



CE TEST REPORT

FOR

3.5" SATA HDD Single Bay Giga LAN

Model : PD-LN2U2SS, IB-NAS4210-B

Issued to

Macpower & Tytech Technology Co., Ltd.
8F, No. 52, MinQuan Road Hsintien City, Taipei 231, Taiwan R.O.C.

Issue by

Global Certification Corp.

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PHOTOS OF TEST CONFIGURATION

APPENDIX 2

TEST DATA

PHOTOS OF EUT



1. GENERAL INFORMATION

Applicant : Macpower & Tytech Technology Co., Ltd.

Address : 8F, No. 52, MinQuan Road Hsintien City, Taipei 231, Taiwan R.O.C.

Manufacturer : Macpower & Tytech Technology Co., Ltd.

Address : 8F, No. 52, MinQuan Road Hsintien City, Taipei 231, Taiwan R.O.C.

EUT : 3.5" SATA HDD Single Bay Giga LAN

Model Name : PD-LN2U2SS, IB-NAS4210-B

Model Differences : The difference between series of models PD-LN2U2SS and IB-NAS4210-B is different software and market, but the PCB layout is same, the EMI characteristic is same. The model PD-LN2U2SS is testing sample and the final test data were shown in this test report.

Measurement procedure used:

EMI :

EN55022 CLASS B:2006

EN61000-3-2:2006

EN61000-3-3:1995+A1:2001+A2:2005

EMS :

EN55024:1998+A1:2001+A2:2003

IEC 61000-4-2 : 2001

IEC 61000-4-3 : 2008

IEC 61000-4-4 : 2004

IEC 61000-4-5 : 2005

IEC 61000-4-6 : 2008

IEC 61000-4-8 : 2001

IEC 61000-4-11 : 2004

Deviation from Applicable Standard

According to applicants declaration this EUT is a class B product

The above equipment was tested by Global Certification Corp. for compliance with the requirements set forth in the EUROPEAN COUNCIL Directive 2004/108/EC and the 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.

This test report shall not be reproducing in part without written approval of Global Certification Corp.

Approved By:

Alex Chou / Manager

Issued Date:03.03.2009



1.1 DESCRIPTION OF THE TESTED SAMPLES

EUT

EUT Type : Engineer Type
Condition when received : Good Damage :
EUT Name : 3.5" SATA HDD Single Bay Giga LAN
Applicant : Macpower & Tytech Technology Co., Ltd.
Manufacturer : Macpower & Tytech Technology Co., Ltd.
Model Number : PD-LN2U2SS, IB-NAS4210-B
Serial Number : N/A
FCC ID : N/A
Receipt Date : 02/25/2009
Used Power : AC POWER DC POWER
Power Supply Type : Switching Linear N/A
Power Cord (Input) : AC 230 V 50 Hz 2 Pin 0 m Un-Shielded N/A
Power Cord (Output) : DC 12 V 2 Pin 1.5 m Un-Shielded N/A
Power From N/A Inside Outside
N/A Adaptor BATTERY Power Supply DC Power Source
Support Unit PC AC Power Source
Test Power AC POWER DC POWER 230 V 50 Hz 2 Pin 0 m
The frequency of the EUT :
OSC/Clock Frequencies : 60MHz, 25MHz

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1.2 I/O PORT OF THE EUT

I/O port type	Q'ty	Tested with	Connect type	Note
1) LAN Port	1	1	Metal	
2) USB Port	2	2	Metal	

1.3 TEST METHODOLOGY

EUT SYSTEM OPERATION

1. The EUT was configured according to EN55022 Class B
 2. All I/O ports were connected to the appropriate peripherals.
 3. Photos of test configuration please refer to appendix 1 or 1.4 Setup Diagram.
 4. Turn on all the power of EUT and peripheral.
 5. EUT executes "winthrax.exe to active read-write function under windows.
 6. During the test, the EUT was sending data to the PC connected via USB port.
 7. Perform the EMI testing procedures, and measure the maximum emission noise.
- All peripherals and cables are listed below (including internal device)

DECISION OF FINAL TEST MODE

1. **The following test mode were scanned during the preliminary test:**

Mode 1: USB

Mode 2: LAN

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

Conduction: Mode 1

Radiation: Mode 1

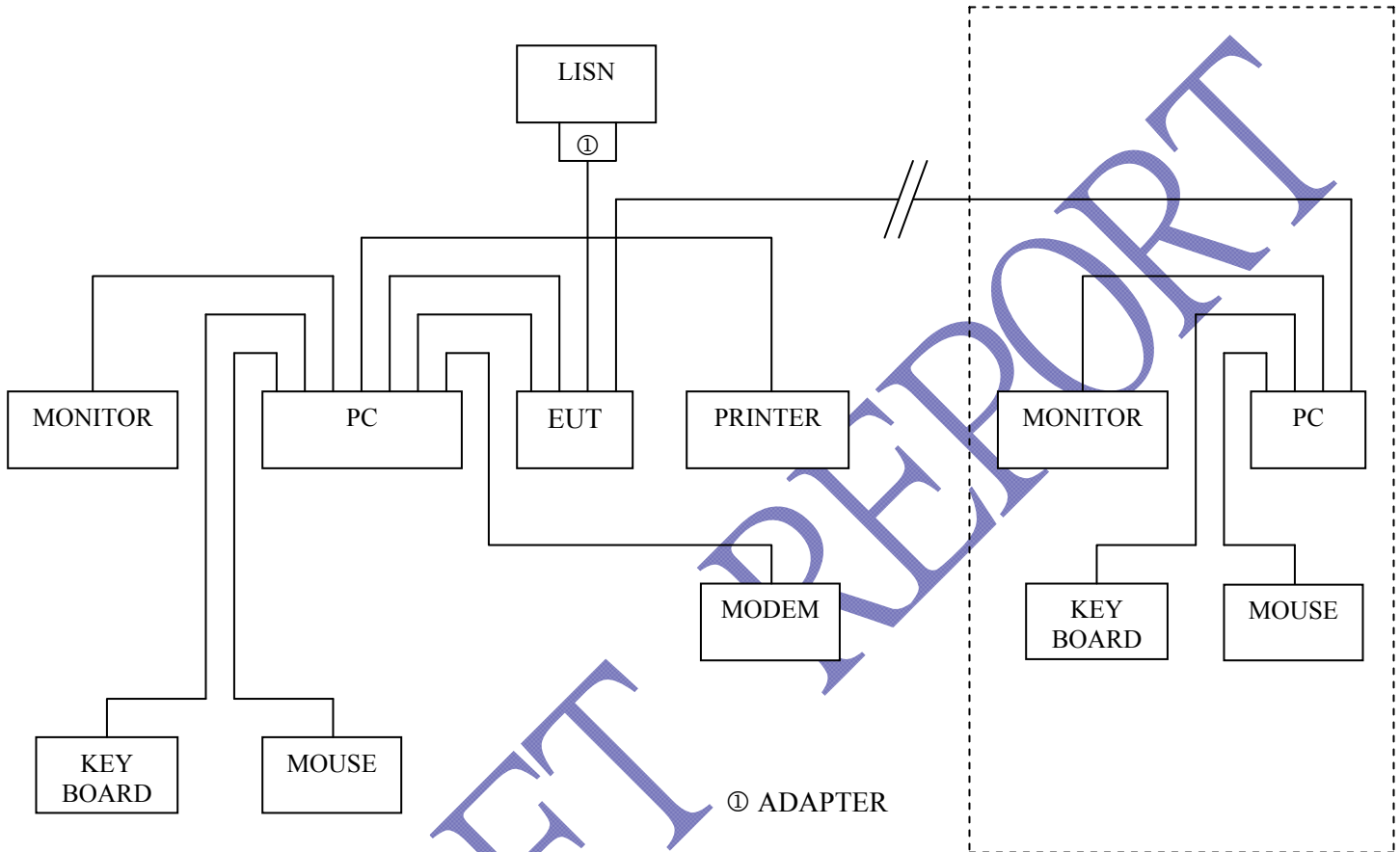
Then, the EUT configuration and cable configuration of the above highest emission mode was chosen for all final test item

3. **HARMONICS / FLICKER and EMS test mode is Mode 1**

1.4 DESCRIPTION OF THE SUPPORT EQUIPMENTS

Setup Diagram

See test photographs attached in appendix 1 for the actual connections between EUT and support equipment.





Support Equipment

Peripherals Devices:

OUTSIDE SUPPORT EQUIPMENT							
No.	Equipment	Model	Serial No.	FCC ID/ BSMI ID	Trade name	Data Cable	Power Cord
1.	PC	A13	L3AB112	R33B65	IBM	Shielded 10M	Unshielded 1.8m
2.	PC	C79	L3G5275	R33B65	IBM	Shielded 1m	Unshielded 1.8m
3.	MONITOR	TFT22W90P SA	E9377JA000166	R33037	AOC	Shielded 1.8M	Unshielded 1.8m
4.	MONITOR	V22ECBF	3M6U07702009	R31282	TATUNG	Shielded 1.6M	Unshielded 1.8m
5.	PRINTER	PHOTO750	BDEK017629	/3872P011	EPSON	Shielded 1.8M	Unshielded 1.8M
6.	MODEM	2814	N/A	IFAXDM1414	ACEEX	Shielded RS232~1.2M	Unshielded 1.8M
7.	MOUSE	M-S34	HCA41700559	DEL211029/48 62A011	Logitech	Shielded 1.8M~PS2	N/A
8.	MOUSE	MO28UOL	44Q3831	R41108	Lenovo	Shielded 1.8M/USB	N/A
9.	KEY BOARD	RT7D00	TH-0332TR-37171-16R-3087	AQ6-7D0080C OB/3892C595	DELL	Shielded 1.9M/PS2	N/A
10.	KEY BOARD	AS-KBAOO O	C0610230445	T3A002	ASUS	Shielded 1.4M/PS2	N/A
11.	USB storage	TS2GJFV30	156511-6400	DOC/ D33193	TRANSCEND	Shielded 1M	N/A
12.	ADAPTER	AG2412-B	N/A	N/A	JENTEC	N/A	Unshielded 1.5M
INSIDE SUPPORT EQUIPMENT							
No.	Equipment	Model	Serial No.	FCC ID/ BSMI ID	Trade name	Data Cable	Power Cord
1.	MAIN BOARD	MP-LN2U23 SL	N/A	N/A	N/A	Unshielded 0.2M	Unshielded 0.2M
2.	HDD	200G	4ND43KQD	D33027	Seagate	Unshielded 0.2M	Unshielded 0.2M

Note: All the above equipment/cable were placed in worse case position to maximize emission signals during emission test

Grounding: Grounding was in accordance with the manufacturer's requirement and conditions for the intended use.

1.5 FEATURES OF EUT: PLEASE REFER TO USER MANUAL OR PRODUCT SPECIFICATION.



2. INSTRUMENT AND CALIBRATION

2.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in the report has been calibrated once a year or in accordance with the manufacturer’s recommendations, and is traceable to recognized national standards.

2.2 TEST AND MEASUREMENT EQUIPMENT

The following list contains measurement equipment used for testing. The equipment conforms to the requirement of CISPR 16-1, ANSI C63.2 and. Other required standards.

Calibration of all test and measurement, including any accessories that may effect such calibration, is checked frequently to ensure the accuracy. Adjustments are made and correction factors are applied in accordance with the instructions contained in the respective.

TABLE 1 LIST OF TEST AND MEASUREMENT EQUIPMENT

Conducted Emission Measurement					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Due Date	Note
EMC Test Receiver	R&S	ESCI	100438	Apr. 29. 2009	
LISN	SCHAFFNER	NNB41	03/10015	Sep. 23. 2009	For EUT
LISN	EMCO	3825/2	9001-1589	Sep. 23. 2009	For Support Unit
RF Cable	Huber+Suhner	RG223/U	001	May. 29. 2009	
50ohm Terminal	N/A	50Ω	QC-TM001	Sep. 24. 2011	
Impedance Stabilization	Teseq GmbH	ISN T8	23334	DEC. 20. 2009	
Radiated Emission Measurement					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Due Date	Note
Test Receiver	AFJ	ER55R	55300508277	SEP. 21. 2009	
Bilog Antenna	SUNOL	JB1	A052204	OCT. 19. 2009	
Turn table	EMCO	2080	9508-1805	N/A	



Controller	EMCO	2090	9804-1328	N/A	
Preamplifier	WIRELESS	FPA6592G	60017	SEP. 24. 2009	
Spectrum Analyzer	NEX	NS-265	5044006	AUG. 07. 2009	
RF Cable	Huber+Suhner	RG214/U	15M+8M-002	SEP. 22. 2009	
Thermo-Hygro meter	WISEWIND	4-INU-1	050100378	Apr. 08. 2009	
Power Harmonic Measurement and Voltage Fluctuations					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Due Date	Note
5KV AC Power Source	SCHAFFNER	NSG1007	55869	DEC. 28. 2009	
Signal Conditioning	SCHAFFNER	CCN1000-1	72281	DEC. 28. 2009	
EMS					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Due Date	Note
IEC61000-4-2					
Thermo-Hygro meter	WISEWIND	N/A	N/A	NOV. 02. 2010	
ESD Dimulator	SCHAFFNER	NSG435	N/A	OCT. 30. 2009	
IEC61000-4-3					
Power Meter	BOONTON	4231A	110602	NOV. 13. 2009	
Signal Generator	IFR	2023A	202305/561	SEP. 06. 2009	
Electric Field probe	ETS-LINDGREN	HI-6005	00029837	MAY. 29. 2009	
Power Amplifier	SCHAFFNER	CBA9413B	4039	N/A	
Power Amplifier	SCHAFFNER	CBA 3G-050	T43762	N/A	
IEC61000-4-4/ IEC61000-4-5/ IEC61000-4-8/ IEC61000-4-11					
System Mainframe	SCHAFFNER	NSG2050	200339-277AR	OCT. 22. 2009	



Pulse Coupling Network	SCHAFFNER	CDN131	34330	OCT. 22. 2009	
Fast Transient/Burst	SCHAFFNER	PNW2225	200404-515Lu	OCT. 22. 2009	
Dropout / Variation	SCHAFFNER	PNW2003	200321-502Lu	OCT. 22. 2009	
Impulse NETW · 1,2/50-8/20 COMB.-WAVE	SCHAFFNER	PNW2050.8.	200413-503LU	OCT. 22. 2009	
Coil	SCHAFFNER	INA702	403-388/0411	N/A	
Clamp	SCHAFFNER	CDN8014	20607	N/A	
TTIAXIAL ELF Magnetic Field Meter	SYPRIS	4090	4090070316	Apr. 08. 2009	
IEC61000-4-6					
RF-Generator	SCHAFFNER	NSG2070	NSG2070	OCT. 22. 2009	
CDN	SCHAFFNER	CDN M216	19286	OCT. 24. 2009	
CDN	SCHAFFNER	CDN M316	20653	OCT. 24. 2009	
Clamp	SCHAFFNER	KEMZ801	19806	OCT. 24. 2009	

※ Calibration interval of instruments listed above is one year

2.3 TEST PERFORMED

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver which resolution bandwidth is set at 9 KHz.

Radiated emissions were investigated over the frequency range from 30MHz to 1000MHz using a receiver which resolution bandwidth is set at 120KHz. Radiated measurement was performed at distance that from an antenna to EUT is 10 meters.



2.4 APPENDIX

Appendix A: Measurement Procedure for Main Power Port Conducted Emissions

The measurements are performed in a Global lab's room; The EUT was placed on non-conductive 1.0m x 1.5m table, which is 0.8 meter above an earth-grounded.

Power to the EUT was provided through the LISN which has the Impedance (50ohm/50uH) vs. Frequency Characteristic in accordance with the standard. Powers to the LISNs were filtered to eliminate ambient signal interference and these filters were bonded to the ground plane. Peripheral equipment required to provide a functional system (support equipment) for EUT testing was powered from the second LISN through a ganged, metal power outlet box which is bonded to the ground plane at the LISN.

If the EUT is supplied with a flexible power cord, the power cord length in excess of the distance separating the EUT from the LISN shall be folded back and forth at the center of the lead so as to form a bundle not exceeding 40cm in length. If the EUT is provided with a permanently coiled power cord, bundling of the cord is not required. If the EUT is supplied without a power cord, the EUT shall be connected to the LISN by a power cord of the type specified by the manufacturer which shall not be longer than 1 meter. The excess power cord shall be bundled as described above. If a non-flexible power cord is provided with the EUT, it shall be cut to the length necessary to attach the EUT to the LISN and shall not be bundled.

The interconnecting cables were arranged and moved to get the maximum measurement. Both the line of power cord, hot and neutral, was measured.

The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information which could be useful in reducing their amplitude.

Appendix B: Test Procedure for Radiated Emissions

Preliminary Measurements in the Anechoic Chamber

The radiated emissions are initially measured in the anechoic chamber at a measurement distance of 3 meters. Desktop EUT are placed on a wooden stand 0.8 meter in height. The measurement antenna is 3 meters from the EUT. The test setup in anechoic chamber is the same as open site. The turntable rotated 360°. The antenna height is 1m. The primary objective of the radiated measurements in the anechoic chamber is to identify the frequency spectrum in the absence of the electromagnetic environment existing on the open test site. The frequencies can then be pre-selected on the open test site to obtain the corresponding amplitude. The initial scan is made with the spectrum analyzer in automatic sweep mode. The spectrum peaks are then measured manually to determine the exact frequencies.



Measurements on the Open Site or Chamber

The radiated emissions test will then be repeated on the open site or chamber to measure the amplitudes accurately and without the multiple reflections existing in the shielded room. The EUT and support equipments are set up on the turntable. Desktop EUT are set up on a wooden stand 0.8 meter above the ground.

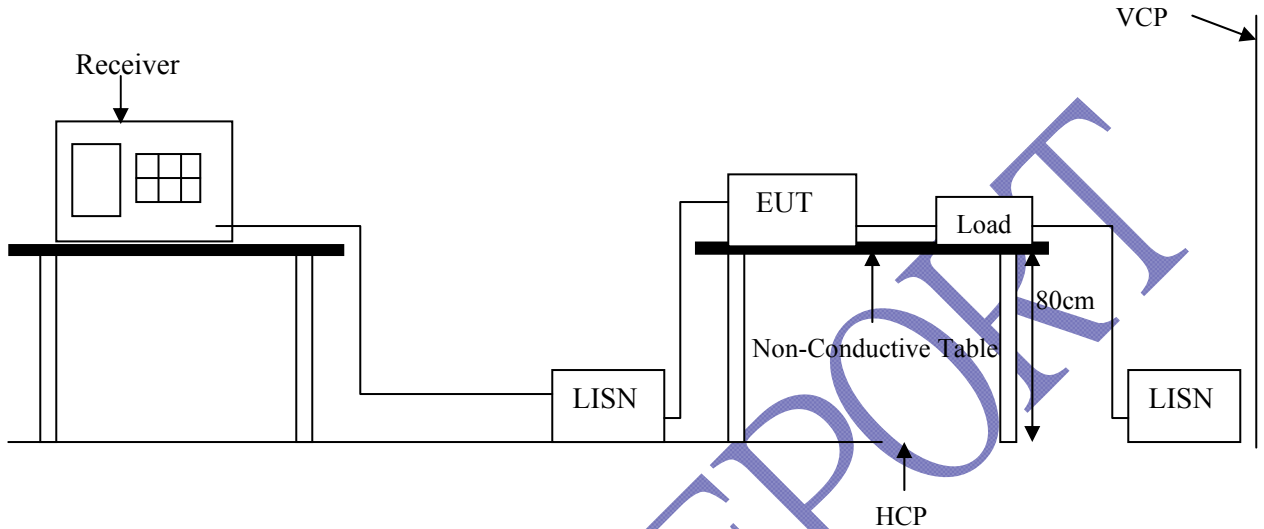
For the initial measurements, the receiving antenna is varied from 1-4 meter height and is changed in the vertical plane from vertical to horizontal polarization at each frequency. Both reading are recorded with the quasi-peak detector with 120 KHz bandwidth. For frequency between 30 MHz and 1000MHz, the reading is recorded with peak detector or quasi-peak detector.

At the highest amplitudes observed, the EUT is rotated in the horizontal plane while changing the antenna polarization in the vertical plane to maximize the reading. The interconnecting cables were arranged and moved to get the maximum measurement. Once the maximum reading is obtained, the antenna elevation and polarization will be varied between specified limits to maximize the readings.

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3. CONDUCTED EMISSION MEASUREMENT

3.1 TEST SET-UP



3.2 LIMIT

Frequency range (MHz)	CLASS A		CLASS B	
	QP dB(uV)	Average dB(uV)	QP dB(uV)	Average dB(uV)
0.15-0.5	79 dBuV	66 dBuV	66 - 56 dBuV	56 - 46 dBuV
0.5-5.0	73 dBuV	60 dBuV	56 dBuV	46 dBuV
5.0-30.0	73 dBuV	60 dBuV	60 dBuV	50 dBuV

Remark: In the above table, the tighter limit applies at the band edges.

3.3 TEST PROCEDURE

The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). It provides a 50 ohm / 50 μ H coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50 ohm / 50 μ H coupling impedance with 50 ohm termination. (Please refer to the block diagram of the test setup and photograph.)

Both sides of AC line are checked for the maximum conducted emission interference. In order to find the maximum emissions, the relating positions of equipment and all of the interference cables must be changed according to EN 55022/2006 regulation: The measurement procedure on conducted emission interference.

The resolution bandwidth of the field strength meter is set at 9 KHz



3.4 TEST SPECIFICATION

According to EN 55022

(Please refers to Page 4 for dated references which are related to the standard as mentioned above)

3.5 RESULT: PASSED

EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)

Frequency Range:	150KHz--30MHz
Detector Function:	Quasi-Peak / Average Mode
Resolution Bandwidth:	9KHz

3.6 TEST DATA:

Please refer to appendix 2

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3.7 LIMIT OF CONDUCTED COMMON MODE DISTURBANCE AT TELECOMMUNICATION PORTS:

Frequency Range	Quasi Peak (dBuV)	Average
0.15 ~ 0.5 MHz	84 – 74	74 – 64
0.5 ~ 30 MHz	74	64

The limits decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5MHz for Class B.

REMARK:

1. Model: PD-LN2U2SS, IB-NAS4210-B
2. Measuring mode: 1.1000Mbps, 2.10Mbps, 3.10Mbps
3. The Worst Mode: 3.10Mbps
4. Deviations from the test standards and rules: None.
5. “*”, means this data is peak measuring as peak value is under Q.P. Limit or Average Limit 3dB margin.
6. Result : **PASSED**



3.8 RESULT OF CONDUCTED COMMON MODE DISTURBANCE AT TELECOMMUNICATION PORTS

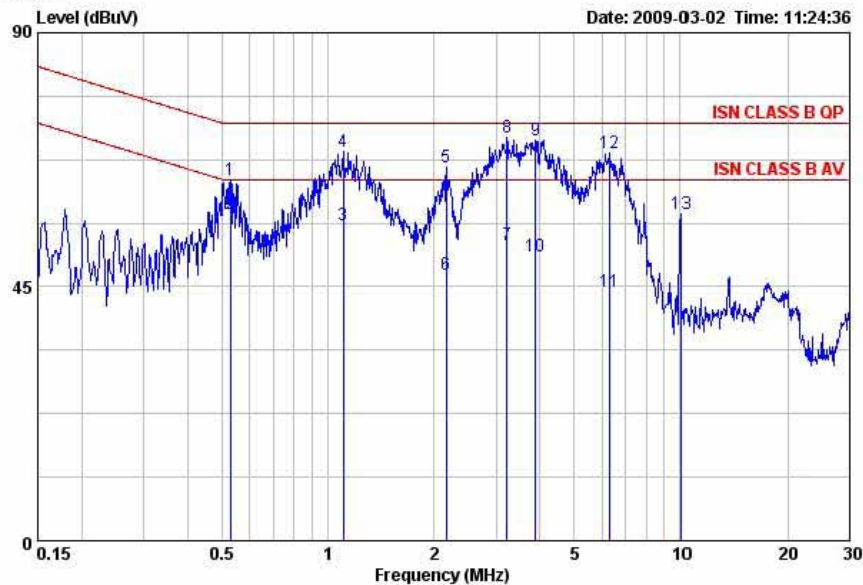


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Data: 2

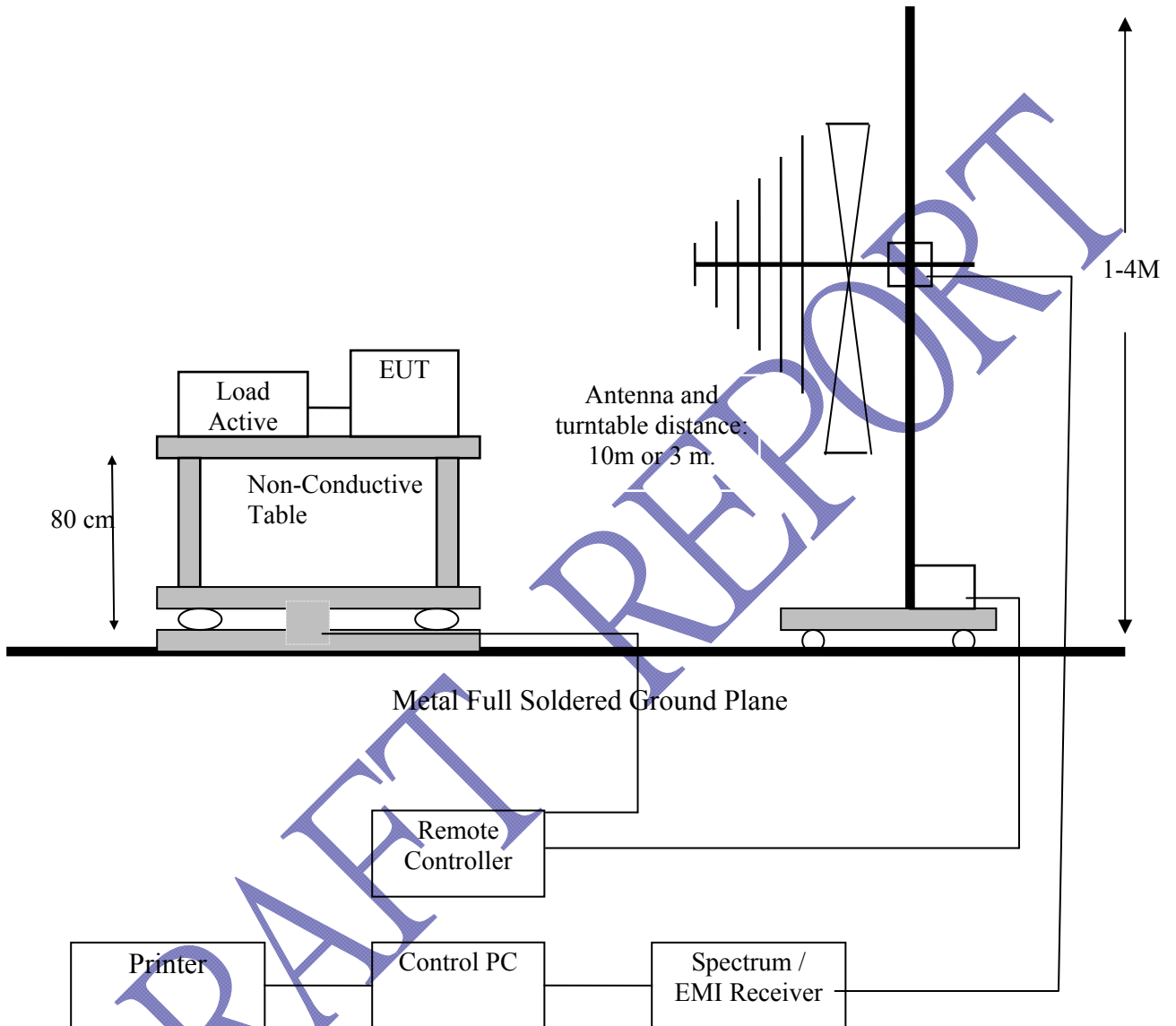


Site : CONDUCTED Test Site 1
 Condition: ISN CLASS B QP LINE
 EUT : 3.5" SATA HDD Single Bay Giga LAN
 MODEL : PD-LN2U2SS
 MEMO : 10M

	Freq	Read Level	Level	Over Limit	Limit Line	LISN Factor	Cable Loss	Aux Factor	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	dB	
1	0.53	43.64	63.83	-10.17	74.00	10.13	0.06	10.00	Peak
2	0.53	37.83	58.02	-5.98	64.00	10.13	0.06	10.00	Average
3	1.11	35.56	55.80	-8.20	64.00	10.14	0.10	10.00	Average
4	1.11	48.63	68.87	-5.13	74.00	10.14	0.10	10.00	Peak
5	2.17	45.82	66.12	-7.88	74.00	10.16	0.14	10.00	Peak
6	2.17	26.85	47.15	-16.85	64.00	10.16	0.14	10.00	Average
7	3.22	32.02	52.36	-11.64	64.00	10.17	0.17	10.00	Average
8	3.22	51.14	71.48	-2.52	74.00	10.17	0.17	10.00	Peak
9	3.88	50.54	70.90	-3.10	74.00	10.17	0.19	10.00	Peak
10	3.88	30.00	50.36	-13.64	64.00	10.17	0.19	10.00	Average
11	6.32	23.78	44.19	-19.81	64.00	10.19	0.22	10.00	Average
12	6.32	48.22	68.63	-5.37	74.00	10.19	0.22	10.00	Peak
13	10.02	37.56	58.02	-15.98	74.00	10.21	0.25	10.00	Peak

4. RADIATED EMISSION MEASUREMENT

4.1 TEST SETUP



4.2 LIMIT

Frequency MHz	Class A		Class B	
	Distance (Meter)	Limit dB μ V/m	Distance (Meter)	Limit dB μ V/m
30 ~ 230	10	40	10	30
230 ~ 1000	10	47	10	37

Remark: In the above table, the tighter limit applies at the band edges

4.3 TEST PROCEDURE

The EUT and its simulators are placed on turn table, non-conductive and wooden table, which is 0.8 meter above ground. The turn table rotates 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that distance from antenna to the EUT is 10 meters.

The antenna is moved up and down between 1 meter to 4 meters to receive the maximum emission level.

Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission, all of the interference cables must be manipulated according to EN 55022/1998 regulation: the test procedure of the radiated emission measurement.

The bandwidth set on the field strength is 120 KHz when the frequency range is below 1GHz

4.4 TEST SPECIFICATION

According to EN 55022

(Please refers to Page 4 for dated references which are related to the standard as mentioned above)

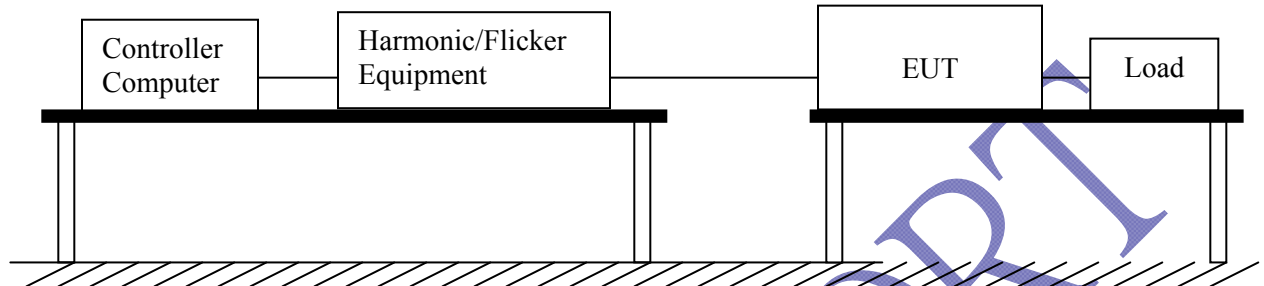
4.5 RESULT: PASSED

4.6 TEST DATA:

Please refer to appendix 2

5. POWER HARMONIC MEASUREMENT

5.1 TEST SETUP



5.2 LIMIT OF HARMONIC CURRENT

Limit of Harmonic Currents

Harmonic Order	Maximum Permissible Harmonic Current (Ampere)	Harmonic Order	Maximum Permissible Harmonic Current (Ampere)
Odd Harmonic		Even Harmonic	
3	2.30	2	1.08
5	1.14	4	0.43
7	0.77	6	0.30
9	0.40	8 ≤ n ≤ 40	0.23 x 8/n
11	0.33		
13	0.21		
15 ≤ n (39)	0.15 x 15/n		

5.3 TEST PROCEDURE

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

5.4 TEST SPECIFICATION

According to EN 61000-3-2

(Please refers to Page 4 for dated references which are related to the standard as mentioned above)

5.5 RESULT: PASSED

5.6 TEST DATA:



Harmonics – Class-D per Ed. 3.0 (2005-11) (Run time)

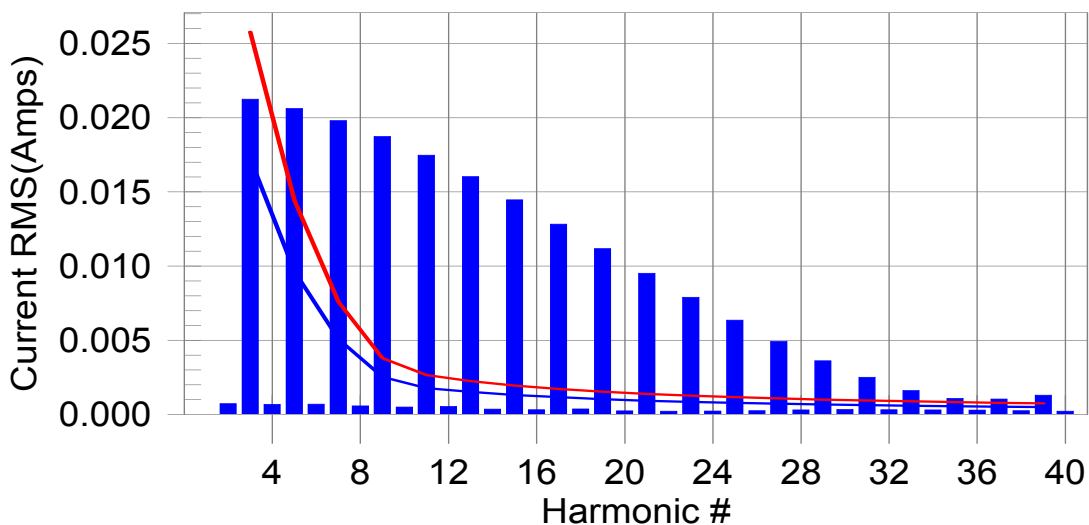
EUT: 3.5" SATA HDD Single Bay Giga LAN
Test category: Class-D per Ed. 3.0 (2005-11) (European limits) Tested by: Anson
Test date: 2009/3/2 Test Margin: 100
Comment: PD-LN2U2SS
Customer: 922504

Test Result: N/L Source qualification: Normal

Current & voltage waveforms



Harmonics and Class D limit line



Test result: N/L Worst harmonic was #0 with 0.00% of the limit.



Current Test Result Summary (Run time)

EUT: 3.5" SATA HDD Single Bay Giga LAN Tested by: Anson
 Test category: Class-D per Ed. 3.0 (2005-11) (European limits) Test Margin: 100
 Test date: 2009/3/2
 Comment: PD-LN2U2SS
 Customer: 922504

Test Result: N/L Source qualification: Normal
 THC(A): 0.00 I-THD(%): 0.00 POHC(A): 0.000 POHC Limit(A): 0.000
 Highest parameter values during test:

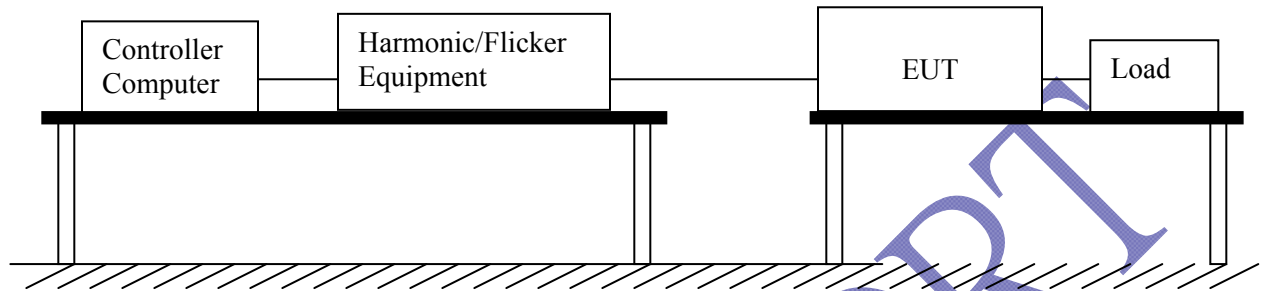
V_RMS (Volts):	229.43	Frequency(Hz):	50.00
I_Peak (Amps):	0.306	I_RMS (Amps):	0.060
I_Fund (Amps):	0.023	Crest Factor:	5.232
Power (Watts):	5.1	Power Factor:	0.368

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001						
3	0.021	0.017	0.0	0.021	0.026	0.00	N/L
4	0.001						
5	0.020	0.010	0.0	0.021	0.014	0.00	N/L
6	0.001						
7	0.020	0.005	0.0	0.020	0.008	0.00	N/L
8	0.001						
9	0.019	0.003	0.0	0.019	0.004	0.00	N/L
10	0.001						
11	0.017	0.002	0.0	0.017	0.003	0.00	N/L
12	0.001						
13	0.016	0.002	0.0	0.016	0.002	0.00	N/L
14	0.000						
15	0.014	0.001	0.0	0.014	0.002	0.00	N/L
16	0.000						
17	0.013	0.001	0.0	0.013	0.002	0.00	N/L
18	0.000						
19	0.011	0.001	0.0	0.011	0.002	0.00	N/L
20	0.000						
21	0.009	0.001	0.0	0.010	0.001	0.00	N/L
22	0.000						
23	0.008	0.001	0.0	0.008	0.001	0.00	N/L
24	0.000						
25	0.006	0.001	0.0	0.006	0.001	0.00	N/L
26	0.000						
27	0.005	0.001	0.0	0.005	0.001	0.00	N/L
28	0.000						
29	0.003	0.001	0.0	0.004	0.001	0.00	N/L
30	0.000						
31	0.002	0.001	0.0	0.003	0.001	0.00	N/L
32	0.000						
33	0.002	0.001	0.0	0.002	0.001	0.00	N/L
34	0.000						
35	0.001	0.001	0.0	0.001	0.001	0.00	N/L
36	0.000						
37	0.001	0.001	0.0	0.001	0.001	0.00	N/L
38	0.000						
39	0.001	0.001	0.0	0.001	0.001	0.00	N/L
40	0.000						

Note: The EUT power level is below 75.0 Watts and therefore has no defined limits

6. VOLTAGE FLUCTUATIONS

6.1 TEST SETUP



6.2 VOLTAGE FLUCTUATIONS TEST

Port:	AC mains
Basic Standard:	EN61000-3-3
Test Procedure	Refer to Paragraph 6.3
Observation period:	For Pst 10min For Plt 2 hours

6.3 TEST PROCEDURE

The EUT is supplied in series with reference impedance from a power source with the voltage and frequency as the nominal supply voltage and frequency of the EUT.

6.4 TEST SPECIFICATION

EN 61000-3-3

(Please refers to Page 4 for dated references which are related to the standard as mentioned above)

6.5 RESULT: PASSED

6.6 TEST DATA



Flicker Test Summary per EN/IEC61000-3-3 (Run time)

EUT: 3.5" SATA HDD Single Bay Giga LAN
Test category: All parameters (European limits)
Test date: 2009/3/2
Comment: PD-LN2U2SS
Customer: 922504

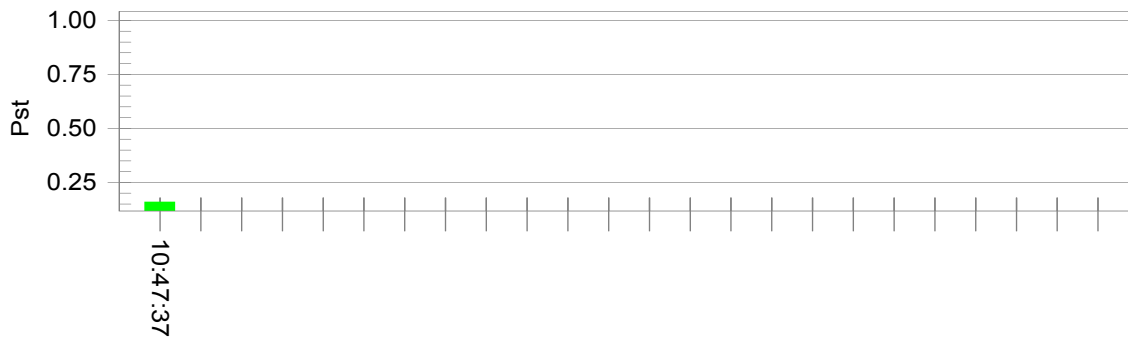
Tested by: Anson
Test Margin: 100

Test Result: Pass

Status: Test Completed

Pst; and limit line

European Limits



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt):	229.37		
Highest dt (%):	0.00	Test limit (%):	3.30 Pass
Time(mS) > dt:	0.0	Test limit (mS):	500.0 Pass
Highest dc (%):	0.00	Test limit (%):	3.30 Pass
Highest dmax (%):	0.00	Test limit (%):	4.00 Pass
Highest Pst (10 min. period):	0.160	Test limit:	1.000 Pass
Highest Plt (2 hr. period):	0.070	Test limit:	0.650 Pass

7. ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD)

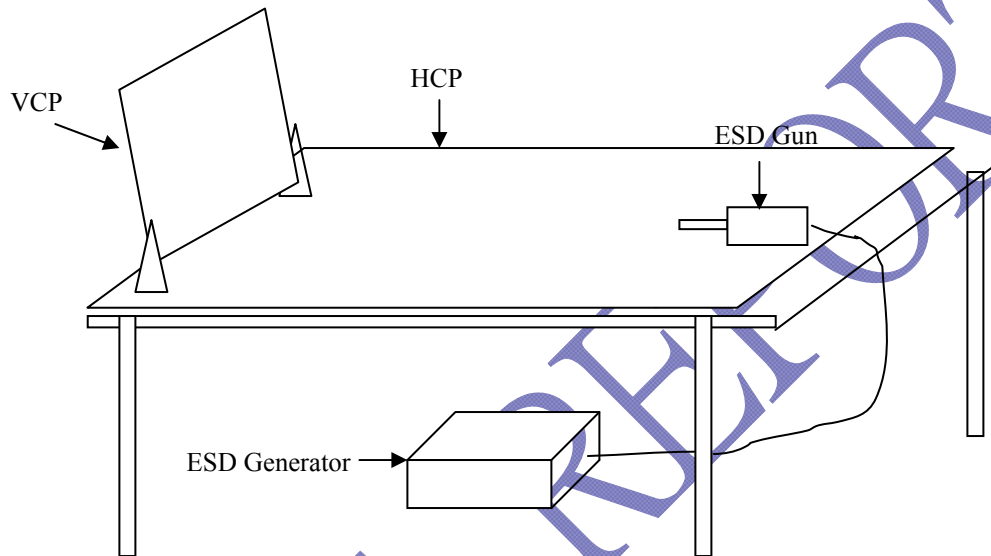
7.1 TEST PROCEDURE

According To IEC 61000-4-2

According To EN 55024

(Please refers to Page 4 for dated references which are related to the standard as mentioned above)

7.2 TEST SETUP



7.3 TEST LEVEL

Item	Test Specification	Unit	Performance Criteria
Enclosure Room	±2, 4, 8 (Air Discharge)	KV (Charge Voltage)	B
Electrostatic Discharge	±2,4 (Contact Discharge)		
Time between test	<u>1</u>	sec	

Number of test: 10 Discharges / Test point / Polarity / Level

Particular requirements: at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points.

When the measurement was taken, The ESD discharger was performed in single discharge. For the single discharge time between successive single discharges will keep on one second. It was at least ten single discharges with positive and negative at the same selected pointed. The selected pointed, which was performed with electrostatic discharge, was marked on the red label on the EUT

Indirect applicant of discharge to the EUT

Vertical Coupling Plane (VCP)



The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance 0.1m from, the EUT, with the discharge electrode touching the coupling plane.

The four faces of the EUT will be performed with electrostatic discharge. It was at least ten singles discharges with positive and negative at the same selected point.

Horizontal Coupling Plane (HCP)

The coupling plane is placed under the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the discharge electrode touching the coupling.

The four faces of the EUT will be performed with electrostatic discharge. It was at least ten single discharges with positive and negative at the same selected pointed.

7.4 TEST RESULT.

Model: PD-LN2U2SS

Mode: USB

Temperature: 20°C , Humidity: 55 % RH

Test Point	Air Discharge	Contact Discharge	Performance Criteria	Result
HCP	----	±2, 4KV	B	PASSED
VCP	----	±2, 4KV	B	PASSED
CASE	±2, 4, 8KV	±2, 4KV	B	PASSED
I/O PORTS	±2, 4, 8KV	±2, 4KV	B	PASSED
LED	±2, 4, 8KV	±2, 4KV	B	PASSED
SCREWS	±2, 4, 8KV	±2, 4KV	B	PASSED
DC SOCKET	±2, 4, 8KV	±2, 4KV	B	PASSED
BUTTON	±2, 4, 8KV	±2, 4KV	B	PASSED

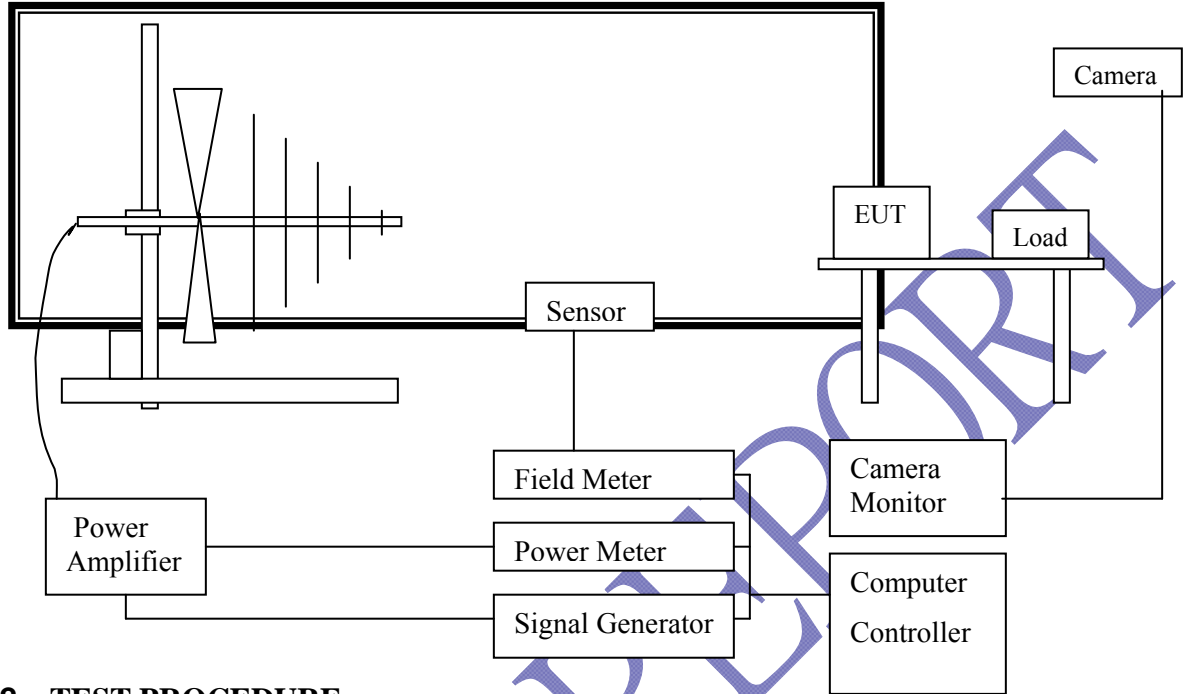
Final Result: **PASSED**

Remark: During the test, the data packages are stops to write and read. After the test, EUT resume automatically.

Photos of test configuration please refer to appendix 1.

8. RADIATED EMISSION MEASUREMENT (RS)

8.1 TEST SETUP



8.2 TEST PROCEDURE

According To IEC 61000-4-3

According To EN 55024

(Please refers to Page 4 for dated references which are related to the standard as mentioned above)

8.3 TEST LEVEL

Item	Test Specification	Unit	Performance Criteria
Radio –Frequency	80~1000	MHz	A
Electromagnetic Field	3	V/m (unmodulated, rms)	
Amplitude Modulated	80	%AM (1KHz)	

8.4 TEST PROCEDURE

The EUT and load, which are placed on a wooden table that the height is 0.8 meter above ground, are placed with one coincident with the calibration plane such that the distance from antenna to the EUT is 3 meters.

Both horizontal and vertical polarization of the antenna position and four sides of the EUT are set on measurement. In order to judge the EUT performance, a CCD camera is used to monitor the situation of EUT.

All the scanning conditions are as follows:

Condition of Test	Remarks
1. Field Strength	3 V/M; Level 2
2. Radiated Signal	AM 80% modulated with 1KHz
3. Scanning Frequencies	80MHz ~ 1000MHz
4. Dwell Time	3 seconds
5. Frequency step size	1%
6. The rate of swept of frequency	1.5×10^{-3} decades/s
7. Antenna Polarity	HORIZONTAL & VERTICAL
8. The four sides of EUT are tested	FRONT, REAR, RIGHT, LEFT

8.5 TEST RESULT

Model: PD-LN2U2SS

Mode: USB

Temperature: 20°C , Humidity: 55 % RH

ANT SIDE	3V HORIZONTAL	3V VERTICAL	RESULT
FRONT	A	A	PASSED
REAR	A	A	PASSED
RIGHT	A	A	PASSED
LEFT	A	A	PASSED

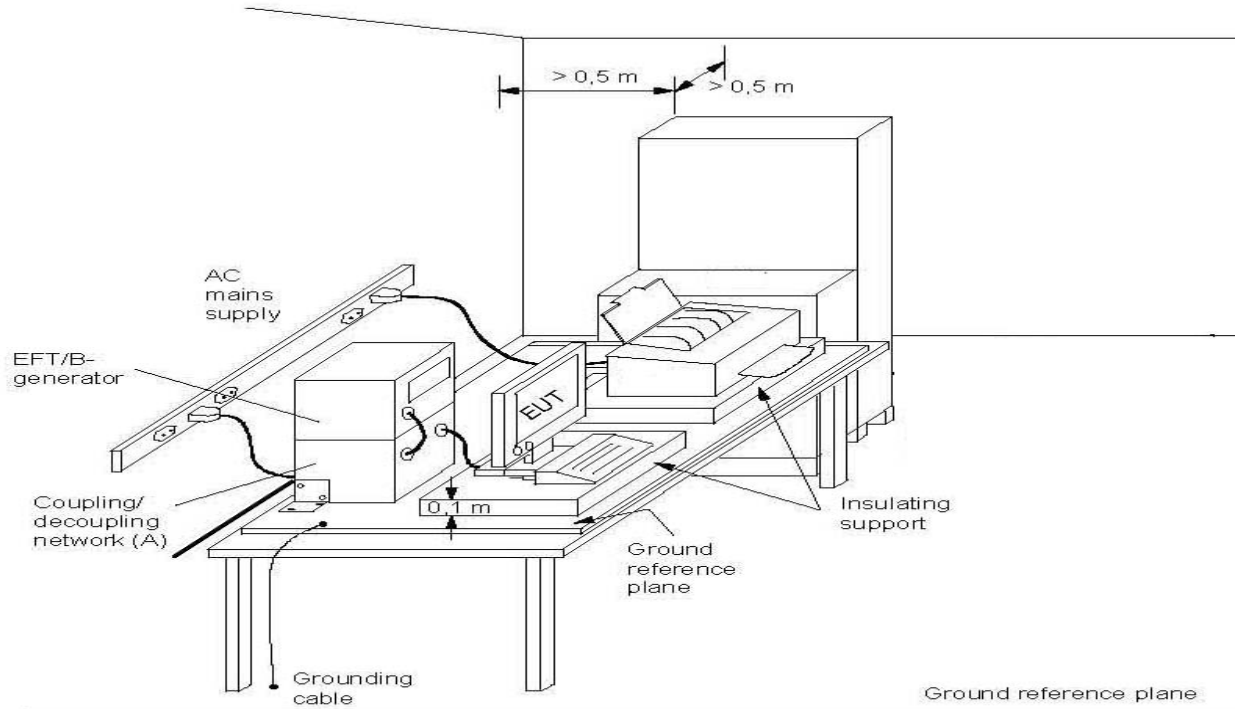
Final Result: **PASSED**

Remark:

Photos of test configuration please refer to appendix 1.

9. ELECTRICAL FAST TRANSIENT/BURST (EFT)

9.1 TEST SETUP



9.2 TEST PROCEDURE

According To IEC 61000-4-4

According To EN 55024

(Please refers to Page 4 for dated references which are related to the standard as mentioned above)

9.3 TEST PROCEDURE

The EUT and load are placed on a ground reference plane and insulated from it by an insulating support $0,1\text{ m} \pm 0,01\text{ m}$ thick. The minimum area of the ground reference plane is $1\text{ m} \times 1\text{ m}$. It also projected beyond the EUT by at least 0.1meter on all sides.

For Input and Output AC power or DC Input and DC Output Power Ports:

The EUT is connected with the power mains through a coupling device that directly couples the EFT interference signal.

Each of the line and nature conductors is impressed with burst noise for 1 minute.

For Protective Earth Port:

The EUT is connected to the power mains through a coupling device that directly couples the EFT interference signal. The protective earth line (PE) is impressed with burst noise for 1 minute.

The length of power cord between the coupling device and the EUT shall be $0,5\text{ m} \pm 0,05\text{ m}$.

For signal Lines and Control Lines Test:

The EFT interference signal is through a coupling clamp device couples to the signal and control lines of the EUT with burst noise for 1 minute.



9.4 TEST LEVEL

Item	Test Specification	Unit	Performance Criteria
Test Voltage	±0.5, ±1	KV (Peak)	B
Pulse Rise time & Duration	5/50	Tr/Ts (ns)	
Pulse Repetition	5	Rep. Frequency (KHz)	
Coupling of power line	L, N, PE, L+N, L+PE, N+PE, L+N+PE		

9.5 TEST RESULT

Model: PD-LN2U2SS

Mode: USB

Temperature: 20°C , Humidity: 55 % RH

Power Line			
TEST VOLTAGE	L	N	L+N
±0.5KV	A	A	A
±1KV	A	A	A

Signal Control Line	
TEST VOLTAGE	Performance Criteria
±0.25KV	A
±0.5KV	A

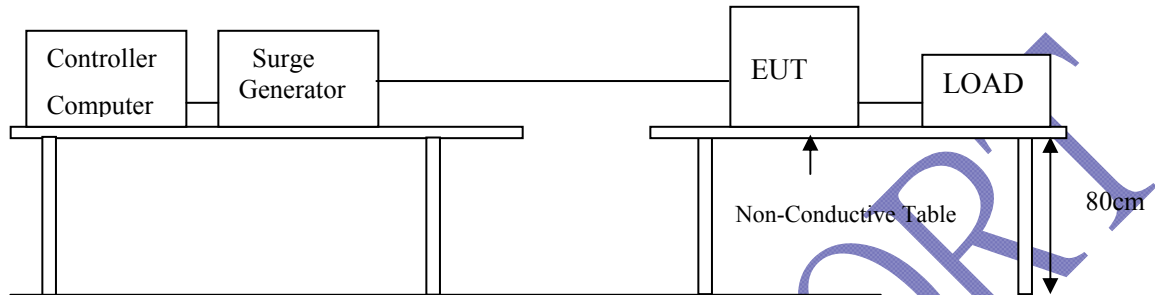
Final Result: **PASSED**

Remark:

Photos of test configuration please refer to appendix 1.

10. SURGE

10.1 TEST SETUP



10.2 TEST PROCEDURE

According To IEC 61000-4-5

According To EN 55024

(Please refers to Page 4 for dated references which are related to the standard as mentioned above)

10.3 TEST LEVEL

Item	Test Specification	Unit	Performance Criteria
DC Input and DC Output Power Ports			
Surge	1.2/50(8/20)	Tr/Ts (μs)	B
Line to Ground	±0.5	KV	
Line to Line	±0.5	KV	
AC Input and AC Output Power Ports			
Surge	1.2/50(8/20)	Tr/Ts (μs)	B
Line to Ground	±2	KV	
Line to Line	±1	KV	
Polarity	POSITIVE / NEGATIVE		
Phase shifting in a range between 0°to 360°			



10.4 TEST PROCEDURE

The EUT and its load are placed on a table which is 0.8 meter height. The length of power cord between the coupling device and the EUT shall be 2 meters or less.

For Input and Output AC Power or DC Input and DC Output Power Ports:

The EUT is connected to the power mains through a coupling device that directly couples the Surge interference signal.

The Surge noise shall be applied synchronized to the voltage phase at 0°, 90°, 180°, 270° and the peak value of the AC voltage wave. (5 Positive and 5 Negative)

Each of line-earth and line-line is impressed with a sequence of five surge voltages with interval of 1 minute.

10.5 TEST RESULT

Model: PD-LN2U2SS

Mode: USB

Temperature: 20°C , Humidity: 55 % RH

Environmental Phenomena	Test Specification	Units	Performance Criteria
Line to Line	±1	KV (Charge Voltage)	A

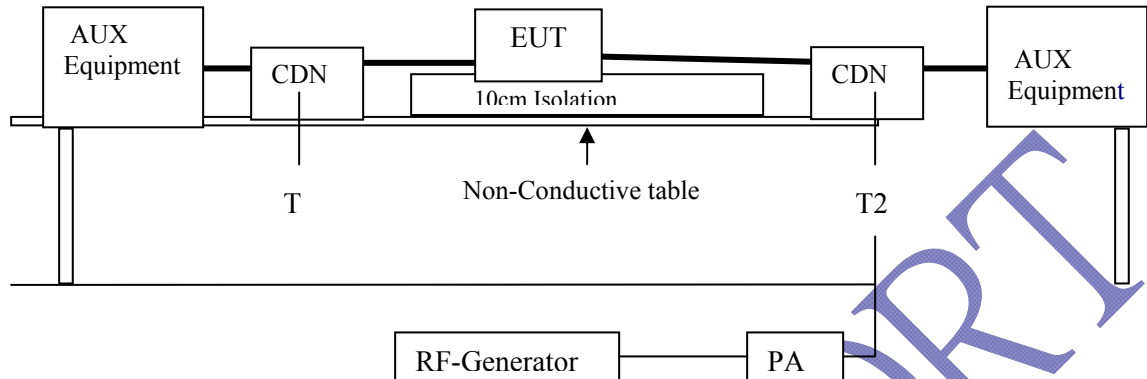
Final Result: **PASSED**

Remark:

Photos of test configuration please refer to appendix 1.

11. IMMUNITY TEST TO CS CONDUCTED DISTURBANCE (CS)

11.1 TEST SETUP



11.2 TEST PROCEDURE

According To IEC 61000-4-6

According To EN 55024

(Please refers to Page 4 for dated references which are related to the standard as mentioned above)

11.3 TEST LEVEL

Item	Test Specification	Unit	Performance Criteria
Ports for Signal Lines			
Radio-Frequency	0.15 ~ 80	MHz	A
Common Mode	3	V (rms, Unmodulated)	
Amplitude Modulated	80	%AM (1KHz)	
	150	Source Impedance	
Ac Input and AC Output and DC Input and DC output Ports and Functional Earth Ports			
Radio-Frequency	0.15 ~ 80	MHz	
Common Mode	3	V (rms, Unmodulated)	A
Amplitude Modulated	80	%AM (1KHz)	
	150	Source Impedance	

11.4 TEST PROCEDURE

The EUT are placed on a table which is 0.8meter height and a ground reference plane on the table, the EUT are placed upon table and use 10cm insulation between the EUT and ground reference plane.

For AC Input and AC Output Power or DC Input and DC Output Power Ports

The EUT is connected to the power mains through a coupling and decoupling networks for Power supply lines. It also directly couples the disturbance signal into EUT.

Use CDN-M2 for two wires or CDN-M3 for three wires.

For Signal Lines and Control Lines Test:

The disturbance signal is through a coupling and decoupling networks (CDN) or EM-clamp which is to couple the signal and control lines of the EUT.

All scanning frequencies conditions are as following:

Condition of Test	Remarks
EN 61000-4-6/2007	
1. Field Strength	3 V/M; Level 2
2. Radiated Signal	AM 80% modulated with 1KHz
3. Scanning Frequencies	0.15MHz ~ 80MHz
4. Dwell Time	3 seconds
5. Frequency step size Δf	1%
6. The rate of swept of frequency	1.5×10^{-3} decades/s

11.5 TEST RESULT

Model: PD-LN2U2SS

Mode: USB

Temperature: 20°C , Humidity: 55 % RH

TEST Specification	Unit	Performance Criteria
0.15 - 80	MHz	A
3	V	
80	% AM (1KHz)	

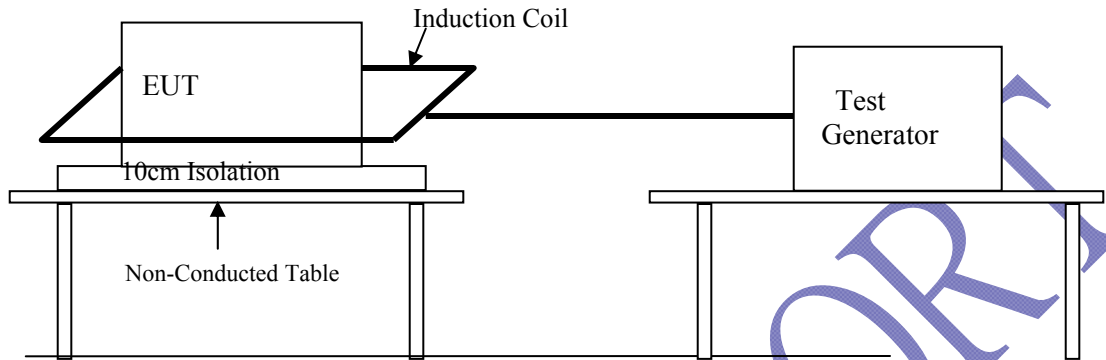
Final Result: **PASSED**

Remark:

Photos of test configuration please refer to appendix 1.

12. POWER FREQUENCY MAGNETIC FIELD (MAGNETIC)

12.1 TEST SETUP



12.2 TEST STANDARD

According To IEC 61000-4-8

According To EN 55024

(Please refers to Page 4 for dated references which are related to the standard as mentioned above)

12.3 TEST LEVEL

Item	Test Specification	Unit	Performance Criteria
Power-Frequency	50	Hz	A
Magnetic Field	1	A/M	

12.4 TEST PROCEDURE

The EUT and its load are placed on a table that is 0.8 meter above the metal ground plane dimension is at least 1 meter x 1 meter. The test magnetic field shall be placed at least than 3 meter distance from the induction coil.

The test magnetic field shall be applied by the immersion method to the EUT. The induction coil shall be rotated by 90° in order to expose the EUT to the test field with different orientation (X, Y, Z orientation).



12.5 TEST RESULT

Model: PD-LN2U2SS

Mode: USB

Temperature: 20°C , Humidity: 55 % RH

Environmental Phenomena	Test Specification	Units	Performance Criteria
Magnetic Field	1	A/m	A

Final Result: **PASSED**

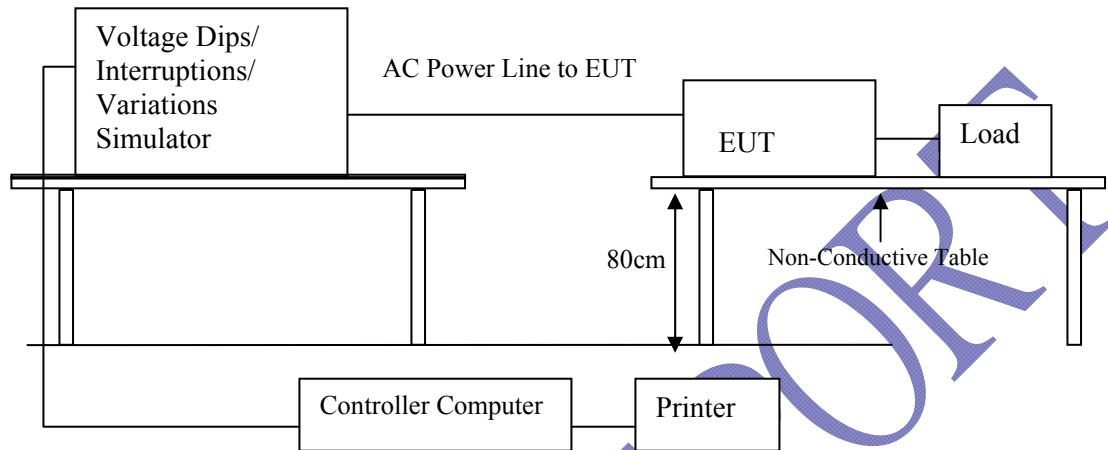
Remark:

Photos of test configuration please refer to appendix 1.

DRAFT REPORT

13. VOLTAGE DIPS AND INTERRUPTION MEASUREMENT

13.1 TEST SETUP



13.2 TEST PROCEDURE

According To IEC 61000-4-11

According To EN 55024

(Please refers to Page 4 for dated references which are related to the standard as mentioned above)



13.3 TEST LEVEL

Class ^a	Test level and durations for voltage dips				
Class 1	Case-by-case according to the equipment requirements				
Class 2	0 % during 1/2 cycle	0 % during 1 cycle	70 % during 25/30 ^c cycles		
Class 3	0 % during 1/2 cycle	0 % during 1 cycle	40 % during 10/12 ^c cycles	70 % during 25/30 ^c cycles	80 % during 250/300 ^c cycles
Class X ^b	X	X	X	X	X

a: Classes as per IEC 61000-2-4.

b: To be defined by product committee. For equipment connected directly or indirectly to the public network, the levels must not be less severe than Class 2.

c: “25/30 cycles” means “25 cycles for 50 Hz test” and “30 cycles for 60 Hz test”.

Class ^a	Test level and durations for short interruptions (t _s) (50Hz/ 60Hz)
Class 1	Case-by-case according to the equipment requirements
Class 2	0 % during 250/300 ^c cycles
Class 3	0 % during 250/300 ^c cycles
Class X ^b	X

a: Classes as per IEC 61000-2-4.

b: To be defined by product committee. For equipment connected directly or indirectly to the public network, the levels must not be less severe than Class 2.

c: “250/300 cycles” means “250 cycles for 50 Hz test” and “300 cycles for 60 Hz test”.

13.4 TEST PROCEDURE

The EUT and its load are placed on a wooden table which is 0.8 meter above a metal ground plane which dimension is 1 meter x 1 meter, the thickness is 0.65mm. It projected beyond the EUT by at least 0.1 meter on all sides. The power cord shall be used the shortest power cord as specified by the manufacturer.

For Voltage Dips / Interruption Test:

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 dips of supplied voltage and duration time is 10ms, for 60% voltage dips of supplied voltage and duration time is 100ms with a sequence of three voltage dips with intervals of 10 seconds, and for 95% voltage interruption of supplied voltage and the duration time is 5000ms with a sequence of three voltage interruptions with intervals of 10 seconds.

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



13.5 TEST RESULT

Model: PD-LN2U2SS

Mode: USB

Temperature: 20°C , Humidity: 55 % RH

Environmental Phenomena	Test Specification	Units	Performance Criteria
Voltage Dips	0 1/2	% during Cycle	A
	70 25	% during Cycles	C
Voltage Short Interruptions	0 250	% during Cycles	C

Final Result: **PASSED**

Remark:

Photos of test configuration please refer to appendix 1.



14. PERFORMANCE CRITERIA

- A. The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.
- B. The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
- C. Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

DRAFT REPORT



15. MODIFICATION LIST FOR EMC COMPLYING TEST

The modification is solely made by the applicant.

Appendix

Appendix A: Summary of Test Result

**** EMC Test Result: The EUT has been passed the all measurements. ****

The uncertainty is calculated in accordance with CISPR16-4-2, the total uncertainty for this test is as follows:

Uncertainty of Conducted Emission Measurement

Contribution	Probability Distribution	150KHz~ 30MHz
Receiver reading	Normal (k=2)	±0.3
Cable loss	Normal (k=2)	±0.2
AMN insertion loss	Rectangular	±0.3
RCV/SPA specification	Rectangular	±0.1
combined standard uncertainty $U_e(y)$	normal	±0.5
Measuring uncertainty for a level of confidence of 95% $U=2U_e(y)$	normal (k=2)	±1.0

Uncertainty of Radiated Emission Measurement

Contribution	Probability Distribution	30MHz~1GHz
Receiver reading	Normal (k=2)	±0.3
Cable loss calibration	Normal (k=2)	±0.3
Antenna factor calibration	Rectangular	±0.9
Pre Amplifier Gain calibration	Rectangular	±0.3
RCV/SPA specification	Rectangular	±0.2
combined standard uncertainty $U_e(y)$	normal	±1.0
Measuring uncertainty for a level of confidence of 95% $U=2U_e(y)$	normal (k=2)	±2.0



Global Certification Corp.

Appendix 2

TEST DATA



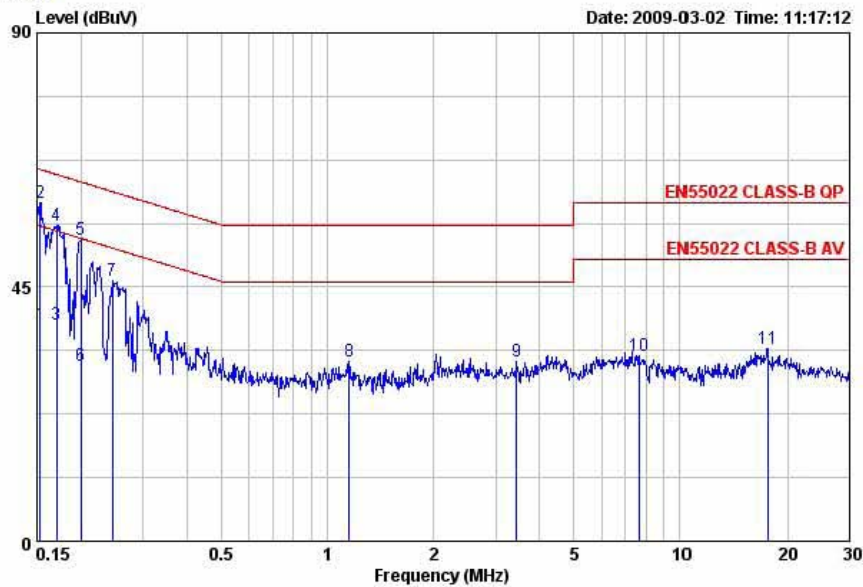
Test Data Of Conducted Emission Measurement (LINE)



環球認證有限公司
Global Certification Corp.

Global Certification Corp.
No.112-3, Sec.2, Siangjiang Rd.
Sijhih City, Taipei County 221, Taiwan
TEL:886-2-26426992 FAX:886-2-26487450
WebSite: http://www.gcc.tw

Data: 2



Site : CONDUCTED Test Site 1
Condition : EN55022 CLASS-B QP LINE
EUT : 3.5" SATA HDD Single Bay Giga LAN
MODEL : PD-LN2U2SS
MEMO : USB

	Freq	Read Level	Over Level	Over Limit	Limit Line	LISN Factor	Cable Loss	Aux Factor	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	dB	
1	0.15	18.26	38.41	-17.41	55.82	10.12	0.03	10.00	Average
2	0.15	39.73	59.88	-5.94	65.82	10.12	0.03	10.00	Peak
3	0.17	18.29	38.44	-16.50	54.94	10.12	0.03	10.00	Average
4	0.17	35.75	55.90	-9.04	64.94	10.12	0.03	10.00	Peak
5	0.20	33.17	53.32	-10.30	63.62	10.12	0.03	10.00	Peak
6	0.20	10.90	31.05	-22.57	53.62	10.12	0.03	10.00	Average
7	0.25	25.90	46.06	-15.85	61.91	10.12	0.04	10.00	Peak
8	1.15	11.50	31.74	-24.26	56.00	10.14	0.10	10.00	Peak
9	3.44	11.41	31.76	-24.24	56.00	10.17	0.18	10.00	Peak
10	7.65	12.41	32.84	-27.16	60.00	10.20	0.23	10.00	Peak
11	17.57	13.57	34.09	-25.91	60.00	10.18	0.34	10.00	Peak



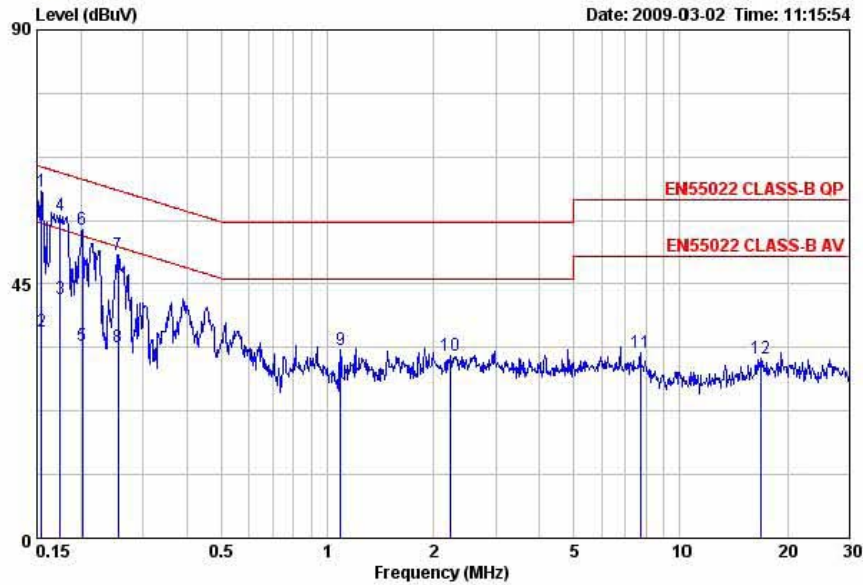
Test Data Of Conducted Emission Measurement (NATURAL)



環球認證有限公司
Global Certification Corp.

Global Certification Corp.
No.112-3, Sec.2, Siangjhang Rd.
Sijhih City, Taipei County 221, Taiwan
TEL:886-2-26426992 FAX:886-2-26487450
WebSite: http://www.gcc.tw

Data: 1



Site : CONDUCTED Test Site 1
Condition : EN55022 CLASS-B QP NEUTRAL
EUT : 3.5" SATA HDD Single Bay Giga LAN
MODEL : PD-LN2U2SS
MEMO : USB

	Read Freq	Read Level	Over Level	Limit	LISN	Cable	Aux	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.15	41.25	61.40	-4.34	65.74	10.12	10.00	Peak
2	0.15	16.46	36.61	-19.13	55.74	10.12	10.00	Average
3	0.17	22.28	42.43	-12.29	54.72	10.12	10.00	Average
4	0.17	37.11	57.26	-7.46	64.72	10.12	10.00	Peak
5	0.20	13.84	33.99	-19.55	53.54	10.12	10.00	Average
6	0.20	34.45	54.60	-8.94	63.54	10.12	10.00	Peak
7	0.25	30.08	50.24	-11.36	61.60	10.12	10.00	Peak
8	0.25	13.66	33.82	-17.78	51.60	10.12	10.00	Average
9	1.09	13.19	33.41	-22.59	56.00	10.13	10.00	Peak
10	2.24	12.12	32.41	-23.59	56.00	10.15	10.00	Peak
11	7.73	12.49	32.91	-27.09	60.00	10.19	10.00	Peak
12	16.75	11.25	31.80	-28.20	60.00	10.21	10.00	Peak



Test Data Of Radiated Emission Measurement (Horizontal)

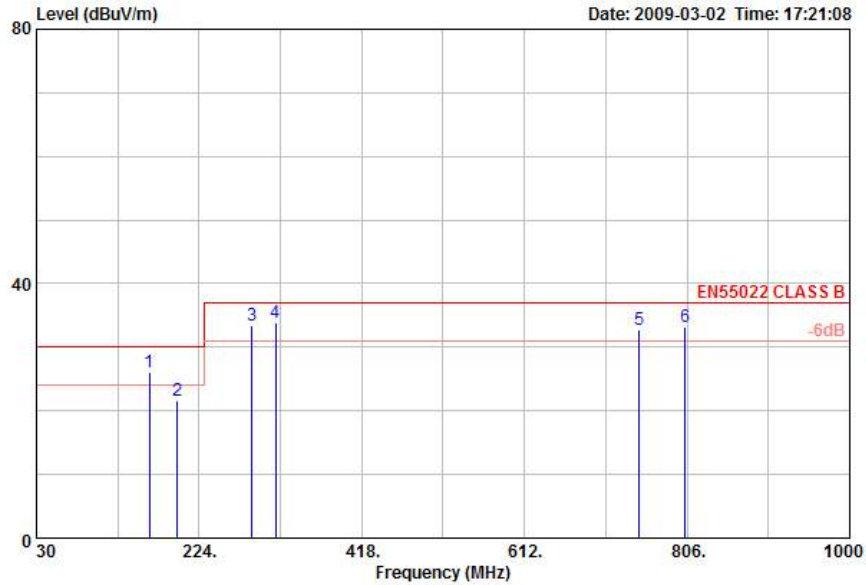


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Data: 1



Site : OPEN SITE Test Site 1
 Condition: EN55022 CLASS B HORIZONTAL
 EUT : 3.5 " SATA HDD Single Bay Giga LAN
 MODEL : PD-LN2U2SS
 MEMO : USB

	Freq	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1 !	165.07	26.08	30.00	-3.92	11.42	14.66	Peak
2	198.03	21.63	30.00	-8.37	6.19	15.44	Peak
3 !	286.63	33.37	37.00	-3.63	17.09	16.28	QP
4 !	315.11	33.89	37.00	-3.11	17.16	16.73	QP
5 !	749.26	32.74	37.00	-4.26	7.47	25.27	Peak
6 !	804.09	33.26	37.00	-3.74	7.00	26.26	QP



Test Data Of Radiated Emission Measurement (Vertical)

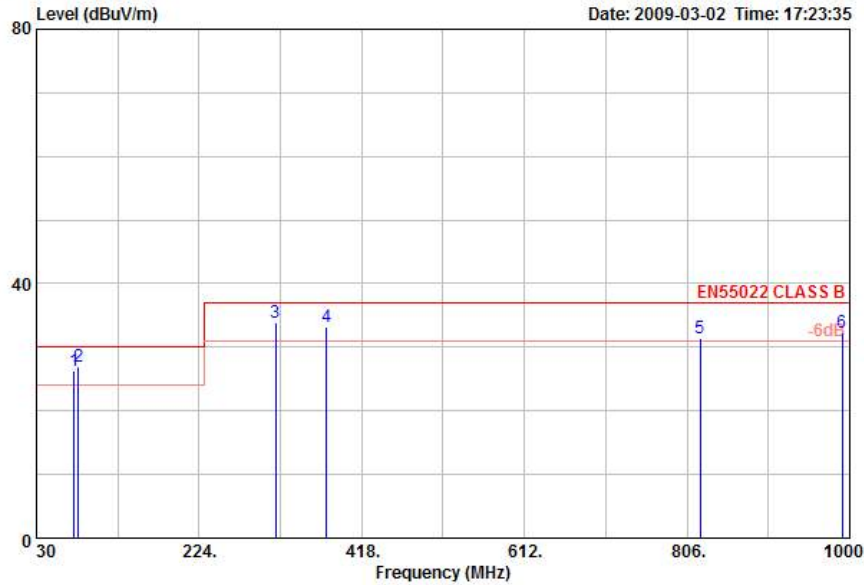


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Data: 2



Site : OPEN SITE Test Site 1
 Condition: EN55022 CLASS B VERTICAL
 EUT : 3.5 " SATA HDD Single Bay Giga LAN
 MODEL : PD-LN2U2SS
 MEMO : USB

	Freq	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	Limit	Level	dB/m	
				dB	dBuV		
1 !	74.66	26.34	30.00	-3.66	16.74	9.60	QP
2 !	79.73	26.98	30.00	-3.02	17.46	9.52	QP
3 !	315.09	33.91	37.00	-3.09	17.18	16.73	QP
4 !	375.78	33.22	37.00	-3.78	14.99	18.23	Peak
5 !	821.61	31.39	37.00	-5.61	4.92	26.47	Peak
6 !	990.65	32.35	37.00	-4.65	3.71	28.64	Peak