CE

SPORTON LAB.

Certificate No: EC482159

CERTIFICATE OF COMPLIANCE

EQUIPMENT: IPC Bare Bone System
MODEL NO. : JNF9QUXX-YYYY
(X & Y Stands for "0~9", "A~Z")
HBJC5WWF9QUXX-YYYY-ZZ
(W, X, Y & Z Stands for "0~9", "A~Z")
APPLICANT : Jetway Information Co., Ltd.
9F., No. 207, Sec. 3, Beixin Rd., Xindian Dist.,
New Taipei City 231, Taiwan (R.O.C.)

SPORTON LAB.

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 55022:2010/AC:2011 Class B,
EN 61000-3-2:2006/A1:2009 and /A2:2009, EN 61000-3-3:2008 and
EN 55024:2010 (IEC 61000-4-2 Edition 2.0 2008-12
IEC 61000-4-3 Edition 3.2 2010-04, IEC 61000-4-4 Edition 3.0 2012-05
IEC 61000-4-5 Edition 2.0 2005-11, IEC 61000-4-6 Edition 3.0 2008-10
IEC 61000-4-8 Edition 2.0 2009-09, IEC 61000-4-11 Edition 2.0 2004-03)

THE TEST WAS CARRIED OUT ON **Sep. 10, 2014** AT
SPORTON INTERNATIONAL INC. LAB.

Kero Kuo.

Kero Kuo
Assistant Manager

CE EMC TEST REPORT

according to

European Standard EN 55022:2010/AC:2011 Class B, EN 61000-3-2:2006/A1:2009 and /A2:2009, EN 61000-3-3:2008 and EN 55024:2010 (IEC 61000-4-2 Edition 2.0 2008-12 IEC 61000-4-3 Edition 3.2 2010-04, IEC 61000-4-4 Edition 3.0 2012-05 IEC 61000-4-5 Edition 2.0 2005-11, IEC 61000-4-6 Edition 3.0 2008-10 IEC 61000-4-8 Edition 2.0 2009-09, IEC 61000-4-11 Edition 2.0 2004-03)

Equipment : IPC Bare Bone System

Model No. : JNF9QUXX-YYYY
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Applicant : Jetway Information Co., Ltd.
9F., No. 207, Sec. 3, Beixin Rd., Xindian Dist.,
New Taipei City 231, Taiwan (R.O.C.)

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.

Testing Laboratory
1190

SPORTON International Inc.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

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History of this test report

Original Report Issue Date: Sep. 29, 2014

■ No additional attachment.

□ Additional attachments were issued as in the following record:

Report No.	Version	Issue Date	Description

Certificate No. : EC482159

CERTIFICATE OF COMPLIANCE

according to

European Standard EN 55022:2010/AC:2011 Class B, EN 61000-3-2:2006/A1:2009 and /A2:2009, EN 61000-3-3:2008 and EN 55024:2010 (IEC 61000-4-2 Edition 2.0 2008-12 IEC 61000-4-3 Edition 3.2 2010-04, IEC 61000-4-4 Edition 3.0 2012-05 IEC 61000-4-5 Edition 2.0 2005-11, IEC 61000-4-6 Edition 3.0 2008-10 IEC 61000-4-8 Edition 2.0 2009-09, IEC 61000-4-11 Edition 2.0 2004-03)

Equipment : IPC Bare Bone System

Model No. : JNF9QUXX-YYYY
(X & Y Stands for "0~9", "A~Z")
HBJC5WWF9QUXX-YYYY-ZZ
(W, X, Y & Z Stands for "0~9", "A~Z")

Applicant : Jetway Information Co., Ltd.
9F., No. 207, Sec. 3, Beixin Rd., Xindian Dist.,
New Taipei City 231, Taiwan (R.O.C.)

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 55022:2010/AC:2011 Class B, EN 61000-3-2:2006/A1:2009 and /A2:2009, EN 61000-3-3:2008 and EN 55024:2010 (IEC 61000-4-2 Edition 2.0 2008-12 IEC 61000-4-3 Edition 3.2 2010-04, IEC 61000-4-4 Edition 3.0 2012-05 IEC 61000-4-5 Edition 2.0 2005-11, IEC 61000-4-6 Edition 3.0 2008-10 IEC 61000-4-8 Edition 2.0 2009-09, IEC 61000-4-11 Edition 2.0 2004-03)**
The product sample received on Aug. 27, 2014 and completely tested on ***Sep. 10, 2014*** **at SPORTON International Inc.** LAB.

Kero Kuo
Assistant Manager

SPORTON International Inc.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

1. General Description of Equipment under Test

1.1. Applicant

Jetway Information Co., Ltd.

9F., No. 207, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan (R.O.C.)

1.2. Manufacturer

Same as 1.1

1.3. Basic Description of Equipment under Test

Equipment	:	IPC Bare Bone System
Model No.	:	JNF9QUXX-YYYY (X & Y Stands for "0~9", "A~Z") HBJC5WWF9QUXX-YYYY-ZZ (W, X, Y & Z Stands for "0~9", "A~Z")
Power Supply Type	:	From Adapter (switching)
AC Power Cord	:	Non-Shielded, 1.85 m, 3 pin
DC Power Cord	:	B-Shielded, 1.8 m

1.4. Feature of Equipment under Test

Please refer to user manual.

2. Test Configuration of Equipment under Test

2.1. Test Manner

a. During testing, the interface cables and equipment positions were varied according to European Standard EN 55022 .
b. The complete test system included LCD Monitor*2, Keyboard*1, Mouse*1, Modem*2, Printer*1, Headset*1, USB 3.0 Flash Disk*1, Remote workstation: PC*2, LCD Monitor*2, Keyboard*2, Mouse*2 and EUT for EMI test.
c. The complete test system included Monitor*1, Keyboard*1, Mouse*1, Modem*2, Headset*1, USB 3.0 Flash Disk*1, Remote workstation: Notebook*2 and EUT for EMS test.
d. The equipment under test were performed the following test modes:

Test Items	Description of test modes
AC Conducted Emission	Mode 1. R/W,DVI+VGA:1920*1200,LAN:1G*2 Mode 2. R/W,HDMI:1920*1080,LAN:1G*2 The following test mode was referred to pretest worst case “Mode 2” for final test.
ISN	Mode 2(a). LAN 1 : 1Gbps Mode 2(b). LAN 2 : 1Gbps Mode 2(c). LAN 1 : 100Mbps Mode 2(d). LAN 1 : 10Mbps The following test mode was referred to pretest worst case “Mode 2(a),(c),(d)” for final test.
Radiated Emissions Below 1GHz	Mode 1. R/W,DVI+VGA:1920*1200,LAN:1G*2 Mode 2. R/W,HDMI:1920*1080,LAN:1G*2 The following test mode was referred to pretest worst case “Mode 2” for final test.
Radiated Emissions Above 1GHz	Mode 1. R/W,DVI+VGA:1920*1200,LAN:1G*2
Flicker Emissions	Mode 1. R/W,DVI+VGA:1920*1200,LAN:1G*2 Mode 2. R/W,HDMI:1920*1080,LAN:1G*2
EMS	Mode 1. R/W,DVI+VGA:1920*1200,LAN:1G*2 Mode 2. R/W,HDMI:1920*1080,LAN:1G*2

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

2.2. Description of Test System

<For conducted emission and Radiated emission below 1GHz >

No.	Peripheral	Manufacturer	Model Number	Cable / Spec. Description
For Local				
1	LCD MONITOR"24"	DELL	U2410F	D-sub Cable, D-Shielded, 1.8m
				HDMI Cable, D-Shielded, 1.5m
2	LCD MONITOR"24"	DELL	U2410F	DVI Cable, D-Shielded, 1.8m
3	Keyboard	Lenovo	KU-0225	USB Cable, AL-F-Shielded, 1.8m
4	MOUSE	Lenovo	M-U0025-O	USB Cable, AL-F-Shielded, 1.8m
5	Modem *2	ACEEX	DM1414	RS-232 Cable, D-Shielded, 1.15m
6	Printer	XEROX	PHASER3121	USB Cable, D-Shielded, 1.8m
7	Headset	i-Acon	HOH-323-BK	Audio Cable, Non-Shielded, 2.0m
8	USB 3.0 FLASH DISK	PQI	U273V	-
For Remote				
9	PC *2	Lenovo	C61	-
10	LCD MONITOR"19"*2	DELL	E198WFPF	D-SUB Cable, D-Shielded, 1.8m
11	Keyboard *2	Lenovo	KU-0225	USB Cable, AL-F-Shielded, 1.8m
12	MOUSE *2	Lenovo	M-U0025-O	USB Cable, AL-F-Shielded, 1.8m

<Radiated emission above 1GHz >

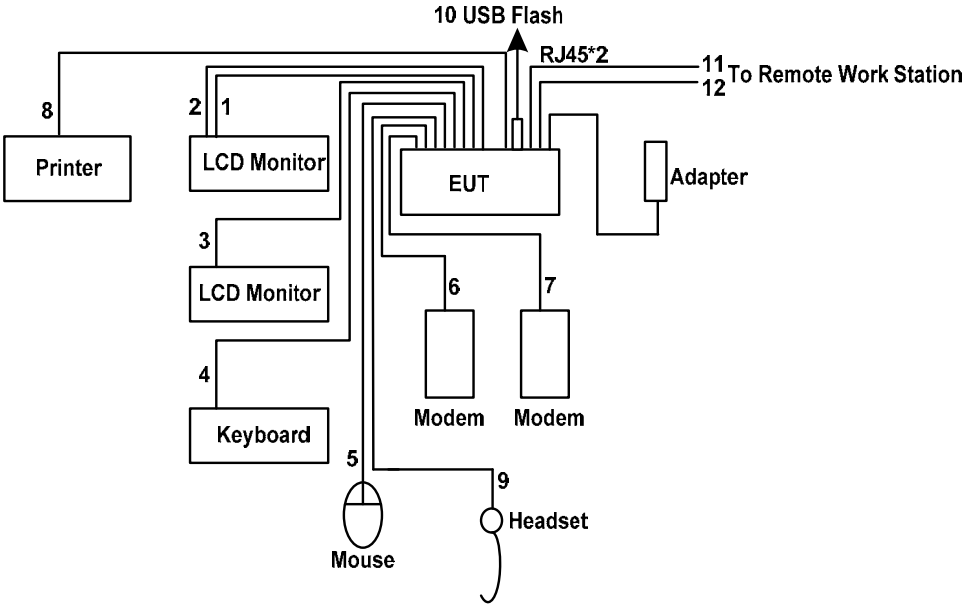
No.	Peripheral	Manufacturer	Model Number	Cable / Spec. Description
For Local				
1	LCD MONITOR"24"	DELL	2408WFPB	D-sub Cable, D-Shielded, 1.8m
				HDMI Cable, D-Shielded, 1.5m
2	LCD MONITOR"24"	DELL	U2410f	DVI Cable, D-Shielded, 1.8m
3	Keyboard	DELL	SK-8175	USB Cable, AL-F-Shielded, 1.8m
4	MOUSE	DELL	MOC5UO	USB Cable, AL-F-Shielded, 1.8m
5	Modem *2	ACEEX	DM1414	RS-232 Cable, D-Shielded, 1.15m
6	Printer	EPSON	C61	USB Cable, D-Shielded, 1.8m
7	Headset	INTOPIC	JAZZ-368	Audio Cable, Non-Shielded, 2.0m
8	USB 3.0 FLASH DISK	PHILIPS	FM08FD75B	-
For Remote				
9	PC *2	HP	DC7700	-
10	LCD MONITOR"24"*2	DELL	2408WFPB	D-SUB Cable, D-Shielded, 1.8m
11	Keyboard *2	Microsoft	1366	USB Cable, AL-F-Shielded, 1.8m
12	MOUSE *2	Microsoft	1113	USB Cable, AL-F-Shielded, 1.8m

< EMS >

No.	Peripheral	Manufacturer	Model Number	Cable / Spec. Description
For Local				
1	Monitor	DELL	2408WFPB	D-sub Cable, D-Shielded, 1.8m
				HDMI Cable, D-Shielded, 1.5m
				DVI Cable, D-Shielded, 1.8m
2	USB 3.0 FLASH DISK	PHILIPS	FM08FD75B	-
3	Modem *2	ACEEX	DM1414	RS-232 Cable, D-Shielded, 1.15m
4	Mouse	Microsoft	1366	USB Cable, D-Shielded, 1.85m
5	keyboard	Microsoft	MSK-1113	USB Cable, D-Shielded, 1.85m
6	Headset	INTOPIC	SR-MK02	Audio Cable, Non-Shielded,1.8m
For Remote				
7	NB	HP	Pavilion dm1	-
8	NB	HP	541	-

2.3. Connection Diagram for AC Powerline Conducted and Radiated Emission

Test Setup Diagram



1. D-sub Cable was connected from support unit 1 to EUT.
2. HDMI Cable was connected from support unit 1 to EUT.
3. DVI Cable was connected from support unit 2 to EUT.
4. USB Cable was connected from support unit 3 to EUT.
5. USB Cable was connected from support unit 4 to EUT.
6. RS-232 Cable was connected from support unit 5 to EUT.
7. RS-232 Cable was connected from support unit 5 to EUT.
8. USB Cable was connected from support unit 6 to EUT.
9. Audio Cable was connected from support unit 7 to EUT.
10. USB Flash was plugged into EUT.
11. RJ45 Cable was connected from EUT to remote work station.
12. RJ45 Cable was connected from EUT to remote work station.

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

3. Test Software

<EMI>

Conduction & Radiated Test :

One executive program was used as the test software under Win 7.

The programs were executed as follows:

a. EUT conducted “EMI program” to drive peripheral printer and modem.
b. The printer printed “H” patterns out.
c. EUT conducted “WINTHRAX” to do read/write function with USB Flash.
d. EUT conducted “Media player” to play audio signal from headset.
e. EUT conducted “Sound Recorder” to record audio signal from headset.
f. EUT conducted “MyHwin” to send “H” messages to the monitor and the monitor displayed “H” patterns.
g. EUT conducted “PING” to maintain connection with remote PC via LAN.

< ISN >

During testing, the remote PC executed "Tfgen" to do ISN(T8) test (LAN utilization in excess of 10 %) via RJ45 cable.

< EMS >

One executive program was used as the test software under Win 7.

The programs were executed as follows:

a. The remote notebooks executed "Ping" to maintain connection with the EUT via LAN.
b. EUT conducted “MyHwin” to drive peripheral monitor and to display “H” patterns on the monitor.
c. EUT conducted “WINTHRAX” to do read/write function with USB Flash.
d. EUT conducted “Media player” to play audio signal from headset.

4. General Information of Test

4.1. Test Facility

<EMI>

Test Site：SPORTON INTERNATIONAL INC.

Test Site Location : No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei 114, 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 : 886-3-327-0973

Test Site No. : 03CH04-HY

<EMS>

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 : 886-3-327-0973

4.2. Test Voltage

AC 230V / 50Hz

4.3. Measurement Procedure

EMI Test	:	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)

4.4. Test in Compliance with

EMI Test	:	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. Conducted Emissions Measurement

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 6.4. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position producing maximum conducted emissions.

5.1. Limits for conducted disturbance at mains terminals and telecommunication ports

Limits for conducted disturbance at mains terminals

Frequency range (MHz)	Class A Limits dB(μV)		Class B Limits dB(μV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 to 0.50	79	66	66 - 56	56 - 46
0.50 to 5	73	60	56	46
5 to 30	73	60	60	50

NOTE: The limits decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

Limits for conducted disturbance at telecommunication ports

Frequency range (MHz)	Class B			
	Voltage limits dB (μV)		Current limits dB (μA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 to 0.50	84 - 74	74 - 64	40 - 30	30 - 20
0.50 to 30	74	64	30	20

NOTE: The limits decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

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 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.

c. Connect EUT to the power mains through a line impedance stabilization network (LISN).

d. Connect Telecommunication port to ISN (Impedance Stabilization Network).

e. All the support units are connect to the other LISN.

f. The LISN provides 50 ohm, coupling impedance for the measuring instrument.

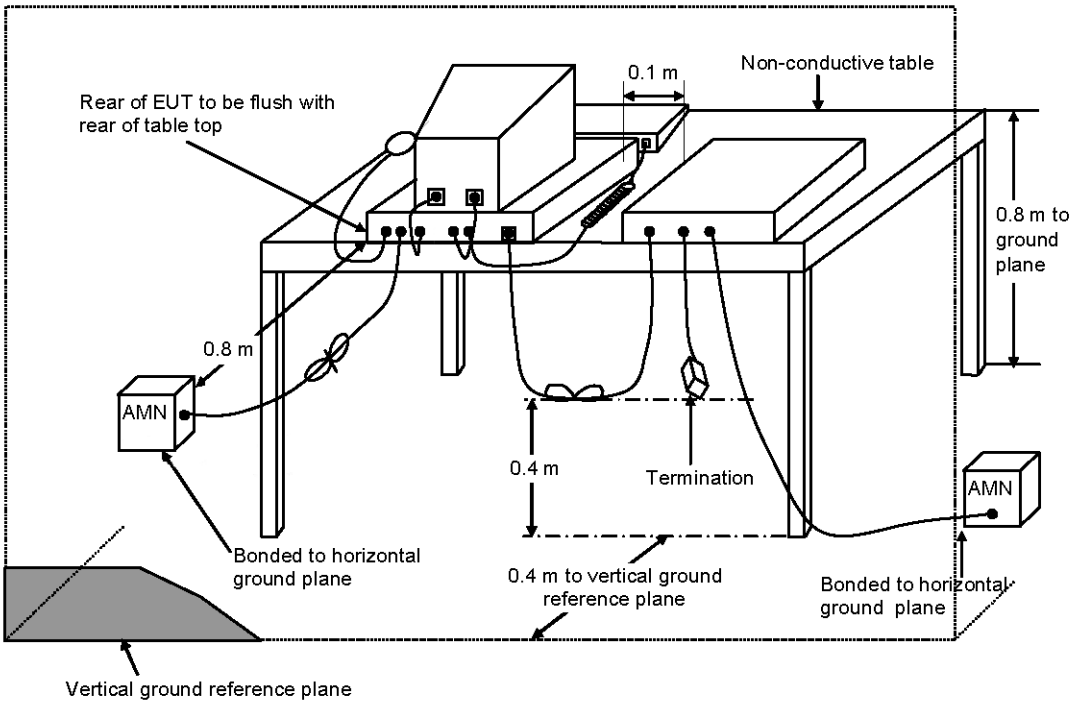
g. The CISPR states that a 50 ohm, 50 microhenry LISN should be used.

h. Both sides of AC line were checked for maximum conducted interference.

i. The frequency range from 150 kHz to 30 MHz was searched.

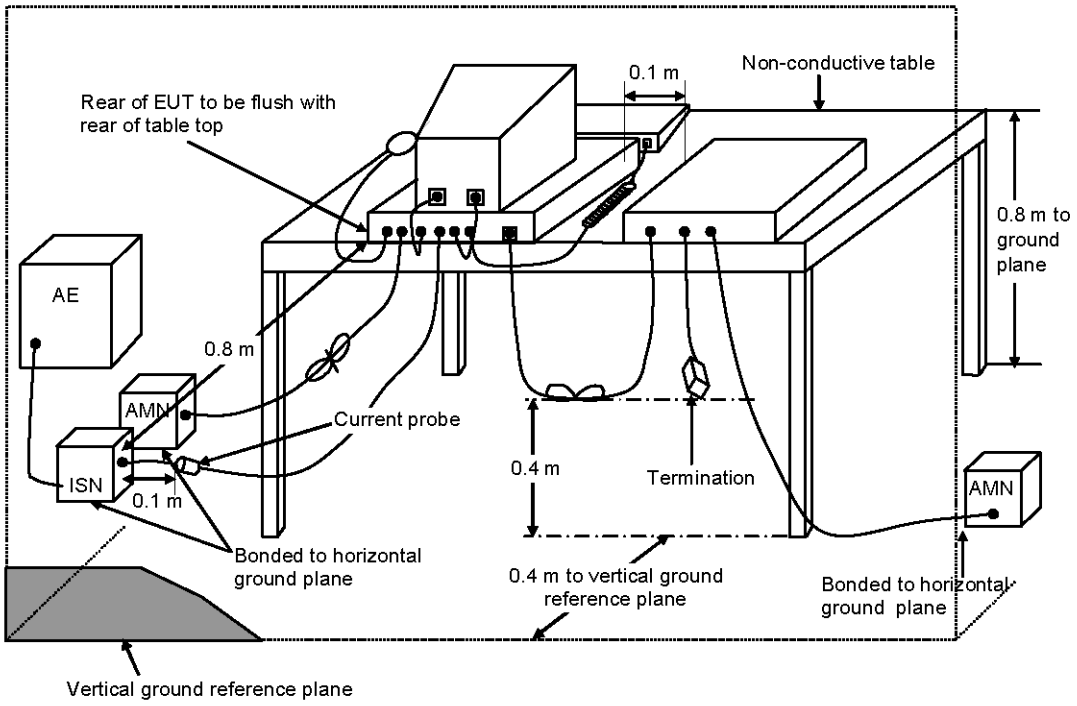
j. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

5.3. Typical Test Setup Layout of AC Powerline Conducted Emissions



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. Typical Test Setup Layout of Disturbance at Telecommunication Ports

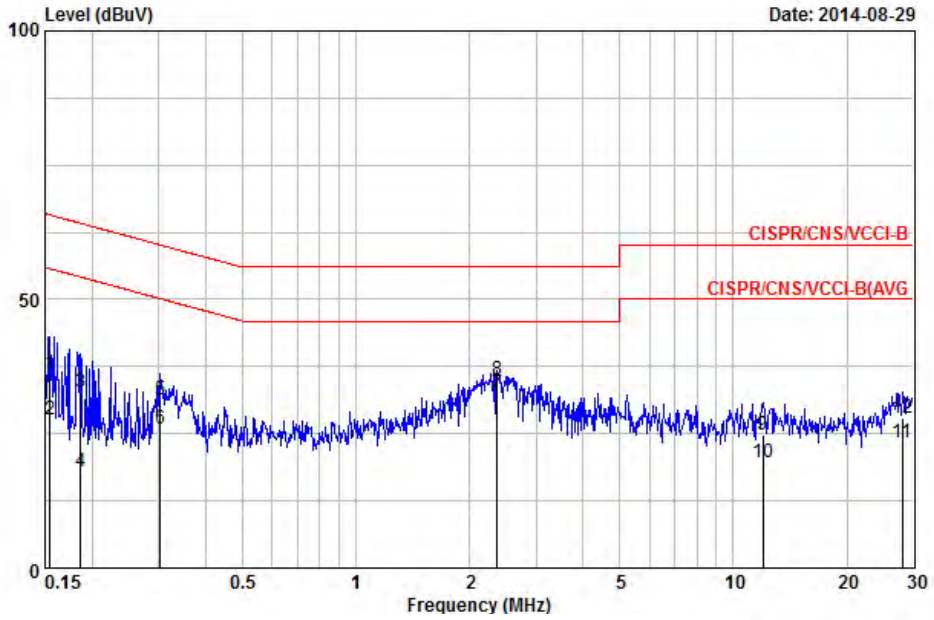


a. AMN and ISN are 80 cm from the EUT and at least 80 cm from other units and other metal planes.
b. EUT is connected to one artificial mains network (AMN).
c. All other units of a system are powered from a second AMN. A multiple outlet strip can be used for multiple mains cords.
d. Rear of EUT to be 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.

5.5. Test Result of AC Powerline Conducted Emission

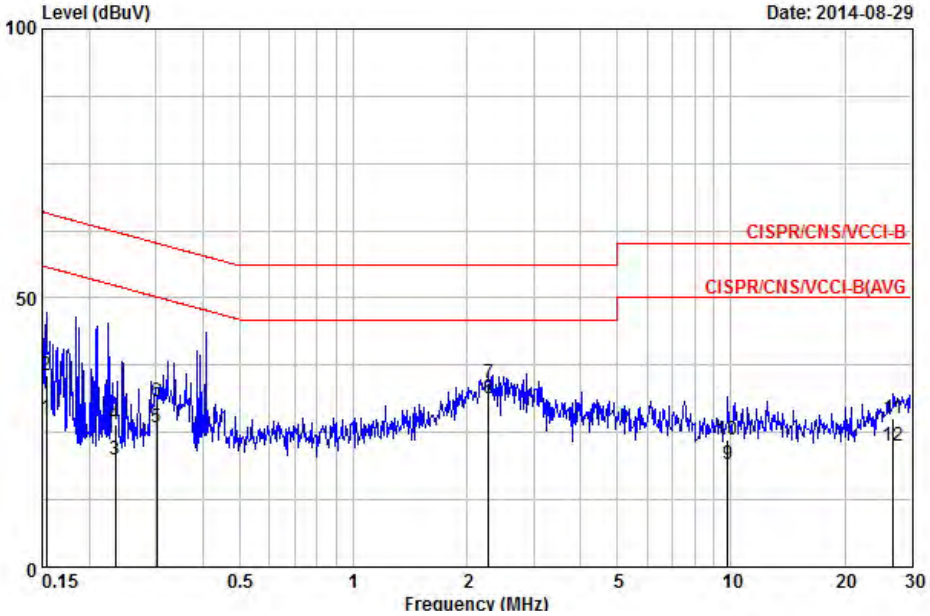
Test Mode	Mode 2	Test Site No.	CO01-NH
Test Frequency	0.15 MHz ~ 30 MHz	Test Engineer	Willy
Temperature	27 ℃	Relative Humidity	54 %
Note: 1. Corrected Reading (dBμV) = LISN Factor + Cable Loss + Read Level = Level			
2. All emissions not reported here are more than 10 dB below the prescribed limit.			
■ 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	0.155	36.05	-29.69	65.74	25.38	10.58	0.09	QP
2	0.155	27.75	-27.99	55.74	17.08	10.58	0.09	AVERAGE
3	0.186	32.86	-31.34	64.20	22.20	10.56	0.10	QP
4	0.186	17.97	-36.23	54.20	7.31	10.56	0.10	AVERAGE
5	0.303	31.24	-28.91	60.15	20.62	10.52	0.10	QP
6	0.303	26.02	-24.13	50.15	15.40	10.52	0.10	AVERAGE
7	2.371	32.57	-13.43	46.00	21.89	10.56	0.12	AVERAGE
8	2.371	35.03	-20.97	56.00	24.35	10.56	0.12	QP
9	11.996	24.85	-35.15	60.00	13.88	10.78	0.20	QP
10	11.996	19.75	-30.25	50.00	8.78	10.78	0.20	AVERAGE
11	28.003	23.22	-26.78	50.00	11.78	11.04	0.40	AVERAGE
12	28.003	27.96	-32.04	60.00	16.52	11.04	0.40	QP

Neutral



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.154	27.72	-28.06	55.78	17.54	10.09	0.09	AVERAGE
2	0.154	35.54	-30.24	65.78	25.36	10.09	0.09	QP
3	0.235	19.99	-32.29	52.28	9.81	10.08	0.10	AVERAGE
4	0.235	26.61	-35.67	62.28	16.43	10.08	0.10	QP
5	0.301	25.93	-24.27	50.21	15.75	10.08	0.10	AVERAGE
6	0.301	30.78	-29.42	60.21	20.60	10.08	0.10	QP
7	2.281	34.12	-21.88	56.00	23.87	10.13	0.12	QP
8	2.281	31.38	-14.62	46.00	21.13	10.13	0.12	AVERAGE
9	9.809	18.99	-31.01	50.00	8.51	10.29	0.20	AVERAGE
10	9.809	23.76	-36.24	60.00	13.28	10.29	0.20	QP
11	26.841	27.51	-32.49	60.00	16.46	10.65	0.40	QP
12	26.841	22.64	-27.36	50.00	11.59	10.65	0.40	AVERAGE

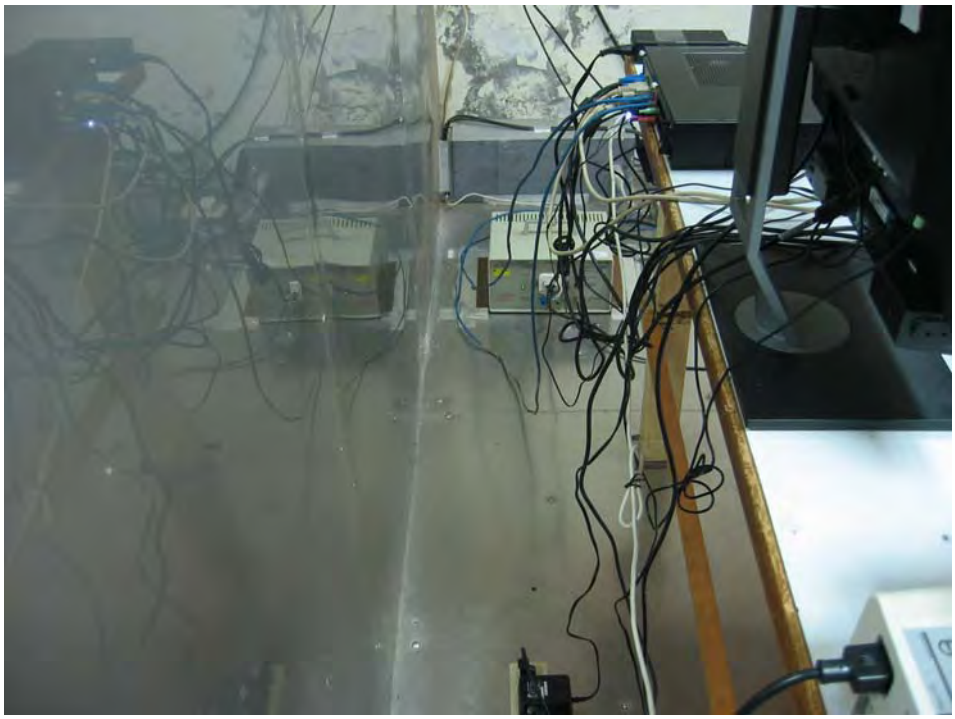
5.6. Photographs of Conducted Power line Test Configuration

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

FRONT VIEW

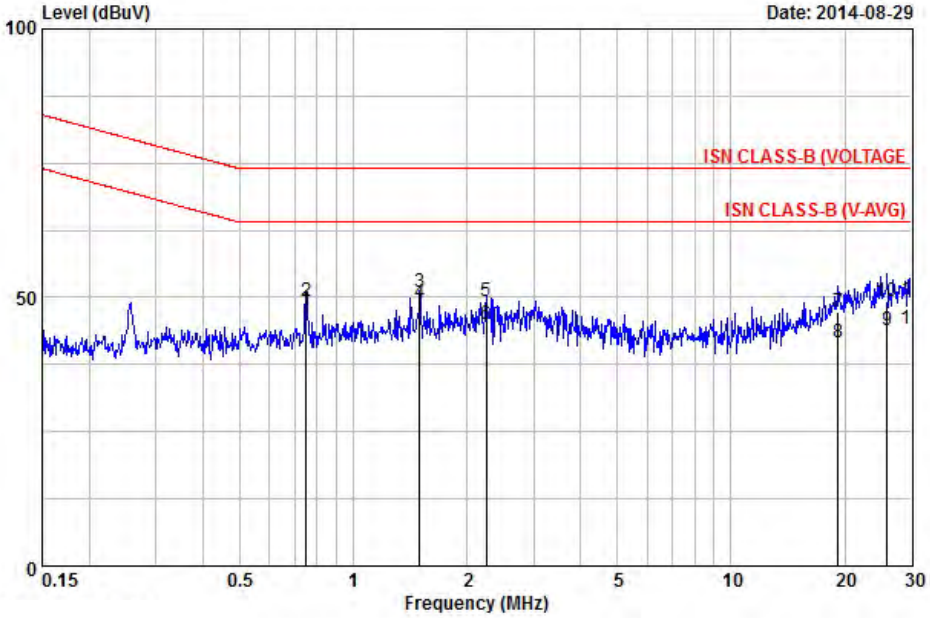


REAR VIEW



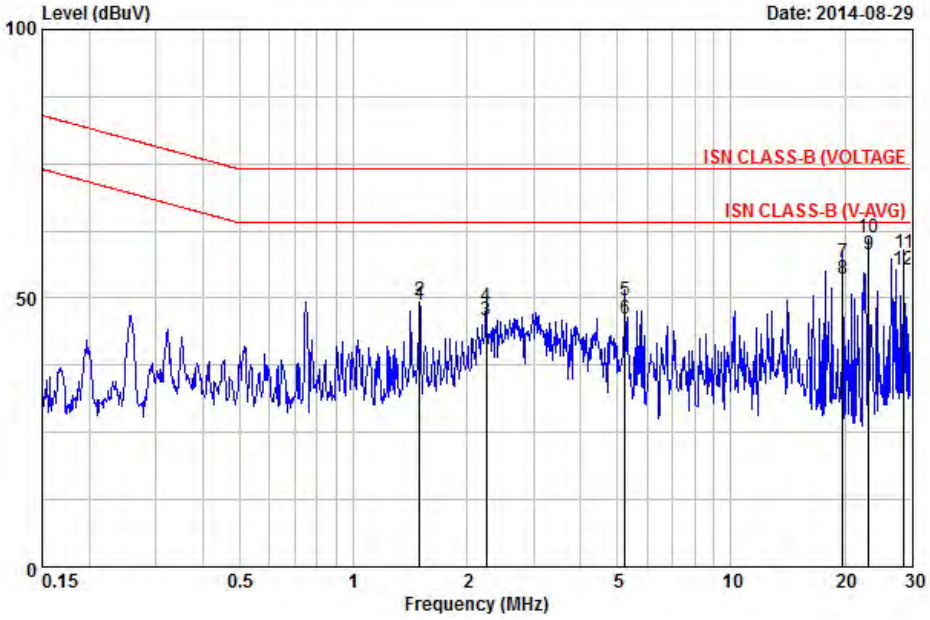
5.7. Test Result of Disturbance at Telecommunication Ports

Test Mode	Mode 2(a)	Test Site No.	CO01-NH
Test Frequency	0.15 MHz ~ 30 MHz	Test Engineer	Willy
Temperature	27 ℃	Relative Humidity	54 %
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			



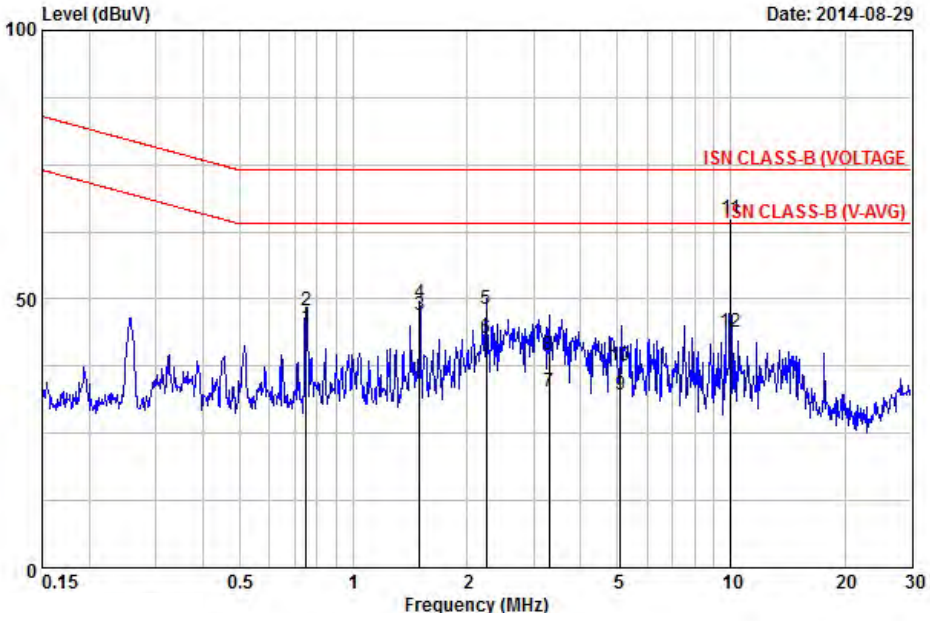
	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.750	47.54	-16.46	64.00	37.66	9.78	0.10	AVERAGE
2	0.750	49.30	-24.70	74.00	39.42	9.78	0.10	QP
3	1.498	51.11	-22.89	74.00	41.30	9.71	0.10	QP
4	1.498	49.12	-14.88	64.00	39.31	9.71	0.10	AVERAGE
5	2.249	49.18	-24.82	74.00	39.38	9.68	0.12	QP
6	2.249	44.95	-19.05	64.00	35.15	9.68	0.12	AVERAGE
7	19.224	47.22	-26.78	74.00	37.12	9.81	0.29	QP
8	19.224	41.67	-22.33	64.00	31.57	9.81	0.29	AVERAGE
9	25.864	43.87	-20.13	64.00	33.41	10.06	0.40	AVERAGE
10	25.864	49.34	-24.66	74.00	38.88	10.06	0.40	QP
11	30.000	49.56	-24.44	74.00	38.94	10.22	0.40	QP
12	30.000	44.10	-19.90	64.00	33.48	10.22	0.40	AVERAGE

Test Mode	Mode 2(c)	Test Site No.	CO01-NH
Test Frequency	0.15 MHz ~ 30 MHz	Test Engineer	Willy
Temperature	27 ℃	Relative Humidity	54 %
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			



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	1.498	48.79	-15.21	64.00	38.98	9.71	0.10	AVERAGE
2	1.498	49.61	-24.39	74.00	39.80	9.71	0.10	QP
3	2.247	45.83	-18.17	64.00	36.03	9.68	0.12	AVERAGE
4	2.247	48.30	-25.70	74.00	38.50	9.68	0.12	QP
5	5.235	49.53	-24.47	74.00	39.69	9.64	0.20	QP
6	5.235	46.06	-17.94	64.00	36.22	9.64	0.20	AVERAGE
7	19.706	56.80	-17.20	74.00	46.68	9.82	0.29	QP
8	19.706	53.62	-10.38	64.00	43.50	9.82	0.29	AVERAGE
9 @	23.126	58.15	-5.85	64.00	47.83	9.96	0.36	AVERAGE
10	23.126	61.25	-12.75	74.00	50.93	9.96	0.36	QP
11	28.685	58.32	-15.68	74.00	47.74	10.18	0.40	QP
12 @	28.685	55.26	-8.74	64.00	44.68	10.18	0.40	AVERAGE

Test Mode	Mode 2(d)	Test Site No.	CO01-NH
Test Frequency	0.15 MHz ~ 30 MHz	Test Engineer	Willy
Temperature	27 ℃	Relative Humidity	54 %
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			



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.750	44.78	-19.22	64.00	34.90	9.78	0.10	AVERAGE
2	0.750	47.85	-26.15	74.00	37.97	9.78	0.10	QP
3	1.499	47.03	-16.97	64.00	37.22	9.71	0.10	AVERAGE
4	1.499	49.37	-24.63	74.00	39.56	9.71	0.10	QP
5	2.249	48.01	-25.99	74.00	38.21	9.68	0.12	QP
6	2.249	42.69	-21.31	64.00	32.89	9.68	0.12	AVERAGE
7	3.293	32.76	-31.24	64.00	22.93	9.66	0.17	AVERAGE
8	3.293	39.49	-34.51	74.00	29.66	9.66	0.17	QP
9	5.105	32.26	-31.74	64.00	22.42	9.64	0.20	AVERAGE
10	5.105	37.52	-36.48	74.00	27.68	9.64	0.20	QP
11 @	10.000	64.84	-9.16	74.00	54.99	9.65	0.20	QP
12	10.000	43.94	-20.06	64.00	34.09	9.65	0.20	AVERAGE

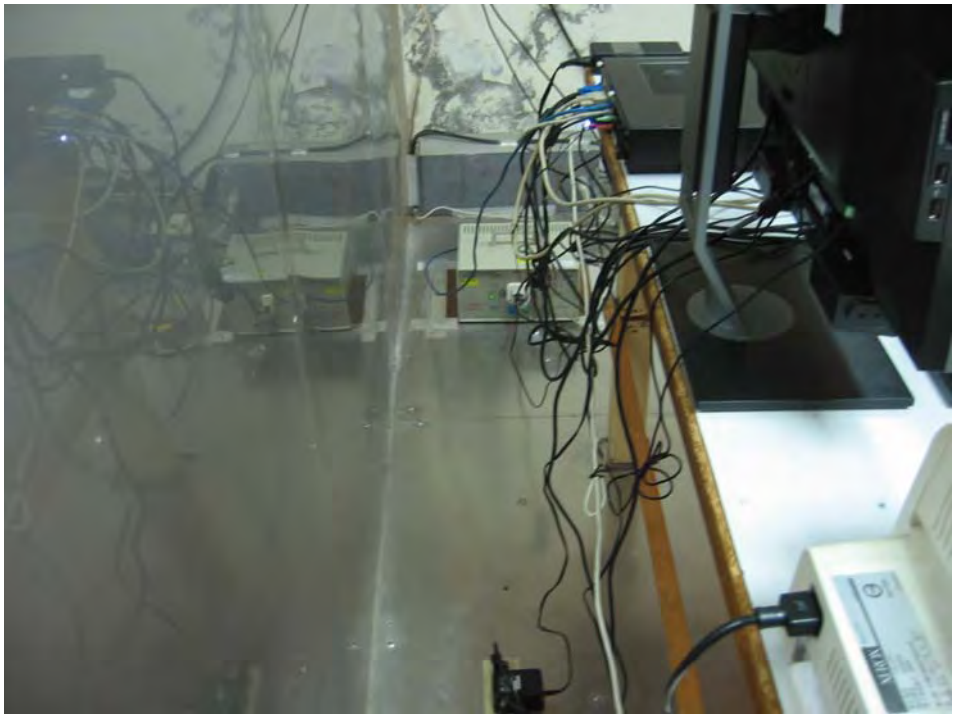
5.8. Photographs of Telecommunication Ports Test Configuration

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

FRONT VIEW



REAR VIEW



6. Radiated Emission Measurement

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 7.4. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

6.1. Limits for radiated disturbance

Limits for radiated disturbance at a measuring distance of 10 m

Frequency range (MHz)	Class A	Class B
	Quasi-peak limits dB(μV/m)	Quasi-peak limits dB(μV/m)
30 to 230	40	30
230 to 1000	47	37

Limits for radiated disturbance at a measuring distance of 3 m

Frequency range (MHz)	Class A		Class B	
	Average limit dB(μV/m)	Peak limit dB(μV/m)	Average limit dB(μV/m)	Peak limit dB(μV/m)
1000 to 3000	56	76	50	70
3000 to 6000	60	80	54	74

6.2. Test Procedures

For Below 1GHz

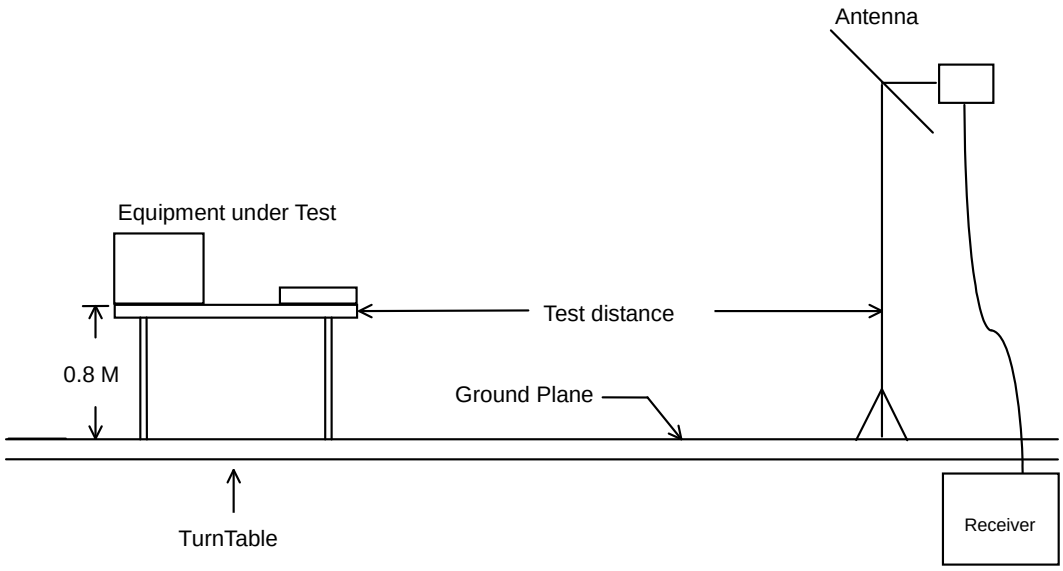
a. The EUT was placed on a rotatable table top 0.8 meter above ground.
b. The EUT was set 10 meters from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.
c. The table was rotated 360 degrees to determine the position of the highest radiation.
d. The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

For above 1GHz

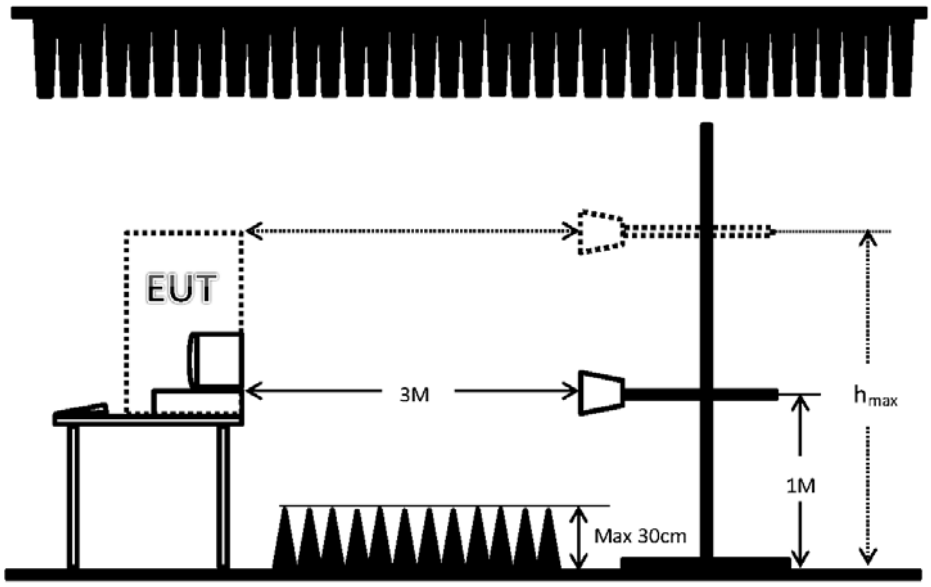
a. Same test set up as below 1GHz radiated testing.
b. The EUT was set 3 meters from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.
c. There should be absorber placed between the EUT and Antenna and its located size should let the test site meet CISPR16-1-4 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 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∘), 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 Emissions

For Below 1GHz



For above 1GHz

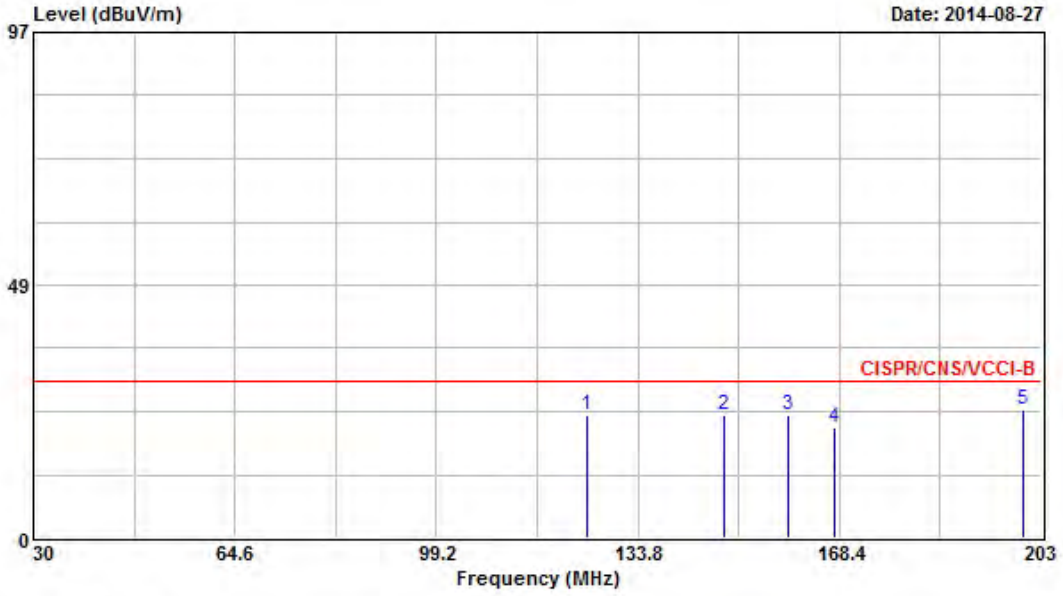


Remark: When EUT's height is over 172cm, h_{max} = top of EUT

6.4. Test Result of Radiated Emission for Below 1GHz

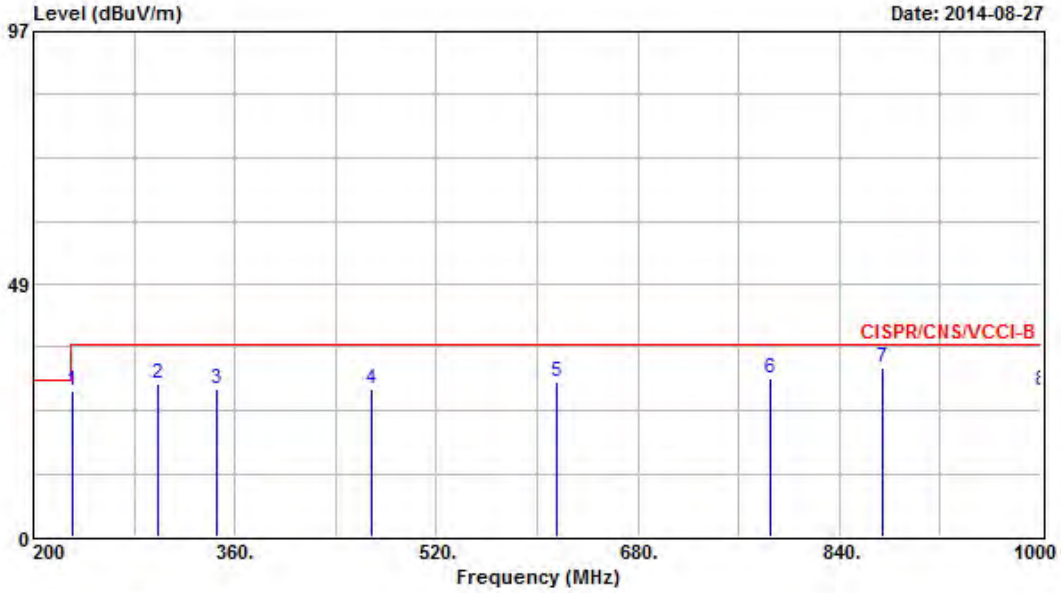
Test mode	Mode 2	Test Site No.	OS02-NH
Test frequency	30 MHz ~ 1000 MHz	Test Engineer	Chas
Temperature	30 ℃	Relative Humidity	49 %
Note: 1. Emission level (dBμV/m) = 20 log Emission level (μV/m)			
2. Corrected Reading : Antenna Factor + Cable Loss + Read Level – Preamp Factor = Level			
■ The test was passed at the minimum margin that marked by the frame in the following data			

Vertical



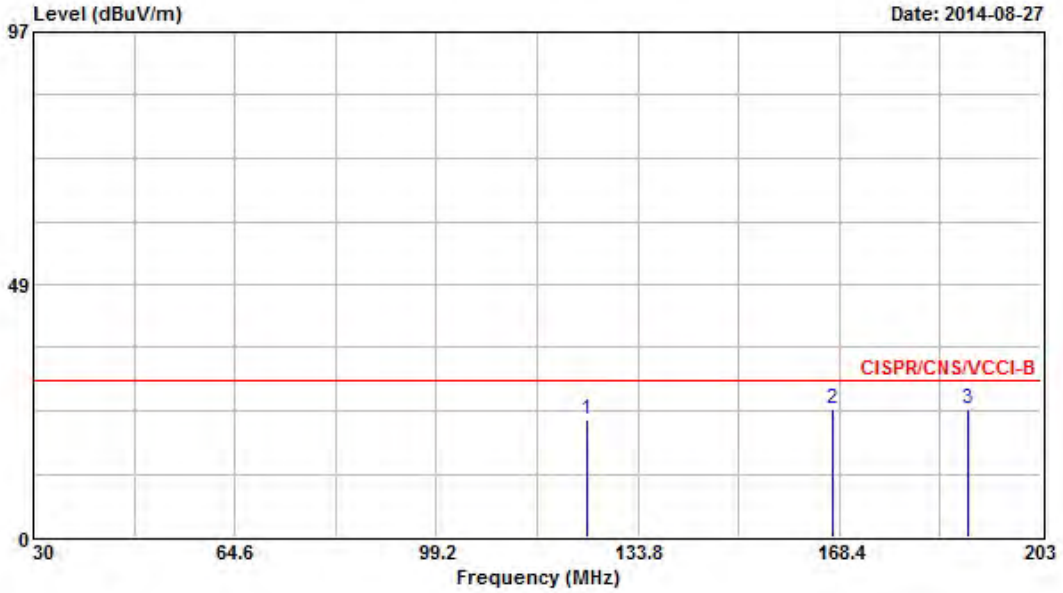
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	125.150	23.41	-6.59	30.00	41.48	12.08	1.44	31.59	Peak	---	---
2	148.510	23.42	-6.58	30.00	42.70	10.70	1.57	31.55	Peak	---	---
3	159.580	23.67	-6.33	30.00	43.29	10.26	1.64	31.52	Peak	---	---
4	167.540	21.04	-8.96	30.00	40.94	9.91	1.69	31.50	Peak	---	---
5	200.060	24.58	-5.42	30.00	44.74	9.42	1.85	31.43	Peak	---	---

Vertical



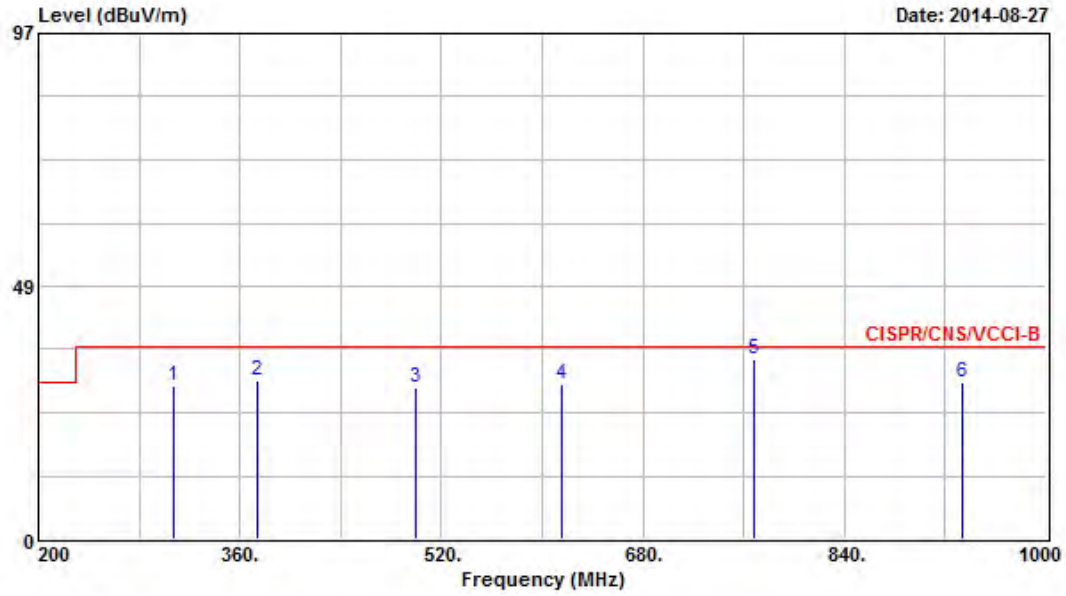
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	230.400	27.91	-9.09	37.00	46.06	11.23	2.00	31.38	Peak	---	---
2	299.200	29.44	-7.56	37.00	45.15	13.27	2.28	31.26	Peak	---	---
3	345.600	28.27	-8.73	37.00	42.68	14.43	2.48	31.32	Peak	---	---
4	468.000	28.21	-8.79	37.00	39.55	17.07	2.94	31.35	Peak	---	---
5	615.200	29.87	-7.13	37.00	38.53	19.08	3.49	31.23	Peak	---	---
6	784.800	30.32	-6.68	37.00	37.33	20.26	3.93	31.20	Peak	---	---
7 @	874.400	32.53	-4.47	37.00	38.41	21.11	4.14	31.13	Peak	---	---
8	1000.000	28.15	-8.85	37.00	32.34	22.38	4.47	31.04	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	124.980	22.66	-7.34	30.00	40.73	12.08	1.44	31.59	Peak	---	---
2	167.360	24.43	-5.57	30.00	44.33	9.91	1.69	31.50	Peak	---	---
3 @	190.370	24.60	-5.40	30.00	44.92	9.36	1.78	31.46	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	307.200	29.24	-7.76	37.00	44.72	13.47	2.32	31.27	Peak	---	---
2	374.400	30.30	-6.70	37.00	43.87	15.17	2.62	31.36	Peak	---	---
3	499.200	29.13	-7.87	37.00	39.77	17.64	3.05	31.33	Peak	---	---
4	615.200	29.71	-7.29	37.00	38.37	19.08	3.49	31.23	Peak	---	---
5 @	768.800	34.48	-2.52	37.00	41.71	20.08	3.90	31.21	QP	100	180
6	933.600	29.93	-7.07	37.00	35.02	21.69	4.31	31.09	Peak	---	---

6.5. Photographs of Radiated Emission (Below 1GHz) Test Configuration

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

FRONT VIEW



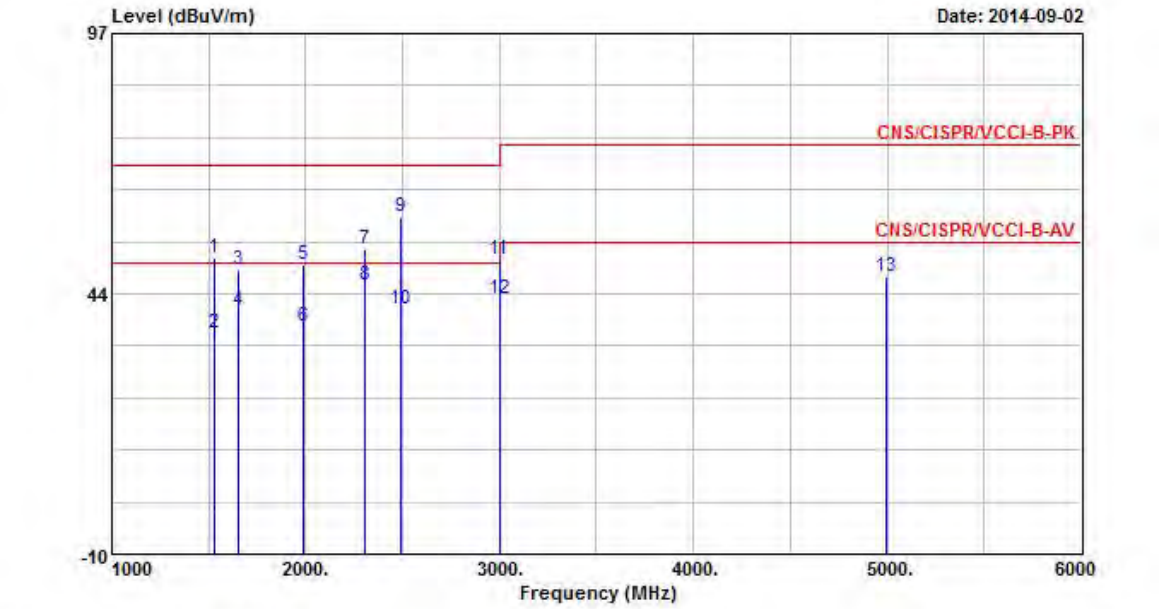
REAR VIEW



6.6. Test Result of Radiated Emission for Above 1GHz

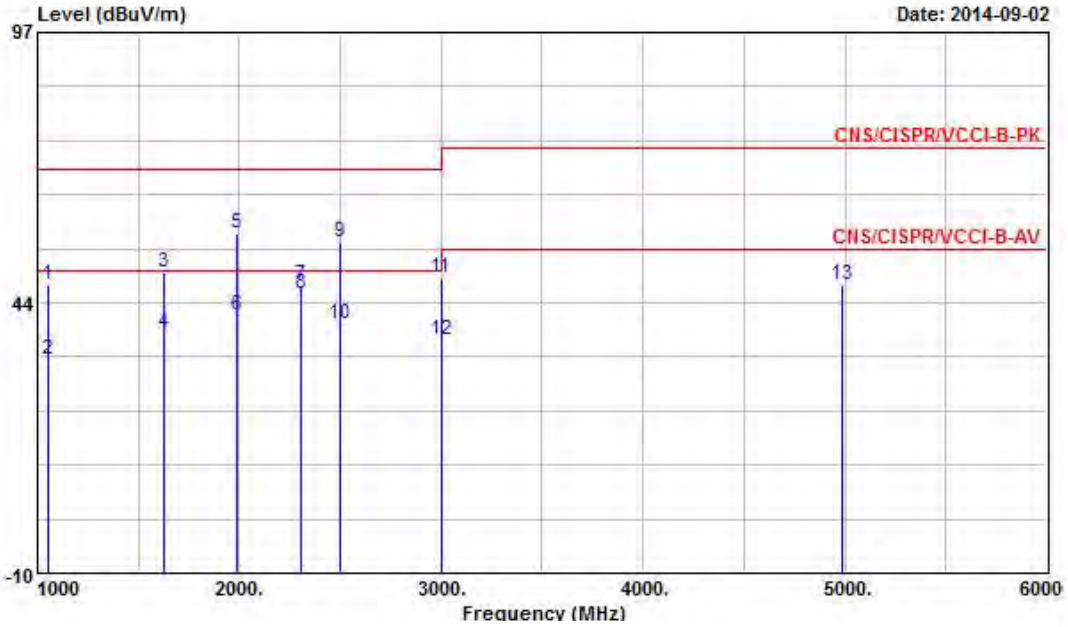
Test mode	Mode 1	Test Site No.	03CH04-HY
Test frequency	1 GHz ~ 6 GHz	Test Engineer	Alan
Temperature	21 ℃	Relative Humidity	52 %
Note: 1. Emission level (dBμV/m) = 20 log Emission level (μV/m)			
2. Corrected Reading : Antenna Factor + Cable Loss + Read Level – Preamp Factor = Level			
■ **The test was 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	1526.000	50.88	-19.12	70.00	56.90	25.82	33.74	1.90	100	185	Peak
2	1526.000	35.44	-14.56	50.00	41.46	25.82	33.74	1.90	100	185	Average
3	1654.000	48.53	-21.47	70.00	54.30	25.89	33.68	2.01	100	188	Peak
4 @	1654.000	39.91	-10.09	50.00	45.68	25.89	33.68	2.01	100	188	Average
5	1990.000	49.40	-20.60	70.00	54.59	26.09	33.52	2.24	100	194	Peak
6	1990.000	36.97	-13.03	50.00	42.16	26.09	33.52	2.24	100	194	Average
7	2308.000	52.81	-17.19	70.00	57.30	26.84	33.80	2.47	100	223	Peak
8 @	2308.000	45.17	-4.83	50.00	49.66	26.84	33.80	2.47	100	223	Average
9 @	2494.000	59.33	-10.67	70.00	63.45	27.30	33.99	2.57	100	200	Peak
10 @	2494.000	40.28	-9.72	50.00	44.40	27.30	33.99	2.57	100	200	Average
11	2998.000	50.62	-19.38	70.00	53.67	28.30	34.31	2.96	100	188	Peak
12 @	2998.000	42.29	-7.71	50.00	45.34	28.30	34.31	2.96	100	188	Average
13	4998.000	46.94	-27.06	74.00	46.38	31.50	34.40	3.46	---	---	Peak

Horizontal

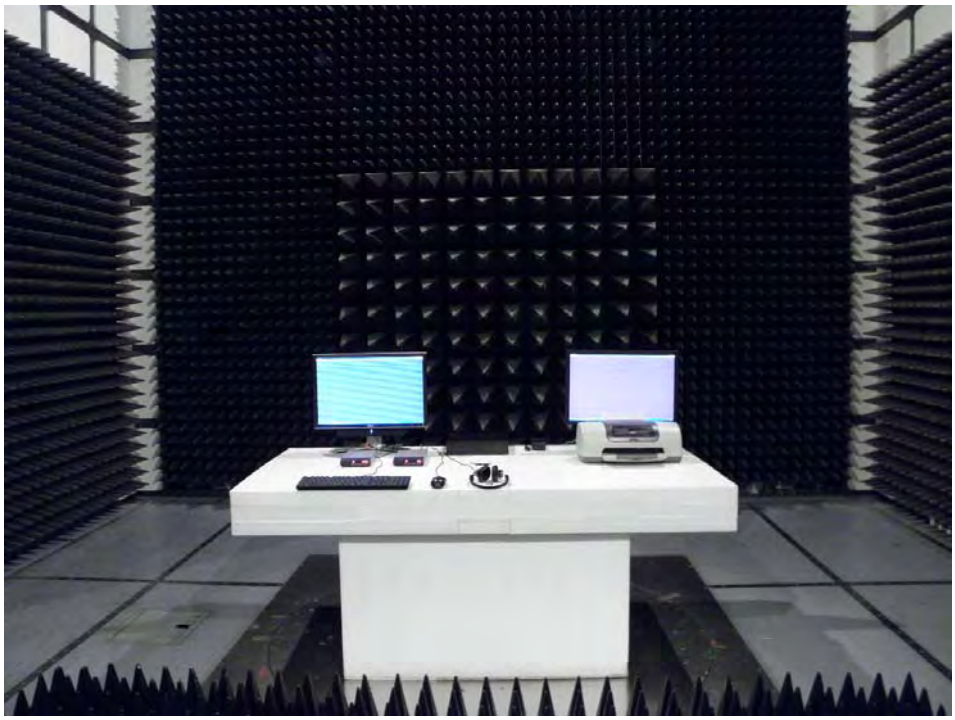


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	1052.000	46.97	-23.03	70.00	55.00	24.81	34.44	1.60	100	236	Peak
2	1052.000	32.37	-17.63	50.00	40.40	24.81	34.44	1.60	100	236	Average
3	1628.000	49.48	-20.52	70.00	55.30	25.88	33.69	1.99	100	188	Peak
4	1628.000	37.45	-12.55	50.00	43.27	25.88	33.69	1.99	100	188	Average
5	1990.000	57.34	-12.66	70.00	62.53	26.09	33.52	2.24	100	217	Peak
6 @	1990.000	41.01	-8.99	50.00	46.20	26.09	33.52	2.24	100	217	Average
7	2308.000	47.17	-22.83	70.00	51.66	26.84	33.80	2.47	100	226	Peak
8 @	2308.000	45.19	-4.81	50.00	49.68	26.84	33.80	2.47	100	226	Average
9	2500.000	55.43	-14.57	70.00	59.55	27.30	33.99	2.57	100	190	Peak
10 @	2500.000	39.22	-10.78	50.00	43.34	27.30	33.99	2.57	100	190	Average
11	2998.000	48.43	-21.57	70.00	51.48	28.30	34.31	2.96	100	199	Peak
12	2998.000	36.13	-13.87	50.00	39.18	28.30	34.31	2.96	100	199	Average
13	4986.000	46.85	-27.15	74.00	46.29	31.47	34.40	3.48	---	---	Peak

6.7. Photographs of Radiated Emission (From 1GHz to 6GHz) Test Configuration

- The photographs show the configuration that generates the maximum emission

FRONT VIEW



REAR VIEW



7. Harmonic Current Emissions Measurement

7.1. Standard

- Standard : EN 61000-3-2:2006/A1:2009 and /A2:2009

7.2. Test Procedure

The measurement of harmonic currents shall be performed as follows:

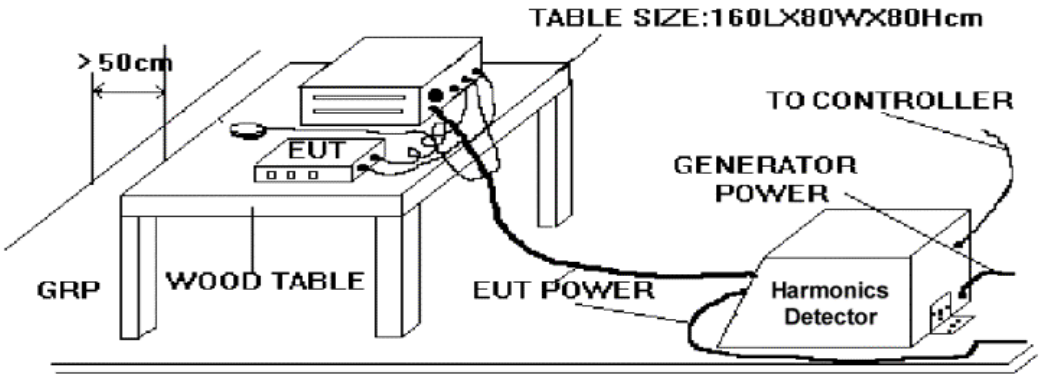
– for each harmonic order, measure the 1.5 s smoothed r.m.s. harmonic current in each DFT time window as defined in EN / IEC 61000-4-7: 2002.

– calculate the arithmetic average of the measured values from the DFT time windows, over the entire observation period Short cyclic (Tcycle ≦ 2.5 min). Because of synchronisation to meet the requirements for repeatability in 5%.

7.3. Test Equipment Settings

Harmonic Parameters	Setting
Line Voltage	230 V
Line Frequency	50 Hz
Current Measurement Range	High
Device Class	A
Measurement Delay	10.0 seconds
Test Duration	10.0 minutes
Class determination Pre-test Duration	10.0 seconds

7.4. Typical Test Setup Layout of Harmonic Current Emissions



7.5. Test Result of Harmonic Current Emissions

Mode 1&2

V_RMS (Volts):	229.79	Frequency(Hz):	50.00
I_Peak (Amps):	1.056	I_RMS (Amps):	0.314
I_Fund (Amps):	0.198	Crest Factor:	3.395
Power (Watts):	44.6	Power Factor:	0.635

As specified on clause 7 of EN 61000-3-2:2006/A1:2009 and /A2:2009, the limits are not specified for equipment with a rated power of 75W or less.

8. Voltage Fluctuations and Flicker Measurement

8.1. Standard

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

8.2. Test Procedure

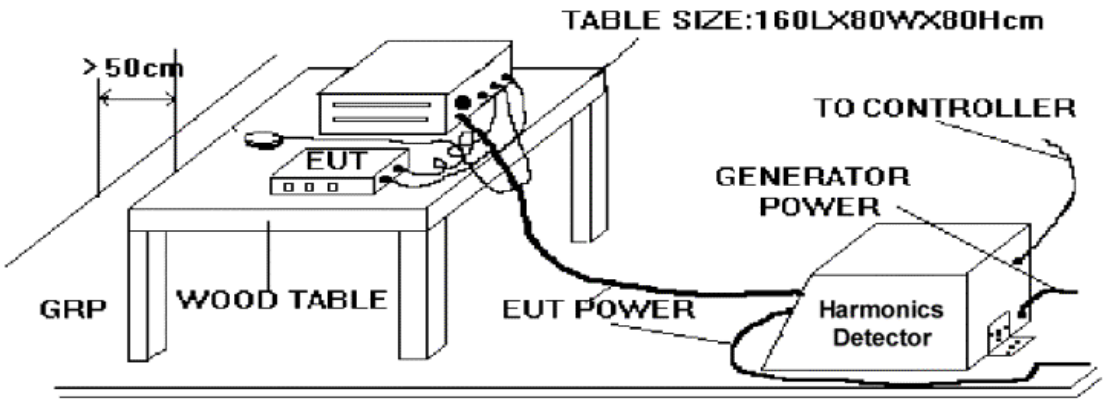
The equipment shall be tested under the conditions of **Clause 5.**

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 ±8% is achieved during the whole assessment procedure.

8.3. Test Equipment Settings

Flicker Parameters	Setting
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. Typical Test Setup Layout of Voltage Fluctuations and Flicker



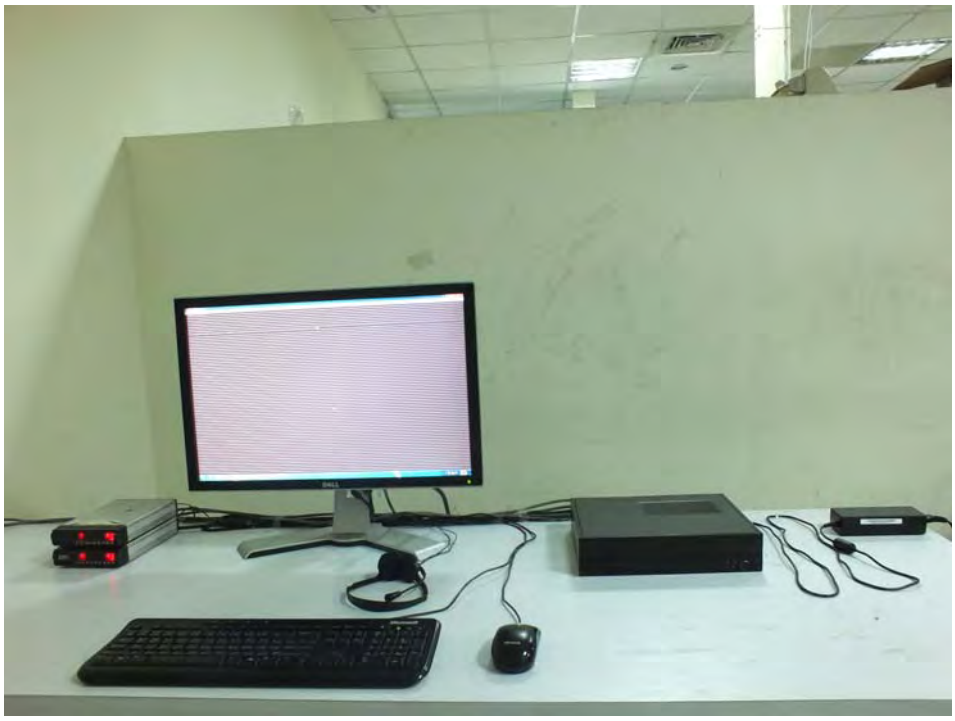
8.5. Test Result of Voltage Fluctuation and Flicker

Test mode	Mode 1&2
Final Test Result	***PASS***
Temperature	25 ℃
Relative Humidity	47 %
Atmospheric Pressure	106 kPa
Test Date	Sep. 10, 2014
Test Engineer	Ben

Vrms at the end of test (Volt):	229.80			
Highest dt (%):	0.68	Test limit (%):	3.30	Pass
Time(mS) > dt:	0.0	Test limit (mS):	500.0	Pass
Highest dc (%):	0.00	Test limit (%):	3.30	Pass
Highest dmax (%):	0.70	Test limit (%):	4.00	Pass
Highest Pst (10 min. period):	0.131	Test limit:	1.000	Pass

8.6. Photographs of Voltage Fluctuation and Flicker Test

Mode 1&2



FRONT VIEW

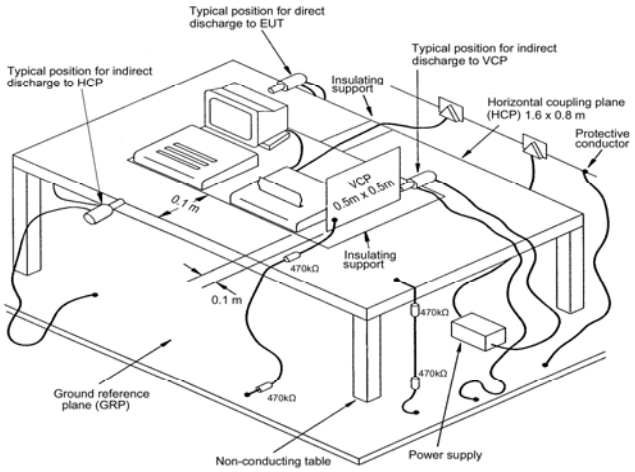


REAR VIEW

9. Electrostatic Discharge Immunity Measurement (ESD)

Test mode	Mode 1&2
Final Test Result	***PASS***
Pass Performance Criteria	**A** ±2 / ±4 / ±8 kV for air discharge
	B ±2 / ±4 kV for contact discharge
Required Performance Criteria	**B** ±2 / ±4 / ±8 kV for air discharge
	B ±2 / ±4 kV for contact discharge
Basic Standard	IEC 61000-4-2
Product Standard	EN 55024:2010
Level	3 for air discharge
	2 for contact discharge
Test Voltage	±2 / ±4 / ±8 kV for air discharge
	±2 / ±4 kV for contact discharge
Discharge Impedance	330 ohm / 150 pF
Temperature	23 ℃
Relative Humidity	41 %
Atmospheric Pressure	102 kPa
Test Date	Sep. 10, 2014
Test Engineer	Ben
Observation	The test points, please refer to section 9.5.

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	
Power Switch	10	A	A	A	A	A	A	Normal
HDMI Port	10	A	A	A	A	A	A	Normal
Microphone jack	10	A	A	A	A	A	A	Normal
Earphone jack	10	A	A	A	A	A	A	Normal
DC input jack	10	A	A	A	A	A	A	Normal
LED	10	A	A	A	A	A	A	Normal

9.5.2. Test Result of Contact Discharge

Direct discharge

Test Method	No. of Discharges	Contact Discharge/Pointed Tip				Test Record
		+2kV	-2kV	+4kV	-4kV	
Case	25	A	A	A	A	Normal
Screw	25	A	A	A	A	Normal
D-SUB port	25	A	A	A	A	Normal
DVI port	25	A	A	A	A	Normal
COM port	25	A	A	A	A	Normal
RJ45 port	25	A	A	B	B	Note[1]
Remark	Note[1]：During the test, Ping was interfered and the network was disconnected. After the test, the equipment continued to operate automatically without operator intervention.					

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	Normal
HCP (At Left)	25	A	A	A	A	Normal
HCP (At Right)	25	A	A	A	A	Normal
HCP (At Rear)	25	A	A	A	A	Normal
VCP (At Front)	25	A	A	A	A	Normal
VCP (At Left)	25	A	A	A	A	Normal
VCP (At Right)	25	A	A	A	A	Normal
VCP (At Rear)	25	A	A	A	A	Normal

9.6. Photographs of Test Points

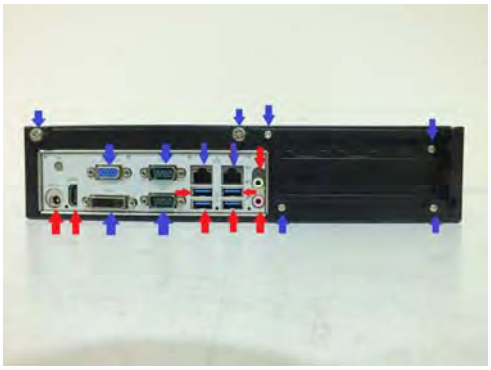
Test Points

Mode 1& 2

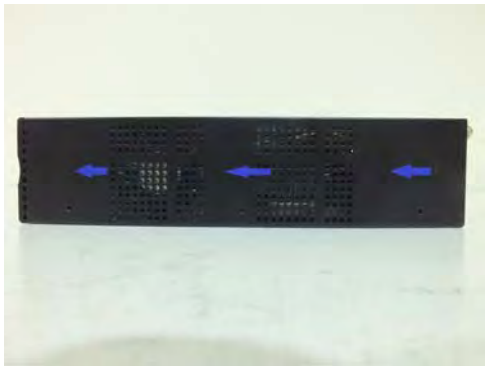
Front View



Rear View

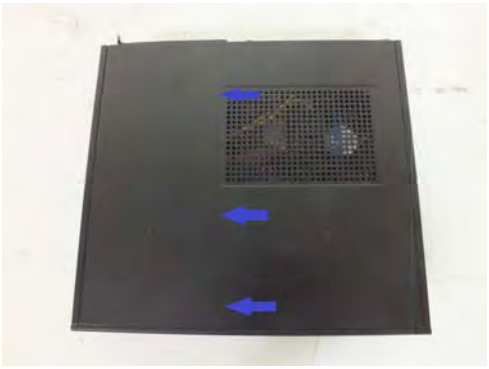


Side View





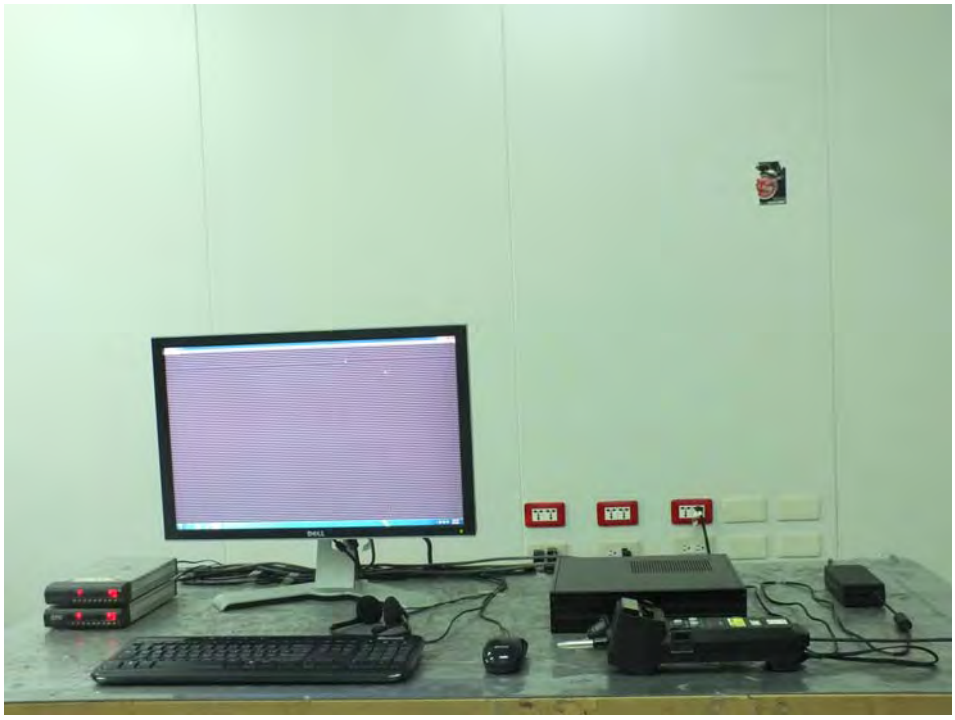
Top View



9.7. Photographs of Electrostatic Discharge Immunity Test

Mode 1&2

FRONT VIEW



REAR VIEW



10. Radio Frequency Electromagnetic Field Immunity Measurement (RS)

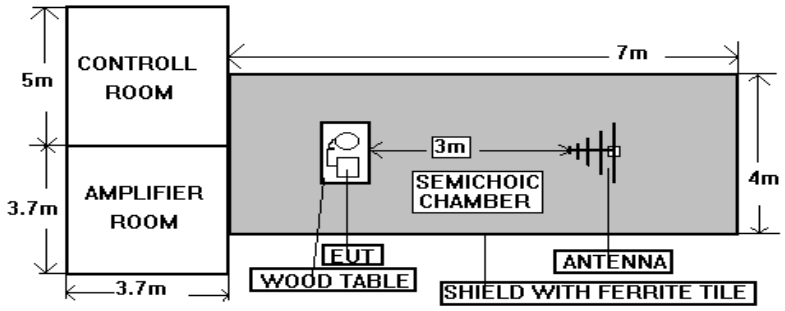
Test mode	Mode 1&2
Final Test Result	***PASS***
Pass Performance Criteria	A
Required Performance Criteria	A
Basic Standard	IEC 61000-4-3
Product Standard	EN 55024:2010
Level	2
Frequency Range	80-1000 MHz
Field Strength	3 V/m (unmodulated, r.m.s) 80% AM (1 kHz)
Temperature	25 ℃
Relative Humidity	47 %
Atmospheric Pressure	102 kPa
Test Date	Sep. 09, 2014
Test Engineer	Ben
Observation	Normal

10.1. Test Record

Frequency Band: 80-1000 MHz

Sides of the EUT have been exposed to the field	Antenna positioned	Test field strength Level	Test field strength (V/m)	Test Record
Front	Vertical	2	3	Normal (No influencing)
	Horizontally	2	3	Normal (No influencing)
Left	Vertical	2	3	Normal (No influencing)
	Horizontally	2	3	Normal (No influencing)
Back	Vertical	2	3	Normal (No influencing)
	Horizontally	2	3	Normal (No influencing)
Right	Vertical	2	3	Normal (No influencing)
	Horizontally	2	3	Normal (No influencing)

10.2. 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 61000-4-3 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.

10.3. 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*10-3 decades/s. The sensitive frequencies or frequencies of dominant interest may be discretely analyzed.

10.4. Test Severity Levels

Frequency Band : 80-1000MHz

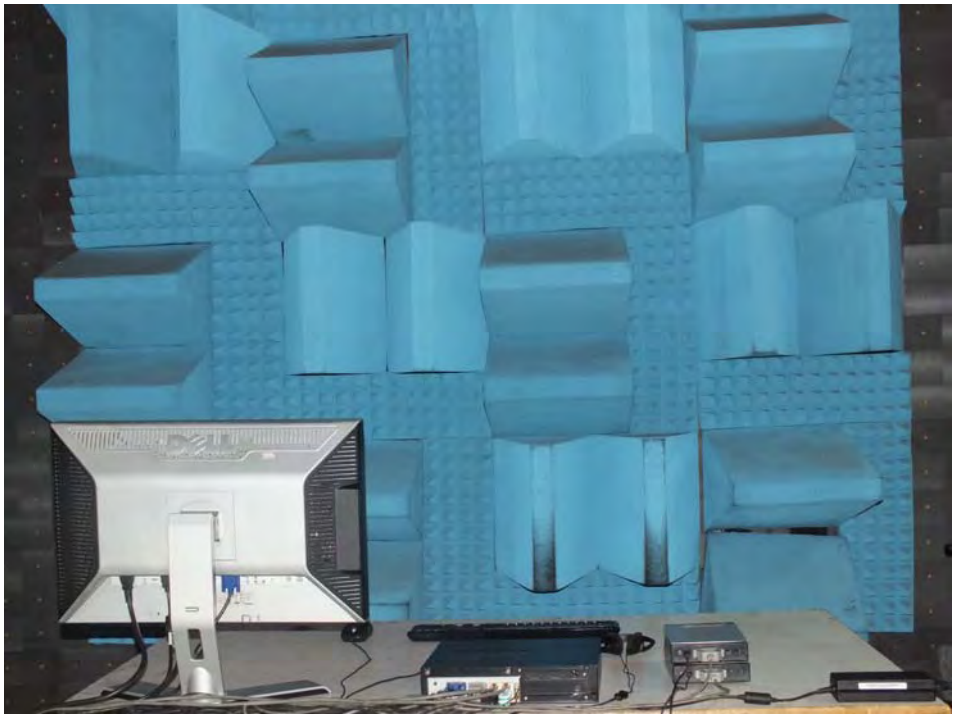
Level	Test field strength (V/m)
1	1
2	3
3	10
X	Specified
Remark : “X” is an open class.	

10.5. Photographs of Radio Frequency Electromagnetic Field Immunity Test

Mode 1&2



FRONT VIEW



REAR VIEW

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

Test mode	Mode 1&2
Final Test Result	***PASS***
Pass Performance Criteria	A
Required Performance Criteria	B
Basic Standard	IEC 61000-4-4
Product Standard	EN 55024:2010
Level	on input power ports -- 2 on telecommunication ports -- 2
Test Voltage	on input power ports -- ± 0.5 / ± 1.0 kV on telecommunication ports -- ± 0.25 / ± 0.5 kV
Impulse wave shape	5/50 ns (Tr/Th)
Impulse frequency	5 kHz
Test Repetition Rate	1 time / minute
Temperature	25 ℃
Relative Humidity	47 %
Atmospheric Pressure	102 kPa
Test Date	Sep. 10, 2014
Test Engineer	Ben
Observation	Normal

11.1. Test Record

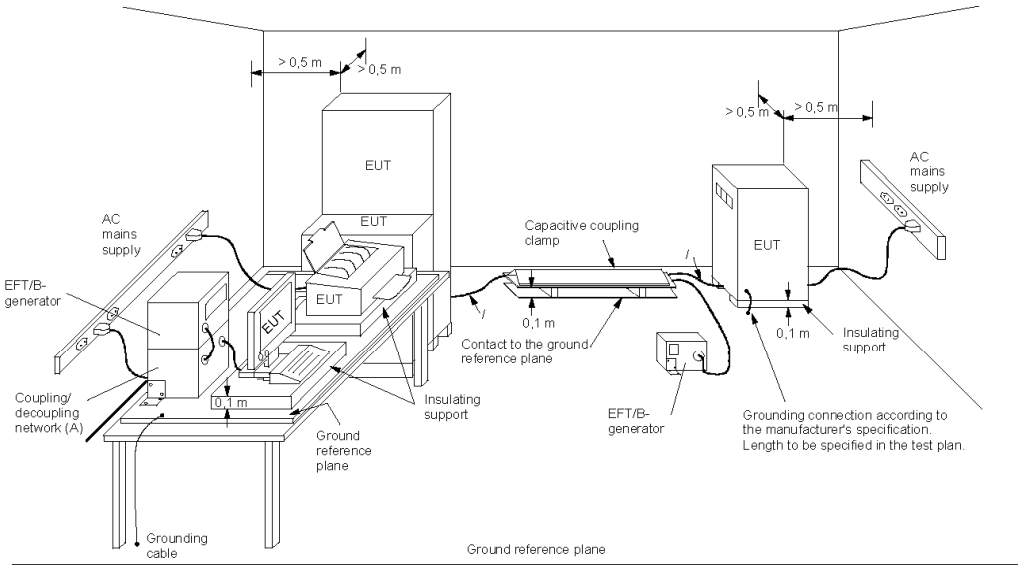
■ on Input power ports:

Test Location	Polarity	Test Level	Voltage (Peak)	Test Record
L+N	+	2	1.0 kV	Normal (No influencing)
	−	2	1.0 kV	Normal (No influencing)

■ on telecommunication ports:

Test Location	Polarity	Test Level	Voltage (Peak)	Test Record
Line – Ground (RJ45 port)	+	2	0.5 kV	Normal (No influencing)
	−	2	0.5 kV	Normal (No influencing)

11.2. Test setup



IEC 901/04

Key

l length between clamp and the EUT to be tested (should be 0,5 m ± 0,05 m)

(A) location for supply line coupling

(B) location for signal lines coupling

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 0.5 m or less.

11.3. 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 0.5 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.

11.4. 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.

11.5. 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).

11.6. 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.		

11.7. Photographs of Electrical Fast Transient/Burst Immunity Test

Mode 1& 2

FRONT VIEW



REAR VIEW



12. Surge Immunity Measurement

Test mode	Mode 1&2
Final Test Result	***PASS***
Pass Performance Criteria	**A** for Input Power Port, **B** for RJ45 Port
Required Performance Criteria	B for Input power ports, C for telecommunication ports
Basic Standard	IEC 61000-4-5
Product Standard	EN 55024:2010
Surge wave form (Tr/Th)	1,2/50 (8/20) μs for input power ports 10/700 μs for telecommunication ports
Level	on input power ports -- 3 on telecommunication ports -- 2
Test Voltage	on Input Power Port -- ± 1.0 / ± 2.0 kV on RJ45 Ports -- ± 1.0 kV
Phase Angle	0°, 90°, 180°, 270°
Number of surges	5 positive and 5 negative pulses
Pulse Repetition Rate	1 time / min. (maximum)
Temperature	25 ℃
Relative Humidity	47 %
Atmospheric Pressure	102 kPa
Test Date	Sep. 10, 2014
Test Engineer	Ben
Observation	Please refer to section 12.1

12.1. Test Record

■ on Input power ports:

Test Location	Voltage (kV)	Polarity	Phase Angle				Test Record
			0°	90°	180°	270°	
L - N	1.0	+	A	A	A	A	Normal (No influencing)
		−	A	A	A	A	Normal (No influencing)
L - PE	2.0	+	A	A	A	A	Normal (No influencing)
		−	A	A	A	A	Normal (No influencing)
N - PE	2.0	+	A	A	A	A	Normal (No influencing)
		−	A	A	A	A	Normal (No influencing)

■ on telecommunication ports:

Outdoor

Test Location	Voltage (kV)	Polarity	Criteria	Test Record
Line – Ground (RJ45 port)	1.0	+	B	Note[1]
		−	B	Note[1]
	Note[1] : During the test, Ping was interfered and the network was disconnected. After the test, the equipment continued to operate automatically without operator intervention.			

12.2. Test Severity Levels

Level	Open-circuit test voltage, ± 10%, kV
1	0.5
2	1.0
3	2.0
4	4.0
x	Specified
Remark : " X " is an open level. 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.

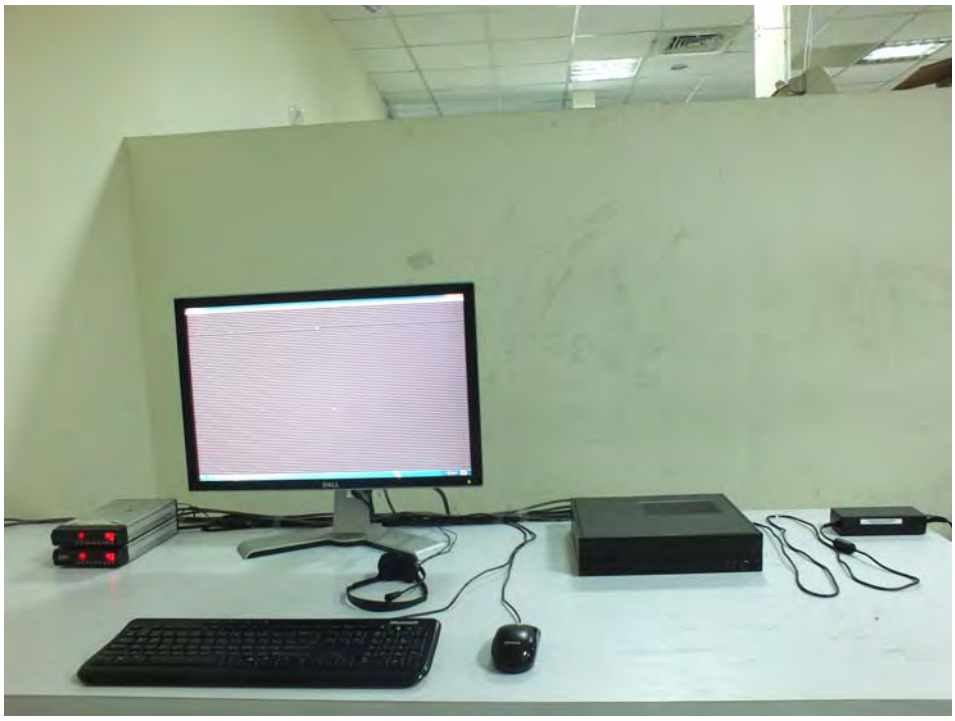
12.4. Operating Condition

Full system

12.5. Photographs of Surge Immunity Test

Mode 1&2

FRONT VIEW



REAR VIEW



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

Test mode	Mode 1&2
Final Test Result	***PASS***
Pass Performance Criteria	A
Required Performance Criteria	A
Basic Standard	IEC 61000-4-6
Product Standard	EN 55024:2010
Level	2
Test Voltage	3 V (unmodulated, r.m.s), 80% AM (1 kHz)
Frequency Range	0.15 MHz to 80 MHz
Test Port	on Input Power Port and Telecommunication Port
Dwell time	2.9 seconds
Frequency step size	1 %
Coupling mode (* There is one steps in this test.)	CDN M3 for AC power Port FCC T8 for RJ45 Port ; T800 for RJ45 Port
Temperature	24 ℃
Relative Humidity	48 %
Atmospheric Pressure	102 kPa
Test Date	Sep. 10, 2014
Test Engineer	Ben
Observation	Normal

13.1. Test Record

Test Port	Test field strength level	Test field strength (V rms)	Test Record
Input power port	2	3	Normal (No influencing)
RJ45 port	2	3	Normal (No influencing)

13.2. Test Step for Tested Port

Test Step	Tested Port	Injection CDN terminated with 50 Ω	Other ports
1	AC	RJ-45	Decoupling networks shall be installed on all other ports to which cables are attached. In this manner there is only one loop terminated with 150 Ω at each end.
2	RJ-45	AC	
3	RJ-45	AC	

13.3. Test Severity Levels

Level	Voltage Level (EMF)
1	1 V rms
2	3 V rms
3	10 V rms
x	Specified
Remark : " X " is an open level. This level can be specified in the product specification.	

13.4. Operating Condition

Full system

13.5. 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 1.5×10^{-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.

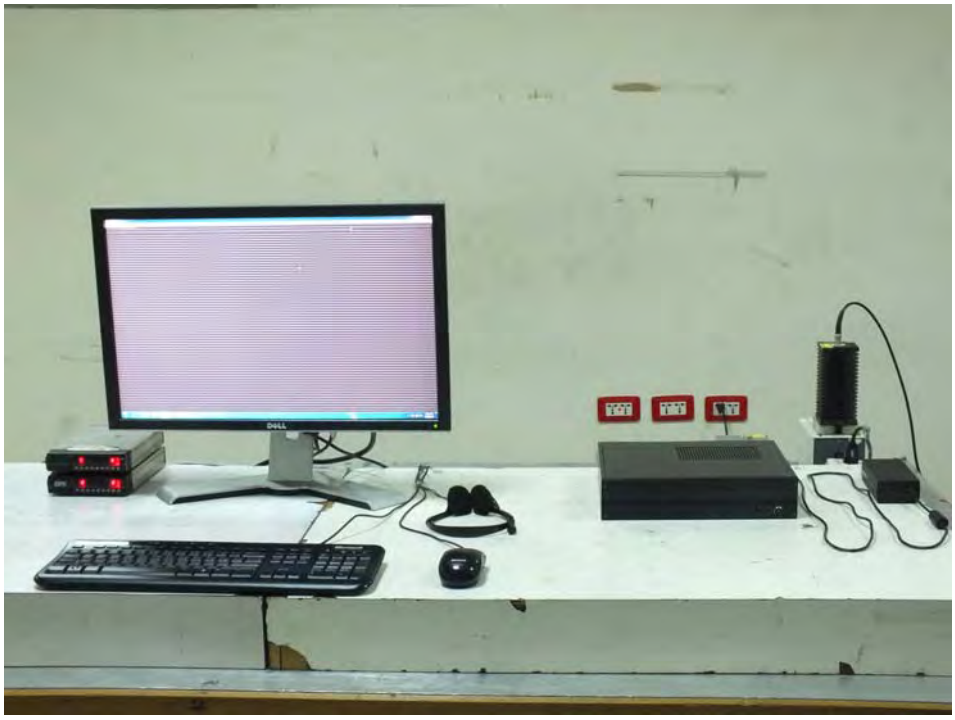
i. Testing shall be performed according to a Test Plan, which shall be included in the test report.

j. It may be necessary to carry out some investigatory testing in order to establish some aspects of the test plan.

13.6. Photographs of CS Immunity Test

Mode 1&2

FRONT VIEW



REAR VIEW



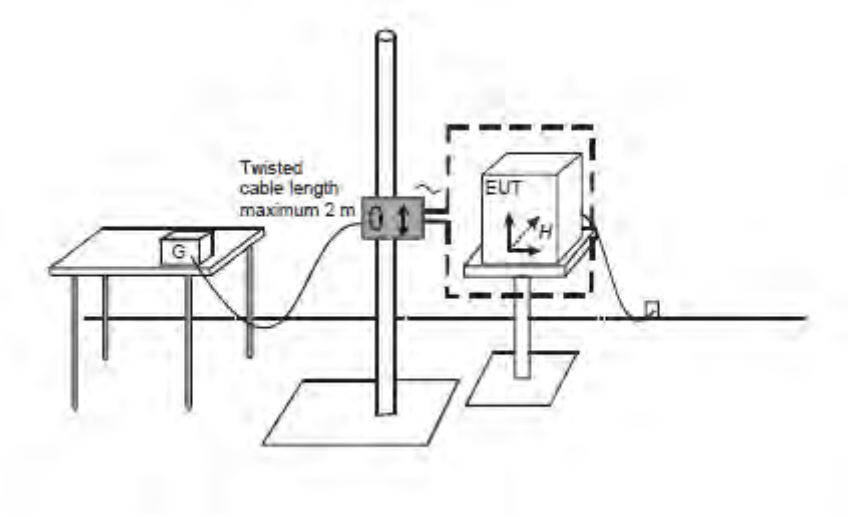
14. Power Frequency Magnetic Field immunity Measurement (PFMF)

Test mode	Mode 1&2
Final Test Result	***PASS***
Pass Performance Criteria	A
Required Performance Criteria	A
Basic Standard	IEC 61000-4-8
Product Standard	EN 55024:2010
Temperature	25 ℃
Relative Humidity	47 %
Atmospheric Pressure	102 kPa
Test Date	Sep. 09, 2014
Test Engineer	Ben
Observation	Please refer to section 14.1

14.1. Test Record

Power Frequency Magnetic Field	Testing duration	Coil Orientation	Test Record
50/60HZ,1A/M	1.0 Min	X-axis	Normal (No influencing)
50/60HZ,1A/M	1.0 Min	Y-axis	Normal (No influencing)
50/60HZ,1A/M	1.0 Min	Z-axis	Normal (No influencing)

14.2. Test Setup

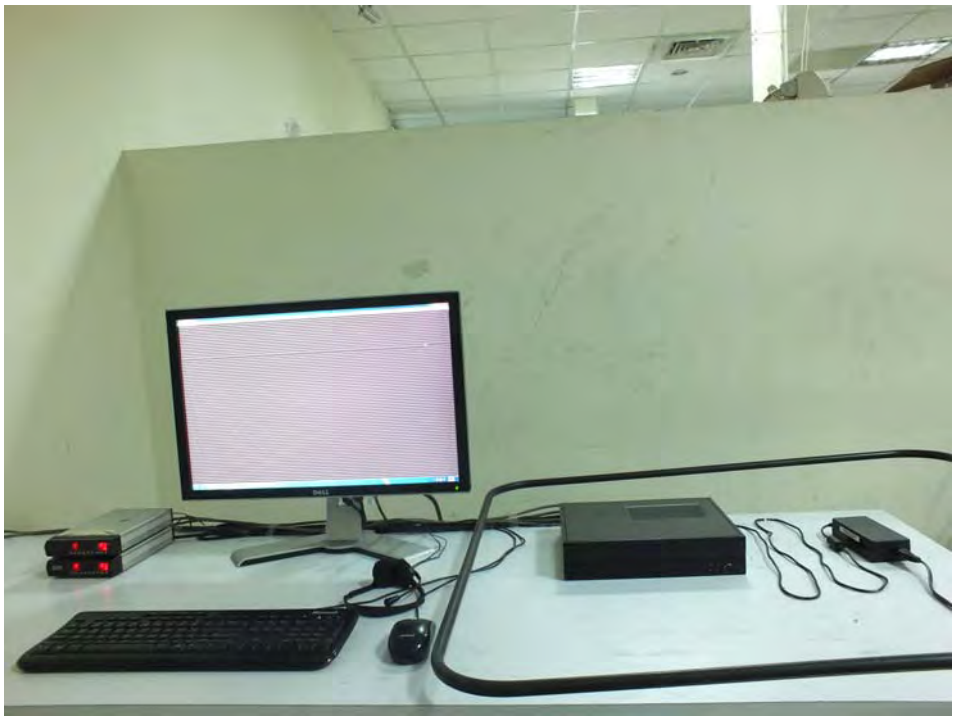


EUT : Equipment under test G : Test Generator

14.3. Photographs of Power Frequency Magnetic Field Immunity Tests

Mode 1&2

FRONT VIEW



REAR VIEW



15. Voltage Dips and Voltage Interruptions Immunity Measurement (DIP)

Test mode	Mode 1&2
Final Test Result	***PASS***
Pass Performance Criteria	**C** for voltage interruption, **A** for voltage dips
Required Performance Criteria	C for voltage interruption, C/B for voltage dips
Basic Standard	IEC 61000-4-11
Product Standard	EN 55024:2010
Test Port	Input power ports
Temperature	25 ℃
Relative Humidity	47 %
Atmospheric Pressure	102 kPa
Test Date	Sep. 10, 2014
Test Engineer	Ben
Observation	Please refer to section 15.1 and 15.2

15.1. Test Record of Voltage Interruption

Voltage (V)	Performance Criterion (Phase Angle)		Reduction Voltage	Duration (Periods)
	0°	180°		
100/240	C	C	>95 %	5000 ms

15.2. Test Record of Voltage Dips

Voltage (V)	Performance Criterion (Phase Angle)		Reduction Voltage	Duration (Periods)
	0°	180°		
100/240	A	A	30 %	500 ms
100/240	A	A	>95 %	10ms

15.3. Testing Requirement and Procedure

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

15.4. Test Conditions

a. Source voltage and frequency : 100/240V, 50Hz, Single phase.
b. Test of interval : 10 sec.
c. Level and duration : Sequency of 3 dips/interrupts.
d. Voltage rise (and fall) time : 1 ~ 5 μs.

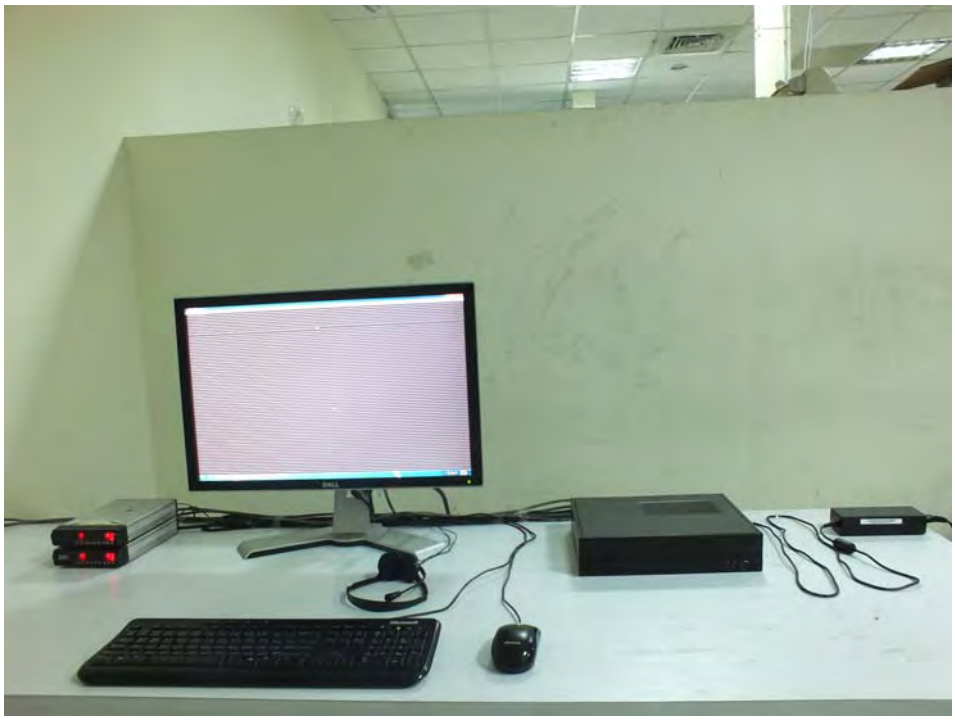
15.5. Operating Condition

Full system

15.6. Photographs of Voltage Dips and Voltage Interruption Immunity Tests

Mode 1&2

FRONT VIEW



REAR VIEW



16. List of Measuring Equipment Used

< Conducted Emission >

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Receiver	R&S	ESCS 30	100167	9 kHz - 2.75 GHz	Nov. 05, 2013	Conduction (CO01-NH)
LISN	SCHAFFNER	NNB41	06/10024	9kHz - 30MHz	Dec. 05, 2013	Conduction (CO01-NH)
LISN	KYORITSU	KNW-407	8-1010-15	9kHz – 30MHz	N/A	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. 11, 2013	Conduction (CO01-NH)
Impedance Stabilization Network	TESEQ GMBH	ISN T800	26105	150kHz - 30MHz	Nov. 09, 2013	Conduction (CO01-NH)

Note: Calibration Interval of instruments listed above is one year.

< Radiated 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. 30, 2013	Radiation (OS02-NH)
Amplifier	BURGEON	BPA-530	100203	0.01 MHz - 3 GHz	May 19, 2014	Radiation (OS02-NH)
Receiver	R&S	ESCI	100497	9 kHz – 3 GHz	Apr. 24, 2014	Radiation (OS02-NH)
Bilog Antenna	CHASE	CBL6122B	2884	30 MHz - 2 GHz	Feb. 28, 2014	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	Aug. 30, 2013	Radiation (OS02-NH)

Note: Calibration Interval of instruments listed above is one year.

< Radiated Emission above 1GHz >

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH04-HY	1 GHz ~ 6 GHz 3m	May 16, 2014	Radiation (03CH04-HY)
Receiver	R&S	ESU	100422	20Hz ~ 26.5GHz	Jun. 19, 2014	Radiation (03CH04-HY)
Amplifier	Agilent	8449B	3008A02326	1GHz ~ 26.5GHz	May 22, 2014	Radiation (03CH04-HY)
Horn Antenna	SCHWARZBECK	BBHA9120	BBHA9120D1130	1 GHz ~ 18 GHz	Sep.10, 2013	Radiation (03CH04-HY)
Turn Table	Chaintek	3000	MF7802056	0 ~ 360 degree	NCR	Radiation (03CH04-HY)
Antenna Mast	MF	MF-7802	MF780208163	1 m ~ 4 m	NCR	Radiation (03CH04-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX 106	CB063-HF	1 GHz ~ 40 GHz	Nov. 20 , 2013	Radiation (03CH04-HY)

Note: Calibration Interval of instruments listed above is one year.

< EMS >

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
ESD Simulator	KEYTEK	MZ-15/EC	0711355	Air: 0 ~15kV Contact: 0 ~ 8kV	Apr. 28, 2014	ESD (ES01-HY)
EFT Generator	TESEQ	FTM3425	0180	0 ~ 4kV	Jan. 02, 2014	EFT (EX01-HY)
EFT/Clamp	TESEQ	CDN 3425	1705	0 ~ 2kV	Jan. 02, 2014	EFT(*) (EX01-HY)
SURGE Generator	TESEQ	CWN 3650	0429	0 ~ 6 kV/2Ω 0~ 6 kV/12Ω	Jan. 02, 2014	SURGE (EX01-HY)
SURGE/MODULE	TESEQ	TSM	1012	0.5Kv ~ 6 kV	Jan. 02, 2014	SURGE (EX01-HY)
SURGE/CDN	EMC -PARTNER	CDN	UTP-8	0.5Kv ~ 6 kV	Sep. 18, 2013	SURGE (EX01-HY)
Conducted Immunity Test System	TESEQ	NSG4070	34293	9kHz ~ 1GHz	Jul. 07, 2014	CS(*) (CS03-HY)
Attenuator	BIRD	100-SA-MFB-06	0232	150kHz ~ 230MHz	Jul. 09, 2014	CS(*) (CS03-HY)
Coupling and Decoupling Network	SCHAFFNER	CDN M016	16672	150kHz ~ 230MHz	Jul. 04, 2014	CS (CS03-HY)
Coupling and Decoupling Network	FCC	T8	120750	150kHz ~ 230MHz	Jul. 04, 2014	CS (CS03-HY)
Coupling/Decoupling Network	SCHAFFNER	CDN T800	28632	150kHz~230MHz	Jun. 19, 2014	CS (CS03-HY)
Magnetic field Immunity Loop	FCC (KEYTEK)	F-1000-4-8-G-125A	03007	30A//CONTINUOUS 100A/2Hrs 230A/30SEC	Oct. 14, 2013	PFMF (CS03-HY)
Magnetic Generator	FCC (KEYTEK)	F-1000-4-8/9/10-L-1M	03003	30A//CONTINUOUS 100A/2Hrs 230A/30SEC	Oct. 14, 2013	PFMF (CS03-HY)
DIP Generator	TESEQ	VAR 3005-S16	0804	230VA/50Hz/60Hz 0%Open/5S 0%Short/5S 40%0.10S 70%/0.01S	Jan. 02, 2014	DIP (EX01-HY)
Harmonic/Flicker Test System	SCHAFFNER	CCN1000-1	72471	4000VA 16A PEAK	Jan. 29, 2014	Harmonics, Flicker (EX01-HY)

Note: Calibration Interval of instruments listed above is one year.

< RS > -- From 80 MHz to 1000 MHz test

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RS immunity Test system	ROHDE& SCHWARZ	RSF	RS-01	80M~3GHz	Mar. 14, 2014	RS
Amplifier	AR	250W 1000AM	0332909	80MHz ~ 1GHz	Mar. 05, 2014	RS
DUAL DIRECTIONAL COUPLER	AMPLIFIER& RESEARCH	DC6180A	312453	0.08 ~ 1GHz	Oct. 07, 2013	RS
INTEGRATED MEASUREMENT SYSTEM	ROHDE& SCHWARZ	IMS	100007	9kHz ~ 3GHz	Mar. 26, 2014	RS
NRP-Z91 POWER SENSOR 6GHZ	ROHDE& SCHWARZ	NRP-Z91 1168.8004.02	100095	9kHz ~ 3GHz	Mar. 26, 2014	RS
Antenna	FRANKONIA	BTA-L	02002L	26MHz ~ 1GHz	May 05, 2014	RS
Probe	ETS-LINDGREN	HI-6005	00052473	0.1MHz ~ 5GHz	Feb. 05, 2014	RS

Note: Calibration Interval of instruments listed above is one year.

17. Uncertainty of Test Site

Emission Test Measurement Uncertainty

Test Items	Test Site No.	Uncertainty	Remark
Conducted Emissions	CO01-NH	± 2.6dB	Confidence levels of 95%
Radiated Emissions below 1GHz	OS02-NH	± 3.0dB	Confidence levels of 95%
Radiated Emissions above 1GHz	03CH04-HY	± 4.8dB	Confidence levels of 95%

Immunity Test Measurement Uncertainty

◆ **ESD Immunity (IEC 61000-4-2)**

Negative Discharge Current

From Standard				From calibration certificate					
2kV	First Peak Current	Current at 30ns	Current at 60ns	Measured First Peak Current	1st Peak Worst case. **+5%**	Measured Current at 30ns	30ns Worst case. **+5%**	Measured Current at 60ns	60ns Worst case. **-5%**
Nominal	7.5	4	2	7.48	7.85	4.2	4.41	2.01	2.11
Min	6.75	2.8	1.4		6.75		2.8		1.4
Max	8.25	5.2	2.6		8.25		5.2		2.6
Tolerance in %	10%	30%	30%						

4kV	First Peak Current	Current at 30ns	Current at 60ns	First Peak Current	1st Peak Worst case. **+5%**	Measured Current at 30ns	30ns Worst case. **+5%**	Measured Current at 60ns	60ns Worst case. **+5%**
Nominal	15	8	4	15.12	15.88	8.03	8.43	3.68	3.86
Min	13.5	5.6	2.8		13.5		5.6		2.8
Max	16.5	10.4	5.2		16.5		10.4		5.2
Tolerance in %	10%	30%	30%						

6kV	First Peak Current	Current at 30ns	Current at 60ns	First Peak Current	1st Peak Worst case. **-5%**	Measured Current at 30ns	30ns Worst case. **+5%**	Measured Current at 60ns	60ns Worst case. **+5%**
Nominal	22.5	12	6	22.78	23.92	12.37	12.99	5.45	5.72
Min	20.25	8.4	4.2		20.25		8.4		4.2
Max	24.75	15.6	7.8		24.75		15.6		7.8
Tolerance in %	10%	30%	30%						

Negative Discharge Current

From Standard				From calibration Certificate					
8kV	First Peak Current	Current at 30ns	Current at 60ns	First Peak Current	1st Peak Worst case. **+5%**	Measured Current at 30ns	30ns Worst case. **+5%**	Measured Current at 60ns	60ns Worst case. **+5%**
Nominal	30	16	8	30.26	31.77	16.13	16.94	7.39	7.76
Min	27	11.2	5.6		27		11.2		5.6
Max	33	20.8	10.4		33		20.8		10.4
Tolerance in %	10%	30%	30%						

Negative Discharge Voltage

Standard Parameters				Measured Values
Indicated Voltage.	Tolerance.	Max.	Min.	
kV	%	kV	kV	kV
2	10	2.20	1.80	2.05
4	10	4.40	3.60	4.027
6	10	6.60	5.40	5.955
8	10	8.80	7.20	7.916
15	10	16.50	13.50	14.839

Negative Rise Time

Standard Parameters	
T max.	1ns
T min	0.7ns

Measured Values			
Indicated Voltage.	Measured Rise Time.	Worst Case max. +6%	Worst Case min. -6%
2kV	0.851	0.902	0.799
4kV	0.780	0.268	0.733
6kV	0.750	0.795	0.705
8kV	0.772	0.818	0.726

It has been demonstrated that the ESD generator meets the specified requirements in the standard with at least a 95% confidence

◆ RF Radiated Immunity (IEC 61000-4-3)

Symbol	Source of Uncertainty	Value	Probability distribution	Divisor	$u_i(y)$
F_{SM}	Felds Strength monitor	1.5	Normal 2	2.000	0.75
FS_{AW}	Field Strength acceptability window	0.50	Rectangular	1.732	0.29
PAH	Power Amplifier Harmonics	0.50	Rectangular	1.732	0.29
R_S	Measurement System Repeatability	0.50	normal 1	1.000	0.50
R_{EUT}	Repeatability of EUT	0.00	normal 1	1.000	0.00
$u_c(F_S)$	Combined Standard Uncertainty	-	normal	-	0.83
$U(F_S)$	**Expanded Uncertainty**	-	**normal k= 2**		**1.66**

Specified Level (V/m)	Test level (V/m)
For 1 Volts	1.25
For 3 Volts	3.33
For 10 Volts	11.22

◆ EFT/BURST Immunity (IEC 61000-4-4)

Voltage Output

Standard Parameters				Measured Values
Indicated Voltage.	Tolerance.	Max.	Min.	
kV	%	kV	kV	kV
0.5	10	0.55	0.45	0.489
1	10	1.1	0.9	1.006
2	10	2.2	1.8	2.016
4	10	4.4	3.6	3.830
- 0.5	10	- 0.55	- 0.45	- 0.489
- 1	10	- 1.1	- 0.9	- 0.972
- 2	10	- 2.2	- 1.8	- 1.961
- 4	10	- 4.4	- 3.6	- 3.770

Spike frequency

Standard Parameters					Measured Values
Indicated Voltage.		Tolerance.	Max.	Min.	
kV	kHz	%	kHz	kHz	kHz
0.5	5	10	5.5	4.5	5.00
1	5	10	5.5	4.5	4.98
2	5	10	5.5	4.5	4.98
4	2.5	10	2.75	2.25	2.49
4	5	10	5.5	4.5	5.01

Burst width

Standard Parameters					Measured Values
Indicated Voltage.		Tolerance.	Max.	Min.	
kV	ms	%	ms	ms	ms
0.5	15	20	18	12	14.97
1	15	20	18	12	14.94
2	15	20	18	12	14.91
4	15	20	18	12	14.95

Burst period

Standard Parameters					Measured Values
Indicated Voltage.		Tolerance.	Max.	Min.	
kV	ms	%	ms	ms	ms
0.5	300	20	360	240	299.7
1	300	20	360	240	300.5
2	300	20	360	240	299.2
4	300	20	360	240	300.2

It has been demonstrated that the EFT/BURST generator meets the specified requirements in the standard with at least a 95% confidence

◆ Surge Immunity (IEC 61000-4-5)

Surge Voltage Output

Standard Parameters				Measured Values
Indicated Voltage.	Tolerance.	Max.	Min.	
kV	%	kV	kV	kV
0.5	10	0.55	0.45	0.488
1	10	1.1	0.9	0.964
2	10	2.2	1.8	1.984
4	10	4.4	3.6	3.94
6	10	6.6	5.4	5.91
- 0.5	10	- 0.55	- 0.45	- 0.484
- 1	10	- 1.1	- 0.9	- 0.977
- 2	10	- 2.2	- 1.8	- 1.992
- 4	10	- 4.4	- 3.6	- 3.95
- 6	10	- 6.6	- 5.4	- 5.91

Output Wave

Standard Parameters			Measured Values
+ 6 kV			
	Max.	Min.	
Rise Time	1.56 µs	0.84 µs	1.24 µs
Duration Time	60 µs	40 µs	52.83 µs
+ 6 kV			
Rise Time	1.56 µs	0.84 µs	1.30 µs
Duration Time	60 µs	40 µs	54.72 µs

It has been demonstrated that the Surge generator meets the specified requirements in the standard with at least a 95% confidence

◆ RF Conducted Immunity (IEC 61000-4-6)

Symbol	Source of Uncertainty	Value	Probability distribution	Divisor	u_i(y)
S_A	Spectrum Analyzer	1.50	Rectangular	1.732	0.87
C_C	Current coil Calibration	1.00	normal 2	2.000	0.50
M	Mismatch	-0.5	U-shaped	1.414	-0.35
M	Mismatch	-0.3	U-shaped	1.414	-0.35
R_S	Measurement System Repeatability	0.50	normal 1	1.000	0.50
R_{EUT}	Repeatability of EUT	0.00	normal 1	1.000	0.00
$u_c(F_S)$	Combined Standard Uncertainty	-	normal	-	1.57
$U(F_S)$	**Expanded Uncertainty**	-	**normal k= 2**		**3.14**

Specified Level (V)	Test level (V)
For 1 Volts	1.30
For 3 Volts	3.88
For 10 Volts	12.15

◆ Magnetic Field Immunity (IEC 61000-4-8)

Current output

Standard Parameters					Measured Values
Magnetic Field Strength	Output Current	Tolerance.	Max.	Min.	
A/m	A	%	A	A	A
1	6	5	6.3	3.8	6.1
3	50	5	52.5	47.5	49.0
10	180	5	189	171	188.0

It has been demonstrated that the Magnetic generator meets the specified requirements in the standard with at least a 95% confidence

◆ **Voltage Variation Immunity (IEC 61000-4-11)**

Short Dip period

Standard Parameters					
Degree	Duration	Tolerance.	Max.	Min.	Measured Values
	ms	%	ms	ms	ms
90	4	5	4.2	3.8	4.17
180	8	5	8.4	7.6	8.33
270	12	5	12.6	11.4	12.50
360	16	5	16.8	15.2	16.67

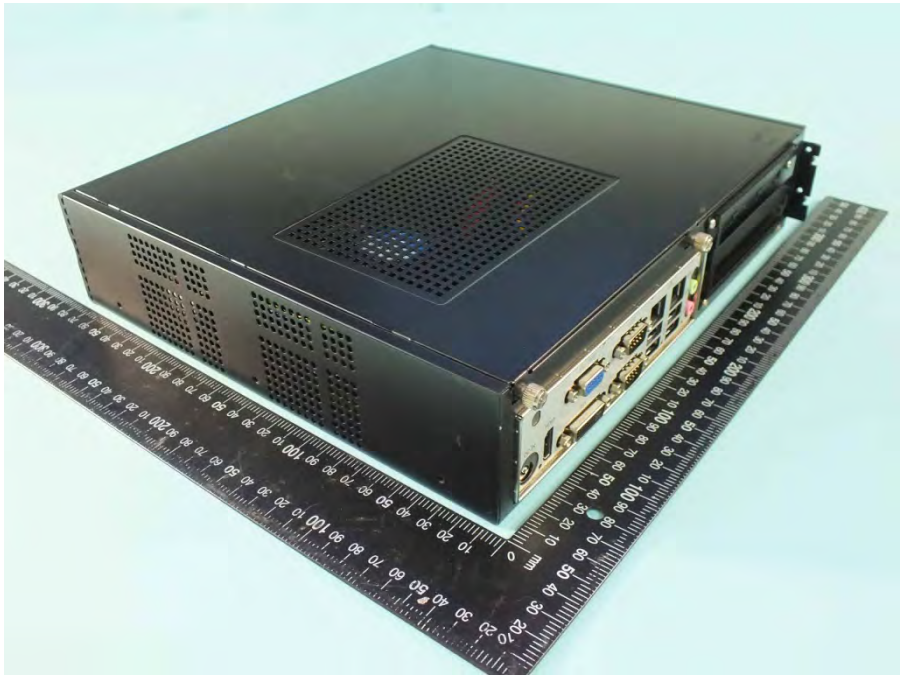
Long Dip period

Standard Parameters					
Degree	Duration	Tolerance.	Max.	Min.	Measured Values
	ms	%	ms	ms	ms
90	16	5	16.8	15.2	16.38
180	50	5	55	45	50.04
270	100	5	110	90	99.64
360	150	5	165	135	149.3

It has been demonstrated that the Dip generator meets the specified requirements in the standard with at least a 95% confidence

APPENDIX A. Photographs of EUT



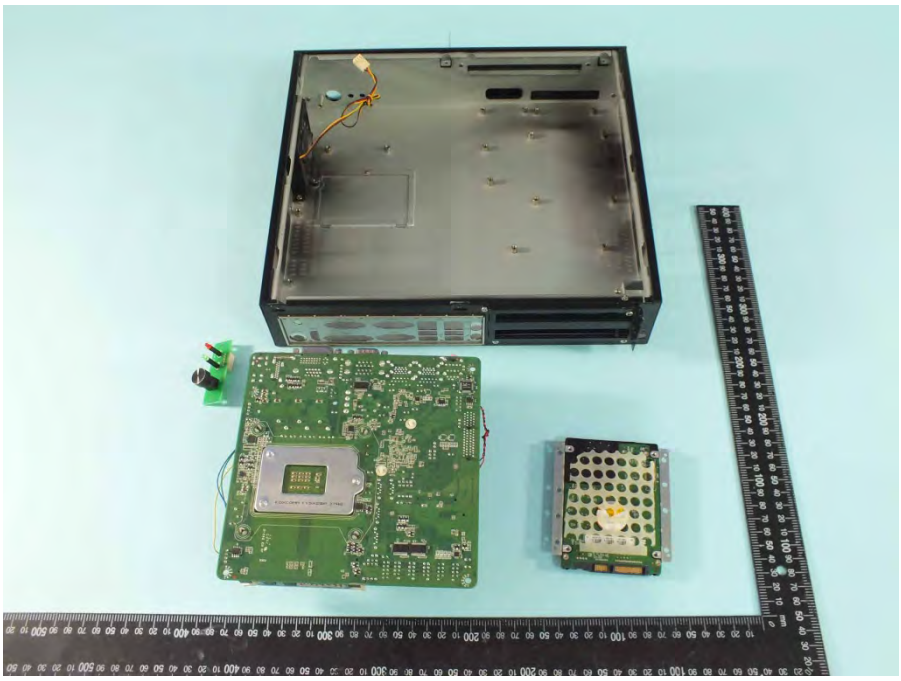


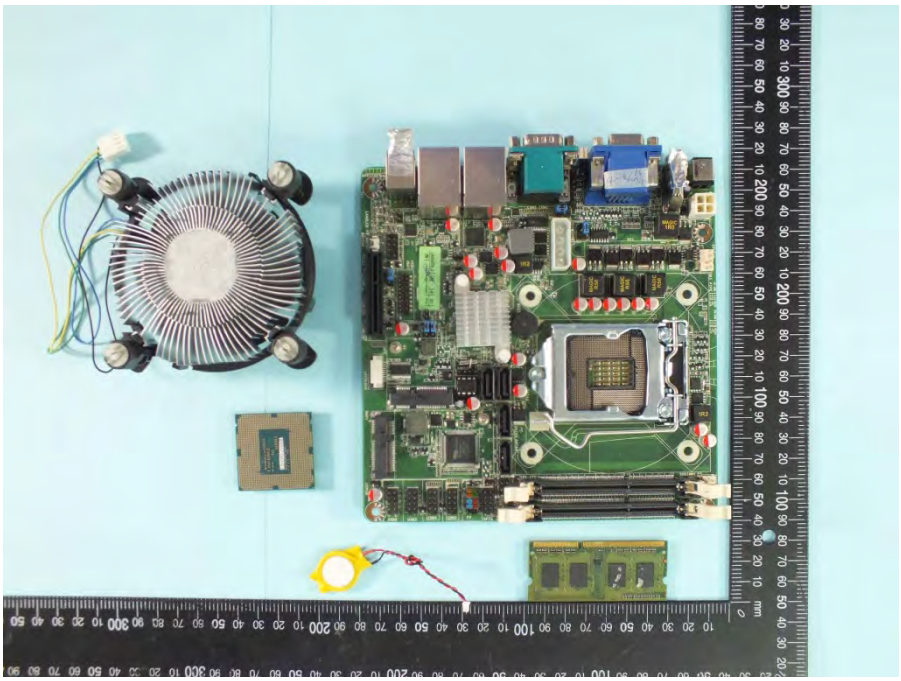

RF
HDMI
DC-IN
DVI
019

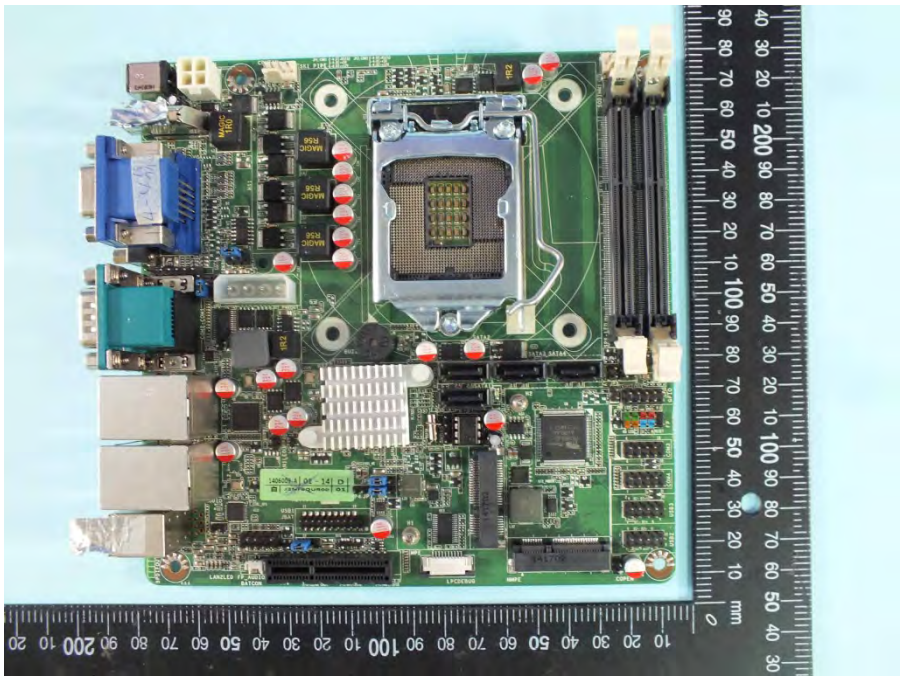


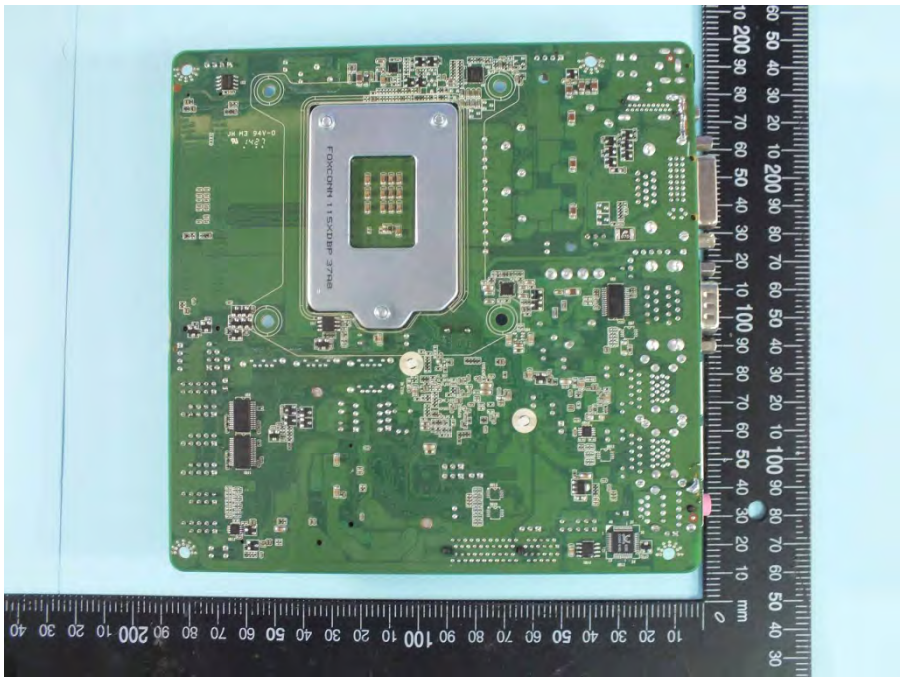


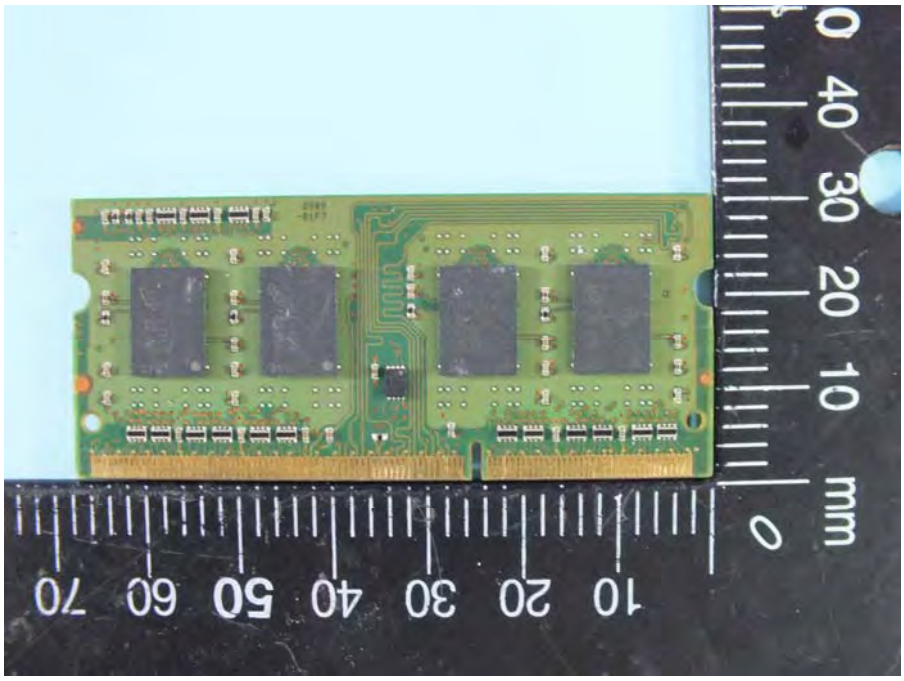

MAGIC
1R0

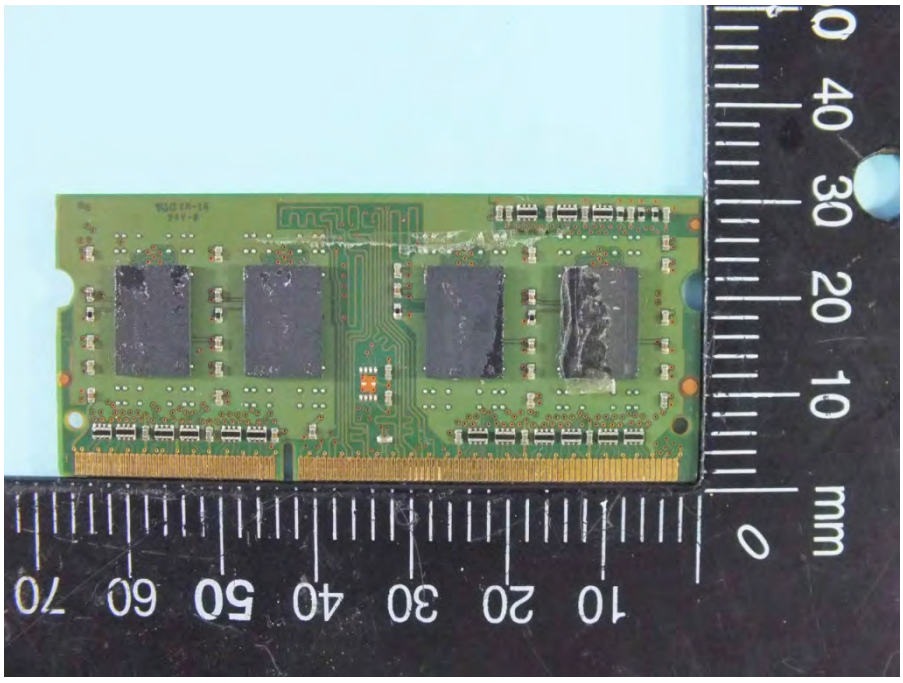




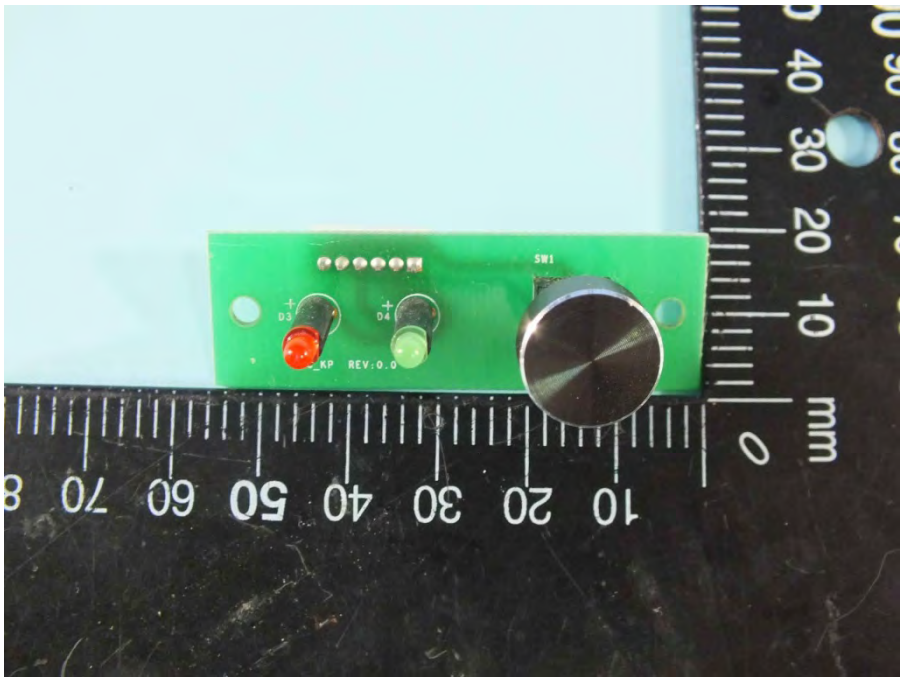


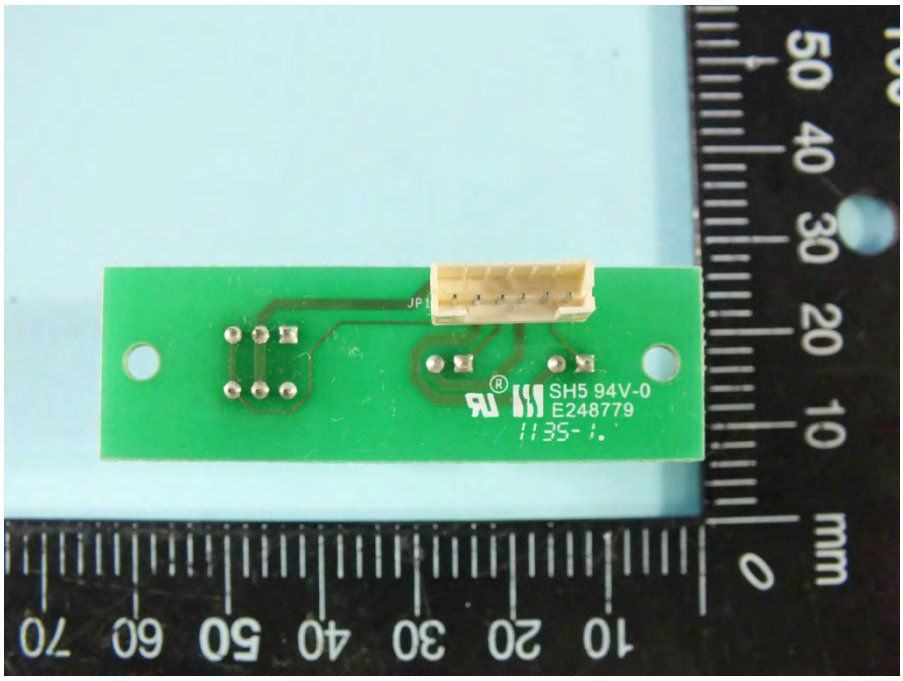



0 40 30 20 10 mm
10 20 30 40 50 60 70


0 40 30 20 10 mm
10 20 30 40 50 60 70


INTEL CONFIDENTIAL
QDN1 ES 3.20GHZ
MALAY
L314B180

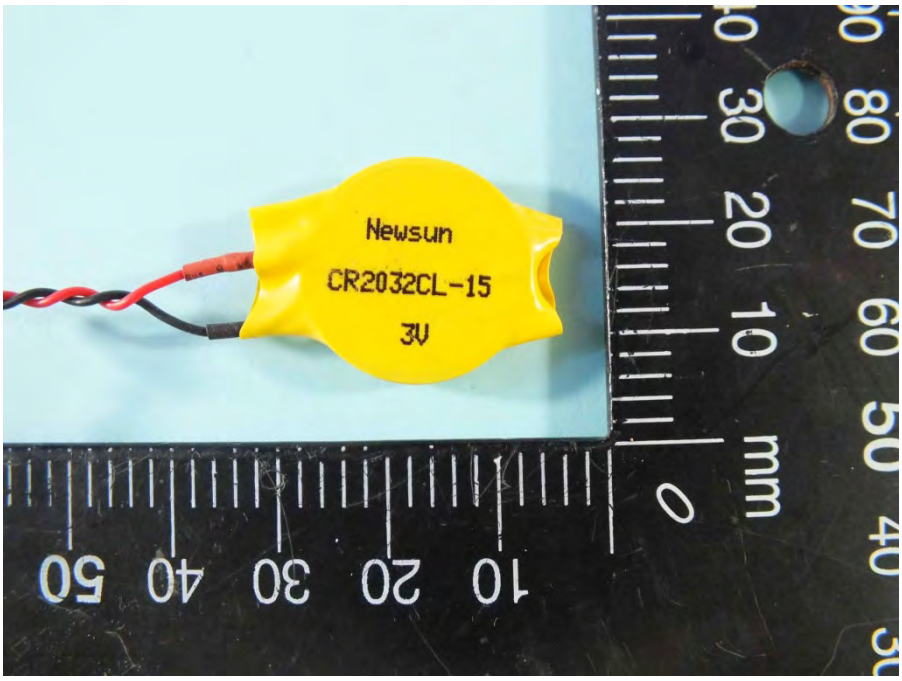

SW1
D3
D4
REV:0.0


JP1
SH5 94V-0
E248779
1135-1.
mm


WD
160GB
WD Scorpio Blue
mm




FRAGILE
DO NOT COVER
ANY DRIVE HOLES
WD
www.westerndigital.com
160GB
WD1600BEVT
S/N : WX70A59T4770
P/N: XXXXXX-XXX
CT: XXXXXXXXXXXXX
MDL : WD1600BEVT-22ZCT0
Product warranty will be void if seal,
label or cover is removed or damaged
WWN:50014EE0AC04E12B
DATE: 04 JUN 2009
DCM : HBNTJAB
5VDC : 0.55A
LBA : 312581808
R/N : 701499
U.S. Patents: 6178056, 5956196,6289484, 6263459
Product of Malaysia
Canada ICES-003 Class B/
NMB-003 Classe B
RoHS
SERIAL ATA
D33015
E101559
N3565
WDT-701499(B)
ECS


Newsun
CR2032CL-15
3V






DELTA ELECTRONICS, INC.
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AC/DC ADAPTER (电源适配器/交換式電源供應器)
MODEL(型号/型號): ADP-120ZB BB
INPUT(输入/輸入): 100-240V~ 2.0A(2.0A) 50-60Hz
OUTPUT(输出/輸出): 19V ⎓ 6.32A(6.32A)
CAUTION(警告): 适用于资讯类产品/適用於資訊類產品
For use with Information Technology Equipment.
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Endast för kontorsmaskin.
Apparatet må kun tilkoples jordet stikkontakt.
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ITE POWER SUPPLY
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A/S Center : 02-714-8150
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REV.: 00
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