

VERIFICATION

of conformity with European EMC Directive

No. E920093-2

<i>Document holder:</i>	SEA SONIC ELECTRONICS CO., LTD.
<i>Type of equipment:</i>	Switching Power Supply
<i>Type designation:</i>	SS-250AGX Active PFC yz, SS-250SGX Active PFC yz, SS-300AGX Active PFC yz, SS-300SGX Active PFC yz, SS-300FB Active PFC yz, SS-350AGX Active PFC yz, SS-350SGX Active PFC yz, SS-350UMD Active PFC Fz, SS-400AGX Active PFC Fz, SS-400SGX Active PFC Fz, SS-460AGX Active PFC Fz, SS-460SGX Active PFC Fz SS-350FB Active PFC yz, SS-400FB Active PFC Fz, SS-300FT Active PFC yz, SS-350FT Active PFC yz, SS-400FT Active PFC Fz

A sample of the equipment has been tested for CE-marking according to the EMC Directive, 89/336/EEC. & 92/31/EEC & 93/68/EEC *Standard(s) used for showing compliance with the essential requirements of the directive:*

EMC Standard(s):

EN 61000-6-3: 2001 / EN 55022: 1998+A1: 2000
EN 61000-3-2: 2000
EN 61000-3-3:1995

Class B

Performance Criterion

EN 61000-6-2: 2001 / EN 55024: 1998+A1: 2001
EN 61000-4-2: 1995+A1: 1998
EN 61000-4-3: 1996+A1: 1998
EN 61000-4-4: 1995
EN 61000-4-5: 1995
EN 61000-4-6: 1996
EN 61000-4-8: 1993
EN 61000-4-11: 1994

B
A
B
B
A
A
B

The referred test report(s) show that the product fulfills the requirements in the EMC Directive for CE marking. On this basis, together with the manufacturer's own documented production control, the manufacturer (or his European authorized representative) can in his EC Declaration of Conformity verify compliance with the EMC Directive.



Signed for and on behalf of
PEP Testing Laboratory

M. Y. Tsui

Date: SEP. 18, 2003

M. Y. Tsui / President

Declaration of Conformity

The following

Applicant : **SEA SONIC ELECTRONICS CO., LTD.**

Equipment : **Switching Power Supply**

Model No. : **SS-250AGX Active PFC yz, SS-250SGX Active PFC yz, SS-300AGX Active PFC yz, SS-300SGX Active PFC yz, SS-300FB Active PFC yz, SS-350AGX Active PFC yz, SS-350SGX Active PFC yz, SS-350UMD Active PFC Fz, SS-400AGX Active PFC Fz, SS-400SGX Active PFC Fz, SS-460AGX Active PFC Fz, SS-460SGX Active PFC Fz, SS-350FB Active PFC yz, SS-400FB Active PFC Fz, SS-300FT Active PFC yz, SS-350FT Active PFC yz, SS-400FT Active PFC Fz**

Report No. : **E920093-2**

is herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility(89/336/EEC) and the amendments in the Council Directive 92/31/EEC, 93/68/EEC.

For the evaluation of above mentioned Directives, the following standards were applied:

- 1) EN 61000-6-3: 2001 / EN 55022: 1998+A1 : 2000 Class B
- 2) EN 61000-3-2 : 2000
- 3) EN 61000-3-3 : 1995
- 4) EN 61000-6-2: 2001 / EN 55024 : 1998+A1 : 2001
EN 61000-4-2 : 1995+A1: 1998
EN 61000-4-3 : 1996+A1: 1998
EN 61000-4-4 : 1995
EN 61000-4-5 : 1995
EN 61000-4-6 : 1996
EN 61000-4-8 : 1993
EN 61000-4-11 : 1994

The following manufacturer is responsible for this declaration:

DONG GUAN SEA SONIC ELECTRONICS CO., LTD.
ZHENG KENG INDUSTRIAL PARK,
YU WU DISTRICT, FUCHENG DONGGUAN,
P. R. C.

China / SEP. 18, 2003

Place and Date

Signature of responsible Person

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1. General

1.1 General Information :

Applicant : SEA SONIC ELECTRONICS CO., LTD.

8F., #19 ALLEY 360, SEC. 1, NEIHU ROAD, NEIHU,
TAIPEI, TAIWAN, R. O. C.

Manufacturer : DONG GUAN SEA SONIC ELECTRONICS CO., LTD.

ZHENG KENG INDUSTRIAL PARK, YU WU DISTRICT,
FUCHENG DONGGUAN, P. R. C.

Measurement Procedure : EN55022

1.2 Place of Measurement

PEP TESTING LABORATORY

*12-3Fl, No. 27-1, Lane 169, Kang-Ning St., Hsi-Chih,
Taipei Hsien, Taiwan, R. O. C.
TEL : 8862-26922097 FAX : 8862-26956236*

NVLAP LAB CODE 200097-0
FCC Registration No. : 90868
NEMKO Aut. No. : ELA133
BSMI Aut. No. : SL2-IN-E-11
VCCI Registration No. : C-493/R-477

1.3 Test Standards

Tested for compliance with:

- EN 61000-6-3:2001** - Electromagnetic compatibility (EMC) Part 6-3: Generic standard – Emission standard for residential, commercial and light-industrial environments.
- EN 55022:1998** - Information Technology Equipment – Radio disturbance characteristics - Limits and methods of measurement
- +A1: 2000**
- EN 61000-3-2: 2000** - Electromagnetic compatibility (EMC) Part 3-2: Limits – Limits for harmonic current emissions (equipment input Current up to and including 16A per phase
- EN 61000-3-3:1995** - Electromagnetic compatibility (EMC) Part 3-2: Limits – Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current up to 16A
- EN 61000-6-2:2001** - Electromagnetic compatibility (EMC) Part 6-2: Generic standard – Immunity for industrial environments.
- EN 55024:1998** - Information technology equipment – Immunity characteristics
- +A1: 2001** Limits and methods of measurement
- EN 61000-6-2:2001** - Electromagnetic compatibility (EMC) Part 6-2: Generic standard – Immunity for industrial environments.
- EN 61000-4-2:1995** - Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques, Section 2: Electrostatic discharge immunity test Basic EMC Publication
- +A1: 1998**
- EN 61000-4-3:1996** - Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques, Section 3: Radiated, radio-Frequency, electromagnetic field immunity test
- +A1:1998**
- EN 61000-4-4:1995** - Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques, Section 4: Electrical fast transient / Burst immunity test Basic EMC publication
- EN 61000-4-5: 1995** - Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques, Section 5: Surge immunity test (includes corrigendum: 1995)
- EN 61000-4-6: 1996** - Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques, Section 6: Immunity to conducted disturbances, induced by radio-frequency fields
- EN 61000-4-8: 1993** - Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques, Section 8: Power frequency magnetic field immunity test Basic EMC publication
- EN 61000-4-11: 1994** - Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques, Section 11: Voltage dips, short interruptions and voltage variations immunity tests

2. Product Information

- a. EUT Name:** Switching Power Supply
- b. Model No. :** SS-300FB Active PFC yz, SS-300AGX Active PFC yz,
SS-350UMD Active PFC Fz, SS-460AGX Active PFC Fz
- c. CPU Type :** N/A
- d. Chipset Type:** N/A
- e. System Speed :** N/A
- f. Crystal/Oscillator(s) :** N/A
- g. Port/Connector(s) :** N/A
- h. Memory Expansion :** N/A
- i. Power Rating :** Power Supply -----
Model No. : SS-300FB Active PFC yz,
SS-300AGX Active PFC yz
Input : AC100V ~ 240V , 5A or AC200V ~ 240V , 2.5A
Output : DC+3.3V , +5V , +12V , +5Vsb , -12V
28A , 30A , 18A , 2A , 0.8A

Model No. : SS-350UMD Active PFC Fz
Input : AC100V ~ 240V , 6A or AC200V ~ 240V , 3A
Output : DC+3.3V , +5V , +12V , +5Vsb , -12V
28A , 30A , 19A , 2A , 0.8A

Model No. : SS-460AGX Active PFC Fz
Input : AC100V ~ 240V , 8A
Output : DC+3.3V , +5V , +12V , +5Vsb , -12V
28A , 30A , 25A , 2A , 0.8A
- j. Chassis Used :** Metal
- k. Condition of the EUT :** Prototype Sample Engineering Sample
Production Sample
- l. Test Item Receipt Date :** FEB. 20, 2003

2a. Product Technical Judgement

N/A

3. EUT Description

The equipment under test (EUT) is Switching Power Supply model SS-250AGX Active PFC yz, SS-250SGX Active PFC yz, SS-300AGX Active PFC yz, SS-300SGX Active PFC yz, SS-350AGX Active PFC yz, SS-350SGX Active PFC yz, SS-400AGX Active PFC Fz, SS-400SGX Active PFC Fz, SS-460AGX Active PFC Fz, SS-460SGX Active PFC Fz, SS-300FB Active PFC yz and SS-350UMD Active PFC Fz (where “y” can be “F” meaning input voltage AC 100~240V or “T” meaning input voltage AC 200~240V; “z” can be “0” meaning no I/O switch or “3” meaning I/O switch attached; the digit in model number: 250, 300, 350, 400 and 460 means output wattage). After verifying these models, we took the worst-case model: SS-300FB Active PFC yz, SS-300AGX Active PFC yz, SS-460AGX Active PFC Fz and SS-350UMD Active PFC Fz for test. The EUT is used to supply PC. For more detail information about EUT, please refer to user manual.

Test method: The EUT was configured into PC system. All corresponding peripherals to PC I/O ports and EUT were setup to proceed with test. Test engineer tried to obtain the worst-case test data by running EMITEST program during the test and it was recorded and provided in this report.

As pre-scan, we took radiated emission first. EUT configuration including peripheral devices placement and data cables coupling was compliant with EN 55022 requirement. Test engineer tried to find the worst data cables coupling in order to perform the final test that conducted emission and radiated emission would keep the same configuration under test.

Conducted emission test:

The system was setup with the EMI diagnostic software running. The power line conducted EMI tests were run on the line and neutral conductors of the power cord and the results were recorded. The effect of varying the position of the interface cables has been investigated to find the worst-case configuration that produces maximum emission.

At the frequencies where the peak values of the emission exceeded the quasi-peak limit, the emissions were also measured with the quasi-peak detectors. The average detector also measured the emission either (A) quasi-peak values were under quasi-peak limit but exceeded average limit, or (B) peak values were under quasi-peak limit but exceeded average limit.

Radiated emission test:

The maximum readings were found by varying the height of antenna and then rotating the turntable. Both polarization of antenna, horizontal and vertical, are measured. The effect of varying the position of the interface cables has been investigated to find the configuration that produces maximum emission.

The highest emissions were also analyzed in details by operating the spectrum analyzer in fixed tuned quasi-peak mode to determine the precise amplitude of the emissions. While doing so, the antenna height was varied between one and four meters, and the turntable was slowly rotated, to maximize the emission.

4. Modification(s):

N/A

5. Test Software Used

(A) EMITEST program was the software used to detect PC peripherals during the test.

5. Keyboard (KBS1 PS/2)

FCC ID : E5XKB5121WTH0110

Manufacturer : BTC

Model Number : 5121W

Power Supply : +5Vdc from PS2 of PC

Power Cord : N/A

Data Cable : 1 > Shielded , Non-detachable,1.6m

2 > Back Shell : Metal

6. Mouse (MOUS/1 PS/2)

FCC ID : DZL211106

Manufacturer : LOGITECH

Model Number : M-S43

Power Supply : +5Vdc from PS2 of PC

Power Cord : N/A

Data Cable : 1 > Shielded , Non-detachable,1.8m

2 > Back Shell : Metal

7. EN 55022 Conducted Disturbance Test

Test Standard	Model No.	Result
EN 55022	SS-300FB Active PFC yz, SS-300AGX Active PFC yz, SS-350UMD Active PFC Fz, SS-460AGX Active PFC Fz	Passed

7.1 Conducted Disturbance Test Limits at Main Ports

Frequency Rang	Limits dB(uV)			
	Class A ITE		Class B ITE	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.50	79	66	66-56	56-46
0.50 - 5.0	73	60	56	46
5.0 - 30	73	60	60	50

- Remarks: - If the average limit is met when a quasi-peak detector is used, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary.
- The lower limit shall apply at the transition frequency
 - The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50 MHz.

7.1 Conducted Disturbance Test Limits at Telecommunication Ports

Frequency Range	Voltage Limits dB(uV)			
	Class A ITE		Class B ITE	
MHz	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.50	97-87	84-74	84-74	74-64
0.50 - 5.0	87	74	74	64
5.0 - 30	87	74	74	64

Remarks: -If the reading at the measuring receiver shows fluctuations close to the limit, The reading shall be observed for at least 15 seconds at each measurement frequency, and the higher reading shall be recorded. Exception: Any brief, isolated high reading shall be ignored.

-If the average limit is met when a quasi-peak detector is used, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary.

-The lower limit shall apply at the transition frequency.

-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5 MHz.

7.2 Conducted Disturbance Test Setup Photo.

Model No. : SS-300FB Active PFC yz

< FRONT VIEW >



< REAR VIEW >

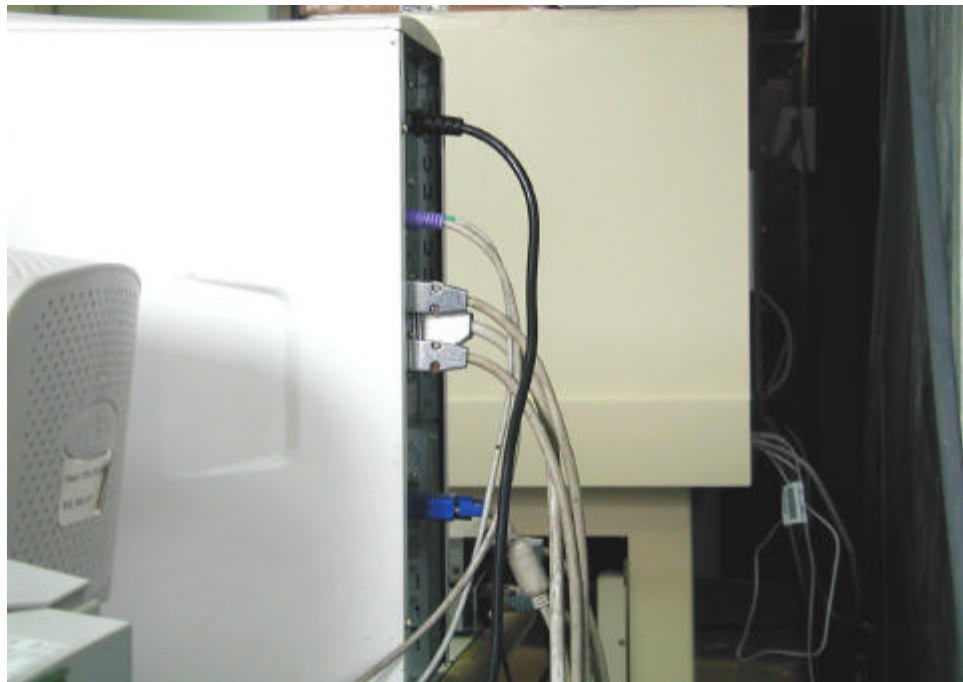


Model No. : SS-300AGX Active PFC yz

< FRONT VIEW >



< REAR VIEW >



Model No. : SS-350UMD Active PFC Fz

< FRONT VIEW >



< REAR VIEW >



Model No. : SS-460AGX Active PFC Fz

< FRONT VIEW >



< REAR VIEW >



7.3 Conducted Disturbance Test Data at Main Ports (LISN)

Model No. : SS-300FB Active PFC yz
Frequency range : 150KHz to 30MHz
Detector : Peak Value
Temperature : 18
Humidity : 57 %

Test Data : # 2123 # 1660 < LINE >
 # 2128 # 1665 < NEUTRAL >

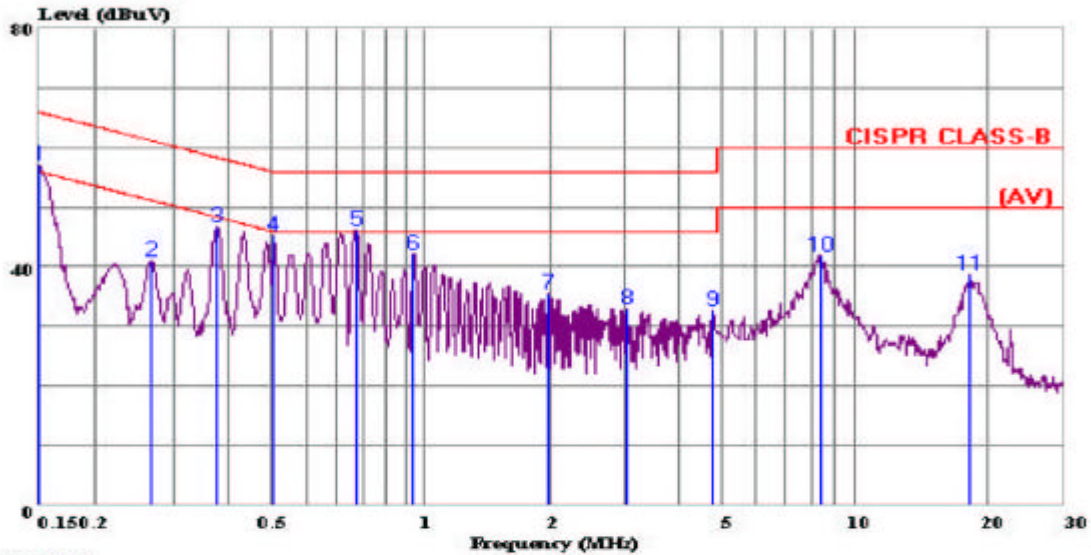
- Note
1. Level = Read Level + Probe (LISN) Factor + Cable Loss
 2. Over Limit = Level – Limit Line = Margin



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Data#: 2123 File#: EN55022-B(QP).EMI Date: 2003-02-20 Time: 13:42:32



Trace: 2122
 Site : Shih-Chi : Conduction NO.1(Nick)
 Condition: CISPR CLASS-B LISN.L(16A) LINE
 eut : E920093
 power : AC 230V 50Hz
 memo : Peak Vaule
 : Final Test
 : SS-300FB Active PFC F3

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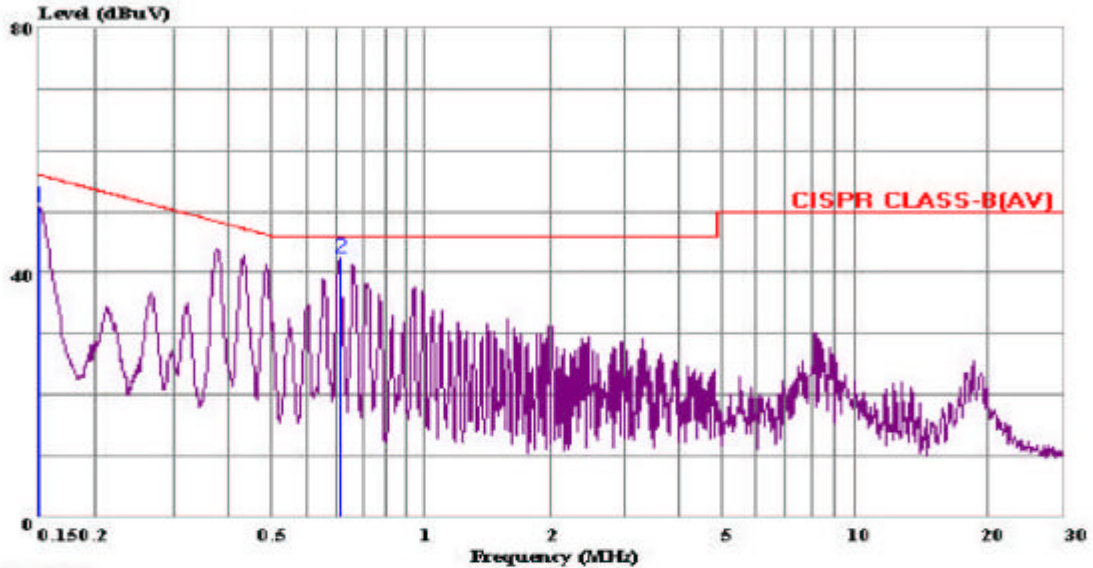
	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1 !	0.150	57.00	-9.00	66.00	56.40	0.30	0.30	
2	0.267	41.01	-20.19	61.20	40.40	0.34	0.27	
3	0.377	46.69	-11.65	58.34	46.20	0.39	0.10	
4	0.502	45.30	-10.70	56.00	44.80	0.40	0.10	
5 !	0.771	46.20	-9.80	56.00	45.60	0.40	0.20	
6	1.037	42.10	-13.90	56.00	41.40	0.40	0.30	
7	2.088	35.51	-20.49	56.00	34.80	0.40	0.31	
8	3.123	33.00	-23.00	56.00	32.20	0.40	0.40	
9	4.900	32.64	-23.36	56.00	31.80	0.44	0.40	
10	8.546	41.82	-18.18	60.00	40.79	0.57	0.46	
11	18.426	38.57	-21.43	60.00	37.20	0.87	0.50	



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Data#: 1660 File#: EN55022-B(AV).EMI Date: 2003-02-20 Time: 13:48:08



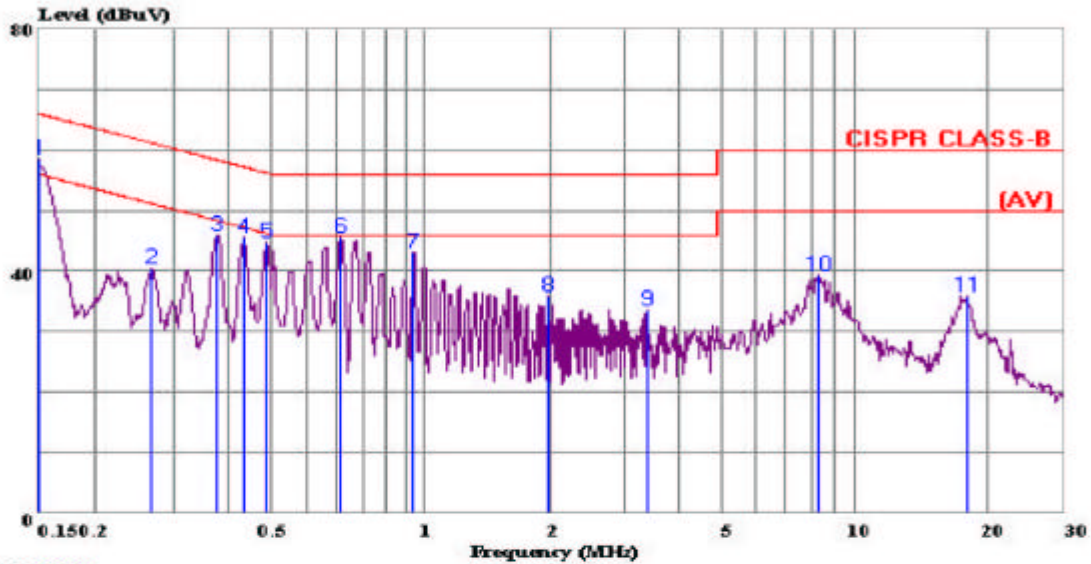
Trace: 1659
 Site : Shih-Chi : Conduction NO.1(Nick)
 Condition: CISPR CLASS-B(AV) LISN.L(16A) LINE
 eut : E920093
 power : AC 230V 50Hz
 memo : Average Value
 : Final Test
 : SS-300FB Active PFC F3

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.150	50.80	-5.20	56.00	50.20	0.30	0.30	
2	0.712	42.36	-3.64	46.00	41.76	0.40	0.20	



Data#: 2128 File#: EN55022-B(QP).EMI Date: 2003-02-20 Time: 13:52:10



Trace: 2127

Site : Shih-Chi : Conduction NO.1(Nick)
 Condition: CISPR CLASS-B LISN.N(16A) NEUTRAL
 eut : E920093
 power : AC 230V 50Hz
 memo : Peak Vaule
 : Final Test
 : SS-300FB Active PFC F3

Page: 1

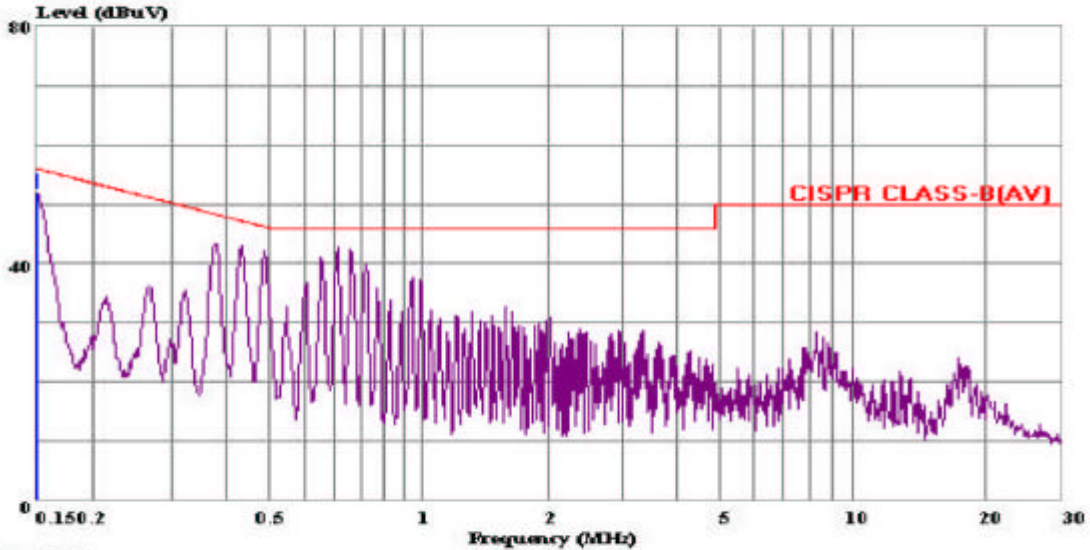
	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.150	58.60	-7.40	66.00	58.20	0.10	0.30	
2	0.267	40.36	-20.84	61.20	39.99	0.10	0.27	
3	0.377	46.00	-12.34	58.34	45.80	0.10	0.10	
4	0.433	45.61	-11.59	57.20	45.40	0.11	0.10	
5	0.489	44.62	-11.57	56.19	44.40	0.12	0.10	
6	0.716	45.56	-10.44	56.00	45.20	0.16	0.20	
7	1.037	42.90	-13.10	56.00	42.40	0.20	0.30	
8	2.088	35.91	-20.09	56.00	35.40	0.20	0.31	
9	3.472	33.60	-22.40	56.00	33.00	0.20	0.40	
10	8.456	39.41	-20.59	60.00	38.61	0.36	0.44	
11	18.135	35.77	-24.23	60.00	34.60	0.67	0.50	



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Data#: 1665 File#: EN55022-B(AV).EMI Date: 2003-02-20 Time: 13:56:15



Trace: 1664
 Site : Shih-Chi : Conduction NO.1(Nick)
 Condition: CISPR CLASS-B(AV) LISN.N(16A) NEUTRAL
 eut : E920093
 power : AC 230V 50Hz
 memo : Average Value
 : Final Test
 : SS-300FB Active PFC F3

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	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.150	52.00	-4.00	56.00	51.60	0.10	0.30	

Model No. : SS-300AGX Active PFC yz
Frequency range : 150KHz to 30MHz
Detector : Peak Value
Temperature : 18
Humidity : 57 %

Test Data : # 2159 # 1685 < LINE >
 # 2154 < NEUTRAL >

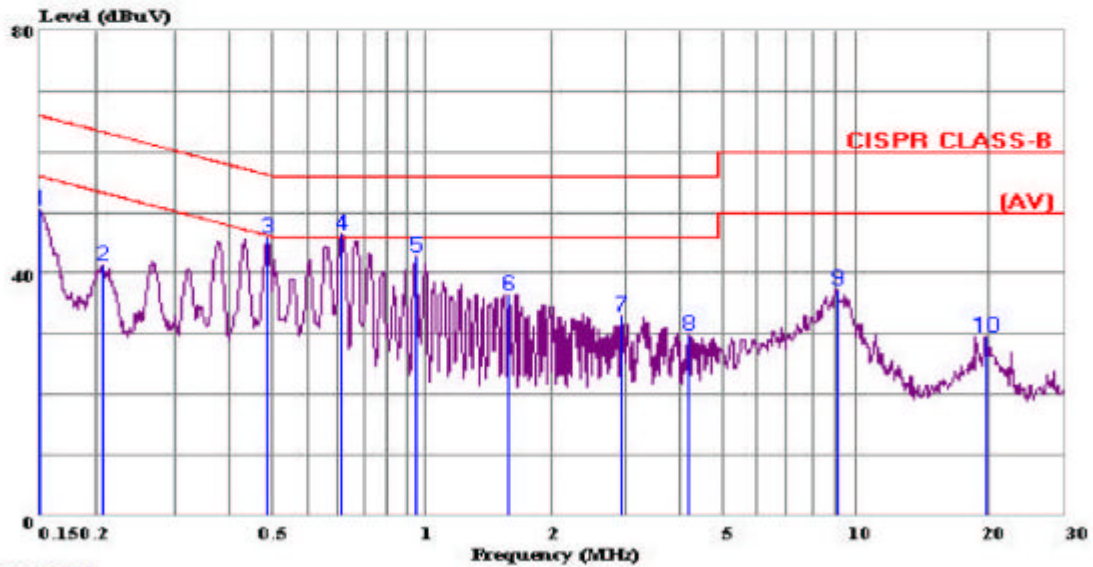
- Note
1. Level = Read Level + Probe (LISN) Factor + Cable Loss
 2. Over Limit = Level – Limit Line = Margin



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PEP Testing Laboratory

Data#: 2159 File#: EN55022-B(QP).EMI Date: 2003-02-20 Time: 15:12:17



Trace: 2159

Site : Shih-Chi : Conduction NO.1(Nick)
 Condition: CISPR CLASS-B LISN.L(16A) LINE
 eut : E920093
 power : AC 230V 50Hz
 memo : Peak Vaule
 : Final Test
 : SS-300AGX Active PFC F3

Page: 1

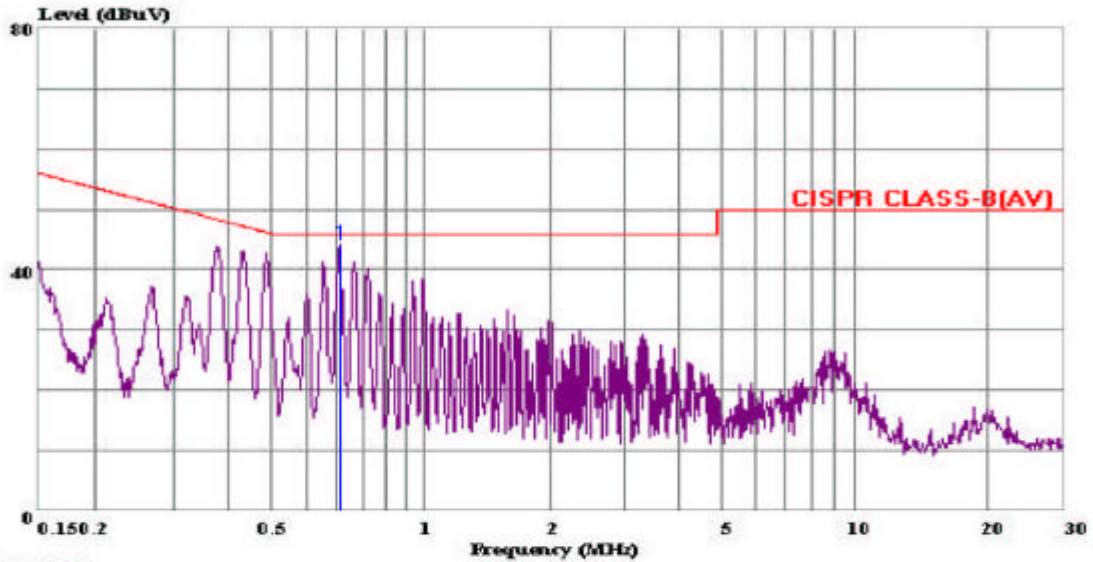
	Freq	Level	Over	Limit	Read	Probe	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.150	50.60	-15.40	66.00	50.00	0.30	0.30	
2	0.208	41.21	-22.06	63.27	40.60	0.31	0.30	
3	0.484	45.90	-10.37	56.27	45.40	0.40	0.10	
4 !	0.712	46.40	-9.60	56.00	45.80	0.40	0.20	
5	1.043	42.70	-13.30	56.00	42.00	0.40	0.30	
6	1.698	36.50	-19.50	56.00	35.80	0.40	0.30	
7	3.025	33.00	-23.00	56.00	32.20	0.40	0.40	
8	4.269	29.82	-26.18	56.00	29.01	0.41	0.40	
9	9.204	37.28	-22.72	60.00	36.20	0.58	0.50	
10	19.845	29.64	-30.36	60.00	28.20	0.90	0.54	



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Data#: 1685 File#: EN55022-B(AV).EMI Date: 2003-02-20 Time: 15:14:28



Trace: 1684

Site : Shih-Chi : Conduction NO.1(Nick)
 Condition: CISPR CLASS-B(AV) LISN.L(16A) LINE
 eut : E920093
 power : AC 230V 50Hz
 memo : Average Value
 : Final Test
 : SS-300AGX Active PFC F3

Page: 1

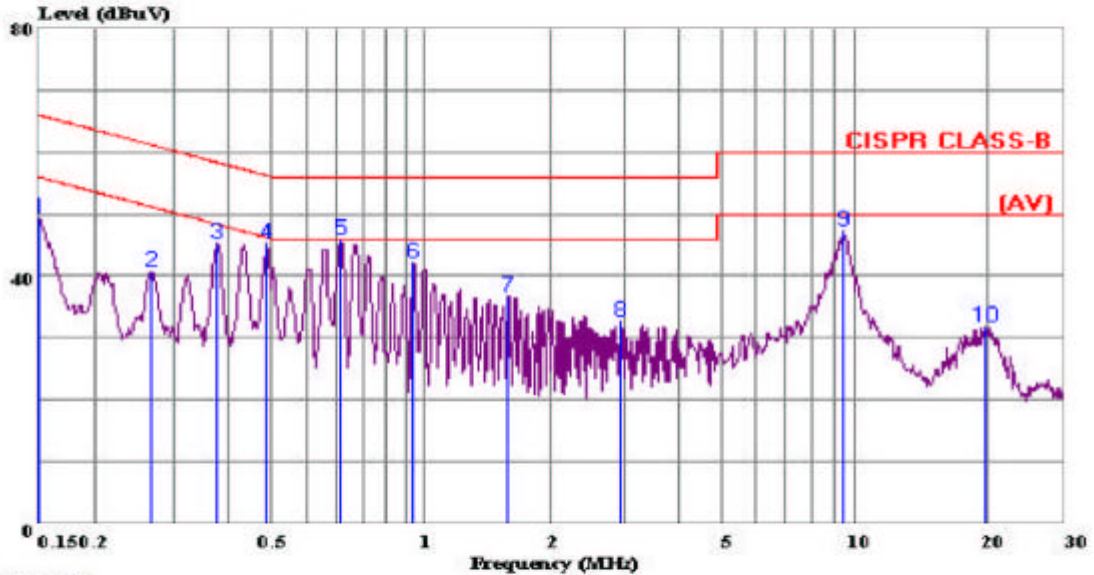
	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.712	44.20	-1.80	46.00	43.60	0.40	0.20	



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PEP Testing Laboratory

Data#: 2154 File#: EN55022-B(QP).EMI Date: 2003-02-20 Time: 15:08:00



Trace: 2153
 Site : Shih-Chi : Conduction NO.1(Nick)
 Condition: CISPR CLASS-B LISN.N(16A) NEUTRAL
 eut : E920093
 power : AC 230V 50Hz
 memo : Peak Vaule
 : Final Test
 : SS-300AGX Active PFC F3

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.150	49.40	-16.60	66.00	49.00	0.10	0.30	
2	0.269	40.76	-20.40	61.16	40.40	0.10	0.26	
3	0.377	45.20	-13.14	58.34	45.00	0.10	0.10	
4	0.486	45.22	-11.01	56.23	45.00	0.12	0.10	
5	0.716	45.76	-10.24	56.00	45.40	0.16	0.20	
6	1.037	42.10	-13.90	56.00	41.60	0.20	0.30	
7	1.689	36.70	-19.30	56.00	36.20	0.20	0.30	
8	3.025	32.80	-23.20	56.00	32.20	0.20	0.40	
9	9.603	47.29	-12.71	60.00	46.40	0.39	0.50	
10	19.845	31.85	-28.15	60.00	30.61	0.70	0.54	

Model No. : SS-350UMD Active PFC Fz
Frequency range : 150KHz to 30MHz
Detector : Peak Value
Temperature : 18
Humidity : 57 %

Test Data : # 2244 # 1955 < LINE >
 # 2239 # 1701 < NEUTRAL >

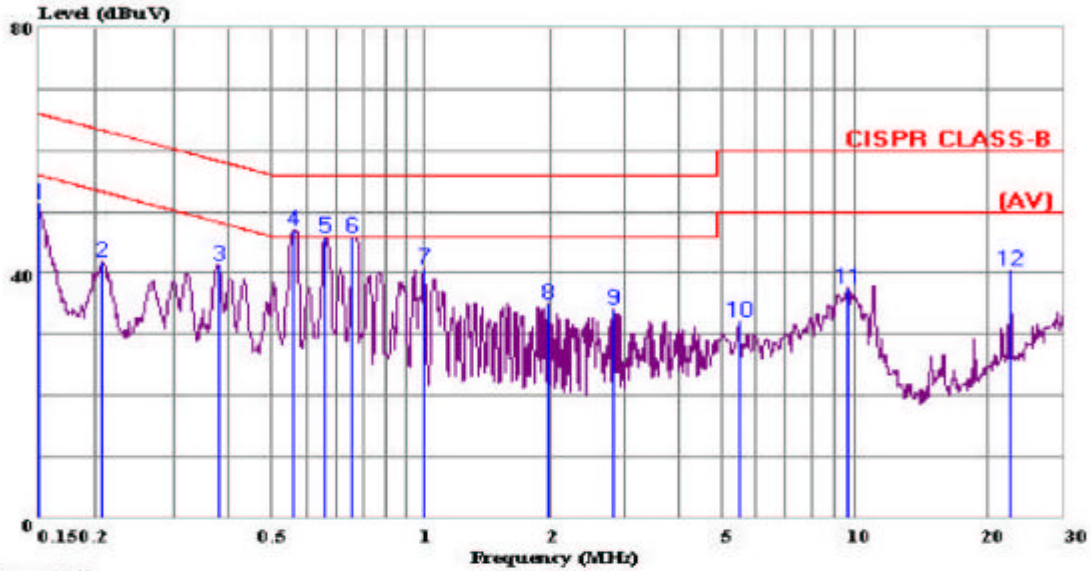
- Note
1. Level = Read Level + Probe (LISN) Factor + Cable Loss
 2. Over Limit = Level – Limit Line = Margin



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PEP Testing Laboratory

Data#: 2244 File#: EN55022-B(QP).EMI Date: 2003-02-21 Time: 09:39:02



Trace: 2243
 Site : Shih-Chi : Conduction NO.1(Nick)
 Condition: CISPR CLASS-B LISN.L(16A) LINE
 eut : E920093
 power : AC 230V 50Hz
 memo : Peak Vaule
 : Final Test
 : SS-350UMD Active PFC F3

Page: 1

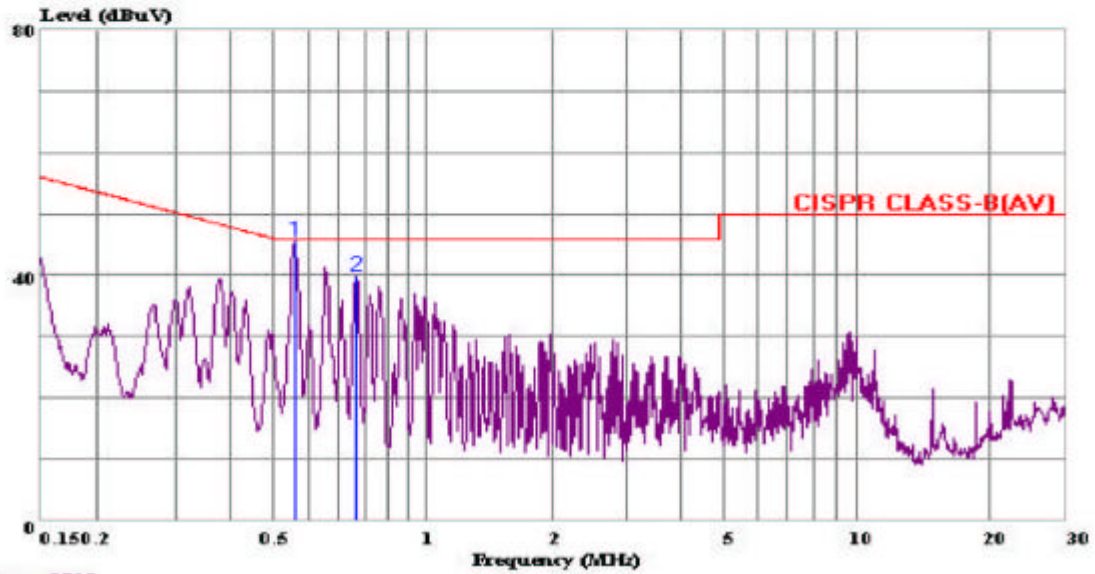
	Freq	Level	Over	Limit	Read	Probe	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.150	51.20	-14.80	66.00	50.60	0.30	0.30	
2	0.208	42.01	-21.26	63.27	41.40	0.31	0.30	
3	0.379	41.29	-17.01	58.30	40.80	0.39	0.10	
4 !	0.558	46.90	-9.10	56.00	46.40	0.40	0.10	
5	0.661	45.96	-10.04	56.00	45.40	0.40	0.16	
6 !	0.759	46.00	-10.00	56.00	45.40	0.40	0.20	
7	1.100	40.70	-15.30	56.00	40.00	0.40	0.30	
8	2.088	34.91	-21.09	56.00	34.20	0.40	0.31	
9	2.915	33.99	-22.01	56.00	33.20	0.40	0.39	
10	5.594	32.07	-27.93	60.00	31.20	0.47	0.40	
11	9.861	37.50	-22.50	60.00	36.40	0.60	0.50	
12	22.775	40.42	-19.58	60.00	38.81	1.01	0.60	



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PEP Testing Laboratory

Data#: 1955 File#: EN55022-B(AV).EMI Date: 2003-03-14 Time: 14:57:52



Trace: 1705

Site : Shih-Chi : Conduction NO.1(Nick)
Condition: CISPR CLASS-B(AV) LISN.L(16A) LINE
cut : E920093
power : AC 230V 50Hz
memo : Average Value
: Final Test
: SS-350UMD Active PFC

Page: 1

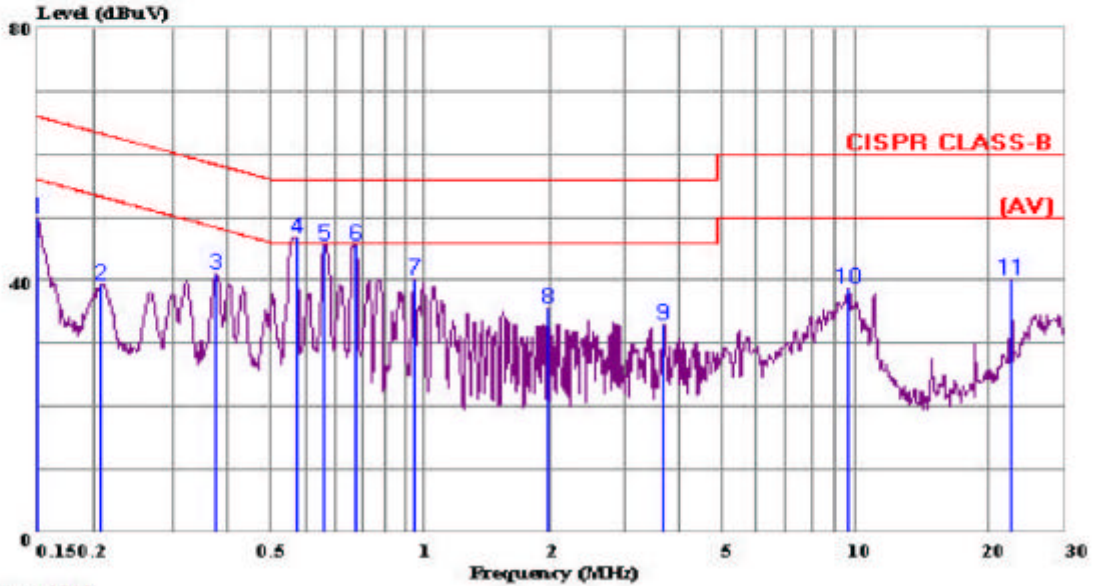
	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.558	45.70	-0.30	46.00	45.20	0.40	0.10	
2	0.763	39.80	-6.20	46.00	39.20	0.40	0.20	



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PEP Testing Laboratory

Data#: 2239 File#: EN55022-B(QP).EMI Date: 2003-02-21 Time: 09:32:56



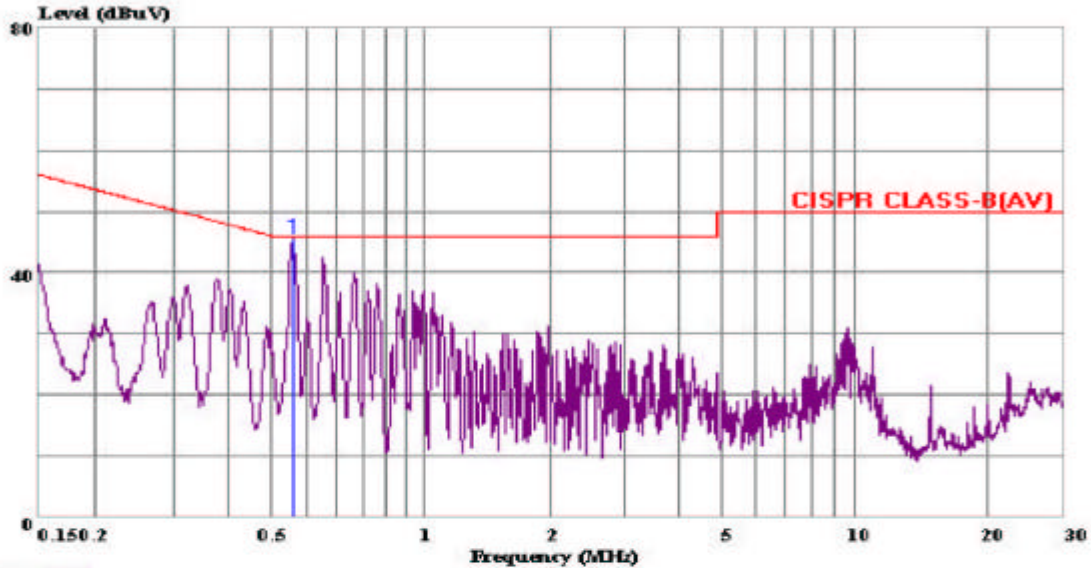
Trace: 2238
 Site : Shih-Chi : Conduction NO.1(Nick)
 Condition: CISPR CLASS-B LISN.N(16A) NEUTRAL
 eut : E920093
 power : AC 230V 50Hz
 memo : Peak Vaule
 : Final Test
 : SS-350UMD Active PFC F3

Page: 1

	Freq	Level	Over	Limit	Read	Probe	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.150	49.80	-16.20	66.00	49.40	0.10	0.30	
2	0.207	39.40	-23.92	63.32	39.00	0.10	0.30	
3	0.377	41.00	-17.34	58.34	40.80	0.10	0.10	
4	0.570	46.64	-9.36	56.00	46.40	0.14	0.10	
5	0.661	45.72	-10.28	56.00	45.41	0.15	0.16	
6	0.775	45.57	-10.43	56.00	45.20	0.17	0.20	
7	1.043	40.10	-15.90	56.00	39.60	0.20	0.30	
8	2.088	35.51	-20.49	56.00	35.00	0.20	0.31	
9	3.779	33.00	-23.00	56.00	32.40	0.20	0.40	
10	9.861	38.70	-21.30	60.00	37.80	0.40	0.50	
11	22.775	40.08	-19.92	60.00	38.61	0.87	0.60	



Data#: 1701 File#: EN55022-B(AV).EMI Date: 2003-02-21 Time: 09:36:22



Trace: 1700
Site : Shih-Chi : Conduction NO.1(Nick)
Condition: CISPR CLASS-B(AV) LISN.N(16A) NEUTRAL
eut : E920093
power : AC 230V 50Hz
memo : Average Value
: Final Test
: SS-350UMD Active PFC F3

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	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.558	45.64	-0.36	46.00	45.40	0.14	0.10	

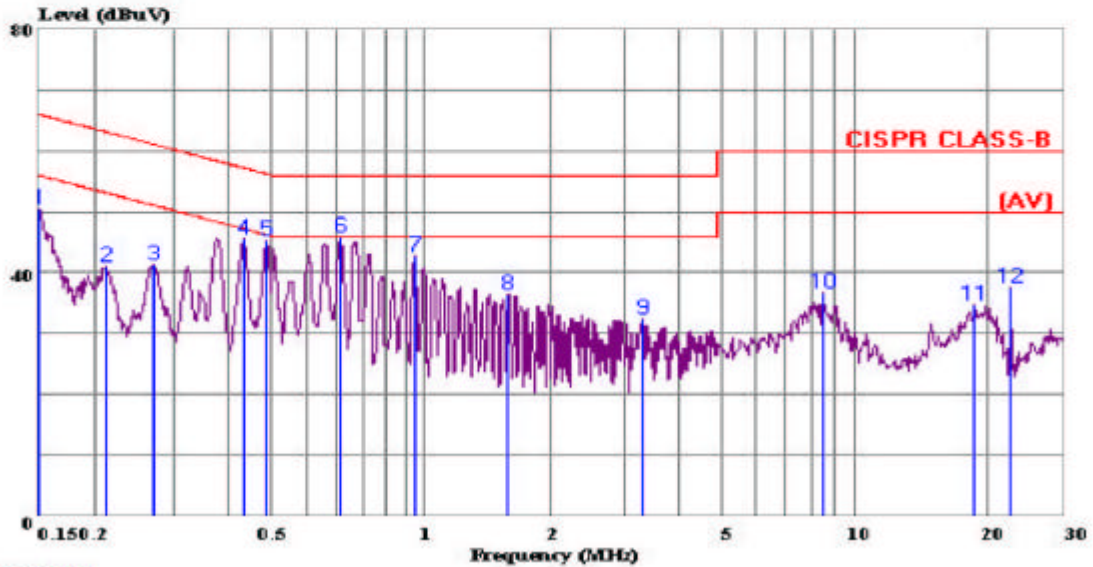
Model No. : SS-460AGX Active PFC Fz
Frequency range : 150KHz to 30MHz
Detector : Peak Value
Temperature : 18
Humidity : 57 %

Test Data : # 2118 < LINE >
 # 2113 < NEUTRAL >

- Note
1. Level = Read Level + Probe (LISN) Factor + Cable Loss
 2. Over Limit = Level – Limit Line = Margin



Data#: 2118 File#: EN55022-B(QP).EMI Date: 2003-02-20 Time: 11:54:10



Trace: 2117

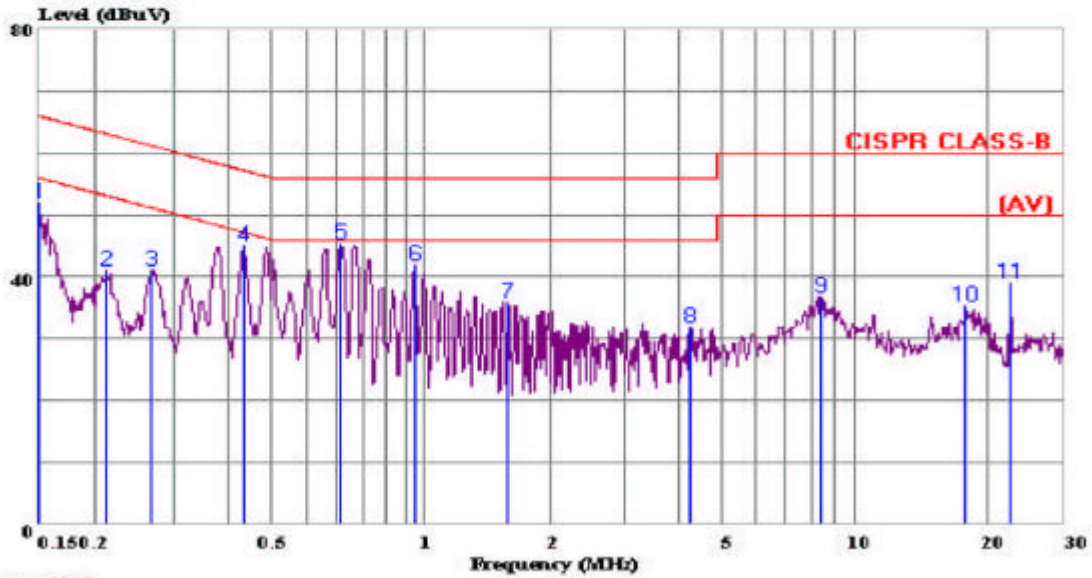
Site : Shih-Chi : Conduction NO.1(Nick)
 Condition: CISPR CLASS-B LISN.L(16A) LINE
 eut : E920093
 power : AC 230V 50Hz
 memo : Peak Vaule
 : Final Test
 : SS-460AGX Active PFC F3

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	Freq	Level	Over	Limit	Read	Probe	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.150	50.40	-15.60	66.00	49.80	0.30	0.30	
2	0.213	41.01	-22.09	63.10	40.40	0.31	0.30	
3	0.270	41.20	-19.92	61.12	40.60	0.34	0.26	
4	0.433	45.50	-11.70	57.20	45.00	0.40	0.10	
5	0.486	45.30	-10.93	56.23	44.80	0.40	0.10	
6	0.712	45.80	-10.20	56.00	45.20	0.40	0.20	
7	1.043	42.70	-13.30	56.00	42.00	0.40	0.30	
8	1.698	36.30	-19.70	56.00	35.60	0.40	0.30	
9	3.399	32.40	-23.60	56.00	31.60	0.40	0.40	
10	8.592	36.63	-23.37	60.00	35.60	0.57	0.46	
11	18.920	34.58	-25.42	60.00	33.20	0.88	0.50	
12	22.775	37.62	-22.38	60.00	36.01	1.01	0.60	



Data#: 2113 File#: EN55022-B(QP).EMI Date: 2003-02-20 Time: 11:46:07



Trace: 2112

Site : Shih-Chi : Conduction NO.1(Nick)
 Condition: CISPR CLASS-B LISN.N(16A) NEUTRAL
 eut : E920093
 power : AC 230V 50Hz
 memo : Peak Vaule
 : Final Test
 : SS-460AGX Active PFC F3

Page: 1

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.150	51.80	-14.20	66.00	51.40	0.10	0.30	
2	0.213	41.00	-22.10	63.10	40.60	0.10	0.30	
3	0.269	40.96	-20.20	61.16	40.60	0.10	0.26	
4	0.433	45.01	-12.19	57.20	44.80	0.11	0.10	
5	0.712	45.16	-10.84	56.00	44.80	0.16	0.20	
6	1.043	41.90	-14.10	56.00	41.40	0.20	0.30	
7	1.698	35.90	-20.10	56.00	35.40	0.20	0.30	
8	4.338	31.82	-24.18	56.00	31.20	0.22	0.40	
9	8.501	36.62	-23.38	60.00	35.80	0.37	0.45	
10	18.039	35.37	-24.63	60.00	34.21	0.66	0.50	
11	22.775	39.07	-20.93	60.00	37.60	0.87	0.60	

8. EN 55022 Radiated Disturbance Test

Test Standard	Model No.	Result
EN 55022	SS-300FB Active PFC yz, SS-300AGX Active PFC yz, SS-350UMD Active PFC Fz, SS-460AGX Active PFC Fz	Passed

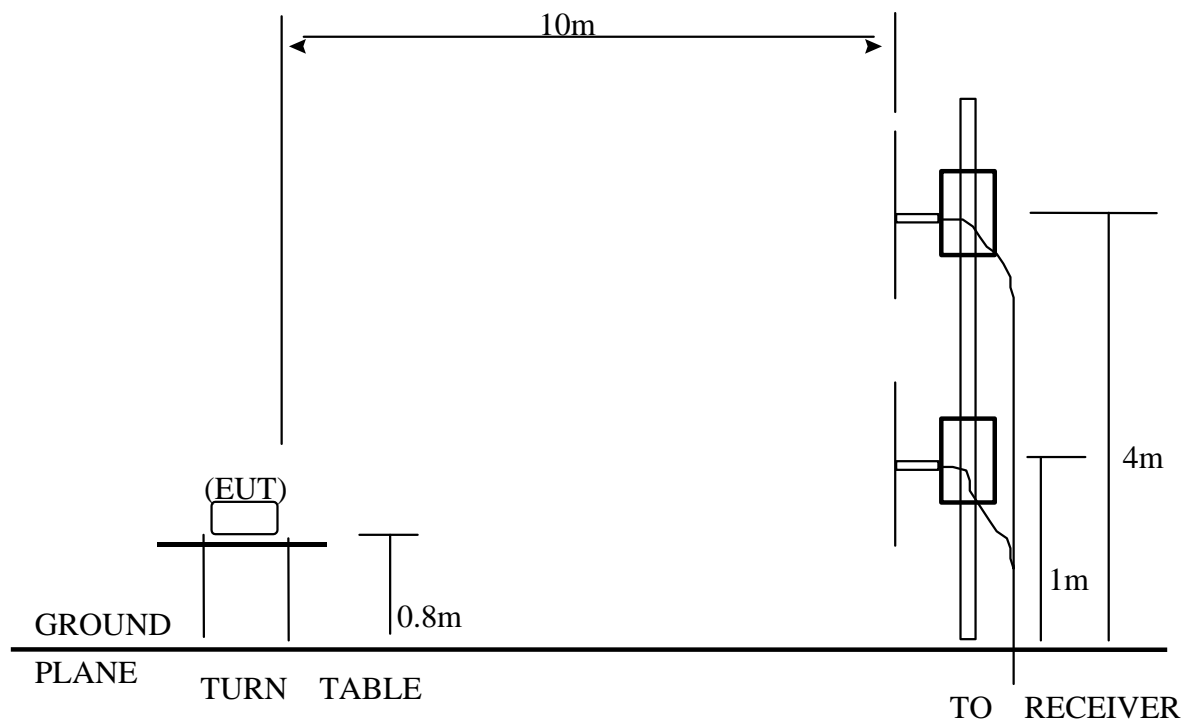
8.1 Radiated Disturbance Test Description

Preliminary measurements were made indoors chamber at 3 meter using broadband antennas, broadband amplifier, and spectrum analyzer to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30 to 1000 MHz using logbicon antenna. Above 1GHz, linearly polarized double ridge horn antenna were used.

Final measurements were made outdoors at 10-meter test range using biconical, dipole antenna or horn antenna. The test equipment was placed on a wooden bench situated on a 1.5x1 meter area adjacent to the measurement area. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined and investigated using Quasi-Peak Adapter. The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 120kHz.

The half-wave dipole antenna was tuned to the frequency found during preliminary radiated measurements. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8-meter high non-metallic 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission.

8.2 Radiated Disturbance Test Setup



EUT = Equipment Under Test

8.3 Radiated Disturbance Test Limits

Limits for radiated disturbance of Class A ITE at
a measuring distance of 10 m

Frequency MHz	Field Strength dB(μ V/m)
30 to 230	40
230 to 1 000	47
NOTES 1 The lower limit shall apply at the transition frequency. 2 Additional provisions may be required for cases where interference occurs.	

Limits for radiated disturbance of Class B ITE at
a measuring distance of 10 m

Frequency MHz	Field Strength dB(μ V/m)
30 to 230	30
230 to 1 000	37
NOTES 1 The lower limit shall apply at the transition frequency. 2 Additional provisions may be required for cases where interference occurs.	

8.4 Radiated Disturbance Test Setup Photos.

Model No. : SS-300FB Active PFC yz

< FRONT VIEW >



< REAR VIEW >



Model No. : SS-300AGX Active PFC yz
< FRONT VIEW >



< REAR VIEW >



Model No. : SS-350UMD Active PFC Fz
< FRONT VIEW >



< REAR VIEW >



Model No. : SS-460AGX Active PFC Fz
< FRONT VIEW >



< REAR VIEW >



8.5 Radiated Disturbance Test Data

Model No. : SS-300FB Active PFC yz
Frequency range : 30MHz to 1GHz **Detector** : Quasi-Peak Value
Frequency range : above 1GHz **Detector** : Quasi-Peak/Average Value
Temperature : 18 ° C **Humidity** : 57 %

Antenna polarization : HORIZONTAL ; **Test distance** : 10m ;

Freq. (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Azimuth (angle)	Antenna High(m)
58.523	19.87	-10.13	30.00	34.27	5.94	0.10	20.44	240.0	4.0
121.343	20.39	- 9.61	30.00	33.79	6.34	0.33	20.07	120.0	4.0
228.320	16.36	-13.64	30.00	23.06	12.16	0.92	19.78	150.0	4.0
243.686	19.75	-17.25	37.00	25.68	12.88	0.97	19.78	270.0	4.0
495.187	21.74	-15.26	37.00	20.23	19.49	1.69	19.67	180.0	3.5
576.606	24.93	-12.07	37.00	22.41	20.10	1.86	19.44	210.0	3.5

Note :

1. Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line

Model No. : SS-300FB Active PFC yz
Frequency range : 30MHz to 1GHz **Detector** : Quasi-Peak Value
Frequency range : above 1GHz **Detector** : Quasi-Peak/Average Value
Temperature : 18° C **Humidity** : 57 %

Antenna polarization : VERTICAL ; **Test distance** : 10m ;

Freq. (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Azimuth (° angle)	Antenna High(m)
63.032	22.69	- 7.31	30.00	37.61	5.32	0.13	20.37	100.0	1.0
122.517	25.41	- 4.59	30.00	38.85	6.27	0.35	20.06	240.0	1.0
229.340	16.75	-13.25	30.00	23.34	12.20	0.92	19.71	180.0	1.0
444.104	19.75	-17.25	37.00	21.34	16.81	1.54	19.94	120.0	1.5
581.991	23.92	-13.08	37.00	21.10	20.40	1.87	19.45	210.0	1.5
716.619	25.44	-11.56	37.00	20.23	22.77	1.97	19.53	150.0	1.5

Note :

1. Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line

Model No. : SS-300AGX Active PFC yz
Frequency range : 30MHz to 1GHz **Detector** : Quasi-Peak Value
Frequency range : above 1GHz **Detector** : Quasi-Peak/Average Value
Temperature : 18 ° C **Humidity** : 57 %

Antenna polarization : HORIZONTAL ; **Test distance** : 10m ;

Freq. (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Azimuth (angle)	Antenna High(m)
58.540	18.71	-11.29	30.00	33.11	5.94	0.10	20.44	120.0	4.0
118.387	20.71	- 9.29	30.00	33.94	6.53	0.30	20.06	270.0	4.0
229.331	17.26	-12.74	30.00	23.85	12.20	0.92	19.71	220.0	4.0
242.562	19.46	-17.54	37.00	25.44	12.84	0.97	19.79	180.0	4.0
497.338	23.01	-13.99	37.00	21.37	19.59	1.69	19.64	110.0	3.5
576.569	24.01	-12.99	37.00	21.49	20.10	1.86	19.44	240.0	3.5

Note :

1. Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line

Model No. : SS-300AGX Active PFC yz
Frequency range : 30MHz to 1GHz **Detector** : Quasi-Peak Value
Frequency range : above 1GHz **Detector** : Quasi-Peak/Average Value
Temperature : 18° C **Humidity** : 57 %

Antenna polarization : VERTICAL ; **Test distance** : 10m ;

Freq. (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Azimuth (angle)	Antenna High(m)
62.855	18.12	-11.88	30.00	33.01	5.35	0.13	20.37	240.0	1.0
121.075	23.33	- 6.67	30.00	36.71	6.38	0.32	20.08	150.0	1.0
229.370	16.51	-13.49	30.00	23.10	12.20	0.92	19.71	210.0	1.0
244.356	17.63	-19.37	37.00	23.50	12.92	0.98	19.77	270.0	1.0
400.197	22.21	-14.79	37.00	24.42	16.10	1.40	19.71	120.0	1.5
441.484	19.36	-17.64	37.00	21.10	16.69	1.53	19.96	150.0	1.5

Note :

1. Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line

Model No. : SS-350UMD Active PFC Fz
Frequency range : 30MHz to 1GHz **Detector** : Quasi-Peak Value
Frequency range : above 1GHz **Detector** : Quasi-Peak/Average Value
Temperature : 18 ° C **Humidity** : 57 %

Antenna polarization : HORIZONTAL ; **Test distance** : 10m ;

Freq. (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Azimuth (° angle)	Antenna High(m)
54.392	20.90	- 9.10	30.00	34.70	6.67	0.10	20.57	110.0	4.0
116.835	19.65	-10.35	30.00	32.83	6.56	0.30	20.04	240.0	4.0
229.486	18.31	-11.69	30.00	24.90	12.20	0.92	19.71	90.0	4.0
237.972	21.37	-15.63	37.00	27.63	12.64	0.95	19.85	180.0	4.0
400.204	20.07	-16.93	37.00	22.28	16.10	1.40	19.71	210.0	3.5
492.593	22.92	-14.08	37.00	21.69	19.27	1.68	19.72	150.0	3.5

Note :

1. Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line

Model No. : SS-350UMD Active PFC Fz
Frequency range : 30MHz to 1GHz **Detector** : Quasi-Peak Value
Frequency range : above 1GHz **Detector** : Quasi-Peak/Average Value
Temperature : 18° C **Humidity** : 57 %

Antenna polarization : VERTICAL ; **Test distance** : 10m ;

Freq. (MHz)	Level (dBuV/m)	Over Limit Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Azimuth (angle)	Antenna High(m)
62.843	20.28	- 9.72	30.00	35.17	5.35	0.13	20.37	150.0	1.0
121.074	22.06	- 7.94	30.00	35.44	6.38	0.32	20.08	270.0	1.0
229.344	20.20	- 9.80	30.00	26.79	12.20	0.92	19.71	290.0	1.0
444.815	20.29	-16.71	37.00	21.88	16.81	1.54	19.94	320.0	1.5
724.802	28.81	- 8.19	37.00	23.69	22.80	2.00	19.68	100.0	1.5
827.732	25.52	-11.48	37.00	19.19	23.29	2.35	19.31	120.0	1.5

Note :

1. Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line

Model No. : SS-460AGX Active PFC Fz
Frequency range : 30MHz to 1GHz **Detector** : Quasi-Peak Value
Frequency range : above 1GHz **Detector** : Quasi-Peak/Average Value
Temperature : 18 ° C **Humidity** : 57 %

Antenna polarization : HORIZONTAL ; **Test distance** : 10m ;

Freq. (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Azimuth (angle)	Antenna High(m)
52.880	19.63	-10.37	30.00	33.19	6.95	0.10	20.61	120.0	4.0
119.454	18.31	-11.69	30.00	31.59	6.51	0.30	20.09	180.0	4.0
229.343	21.24	- 8.76	30.00	27.83	12.20	0.92	19.71	210.0	4.0
243.137	18.21	-18.79	37.00	24.14	12.88	0.97	19.78	150.0	4.0
427.329	19.99	-17.01	37.00	22.42	16.12	1.49	20.04	240.0	3.5
499.584	26.68	-10.32	37.00	24.90	19.70	1.70	19.62	270.0	3.5

Note :

1. Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line

Model No. : SS-460AGX Active PFC Fz
Frequency range : 30MHz to 1GHz **Detector** : Quasi-Peak Value
Frequency range : above 1GHz **Detector** : Quasi-Peak/Average Value
Temperature : 18° C **Humidity** : 57 %

Antenna polarization : VERTICAL ; **Test distance** : 10m ;

Freq. (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Azimuth (angle)	Antenna High(m)
67.293	22.37	- 7.63	30.00	37.65	4.83	0.17	20.28	240.0	1.0
118.395	23.27	- 6.73	30.00	36.52	6.52	0.30	20.07	270.0	1.0
150.387	18.21	-11.79	30.00	30.05	7.66	0.51	20.01	200.0	1.0
229.330	17.80	-12.20	30.00	24.39	12.20	0.92	19.71	150.0	1.0
450.434	21.55	-15.45	37.00	22.82	17.08	1.56	19.91	210.0	1.5
713.817	23.29	-13.71	37.00	18.05	22.76	1.96	19.48	120.0	1.5

Note :

1. Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line

9. EN 61000-3-2 Harmonic Current Test

Test standard	Model No.	Result
EN 61000-3-2	SS-300FB Active PFC yz, SS-300AGX Active PFC yz, SS-350UMD Active PFC Fz, SS-460AGX Active PFC Fz	Passed

9.1 Harmonic Current Test Description

The equipment under test is supplied in series with shunt(s) R_m or current transformer(s) from a source having the same nominal voltage and frequency as the rated supply voltage and frequency of the equipment under test. Whether the equipment operates with automatic, mixed or manual control, the measurements shall be made under normal load, or conditions for adequate heat discharge, and under normal operating conditions.

User's operation controls or automatic programmers shall be set to produce the maximum harmonic component, for each successive harmonic component in turn.

For the purpose of harmonic current limitation, equipment is classified as follows:

Class A:

- Balanced three-phase equipment;
- Household appliances excluding equipment identified as Class D;
- Tools excluding portable tools;
- Dimmers for incandescent lamps;
- Audio equipment.

Equipment not specified in one of the three other classes shall be considered as Class A equipment.

NOTE 1 Equipment that can be shown to have a significant effect on the supply system may be reclassified in a future edition of the standard. Factors to be taken into account include:

- number in use;
- duration of use;
- simultaneity of use;
- power consumption;
- harmonic spectrum, including phase.

Class B: Portable tools.

- Portable tools;
- Arc welding equipment which is not professional equipment.

Class C:

- Lighting equipment.

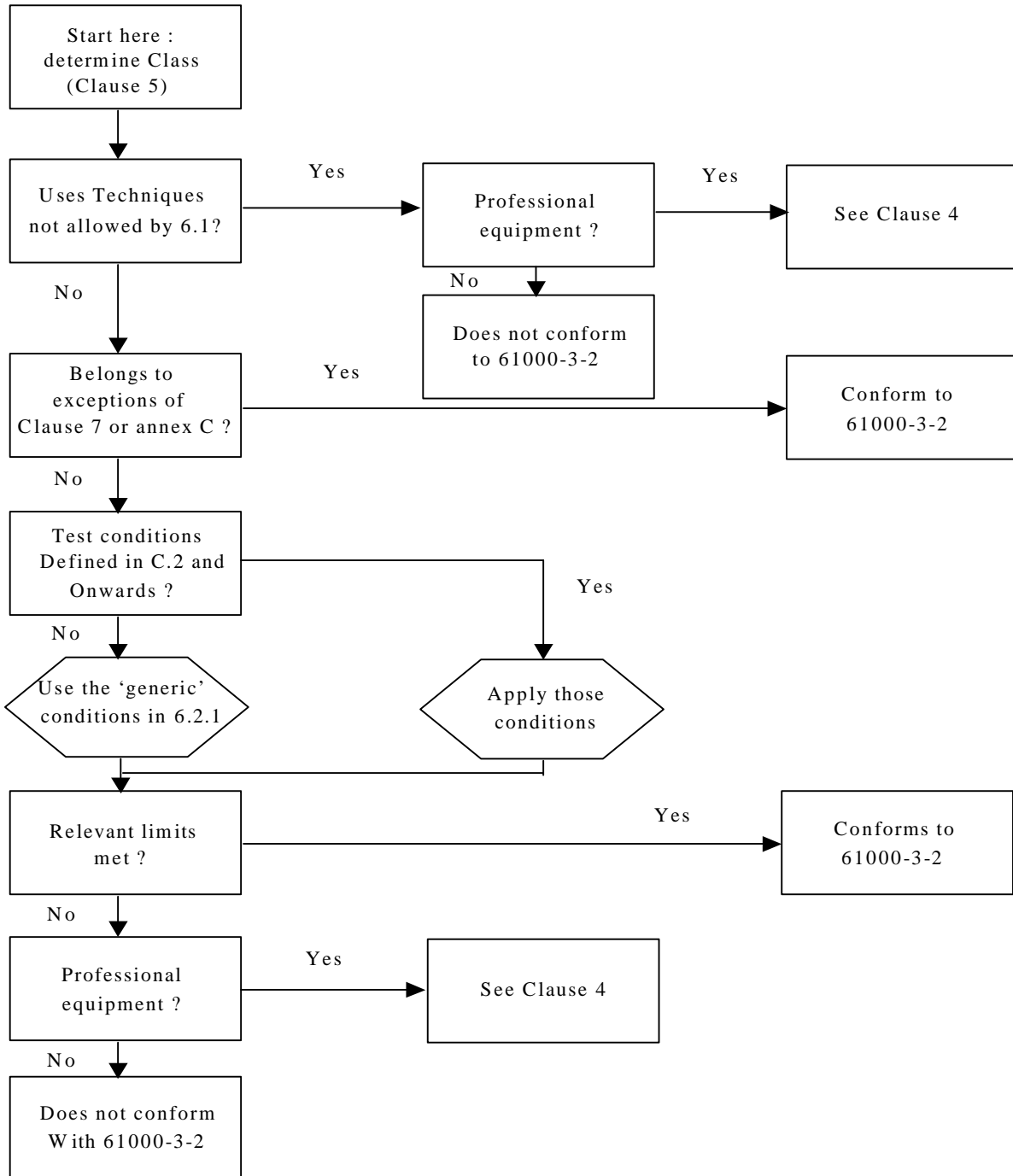
Class D:

Equipment having a specified power according to 6.2.2 less than or equal to 600W, of the following types:

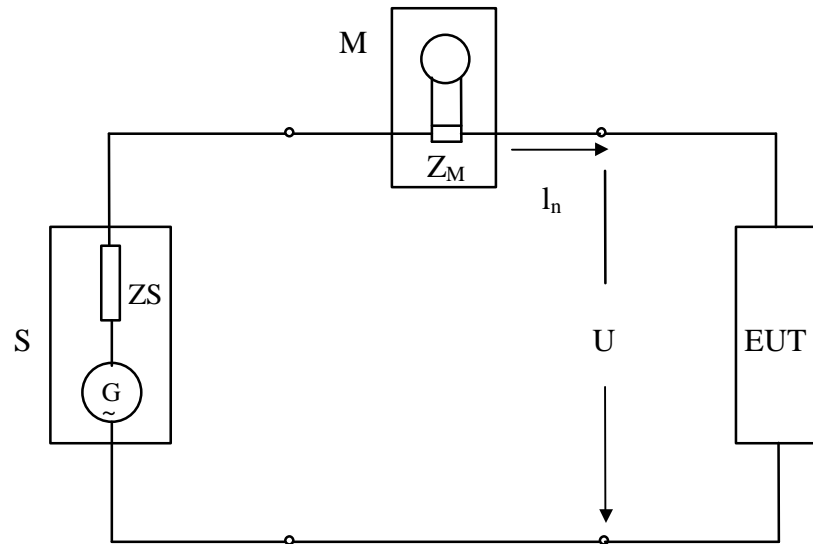
- Personal computers and personal computer monitors;
- Television receivers.

NOTE 2 Class D limits are reserved for equipment that, by virtue of the factors listed in note 1, can be shown to have a pronounced effect on the public electricity supply system.

9.2 Flow-chart for determining Conformity



9.3 Harmonic Current Test Setup



S	power supply source	Z _M	input impedance of measurement equipment
M	measurement equipment	Z _S	internal impedance of the supply source
EUT	equipment under test	I _n	harmonic component of order n of the line current
U	test voltage	G	open-loop voltage of the supply source

9.4 Harmonic Current Test Limits

Table 1 Limits for Class A equipment

Harmonic order n	Maximum permissible harmonic current A
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
15 ≤ n ≤ 39	$0.15 \frac{15}{n}$
Even harmonics	
2	1.08
4	0.43
6	0.30
8 ≤ n ≤ 40	$0.23 \frac{8}{n}$

Note :

1. For Class A equipment, the harmonics of the input current shall not exceed the absolute values given in table 1.
2. For Class B equipment, the harmonics of the input current shall not exceed the values given in table 1 multiplied by a factor of 1,5.

Table 2 Limits for Class C equipment

Harmonic order n	Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency %
2	2
3	$30 \cdot \lambda^*$
5	10
7	7
9	5
$11 \leq n \leq 39$ (odd harmonics only)	3

* λ is the circuit power factor

Note :

The harmonic current limits of lighting equipment shall not exceed the relative limits given in table 2.

Table 3 Limits for Class D equipment

Harmonic n	Maximum permissible harmonic current per watt mA/W	Maximum permissible harmonic current A
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
$13 \leq n \leq 39$ (odd harmonics only)	$\frac{3.85}{n}$	See table 1

Note :

The harmonics of the input current shall not exceed the values that can be derived from table 3.

9.5 Harmonic Current Test Setup Photo

Model No. : SS-300FB Active PFC yz

< FRONT VIEW >



Model No. : SS-300AGX Active PFC yz

< FRONT VIEW >



Model No. : SS-350UMD Active PFC Fz

< FRONT VIEW >



Model No. : SS-460AGX Active PFC Fz

< FRONT VIEW >



9.6 Harmonic Current Test Data

Model : SS-300FB Active PFC yz
 Line Voltage : 229.9 Vrms
 RMS Current : 0.3 A
 Real Power : 82.3 W
 Fundamental Amp : 432.5 mArms
 Line Frequency : 50 Hz
 Device Class : D

Harm. Order	Indicated Values	Max. Permits Harm. Current Ampere
---	---	---
3	0.0667	0.2799
5	0.0161	0.1564
7	0.0127	0.0823
9	0.0079	0.0412
11	0.0117	0.0288
13	0.0081	0.0244
15	0.0078	0.0211
17	0.0099	0.0186
19	0.0093	0.0167
21	0.0072	0.0151
23	0.0114	0.0138
25	0.0085	0.0127
27	0.0065	0.0117
29	0.0088	0.0109
31	0.0067	0.0102
33	0.0079	0.0096
35	0.0056	0.0091
37	0.0053	0.0086
39	0.0041	0.0081

Model : SS-300AGX Active PFC yz
 Line Voltage : 229.9 Vrms
 RMS Current : 0.3 A
 Real Power : 91.3 W
 Fundamental Amp : 419.5 mArms
 Line Frequency : 50 Hz
 Device Class : D

Harm. Order	Indicated Values	Max. Permits Harm. Current Ampere
---	---	---
3	0.0469	0.3104
5	0.0166	0.1734
7	0.0132	0.0913
9	0.0095	0.0456
11	0.0066	0.0319
13	0.0077	0.0270
15	0.0102	0.0234
17	0.0106	0.0207
19	0.0057	0.0185
21	0.0076	0.0167
23	0.0071	0.0153
25	0.0089	0.0141
27	0.0091	0.0130
29	0.0075	0.0121
31	0.0082	0.0113
33	0.0050	0.0106
35	0.0046	0.0100
37	0.0050	0.0095
39	0.0041	0.0090

Model : SS-350UMD Active PFC Fz
 Line Voltage : 229.9 Vrms
 RMS Current : 0.3 A
 Real Power : 83.7 W
 Fundamental Amp : 428.1 mArms
 Line Frequency : 50 Hz
 Device Class : D

Harm. Order	Indicated Values	Max. Permits Harm. Current Ampere
---	---	---
3	0.1227	0.2847
5	0.0165	0.1591
7	0.0180	0.0837
9	0.0142	0.0419
11	0.0114	0.0293
13	0.0094	0.0248
15	0.0060	0.0215
17	0.0060	0.0190
19	0.0062	0.0170
21	0.0077	0.0154
23	0.0073	0.0140
25	0.0060	0.0129
27	0.0074	0.0119
29	0.0080	0.0111
31	0.0069	0.0104
33	0.0078	0.0098
35	0.0086	0.0092
37	0.0060	0.0087
39	0.0067	0.0083

Model : SS-460AGX Active PFC Fz
 Line Voltage : 229.9 Vrms
 RMS Current : 0.3 A
 Real Power : 79.7 W
 Fundamental Amp : 409.3 mArms
 Line Frequency : 50 Hz
 Device Class : D

Harm. Order	Indicated Values	Max. Permits Harm. Current Ampere
---	---	---
3	0.1100	0.2711
5	0.0101	0.1515
7	0.0154	0.0797
9	0.0131	0.0399
11	0.0077	0.0279
13	0.0096	0.0236
15	0.0070	0.0205
17	0.0068	0.0181
19	0.0069	0.0162
21	0.0097	0.0146
23	0.0107	0.0133
25	0.0105	0.0123
27	0.0117	0.0114
29	0.0083	0.0106
31	0.0093	0.0099
33	0.0096	0.0093
35	0.0088	0.0084
37	0.0057	0.0083
39	0.0046	0.0079

10. EN 61000-3-3 Voltage Fluctuations Test

Test standard	Model No.	Result
EN 61000-3-3	SS-300FB Active PFC yz, SS-300AGX Active PFC yz, SS-350UMD Active PFC Fz, SS-460AGX Active PFC Fz	Passed

10.1 Voltage Fluctuations Test Description

EN 61000-3-3 standards define the measurement requirements, ac power source requirements, line impedance requirements, and voltage fluctuation and flicker limits for assessing electronic and electrical equipment's propensity to cause voltage disturbances on the ac mains. Compliance with these standards ensures that voltage fluctuations do not interfere with other equipment connected to the ac mains or cause incandescent lights to visibly flicker in a way that causes an annoyance or health risk to a human observer.

When automatic controls cycle on and off, they cause frequent changes of toehold to the supply. When the fluctuating load is in a branch circuit with other loads, these changes cause rms voltage fluctuations that affect all of the loads in the branch. In particular, variations in voltage amplitude cause changes in the light output of any filament lamps in the branch circuit. Because the output of a filament lamp is proportional to the square of the applied voltage, changes in light intensities can be significant even for small changes in voltage.

10.2 Voltage Fluctuations Test Limits

Compliance is determined if the following test parameters are within the following defined limits:

Short-term Flicker (Pst): The flicker severity evaluated over a short period of time (10 minutes). Pst = 1 is the conventional threshold of irritability, and therefore the limit.

Long-term Flicker (Plt): The flicker severity evaluated over a long period (typically 2 hours) using successive Pst values. Plt = 0.65 is the conventional threshold of irritability, and therefore the limit.

For voltage changes that are caused by manual switching of equipment or that occur less frequently than once per hour, Pst and Plt are not applicable.

However, the following voltage change “(D)” parameters are applicable, with the limits multiplied by 1.33.

Relative Steady-state Voltage Change (Dc): The difference between two adjacent steady-state voltages relative to the nominal voltage. Dc must be =3%

Relative Voltage Change Characteristic (D(t)): The change in rms voltage, relative to the nominal voltage, as a function of time and between periods when the voltage is in a steady-state condition for at least 1 second. D(t) must not be > 3% for more than 200 milliseconds continuously during a voltage change event.

Maximum Relative Voltage change (Dmax): The difference between maximum and minimum rms values of the voltage change characteristic relative to the nominal voltage. Dmax must be =4%

10.3 Voltage Fluctuations Test Setup Photo

Model No. : SS-300FB Active PFC yz

< FRONT VIEW >



Model No. : SS-300AGX Active PFC yz

< FRONT VIEW >



Model No. : SS-350UMD Active PFC Fz

< FRONT VIEW >



Model No. : SS-460AGX Active PFC Fz

< FRONT VIEW >



Model No : SS-350UMD Active PFC Fz

RMS Voltage : 229.9V RMS Current : 0.3 A
 Real Power : 71.7 W Peak Current : 0.7 A
 Apparent Power : 78.9 VA Frequency : 50.0 Hz

	Indicated Values	Limit	Pass(P) or Fail (F)
Pst	0.07	< 1.0	P
Plt	0.07	< 0.65	P
Dc	0.00%	< 3%	P
Dmax	0.00%	< 4%	P
D(t)	0.00%	< 3%	P

Pst : Short-term flicker indicator

Plt : Long-term flicker indicator

Dc : Relative steady state voltage change

Dmax : Maximum relative voltage change

D (t) : Voltage change

11. EN 61000-4-2 Electrostatic Discharge Test

Test standard	Model No.	Result
EN 61000-4-2	SS-300FB Active PFC yz, SS-300AGX Active PFC yz, SS-350UMD Active PFC Fz, SS-460AGX Active PFC Fz	B

The test results shall be classified on the basis of the operating conditions and the functional specifications of the equipment under test , as in the following , unless different specifications are given by product committees or product specifications :

Performance Criterion :

- A) normal performance within the specification limits ;*
- B) temporary degradation or loss of function or performance which is self-recoverable ;*
- C) temporary degradation or loss of function or performance which requires operator intervention or system reset ;*

11.1 Electrostatic Discharge Test Description

This standard relates to equipment, systems, sub-systems and peripherals which may be involved in static electricity discharges owing to environmental and installation conditions. such as low relative humidity, use of low-conductivity (artificial-fibre) carpets, vinyl garments, etc., which may exist in allocations classified in standards relevant to electrical and electronic equipment.

The test set-up shall consist of a wooden table, 0.8 m high standing on the ground reference plane. A horizontal coupling plane(HCP), 1.6 m x 0.8 m, shall be placed on the table. The EUT and cables shall be isolated from the coupling plane by an insulating support 0.5 mm thick .

A ground reference plane shall be provided on floor of the laboratory. It shall be metallic sheet of 0.25 mm minimum thickness. The minimum size of the reference plane is 1 m, the exact size depending on the dimensions of the EUT .

It shall project beyond the EUT or coupling plane by at least 0.5 m on all sides. and shall be connected to the protective grounding system.

In order to minimize the impact of environmental parameters on test results, the tests shall be carried out in climatic and electromagnetic reference conditions.

Climatic conditions

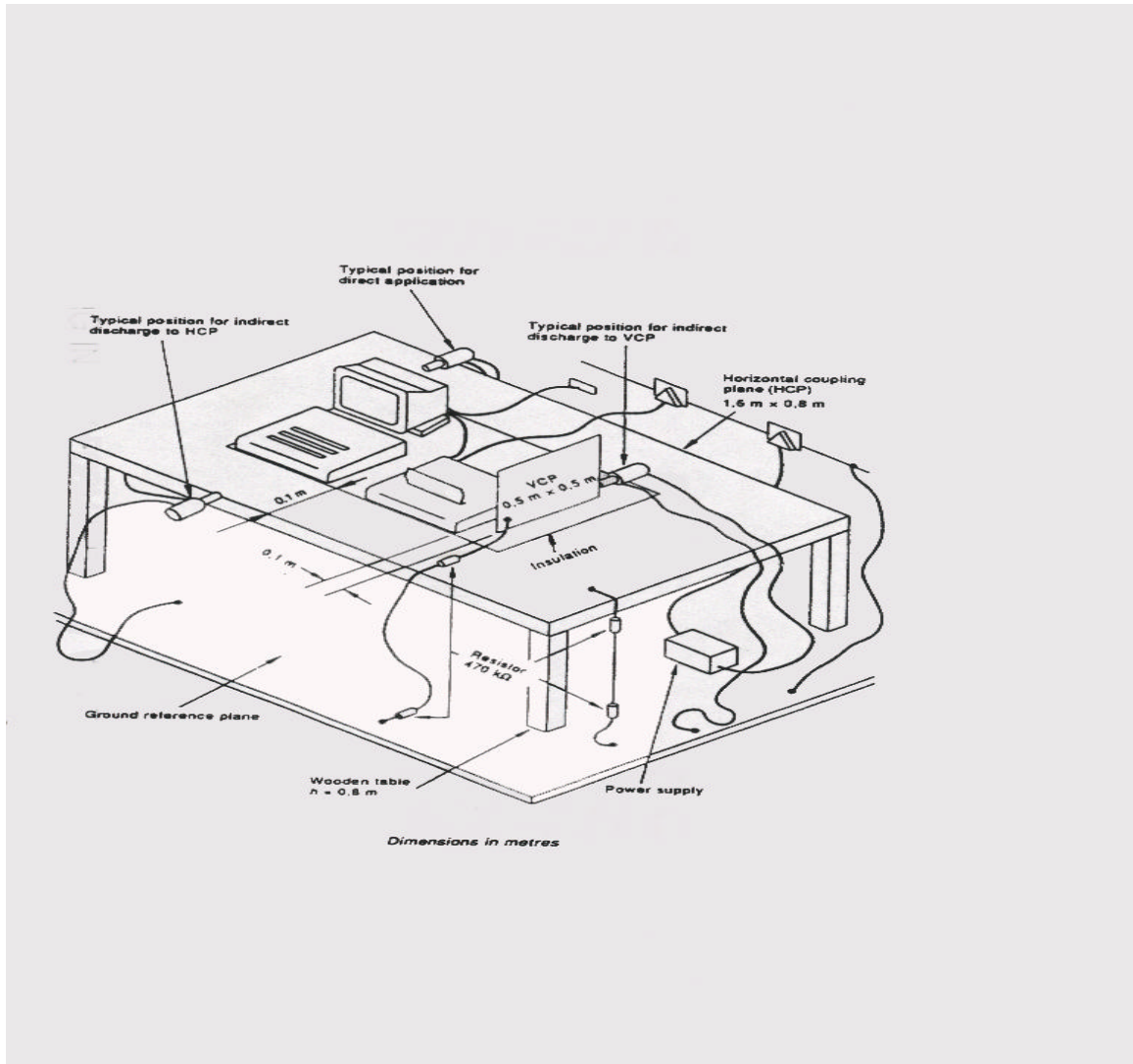
- ambient temperature: 15 to 35 ;
- relative humidity: 30 % to 60%
- atmospheric pressure: 86 KPa (860 mbar) to 106 KPa (1 060 mbar).

NOTE – Any other values are specified in the product specification.

Electromagnetic conditions

The electromagnetic environment of the laboratory shall not influence the test results.

11.2 Electrostatic Discharge Test Setup



- Example of test set-up for table-top equipment,
laboratory tests

11.3 Electrostatic Discharge Test Limits

Test levels

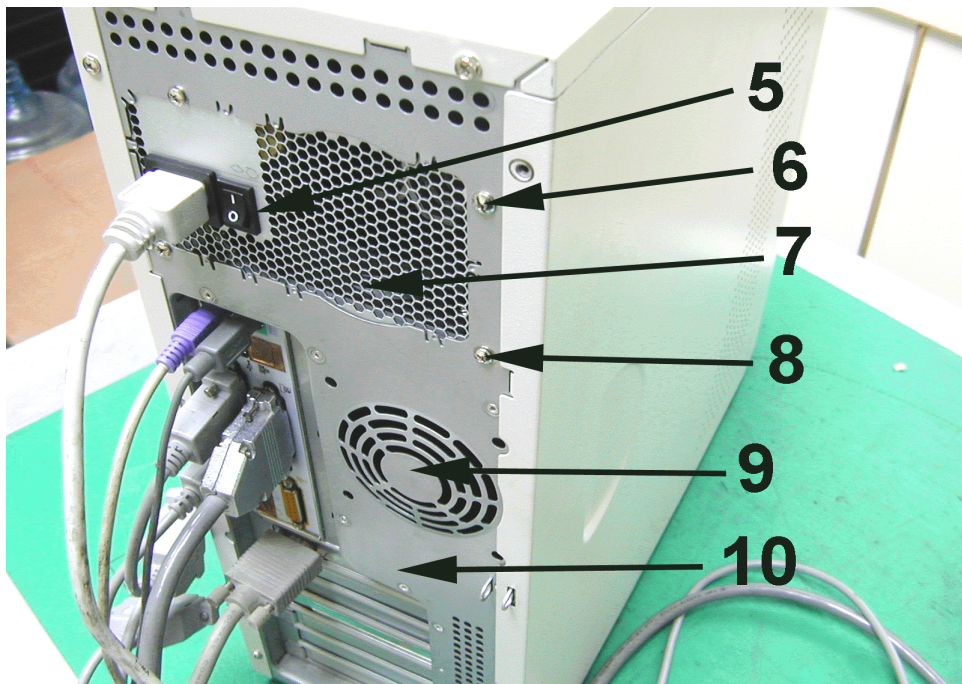
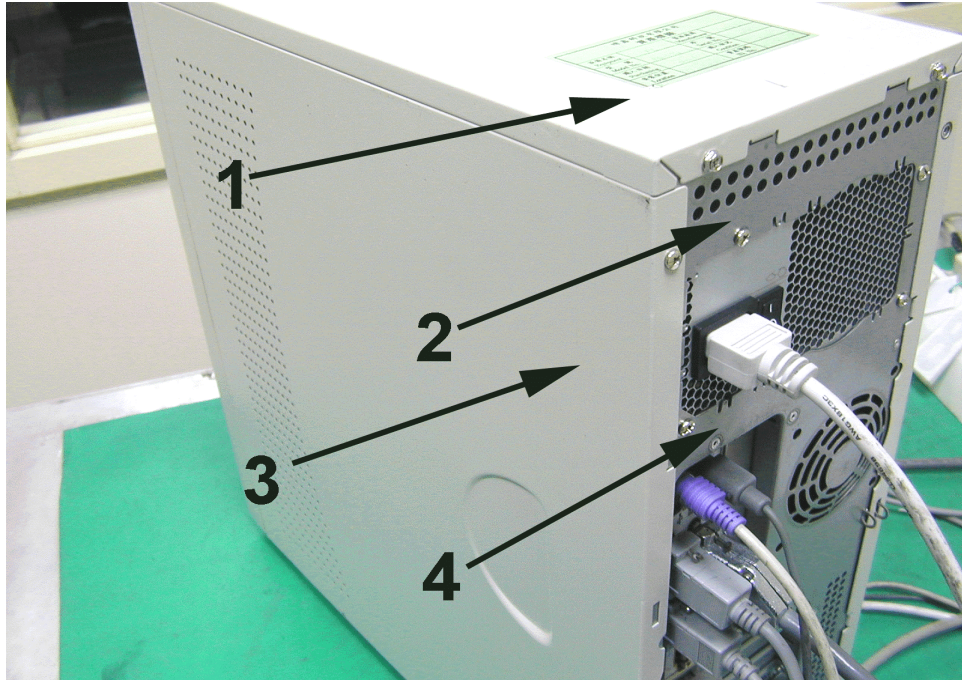
Contact discharge		Air discharge	
Level	Test voltage kv	Level	Test voltage
1	2	1	2
2	4	2	4
3	6	3	8
4	8	4	15
x ¹⁾	Special	x ¹⁾	Special

¹⁾ "x" is an open level . The level has to be specified in the dedicated equipment specification .

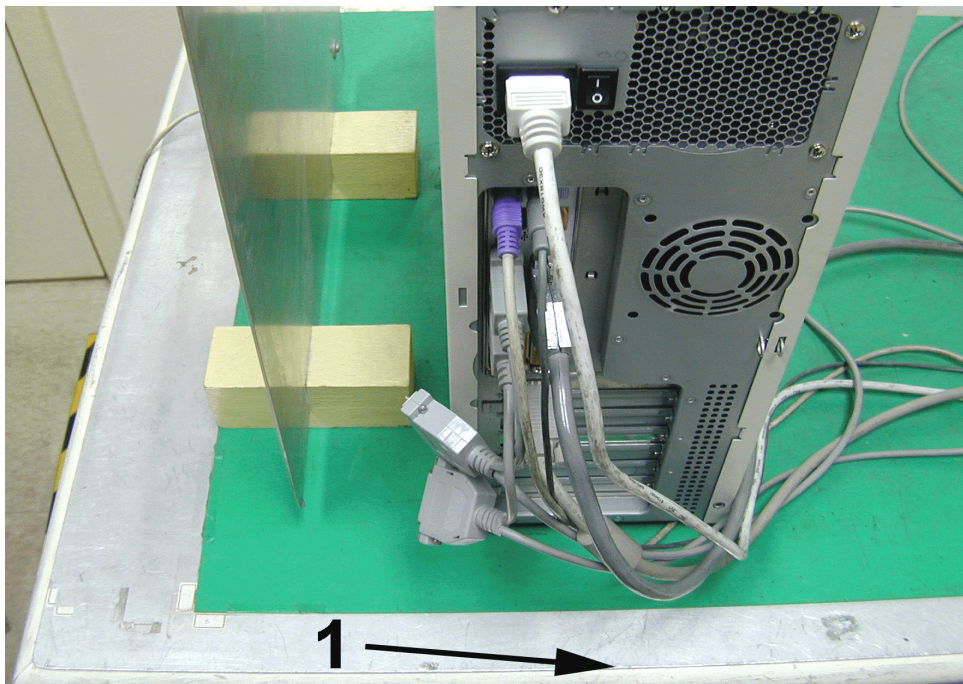
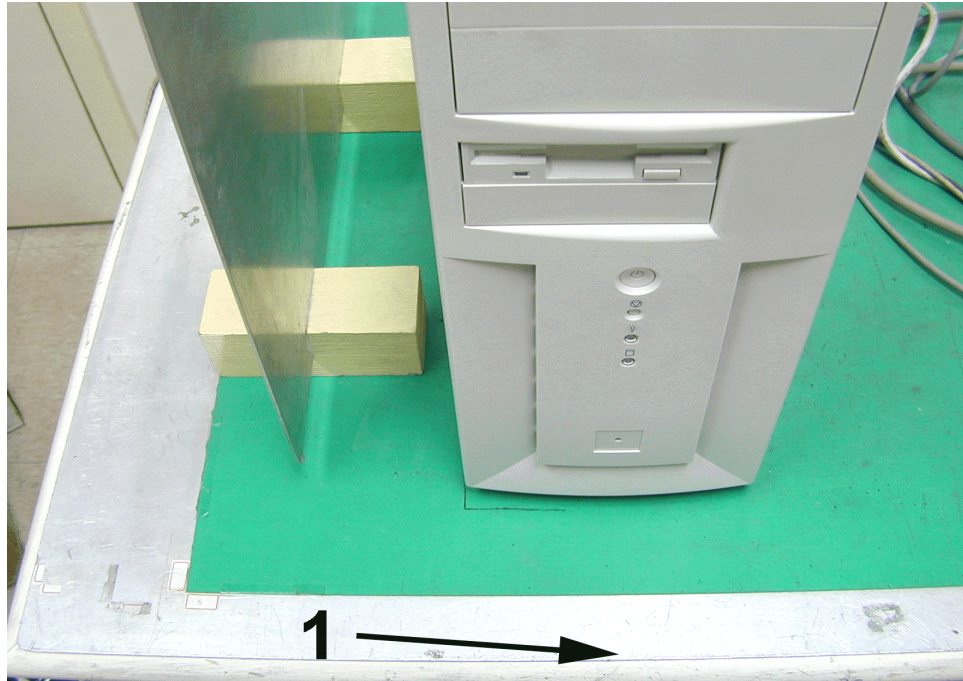
If higher voltages than those shown are specified , special test equipment may be needed .

11.4 Direct Discharge Test Drawing

Model No. : SS-300FB Active PFC yz

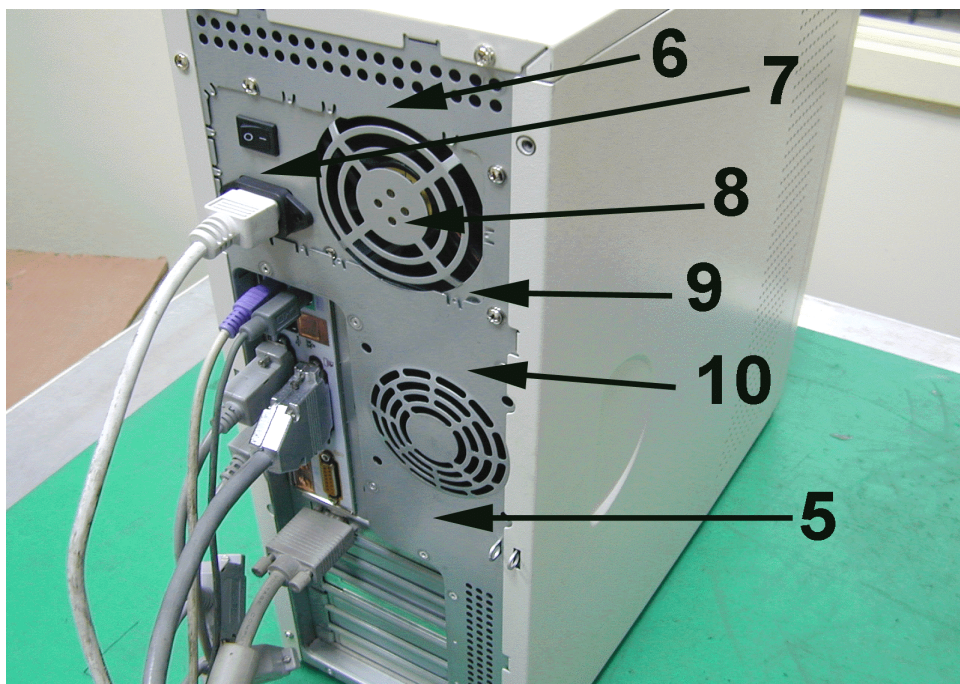
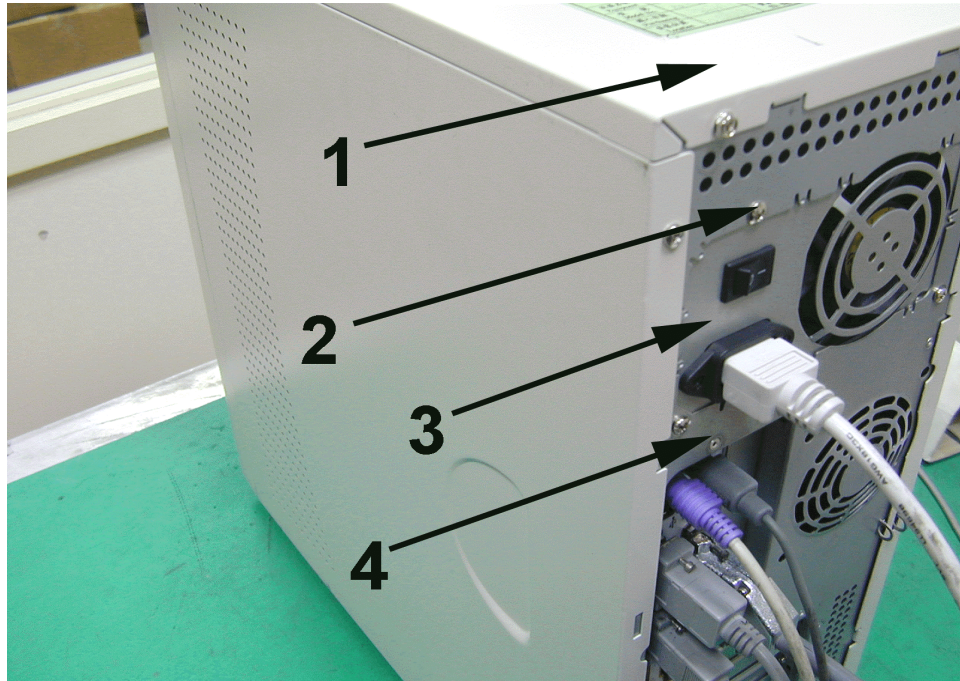


Indirect Discharge Test Drawing

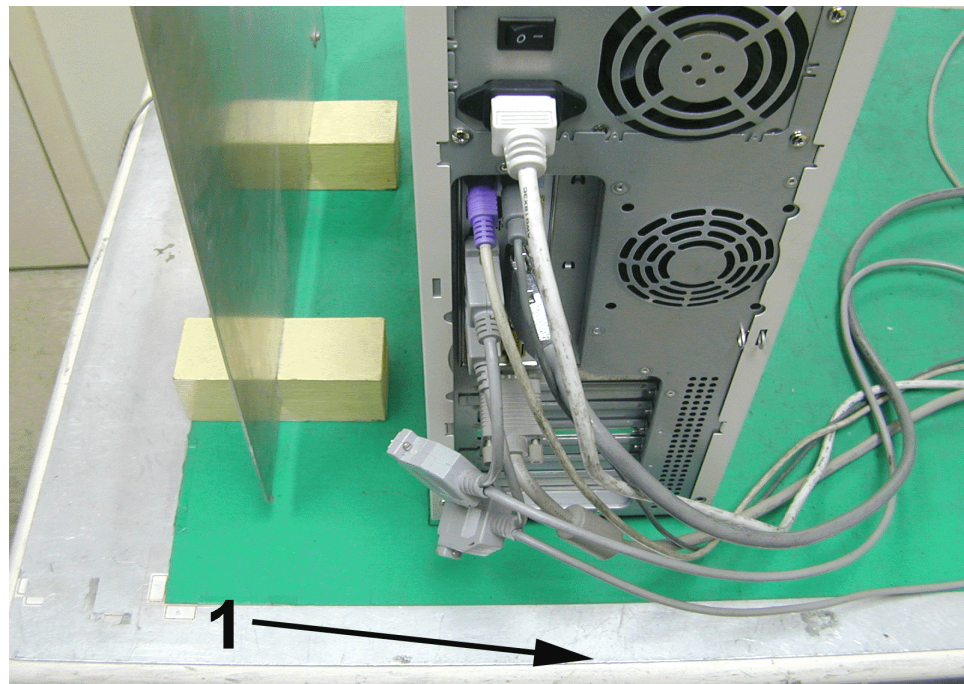
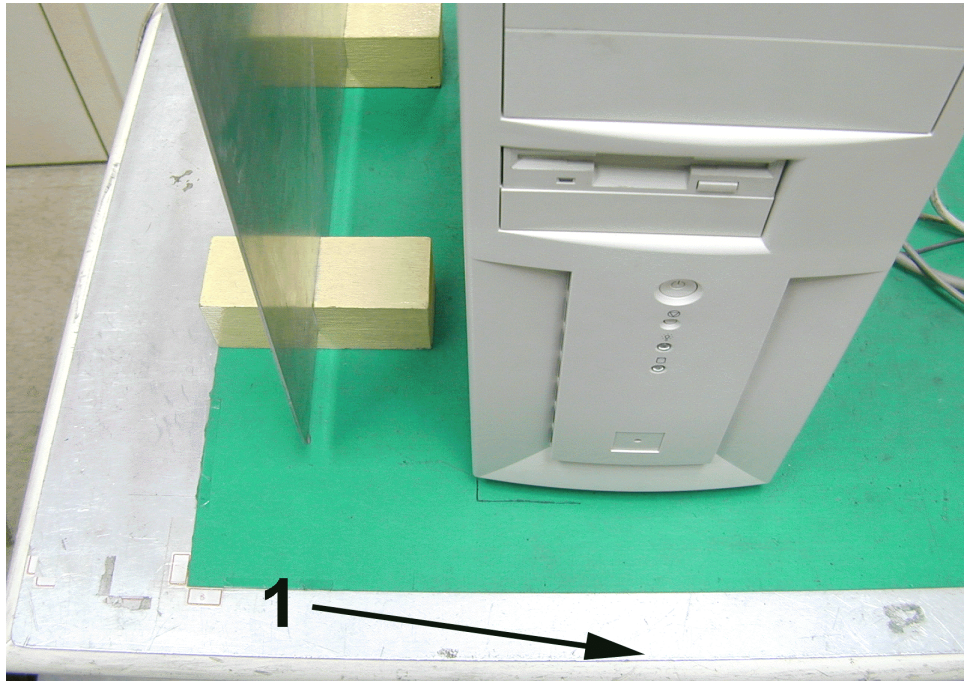


Direct Discharge Test Drawing

Model No. : SS-300AGX Active PFC yz

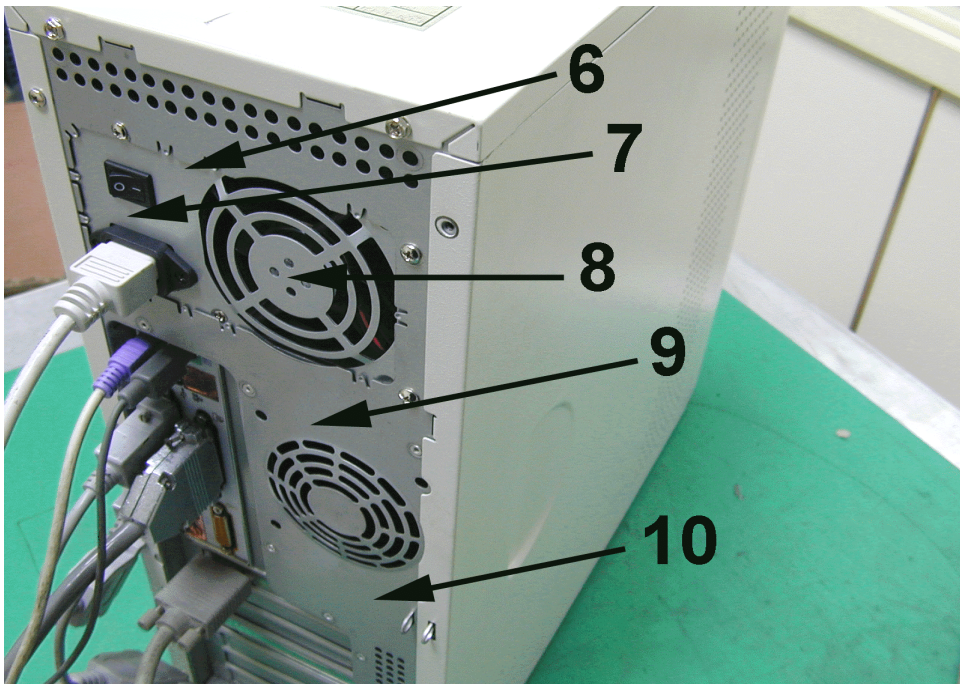
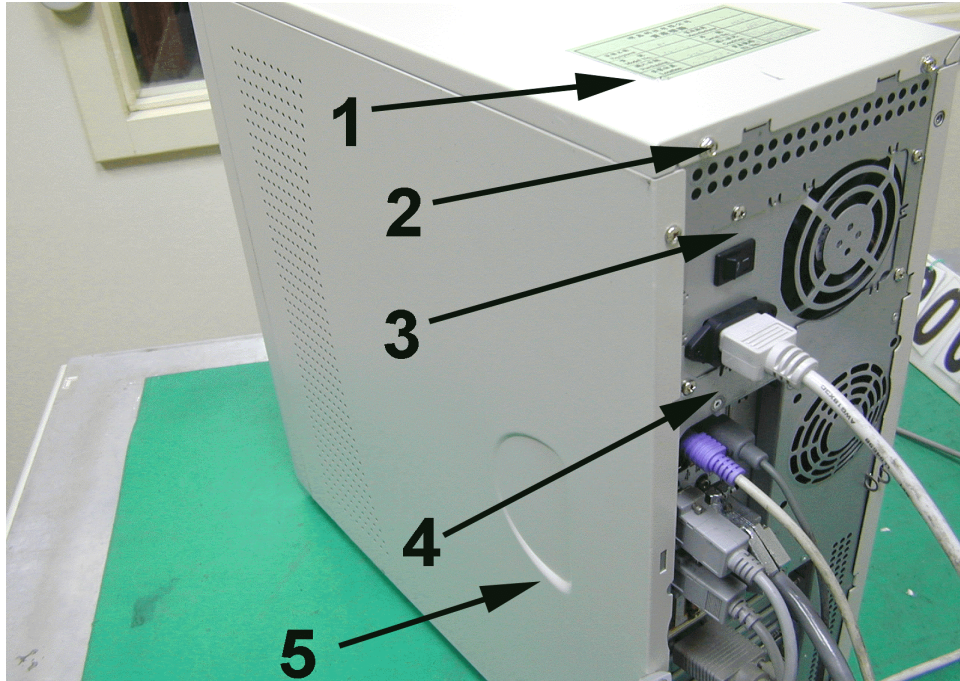


Indirect Discharge Test Drawing

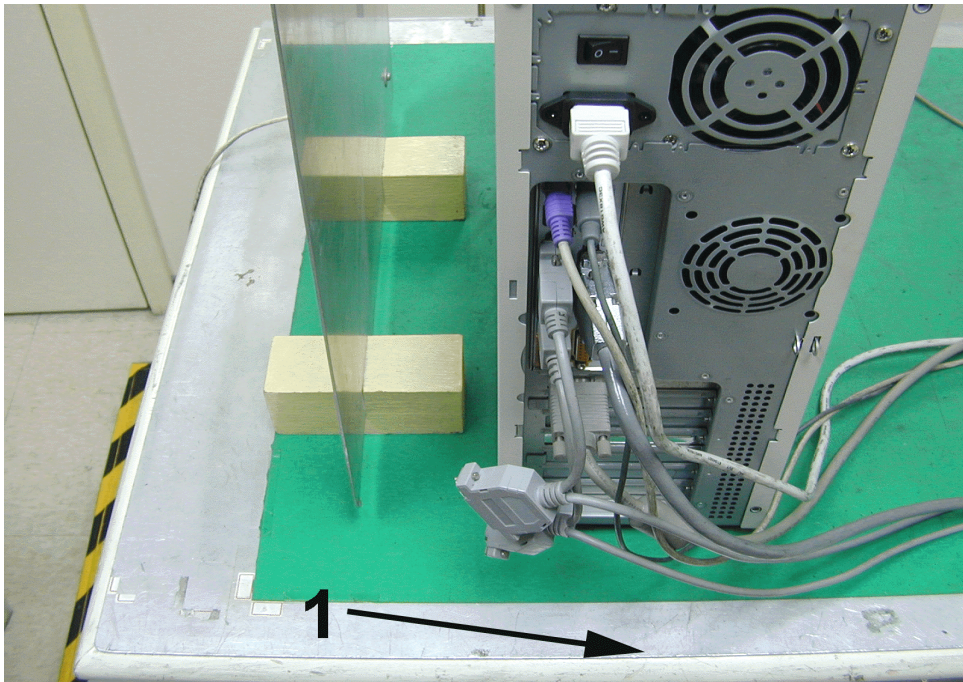
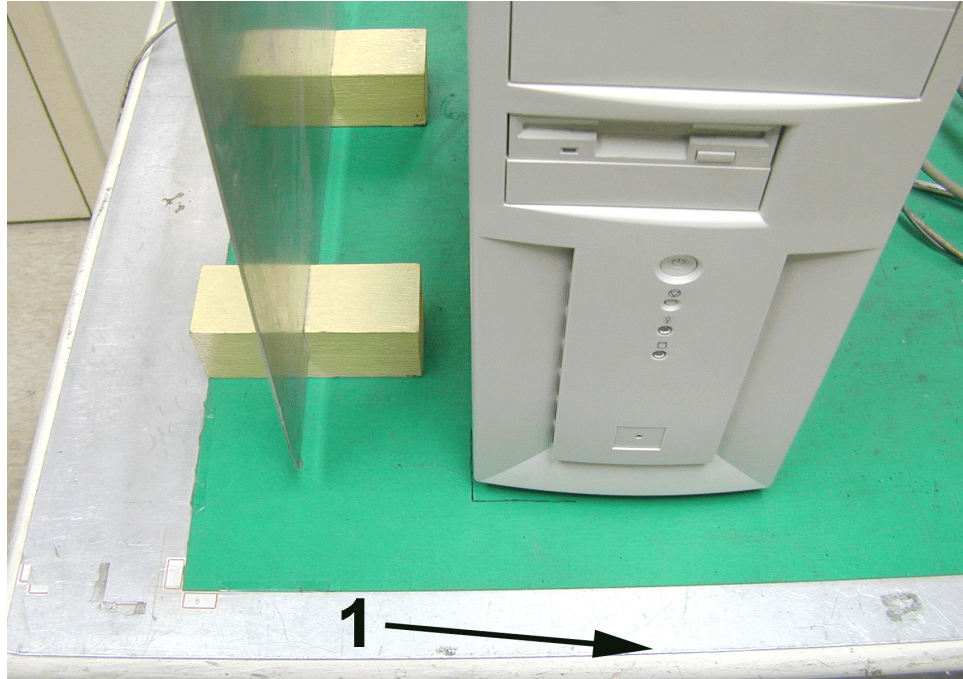


Direct Discharge Test Drawing

Model No. : SS-350UMD Active PFC Fz

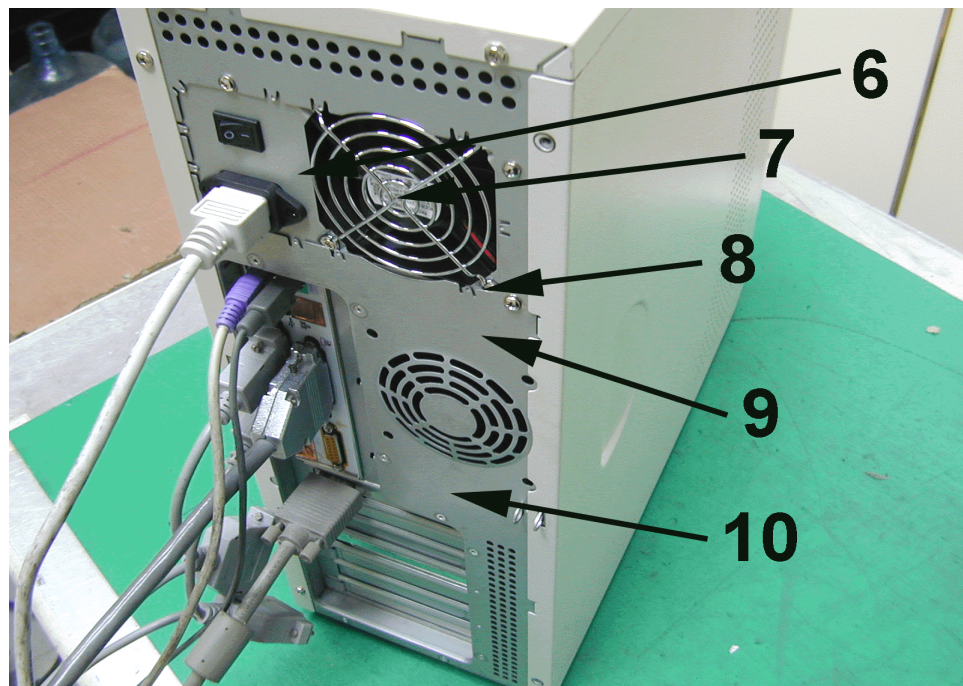
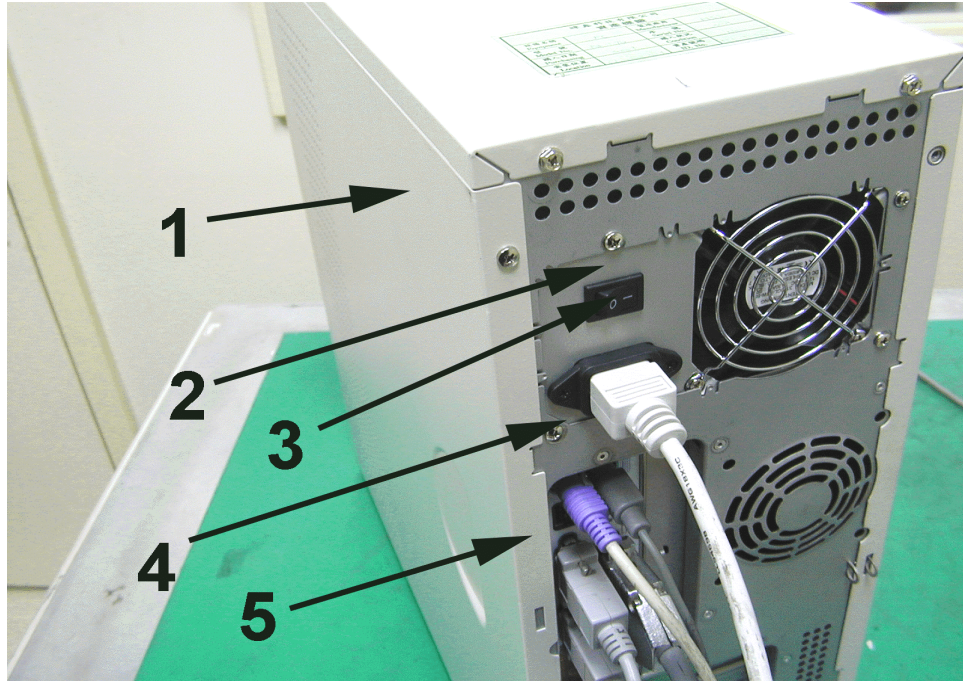


Indirect Discharge Test Drawing

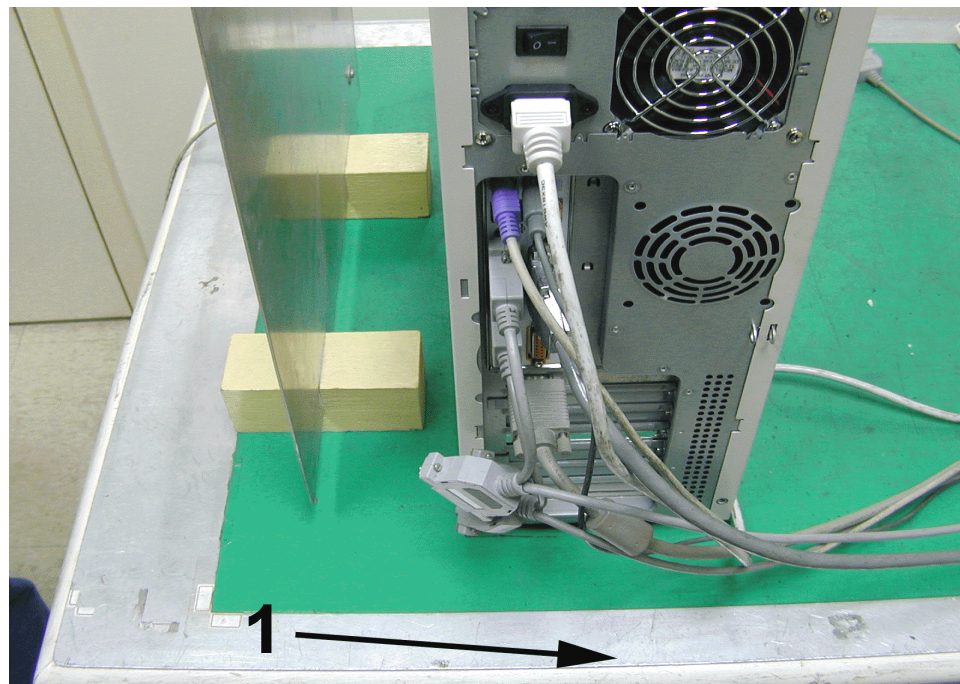
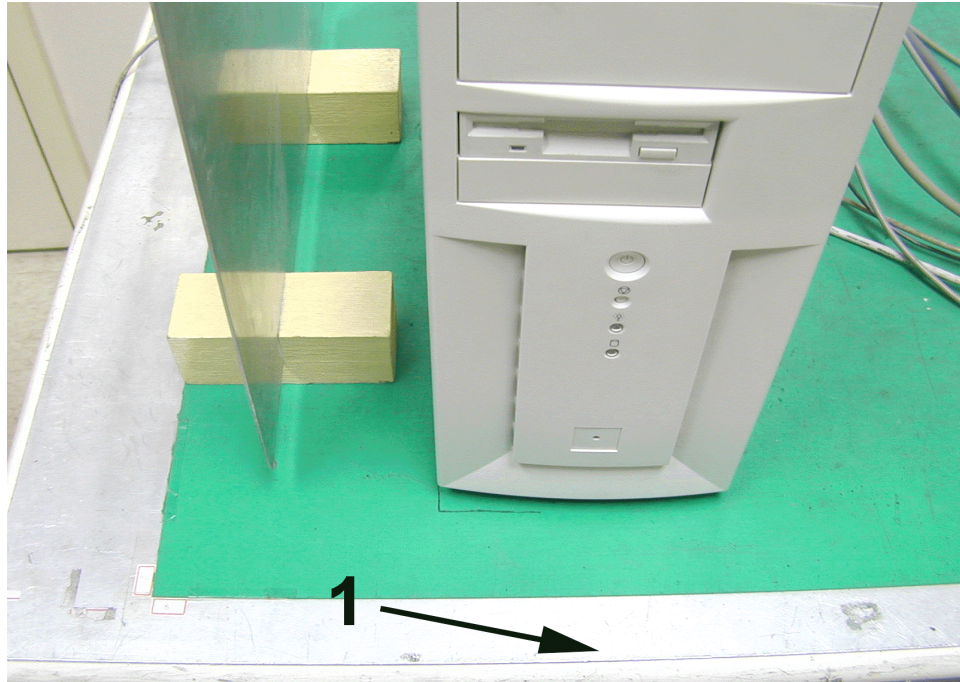


Direct Discharge Test Drawing

Model No. : SS-460AGX Active PFC Fz



Indirect Discharge Test Drawing



11.5 Electrostatic Discharge Test Data (Direct Discharge)

Model No. : SS-300FB Active PFC yz

Test Item : Direct Discharge	Instrument : NoiseKen ESS-100L
Temperature : <u>22</u>	Relative Humidity : <u>48 %RH</u>
Storage Capacitor : 150 pf	Discharge Resistor : 330 Ohm
Discharge Rate : < 1 / Sec	

	Contact Discharge								Air Discharge								
	2 KV		4 KV		6 KV		8 KV		2 KV		4 KV		6 KV		8 KV		
	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	
1	P	P	P	P	/	/	/	/	P	P	P	P	P	P	P	P	P
2	P	P	P	P	/	/	/	/	P	P	P	P	P	P	P	P	P
3	P	P	P	P	/	/	/	/	P	P	P	P	P	P	P	P	P
4	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
5	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
6	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
7	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
8	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
9	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
10	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P

1. " P " - - - - means the EUT function is correct during the test.
2. " / " - - - - no test.

Electrostatic Discharge Test Data (Indirect Discharge)

Model No. : SS-300FB Active PFC yz

Test Item : Indirect Discharge	Instrument : NoiseKen ESS-100L
Temperature : <u>22</u>	Relative Humidity : <u>48 %RH</u>
Storage Capacitor : 150 pf	Discharge Resistor : 330 Ohm
Discharge Rate : < 1 / Sec	

	Contact Discharge								Air Discharge							
	2 KV		4 KV		6 KV		8 KV		2 KV		4 KV		6 KV		8 KV	
	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
1	P	P	P	P	/	/	/	/	/	/	/	/	/	/	/	/
2	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
4	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
5	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
6	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
7	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
8	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
9	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
10	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/

1. " P " - - - - means the EUT function is correct during the test.
2. " / " - - - - no test.

Electrostatic Discharge Test Data (Direct Discharge)

Model No. : SS-300AGX Active PFC yz

Test Item : Direct Discharge	Instrument : NoiseKen ESS-100L
Temperature : <u>22</u>	Relative Humidity : <u>48 %RH</u>
Storage Capacitor : 150 pf	Discharge Resistor : 330 Ohm
Discharge Rate : < 1 / Sec	

	Contact Discharge								Air Discharge								
	2 KV		4 KV		6 KV		8 KV		2 KV		4 KV		6 KV		8 KV		
	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	
1	P	P	P	P	/	/	/	/	P	P	P	P	P	P	P	P	P
2	P	P	P	P	/	/	/	/	P	P	P	P	P	P	P	P	P
3	P	P	P	P	/	/	/	/	P	P	P	P	P	P	P	P	P
4	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
5	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
6	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
7	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
8	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
9	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
10	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P

1. " P " - - - - means the EUT function is correct during the test.
2. " / " - - - - no test.

Electrostatic Discharge Test Data (Indirect Discharge)

Model No. : SS-300AGX Active PFC yz

Test Item : Indirect Discharge	Instrument : NoiseKen ESS-100L
Temperature : <u>22</u>	Relative Humidity : <u>48 %RH</u>
Storage Capacitor : 150 pf	Discharge Resistor : 330 Ohm
Discharge Rate : < 1 / Sec	

	Contact Discharge								Air Discharge								
	2 KV		4 KV		6 KV		8 KV		2 KV		4 KV		6 KV		8 KV		
	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	
1	P	P	P	P	/	/	/	/	/	/	/	/	/	/	/	/	/
2	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
4	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
5	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
6	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
7	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
8	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
9	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
10	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/

1. " P " - - - - means the EUT function is correct during the test.
2. " / " - - - - no test.

11.5 Electrostatic Discharge Test Data (Direct Discharge)

Model No. : SS-350UMD Active PFC Fz

Test Item : Direct Discharge	Instrument : NoiseKen ESS-100L
Temperature : <u>22</u>	Relative Humidity : <u>48 %RH</u>
Storage Capacitor : 150 pf	Discharge Resistor : 330 Ohm
Discharge Rate : < 1 / Sec	

	Contact Discharge								Air Discharge								
	2 KV		4 KV		6 KV		8 KV		2 KV		4 KV		6 KV		8 KV		
	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	
1	P	P	P	P	/	/	/	/	P	P	P	P	P	P	P	P	P
2	P	P	P	P	/	/	/	/	P	P	P	P	P	P	P	P	P
3	P	P	P	P	/	/	/	/	P	P	P	P	P	P	P	P	P
4	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
5	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
6	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
7	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
8	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
9	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
10	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P

1. " P " - - - - means the EUT function is correct during the test.
2. " / " - - - - no test.

Electrostatic Discharge Test Data (Indirect Discharge)

Model No. : SS-350UMD Active PFC Fz

Test Item : Indirect Discharge	Instrument : NoiseKen ESS-100L
Temperature : <u>22</u>	Relative Humidity : <u>48 %RH</u>
Storage Capacitor : 150 pf	Discharge Resistor : 330 Ohm
Discharge Rate : < 1 / Sec	

	Contact Discharge								Air Discharge								
	2 KV		4 KV		6 KV		8 KV		2 KV		4 KV		6 KV		8 KV		
	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	
1	P	P	P	P	/	/	/	/	/	/	/	/	/	/	/	/	/
2	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
4	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
5	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
6	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
7	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
8	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
9	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
10	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/

1. " P " - - - - means the EUT function is correct during the test.
2. " / " - - - - no test.

Electrostatic Discharge Test Data (Direct Discharge)

Model No. : SS-460AGX Active PFC Fz

Test Item : Direct Discharge	Instrument : NoiseKen ESS-100L
Temperature : <u>22</u>	Relative Humidity : <u>48 %RH</u>
Storage Capacitor : 150 pf	Discharge Resistor : 330 Ohm
Discharge Rate : < 1 / Sec	

	Contact Discharge								Air Discharge								
	2 KV		4 KV		6 KV		8 KV		2 KV		4 KV		6 KV		8 KV		
	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	
1	P	P	P	P	/	/	/	/	P	P	P	P	P	P	P	P	P
2	P	P	P	P	/	/	/	/	P	P	P	P	P	P	P	P	P
3	P	P	P	P	/	/	/	/	P	P	P	P	P	P	P	P	P
4	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
5	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
6	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
7	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
8	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
9	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P
10	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P	P

1. " P " - - - - means the EUT function is correct during the test.
2. " / " - - - - no test.

Electrostatic Discharge Test Data (Indirect Discharge)

Model No. : SS-460AGX Active PFC Fz

Test Item : Indirect Discharge	Instrument : NoiseKen ESS-100L
Temperature : <u>22</u>	Relative Humidity : <u>48 %RH</u>
Storage Capacitor : 150 pf	Discharge Resistor : 330 Ohm
Discharge Rate : < 1 / Sec	

	Contact Discharge								Air Discharge							
	2 KV		4 KV		6 KV		8 KV		2 KV		4 KV		6 KV		8 KV	
	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
1	P	P	P	P	/	/	/	/	/	/	/	/	/	/	/	/
2	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
4	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
5	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
6	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
7	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
8	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
9	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
10	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/

1. " P " - - - - means the EUT function is correct during the test.
2. " / " - - - - no test.

12. EN 61000-4-3 Radio-Frequency Electromagnetic Field Test

Test standard	Model No.	Result
EN 61000-4-3	SS-300FB Active PFC yz, SS-300AGX Active PFC yz, SS-350UMD Active PFC Fz, SS-460AGX Active PFC Fz	A

Field Strength : 3 V/M , Level 2 .

Modulation : AM 80 % , 1KHz . ON (YES) . OFF (___)

Start : 80 MHz , Stop : 1000 MHz . AC Power : 230 Vac

DC Power : N/A Vdc

Field Strength : 10 V/M , Level 3 .

Modulation : AM 80 % , 1KHz . ON (YES) . OFF (___)

Start : 80 MHz , Stop : 1000 MHz . AC Power : 230 Vac

DC Power : N/A Vdc

The test results shall be classified on the basis of the operating conditions and the functional specifications of the equipment under test , as in the following , unless different specifications are given by product committees or product specifications :

Performance Criterion :

A) normal performance within the specification limits ;

B) temporary degradation or loss of function or performance which is self-recoverable ;

C) temporary degradation or loss of function or performance which requires operator intervention or system reset ;

12.1 Radio-Frequency Electromagnetic Field Test Description

Most electronic equipment is, in some manner, affected by electromagnetic radiation.

This radiation is frequently generated by such sources as the small hand-held radio transceivers that are used by operating, maintenance and security personnel, fixed-station radio and television transmitters, vehicle radio transmitters, and various industrial electromagnetic sources.

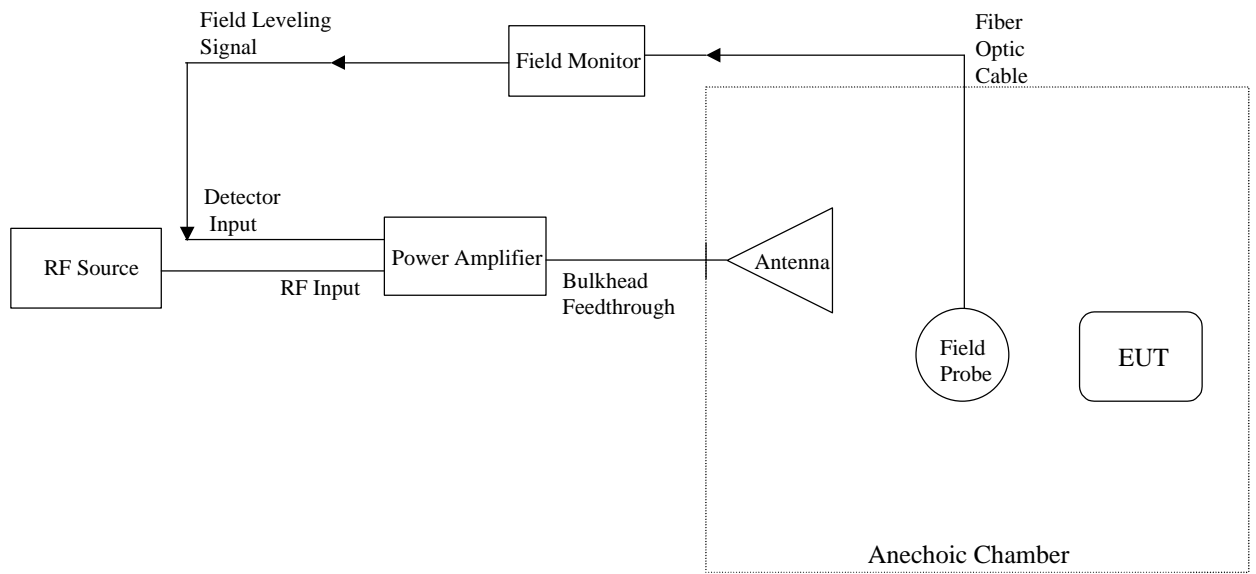
In addition to electromagnetic energy deliberately generated, there is also spurious radiation caused by devices such as welders, thyristors, fluorescent lights, switches operating inductive loads, etc. For the most part, this interference manifests itself as conducted electrical interference and, as such, is dealt with in other parts of this standard. Methods employed to prevent effects from electromagnetic fields will normally also reduce the effects from these sources.

The electromagnetic environment is determined by the strength of the electromagnetic field (field strength in volts per metre). The field strength is not easily measured without sophisticated instrumentation nor is it easily calculated by classical equations and formulae because of the effect of surrounding structures or the proximity of other equipment that will distort and/or reflect the electromagnetic waves.

All testing of equipment shall be performed in a configuration as close as possible to the installed case. Wiring shall be consistent with the manufacturer's recommended procedures, and the equipment shall be in its housing with all covers and access panels in place, unless otherwise stated.

If the equipment is designed to be mounted in a panel, rack or cabinet, it shall be tested in this configuration.

12.2 Radio-Frequency Electromagnetic Field Test Block Diagram



12.3 Radio-Frequency Electromagnetic Field Test Limits

Table 1 - Test levels

Level	Test field strength V/m
1	1
2	3
3	10
x	Special

NOTE – x is an open test level. This level may be given in the Product specification.

Table 1 gives details of the field strength of the unmodulated signal. For testing of equipment, this signal is 80 % amplitude modulate with a 1 KHz sinewave to simulate actual threats.

12.4 Radio-Frequency Electromagnetic Field Test Setup Photo

Model No. : SS-300FB Active PFC yz

< FRONT VIEW >



Model No. : SS-300AGX Active PFC yz

< FRONT VIEW >



Model No. : SS-350UMD Active PFC Fz

< FRONT VIEW >



Model No. : SS-460AGX Active PFC Fz

< FRONT VIEW >



13. EN 61000-4-4 Fast Transient Burst Test

Test standard	Model No.	Result
EN 61000-4-4	SS-300FB Active PFC yz, SS-300AGX Active PFC yz, SS-350UMD Active PFC Fz, SS-460AGX Active PFC Fz	B

The test results shall be classified on the basis of the operating conditions and the functional specifications of the equipment under test , as in the following , unless different specifications are given by product committees or product specifications :

Performance Criterion :

- A) normal performance within the specification limits ;***
- B) temporary degradation or loss of function or performance which is self-recoverable ;***
- C) temporary degradation or loss of function or performance which requires operator intervention or system reset ;***

13.1 Fast Transient Bursts Test Description

The repetitive fast transient test is a test with bursts consisting of a number of fast transients, coupled into MBS, control and signal ports of electrical and electronic equipment. Significant for the test are the short rise time, the repetition rate and the low energy of the transients.

The test shall be carried out on the basis of a test plan including verification of the performances of the EUT as defined in the technical specification.

Climatic conditions

The tests shall be carried out in standard climatic conditions in accordance with IEC 68-1:

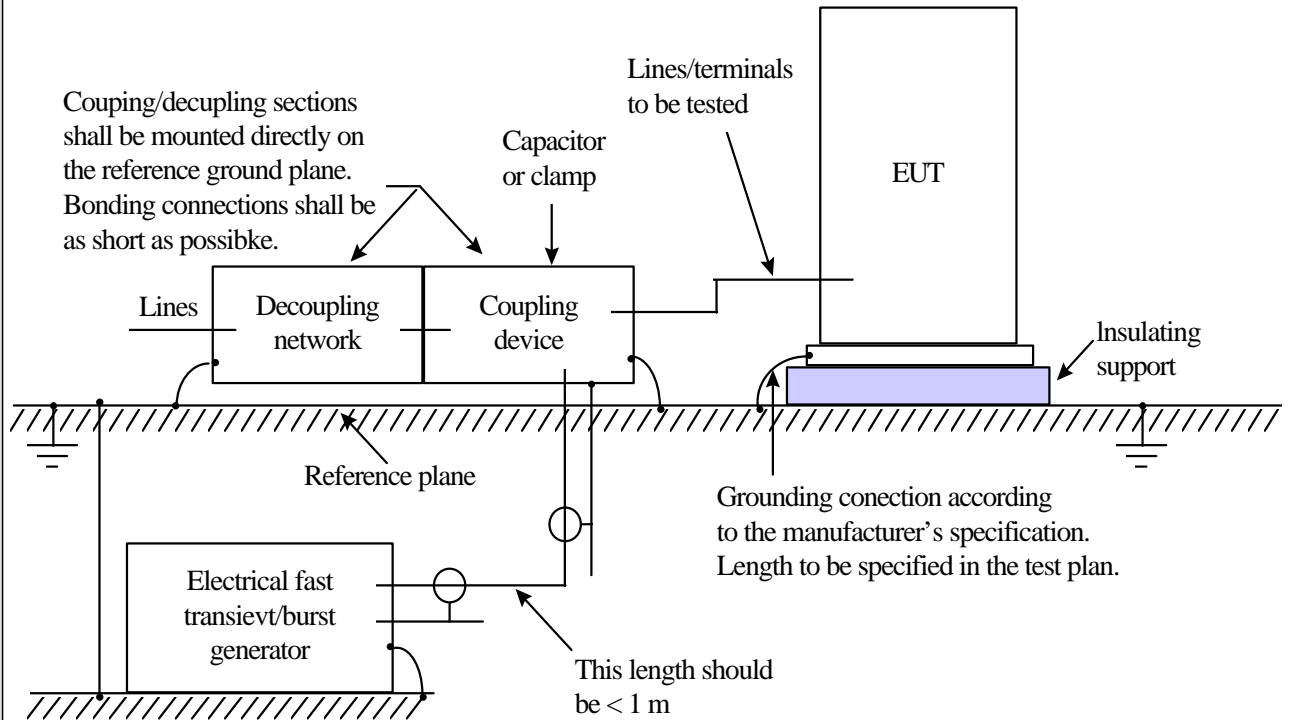
- ambient temperature: 15 to 35
- relative humidity: 25% to 75%
- atmospheric pressure: 86kPa (860 mbar) to 106Kpa (1 060 mbar)

NOTE – Any other values are specified in the product specification.

Electromagnetic conditions

The electromagnetic conditions of the laboratory shall be such to guarantee the correct operation of the EUT in order not to influence the test results.

13.2 Fast Transient Burst Test Setup



Block-diagram for electrical fast transient/burst immunity test

13.3 Fast Transient Burst Test Limits

Test levels

Open-circuit output test voltage ($\pm 10\%$) and repetition rate of the impulses ($\pm 20\%$)				
Level	On MBS port, PE		On I/O (Input/Output) signal, data and control ports	
	Voltage peak kV	Repetition rate kHz	Voltage peak kV	Repetition rate kHz
1	0.5	5	0.25	5
2	1	5	0.5	5
3	2	5	1	5
4	4	2.5	2	5
x ¹⁾	Special	Special	Special	Special

¹⁾ "x" is an open level. The level has to be specified in the dedicated equipment specification.

13.4 Fast Transient Burst Test Setup Photo

Model No. : SS-300FB Active PFC yz

< FRONT VIEW >



Model No. : SS-300AGX Active PFC yz

< FRONT VIEW >



Model No. : SS-350UMD Active PFC Fz

< FRONT VIEW >



Model No. : SS-460AGX Active PFC Fz

< FRONT VIEW >



13.5 Fast Transient Burst Test Data

MODEL NO. : SS-300FB Active PFC yz

REGULATION : **According to EN 61000-4-4 (1995) Spec.**

TEST RESULT

Temperature : <u>22 degree .</u>		Duration of tests : <u>1 min .</u>					
Relative Humidity : <u>48 % RH .</u>		Time between test : <u>60 second .</u>					
Pulse : <u>5 / 50 ns .</u>		AC Power : <u>230 Vac .</u>					
Burst : <u>15 ms / 300 ms .</u>		DC Power : <u>N/A Vdc .</u>					
Voltage \ Polarity \ Test Point \ Mode \ Result		0.5 KV		1 KV		2 KV	
		+	-	+	-	+	-
Power Line	L	/	/	P	P	P	P
	N	/	/	P	P	P	P
	G	/	/	P	P	P	P
Signal Line Clamp Test		/	/	/	/	/	/

- Note :
1. "P" mean the EUT function is correct during the test .
 2. "F" ----- Fail
 3. "/" ----- no test

MODEL NO. : SS-300AGX Active PFC yz

REGULATION : **According to EN 61000-4-4 (1995) Spec.**

TEST RESULT

Temperature : <u>22 degree .</u>	Duration of tests : <u>1 min .</u>						
Relative Humidity : <u>48 % RH .</u>	Time between test : <u>60 second .</u>						
Pulse : <u>5 / 50 ns .</u>	AC Power : <u>230 Vac .</u>						
Burst : <u>15 ms / 300 ms .</u>	DC Power : <u>N/A Vdc .</u>						
Voltage \ Polarity	0.5 KV	1 KV	2 KV				
\ Test Point \ Mode \ Result	+	-	+	-	+	-	
Power Line	L	/	/	P	P	P	P
	N	/	/	P	P	P	P
	G	/	/	P	P	P	P
Signal Line Clamp Test	/	/	/	/	/	/	

- Note :
1. "P" mean the EUT function is correct during the test .
 2. "F" ----- Fail
 3. "/" ----- no test

MODEL NO. : SS-350UMD Active PFC Fz

REGULATION : **According to EN 61000-4-4 (1995) Spec.**

TEST RESULT

Temperature : <u>22 degree .</u>	Duration of tests : <u>1 min .</u>						
Relative Humidity : <u>48 % RH .</u>	Time between test : <u>60 second .</u>						
Pulse : <u>5 / 50 ns .</u>	AC Power : <u>230 Vac .</u>						
Burst : <u>15 ms / 300 ms .</u>	DC Power : <u>N/A Vdc .</u>						
Voltage \ Polarity \ Test Point \ Mode \ Result	0.5 KV		1 KV		2 KV		
	+	-	+	-	+	-	
Power Line	L	/	/	P	P	P	P
	N	/	/	P	P	P	P
	G	/	/	P	P	P	P
Signal Line Clamp Test		/	/	/	/	/	/

- Note :
1. "P" mean the EUT function is correct during the test .
 2. "F" ----- Fail
 3. "/" ----- no test

MODEL NO. : SS-460AGX Active PFC Fz

REGULATION : **According to EN 61000-4-4 (1995) Spec.**

TEST RESULT

Temperature : <u>22 degree .</u>	Duration of tests : <u>1 min .</u>						
Relative Humidity : <u>48 % RH .</u>	Time between test : <u>60 second .</u>						
Pulse : <u>5 / 50 ns .</u>	AC Power : <u>230 Vac .</u>						
Burst : <u>15 ms / 300 ms .</u>	DC Power : <u>N/A Vdc .</u>						
Voltage \ Polarity	0.5 KV	1 KV	2 KV				
\ Test Point \ Mode \ Result	+	-	+	-	+	-	
Power Line	L	/	/	P	P	P	P
	N	/	/	P	P	P	P
	G	/	/	P	P	P	P
Signal Line Clamp Test	/	/	/	/	/	/	

- Note :
1. "P" mean the EUT function is correct during the test .
 2. "F" ----- Fail
 3. "/" ----- no test

14. EN 61000-4-5 Surge Immunity Test

Test standard	Model No.	Result
EN 61000-4-5	SS-300FB Active PFC yz, SS-300AGX Active PFC yz, SS-350UMD Active PFC Fz, SS-460AGX Active PFC Fz	B

The test results shall be classified on the basis of the operating conditions and the functional specifications of the equipment under test , as in the following , unless different specifications are given by product committees or product specifications :

Performance Criterion :

- A) normal performance within the specification limits ;***
- B) temporary degradation or loss of function or performance which is self-recoverable ;***
- C) temporary degradation or loss of function or performance which requires operator intervention or system reset ;***

14.1 Surge Immunity Test Description

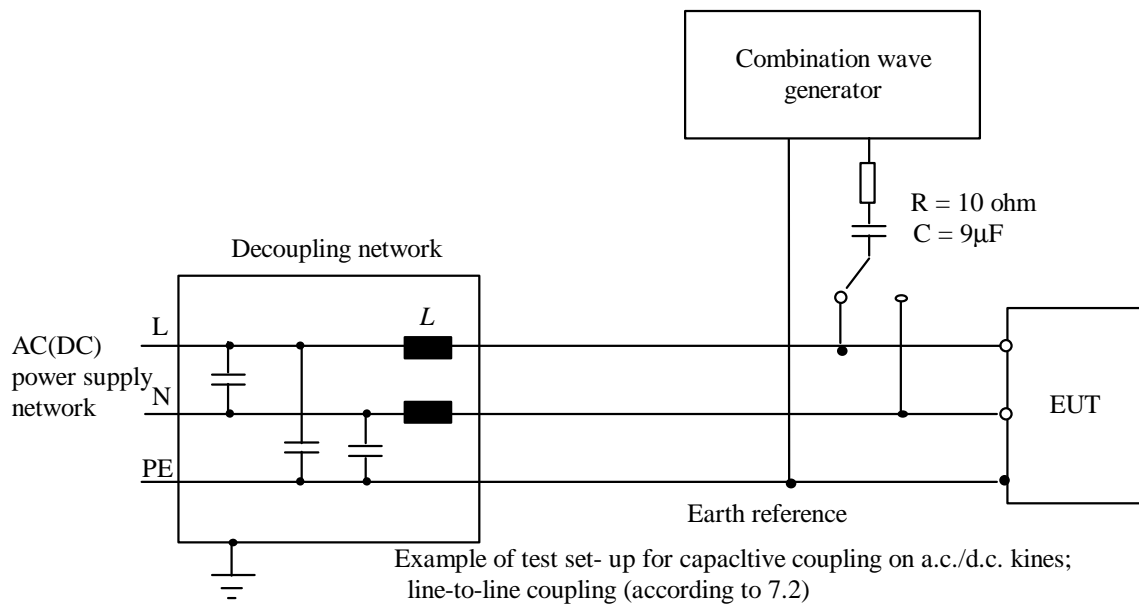
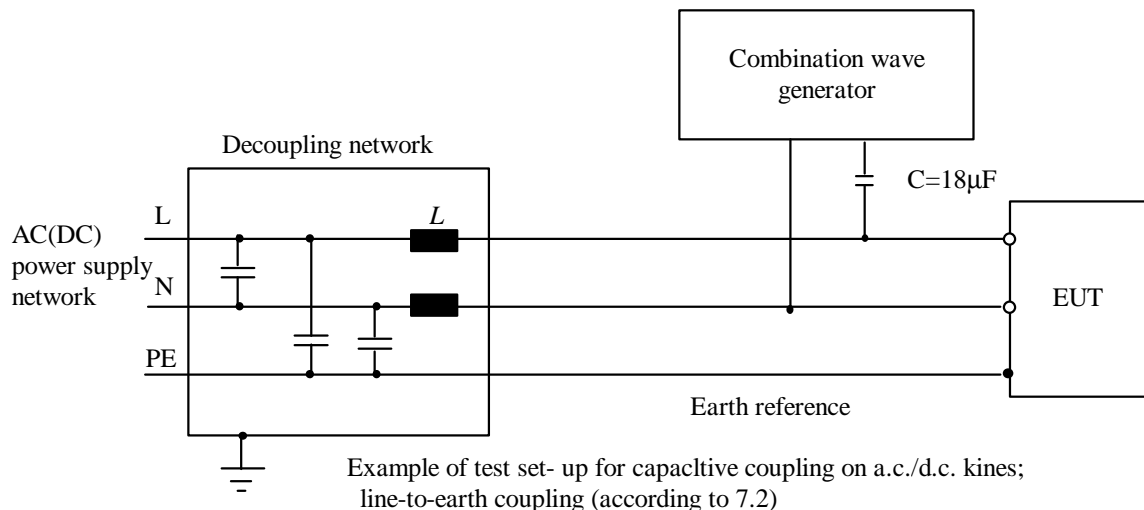
The task of the described laboratory test is to find the reaction of the EUT under specified operational conditions caused by surge voltages from switching and lightning effects at certain threat levels.

The following equipment is part of the test set-up :

- equipment under test (EUT);
- auxiliary equipment (AE);
- cables (of specified type and length);
- coupling device (capacitive or arrestors);
- test generator (combination wave generator, 1.2/50 μ s generator);
- decoupling network/protection devices;
- additional resistors, 10 ohm and 40 ohm

The surge is to be applied to the EUT MBS 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 so that the specified wave may be developed on the lines under test .

14.2 Surge Immunity Test Setup



14.3 Surge Immunity Test Limits

The preferential range of test levels is given in table 1.

Table 1-Test levels

Level	Open-circuit test voltage $\pm 10\%$ kV
1	0.5
2	1.0
3	2.0
4	4.0
x	Special
NOTE - x is an open class . The level can be specified in the product specification .	

14.4 Surge Immunity Test Setup Photo

Model No. : SS-300FB Active PFC yz

< FRONT VIEW >



Model No. : SS-300AGX Active PFC yz

< FRONT VIEW >



Model No. : SS-350UMD Active PFC Fz

< FRONT VIEW >



Model No. : SS-460AGX Active PFC Fz

< FRONT VIEW >



14.5 Surge Immunity Test Data

MODEL NO : SS-300FB Active PFC yz

TEST SETUP : According to EN 61000-4-5 (1995)

TEST RESULT

Temperature		: <u>22</u>	Relative Humidity		<u>48 %RH</u>					
Waveform		: <u>1,2 x 50 μs</u>	Test rate		<u>15 sec</u>					
Times		<u>1</u>	times / each condition		AC power <u>230 VAC</u>					
		\Phase	0	45	90	135	180	215	270	315
\Voltage\Mode\Polarity\Result										
1KV	Line	+	P	P	P	P	P	P	P	P
	Neutral	-	P	P	P	P	P	P	P	P
2KV	Line	+	/	/	/	/	/	/	/	/
	Neutral	-	/	/	/	/	/	/	/	/
2KV	Line	+	P	P	P	P	P	P	P	P
	Ground	-	P	P	P	P	P	P	P	P
	Neutral	+	P	P	P	P	P	P	P	P
	Ground	-	P	P	P	P	P	P	P	P

- Note : 1. " P " means the EUT function is correct during the test
 2. " / " no test

MODEL NO : SS-300AGX Active PFC yzTEST SETUP : According to EN 61000-4-5 (1995)

TEST RESULT

Temperature : <u>22</u>		Relative Humidity <u>48 %RH</u>								
Waveform : <u>1,2 x 50 μs</u>		Test rate : <u>15</u> sec								
Times <u>1</u> times / each condition		AC power <u>230</u> VAC								
		\Phase	0	45	90	135	180	215	270	315
\Voltage\Mode\Polarity\Result										
1KV	Line	+	P	P	P	P	P	P	P	P
	Neutral	-	P	P	P	P	P	P	P	P
2KV	Line	+	/	/	/	/	/	/	/	/
	Neutral	-	/	/	/	/	/	/	/	/
2KV	Line	+	P	P	P	P	P	P	P	P
	Ground	-	P	P	P	P	P	P	P	P
	Neutral	+	P	P	P	P	P	P	P	P
	Ground	-	P	P	P	P	P	P	P	P

- Note : 1. " P " means the EUT function is correct during the test
 2. "/" no test

MODEL NO : SS-350UMD Active PFC FzTEST SETUP : According to EN 61000-4-5 (1995)

TEST RESULT

Temperature : <u>22</u>		Relative Humidity <u>48 %RH</u>								
Waveform : <u>1,2 x 50 μs</u>		Test rate : <u>15</u> sec								
Times <u>1</u> times / each condition		AC power <u>230</u> VAC								
		\Phase	0	45	90	135	180	215	270	315
\Voltage\Mode\Polarity\Result										
1KV	Line	+	P	P	P	P	P	P	P	P
	Neutral	-	P	P	P	P	P	P	P	P
2KV	Line	+	/	/	/	/	/	/	/	/
	Neutral	-	/	/	/	/	/	/	/	/
2KV	Line	+	P	P	P	P	P	P	P	P
	Ground	-	P	P	P	P	P	P	P	P
	Neutral	+	P	P	P	P	P	P	P	P
	Ground	-	P	P	P	P	P	P	P	P

- Note : 1. " P " means the EUT function is correct during the test
 2. "/" no test

MODEL NO : SS-460AGX Active PFC FzTEST SETUP : According to EN 61000-4-5 (1995)

TEST RESULT

Temperature : <u>22</u>		Relative Humidity <u>48 %RH</u>								
Waveform : <u>1,2 x 50 μs</u>		Test rate : <u>15</u> sec								
Times <u>1</u> times / each condition		AC power <u>230</u> VAC								
		\Phase	0	45	90	135	180	215	270	315
\Voltage\Mode\Polarity\Result										
1KV	Line	+	P	P	P	P	P	P	P	P
	Neutral	-	P	P	P	P	P	P	P	P
2KV	Line	+	/	/	/	/	/	/	/	/
	Neutral	-	/	/	/	/	/	/	/	/
2KV	Line	+	P	P	P	P	P	P	P	P
	Ground	-	P	P	P	P	P	P	P	P
	Neutral	+	P	P	P	P	P	P	P	P
	Ground	-	P	P	P	P	P	P	P	P

- Note : 1. " P " means the EUT function is correct during the test
 2. "/" no test

15. EN 61000-4-6 Immunity To Conducted Disturbances, Induced By Radio-Frequency Fields

Test standard	Model No.	Result
EN 61000-4-6	SS-300FB Active PFC yz, SS-300AGX Active PFC yz, SS-350UMD Active PFC Fz, SS-460AGX Active PFC Fz	A

The test results shall be classified on the basis of the operating conditions and the functional specifications of the equipment under test , as in the following , unless different specifications are given by product committees or product specifications :

Performance Criterion :

- A) normal performance within the specification limits ;*
- B) temporary degradation or loss of function or performance which is self-recoverable ;*
- C) temporary degradation or loss of function or performance which requires operator intervention or system reset ;*

15.1 Immunity To Conducted Disturbances, Induced By Radio-Frequency Fields Description

The EUT shall be placed on an insulating support, 0.1 m above the ground reference plane. For table-top equipment, the ground reference plane may be placed on a table (see figure) .

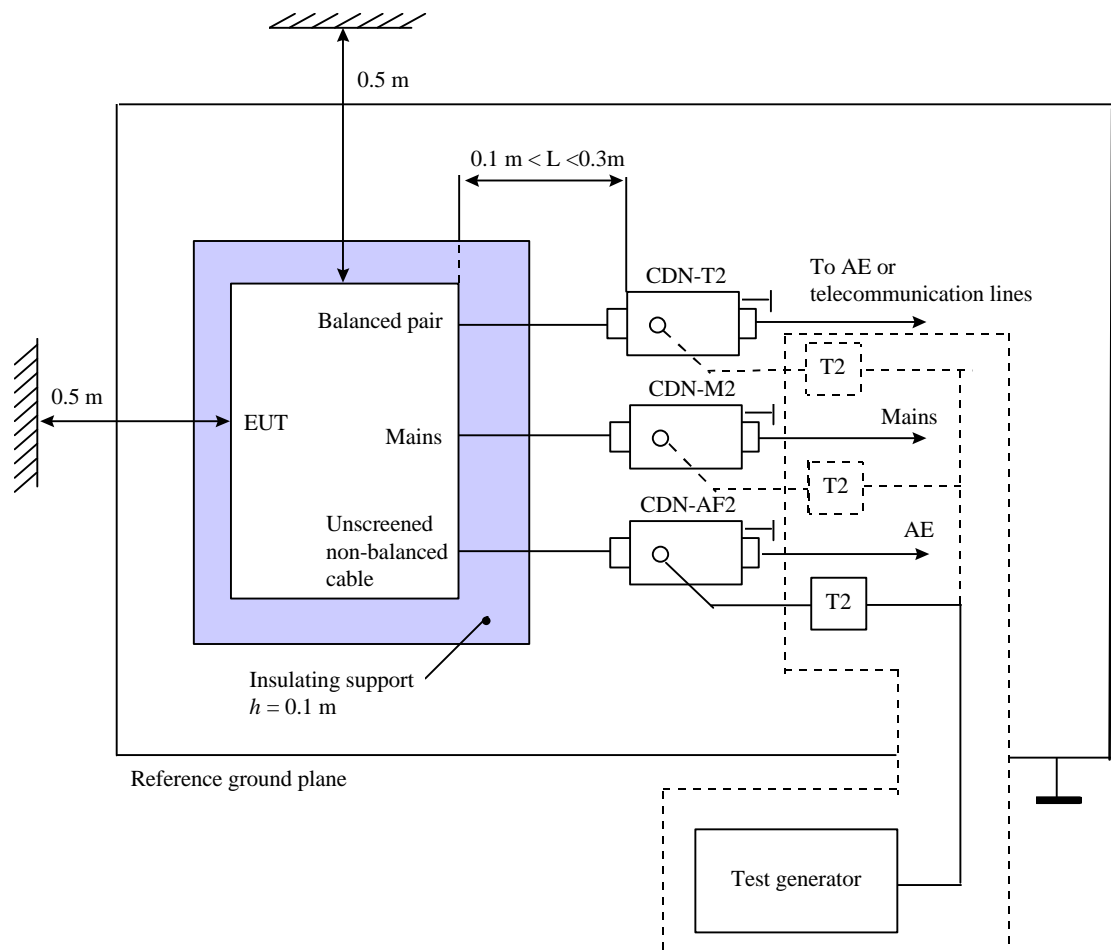
On all cables to be tested, coupling and decoupling devices shall be inserted. The coupling and decoupling devices shall be placed on the ground reference plane, making direct contact with it at about 0.1 m to 0.3 m from the EUT. The cables between the coupling and decoupling devices and the EUT shall be as short as possible and shall not be bundled nor wrapped. height above the ground reference plane shall be between 30 mm and 50 mm.

If the EUT is provided with other earth terminals, they shall, when allowed, be connected to the ground reference plane through the coupling and decoupling network CDN-M1, (i.e. the AE port of the CDN-M1 is then connected to the ground reference).

If 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.

Auxiliary equipment (AE) required for the defined operation of the EUT according to the specifications of the product committee, e.g. communication equipment, modem, printer, sensor, etc., as well as auxiliary equipment necessary for ensuring any data transfer and assessment of the functions, shall be connected to the EUT through coupling and decoupling devices. However, as far as possible the number of cables to be tested should be limited by restricting attention to the representative functions.

15.2 Immunity To Conducted Disturbances, Induced By Radio-Frequency Fields Setup



NOTE - The EUT clearance from any metallic obstacles shall be at least 0.5 m .
All non-excited input ports of the CDNs shall be terminated by 50 ohm loads .

Example of test set-up with a single-unit system
for class II safety equipment (see IEC 536)

15.3 Immunity To Conducted Disturbances, Induced By Radio-Frequency Fields Test Limits

No tests are required for induced disturbances caused by electromagnetic fields coming from intentional RF transmitters in the frequency range 9 kHz to 150 kHz,

The open-circuit test levels (e.m.f.) of the unmodulated disturbing signal, expressed in r.m.s., are given in table 1. The test levels are set at the EUT port of the coupling and decoupling devices. For testing of equipment, this signal is 80% amplitude modulated with a 1 kHz sine wave to simulate actual threats.

Table1 – Test levels

Frequency range 150 kHz – 80MHz		
Level	Voltage level (e.m.t.)	
	Uo [dB(μ V)]	Uo[V]
1	120	1
2	130	3
X ¹⁾	140	10
	special	
¹⁾ X is an open level.		

15.4 Immunity To Conducted Disturbances, Induced By Radio-Frequency Fields Test Setup Photo

Model No. : SS-300FB Active PFC yz

< FRONT VIEW >



Model No. : SS-300AGX Active PFC yz

< FRONT VIEW >



Model No. : SS-350UMD Active PFC Fz

< FRONT VIEW >



Model No. : SS-460AGX Active PFC Fz

< FRONT VIEW >



15.5 Immunity To Conducted Disturbances, Induced By Radio-Frequency Fields Test Data

MODEL NO. : SS-300FB Active PFC yz

REGULATION : EN 61000-4-6 (1996)

TEST RESULT

Temperature : 22 degree , Relative Humidity : 48 % RH
 Start : 0.15 MHz , Stop : 80 MHz , Power : AC 230V
 Modulation : AM 80 % , 1kHz. ON (YES) , OFF ()
 Output impedance : 50 ohm , Source impedance : 150 ohm
 Performance criterion : A

Test Ports	Frequency(MHz) Range	EUT Condition	3V(rms) Field strength	10V(rms) Field strength
Input / Output a. c. power	0.15 - - - - - 80	NORMAL	P	P
Input / Output d. c.	0.15 - - - - - 80	NORMAL	/	/
Signal lines Control lines	0.15 - - - - - 80	NORMAL	/	/

Note : 1. " P " mean the EUT function is correct during the test.

2. " / " no test.

MODEL NO. : SS-300AGX Active PFC yz

REGULATION : EN 61000-4-6 (1996)

TEST RESULT

Temperature : <u>22 degree</u> , Relative Humidity : <u>48 % RH</u> Start : <u>0.15 MHz</u> , Stop : <u>80 MHz</u> , Power : <u>AC 230V</u> Modulation : AM 80 % , 1kHz. ON (<u>YES</u>) , OFF (<u> </u>) Output impedance : 50 ohm , Source impedance : 150 ohm Performance criterion : A				
Test Ports	Frequency(MHz) Range	EUT Condition	3V(rms) Field strength	10V(rms) Field strength
Input / Output a. c. power	0.15 - - - - - 80	NORMAL	P	P
Input / Output d. c.	0.15 - - - - - 80	NORMAL	/	/
Signal lines Control lines	0.15 - - - - - 80	NORMAL	/	/

- Note : 1. " P " mean the EUT function is correct during the test.
 2. " / " no test.

MODEL NO. : SS-350UMD Active PFC Fz

REGULATION : EN 61000-4-6 (1996)

TEST RESULT

Temperature : 22 degree , Relative Humidity : 48 % RH
 Start : 0.15 MHz , Stop : 80 MHz , Power : AC 230V
 Modulation : AM 80 % , 1kHz. ON (YES) , OFF ()
 Output impedance : 50 ohm , Source impedance : 150 ohm
 Performance criterion : A

Test Ports	Frequency(MHz) Range	EUT Condition	3V(rms) Field strength	10V(rms) Field strength
Input / Output a. c. power	0.15 - - - - - 80	NORMAL	P	P
Input / Output d. c.	0.15 - - - - - 80	NORMAL	/	/
Signal lines Control lines	0.15 - - - - - 80	NORMAL	/	/

Note : 1. " P " mean the EUT function is correct during the test.

2. " / " no test.

MODEL NO. : SS-460AGX Active PFC Fz

REGULATION : EN 61000-4-6 (1996)

TEST RESULT

Temperature : 22 degree , Relative Humidity : 48 % RH
 Start : 0.15 MHz , Stop : 80 MHz , Power : AC 230V
 Modulation : AM 80 % , 1kHz. ON (YES) , OFF ()
 Output impedance : 50 ohm , Source impedance : 150 ohm
 Performance criterion : A

Test Ports	Frequency(MHz) Range	EUT Condition	3V(rms) Field strength	10V(rms) Field strength
Input / Output a. c. power	0.15 - - - - - 80	NORMAL	P	P
Input / Output d. c.	0.15 - - - - - 80	NORMAL	/	/
Signal lines Control lines	0.15 - - - - - 80	NORMAL	/	/

Note : 1. " P " mean the EUT function is correct during the test.

2. " / " no test.

16. EN 61000-4-8 Power Frequency Magnetic Field Immunity Test

Test standard	Model No.	Result
EN 61000-4-8	SS-300FB Active PFC yz, SS-300AGX Active PFC yz, SS-350UMD Active PFC Fz, SS-460AGX Active PFC Fz	A

(A) Test instruments :

HAEFELY&TRENCH magnetic field tester MAG100.1
HAEFELY&TRENCH coil with clamp 1m x 1m
HAEFELY&TRENCH support with castors height 2m

(B) Laboratory reference conditions :

Temperature : 22
relative humidity : 48 %
atmospheric pressure : 95 kPa
electromagnetic : 10 dB below the select test level

(C) Test level : level 1 , 1 A/m
level 4 , 30 A/m

The test results shall be classified on the basis of the operating conditions and the functional specifications of the equipment under test , as in the following , unless different specifications are given by product committees or product specifications :

Performance Criterion :

A) normal performance within the specification limits ;

B) temporary degradation or loss of function or performance which is self-recoverable ;

C) temporary degradation or loss of function or performance which requires operator intervention or system reset ;

16.1 Power Frequency Magnetic Field Immunity Test Description

The magnetic fields to which equipment is subjected may influence the reliable operation of equipment and systems.

The following tests are intended to demonstrate the immunity of equipment when subjected to power frequency magnetic fields related to the specific location and installation condition of the equipment (e.g. proximity of equipment to the disturbance source).

The power frequency magnetic field is generated by power frequency current in conductors or, more seldom, from other devices (e.g. leakage of transformers) in the proximity of equipment.

As for the influence of nearby conductors, one should differentiate between:

- the current under normal operating conditions, which produces a steady magnetic field, with a comparatively small magnitude;
- the current under fault conditions which can produce comparatively high magnetic fields but of short duration, until the protection devices operate (a few milliseconds with fuses, a few seconds for protection relays).

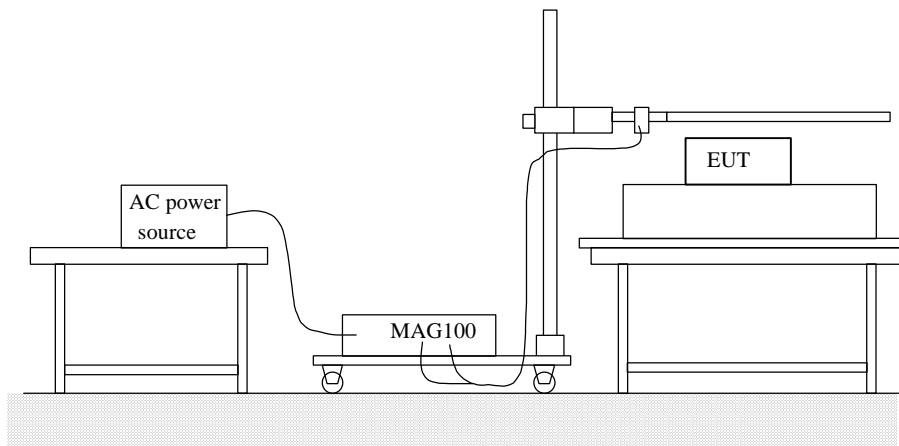
The test with a steady magnetic field may apply to all types of equipment intended for public or industrial low voltage distribution networks or for electrical plants.

The test with short duration magnetic field related to fault conditions, requires test levels that differ from those for steady state conditions; the highest values apply mainly to equipment to be installed in exposed places of electrical plants.

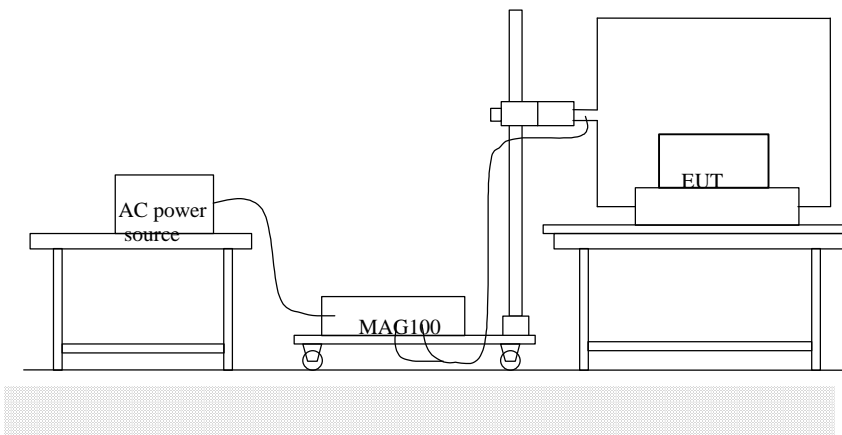
The test field waveform is that of power frequency.

In many cases (household areas, sub-stations and power plant under normal conditions), the magnetic field produced by harmonics is negligible. However, in very special cases like heavy industrial areas (large power converters, etc.) they occur, and will be considered in a future revision of this standard.

16.2 Power Frequency Magnetic Field Immunity Test Setup



Vertical magnetic field drawing



Horizontal magnetic field drawing

16.3 Power Frequency Magnetic Field Immunity Test Limits

Table 1-Test levels for continuous field

Level	Magnetic field strength A/m
1	1
2	3
3	10
4	30
5	100
x ¹⁾	special

NOTES
1 – “x” is an open level. This level can be given in the product specification.

Table 2 – Test levels for short duration: 1 s to 3 s

Level	Magnetic field strength A/m
1	n.a. ²⁾
2	n.a. ²⁾
3	n.a. ²⁾
4	300
5	1000
x ¹⁾	special

NOTES
1 – “x” is an open level. This level, as well the duration of the test, can be given in the product specification.
2 – “n.a.” = not applicable

16.4 Power Frequency Magnetic Field Immunity Test Setup Photos

Model No. : SS-300FB Active PFC yz

< VERTICAL VIEW >



< HORIZONTAL VIEW >



Model No. : SS-300AGX Active PFC yz
< VERTICAL VIEW >



< HORIZONTAL VIEW >



Model No. : SS-350UMD Active PFC Fz

< VERTICAL VIEW >



< HORIZONTAL VIEW >



Model No. : SS-460AGX Active PFC Fz

< VERTICAL VIEW >



< HORIZONTAL VIEW >



17. EN 61000-4-11 Voltage Dips, Short Interruptions And Voltage Variations Immunity Tests

17.1 Voltage Dips,short Interruptions And Voltage Variations Immunity Tests Description

Electrical and electronic equipment may be affected by voltage dips, short interruptions or voltage variations of MBS.

Voltage dips and short interruptions are caused by faults in the network, in installations or by a sudden large change of load. In certain cases, two or more consecutive dips or interruptions may occur. Voltage variations are caused by the continuously varying loads connected to the network. Before starting the test of a given equipment, a test plan shall be prepared.

It is recommended that the test plan shall comprise the following items :

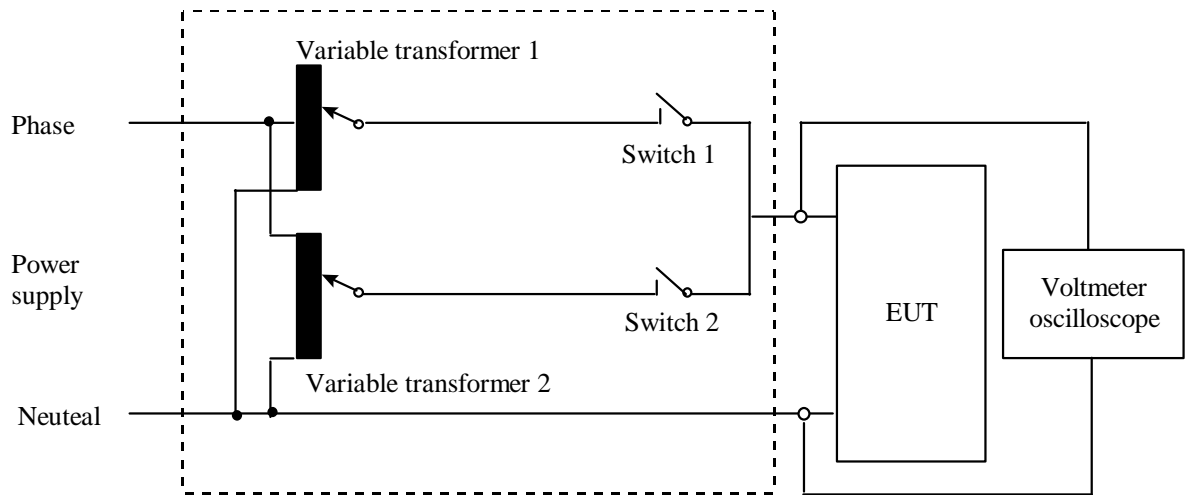
- the type designation of the EUT;
- information on possible connections (plugs, terminals, etc.) and cables, and peripherals;
- input power port of equipment to be tested;
- representative operational modes of the EUT for the test;
- performance criteria used and defined in the technical specifications;
- operational mode(s) of equipment;
- description of the test set-up.

If the actual operating signal sources are not available to the EUT, they may be simulated.

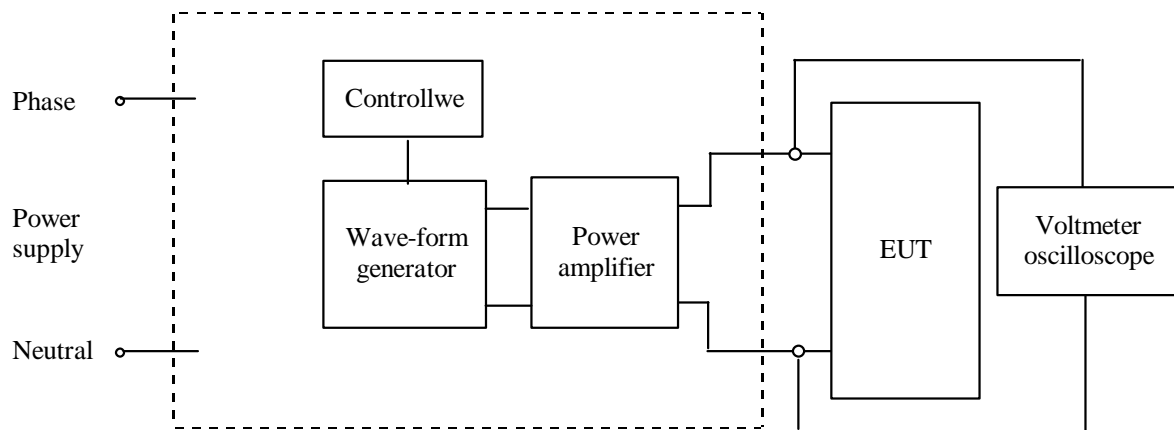
For each test any degradation of performance shall be recorded.

The monitoring equipment should be capable of displaying the status of the operational mode of the EUT during and after the tests. After each group of tests a full functional check shall be performed.

17.2 Voltage Dips, short Interruptions And Voltage Variations Immunity Tests Setup



Schematic of test instrumentation for voltage dips and short interruptions using variable transformers and seitches



Schematic of test instrumentation for voltage dips, short interruptions and variations using power amplifier

17.3 Voltage Dips, short Interruptions And Voltage Variations Immunity Tests Limits

Preferred test levels and durations for
voltage dips and short interruptions

Test level $\% U_T$	Voltage dip and short interruptions $\% U_T$	Duration (in period)
0	100	0.5*
40	60	1
70	30	5
		10
		25
		50
		x

* For 0.5 period, the test shall be made in positive and negative polarity, i.e. starting at 0° and 180° , respectively .

NOTES

- 1 One or more of the above test levels and durations may be chosen .
- 2 If the EUT is tested for voltage dips of 100%, it is generally unnecessary to test for other levels for the same durations. However, for some cases (safeguard systems or electromechanical devices) it is not true. The product specification or product committee shall give an indication of the applicability of this note .
- 3 "x" is an open duration. This duration can be given in the product specification. Utilities in Europe have measured dips and short interruptions of duration between 1/2 a period and 3 000 periods, but duration less than 50 periods are most common.
- 4 Any duration may apply to any test level .

17.4 Voltage Dips, short Interruptions And Voltage Variations Test Setup Photos

Model No. : SS-300FB Active PFC yz

< FRONT VIEW >



Model No. : SS-300AGX Active PFC yz

< FRONT VIEW >



Model No. : SS-350UMD Active PFC Fz

< FRONT VIEW >



Model No. : SS-460AGX Active PFC Fz

< FRONT VIEW >



17.5 Voltage Dips, short Interruptions And Voltage Variations Immunity Tests Data

MODEL NO. : SS-300FB Active PFC yz

REGULAR : EN 61000-4-11 (1994)

TEST RESULT : Test Voltage **230Vac**

	Test Level %U _T	Duration (ms)	Performance Criterion
Voltage dips	30	10	B
	60	100/1000	C
Voltage interruptions	>95	5000	C

U_T is the rated voltage for the equipment.

	Test Level %U _T	Duration (ms)	Performance Criterion
Voltage dips	>95	10	B
	30	500	C
Voltage interruptions	>95	5000	C

MODEL NO. : SS-300AGX Active PFC yz

REGULAR : EN 61000-4-11 (1994)

TEST RESULT : Test Voltage **230Vac**

	Test Level %U _T	Duration (ms)	Performance Criterion
Voltage dips	30	10	B
	60	100/1000	B
Voltage interruptions	>95	5000	C

U_T is the rated voltage for the equipment.

	Test Level %U _T	Duration (ms)	Performance Criterion
Voltage dips	>95	10	B
	30	500	C
Voltage interruptions	>95	5000	C

MODEL NO. : SS-350UMD Active PFC Fz

REGULAR : EN 61000-4-11 (1994)

TEST RESULT : Test Voltage **230Vac**

	Test Level %U _T	Duration (ms)	Performance Criterion
Voltage dips	30	10	B
	60	100/1000	B
Voltage interruptions	>95	5000	C

U_T is the rated voltage for the equipment.

	Test Level %U _T	Duration (ms)	Performance Criterion
Voltage dips	>95	10	B
	30	500	C
Voltage interruptions	>95	5000	C

MODEL NO. : SS-460AGX Active PFC Fz

REGULAR : EN 61000-4-11 (1994)

TEST RESULT : Test Voltage **230Vac**

	Test Level %U _T	Duration (ms)	Performance Criterion
Voltage dips	30	10	B
	60	100/1000	B
Voltage interruptions	>95	5000	C

U_T is the rated voltage for the equipment.

	Test Level %U _T	Duration (ms)	Performance Criterion
Voltage dips	>95	10	B
	30	500	C
Voltage interruptions	>95	5000	C

18. Labeling Requirement, WARNING



1. The vertical size is 5mm.
2. The mark will be placed in a visible spot on the outside of the equipment, but in cases where that is impractical, it may be included on the packaging and/or documentation.

ITE is subdivided into two categories denoted class A ITE and class B ITE.

Class A ITE

Class A ITE is a category of all other ITE which satisfies the Class A ITE limits but not the Class B ITE limits. Such equipment should not be restricted in its sale but the following warning shall be included in the instructions for use :

Warning

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Class B ITE

Class B ITE is a category of apparatus which satisfies the class B ITE disturbance limits.

Class B ITE is intended primarily for use in the domestic environment and may include:

- equipment with no fixed place of use; for example, portable equipment powered by built-in batteries;
- telecommunication terminal equipment powered by a telecommunication network;
- personal computers and auxiliary connected equipment.

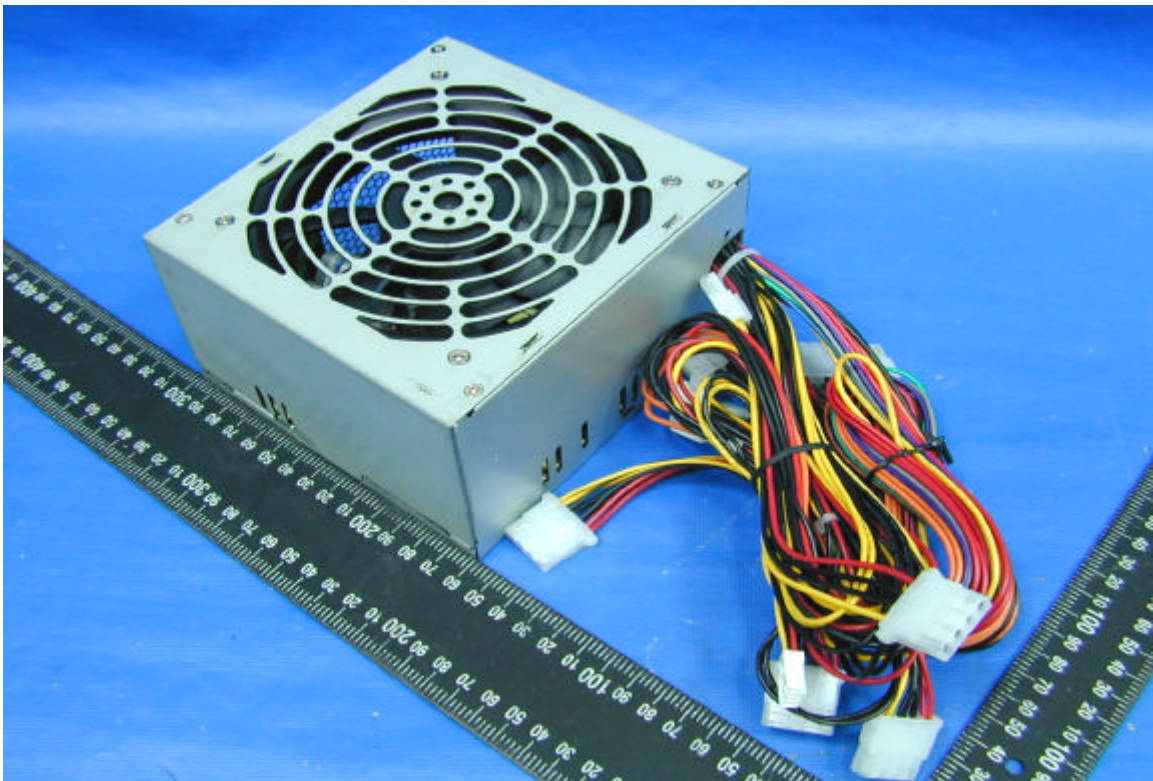
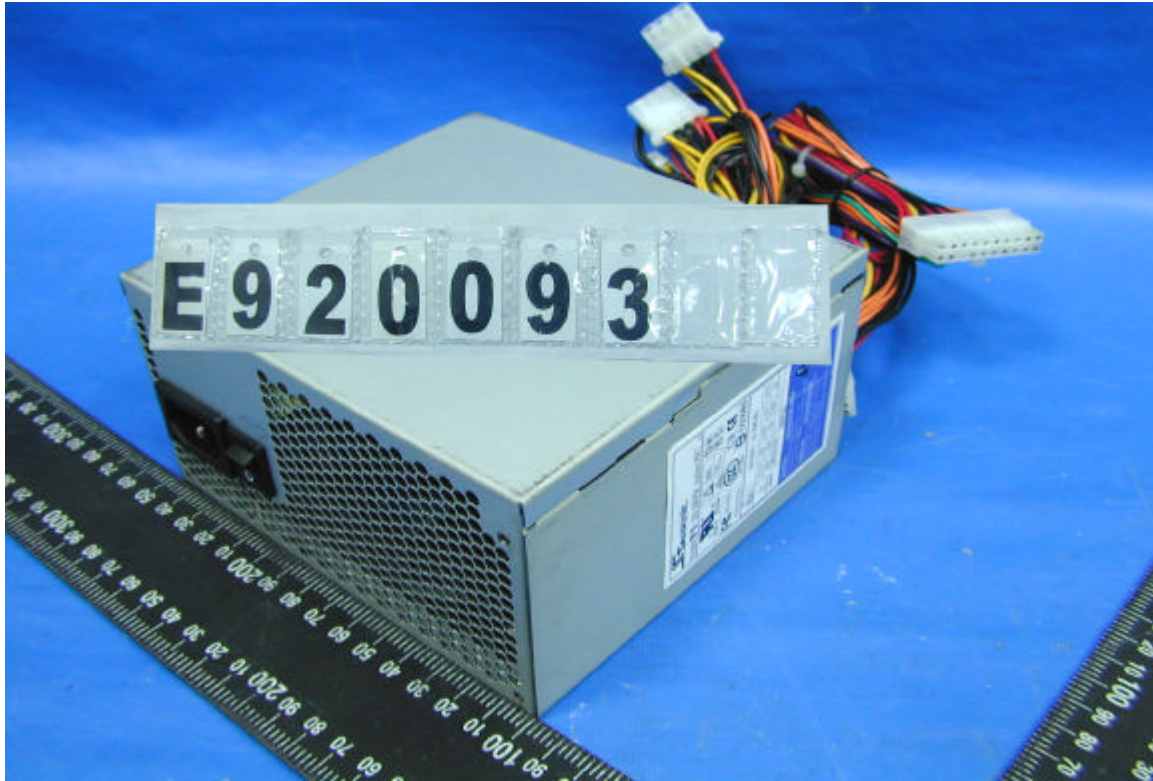
19. The List of Test Instruments

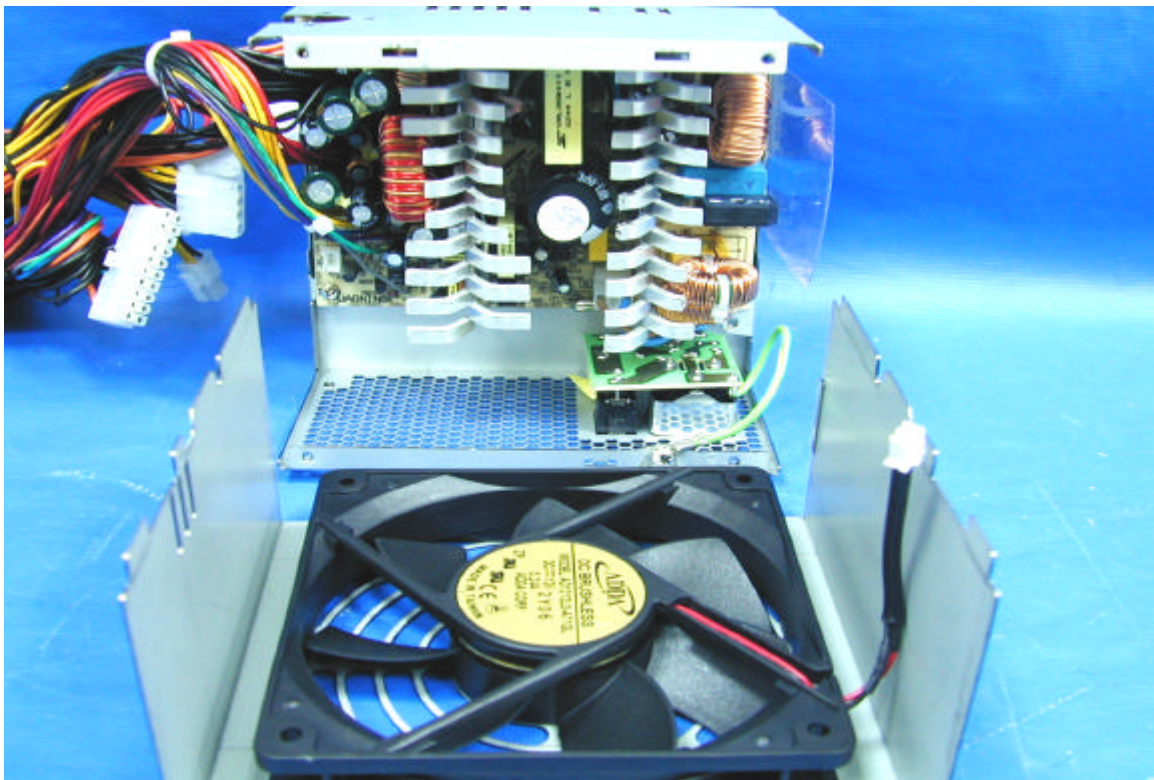
Test Mode	Instrument	Model No.	Serial No.	Next Cal. Date	Cal. Interval
Conduction (No.1)	R & S Receiver	ESHS10	830223/008	May 22, 2003	1Year
	Rolf Heine LISN	NNB-4/63TL	98008	Apr. 29, 2003	1Year
	R & S LISN	ESH3-Z5	844982/039	Aug. 07, 2003	1Year
	Spectrum Analyzer	R3261A	91720076	Jun. 09, 2003	1Year
	RF Cable	Rg400	N/A	May 13, 2003	1Year
	Schaffner ISN	T411	N/A	Jun.30, 2003	1Year
Radiation (OP No.1)	R & S Receiver	ESVS30	863342/012	May 20,2003	1Year
	Schaffner Pre-amplifier	CPA9232	1028	May 13, 2003	1Year
	COM-Power Horn Ant.	AH-118 (1GHz~18GHz)	10095	May 21, 2004	2Year
	Schwarzbeck Precision Dipole Ant	VHAP (30MHz~1GHz)	970 + 971 953 + 954	Jun. 27, 2003	3Year
	R &S Signal Generator	SMY01	841104/037	Apr. 29, 2003	1Year
	RF Cable	No. 1	N/A	May 12, 2003	1Year
	EMCO Antenna	3142B (26MHz~2GHz)	9904-1370	Aug. 25, 2003	1Year

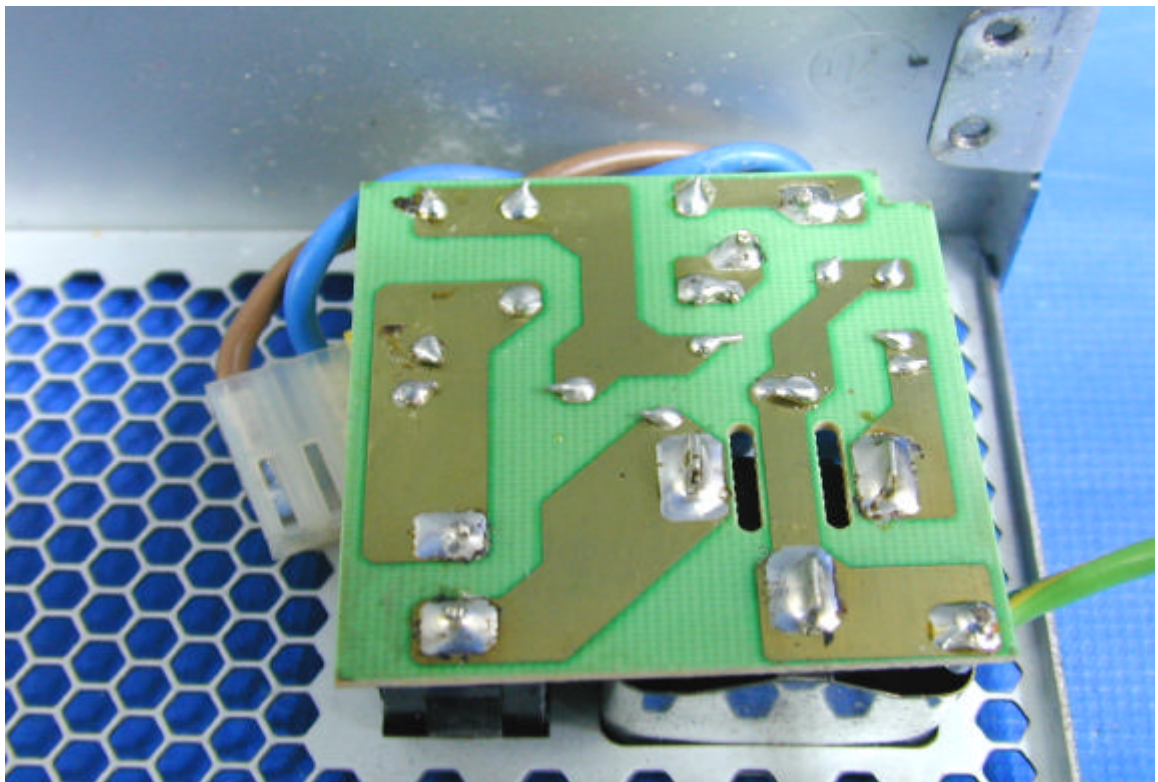
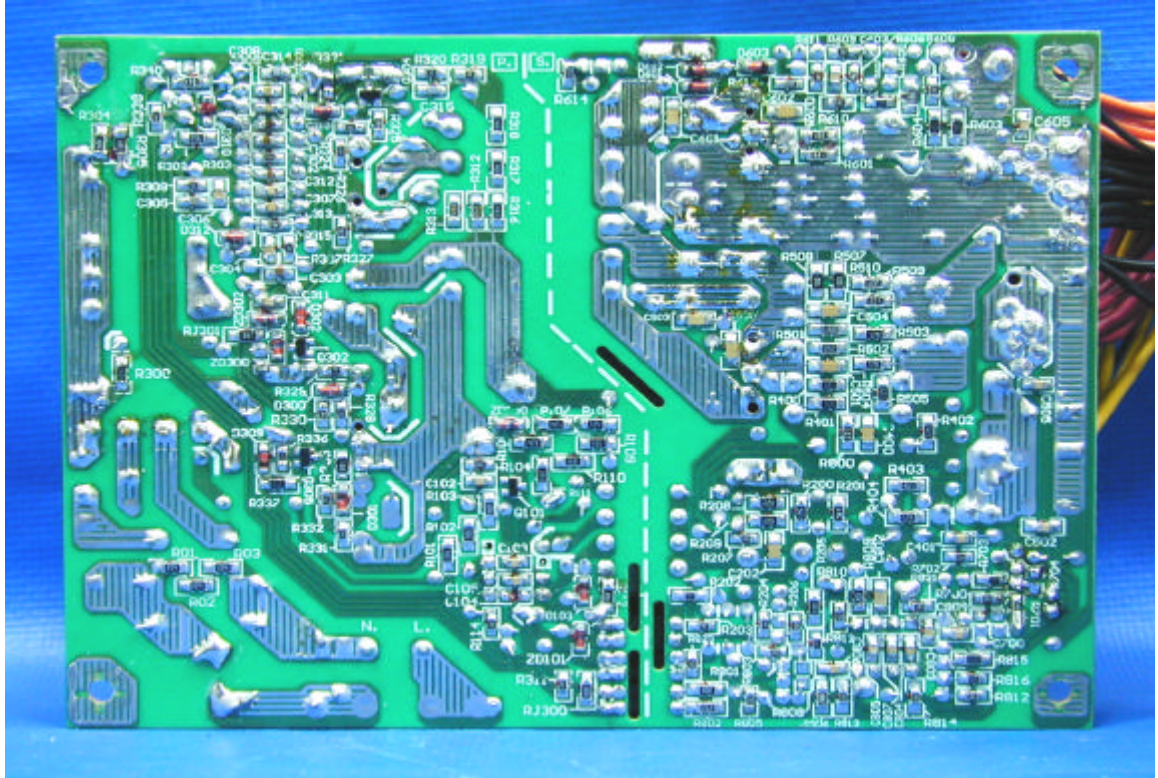
Test Mode	Test item	Instrument	Model No.	Serial No.	Next Cal. Date	Cal. Interval
EMS (NO.1)	4-2	ESD Test System	ESS-100L (A)TC-815D	4099C01970	July 15, 2003	1Year
	4-3	Comtest G-Strip	G-320	CC112-0008	Oct. 01, 2003	2Year
	4-4	KeyTek EFT Noise Generator	CE-40	9508266	Jan. 27, 2005	2Year
	4-5	HAEFELY Surge Tester	PSURGE 4	083665-17	Dec. 18, 2004	2Year
	4-8	HAEFELY Magnetic Field	MAG 100.1	083858-04	Dec. 26, 2004	2Year
	4-11	HAEFELY Line Interference Tester	PLINE 1610	083732-01	Dec. 19, 2004	2Year
	4-3 4-6	HP Signal Generator	8648A	3619U00426	Sep. 15, 2003	1Year
	3-2 3-3	HP Harmonic/ Flicker Test System	6842A	3531A-00141	Dec. 19, 2004	2Year

20. EUT Photos

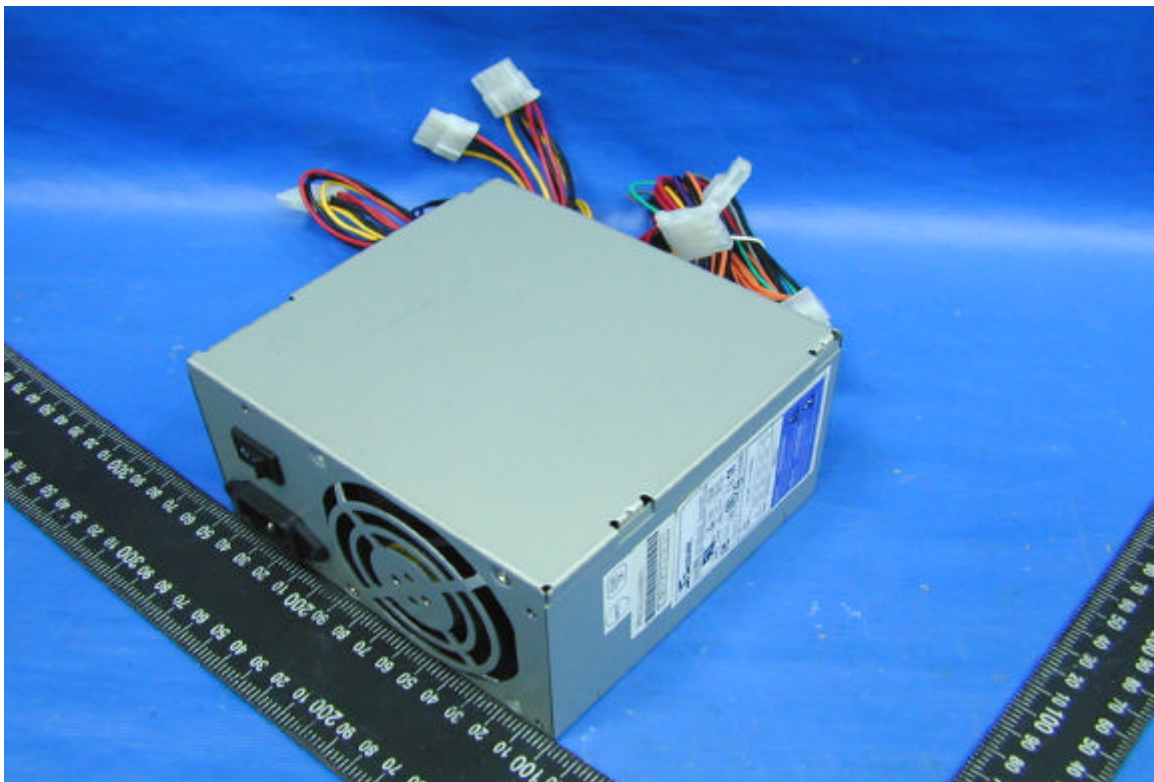
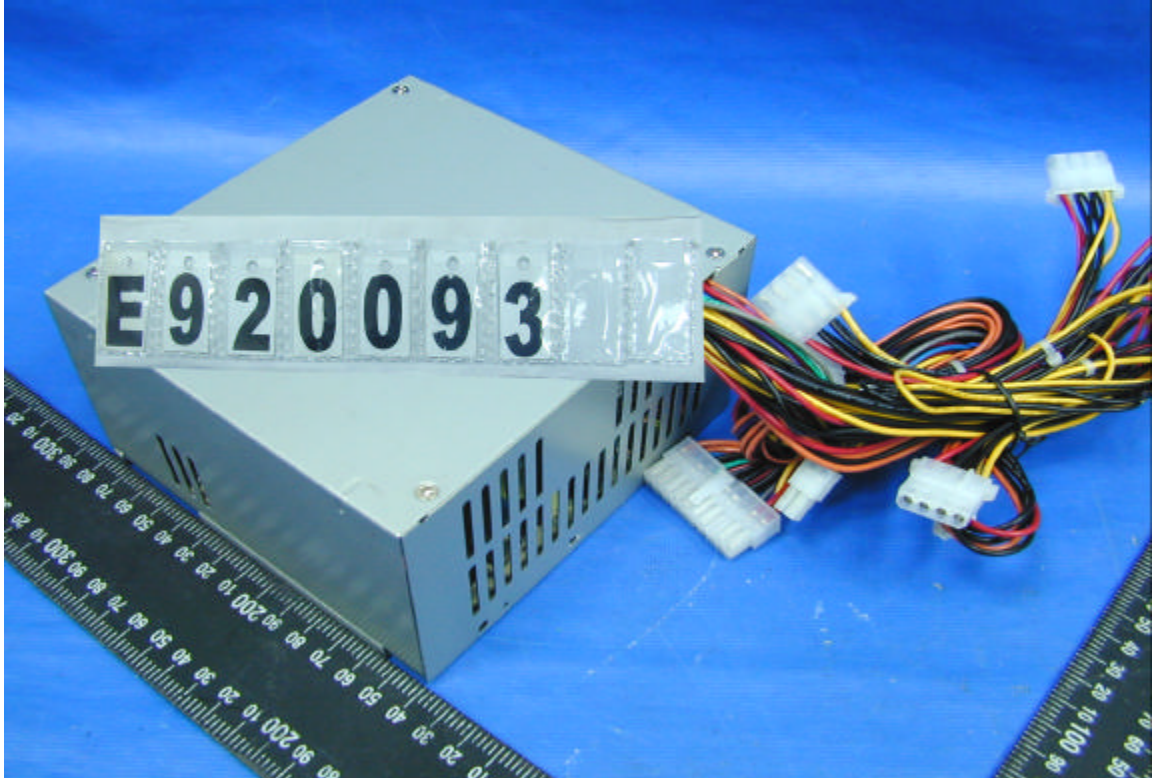
MODEL NO. : SS-300FB Active PFC v2 ;

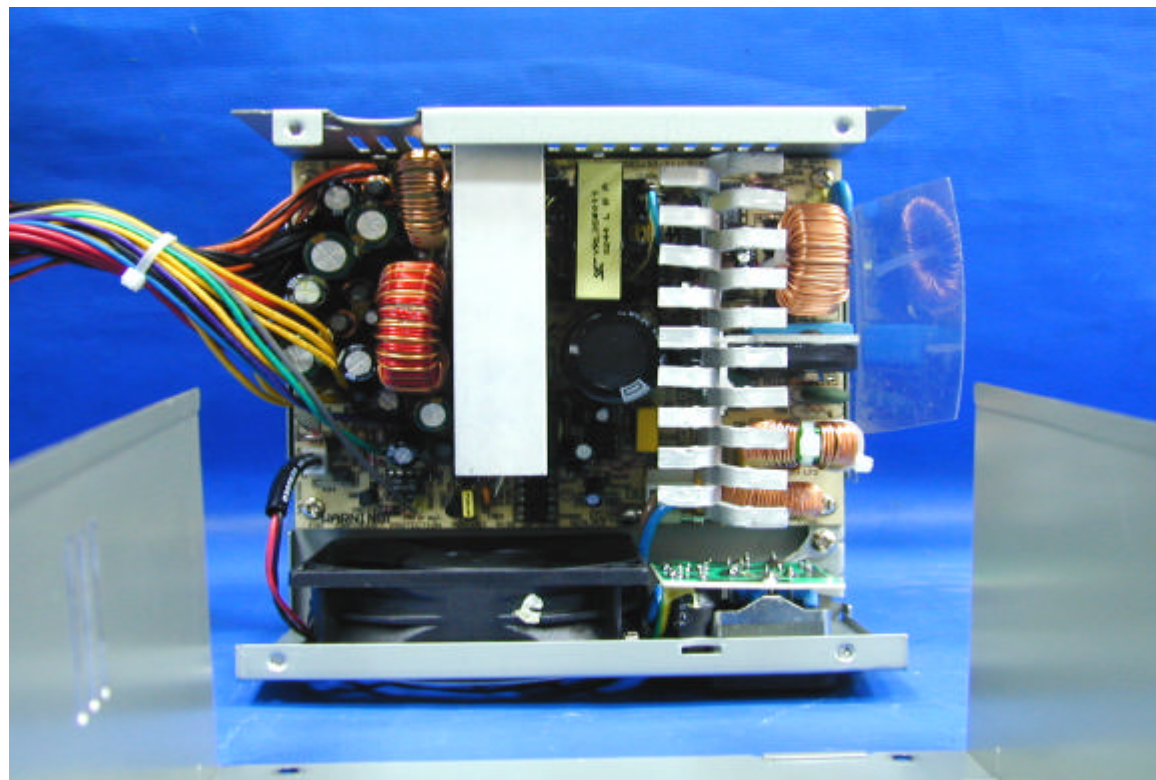


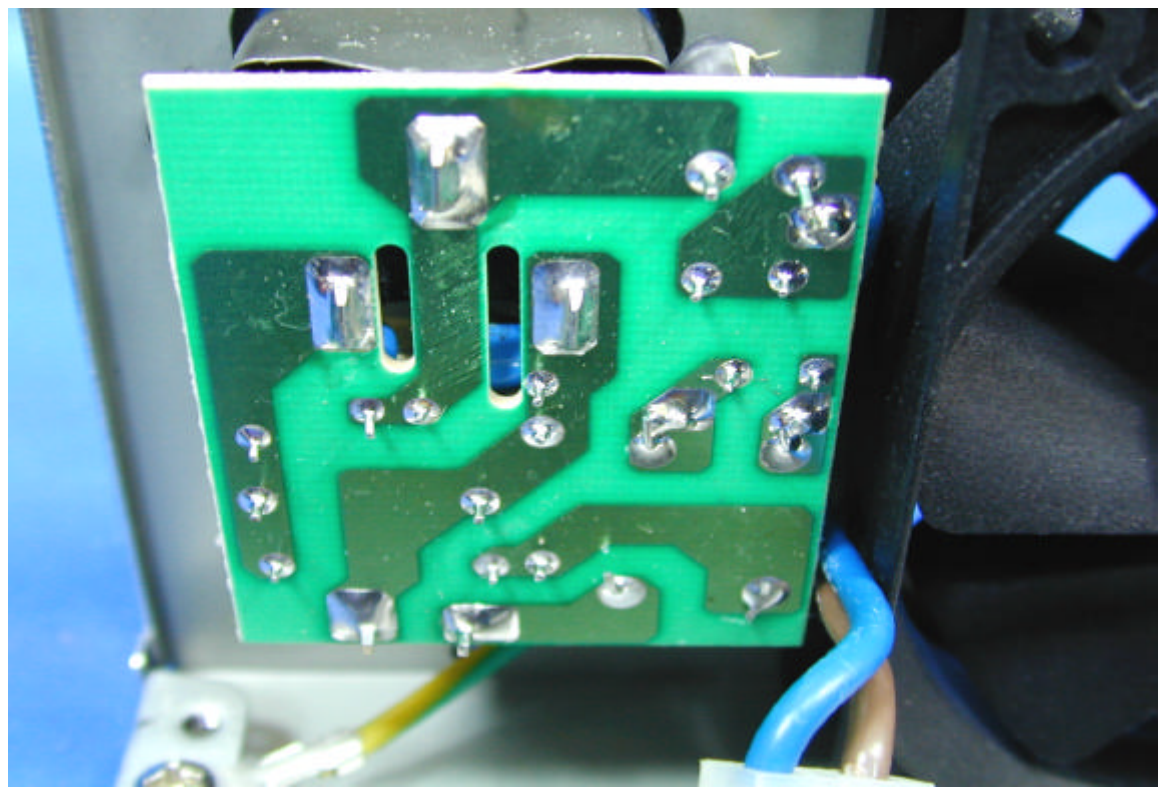
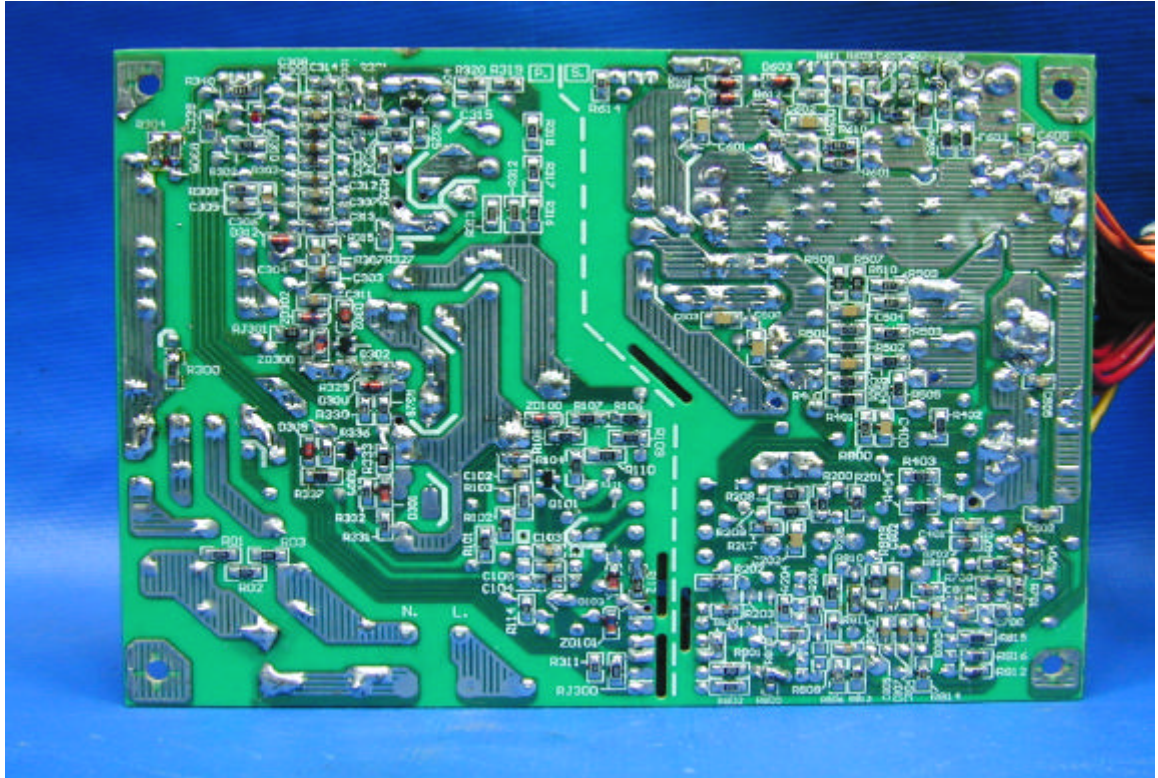




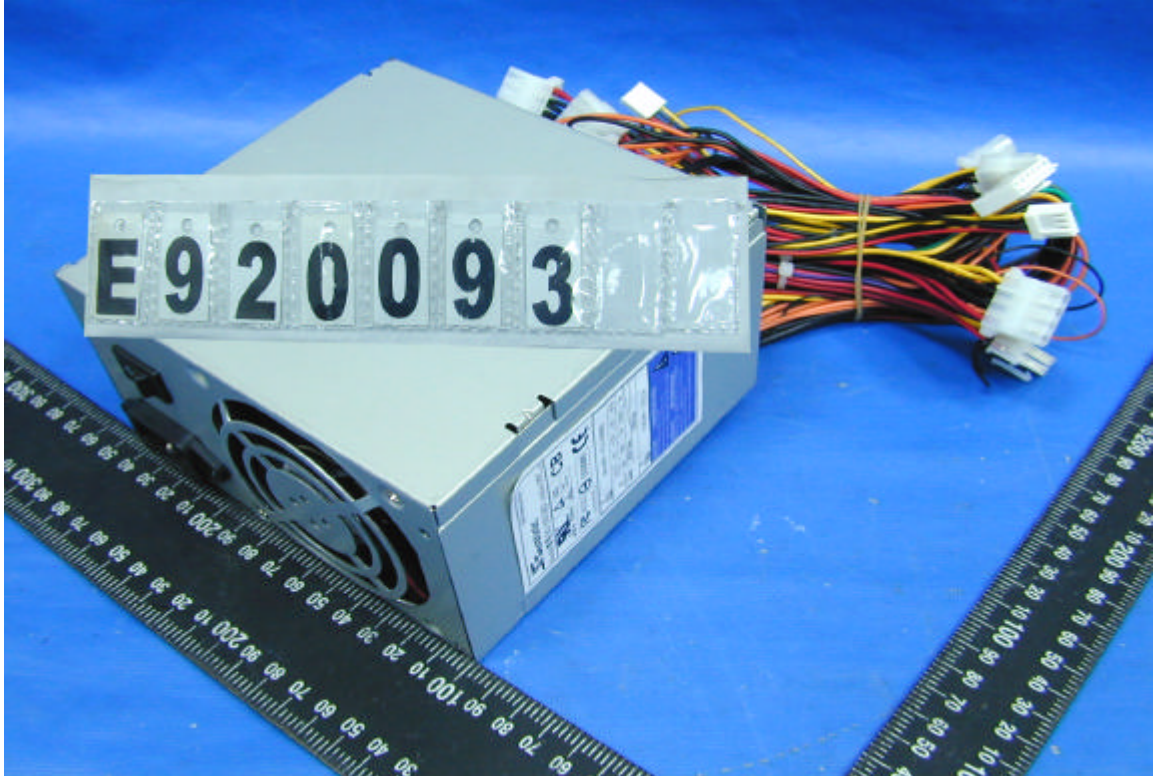
MODEL NO. : SS-300AGX Active PFC yz ;

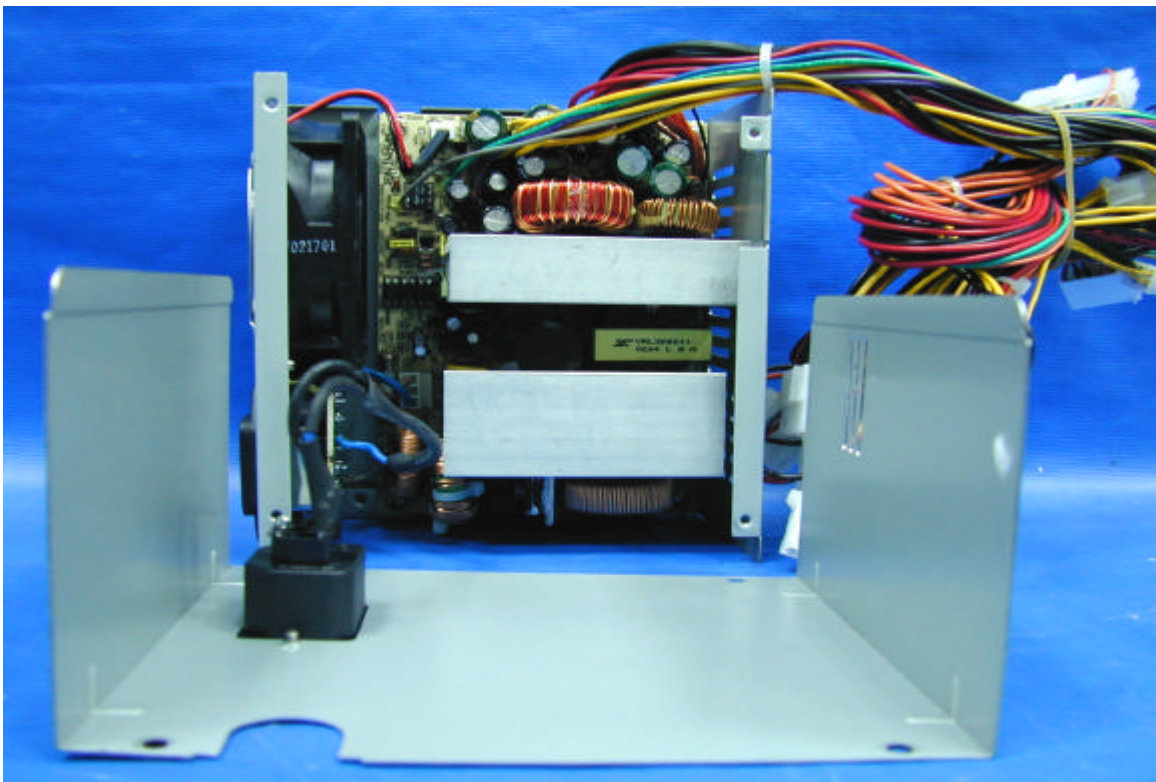




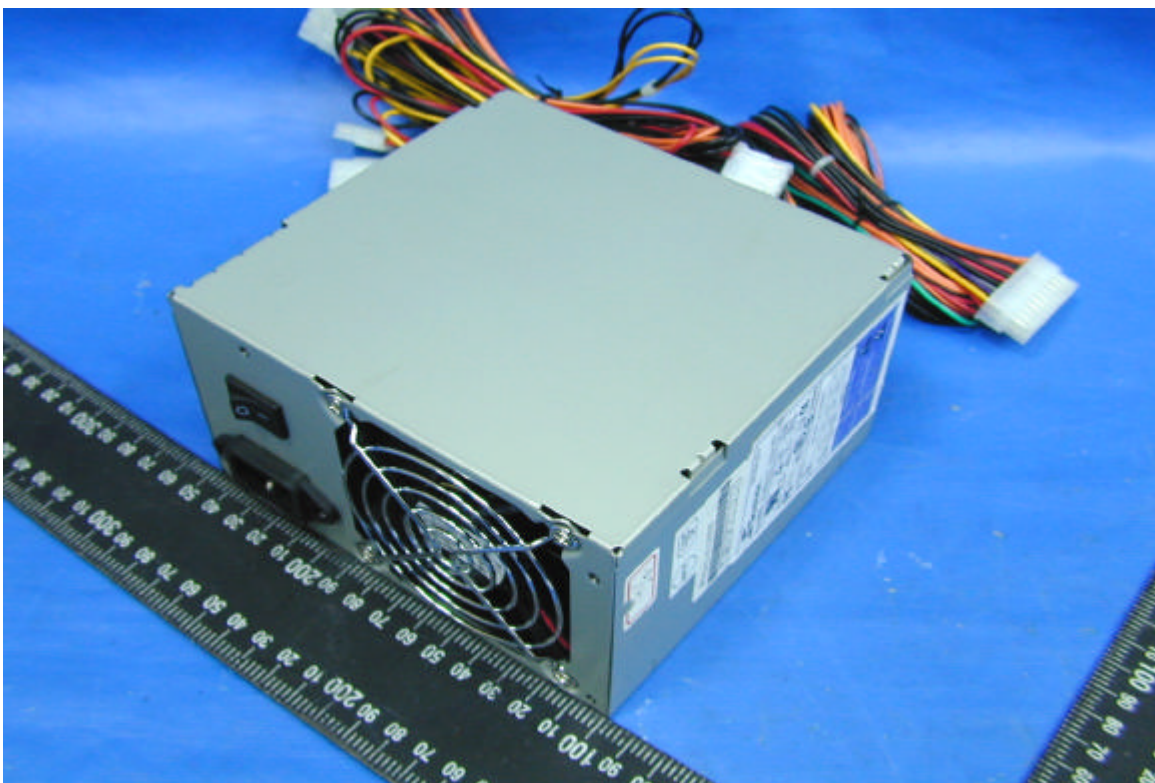
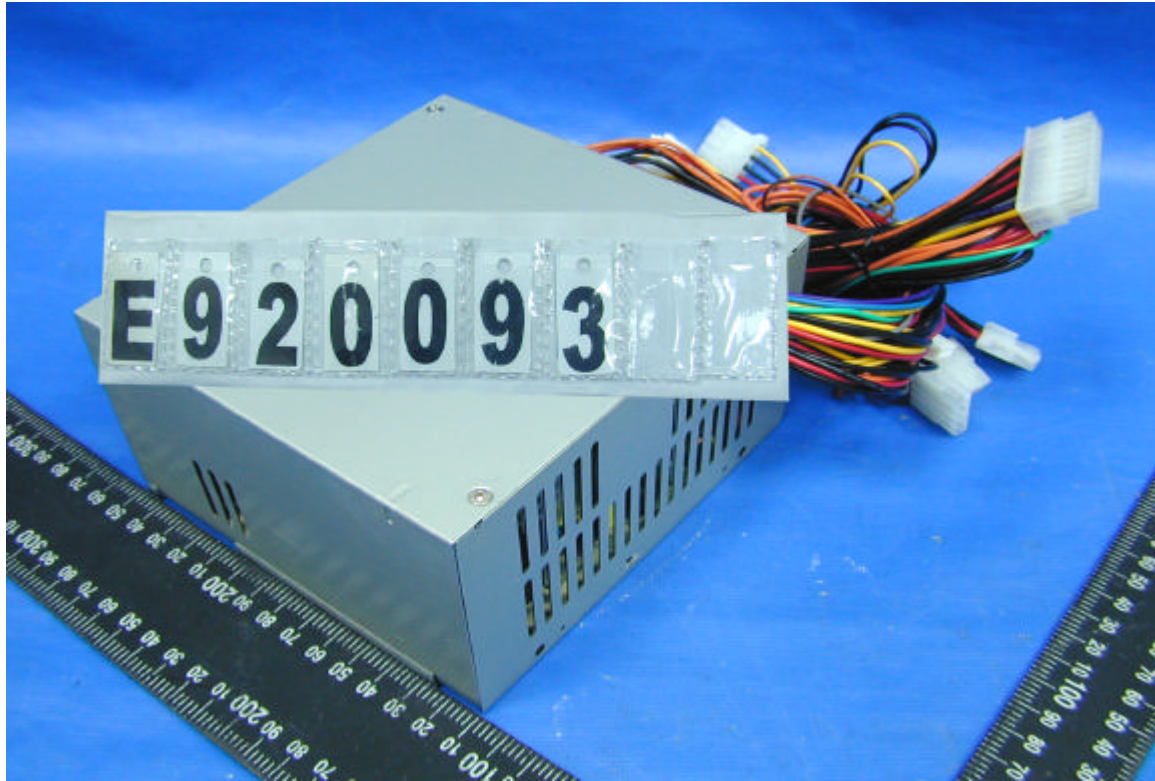


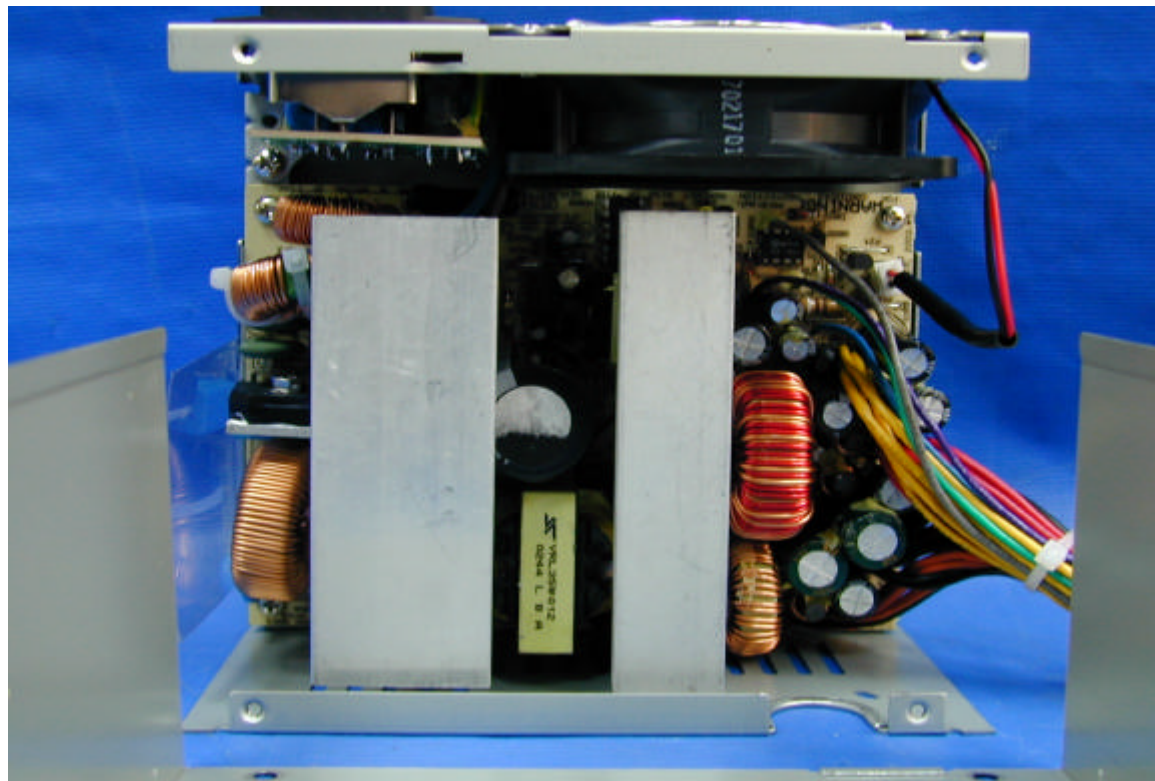
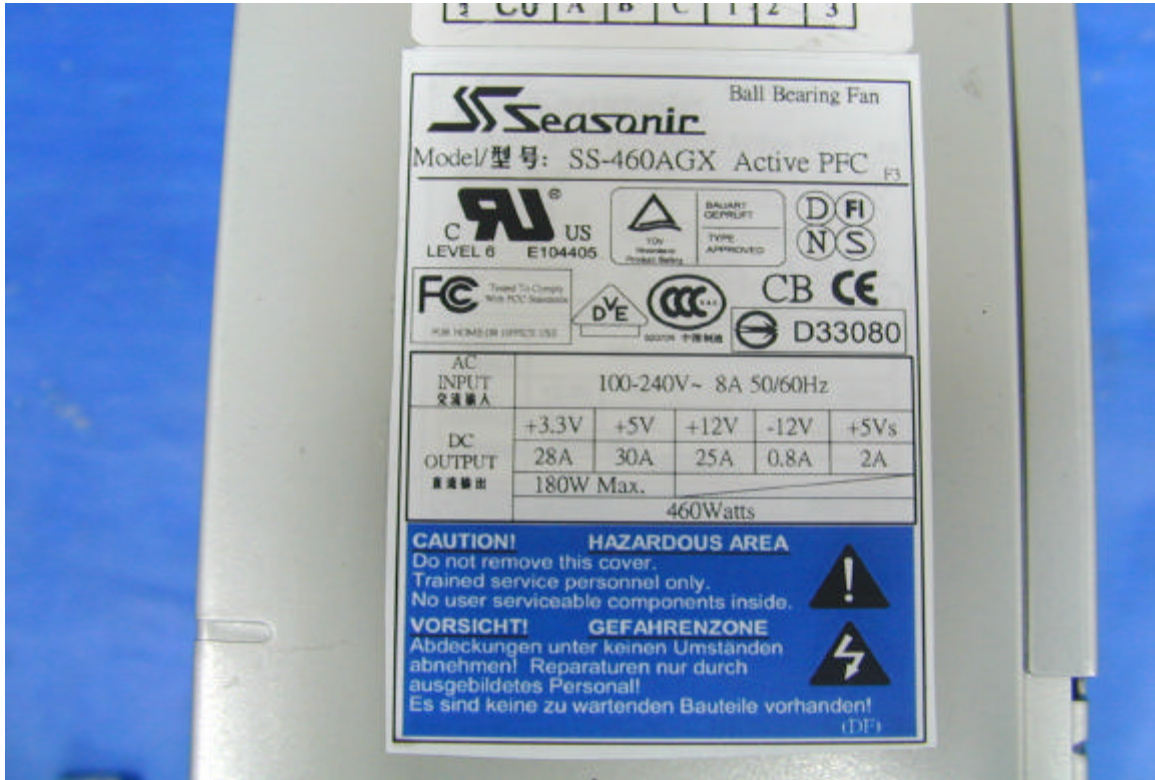
MODEL NO. : SS-350UMD Active PFC Fz

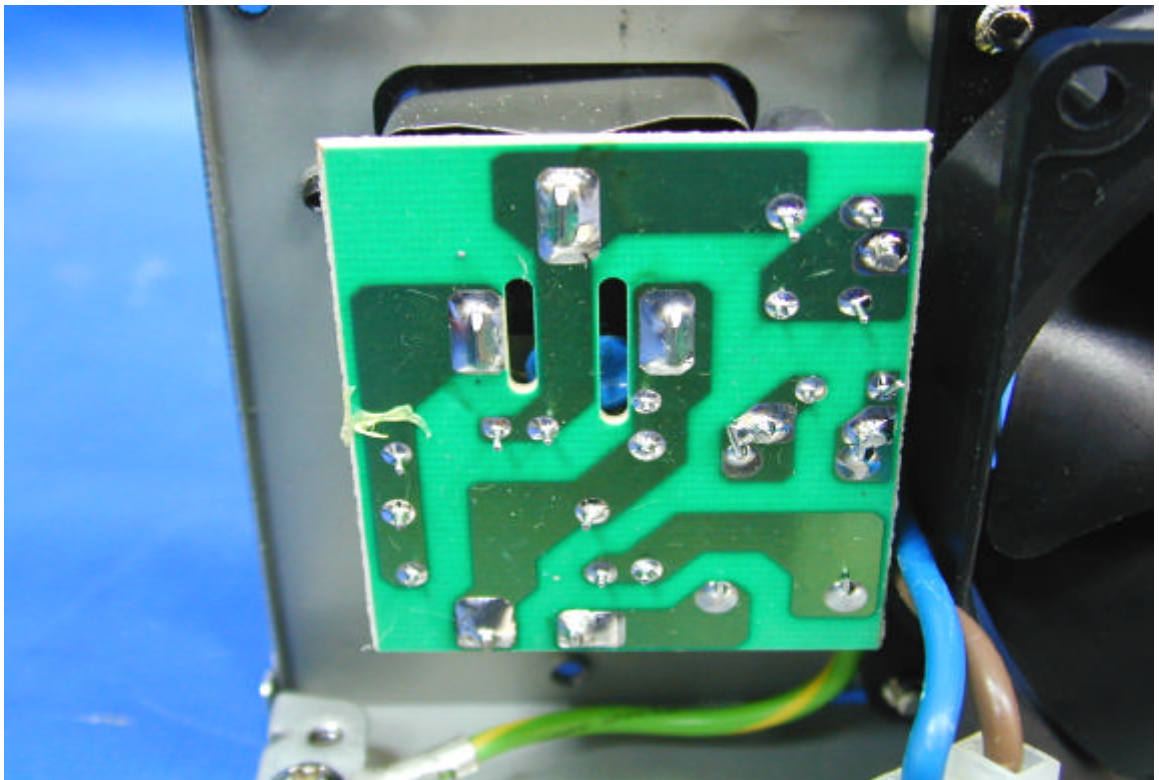
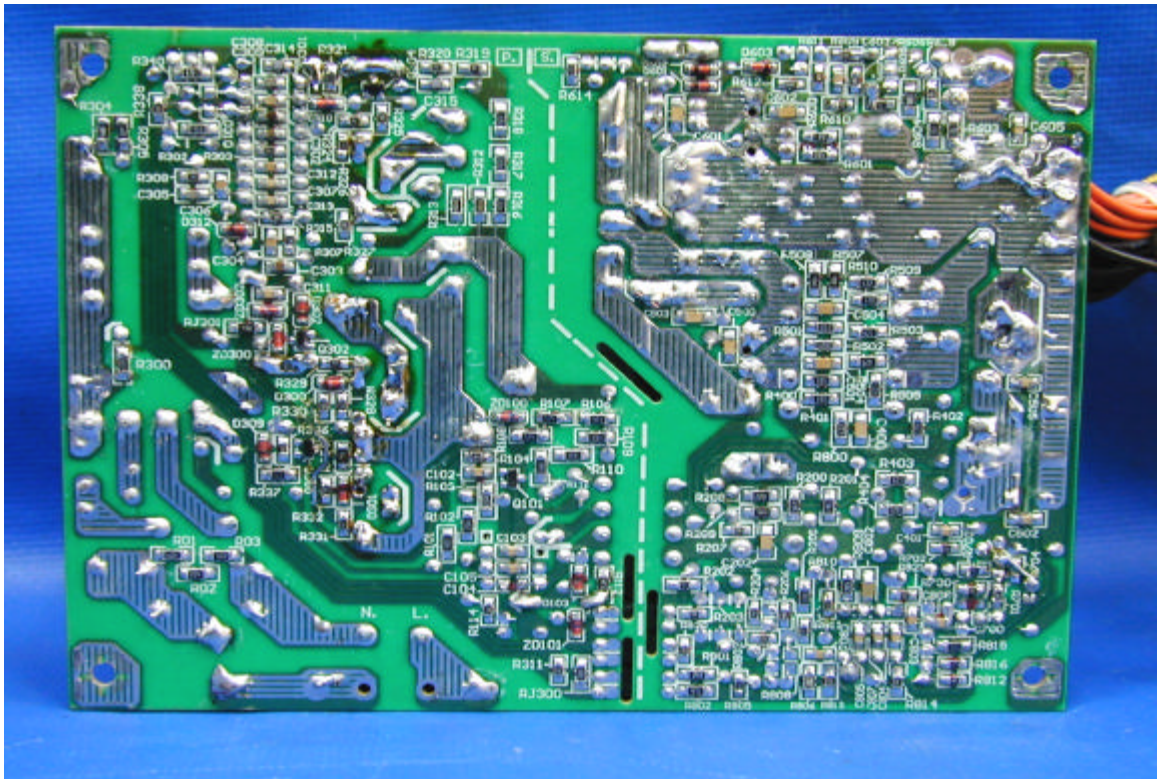




MODEL NO. : SS-460AGX Active PFC Fz;







VERIFICATION

of conformity with European EMC Directive

No. E920093

Document holder:

SEA SONIC ELECTRONICS CO., LTD.

Type of equipment:

Switching Power Supply

Type designation:

**SS-250AGX Active PFC yz, SS-250SGX Active PFC yz,
SS-300AGX Active PFC yz, SS-300SGX Active PFC yz,
SS-300FB Active PFC yz, SS-350AGX Active PFC yz,
SS-350SGX Active PFC yz, SS-350UMD Active PFC Fz,
SS-400AGX Active PFC Fz, SS-400SGX Active PFC Fz,
SS-460AGX Active PFC Fz, SS-460SGX Active PFC Fz**

A sample of the equipment has been tested for CE-marking according to the EMC Directive, 89/336/EEC. & 92/31/EEC & 93/68/EEC *Standard(s) used for showing compliance with the essential requirements of the directive:*

EMC Standard(s):

Performance Criterion

EN 61000-6-3: 2001 / EN 55022: 1998+A1: 2000

Class B

EN 61000-3-2: 2000

EN 61000-3-3:1995

EN 61000-6-2: 2001 / EN 55024: 1998+A1: 2001

EN 61000-4-2: 1995+A1: 1998

B

EN 61000-4-3: 1996+A1: 1998

A

EN 61000-4-4: 1995

B

EN 61000-4-5: 1995

B

EN 61000-4-6: 1996

A

EN 61000-4-8: 1993

A

EN 61000-4-11: 1994

The referred test report(s) show that the product fulfills the requirements in the EMC Directive for CE marking. On this basis, together with the manufacturer's own documented production control, the manufacturer (or his European authorized representative) can in his EC Declaration of Conformity verify compliance with the EMC Directive.

**Signed for and on behalf of
PEP Testing Laboratory**



M. Y. Tsui

Date: MAR. 17, 2003

M. Y. Tsui / President

Declaration of Conformity

The following

Applicant : SEA SONIC ELECTRONICS CO., LTD.

Equipment : Switching Power Supply

Model No. : SS-250AGX Active PFC yz, SS-250SGX Active PFC yz,
SS-300AGX Active PFC yz, SS-300SGX Active PFC yz,
SS-300FB Active PFC yz, SS-350AGX Active PFC yz,
SS-350SGX Active PFC yz, SS-350UMD Active PFC Fz,
SS-400AGX Active PFC Fz, SS-400SGX Active PFC Fz,
SS-460AGX Active PFC Fz, SS-460SGX Active PFC Fz

Report No. : E920093

is herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility(89/336/EEC) and the amendments in the Council Directive 92/31/EEC, 93/68/EEC.

For the evaluation of above mentioned Directives, the following standards were applied:

- 1) EN 61000-6-3: 2001 / EN 55022: 1998+A1 : 2000 Class B
- 2) EN 61000-3-2 : 2000
- 3) EN 61000-3-3 : 1995
- 4) EN 61000-6-2: 2001 / EN 55024 : 1998+A1 : 2001
EN 61000-4-2 : 1995+A1: 1998
EN 61000-4-3 : 1996+A1: 1998
EN 61000-4-4 : 1995
EN 61000-4-5 : 1995
EN 61000-4-6 : 1996
EN 61000-4-8 : 1993
EN 61000-4-11 : 1994

The following manufacturer is responsible for this declaration:

DONG GUAN SEA SONIC ELECTRONICS CO., LTD.
ZHENG KENG INDUSTRIAL PARK,
YU WU DISTRICT, FUCHENG DONGGUAN,
P. R. C.

P. R. C. / Mar. 17, 2003

Place and Date

Signature of responsible Person

EUT DECLARATION FOR CE-EMC PERMISSIVE CHANGE

We hereby declare that both of the major electrical design and construction of these requested models: SS-300AGX Active PFC yz, SS-350AGX Active PFC yz, SS-400AGX Active PFC Fz, SS-460AGX Active PFC Fz, SS-300FB Active PFC Fz, SS-300SGX Active PFC yz, SS-350SGX Active PFC yz, SS-400SGX Active PFC Fz, SS-460SGX Active PFC Fz and SS-350UMD Active PFC Fz are identical to the original samples listed in PEP Report No. E920093 except the part of output wattage is updated to 200W from original 180W. Two additional models: SS-400FB Active PFC Fz and SS-350FB Active yz that come with components of transformer, rectifier and transistor differing from original models are requested to attached as serial models. From technical point of view, the worst-case model: SS-400FB Active PFC Fz was took for additional tests. We attached update of model SS-300AGX Active PFC yz, SS-350AGX Active PFC yz, SS-400AGX Active PFC Fz, SS-460AGX Active PFC Fz, SS-300FB Active PFC Fz, SS-300SGX Active PFC yz, SS-350SGX Active PFC yz, SS-400SGX Active PFC Fz, SS-460SGX Active PFC Fz and SS-350UMD and additional models SS-400FB Active PFC Fz and SS-350FB Active yz with test result in original report as reference.

Applicant : SEA SONIC ELECTRONICS CO., LTD.

Address : 8F., #19 ALLEY 360, SEC. 1, NEIHU ROAD, NEIHU, TAIPEI,
TAIWAN, R. O. C.

Signature : _____
H. P. WU / SAFETY ENGINEER

Date : / /

EN 55022 Conducted Disturbance Test

Test Standard	Model No.	Result
EN 55022	SS-400FB Active PFC Fz	Passed

Conducted Disturbance Test Setup Photo.

< FRONT VIEW >



< REAR VIEW >



Conducted Disturbance Test Data at Main Ports (LISN)

Model No. : SS-400FB Active PFC Fz
Frequency range : 150KHz to 30MHz
Detector : Peak Value
Temperature : 34 °C
Humidity : 50 %

Test Data : # 1097 < LINE >
1102 < NEUTRAL >

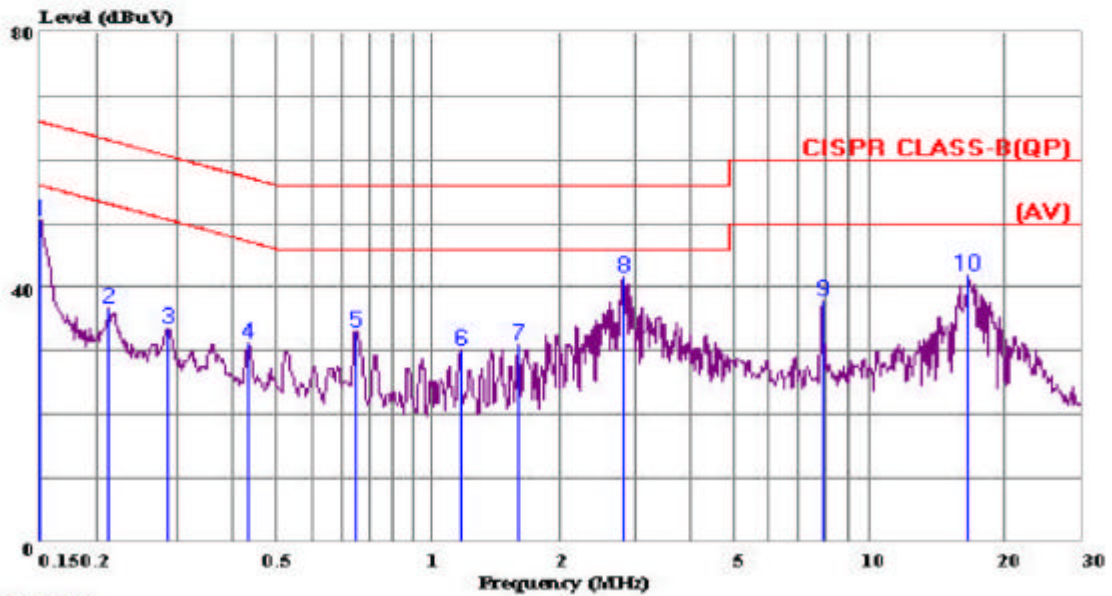
- Note 1. Level = Read Level + Probe (LISN) Factor + Cable Loss
2. Over Limit = Level – Limit Line = Margin



暉鑫科技股份有限公司

PEP Testing Laboratory

Data#: 1097 File#: EN55022-B(QP).EMI Date: 2003-07-22 Time: 11:11:02



Trace: 1096

Site : Shih-Chi : Conduction No.1(Nick)
 Condition: CISPR CLASS-B(QP) LISN.L(16A) LINE
 eut : E920093-1
 power : AC 230V 50Hz
 memo : Peak Vaule
 : Final Test

Page: 1

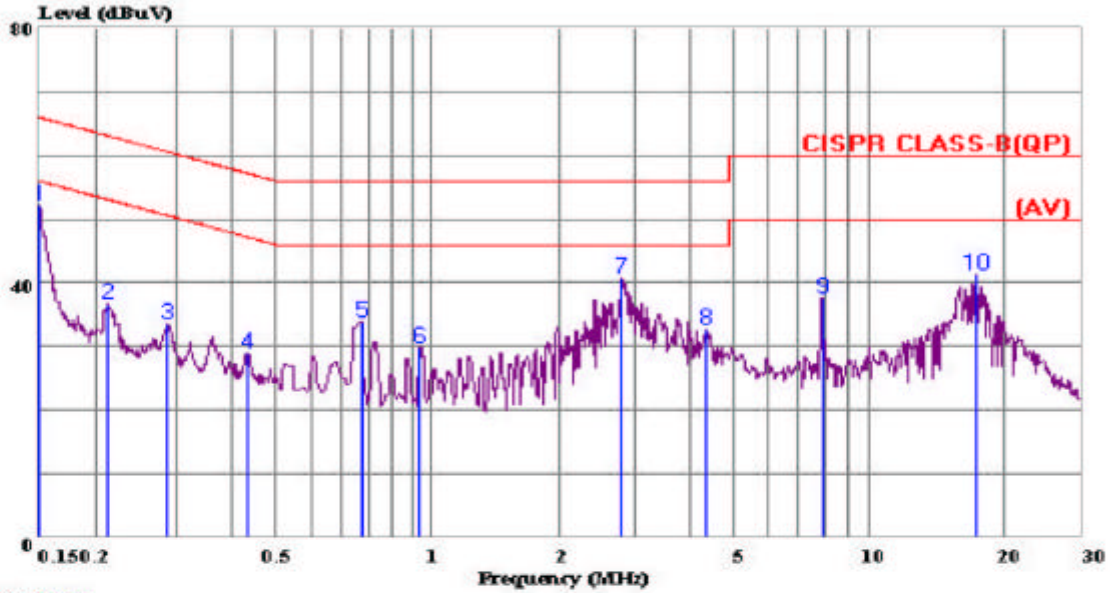
	Freq	Level	Over	Limit	Read	Probe	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.151	50.40	-15.56	65.96	50.00	0.30	0.10	
2	0.214	36.84	-26.21	63.05	36.40	0.31	0.13	
3	0.289	33.67	-26.87	60.54	33.20	0.35	0.12	
4	0.431	31.30	-25.94	57.24	30.80	0.40	0.10	
5	0.751	33.10	-22.90	56.00	32.60	0.40	0.10	
6	1.276	30.20	-25.80	56.00	29.60	0.40	0.20	
7	1.707	31.00	-25.00	56.00	30.40	0.40	0.20	
8	2.915	41.60	-14.40	56.00	41.00	0.40	0.20	
9	8.020	37.85	-22.15	60.00	37.00	0.55	0.30	
10	16.839	41.75	-18.25	60.00	40.58	0.84	0.33	



暉鑫科技股份有限公司

PEP Testing Laboratory

Data#: 1102 File#: EN55022-B(QP).EMI Date: 2003-07-22 Time: 11:16:22



Trace: 1101
 Site : Shih-Chi : Conduction No.1(Nick)
 Condition: CISPR CLASS-B(QP) LISN.N(16A) NEUTRAL
 eut : E920093-1
 power : AC 230V 50Hz
 memo : Peak Vaule
 : Final Test

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.150	52.20	-13.80	66.00	52.00	0.10	0.10	
2	0.213	36.63	-26.47	63.10	36.40	0.10	0.13	
3	0.288	33.42	-27.17	60.59	33.20	0.10	0.12	
4	0.433	29.01	-28.19	57.20	28.80	0.11	0.10	
5	0.771	33.87	-22.13	56.00	33.60	0.17	0.10	
6	1.037	29.80	-26.20	56.00	29.40	0.20	0.20	
7	2.900	40.60	-15.40	56.00	40.20	0.20	0.20	
8	4.454	32.72	-23.28	56.00	32.20	0.22	0.30	
9	8.020	37.65	-22.35	60.00	37.00	0.35	0.30	
10	17.568	41.16	-18.84	60.00	40.20	0.66	0.30	

EN 55022 Radiated Disturbance Test

Test Standard	Model No.	Result
EN 55022	SS-400FB Active PFC Fz	Passed

Radiated Disturbance Test Setup Photos.

< FRONT VIEW >



< REAR VIEW >



Radiated Disturbance Test Data

Model No. : SS-400FB Active PFC Fz
Frequency range : 30MHz to 1GHz **Detector** : Quasi-Peak Value
Frequency range : above 1GHz **Detector** : Quasi-Peak/Average Value
Temperature : 34 ° C **Humidity** : 50 %

Antenna polarization : HORIZONTAL ; **Test distance** : 10m ;

Freq. (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Azimuth (°angle)	Antenna High(m)
57.747	26.62	- 3.38	30.00	39.64	6.08	0.66	19.76	50.0	4.0
224.994	22.44	- 7.56	30.00	28.41	12.00	1.50	19.47	140.0	4.0
234.734	18.68	-18.32	37.00	24.18	12.48	1.54	19.52	160.0	4.0
584.291	22.65	-14.35	37.00	18.32	20.50	2.59	18.76	200.0	3.5
799.836	23.82	-13.18	37.00	16.92	22.70	3.20	19.00	230.0	3.5
833.508	28.71	- 8.29	37.00	21.28	23.47	3.13	19.17	300.0	3.5

Note :

1. Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line

Model No. : SS-400FB Active PFC Fz
Frequency range : 30MHz to 1GHz **Detector** : Quasi-Peak Value
Frequency range : above 1GHz **Detector** : Quasi-Peak/Average Value
Temperature : 34 ° C **Humidity** : 50 %

Antenna polarization : VERTICAL ; **Test distance** : 10m ;

Freq. (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Azimuth (°angle)	Antenna High(m)
121.250	26.83	- 3.17	30.00	39.41	6.38	0.92	19.88	34.0	1.0
224.998	24.23	- 5.77	30.00	30.20	12.00	1.50	19.47	115.0	1.0
235.283	21.80	-15.20	37.00	27.30	12.48	1.54	19.52	230.0	1.0
733.183	24.72	-12.28	37.00	18.20	22.89	2.76	19.13	321.0	1.5
824.924	24.89	-12.11	37.00	17.67	23.20	3.15	19.13	340.0	1.5
932.292	28.94	- 8.06	37.00	19.15	25.60	3.17	18.98	185.0	1.5

Note :

1. Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line

EN 61000-4-2 Electrostatic Discharge Test

Test standard	Model No.	Result
EN 61000-4-2	SS-400FB Active PFC Fz	B

The test results shall be classified on the basis of the operating conditions and the functional specifications of the equipment under test , as in the following , unless different specifications are given by product committees or product specifications :

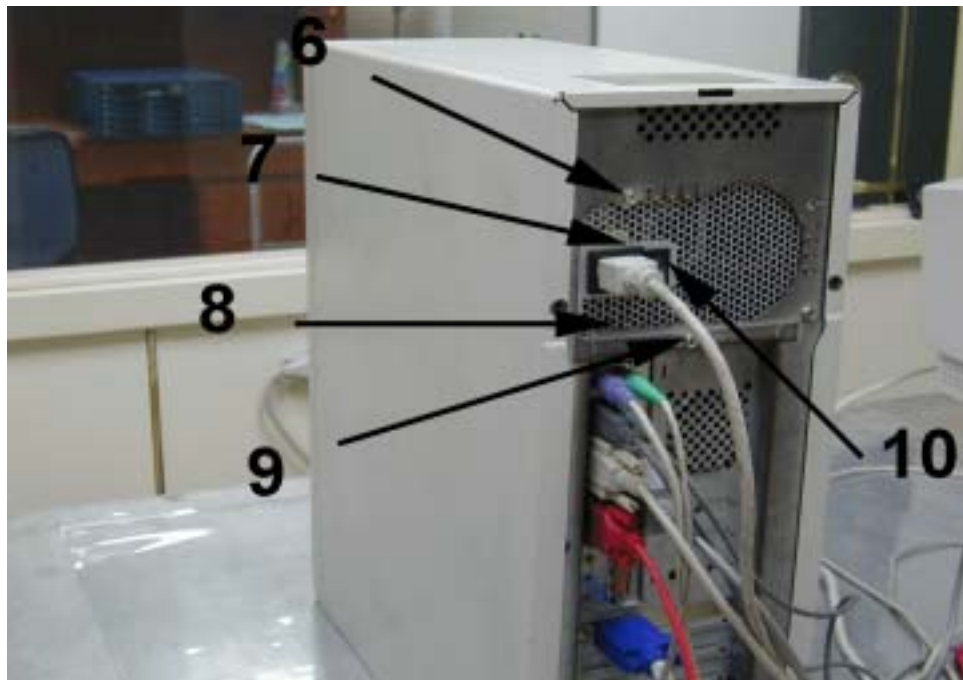
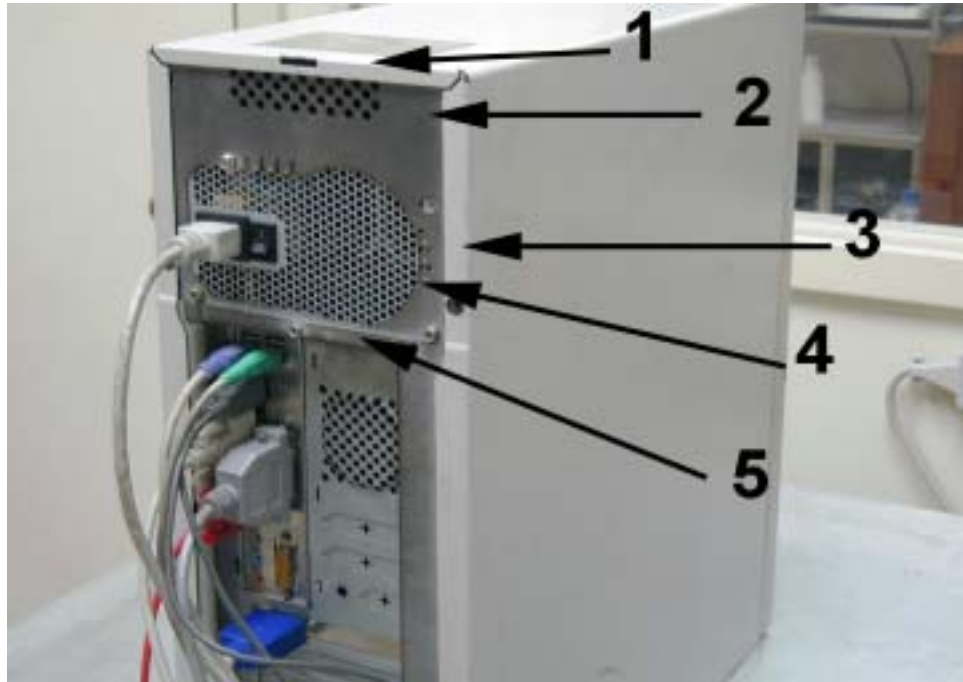
Performance Criterion :

A) normal performance within the specification limits ;

B) temporary degradation or loss of function or performance which is self-recoverable ;

C) temporary degradation or loss of function or performance which requires operator intervention or system reset ;

Direct Discharge Test Drawing



Indirect Discharge Test Drawing



Electrostatic Discharge Test Data (Direct Discharge)

Model No. : SS-400FB Active PFC Fz

Test Item : Direct Discharge		Instrument : NoiseKen ESS-100L														
Temperature : <u>28</u> °C		Relative Humidity : <u>45</u> %RH														
Storage Capacitor : 150 pf		Discharge Resistor : 330 Ohm														
Discharge Rate : < 1 / Sec																
	Contact Discharge								Air Discharge							
	2 KV		4 KV		6 KV		8 KV		2 KV		4 KV		6 KV		8 KV	
	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
1	P	P	P	P	/	/	/	/	P	P	P	P	P	P	P	P
2	P	P	P	P	/	/	/	/	P	P	P	P	P	P	P	P
3	P	P	P	P	/	/	/	/	P	P	P	P	P	P	P	P
4	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P
5	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P
6	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P
7	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P
8	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P
9	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P
10	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P

1. " P " - - - - means the EUT function is correct during the test. _____
2. " / " - - - - no test. _____

Electrostatic Discharge Test Data (Indirect Discharge)

Model No. : SS-400FB Active PFC Fz

Test Item : Indirect Discharge		Instrument : NoiseKen ESS-100L														
Temperature : <u>28</u> °C		Relative Humidity : <u>45</u> %RH														
Storage Capacitor : 150 pf		Discharge Resistor : 330 Ohm														
Discharge Rate : < 1 / Sec																
	Contact Discharge								Air Discharge							
	2 KV		4 KV		6 KV		8 KV		2 KV		4 KV		6 KV		8 KV	
	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
1	P	P	P	P	/	/	/	/	/	/	/	/	/	/	/	/
2	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
4	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
5	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
6	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
7	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
8	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
9	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
10	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/

1. " P " - - - - means the EUT function is correct during the test.

2. " / " - - - - no test.

EN 61000-4-3 Radio-Frequency Electromagnetic Field Test

Test Standard	Model No.	Result
EN 61000-4-3	SS-400FB Active PFC Fz	A

Field Strength : 10 V/M , Level 3 .

Modulation : AM 80 % , 1KHz . ON (YES) . OFF (___)

Start : 80 MHz , Stop : 1000 MHz . AC Power : 230 Vac

DC Power : N/A Vdc

The test results shall be classified on the basis of the operating conditions and the functional specifications of the equipment under test , as in the following , unless different specifications are given by product committees or product specifications :

Performance Criterion :

A) normal performance within the specification limits ;

B) temporary degradation or loss of function or performance which is self-recoverable ;

C) temporary degradation or loss of function or performance which requires operator intervention or system reset ;

Radio-Frequency Electromagnetic Field Test Setup Photo

< FRONT VIEW >



EN 61000-4-5 Surge Immunity Test

Test Standard	Model No.	Result
EN 61000-4-5	SS-400FB Active PFC Fz	B

The test results shall be classified on the basis of the operating conditions and the functional specifications of the equipment under test , as in the following , unless different specifications are given by product committees or product specifications :

Performance Criterion :

A) normal performance within the specification limits ;

B) temporary degradation or loss of function or performance which is self-recoverable ;

C) temporary degradation or loss of function or performance which requires operator intervention or system reset ;

Surge Immunity Test Setup Photo

< FRONT VIEW >



Surge Immunity Test Data

MODEL NO : SS-400FB Active PFC Fz

TEST SETUP : According to EN 61000-4-5 (1995)

TEST RESULT

Temperature : <u>28</u> °C		Relative Humidity <u>45</u> %RH								
Waveform : <u>1,2 x 50 μs</u>		Test rate : <u>15</u> sec								
Times <u>1</u> times / each condition		AC power <u>230</u> VAC								
\Voltage\Mode\Polarity\Result		\Phase	0	45	90	135	180	215	270	315
1KV	Line	+	P	P	P	P	P	P	P	P
	Neutral	-	P	P	P	P	P	P	P	P
2KV	Line	+	/	/	/	/	/	/	/	/
	Neutral	-	/	/	/	/	/	/	/	/
2KV	Line	+	P	P	P	P	P	P	P	P
	Ground	-	P	P	P	P	P	P	P	P
	Neutral	+	P	P	P	P	P	P	P	P
	Ground	-	P	P	P	P	P	P	P	P

Note : 1. " P " means the EUT function is correct during the test

2. "/" no test

EUT Photos

MODEL NO. : SS-400FB Active PFC Ez;



