Exhibit 7. **Measurement Procedures -----**47 CFR. 2.999

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

All radios under test were powered by Motorola 3.6 V rechargeable Lithium Ion batteries listed as item 7 in Exhibit 7.7.

7.1. RF Power Output -- Pursuant to 47 CFR 2.985

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

The RF power output is not adjustable except by control from the base station using control channel signals. The transmitter power test procedure in the service manual describes the procedure to use radio embedded software to measure the highest level of transmitter power. This measurement is made with an antenna connector through a 30 dB attenuating load using an RF power meter.

Due to the TDM pulsing, an average reading power meter will not correctly display the pulse mean power as it must be corrected for the duty cycle of the pulse train. The Motorola R2660C Service Monitor used for radio servicing provides this compensation. Another instrument which may be used is the Hewlett-Packard model 437B which was used to take the data reported herein. To use it requires setting the duty cycle on the RF power meter to 16.667% for 6:1 TDM (this is the test mode default condition), or 33.333% for 3:1 TDM, or 97.916% for 1:1 TDM in data mode (94 out of 96 slots).

7.2. Occupied Bandwidth -- Pursuant to 47 CFR 2.989

Method of Measurement: Per TIA/EIA-603-1 clause 2.2.11

1.) Set the radio for measurement of RF output power using the power test procedure in the service manual which sets the radio transmit at “full training” mode per part 2.989 (h), and attach it to a spectrum analyzer through an attenuator. The analyzer is to be set for peak detection with a video bandwidth of 10 times the resolution bandwidth setting, a span of 100 seconds, and a span of 100 kHz.

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 and sweep at a period of 2.8 seconds 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 6-5 through 6-16.

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 2.993

<u>Test Site:</u>

The test site is the Motorola LMPS OATS (Open Area Test Site) site, located at, 8000 West Sunrise Blvd., Fort Lauderdale, Florida 33322. Phone Number (954)723-6049. This is a region which is reasonably free from RF interference.

<u>Method of Measurement</u>: EIA/TIA-603-1 clauses 2.2.12 and 5.2.12

The equipment is placed on the turntable, connected to a dummy RF load and placed in normal operation using the intended power source. A broadband receiving antenna located 3 meters from the transmitter picks up any signal radiated from the transmitter and its operation 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 picked up by the antenna.

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

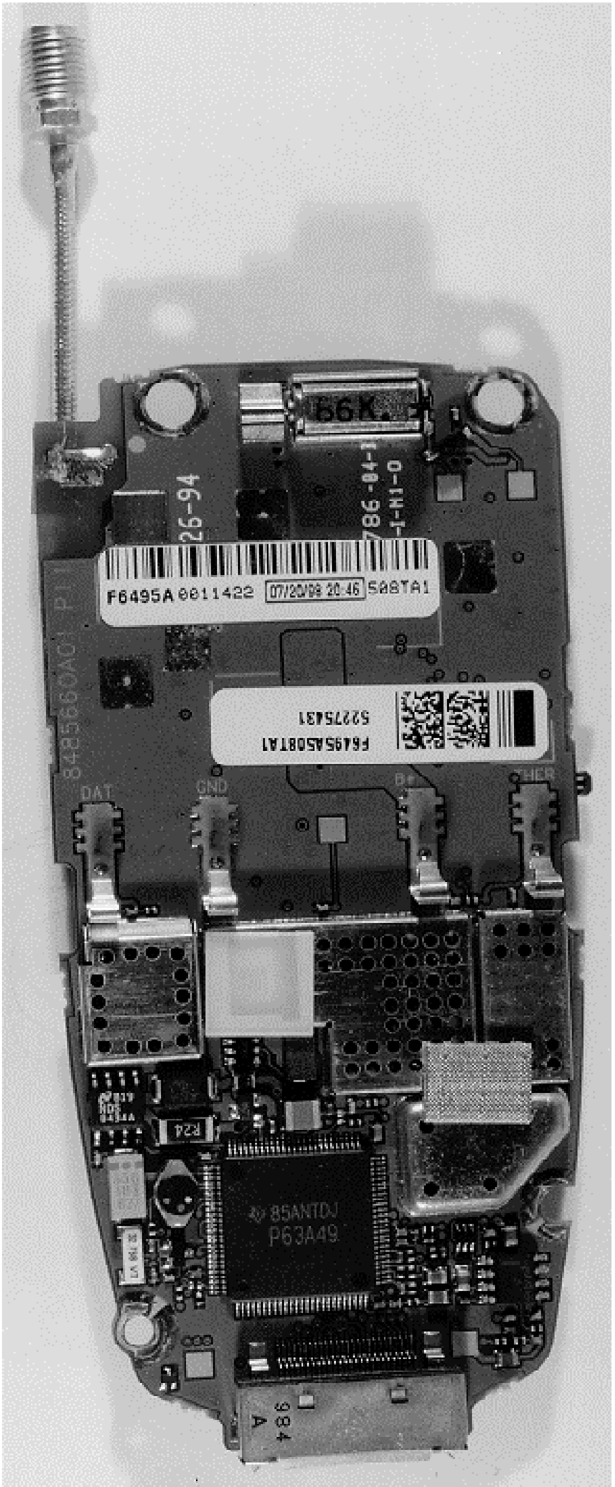
1. Rotating the transmitter under test.
2. Adjusting the antenna height.

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 10kHz for emissions below 1GHz, and 1MHz 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 that particular 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. Actual measurements for both maximum and minimum transmit power levels are recorded in tables in exhibit 6.

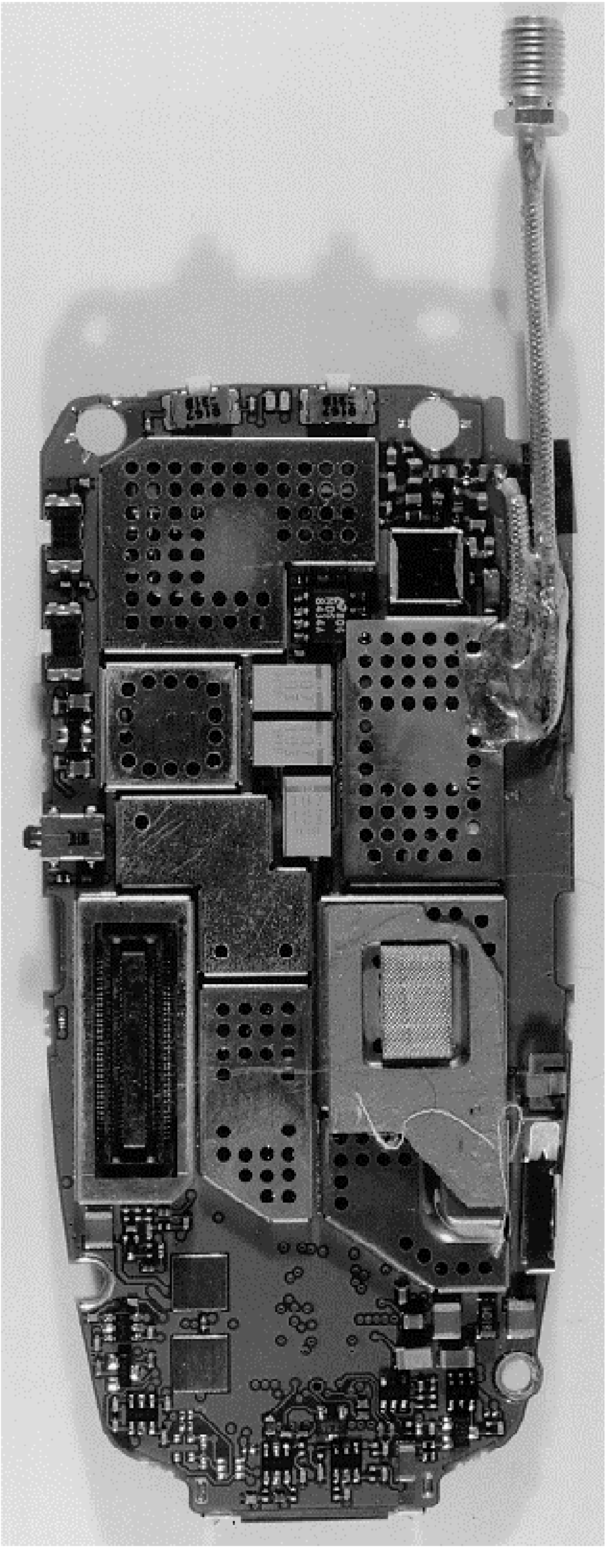
7.4. Conducted Spurious Emissions -- Pursuant to FCC Rule 2.991

<u>Method of Measurement</u>: ANSI/TIA/EIA-603-1992 clauses 2.2.13

To obtain conducted spurious emissions data, a special adapter is made using a semi rigid cable with female SMA connector soldered to the radio main circuit board, and the assembly was placed in a modified housing as illustrated in photographs 7-1 through 7-4. The special adapter is listed as item 20 in Exhibit 7.7.



Photograph 7-1: Back side of main circuit board showing a semi rigid cable with female SMA connector soldered on the board.



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

Photograph 7-3: Front view of radio, with a semi rigid cable with female SMA connector soldered on the main circuit board, and enclosed in modified housing for RX/TX conducted emissions testing.

Photograph 7-4: Back view of radio with battery, with a semi rigid cable with female SMA connector soldered on the main circuit board, and enclosed in modified housing for RX/TX conducted emission testing.

The transmitter is terminated into a 50 ohm load, and the radio is interfaced with a spectrum analyzer with sufficient dynamic range to permit the spurious emission level relative to the carrier level to be measured directly. Measurements at both maximum and minimum transmit power are made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, or as high as the state of the art permits, except for that region within 50kHz of the carrier. The spectrum analyzer is set to use a resolution bandwidth of 10 kHz for spurious emissions below 1GHz, and 1MHz for higher frequency spurious emissions. The video bandwidth is set to three times the resolution bandwidth for both cases.

7.5. Frequency Stability -- Pursuant to FCC Rule 2.995 and 90.213

Frequency Stability is independent of modulation scheme (QPSK, Quad-16QAM, and Quad-64QAM). 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 Type Accepted 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 base station. To assure attainment of the 2.5 PPM accuracy requirement of part 90.213 for this transceiver, the frequency error is measured when locked to ensure that it does not exceed 1.0 PPM.

Method of Measurement: (Proprietary)

Since the transmitter frequency is locked to the frequency of the 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 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.

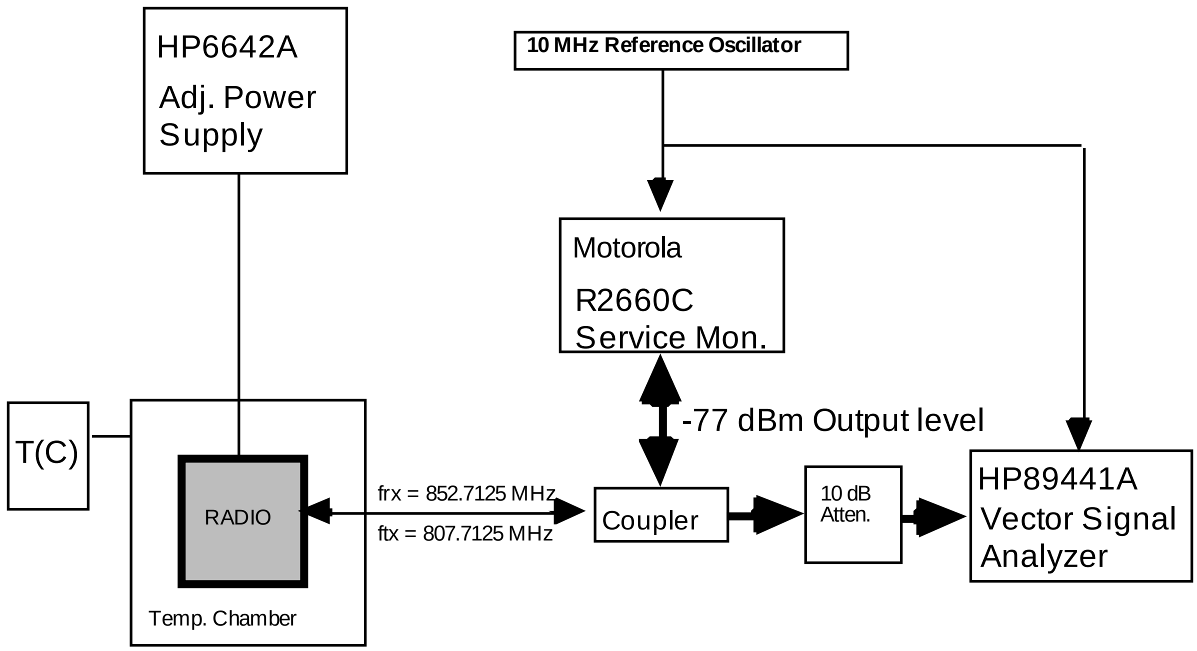


Figure 7-1: Transmit Frequency Measurement Setup

During the test the transceiver was receiving a very high accuracy forward control channel frequency signal from the Service Monitor, and TDD transmitting a signal on the reverse control channel at a frequency 45.000000 MHz lower corresponding to the normally assigned frequency separation. A Hewlett-Packard model 89441A signal analyzer was used to measure the centroid frequency of the emission. This instrument also was locked to the same high stability frequency reference as the Service Monitor.

The frequency of the transceiver was measured as operating voltage or temperature was varied, and compared to the frequency of the R2660C service monitor signal. This produced an error from the expected frequency separation of 45.000000 MHz which was then recorded, and calculated in PPM relative to the expected transmission frequency.

7.6 Power Line Conducted Spurious Emissions -- Pursuant 47 CFR 15.107

Test Site:

The test site is the Florida Atlantic University EMI Research Lab, located at 3998 FAU Blvd., Boca Raton, Florida 33431. Phone Number (561)338-1650. This is a region which is reasonably free from RF interference.

Method of Measurement: EIA/TIA-603-1 clauses 2.1.3 and 5.1.3.3

Connect the receiver to the power line through a line stabilization network. A spectrum analyzer of nominal 50 Ω impedance to one terminal 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 of the line stabilization network and record all spurious outputs found. The power line conducted spurious emissions is the largest reading obtained.

7.7. Measurement Equipment List -----47 CFR. 2.999

1. Spectrum Analyzer
   - A. H.P. 8563E, 9 kHz-26.5 GHz Spectrum Analyzer
   - B. H.P. 8566B ,100 Hz-22 GHz Spectrum Analyzer
   - C. H.P. 8561E, 30 Hz-6.5 GHz Spectrum Analyzer
   - D. Rhode & Schwarz FSEM30, 10Hz – 26.5GHz Spectrum Analyzer
2. Quasi-Peak Adapter
   - A. H.P. 85650A, 10 kHz - 1 GHz Quasi-Peak Adapter
3. Vector Signal Analyzer
   - A. H.P. 89441A, DC - 2650 MHz Vector Signal Analyzer
4. Communications System Analyzer
   - A. Motorola R2660C MIRS Digital Communications System Analyzer
5. Power Meter
   - A. H.P. 437B Power Meter
   - B. H.P. 8482A Power Sensor
6. Multimeter
   - A. H.P. 3487A Multimeter
7. Power Supply
   - A: Motorola 6 mm 600 mAh 3.6 V Lithium Ion Battery, Kit #: NTN 8615A
   - B: Motorola 8 mm 900 mAh 3.6 V Lithium Ion Battery, Kit #: NTN 8614A
8. RF Load
   - A. Weinschel Associates, Model: WA1419-2, S/N: 675, 50 Ohm, 10 Watt Termination
   - B. Weinschel Associates, Model: 41-10-12, S/N: 5408, 10 Watt , 10 dB Attenuator
9. Filter
   - A. Mini-Circuits, Model: SLP-550, 9536-15, Low Pass Filter
   - B. Trilithic, Model: 7HX1000-3-AA, 9431130, High Pass Filter
   - C. Trilithic, Model: X5HX1612-0.75-AA, 23042, High Pass Filter
10. Amplifier
    - A. H.P. 8447F, 0.1 - 1300 MHz, 26 dB Gain Amplifier
    - B. H.P. 83017A, 0.5 - 26.5 GHz, 25 dB Gain Amplifier
    - C. MITEQ ATS5-00101800-60-10P-5, 0.1-18GHz, 25dB Gain Amplifier
11. Antenna
    - A. Electro-Mechanics Co., Model: 3104, S/N: 2737 & 2738, 20 MHz - 200 MHz, Biconical Antenna

B. Electro-Mechanics Co., Model: 3146, S/N: 1385, 200 MHz - 1000 MHz, Log-Periodic Antenna
C. Electro-Mechanics Co., Model: 3115, S/N: 2573, 1 GHz -18 GHz, Double Ridge Guide Horn Ant.
D. Watkins -Johnson, Model: WJ48010, S/N: 234, 0.5 GHz - 12.4 GHz, Log - Periodic Antenna
E. A.H. Systems Inc., Model: SAS-200/571, S/N: 272, 700MHz - 18GHz, Double Ridge Guide Horn Antenna
F. A.H. Systems Inc., Model: SAS-200/571, S/N: 271, 700MHz - 18GHz, Double Ridge Guide Horn Antenna
G. EMCO, Model: 3143, S/N: 9403-1019, 20MHz – 1GHz, Biconilog Antenna
H. EMCO, Model: 3141, S/N: 9403-1047, 20MHz – 1GHz, Biconilog Antenna

12. Temperature Chamber
    A. Votsch, model VT4002
13. LISN
    A. Solar, Model: 8028-50, Line Impedance Stabilization Network
14. Antenna Positioning Mast
    A. Electro-Mechanics Co., Model: 1050
15. Computer
    A. IBM PC Or Compatible, 486 Or Higher, Window 3.1/Window 95 Or Higher.
    B. HP9121 (CPU) , HP9816 (Monitor)
16. RF Signal Generators
    A. HP8683D 2.3 - 13.0 GHz RF Signal Generator
17. Programming Cable
    A. DB9 (IBM) - NKN6488 (Motorola)
18. Table
    A. Wood Table, 0.8 m x 1.0 m x 1.5 m
19. Groundplane

20. Semi Rigid Cable With Female SMA Connector.

21. Heslett Packard HP54616B Oscilloscope 500MHz

22. Tektronix 1103 Tekprobe Power Supply

23. Tektronix TCP202 Current Sensor Probe