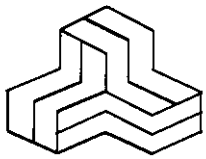
ENGINEERING TEST REPORT



World's Smallest 900 MHz Video-Transmitter
MODEL NO.: XLT-900

FCC ID: OFHXLT-900

FCC PART 15, SUBPART C, PARA. 15.249
LOW POWER TRANSMITTERS
OPERATING IN THE FREQUENCY BAND FROM 902 - 928 MHz

UltraTech's FILE NO.: VOS-001FT

TESTED FOR:

VOSTEK ELECTRONICS
20 Gamble Avenue, Suite 1017
Toronto, Ontario
Canada, M4K 2G9

TESTED BY:

UltraTech Engineering Labs Inc.
4181 Sladeview Crescent, Unit 33
Mississauga, Ontario
Canada L5L 5R2

PREPARED BY: Dan Huynh

DATE: February 12, 1999

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1. EXHIBIT 1 - SUMMARY OF TEST RESULTS & GENERAL STATEMENT OF CERTIFICATION

FCC PARAGRAPH.	TEST REQUIREMENTS	COMPLIANCE (YES/NO)
15.249(a), 15.209, 15.205 & 1.1310	Transmitter Radiated Emissions, Harmonic Emissions and RF Exposure Limit	Yes
15.107(a)	AC Power Conducted Emissions	Not applicable for battery operated equipment

Note: This Radio Transmitter works together with the Poptron Radio Receiver, Model PTV-402, which has been certified by FCC under FCC ID: KK7-PTU-402

TESTIMONIAL AND STATEMENT OF CERTIFICATION

THIS IS TO CERTIFY:

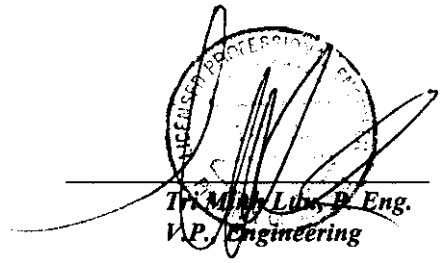
1) *THAT the application was prepared either by, or under the direct supervision of the undersigned.*

2) *THAT the measurement data supplied with the application was taken under my direction and supervision.*

3) *THAT the data was obtained on representative production units, representative.*

4) *THAT, to the best of my knowledge and belief, the facts set forth in the application and accompanying technical data are true and correct.*

Certified by:



Tri Minh Luu, P. Eng.
V.P., Engineering

DATE: February 12, 1999

2. EXHIBIT 2 - GENERAL INFORMATION

2.1. Applicant

VOSTEK ELECTRONICS
20 Gamble Avenue, Suite 1017
Toronto, Ontario
Canada, M4K 2G9

Applicant's Representative: Mr. Vasko Bjelica

2.2. Manufacturer

VOSTEK ELECTRONICS
20 Gamble Avenue, Suite 1017
Toronto, Ontario
Canada, M4K 2G9

2.3. Description of Equipment under Test

PRODUCT NAME:	World's Smallest 900 MHz Video-Transmitter
SERIAL NUMBER:	Pre-production
TYPE OF EQUIPMENT:	DSSS Transmitters
OPERATING FREQ.:	902 - 928 MHz
BANDWIDTH (26 dB OBW):	25.0 kHz
POWER RATING:	0.21 m Watts peak
DUTY CYCLE:	Continuous
EMISSION DESIGNATION:	25K0A3W
INPUT SUPPLY:	9-V battery
FCC ID:	OFHXLT-900

3.3. Justification

No deviation, in both configuration and operation manners, different from normal operation were required.

3.4. EUT Operating Condition

The smallest 900 MHz video transmitter can be used for any security applications or video-observation wireless type. This low power unit can transmit picture up to 200-300 ft. The EUT was set to transmits continuously, AM modulated with a video signal from a video camera, during testing.

3.5. Special Accessories

No special accessories were required.

3.6. Equipment Modifications

Not required.

4. EXHIBIT 4 - TEST DATA

4.1. *Transmitter Fundamental & Harmonic Radiated Emissions @ FCC CFR 47, Para 15.249(a)*

PRODUCT NAME: **World's Smallest 900 MHz Video-Transmitter, Model No.: XLT-900**

FCC REQUIREMENTS:

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

FUNDAMENTAL FREQUENCY	Field Strength of Fundamental @ 3m (dBuV/m)	Field Strength of Harmonics @ 3m (dBuV/m)
902 – 928 MHz	94.0	54.0

Remarks:

- Applies to harmonics/spurious emissions that fall in the restricted bands listed in Section 15.205. The maximum permitted average field strength is listed in Section 15.209.
- **@ FCC CFR 47, Para. 15.237(c)** - The emission limits as specified above are based on measurement instrument employing an average detector. The provisions in **@15.35** for limiting peak emissions apply.

FCC CFR 47, Part 15, Subpart C, Para. 15.205(a) - Restricted Frequency Bands

MHz	MHz	MHz	GHz
0.090 - 0.110	162.0125 - 167.17	2310 - 2390	9.3 - 9.5
0.49 - 0.51	167.72 - 173.2	2483.5 - 2500	10.6 - 12.7
2.1735 - 2.1905	240 - 285	2655 - 2900	13.25 - 13.4
8.362 - 8.366	322 - 335.4	3260 - 3267	14.47 - 14.5
13.36 - 13.41	399.9 - 410	3332 - 3339	14.35 - 16.2
25.5 - 25.67	608 - 614	3345.8 - 3358	17.7 - 21.4
37.5 - 38.25	960 - 1240	3600 - 4400	22.01 - 23.12
73 - 75.4	1300 - 1427	4500 - 5250	23.6 - 24.0
108 - 121.94	1435 - 1626.5	5350 - 5460	31.2 - 31.8
123 - 138	1660 - 1710	7250 - 7750	36.43 - 36.5
149.9 - 150.05	1718.8 - 1722.2	8025 - 8500	Above 38.6
156.7 - 156.9	2200 - 2300	9000 - 9200	

FCC CFR 47, Part 15, Subpart C, Para. 15.209(a)
-- Field Strength Limits within Restricted Frequency Bands --

FREQUENCY (MHz)	FIELD STRENGTH LIMITS (microvolts/m)	DISTANCE (Meters)
0.009 - 0.490	2,400 / F (KHz)	300
0.490 - 1.705	24,000 / F (KHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

CLIMATE CONDITION:

Standard Temperature and Humidity:

- Ambient temperature: 23 °C
- Relative humidity: 51%

POWER INPUT:

9 V battery

TEST EQUIPMENT:

- **Spectrum Analyzer**, Advantest, Model R3271, S/N: 15050203, 100 Hz to 32 GHz)
- **Spectrum Analyzer**, Advantest, Model 3261A, SN 91720151, Input +25dBm max., 9KHz-2.6GHz, 50 Ohms, built-in Quasi-Peak Detector.
- **RF Preselector,** Advantest Model R3551, SN 92970002, 9KHz-1GHz, 50 Ohms input/output, input +25 dBm max, 30 dB gain.
- **Microwave Amplifier**, HP, Model 83017, Frequency Range 0.5 to 26.5 GHz, 30dB gain nominal.
- **Active Loop Antenna**, Emco, Model 6507, SN 8906-1167, Frequency Range 1 KHz - 30 MHz, @ 50 Ohms
- **Log Periodic/Bow-Tie Antenna**, Emco, Model 3143, SN 1029, 20 - 1000 MHz, @ 50 ohms.
- **Log Periodic Antenna**, A.H. Systems, Model SAS-200/518, SN 343, Frequency Range: 1 - 18 GHz, @ 50 Ohms.
- **Horn Antenna**, Emco, Model 3160-09, 18-26.5GHz

METHOD OF MEASUREMENTS:

Refer to **ANSI 63.4-1992, Para. 8** for detailed radiated emissions measurement procedures.

Applies to harmonics/spurious that fall in the restricted bands listed in Section 15.205. the maximum permitted average field strength is listed in Section 15.209. A Pre-Amp and highpass filter are used for this measurement.

For measurement below 1 GHz, set RBW = 100 KHz, VBW $\geq$ 100 KHz, SWEEP=AUTO.

For measurement above 1 GHz, set RBW = 1 MHz, VBW = 1 MHz (Peak) & VBW = 10 Hz (Average), SWEEP=AUTO.

If the emission is pulsed, modified the unit for continuous operation, then use the settings above for measurements, then correct the reading by subtracting the peak-average correction factor derived from the appropriate duty cycle calculation. See Section 15.35(b) and (c).

FCC CFR 47, Para. 2.997 - Frequency spectrum to be investigated

The spectrum was investigated from the lowest radio generated in the equipment up to at least the 10th harmonic of the carrier frequency or to the highest frequency practicable in the present state of the art of measuring techniques, whichever is lower. Particular attention should be paid to harmonics and subharmonics of the carrier frequency. Radiation at the frequencies of multiplier stages should be checked. The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

FCC CFR 47, Para. 2.993 - Field Strength Spurious Emissions

(a) Measurements was made to detect spurious emissions radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data were supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph 2.989(c) as appropriate. For equipment operating on frequencies below 1 GHz, an Open Field Test is normally required, with the measuring instrument antenna located in the far field at all test frequencies. In event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurement will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with the reference to the rated power output of the transmitter, assuming all emissions are radiated from half-wave dipole antennas.

(b) Measurements specified in paragraph (a) of this section shall be made for the following equipment:

(1) Those in which the spurious emission are required to be 60 dB or more below the mean power of the transmitter.
(2) All equipment operating on frequencies higher than 25 MHz
(3) All equipment where the antenna is an integral part of, and attached directly to the transmitter.
(4) Other types of equipment as required, when deemed necessary by the Commission.

TEST RESULTS: Conforms.

TEST PERSONNEL: Mr. Hung Trinh, RFI Technician

DATE: January 29, 1999

MEASUREMENT DATA

RADIATED EMISSIONS MEASUREMENTS @ 3 METERS

TEST CONFIGURATION

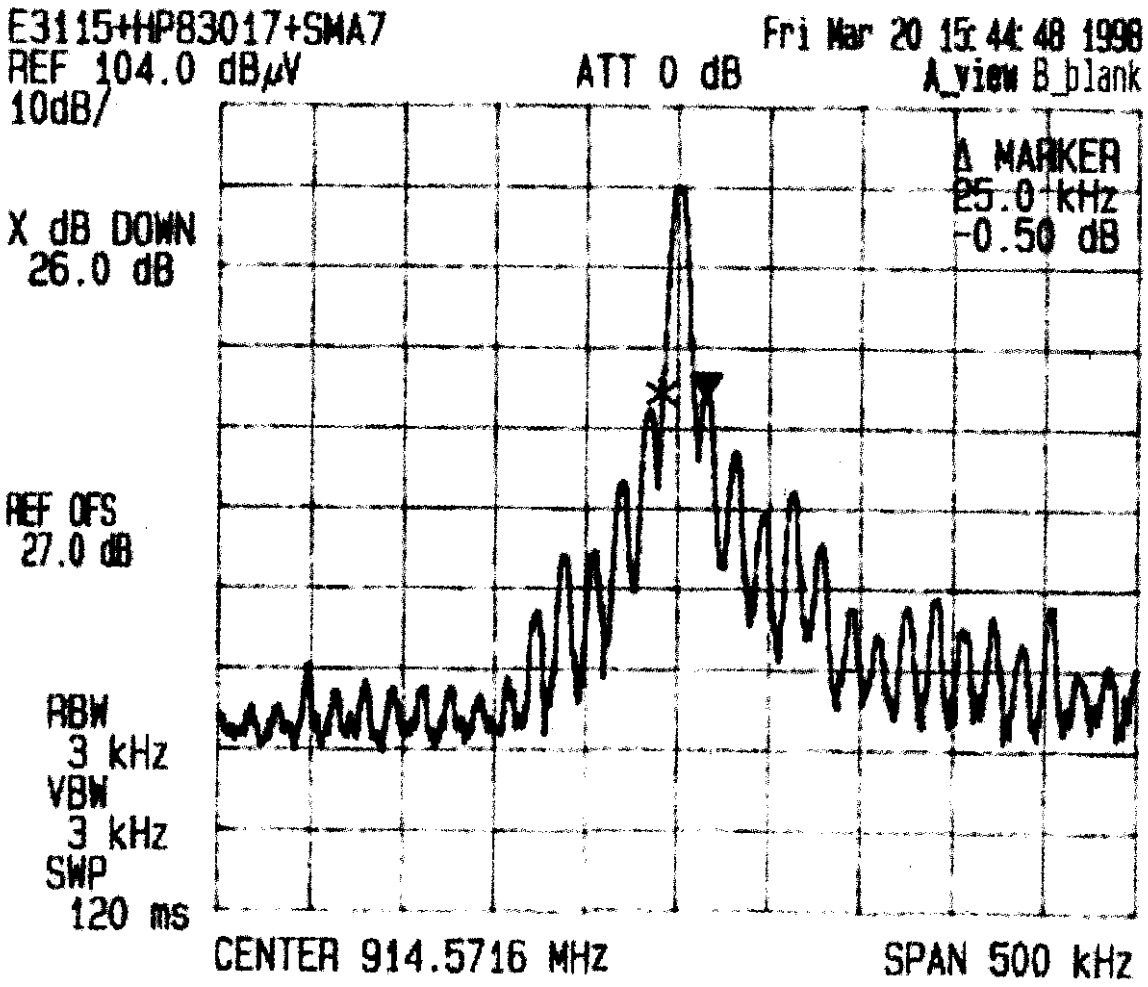
- *This lowest, middle and highest channels were established at its full rated output power. The emissions were investigated from the lowest frequency generated by the transmitter up to the 10th harmonic of the fundamental emissions in each case. the measured level of the carrier was recorded and compared to the level of the emissions as required in Parts 15.249(c) or 15.209(a) whichever was applicable.*
- *For measuring radiated emissions at frequencies below 1 GHz, the Spectrum Analyzer was set as 100 KHz RBW, VBW ≥ RBW, SWEEP TIME: AUTO, PEAK DETECTOR.*
- *For measuring radiated emissions at frequencies above 1 GHz, the Spectrum Analyzer was set as 1 MHz RBW, 1 MHz VBW, SWEEP TIME: AUTO for PEAK measurements and 1 MHz RBW, 10 Hz VBW, SWEEP TIME: AUTO for AVERAGE measurements.*
- *The following measurements were the worst cases when the radiating antenna was placed in both horizontal and vertical polarization.*
- *The following **AVERAGE** rf levels were obtained from either Peak or Average readings added by the duty cycle correction factor. **DUTY CYCLE FACTOR = Continuous.***

FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT 15.249 (dBuV/m)	MARGIN (dB)	PASS/ FAIL
916.63	**84.1**	**V**	**--**	**94.0**	**-9.9**	**PASS**
916.63	**88.6**	**H**	**--**	**94.0**	**-5.4**	**PASS**
1833.00	40.4	V	54.0	54.0	-13.6	PASS
1833.00	52.0	H	54.0	54.0	-2.0	PASS
2750.00	38.4	V	54.0	54.0	-15.6	PASS**
2750.00	37.6	H	54.0	54.0	-16.4	PASS**
3667.00	41.2	V	54.0	54.0	-12.8	PASS**
3667.00	41.1	H	54.0	54.0	-12.9	PASS**
4583.00	48.5	V	54.0	54.0	-5.5	PASS**
4583.00	51.1	H	54.0	54.0	-2.9	PASS**
5500.00	49.0	V	54.0	54.0	-5.0	PASS
5500.00	45.4	H	54.0	54.0	-8.6	PASS

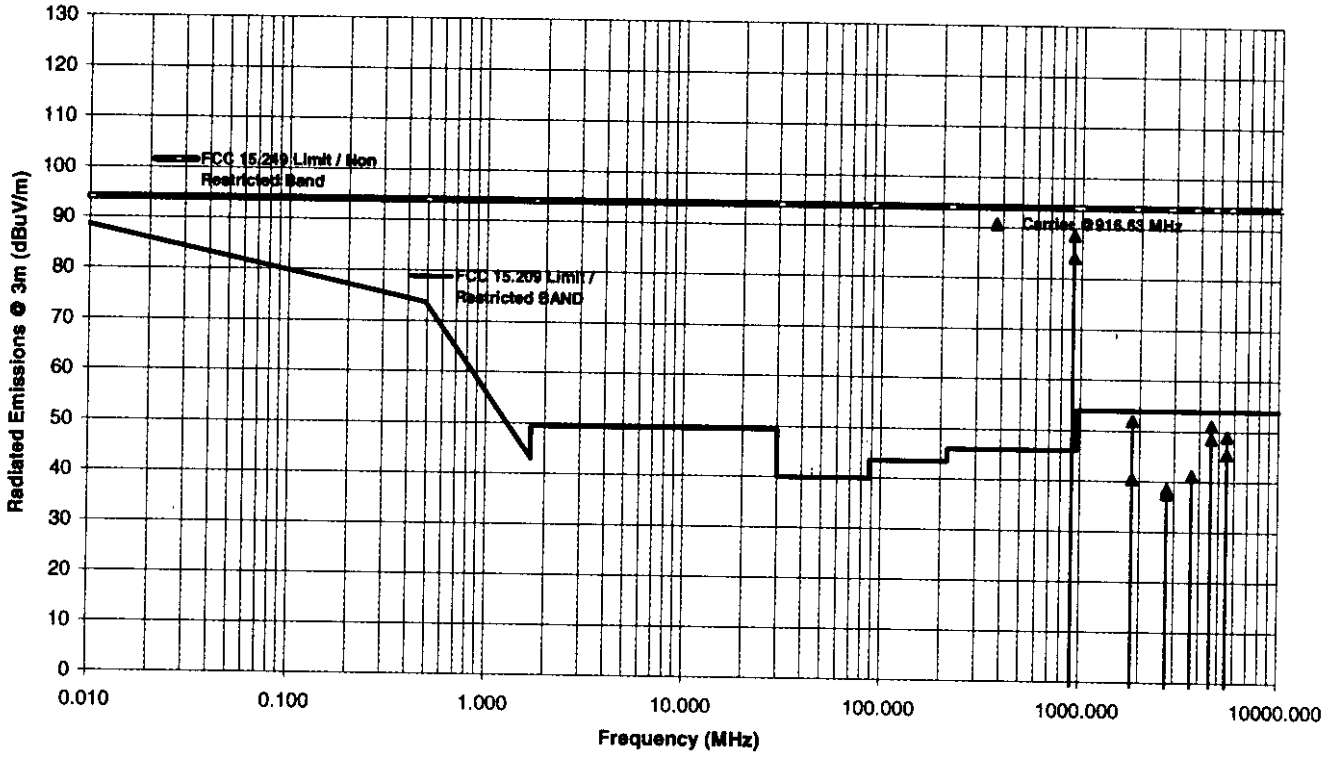
No other significant emissions were found in the frequency range from 10 MHz to 10 GHz.

** ***Emission within the restricted band specified in @ 15.205(a)***

26 dB EMISSION BANDWIDTH



Transmitter Radiated Emissions Measurements at 3 Meter OFTS
Vostek Electronics 900 MHz Video Transmitter, Model XLT-900
TRANSMIT Freq.: 916.63 MHz



4.2. RF Exposure Limit FCC 1.1310

PRODUCT NAME: **World's Smallest 900 MHz Video-Transmitter, Model No.: XLT-900**

FCC REQUIREMENTS:

FCC 1.1310:- The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in 1.1307(b).

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (minutes)
(A) Limits for Occupational/Control Exposures				
30-300	61.4	0.163	1.0	6
300-1500	...	...	F/300	6
(B) Limits for General Population/Uncontrolled Exposure				
30-300	27.5	0.073	0.2	30
300-1500	...	...	F/1500	30

F = Frequency in MHz
* = Plane-wave equivalent power density

CLIMATE CONDITION:

Standard Temperature and Humidity:

- Ambient temperature: 23+3 °C
- Relative humidity: 50+5 %
- Atmospheric Pressure: 100+5 kPa

POWER INPUT:

9 V battery

METHOD OF MEASUREMENTS:

FCC @ 1.1310 & OST Bulletin No. 65-October 1985

$S = PG/4\Pi r^2 = EIRP/4\Pi r^2$

Where: P: power input to the antenna in mW
EIRP: Equivalent (effective) isotropic radiated power.
S: power density mW/cm^2
G: numeric gain of antenna relative to isotropic radiator
r: distance to centre of radiation in cm

FCC radio frequency exposure limits may be exceeded at distances closer than r cm from the antenna of this device

$r = \sqrt{PG/4\Pi S}$

FCC radio frequency exposure limits may be exceeded at distances closer than r cm from the antenna of this device

TEST RESULTS: Conforms.

TEST PERSONNEL: Mr. Hung Trinh, RFI Technician

DATE: January 29, 1999

MEASUREMENT DATA:

EFFECTIVE ISOTROPIC RADIATED POWER (EIRP) MEASURED AT 3 METER DISTANCE (Substitution Method)

TX CHANNEL OUTPUT	FUNDAMENTAL FREQUENCY (MHz)	Tx Antenna Gain (Numeric)	Max. Field Strength Level @ 100 KHz BW At 3 m (dBuV/m)	Max. EIRP POWER In a 100 KHz BW (mW)	POWER LIMIT (mW)
Single channel output	916.63	1	88.6	0.22	N/A

RF EXPOSURE DISTANCE LIMITS: $r = (PG/4\Pi S)^{1/2}$
G= 1 numeric, S = 916.63/1500 = 0.61 mW/cm^2 (f in MHz)

TRANSMITTER CHANNEL OUTPUT	FUNDAMENTAL FREQUENCY (MHz)	MEASURED EIRP FULL POWER (mWatts)	MNIMUM ALLOWABLE DISTANCE (r) FROM SKIN (Centi-Meter)
Single channel output	916.63	0.22	0.17

Since the power density of 0.61 mW/cm^2 is at a very short distance (0.17cm) from the radiating antenna as a wire lead permanently attached to the printed circuit board by means of soldering, and the EUT and its antenna will be installed inside the video camera case by the video camera manufacturer. Therefore, the RF exposure limit warning or SAR tests are not necessary.

5. EXHIBIT 5 - GENERAL TEST PROCEDURES

5.1. Electrical Field Radiated Emissions Measurements - General Test Method

- The radiated emission measurements were performed at the UltraTech's 3 Meter Open Field Test Site (OFTS) situated in the Town of Oakville, province of Ontario. The Attenuation Characteristics of OFTS have been filed to FCC.

- Radiated emissions measurements were made using the following test instruments:

  1) Calibrated EMCO active loop antenna in the frequency range from 10 KHz to 1 MHz
  2) Calibrated EMCO biconilog antenna in the frequency range from 30 MHz to 2000 MHz.
  3) Calibrated A.H. Systems log periodic antenna in the frequency range above 1000 MHz (1GHz - 18 GHz).
  4) Horn Antennas:
     a) Horn Antenna, Emco, Model 3160-09, 18-26.5GHz
     b) Horn Antenna, Emco, Model 3160-10, 26.5-40GHz
     c) Mixer, Tektronix, P/N 118-0098-00, 18-26.5GHz
     d) Mixer, Tektronix, P/N 119-0098-00, 26.5-40GHz
     e) Mixer, HP, P/N R3434A, 12.4-18GHz
     f) Mixer, HP, P/N R3434B, 18-26.5GHz
     g) Mixer, HP, P/N R3434C, 26.5-40GHz
  5) Calibrated Advantest spectrum analyzer and pre-selector/pre-amplifier. In general, the spectrum analyzer would be used as follows:

     - The rf electric field levels were measured with the spectrum analyzer set to PEAK detector (1 KHz RBW and 1 KHz VBW for frequency below 30 MHz, 100 KHz RBW and VBW $\geq$ RBW for Frequency below 1 GHz and 1 MHz RBW and 1 MHz VBW for frequency greater than 1 GHz).

     - If any rf emission was observed to be a broadband noise, the spectrum analyzer's CISPR QUASI-PEAK detector (120 KHz RBW and 1MHz VBW) was then set to measure the signal level.

     - If the signal being measured was narrowband and the ambient field was broadband, the bandwidth of the spectrum analyzer was reduced.

- The EUT was set-up in its typical configuration and operated in its various modes as described in 3.2 of the test report.

- The frequencies of emissions was first detected. Then the amplitude of the emissions was measured at the specified measurement distance using required antenna height, polarization, and detector characteristics.

- During this process, cables and peripheral devices were manipulated within the range of likely configuration.

- For each mode of operation required to be tested, the frequency spectrum was monitored. Variations in antenna heights (from 1 meter to 4 meters above the ground plane), antenna polarization (horizontal plane and vertical plane), cable placement and peripheral placement (each variable within bounds specified elsewhere) were explored to produce the highest amplitude signal relative to the limit.

The maximum radiated emission for a given mode of operation was found by using the following step-by-step procedure:

Step1: Monitor the frequency range of interest at a fixed antenna height and EUT azimuth.

Step2: Manipulate the system cables to produce highest amplitude signal relative to the limit. Note the amplitude and frequency of the suspect signal.

Step3: Rotate the EUT 360 degrees to maximize the suspected highest amplitude signal. If the signal or another at a different frequency is observed to exceed the previously noted highest amplitude signal by 1 dB or more, go back to the azimuth and repeat Step 2. Otherwise, orient the EUT azimuth to repeat the highest amplitude observation and proceed.

Step4: Move the antenna over its full allowed range of travel (1 to 4 meters) to maximize the suspected highest amplitude signal. If the signal or another at a different frequency is observed to exceed the previously noted highest amplitude signal by 1 dB or more, return to Step 2 with the highest amplitude observation and proceed.

Step5: Change the polarization of the antenna and repeat Step 2 through 4. Compare the resulting suspected highest amplitude signal with that found for the other polarization. Select and note the higher of the two signals. This signal is termed the highest observed signal with respect to the limit for this EUT operational mode.

Step6: The effects of various modes of operation is examined. This is done by varying the equipment modes as steps 2 through 5 are being performed.

Step7: After completing steps 1 through 6, record the final highest emission level, frequency, antenna polarization and detector mode of the measuring instrument.

Calculation of Field Strength:

The field strength is calculated by adding the calibrated antenna factor and cable factor, and subtracting the Amplifier gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where FS = Field Strength
RA = Receiver/Analyzer Reading
AF = Antenna Factor
CF = Cable Attenuation Factor
AG = Amplifier Gain

Example: If a receiver reading of 60.0 dBuV is obtained, the antenna factor of 7.0 dB/m and cable factor of 1.0 dB are added, and the amplifier gain of 30 dB is subtracted. The actual field strength will be:.

Field Level in dBuV/m = 60 + 7.0 + 1.0 - 30 = 38.0 dBuV/m.

Field Level in uV/m = $10^{(38/20)}$ = 79.43 uV/m.

Notes: The frequency and amplitude of at least six highest conducted emissions relative to the limit are recorded unless such emissions are more than 20 dB below the limit. If less than six emissions are within 20dB of the limit, the background or receiver noise level shall be reported at representative frequencies.

6. EXHIBIT 6 - INFORMATION RELATED TO EQUIPMENT UNDER TESTS

6.1. FCC ID Labeling and Sketch of FCC Label Location

Refer to the attached sketch of FCC label location.

6.2. Photographs of Equipment under Test

Refer to the attached photographs.

6.3. System Block Diagram(s)

Refer to the attached block diagram.

6.4. Schematic Diagrams

Refer to the attached schematic.

6.5. User's Manual with "FCC Information to User Statements"

Refer to the attached Users' manual.