

Verification of Compliance

Product Name : **Nuvo-3000 Series**
Main Model Number : **Nuvo-3005E-I7QC**
Series Model Number : **Nuvo-3005P-I7QC, Nuvo-3005E-I5DC, Nuvo-3005P-I5DC**
Applicant : **Neousys Technology Inc.**
Address : **15F, No. 868-3, Zhongzheng Rd., Zhonghe Dist., New Taipei City, 23586, Taiwan (R.O.C.)**
Report Number : **C22-U070-1307-322**
Issue Date : **August 15, 2013**
Applicable Standards : **EN 55022:2010 Class A ITE**
EN 61000-3-2: 2006+A1:2009+A2:2009
EN 61000-3-3:2008
EN 55024:2010
EN 61000-4-2:2009
EN 61000-4-3:2006+A1:2008+A2:2010
EN 61000-4-4:2012
EN 61000-4-5:2006
EN 61000-4-6:2009
EN 61000-4-8:2010
EN 61000-4-11:2004

Based on the EMC Directive 2004/108/EC and the specifications of the customer, one sample of the designated product has been tested in our laboratory and found to be in compliance with the EMC standards cited above.



TAF 0905
FCC CAB Code TW1053
NVLAP Lab Code 200575-0
IC Code 4699A
VCCI Accep. No. R-1527, C-1609, T-1441, G-10,
T-1334, G-10, G-614



Central Research Technology Co.
EMC Test Laboratory
11, Lane 41, Fushuen St., Jungshan Chiu,
Taipei, Taiwan, 104, R.O.C.
Tel : 886-2-25984568
Fax: 886-2-25984546

(Tsun-Yu Shih/ General Manager)

Date: August 15, 2013

Declaration of Conformity

The following device:

Product Name : Nuvo-3000 Series

Main Model No. : Nuvo-3005E-I7QC

Series Model No. : Nuvo-3005P-I7QC, Nuvo-3005E-I5DC, Nuvo-3005P-I5DC



is here with confirmed to comply with the requirements set out in the Council Directive on the Approximation of the laws of the European Council EMC Directive 2004/108/EC. The characteristics of electromagnetic compatibility have been evaluated by Central Research Technology Co., and the results are shown in the test report. (Report No. : C22-U070-1307-322, issued in 2013), For the evaluation regarding the Directives, the following standards were applied:

EN 55022:2010 Class A ITE

EN 61000-3-2:2006+A1:2009+A2:2009

EN 61000-3-3:2008

EN 55024:2010

EN 61000-4-2:2009

EN 61000-4-3:2006+A1:2008+A2:2010

EN 61000-4-4:2012

EN 61000-4-5:2006

EN 61000-4-6:2009

EN 61000-4-8:2010

EN 61000-4-11:2004

It is understood that each unit marketed is identical to the device as tested, and any changes to the device that could adversely affect the EMC characteristics will require retest.

The following importer/manufacturer is responsible for this declaration:

Company Name : _____

Company Address : _____

(in E.U.)

Telephone : _____ Fax : _____

The person to be responsible for marking this declaration:

Name (Full name)

Position/Title

Legal Signature

Date

CE EMC Test Report

for

Nuvo-3000 Series

Main Model No. : Nuvo-3005E-I7QC
**Series Model No. : Nuvo-3005P-I7QC, Nuvo-3005E-I5DC,
Nuvo-3005P-I5DC**
Report Number : C22-U070-1307-322
Date of Receipt : July 31, 2013
Date of Report : August 15, 2013

Prepared for

Neousys Technology Inc.

15F, No. 868-3, Zhongzheng Rd., Zhonghe Dist., New Taipei City, 23586, Taiwan (R.O.C.)

Prepared by



Central Research Technology Co.

EMC Test Laboratory

11, Lane 41, Fushuen St., Jungshan Chiu, Taipei, Taiwan, 104, R.O.C.

This report shall not be reproduced, except in full, without written approval of Central Research Technology Co.. It may be duplicated completely in its entirety for legal use with the permission of the applicant. The test result in the report applies only to the sample tested.

Verification of Compliance

Equipment Under Test : Nuvo-3000 Series

Main Model No. : Nuvo-3005E-I7QC

Series Model No. : Nuvo-3005P-I7QC, Nuvo-3005E-I5DC, Nuvo-3005P-I5DC

Applicant : Neousys Technology Inc.

Address : 15F, No. 868-3, Zhongzheng Rd., Zhonghe Dist., New Taipei City, 23586, Taiwan (R.O.C.)

Applicable Standards : **EN 55022:2010 Class A ITE**
EN 61000-3-2:2006+A1:2009+A2:2009
EN 61000-3-3:2008
EN 55024:2010
EN 61000-4-2:2009
EN 61000-4-3:2006+A1:2008+A2:2010
EN 61000-4-4:2012
EN 61000-4-5:2006
EN 61000-4-6:2009
EN 61000-4-8:2010
EN 61000-4-11:2004

Date of Testing : July 31~August 7, 2013

Deviation : The test method and configuration of EMS tests are following the requirement of the applicable standards cited above.

Condition of Test Sample : Engineering Sample



We, **Central Research Technology Co.**, hereby certify that one sample of the designated product was tested in our facility during the period mentioned above. The test records, data evaluation and Equipment Under Test (EUT) configurations shown in the present report are true and accurate representation of the measurements of the sample's EMC characteristics under the conditions herein specified.

The test results show that the EUT as described in the present report is in compliance with the requirements set forth in the standards mentioned above and apply to the tested sample identified in the present report only. The test report shall not be reproduced, except in its entirety, without the written approval of Central Research Technology Co.

PREPARED BY : Iris Chen , **DATE** : Aug. 15, 2013
(Iris Chen/System Executive)

APPROVED BY : Tsun-Yu Shih , **DATE** : Aug. 15, 2013
(Tsun-Yu Shih/General Manager)

Contents

1. General Description.....	6
1.1 General Description of EUT	6
1.2 Test Mode	9
1.3 Applied standards	10
1.4 Test Setup for the EUT	11
1.5 The Support Units	12
1.6 Layout of the Setup	16
1.7 Test Capability	20
2. Conducted Emission Measurement.....	22
2.1 Limits for Emission Measurement	22
2.2 Test Instruments	23
2.3 Test Procedures.....	25
2.4 Test Configurations.....	26
2.5 Photographs of the Test Configurations	26
2.6 Test Results	27
3. Radiated Emission Measurement	30
3.1 Limits for Emission Measurement	30
3.2 Test Instruments	31
3.3 Test Procedures.....	34
3.4 Test Configurations.....	36
3.5 Photographs of the Test Configurations	37
3.6 Test Results	38
4. Harmonic Current Emission Measurement.....	42
4.1 Limits for Emission Measurement	42
4.2 Test Instruments	43
4.3 Test Procedures.....	44
4.4 Test Configurations.....	45
4.5 Photographs of the Test Configurations	45
4.6 Test Results	46

5. Voltage Fluctuations and Flickers Emission Measurement.....	48
5.1 Limits for Emission Measurement	48
5.2 Test Instruments	48
5.3 Test Procedures.....	49
5.4 Test Configurations.....	50
5.5 Photographs of the Test Configurations	50
5.6 Test Results	51
6. Electrostatic Discharge (ESD) Immunity Test	52
6.1 Specifications of Immunity Test Requirement.....	52
6.2 Description of Performance Criteria	53
6.3 Test Instruments	53
6.4 Test Procedures.....	54
6.5 Test Configurations.....	56
6.6 Photographs of the Test Configurations	56
6.7 Test Results	57
7. Radiated Electromagnetic Field (RS) Immunity Test.....	62
7.1 Specifications of Immunity Test Requirement.....	62
7.2 Description of Performance Criteria	63
7.3 Test Instruments	64
7.4 Test Procedures.....	65
7.5 Test Configurations.....	66
7.6 Photographs of the Test Configurations	66
7.7 Test Results	67
8. Electrical fast transient / burst (EFT) Immunity Test.....	68
8.1 Specifications of Immunity Test Requirement.....	68
8.2 Description of Performance Criteria	69
8.3 Test Instruments	69
8.4 Test Procedures.....	70
8.5 Test Configurations.....	71
8.6 Photographs of the Test Configurations	71
8.7 Test Results	72
9. Surge Immunity Test	73

9.1	Specifications of Immunity Test Requirement	73
9.2	Description of Performance Criteria	74
9.3	Test Instruments	74
9.4	Test Procedures	75
9.5	Test Configurations	76
9.6	Photographs of the Test Configurations	76
9.7	Test Results	77
10.	Conducted disturbances (CS) Immunity Test	78
10.1	Specifications of Immunity Test Requirement	78
10.2	Description of Performance Criteria	79
10.3	Test Instruments	80
10.4	Test Procedures	81
10.5	Test Configurations	82
10.6	Photographs of the Test Configurations	82
10.7	Test Results	83
11.	Power frequency magnetic field (PFM) Immunity Test.....	84
11.1	Specifications of Immunity Test Requirement	84
11.2	Description of Performance Criteria	85
11.3	Test Instruments	85
11.4	Test Procedures	86
11.5	Test Configurations	87
11.6	Photographs of the Test Configurations	87
11.7	Test Results	88
12.	Voltage dips, short interruptions Immunity Test.....	89
12.1	Specifications of Immunity Test Requirement	89
12.2	Description of Performance Criteria	90
12.3	Test Instruments	90
12.4	Test Procedures	91
12.5	Test Configurations	92
12.6	Photographs of the Test Configurations	92
12.7	Test Results	93

Attachment 1 – Photographs of the Test Configurations**Attachment 2 – Photographs of EUT**

1. General Description

1.1 General Description of EUT

Equipment Under Test : Nuvo-3000 Series

Main Model No. : Nuvo-3005E-I7QC

Series Model No. : Nuvo-3005P-I7QC, Nuvo-3005E-I5DC,
Nuvo-3005P-I5DC

Power in : Supplied by the power adapter.

Power adapter specification : Trade Name : MEAN WELL
Model No. : GS160A20
Input : 100-240Vac, 50/60Hz, 2.0A
Output : 20Vdc, 8A, 160W MAX.

Highest Operating Frequency : 3.3GHz from the test specification

Manufacturer : Neosys Technology Inc.

Function Description :

The EUT is an engineering sample of the Nuvo-3000 Series. Please refer to the user's manual for the details.

The I/O ports of EUT are listed below:

No.	I/O Port Type	Quantity
1	PS/2 port	1
2	D-Sub port	1
3	USB port	4
4	Com. port	2
5	LAN port	5
6	Audio output port	1
7	USB 3.0 port	4
8	DVI/HDMI port (White)	1
9	DVI/HDMI port (Blue)	1
10	Mic. port	1
11	CFast slot	1
12	AUX I/O port	1
13	DC input port	2 set
14	ON/OFF Ctrl Status Output port	1

The specifications of the EUT (supplied by manufacturer) are listed below:

Nuvo-3000 Series Specifications

System Core		Expansion Bus	
Processor	Intel® Core™ i7-3610QE (2.3/3.3 GHz, 6 MB cache) Intel® Core™ i5-3610ME (2.7/3.3 GHz, 3 MB cache) Intel® Celeron™ 1020E (2.2 GHz, 2 MB cache)	Mini PCI-E	1x internal mini PCI Express socket with USIM socket 1x internal mini PCI Express socket
Chipset	Intel® HM76 Platform Controller Hub	PCI/PCI Express	1x PCI slot in Cassette (Nuvo-3003P/3005P) 1x PCIe x8 slot via x16 connector in Cassette (Nuvo-3003E/3005E)
Graphics	Integrated Intel® HD Graphics 4000 Controller (i7/i5) Integrated Intel® HD Graphics Controller (Celeron)	Power Supply & Ignition Control	
Memory	2x 204-pin SO-DIMM sockets, up to 16 GB DDR3 1333/1600 MHz SDRAM	DC Input	1x 4-pin power connector for 8~25V DC input
I/O Interface		Ignition Control	1x 3-pin pluggable terminal block for ignition signal input (IGN/GND/V+)
Ethernet	Up to 5x Gigabit Ethernet ports by Intel® I210	Remote Ctrl. & Status Output	1x 10-pin (2x5) wafer connector for remote on/off control and status LED output
Video Port	1x DB-15 connector for analog RGB, supporting 2048x1536 resolution 2x DVI-I connectors for DP/HDMI/DVI outputs, supporting 2560x1600 (DP) 1920x1080 (DVI/HDMI) resolution	Mechanical	
USB	4x USB 3.0 ports and 4x USB 2.0 ports	Dimension	240 mm (W) x 225 mm (D) x 90 mm (H)
Serial Port	2x software-programmable RS-232/422/485 (COM1 & COM2)	Weight	4.4 Kg (including 2.5" HDD and DDR3 SODIMM)
Isolated DIO	8x isolated digital input channels with COS interrupt and 8x isolated digital output channels	Mounting	Wall-mounting (standard) or DIN-Rail mounting (optional)
KB/MS	1x 6-pin mini-DIN connector for PS/2 keyboard/mouse	Environmental	
Audio	1x mic-in and 1x speaker-out	Operating Temperature	-25°C ~ 70°C */** (with i5-3610ME & Celeron 1020E) -25°C ~ 60°C */** (with i7-3610QE)
Storage Interface		Storage	-40°C ~ 85°C
SATA HDD	1x Internal SATA port for 2.5" HDD/SSD installation	Humidity	10%~90% , non-condensing
CFast	1x CFast socket	Vibration	Operating, 5 Grms, 5-500 Hz, 3 Axes (w/ SSD, according to IEC60068-2-64)
		Shock	Operating, 50 Grms, Half-sine 11 ms Duration (w/ SSD, according to IEC60068-2-27)
		EMC	CE/FCC Class A, according to EN 55022 & EN 55024
		MTBF	93,732 hours

* 100% CPU loading is applied using Intel® Thermal Analysis Tool. For detail testing criteria, please contact Neousys Technology.

** For sub-zero operating temperature, a wide temperature HDD drive or Solid State Disk (SSD) is required.

1.2 Test Mode

Normal operating as the specification of manufacturer.

The EUT has 2 DVI/HDMI ports (White & Blue). According to the preliminary test result to find that DVI/HDMI (White) is worse. It was taken as the representative condition for testing and its data are recorded in the present document.

The EUT was tested with display mode: D-Sub+ DVI 1920x1200 @60Hz.

1.3 Applied standards

According to the specifications of the manufacturer and the requirements set in European Council EMC Directive 2004/108/EC, the applied standards to evaluate the compliance of the EUT are as following:

Applied Standards	Test Items	Results
<input checked="" type="checkbox"/> EN 55022:2010 Class A ITE	Conducted Emission Measurement	<u>PASS</u>
	Radiated Emission Measurement	<u>PASS</u>
<input checked="" type="checkbox"/> EN 61000-3-2:2006+A1:2009+A2:2009	Harmonic Current Emission Measurement	<u>PASS</u>
<input checked="" type="checkbox"/> EN 61000-3-3:2008	Voltage Fluctuation and Flicker Emission Measurement	<u>PASS</u>
<input checked="" type="checkbox"/> EN 55024:2010		
<input checked="" type="checkbox"/> EN 61000-4-2:2009	Electrostatic discharge Test (ESD)	<u>PASS</u>
<input checked="" type="checkbox"/> EN 61000-4-3:2006+A1:2008+A2:2010	Radiated electromagnetic field immunity Test (RS)	<u>PASS</u>
<input checked="" type="checkbox"/> EN 61000-4-4:2012	Electrical fast transient / burst immunity Test (EFT)	<u>PASS</u>
<input checked="" type="checkbox"/> EN 61000-4-5:2006	Surge immunity Test	<u>PASS</u>
<input checked="" type="checkbox"/> EN 61000-4-6:2009	Immunity to conducted disturbances, induced by radio-frequency fields (CS)	<u>PASS</u>
<input checked="" type="checkbox"/> EN 61000-4-8:2010	Power frequency magnetic field immunity Test (PFM)	<u>PASS</u>
<input checked="" type="checkbox"/> EN 61000-4-11:2004	Voltage dips, short interruptions Test	<u>PASS</u>

1.4 Test Setup for the EUT

The EUT is an unique unit connected with other necessary accessories and support units listed in the next section. It has been tested against each standard after the following setup steps:

- a. Connect the EUT and all the support units to the appropriate power source.
- b. Turn on the EUT and all the accessories and support units.
- c. Install an EMC test software into EUT and execute it under the Windows environment.
- d. The EUT sends “H” patterns to the monitors, which fills the whole screen of it.
- e. The EUT sends messages to the modem.
- f. The EUT reads/writes messages from/to the USB 3.0 HDD/ USB 2.0 HDD/USB Flash Disk and CFast Card continually.
- g. The EUT sends 1kHz audio signal to the earphone.
- h. The Cameras keep shooting and transmitting the images to the LCD Monitor through the LAN port by the EUT.
- i. Another PC sends/ receives messages to/ from the EUT through a Hub by executing the command of “PING”.
- j. Repeat and keep the setup steps listed above before and during all tests.

EUT I/O ports / Peripherals	Exerciser Program (software)	Version of Program
EUT	BurnIn Test.exe	V 7.1
Monitor		
USB 2.0 HDD/ USB Flash Disk		
Modem		
USB 3.0 HDD		

1.5 The Support Units

Conducted Emission Test

No.	Unit	Model No.	FCC ID	Trade Name	Power Cord	Supported by lab.
1	PS/2 Mouse	MO71KC	DoC	DELL	N/A	✓
2	USB Keyboard	SK-8115	DoC	DELL	N/A	✓
3	Monitor	U2410	DoC	DELL	1.8m	✓
		2408WFP	DoC	DELL	1.8m	✓
4	USB Flash Disk	U172	DoC	PQI	N/A	✓
5	Earphone & Microphone	CW-010M.V	N/A	i-Acom	N/A	✓
6	Modem	DM-1414	IFAXDH1414	ACEEX	1.8m	✓
7	USB 3.0 HDD	HD-PCTU3	DoC	BUFFALO	N/A	✓
		My Passport Essential	DoC	WD	N/A	✓
8	IP Camera	N/A	N/A	N/A	1.8m	
9	CFast Card (16GB)	N/A	N/A	apacer	N/A	

Radiated Emission Test

No.	Unit	Model No.	FCC ID	Trade Name	Power Cord	Supported by lab.
1	PS/2 Mouse	MO71KC	DoC	DELL	N/A	✓
2	USB Keyboard	SK-8115	DoC	DELL	N/A	✓
3	Monitor	U2410	DoC	DELL	1.8m	✓
4	USB Flash Disk	U172	DoC	PQI	N/A	✓
5	Earphone & Microphone	CW-010M.V	N/A	i-Acom	N/A	✓
6	Modem	DM-1414	IFAXDH1414	ACEEX	1.8m	✓
7	USB 3.0 HDD	FreeAgent Goflex	DoC	Seagate	N/A	✓
		My Passport Essential	DoC	WD	N/A	✓
8	IP Camera	N/A	N/A	N/A	1.8m	
9	CFast Card (16GB)	N/A	N/A	apacer	N/A	

ESD Test

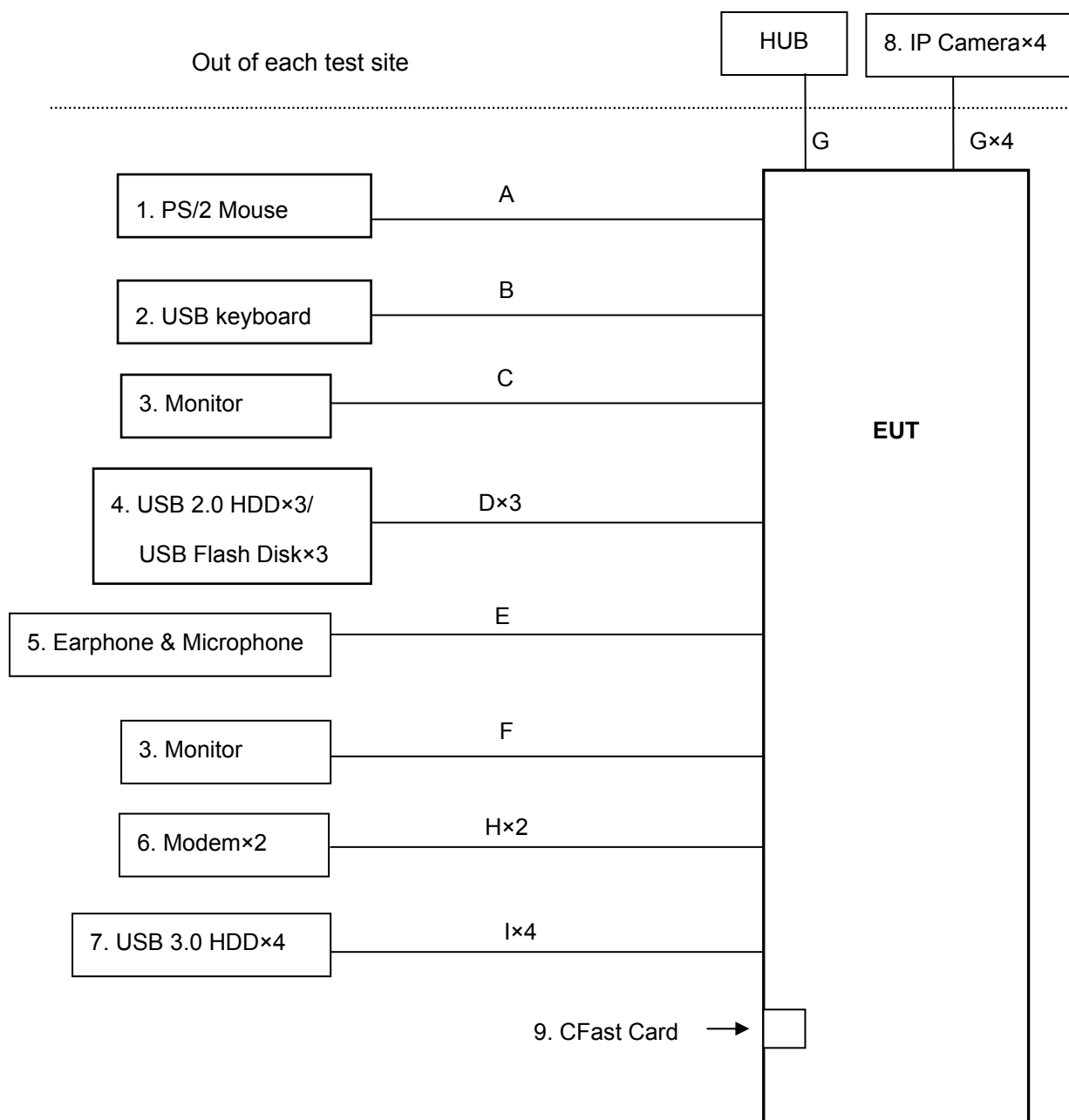
No.	Unit	Model No.	FCC ID	Trade Name	Power Cord	Supported by lab.
1	PS/2 Mouse	MO71KC	DoC	DELL	N/A	✓
2	USB Keyboard	SK-8115	DoC	DELL	N/A	✓
3	Monitor	2408WFP	DoC	DELL	1.8m	✓
4	USB 2.0 HDD	F12-U	DoC	TeraSys	N/A	✓
5	Earphone & Microphone	CW-010M.V	N/A	i-Acom	N/A	✓
6	Modem	DM-1414	IFAXDH1414	ACEEX	1.8m	✓
7	USB 3.0 HDD	BUF-HD-HXU3(B)	DoC	BUFFALO	1.5m	✓
		HD-LB2.0TU3-A2	DoC	BUFFALO	1.2m	✓
8	IP Camera	N/A	N/A	N/A	1.8m	
9	CFast Card (16GB)	N/A	N/A	apacer	N/A	

Other Tests

No.	Unit	Model No.	FCC ID	Trade Name	Power Cord	Supported by lab.
1	PS/2 Mouse	MO71KC	DoC	DELL	N/A	✓
2	USB Keyboard	SK-8115	DoC	DELL	N/A	✓
3	Monitor	2408WFP	DoC	DELL	1.8m	✓
4	USB Flash Disk	U172	DoC	PQI	N/A	✓
5	Earphone & Microphone	CW-010M.V	N/A	i-Acom	N/A	✓
6	Modem	DM-1414	IFAXDH1414	ACEEX	1.8m	✓
7	USB 3.0 HDD	HD-PCTU3	DoC	BUFFALO	N/A	✓
		My Passport Essential	DoC	WD	N/A	✓
8	IP Camera	N/A	N/A	N/A	1.8m	
9	CFast Card (16GB)	N/A	N/A	apacer	N/A	

1.6 Layout of the Setup

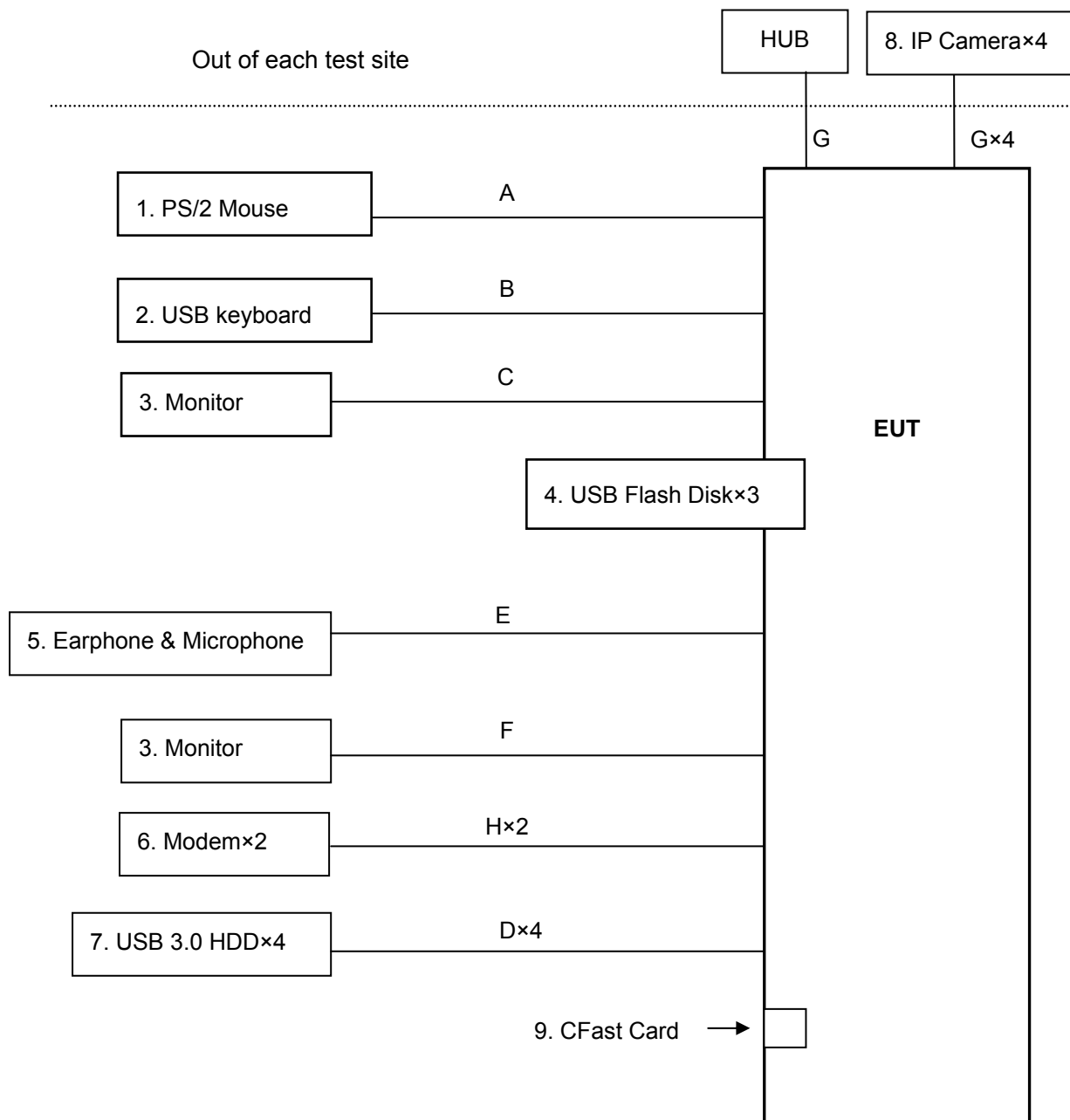
Conducted Emission and ESD Tests



Connecting Cables :

No.	Cable	Length	Shielded	Core	Shielded Backshell	Supported by lab.	Note
A	PS/2 Mouse Cable	1.8m	✓			✓	
B	USB Keyboard Cable	2.0m	✓			✓	
C	D-sub Cable	1.7m	✓	✓		✓	2 Cores
D	USB Cable	1.0m	✓			✓	CE test
		1.8m	✓			✓	ESD test
E	Earphone & Microphone Cable	1.8m	✓			✓	
F	DVI Cable	1.8m	✓	✓		✓	2 Cores
G	LAN Cable	>3m				✓	
H	Modem Cable	1.8m	✓	✓		✓	2 Cores
I	USB 3.0 Cable	1.0m	✓			✓	

Other Tests



Connecting Cables :

No.	Cable	Length	Shielded	Core	Shielded Backshell	Supported by lab.	Note
A	PS/2 Mouse Cable	1.8m	✓			✓	
B	USB Keyboard Cable	2.0m	✓			✓	
C	D-sub Cable	1.7m	✓	✓		✓	2 Cores
D	USB 3.0 Cable	1.0m	✓			✓	
E	Earphone & Microphone Cable	1.8m	✓			✓	
F	DVI Cable	1.8m	✓	✓		✓	2 Cores
G	LAN Cable	>3m				✓	
H	Modem Cable	1.8m	✓	✓		✓	2 Cores

1.7 Test Capability

Test Facility

The test facility used for evaluating the conformance of the EUT with each standard in the present report meets what required in CISPR16-1-4, CISPR16-2-3.

Test Room	Type of Test Room	Descriptions
TR1	10m semi-anechoic chamber (23m×14m×9m)	Complying with the NSA and the site VSWR requirements in documents CISPR 22 and CISPR 16-1-4 for the radiated emission measurement.
TR1	3m fully-anechoic chamber (23m×14m×9m)	
TR11	3m semi-anechoic chamber (9m×6m×6m)	Complying with the NSA requirements set in documents CISPR 22/ EN 55022 for the radiated emission measurement.
TR5	Shielding Room (8m×5m×4m)	For the conducted emission measurement.
TR4	Shielding Room (5m×3m×3m)	
TR2	3m fully-anechoic chamber (7m×3m×3m)	Complying with the field uniformity requirements in standard IEC/ EN 61000-4-3 for the radiated immunity test.
TR7	Shielding Room (5m×3m×3m)	For the Current Harmonic / Voltage Flicker and other immunity tests.
TR8	Shielding Room (5m×3m×3m)	
AR	Shielding Room (3m×3m×3m)	
TR12	Plane Grounding Site (2.4m×3m)	
TR300	3m fully-anechoic chamber (8m×5m×5m)	Complying with the site VSWR requirements set in documents CISPR 16-1-4 for the radiated emission measurement.

Test Laboratory Competence Information

Central Research Technology Co. has been accredited / filed / authorized by the agencies listed in the following table.

Certificate	Nation	Agency	Code	Mark
Accreditation Certificate	USA	NVLAP	200575-0	ISO/IEC 17025
	R.O.C. (Taiwan)	TAF	0905	ISO/IEC 17025
	R.O.C. (Taiwan)	BSMI	SL2-IN-E-0033, SL2-IS-E-0033, SL2-R1/R2-E-0033, SL2-A1-E-0033, SL2-L1-E-0033	ISO/IEC 17025
Site Filing Document	USA	FCC	474046,TW1053	Test facility list & NSA Data
	Canada	IC	4699A-1,-3	Test facility list & NSA Data
	Japan	VCCI	R-1527,C-1609, C-4400, T-1441, T-1334, G-10, G-614	Test facility list & NSA Data
Authorization Certificate	Germany	TUV	10021687	ISO/IEC 17025
	Norway	Nemko	ELA 212	ISO/IEC 17025

The copy of each certificate can be downloaded from our web site: www.crc-lab.com

2. Conducted Emission Measurement

Test Result : **PASS**

2.1 Limits for Emission Measurement

☒ Limits for conducted disturbances at the power mains

Frequency (MHz)	Class A Equipment		Class B Equipment	
	Quasi-peak (dB μ V)	Average (dB μ V)	Quasi-peak (dB μ V)	Average (dB μ V)
0.15 to 0.5	79	66	66 – 56	56 – 46
0.5 to 5	73	60	56	46
5 to 30	73	60	60	50

Note 1- The lower limit shall apply at the transition frequency.
 Note 2- The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5MHz for Class B equipment.

☒ Limits for conducted common mode disturbances at telecommunication ports

Frequency (MHz)	Class A Equipment				Class B Equipment			
	Voltage Limits		Current Limits		Voltage Limits		Current Limits	
	Q.P. (dB μ V)	Average (dB μ V)	Q.P. (dB μ A)	Average (dB μ A)	Q.P. (dB μ V)	Average (dB μ V)	Q.P. (dB μ A)	Average (dB μ A)
0.15 to 0.5	97 - 87	84 – 74	53 – 43	40 – 30	84 – 74	74 - 64	40 – 30	30 - 20
0.5 to 30	87	74	43	30	74	64	30	20

Note 1- The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5MHz.
 Note 2- The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150 Ω to the telecommunication port under test.

2.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Test Receiver	R&S	ESCS 30/ 836858/021	Jan. 14, 2013	Jan. 14, 2014
LISN	R&S	ESH2-Z5/ 880669/039	March 15, 2013	March 15, 2014
2 nd LISN	R&S	ENV4200/ 833209/010	March 29, 2013	March 29, 2014
Balanced TELE. ISN	FCC	<input type="checkbox"/> FCC-TLISN-T2-02/ 20269	August 8, 2012	August 8, 2013
		<input type="checkbox"/> FCC-TLISN-T4-02/ 20270	April 1, 2013	April 1, 2014
		<input checked="" type="checkbox"/> FCC-TLISN-T8-02/ 20318	Dec. 28, 2012	Dec. 28, 2013
<input type="checkbox"/> Capacitive Voltage Probe	FCC	F-CVP-1/ 84	Aug. 18, 2012	Aug. 18, 2013
<input type="checkbox"/> Broadband Current Probe	AH	BCP-511/ 769	Aug. 18, 2012	Aug. 18, 2013
50Ω terminator	N/A	N/A/ 001	Aug. 20, 2012	Aug. 20, 2013
RF Switch	R&S	RSU28/ 338965/002	Feb. 19, 2013	Aug. 19, 2013
RF Cable	N/A	N/A/ C0052 ~ 56	Feb. 19, 2013	Aug. 19, 2013
Test Software	Audix	e3/ Ver. 5.2004-2-19k	NCR	NCR
TR5 shielded room	ETS LINDGREN	TR5/ 15353-F	NCR	NCR

Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

Measurement Uncertainty

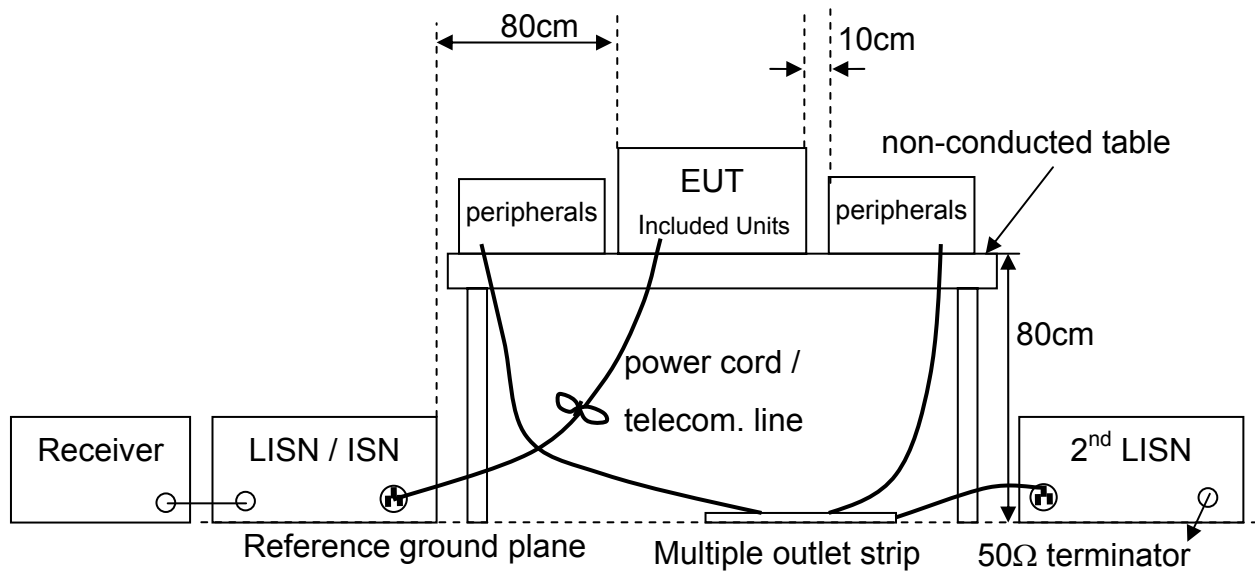
The assessed measurement uncertainty with a suitable coverage factor K to ensure 95% confidence level for the normal distribution are shown as below, the values are less than U_{cisper} in table 1 of CISPR 16-4-2.

Equipment	Model Number	Uncertainty Value
LISN	ESH2-Z5	3.1dB
	ENV 4200	2.7dB
ISN	FCC-TLISN-T2-02	3.4dB
	FCC-TLISN-T4-02	3.2dB
	FCC-TLISN-T8-02	3.2dB

2.3 Test Procedures

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters above the reference ground plane and 0.4 meters from the conducting wall of the shielded room. Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15 meters above the reference ground plane.
- c. Connect the EUT's power source / telecommunication lines to the appropriate power mains / peripherals through the LISN / ISN.
- d. All the other peripherals are connected to the 2nd LISN, if any.
- e. The LISN / ISN was placed 0.8 meters from the EUT and at least 0.8 meters from other units and other metal planes.
- f. Measure the conducted emissions on each power line (Neutral Line and Line 1 – Hot side) of the EUT's power source by using the test receiver connected to the coupling RF output port of LISN.
- g. Rapidly scan the signal from 150kHz to 30MHz by using the receiver through the Maximum-Peak detector to determine those frequencies associated with higher emission levels for each measured line.
- h. Then measure the maximum level of conducted disturbance for each frequency found from step g. by using the receiver through the Quasi-Peak and Average detectors per CISPR 16-1.
- i. Record the level for each frequency and compare with the required limit.
- j. If required, measure the conducted emissions on telecommunication lines of EUT by using the test receiver connected to the coupling RF output port of ISN and repeat step g. to i.
- k. If the peak emission level is lower than the specified Average limit, then the emission values presented will be the peak value only. Otherwise, accurate Q.P. or Average values will be measured and presented.

2.4 Test Configurations

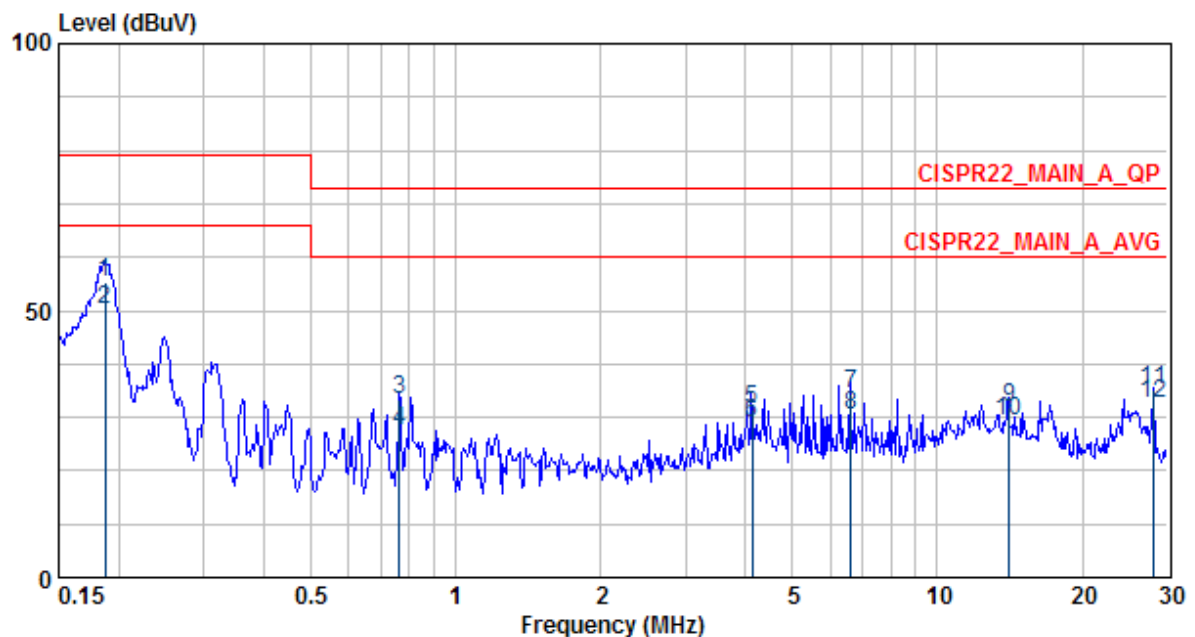


2.5 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

2.6 Test Results

Test Mode : Normal
Test Voltage : 230V/50Hz to the power adapter
Tester : Kent **Temperature** : 27°C
Humidity : 68%RH **Frequency Range** : 150kHz~30MHz
IF Bandwidth : 9kHz **Phase** : Line

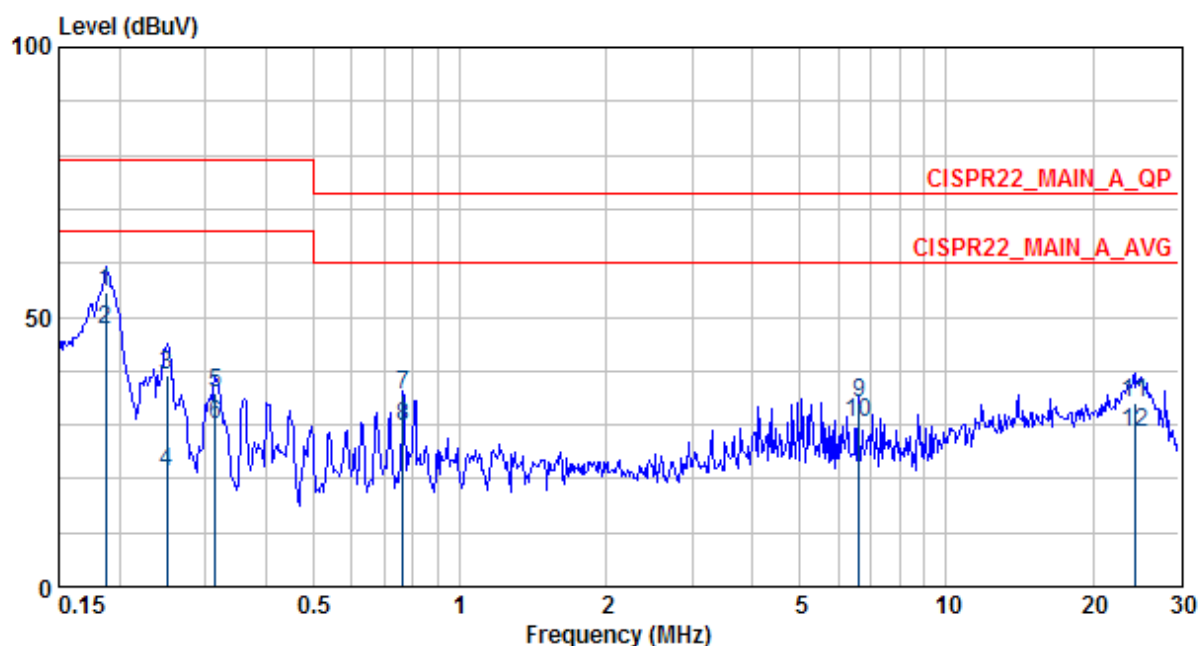


	Freq	Level	Factor	Read	Limit	Over		
	MHz	dBuV	dB	Level	Line	Limit	Pol/Phase	Remark
1	0.187	55.41	0.28	55.13	79.00	-23.59	LINE	QP
2	0.187	50.10	0.28	49.82	66.00	-15.90	LINE	AVERAGE
3	0.764	33.47	0.34	33.13	73.00	-39.53	LINE	QP
4	0.764	27.30	0.34	26.96	60.00	-32.70	LINE	AVERAGE
5	4.129	31.67	0.49	31.18	73.00	-41.33	LINE	QP
6	4.129	28.77	0.49	28.28	60.00	-31.23	LINE	AVERAGE
7	6.606	34.37	0.56	33.81	73.00	-38.63	LINE	QP
8	6.606	30.24	0.56	29.68	60.00	-29.76	LINE	AVERAGE
9	14.086	31.83	0.69	31.14	73.00	-41.17	LINE	QP
10	14.086	29.13	0.69	28.44	60.00	-30.87	LINE	AVERAGE
11	28.170	35.34	0.30	35.04	73.00	-37.66	LINE	QP
12	28.170	32.61	0.30	32.31	60.00	-27.39	LINE	AVERAGE

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + insertion loss of LISN.
3. Q.P. is abbreviation of quasi-peak.
4. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the EUT shall be deemed to meet both limits.

Test Mode : Normal
Test Voltage : 230V/50Hz to the power adapter
Tester : Kent **Temperature** : 27°C
Humidity : 68%RH **Frequency Range** : 150kHz~30MHz
IF Bandwidth : 9kHz **Phase** : Neutral

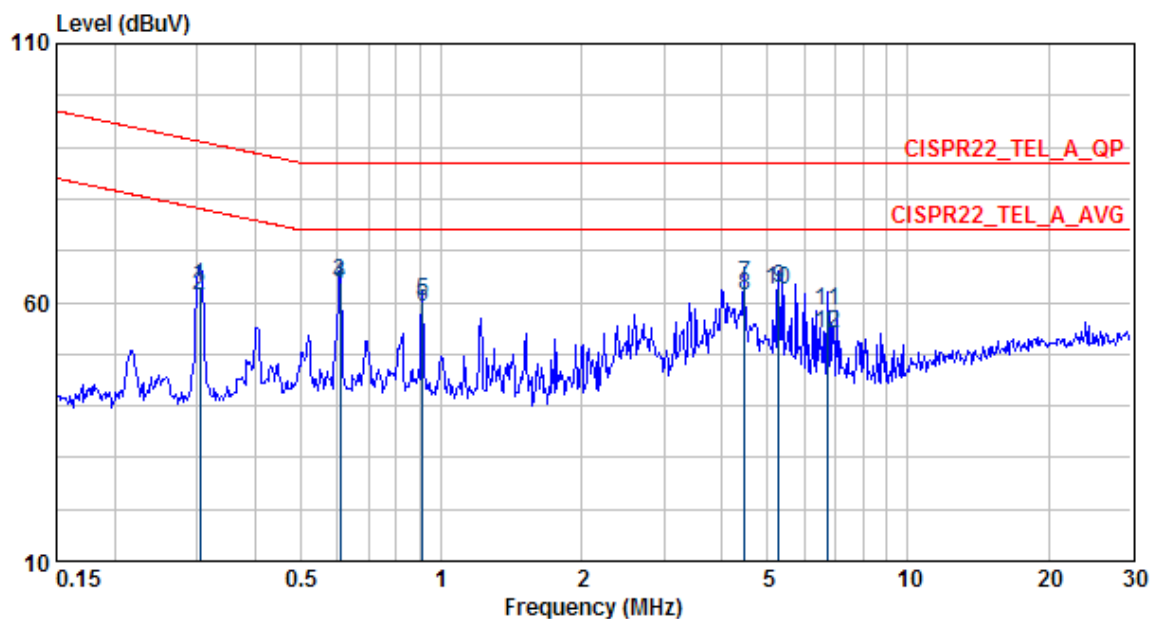


	Freq	Level	Factor	Read	Limit	Over		
	MHz	dBuV	dB	Level	Line	Limit	Pol/Phase	Remark
1	0.187	54.51	0.17	54.34	79.00	-24.49	NEUTRAL	QP
2	0.187	47.79	0.17	47.62	66.00	-18.21	NEUTRAL	AVERAGE
3	0.251	39.31	0.18	39.13	79.00	-39.69	NEUTRAL	QP
4	0.251	21.28	0.18	21.10	66.00	-44.72	NEUTRAL	AVERAGE
5	0.315	35.98	0.19	35.79	79.00	-43.02	NEUTRAL	QP
6	0.315	30.03	0.19	29.84	66.00	-35.97	NEUTRAL	AVERAGE
7	0.764	35.43	0.23	35.20	73.00	-37.57	NEUTRAL	QP
8	0.764	29.55	0.23	29.32	60.00	-30.45	NEUTRAL	AVERAGE
9	6.615	34.01	0.51	33.50	73.00	-38.99	NEUTRAL	QP
10	6.615	30.53	0.51	30.02	60.00	-29.47	NEUTRAL	AVERAGE
11	24.400	34.09	1.24	32.85	73.00	-38.91	NEUTRAL	QP
12	24.400	28.46	1.24	27.22	60.00	-31.54	NEUTRAL	AVERAGE

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + insertion loss of LISN.
3. Q.P. is abbreviation of quasi-peak.
4. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the EUT shall be deemed to meet both limits.

Test Mode : Normal
Test Voltage : 230V/50Hz to the power adapter
Tester : Kent **Temperature** : 27°C
Humidity : 68%RH **Frequency Range** : 150kHz~30MHz
IF Bandwidth : 9kHz **Phase** : LAN1 for 1Gbps



	Freq	Level	Factor	Read	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Pol/Phase	Remark
1	0.304	62.96	10.25	52.71	91.13	-28.17	LINE	QP
2	0.304	61.28	10.25	51.03	78.13	-16.85	LINE	AVERAGE
3	0.608	63.88	10.19	53.69	87.00	-23.12	LINE	QP
4	0.608	63.37	10.19	53.18	74.00	-10.63	LINE	AVERAGE
5	0.911	60.27	10.15	50.12	87.00	-26.73	LINE	QP
6	0.911	59.13	10.15	48.98	74.00	-14.87	LINE	AVERAGE
7	4.476	63.39	10.27	53.12	87.00	-23.61	LINE	QP
8	4.476	61.30	10.27	51.03	74.00	-12.70	LINE	AVERAGE
9	5.282	62.85	10.30	52.55	87.00	-24.15	LINE	QP
10	5.282	62.40	10.30	52.10	74.00	-11.60	LINE	AVERAGE
11	6.713	58.52	10.37	48.15	87.00	-28.48	LINE	QP
12	6.713	54.10	10.37	43.73	74.00	-19.90	LINE	AVERAGE

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + insertion loss of LISN/ISN.
3. Q.P. is abbreviation of quasi-peak.
4. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the EUT shall be deemed to meet both limits.

3. Radiated Emission Measurement

Test Result : **PASS**

3.1 Limits for Emission Measurement

Type of EUT	Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
<input type="checkbox"/>	Below 108	1000
<input type="checkbox"/>	108 - 500	2000
<input type="checkbox"/>	500 - 1000	5000
<input checked="" type="checkbox"/>	Above 1000	5 th harmonic of the highest frequency or 6GHz, whichever is lower

☒ Limits for radiated disturbances at a measuring distance of 10m

Frequency (MHz)	Class A Equipment	Class B Equipment
	Quasi-peak (dBμV/m)	Quasi-peak (dBμV/m)
30 to 230	40	30
230 to 1000	47	37

Note 1- The lower limit shall apply at the transition frequency.
 Note 2- Additional provisions may be required for cases where interference occurs.

☒ Limits for radiated disturbances at a measuring distance of 3m

Frequency (GHz)	Class A Equipment		Class B Equipment	
	Peak (dBμV/m)	Average (dBμV/m)	Peak (dBμV/m)	Average (dBμV/m)
1 to 3	76	56	70	50
3 to 6	80	60	74	54

Note 1- The lower limit shall apply at the transition frequency.

3.2 Test Instruments

☒ Below 1GHz measurement

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
EMI Test Receiver	R&S	ESCS 30/ 836858/020	Sept. 10, 2012	Sept. 10, 2013
Broadband Antenna	R&S	HL-562/ 360543/007	March 27, 2013	March 27, 2014
Broadband Antenna	R&S	HL-562/ 830547/010	April 30, 2013	April 30, 2014
Pre-Amplifier	Mini Circuit	ZKL-2/ 001	July 15, 2013	Jan. 15, 2014
Pre-Amplifier	Mini Circuit	ZKL-2/ 002	July 15, 2013	Jan. 15, 2014
Spectrum Analyzer	R&S	FSP40/ 100031	July 15, 2013	July 15, 2014
Spectrum Analyzer	R&S	FSP7/ 100384	Jan. 3, 2013	Jan. 3, 2014
RF Cable	JYEBAO	0214/ C0049	July 15, 2013	Jan. 15, 2014
RF Cable	JYEBAO	0214/ C0050	July 15, 2013	Jan. 15, 2014
Test Software	Audix	e3/ Ver. 4.3.714.e	NCR	NCR
TR1 Semi - anechoic Chamber	ETS. LINDGREN	TR1/ 17627-B	May 4, 2013	May 4, 2014

Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.
3. The calibration date of the chamber TR1 listed above is the date of NSA measurement.

☒ Above 1GHz measurement (TR300)

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Horn Antenna	EMCO	3117/ 57408	Feb. 27, 2013	Feb. 27, 2014
Pre-Amplifier	KMIC	KMA010180A01/ 99056	Oct. 19, 2012	Oct. 19, 2013
Spectrum Analyzer	Agilent	E4407B/ MY45106794	March 29, 2013	March 29, 2014
RF Cable	Suhner	Sucoflex 104/ C0083+C0071	March 19, 2013	Sept. 19, 2013
	Mini-Circuits	CBL-2FT-SMSM/ C0120	March 19, 2013	Sept. 19, 2013
Test Software	Audix	e3/ Ver. 4.3.714.e	NCR	NCR
TR300 Fully - anechoic Chamber	ETS. LINDGREN	TR300/ 906-A	May 25, 2013	May 25, 2014

Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.
3. The calibration date of the chamber TR1 listed above is the date of site VSWR measurement.

Measurement Uncertainty

The assessed measurement uncertainty with a suitable coverage factor K to ensure 95% confidence level for the normal distribution are shown as below, the values are less than U_{cispr} in table 1 of CISPR 16-4-2.

Test Site (Measuring distance)	Polarization	Frequency Range	
		30MHz ~200MHz	200MHz ~1000MHz
TR1(10m)	Horizontal	3.2dB	3.5dB
	Vertical	3.3dB	3.6dB

Test Site (Measuring distance)	Polarization	Frequency Range
		1GHz ~6GHz
TR1(3m)	Horizontal	3.7dB
	Vertical	3.7dB
TR300(3m)	Horizontal	3.9dB
	Vertical	3.8dB

3.3 Test Procedures

Below 1GHz measurement

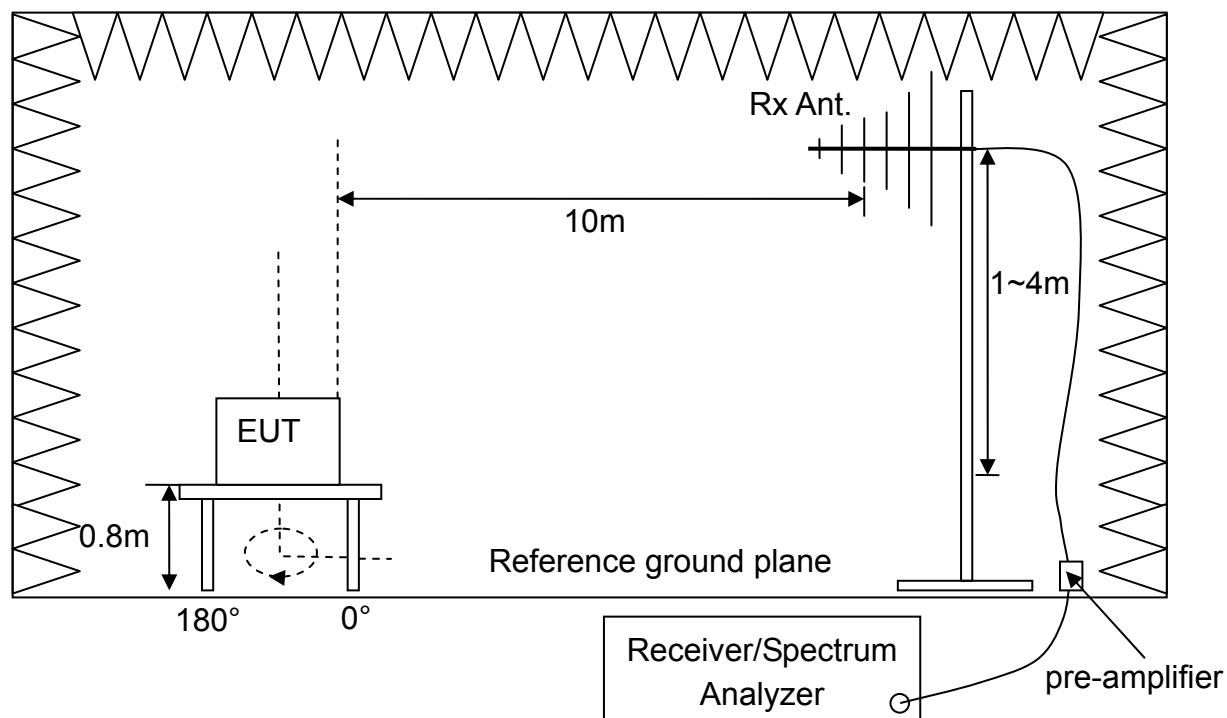
- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters above the reference ground plane and 10 meters away from the interference receiving antenna in the semi-anechoic chamber.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15 meters above the reference ground plane and 10 meters away from the interference-receiving antenna in the semi-anechoic chamber.
- d. Rapidly sweep the signal from 30MHz to 1GHz by using the spectrum through the Maximum-peak detector.
- e. Rotate the EUT from 0° to 360° and position the receiving antenna at heights from 1 to 4 meters above the reference ground plane continuously to determine at least six frequencies associated with higher emission levels and record them.
- f. Then measure each frequency found from step e. by using the spectrum with rotating the EUT and positioning the receiving antenna height to determine the maximum level.
- g. Finely tune the antenna and turntable around the recorded position of each frequency found from step f. by using the receiver through the Quasi-Peak detector per CISPR 16-1 to find out where the maximum level occurred.
- h. Record frequency, azimuth angle of the turntable, height, and polarization of the receiving antenna and compare the maximum level with the required limit.
- i. Change the receiving antenna to another polarization to measure radiated emission by following step d. to h. again.
- j. If the peak emission level measured from step e. is 4dB lower than the limit specified, then the emission values presented will be the peak value only. Otherwise, accurate Q.P. value will be measured and presented.

Above 1GHz measurement

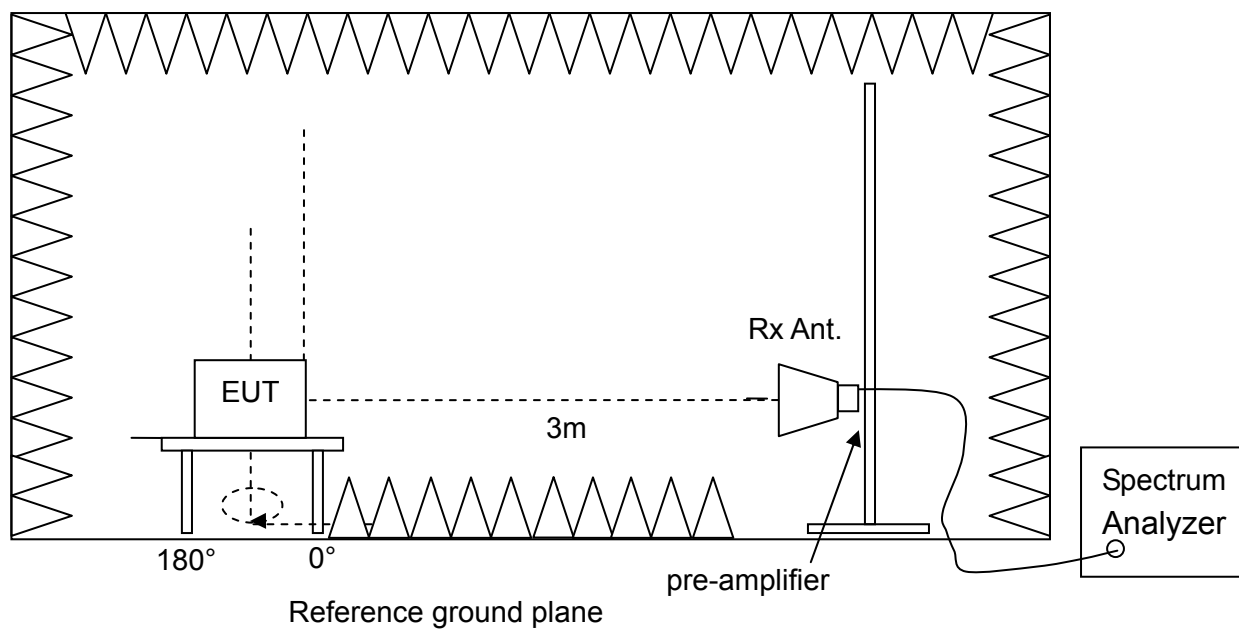
- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it should be placed on a non-conducted table with a height of 0.8 meters above the reference ground plane and 3 meters away from the interference receiving antenna in the fully-anechoic chamber.
- c. If the EUT is floor-standing equipment, it should be placed on a non-conducted support with a height up to 0.15 meters above the reference ground plane and 3 meters away from the interference-receiving antenna in the fully-anechoic chamber.
- d. Rapidly sweep the signal from 1GHz to the upper frequency of measurement range by using the spectrum through the Maximum-peak detector.
- e. Rotate the EUT from 0° to 360° continuously and position the receiving antenna at specified height above the reference ground plane to determine the frequencies associated with higher emission levels and record them.
- f. Then measure each frequency found from step e. by using the spectrum with rotating the EUT to determine the maximum peak and average level.
- g. Record frequency, azimuth angle of the turntable and compare the maximum level with the required limit.
- h. Change the receiving antenna to another polarization to measure radiated emission by following step d. to g. again.

3.4 Test Configurations

Below 1GHz measurement



Above 1GHz measurement



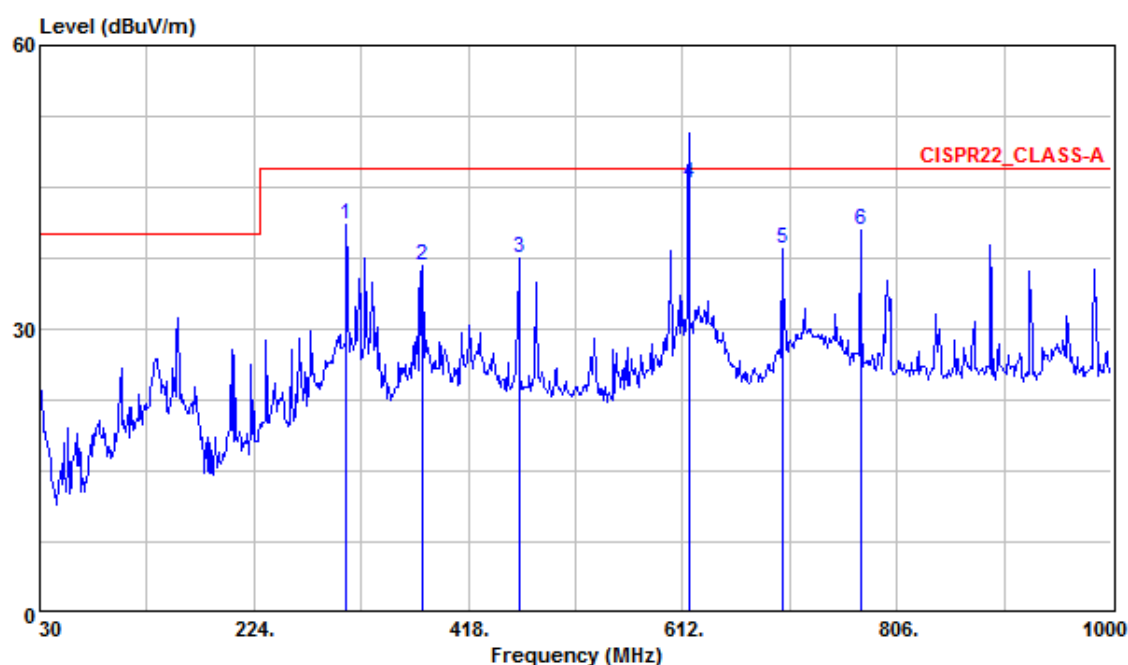
3.5 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

3.6 Test Results

Radiated Emission Measurement below 1000MHz

Test Mode : Normal
Test Voltage : 230V/50Hz to the power adapter
Tester : Carl **Temperature** : 27°C
Humidity : 67%RH **Frequency Range** : 30MHz~1GHz
IF Bandwidth : 120kHz **Polarization** : Horizontal

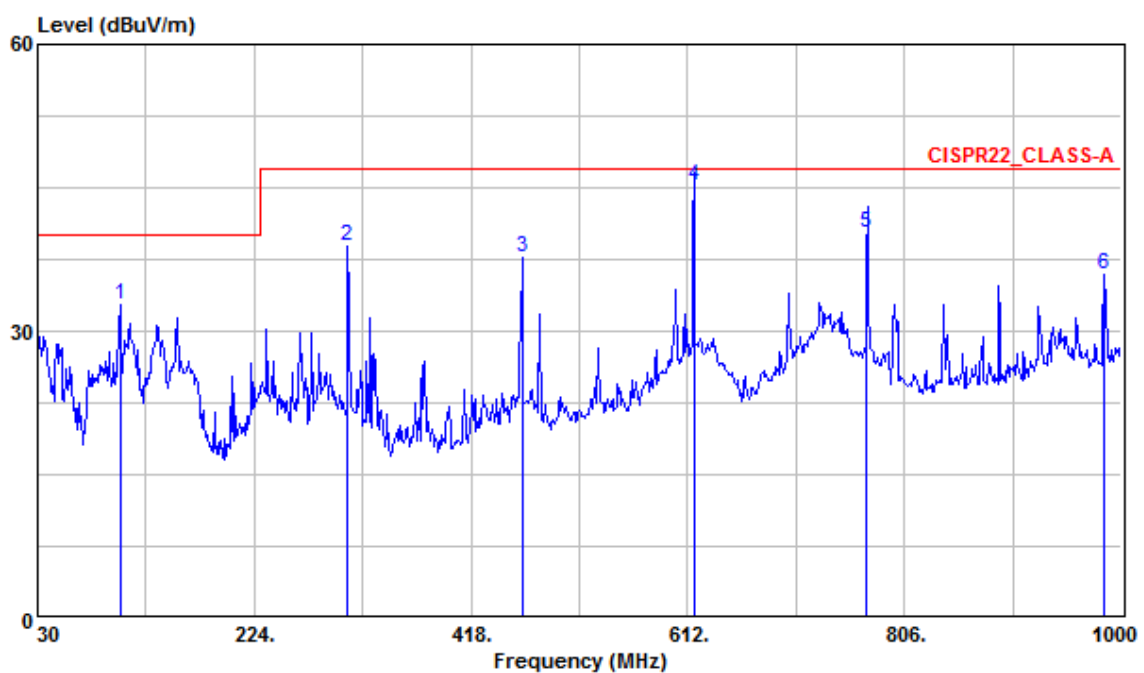


	Freq	Level	Read	Limit	Over	Ant	Table		
	MHz	dBuV/m	Level	Factor	Line	Limit	Pos	Pos	Pol/Phase
			dBuV	dB/m	dBuV/m	dB	cm	deg	Remark
1	307.420	41.01	56.74	-15.73	47.00	-5.99	---	---	HORIZONTAL Peak
2	377.260	36.78	50.65	-13.87	47.00	-10.22	---	---	HORIZONTAL Peak
3	463.590	37.43	48.64	-11.21	47.00	-9.57	---	---	HORIZONTAL Peak
4 @	617.993	45.40	53.49	-8.09	47.00	-1.60	175	278	HORIZONTAL QP
5	702.210	38.58	45.63	-7.05	47.00	-8.42	---	---	HORIZONTAL Peak
6	773.020	40.49	46.40	-5.91	47.00	-6.51	---	---	HORIZONTAL Peak

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + antenna factor – gain of pre-amplifier.
3. Q.P is abbreviation of quasi-peak.

Test Mode : Normal
Test Voltage : 230V/50Hz to the power adapter
Tester : Carl **Temperature** : 27°C
Humidity : 67%RH **Frequency Range** : 30MHz~1GHz
IF Bandwidth : 120kHz **Polarization** : Vertical



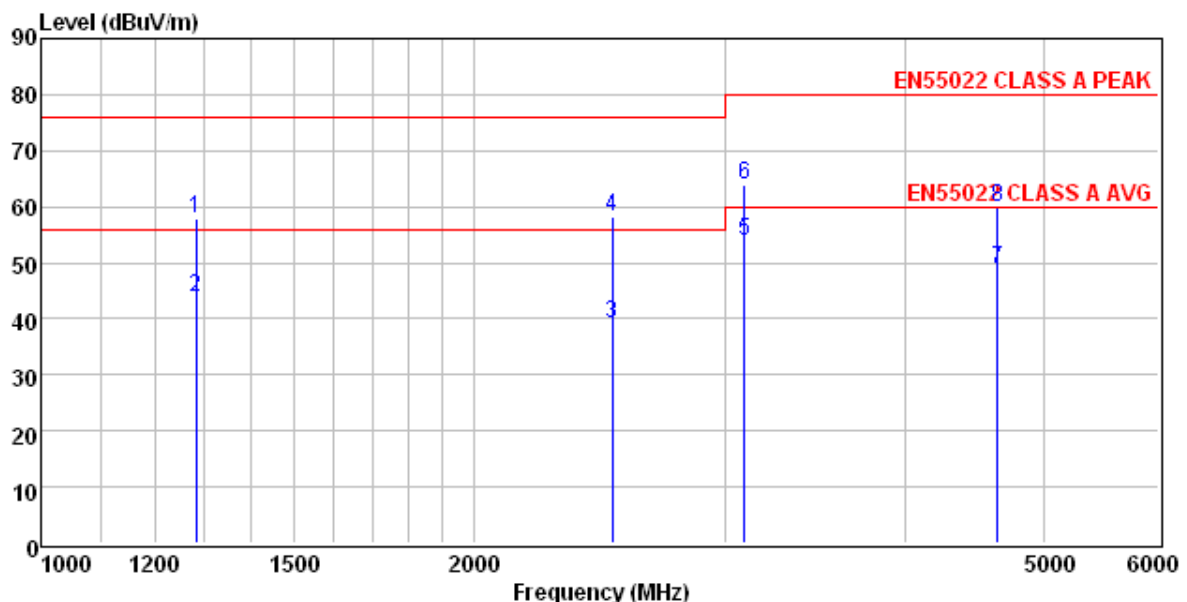
	Freq	Level	Read	Limit	Over	Ant	Table		
	MHz	dBuV/m	Level	Factor	Line	Limit	Pos	Pos	Pol/Phase
			dBuV	dB/m	dBuV/m	dB	cm	deg	Remark
1	103.720	32.84	51.82	-18.98	40.00	-7.16	---	---	VERTICAL
2	307.420	38.91	54.45	-15.54	47.00	-8.09	---	---	VERTICAL
3	463.590	37.75	48.30	-10.55	47.00	-9.25	---	---	VERTICAL
4 @	617.991	45.26	52.28	-7.02	47.00	-1.74	104	353	VERTICAL
5	772.498	40.22	45.00	-4.78	47.00	-6.78	129	329	VERTICAL
6	984.480	35.98	37.85	-1.87	47.00	-11.02	---	---	VERTICAL

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + antenna factor – gain of pre-amplifier.
3. Q.P is abbreviation of quasi-peak.

Radiated Emission Measurement above 1000MHz

Test Mode : Normal
Test Voltage : 230V/50Hz to the power adapter
Tester : Jun **Temperature** : 22°C
Humidity : 40%RH **Frequency Range** : 1GHz~6GHz
IF Bandwidth : 1MHz **Polarization** : Horizontal

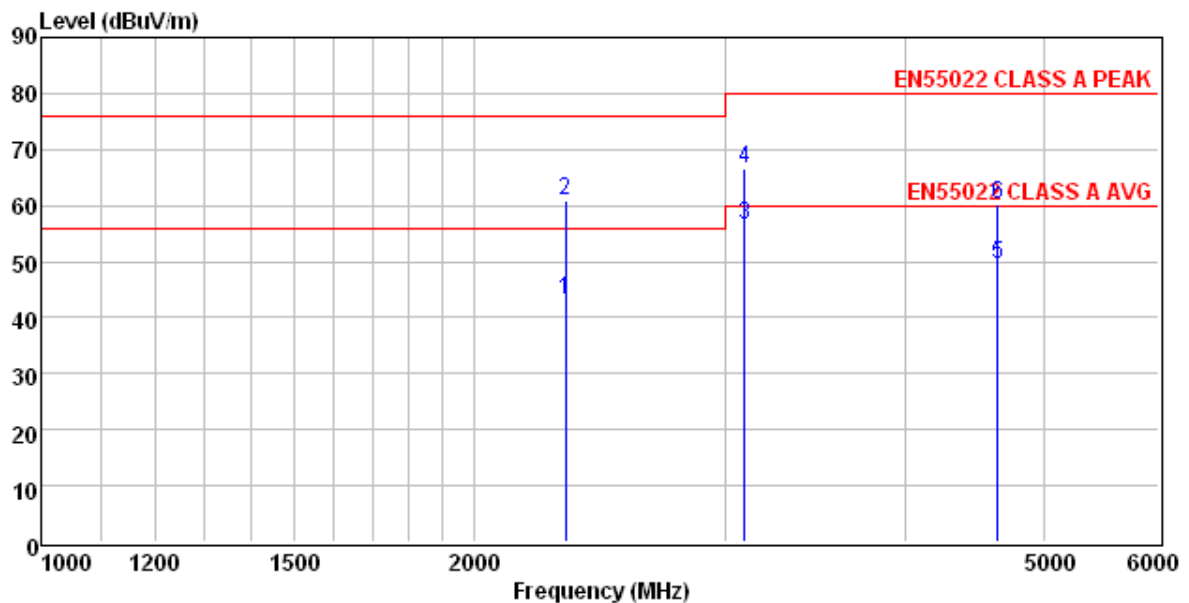


	Freq	Level	Factor	Read Level	Limit Line	Over Limit	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dB/m	dBuV	dBuV/m	dB	cm	deg		
1	1282.24	57.91	-11.31	69.22	76.00	-18.09	230	297	HORIZONTAL	Peak
2	1282.96	43.76	-11.31	55.07	56.00	-12.24	230	294	HORIZONTAL	Average
3	2500.12	39.26	-8.04	47.30	56.00	-16.74	230	157	HORIZONTAL	Average
4	2500.22	58.11	-8.04	66.15	76.00	-17.89	230	165	HORIZONTAL	Peak
5	3090.06	53.85	-6.78	60.63	60.00	-6.15	230	198	HORIZONTAL	Average
6	3090.14	63.91	-6.78	70.69	80.00	-16.09	230	196	HORIZONTAL	Peak
7	4634.96	48.97	-4.36	53.33	60.00	-11.03	230	16	HORIZONTAL	Average
8	4635.01	59.91	-4.36	64.27	80.00	-20.09	230	14	HORIZONTAL	Peak

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + antenna factor – gain of pre-amplifier.

Test Mode : Normal
Test Voltage : 230V/50Hz to the power adapter
Tester : Jun **Temperature** : 22°C
Humidity : 40%RH **Frequency Range** : 1GHz~6GHz
IF Bandwidth : 1MHz **Polarization** : Vertical



	Freq	Level	Factor	Read Level	Limit Line	Over Limit	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dB/m	dBuV	dBuV/m	dB	cm	deg		
1	2317.48	43.26	-8.48	51.74	56.00	-12.74	230	264	VERTICAL	Average
2	2317.48	61.01	-8.48	69.49	76.00	-14.99	230	265	VERTICAL	Peak
3	3090.00	56.42	-6.78	63.20	60.00	-3.58	230	271	VERTICAL	Average
4	3090.08	66.65	-6.78	73.43	80.00	-13.35	230	272	VERTICAL	Peak
5	4634.99	49.49	-4.36	53.85	60.00	-10.51	230	180	VERTICAL	Average
6	4635.28	60.30	-4.36	64.66	80.00	-19.70	230	181	VERTICAL	Peak

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + antenna factor – gain of pre-amplifier.

4. Harmonic Current Emission Measurement

Test Result : **PASS**

4.1 Limits for Emission Measurement

☒ Limits for Class A equipment

Harmonic order (n)	Maximum permissible harmonic current (A)	Harmonic order (n)	Maximum permissible harmonic current (A)
Odd harmonics		Even Harmonics	
3	2.30	2	1.08
5	1.14	4	0.43
7	0.77	6	0.3
9	0.40	8 n 40	0.23 8/n
11	0.33		
13	0.21		
15 n 39	0.15 15/n		

☐ Limits for Class B equipment

It shall not exceed the values given in class A multiplied by a factor of 1.5.

☐ Limits for Class C equipment

Harmonic order (n)	Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency %
2	2
3	$30 \cdot \lambda$ (λ is the circuit power factor)
5	10
7	7
9	5
$11 \leq n \leq 39$ (odd harmonics only)	3

☐ Limits for Class D equipment

Harmonic order (n)	Maximum permissible harmonic current per watt (mA/W)	Maximum permissible harmonic current (A)
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
$13 \leq n \leq 39$ (odd harmonics only)	3.85/n	See class A

4.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Power Source	California Instrument	5001ix-208/ 56619	Oct. 17, 2012	Oct. 17, 2013
Power Analyzer		PACS-1/ 72398	Oct. 17, 2012	Oct. 17, 2013
Test Software	C.I.	CTS 3.0/ Ver. 3.2.0.18	NCR	NCR
TR7 shielded room	ETS. LINDGREN	TR7/ 15353-D	NCR	NCR

Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

4.3 Test Procedures

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters in the shielded room.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 0.1 meters in the shielded room.
- d. Decide the classification of the EUT as following:

Class A : - balanced three-phase equipment

- household appliances, excluding equipment identified as class D
- tools, excluding portable tools
- dimmers for incandescent lamps
- audio equipment
- equipments not specified in one of the three other classes

Class B : - portable tools

- arc welding equipment which is not professional equipment.

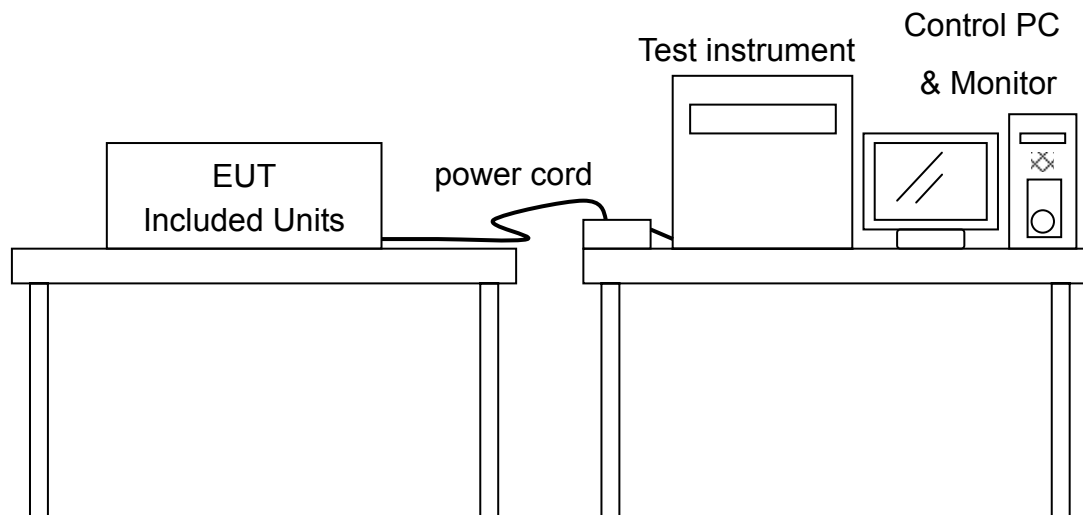
Class C : - lighting equipment

Class D : - Equipment specified power less than or equal to 600W of the following types

- personal computers and personal computer monitors
- television receivers

- e. Connects the EUT's power source to the mains power supplied by the test instrument. Turn on the EUT.
- f. Operating the EUT as required and measuring the harmonic current emissions on the current carrying lines of EUT's power source.

4.4 Test Configurations



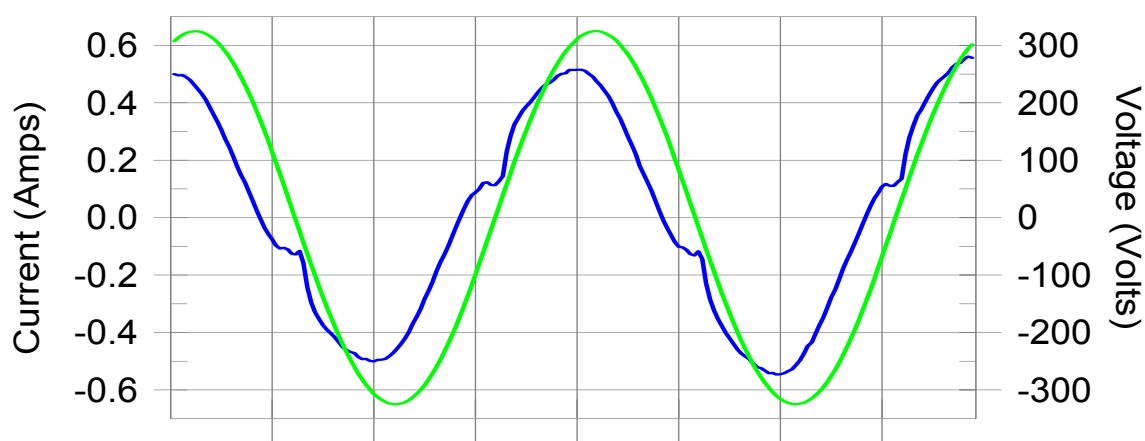
4.5 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

4.6 Test Results

Test Mode : Normal
Tester : Rod
Temperature : 25°C
Humidity : 69%RH

TEST FREQ	50
TEST VOLTS	230
TEST TIME	10 Minutes
MAX WATTS	75.2 W



Test Raw Data:

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	1.080	0.0	0.002	1.620	0.11	Pass
3	0.027	2.300	1.2	0.028	3.450	0.81	Pass
4	0.001	0.430	0.0	0.001	0.645	0.17	Pass
5	0.016	1.140	1.4	0.018	1.710	1.04	Pass
6	0.000	0.300	0.0	0.001	0.450	0.11	Pass
7	0.012	0.770	1.6	0.013	1.155	1.09	Pass
8	0.000	0.230	0.0	0.001	0.345	0.15	Pass
9	0.009	0.400	2.1	0.009	0.600	1.46	Pass
10	0.000	0.184	0.0	0.000	0.276	0.15	Pass
11	0.006	0.330	1.8	0.006	0.495	1.22	Pass
12	0.000	0.153	0.0	0.000	0.230	0.18	Pass
13	0.004	0.210	2.1	0.005	0.315	1.47	Pass
14	0.000	0.131	0.0	0.000	0.197	0.15	Pass
15	0.004	0.150	2.5	0.004	0.225	1.78	Pass
16	0.000	0.115	0.0	0.000	0.173	0.20	Pass
17	0.003	0.132	2.1	0.003	0.199	1.75	Pass
18	0.000	0.102	0.0	0.000	0.153	0.25	Pass
19	0.002	0.118	1.8	0.003	0.178	1.47	Pass
20	0.000	0.092	0.0	0.000	0.138	0.21	Pass
21	0.002	0.107	1.8	0.002	0.161	1.27	Pass
22	0.000	0.084	0.0	0.000	0.125	0.20	Pass
23	0.002	0.098	1.8	0.002	0.147	1.46	Pass
24	0.000	0.077	0.0	0.000	0.115	0.19	Pass
25	0.001	0.090	1.6	0.002	0.135	1.39	Pass
26	0.000	0.071	0.0	0.000	0.106	0.23	Pass
27	0.001	0.083	0.0	0.002	0.125	1.37	Pass
28	0.000	0.066	0.0	0.000	0.099	0.28	Pass
29	0.001	0.078	0.0	0.002	0.116	1.48	Pass
30	0.000	0.061	0.0	0.000	0.092	0.30	Pass
31	0.001	0.073	0.0	0.001	0.109	1.15	Pass
32	0.000	0.058	0.0	0.000	0.086	0.29	Pass
33	0.001	0.068	0.0	0.001	0.102	0.96	Pass
34	0.000	0.054	0.0	0.000	0.081	0.22	Pass
35	0.001	0.064	0.0	0.001	0.096	0.99	Pass
36	0.000	0.051	0.0	0.000	0.077	0.24	Pass
37	0.001	0.061	0.0	0.001	0.091	0.86	Pass
38	0.000	0.048	0.0	0.000	0.073	0.25	Pass
39	0.001	0.058	0.0	0.001	0.087	0.91	Pass
40	0.000	0.046	0.0	0.000	0.069	0.26	Pass

5. Voltage Fluctuations and Flickers Emission Measurement

Test Result : **PASS**

5.1 Limits for Emission Measurement

- the short-term flicker indicator, P_{st} , shall not be greater than 1.0;
- the long-term flicker indicator, P_{lt} , shall not be greater than 0.65;
- the relative steady-state voltage change, d_c , shall not exceed 3.3%;
- the voltage change with time, $d(t)$, during a voltage change shall not exceed 3.3% for more than 500ms.
- the maximum relative voltage change, d_{max} , shall not exceed
 - ☒ a) 4% without additional conditions;
 - ☐ b) 6% for equipment which is switched manually
 - ☐ c) 7% for equipment which is attended whilst in use

5.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Power Source	California Instrument	5001ix-208/ 56619	Oct. 17, 2012	Oct. 17, 2013
Power Analyzer		PACS-1/ 72398	Oct. 17, 2012	Oct. 17, 2013
Test Software	C.I.	CTS 3.0/ Ver. 3.2.0.18	NCR	NCR
TR7 shielded room	ETS. LINDGREN	TR7/ 15353-D	NCR	NCR

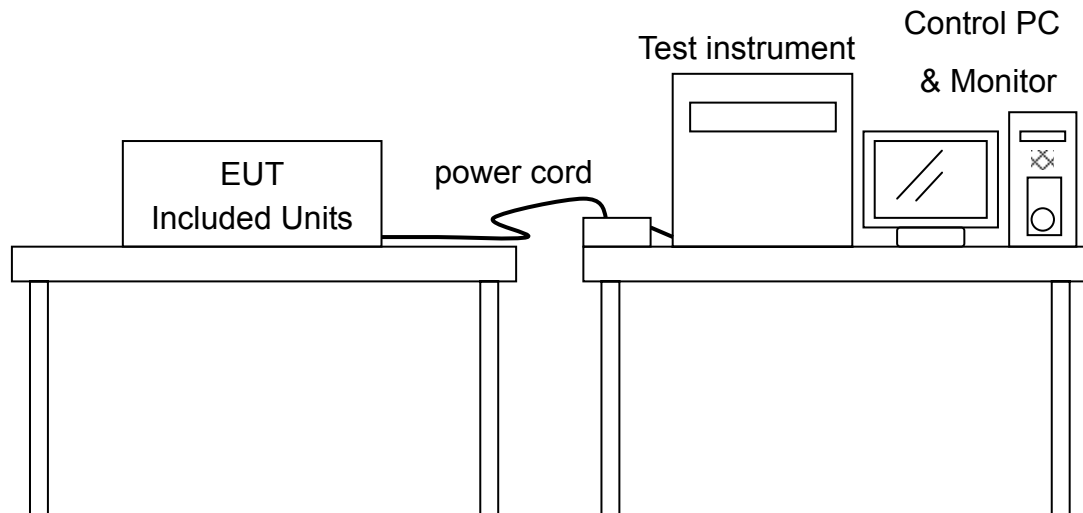
Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

5.3 Test Procedures

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters in the shielded room.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 0.1 meters in the shielded room.
- d. Decide the type of EUT to define the d_{\max} limit and its corresponding test methods described in the relative standard.
- e. Maintain the supply voltage to be $\pm 2\%$ of the EUT's rated voltage and also the frequency to be $50\text{Hz} \pm 0.5\%$.
- f. Connects the EUT's power source to the mains power supplied by the test instrument.
- g. Operating the EUT as required and measuring the voltage fluctuation and flickers of EUT's power source.
- h. Verify the fluctuations of the test supply voltage to be less than 0.4 before and after the test.

5.4 Test Configurations



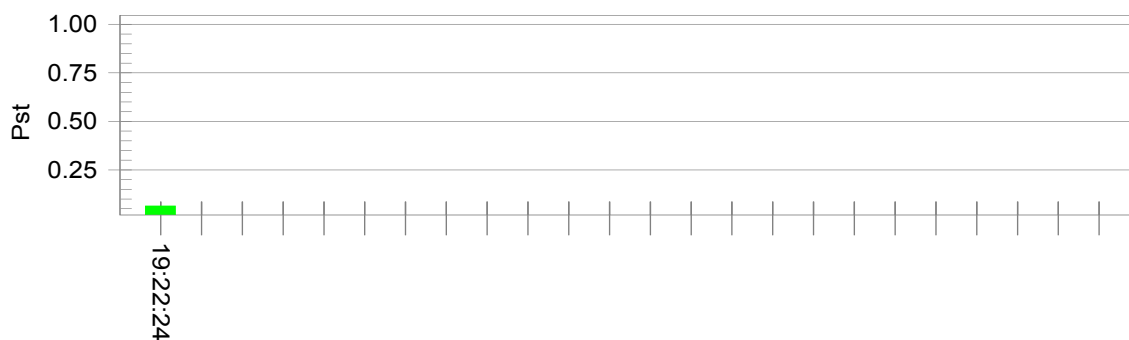
5.5 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

5.6 Test Results

Test Mode : Normal
Tester : Rod
Temperature : 25°C
Humidity : 69%RH

TEST FREQ	50	
TEST VOLTS	230	
TEST TIME	10 Minutes	
	EUT Data	Limit
d(t)>3.3% (ms)	0	500
d _c (%)	0	3.3
d _{max} (%)	0	4
P _{st} max	0.064	1
P _{lt} max	0.028	0.65



6. Electrostatic Discharge (ESD) Immunity Test

Test Result : PASS

6.1 Specifications of Immunity Test Requirement

Product (Generic) Standard	: EN 55024:2010
Basic Standard	: EN 61000-4-2:2009
Required Performance	: B
Test Level	: 2 (Contact discharge) 3 (Air discharge)
Discharge Voltage	: Contact → ±4kV (Direct / Indirect discharge) Air → ±2kV, ±4kV, ±8kV (Direct discharge)
Time Interval	: 1 sec. minimum
Number of discharges	: Minimum 20 times at each test point
Test Voltage	: 230V/50Hz to the power adapter
Tester	: Mathew
Ambient Temperature	: 24°C
Relative Humidity	: 47%
Atmospheric Pressure	: 1010mbar

6.2 Description of Performance Criteria

- Criteria A** : normal performance within levels specified by the manufacturer, requestor or purchaser;
- Criteria B** : temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the EUT recovers its normal performance, without operator intervention;
- Criteria C** : temporary loss of function or degradation of performance, the correction of which requires operator intervention;
- Criteria D** : loss of function or degradation of performance which is not recoverable, owing to damage to hardware or software, or loss of data.

6.3 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Electrostatic Generator	EM TEST	DITO/ V1138110834	Dec. 25, 2012	Dec. 25, 2013
TR8 shielded room	ETS. LINDGREN	TR8/ 15353-C	NCR	NCR

Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

6.4 Test Procedures

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters above the ground reference plane in the shielded room. Also a HCP (Horizontal Coupling Plane) which was connected to the ground reference plane via a cable with a 470k Ω resistor located at each end was placed on the wooden table and isolated with the EUT by an insulating support 0.5mm thick. The ground reference plane shall project beyond the EUT or HCP by at least 0.5m on all sides.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 0.1 meters above the ground reference plane in the shielded room. The ground reference plane shall project beyond the EUT by at least 0.5m on all sides.
- d. Keep the EUT 1m away from all other metallic walls in the shielded room as the minimum distance.
- e. The static electricity discharges shall be applied only to those points and surfaces of the EUT which are accessible to persons during normal use. Contact discharge is the preferred test method and it is applied to the conductive surfaces of EUT and coupling planes. Air discharge shall be used where contact discharge cannot be performed and it is applied to the insulating surfaces of EUT.
- f. The discharge return cable of the generator shall be kept at a distance of at least 0.2m from the EUT whilst the discharge is being applied.
- g. The time interval between successive single discharges was at least 1 second.
- h. Select appropriate points of the EUT for contact discharge and put marks on it to indicate the tested point(s). Then start the contact discharge with the tip of the discharge electrode to touch the EUT before the discharge switch is operated.
- i. Use the round discharge tip of the discharge electrode to scan the EUT to select the points for air discharge. Then start the air discharge by approaching the discharge electrode as fast as possible to touch the EUT. After each discharge, the ESD generator shall be removed from the EUT.
- j. The indirect HCP discharge test is applied at the front edge of each HCP opposite the center point of each unit of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

- k. The indirect VCP (Vertical Coupling Plane) discharge test is applied to the center of one vertical edge of the coupling plane. The VCP, of dimensions 0.5m×0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. It shall be applied with sufficient different positions such that the four faces of the EUT are completely illuminated.

Special Test Requirements for Information Technology Equipment (ITE)

The discharges shall be applied in two ways as below:

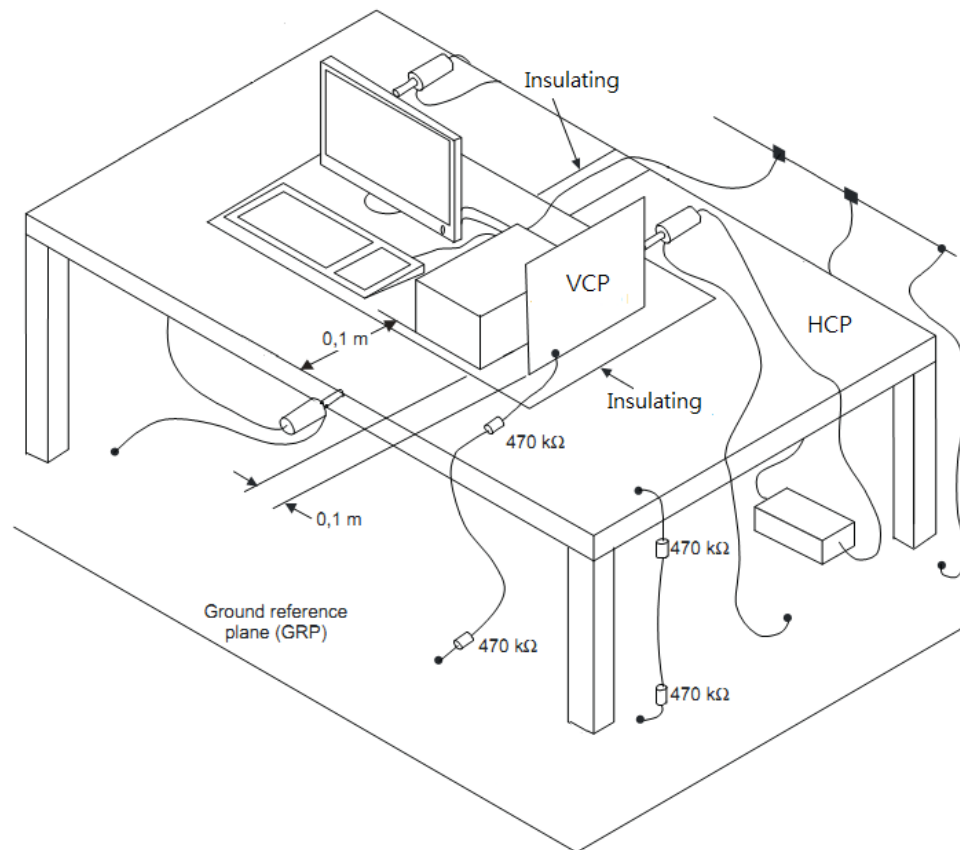
- a. Contact discharges to the conductive surfaces and coupling planes:

The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 50 indirect discharges to the center of the front edge of the horizontal coupling plane. The remaining three test points shall each receive at least 50 direct contact discharges. If no direct contact test points are available, at least 200 indirect discharges shall be applied in the indirect mode (for use of the VCP).

- b. Air discharges at slots and apertures and insulating surfaces:

A minimum of 10 single air discharges shall be applied to the each selected test point.

6.5 Test Configurations



6.6 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

6.7 Test Results

Test Mode : Normal

Discharge Voltage (kV)	Type of discharge	Label for Dischargeable Points	Performance		Result (Pass/Fail)
			Required	Observation	
±4	Contact	10~18	B	A(1)	Pass
±2	Air	1~9	B	A(1)	Pass
±4	Air	1~9	B	A(1)	Pass
±8	Air	1~9	B	A(1)	Pass
±4	HCP-Bottom	Edge of the HCP	B	A(1)	Pass
±4	VCP-Front	Center of the VCP	B	A(1)	Pass
±4	VCP-Left	Center of the VCP	B	A(1)	Pass
±4	VCP-Back	Center of the VCP	B	A(1)	Pass
±4	VCP-Right	Center of the VCP	B	A(1)	Pass

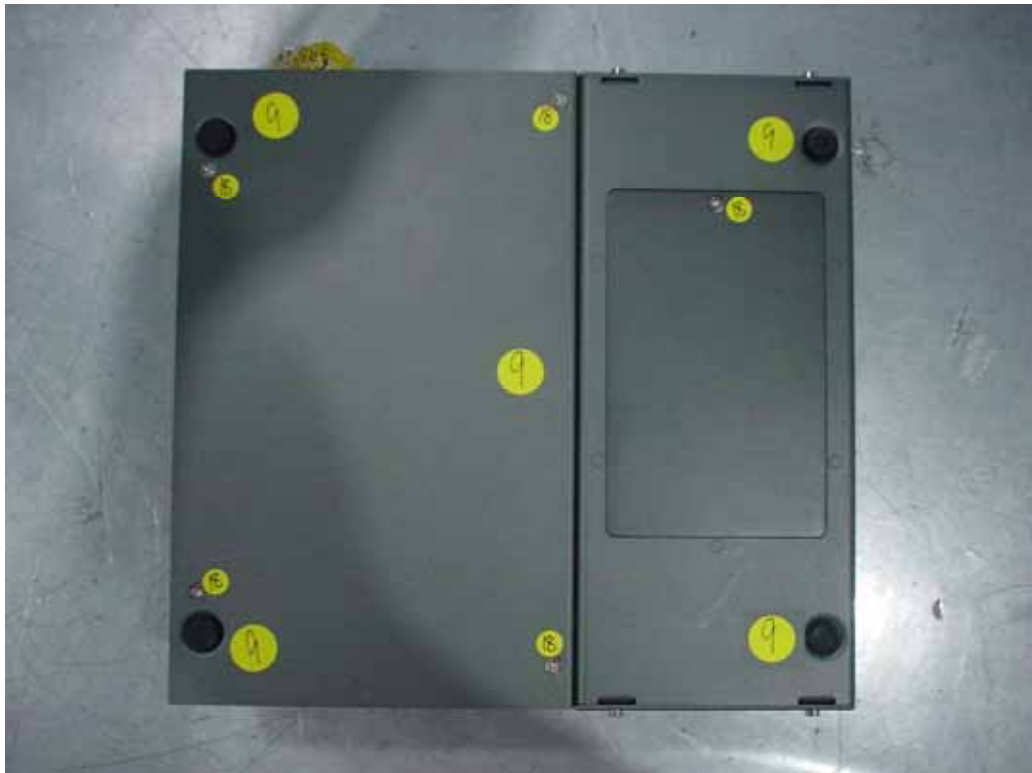
Observation of Performance during Test

(1) Normal operation condition specified by manufacturer during the test.

Photographs of the Dischargeable Points on the EUT for ESD Test









7. Radiated Electromagnetic Field (RS) Immunity Test

Test Result : PASS

7.1 Specifications of Immunity Test Requirement

Product (Generic) Standard	: EN 55024:2010
Basic Standard	: EN 61000-4-3:2006+A1:2008+A2:2010
Required Performance	: A
Test Level	: 2
Field Strength	: 3 V/m
Test Frequency Range	: 80MHz ~ 1GHz
Frequency Step	: 1% of the momentary frequency
Dwell Time	: Minimum 3 sec. per frequency
Modulation	: 1kHz Sine Wave with 80% Amplitude Modulation
Polarization of Antenna	: Horizontal and Vertical
Test Voltage	: 230V/50Hz to the power adapter
Tester	: Rod
Ambient Temperature	: 26°C
Relative Humidity	: 64%
Atmospheric Pressure	: 1007mbar

7.2 Description of Performance Criteria

- Criteria A** : normal performance within levels specified by the manufacturer, requestor or purchaser;
- Criteria B** : temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the EUT recovers its normal performance, without operator intervention;
- Criteria C** : temporary loss of function or degradation of performance, the correction of which requires operator intervention;
- Criteria D** : loss of function or degradation of performance which is not recoverable, owing to damage to hardware or software, or loss of data.

7.3 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Signal Generator	R&S	SML03/ 101676	July 15, 2013	July 15, 2014
Switch Box	AR	SC1000M3/ 309064	NCR	NCR
Dual Directional Coupler	AR	DC6180/ 28730	Jan. 3, 2013	Jan. 3, 2014
	AR	DC 7144A/ 308731	May 7, 2013	May 7, 2014
Power Amplifier	AR	150W1000/ 29167	NCR	NCR
	AR	30S1G3/ 308785	NCR	NCR
Bi-Log Antenna	EMCO	3142B/ 1716	NCR	NCR
	R&S	HL046/ 359132/004	NCR	NCR
	TRC	TRC Horn/ 001	NCR	NCR
Field Monitor	AR	FM7004/ 0336364	NCR	NCR
Electric Field Probe	AR	FL7006/ 0336500	April 16, 2013	April 16, 2014
Probe Positioner	HD	FSM916/ 916/319	NCR	NCR
Controller	HD	HD100/ 100/671	NCR	NCR
Dual Channel Power Meter	R&S	NRVD/ 100499	Jan. 4, 2013	Jan. 4, 2014
Test Software	AR	SW1007/ Ver. 2.0.1	NCR	NCR
TR2 fully-anechoic chamber	ETS. LINDGREN	TR2/ 15353-R	Sept. 16, 2012	Sept. 16, 2013

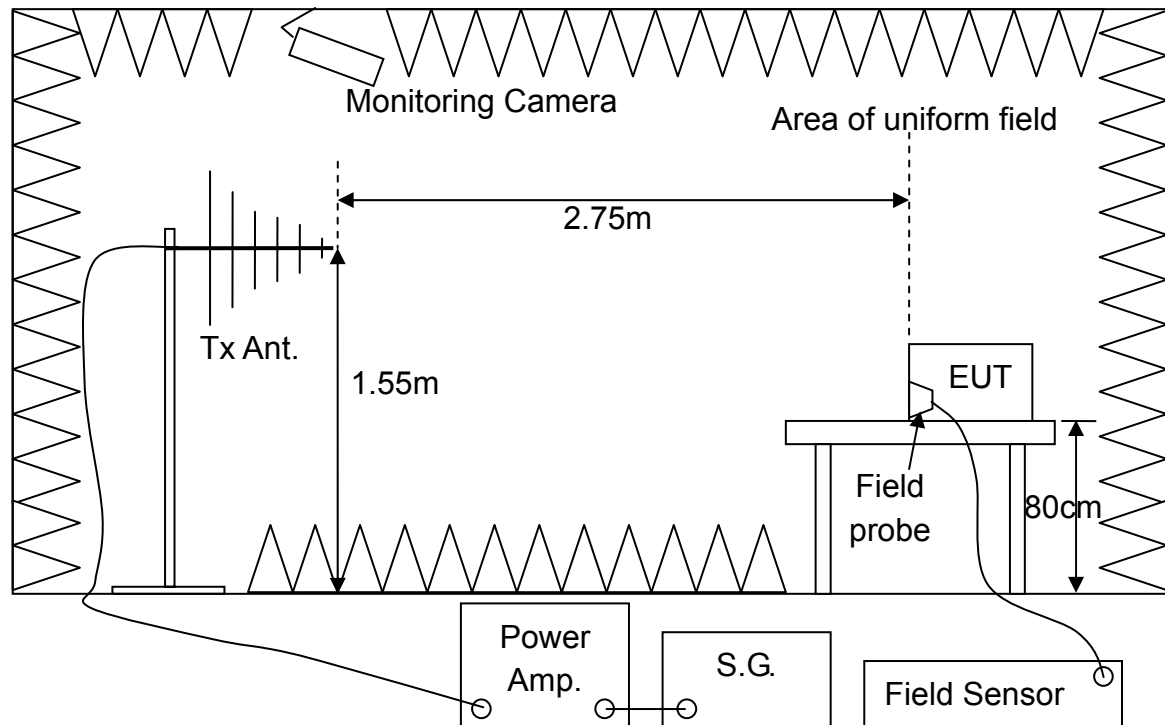
Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.
3. The calibration date of the fully-anechoic chamber listed above is the date of Field Uniformity Calibration measurement.

7.4 Test Procedures

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters and 2.75 meters away from the transmitting antenna in the fully anechoic chamber.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 0.1 meters and 2.75 meters away from the transmitting antenna in the fully anechoic chamber. Also if the floor-standing equipment which is capable of being stood on a non-conducting 0.8m high platform may be so arranged.
- d. All EUT's individual faces shall be fully enclosed by the "uniform area" and its wires shall be arranged parallel to the uniform area of the field.
- e. Before testing the EUT, the intensity of the established field strength is checked by placing the field sensor at a calibration grid point to give the calibrated field strength to measure the EUT.
- f. After the calibration has been verified, the test field can be generated using the values obtained from the calibration.
- g. Perform the test with the specified immunity level in the test frequency range and with the specified modulation type.
- h. The transmitting antenna is normally facing each of the four sides of the EUT with two polarizations (Vertical and Horizontal) to perform the test.
- i. The dwell time at each frequency shall be not less than the time necessary for the EUT to be exercised and be able to respond.
- j. The sensitive frequencies of EUT shall be analyzed separately, if any.
- k. Record the performance of the EUT.

7.5 Test Configurations



7.6 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

7.7 Test Results

Test Mode : Normal

Side of the EUT	Polarization	Performance		Result (Pass/Fail)
		Required	Observation	
Front	H	A	A(1)	Pass
	V	A	A(1)	Pass
Left	H	A	A(1)	Pass
	V	A	A(1)	Pass
Back	H	A	A(1)	Pass
	V	A	A(1)	Pass
Right	H	A	A(1)	Pass
	V	A	A(1)	Pass

Observation of Performance during Test

(1) Normal operation condition specified by manufacturer during the test.

8. Electrical fast transient / burst (EFT) Immunity Test

Test Result : PASS

8.1 Specifications of Immunity Test Requirement

Product (Generic) Standard	: EN 55024:2010
Basic Standard	: EN 61000-4-4:2012
Required Performance	: B
Test Level	: 2
Voltage Peak	: <input checked="" type="checkbox"/> ±1kV (on power supply port) <input checked="" type="checkbox"/> ±0.5kV (on I/O signal, data and control port)
Impulse Frequency	: 5kHz
Wave Shape of the Pulse (T_r/T_h)	: 5ns / 50ns
Burst Duration	: 15ms
Burst Period	: 300ms
Time Duration	: 1 min
Test Voltage	: 230V/50Hz to the power adapter
Tester	: Rod
Ambient Temperature	: 24°C
Relative Humidity	: 64%
Atmospheric Pressure	: 1004mbar

8.2 Description of Performance Criteria

- Criteria A** : normal performance within levels specified by the manufacturer, requestor or purchaser;
- Criteria B** : temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the EUT recovers its normal performance, without operator intervention;
- Criteria C** : temporary loss of function or degradation of performance, the correction of which requires operator intervention;
- Criteria D** : loss of function or degradation of performance which is not recoverable, owing to damage to hardware or software, or loss of data.

8.3 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
EFT/Burst Simulator	EMC PARTNER	TRA2000IN6/ 870	April 2, 2013	April 2, 2014
Coupling Clamp	EMC PARTNER	CN-EFT1000/ 532	NCR	NCR
Test Software	EMC PARTNER	TEMA/ Ver. 1.86	NCR	NCR
TR7 shielded room	ETS. LINDGREN	TR7/ 15353-D	NCR	NCR

Note:

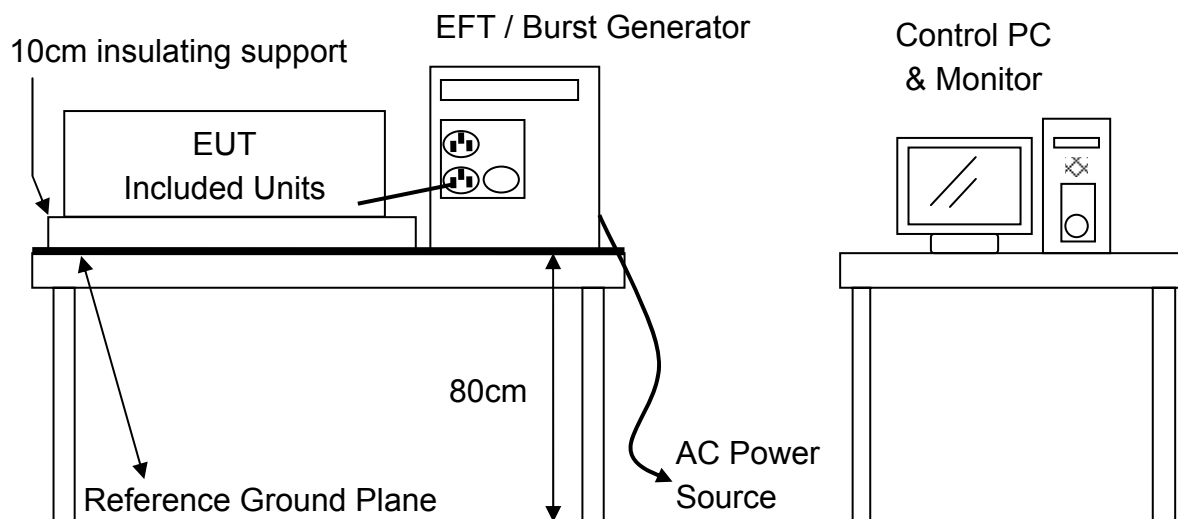
1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

8.4 Test Procedures

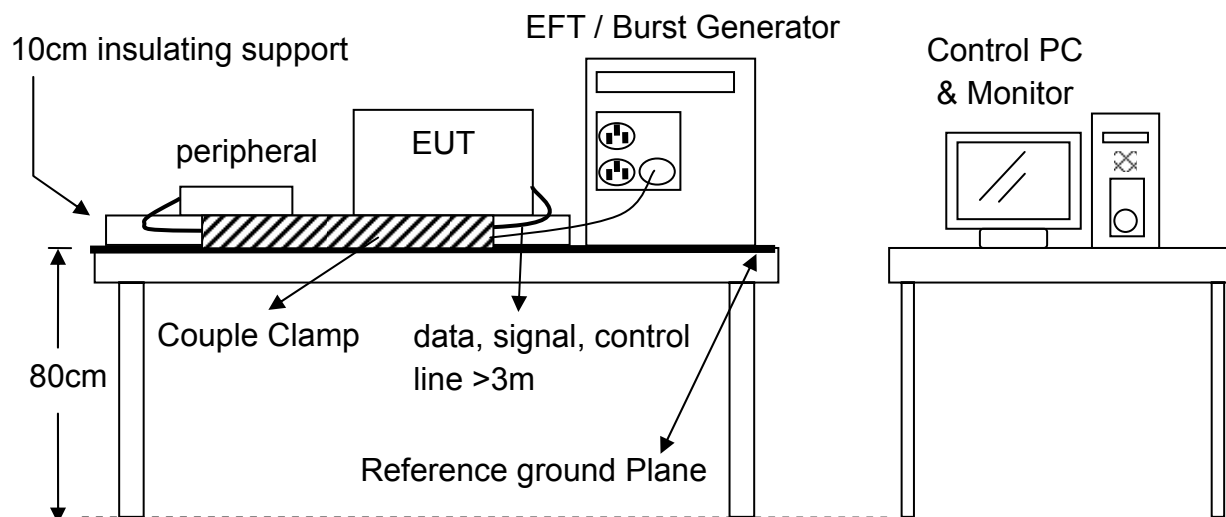
- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a non-conducted support with a height 0.1 meters above the ground reference plane. Also the ground reference plane is placed on a wooden table with a height of 0.8 meters in the shielded room. The ground reference plane shall project beyond the EUT by at least 0.1m on all sides.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 0.1 meters above the ground reference plane in the shielded room. The ground reference plane shall project beyond the EUT by at least 0.1m on all sides.
- d. The test generator and the coupling/decoupling network shall be placed directly on, and bonded to, the ground reference plane.
- e. All cables to the EUT shall be placed on the insulation support 0.1 m above the ground reference plane. Cables not subject to electrical fast transients shall be routed as far as possible from the cable under test to minimize the coupling between the cables.
- f. Keep the EUT 0.5m away from all other conductive structures, except the ground reference plane beneath the EUT as the minimum distance. Also if any, the minimum distance between the coupling clamp and all other conductive structures, except the ground reference plane beneath the coupling clamp and EUT shall be 0.5m.
- g. Keep the length of the power and signal lines, if required, between the coupling device and the EUT to be 0.5m. If a non-detachable supply cable more than 0.5m long, the excess length of this cable shall be folded to avoid a flat coil and situated at a distance of 0,1 m above the ground reference plane.
- h. Connect the EUT's power source to the appropriate power through the coupling devices and perform the specified test level.
- i. If any, connect all the I/O signal, data and control lines between EUT and accessories/support units through the coupling devices and perform the specified test level.
- j. Record the performance of the EUT.

8.5 Test Configurations

Power supply port Test



I/O signal, data and control port Test (if any)



8.6 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

8.7 Test Results

Test Mode : Normal

Injected Line	Voltage Peak (kV)	Injected Method	Performance		Result (Pass/Fail)
			Required	Observation	
L1 - L2 - PE	±1.0	Direct	B	A(1)	Pass
Data Line (LAN1)	±0.5	Clamp Coupling	B	A(1)	Pass

Observation of Performance during Test

(1) Normal operation condition specified by manufacturer during the test.

9. Surge Immunity Test

Test Result : PASS

9.1 Specifications of Immunity Test Requirement

Product (Generic) Standard	: EN 55024:2010
Basic Standard	: EN 61000-4-5:2006
Required Performance	: B
Test Level	: <input checked="" type="checkbox"/> 2 (line to line on power supply port) <input checked="" type="checkbox"/> 3 (line to earth (ground) on power supply port) <input type="checkbox"/> 2 (on I/O signal, data and control port)
Open-circuit Test Voltage	: <input checked="" type="checkbox"/> $\pm 0.5\text{kV}$, $\pm 1\text{kV}$ (line to line on power supply port) <input checked="" type="checkbox"/> $\pm 0.5\text{kV}$, $\pm 1\text{kV}$, $\pm 2\text{kV}$ (line to earth (ground) on power supply port) <input type="checkbox"/> $\pm 0.5\text{kV}$, $\pm 1\text{kV}$ (on I/O signal, data and control port)
CW Waveform (T_r/T_h)	: 1.2 / 50 μs (open-circuit voltage) 8 / 20 μs (short-circuit current)
Phase Angel / Reference	: 0°, 90°, 180°, 270° / L1
Repetition Rate	: 1/min. maximum
Number of Test	: at least 5 positive and 5 negative at selected points
Test Voltage	: 230V/50Hz to the power adapter
Tester	: Rod
Ambient Temperature	: 24°C
Relative Humidity	: 64%
Atmospheric Pressure	: 1004mbar

9.2 Description of Performance Criteria

- Criteria A** : normal performance within levels specified by the manufacturer, requestor or purchaser;
- Criteria B** : temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the EUT recovers its normal performance, without operator intervention;
- Criteria C** : temporary loss of function or degradation of performance, the correction of which requires operator intervention;
- Criteria D** : loss of function or degradation of performance which is not recoverable, owing to damage to hardware or software, or loss of data.

9.3 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Surge Simulator	EMC PARTNER	TRA2000IN6/ 870	April 2, 2013	April 2, 2014
Test Software	EMC PARTNER	TEMA/ Ver. 1.86	NCR	NCR
TR7 shielded room	ETS. LINDGREN	TR7/ 15353-D	NCR	NCR

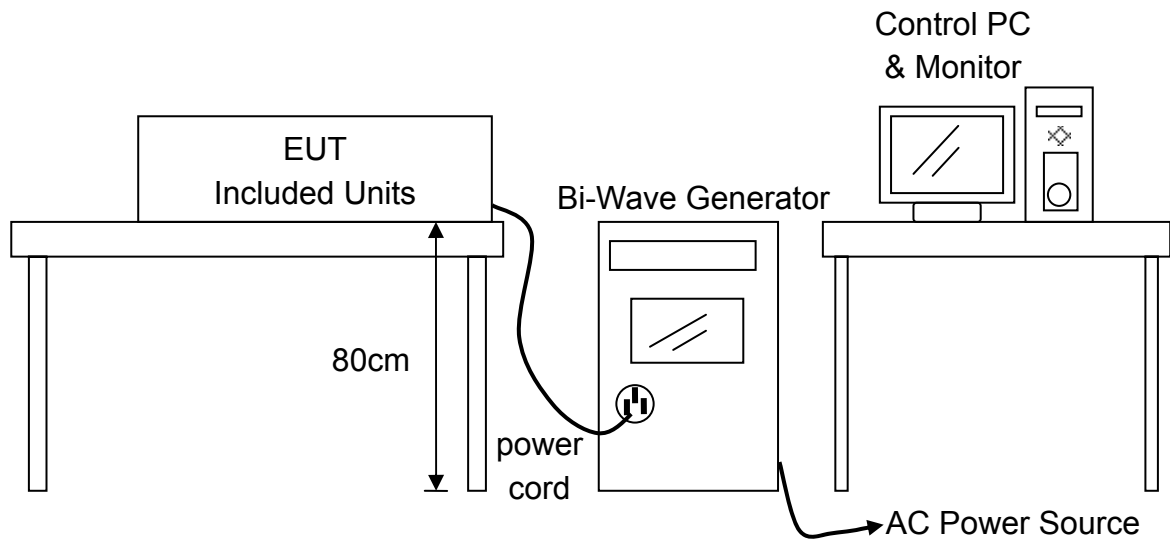
Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

9.4 Test Procedures

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters in the shielded room.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 0.1 meters above the ground reference plane in the shielded room.
- d. For the surge test applied to EUT's power supply and unshielded unsymmetrical interconnection lines, if required, the capacitive coupling network are used.
- e. If any, the surge test applied to the unshielded symmetrically interconnection lines of EUT, the gas arrestors coupling network are used.
- f. Keep the interconnection line, if required, or power cord between the EUT or its power source and the coupling / decoupling network to be 2m in length (or shorter).
- g. 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).
- h. All lower levels including the selected test level shall be satisfied and the test voltage has to be increased by steps up to the specified test level.
- i. Connect the EUT's power source to the appropriate power through the coupling devices and perform the specified test level.
- j. If any, connect all the interconnection lines between EUT and accessories/support units through the coupling devices and perform the specified test level.
- k. Record the performance of the EUT.

9.5 Test Configurations



9.6 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

9.7 Test Results

Test Mode : Normal

Coupled Line	Open-circuit Test Voltage (kV)	Performance					Result (Pass/Fail)
		Required	Observation				
			0°	90°	180°	270°	
L1 - PE	±0.5	B	A(1)	A(1)	A(1)	A(1)	Pass
L2 - PE	±0.5	B	A(1)	A(1)	A(1)	A(1)	Pass
L1 – L2	±0.5	B	A(1)	A(1)	A(1)	A(1)	Pass
L1 - PE	±1	B	A(1)	A(1)	A(1)	A(1)	Pass
L2 - PE	±1	B	A(1)	A(1)	A(1)	A(1)	Pass
L1 – L2	±1	B	A(1)	A(1)	A(1)	A(1)	Pass
L1 - PE	±2	B	A(1)	A(1)	A(1)	A(1)	Pass
L2 - PE	±2	B	A(1)	A(1)	A(1)	A(1)	Pass

Observation of Performance during Test

(1) Normal operation condition specified by manufacturer during the test.

10. Conducted disturbances (CS) Immunity Test

Test Result : PASS

10.1 Specifications of Immunity Test Requirement

Product (Generic) Standard	: EN 55024:2010
Basic Standard	: EN 61000-4-6:2009
Required Performance	: A
Test Level	: 2
Voltage Level(e.m.f.)	: 3V (e.m.f.)
Test Frequency Range	: 150kHz ~ 80MHz
Frequency Step	: 1% of the momentary frequency
Dwell Time	: Minimum 3 sec. per frequency
Modulation	: 1kHz Sine Wave with 80% Amplitude Modulation
Coupling Devices	: <input checked="" type="checkbox"/> CDN-M3 (on power supply port) : <input type="checkbox"/> CDN-T2 (on RJ-11 port) : <input type="checkbox"/> CDN-T4 (on LAN port) : <input checked="" type="checkbox"/> CDN-T8 (on LAN port) : <input type="checkbox"/> EM Clamp (on I/O signal, data and control port)
Test Voltage	: 230V/50Hz to the power adapter
Tester	: Rod
Ambient Temperature	: 27°C
Relative Humidity	: 61%
Atmospheric Pressure	: 1007mbar

10.2 Description of Performance Criteria

- Criteria A** : normal performance within levels specified by the manufacturer, requestor or purchaser;
- Criteria B** : temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the EUT recovers its normal performance, without operator intervention;
- Criteria C** : temporary loss of function or degradation of performance, the correction of which requires operator intervention;
- Criteria D** : loss of function or degradation of performance which is not recoverable, owing to damage to hardware or software, or loss of data.

10.3 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Signal Generator	R&S	SML03/ 101676	July 15, 2013	July 15, 2014
Dual Directional Coupler	AR	DC2600/ 28834	Jan. 3, 2013	Jan. 3, 2014
Power Amplifier	AR	75A250/ 28845	NCR	NCR
CDN	FCC	<input type="checkbox"/> FCC-801-M2-16A/ 2032	Jan. 14, 2013	Jan. 14, 2014
		<input checked="" type="checkbox"/> FCC-801-M3-16A/ 2060	Jan. 14, 2013	Jan. 14, 2014
		<input type="checkbox"/> FCC-801-M5-16A/ 2020	Jan. 14, 2013	Jan. 14, 2014
	FCC	<input type="checkbox"/> FCC-801-T2/ 2032	Sept. 5, 2012	Sept. 5, 2013
		<input type="checkbox"/> FCC-801-T4-RJ45/ 08031	Sept. 5, 2012	Sept. 5, 2013
		<input checked="" type="checkbox"/> NCDN-T8-RJ45/ 06016	March 16, 2013	March 16, 2014
EM CLAMP	FCC	FCC-2031-23MM/ 107	Jan. 4, 2013	Jan. 4, 2014
Test Software	AR	SW1006/ Ver. 1.13	NCR	NCR
AR shielded room	ETS. LINDGREN	AR/ 15353-J	NCR	NCR

Note:

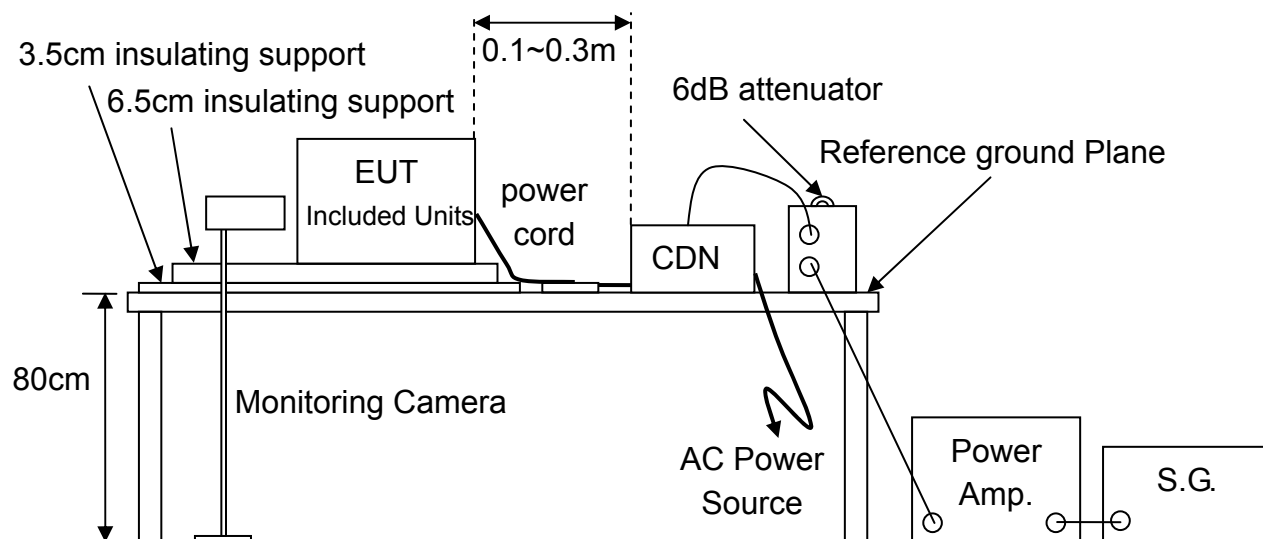
1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

10.4 Test Procedures

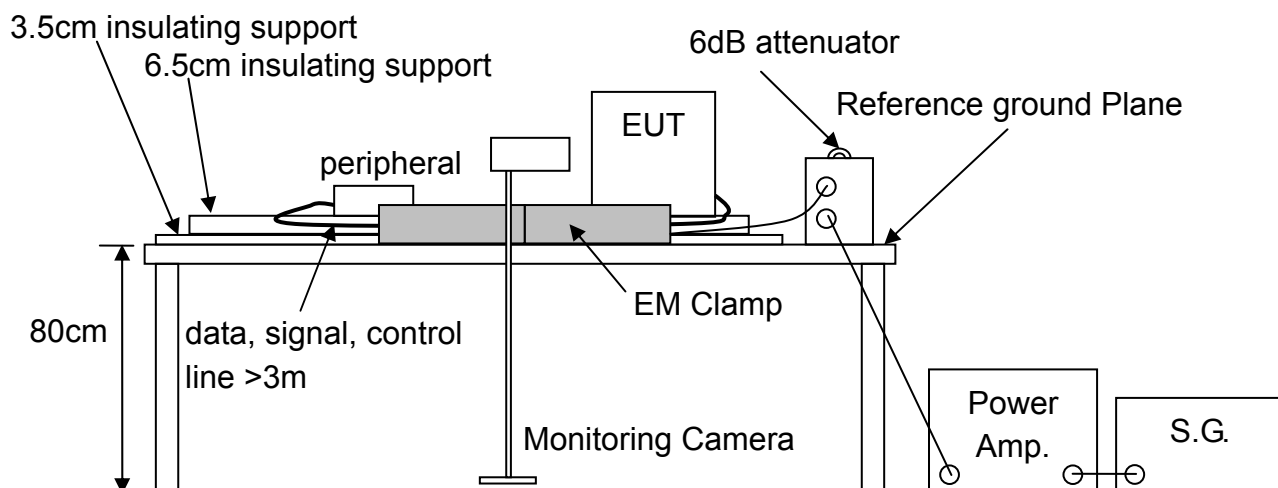
- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a non-conducted support with a height 0.1 meters above the ground reference plane. Also the ground reference plane is placed on a wooden table with a height of 0.8 meters in the shielded room.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 0.1 meters above the ground reference plane in the shielded room.
- d. Decide the injection methods and test points according to the relative standard.
- e. All relevant cables shall be provide with the appropriate coupling and decoupling devices at a distance between 0.1m and 0.3m from the projected geometry of the EUT on the ground reference plane.
- f. All cables connected to each Auxiliary Equipment (AE), other than those being connected to the EUT, shall not be bundled nor wrapped and shall be kept between 30mm and 50mm above the ground reference plane.
- g. 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 Ω load resistor.
- h. Perform the test with the specified immunity level in the test frequency range and with the specified modulation type.
- i. The dwell time at each frequency shall be not less than the time necessary for the EUT to be exercised and be able to respond.
- j. The sensitive frequencies of EUT and harmonics or frequencies of dominant interest shall be analyzed separately, if any.
- k. Record the performance of the EUT.

10.5 Test Configurations

Power supply and LAN port Test



I/O signal, data and control port Test (if any)



10.6 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

10.7 Test Results

Test Mode : Normal

Injected Line	Coupling Devices	Performance		Result (Pass/Fail)
		Required	Observation	
Power Lines	CDN-M3	A	A(1)	Pass
Data Line (LAN1)	CDN-T8(1Gbps)	A	A(1)	Pass

Observation of Performance during Test

(1) Normal operation condition specified by manufacturer during the test.

11. Power frequency magnetic field (PFM) Immunity Test

Test Result : PASS

11.1 Specifications of Immunity Test Requirement

Product (Generic) Standard	:	EN 55024:2010
Basic Standard	:	EN 61000-4-8:2010
Required Performance	:	A
Test Level	:	1
Magnetic Field Strength	:	1 A/m
Power Frequency	:	50 Hz
Test Duration	:	1 min.
Magnetic Field Orientation	:	X, Y, Z-axis
Test Voltage	:	230V/50Hz to the power adapter
Tester	:	Rod
Environment Magnetic Field	:	0.03 A/m (< 0.1 A/m (20dB below the test field))
Ambient Temperature	:	24°C
Relative Humidity	:	64%
Atmospheric Pressure	:	1004mbar

11.2 Description of Performance Criteria

- Criteria A** : normal performance within levels specified by the manufacturer, requestor or purchaser;
- Criteria B** : temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the EUT recovers its normal performance, without operator intervention;
- Criteria C** : temporary loss of function or degradation of performance, the correction of which requires operator intervention;
- Criteria D** : loss of function or degradation of performance which is not recoverable, owing to damage to hardware or software, or loss of data.

11.3 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Current Source	FCC	F-1000-4-8-125A/ 1008	June 28, 2013	June 28, 2014
Coil	FCC	F-1000-4-8-1M/ 1007	June 28, 2013	June 28, 2014
Low Frequency Gauss Meter	CHAUVIN ARNOUX	C.A40/ 150361	July 19, 2013	July 19, 2014
TR12 Plane Grounding Site	CRC	TR12	NCR	NCR

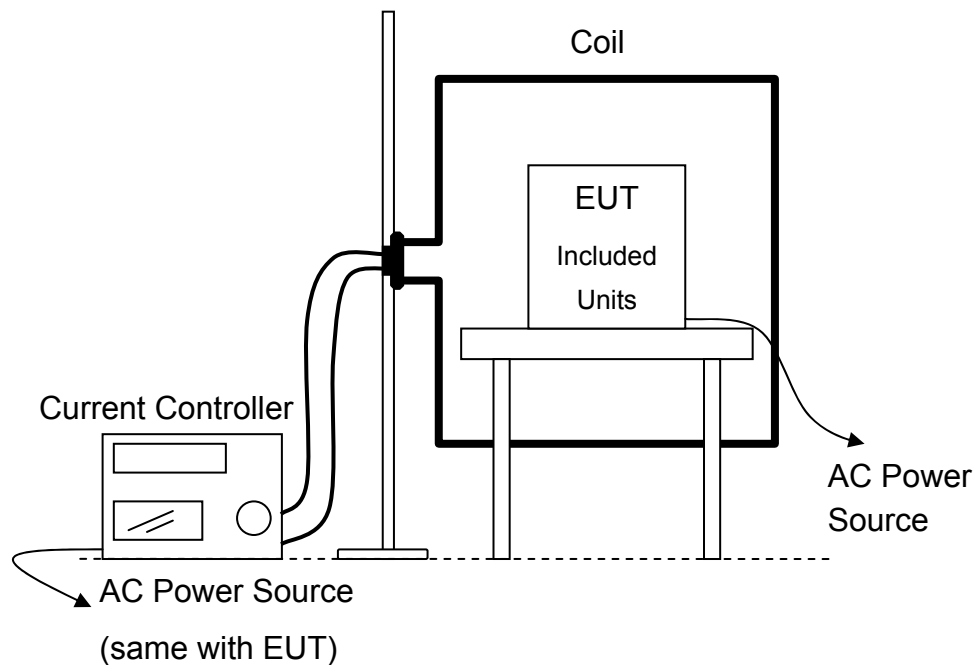
Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

11.4 Test Procedures

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height 0.8 meters.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 0.1 meters above the ground reference plane (minimum size is 1m×1m) in the shielded room.
- d. For the tabletop equipment, the induction coil with a square form in 1m side (or diameter) is used and shall enclose the EUT placed at its center. For the floor-standing equipment, the induction coil shall be able to envelop the EUT and made of conductors of relatively small cross-section.
- e. The dimensions of induction coil shall be able to keep the magnetic fields over the whole volume of the EUT with an acceptable variation of $\pm 3\text{dB}$.
- f. The test generator shall be placed at less than 3m distance from the induction coil.
- g. Keep all cables of EUT to be exposed to the magnetic field for 1m of their length.
- h. Before the test, maintain the electromagnetic field value of the test environment to be at least 20dB lower than the selected test level. Then tune up the currents of the test generator and use the Guass Meter to calibrate the specified test level at the center of the induction coil.
- i. Perform the test with the specified magnetic field by rotating the induction coil to three different orientations to generate X, Y and Z directed magnetic field sequentially.
- j. Record the performance of the EUT.

11.5 Test Configurations



11.6 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

11.7 Test Results

Test Mode : Normal

Magnetic Field Orientation	Magnetic Field (A/m)	Frequency (Hz)	Performance		Result (Pass/Fail)
			Required	Observation	
X-axis	1	50	A	A(1)	Pass
Y-axis	1	50	A	A(1)	Pass
Z-axis	1	50	A	A(1)	Pass

Observation of Performance during Test

(1) Normal operation condition specified by manufacturer during the test.

12. Voltage dips, short interruptions Immunity Test

Test Result : PASS

12.1 Specifications of Immunity Test Requirement

Product (Generic) Standard	:	EN 55024:2010
Basic Standard	:	EN 61000-4-11:2004
Required Performance and Test Level	:	<input checked="" type="checkbox"/> B for 0% residual voltage dips with 0.5 cycle <input checked="" type="checkbox"/> C for 70% residual voltage dips with 25 cycles <input type="checkbox"/> C for 40% residual voltage dips <input checked="" type="checkbox"/> C for 0% residual voltage interruptions with 250 cycles
Basis Test Voltage Level (U_T)	:	230V/50Hz to the power adapter
Test Duration	:	Maximum 3 dips/interruptions with a sequence
Time interval	:	10s minimum between each test event
Phase Angle of Abrupt Changes	:	0°
Tester	:	Rod
Ambient Temperature	:	24°C
Relative Humidity	:	64%
Atmospheric Pressure	:	1004mbar

12.2 Description of Performance Criteria

- Criteria A** : normal performance within levels specified by the manufacturer, requestor or purchaser;
- Criteria B** : temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the EUT recovers its normal performance, without operator intervention;
- Criteria C** : temporary loss of function or degradation of performance, the correction of which requires operator intervention;
- Criteria D** : loss of function or degradation of performance which is not recoverable, owing to damage to hardware or software, or loss of data.

12.3 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Voltage DIP Tester	EMC PARTNER	TRA2000IN6/ 870	April 2, 2013	April 2, 2014
Test Software	EMC PARTNER	TEMA/ Ver. 1.86	NCR	NCR
TR7 shielded room	ETS. LINDGREN	TR7/ 15353-D	NCR	NCR

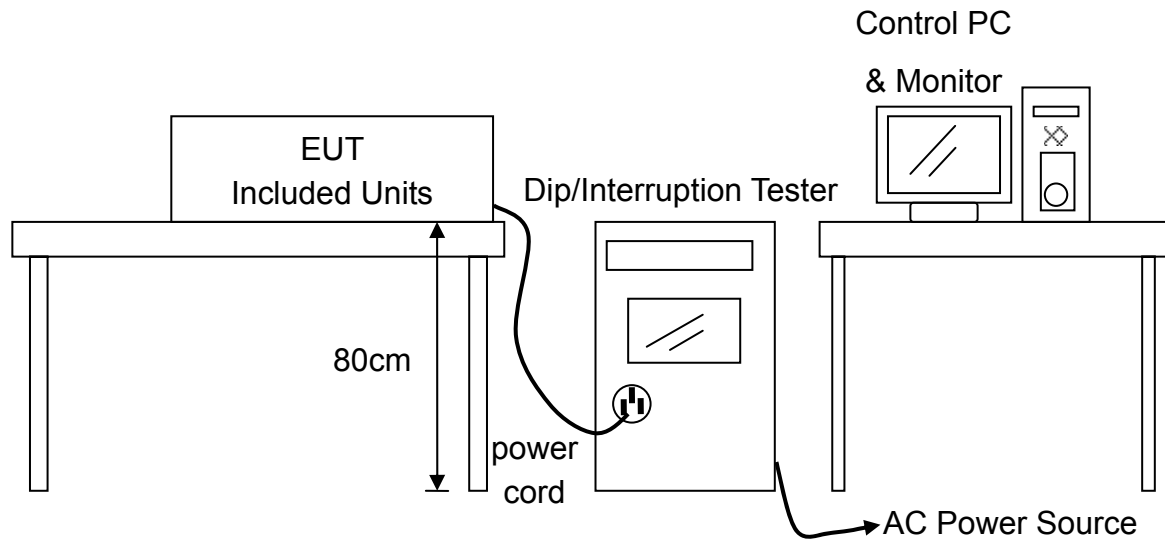
Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

12.4 Test Procedures

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height 0.8 meters above the ground reference plane in the shielded room.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 0.1 meters above the ground reference plane in the shielded room.
- d. The test shall be performed with the EUT connected to the test Generator with the shortest power supply cable as specified by the manufacturer.
- e. If any, tests on the three-phase EUT are accomplished by using three sets of equipment mutually synchronized.
- f. During the tests, the main voltage for testing is monitored within an accuracy of 2% and the zero crossing control of the generators must have an accuracy of $\pm 10^\circ$.
- g. The EUT shall be tested for each selected combination of test level and duration with a sequence of three dips/interruptions with intervals of 10 sec. minimum (between each test event). Each representative mode of operation shall be test.
- h. Abrupt changes in supply voltage shall occur at zero crossings of the voltage and additional angles preferably selected from 0° , 45° , 90° , 135° , 180° , 225° , 270° , 315° on each phase.
- i. Connect the EUT's power source to the appropriate power through the test generator and perform the specified test level.
- j. Record the performance of the EUT.

12.5 Test Configurations



12.6 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

12.7 Test Results

Test Mode : Normal

Voltage Dips Test

Test level (% residual voltage)	Reduction Voltage (%)	Duration (cycle)	Performance		Result (Pass/Fail)
			Required	Observation	
0	>95	0.5	B	A(1)	Pass
70	30	25	C	A(1)	Pass

Voltage Interruption Test

Test level (% residual voltage)	Reduction Voltage (%)	Duration (cycle)	Performance		Result (Pass/Fail)
			Required	Observation	
0	>95	250	C	B(2)	Pass

Observation of Performance during Test

- (1) Normal operation condition specified by manufacturer during the test.
- (2) The EUT shuts down while test is performing, it could self-recover after the test.

Attachment 1

Photographs of the Test Configurations

Contents

1. Conducted Emission Measurement.....	1
2. Radiated Emission Measurement	2
3. Harmonic Current & Voltage Fluctuations Emission Measurement.....	3
4. Electrostatic Discharge (ESD) Immunity Test	3
5. Radiated Electromagnetic Field (RS) Immunity Test.....	4
6. Electrical fast transient / burst (EFT) Immunity Test.....	5
7. Surge Immunity Test	6
8. Conducted disturbances (CS) Immunity Test	7
9. Power frequency magnetic field (PFM) Immunity Test.....	8
10. Voltage dips, short interruptions Immunity Test.....	8

1. Conducted Emission Measurement



2. Radiated Emission Measurement



3. Harmonic Current & Voltage Fluctuations Emission Measurement



4. Electrostatic Discharge (ESD) Immunity Test



5. Radiated Electromagnetic Field (RS) Immunity Test



6. Electrical fast transient / burst (EFT) Immunity Test



Test for LAN port



7. Surge Immunity Test



8. Conducted disturbances (CS) Immunity Test



Test for LAN port



9. Power frequency magnetic field (PFM) Immunity Test



10. Voltage dips, short interruptions Immunity Test



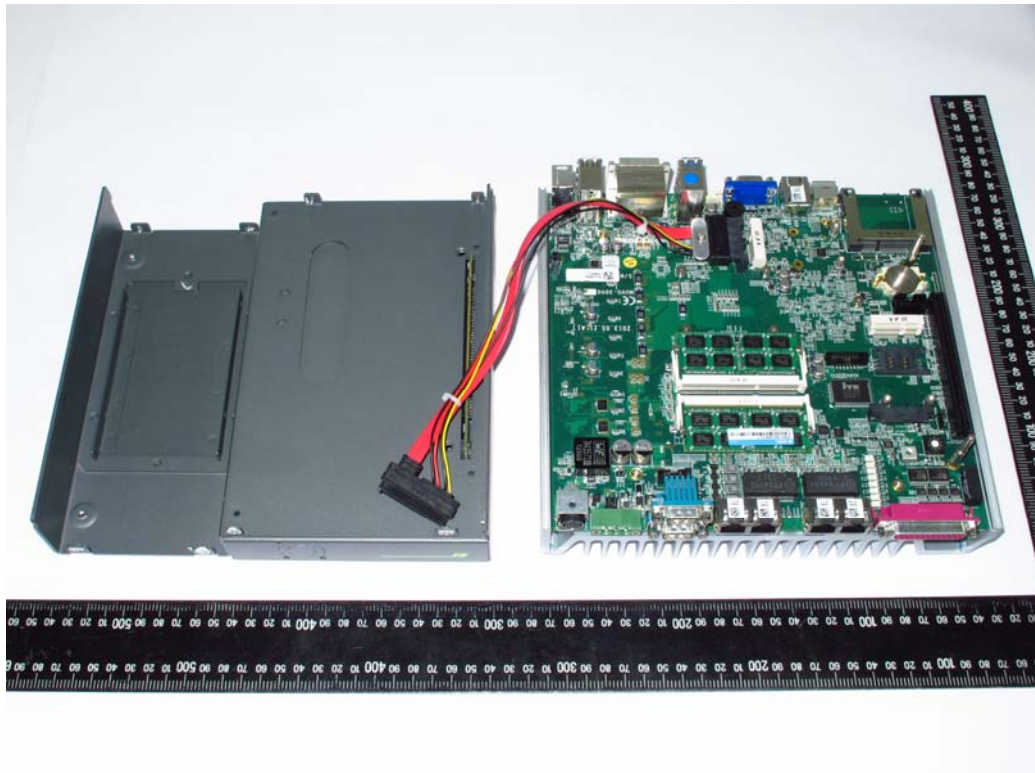
Attachment 2

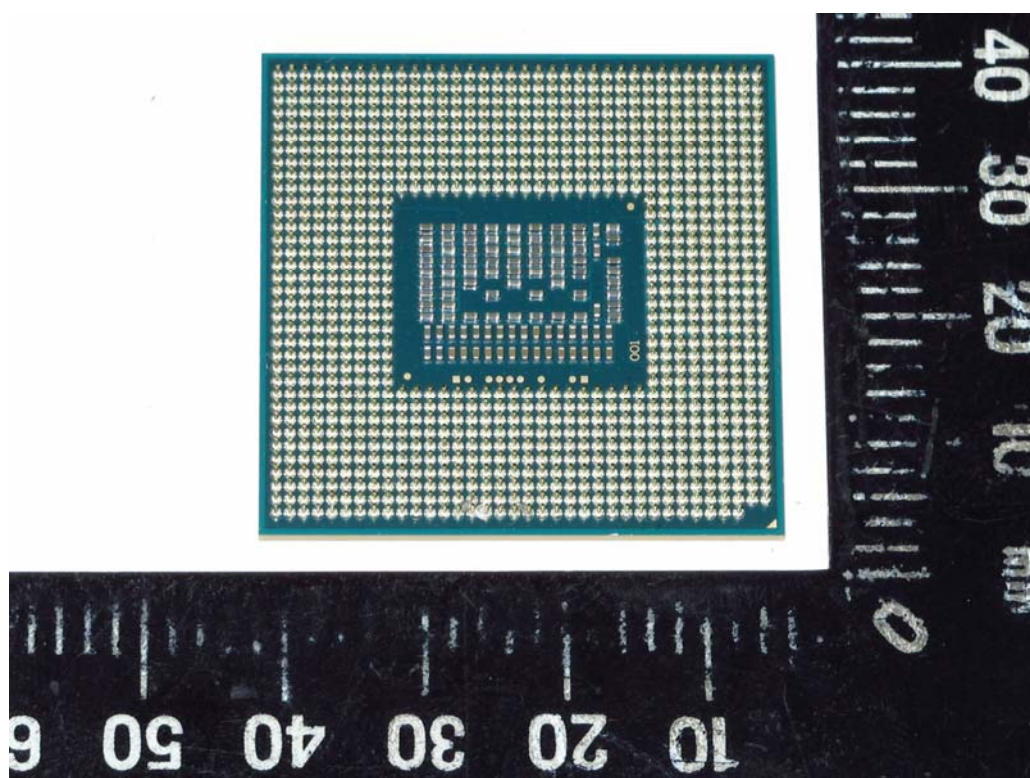
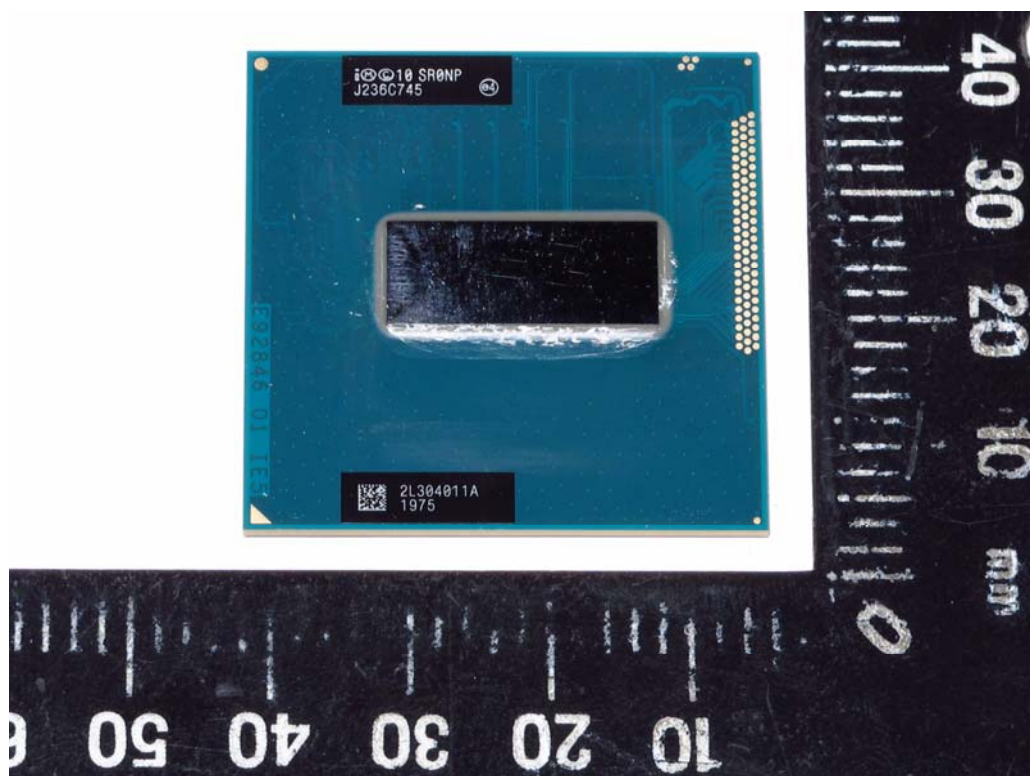
Photographs of EUT

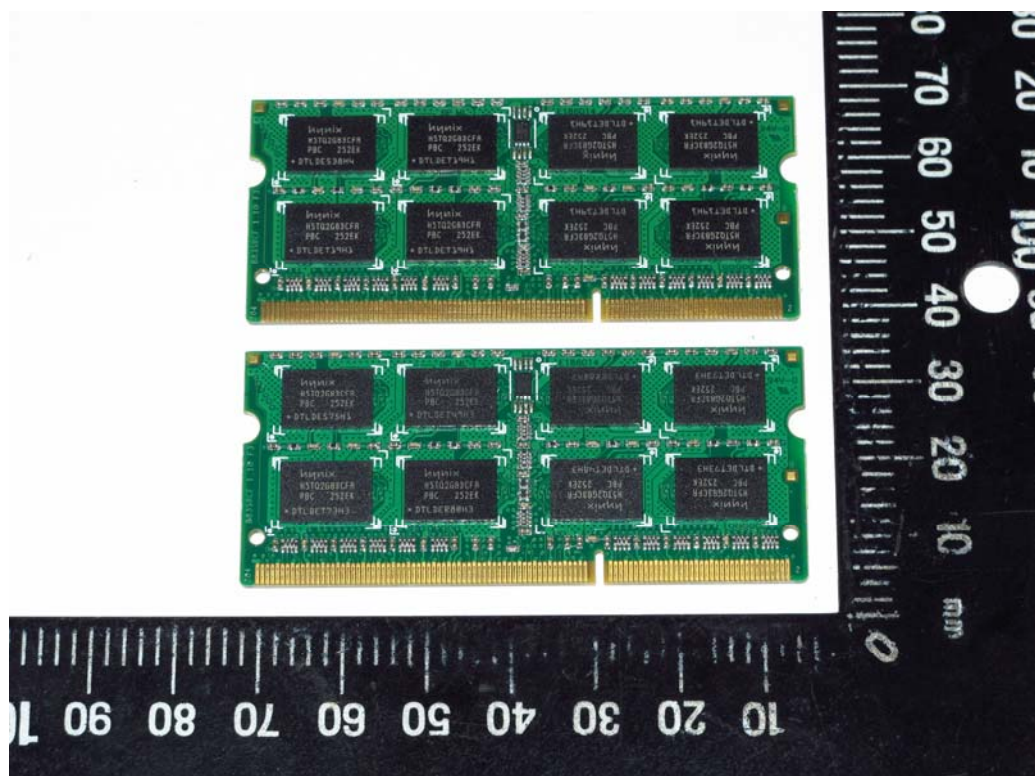
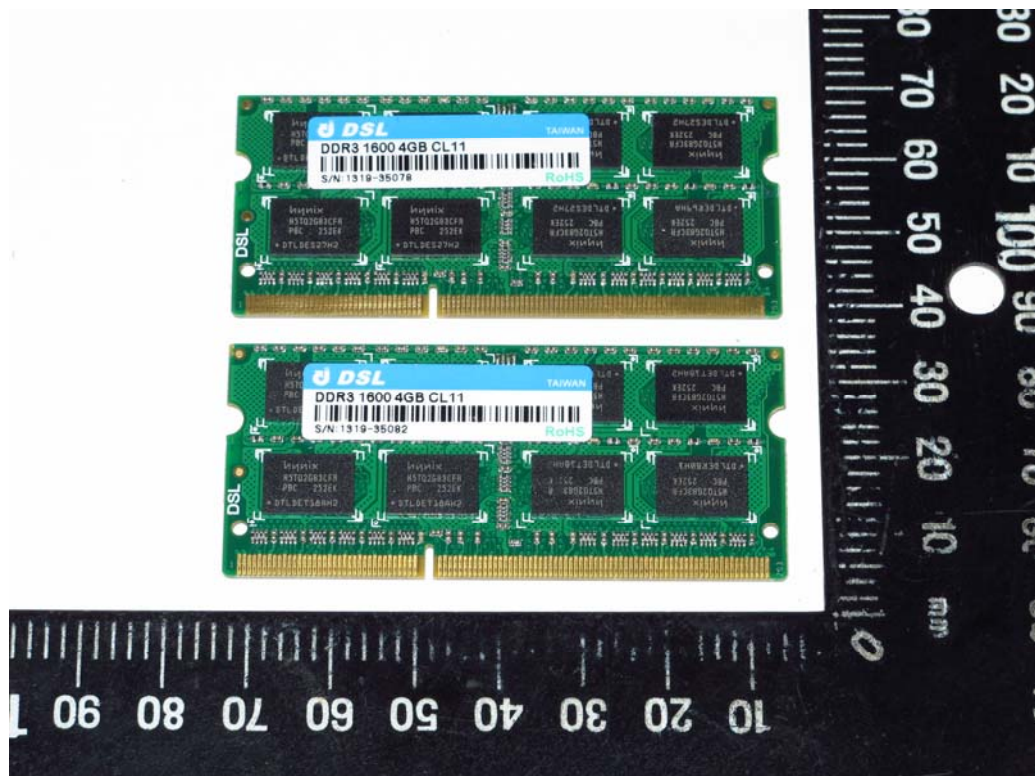


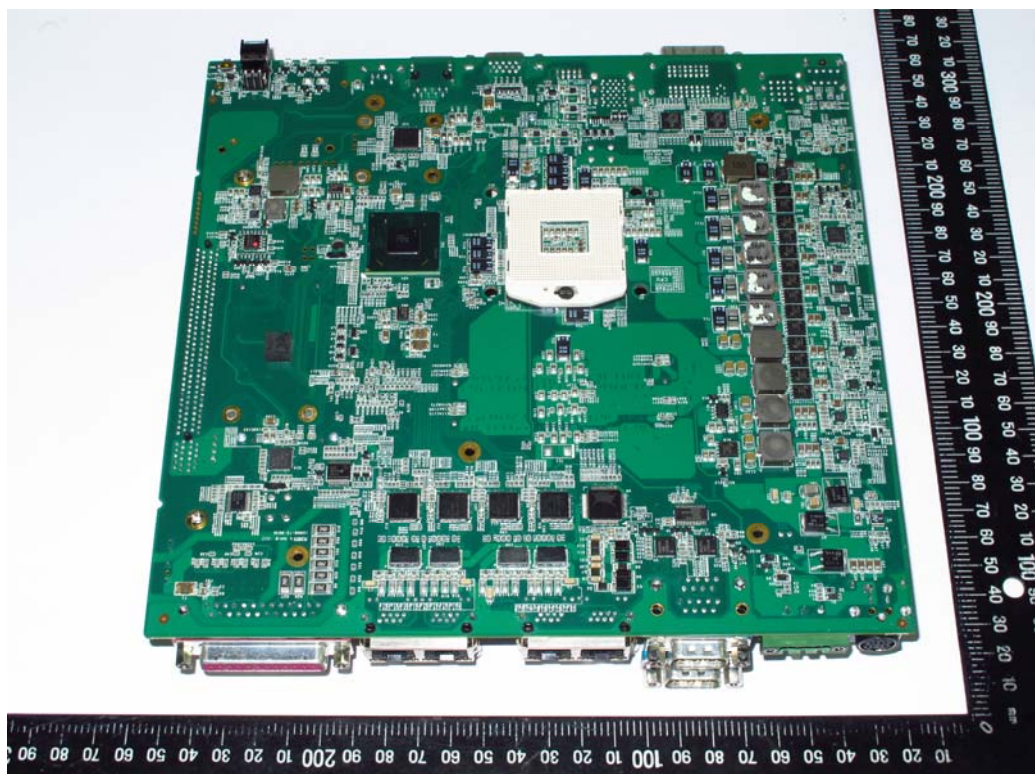
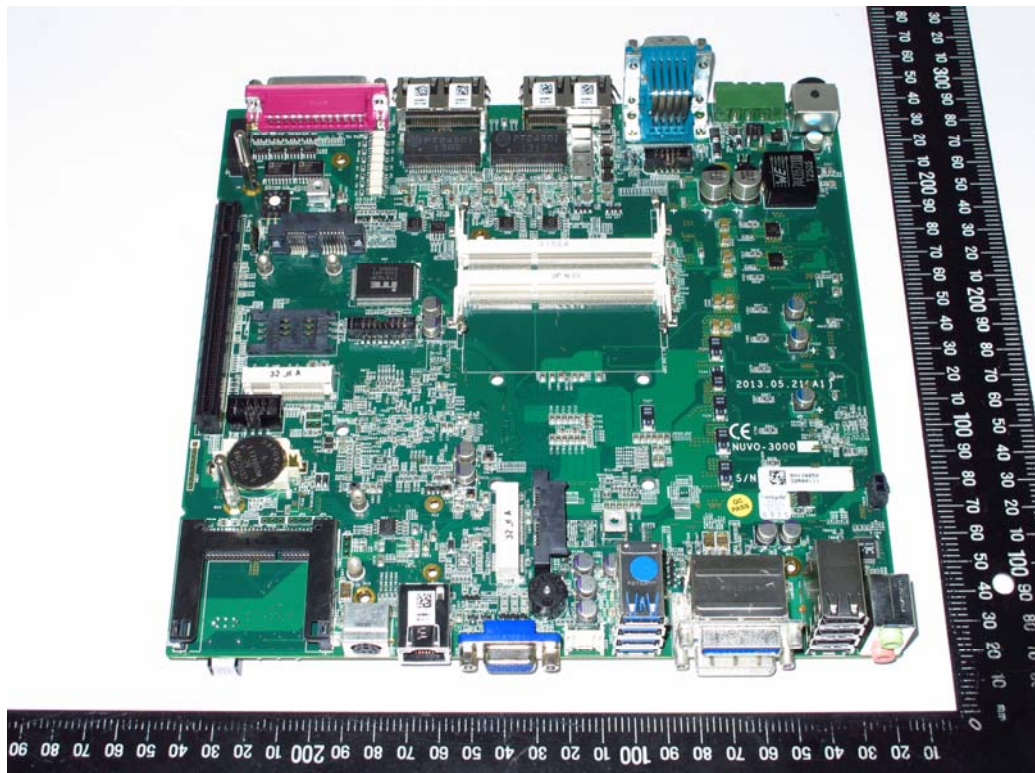














Power Adapter



