EMC Test report

Product Type	:	ADSL2/2+ IP DSLAM
Applicant	:	DrayTek Corp.
Address	:	No. 26, Fu-Shing Rd., HuKou County, Hsin-Chu Industrial Park, Hsin-Chu,Taiwan 303 R.O.C.
Trade Name	:	DrayTek
Model No.	:	VigorAccess A48 Series
Test Specification	:	EN 55022:2006+A1:2007 / Class A EN 55024:1998+A1:2001+A2:2003 EN 61000-3-2:2006 / Class A EN 61000-3-3:1995+A1:2001+A2:2005
Issue Date	:	Mar. 31, 2010

Issue by

A Test Lab Techno Corp.
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Taiwan Accreditation Foundation accreditation number: 1330

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Revision History

Rev.	Issue Date	Revisions	Revised By
00	Jan. 28, 2010	Initial Issue	
01	Feb. 01, 2010	Revise Trade Name.	Joyce Liao
02	Mar. 31, 2010	Add model list difference, DC test and photos of DC sample.	Linda Su

Test Report Certification

Issued Date: 2010/03/31

Product Type	:	ADSL2/2+ IP DSLAM
Applicant	:	DrayTek Corp.
Address	:	No. 26, Fu-Shing Rd., HuKou County, Hsin-Chu Industrial Park, Hsin-Chu,Taiwan 303 R.O.C.
Trade Name	:	DrayTek
Model No.	:	VigorAccess A48 Series
EUT Rated Voltage	:	AC 100-240V, 50-60Hz, 2.7/1.2A DC -42 ~ -60V, 3.2A, 100W
Test Voltage	:	230 Vac / 50 Hz
Applicable Standard	:	EN 55022:2006+A1:2007 / Class A EN 55024:1998+A1:2001+A2:2003 EN 61000-3-2:2006 / Class A EN 61000-3-3:1995+A1:2001+A2:2005
Test Result	:	Complied
Performed Lab.	:	A Test Lab Techno Corp. No. 140-1, Changan Street, Bade City, Taoyuan Country 334, Taiwan R.O.C. Tel：+86-3-2710188 / Fax：+86-3-2710190 Taiwan Accreditation Foundation accreditation number: 1330 http://www.atl-lab.com.tw/e-index.htm

The above equipment has been tested by A Test Lab Techno Corp., and found compliance with the requirements set forth in the Electromagnetic Compatibility Directive 2004/108/EC and technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved By	:	Miller Lee	Reviewed By	: Gary Wu
(Manager)		(Miller Lee)	(Testing Engineer)	(Gary Wu)

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1 General Information

1.1 Summary of Test Result

Emission			
Standard	**Item**	**Result**	**Remark**
EN 55022: 2006+A1: 2007	Conducted and Radiated Emission	PASS	Meet Class A limit
EN 61000-3-2: 2006	Harmonic current emissions	PASS	Meet Class A limit
EN 61000-3-3: 1995+ A1: 2001 + A2: 2005	Voltage fluctuations & flicker	PASS	Meets the requirements

Immunity			
Standard	**Item**	**Result**	**Remark**
IEC 61000-4-2: 2008	ESD	PASS	Meets the requirements of Criterion B
EN 61000-4-3: 2006 +A1:2008	RS	PASS	Meets the requirements of Criterion A
EN 61000-4-4: 2004	EFT	PASS	Meets the requirements of Criterion B
EN 61000-4-5: 2006	Surge	PASS	Meets the requirements of Criterion B
IEC 61000-4-6: 2008	CS	PASS	Meets the requirements of Criterion A
EN 61000-4-8: 1993 +A1:2001	PMF	PASS	Meets the requirements of Criterion A
EN 61000-4-11: 2004	Voltage dips & voltage variations	PASS	Meets the requirements of **Voltage Dips:** 1) >95% reduction Criterion B 2) 30% reduction Criterion C **Voltage Interruptions:** 1) >95% reduction Criterion C

The test results of this report relate only to the tested sample(s) identified in this report. Manufacturer or whom it may concern should recognize the pass or fail of the test result.

1.2 Measurement Uncertainty

Conducted Emission

The measurement uncertainty is evaluated as ± 2.26 dB.

Conducted Emissions (Telecommunication Ports)

The measurement uncertainty is evaluated as ± 2.26 dB.

Radiated Emission

The measurement uncertainty is evaluated as ± 3.19 dB.

Harmonic Current Emission

The measurement uncertainty is evaluated as ± 1.2 %.

Voltage Fluctuations and Flicker

The measurement uncertainty is evaluated as ± 1.5 %.

Electrostatic Discharge

As what is concluded in the document from Note2 of clause 5.4.6.2 of ISO/IEC 17025: 2005[E], the requirements for measurement uncertainty in ESD testing are deemed to have been satisfied, and the testing is reported in accordance with the relevant ESD standards. The immunity test signal from the ESD system meet the required specifications in IEC 61000-4-2 through the calibration report with the calibrated uncertainty for the waveform of voltage and timing as being 1.52 % and 2.69%.

Radiated susceptibility

As what is concluded in the document from Note2 of clause 5.4.6.2 of ISO/IEC 17025: 2005[E], the requirements for measurement uncertainty in RS testing are deemed to have been satisfied, and the testing is reported in accordance with the relevant RS standards. The immunity test signal from the RS system meet the required specifications in IEC 61000-4-3 through the calibration for the uniform field strength and monitoring for the test level with the uncertainty evaluation report for the electrical filed strength as being 2.65 dB.

Electrical fast transient/burst

As what is concluded in the document from Note2 of clause 5.4.6.2 of ISO/IEC 17025: 1999[2], the requirements for measurement uncertainty in EFT/Burst testing are deemed to have been satisfied, and the testing is reported in accordance with the relevant FT/Burst standards. The immunity test signal from the FT/Burst system meet the required specifications in IEC 61000-4-4 through the calibration report with the calibrated uncertainty for the waveform of voltage. Frequency and timing as being 1.57% and 2.73%.

Surge

As what is concluded in the document from Note2 of clause 5.4.6.2 of ISO/IEC 17025: 2005[E], the requirements for measurement uncertainty in Surge testing are deemed to have been satisfied, and the testing is reported in accordance with the relevant Surge standards. The immunity test signal from the Surge system meet the required specifications in IEC 61000-4-5 through the calibration report with the calibrated uncertainty for the waveform of voltage and timing as being 1.58 % and 2.71%.

Conducted susceptibility

As what is concluded in the document from Note2 of clause 5.4.6.2 of ISO/IEC 17025: 2005[E], the requirements for measurement uncertainty in CS testing are deemed to have been satisfied, and the testing is reported in accordance with the relevant CS standards. The immunity test signal from the CS system meet the required specifications in IEC 61000-4-6 through the calibration for unmodulated signal and monitoring for the test level with the uncertainty evaluation report for the injected modulated signal level through CDN and EM Clamp/Direct Injection as being 3.68 dB and 2.72 dB.

Power frequency magnetic field

As what is concluded in the document from Note2 of clause 5.4.6.2 of ISO/IEC 17025: 2005[E], the requirements for measurement uncertainty in PFM testing are deemed to have been satisfied, and the testing is reported in accordance with the relevant PFM standards. The immunity test signal from the PFM system meet the required specifications in IEC 61000-4-8 through the calibration report with the calibrated uncertainty for the Gauss Meter to verify the output level of magnetic field strength as being 1.8 %.

Voltage dips and interruption

As what is concluded in the document from Note2 of clause 5.4.6.2 of ISO/IEC 17025: 2005[E], the requirements for measurement uncertainty in DIP testing are deemed to have been satisfied, and the testing is reported in accordance with the relevant DIP standards. The immunity test signal from the DIP system meet the required specifications in IEC 61000-4-11 through the calibration report with the calibrated uncertainty for the waveform of voltage and timing as being 1.58 % and 2.72%.

2 EUT Description

Product	:	ADSL2/2+ IP DSLAM
Trade Name	:	DrayTek
Model No.	:	VigorAccess A48 Series
Applicant	:	DrayTek Corp. No. 26, Fu-Shing Rd., HuKou County, Hsin-Chu Industrial Park, Hsin-Chu,Taiwan 303 R.O.C.
Manufacturer	:	DrayTek Corp. No. 26, Fu-Shing Rd., HuKou County, Hsin-Chu Industrial Park, Hsin-Chu,Taiwan 303 R.O.C.
EUT Power Rating	:	AC 100-240V, 50-60Hz, 2.7/1.2A DC -42 ~ -60V, 3.2A, 100W

I/O Port Description :

I/O PORT TYPES	Q'TY	Test Description
1). LAN Port	4	Connected to Notebook and Terminal
2). Fiber Port	2	Connected to Switch
3). Signal Port	4	Connected to PSTN and Telephone

Difference Description of EUT

VigorAccess A48 Series model list and difference									
Item	**Model No.**	**DSL 25-48**	**G2 (GLAN)**	**G3**	**G4**	**DC**	**AC**	**ALARM PORT**	**DSL LED**
1	A48M-2-SFP-DC-AL	■	■	■	■	■	□	■	■
2	A48M-2-SFP-DC-A	■	■	■	■	■	□	■	□
3	A48M-2-SFP-DC-L	■	■	■	■	■	□	□	■
4	A48M-2-SFP-DC-S	■	■	■	■	■	□	□	□
5	A48M-2-SFP-AC-AL	■	■	■	■	□	■	■	■
6	A48M-2-SFP-AC-A	■	■	■	■	□	■	■	□
7	A48M-2-SFP-AC-L	■	■	■	■	□	■	□	■
8	A48M-2-SFP-AC-S	■	■	■	■	□	■	□	□
9	A48M-1-SFP-DC-AL	■	■	■	□	■	□	■	■
10	A48M-1-SFP-DC-A	■	■	■	□	■	□	■	□
11	A48M-1-SFP-DC-L	■	■	■	□	■	□	□	■
12	A48M-1-SFP-DC-S	■	■	■	□	■	□	□	□

VigorAccess A48 Series model list and difference									
Item	Model No.	DSL 25-48	G2 (GLAN)	G3	G4	DC	AC	ALARM PORT	DSL LED
13	A48M-1-SFP-AC-AL	■	■	■	□	□	■	■	■
14	A48M-1-SFP-AC-A	■	■	■	□	□	■	■	□
15	A48M-1-SFP-AC-L	■	■	■	□	□	■	□	■
16	A48M-1-SFP-AC-S	■	■	■	□	□	■	□	□
17	A48S-2-GE-DC-AL	■	■	□	□	■	□	■	■
18	A48S-2-GE-DC-A	■	■	□	□	■	□	■	□
19	A48S-2-GE-DC-L	■	■	□	□	■	□	□	■
20	A48S-2-GE-DC-S	■	■	□	□	■	□	□	□
21	A48S-2-GE-AC-AL	■	■	□	□	□	■	■	■
22	A48S-2-GE-AC-A	■	■	□	□	□	■	■	□
23	A48S-2-GE-AC-L	■	■	□	□	□	■	□	■
24	A48S-2-GE-AC-S	■	■	□	□	□	■	□	□
25	A48S-1-GE-DC-AL	■	□	□	□	■	□	■	■
26	A48S-1-GE-DC-A	■	□	□	□	■	□	■	□
27	A48S-1-GE-DC-L	■	□	□	□	■	□	□	■
28	A48S-1-GE-DC-S	■	□	□	□	■	□	□	□
29	A48S-1-GE-AC-AL	■	□	□	□	□	■	■	■
30	A48S-1-GE-AC-A	■	□	□	□	□	■	■	□
31	A48S-1-GE-AC-L	■	□	□	□	□	■	□	■
32	A48S-1-GE-AC-S	■	□	□	□	□	■	□	□
33	A24M-2-SFP-DC-AL	□	■	■	■	■	□	■	■
34	A24M-2-SFP-DC-A	□	■	■	■	■	□	■	□
35	A24M-2-SFP-DC-L	□	■	■	■	■	□	□	■
36	A24M-2-SFP-DC-S	□	■	■	■	■	□	□	□
37	A24M-2-SFP-AC-AL	□	■	■	■	□	■	■	■
38	A24M-2-SFP-AC-A	□	■	■	■	□	■	■	□
39	A24M-2-SFP-AC-L	□	■	■	■	□	■	□	■
40	A24M-2-SFP-AC-S	□	■	■	■	□	■	□	□

VigorAccess A48 Series model list and difference									
Item	Model No.	DSL 25-48	G2 (GLAN)	G3	G4	DC	AC	ALARM PORT	DSL LED
41	A24M-1-SFP-DC-AL	□	■	■	□	■	□	■	■
42	A24M-1-SFP-DC-A	□	■	■	□	■	□	■	□
43	A24M-1-SFP-DC-L	□	■	■	□	■	□	□	■
44	A24M-1-SFP-DC-S	□	■	■	□	■	□	□	□
45	A24M-1-SFP-AC-AL	□	■	■	□	□	■	■	■
46	A24M-1-SFP-AC-A	□	■	■	□	□	■	■	□
47	A24M-1-SFP-AC-L	□	■	■	□	□	■	□	■
48	A24M-1-SFP-AC-S	□	■	■	□	□	■	□	□
49	A24S-2-GE-DC-AL	□	■	□	□	■	□	■	■
50	A24S-2-GE-DC-A	□	■	□	□	■	□	■	□
51	A24S-2-GE-DC-L	□	■	□	□	■	□	□	■
52	A24S-2-GE-DC-S	□	■	□	□	■	□	□	□
53	A24S-2-GE-AC-AL	□	■	□	□	□	■	■	■
54	A24S-2-GE-AC-A	□	■	□	□	□	■	■	□
55	A24S-2-GE-AC-L	□	■	□	□	□	■	□	■
56	A24S-2-GE-AC-S	□	■	□	□	□	■	□	□
57	A24S-1-GE-DC-AL	□	□	□	□	■	□	■	■
58	A24S-1-GE-DC-A	□	□	□	□	■	□	■	□
59	A24S-1-GE-DC-L	□	□	□	□	■	□	□	■
60	A24S-1-GE-DC-S	□	□	□	□	■	□	□	□
61	A24S-1-GE-AC-AL	□	□	□	□	□	■	■	■
62	A24S-1-GE-AC-A	□	□	□	□	□	■	■	□
63	A24S-1-GE-AC-L	□	□	□	□	□	■	□	■
64	A24S-1-GE-AC-S	□	□	□	□	□	■	□	□

AL: Alarm+LED

A: Alarm

L: LED

S: Standard

3 Test Methodology

3.1. Decision of Test Mode

3.1.1 The following test mode(s) were scanned during the preliminary test:

Pre-Test Mode
Mode 1: Normal Operation (AC)
Mode 2: Normal Operation (DC)

3.1.2 After the preliminary scan, the following test mode was found to produce the highest emission level.

Final Test Mode		
Emission	Conducted Emission	Mode 1: Normal Operation (AC)
	Radiated Emission	Mode 1: Normal Operation (AC) Mode 2: Normal Operation (DC)

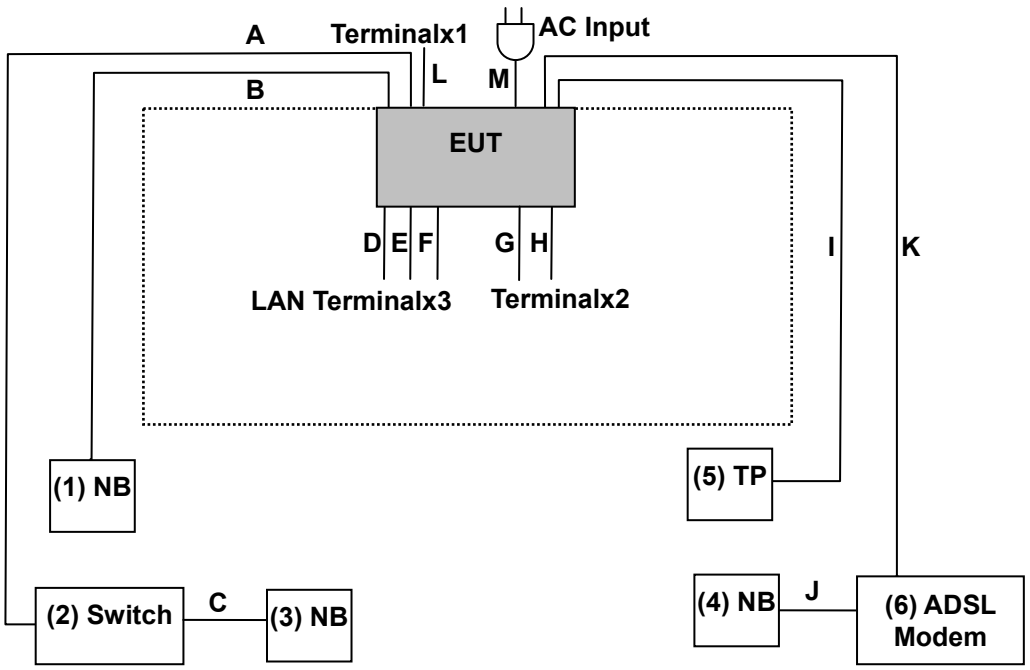
Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items.

3.2. EUT Exercise Software

1.	Setup the EUT and simulators as shown on 3.3.
2.	Turn on the power of all equipment.
3.	Data will communicate between the notebook and partner notebook through EUT.
4.	The notebook and partner notebook will show the transmitting and receiving characteristics when the communication is success.
5.	Repeat the above procedure (3) to (4).

3.3. Configuration of Test System Details

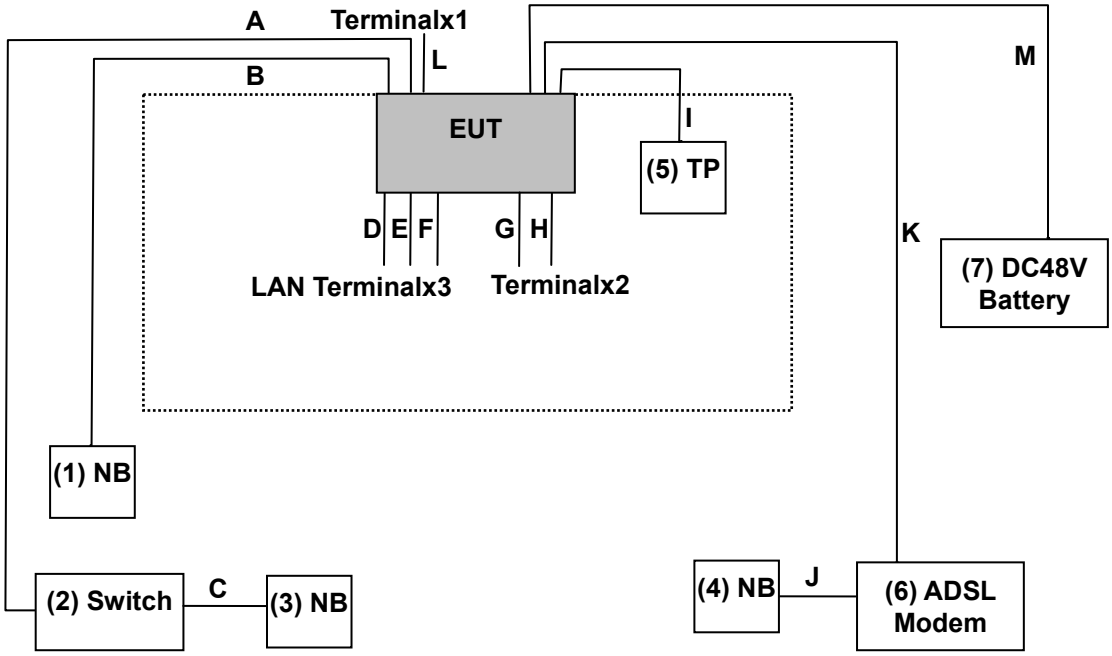
Mode 1



Signal Cable Type		Signal Cable Description
A	Fiber Cable	Non-Shielded, 2m
B	LAN Cable	Non-Shielded, 7m
C	LAN Cable	Non-Shielded, 3m
D	LAN Cable	Non-Shielded, 1m
E	LAN Cable	Non-Shielded, 1m
F	LAN Cable	Non-Shielded, 1m
G	Signal Cable	Non-Shielded, 2m
H	Signal Cable	Non-Shielded, 2m
I	Telecom Cable	Non-Shielded, 7m
J	LAN Cable	Non-Shielded, 3m
K	Telecom Cable	Non-Shielded, 7m
L	Fiber Cable	Non-Shielded, 2m
M	Power Cable	Non-Shielded, 1.7m

Devices Description					
Product		Manufacturer	Model No.	Serial No.	Power Cord
1.	Notebook	DELL	D531	GCDCD-T6HYQ-3MQ8 R-JCPD3-3G8G2	Non-Shielded, 1.5m with one core
2.	Vigor Switch	DrayTek	G2080	N/A	N/A
3.	Notebook	DELL	D830	CN-OHN341-48643-88 Q-1221	Non-Shielded, 1.5m with one core
4.	Notebook	DELL	D531	CN-OXM006-48643-87 A-3398	Non-Shielded, 1.5m with one core
5.	Telephone	H · T · T	N/A	N/A	Non-Shielded, 1.5m
6.	ADSL Modem	DrayTek	Vigor2920	N/A	N/A

Mode 2



Signal Cable Type		Signal Cable Description
A	Fiber Cable	Non-Shielded, 2m
B	LAN Cable	Non-Shielded, 7m
C	LAN Cable	Non-Shielded, 3m
D	LAN Cable	Non-Shielded, 1m
E	LAN Cable	Non-Shielded, 1m
F	LAN Cable	Non-Shielded, 1m
G	Signal Cable	Non-Shielded, 2m
H	Signal Cable	Non-Shielded, 2m
I	Telecom Cable	Non-Shielded, 7m
J	LAN Cable	Non-Shielded, 3m
K	Telecom Cable	Non-Shielded, 7m
L	Fiber Cable	Non-Shielded, 2m
M	Power Cable	Non-Shielded, 1.5m

Devices Description					
Product		Manufacturer	Model No.	Serial No.	Power Cord
1.	Notebook	DELL	D531	GCDCD-T6HYQ-3MQ8 R-JCPD3-3G8G2	Non-Shielded, 1.5m with one core
2.	Vigor Switch	DrayTek	G2080	N/A	N/A
3.	Notebook	DELL	D830	CN-OHN341-48643-88 Q-1221	Non-Shielded, 1.5m with one core
4.	Notebook	DELL	D531	CN-OXM006-48643-87 A-3398	Non-Shielded, 1.5m with one core
5.	Telephone	H · T · T	N/A	N/A	Non-Shielded, 1.5m
6.	ADSL Modem	DrayTek	Vigor2920	N/A	N/A
7.	DC 48V Battery	YUASA GLOBAL	75D23L SMF NX100-S6LS	N/A	Non-Shielded, 1.5m

3.4. Test Site Environment

Items	Test Item	Required (IEC 68-1)	Actual
Temperature (°C)	EN55022 CE	15-35	25
Humidity (%RH)		25-60	50
Barometric pressure (mbar)		860-1060	950-1000
Temperature (°C)	EN55022 RE	15-35	25
Humidity (%RH)		25-60	50
Barometric pressure (mbar)		860-1060	950-1000
Temperature (°C)	EN 61000-3-2	--	26
Humidity (%RH)		--	51
Barometric pressure (mbar)		--	950-1000
Temperature (°C)	EN 61000-3-3	--	24
Humidity (%RH)		--	50
Barometric pressure (mbar)		--	950-1000
Temperature (°C)	IEC 61000-4-2	15-35	24.3
Humidity (%RH)		30-60	50
Barometric pressure (mbar)		860-1060	950-1000
Temperature (°C)	IEC 61000-4-3	--	24
Humidity (%RH)		--	50
Barometric pressure (mbar)		--	950-1000
Temperature (°C)	IEC 61000-4-4	15-35	26
Humidity (%RH)		30-60	50
Barometric pressure (mbar)		860-1060	950-1000
Temperature (°C)	IEC 61000-4-5	15-35	26
Humidity (%RH)		10-75	50
Barometric pressure (mbar)		860-1060	950-1000
Temperature (°C)	IEC 61000-4-6	--	24
Humidity (%RH)		--	51
Barometric pressure (mbar)		--	950-1000
Temperature (°C)	IEC 61000-4-8	15-35	24
Humidity (%RH)		25-75	51
Barometric pressure (mbar)		860-1060	950-1000
Temperature (°C)	IEC 61000-4-11	15-35	24
Humidity (%RH)		25-75	51
Barometric pressure (mbar)		860-1060	950-1000

4 Emission Test

4.1. Conducted Emission Measurement

4.1.1. Limit

4.1.1.1. A.C. Mains Conducted Interference Limit：

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

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

4.1.1.2. Telecommunication Port Conducted Interference Limits:

Requirement (MHz)	Class A Equipment				Class B Equipment			
	Voltage Limit (dBμV)		Current Limit (dBμA)		Voltage Limit (dBμV)		Current Limit (dBμA)	
	QP	Avg.	QP	Avg.	QP	Avg.	QP	Avg.
0.15 to 0.50	97 to 87	84 to 74	53 to 43	40 to 30	84 to 74	74 to 64	40 to 30	30 to 20
0.50 to 30	87	74	43	30	74	64	30	20

4.1.2. Test Instruments

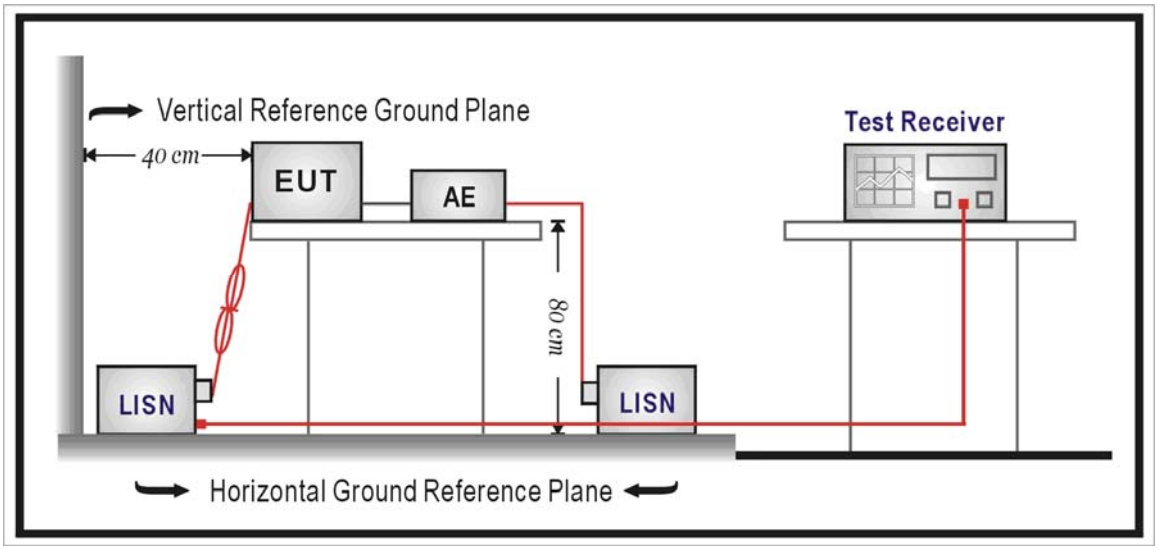
Describe	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Test Receiver	R&S	ESCI	100367	07/01/2009	(1)
LISN	EMCO	3816/2 SH	00060110	06/05/2009	(1)
LISN	EMCO	3816/2 SH	00060111	06/29/2009	(1)
Transient Limiter	ELECTRO-METRICS	EM-7600	777	09/22/2009	(2)
Test Site	ATL	TE02	TE02	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

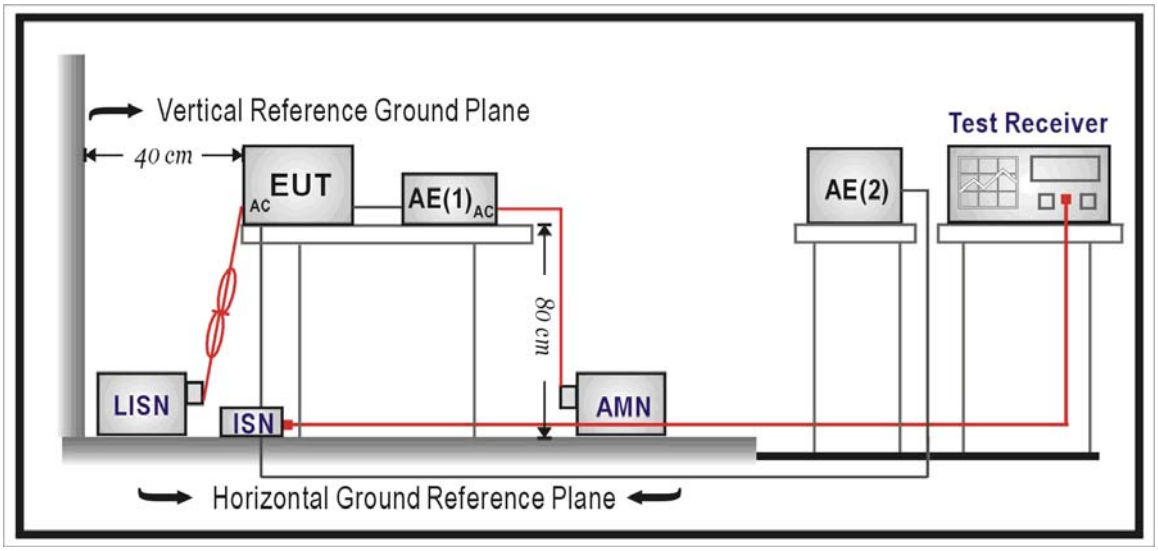
NOTE: N.C.R. = No Calibration Request.

4.1.3. Test Setup

A.C. Mains Setup



Telecommunication Port Setup



4.1.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination.
The mains voltage shall be supplied to the EUT via the LISN when the measurement of telecommunication port is performed. The common mode disturbances at the telecommunication port shall be connected to the ISN.

For A.C. mains conducted interference, measured both sides of A.C. lines and carried out using quasi-peak and average detector receivers of maximum conducted interference.

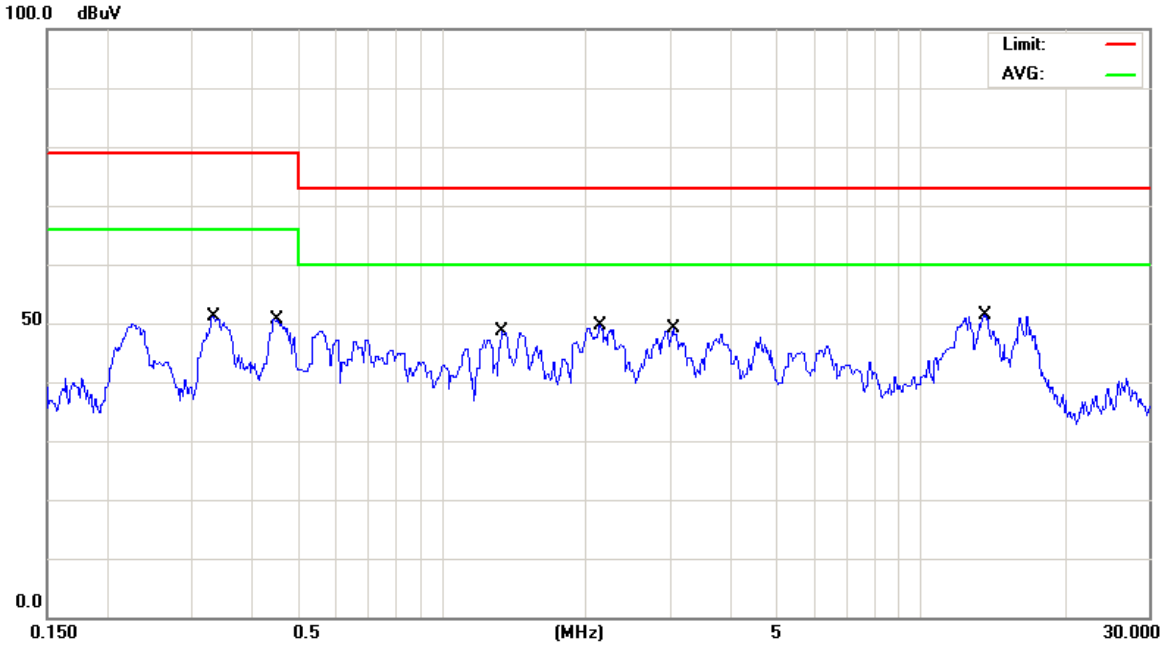
For telecommunication port interference measurement, using ISNs with suitable longitudinal conversion losses (LCL) as defined in the port of specification from manufacture, and the LCL shall be meet the related standard requirement. Measured the line and carried out using quasi-peak and average detector receivers of maximum conducted interference.

Conducted emissions were invested over the frequency range from 0.15 MHz to 30 MHz using a receiver bandwidth of 9 kHz. The equipment under test (EUT) shall be meet the limits in section 4.1.2, as applicable, including the average limit and the quasi-peak limit when using respectively (A.C. mains and telecommunication port), an average detector and quasi-peak detector measured in accordance with the methods described of related standard. Either the voltage limits or the current limits shall be met. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

If the reading of the measuring receiver shows fluctuations close to the limit, the reading shall be observed for at least 15 s at each measurement frequency; the higher reading shall be recorded with the exception of any brief isolated high reading which shall be ignored.

4.1.5. Test Result

File :09-0345-EO(Conduction) Data :#1 Date: 2009/12/24 Time: 下午 02:09:22



Site : Conducted Phase: *L1* Temperature: 26 ℃

Limit: EN55022 Class A Conduction(QP) Power: AC 230V/50Hz Humidity: 55 %

EUT: ADSL2/2+ IP DSLAM

M/N: VigorAccess A48 Series

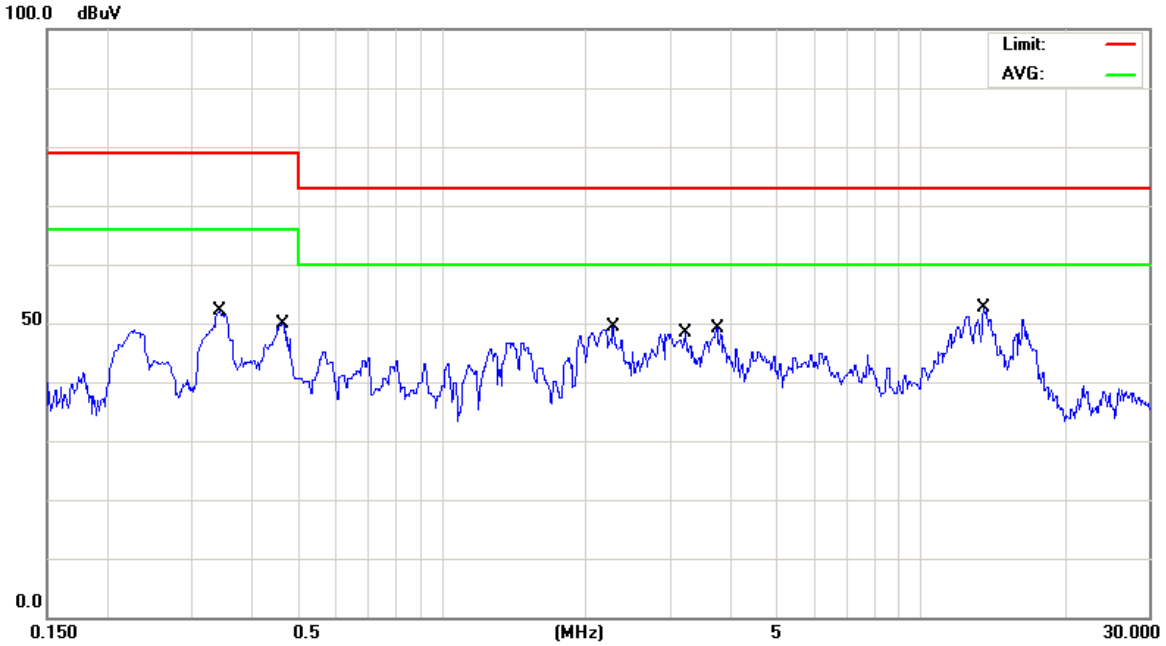
Mode: 1

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.3334	36.53	9.77	46.30	79.00	-32.70	QP	
2		0.3334	31.33	9.77	41.10	66.00	-24.90	AVG	
3		0.4531	36.80	9.78	46.58	79.00	-32.42	QP	
4		0.4531	30.90	9.78	40.68	66.00	-25.32	AVG	
5		1.3370	34.30	9.82	44.12	73.00	-28.88	QP	
6		1.3370	26.90	9.82	36.72	60.00	-23.28	AVG	
7		2.1380	36.50	9.88	46.38	73.00	-26.62	QP	
8	*	2.1380	29.30	9.88	39.18	60.00	-20.82	AVG	
9		3.0380	34.00	9.89	43.89	73.00	-29.11	QP	
10		3.0380	27.00	9.89	36.89	60.00	-23.11	AVG	
11		13.6000	34.80	10.21	45.01	73.00	-27.99	QP	
12		13.6000	27.90	10.21	38.11	60.00	-21.89	AVG	

*:Maximum data x:Over limit !:over margin ●Reference Only

File :09-0345-EO(Conduction) Data :#2 Date: 2009/12/24 Time: 下午 02:15:40



Site : Conducted Phase: *L2* Temperature: 26 ℃

Limit: EN55022 Class A Conduction(QP) Power: AC 230V/50Hz Humidity: 55 %

EUT: ADSL2/2+ IP DSLAM

M/N: VigorAccess A48 Series

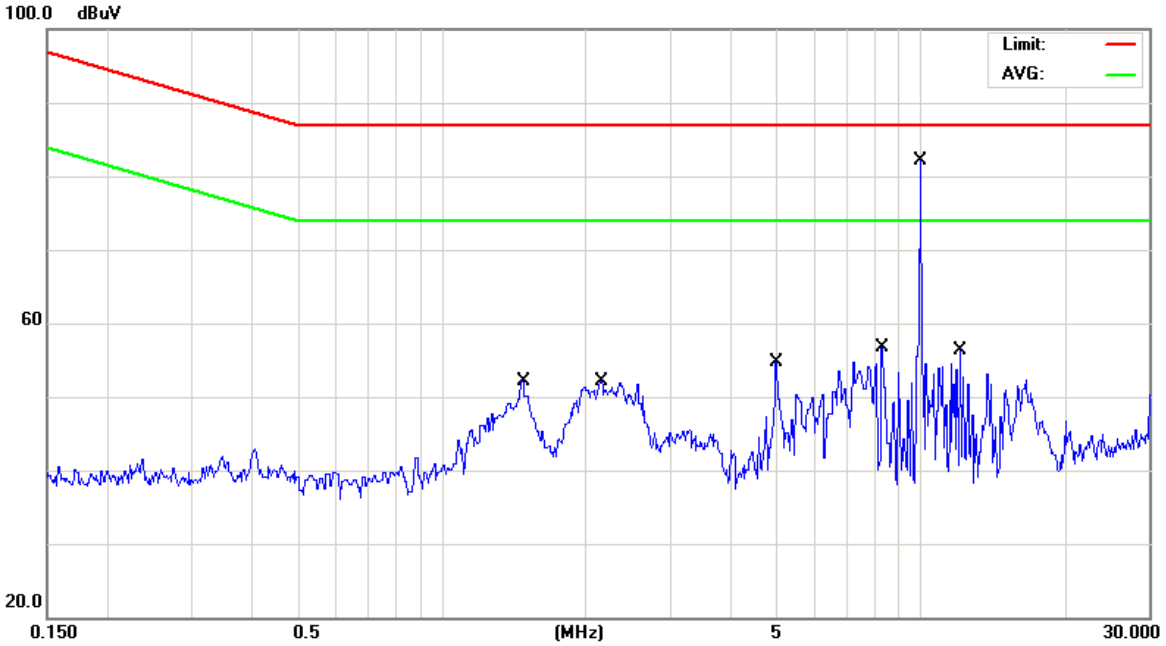
Mode: 1

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.3446	38.70	9.78	48.48	79.00	-30.52	QP	
2		0.3446	32.10	9.78	41.88	66.00	-24.12	AVG	
3		0.4650	34.80	9.78	44.58	79.00	-34.42	QP	
4		0.4650	28.70	9.78	38.48	66.00	-27.52	AVG	
5		2.2730	30.30	9.87	40.17	73.00	-32.83	QP	
6		2.2730	23.40	9.87	33.27	60.00	-26.73	AVG	
7		3.2180	31.60	9.91	41.51	73.00	-31.49	QP	
8		3.2180	25.70	9.91	35.61	60.00	-24.39	AVG	
9		3.7400	32.50	9.95	42.45	73.00	-30.55	QP	
10		3.7400	26.60	9.95	36.55	60.00	-23.45	AVG	
11		13.5500	34.70	10.21	44.91	73.00	-28.09	QP	
12	*	13.5500	27.90	10.21	38.11	60.00	-21.89	AVG	

*:Maximum data x:Over limit !:over margin ●Reference Only

File :09-0345-EO(ISN-10M) Data :#1 Date: 2009/12/24 Time: 下午 03:47:43



Site : Conducted
Phase: *L1*
Temperature: 26 ℃

Limit: ISN(Voltage)-CLASS A (QP)
Power: AC 230V/50Hz
Humidity: 55 %

EUT: ADSL2/2+ IP DSLAM

M/N: VigorAccess A48 Series

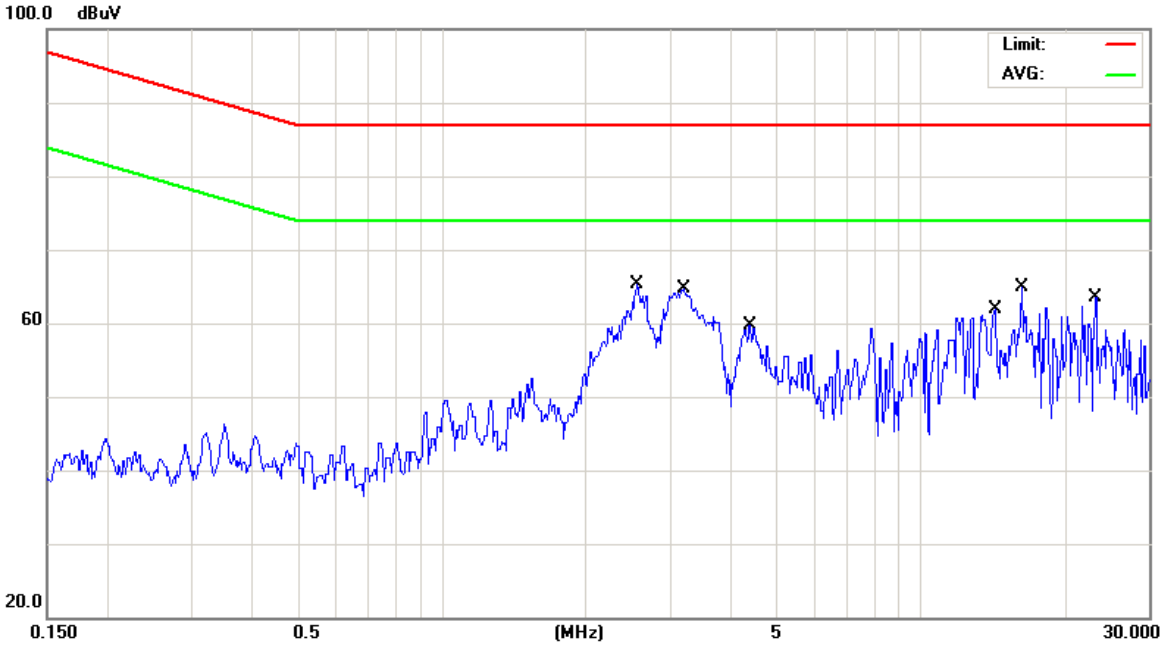
Mode: ISN-10M

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		1.4719	35.27	9.81	45.08	87.00	-41.92	QP	
2		1.4719	28.47	9.81	38.28	74.00	-35.72	AVG	
3		2.1469	34.56	9.88	44.44	87.00	-42.56	QP	
4		2.1469	26.76	9.88	36.64	74.00	-37.36	AVG	
5		5.0000	35.94	10.08	46.02	87.00	-40.98	QP	
6		5.0000	17.64	10.08	27.72	74.00	-46.28	AVG	
7		8.3000	32.21	10.09	42.30	87.00	-44.70	QP	
8		8.3000	14.61	10.09	24.70	74.00	-49.30	AVG	
9	*	10.0000	65.20	10.08	75.28	87.00	-11.72	QP	
10		10.0000	45.70	10.08	55.78	74.00	-18.22	AVG	
11		12.1000	32.12	10.13	42.25	87.00	-44.75	QP	
12		12.1000	17.32	10.13	27.45	74.00	-46.55	AVG	

*:Maximum data x:Over limit !:over margin ●Reference Only

File :09-0345-EO(ISN-100M) Data :#1 Date: 2009/12/24 Time: 下午 02:40:09



Site : Conducted
Limit: ISN(Voltage)-CLASS A (QP)
EUT: ADSL2/2+ IP DSLAM
M/N: VigorAccess A48 Series
Mode: ISN-100M
Note:

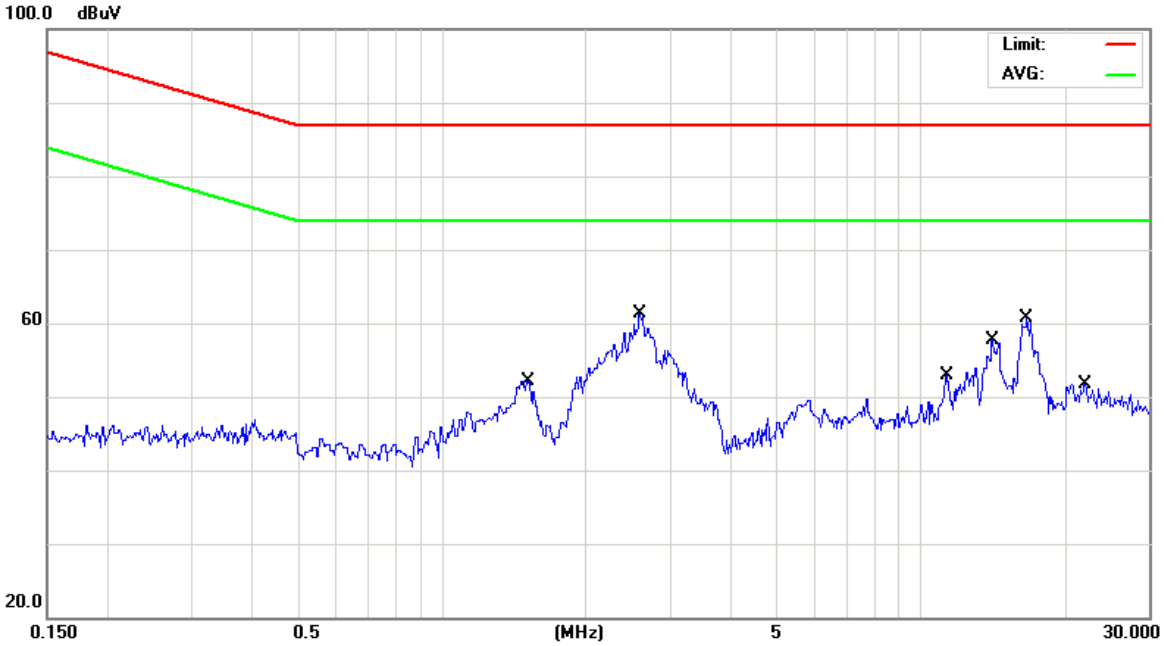
Phase: *L1*
Power: AC 230V/50Hz

Temperature: 26 ℃
Humidity: 55 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		2.5520	48.96	9.93	58.89	87.00	-28.11	QP	
2		2.5520	39.26	9.93	49.19	74.00	-24.81	AVG	
3		3.2000	51.25	9.91	61.16	87.00	-25.84	QP	
4	*	3.2000	45.15	9.91	55.06	74.00	-18.94	AVG	
5		4.3880	43.54	10.01	53.55	87.00	-33.45	QP	
6		4.3880	37.44	10.01	47.45	74.00	-26.55	AVG	
7		14.3000	35.61	10.20	45.81	87.00	-41.19	QP	
8		14.3000	29.01	10.20	39.21	74.00	-34.79	AVG	
9		16.2500	41.32	10.25	51.57	87.00	-35.43	QP	
10		16.2500	34.22	10.25	44.47	74.00	-29.53	AVG	
11		23.1500	28.53	10.37	38.90	87.00	-48.10	QP	
12		23.1500	21.33	10.37	31.70	74.00	-42.30	AVG	

*:Maximum data x:Over limit !:over margin ●Reference Only

File :09-0345-EO(ISN-1G) Data :#1 Date: 2009/12/24 Time: 下午 04:32:21



Site : Conducted
Limit: ISN(Voltage)-CLASS A (QP)
EUT: ADSL2/2+ IP DSLAM
M/N: VigorAccess A48 Series
Mode: ISN-1G
Note:

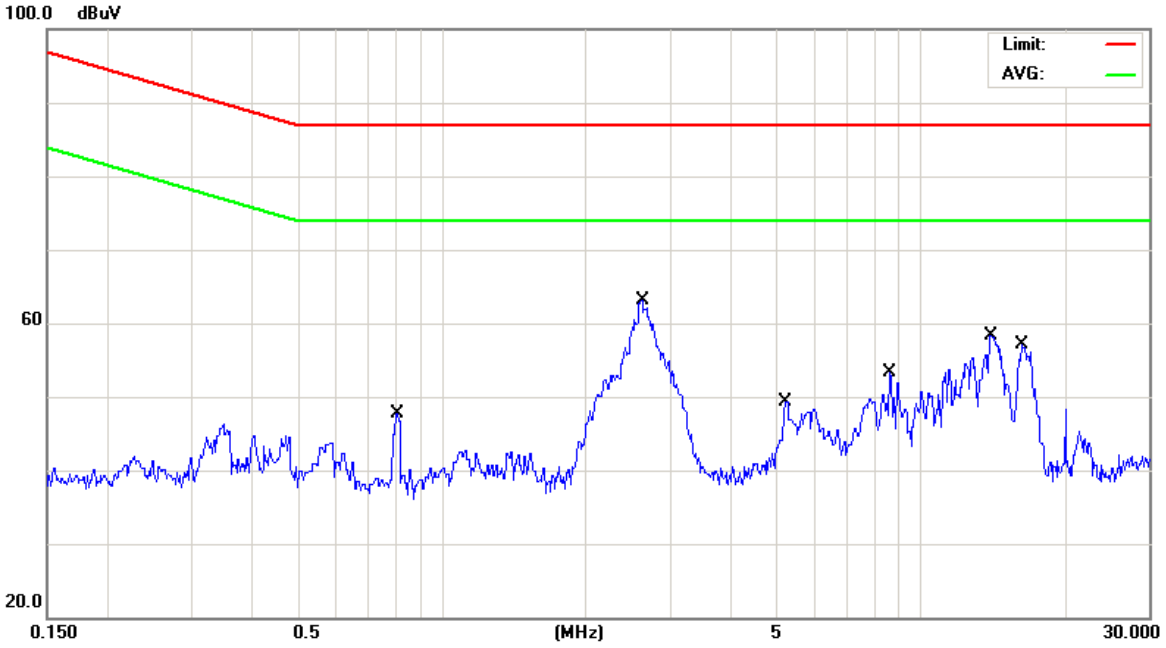
Phase: *L1*
Power: AC 230V/50Hz

Temperature: 26 ℃
Humidity: 55 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		1.5079	37.67	9.81	47.48	87.00	-39.52	QP	
2		1.5079	30.87	9.81	40.68	74.00	-33.32	AVG	
3		2.5880	47.76	9.93	57.69	87.00	-29.31	QP	
4		2.5880	35.56	9.93	45.49	74.00	-28.51	AVG	
5		11.3000	33.30	10.11	43.41	87.00	-43.59	QP	
6		11.3000	27.60	10.11	37.71	74.00	-36.29	AVG	
7		14.1000	40.71	10.20	50.91	87.00	-36.09	QP	
8		14.1000	34.31	10.20	44.51	74.00	-29.49	AVG	
9		16.6500	43.62	10.25	53.87	87.00	-33.13	QP	
10	*	16.6500	37.32	10.25	47.57	74.00	-26.43	AVG	
11		21.9500	34.13	10.36	44.49	87.00	-42.51	QP	
12		21.9500	28.53	10.36	38.89	74.00	-35.11	AVG	

*:Maximum data x:Over limit !:over margin ●Reference Only

File :09-0345-EO(ISN-TEL) Data :#1 Date: 2009/12/24 Time: 下午 04:24:58



Site : Conducted
Limit: ISN(Voltage)-CLASS A (QP)
EUT: ADSL2/2+ IP DSLAM
M/N: VigorAccess A48 Series
Mode: ISN-TEL
Note:

Phase: *L1*
Power: AC 230V/50Hz

Temperature: 26 ℃
Humidity: 55 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.8059	29.38	9.80	39.18	87.00	-47.82	QP	
2		0.8059	29.28	9.80	39.08	74.00	-34.92	AVG	
3		2.6150	47.56	9.93	57.49	87.00	-29.51	QP	
4	*	2.6150	37.26	9.93	47.19	74.00	-26.81	AVG	
5		5.2500	29.24	10.06	39.30	87.00	-47.70	QP	
6		5.2500	21.24	10.06	31.30	74.00	-42.70	AVG	
7		8.6000	33.31	10.09	43.40	87.00	-43.60	QP	
8		8.6000	24.91	10.09	35.00	74.00	-39.00	AVG	
9		14.0000	43.81	10.20	54.01	87.00	-32.99	QP	
10		14.0000	35.71	10.20	45.91	74.00	-28.09	AVG	
11		16.2000	39.92	10.25	50.17	87.00	-36.83	QP	
12		16.2000	31.72	10.25	41.97	74.00	-32.03	AVG	

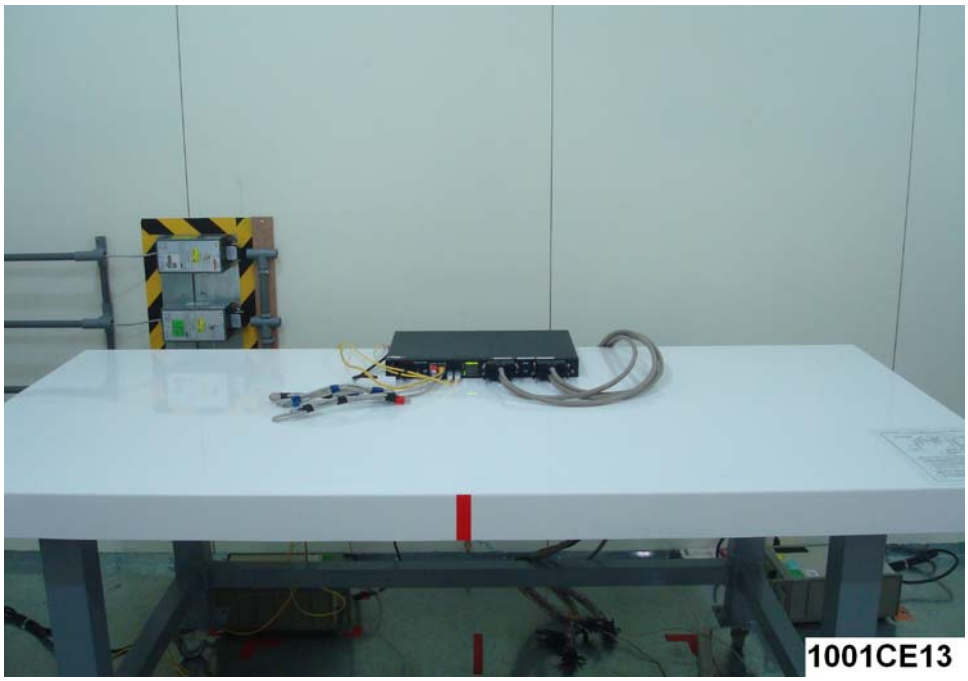
*:Maximum data x:Over limit !:over margin ●Reference Only

4.1.6. Test Photograph

A.C. Mains:

Test Mode : Mode 1

Description : Front View of Conducted Test



Test Mode : Mode 1

Description : Back View of Conducted Test

4.2. Radiated Interference Measurement

4.2.1. Limit

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

NOTE: The lower limit shall apply at the transition frequencies.

Frequency (MHz)	dBuV/m (Distance 3m)			
	Class A		Class B	
	Average	Peak	Average	Peak
1000 ~ 3000	56	76	50	70
3000 ~ 6000	60	80	54	74

NOTE: The lower limit shall apply at the transition frequencies.

4.2.2. Test Instruments

10 Meter Chamber					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Pre Amplifier	Agilent	8447D	2944A11120	01/12/2010	(1)
Pre Amplifier	Agilent	8447D	2944A11119	01/12/2010	(1)
Test Receiver	R&S	ESCI	100722	10/08/2009	(1)
Test Receiver	R&S	ESCI	101000	12/11/2009	(1)
Broadband Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB 9160	9160-3268	06/02/2009	(1)
Broadband Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB 9160	9160-3273	12/29/2009	(1)
Horn Antenna (1~18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	07/01/2009	(2)
Horn Antenna (18~40GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9170	9170-320	06/30/2009	(2)
Test Site	ATL	TE06	TE06	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

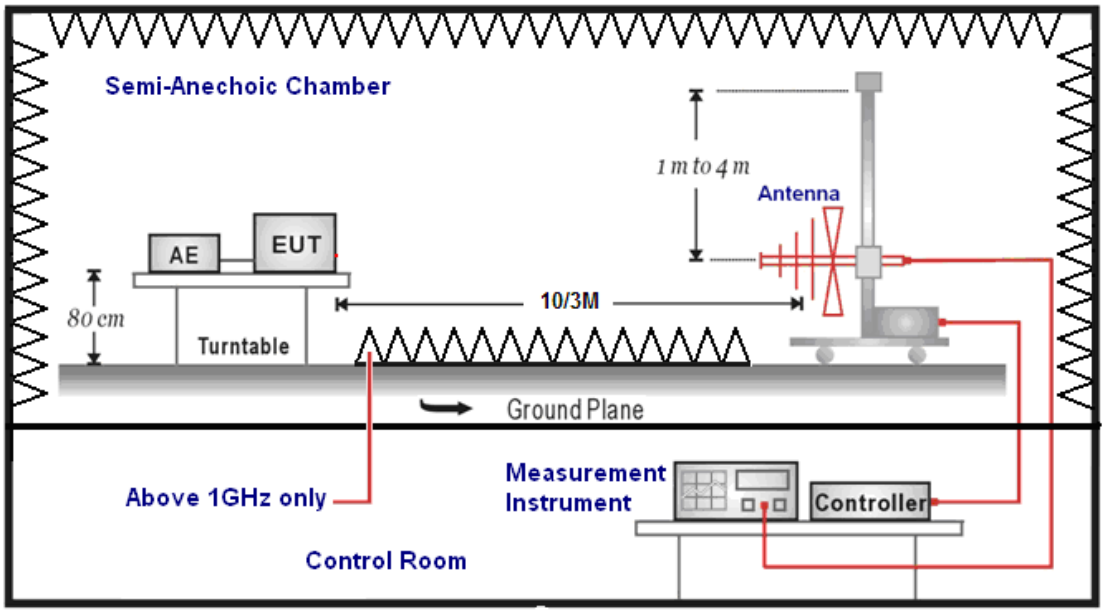
NOTE: N.C.R. = No Calibration Request.

3 Meter Chamber					
Equipment	**Manufacturer**	**Model Number**	**Serial Number**	**Cal. Date**	**Remark**
RF Pre-selector	Agilent	N9039A	MY46520256	01/27/2009	(2)
Spectrum Analyzer	Agilent	E4446A	MY46180578	01/20/2009	(2)
Pre Amplifier	Agilent	8449B	3008A02237	07/01/2009	(1)
Pre Amplifier	Agilent	8447D	2944A10961	06/30/2009	(1)
Broadband Antenna (30MHz~1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	9163-270	06/23/2009	(2)
Horn Antenna (1~18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	07/01/2009	(2)
Horn Antenna (18~40GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9170	9170-320	06/30/2009	(2)
Test Site	ATL	TE01	TE01	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

NOTE: N.C.R. = No Calibration Request.

4.2.3. Setup



4.2.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. When the EUT is floor- standing equipment, it is placed on the ground plane which has a 15 cm non-conductive covering to insulate the EUT from the ground plane.
The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 10 meters for under 1GHz, and 3 meter for above 1GHz if the highest internal source frequency of the EUT is higher than 108 MHz.

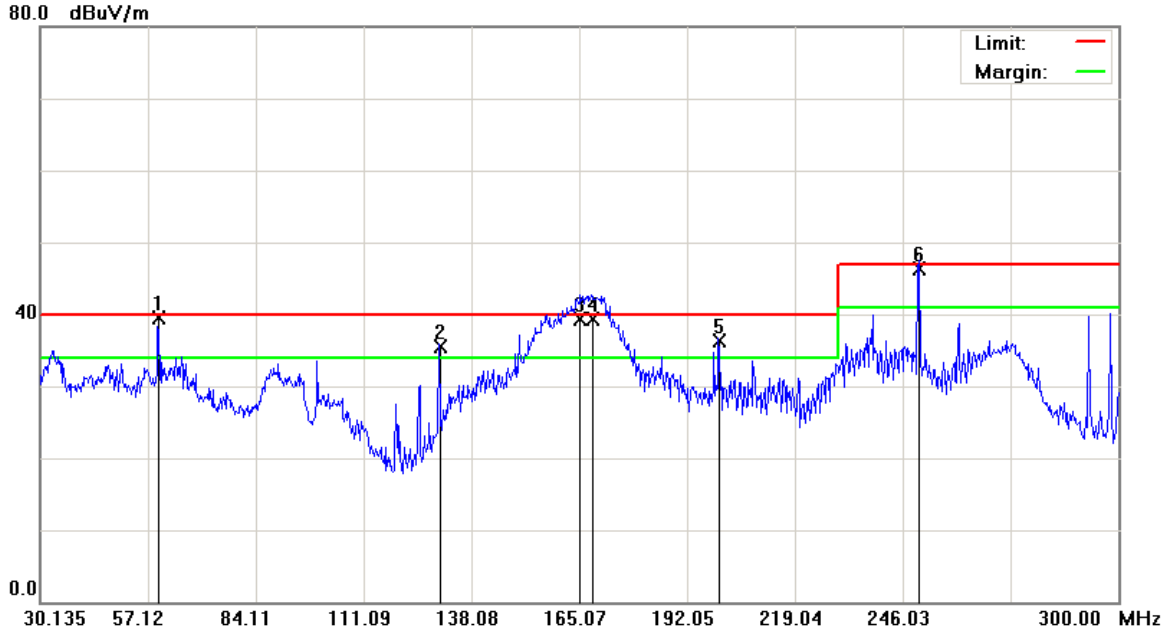
The highest internal source of a EUT is defined as the highest frequency generated or used within the EUT or on which the EUT operates or tunes. If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz. If the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz. If the highest frequency of the internal sources of the EUT is between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz. If the highest frequency of the internal sources of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 6 GHz, whichever is less.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated on radiated measurement.

Radiated emissions were invested over the frequency range from 30MHz to1GHz using a receiver bandwidth of 120 kHz. Radiated was performed at an antenna to EUT distance of 10 meters.

4.2.5. Test result

File :09-0345-EO-AC P5-P8 Data :#5 Date: 2009/12/28 Time: AM 10:29:53



Site: : 10M Chamber
Limit: EN55022 ClassA 10m Radiation
EUT: ADSL2/2+ IP DSLAM
M/N: VigorAccess A48 Series
Mode: 1
Note:

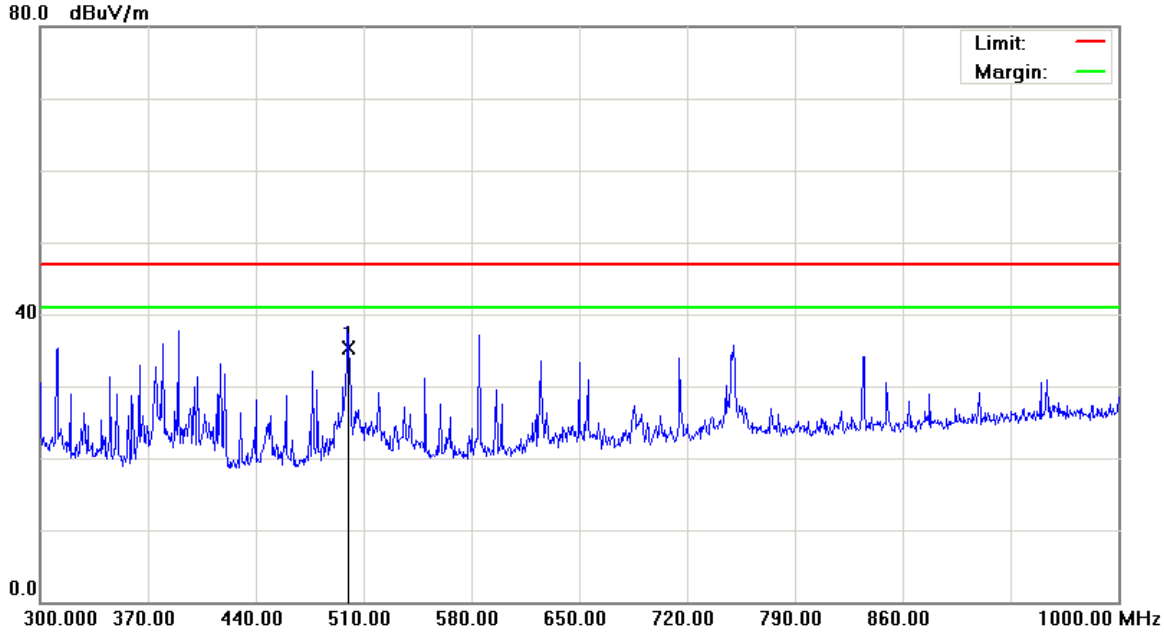
Polarization: *Vertical*
Power: AC 230V/50Hz
Distance: 10m

Temperature: 26 ℃
Humidity: 60 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	59.5650	53.80	-14.38	39.42	40.00	-0.58	QP	142	14	
2	!	130.0350	49.00	-13.47	35.53	40.00	-4.47	QP	138	186	
3	!	165.2700	51.78	-12.54	39.24	40.00	-0.76	QP	185	355	
4	!	168.1050	52.12	-12.76	39.36	40.00	-0.64	QP	220	109	
5	!	199.9650	51.45	-15.19	36.26	40.00	-3.74	QP	186	5	
6	!	250.0500	59.32	-12.96	46.36	47.00	-0.64	QP	241	221	

*:Maximum data x:Over limit !:over margin

File :09-0345-EO-AC P5-P8 Data :#6 Date: 2009/12/28 Time: AM 10:33:53



Site: : 10M Chamber
Limit: EN55022 ClassA 10m Radiation
EUT: ADSL2/2+ IP DSLAM
M/N: VigorAccess A48 Series
Mode: 1
Note:

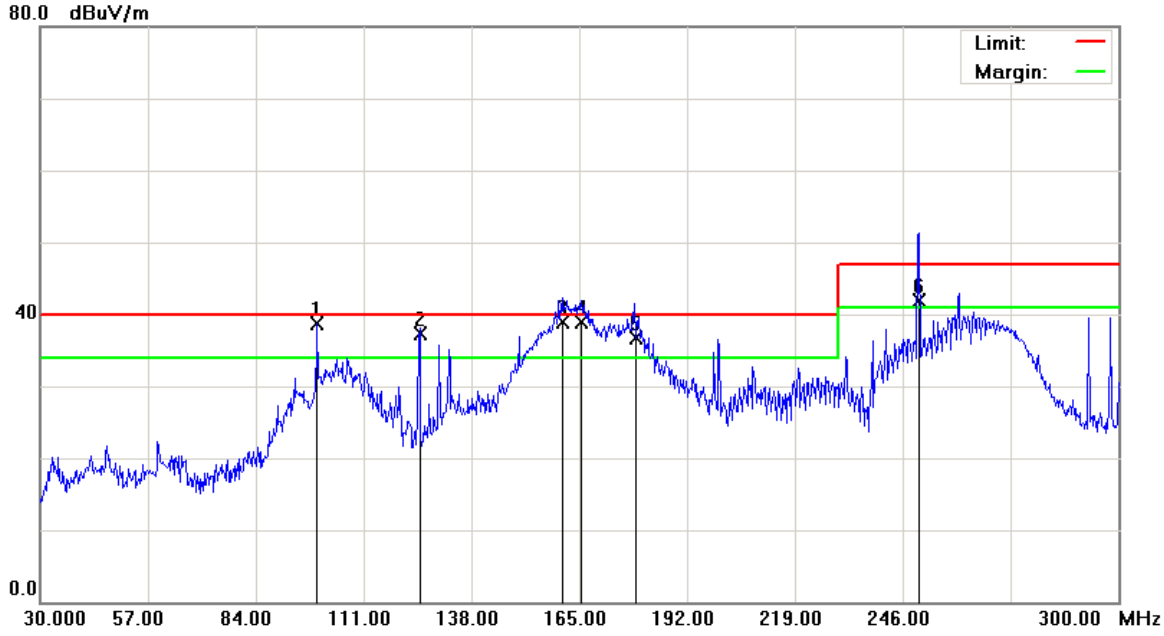
Polarization: *Vertical*
Power: AC 230V/50Hz
Distance: 10m

Temperature: 26 ℃
Humidity: 60 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	499.8500	42.91	-7.62	35.29	47.00	-11.71	QP	113	145	

*:Maximum data x:Over limit !:over margin

File :09-0345-EO-AC P5-P8 Data :#7 Date: 2009/12/28 Time: AM 10:37:57



Site: : 10M Chamber
Limit: EN55022 ClassA 10m Radiation
EUT: ADSL2/2+ IP DSLAM
M/N: VigorAccess A48 Series
Mode: 1
Note:

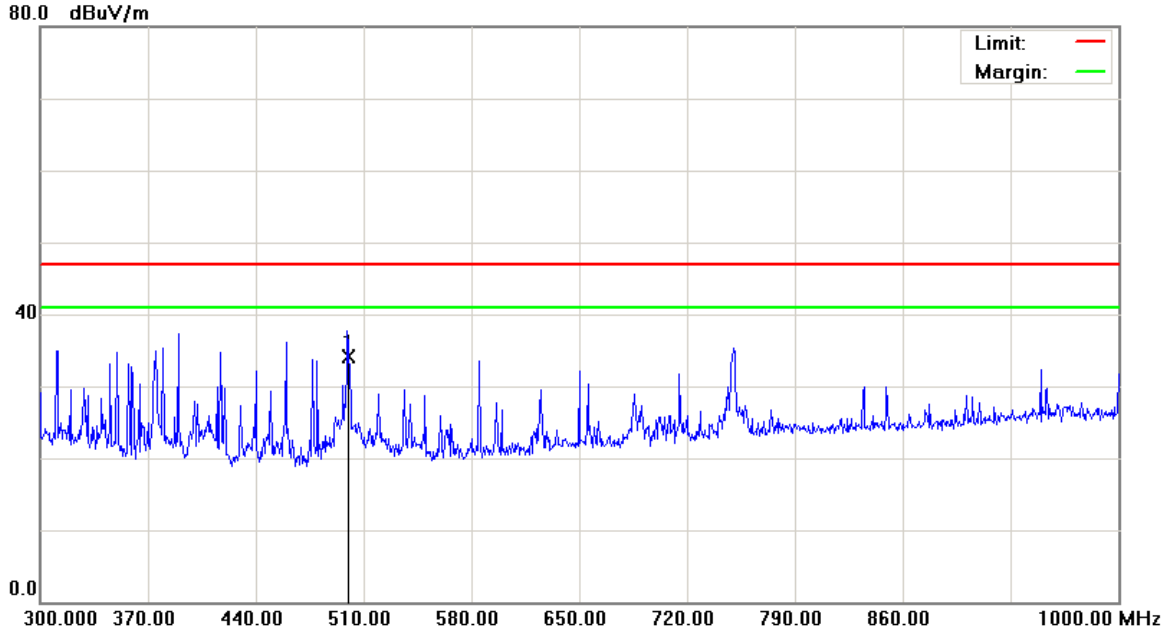
Polarization: ***Horizontal***
Power: AC 230V/50Hz
Distance: 10m

Temperature: 26 ℃
Humidity: 60 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	!	99.3900	55.00	-16.35	38.65	40.00	-1.35	QP	118	14	
2	!	125.0400	51.02	-13.77	37.25	40.00	-2.75	QP	135	226	
3	*	160.8150	51.23	-12.28	38.95	40.00	-1.05	QP	186	135	
4	!	165.5400	51.42	-12.56	38.86	40.00	-1.14	QP	221	142	
5	!	178.9050	50.10	-13.40	36.70	40.00	-3.30	QP	235	11	
6	!	250.0500	54.93	-12.96	41.97	47.00	-5.03	QP	388	8	

*:Maximum data x:Over limit !:over margin

File :09-0345-EO-AC P5-P8 Data :#8 Date: 2009/12/28 Time: AM 10:41:58



Site: : 10M Chamber
Limit: EN55022 ClassA 10m Radiation
EUT: ADSL2/2+ IP DSLAM
M/N: VigorAccess A48 Series
Mode: 1
Note:

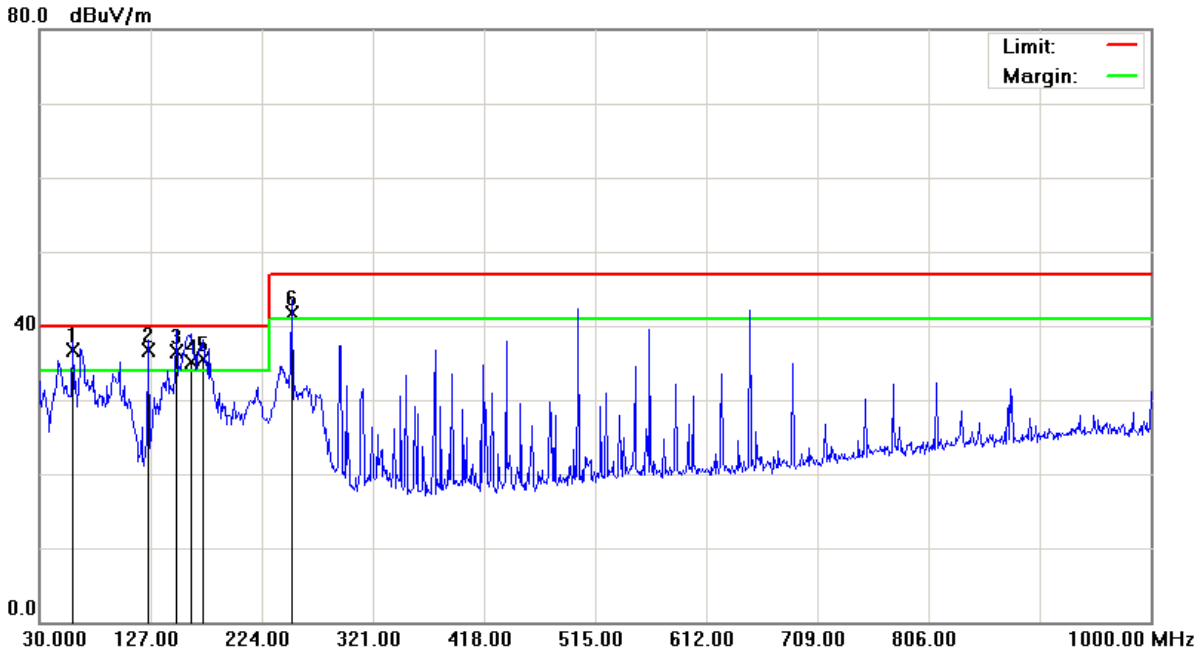
Polarization: ***Horizontal***
Power: AC 230V/50Hz
Distance: 10m

Temperature: 26 ℃
Humidity: 60 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	499.8500	41.79	-7.62	34.17	47.00	-12.83	QP	114	15	

*:Maximum data x:Over limit !:over margin

File :09-0345-EO Data :#1 Date: 2010/3/16 Time: PM 04:11:25



Site: : 10M Chamber
Limit: EN55022 ClassA 10m Radiation
EUT: ADSL2/2+ IP DSLAM
M/N: VigorAccess A48 Series
Mode: 2
Note:

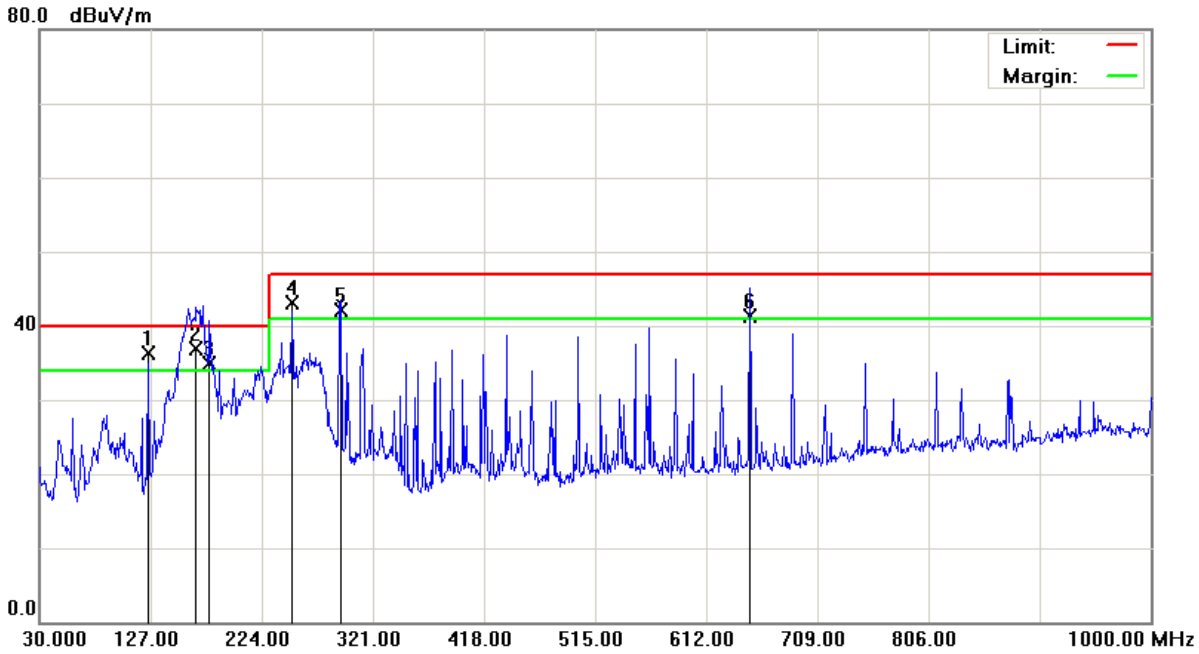
Polarization: *Vertical*
Power: DC 48V
Distance: 10m

Temperature: 26 ℃
Humidity: 60 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	59.1000	50.90	-14.23	36.67	40.00	-3.33	QP	199	63	
2	!	125.0600	50.10	-13.48	36.62	40.00	-3.38	QP	100	196	
3	!	149.3100	48.30	-11.77	36.53	40.00	-3.47	QP	100	219	
4	!	161.9200	46.80	-11.70	35.10	40.00	-4.90	QP	100	360	
5	!	172.5900	47.80	-12.24	35.56	40.00	-4.44	QP	100	360	
6	!	250.1900	53.80	-12.09	41.71	47.00	-5.29	QP	100	157	

*:Maximum data x:Over limit !:over margin

File :09-0345-EO Data :#2 Date: 2010/3/16 Time: PM 04:11:25



Site: : 10M Chamber
Limit: EN55022 ClassA 10m Radiation
EUT: ADSL2/2+ IP DSLAM
M/N: VigorAccess A48 Series
Mode: 2
Note:

Polarization: ***Horizontal***
Power: DC 48V
Distance: 10m

Temperature: 26 ℃
Humidity: 60 %

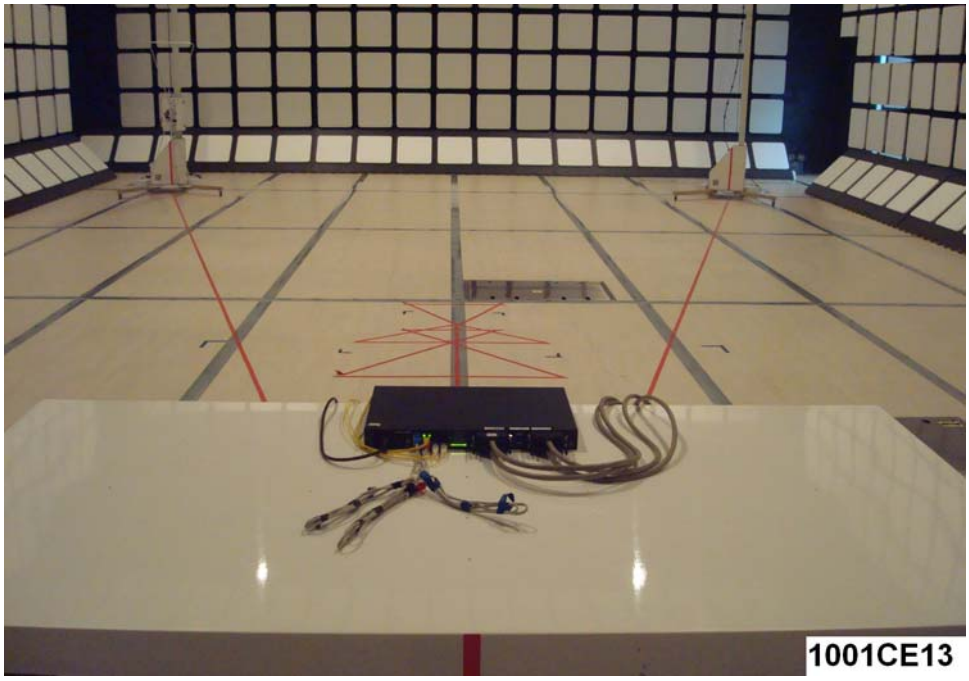
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	!	125.0600	50.10	-13.77	36.33	40.00	-3.67	QP	400	94	
2	*	166.7700	49.60	-12.65	36.95	40.00	-3.05	QP	400	302	
3	!	178.4100	48.20	-13.36	34.84	40.00	-5.16	QP	400	287	
4	!	250.1900	56.10	-12.96	43.14	47.00	-3.86	QP	301	97	
5	!	292.8700	53.70	-11.55	42.15	47.00	-4.85	QP	301	291	
6	!	649.8300	46.20	-4.84	41.36	47.00	-5.64	QP	201	154	

*:Maximum data x:Over limit !:over margin

4.2.6. Test Photograph

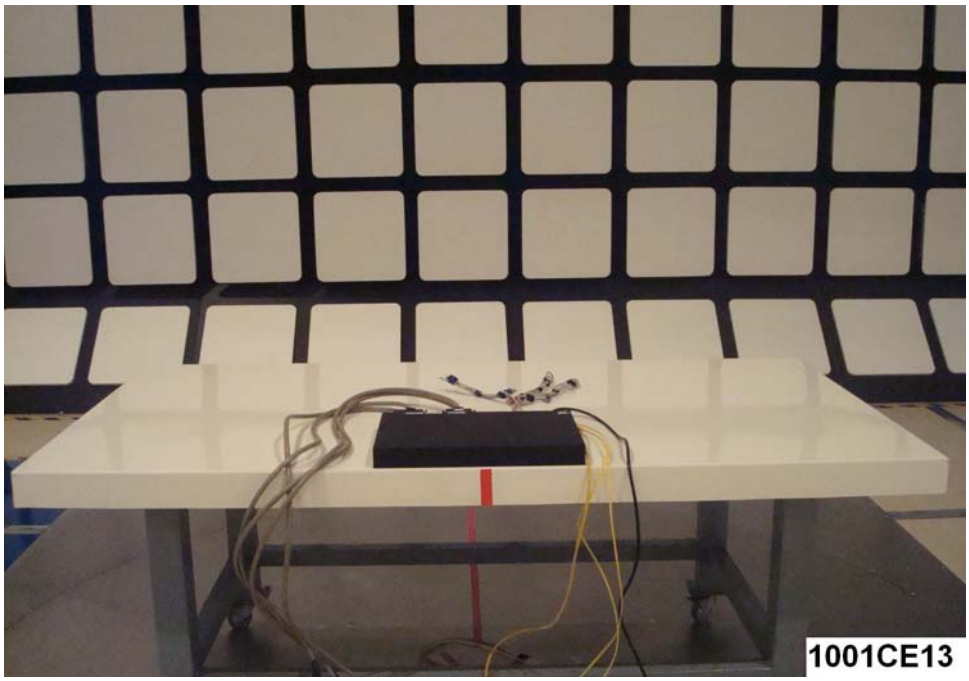
Test Mode : Mode 1

Description : Front View of Radiated Emission Test



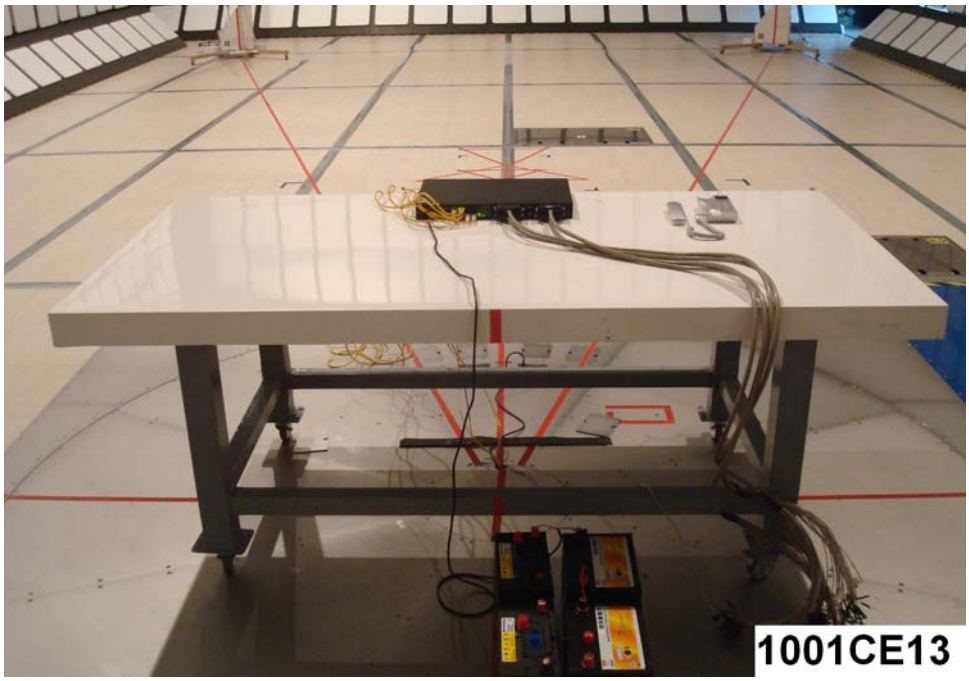
Test Mode : Mode 1

Description : Back View of Radiated Emission Test



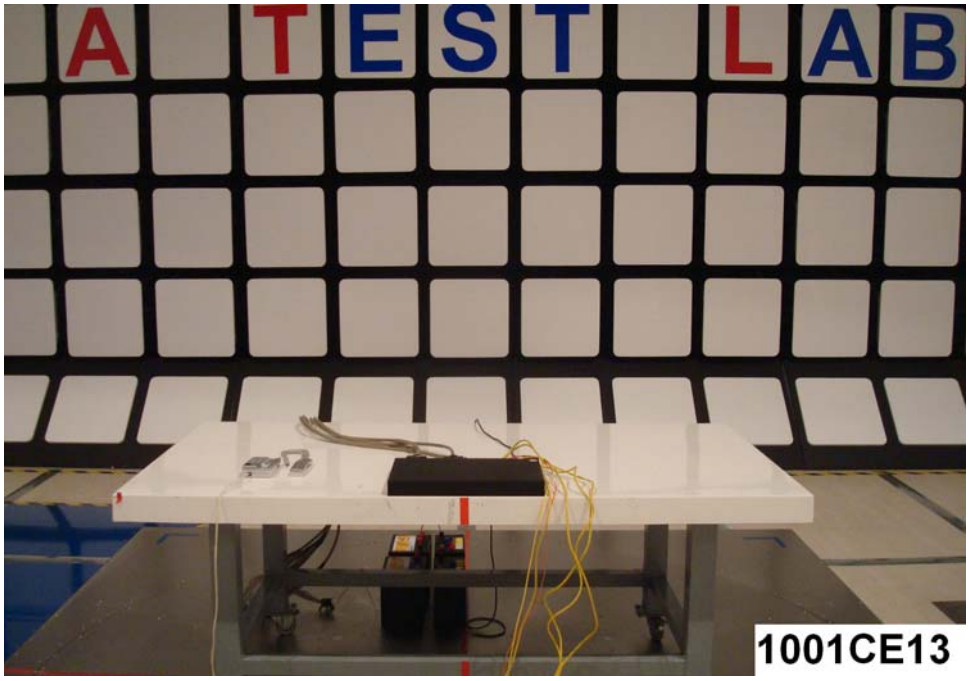
Test Mode : Mode 2

Description : Front View of Radiated Emission Test



Test Mode : Mode 2

Description : Back View of Radiated Emission Test



4.3. Harmonics Current Measurement

4.3.1. Limit

Limits of Class A Harmonics Currents

Harmonics Order n	Maximum Permissible harmonic current (A)	Harmonics Order n	Maximum Permissible harmonic current (A)
Odd harmonics		Even harmonics	
3	2.30	2	1.08
5	1.14	4	0.43
7	0.77	6	0.30
9	0.40	$8 \le n \le 40$	0.23 * 8/n
11	0.33		
13	0.21		
$15 \le n \le 39$	0.15 * 15/n		

Limits of Class B Harmonics Currents

For Class B equipment, the harmonic of the input current shall not exceed the maximum permissible values given in table which is the limit of Class A multiplied by a factor of 1.5.

Limits of Class C Harmonics Currents

Harmonics Order n	Maximum Permissible harmonic current Expressed as a percentage of the input current at the fundamental frequency (%)
2	2
3	$30 \cdot \lambda^*$
5	10
7	7
9	5
$11 \le n \le 39$ (odd harmonics only)	3
∗λ is the circuit power factor	

Limits of Class D Harmonics Currents

Harmonics Order n	Maximum Permissible harmonic current per watt (mA/W)	Maximum Permissible harmonic current (A)
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
$11 \le n \le 39$ (odd harmonics only)	3.85/n	See limit of Class A

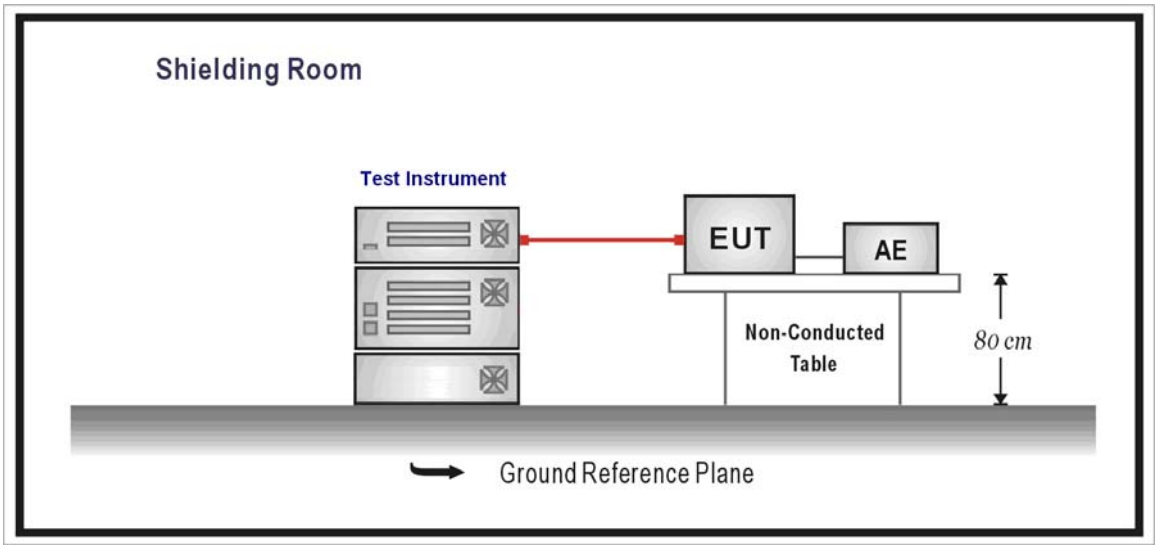
4.3.2. Test Instrument

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Power Harmonics Analyzers	EMC-Partner AG	HAR1000-1P	171	02/04/2009	(2)
Test Site	ATL	TE05	TE05	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

NOTE: N.C.R. = No Calibration Request.

4.3.3. Setup



4.3.4. Test Procedure

The EUT was placed on the top of a wooden table 0.8 meters above the ground and the EUT is supplied in series with power analyzer from a power source having the same normal voltage and frequency as the rated supply voltage and the equipment under test. And the rated voltage at the supply voltage of EUT of 0.94 times and 1.06 times shall be performed.

A definition of the normal load or of the conditions for adequate heat discharge can usually be found in the EN publication corresponding to the equipment under test.

Equipment may have several separately controlled circuits. Each circuit is considered as a single piece of equipment if it can be operated independently and separately from the other circuits.

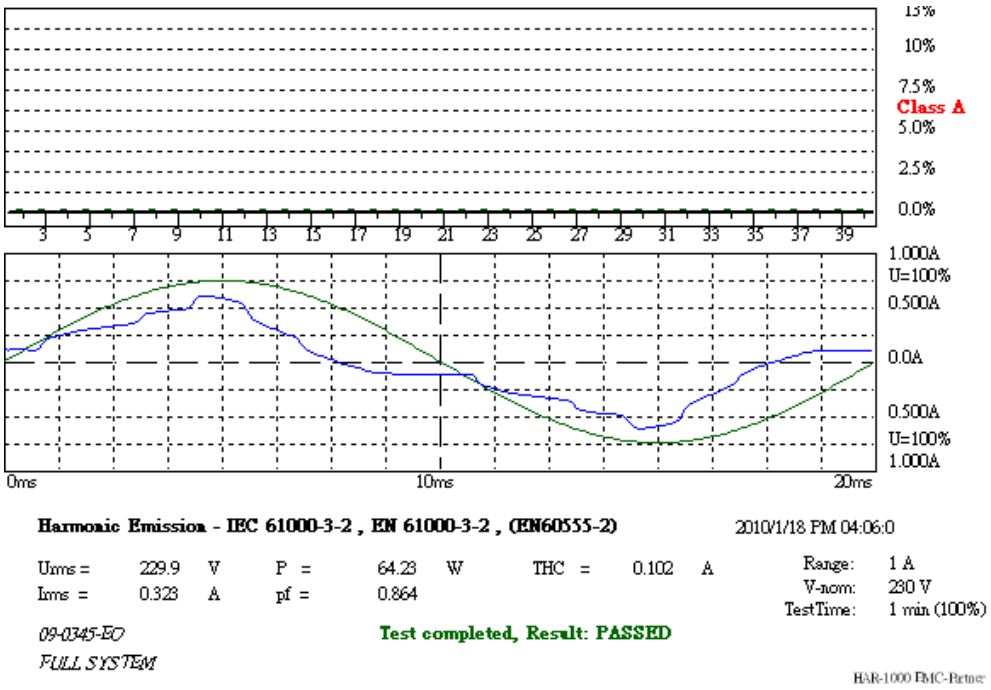
4.3.5. Test Result

Product	ADSL2/2+ IP DSLAM		
Test Item	Power Harmonics		
Test Mode	Mode 1		
Date of Test	01/18/2010	Test Site	TE05

Test Result: Pass **Source qualification: Normal**

Current & voltage waveforms

Harmonics and Class A limit line **European Limits**



Test result: Pass Worst harmonic was #0 with 0.00% of the limit.

Urms =	229.9V	Freq =	49.987	Range:	1 A
Irms =	0.323A	Ipk =	0.618A	cf =	1.911
P =	64.23W	S =	74.32VA	pf =	0.864
THDi =	31.6 %	THDu =	0.10 %	Class A	

Test - Time : 1min (100 %)

Test completed, Result: PASSED

Order	Freq. [Hz]	Iavg [A]	Iavg%L [%]	Imax [A]	Imax%L [%]	Limit [A]	Status
1	50	0.3040		0.3077			
2	100	0.0000	0.0000	0.0007	0.0678	1.0800	Pass
3	150	0.0940	4.0879	0.0942	4.0947	2.3000	Pass
4	200	0.0000	0.0000	0.0003	0.0710	0.4300	Pass
5	250	0.0281	2.4629	0.0281	2.4682	1.1400	Pass
6	300	0.0000	0.0000	0.0003	0.1017	0.3000	Pass
7	350	0.0174	2.2585	0.0174	2.2591	0.7700	Pass
8	400	0.0000	0.0000	0.0002	0.1061	0.2300	Pass
9	450	0.0000	0.0000	0.0025	0.6256	0.4000	Pass
10	500	0.0000	0.0000	0.0002	0.1327	0.1840	Pass
11	550	0.0132	3.9919	0.0133	4.0320	0.3300	Pass
12	600	0.0000	0.0000	0.0003	0.1990	0.1533	Pass
13	650	0.0091	4.3321	0.0096	4.5631	0.2100	Pass
14	700	0.0000	0.0000	0.0004	0.2786	0.1314	Pass
15	750	0.0056	3.7159	0.0065	4.3132	0.1500	Pass
16	800	0.0000	0.0000	0.0004	0.3715	0.1150	Pass
17	850	0.0000	0.0000	0.0041	3.0897	0.1324	Pass
18	900	0.0000	0.0000	0.0004	0.4180	0.1022	Pass
19	950	0.0085	7.2049	0.0087	7.3188	0.1184	Pass
20	1000	0.0000	0.0000	0.0002	0.2654	0.0920	Pass
21	1050	0.0000	0.0000	0.0038	3.5889	0.1071	Pass
22	1100	0.0000	0.0000	0.0002	0.2919	0.0836	Pass
23	1150	0.0000	0.0000	0.0045	4.6170	0.0978	Pass
24	1200	0.0000	0.0000	0.0002	0.3184	0.0767	Pass
25	1250	0.0000	0.0000	0.0011	1.2207	0.0900	Pass
26	1300	0.0000	0.0000	0.0002	0.3450	0.0708	Pass
27	1350	0.0000	0.0000	0.0046	5.5664	0.0833	Pass
28	1400	0.0000	0.0000	0.0003	0.4644	0.0657	Pass
29	1450	0.0050	6.3916	0.0056	7.2374	0.0776	Pass
30	1500	0.0000	0.0000	0.0004	0.5971	0.0613	Pass
31	1550	0.0000	0.0000	0.0021	2.8592	0.0726	Pass
32	1600	0.0000	0.0000	0.0004	0.7430	0.0575	Pass
33	1650	0.0000	0.0000	0.0011	1.6113	0.0682	Pass
34	1700	0.0000	0.0000	0.0004	0.7895	0.0541	Pass
35	1750	0.0026	3.9705	0.0051	7.8803	0.0643	Pass
36	1800	0.0000	0.0000	0.0003	0.5971	0.0511	Pass
37	1850	0.0000	0.0000	0.0025	4.1151	0.0608	Pass
38	1900	0.0000	0.0000	0.0003	0.6303	0.0484	Pass
39	1950	0.0000	0.0000	0.0021	3.5970	0.0577	Pass
40	2000	0.0000	0.0000	0.0003	0.6634	0.0460	Pass

1. Dynamic limits were applied for this test. The highest harmonics values in the above table may not occur at the same window as the maximum harmonics/limit ratio.

2. According to EN61000-3-2 paragraph 7 the note 1 and 2 are valid for all applications having an active input power >75W. Others the result should be pass.

4.3.6. Test Photograph

Test Mode : Mode 1

Description : Power Harmonics Test Setup

4.4. Voltage Fluctuation and Flicker

4.4.1. Limit

The following limits apply:

-- the value of P_{st} shall not be greater than 1.0;

-- the value of P_{lt} shall not be greater than 0.65;

-- the value of d(t) during a voltage change shall not exceed 3.3 % for more than 500 ms;

-- the relative steady-state voltage change, d_c, shall not exceed 3.3 %;

-- the maximum relative voltage change, d_{max}, shall not exceed;

a) 4 % without additional conditions;

b) 6 % for equipment which is:

-- switched manually, or

-- switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.

Note: The cycling frequency will be further limited by the P_{st} and P_{1t} limit.

For example: a d_{max} of 6%producing a rectangular voltage change characteristic twice per hour will give a P_{1t} of about 0.65.

c) 7 % for equipment which is:

-- attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or

-- switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.

P_{st} and P_{1t} requirements shall not be applied to voltage changes caused by manual switching.

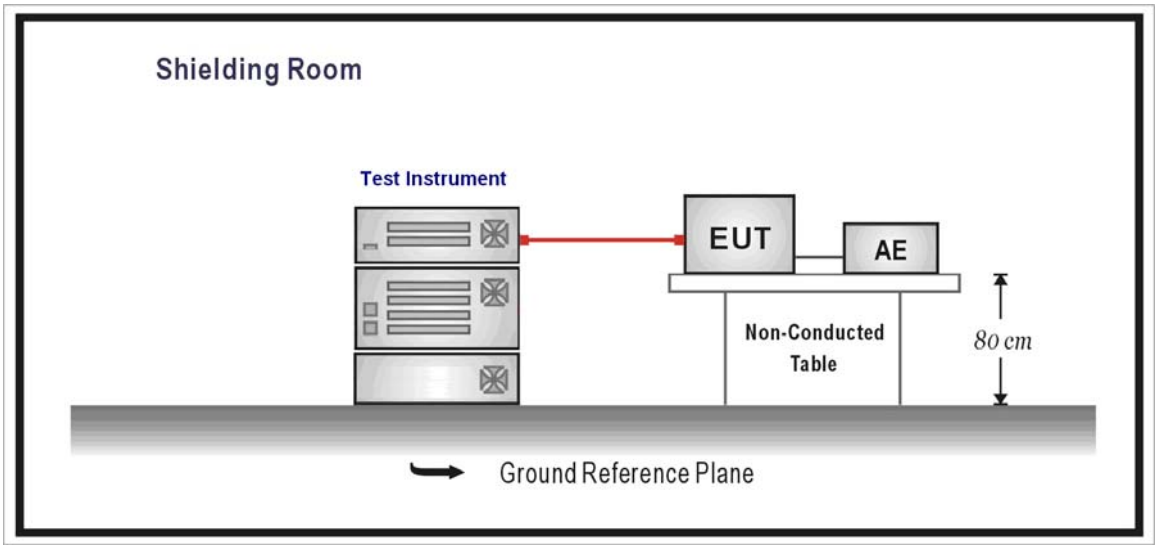
4.4.2. Test Instrument

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Power Harmonics Analyzers	EMC-Partner AG	HAR1000-1P	171	02/04/2009	(2)
Test Site	ATL	TE05	TE05	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

NOTE: N.C.R. = No Calibration Request.

4.4.3. Setup



4.4.4. Test Procedure

The EUT is supplied in series with power analyzer from a power source having the same normal voltage and frequency as the rated supply voltage and the equipment under test. And the rated voltage at the supply voltage of EUT of 0.94 times and 1.06 times shall be performed.

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.

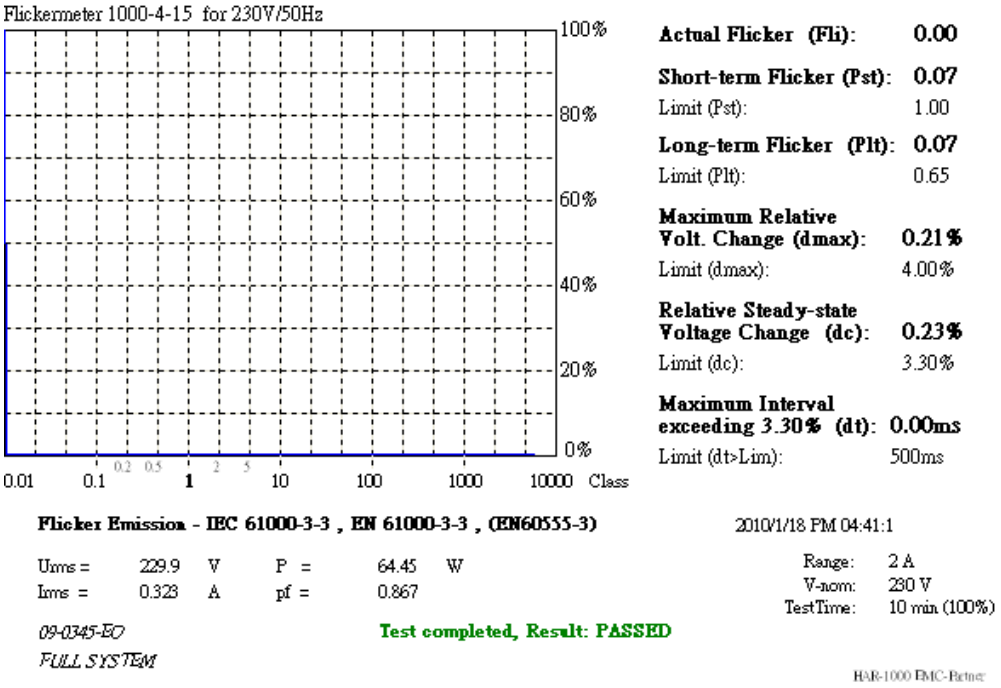
During the flick measurement, the measure time shall include that part of whole operation cycle in which the EUT produce the most unfavorable sequence of voltage changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is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

4.4.5. Test Result

Product	ADSL2/2+ IP DSLAM		
Test Item	Flicker		
Test Mode	Mode 1		
Date of Test	01/18/2010	Test Site	TE05

Test Result: Pass **Status: Test Completed**

Plt and limit line



Urms = 229.9V Freq = 49.987 Range: 2 A
Irms = 0.323A Ipk = 0.623A cf = 1.927
P = 64.40W S = 74.32VA pf = 0.867

Test - Time : 1 x 10min = 10min (0 %)

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

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

Test completed, Result: PASSED

4.4.6. Test Photograph

Test Mode : Mode 1

Description : Flicker Test Setup

5 Immunity Test

5.1. Electrostatic Discharge (ESD)

5.1.1. Test Specification

EN 61000-4-2			
Environmental Phenomena	**Units**	**Test Specification**	**Performance Criteria**
Enclosure Port			
Electrostatic Discharge	kV (Charge Voltage)	±8 Air Discharge ±4 Contact Discharge	B

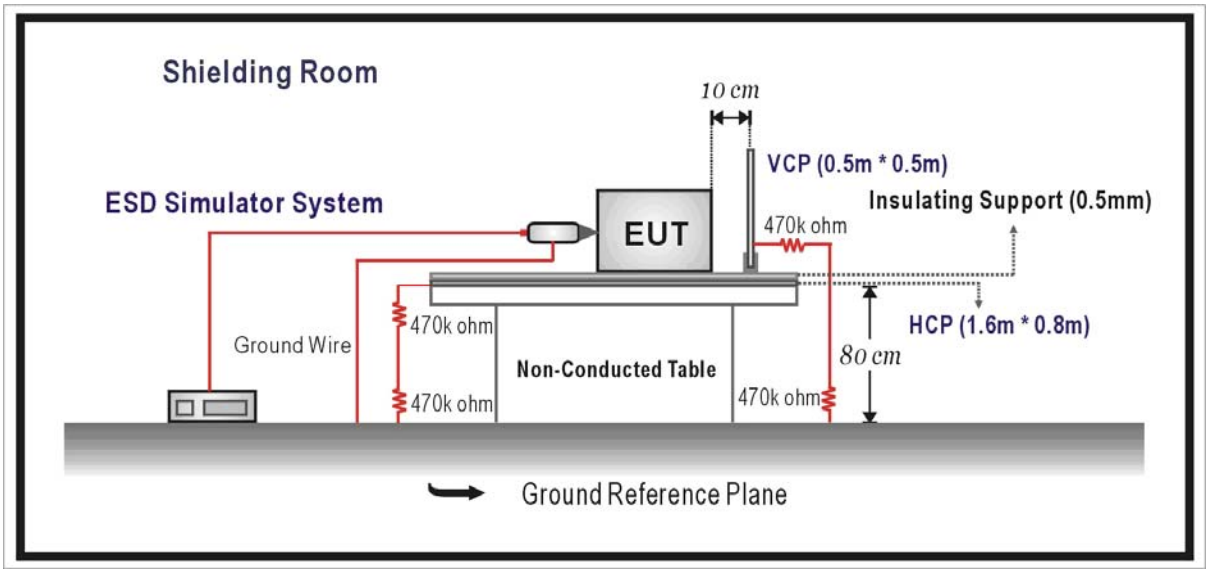
5.1.2. Test Instrument

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Discharge Gun	Noiseken	ESS-2002	NOISE-ESS-2002CM	03/04/2009	(1)
0.8m Height Wooden Table	N/A	N/A	N/A	N.C.R.	-----
Test Site	ATL	TE04	TE04	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

NOTE: N.C.R. = No Calibration Request.

5.1.3. Setup



5.1.4. Test Procedure

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 (HCP). The remaining three test points shall each receive at least 50 direct contact discharges. If no direct contact test point be 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 IEC 61000-4-2:

a) The EUT was located 0.1 m minimum from all side of the HCP (dimensions 1.6m x 0.8m).

b) The support units were located another table 30 cm away from the EUT, but direct support unit was/were located at same location as EUT on the HCP and keep at a distance of 10 cm with EUT.

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

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

e) 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.

f) At least ten single discharges (in the most sensitive polarity) were applied at the front edge of each HCP opposite the center point of each unit of the EUT and 0.1 meters from the front of the EUT. The long axis of the discharge electrode was in the plane of the HCP and perpendicular to its front edge during the discharge.

g) At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane (VCP) 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.

5.1.5. Test Result

Product	ADSL2/2+ IP DSLAM		
Test Item	Electrostatic Discharge		
Test Mode	Mode 1		
Date of Test	01/20/2010	Test Site	TE04

Air Discharge												
Test Points	Test Levels								Results			
	± 2 kV	Performance Criterion		± 4 kV	Performance Criterion		± 8 kV	Performance Criterion		Pass	Fail	Observation
Front	☒	☐A	☒B	☒	☐A	☒B	☒	☐A	☒B	☒	☐	Note 2
Back	☐	☐A	☐B	☐	☐A	☐B	☐	☐A	☐B	☐	☐	---
Left	☐	☐A	☐B	☐	☐A	☐B	☐	☐A	☐B	☐	☐	---
Right	☐	☐A	☐B	☐	☐A	☐B	☐	☐A	☐B	☐	☐	---
Top	☐	☐A	☐B	☐	☐A	☐B	☐	☐A	☐B	☐	☐	---
Bottom	☐	☐A	☐B	☐	☐A	☐B	☐	☐A	☐B	☐	☐	---

Contact Discharge												
Test Points	Test Levels								Results			
	± 2 kV	Performance Criterion		± 4 kV	Performance Criterion		± 8 kV	Performance Criterion		Pass	Fail	Observation
Front	☒	☐A	☒B	☒	☐A	☒B	☐	☐A	☐B	☒	☐	Note 2
Back	☒	☐A	☒B	☒	☐A	☒B	☐	☐A	☐B	☒	☐	Note 2
Left	☒	☐A	☒B	☒	☐A	☒B	☐	☐A	☐B	☒	☐	Note 2
Right	☒	☐A	☒B	☒	☐A	☒B	☐	☐A	☐B	☒	☐	Note 2
Top	☒	☐A	☒B	☒	☐A	☒B	☐	☐A	☐B	☒	☐	Note 2
Bottom	☒	☐A	☒B	☒	☐A	☒B	☐	☐A	☐B	☒	☐	Note 2

For the tested points to EUT, please refer to attached page.
(Blue arrow mark for Air Discharge and red arrow mark for Contact Discharge)

Discharge To Horizontal Coupling Plane								
Side of EUT	Test Levels				Results			
	± 2 kV	± 4 kV	± 6 kV	± 8 kV	Pass	Fail	Performance Criterion	Observation
Front	☒	☒	☐	☐	☒	☐	☐A ☒B	Note 2
Back	☐	☐	☐	☐	☐	☐	☐A ☐B	---
Left	☐	☐	☐	☐	☐	☐	☐A ☐B	---
Right	☐	☐	☐	☐	☐	☐	☐A ☐B	---

Discharge To Vertical Coupling Plane								
Side of EUT	Test Levels				Results			
	± 2 kV	± 4 kV	± 6 kV	± 8 kV	Pass	Fail	Performance Criterion	Observation
Front	☒	☒	☐	☐	☒	☐	☐A ☒B	Note 2
Back	☒	☒	☐	☐	☒	☐	☐A ☒B	Note 2
Left	☒	☒	☐	☐	☒	☐	☐A ☒B	Note 2
Right	☒	☒	☐	☐	☒	☐	☐A ☒B	Note 2

NOTE : 1. There was no change compared with initial operation during the test.
2. Temporary degradation of performance or loss of function, but it could be reset by itself.

Product	ADSL2/2+ IP DSLAM		
Test Item	Electrostatic Discharge		
Test Mode	Mode 2		
Date of Test	03/24/2010	Test Site	TE04

Air Discharge												
Test Points	Test Levels									Results		
	± 2 kV	Performance Criterion		± 4 kV	Performance Criterion		± 8 kV	Performance Criterion		Pass	Fail	Observation
Front	☒	☒A	☐B	☒	☒A	☐B	☒	☒A	☐B	☒	☐	Note 1
Back	☐	☐A	☐B	☐	☐A	☐B	☐	☐A	☐B	☐	☐	---
Left	☐	☐A	☐B	☐	☐A	☐B	☐	☐A	☐B	☐	☐	---
Right	☐	☐A	☐B	☐	☐A	☐B	☐	☐A	☐B	☐	☐	---
Top	☐	☐A	☐B	☐	☐A	☐B	☐	☐A	☐B	☐	☐	---
Bottom	☐	☐A	☐B	☐	☐A	☐B	☐	☐A	☐B	☐	☐	---

Contact Discharge												
Test Points	Test Levels									Results		
	± 2 kV	Performance Criterion		± 4 kV	Performance Criterion		± 8 kV	Performance Criterion		Pass	Fail	Observation
Front	☒	☐A	☒B	☒	☐A	☒B	☐	☐A	☐B	☒	☐	Note 2
Back	☒	☐A	☒B	☒	☐A	☒B	☐	☐A	☐B	☒	☐	Note 2
Left	☒	☐A	☒B	☒	☐A	☒B	☐	☐A	☐B	☒	☐	Note 2
Right	☒	☐A	☒B	☒	☐A	☒B	☐	☐A	☐B	☒	☐	Note 2
Top	☒	☐A	☒B	☒	☐A	☒B	☐	☐A	☐B	☒	☐	Note 2
Bottom	☒	☐A	☒B	☒	☐A	☒B	☐	☐A	☐B	☒	☐	Note 2

For the tested points to EUT, please refer to attached page.
(Blue arrow mark for Air Discharge and red arrow mark for Contact Discharge)

Discharge To Horizontal Coupling Plane									
Side of EUT	Test Levels				Results				
	± 2 kV	± 4 kV	± 6 kV	± 8 kV	Pass	Fail	Performance Criterion		Observation
Front	☒	☒	☐	☐	☒	☐	☐A	☒B	Note 2
Back	☐	☐	☐	☐	☐	☐	☐A	☐B	---
Left	☐	☐	☐	☐	☐	☐	☐A	☐B	---
Right	☐	☐	☐	☐	☐	☐	☐A	☐B	---

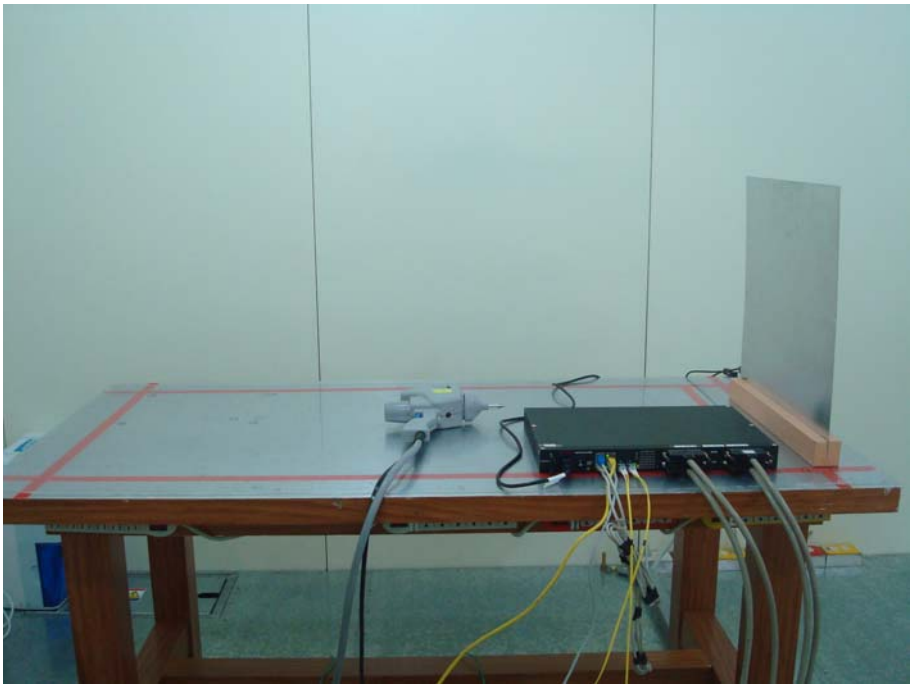
Discharge To Vertical Coupling Plane									
Side of EUT	Test Levels				Results				
	± 2 kV	± 4 kV	± 6 kV	± 8 kV	Pass	Fail	Performance Criterion		Observation
Front	☒	☒	☐	☐	☒	☐	☐A	☒B	Note 2
Back	☒	☒	☐	☐	☒	☐	☐A	☒B	Note 2
Left	☒	☒	☐	☐	☒	☐	☐A	☒B	Note 2
Right	☒	☒	☐	☐	☒	☐	☐A	☒B	Note 2

NOTE : 1. There was no change compared with initial operation during the test.
2. Temporary degradation of performance or loss of function, but it could be reset by itself.

5.1.6. Test Photograph

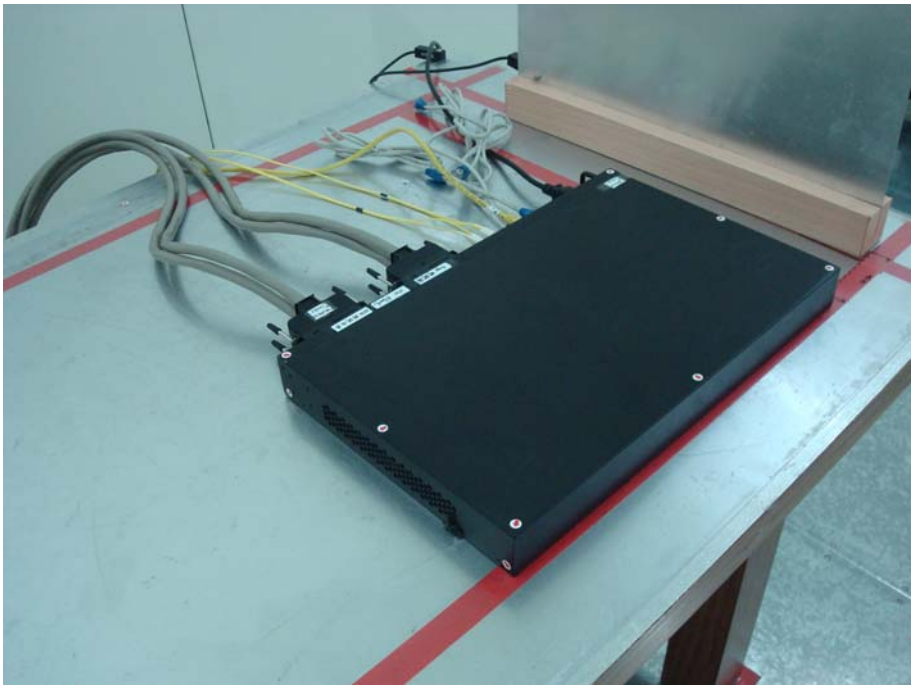
Test Mode : Mode 1

Description : Front View of ESD Test



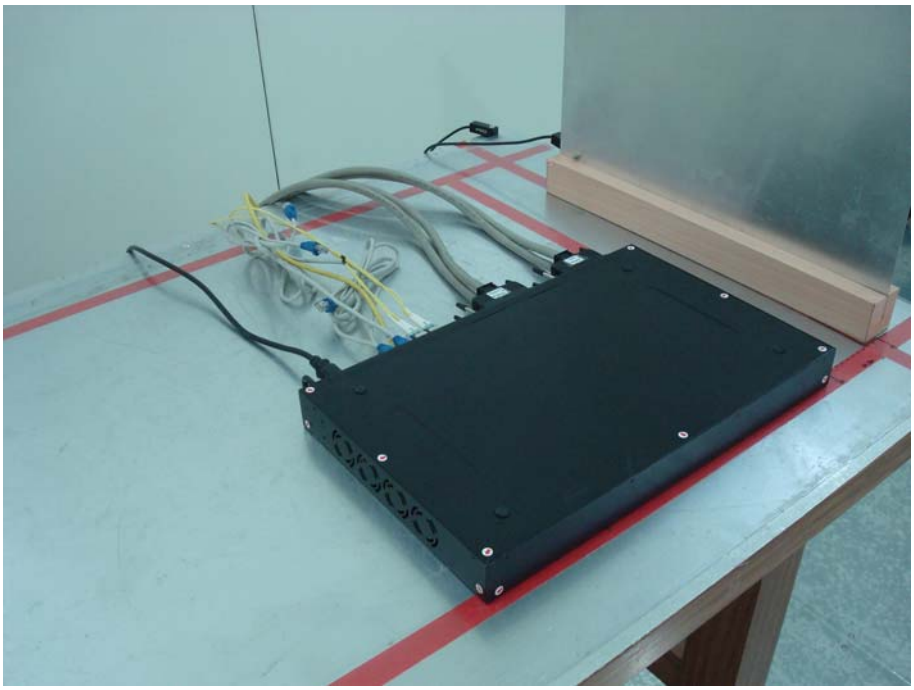
Test Mode : Mode 1

Description : Close View of ESD Test



Test Mode : Mode 1

Description : Close View of ESD Test



Test Mode : Mode 2

Description : Front View of ESD Test

Test Mode : Mode 2

Description : Close View of ESD Test

Test Mode : Mode 2

Description : Close View of ESD Test

Test Mode : Mode 2

Description : Close View of ESD Test

Test Mode : Mode 2

Description : Close View of ESD Test

5.2. Radiated Electromagnetic Field (RS)

5.2.1. Test Specification

IEC 61000-4-3			
Environmental Phenomena	**Units**	**Test Specification**	**Performance Criteria**
Enclosure Port			
Test Frequency Range	MHz	80-1000	A
RF Electromagnetic Field	V/m(Un-modulated, rms)	3	
Amplitude Modulated	% AM (1kHz)	80	

EUT tested in accordance with the specifications given by the standard of IEC 61000-4-3.

Step : 1%

Step time : 3 Second

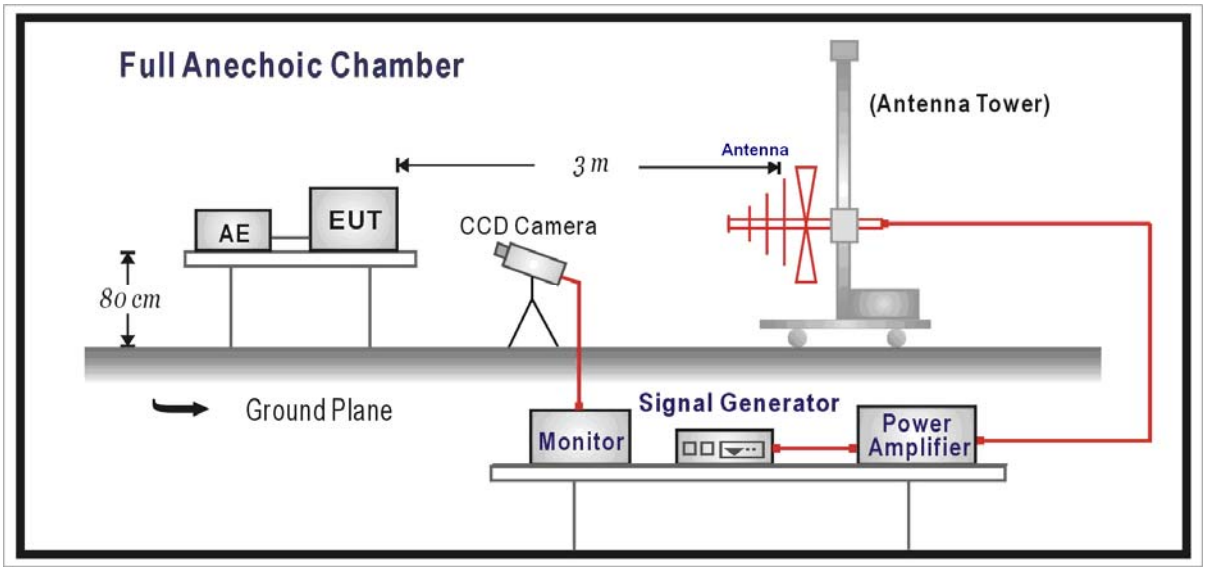
5.2.2. Test Instrument

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
SMB 100A SIGNAL GENERATOR	R&S	SMB100A	100724	08/20/2009	(2)
NRP-Z91 POWER SENSOR	R&S	NRP-Z91	100611	05/17/2009	(2)
NRP-Z91 POWER SENSOR	R&S	NRP-Z91	100612	05/17/2009	(2)
NRP POWER METER	R&S	NRP	101591	05/17/2009	(2)
Solid State Power Amplifier	BONN ELEKTRONIK	BLWA 0830-160/100/40D	87050	N.C.R.	-----
Signal Generator Module	R&S	SM300 Module	102209	N.C.R.	-----
Broad-Band Horn Antenna	Schwarzbeck Mess-Elektronik	BBHA 9120	BBHA 9120 E388	N.C.R.	-----
Test Site	ATL	TE07	888009	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

NOTE: N.C.R. = No Calibration Request.

5.2.3. Setup



5.2.4. Test Procedure

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

a) The testing was performed in a fully anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.

b) The frequency range is swept from 80 MHz to 1000 MHz, with the signal 80% amplitude modulated with a 1kHz sine-wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s, where the frequency range is swept incrementally, the step size was 1% of preceding frequency value.

c) The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.

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

5.2.5. Test Result

Product	ADSL2/2+ IP DSLAM		
Test Item	Radiated Susceptibility		
Test Mode	Mode 1		
Date of Test	01/19/2010	Test Site	TE07

Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Performance Criterion	Result
80 ~ 1000	H	0	3	☒A ☐B	PASS
80 ~ 1000	V	0	3	☒A ☐B	PASS
80 ~ 1000	H	90	3	☒A ☐B	PASS
80 ~ 1000	V	90	3	☒A ☐B	PASS
80 ~ 1000	H	180	3	☒A ☐B	PASS
80 ~ 1000	V	180	3	☒A ☐B	PASS
80 ~ 1000	H	270	3	☒A ☐B	PASS
80 ~ 1000	V	270	3	☒A ☐B	PASS

Note:

The testing performed is from lowest level up to the highest level as required by standard, but only highest level is shown on the report.

Criteria A: Operate as intended during and after the test
Criteria B: Operate as intended after the test
Criteria C: Loss/Error of function

☐ Additional Information
☐ There was no observable degradation in performance.
☐ EUT stopped operation and could / could not be reset by operator at _____ V/m at frequency _____MHz.
☒ No false alarms or other malfunctions were observed during or after the test.

Product	ADSL2/2+ IP DSLAM		
Test Item	Radiated Susceptibility		
Test Mode	Mode 2		
Date of Test	03/24/2010	Test Site	TE07

Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Performance Criterion	Result
80 ~ 1000	H	0	3	☒A ☐B	PASS
80 ~ 1000	V	0	3	☒A ☐B	PASS
80 ~ 1000	H	90	3	☒A ☐B	PASS
80 ~ 1000	V	90	3	☒A ☐B	PASS
80 ~ 1000	H	180	3	☒A ☐B	PASS
80 ~ 1000	V	180	3	☒A ☐B	PASS
80 ~ 1000	H	270	3	☒A ☐B	PASS
80 ~ 1000	V	270	3	☒A ☐B	PASS

Note:

The testing performed is from lowest level up to the highest level as required by standard, but only highest level is shown on the report.

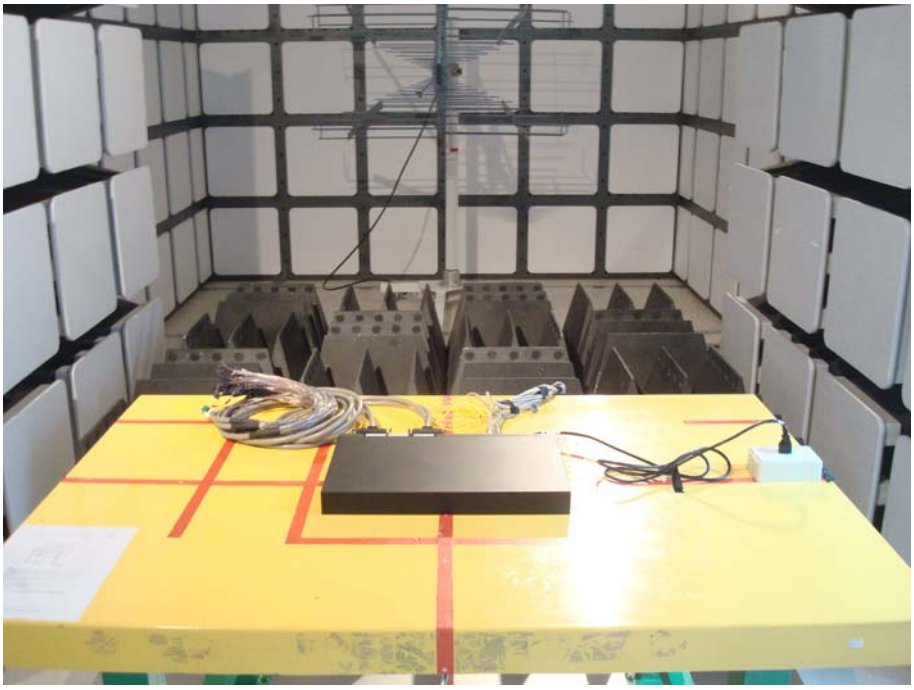
Criteria A: Operate as intended during and after the test
Criteria B: Operate as intended after the test
Criteria C: Loss/Error of function

☐ Additional Information
☐ There was no observable degradation in performance.
☐ EUT stopped operation and could / could not be reset by operator at _____ V/m at frequency _____MHz.
☒ No false alarms or other malfunctions were observed during or after the test.

5.2.6. Test Photograph

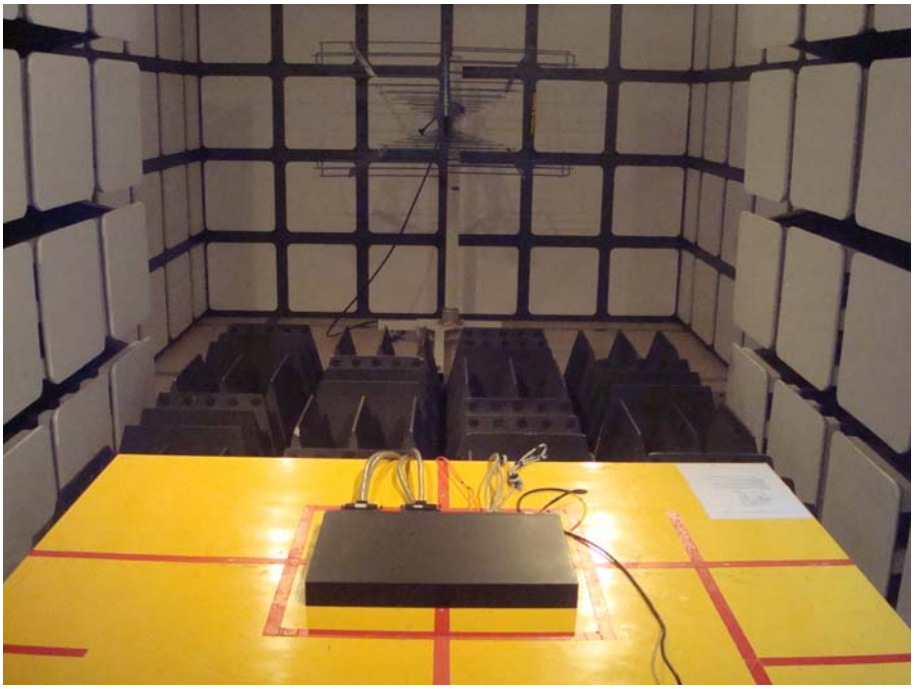
Test Mode : Mode 1

Description : Front View of RS Test



Test Mode : Mode 2

Description : Front View of RS Test



5.3. Electrical Fast Transient/Burst (EFT)

5.3.1. Test Specification

IEC 61000-4-4				
Item	**Environmental Phenomena**	**Units**	**Test Specification**	**Performance Criteria**
I/O and communication ports				
Fast Transients Common Mode		kV (Peak) Tr/Th ns Rep. Frequency kHz	±0.5 5/50 5	B
Input DC Power Ports				
Fast Transients Common Mode		kV (Peak) Tr/Th ns Rep. Frequency kHz	±0.5 5/50 5	B
Input AC Power Ports				
Fast Transients Common Mode		kV (Peak) Tr/Th ns Rep. Frequency kHz	±1 5/50 5	B

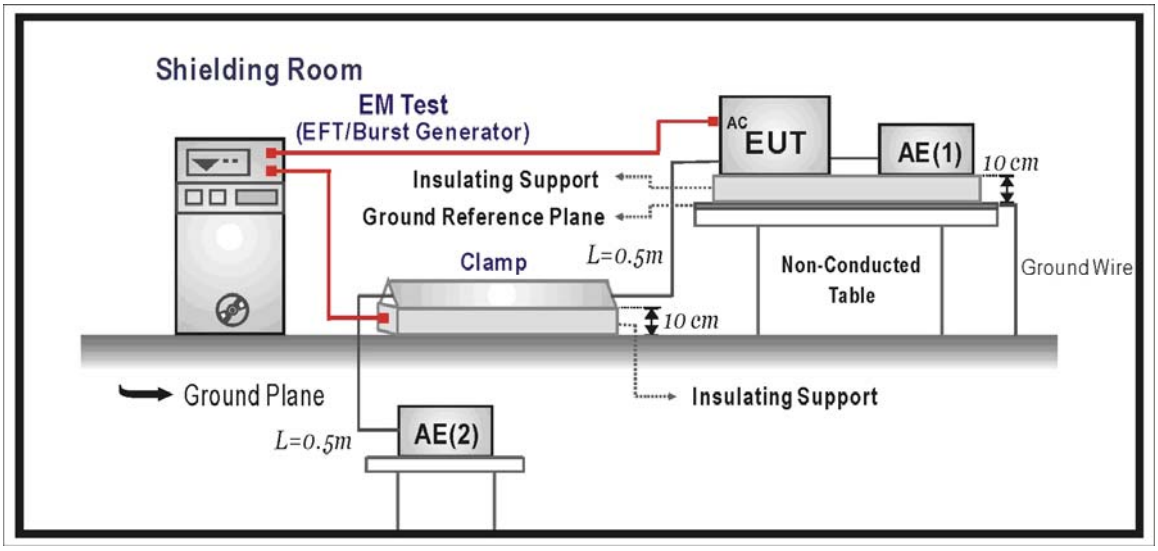
5.3.2. Test Instrument

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
EMC Immunity Tester	EMC-PARTNER AG	TRANSIENT 2000IN6	952	02/24/2009	(1)
Test Site	ATL	TE08	TE08	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

NOTE: N.C.R. = No Calibration Request.

5.3.3. Setup



5.3.4. Test Procedure

a) Both positive and negative polarity discharges were applied.

b) The length of the "hot wire" from the coaxial output of the EFT generator to the terminals on the EUT should not exceed 1 meter.

c) The duration time of each test sequential was 1 minute.
d) The transient/burst waveform was in accordance with IEC 61000-4-4, 5/50ns.

5.3.5. Test Result

Product	ADSL2/2+ IP DSLAM		
Test Item	Electrical Fast Transient/Burst		
Test Mode	Mode 1		
Date of Test	01/20/2010	Test Site	TE08

Test Point	Polarity	Test Level (kV)	Inject Time (Second)	Inject Method	Performance Criterion	Result
L	+/-	1	120	Direct	☒A ☐B	PASS
N	+/-	1	120	Direct	☐A ☒B	PASS
PE	+/-	1	120	Direct	☒A ☐B	PASS
L+N	+/-	1	120	Direct	☐A ☒B	PASS
L+PE	+/-	1	120	Direct	☐A ☒B	PASS
N+PE	+/-	1	120	Direct	☒A ☐B	PASS
L+N+PE	+/-	1	120	Direct	☒A ☐B	PASS
Lan Port	+/-	0.5	120	Direct	☒A ☐B	PASS
Telecom Port	+/-	0.5	120	Direct	☒A ☐B	PASS

Note:

The testing performed is from lowest level up to the highest level as required by standard, but only highest level is shown on the report.

Criteria A : Operate as intended during and after the test

Criteria B : Operate as intended after the test

Criteria C : Loss/Error of function

☐ Additional Information

☒ EUT stopped operation and could be reset by itself at___1___ kV of Line.

☐ No false alarms or other malfunctions were observed during or after the test.

Product	ADSL2/2+ IP DSLAM		
Test Item	Electrical Fast Transient/Burst		
Test Mode	Mode 2		
Date of Test	03/24/2010	Test Site	TE08

Test Point	Polarity	Test Level (kV)	Inject Time (Second)	Inject Method	Performance Criterion	Result
Lan Port	+/-	0.5	120	Direct	☒A ☐B	PASS
Telecom Port	+/-	0.5	120	Direct	☒A ☐B	PASS

Note:

The testing performed is from lowest level up to the highest level as required by standard, but only highest level is shown on the report.

Criteria A : Operate as intended during and after the test

Criteria B : Operate as intended after the test

Criteria C : Loss/Error of function

☐ Additional Information

☐ EUT stopped operation and could be reset by itself at_____ kV of Line.

☐ No false alarms or other malfunctions were observed during or after the test.

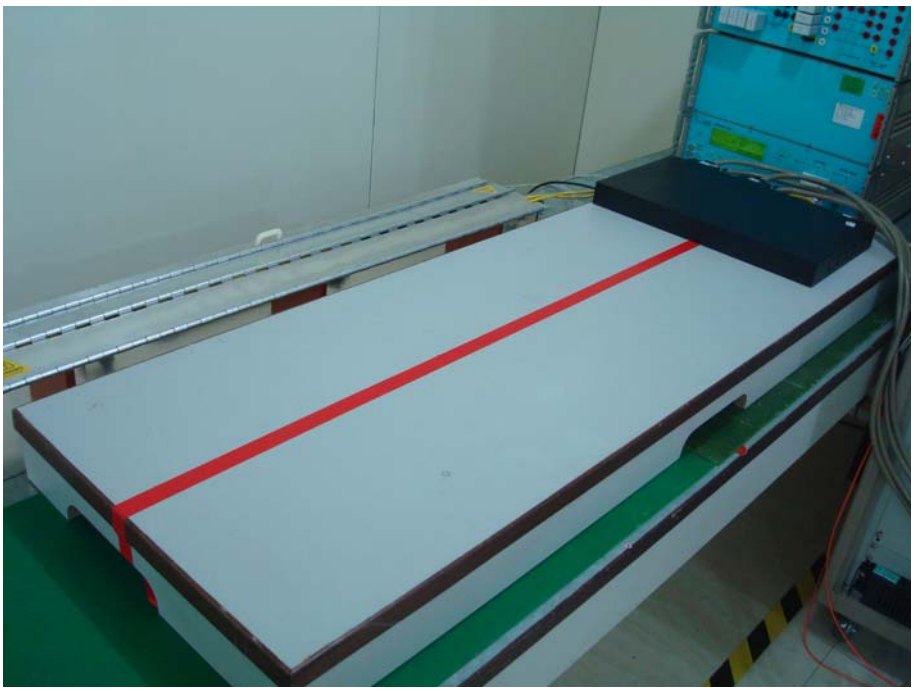
5.3.6. Test Photograph

Test Mode : Mode 1

Description : Front View of EFT Test – AC Mains / Lan Port / Telecom Port

Test Mode : Mode 2

Description : Front View of EFT Test –Lan Port / Telecom Port



5.4. Surge

5.4.1. Test Specification

IEC61000-4-5				
Item	**Environmental Phenomena**	**Units**	**Test Specification**	**Performance Criteria**
Signal Ports and Telecommunication Ports(See 1) and 2))				
Surges Line to Ground		Tr/Th us kV	1.2/50 (8/20) ± 1	B
Input DC Power Ports				
Surges Line to Ground		Tr/Th us kV	1.2/50 (8/20) ± 0.5	B
Input AC Power Ports				
Surges Line to Line Line to Ground		Tr/Th us kV kV	1.2/50 (8/20) ± 1 ± 2	B

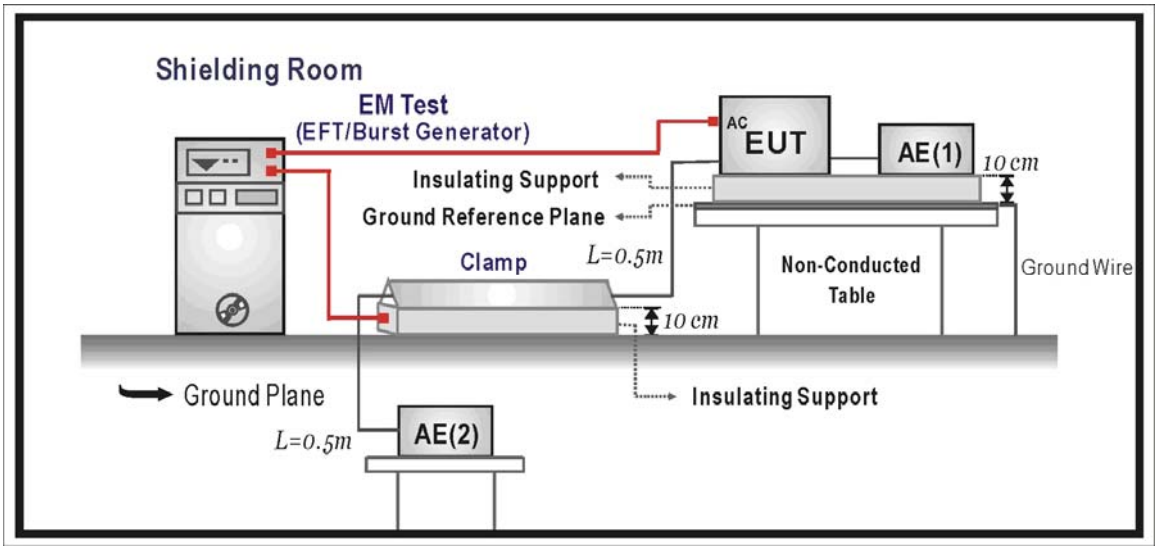
5.4.2. Test Instrument

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
EMC Immunity Tester	EMC-PARTNER AG	TRANSIENT 2000IN6	952	02/24/2009	(1)
Test Site	ATL	TE08	TE08	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

NOTE: N.C.R. = No Calibration Request.

5.4.3. Setup



5.4.4. Test Procedure

a) For EUT power supply:

The surge is 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 was shorter than 2 meters in length.

b) For test applied to unshielded un-symmetrically operated interconnection lines of EUT:
The surge was applied to the lines via the capacitive coupling. The coupling / decoupling networks didn't influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

c) For test applied to unshielded symmetrically operated interconnection / telecommunication lines of EUT:
The surge was applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor were not specified. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

5.4.5. Test Result

Product	ADSL2/2+ IP DSLAM		
Test Item	Surge		
Test Mode	Mode 1		
Date of Test	01/20/2010	Test Site	TE08

Inject Line	Polarity	Angle	Voltage kV	Time Interval (Second)	Inject Method	Complied to Criteria	Result
L+N	±	0	1kV	60	Direct	☒A ☐B	Pass
L+N	±	90	1kV	60	Direct	☒A ☐B	Pass
L+N	±	180	1kV	60	Direct	☒A ☐B	Pass
L+N	±	270	1kV	60	Direct	☒A ☐B	Pass
L+PE	±	0	2kV	60	Direct	☒A ☐B	Pass
L+PE	±	90	2kV	60	Direct	☒A ☐B	Pass
L+PE	±	180	2kV	60	Direct	☒A ☐B	Pass
L+PE	±	270	2kV	60	Direct	☒A ☐B	Pass
N+PE	±	0	2kV	60	Direct	☒A ☐B	Pass
N+PE	±	90	2kV	60	Direct	☒A ☐B	Pass
N+PE	±	180	2kV	60	Direct	☒A ☐B	Pass
N+PE	±	270	2kV	60	Direct	☒A ☐B	Pass
L+N+PE	±	0	2kV	60	Direct	☒A ☐B	Pass
L+N+PE	±	90	2kV	60	Direct	☒A ☐B	Pass
L+N+PE	±	180	2kV	60	Direct	☒A ☐B	Pass
L+N+PE	±	270	2kV	60	Direct	☒A ☐B	Pass

Note:

The testing performed is from lowest level up to the highest level as required by standard, but only highest level is shown on the report.

Criteria A : Operate as intended during and after the test
Criteria B : Operate as intended after the test
Criteria C : Loss/Error of function

☐ Additional Information

☐ EUT stopped operation and could / could not be reset by operator at_____kV of Line_____.

☒ No false alarms or other malfunctions were observed during or after the test.

5.4.6. Test Photograph

Test Mode : Mode 1

Description : Front View of Surge Test – AC Mains

5.5. Conducted Susceptibility (CS)

5.5.1. Test Specification

IEC 61000-4-6			
Environmental Phenomena	**Units**	**Test Specification**	**Performance Criteria**
Signal Ports and Telecommunication Ports			
Radio-Frequency Continuous Conducted	MHz	0.15-80	A
	V (rms, Un-modulated)	3	
	% AM (1kHz)	80	
Input DC Power Ports			
Radio-Frequency Continuous Conducted	MHz	0.15-80	A
	V (rms, Un-modulated)	3	
	% AM (1kHz)	80	
Input AC Power Ports			
Radio-Frequency Continuous Conducted	MHz	0.15-80	A
	V (rms, Un-modulated)	3	
	% AM (1kHz)	80	

EUT tested in accordance with the specifications given by the standard of IEC 61000-4-6.

Step : 1%

Step time : 3 Second

5.5.2. Test Instrument

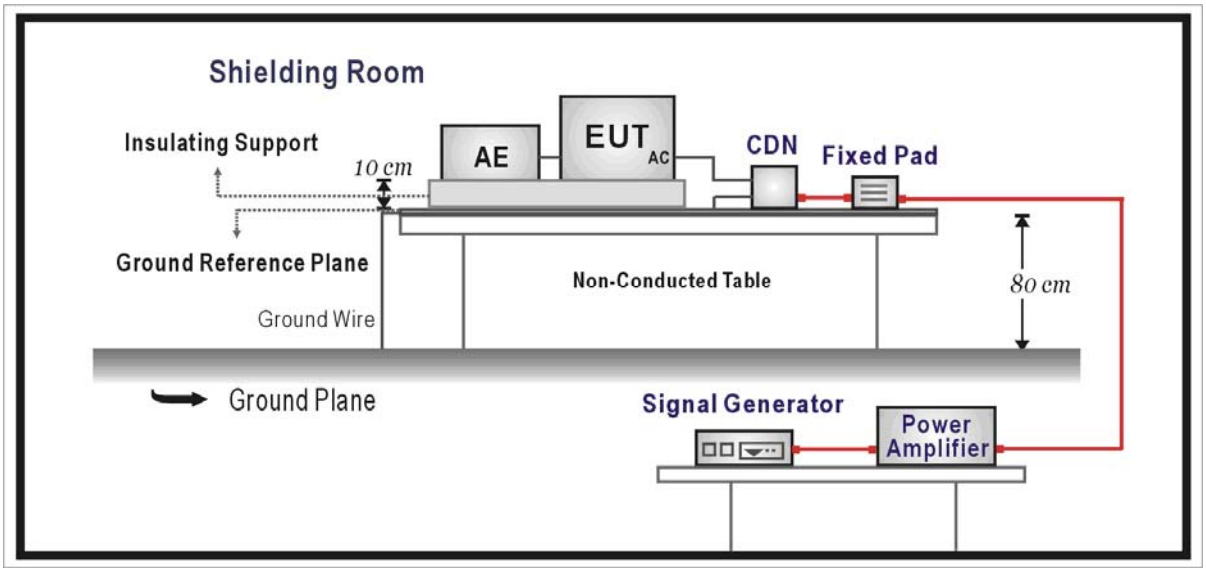
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Signal Line Coupling Decoupling Network	FCC	FCC-801--T2-RJ11	8017	07/06/2009	(2)
Signal Line Coupling Decoupling Network	FCC	FCC-801--T4-RJ45	8018	07/06/2009	(2)
Signal Line Coupling Decoupling Network	FCC	FCC-801-M2/M3-1 6A8030	8030	07/06/2009	(2)
EM Injection Clamp	FCC	F-203I-23MM	8576	07/09/2009	(2)
Amplifiers	ar	75A250A	328729	07/06/2009	(2)
NRP-Z91 POWER SENSOR	R&S	NRP-Z91	100613	05/17/2009	(2)
De-coupling Network	FCC	F-203I-23MM-DCN	8234	N.C.R.	-----
Test Site	ATL	TE08	TE08	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

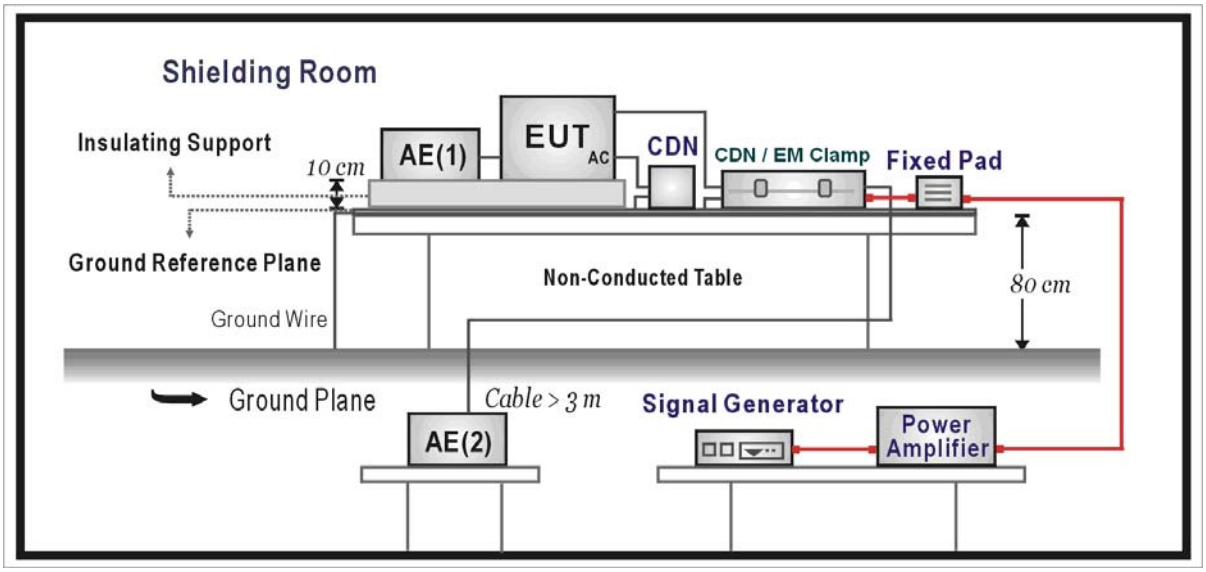
NOTE: N.C.R. = No Calibration Request.

5.5.3. Setup

CDN Method



EM Clamp Method



5.5.4. Test Procedure

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

The test shell performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50-ohm load resistor.

The frequency range was 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 was modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. The sweep rate was 1.5 x 10^{-3} decades/s. Where the frequency range is swept incrementally, the step size was 1 % of preceding frequency value from 150 kHz to 80 MHz.

The dwell time at each frequency was less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies such as clock frequency and harmonics or frequencies of dominant interest, was analyzed separately.

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

5.5.5. Test Result

Product	ADSL2/2+ IP DSLAM		
Test Item	Conducted Susceptibility		
Test Mode	Mode 1		
Date of Test	01/20/2010	Test Site	TE08

Frequency Band (MHz)	Field Strength (Vrms)	Inject Port	Inject Method	Performance Criterion	Result
0.15 ~ 80	3	AC Mains	CDN-M3	☒A ☐B	PASS
0.15 ~ 80	3	Telecom Port	CDN-T2	☒A ☐B	PASS
0.15 ~ 80	3	Lan Port	CDN-T4	☒A ☐B	PASS

Note:

The testing performed is from lowest level up to the highest level as required by standard, but only highest level is shown on the report.

Criteria A : Operate as intended during and after the test

Criteria B : Operate as intended after the test

Criteria C : Loss/Error of function

☐ Additional Information

☐ EUT stopped operation and could / could not be reset by operator at _____ dBuV (V) at frequency _____MHz.

☒ No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

Product	ADSL2/2+ IP DSLAM		
Test Item	Conducted Susceptibility		
Test Mode	Mode 2		
Date of Test	03/24/2010	Test Site	TE08

Frequency Band (MHz)	Field Strength (Vrms)	Inject Port	Inject Method	Performance Criterion	Result
0.15 ~ 80	3	Telecom Port	Clamp	☒A ☐B	PASS
0.15 ~ 80	3	Lan Port	Clamp	☒A ☐B	PASS

Note:

The testing performed is from lowest level up to the highest level as required by standard, but only highest level is shown on the report.

Criteria A : Operate as intended during and after the test

Criteria B : Operate as intended after the test

Criteria C : Loss/Error of function

☐ Additional Information

☐ EUT stopped operation and could / could not be reset by operator at _____ dBuV (V) at frequency _____MHz.

☒ No false alarms or other malfunctions were observed during or after the test.
The acceptance criteria were met, and the EUT passed the test.

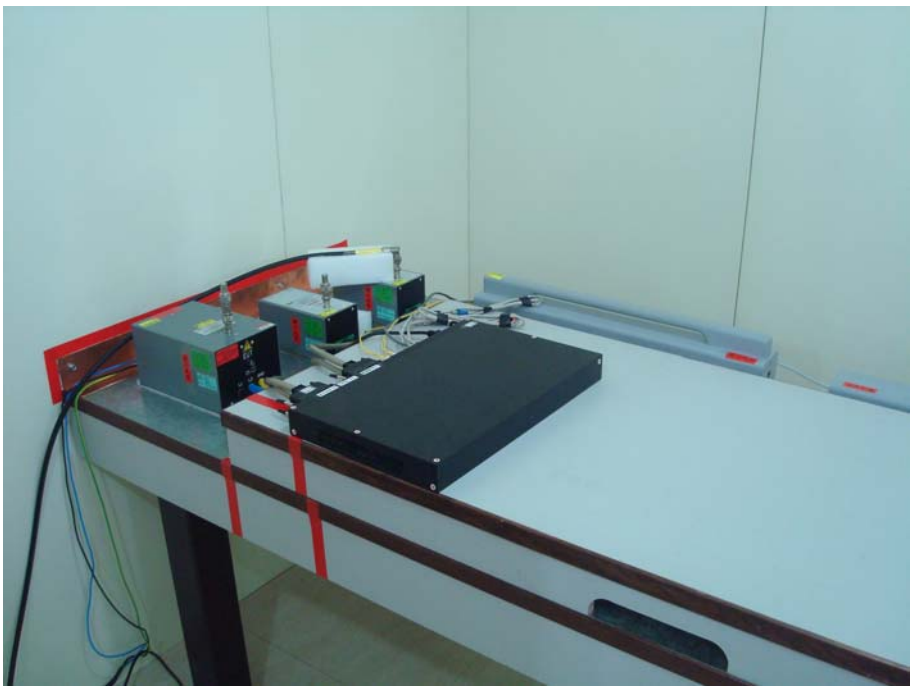
5.5.6. Test Photograph

Test Mode : Mode 1

Description : Front View of CS Test – AC Mains

Test Mode : Mode 1

Description : Front View of CS Test – Lan Port / Telecom Port



Test Mode : Mode 2

Description : Front View of CS Test –Lan Port / Telecom Port

5.6. Power Frequency Magnetic Field (PMF)

5.6.1. Test Specification

IEC 61000-4-8				
Item	**Environmental Phenomena**	**Units**	**Test Specification**	**Performance Criteria**
Enclosure Port				
	Power-Frequency Magnetic Field	Hz A/m (r.m.s.)	50 1	A

EUT tested in accordance with the specifications given by the standard of IEC 61000-4-8.

Orientation : X, Y, Z

Test time : 180 Second

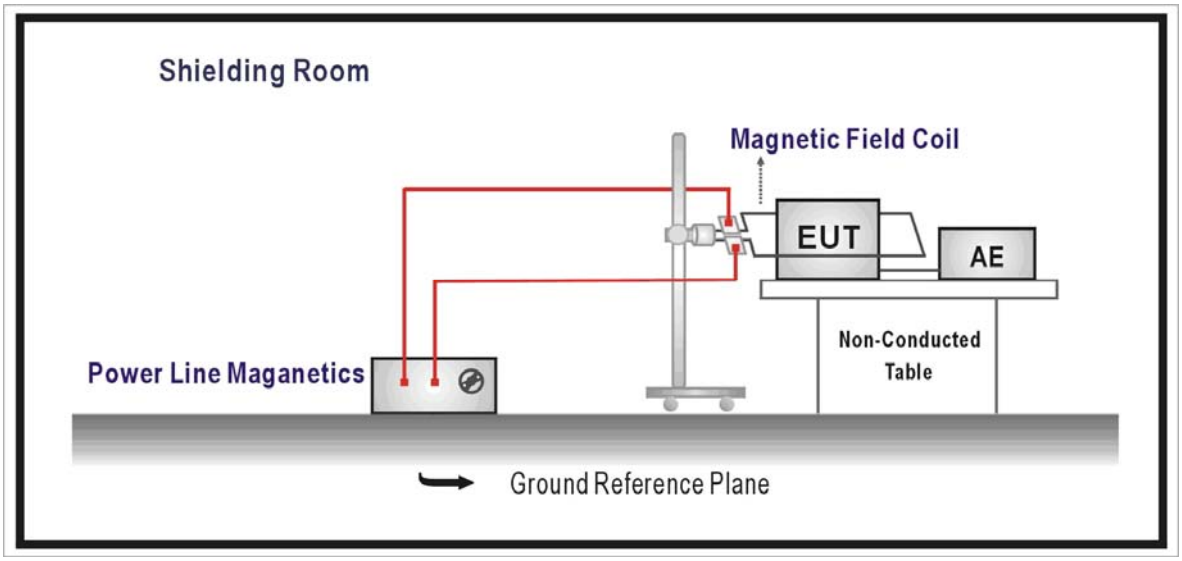
5.6.2. Test Instrument

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
EMC Immunity Tester	EMC-PARTNER AG	TRANSIENT 2000IN6	952	02/24/2009	(1)
Test Site	ATL	TE08	TE08	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

NOTE: N.C.R. = No Calibration Request.

5.6.3. Setup



5.6.4. Test Procedure

a). The equipment was configured and connected to satisfy its functional requirements. It shall be placed on the GRP with the interposition of a 0.1m-thick insulating support.

b). The equipment cabinets shall be connected to the safety earth directly on the GRP via the earth terminal of the EUT.

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

d). 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.

5.6.5. Test Result

Product	ADSL2/2+ IP DSLAM		
Test Item	Power Frequency Magnetic Field		
Test Mode	Mode 1		
Date of Test	01/20/2010	Test Site	TE08

Polarization	Frequency (Hz)	Magnetic Strength (A/m)	Complied to Criteria	Result
X Orientation	50	1	A	PASS
Y Orientation	50	1	A	PASS
Z Orientation	50	1	A	PASS

Note:

Criteria A : Operate as intended during and after the test

Criteria B : Operate as intended after the test

Criteria C : Loss/Error of function

☐ Additional Information

☐ EUT stopped operation and could / could not be reset by operator at _____ dBuV (V) at frequency _____ MHz.

☒ No false alarms or other malfunctions were observed during or after the test.
The acceptance criteria were met, and the EUT passed the test.

Product	ADSL2/2+ IP DSLAM		
Test Item	Power Frequency Magnetic Field		
Test Mode	Mode 2		
Date of Test	03/24/2010	Test Site	TE08

Polarization	Frequency (Hz)	Magnetic Strength (A/m)	Complied to Criteria	Result
X Orientation	50	1	A	PASS
Y Orientation	50	1	A	PASS
Z Orientation	50	1	A	PASS

Note:

Criteria A : Operate as intended during and after the test

Criteria B : Operate as intended after the test

Criteria C : Loss/Error of function

☐ Additional Information

☐ EUT stopped operation and could / could not be reset by operator at _____ dBuV (V) at frequency _____ MHz.

☒ No false alarms or other malfunctions were observed during or after the test.
The acceptance criteria were met, and the EUT passed the test.

5.6.6. Test Photograph

Test Mode : Mode 1

Description : Front View of PMF Test

Test Mode : Mode 2

Description : Front View of PMF Test

5.7. Voltage Dips and Interruption

5.7.1. Test Specification

IEC 61000-4-11			
Environmental Phenomena	**Units**	**Test Specification**	**Performance Criteria**
Input AC Power Ports			
Voltage Dips	0	% Reduction	B
	0.5	Period	
	70	% Reduction	C
	25	Period	
	0	% Reduction	C
	250	Period	

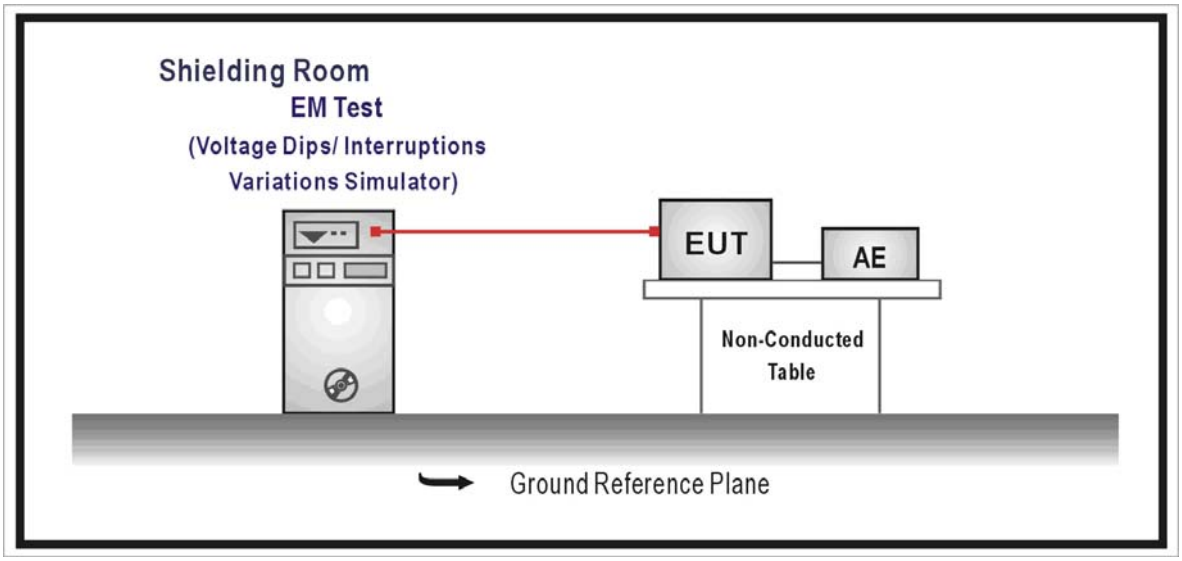
5.7.2. Test Instrument

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
EMC Immunity Tester	EMC-PARTNER AG	TRANSIENT 2000IN6	952	02/24/2009	(1)
Test Site	ATL	TE08	TE08	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

NOTE: N.C.R. = No Calibration Request.

5.7.3. Setup



5.7.4. Test Procedure

The EUT and its load are placed on a table which is 0.8 meter above a metal ground plane measured 1m*1m min. And 0.65mm thick min. And projected beyond the EUT by at least 0.1m on all sides. The power cord shall be used the shortest power cord as specified by the manufacturer.

For Voltage Dips/ Interruptions test:

The selection of test voltage is based on the rated power range. If the operation range is large than 20% of lower power range, both end of specified voltage shall be tested. Otherwise, the typical voltage specification is selected as test voltage.

The EUT is connected to the power mains through a coupling device that directly couples to the Voltage Dips and Interruption Generator.

The EUT shall be tested for 30% voltage dip of supplied voltage and duration 25 Periods,

for 95% voltage dip of supplied voltage and duration 0.5 Periods with a sequence of three voltage dips with intervals of 10 seconds, and for 95% voltage interruption of supplied voltage and duration 250 Periods with a sequence of three voltage interruptions with intervals of 10 seconds.

Voltage phase shifting are shall occur at 0^0, 45^0, 90^0, 135^0, 180^0, 225^0, 270^0, 315^0 of the voltage.

5.7.5. Test Result

Product	ADSL2/2+ IP DSLAM		
Test Item	Voltage Dips and Interruption Measurement		
Test Mode	Mode 1		
Date of Test	01/20/2010	Test Site	TE08

Voltage Reduction (%)	Angle	Test Duration (ms)	Performance Criteria	Test Result
>95(0V)	0	10	☒A ☐B ☐C	Pass
>95(0V)	45	10	☒A ☐B ☐C	Pass
>95(0V)	90	10	☒A ☐B ☐C	Pass
>95(0V)	135	10	☒A ☐B ☐C	Pass
>95(0V)	180	10	☒A ☐B ☐C	Pass
>95(0V)	225	10	☒A ☐B ☐C	Pass
>95(0V)	270	10	☒A ☐B ☐C	Pass
>95(0V)	315	10	☒A ☐B ☐C	Pass
30(161V)	0	500	☒A ☐B ☐C	Pass
30(161V)	45	500	☒A ☐B ☐C	Pass
30(161V)	90	500	☒A ☐B ☐C	Pass
30(161V)	135	500	☒A ☐B ☐C	Pass
30(161V)	180	500	☒A ☐B ☐C	Pass
30(161V)	225	500	☒A ☐B ☐C	Pass
30(161V)	270	500	☒A ☐B ☐C	Pass
30(161V)	315	500	☒A ☐B ☐C	Pass
>95(0V)	0	5000	☐A ☐B ☒C	Pass
>95(0V)	45	5000	☐A ☐B ☒C	Pass
>95(0V)	90	5000	☐A ☐B ☒C	Pass
>95(0V)	135	5000	☐A ☐B ☒C	Pass
>95(0V)	180	5000	☐A ☐B ☒C	Pass
>95(0V)	225	5000	☐A ☐B ☒C	Pass
>95(0V)	270	5000	☐A ☐B ☒C	Pass
>95(0V)	315	5000	☐A ☐B ☒C	Pass

Note:

The acceptance criteria were met, and the EUT passed the test.

Criteria A : Operate as intended during and after the test

Criteria B : Operate as intended after the test

Criteria C : Loss/Error of function

☐ Additional Information

☐ EUT stopped operation and could / could not be reset by operator at_____dBuV(V) at frequency_____MHz.

☒ No false alarms or other malfunctions were observed during or after the test.

5.7.6. Test Photograph

Test Mode : Mode 1

Description : Front View of Dips Test

6 EUT Photograph

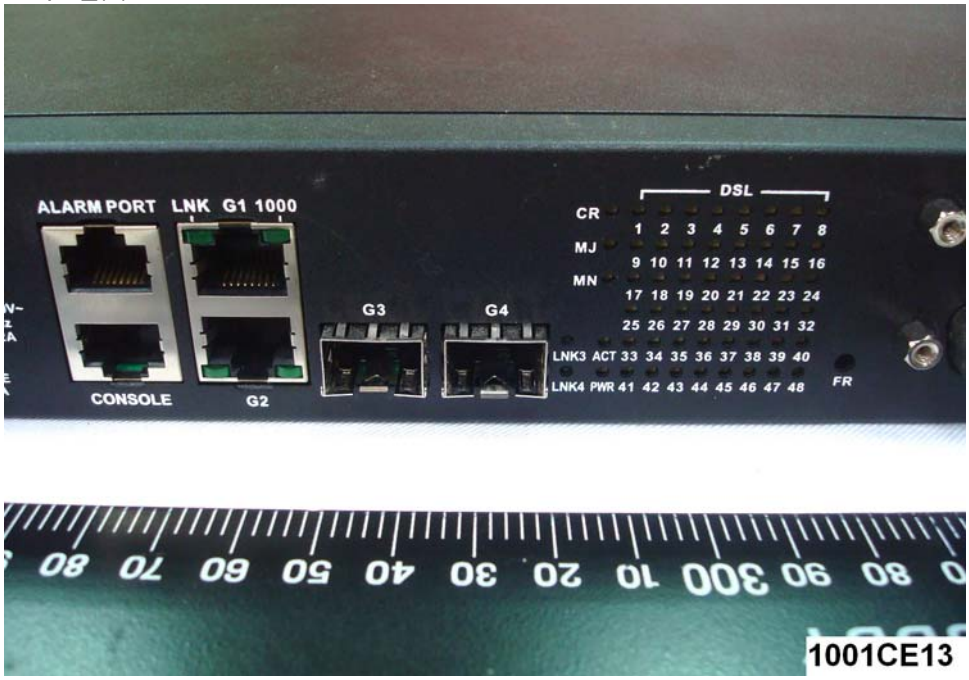
AC Sample_(1) EUT Photo

AC Sample_(2) EUT Photo

AC Sample_(3) EUT Photo

AC Sample_(4) EUT Photo

AC Sample_(5) EUT Photo



AC Sample_(6) EUT Photo

AC Sample_(7) EUT Photo

AC Sample_(8) EUT Photo

AC Sample_(9) EUT Photo

1001CE13

AC Sample_(10) EUT Photo

1001CE13

AC Sample_(11) EUT Photo

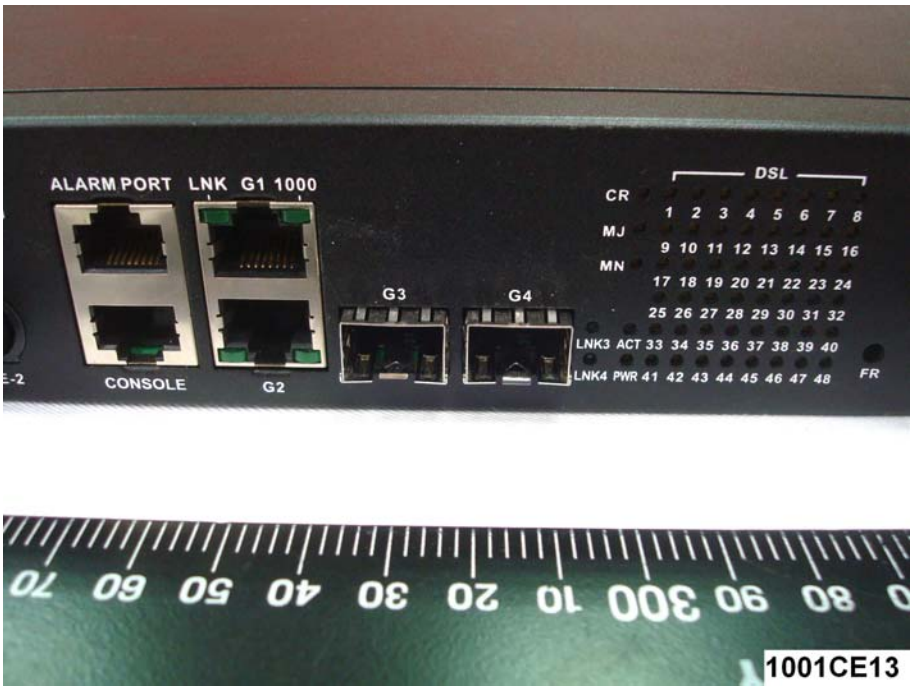
DC Sample_(1) EUT Photo

DC Sample_(2) EUT Photo

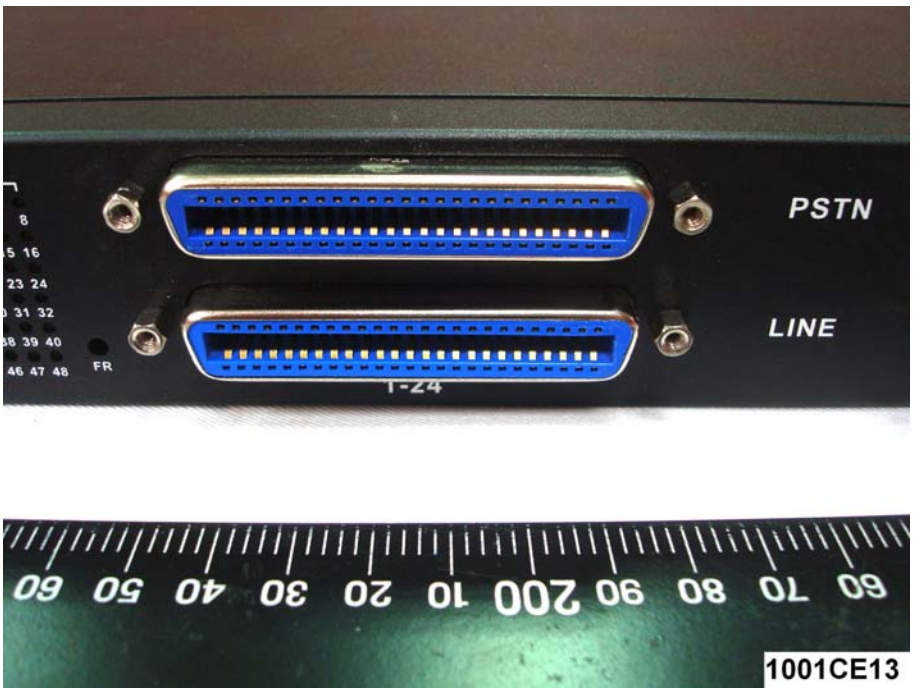
DC Sample_(3) EUT Photo

DC Sample_(4) EUT Photo

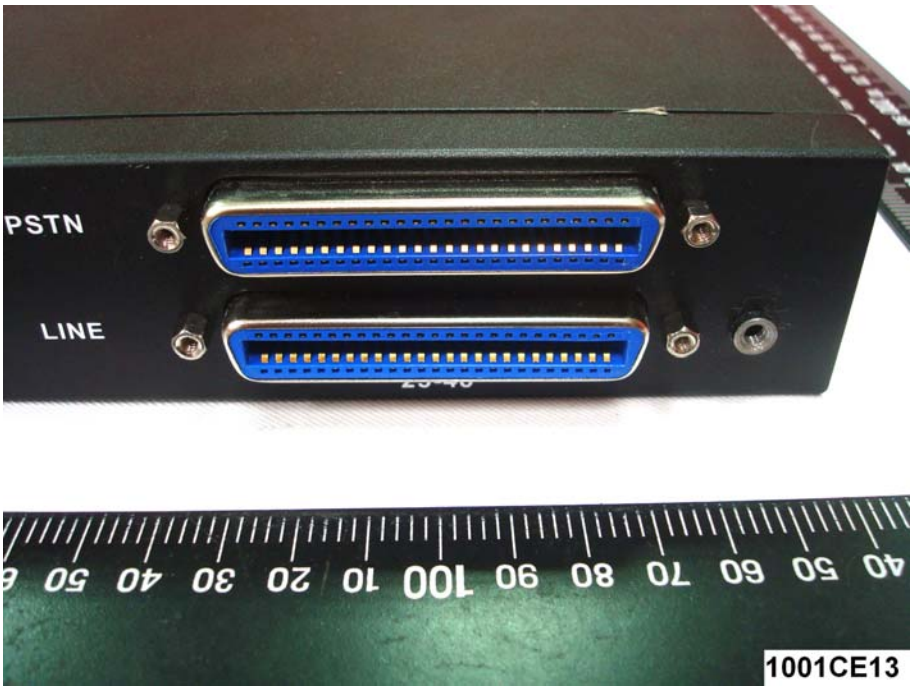
DC Sample_(5) EUT Photo



DC Sample_(6) EUT Photo

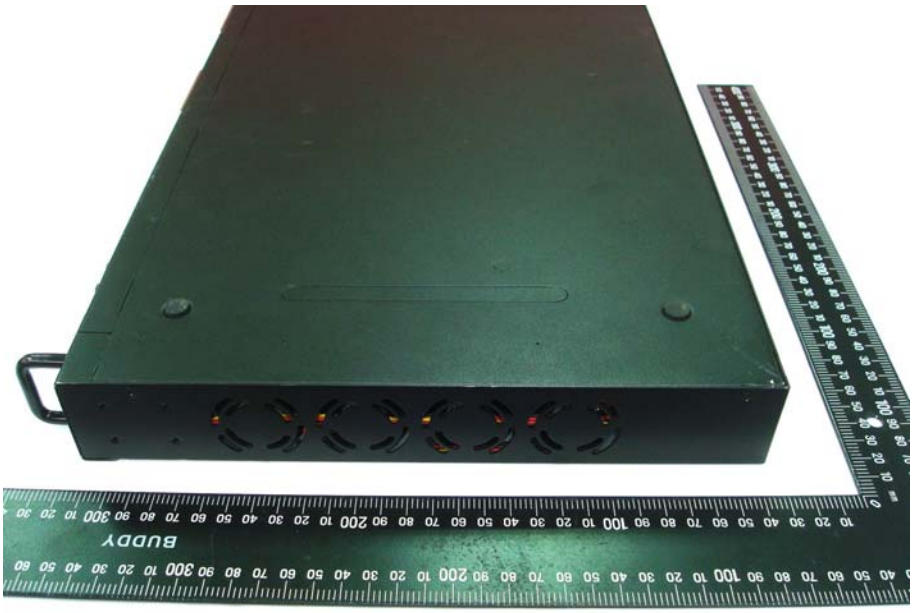


DC Sample_(7) EUT Photo



DC Sample_(8) EUT Photo

DC Sample_(9) EUT Photo



DC Sample_(10) EUT Photo