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 Conducted 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 reading, the radio was programmed to utilize the maximum and minimum output power setting. 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.

A special DC/RF test fixture was utilized to interface with the radio test RF connector while simultaneously supplying the nominal operating voltage of 4.0V. The radio RF connector is utilized in all factory tuning and testing procedures, and provides a 50-ohm connection to the transmitter path while disconnecting the radio antenna. All conducted measurements were performed via this test port.

NOTE: This DC/RF test fixture in not offered for sale.

Method of Measurement for Effective Radiated Power: TIA/EIA-603-B 2.2.17.2

The ERP characteristic was measured while a radio was set to transmit a test mode CW signal at the maximum rated output power (+/- 5%) and was vertically mounted on a non-conducting platform/turntable in a RF Anechoic Chamber. 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 product 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 10 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 locations. This is portrayed as blue line 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 yellow line on the analyzer display of the figures.

(4) Overlay the applicable emission mask on the analyzer display as red line.

(5) Compare yellow line and red line to ensure that the spectrum never exceeds the applicable emission mask.

For Quad-QPSK Modulation:

32K Bits Per Second Pseudo-Random Digital Modulation.
Vertical division: 10 dB/div.
Carrier Reference: Carrier Reference 0 dB corresponds to maximum and minimum peak output power settings, respectively.

For Quad-16QAM Modulation:

64K Bits Per Second Pseudo-Random Digital Modulation
Vertical: 10 dB/div
Carrier Reference: Carrier Reference 0 dB corresponds to maximum and minimum peak output power settings, respectively.

For Quad-64QAM Modulation:

96K Bits Per Second Pseudo-Random Digital Modulation
Vertical: 10 dB/div
Carrier Reference: Carrier Reference 0 dB corresponds to maximum and minimum peak output power settings, respectively.

One trace was used to capture transmitter performance, measured using a resolution bandwidth of 300 Hz, while the reference level was obtained by another trace, using a resolution bandwidth of 30 kHz. A third trace shows the applicable emission mask.

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

Test Sites:

1. 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.

2. TIMCO Engineering Lab, 849 NW State Road. 45Newberry, Florida 32669

3. FAU EMI Lab, Florida Atlantic University, 3998 N.W. 8th Street (FAU Blvd) Suite #310, Boca Raton, FL 33431.

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

800-900 and 901-902 MHz Band

The equipment is placed on the turntable and placed in normal operation transmit mode of operation.

A broadband 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.

MOTOtalk 900 MHz ISM Band Measurement

Source: FCC Public Notice DA 00-705 March 30, 2000. "Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems"

The following spectrum analyzer settings were used:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Following the guidelines in ANSI C63.4-1992 with respect to maximizing the emission by rotating the EUT, the emissions were measured at maximum and minimum power output. A pre-amp and a high pass filter are required for this test in order to provide the measuring system with sufficient sensitivity. After allowing the trace to stabilize, the peak reading of the emission is the peak field strength, after applying the appropriate correction factors.

Next the VBW is set to 10 Hz, while maintaining all of the other instrument settings. This peak level is measured and corrected. The dwell time per channel of the hopping signal is less than 100 ms, so the reading obtained with the 10 Hz VBW was further adjusted by a "duty cycle correction factor", derived from 20 log (dwell time/100 ms):

Dwell time = 274 symbols/3200symbols/sec = 85.625ms

Correction factor 20 log (85.625ms/100ms) = -1.348 dB

Equipment used for radiated emissions measurements (FL08 EMC Lab):

Site	3 Meters
Antenna	Horn 511
Amp	Amp #1
Cables	#101 and #102

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 three 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 24 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 24 base station. This process results in electronic adjustments of 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.

By locking onto a base station meeting the requirements of 47 CFR 90.213 and 47 CFR 24.135, which is necessary for the transceiver to function, the transceiver transmitter inherits the inherent stability of the compatible base station. To assure attainment of the frequency accuracy requirement (1 ppm accuracy requirement for the 901-902 MHz band) of Parts 24.135 and 90.213 for this transceiver, the frequency error is measured when locked to a base station simulator. Since the same techniques are used for operation in the Narrowband PCS band, the frequency stability there will be comparable.

Land Mobile and Narrowband PCS Band Frequency Error vs. temperature

The unit tested used a frequency of 858.5125/813.5125 MHz (800MHz Band) and 935.01875/896.01875 MHz (900MHz band). A Power Supply was controlled to provide a continuous 4.0VDC to the unit tested. The sensor leads from the power supply were attached to the input of the DC/RF test fixture in which the radio was placed. 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 of 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 10 degree (Celsius) steps.

The measurement was taken by placing 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 gathered measurements 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.

For MOTOtalk measurement, a special test mode which is not accessible by user was used. Frequency was set to 915.525 MHz (ISM band frequency) and transmission started after the soaking cycle on the device under test. A Hewlett Packard Model 89441A was used to measure the maximum frequency excursion due to temperature extremes.

After having taken measurement at a specific set point in the temperature range previously specified, the transmission was terminated by sending a command. 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.

Land Mobile and Narrowband PCS Band Frequency Error vs. voltage

The unit tested used a frequency of 858.45/813.45 MHz (800MHz Band) and 937.48125/898.49375 MHz (900MHz band). A Power Supply was controlled to provide a voltage range of 3.55VDC to 4.2VDC 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 placing 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 $4.2V_{DC}$, the Power Supply's output was reduced by $0.1V_{DC}$. The measurement process was repeated until Frequency Error measurements were made in $0.1V_{DC}$ steps of each of the specified voltages in the range previously mentioned.

ISM Band Frequency Error measurement in 902 MHz to 928 MHz ISM band

The unit was tested at a transmitter output frequency of 915.525 MHz. A power supply with the capability of toggling between 4.0 V and 3.55 V was used to provide battery voltage to the unit being tested. The units RF output was attached to a spectrum analyzer capable of making an occupied bandwidth measurement with high frequency accuracy.

The measurements were made by soaking the unit tested in an idle mode for the length of time necessary to stabilize transmitter temperature, at least 40 min per temperature. At the end the temperature soak the transmitter was enabled in the ISM band. Frequency deviation from 915.525 MHz was recorded after the transmitter had produced full output power for 10 seconds (as determined manually).

During operation of the transmitter at -30C, 20C, and 50C an attempt was made to determine frequency error caused by changing the supply voltage from 4.0 VDC (nominal) to 3.55 VDC (minimum). The voltage was toggled from nominal to minimum to nominal repeatedly while monitoring frequency.

Method of Measurement: Proprietary

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.

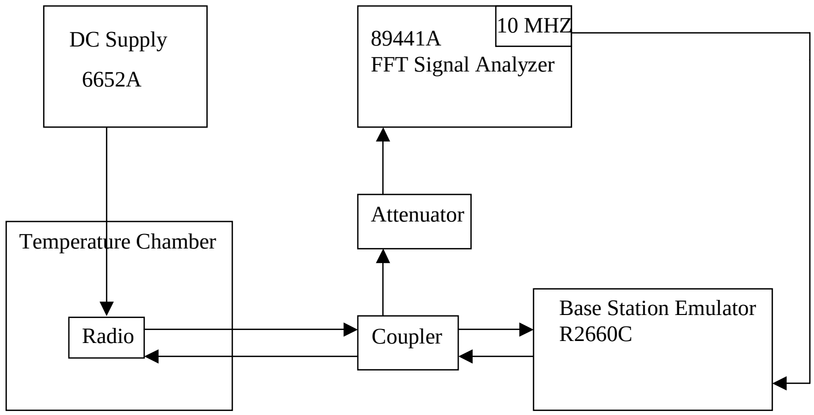

Figure 7-1: Transmit Frequency Measurement Setup

7.5 Power Line Conducted Spurious Output Voltage Pursuant 47 CFR 15.107

Test Site:

Florida Atlantic University EMI Lab, Boca Raton, Florida which is accredited to ISO/IEC 25 from the American Association for Laboratory Accreditation (FCC Registration: 90599/Industury Canada: IC46405-4076).

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 50Ω impedance to one terminal ("neutral") of the line stabilization network. The spectrum analyzer is then tuned to search for spurious outputs from *150 kHz to 30 MHz pursuant 47 CFR 15.107*. All spurious voltages are recorded. Six highest local maxima are noted, measured with a "Quasi-peak" and "Average" detectors, and then tabulated.

7.6 Carrier Separation between Hopsets

The carriers within a 900 ISM Band hopset are separated by 500 kHz, and the 20 dB bandwidth of a 900 ISM Band carrier is 25.6 kHz.

The test is setup as shown in Figure 7-2. The spectrum analyzer is setup to capture two adjacent carriers. Transmission in the 900 ISM Band mode is initiated until relevant data is captured.

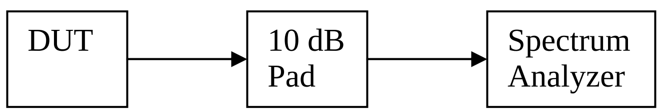

Figure 7-2. Test bench for ISM Band multi-channel measurements.

7.7 Hopping Bandwidth between Hopsets

The aggregate of all 10 hopsets result in an overall carrier separation of 50 kHz with a 20 dB bandwidth of 25.6 kHz.

Step 1. Connect the DUT to the spectrum analyzer as in Figure 7-3.
Step 2. Set up the spectrum analyzer as required to measure the 20 dB bandwidth
Span = 100 kHz
RBW = 300 kHz
Sweep = Auto
Ref. Level = 30 dBm
Trace = Max Hold (RMS Detector used)

Occupied Bandwidth
Step 3. Initiate Transmission until relevant data captured.
Step 4. Set up the spectrum analyzer as required to capture two adjacent carriers.
Span = 150 kHz
RBW = 300 Hz
Sweep = Auto
Ref. Level = 30 dBm
Trace = Max Hold
Use Markers
Step 5. Initiate Transmission until relevant data captured.

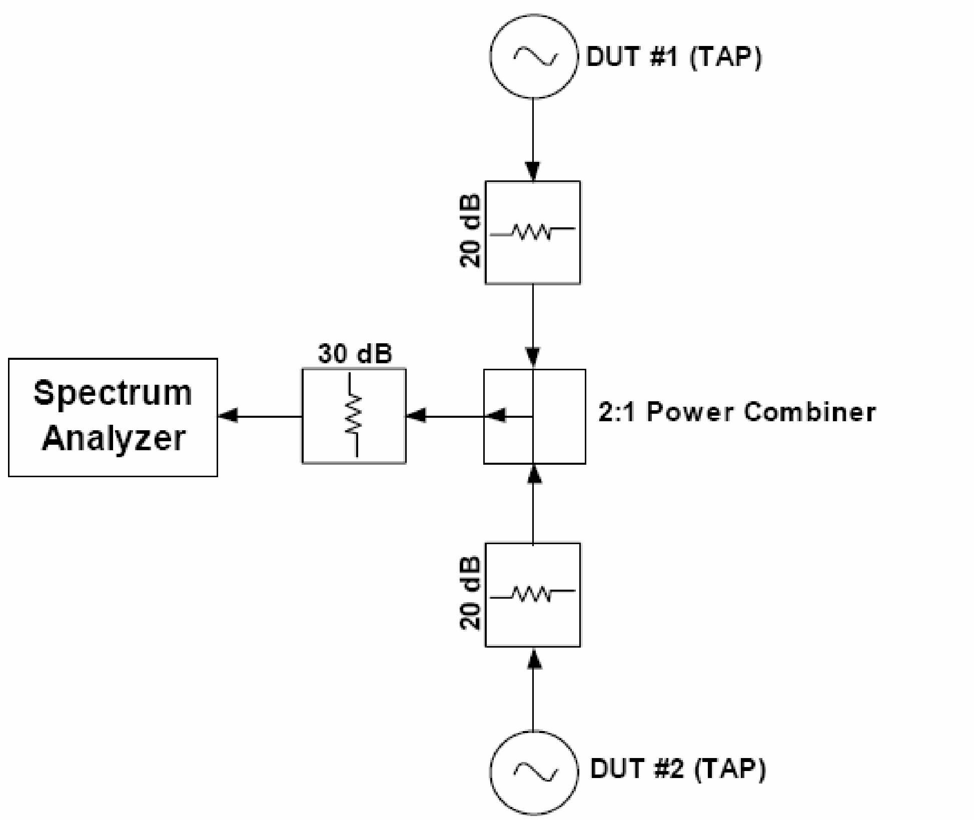

Figure 7-3. Test setup for multi-channel measurements.

7.8 Average Time of Occupancy

Step 1. Set up the spectrum analyzer (or oscilloscope) as required to capture a single transmitted burst (or a continuous stream of bursts at the same frequency).

Step 2. Initiate Transmission until relevant data captured.

Step 3. Measure the duration of the 85.625 ms burst.

Step 4. Describe worst case scenario (continuous transmission).

7.9 Equal Distribution of Hopping Frequencies for Continuous Transmission

Through ISM Band subscriber test-mode software, a frequency counting algorithm was implemented and used to keep count of how many times a particular frequency was used during a continuous transmission with a DUT. From this data, the frequency distribution can be calculated.

7.10 Equal Distribution of Hopping Frequencies for Discontinuous Transmission

Through ISM Band subscriber test-mode software, a frequency counting algorithm was implemented and used to keep count of how many times a particular frequency was used during a transmission with a DUT. The algorithm used the probability density function for 800/900 Band dispatch call lengths based on actual user data (refer to Figure 7-4) to model multiple ISM Band transmission times with the same call length distribution. The frequency distribution was calculated from the data generated.

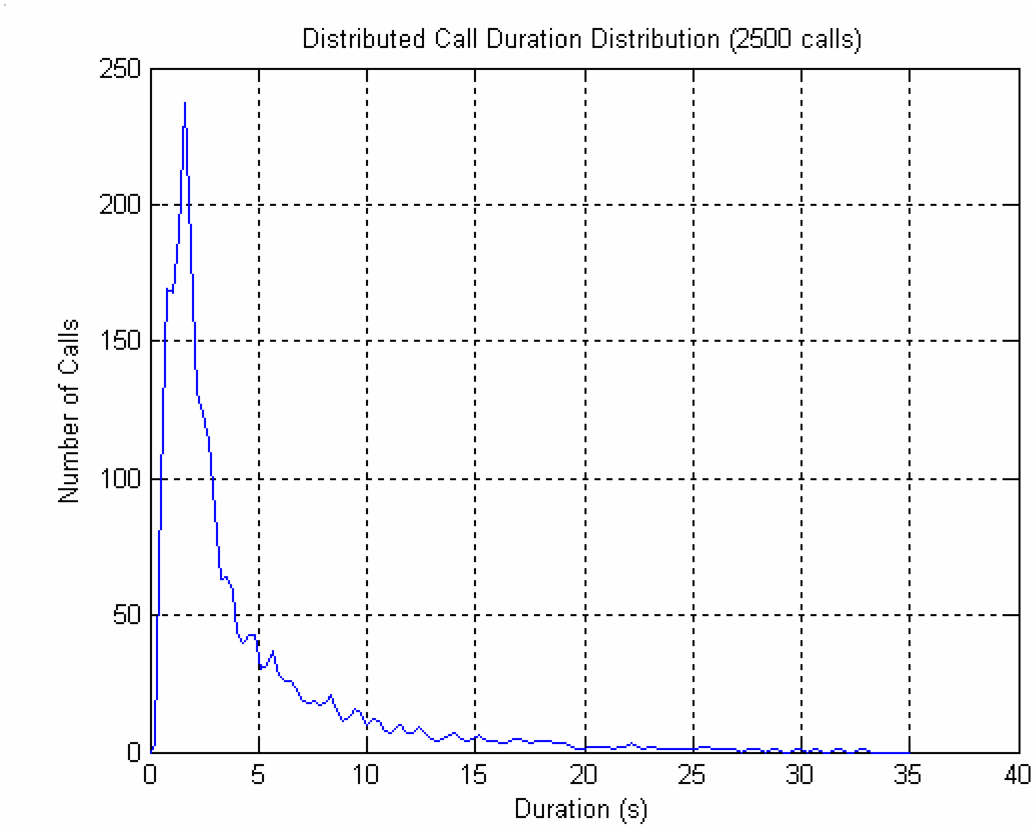

Figure 7-4. Call-length Probability Distribution Function

7.11 Measurement Equipment List ---- 47 CFR 2.947(d)

1. Spectrum Analyzer
    - H.P. 8566B
    - H.P. 8563E
    - Rhode & Schwarz ESI26
    - Rhode & Schwarz ESMI
    - Rhode & Schwarz FSEB
2. Vector Signal Analyzer
    - H.P. 89441A
3. Communications System Analyzer
    - Motorola R-2660 MIRS Digital Communication System Analyzer
4. Oscilloscope
    - HP 54616B, Oscilloscope
    - Tektronix, Model TCP202, Current Probe
5. RF Signal Generator
    - H.P. 8656A
    - Rhode and Schwarz SMP22
    - H.P. E4420A
6. Power Meter
    - H.P. 437B Power Meter
    - H.P. 8482A Power Sensor
    - Gigatronics 8651A Power Meter
    - Gigatronics 80701A Power Sensor
7. Multimeter
    - Keithley 2001 Multimeter
8. Power Supply
    - Motorola Lithium Ion Battery, Kit #: NTN 5705A
    - DC Power Supply, H.P., Model: 6652A
    - DC Power Supply, H.P., Model: 6632A
    - DC Power Supply, H.P., Model: 6032A
    - Battery Charger, Model: NNTN4680A
    - DC/RF Test Fixture, 22000uF shunt capacitor / series .2 ohm resistor
9. RF Load
    - Weinschel Engineering, Model: 9305-30, 20 Watt, 30 dB Attenuator
    - Weinschel Engineering, Model: 9305-10, 20 Watt, 10 dB Attenuator
    - Narda, Model: MOD766-30, 20 Watt, 30 dB Attenuator
10. Filter
    - Trilithic, Model: X5HX1612-0-75-AA, High Pass Filter
    - Trilithic, Model: R9H1-1G4/8G-28A, High Pass Filter

11. Amplifier
    - MITEQ AFS5-00101800-25-ULN, 1-18GHz, 25dB Gain Amplifier
    - PST 10W Amplifer

12. Antenna Chamber
    - Anechoic Chamber, RF/EMI Shielded Enclosure

13. Antenna
    - Watkins - Johnson, 0.5 GHz - 12.4 GHz, Model WJ-48010
    - Watkins - Johnson, Model: AR122
    - A.H. Systems Inc., Model: SAS-200/571, 700MHz - 18GHz, Double Ridge Guide Horn
    - EMCO, Model: 3141, 20MHz – 1GHz, Biconilog
    - Schaffner-Chase EMC Ltd., Bilog Antenna, Model CBL6112B
    - Watkins-Johnson L.P. antenna AR7-17A
    - Reference Sleeve-Dipole

14. Temperature Chamber
    - Thermotron, Model: S-8.0C
15. LISN
    - EMCO, Model: 3810/2NM, Line Impedance Stabilization Network

16. Antenna Positioning Mast / Turntable
    - Sunol Sciences Corp., Model: FM 2011, Turntable
    - Sunol Sciences Corp., Model: TLT95, Antenna Positioning Mast
    - Sunol Sciences Corp., Model: SC98V, System controller
    - Scientific Atlanta Antenna Analyzer System 2083A

17. 17. Vector Network Analyzer
    - Anritsu MS4624B Vector Network Analyzer

18. Computers
    - Dell, Laptop Computer
    - Hitachi MX 166 computer, Hyperlink Terminal
    - Dell Precision 420 Computer
19. Programming Cable
    - RS232 Data Cable
20. Table
    - Wood Table
21. RF Tray
    - OATS RF Tray, Model 2000

22. Test Site
    - OATS, Ground plane
    - 60' Tapered Anechoic Chamber, Emerson & Cummings 1203
    - FAU EMI Lab