EXHIBIT 7: TEST SET-UP PROCEDURES AND TEST EQUIPMENT USED

Except where otherwise stated, all measurements are made following the FCC Part 90 requirements. This exhibit presents a brief summary of how the measurements were made, the required limits, and the test equipment used.

1. The following procedures are presented with this application.

    1) Test Lab and Equipment List
    2) RF Power Output
    3) Occupied Bandwidth
    4) Conducted Spurious Emissions
    5) Conducted Powerline Emissions
    6) Radiated Spurious Emissions
    7) Frequency Stability vs. Temperature and Voltage, and Transient Behavior

Test Lab

Protocol Labs, FCC Registration Number 96437
28945 McTavish Rd.
Abbotsford BC, Canada

Test Equipment List

The calibration of this equipment is performed at regular intervals.

Transmitter Frequency:
HP 8566B Spectrum Analyzer with HP 85685A Preselector, HP 8657B Signal Generator with High-Stability Frequency Reference.

Temperature Measurement:
Yokagawa Chart Recorder

Transmitter RF Power:
Marconi 6960B Power Meter with Marconi 6912 Power Sensor

DC Voltages and Currents:
Fluke 80 Digital Voltmeter

Transmitter Conducted Spurious and Harmonic Emissions:
HP 8566B Spectrum Analyzer with HP 85685A Preselector

Transmitter Occupied Bandwidth:
HP 8566B Spectrum Analyzer with HP 85685A Preselector and plotter

Radiated Spurious and Harmonic Emissions
HP 8566B Spectrum Analyzer with HP 85685A Preselector

Measurement Procedures Used for Submitted Data

EXHIBIT 6A - RF Power Output vs. DC Power Input (FCC Rules Part 2.1046)

The transmitter is operated under normal conditions at the specified nominal dc input at the battery terminal. The antenna output is terminated in 4 W, 50 ohm RF load, though an Amplifier Research DC1000 Directional Coupler, with it's measurement terminal connected to a Marconi 6912 Power Sensor and a Marconi 6960B Power Meter. The dc supply is interrupted to allow insertion of a dc Ammeter in series with the dc supply. The dc voltage drop of the ammeter is negligible. A dc Voltmeter is used to measure the dc voltage applied to the final stage. The dc-input power, in Watts, is computed as the product of the dc current (in Amperes) times the dc voltage (in Volts). This measurement is performed at the lowest, the center and the highest operating frequencies of the frequency range.

EXHIBIT 6B - Occupied Bandwidth (FCC Rules Part 2.1049(i)

The output of the transmitter is connected, via a suitable attenuator, to the input of an HP 8566B Spectrum Analyzer with HP 85685A Preselector, and plotter. The Spectrum analysis of the transmitter output is performed to at least ±50 KHz from the central carrier frequency. The unmodulated carrier is used to establish a 0-dB reference, for the Emissions Mask Part 90.210(d), Exhibit 6B-1, using a resolution bandwidth of 10KHz. The modulating signal is applied with the resolution bandwidth reduced to 100 Hz, and plots produced. This measurement is repeated with the four transmission modes, using full speed transmission of psuedo-random data, at the following bit rates:

DPSK 1200 BPS	Exhibit 6B-2
FSK 2400 BPS	Exhibit 6B-3
DFM 4800 BPS	Exhibit 6B-4
Dual Binary (COS) 9600 BPS	Exhibit 6B-5

EXHIBIT 6C - Conducted Spurious Emissions (FCC Rules Part 2.1051)

The output of the transmitter is connected, via a suitable attenuator, to the input of an HP 8566B Spectrum Analyzer with HP 85685A Preselector. After a carrier reference level has been established, a tunable notch filter is inserted between the attenuator and the spectrum analyzer to allow suppression of the carrier level. The effects of the notch filter on other frequencies, if any, are taken into account. The level of spurious emissions, in dB relative to the carrier, is plotted. This data is measured at the upper, middle and lower frequency limits of the frequency range, and transmit power is adjusted, the measurement is repeated at the minimum and maximum power levels. (Exhibits 6C-1 to 6C-6)

EXHIBIT 6D – Powerline Conducted Emissions (FCC Rules Part 15.208)

The power connector was connected, to a Solar 8012-50-R-24-BNC LISN, and the RF Terminal was connected to an HP 8566B Spectrum Analyzer with HP 85685A Preselector, and the conducted Emissions were measured on Line 1 (Exhibit 6D-1) and Line 2 (Exhibit 6D-1) independently, The signal strength of 250 microvolts (49 dBuV) is the limit.

EXHIBIT 6E - Radiated Spurious Emissions (FCC Rules Part 2.1053, Part 15.209)

Measurements were made at an approved open field test site constructed in accordance with Appendix B, FCC/OST 55 (1982), and were performed in accordance with the Code of Federal Regulations, Title 47, Part 2, paragraph 2.1053. The data is plotted as “Radiated Spurious and Harmonic Emissions (Horizontal and Vertical)” on the graphs comprising Exhibit 6E-1.

The following additional instruments are used in performing the radiated field strength measurements:

- Hewlett Packard model 8566A spectrum analyzer
- Hewlett Packard model 8657B signal generator
- EMCO 3141 Bilog Antenna (30-2500 MHz)
- EMCO 3105 Horn Antenna (1-18 GHz)
- 4W, 50 Ohm RF Load

EXHIBIT 6F Frequency Stability vs. and Frequency Stability vs. Temperature (Part 2.1047 and Part 90.213), and Transient Behavior (Part 90.214.)

The output of the transmitter is connected, via a suitable attenuator, to the input of an HP 8566B Spectrum Analyzer with HP 85685A Preselector. The transmittter was placed in t emperature chamber, and the temperature was varied from –30 to +60 deg.C. The temperature measurements of the environmental chamber is referenced to a Yokagawa Chart Record with the J Thermocouples. Frequency Stability vs. Voltage data is measured in accordance with FCC Rules Part 2.1047 and Part 90.213. An HP8657B Signal Generator with high stability frequency reference provided a Frequency Standard as a reference for frequency measurements. (Exhibit 6F-1). Similar measurements are made with variations in the supply voltage. (Exhibit 6F-2).

With the output of the transmitter is connected, via a suitable attenuator, to the input of an HP 8566B Spectrum Analyzer with HP 85685A Preselector with a plotter, the transient behavior was measured by time domain sweeping of the carrier frequency in the Occupied Bandwidth to demonstrate the stability of the carrier during the power up and power down cycles per Part 90.214 (Exhibit 6F-3).