Exhibit 7. Measurement Procedures -- 47 CFR. 2.947

This exhibit presents a summary of how the measurements were made.

7.1. RF Power -- Pursuant to 47 CFR 2.947(c)

Method of Output Power Measurement: Adaptation of TIA/EIA-603-A clause 2.2.1 for Pulsed Measurements

The RF output power is not adjustable by the user. The output power is controlled by the radio in response to the received signal strength or by or special radio service software. To obtain RF output power data the radio was programmed to utilize the maximum RF and minimum RF output power setting. A special adapter was made to interface with the antenna terminals, refer to the photographs below. This soldered connector was then connected through a 30 dB attenuator to an RF power sensor. To correct the average reading power meter, a setting of the duty cycle on the RF power meter was set to 16.667% for herein reported 6:1 TDM test signals.

To obtain all conducted measurements, a special adapter was made using a semi-rigid cable with female SMA connector soldered to the radio main circuit board antenna launch, with the assembly in place of the normal antenna removed, as illustrated in photographs below:

Photograph 7-1: Front view of radio with semi-rigid cable with female SMA connector soldered on the board.

Photograph 7-2: Back side of main circuit board showing a semi-rigid cable with female SMA connector soldered on the board.

Method of Measurement for Effective Radiated Power: Proprietary

The ERP characteristic was measured while a radio was vertically mounted on a non-conducting platform/turntable in a RF Anechoic Chamber. Since the instrumentation for the measurement system RF Anechoic chamber did not support pulsed measurements the radio was set into a test mode that enabled transmission of a continuous wave (CW) signal. The power received at an antenna located at the end of the chamber was recorded on a spectrum analyzer for a complete 360-degree rotation. The same procedure was repeated for 800 and 900 MHz sleeve reference dipole. The CW RF output power of the radio was measured by a conducted means to determine the necessary input power for the reference dipole (after compensation for interface, cable, and antenna losses). The maximum power levels measured were compared to determine the antenna gain of the radio antenna in reference to the standard dipole. This relative antenna gain was used to scale the maximum RF conducted output power and determine the maximum herein reported ERP.

7.2. Emission Mask-- Pursuant to 47 CFR 2.947(b)

Method of Measurement: Per TIA/EIA-603-A clause 2.2.11

(1) Set the radio for measurement of RF output power using the power test procedure in the service manual which employs a pseudo random data sequence per part 2.1049(h), and attach it to a spectrum analyzer through a 30 dB attenuator. The analyzer is to be set for peak detection with a video bandwidth of 3 times the resolution bandwidth setting, a span of 100 kHz, and a sweep period of 20 seconds.

(2) Using a 30 kHz resolution bandwidth to assure that essentially all of the transmitted energy is measured, obtain a “rainbow” curve and adjust the analyzer setting so that the crest of the curve lies at the 0 dB reference location. This is portrayed as trace 1 on the analyzer display.

(3) Reduce the resolution bandwidth to 300 Hz to characterize the transmitter emission on-channel and adjacent channels spectral performance characteristic. This is portrayed as trace 2 on the analyzer display of Figures 6-7 to 6-12.

(4) Overlay the applicable emission mask on the analyzer display as trace 3.

(5) Compare traces 2 and 3 to ensure that trace 2 never exceeds trace 3.

7.3. Radiated Spurious Emissions -- Pursuant to 47 CFR 2.947(b)

Test Sites:

Open Area Test Site (OATS) of the Motorola EMC Lab, 8000 W Sunrise Blvd, Plantation, Florida 33322 which is accredited to ISO/IEC 25 from the American Association for Laboratory Accreditation (FCC Registration: 91932/Industury Canada: IC3679). The radiated emission testing was performed for minimum and maximum powers in transmit mode.

The Motorola PCS EMC Laboratory, 1500 Gateway Blvd., Boynton Beach, Florida, 33426 which is accredited to ISO/IEC 17025 from the American Association for Laboratory Accreditation (FCC Registration: 100,000/Industury Canada: IC3908). The radiated emission testing was performed for minimum and maximum powers in transmit mode.

Method of Measurement: TIA/EIA-603-A clause 2.2.12

The equipment is placed on the turntable, connected to a dummy RF load (a 50 ohm load was attached to the semi-rigid cable soldered to the main board) and placed in normal operation transmit mode of operation.

A broad-band receiving antenna located 3 meters from the transmitter receives any signal radiated from the transmitter and its operational accessories. The antenna is adjustable in height and can be rotated for horizontal or vertical polarization. A spectrum analyzer covering the necessary frequency range is used to detect and measure any radiation received by the antenna.

The transmitter's modulated pseudo random digital signal is monitored and adjusted to obtain peak reading of received signals wherever they occur in the spectrum by:

(1) Rotating the transmitter under test.

(2) Adjusting the antenna height.

The testing procedure is repeated for both horizontal and vertical polarization of the receiving antenna. Relative signal strength is indicated on the spectrum analyzer connected to this antenna. The spectrum analyzer resolution bandwidth was set to 10 kHz for emissions below 1 GHz, and 1 MHz for higher frequency emissions. To obtain actual radiated signal strength for each spurious and harmonic frequency observed, a standard signal generator with calibrated output is connected to an antenna adjusted to in the range from 30 MHz to that harmonic frequency. This antenna is substituted for the transmitter under test. The signal generator output level is adjusted until a reading identical to that obtained with the actual transmitter is observed on the spectrum analyzer. Signal strength is then derived from the generator and appropriate cable losses due to set up. Measured emissions for both maximum and minimum transmit power levels are recorded in tables in Exhibit 6.

7.4. Frequency Stability -- Pursuant to 47 CFR 2.947(c)

Measuring the frequency accuracy of the iDEN time division multiplexed (TDM) transmitter needs special procedures for 3 reasons. First is the short (15 ms.) nature of its TDM pulses, which preclude the use of an ordinary CW type digital frequency counter. Second, software in the radio prevents the radio from transmitting its TDM pulses unless it is receiving a signal on the trunking system control channel. Third, to maintain the very high stability (greater than that required by part 90 rules) needed for system operation, the radio transmitter frequency is controlled by an automatic frequency control loop in the radio's receiver which locks onto the system forward control channel produced by a compatible FCC certified part 90 base station. This process results in electronically adjusting the initial frequency of the reference oscillator in the synthesizer section of the radio, which is used for both transmission and reception.

As a result, unlike traditional transceivers which do not frequency lock to a remote base station reference frequency, the transmitter frequency accuracy is essentially independent of the voltage and temperature induced variations of the subject transceiver's frequency reference oscillator. Rather, the transceiver frequency stability is that of the remote base station, but degraded by any inaccuracy in the transceiver frequency locking process. This inaccuracy is primarily attributed to reference oscillator AFC resolution.

By locking onto a base station meeting the requirements of 47 CFR 90.213, which is necessary for the transceiver to function, the transceiver transmitter inherits the inherent 1.5 PPM or better stability of the compatible base station. To assure attainment of the frequency accuracy requirement (2.5 PPM accuracy requirement for the 800MHz band and the 1.5PPM accuracy requirement for the 900MHz band) of part 90.213 for this transceiver, the frequency error is measured when locked to a base station simulator.

<u>Frequency Error vs temperature</u>

The unit tested used a frequency of 858.0625/813.0625 MHz (800MHz Band) and 938.48125/899.48125 MHz (900MHz band). A Power Supply was controlled to provide a continuous 4.1VDC to the unit tested. The sensor leads from the power supply were attached to the input of the battery eliminator of the unit tested. A Temperature Chamber was used to control a temperature range of –30 degree Celsius to +60 degree Celsius.

At each set point, a soak time of 20 minutes was used to ensure thermal penetration of the unit tested before each measurement of frequency error was taken. A soak time 45 minutes was used at –30 degree Celsius to ensure thermal penetration of the unit tested because of the variance from the starting temperature of +25 degree Celsius. Soak cycles of 20 minutes each thereafter were used because of the fact that the set points were incremented at only 10 degree Celsius.

The measurement was taken by putting the unit tested into a phone call to the Motorola R2660C. The iDEN 3:1 Call Test on the Motorola R2660C was controlled to facilitate the call. Once the call had been established, a Hewlett Packard Model 89441A took measurement of the frequency error and recorded it to a data file.

After having taken measurement at a specific set point in the temperature range previously specified, the iDEN 3:1 Call test on the Motorola R2660C was terminated. The Temperature Chamber would proceed to its next increment and repeat the test execution process at the end of that particular soak cycle. The process was continued until measurements were made at each of the specified temperatures in the temperature range previously mentioned.

<u>Frequency Error vs voltage</u>

The unit tested used a frequency of 858.0125/813.0125 MHz (800MHz Band) and 938.48125/899.48125 MHz (900MHz band). A Power Supply was controlled to provide a voltage range of 3.5VDC to 4.3VDC to the unit tested. The sensor leads from the power supply were attached to the input of the battery eliminator of the unit tested.

The measurements were taken by putting the unit tested into a phone call to the Motorola R2660C. The iDEN 3:1 Call Test on the Motorola R2660C was controlled to facilitate the call. Once the call had been established, a Hewlett Packard Model 89441A took measurement of the frequency error and recorded it to a data file.

After having taken a frequency error measurement at 4.3VDC, the Power Supply's output was reduced by an increment of 0.1VDC. The measurement process was repeated until Frequency Error measurements were made in 0.1VDC steps of each of the specified voltages in the range previously mentioned.

The only difference in the test setup compared to the FC vs Temperature set up was that the Temperature Chamber was neither needed nor used for this test.

<u>Method of Measurement: Proprietary</u>

Since the transmitter frequency is locked to the frequency of the compatible base station via the receiver in this transceiver, frequency accuracy data was measured with the transceiver locked onto a base station transmitter emulated by a Motorola R2660C Service Monitor as shown in Figure 7-1. This was done using the QUAD-16QAM time division duplex (TDD) characteristic of the transceiver wherein it was placed into a TDD mode of transmission as normally used to make a call to a landline phone.

During the test the transceiver was receiving a very high accuracy forward control channel frequency signal from the compatible base station emulator and TDD transmitting a signal on the reverse control channel at a frequency 45 MHz lower in the 800MHz band, (39 MHz lower in the 900MHz band) corresponding to the normally assigned frequency separation. A Hewlett Packard model 89441A signal analyzer was used to measure the centroid frequency of the emission. The frequency of the transceiver was measured as operating voltage or temperature was varied, and compared to the frequency of the assigned channel.

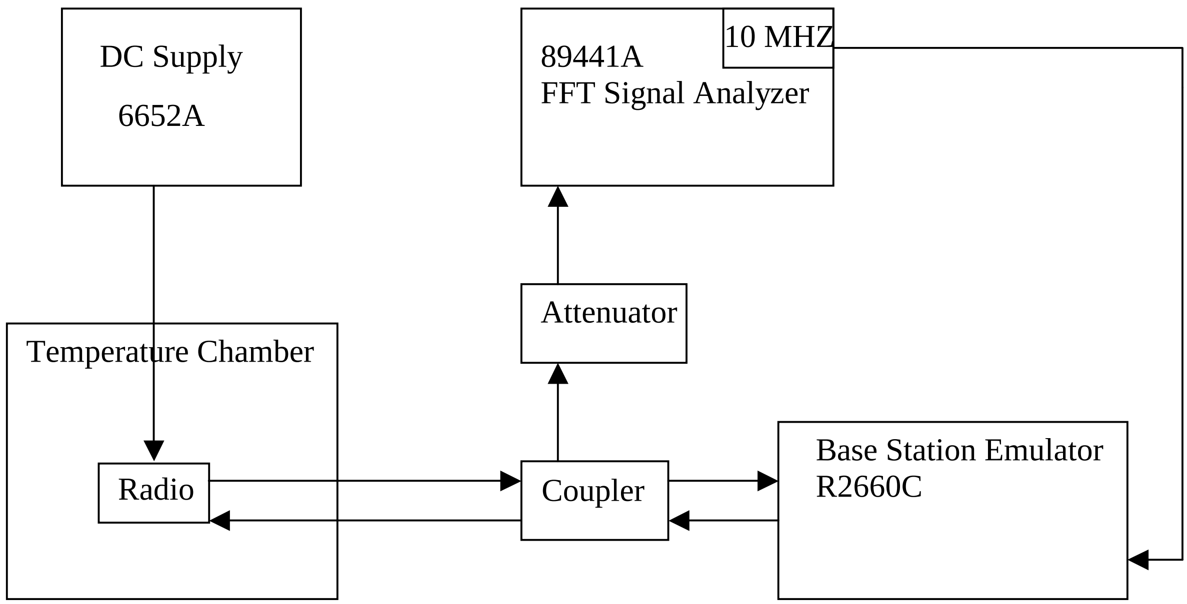

Figure 7-1: Transmit Frequency Measurement Setup

7.5 Power Line Conducted Spurious Output Voltage Pursuant 47 CFR 15.107

Test Site:

The Motorola PCS EME Laboratory, 1500 Gateway Blvd., Boynton Beach, Florida, 33426 which is accredited to ISO/IEC 17025 from the American Association for Laboratory Accreditation (FCC Registration: 100,000/Industury Canada: 3908).

Method of Measurement: TIA/TEA-603-A clause 2.1.3

Connect the receiver to the power line through a line stabilization network. A spectrum analyzer of nominal 50 Ω impedance to one terminal ("neutral") of the line stabilization network. The spectrum analyzer is then tuned to search for spurious outputs from *450kHz to 30 MHz pursuant 47 CFR 15.107*. Record all spurious outputs found. The spectrum analyzer is then connected to the other terminal ("phase") of the line stabilization network and record all spurious outputs found. The power line conducted spurious emissions is the largest reading obtained.

7.6. Measurement Equipment List ---- 47 CFR 2.947(d)

1. Spectrum Analyzer
    A. H.P. 8566B
    B. Rhode & Schwarz ESI26
2. Vector Signal Analyzer
    A. H.P. 89441A
3. Communications System Analyzer
    A. Motorola R2660C MIRS Digital Communication System Analyzer
4. Oscilloscope
    A. LeCroy, Model AP015, Oscilloscope
    B. H.P. 10071A, 10:1 Voltage Probe
    C. Lecroy, LC574AM, Current Probe
5. RF Signal Generator
    A. H.P. 8657B
    B. Rhode and Schwarz SMP22
    C. H.P. E4420A
6. Power Meter
    A. H.P. 437B Power Meter
    B. H.P. 8482A Power Sensor
7. Multimeter
    A. Keithley 2001 Multimeter
8. Power Supply
    A. Motorola Lithium Ion Battery, Kit #: NTN 5705A
    B. DC Power Supply, H.P., Model: 6652A
    C. DC Power Supply, H.P., Model: 6632A
    D. DC Power Supply, H.P., Model: 6032A
    E. Battery Charger, Model: SPN4741A
    F. Battery Eliminator, 22000uF shunt capacitor / series .2 ohm resistor
9. RF Load
    A. Weinschel Engineering, Model: 9305-30, 20 Watt, 30 dB Attenuator
    B. Weinschel Engineering, Model: 9305-10, 20 Watt, 10 dB Attenuator
    C. Narda, Model: MOD766-30, 20 Watt, 30 dB Attenuator
    D. 50 ohm load, Model: FSC 96341
10. Filter
    A. Trilithic, Model: X5HX1612-0-75-AA, High Pass Filter
    B. Trilithic, Model: R9H1-1G4/8G-28A, High Pass Filter
11. Amplifier
    A. MITEQ AFS5-00101800-25-ULN, 1-18GHz, 25dB Gain Amplifier
12. Antenna
    A. Watkins - Johnson, 0.5 GHz - 12.4 GHz, Model WJ-48010
    B. Watkins - Johnson, Model: AR122
    C. A.H. Systems Inc., Model: SAS-200/571, 700MHz - 18GHz, Double Ridge Guide Horn
    D. EMCO, Model: 3141, 20MHz – 1GHz, Biconilog
    E. Schaffner-Chase EMC Ltd., Bilog Antenna, Model CBL6112B
13. Temperature Chamber

A. Thermotron, Model: S-8.0CLISN
A. EMCO, Model: 3810/2NM, Line Impedance Stabilization Network

14. Antenna Positioning Mast / Turntable
    A. Sunol Sciences Corp., Model: FM 2011, Turntable
    B. Sunol Sciences Corp., Model: TLT95, Antenna Positioning Mast
    C. Sunol Sciences Corp., Model: SC98V, System controller
    D. Scientific Atlanta Antenna Analyzer System 2083A
15. Computer
    A. Dell, Model: CPM233XT: Hyperlink Terminal, Laptop Computer
16. Programming Cable
    A. RS232 Data Cable, Model :SKN6315A
17. Cable Adapter
    A. SMA Semi-rigid cable adapter
18. Table
    A. Wood Table
19. RF Tray
    A. OATS RF Tray, Model 2000
20. Test Site
    A. OATS Ground plane
    B. Anechoic Chamber, Emerson & Cummings 1203