

**KTL Test Report:** 9R01569.1

**Applicant:** Norpak Corporation  
10 Hearst Way  
Kanata, Ontario  
K2L 2P4

**Equipment Under Test:** TTX81X PC Card - TV Data Broadcast Receiver  
**(E.U.T.)**

**FCC ID:** CIHTTX81X

**In Accordance With:** FCC Part 15, Subpart B  
Class B Certification

**Tested By:** KTL Ottawa Inc.  
3325 River Road, R.R. 5  
Ottawa, Ontario K1V 1H2

**Authorized By:** K. Colborne, RF Laboratory Supervisor

**Date:**

**Total Number of Pages:** 26

**TABLE OF CONTENTS****Section 1. Summary of Test Results**

- General
- Summary of Tests

**Section 2. Equipment Under Test (E.U.T.)**

- Description of E.U.T.
- Modifications Incorporated in E.U.T.
- Theory of Operation
- Justification
- Exercise Program

**Section 3. Equipment Configuration**

- Equipment Configuration List
- Inter-connection Cables
- Configuration of the Equipment Under Test (E.U.T.) Block Diagram

**Section 4. Powerline Conducted Emissions**

- Test Conditions
- Test Results
- Performance Criteria
- Test Data - Powerline Conducted Emissions (See Graphs)
- Test Data - Powerline Conducted Emissions - Phase Conductor (See Graphs)
- Test Data - Powerline Conducted Emissions - Neutral Conductor (See Graphs)
- Conducted Photographs

**Section 5. Radiated Emissions**

- Test Conditions
- Test Results
- Performance Criteria
- Test Data-Radiated Emissions
- Radiated Photographs
- Pre-Scan Data

**Section 6. Sample Calculations**

- Conducted Emissions
- Radiated Emissions

*EQUIPMENT: TTX81X PC Card - TV Data Broadcast Receiver*  
*FCC ID: CIHTTX81X*

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**TABLE OF CONTENTS, continued**

**Section 7. Block Diagrams**

Conducted Emissions  
Radiated Emissions

**Section 8. Test Equipment List**

Equipment List - Powerline Conducted Emissions  
Equipment List - Radiated Emissions

*EQUIPMENT: TTX81X PC Card - TV Data Broadcast Receiver  
FCC ID: CIHTTX81X*

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## **Section 1. Summary of Test Results**

### **General:**

#### **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15, Subpart B for Class B Digital Devices.

These tests were conducted using measurement procedures of ANSI C63.4-1992.

The equipment was tested for conducted emissions from 0.45 MHz to 30 MHz using a 50 microhenry line impedance stabilization network (L.I.S.N.) as described in ANSI C63.4-1992. Peripheral equipment was also operated through a 50 microhenry L.I.S.N.

The equipment was tested for radiated emissions from 30 MHz to 1000 MHz with extension to the 10<sup>th</sup> harmonic of any fundamental clock frequency in accordance with the requirements of FCC Part 15, Subpart B. Frequencies were initially identified in a large shielded room. Amplitude measurements were made on an outdoor Open Area Test Site. Details of the outdoor site are on file with the FCC.

### **Abstract:**

| Name Of Test        | Para. No. | Results  | Margin |
|---------------------|-----------|----------|--------|
| Conducted Emissions | 15.107    | Complies | ???    |
| Radiated Emissions  | 15.109    | Complies | ???    |

THIS REPORT APPLIES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE. None



**NVLAP Lab Code: 100351-0**

Test Performed By: \_\_\_\_\_ Date: \_\_\_\_\_  
[Wayne Clarke, Technologist](#)

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*EQUIPMENT: TTX81X PC Card - TV Data Broadcast Receiver  
FCC ID: CIHTTX81X*

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**Section 2.      Equipment Under Test (E.U.T.)**

Brand Name:      TTX81X PC Card - TV Data Broadcast Receiver

Manufacturer:      Norpak Corporation

Model No.:      TTX81X

Serial No.:      None



Production Unit



Pre-Production Unit

**Description of E.U.T.**

The E.U.T. is a PC card that interfaces directly with the PC BUS, decoding the raw data stream on board and providing NABTS or WST data to the PC for application processing.

**Modifications Incorporated in E.U.T.**

The EUT has not been modified from what is described by the brand name and unique type identification stated above.

*EQUIPMENT: TTX81X PC Card - TV Data Broadcast Receiver*  
*FCC ID: CIHTTX81X*

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### **Theory of Operation**

The TTX81X receiver is installed in a PC and connected to an incoming TV signal from any source including cable, off-air antenna or TVRO satellite dish. The TV input signal is software selectable for either a base band (composite) or RF video input. Again under software control, the card is configured for the desired TV channel, data mode and authorized packet address or addresses. The receiver continuously monitors the TV signal for any data. When data of the required type is received it is captured and delivered to the PC for subsequent handling.

*EQUIPMENT: TTX81X PC Card - TV Data Broadcast Receiver  
FCC ID: CIHTTX81X*

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**Justification**

The E.U.T. was configured for testing as per typical installation. Position and bundling of cables were investigated to establish maximum amplitude of emissions.

The following combinations were investigated to establish worst case configuration:

- (1) The E.U.T. was receiving data packets.
- (2) Cable positioning.

**Exercise Program**

The E.U.T. exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.

**Exercise Mode:**

- (1) The E.U.T. was receiving data packets from an encoder and checking for “BER” on received signal.

*EQUIPMENT: TTX81X PC Card - TV Data Broadcast Receiver  
FCC ID: CIHTTX81X*

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## **Section 3. Equipment Configuration**

### **Equipment Configuration List:**

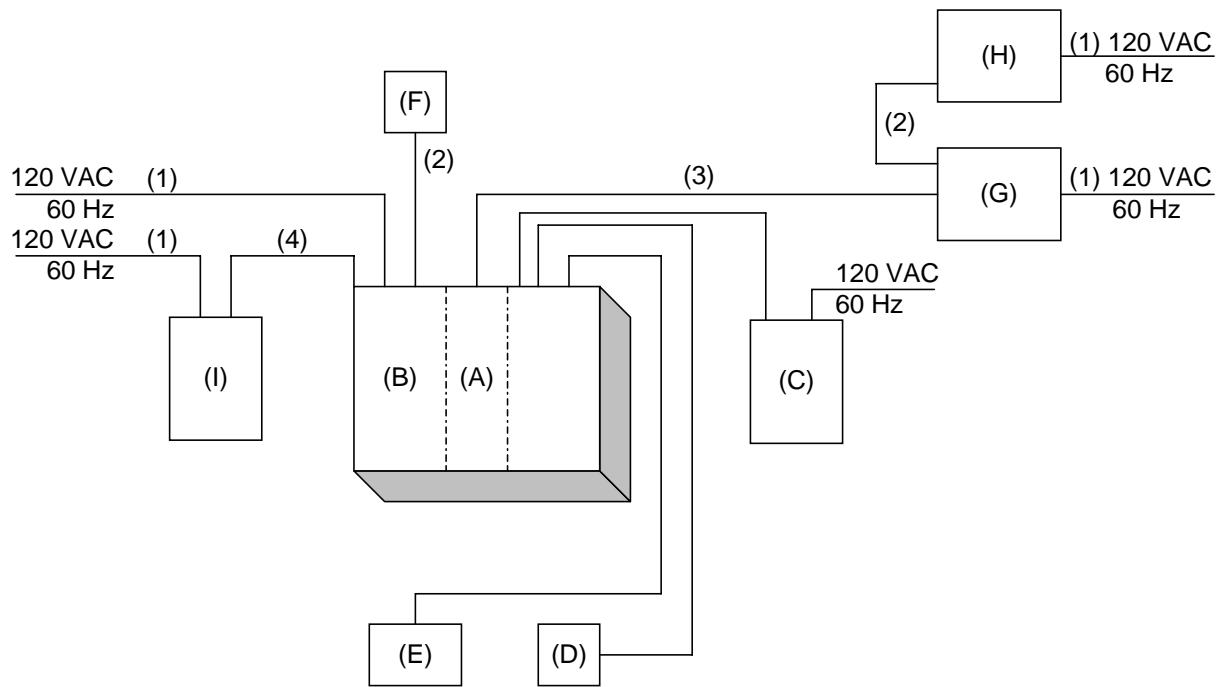
| <b>Item</b> | <b>Description</b>         | <b>Model No.</b> | <b>Serial No.</b> | <b>Rev.</b> |
|-------------|----------------------------|------------------|-------------------|-------------|
| (A)         | TV Data Broadcast Receiver | TTX81X           | None              |             |
| (B)         | IBM PC                     | L5F              | 156571L5F23RBM79  |             |
| (C)         | IBM Monitor                | 6542-103         | 6669868           |             |
| (D)         | IBM 2 Button Mouse         | 13H6690          | 23-H7-1946        |             |
| (E)         | IBM Keyboard               | 06H5283          | 30492             |             |
| (F)         | 75 ohm Load                | None             | None              |             |
| (G)         | Samsung VCR                | VT2870/SECA      | 61FB5001679032    |             |
| (H)         | GES3 Encoder               | GS3-UNI-536      | None              |             |
| (I)         | Fujitsu Printer            | C9SDP033M3352A1  | 00301899          |             |

### **Inter-connection Cables:**

| <b>Item</b> | <b>Description</b>                | <b>Length (m)</b> |
|-------------|-----------------------------------|-------------------|
| (1)         | Standard AC Cable                 | 1.8               |
| (2)         | 75 ohm Coax Cable                 | 1.0               |
| (3)         | 75 ohm Coax Cable                 | 10.0              |
| (4)         | Centronics To dB 25 Printer Cable | 5.0               |

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FCC ID: CIHTTX81X*

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**Configuration of the Equipment Under Test (E.U.T)**

*EQUIPMENT: TTX81X PC Card - TV Data Broadcast Receiver  
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## **Section 4.      Conducted Emissions**

|                                   |                    |
|-----------------------------------|--------------------|
| NAME OF TEST: Conducted Emissions | PARA. NO.: 15.107  |
| TESTED BY: Wayne Clarke           | DATE: May 20, 1999 |

**Test Conditions:**      Test Voltage: 120 VAC  
                            Temperature: 22 °C  
                            Humidity: 40 %

### **Minimum Standard:**

| Frequency(MHz) | Maximum Powerline Conducted RF Voltage |      |
|----------------|--|------|
|                | µV                                     | dBµV |
| 0.45 - 30.0    | 250                                    | 48   |

**Test Results:**      Complies. See attached graphs and table.

**Measurement Data:**      See attached graphs and table.

### **Method Of Measurement: (Procedure ANSI C63.4-1992)**

Measurements were made using a spectrum analyzer with 10 kHz RBW, Peak detector. Any emissions that are close to the limit are measured using a test receiver with 10 kHz bandwidth, CISPR Quasi-Peak detector.

Broadband emissions are identified by switching the receiver detector function from Quasi-Peak to Average. If the amplitude of the emission drops by 6 dB or more then the emission is classified as broadband and the Quasi-Peak level is reduced by a factor of 13 dB.

All emissions within 10 dB of limit have been recorded.

*EQUIPMENT: TTX81X PC Card - TV Data Broadcast Receiver*  
*FCC ID: CIHTTX81X*

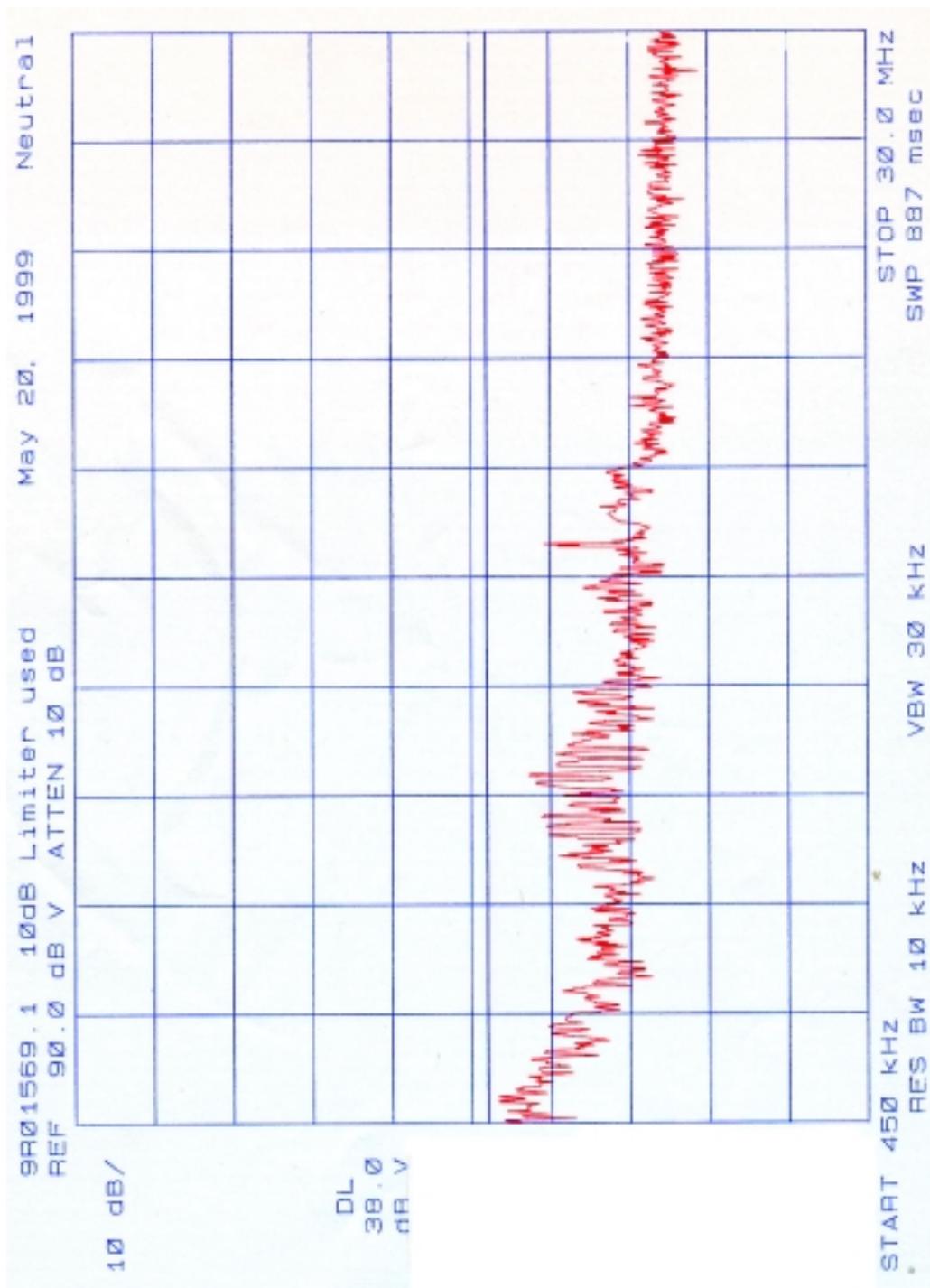
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**Measurement Data:**

| Conductor | Frequency (MHz) | CISPR (dB $\mu$ V) | Average (dB $\mu$ V) | BB/NB | BB Correction (dB) | Result (dB $\mu$ V) |
|-----------|-----------------|--------------------|----------------------|-------|--------------------|---------------------|
| Neutral   | 1.0             | 43.1               | 40.7                 | NB    | 0.0                | 7.3                 |
| Phase     | 1.0             | 43.2               | 40.3                 | NB    | 0.0                | 7.7                 |
| Neutral   | 0.47            | 43.4               | 42.4                 | NB    | 0.0                | 5.6                 |
| Phase     | 0.47            | 43.2               | 40.3                 | NB    | 0.0                | 7.7                 |
| Neutral   | 9.84            | 38.5               | 28.5                 | BB    | -13.0              | 35.2                |
| Phase     | 9.84            | 36.2               | 26.8                 | BB    | -13.0              | 34.2                |
| Neutral   | 16.09           | 39.5               | 38.1                 | NB    | 0.0                | 9.9                 |
| Phase     | 16.09           | 41.6               | 39.8                 | NB    | 0.0                | 8.2                 |

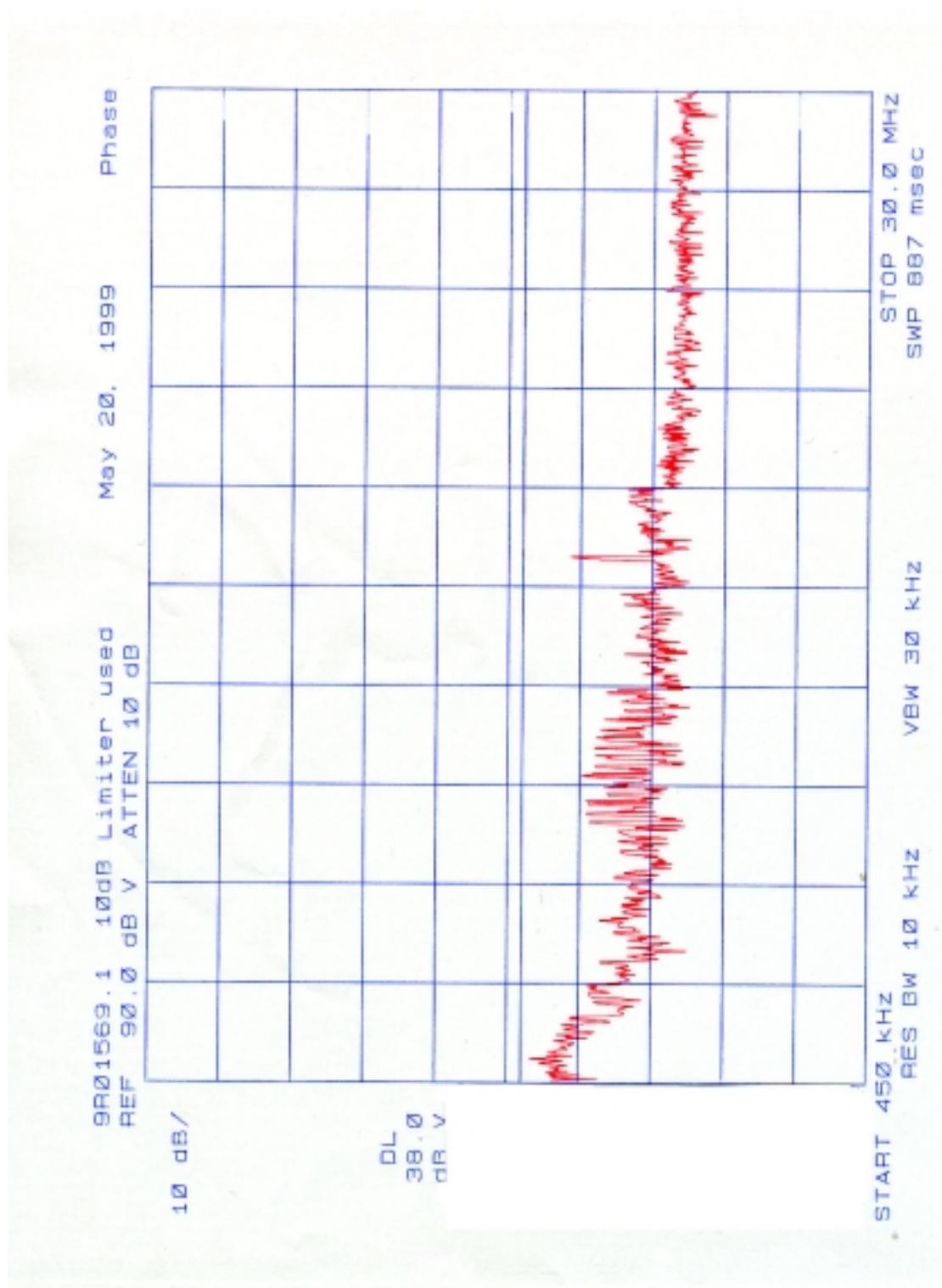
*EQUIPMENT: TTX81X PC Card - TV Data Broadcast Receiver  
FCC ID: CIHTTX81X*

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**Conducted Emissions (120 VAC, 60 Hz)**

*EQUIPMENT: TTX81X PC Card - TV Data Broadcast Receiver  
FCC ID: CIHTTX81X*

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*EQUIPMENT: TTX81X PC Card - TV Data Broadcast Receiver*  
*FCC ID: CIHTTX81X*

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## **Conducted Photographs (Worst Case Configuration)**

### **Front View**



### **Side View**



*EQUIPMENT: TTX81X PC Card - TV Data Broadcast Receiver  
FCC ID: CIHTTX81X*

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## **Section 5. Radiated Emissions**

|                                  |                    |
|----------------------------------|--------------------|
| NAME OF TEST: Radiated Emissions | PARA. NO.: 15.109  |
| TESTED BY: Wayne Clarke          | DATE: May 20, 1999 |

**Test Conditions:**      Test Voltage: 120 VAC  
                            Temperature: 22 °C  
                            Humidity: 40 %

### **Minimum Standard:**

| <b>Frequency(MHz)</b> | <b>Maximum Field Strength at 3m</b> |               |
|-----------------------|-------------------------------------|---------------|
|                       | <b>µV/m</b>                         | <b>dBµV/m</b> |
| 30 - 88               | 100                                 | 40.0          |
| 88 - 216              | 150                                 | 43.5          |
| 216 - 960             | 200                                 | 46.0          |
| Above 960             | 500                                 | 54.0          |

**Test Results:**      Complies. The worst-case emission level is 42.3 dBµV/m @ 3m at 324.015 MHz. This is 3.7 dB below the specification limit.

**Measurement Data:**      See attached table.

The equipment was prescanned in a shielded room using a spectrum analyzer and broadband antenna. A list of frequencies was compiled for investigation in the open field. The equipment was then moved to an open area test site where amplitude measurements were made at a distance of 3 meters. The bandwidth was set to 120 kHz and the detector function was CISPR Quasi-Peak.

All fundamental clock frequencies were measured to the 10<sup>th</sup> Harmonic.

EQUIPMENT: TTX81X PC Card - TV Data Broadcast Receiver  
FCC ID: CIHTTX81X

## Test Data - Radiated Emissions

| Test Distance<br>(meters) : 3 |           | Range:<br>B Tower |                     | Receiver:<br>ESVS 30 |                                  | RBW(kHz):<br>120         |                         | Detector:<br>Q-Peak    |                                     |                         |                |
|-------------------------------|-----------|-------------------|---------------------|----------------------|----------------------------------|--------------------------|-------------------------|------------------------|-------------------------------------|-------------------------|----------------|
| Freq.<br>(MHz)                | Ant.<br>* | Pol.<br>(V/H)     | Ant.<br>HGT.<br>(m) | Table<br>(deg.)      | RCVD<br>Signal<br>(dB $\mu$ V/m) | Ant.<br>Factor<br>(dB)** | Amp.<br>Gain<br>(dB)*** | Dist.<br>Corr.<br>(dB) | Field<br>Strength<br>(dB $\mu$ V/m) | Limit<br>(dB $\mu$ V/m) | Margin<br>(dB) |
| 111.937                       | B/C2      | V                 |                     |                      | 18.0                             | 13.1                     |                         |                        | 31.1                                | 43.5                    | 12.4           |
| 111.937                       | B/C2      | H                 |                     |                      | 18.3                             | 13.1                     |                         |                        | 31.4                                | 43.5                    | 12.1           |
| 58.28                         | B/C2      | V                 |                     |                      | 19.5                             | 10.5                     |                         |                        | 30.0                                | 40.0                    | 10.0           |
| 58.28                         | B/C2      | H                 |                     |                      | 19.4                             | 10.5                     |                         |                        | 29.9                                | 40.0                    | 10.1           |
| 58.03                         | B/C2      | V                 |                     |                      | 15.2                             | 10.5                     |                         |                        | 25.7                                | 40.0                    | 14.3           |
| 58.03                         | B/C2      | H                 |                     |                      | 20.4                             | 10.5                     |                         |                        | 30.9                                | 40.0                    | 9.1            |
| 107.941                       | B/C2      | V                 |                     |                      | 20.8                             | 12.6                     |                         |                        | 33.4                                | 43.5                    | 10.1           |
| 107.941                       | B/C2      | H                 |                     |                      | 16.3                             | 12.6                     |                         |                        | 28.9                                | 43.5                    | 14.6           |
| 56.32                         | B/C2      | V                 |                     |                      | 24.6                             | 10.7                     |                         |                        | 35.3                                | 40.0                    | 4.7*           |
| 56.317                        | B/C2      | H                 |                     |                      | 19.9                             | 10.7                     |                         |                        | 30.6                                | 40.0                    | 9.4            |
| 324.015                       | L/P       | V                 |                     |                      | 19.2                             | 19.2                     |                         |                        | 38.4                                | 46.0                    | 7.6            |
| 324.015                       | L/P       | H                 |                     |                      | 22.5                             | 19.2                     |                         |                        | 41.7                                | 46.0                    | 4.3*           |
| 300.714                       | L/P       | V                 |                     |                      | 10.6                             | 19.4                     |                         |                        | 30.0                                | 46.0                    | 16.0           |
| 300.714                       | L/P       | H                 |                     |                      | 14.8                             | 19.4                     |                         |                        | 34.2                                | 46.0                    | 11.8           |
| 400.978                       | L/P       | V                 |                     |                      | 13.0                             | 21.0                     |                         |                        | 34.0                                | 46.0                    | 12.0           |
| 400.978                       | L/P       | H                 |                     |                      | 15.9                             | 21.0                     |                         |                        | 36.9                                | 46.0                    | 9.1            |
| 323.274                       | L/P       | V                 |                     |                      | 17.5                             | 19.2                     |                         |                        | 36.7                                | 46.0                    | 9.3            |
| 323.274                       | L/P       | H                 |                     |                      | 17.4                             | 19.2                     |                         |                        | 36.6                                | 46.0                    | 9.4            |
| 324.015                       | E/D3      | V                 |                     |                      | 16.0                             | 23.4                     |                         |                        | 39.4                                | 46.0                    | 6.6            |
| 324.015                       | E/D3      | H                 |                     |                      | 18.9                             | 23.4                     |                         |                        | 42.3                                | 46.0                    | 3.7            |
| 56.32                         | E/D2      | V                 |                     |                      | 28.7                             | 4.4                      |                         |                        | 33.1                                | 40.0                    | 6.9            |
| 56.32                         | E/D2      | H                 |                     |                      | 26.7                             | 4.4                      |                         |                        | 31.1                                | 40.0                    | 8.9            |

Notes:  
B/C = Biconical, B/L = Biconilog, L/P = Log-Periodic, H = Horn, D/P = Dipole  
\* Re-measured using dipole antenna.  
\*\* Includes cable loss when amplifier is not used.  
\*\*\* Includes cable loss.  
( ) Denotes failing emission level.

*EQUIPMENT: TTX81X PC Card - TV Data Broadcast Receiver*  
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**Radiated Photographs (Worst Case Configuration)**

**Front View**

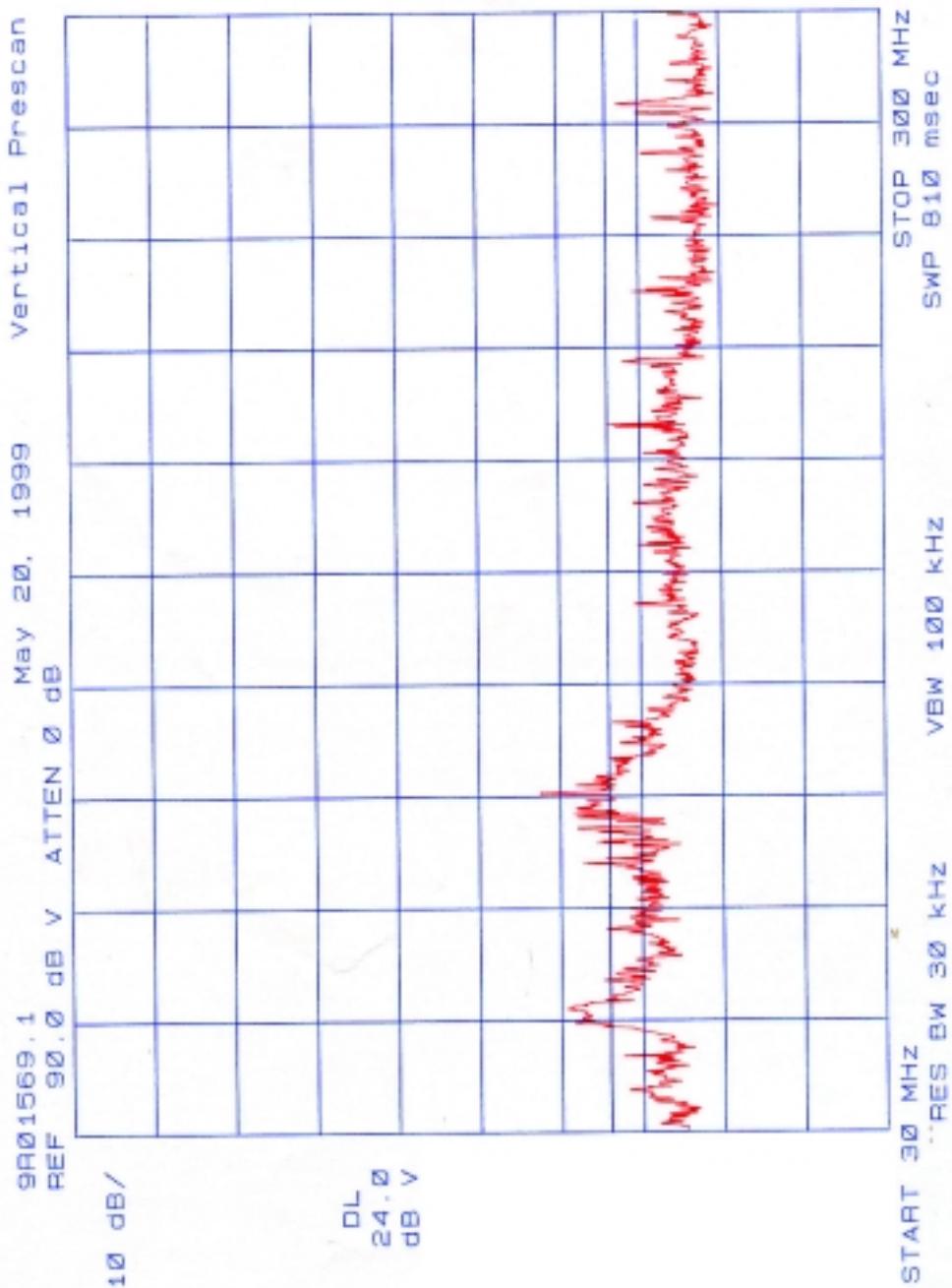


**Rear View**



*EQUIPMENT: TTX81X PC Card - TV Data Broadcast Receiver*  
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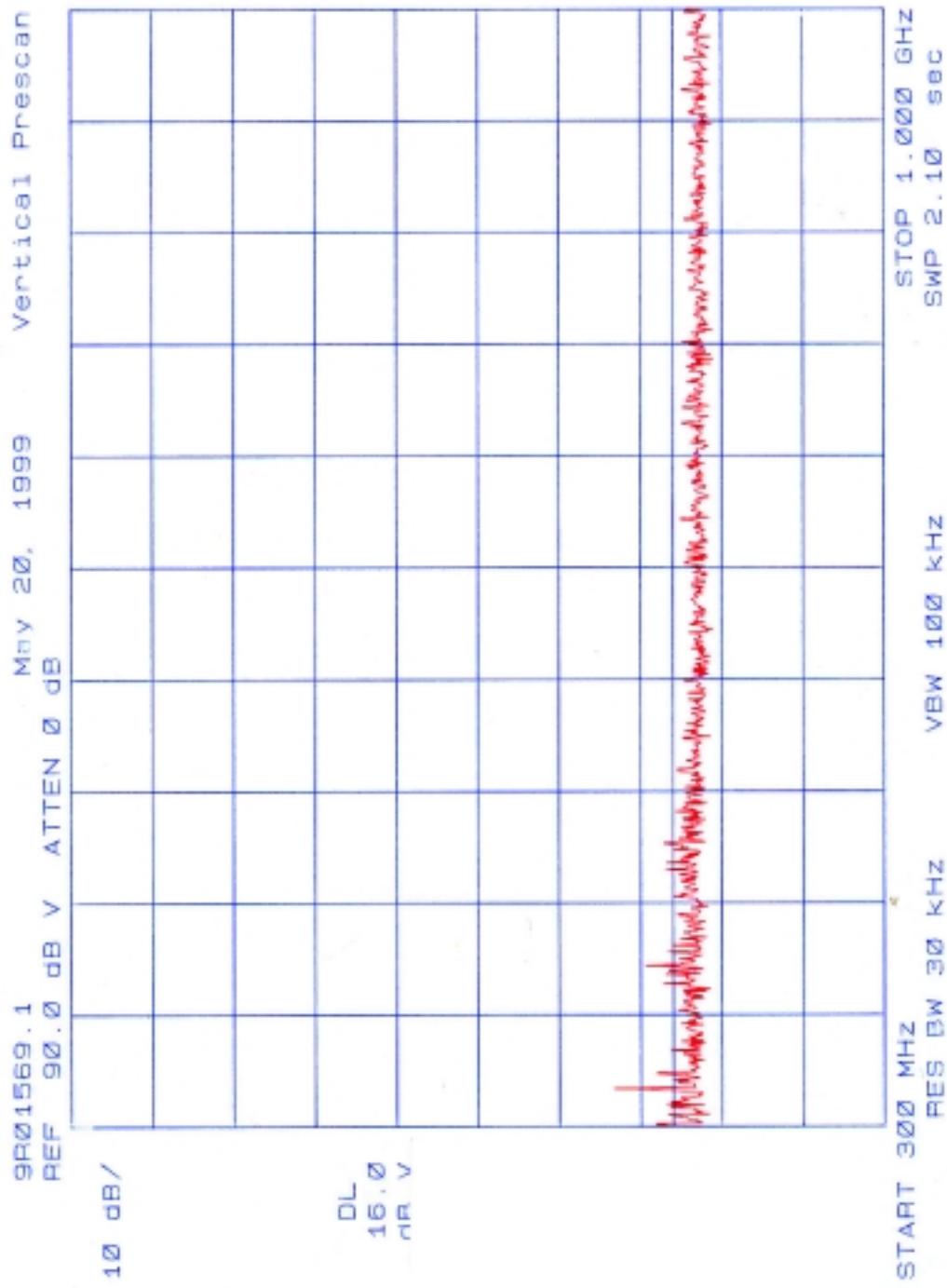
**Pre-Scan Data**

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FCC PART 15, SUBPART B  
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PROJECT NO.: 9R01569.1

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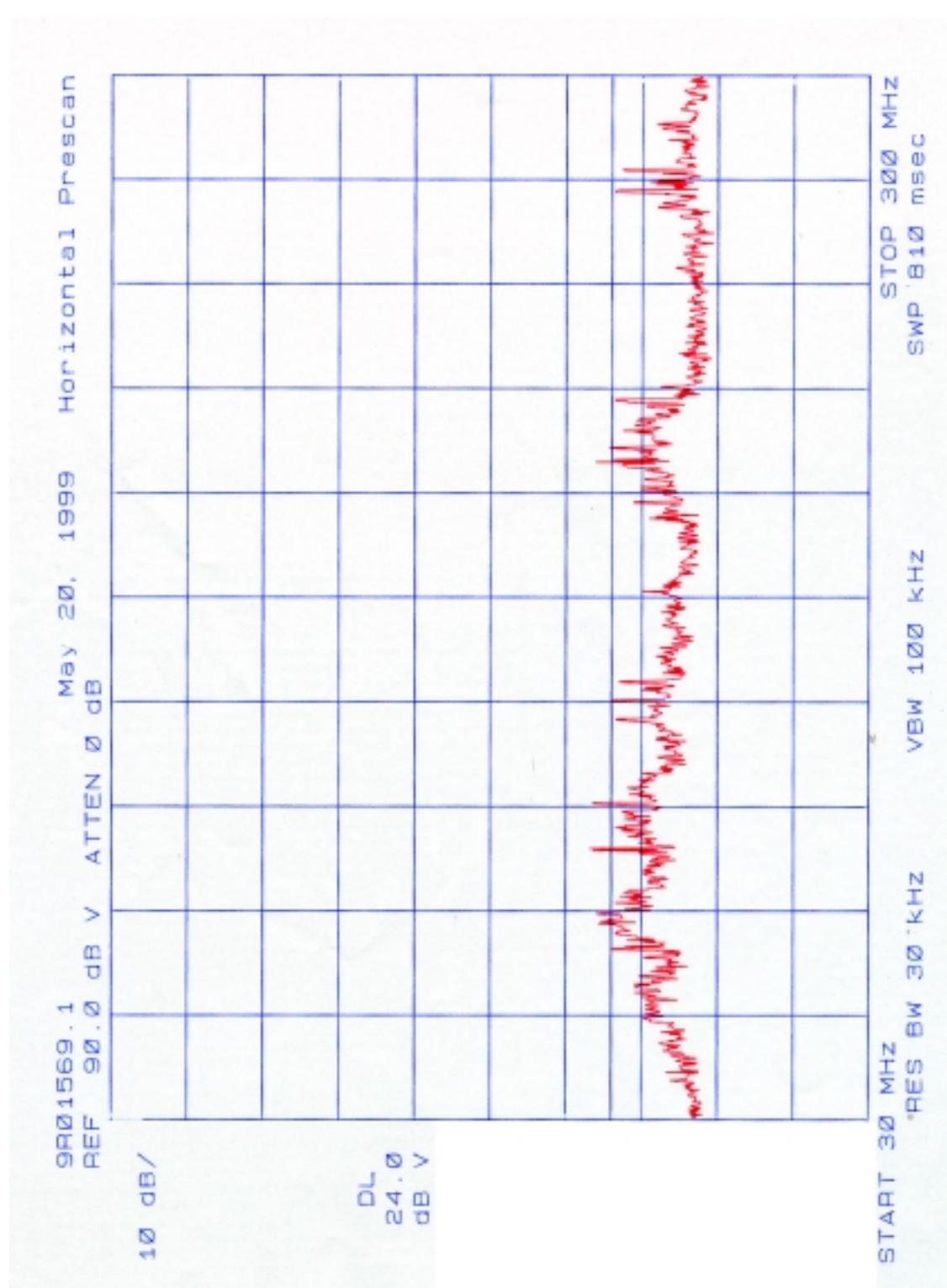


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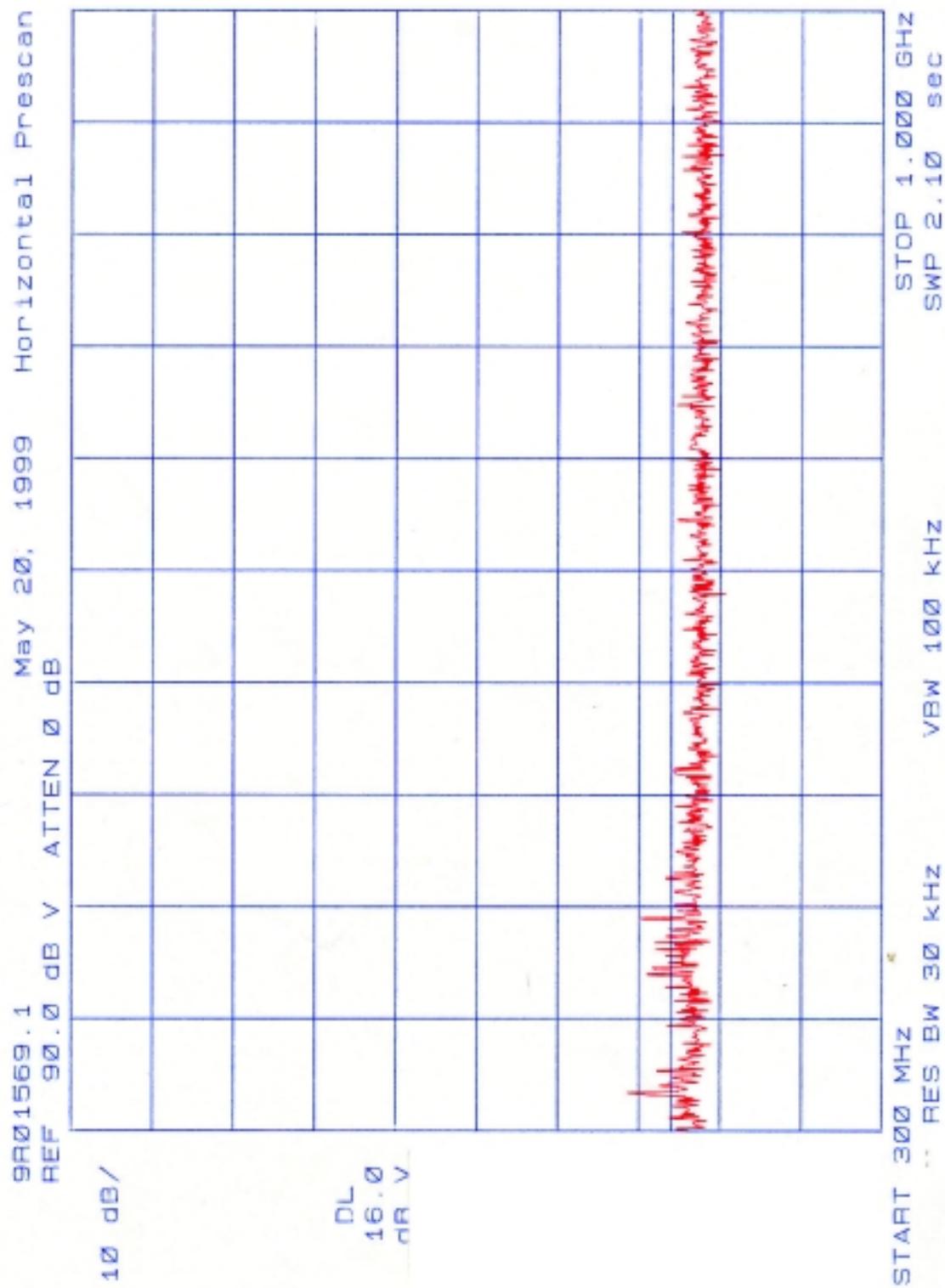


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CLASS B CERTIFICATION  
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*EQUIPMENT: TTX81X PC Card - TV Data Broadcast Receiver  
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**Prescan Data**

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Project Number : 9R01569  
Project Filename : 9R1569.LST  
Date : May 20, 1999  
Start Frequency : 30 MHz  
Stop Frequency : 1000 MHz  
Display Line Value: 24 (30-300 MHz), 16 (300-1000MHz) dBuV

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**Vertical Prescan**

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Top 6 Emissions below 300 MHz from the vertical prescan list:

111.94 MHz, 31 dBuV.  
58.29 MHz, 28.9 dBuV.  
113.95 MHz, 26.4 dBuV.  
94.91 MHz, 26.2 dBuV.  
99.89 MHz, 26 dBuV.  
59.2 MHz, 25.7 dBuV.

Full Emission List below 300 MHz:

58.29 MHz, 28.9 dBuV. Peak.  
58.6 MHz, 24.9 dBuV. Peak.  
58.81 MHz, 24.8 dBuV. Peak.  
59.2 MHz, 25.7 dBuV. Peak.  
59.71 MHz, 25.5 dBuV. Peak.  
60 MHz, 24.4 dBuV. Peak.  
94.91 MHz, 26.2 dBuV. Peak.  
99.89 MHz, 26 dBuV. Peak.  
103.31 MHz, 25.6 dBuV. Peak.  
106.91 MHz, 24.8 dBuV. Peak.  
107.96 MHz, 25.6 dBuV. Peak.  
111.94 MHz, 31 dBuV. Peak.  
113.95 MHz, 26.4 dBuV. Peak.

Top Emissions above 300 MHz from the vertical prescan list:

324.02 MHz, 22.8 dBuV.  
401 MHz, 19.2 dBuV.  
395.38 MHz, 16.6 dBuV.  
323.28 MHz, 16.3 dBuV.  
477.83 MHz, 16.2 dBuV.

Full Emission List above 300 MHz:

323.28 MHz, 16.3 dBuV. Peak.  
324.02 MHz, 22.8 dBuV. Peak.  
395.38 MHz, 16.6 dBuV. Peak.  
401 MHz, 19.2 dBuV. Peak.  
477.83 MHz, 16.2 dBuV. Peak.

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**Horizontal Prescan**

---

Top Emissions below 300 MHz from the horizontal prescan list:

99.88 MHz, 27.5 dBuV.  
200.47 MHz, 26.6 dBuV.  
79.07 MHz, 24.7 dBuV.

Full Emission List below 300 MHz:

79.07 MHz, 24.7 dBuV. Peak.  
99.88 MHz, 27.5 dBuV. Peak.  
200.47 MHz, 26.6 dBuV. Peak.

Top 6 Emissions above 300 MHz from the horizontal prescan list:

324.04 MHz, 19.1 dBuV.  
417.88 MHz, 18.6 dBuV.  
413.87 MHz, 18.4 dBuV.  
323.3 MHz, 17.9 dBuV.  
409.88 MHz, 17.8 dBuV.  
405.88 MHz, 17.4 dBuV.

Full Emission List above 300 MHz:

323.3 MHz, 17.9 dBuV. Peak.  
324.04 MHz, 19.1 dBuV. Peak.  
328.35 MHz, 16.3 dBuV. Peak.  
397.88 MHz, 16.5 dBuV. Peak.  
405.88 MHz, 17.4 dBuV. Peak.  
409.88 MHz, 17.8 dBuV. Peak.  
413.87 MHz, 18.4 dBuV. Peak.  
417.88 MHz, 18.6 dBuV. Peak.  
421.85 MHz, 16.2 dBuV. Peak.  
432.87 MHz, 17.3 dBuV. Peak.

## **Section 6.      Sample Calculations**

### **Conducted Emissions:**

If the Quasi-Peak to Average ratio is greater than 6 dB, then the emission is classified as broadband and its Quasi-Peak level is reduced by 13 dB for comparison to the limit.

i.e.    Quasi-Peak level = 40 dB $\mu$ V  
Average level = 34 dB $\mu$ V  
Corrected level =  $40 - 13 = 27$  dB $\mu$ V

### **Radiated Emissions**

Emissions are measured at a distance of 3 meters and corrected for antenna factor and cable loss.

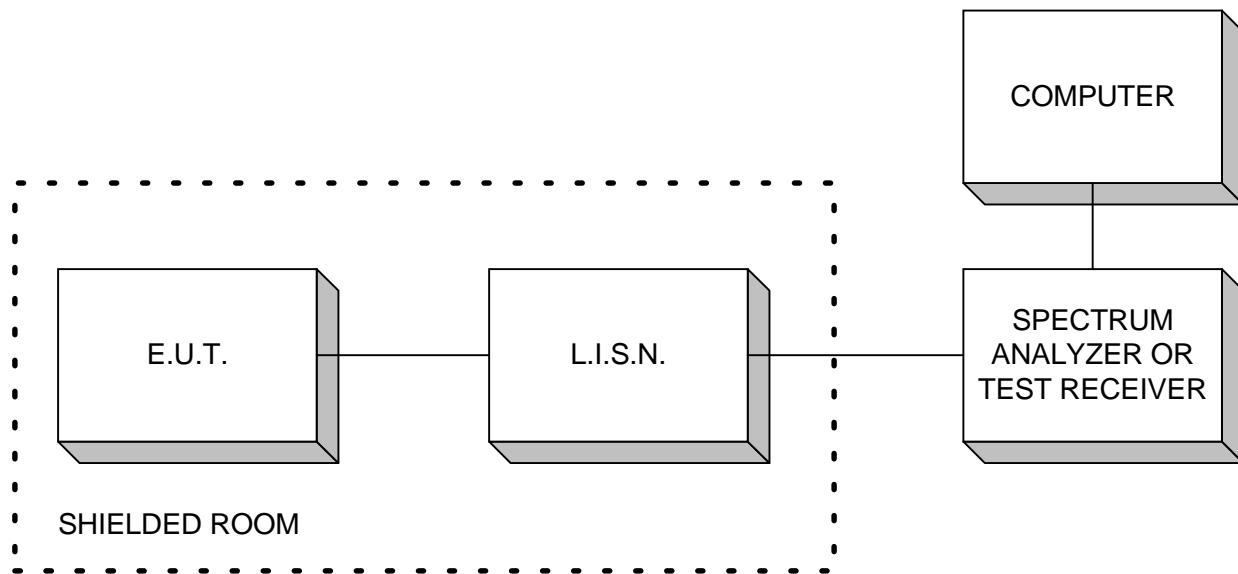
i.e.    Received Signal = 25 dB $\mu$ V @ 100 MHz  
Antenna Factor & Cable Loss = 9.8 dB  
Field Intensity =  $25 + 9.8 = 34.8$  dB $\mu$ V/m @ 3 m

*EQUIPMENT: TTX81X PC Card - TV Data Broadcast Receiver  
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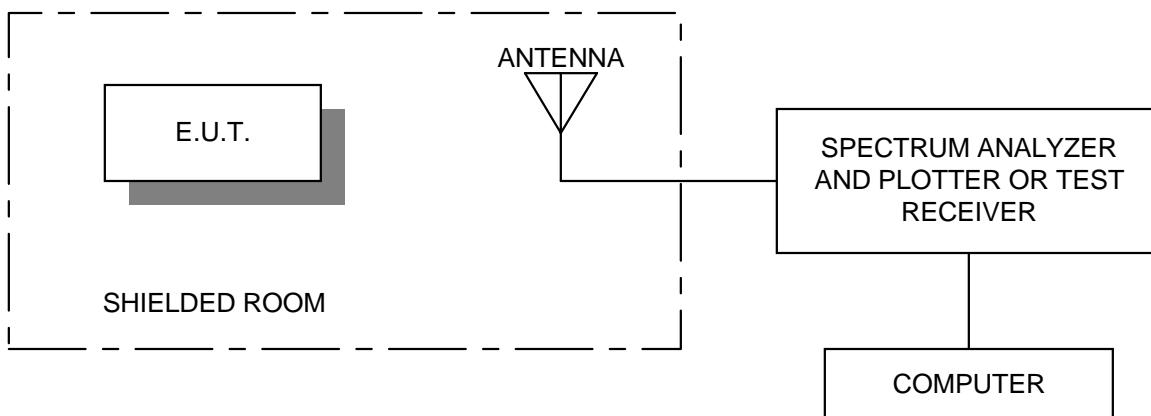
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## Section 7. Block Diagrams

### Conducted Emissions

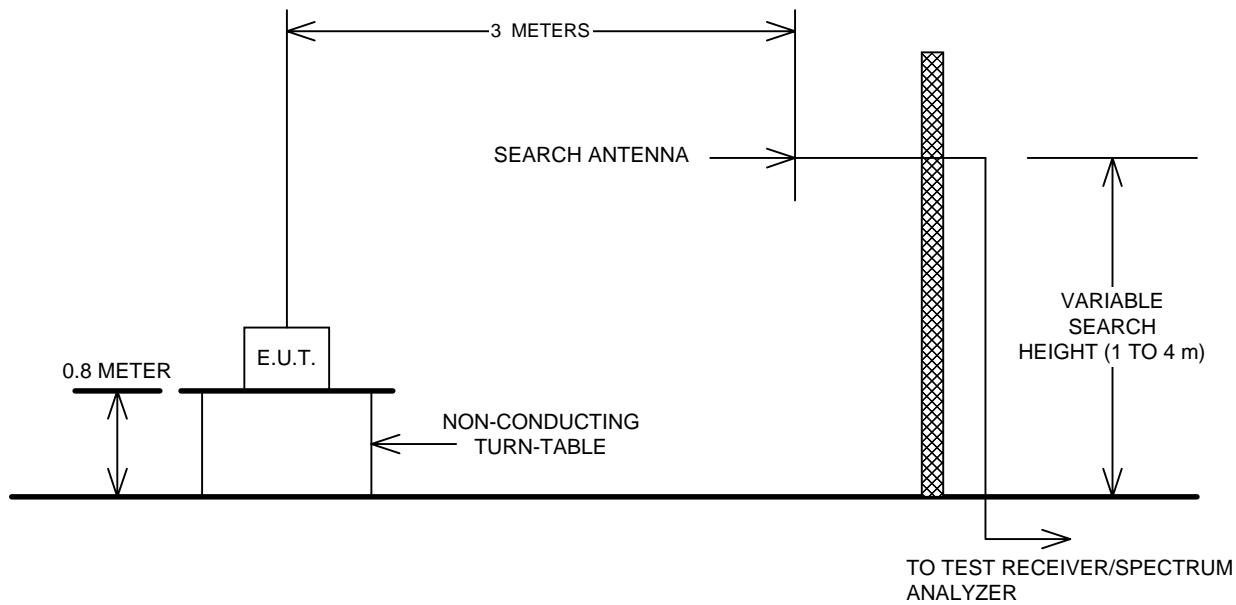


### Radiated Prescan



*EQUIPMENT: TTX81X PC Card - TV Data Broadcast Receiver  
FCC ID: CIHTTX81X*

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**Outdoor Test Site For Radiated Emissions**

The spectrum was searched up to the 10th harmonic of the fundamental frequency of operation.

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## **Section 8. Test Equipment List**

### **Equipment List - Conducted Emissions - Shielded Room #1**

| <b>CAL Cycle</b> | <b>Equipment</b>          | <b>Manufacturer</b> | <b>Model #</b> | <b>Serial/Asset #</b> | <b>Last Cal.</b> | <b>Next Cal.</b> |
|------------------|---------------------------|---------------------|----------------|-----------------------|------------------|------------------|
| 1 Year           | LISN                      | Rohde & Schwarz     | ESH2-Z5        | 890485/017            | July 23/98       | July 23/99       |
| 1 Year           | LISN(peripheral)          | Tegam               | 95300-50       | T-109014/15           | July 24/98       | July 24/99       |
| 1 Year           | Receiver                  | Rohde & Schwarz     | ESH3           | 872079/053            | July 23/98       | July 23/99       |
| 1 Year           | Spectrum analyzer         | Hewlett-Packard     | 8566B          | 2311A02238            | Oct. 22/98       | Oct. 22/99       |
| 1 Year           | Spectrum analyzer display | Hewlett-Packard     | 8566B          | 2314A04759            | Oct. 22/98       | Oct. 22/99       |
| 1 Year           | Quasi-peak adapter        | Hewlett-Packard     | 85650A         | 2043A00302            | Oct. 22/98       | Oct. 22/99       |
|                  | Plotter                   | Hewlett-Packard     | 7550A          | 28484 15123           | N/A              | N/A              |
| 1 Year           | Transient Limiter         | Hewlett-Packard     | 1194 7A        | 3107A01766            | July 21/98       | July 21/99       |

### **Equipment List - Radiated Emissions**

| <b>CAL Cycle</b> | <b>Equipment</b>          | <b>Manufacturer</b> | <b>Model #</b> | <b>Serial/Asset #</b> | <b>Last Cal.</b> | <b>Next Cal.</b> |
|------------------|---------------------------|---------------------|----------------|-----------------------|------------------|------------------|
|                  | Biconilog Antenna         | EMCO                | 3143           | 9404-1039             | NCR              | NCR              |
| 1 Year           | Dipole Antenna Set        | EMCO                | 3121C          | 1029                  | Nov. 18/98       | Nov. 18/99       |
| 1 Year           | Receiver                  | Rohde & Schwarz     | ESVS-30        | 843710/002            | Oct. 27/98       | Oct. 27/99       |
| 1 Year           | Spectrum Analyzer         | Hewlett-Packard     | 8566B          | 2311A02238            | Oct. 22/98       | Oct. 22/99       |
| 1 Year           | Spectrum Analyzer Display | Hewlett-Packard     | 8566B          | 2314A04759            | Oct. 22/98       | Oct. 22/99       |
| 1 Year           | Quasi-Peak Adapter        | Hewlett Packard     | 85650A         | 2043A00302            | Oct. 22/98       | Oct. 22/99       |
|                  | Plotter                   | Hewlett-Packard     | 7550A          | 28484 15123           | N/A              | N/A              |
| 1 Year           | Biconical (2) Antenna     | EMCO                | 3109           | 9503-2894             | June 2/98        | June 2/99        |
| 1 Year           | Log Periodic Antenna      | EMCO                | LPA-25         | 1141                  | July 27/98       | July 27/99       |

Note: N/A = Not Applicable  
NCR = No Cal Required