

6a.5 Land Mobile Frequency Stability -- Pursuant 47 CFR 2.1055a(1) & 2.1055(d)2

Frequency stability measurements were made as 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 for 800MHz band operation and 1.5 PPM or better for 900MHz band operation. The transmitter's suppressed carrier emission is produced by impressing the baseband information signal directly onto a digitally synthesized injection frequency with a channel resolution of 12.5 kHz. The synthesized frequency is derived from a temperature compensated crystal oscillator (Y600). 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. Thus the temperature and voltage frequency stability of the transmitter is within 0.4 PPM 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 0.4 PPM of the control channel oscillator. Since the base station stability is FCC regulated to be 1.5 PPM or better for the 800MHz band and 0.1 PPM or better for the 900MHz band, the absolute accuracy of the transmitter is inherently better than 1.9 PPM in the 800MHz band and 0.5 PPM in the 900MHz band. This is accomplished by programming fine synthesizer adjustments to U600 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 from a fully charged battery voltage of 4.2V to a low battery voltage of 3.55V, below which the radio products shuts down in order to prevent transmitter malfunction.

Frequency stability is independent of modulation scheme (Quad-QPSK, Quad-16QAM, Quad-64QAM) or TDM interleaving. The data shown in following tables was taken with the radio set to transmit a Quad-16QAM signal at 813.45 and 898.49375 MHz while locked to a Motorola R2660C service monitor. Measured frequency error points over all extreme temperature and voltage conditions are substantially smaller than the allowable error.

	At 813.45 MHz	
Temp C	4.2V	3.55V
50	0.02 ppm	0.00 ppm
40	0.02	0.01
30	0.02	0.01
20	0.01	0.01
10	0.00	0.02
0	0.00	0.02
-10	0.01	0.02
-20	0.00	0.00
-30	0.01	0.01

Table 6a-15. Transmitter Frequency Stability 800 MHz

	At 898.49375 MHz	
Temp C	4.2V	3.55V
50	0.07 ppm	0.05 ppm
40	0.05	0.04
30	0.06	0.07
20	0.06	0.08
10	0.06	0.06
0	0.06	0.03
-10	0.06	0.06
-20	0.04	0.07
-30	0.02	0.06

Table 6a-16. Transmitter Frequency Stability 900 MHz