# FCC TEST REPORT

according to

**47 CFR FCC Rules and Regulations Part 15 Subpart B,**

**Class A Digital Device and Canada Standard ICES-003 Issue 5**

| | | |
|---|---|---|
| Equipment | : | Managed Switch, 24-port Gigabit PoE+, 4-port 1G/10G SFP+ |
| Model No. | : | SM24TAT4XA |
| Filing Type | : | Verification |
| Applicant | : | **Transition Networks, Inc.** 10900 Red Circle Drive Minnetonka, MN 55343 USA |

## Statement

- The test result refers exclusively to the test presented test model / sample.
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- Certificate or Test Report must not be used by the applicant to claim the product in this test report endorsement by TAF or any agency of U.S. government.

***SPORTON International Inc.***

*6F, No. 106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.*

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## History of this test report

| Report No. | Version | Issue Date | Description |
|---|---|---|---|
| FV371011-01 | Rev.01 | Nov. 07, 2013 | Initial issue of report |
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Certificate No. : FV371011-01

# CERTIFICATE OF COMPLIANCE

according to

**47 CFR FCC Rules and Regulations Part 15 Subpart B,**

**Class A Digital Device and Canada Standard ICES-003 Issue 5**

Equipment : Managed Switch, 24-port Gigabit PoE+, 4-port 1G/10G SFP+

Model No. : SM24TAT4XA

Applicant : **Transition Networks, Inc.**
10900 Red Circle Drive Minnetonka, MN 55343 USA

I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 - 2009** and the energy emitted by this equipment was ***passed*** **CISPR PUB. 22** and **FCC Part 15** and **Canada Standard ICES-003** in both radiated and conducted emission **Class A** limits.
The product sample received on Jul. 12, 2013 and completely tested on ***Jul. 31, 2013*** at **SPORTON International Inc.** LAB.

Jack Deng
Engineering Manager

***SPORTON International Inc.***

*6F, No. 106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.*

# 1. General Description of Equipment under Test

## 1.1. Applicant

Transition Networks, Inc.

10900 Red Circle Drive Minnetonka, MN 55343 USA

## 1.2. Manufacturer

Same as 1.1

## 1.3. Basic Description of Equipment under Test

| | | |
|---|---|---|
| Equipment | : | Managed Switch, 24-port Gigabit PoE+, 4-port 1G/10G SFP+ |
| Model No. | : | SM24TAT4XA |
| Fiber Cable x2 | : | Non-Shielded, 2 m |
| RJ45 Cable x24 | : | Non-Shielded, 1 m |
| RJ45 Cable x2 | : | Non-Shielded, 20 m |
| RS232 Cable | : | D-Shielded, 1.8 m |
| Power Supply Type | : | From Switching Power Supply |
| AC Power Cord | : | Non-Shielded, 1.8 m, 3 pin |

## 1.4. Feature of Equipment under Test

Please refer to user manual.

## 1.5. Modification of EUT

None.

# 2. Test Configuration of Equipment under Test

## 2.1. Test Manner

a. During testing, the personal computer and equipment positions were varied according to ANSI C63.4-2009 and configuration operated in a manner which tended to maximize its emission characteristics in a typical application.

b. The equipment under test were performed the following test modes:

| Test Items | Function Type |
|---|---|
| **AC Conducted Emission** | Mode 1. LAN 1Gbps |
| **Radiated Emissions** | Mode 1. LAN 1Gbps<br>**< below 1GHz & above 1GHz >** |

c. Frequency range investigated: Conduction 150 kHz to 30 MHz, Radiation 30 MHz to 6,000 MHz.

## 2.2. Description of Test System

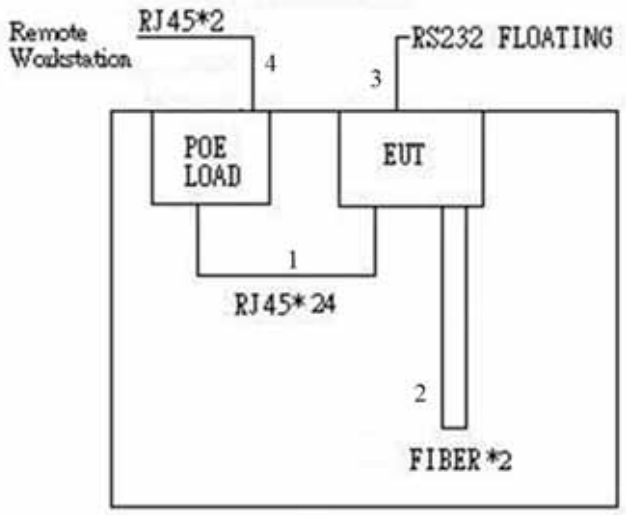
**< EMI ><Conducted and Radiated below 1GHz>**

| No. | Peripheral | Manufacturer | Model Number | FCC ID | Cable / Spec. Description |
|---|---|---|---|---|---|
| **For Local** | | | | | |
| 1 | POE LOAD | NA | - | - | - |
| 2 | FIBER MODULE *4 | RUBY | 21CFR | - | - |
| **For Remote** | | | | | |
| - | Personal Computer *2 | DELL | DCTA | DoC | - |
| - | LCD Monitor *2 | DELL | E198WFPF | DoC | DVI Cable, D-Shielded, 1.8m |
| - | Keyboard *2 | DELL | SK-8175 | DoC | USB Cable, AL-F-Shielded, 1.8m |
| - | Mouse *2 | DELL | MOC5UO | DoC | USB Cable, AL-F-Shielded, 1.8m |

**< EMI ><Radiated above 1GHz>**

| No. | Peripheral | Manufacturer | Model Number | FCC ID | Cable / Spec. Description |
|---|---|---|---|---|---|
| **For Local** | | | | | |
| 1 | POE LOAD | NA | - | - | - |
| 2 | FIBER MODULE *4 | RUBY | 21CFR | - | - |
| **For Remote** | | | | | |
| - | Personal Computer *2 | DELL | DCTA | DoC | - |
| - | LCD Monitor *2 | DELL | E198WFPF | DoC | DVI Cable, D-Shielded, 1.8m |
| - | Keyboard *2 | DELL | SK-8175 | DoC | USB Cable, AL-F-Shielded, 1.8m |
| - | Mouse *2 | DELL | MOC5UO | DoC | USB Cable, AL-F-Shielded, 1.8m |

## 2.3. Connection Diagram of Test System




1. These RJ45 cables are connected from the EUT to the support unit 1.
2. These Fiber cables are loopback.
3. The RS232 cable is floating.
4. These RJ45 cables are connected from the support unit 1 to the remote workstation.

Note: Above support unit on behalf of the meaning, please refer to section 2.2.

# 3. Test Software

During the test, the program under Win XP from remote workstation was executed:

- Executed "Ping.exe" to link with the EUT to maintain the connection via RJ45 cable.

# 4. General Information of Test

## 4.1. Test Facility

**Test Site：SPORTON INTERNATIONAL INC.**

Test Site Location : No. 3, Lane 238, Kang Lo Street, Nei Hwu District, Taipei 11424, Taiwan, R.O.C.
TEL : 886-2-2631-4739
FAX : 886-2-2631-9740

Test Site No. : CO01-NH, OS02-NH

Test Site Location : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiag, Tao Yuan Hsien, Taiwan, R.O.C.
TEL : 886-3-327-3456
FAX : 886-3-318-0055

Test Site No. : 03CH04-HY

## 4.2. Uncertainty of Test Site

| Test Items | Test Site No. | Uncertainty | Remark |
|---|---|---|---|
| Conducted Emissions | CO01-NH | ± 2.62dB | Confidence levels of 95% |
| Radiated Emissions below 1GHz | OS02-NH | ± 3.04dB | Confidence levels of 95% |
| Radiated Emissions above 1GHz | 03CH04-HY | ± 4.78dB | Confidence levels of 95% |

## 4.3. Test Voltage

AC 120V / 60Hz

## 4.4. Measurement Procedure

ANSI C63.4-2009

## 4.5. Test in Compliance with

CISPR PUB. 22 and FCC Part 15 and Canada Standard ICES-003 Issue 5

15.107 Conducted Emission

15.109 Radiated Emission

## 4.6. Frequency Range Investigated

a. Conducted emission test: from 150 kHz to 30 MHz

b. Radiated emission test: from 30 MHz to 6,000 MHz

## 4.7. Test Distance

a. The test distance of radiated emission test from antenna to EUT is 10 M (from 30MHz~1000MHz).

b. The test distance of radiated emission test from antenna to EUT is 3 M (from 1GHz~ 6GHz).

# 5. Test of Conducted Powerline

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz and return leads of the EUT according to the methods defined in ANSI C63.4-2009 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meter above the ground plane as shown in section 5.3. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

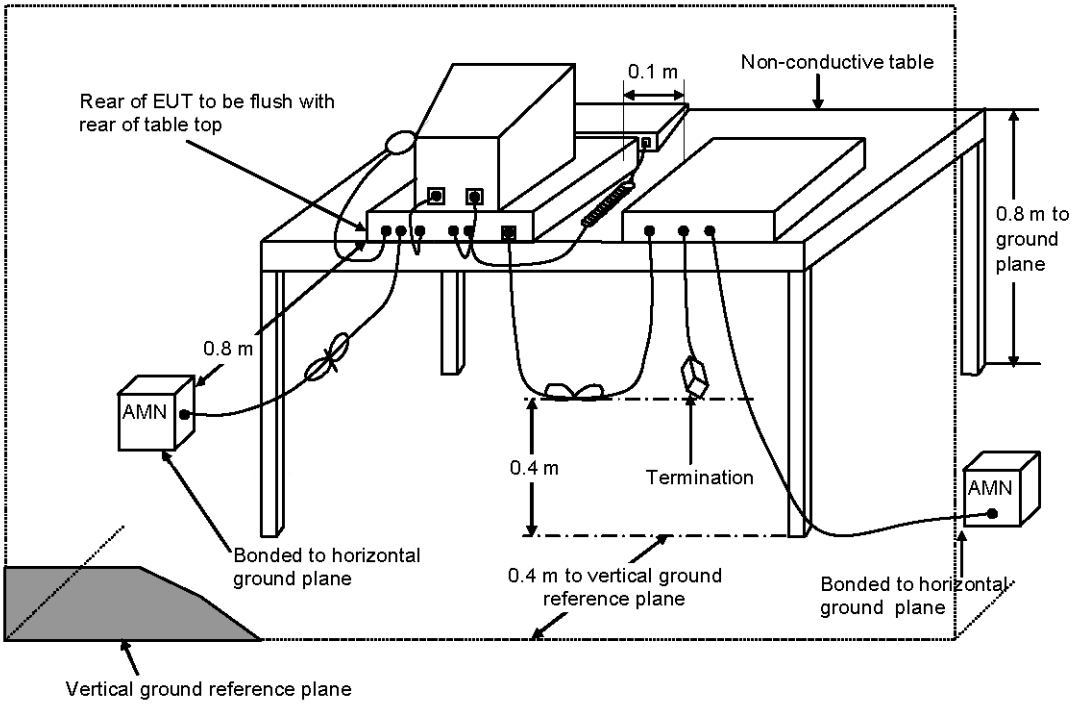
## 5.1. Description of Major Test Instruments

| Test Receiver Parameters | Setting |
|---|---|
| Test Receiver | R&S ESCS 30 |
| Attenuation | 10 dB |
| Start Frequency | 0.15 MHz |
| Stop Frequency | 30 MHz |
| IF Bandwidth | 9 kHz |
| Signal Input | 9 kHz - 2.75 GHz |

## 5.2. Test Procedures

a. The EUT was warmed up for 15 minutes before testing started.
b. The EUT was placed on a desk 0.8 meters height from the metal ground plane and 0.4 meter from the conducting wall of the shielding room and it was kept at least 0.8 meters from any other grounded conducting surface.
c. Connect EUT to the power mains through a line impedance stabilization network (LISN).
d. All the support units are connect to the other LISN.
e. The LISN provides 50 ohm coupling impedance for the measuring instrument.
f. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
g. Both sides of AC line were checked for maximum conducted interference.
h. The frequency range from 150 kHz to 30 MHz was searched.
i. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

## 5.3. Typical Test Setup Layout of Conducted Powerline

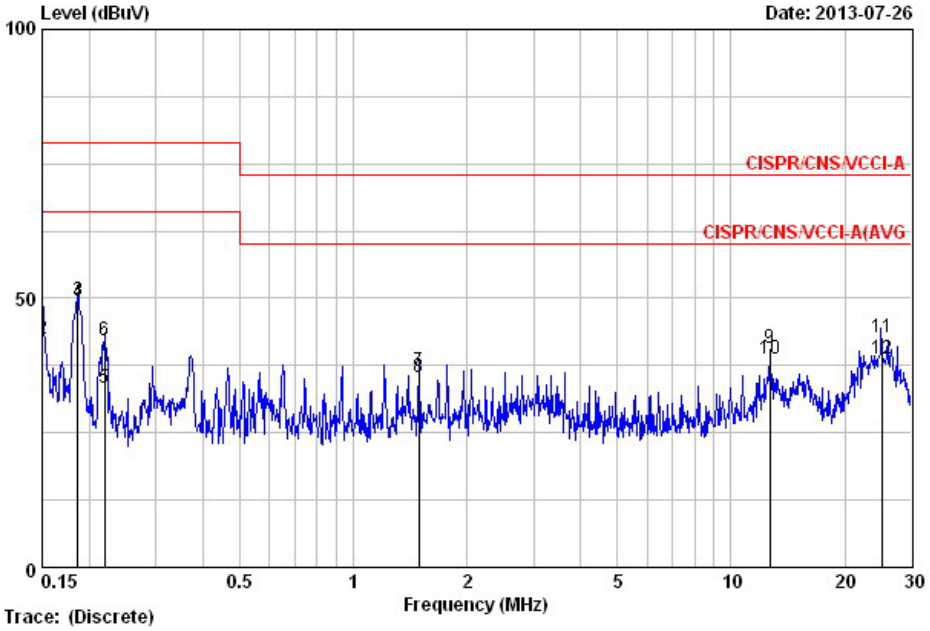



a. AMN is 80 cm from the EUT and at least 80 cm from other units and other metal planes.
b. EUT is connected to one artificial mains network (AMN).
c. All other units of a system are powered from a second AMN. A multiple outlet strip can be used for multiple mains cords.
d. Rear of EUT to be flushed with rear of table top.
e. Peripherals shall be placed at a distance of 10 cm from each other and from the controller, except for the monitor which, if this is an acceptable installation practice, shall be placed directly on the top of the controller.
f. If cables, which hang closer than 40 cm to the horizontal metal ground plane, cannot be shortened to appropriate length, the excess shall be folded back and forth forming a bundle 30 cm to 40 cm long.
g. Mains cords and signal cables shall be positioned for their entire lengths, as far as possible, at 40 cm from the vertical reference plane.
h. Cables of hand operated devices, such as keyboards, mice, etc. shall be placed as for normal usage.

## 5.4. Test Result of AC Powerline Conducted Emission

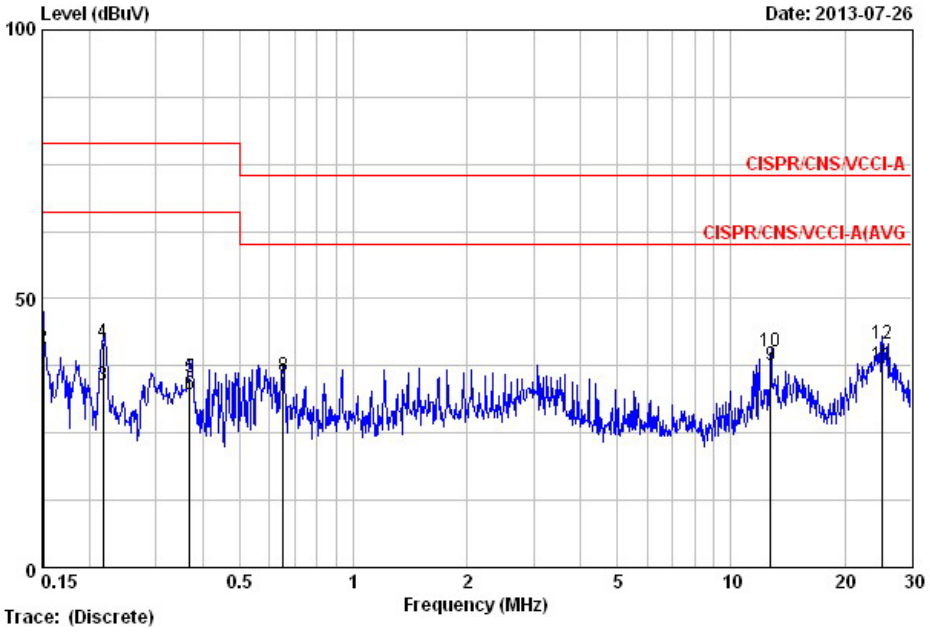
| **Test Mode** | Mode 1 | **Test Site No.** | CO01-NH |
|---|---|---|---|
| **Test Frequency** | 0.15 MHz ~ 30 MHz | **Test Engineer** | Willy |
| **Temperature** | 27 ℃ | **Relative Humidity** | 50 % |
| Note: 1. Corrected Reading (dBμV) = LISN Factor + Cable Loss + Read Level = Level | | | |
| 2. All emissions not reported here are more than 10 dB below the prescribed limit. | | | |
| **■ The test was passed at the minimum margin that marked by the frame in the following data** | | | |

**Line**




| | Freq | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV | dBuV | dB | dB | |
| 1 | 0.150 | 47.39 | -31.61 | 79.00 | 37.12 | 10.17 | 0.10 | QP |
| 2 | 0.150 | 42.45 | -23.55 | 66.00 | 32.18 | 10.17 | 0.10 | AVERAGE |
| 3 | 0.186 | 49.57 | -29.43 | 79.00 | 39.30 | 10.17 | 0.10 | QP |
| 4 | 0.186 | 49.26 | -16.74 | 66.00 | 38.99 | 10.17 | 0.10 | AVERAGE |
| 5 | 0.220 | 33.34 | -32.66 | 66.00 | 23.07 | 10.17 | 0.10 | AVERAGE |
| 6 | 0.220 | 42.18 | -36.82 | 79.00 | 31.91 | 10.17 | 0.10 | QP |
| 7 | 1.487 | 36.48 | -36.52 | 73.00 | 26.12 | 10.20 | 0.16 | QP |
| 8 | 1.487 | 35.32 | -24.68 | 60.00 | 24.96 | 10.20 | 0.16 | AVERAGE |
| 9 | 12.655 | 40.80 | -32.20 | 73.00 | 30.23 | 10.37 | 0.20 | QP |
| 10 | 12.655 | 38.65 | -21.35 | 60.00 | 28.08 | 10.37 | 0.20 | AVERAGE |
| 11 | 25.031 | 42.65 | -30.35 | 73.00 | 31.72 | 10.53 | 0.40 | QP |
| 12 | 25.031 | 38.85 | -21.15 | 60.00 | 27.92 | 10.53 | 0.40 | AVERAGE |

**Neutral**




| | Freq | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV | dBuV | dB | dB | |
| 1 | 0.151 | 44.20 | -34.80 | 79.00 | 33.96 | 10.14 | 0.10 | QP |
| 2 | 0.151 | 40.62 | -25.38 | 66.00 | 30.38 | 10.14 | 0.10 | AVERAGE |
| 3 | 0.217 | 34.03 | -31.97 | 66.00 | 23.79 | 10.14 | 0.10 | AVERAGE |
| 4 | 0.217 | 41.86 | -37.14 | 79.00 | 31.62 | 10.14 | 0.10 | QP |
| 5 | 0.369 | 35.41 | -43.59 | 79.00 | 25.17 | 10.14 | 0.10 | QP |
| 6 | 0.369 | 32.18 | -33.82 | 66.00 | 21.94 | 10.14 | 0.10 | AVERAGE |
| 7 | 0.651 | 34.17 | -25.83 | 60.00 | 23.92 | 10.15 | 0.10 | AVERAGE |
| 8 | 0.651 | 35.75 | -37.25 | 73.00 | 25.50 | 10.15 | 0.10 | QP |
| 9 | 12.749 | 37.67 | -22.33 | 60.00 | 27.12 | 10.35 | 0.20 | AVERAGE |
| 10 | 12.749 | 40.06 | -32.94 | 73.00 | 29.51 | 10.35 | 0.20 | QP |
| 11 | 25.128 | 37.69 | -22.31 | 60.00 | 26.74 | 10.55 | 0.40 | AVERAGE |
| 12 | 25.128 | 41.54 | -31.46 | 73.00 | 30.59 | 10.55 | 0.40 | QP |

# 6. Test of Radiated Emission

Radiated emissions from 30 MHz to 6,000 MHz were measured with a bandwidth of 120 kHz for 30 MHz to 1000 MHz and 1 MHz for above 1GHz according to the methods defines in ANSI C63.4-2009. The EUT was placed on a nonmetallic stand, 0.8 meter above the ground plane, as shown in section 6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

## 6.1. Description of Major Test Instruments

***For Below 1GHz***

| Amplifier Parameters | Setting |
|---|---|
| Amplifier | (BURGEON BPA-530 ) |
| RF Gain | 30 dB |
| Signal Input | 0.01 MHz - 3 GHz |

| Test Receiver Parameters | Setting |
|---|---|
| Test Receiver | ( R&S ESCI ) |
| Resolution Bandwidth | 120 kHz |
| Frequency Band | 9 kHz - 3 GHz |
| Quasi-Peak Detector | ON for Quasi-Peak Mode |
| | OFF for Peak Mode |

***For above 1GHz***

| Amplifier Parameters | Setting |
|---|---|
| Amplifier | AGILENT 8449B |
| RF Gain | 35 dB |
| Signal Input | 1 GHz - 26.5 GHz |

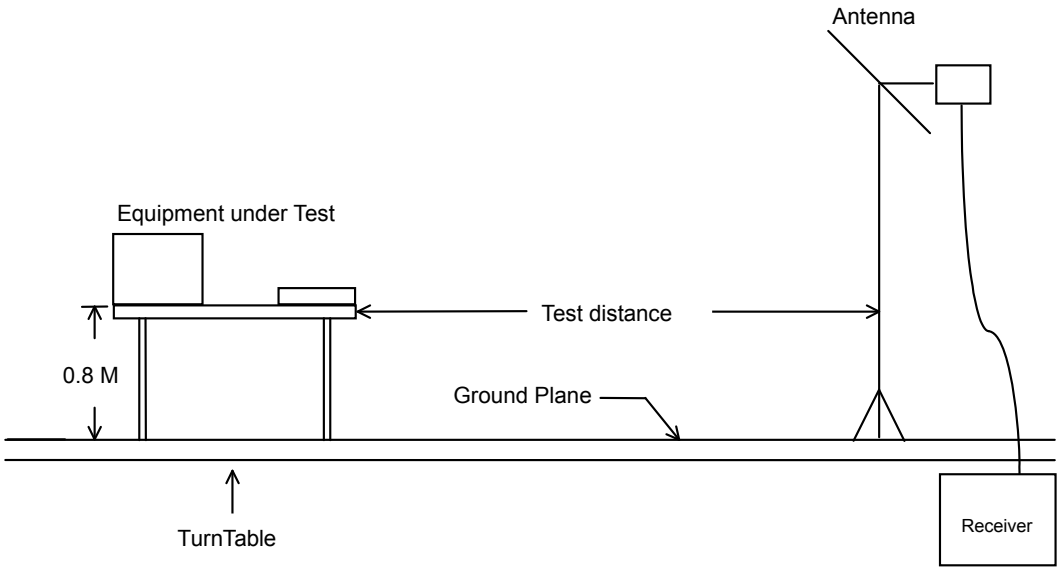
| Spectrum Analyzer Parameters | Setting |
|---|---|
| Spectrum Analyzer | R&S FSP40 |
| Attenuation | 10 dB |
| Start Frequency | 1 GHz |
| Stop Frequency | 6 GHz |
| Resolution Bandwidth | 1 MHz |
| Video Bandwidth | 3 MHz |
| Signal Input | 9 kHz - 40 GHz |

## 6.2. Test Procedures

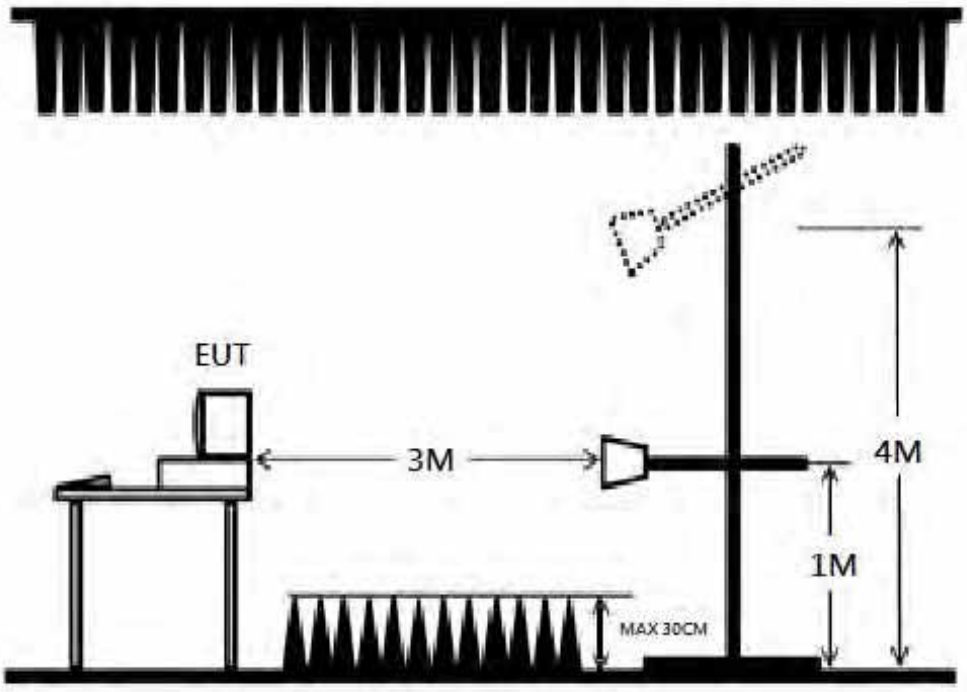
a. The EUT was placed on a rotatable table top 0.8 meter above ground.
b. The EUT was set 3m(above 1GHz)/10m(below 1GHz) from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.
c. The table was rotated 360 degrees to determine the position of the highest radiation.
d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
h. The FCC Part 15.109 (g) permit parties seeking to authorize a digital device to choose to demonstrate that the device complies with either the Part 15 standards or the international standards found in Publication 22 of the International Special Committee on Radio Interference (CISPR).
i. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

## 6.3. Typical Test Setup Layout of Radiated Emission

***For Below 1GHz***



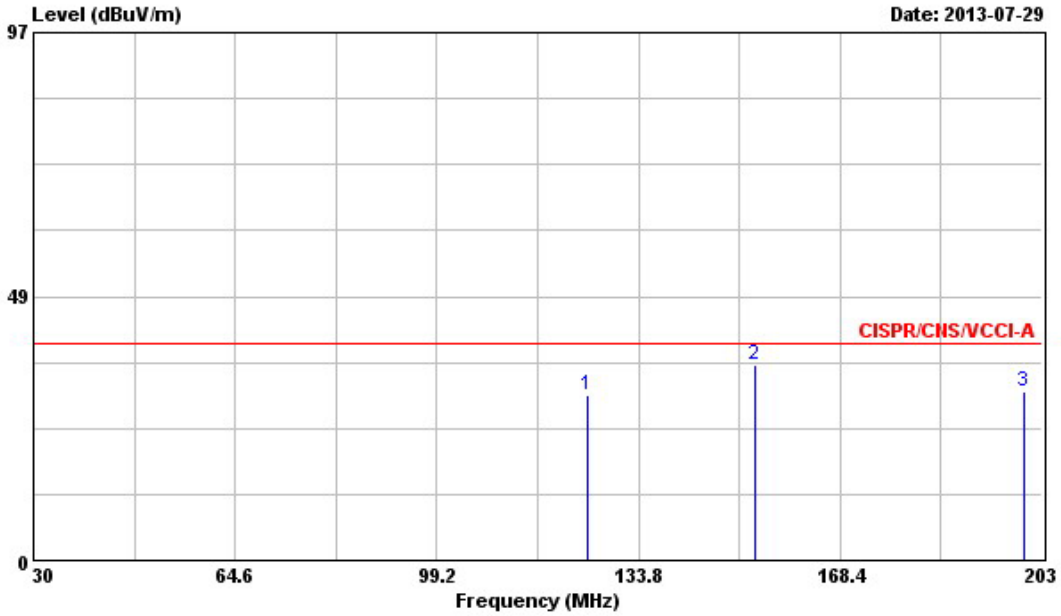

***For above 1GHz***



## 6.4. Test Result of Radiated Emission for Below 1GHz

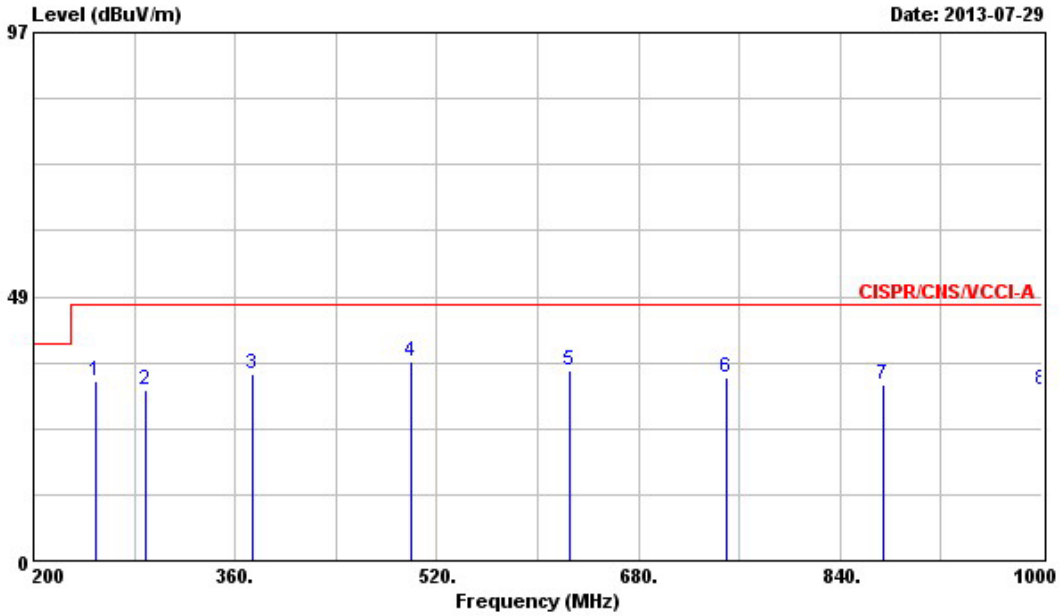
| **Test mode** | Mode 1 | **Test Site No.** | OS02-NH |
|---|---|---|---|
| **Test frequency** | 30 MHz ~ 1000 MHz | **Test Engineer** | Chas |
| **Temperature** | 29 ℃ | **Relative Humidity** | 53 % |
| Note: 1. Emission level (dBμV/m) = 20 log Emission level (μV/m) | | | |
| 2. Corrected Reading : Antenna Factor + Cable Loss + Read Level – Preamp Factor = Level | | | |
| **■ The test was passed at the minimum margin that marked by the frame in the following data** | | | |

**Vertical**



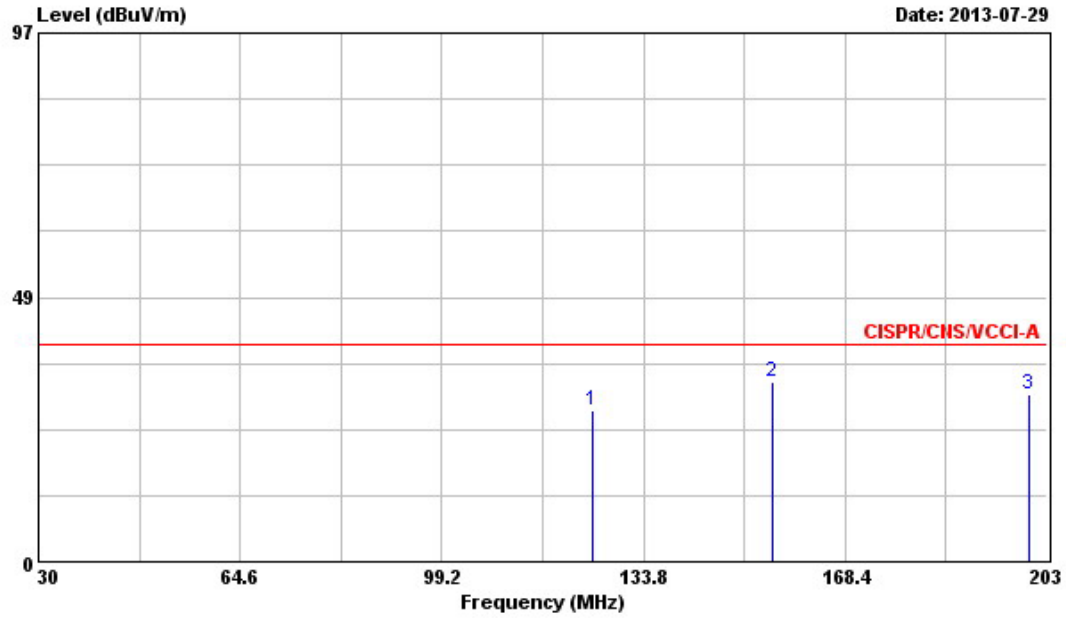

| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Remark | Ant Pos | Table Pos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | | cm | deg |
| 1 | 125.150 | 30.29 | -9.71 | 40.00 | 48.13 | 12.30 | 1.40 | 31.54 | Peak | --- | --- |
| 2 @ | 153.870 | 35.89 | -4.11 | 40.00 | 55.32 | 10.47 | 1.57 | 31.47 | Peak | 100 | 180 |
| 3 | 200.060 | 31.01 | -8.99 | 40.00 | 51.42 | 9.18 | 1.75 | 31.34 | Peak | --- | --- |

**Vertical**



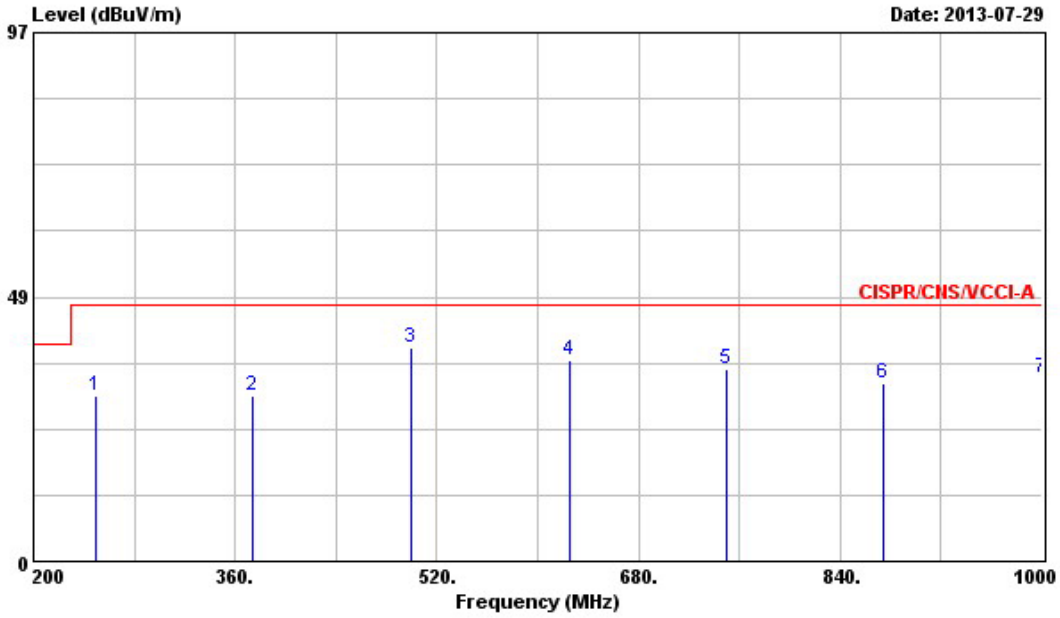

| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Remark | Ant Pos | Table Pos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | | cm | deg |
| 1 | 249.600 | 32.92 | -14.08 | 47.00 | 49.99 | 12.28 | 1.95 | 31.30 | Peak | --- | --- |
| 2 | 288.800 | 31.31 | -15.69 | 47.00 | 47.41 | 13.08 | 2.08 | 31.26 | Peak | --- | --- |
| 3 | 374.400 | 34.25 | -12.75 | 47.00 | 47.97 | 15.16 | 2.44 | 31.32 | Peak | --- | --- |
| 4 | 499.200 | 36.67 | -10.33 | 47.00 | 47.61 | 17.54 | 2.84 | 31.32 | Peak | --- | --- |
| 5 | 624.800 | 35.08 | -11.92 | 47.00 | 44.25 | 18.89 | 3.23 | 31.29 | Peak | --- | --- |
| 6 | 749.600 | 33.55 | -13.45 | 47.00 | 41.36 | 19.79 | 3.63 | 31.23 | Peak | --- | --- |
| 7 | 874.400 | 32.48 | -14.52 | 47.00 | 38.54 | 21.08 | 3.94 | 31.08 | Peak | --- | --- |
| 8 | 1000.000 | 31.32 | -15.68 | 47.00 | 35.53 | 22.36 | 4.33 | 30.90 | Peak | --- | --- |

**Horizontal**




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Remark | Ant Pos | Table Pos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | | cm | deg |
| 1 | 125.150 | 27.60 | -12.40 | 40.00 | 45.44 | 12.30 | 1.40 | 31.54 | Peak | --- | --- |
| 2 | 155.940 | 32.86 | -7.14 | 40.00 | 52.34 | 10.41 | 1.57 | 31.46 | Peak | --- | --- |
| 3 | 200.060 | 30.74 | -9.26 | 40.00 | 51.15 | 9.18 | 1.75 | 31.34 | Peak | --- | --- |

**Horizontal**

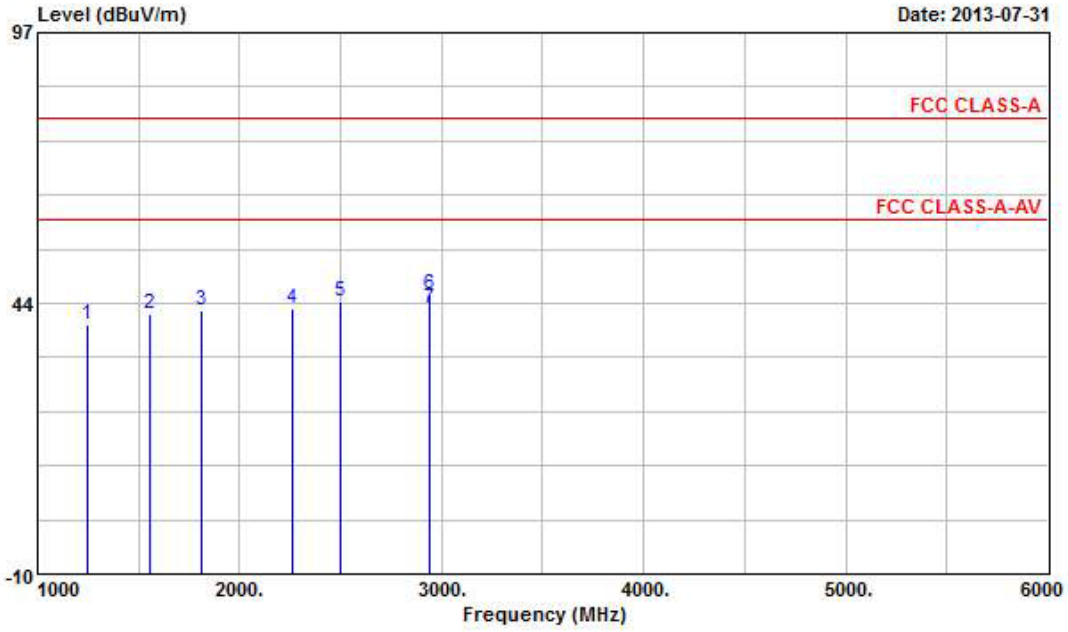



| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Remark | Ant Pos | Table Pos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | | cm | deg |
| 1 | 249.600 | 30.33 | -16.67 | 47.00 | 47.40 | 12.28 | 1.95 | 31.30 | Peak | --- | --- |
| 2 | 374.400 | 30.41 | -16.59 | 47.00 | 44.13 | 15.16 | 2.44 | 31.32 | Peak | --- | --- |
| 3 | 499.200 | 39.30 | -7.70 | 47.00 | 50.24 | 17.54 | 2.84 | 31.32 | Peak | --- | --- |
| 4 | 624.800 | 36.90 | -10.10 | 47.00 | 46.07 | 18.89 | 3.23 | 31.29 | Peak | --- | --- |
| 5 | 749.600 | 35.31 | -11.69 | 47.00 | 43.12 | 19.79 | 3.63 | 31.23 | Peak | --- | --- |
| 6 | 874.400 | 32.65 | -14.35 | 47.00 | 38.71 | 21.08 | 3.94 | 31.08 | Peak | --- | --- |
| 7 | 1000.000 | 33.65 | -13.35 | 47.00 | 37.86 | 22.36 | 4.33 | 30.90 | Peak | --- | --- |

## 6.5. Test Result of Radiated Emission for Above 1GHz

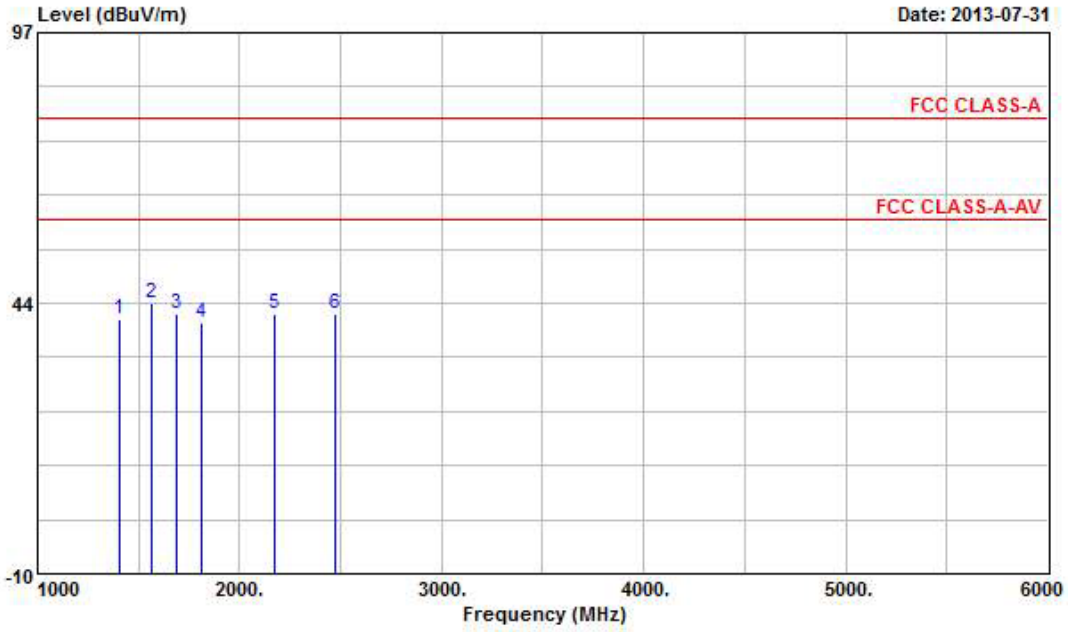
| **Test mode** | Mode 1 | **Test Site No.** | 03CH04-HY |
|---|---|---|---|
| **Test frequency** | 1 GHz ~ 6 GHz | **Test Engineer** | Kevin |
| **Temperature** | 22 ℃ | **Relative Humidity** | 53 % |
| Note: 1. Emission level (dBμV/m) = 20 log Emission level (μV/m) | | | |
| 2. Corrected Reading : Antenna Factor + Cable Loss + Read Level – Preamp Factor = Level | | | |
| **■ The test was passed at the minimum margin that marked by the frame in the following data** | | | |

**Vertical**




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Ant Pos | Table Pos | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | cm | deg | |
| 1 | 1246.000 | 39.44 | -40.56 | 80.00 | 45.89 | 25.19 | 34.14 | 2.49 | --- | --- | Peak |
| 2 | 1558.000 | 41.25 | -38.75 | 80.00 | 47.08 | 25.06 | 33.73 | 2.84 | --- | --- | Peak |
| 3 | 1812.000 | 41.98 | -38.02 | 80.00 | 47.11 | 25.35 | 33.60 | 3.13 | --- | --- | Peak |
| 4 | 2260.000 | 42.59 | -37.41 | 80.00 | 44.79 | 27.97 | 33.76 | 3.59 | --- | --- | Peak |
| 5 | 2500.000 | 43.68 | -36.32 | 80.00 | 46.28 | 27.55 | 33.99 | 3.84 | --- | --- | Peak |
| 6 | 2940.000 | 45.15 | -34.85 | 80.00 | 46.67 | 28.45 | 34.28 | 4.31 | --- | --- | Peak |
| 7 @ | 2940.000 | 42.60 | -17.40 | 60.00 | 44.12 | 28.45 | 34.28 | 4.31 | 100 | 163 | Average |

**Horizontal**



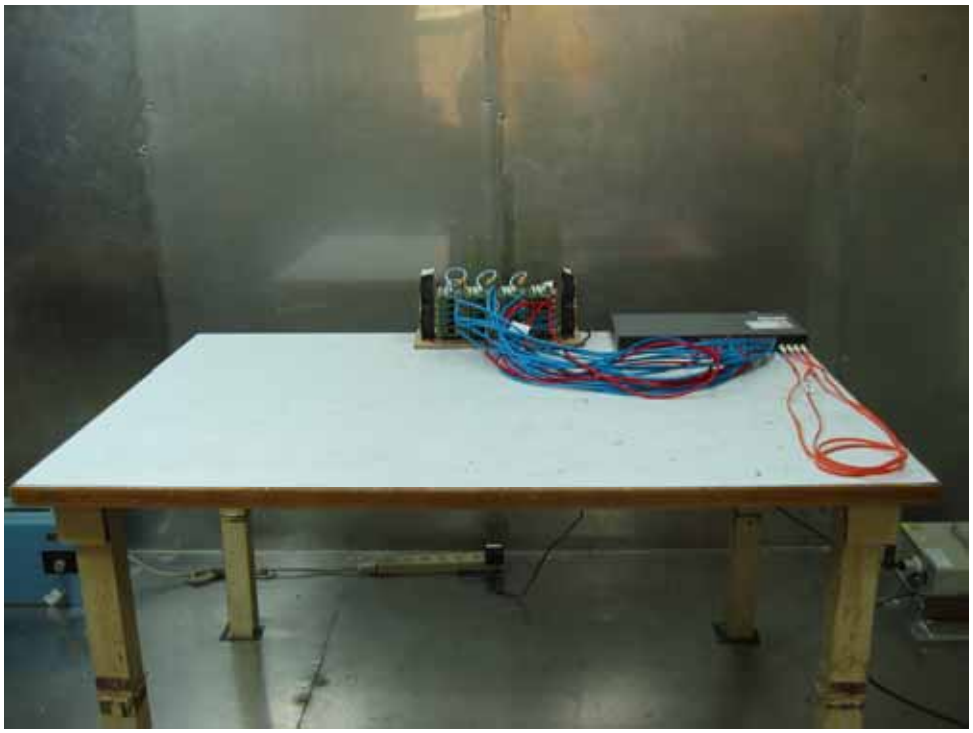

| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Ant Pos | Table Pos | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | cm | deg | |
| 1 | 1404.000 | 40.28 | -39.72 | 80.00 | 46.10 | 25.40 | 33.90 | 2.68 | --- | --- | Peak |
| 2 | 1564.000 | 43.63 | -36.37 | 80.00 | 49.43 | 25.06 | 33.73 | 2.86 | --- | --- | Peak |
| 3 | 1686.000 | 41.48 | -38.52 | 80.00 | 47.17 | 24.98 | 33.67 | 3.00 | --- | --- | Peak |
| 4 | 1812.000 | 39.68 | -40.32 | 80.00 | 44.81 | 25.35 | 33.60 | 3.13 | --- | --- | Peak |
| 5 | 2172.000 | 41.34 | -38.66 | 80.00 | 43.89 | 27.62 | 33.68 | 3.51 | --- | --- | Peak |
| 6 | 2470.000 | 41.22 | -38.78 | 80.00 | 43.81 | 27.56 | 33.97 | 3.81 | --- | --- | Peak |

# 7. Photographs of Test Configuration

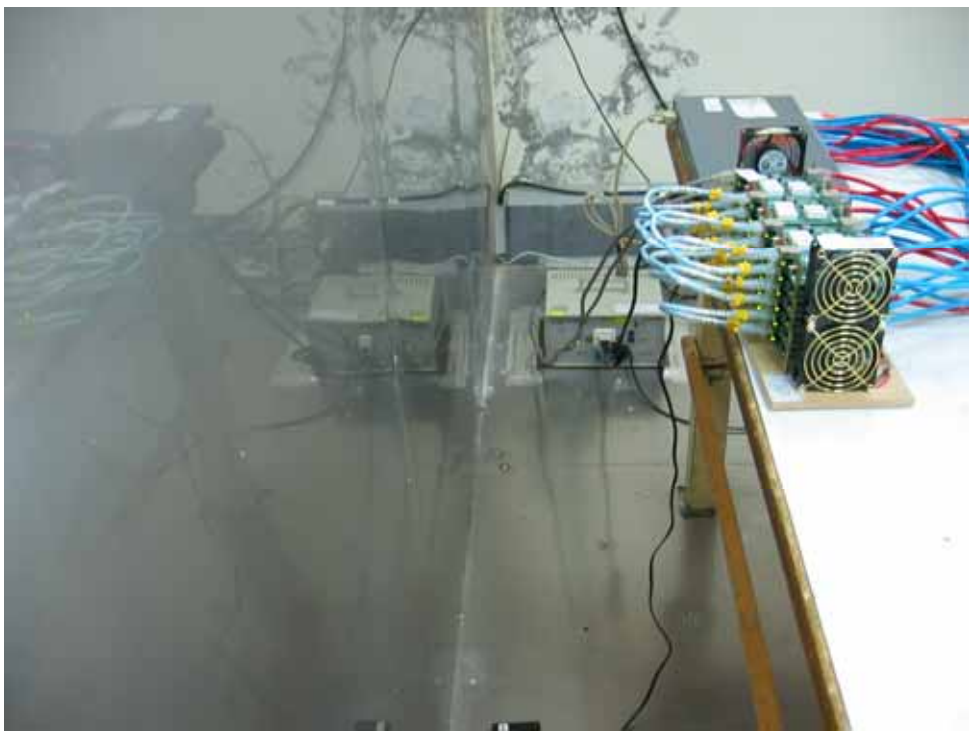
## 7.1. Photographs of AC Powerline Conducted Emissions Test Configuration

● The photographs show the configuration that generates the maximum emission.

FRONT VIEW



REAR VIEW

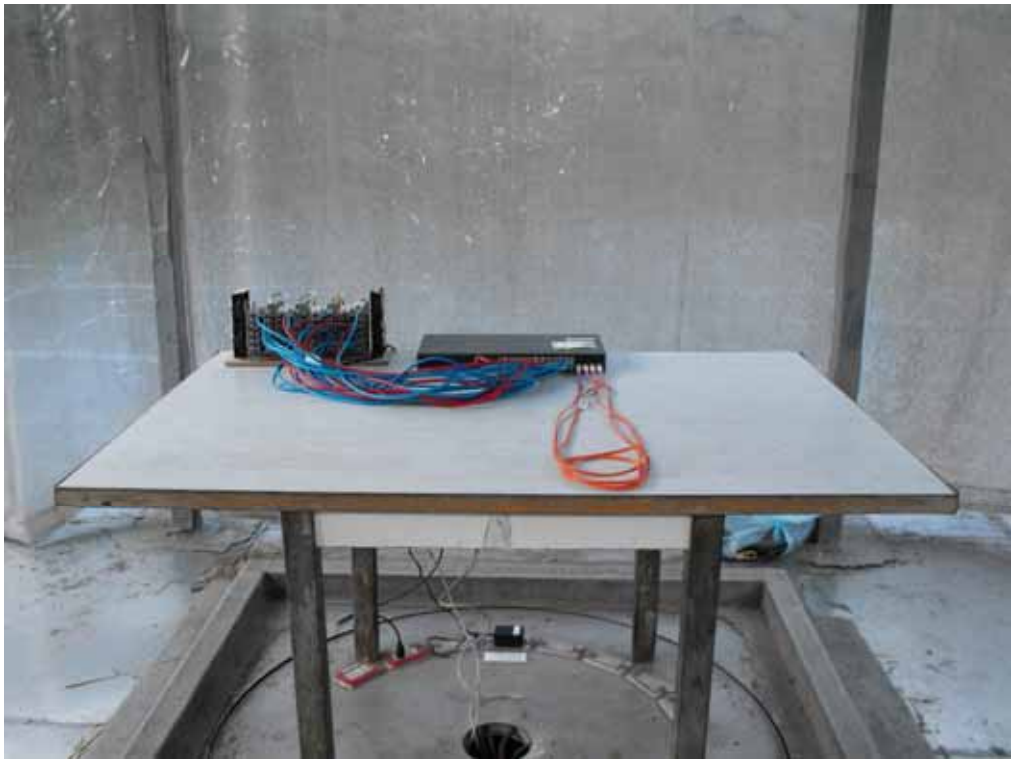


SIDE VIEW

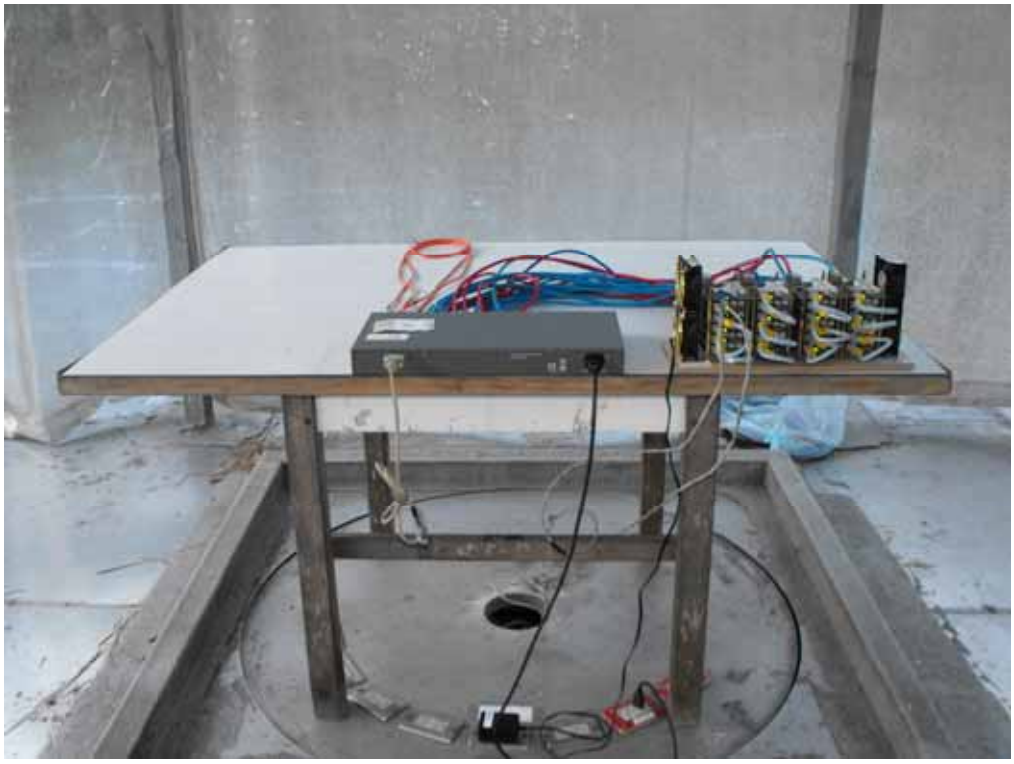
## 7.2. Photographs of Radiated Emissions Test Configuration

● The photographs show the configuration that generates the maximum emission.
For Below 1GHz

FRONT VIEW

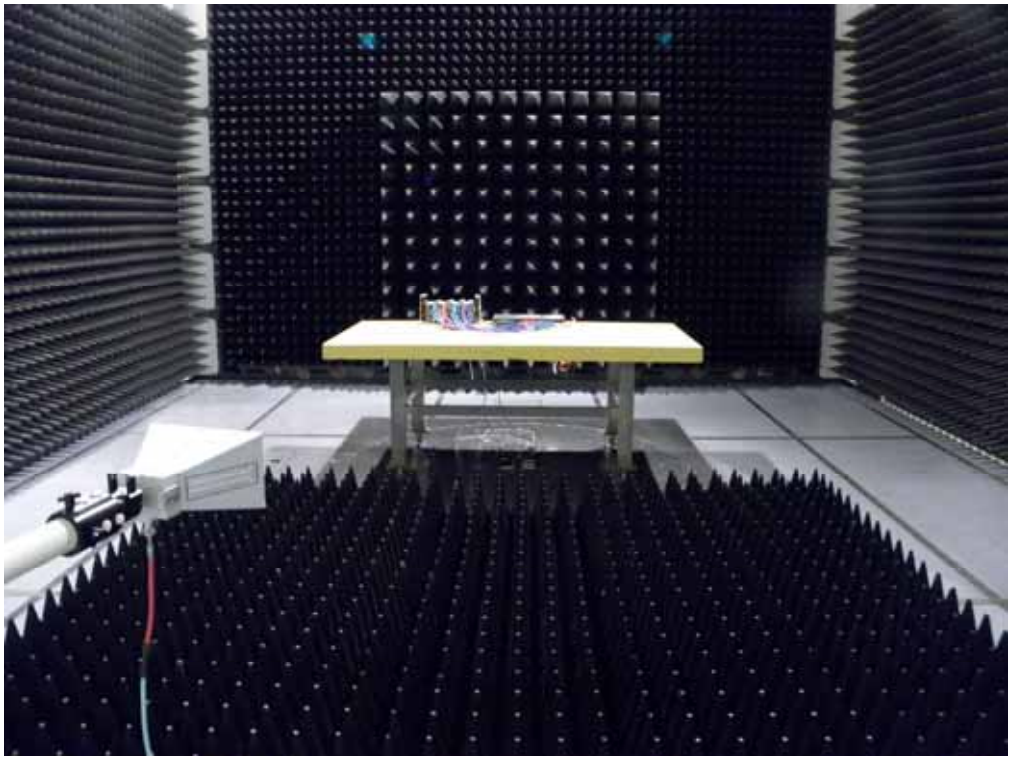


REAR VIEW

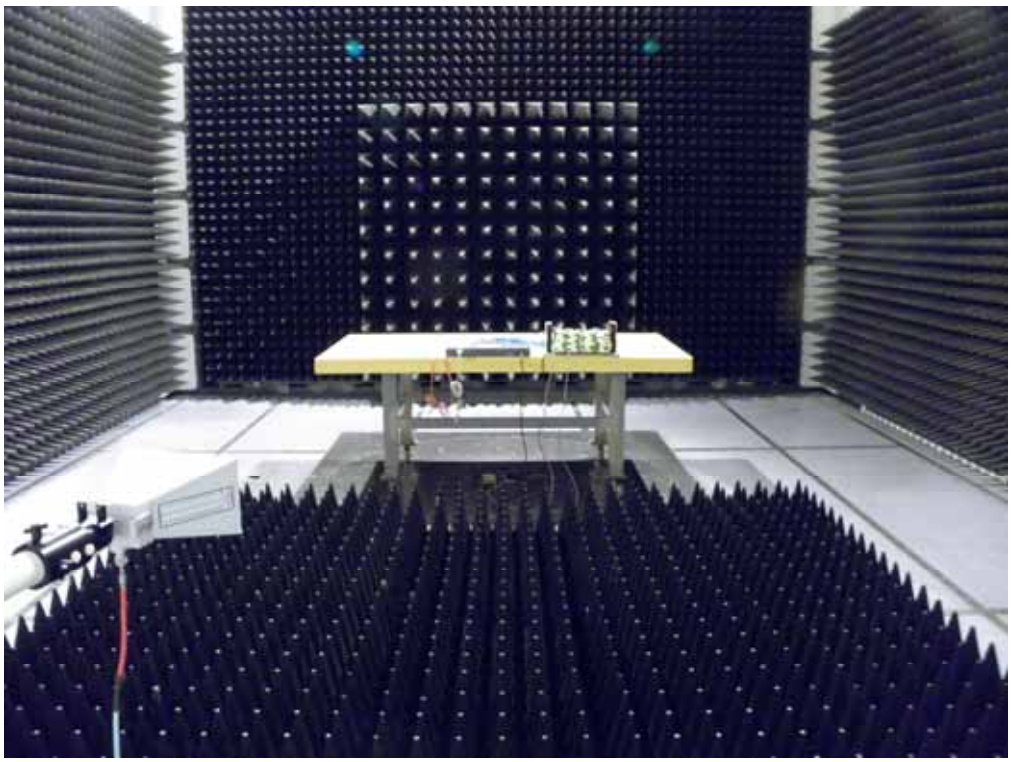


● The photographs show the configuration that generates the maximum emission.
For Above 1GHz

FRONT VIEW



REAR VIEW



# 8. List of Measuring Equipment Used

***Conducted Emission***

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Remark |
|---|---|---|---|---|---|---|
| Receiver | R&S | ESCS 30 | 100357 | 9 kHz ~ 2.75 GHz | Nov. 22, 2012 | Conduction (CO01-NH) |
| LISN | SCHAFFNER | NNB41 | 04/10053 | 9 kHz ~ 30 MHz | Nov. 20, 2012 | Conduction (CO01-NH) |
| Power Filter | CORCOM | MR12030 | N/A | 30A*2 | NCR | Conduction (CO01-NH) |
| RF Cable-CON | Suhner Switzerland | RG223/U | CB004 | 9 kHz ~ 30 MHz | Dec. 12, 2012 | Conduction (CO01-NH) |

Note: Calibration Interval of instruments listed above is one year.
NCR: NO CALIBRATION REQUEST.

***Radiation Emission Below 1GHz***

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Remark |
|---|---|---|---|---|---|---|
| Open Area Test Site | SPORTON | OATS-10 | OS02-NH | 30 MHz - 1 GHz 10m, 3m | Dec. 31, 2012 | Radiation (OS02-NH) |
| Amplifier | BURGEON | BPA-530 | 100203 | 0.01 MHz - 3 GHz | Jun. 04, 2013 | Radiation (OS02-NH) |
| Receiver | R&S | ESCI | 100497 | 9 kHz – 3 GHz | Apr. 26, 2013 | Radiation (OS02-NH) |
| Bilog Antenna | CHASE | CBL6122B | 2884 | 30 MHz - 2 GHz | Feb. 10, 2013 | Radiation (OS02-NH) |
| Turn Table | EMCO | 2080 | 9508-1805 | 0 - 360 degree | NCR | Radiation (OS02-NH) |
| Antenna Mast | ETS | 2075-2 | 2385 | 1 m - 4 m | NCR | Radiation (OS02-NH) |
| RF Cable-R10m | MIYAZAKI | 5DFB | CB044 | 30 MHz - 1 GHz | Sep. 14, 2012 | Radiation (OS02-NH) |

Note: Calibration Interval of instruments listed above is one year.
NCR: NO CALIBRATION REQUEST.

***Radiation Emission Above 1GHz***

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Remark |
|---|---|---|---|---|---|---|
| Spectrum Analyzer | R&S | FSP40 | 100593 | 9 kHz ~ 40 GHz | Sep. 14, 2012 | Radiation (03CH04-HY) |
| Amplifier | Agilent | 8449B | 3008A02326 | 1 GHz ~ 26.5 GHz | May 17, 2013 | Radiation (03CH04-HY) |
| Horn Antenna | SCHWARZBECK | BBHA9120 | BBHA9120D1130 | 1 GHz ~ 18 GHz | Apr. 29, 2013 | Radiation (03CH04-HY) |
| Turn Table | Chaintek | 3000 | * | 0 ~ 360 degree | NCR | Radiation (03CH04-HY) |
| Antenna Mast | Chaintek | * | * | 1 m ~ 4 m | NCR | Radiation (03CH04-HY) |
| RF Cable-HIGH | SUHNER | SUCOFLEX 106 | CB063-HF | 1 GHz ~ 40 GHz | Nov. 21, 2012 | Radiation (03CH04-HY) |

Note: Calibration Interval of instruments listed above is one year.
NCR: NO CALIBRATION REQUEST.

# APPENDIX A. Photographs of EUT


REV:C1
COMPLIES WITH FCC CLASS A
MADE IN TAIWAN
RoHS