



Electrical (EMC)

**DATE: 02 September 2003**

**I.T.L. (PRODUCT TESTING) LTD.**

**EMC Test**

**for**

**RACAM - TECH LTD.**

**Equipment under test:**

**Extension Unit**

**XU**

Approved by: \_\_\_\_\_

I. Raz, EMC Laboratory Manager

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This report relates only to items tested.



Electrical (EMC)

## Measurement/Technical Report for RACAM - TECH LTD.\*

Extension Unit

XU

**FCC ID:RBU1014411**

**02 September 2003**

This report concerns: Original Grant ☒ Class II change

Class B verification ☐ Class A verification ☐ Class I change

Equipment type: Radio Telemetry Transmitter

Request Issue of Grant:

☒ Immediately upon completion of review

Limits used:

CISPR 22 ☐

Part 15 ☒

Measurement procedure used is ANSI C63.4-2001.

Application for Certification

prepared by:

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(different from "prepared by")

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\* See customer's statement on page 5.

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## 1. General Information

### 1.1 Administrative Information

|                                |                                                                                          |
|--------------------------------|------------------------------------------------------------------------------------------|
| Manufacturer:                  | RACAM - TECH LTD.                                                                        |
| Manufacturer's Address:        | 27 Lehi St.<br>Bnei-Brak 51200<br>Israel<br>Tel: +972-3-579-8282<br>Fax: +972-3-579-8866 |
| Manufacturer's Representative: | Shlomo Hass<br>Hanoch Maliss                                                             |
| Equipment Under Test (E.U.T):  | Extension Unit                                                                           |
| Equipment Model No.:           | XU                                                                                       |
| Equipment Serial No.:          | 0371                                                                                     |
| Date of Receipt of E.U.T:      | 12.08.03                                                                                 |
| Start of Test:                 | 12.08.03                                                                                 |
| End of Test:                   | 18.08.03                                                                                 |
| Test Laboratory Location:      | I.T.L (Product Testing) Ltd.<br>Kfar Bin Nun,<br>ISRAEL 99780                            |
| Test Specifications:           | See Section 2                                                                            |

## **1.2 List of Accreditations**

The EMC laboratory of I.T.L. is accredited by the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), Registration No. 90715.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) (Japan), Registration Numbers: C-1350, R-1285.
5. Industry Canada (Canada), File No. IC 4025.
6. TUV Product Services, England, ASLLAS No. 97201.
7. Nemko (Norway), Authorization No. ELA 207.

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.

### **1.3 Product Description**

The product is a wireless fireworks shooting system using a Terminal Unit (TU) installed in a base unit (BU). The Base Unit is wire connected to an Extension Unit (XU) using a twisted pair 2 wire telephone cable. Any message from the Terminal Unit is RF transmitted by the Extension Unit.

The Extension Unit is mounted on a tripod during its operation.

The Extension Unit (XU) has one key, 2 LEDs, RJ11 connector, Antenna and TRI-POD mount.

The XU use the Motorola MC68HC908GP32 micro-controller with external crystal of 32.768KHz, the controller use internal PLL to generate internal bus frequency of 2.4576MHz.

### **1.4 Test Methodology**

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4: 2001. Radiated testing was performed at an antenna to EUT distance of 3 meters.

### **1.5 Test Facility**

The radiated emissions tests were performed at I.T.L.'s testing facility at Kfar Bin-Nun, Israel. This site is a FCC listed test laboratory (FCC Registration No. 90715, date of listing March 9, 2001).

I.T.L.'s EMC Laboratory is also accredited by A2LA, certificate No. 1152.01.

### **1.6 Measurement Uncertainty**

Radiated Emission

The Open Site complies with the  $\pm 4$  dB Normalized Site Attenuation requirements of ANSI C63.4-2001. In accordance with Paragraph 5.4.6.1 of this standard, this tolerance includes instrumentation calibration errors, measurement technique errors, and errors due to site anomalies.

## 2. Product Labeling

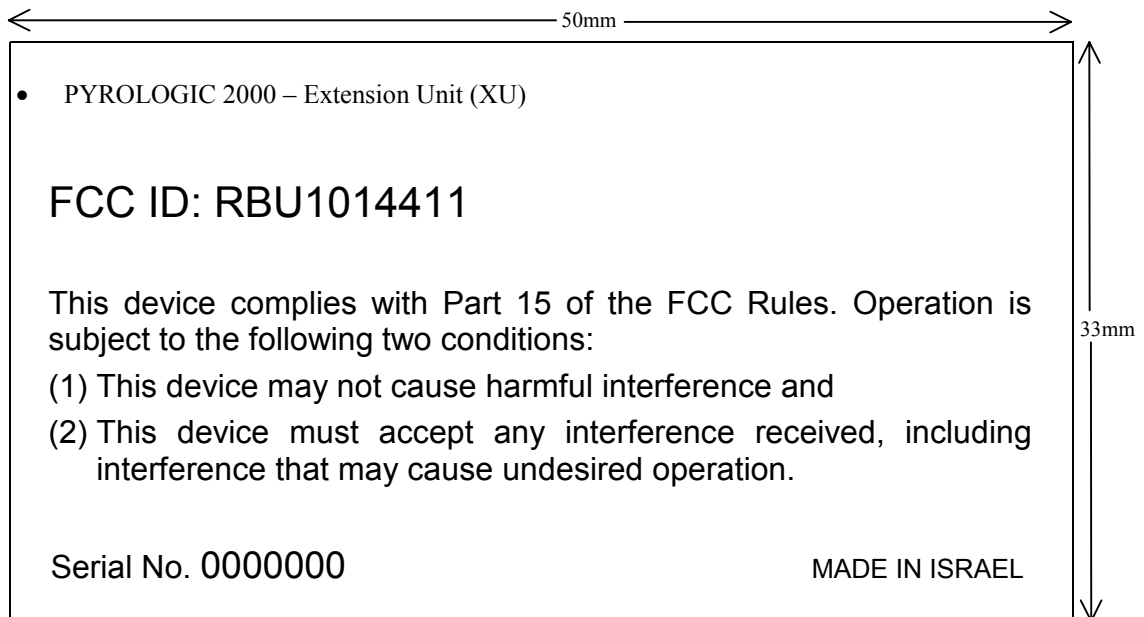


Figure 1. FCC Label



Figure 2. Location of Label on EUT

### **3. System Test Configuration**

#### **3.1 Justification**

The system was configured for testing in a typical fashion (as a customer would normally use it). The XU was placed vertically as it will be mount on a regular TRI-POD and the antenna were set vertically to get the maximum emission. The XU was rotated to get the maximum emission position and polarity.

The XU was connected to a BU by a 10m twisted pair 2 wire unshielded cable. A TU was placed on the BU, a XPTT (joystick), and a 9 pin cable (for option of far fire signal) were also connected to the BU. The BU was powered by a wall mount DC/DC 110V – 6.1V adapter.

Since the actual transmissions of the XU are short frames, the XU was set for measurement into two special modes. CW transmission & continuously modulated transmission. The results were calculated accordingly.

#### **3.2 EUT Exercise Software**

The XU exercise software used during radiated and conducted testing was the normal TU software revision 1.10.

The entry to the special modes was done by entering a special manufactory password, then selecting by menu the mode of transmission.

#### **3.3 Special Accessories**

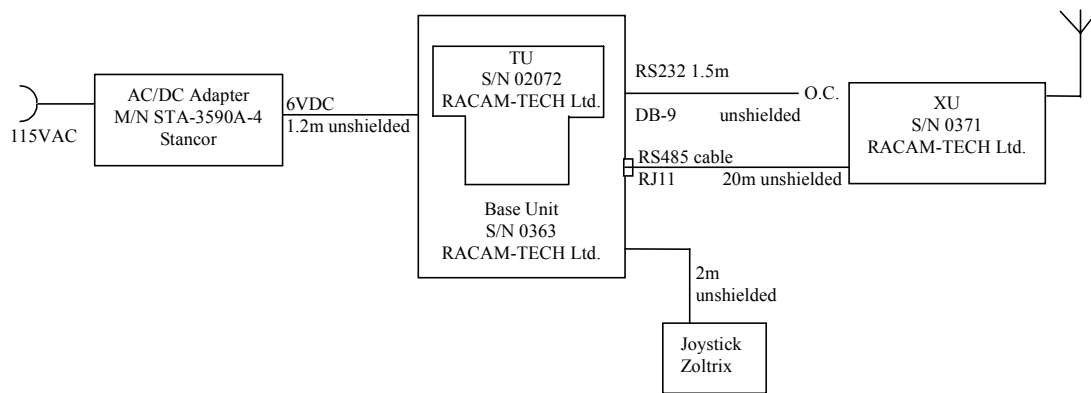
No special accessories were needed to achieve compliance.

#### **3.4 Equipment Modifications**

Resistor R17 value was changed to 18 kOhm (instead of 12 kOhm) to reduce carrier level.

The AC/DC adapter was changed to AC/DC adapter, M/N STA-3590A-4, manufactured by Stancor.

### 3.5 Configuration of Tested System



**Figure 3. Configuration of Tested System**

## 4. Block Diagram

### 4.1 Schematic Block/Connection Diagram

Intentionally blank for reasons of confidentiality

**Figure 4. E.U.T. Block Diagram**

### 4.2 Theory of Operation

The Terminal Unit (TU) ), is a terminal with a keyboard, LEDs and LCD display that allow the operator to program a fire sequence, store it in a “memory key” and to remotely control the RCU’s (Remote Controlled Unit).

The TU uses the Motorola MC68HC908GP32 micro-controller with external crystal of 32.768KHz, the controller uses internal PLL to generate internal bus frequency of 2.4576MHz.

The TU uses the EM MICROELECTRONIC-MARIN SA V3021 Real-Time-Clock with external crystal of 32.768KHz.

The TU is powered by 4 x 1.5V AA battery or by a DC supplement via its BU connectors. It uses a National Semiconductor LM2704 DC-DC switching regulator.

The TU can operate also as a stand alone, hand held terminal. In that case it transmit using an internal transmitter & its fixed antenna. ( a separate FCC ID was issued for this option, FCC ID RBU1014401 8 August 2003).

The base unit accommodates the terminal unit. The communication between the TU and the Base Unit is through mating connectors on the back of the TU and on the top of the BU. An external PTT is connectable to the side of the BU. External power can be connected to the BU by a regulated AC-DC adapter connected to 120VAC 60 Hz input, providing to the BU its 6 -:- 7.5 VDC 500mA output.

The BU uses only passive components and is powered by a 5V via its TU connectors.

Connecting an Extension Unit (XU) to the BU is done by using a twisted pair 2 wire telephone cable with RJ11-2/6 connectors, connected to the telephone sockets in both units.

Connecting an XPTT and an XU does not affect the function and operation procedures. In terms of functionality, the XPTT replaces the TU PTT and the XU is an extension of the TU (transmission made through XU antenna instead of TU antenna).

The Extension Unit (XU) has one key, 2 LEDs, RJ11 connector, Antenna and TRI-POD mount.

The XU use the Motorola MC68HC908GP32 micro-controller with external crystal of 32.768KHz, the controller use internal PLL to generate internal bus frequency of 2.4576MHz.

The TU is powered by 9V battery and LDO to regulate 5V & 3V DC for its operation.

The RF section of the XU is based on MOTOROLA Tango3 MC33493 UHF transmitter with external crystal of 13.0625MHz, the Tango3 use internal PLL to generate RF frequency of 418MHz. The modulation is ASK (OOK). The bit rate is 2778 bps with Manchester encoding of 50%. Transmission frame is build of transmit block of 40msec & one frame is transmitted every 100msec. The transmission is manually operated and in any case ceases within 5 sec of switch or key being released. The output power was set to the level allowed under Part 15.231 A-D of the FCC regulation.

The XU use fixed (screwed) 360<sup>0</sup> rotated Antenna.

## 5. Conducted and Radiated Measurement Photos



Figure 5. Conducted Emission Test. Front

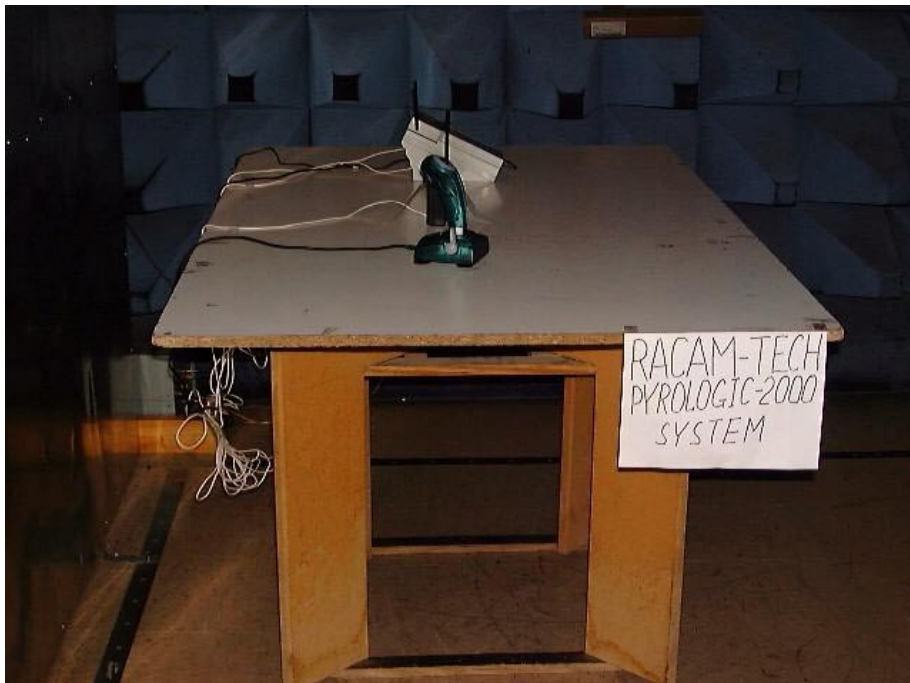


Figure 6. Conducted Emission Test. Side



**Figure 7. Radiated Emission Test. Front**



**Figure 8. Radiated Emission Test. Side**

## 6. Conducted Emission Data

### 6.1 Test Specification

FCC, Part 15, Subpart B: Class B

### 6.2 Test Procedure

The E.U.T operation mode and test set-up are as described in Section 3.1. In order to minimize background noise interference, the conducted emission testing was performed inside a shielded room (see section 3), with the E.U.T placed on an 0.8 meter high wooden table, 0.4 meter from the room's vertical wall.

The E.U.T was powered from 115 V AC / 60 Hz via 50 Ohm / 50  $\mu$ Hn Line Impedance Stabilization Network (LISN) on the phase and neutral lines. The LISN's were grounded to the shielded room ground plane (floor), and were kept at least 0.8 meters from the nearest boundary of the E.U.T

The center of the E.U.T AC cable was folded back and forth, in order to form a bundle less than 0.40 meters and a total cable length of 1 meter.

The effect of varying the position of the cables was investigated to find the configuration that produces maximum emission.

The emission voltages at the LISN's outputs were measured using a computerized receiver, complying with CISPR 16 requirements. The specification limits are loaded to the receiver via a 3.5" floppy disk and are displayed on the receiver's spectrum display.

A frequency scan between 0.45 and 30 MHz was performed at 9 kHz I.F. band width, and using peak detection.

The spectral components having the highest level on each line were measured using a quasi-peak detector

### 6.3 Measured Data

JUDGEMENT: Passed by 41.4 dB $\mu$ V

The EUT met the FCC Part 15, Subpart B, Class B specification requirements.

The details of the highest emissions are given in Figure 9 to Figure 14.

TEST PERSONNEL:

Tester Signature: 

Date: 03.09.03

Typed/Printed Name: Y. Mordukhovitch

## Conducted Emission

E.U.T Description      Extension Unit  
 Type                      XU  
 Serial Number:        0371

Specification:    FCC, Part 15, Subpart B: Class B  
 Lead:              Phase  
 Detectors:        Peak, Quasi-peak, Average

| Frequency<br>(MHz) | Peak<br>Amplitude<br>(dBμV) | Quasi-peak<br>Amplitude<br>(dBμV) | Specification<br>(dB μV) | Pass/Fail | Margin<br>(dB) |
|--------------------|-----------------------------|-----------------------------------|--------------------------|-----------|----------------|
| 1.09               | 6.5                         | 4.1                               | 56.0                     | Pass      | -51.9          |
| 4.30               | -1.1                        | -10.2                             | 56.0                     | Pass      | -66.2          |
| 11.08              | 0.1                         | -10.9                             | 60.0                     | Pass      | -70.9          |
| 18.92              | -2.0                        | -6.3                              | 60.0                     | Pass      | -66.3          |
| 19.65              | 14.0                        | 11.3                              | 60.0                     | Pass      | -48.7          |
| 29.48              | 17.3                        | 13.8                              | 60.0                     | Pass      | -46.2          |

**Figure 9. Conducted Emission. PHASE. Detectors: Peak, QUASI-PEAK**

| Frequency<br>(MHz) | Peak<br>Amplitude<br>(dBμV) | Average<br>Amplitude<br>(dBμV) | Specification<br>(dB μV) | Pass/Fail | Margin<br>(dB) |
|--------------------|-----------------------------|--------------------------------|--------------------------|-----------|----------------|
| 1.09               | 6.5                         | 0.7                            | 46.0                     | Pass      | -45.3          |
| 4.30               | -1.1                        | -16.5                          | 46.0                     | Pass      | -62.5          |
| 11.08              | 0.1                         | -17.8                          | 50.0                     | Pass      | -67.8          |
| 18.92              | -2.0                        | -15.9                          | 50.0                     | Pass      | -65.9          |
| 19.65              | 14.0                        | 5.9                            | 50.0                     | Pass      | -44.1          |
| 29.48              | 17.3                        | 8.6                            | 50.0                     | Pass      | -41.4          |

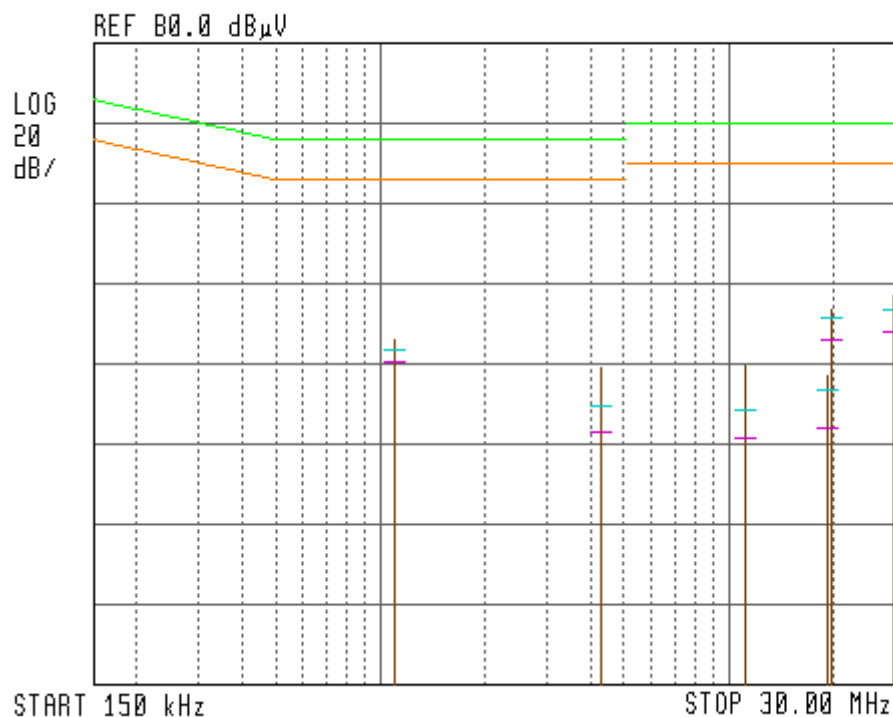
**Figure 10. Detectors: Peak, AVERAGE .**

# Conducted Emission

|                   |                |
|-------------------|----------------|
| E.U.T Description | Extension Unit |
| Type              | XU             |
| Serial Number:    | 0371           |

Specification: FCC, Part 15, Subpart B: Class B  
Lead: Phase  
Detectors: Peak, Quasi-peak, Average

 12:01:12 AUG 17, 2003



**Figure 11. Conducted Emission. PHASE. Detectors: Peak, Average, Quasi-peak**

Notes:

1. Horizontal axis shows logarithmic frequency scale.
2. The vertical axis shows amplitude (in dB  $\mu$ V).
3. Peak detection is designated by the top of each vertical line.
4. Quasi-peak detection is designated by the first dash mark (from the top) of each vertical line.
5. Average detection is designated by the second dash mark (from the top) of each vertical line.

## Conducted Emission

E.U.T Description    Extension Unit  
 Type                    XU  
 Serial Number:        0371

Specification:    FCC, Part 15, Subpart B: Class B  
 Lead:              Neutral  
 Detectors:        Peak, Quasi-peak, Average

| Frequency<br>(MHz) | Peak<br>Amplitude<br>(dB $\mu$ V) | Quasi-peak<br>Amplitude<br>(dB $\mu$ V) | Specification<br>(dB $\mu$ V) | Pass/Fail | Margin<br>(dB) |
|--------------------|-----------------------------------|-----------------------------------------|-------------------------------|-----------|----------------|
| 1.14               | 5.1                               | 1.9                                     | 56.0                          | Pass      | -54.1          |
| 4.30               | 2.9                               | -10.8                                   | 56.0                          | Pass      | -66.8          |
| 11.08              | -3.0                              | -10.5                                   | 60.0                          | Pass      | -70.5          |
| 18.92              | 16.4                              | -1.3                                    | 60.0                          | Pass      | -61.3          |
| 19.65              | 17.0                              | 12.2                                    | 60.0                          | Pass      | -47.8          |
| 29.48              | 18.4                              | 14.9                                    | 60.0                          | Pass      | -45.1          |

**Figure 12. Conducted Emission. NEUTRAL. Detectors: Peak, QUASI-PEAK**

| Frequency<br>(MHz) | Peak<br>Amplitude<br>(dB $\mu$ V) | Average<br>Amplitude<br>(dB $\mu$ V) | Specification<br>(dB $\mu$ V) | Pass/Fail | Margin<br>(dB) |
|--------------------|-----------------------------------|--------------------------------------|-------------------------------|-----------|----------------|
| 1.14               | 5.1                               | -1.4                                 | 46.0                          | Pass      | -47.4          |
| 4.30               | 2.9                               | -16.9                                | 46.0                          | Pass      | -62.9          |
| 11.08              | -3.0                              | -17.3                                | 50.0                          | Pass      | -67.3          |
| 18.92              | 16.4                              | -17.7                                | 50.0                          | Pass      | -67.7          |
| 19.65              | 17.0                              | 7.8                                  | 50.0                          | Pass      | -42.2          |
| 29.48              | 18.4                              | 10.0                                 | 50.0                          | Pass      | -40.0          |

**Figure 13. Detectors: Peak, AVERAGE**



#### **6.4 Test Instrumentation Used, Conducted Measurement**

| <b>Instrument</b> | <b>Manufacturer</b> | <b>Model</b>  | <b>Serial No.</b> | <b>Calibration</b>  | <b>Period</b> |
|-------------------|---------------------|---------------|-------------------|---------------------|---------------|
| LISN              | Fischer             | FCC-LISN-2A   | 127               | March 12,<br>2003   | 1 year        |
| LISN              | Fischer             | FCC-LISN-2A   | 128               | March 12,<br>2003   | 1 year        |
| Receiver          | HP                  | 85420E/85422E | 3427A00103/34     | January 31,<br>2003 | 1 year        |
| Printer           | HP                  | ThinkJet2225  | 2738508357        | N/A                 | N/A           |

## 7. Field Strength of Fundamental

### 7.1 Test Specification

F.C.C., Part 15, Subpart C, Section 15.231

### 7.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 3.

The E.U.T. was placed on a non-conductive table, 0.8 meters above the O.A.T.S. ground plane.

The EMI receiver was set to the E.U.T. Fundamental Frequency (418MHz) and Peak Detection.

The turntable and antenna mast were adjusted for maximum level reading on the EMI receiver.

The measurement was performed for vertical and horizontal polarizations of the test antenna.

The final result is:

Peak Level(dBμV/m) – E.U.T. Max. Duty Cycle Factor, in 100msec time window (dB)

### 7.3 Measured Data

JUDGEMENT: Passed by 2.6 dBμV

The EUT met the FCC Part 15, Subpart C, Section 15.231 specification requirements.

The details of the highest emissions are given in Figure 15.

TEST PERSONNEL:

Tester Signature: 

Date: 03.09.03

Typed/Printed Name: Y. Mordukhovitch

## Field Strength of Fundamental

E.U.T Description    Extension Unit  
Type                      XU  
Serial Number:        0371

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal  
Test Distance: 3 meters

Frequency range: MHz  
Detector: Peak

| Freq.  | Pol. | Peak<br>Amp<br>(1) | D.C.F.<br>(2) | Correction<br>(3) | Final<br>Result<br>(4) | Specification | Margin    |
|--------|------|--------------------|---------------|-------------------|------------------------|---------------|-----------|
| (MHz)  | V/H  | (dBμV/m)           | (dB)          | (dB)              | (dBμV/m)               | (dBμV/m)      | (dB μV/m) |
| 418.02 | V    | 91.7               | -14.0         | 18.7              | 77.7                   | 80.3          | -2.6      |
| 418.02 | H    | 91.2               | -14.0         | 18.7              | 77.2                   | 80.3          | -3.1      |

**Figure 15. Field Strength of Fundamental. Antenna Polarization: HORIZONTAL/VERTICAL. Detector: Peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

(1) "Peak Amp." (dBμV/m) included the "correction" numbers.

(2) "Duty Cycle Factor (D.C.F.)="  $20 \log \frac{20(m \text{ sec})}{100(m \text{ sec})} = -14dB$  (See Section 4.2 of this report).

(3) "Correction" (dB) = Test Antenna Correction Factor(dB) + Coax Cable.

(4) "Final Result" (dBμV/m)=Peak Amp. (dBμV/m)+D.C.F. (dB).

#### 7.4 Test Instrumentation Used, Field Strength of Fundamental

| Instrument              | Manufacturer | Model         | Serial Number | Calibration      | Period |
|-------------------------|--------------|---------------|---------------|------------------|--------|
| EMI Receiver            | HP           | 85422E        | 3411A00102    | January 31, 2003 | 1 year |
| RF Section              | HP           | 85420E        | 3427A00103    | January 31, 2003 | 1 year |
| Antenna Log Periodic    | ARA          | LPD-2010/A    | 1038          | April 20, 2003   | 1 year |
| Antenna Mast            | ARA          | AAM-4A        | 1001          | N/A              | N/A    |
| Turntable               | ARA          | ART-1001/4    | 1001          | N/A              | N/A    |
| Mast & Table Controller | ARA          | ACU-2/5       | 1001          | N/A              | N/A    |
| Printer                 | HP           | ThinkJet 2225 | 2738508357.0  | N/A              | N/A    |

## **8. Spurious Radiated Emission, Below 1 GHz**

### **8.1 Test Specification**

30-1000 MHz, F.C.C., Part 15, Subpart C, Section 15.231

### **8.2 Test Procedure**

The E.U.T. operation mode and test set-up are as described in Section 3.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The effect of varying the position of the cables was investigated to find the configuration that produces maximum emission. The configuration tested is shown in Figure 3.1.

The frequency range 30-1000 MHz was scanned, and the list of the highest emissions was verified and updated accordingly.

The final measured result is based on a peak detector measurement minus the transmission duty cycle factor in a time window of 100msec. (Section 15.231(b)(2).

The levels of the emissions within the frequency ranges of the restricted bands (Section 15.205 of FCC Part 15) were compared to the limits of the table in Section 15.209 (a), General Requirements.

The emission levels for other frequencies were compared to the fundamental carrier level and the requirement of Section 15.231 (a).

The emissions were measured using a computerized EMI receiver complying to CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.

Verification of the E.U.T emissions was based on the following methods:

- Turning the E.U.T on and off.

- Using a frequency span less than 10 MHz.

- Observation of the signal level during turntable rotation. Background noise is not affected by the rotation of the E.U.T.

### 8.3 **Measured Data**

JUDGEMENT: Passed by 1.5 dB $\mu$ V/m

The EUT met the requirements of the F.C.C. Part 15, Subpart C, specification.

The details of the highest emissions are given in Figure 16 to Figure 17.

TEST PERSONNEL:

Tester Signature: 

Date: 03.09.03

Typed/Printed Name: Y. Mordukhovitch

## Spurious Radiated Emission

E.U.T Description    Extension Unit  
Type                      XU  
Serial Number:        0371

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal  
Test Distance: 3 meters

Frequency range: 30 MHz to 1.0 GHz  
Detector: Peak

| Frequency<br>(MHz) | Peak Amp<br>(1)<br>(dBμV/m) | D.C.F.<br>(2)<br>(dB) | Correction<br>(3)<br>(dB) | Final Result<br>(4)<br>(dBμV/m) | Specification<br>(dBμV/m) | Margin<br>(dB μV/m) |
|--------------------|-----------------------------|-----------------------|---------------------------|---------------------------------|---------------------------|---------------------|
| 127.74             | 26.5                        | -14.0                 | 13.8                      | +12.5                           | 40.0                      | -27.5               |
| 137.20             | 25.7                        | -14.0                 | 14.3                      | +11.7                           | 43.5                      | -31.8               |
| 213.80             | 45.9                        | -14.0                 | 18.3                      | +31.9                           | 60.3 (5)                  | -28.4               |
| 262.41             | 42.0                        | -14.0                 | 21.3                      | +28.0                           | 46.0                      | -18.0               |
| 266.21             | 41.2                        | -14.0                 | 21.4                      | +27.2                           | 46.0                      | -18.8               |
| 276.55             | 42.8                        | -14.0                 | 21.8                      | +28.8                           | 46.0                      | -17.2               |
| 287.14             | 40.7                        | -14.0                 | 22.3                      | +26.7                           | 60.3 (5)                  | -33.6               |
| 290.29             | 40.3                        | -14.0                 | 22.5                      | +26.3                           | 60.3 (5)                  | -34.0               |
| 391.89             | 43.5                        | -14.0                 | 18.2                      | +29.5                           | 60.3 (5)                  | -30.8               |
| 404.95             | 58.5                        | -14.0                 | 18.6                      | +44.5                           | 46.0                      | -1.5                |
| 431.07             | 53.7                        | -14.0                 | 18.9                      | +39.7                           | 60.3 (5)                  | -20.6               |
| 836.03             | 63.0                        | -14.0                 | 26.0                      | +49.0                           | 60.3 (5)                  | -11.3               |

**Figure 16. Spurious Radiated Emission. Antenna Polarization: HORIZONTAL.  
Detector: Peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

(1) "Peak Amp." (dBμV/m) includes the "correction" numbers.

(2) "Duty Cycle Factor (D.C.F.)" =  $20 \log \frac{20(m \text{ sec})}{100(m \text{ sec})} = -14 \text{ dB}$  (See Section 4.2 of this report).

(3) "Correction" (dB) = Test Antenna Correction Factor(dB) + Coax Cable.

(4) "Final Result" (dBμV/m)=Peak Amp. (dBμV/m)+D.C.F. (dB).

(5) Out of restricted band signal: Limit = fundamental limit (80.3dB)-20dB

# Spurious Radiated Emission

E.U.T Description    Extension Unit  
 Type                    XU  
 Serial Number:        0371

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical  
 Test Distance: 3 meters

Frequency range: 30 MHz to 1.0 GHz  
 Detector: Peak

| Frequency<br>(MHz) | Peak Amp<br>(1)<br>(dBμV/m) | D.C.F.<br>(2)<br>(dB) | Correction<br>(3)<br>(dB) | Final Result<br>(4)<br>(dBμV/m) | Specification<br>(dBμV/m) | Margin<br>(dB μV/m) |
|--------------------|-----------------------------|-----------------------|---------------------------|---------------------------------|---------------------------|---------------------|
| 33.28              | 21.0                        | -14.0                 | 14.9                      | +7.0                            | 60.3 (5)                  | -53.3               |
| 127.75             | 24.5                        | -14.0                 | 13.8                      | +10.5                           | 43.5                      | -33.5               |
| 210.86             | 40.7                        | -14.0                 | 18.1                      | +26.7                           | 60.3 (5)                  | -33.6               |
| 215.85             | 41.2                        | -14.0                 | 18.4                      | +27.2                           | 60.3 (5)                  | -33.1               |
| 257.68             | 40.6                        | -14.0                 | 21.1                      | +26.6                           | 46.0                      | -19.4               |
| 277.23             | 54.5                        | -14.0                 | 21.8                      | +40.5                           | 46.0                      | -5.5                |
| 391.88             | 40.6                        | -14.0                 | 18.2                      | +26.6                           | 60.3 (5)                  | -33.7               |
| 404.95             | 56.7                        | -14.0                 | 18.6                      | +42.7                           | 46.0                      | -3.3                |
| 431.07             | 52.1                        | -14.0                 | 18.9                      | +38.1                           | 60.3 (5)                  | -22.2               |
| 836.03             | 67.2                        | -14.0                 | 26.0                      | +53.2                           | 60.3 (5)                  | -7.1                |

**Figure 17. Spurious Radiated Emission. Antenna Polarization: VERTICAL.  
 Detector: Peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

- (1) "Peak Amp." (dBμV/m) includes the "correction" numbers.  
 (2) "Duty Cycle Factor (D.C.F.)=  $20 \log \frac{20(m \text{ sec})}{100(m \text{ sec})} = -14dB$  (See Section 4.2 of this report).  
 (3) "Correction" (dB) = Test Antenna Correction Factor(dB) + Coax Cable.  
 (4) "Final Result" (dBμV/m)=Peak Amp. (dBμV/m)+D.C.F. (dB).  
 (5) Out of restricted band signal: Limit = fundamental limit (80.3dB)-20dB

#### 8.4 Test Instrumentation Used, Spurious Radiated Measurements

| Instrument              | Manufacturer | Model         | Serial Number | Calibration      | Period |
|-------------------------|--------------|---------------|---------------|------------------|--------|
| EMI Receiver            | HP           | 85422E        | 3411A00102    | January 31, 2003 | 1 year |
| RF Section              | HP           | 85420E        | 3427A00103    | January 31, 2003 | 1 year |
| Antenna Bioconical      | ARA          | BCD 235/B     | 1041          | April 20, 2003   | 1 year |
| Antenna –Log Periodic   | ARA          | LPD-2010/A    | 1038          | April 20, 2003   | 1 year |
| Antenna Mast            | ARA          | AAM-4A        | 1001          | N/A              | N/A    |
| Turntable               | ARA          | ART-1001/4    | 1001          | N/A              | N/A    |
| Mast & Table Controller | ARA          | ACU-2/5       | 1001          | N/A              | N/A    |
| Printer                 | HP           | ThinkJet 2225 | 2738508357.0  | N/A              | N/A    |

## 8.5 **Field Strength Calculation**

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

$$[\text{dB}\mu\text{V}/\text{m}] \text{ FS} = \text{RA} + \text{AF} + \text{CF}$$

FS: Field Strength  $[\text{dB}\mu\text{V}/\text{m}]$   
RA: Receiver Amplitude  $[\text{dB}\mu\text{V}]$   
AF: Receiving Antenna Correction Factor  $[\text{dB}/\text{m}]$   
CF: Cable Attenuation Factor  $[\text{dB}]$

No external pre-amplifiers are used.

## 9. Spurious Radiated Emission Above 1 GHz

### 9.1 Radiated Emission Above 1 GHz

The E.U.T operation mode and test set-up are as described in Section 3.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The effect of varying the position of the cables was investigated to find the configuration that produces maximum emission. The configuration tested is shown in Figure 3.1.

The levels of the emissions within the frequency ranges of the restricted bands (Section 15.205 of FCC Part 15) were compared to the limits of the table in Section 15.209 (a), General Requirements.

The emission levels for other frequencies were compared to the fundamental carrier level and the requirement of Section 15.231(b).

In the frequency range 1-2.9 GHz, a computerized EMI receiver complying to CISPR 16 requirements and a High Pass Filter were used. The test distance was 3 meters.

In the frequency range 2.9-42 GHz, a spectrum analyzer including a low noise amplifier was used. The test distance was 3 meters. During peak measurements, the I.F. bandwidth was 1 MHz, and video bandwidth 3 MHz. During average measurements, the I.F. bandwidth was 1 MHz and video bandwidth was 100 Hz.

The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.

Verification of the E.U.T emissions was based on the following methods: turning the E.U.T on and off; using a frequency span less than 10 MHz; observation of the signal level during turntable rotation. (Background noise is not affected by the rotation of the E.U.T.)

### 9.2 Test Data

JUDGEMENT: Passed by 13.8 dBμV/m

The EUT met the requirements of the F.C.C. Part 15, Subpart C, specification.

The details of the highest emissions are given in Figure 18 to Figure 25.

TEST PERSONNEL:

Tester Signature:  Date: 03.09.03

Typed/Printed Name: Y. Mordukhovitch

## Spurious Radiated Emission Above 1 GHz

E.U.T Description    Extension Unit  
Type                      XU  
Serial Number:        0371

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal  
Test Distance: 3 meters

Frequency range: 1 GHz to 2.9 GHz  
Detector: Average

| Frequency<br>(MHz) | Peak Amp<br>(1)<br>(dBμV/m) | D.C.F.<br>(2)<br>(dB) | Correction<br>(3)<br>(dB) | Final Result<br>(4)<br>(dBμV/m) | Avg.<br>Specification<br>(dBμV/m) | Margin<br>(dB μV/m) |
|--------------------|-----------------------------|-----------------------|---------------------------|---------------------------------|-----------------------------------|---------------------|
| 1254.04            | 56.0                        | -14.0                 | 34.1                      | +42.0                           | 60.3 (5)                          | -18.3               |
| 1672.05            | 49.1                        | -14.0                 | 37.7                      | +35.1                           | 54.0                              | -18.9               |
| 2090.06            | 55.7                        | -14.0                 | 41.0                      | +41.7                           | 60.3 (5)                          | -18.6               |

**Figure 18. Radiated Emission. Antenna Polarization: HORIZONTAL.  
Detector: Average**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

(1) "Peak Amp." (dBμV/m) includes the "correction" numbers.

(2) "Duty Cycle Factor (D.C.F.)=  $20 \log \frac{20(m \text{ sec})}{100(m \text{ sec})} = -14dB$  (See Section 4.2 of this report).

(3) "Correction" (dB) = Test Antenna Correction Factor(dB) + Coax Cable.

(4) "Final Result" (dBμV/m)=Peak Amp. (dBμV/m)+D.C.F. (dB).

(5) Out of restricted band signal: Limit = fundamental limit (80.3dB)-20dB

## Spurious Radiated Emission Above 1 GHz

|                   |                |
|-------------------|----------------|
| E.U.T Description | Extension Unit |
| Type              | XU             |
| Serial Number:    | 0371           |

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal  
Test Distance: 3 meters

Frequency range: 1 GHz to 2.9 GHz  
Detector: Peak

| Frequency<br>(MHz) | Peak Amp<br>(dB $\mu$ V/m) | Correction<br>(dB) | Specification<br>(dB $\mu$ V/m) | Margin<br>(dB $\mu$ V/m) |
|--------------------|----------------------------|--------------------|---------------------------------|--------------------------|
| 1254.04            | 56.0                       | 34.1               | 80.3 (Note*)                    | -24.3                    |
| 1672.05            | 49.1                       | 37.7               | 74.0                            | -24.9                    |
| 2090.06            | 55.7                       | 41.0               | 80.3 (Note*)                    | -24.6                    |

**Figure 19. Radiated Emission. Antenna Polarization: HORIZONTAL.  
Detector: Peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Note\* Out of restricted band signal: Limit = Average limit + 20dB

## Spurious Radiated Emission Above 1 GHz

E.U.T Description    Extension Unit  
Type                      XU  
Serial Number:        0371

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal  
Test Distance: 3 meters

Frequency range: 2.9 GHz to 4.3 GHz  
Detector: Peak

| Freq.<br>(MHz) | Peak<br>Amp<br>(dBμV) | Correction Factors    |                     |                          | Peak.<br>Specification<br>(dB μV/m) | Peak<br>Final<br>Result<br>FR (P)*<br>(dB μV/m)<br>See Note * | Peak.<br>Margin<br>(dB) |
|----------------|-----------------------|-----------------------|---------------------|--------------------------|-------------------------------------|---------------------------------------------------------------|-------------------------|
|                |                       | Antenna<br>AF<br>(dB) | Cable<br>CF<br>(dB) | Low Noise<br>Amp<br>(dB) |                                     |                                                               |                         |
| 2926.08        | 43.5                  | 32.6                  | 1.6                 | 30.5                     | 80.3 (Note **)                      | 47.2                                                          | -33.1                   |
| 3344.10        | 44.6                  | 33.3                  | 1.9                 | 30.5                     | 80.3 (Note **)                      | 49.3                                                          | -31.0                   |

**Figure 20. Radiated Emission. Antenna Polarization: HORIZONTAL.  
Detector: Peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Note \*: In the frequency range above 2.9 GHz, the field strength was manually calculated by using the following equation:

$$FR(P) = \text{Peak} + AF + CF - LN$$

Where: FR (P) is final peak detector result.

Peak is peak detector measurement.

AF is antenna factor.

CF is cable factor.

LN is low noise amplifier factor.

Note\*\* Out of restricted band signal: Limit = Average limit + 20dB

## Spurious Radiated Emission Above 1 GHz

E.U.T Description    Extension Unit  
 Type                    XU  
 Serial Number:        0371

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal  
 Test Distance: 3 meters

Frequency range: 2.9 GHz to 4.3 GHz  
 Detector: Average

| Freq.<br>(MHz) | Peak<br>Amp<br>(dBμV) | D.C.F.<br>(See<br>Note**)<br>(dB) | Correction<br>Factors |                  |                          | AVG<br>Specification<br>(dB μV/m) | AVG<br>Final<br>Result<br>FR (A)<br>(dB μV/m)<br>See Note * | AVG<br>Margin<br>(dB) |
|----------------|-----------------------|-----------------------------------|-----------------------|------------------|--------------------------|-----------------------------------|-------------------------------------------------------------|-----------------------|
|                |                       |                                   | Antenna<br>AF<br>(dB) | Cable CF<br>(dB) | Low Noise<br>Amp<br>(dB) |                                   |                                                             |                       |
| 2926.08        | 43.5                  | -14.0                             | 32.6                  | 1.6              | 30.5                     | 60.3 (Note***)                    | 33.2                                                        | -27.1                 |
| 3344.10        | 44.6                  | -14.0                             | 33.3                  | 1.9              | 30.5                     | 60.3 (Note***)                    | 35.3                                                        | -25.0                 |

**Figure 21. Radiated Emission. Antenna Polarization: HORIZONTAL.  
 Detector: Average**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Note\*: In the frequency range above 2.9 GHz, the field strength was manually calculated by using the following equation:

$$FR(A) = \text{Peak} + \text{D.C.F.} + \text{AF} + \text{CF} - \text{LN}$$

Where: FR(A) is final average detector result.

Peak is Peak detector measurement.

AF is antenna factor.

CF is cable factor.

LN is low noise amplifier factor.

Note\*\*: "Duty Cycle Factor" (D.C.F.) =  $20 \log \frac{20(m \text{ sec})}{100(m \text{ sec})} = -14 \text{ dB}$  (See Section 4.2 of this report).

Note\*\*\*: Out of restricted band signal:

Limit = fundamental limit (80.3dB)-20dB

## Spurious Radiated Emission Above 1 GHz

E.U.T Description    Extension Unit  
Type                      XU  
Serial Number:        0371

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical  
Test Distance: 3 meters

Frequency range: 1 GHz to 2.9 GHz  
Detector: Average

| Frequency<br>(MHz) | Peak Amp<br>(1)<br>(dBμV/m) | D.C.F.<br>(2)<br>(dB) | Correction<br>(3)<br>(dB) | Final Result<br>(4)<br>(dBμV/m) | Avg.<br>Specification<br>(dBμV/m) | Margin<br>(dB μV/m) |
|--------------------|-----------------------------|-----------------------|---------------------------|---------------------------------|-----------------------------------|---------------------|
| 1254.04            | 60.5                        | -14.0                 | 34.1                      | +46.5                           | 60.3 (5)                          | -13.8               |
| 1672.05            | 48.5                        | -14.0                 | 37.7                      | +34.5                           | 54.0                              | -19.5               |
| 2090.06            | 55.7                        | -14.0                 | 41.0                      | +41.7                           | 60.3 (5)                          | -18.6               |

**Figure 22. Radiated Emission. Antenna Polarization: VERTICAL.  
Detector: Average**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

(1) "Peak Amp." (dBμV/m) includes the "correction" numbers.

(2) "Duty Cycle Factor" (D.C.F.)=  $20 \log \frac{20(m \text{ sec})}{100(m \text{ sec})} = -14dB$  (See Section 4.2 of this report).

(3) "Correction" (dB) = Test Antenna Correction Factor(dB) + Coax Cable.

(4) "Final Result" (dBμV/m)=Peak Amp. (dBμV/m)+D.C.F. (dB).

(5) Out of restricted band signal: Limit = fundamental limit (80.3dB)-20dB

## Spurious Radiated Emission Above 1 GHz

E.U.T Description    Extension Unit  
 Type                    XU  
 Serial Number:        0371

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical  
 Test Distance: 3 meters

Frequency range: 1 GHz to 2.9 GHz  
 Detector: Peak

| Frequency<br>(MHz) | Peak Amp<br>(dB $\mu$ V/m) | Correction<br>(dB) | Specification<br>(dB $\mu$ V/m) | Margin<br>(dB $\mu$ V/m) |
|--------------------|----------------------------|--------------------|---------------------------------|--------------------------|
| 1254.04            | 60.5                       | 34.1               | 80.3 (Note *)                   | -19.8                    |
| 1672.05            | 48.5                       | 37.7               | 74.0                            | -25.5                    |
| 2090.06            | 55.7                       | 41.0               | 80.3 (Note *)                   | -24.6                    |

**Figure 23. Radiated Emission. Antenna Polarization: VERTICAL.  
 Detector: Peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Note\* Out of restricted band signal: Limit = Average limit + 20dB

## Spurious Radiated Emission Above 1 GHz

E.U.T Description    Extension Unit  
Type                      XU  
Serial Number:        0371

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical  
Test Distance: 3 meters

Frequency range: 2.9 GHz to 4.2 GHz  
Detector: Peak

| Freq.   | Peak<br>Amp | Correction Factors |             |                             | Peak.<br>Specification | Peak<br>Final<br>Result FR<br>(P) | Peak.<br>Margin |
|---------|-------------|--------------------|-------------|-----------------------------|------------------------|-----------------------------------|-----------------|
| (MHz)   | (dBμV/m)    | Antenna<br>AF      | Cable<br>CF | Low<br>Noise<br>Amp<br>(dB) | (dB μV/m)              | (dB μV/m)<br>See Note *           | (dB)            |
| 2926.08 | 43.2        | 32.6               | 1.6         | 30.5                        | 80.3**                 | 46.9                              | -33.4           |
| 3344.10 | 45.2        | 33.3               | 1.9         | 30.5                        | 80.3**                 | 49.9                              | -30.4           |

**Figure 24. Radiated Emission. Antenna Polarization: VERTICAL.  
Detector: Peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Note\*: In the frequency range above 2.9 GHz, the field strength was manually calculated by using the following equation:

$$FR(P) = Peak + AF + CF - LN$$

Where: FR (P) is final peak detector result,

Peak is peak detector measurement,

AF is antenna factor,

CF is cable factor,

LN is low noise amplifier factor.

Note\*\* Out of restricted band signal: Limit = Average limit + 20dB

## Spurious Radiated Emission Above 1 GHz

E.U.T Description    Extension Unit  
Type                      XU  
Serial Number:        0371

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical  
Test Distance: 3 meters

Frequency range: 2.9 GHz to 4.2 GHz  
Detector: Average

| Freq.<br>(MHz) | Peak<br>Amp<br>(dBμV) | D.C.F.<br>(See<br>Note**)<br>(dB) | Correction<br>Factors |                  |                          | AVG<br>Specification<br>(dB μV/m) | Final<br>Result<br>FR (A)<br>(dB μV/m)<br>See Note * | AVG<br>Margin<br>(dB) |
|----------------|-----------------------|-----------------------------------|-----------------------|------------------|--------------------------|-----------------------------------|------------------------------------------------------|-----------------------|
|                |                       |                                   | Antenna<br>AF<br>(dB) | Cable CF<br>(dB) | Low Noise<br>Amp<br>(dB) |                                   |                                                      |                       |
| 2926.08        | 43.2                  | -14.0                             | 32.6                  | 1.6              | 30.5                     | 60.3 (Note***)                    | 32.9                                                 | -27.4                 |
| 3344.10        | 45.2                  | -14.0                             | 33.3                  | 1.9              | 30.5                     | 60.3 (Note***)                    | 35.9                                                 | -24.4                 |

**Figure 25. Radiated Emission. Antenna Polarization: VERTICAL  
Detector: Average**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Note\*: In the frequency range above 2.9 GHz, the field strength was manually calculated by using the following equation:

$$FR(A) = \text{Peak} - DCF + AF + CF - LN$$

Where: FR(A) is average detector result,

Peak is Peak detector measurement,

AF is antenna factor,

CF is cable factor,

LN is low noise amplifier factor.

Note\*\*: "Duty Cycle Factor" (D.C.F.) =  $20 \log \frac{20(m \text{ sec})}{100(m \text{ sec})} = -14 \text{ dB}$  (See Section 4.2 of this report).

Note\*\*\*: Out of restricted band signal:

Limit = fundamental limit (80.3dB)-20dB

### 9.3 *Test Instrumentation Used, Spurious Radiated Measurements Above 1 GHz*

| Instrument              | Manufacturer  | Model            | Serial Number | Calibration      | Period |
|-------------------------|---------------|------------------|---------------|------------------|--------|
| Receiver                | HP            | 85422E           | 3411A00102    | January 31, 2003 | 1 year |
| RF Section              | HP            | 85420E           | 3427A00103    | January 31, 2003 | 1 year |
| Antenna Mast            | ARA           | AAM-4A           | 1001          | N/A              | N/A    |
| Turntable               | ARA           | ART-1001/4       | 1001.0        | N/A              | N/A    |
| Mast & Table Controller | ARA           | ACU-2/5          | 1001          | N/A              | N/A    |
| Printer                 | HP            | ThinkJet2225     | 2738508357.0  | N/A              | N/A    |
| Antenna-Log Periodic    | A.H.System    | SAS-200/511      | 253.0         | January 31,2003  | 2 year |
| Low Noise Amplifier     | DBS MICROWAVE | LNA-DBS-0411N313 | 013           | April 10, 2003   | 1 year |
| Spectrum Analyzer       | HP            | 8592L            | 3745A08184    | January 31,2003  | 1 year |

## 10. Bandwidth

### 10.1 Test procedure

The transmitter unit operated with normal modulation. The spectrum analyzer was set to 30 kHz resolution BW and center frequency of the transmitter fundamental. The spectrum bandwidth of the transmitter unit at the points of 20 dB below maximum peak power was measured and recorded.

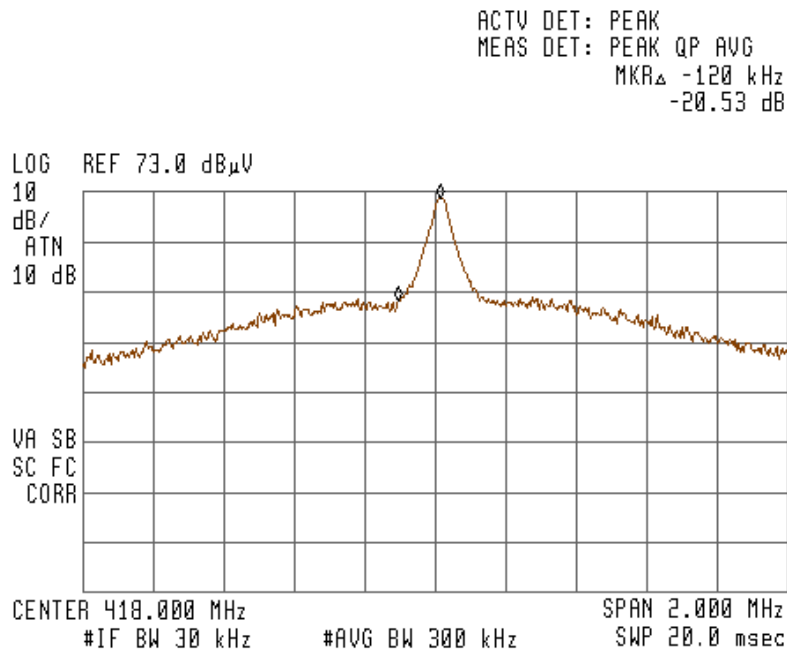


Figure 26

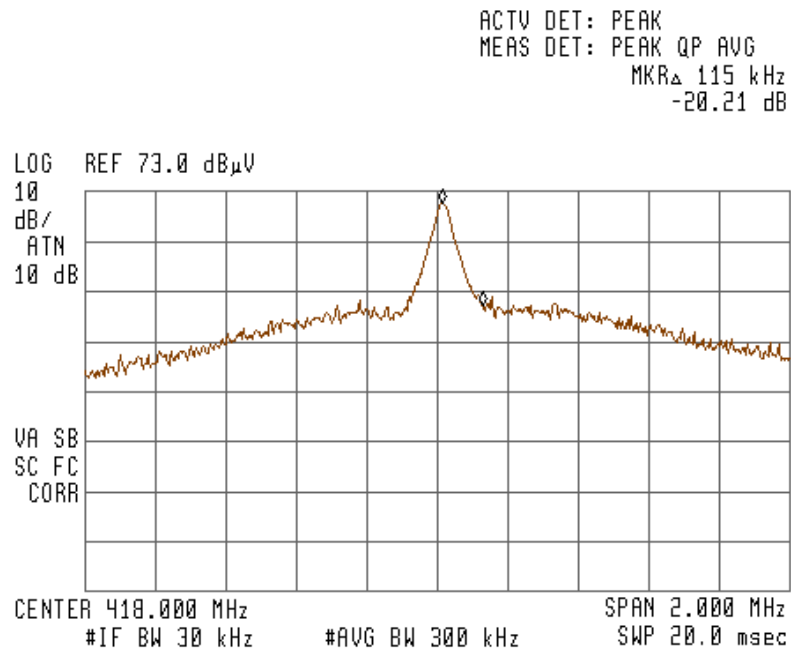


Figure 27

## 10.2 Results table

E.U.T Description: Extension Unit

Model: XU

Serial Number: Not Designated

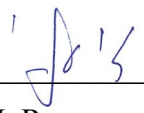
Specification: F.C.C. Part 15, Subpart C: (15.231)

| Operation<br>Frequency<br>(MHz) | Reading<br>( $\Delta$ kHz) | Specification<br>(1)<br>( $\Delta$ kHz) | Margin<br>(kHz) |
|---------------------------------|----------------------------|-----------------------------------------|-----------------|
| 418.00                          | +115                       | +522.5                                  | -407.5          |
| 418.00                          | -120                       | -522.5                                  | -402.5          |

**Figure 28 Bandwidth**

JUDGEMENT: Passed by 402.5 kHz

TEST PERSONNEL:

Tester Signature: 

Date: 03.09.03

Typed/Printed Name: I. Raz

(1) 0.25% of the E.U.T. fundamental frequency, Section 15.231(c).

### 10.3 Test Equipment Used.

Bandwidth

| Instrument                 | Manufacturer | Model         | Serial Number | Calibration      | Period |
|----------------------------|--------------|---------------|---------------|------------------|--------|
| EMI Receiver               | HP           | 85422E        | 3411A00102    | January 31, 2003 | 1 year |
| RF Section                 | HP           | 85420E        | 3427A00103    | January 31, 2003 | 1 year |
| Antenna –Log<br>Periodic   | ARA          | LPD-2010/A    | 1038          | April 20, 2003   | 1 year |
| Antenna Mast               | ARA          | AAM-4A        | 1001          | N/A              | N/A    |
| Turntable                  | ARA          | ART-1001/4    | 1001          | N/A              | N/A    |
| Mast & Table<br>Controller | ARA          | ACU-2/5       | 1001          | N/A              | N/A    |
| Printer                    | HP           | ThinkJet 2225 | 2738508357.0  | N/A              | N/A    |

**Figure 29 Test Equipment Used**

## 11. Photographs of Tested E.U.T.



Figure 30 Top View Closed Cover

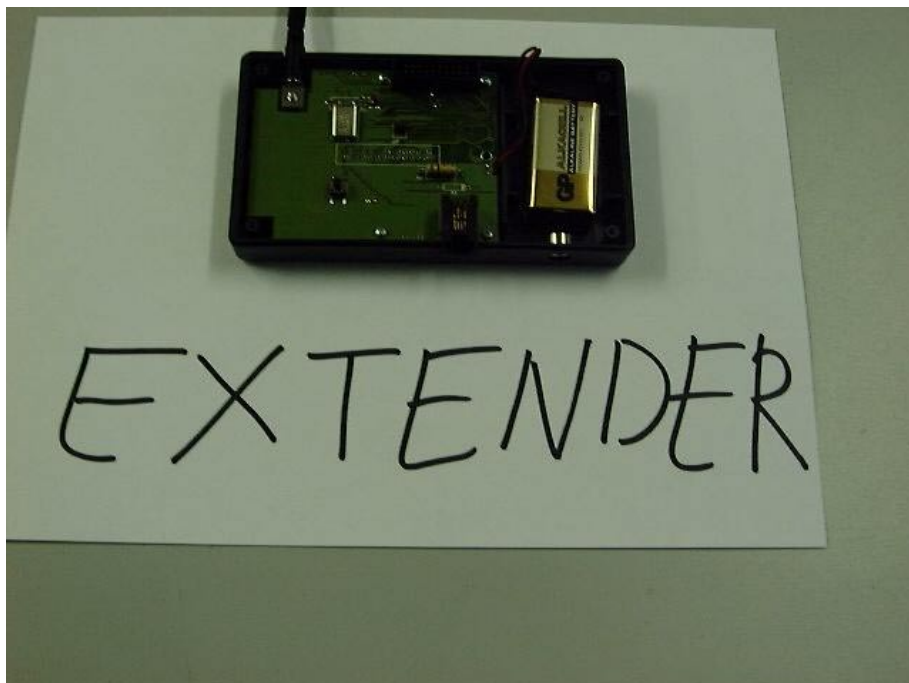


Figure 31 Top View Cover Removed



Figure 32 External View Bottom

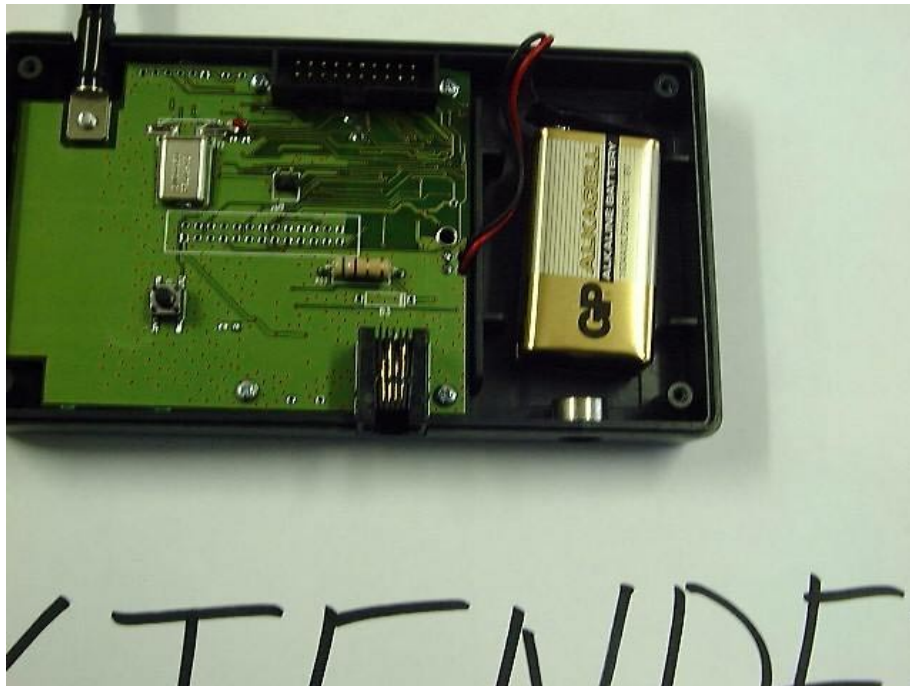
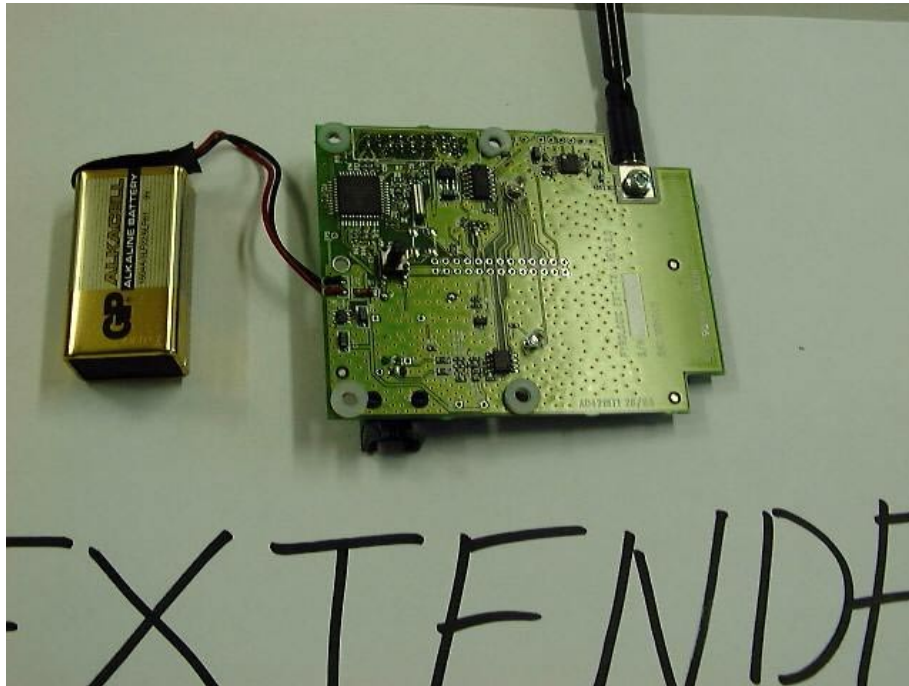


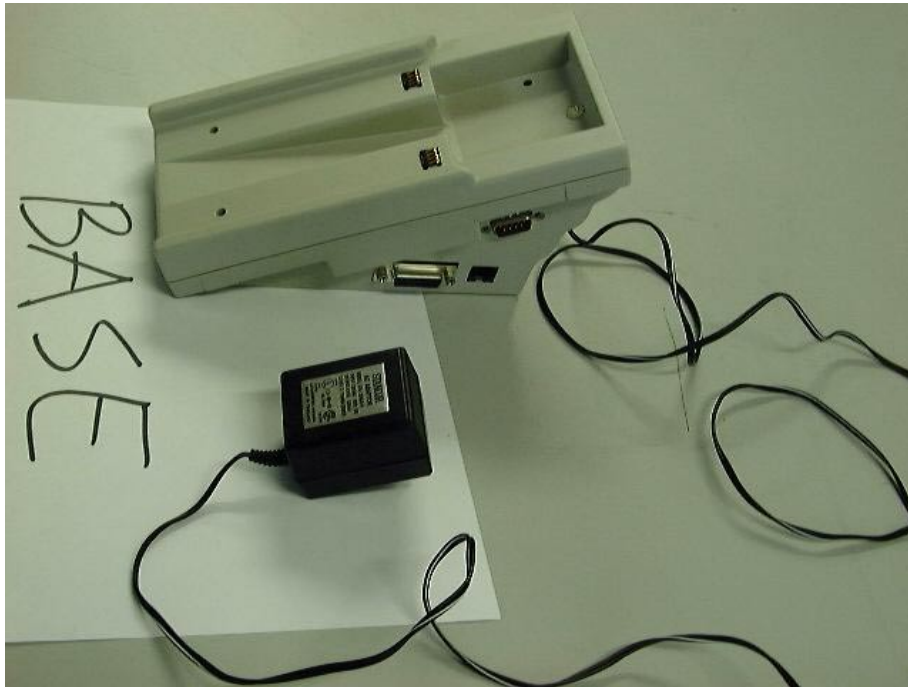
Figure 33 PCB (Side 1) in Unit



**Figure 34 PCB Side 2**



**Figure 35 Base Unit**



**Figure 36 Base Unit and AC Adapter**