EMC TEST Report

Issued Date : Jul. 17, 2006
Report No. : 0606171
Equipment : IPC
Model No. : POC-155

Applicant : Advantech Co., Ltd.
Address : No. 1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei, Taiwan 114, R.O.C.

Tested by:
Neutron Engineering Inc. EMC Laboratory
Data of Test:
Jun. 30, 2006 ~ Jul. 12, 2006

Testing Engineer : (Peter Li)

Technical Manager : (Jeff Yang)

Authorized Signatory : (Andy Chiu)

NEUTRON ENGINEERING INC.

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TEL : (02) 2646-5426 FAX : (02) 2646-6815

NVLAP Lab Code: 200145-0

ilac-MRA TAF Testing Laboratory 0659

VCCI R-1347 C-1410

Declaration

Neutron represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (**NML**) of **R.O.C**., or National Institute of Standards and Technology (**NIST**) of **U.S.A.**

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Neutron's laboratory quality assurance procedures are in compliance with the **ISO Guide 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

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1. CERTIFICATION

Equipment:	IPC
Trade Name :	ADVANTECH
Model No.:	POC-155
Applicant:	Advantech Co., Ltd.
Data of Test :	Jun. 30, 2006 ~ Jul. 12, 2006
Test Item:	ENGINEERING SAMPLE
Standards:	EN 60601-1-2: 2001
	EN 55011:1998+A1:1999+A2:2002 Class B
	EN 61000-3-2:2000 Class D
	EN 61000-3-3:1995+A1: 2001
	IEC 61000-4-2: 2001
	IEC 61000-4-3: 2002
	IEC 61000-4-4: 2004
	IEC 61000-4-5: 2005
	IEC 61000-4-6: 2004
	IEC 61000-4-8: 2001
	IEC 61000-4-11: 2004

The above equipment has been tested and found compliance with the requirement of the relative standards by Neutron Engineering Inc. EMC Laboratory.
The test data, data evaluation, and equipment configuration contained in our test report (Ref No. NEI-EMC-1-0606171) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of NVLAP and CNLA according to the ISO-17025 quality assessment standard and technical standard(s).

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

EMC Emission EN 60601-1-2: 2001				
Standard	Test Item	Limit	Judgment	Remark
EN 55011:1998 +A1:1999 +A2:2002	Conducted Emission	Class B	PASS	
	Radiated Emission	Class B	PASS	
EN 61000-3-2:2000	Harmonic Current Emission	Class D	PASS	
EN 61000-3-3:1995 +A1: 2001	Voltage Fluctuations & Flicker	------	PASS	
EMC Immunity EN 60601-1-2: 2001				
Section	Test Item	Performance Criteria	Judgment	Remark
IEC 61000-4-2:2001	Electrostatic Discharge	Note (3)	PASS	
IEC 61000-4-3:2002	RF electromagnetic field		PASS	
IEC 61000-4-4: 2004	Fast transients		PASS	
IEC 61000-4-5:2005	Surges		PASS	
IEC 61000-4-6:2004	Injected Current		PASS	
IEC 61000-4-8:2001	Power Frequency Magnetic Field		PASS	
IEC 61000-4-11:2004	Volt. Interruptions Volt. Dips		PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

(2) The power consumption of EUT is less than 75W and no Limits apply.

(3) The performance criteria for EN60601-1-2 are listed in the item 36.202.1 j.

(4) For client's request and manual description, the test will not be executed.

2.1 TEST FACILITY

The test facilities used to collect the test data in this report is **C01/OS02** at the location of No.132-1, Lane 329, Sec. 2, Palain Road, Shijr City, Taipei, Taiwan.

2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95** %。

A. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U，(dB)	NOTE
C-01	ANSI	150 KHz ~ 30MHz	1.94	

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U，(dB)	NOTE
OS-01	ANSI	30MHz ~ 200MHz	V	3.82	
		30MHz ~ 200MHz	H	3.60	
		200MHz ~ 1,000MHz	V	3.86	
		200MHz ~ 1,000MHz	H	3.94	
OS-02	ANSI	30MHz ~ 200MHz	V	2.48	
		30MHz ~ 200MHz	H	2.16	
		200MHz ~ 1,000MHz	V	2.50	
		200MHz ~ 1,000MHz	H	2.66	

C. Harmonic/ Flicker Measurement :

Test item	U	NOTE
IEC 61000-3-2	Voltage: 0.04%; Current: .191%; Frequency: $2.8x10^{-10}$	
IEC 61000-3-3	Voltage: 0.04%; Current: .191%; Frequency: $2.8x10^{-10}$	

D. Immunity Measurement :

Test item	U	NOTE
IEC 61000-4-2	Voltage: 1.6%; Timing: 2.8%	
IEC 61000-4-3	2.66 dB	
IEC 61000-4-4	Voltage: 1.6%; Timing: 2.8%; Frequency: $2.8x10^{-10}$	
IEC 61000-4-5	Voltage: 1.6%; Timing: 2.8%	
IEC 61000-4-6	CDN: 1.75 dB; EM Clamp: 1.47 dB	
IEC 61000-4-8	1%	
IEC 61000-4-11	Voltage: 1.6%; Timing: 2.8%	

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	IPC
Trade Name	ADVANTECH
Model No.	POC-155
OEM Brand/Model No.	N/A
Model Difference	N/A
Product Description	The EUT is an IPC. Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.
Power Supply	AC Mains
Connecting I/O Port(s)	Please refer to the User's Manual
Products Covered	N/A

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

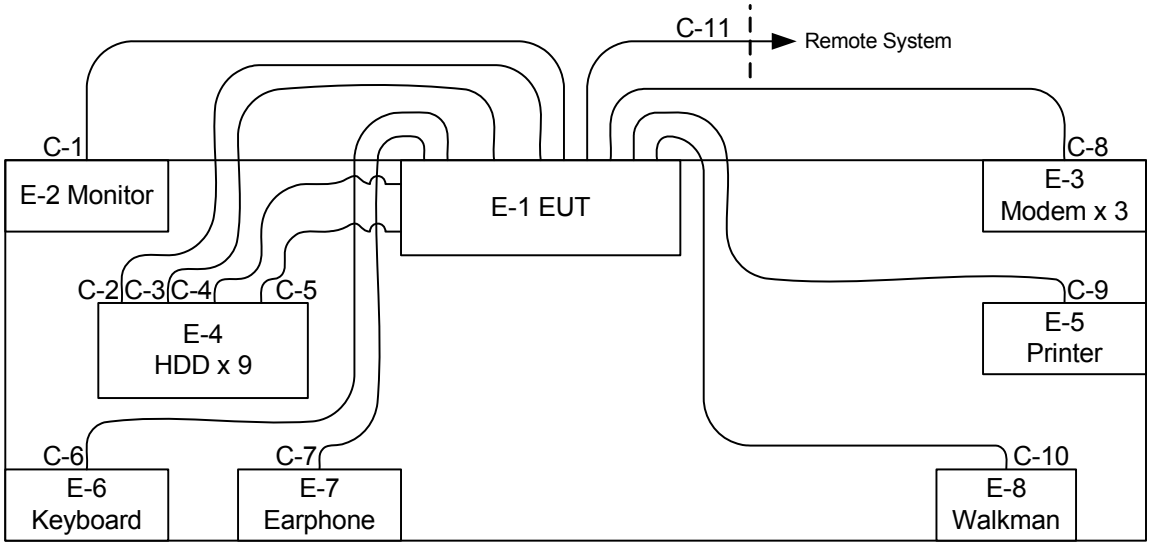
Pretest Test Mode	Description
Mode 1	FULL SYSTEM

For Conducted / Radiated Test	
Final Test Mode	**Description**
Mode 1	FULL SYSTEM

For Harmonics / Flicks	
Final Test Mode	**Description**
Mode 1	FULL SYSTEM

For EMS Test	
Final Test Mode	**Description**
Mode 1	FULL SYSTEM

3.3 **BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED**



C-1 VGA Cable
C-2 Data Cable
C-3 Data Cable
C-4 Data Cable
C-5 Data Cable
C-6 Data Cable
C-7 Audio Cable
C-8 Interface Cable
C-9 Centronics Cable
C-10 Audio Cable
C-11 RJ-45 Cable

3.4 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.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
E-1	IPC	ADVANTECH	POC-155	DOC	N/A	EUT
E-2	19" LCD Monitor	Samsung	SyncMaster 193P	GH19PH	DI19H4JXC05517A	
E-3	Modem	ACEEX	DM-1414V	DOC	8041708	
E-4	2.5"Mobile External HDD	FireWire	F12	DOC	N/A	
E-5	Printer	SII	DPU-414	DOC	1045105A	
E-6	PS/2 K/B	Logitech	Y-SJ17(ACK260A)	DOC	SYU44664880	
E-7	Earphone	N/A	N/A	N/A	N/A	
E-8	Walkman	N/A	KT-V860	N/A	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	YES	YES	1.8M	
C-2	YES	NO	1.6M	
C-3	YES	NO	1.6M	
C-4	YES	NO	1.6M	
C-5	YES	NO	1.6M	
C-6	YES	NO	1.5M	
C-7	NO	NO	1.8M	
C-8	YES	NO	1.5M	
C-9	YES	NO	1.8M	
C-10	NO	NO	1.8M	
C-11	NO	NO	20M	

Note:

(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 POWER LINE CONDUCTED EMISSION (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

4.1.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	LISN	Rolf Heine	NNB-2/16Z	98053	Dec. 19, 2006
2	4L-V-LISN	Rolf Heine	NNB-4/63TL	02/10040	Apr. 10, 2007
3	Pulse Limiter	Electro-Metrics	EM-7600	112644	Nov. 29, 2006
4	50Ω Terminator	N/A	N/A	N/A	May.11, 2007
5	Test Cable	N/A	C01	N/A	Nov. 29, 2006
6	EMI Test Receiver	R&S	ESCI	100082	Feb. 01, 2007

Remark: ” N/A” denotes No Model No. , Serial No. or No Calibration specified.

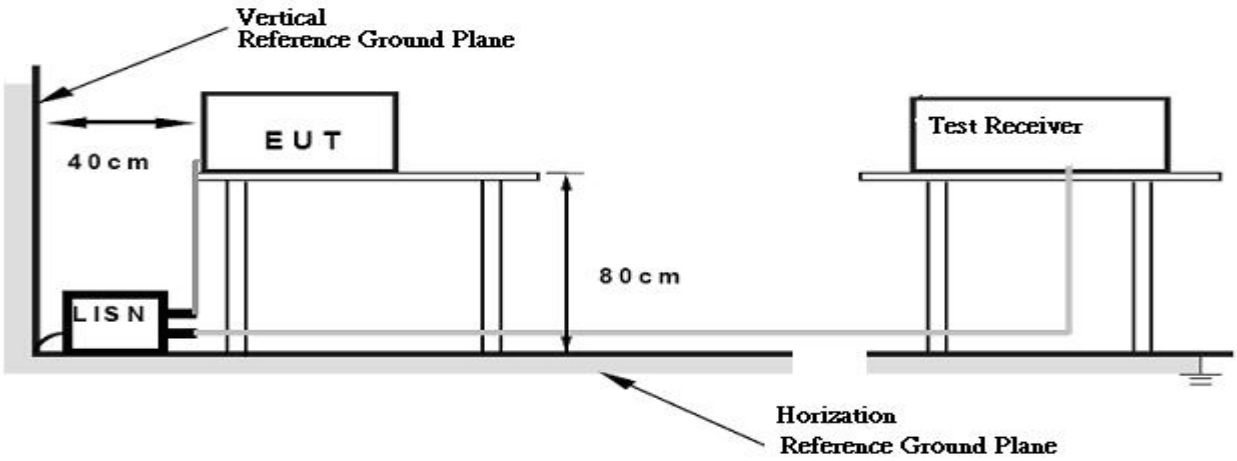
4.1.3 TEST PROCEDURE

a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



4.1.6 **EUT OPERATING CONDITIONS**

The EUT exercise program (EMC Test Program File) used during radiated and/or conducted emission measurement was designed to exercise the various system components in a manner similar to a typical use. The program contained on a PC hard disk and is auto-starting on power-up. Once loaded, the program sequentially exercises each system component in turn. The sequence used is:

1. Read (write) from (to) mass storage device (EUT – Ext. HDD).
2. Send "H" pattern to video port device (Monitor).
3. Send " H " pattern to parallel port device (Printer).
4. Send " H " pattern to serial port device (Modem).
5. EUT send/receive data to/from remote system.

6 Repeated from 2 to 5continuously.

As the keyboard and mouse are strictly input devices, no data is transmitted to (from) them during test. They are, however, continuously scanned for data input activity.

4.1.7 TEST RESULTS

EUT：	IPC	Model No. ：	POC-155
Temperature：	24 ℃	Relative Humidity：	55 %
Pressure：	1008 hPa	Test Power ：	AC 230V/50Hz
Test Mode ：	FULL SYSTEM		

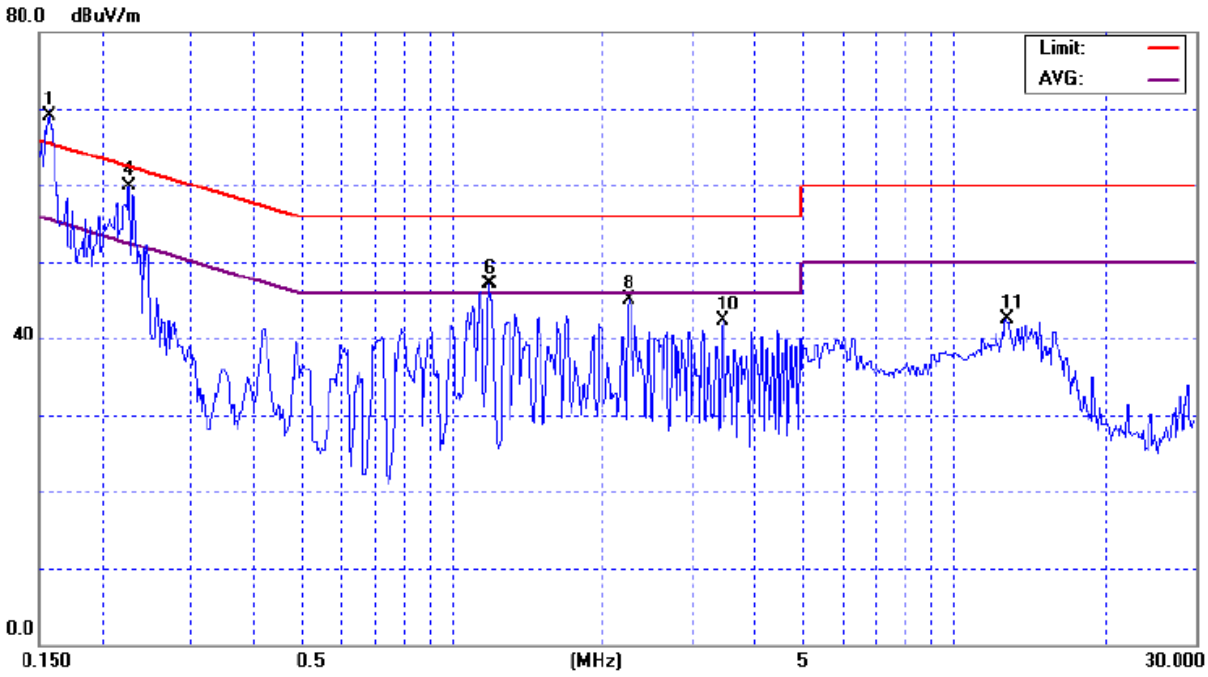
Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Margin (dB)	Note
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		
0.16	Line	43.01	36.01	65.65	55.65	-19.64	(AV)
0.23	Line	59.91	33.91	62.60	52.60	-2.69	(QP)
1.19	Line	47.07	31.67	56.00	46.00	-8.93	(QP)
2.25	Line	45.03	30.23	56.00	46.00	-10.97	(QP)
3.44	Line	42.25		56.00	46.00	-13.75	(QP)
12.75	Line	42.53	*	60.00	50.00	-17.47	(QP)

Remark

(1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz；SPA setting in RBW=10KHz,VBW =10KHz, Swp. Time = 0.3 sec./MHz。Reading in which marked as AV means measurements by using are Average Mode with instrument setting in RBW=1MHz,VBW=10Hz, Swp. Time =0.3 sec./MHz 。

(2) All readings are QP Mode value unless otherwise stated AVG in column of『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform。In this case, a " * " marked in AVG Mode column of Interference Voltage Measured 。

(3) Measuring frequency range from 150KHz to 30MHz 。



EUT：	IPC	Model No. ：	POC-155
Temperature：	24 ℃	Relative Humidity：	55 %
Pressure：	1008 hPa	Test Power ：	AC 230V/50Hz
Test Mode ：	FULL SYSTEM		

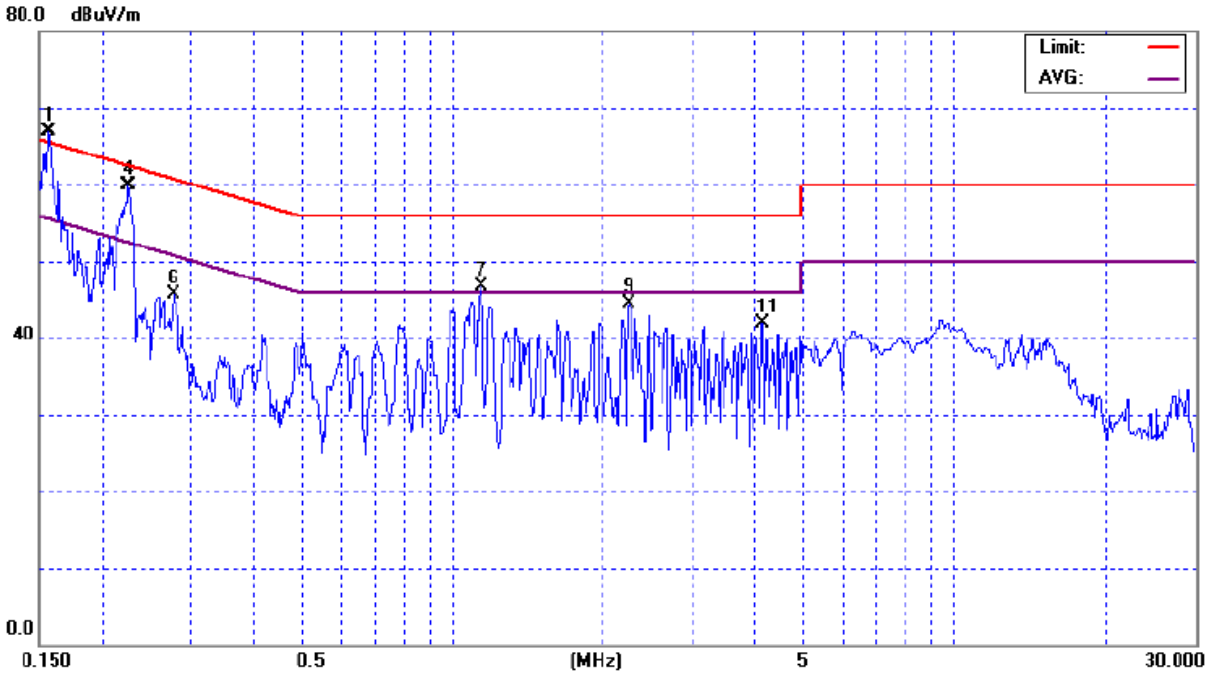
Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Margin (dB)	Note
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		
0.16	Neutral	46.31	35.41	65.67	55.67	-19.36	(QP)
0.23	Neutral	59.90	35.90	62.60	52.60	-2.70	(QP)
0.28	Neutral	45.64	*	60.89	50.89	-15.25	(QP)
1.14	Neutral	46.76	34.06	56.00	46.00	-9.24	(QP)
2.25	Neutral	44.42	32.92	56.00	46.00	-11.58	(QP)
4.14	Neutral	41.86	*	56.00	46.00	-14.14	(QP)

Remark

(1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz；SPA setting in RBW=10KHz,VBW =10KHz, Swp. Time = 0.3 sec./MHz。Reading in which marked as AV means measurements by using are Average Mode with instrument setting in RBW=1MHz,VBW=10Hz, Swp. Time =0.3 sec./MHz。

(2) All readings are QP Mode value unless otherwise stated AVG in column of『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform。In this case, a " * " marked in AVG Mode column of Interference Voltage Measured。

(3) Measuring frequency range from 150KHz to 30MHz。



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 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

Notes:

(1) The limit for radiated test was performed according to as following: CISPR 22/ FCC PART 15B /ICES-003.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

4.2.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Log-Bicon Antenna	MESS-ELEKTRONIK	VULB 9160	3058	Nov. 29, 2006
2	Test Cable	N/A	10M_OS02	N/A	Nov. 29, 2006
3	Test Cable	N/A	OS02-1/-2/-3	N/A	Nov. 29, 2006
4	Pre-Amplifier	Anritsu	MH648A	M09961	Nov. 29, 2006
5	Pre-Amplifier	Agilent	8449B	3008A01714	May. 15, 2007
6	Spectrum Analyzer	R&S	FSP_40	100129	Jan. 09, 2007
7	EMI Test Receiver	R&S	ESCI	100082	Feb. 01, 2007
8	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-325	Oct. 26, 2006
9	Antenna Mast	Chance Most	CMTB-1.5	N/A	N/A
10	Turn Table	Chance Most	CMTB-1.5	N/A	N/A

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

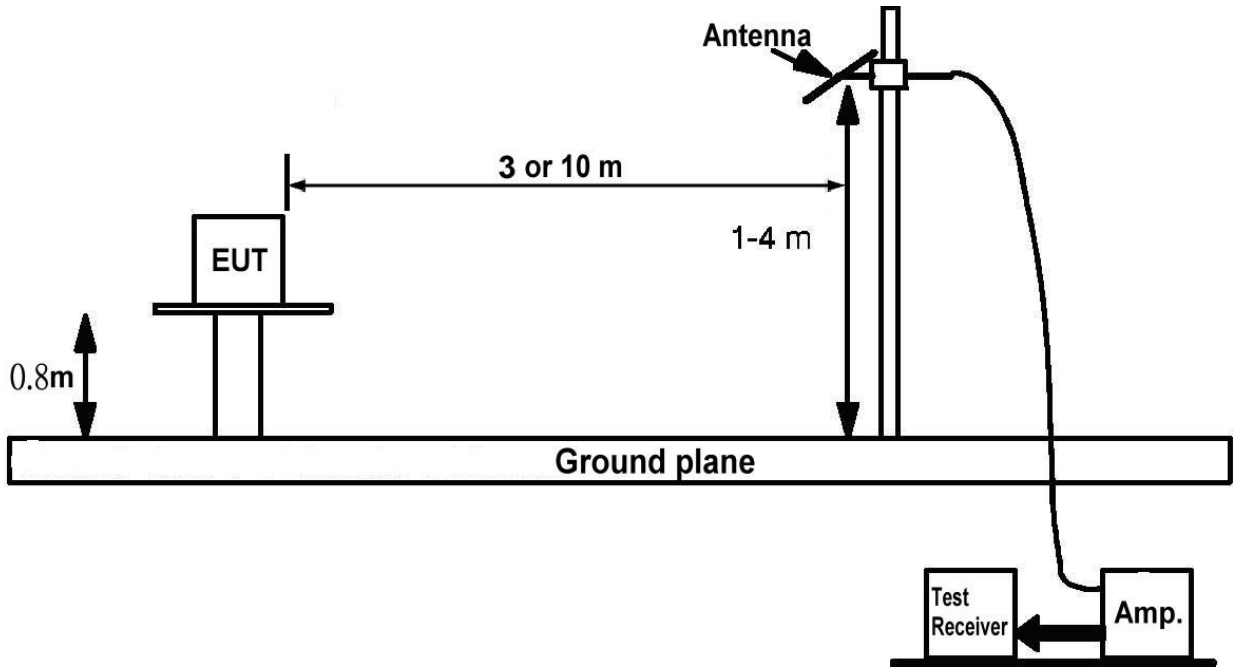
4.2.3 TEST PROCEDURE

a. The measuring distance of at 10 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m or 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



4.2.6 **EUT OPERATING CONDITIONS**

The EUT tested system was configured as the statements of **4.1.6** Unless otherwise a special operating condition is specified in the follows during the testing.

4.2.7 TEST RESULTS

EUT：	IPC	Model No. ：	POC-155
Temperature：	31 ℃	Relative Humidity：	68 %
Pressure：	1009 hPa	Test Power ：	AC 230V/50Hz
Test Mode ：	FULL SYSTEM		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
114.20	V	34.68	-7.06	27.62	30.00	- 2.38	
176.03	V	33.10	-6.20	26.90	30.00	- 3.10	QP
300.03	V	34.99	-4.95	30.04	37.00	- 6.96	
483.15	V	31.21	-0.50	30.71	37.00	- 6.29	
800.06	V	28.90	6.02	34.92	37.00	- 2.08	QP
961.34	V	25.34	8.42	33.76	37.00	- 3.24	

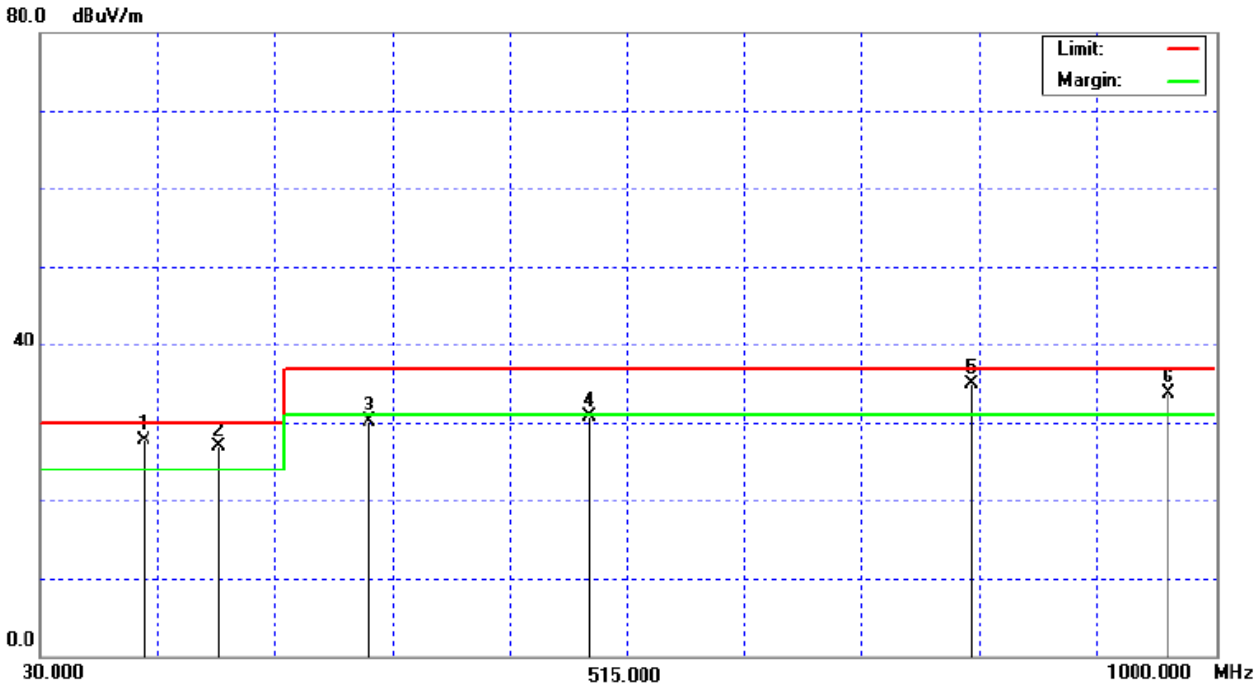
Remark：

(1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz；SPA setting in RBW=120KHz, VBW =120KHz, Swp. Time = 0.3 sec./MHz。

(2) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measure-ment didn't perform。

(3) Measuring frequency range from 30MHz to 1000MHz。

(4) If the peak scan value lower limit more than 20dB, then this signal data does not how in table。



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Temperature：	31 ℃	Relative Humidity：	68 %
Pressure：	1009 hPa	Test Power ：	AC 230V/50Hz
Test Mode ：	FULL SYSTEM		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
96.47	H	36.67	-10.23	26.44	30.00	- 3.56	
205.24	H	34.47	-9.03	25.44	30.00	- 4.56	
300.03	H	39.61	-4.95	34.66	37.00	- 2.34	
483.31	H	28.84	-0.49	28.35	37.00	- 8.65	
635.80	H	29.79	2.92	32.71	37.00	- 4.29	
800.08	H	28.68	6.02	34.70	37.00	- 2.30	QP

Remark：

(1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz；SPA setting in RBW=120KHz, VBW =120KHz, Swp. Time = 0.3 sec./MHz。

(2) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measure-ment didn't perform。

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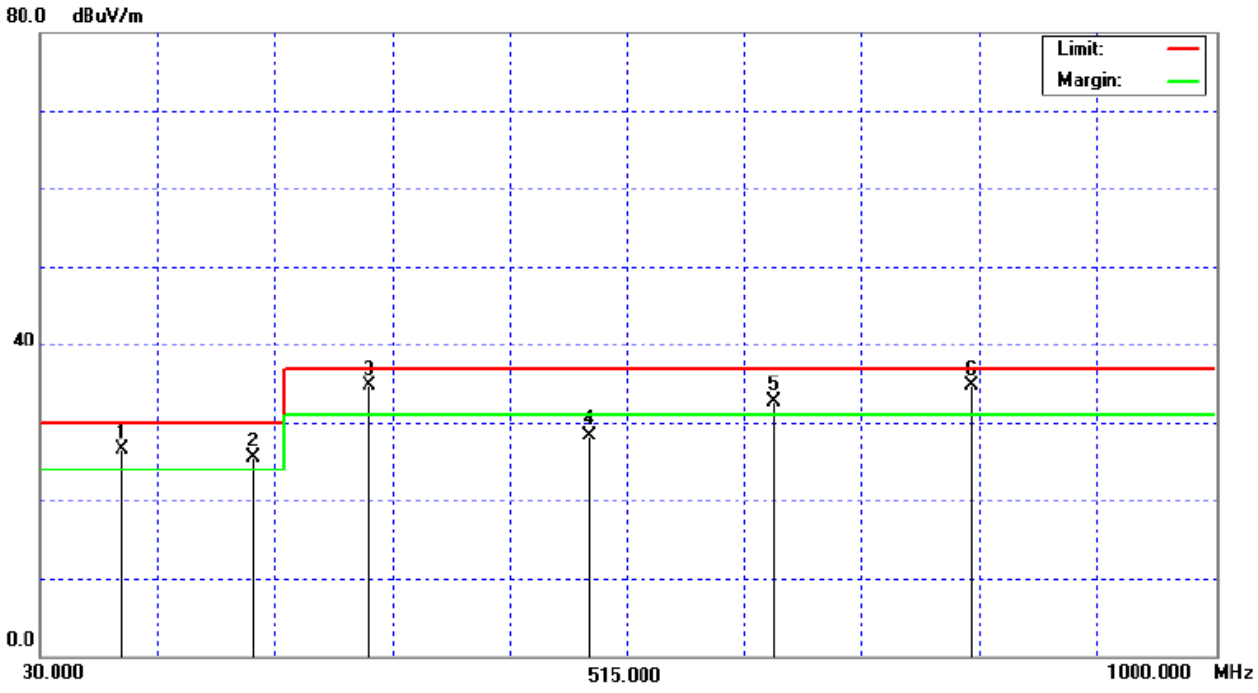


4.3 HARMONICS CURRENT MEASUREMENT

4.3.1 LIMITS OF HARMONICS CURRENT MEASUREMENT

IEC 555-2					
Table - I			Table - II		
Equipment Category	Harmonic Order n	Max. Permissible Harmonic Current (in Ampers)	Equipment Category	Harmonic Order n	Max. Permissible Harmonic Current (in Ampers)
Non Portable Tools or TV Receivers	Odd Harmonics		TV Receivers	Odd Harmonics	
	3	2.30		3	0.80
	5	1.14		5	0.60
	7	0.77		7	0.45
	9	0.40		9	0.30
	11	0.33		11	0.17
	13	0.21		13	0.12
	15≤n≤39	0.15 · 15/n		15≤n≤39	0.10 · 15/n
	Even Harmonics			Even Harmonics	
	2	1.08		2	0.30
	4	0.43		4	0.15
	8	0.30			
	8≤n≤40	0.23 · 8/n		DC	0.05

EN 61000-3-2/IEC 61000-3-2					
Equipment Category	Max. Permissible Harmonic Current (in Ampers)	Equipment Category	Harmonic Order n	Max. Permissible Harmonic Current (in A)	(mA/w)
Class A	Same as Limits Specified in 4-2.1, Table - I, but only odd harmonics required	Class D	3	2.30	3.4
			5	1.14	1.9
			7	0.77	1.0
			9	0.40	0.5
			11	0.33	0.35
			13≤n≤39	see Table I	3.85/n
			only odd harmonics required		

4.3.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Harmonic & Flicker	California	PACS-1	72345	Feb. 16, 2007
2	Power Source	California	3001iX	56310	Feb. 16, 2007

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

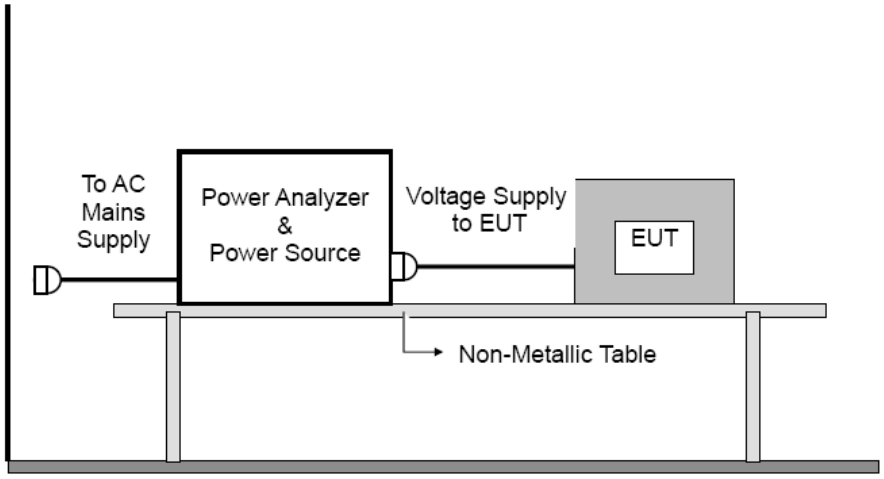
4.3.3 TEST PROCEDURE

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.
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. Portable tools.; Arc welding equipment which is not professional equipment.
   Class C: Lighting equipment.
   Class D: Equipment having a specified power less than or equal to600 W of the following types: Personal computers and personal computer monitors and television receivers.
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.
d. For the actual test configuration, please refer to the related item –EUT Test Photos.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



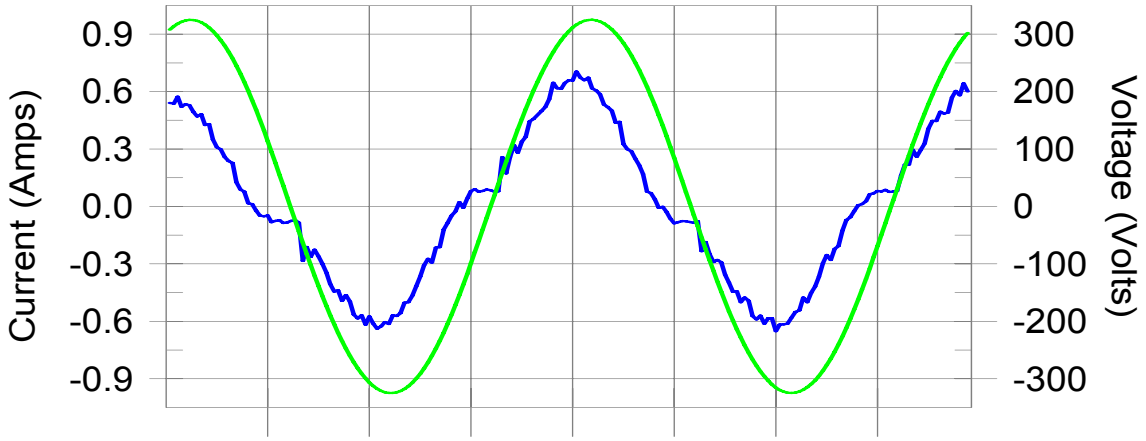
4.3.6 **EUT OPERATING C**ONDITIONS

The EUT tested system was configured as the statements of **4.1.6** Unless otherwise a special operating condition is specified in the follows during the testing.

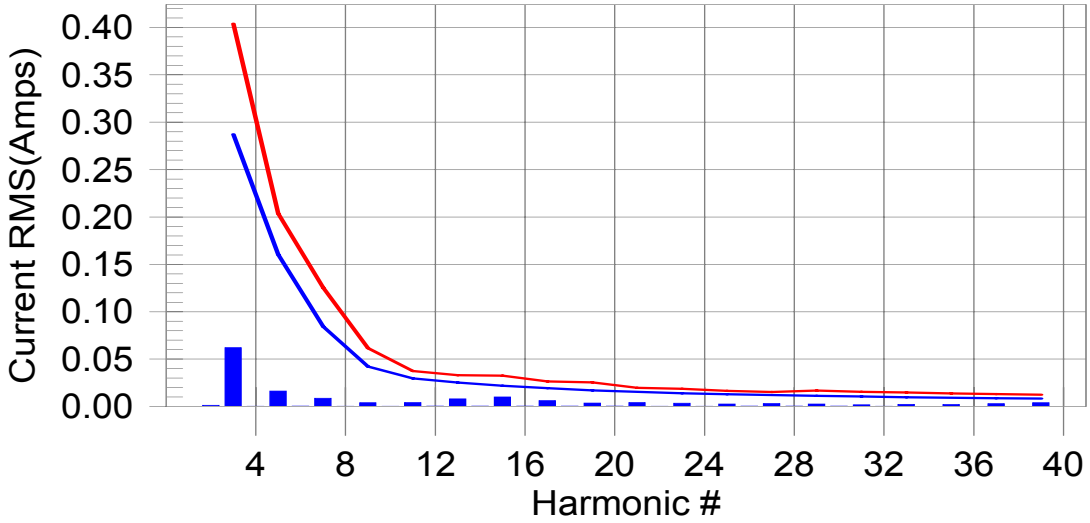
4.3.7 TEST RESULTS

Harmonics – Class-D per Ed. 2.1(Run time)			
EUT：	IPC	Model No. ：	POC-155
Temperature：	31 ℃	Relative Humidity：	68 %
Pressure：	1009hPa	Test Power ：	AC 230V/50Hz
Test Mode ：	FULL SYSTEM		

Current & voltage waveforms



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



Test result: Pass Worst harmonic was #39 with 32.18% of the limit.

Current Test Result Summary (Run time)			
EUT：	IPC	Model No. ：	POC-155
Temperature：	31 ℃	Relative Humidity：	68 %
Pressure：	1009hPa	Test Power ：	AC 230V/50Hz
Highest parameter values during test:			
V_RMS (Volts):	229.90	Frequency(Hz):	50.00
I_Peak (Amps):	0.748	I_RMS (Amps):	0.393
I_Fund (Amps):	0.386	Crest Factor:	2.027
Power (Watts):	84.5	Power Factor:	0.936
Test Mode:	FULL SYSTEM		

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001						
3	0.062	0.287	21.4	0.062	0.404	15.36	Pass
4	0.000						
5	0.015	0.160	9.3	0.016	0.204	0.00	Pass
6	0.000						
7	0.008	0.084	9.9	0.009	0.125	6.91	Pass
8	0.000						
9	0.004	0.042	9.0	0.004	0.062	6.57	Pass
10	0.000						
11	0.002	0.030	7.6	0.004	0.038	0.00	Pass
12	0.000						
13	0.007	0.025	26.4	0.008	0.033	0.00	Pass
14	0.000						
15	0.009	0.022	41.3	0.010	0.033	31.36	Pass
16	0.001						
17	0.005	0.019	27.9	0.006	0.026	23.03	Pass
18	0.000						
19	0.003	0.017	17.7	0.004	0.025	14.40	Pass
20	0.000						
21	0.001	0.015	9.4	0.004	0.020	0.00	Pass
22	0.000						
23	0.003	0.014	21.9	0.004	0.019	0.00	Pass
24	0.000						
25	0.002	0.013	13.8	0.003	0.017	0.00	Pass
26	0.000						
27	0.002	0.012	13.6	0.003	0.015	0.00	Pass
28	0.000						
29	0.002	0.011	20.2	0.003	0.017	16.45	Pass
30	0.000						
31	0.001	0.010	14.3	0.002	0.016	11.83	Pass
32	0.000						
33	0.002	0.010	18.1	0.002	0.015	15.39	Pass
34	0.000						
35	0.002	0.009	17.9	0.002	0.014	15.72	Pass
36	0.000						
37	0.003	0.009	29.2	0.003	0.013	22.82	Pass
38	0.000						
39	0.003	0.008	38.4	0.004	0.012	32.18	Pass
40	0.000						

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

Voltage Source Verification Data (Run time)			
EUT：	IPC	Model No. ：	POC-155
Temperature：	31 ℃	Relative Humidity：	68 %
Pressure：	1009hPa	Test Power ：	AC 230V/50Hz
Highest parameter values during test:			
V_RMS (Volts):	229.90	Frequency(Hz):	50.00
I_Peak (Amps):	0.748	I_RMS (Amps):	0.393
I_Fund (Amps):	0.386	Crest Factor:	2.027
Power (Watts):	84.5	Power Factor:	0.936
Test Mode:	FULL SYSTEM		

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.079	0.460	17.26	OK
3	0.531	2.069	25.65	OK
4	0.054	0.460	11.75	OK
5	0.066	0.920	7.21	OK
6	0.055	0.460	12.07	OK
7	0.012	0.690	1.76	OK
8	0.016	0.460	3.52	OK
9	0.018	0.460	3.93	OK
10	0.018	0.460	4.01	OK
11	0.013	0.230	5.80	OK
12	0.023	0.230	9.88	OK
13	0.017	0.230	7.50	OK
14	0.015	0.230	6.52	OK
15	0.015	0.230	6.32	OK
16	0.023	0.230	9.97	OK
17	0.016	0.230	6.75	OK
18	0.028	0.230	12.07	OK
19	0.016	0.230	7.02	OK
20	0.023	0.230	10.19	OK
21	0.012	0.230	5.19	OK
22	0.016	0.230	6.77	OK
23	0.011	0.230	4.97	OK
24	0.011	0.230	4.63	OK
25	0.011	0.230	4.60	OK
26	0.009	0.230	3.83	OK
27	0.010	0.230	4.40	OK
28	0.010	0.230	4.34	OK
29	0.014	0.230	6.12	OK
30	0.011	0.230	4.59	OK
31	0.010	0.230	4.35	OK
32	0.010	0.230	4.34	OK
33	0.007	0.230	3.11	OK
34	0.009	0.230	3.82	OK
35	0.008	0.230	3.55	OK
36	0.009	0.230	4.01	OK
37	0.008	0.230	3.57	OK
38	0.008	0.230	3.63	OK
39	0.005	0.230	2.18	OK
40	0.010	0.230	4.40	OK

4.4 VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT

4.4.1 LIMITS OF VOLTAGE FLUCTUATION AND FLICKSMEASUREMENT

Tests	Limits		Descriptions
	IEC555-3	IEC/EN 61000-3-2	
Pst	≤ 1.0, Tp= 10 min.	≤ 1.0, Tp= 10 min.	Short Term Flicker Indicator
Plt	N/A	≤ 0.65, Tp=2 hr.	Long Term Flicker Indicator
dc	≤ 3 %	≤ 3.3 %	Relative Steady-State V-Chang
dmax	≤ 4 %	≤ 4 %	Maximum Relative V-change
d (t)	N/A	≤ 3.3% for > 500 ms	Relative V-change characteristic

4.4.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Harmonic & Flicker	California	PACS-1	72345	Feb. 16, 2007
2	Power Source	California	3001iX	56310	Feb. 16, 2007

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

4.4.3 TEST PROCEDURE

a. Harmonic Current Test:
Test was performed according to the procedures specified in Clause 5.0 of IEC555-2 and/or Sub-clause 6.2 of IEC/EN 61000-3-2 depend on which standard adopted for compliance measurement.

b. Fluctuation and Flickers Test:
Tests was performed according to the Test Conditions/Assessment of Voltage Fluctuations specified in Clause 5.0/6.0 of IEC555-3 and/or Clause 6.0/4.0 of IEC/EN 61000-3-3 depend on which standard adopted for compliance measurement.

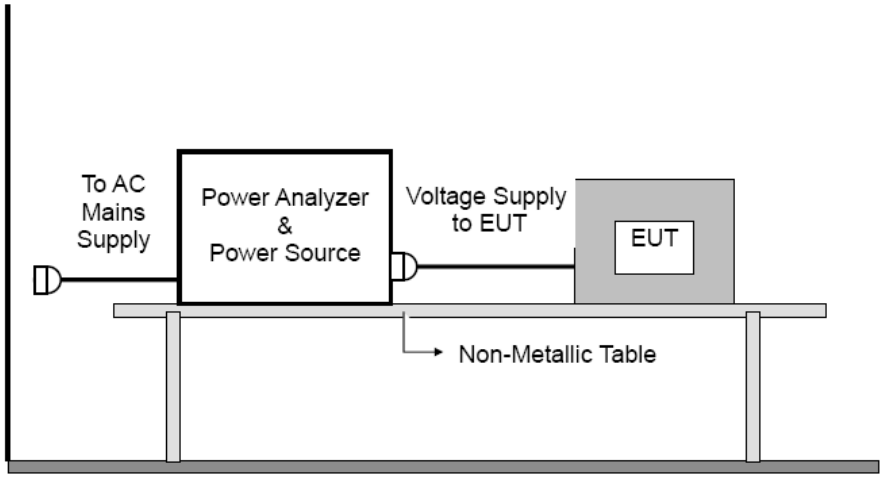
c. All types of harmonic current and/or voltage fluctuation in this report are assessed by direct measurement using flicker-meter.

d. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TESTSETUP



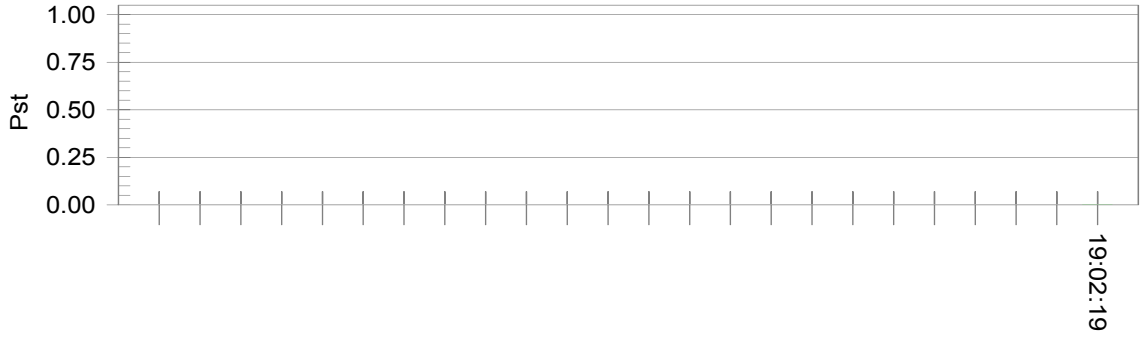
4.4.6 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **4.1.6** Unless otherwise a special operating condition is specified in the follows during the testing.

4.4.7 TEST RESULTS

EUT：	IPC	Model No. ：	POC-155
Temperature：	31 ℃	Relative Humidity：	68 %
Pressure：	1009hPa	Test Power ：	AC 230V/50Hz
Test Mode ：	FULL SYSTEM		

Pst_i and limit line **European Limits**



Time is too short for Plt plot

Parameter values recorded during the test:

Vrms at the end of test (Volt): 229.78				
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):	0.001	Test limit:	1.000	PASS
Highest Plt (2 hr. period):	0.001	Test limit:	0.650	PASS

5. EMC IMMUNITY TEST

5.1 STANDARD COMPLIANCE/SERVRITY LEVEL/CRITERIA

Tests Standard No.	TEST SPECIFICATION Level	Test Mode Test Ports	Perform. Criteria	Remark
1. ESD IEC/EN 61000-4-2	8KV air discharge 6KV contact discharge	Direct Mode	Note (1)	
	6KV HCP discharge 6KV VCP discharge	Indirect Mode		
2. RS IEC/EN 61000-4-3	80 MHz to 2500 MHz 3V/m(rms), 1 KHz, 80%, AM modulated	Enclosure		
3. EFT/Burst IEC/EN 61000-4-4	2.0KV(peak) 5/50ns Tr/Th 5KHz Repetition Freq.	Power Supply Port		
	1.0 KV(peak) 5/50ns Tr/Th 5KHz Repetition Freq.	CTL/Signal Data Line Port		
4. Surges IEC/EN 61000-4-5	1 KV(5P/5N) 1.2/50(8/20) Tr/Th us	L-N		
	2 KV(5P/5N) 1.2/50(8/20) Tr/Th us	L-PE N-PE		
5 Injected Current IEC/EN 61000-4-6	0.15 MHz to 80 MHz 3V(rms), 1KHz 80%, AM Modulated 150Ω source impedance	CTL/Signal Port		
	0.15 MHz to 80 MHz 3V(rms), 1KHz 80%, AM Modulated 150Ω source impedance	AC Power Port		
	0.15 MHz to 80 MHz 3V(rms), 1KHz 80%, AM Modulated 150Ω source impedance	DC Power Port		N/A
6. Power Frequency Magnetic Field IEC/EN 61000-4-8	50 / 60 Hz, 3A/m	Enclosure		
7. Volt. Interruptions Volt. Dips IEC/EN 61000-4-11	Voltage dip＞95% Voltage dip 60% Voltage dip 30% Interruption＞95%	＜5% 40% 70% ＜5%		

* Remark:

N/A : denotes test is not applicable in this Test Report

(1) : The performance criteria for EN60601-1-2 are listed in the item 36.202.1 j).

5.2 GENERAL PERFORMANCE CRITERIA

According to **EN 60601-1-2** standard, the general performance criteria as following:

item	Compliance criteria
36.202.1 j)	Under the test conditions specified in 36.202, the EQUIPMENT or SYSTIMES shall be able to provide the ESSENTIAL PERFORMANCE and remain safe. The following DEGRADATIONS associated with ESSENTIAL PERFORMANCE and safety shall not be allowed： -component failures -changes in programmable parameters -reset to factor defaults(manufacturer's presets) -change of operating mode -false alarms -cessation or interruption of any intended operation, even if accompanied by an alarm -initiation of any unintended operation, including unintended or uncontrolled motion, even if accompanied by an alarm -error of a displayed numerical value sufficiently large to affect diagnosis or treatment -noise on a waveform in which the noise is indistinguishable from physiologically produced signals or the noise interferes with interpretation of physiologically-produced signals -artifact or distortion in an image in which the artifact is indistinguishable from physiologically-produced signals or the distortion interferes with interpretation of physiologically-produced signals， -failure of automatic diagnosis or treatment EPUIPMDENT and SYSTEMS to diagnose or treat, even if accompanied by an alarm For EQUIPMENT and SYSTEMS with multiple FUNCTIONS, the criteria apply to each FUNCTION, parameter and channel. The EQUIPMENT and SYSTEMS may exhibit DEGRADATION of performance (e.g. deviation from manufacturer's specifications) that does not affect ESSENTICAL PERFORMANCE or safety.

5.3 TEST SETUP

The EUT tested system was configured as the statements of **4.1.6** Unless otherwise a special operating condition is specified in the follows during the testing.

5.4 ESD TESTING

5.4.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Required Performance	Compliance is checked by the following tests and determined during and after the tests in accordance with 36.202.1 j).
Discharge Voltage:	Air Discharge：2kV/4kV/8kV (Direct) Contact Discharge：2kV/4kV/6kV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Air Discharge: min. 20 times at each test point Contact Discharge: min. 200 times in total
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

5.4.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	ESD Simulator	Thermo	MZ-15/EC	0502184	Nov. 27, 2006

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

5.4.3 TEST PROCEDURE

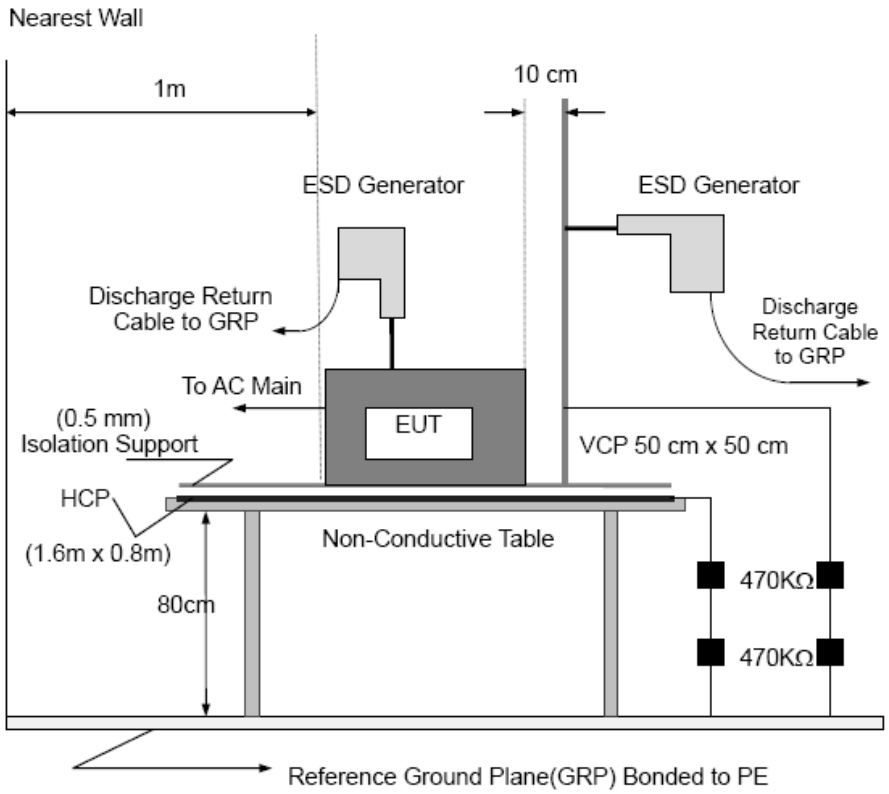
The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

a. Contact discharge was applied to conductive surfaces and coupling planes of the EUT.
   During the test, it was performed with single discharges. For the single discharge time between successive single discharges was at least 1 second. 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.
   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.
   Horizontal Coupling Plane (HCP):
   The coupling plane is placed under to the EUT. The generator shall be positioned vertically at a distance of 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.
b. Air discharges at insulation surfaces of the EUT.
   It was at least ten single discharges with positive and negative at the same selected point.
c. For the actual test configuration, please refer to the related Item –EUT Test Photos.

5.4.4 DEVIATION FROM TEST STANDARD

No deviation

5.4.5 TEST SETUP



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 940k total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC /EN 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of1-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/EN 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

5.4.6 TEST RESULTS

EUT：	IPC	Model No. ：	POC-155
Temperature：	24 ℃	Relative Humidity：	57 %
Pressure：	1002.7 hPa	Test Power ：	AC 230V/50Hz
Test Mode ：	FULL SYSTEM		

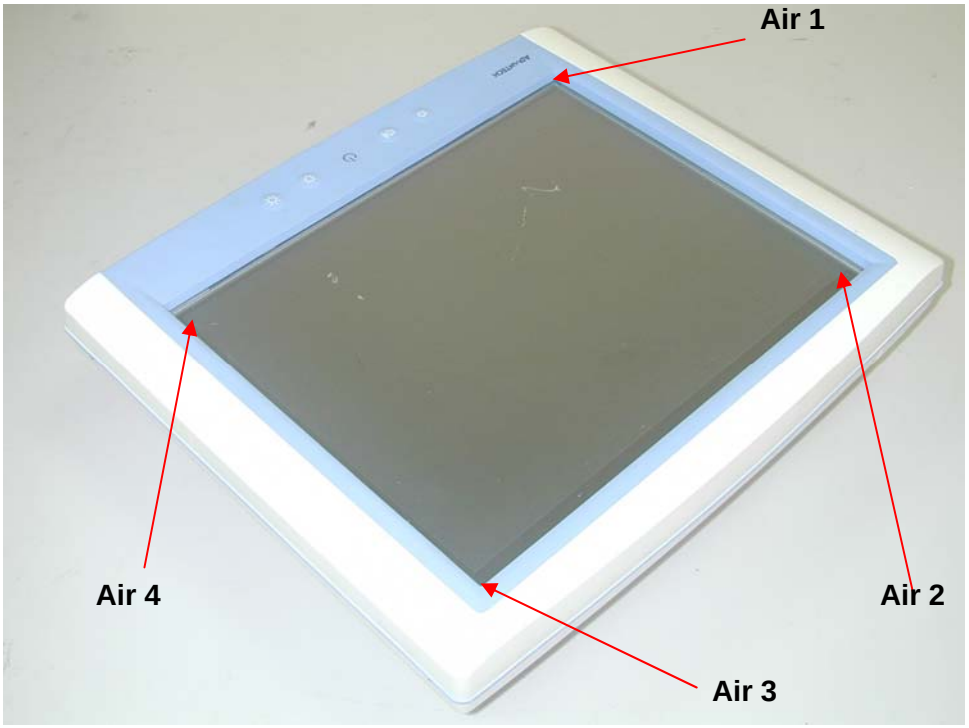
Mode	Air Discharge								Contact Discharge							
	2KV		4KV		8KV		12KV		2KV		4KV		6KV		8KV	
Location	P	N	P	N	P	N	P	N	P	N	P	N	P	N	P	N
1	A	A	A	A	A	A			A	A	A	A	A	A		
2	A	A	A	A	A	A			A	A	A	A	A	A		
3	A	A	A	A	A	A			A	A	A	A	A	A		
4	A	A	A	A	A	A			A	A	A	A	A	A		
5	A	A	A	A	A	A			A	A	A	A	A	A		
6	A	A	A	A	A	A			A	A	A	A	A	A		
7	A	A	A	A	A	A										
8	A	A	A	A	A	A										
9	A	A	A	A	A	A										
10	A	A	A	A	A	A										
Result	**A**								**A**							
Judgment	**PASS**								**PASS**							

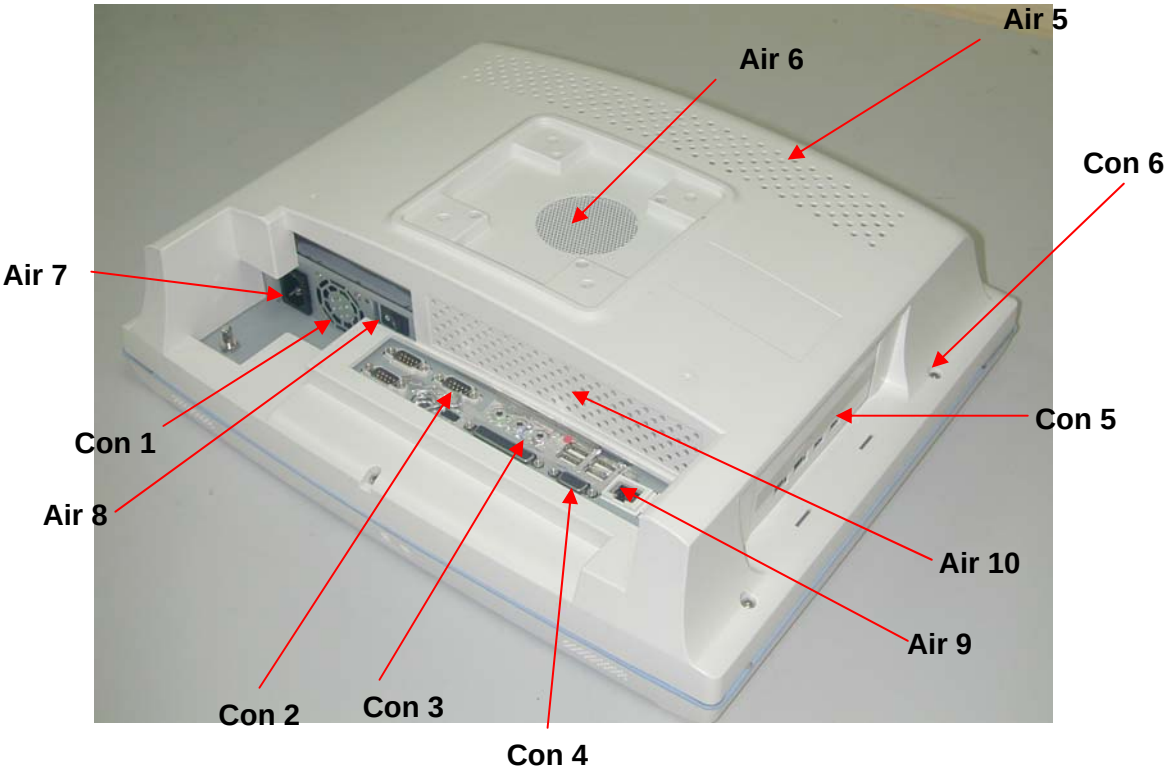
Mode	HCP Discharge								VCP Discharge							
	2KV		4KV		6KV		8KV		2KV		4KV		6KV		8KV	
Location	P	N	P	N	P	N	P	N	P	N	P	N	P	N	P	N
1	A	A	A	A	A	A			A	A	A	A	A	A		
2	A	A	A	A	A	A			A	A	A	A	A	A		
3	A	A	A	A	A	A			A	A	A	A	A	A		
4	A	A	A	A	A	A			A	A	A	A	A	A		
Result	**A**								**A**							
Judgment	**PASS**								**PASS**							

Note:

1) P/N denotes the Positive/Negative polarity of the output voltage.
2) Test condition:
   Direct / Indirect (HCP/VCP) discharges: Minimum 50 times (Positive/Negative) at each point. Air discharges: Minimum 10 times (Positive/Negative) at each point.
3) Test location(s) in which discharge (Air and contact discharge) to be applied illustrated by photos shown in next page(s)
4) The Indirect (HCP/VCP) discharges description of test point as following:
   1.left side 2.right side 3.front side 4.rear side
5) N/A - denotes test is not applicable in this test report
6) “A”: There was no change compared with initial operating during the test.
7) ”B”: The error messages will appear on the LCD Panel while test is performing, it can automatic self-recover after finishing the test and meet the EN60601-1-2 are listed in the item 36.202.1 j) requirement.

5.4.7 PHOTO(S) SHOWN THE LOCATION(S) OF ESD EVALUATED





5.5 RS TESTING

5.5.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-3
Required Performance	Compliance is checked by the following tests and determined during and after the tests in accordance with 36.202.1 j).
Frequency Range:	80 MHz - 1000 MHz 1GHz – 2.5GHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5 m
Dwell Time:	at least 3 seconds

5.5.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Signal Generator	R&S	SMT 06	832080/007	Aug. 03, 2006
2	Power Amplifier(RS)	M2S	AC8113-800/250A	9904-113	Apr. 09, 2008
3	Antenna(500W)	MESS-ELEKTRONIK	VULB9161	4022	Aug. 16, 2006

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

5.5.3 TEST PROCEDURE

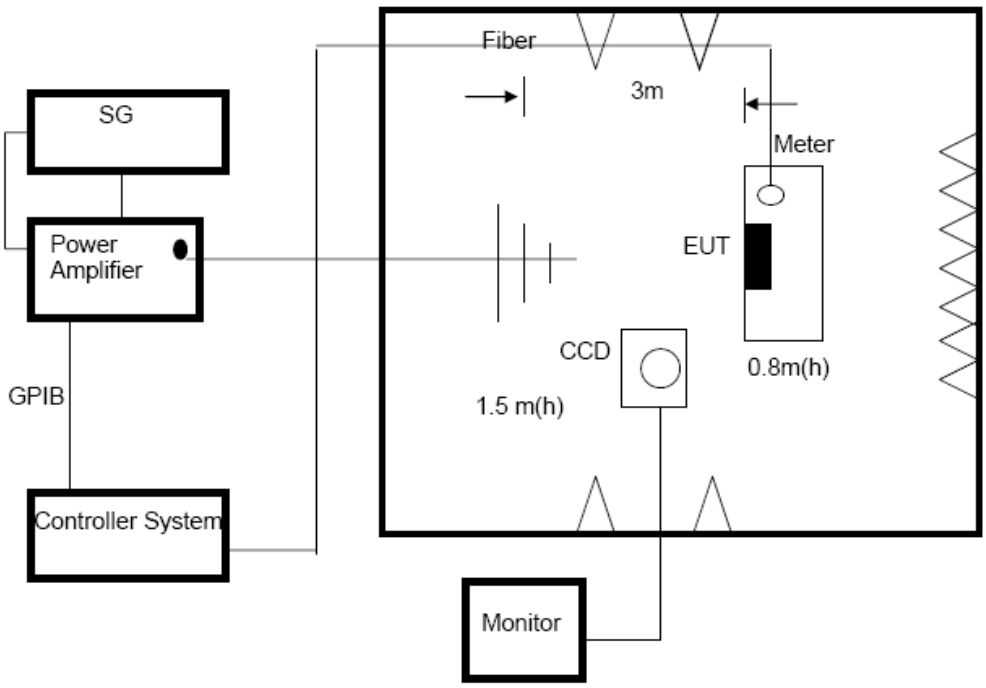
The EUT and support equipment, which are placed on a table that is 0.8 meter above ground and the testing was performed in a fully-anechoic chamber.
The testing distance from antenna to the EUT was 3 meters.
The other condition as following manner:

a. The field strength level was 3V/m.
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 1.5x 10-3 decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
c. Sweep Frequency 900 MHz, with the Duty Cycle:1/8 and Modulation: Pulse 217 Hz(if applicable)
d. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
e. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

5.5.4 DEVIATION FROM TEST STANDARD

No deviation

5.5.5 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 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/EN 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.

5.5.6 TEST RESULTS

EUT：	IPC	Model No. ：	POC-155
Temperature：	26 ℃	Relative Humidity：	55 %
Pressure：	1002.7 hPa	Test Power ：	AC 230V/50Hz
Test Mode ：	FULL SYSTEM		

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Results	Judgment
80MHz - 1000MHz	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	0	**A**	**PASS**
			90		
			180		
			270		
1GHz – 2.5GHz	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	0	**A**	**PASS**
			90		
			180		
			270		

Note:

1) P/N denotes the Positive/Negative polarity of the output voltage.
2) N/A - denotes test is not applicable in this test report.
3) “A”: There was no change compared with initial operating during the test.

5.6 EFT/BURST TESTING

5.6.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-4
Required Performance	Compliance is checked by the following tests and determined during and after the tests in accordance with 36.202.1 j).
Test Voltage:	Power Line：2 kV Signal/Control Line：1 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.

5.6.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMC Immunity Test System	Thermo	EMCPRO PLUS	0502176	Dec. 01, 2006
2	Capacitive Clamp	Thermo	CCL	0502218	N/A

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

5.6.3 TEST PROCEDURE

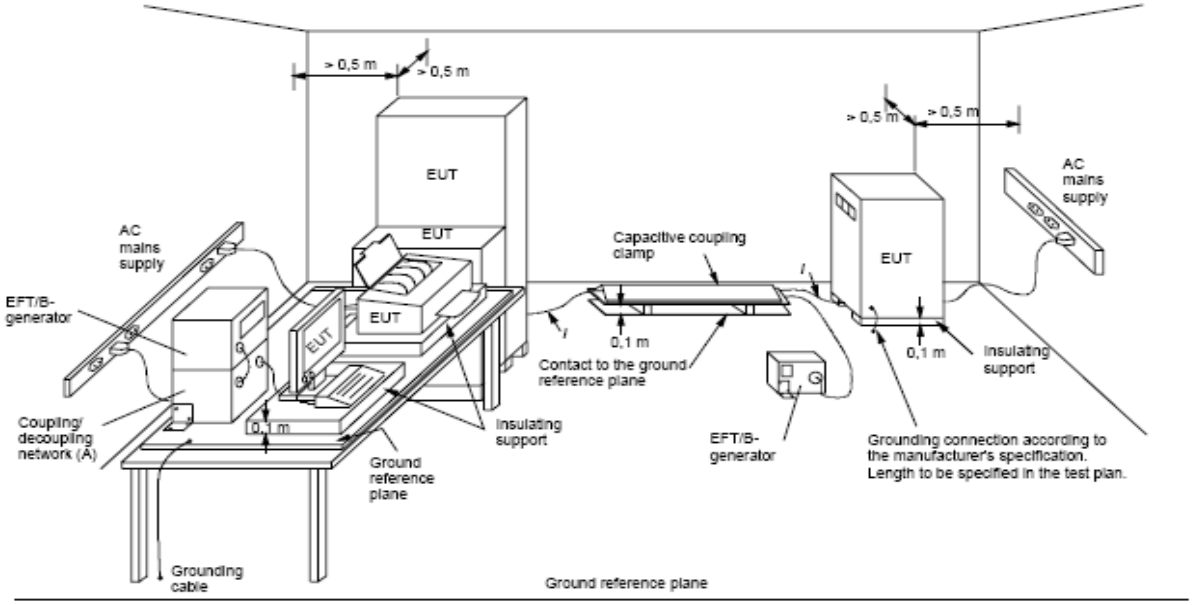
The EUT shall be placed on a ground reference plane and shall be insulated from it by an insulating support 0,1 m ± 0,01 m thick.
The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1m*1m min. and 0.65mm thick min.
The other condition as following manner:

a. The length of power cord between the coupling device and the EUT should not exceed 1 meter.
b. Both positive and negative polarity discharges were applied.
c. The duration time of each test sequential was 1 minute
d. For the actual test configuration, please refer to the related Item –EUT Test Photos.

5.6.4 DEVIATION FROM TEST STANDARD

No deviation

5.6.5 TEST SETUP



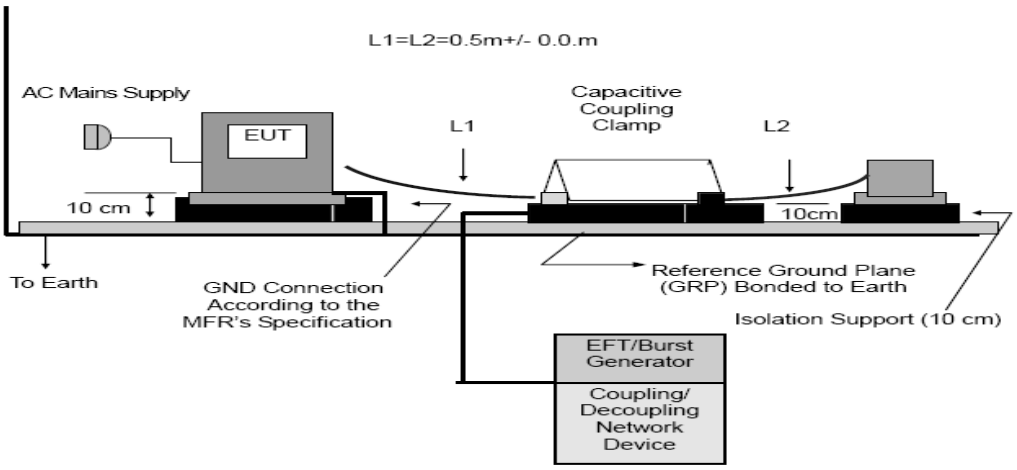
IEC 901/04

Key

l length between clamp and the EUT to be tested (should be 0,5 m ± 0,05 m)

(A) location for supply line coupling

(B) location for signal lines coupling



Note:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table with a ground reference plane and (0.8m high) standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system. A minimum distance of 0.5m was provided between the EUT and the walls of the laboratory or any other metallic structure.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-4 and its cables, were isolated from the Ground Reference Plane by an insulating support that is 0.1-meter thick. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system.

5.6.6 TEST RESULTS

EUT：	IPC	Model No. ：	POC-155
Temperature：	26 ℃	Relative Humidity：	55 %
Pressure：	1002.7 hPa	Test Power ：	AC 230V/50Hz
Test Mode ：	FULL SYSTEM		

Mode	(**X**) AC Power Line		( ) DC Power Line		(**X**) Signal/Control Line	
Test Level	2 KV		1 KV		1 KV	
Port(s)	Polarity	Results	Polarity	Results	Polarity	Results
Line (L)	P	B	P		P	
	N	B	N		N	
Neutral (N)	P	B	P		P	
	N	B	N		N	
Ground (PE)	P	B	P		P	
	N	B	N		N	
Signal/Control Line	P		P		P	B
	N		N		N	B
Result	**B**		**N/A**		**B**	
Judgment	**PASS**		**N/A**		**PASS**	

Note:

1) P/N denotes the Positive/Negative polarity of the output voltage.

2) N/A - denotes test is not applicable in this test report

3) “A”: There was no change compared with initial operating during the test.

4) ”B”: The error messages will appear on the LCD Panel while test is performing, it can automatic self-recover after finishing the test and meet the EN60601-1-2 are listed in the item 36.202.1 j) requirement.

5.7 SURGE TESTING

5.7.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-5
Required Performance	Compliance is checked by the following tests and determined during and after the tests in accordance with 36.202.1 j).
Wave-Shape:	Combination Wave 1.2/50 us Open Circuit Voltage 8 /20 us Short Circuit Current
Test Voltage:	Power Line：0.5 kV, 1 kV, 2 kV
Surge Input/Output:	L1-L2, L1-PE, L2-PE
Generator Source:	2 ohm between networks
Impedance:	12 ohm between network and ground
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

5.7.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMC Immunity Test System	Thermo	EMCPRO PLUS	0502176	Dec. 01, 2006

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

5.7.3 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 2meters in length (or shorter).

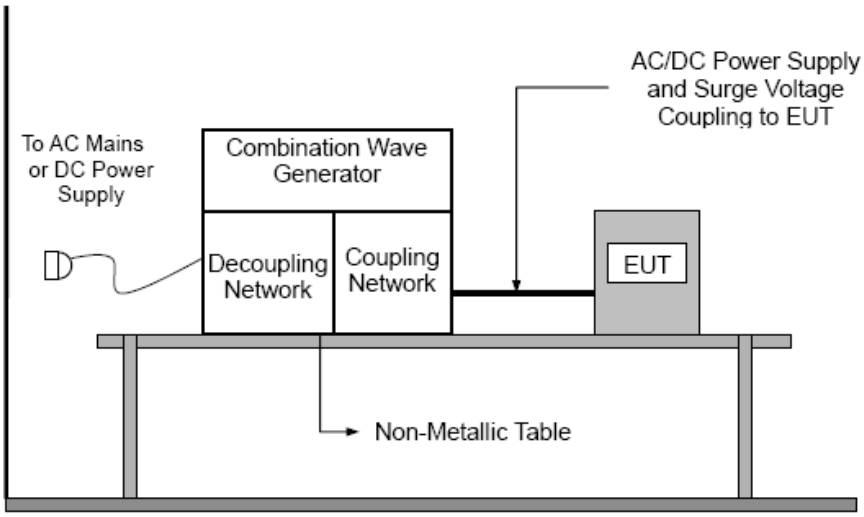
b. For test applied to unshielded unsymmetrically operated interconnection lines of EUT:
The surge is applied to the lines via the capacitive coupling. The coupling /decoupling networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the 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).

d. For the actual test configuration, please refer to the related Item –EUT Test Photos.

5.7.4 DEVIATION FROM TEST STANDARD
No deviation

5.7.5 TEST SETUP



5.7.6 TEST RESULTS

EUT：	IPC	Model No. ：	POC-155
Temperature：	26 ℃	Relative Humidity：	55 %
Pressure：	1002.7 hPa	Test Power ：	AC 230V/50Hz
Test Mode ：	FULL SYSTEM		

Wave Form EUT Ports Tested	1.2/50(8/20)Ti/Th us						Judgment
	Polarity	Phase	Voltage				
			0.5kV	1kV	1.5kV	2kV	
L - N	+/-	0°	A	A			**PASS**
	+/-	90°	A	A			
	+/-	180°	A	A			
	+/-	270°	A	A			
L - PE	+/-	0°	A	A	A	A	**PASS**
	+/-	90°	A	A	A	A	
	+/-	180°	A	A	A	A	
	+/-	270°	A	A	A	A	
N - PE	+/-	0°	A	A	A	A	**PASS**
	+/-	90°	A	A	A	A	
	+/-	180°	A	A	A	A	
	+/-	270°	A	A	A	A	
Signal Line	+/-	0°					**N/A**
	+/-	90°					
	+/-	180°					
	+/-	270°					

Note:

1) Polarity and Numbers of Impulses：5 Pst / Ngt at each tested mode
2) N/A - denotes test is not applicable in this Test Report
3) “A”: There was no change compared with initial operating during the test.
4) ”B”: The error messages will appear on the LCD Panel while test is performing, it can automatic self-recover after finishing the test and meet the EN60601-1-2 are listed in the item 36.202.1 j) requirement.

5.8 INJECTION CURRENT TESTING

5.8.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-6
Required Performance	Compliance is checked by the following tests and determined during and after the tests in accordance with 36.202.1 j).
Frequency Range:	0.15 MHz - 80 MHz
Voltage Level:	3 Vr.m.s.
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Dwell Time:	at least 3 seconds

5.8.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Signal Generator	IFR	2023A	202301/368	Apr. 02, 2008
2	Power Amplifier(CS)	M2S	A0122-250	9902-111	Apr. 09, 2008
3	CDN	MEB	M3	13389	Jun. 06, 2007
4	EM Clamp	MEB	KEMZ 801	14291	Jul. 07, 2007

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

5.8.3 TEST PROCEDURE

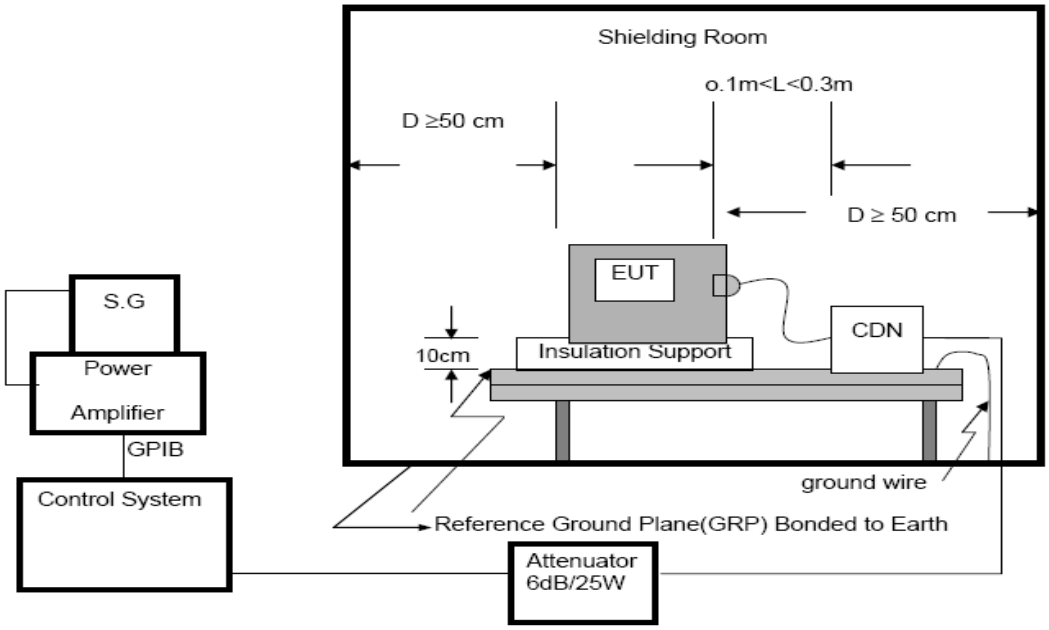
The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1m*1m min. and 0.65mm thick min.
The other condition as following manner:

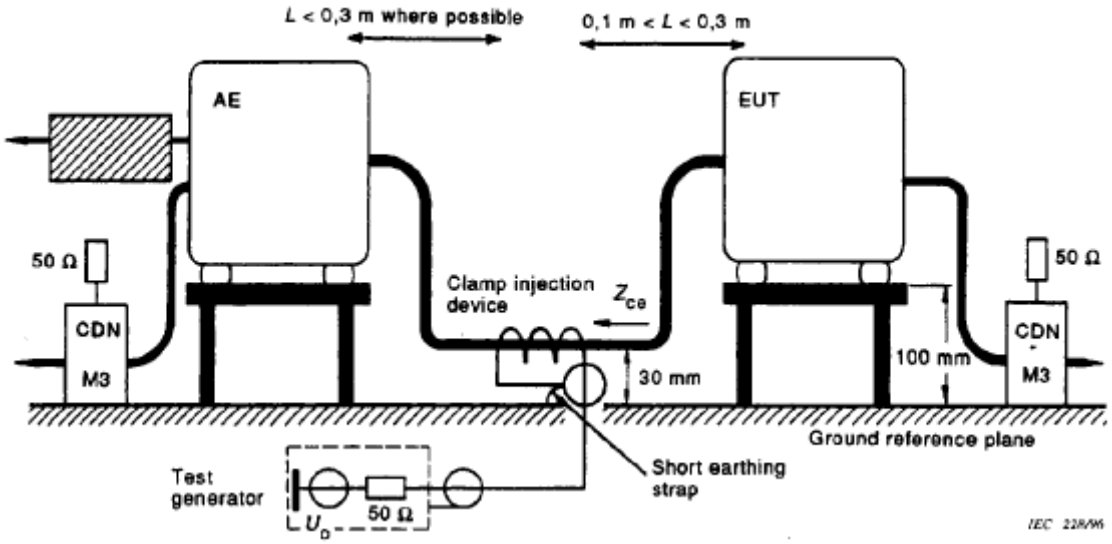
a. The voltage level was 3 Vr.m.s..
b. The frequency range is swept from 150 KHz to 80 MHz, with the signal 80%amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed 1.5x 10-3 decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
d. The disturbing signal shall be coupled to the supply lines, using type CDN-M3 (three wires). For all signal line, the EM-clamp will be used.
e. For Auxiliary equipment (AE) that is supplied by a class II adapter, they will put a M2 CDN terminated with 50 Ohm between the power adapter and the AE.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

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 –EUT Test Photos.

NOTE:

The equipment to be tested is placed on an insulating support of 0.1 meters height above a ground reference plane.

All relevant cables shall be provided with the appropriate coupling and decoupling devices at a distance between 0.1 meters to 0.3 meters from the EUT and the EUT shall be as short as possible and shall not be bundled nor wrapped. Their height above the ground reference plane shall be between 30 mm and 50 mm.

The CDN connected to the AE, e.g. CDN-M1 connected to the dedicated earth terminal or CDN-M3, shall be terminated with 50 Ohm at the input-port.

Unterminated CDNs are equivalent to decoupling networks.

5.8.6 TEST RESULTS

EUT：	IPC	Model No. ：	POC-155
Temperature：	26 ℃	Relative Humidity：	55 %
Pressure：	1002.7 hPa	Test Power ：	AC 230V/50Hz
Test Mode ：	FULL SYSTEM		

Test Ports (Mode)	Freq. Range MHz)	Voltage Level	Results	Judgment
Input/ Output AC. Power Port	0.15 ---80	3V(rms) AM Modulated 1000Hz, 80%	**A**	**PASS**
Input/ Output DC. Power Port	0.15 --- 80		**N/A**	**N/A**
All Signal Cables **Note(3)**	0.15 --- 80		**A**	**PASS**

Note:

1) N/A - denotes test is not applicable in this Test Report.
2) “A”: There was no change compared with initial operating during the test.
3) For Auxiliary equipment (AE) that is supplied by a class II adapter, they will put a M2 CDN terminated with 50 Ohm between the power adapter and the AE.
   For the EUT is provided with a keyboard or hand-held accessory, then the artificial hand shall be placed on this keyboard or wrapped around the accessory and connected to the ground reference plane.

5.9 POWER FREQUENCY MAGNETIC FIELD TESTING

5.9.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-8
Required Performance	Compliance is checked by the following tests and determined during and after the tests in accordance with 36.202.1 j).
Frequency Range:	50 / 60 Hz
Field Strength:	3 A/m
Observation Time:	1 minute
Inductance Coil:	Rectangular type, 1mx1m

5.9.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Magnetic Field Test Generator	FCC	F-100-4-8-G-125A	04029	Apr. 06, 2007

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

5.9.3 TEST PROCEDURE

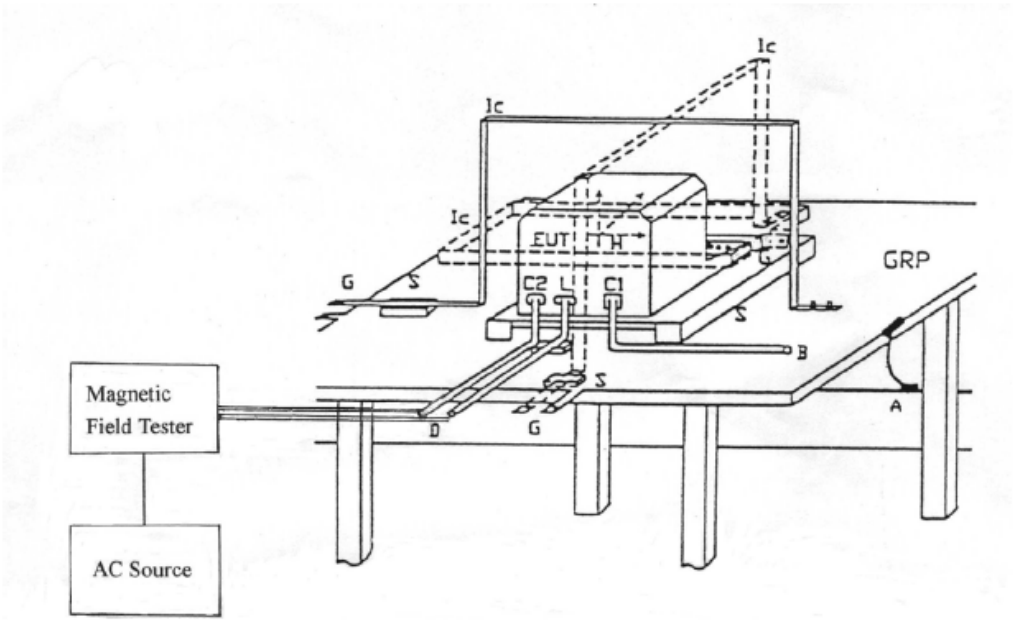
The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1m*1m min. and 0.65mm thick min.
The other condition as following manner:

a. The equipment cabinets shall be connected to the safety earth directly on the GRP via the earth terminal of the EUT.
b. 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.
c. For the actual test configuration, please refer to the related Item –EUT Test Photos.

5.9.4 DEVIATION FROM TEST STANDARD

No deviation

5.9.5 TEST SETUP



Note:

TABLE-TOP 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.

5.9.6 TEST RESULTS

EUT：	IPC	Model No. ：	POC-155
Temperature：	26 ℃	Relative Humidity：	55 %
Pressure：	1002.7 hPa	Test Power ：	AC 230V/50Hz
Test Mode ：	FULL SYSTEM		

Test Mode	Test Level	Antenna aspect	Duration (s)	Results	Judgment
Enclosure	3 A/m	X	60 s	**A**	**PASS**
Enclosure	3 A/m	Y	60 s	**A**	**PASS**
Enclosure	3 A/m	Z	60 s	**A**	**PASS**

Note:

1) N/A - denotes test is not applicable in this test report
2) “A”: There was no change compared with initial operating during the test.

5.10 VOLTAGE INTERRUPTION/DIPS TESTING

5.10.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-11
Required Performance	Compliance is checked by the following tests and determined during and after the tests in accordance with 36.202.1 j). EQUIPMENT or SYSTIMES are allowed a deviation from the requirement of 36.202.1 j at the IMMUNITY TEST LEVEL for voltage interruption.
Test Duration Time:	Minimum three test events in sequence
Interval between Event:	Minimum ten seconds
Phase Angle:	0°/45°/90°/135°/180°/225°/270°/315°/360°
Test Cycle:	3 times

5.10.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMC Immunity Test System	Thermo	EMCPRO PLUS	0502176	Dec. 01, 2006

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

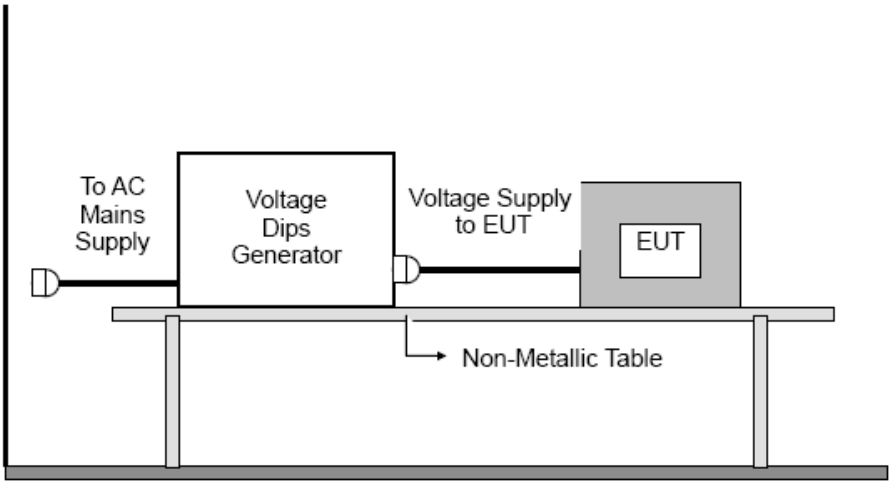
5.10.3 TEST PROCEDURE

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.

5.10.4 DEVIATION FROM TEST STANDARD

No deviation

5.10.5 TEST SETUP



For the actual test configuration, please refer to the related Item –EUT Test Photos.

5.10.6 TEST RESULTS

EUT：	IPC	Model No. ：	POC-155
Temperature：	26 ℃	Relative Humidity：	55 %
Pressure：	1002.7 hPa	Test Power ：	AC 230V/50Hz
Test Mode ：	FULL SYSTEM		

Voltage Reduction	Duration	Results	Judgment
Voltage dip ＞95%	0.5 cycles	**A**	**PASS**
Voltage dip 60%	5 cycles	**B**	**PASS**
Voltage dip 30%	25 cycles	**B**	**PASS**
Interruption＞95%	5 seconds	**C**	**PASS**

Note:

1). N/A - denotes test is not applicable in this test report.

2) “A”: There was no change compared with initial operating during the test.

3) ”B”: The error messages will appear on the LCD Panel while test is performing, it can automatic self-recover after finishing the test and meet the EN60601-1-2 are listed in the item 36.202.1 j) requirement.

4) “C”: The EUT shuts down while test is performing, it can be restarted and still keep it that the factor defaults (manufacturer’s presets) manually after finishing the test.

6. EUT TEST PHOTO

Conducted Measurement Photos

Radiated Measurement Photos

Harmonic & Flicker Measurement Photos

EMS Measurement Photos
ESD

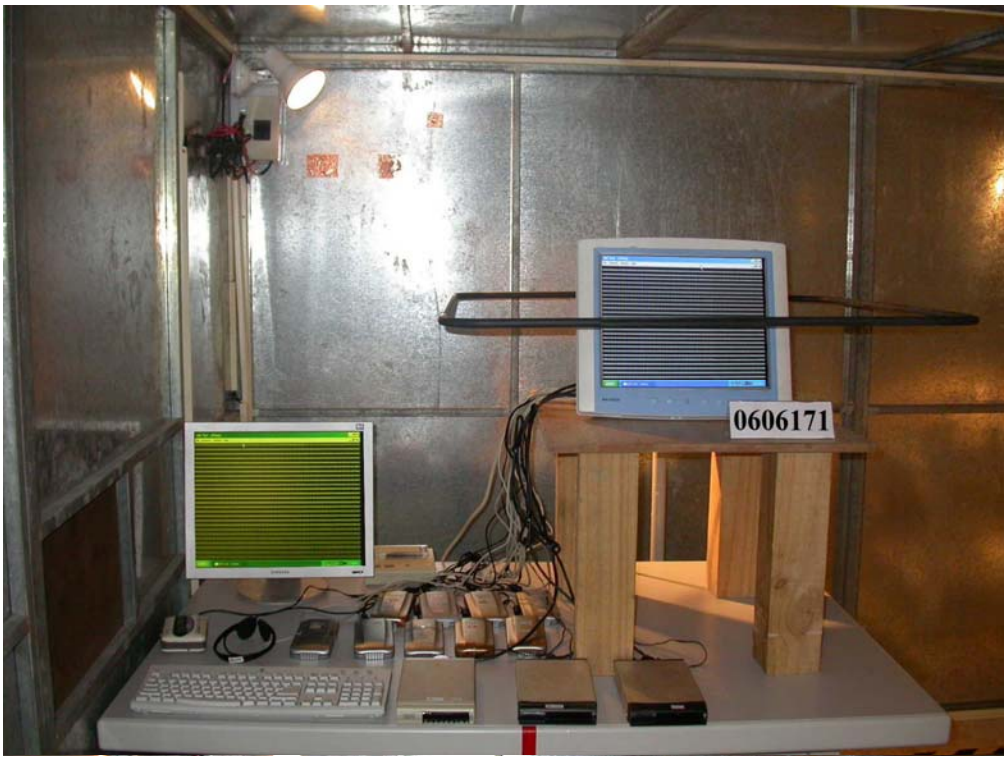
RS

EFT

Surge

CS

PMF



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