

CE EMC TEST REPORT

REPORT NO. : CE950109L05
MODEL NO. : WP54AG
RECEIVED : Jan. 09, 2006
TESTED : Jan. 24 ~ Jan. 27, 2006
ISSUED : Feb. 06, 2006

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1 CERTIFICATION

PRODUCT : NETPASSAGE WP54AG WIRELESS-AG NETWORK ACCESS POINT

BRAND NAME : Compex

MODEL NO. : WP54AG

APPLICANT : Compex Systems Pte Ltd.

TESTED : Jan. 24 ~ Jan. 27, 2006

TEST SAMPLE : ENGINEERING SAMPLE

STANDARDS : EN 55022:1998 +A1:2000 +A2:2003, Class B

EN 61000-3-2:2000, Class A (refer to *Note below)

EN 61000-3-3:1995+A1:2001

EN 55024:1998+A1:2001 +A2:2003

IEC 61000-4-2:2001

IEC 61000-4-3:2002+A1:2002

IEC 61000-4-4:2004

IEC 61000-4-5:2001

IEC 61000-4-6:2003+A1:2004

IEC 61000-4-8:2001

IEC 61000-4-11:2004

The above equipment (model: WP54AG) has been tested by **Advance Data Technology Corporation**, 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 : Windy Chou, **DATE :** Feb. 06, 2006
(Windy Chou)

TECHNICAL ACCEPTANCE : Mart Su, **DATE :** Feb. 06, 2006
Responsible for EMI (Mart Su)

TECHNICAL ACCEPTANCE : Kent Chen, **DATE :** Feb. 06, 2006
Responsible for EMS (Kent Chen)

APPROVED BY : Clark Lin, **DATE :** Feb. 06, 2006
(Clark Lin / Deputy Manager)

***Note:** The power consumption of EUT is less than 75W and no limits apply. Therefore it is deemed to comply with EN 61000-3-2 without any testing.

2 SUMMARY OF TEST RESULTS

After estimating all the combination of every test mode, the result shown as below is the worst case.

The EUT has been tested according to the following specifications:

EMISSION			
Standard	Test Type	Result	Remarks
EN 55022:1998 +A1:2000 +A2:2003, Class B	Conducted test	PASS	Meet the requirement of limit Minimum passing margin is -18.19dB at 0.748MHz
	Conducted Test (Telecom port)	PASS	Meets Class B Limit. Minimum passing margin is -1.16dB at 23.129MHz.
	Radiated test	PASS	Meet the requirement of limit Minimum passing margin is -3.29dB at 173.85MHz
EN61000-3-2:2000, Class A	Harmonic current emissions	PASS	Meets the requirements
EN 61000-3-3:1995 +A1:2001	Voltage fluctuations & flicker	PASS	Meets the requirements

NOTE: The information of measurement uncertainty is available upon the customer's request.

IMMUNITY (EN 55024:1998+A1:2001+A2+2003)			
Standard	Test Type	Result	Remarks
IEC 61000-4-2:2001	Electrostatic discharge immunity test	PASS	Meets the requirements of Performance Criterion B
IEC 61000-4-3:2002 +A1:2002	Radiated, radio-frequency, electromagnetic field immunity test	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-4:2004	Electrical fast transient / burst immunity test.	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-5:2001	Surge immunity test	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-6:2003 +A1:2004	Immunity to conducted disturbances, induced by radio-frequency fields	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-8:2001	Power frequency magnetic field immunity test.	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-11:2004	Voltage dips, short interruptions and voltage variations immunity tests	PASS	Meets the requirements of Voltage Dips: 1. >95% reduction - Performance Criterion A 2. 30% reduction – Performance Criterion C Voltage Interruptions: 1. >95% reduction – Performance Criterion C

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:

Measurement	Frequency	Uncertainty
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz (Horizontal)	3.58 dB
	30MHz ~ 200MHz (Vertical)	3.73 dB
	200MHz ~1000MHz (Horizontal)	3.75 dB
	200MHz ~1000MHz (Vertical)	3.73 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	NETPASSAGE WP54AG WIRELESS-AG NETWORK ACCESS POINT
MODEL NO.	WP54AG
POWER SUPPLY	9Vdc from adapter
DATA CABLE	1.6 m non-shielded RJ45 UTP cable without core

NOTE:

1. The EUT is powered by the following adapter.

Brand	OEM
Model	AD-0970B
Input Power	230Vac, 50Hz, 80mA
Output Power	9Vdc, 700mA
Power Cord	1.83 m non-shielded cable without core

2. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 GENERAL DESCRIPTION OF THE APPLIED STANDARD

The EUT is a kind of ITE equipment and, according to the specifications of the manufacturers, must comply with the requirements of the following standards:

EN 55022:1998 +A1:2000 +A2:2003,	EN 55024:1998+A1:2001+A2:2003
Class B	IEC 61000-4-2:2001
EN 61000-3-2:2000, Class A	IEC 61000-4-3:2002+A1:2002
EN 61000-3-3:1995+A1:2001	IEC 61000-4-4:2004
	IEC 61000-4-5:2001
	IEC 61000-4-6:2003+A1:2004
	IEC 61000-4-8:2001
	IEC 61000-4-11:2004

All tests have been performed and recorded as per the above standards.

3.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

For emission test

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	DELL	PP05L	27368374672	E2K24CLNS
2	NOTEBOOK	DELL	D600	F8HBC1S	E2K24CLNS
3	NOTEBOOK	DELL	PP11L	9Y27F1S	FCC DoC Approved
4	PRINTER	EPSON	LQ-300+	DCGY054105	FCC DoC Approved
5	MODEM	ACEEX	1414V/3	0401008274	IFAXDM1414

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	NA
3	NA
4	1.8 m shielded cable
5	1.6 m shielded cable

NOTE:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item 2 acted as communication partners to transfer data.

For harmonics, flicker and immunity test

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP11L	8Y27F1S	FCC DoC Approved
2	NOTEBOOK COMPUTER	DELL	PP05L	29545157008	E2K24CLNS

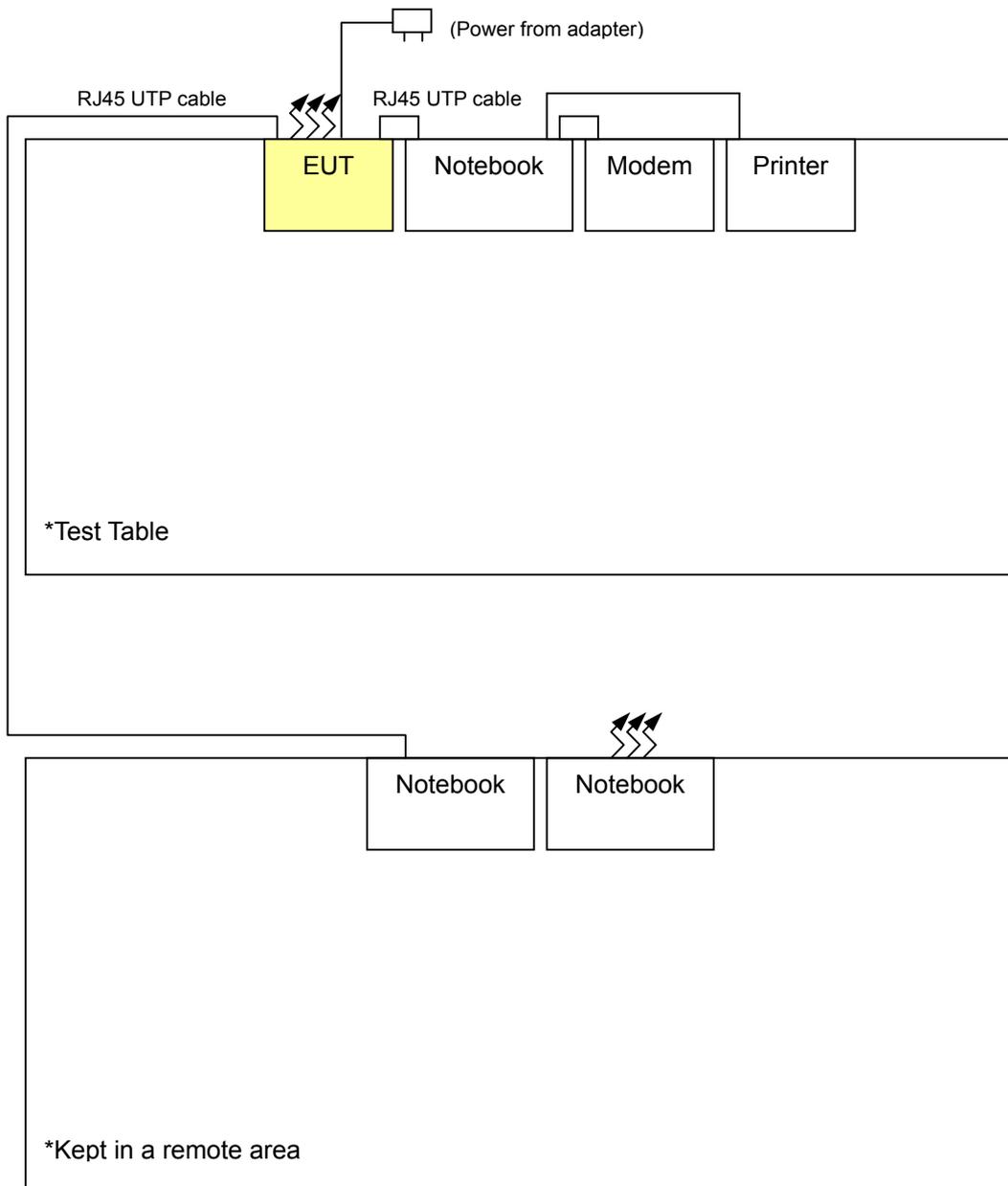
NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	NA

NOTE:

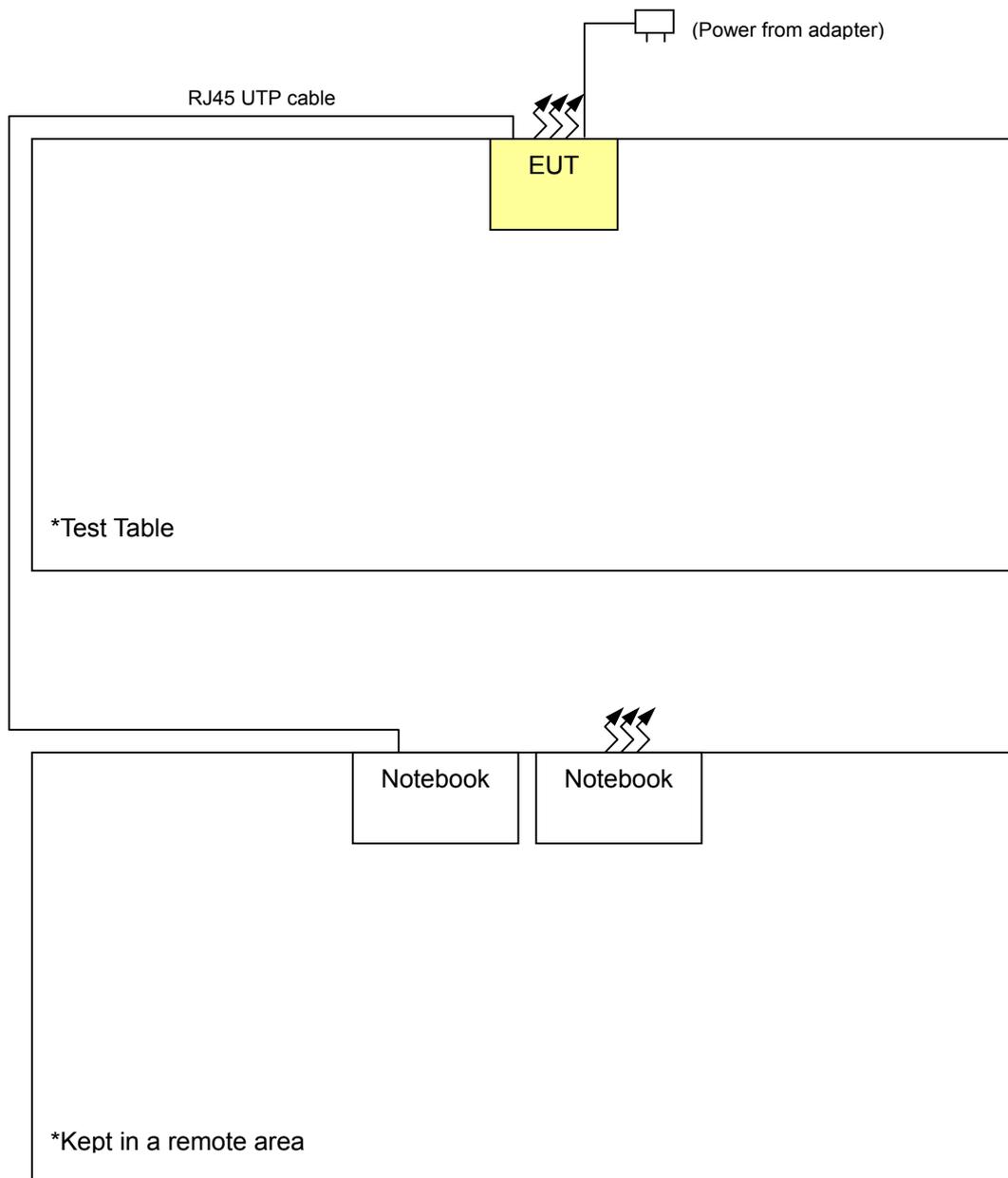
1. All power cords of the above support units are non-shielded (1.8m).
2. Item 1-2 acted as communication partners to transfer data.

3.4 CONFIGURATION OF SYSTEM UNDER TEST

For conducted & radiated emission test



For harmonics, flicker and immunity test





4 EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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 of 0.15 to 0.50 MHz.
 - (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.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Nov. 11, 2006
RF signal cable Woken	5D-FB	Cable-HYC01-01	Jan. 06, 2007
LISN SCHWARZBECK	NNBL 8226-2	8226-142	May 02, 2006
LISN ROHDE & SCHWARZ	ESH2-Z5	100104	Feb. 15, 2006
Software ADT	ADT_Cond_V3	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 HwaYa Shielded Room 1.
 3. The VCCI Site Registration No. is C-2040.

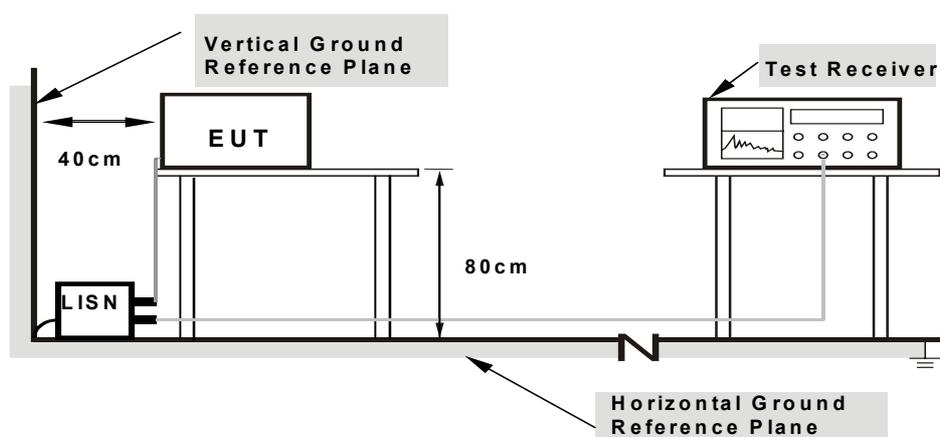
4.1.3 TEST PROCEDURE

- 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 frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit - 20dB) was not reported.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 TEST SETUP



- Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

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



4.1.6 EUT OPERATING CONDITIONS

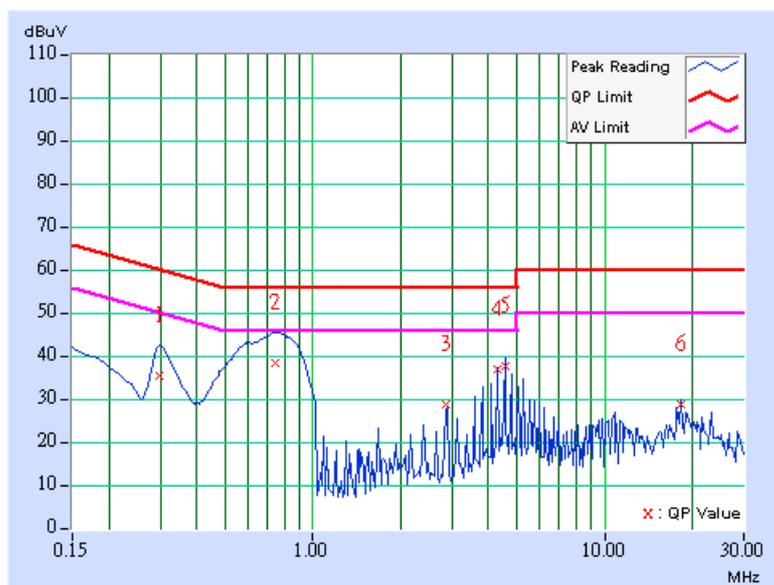
- a. The notebook ran a test program to enable all functions.
- b. The notebook sent “H” messages to the printer and the printer printed “H” patterns.
- c. The notebook sent “H” messages to its screen and the screen displayed “H” patterns.
- d. The notebook sent “H” messages to the modem.
- e. The EUT communicated data with the notebooks via wired and wireless transmission.
- f. Steps b ~ e were repeated.

4.1.7 TEST RESULTS

INPUT POWER (SYSTEM)	230 Vac, 50 Hz	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	19deg.C, 70% RH, 998 hPa	PHASE	Line 1
TESTED BY	Derry Tsai		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.298	0.10	34.45	-	34.55	-	60.29	50.29	-25.74	-
2	0.748	0.16	37.65	-	37.81	-	56.00	46.00	-18.19	-
3	2.876	0.32	27.98	-	28.30	-	56.00	46.00	-27.70	-
4	4.313	0.47	36.09	-	36.56	-	56.00	46.00	-19.44	-
5	4.555	0.48	36.93	-	37.41	-	56.00	46.00	-18.59	-
6	18.242	0.99	27.96	-	28.95	-	60.00	50.00	-31.05	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

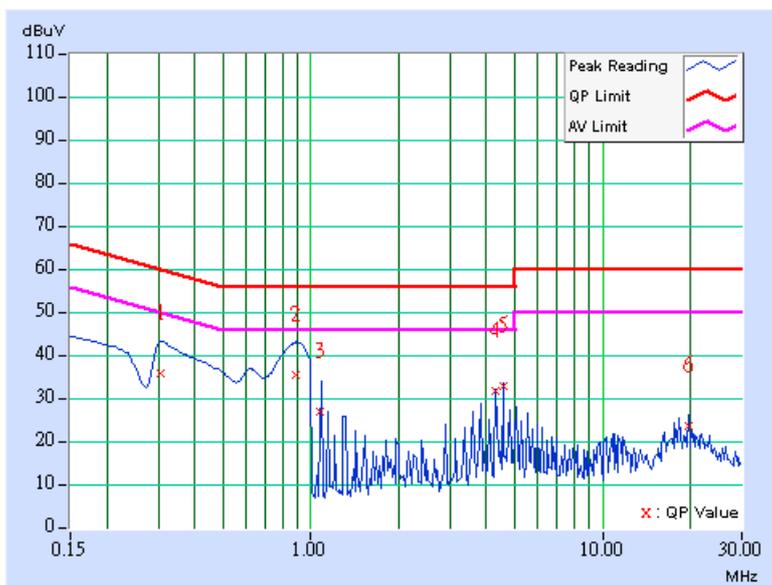




INPUT POWER (SYSTEM)	230 Vac, 50 Hz	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	19deg.C, 70% RH, 998 hPa	PHASE	Line 2
TESTED BY	Derry Tsai		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.306	0.10	35.05	-	35.15	-	60.07
2	0.892	0.18	34.60	-	34.78	-	56.00	46.00	-21.22	-
3	1.073	0.20	26.37	-	26.57	-	56.00	46.00	-29.43	-
4	4.319	0.47	31.09	-	31.56	-	56.00	46.00	-24.44	-
5	4.559	0.47	32.09	-	32.56	-	56.00	46.00	-23.44	-
6	19.709	0.82	22.80	-	23.62	-	60.00	50.00	-36.38	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



4.2 CONDUCTED EMISSION MEASUREMENT AT TELECOMMUNICATION PORTS

4.2.1 LIMIT OF CONDUCTED COMMON MODE DISTURBANCE AT TELECOMMUNICATION PORTS

For Class A Equipment

FREQUENCY (MHz)	Voltage Limit (dBuV)		Current Limit (dBuA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.5	97 ~ 87	84 ~ 74	53 ~ 43	40 ~ 30
0.5 ~ 30.0	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 Limit (dBuA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.5	84 ~ 74	74 ~ 64	40 ~ 30	30 ~ 20
0.5 ~ 30.0	74	64	30	20

NOTE:

1. The limits decrease linearly with the logarithm of the frequency in the range 0,15 MHz to 0,5 MHz.
2. Provisionally, a relaxation of 10 dB over the frequency range of 6 MHz to 30 MHz is allowed for high-speed services having significant spectral density in this band. However, this relaxation is restricted to the common mode disturbance converted by the cable from the wanted signal.



4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Nov. 11, 2006
RF signal cable Woken	5D-FB	Cable-HYC01-01	Jan. 06, 2007
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Feb. 15, 2006
LISN ROHDE & SCHWARZ	ESH2-Z5	100104	Feb. 15, 2006
Software ADT	ADT_Cond_V3	NA	NA
ISN	FCC-TLISN-T4	20208	Mar. 22, 2006
ISN	FCC-TLISN-T2	20207	Mar. 22, 2006
ISN	TLISN-T2-PLC	20187	Sep. 19, 2006

- 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 HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-2040.

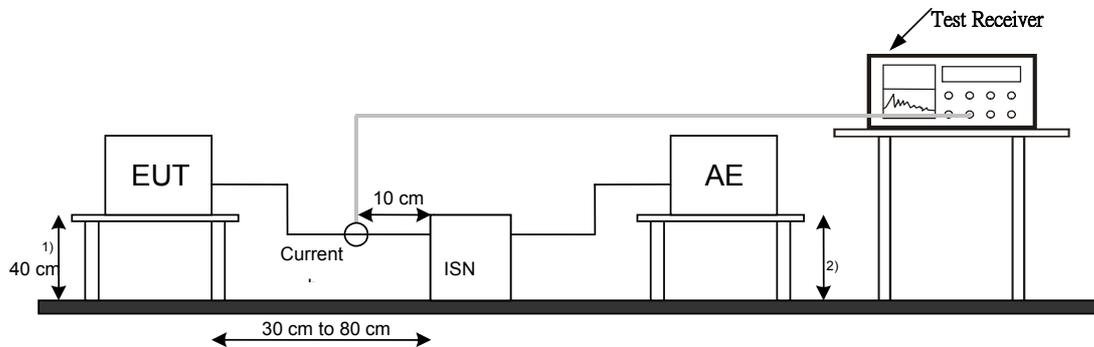
4.2.3 TEST PROCEDURE

- a. Current probe shall be placed at 0.1m from the ISN.
- b. Current at the measurement port of the ISN was detected, the reading was corrected by adding the current division factor of the current probe, and was compared to the current limits.
- c. The disturbance levels and the frequencies of at least six highest disturbances were recorded from each telecommunication port, which comprises the EUT.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



- 1) Distance to the ground reference plane (vertical or horizontal).
- 2) Distance to the ground reference plane is not critical.

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

4.2.6 EUT OPERATING CONDITIONS

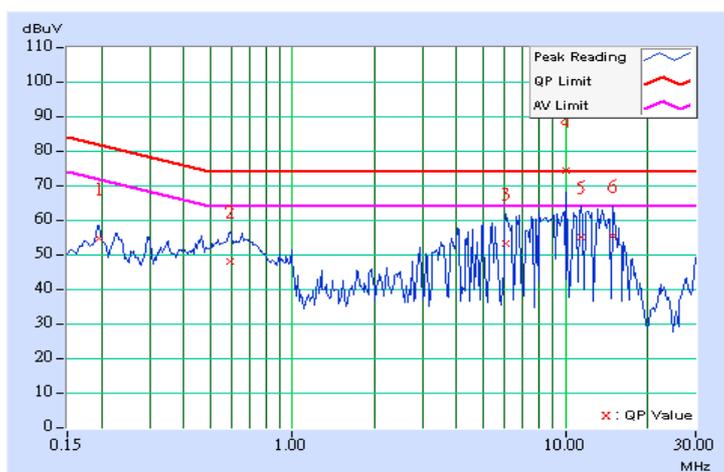
Same as 4.1.6.

4.2.7 TEST RESULTS

INPUT POWER (SYSTEM)	230 Vac, 50 Hz	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	19 deg. C, 70% RH, 998 hPa	TEST MODE	RJ45-LAN Full Telecom port (10Mbps)
TESTED BY	Derry Tsai		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin		Margin with 10dB relaxation	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	A.V.	Q.P.	A.V.	Q.P.	AV.
1	0.197	9.73	44.77	-	54.50	-	81.74	71.74	-27.24	-	*	*
2	0.591	9.69	38.31	-	48.00	-	74.00	64.00	-26.00	-	*	*
3	6.059	9.79	43.50	-	53.29	-	74.00	64.00	-20.71	-	-30.71	-
4	10.000	9.77	64.34	42.63	74.11	52.40	74.00	64.00	0.11	-11.60	-9.89	-21.60
5	11.488	9.82	45.18	-	55.00	-	74.00	64.00	-19.00	-	-29.00	-
6	15.004	9.93	45.65	-	55.58	-	74.00	64.00	-18.42	-	-28.42	-

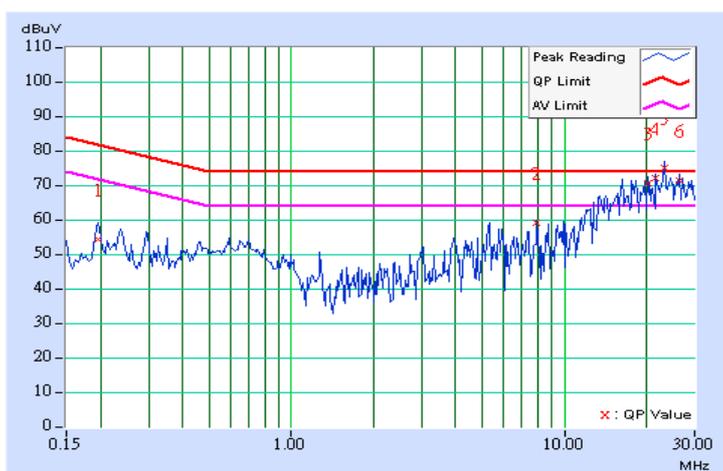
- REMARKS:
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.
 7. According to Note 3 of Table 4 of CISPR 22/EN 55022, a relaxation of 10 dB over the frequency range of 6MHz to 30MHz is allowed for high speed services having significant spectral density in this band. However, this relaxation is restricted to the common mode disturbance converted by the cable from the wanted signal. “**”: There is no relaxation of 10dB.



INPUT POWER (SYSTEM)	230 Vac, 50 Hz	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	19 deg. C, 70% RH, 998 hPa	TEST MODE	RJ45-LAN Full Telecom port (100Mbps)
TESTED BY	Derry Tsai		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin		Margin with 10dB relaxation	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)		(dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	A.V.	Q.P.	A.V.	Q.P.	AV.	Q.P.
1	0.197	9.73	44.67	-	54.40	-	81.74	71.74	-27.34	-	*	*
2	7.924	9.78	49.18	-	58.96	-	74.00	64.00	-15.04	-	-25.04	-
3	20.259	9.93	60.95	59.04	70.88	68.97	74.00	64.00	-3.12	4.97	-13.12	-5.03
4	21.664	9.93	62.29	60.08	72.22	70.01	74.00	64.00	-1.78	6.01	-11.78	-3.99
5	23.129	9.93	65.38	62.91	75.31	72.84	74.00	64.00	1.31	8.84	-8.69	-1.16
6	26.488	9.93	61.71	59.23	71.64	69.16	74.00	64.00	-2.36	5.16	-12.36	-4.84

- REMARKS:
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.
 7. According to Note 3 of Table 4 of CISPR 22/EN 55022, a relaxation of 10 dB over the frequency range of 6MHz to 30MHz is allowed for high speed services having significant spectral density in this band. However, this relaxation is restricted to the common mode disturbance converted by the cable from the wanted signal. "**": There is no relaxation of 10dB.



4.3 RADIATED EMISSION MEASUREMENT

4.3.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (μ V/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.



4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESIB7	100212	May 06, 2006
Test Receiver ROHDE & SCHWARZ	ESIB7	100187	Nov. 28, 2006
Spectrum Analyzer Agilent	FSP40	100039	Nov. 27, 2006
BILOG Antenna SCHWARZBECK	VULB9168	9168-148	Nov. 30, 2006
BILOG Antenna SCHWARZBECK	VULB9168	9168-149	Nov. 30, 2006
HORN Antenna EMCO	3115	5623	Jul. 13, 2006
Preamplifier Agilent	8447D	2944A10636	Dec. 08, 2006
Preamplifier Agilent	8447D	2944A10637	Dec. 08, 2006
Preamplifier Agilent	8449B	3008A01959	Dec. 19, 2006
RF signal cable Woken	8D-FB	Cable-Hych1-01	Jun. 02, 2006
RF signal cable Woken	8D-FB	Cable-Hych1-02	Jun. 02, 2006
RF signal cable HUBER+SUHNER	SUCOFLEX 104	218186/4	Nov. 16, 2006
Software ADT	ADT_Radiated_V7	NA	NA
Antenna Tower HD Deisel GmbH	MA240	11030	NA
Antenna Tower HD Deisel GmbH	MA240	12030	NA
Turn Table HD Deisel GmbH	DS430	50303	NA
Controller HD Deisel GmbH	HD2000	18303	NA
Ferrite clamp	FC18	910047	NA
Ferrite clamp	FC18	910046	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 HwaYa Chamber 1.

3. The VCCI Site Registration No. is R-1893.

4. The IC Site Registration No. is IC4924-1.

4.3.3 TEST PROCEDURE

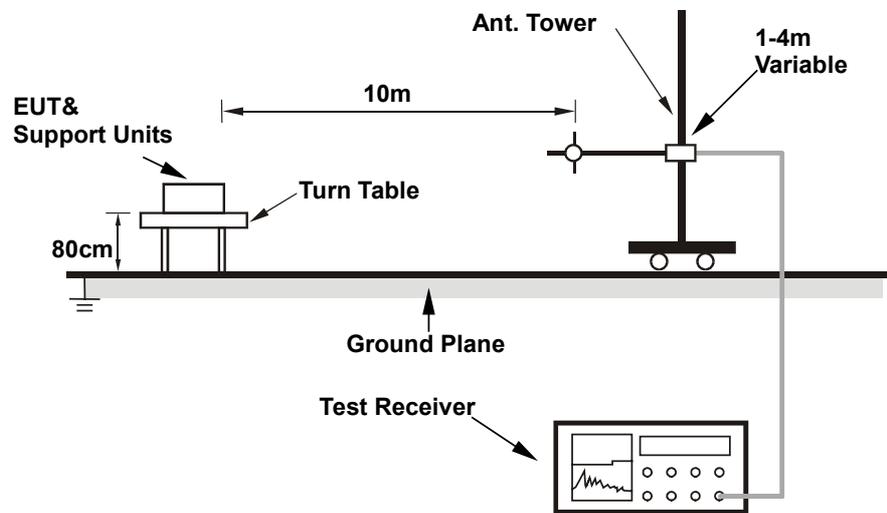
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted 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.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

4.3.5 TEST SETUP



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

4.3.6 EUT OPERATING CONDITIONS

Same as item 4.1.6.



4.3.7 TEST RESULTS

FREQUENCY RANGE	30 ~ 1000 MHz	INPUT POWER	230 Vac, 50 Hz
ENVIRONMENTAL CONDITIONS	24 deg. C, 76% RH, 998 hPa	DETECTOR FUNCTION	Quasi-Peak
TESTED BY	JN Chen		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	86.37	15.47 QP	30.00	-14.53	4.00 H	278	5.67	9.81
2	173.85	18.61 QP	30.00	-11.39	3.50 H	66	5.81	12.80
3	218.56	19.44 QP	30.00	-10.56	2.50 H	313	7.56	11.89
4	348.80	26.46 QP	37.00	-10.54	3.00 H	109	9.76	16.70
5	438.22	28.28 QP	37.00	-8.72	2.50 H	323	9.25	19.03
6	525.69	25.97 QP	37.00	-11.03	2.00 H	161	4.66	21.31
7	700.64	27.97 QP	37.00	-9.03	2.00 H	83	3.35	24.62
8	788.12	31.88 QP	37.00	-5.12	1.00 H	118	4.96	26.92
9	963.07	32.50 QP	37.00	-4.50	1.00 H	35	2.43	30.07

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	30.00	22.52 QP	30.00	-7.48	1.50 V	258	7.71	14.80
2	86.37	23.71 QP	30.00	-6.29	2.00 V	342	13.63	10.09
3	173.85	26.71 QP	30.00	-3.29	2.00 V	132	13.32	13.39
4	348.80	26.32 QP	37.00	-10.68	4.00 V	104	8.65	17.68
5	397.39	27.65 QP	37.00	-9.35	1.00 V	89	8.37	19.28
6	438.22	30.46 QP	37.00	-6.54	2.00 V	263	10.32	20.15
7	788.12	30.17 QP	37.00	-6.83	2.00 V	165	1.91	28.26
8	943.63	31.71 QP	37.00	-5.29	4.00 V	250	0.41	31.30
9	982.51	31.65 QP	37.00	-5.35	2.00 V	352	0.41	31.24

- 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)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.

4.4 HARMONICS CURRENT MEASUREMENT

4.4.1 LIMITS OF HARMONICS CURRENT MEASUREMENT

Limits for Class A equipment	
Harmonics Order n	Max. permissible harmonics current A
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
15<=n<=39	0.15x15/n
Even harmonics	
2	1.08
4	0.43
6	0.30
8<=n<=40	0.23x8/n

Limits for Class D equipment		
Harmonics Order n	Max. permissible harmonics current per watt mA/W	Max. permissible harmonics current A
Odd Harmonics only		
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
13	0.30	0.21
15<=n<=39	3.85/n	0.15x15/n

- NOTE:** 1. Class A and Class D are classified according to item section 5 of EN 61000-3-2.
2. According to section 7 of EN61000-3-2, 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.

4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Schaffner AC Power Source	NSG1007	55616	Nov. 21, 2006
Schaffner Signal Conditioning Unit- Lumped Impedance	CCN1000-1-LR1	72224	Nov. 21, 2006
Software	Shchaffner Win 2100V3	NA	NA

- NOTE:** 1. The test was performed in Hwa Ya EMS Room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.4.3 TEST PROCEDURE

- 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 classification of EUT is according to section 5 of EN 61000-3-2: 2000.

The EUT is classified as follows:

Class A: 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.

Class B: Portable tools. Arc welding equipment which is not professional equipment

Class C: Lighting equipment, including dimming devices.

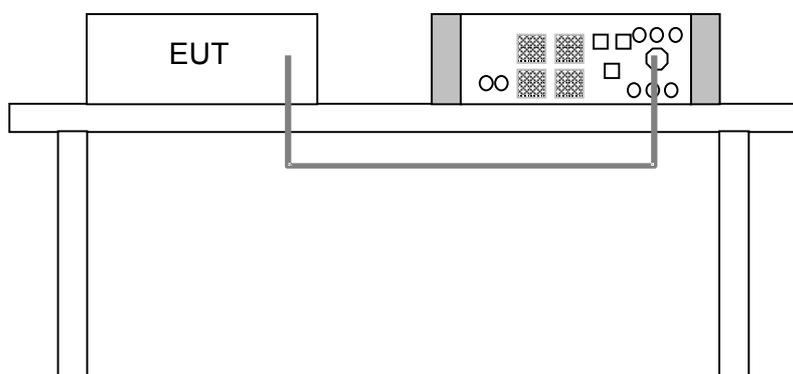
Class D: Equipment having a specified power less than or equal to 600 W of the following types: Personal computers and personal computer monitors.

- c. 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.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

4.4.5 TEST SETUP



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

4.4.6 EUT OPERATING CONDITIONS

- a. The notebook ran a test program to enable all functions.
- b. The notebook sent “H” messages to its screen and the screen displayed “H” patterns.
- c. The EUT communicated data with the notebooks via wired and wireless transmission.
- d. Steps b ~ c were repeated.

4.4.7 TEST RESULTS

FUNDAMENTAL VOLTAGE/AMPERE	230.14 Vrms 0.036 Arms	POWER FREQUENCY	50 Hz
RATED POWER CONSUMPTION	6 W	POWER FACTOR	0.718
ENVIRONMENTAL CONDITIONS	21 deg. C, 52% RH, 998 hPa	TESTED BY	Brian Hsieh

- NOTE:** 1. Limits are not specified for equipment with a rated power of 75W or less (other than lighting equipment).
2. According to EN61000-3-2 the manufacturer shall specify the power of the apparatus. This value shall be used for establishing limits. The specified power shall be within +/-10% of the measured power.

4.5 VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT

4.5.1 LIMITS OF VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT

TEST ITEM	LIMIT	NOTE
P_{st}	1.0	P_{st} means short-term flicker indicator.
P_{lt}	0.65	P_{lt} means long-term flicker indicator.
T_{dt} (ms)	500	T_{dt} means maximum time that dt exceeds 3.3 %.
d_{max} (%)	4%	d_{max} means maximum relative voltage change.
dc (%)	3.3%	dc means relative steady-state voltage change

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Schaffner AC Power Source	NSG1007	55616	Nov. 21, 2006
Schaffner Signal Conditioning Unit- Lumped Impedance	CCN1000-1-LR1	72224	Nov. 21, 2006
Software	Shchaffner Win 2100V3	NA	NA

NOTE: 1. The test was performed in Hwa Ya EMS Room.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

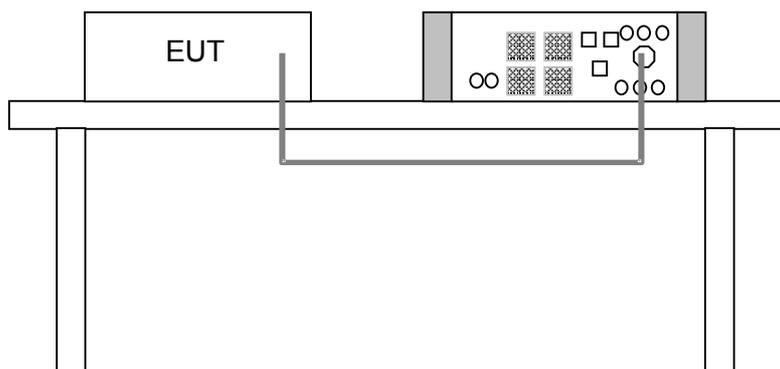
4.5.3 TEST PROCEDURE

- 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.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation.

4.5.5 TEST SETUP



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

4.5.6 EUT OPERATING CONDITIONS

Same as item 4.3.6.

4.5.7 TEST RESULTS

FUNDAMENTAL VOLTAGE/AMPERE	230.10 Vrms 0.036 Arms	POWER FREQUENCY	50.00 Hz
OBSERVATION PERIOD (Tp)	10 mins	POWER FACTOR	0.718
ENVIRONMENTAL CONDITIONS	21 deg. C, 52% RH, 998 hPa	TESTED BY	Brian Hsieh

TEST PARAMETER	MEASUREMENT VALUE	LIMIT	REMARKS
P_{st}	0.001	1.0	PASS
P_{lt}	0.001	0.65	PASS
T_{dt} (ms)	0	500	PASS
d_{max} (%)	0	4%	PASS
dc (%)	0	3.3%	PASS

- NOTE:**
1. P_{st} means short-term flicker indicator.
 2. P_{lt} means long-term flicker indicator.
 3. T_{dt} means maximum time that dt exceeds 3.3 %.
 4. d_{max} means maximum relative voltage change.
 5. dc means relative steady-state voltage change.

5 IMMUNITY TEST

5.1 GENERAL DESCRIPTION

Product Standard	EN 55024:1998+A1:2001+A2:2003	
Basic Standard, specification requirement, and Performance Criteria	IEC 61000-4-2	Electrostatic Discharge – ESD: 8kV air discharge, 4kV Contact discharge, Performance Criterion B
	IEC 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test – RS: 80-1000 MHz, 3V/m, 80% AM (1kHz), Performance Criterion A
	IEC 61000-4-4	Electrical Fast Transient/Burst - EFT, Power line: 1kV, Signal line: 0.5kV, Performance Criterion B
	IEC 61000-4-5	Surge Immunity Test: 1.2/50 us Open Circuit Voltage, 8 /20 us Short Circuit Current, Power Line - line to line: 1 kV, line to earth: 2kV, Performance Criterion B
	IEC 61000-4-6	Conducted Radio Frequency Disturbances Test – CS: 0.15-80 MHz, 3Vrms, 80% AM, 1kHz, Performance Criterion A
	IEC 61000-4-8	Power Frequency Magnetic Field Test, 50 Hz, 1A/m, Performance Criterion A
	IEC 61000-4-11	Voltage Dips: i) >95% reduction -0.5 period, Performance Criterion B ii) 30% reduction – 25 period, Performance Criterion C Voltage Interruptions: i) >95% reduction – 250 period, Performance Criterion C

5.2 GENERAL PERFORMANCE CRITERIA DESCRIPTION

According to Clause 7.1 of EN EN 55024 standard, the following describes the general performance criteria.

<p>Criterion A</p>	<p>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.</p>
<p>Criterion B</p>	<p>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 phenomenon 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.</p> <p>During the test, degradation of performance is allowed. However, no change of operating state if 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.</p>
<p>Criterion C</p>	<p>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.</p>

5.3 PARTICULAR PERFORMANCE CRITERIA DESCRIPTION FOR DATA DISPLAY FUNCTION OF EUT

Criterion A	When seen from normal viewing distance, the EUT shall operate with no change beyond the manufacturer's specification, in flicker, color, focus and jitter (except for the power magnetic field test).
Criterion B	Screen disturbances during the application of the test are permissible.
Criterion C	Failures which are not self-recovered after removal of the external disturbance, but which can be recovered to normal operation by reset or reboot are permissible.

5.4 EUT OPERATING CONDITION

Same as item 4.3.6.



5.5 ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD)

5.5.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Discharge Voltage:	Air Discharge: 2; 4; 8 kV (Direct) Contact Discharge: 2; 4 kV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Air Discharge: min. 20 times at each test point Contact Discharge: min. 50 times at each test point
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

5.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Thermo ESD Simulator	MZ-15/EC	0310225	Sep. 29, 2006
ELECTROSTATIC DISCHARGE	ESD 30C	1003-12	Jul. 10, 2006
NOISEKEN ELECTRONIC DISCHARGE SIMULATOR	ESS-2000	ESS0382041	Jan. 10, 2007

- NOTE:** 1. The test was performed in Hwa Ya ESD Room No. 1.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.5.3 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. 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.

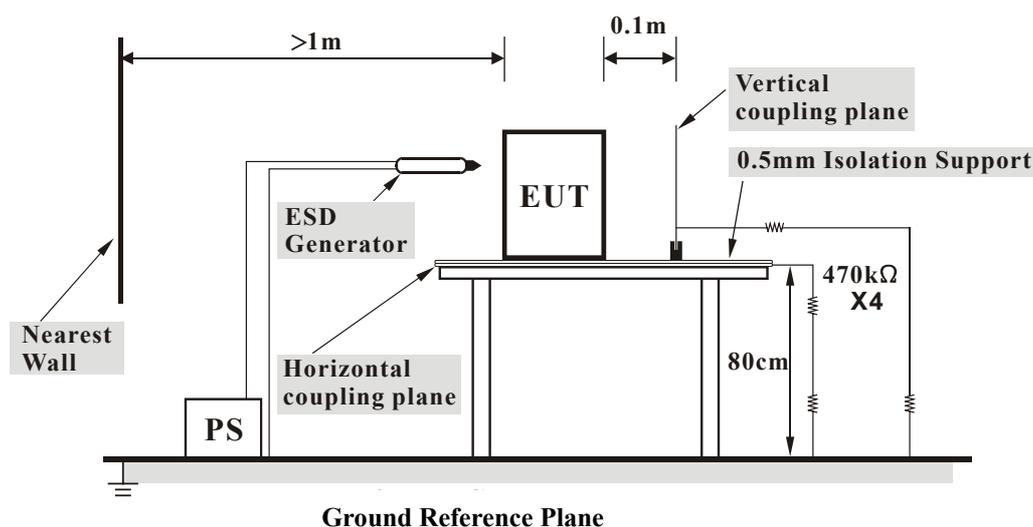
The basic test procedure was in accordance with IEC 61000-4-2:

- 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 **Horizontal Coupling Plane** at points on each side of the EUT. The ESD generator was positioned vertically 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 **Vertical Coupling Plane** 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.

5.5.4 DEVIATION FROM TEST STANDARD

No deviation.

5.5.5 TEST SETUP



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 **Ground Reference Plane**. 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 **Horizontal Coupling Plane** (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 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.



5.5.6 TEST RESULTS

MODE	Operating	INPUT POWER (SYSTEM)	230 Vac, 50 Hz
ENVIRONMENTAL CONDITIONS	23 deg.C, 51% RH, 998 hPa	TESTED BY	Brian Hsieh

TEST RESULTS OF DIRECT APPLICATION					
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge	Test Result
2; 4	+/-	1	NOTE 2	NA	PASS
2; 4	+/-	2	NOTE 1	NA	PASS
2; 4; 8	+/-	4	NA	NOTE 2	PASS
2; 4; 8	+/-	3, 5~8	NA	NOTE 1	PASS

Description of test point: Please refers to following page for representative mark only.

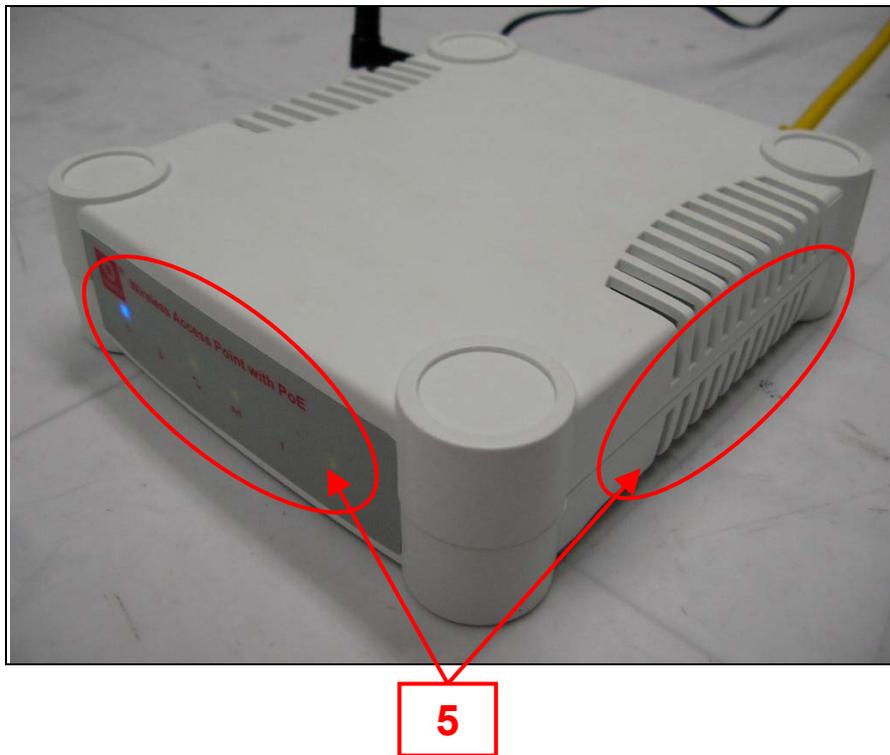
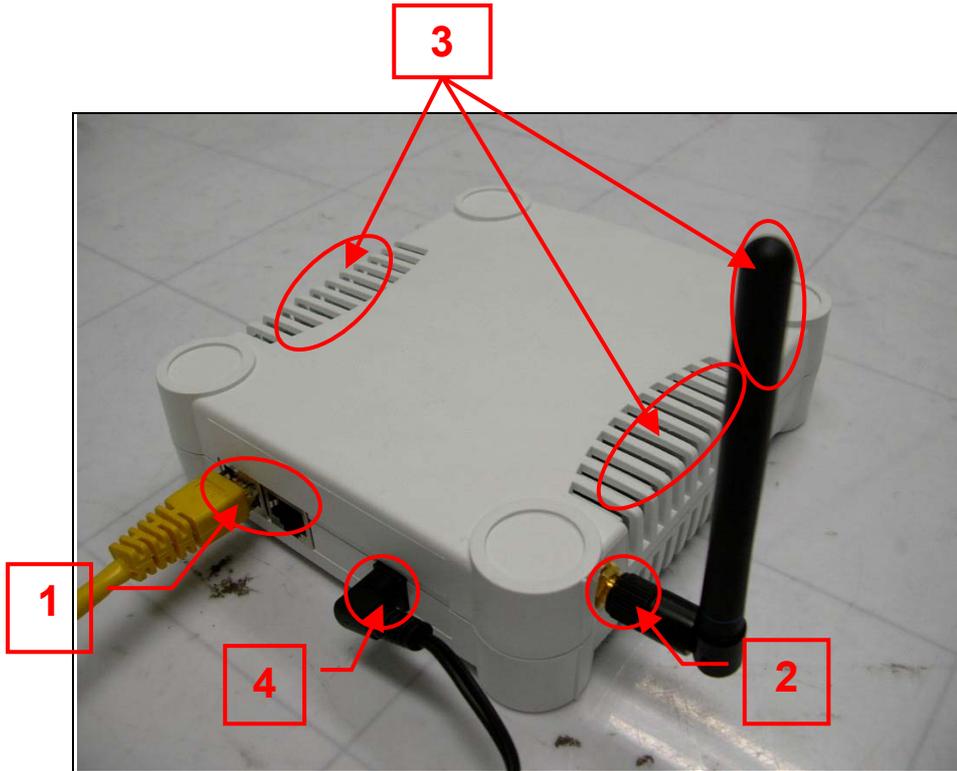
TEST RESULTS OF INDIRECT APPLICATION					
Discharge Level (kV)	Polarity (+/-)	Test Point	Horizontal Coupling Plane	Vertical Coupling Plane	Test Result
2; 4	+/-	4 sides	NOTE 1	NOTE 1	PASS

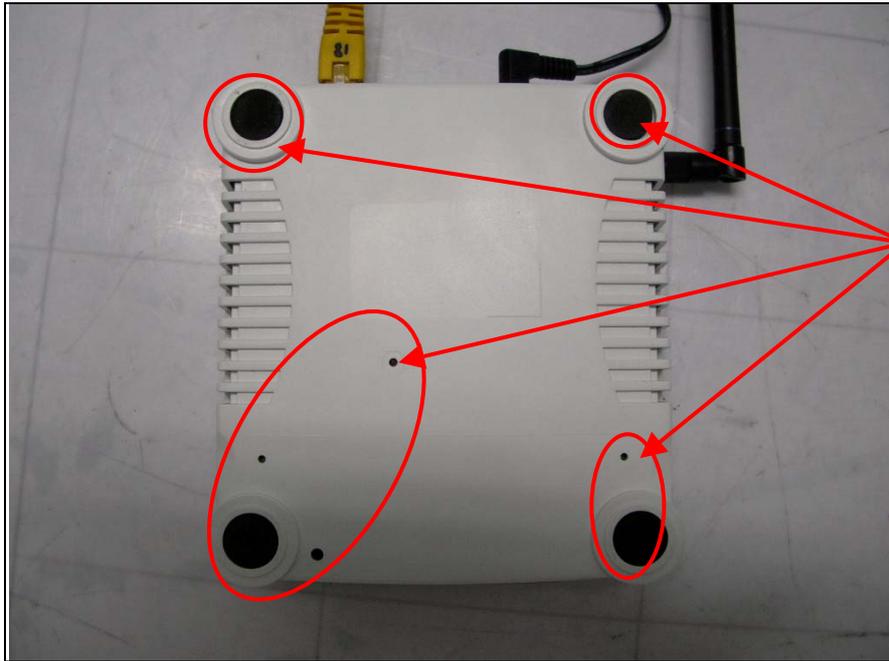
Description of test point:

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

NOTE:

1. There was no change compared with initial operation during and after the test.
2. The connection of the EUT broke off for a while and automatically recovered to the initial operation during the test.







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5.6 RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD IMMUNITY TEST (RS)

5.6.1 TEST SPECIFICATION

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

5.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Boonton RF Power Meter	4232A-01-02	107402	Nov. 20, 2006
R&S Signal Generator	SML03	101499	Nov. 20, 2006
AR ELECTRIC FIELD SENSOR	FP 6001	307198	Feb. 21, 2006
Software	ADT_RS_V450	NA	NA

- NOTE:**
1. The test was performed in Hwa Ya RS Room.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.6.3 TEST PROCEDURE

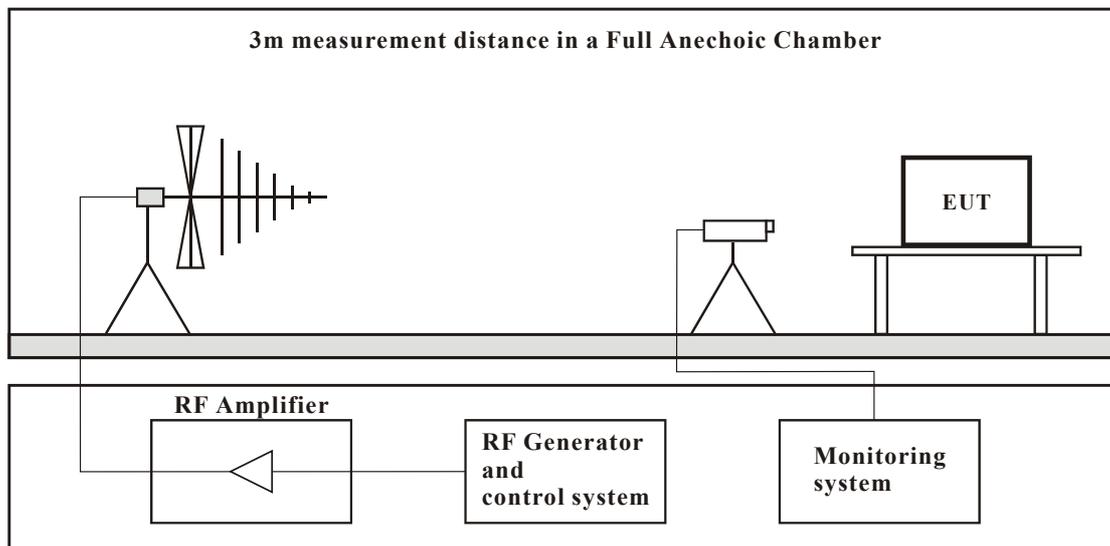
The test procedure was in accordance with IEC 61000-4-3

- 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 sinewave. 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.
- d. The field strength level was 3V/m.
- e. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

5.6.4 DEVIATION FROM TEST STANDARD

No deviation.

5.6.5 TEST SETUP



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 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 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.

5.6.6 TEST RESULTS

MODE	Operating	INPUT POWER (SYSTEM)	230 Vac, 50 Hz
ENVIRONMENTAL CONDITIONS	25 deg.C, 49% RH, 998 hPa	TESTED BY	Brain Hsieh

Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Observation	Test Result
80 ~ 1000	V&H	0	3	NOTE	PASS
80 ~ 1000	V&H	90	3	NOTE	PASS
80 ~ 1000	V&H	180	3	NOTE	PASS
80 ~ 1000	V&H	270	3	NOTE	PASS

NOTE: There was no change compared with the initial operation during the test.



5.7 ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST (EFT)

5.7.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-4
Test Voltage:	Power line: 1 kV Signal line: 0.5 kV
Polarity:	Positive & Negative
Impulse Frequency:	5 kHz
Impulse Waveshape :	5/50 ns
Burst Duration:	15 ms
Burst Period:	300 ms
Test Duration:	Not less than 1 min.

5.7.2 TEST INSTRUMENTS

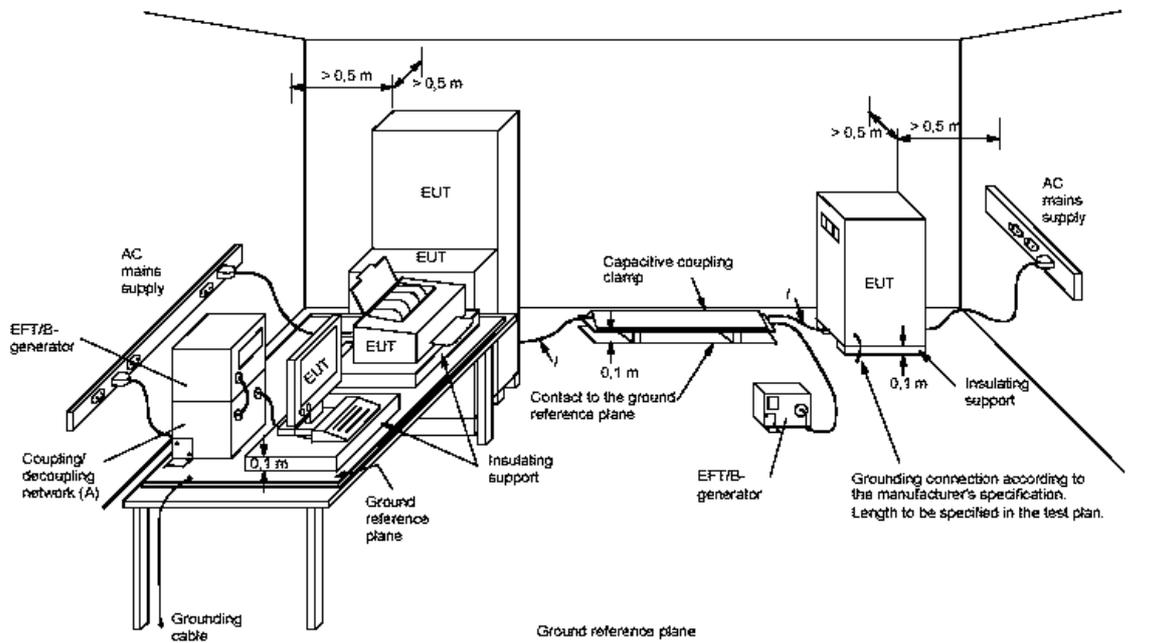
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
EMC-Partner EFT Generator	TRA2000EFT-C1	623	Nov. 15, 2006
EMC-Partner Capacitive Coupling clamp	CN-EFT1000	364	NA
EFT Adapter WONORO	WA	EF1Ada-001	NA
Software	EMC-Partner GENECS	NA	NA

- NOTE:** 1. The test was performed in Hwa Ya EFT Room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.7.3 TEST PROCEDURE

- Both positive and negative polarity discharges were applied.
- 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.
- The duration time of each test sequential was 1 minute.
- The transient/burst waveform was in accordance with IEC 61000-4-4, 5/50ns.

5.7.4 TEST SETUP



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



5.7.5 TEST RESULTS

MODE	Operating	INPUT POWER (SYSTEM)	230 Vac, 50 Hz
ENVIRONMENTAL CONDITIONS	25 deg.C, 49% RH, 998 hPa	TESTED BY	Brain Hsieh

Test Point	Polarity	Test Level (kV)	Observation	Test Result
L1	+/-	1	NOTE	PASS
L2	+/-	1	NOTE	PASS
L1-L2	+/-	1	NOTE	PASS
RJ45 UTP cable	+/-	0.5	NOTE	PASS

NOTE: There was no change compared with the initial operation during the test.

5.8 SURGE IMMUNITY TEST

5.8.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-5
Wave-Shape:	Combination Wave 1.2/50 us Open Circuit Voltage 8 /20 us Short Circuit Current
Test Voltage:	Power line ~ line to line: 0.5; 1 kV
Surge Input/Output:	L1-L2
Generator Source Impedance:	2 ohm between networks
Polarity:	Positive/Negative
Phase Angle:	0° /90°/180°/270°
Pulse Repetition Rate:	1 TIME / MIN. (MAXIMUM)
Number of Tests:	5 positive and 5 negative at selected points

5.8.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATION UNTIL
EMC-Partner Modular Impulse Generator	MIG0603IN3	352	Nov. 15, 2006
Surge Adapter WONORO	WA	SU1 Ada-001	NA

- NOTE:** 1. The test was performed in Hwa Ya Surge Room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.8.3 TEST PROCEDURE

- a. For EUT power supply:

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).

- b. For test applied to unshielded unsymmetrically operated interconnection lines of EUT:

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 (or shorter).

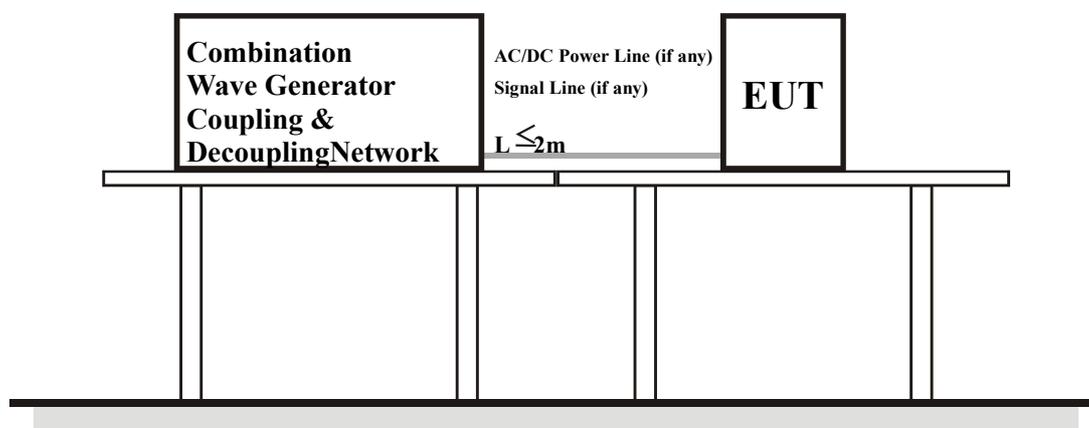
- c. For test applied to unshielded symmetrically operated interconnection / telecommunication lines of EUT:

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 (or shorter).

5.8.4 DEVIATION FROM TEST STANDARD

No deviation.

5.8.5 TEST SETUP



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



5.8.6 TEST RESULTS

MODE	Operating	INPUT POWER (SYSTEM)	230 Vac, 50 Hz
ENVIRONMENTAL CONDITIONS	23 deg.C, 49% RH, 998 hPa	TESTED BY	Brain Hsieh

Voltage (kV)	Test Point	Polarity (+/-)	Observation				Test Result
			0°	90°	180°	270°	
0.5; 1	L1-L2	+/-	NOTE	NOTE	NOTE	NOTE	PASS

NOTE: There was no change compared with the initial operation during the test.



5.9 IMMUNITY TO CONDUCTED DISTURBANCES INDUCED BY RF FIELDS (CS)

5.9.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-6
Frequency Range:	0.15 MHz ~ 80 MHz
Field Strength:	3 V _{r.m.s.}
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Coupled Cable:	Power Mains, Unshielded
Coupling Device:	CDN-M2 (2 wires), EM-Clamp

5.9.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
FCC POWER LINE COUPLING DECOUPLING NETWORK	M/N:FCC-801-M1-25A	03030	Nov. 04, 2006
FCC POWER LINE COUPLING DECOUPLING NETWORK	M/N:FCC-801-M2-25A	03049	Nov. 04, 2006
FCC POWER LINE COUPLING DECOUPLING NETWORK	M/N:FCC-801-M2-25A	03050	Nov. 04, 2006
FCC POWER LINE COUPLING DECOUPLING NETWORK	M/N:FCC-801-M3-25A	03056	Nov. 04, 2006
FCC POWER LINE COUPLING DECOUPLING NETWORK	M/N:FCC-801-M3-25A	03057	Nov. 04, 2006
FCC SIGNAL LINE POWER LINE COUPLING DECOUPLING NETWORK	P/N:FCC-801-T2	03030	Nov. 04, 2006
FCC SIGNAL LINE POWER LINE COUPLING DECOUPLING NETWORK	P/N:FCC-801-T4	03031	Nov. 04, 2006
FCC SIGNAL LINE POWER LINE COUPLING DECOUPLING NETWORK	P/N:FCC-801-T8	03032	Nov. 04, 2006
EMI Injection Clamp	P/N:F-203I-23MM	434	Nov. 04, 2006
BOONTON 4232ARF POWER METER	4232A-01-02	104302	Nov. 04, 2006
R&S Signal generator	SML 01	102148	Oct. 25, 2006
Software	ADT_CS_V37	NA	NA

- NOTE:**
1. The test was performed in Hwa Ya CS Room.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

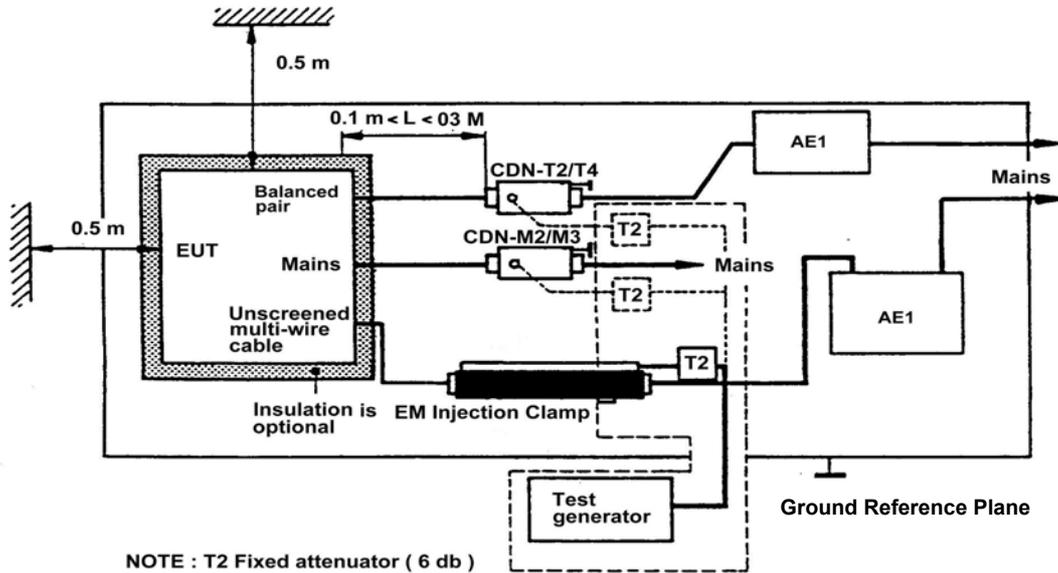
5.9.3 TEST PROCEDURE

- a. The EUT shall be tested within its intended operating and climatic conditions.
- b. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50-ohm load resistor.
- c. 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. The sweep rate shall not exceed 1.5×10^{-3} decades/s. The step size shall not exceed 1 % of the start and thereafter 1 % of preceding frequency value where the frequency is swept incrementally.
- d. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies such as clock frequency(ies) and harmonics or frequencies of dominant interest, shall be analyzed separately.
- e. Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.

5.9.4 DEVIATION FROM TEST STANDARD

No deviation.

5.9.5 TEST SETUP



- Note:** 1. The EUT is setup 0.1m above Ground Reference Plane
 2. The CDNs and / or EM clamp used for real test depends on ports and cables configuration of EUT.

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

5.9.6 TEST RESULTS

MODE	Operating	INPUT POWER (SYSTEM)	230 Vac, 50 Hz
ENVIRONMENTAL CONDITIONS	25 deg.C, 49% RH, 998 hPa	TESTED BY	Brain Hsieh

Frequency Band (MHz)	Applied Voltage (Vrms)	Tested Line	Injection Method	Observation	Test Result
0.15 ~ 80	3	Power line	CDN-M2	NOTE	PASS
0.15 ~ 80	3	RJ45 UTP cable	EM-Clamp	NOTE	PASS

NOTE: There is no change compared with the initial operation during the test.

5.10 POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST

5.10.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-8
Frequency Range:	50Hz
Field Strength:	1 A/m
Observation Time:	1 minute
Inductance Coil:	Rectangular type, 1mx1m

5.10.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Schaffner Induction Coil Interface	INA2141	6015	NA
Schaffner AC Power Source	NSG1007	55616	Nov. 21, 2006
Schaffner INA702 Coil	INA702	111	NA
Software	Shchaffner Win 2120V3	NA	NA

- NOTE:** 1. The test was performed in Hwa Ya EMS Room.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

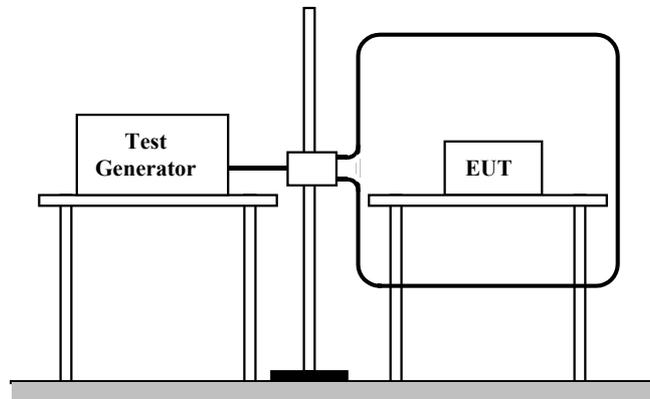
5.10.3 TEST PROCEDURE

- The equipment is configured and connected to satisfy its functional requirements.
- The power supply, input and output circuits shall be connected to the sources of power supply, control and signal.
- 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.

5.10.4 DEVIATION FROM TEST STANDARD

No deviation.

5.10.5 TEST SETUP



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

NOTE:

TABLETOP EQUIPMENT

The equipment shall be subjected to the test magnetic field by using the induction coil of standard dimension (1 m x 1 m). The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

FLOOR-STANDING EQUIPMENT

The equipment shall be subjected to the test magnetic field by using induction coils of suitable dimensions. The test shall be repeated by moving and shifting the induction coils, in order to test the whole volume of the EUT for each orthogonal direction. The test shall be repeated with the coil shifted to different positions along the side of the EUT, in steps corresponding to 50 % of the shortest side of the coil. The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.



5.10.6 TEST RESULTS

MODE	Operating	INPUT POWER (SYSTEM)	230 Vac, 50 Hz
ENVIRONMENTAL CONDITIONS	24 deg.C, 50% RH, 998 hPa	TESTED BY	Brain Hsieh

Direction	Field Strength (A/m)	Observation	Test Result
X - Axis	1	NOTE	PASS
Y - Axis	1	NOTE	PASS
Z - Axis	1	NOTE	PASS

NOTE: There was no change compared with the initial operation during the test.



5.11 VOLTAGE DIP/SHORT INTERRUPTIONS/VOLTAGE VARIATIONS (DIP) IMMUNITY TEST

5.11.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-11
Test Duration Time:	Minimum 3 test events in sequence
Interval between Event:	Minimum 10 seconds
Phase Angle:	0°/180°
Test Cycle:	3 times

5.11.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Schaffner AC Power Source	NSG1007	55616	Nov. 21, 2006
Schaffner Signal Conditioning Unit- Lumped Impedance	CCN1000-1-LR1	72224	Nov. 21, 2006
Software	Shchaffner Win 2100V3	NA	NA

- NOTE:** 1. The test was performed in Hwa Ya EMS Room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

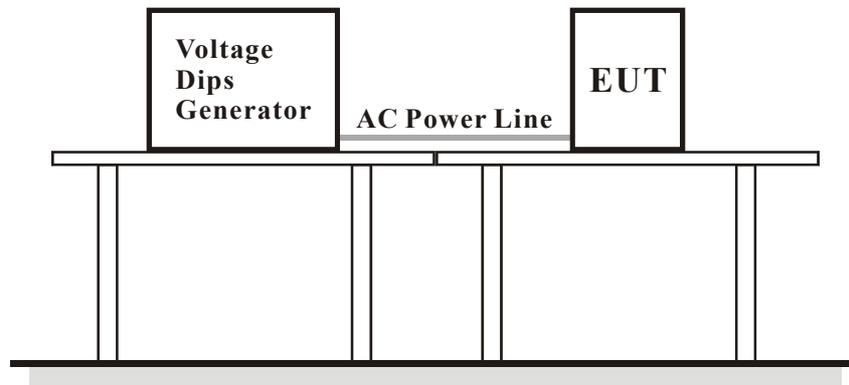
5.11.3 TEST PROCEDURE

The EUT shall be tested for each selected combination of test levels and duration with a sequence of three 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 zero crossings of the voltage waveform.

5.11.4 DEVIATION FROM TEST STANDARD

No deviation.

5.11.5 TEST SETUP



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



5.11.6 TEST RESULTS

ENVIRONMENTAL CONDITIONS	25 deg. C, 51% RH, 998 hPa	INPUT POWER	230 Vac, 50 Hz
TESTED BY	Brian Hsieh		

Ut: 230Vac, 50Hz			
Voltage % Reduction	Duration (Period)	Observation	Test Result
>95	0.5	NOTE 1	PASS
30	25	NOTE 2	PASS
>95	250	NOTE 2	PASS

NOTE:

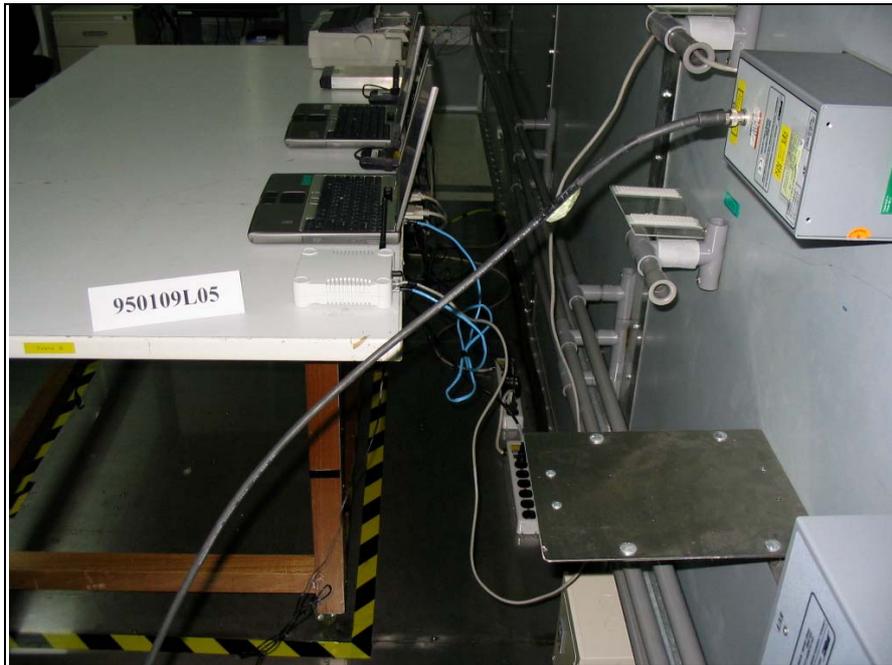
1. There was no change compared with the initial operation during the test.
2. The connection of the EUT broke off during the test and automatically recovered to the initial operation after the test.

6 PHOTOGRAPHS OF THE TEST CONFIGURATION

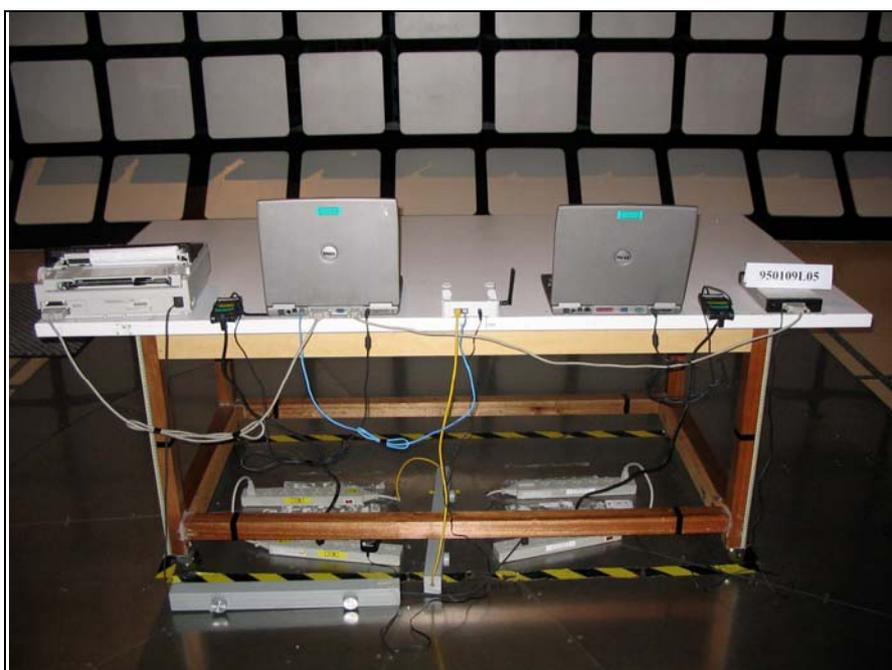
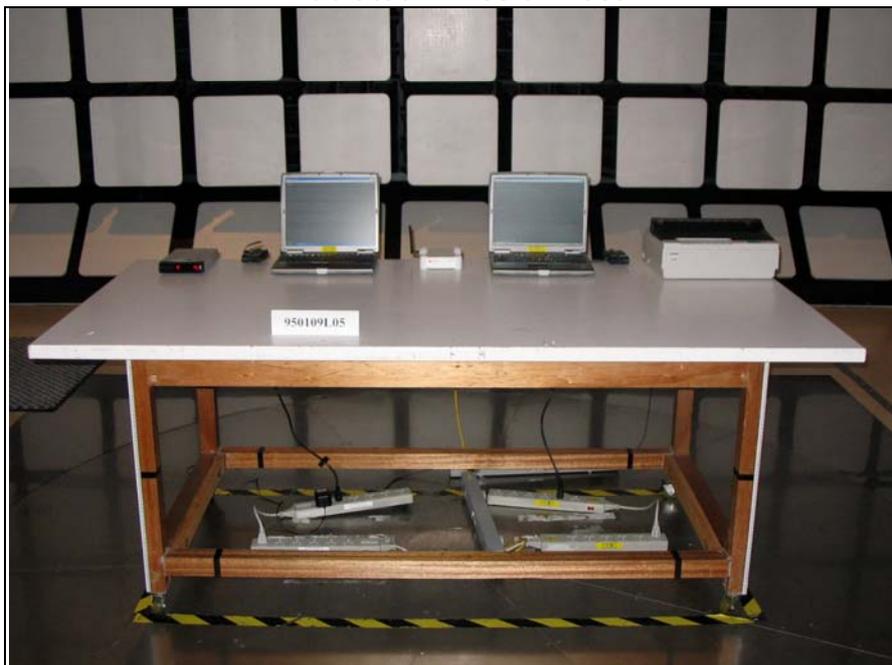
Conducted Emission Test



TELECOMMUNICATION PORT – RJ45
CURRENT OF CONDUCTED EMISSION TEST CONDUCTED



Radiated Emission Test



Harmonics Emission Test & Voltage Fluctuation and Flicker Test



ESD Test



RS Test



EFT Test



Surge Test



CS Test (Power line with CDN-M2)



CS Test (RJ45 UTP cable with EM-Clamp)



Magnetic Test



Voltage Dip and Interruption Test





7 APPENDIX - INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025:

USA	FCC, UL, A2LA
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA , CSA
R.O.C.	CNLA, BSMI, DGT
Netherlands	Telefication
Singapore	PSB , GOST-ASIA(MOU)
Russia	CERTIS(MOU)

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml. If you have any comments, please feel free to contact us at the following:

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