FCC ID: NYYETNA-110

# EMC

## TEST REPORT

REPORT NO. : F87072108
MODEL NO. : ETNA-110
DATE OF TEST : July 22, 1998

PREPARED FOR: MOVITA TECHNOLOGIES INC.

ADDRESS : No.26 WU-CHUNG 7 RD.,
WU-KU INDUSTRIAL PARK,
TAIPEI COUNTY, TAIWAN, R.O.C.

PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION

NVLAP®
Accredited Laboratory

12F, NO.1, SEC.4, NAN-KING EAST RD.,
TAIPEI, TAIWAN, R.O.C.

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# 1. CERTIFICATION

Issue Date: July 27, 1998

| | | |
|---|---|---|
| Product | : | NOTEBOOK COMPUTER |
| Trade Name | : | MOVITA |
| Model No. | : | ETNA-110 |
| Applicant | : | MOVITA TECHNOLOGIES INC. |
| Standard | : | FCC Part 15, Subpart B, Class B<br>ANSI C63.4-1992<br>CISPR 22:1993+A1+A2 |

We hereby certify that one sample of the designation has been tested in our facility on July 22, 1998. The test record, data evaluation and Equipment Under Test (EUT) configurations represent herein are true and accurate representation of the measurements of the sample's EMC characteristics under the conditions herein specified.

The test results show that the EUT as described in this report is in compliance with the Class B limits of conducted and radiated emission of applicable standards.

TESTED BY: Ken Liu , DATE: 7.27.98
( Ken Liu )

CHECKED BY: Sharon Hsiung , DATE: 7/27/98
( Sharon Hsiung )

APPROVED BY: Mike Su , DATE: 7/27/98
( Mike Su )

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# 2. GENERAL INFORMATION

## 2.1 GENERAL DESCRIPTION OF EUT

| | | |
|---|---|---|
| Product | : | NOTEBOOK |
| Model No. | : | ETNA-110 |
| Power Cord | : | AC Nonshielded (1.8m) |
| | | DC Nonshielded (1.2m) |
| Data Cable | : | N/A |

Note: The EUT was tested with an ILAN power adapter, model: F1700C which has a 2 pin nonshielded power cord.

| | | | |
|---|---|---|---|
| Its rating | Input | : | 100-240 Vac, 1.8A, 50-60 Hz |
| | Output | : | 20Vdc, 2.8A |

The EUT was tested with the following configuration:

| | | |
|---|---|---|
| HDD | : | IBM DTCA-23240 |
| CD-ROM | : | TEAC CD-224E |
| FDD | : | TEAC FD-05HG |
| CPU | : | Intel Tillamook Pentium 266, Speed : 266 MHz, the frequency of clock generator is 66 MHz with |

XGA LCD display: HITACHI 14.1" TFT model: TX36D62VC1CAB

For more detailed features, please refer to manufacturer's specification or User's Manual.

## 2.2 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories are used to form representative test configuration during the tests.

| No. | Product | Brand | Model No. | FCC ID | I/O Cable |
|---|---|---|---|---|---|
| 1 | MONITOR | ADI | 937G | BR8937G | Shielded Signal (1.5m)<br>Nonshielded Power (1.8m) |
| 2 | KEYBOARD | FORWARD | FDA-104GA | F4ZDA-104G | Shielded Signal (1.4m) |
| 3 | PRINTER | HP | C2145A | B94C2145X | Shielded Signal (1.4m) |
| 4 | MODEM | ACEEX | 1414 | IFAXDM1414 | Shielded Signal (1.2m) |
| 5 | MICROPHONE | CAROL | MUD-329 | N/A | Nonshielded Signal (3.8m) |
| 6 | EARPHONE | GAMMA | LH115 | N/A | Shielded Signal (2.4m) |
| 7 | MOUSE | HP | M-S34 | DZL211029 | Shielded Signal (1.8m) |
| 8 | TELEVISION | SONY | PVM-1351Q | VERIFICATION | Shielded Signal (1.0m)<br>Nonshielded Power (1.8m) |

Note: 1. A 600 ohm resistor laod was connected to the internal modem port of EUT via a telephone cable (2.4m)

2. A USB cable (1.2m) was connected to the USB port of EUT to form an open loop cable.

## 2.3 TEST METHODOLOGY AND CONFIGURATION

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4-1992. Radiated testing was performed at a 3/10 meters open area test site. Please refer to the photos of test configuration in Item 5.

# 3. TEST INSTRUMENTS

## 3.1 TEST INSTRUMENTS (EMISSION)

**RADIATED EMISSION MEASUREMENT**

| Description & Manufacturer | Model No. | Serial No. | Calibrated Until |
|---|---|---|---|
| HP Spectrum Analyzer | 8590L | 3544A01042 | April 29, 1999 |
| HP Preamplifier | 8447D | 2944A08313 | Sept. 18, 1998 |
| HP Preamplifier | 8347A | 3307A01088 | Sept. 4, 1998 |
| ROHDE & SCHWARZ TEST RECEIVER | ESVS 30 | 841977/008 | Oct. 5, 1998 |
| SCHWARZBECK Tunable Dipole Antenna | VHA 9103<br>UHA 9105 | E101051<br>E101055 | Nov. 28, 1998 |
| CHASE BiLOG Antenna | CBL6111A | 1647 | July 3, 1999 |
| EMCO Double Ridged Guide Antenna | 3115 | 9312-4192 | April 3, 1999 |
| EMCO Turn Table | 1016 | 1722 | N/A |
| EMCO Tower | 1051 | 1825 | N/A |
| Open Field Test Site | Site 4 | ADT-R04 | June 19, 1999 |

Note: 1. The measurement uncertainty is less than +/- 3dB, which is calculated as per NAMA's document NIS81.

2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

**CONDUCTED EMISSION MEASUREMENT**

| Description & Manufacturer | Model No. | Serial No. | Calibrated Until |
|---|---|---|---|
| ROHDE & SCHWARZ Test Receiver | ESHS30 | 828765/002 | July 31, 1998 |
| ROHDE & SCHWARZ Artificial Mains Network | ESH2-Z5 | 828075/003 | July 28, 1998 |
| EMCO-L.I.S.N. | 3825/2 | 90031627 | July 28, 1998 |
| Shielded Room | Site 5 | ADT-C05 | N/A |

Note: 1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per NAMA's document NIS81.

2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

## 3.2 LIMITS OF CONDUCTED AND RADIATED EMISSION

### LIMIT OF RADIATED EMISSION OF CISPR 22

| FREQUENCY (MHz) | Class A (at 10m) dBuV/m | Class B (at 10m) dBuV/m |
|---|---|---|
| 30 - 230 | 40 | 30 |
| 230 - 1000 | 47 | 37 |

LIMIT OF RADIATED EMISSION OF FCC PART 15, SUBPART B FOR FREQUENCY ABOVE 1000 MHz

| FREQUENCY (MHz) | Class A (at 10m) | | Class B (at 3m) | |
|---|---|---|---|---|
| | uV/m | dBuV/m | uV/m | dBuV/m |
| Above 1000 | 300 | 49.5 | 500 | 54.0 |

Note: (1) The lower limit shall apply at the transition frequencies.

(2) Emission level (dBuV/m) = 20 log Emission level (uV/m).

(3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

### LIMIT OF CONDUCTED EMISSION OF CISPR 22

| FREQUENCY (MHz) | Class A (dBuV) | | Class B (dBuV) | |
|---|---|---|---|---|
| | Quasi-peak | Average | Quasi-peak | Average |
| 0.15 - 0.5 | 79 | 66 | 66 - 56 | 56 - 46 |
| 0.50 - 5.0 | 73 | 60 | 56 | 46 |
| 5.0 - 30.0 | 73 | 60 | 60 | 50 |

Note: (1) The lower limit shall apply at the transition frequencies.

(2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz

(3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

# 4. TEST RESULTS (EMISSION)

## 4.1 RADIO DISTURBANCE

| | | |
|---|---|---|
| Frequency Range | : | 0.15 - 30 MHz (Conducted Emission) |
| | | 30 - 2000 MHz (Radiated Emission) |
| Input Voltage | : | 120 Vac, 60 Hz |
| Temperature | : | 30 ℃ |
| Humidity | : | 45 % |
| Atmospheric Pressure | : | 1060 mbar |

| TEST RESULT | Remarks |
|---|---|
| PASS | Minimum passing margin of conducted emission: -21.9 dB at 0.175 MHz<br>Minimum passing margin of radiated emission: -2.0 dB at 193.33 MHz |

Note : The EUT was pretested under the following mode :

Mode 1 : Notebook Display + CRT Display

Mode 2 : Notebook Display + TV Display

During the pretest, the worst emission levels were found when there was EUT and CRT Display and therefore the data of only this mode is recorded in this report.

### 4.1.1 EUT OPERATION CONDITION

1. Turn on the power of all equipment.
2. EUT runs a test program to enable all functions.
3. EUT sends "H" messages to LCD display and external monitor. The LCD and external monitor display "H" patterns on their screen and simultaneously.
4. EUT sends "H" messages to printer and printer prints "H" messages on paper.
5. EUT sends "H" messages to modem.
6. EUT sends audio messages to earphone.
7. Repeat steps 3-7.

## 4.2 TEST DATA OF CONDUCTED EMISSION

EUT: **NOTEBOOK COMPUTER** MODEL: **ETNA-110**

MODE: **Notebook + CRT Display**

6 dB Bandwidth: 10 kHz

TEST PERSONNEL: KEN

| Freq. | L Level | | N Level | | Limit | | Margin [dB (μV)] | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| [MHz] | [dB (μV)] | | [dB (μV)] | | [dB (μV)] | | L | | N | |
| | QP | AV | QP | AV | QP | AV | QP | AV | QP | AV |
| 0.175 | 42.20 | - | 42.80 | - | 64.72 | 54.72 | -22.5 | - | -21.9 | - |
| 0.462 | 17.90 | - | 31.70 | - | 56.66 | 46.66 | -38.8 | - | -25.0 | - |
| 1.221 | 18.20 | - | 26.50 | - | 56.00 | 46.00 | -37.8 | - | -29.5 | - |
| 4.490 | 27.40 | - | 30.90 | - | 56.00 | 46.00 | -28.6 | - | -25.1 | - |
| 22.570 | 34.40 | - | 35.60 | - | 60.00 | 50.00 | -25.6 | - | -24.4 | - |
| 27.143 | 34.80 | - | 33.50 | - | 60.00 | 50.00 | -25.2 | - | -26.5 | - |

Remarks:
1. "*": Undetectable
2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
3. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
4. The emission level of other frequencies were very low against the limit.
5. Margin value = Emission level - Limit value

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Tested by KEN

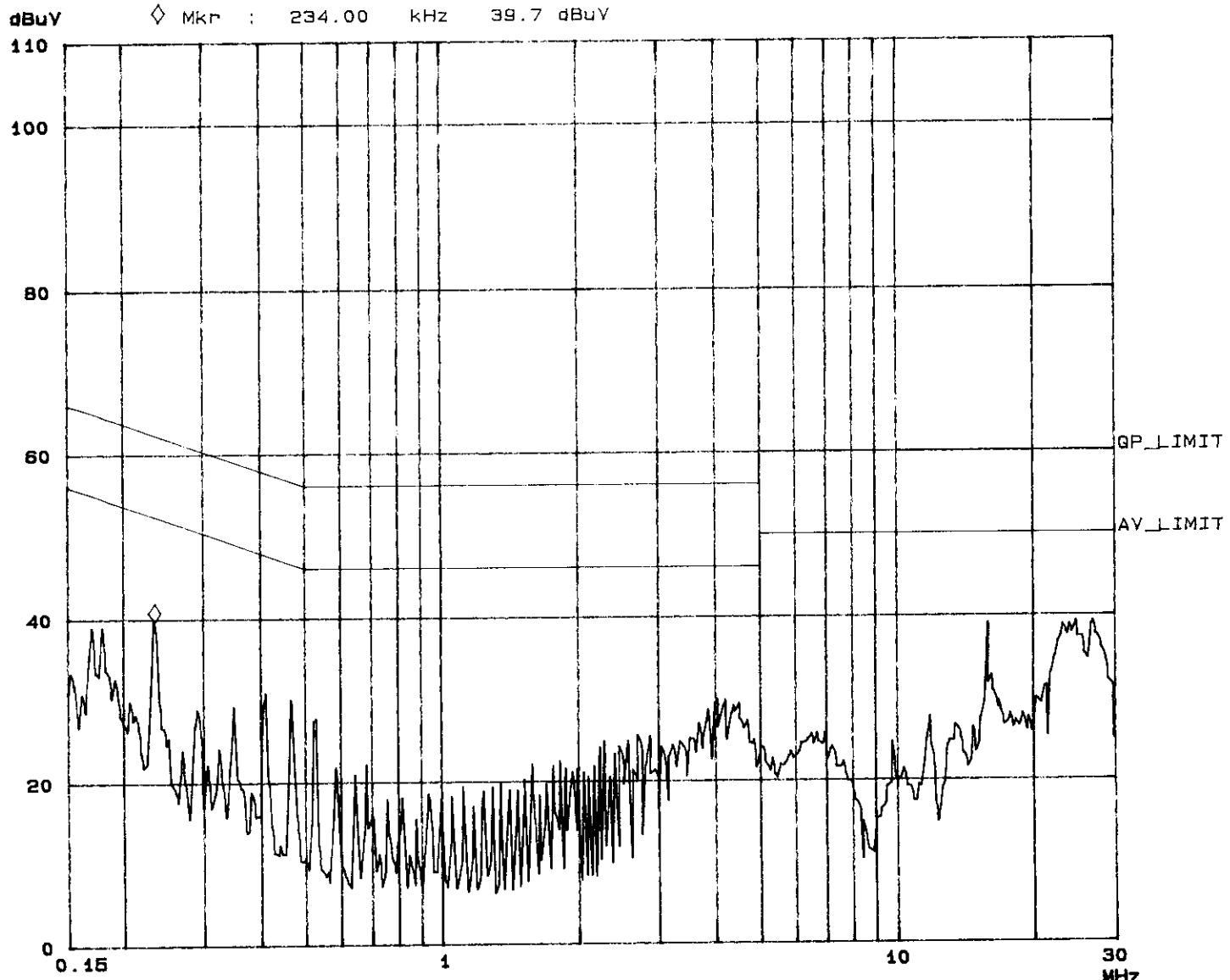
# ADT CO. Shielded Room 5
# CISPR 22 CLASS B

22. Jul 98 17:21

EUT: ETNA-110
Test Spec: LISN : L
Comment: CPU 266MHZ HITACHI 14.1 FULL SYSTEM

Fast Scan Settings (3 Ranges)

| Frequencies | | | Receiver Settings | | | | | |
|---|---|---|---|---|---|---|---|---|
| Start | Stop | Step | IF BW | Detector | M-Time | Atten | Preamp | OpRge |
| 150k | 450k | 3k | 10k | PK | 1ms | 10dBLN | OFF | 60dB |
| 450k | 5M | 3k | 10k | PK | 1ms | 10dBLN | OFF | 60dB |
| 5M | 30M | 3k | 10k | PK | 1ms | 10dBLN | OFF | 60dB |



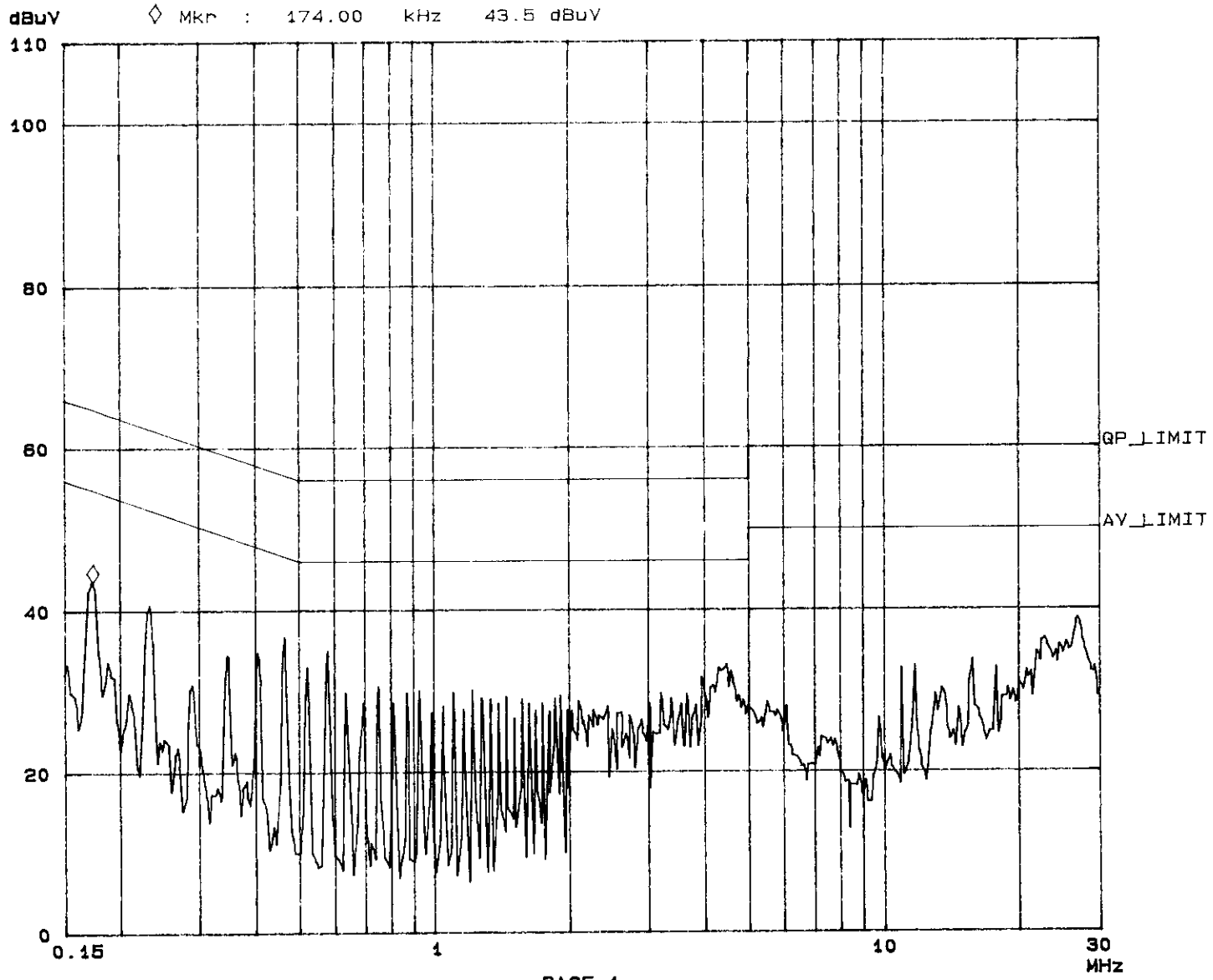
ADT CO. Shielded Room 5
CISPR 22 CLASS B

22. Jul 98 16:59

EUT: ETNA-110
Test Spec: LISN : N
Comment: CPU 266MHZ HITACHI 14.1 FULL SYSTEM

Fast Scan Settings (3 Ranges)

| Frequencies | | | Receiver Settings | | | | | |
|---|---|---|---|---|---|---|---|---|
| Start | Stop | Step | IF BW | Detector | M-Time | Atten | Preamp | OpRge |
| 150k | 450k | 3k | 10k | PK | 1ms | 10dBLN | OFF | 60dB |
| 450k | 5M | 3k | 10k | PK | 1ms | 10dBLN | OFF | 60dB |
| 5M | 30M | 3k | 10k | PK | 1ms | 10dBLN | OFF | 60dB |



## 4.3 TEST DATA OF RADIATED EMISSION

EUT: **NOTEBOOK COMPUTER** MODEL: **ETNA-110**

MODE: **Notebook + CRT Display** POLARITY: Horizontal

ANTENNA: CHASE BILOG CBL 6111A/EMCO Horn 3115

DETECTOR FUNCTION AND BANDWIDTH: Quasi peak, 120 kHz (30-1000 MHz)
Peak, 1 MHz (1000 MHz-2000 MHz)

FREQUENCY RANGE: 30-1000 MHz MEASURED DISTANCE: 10 M

FREQUENCY RANGE: 1000-2000 MHz MEASURED DISTANCE: 3 M

TEST PERSONNEL: KEN

| Frequency (MHz) | Correction Factor (dB/m) | Reading Data (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|
| 160.40 | 12.0 | 14.5 | 26.5 | 30.0 | -3.5 |
| 180.45 | 11.6 | 13.3 | 24.9 | 30.0 | -5.1 |
| 193.33 | 11.6 | 16.4 | 28.0 | 30.0 | -2.0 |
| 212.65 | 12.4 | 13.9 | 26.3 | 30.0 | -3.7 |
| 225.55 | 13.3 | 14.4 | 27.7 | 30.0 | -2.3 |
| 322.19 | 17.2 | 15.9 | 33.1 | 37.0 | -3.9 |

REMARKS :
1. Emission level (dBuV/m) = Correction Factor(dB/m) +Meter Reading (dBuV).
2. Correction Factor(dB/m) = Ant. Factor(dB/m)+Cable loss(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level - Limit value

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# TEST DATA OF RADIATED EMISSION

EUT: **NOTEBOOK COMPUTER** MODEL: **ETNA-110**

MODE: **Notebook + CRT Display** POLARITY: Vertical

ANTENNA: CHASE BILOG CBL 6111A/EMCO Horn 3115

DETECTOR FUNCTION AND BANDWIDTH: Quasi peak, 120 kHz (30-1000 MHz)
Peak, 1 MHz (1000 MHz-2000 MHz)

FREQUENCY RANGE: 30-1000 MHz MEASURED DISTANCE: 10 M

FREQUENCY RANGE: 1000-2000 MHz MEASURED DISTANCE: 3 M

TEST PERSONNEL: KEN

| Frequency (MHz) | Correction Factor (dB/m) | Reading Data (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|
| 115.99 | 12.6 | 14.1 | 26.7 | 30.0 | -3.3 |
| 128.88 | 14.3 | 12.1 | 26.4 | 30.0 | -3.6 |
| 160.37 | 12.8 | 14.8 | 27.6 | 30.0 | -2.4 |
| 200.48 | 12.1 | 15.6 | 27.7 | 30.0 | -2.3 |
| 212.66 | 12.6 | 14.8 | 27.4 | 30.0 | -2.6 |
| 225.55 | 13.1 | 14.2 | 27.3 | 30.0 | -2.7 |
| 322.19 | 17.8 | 16.8 | 34.6 | 37.0 | -2.4 |

REMARKS :
1. Emission level (dBuV/m) = Correction Factor(dB/m) +Meter Reading (dBuV).
2. Correction Factor(dB/m) = Ant. Factor(dB/m)+Cable loss(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level - Limit value