



**FCC CFR47 PART 24 E CERTIFICATION**

**TEST REPORT**

***FOR***

**WIRELESS PCMCIA CDMA DATA MODEM**

**MODEL: SAPPHIRE PC3200**

**FCC ID: PNF-PC3200P**

**REPORT NUMBER: 02U1373-1**

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*Prepared for*

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## 1. TEST RESULT CERTIFICATION

**COMPANY NAME:** AIRPRIME INC.  
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**TELEPHONE NO:** (760) 476-8751

**EUT DESCRIPTION:** WIRELESS PCMCIA CDMA DATA MODEM

**MODEL NAME:** SAPPHIRE PC3200

**DATE TESTED:** JUNE 26 – JULY 10, 2002

|                       |                                         |
|-----------------------|-----------------------------------------|
| EQUIPMENT TYPE        | 1851-1909 MHz PC CARD MODEM TRANSCEIVER |
| MEASUREMENT PROCEDURE | ANSI 63.4 / 1992, TIA/EIA 603           |
| PROCEDURE             | CERTIFICATION                           |
| FCC RULE              | CFR 47 PART 2, 15 and 24 Subpart E      |

Compliance Certification Services, Inc. tested the above equipment for compliance with the requirement set forth in CFR 47, PART 24 Subpart E-Broadband PCS. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

**Warning :** This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document.

Released For CCS By:



STEVE CHENG  
EMC ENGINEERING MANAGER  
COMPLIANCE CERTIFICATION SERVICES

Tested By:



SKIP DOYLE  
EMC ENGINEER  
COMPLIANCE CERTIFICATION SERVICES

## 2. EUT DESCRIPTION

The PC3200 is a CDMA PC card designed specifically for Sprint PCS that provides wireless data functionality to notebook computers. The operation frequency range is from 1851 MHz to 1909 MHz, with a maximum power output of 1 Watts.

## 3. TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures documented on chapter 13 of ANSI C63.4 and FCC CFR 47 2.1046, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057.

## 4. TEST FACILITY

The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

## 5. ACCREDITATION AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200065-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (reference no: 31040/SIT (1300B3) and 31040/SIT (1300F2))

## 6. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

## 7. APPLICABLE RULES AND BRIEF TEST RESULT

### §24.232- POWER LIMIT

24.232(a), Ref. Section 2.1046 Maximum Peak output power for base station transmitters should not exceed 100 Watts conducted and 1640W EIRP if antenna height up to 300 meters for Base Station, 2W EIRP (equivalent isotropically radiated power)

*Spec limit: As specified above, 2W maximum.*

*Test result: EUT rated power is 955milliwatts EIRP. No non-compliance noted.*

| <i>Modulation</i> | <i>Max Peak Output Power(dBm)</i> | <i>Max Peak Output Power(mW)</i> |
|-------------------|-----------------------------------|----------------------------------|
| CDMA 1900MHz      | 29.8 (EIRP)                       | 955                              |

### TYPE OF EMISSIONS

F9W (CDMA)

### §24.235- FREQUENCY STABILITY

Ref. Section 2.1055. The frequency stability shall be sufficient to ensure that the fundamental emission stays within  $\pm 2.5$  ppm.

#### **FREQUENCY STABILITY OVER TEMPERATURE**

The frequency stability shall be measured with variation of ambient temperature from  $-30$  deg. to  $+50$  deg. Centigrade.

#### **FREQUENCY STABILITY OVER PRIMARY SUPPLY VOLTAGE AT 20 DEG. CENTIGRADE**

The frequency stability shall be measured with variation of supply voltage from 85% to 115% of rated voltage (102 to 138VAC).

*Spec limit: As stated above.*

*Test result: This measurement results shows that the EUT complies with the rule.*

### **§24.238- EMISSION LIMITS**

24.238(a); The magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under conditions specified in the instruction manual and/or alignment procedure, shall not be less than  $43 + 10 \log$  (mean output power in watts) dBc below the mean power output outside a licensee's frequency block (-13dBm).

Mean Power = .7943 Watts (29 dBm)  
 $43 + 10 \log (.7943 \text{ Watts}) = 42 \text{ dB}$

Out-of-Band and Band-Edges emissions must be attenuated by the following amount:  
 $29 \text{ dBm} - 42 \text{ dB} = -13 \text{ dBm}$

24.238(b) & (c);

- (1) Compliance with the out-of-band emissions requirement is based on test being performed with 1MHz analyzer RES BW.
- (2) At block edges, RES BW may be adjusted to a level at least as large as 1% of emission bandwidth. The emissions bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. For the EUT this is at least:

CDMA:

$0.01 * 1.413 \text{ MHz} = 14.13 \text{ kHz}$ . A RES BW of 30 kHz was used for measuring at the block edges.

***Spec limit: As specified as above.***

***Test result: no non-compliance noted.***

### **§2.1057- SPECTRUM RANGE TO BE INVESTIGATED**

Lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown below:

(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

(2) If the equipment operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

(3) If the equipment operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower.

(b) Particular attention should be paid to harmonics and sub-harmonics of the carrier frequency as well as to those frequencies removed from the carrier by multiples of the oscillator frequency.

Radiation at the frequencies of multiplier stages should also be checked.

(c) The amplitude of spurious emissions, which are attenuated more than 20 dB below the permissible value, need not be reported.

(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution bandwidth of 1 MHz.

***Spec limit: Frequency investigation range from 30MHz to tenth harmonic (i.e. 20 GHz.).***

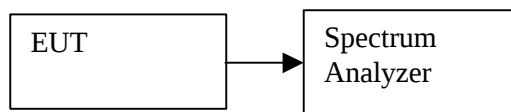
## 8. TEST SETUP, PROCEDURE AND RESULT

### 8.1. SECTION 2.1046: RF POWER OUTPUT

#### INSTRUMENTS LIST

| EQUIPMENT         | MANUFACTURE   | MODEL NO.    | CAL. DUE DATE |
|-------------------|---------------|--------------|---------------|
| Spectrum Analyzer | HP            | 8593EM       | 6/11/03       |
| Attenuator        | MINI CIRCUITS | MCL BW-S10W2 | N/A           |

#### TEST SETUP



#### TEST PROCEDURE

The EUT was set to maximum output power (maximum gain). RF output power was measured with Spectrum Analyzer.

#### RESULT

Measured with Spectrum Analyzer. Set the power amplifier to the maximum output gain.

#### ***Test result:***

|                            |                                     |                                    |
|----------------------------|-------------------------------------|------------------------------------|
| <b><i>Modulation</i></b>   | <b><i>Max Output Power(dBm)</i></b> | <b><i>Max Output Power(mW)</i></b> |
| <b><i>CDMA 1900MHz</i></b> | <b><i>29.8 (EIRP)</i></b>           | <b><i>955</i></b>                  |

**Test with Toshiba Laptop:**

| Frequency<br>(GHz)                       | SA reading<br>(dBuV) | SG reading<br>(dBm) | CL<br>(dB) | Gain<br>(dBi) | Gain<br>(dBd) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Notes |
|------------------------------------------|----------------------|---------------------|------------|---------------|---------------|---------------|----------------|----------------|-------|
| Fundamental (Low, Mid, & High Channels): |                      |                     |            |               |               |               |                |                |       |
| 1.851                                    | 100.70               | 21.90               | 1.20       | 8.80          | 0.00          | 29.50         | 33.00          | -3.50          | V     |
| 1.851                                    | 88.72                | 9.90                | 1.20       | 8.80          | 0.00          | 17.50         | 33.00          | -15.50         | H     |
| 1.880                                    | 100.60               | 21.80               | 1.20       | 8.80          | 0.00          | 29.40         | 33.00          | -3.60          | V     |
| 1.880                                    | 89.20                | 10.40               | 1.20       | 8.80          | 0.00          | 18.00         | 33.00          | -15.00         | H     |
| 1.909                                    | 100.10               | 21.30               | 1.20       | 8.80          | 0.00          | 28.90         | 33.00          | -4.10          | V     |
| 1.909                                    | 83.40                | 4.60                | 1.20       | 8.80          | 0.00          | 12.20         | 33.00          | -20.80         | H     |

**Test with IBM Laptop:**

| Frequency<br>(GHz)                       | SA reading<br>(dBuV) | SG reading<br>(dBm) | CL<br>(dB) | Gain<br>(dBi) | Gain<br>(dBd) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Notes |
|------------------------------------------|----------------------|---------------------|------------|---------------|---------------|---------------|----------------|----------------|-------|
| Fundamental (Low, Mid, & High Channels): |                      |                     |            |               |               |               |                |                |       |
| 1.851                                    | 100.3                | 21.50               | 1.20       | 8.80          | 0.00          | 29.10         | 33.00          | -3.90          | V     |
| 1.851                                    | 89.2                 | 10.40               | 1.20       | 8.80          | 0.00          | 18.00         | 33.00          | -15.00         | H     |
| 1.880                                    | 100.8                | 22.00               | 1.20       | 8.80          | 0.00          | 29.60         | 33.00          | -3.40          | V     |
| 1.880                                    | 89.9                 | 11.10               | 1.20       | 8.80          | 0.00          | 18.70         | 33.00          | -14.30         | H     |
| 1.909                                    | 98.8                 | 20.00               | 1.20       | 8.80          | 0.00          | 27.60         | 33.00          | -5.40          | V     |
| 1.909                                    | 83.4                 | 4.60                | 1.20       | 8.80          | 0.00          | 12.20         | 33.00          | -20.80         | H     |

**Test with Fujitsu Laptop:**

| Frequency<br>(GHz)                       | SA reading<br>(dBuV) | SG reading<br>(dBm) | CL<br>(dB) | Gain<br>(dBi) | Gain<br>(dBd) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Notes |
|------------------------------------------|----------------------|---------------------|------------|---------------|---------------|---------------|----------------|----------------|-------|
| Fundamental (Low, Mid, & High Channels): |                      |                     |            |               |               |               |                |                |       |
| 1.851                                    | 99.63                | 20.80               | 1.20       | 8.80          | 0.00          | 28.40         | 33.00          | -4.60          | V     |
| 1.851                                    | 85.72                | 6.90                | 1.20       | 8.80          | 0.00          | 14.50         | 33.00          | -18.50         | H     |
| 1.880                                    | 101.00               | 22.20               | 1.20       | 8.80          | 0.00          | 29.80         | 33.00          | -3.20          | V     |
| 1.880                                    | 87.20                | 8.40                | 1.20       | 8.80          | 0.00          | 16.00         | 33.00          | -17.00         | H     |
| 1.909                                    | 91.00                | 12.20               | 1.20       | 8.80          | 0.00          | 19.80         | 33.00          | -13.20         | V     |
| 1.909                                    | 81.00                | 2.20                | 1.20       | 8.80          | 0.00          | 9.80          | 33.00          | -23.20         | H     |

## 8.2. SECTION 2.1047: MODULATION CHARACTERISTICS

NOT APPLICABLE

## 8.3. SECTION 2.1049: OCCUPIED BANDWIDTH

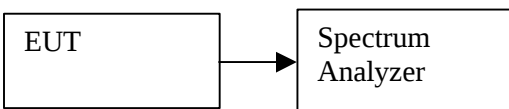
### SECTION 2.1049(i)

Transmitters designed for other types of modulation – when modulated by an appropriate signal of sufficient amplitude to be representative of the type of service in which used. A description of the input signal should be supplied.

### INSTRUMENTS LIST

| EQUIPMENT         | MANUFACTURE   | MODEL NO.    | CAL. DUE DATE |
|-------------------|---------------|--------------|---------------|
| Spectrum Analyzer | HP            | 8593EM       | 6/11/03       |
| Attenuator        | MINI CIRCUITS | MCL BW-S10W2 | N/A           |

### TEST SETUP

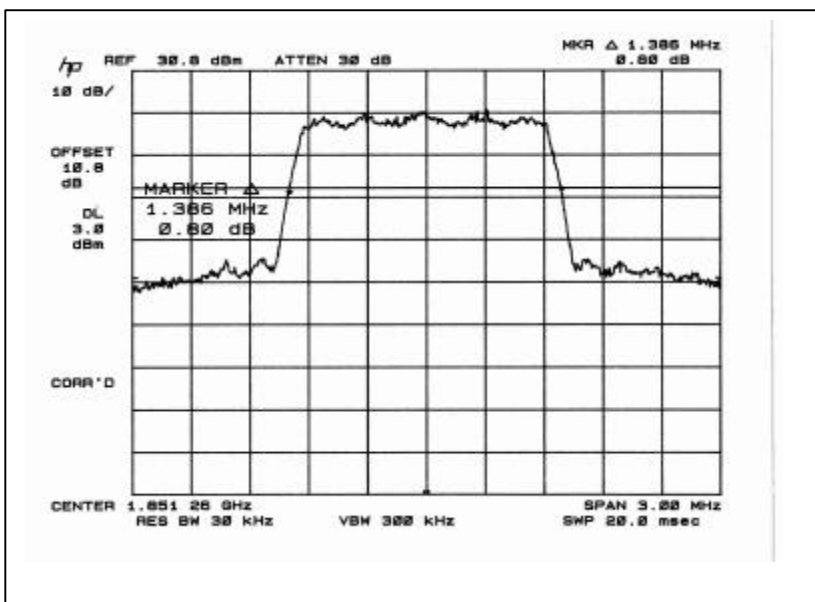


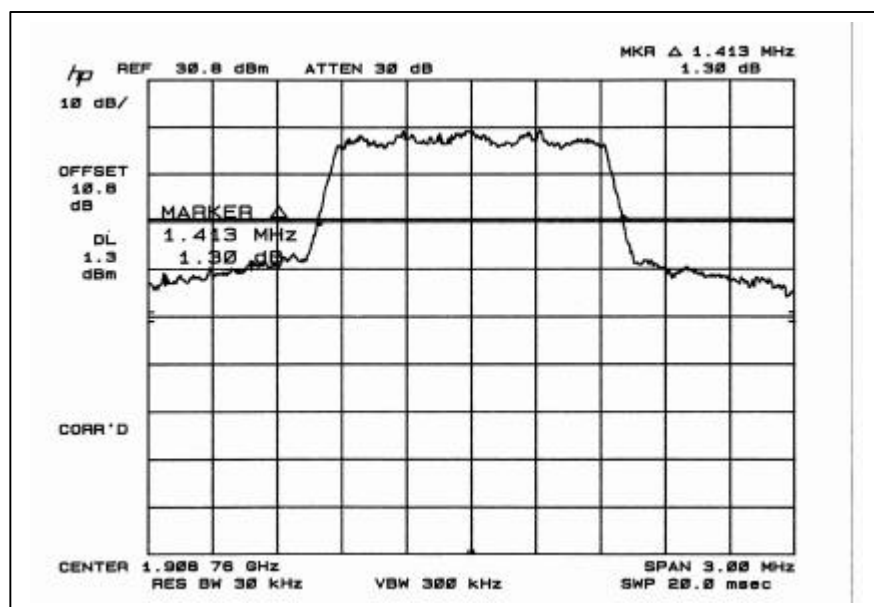
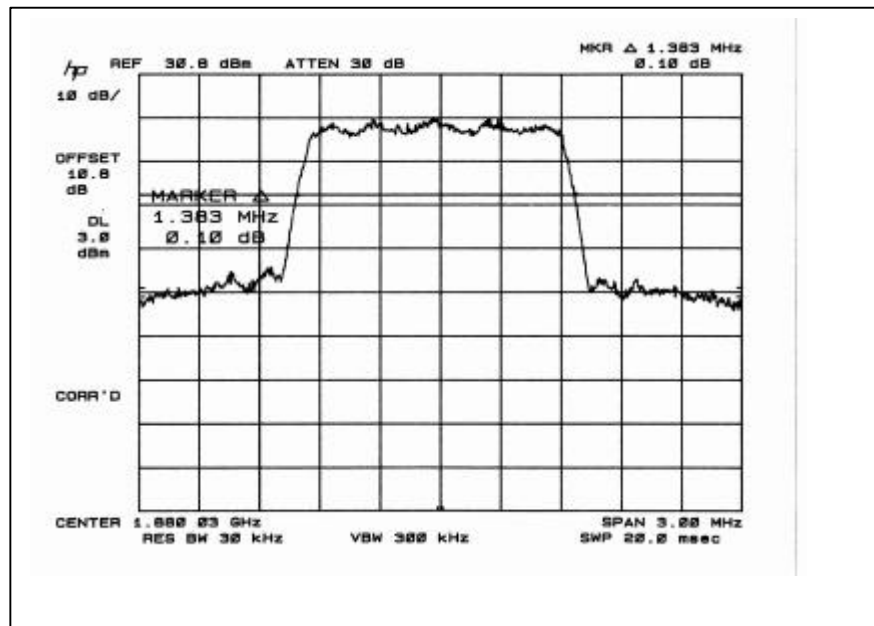
### TEST PROCEDURE

The EUT's occupied bandwidth output plot is compared with the input source plot to check that no distortion is created when the input signal is amplified by the EUT. Identical bandwidths, spans and center frequencies are used for both plots. Reference levels and attenuation are adjusted.

### RESULT

**No non-compliance noted.**



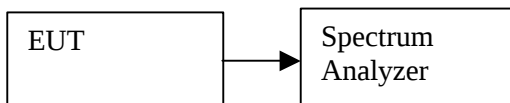


## 8.4. SECTION 2.1051: SPURIOUS EMISSION AT ANTENNA TERMINAL

### INSTRUMENTS LIST

| EQUIPMENT         | MANUFACTURE   | MODEL NO.    | CAL. DUE DATE |
|-------------------|---------------|--------------|---------------|
| Spectrum Analyzer | HP            | 8593EM       | 6/11/03       |
| Attenuator        | MINI CIRCUITS | MCL BW-S10W2 | N/A           |

### TEST SETUP

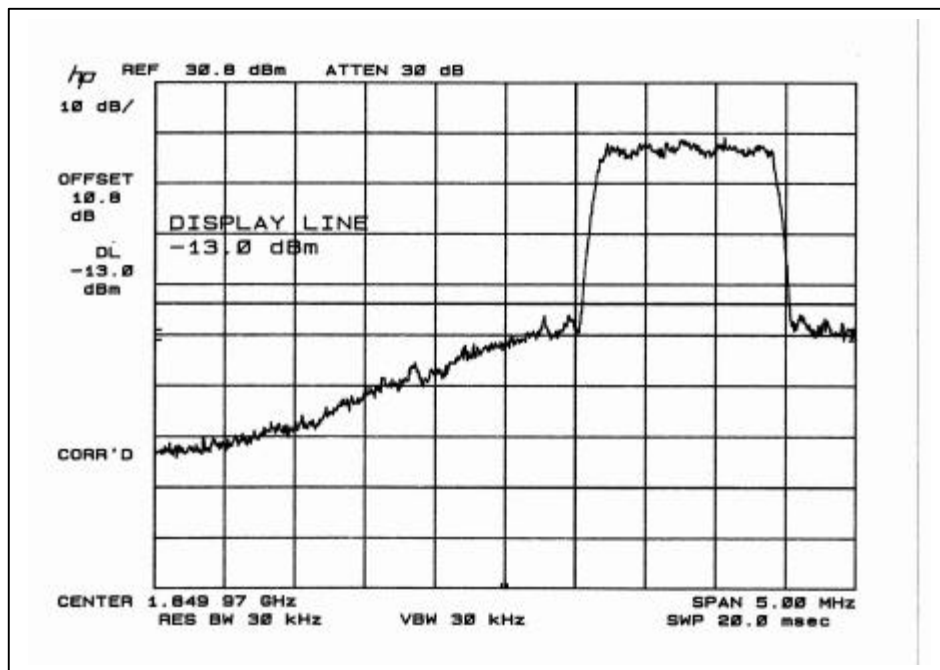


### TEST PROCEDURE

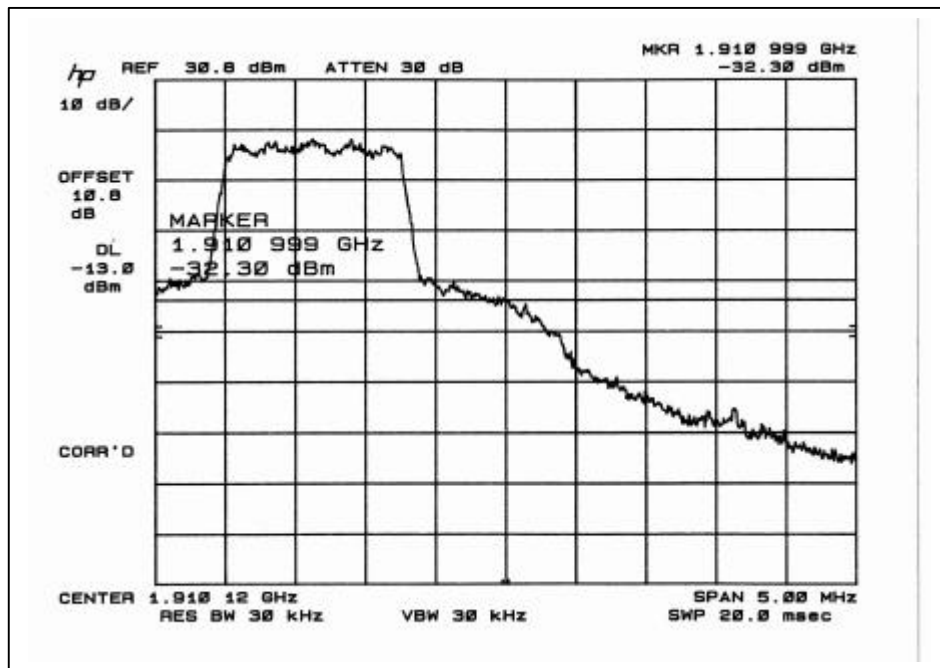
- 1) RF signal or three balanced signals (intermodulation measurement) were applied to the RF input. One set as close as possible to the bottom of the block edge and one set as close as possible to the top of the block edge. Set the RES BW to 1% of the emission bandwidth to show compliance with the -13dBm limit, in the 1 MHz bands immediately outside and adjacent to the top and bottom edges of the frequency block.
- 2) For the Out-of-Band measurements a 1 MHz RES BW was used to scan from 15 MHz to 10 x of the fundamental carrier for all frequency block. A display line was placed at -13dBm to show compliance for spurious, harmonics, and intermodulation emissions.
- 3) 24.318(b) and also outside of which all emissions are attenuated at least 26 dB below the transmitter power.

### RESULT

***No non-compliance noted.***

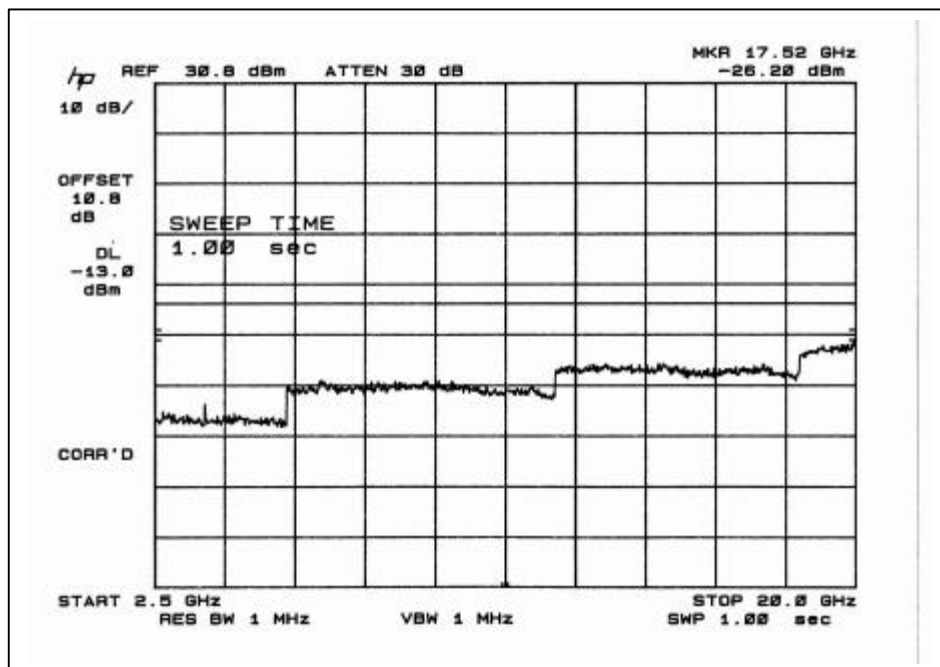
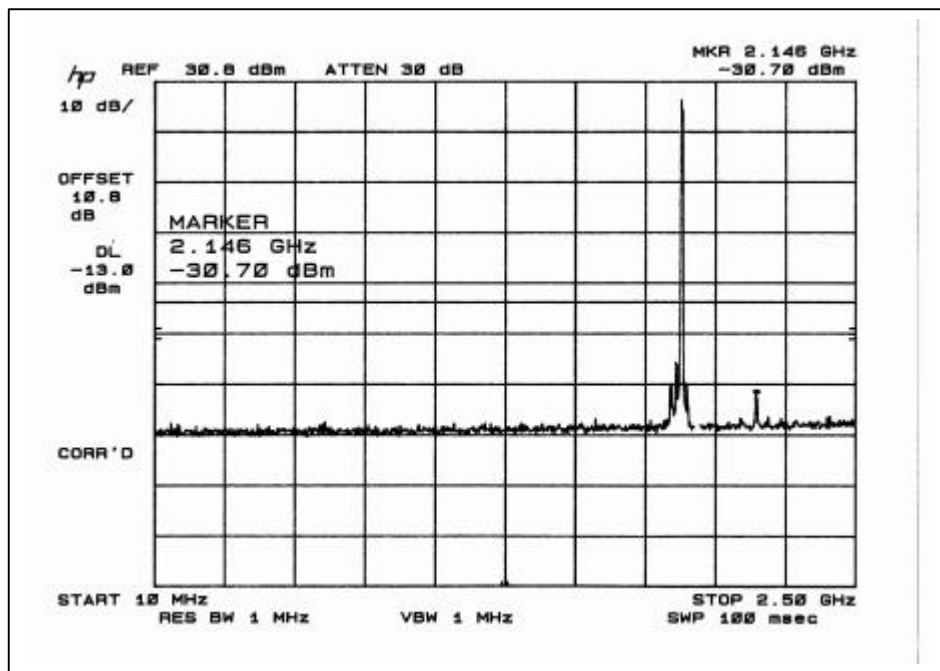


Bottom Band Edge



Upper Band Edge

### Out-Of-Band Emissions



## 8.5. SECTION 2.1053: FIELD STRENGTH OF SPURIOUS RADIATION

### INSTRUMENTS LIST

| EQUIPMENT         | MANUFACTURE       | MODEL NO.  | CAL. DUE DATE |
|-------------------|-------------------|------------|---------------|
| Spectrum Analyzer | HP                | 8593EM     | 6/11/03       |
| Signal Generator  | HP                | 83732B     | 3/29/03       |
| Amplifier         | MITEQ             | NSP2600-44 | 4/26/03       |
| Bicon Antenna     | Eaton             | 94455-1    | 3/30/03       |
| LP Antenna        | EMCO              | 3146       | 3/30/03       |
| Tune Dipole       | Compliance Design | Robert     | 5/5/03        |
| Tx Horn Antenna   | EMCO              | 3115       | 1/31/03       |
| Rx Horn Antenna   | EMCO              | 3115       | 1/31/03       |
| HPF               | MICROLAB          | FH-2400H   | N/A           |

### Detector Function Setting of Test Receiver

| Frequency Range (MHz) | Detector Function                                                            | Resolution Bandwidth                                                        | Video Bandwidth                                                             |
|-----------------------|------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| Above 1000            | <input checked="" type="checkbox"/> Peak<br><input type="checkbox"/> Average | <input checked="" type="checkbox"/> 1 MHz<br><input type="checkbox"/> 1 MHz | <input checked="" type="checkbox"/> 1 MHz<br><input type="checkbox"/> 10 Hz |

### TEST SETUP

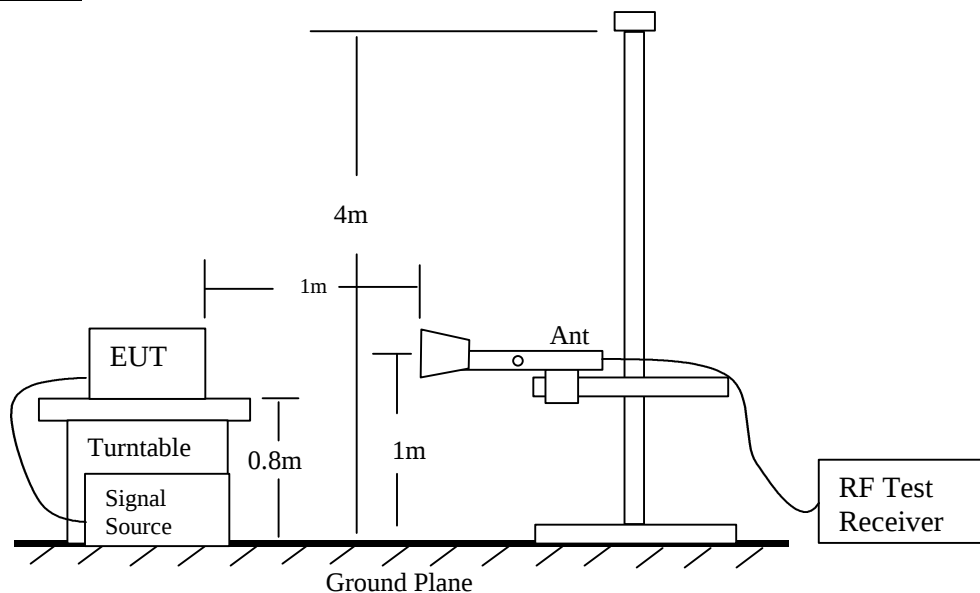


Fig 1: Radiated Emission Measurement

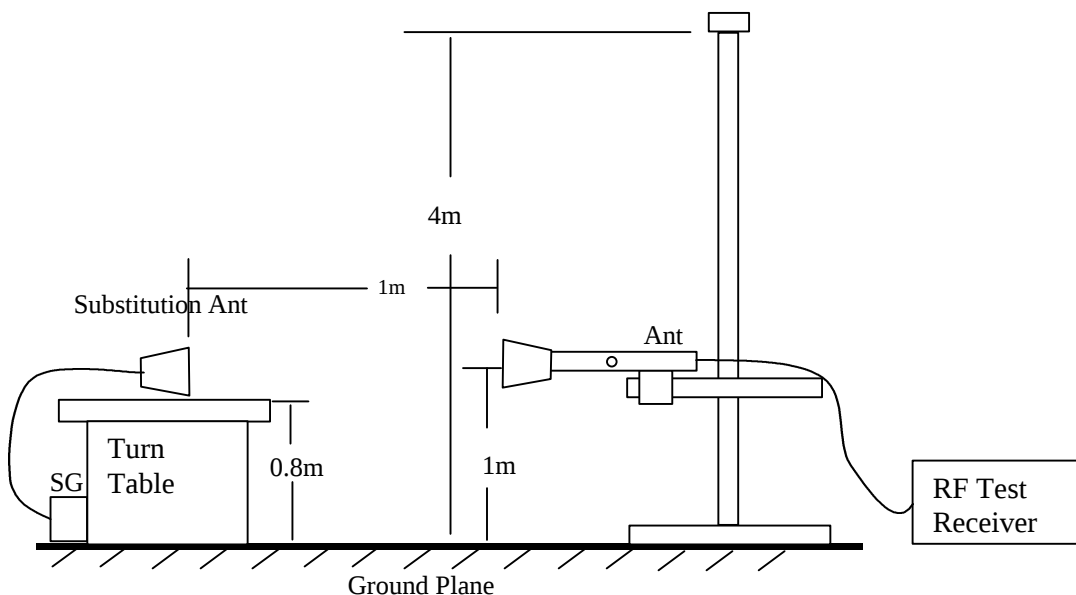


Fig 2: Radiated Emission – Substitution Method set-up

### **TEST PROCEDURE**

- 1). On a test site, the EUT shall be placed on a turntable, and in the position closest to the normal use as declared by the user.
- 2). The test antenna shall be oriented initially for vertical polarization located 1m from the EUT to correspond to the frequency of the transmitter.
- 3). The output of the test antenna shall be connected to the measuring receiver and either a peak or average detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.
- 4). The transmitter shall be switched on, if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.
- 5). The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
- 6). The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- 7). The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
- 8). The maximum signal level detected by the measuring receiver shall be noted.
- 9). The transmitter shall be replaced by a substitution antenna.
- 10). The substitution antenna shall be oriented for vertical polarization.
- 11). The substitution antenna shall be connected to a calibrated signal generator.
- 12). If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.

13). The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.

14). The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.

15). The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.

16). The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.

17). The measure of the effective radiated power is the larger of the two levels recorded, at the input to the substitution antenna, corrected for the gain of the substitution antenna if necessary.

### **RESULT**

No non-compliance noted, as shown below

**Test with Fujitsu Laptop:**

| Frequency<br>(GHz)                                          | SA reading<br>(dBuV) | SG reading<br>(dBm) | CL<br>(dB) | Gain<br>(dBi) | Gain<br>(dBd) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Notes           |
|-------------------------------------------------------------|----------------------|---------------------|------------|---------------|---------------|---------------|----------------|----------------|-----------------|
| Spurious Emissions                                          |                      |                     |            |               |               |               |                |                |                 |
| Lo Channel:                                                 |                      |                     |            |               |               |               |                |                |                 |
| 3.70                                                        | 36.00                | -61.00              | 1.66       | 8.90          | 0.00          | -53.76        | -13.00         | -40.76         | V               |
| 5.55                                                        | 59.00                | -48.80              | 2.15       | 10.30         | 0.00          | -40.65        | -13.00         | -27.65         | V               |
| 7.41                                                        | 51.00                | -53.70              | 2.50       | 10.30         | 0.00          | -45.90        | -13.00         | -32.90         | V               |
| 9.26                                                        | 46.50                | -50.59              | 2.84       | 10.10         | 0.00          | -43.33        | -13.00         | -30.33         | V (Noise Floor) |
| 11.11                                                       | 46.50                | -54.34              | 3.10       | 12.00         | 0.00          | -45.44        | -13.00         | -32.44         | V (Noise Floor) |
| 12.96                                                       | 47.50                | -48.21              | 3.42       | 11.90         | 0.00          | -39.73        | -13.00         | -26.73         | V (Noise Floor) |
| 14.81                                                       | 48.00                | -53.05              | 3.79       | 15.10         | 0.00          | -41.74        | -13.00         | -28.74         | V (Noise Floor) |
| 16.66                                                       | 49.00                | -48.52              | 4.18       | 10.00         | 0.00          | -42.70        | -13.00         | -29.70         | V (Noise Floor) |
| 18.51                                                       | 50.00                | -58.89              | 1.66       | 8.90          | 0.00          | -51.65        | -13.00         | -38.65         | V (Noise Floor) |
| 3.70                                                        | 41.70                | -63.40              | 2.15       | 8.90          | 0.00          | -56.65        | -13.00         | -43.65         | H               |
| 5.55                                                        | 50.00                | -58.90              | 2.50       | 10.30         | 0.00          | -51.10        | -13.00         | -38.10         | H               |
| 7.41                                                        | 48.00                | -52.50              | 2.84       | 10.30         | 0.00          | -45.04        | -13.00         | -32.04         | H               |
| 9.26                                                        | 46.50                | -54.73              | 3.10       | 10.10         | 0.00          | -47.73        | -13.00         | -34.73         | H (Noise Floor) |
| 11.11                                                       | 46.50                | -55.22              | 3.42       | 12.00         | 0.00          | -46.64        | -13.00         | -33.64         | H (Noise Floor) |
| 12.96                                                       | 47.50                | -52.24              | 3.79       | 11.90         | 0.00          | -44.13        | -13.00         | -31.13         | H (Noise Floor) |
| 14.81                                                       | 48.00                | -52.46              | 4.18       | 15.10         | 0.00          | -41.54        | -13.00         | -28.54         | H (Noise Floor) |
| 16.66                                                       | 49.00                | -48.31              | 3.79       | 10.00         | 0.00          | -42.10        | -13.00         | -29.10         | H (Noise Floor) |
| 18.51                                                       | 50.00                | -54.77              | 4.18       | 8.90          | 0.00          | -50.05        | -13.00         | -37.05         | H (Noise Floor) |
| Mid Channel                                                 |                      |                     |            |               |               |               |                |                |                 |
| 3.76                                                        | 36.00                | -60.50              | 1.66       | 8.90          | 0.00          | -53.26        | -13.00         | -40.26         | V               |
| 5.64                                                        | 63.00                | -44.50              | 2.15       | 10.30         | 0.00          | -36.35        | -13.00         | -23.35         | V               |
| 7.52                                                        | 57.50                | -51.20              | 2.50       | 10.30         | 0.00          | -43.40        | -13.00         | -30.40         | V               |
| 9.40                                                        | 46.50                | -50.59              | 2.84       | 10.10         | 0.00          | -43.33        | -13.00         | -30.33         | V (Noise Floor) |
| 11.28                                                       | 46.50                | -54.34              | 3.10       | 12.00         | 0.00          | -45.44        | -13.00         | -32.44         | V (Noise Floor) |
| 13.16                                                       | 47.50                | -48.21              | 3.42       | 11.90         | 0.00          | -39.73        | -13.00         | -26.73         | V (Noise Floor) |
| 15.04                                                       | 48.00                | -53.05              | 3.79       | 15.10         | 0.00          | -41.74        | -13.00         | -28.74         | V (Noise Floor) |
| 16.92                                                       | 49.00                | -48.52              | 4.18       | 10.00         | 0.00          | -42.70        | -13.00         | -29.70         | V (Noise Floor) |
| 18.80                                                       | 50.00                | -58.89              | 1.66       | 8.90          | 0.00          | -51.65        | -13.00         | -38.65         | V (Noise Floor) |
| 3.76                                                        | 36.00                | -61.00              | 2.15       | 8.90          | 0.00          | -54.25        | -13.00         | -41.25         | H               |
| 5.64                                                        | 55.00                | -51.50              | 2.50       | 10.30         | 0.00          | -43.70        | -13.00         | -30.70         | H               |
| 7.52                                                        | 49.50                | -50.50              | 2.84       | 10.30         | 0.00          | -43.04        | -13.00         | -30.04         | H               |
| 9.40                                                        | 44.50                | -54.73              | 3.10       | 10.10         | 0.00          | -47.73        | -13.00         | -34.73         | H (Noise Floor) |
| 11.28                                                       | 46.50                | -55.22              | 3.42       | 12.00         | 0.00          | -46.64        | -13.00         | -33.64         | H (Noise Floor) |
| 13.16                                                       | 47.50                | -52.24              | 3.79       | 11.90         | 0.00          | -44.13        | -13.00         | -31.13         | H (Noise Floor) |
| 15.04                                                       | 48.00                | -52.46              | 4.18       | 15.10         | 0.00          | -41.54        | -13.00         | -28.54         | H (Noise Floor) |
| 16.92                                                       | 49.00                | -48.31              | 3.79       | 10.00         | 0.00          | -42.10        | -13.00         | -29.10         | H (Noise Floor) |
| 18.80                                                       | 50.00                | -54.77              | 4.18       | 8.90          | 0.00          | -50.05        | -13.00         | -37.05         | H (Noise Floor) |
| High Channel                                                |                      |                     |            |               |               |               |                |                |                 |
| 3.82                                                        | 36.00                | -61.00              | 1.66       | 8.90          | 0.00          | -53.76        | -13.00         | -40.76         | V               |
| 5.73                                                        | 46.50                | -55.20              | 2.15       | 10.30         | 0.00          | -47.05        | -13.00         | -34.05         | V               |
| 7.64                                                        | 46.00                | -55.50              | 2.50       | 10.30         | 0.00          | -47.70        | -13.00         | -34.70         | V               |
| 9.54                                                        | 44.50                | -50.59              | 2.84       | 10.10         | 0.00          | -43.33        | -13.00         | -30.33         | V (Noise Floor) |
| 11.45                                                       | 46.50                | -54.34              | 3.10       | 12.00         | 0.00          | -45.44        | -13.00         | -32.44         | V (Noise Floor) |
| 13.36                                                       | 47.50                | -48.21              | 3.42       | 11.90         | 0.00          | -39.73        | -13.00         | -26.73         | V (Noise Floor) |
| 15.27                                                       | 48.00                | -53.05              | 3.79       | 15.10         | 0.00          | -41.74        | -13.00         | -28.74         | V (Noise Floor) |
| 17.18                                                       | 49.00                | -48.52              | 4.18       | 10.00         | 0.00          | -42.70        | -13.00         | -29.70         | V (Noise Floor) |
| 19.09                                                       | 50.00                | -58.89              | 1.66       | 8.90          | 0.00          | -51.65        | -13.00         | -38.65         | V (Noise Floor) |
| 3.82                                                        | 36.00                | -61.00              | 2.15       | 8.90          | 0.00          | -54.25        | -13.00         | -41.25         | H               |
| 5.73                                                        | 45.00                | -50.00              | 2.50       | 10.30         | 0.00          | -42.20        | -13.00         | -29.20         | H               |
| 7.64                                                        | 45.00                | -51.00              | 2.84       | 10.30         | 0.00          | -43.54        | -13.00         | -30.54         | H               |
| 9.54                                                        | 44.50                | -54.73              | 3.10       | 10.10         | 0.00          | -47.73        | -13.00         | -34.73         | H (Noise Floor) |
| 11.45                                                       | 46.50                | -55.22              | 3.42       | 12.00         | 0.00          | -46.64        | -13.00         | -33.64         | H (Noise Floor) |
| 13.36                                                       | 47.50                | -52.24              | 3.79       | 11.90         | 0.00          | -44.13        | -13.00         | -31.13         | H (Noise Floor) |
| 15.27                                                       | 48.00                | -52.46              | 4.18       | 15.10         | 0.00          | -41.54        | -13.00         | -28.54         | H (Noise Floor) |
| 17.18                                                       | 49.00                | -48.31              | 3.79       | 10.00         | 0.00          | -42.10        | -13.00         | -29.10         | H (Noise Floor) |
| 19.09                                                       | 50.00                | -54.77              | 4.18       | 8.90          | 0.00          | -50.05        | -13.00         | -37.05         | H (Noise Floor) |
| Note: Completed scan from 30MHz to 20 GHz.                  |                      |                     |            |               |               |               |                |                |                 |
| EIPR = SG reading - CL + Gain (dBi)                         |                      |                     |            |               |               |               |                |                |                 |
| Margin = EIPR - Limit                                       |                      |                     |            |               |               |               |                |                |                 |
| SA: Spectrum Analyzer, HP 8593EM, S/N: 3710A00205           |                      |                     |            |               |               |               |                |                |                 |
| SG: Signal Generator, HP 83732B, S/N: US34490599            |                      |                     |            |               |               |               |                |                |                 |
| TX Antenna: Dipole, Compliance Design, Roberts, S/N: 116717 |                      |                     |            |               |               |               |                |                |                 |
| CL: cable loss (5ft), FLEXCO                                |                      |                     |            |               |               |               |                |                |                 |
| Pre-Amp: Miteq NSP2600 -44, S/N: 646456                     |                      |                     |            |               |               |               |                |                |                 |
| RX Antenna: Bicon, Eston 94455-1, S/N: 1214                 |                      |                     |            |               |               |               |                |                |                 |
| LP, EMCO 3146, S/N: 3163                                    |                      |                     |            |               |               |               |                |                |                 |
| Horn, EMCO 3115, S/N: 6739                                  |                      |                     |            |               |               |               |                |                |                 |

**Test with Toshiba Laptop:**

| Frequency<br>(GHz)                                       | SA reading<br>(dBuV) | SG reading<br>(dBm) | CL<br>(dB) | Gain<br>(dBi) | Gain<br>(dBd) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Notes |
|----------------------------------------------------------|----------------------|---------------------|------------|---------------|---------------|---------------|----------------|----------------|-------|
| Spurious Emissions                                       |                      |                     |            |               |               |               |                |                |       |
| Lo Channel:                                              |                      |                     |            |               |               |               |                |                |       |
| 3.70                                                     | 35.6                 | -61.00              | 1.66       | 8.90          | 0.00          | -53.76        | -13.00         | -40.76         | V     |
| 5.55                                                     | 60.1                 | -47.00              | 2.15       | 10.30         | 0.00          | -38.85        | -13.00         | -25.85         | V     |
| 7.41                                                     | 53.5                 | -51.00              | 2.50       | 10.30         | 0.00          | -43.20        | -13.00         | -30.20         | V     |
| 3.70                                                     | 34.4                 | -62.00              | 2.15       | 8.90          | 0.00          | -55.25        | -13.00         | -42.25         | H     |
| 5.55                                                     | 53.4                 | -55.40              | 2.50       | 10.30         | 0.00          | -47.60        | -13.00         | -34.60         | H     |
| 7.41                                                     | 49.9                 | -58.50              | 2.84       | 10.30         | 0.00          | -51.04        | -13.00         | -38.04         | H     |
| Mid Channel                                              |                      |                     |            |               |               |               |                |                |       |
| 3.76                                                     | 37.6                 | -59.00              | 1.66       | 8.90          | 0.00          | -51.76        | -13.00         | -38.76         | V     |
| 5.64                                                     | 67.3                 | -41.50              | 2.15       | 10.30         | 0.00          | -33.35        | -13.00         | -20.35         | V     |
| 7.52                                                     | 58.9                 | -48.70              | 2.50       | 10.30         | 0.00          | -40.90        | -13.00         | -27.90         | V     |
| 3.76                                                     | 37.2                 | -50.40              | 2.15       | 8.90          | 0.00          | -43.65        | -13.00         | -30.65         | H     |
| 5.64                                                     | 57.8                 | -51.50              | 2.50       | 10.30         | 0.00          | -43.70        | -13.00         | -30.70         | H     |
| 7.52                                                     | 51.5                 | -52.80              | 2.84       | 10.30         | 0.00          | -45.34        | -13.00         | -32.34         | H     |
| High Channel                                             |                      |                     |            |               |               |               |                |                |       |
| 3.82                                                     | 38.6                 | -61.00              | 1.66       | 8.90          | 0.00          | -53.76        | -13.00         | -40.76         | V     |
| 5.73                                                     | 48.5                 | -57.00              | 2.15       | 10.30         | 0.00          | -48.85        | -13.00         | -35.85         | V     |
| 7.64                                                     | 47.4                 | -59.50              | 2.50       | 10.30         | 0.00          | -51.70        | -13.00         | -38.70         | V     |
| 3.82                                                     | 37.2                 | -64.00              | 2.15       | 8.90          | 0.00          | -57.25        | -13.00         | -44.25         | H     |
| 5.73                                                     | 46.4                 | -59.80              | 2.50       | 10.30         | 0.00          | -52.00        | -13.00         | -39.00         | H     |
| 7.64                                                     | 46.7                 | -59.30              | 2.84       | 10.30         | 0.00          | -51.84        | -13.00         | -38.84         | H     |
| Note: Completed scan from 30MHz to 20 GHz.               |                      |                     |            |               |               |               |                |                |       |
| EIPR = SG reading - CL + Gain (dBi)                      |                      |                     |            |               |               |               |                |                |       |
| Margin = EIPR - Limit                                    |                      |                     |            |               |               |               |                |                |       |
| SA: Spectrum Analyzer, HP 8593EM, S/N: 3710A00205        |                      |                     |            |               |               |               |                |                |       |
| SG: Signal Generator, HP 83732B, S/N: US34490599         |                      |                     |            |               |               |               |                |                |       |
| TX Antenna: Dipole, Compliance Design, Roberts, S/N: 111 |                      |                     |            |               |               |               |                |                |       |
| Horn, EMCO 3115, S/N: 6717                               |                      |                     |            |               |               |               |                |                |       |
| CL: cable loss (5ft), FLEXCO                             |                      |                     |            |               |               |               |                |                |       |
| Pre-Amp: Miteq NSP2600 -44, S/N: 646456                  |                      |                     |            |               |               |               |                |                |       |
| RX Antenna: Bicon, Eston 94455-1, S/N: 1214              |                      |                     |            |               |               |               |                |                |       |
| LP, EMCO 3146, S/N: 3163                                 |                      |                     |            |               |               |               |                |                |       |
| Horn, EMCO 3115, S/N: 6739                               |                      |                     |            |               |               |               |                |                |       |

**Test with IBM Laptop:**

| Frequency<br>(GHz)                                       | SA reading<br>(dBuV) | SG reading<br>(dBm) | CL<br>(dB) | Gain<br>(dBi) | Gain<br>(dBd) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Notes |
|----------------------------------------------------------|----------------------|---------------------|------------|---------------|---------------|---------------|----------------|----------------|-------|
| Spurious Emissions                                       |                      |                     |            |               |               |               |                |                |       |
| Lo Channel:                                              |                      |                     |            |               |               |               |                |                |       |
| 3.70                                                     | 36.5                 | -64.70              | 1.66       | 8.90          | 0.00          | -57.46        | -13.00         | -44.46         | V     |
| 5.55                                                     | 58.8                 | -49.50              | 2.15       | 10.30         | 0.00          | -41.35        | -13.00         | -28.35         | V     |
| 7.41                                                     | 52.7                 | -56.30              | 2.50       | 10.30         | 0.00          | -48.50        | -13.00         | -35.50         | V     |
| 3.70                                                     | 33.6                 | -67.60              | 2.15       | 8.90          | 0.00          | -60.85        | -13.00         | -47.85         | H     |
| 5.55                                                     | 52.6                 | -56.40              | 2.50       | 10.30         | 0.00          | -48.60        | -13.00         | -35.60         | H     |
| 7.41                                                     | 48.7                 | -51.50              | 2.84       | 10.30         | 0.00          | -44.04        | -13.00         | -31.04         | H     |
| Mid Channel                                              |                      |                     |            |               |               |               |                |                |       |
| 3.76                                                     | 36.4                 | -64.80              | 1.66       | 8.90          | 0.00          | -57.56        | -13.00         | -44.56         | V     |
| 5.64                                                     | 66.7                 | -41.50              | 2.15       | 10.30         | 0.00          | -33.35        | -13.00         | -20.35         | V     |
| 7.52                                                     | 57.8                 | -42.40              | 2.50       | 10.30         | 0.00          | -34.60        | -13.00         | -21.60         | V     |
| 3.76                                                     | 36.8                 | -64.40              | 2.15       | 8.90          | 0.00          | -57.65        | -13.00         | -44.65         | H     |
| 5.64                                                     | 56.3                 | -43.90              | 2.50       | 10.30         | 0.00          | -36.10        | -13.00         | -23.10         | H     |
| 7.52                                                     | 50.6                 | -54.40              | 2.84       | 10.30         | 0.00          | -46.94        | -13.00         | -33.94         | H     |
| High Channel                                             |                      |                     |            |               |               |               |                |                |       |
| 3.82                                                     | 37.4                 | -63.80              | 1.66       | 8.90          | 0.00          | -56.56        | -13.00         | -43.56         | V     |
| 5.73                                                     | 46.4                 | -53.80              | 2.15       | 10.30         | 0.00          | -45.65        | -13.00         | -32.65         | V     |
| 7.64                                                     | 46.9                 | -53.30              | 2.50       | 10.30         | 0.00          | -45.50        | -13.00         | -32.50         | V     |
| 3.82                                                     | 35.8                 | -62.20              | 2.15       | 8.90          | 0.00          | -55.45        | -13.00         | -42.45         | H     |
| 5.73                                                     | 45.3                 | -54.80              | 2.50       | 10.30         | 0.00          | -47.00        | -13.00         | -34.00         | H     |
| 7.64                                                     | 45.8                 | -55.30              | 2.84       | 10.30         | 0.00          | -47.84        | -13.00         | -34.84         | H     |
| Note: Completed scan from 30MHz to 20 GHz.               |                      |                     |            |               |               |               |                |                |       |
| EIPR = SG reading - CL + Gain (dBi)                      |                      |                     |            |               |               |               |                |                |       |
| Margin = EIPR - Limit                                    |                      |                     |            |               |               |               |                |                |       |
| SA: Spectrum Analyzer, HP 8593EM, S/N: 3710A00205        |                      |                     |            |               |               |               |                |                |       |
| SG: Signal Generator, HP 83732B, S/N: US34490599         |                      |                     |            |               |               |               |                |                |       |
| TX Antenna: Dipole, Compliance Design, Roberts, S/N: 111 |                      |                     |            |               |               |               |                |                |       |
| Horn, EMCO 3115, S/N: 6717                               |                      |                     |            |               |               |               |                |                |       |
| CL: cable loss (5ft), FLEXCO                             |                      |                     |            |               |               |               |                |                |       |
| Pre-Amp: Miteq NSP2600 -44, S/N: 646456                  |                      |                     |            |               |               |               |                |                |       |
| RX Antenna: Bicon, Eston 94455-1, S/N: 1214              |                      |                     |            |               |               |               |                |                |       |
| LP, EMCO 3146, S/N: 3163                                 |                      |                     |            |               |               |               |                |                |       |
| Horn, EMCO 3115, S/N: 6739                               |                      |                     |            |               |               |               |                |                |       |

## 8.6 SECTION 2.1055: FREQUENCY STABILITY

### INSTRUMENTS LIST

| EQUIPMENT             | MANUFACTURE | MODEL NO.    | CAL. DUE DATE |
|-----------------------|-------------|--------------|---------------|
| EMI Receiver          | HP          | 8593EM       | 6/11/03       |
| Environmental Chamber | Thermotron  | SE 600-10-10 | 4/26/03       |

#### Detector Function Setting of Test Receiver

| Frequency Range (MHz) | Detector Function | Resolution Bandwidth | Video Bandwidth |
|-----------------------|-------------------|----------------------|-----------------|
| Above 1000            | Peak              | 300 Hz               | 300 Hz          |

### TEST SETUP

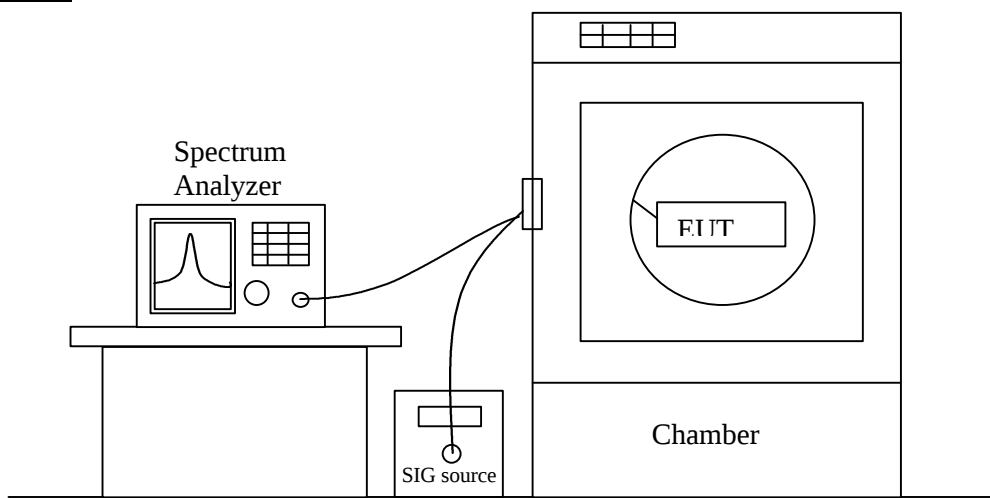


Fig. 3: Frequency Stability Setup

### TEST PROCEDURE

- **Frequency stability versus environmental temperature**

- 1). Setup the configuration per figure 6 for frequencies measurement inside the environmental chamber. Set the temperature of the chamber to 25°C. Set SA Resolution Bandwidth low enough to obtain the desired frequency resolution and measure the EUT 25°C operating frequency as reference frequency.
- 2). Turn EUT off and set Chamber temperature to -30°C.
- 3). Allow sufficient time (approximately 20 to 30 min) after chamber reach the assigned temperature) for EUT to stabilize. Turn on EUT and measure the EUT operating frequency. Turn off EUT after the measurement.
- 4). Repeat step 3 with a 10°C increased per stage until the highest temperature of +50°C reached, record all measured frequencies on each temperature step.

• **Frequency stability versus AC input voltage**

- 1). Setup the configuration per figure 6 and set chamber temperature to 25°C. Use a variable AC power supply to power the EUT and set AC output voltage to EUT nominal input AC voltage. Set SA Resolution Bandwidth low enough to obtain the desired frequency resolution and measure the EUT 25°C operating frequency as reference frequency.
- 2). Slowly reduce the EUT input voltage to specified extreme voltage variation ( $\pm 15\%$ ) and record the maximum frequency change.

**RESULT**

No non-compliance noted, as shown below because the EUT uses the same OSC in both receiver and transmitter LO circuit. As a result, the frequency does not shift in Frequency Stability Test.

**Frequency stability versus environmental temperature**

| Reference Frequencies: $F_c = 1851.255\text{MHz}$<br>Limit: $\pm 2.5$ ppm (4628Hz) |                      |                                                |                                                |
|------------------------------------------------------------------------------------|----------------------|------------------------------------------------|------------------------------------------------|
| Environment Temperature (°C)                                                       | Power Supplied (Vac) | Frequency deviation measured with time elapse  |                                                |
|                                                                                    |                      | Reference $F_L$ @ -20dBc<br>1850.553MHz @ 23°C | Reference $F_H$ @ -20dBc<br>1851.957MHz @ 23°C |
|                                                                                    |                      | Delta (KHz)                                    | Delta (KHz)                                    |
| 60                                                                                 | Fixed 115 Vac        | 0                                              | 0                                              |
| 50                                                                                 | Fixed 115 Vac        | 0                                              | 0                                              |
| 40                                                                                 | Fixed 115 Vac        | 0                                              | 0                                              |
| 30                                                                                 | Fixed 115 Vac        | 0                                              | 0                                              |
| 20                                                                                 | Fixed 115 Vac        | 0                                              | 0                                              |
| 10                                                                                 | Fixed 115 Vac        | 2                                              | -2                                             |
| 0                                                                                  | Fixed 115 Vac        | 2                                              | -2                                             |
| -10                                                                                | Fixed 115 Vac        | 2                                              | -2                                             |
| -20                                                                                | Fixed 115 Vac        | 2.5                                            | -2.5                                           |
| -30                                                                                | Fixed 115 Vac        | 3                                              | -3                                             |

| Reference Frequencies: $F_c = 1851.255\text{MHz}$<br>Limit: $\pm 2.5$ ppm (4628Hz) |                      |                                                  |                                                  |
|------------------------------------------------------------------------------------|----------------------|--------------------------------------------------|--------------------------------------------------|
| Environment Temperature (°C)                                                       | Power Supplied (Vac) | Frequency deviation measured with time elapse    |                                                  |
|                                                                                    |                      | Reference $F_L$ @ -20dBc<br>1850.553MHz @ 120Vac | Reference $F_H$ @ -20dBc<br>1851.957MHz @ 120Vac |
|                                                                                    |                      | Delta (KHz)                                      | Delta (KHz)                                      |
| 23                                                                                 | Fixed 102 Vac        | 0                                                | 0                                                |
| 23                                                                                 | Fixed 138 Vac        | 0                                                | 0                                                |

## 8.7 RADIATED EMISSION: part 15.209

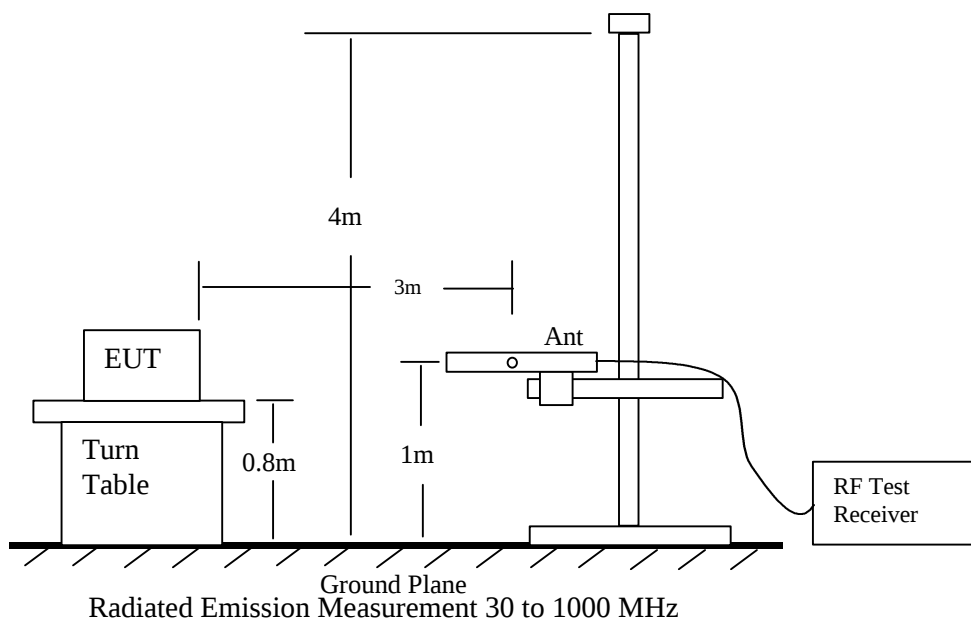
### INSTRUMENTS LIST

| EQUIPMENT         | MANUFACTURE | MODEL NO. | CAL. DUE DATE |
|-------------------|-------------|-----------|---------------|
| Spectrum Analyzer | HP          | 8593EM    | 6/11/03       |
| Amplifier         | HP          | 8447D     | 4/26/03       |
| Bicon Antenna     | Eaton       | 94455-1   | 3/30/03       |
| LP Antenna        | EMCO        | 3146      | 3/30/03       |

#### Detector Function Setting of Test Receiver

| Frequency Range (MHz) | Detector Function                                                            | Resolution Bandwidth                                                          | Video Bandwidth                                                               |
|-----------------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| below 1000            | <input checked="" type="checkbox"/> Peak<br><input type="checkbox"/> Average | <input checked="" type="checkbox"/> 120 KHz<br><input type="checkbox"/> 1 MHz | <input checked="" type="checkbox"/> 120 KHz<br><input type="checkbox"/> 10 Hz |

### TEST SETUP



**Test with Fujitsu Laptop:**

| Freq.        | Reading | AF    | Closs | Pre-amp | Level    | Limit | Margin | Pol   | Az    | Height  | Mark    |
|--------------|---------|-------|-------|---------|----------|-------|--------|-------|-------|---------|---------|
| (MHz)        | (dBuV)  | (dB)  | (dB)  | (dB)    | (dBuV/m) | FCC_B | (dB)   | (H/V) | (Deg) | (Meter) | (P/Q/A) |
| 144.00       | 43.90   | 10.78 | 2.54  | 29.42   | 27.80    | 43.50 | -15.70 | 3mV   | 0.00  | 1.00    | P       |
| 192.00       | 44.50   | 8.82  | 2.91  | 29.18   | 27.05    | 43.50 | -16.45 | 3mH   | 0.00  | 1.50    | P       |
| 144.00       | 43.10   | 10.78 | 2.54  | 29.42   | 27.00    | 43.50 | -16.50 | 3mH   | 0.00  | 1.50    | P       |
| 48.00        | 42.00   | 8.58  | 1.72  | 29.68   | 22.62    | 40.00 | -17.38 | 3mV   | 0.00  | 1.00    | P       |
| 48.00        | 40.60   | 8.58  | 1.72  | 29.68   | 21.22    | 40.00 | -18.78 | 3mH   | 0.00  | 2.00    | P       |
| 96.00        | 40.70   | 9.35  | 2.18  | 29.55   | 22.68    | 43.50 | -20.82 | 3mV   | 0.00  | 1.00    | P       |
| 6 Worst Data |         |       |       |         |          |       |        |       |       |         |         |

**Test with Toshiba Laptop:**

| Freq.        | Reading | AF    | Closs | Pre-amp | Level    | Limit | Margin | Pol   | Az    | Height  | Mark    |
|--------------|---------|-------|-------|---------|----------|-------|--------|-------|-------|---------|---------|
| (MHz)        | (dBuV)  | (dB)  | (dB)  | (dB)    | (dBuV/m) | FCC_B | (dB)   | (H/V) | (Deg) | (Meter) | (P/Q/A) |
| 144.00       | 43.40   | 10.78 | 2.54  | 29.42   | 27.30    | 43.50 | -16.20 | 3mV   | 0.00  | 1.00    | P       |
| 192.00       | 44.00   | 8.82  | 2.91  | 29.18   | 26.55    | 43.50 | -16.95 | 3mH   | 0.00  | 1.50    | P       |
| 144.00       | 42.60   | 10.78 | 2.54  | 29.42   | 26.50    | 43.50 | -17.00 | 3mH   | 0.00  | 1.50    | P       |
| 48.00        | 41.50   | 8.58  | 1.72  | 29.68   | 22.12    | 40.00 | -17.88 | 3mV   | 0.00  | 1.00    | P       |
| 48.00        | 40.10   | 8.58  | 1.72  | 29.68   | 20.72    | 40.00 | -19.28 | 3mH   | 0.00  | 2.00    | P       |
| 96.00        | 40.20   | 9.35  | 2.18  | 29.55   | 22.18    | 43.50 | -21.32 | 3mV   | 0.00  | 1.00    | P       |
| 6 Worst Data |         |       |       |         |          |       |        |       |       |         |         |

**Test with IBM Laptop:**

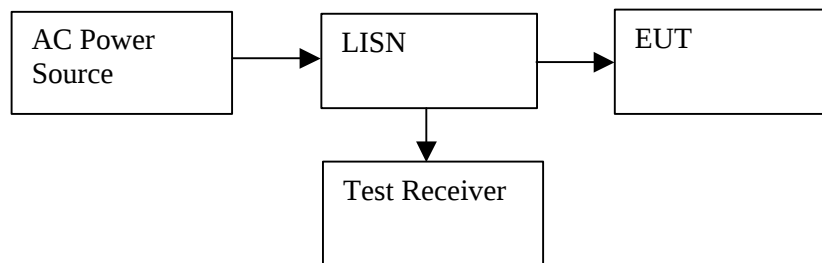
| Freq.        | Reading | AF    | Closs | Pre-amp | Level    | Limit | Margin | Pol   | Az    | Height  | Mark    |
|--------------|---------|-------|-------|---------|----------|-------|--------|-------|-------|---------|---------|
| (MHz)        | (dBuV)  | (dB)  | (dB)  | (dB)    | (dBuV/m) | FCC_B | (dB)   | (H/V) | (Deg) | (Meter) | (P/Q/A) |
| 48.00        | 46.10   | 11.40 | 0.88  | 27.50   | 30.87    | 40.00 | -9.13  | 3mV   | 0.00  | 1.00    | P       |
| 48.00        | 44.50   | 11.40 | 0.88  | 27.50   | 29.27    | 40.00 | -10.73 | 3mH   | 0.00  | 2.50    | P       |
| 192.00       | 41.60   | 15.70 | 1.84  | 26.92   | 32.21    | 43.50 | -11.29 | 3mH   | 0.00  | 2.50    | P       |
| 96.00        | 47.70   | 10.36 | 1.21  | 27.35   | 31.92    | 43.50 | -11.58 | 3mV   | 0.00  | 1.00    | P       |
| 144.00       | 40.80   | 15.52 | 1.57  | 27.15   | 30.75    | 43.50 | -12.75 | 3mV   | 0.00  | 1.00    | P       |
| 192.00       | 39.50   | 15.70 | 1.84  | 26.92   | 30.11    | 43.50 | -13.39 | 3mV   | 0.00  | 1.00    | P       |
| 6 Worst Data |         |       |       |         |          |       |        |       |       |         |         |

## 8.8 POWER LINE CONDUCTED EMISSION: Part 15.107

### TEST SETUP

Detector Function Setting of Test Receiver

| Frequency Range (MHz) | Detector Function                                                               | Resolution Bandwidth                       | Video Bandwidth                            |
|-----------------------|---------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------------|
| 450 KHz to 30 MHz     | <input type="checkbox"/> Peak<br><input checked="" type="checkbox"/> Quasi Peak | <input checked="" type="checkbox"/> 10 KHz | <input checked="" type="checkbox"/> 10 KHz |



### TEST PROCEDURE

1. The EUT was placed on a wooden table 80 cm above the horizontal ground plane and 40 cm away from the vertical ground plane. The EUT was set to transmit / receive in a continuous mode.
2. Conducted disturbance was measured between the phase lead and the ground, and between the neutral lead and the ground. The frequency 0.450 - 30 MHz was investigated.

### RESULT

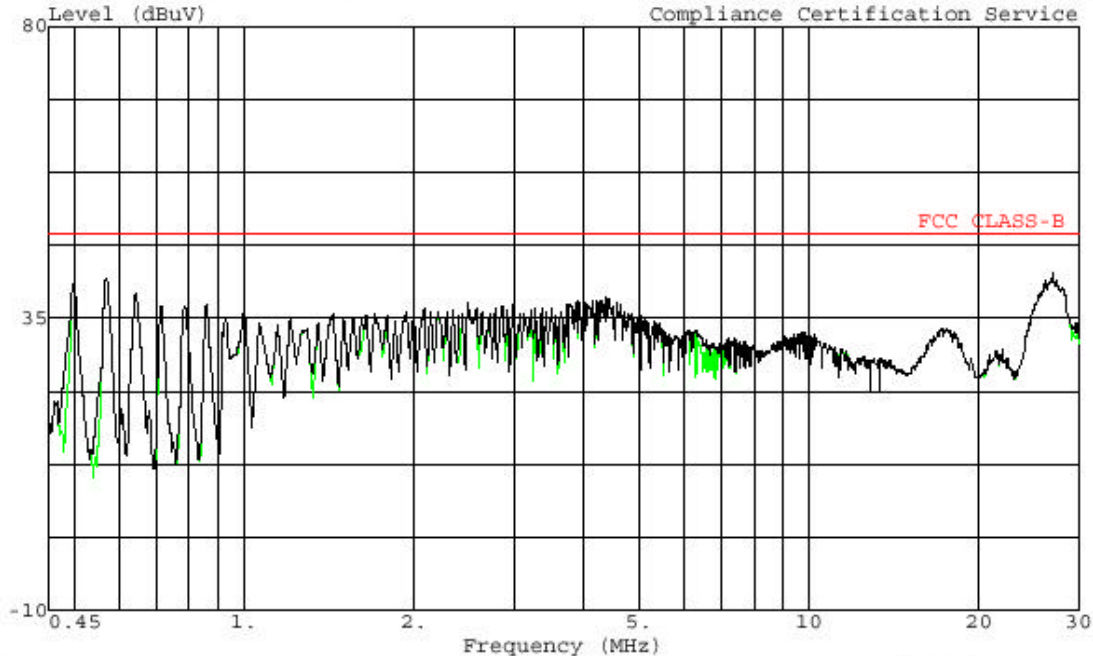
*No non-compliance noted. See Line Conduction plot*

**Test with Fujitsu Laptop:**



561F Monterey Road,  
San Jose, CA 95037 USA  
Tel: (408) 463-0885  
Fax: (408) 463-0888

Data#: 6 File#: 071202LC.EMI Date: 07-12-2002 Time: 12:39:42  
Level (dBuV) Compliance Certification Service



Trace: 3  
Project # : 02U1373-1  
Test Engineer: Skip Doyle  
Company : AirPrime Inc  
EUT : WIRELESS PCMCIA CDMA DATA MODEM  
 : DIAMOND PC3200  
Test Config : EUT/ Support Equipment  
Type of Test : FCC Class B  
Mode of Op. : Tx / Rx set to Mid Channel 600 - Fujitsu  
 : L1: Peak ( Green ) L2: Peak ( Black )  
 : 115VAc, 60Hz

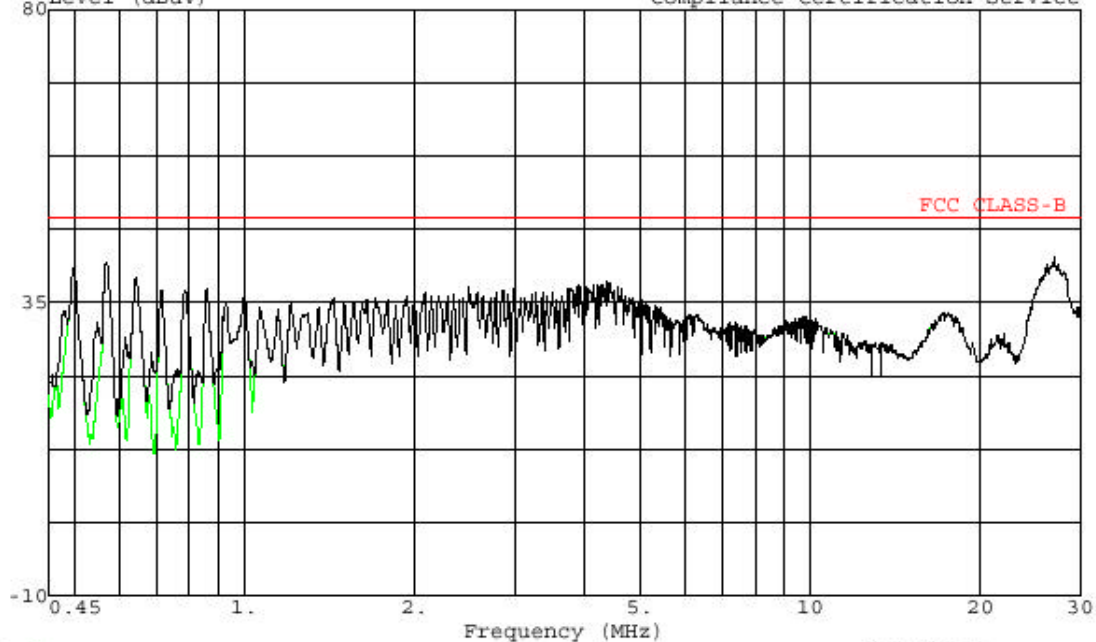
Ref Trace:

**Test with Toshiba Laptop:**



561F Monterey Road,  
San Jose, CA 95037 USA  
Tel: (408) 463-0885  
Fax: (408) 463-0888

Data#: 12 File#: 071202LC.EMI Date: 07-12-2002 Time: 12:39:42  
Level (dBuV) Compliance Certification Service



Trace: 6  
Project # : 02U1373-1  
Test Engineer: Skip Doyle  
Company : AirPrime Inc  
EUT : WIRELESS PCMCIA CDMA DATA MODEM  
: DIAMOND PC3200  
Test Config : EUT/ Support Equipment  
Type of Test : FCC Class B  
Mode of Op. : Tx / Rx set to Mid Channel 600 - Toshiba  
: L1: Peak ( Green ) L2: Peak ( Black )  
: 115VAc, 60Hz

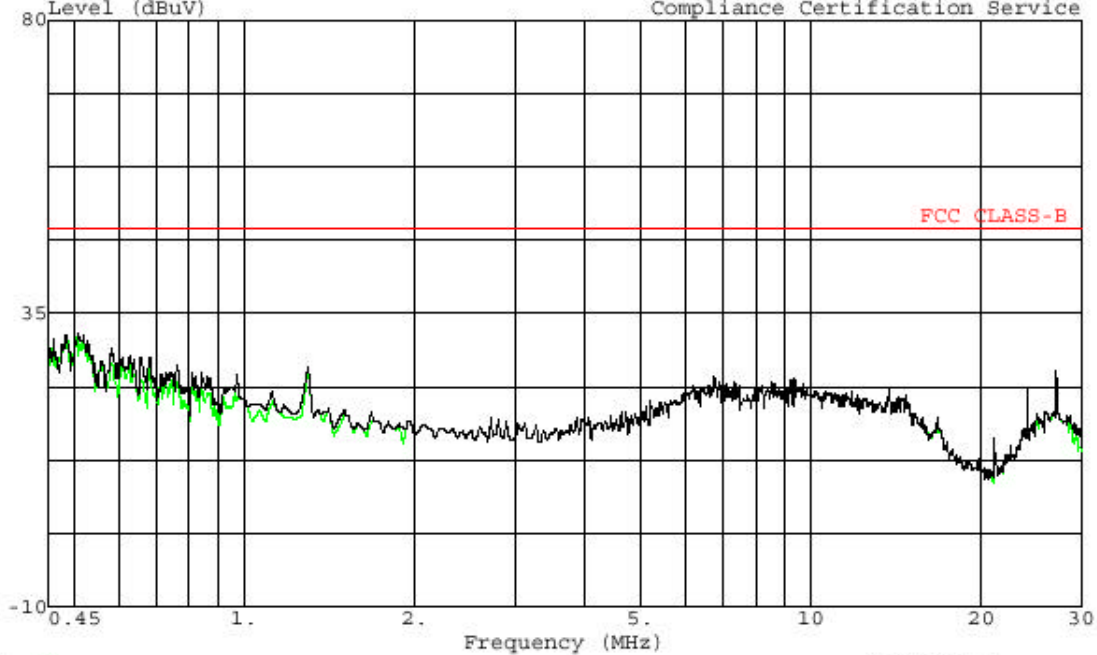
Ref Trace:

**Test with IBM Laptop:**



561F Monterey Road,  
San Jose, CA 95037 USA  
Tel: (408) 463-0885  
Fax: (408) 463-0888

Data#: 19 File#: 071202LC.EMI Date: 07-12-2002 Time: 18:59:22  
Level (dBuV) Compliance Certification Service



Trace: 15  
Project # : 02U1373-1  
Test Engineer: Skip Doyle  
Company : AirPrime Inc  
EUT : WIRELESS PCMCIA CDMA DATA MODEM  
: DIAMOND PC3200  
Test Config : EUT/ Support Equipment  
Type of Test : FCC Class B  
Mode of Op. : Tx / Rx set to Mid Channel 600 - IBM  
: Peak: L1( Black ), L2 (Green)  
: 115VAc, 60Hz

Ref Trace:

**Test with Fujitsu Laptop:**

| CONDUCTED EMISSIONS DATA (115VAC 60Hz) (FUJITSU LAPTOP) |           |           |           |       |       |       |         |         |         |
|---------------------------------------------------------|-----------|-----------|-----------|-------|-------|-------|---------|---------|---------|
| Freq.                                                   | Reading   |           |           | Closs | Limit | FCC_B | Margin  |         | Remark  |
| (MHz)                                                   | PK (dBuV) | QP (dBuV) | AV (dBuV) | (dB)  | QP    | AV    | QP (dB) | AV (dB) | L1 / L2 |
| 0.50                                                    | 40.30     | --        | --        | 0.00  | 48.00 | --    | -7.70   | --      | L1      |
| 0.57                                                    | 41.12     | --        | --        | 0.00  | 48.00 | --    | -6.88   | --      | L1      |
| 27.01                                                   | 42.06     | --        | --        | 0.00  | 48.00 | --    | -5.94   | --      | L1      |
| 0.50                                                    | 40.30     | --        | --        | 0.00  | 48.00 | --    | -7.70   | --      | L2      |
| 0.57                                                    | 41.12     | --        | --        | 0.00  | 48.00 | --    | -6.88   | --      | L2      |
| 27.01                                                   | 42.06     | --        | --        | 0.00  | 48.00 | --    | -5.94   | --      | L2      |
| 6 Worst Data                                            |           |           |           |       |       |       |         |         |         |

**Test with Toshiba Laptop:**

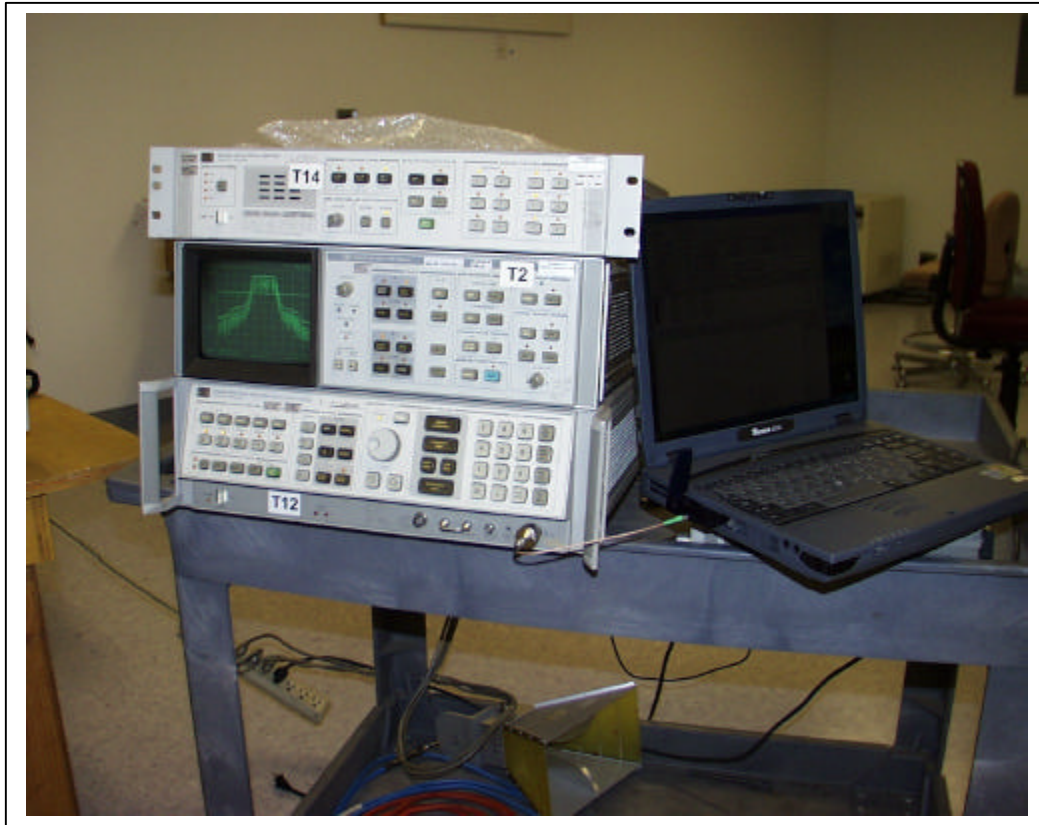
| CONDUCTED EMISSIONS DATA (115VAC 60Hz) (TOSHIBA LAPTOP) |           |           |           |       |       |       |         |         |         |
|---------------------------------------------------------|-----------|-----------|-----------|-------|-------|-------|---------|---------|---------|
| Freq.                                                   | Reading   |           |           | Closs | Limit | FCC_B | Margin  |         | Remark  |
| (MHz)                                                   | PK (dBuV) | QP (dBuV) | AV (dBuV) | (dB)  | QP    | AV    | QP (dB) | AV (dB) | L1 / L2 |
| 0.50                                                    | 40.29     | --        | --        | 0.00  | 48.00 | --    | -7.71   | --      | L1      |
| 0.57                                                    | 41.12     | --        | --        | 0.00  | 48.00 | --    | -6.88   | --      | L1      |
| 27.01                                                   | 42.06     | --        | --        | 0.00  | 48.00 | --    | -5.94   | --      | L1      |
| 0.50                                                    | 40.30     | --        | --        | 0.00  | 48.00 | --    | -7.70   | --      | L2      |
| 0.57                                                    | 41.01     | --        | --        | 0.00  | 48.00 | --    | -6.99   | --      | L2      |
| 27.01                                                   | 42.06     | --        | --        | 0.00  | 48.00 | --    | -5.94   | --      | L2      |
| 6 Worst Data                                            |           |           |           |       |       |       |         |         |         |

**Test with IBM Laptop:**

| CONDUCTED EMISSIONS DATA (115VAC 60Hz) (IBM LAPTOP) |           |           |           |       |       |       |         |         |         |
|-----------------------------------------------------|-----------|-----------|-----------|-------|-------|-------|---------|---------|---------|
| Freq.                                               | Reading   |           |           | Closs | Limit | FCC_B | Margin  |         | Remark  |
| (MHz)                                               | PK (dBuV) | QP (dBuV) | AV (dBuV) | (dB)  | QP    | AV    | QP (dB) | AV (dB) | L1 / L2 |
| 0.48                                                | 31.50     | --        | --        | 0.00  | 48.00 | --    | -16.50  | --      | L1      |
| 1.30                                                | 26.36     | --        | --        | 0.00  | 48.00 | --    | -21.64  | --      | L1      |
| 27.12                                               | 25.38     | --        | --        | 0.00  | 48.00 | --    | -22.62  | --      | L1      |
| 0.51                                                | 31.96     | --        | --        | 0.00  | 48.00 | --    | -16.04  | --      | L2      |
| 1.30                                                | 26.72     | --        | --        | 0.00  | 48.00 | --    | -21.28  | --      | L2      |
| 27.12                                               | 26.24     | --        | --        | 0.00  | 48.00 | --    | -21.76  | --      | L2      |
| 6 Worst Data                                        |           |           |           |       |       |       |         |         |         |

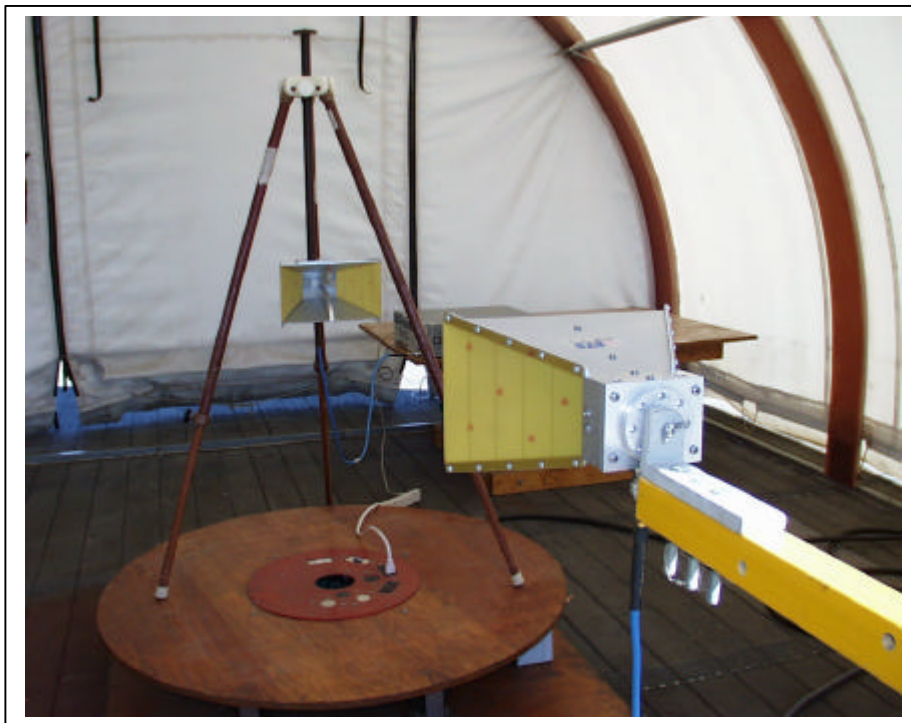
## 9 ATTACHMENT

### 9.1 EUT SETUP PHOTOS





**Radiated Emissions Measurement**



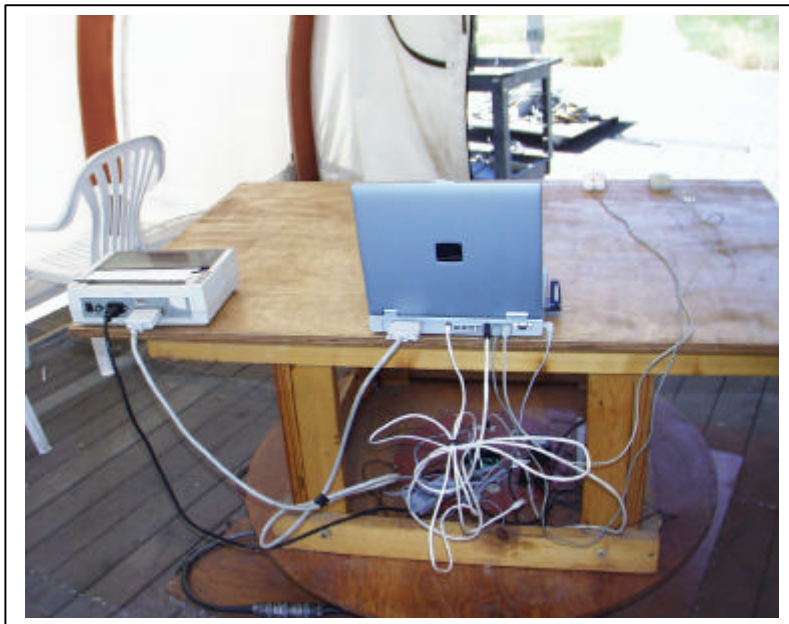
**Substitution Measurement**



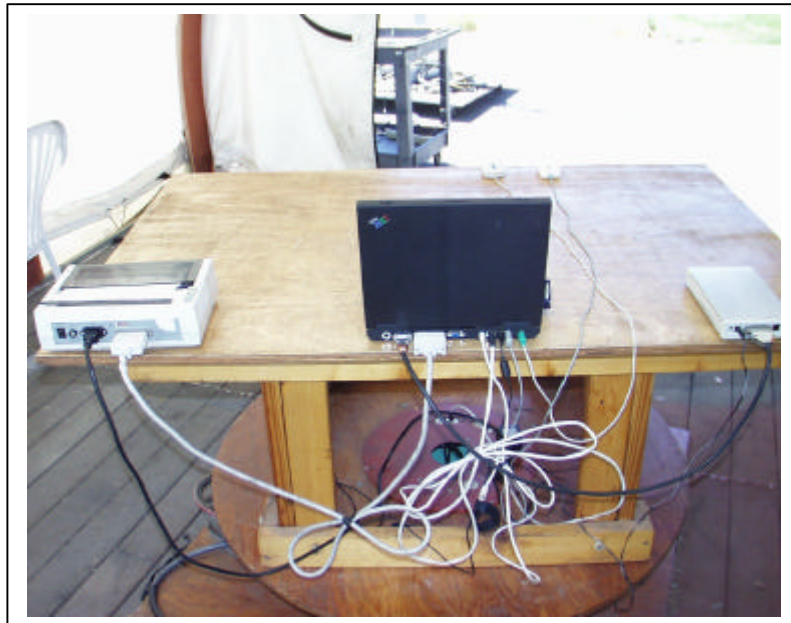
### **FREQUENCY VS. TEMPERATURE (OR VOLTAGE)**



### 15.109 Radiated Emissions Measurement (Toshiba)



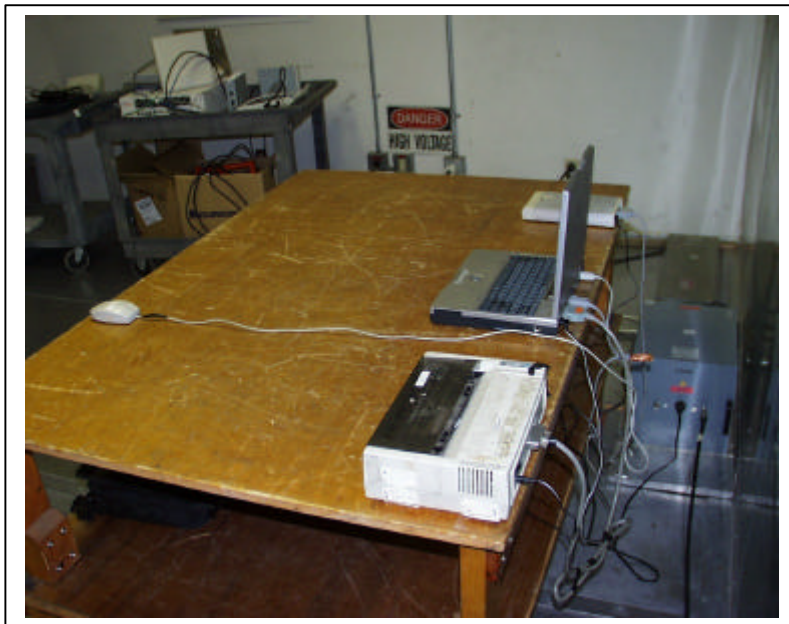
### 15.109 Radiated Emissions Measurement (Fujitsu)



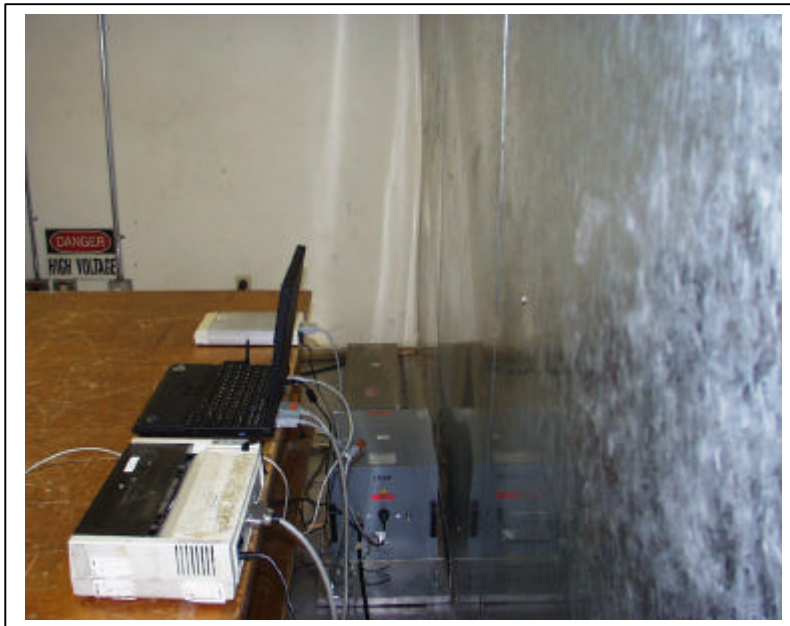
### 15.109 Radiated Emissions Measurement (IBM)



#### 15.107 Conducted Emissions Measurement (Toshiba)



#### 15.107 Conducted Emissions Measurement (Fujitsu)



#### 15.107 Conducted Emissions Measurement (IBM)

## END OF REPORT