FREQUENCY STABILITY vs. AMBIENT TEMPERATURE VARIATION

With fully functioning PIT SET transmitter unit, the temperature stability of the frequency generating components was observed. The PIT SET was placed in a temperature chamber. The computer which signaled the transmitter to transmit was outside the chamber. A ½ wavelength receiving antenna was inside the chamber with its output going to the frequency measuring spectrum analyzer.

With the transmitter programmed to transmit at 460.00000 MHz, the chamber temperature was set to 20° C. After reaching the set temperature, the transmitter was allowed to stabilize for about 10 minutes or more. The transmitter was instructed to transmit, the signal was captured by the spectrum analyzer and the frequency was determined and compared to the expected 460.00000. The temperature in the chamber was then increased in 10° C increments. At each new temperature, time was allowed for stabilization of the transmitter, a transmission was made and the frequency determined. The temperature was increased at the 10° C increments to 70° C, and then reduced back to 20° C where another reading was taken. The temperature was then reduced in 10° C increments, checking the frequency at each point, until a temperature of -30° C was reached. The frequency at each temperature was recorded and is found in Table. It can be seen from the table that all readings are with the 2.5 ppm allowed.

Expected Frequency 460.000 MHz

Temperature [C]	Frequency [MHz[	Variance [PPM]
70	459.999601	-0.867
60	459.999606	-0.857
50	459.999628	-0.809
40	459.999691	-0.672
30	459.999733	-0.580
20	459.999676	-0.704
10	459.999792	-0.452
0	459.999672	-0.713
-10	459.99968	-0.696
-20	459.999812	-0.409
-30	460.00003	0.065

Imbedded microcontroller disables MTU operation outside of this temperature range.

Measured and Recorded on December 19, 2002

SUMMARY

The Hexagram LLB6717DTransmitting Unit (PIT SET) has been shown to be capable of complying with those requirements of the Federal Communications Commission for a Part 90 transmitter that are covered by this report.

EQUIPMENT UNDER TEST	"PIT SET Transmitter, LLB6117D
MANUFACTURER	Hexagram, Inc. 23905 Mercantile Cleveland, OH 44122
TEST DATE	December 19, 2002
MEASUREMENT EQUIPMENT	
	Hewlett-Packard Spectrum Analyzer Type 8560A with 8560A RF Section 85650A Quasi-Peak Adapter
ANTENNAS	½ WL Dipole Antenna
MISCELLANEOUS	7.5 m RG-213/U coaxial cable
	Environmental Chamber, Model VersaTenn II Temp Range: -73C to +200C
	Radio Shack 63-1011 Digital Thermometer

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