

Chapter
6

TESTS and DIAGRAMS

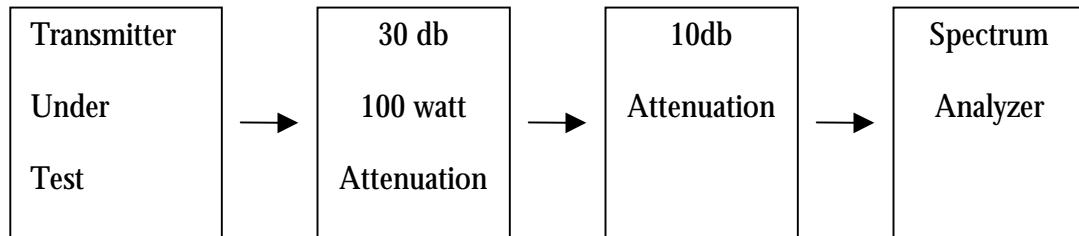
Statement of Attestation

Transmitter Spectrum Measurement of Fundamentals and Harmonics

[Refer to Sections 2.985 and 2.991]

The transmitter was connected to the spectrum analyzer through a 100 watt 30db 50 ohm pad and a 10db 50 ohm. The transmitter was keyed at 1 MHz intervals from 118.000 MHz to 136.975 MHz. The transmitter was modulated with a 2500 Hz tone sufficient to produce 85% modulation.

All measurements were made in dbm references. The fundamentals were measured first and then plus and minus 25Khz. Harmonics up to the 5th harmonics were made and recorded. Harmonics up to the 10th harmonics were explored and found to exceed the requirements by more than 20db.

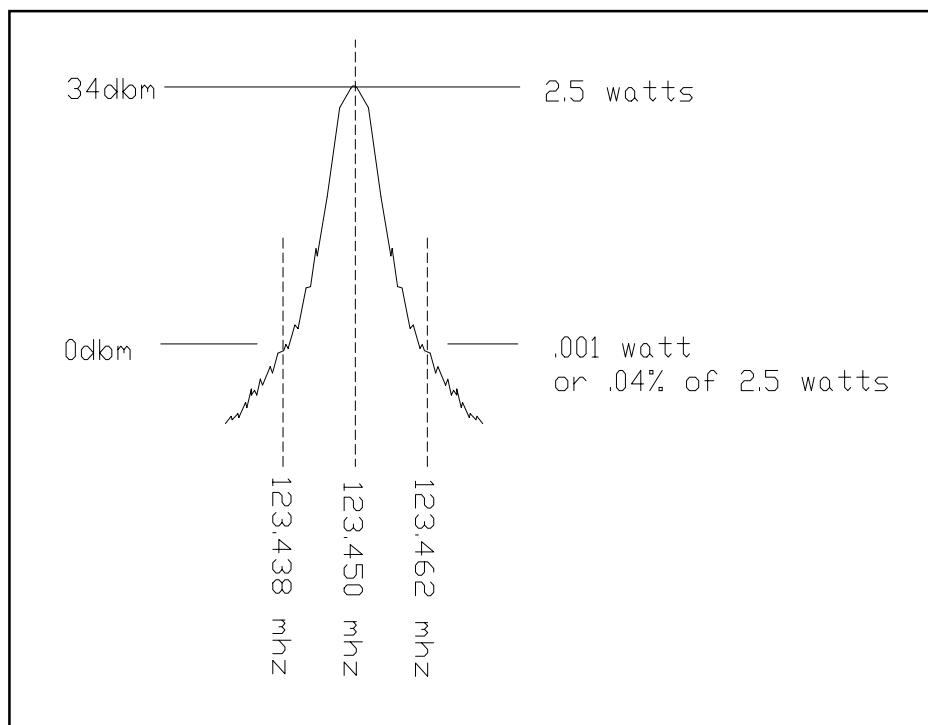


TRANSMITTER POWER MEASURED IN dbm
[Refer to Sections 2.985 and 2.991]

	Fundamental	+/- 25 kHz	1 Harmonic	2 Harmonic	3 Harmonic	4 Harmonic	5 Harmonic
118.000	+33	-01	-54	-41	-59	-55	-73
119.000	+33	-13	-53	-41	-58	-56	-72
120.000	+33	-15	-52	-41	-58	-56	-72
121.000	+33	-15	-52	-43	-58	-57	-71
122.000	+33	-15	-51	-44	-57	-58	-70
123.000	+33	-08	-52	-44	-57	-59	-69
124.000	+33	-05	-51	-45	-57	-61	-68
125.000	+33	-00	-41	-46	-57	-65	-67
126.000	+33	+02	-52	-46	-57	-65	-67
127.000	+33	-15	-53	-46	-57	-61	-68
128.000	+33	-15	-53	-46	-57	-61	-68
129.000	+33	+02	-54	-47	-57	-58	-69
130.000	+33	+02	-51	-48	-57	-57	-70
131.000	+33	-05	-52	-48	-58	-61	-73
132.000	+33	-08	-51	-48	-58	-64	-74
133.000	+31	-15	-50	-49	-58	-66	-74
134.000	+31	-13	-52	-49	-60	-68	-77
135.000	+31	-15	-51	-50	-61	-69	-76
136.000	+31	-15	-53	-51	-61	-70	-76
136.975	+31	-15	-54	-51	-60	-72	-80

A W O S 7 6 0 V H F T r a n s m i t t e r O c c u p i e d B a n d w i d t h
M e a s u r e m e n t s
[Refer to section 2.989]

25 K h z s p e c t r u m m o n i t o r e d w i t h c a r r i e r m o d u l a t e d a t 8 5 % w i t h 2 5 0 0 H z



900427.dwg

This test was made at 118.000 Mhz, 123.450 Mhz, 130.000 Mhz, and 136.975 Mhz with similar test results. All of which exceed the requirements of .5% of Section 2.989 of Commission's rules.

Transmitter Modulation Characteristics

[Required by Section 2.987 (d) and 87.73(a)]

Modulation of the transmitter in normal use resulted in modulation peaks of at least 70% and did not exceed 100%

Transmitter modulation characteristics of audio frequencies from 100hz to 5000hz were measured as follows per section 2.987(a).

Hz	% Modulation
100	50
300	60
500	75
800	80
1000	85
1200	85
1400	85
1600	85
1800	85
2000	85
2200	85
2400	85
2600	85
2800	85
3000	85
3500	75
4000	65
4500	60
5000	50

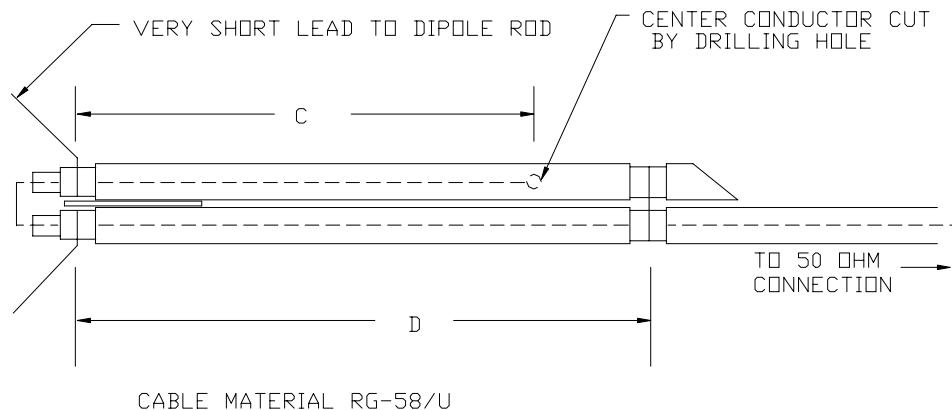
FIELD STRENGTH OF SPURIOUS RADIATION

[Refer to Section 2.993]

The unit was set up on a revolving stand and operated under Normal standby conditions three (3) meters from the receiving dipole antennas which were constructed as illustrated in Drawing number 900428. The antenna was then connected to a spectrum analyzer and an analysis of the frequencies from 20 MHz to 1000 MHz was made.

As indicated in table 6.1 no spurious radiations were found which exceeded radiation measurement requirements.

BALUM CONSTRUCTION FOR FIELD STRENGTH MEASURE DIPOLE ANTENNAS



Frequency Range Mhz	Length C Inches	Length D Inches	Constructed Dipole Length
25-65	34.3	43.3	25'
65-180	14.2	16.25	8'
180-400	6.125	7.5	3'
400-1000	2.7	3.0	1.5'

The constructed dipoles were made of one inch PVC Pipe with the dipole wire taped to them. The wires were then cut to the proper length for each frequency tested.

Field Strength of Spurious Radiation

Table 6.1

Frequency Mhz	Spectrum Explored	Radiated Harmonic dbm
20	+/- 5Mhz	<-100
25	+/- 5Mhz	<-100
30	+/- 5Mhz	-90.6
35	+/- 5Mhz	-95.6
40	+/- 5Mhz	-95.6
45	+/- 5Mhz	-92.6
50	+/- 5Mhz	<-100
55	+/- 5Mhz	<-100
60	+/- 5Mhz	<-100
65	+/- 5Mhz	<-100
70	+/- 5Mhz	<-100
75	+/- 5Mhz	<-100
80	+/- 5Mhz	<-100
90	+/- 10Mhz	<-100
100	+/- 10Mhz	<-100
110	+/- 10Mhz	<-100
120	+/- 10Mhz	<-100
130	+/- 10Mhz	-91.6
140	+/- 10Mhz	<-100
150	+/- 10Mhz	-98.6
160	+/- 10Mhz	<-100
170	+/- 10Mhz	<-100
180	+/- 10Mhz	<-100
190	+/- 10Mhz	<-100
200	+/- 50Mhz	<-100
225	+/- 50Mhz	<-100
250	+/- 50Mhz	-96.1
275	+/- 50Mhz	-93.1
300	+/- 50Mhz	-91.1
350	+/- 50Mhz	<-100
400	+/- 50Mhz	-97.1
450	+/- 50Mhz	-95.1
500	+/- 50Mhz	<-100
550	+/- 50Mhz	<-100
600	+/- 50Mhz	<-100
650	+/- 50Mhz	<-100
700	+/- 50Mhz	-95.1
750	+/- 50Mhz	<-100
800	+/- 50Mhz	<-100
850	+/- 50Mhz	<-100
900	+/- 50Mhz	<-100
1000	+/- 50Mhz	<-100

FREQUENCY STABILITY TEST

[Refer to Section 2.995 (a) (2)]

The unit was tested in a temperature controlled test chamber. The temperature was lowered to -30 degrees centigrade and raised to +60 degrees centigrade. Measurement of transmit frequency at each 10 degree multiple. The frequency did not vary more than .001% over the temperature range.

At temperatures under 25 degrees centigrade, the unit remained off at all times except during brief times when transmit and receive test were made. This assured that the components were chilled to the maximum.

At temperatures over 25 degrees centigrade, the unit was left on at all times. This assured that the components were heated to the maximum.

Variations of frequency versus change in temperature measurements are as follows per section 2.995:

Degrees Celsius	Frequency MHz
-30	121.5005
-20	121.5005
-10	121.5004
0	121.5004
+10	121.5000
+20	121.5000
+30	121.5000
+40	121.4999
+50	121.4998
+55	121.4995
+60	121.4995

Maximum frequency deviation is .001%.

VARIATIONS OF PRIMARY SUPPLY VOLTAGE

[Refer to Section 2.995 (d)(1)]

The primary voltage was varied from 10.2v to 13.8v and the transmit frequency was monitored. The transmit frequency did not vary more .001%.

Statement of Compliance

This equipment has been tested in accordance with the requirements contained in the appropriate commission regulations. To the best of my knowledge, these test were performed using measurement procedures consistent with industry or Commissions standards and demonstrate that the equipment complies with the appropriate standards. Each unit manufactured, imported or marketed, as defined in the Commission's regulations, will conform to the sample(s) tested within the variations that can be expected due to quantity production and testing on a statistical basis. I further certify that the necessary measurements were made by the engineering department of Val Avionics, Ltd. Located at 3280 25th street SE in Salem, Oregon.

James L. Harr, Chief Engineer

Revision History

Rev No.	Date	Page/Dwg No.	Description of Change	Action
1	08/24/98	Chapter 6	Added Text and Diagrams	Remove & Replace
		Page 28	Added text to first paragraph	
		Page 29	Added reference sections to table	
		Page 30	Added Transmitter Occupied Bandwidth Measurements	
		Page 32	Added Field Strength of Spurious Radiation	
		Page 33	Added Table 6.1	
		Page 34	Added Frequency Stability Test to include ranges of -30 to +60	
		Page 35	Corrected Text from 12v to 15.8v to 10.2v to 13.8v	
1	08/24/98	Chapter 1	Added Text General Information	
		Page 1	Added Text	Remove & Replace
		Page 2	Added Information to Specifications	Remove & Replace
		Page 3	Added Text to Installation	Remove & Replace
		Page 6	Added Pin Assignment Diagram	Add