

6.5. *Frequency Stability Data -- Pursuant 47 CFR 2.1055*

Measurements were made per method described in paragraph 7.4. Because of its 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 type acceptance per 47 CFR 2.995 (b) 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 0.2PPM of the base station once it has acquired the primary control channel. Thus the temperature and voltage performance of the transmitter is within 0.4PPM accuracy of the higher stability base station oscillator.

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 0.2 PPM of the control channel oscillator. This degree of AFC accuracy is determined by the bandwidth of the phase locked loop within the IC. Since the base station stability is FCC regulated to be 1.5 PPM or better, the absolute accuracy of the transmitter is ± 1.9 PPM. This is accomplished by programming U301 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 3.0 volts. Any voltage below 3.0 volts is outside the specified operating range of the transmitter and linearity is degraded below 3.0 volts. For this reason, the radio shuts down(while in TX mode) when the voltage drops below 3.0 volts.

Frequency stability is independent of modulation scheme (Quad-16QAM, Quad-64QAM). The data shown in following tables was taken with the radio set to transmit at 815 MHz and Quad-16QAM while locked to a R2660C service monitor.

Table of Transmitter Frequency Stability Data - Frequency vs. Temperature

Temperature (° Centigrade)	Frequency Error (Hz)	Frequency Error (ppm)
-30	33	0.040
-20	57	0.070
-10	16	0.020
0	23	0.028
10	31	0.038
20	34	0.042
30	39	0.048
40	25	0.031
50	35	0.043
60	28	0.034

Table of Transmitter Frequency Stability Data - Frequency vs. Voltage

Voltage (Volts)	Error in (Hz)	Error in (ppm)
3.0	45	0.055
3.1	43	0.053
3.2	47	0.058
3.3	49	0.060
3.4	52	0.064
3.5	50	0.061
3.6	48	0.059
3.7	51	0.063
3.8	40	0.049
3.9	48	0.059
4.0	90	0.110
4.1	110	0.135
4.2	110	0.135

Figure 6.5-1: Frequency Error vs. Voltage

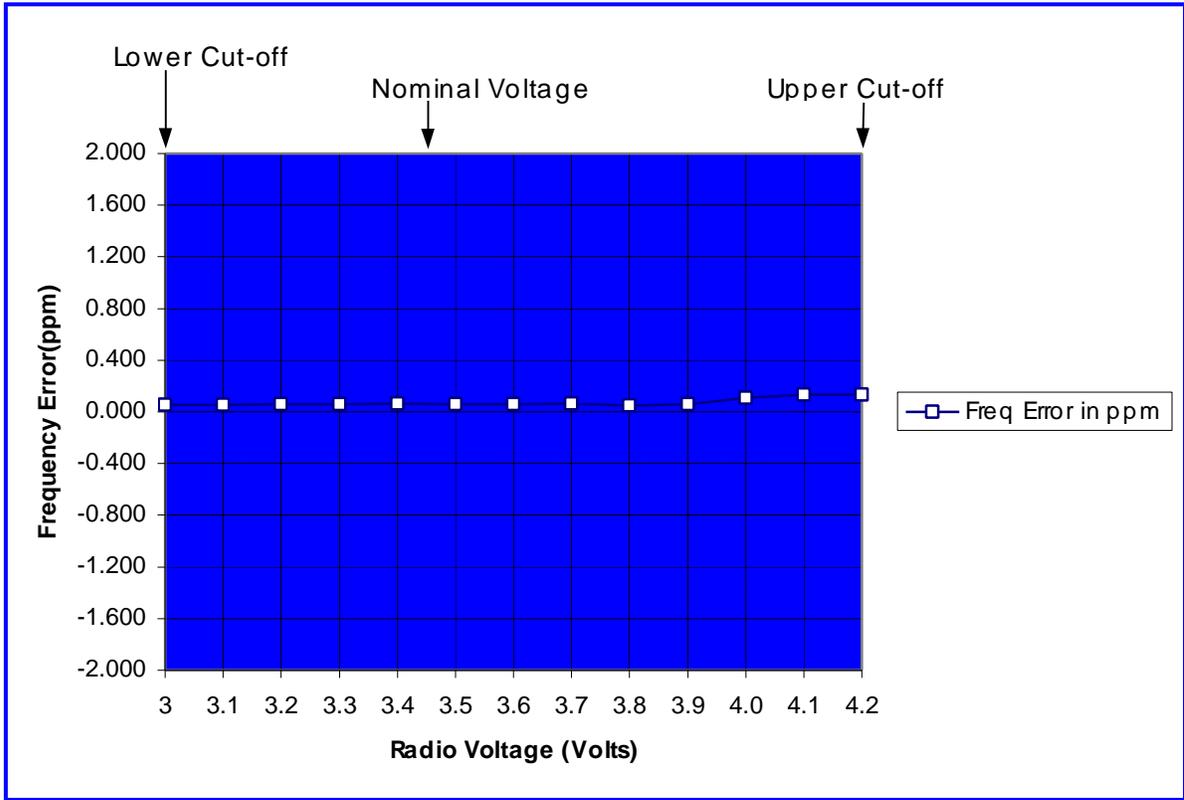
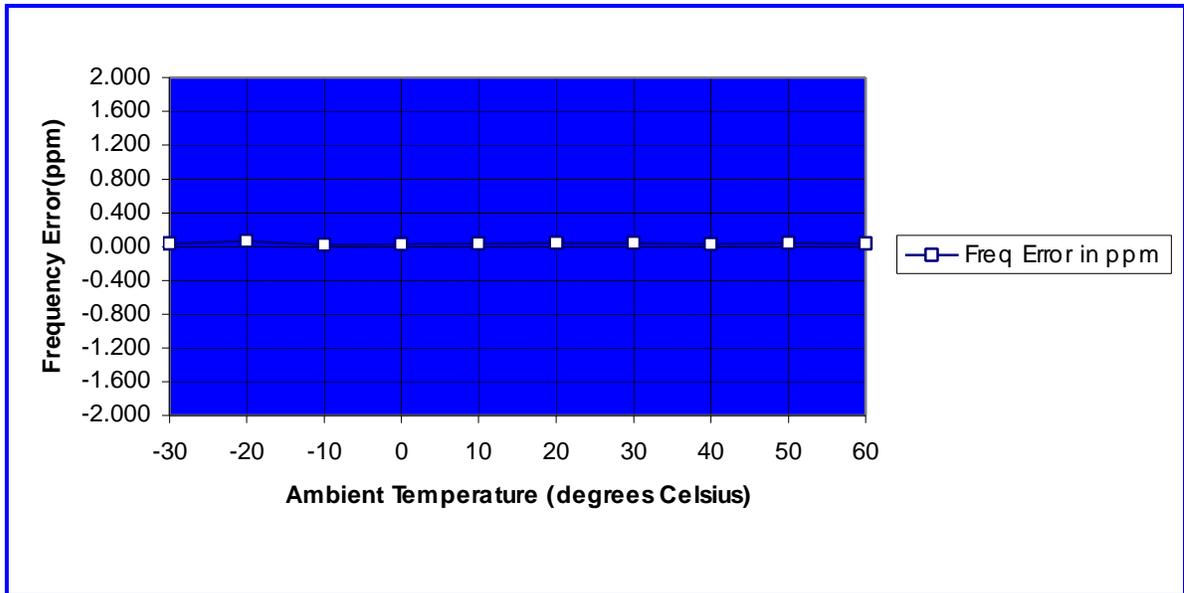


Figure 6.5-2: Frequency Error vs. Temperature



6.6. Power Line Conducted Spurious Emissions -- Pursuant 47 CFR 15.107

This transceiver can transmit while resting in a battery charger that is connected to the AC power line. As shown in Figures 6-25 to 6-30 the maximum emissions of 35.68dB V (60.8 microvolts) did not exceed 48dB V (250 microvolts) over the frequency range 450 kHz to 30 MHz.

NOTE: The reference line in the following graphs have a 10dB offset due to an attenuator (external pad) in the measurement equipment set-up.

Figure 6.6-1: Radio while in TX mode (Max. Power) at 813.5625 MHz and measuring the Line One

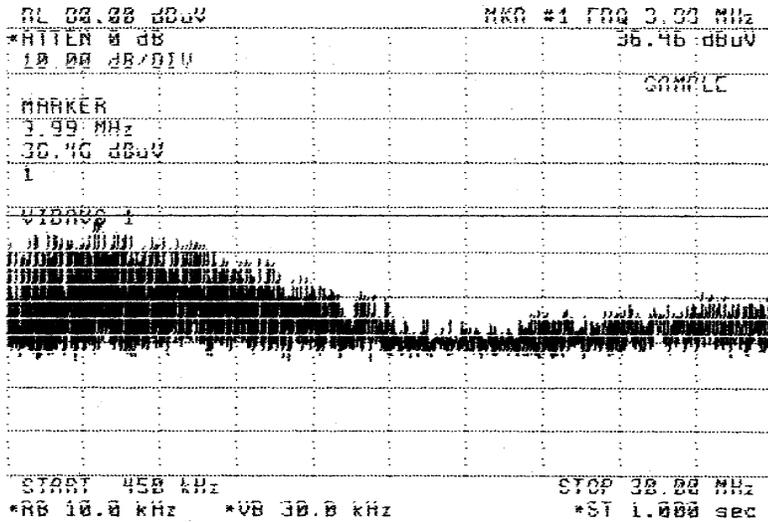


Figure 6.6-2: Radio while in TX mode (Max. Power) at 813.5625 MHz and measuring the Neutral Line

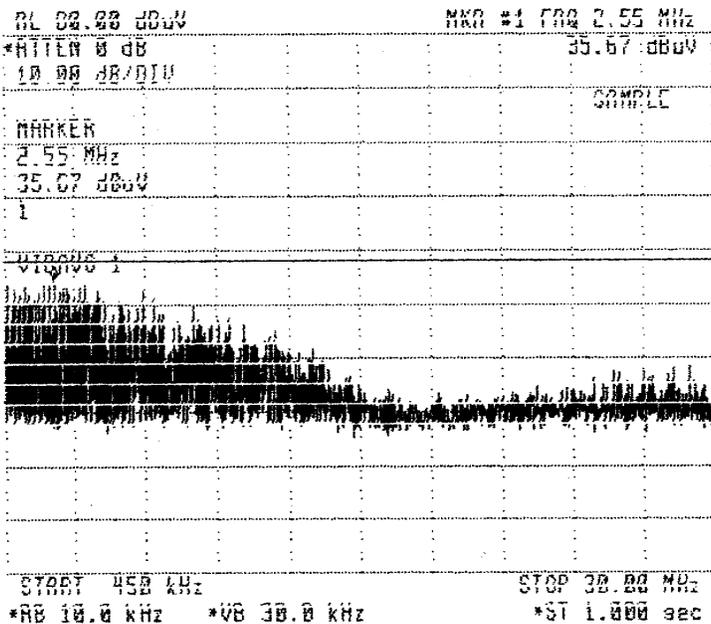


Figure 6.6-3: Radio while in TX mode (Min. Power) at 813.5625 MHz and measuring the Line One

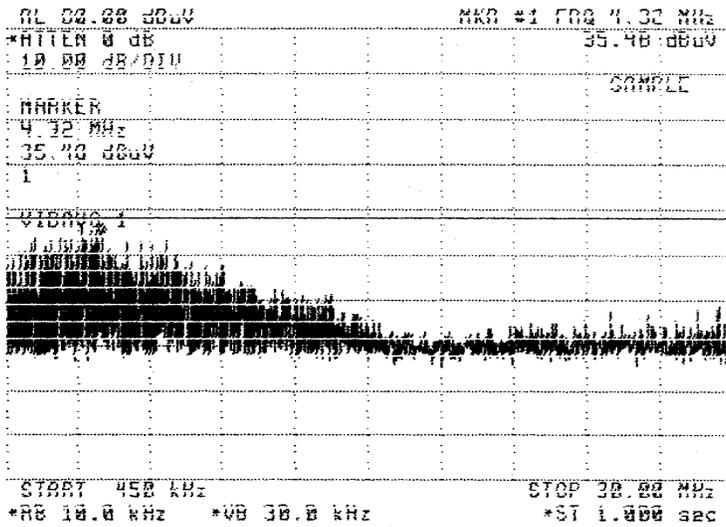


Figure 6.6-4: Radio while in TX mode (Min. Power) at 813.5625 MHz and measuring the Neutral Line

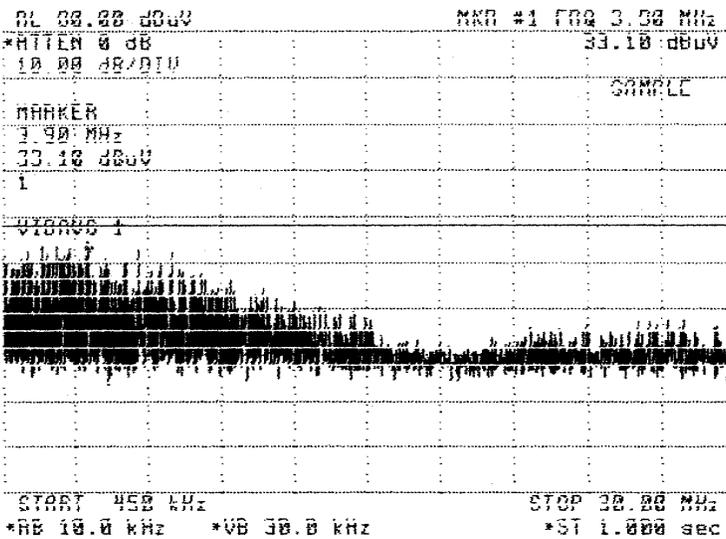


Figure 6.6-5: Radio while in TX mode (Max. Power) at 824.9875 MHz and measuring the line one

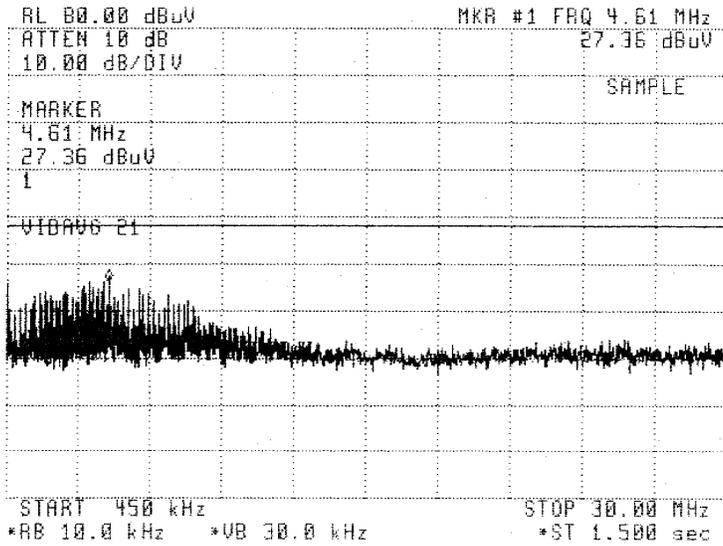


Figure 6.6-6: Radio while in TX mode (Max. Power) at 824.9875 MHz and measuring the Neutral Line

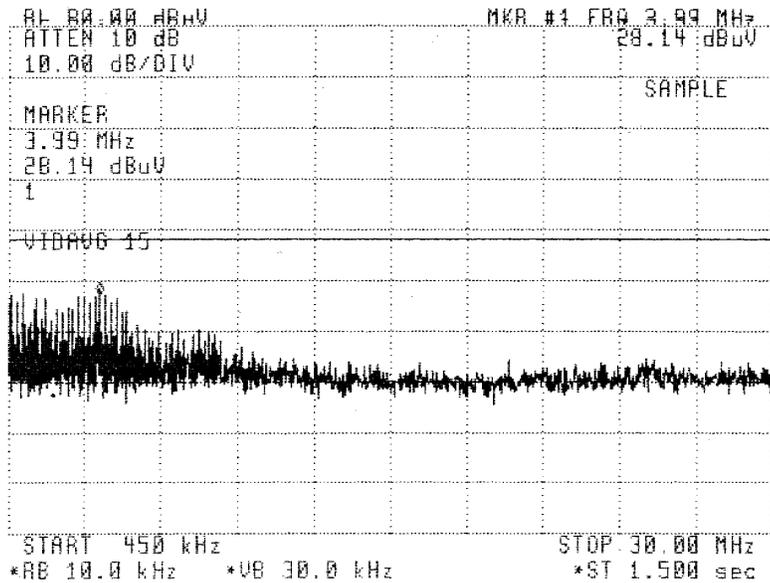


Figure 6.6-7: Radio while in TX mode (Min. Power) at 824.9875 MHz and measuring the line one

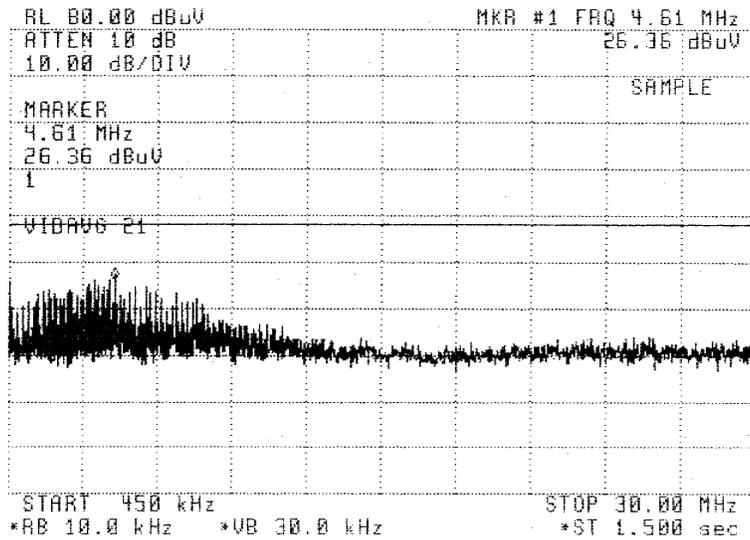


Figure 6.6-8: Radio while in TX mode (Min. Power) at 824.9875 MHz and measuring the Neutral Line

