Ohtama

# EMC Test Report

| | |
|---|---|
| **Test Report Number** | T-1355833-03 |
| **Applied Standard(s)** | FCC 47 CFR Part15 Subpart B |
| **Date of Issue** | 15 February, 2013 |
| **Testing Laboratory Address** | TÜV SÜD Ohtama, Ltd. Ashigawa Laboratory<br>1661 Ohshuku, Ashigawa-cho, Fuefuki-shi, Yamanashi 409-3704 JAPAN |
| **Test Date(s)** | 5 February, 2013 to 6 February, 2013 |
| **Product Name** | Card Printer |
| **Model Number** | PR5520 (PR-C201) |
| **Serial Number** | A1X00059 |
| **Applicant (Client) Address** | Nisca Corporation<br>430-1 Kobayashi Fujikawa-cho Minamikoma-gun Yamanashi-ken<br>400-0593 Japan |
| **Manufacturer Address** | Nisca Corporation<br>430-1 Kobayashi Fujikawa-cho Minamikoma-gun Yamanashi-ken<br>400-0593 Japan |

## Test Result

The test result for the electromagnetic compatibility tests as described in the section 1 to 2 and in this page was:

☒ **Pass**

ilac-MRA VLAC Lab Accreditation VLAC-018-2

**Approved by:**

Masashi Fujimoto
Center Manager

Checked box (☒) indicates that the listed condition, standard or equipment is applicable for this Report.
Blank box (☐) indicates that the listed condition, standard or equipment is not applicable for this Report.
It is not allowed to copy this report, except in full, without written permission of the test laboratory.
Test results of this report refer only to the EUT tested here.

# Table of Contents


Page

Cover Page....1
Table of Contents....2
1. Summary....3
1.1 Terms and definitions....3
1.2 Deviations from Standard(s)....3
2. Equipment Under Test (EUT)....4
2.1 General Descriptions....4
2.2 Detailed Descriptions....4
2.3 Modification to the EUT....4
2.4 Operation Mode(s) of the EUT for EMC during the Test(s)....4
2.5 EUT, Peripheral Devices and Interconnecting Cables....5
2.6 System Configuration....6
3. Test Data....7
3.1 Conducted Emissions....7
3.2 Radiated Electric-Field Emissions....15
4. Test facility....27
4.1 Test Instruments....27
4.2 Test equipment....27
4.3 Normalized Site Attenuation....27
Annex A (Miscellaneous Information)....28
A.1 Test Locations....28
A.2 Uncertainty....28
Annex B (Description of Test Method)....29
B.1 Conducted Emissions (AC Main and Other Terminals)....29
B.2 Radiated Electric-Field Emissions (30 MHz to 1000MHz)....30
B.3 Radiated Electric-Field Emissions above 1000MHz....30

# 1. Summary

## 1.1 Terms and definitions

**AV**
Average

**DoC**
Declaration of Conformity

**L**
Live (Phase)

**N**
Neutral (Phase)

**PK**
Peak

**QP**
Quasi-peak

## 1.2 Deviations from Standard(s)

Tests were performed without connecting two of optional I/F ports by customer's request.

# 2. Equipment Under Test (EUT)

## 2.1 General Descriptions

Card Printer receives the image data from the host computer through USB 2.0 or Ethernet interface and copies the image on a film from an ink ribbon by the thermal ink transfer printing system which used thermal head for and prints the image on a plastic card from a film by the thermal ink transfer printing system which used a heat roller for.

## 2.2 Detailed Descriptions

| | |
|---|---|
| Product Name | Card Printer |
| Model Number | PR5520 (PR-C201) |
| Serial Number | A1X00059 |
| Power Supply | 120 V ac, 60 Hz, |
| Dimension | 340 mm (W) x 435 mm (H) x 297 mm (D) |
| Highest Operating Frequency | 480 MHz |
| Normal Placement | Table-top |
| Condition of the EUT | Product on production line |

## 2.3 Modification to the EUT

There was no modification or measure.

## 2.4 Operation Mode(s) of the EUT for EMC during the Test(s)

| Operation Mode Name | Description |
|---|---|
| Card Print<br>An USB2.0 mode | Card Printer receives the image data from the host computer through USB2.0 interface.<br>And Card Printer transports a card in order of a built-in contactless reader writer, a built-in contact reader writer, a built-in magnetic reader writer and encodes the data, and prints the image and drains a card to an outlet.<br>While encoding and printing, Card Printer receives the next image data from the host computer, and certifies the ribbon and film with the RFID unit.<br>The above operation was repeated. |
| Card Print<br>An Ethernet mode | Card Printer receives the image data from the host computer through Ethernet interface.<br>And Card Printer transports a card in order of a built-in contactless reader writer, a built-in contact reader writer, a built-in magnetic reader writer and encodes the data, and prints the image data and drains a card to an outlet.<br>While encoding and printing, Card Printer receives the next image data from the host computer, and certifies the ribbon and film with the RFID unit.<br>The above operation was repeated. |

## 2.5 EUT, Peripheral Devices and Interconnecting Cables

The following devices and cables were used during the test:

### 2.5.1 EUT

| Mark | Description | Model Number | Serial Number | FCC ID Code or DoC status | Manufacturer |
|---|---|---|---|---|---|
| EUT | Card Printer | PR5520 (PR-C201) | A1X00059 | - | Nisca Corporation |

### 2.5.2 Peripheral Devices

| Mark | Description | Model Number | Serial Number | FCC ID Code or DoC status | Manufacturer |
|---|---|---|---|---|---|
| A | Contactless reader writer | PR5363GIDA (PR-450RKM) | 4665006440800305 | - | Nisca Corporation |
| B | Contact reader writer | PR5362GCAA (ASEDriveIIIeUSB) | X14280 | - | Nisca Corporation |
| C | Magnetic reader writer | PR5361GMD (CR-78RW-3) | 2J00219 | - | Nisca Corporation |
| D | Digital Fiber Sensor | FX-102 | BGVZ | - | Panasonic Electric Works SUNX |
| E | HP Compaq | dx7400 | JPA74500ZJ | - | Hewlett-Packard |
| F | Monitor | Flex Scan L565 | K7126083 | - | EIZO NANAO CORPORATION |
| G | Mouse | M-SBJ96 | F93AA0AN3UZ0O7V | - | Hewlett-Packard |
| H | Keyboard | KB-0316 | BC3480CGAV3190 | - | Hewlett-Packard |
| I | RFID unit | CP010901 | CF4612P10010 | - | EVOLIS |

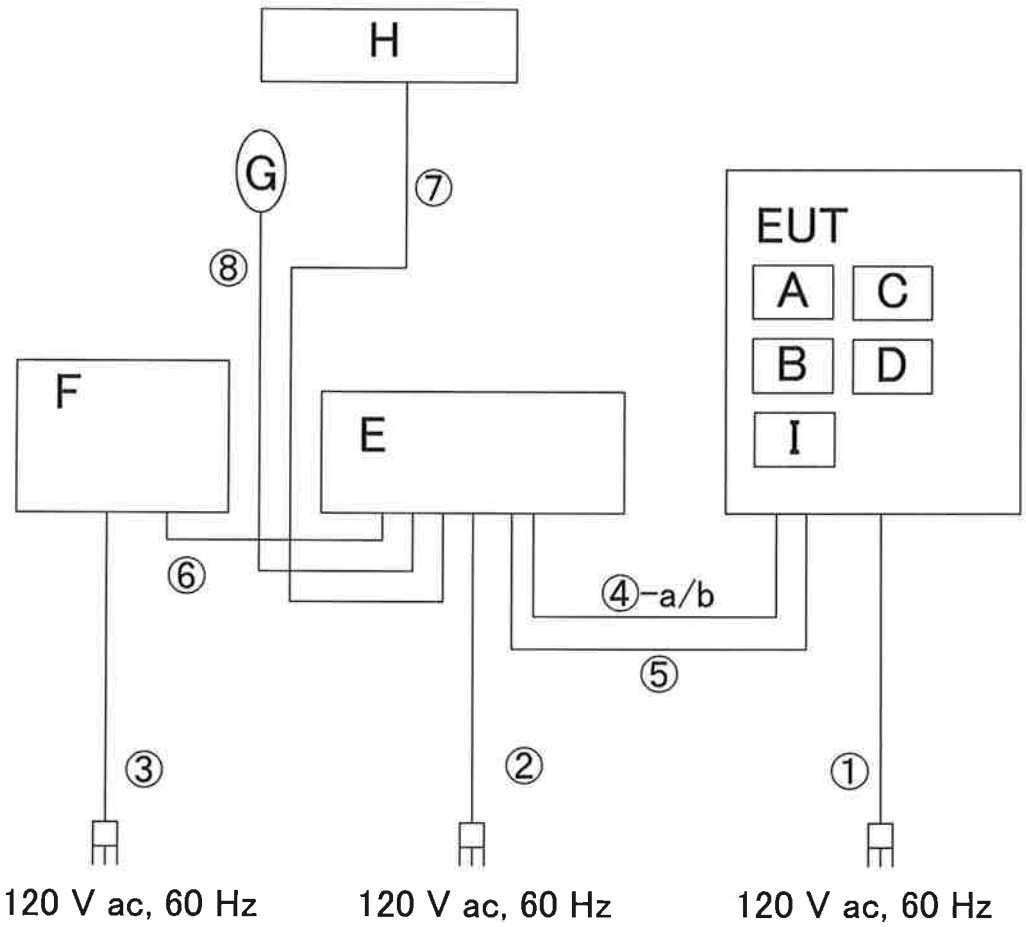
### 2.5.3 Interconnecting Cables

| Mark | Description | Length (m) | Shielded | | Identification (Conductors) |
|---|---|---|---|---|---|
| | | | Cable | Connector | |
| ① | AC code 1 | 3.0 | None | None | 3 |
| ② | AC code 2 | 2.1 | None | None | 3 |
| ③ | AC code 3 | 2.1 | None | None | 3 |
| ④-a | USB I/F cable | 2.0 | Yes | Yes | 4 |
| ④-b | Ethernet I/F cable | 3.0 | None | None | 8 |
| ⑤ | RS232-C I/F cable | 2.0 | Yes | Yes | 8 |
| ⑥ | CRT I/F cable | 1.7 | Yes | Yes | 9 |
| ⑦ | Keyboard I/F cable | 1.8 | None | Yes | 6 |
| ⑧ | Mouse I/F cable | 1.8 | None | Yes | 6 |

Remarks: The length described here is the length of the cable typically used in the tests, but different length of the cable may be used in some tests to satisfy the requirements for the test.

## 2.6 System Configuration

Unless otherwise specified in the following sections, the test configuration described here is applied for the tests.
The configuration was chosen by the applicant.



# 3. Test Data

## 3.1 Conducted Emissions

### 3.1.1 Test specification

| | |
|---|---|
| Standard | FCC 47 CFR Part15 Subpart B |
| Class of Equipment | Unintentional radiators other than class A digital devices |
| Frequency Range | 0.15 MHz to 30 MHz |
| | |
| Test Date | 6 February, 2013 |
| Test Location | Ashigawa Laboratory<br>Shielded room No.1 |
| Test Engineer | Yuji Shimizu |
| Temperature | 24 °C |
| Humidity | 28 % RH |
| Pressure | 928 hPa |
| Power Supply | 120 V ac, 60 Hz |
| Operation Mode Name | Card Print An USB2.0 mode |

#### 3.1.1.1 Test Result

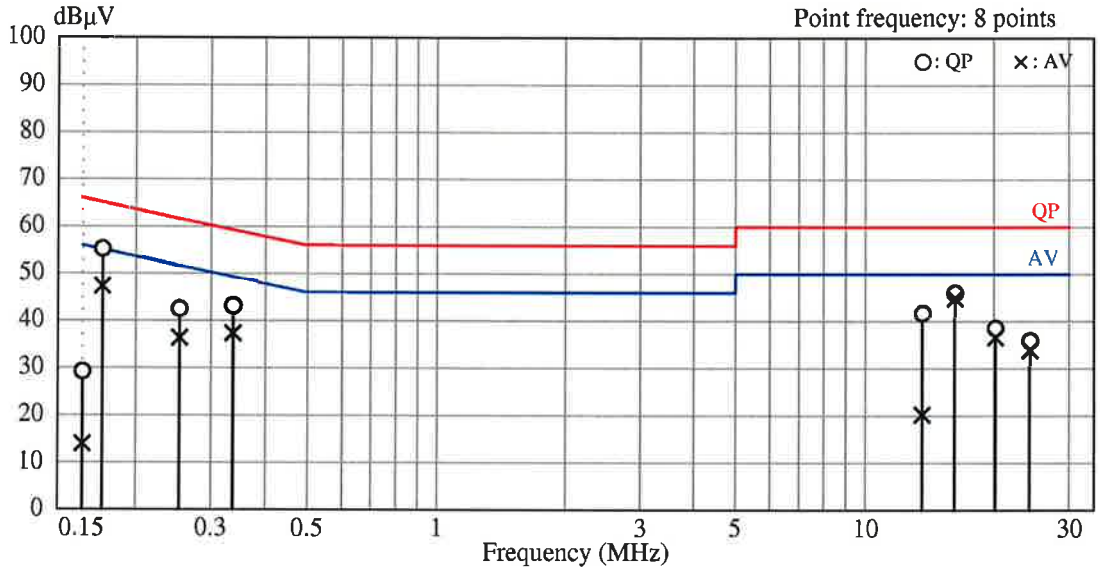
Pass

#### 3.1.1.2 Test Detail

| Tested Port | Minimum limit margin | Note |
|---|---|---|
| AC code 1 | 5.2 dB at 16.1423 MHz (AV) | |

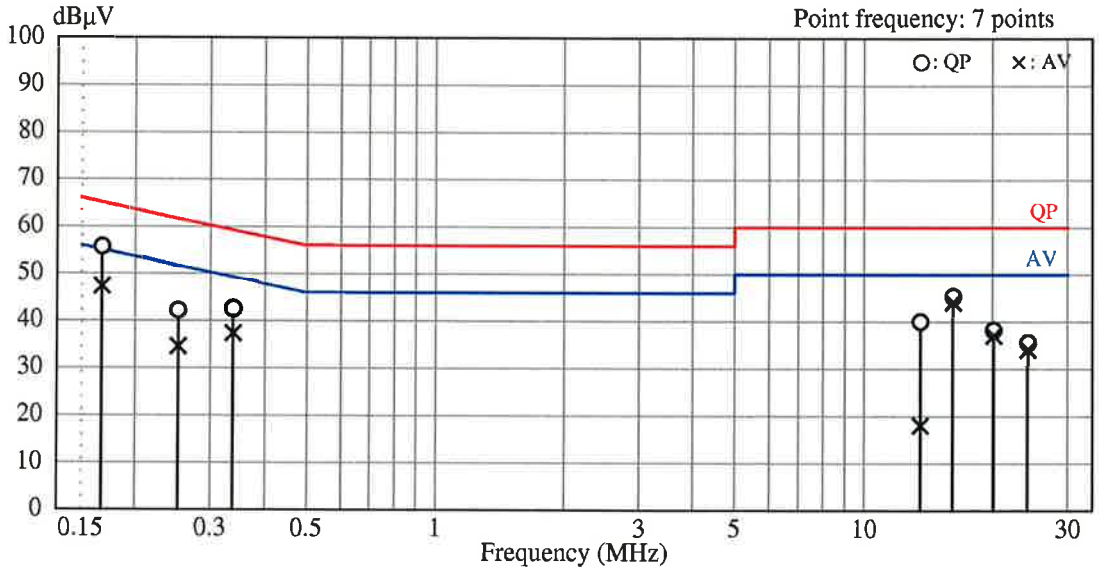
### 3.1.1.3 Card Print An USB2.0 mode (L)

| Frequency (MHz) | Reading (dBµV) | | Correction factor (dB) | Noise level (dBµV) | | Limit (dBµV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | QP | AV | | QP | AV | QP | AV | QP | AV |
| 0.1500 | 18.5 | 3.2 | 10.7 | 29.2 | 13.9 | 66.0 | 56.0 | 36.8 | 42.1 |
| 0.1669 | 44.5 | 36.6 | 10.7 | 55.2 | 47.3 | 65.1 | 55.1 | 9.9 | 7.8 |
| 0.2532 | 31.8 | 25.6 | 10.7 | 42.5 | 36.3 | 61.7 | 51.7 | 19.2 | 15.4 |
| 0.3371 | 32.4 | 26.6 | 10.7 | 43.1 | 37.3 | 59.3 | 49.3 | 16.2 | 12.0 |
| 13.5600 | 29.5 | 8.0 | 12.2 | 41.7 | 20.2 | 60.0 | 50.0 | 18.3 | 29.8 |
| 16.1423 | 33.6 | 32.4 | 12.4 | 46.0 | 44.8 | 60.0 | 50.0 | 14.0 | 5.2 |
| 20.1793 | 25.8 | 23.8 | 12.7 | 38.5 | 36.5 | 60.0 | 50.0 | 21.5 | 13.5 |
| 24.2172 | 22.9 | 20.9 | 13.0 | 35.9 | 33.9 | 60.0 | 50.0 | 24.1 | 16.1 |



### 3.1.1.4 Card Print An USB2.0 mode (N)

| Frequency (MHz) | Reading (dBµV) | | Correction factor (dB) | Noise level (dBµV) | | Limit (dBµV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | QP | AV | | QP | AV | QP | AV | QP | AV |
| 0.1672 | 45.0 | 36.6 | 10.7 | 55.7 | 47.3 | 65.1 | 55.1 | 9.4 | 7.8 |
| 0.2524 | 31.5 | 23.8 | 10.7 | 42.2 | 34.5 | 61.7 | 51.7 | 19.5 | 17.2 |
| 0.3386 | 31.9 | 26.6 | 10.7 | 42.6 | 37.3 | 59.2 | 49.2 | 16.6 | 11.9 |
| 13.5600 | 27.9 | 5.9 | 12.1 | 40.0 | 18.0 | 60.0 | 50.0 | 20.0 | 32.0 |
| 16.1436 | 33.0 | 31.7 | 12.4 | 45.4 | 44.1 | 60.0 | 50.0 | 14.6 | 5.9 |
| 20.1796 | 25.5 | 24.3 | 12.7 | 38.2 | 37.0 | 60.0 | 50.0 | 21.8 | 13.0 |
| 24.2147 | 22.6 | 21.1 | 13.0 | 35.6 | 34.1 | 60.0 | 50.0 | 24.4 | 15.9 |



### 3.1.2 Test specification

| | |
|---|---|
| Standard | FCC 47 CFR Part15 Subpart B |
| Class of Equipment | Unintentional radiators other than class A digital devices |
| Frequency Range | 0.15 MHz to 30 MHz |
| | |
| Test Date | 6 February, 2013 |
| Test Location | Ashigawa Laboratory<br>Shielded room No.1 |
| Test Engineer | Yuji Shimizu |
| Temperature | 24 °C |
| Humidity | 28 % RH |
| Pressure | 928 hPa |
| Power Supply | 120 V ac, 60 Hz |
| Operation Mode Name | Card Print An Ethernet mode |

#### 3.1.2.1 Test Result

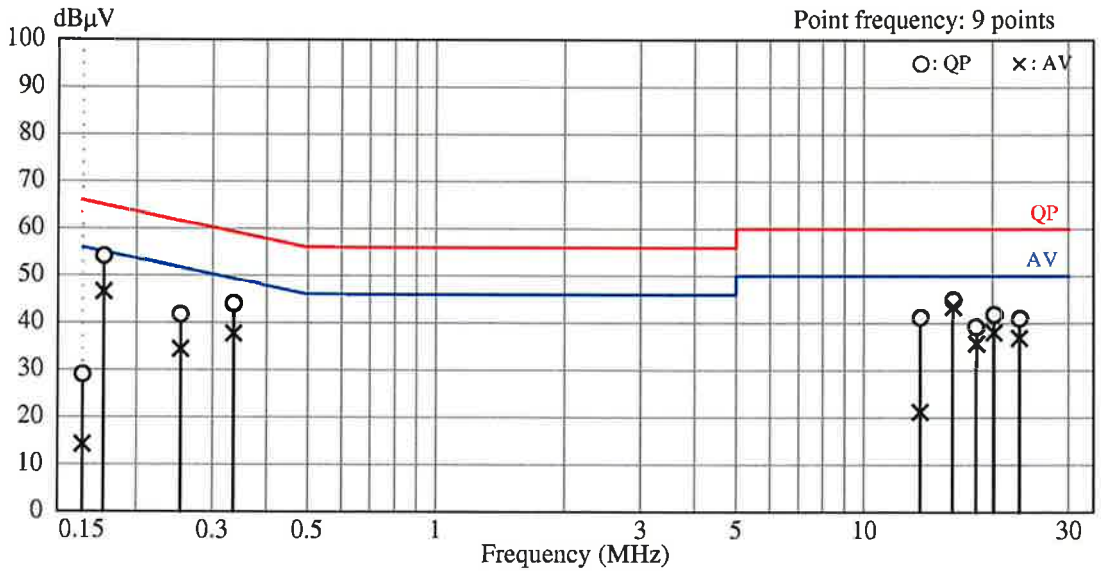
Pass

#### 3.1.2.2 Test Detail

| Tested Port | Minimum limit margin | Note |
|---|---|---|
| AC code 1 | 6.5 dB at 16.1523 MHz (AV) | |

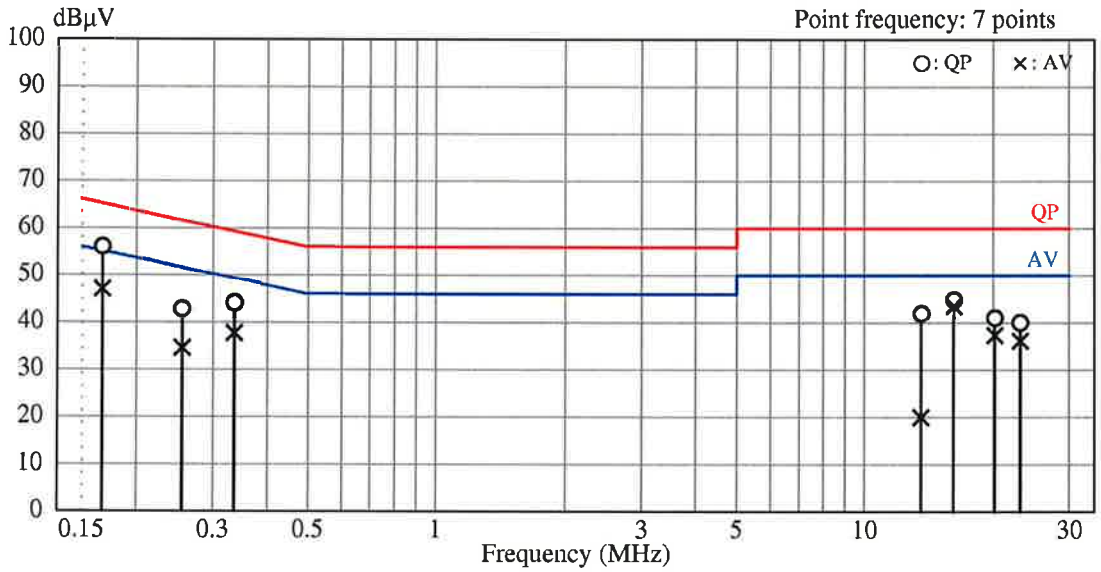
### 3.1.2.3 Card Print An Ethernet mode (L)

| Frequency (MHz) | Reading (dBµV) | | Correction factor (dB) | Noise level (dBµV) | | Limit (dBµV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | QP | AV | | QP | AV | QP | AV | QP | AV |
| 0.1500 | 18.3 | 3.5 | 10.7 | 29.0 | 14.2 | 66.0 | 56.0 | 37.0 | 41.8 |
| 0.1679 | 43.4 | 35.8 | 10.7 | 54.1 | 46.5 | 65.1 | 55.1 | 11.0 | 8.6 |
| 0.2528 | 31.0 | 23.7 | 10.7 | 41.7 | 34.4 | 61.7 | 51.7 | 20.0 | 17.3 |
| 0.3355 | 33.3 | 27.0 | 10.7 | 44.0 | 37.7 | 59.3 | 49.3 | 15.3 | 11.6 |
| 13.5600 | 29.0 | 9.0 | 12.2 | 41.2 | 21.2 | 60.0 | 50.0 | 18.8 | 28.8 |
| 16.1581 | 32.5 | 31.0 | 12.4 | 44.9 | 43.4 | 60.0 | 50.0 | 15.1 | 6.6 |
| 18.3023 | 26.6 | 23.1 | 12.6 | 39.2 | 35.7 | 60.0 | 50.0 | 20.8 | 14.3 |
| 20.1937 | 29.1 | 25.3 | 12.7 | 41.8 | 38.0 | 60.0 | 50.0 | 18.2 | 12.0 |
| 23.1253 | 28.0 | 23.8 | 13.0 | 41.0 | 36.8 | 60.0 | 50.0 | 19.0 | 13.2 |



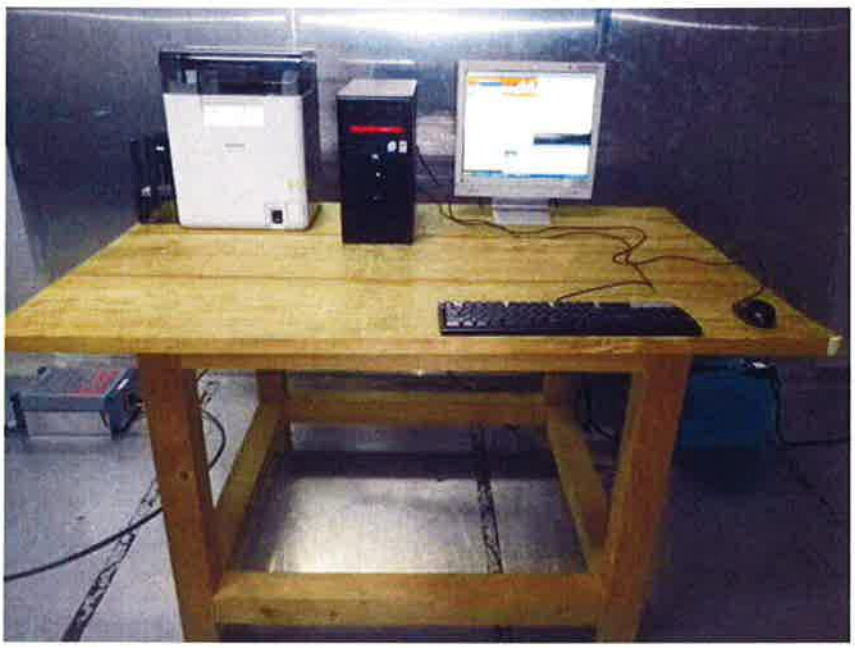
### 3.1.2.4 Card Print An Ethernet mode (N)

| Frequency (MHz) | Reading (dBµV) | | Correction factor (dB) | Noise level (dBµV) | | Limit (dBµV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | QP | AV | | QP | AV | QP | AV | QP | AV |
| 0.1669 | 45.3 | 36.3 | 10.7 | 56.0 | 47.0 | 65.1 | 55.1 | 9.1 | 8.1 |
| 0.2545 | 32.1 | 23.8 | 10.7 | 42.8 | 34.5 | 61.6 | 51.6 | 18.8 | 17.1 |
| 0.3357 | 33.4 | 27.0 | 10.7 | 44.1 | 37.7 | 59.3 | 49.3 | 15.2 | 11.6 |
| 13.5600 | 29.8 | 7.8 | 12.1 | 41.9 | 19.9 | 60.0 | 50.0 | 18.1 | 30.1 |
| 16.1523 | 32.4 | 31.1 | 12.4 | 44.8 | 43.5 | 60.0 | 50.0 | 15.2 | 6.5 |
| 20.1928 | 28.3 | 24.6 | 12.7 | 41.0 | 37.3 | 60.0 | 50.0 | 19.0 | 12.7 |
| 23.1253 | 27.0 | 23.1 | 13.0 | 40.0 | 36.1 | 60.0 | 50.0 | 20.0 | 13.9 |

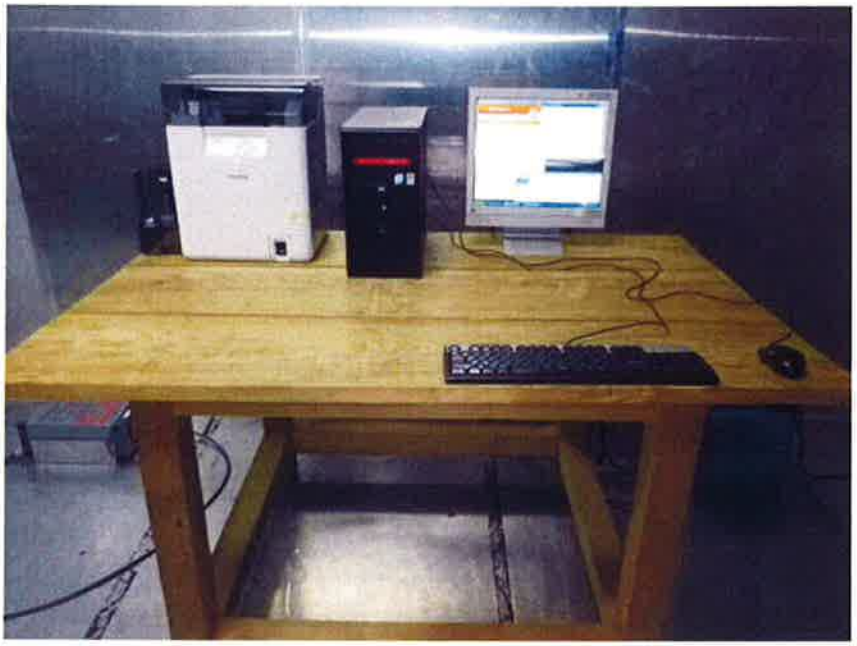


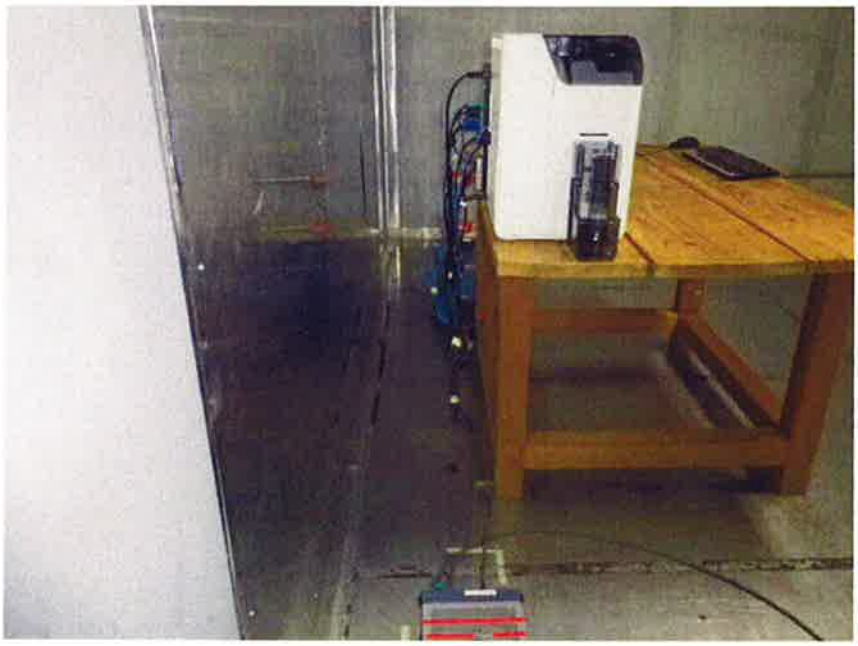
### 3.1.3 Test Setup Photographs (EUT)

Card Print An USB2.0 mode



Card Print An Ethernet mode





## 3.2 Radiated Electric-Field Emissions

### 3.2.1 Test Specification

| | |
|---|---|
| Standard | FCC 47 CFR Part15 Subpart B |
| Class of Equipment | Unintentional radiators other than class A digital devices |
| Test Distance | 3m |
| Frequency Range | 30 MHz to 1 000 MHz<br>1 000 MHz to 2 000 MHz |
| Test Date | 5 February, 2013 (30 MHz to 1 000 MHz)<br>6 February, 2013 (1 000 MHz to 2 000 MHz) |
| Test Location | Ashigawa Laboratory<br>Open site No.1 |
| Test Engineer | Yuji Shimizu |
| Temperature | 18°C (5 February, 2013)<br>17°C (6 February, 2013) |
| Humidity | 28 % RH (5 February, 2013)<br>33 % RH ((6 February, 2013) |
| Pressure | 937hPa (5 February, 2013)<br>928hPa (6 February, 2013) |
| Power Supply | 120 V ac, 60 Hz |
| Operation Mode Name | Card Print An USB2.0 mode |

#### 3.2.1.1 Test Result

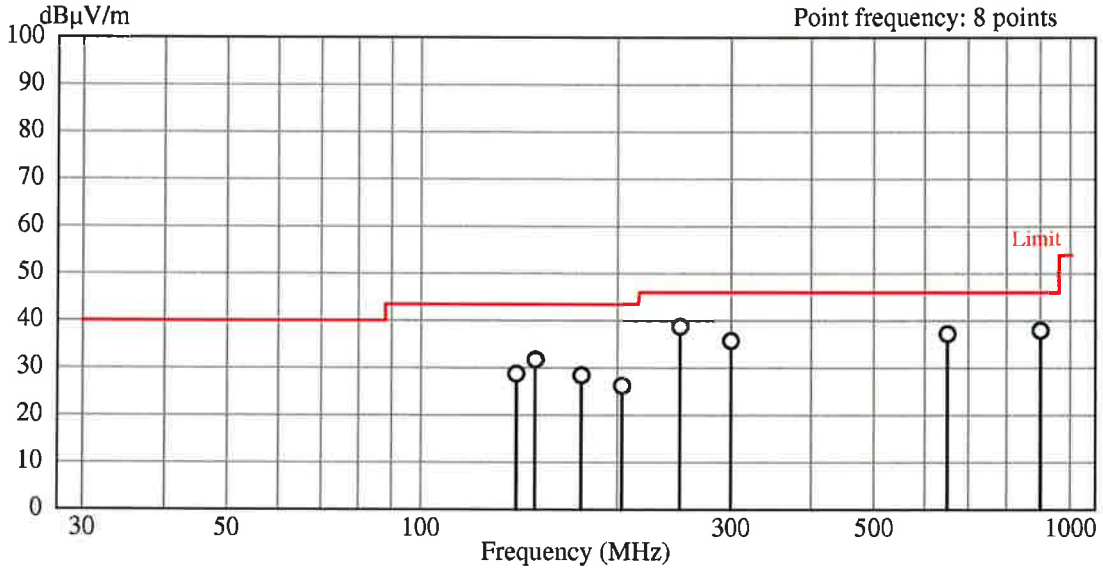
Pass

#### 3.2.1.2 Test Detail

| Minimum limit margin | Note |
|---|---|
| 4.4 dB at 37.20 MHz | |

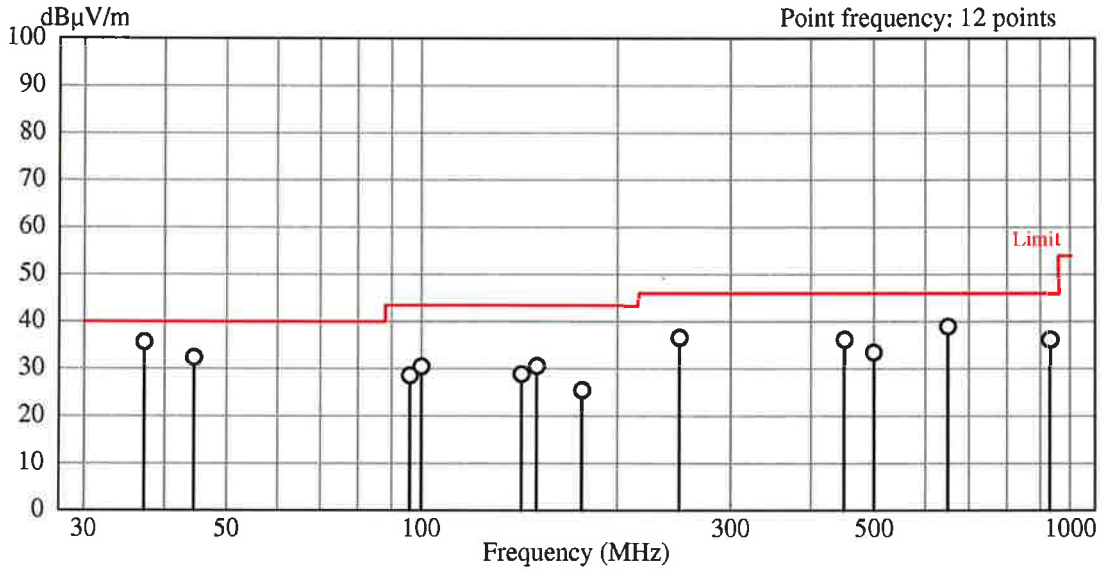
### 3.2.1.3 Card Print An USB2.0 mode, Below 1 000 MHz (3 m), Horizontal

| Frequency (MHz) | Reading (dBµV) | Correction factor (dB/m) | Noise level (dBµV/m) | Antenna height (m) | Turn table angle (°) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 140.29 | 35.5 | -6.8 | 28.7 | 1.4 | 127 | 43.5 | 14.8 |
| 150.00 | 38.0 | -6.3 | 31.7 | 1.4 | 279 | 43.5 | 11.8 |
| 176.28 | 35.0 | -6.6 | 28.4 | 1.5 | 161 | 43.5 | 15.1 |
| 203.40 | 35.0 | -8.8 | 26.2 | 1.0 | 307 | 43.5 | 17.3 |
| 250.00 | 45.0 | -6.3 | 38.7 | 1.0 | 178 | 46.0 | 7.3 |
| 300.00 | 40.1 | -4.4 | 35.7 | 1.0 | 213 | 46.0 | 10.3 |
| 650.00 | 34.3 | 2.9 | 37.2 | 1.0 | 169 | 46.0 | 8.8 |
| 900.00 | 31.0 | 6.9 | 37.9 | 1.5 | 207 | 46.0 | 8.1 |



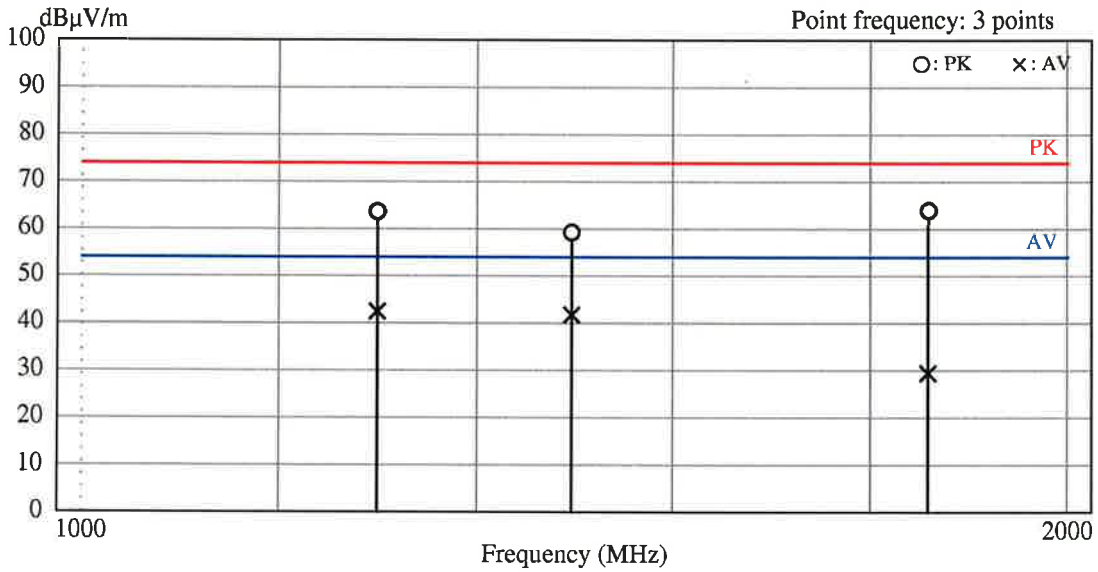
### 3.2.1.4 Card Print An USB2.0 mode, Below 1 000 MHz (3 m), Vertical

| Frequency (MHz) | Reading (dBµV) | Correction factor (dB/m) | Noise level (dBµV/m) | Antenna height (m) | Turn table angle (°) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 37.20 | 43.5 | -7.9 | 35.6 | 1.0 | 85 | 40.0 | 4.4 |
| 44.52 | 39.3 | -7.0 | 32.3 | 1.0 | 229 | 40.0 | 7.7 |
| 95.97 | 40.1 | -11.6 | 28.5 | 1.0 | 296 | 43.5 | 15.0 |
| 100.00 | 41.3 | -10.9 | 30.4 | 1.0 | 290 | 43.5 | 13.1 |
| 142.11 | 35.5 | -6.7 | 28.8 | 1.0 | 177 | 43.5 | 14.7 |
| 150.00 | 36.8 | -6.3 | 30.5 | 1.0 | 22 | 43.5 | 13.0 |
| 176.28 | 32.0 | -6.6 | 25.4 | 1.0 | 223 | 43.5 | 18.1 |
| 250.00 | 42.8 | -6.3 | 36.5 | 1.7 | 196 | 46.0 | 9.5 |
| 450.00 | 37.0 | -0.9 | 36.1 | 1.6 | 192 | 46.0 | 9.9 |
| 500.00 | 33.5 | -0.1 | 33.4 | 1.6 | 175 | 46.0 | 12.6 |
| 650.00 | 36.0 | 2.9 | 38.9 | 1.2 | 196 | 46.0 | 7.1 |
| 931.49 | 28.5 | 7.6 | 36.1 | 1.5 | 339 | 46.0 | 9.9 |



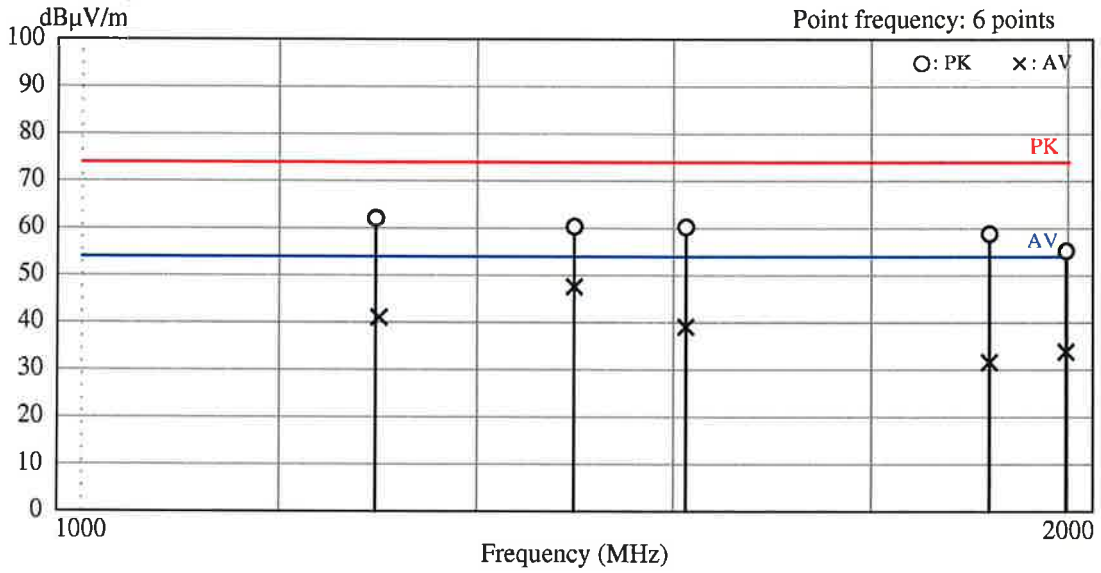
### 3.2.1.5 Card Print An USB2.0 mode, Above 1 000 MHz (3 m), Horizontal

| Frequency (MHz) | Reading (dBµV) | Correction factor (dB/m) | Noise level (dBµV/m) | Antenna height (m) | Turn table angle (°) | Limit (dBµV/m) | Margin (dB) | Detector Mode |
|---|---|---|---|---|---|---|---|---|
| 1300.02 | 75.9 | -12.3 | 63.6 | 1.2 | 195 | 74.0 | 10.4 | PK |
| 1300.02 | 54.7 | -12.3 | 42.4 | 1.2 | 195 | 54.0 | 11.6 | AV |
| 1496.17 | 72.1 | -12.9 | 59.2 | 1.2 | 339 | 74.0 | 14.8 | PK |
| 1496.17 | 54.6 | -12.9 | 41.7 | 1.2 | 339 | 54.0 | 12.3 | AV |
| 1857.73 | 74.8 | -10.9 | 63.9 | 1.2 | 227 | 74.0 | 10.1 | PK |
| 1857.73 | 40.3 | -10.9 | 29.4 | 1.2 | 227 | 54.0 | 24.6 | AV |



### 3.2.1.6 Card Print An USB2.0 mode, Above 1 000 MHz (3 m), Horizontal

| Frequency (MHz) | Reading (dBµV) | Correction factor (dB/m) | Noise level (dBµV/m) | Antenna height (m) | Turn table angle (°) | Limit (dBµV/m) | Margin (dB) | Detector Mode |
|---|---|---|---|---|---|---|---|---|
| 1296.56 | 74.3 | -12.2 | 62.1 | 1.0 | 218 | 74.0 | 11.9 | PK |
| 1299.99 | 53.2 | -12.2 | 41.0 | 1.0 | 218 | 54.0 | 13.0 | AV |
| 1498.97 | 73.2 | -12.9 | 60.3 | 1.0 | 345 | 74.0 | 13.7 | PK |
| 1498.97 | 60.4 | -12.9 | 47.5 | 1.0 | 345 | 54.0 | 6.5 | AV |
| 1612.53 | 72.0 | -11.8 | 60.2 | 1.3 | 204 | 74.0 | 13.8 | PK |
| 1612.53 | 50.8 | -11.8 | 39.0 | 1.3 | 204 | 54.0 | 15.0 | AV |
| 1920.03 | 70.6 | -11.8 | 58.8 | 1.2 | 173 | 74.0 | 15.2 | PK |
| 1920.03 | 43.4 | -11.8 | 31.6 | 1.2 | 173 | 54.0 | 22.4 | AV |
| 1998.02 | 67.2 | -12.0 | 55.2 | 1.2 | 22 | 74.0 | 18.8 | PK |
| 1998.02 | 45.8 | -12.0 | 33.8 | 1.2 | 22 | 54.0 | 20.2 | AV |



### 3.2.2 Test Specification

| | |
|---|---|
| Standard | FCC 47 CFR Part15 Subpart B |
| Class of Equipment | Unintentional radiators other than class A digital devices |
| Test Distance | 3m |
| Frequency Range | 30 MHz to 1 000 MHz<br>1 000 MHz to 2 000 MHz |
| Test Date | 5 February, 2013 (30 MHz to 1 000 MHz)<br>6 February, 2013 (1 000 MHz to 2 000 MHz) |
| Test Location | Ashigawa Laboratory<br>Open site No.1 |
| Test Engineer | Yuji Shimizu |
| Temperature | 18°C (5 February, 2013)<br>17°C (6 February, 2013) |
| Humidity | 28 % RH (5 February, 2013)<br>33 % RH ((6 February, 2013) |
| Pressure | 937hPa (5 February, 2013)<br>928hPa (6 February, 2013) |
| Power Supply | 120 V ac, 60 Hz |
| Operation Mode Name | Card Print An Ethernet mode |

#### 3.2.2.1 Test Result

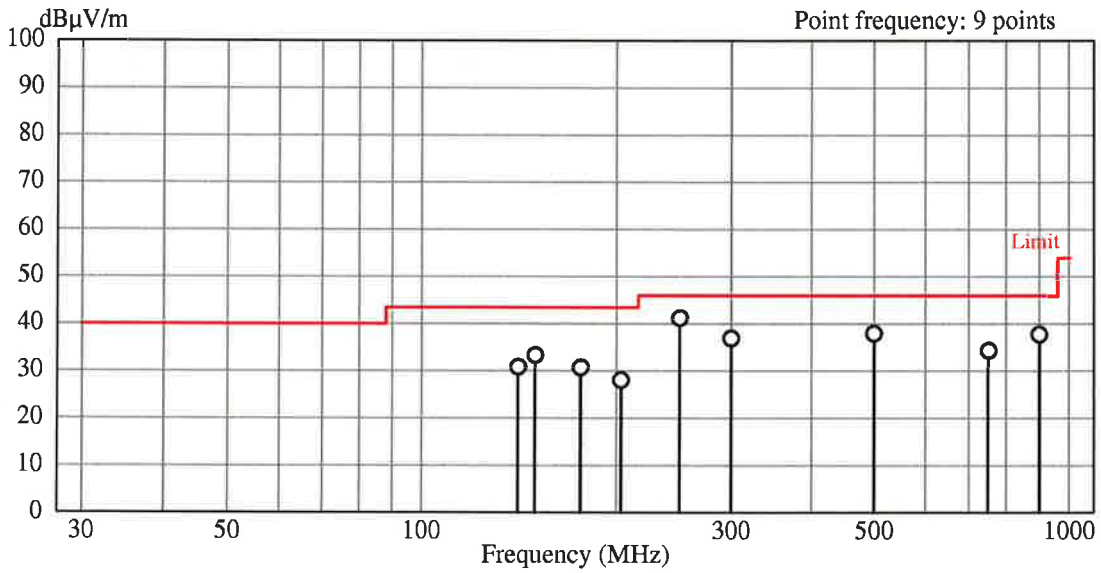
Pass

#### 3.2.2.2 Test Detail

| Minimum limit margin | Note |
|---|---|
| 3.7 dB at 37.14 MHz | |

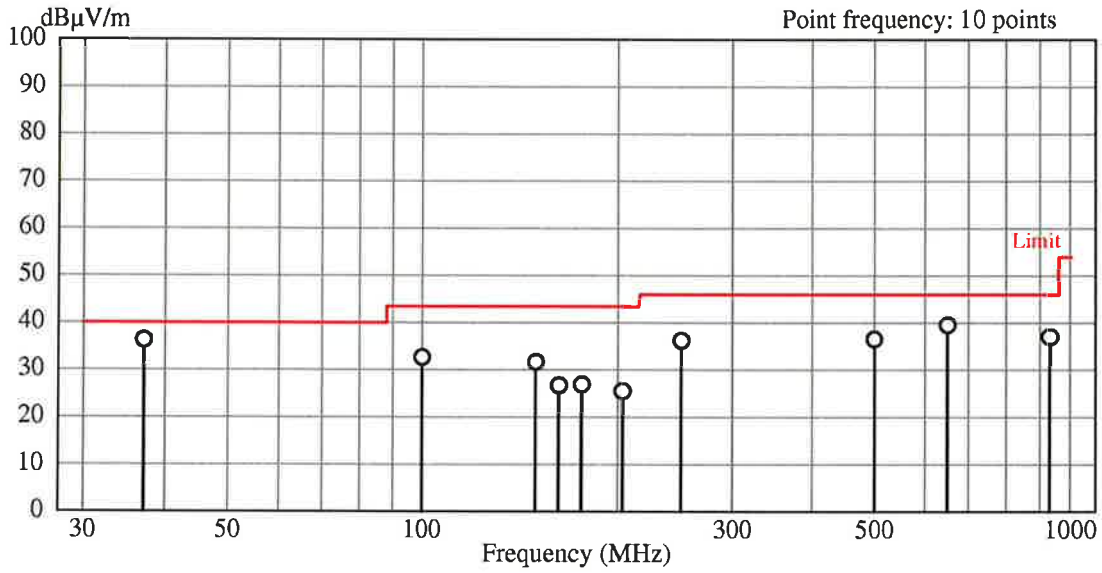
### 3.2.2.3 Card Print An Ethernet mode, Below 1 000 MHz (3 m), Horizontal

| Frequency (MHz) | Reading (dBµV) | Correction factor (dB/m) | Noise level (dBµV/m) | Antenna height (m) | Turn table angle (°) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 141.21 | 37.5 | -6.7 | 30.8 | 1.4 | 115 | 43.5 | 12.7 |
| 150.00 | 39.6 | -6.3 | 33.3 | 1.4 | 263 | 43.5 | 10.2 |
| 176.28 | 37.3 | -6.6 | 30.7 | 1.5 | 149 | 43.5 | 12.8 |
| 203.40 | 36.8 | -8.8 | 28.0 | 1.0 | 301 | 43.5 | 15.5 |
| 250.00 | 47.5 | -6.3 | 41.2 | 1.0 | 180 | 46.0 | 4.8 |
| 300.00 | 41.3 | -4.4 | 36.9 | 1.0 | 280 | 46.0 | 9.1 |
| 500.00 | 38.0 | -0.1 | 37.9 | 1.0 | 152 | 46.0 | 8.1 |
| 750.00 | 29.6 | 4.7 | 34.3 | 1.0 | 133 | 46.0 | 11.7 |
| 900.00 | 30.8 | 6.9 | 37.7 | 1.5 | 208 | 46.0 | 8.3 |



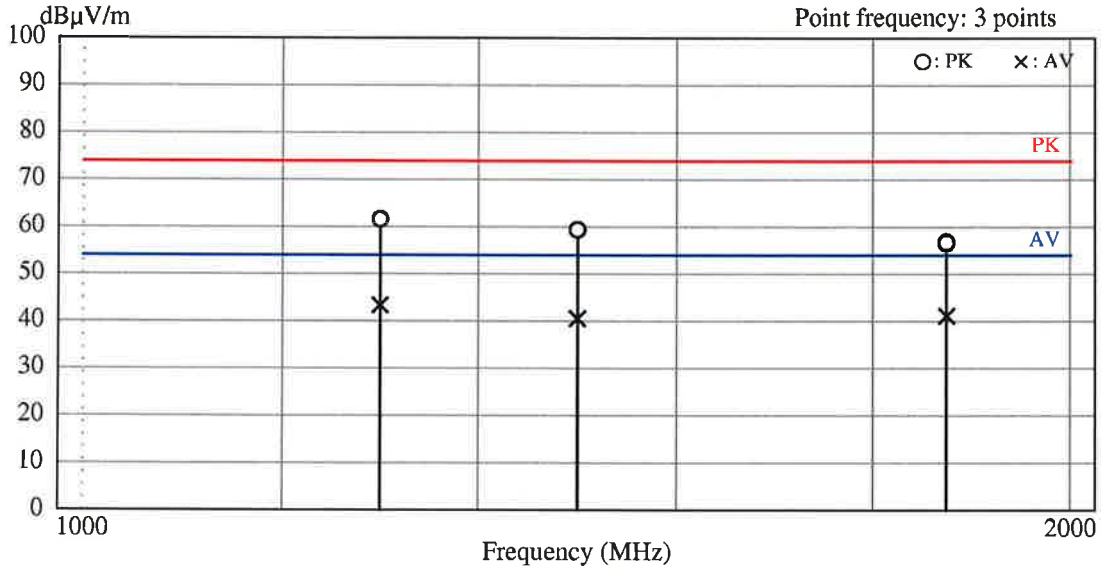
### 3.2.2.4 Card Print An Ethernet mode, Below 1 000 MHz (3 m), Vertical

| Frequency (MHz) | Reading (dBµV) | Correction factor (dB/m) | Noise level (dBµV/m) | Antenna height (m) | Turn table angle (°) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 37.14 | 44.2 | -7.9 | 36.3 | 1.0 | 75 | 40.0 | 3.7 |
| 100.00 | 43.5 | -10.9 | 32.6 | 1.0 | 282 | 43.5 | 10.9 |
| 150.00 | 37.9 | -6.3 | 31.6 | 1.0 | 36 | 43.5 | 11.9 |
| 162.72 | 32.6 | -5.9 | 26.7 | 1.0 | 229 | 43.5 | 16.8 |
| 176.28 | 33.5 | -6.6 | 26.9 | 1.0 | 228 | 43.5 | 16.6 |
| 203.40 | 34.3 | -8.8 | 25.5 | 1.5 | 261 | 43.5 | 18.0 |
| 250.00 | 42.5 | -6.3 | 36.2 | 2.0 | 359 | 46.0 | 9.8 |
| 500.00 | 36.6 | -0.1 | 36.5 | 1.6 | 164 | 46.0 | 9.5 |
| 650.00 | 36.6 | 2.9 | 39.5 | 1.2 | 180 | 46.0 | 6.5 |
| 931.49 | 29.4 | 7.6 | 37.0 | 1.5 | 341 | 46.0 | 9.0 |



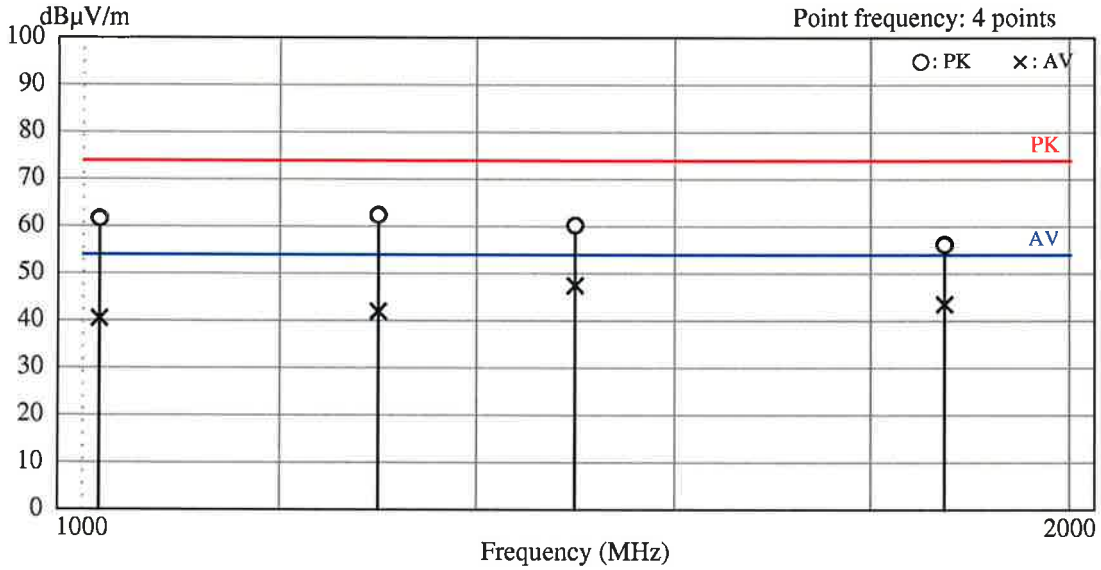
### 3.2.2.5 Card Print An Ethernet mode, Below 1 000 MHz (3 m), Horizontal

| Frequency (MHz) | Reading (dBµV) | Correction factor (dB/m) | Noise level (dBµV/m) | Antenna height (m) | Turn table angle (°) | Limit (dBµV/m) | Margin (dB) | Detector Mode |
|---|---|---|---|---|---|---|---|---|
| 1300.01 | 73.8 | -12.3 | 61.5 | 1.2 | 190 | 74.0 | 12.5 | PK |
| 1300.01 | 55.6 | -12.3 | 43.3 | 1.2 | 190 | 54.0 | 10.7 | AV |
| 1500.00 | 72.1 | -12.8 | 59.3 | 1.2 | 220 | 74.0 | 14.7 | PK |
| 1500.00 | 53.3 | -12.8 | 40.5 | 1.2 | 220 | 54.0 | 13.5 | AV |
| 1875.03 | 67.9 | -11.2 | 56.7 | 1.2 | 139 | 74.0 | 17.3 | PK |
| 1875.03 | 52.3 | -11.2 | 41.1 | 1.2 | 139 | 54.0 | 12.9 | AV |



### 3.2.2.6 Card Print An Ethernet mode, Below 1 000 MHz (3 m), Vertical

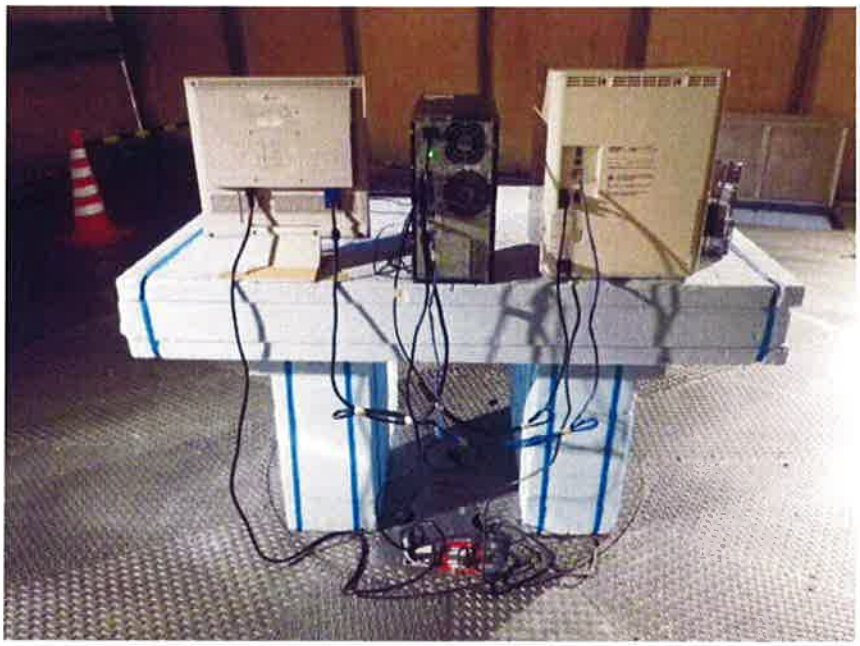
| Frequency (MHz) | Reading (dBµV) | Correction factor (dB/m) | Noise level (dBµV/m) | Antenna height (m) | Turn table angle (°) | Limit (dBµV/m) | Margin (dB) | Detector Mode |
|---|---|---|---|---|---|---|---|---|
| 1016.20 | 74.7 | -13.1 | 61.6 | 1.4 | 346 | 74.0 | 12.4 | PK |
| 1016.20 | 53.5 | -13.1 | 40.4 | 1.4 | 346 | 54.0 | 13.6 | AV |
| 1300.02 | 74.7 | -12.3 | 62.4 | 1.0 | 217 | 74.0 | 11.6 | PK |
| 1300.02 | 54.2 | -12.3 | 41.9 | 1.0 | 217 | 54.0 | 12.1 | AV |
| 1498.89 | 73.1 | -12.9 | 60.2 | 1.0 | 340 | 74.0 | 13.8 | PK |
| 1498.89 | 60.3 | -12.9 | 47.4 | 1.0 | 340 | 54.0 | 6.6 | AV |
| 1875.02 | 67.3 | -11.2 | 56.1 | 1.2 | 216 | 74.0 | 17.9 | PK |
| 1875.02 | 54.7 | -11.2 | 43.5 | 1.2 | 216 | 54.0 | 10.5 | AV |



### 3.2.3 Test Setup Photographs (EUT)

Card Print An USB2.0 mode

Card Print An Ethernet mode



# 4. Test facility

## 4.1 Test Instruments

### 4.1.1 Conducted Emissions

| Product Name | Manufacturer | Model Number | Serial Number | Calibration Date | Due Date |
|---|---|---|---|---|---|
| Spectrum Analyzer | Hewlett Packard | 8567A | 2816A16138 | 2012/03/22 | 2013/03/31 |
| Receiver | Kyoritsu | KNM-2402 | 4N-302-1 | 2013/01/16 | 2014/01/31 |
| Sheath Current Absorber | TÜV SÜD Ohtama, Ltd. | None | None | 2012/10/30 | 2013/10/31 |
| Attenuator | TÜV SÜD Ohtama, Ltd. | None | None | 2012/10/01 | 2013/10/31 |
| LISN | Rohde&Schwarz | ESH3-Z5 | 892475/013 | 2012/07/12 | 2013/07/31 |
| RF Switch System | TÜV SÜD Ohtama, Ltd. | #1 RF Switch System | None | 2012/07/14 | 2013/07/31 |
| Soft Ware | TÜV SÜD Ohtama, Ltd. | emission measurement program | toemc02-1.4 | - | - |

### 4.1.2 Radiated Electric-Field Emissions

| Product Name | Manufacturer | Model Number | Serial Number | Calibration Date | Due Date |
|---|---|---|---|---|---|
| Spectrum Analyzer | Hewlett Packard | 8567A | 2816A16138 | 2012/03/22 | 2013/03/31 |
| Signal Analyzer | Agilent Technologies | N9010A | MY49060619 | 2012/08/06 | 2013/08/31 |
| Receiver | Rohde&Schwarz | ESVS10 | 849231/007 | 2012/07/05 | 2013/07/31 |
| Pre-Amplifier | Hewlett Packard | 8447D | 2944A08785 | 2012/07/14 | 2013/07/31 |
| Pre-Amplifier | Toyo | TPA0108-40 | 632 | 2012/10/04 | 2013/10/31 |
| Attenuator | Hewlett Packard | 8491A | 37364 | 2012/07/14 | 2013/07/31 |
| Bilog Antenna | Schwarzbeck | VULB9160 | 9160-3222 | 2012/06/15 | 2013/06/30 |
| Horn Antenna | Schwarzbeck | BBHA9120B | 475 | 2012/11/22 | 2013/11/30 |
| RF Switch System | TÜV SÜD Ohtama, Ltd. | #1 RF Switch System | None | 2012/07/14 | 2013/07/31 |
| Soft Ware | TÜV SÜD Ohtama, Ltd. | emission measurement program | toemc02-1.4 | - | - |

## 4.2 Test equipment

| Dimension | Material | Measurement |
|---|---|---|
| 1.5m (W) X 0.8m (H) X 1.0m (D) | Wood | Conducted Emissions |
| 1.5m (W) X 0.8m (H) X 1.0m (D) | polystyrene | Radiated Electric-Field Emissions |

## 4.3 Normalized Site Attenuation

| Site Name | Laboratory | Calibration Date | Due Date |
|---|---|---|---|
| Open site No.1 | Ashigawa Laboratory | 2012/05/02 | 2013/05/31 |

# Annex A (Miscellaneous Information)

## A.1 Test Locations

Unless otherwise described in this report, the tests were carried out at the following locations:

TÜV SÜD Ohtama, Ltd., Ashigawa Laboratory
1661 Ohshuku, Ashigawa-cho, Fuefuki-shi, Yamanashi-ken, Japan
TEL: +81-55-298-2141
FAX: +81-55-298-2125

VLAC Attestation No.: VLAC-018-2
VCCI Registration No.:
No.1 Open test site A-0011
No.2 Open test site A-0011
No.3 Open test site R-658 C-675 T-1685 G-5

TÜV SÜD Ohtama, Ltd., Kamikuishiki Laboratory
3415 Furuseki-machi, Kofu-shi, Yamanashi-ken, Japan
TEL: +81-555-88-2580
FAX: +81-555-88-2588

## A.2 Uncertainty

Emissions

| **Measurement** | **Uncertainty** ($k$ = 2) |
|---|---|
| | $U_{lab}$ |
| RF Conducted Emissions (150kHz-30MHz ) | |
| AMN | 3.5dB |
| Radiated Electromagnetic Field | |
| 30-1000MHz | 5.0dB |
| 1-18GHz | 5.3dB |

Tests not listed above
Uncertainty for other tests which are reported in this test report, if any, would be available on request.

Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

# Annex B (Description of Test Method)

Unless otherwise described in this report, tests are carried out using the methods which are described in the applied standards and summarized in this section.

Specifically for 47 CFR 15 Subpart B, section 6 of ANSI C63.4-2003 is to be used for EUT arrangements and operations, and section 8 of the standard is to be used for radiated emissions measurement procedures.

## B.1 Conducted Emissions (AC Main and Other Terminals)

Table-top EUT is placed on a wooden table so that one side (rear or bottom) of the EUT is separated 0.4 m from the reference plane (metallic wall or ground plane), and floor-standing EUT is placed on the ground plane.
Mains to the EUT is supplied through a LISN, and mains to non-EUT components, if any, are supplied through yet another LISN(s).
If LISN is not applicable, mains would be supplied directly and a voltage probe would be used instead for the measurement.
For each current-carrying conductors or terminals to be measured, a spectrum analyzer is used to pre-scan the emissions.
For each of the significant emissions detected, the maximum signal level is read using a measuring receiver having CISPR 16 quasi-peak (QP) and average (AV) detector function and 9 kHz nominal bandwidth.
Then, appropriate correction factor —consists of transducer (LISN or voltage probe) factor and transmission loss (due to the attenuator, filter and/or transient suppressor, if any, and the cable) in the system— is applied to the receiver reading to calculate the corresponding emission level.
*For example, if reading on the receiver is 33.0 dBμV, the transducer factor is 0.5 dB, and transmission loss (attenuation) in the coaxial cable and the attenuator is 10.5 dB, the emission level is calculated as:*
*33.0 dBμV + 0.5 dB + 10.5 dB = 44.0 dBμV.*
Finally, the calculated emission level is compared with the upper limit specified in the standard.
Actual measurement will be carried out according to the appropriate edition of CISPR 16-2-1, CISPR 22, and ANSI C63.4 and/or other standards whichever applicable.
Specifically for 47 CFR 15 Subpart B, section 6 of ANSI C63.4-2003 is to be used for EUT arrangements and operations, and section 8 of the standard is to be used for radiated emissions measurement procedures.

## B.2 Radiated Electric-Field Emissions (30 MHz to 1000MHz)

EUT is placed on a turn-table in a test site, on a wooden table 0.8 m height or on the floor unless otherwise specified in the standard.
Receiving antenna ---usually biconical, log-periodic or biconical/log-periodic hybrid---is positioned at the specified distance from the EUT.
For each polarization (horizontal and vertical), a spectrum analyzer is used to pre-scan the emissions while rotating the turn-table.
For each of the significant electromagnetic field detected, the test personnel discriminates EUT's emissions from the ambient noises.
For each of the significant emissions, maximum level of the emission is searched while rotating the turn-table and varying the antenna height between 1 m and 4 m, and the maximum signal level is read using a measuring receiver having CISPR 16 quasi-peak (QP) detector function and 120 kHz nominal bandwidth.
Then, appropriate correction factor —consists of antenna factor, amplifier gain and transmission loss (due to the attenuator and the cable loss) in the system— is applied to the receiver reading to calculate the corresponding field strength.
*For example, if reading on the receiver is 33.0 dBµV, the antenna factor is 9.4 dB (1/m), the amplifier gain is 25.6 dB, and transmission loss (attenuation) in the coaxial cable and the attenuator is 6.5 dB, the field strength is calculated as: 33.0 dBµV + 9.4 dB (1/m) - 25.6 dB + 6.5 dB = 23.3 dBµV/m.*
Finally, the calculated field strength is compared with the upper limit specified in the standard.
Actual measurement will be carried out according to the appropriate edition of CISPR 16-2-3, CISPR 22, and ANSI C63.4 and/or other standards whichever applicable.
Specifically for 47 CFR 15 Subpart B, section 6 of ANSI C63.4-2003 is to be used for EUT arrangements and operations, and section 8 of the standard is to be used for radiated emissions measurement procedures.

## B.3 Radiated Electric-Field Emissions above 1000MHz

EUT is placed on a turn-table in a test site, on a wooden table 0.8 m height or on the floor unless otherwise specified in the standard.
Receiving antenna ---usually double ridge waveguide horn or standard horn--- is positioned at the specified distance from the EUT.
For each polarization (horizontal and vertical), a spectrum analyzer is used to pre-scan the emissions while rotating the turn-table.
For each of the significant electromagnetic field detected, the test personnel discriminates EUT's emissions from the ambient noises.
For each of the significant emissions, maximum level of the emission is searched while rotating the turn-table and varying the antenna height if it is required, and the maximum signal level is read using a spectrum analyzer or a measuring receiver having peak detector function and 1 MHz nominal bandwidth, unless otherwise specified in the standard. To obtain average readings with spectrum analyzers, video averaging (usually with VBW = 10 Hz) may be used.
As specified in the applicable standard, the antenna height would be (1) varied between 1 m and 4 m, or (2) varied so that the whole height of the EUT is covered by the main lobe of the receiving antenna, or (3) fixed to the approximate radiation center of the EUT.
Then, appropriate correction factor ---consists of antenna factor, amplifier gain and transmission loss (due to the attenuator and the cable loss) in the system--- is applied to the spectrum analyzer/receiver reading to calculate the corresponding field strength, and the result is compared with the upper limit specified in the standard.
Actual measurement will be carried out according to the appropriate edition of CISPR 16-2-3, CISPR 22, ANSI C63.4 and/or other standards whichever applicable.
Specifically for 47 CFR 15 Subpart B, section 6 of ANSI C63.4-2003 is to be used for EUT arrangements and operations, and section 8 of the standard is to be used for radiated emissions measurement procedures.