



# PEP Testing Laboratory

## RFI / EMI TEST REPORT

**APPLICANT** : ULTIMA ELECTRONICS CORP.

**E. U. T.** : MOUSE

**TRADE NAME** : N/A

**FCC ID** : ITEUECUM990

**REGULATION** : CFR 47 , Part 15 Subpart B , Class B

**TEST SITE** : PEP Testing Laboratory

**TEST ENGINEER** : *Juon Gong*

**TEST DATE** : *8 / 17 / 1998*

**ISSUED DATE** : AUG. / 27 / 1998

**REPORT No.** : 980447



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## VERIFICATION

### WE HEREBY VERIFY THAT:

The E. U. T. listed below has completed RFI testing by PEP Testing Laboratory and the interference emissions can pass **FCC Class B** limitations.

The tested configurations and the facility complies with the radiated and AC line conducted test site criteria in ANSI C63.4-1992.

Any data in this RFI report is “ **reference** ” only.

APPLICANT : ULTIMA ELECTRONICS CORP. \*

PRODUCT : MOUSE \*

FCC ID : ITEUECUM990 \*

MODEL : UM990 \*

M. Y. TSUI

Manager

### PEP Testing Laboratory

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## 1. GENERAL

### 1.1 GENERAL INFORMATION:

APPLICANT : ULTIMA ELECTRONICS CORP.

7F, NO. 100, LI DE CHUNG HO  
CITY, TAIPEI HSIEN, TAIWAN  
R. O. C.

MANUFACTURER : ULTIMA ELECTRONICS CORP.

7F, NO. 100, LI DE CHUNG HO  
CITY, TAIPEI HSIEN, TAIWAN  
R. O. C.

MEASUREMENT PROCEDURE : ANSI C63 , 4 - 1992

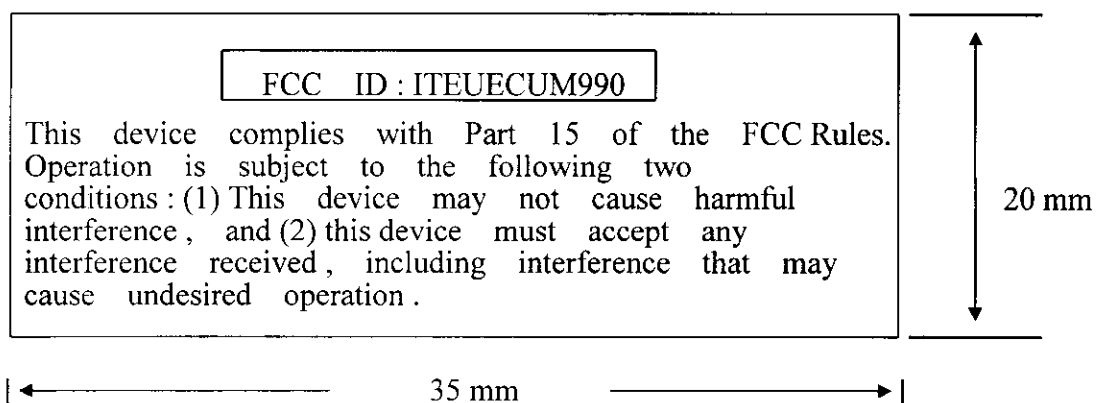
TESTED FOR COMPLIANCE WITH : Title 47 of CFR  
Part 15 , Subpart B , Class B

### 1.2 PLACE OF MEASUREMENT PEP Testing Laboratory



## 1.3 LABELING REQUIREMENT

A FCC ID label shall be permanently attached and conspicuously located on the equipment :





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## 1.4 INFORMATION TO THE USER

The following FCC statement should be declared in a conspicuous location in the user's manual.

### Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio / TV technician for help.

Warning : A shielded-type power cord is required in order to meet FCC emission limits and also to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used.

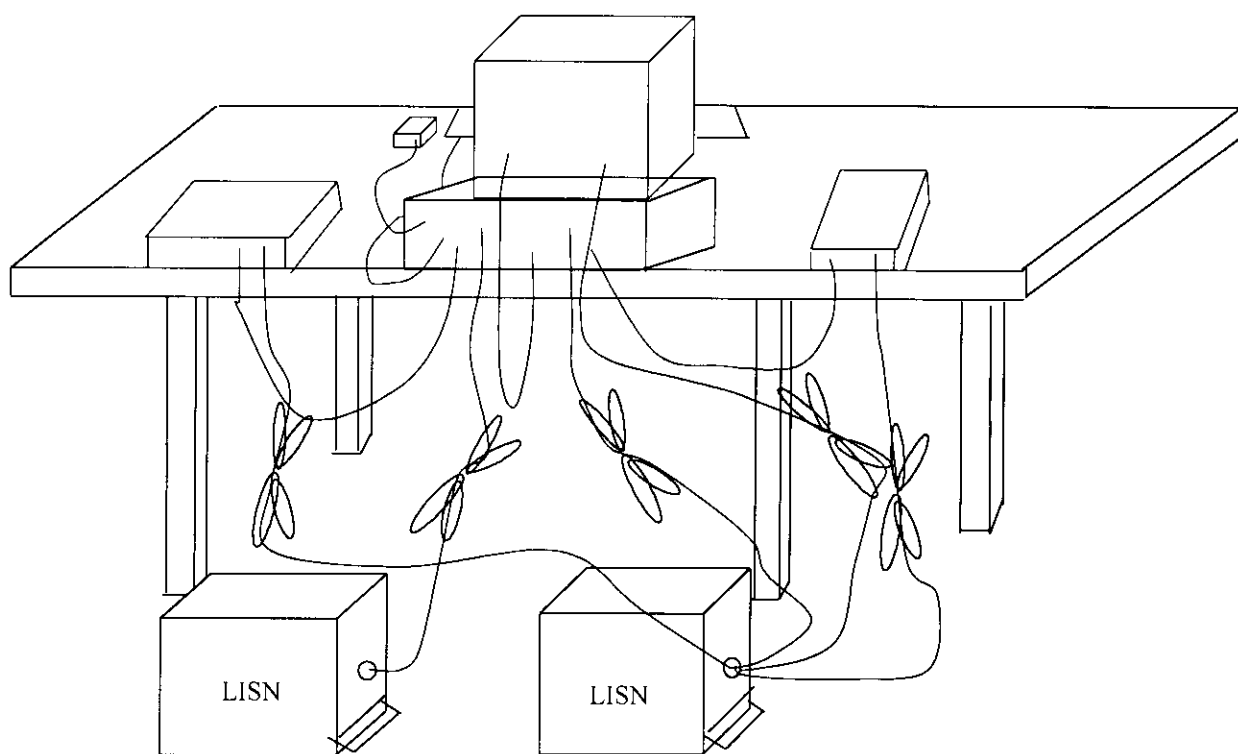
Use only shielded cables to connect I/O devices to this equipment.

You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.



## 2. CONDUCTION EMISSIONS TEST

### 2.1 GENERAL SETUP OF THE TEST FACILITIES





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## 2.2 TEST PROCEDURES

The system was setup as described above , with the EMI diagnostic software .

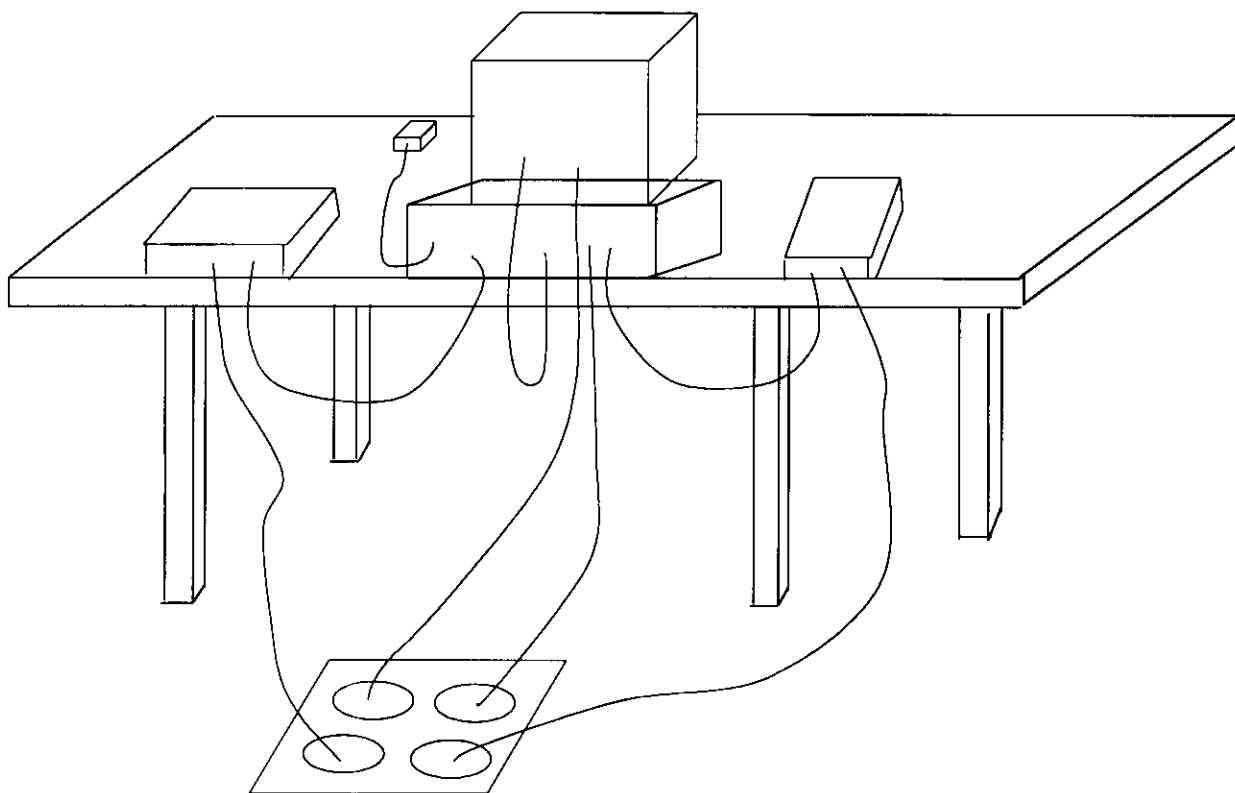
Both the line of power cord , hot and neutral , were run with the EMI tests software .

To get the maximum power line conducted emission , we changed the configuration by varying the monitor power cord fed from floor outlet and from the outlet on the power supply of this computer .

The highest emissions were recorded in the RFI test report .

### 3. RADIATED EMISSIONS TEST

#### 3.1 GENERAL SETUP OF THE FACILITIES





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## 3.2 TEST PROCEDURES

Radiated emissions test was carried out by **PEP Testing Laboratory** at the open field test site authorized by FCC.

The EUT and supporting equipments were setup with the EMI diagnostic software.

- a. setting up the EUT under normally position, and scanning it from 30 MHz to 1000 MHz, then recording those narrow band noises which cannot be 6 dBuV below lower bound. Both horizontal and vertical antenna are measured from 1 meter height to 4.0 meter height, and turntable rotate 360 degrees.
- b. fixing the EUT rear face to antenna and antenna 1.0 meter height.  
We adjusted I/O cables to find the highest coupling noise and moved the height of antenna from 1 to 4 meters, then rotated the turntable simultaneously.
- c. checking following step b. all points which were recorded in step a.
- d. changing the peripherals position, and routine steps a. b. c.

The highest emissions were recorded in the RFI test report.



## 4. DESCRIPTION FOR EUT TESTING CONFIGURATION

### **\*\* TEST PROCEDURE - - - -**

- (A) The EUT was 2 keys PC mouse model No. UM990 , for more detail information about the EUT , please refer user's manual .
- (B) The EUT was inserted into RS232 port on PC and designated as COM.1 , PC system and EUT were enable by FCC EMI test program , the data cable of the mouse put as close as on the right side of the PC and on the left side of the PC during pre-scan , on the right side will be worse case than on the left side ; therefore , the worst case data were in this RFI report .
- (C) After the EUT was set up , we did the conducted emission test in the shielded room and the worst case placement finding as the ANSI C63.4 requirement ; similarly , the radiated emission test was done at the open field site .
- (D) If the peak value of the noise can't under Non-consumer equipment limit 3 dBuV more , we'll change Biconical antenna or Log-periodic antenna for Dipole antenna and record its Quasi-Peak value , making sure it can under 6 dBuV at least .
- (E) In the RFI test report , we provided the worst conducted emission testing data in page C-1.\*  
For the radiated emission test , the worst data recorded in the page R-1.\*

### **\*\* I / O DATA CABLES INFORMATIONS - - -**

Please refer the page 9 .



## 5. SUPPORTING DEVICES TO TEST

### **SUPPORT UNIT 1. - - - - PERSONAL COMPUTER**

Manufacturer : Jm Computer Inc.  
Model Number : C486SDX-SDT  
Power Supply Type : Switching  
Power Cord : Shielded, Detachable, 1.2m  
Data Cable : Shielded, Detachable, 1.2m  
FCC ID : K25C486SDX-SDT

### **SUPPORT UNIT 2. - - - - MONITOR**

Manufacturer : Acer Peripherals Inc.  
Model Number : 7134T  
Power Supply Type : Switching  
Power Cord : Shielded, Detachable, 1.2m  
Data Cable : Shielded, Undetachable, 1m  
FCC ID : JVP7134T

### **SUPPORT UNIT 3. - - - - PRINTER**

Manufacturer : Hewlett-Packard Singapore Pte Ltd.  
Model Number : HP 2225C<sup>+</sup>  
Power Supply Type : Linear  
Power Cord : Non-Shielded, Detachable, 1.2m  
Data Cable : Shielded, Detachable, 1m. 2464  
FCC ID : DSI6XU2225



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## **SUPPORT UNIT 4. ---- MODEM**

Manufacturer : ACEEX  
Model Number : 1414  
Power Supply Type : Linear  
Power Cord : Non-Shielded, Detachable, 1.2m  
Data Cable : Shielded, Detachable, 1m  
FCC ID : IFAXDM1414

## **SUPPORT UNIT 5. ---- KEYBOARD**

Manufacturer : Acer Peripherals Inc.  
Model Number : 6311-KW  
Power Supply Type : N/A  
Power Cord : N/A  
Data Cable : Shielded, Undetachable, 1.2m  
FCC ID : JVPKBS-WIN



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## **EQUIPMENT UNDER TEST ---- MOUSE**

**Manufacturer : ULTIMA ELECTRONICS CORP.**

**Model Number : UM990**

**Data Cable : Shielded, Undetachable, 1.2m**

**FCC ID : ITEUECUM990**



## 6. TEST CONFIGURATION

### **Radiated emission detector function :**

**(1) 30MHZ~1GHZ : Quasi-Peak Value**

**Resolution BW : 120KHZ Video BW : 300KHZ**

**(2) above 1GHZ : Quasi-Peak value and Average Value**

**Resolution BW : 1MHZ Video BW : 1MHZ**

**\* either Q. P. or average value will be recorded  
in the report**

### **Conducted emission detector function :**

**(1) 450KHZ~30MHZ : Quasi-Peak Value**

**Resolution BW : 9KHZ Video BW : 30KHZ**

**The else descriptions : N/A**

**Conducted Emission Test Photo. : Page C-1**

**Test Data : Hot C-1.1**

**Neutral C-1.2**

**Radiated Emission Test Photo. : Page R-1**

**Test Data : Horizontal R-1.1**

**Vertical R-1.2**



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CONDUCTED TEST CONFIGURATION PHOTO.

< FRONT VIEW >





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## CONDUCTED EMISSIONS TEST DATA

**Note : HOT LINE TEST**

| Freq.<br>(MHz) | Level<br>(dB) | Over<br>Limit<br>(dB) | Limit<br>Line<br>(dB) | Read<br>Level<br>(dB) | Probe<br>Factor<br>(dB) | Cable<br>Loss<br>(dB) | Preamp<br>Factor<br>(dB) |
|----------------|---------------|-----------------------|-----------------------|-----------------------|-------------------------|-----------------------|--------------------------|
| 1.750          | 33.68         | -14.32                | 48.00                 | 31.81                 | 0.10                    | 1.77                  | 0.00                     |
| 3.316          | 27.62         | -20.38                | 48.00                 | 25.65                 | 0.17                    | 1.80                  | 0.00                     |
| 5.385          | 27.85         | -20.15                | 48.00                 | 25.70                 | 0.30                    | 1.85                  | 0.00                     |
| 6.478          | 26.31         | -21.69                | 48.00                 | 24.10                 | 0.36                    | 1.85                  | 0.00                     |
| 7.808          | 24.90         | -23.10                | 48.00                 | 22.63                 | 0.42                    | 1.85                  | 0.00                     |
| 15.580         | 28.64         | -19.36                | 48.00                 | 26.03                 | 0.71                    | 1.90                  | 0.00                     |
| 17.205         | 31.03         | -16.97                | 48.00                 | 28.34                 | 0.75                    | 1.94                  | 0.00                     |
| 18.150         | 32.03         | -15.97                | 48.00                 | 29.31                 | 0.77                    | 1.95                  | 0.00                     |

Note :

1. Level = Read Level + Probe Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line



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## : CONDUCTED EMISSIONS TEST DATA

### Note : NEUTRAL LINE TEST

| Freq.<br>(MHz) | Level<br>(dB) | Over<br>Limit<br>(dB) | Limit<br>Line<br>(dB) | Read<br>Level<br>(dB) | Probe<br>Factor<br>(dB) | Cable<br>Loss<br>(dB) | Preamp<br>Factor<br>(dB) |
|----------------|---------------|-----------------------|-----------------------|-----------------------|-------------------------|-----------------------|--------------------------|
| 1.750          | 37.20         | -10.80                | 48.00                 | 35.33                 | 0.10                    | 1.77                  | 0.00                     |
| 3.316          | 35.06         | -12.94                | 48.00                 | 33.09                 | 0.17                    | 1.80                  | 0.00                     |
| 3.907          | 36.46         | -11.54                | 48.00                 | 34.46                 | 0.20                    | 1.80                  | 0.00                     |
| 5.385          | 33.78         | -14.22                | 48.00                 | 31.63                 | 0.30                    | 1.85                  | 0.00                     |
| 6.419          | 37.67         | -10.33                | 48.00                 | 35.47                 | 0.35                    | 1.85                  | 0.00                     |
| 7.808          | 32.31         | -15.69                | 48.00                 | 30.04                 | 0.42                    | 1.85                  | 0.00                     |
| 14.752         | 33.69         | -14.31                | 48.00                 | 31.10                 | 0.69                    | 1.89                  | 0.00                     |
| 17.796         | 34.89         | -13.11                | 48.00                 | 32.18                 | 0.76                    | 1.95                  | 0.00                     |
| 25.242         | 31.03         | -16.97                | 48.00                 | 27.94                 | 0.93                    | 2.16                  | 0.00                     |

Note :

1. Level = Read Level + Probe Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line

## RADIATED EMISSIONS TEST DATA

Antenna polarization : HORIZONTAL ; Test distance : 3 m ;

| Freq.<br>(MHz) | Level<br>(dB) | Over<br>Limit<br>(dB) | Limit<br>Line<br>(dB) | Read<br>Level<br>(dB) | Probe<br>Factor<br>(dB) | Cable<br>Loss<br>(dB) | Preamp<br>Factor<br>(dB) |
|----------------|---------------|-----------------------|-----------------------|-----------------------|-------------------------|-----------------------|--------------------------|
| 96.640         | 24.65         | -18.85                | 43.50                 | 43.38                 | -0.37                   | 1.63                  | 20.00                    |
| 120.440        | 21.15         | -22.35                | 43.50                 | 37.55                 | 1.65                    | 1.95                  | 20.00                    |
| 168.380        | 23.64         | -19.86                | 43.50                 | 38.11                 | 3.13                    | 2.40                  | 20.00                    |
| 181.640        | 27.06         | -16.44                | 43.50                 | 40.33                 | 4.30                    | 2.43                  | 20.00                    |
| 188.440        | 28.58         | -14.92                | 43.50                 | 41.46                 | 4.59                    | 2.53                  | 20.00                    |
| 201.600        | 27.91         | -15.59                | 43.50                 | 40.68                 | 4.52                    | 2.71                  | 20.00                    |
| 217.600        | 29.16         | -16.84                | 46.00                 | 44.47                 | 1.84                    | 2.85                  | 20.00                    |
| 227.200        | 29.01         | -16.99                | 46.00                 | 44.81                 | 1.28                    | 2.92                  | 20.00                    |
| 335.200        | 24.59         | -21.41                | 46.00                 | 37.67                 | 3.21                    | 3.72                  | 20.00                    |
| 529.600        | 26.96         | -19.04                | 46.00                 | 35.66                 | 6.64                    | 4.65                  | 20.00                    |

Note :

1. Level = Read Level + Probe Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line



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## RADIATED EMISSIONS TEST DATA

Antenna polarization : VERTICAL ; Test distance : 3 m ;

| Freq.<br>(MHz) | Level<br>(dB) | Over<br>Limit<br>(dB) | Limit<br>Line<br>(dB) | Read<br>Level<br>(dB) | Probe<br>Factor<br>(dB) | Cable<br>Loss<br>(dB) | Preamp<br>Factor<br>(dB) |
|----------------|---------------|-----------------------|-----------------------|-----------------------|-------------------------|-----------------------|--------------------------|
| 48.190         | 25.57         | -14.43                | 40.00                 | 44.66                 | -0.15                   | 1.06                  | 20.00                    |
| 92.390         | 22.72         | -20.78                | 43.50                 | 42.06                 | -0.88                   | 1.54                  | 20.00                    |
| 120.440        | 23.74         | -19.76                | 43.50                 | 40.14                 | 1.65                    | 1.95                  | 20.00                    |
| 147.640        | 26.01         | -17.49                | 43.50                 | 42.48                 | 1.26                    | 2.28                  | 20.00                    |
| 175.690        | 28.18         | -15.32                | 43.50                 | 42.08                 | 3.70                    | 2.40                  | 20.00                    |
| 188.440        | 28.91         | -14.59                | 43.50                 | 41.79                 | 4.59                    | 2.53                  | 20.00                    |
| 217.600        | 28.02         | -17.98                | 46.00                 | 40.93                 | 4.24                    | 2.85                  | 20.00                    |
| 227.200        | 25.34         | -20.66                | 46.00                 | 38.14                 | 4.28                    | 2.92                  | 20.00                    |
| 335.200        | 25.14         | -20.86                | 46.00                 | 35.22                 | 6.21                    | 3.72                  | 20.00                    |
| 401.600        | 24.29         | -21.71                | 46.00                 | 32.26                 | 8.12                    | 3.91                  | 20.00                    |

Note :

1. Level = Read Level + Probe Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line



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## List of Test Equipment

| Instrument                | Model No.           | Cal. Due Date | S/N        |
|---------------------------|---------------------|---------------|------------|
| R&S Receiver              | ESVS30(30M~1GHZ)    | Apr. 21, 1999 | 863342/012 |
| R&S Receiver              | ESBI (20~5GHZ)      | Feb. 12, 1999 | 845658/003 |
| Spectrum Analyzer         | HP8591A(9K~1.8GHZ)  | Jan. 31, 1999 | 3225A03039 |
| Spectrum Analyzer         | R3261A (9K~2.6GHZ)  | Dec. 03 1998  | 91720076   |
| EMCO L.I.S.N.             | 3825/2 (10K~30MHZ)  | Oct. 31, 1998 | 9311-2150  |
| L.I.S.N.                  | KNW-242(10K~30MHZ)  | Jan. 31, 1999 | 8-837-7    |
| R & S L.I.S.N.            | ESH3-Z5(9K~30MHZ)   | Feb. 12, 1999 | 844982/039 |
| Anritsu Pre-Amp.          | MH648A(100K~1.4GHZ) | Nov. 9, 1998  | M40076     |
| R & S Pre-Amp.            | ESMI-Z7(20M~7GHZ)   | Feb. 12, 1999 | 6/2278/011 |
| Chase bi-Log Antenna      | CBL6111B(30M~1GHZ)  | Aug. 05, 1998 | 1968       |
| COM-Power Horn Antenna    | AH-118 (1G~18GHZ)   |               | 10056      |
| EMCO Dipole Antenna       | 3121C (20M~1GHZ)    | May. 22, 1999 | 9611-1230  |
| EMCO Biconical Antenna    | 3110B (30M~300M)    | Mar. 10, 1999 | 2932       |
| EMCO Log-Periodic Antenna | 3146A (300M~1GHZ)   | Apr. 14, 1999 | 1384       |