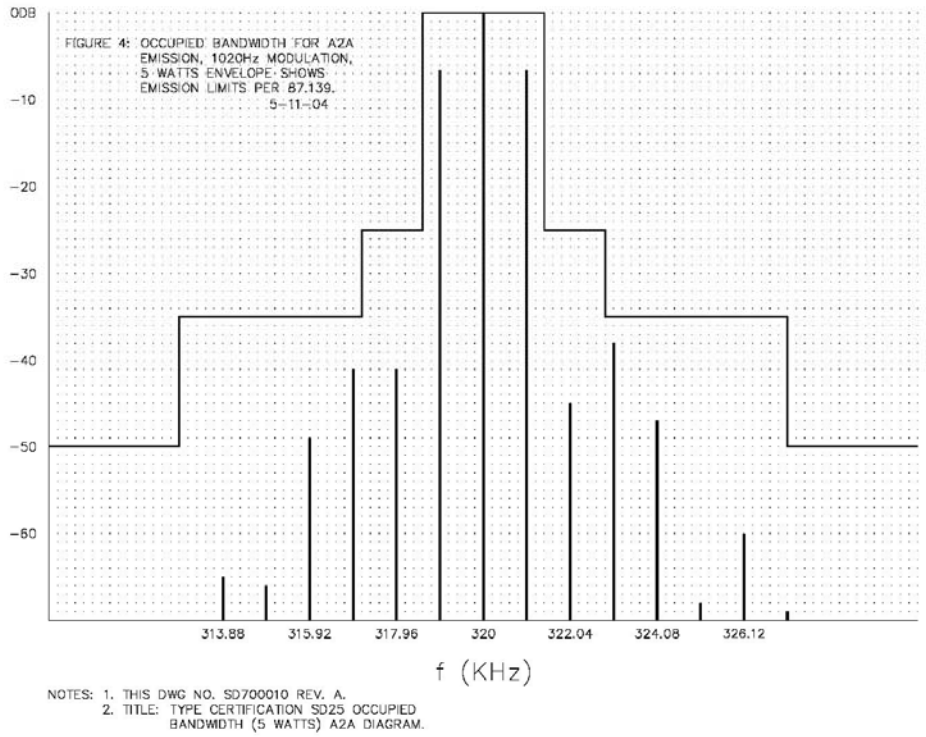


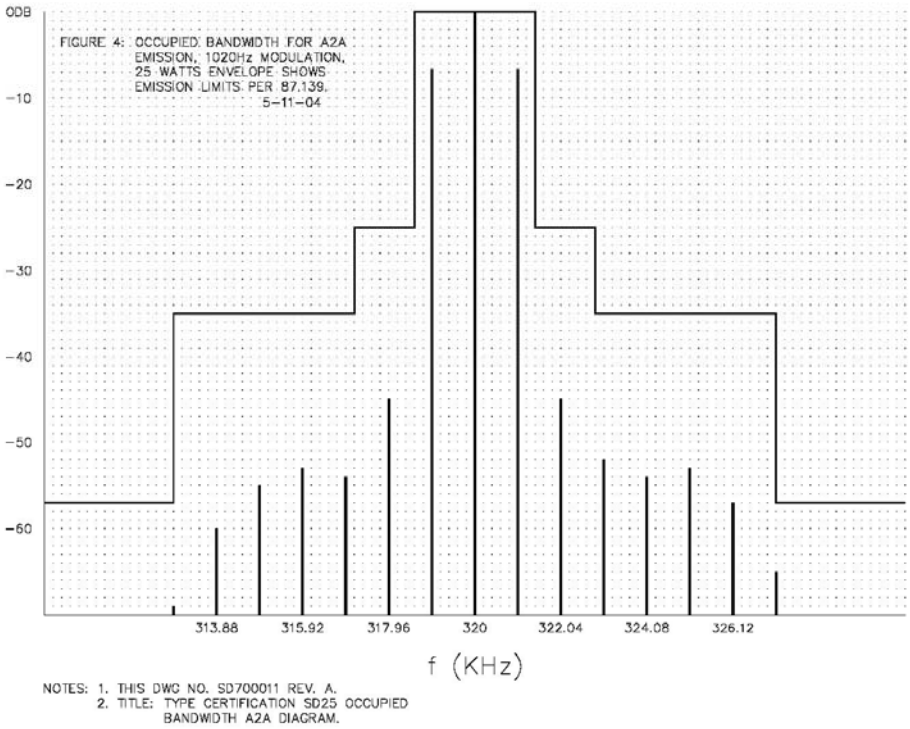
NOTES: 1. THIS DWG NO. SD700006 REV. A.
2. TITLE: TYPE CERTIFICATION SD25 OCCUPIED BANDWIDTH A3E DIAGRAM.



NOTES: 1. THIS DWG NO. SD700005 REV. A.
2. TITLE: TYPE CERTIFICATION SD25 OCCUPIED BANDWIDTH (5 WATTS) A3E DIAGRAM.

A2A emission - The transmitter was set to 25 Watts into a 50 Ohm dummy load. The system was adjusted for 95% modulation with an internally produced identifier tone of 1020 Hz. The measurements for the spectrum shown below were made using a Hewlett Packard 3585B Spectrum Analyzer. The subsequent figure shows the same information for 5 Watts.





2.1051 Measurements required: Spurious emissions at antenna terminals.
The transmitter was connected to a dummy antenna through the PC-1000C antenna tuning unit. The dummy antenna was 10 Ohms in series with 500 pF. The equipment was operated at 25 and 5 Watts from 190 to 535 KHz in 10 KHz increments. The spectrum was observed for each case with a Hewlett Packard 3585B Spectrum Analyzer. Results are tabulated below. All spurious emissions are dB relative to carrier.

Spurious Emissions Attenuation in dB at 25 Watts Output Power

Frequency (Hz)	2 x Freq	3 x Freq	4 x Freq	5 x Freq	All Others Frequencies
190,000	<80	<80	<80	<80	<80
200,000	<80	<80	<80	<80	<80
210,000	<80	<80	<80	<80	<80
220,000	<80	<80	<80	<80	<80
230,000	<80	<80	<80	<80	<80
240,000	<80	<80	<80	<80	<80
250,000	<80	<80	<80	<80	<80
260,000	<80	<80	<80	<80	<80
270,000	<80	<80	<80	<80	<80
280,000	<80	<80	<80	<80	<80

290,000	<80	<80	<80	<80	<80
300,000	<80	<80	<80	<80	<80
310,000	<80	<80	<80	<80	<80
320,000	<80	<80	<80	<80	<80
330,000	<80	<80	<80	<80	<80
340,000	<80	<80	<80	<80	<80
350,000	<80	<80	<80	<80	<80
360,000	<80	<80	<80	<80	<80
370,000	<80	<80	<80	<80	<80
380,000	<80	<80	<80	<80	<80
390,000	<80	<80	<80	<80	<80
400,000	<80	<80	<80	<80	<80
410,000	<80	<80	<80	<80	<80
420,000	<80	<80	<80	<80	<80
430,000	<80	<80	<80	<80	<80
440,000	<80	<80	<80	<80	<80
450,000	<80	<80	<80	<80	<80
460,000	<80	<80	<80	<80	<80
470,000	<80	<80	<80	<80	<80
480,000	<80	<80	<80	<80	<80
490,000	<80	<80	<80	<80	<80
500,000	<80	<80	<80	<80	<80
510,000	<80	<80	<80	<80	<80
520,000	<80	<80	<80	<80	<80
530,000	<80	<80	<80	<80	<80
535,000	<80	<80	<80	<80	<80

Spurious Emissions Attenuation in dB at 5 Watts Output Power

Frequency (Hz)	2 x Freq	3 x Freq	4 x Freq	5 x Freq	All Others Frequencies
190,000	<80	<80	<80	<80	<80
200,000	<80	<80	<80	<80	<80
210,000	<80	<80	<80	<80	<80
220,000	<80	<80	<80	<80	<80
230,000	<80	<80	<80	<80	<80
240,000	<80	<80	<80	<80	<80
250,000	<80	<80	<80	<80	<80
260,000	<80	<80	<80	<80	<80
270,000	<80	<80	<80	<80	<80
280,000	<80	<80	<80	<80	<80
290,000	<80	<80	<80	<80	<80

300,000	<80	<80	<80	<80	<80
310,000	<80	<80	<80	<80	<80
320,000	<80	<80	<80	<80	<80
330,000	<80	<80	<80	<80	<80
340,000	<80	<80	<80	<80	<80
350,000	<80	<80	<80	<80	<80
360,000	<80	<80	<80	<80	<80
370,000	<80	<80	<80	<80	<80
380,000	<80	<80	<80	<80	<80
390,000	<80	<80	<80	<80	<80
400,000	<80	<80	<80	<80	<80
410,000	<80	<80	<80	<80	<80
420,000	<80	<80	<80	<80	<80
430,000	<80	<80	<80	<80	<80
440,000	<80	<80	<80	<80	<80
450,000	<80	<80	<80	<80	<80
460,000	<80	<80	<80	<80	<80
470,000	<80	<80	<80	<80	<80
480,000	<80	<80	<80	<80	<80
490,000	<80	<80	<80	<80	<80
500,000	<80	<80	<80	<80	<80
510,000	<80	<80	<80	<80	<80
520,000	<80	<80	<80	<80	<80
530,000	<80	<80	<80	<80	<80
535,000	<80	<80	<80	<80	<80

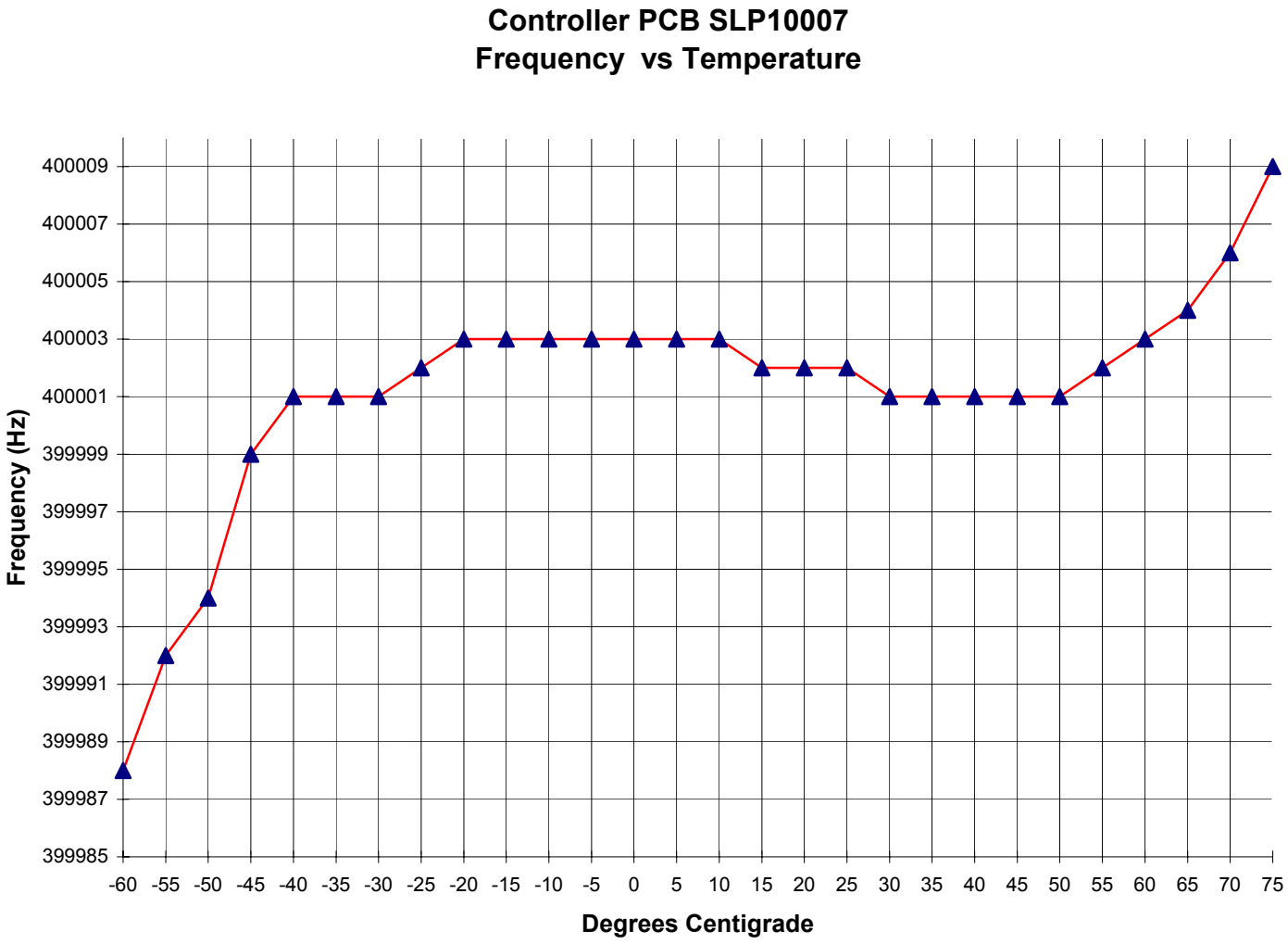
2.1053 Measurements required: Field strength of spurious radiation

The SD25 Watt transmitter was connected to a 50 Ohm non inductive dummy load, placed in an open field, grounded to the main chassis ground lug, metal door secured and adjusted for 250 Watts output power. The operating frequency was 400khz. At 400khz a wavelength is 750m, and the far field is at a distance of at least 119m. A Hewlett Packard 3585B Spectrum Analyzer and an Electro - Metrics ALP-70 antenna were used as measuring instruments. The antenna was set up to measure maximum received signal at a distance of 10m in all four quadrants. The following table lists the results

Freq (KHz)	**Received Reading dBm Quad.1**	**uV Quad.1**	**Received Reading dBm Quad.2**	**uV Quad.2**	**Received Reading dBm Quad.3**	**uV Quad.3**	**Received Reading dBm Quad.4**	**uV Quad.4**
400	-92	5.62	-94	4.46	-86	11.2	-91	6.30
800	-100	2.24	-103	1.58	-100	2.24	-96	3.54
1200	-101	1.99	-104	1.41	-100	2.24	-98	2.82
1600	-101	1.99	-97	3.16	-98	2.82	-95	3.98
to 10^{th}	<-104	<1.41	<-104	<1.41	<-104	<1.41	-103	1.58

Harmonic	noise	noise	noise

2.1055 Measurement required: Frequency stability.
(a)(1) At room temperature the Controller / Monitor board, SLP10007, was provide all required operating voltages, configured for an output frequency of 400Khz and placed in an environmental chamber. The temperature was varied from –60º C to +75º C and the frequency measured, at each 10º C interval, with a Tektronix CMC251 frequency counter. The results of this test are in the "Frequency vs. Temperature" graph below.

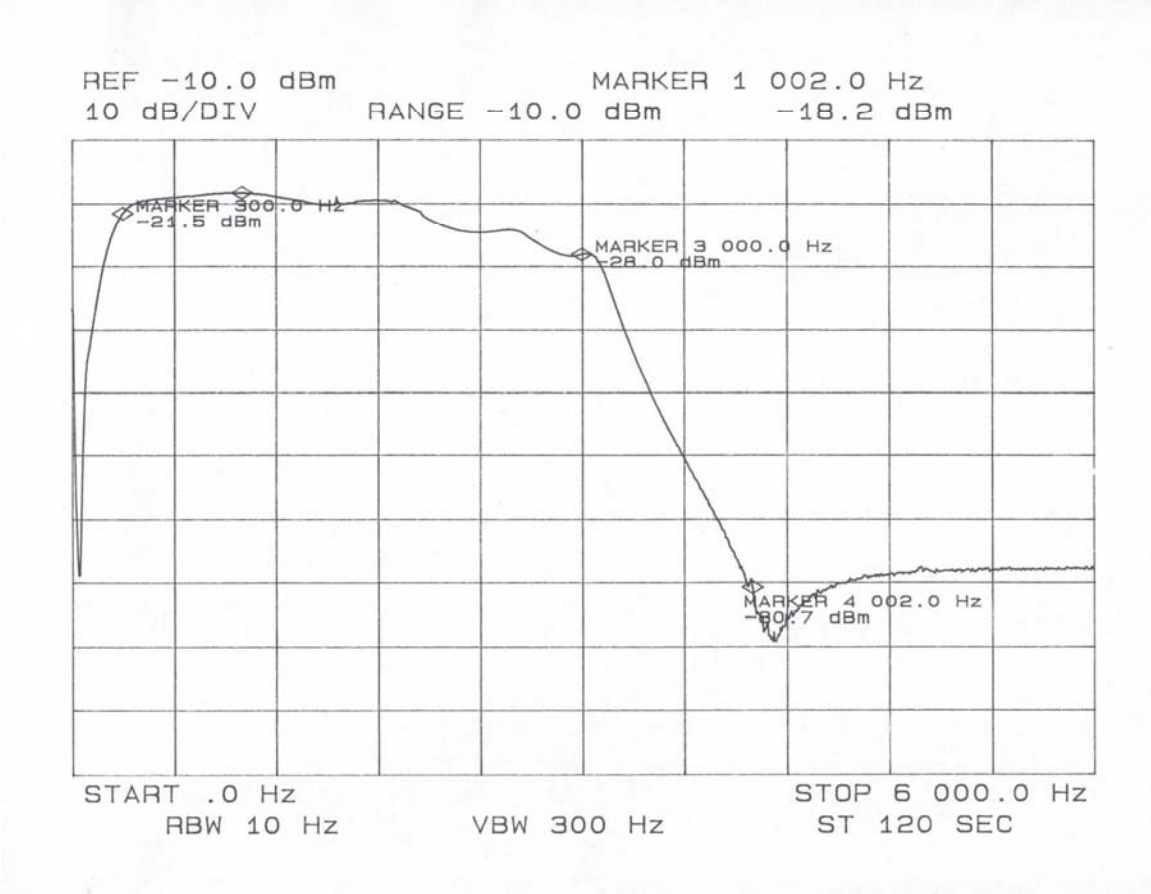


(d)(1) The transmitter was set via its computer interface to operate at 400,000 Hz and its AC input was connected to a variable voltage transformer to simulate AC line supply variation. The initial observed frequency reading was 400,002 Hz. The transmitter was

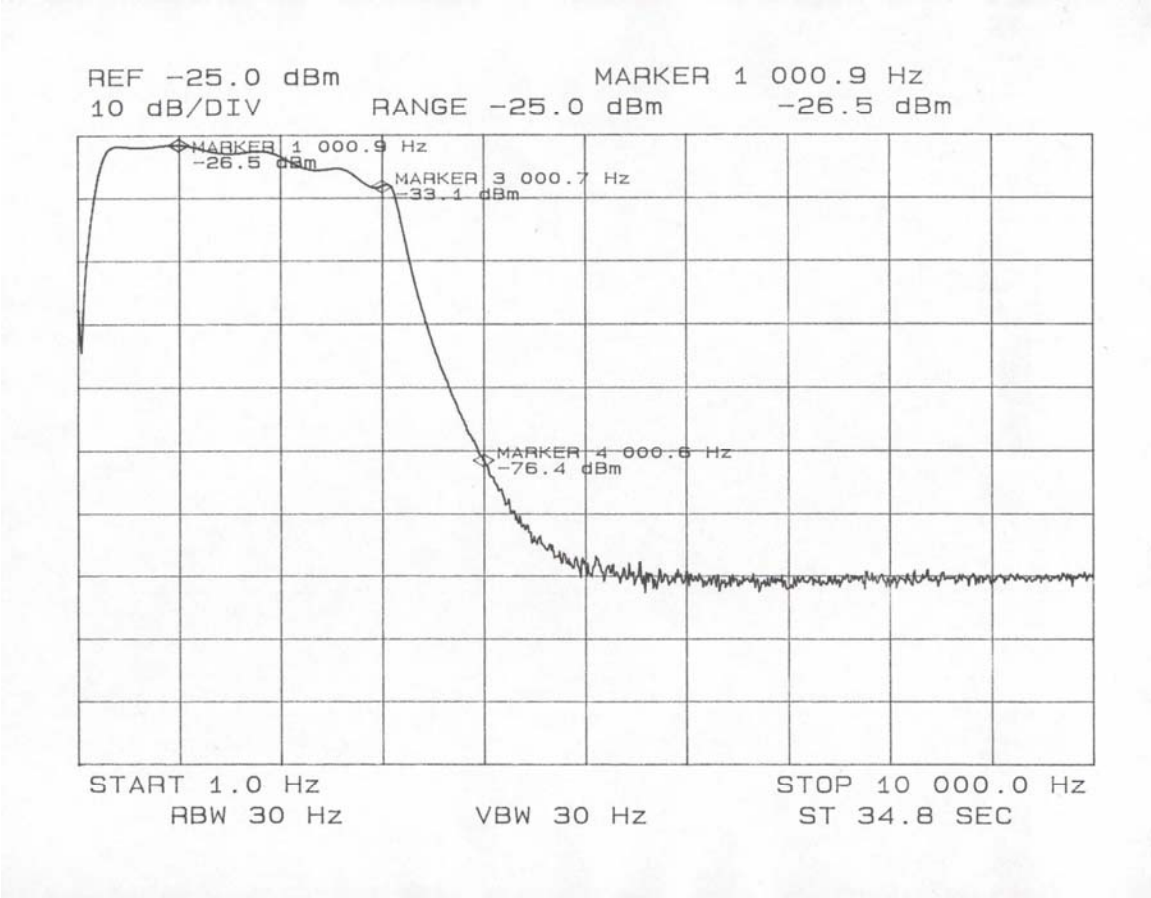
connected to a 50 Ohm Dummy Load, and the RF Power was set to rated output power. As the AC input Voltage was slowly varied from 90 to 140 Vac, the RF output frequency was measured at the output using a Tektronix CMC251 frequency counter. There was no observed RF frequency variation during this test.

(1) The application for certification of an external RF PA N/A
(2) N/A
(3) N/A

Appendix A



Sweep Modulating Circuitry
Figure 1



Sweep Audio Filter
Figure 2