



**SPORTON LAB.**

Certificate No: EC191309

# CERTIFICATE

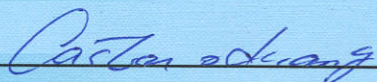
- **EQUIPMENT:** Network Video Recorder  
**MODEL NO. :** KRR-4XX (XX is the number of channels this device supports, 16=16 channels, 24=24 channels)  
**APPLICANT :** KOUKAAM a.s.  
Kaplanova 2252/8, 148 00 Praha 4, Czech Republic.



**I HEREBY**

**CERTIFY THAT:**

THE MEASUREMENTS SHOWN IN THIS TEST REPORT WERE MADE IN ACCORDANCE WITH THE PROCEDURES GIVEN IN **EUROPEAN COUNCIL DIRECTIVE 2004/108/EC**. THE EQUIPMENT WAS **PASSED** THE TEST PERFORMED ACCORDING TO  
**European Standard EN 55022:2006/A1:2007 Class B, EN 61000-3-2:2006/A2:2009, EN 61000-3-3:2008 and EN 55024:1998/A1:2001/A2:2003 (IEC 61000-4-2:2008, IEC 61000-4-3:2006/A1:2007/A2:2010, IEC 61000-4-4:2004, IEC 61000-4-5:2005, IEC 61000-4-6:2008, IEC 61000-4-8:2009, IEC 61000-4-11:2004).**  
THE TEST WAS CARRIED OUT ON **Dec. 27, 2011** AT **SPORTON INTERNATIONAL INC. LAB.**

  
Castries Huang  
Supervisor

# CE EMC TEST REPORT

according to

**European Standard EN 55022:2006/A1:2007 Class B,  
EN 61000-3-2:2006/A2:2009, EN 61000-3-3:2008 and  
EN 55024:1998/A1:2001/A2:2003 (IEC 61000-4-2:2008,  
IEC 61000-4-3:2006/A1:2007/A2:2010, IEC 61000-4-4:2004,  
IEC 61000-4-5:2005, IEC 61000-4-6:2008,  
IEC 61000-4-8:2009, IEC 61000-4-11:2004)**

Equipment : Network Video Recorder

Model No. : KRR-4XX (XX is the number of  
channels this device supports, 16=16  
channels, 24=24 channels)

Applicant : **KOUKAAM a.s.**  
Kaplanova 2252/8, 148 00 Praha 4,  
Czech Republic.

## Statement

- The test result refers exclusively to the test presented test model / sample.
- Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.
- This test report is only applicable to European Community.

***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
EC191309	Rev.01	Dec. 28, 2011	Initial issue of report



## CERTIFICATE OF COMPLIANCE

according to

**European Standard EN 55022:2006/A1:2007 Class B,  
EN 61000-3-2:2006/A2:2009, EN 61000-3-3:2008 and  
EN 55024:1998/A1:2001/A2:2003 (IEC 61000-4-2:2008,  
IEC 61000-4-3:2006/A1:2007/A2:2010, IEC 61000-4-4:2004,  
IEC 61000-4-5:2005, IEC 61000-4-6:2008,  
IEC 61000-4-8:2009, IEC 61000-4-11:2004)**

Equipment : Network Video Recorder

Model No. : KRR-4XX (XX is the number of  
channels this device supports,  
16=16 channels, 24=24 channels)

Applicant : **KOUKAAM a.s.**  
Kaplanova 2252/8, 148 00 Praha 4,  
Czech Republic.

### I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **EUROPEAN COUNCIL DIRECTIVE 2004/108/EC**. The equipment was **passed** the test performed according to **European Standard EN 55022:2006/A1:2007 Class B, EN 61000-3-2:2006/A2:2009, EN 61000-3-3:2008 and EN 55024:1998/A1:2001/A2:2003 (IEC 61000-4-2:2008, IEC 61000-4-3:2006/A1:2007/A2:2010, IEC 61000-4-4:2004, IEC 61000-4-5:2005, IEC 61000-4-6:2008, IEC 61000-4-8:2009, IEC 61000-4-11:2004)**.

The test was carried out on **Dec. 27, 2011** at **SPORTON International Inc. LAB.**

  
Castries Huang  
Supervisor

**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

KOUKAAM a.s.  
Kaplanova 2252/8, 148 00 Praha 4, Czech Republic.

### 1.2. Manufacturer

Same as 1.1

### 1.3. Basic Description of Equipment under Test

Equipment : Network Video Recorder  
Model No. : KRR-4XX (XX is the number of channels this device supports, 16=16 channels, 24=24 channels)  
RJ45 Cable x2 : Non-Shielded, 15 m  
USB Cable : D-Shielded, 1.8 m  
Y-AC Power Cable : Non-Shielded, 0.5 m  
RJ45 Cable x2 : Non-Shielded, 1.5 m  
Data Cable Type : Please see section 2.2 of this test report for details  
Power Supply Type : From Switching Power Supply  
AC Power Cord x2 : Non-Shielded, 1.8 m, 3 pin

### 1.4. Feature of Equipment under Test

Please refer to user manual.

## 2. Test Configuration of Equipment under Test

### 2.1. Test Manner

- a. The EUT has been associated with personal computer and peripherals pursuant to European Standard EN 55022 and EN 55024.
- b. The complete test system included remote workstation and EUT for Conducted and Radiated below 1GHz test. The remote workstation included DELL PC, DELL LCD Monitor, DELL USB Keyboard, DELL USB Mouse, ASUS HUB, VIVOTEK CCD and EUT.
- c. The complete test system included remote workstation and EUT for Radiated above 1GHz test. The remote workstation included DELL Notebook, ASUS HUB, VIVOTEK CCD and EUT.
- d. The complete test system included remote workstation, Transcend USB 2.0 Flash Disk, ASUS HUB, VIVOTEK CCD and EUT for EMS test. The remote workstation included DELL PC, DELL LCD Monitor, DELL USB Keyboard and DELL USB Mouse.
- e. The following test modes were performed:

Test Items	Function Type
AC Conducted Emission	Mode 1. REC +LAN 1Gbps+POWER(ETASIS) Mode 2. PLAY +LAN 100Mbps+POWER(ETASIS) Mode 3. REC +LAN 1Gbps+POWER(EMACS) cause "mode 1" generated the worst test result; it was reported as final data.
ISN	Mode 1. REC +LAN 1Gbps+POWER(ETASIS) Mode 2. REC +LAN 100Mbps+POWER(ETASIS) Mode 3. REC +LAN 10Mbps+POWER(ETASIS) Mode 4. REC +LAN 1Gbps+POWER(EMACS) Mode 5. REC +LAN 100Mbps+POWER(EMACS) Mode 6. REC +LAN 10Mbps+POWER(EMACS) cause "mode 1" generated the worst test result; it was reported as final data.
Radiated Emissions	Mode 1. REC +LAN 1Gbps+POWER(ETASIS) Mode 2. PLAY +LAN 100Mbps+POWER(ETASIS) Mode 3. REC +LAN 1Gbps+POWER(EMACS) < below 1GHz >cause "mode 1" generated the worst test result; it was reported as final data. < above 1GHz >cause "mode 1" is highest frequency of the internal sources of the EUT; it was reported as final data.
EMS	Mode 1. REC +LAN 1Gbps+POWER(ETASIS) Mode 2. REC +LAN 1Gbps+POWER(EMACS)

- f. Frequency range investigated: Conduction 150 kHz to 30 MHz, radiation 30 MHz to 6,000 MHz.
- g. Frequency range investigated immunity test: CS 150 kHz to 80 MHz, RS 80 MHz to 1,000 MHz.



## 2.2. Description of Test System

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

No.	Peripheral	Manufacturer	Model Number	FCC ID	Cable / Spec. Description	Placed
1	Personal Computer	DELL	DCTA	DoC	N/A	Remote
2	LCD Monitor	DELL	E198WFPf	DoC	D-SUB Cable, D-Shielded, 1.8m	Remote
3	USB Keyboard	DELL	SK-8175	DoC	USB Cable, AL-F-Shielded, 1.8m	Remote
4	USB Mouse	DELL	MOC5UO	DoC	USB Cable, AL-F-Shielded, 1.8m	Remote
5	HUB	ASUS	GX-01051	DoC	N/A	Remote
6	CCD	VIVOTEK	H.264	N/A	N/A	Remote

### < EMI ><Radiated above 1GHz>

No.	Peripheral	Manufacturer	Model Number	FCC ID	Cable / Spec. Description	Placed
1	Notebook	DELL	6400	DoC	N/A	Remote
2	HUB	ASUS	GX-01051	DoC	N/A	Remote
3	CCD	VIVOTEK	H.264	N/A	N/A	Remote

### < EMS >

No.	Peripheral	Manufacturer	Model Number	FCC ID	Cable / Spec. Description	Placed
1	USB 2.0 Flash Disk	TRANSCEND	JFV30	DoC	USB Cable, D-Shielded, 0.5m	Local
2	HUB	ASUS	GX-01051	DoC	N/A	Local
3	CCD	VIVOTEK	H.264	N/A	N/A	Local
4	Personal Computer	DELL	470	DoC	N/A	Remote
5	LCD Monitor	DELL	E198WFPf	DoC	D-SUB Cable, Shielded, 1.8m	Remote
6	USB Keyboard	DELL	SK-8115	DoC	USB Cable, AL-F-Shielded, 2.0m	Remote
7	USB Mouse	DELL	MOA8BO	DoC	USB Cable, AL-F-Shielded, 1.8m	Remote

### 3. Test Software

#### < EMI >

During the test, the programs under Win XP from remote workstation were executed:

The program was executed as follows:

- a. Turn on the power of all equipment.
- b. The PC reads the test program from the hard disk drive and runs it.
- c. The PC sends "H" pattern to the monitor, and the monitor displays "H" patterns on the screen.
- d. The PC sends signal messages to the internal Hard Disk, and the Hard Disk reads and writes the message.
- e. Repeat the steps from c to d.

At the same time, the following programs were executed:

- Executed "ping.exe" to link with the EUT to receive and transmit data by RJ45 cable.
- Executed "IE.exe" to display the image captured from EUT by RJ45 cable.

For ISN test on the 10Mbps, the remote workstation Executed "ping.exe" to traffic packet data generated software and keep 10% traffic load to link with the EUT by RJ45 cable.

For ISN test on the 1Gbps and 100Mbps, the remote workstation Executed "tfggen.exe" to traffic packet data generated software and keep 10% traffic load to link with the EUT by RJ45 cable.

#### < EMS >

During the test, the programs under Win XP from remote workstation were executed:

- Executed "ping.exe" to link with the EUT to receive and transmit data by RJ45 cable.
- Executed "IE.exe" to display the image captured from EUT by RJ45 cable.

## 4. General Information of Test

### 4.1. Test Facility

**<EMI>**

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. : 03CH03-HY

**<EMS>**

Test Site Location : 3F, No.587, Tanmeu St., Neihu District, Taipei, Taiwan, R.O.C.  
TEL : 886-2-2794-8886  
FAX : 886-2-2794-9777

### 4.2. Test Voltage

AC 230V / 50Hz

### 4.3. Measurement Procedure

EMI Test (conduction and radiation) : European Standard EN 55022 Class B  
Harmonics Test : European Standard EN 61000-3-2  
Voltage Fluctuations Test : European Standard EN 61000-3-3  
EMS Test : European Standard EN 55024  
(ESD: IEC 61000-4-2, RS: IEC 61000-4-3, EFT: IEC 61000-4-4, SURGE: IEC 61000-4-5,  
CS: IEC 61000-4-6, Power Frequency Magnetic Field: IEC 61000-4-8, DIPS: IEC 61000-4-11)

The test configuration, test modes and test software used in this test report are designated by the applicant.

### 4.4. Test in Compliance with

EMI Test (conduction and radiation) : European Standard EN 55022 Class B  
Harmonics Test : European Standard EN 61000-3-2  
Voltage Fluctuations Test : European Standard EN 61000-3-3  
EMS Test : European Standard EN 55024  
(ESD: IEC 61000-4-2, RS: IEC 61000-4-3, EFT: IEC 61000-4-4, SURGE: IEC 61000-4-5,  
CS: IEC 61000-4-6, Power Frequency Magnetic Field: IEC 61000-4-8, DIPS: IEC 61000-4-11)

#### **4.5. Frequency Range Investigated**

- a. Conducted emission test: from 150 kHz to 30 MHz
- b. Radiated emission test: from 30 MHz to 6,000 MHz
- c. Radio frequency electromagnetic field immunity test: 80-1000 MHz

#### **4.6. Test Distance**

- a. The test distance of radiated emission test from antenna to EUT is 10 M (from 30MHz~1GHz).
- b. The test distance of radiated emission test from antenna to EUT is 3 M (from 1GHz~6GHz).
- c. The test distance of radio frequency electromagnetic field immunity test from antenna to EUT is 3 M.

## 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 European Standard EN 55022 Clause 9. 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 producing maximum conducted emissions.

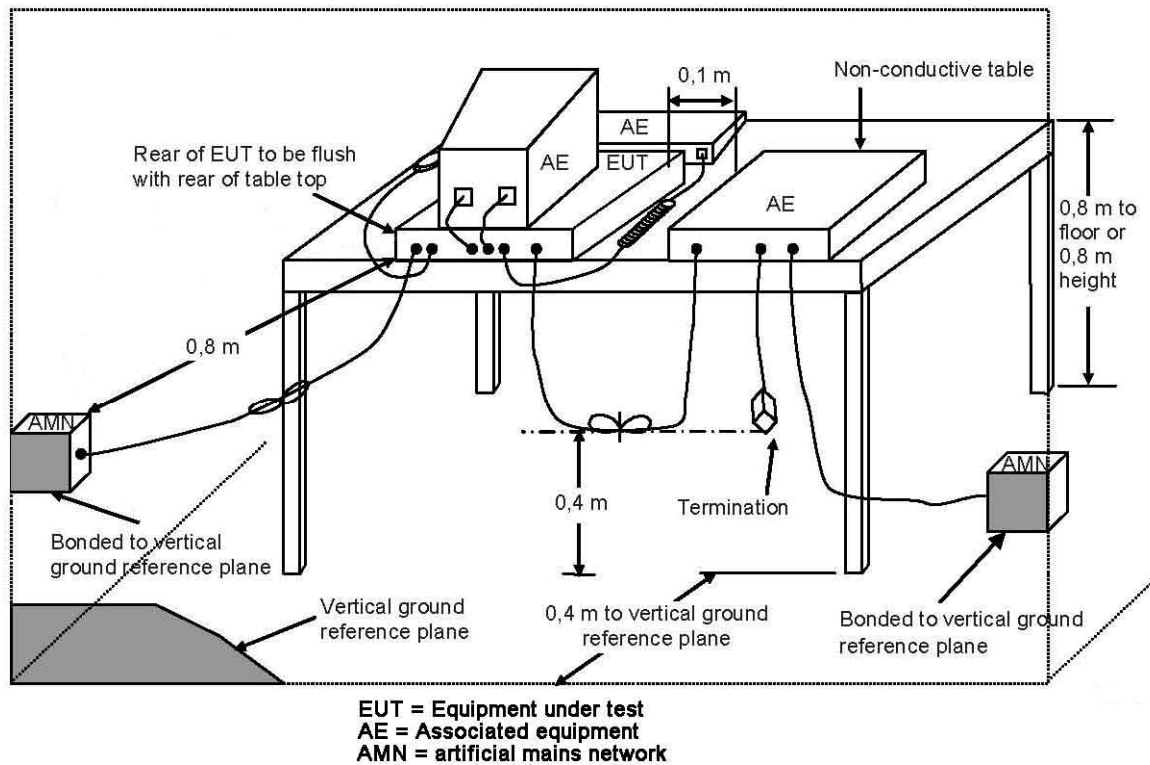
### 5.1. Description of Major Test Instruments

● Test Receiver	( R&S ESCS 30 )
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

### 5.2. Test Procedures

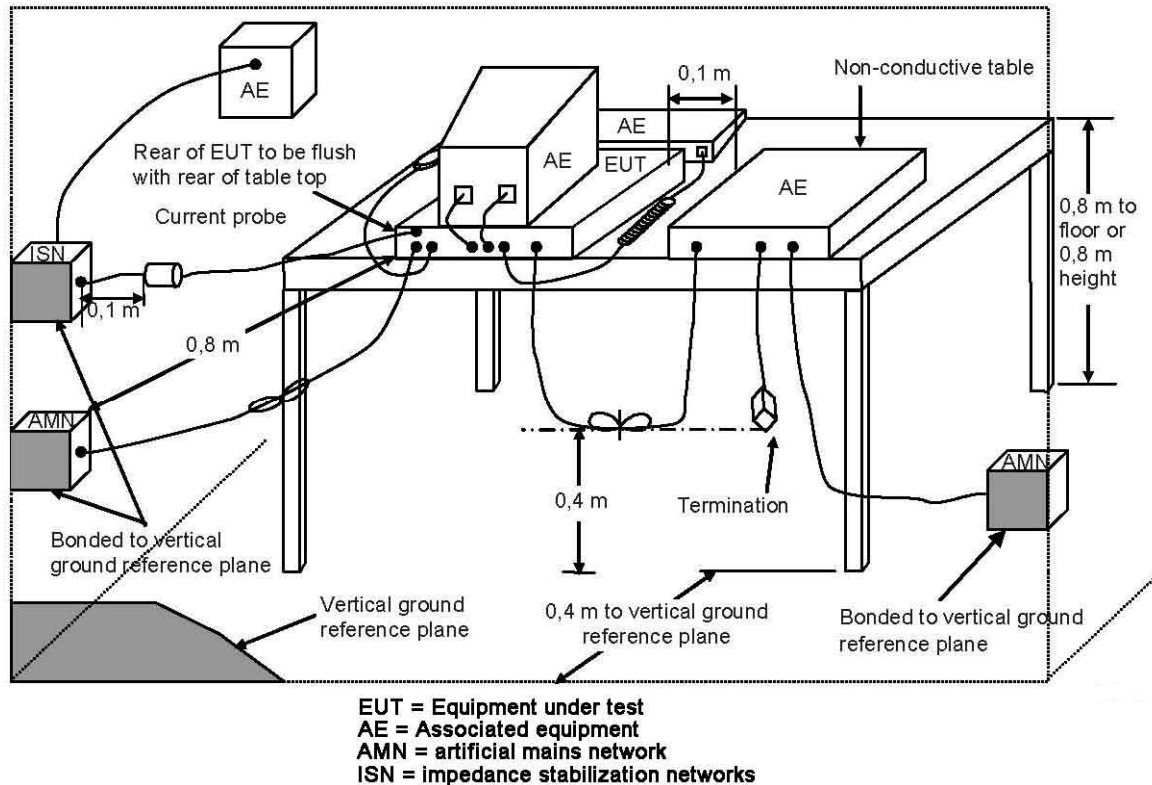
- a. The EUT was placed on a desk 0.8 meter height from the metal ground plane and 0.4 meter from the conducting wall of the shielding room and it was kept at least 0.8 meter from any other grounded conducting surface.
- b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- c. Connect Telecommunication port to ISN (Impedance Stabilization Network).
- 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 CISPR 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



1. AMN is 80 cm from the EUT and at least 80 cm from other units and other metal planes.
2. EUT is connected to one artificial mains network (AMN).
3. All other units of a system are powered from a second AMN. A multiple outlet strip can be used for multiple mains cords.
4. Rear of EUT to be flushed with rear of table top.
5. 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.
6. 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.
7. Mains cords and signal cables shall be positioned for their entire lengths, as far as possible, at 40 cm from the vertical reference plane.
8. Cables of hand operated devices, such as keyboards, mice, etc. shall be placed as for normal usage.

**5.4. Typical Test Setup Layout of disturbances at telecommunication ports**



1. AMN and ISN are 80 cm from the EUT and at least 80 cm from other units and other metal planes.
2. EUT is connected to one artificial mains network (AMN).
3. All other units of a system are powered from a second AMN. A multiple outlet strip can be used for multiple mains cords.
4. Rear of EUT to be flushed with rear of table top.
5. 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.
6. 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.
7. Mains cords and signal cables shall be positioned for their entire lengths, as far as possible, at 40 cm from the vertical reference plane.
8. Cables of hand operated devices, such as keyboards, mice, etc. shall be placed as for normal usage.

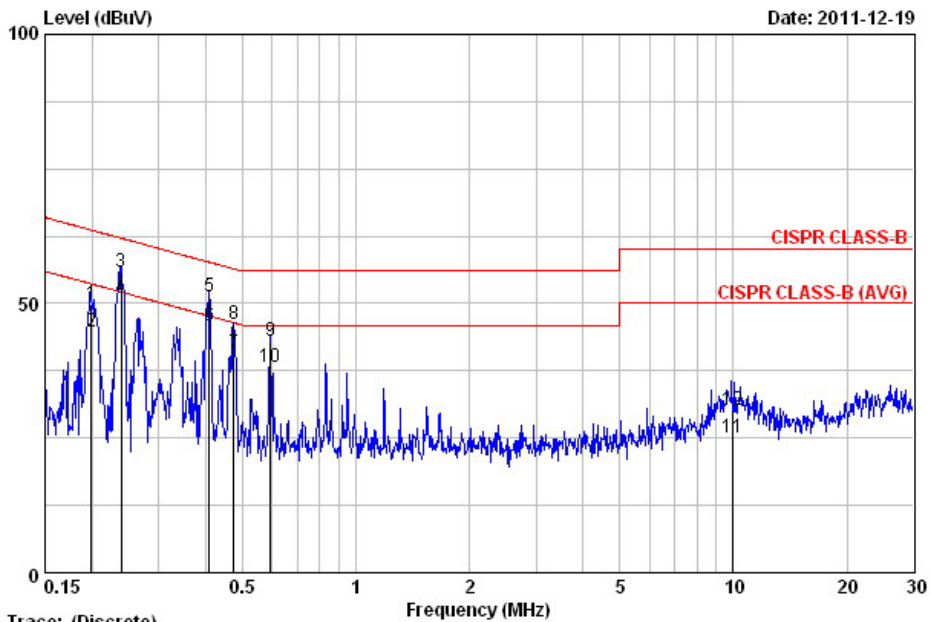


**5.5. Test Result of AC Powerline Conducted Emission**

<b>Test Mode</b>	Mode 1		
<b>Test Frequency</b>	0.15 MHz ~ 30 MHz	<b>Test Site No.</b>	CO01-NH
<b>Test Voltage</b>	AC 230V / 50Hz	<b>Test Engineer</b>	Eddie
<b>Temperature</b>	23 °C	<b>Relative Humidity</b>	50 %

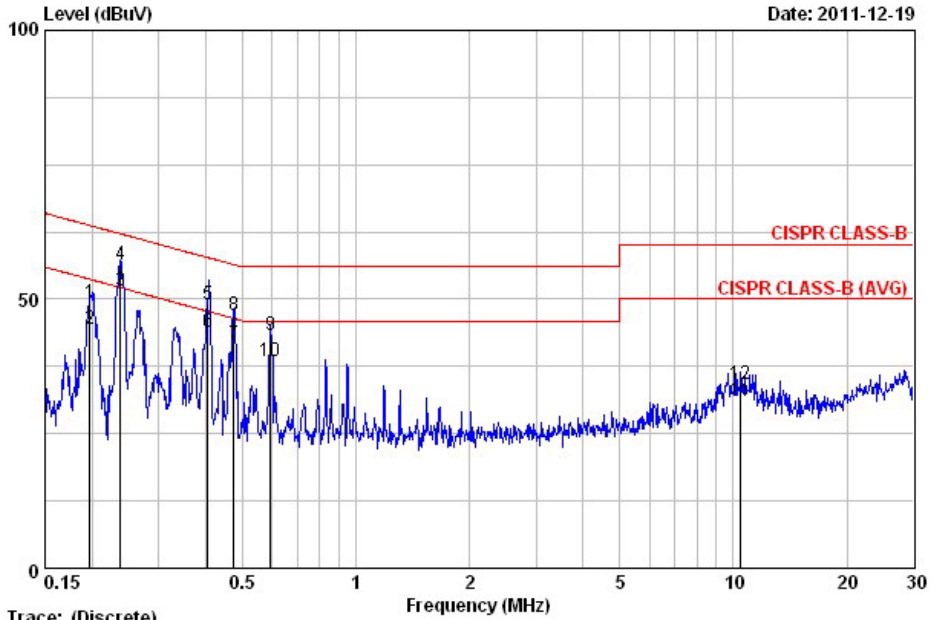
Note: 1. Corrected Reading (dBµV) = LISN Factor + Cable Loss + Read Level = Level  
 2. All emissions not reported here are more than 10 dB below the prescribed limit.

■ The test was passed at the minimum margin that marked by the frame in the following data



Trace: (Discrete)  
 Site : CO01-NH  
 Condition : CISPR CLASS-B NNB41/04/10053 LINE  
 eut :  
 power : AC 230V  
 memo : MODE 1  
 memo :  
 memo :

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.199	49.94	-13.72	63.66	39.68	10.16	0.10	QP
2	0.199	44.71	-8.95	53.66	34.45	10.16	0.10	AVERAGE
3	0.239	55.93	-6.20	62.13	45.67	10.16	0.10	QP
4	0.239	50.95	-1.18	52.13	40.69	10.16	0.10	AVERAGE
5	0.408	51.19	-6.49	57.68	40.93	10.16	0.10	QP
6	0.408	45.88	-1.80	47.68	35.62	10.16	0.10	AVERAGE
7	0.474	40.70	-5.75	46.45	30.44	10.16	0.10	AVERAGE
8	0.474	46.07	-10.38	56.45	35.81	10.16	0.10	QP
9	0.595	43.08	-12.92	56.00	32.81	10.17	0.10	QP
10	0.595	38.05	-7.95	46.00	27.78	10.17	0.10	AVERAGE
11	9.916	25.09	-24.91	50.00	14.60	10.29	0.20	AVERAGE
12	9.916	30.14	-29.86	60.00	19.65	10.29	0.20	QP



Trace: (Discrete)

Site : CO01-NH  
 Condition : CISPR CLASS-B NNB41/04/10053 NEUTRAL  
 Cut :  
 power : AC 230V  
 memo : MODE 1  
 memo :  
 memo :  
 memo :

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.198	49.30	-14.42	63.71	39.06	10.14	0.10	QP
2	0.198	44.33	-9.39	53.71	34.09	10.14	0.10	AVERAGE
3 (β)	0.238	51.43	-0.74	52.17	41.19	10.14	0.10	AVERAGE
4	0.238	56.55	-5.62	62.17	46.31	10.14	0.10	QP
5	0.404	48.95	-8.81	57.76	38.71	10.14	0.10	QP
6	0.404	43.89	-3.87	47.76	33.65	10.14	0.10	AVERAGE
7	0.475	41.56	-4.87	46.43	31.32	10.14	0.10	AVERAGE
8	0.475	47.06	-9.37	56.43	36.82	10.14	0.10	QP
9	0.595	43.37	-12.63	56.00	33.12	10.14	0.10	QP
10	0.595	38.41	-7.59	46.00	28.16	10.14	0.10	AVERAGE
11	10.452	31.07	-18.93	50.00	20.58	10.29	0.20	AVERAGE
12	10.452	34.31	-25.69	60.00	23.82	10.29	0.20	QP

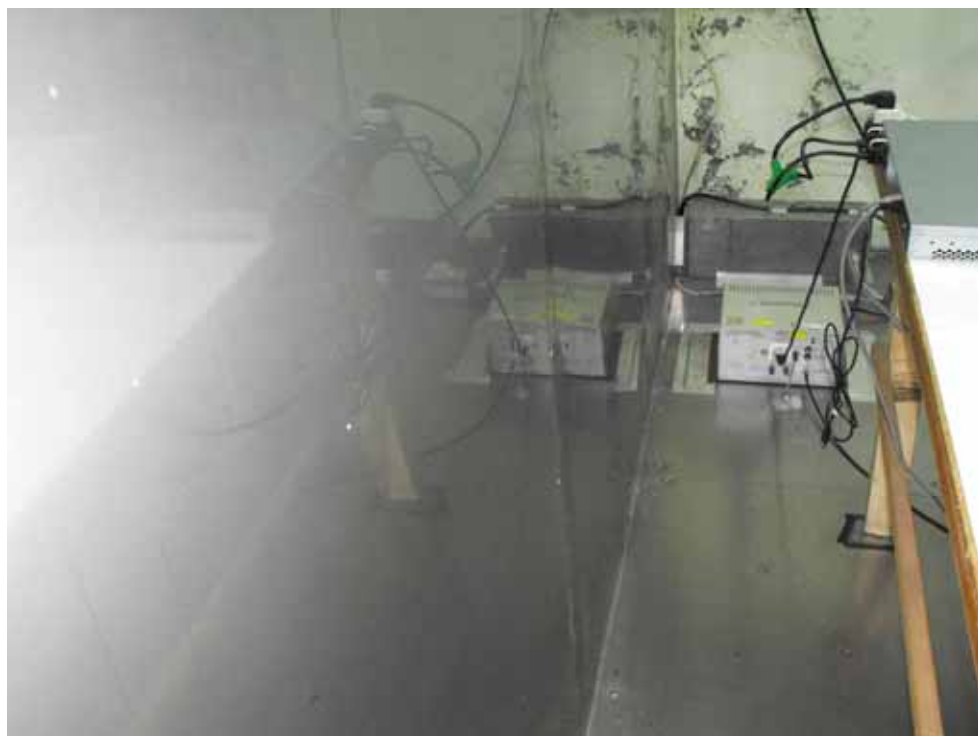
### 5.6. Photographs of Conducted Powerline Test Configuration

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

FRONT VIEW



REAR VIEW

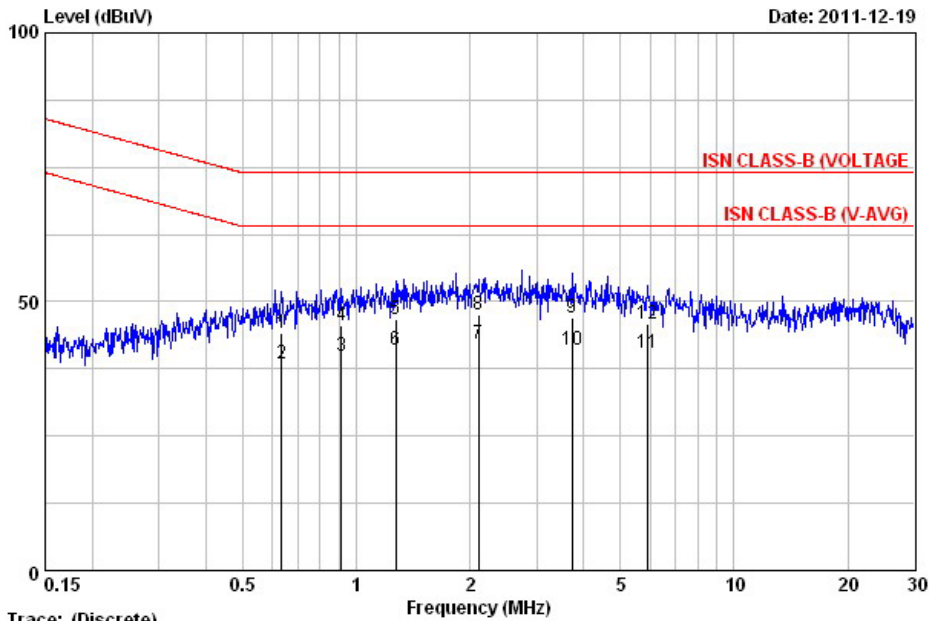


**5.7. Test Result of disturbances at telecommunication ports**

Test Mode	Mode 1		
Test Frequency	0.15 MHz ~ 30 MHz	Test Site No.	CO01-NH
Test Voltage	AC 230V / 50Hz	Test Engineer	Eddie
Temperature	23 °C	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



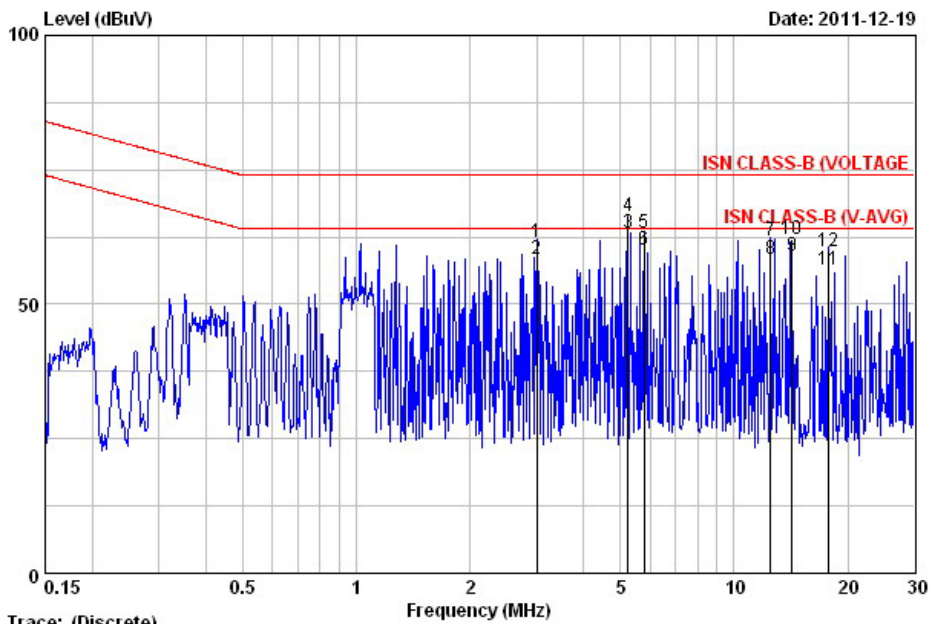
Trace: (Discrete)  
 Site : CO01-NH  
 Condition : ISN CLASS-B (VOLTAGE T800-20110919)  
 eut :  
 power : AC 230V  
 memo : MODE 1  
 memo : LAN 1Gbps-10%  
 memo :  
 memo :

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBµV	dB	dBµV	dBµV	dB	dB	
1	0.634	44.12	-29.88	74.00	34.22	9.80	0.10	QP
2	0.634	38.37	-25.63	64.00	28.47	9.80	0.10	AVERAGE
3	0.914	39.84	-24.16	64.00	29.98	9.76	0.10	AVERAGE
4	0.914	45.51	-28.49	74.00	35.65	9.76	0.10	QP
5	1.269	46.61	-27.39	74.00	36.75	9.73	0.13	QP
6	1.269	41.00	-23.00	64.00	31.14	9.73	0.13	AVERAGE
<b>7</b>	<b>2.110</b>	<b>42.07</b>	<b>-21.93</b>	<b>64.00</b>	<b>32.18</b>	<b>9.69</b>	<b>0.20</b>	<b>AVERAGE</b>
8	2.110	47.44	-26.56	74.00	37.55	9.69	0.20	QP
9	3.720	46.93	-27.07	74.00	37.07	9.66	0.20	QP
10	3.720	41.11	-22.89	64.00	31.25	9.66	0.20	AVERAGE
11	5.898	40.54	-23.46	64.00	30.70	9.64	0.20	AVERAGE
12	5.898	45.89	-28.11	74.00	36.05	9.64	0.20	QP

<b>Test Mode</b>	Mode 2		
<b>Test Frequency</b>	0.15 MHz ~ 30 MHz	<b>Test Site No.</b>	CO01-NH
<b>Test Voltage</b>	AC 230V / 50Hz	<b>Test Engineer</b>	Eddie
<b>Temperature</b>	23 °C	<b>Relative Humidity</b>	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



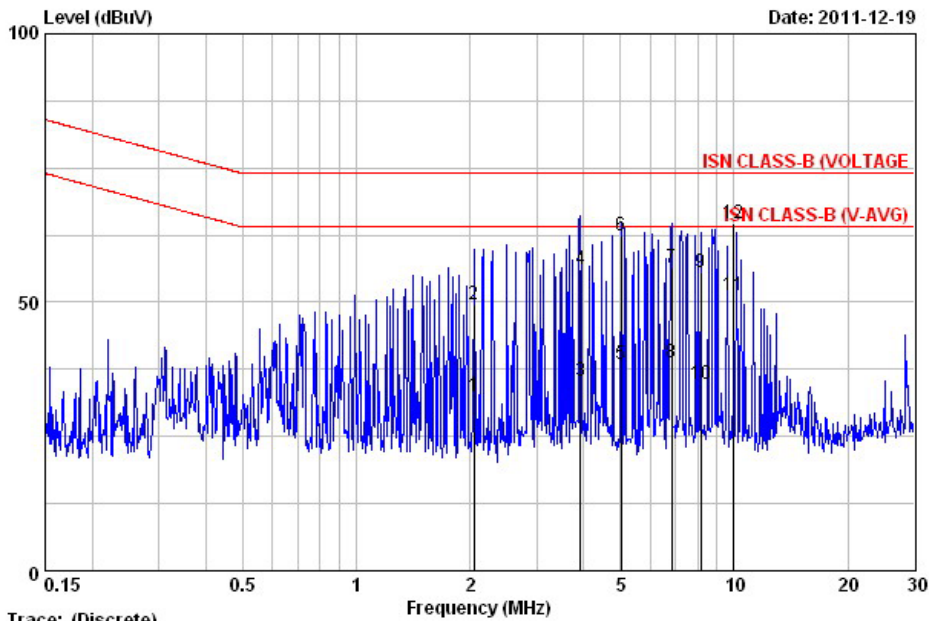
Site : CO01-NH  
 Condition : ISN CLASS-B (VOLTAGE T400A-20110919)  
 eut :  
 power : AC 230V  
 memo : MODE 1  
 memo : LAN 100Mbps-10 %  
 memo :  
 memo :

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	3.009	61.44	-12.56	74.00	51.64	9.60	0.20	QP
2	3.009	58.27	-5.73	64.00	48.47	9.60	0.20	AVERAGE
3	5.237	63.26	-0.74	64.00	53.49	9.57	0.20	AVERAGE
4	5.237	66.50	-7.50	74.00	56.73	9.57	0.20	QP
5	5.786	63.24	-10.76	74.00	53.47	9.57	0.20	QP
6	5.786	60.04	-3.96	64.00	50.27	9.57	0.20	AVERAGE
7	12.504	61.81	-12.19	74.00	52.05	9.55	0.20	QP
8	12.504	58.45	-5.55	64.00	48.69	9.55	0.20	AVERAGE
9	14.214	58.95	-5.05	64.00	49.20	9.55	0.20	AVERAGE
10	14.214	62.22	-11.78	74.00	52.47	9.55	0.20	QP
11	17.696	56.49	-7.51	64.00	46.68	9.55	0.26	AVERAGE
12	17.696	59.92	-14.08	74.00	50.11	9.55	0.26	QP

Test Mode	Mode 3		
Test Frequency	0.15 MHz ~ 30 MHz	Test Site No.	CO01-NH
Test Voltage	AC 230V / 50Hz	Test Engineer	Eddie
Temperature	23 °C	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



Site : CO01-NH  
 Condition : ISN CLASS-B (VOLTAGE T400A-20110919)  
 eut :  
 power : AC 230V  
 memo : MODE 1  
 memo : LAN 10Mbps-10%  
 memo :  
 memo :

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	2.044	32.60	-31.40	64.00	22.77	9.63	0.20	AVERAGE
2	2.044	49.57	-24.43	74.00	39.74	9.63	0.20	QP
3	3.922	35.28	-28.72	64.00	25.49	9.59	0.20	AVERAGE
4	3.922	56.07	-17.93	74.00	46.28	9.59	0.20	QP
5	5.031	38.55	-25.45	64.00	28.78	9.57	0.20	AVERAGE
6	5.031	62.47	-11.53	74.00	52.70	9.57	0.20	QP
7	6.841	56.51	-17.49	74.00	46.75	9.57	0.20	QP
8	6.841	38.86	-25.14	64.00	29.10	9.57	0.20	AVERAGE
9	8.148	55.45	-18.55	74.00	45.69	9.56	0.20	QP
10	8.148	34.67	-29.33	64.00	24.91	9.56	0.20	AVERAGE
11	10.000	51.29	-12.71	64.00	41.53	9.56	0.20	AVERAGE
12	10.000	64.78	-9.22	74.00	55.02	9.56	0.20	QP



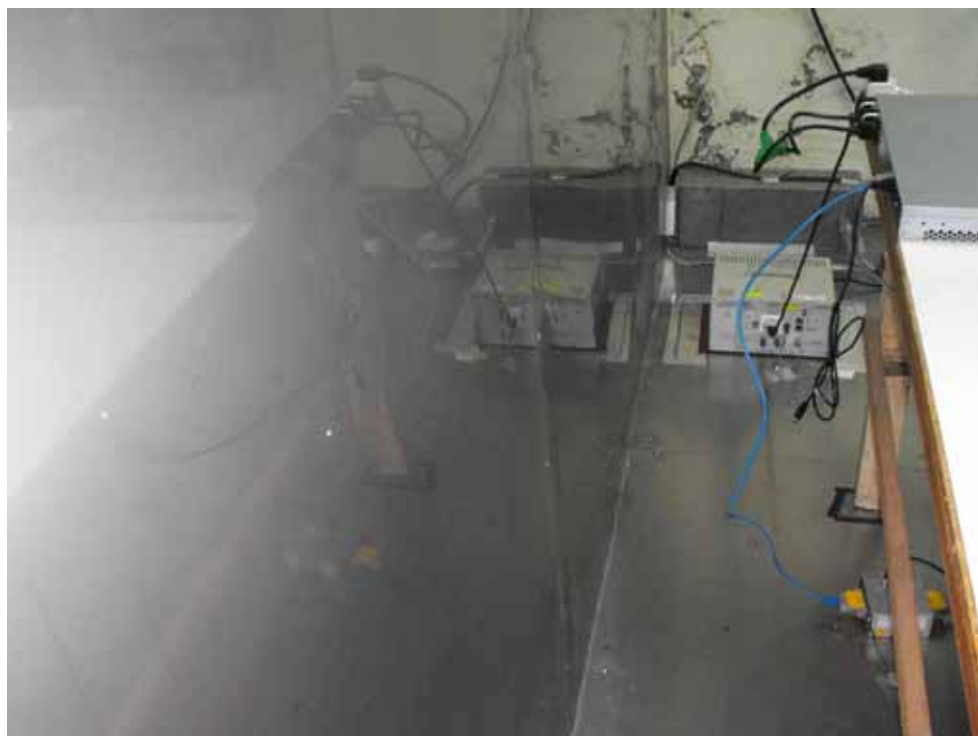
### 5.8. Photographs of disturbances at telecommunication ports Test Configuration

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

FRONT VIEW



REAR VIEW





## 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 1,000 MHz and 1 MHz for above 1GHz according to the methods defines in European Standard EN 55022, Clause 10. 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

#### 6.1.1. For Below 1GHz

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

#### 6.1.2. For above 1GHz

- Amplifier ( Agilent 8449B )
  - RF Gain 35 dB
  - Signal Input 1 GHz - 26.5 GHz
  
- Test Receiver ( R&S ESI )
  - Attenuation 10 dB
  - Start Frequency 1000 MHz
  - Stop Frequency 6000 MHz
  - Resolution Bandwidth 1 MHz
  - Signal Input 20 Hz - 7 GHz

## 6.2. Test Procedures

### < Below 1GHz >

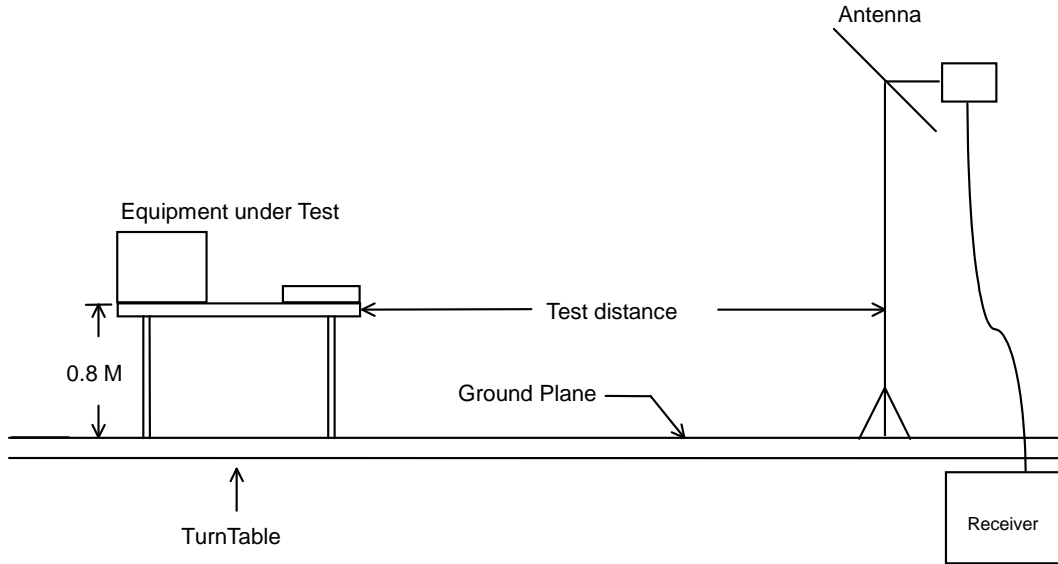
- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 10 meters from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- 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.

### < Above 1GHz >

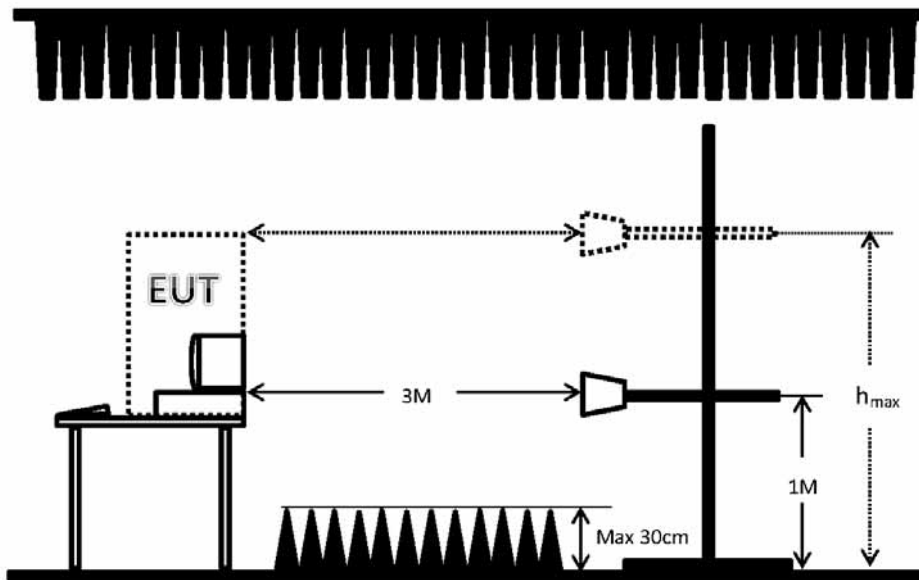
- a. Same test set up as below 1GHz radiated testing.
- b. The EUT was set 3 meters from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.
- c. There should be absorber placed between the EUT and Antenna and its located size should let the test site meet CISPR16-1-4 requirement.
- d. The table was rotated 360 degrees to determine the position of the highest radiation.
- e. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- f. Set the DRG Horn Antenna (Model: 3115) at 1M height, then run the turn table to get the maximum noise reading from Horizontal and Vertical polarity separately.
- g. When EUT locating on the turn-table, and its height is over 172cm (Antenna's 3dB beam width of 6GHz is  $27^\circ$  ), the DRG Horn Antenna must be raised up and descended down, then turning around the turn-table to get the maximum noise reading of the Horizontal and Vertical polarity separately. Note the maximum raise up height is same as the top of EUT.
- h. If 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

< Below 1GHz >



< Above 1GHz >



Remark: When EUT's height is over 172cm,  $h_{max}$  = top of EUT

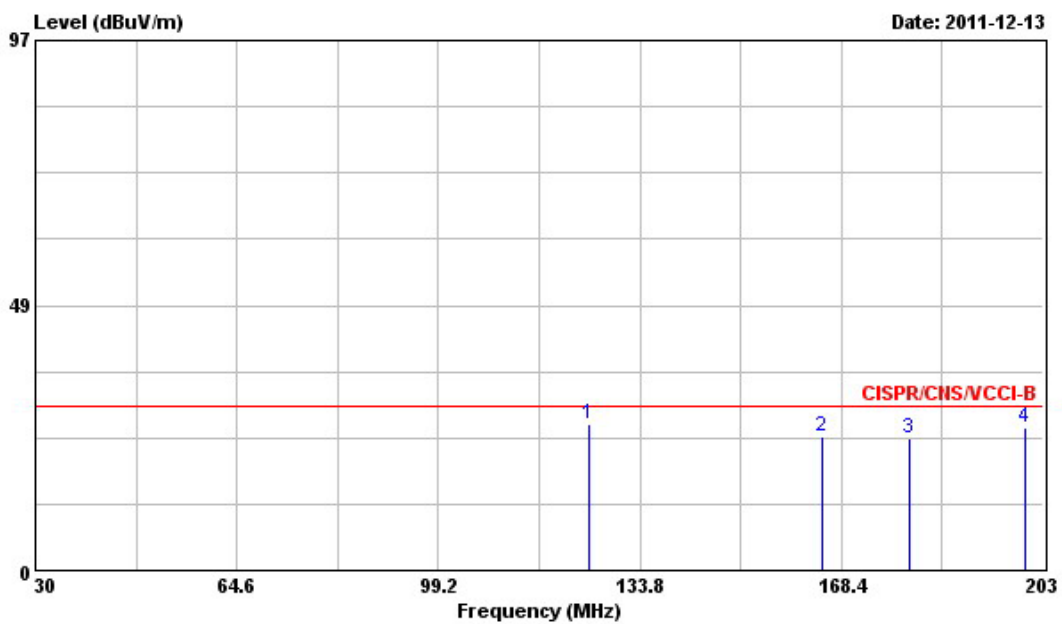
**6.4. Test Result of Radiated Emission**

Test mode	Mode 1	Test Site No.	OS02-NH
Test frequency	30 MHz ~ 1000 MHz	Test Engineer	Chas
Antenna distance	10 meters	Test Voltage	AC 230V / 50Hz
Temperature	17 °C	Relative Humidity	55 %

Note: 1. Emission level (dB $\mu$ V/m) = 20 log Emission level ( $\mu$ V/m)

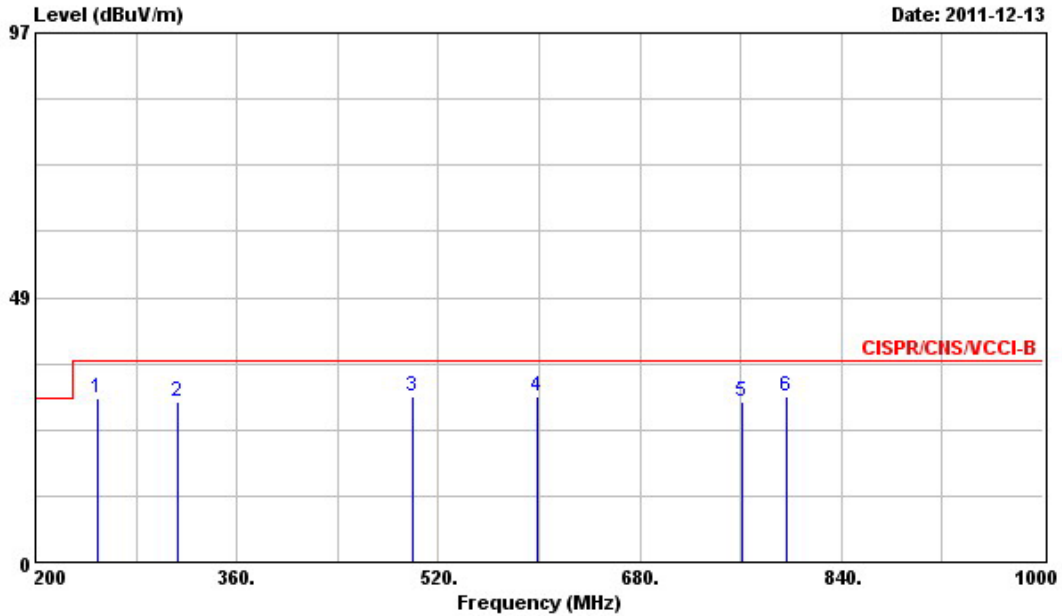
2. Corrected Reading : Antenna Factor + Cable Loss + Read Level – Preamp Factor = Level

■ The test was passed at the minimum margin that marked by the frame in the following data



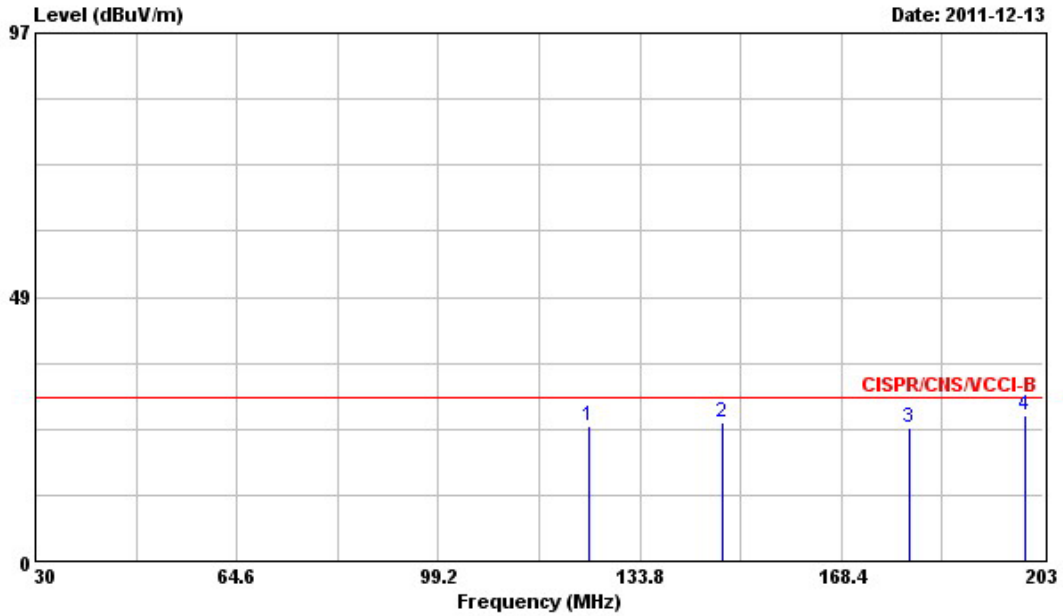
Site : OS02-NH  
 Condition : CISPR/CNS/VCCI-B 10m OS02-ANT-01-20-2011 VERTICAL  
 EUT :  
 POWER : 230VAC  
 MEMO :

	Freq	Level	Over Limit	Limit Line	ReadAntenna 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	124.980	26.93	-3.07	30.00	44.48	12.21	1.88	31.64	QP	100	180
2	165.110	24.50	-5.50	30.00	44.00	9.81	2.24	31.55	Peak	---	---
3	179.990	24.15	-5.85	30.00	44.20	9.09	2.37	31.51	Peak	---	---
4	200.060	26.26	-3.74	30.00	45.97	9.25	2.50	31.46	Peak	---	---



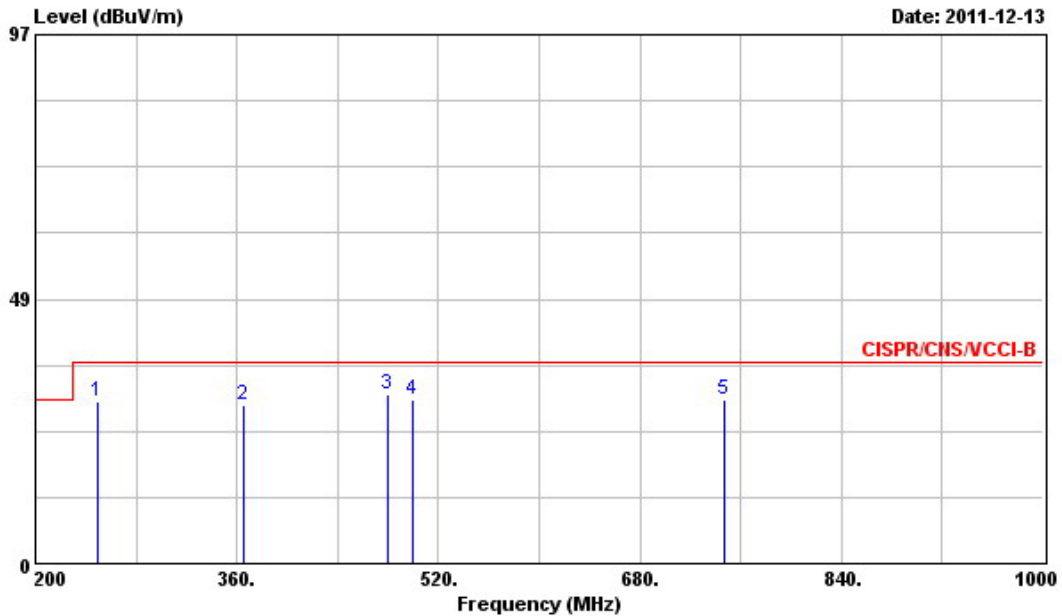
Site : OS02-NH  
 Condition : CISPR/CNS/VCCI-B 10m OS02-ANT-01-20-2011 VERTICAL  
 EUT :  
 POWER : 230VAC  
 MEMO :

	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	30.02	-6.98	37.00	45.74	12.95	2.75	31.42	Peak	---	---
2	312.800	29.35	-7.65	37.00	43.90	13.63	3.20	31.38	Peak	---	---
3	499.200	30.25	-6.75	37.00	39.81	17.47	4.32	31.35	Peak	---	---
4	599.200	30.28	-6.72	37.00	38.07	18.61	4.89	31.29	Peak	---	---
5	760.800	29.51	-7.49	37.00	35.11	19.89	5.82	31.31	Peak	---	---
6	796.800	30.53	-6.47	37.00	35.59	20.20	6.07	31.33	Peak	---	---



Site : OS02-NH  
 Condition : CISPR/CNS/VCCI-B 10m OS02-ANT-01-20-2011 HORIZONTAL  
 EUT :  
 POWER : 230VAC  
 MEMO :

	Freq	Level	Over Limit	Limit Line	ReadAntenna 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	125.000	24.95	-5.05	30.00	42.50	12.21	1.88	31.64	QP	---	---
2	147.990	25.63	-4.37	30.00	44.55	10.59	2.08	31.59	Peak	---	---
3	179.990	24.64	-5.36	30.00	44.69	9.09	2.37	31.51	Peak	---	---
4	200.060	26.90	-3.10	30.00	46.61	9.25	2.50	31.46	Peak	---	---



Site : OS02-NH  
 Condition : CISPR/CNS/VCCI-B 10m OS02-ANT-01-20-2011 HORIZONTAL  
 EUT :  
 POWER : 230VAC  
 MEMO :

	Freq	Level	Over Limit	Limit Line	ReadAntenna 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	29.57	-7.43	37.00	45.29	12.95	2.75	31.42	Peak	---	---
2	365.600	29.09	-7.91	37.00	41.92	15.08	3.49	31.40	Peak	---	---
3	480.000	31.11	-5.89	37.00	41.10	17.18	4.19	31.36	Peak	---	---
4	499.200	30.01	-6.99	37.00	39.57	17.47	4.32	31.35	Peak	---	---
5	747.200	30.06	-6.94	37.00	35.86	19.78	5.73	31.31	Peak	---	---

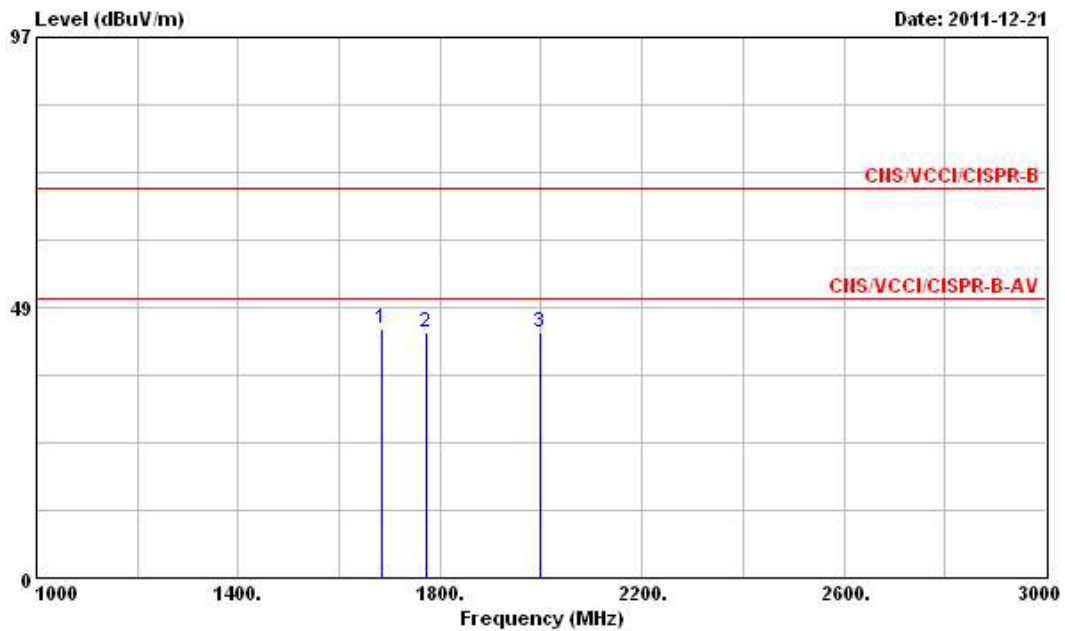


<b>Test mode</b>	Mode 1	<b>Test Site No.</b>	03CH03-HY
<b>Test frequency</b>	1000 MHz ~ 6000 MHz	<b>Test Engineer</b>	Chris
<b>Antenna distance</b>	3 meter	<b>Test Voltage</b>	AC 230V / 50Hz
<b>Temperature</b>	17 °C	<b>Relative Humidity</b>	55 %

Note: 1. Emission level (dB $\mu$ V/m) = 20 log Emission level ( $\mu$ V/m)

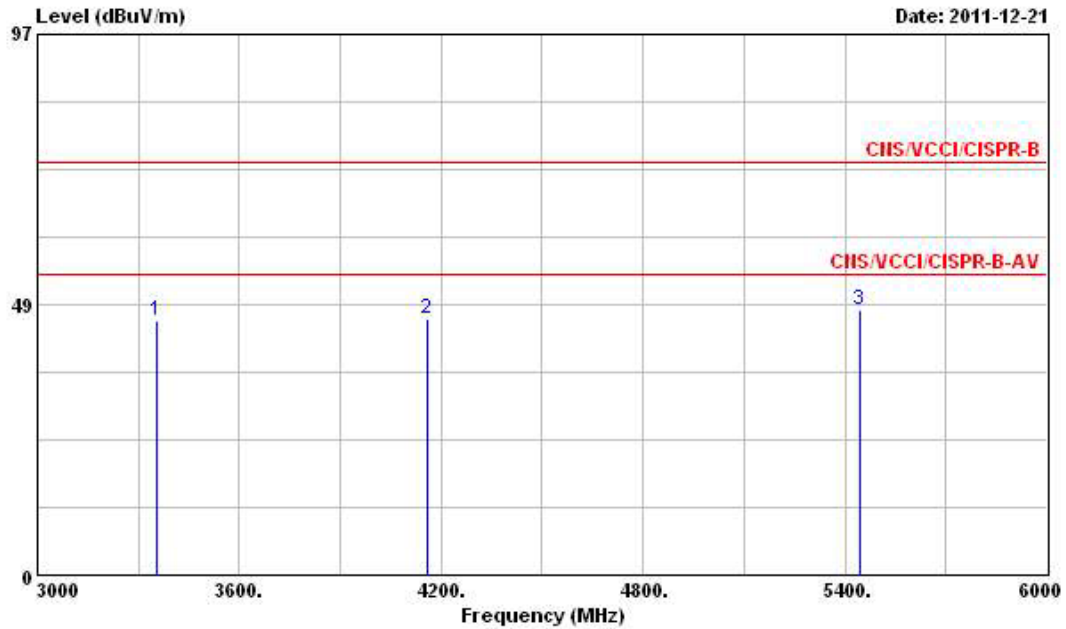
2. Corrected Reading : Antenna Factor + Cable Loss + Read Level – Preamp Factor = Level

■ The test was passed at the minimum margin that marked by the frame in the following data



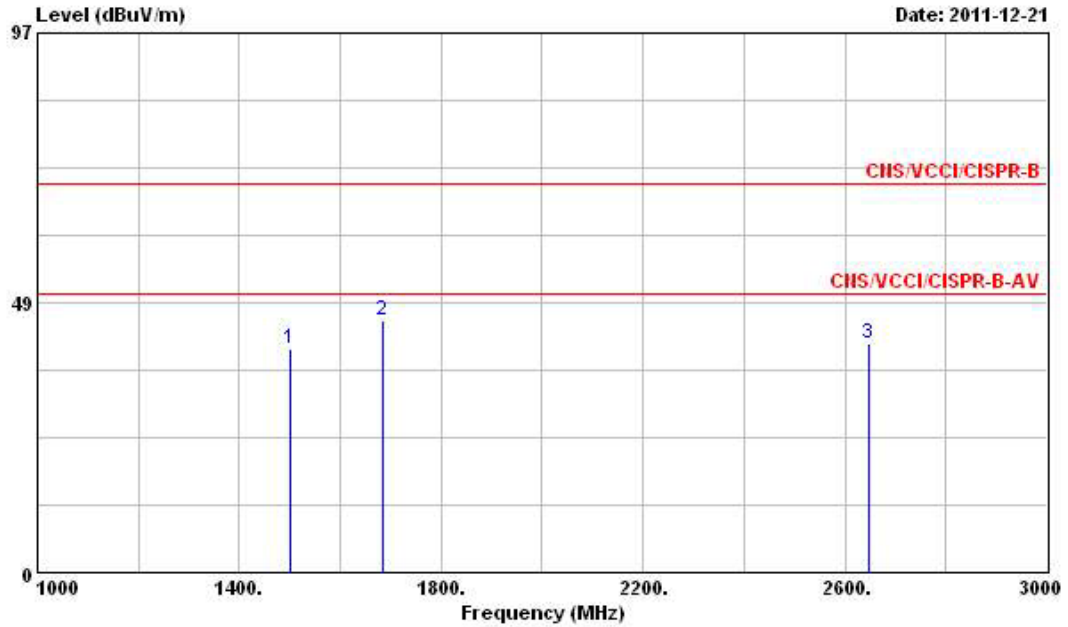
Site : 03CH03-HY  
 Condition : CNS/VCCI/CISPR-B 3m HORN-6741-2011-06 VERTICAL  
 EUT :  
 Power : 230V 50Hz  
 Modele : KRR-4XX  
 Memo : REC +LAN 1 Gbps+POWER(ETASIS)

	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 @	1684.000	44.65	-25.35	70.00	47.53	26.04	3.96	32.88	Peak	---	---
2	1772.000	43.93	-26.07	70.00	46.34	26.43	3.99	32.83	Peak	---	---
3	1998.000	44.17	-25.83	70.00	45.26	27.50	4.08	32.67	Peak	---	---



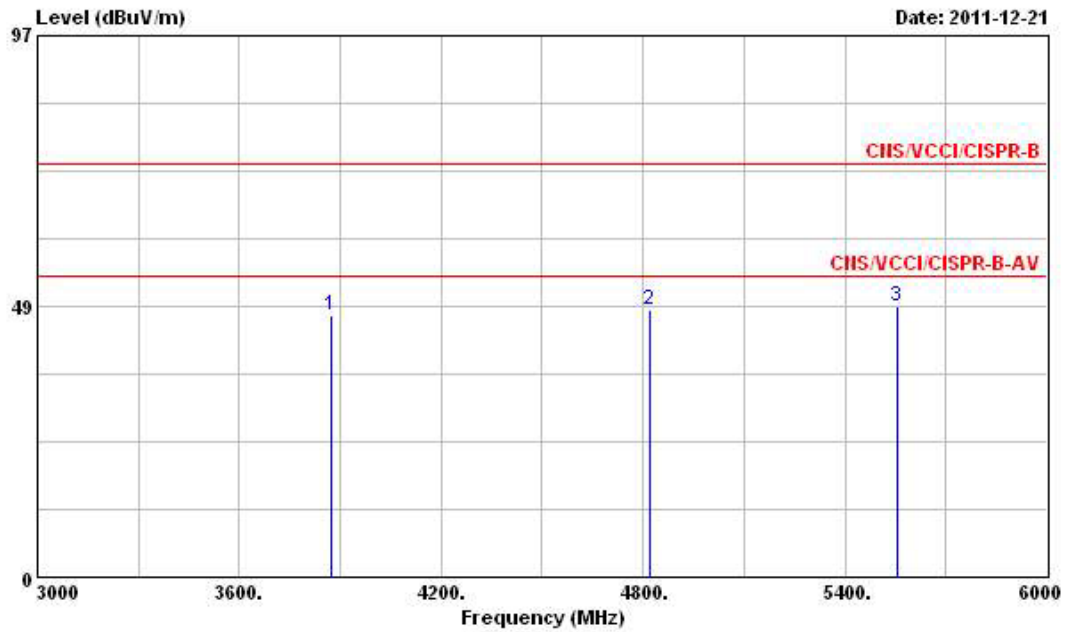
Site : 03CH03-HY  
 Condition : CNS/VCCI/CISPR-B 3m HORN-6741-2011-06 VERTICAL  
 EUT :  
 Power : 230V 50Hz  
 Modele : KRR-4XX  
 Memo : REC +LAN 1 Gbps+POWER(ETASIS)

	Freq	Level	Over Limit	Limit Line	ReadAntenna 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	3354.000	45.47	-28.53	74.00	42.04	30.79	5.41	32.77	Peak	---	---
2	4158.000	45.99	-28.01	74.00	40.67	32.47	5.51	32.66	Peak	---	---
3	5445.000	47.54	-26.46	74.00	40.82	33.92	5.36	32.56	Peak	---	---



Site : 03CH03-HY  
 Condition : CNS/VCCI/CISPR-B 3m HORN-6741-2011-06 HORIZONTAL  
 EUT :  
 Power : 230V 50Hz  
 Modele : KRR-4XX  
 Memo : REC +LAN 1 Gbps+POWER(ETASIS)

	Freq	Level	Over Limit	Limit Line	ReadAntenna 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	1500.000	40.20	-29.80	70.00	44.12	25.20	3.88	33.00	Peak	---	---
2	1686.000	45.17	-24.83	70.00	48.05	26.04	3.96	32.88	Peak	100	142
3	2646.000	41.05	-28.95	70.00	39.95	28.91	4.97	32.78	Peak	---	---



Site : 03CH03-HY  
 Condition : CNS/VCCI/CISPR-B 3m HORN-6741-2011-06 HORIZONTAL  
 EUT :  
 Power : 230V 50Hz  
 Modele : KRR-4XX  
 Memo : REC +LAN 1Gbps+POWER(ETASIS)

	Freq	Level	Over Limit	Limit Line	ReadAntenna 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	3873.000	46.97	-27.03	74.00	41.99	32.16	5.49	32.67	Peak	---	---
2	4818.000	47.98	-26.02	74.00	42.11	33.06	5.43	32.62	Peak	---	---
3	5553.000	48.36	-25.64	74.00	41.60	34.02	5.31	32.57	Peak	---	---

### 6.5. Photographs of Radiated Emission Test Configuration

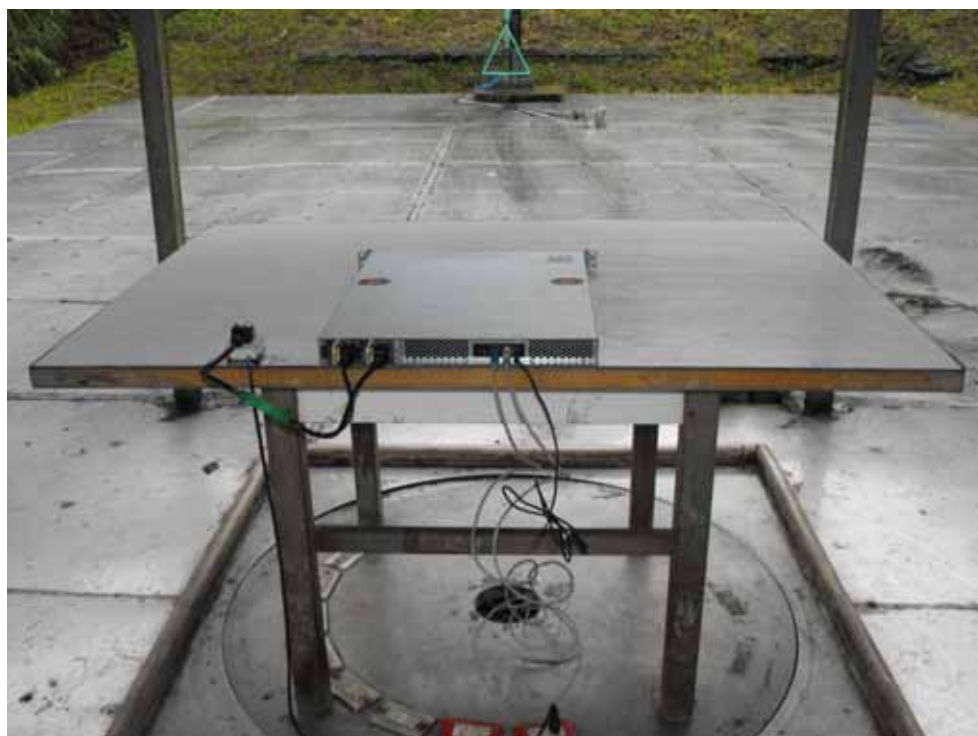
- The photographs show the configuration that generates the maximum emission.

For Below 1GHz

FRONT VIEW



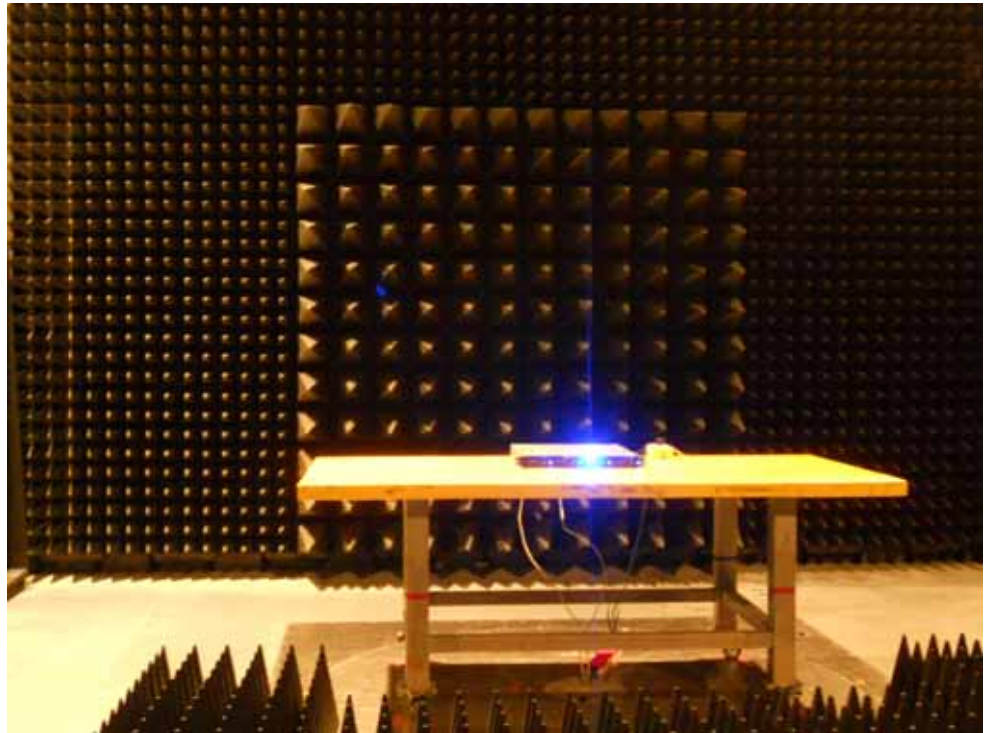
REAR VIEW





For Above 1GHz

FRONT VIEW



REAR VIEW



## 7. Harmonics Test

As specified on clause 7 of EN 61000-3-2:2006/A2:2009, the limits are not specified for equipment with a rated power of 75W or less.

The EUT meets the above condition, so it conforms to EN 61000-3-2.

## 8. Voltage Fluctuations Test

### 8.1. Standard

- Product Standard : EN 61000-3-3:2008

### 8.2. Test Procedure

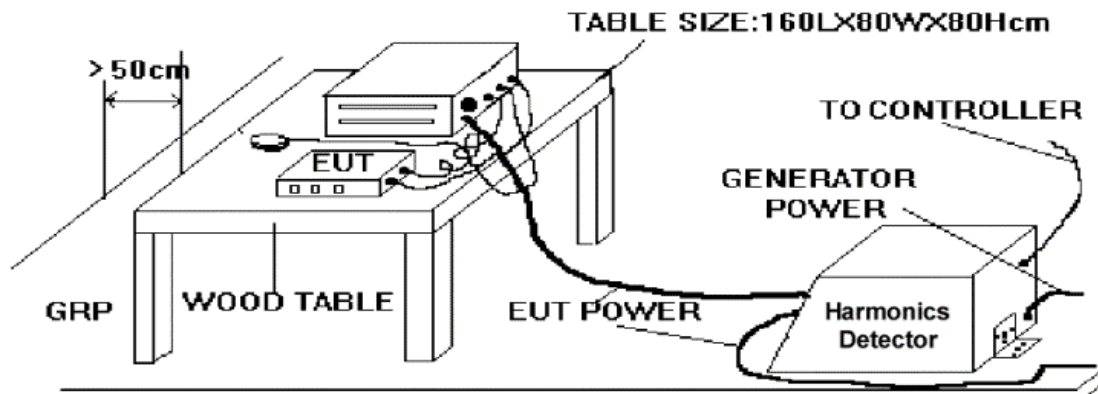
The equipment shall be tested under the conditions of **Clause 5**.

The total impedance of the test circuit, excluding the appliance under test, but including the internal impedance of the supply source, shall be equal to the reference impedance. The stability and tolerance of the reference impedance shall be adequate to ensure that the overall accuracy of  $\pm 8\%$  is achieved during the whole assessment procedure.

### 8.3. Test Equipment Settings

Line Voltage	: 230 V
Line Frequency	: 50 Hz
Measurement Delay	: 10.0 seconds
Pst Integration Time	: 10.0 minutes
Pst Integration Periods	: 1
Test Duration	: 10.0 minutes

### 8.4. Test Setup





**8.5. Test Result of Voltage Fluctuation and Flicker Test**

Final Test Result : **PASS**  
Temperature : 22 °C  
Relative Humidity : 48 %  
Atmospheric Pressure : 103 kPa  
Test Date : Dec. 26, 2011  
Test Engineer : Yen-Liang Ou  
Test Mode : Mode 1

Urms = 230.1V Freq = 49.987 Range: 2 A  
Irms = 0.432A Ipk = 0.777A cf = 1.801  
P = 62.24W S = 99.32VA pf = 0.627

Test - Time : 1 x 10min = 10min ( 100 %)

LIN (Line Impedance Network) : SLIN 0.24ohm +j0.15ohm N:0.16ohm +j0.10ohm

Limits : Plt : 0.65 Pst : 1.00  
dmax : 4.00 % dc : 3.30 %  
dtLim: 3.30 % dt>Lim: 500ms

Test completed, Result: PASSED

	Pst	P50s	P10s	P3s	P1s	P0.1s	dmax	dc	dt>Lim
1	0.072	0.010	0.010	0.010	0.010	0.010	0.500	0.020	0.000

**Final Test Result** : **PASS**  
**Temperature** : 22 °C  
**Relative Humidity** : 48 %  
**Atmospheric Pressure** : 103 kPa  
**Test Date** : Dec. 24, 2011  
**Test Engineer** : Yen-Liang Ou  
**Test Mode** : Mode 2

Urms = 230.1V    Freq = 50.000    Range: 2 A  
 Irms = 0.426A    Ipk = 1.401A    cf = 3.291  
 P = 57.97W    S = 97.98VA    pf = 0.592

Test - Time : 1 x 10min = 10min ( 100 %)

LIN (Line Impedance Network) : SLIN 0.24ohm +j0.15ohm N:0.16ohm +j0.10ohm

Limits :    Plt : 0.65    Pst : 1.00  
           dmax : 4.00 %    dc : 3.30 %  
           dtLim: 3.30 %    dt>Lim: 500ms

Test completed, Result: PASSED

	Pst	P50s	P10s	P3s	P1s	P0.1s	dmax	dc	dt>Lim
1	0.072	0.010	0.010	0.010	0.010	0.010	0.000	0.150	0.000

**8.6. Photographs of Harmonics Test, Voltage Fluctuation and Flicker Test**

FRONT VIEW



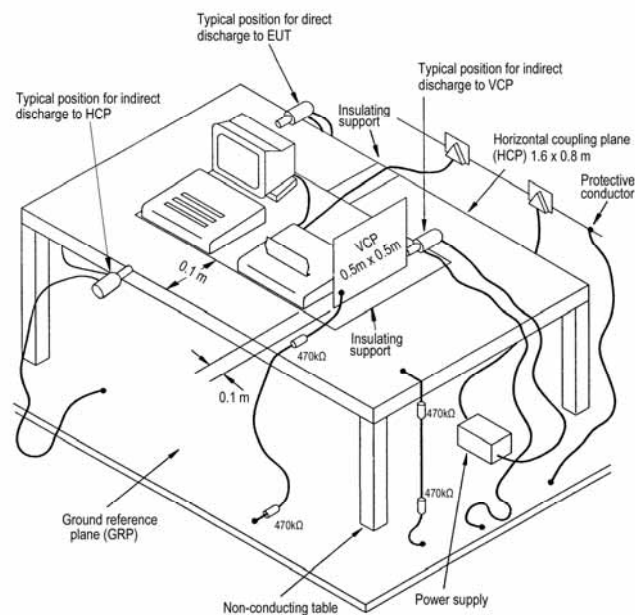
REAR VIEW



## 9. Electrostatic Discharge Immunity Test (ESD)

- Final Test Result : **PASS**
- Pass Performance Criteria : **A**
- Required Performance Criteria : B
- Basic Standard : IEC 61000-4-2:2008
- Product Standard : EN 55024:1998/A1:2001/A2:2003
- Level : 3 for air discharge  
: 2 for contact discharge
- Test Voltage :  $\pm 2 / \pm 4 / \pm 8$  KV for air discharge  
:  $\pm 2 / \pm 4$  KV for contact discharge
- Temperature : 22 °C
- Relative Humidity : 49 %
- Atmospheric Pressure : 103 kPa
- Test Date : Dec. 27, 2011
- Test Mode : Mode 1
- Test Engineer : Yen-Liang Ou
- Observation : Normal.

### 9.1. Test Setup



The test setup consists of the test generator, EUT and auxiliary instrumentation necessary to perform DIRECT and INDIRECT application of discharges to the EUT as applicable, in the follow manner:

- a. CONTACT DISCHARGE to the conductive surfaces and to coupling plane;
- b. AIR DISCHARGE at insulating surfaces.

The preferred test method is that of type tests performed in laboratories and the only accepted method of demonstrating conformance with this standard. The EUT was arranged as closely as possible to arrangement in final installed conditions.

## **9.2. Test Setup for Tests Performed in Laboratory**

A ground reference plane was provided on the floor of the test site. It was a metallic sheet (copper or aluminum) of 0.25 mm, minimum thickness; other metallic may be used but they shall have at least 0.65 mm thickness. In the SPORTON EMC LAB., we provided 1 mm thickness aluminum ground reference plane or 1 mm thickness stainless steel ground reference plane. The minimum size of the ground reference plane is 1 m x 1 m, the exact size depending on the dimensions of the EUT. It was connected to the protective grounding system.

The EUT was arranged and connected according to its functional requirements. A distance of 1 m minimum was provided between the EUT and the wall of the Lab., and any other metallic structure. In cases where this length exceeds the length necessary to apply the discharges to the selected points, the excess length shall, where possible, be placed non-inductively off the ground reference plane and shall not come closer than 0.2 m to other conductive parts in the test setup.

Where the EUT is installed on a metal table, the table was connected to the reference plane via a cable with a 470k ohm resister located at each end, to prevent a build-up of charge. The test setup was consist a wooden table, 0.8 m high, standing on the ground reference plane. A HCP, 1.6 m x 0.8 m, was placed on the table. The EUT and cables was isolated from the HCP by an insulating support 0.5 mm thick. The VCP size, 0.5 m x 0.5 m.

### 9.3. ESD Test Procedure

- a. In the case of air discharge testing the climatic conditions shall be within the following ranges:
- ambient temperature: 15 °C to 35 °C;
  - relative humidity : 30 % to 60 %;
  - atmospheric pressure : 86 kPa (860 mbar) to 106 kPa (1060 mbar).
- b. Test programs and software shall be chosen so as to exercise all normal modes of operation of the EUT. The use of special exercising software is encouraged, but permitted only where it can be shown that the EUT is being comprehensively exercised.
- c. The test voltage shall be increased from the minimum to the selected test severity level, in order to determine any threshold of failure. The final severity level should not exceed the product specification value in order to avoid damage to the equipment.
- d. The test shall be performed with both air discharge and contact discharge. On preselected points at least 10 single discharges (in the most sensitive polarity) shall be applied on air discharge. On preselected points at least 25 single discharges (in the most sensitive polarity) shall be applied on contact discharge.
- e. For the time interval between successive single discharges an initial value of one second is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.
- f. In the case of contact discharges, the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.
- g. In the case of painted surface covering a conducting substrate, the following procedure shall be adopted:
- If the coating is not declared to be an insulating coating by the equipment manufacturer, then the pointed tip of the generator shall penetrate the coating so as to make contact with the conducting substrate.
  - Coating declared as insulating by the manufacturer shall only be submitted to the air discharge.
  - The contact discharge test shall not be applied to such surfaces.
- h. In the case of air discharges, the round discharge tip of the discharge electrode shall be approached as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator (discharge electrode) shall be removed from the EUT. The generator is then retriggered for a new single discharge. This procedure shall be repeated until the discharges are completed. In the case of an air discharge test, the discharge switch, which is used for contact discharge, shall be closed.

## 9.4. Test Severity Levels

### 9.4.1. Contact Discharge

Level	Test Voltage (KV) of Contact discharge
1	±2
2	±4
3	±6
4	±8
X	Specified
Remark : "X" is an open level.	

### 9.4.2. Air Discharge

Level	Test Voltage (KV) of Air Discharge
1	±2
2	±4
3	±8
4	±15
X	Specified
Remark : "X" is an open level.	

## 9.5. Test Points

### 9.5.1. Test Result of Air Discharge

Test Method	No. Of Discharges	Air Discharge/Round Tip						Test Record
		+2kV	-2kV	+4kV	-4kV	-8kV	+8kV	
LED	10	ND	ND	ND	ND	ND	ND	Note <sup>1</sup>
Power SW	10	ND	ND	ND	ND	ND	ND	Note <sup>1</sup>
RESET SW	10	ND	ND	ND	ND	ND	ND	Note <sup>1</sup>
AC SOCKET	10	ND	ND	ND	ND	ND	ND	Note <sup>1</sup>
USB port	10	ND	ND	ND	ND	ND	ND	Note <sup>1</sup>
Control Button	10	ND	ND	ND	ND	ND	ND	Note <sup>1</sup>
Remark	1. The "ND" is means No Discharge.							

### 9.5.2. Test Result of Contact Discharge

#### 9.5.2.1 Direct discharge

Test Method	No. Of Discharges	Contact Discharge/Pointed Tip				Test Record
		+2kV	-2kV	+4kV	-4kV	
case	25	A	A	A	A	None
screw	25	A	A	A	A	None
bracket	25	A	A	A	A	None
RJ45 port	25	A	A	A	A	None

#### 9.5.2.2 Indirect discharge to HCP and VCP

Test Method	No. Of Discharges	Contact Discharge/Pointed Tip				Test Record
		+2kV	-2kV	+4kV	-4kV	
HCP (At Front)	25	A	A	A	A	None
HCP (At Left)	25	A	A	A	A	None
HCP (At Right)	25	A	A	A	A	None
HCP (At Rear)	25	A	A	A	A	None
VCP (At Front)	25	A	A	A	A	None
VCP (At Left)	25	A	A	A	A	None
VCP (At Right)	25	A	A	A	A	None
VCP (At Rear)	25	A	A	A	A	None



**9.6. Photographs of Electrostatic Discharge Immunity Test**

FRONT VIEW



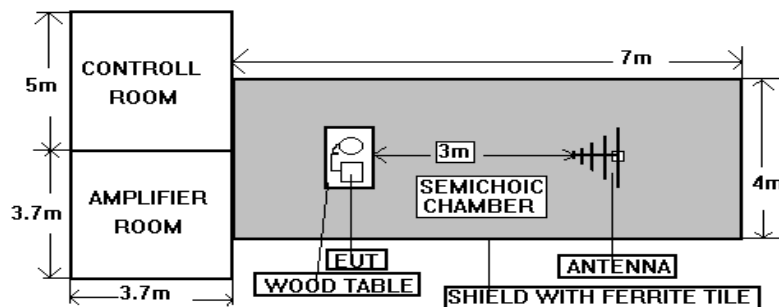
REAR VIEW



## 10. Radio Frequency Electromagnetic Field Immunity Test (RS)

- Final Test Result : **PASS**
- Pass Performance Criteria : **A**
- Required Performance Criteria : A
- Basic Standard : IEC 61000-4-3:2006/A1:2007/A2:2010
- Product Standard : EN 55024:1998/A1:2001/A2:2003
- Level : 2
- Frequency Range : 80-1000 MHz
- Additional Selection Frequency : 80, 120, 160, 230, 434, 460, 600, 863, 900MHz
- Dwell Time : 2.9 seconds
- Field Strength : 3 V/m (unmodulated, r.m.s) 80% AM (1 kHz)
- Temperature : 22 °C
- Relative Humidity : 48 %
- Atmospheric Pressure : 103 kPa
- Test Date : Dec. 27, 2011
- Test Mode : Mode 1
- Test Engineer : Yen-Liang Ou
- Observation : Normal.

### 10.1. Test Setup



**NOTE :** The SPORTON 7m x 4m x 4m semi-anechoic chamber is compliance with the sixteen point's uniform field requirement as stated in IEC 1000-4-3 Section 6.2.

The procedure defined in this part requires the generation of electromagnetic fields within which the test sample is placed and its operation observed. To generate fields that are useful for simulation of actual (field) conditions may require significant antenna drive power and the resultant high field strength levels. To comply with local regulations and to prevent biological hazards to the testing personnel, it is recommended that these tests be carried out in a shielded enclosure or semi-anechoic chamber.

## 10.2. Test Procedure

- a. The equipment to be tested is placed in the center of the enclosure on a wooden table. The equipment is then connected to power and signal leads according to pertinent installation instructions.
- b. The bilog antenna which is enabling the complete frequency range of 80-1000MHz is placed 3m away from the equipment. The required field strength is determined by placing the field strength meter(s) on top of or directly alongside the equipment under test and monitoring the field strength meter via a remote field strength indicator outside the enclosure while adjusting the continuous-wave to the applicable antennae.
- c. The test is normally performed with the generating antenna facing each of four sides of the EUT. The polarization of the field generated by the broadband (bilog) antenna necessitates testing each position twice, once with the antenna positioned vertically and again with the antenna positioned horizontally.
- d. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies e.g. clock frequency(ies) and harmonics or frequencies of dominant interest shall be analyzed separately.
- e. At each of the above conditions, the frequency range is swept 80-1000MHz, pausing to adjust the R.F. signal level or to switch oscillators and antenna. The rate of sweep is in the order of  $1.5 \times 10^{-3}$  decades/s. The sensitive frequencies or frequencies of dominant interest may be discretely analyzed.

**10.3. Test Severity Levels**

Frequency Band : 80-1000MHz

Level	Test field strength (V/m)
1	1
2	3
3	10
X	Specified
Remark : "X" is an open class.	

**10.4. Test side**

Antenna Polarization	Test side	Test Result
VERTICAL	FRONT	<u>PASS</u>
VERTICAL	BACK	<u>PASS</u>
VERTICAL	RIGHT	<u>PASS</u>
VERTICAL	LEFT	<u>PASS</u>
HORIZONTAL	FRONT	<u>PASS</u>
HORIZONTAL	BACK	<u>PASS</u>
HORIZONTAL	RIGHT	<u>PASS</u>
HORIZONTAL	LEFT	<u>PASS</u>

### 10.5. Photographs of Radio Frequency Electromagnetic Field Immunity Test

FRONT VIEW



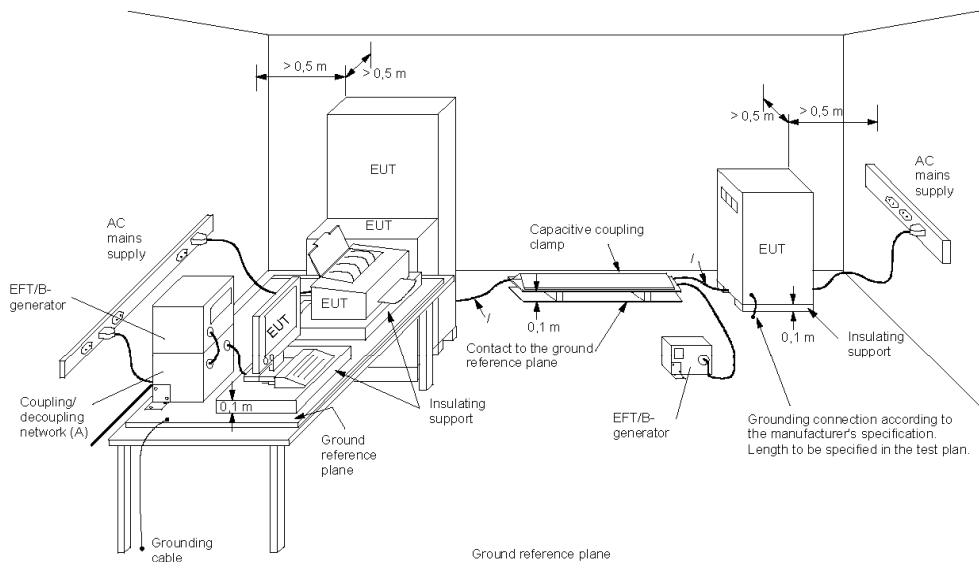
REAR VIEW



## 11. Electrical Fast Transient/Burst Immunity Test (EFT/BURST)

- Final Test Result : **PASS**
- Pass Performance Criteria : **A**
- Required Performance Criteria : B
- Basic Standard : IEC 61000-4-4:2004
- Product Standard : EN 55024:1998/A1:2001/A2:2003
- Level : on Input power ports -- 2  
: on signal port and telecommunication ports -- 2
- Test Voltage : on Input power ports --  $\pm 0.5 / \pm 1.0$  kV  
: on signal port and telecommunication ports --  $\pm 0.25 / \pm 0.5$  kV
- Temperature : 22 °C
- Relative Humidity : 48 %
- Atmospheric Pressure : 103 kPa
- Test Date : Dec. 27, 2011
- Test Mode : Mode 1
- Test Engineer : Yen-Liang Ou
- Observation : Normal.

### 11.1. Test setup



**Key**

- / length between clamp and the EUT to be tested (should be  $0,5 \text{ m} \pm 0,05 \text{ m}$ )
- (A) location for supply line coupling
- (B) location for signal lines coupling

IEC 901/04

The EUT was placed on a ground reference plane and was insulated from it by an insulating support about 0.1 m thick. If the EUT is table-top equipment, it was located approximately 0.8 m above the GRP. The GRP. Was a metallic sheet (copper or aluminum) of 0.25 mm, minimum thickness; other metallic may be used but they shall have at least 0.65 mm thickness. It shall project beyond the EUT by at least 0.1 m on all sides and connected to the protective earth. In the SPORTON EMC LAB., We provided 1 mm thickness aluminum ground reference plane or 1 mm thickness stainless steel ground reference plane. The minimum size of the ground reference plane is 1 m x 1 m, the exact size depending on the dimensions of the EUT. It was connected to the protective grounding system. The EUT was arranged and connected according to its functional requirements. The minimum distance between the EUT and other conductive structures, except the GRP. Beneath the EUT, was more than 0.5 m. using the coupling clamp, the minimum distance between the coupling plates and all other conductive structures, except the GRP. Beneath the EUT, was more than 0.5 m. The length of the signal and power lines between the coupling device and the EUT was 1 m or less.

## **11.2. Test on Power Line**

- a. The EFT/B-generator was located on the GRP. The length from the EFT/B-generator to the EUT as not exceeds 1 m.
- b. The EFT/B-generator provides the ability to apply the test voltage in a non-symmetrical condition to the power supply input terminals of the EUT.

## **11.3. Test on Communication Lines**

- a. The coupling clamp is composed of a clamp unit for housing the cable (length more than 3 m), and was placed on the GRP.
- b. The coupling clamp provides the ability of coupling the fast transient/bursts to the cable under test.

**11.4. Test Procedure**

- a. In order to minimize the effect of environmental parameters on test results, the climatic conditions when test is carrying out shall comply with the following requirements:
  - ambient temperature: 15 °C to 35 °C;
  - relative humidity : 45 % to 75 %;
  - atmospheric pressure : 86 kPa (860 mbar) to 106 kPa (1060 mbar).
- b. In order to minimize the effect of environmental parameters on test results, the electromagnetic environment of the laboratory shall not influence the test results.
- c. The variety and diversity of equipment and systems to be tested make it difficult to establish general criteria for the evaluation of the effects of fast transients/bursts on equipment and systems.
- d. The test results may be classified on the basic of the operating conditions and the functional specification of the equipment under test, according to the following performance criteria :
  - Normal performance within the specification limits.
  - Temporary degradation or loss of function or performance which is self-recoverable.
  - Temporary degradation or loss of function or performance which requires operator intervention or system reset.
  - Degradation or loss of function which is not recoverable due to damage of equipment (components).

**11.5. Test Severity Levels**

The following test severity levels are recommended for the fast transient/burst test :

Open circuit output test voltage ± 10%		
Level	On Input power ports	On signal port and telecommunication ports
1	0.5 KV	0.25 KV
2	1.0 KV	0.50 KV
3	2.0 KV	1.00 KV
4	4.0 KV	2.00 KV
X	Specified	Specified

Remark : " X " is an open level.  
 The level is subject to negotiation between the user and the manufacturer or is specified by the manufacturer.



**11.6. Photographs of Electrical Fast Transient/BURST Immunity Test**

FRONT VIEW



REAR VIEW



CLAMP



## 12. Surge Immunity Test

- Final Test Result : **PASS**
- Pass Performance Criteria : **B**
- Required Performance Criteria : B
- Basic Standard : IEC 61000-4-5:2005
- Product Standard : EN 55024:1998/A1:2001/A2:2003
- Surge wave form (Tr/Th) : 1.2/50 ( 8/20 )  $\mu$ s
- Level :
  - : on Input power ports -- 3
  - : on signal port and telecommunication ports -- N/A
- Test Voltage :
  - : on Input power ports --  $\pm 0.5 / \pm 1.0 / \pm 2.0$  kV
  - : on signal port and telecommunication ports -- N/A
- Temperature : 22 °C
- Relative Humidity : 48 %
- Atmospheric Pressure : 103 kPa
- Test Date : Dec. 27, 2011
- Test Mode : Mode 1-2
- Test Engineer : Yen-Liang Ou
- Observation : During the test at  $\pm 1$ kV on L-N, the EUT was interfered. After the test, the equipment continued to operate as intended by the operator for Mode 2.
- Remark : The function loss were meet manufacturer' spec.  
The test on signal/telecommunication ports is not required due to the ports does not connect directly to outdoor cables for Mode 1.

### 12.1. Test Record

- Input AC power port:

<FOR Mode 1>

Voltage ( KV )	Test Location	Polarity	Phase Angle				Remark
			0°	90°	180°	270°	
0.5/1.0	L - N	+	A	A	A	A	Normal
		-	A	A	A	A	Normal
0.5/1.0/2.0	L - PE	+	A	A	A	A	Normal
		-	A	A	A	A	Normal
	N - PE	+	A	A	A	A	Normal
		-	A	A	A	A	Normal

⊕ Remark : PE = Earth reference

<FOR Mode 2>

Voltage ( KV )	Test Location	Polarity	Phase Angle				Remark
			0°	90°	180°	270°	
0.5/1.0	L - N	+	B	B	B	B	Refer Observation
		-	B	B	B	B	Refer Observation
0.5/1.0/2.0	L - PE	+	A	A	A	A	Normal
		-	A	A	A	A	Normal
	N - PE	+	A	A	A	A	Normal
		-	A	A	A	A	Normal

⊕ Remark : PE = Earth reference

## 12.2. Test Level

Level	Open-circuit test voltage, ± 10%, KV
1	0.5
2	1.0
3	2.0
4	4.0
x	Specified
NOTE - x is an open class. This level can be specified in the product specification.	

### 12.3. Test Procedure

- a. Climatic conditions  
The climatic conditions shall comply with the following requirements :
  - ambient temperature : 15 °C to 35 °C
  - relative humidity : 10 % to 75 %
  - atmospheric pressure : 86 kPa to 106 kPa ( 860 mbar to 1060 mbar )
- b. Electromagnetic conditions  
The electromagnetic environment of the laboratory shall not influence the test results.
- c. The test shall be performed according the test plan that shall specify the test set-up with
  - generator and other equipment utilized;
  - test level ( voltage/current );
  - generator source impedance;
  - internal or external generator trigger;
  - number of tests : at least five positive and five negative at the selected points;
  - repetition rate : maximum 1/min.
  - inputs and outputs to be tested;
  - representative operating conditions of the EUT;
  - sequence of application of the surge to the circuit;
  - phase angle in the case of a.c. power supply;
  - actual installation conditions, for example :
    - AC : neutral earthed,
    - DC : ( + ) or ( - ) earthed to simulated the actual earthing conditions.
- d. If not otherwise specified the surges have to be applied synchronized to the voltage phase at the zero-crossing and the peak value of the a.c. voltage wave ( positive and negative ).
- e. The surges have to be applied line to line and line(s) and earth. When testing line to earth, the test voltage has to be applied successively between each of the lines and earth, if there is no other specification.
- f. The test procedure shall also consider the non-linear current-voltage characteristics of the equipment under test. Therefore the test voltage has to be increased by steps up to the test level specified in the product standard or test plan.
- g. All lower levels including the selected test level shall be satisfied. For testing the secondary protection, the output voltage of the generator shall be increased up to the worst-case voltage breakdown level ( let-through level ) of the primary protection.
- h. If the actual operating signal sources are not available, the may be simulated. Under no circumstances may the test level exceed the product specification. The test shall be carried out according the test plan.
- i. To find all critical points of the duty cycle of the equipment, a sufficient number of positive and

negative test pulses shall be applied. For acceptance test previously unstressed equipment shall be used to the protection devices shall be replaced.

#### **12.4. Operating Condition**

Full system

### 12.5. Photographs of Surge Immunity Test

FRONT VIEW



REAR VIEW



### 13. Conducted Disturbances Induced by Radio-Frequency Field Immunity Test ( CS )

- Final Test Result : **PASS**
- Pass Performance Criteria : **A**
- Required Performance Criteria : A
- Basic Standard : IEC 61000-4-6:2008
- Product Standard : EN 55024:1998/A1:2001/A2:2003
- Level : 2
- Test Voltage : 3 V (unmodulated, r.m.s) 80% AM (1 kHz)
- Frequency Range : 0.15 MHz to 80 MHz
- Additional Selection Frequency : 0.2, 1, 7.1, 13.56, 21, 27.12, 40.68MHz
- Dwell time : 2.9 seconds
- Frequency step size : 1 %
- Coupling mode : CDN-M2+M3 for Input power ports  
: CDN-RJ45 for signal port and telecommunication ports
- Temperature : 22 °C
- Relative Humidity : 48 %
- Atmospheric Pressure : 103 kPa
- Test Date : Dec. 27, 2011
- Test Mode : Mode 1
- Test Engineer : Yen-Liang Ou
- Observation : Normal.

#### 13.1. Test Level

Level	Voltage Level (EMF)
1	1 V rms
2	3 V rms
3	10 V rms
x	Specified
NOTE - x is an open class. This level can be specified in the product specification.	

#### 13.2. Operating Condition

Full system



### 13.3. Test Procedure

- a. The EUT shall be operated within its intended climatic conditions. The temperature and relative humidity should be recorded.
- b. This test method test can be performed without using a sell shielded enclosure. This is because the disturbance levels applied and the geometry of the setups are not likely to radiated a high amount of energy, especially at the lower frequencies. If under certain circumstances the radiated energy is too high, a shielded enclosure has to be used.
- c. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn while the other non-excited RF-input ports of the coupling devices are terminated by a 50 ohm load resistor.
- d. The frequency range is swept from 150 kHz to 80 MHz, using the signal levels established during the setting process, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave, pausing to adjust the RF-signal level or to switch coupling devices as necessary. The rate of sweep shall no exceed  $1.5 \times 10^{-3}$  decades/s. Where the frequency is swept incrementally, the step size shall no exceed 1% of the start and thereafter 1% of the preceding frequency value.
- e. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies e.g. clock frequency(ies) and harmonics or frequencies of dominant interest shall be analyzed separately.
- f. In cases of dispute, the test procedure using a step size not exceeding 1% of the start and thereafter 1% of preceding frequency value shall take precedence.
- g. Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.
- h. The use of special exercising programs is recommended.
- i. Testing shall be performed according to a Test Plan, which shall be included in the test report.
- j. It may be necessary to carry out some investigatory testing in order to establish some aspects of the test plan.

**13.4. Photographs of CS tests**

FRONT VIEW



REAR VIEW



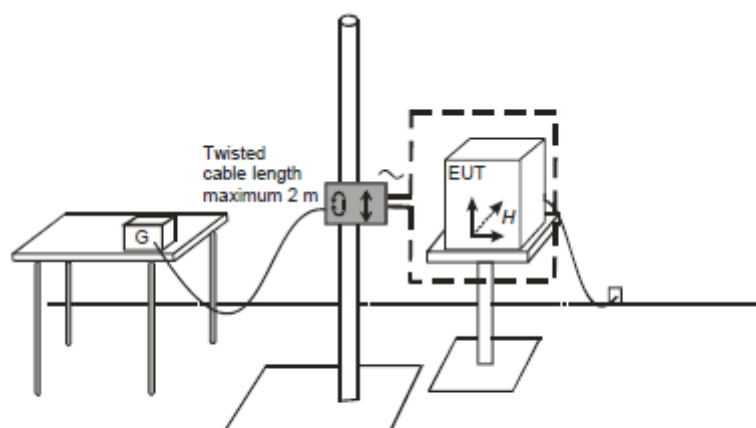
### 14. Power Frequency Magnetic Field immunity tests

- Final Test Result : **PASS**
- Pass Performance Criteria : **A**
- Required Performance Criteria : A
- Basic Standard : IEC 61000-4-8:2009
- Product Standard : EN 55024:1998/A1:2001/A2:2003
- Temperature : 22 °C
- Relative Humidity : 48 %
- Atmospheric Pressure : 103 kPa
- Test Date : Dec. 27, 2011
- Test Mode : Mode 1
- Test Engineer : Yen-Liang Ou
- Observation : Normal.

#### 14.1. Test Record

Power Frequency Magnetic Field	Testing duration	Coil Orientation	Results	Remark
50Hz, 1A/m	1.0 Min	X-axis	Pass	Normal
50Hz, 1A/m	1.0 Min	Y-axis	Pass	Normal
50Hz, 1A/m	1.0 Min	Z-axis	Pass	Normal

#### 14.2. Test Setup



EUT : Equipment under test    G : Test Generator

**14.3. Photographs of Power Frequency Magnetic Field immunity tests**

FRONT VIEW



REAR VIEW



## 15. Voltage Dips and Voltage Interruptions Immunity Tests

- Final Test Result : **PASS**
- Pass Performance Criteria : **C** for voltage interruption, **A/A** for voltage dips
- Required Performance Criteria : C for voltage interruption, C/B for voltage dips
- Basic Standard : IEC 61000-4-11:2004
- Product Standard : EN 55024:1998/A1:2001/A2:2003
- Test Port : Input power ports
- Temperature : 22 °C
- Relative Humidity : 48 %
- Atmospheric Pressure : 103 kPa
- Test Date : Dec. 27, 2011
- Test Mode : Mode 1
- Test Engineer : Yen-Liang Ou

### 15.1. Test Record of Voltage Interruption

Voltage (V)	Phase Angle		Reduction Voltage	Duration (Periods)	Observation
	0 °	180 °			
100/240	C	C	>95 %	250	After the interruption, the power of EUT was off. The power of the EUT must be reset by the operator

### 15.2. Test Record of Voltage Dips

Voltage (V)	Phase Angle		Reduction Voltage	Duration (Periods)	Observation
	0 °	180 °			
100/240	A	A	30 %	25	Normal
100/240	A	A	>95 %	0.5	Normal

### 15.3. Testing Requirement and Procedure

The test was based on IEC 61000-4-11:2004

### 15.4. Test Conditions

1. Source voltage and frequency : 100/240V, 50Hz, Single phase.
2. Test of interval : 10 sec.
3. Level and duration : Sequency of 3 dips/interrupts.
4. Voltage rise (and fall) time : 1 ~ 5  $\mu$ s.

### 15.5. Operating Condition

Full system

**15.6. Photographs of Voltage Dips and Voltage Interruptions Immunity Tests**

FRONT VIEW



REAR VIEW



## 16. List of Measuring Equipment Used

<EMI>

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Receiver	R&S	ESCS 30	100357	9 kHz - 2.75 GHz	Nov. 18, 2011	Conduction (CO01-NH)
LISN	SCHAFFNER	NNB41	04/10053	9kHz - 30MHz	Nov. 17, 2011	Conduction (CO01-NH)
Power Filter	CORCOM	MR12030	N/A	30A*2	N/A	Conduction (CO01-NH)
RF Cable-CON	Suhner Switzerland	RG223/U	CB004	9kHz - 30MHz	Dec. 13, 2011	Conduction (CO01-NH)
Impedance Stabilization Network	TESEQ GMBH	ISN T400A	25669	150kHz - 30MHz	Sep. 19, 2011	Conduction (CO01-NH)
Impedance Stabilization Network	TESEQ GMBH	ISN T800	26105	150kHz - 30MHz	Sep. 19, 2011	Conduction (CO01-NH)
Open Area Test Site	SPORTON	OATS-10	OS02-NH	30 MHz - 1 GHz 10m, 3m	Jan. 03, 2011	Radiation (OS02-NH)
Amplifier	BURGEON	BPA-530	100203	0.01 MHz - 3 GHz	May 24, 2011	Radiation (OS02-NH)
Receiver	R&S	ESCI	100497	9 kHz - 3 GHz	Mar. 22, 2011	Radiation (OS02-NH)
Bilog Antenna	CHASE	CBL6122B	2884	30 MHz - 2 GHz	Jan. 16, 2011	Radiation (OS02-NH)
Turn Table	EMCO	2080	9508-1805	0 - 360 degree	N/A	Radiation (OS02-NH)
Antenna Mast	ETS	2075-2	2385	1 m - 4 m	N/A	Radiation (OS02-NH)
RF Cable-R10m	MIYAZAKI	5DFB	CB044	30 MHz - 1 GHz	Sep. 16, 2011	Radiation (OS02-NH)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30 MHz ~ 1 GHz 3m	Dec. 12, 2011	Radiation (03CH03-HY)
Amplifier	Agilent	8449B	3008A02120	1 GHz ~ 26.5 GHz	Aug. 08, 2011	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6741	1 GHz ~ 18 GHz	May 30, 2011	Radiation (03CH03-HY)
RF Cable-high	SUHNER	SUCOFLEX 106	03CH03-HY	1 GHz ~ 40 GHz	Jan. 18, 2011	Radiation (03CH03-HY)
Turn Table	HD	DS 420	420/650/00	0 - 360 degree	N/A	Radiation (03CH03-HY)
Antenna Mast	MF	MF-7802	MF780208179	1 m - 4 m	N/A	Radiation (03CH03-HY)
Receiver	R&S	ESI	838496/008	20 Hz ~ 7 GHz	Apr. 24, 2011	Radiation (03CH03-HY)

Calibration Interval of instruments listed above is one year.



**<EMS>**

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
ESD Generator	TESEQ AG	NSG 437	192	Air: 0 ~ 30 KV Contact: 0 ~15KV	Oct. 07, 2011	ESD
Amplifier	AMPLIFIER& RESEARCH	250W1000A	0325368	80M~1GHz	Sep. 09, 2011	RS
DUAL DIRECTIONAL COUPLER	FARNKONIA	FLH200/100	1127	80-1GHz	Sep. 07, 2011	RS
S.G.	ROHDE& SCHWARZ	SML03	103349	9kHz~3.3GHz	Sep. 08, 2011	RS
METER	HP	438A	3513U04050	100 kHz~26.5 GHz	Sep. 08, 2011	RS
POWER Sensor	HP	8481D	3318A13140	10MHz~18GHz	Sep. 08, 2011	RS
POWER Sensor	HP	8482A	3318A26464	100 kHz~4.2GHz	Sep. 08, 2011	RS
Attenuator	HP	8491A	53603	3dB	N/A	RS
EMCPro System	KeyTek	EMCPro	0609221	0 KV - 4.4 KV	Oct. 17, 2011	EFT
EFT/Clamp	KEYTEK	CCL-4/S	0303191	0 KV -1 KV	N/A	EFT
SURGE Generator Bi-Wave	KEYTEK	EMCPRO	0609221	0 KV -6 KV/2 $\Omega$ 0KV-500V/12 $\Omega$	Oct. 17, 2011	SURGE
Conducted Immunity Test System	SCHAFFNER	NSG2070	1091	100KHz ~ 250MHz FM 1KHZ 80%	Jun. 17, 2011	CS
Attenuator	EM TEST	75W-DC-250 MHz 06	0004166A	150 kHz – 230 MHz	Jun. 15, 2011	CS
Koppel- Eutkoppelnetzwerk	FRANKONIA	CDN M2+M3	A3011018	150k~230MHz	Jun. 19, 2011	CS
Coupling/ Decoupling Network	FRANKONIA	CDN RJ45	A3023005	150k~230MHz	Jun. 19, 2011	CS (RJ45)
Magnetic Field Antenna	FCC	F-1000-4-8/9/10-L-1M	9830	0~125A	Apr. 19, 2011	Magnetic
Magnetic Generator	FCC	F-1000-4-8-G-125A	05004	0~125A	Apr. 19, 2011	Magnetic
EMCPro System	KeyTek	EMCPro	0609221	230VA/50Hz/60Hz 0%Open/5S 0%Short/5S 40%/0.10S 70%/0.01S	Oct. 17, 2011	DIP
Harmonic/Flicker Test System	EMC PARTNER	Harmonics -1000	088	4000VA 16A PEAK	Sep. 15, 2011	Harmonics, Flicker

Calibration Interval of instruments listed above is one year.

**APPENDIX A. Photographs of EUT**







