

6.4 Conducted Spurious Emissions Data -- Pursuant 47 CFR 2.1051, 2.1057, 90.210 (g) and 90.691.

FCC Emission Limit: less than -13 dBm

Description	Frequency (MHz)	Measured Power (dBm)	Margin to FCC Spec (dB)
IF	154.65	<-33	> 20
2*IF	309.3	<-33	> 20
LO	960.6625	-26	13
IF + LO	1115.3125	<-33	> 20
2 X Fund	1612.025	-24.37	11.37
3 X Fund	2418.0375	<-33	> 20
4 X Fund	3224.05	<-33	> 20
5 X Fund	4030.0625	<-33	> 20
6 X Fund	4836.075	<-33	> 20
7 X Fund	5642.0875	<-33	> 20
8 X Fund	6448.1	<-33	> 20
9 X Fund	7254.1125	<-33	> 20
10 X Fund	8060.125	<-33	> 20

Table 6-1: Transmitter Conducted Spurious Emissions Data.

Maximum Output Power Setting, Fundamental Frequency 806.0125 MHz

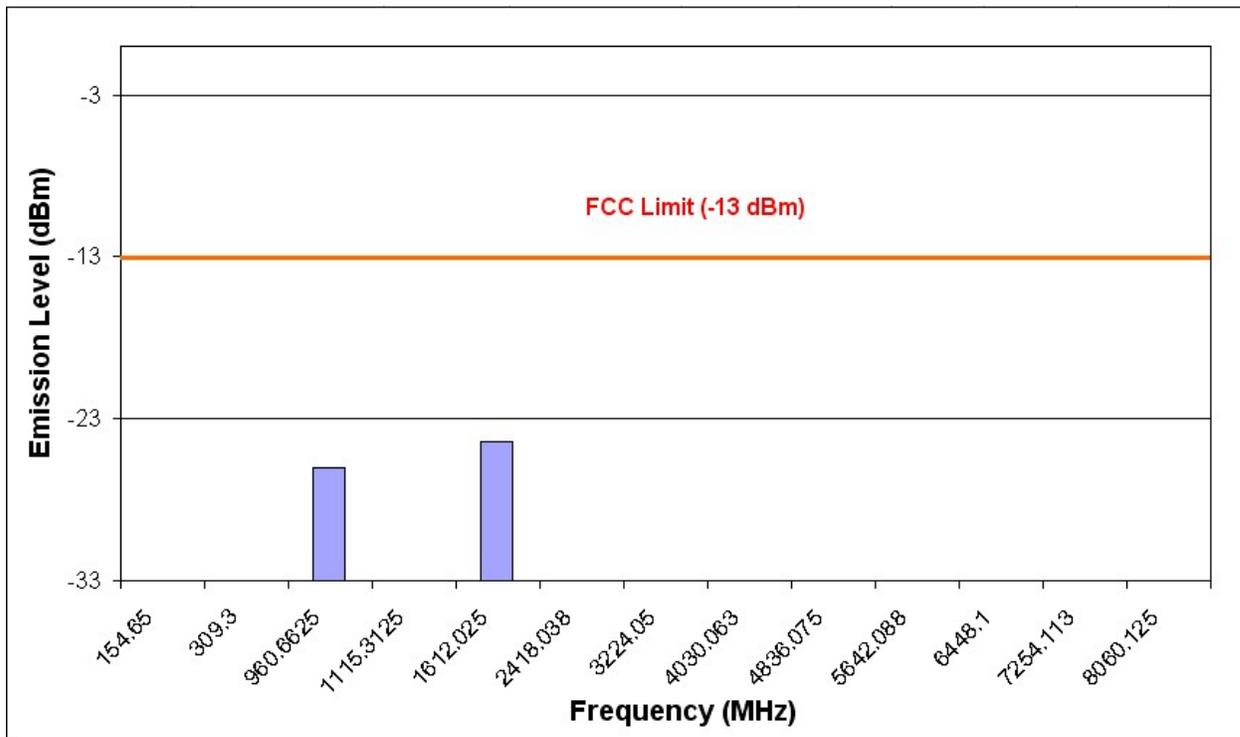


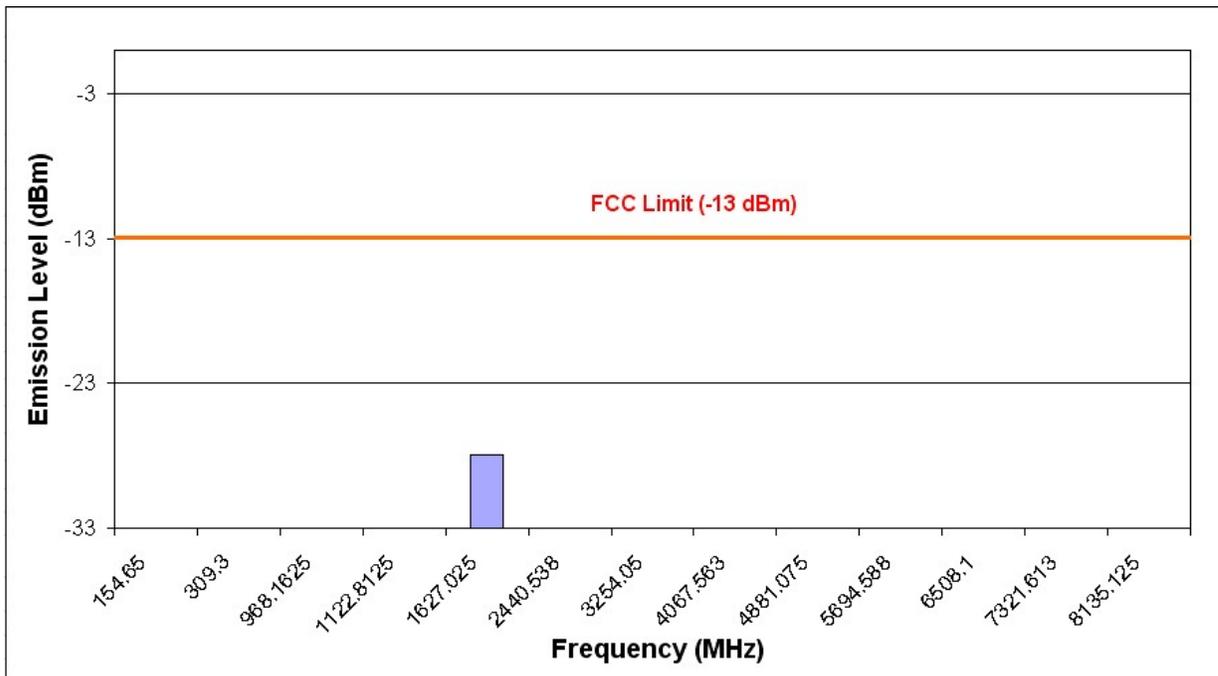
Figure 6-17: Transmitter Conducted Spurious Emissions Plot.

Maximum Output Power Setting, Fundamental Frequency 806.0125 MHz

At minimum power setting, Conducted emissions were at least 20 dB below FCC limit.

Description	Frequency (MHz)	Measured Power (dBm)	Margin to FCC Spec (dB)
IF	154.65	<-33	> 20
2*IF	309.3	<-33	> 20
LO	968.1625	-33	20
IF + LO	1122.8125	<-33	> 20
2 X Fund	1627.025	-27.907	14.907
3 X Fund	2440.5375	<-33	> 20
4 X Fund	3254.05	<-33	> 20
5 X Fund	4067.5625	<-33	> 20
6 X Fund	4881.075	<-33	> 20
7 X Fund	5694.5875	<-33	> 20
8 X Fund	6508.1	<-33	> 20
9 X Fund	7321.6125	<-33	> 20
10 X Fund	8135.125	<-33	> 20

**Table 6-2: Transmitter Conducted Spurious Emissions Data.
Maximum Output Power Setting, Fundamental Frequency 813.5125 MHz**



**Figure 6-18: Transmitter Conducted Spurious Emissions Plot.
Maximum Output Power Setting, Fundamental Frequency 813.5125 MHz**

At minimum power setting, Conducted emissions were at least 20 dB below FCC limit.

Description	Frequency (MHz)	Measured Power (dBm)	Margin to FCC Spec (dB)
IF	154.65	<-33	> 20
2*IF	309.3	<-33	> 20
LO	979.6375	-31	18
IF + LO	1134.2875	<-33	> 20
2 X Fund	1649.975	<-33	> 20
3 X Fund	2474.9625	<-33	> 20
4 X Fund	3299.95	<-33	> 20
5 X Fund	4124.9375	<-33	> 20
6 X Fund	4949.925	<-33	> 20
7 X Fund	5774.9125	<-33	> 20
8 X Fund	6599.9	<-33	> 20
9 X Fund	7424.8875	<-33	> 20
10 X Fund	8249.875	<-33	> 20

Table 6-3: Transmitter Conducted Spurious Emissions Data. Maximum Output Power Setting, Fundamental Frequency 824.9875 MHz

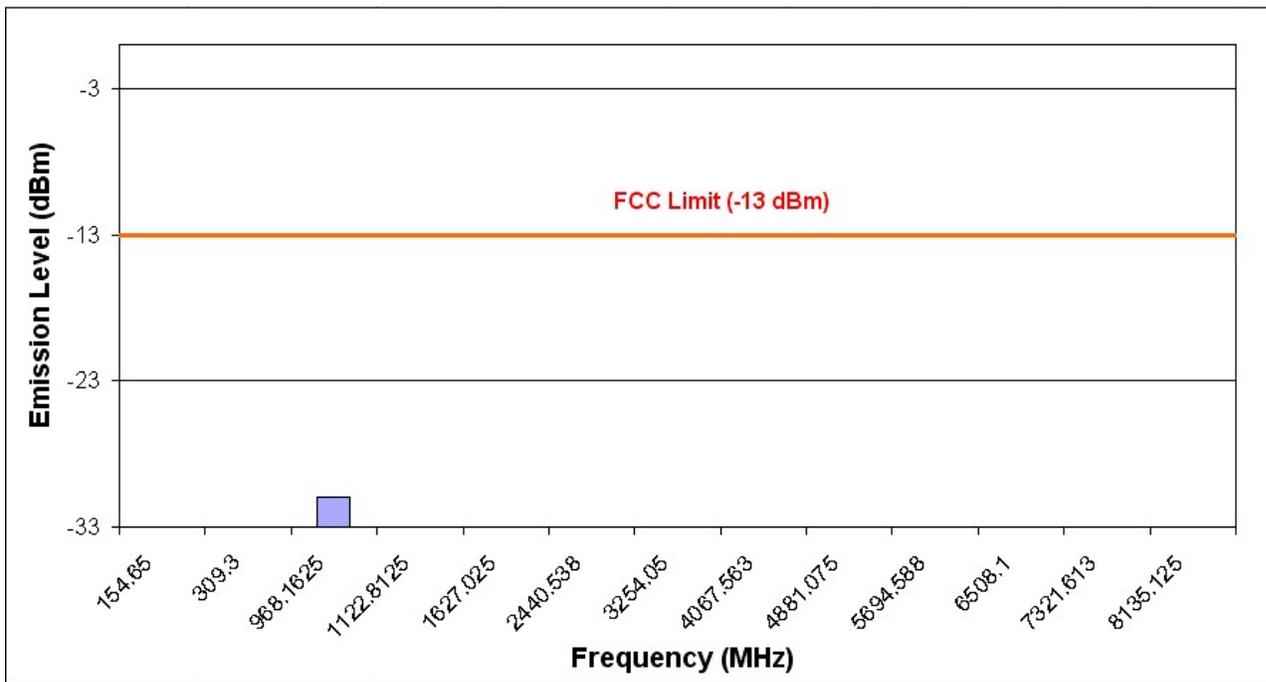


Figure 6-19: Transmitter Conducted Spurious Emissions Plot. Maximum Output Power Setting, Fundamental Frequency 824.9875 MHz

At minimum power setting, Conducted emissions were at least 20 dB below FCC limit.

6.5 Frequency Stability Data -- Pursuant 47 CFR 2.1055a(1), 2.1055(d)2

Measurements were made per method described in paragraph 7.4. Because of the transmitter's dependence on the stability of the base station oscillator, it is not possible to provide stability data for this transmitter as is commonly supplied for certification per 47 CFR 2.1055 for a radio with a locally stabilized oscillator.

The following information is provided to clarify how the transmitter attains the necessary accuracy of 2.5 PPM or better. The transmitter's suppressed carrier emission is produced by mixing of a modulated intermediate frequency with a higher, digitally synthesized injection frequency with a resolution of 12.5 kHz. Both of these frequencies are derived from a temperature compensated crystal oscillator (Y300 in Figure 4-1). Transmission frequency accuracy is enhanced by the radio receiver circuitry, which causes the radio operating frequency to become locked to within 0.4 PPM of the base station once it has acquired the primary control channel.

The AFC routine and frequency locking mechanism are implemented using both hardware and software. The hardware and software combined provide an automatic frequency control function, which locks the receiver to within 0.4 PPM of the control channel oscillator. Since the base station stability is FCC regulated to be 1.5 PPM or better, the absolute accuracy of the transmitter is inherently better than 1.9 PPM. This is accomplished by programming U601 while the radio is in operation.

Transmitter frequency stability is guaranteed over all specified environmental operating conditions (battery voltage, temperature, humidity, etc.) because of the nature of the base station frequency locking mechanism. The frequency stability of the transmitter is maintained until the battery voltage drops below 3.2 volts. Any voltage below 3.2 volts is outside the specified operating range of the transmitter and linearity is degraded. For this reason, the radio shuts down (while in transmit mode) when the voltage drops below 3.2 volts.

Note:

Frequency stability is independent of modulation scheme (Quad -QPSK, Quad-16QAM, Quad-64QAM). The data shown in following tables was taken with the radio set to transmit a Quad-16QAM signal at 810.6625 MHz while locked to a R2660C service monitor.

Temperature [degC]	Frequency Error [Hz]	Frequency Error [ppm]
-25	113	0.139
-20	144	0.178
-15	105	0.130
-10	142	0.175
-5	-139	-0.171
0	-12	-0.015
5	-48	-0.059
10	-22	-0.027
15	24	0.030
20	-29	-0.036
25	-65	-0.080
30	-4	-0.005
35	119	0.147
40	-85	-0.105
45	11	0.014
50	108	0.133
55	146	0.180
60	-18	-0.022

Table 6-4: Transmitter Frequency Stability Data - Frequency vs. Temperature

Supply Voltage (Volt)	Frequency Error [Hz]	Frequency Error [ppm]
3.2	-11	-0.014
3.3	-27	-0.033
3.4	39	0.048
3.5	83	0.102
3.6	75	0.093
3.7	16	0.020
3.8	-96	-0.118
3.9	95	0.117
4	87	0.107

Table 6-5: Transmitter Frequency Stability Data - Frequency vs. Voltage

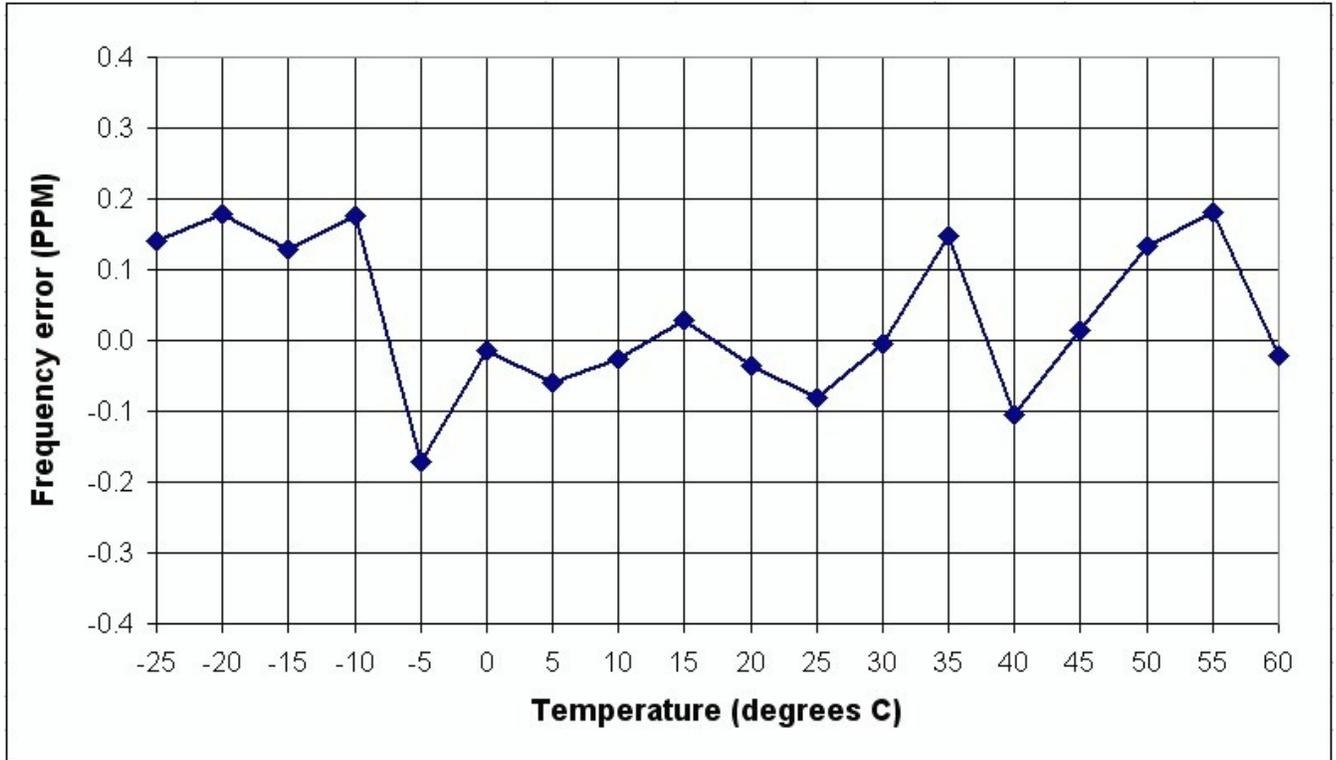


Figure 6-20: Frequency Stability vs. Temperature

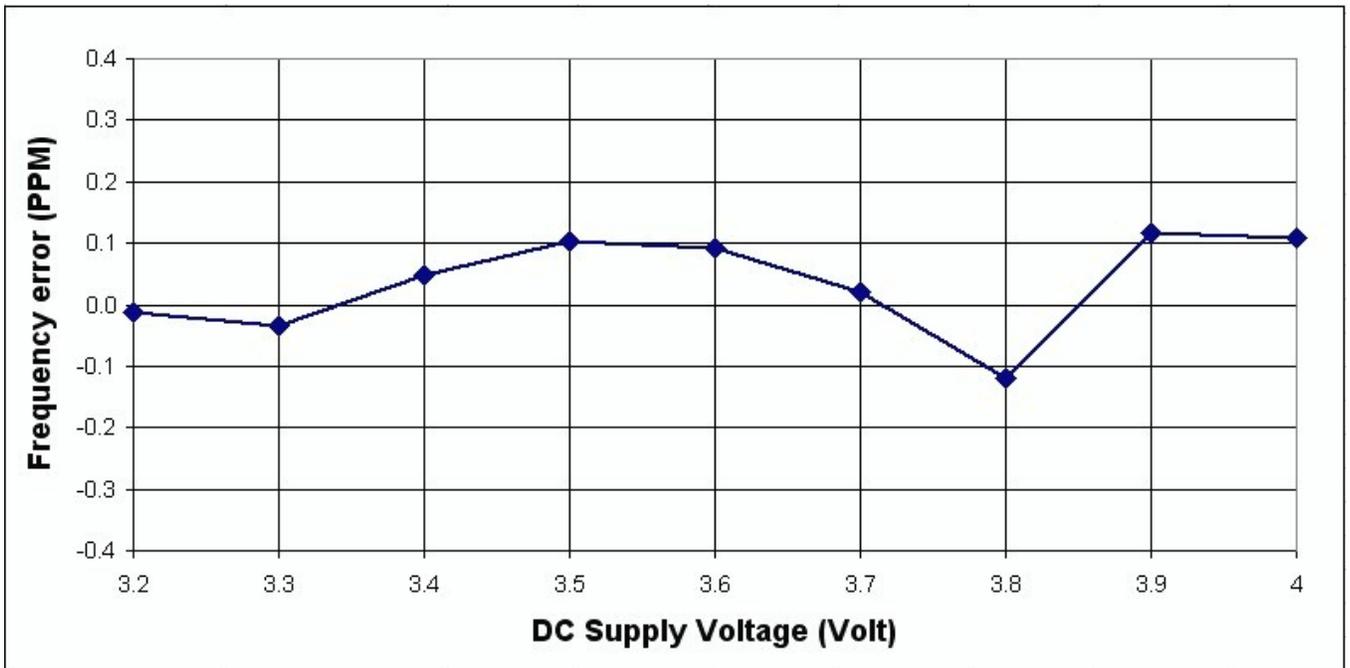


Figure 6-21: Frequency Stability vs. Voltage

6.6 Effective Radiated Power (ERP)

The method described in paragraph 7.1b was employed. Prior to measuring ERP, the output power of the transmitter was adjusted to within 5% of the maximum power level, which is 0.7 W pulse average.

The ERP measurement results are summarized in Tables 6.9 below.

Frequency (MHz)	Polarization	Peak Measurement	Signal Generator (dBm)	Cable loss (dB)	Antenna gain (dBd)	ERP (dBm)	ERP (Watt)
806.0125	Horizontal	106.1	33.3	3.5	-0.89	28.91	0.78
806.0125	Vertical	108.8	36	3.5	-0.89	31.61	1.45
813.5125	Horizontal	104.9	31.4	3.5	-0.89	27.01	0.50
813.5125	Vertical	108.6	35.1	3.5	-0.89	30.71	1.18
820.9875	Horizontal	104	30.5	3.5	-0.8	26.2	0.42
820.9875	Vertical	106.2	32.6	3.5	-0.8	28.3	0.68
824.9875	Horizontal	104.3	30.8	3.5	-0.79	26.51	0.45
824.9875	Vertical	108.2	34.7	3.5	-0.79	30.41	1.10

Table 6-6: ERP measurement results for iO1500R with antenna FAF5055A

Based on the above results, the maximum ERP was measured at Vertical polarization and is 1.45 Watt Peak.