EMC Test Report

Report No.:	RM140718E03 R1
Test Model:	SS-AC1200-EU
Series Model:	ECW5320, ECW5320-L, ECW5320-C, ECW3320, ECW3320-L, ECW3320-C, SS-N300-EU
Received Date:	July 18, 2014
Test Date:	July 25 to Aug. 04, 2014
Issued Date:	Aug. 28, 2014
Applicant:	Accton Technology Corporation
Address:	No.1, Creation Rd. III, Science-based Industrial Park, Hsinchu, Taiwan, R.O.C.
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.
Test Location (1):	No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.
Test Location (2):	No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.

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Release Control Record

Issue No.	Description	Date Issued
RM140718E03	Original release	Aug. 15, 2014
RM140718E03 R1	1. Changed the applicant 2. Changed the test model no.	Aug. 28, 2014

1 Certificate of Conformity

Product:	802.11ac Dual-Band Wireless Access Point, 802.11b/g/n Wireless Access Point, 2.4G Ceiling/Wall/Desktop Enterprise AP, Dualband Ceiling/Wall/Desktop Enterprise AP (802.11ac)
Brand:	Edge-corE, IgniteNet
Test Model:	SS-AC1200-EU
Series Model:	ECW5320, ECW5320-L, ECW5320-C, ECW3320, ECW3320-L, ECW3320-C, SS-N300-EU,
Sample Status:	ENGINEERING SAMPLE
Applicant:	Accton Technology Corporation
Test Date:	July 25 to Aug. 04, 2014
Standards:	**EN 301 489-1 V1.9.2 (2011-09)** **EN 301 489-17 V2.2.1 (2012-09)** **EN 55022:2010 +AC:2011, Class B** **CISPR 22:2008, Class B** **AS/NZS CISPR 22:2009 +A1:2010, Class B** **EN 61000-3-2:2006 +A1:2009 +A2:2009, Class A** **EN 61000-3-3:2013** **EN 55024:2010** EN 61000-4-2:2009 / IEC 61000-4-2:2008 ED. 2.0 EN 61000-4-3:2006 +A1:2008 +A2:2010 / IEC 61000-4-3:2010 ED. 3.2 EN 61000-4-4:2012 / IEC 61000-4-4:2012 ED. 3.0 EN 61000-4-5:2006 / IEC 61000-4-5:2005 ED. 2.0 EN 61000-4-6:2014 / IEC 61000-4-6:2013 ED. 4.0 EN 61000-4-8:2010 / IEC 61000-4-8:2009 ED. 2.0 EN 61000-4-11:2004 / IEC 61000-4-11:2004 ED. 2.0

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : _____ , **Date:** Aug. 28, 2014

Midoli Peng / Specialist

Approved by : _____ , **Date:** Aug. 28, 2014

Ken Lu / Manager

2 Summary of Test Results

EN 301 489-1 V1.9.2 (2011-09) / EN 301 489-17 V2.2.1 (2012-09), Emission					
Clause	Basic Standard	Phenomenon	Application	Result/Remarks	Verdict
8.2	EN 55022:2010 +AC:2011* EN 55022:2006 +A1:2007	Radiated emission 30-1000 MHz	Enclosure of ancillary equipment measured on a stand alone basis	Minimum passing Class B margin is -3.55 dB at 52.80 MHz	Pass
		Radiated emission 1-6 GHz		Minimum passing Class B margin is -14.72 dB at 1374.85 MHz	Pass
8.3	EN 55022:2010 +AC:2011* EN 55022:2006 +A1:2007	Conducted emission 150 kHz - 30 MHz	DC power input/output ports (fixed)	Test not applicable because port does not exists.	N/A
		Conducted emission 150 kHz - 30 MHz	DC power input ports (vehicular)	Test not applicable because port does not exist.	N/A
8.4	EN 55022:2010 +AC:2011* EN 55022:2006 +A1:2007	Conducted emission 150 kHz - 30 MHz	AC mains input/output ports	Minimum passing Class B margin is -5.94 dB at 0.42734 MHz	Pass
8.5	EN 61000-3-2:2006 +A1:2009 +A2:2009	Harmonic current emissions	AC mains input port	Class A	Pass
8.6	EN 61000-3-3:2013* EN 61000-3-3:2008	Voltage fluctuations and flicker	AC mains input ports	Meets the requirements. $P_{st} \leqq 1.0$ $d_{max} \leqq 4\%$ $P_{lt} \leqq 0.65$ $d_c \leqq 3.3\%$ $T_{max} \leqq 500ms$	Pass
8.7	EN 55022:2010 +AC:2011* EN 55022:2006 +A1:2007	Conducted disturbance 150 kHz - 30 MHz	Telecommunication ports	Minimum passing Class B margin is -3.01 dB at 21.55469 MHz	Pass

EN 301 489-1 V1.9.2 (2011-09) / EN 301 489-17 V2.2.1 (2012-09), Immunity					
Clause	Basic Standard	Phenomenon	Application	Result/Remarks	Verdict
9.2	EN 61000-4-3:2006 +A1:2008 +A2:2010	RF Electromagnetic Field (80 MHz to 1000 MHz and 1400 MHz to 2700 MHz) (RS)	Enclosure	Performance Criterion A	Pass
9.3	EN 61000-4-2:2009	Electrostatic Discharges (ESD)	Enclosure	Performance Criterion B	Pass
9.4	EN 61000-4-4:2012* EN 61000-4-4:2004 +A1:2010	Fast Transients Common Mode (EFT)	Signal, telecommunication and control ports, DC and AC power ports	Performance Criterion A	Pass
9.5	EN 61000-4-6:2014* EN 61000-4-6:2009	RF Common Mode 150 kHz to 80 MHz (CS)	Signal, telecommunication and control ports, DC and AC power ports	Performance Criterion A	Pass
9.6	ISO 7637-2:2004	Transients and Surges	DC power input ports (Vehicular)	Test not applicable because not intend for vehicular use.	N/A
9.7	EN 61000-4-11:2004	Voltage Dips and Interruptions	AC mains power input ports	Voltage Dips: 1. 0% residual – 0.5 cycle Performance Criterion A 2. 0% residual – 1 cycle Performance Criterion A 3. 70% residual – 25 cycles Performance Criterion A Voltage Interruptions: 1. 0% residual – 250 cycles Performance Criterion B is required for EUT without battery back-up.	Pass
9.8	EN 61000-4-5:2006	Surges	AC mains power input ports, line to line and line to ground Telecommunication ports, line to ground	Performance Criterion B	Pass

N/A: Not Applicable

* Both of specific and the latest version of the basic standard are referenced to fulfill the requirements.

Note: There is no deviation to the applied test methods and requirements covered by the scope of this report.

EN 55024, Immunity				
EN 55024 Clause	Basic standard	Test Item	Result/Remarks	Verdict
4.2.1	EN 61000-4-2:2009	Electrostatic discharges (ESD)	Performance Criterion B	Pass
4.2.3.2	EN 61000-4-3:2006 +A1:2008 +A2:2010	Continuous radiated disturbances (RS)	Performance Criterion A	Pass
4.2.2	EN 61000-4-4:2004 EN 61000-4-4:2012*	Electrical fast transients (EFT)	Performance Criterion A	Pass
4.2.5	EN 61000-4-5:2006	Surges	Performance Criterion A	Pass
4.2.3.3	EN 61000-4-6:2009 EN 61000-4-6:2014*	Continuous conducted disturbances (CS)	Performance Criterion A	Pass
4.2.4	EN 61000-4-8:2010	Power-frequency magnetic fields (PFMF)	Performance Criterion A	Pass
4.2.6	EN 61000-4-11:2004	Voltage dips and interruptions	Voltage Dips: >95% reduction – 0.5 period, Performance Criterion A 30% reduction – 25 periods, Performance Criterion A Voltage Interruptions: >95% reduction – 250 periods, Performance Criterion B	Pass

N/A: Not Applicable

* Both of specific and the latest version of the basic standard are referenced to fulfill the requirements.

Note: There is no deviation to the applied test methods and requirements covered by the scope of this report.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement	Expended Uncertainty (k=2) (±)	Maximum allowable uncertainty (±)
Conducted disturbance at mains port using AMN, 150kHz ~ 30MHz	2.86 dB	3.4 dB (U_{cispr})
Conducted disturbance at telecommunication port using AAN, 150kHz ~ 30MHz	3.14 dB	5.0 dB (U_{cispr})
Radiated disturbance, 30MHz ~ 1GHz	3.99 dB	6.3 dB (U_{cispr})
Radiated disturbance, 1GHz ~ 6GHz	3.65 dB	5.2 dB (U_{cispr})

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 Features of EUT

The tests reported herein were performed according to the method specified by Accton Technology Corporation, for detailed feature description, please refer to the manufacturer's specifications or user's manual.

3.2 General Description of EUT

Product	802.11ac Dual-Band Wireless Access Point, 802.11b/g/n Wireless Access Point, 2.4G Ceiling/Wall/Desktop Enterprise AP, Dualband Ceiling/Wall/Desktop Enterprise AP (802.11ac)
Brand Name	Edge-corE, IgniteNet
Model No.	SS-AC1200-EU
Series Models	ECW5320, ECW5320-L, ECW5320-C, ECW3320, ECW3320-L, ECW3320-C, SS-N300-EU
Status of EUT	ENGINEERING SAMPLE
Operating Software	NA
Power Supply rating	DC12V from power adapter or DC 48V from PoE
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only
Operating Frequency	**For 2.4GHz:** 2412 ~ 2472MHz **For 5GHz:** 5180 MHz ~5240 MHz
Antenna Type	Please see NOTE
I/O Ports	Refer to user's manual
Accessory Device	Adapter × 1
Data Cable Supplied	NA

Note:

1. 2.4GHz and 5GHz technology can transmit at same time.
2. The EUT has two brand names, four product names and eight model names, which are identical to each other in all aspects except for the following:

Brand	Product Name	Model Name	Radio 2.4G	Radio 5G	Software
Edge-corE	802.11b/g/n Wireless Access Point	ECW3320	Support	Non-Support	Fat
		ECW3320-L			Fit
		ECW3320-C			Fit
	802.11ac Dual-Band Wireless Access Point	ECW5320	Support	Support	Fat
		ECW5320-L			Fit
		ECW5320-C			Fit
IgniteNet	2.4G Ceiling/Wall/Desktop Enterprise AP	SS-N300-EU	Support	Non-Support	Fat
	Dualband Ceiling/Wall/Desktop Enterprise AP (802.11ac)	SS-AC1200-EU	Support	Support	Fat
From the above models, model: **SS-AC1200-EU** was selected as representative model for the test and its data were recorded in this report.					

3. The antennas provided to the EUT, please refer to the following table:

For 2.4G WLAN used						
Set	Transmitter Circuit	Antenna Gain(dBi) <including cable loss>	Frequency range (MHz ~ MHz)	Antenna Type	Connecter Type	Cable Length (mm)
1	Chain (0)	3.16	2400~2500	PCB Dipole	IPEX	255 (Gray)
	Chain (1)	4.04				150 (Blue)
For 5G WLAN used						
Set	Transmitter Circuit	Antenna Gain(dBi) <including cable loss>	Frequency range (MHz ~ MHz)	Antenna Type	Connecter Type	Cable Length (mm)
1	Chain (0)	5.07	2150~5850	PCB Dipole	MMCS	65 (White)
	Chain (1)	3.97				140 (Black)

4. The EUT must be supplied with a power adapter as following table:

Brand	Model No.	Spec.
Sunny	SYS1308-2412-W2E	Input: 100-240V, 1.0A, 50-60Hz Output: 12V, 2A DC power cable: 1.83m, unshielded

5. The EUT incorporates a MIMO function without beamforming.

MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11a	6 ~ 54Mbps	1TX (Diversity)	2RX
802.11b	1 ~ 11Mbps	1TX (Diversity)	2RX
802.11g	6 ~ 54Mbps	1TX (Diversity)	2RX
802.11n (HT20) & 802.11n (HT40)	MCS 0~7	1TX (Diversity)	2RX
	MCS 8~15	2TX	2RX
802.11ac (VHT20)	MCS0~8 (256QAM) Nss= 1	1TX (Diversity)	2RX
	MCS0~8 (256QAM) Nss= 2	2TX	2RX
802.11ac (VHT40) & 802.11ac (VHT80)	MCS0~9 (256QAM) Nss= 1	1TX (Diversity)	2RX
	MCS0~9 (256QAM) Nss= 2	2TX	2RX

3.3 Operating Modes of EUT and Determination of Worst Case Operating Mode

1. The EUT is designed with AC power or PoE of rating 100-240Vac, 50/60Hz.
2. For radiated emission evaluation, 230Vac/50Hz (for EN 55022 & AS/NZS CISPR 22), 120Vac/60Hz (for FCC Part 15) & 48Vdc had been covered during the pre-test. The worst data was found at **48Vdc** and recorded in the applied test report.
3. Test modes are presented in the report as below.

Pre-test Mode	Test Condition			
	LAN port Speed	WAN/PoE port Speed	Polarity	Power Source
A	100Mpbs	1000Mpbs	laying-flat type	With Adapter
B	100Mpbs	1000Mpbs	stand-up type	With Adapter
C	100Mbps	1000Mbps	laying-flat type	With PoE
D	**100Mbps**	**100Mbps**	**laying-flat type**	**With PoE**
E	10Mbps	10Mbps	laying-flat type	With PoE

From the above pre-test modes, the worse radiated emission was found in **Mode D**. Therefore only the test data of the mode was recorded in this report.

4. Test modes are presented in the report as below.

Conducted emission test			
Test Mode	Test Condition		
	LAN port Speed	WAN/PoE port Speed	Power Source
1	100Mpbs	1000Mpbs	With Adapter
2	100Mpbs	1000Mpbs	With PoE

Radiated emission test				
Test Mode	Test Condition			
	LAN port Speed	WAN/PoE port Speed	Polarity	Power Source
1	100Mpbs	1000Mpbs	laying-flat type	With PoE

Conducted emission at telecom port test		
Test Mode	Test Condition	
	Speed	Power Source
1	WAN/PoE port: 1000Mpbs	With Adapter
2	WAN/PoE port: 100Mpbs	With Adapter
3	WAN/PoE port: 10Mpbs	With Adapter
4	LAN port: 100Mpbs	With Adapter
5	LAN port: 10Mpbs	With Adapter
6	WAN/PoE port: 1000Mpbs	With PoE
7	WAN/PoE port: 100Mpbs	With PoE
8	WAN/PoE port: 10Mpbs	With PoE
9	LAN port: 100Mpbs	With PoE
10	LAN port: 10Mpbs	With PoE

Harmonics / Flicker / DIP test			
Test Mode	Test Condition		
	LAN port Speed	WAN/PoE port Speed	Power Source
1	100Mpbs	1000Mpbs	With Adapter

Immunity test (Except for DIP test)			
Test Mode	Test Condition		
	LAN port Speed	WAN/PoE port Speed	Power Source
1	100Mpbs	1000Mpbs	With Adapter
2	100Mpbs	1000Mpbs	With PoE (only test signal line)

Note: The test Configuration was defined by the applicant requirement.

3.4 Test Program Used and Operation Descriptions

For Conducted emission / Conducted emission at telecom port / Radiated emission test:

※Adapter Mode

1. Turn on the power of all equipment.
2. Support units B~C (Notebook Computer) run test program “Ping.exe” to enable EUT under transmission/receiving condition continuously via wireless transmission.
3. Support units D~F (Notebook Computer) run test program “Ping.exe” to enable EUT under transmission/receiving condition continuously via UTP cables.
4. Support unit G (iPod shuffle) was connected to EUT via one USB cable to simulate real connection.

※PoE Mode:

1. Turn on the power of all equipment.
2. Support units B~C (Notebook Computer) run test program “Ping.exe” to enable EUT under transmission/receiving condition continuously via wireless transmission.
3. Support unit D (Notebook Computer) runs test program “Ping.exe” to enable EUT under transmission/receiving condition continuously via PoE and one UTP cable.
4. Support units E~F (Notebook Computer) run test program “Ping.exe” to enable EUT under transmission/receiving condition continuously via UTP cables.
5. Support unit G (iPod shuffle) was connected to EUT via one USB cable to simulate real connection.

For Immunity test: (Except for PFMF)

※Adapter Mode

1. Turn on the power of all equipment.
2. Support units B~C (Notebook Computer) run test program “Ping.exe” to enable EUT under transmission/receiving condition continuously via wireless transmission.
3. Support units D, F (Notebook Computer) run test program “Ping.exe” to enable EUT under transmission/receiving condition continuously via UTP cables.
4. Support unit I (USB Flash Drive) was connected to EUT to simulate real connection.

※PoE Mode:

1. Turn on the power of all equipment.
2. Support units B~C (Notebook Computer) run test program “Ping.exe” to enable EUT under transmission/receiving condition continuously via wireless transmission.
3. Support unit D (Notebook Computer) runs test program “Ping.exe” to enable EUT under transmission/receiving condition continuously via PoE and one UTP cable.
4. Support unit F (Notebook Computer) runs test program “Ping.exe” to enable EUT under transmission/receiving condition continuously via one UTP cable.
5. Support unit I (USB Flash Drive) was connected to EUT to simulate real connection.

For Harmonics / Flicker / PFMF test:

※Adapter Mode

1. Turn on the power of all equipment.
2. Support units B~C (Notebook Computer) run test program “Ping.exe” to enable EUT under transmission/receiving condition continuously via wireless transmission.
3. Support units D, F (Notebook Computer) run test program “Ping.exe” to enable EUT under transmission/receiving condition continuously via UTP cables.
4. Support unit H (FireWire Hard Drive) was connected to EUT via one USB cable to simulate real connection.

※PoE Mode:

1. Turn on the power of all equipment.
2. Support units B~C (Notebook Computer) run test program “Ping.exe” to enable EUT under transmission/receiving condition continuously via wireless transmission.
3. Support unit D (Notebook Computer) runs test program “Ping.exe” to enable EUT under transmission/receiving condition continuously via PoE and one UTP cable.
4. Support unit F (Notebook Computer) runs test program “Ping.exe” to enable EUT under transmission/receiving condition continuously via one UTP cable.
5. Support unit H (FireWire Hard Drive) was connected to EUT via one USB cable to simulate real connection.

3.5 Primary Clock Frequencies of Internal Source

The EUT is a 2.4GHz & 5GHz WLAN device, provided by Accton Technology Corporation, for detailed internal source, please refer to the manufacturer's specifications.

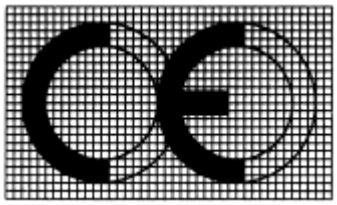
3.6 Miscellaneous

Ø Complete CE marking

The following picture shows an example of CE marking. The "CE" mark is always required. The other elements, notified body number ("NBnr" replaced by the four-digit identification number of any notified body involved) and class identifier (alert sign), may or may not be present depending on the particular circumstances.

Ø CE mark

The R&TTE Directive requires that apparatus bears the CE mark as an attestation of compliance with the R&TTE Directive. The CE mark may, however, be required to show conformity with other directives, in which case its presence attests to compliance with all applicable directives.



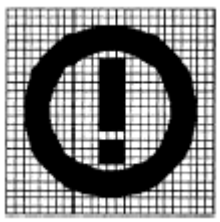
The CE marking must have a height of at least 5 mm except where this is not possible on account of the nature of the apparatus.

Ø Identification number of the notified body

The CE marking should include the identification number of the notified body involved in the conformity assessment procedure. Where more than one notified body is involved, all the identification numbers of all notified bodies involved should be indicated. The identification number must have the same height as the CE marking.

Ø Class identifier

The class identifier is the "information sign" or "alert sign". It forms part of the CE marking and is used to inform the user that restrictions on the use of the apparatus may apply in some countries or geographic areas. It must have the same height as the CE marking.

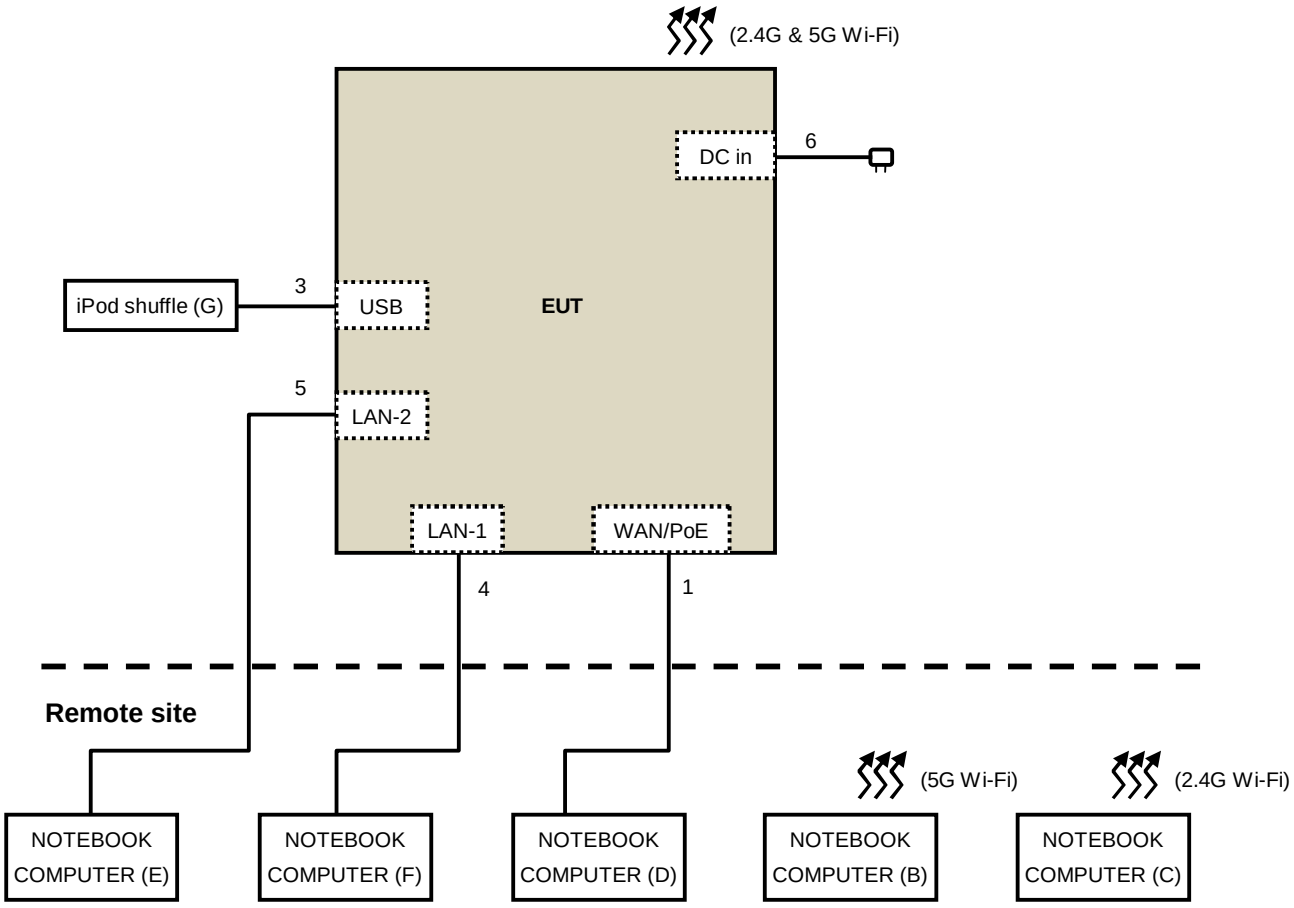


This marking should be accompanied by information for the user on the applicable restrictions on the use of the apparatus and where these restrictions apply.

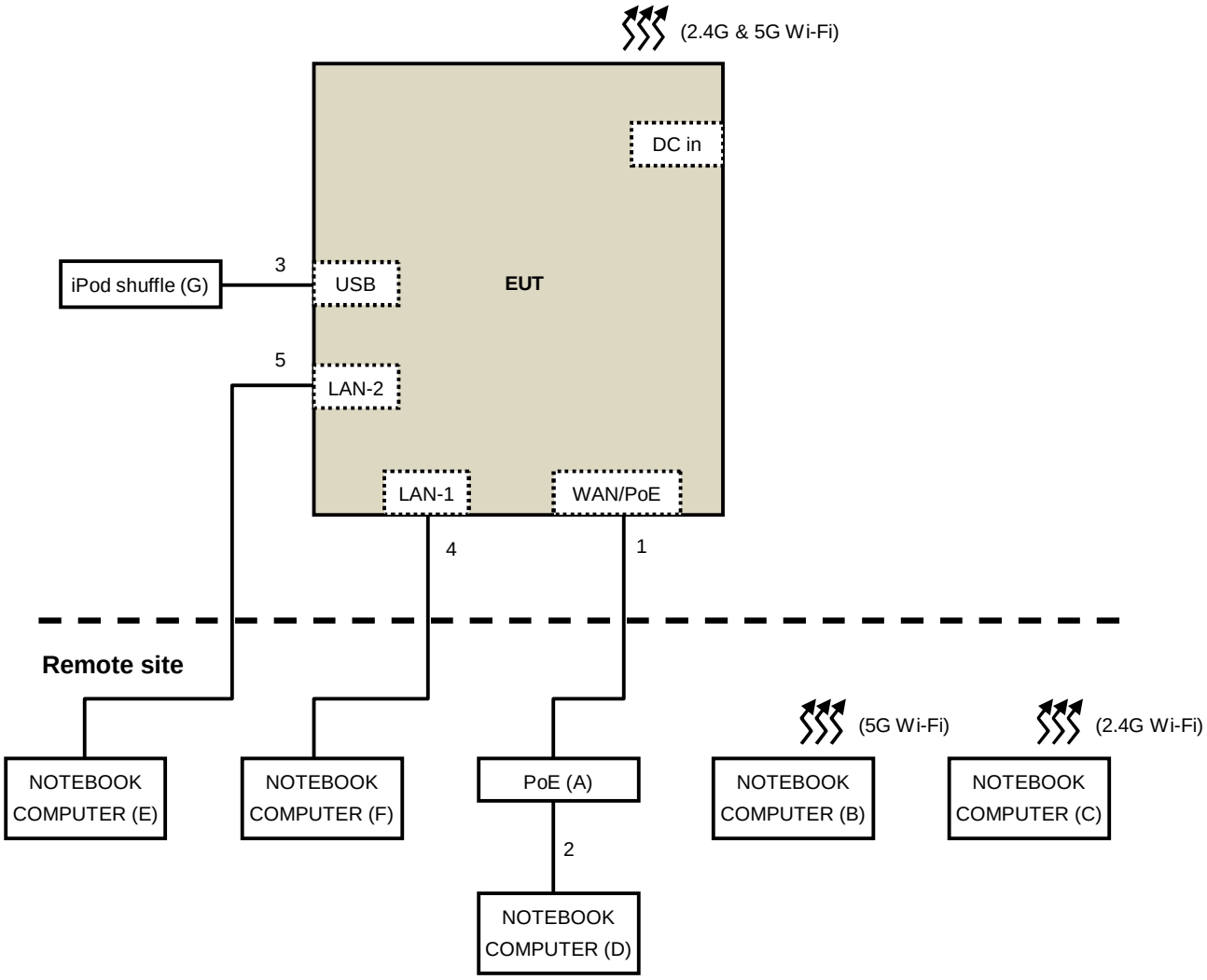
4 Configuration and Connections with EUT

4.1 Connection Diagram of EUT and Peripheral Devices

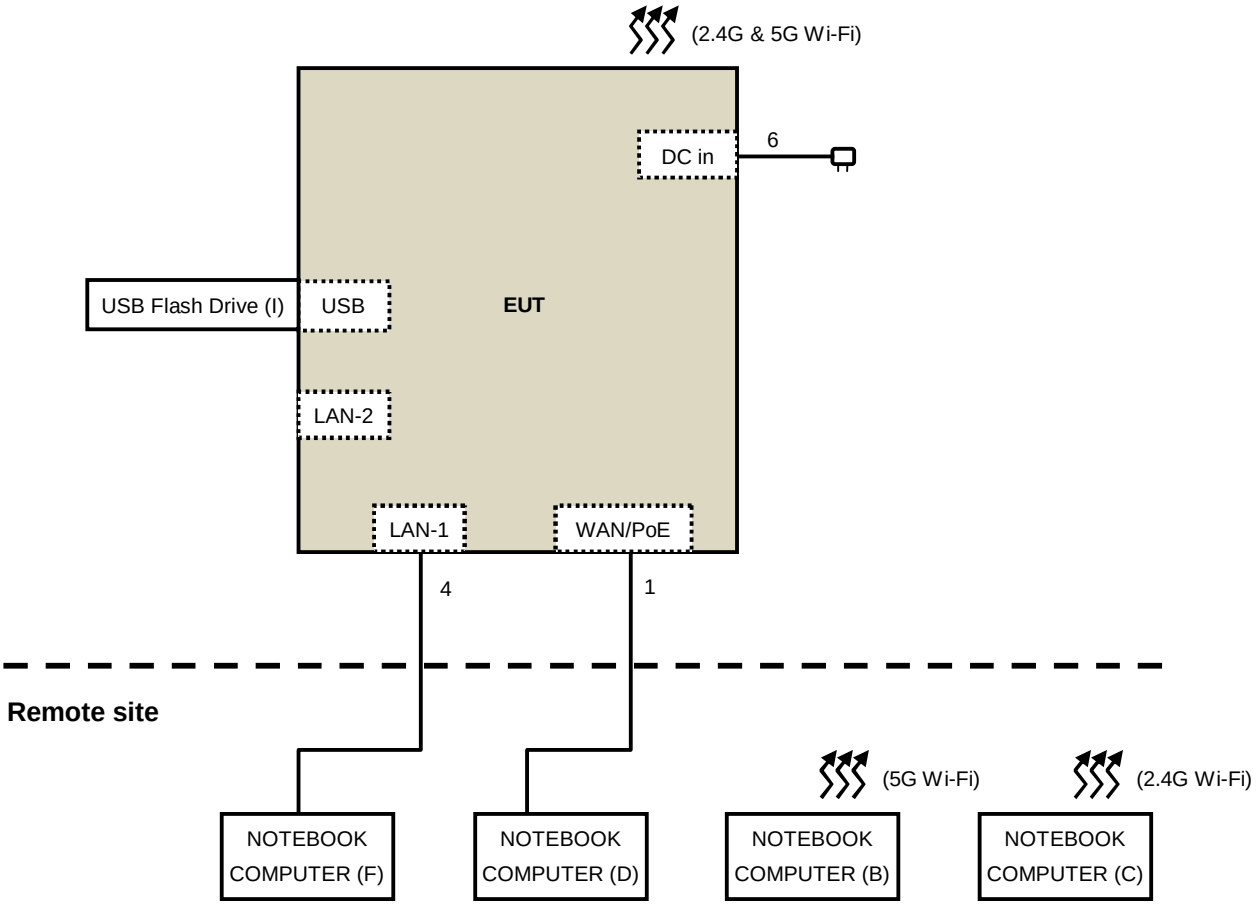
For Conducted emission / Conducted emission at telecom port / Radiated emission test:
※Adapter Mode:



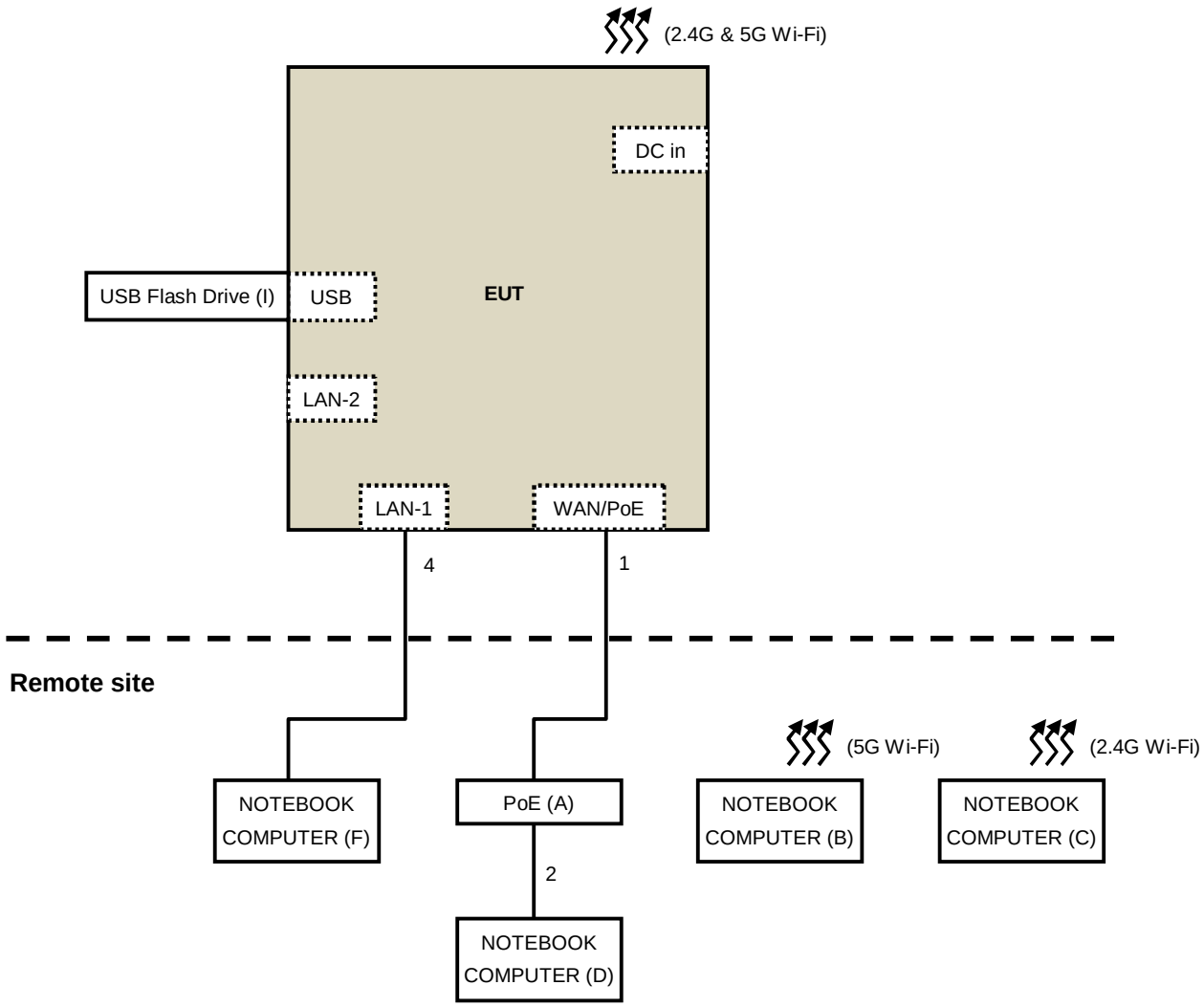
※PoE Mode:


(2.4G & 5G Wi-Fi)
DC in
iPod shuffle (G)
3
USB
EUT
5
LAN-2
LAN-1
WAN/PoE
4
1
Remote site
(5G Wi-Fi)
(2.4G Wi-Fi)
NOTEBOOK COMPUTER (E)
NOTEBOOK COMPUTER (F)
PoE (A)
NOTEBOOK COMPUTER (B)
NOTEBOOK COMPUTER (C)
2
NOTEBOOK COMPUTER (D)

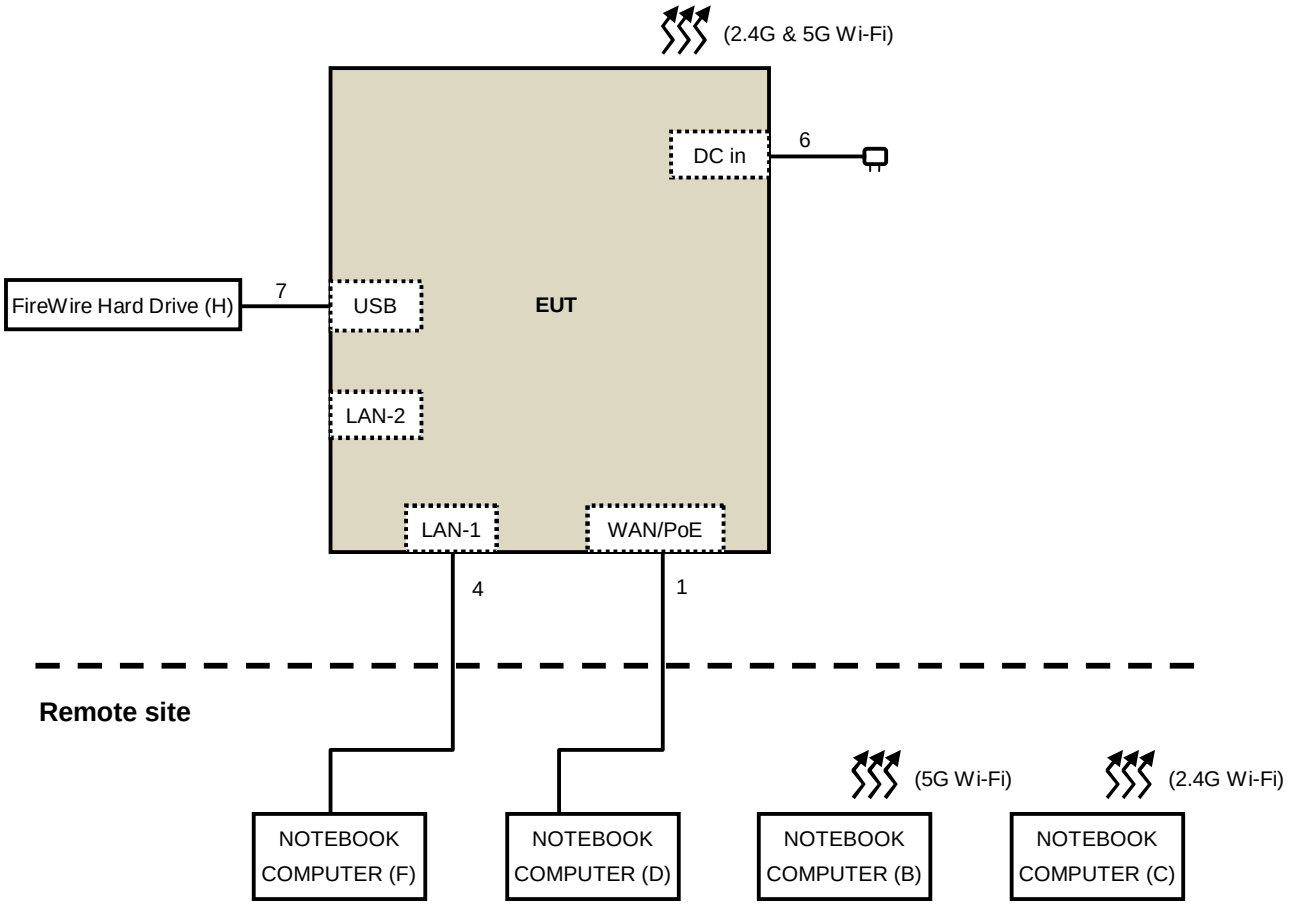
For Immunity test: (Except for PFMF)
※Adapter Mode:



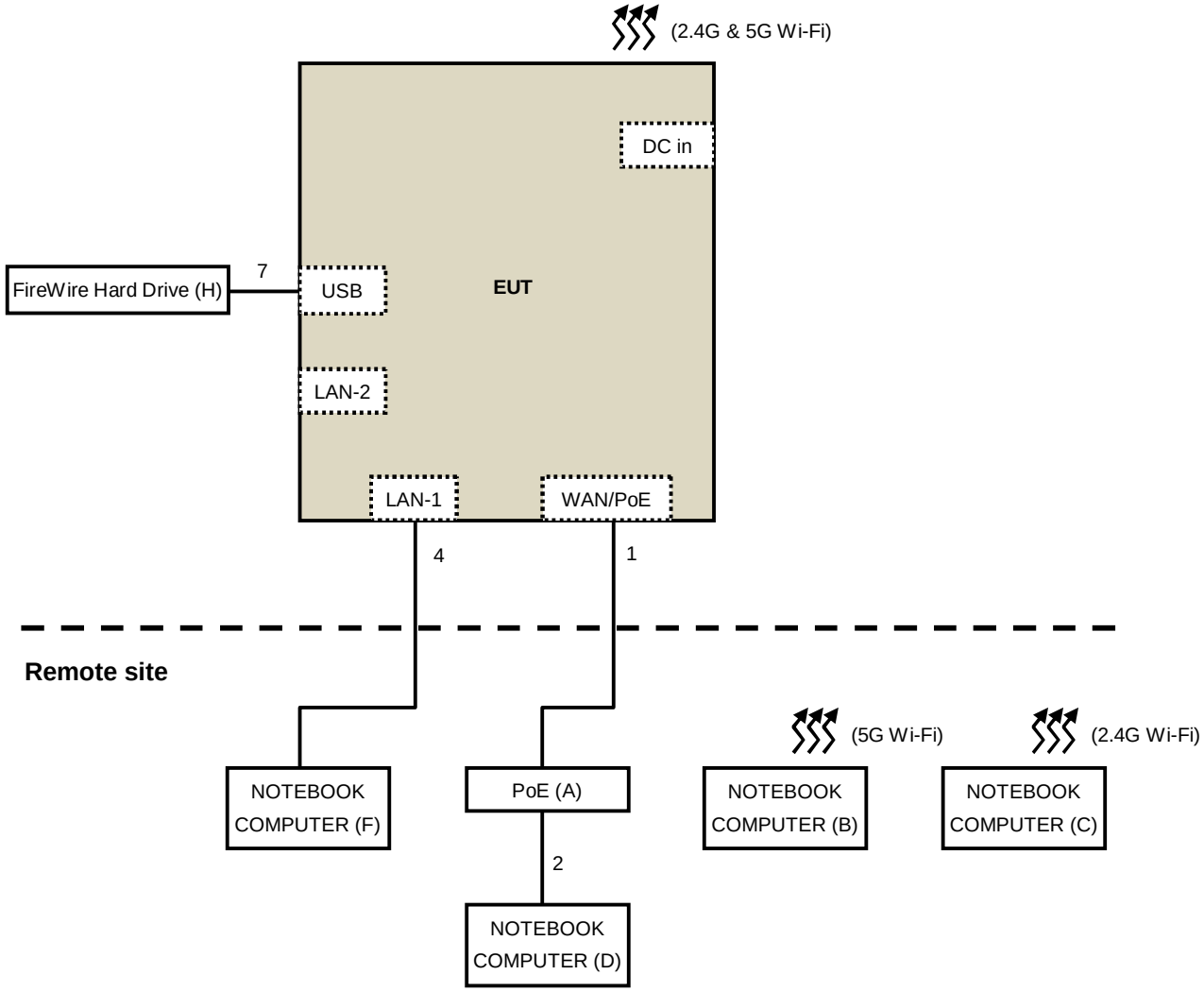
※PoE Mode:


(2.4G & 5G Wi-Fi)
DC in
USB Flash Drive (I)
USB
EUT
LAN-2
LAN-1
WAN/PoE
4
1
Remote site
(5G Wi-Fi)
(2.4G Wi-Fi)
NOTEBOOK COMPUTER (F)
PoE (A)
NOTEBOOK COMPUTER (B)
NOTEBOOK COMPUTER (C)
2
NOTEBOOK COMPUTER (D)

For Harmonics / Flicker / PFMF test:
※Adapter Mode:



※PoE Mode:


(2.4G & 5G Wi-Fi)
DC in
FireWire Hard Drive (H)
7
USB
EUT
LAN-2
LAN-1
WAN/PoE
4
1
Remote site
(5G Wi-Fi)
(2.4G Wi-Fi)
NOTEBOOK COMPUTER (F)
PoE (A)
NOTEBOOK COMPUTER (B)
NOTEBOOK COMPUTER (C)
2
NOTEBOOK COMPUTER (D)

4.2 Configuration of Peripheral Devices and Cable Connections

No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	PoE	Motorola	AP-PSBIAS-2 P2-AFR	NA	NA	Supplied by Client
B	NOTEBOOK COMPUTER	DELL	PP32LA	HSLB32S	FCC DoC	Provided by Lab
C	NOTEBOOK COMPUTER	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
D	NOTEBOOK COMPUTER	DELL	E5420	CHHYLQ1	FCC DoC	Provided by Lab
E	NOTEBOOK COMPUTER	DELL	E5430	4N1SKV1	FCC DoC	Provided by Lab
F	NOTEBOOK COMPUTER	DELL	PP27L	7YLB32S	FCC DoC	Provided by Lab
G	iPod shuffle	Apple	MD778TA/A	CC4JMH7LF4T1	FCC DoC	Provided by Lab
H	FireWire Hard Drive	TeraSys	F12-UF	A0100223-5Ab00 11	FCC DoC	Provided by Lab
I	USB Flash Drive	Transcend	TS4GJF300	A59064 0200	FCC DoC	Provided by Lab

NOTE:

1. All power cords of the above support units are non-shielded (1.8 m).

No.	Cable	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Number)	Remark
1	UTP	1	10	No	0	Provided by Lab
2	UTP	1	1	No	0	Provided by Lab
3	USB	1	0.1	Yes	0	Provided by Lab
4	UTP	1	10	No	0	Provided by Lab
5	UTP	1	10	No	0	Provided by Lab
6	DC	1	1.83	No	0	Supplied by Client
7	USB	1	1.8	Yes	0	Provided by Lab

5 Conducted Disturbance at Mains Ports

5.1 Limits

Frequency (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

Notes: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

5.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100375	Apr. 29, 2014	Apr. 28, 2015
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 12, 2013	Sep. 11, 2014
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100071	Nov. 13, 2013	Nov. 12, 2014
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 10, 2014	Mar. 09, 2015
50 ohms Terminator	N/A	EMC-03	Sep. 24, 2013	Sep. 23, 2014
50 ohms Terminator	N/A	EMC-02	Oct. 01, 2013	Sep. 30, 2014
Software ADT	BV ADT_Cond_V7.3.7.3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3 The VCCI Con C Registration No. is C-3611.
4 Tested Date: July 25, 2014

5.3 Test Arrangement

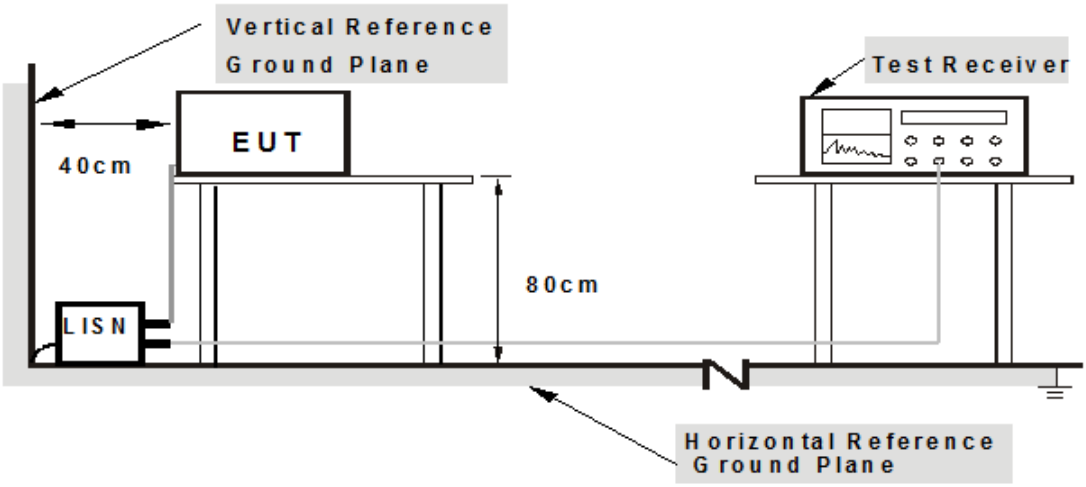
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The test results of conducted disturbance at mains ports are recorded of six worst margins for quasi-peak (mandatory) [and average (if necessary)] values against the limits at frequencies of interest unless the margin is 20 dB or greater.

Note:

The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

5.4 Supplementary Information

There is not any deviation from the test standards for the test method.

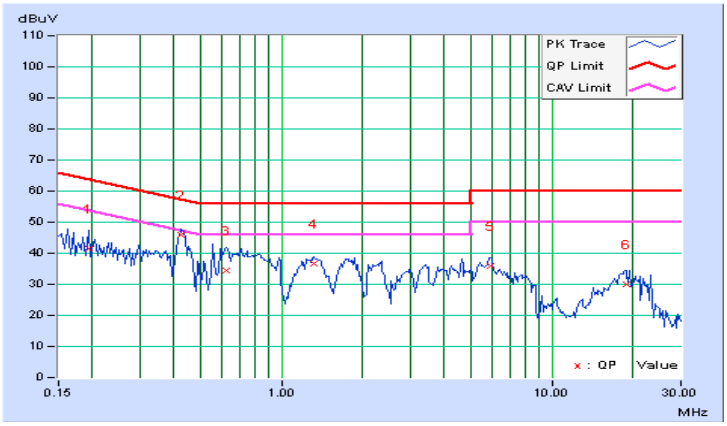
5.5 Test Results (Mode 1)

Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	230Vac, 50Hz	**Environmental Conditions**	30℃, 70%RH
Tested by	Mike Hsieh		
Test Mode	Mode 1		

Phase Of Power : Line (L)										
No	**Frequency (MHz)**	**Correction Factor (dB)**	**Reading Value (dBuV)**		**Emission Level (dBuV)**		**Limit (dBuV)**		**Margin (dB)**	
			Q.P.	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**
1	0.19297	0.07	41.40	33.14	41.47	33.21	63.91	53.91	-22.44	-20.70
2	**0.42734**	**0.09**	**45.85**	**41.27**	**45.94**	**41.36**	**57.30**	**47.30**	**-11.36**	**-5.94**
3	0.62656	0.11	34.50	27.71	34.61	27.82	56.00	46.00	-21.39	-18.18
4	1.32031	0.14	36.51	32.06	36.65	32.20	56.00	46.00	-19.35	-13.80
5	5.92578	0.32	35.61	31.82	35.93	32.14	60.00	50.00	-24.07	-17.86
6	18.76172	0.68	29.33	23.78	30.01	24.46	60.00	50.00	-29.99	-25.54

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

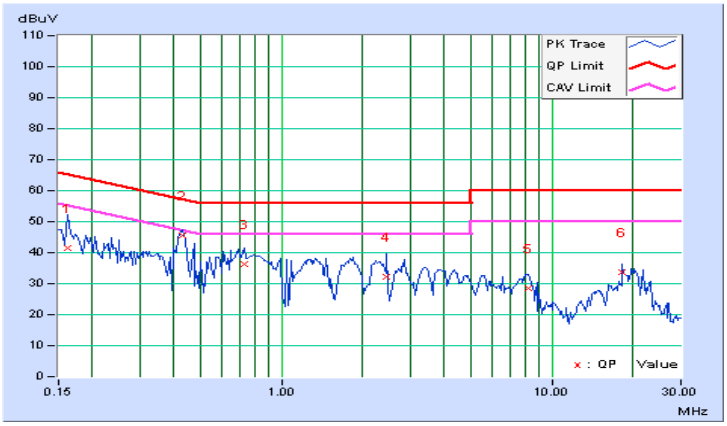


Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	230Vac, 50Hz	**Environmental Conditions**	30℃, 70%RH
Tested by	Mike Hsieh		
Test Mode	Mode 1		

Phase Of Power : Neutral (N)										
No	**Frequency (MHz)**	**Correction Factor (dB)**	**Reading Value (dBuV)**		**Emission Level (dBuV)**		**Limit (dBuV)**		**Margin (dB)**	
			Q.P.	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**
1	0.16172	0.07	41.35	27.70	41.42	27.77	65.38	55.38	-23.95	-27.60
2	0.43125	0.09	45.29	41.19	45.38	41.28	57.23	47.23	-11.85	-5.95
3	0.72813	0.11	36.15	31.24	36.26	31.35	56.00	46.00	-19.74	-14.65
4	2.45703	0.20	32.06	24.60	32.26	24.80	56.00	46.00	-23.74	-21.20
5	8.19531	0.39	28.10	21.28	28.49	21.67	60.00	50.00	-31.51	-28.33
6	18.24219	0.66	33.06	28.72	33.72	29.38	60.00	50.00	-26.28	-20.62

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



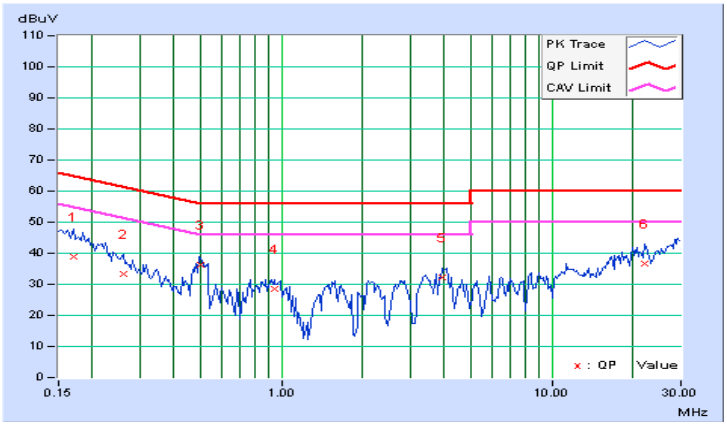
5.6 Test Results (Mode 2)

Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power (System)	230Vac, 50Hz	Environmental Conditions	30℃, 70%RH
Tested by	Mike Hsieh		
Test Mode	Mode 2		

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	0.07	38.95	32.52	39.02	32.59	64.98	54.98	-25.97	-22.40
2	0.25938	0.08	33.30	28.94	33.38	29.02	61.45	51.45	-28.08	-22.44
3	0.50166	0.10	36.24	35.28	36.34	35.38	56.00	46.00	-19.66	-10.62
4	0.93906	0.13	28.24	25.28	28.37	25.41	56.00	46.00	-27.63	-20.59
5	3.94922	0.26	31.91	24.71	32.17	24.97	56.00	46.00	-23.83	-21.03
6	22.05859	0.77	35.83	30.31	36.60	31.08	60.00	50.00	-23.40	-18.92

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

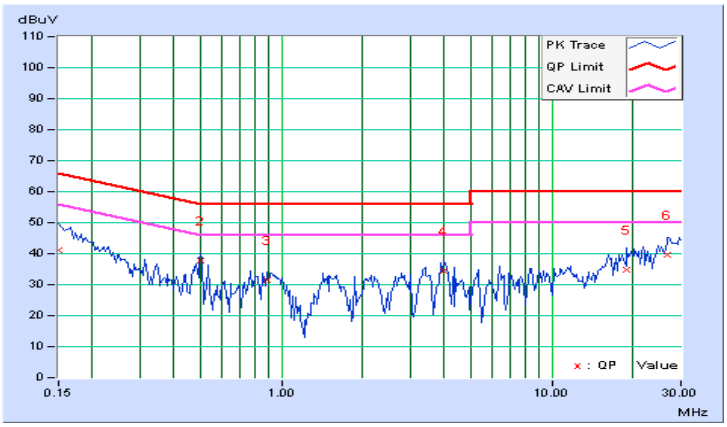


Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power (System)	230Vac, 50Hz	**Environmental Conditions**	30℃, 70%RH
Tested by	Mike Hsieh		
Test Mode	Mode 2		

Phase Of Power : Neutral (N)										
No	**Frequency (MHz)**	**Correction Factor (dB)**	**Reading Value (dBuV)**		**Emission Level (dBuV)**		**Limit (dBuV)**		**Margin (dB)**	
			Q.P.	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**
1	0.15000	0.08	41.05	21.24	41.13	21.32	66.00	56.00	-24.87	-34.68
2	0.50156	0.10	37.83	36.78	37.93	36.88	56.00	46.00	-18.07	-9.12
3	0.88438	0.12	31.48	26.83	31.60	26.95	56.00	46.00	-24.40	-19.05
4	3.96875	0.26	34.04	27.30	34.30	27.56	56.00	46.00	-21.70	-18.44
5	18.88281	0.67	34.19	27.60	34.86	28.27	60.00	50.00	-25.14	-21.73
6	26.62891	0.89	38.74	33.44	39.63	34.33	60.00	50.00	-20.37	-15.67

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



6 Conducted Disturbance at Telecommunication Ports

6.1 Limits

For Class A Equipment

Frequency (MHz)	Voltage Limit (dBuV)		Current limits (dBuA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15-0.5	97-87	84-74	53-43	40-30
0.5-30	87	74	43	30

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

For Class B Equipment

Frequency (MHz)	Voltage Limit (dBuV)		Current limits (dBuA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15-0.5	84-74	74-64	40-30	30-20
0.5-30	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.

6.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 05, 2013	Sep. 04, 2014
Line-Impedance Stabilization Network (for Peripheral) ROHDE & SCHWARZ	ENV216	100072	June 10, 2014	June 09, 2015
Pulse Limiter SCHWARZBECK	VTSD 9561F	9607	Mar. 06, 2014	Mar. 05, 2015
(FCC-TLISN-S8-RJ45) FCC ISN	FCC-TLISN-S8-RJ 45	20610	July 24, 2014	July 23, 2015
(FCC-TLISN-C1-BNC-50) FCC ISN	FCC-TLISN-C1-BN C-50	20609	June 27, 2014	June 26, 2015
RF Cable (JYEBAO)	5DFB	CONCAB-003	Mar. 07, 2014	Mar. 06, 2015
CURRENT PROBE CHASE	SMZ 11	18013	Aug. 27, 2013	Aug. 26, 2014
Capacitive Voltage Probe CHASE	CVP 2200	18312	Aug. 29, 2013	Aug. 28, 2014
(T800) TESEQ ISN	T800	34442	Aug. 28, 2013	Aug. 27, 2014
(ISN T8-Cat6) TESEQ ISN	ISN T8-Cat6	30972	Nov. 26, 2013	Nov. 25, 2014
(ISN ST08) TESEQ ISN	ISN ST08	34002	Nov. 28, 2013	Nov. 27, 2014
(FCC-TLISN-T2-02) FCC ISN	FCC-TLISN-T2-02	20171	Sep. 20, 2013	Sep. 19, 2014
(FCC-TLISN-T4-02) FCC ISN	FCC-TLISN-T4-02	20172	Sep. 20, 2013	Sep. 19, 2014
Software ADT	BV ADT_ISN_V7.3.7.3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C
3 The VCCI ISN C Registration No. is T-1744.
4. Tested Date: July 25 to 29, 2014

6.3 Test Arrangement

Method of Annex C.1.1, Using ISNs:

a. The EUT is placed 0.4 meters from the conducting wall of the shielded room and connected to ISN directly to reference ground plane.

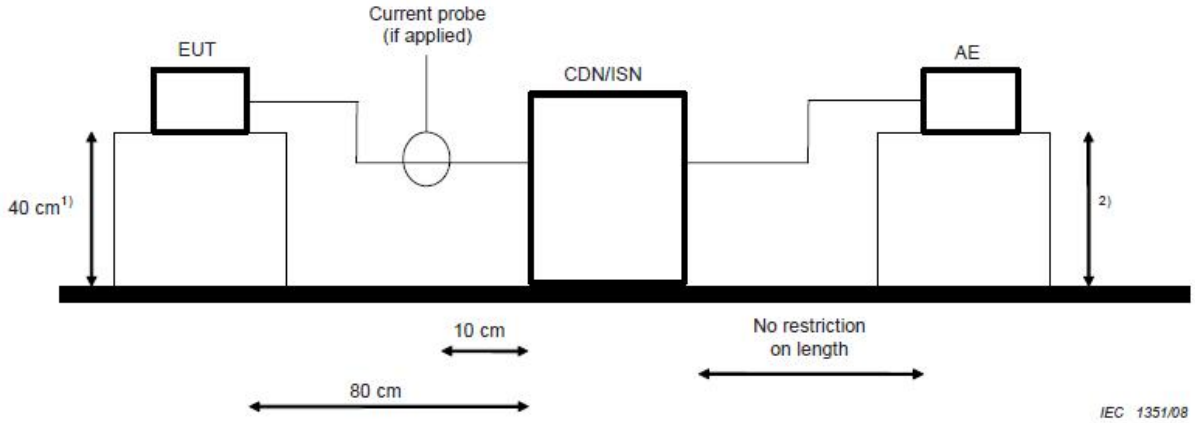
b. If voltage measurement is used, measure voltage at the measurement port of the ISN, correct the reading by adding the ISN voltage division factor, and compare to the voltage limit.

c. If current measurement is used, measure current with the current probe and compare to the current limit. A 50 Ω load has to be connected to the measurement port of the ISN during the current measurement.

d. It is not necessary to apply the voltage and the current limit if a ISN is used.

e. The test results of disturbance at telecommunication ports are recorded of six worst margins for quasi-peak (mandatory) [and average (if necessary)] values against the limits at frequencies of interest unless the margin is 20 dB or greater.

Note:
The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.



AE = Associated equipment
EUT = Equipment under test

1) Distance to the reference groundplane (vertical or horizontal).
2) Distance to the reference groundplane is not critical.

Method of Annex C.1.2 Using a 150 Ω load to the outside surface of the shield:

a. Break the insulation and connect a 150Ω resistor from the outside surface of the shield to ground.

b. Apply a clamp between 150Ω connection and associated equipment.

c. Current probe shall be placed at 0.1 m from the ISN.

d. Measure current with a current probe and compare to the current limit.

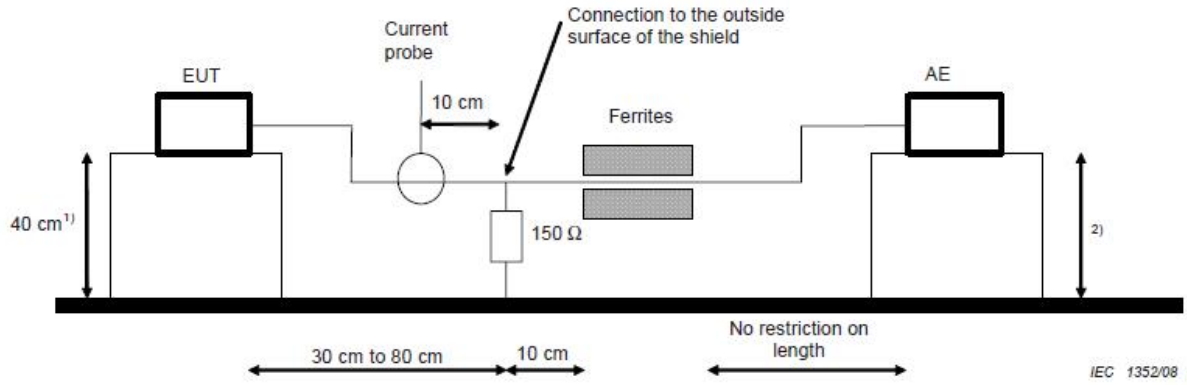
Voltage measurement is also possible either in parallel with the 150 Ω resistor with a high impedance probe. (only for a high impedance probe applied, replaced d. if this is the case)

Voltage measurement by using a "50 Ω to 150 Ω adaptor" described in IEC 61000-4-6 as 150 Ω load, and applying the appropriate correction factor (9,6 dB in case of the "50 Ω to 150 Ω adaptor"). (only for 50 Ω to 150 Ω adaptor applied, replaced d. if this is the case.)

e. The test results of disturbance at telecommunication ports are recorded of six worst margins for quasi-peak (mandatory) [and average (if necessary)] values against the limits at frequencies of interest unless the margin is 20 dB or greater.

Note:
The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP)

and average detection (AV) at frequency 0.15MHz-30MHz.



AE = Associated equipment
EUT = Equipment under test

1) Distance to the reference groundplane (vertical or horizontal).
2) Distance to the reference groundplane is not critical.

Method of Annex C.1.3: Using a combination of current probe and capacitive voltage probe:

a. Measure current with a current probe.

b. Compare the measured current with the applicable current limit.

c. Measure voltage with a capacitive probe as specified in 5.2.2 of CISPR 16-1-2.

d. Adjust the measured voltage as follows:

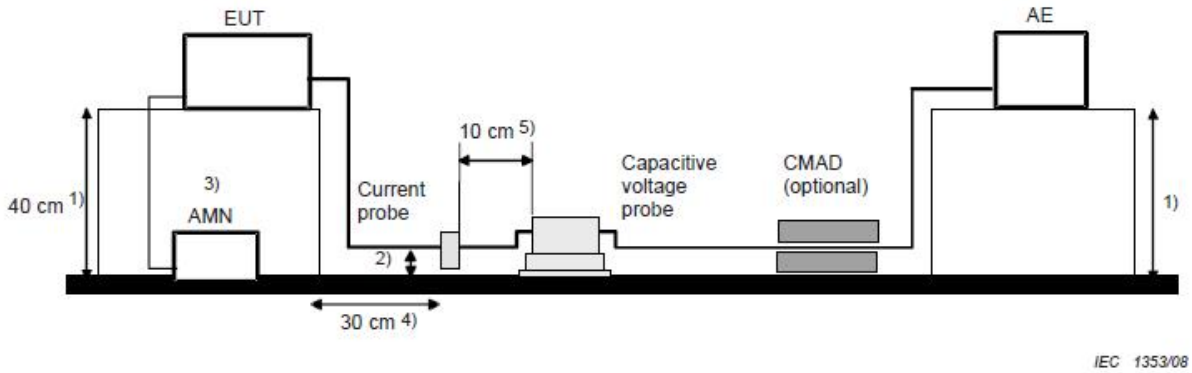
- current margin ≤ 6 dB – subtract the actual current margin from measured voltage;
- current margin > 6 dB – subtract 6 dB from measured voltage.

e. Compare adjusted voltage with the applicable voltage limit

f. Both the measured current and the adjusted voltage shall be below the applicable

g. The test results of disturbance at telecommunication ports are recorded of six worst margins for quasi-peak (mandatory) [and average (if necessary)] values against the limits at frequencies of interest unless the margin is 20 dB or greater.

Note:
The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.



AE = Associated equipment
EUT = Equipment under test
CMAD = Common mode Absorbing Device

6.4 Supplementary Information

There is not any deviation from the test standards for the test method.

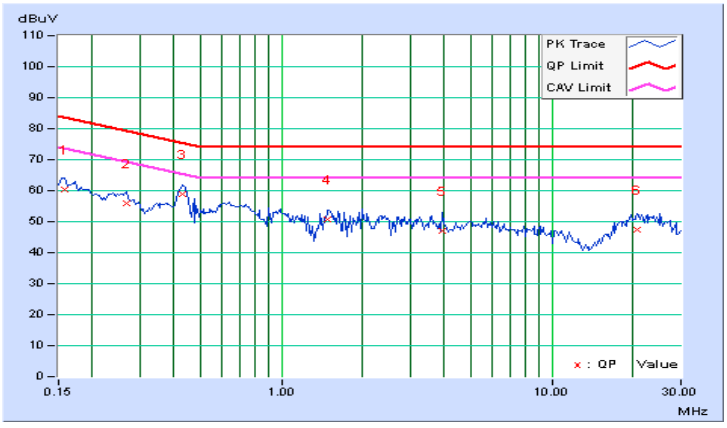
6.5 Test Results (Mode 1)

Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	230Vac, 50Hz	**Environmental Conditions**	30℃, 70%RH
Tested by	Mike Hsieh		
Test Mode	Mode 1_WAN/PoE port: 1000Mbps		

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	10.25	50.12	42.31	60.37	52.56	83.58	73.58	-23.21	-21.02
2	0.26719	10.01	46.03	40.35	56.04	50.36	79.20	69.20	-23.17	-18.85
3	0.43125	9.89	49.04	44.21	58.93	54.10	75.23	65.23	-16.30	-11.13
4	1.48438	9.76	41.11	34.98	50.87	44.74	74.00	64.00	-23.13	-19.26
5	3.94531	9.72	37.50	31.88	47.22	41.60	74.00	64.00	-26.78	-22.40
6	20.75391	9.97	37.59	32.44	47.56	42.41	74.00	64.00	-26.44	-21.59

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



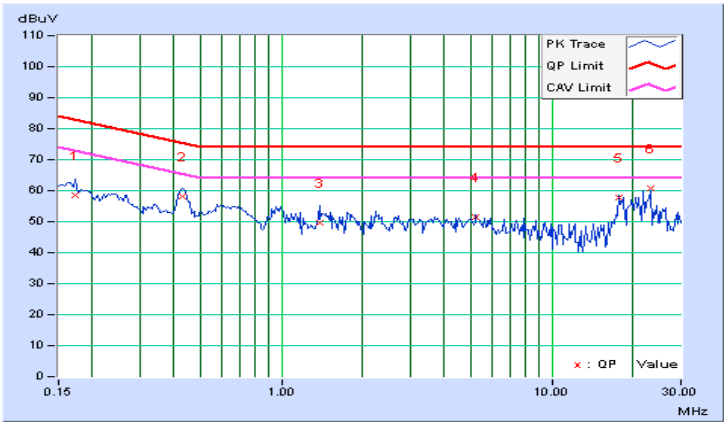
6.6 Test Results (Mode 2)

Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	230Vac, 50Hz	**Environmental Conditions**	30℃, 70%RH
Tested by	Mike Hsieh		
Test Mode	Mode 2_WAN/PoE port: 100Mbps		

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17344	10.20	48.20	39.10	58.40	49.30	82.79	72.79	-24.39	-23.49
2	0.43125	9.89	48.42	43.60	58.31	53.49	75.23	65.23	-16.92	-11.74
3	1.38281	9.76	39.75	33.21	49.51	42.97	74.00	64.00	-24.49	-21.03
4	5.23828	9.72	41.58	37.51	51.30	47.23	74.00	64.00	-22.70	-16.77
5	17.69531	9.88	47.82	44.23	57.70	54.11	74.00	64.00	-16.30	-9.89
6	23.12891	10.04	50.69	47.51	60.73	57.55	74.00	64.00	-13.27	-6.45

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



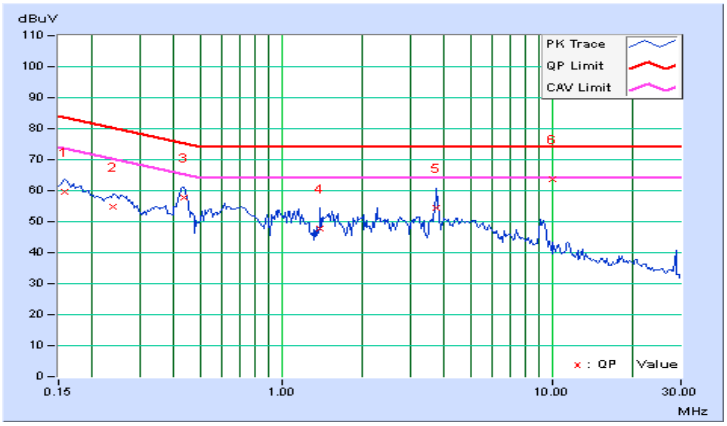
6.7 Test Results (Mode 3)

Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	230Vac, 50Hz	**Environmental Conditions**	30℃, 70%RH
Tested by	Mike Hsieh		
Test Mode	Mode 3_WAN/PoE port: 10Mbps		

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	10.25	49.32	40.68	59.57	50.93	83.58	73.58	-24.01	-22.65
2	0.23984	10.04	44.63	38.16	54.67	48.20	80.10	70.10	-25.43	-21.90
3	0.43516	9.89	47.84	43.12	57.73	53.01	75.15	65.15	-17.42	-12.14
4	1.39453	9.76	38.13	32.18	47.89	41.94	74.00	64.00	-26.11	-22.06
5	3.75000	9.72	44.76	37.50	54.48	47.22	74.00	64.00	-19.52	-16.78
6	10.00000	9.76	53.97	45.25	63.73	55.01	74.00	64.00	-10.27	-8.99

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



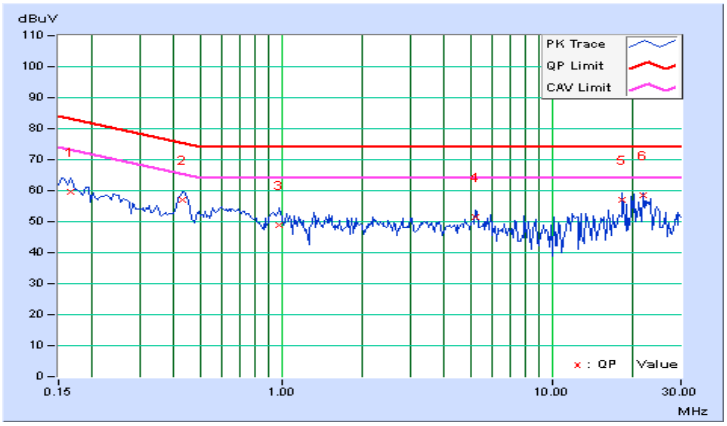
6.8 Test Results (Mode 4)

Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	230Vac, 50Hz	**Environmental Conditions**	30℃, 70%RH
Tested by	Mike Hsieh		
Test Mode	Mode 4_LAN port: 100Mbps		

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16562	10.23	49.36	40.98	59.59	51.21	83.18	73.18	-23.59	-21.97
2	0.43125	9.89	47.18	42.74	57.07	52.63	75.23	65.23	-18.16	-12.60
3	0.98594	9.78	39.26	32.01	49.04	41.79	74.00	64.00	-24.96	-22.21
4	5.23438	9.72	41.58	37.53	51.30	47.25	74.00	64.00	-22.70	-16.75
5	18.24219	9.90	47.32	44.00	57.22	53.90	74.00	64.00	-16.78	-10.10
6	21.66406	9.99	48.56	45.68	58.55	55.67	74.00	64.00	-15.45	-8.33

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



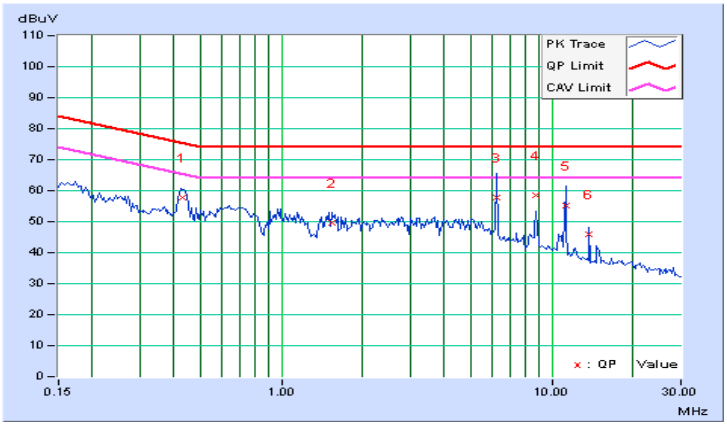
6.9 Test Results (Mode 5)

Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	230Vac, 50Hz	**Environmental Conditions**	30℃, 70%RH
Tested by	Mike Hsieh		
Test Mode	Mode 5_LAN port: 10Mbps		

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.43094	9.89	47.84	43.30	57.73	53.19	75.23	65.23	-17.50	-12.04
2	1.53516	9.75	39.85	33.78	49.60	43.53	74.00	64.00	-24.40	-20.47
3	6.25000	9.73	47.90	40.09	57.63	49.82	74.00	64.00	-16.37	-14.18
4	8.74956	9.75	48.87	40.62	58.62	50.37	74.00	64.00	-15.38	-13.63
5	11.25000	9.77	45.37	36.95	55.14	46.72	74.00	64.00	-18.86	-17.28
6	13.75000	9.81	35.98	26.88	45.79	36.69	74.00	64.00	-28.21	-27.31

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



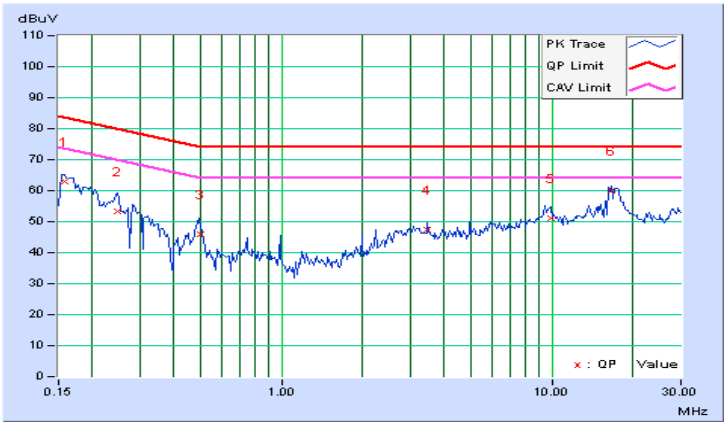
6.10 Test Results (Mode 6)

Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power (System)	230Vac, 50Hz	**Environmental Conditions**	30℃, 70%RH
Tested by	Mike Hsieh		
Test Mode	Mode 6_WAN/PoE port: 1000Mbps		

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	10.25	52.55	52.08	62.80	62.33	83.58	73.58	-20.78	-11.25
2	0.24766	10.03	43.48	38.24	53.51	48.27	79.84	69.84	-26.33	-21.57
3	0.50100	9.86	36.17	33.36	46.03	43.22	74.00	64.00	-27.97	-20.78
4	3.46875	9.72	37.58	34.56	47.30	44.28	74.00	64.00	-26.70	-19.72
5	9.90625	9.76	41.34	36.38	51.10	46.14	74.00	64.00	-22.90	-17.86
6	16.60156	9.86	50.28	47.51	60.14	57.37	74.00	64.00	-13.86	-6.63

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



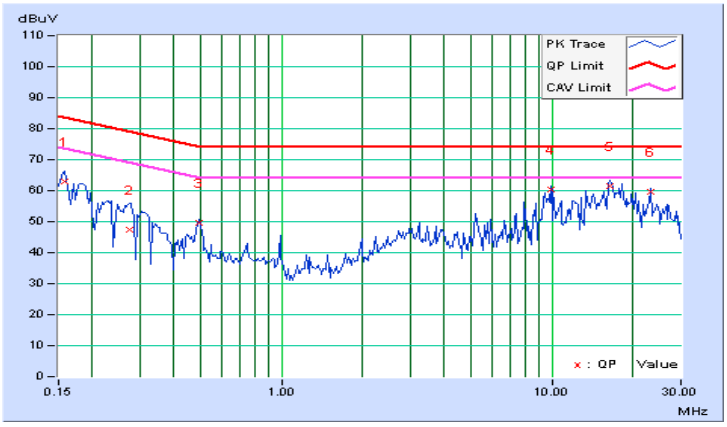
6.11 Test Results (Mode 7)

Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power (System)	230Vac, 50Hz	Environmental Conditions	30℃, 70%RH
Tested by	Mike Hsieh		
Test Mode	Mode 7_WAN/PoE port: 100Mbps		

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	10.25	52.75	52.57	63.00	62.82	83.58	73.58	-20.58	-10.76
2	0.27500	10.00	37.29	33.67	47.29	43.67	78.97	68.97	-31.68	-25.30
3	0.49766	9.87	39.58	37.09	49.45	46.96	74.04	64.04	-24.59	-17.08
4	9.93750	9.76	50.72	49.39	60.48	59.15	74.00	64.00	-13.52	-4.85
5	16.35156	9.85	51.52	49.88	61.37	59.73	74.00	64.00	-12.63	-4.27
6	23.12891	10.04	49.52	46.53	59.56	56.57	74.00	64.00	-14.44	-7.43

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



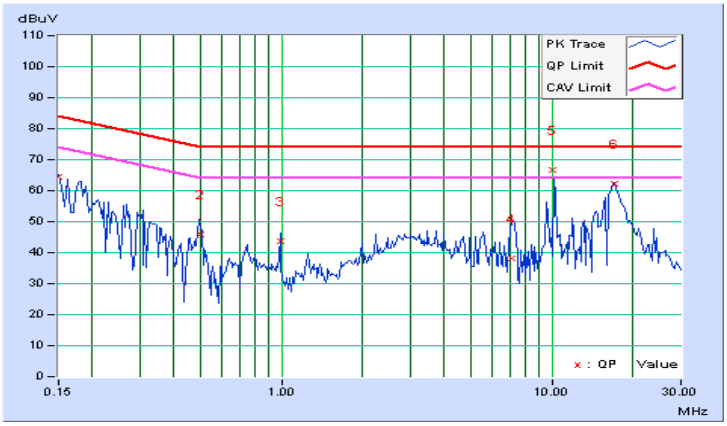
6.12 Test Results (Mode 8)

Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power (System)	230Vac, 50Hz	**Environmental Conditions**	30℃, 70%RH
Tested by	Mike Hsieh		
Test Mode	Mode 8_WAN/PoE port: 10Mbps		

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.28	54.33	53.34	64.61	63.62	84.00	74.00	-19.39	-10.38
2	0.50516	9.86	36.08	35.68	45.94	45.54	74.00	64.00	-28.06	-18.46
3	0.98984	9.78	33.81	33.18	43.59	42.96	74.00	64.00	-30.41	-21.04
4	7.12109	9.74	28.39	15.24	38.13	24.98	74.00	64.00	-35.87	-39.02
5	10.00000	9.76	56.95	50.58	66.71	60.34	74.00	64.00	-7.29	-3.66
6	17.09766	9.86	52.21	50.66	62.07	60.52	74.00	64.00	-11.93	-3.48

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



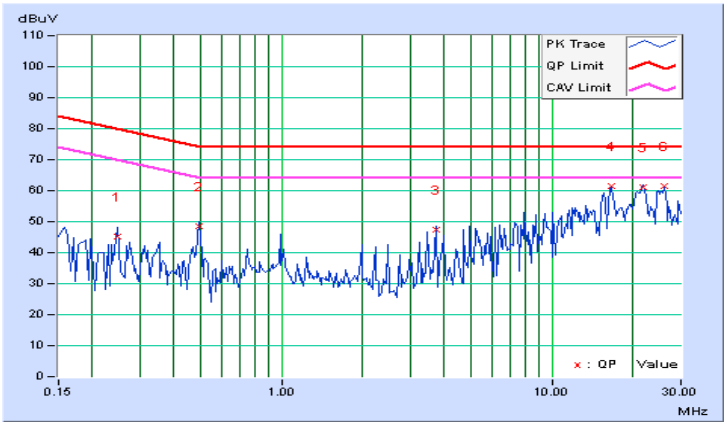
6.13 Test Results (Mode 9)

Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power (System)	230Vac, 50Hz	**Environmental Conditions**	30℃, 70%RH
Tested by	Mike Hsieh		
Test Mode	Mode 9_LAN port: 100Mbps		

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.24766	10.03	35.05	32.65	45.08	42.68	79.84	69.84	-34.76	-27.16
2	0.49375	9.87	38.47	36.97	48.34	46.84	74.10	64.10	-25.77	-17.27
3	3.71875	9.72	37.84	37.24	47.56	46.96	74.00	64.00	-26.44	-17.04
4	16.60156	9.86	51.49	50.89	61.35	60.75	74.00	64.00	-12.65	-3.25
5	21.80469	10.00	51.24	50.61	61.24	60.61	74.00	64.00	-12.76	-3.39
6	26.01563	10.14	51.31	50.54	61.45	60.68	74.00	64.00	-12.55	-3.32

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



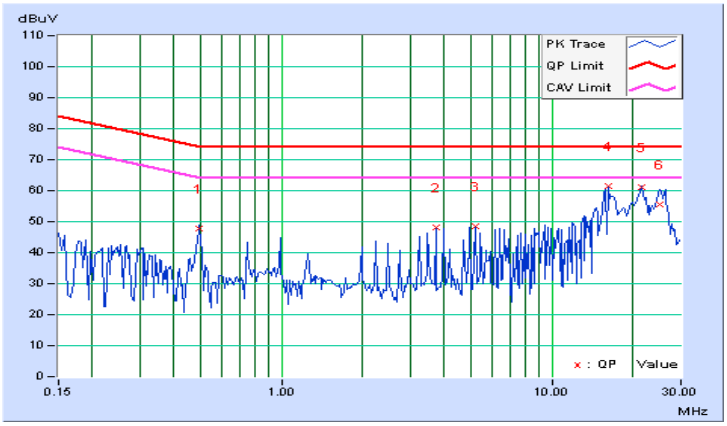
6.14 Test Results (Mode 10)

Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power (System)	230Vac, 50Hz	**Environmental Conditions**	30℃, 70%RH
Tested by	Mike Hsieh		
Test Mode	Mode 10_LAN port: 10Mbps		

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.49766	9.87	37.89	36.90	47.76	46.77	74.04	64.04	-26.28	-17.27
2	3.71484	9.72	38.59	37.92	48.31	47.64	74.00	64.00	-25.69	-16.36
3	5.20313	9.72	38.86	38.13	48.58	47.85	74.00	64.00	-25.42	-16.15
4	16.10547	9.85	51.66	50.86	61.51	60.71	74.00	64.00	-12.49	-3.29
5	**21.55469**	**9.99**	**51.12**	**51.00**	**61.11**	**60.99**	**74.00**	**64.00**	**-12.89**	**-3.01**
6	25.02344	10.10	45.61	45.28	55.71	55.38	74.00	64.00	-18.29	-8.62

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



7 Radiated Disturbance up to 1 GHz

7.1 Limits

Frequency (MHz)	Class A (at 10m)	Class B (at 10m)
	dBuV/m	dBuV/m
30 - 230	40	30
230 - 1000	47	37

Notes: 1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

7.2 Test Instruments

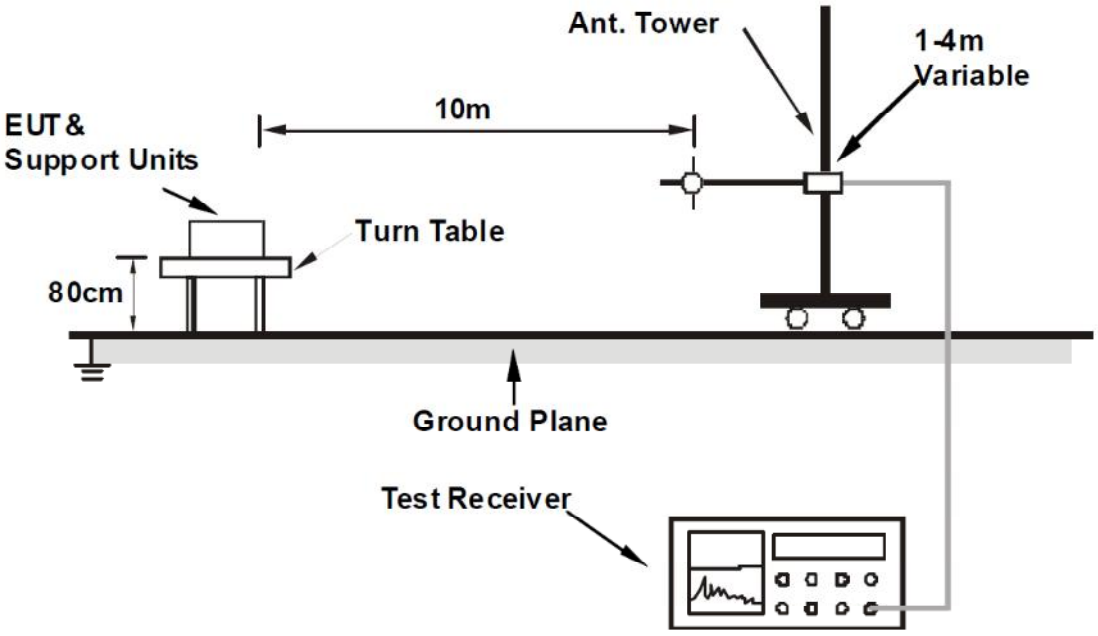
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E9038A	MY50010125	Apr. 17, 2014	Apr. 16, 2015
	N9038A	MY51210202	Dec. 11, 2013	Dec. 10, 2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Nov. 13, 2013	Nov. 12, 2014
	ZFL-1000VH2B	AMP-ZFL-02	Nov. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-359	Feb. 24, 2014	Feb. 23, 2015
	VULB 9168	9168-358	Feb. 25, 2014	Feb. 24, 2015
RF Cable	8DFB	CHFCAB-001 CHFCAB-002 CHFCAB-003	Oct. 04, 2013	Oct. 03, 2014
Pre-Amplifier Agilent	8449B	3008A01975	Mar. 01, 2014	Feb. 28, 2015
Horn Antenna SCHWARZBECK	BBHA 9120	9120D-783	Sep. 26, 2013	Sep. 25, 2014
RF Cable	NA	RF104-110 RF104-206 RF104-209	Dec. 12, 2013	Dec.11, 2014
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 08, 2013	Oct. 07, 2014
Software	ADT_Radiated_V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 10m Chamber No. F.
3 The FCC Site Registration No. is 928149.
4. The VCCI Site Registration No. is R-3252 & G-136.
5 The CANADA Site Registration No. is IC 7450H-1.
6 Tested Date: July 24, 2014

7.3 Test Arrangement

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited test facility. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

Note: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for quasi-peak detection (QP) at frequency below 1GHz.



For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

7.4 Supplementary Information

There is not any deviation from the test standards for the test method.

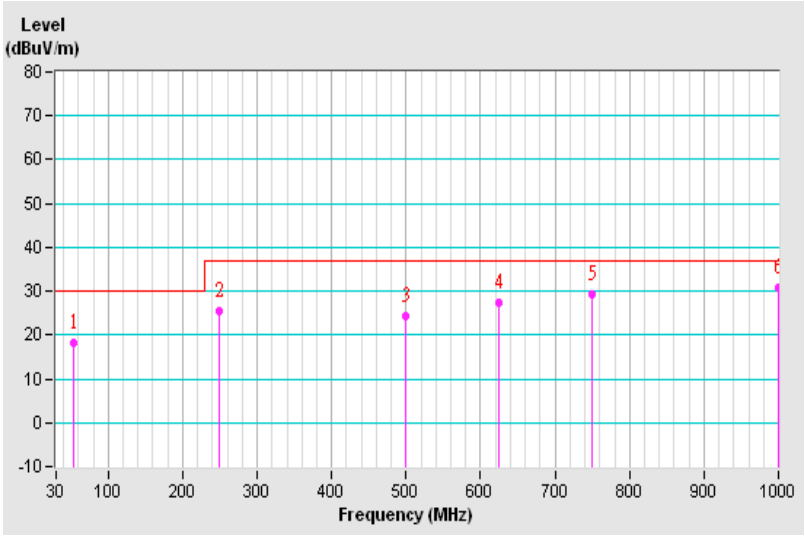
7.5 Test Results (Mode 1)

Frequency Range	30MHz ~ 1GHz	Detector Function & Bandwidth	Quasi-Peak (QP), 120kHz
Tested by	Jyunchun Lin	Environmental Conditions	25℃, 66%RH
Test Mode	Mode 1		

Antenna Polarity & Test Distance : Horizontal at 10 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	52.60	18.36 QP	30.00	-11.64	4.00 H	89	30.74	-12.38
2	250.00	25.61 QP	37.00	-11.39	4.00 H	86	38.83	-13.22
3	500.01	24.38 QP	37.00	-12.62	1.00 H	14	30.18	-5.80
4	625.00	27.46 QP	37.00	-9.54	1.00 H	84	30.07	-2.61
5	749.98	29.14 QP	37.00	-7.86	1.00 H	14	29.19	-0.05
6	1000.00	30.95 QP	37.00	-6.05	1.00 H	129	27.07	3.88

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value

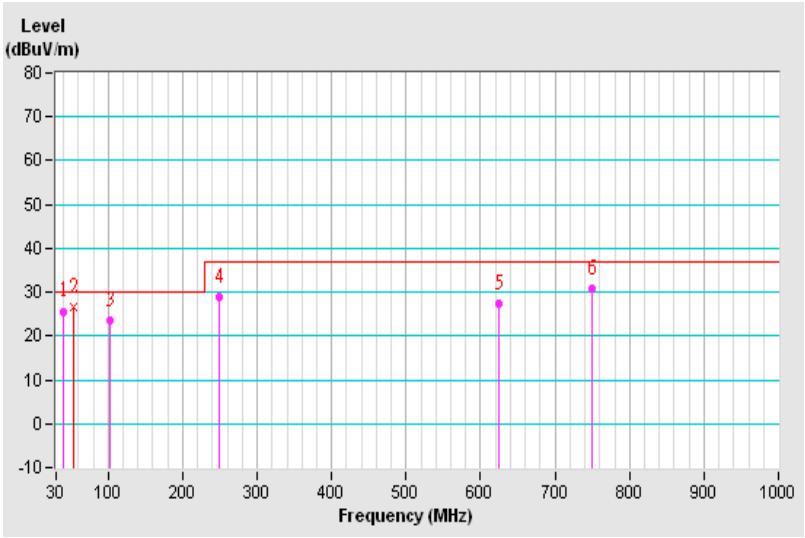


Frequency Range	30MHz ~ 1GHz	Detector Function & Bandwidth	Quasi-Peak (QP), 120kHz
Tested by	Jyunchun Lin	Environmental Conditions	25℃, 66%RH
Test Mode	Mode 1		

Antenna Polarity & Test Distance : Vertical at 10 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	40.52	25.64 QP	30.00	-4.36	1.00 V	97	38.58	-12.94
2	**52.80**	**26.45 QP**	**30.00**	**-3.55**	**2.00 V**	**348**	**39.16**	**-12.71**
3	101.93	23.62 QP	30.00	-6.38	2.00 V	111	40.05	-16.43
4	250.00	28.73 QP	37.00	-8.27	1.00 V	186	41.82	-13.09
5	625.00	27.23 QP	37.00	-9.77	3.00 V	284	30.35	-3.12
6	749.98	30.77 QP	37.00	-6.23	2.00 V	323	31.34	-0.57

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value



8 Radiated Disturbance above 1 GHz

8.1 Limits

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

Notes: 1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

Frequency Range of Radiated Measurement (For unintentional radiators)

Highest frequency generated or used in the EUT or on which the EUT operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 108	1000
108-500	2000
500-1000	5000
Above 1000	Up to 5 times of the highest frequency or 6 GHz, whichever is less

8.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E9038A	MY50010125	Apr. 17, 2014	Apr. 16, 2015
	N9038A	MY51210202	Dec. 11, 2013	Dec. 10, 2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Nov. 13, 2013	Nov. 12, 2014
	ZFL-1000VH2B	AMP-ZFL-02	Nov. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-359	Feb. 24, 2014	Feb. 23, 2015
	VULB 9168	9168-358	Feb. 25, 2014	Feb. 24, 2015
RF Cable	8DFB	CHFCAB-001 CHFCAB-002 CHFCAB-003	Oct. 04, 2013	Oct. 03, 2014
Pre-Amplifier Agilent	8449B	3008A01975	Mar. 01, 2014	Feb. 28, 2015
Horn Antenna SCHWARZBECK	BBHA 9120	9120D-783	Sep. 26, 2013	Sep. 25, 2014
RF Cable	NA	RF104-110 RF104-206 RF104-209	Dec. 12, 2013	Dec.11, 2014
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 08, 2013	Oct. 07, 2014
Software	ADT_Radiated_V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

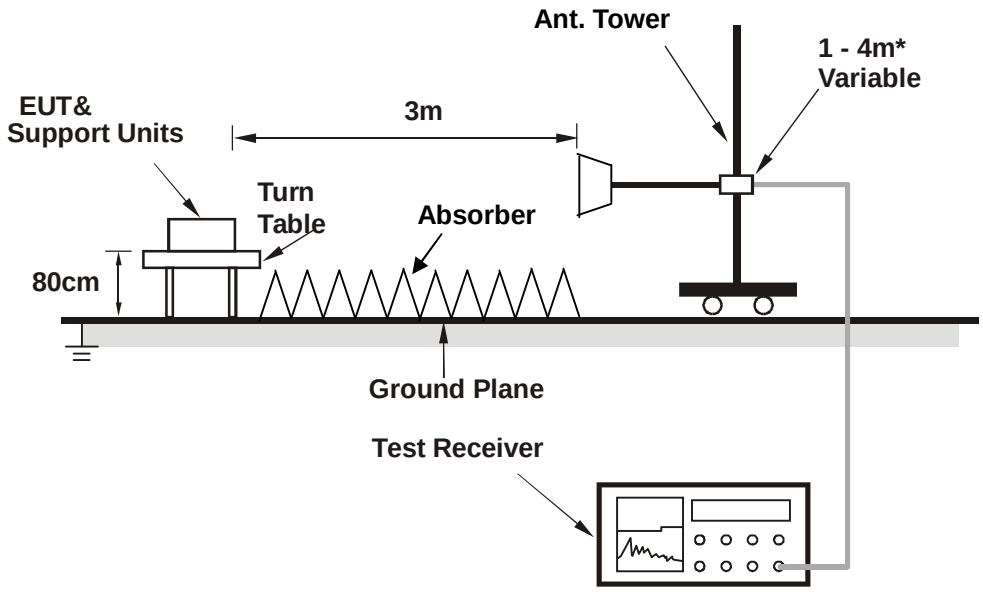
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 10m Chamber No. F.
3 The FCC Site Registration No. is 928149.
4. The VCCI Site Registration No. is R-3252 & G-136.
5 The CANADA Site Registration No. is IC 7450H-1.
6 The 3dB beamwidth of the horn antenna is minimum 30 degree (or w = 1.6m at 3m distance) for 1~6 GHz.
7 Tested Date: July 24, 2014

8.3 Test Arrangement

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The height of antenna can be varied from one meter to four meters, the height of adjustment depends on the EUT height and the antenna 3dB beamwidth both, to detect the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The spectrum analyzer system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

Note:

1. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection (PK) at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.



* : depends on the EUT height and the antenna 3dB beamwidth both.
For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

8.4 Supplementary Information

There is not any deviation from the test standards for the test method.

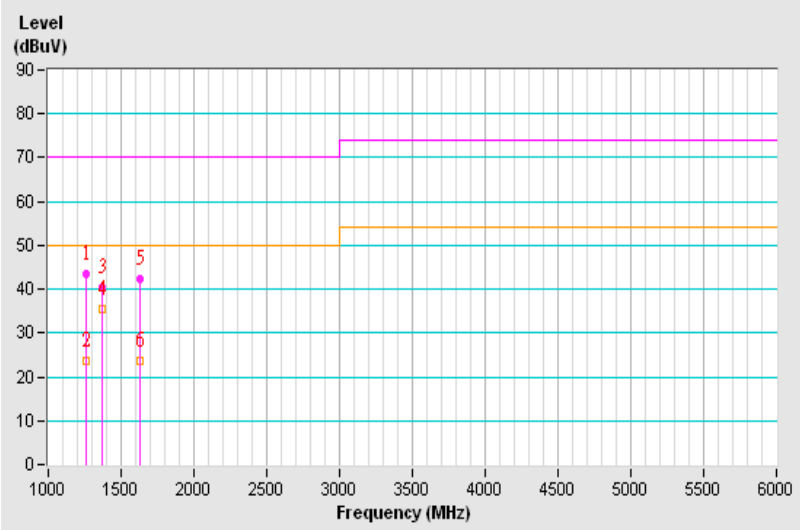
8.5 Test Results (Mode 1)

Frequency Range	1GHz ~ 6GHz	Detector Function & Bandwidth	Peak (PK) / Average (AV), 1MHz
Tested by	Jyunchun Lin	Environmental Conditions	26℃, 63%RH
Test Mode	Mode 1		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1261.80	43.48 PK	70.00	-26.52	1.00 H	260	49.17	-5.69
2	1261.80	23.56 AV	50.00	-26.44	1.00 H	260	29.25	-5.69
3	1374.85	40.45 PK	70.00	-29.55	1.00 H	209	45.52	-5.07
4	**1374.85**	**35.28 AV**	**50.00**	**-14.72**	**1.00 H**	**209**	**40.35**	**-5.07**
5	1630.70	42.37 PK	70.00	-27.63	1.00 H	36	46.21	-3.84
6	1630.70	23.55 AV	50.00	-26.45	1.00 H	36	27.39	-3.84

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value

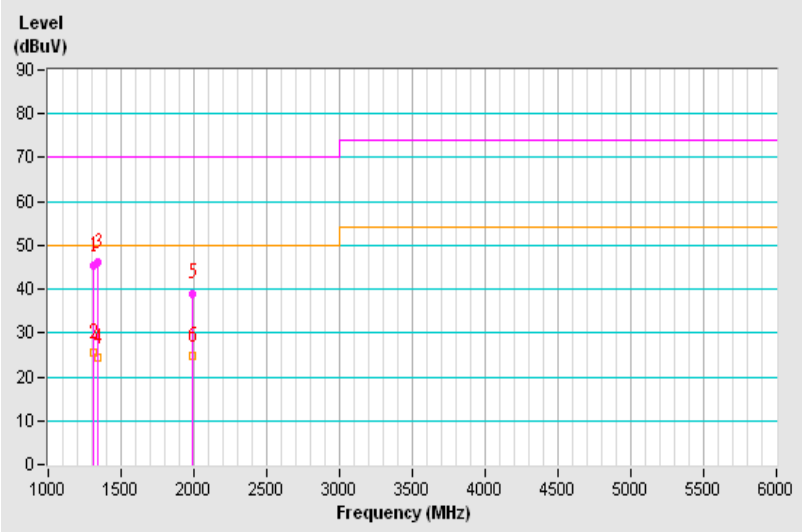


Frequency Range	1GHz ~ 6GHz	Detector Function & Bandwidth	Peak (PK) / Average (AV), 1MHz
Tested by	Jyunchun Lin	Environmental Conditions	26℃, 63%RH
Test Mode	Mode 1		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1307.70	45.35 PK	70.00	-24.65	1.00 V	321	50.78	-5.43
2	1307.70	25.41 AV	50.00	-24.59	1.00 V	321	30.84	-5.43
3	1339.15	46.02 PK	70.00	-23.98	1.00 V	315	51.29	-5.27
4	1339.15	24.54 AV	50.00	-25.46	1.00 V	315	29.81	-5.27
5	1993.65	39.05 PK	70.00	-30.95	1.00 V	322	41.34	-2.29
6	1993.65	24.89 AV	50.00	-25.11	1.00 V	322	27.18	-2.29

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value



9 Harmonics Current Measurement

9.1 Limits of Harmonics Current Measurement

Limits for Class A equipment		Limits for Class D equipment		
Harmonic Order n	Max. permissible harmonics current A	Harmonic Order n	Max. permissible harmonics current per watt mA/W	Max. permissible harmonics current A
Odd harmonics		Odd Harmonics only		
3	2.30	3	3.4	2.30
5	1.14	5	1.9	1.14
7	0.77	7	1.0	0.77
9	0.40	9	0.5	0.40
11	0.33	11	0.35	0.33
13	0.21	13	0.30	0.21
15≦n≦39	0.15x15/n	15≦n≦39	3.85/n	0.15x15/n
Even harmonics				
2	1.08			
4	0.43			
6	0.30			
8≦n≦40	0.23x8/n			

Note: 1. Class A and Class D are classified according to section 5 of EN 61000-3-2.
2. According to section 7 of EN 61000-3-2, the above limits for all equipment except for lighting equipment having an active input power > 75 W and no limits apply for equipment with an active input power up to and including 75 W.

9.2 Classification of equipment

The EUT is Class A in accordance with EN 61000-3-2 as follows:

Class A	Class B	Class C	Class D
Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent lamps, audio equipment, equipment not specified in one of the three other classes.	Portable tools.; Arc welding equipment which is not professional equipment	Lighting equipment.	Equipment having a specified power less than or equal to 600 W of the following types: Personal computers and personal computer monitors and television receivers.

9.3 Test Instruments

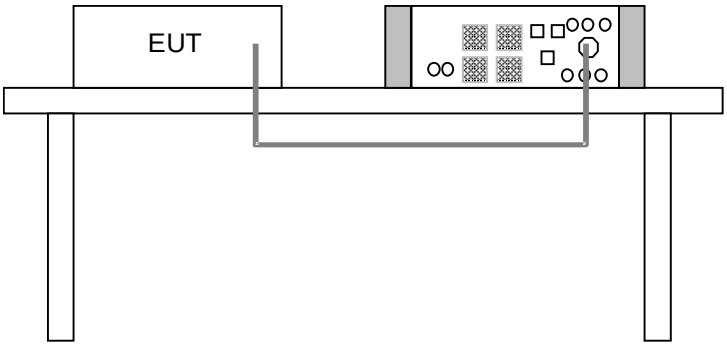
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
EMC Emission Tester EMC PARTNER	1000-1P	086	Jan. 27, 2014	Jan. 26, 2015
EMC Partner(Software)	HARCS_V4.18	NA	NA	NA

Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in EMS A room.
3 Tested Date: July 25, 2014

9.4 Test Arrangement

a. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.

b. The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

9.5 Supplementary Information

There is not any deviation from the test standards for the test method.

9.6 Test Results (Mode 1)

Test Duration (mins)	5	Test Mode	Mode 1
Fundamental Voltage/Ampere	230.3Vrms/ 0.082Arms	Power Frequency	50Hz
Power Consumption	6.945W	Power Factor	0.370
Enviromental Conditions	26 °C, 64RH	Tested by	Sean Huang

Harm. Order	Iavg (A)	Iavg Limit (A)	Imax (A)	Imax Limit (A)	Harm. Order	Iavg (A)	Iavg Limit (A)	Imax (A)	Imax Limit (A)
1	0.0355	-	0.0359	-	2	0.0000	1.0800	0.0015	1.6200
3	0.0275	2.3000	0.0280	3.4500	4	0.0000	0.4300	0.0015	0.6450
5	0.0270	1.1400	0.0275	1.7100	6	0.0000	0.3000	0.0015	0.4500
7	0.0263	0.7700	0.0267	1.1550	8	0.0000	0.2300	0.0016	0.3450
9	0.0253	0.4000	0.0256	0.6000	10	0.0000	0.1840	0.0016	0.2760
11	0.0240	0.3300	0.0244	0.4950	12	0.0000	0.1533	0.0016	0.2300
13	0.0225	0.2100	0.0228	0.3150	14	0.0000	0.1314	0.0016	0.1971
15	0.0209	0.1500	0.0212	0.2250	16	0.0000	0.1150	0.0016	0.1725
17	0.0192	0.1324	0.0194	0.1985	18	0.0000	0.1022	0.0016	0.1533
19	0.0174	0.1184	0.0175	0.1776	20	0.0000	0.0920	0.0016	0.1380
21	0.0156	0.1071	0.0157	0.1607	22	0.0000	0.0836	0.0016	0.1255
23	0.0137	0.0978	0.0139	0.1467	24	0.0000	0.0767	0.0015	0.1150
25	0.0120	0.0900	0.0121	0.1350	26	0.0000	0.0708	0.0015	0.1062
27	0.0103	0.0833	0.0104	0.1250	28	0.0000	0.0657	0.0015	0.0986
29	0.0087	0.0776	0.0089	0.1164	30	0.0000	0.0613	0.0015	0.0920
31	0.0073	0.0726	0.0075	0.1089	32	0.0000	0.0575	0.0014	0.0863
33	0.0061	0.0682	0.0063	0.1023	34	0.0000	0.0541	0.0013	0.0812
35	0.0050	0.0643	0.0052	0.0964	36	0.0000	0.0511	0.0013	0.0767
37	0.0000	0.0608	0.0045	0.0912	38	0.0000	0.0484	0.0012	0.0726
39	0.0000	0.0577	0.0039	0.0865	40	0.0000	0.0460	0.0012	0.0690

NOTE: Steady state values on AC mains are recorded in the table.

10 Voltage Fluctuations and Flicker Measurement

10.1 Limits

Test item	Limit	Note
P_{st}	1.0	P_{st}: short-term flicker severity.
P_{lt}	0.65	P_{lt}: long-term flicker severity.
T_{max} (ms)	500	T_{max}: maximum time duration during the observation period that the voltage deviation d(t) exceeds the limit for d_c .
d_{max} (%)	4	d_{max}: maximum absolute voltage change during an observation period.
d_c (%)	3.3	d_c: maximum steady state voltage change during an observation period.

10.2 Test instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
EMC Emission Tester EMC PARTNER	1000-1P	086	Jan. 27, 2014	Jan. 26, 2015
EMC Partner(Software)	HARCS_V4.18	NA	NA	NA

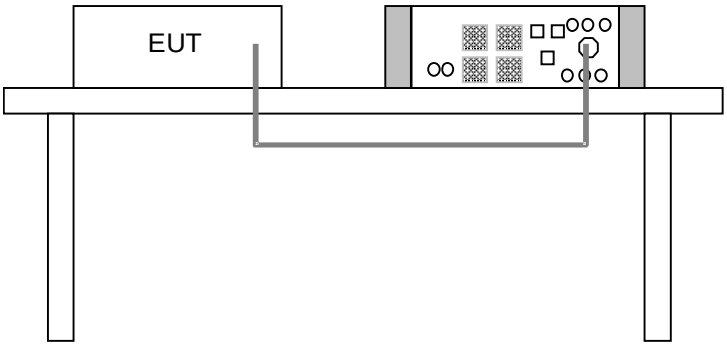
Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in EMS A room.
3 Tested Date: July 25, 2014

10.3 Test Arrangement

a. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.

b. During the flick measurement, the measure time shall include that part of whole operation cycle in which the EUT produce the most unfavorable sequence of voltage changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

10.4 Supplementary Information

There is not any deviation from the test standards for the test method.

10.5 Test Results (Mode 1)

Observation (T_p)	10 min.	Test Mode	Mode 1
Fundamental Voltage/Ampere	230.3 Vrms / 0.073 Arms	Power Frequency	50 Hz
Power Consumption	6.332W	Power Factor	0.378
Enviromental Conditions	26 °C, 64RH	Tested by	Sean Huang

Test Parameter	Measurement Value	Limit	Remarks
P_{st}	0.072	1.00	Pass
P_{lt}	0.072	0.65	Pass
T_{max} (ms)	0.000	500	Pass
d_{max} (%)	0.000	4	Pass
d_c (%)	0.020	3.3	Pass

Note: (1) P_{st} means short-term flicker indicator.
(2) P_{lt} means long-term flicker indicator.
(3) T_{max} means accumulated time value of d(t) with a deviation exceeding 3.3 %.
(4) d_{max} means maximum relative voltage change.
(5) d_c means maximum relative steady-state voltage change.

11 General Immunity requirements (For standard: EN 301 489)

EN 301 489-1 V1.9.2 (2011-09) / EN 301 489-17 V2.2.1 (2012-09), Immunity requirements			
Clause	Reference standard	Test specification	Performance Criterion
9.3	EN 61000-4-2 ESD	Enclosure port: ±8kV Air discharge, ±4kV Contact discharge,	B
9.2	EN 61000-4-3 RS	Enclosure port: 80% AM (1kHz), 80-1000 MHz, 3V/m, 1400-2700 MHz, 3V/m,	A
9.4	EN 61000-4-4 EFT	Signal ports, telecommunication ports and control ports: ±0.5kV, 5/50 T_r/T_h ns, 5kHz Input DC power ports: ±0.5kV, 5/50 T_r/T_h ns, 5kHz Input AC Power ports: ±1kV, 5/50 T_r/T_h ns, 5kHz	B
9.8	EN 61000-4-5 Surge	Telecommunication ports(directly connected to outdoor cables): telecommunication centres: ±0.5kV, 1.2/50 T_r/T_h μs, others: ±1kV, 1.2/50 T_r/T_h μs, Telecommunication ports(indoor cables, longer than 10 m): ±0.5kV, 1.2/50 T_r/T_h μs,	B
		Input AC Power ports: telecommunication centres: line to line: ±0.5kV, 1.2/50 T_r/T_h μs, line to ground: ±1kV, 1.2/50 T_r/T_h μs, others: line to line: ±1kV, 1.2/50 T_r/T_h μs, line to ground: ±2kV, 1.2/50 T_r/T_h μs,	B
9.5	EN 61000-4-6 CS	Signal ports, telecommunication ports, control ports and DC power ports(if cables length > 3m): 0.15-80 MHz, 3V, 80% AM (1kHz), AC Power ports: 0.15-80 MHz, 3V, 80% AM (1kHz)	A
9.7	EN 61000-4-11 Dips & Interruptions	AC Power ports: Voltage Dips: 0% residual, 0.5 cycle, 0% residual, 1 cycle, 70% residual, 25 cycles (at 50Hz), Voltage Interruptions: 0% residual, 250 cycles (at 50 Hz), EUT with battery back-up EUT without battery back-up	 B B B B C

11.1 Performance Criteria

General Performance Criteria

- Performance criteria for continuous phenomena applied to transmitters and receivers (CT/CR)

During and after the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer when the apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance.

During the test the EUT shall not unintentionally transmit or change its actual operating state and stored data.

If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

- Performance criteria for transient phenomena applied to transmitters and receivers (TT/TR)

After the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance.

During the EMC exposure to an electromagnetic phenomenon, a degradation of performance is, however, allowed. No change of the actual mode of operation (e.g. unintended transmission) or stored data is allowed.

If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

- Performance criteria for equipment which does not provide a continuous communication link

For radio equipment which does not provide a continuous communication link, the performance criteria described in CT/CR and TT/TR are not appropriate, then the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests.

The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in CT/CR and TT/TR.

- Performance criteria for ancillary equipment tested on a stand alone basis

If ancillary equipment is intended to be tested on a stand alone basis, the performance criteria described in CT/CR and TT/TR are not appropriate, then the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests.

The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in CT/CR and TT/TR.

Product Specific Performance Criteria

The particular performance criteria which are specified in the relevant part of EN 301 489 series dealing with the particular type of radio equipment, take precedence over the corresponding parts of the general performance criteria.

Where particular performance criteria for specific functions are not given, then the general performance criteria shall apply.

EN 301 489-17, Broadband Data Transmission Systems

The performance criteria are:

- performance criteria A for immunity tests with phenomena of a continuous nature (CT/CR);
- performance criteria B for immunity tests with phenomena of a transient nature (TT/TR);
- performance criteria C for immunity tests with power interruptions exceeding a certain time.

Special conditions for EN 301489-17		
Criteria	During test	After test
A	Shall operate as intended. May show degradation of performance (see note1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 2). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (see note 1). No unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 2). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 2).

Note 1: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance.
If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

Note 2: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed.
If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

12 Electrostatic Discharge Immunity Test (ESD)

12.1 Test Specification

Basic Standard:	EN 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Discharge Voltage:	Air Discharge : ±2, ±4, ±8kV (Direct) Contact Discharge : ±2, ±4kV (Indirect)
Number of Discharge:	Minimum 20 times at each test point
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

12.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ESD Simulator NoiseKen	ESS-100L(A)	0189C01491	May 29, 2014	May 28, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in ESD room A.
3 Tested Date: July 30, 2014

12.3 Test Arrangement

a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.

b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.

c. The time interval between two successive single discharges was at least 1 second.

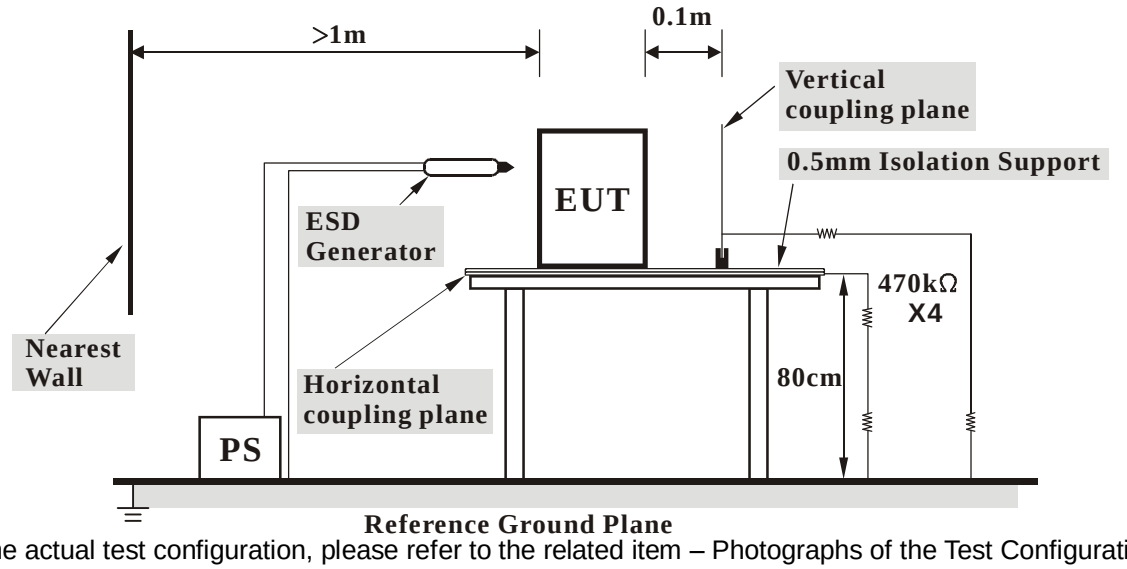
d. The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.

e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.

f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.

g. At least ten single discharges (in the most sensitive polarity) were applied to the **H**orizontal **C**oupling **P**lane at points on each side of the EUT. The ESD generator was positioned at a distance of 0.1 meters from the EUT with the discharge electrode touching the **HCP.**

h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the **V**ertical **C**oupling **P**lane in sufficiently different positions that the four faces of the EUT were completely illuminated. The **VCP** (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the **G**round **R**eference **P**lane. The **GRP** consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A **H**orizontal **C**oupling **P**lane (1.6m x 0.8m) was placed on the table and attached to the **GRP** by means of a cable with 940kΩ total impedance. The equipment under test, was installed in a representative system as described in section 7 of EN/IEC 61000-4-2, and its cables were placed on the **HCP** and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

12.4 Supplementary Information

There is not any deviation from the test standards for the test method.

12.5 Test Results (Mode 1)

Input Power	230 Vac, 50 Hz	Test mode	Mode 1
Enviromental conditions	26 °C, 51% RH 993 mbar	Tested by	Scott Chen

Test Results of Direct Application					
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge	Performance Criterion
2, 4	+/-	5, 8	NA	Note 1	A
8	+/-	5, 8	NA	Note 2	B
2, 4, 8	+/-	1-4, 6,-7, 9-10	NA	Note 1	A

Note: No conductive surfaces found, therefore no contact discharge was executed.

Description of test points of direct application: Please refer to following page for representative mark only.

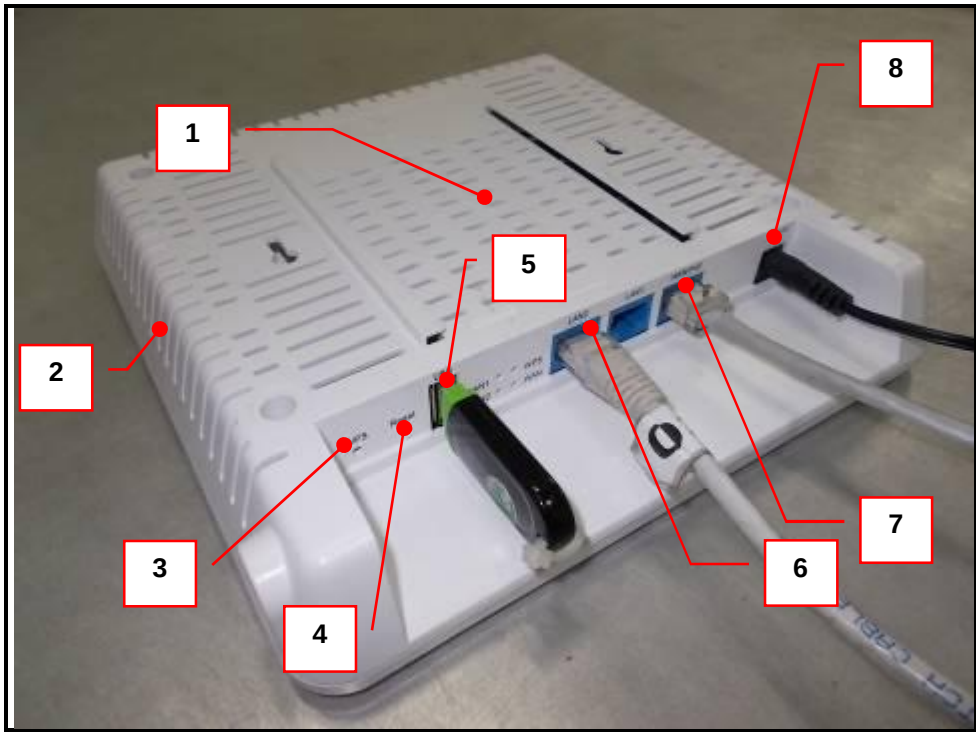
Test Results of Indirect Application					
Discharge Level (kV)	Polarity (+/-)	Test Point	Horizontal Coupling Plane	Vertical Coupling Plane	Performance Criterion
2, 4	+/-	Four Sides	Note 1	Note 1	A

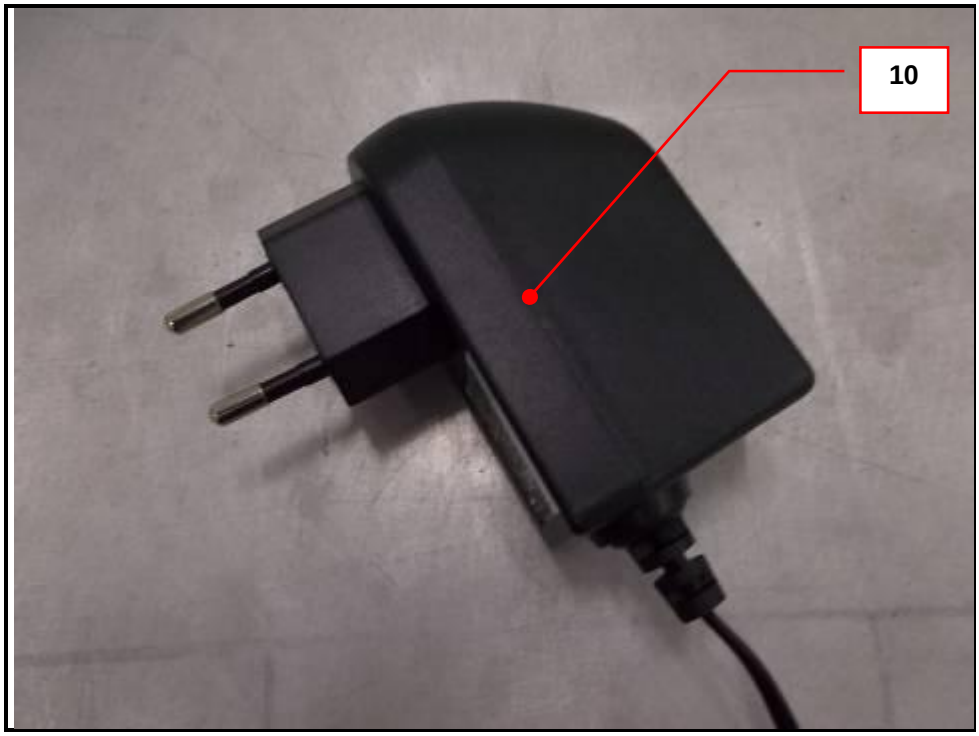
Description of test points of indirect application:

1. Front side 2. Rear side 3. Right side 4. Left side

Note: 1. The EUT function was correct during the test.
2. The EUT had “request time out” message during the test, but could be self- recoverable after the test.

Description of Test Points

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12.6 Test Results (Mode 2)

Input Power	DC 48V from PoE	Test mode	Mode 2
Enviromental conditions	26 °C, 51% RH 993 mbar	Tested by	Scott Chen

Test Results of Direct Application					
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge	Performance Criterion
2, 4	+/-	5	NA	Note 1	A
8	+/-	5	NA	Note 2	B
2, 4, 8	+/-	1-4, 6-9	NA	Note 1	A

Description of test points of direct application: Please refer to following page for representative mark only.

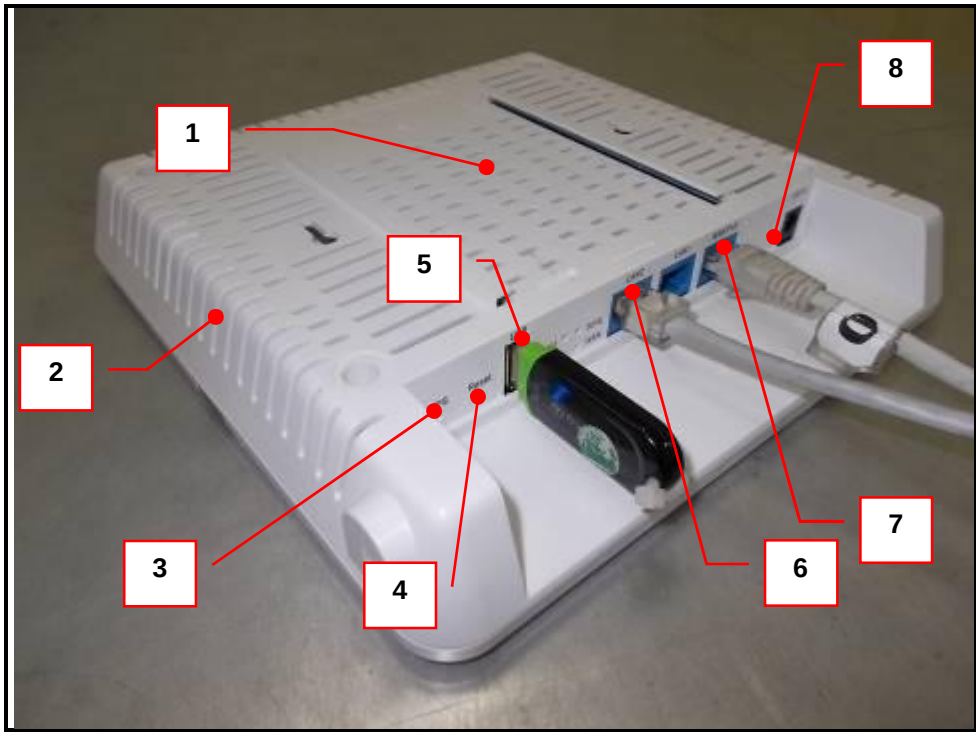
Test Results of Indirect Application					
Discharge Level (kV)	Polarity (+/-)	Test Point	Horizontal Coupling Plane	Vertical Coupling Plane	Performance Criterion
2, 4	+/-	Four Sides	Note 1	Note 1	A

Description of test points of indirect application:

1. Front side 2. Rear side 3. Right side 4. Left side

Note: 1. The EUT function was correct during the test.
2. The EUT had “request time out” message during the test, but could be self- recoverable after the test.

Description of Test Points



13 Radiated, Radio-frequency, Electromagnetic Field Immunity Test (RS)

13.1 Test Specification

Basic Standard:	EN 61000-4-3
Frequency Range:	80 MHz ~ 1000 MHz, 1400 MHz ~ 2700 MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Polarity of Antenna:	Horizontal and Vertical
Antenna Height:	1.5m
Dwell Time:	3 seconds

13.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Amplifier AR	150W1000M3	311567	NA	NA
Power Amplifier AR	60S1G3M1	306171	NA	NA
LOG ANTENNA AR	AT5080ANT	309740	NA	NA
RF Voltage Meter BOONTON	4232A-01	93801	Dec. 10, 2013	Dec. 09, 2014
Signal Generator R&S	SMIQ 03B	102114	Aug. 30, 2013	Aug. 29, 2014
Electric Field Probe Narda	EF 0619	D-0049	Oct. 30, 2013	Oct. 29, 2014
RS Test Workbench(Software) ADT	ADT_RS_V7.6.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Chamber Room No. B.
3 The transmit antenna was located at a distance of 2.0 meters from the EUT.
4. Tested Date: Aug. 04, 2014

13.3 Test Arrangement

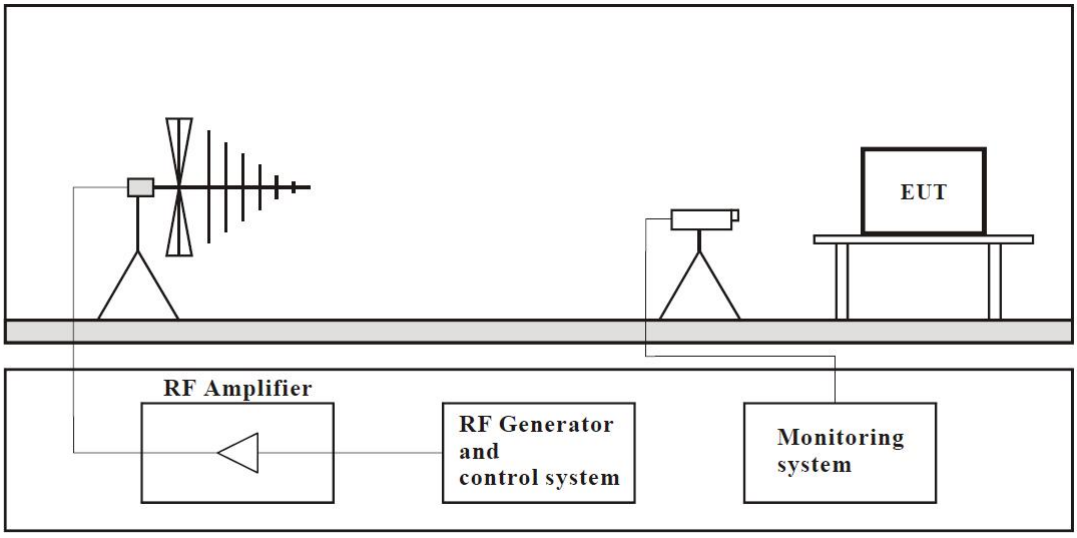
The test procedure was in accordance with EN 61000-4-3

a. The testing was performed in a modified semi-anechoic chamber.

b. The frequency range is swept from 80 MHz to 1000 MHz & from 1400 MHz to 2700 MHz, with the signal 80% amplitude modulated with a 1kHz sine wave.

c. The field strength level was 3 V/m.

d. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the two sides



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLETOP EQUIPMENT
The EUT installed in a representative system as described in section 7 of EN/IEC 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR STANDING EQUIPMENT
The EUT installed in a representative system as described in section 7 of EN/IEC 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

13.4 Supplementary Information

There is not any deviation from the test standards for the test method.

13.5 Test Results (Mode 1)

Input Power	230 Vac, 50 Hz	Test mode	Mode 1
Enviromental conditions	26 °C, 50% RH	Tested by	Barry Lee

Frequency (MHz)	Polarity	Azimuth(°)	Applied Field Strength		Observation	Remarks	Performance Criterion
			(V/m)	Modulation			
80 - 1000	V&H	0, 90, 180, 270	3	80% AM (1kHz)	Note 1	Pass	A
1400 - 2700	V&H	0, 90, 180, 270	3	80% AM (1kHz)	Note 1*	Pass	A

Note: 1. The EUT function was correct during the test.
* The EUT had request time out message from 2419.934MHz to 2444.134MHz during the test, but this band is exclusion band in EN 301 489-17, the test result (request time out) is acceptable under this condition.

13.6 Test Results (Mode 2)

Input Power	DC 48V from PoE	Test mode	Mode 2
Enviromental conditions	26 °C, 50% RH	Tested by	Barry Lee

Frequency (MHz)	Polarity	Azimuth(°)	Applied Field Strength		Observation	Remarks	Performance Criterion
			(V/m)	Modulation			
80 - 1000	V&H	0, 90, 180, 270	3	80% AM (1kHz)	Note 1	Pass	A
1400 - 2700	V&H	0, 90, 180, 270	3	80% AM (1kHz)	Note 1*	Pass	A

Note: 1. The EUT function was correct during the test.
* The EUT had request time out message from 2419.934MHz to 2444.134MHz during the test, but this band is exclusion band in EN 301 489-17, the test result (request time out) is acceptable under this condition.

14 Electrical Fast Transient/Burst Immunity Test (EFT)

14.1 Test Specification

Basic Standard:	EN 61000-4-4
Test Voltage:	Signal ports, telecommunication and control ports: ±0.5kV Input DC power port: NA Input AC Power ports: ±1kV
Impulse Repetition Frequency:	5kHz
Impulse Wave shape :	5/50 T_r/T_h ns
Burst Duration:	15 ms for 5kHz Repetition Frequency,
Burst Period:	300 ms
Test Duration:	1 min.

14.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
TRANSIENT EMC PARTNER	TRA2000IN6	1121	Jan. 16, 2014	Jan. 15, 2015
CN-EFT100 EMC PARTNER	CN-EFT1000	662	NA	NA
Adapter	NA	SU1ADA-002	NA	NA
Software EMC PARTNER,	Test Manger_V1.53	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in EMS room B.
3 Tested Date: Aug. 01, 2014

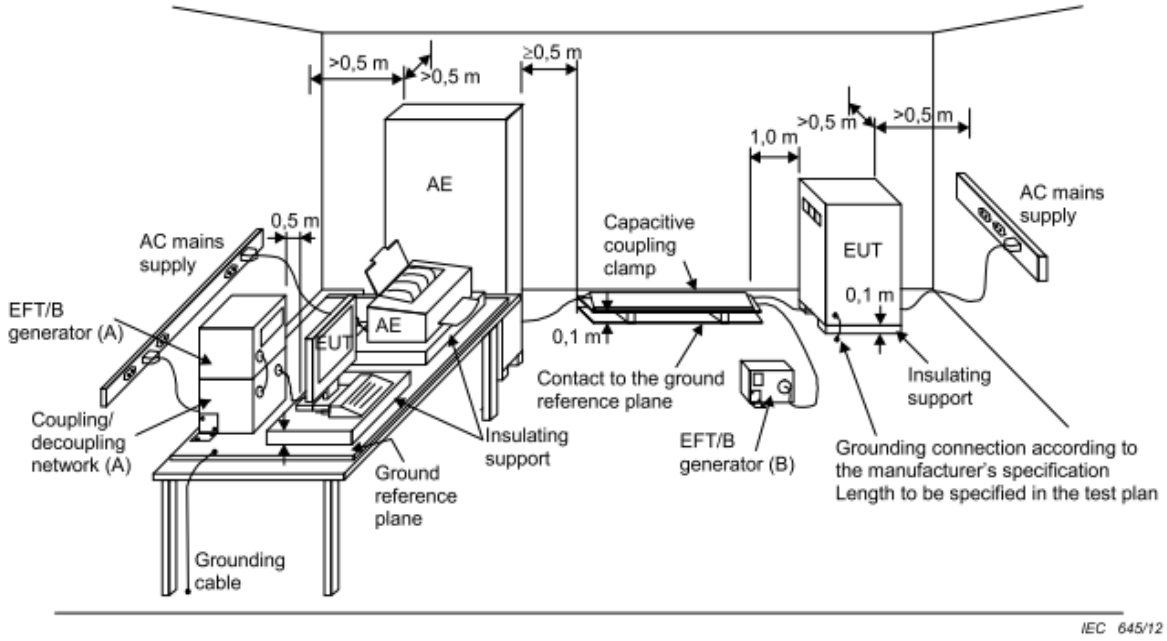
14.3 Test Arrangement

a. Both positive and negative polarity discharges were applied.

b. The distance between any coupling devices and the EUT should be 0.5 m for table-top equipment testing, and 1.0 m for floor standing equipment.

c. The duration time of each test sequential was 1 minute.

d. The transient/burst waveform was in accordance with EN 61000-4-4, 5/50 ns.



NOTE:
(A) location for supply line coupling
(B) location for signal lines coupling

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

14.4 Supplementary Information

There is not any deviation from the test standards for the test method.

14.5 Test Results (Mode 1)

Input Power	230 Vac, 50 Hz	Test mode	Mode 1
Enviromental conditions	25 °C, 54% RH	Tested by	Anderson Chen

Input AC power port

Voltage (kV)	Test Point	Polarity (+/-)	Observation	Performance Criterion
1	L1	+/-	Note 1	A
1	L2	+/-	Note 1	A
1	L1-L2	+/-	Note 1	A

Signal ports

Voltage (kV)	Test Point	Polarity (+/-)	Observation	Performance Criterion
0.5	WAN/PoE	+/-	Note 1	A
0.5	LAN	+/-	Note 1	A

Note: 1. The EUT function was correct during the test.

14.6 Test Results (Mode 2)

Input Power	DC 48V from PoE	Test mode	Mode 2
Enviromental conditions	25 °C, 54% RH	Tested by	Anderson Chen

Signal ports

Voltage (kV)	Test Point	Polarity (+/-)	Observation	Performance Criterion
0.5	WAN/PoE	+/-	Note 1	A
0.5	LAN	+/-	Note 1	A

Note: 1. The EUT function was correct during the test.

15 Surge Immunity Test

15.1 Test Specification

Basic Standard:	EN 61000-4-5
Wave-Shape:	Combination Wave 1.2/50 μs Open Circuit Voltage 8 /20 μs Short Circuit Current
Test Voltage:	Telecommunication ports(directly connected to outdoor cables): Telecommunication centres: NA, Others: NA, Telecommunication ports(indoor cables, longer than 10 m): ±0.5kV, Input AC Power ports: Telecommunication centres: Line to line: NA, Line to ground: NA Others: Line to line: ±0.5kV, ±1kV, Line to ground: NA
AC Phase Angle (degree):	0°, 90°, 180°, 270°
Pulse Repetition Rate:	1 time / 20 sec.
Number of Tests:	5 positive and 5 negative at selected points

15.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
TRANSIENT EMC PARTNER	TRA2000IN6	1121	Jan. 16, 2014	Jan. 15, 2015
CDN-UTP8 EMC PARTNER	CDN-UTP8	036	Jan. 25, 2014	Jan. 24, 2015
Adapter	NA	SU1ADA-002	NA	NA
Software EMC PARTNER	Test Manger_V1.53	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in EMS room B.
3 Tested Date: Aug. 01, 2014

15.3 Test Arrangement

a. Input AC/DC Power ports:

The surge is to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

For double-insulated products without PE or external earth connections, the test shall be done in a similar way as for grounded products but without adding any additional external grounded connections. If there are no other possible connections to earth, line-to-ground tests may be omitted.

b. Signal and telecommunication ports,

I Unshielded unsymmetrical interconnection lines:

The surge is applied to the lines via the capacitive coupling. The coupling / decoupling networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length.

I Unshielded symmetrical interconnections communication lines:

The surge is applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor cannot be specified. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length.

I High speed communications lines

Prior to the test, the correct operation of the port shall be verified; the external connection shall then be removed and the surge applied directly to the port's terminals with no coupling /decoupling network. After the surge, the correct operation of the port shall again be verified.

I Shielded lines:

- Direct application,

The EUT is isolated from ground and the surge is applied to its metallic enclosure; the termination (or auxiliary equipment) at the port(s) under test is grounded. This test applies to equipment with single or multiple shielded cables.

Rules for application of the surge to shielded lines:

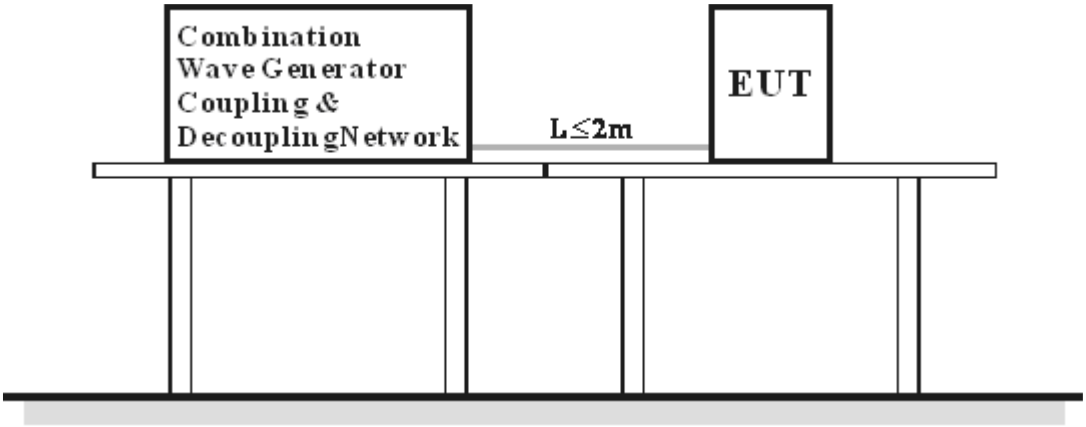
a) Shields grounded at both ends
> The surge injection on the shield.

b) Shields grounded at one end
> If in the installation the shield is connected only at the auxiliary equipment, test shall be done in that configuration but with the generator still connected to the EUT side. If cable lengths allow, the cables shall be on insulated supports 0,1 m above the ground plane or cable tray.

For products which do not have metallic enclosures, the surge is applied directly to the shielded cable.

- Alternative coupling method for testing single cables in a multi-shield configuration,

Surges are applied in close proximity to the interconnection cable under test by a wire. The length of the cable between the port(s) under test and the device attached to the other end of the cable shall be the lesser of: the maximum length permitted by the EUT's specification, or 20 m. Where the length exceeds 1 m, excess lengths of cables shall be bundled at the approximate centre of the cables with the bundles 30 cm to 40 cm in length.



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

15.4 Supplementary Information

There is not any deviation from the test standards for the test method.

15.5 Test Results (Mode 1)

Input Power	230 Vac, 50 Hz	Test mode	Mode 1
Enviromental conditions	25 °C, 54% RH	Tested by	Anderson Chen

Input AC Power ports:

Voltage (kV)	Test Point	Polarity (+/-)	Observation	Performance Criterion
0.5, 1	L1 – L2	+/-	Note 1	A

Telecommunication ports(indoor cables, longer than 10 m)

Voltage (kV)	Test Point	Polarity (+/-)	Observation	Performance Criterion
0.5	WAN/PoE	+/-	Note 2	B
0.5	LAN	+/-	Note 2	B

Note: 1. The EUT function was correct during the test.
2. The EUT had “request time out” message during the test, but could be self- recoverable after the test.

15.6 Test Results (Mode 2)

Input Power	DC 48V from PoE	Test mode	Mode 2
Enviromental conditions	25 °C, 54% RH	Tested by	Anderson Chen

Telecommunication ports(indoor cables, longer than 10 m)

Voltage (kV)	Test Point	Polarity (+/-)	Observation	Performance Criterion
0.5	WAN/PoE	+/-	Note 1	B
0.5	LAN	+/-	Note 1	B

Note: 1. The EUT had “request time out” message during the test, but could be self- recoverable after the test.

16 Immunity to Conducted Disturbances Induced by RF Fields (CS)

16.1 Test Specification

Basic Standard:	EN 61000-4-6
Frequency Range:	0.15 MHz - 80 MHz
Voltage Level:	3 V
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Dwell Time	3 seconds

16.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Signal Generator R&S	SML 03	101364	Aug. 20, 2013	Aug.19, 2014
Amplifier AR	75A250AM2	307297	NA	NA
Voltage Meter BOONTON RF	4232A	93801	Dec. 10, 2013	Dec. 09, 2014
LUTHIE EM Injection Clamp	EM-101	35453	May 21, 2014	May 20, 2015
CDN M2 FCC	FCC-801-M2-16A	03048	Jan. 07, 2014	Jan. 06, 2015
CDN M3 FCC	FCC-801-M3-16A	03055	Jan. 07, 2014	Jan. 06, 2015
Coupling Decoupling Network Fischer Custom Communications Inc	FCC-801-T2	02025	Oct. 08, 2013	Oct. 07, 2014
Coupling Decoupling Network Fischer Custom Communications Inc	FCC-801-T4	02030	Oct. 08, 2013	Oct. 07, 2014
Coupling Decoupling Network Fischer Custom Communications Inc	FCC-801-T8	02036	Oct. 08, 2013	Oct. 07, 2014
ADT CS Test Workbench(Software)	ADT_CS_V7.4.2	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Chamber Room No. B.
3 Tested Date: Aug. 04, 2014

16.3 Test Arrangement

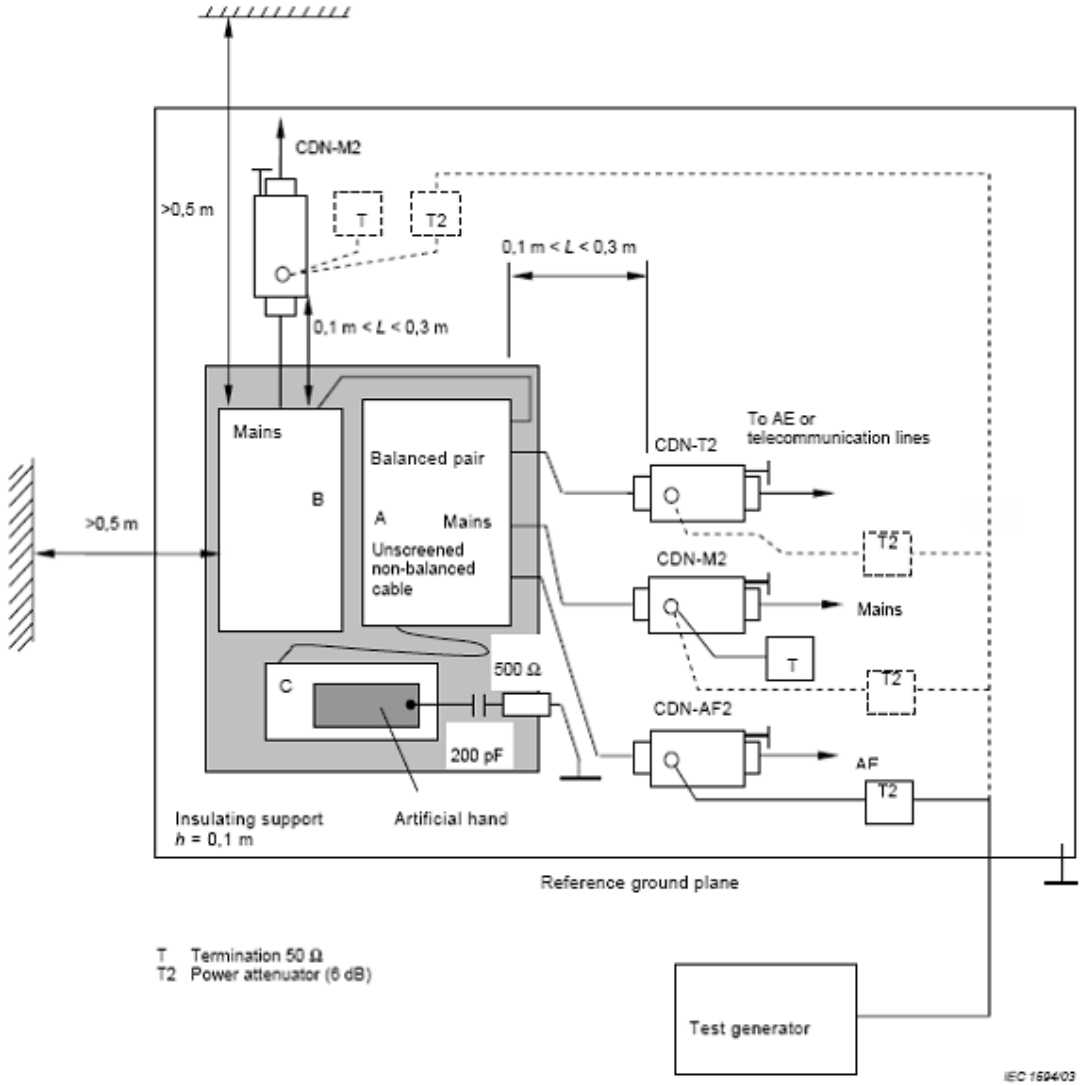
a. The EUT shall be tested within its intended operating and climatic conditions.

b. An artificial hand was placed on the hand-held accessory and connected to the ground reference plane.

c. One of the CDNs not used for injection was terminated with 50 ohm, providing only one return path. All other CDNs were coupled as decoupling networks.

d. The frequency range is swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal is modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. Where the frequency is swept incrementally, the step size shall not exceed 1 % of the preceding frequency value.

e. Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.



Note: 1.The EUT clearance from any metallic obstacles shall be at least 0,5 m.
2. Interconnecting cables (≦1 m) belonging to the EUT shall remain on the insulating support.
For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

16.4 Supplementary Information

There is not any deviation from the test standards for the test method.

16.5 Test Results (Mode 1)

Input Power	230 Vac, 50 Hz	Test mode	Mode 1
Enviromental conditions	26 °C, 50% RH	Tested by	Barry Lee

Frequency (MHz)	Level (V rms)	Tested Line	Injection Method	Return Path	Observation	Remark	Performance Criterion
0.15 – 80	3	AC Main	CDN-M2	CDN-T8	Note 1	Pass	A
0.15 – 80	3	UTP (WAN/PoE)	CDN-T8	CDN-M2	Note 1	Pass	A
0.15 – 80	3	UTP (LAN)	CDN-T4	CDN-M2	Note 1	Pass	A

Note: 1. The EUT function was correct during the test.

16.6 Test Results (Mode 2)

Input Power	DC 48V from PoE	Test mode	Mode 2
Enviromental conditions	26 °C, 50% RH	Tested by	Barry Lee

Frequency (MHz)	Level (V rms)	Tested Line	Injection Method	Return Path	Observation	Remark	Performanc e Criterion
0.15 – 80	3	UTP (WAN/PoE)	CDN-T8	CDN-T4	Note 1	Pass	A
0.15 – 80	3	UTP (LAN)	CDN-T4	CDN-T8	Note 1	Pass	A

Note: 1. The EUT function was correct during the test.

17 Voltage Dips and Interruptions

17.1 Test Specification

Basic Standard:	EN 61000-4-11
Test levels:	Voltage Dips: 0% residual voltage for 0.5 cycle 0% residual voltage for 1 cycle 70% residual voltage for 25 cycles Voltage Interruptions: 0% residual voltage for 250 cycles
Interval between Event:	10 seconds
Sync Angle (degrees):	0° / 180°
Test Cycle:	3 times

17.2 Test Instruments

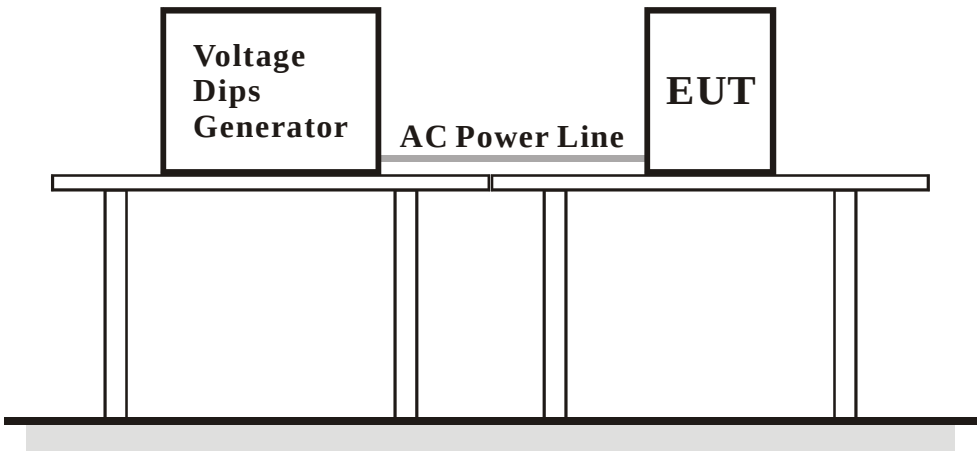
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
TRANSIENT EMC PARTNER	TRA2000IN6	1121	Jan. 16, 2014	Jan. 15, 2015
Adapter	NA	SU1ADA-002	NA	NA
(Software) EMC Partner	Test Manger_V1.53	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in EMS room B.
3 Tested Date: Aug. 01, 2014

17.3 Test Arrangement

The EUT was tested for each selected combination of test levels and duration with a sequence of three dips/interruptions with intervals of 10s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform.



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

17.4 Supplementary Information

There is not any deviation from the test standards for the test method.

17.5 Test Results (Mode 1)

Input Power	230 Vac / 240 Vac / 100 Vac, 50 Hz	Test mode	Mode 1
Enviromental conditions	25 °C, 54% RH	Tested by	Anderson Chen

Input Power for testing: 230Vac, 50 Hz (Nominal input Voltage)					
Voltage Residual (%)	Duration (cycles)	Interval (sec)	Times	Observation	Performance Criterion
0	0.5	10	3	Note 1	A
0	1	10	3	Note 1	A
70	25	10	3	Note 1	A
0	250	10	3	Note 2	B

Input Power for testing: 240Vac, 50 Hz (Maximum rated input voltage)					
Voltage Residual (%)	Duration (cycles)	Interval (sec)	Times	Observation	Performance Criterion
0	0.5	10	3	Note 1	A
0	1	10	3	Note 1	A
70	25	10	3	Note 1	A
0	250	10	3	Note 2	B

Input Power for testing: 100Vac, 50 Hz (Minimum rated input voltage)					
Voltage Residual (%)	Duration (cycles)	Interval (sec)	Times	Observation	Performance Criterion
0	0.5	10	3	Note 1	A
0	1	10	3	Note 1	A
70	25	10	3	Note 1	A
0	250	10	3	Note 2	B

Note: 1. The EUT function was correct during the test.
2. The EUT reboot situation during the test, but it could be self-recoverable after the test.

18 General Immunity Requirements (For standard: EN 55024)

EN 55024:2010, Immunity requirements				
Clause	Reference standard	Table	Test specification	Performance Criterion
4.2.1	EN/IEC 61000-4-2 ESD	1.3	Enclosure port: ±8kV Air discharge, ±4kV Contact discharge,	B
4.2.3.2	EN/IEC 61000-4-3 RS	1.2	Enclosure port: 80-1000 MHz, 3V/m, 80% AM (1kHz),	A
4.2.2	EN/IEC 61000-4-4 EFT	2.3	Signal ports and telecommunication ports: xDSL equipment: ±0.5kV, 5/50 (T_r/T_h) ns, 100kHz others: ±0.5kV, 5/50 (T_r/T_h) ns, 5kHz	B
		3.3	Input DC power port: ±0.5kV, 5/50 (T_r/T_h) ns, 5kHz	
		4.5	Input AC Power ports: ±1kV, 5/50 (T_r/T_h) ns, 5kHz	
4.2.5	EN/IEC 61000-4-5 Surge	2.2	Signal and telecommunication ports (direct to outdoor cables): 10/700 (5/320) (T_r/T_h) µs, w/o primary protectors: ±1kV, or with primary protectors fitted: ±4kV,	C
		3.2	Input DC power port (direct to outdoor cables): ±0.5kV, 1.2/50 (8/20) (T_r/T_h) µs,	B
		4.4	Input AC Power ports: 1.2/50 (8/20) (T_r/T_h) µs, Line to line: ±1kV, Line to earth: ±2kV,	
4.2.3.3	EN/IEC 61000-4-6 CS	2.1	Signal and telecommunication ports(cable length > 3m): 0.15-80 MHz, 3V, 80% AM (1kHz),	A
		3.1	Input DC power port: 0.15-80 MHz, 3V, 80% AM (1kHz)	
		4.1	Input AC Power ports: 0.15-80 MHz, 3V, 80% AM (1kHz)	
4.2.4	EN/IEC 61000-4-8 PFMF	1.1	Enclosure port: 50 or 60 Hz, 1A/m,	A
4.2.6	EN/IEC 61000-4-11 Dips & Interruptions	4.2	Input AC Power ports: Voltage Dips: >95% reduction – 0.5 period, 30% reduction – 25 periods,	B C
		4.3	Input AC Power ports: Voltage Interruptions: >95% reduction – 250 periods,	C

18.1 Performance Criteria

General Performance Criteria

Performance criterion A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criterion B

After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criterion C

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

Product Specific Performance Criteria

The particular performance criteria which are specified in the normative annexes of EN 55024 take precedence over the corresponding parts of the general performance criteria.

Where particular performance criteria for specific functions are not given, then the general performance criteria shall apply.

Function	Performance criteria A	Performance criteria B	Performance criteria C
Read, write and storage of data	During the test storage devices shall maintain normal operation both in read/write and in standby conditions.	During and after the test failures which can be recovered by read and write retries are permissible (temporary delay in processing caused by this process is acceptable). Normal operation of the EUT shall be restored after the test, self-recovery to the conditions immediately prior to the application of the test is accepted where this is a normal means of recovery. In these cases, operator response is permitted to re-initialise an operation.	Failures during test that result in a delay in processing or a system abort, which after testing can be recovered to normal operation by reset or reboot, are permissible.
Data display	During the test, when seen from the normal viewing distance, the EUT shall operate with no change beyond the manufacturer's specification, in flicker, colour, focus and jitter (except for the power frequency magnetic field test).	Screen disturbances during the application of the test are permissible if they self-recover after removal of the external disturbance.	Failures during the test that cannot self-recover after removal of the external disturbance, but which can be recovered after the test to normal operation by reset or reboot are permissible.
Data input	During testing unintended input from an input device is not allowed. During testing input devices shall maintain the specified quality image data.	During testing keyboard/mouse "lock up" is not allowed. For EUT with manually inputted data that can be confirmed by reading the display, errors are permissible during testing if they can be recognised by the operator and easily corrected.	Failures during test that result in a delay in processing or a system abort, which after testing can be recovered to normal operation by reset or reboot, are permissible.
Data printing	During testing printers shall maintain the specified printing quality and normal operation.	During testing no degradation of the printing quality beyond the manufacturer's specification (such as distortion of character(s) or missing pixels) is permissible. A paper feed failure is allowed if after removal of the jammed sheets the job is automatically recovered and there is no loss of printed information.	During testing printing errors or omission of character(s) which require reprinting are permissible. Input/output failures that occur during testing that can be recovered to normal operation after testing by reset or reboot are also permissible.
Data processing	During testing failures which do not influence the specified operation within the product specification, and which do not prevent automatic recovery are permissible.	During testing failures which are recovered automatically but cause temporary delay in processing are permissible.	Failures during testing that - result in a delay in processing after the external disturbance is removed, but which can be recovered after testing to normal operation by a reset or reboot - result in a system abort, which can be recovered to normal operation after testing by reset or reboot, - are followed by alarms and can be recovered to normal operation by the operator's intervention after testing are permissible.

19 Electrostatic Discharge Immunity Test (ESD)

19.1 Test Specification

Basic Standard:	EN/IEC 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Discharge Voltage:	Air Discharge: ±2, ±4, ±8kV (Direct) Contact Discharge: ±2, ±4kV (Indirect)
Number of Discharge:	Air – Direct: 10 discharges per location (each polarity) Contact – Direct & Indirect: 25 discharges per location (each polarity) and min. 200 times in total
Discharge Mode:	Single Discharge
Discharge Period:	1-second minimum

19.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ESD Simulator NoiseKen	ESS-100L(A)	0189C01491	May 29, 2014	May 28, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in ESD room A.
3 Tested Date: July 30, 2014

19.3 Test Arrangement

The discharges shall be applied in two ways:

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, then at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.

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

   On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled by the user. A minimum of 10 single air discharges shall be applied to the selected test point for each such area.

The basic test procedure was in accordance with EN/IEC 61000-4-2:

a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.

b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.

c. The time interval between two successive single discharges was at least 1 second.

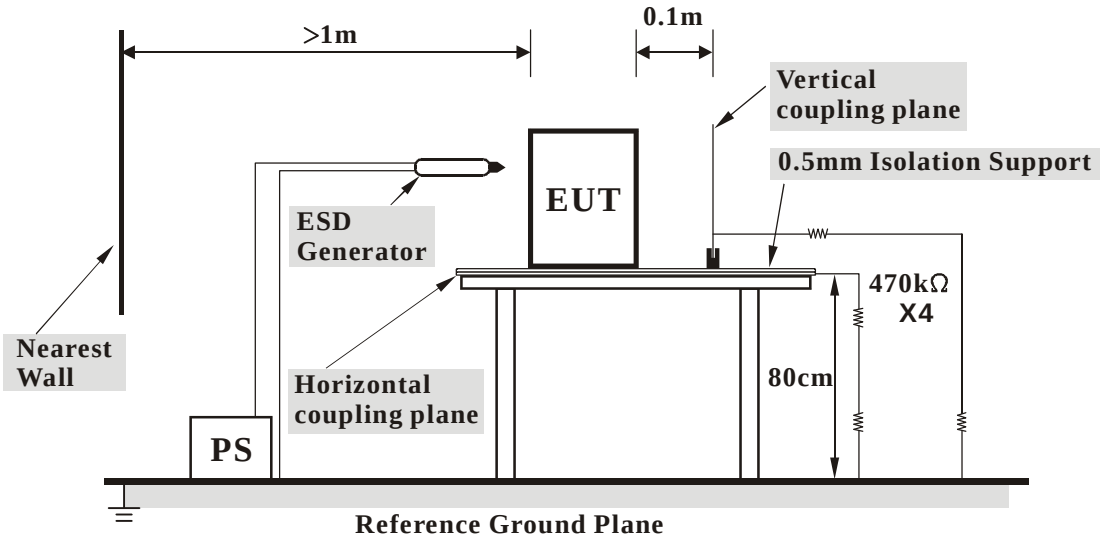
d. The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.

e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.

f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.

g. At least ten single discharges (in the most sensitive polarity) were applied to the **H**orizontal **C**oupling **P**lane at points on each side of the EUT. The ESD generator was positioned at a distance of 0.1 meters from the EUT with the discharge electrode touching the **HCP.**

h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the **V**ertical **C**oupling **P**lane in sufficiently different positions that the four faces of the EUT were completely illuminated. The **VCP** (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the **G**round **R**eference **P**lane. The **GRP** consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A **H**orizontal **C**oupling **P**lane (1.6m x 0.8m) was placed on the table and attached to the **GRP** by means of a cable with 940kΩ total impedance. The equipment under test, was installed in a representative system as described in section 7 of EN/IEC 61000-4-2, and its cables were placed on the **HCP** and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

19.4 Supplementary Information

There is not any deviation from the test standards for the test method.

19.5 Test Results (Mode 1)

Input Power	230 Vac, 50 Hz	Test mode	Mode 1
Enviromental conditions	26 °C, 51% RH 993 mbar	Tested by	Scott Chen

Test Results of Direct Application					
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge	Performance Criterion
2, 4	+/-	5, 8	NA	Note 1	A
8	+/-	5, 8	NA	Note 2	B
2, 4, 8	+/-	1-4, 6,-7, 9-10	NA	Note 1	A

Note: No conductive surfaces found, therefore no contact discharge was executed.

Description of test points of direct application: Please refer to following page for representative mark only.

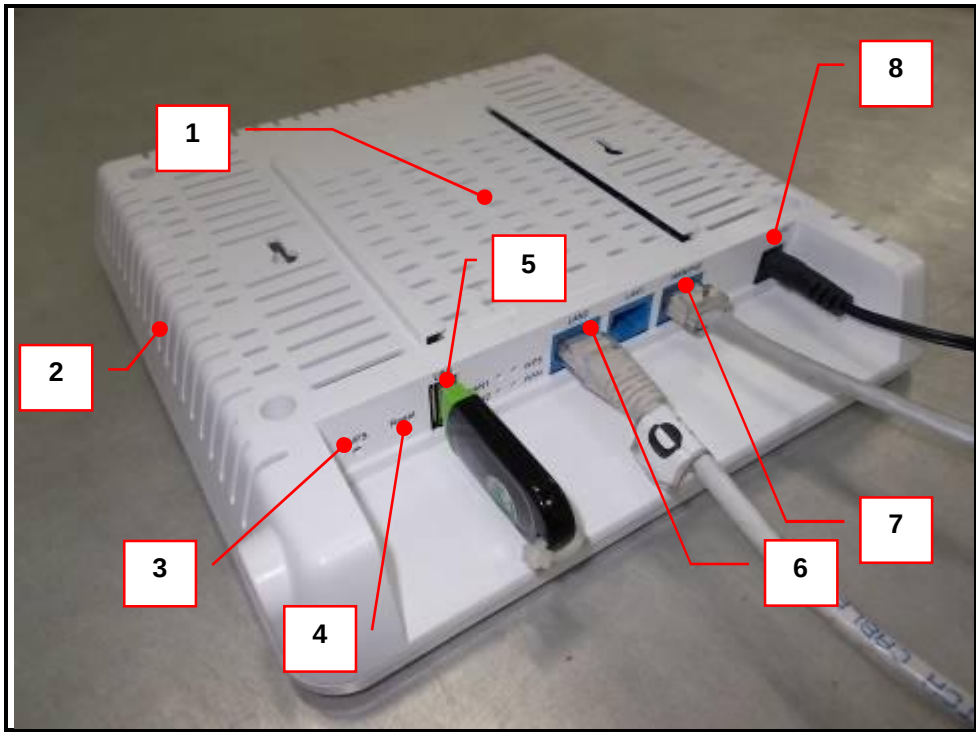
Test Results of Indirect Application					
Discharge Level (kV)	Polarity (+/-)	Test Point	Horizontal Coupling Plane	Vertical Coupling Plane	Performance Criterion
2, 4	+/-	Four Sides	Note 1	Note 1	A

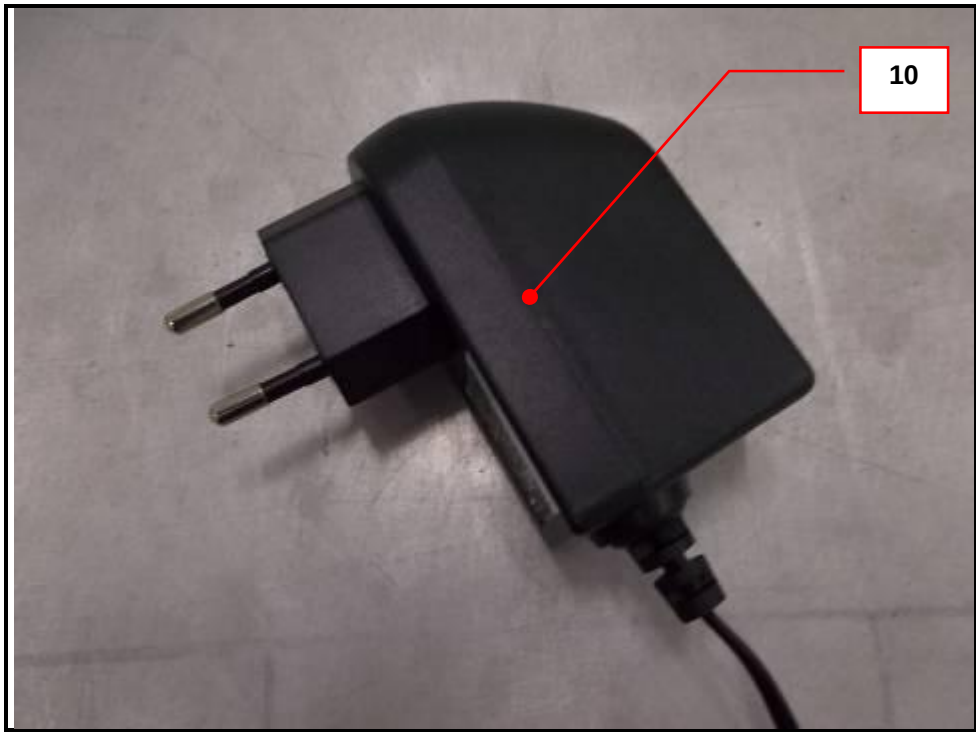
Description of test points of indirect application:

1. Front side 2. Rear side 3. Right side 4. Left side

Note: 1. The EUT function was correct during the test.
2. The EUT had “request time out” message during the test, but could be self- recoverable after the test.

Description of Test Points

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19.6 Test Results (Mode 2)

Input Power	DC 48V from PoE	Test mode	Mode 2
Enviromental conditions	26 °C, 51% RH 993 mbar	Tested by	Scott Chen

Test Results of Direct Application					
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge	Performance Criterion
2, 4	+/-	5	NA	Note 1	A
8	+/-	5	NA	Note 2	B
2, 4, 8	+/-	1-4, 6-9	NA	Note 1	A

Note: No conductive surfaces found, therefore no contact discharge was executed.

Description of test points of direct application: Please refer to following page for representative mark only.

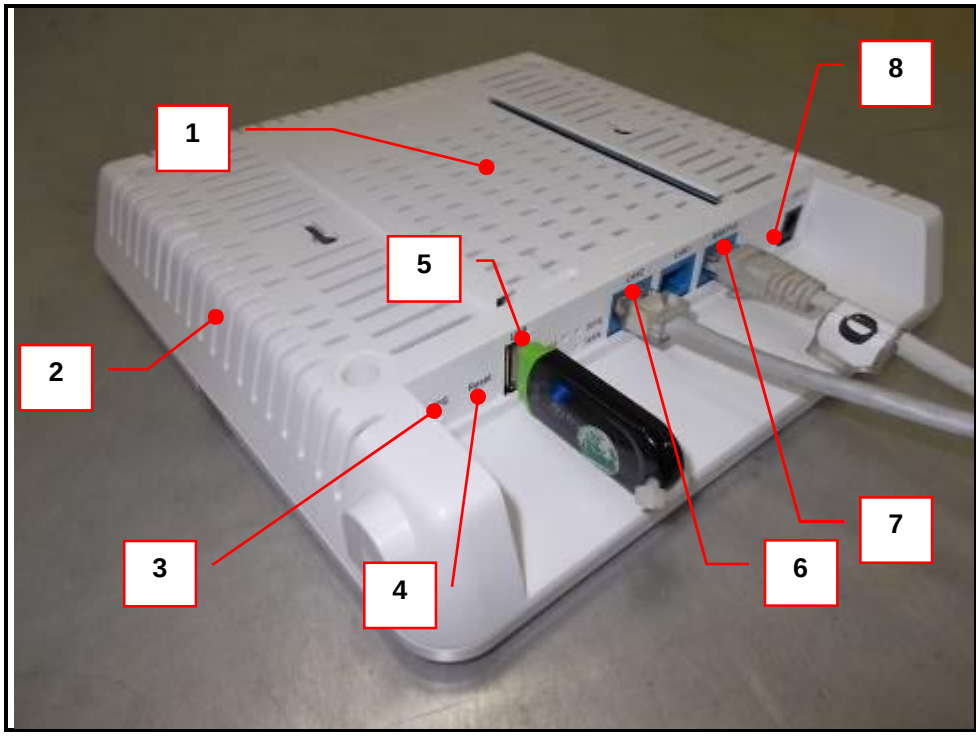
Test Results of Indirect Application					
Discharge Level (kV)	Polarity (+/-)	Test Point	Horizontal Coupling Plane	Vertical Coupling Plane	Performance Criterion
2, 4	+/-	Four Sides	Note 1	Note 1	A

Description of test points of indirect application:

1. Front side 2. Rear side 3. Right side 4. Left side

Note: 1. The EUT function was correct during the test.
2. The EUT had “request time out” message during the test, but could be self- recoverable after the test.

Description of Test Points



20 Radiated, Radio-frequency, Electromagnetic Field Immunity Test (RS)

20.1 Test Specification

Basic Standard:	EN/IEC 61000-4-3
Frequency Range:	80 MHz - 1000 MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Polarity of Antenna:	Horizontal and Vertical
Antenna Height:	1.5m
Dwell Time:	3 seconds

20.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Amplifier AR	150W1000M3	311567	NA	NA
Power Amplifier AR	60S1G3M1	306171	NA	NA
LOG ANTENNA AR	AT5080ANT	309740	NA	NA
RF Voltage Meter BOONTON	4232A-01	93801	Dec. 10, 2013	Dec. 09, 2014
Signal Generator R&S	SMIQ 03B	102114	Aug. 30, 2013	Aug. 29, 2014
Electric Field Probe Narda	EF 0619	D-0049	Oct. 30, 2013	Oct. 29, 2014
RS Test Workbench(Software) ADT	ADT_RS_V7.6.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Chamber Room No. B.
3 The transmit antenna was located at a distance of 2.0 meters from the EUT.
4. Tested Date: Aug. 04, 2014

20.3 Test Arrangement

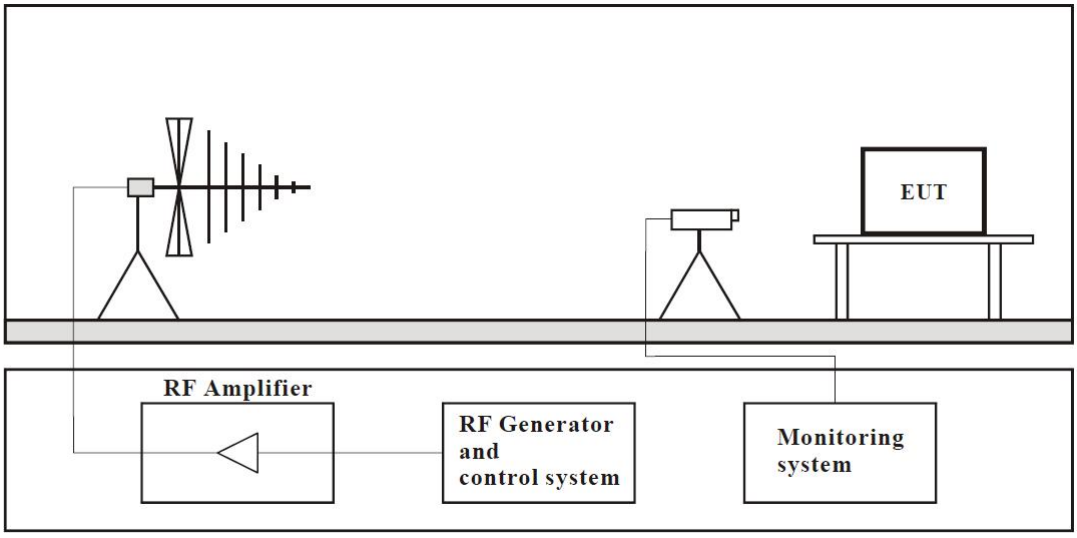
The test procedure was in accordance with EN/IEC 61000-4-3.

a. The testing was performed in a modified semi-anechoic chamber.

b. The frequency range is swept from 80 MHz to 1000 MHz, with the signal 80% amplitude modulated with a 1kHz sine wave.

c. The field strength level was 3 V/m.

d. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLETOP EQUIPMENT
The EUT installed in a representative system as described in section 7 of EN/IEC 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR STANDING EQUIPMENT
The EUT installed in a representative system as described in section 7 of EN/IEC 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

20.4 Supplementary Information

There is not any deviation from the test standards for the test method.

20.5 Test Results (Mode 1)

Input Power	230 Vac, 50 Hz	Test mode	Mode 1
Enviromental conditions	26 °C, 50% RH	Tested by	Barry Lee

Frequency (MHz)	Polarity	Azimuth(°)	Applied Field Strength		Observation	Performance Criterion
			(V/m)	Modulation		
80 -1000	V&H	0	3	80% AM (1kHz)	Note 1	A
80 -1000	V&H	90	3	80% AM (1kHz)	Note 1	A
80 -1000	V&H	180	3	80% AM (1kHz)	Note 1	A
80 -1000	V&H	270	3	80% AM (1kHz)	Note 1	A

Note: 1. The EUT function was correct during the test.

20.6 Test Results (Mode 2)

Input Power	DC 48V from PoE	Test mode	Mode 2
Enviromental conditions	26 °C, 50% RH	Tested by	Barry Lee

Frequency (MHz)	Polarity	Azimuth(°)	Applied Field Strength		Observation	Performance Criterion
			(V/m)	Modulation		
80 -1000	V&H	0	3	80% AM (1kHz)	Note 1	A
80 -1000	V&H	90	3	80% AM (1kHz)	Note 1	A
80 -1000	V&H	180	3	80% AM (1kHz)	Note 1	A
80 -1000	V&H	270	3	80% AM (1kHz)	Note 1	A

Note: 1. The EUT function was correct during the test.

21 Electrical Fast Transient/Burst Immunity Test (EFT)

21.1 Test Specification

Basic Standard:	EN/IEC 61000-4-4
Test Voltage:	Signal / telecommunication port: ±0.5kV Input DC power port: NA Input AC power port: ±1kV
Impulse Repetition Frequency:	xDSL telecommunication port: 100kHz others: 5kHz
Impulse Wave Shape:	5/50 ns
Burst Duration:	0.75 ms for 100kHz Repetition Frequency 15 ms for 5kHz Repetition Frequency,
Burst Period:	300 ms
Test Duration:	1 min.

21.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
TRANSIENT EMC PARTNER	TRA2000IN6	1121	Jan. 16, 2014	Jan. 15, 2015
CN-EFT100 EMC PARTNER	CN-EFT1000	662	NA	NA
Adapter	NA	SU1ADA-002	NA	NA
Software EMC PARTNER,	Test Manger_V1.53	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in EMS room B.
3 Tested Date: Aug. 01, 2014

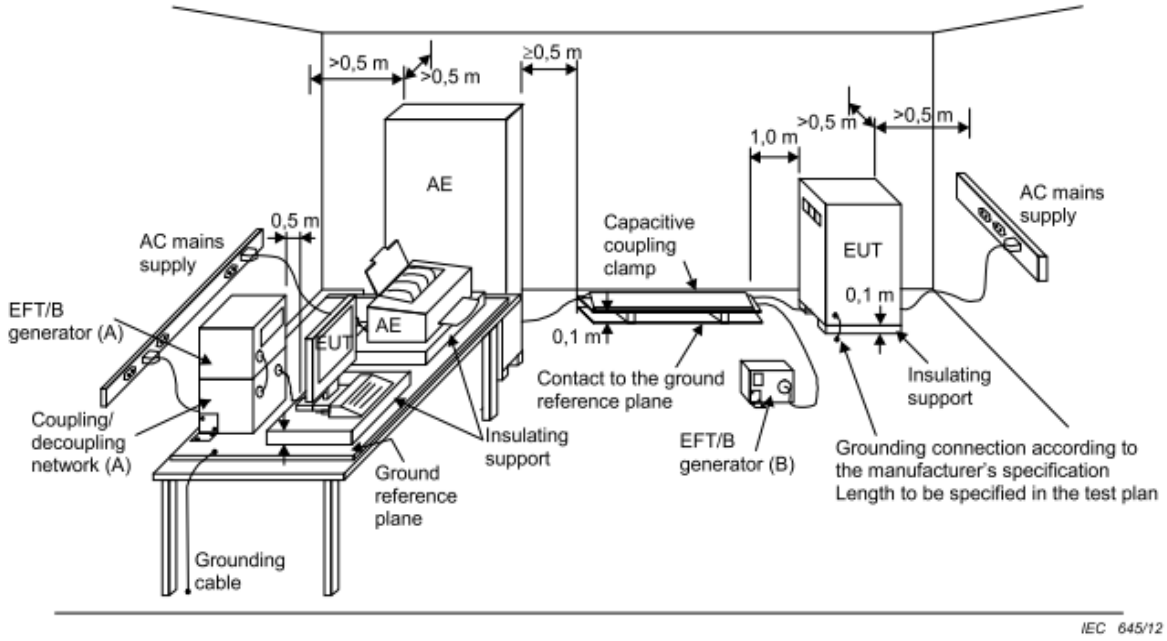
21.3 Test Arrangement

a. Both positive and negative polarity discharges were applied.

b. The distance between any coupling devices and the EUT should be 0.5 m for table-top equipment testing, and 1.0 m for floor standing equipment.

c. The duration time of each test sequential was 1 minute.

d. The transient/burst waveform was in accordance with EN/IEC 61000-4-4, 5/50 ns.



NOTE:
(A) location for supply line coupling
(B) location for signal lines coupling

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

21.4 Supplementary Information

There is not any deviation from the test standards for the test method.

21.5 Test Results (Mode 1)

Input Power	230 Vac, 50 Hz	Test mode	Mode 1
Enviromental conditions	25 °C, 54% RH	Tested by	Anderson Chen

Input AC power port

Voltage (kV)	Test Point	Polarity (+/-)	Observation	Performance Criterion
1	L1	+/-	Note 1	A
1	L2	+/-	Note 1	A
1	L1-L2	+/-	Note 1	A

Signal port

Voltage (kV)	Test Point	Polarity (+/-)	Observation	Performance Criterion
0.5	WAN/PoE	+/-	Note 1	A
0.5	LAN	+/-	Note 1	A

Note: 1. The EUT function was correct during the test.

21.6 Test Results (Mode 2)

Input Power	DC 48V from PoE	Test mode	Mode 2
Enviromental conditions	25 °C, 54% RH	Tested by	Anderson Chen

Signal port

Voltage (kV)	Test Point	Polarity (+/-)	Observation	Performance Criterion
0.5	WAN/PoE	+/-	Note 1	A
0.5	LAN	+/-	Note 1	A

Note: 1. The EUT function was correct during the test.

22 Surge Immunity Test

22.1 Test Specification

Basic Standard:	EN/IEC 61000-4-5
Wave-Shape:	Signal / telecommunication port (direct to outdoor cables*): 10/700 µs Open Circuit Voltage 5/320 µs Short Circuit Current Input DC power port (direct to outdoor cables*): 1.2/50 µs Open Circuit Voltage 8/20 µs Short Circuit Current Input AC power port: 1.2/50 µs Open Circuit Voltage 8/20 µs Short Circuit Current
Test Voltage:	Signal and telecommunication ports**: w/o primary protectors: NA, with primary protectors fitted: NA Input DC power port: NA Input AC power ports: Line to line: ±0.5kV, ±1kV, Line to earth or ground: NA
AC Phase Angle (degree):	0°, 90°, 180°, 270°
Pulse Repetition Rate:	1 time / 20 sec.
Number of Tests:	5 positive and 5 negative at selected points

* This test is only applicable only to ports, which according to the manufacturer's specification, may connect directly to outdoor cables.

** For ports where primary protection is intended, surges are applied at voltages up to 4 kV with the primary protectors fitted. Otherwise the 1 kV test level is applied without primary protection in place.

22.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
TRANSIENT EMC PARTNER	TRA2000IN6	1121	Jan. 16, 2014	Jan. 15, 2015
CDN-UTP8 EMC PARTNER	CDN-UTP8	036	Jan. 25, 2014	Jan. 24, 2015
Adapter	NA	SU1ADA-002	NA	NA
Software EMC PARTNER	Test Manger_V1.53	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in EMS room B.
3 Tested Date: Aug. 01, 2014

22.3 Test Arrangement

a. Input AC/DC Power ports:

The surge is to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

For double-insulated products without PE or external earth connections, the test shall be done in a similar way as for grounded products but without adding any additional external grounded connections. If there are no other possible connections to earth, line-to-ground tests may be omitted.

b. Signal and telecommunication ports,

I Unshielded unsymmetrical interconnection lines:

The surge is applied to the lines via the capacitive coupling. The coupling / decoupling networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length.

I Unshielded symmetrical interconnections communication lines:

The surge is applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor cannot be specified. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length.

I High speed communications lines

Prior to the test, the correct operation of the port shall be verified; the external connection shall then be removed and the surge applied directly to the port's terminals with no coupling /decoupling network. After the surge, the correct operation of the port shall again be verified.

I Shielded lines:

- Direct application,

The EUT is isolated from ground and the surge is applied to its metallic enclosure; the termination (or auxiliary equipment) at the port(s) under test is grounded. This test applies to equipment with single or multiple shielded cables.

Rules for application of the surge to shielded lines:

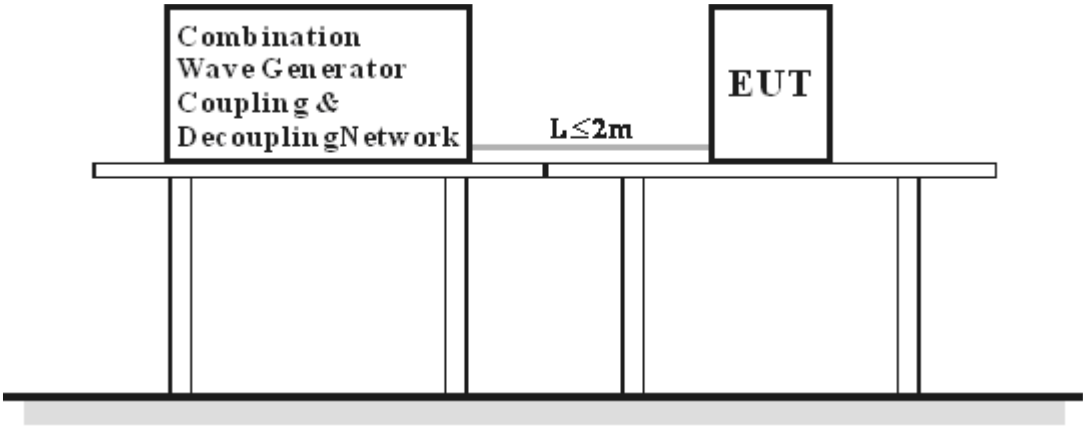
a) Shields grounded at both ends
   - The surge injection on the shield.

b) Shields grounded at one end
   - If in the installation the shield is connected only at the auxiliary equipment, test shall be done in that configuration but with the generator still connected to the EUT side. If cable lengths allow, the cables shall be on insulated supports 0,1 m above the ground plane or cable tray.

For products which do not have metallic enclosures, the surge is applied directly to the shielded cable.

- Alternative coupling method for testing single cables in a multi-shield configuration,

Surges are applied in close proximity to the interconnection cable under test by a wire. The length of the cable between the port(s) under test and the device attached to the other end of the cable shall be the lesser of: the maximum length permitted by the EUT's specification, or 20 m. Where the length exceeds 1 m, excess lengths of cables shall be bundled at the approximate centre of the cables with the bundles 30 cm to 40 cm in length.



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

22.4 Supplementary Information

There is not any deviation from the test standards for the test method.

22.5 Test Results (Mode 1)

Input Power	230 Vac, 50 Hz	Test mode	Mode 1
Enviromental conditions	25 °C, 54% RH	Tested by	Anderson Chen

Input AC power port

Voltage (kV)	Test Point	Polarity (+/-)	Observation	Performance Criterion
0.5, 1	L1-L2	+/-	Note 1	A

Note: 1. The EUT function was correct during the test.

23 Immunity to Conducted Disturbances Induced by RF Fields (CS)

23.1 Test Specification

Basic Standard:	EN/IEC 61000-4-6
Frequency Range:	0.15 MHz - 80 MHz
Voltage Level:	3 V
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Dwell Time	3 seconds

23.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Signal Generator R&S	SML 03	101364	Aug. 20, 2013	Aug.19, 2014
Amplifier AR	75A250AM2	307297	NA	NA
Voltage Meter BOONTON RF	4232A	93801	Dec. 10, 2013	Dec. 09, 2014
LUTHIE EM Injection Clamp	EM-101	35453	May 21, 2014	May 20, 2015
CDN M2 FCC	FCC-801-M2-16A	03048	Jan. 07, 2014	Jan. 06, 2015
CDN M3 FCC	FCC-801-M3-16A	03055	Jan. 07, 2014	Jan. 06, 2015
Coupling Decoupling Network Fischer Custom Communications Inc	FCC-801-T2	02025	Oct. 08, 2013	Oct. 07, 2014
Coupling Decoupling Network Fischer Custom Communications Inc	FCC-801-T4	02030	Oct. 08, 2013	Oct. 07, 2014
Coupling Decoupling Network Fischer Custom Communications Inc	FCC-801-T8	02036	Oct. 08, 2013	Oct. 07, 2014
ADT CS Test Workbench(Software)	ADT_CS_V7.4.2	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Chamber Room No. B.
3 Tested Date: Aug. 04, 2014

23.3 Test Arrangement

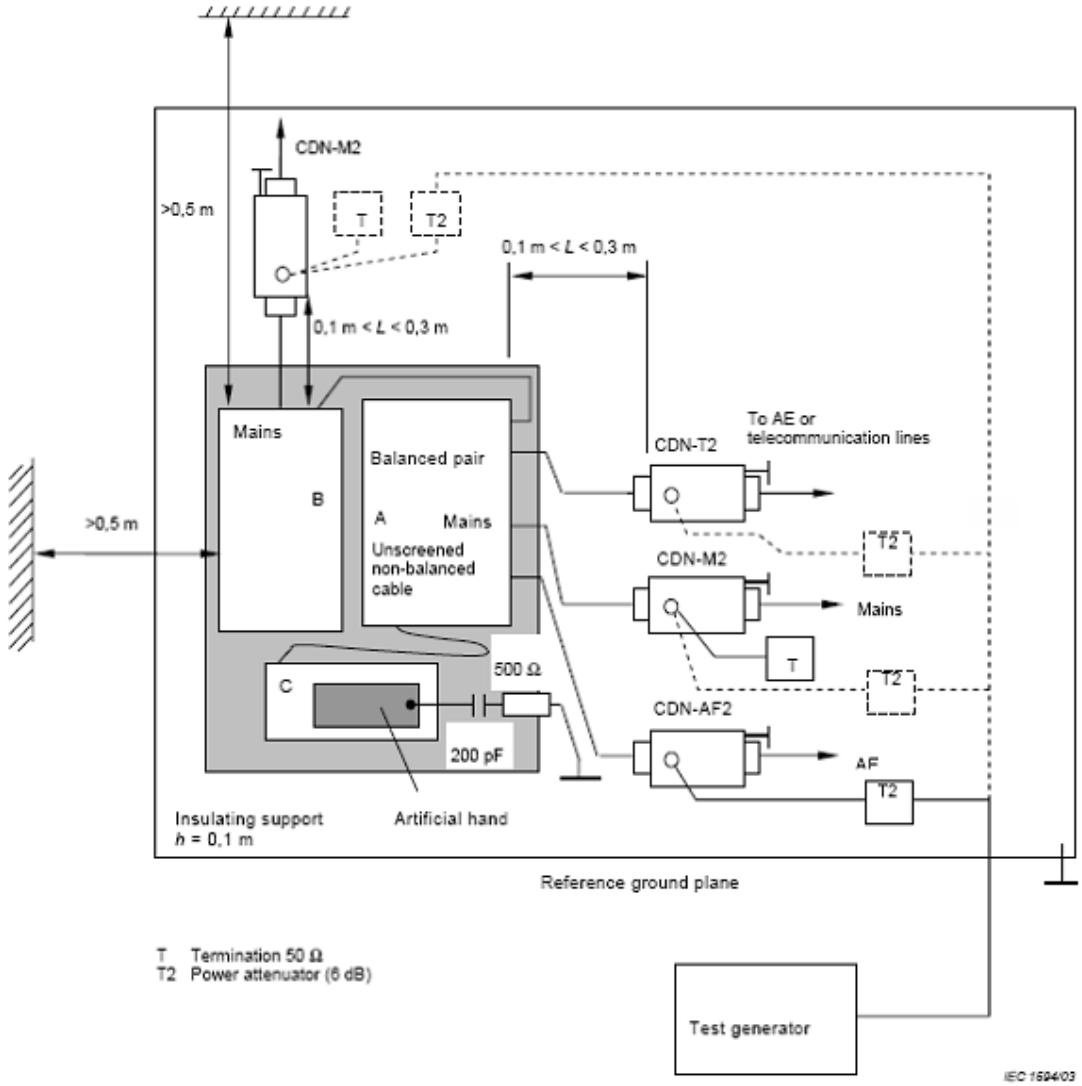
a. The EUT shall be tested within its intended operating and climatic conditions.

b. An artificial hand was placed on the hand-held accessory and connected to the ground reference plane.

c. One of the CDNs not used for injection was terminated with 50 ohm, providing only one return path. All other CDNs were coupled as decoupling networks.

d. The frequency range is swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal is modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. Where the frequency is swept incrementally, the step size shall not exceed 1 % of the preceding frequency value.

e. Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.



Note: 1.The EUT clearance from any metallic obstacles shall be at least 0,5 m.
2. Interconnecting cables (≦1 m) belonging to the EUT shall remain on the insulating support.
For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

23.4 Supplementary Information

There is not any deviation from the test standards for the test method.

23.5 Test Results (Mode 1)

Input Power	230 Vac, 50 Hz	Test mode	Mode 1
Enviromental conditions	26 °C, 50% RH	Tested by	Barry Lee

Frequency (MHz)	Level (Vrms)	Tested Line	Injection Method	Return Path	Observation	Performance Criterion
0.15 – 80	3	AC Main	CDN-M2	CDN-T8	Note 1	A
0.15 – 80	3	UTP (WAN/PoE)	CDN-T8	CDN-M2	Note 1	A
0.15 – 80	3	UTP (LAN)	CDN-T4	CDN-M2	Note 1	A

Note: 1. The EUT function was correct during the test.

23.6 Test Results (Mode 2)

Input Power	DC 48V from PoE	Test mode	Mode 2
Enviromental conditions	26 °C, 50% RH	Tested by	Barry Lee

Frequency (MHz)	Level (Vrms)	Tested Line	Injection Method	Return Path	Observation	Performance Criterion
0.15 – 80	3	UTP (WAN/PoE)	CDN-T8	CDN-T4	Note 1	A
0.15 – 80	3	UTP (LAN)	CDN-T4	CDN-T8	Note 1	A

Note: 1. The EUT function was correct during the test.

24 Power Frequency Magnetic Field Immunity Test

24.1 Test Specification

Basic Standard:	EN/IEC 61000-4-8
Frequency Range:	50Hz
Field Strength:	1 A/m
Observation Time:	1 minute
Inductance Coil:	Helmholtz coil, diameter 1.5m

24.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Triaxial Elf Magnetic Field Meter BELL	4090	NA	Jan. 03, 2014	Jan. 02, 2015
Power frequency magnetic filed coil 3ctest	TCX30	EC1281401	Feb. 28, 2014	Feb. 27, 2015
Power frequency magnetic filed generator 3ctest	PFMF-1200G	EC0111401	Feb. 28, 2014	Feb. 27, 2015

Note:

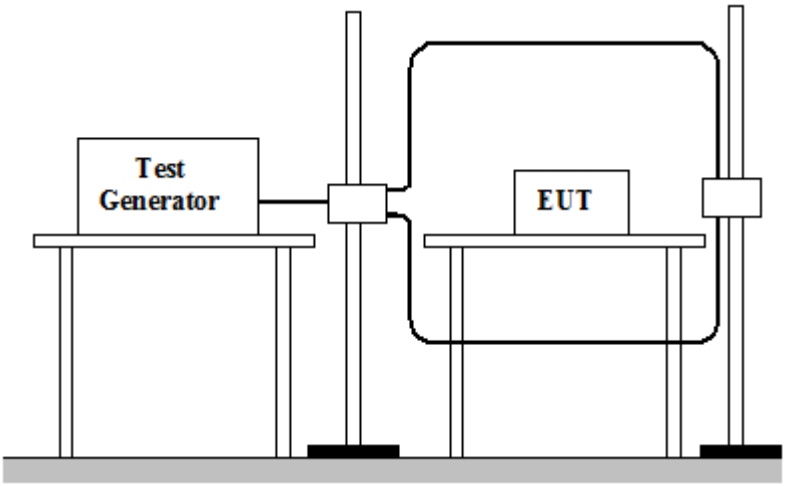
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in EMS room.
3 Tested Date: July 25, 2014

24.3 Test Arrangement

a. The equipment is configured and connected to satisfy its functional requirements.

b. The power supply, input and output circuits shall be connected to the sources of power supply, control and signal.

c. The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.



Tabletop equipment
The equipment shall be subjected to the test magnetic field (see example as above).
The plane of the inductive coil shall then be rotated by 90° in order to expose the EUT to the test field with different orientations.

24.4 Supplementary Information

There is not any deviation from the test standards for the test method.

24.5 Test Results (Mode 1)

Input Power	230 Vac, 50 Hz	Test mode	Mode 1
Enviromental conditions	25 °C, 64% RH	Tested by	Sean Huang

Application	Frequency (Hz)	Field Strength (A/m)	Observation	Performance Criterion
X - Axis	50	1	Note 1	A
Y - Axis	50	1	Note 1	A
Z - Axis	50	1	Note 1	A

Note: 1. The EUT function was correct during the test.

24.6 Test Results (Mode 2)

Input Power	DC 48V from PoE	Test mode	Mode 2
Enviromental conditions	25 °C, 64% RH	Tested by	Sean Huang

Application	Frequency (Hz)	Field Strength (A/m)	Observation	Performance Criterion
X - Axis	50	1	Note 1	A
Y - Axis	50	1	Note 1	A
Z - Axis	50	1	Note 1	A

Note: 1. The EUT function was correct during the test.

25 Voltage Dips and Interruptions

25.1 Test Specification

Basic Standard:	EN/IEC 61000-4-11
Test levels:	Voltage Dips: >95% reduction – 0.5 period 30% reduction – 25 periods Voltage Interruptions: >95% reduction – 250 periods
Interval between Event:	Minimum ten seconds
Sync Angle (degrees):	0° / 180°
Test Cycle:	3 times

25.2 Test Instruments

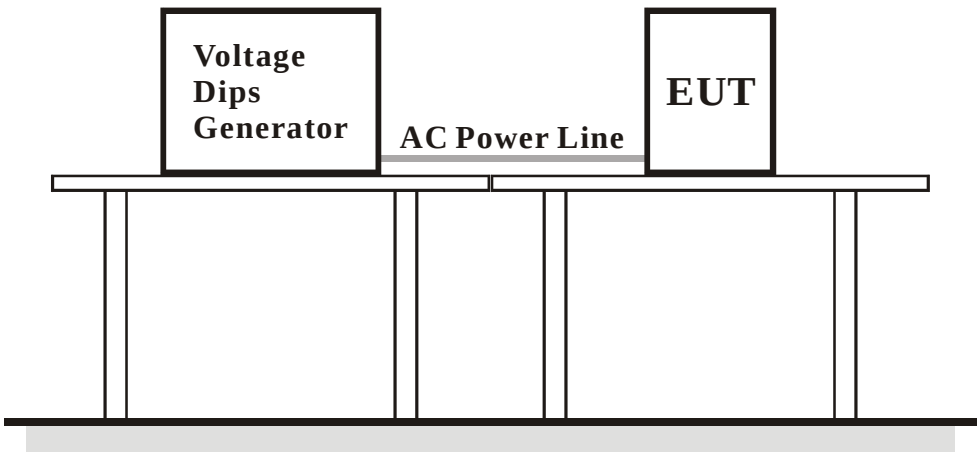
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
TRANSIENT EMC PARTNER	TRA2000IN6	1121	Jan. 16, 2014	Jan. 15, 2015
Adapter	NA	SU1ADA-002	NA	NA
(Software) EMC Partner	Test Manger_V1.53	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in EMS room B.
3 Tested Date: Aug. 01, 2014

25.3 Test Arrangement

The EUT shall be tested for each selected combination of test levels and duration with a sequence of 3 dips/interruptions with intervals of 10 s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at 0 dregee crossover point of the voltage waveform.



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

25.4 Supplementary Information

There is not any deviation from the test standards for the test method.

25.5 Test Results (Mode 1)

Input Power	230 Vac / 240 Vac / 100 Vac, 50 Hz	Test mode	Mode 1
Enviromental conditions	25 °C, 54% RH	Tested by	Anderson Chen

Input Power for testing: 230 Vac, 50 Hz (Nominal input Voltage)					
Voltage Reduction (%)	Duration (period)	Interval (sec)	Times	Observation	Performance Criterion
>95	0.5	10	3	Note 1	A
30	25	10	3	Note 1	A
>95	250	10	3	Note 2	B

Input Power for testing: 240 Vac, 50 Hz (Maximum rated input voltage)					
Voltage Reduction (%)	Duration (period)	Interval (sec)	Times	Observation	Performance Criterion
>95	0.5	10	3	Note 1	A
30	25	10	3	Note 1	A
>95	250	10	3	Note 2	B

Input Power for testing: 100 Vac, 50 Hz (Minimum rated input voltage)					
Voltage Reduction (%)	Duration (period)	Interval (sec)	Times	Observation	Performance Criterion
>95	0.5	10	3	Note 1	A
30	25	10	3	Note 1	A
>95	250	10	3	Note 2	B

Note: 1. The EUT function was correct during the test.
2. The EUT reboot situation during the test, but it could be self-recoverable after the test.

26 Pictures of Test Arrangements

26.1 Conducted Disturbance at Mains Ports

For Mode 1

For Mode 2

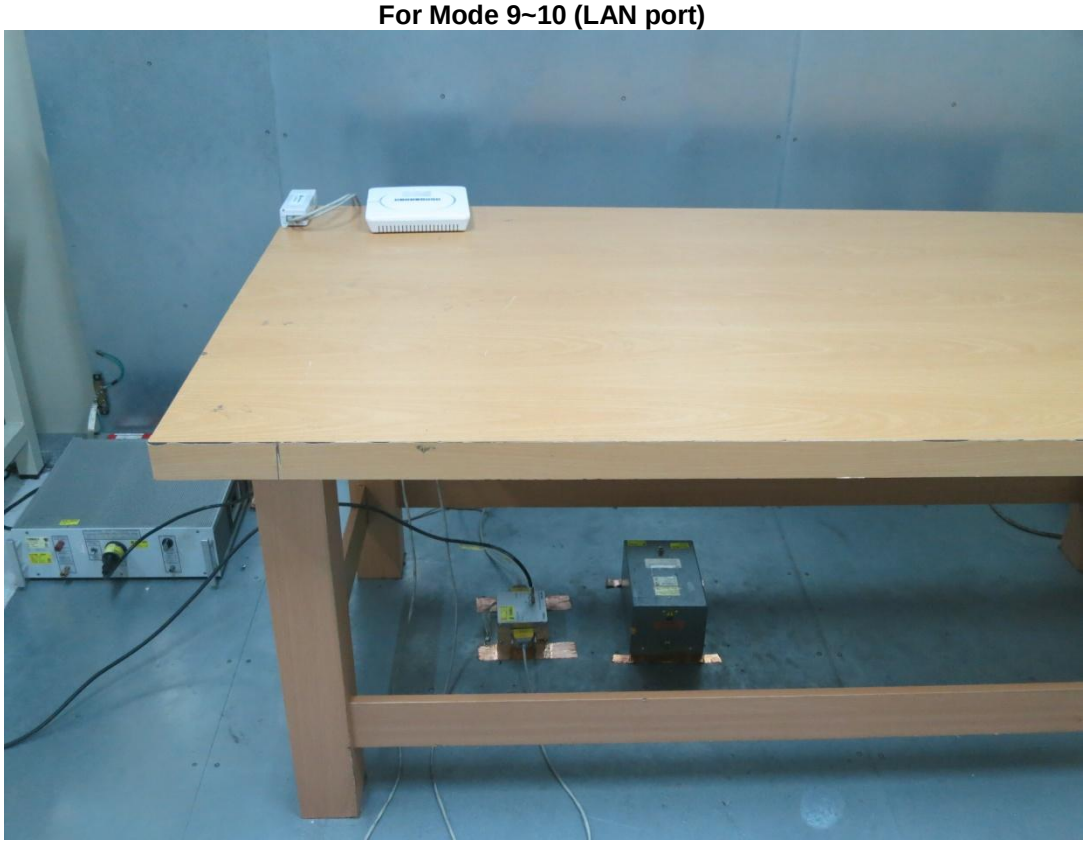
26.2 Conducted Disturbance at Telecommunication Ports

For Mode 1~3 (WAN/PoE port)

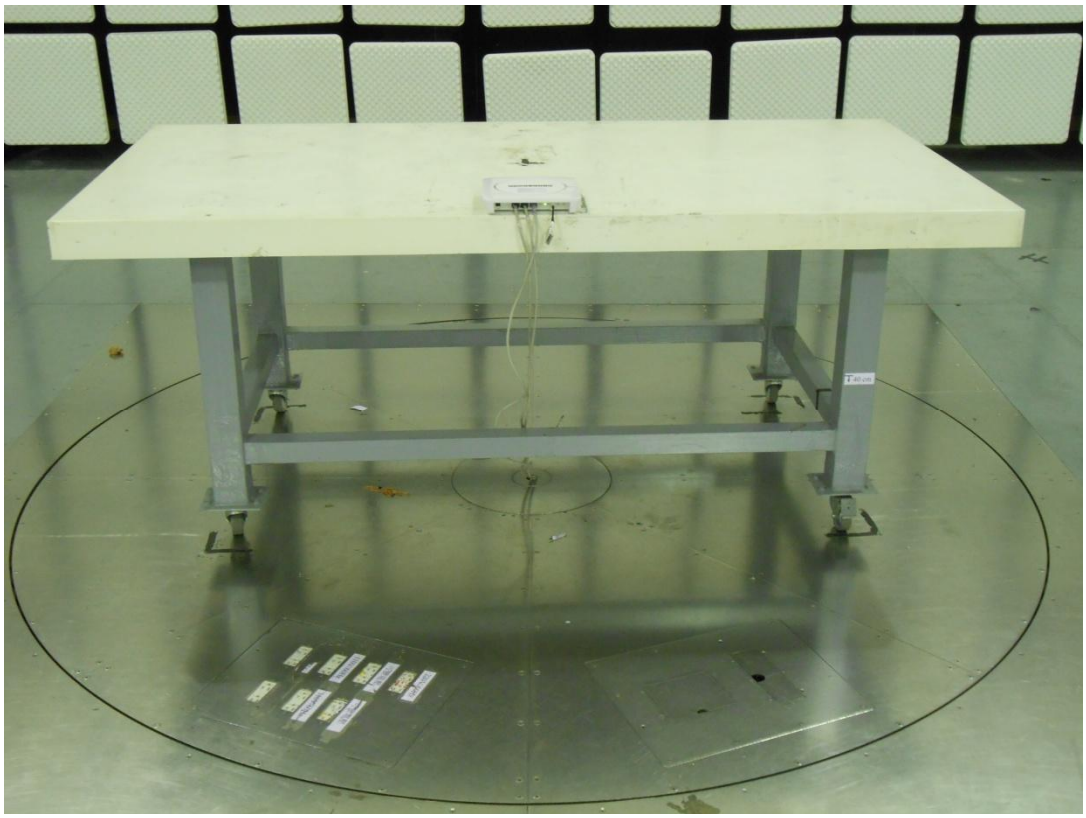
For Mode 4~5 (LAN port)

For Mode 6~8 (WAN/PoE port)

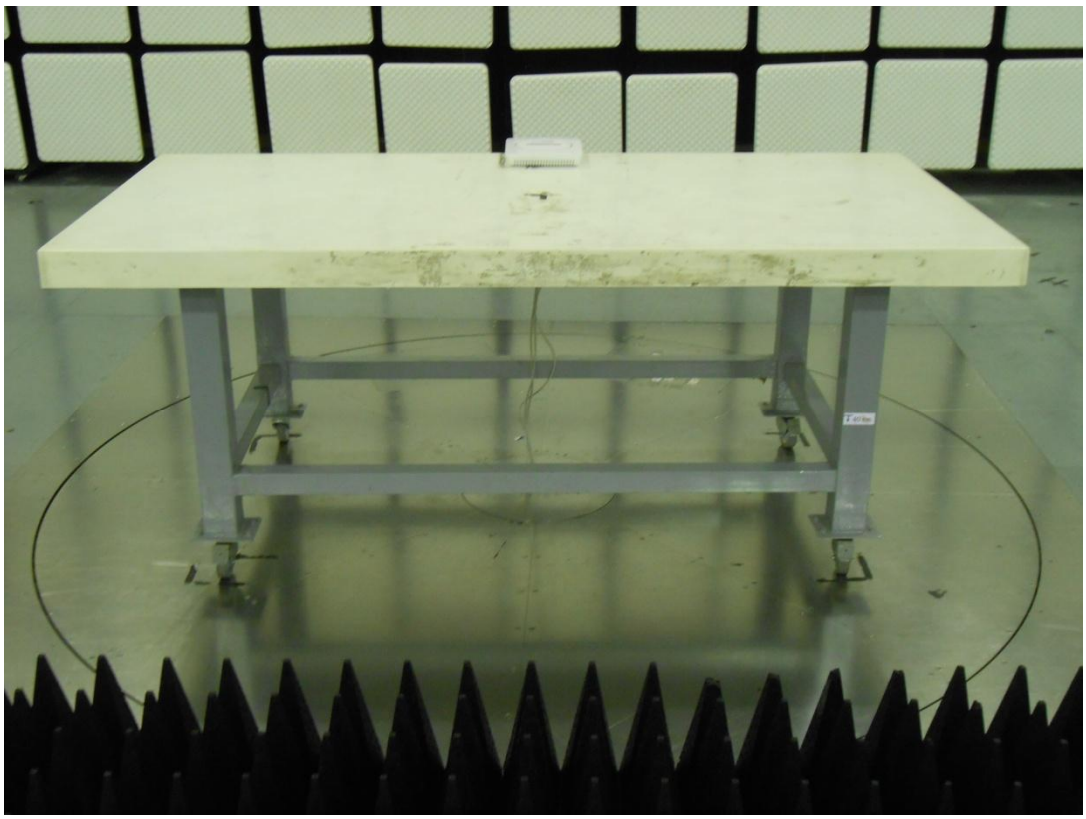
For Mode 9~10 (LAN port)

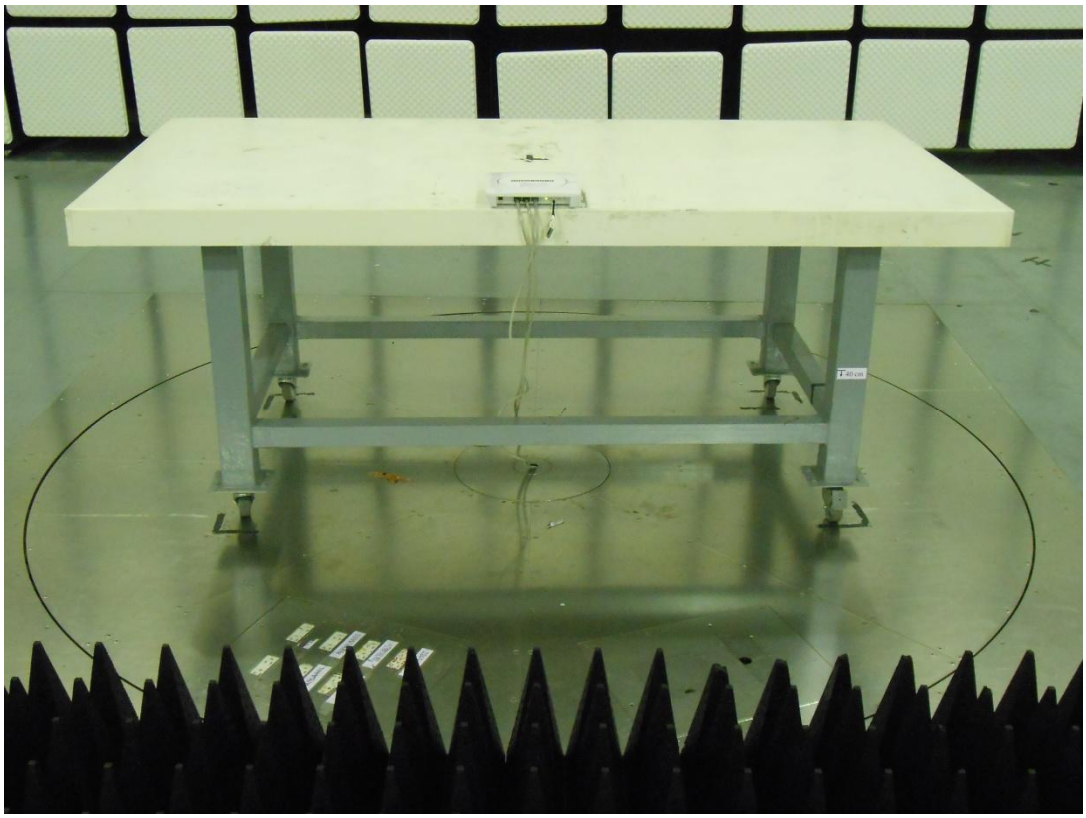


26.3 Radiated Disturbance up to 1 GHz

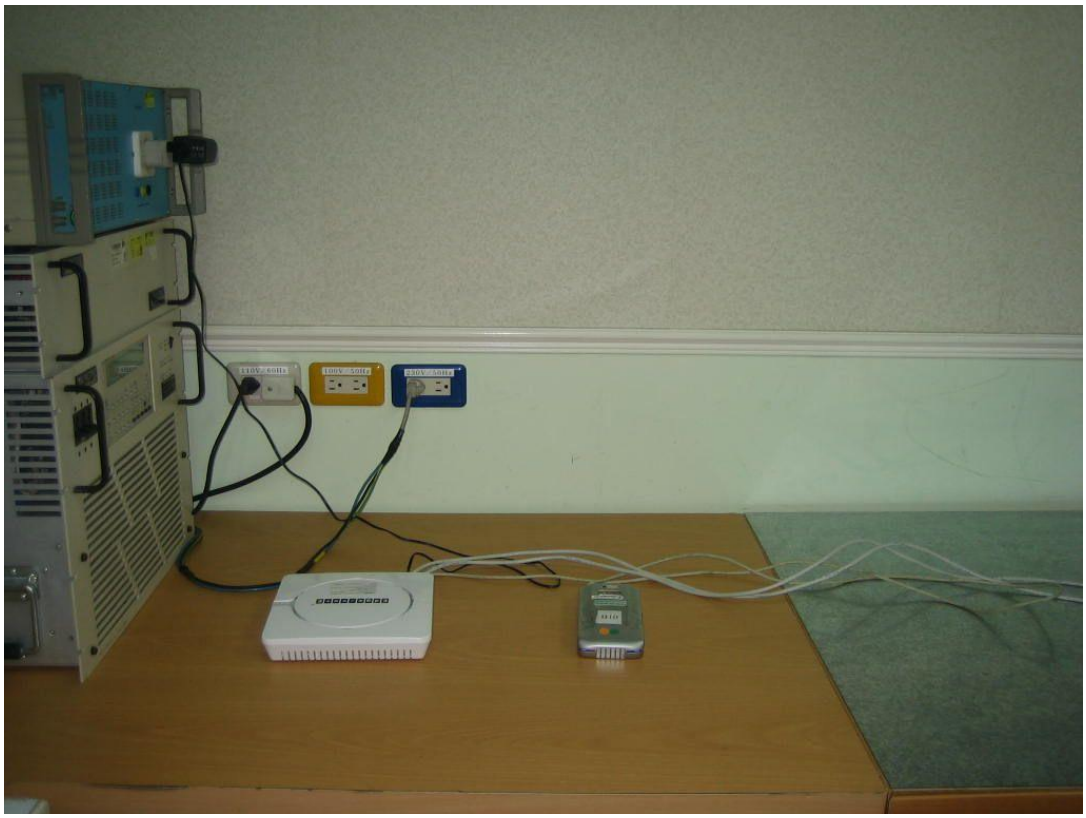


26.4 Radiated Disturbance above 1 GHz





26.5 Harmonics Current, Voltage Fluctuations and Flicker Measurement



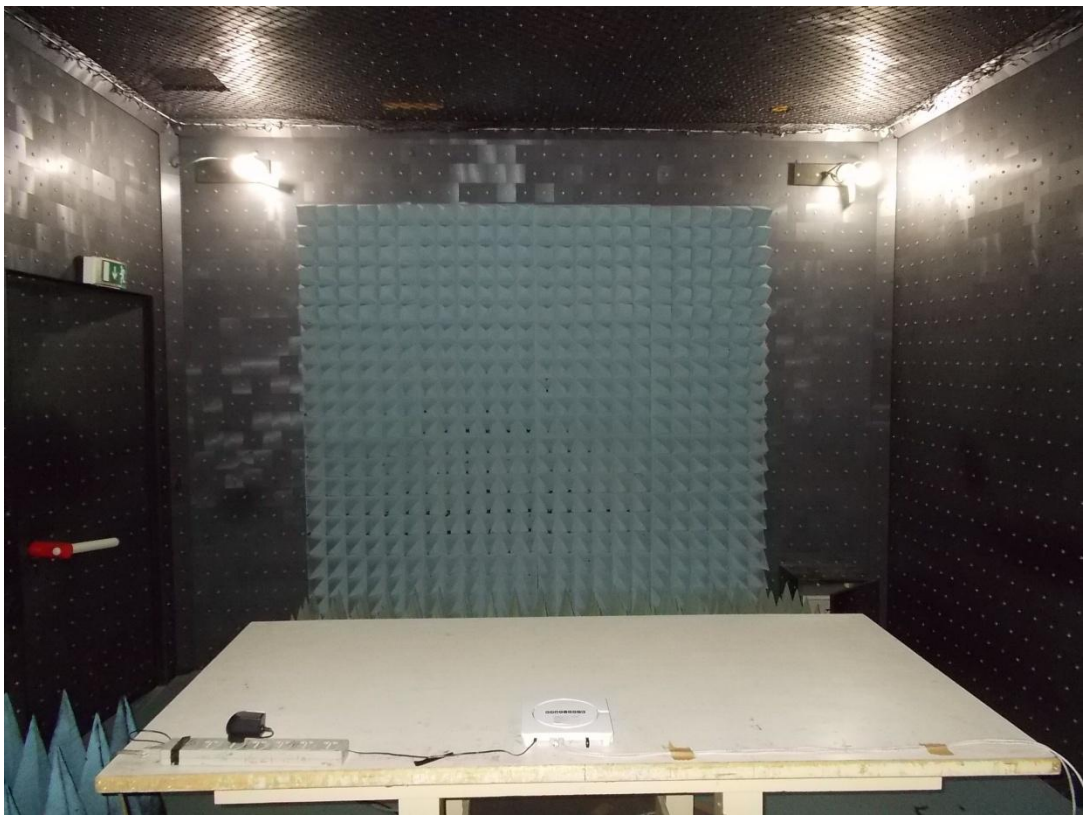
26.6 Electrostatic Discharge Immunity Test (ESD)

For Mode 1

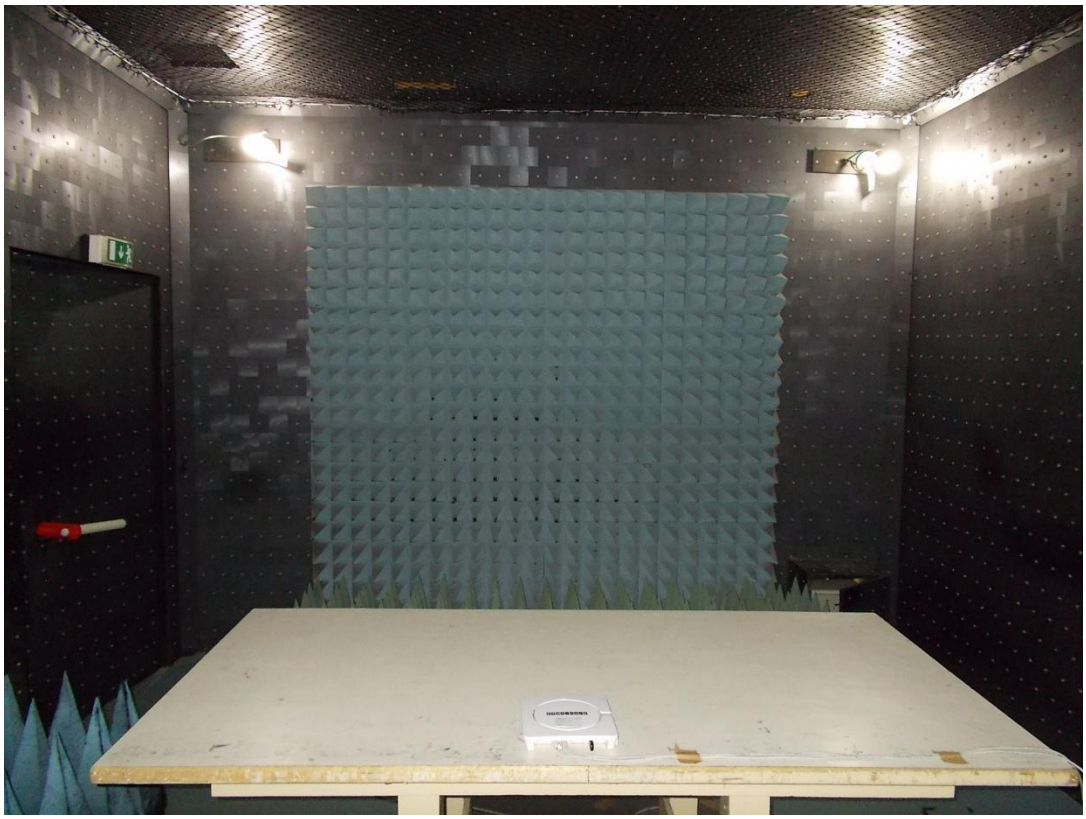
For Mode 2

26.7 Radio-frequency, Electromagnetic Field Immunity Test (RS)

For Mode 1



For Mode 2



26.8 Electrical Fast Transient/Burst Immunity Test (EFT)

For Mode 1

WAN/PoE port

LAN port

For Mode 2

WAN/PoE port

LAN port

26.9 Surge Immunity Test

For Mode 1

WAN/PoE port

LAN port

For Mode 2

WAN/PoE port

LAN port

26.10 Conducted Disturbances Induced by RF Fields (CS)

For Mode 1

WAN/PoE port

LAN port

For Mode 2

WAN/PoE port

LAN port

26.11 Power Frequency Magnetic Field Immunity Test (PFMF)

For Mode 1

For Mode 2

26.12 Voltage Dips and Interruptions

Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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