

EMC TEST REPORT
for
FSP Group Inc.
Switching Power Supply

Models : (1)FSP150-601U (2)FSP200-601U

Prepared for : FSP Group Inc.
6F-1, NO. 487, Ta-Yu Rd., Taoyuan City,
Taiwan, R.O.C.

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TEST REPORT VERIFICATION

Applicant : FSP Group Inc.
 Manufacturer #1 : Shenzhen Huili Elec. Co., Ltd.
 Manufacturer #2 : Welldx Technology Co., Ltd.
 Manufacturer #3 : Fortron/Source (China)Corp.
 EUT Description : Switching Power Supply
 (A) MODEL NO. : (1)FSP150-601U (2)FSP200-601U
 (B) SERIAL NO. : N/A
 (C) POWER SUPPLY : AC 230V/50Hz

Measurement Procedure Used:

EN 55022/1998
 EN 61000-3-2/1995 +A12/1996 +A13/1997 +A1/1998 +A2/1998 +A14/2000 and
 EN 61000-3-3/1995
 EN 55024/1998 (IEC 61000-4-2/1995, IEC 61000-4-3/1995, IEC 61000-4-4/1995,
 IEC 61000-4-5/1995, IEC 61000-4-6/1996, IEC 1000-4-8/1993,
 IEC 61000-4-11/1994)

The device described above are tested by Taiwan Tokin EMC Eng. Corp. to determine the maximum emission levels emanating from the device and the severity levels of the device endured and its performance criterion. The measurement results were contained in this test report and Taiwan Tokin EMC Eng. Corp. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the EN 55022 、 EN 61000-3-2, -3 official limits and EN 55024 official requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Taiwan Tokin EMC Eng. corp.

Date of Test : Jan. 10 ~ Jun. 01. 2001

Prepared by : Nita Lee June 13, 2001
 (NITA LEE)

Test Engineer : Allen Wang 6/14, 2001
 (ALLEN WANG)

Approve & Authorized Signer : Jackie Deng 6/14, 2001
 (JACKIE DENG)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Description	:	Switching Power Supply
Model Number	:	(1)FSP150-601U (2)FSP200-601U
		Please refer to Appendix I for the differences in the models. All models are representative selected in the test and included in this report.
Applicant	:	FSP Group Inc. 6F-1, NO. 487, Ta-Yu Rd., Taoyuan City, Taiwan, R.O.C.
Manufacturer #1	:	Shenzhen Huili Elec., Co., Ltd. Blk. C, Bldg. 7, County 73, Baoan, Shenzhen, Guangdong, China.
Manufacturer #2	:	Wellex Technology Co., Ltd. Zhenlian Building, County 74, Baoan, Shenzhen, Guangdong, China.
Manufacturer #3	:	Fortron/Source (China) Corp. #1 Unit 25, Zone 37, Baoan County, Shenzhen, China. #2 The 2 nd Industrial Park Mabu Xi Xiang, Baoan District, Shenzhen, Guangdong, China.
M/N FSP150-601U (EUT #1)	:	Max Output Power: 150W DC Output: +5V/14A, +12V/4.5A, +3.3V/10A, -5V/0.3A, -12V/0.8A, +5Vsb/2A (+5V & +3.3V = 85 W max) AC Input: 100 ~ 240V, 4/2A, 50/60Hz
M/N FSP200-601U (EUT #2)	:	Max Output Power: 200W DC Output: +5V/20A, +12V/6A, +3.3V/14A, -5V/0.3A, -12V/0.8A, +5Vsb/2A (+5V & +3.3V = 120 W max) AC Input: 100 ~ 240V, 5/3A, 50/60Hz
Date of Receipt of Sample	:	Oct. 04, 2000
Date of Test	:	Jan. 10 ~ Jun. 01, 2001

1.2. Tested Supporting System Details

**** FOR EMI TESTS ****

1.2.1. PERSONAL COMPUTER

Mother Board	:	Motorola P/N : uFX10
CPU	:	Intel Celeron 566
Case	:	EVERCASE, M/N ECR-9102
S.P.S. (EUT #1)	:	FSP, M/N FSP150-601U
S.P.S. (EUT #2)	:	FSP, M/N FSP200-601U
Floppy Driver 3.5"	:	TEAC, FD-05H7, P/N 19307556-30, S/N 1590296
Hard Disk Driver	:	Seagate, M/N ST310211A
CD-ROM	:	TEAC, CD-224E
RAM	:	NEC, 128KX2 PC100-222-620
Power Cord	:	Non-Shielded, Undetachable, 1.8m

1.2.2. MONITOR

Model Number	:	0182-05N
Serial Number	:	23-05485
FCC ID	:	CMC769KM1
Manufacturer	:	IBM
Data Cable	:	Shielded, Undetachable, 1.5m Bonded a ferrite core
Power Cord	:	Non-Shielded, Detachable, 1.8m

1.2.3. KEYBOARD

Model Number	:	5121
Serial Number	:	J83300812
FCC ID	:	E5XKBM104M10UC
Manufacturer	:	Behavior Tech Computer Corp.
Data Cable	:	Shielded, Undetachable, 1.0m

1.2.4. PRINTER

Model Number	:	2225C+
Serial Number	:	3121S96627
FCC ID	:	DSI6XU2225
Manufacturer	:	Hewlett Packard
Power Adapter	:	Hewlett Packard, M/N 82241A Non-Shielded, Undetachable, 2.0m
Data Cable	:	Shielded, Detachable, 1.2m

1.2.5. MODEM

Model Number	:	DM-1414
Serial Number	:	980034398
FCC ID	:	IFAXDM1414
Manufacturer	:	Aceex
Data Cable	:	Shielded, Detachable, 1.2m
Power Adapter	:	Amigo, Model AM-91000A Non-Shielded, Undetachable, 1.8m

1.2.6. MOUSE

Model Number	:	M-S35
Serial Number	:	LZA82103152
FCC ID	:	DZL211029
Manufacturer	:	Logitech
Data Cable	:	Non-Shielded, Undetachable, 1.8m

1.2.7. USB MOUSE #1

Model Number	:	CREUBB
Serial Number	:	N/A
FCC ID	:	NHM-CREUBE
Manufacturer	:	CRE Technology Co., Ltd.
Data Cable	:	Shielded, Undetachable, 1.8m

1.2.8. USB MOUSE #2

Model Number	:	CREUBB
Serial Number	:	N/A
FCC ID	:	NHM-CREUBE
Manufacturer	:	CRE Technology Co., Ltd.
Data Cable	:	Shielded, Undetachable, 1.8m

1.2.9. HUB

Model Number	:	8222-008
Serial Number	:	23-F4014
FCC ID	:	By DoC
Manufacturer	:	IBM
Data Cable	:	Shielded, Detachable, 1.8m
Power Cord	:	Non-Shielded, Detachable, 1.8m

** FOR HARMONIC, FLICKER **

1.2.10. RESISTOR LOAD

Model Number	:	N/A
Manufacturer	:	FSP Group Inc.

** FOR EMS TESTS **

1.2.11.PERSONAL COMPUTER

Mother Board	:	Motorola P/N : uFX10
CPU	:	Intel Celeron 566
Case	:	EVERCASE, M/N ECR-9102
S.P.S. (EUT #1)	:	FSP, M/N FSP150-601U
S.P.S. (EUT #2)	:	FSP, M/N FSP200-601U
Floppy Driver 3.5"	:	TEAC, FD-05H7, P/N 19307556-30, S/N 1590296
Hard Disk Driver	:	Seagate, M/N ST310211A
CD-ROM	:	TEAC, CD-224E
RAM	:	NEC, 128KX2 PC100-222-620
Power Cord	:	Non-Shielded, Undetachable, 1.8m

1.2.12.MONITOR

Model Number	:	PM36B
Serial Number	:	W821111454
FCC ID	:	IIBTC1
Manufacturer	:	Funai Electric Company of Taiwan
Data Cable	:	Shielded, Undetachable, 1.2m
Power Cord	:	Non-Shielded, Detachable, 1.5m

1.2.13.KEYBOARD

Model Number	:	5121
Serial Number	:	J83300818
FCC ID	:	E5XKBM104M10UC
Manufacturer	:	Behavior Tech Computer Corp.
Data Cable	:	Shielded, Undetachable, 1.0m

1.2.14.PRINTER

Model Number	:	2225C+
Serial Number	:	3007S68643
FCC ID	:	DSI6XU2225
Manufacturer	:	Hewlett Packard
Power Adapter	:	Hewlett Packard, M/N 82241A Non-Shielded, Undetachable, 2.0m
Data Cable	:	Shielded, Detachable, 1.2m

1.2.15.MODEM

Model Number	:	DM-1414
Serial Number	:	0029857
FCC ID	:	IFAXDM1414
Manufacturer	:	Aceex
Data Cable	:	Shielded, Detachable, 1.2m
Power Adapter	:	Amigo, Model AM-91000A Non-Shielded, Undetachable, 1.8m

1.2.16.MOUSE

Model Number : M-S35
Serial Number : LZA82103157
FCC ID : DZL211029
Manufacturer : Logitech
Data Cable : Non-Shielded, Undetachable, 1.8m

1.2.17.USB MOUSE #1

Model Number : CREUBB
Serial Number : N/A
FCC ID : NHM-CREUBE
Manufacturer : CRE Technology Co., Ltd.
Data Cable : Shielded, Undetachable, 1.8m

1.2.18.USB MOUSE #2

Model Number : CREUBB
Serial Number : N/A
FCC ID : NHM-CREUBE
Manufacturer : CRE Technology Co., Ltd.
Data Cable : Shielded, Undetachable, 1.8m

1.2.19.HUB

Model Number : 8222-016
Serial Number : 23-36666
FCC ID : By DoC
Manufacturer : IBM
Data Cable : Shielded, Detachable, 1.8m
Power Cord : Non-Shielded, Detachable, 1.8m

1.3. Test Facility

Site Description (No. 7 Open Site)	:	Taiwan Tokin EMC Eng. Corp. LINKOU LAB.
Name of Firm	:	Taiwan Tokin EMC Eng. Corp. 9th Fl., No. 38, Fushing N. Rd., Taiwan, R.O.C.
Site Location	:	No. 53-11, Tin-Fu Tsun, Lin-Kou, Taipei Hsien, Taiwan, R.O.C.
NVLAP Lab. Code	:	200077-0
DAR-Registration No.	:	DAT-P-092/99-00e

1.4. Measurement Uncertainty

- (1) Radiation Uncertainty $U_r = \pm 4.01\text{dB}$
- (2) Conduction Uncertainty $U_c = \pm 2.26\text{dB}$

2. TESTED INSTRUMENTATION USED

2.1. For Conduction Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Personal Computer	DFI	IPV3120400	N/A	N/A	N/A
2.	Test Receiver	Rohde & Schwarz	ESHS10	844591/015	Feb. 26, 01'	1 Year
3.	A.M.N.	Rohde & Schwarz	ESH3-Z5	861189/008	Aug. 02, 00'	1 Year
4.	L.I.S.N.	Kyoritsu	KNW-407	8-1430-6	Nov. 04, 00'	1 Year
5.	Printer	HP	C6450A	TH96Q150GJ	N/A	N/A

2.2. For Radiation Measurement (No. 7 Open Site)

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	HP	8595E	3829A03489	Oct. 30, 00'	1 Year
2.	Test Receiver	R&S	ESVS10	849231/017	Dec. 01, 00'	1 Year
3.	Computer	TOKIN	586PC	N/A	N/A	NA
4.	Printer	Panasonic	C6450A	TH96Q121ZC	N/A	N/A
5.	Amplifier	HP	8447D	2944A06891	N/A	N/A
6.	Biconical Antenna	Chase	VBA6106A	1240	Jul. 05, 00'	1 Year
7.	Log Periodic Antenna	Chase	UPA6109	1064	Jul. 05, 00'	1 Year

2.3. For Harmonic & Flicker Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Universal Power Analyzer	Voltech	PM3000A	6686-002	Jan. 09, 01'	1 Year
2.	Programmable Power Source	Chroma	6590	65900086	Apr. 18, 01'	1 Year

2.4. For ESD Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Simulator	Keytek	MZ-15/EC	9907252	Aug. 25, 00'	1 Year

2.5.For RF Field Strength Susceptibility Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Generator	Maconi	2031	119530/015	Jan. 06, 01'	1 Year
2.	Power Amplifier	A & R	100A250	17811	N/A	N/A
3.	Power Amplifier	A & R	100W1000M1	18233	N/A	N/A
4.	Field Monitor	A & R	FM2000	13605	Jan.17, 01'	1 Year
5.	Field Sensor	A & R	FP2000	17653	Aug. 07, 00'	1 Year
6.	Power Antenna	A & R	AT1080	13002	N/A	N/A
7.	Power Antenna	EMCO	3108	9305-2482	N/A	N/A

2.6.For EFT Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Control Center	Keytek	E103	9506267	Jun. 21, 00'	1 Year
2.	EFT Generator	Keytek	E411	9506182	Jun. 21, 00'	1 Year
3.	EFT Coupler / Decoupler	Keytek	E4551	9506216	Jun. 21, 00'	1 Year
4.	Capacitor Clamp	Keytek	CCL-4/S	9506190	Jun. 21, 00'	1 Year

2.7.For Surge Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Control Center	Keytek	E103	9506267	Jun. 21, 00'	1 Year
2.	Surge Combination Wave	Keytek	E501A	9506272	Jun. 21, 00'	1 Year
3.	Surge Coupler / Decoupler	Keytek	E4551	9506216	Jun. 21, 00'	1 Year

2.8.For Injected Currents Susceptibility Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Generator	Maconi	2031	119530/015	Jan. 06. 01'	1 Year
2.	Power Amplifier	A & R	100A250	17811	N/A	N/A
3.	Power Meter	HP	436A	2236A13620	Dec. 29, 00'	1 Year
4.	Power Sensor	HP	8482B	3318A05483	Dec. 29, 00'	1 Year
5.	CDN-M3	Fischer	FCC-801-M3-25A	98101	Oct. 13, 00'	1 Year
6.	Attenuator	Weinschel	40-6-34	LH972	Jul. 07, 00'	1 Year

2.9.For Power Frequency Magnetic Field Immunity Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Magnetic Field Generator	Hafely	MAG 100.1	080015-01	Dec. 02, 00'	1 Year

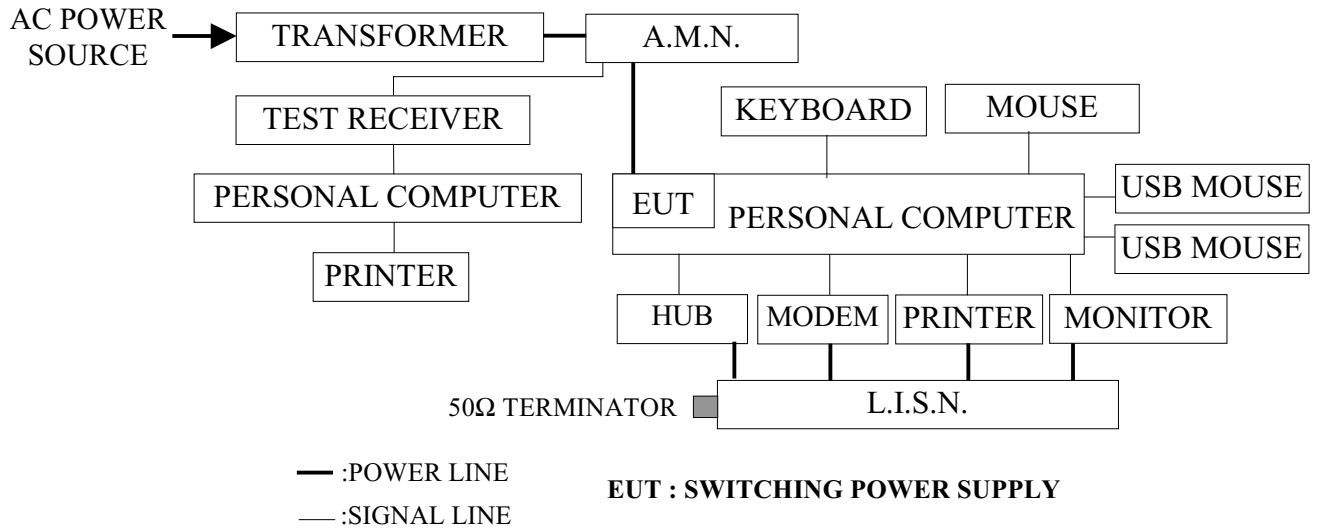
2.10.For Voltage Dips and Interruptions Test

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Programmable AC Source	Chroma	6590	65900086	Apr. 18, 01'	1 Year
2.	Universal Power Analyz	Voltech	PM3000A	6686-002	Jan. 09, 01'	1 Year

3. POWERLINE CONDUCTED TEST

3.1. Block Diagram of Test Setup

3.1.1. Block Diagram of connection between EUT and simulators



3.2. Powerline Conducted Emission Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level	Average Level
150KHz ~ 500KHz	66 ~ 56 dB	56 ~ 46 dB
500KHz ~ 5MHz	56 dB	46 dB
5MHz ~ 30MHz	60 dB	50 dB

3.3. EUT's Configuration during Compliance Measurement

The following equipments were installed on RF LINE VOLTAGE measurement to meet EN 55022 requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

3.3.1. Switching Power Supply (EUT)

Model Number	:	(1)FSP150-601U (2)FSP200-601U
Manufacturer #1	:	Shenzhen Huili Elec., Co., Ltd.
Manufacturer #2	:	Wellex Technology Co., Ltd.
Manufacturer #3	:	Fortron/Source (China) Corp.
M/N FSP150-601U (EUT #1)	:	Max Output Power: 150W DC Output: +5V/14A, +12V/4.5A, +3.3V/10A, -5V/0.3A, -12V/0.8A, +5Vsb/2A (+5V & +3.3V = 85 W max) AC Input: 100 ~ 240V, 4/2A, 50/60Hz
M/N FSP200-601U (EUT #2)	:	Max Output Power: 200W DC Output: +5V/20A, +12V/6A, +3.3V/14A, -5V/0.3A, -12V/0.8A, +5Vsb/2A (+5V & +3.3V = 120 W max) AC Input: 100 ~ 240V, 5/3 A, 50/60Hz

3.3.2. Supporting System : As in Section 1.2

3.4. Operating Condition of EUT

- 3.4.1. Setup the EUT and simulator as shown on 3.1.
- 3.4.2. Turned on the power of all equipments.
- 3.4.3. Personal Computer (EUT inside) read data from disk.
- 3.4.4. Personal Computer running the self-test program “Hwin” by windows and sent “H” character to monitor, then the screen of monitor displayed and filled with “H” pattern.
- 3.4.5. Personal Computer read data from floppy disk and then wrote data into floppy disk.
- 3.4.6. The other peripheral devices were drove and operated in turn during all testing.
- 3.4.7. Repeat above procedures form 3.4.3. to 3.4.6.

3.5. Test Procedure

The EUT (within PC) was put on table which was above the ground by 80cm and PC's power connected to the AC main through a Artificial Mains Network (A.M.N.). The other peripheral devices power cord were connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provided a 50 ohm coupling impedance for the tested equipment. Both sides of A.C. line were checked to find out the maximum conducted emission according to EN55022 Class B regulations during conducted emission measurement.

The bandwidth of the R&S Test Receiver ESHS 10 was set at 10KHz.

The frequency range from 150KHz to 30 MHz was checked.

3.6.Line Conducted RF Voltage Measurement Results

PASSED. Please refer to the following pages.

Test Date : May. 31, 2001 Temperature : 24°C Humidity : 61%

Test Model		Reference Data #
1.	FSP150-601U	# 31 (32, 33), # 34 (35, 36)
2.	FSP200-601U	# 28 (29, 30), # 25 (26, 27)

TOKINNo53-11, Tin-fu Tsun, Lin-kou Hsiang,
Taipei, County, Taiwan R.O.C.

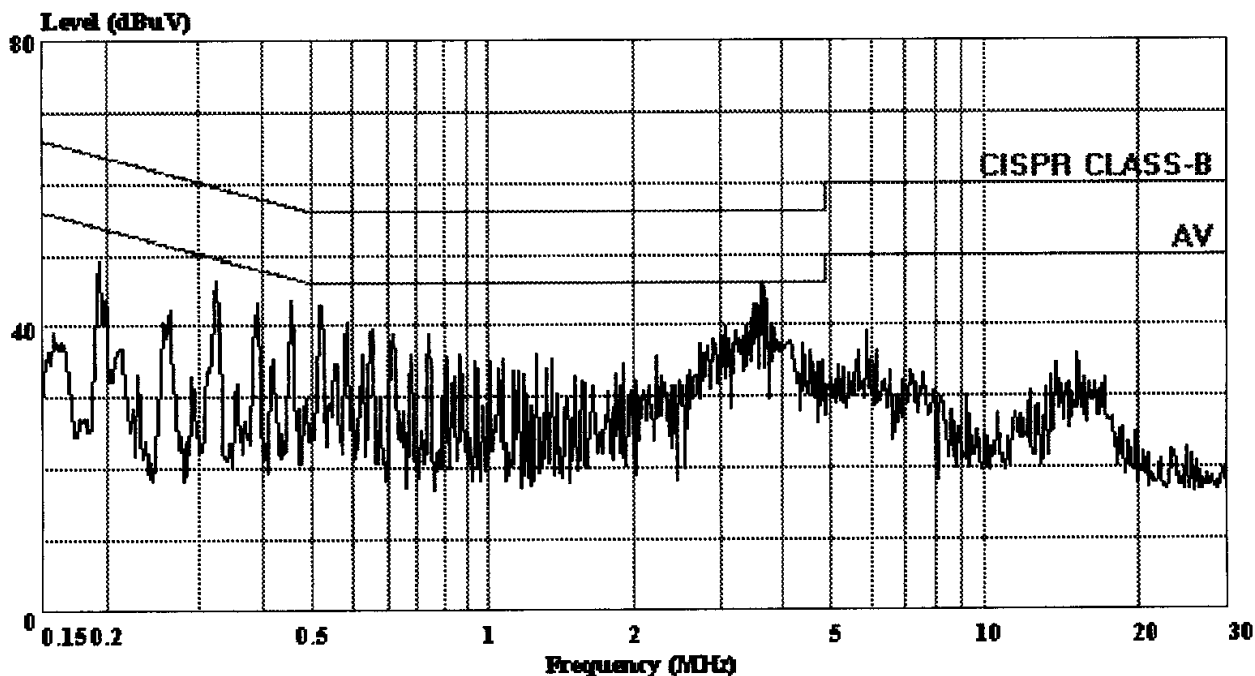
TEL: 02-2609-2133

FAX: 02-2609-9303

TAIWAN TOKIN EMC ENG. CORP.

Data#: 31 File#: FSP-6.EMI

Date: 2001-05-31 Time: 20:25:18



TAIWAN TOKIN EMC ENG. CORP. (No. 4 Shielded room)

Trace:

Ref Trace:

Condition: CISPR CLASS-B ENV4200 LINE

EUT : S.P.S M/N:FSP150-601U

POWER: 230Vac/50Hz

MEMO : W/PC

TOKIN

No53-11, Tin-fu Tsun, Lin-kou Hsiang,
 Taipei, County, Taiwan R.O.C.
 TEL:02-2609-2133
 FAX:02-2609-9303

TAIWAN TOKIN EMC ENG. CORP.

Data#: 32 File#: FSP-6.EMI
 No.4 Shielded room

Date: 2001-05-31 Time: 20:27:45

Condition: CISPR CLASS-B ENV4200 LINE
 EUT : S.P.S M/N:FSP150-601U
 POWER: 230Vac/50Hz
 MEMO : W/PC

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	dB	
1	0.197	46.99	-16.76	63.75	36.29	10.50	0.20	0.00	QP
2	0.324	44.05	-15.55	59.60	33.35	10.50	0.20	0.00	QP
3	0.455	41.87	-14.91	56.78	31.27	10.40	0.20	0.00	QP
4	0.522	43.02	-12.98	56.00	32.42	10.40	0.20	0.00	QP
5	3.782	44.37	-11.63	56.00	33.67	10.30	0.40	0.00	QP
6	6.004	36.76	-23.24	60.00	25.76	10.40	0.60	0.00	QP

Data#: 33 File#: FSP-6.EMI
 No.4 Shielded room

Date: 2001-05-31 Time: 20:28:15

Condition: CISPR CLASS-B(AV) ENV4200 LINE
 EUT : S.P.S M/N:FSP150-601U
 POWER: 230Vac/50Hz
 MEMO : W/PC

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	dB	
1	0.197	39.92	-13.83	53.75	29.22	10.50	0.20	0.00	Average
2	0.324	37.38	-12.22	49.60	26.68	10.50	0.20	0.00	Average
3	0.455	35.07	-11.71	46.78	24.47	10.40	0.20	0.00	Average
4 !	0.522	36.63	-9.37	46.00	26.03	10.40	0.20	0.00	Average
5 !	3.782	37.98	-8.02	46.00	27.28	10.30	0.40	0.00	Average
6	6.004	32.17	-17.83	50.00	21.17	10.40	0.60	0.00	Average

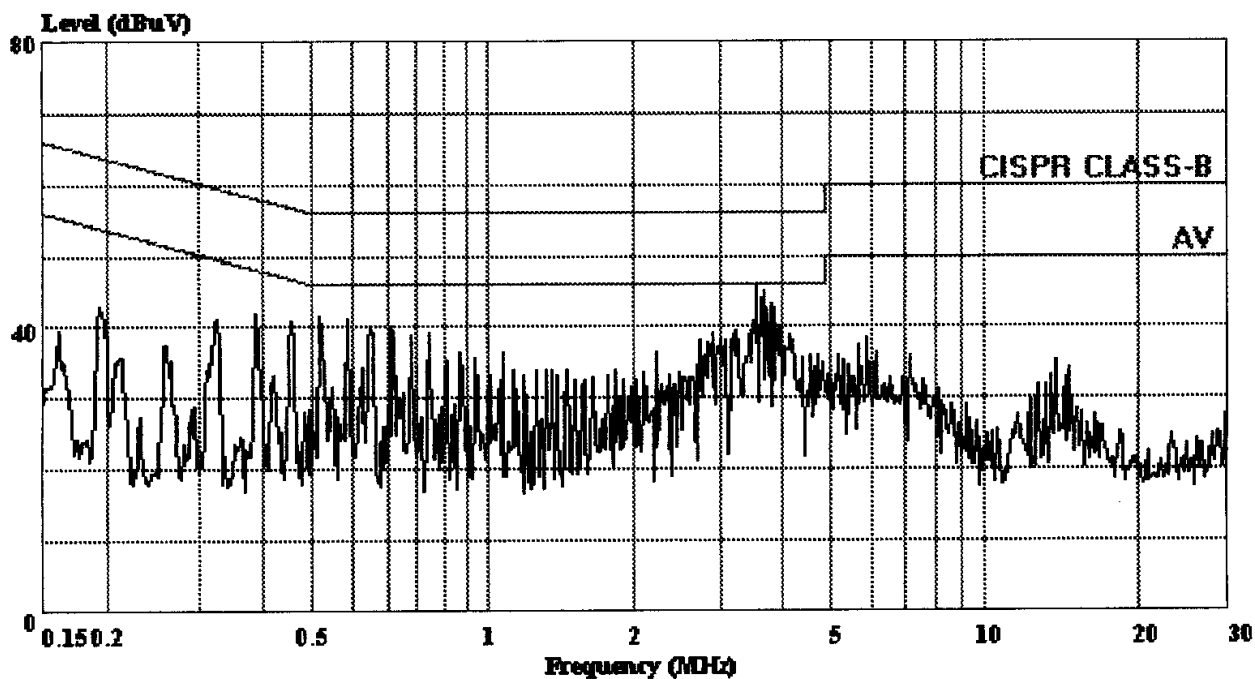
TOKIN

No53-11, Tin-fu Tsun, Lin-kou Hsiang,
 Taipei, County, Taiwan R.O.C.
 TEL: 02-2609-2133
 FAX: 02-2609-9303

TAIWAN TOKIN EMC ENG. CORP.

Data#: 34 File#: FSP-6.EMI

Date: 2001-05-31 Time: 20:28:51

**TAIWAN TOKIN EMC ENG. CORP. (No.4 Shielded room)**

Trace:

Ref Trace:

Condition: CISPR CLASS-B ENV4200 NEUTRAL
 EUT : S.P.S M/N:FSP150-601U
 POWER: 230Vac/50Hz
 MEMO : W/PC

TOKIN

No53-11, Tin-fu Tsun, Lin-kou Hsiang,
 Taipei, County, Taiwan R.O.C.
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 FAX: 02-2609-9303

TAIWAN TOKIN EMC ENG. CORP.

Data#: 35 File#: FSP-6.EMI
 No.4 Shielded room

Date: 2001-05-31 Time: 20:31:44

Condition: CISPR CLASS-B ENV4200 NEUTRAL
 EUT : S.P.S M/N:FSP150-601U
 POWER: 230Vac/50Hz
 MEMO : W/PC

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	dB	
1	0.197	40.54	-23.20	63.74	29.84	10.50	0.20	0.00	QP
2	0.326	39.80	-19.75	59.55	29.10	10.50	0.20	0.00	QP
3	0.457	39.18	-17.56	56.74	28.58	10.40	0.20	0.00	QP
4	0.519	41.60	-14.40	56.00	31.00	10.40	0.20	0.00	QP
5	3.783	44.19	-11.81	56.00	33.49	10.30	0.40	0.00	QP
6	6.005	36.23	-23.77	60.00	25.23	10.40	0.60	0.00	QP

Data#: 36 File#: FSP-6.EMI
 No.4 Shielded room

Date: 2001-05-31 Time: 20:32:11

Condition: CISPR CLASS-B(AV) ENV4200 NEUTRAL
 EUT : S.P.S M/N:FSP150-601U
 POWER: 230Vac/50Hz
 MEMO : W/PC

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	dB	
1	0.197	33.45	-20.29	53.74	22.75	10.50	0.20	0.00	Average
2	0.326	32.90	-16.65	49.55	22.20	10.50	0.20	0.00	Average
3	0.457	32.29	-14.45	46.74	21.69	10.40	0.20	0.00	Average
4	0.519	34.94	-11.06	46.00	24.34	10.40	0.20	0.00	Average
5 !	3.783	37.12	-8.88	46.00	26.42	10.30	0.40	0.00	Average
6	6.005	32.57	-17.43	50.00	21.57	10.40	0.60	0.00	Average

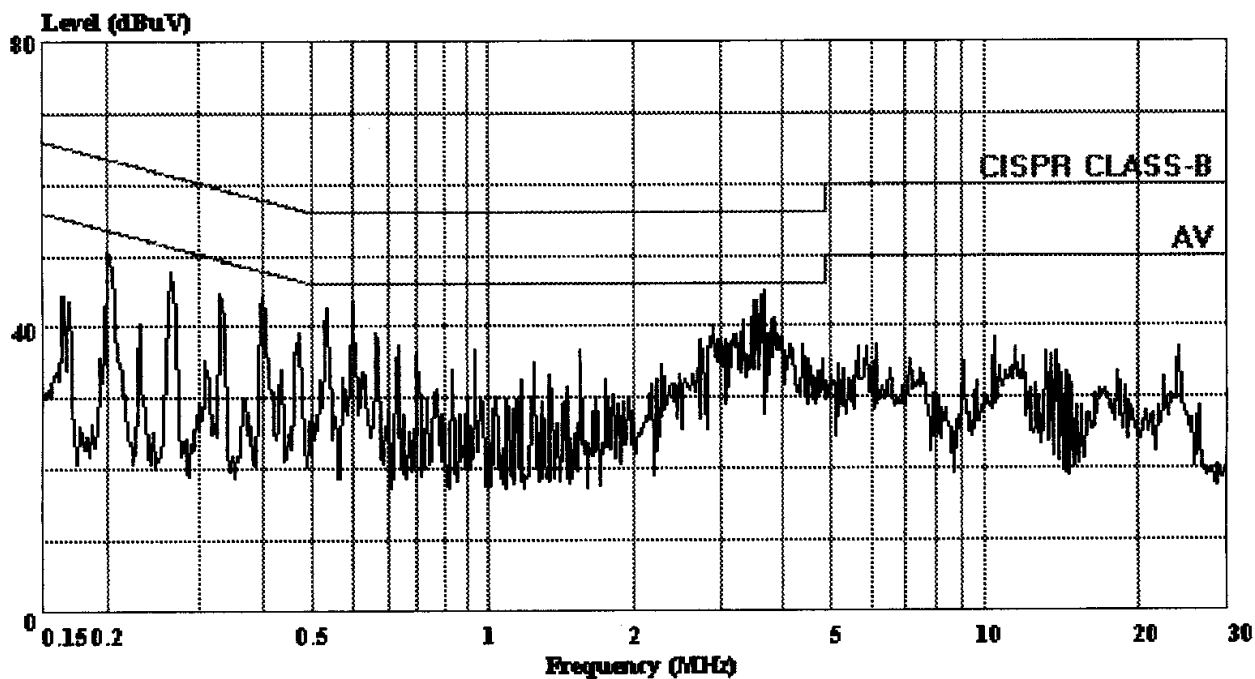
TOKIN

No53-11, Tin-fu Tsun, Lin-kou Hsiang,
Taipei, County, Taiwan R.O.C.
TEL: 02-2609-2133
FAX: 02-2609-9303

TAIWAN TOKIN EMC ENG. CORP.

Data#: 28 File#: FSP-6.EMI

Date: 2001-05-31 Time: 20:11:49

**TAIWAN TOKIN EMC ENG. CORP. (No.4 Shielded room)**

Trace:

Ref Trace:

Condition: CISPR CLASS-B ENV4200 LINE
EUT : S.P.S M/N:FSP200-601U
POWER: 230Vac/50Hz
MEMO : W/PC

TOKIN

No53-11, Tin-fu Tsun, Lin-kou Hsiang,
 Taipei, County, Taiwan R.O.C.
 TEL:02-2609-2133
 FAX:02-2609-9303

TAIWAN TOKIN EMC ENG. CORP.

Data#: 29 File#: FSP-6.EMI
 No.4 Shielded room

Date: 2001-05-31 Time: 20:15:01

Condition: CISPR CLASS-B ENV4200 LINE
 EUT : S.P.S M/N:FSP200-601U
 POWER: 230Vac/50Hz
 MEMO : W/PC

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	dB	
1	0.201	49.98	-13.60	63.58	39.28	10.50	0.20	0.00	QP
2	0.266	45.61	-15.65	61.26	34.91	10.50	0.20	0.00	QP
3	0.534	42.32	-13.68	56.00	31.72	10.40	0.20	0.00	QP
4	3.722	44.62	-11.38	56.00	33.92	10.30	0.40	0.00	QP
5	10.566	35.59	-24.41	60.00	24.39	10.50	0.70	0.00	QP
6	24.140	33.41	-26.59	60.00	22.11	10.60	0.70	0.00	QP

Data#: 30 File#: FSP-6.EMI
 No.4 Shielded room

Date: 2001-05-31 Time: 20:15:29

Condition: CISPR CLASS-B(AV) ENV4200 LINE
 EUT : S.P.S M/N:FSP200-601U
 POWER: 230Vac/50Hz
 MEMO : W/PC

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	dB	
1	0.201	43.18	-10.40	53.58	32.48	10.50	0.20	0.00	Average
2	0.266	40.40	-10.86	51.26	29.70	10.50	0.20	0.00	Average
3 !	0.534	36.25	-9.75	46.00	25.65	10.40	0.20	0.00	Average
4 !	3.722	38.60	-7.40	46.00	27.90	10.30	0.40	0.00	Average
5	10.566	25.14	-24.86	50.00	13.94	10.50	0.70	0.00	Average
6	24.140	22.82	-27.18	50.00	11.52	10.60	0.70	0.00	Average

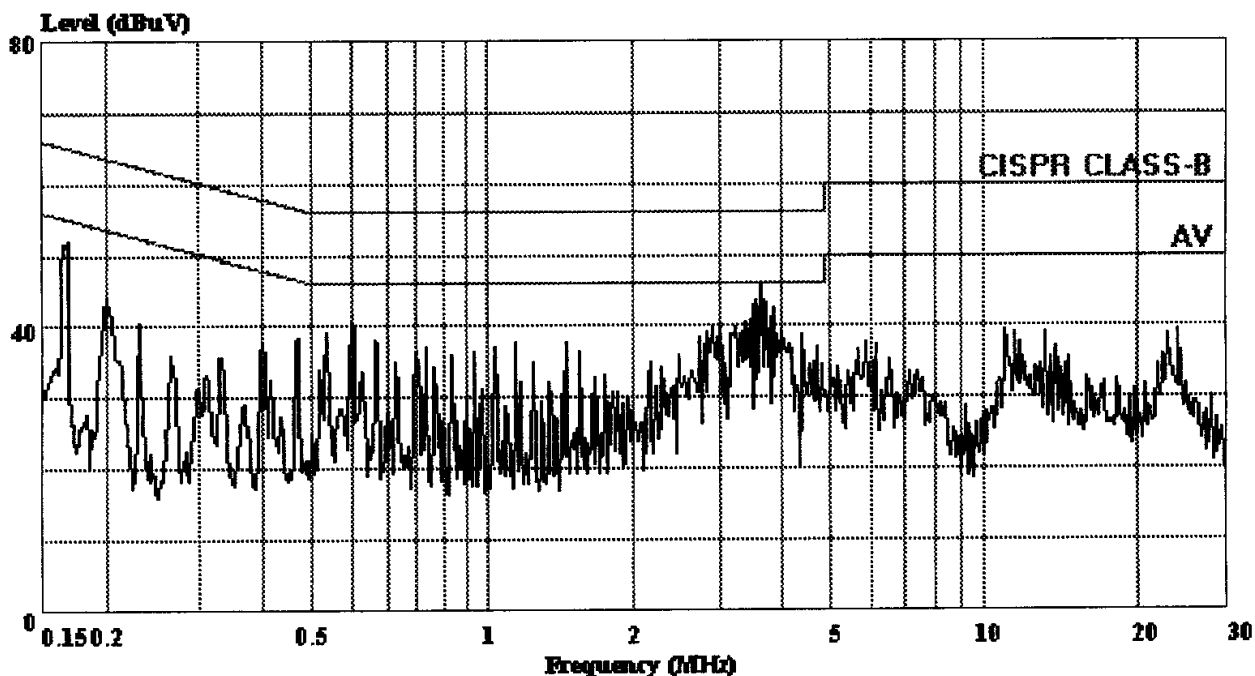
TOKIN

No53-11, Tin-fu Tsun, Lin-kou Hsiang,
 Taipei, County, Taiwan R.O.C.
 TEL: 02-2609-2133
 FAX: 02-2609-9303

TAIWAN TOKIN EMC ENG. CORP.

Data#: 25 File#: FSP-6.EMI

Date: 2001-05-31 Time: 20:07:23



TAIWAN TOKIN EMC ENG. CORP. (No.4 Shielded room)

Trace:

Ref Trace:

Condition: CISPR CLASS-B ENV4200 NEUTRAL

EUT : S.P.S M/N:FSP200-601U

POWER: 230Vac/50Hz

MEMO : W/PC

TOKIN

No53-11, Tin-fu Tsun, Lin-kou Hsiang,
 Taipei, County, Taiwan R.O.C.
 TEL: 02-2609-2133
 FAX: 02-2609-9303

TAIWAN TOKIN EMC ENG. CORP.

Data#: 26 File#: FSP-6.EMI
 No.4 Shielded room

Date: 2001-05-31 Time: 20:10:41

Condition: CISPR CLASS-B ENV4200 NEUTRAL

EUT : S.P.S M/N:FSP200-601U

POWER: 230Vac/50Hz

MEMO : W/PC

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	dB	
1	0.168	47.45	-17.62	65.07	36.75	10.50	0.20	0.00	QP
2	0.201	42.38	-21.18	63.56	31.68	10.50	0.20	0.00	QP
3	0.601	40.43	-15.57	56.00	29.83	10.40	0.20	0.00	QP
4	3.721	44.30	-11.70	56.00	33.60	10.30	0.40	0.00	QP
5	4.525	32.57	-23.43	56.00	21.57	10.40	0.60	0.00	QP
6	11.639	39.17	-20.83	60.00	27.97	10.50	0.70	0.00	QP

Data#: 27 File#: FSP-6.EMI
 No.4 Shielded room

Date: 2001-05-31 Time: 20:11:10

Condition: CISPR CLASS-B(AV) ENV4200 NEUTRAL

EUT : S.P.S M/N:FSP200-601U

POWER: 230Vac/50Hz

MEMO : W/PC

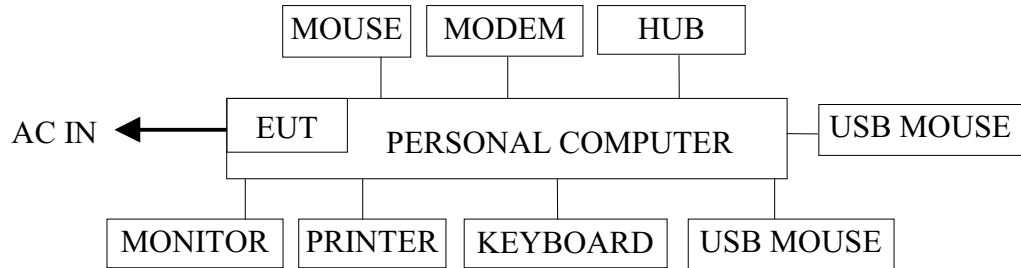
Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	dB	
1	0.168	24.49	-30.58	55.07	13.79	10.50	0.20	0.00	Average
2	0.201	36.51	-17.05	53.56	25.81	10.50	0.20	0.00	Average
3	0.601	33.78	-12.22	46.00	23.18	10.40	0.20	0.00	Average
4 !	3.721	39.18	-6.82	46.00	28.48	10.30	0.40	0.00	Average
5	4.525	19.11	-26.89	46.00	8.11	10.40	0.60	0.00	Average
6	11.639	28.39	-21.61	50.00	17.19	10.50	0.70	0.00	Average

4. RADIATED EMISSION TEST

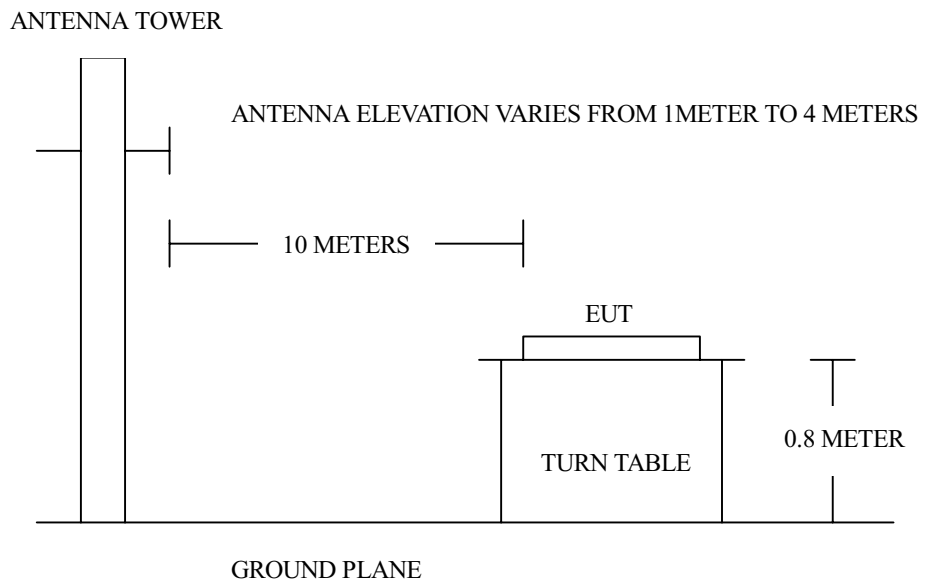
4.1. Block Diagram of Test Setup

4.1.1. Block Diagram of connection between EUT and simulators



EUT : SWITCHING POWER SUPPLY

4.1.2. Open Field Test Site Setup Diagram



4.2. Radiation Limit

All emanations from a class B computing devices or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

FREQUENCY (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMITS (dBuV/m)
30 ~ 230	10	30
230 ~ 1000	10	37

- Note :
- (1) The tighter limit shall apply at the edge between two frequency bands.
 - (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the E.U.T.

4.3. EUT's Configuration during Compliance Measurement

The EN 55022 (CISPR Pub. 22, Class B) regulations test method must be used to find the maximum emission during radiated measurement.

The configuration of EUT is same as used in conducted measurement. Please refer to 3.3.

4.4. Operating Condition of EUT

Same as conducted measurement which is listed in 3.4. except the test set up replaced by section 4.1.

4.5. Test Procedure

The EUT (within PC) was placed on a turn table which was 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. EUT was set 10 meters away from the receiving antenna which was mounted on a antenna tower. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna (calibrated biconical and log periodical antenna) were used as a receiving antenna. Both horizontal and vertical polarization of the antenna were set on measurement.

The bandwidth of the R&S Test Receiver ESVS10 was set at 120KHz.

The frequency range from 30MHz to 1000MHz was checked.

All the test results are listed in section 4.7.

4.6. Test Results

PASSED. Please refer to the following pages.

4.7. Radiated Emission Measurement Results

All the emissions not report below are against the EN55022 (CISPR Pub.22, class B) limit.

Date of Test : May. 31, 2001 Temperature : 21.2°C
 EUT : Switching Power Supply Humidity : 70%
 M/N : FSP150-601U

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading		Emission Level Horizontal dBuV/m	Limits dBuV/m	Margin dB
			Horizontal dBuV				
41.256	17.64	1.22	0.16		19.02	30.00	10.98
73.024	12.41	1.65	1.08		15.14	30.00	14.86
114.077	18.67	2.06	- 1.95		18.78	30.00	11.22
152.153	20.27	2.36	- 2.76		19.87	30.00	10.13
190.243	20.92	2.72	- 2.61		21.03	30.00	8.97
* 228.333	22.14	2.85	- 3.50		21.49	30.00	8.51
266.422	23.05	3.17	- 1.10		25.12	37.00	11.88
329.665	14.57	3.59	1.79		19.95	37.00	17.05
380.379	15.67	3.99	- 0.60		19.06	37.00	17.94
431.129	16.30	4.20	- 1.37		19.13	37.00	17.87
481.881	17.75	4.46	- 1.32		20.89	37.00	16.11
532.610	18.99	4.70	- 1.93		21.76	37.00	15.24
583.377	19.72	4.97	- 1.06		23.63	37.00	13.37

- Remarks :
1. All reading are Quasi-Peak values.
 2. The worst emission is detected at 228.333MHz with corrected signal level of 21.49dBuV/m (limit is 30dBuV) when the antenna is at horizontal polarization and is at 4m high and the turn table is at 135° .
 3. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Date of Test : May. 31, 2001 Temperature : 21.2°C
 EUT : Switching Power Supply Humidity : 70%
 M/N : FSP150-601U

Frequency MHz	Antenna		Cable		Meter Reading		Emission Level	
	Factor dB/m	Loss dB	Vertical dBuV	Vertical dBuV/m	Limits dBuV/m	Margin dB		
41.320	19.18	1.22	- 0.97	19.43	30.00	10.57		
70.985	13.49	1.62	5.79	20.90	30.00	9.10		
114.186	17.67	2.06	- 0.94	18.79	30.00	11.21		
152.218	20.16	2.36	- 2.73	19.79	30.00	10.21		
190.308	23.12	2.72	- 3.83	22.01	30.00	7.99		
* 228.386	22.23	2.85	- 2.52	22.56	30.00	7.44		
266.488	22.56	3.17	0.27	26.00	37.00	11.00		
329.735	14.99	3.59	2.77	21.35	37.00	15.65		
380.479	16.35	3.99	- 0.48	19.86	37.00	17.14		
431.225	16.85	4.20	- 0.16	20.89	37.00	16.11		
481.949	18.15	4.46	0.58	23.19	37.00	13.81		
532.676	18.78	4.70	- 0.77	22.71	37.00	14.29		
583.402	19.71	4.97	- 1.10	23.58	37.00	13.42		

- Remarks :
1. All reading are Quasi-Peak values.
 2. The worst emission is detected at 228.386MHz with corrected signal level of 22.56dBuV/m (limit is 30dBuV) when the antenna is at vertical polarization and is at 1m high and the turn table is at 90° .
 3. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Date of Test : May. 31, 2001 Temperature : 21.2°C
 EUT : Switching Power Supply Humidity : 70%
 M/N : FSP200-601U

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading		Emission Level Horizontal dBuV/m	Limits dBuV/m	Margin dB
			Horizontal dBuV	Horizontal dBuV/m			
30.457	18.85	0.96	- 1.07	18.74	30.00	11.26	
60.159	11.97	1.44	0.20	13.61	30.00	16.39	
70.013	12.20	1.62	0.69	14.51	30.00	15.49	
126.784	19.54	2.19	- 2.80	18.93	30.00	11.07	
164.874	21.00	2.44	- 2.84	20.60	30.00	9.40	
190.224	20.92	2.72	- 2.69	20.95	30.00	9.05	
* 215.613	21.78	2.92	- 2.63	22.07	30.00	7.93	
266.359	23.05	3.17	- 2.21	24.01	37.00	12.99	
329.875	14.57	3.59	1.81	19.97	37.00	17.03	
393.302	16.15	4.02	- 0.30	19.87	37.00	17.13	
456.737	17.10	4.28	- 1.42	19.96	37.00	17.04	
520.175	18.82	4.77	- 1.69	21.90	37.00	15.10	
583.615	19.72	4.97	- 2.03	22.66	37.00	14.34	
647.057	20.29	5.45	- 2.05	23.69	37.00	13.31	

- Remarks :
1. All reading are Quasi-Peak values.
 2. The worst emission is detected at 215.613MHz with corrected signal level of 22.07dBuV/m (limit is 30dBuV) when the antenna is at horizontal polarization and is at 4m high and the turn table is at 225° .
 3. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

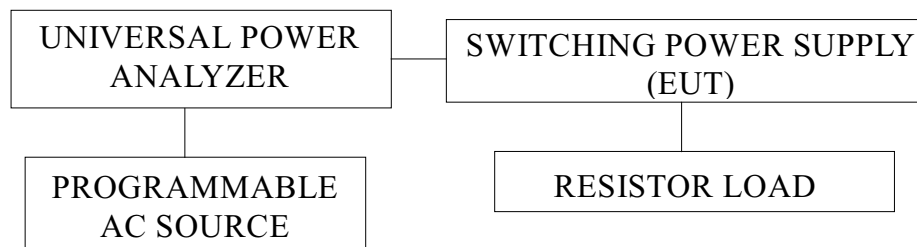
Date of Test : May. 31, 2001 Temperature : 21.2°C
 EUT : Switching Power Supply Humidity : 70%
 M/N : FSP200-601U

Frequency MHz	Antenna		Cable		Meter Reading	Emission Level	
	Factor dB/m	Loss dB	Loss dB	Vertical dBuV	Vertical dBuV/m	Limits dBuV/m	Margin dB
30.518	19.50	0.97		2.21	22.68	30.00	7.32
61.086	12.98	1.46		10.35	24.79	30.00	5.21
71.018	13.49	1.62		9.65	24.76	30.00	5.24
126.847	18.06	2.20		- 1.35	18.91	30.00	11.09
164.900	21.40	2.44		- 2.63	21.21	30.00	8.79
* 190.285	23.12	2.72		- 2.65	23.19	30.00	6.81
228.347	22.23	2.85		- 2.39	22.69	30.00	7.31
266.406	22.56	3.17		- 0.95	24.78	37.00	12.22
317.044	14.73	3.63		3.60	21.96	37.00	15.04
393.210	16.76	4.02		- 0.58	20.20	37.00	16.80
456.655	17.56	4.28		- 0.34	21.50	37.00	15.50
520.110	18.90	4.77		- 0.82	22.85	37.00	14.15
583.580	19.71	4.97		- 1.01	23.67	37.00	13.33
647.026	20.26	5.45		- 1.88	23.83	37.00	13.17

- Remarks :
1. All reading are Quasi-Peak values.
 2. The worst emission is detected at 190.285MHz with corrected signal level of 23.19dBuV/m (limit is 30dBuV) when the antenna is at vertical polarization and is at 1.5m high and the turn table is at 45° .
 4. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

5. POWER HARMONIC & FLICKER MEASUREMENT

5.1. Block Diagram of Test Setup



5.2. Test Standard

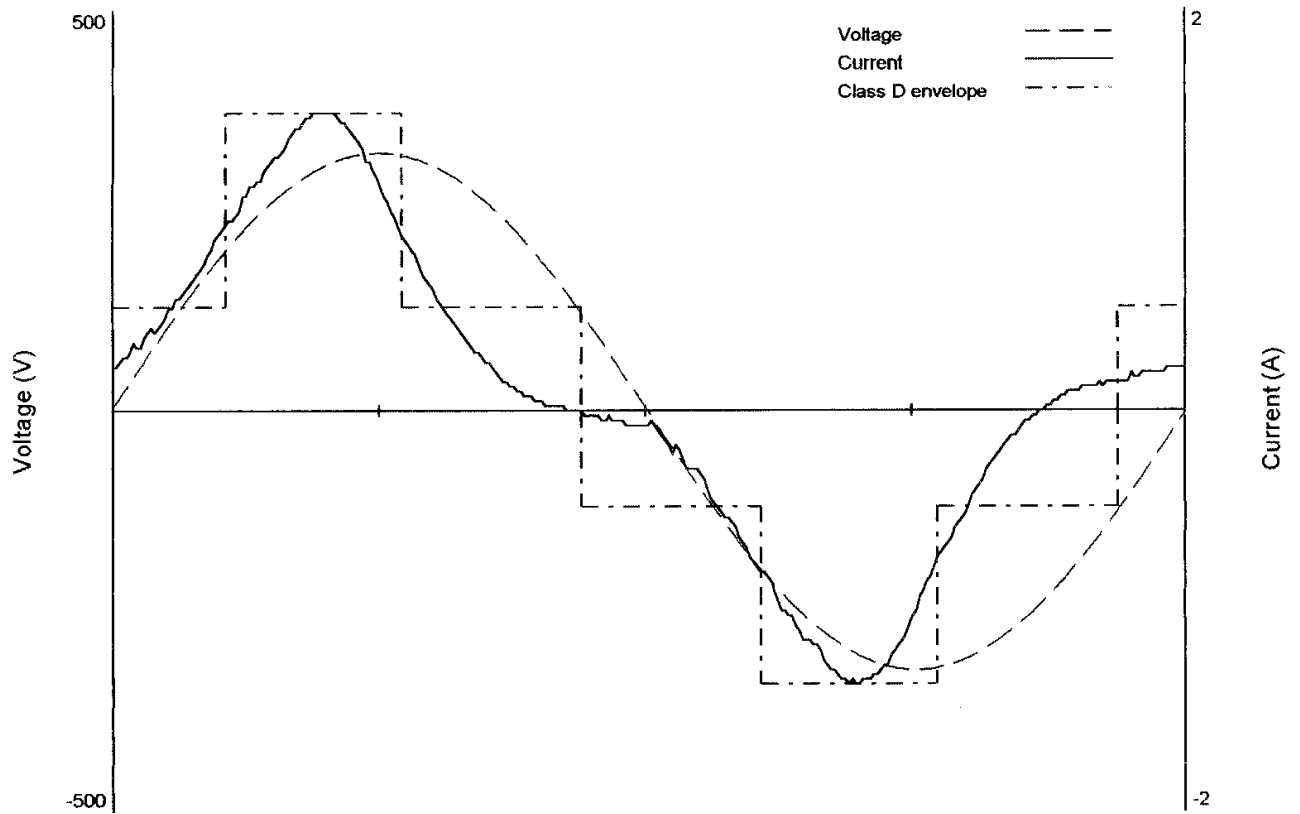
EN 61000-3-2/1995 +A12/1996 +A13/1997 +A1/1998 +A2/1998 +A14/2000 and
EN 61000-3-3/1995

5.3. Test Results

PASSED. Please refer to the following pages.

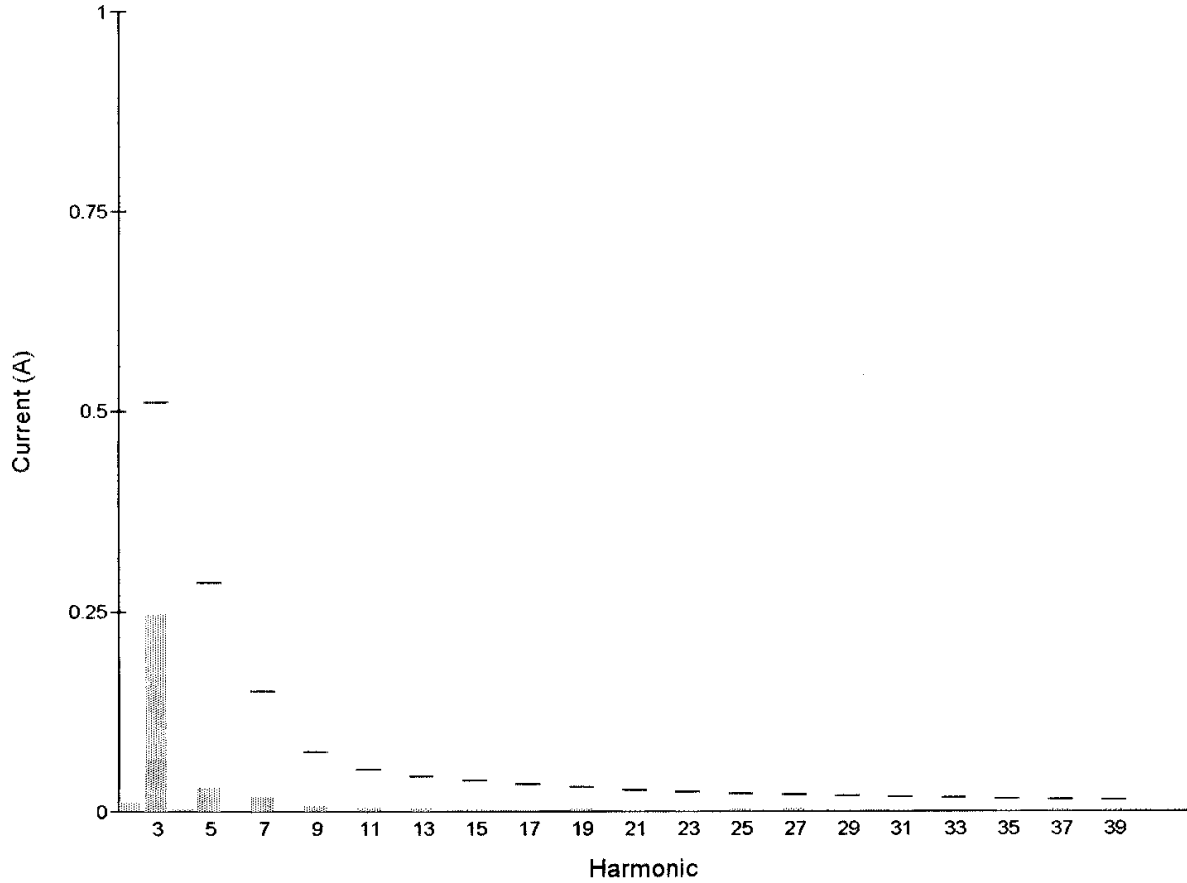
M/N FSP150-601U

FSP		
Product:	M/N:FSP150-601U	2001 Jan 10 6:12pm Page 1 of 1
Serial no:		
Description:	S.P.S. MODE:FULL LOAD	
Voltech IEC1000-3 Windows Software 2.02		Test Date: 2001 Jan 10 5:59pm
Result:	M/N:FSP150-601U	
Type of Test:	Waveform	
Power Analyzer:	Voltech PM3000A v1.67 s/n 6686	
AC Source:	Mains / Manual Source	
	Waveform is not Class D	



FSP		
Product:	M/N:FSP150-601U	2001 Jan 10 6:12pm Page 1 of 1
Serial no:		
Description:	S.P.S. MODE:FULL LOAD	
Voltech IEC1000-3 Windows Software 2.02		Test Date: 2001 Jan 10 5:58pm
Result:	M/N:FSP150-601U	
Type of Test:	Steady State Harmonics Test - Linear Bar Chart	
Power Analyzer:	Voltech PM3000A v1.67 s/n 6686	
AC Source:	Mains / Manual Source	
PASS		

Class	D
Class Multiplier	1
Power	150.4 W



FSP	
Product: M/N:FSP150-601U	2001 Jan 10 6:11pm
Serial no:	Page 1 of 1
Description: S.P.S. MODE:FULL LOAD	
Voltech IEC1000-3 Windows Software 2.02	Test Date: 2001 Jan 10 5:58pm
Result: M/N:FSP150-601U	
Type of Test: Steady State Harmonics Test - Table	
Power Analyzer: Voltech PM3000A v1.67 s/n 6686	
AC Source: Mains / Manual Source	
PASS	

Class	D
Class Multiplier	1
Power	150.4 W

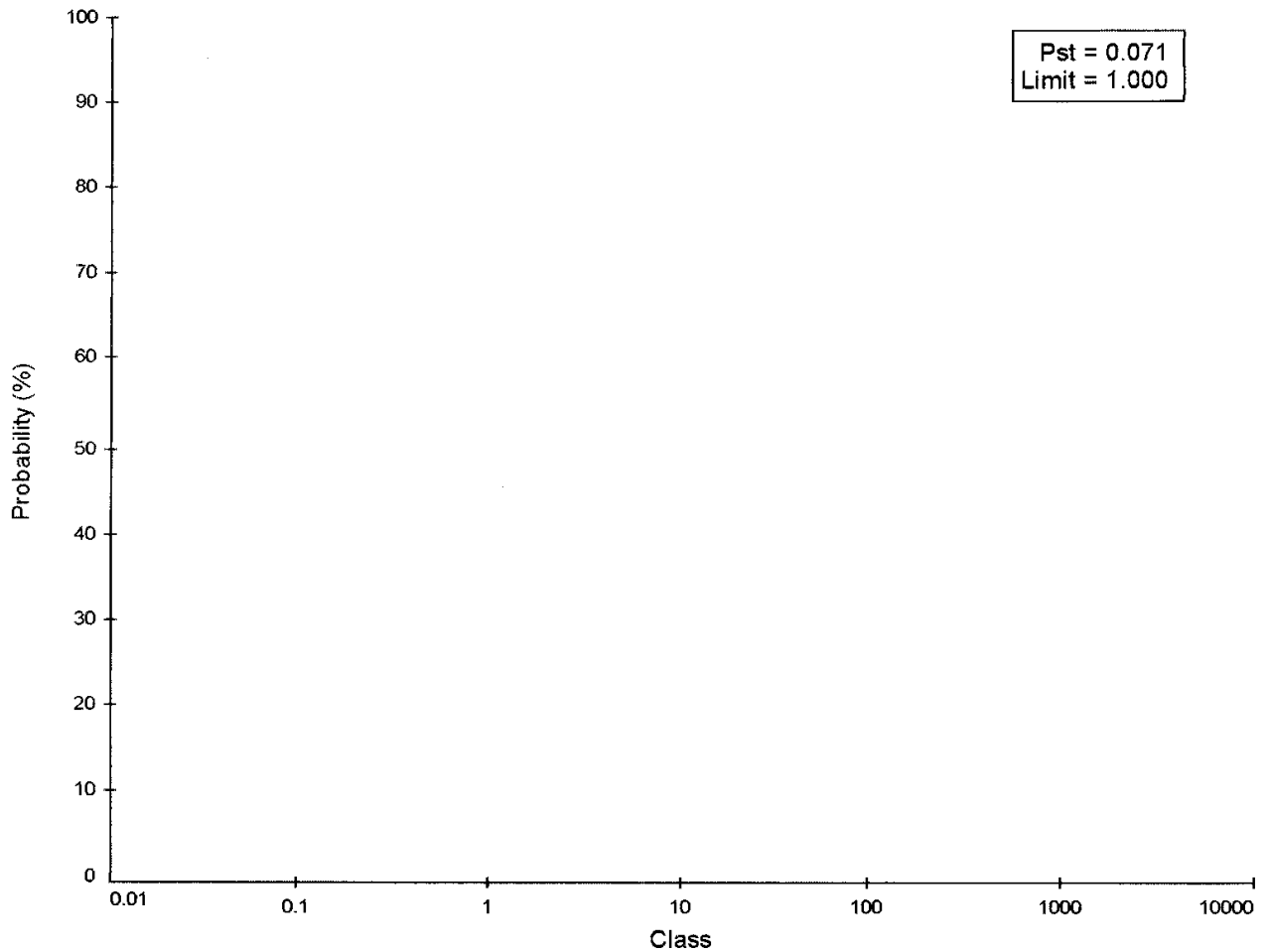
Harmonic	Reading	Limit	Result	Harmonic	Reading	Limit	Result
2	11.54mA	None	Pass	3	247mA	511mA	Pass
4	3.68mA	None		5	30.95mA	286mA	Pass
6	0.20mA	None		7	18.55mA	150mA	Pass
8	0.96mA	None		9	7.46mA	75mA	Pass
10	0.56mA	None		11	5.25mA	53mA	Pass
12	1.15mA	None		13	3.84mA	45mA	
14	0.76mA	None		15	2.40mA	39mA	
16	0.05mA	None		17	1.58mA	34mA	
18	0.42mA	None		19	3.28mA	30mA	
20	0.89mA	None		21	0.89mA	28mA	
22	0.34mA	None		23	1.37mA	25mA	
24	0.71mA	None		25	3.09mA	23mA	
26	0.84mA	None		27	3.81mA	21mA	
28	0.66mA	None		29	0.80mA	20mA	
30	0.95mA	None		31	0.81mA	19mA	
32	0.18mA	None		33	0.55mA	18mA	
34	0.69mA	None		35	1.35mA	17mA	
36	0.23mA	None		37	2.60mA	16mA	
38	0.91mA	None		39	2.49mA	15mA	
40	1.57mA	None					

FSP	
Product: M/N:FSP150-601U	2001 Jan 10 6:11pm
Serial no:	Page 1 of 1
Description: S.P.S. MODE:FULL LOAD	
Voltech IEC1000-3 Windows Software 2.02	Test Date: 2001 Jan 10 6:00pm
Result: M/N:FSP150-601U	
Type of Test: Flickermeter Test - Table	
Power Analyzer: Voltech PM3000A v1.67 s/n 6686	
AC Source: Mains / Manual Source	
PASS	Measurement method - Voltage

	Pst	dc (%)	dmax (%)	dt (ms)
Limit	1.000	3.000	4.000	200
Reading 1	0.071	0.009	0.023	0

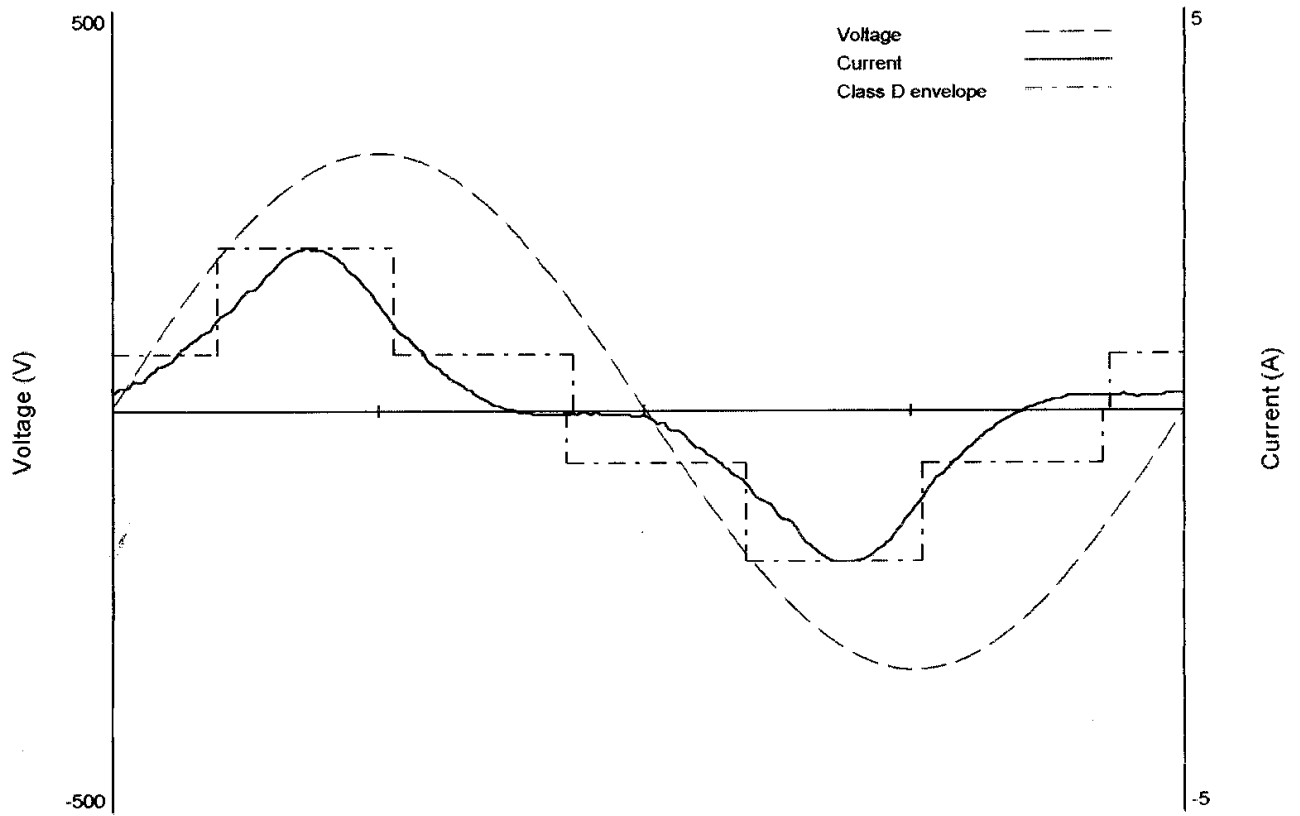
FSP		
Product:	M/N:FSP150-601U	2001 Jan 10 6:10pm Page 1 of 1
Serial no:		
Description:	S.P.S. MODE:FULL LOAD	
Voltech IEC1000-3 Windows Software 2.02		Test Date: 2001 Jan 10 6:00pm
Result:	M/N:FSP150-601U	
Type of Test:	Flickermeter Test - Pst Curve	
Power Analyzer:	Voltech PM3000A v1.67 s/n 6686	
AC Source:	Mains / Manual Source	
PASS	Measurement method - Voltage	

Pst Curve 1



M/N FSP200-601U

FSP		
Product:	M/N:FSP200-601U	2001 Jan 10 5:22pm Page 1 of 1
Serial no:		
Description:	S.P.S MODE:FULL LOAD	
Voltech IEC1000-3 Windows Software 2.02		Test Date: 2001 Jan 10 5:21pm
Result:	M/N:FSP200-601U	
Type of Test:	Waveform	
Power Analyzer:	Voltech PM3000A v1.67 s/n 6686	
AC Source:	Mains / Manual Source	
	Waveform is not Class D	



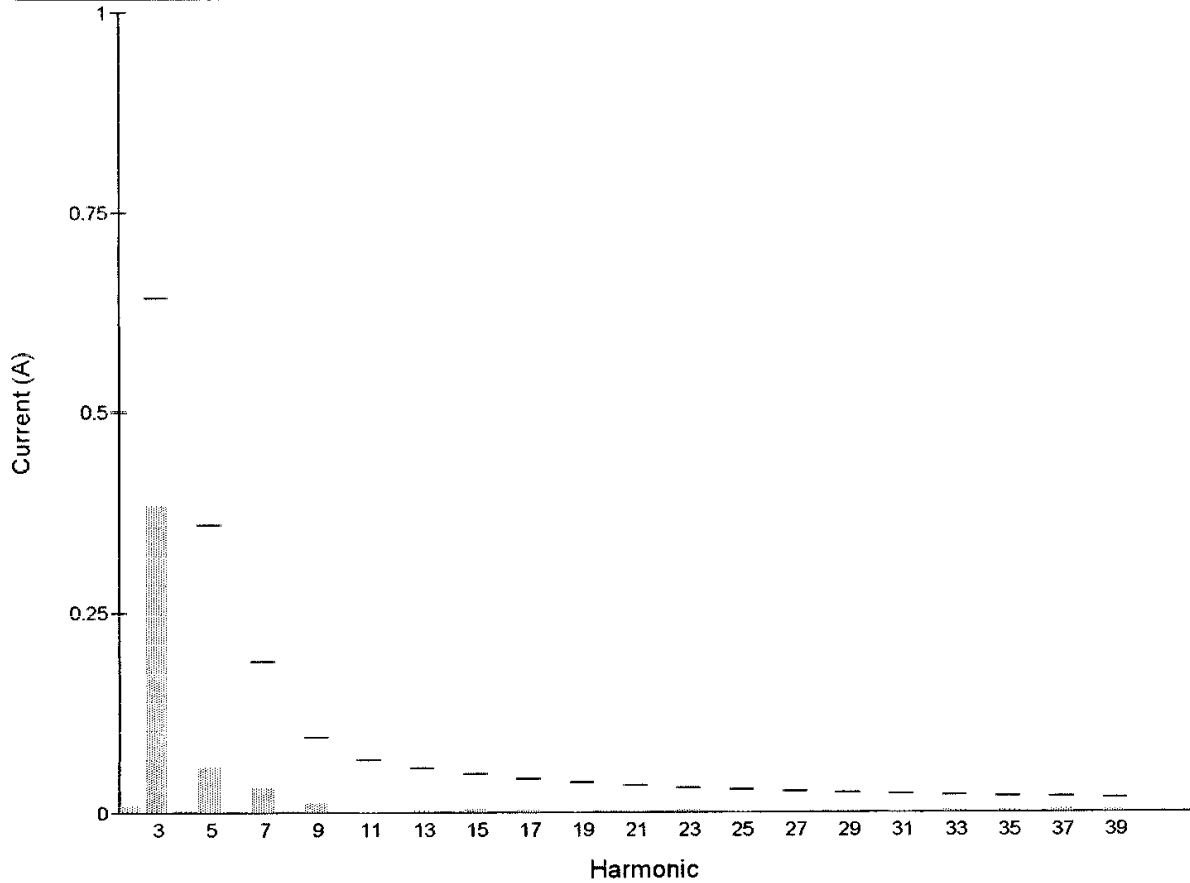
FSP	
Product:	M/N:FSP200-601U
Serial no:	
Description:	S.P.S MODE:FULL LOAD
2001 Jan 10 5:22pm Page 1 of 1	
Voltech IEC1000-3 Windows Software 2.02	Test Date: 2001 Jan 10 5:20pm
Result:	M/N:FSP200-601U
Type of Test:	Steady State Harmonics Test - Table
Power Analyzer:	Voltech PM3000A v1.67 s/n 6686
AC Source:	Mains / Manual Source
PASS	

Class	D
Class Multiplier	1
Power	189.1 W

Harmonic	Reading	Limit	Result	Harmonic	Reading	Limit	Result
2	8.51mA	None	Pass	3	385mA	643mA	Pass
4	2.65mA	None		5	57.42mA	359mA	Pass
6	1.21mA	None		7	31.49mA	189mA	Pass
8	1.93mA	None		9	12.54mA	95mA	Pass
10	0.86mA	None		11	0.79mA	66mA	
12	1.40mA	None		13	2.76mA	56mA	
14	0.74mA	None		15	4.97mA	49mA	
16	0.61mA	None		17	3.07mA	43mA	
18	0.95mA	None		19	1.13mA	38mA	
20	1.09mA	None		21	2.02mA	35mA	
22	1.87mA	None		23	3.15mA	32mA	
24	1.00mA	None		25	0.84mA	29mA	
26	0.05mA	None		27	1.48mA	27mA	
28	0.30mA	None		29	2.03mA	25mA	
30	0.14mA	None		31	1.39mA	23mA	
32	0.16mA	None		33	3.11mA	22mA	
34	0.88mA	None		35	3.07mA	21mA	
36	0.51mA	None		37	3.92mA	20mA	
38	0.53mA	None		39	3.77mA	19mA	
40	1.18mA	None					

FSP		
Product:	M/N:FSP200-601U	2001 Jan 10 5:22pm Page 1 of 1
Serial no:		
Description:	S.P.S MODE:FULL LOAD	
Voltech IEC1000-3 Windows Software 2.02		Test Date: 2001 Jan 10 5:20pm
Result:	M/N:FSP200-601U	
Type of Test:	Steady State Harmonics Test - Linear Bar Chart	
Power Analyzer:	Voltech PM3000A v1.67 s/n 6686	
AC Source:	Mains / Manual Source	
PASS		

Class	D
Class Multiplier	1
Power	189.1 W

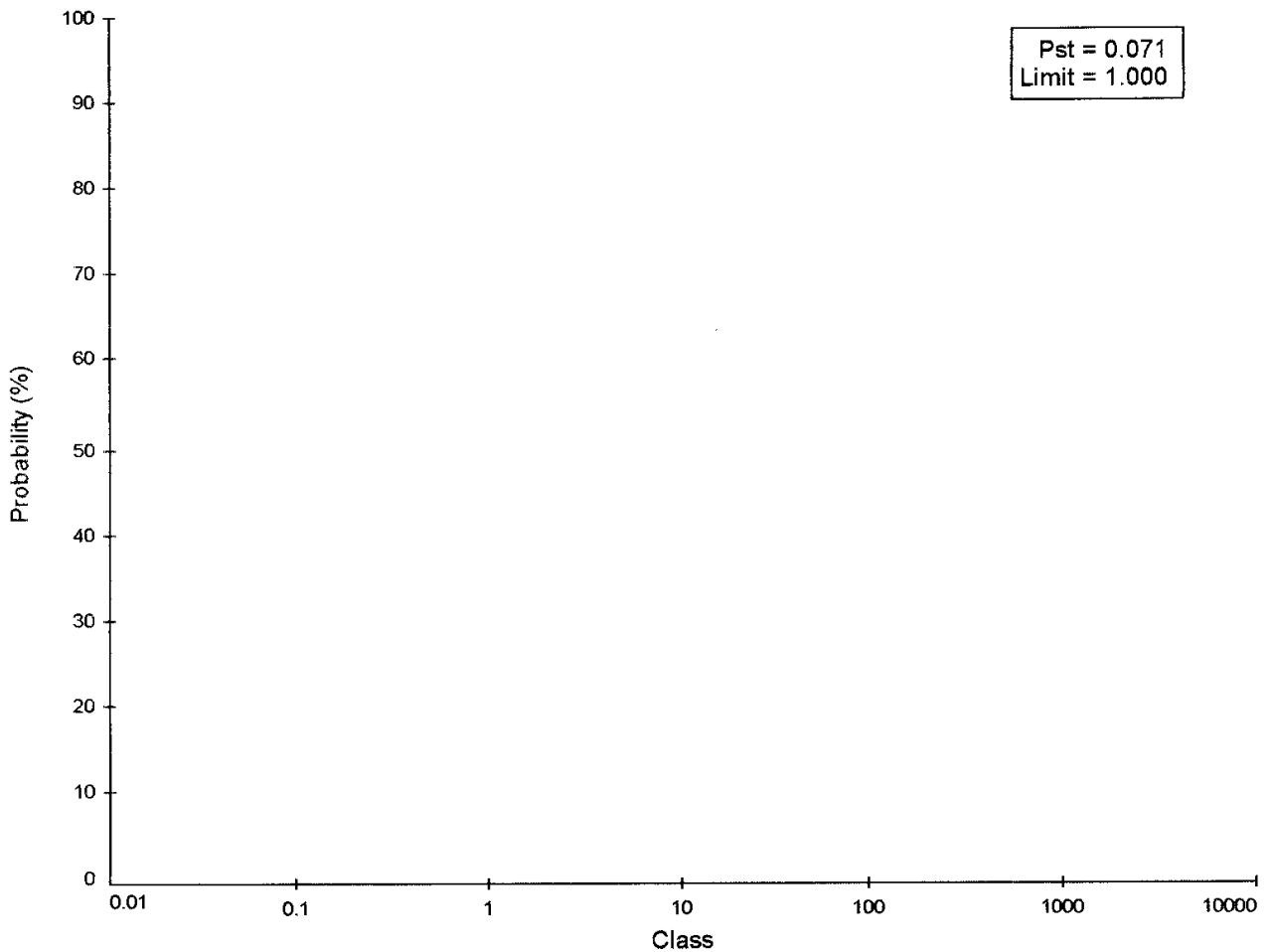


FSP	
Product: M/N:FSP200-601U	2001 Jan 10 5:34pm
Serial no:	Page 1 of 1
Description: S.P.S MODE:FULL LOAD	
Voltech IEC1000-3 Windows Software 2.02	Test Date: 2001 Jan 10 5:23pm
Result: M/N:FSP200-601U	
Type of Test: Flickermeter Test - Table	
Power Analyzer: Voltech PM3000A v1.67 s/n 6686	
AC Source: Mains / Manual Source	
PASS	Measurement method - Voltage

	Pst	dc (%)	dmax (%)	dt (ms)
Limit	1.000	3.000	4.000	200
Reading 1	0.071	0.009	0.023	0

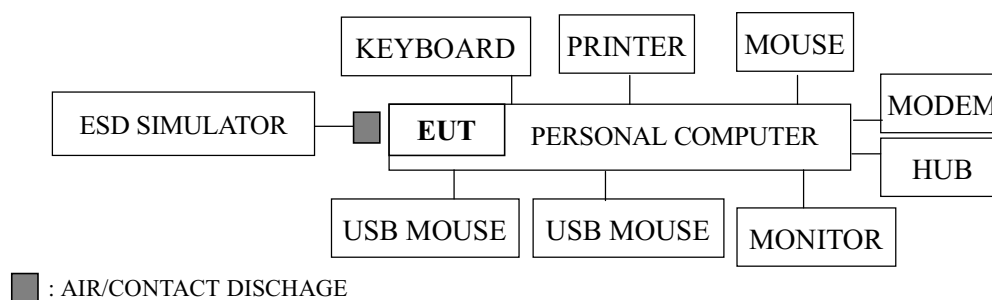
FSP		
Product:	M/N:FSP200-601U	2001 Jan 10 5:33pm Page 1 of 1
Serial no:		
Description:	S.P.S MODE:FULL LOAD	
Voltech IEC1000-3 Windows Software 2.02		Test Date: 2001 Jan 10 5:23pm
Result:	M/N:FSP200-601U	
Type of Test:	Flickermeter Test - Pst Curve	
Power Analyzer:	Voltech PM3000A v1.67 s/n 6686	
AC Source:	Mains / Manual Source	
PASS	Measurement method - Voltage	

Pst Curve 1



6. ELECTROSTATIC DISCHARGE MEASUREMENT

6.1. Block Diagram of Test Setup



EUT: SWITCHING POWER SUPPLY

6.2. Test Standard

EN 55024/1998 (IEC 61000-4-2/1995, Severity Level : Air 8KV, Contact 4KV)

6.3. Severity Levels and Performance Criterion

6.3.1. Severity level

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1.	2	2
2.	4	4
3.	6	8
4.	8	15
X	Special	Special

6.3.2. Performance criterion : **B**

6.4. EUT's Configuration during Compliance Measurement

The configuration of EUT are listed in section 3.3.

6.5. Operating Condition of EUT

Same as conducted measurement which is listed in 3.4. except the test set up replaced by section 6.1.

6.6. Test Procedure

6.6.1. Air Discharge

This test was done on a non-conductive surfaces. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the ESD generator discharge electrode was removed from the EUT. The generator was then retriggered for a new single discharge and repeated 10 times for each preselected test point. This procedure was repeated until all the air discharge completed.

6.6.2. Contact Discharge

All the procedure shall be same as 6.6.1. except that the tip of the discharge electrode shall touch the EUT's conductive surfaces & repeated 50 times for each test point before the discharge switch is operated.

6.6.3. Indirect discharge for horizontal coupling plane

At least 50 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The ESD generator positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

6.6.4. Indirect discharge for vertical coupling plane

At least 50 single discharges shall be applied to the center of one vertical edge of the coupling plane. The coupling planes, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

6.7. Test Results

PASSED. Please refer to the following pages.

Electrostatic Discharge Measurement Results

Taiwan Tokin EMC Eng. Corp.

Date : 06/08/2001

<i>Applicant</i> : <u>FSP Group Inc.</u>		<i>Test Date</i> : <u>Jun. 01, 2001</u>	
<i>EUT</i> : <u>Switching Power Supply, M/N FSP150-601U</u>		<i>Temperature</i> : <u>24</u> °C	
<i>Power Supply</i> : <u>AC 230V, 50Hz</u>		<i>Humidity</i> : <u>50</u> %	
<i>Working Condition</i> : <u>See Section 3.4.</u>			
<i>Item</i>	<i>Amount of Discharge for Per Voltage</i>	<i>Voltage</i>	<i>Results</i>
<i>Contact Discharge</i>	100	+2KV , +4KV -2KV , -4KV	Pass Pass
<i>Air Discharge</i>	0	+2KV , +4KV , +8KV -2KV , -4KV , -8KV	Pass, Note 1 Pass, Note 1
<i>Indirect Discharge (HCP)</i>	50	+2KV , +4KV -2KV , -4KV	Pass Pass
<i>Indirect Discharge (VCP Front)</i>	50	+2KV , +4KV -2KV , -4KV	Pass Pass
<i>Indirect Discharge (VCP Left)</i>	50	+2KV , +4KV -2KV , -4KV	Pass Pass
<i>Indirect Discharge (VCP Back)</i>	50	+2KV , +4KV -2KV , -4KV	Pass Pass
<i>Indirect Discharge (VCP Right)</i>	50	+2KV , +4KV -2KV , -4KV	Pass Pass
<i>Measurement Position</i>	1. Screw	<i>Contact Discharge</i>	
	2. Metal	<i>Contact Discharge</i>	
<i>Please refer to the Photos of ESD Test Points</i>			
<p><i>Note: 1. The EUT is a metal enclosure, it can't be discharge by testing ESD gun. It's unnecessary to test air discharge.</i></p>			

Electrostatic Discharge Measurement Results

Taiwan Tokin EMC Eng. Corp.

Date : 06/08/2001

<i>Applicant :</i> <u>FSP Group Inc.</u>		<i>Test Date :</i> <u>May. 29, 2001</u>	
<i>EUT :</i> <u>Switching Power Supply, M/N FSP200-601U</u>		<i>Temperature :</i> <u>24 °C</u>	
<i>Power Supply :</i> <u>AC 230V, 50Hz</u>		<i>Humidity :</i> <u>50 %</u>	
<i>Working Condition :</i> <u>See Section 3.4.</u>			
<i>Item</i>	<i>Amount of Discharge for Per Voltage</i>	<i>Voltage</i>	<i>Results</i>
<i>Contact Discharge</i>	100	+2KV , +4KV -2KV , -4KV	Pass Pass
<i>Air Discharge</i>	0	+2KV , +4KV , +8KV -2KV , -4KV , -8KV	Pass, Note 1 Pass, Note 1
<i>Indirect Discharge (HCP)</i>	50	+2KV , +4KV -2KV , -4KV	Pass Pass
<i>Indirect Discharge (VCP Front)</i>	50	+2KV , +4KV -2KV , -4KV	Pass Pass
<i>Indirect Discharge (VCP Left)</i>	50	+2KV , +4KV -2KV , -4KV	Pass Pass
<i>Indirect Discharge (VCP Back)</i>	50	+2KV , +4KV -2KV , -4KV	Pass Pass
<i>Indirect Discharge (VCP Right)</i>	50	+2KV , +4KV -2KV , -4KV	Pass Pass
<i>Measurement Position</i>	1. Screw	<i>Contact Discharge</i>	
	2. Metal	<i>Contact Discharge</i>	
<i>Please refer to the Photos of ESD Test Points</i>			
<p><i>Note: 1. The EUT is a metal enclosure, it can't be discharge by testing ESD gun. It's unnecessary to test air discharge.</i></p>			

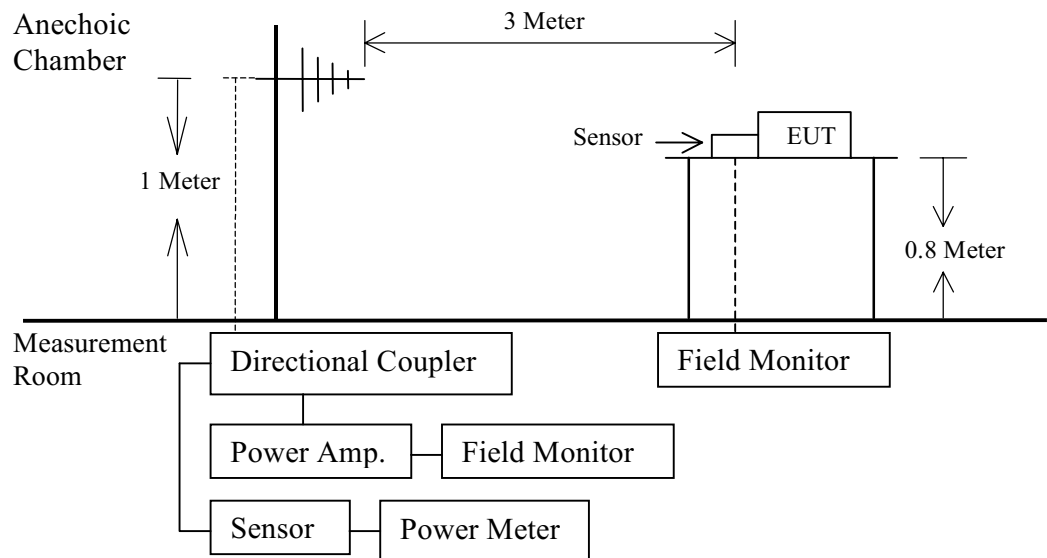
7. RF FIELD STRENGTH SUSCEPTIBILITY MEASUREMENT

7.1. Block Diagram of Test Setup

7.1.1. Block Diagram of connection between EUT and simulators.

Same as Section 4.1.1.

7.1.2. R/S Test Setup



7.2. Test Standard

EN 55024/1998 (IEC 61000-4-3/1995, Severity Level : 2, 3V / m)

7.3. Severity Levels and Performance Criterion

7.3.1. Severity level

Level	Field Strength V/m
1.	1
2.	3
3.	10
X	Special

7.3.2. Performance criterion : A

7.4.EUT's Configuration during Compliance Measurement

The configuration of EUT are listed in section 3.3.

7.5.Operating Condition of EUT

Same as conducted measurement which is listed in 3.4. except the test set up replaced by section 7.1.

7.6.Test Procedure

The field sensor is placed on the EUT table (0.8 meter above the ground) which is 3 meter away from the transmitting antenna. Through the signal generator, power amplifier and transmitting antenna to produce a uniformity field strength (3V/m measured by field sensor) around the EUT table from frequency range 80MHz to 1000MHz and records the signal generator's output level at the same time for whole measured frequency range. Then, put EUT and its simulators on the EUT turn table and keep them 3 meter away from the transmitting antenna which is mounted on an antenna tower and fixes at 1 meter height above the ground. Using the recorded signal generator's output level to measure the EUT from frequency range 80MHz to 1000MHz and both horizontal & vertical polarization of antenna must be set and measured. Each of the four sides of EUT must be faced this transmitting antenna and measures individually.

A CCD camera was put inside the chamber and through its display to monitor the EUT operational situation to judge the EUT performance criterion during measurement.

All the scanning conditions are as follows :

Condition of Test	Remarks
1. Fielded Strength	3 V/m (r.m.s, Unmodulated, Severity Level 2)
2. Amplitude Modulated	1KHz, 80%AM
1. Scanning Frequency	80 - 1000 MHz
2. Sweep time of radiated	0.0015 decade/s
3. Dwell Time	2 Sec.

7.7.Test Results

PASSED. Please refer to the following pages.

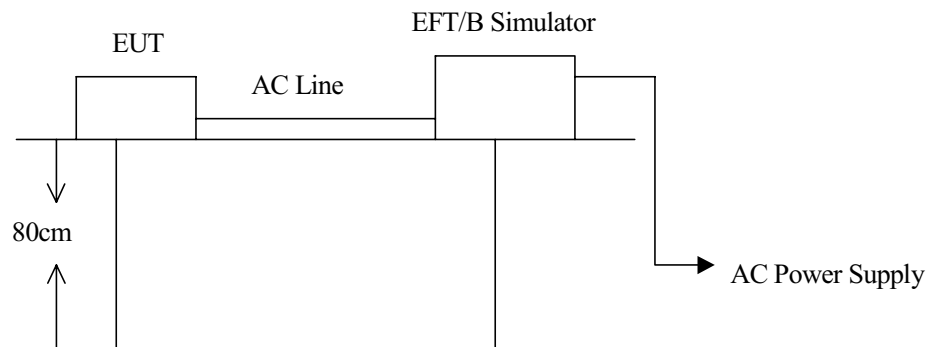
8. ELECTRICAL FAST TRANSIENT/BURST MEASUREMENT

8.1. Block Diagram of Test Setup

8.1.1. Block Diagram of connection between EUT and simulators.

Same as Section 4.1.1.

8.1.2. EFT Test Setup



8.2. Test Standard

EN 55024/1998 (IEC 61000-4-4/1995, Severity Level : 2, 1KV)

8.3. Severity Levels and Performance Criterion

8.3.1. Severity level

Open Circuit Output Test Voltage $\pm 10\%$		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1.	0.5 KV	0.25 KV
2.	1 KV	0.5 KV
3.	2 KV	1 KV
4.	4 KV	2 KV
X	Special	Special

8.3.2. Performance criterion : **B**

8.4. EUT's Configuration during Compliance Measurement

The configuration of EUT are listed in section 3.3.

8.5. Operating Condition of EUT

Same as conducted measurement which is listed in 3.4. except the test set up replaced by section 8.1.

8.6. Test Procedure

The EUT and its simulators shall be placed 0.8m high above the ground reference plane which was a min. 1m*1m metallic sheet with 0.65mm minimum thickness. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

8.6.1. For input and output AC power ports :

The EUT was connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test can't less than 1min.

8.6.2. For signal lines and control lines ports :

No signal lines and control lines ports. It's unnecessary to measure.

8.6.3. For DC input and DC output power ports :

No DC ports. It's unnecessary to measure.

8.7. Test Results

PASSED. Please refer to the following pages.

Electrical Fast Transient/Burst Measurement Results

Taiwan Tokin EMC Eng. Corp.

Date : 06/08/2001

<i>Applicant</i> : <u> FSP Group Inc.</u>					<i>Test Date</i> : <u> Jan. 11, 2001</u>				
<i>EUT</i> : <u>Switching Power Supply, M/N FSP150-601U</u>					<i>Temperature</i> : <u> 20.5 °C</u>				
<i>Power Supply</i> : <u> AC 230V, 50Hz</u>					<i>Humidity</i> : <u> 60 %</u>				
<i>Working Condition</i> : <u> See Section 3.4.</u>									
<i>Inject Place</i> : <u>Power Supply Line</u>					<i>Inject Place</i> : <u>I/O Cable</u>				
<i>Inject Line</i>	<i>Voltage KV</i>	<i>Inject Time(s)</i>	<i>Inject Method</i>	<i>Results</i>	<i>Inject Line</i>	<i>Voltage KV</i>	<i>Inject Time(s)</i>	<i>Inject Method</i>	<i>Results</i>
<i>L1</i>	<i>+0.5 , +1</i>	<i>120</i>	<i>Direct</i>	<i>Pass</i>				<i>Clamp</i>	
<i>L1</i>	<i>-0.5 , -1</i>	<i>120</i>	<i>Direct</i>	<i>Pass</i>				<i>Clamp</i>	
<i>L2</i>	<i>+0.5 , +1</i>	<i>120</i>	<i>Direct</i>	<i>Pass</i>				<i>Clamp</i>	
<i>L2</i>	<i>-0.5 , -1</i>	<i>120</i>	<i>Direct</i>	<i>Pass</i>				<i>Clamp</i>	
<i>PE</i>	<i>+0.5 , +1</i>	<i>120</i>	<i>Direct</i>	<i>Pass</i>				<i>Clamp</i>	
<i>PE</i>	<i>-0.5 , -1</i>	<i>120</i>	<i>Direct</i>	<i>Pass</i>				<i>Clamp</i>	
			<i>Direct</i>					<i>Clamp</i>	
			<i>Direct</i>					<i>Clamp</i>	
			<i>Direct</i>					<i>Clamp</i>	
			<i>Direct</i>					<i>Clamp</i>	
			<i>Direct</i>					<i>Clamp</i>	
			<i>Direct</i>					<i>Clamp</i>	
			<i>Direct</i>					<i>Clamp</i>	
<i>Remark</i> : <i>Criteria-A, No error occurred.</i>									

Electrical Fast Transient/Burst Measurement Results

Taiwan Tokin EMC Eng. Corp.

Date : 06/08/2001

<i>Applicant</i> : <u> FSP Group Inc.</u>					<i>Test Date</i> : <u> May. 29, 2001</u>				
<i>EUT</i> : <u>Switching Power Supply, M/N FSP200-601U</u>					<i>Temperature</i> : <u> 24 °C</u>				
<i>Power Supply</i> : <u> AC 230V, 50Hz</u>					<i>Humidity</i> : <u> 50 %</u>				
<i>Working Condition</i> : <u> See Section 3.4.</u>									
<i>Inject Place</i> : <u>Power Supply Line</u>					<i>Inject Place</i> : <u>I/O Cable</u>				
<i>Inject Line</i>	<i>Voltage KV</i>	<i>Inject Time(s)</i>	<i>Inject Method</i>	<i>Results</i>	<i>Inject Line</i>	<i>Voltage KV</i>	<i>Inject Time(s)</i>	<i>Inject Method</i>	<i>Results</i>
<i>L1</i>	<i>+0.5 , +1</i>	<i>120</i>	<i>Direct</i>	Pass				<i>Clamp</i>	
<i>L1</i>	<i>-0.5 , -1</i>	<i>120</i>	<i>Direct</i>	Pass				<i>Clamp</i>	
<i>L2</i>	<i>+0.5 , +1</i>	<i>120</i>	<i>Direct</i>	Pass				<i>Clamp</i>	
<i>L2</i>	<i>-0.5 , -1</i>	<i>120</i>	<i>Direct</i>	Pass				<i>Clamp</i>	
<i>PE</i>	<i>+0.5 , +1</i>	<i>120</i>	<i>Direct</i>	Pass				<i>Clamp</i>	
<i>PE</i>	<i>-0.5 , -1</i>	<i>120</i>	<i>Direct</i>	Pass				<i>Clamp</i>	
			<i>Direct</i>					<i>Clamp</i>	
			<i>Direct</i>					<i>Clamp</i>	
			<i>Direct</i>					<i>Clamp</i>	
			<i>Direct</i>					<i>Clamp</i>	
			<i>Direct</i>					<i>Clamp</i>	
			<i>Direct</i>					<i>Clamp</i>	
			<i>Direct</i>					<i>Clamp</i>	
<i>Remark</i> : <i>Criteria-A, No error occurred.</i>									

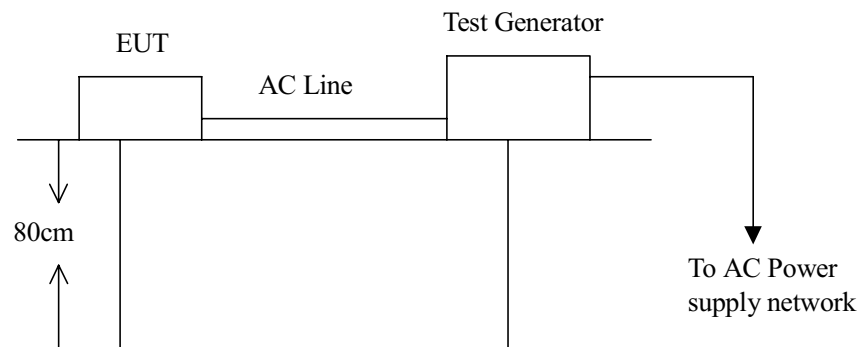
9. SURGES MEASUREMENT

9.1. Block Diagram of Test Setup

9.1.1. Block Diagram of connection between EUT and simulators.

Same as Section 4.1.1.

9.1.2. Test Setup



Remark: Combination wave generator and decoupling networks are included in test.

9.2. Test Standard

EN 55024/1998 【IEC 61000-4-5/1995, Test Level : line to earth - ± 2 KV, line to line - ± 1 KV, 1.2/50 (8/20) Tr/Th us.】

9.3. Test Levels and Performance Criterion

9.3.1. Test Levels

Level	Open-circuit test Voltage +/- 10%, kV
1.	0.5
2.	1.0
3.	2.0
4.	4.0
X	Special

9.3.2. Performance Criterion : **B**

9.4. EUT's Configuration during Compliance Measurement

The configuration of EUT are listed in section 3.3.

9.5. Operating Condition of EUT

Same as conducted measurement which is listed in 3.4. except the test set up replaced by section 9.1.

9.6. Test Procedure

- 9.6.1. Set up the EUT and test generator as shown on section 9.1.
- 9.6.2. For line to line coupling mode, provided a 0.5/1KV 1.2/50us current surge (at open-circuit condition) and 8/20us current surge to EUT selected points.
- 9.6.3. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate were conducted during test.
- 9.6.4. Different phase angles were done individually.
- 9.6.5. Repeat procedure 9.6.2. to 9.6.4. except the open-circuit test voltage change from 0.5/1KV to 1/2KV for line to earth coupling mode test.
- 9.6.6. Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

9.7. Test Results

PASSED. Please refer to the following pages.

Surge Immunity Measurement Results

Taiwan Tokin EMC Eng. Corp.

Date : 06/08/2001

Applicant : <u>FSP Group Inc.</u>			Test Date : <u>Jun. 01, 2001</u>		
EUT : <u>Switching Power Supply, M/N FSP150-601U</u>			Temperature : <u>24</u> °C		
Power Supply : <u>AC 230V, 50Hz</u>			Humidity : <u>50</u> %		
Working Condition : <u>See Section 3.4.</u>					
Input And Output AC Power Port					
Location	Polarity	Phase Angle	No of Pulse	Pulse Voltage (KV)	Result
L-N	+	0	5	0.5, 1	Pass
	+	90	5	0.5, 1	Pass
	+	180	5	0.5, 1	Pass
	+	270	5	0.5, 1	Pass
	-	0	5	0.5, 1	Pass
	-	90	5	0.5, 1	Pass
	-	180	5	0.5, 1	Pass
	-	270	5	0.5, 1	Pass
L-PE	+	0	5	1, 2	Pass
	+	90	5	1, 2	Pass
	+	180	5	1, 2	Pass
	+	270	5	1, 2	Pass
	-	0	5	1, 2	Pass
	-	90	5	1, 2	Pass
	-	180	5	1, 2	Pass
	-	270	5	1, 2	Pass
N-PE	+	0	5	1, 2	Pass
	+	90	5	1, 2	Pass
	+	180	5	1, 2	Pass
	+	270	5	1, 2	Pass
	-	0	5	1, 2	Pass
	-	90	5	1, 2	Pass
	-	180	5	1, 2	Pass
	-	270	5	1, 2	Pass
L, N-PE	+	0	5	1, 2	Pass
	+	90	5	1, 2	Pass
	+	180	5	1, 2	Pass
	+	270	5	1, 2	Pass
	-	0	5	1, 2	Pass
	-	90	5	1, 2	Pass
	-	180	5	1, 2	Pass
	-	270	5	1, 2	Pass
Remark : Criteria-A, No error occurred.					

Surge Immunity Measurement Results

Taiwan Tokin EMC Eng. Corp.

Date : 06/08/2001

Applicant : <u>FSP Group Inc.</u> EUT : <u>Switching Power Supply, M/N FSP200-601U</u> Power Supply : <u>AC 230V, 50Hz</u> Working Condition : <u>See Section 3.4.</u>				Test Date : <u>May. 29, 2001</u> Temperature : <u>24</u> °C Humidity : <u>50</u> %	
Input And Output AC Power Port					
Location	Polarity	Phase Angle	No of Pulse	Pulse Voltage (KV)	Result
L-N	+	0	5	0.5, 1	Pass
	+	90	5	0.5, 1	Pass
	+	180	5	0.5, 1	Pass
	+	270	5	0.5, 1	Pass
	-	0	5	0.5, 1	Pass
	-	90	5	0.5, 1	Pass
	-	180	5	0.5, 1	Pass
	-	270	5	0.5, 1	Pass
L-PE	+	0	5	1, 2	Pass
	+	90	5	1, 2	Pass
	+	180	5	1, 2	Pass
	+	270	5	1, 2	Pass
	-	0	5	1, 2	Pass
	-	90	5	1, 2	Pass
	-	180	5	1, 2	Pass
	-	270	5	1, 2	Pass
N-PE	+	0	5	1, 2	Pass
	+	90	5	1, 2	Pass
	+	180	5	1, 2	Pass
	+	270	5	1, 2	Pass
	-	0	5	1, 2	Pass
	-	90	5	1, 2	Pass
	-	180	5	1, 2	Pass
	-	270	5	1, 2	Pass
L, N-PE	+	0	5	1, 2	Pass
	+	90	5	1, 2	Pass
	+	180	5	1, 2	Pass
	+	270	5	1, 2	Pass
	-	0	5	1, 2	Pass
	-	90	5	1, 2	Pass
	-	180	5	1, 2	Pass
	-	270	5	1, 2	Pass
Remark : Criteria-A, No error occurred.					

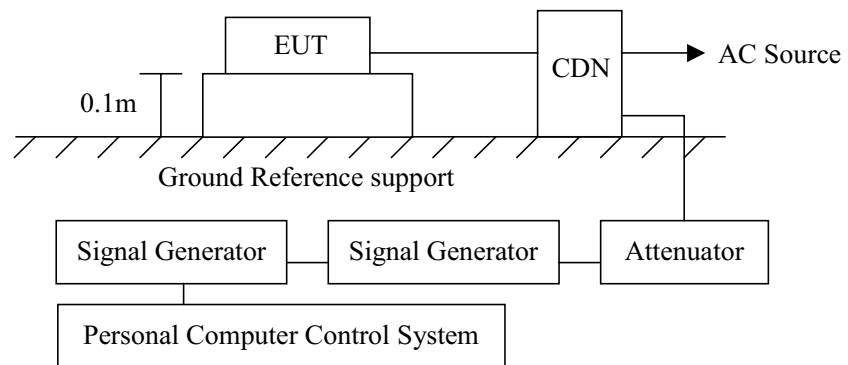
10.INJECTED CURRENTS MEASUREMENT

10.1.Block Diagram of Test Setup

10.1.1.Block Diagram of connection between EUT and simulators.

Same as Section 4.1.1.

10.1.2.Test Setup



10.2.Test Standard

EN 55024/1998 【IEC 61000-4-6/1996, Test Level : 0.15-80MHz, 3V, 80%AM (1KHz)】

10.3.Test Levels and Performance Criterion

10.3.1. Test Levels

Frequency range 0.15MH - 80MHz		
Level	Voltage level (e.m.f.)	
	U [dBuV]	U [V]
1.	120	1
2.	130	3
3.	140	10
X	Special	

10.3.2. Performance Criterion : A

10.4.EUT's Configuration during Compliance Measurement

The configuration of EUT are listed in section 3.3.

10.5.Operating Condition of EUT

Same as conducted measurement which is listed in 3.4. except the test set up replaced by section 10.1.

10.6.Test Procedure

10.6.1. Set up the EUT, CDN and test generators as shown on section 10.1.

10.6.2. The EUT and supporting equipments were placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) was placed on the ground plane at above 0.1-0.3m from EUT. Cables between CDN and EUT were as short as possible.

10.6.3. The disturbance signal described below was injected to EUT through CDN.

10.6.4. The EUT operates within its operational mode(s) under intended climatic conditions after power on.

10.6.5. The frequency range was swept from 150KHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1KHz sinewave.

10.6.6. The rate of sweep shall not exceed 1.5×10^3 decades/s. Where the frequency was swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

10.6.7. Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

10.7.Test Results

PASSED. Please refer to the following pages.

Injected Currents Susceptibility Measurement Results

Taiwan Tokin EMC Eng. Corp.

Date : 06/08/2001

<i>Applicant</i> : <u> FSP Group Inc. </u>		<i>Test Date</i> : <u> May. 30, 2001 </u>		
<i>EUT</i> : <u> Switching Power Supply, M/N FSP150-601U </u>		<i>Temperature</i> : <u> 23 °C </u>		
<i>Power Supply</i> : <u> AC 230V, 50Hz </u>		<i>Humidity</i> : <u> 43 % </u>		
<i>Working Condition</i> : <u> See Section 3.4. </u>				
<i>Frequency Range (MHz)</i>	<i>Injected Position</i>	<i>Strength</i>	<i>Results & Criteria</i>	<i>Remark</i>
0.15MHz ~ 80MHz	Common Mode	3V(rms) Modulated	Pass, A	
<i>Note</i> : No erroe occurred.				

Susceptibility Measurement Results

Taiwan Tokin EMC Eng. Corp.

Date : 06/08/2001

<i>Applicant</i> : <u>FSP Group Inc.</u>		<i>Test Date</i> : <u>May. 30, 2001</u>		
<i>EUT</i> : <u>Switching Power Supply, M/N FSP200-601U</u>		<i>Temperature</i> : <u>23</u> °C		
<i>Power Supply</i> : <u>AC 230V, 50Hz</u>		<i>Humidity</i> : <u>43</u> %		
<i>Working Condition</i> : <u>See Section 3.4.</u>				
<i>Frequency Range (MHz)</i>	<i>Injected Position</i>	<i>Strength</i>	<i>Results & Criteria</i>	<i>Remark</i>
0.15MHz ~ 80MHz	Common Mode	3V(rms) Modulated	Pass, A	
<i>Note</i> : No error occurred.				

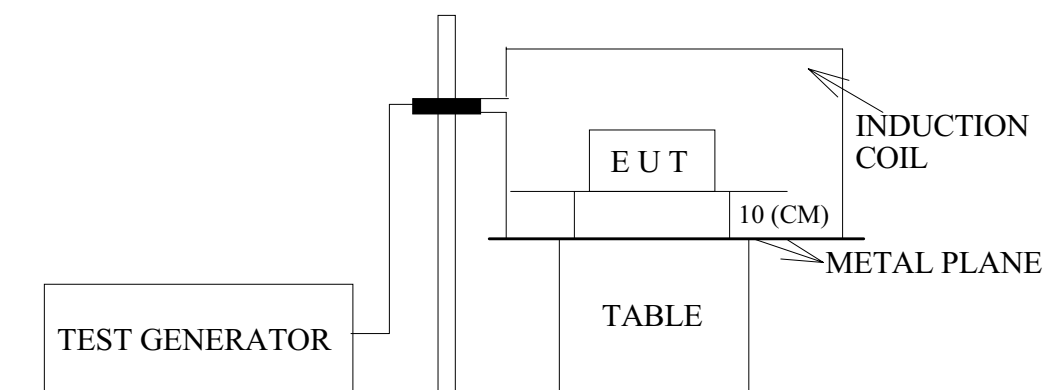
11. POWER FREQUENCY MAGNETIC FIELD MEASUREMENT

11.1. Block Diagram of Test Setup

11.1.1. Block Diagram of connection between EUT and simulators.

Same as section 4.1.1.

11.1.2. Test Setup



11.2. Test Standard

EN 55024/1998 【IEC 61000-4-8/1993, Test Level : 50Hz, 1A/m (r.m.s.)】

11.3. Severity Levels and Performance Criterion

11.3.1. Severity level

Level	Magnetic Field Strength Continuous Field A/m
1.	1
2.	3
3.	10
4.	30
5.	100
X	Special

11.3.2. Performance criterion : A

11.4.EUT's Configuration during Compliance Measurement

The configuration of EUT are listed in section 3.3.

11.5.Operating Condition of EUT

Same as conducted measurement which is listed in 3.4. except the test set up replaced by section 11.1.

11.6.Test Procedure

The EUT placed on 1m high table that above the ground reference plane which the min. size 1m x 1m and 0.65mm thickness metallic. And subjected to the test magnetic field by using the induction coil of standard dimensions (1m x 1m). The induction coil rotated by 90 degrees in order to expose the EUT to the test field with different orientations. All cables of EUT exposed to magnetic field for 1m of their length.

11.7.Test Results

PASSED. Please refer to the following pages.

Power Frequency Magnetic Field Immunity Test Results

Taiwan Tokin EMC Eng. Corp.

Date : 06/08/2001

<i>Applicant</i> : <u>FSP Group Inc.</u>		<i>Test Date</i> : <u>Jun. 01, 2001</u>		
<i>EUT</i> : <u>Switching Power Supply, M/N FSP150-601U</u>		<i>Temperature</i> : <u>24</u> °C		
<i>Power Supply</i> : <u>AC 230V, 50Hz</u>		<i>Humidity</i> : <u>50</u> %		
<i>Working Condition</i> : <u>See Section 3.4.</u>				
<i>Power Frequency Magnetic Field</i>	<i>Testing Duration</i>	<i>Coil Orientation</i>	<i>Results & Criteria</i>	<i>Remark</i>
<u>50Hz, 1 A/m</u>	<u>1 Min</u>	<u>X-axis</u>	Pass, A	
<u>50Hz, 1 A/m</u>	<u>1 Min</u>	<u>Y-axis</u>	Pass, A	
<u>50Hz, 1 A/m</u>	<u>1 Min</u>	<u>Z-axis</u>	Pass, A	
<i>Note</i> : No error occurred.				

Power Frequency Magnetic Field Immunity Test Results

Taiwan Tokin EMC Eng. Corp.

Date : 06/08/2001

<i>Applicant</i> : <u>FSP Group Inc.</u>		<i>Test Date</i> : <u>May. 29, 2001</u>		
<i>EUT</i> : <u>Switching Power Supply, M/N FSP200-601U</u>		<i>Temperature</i> : <u>24</u> °C		
<i>Power Supply</i> : <u>AC 230V, 50Hz</u>		<i>Humidity</i> : <u>50</u> %		
<i>Working Condition</i> : <u>See Section 3.4.</u>				
<i>Power Frequency Magnetic Field</i>	<i>Testing Duration</i>	<i>Coil Orientation</i>	<i>Results & Criteria</i>	<i>Remark</i>
<u>50Hz, 1 A/m</u>	<u>1 Min</u>	<u>X-axis</u>	Pass, A	
<u>50Hz, 1 A/m</u>	<u>1 Min</u>	<u>Y-axis</u>	Pass, A	
<u>50Hz, 1 A/m</u>	<u>1 Min</u>	<u>Z-axis</u>	Pass, A	
<i>Note</i> : No error occurred.				

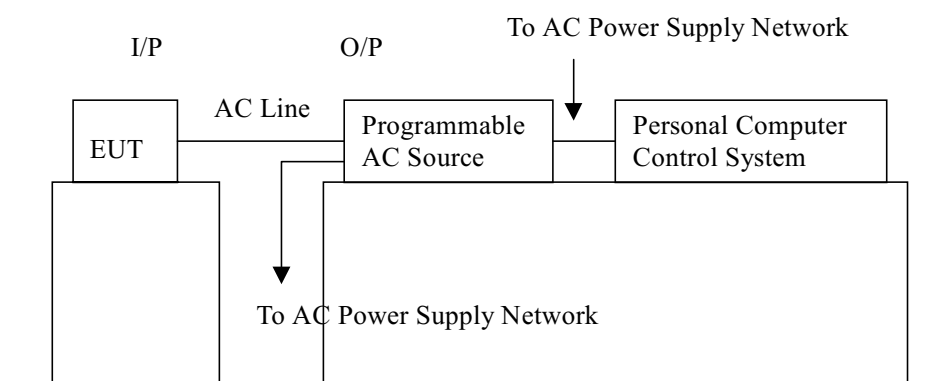
12.VOLTAGE DIPS AND INTERRUPTIONS MEASUREMENT

12.1.Block Diagram of Test Setup

12.1.1.Block Diagram of connection between EUT and simulators.

Same as Section 4.1.1.

12.1.2.Test Setup



12.2.Test Standard

EN 55024/1998 (IEC 61000-4-11/1994, Test Level : Voltage dips : 30% reduction, 500ms ; >95% reduction, 10ms ; Voltage interruptions : >95% reduction , 5000ms)

12.3.Test Levels and Performance Criterion

12.3.1.Test Levels

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

12.3.2. Performance Criterion :

- 1) Voltage dips >95% reduction performance criterion **B**.
- 2) Voltage dips 30% reduction performance criterion **C**.
- 3) Voltage interruption >95% reduction performance criterion **C**.

12.4. EUT's Configuration during Compliance Measurement

The configuration of EUT were listed in section 3.3.

12.5. Operating Condition of EUT

Same as conducted measurement which was listed in 3.4. except the test set up replaced by section 11.1.

12.6. Test Procedure

- 12.6.1. Set up the EUT and test generator as shown on section 11.1.
- 12.6.2. The interruptions was introduced at selected phase angles with specified duration. There was a 10s minimum interval between each test event.
- 12.6.3. After each test a full functional check was performed before the next test.
- 12.6.4. Repeat procedures 11.6.2. & 11.6.3. for voltage dips, only the test level and duration was changed.
- 12.6.5. Record any degradation of performance.

12.7. Test Results

PASSED. Please refer to the following pages.

Voltage Dips And Interruptions Measurement Results

Taiwan Tokin EMC Eng. Corp.

Date : 06/08/2001

Applicant : <u>FSP Group Inc.</u> EUT : <u>Switching Power Supply, M/N FSP150-601U</u> Power Supply : <u>AC 230V, 50Hz</u> Working Condition : <u>See Section 3.4.</u>		Test Date : <u>Jan. 01, 2001</u> Temperature : <u>20.5</u> °C Humidity : <u>60</u> %					
Single Test Voltage							
Type of Test	Test Voltage	Phase Angle	% Reduction	ms	Test Result Performance level		
Voltage Interruptions	230	0	> 95 %	5000	Pass, C, Note		
		45	> 95 %	5000	Pass, C, Note		
		90	> 95 %	5000	Pass, C, Note		
		135	> 95 %	5000	Pass, C, Note		
		180	> 95 %	5000	Pass, C, Note		
		225	> 95 %	5000	Pass, C, Note		
		270	> 95 %	5000	Pass, C, Note		
		315	> 95 %	5000	Pass, C, Note		
Voltage Dips	230	0	30	500	Pass, A		
		45	30	500	Pass, A		
		90	30	500	Pass, A		
		135	30	500	Pass, A		
		180	30	500	Pass, A		
		225	30	500	Pass, A		
		270	30	500	Pass, A		
		315	30	500	Pass, A		
		0	> 95 %	10	Pass, A		
		45	> 95 %	10	Pass, A		
		90	> 95 %	10	Pass, A		
		135	> 95 %	10	Pass, A		
		180	> 95 %	10	Pass, A		
		225	> 95 %	10	Pass, A		
		270	> 95 %	10	Pass, A		
		315	> 95 %	10	Pass, A		
		<p>Note : The EUT cant's work temporarily during the voltage short cut 95% 5000ms test, It's recovered by reset.</p>					

Voltage Dips And Interruptions Measurement Results

Taiwan Tokin EMC Eng. Corp.

Date : 06/08/2001

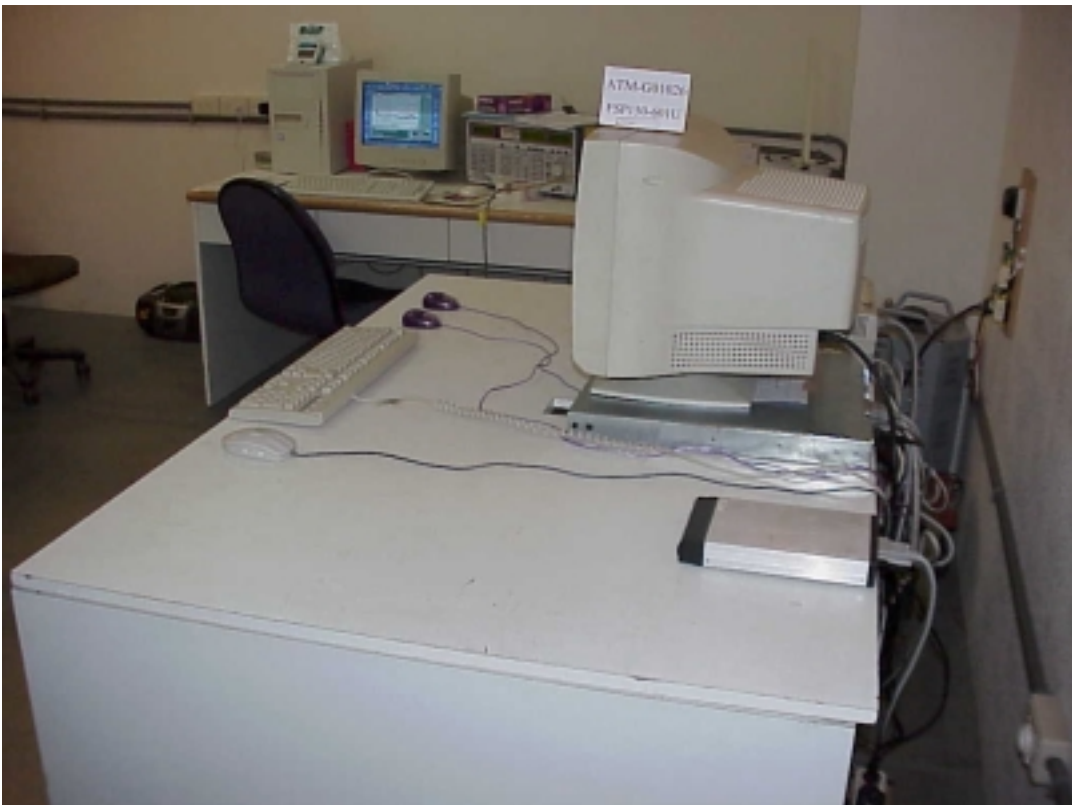
<i>Applicant</i> : <u> FSP Group Inc.</u>			<i>Test Date</i> : <u> May. 29, 2001</u>				
<i>EUT</i> : <u> Switching Power Supply, M/N FSP200-601U</u>			<i>Temperature</i> : <u> 24</u> °C				
<i>Power Supply</i> : <u> AC 230V, 50Hz</u>			<i>Humidity</i> : <u> 50</u> %				
<i>Working Condition</i> : <u> See Section 3.4.</u>							
<i>Single Test Voltage</i>							
<i>Type of Test</i>	<i>Test Voltage</i>	<i>Phase Angle</i>	<i>% Reduction</i>	<i>ms</i>	<i>Test Result Performance level</i>		
<i>Voltage Interruptions</i>	230	0	> 95 %	5000	Pass, C, Note		
		45	> 95 %	5000	Pass, C, Note		
		90	> 95 %	5000	Pass, C, Note		
		135	> 95 %	5000	Pass, C, Note		
		180	> 95 %	5000	Pass, C, Note		
		225	> 95 %	5000	Pass, C, Note		
		270	> 95 %	5000	Pass, C, Note		
		315	> 95 %	5000	Pass, C, Note		
<i>Voltage Dips</i>	230	0	30	500	Pass, A		
		45	30	500	Pass, A		
		90	30	500	Pass, A		
		135	30	500	Pass, A		
		180	30	500	Pass, A		
		225	30	500	Pass, A		
		270	30	500	Pass, A		
		315	30	500	Pass, A		
		0	> 95 %	10	Pass, A		
		45	> 95 %	10	Pass, A		
		90	> 95 %	10	Pass, A		
		135	> 95 %	10	Pass, A		
		180	> 95 %	10	Pass, A		
		225	> 95 %	10	Pass, A		
		270	> 95 %	10	Pass, A		
		315	> 95 %	10	Pass, A		
		<p><i>Note</i> : The EUT cant's work temporarily during the voltage short cut 95% 5000ms test, It's recovered by reset.</p>					

13. PHOTOGRAPHS

13.1. Photos of Powerline Conducted Measurement M/N FSP150-601U



FRONT VIEW OF CONDUCTED TEST



BACK VIEW OF CONDUCTED TEST

M/N FSP200-601U



FRONT VIEW OF CONDUCTED TEST



BACK VIEW OF CONDUCTED TEST

13.2.Photos of Radiated Measurement at Open Field Test Site
M/N FSP150-601U



FRONT VIEW OF CONDUCTED TEST



BACK VIEW OF CONDUCTED TEST



SETUP WITH MAXIMUM DETECTED EMISSION AT HORIZONTAL POLARIZATION



SETUP WITH MAXIMUM DETECTED EMISSION AT VERTICAL POLARIZATION

M/N FSP200-601U



FRONT VIEW OF CONDUCTED TEST



BACK VIEW OF CONDUCTED TEST



SETUP WITH MAXIMUM DETECTED EMISSION AT HORIZONTAL POLARIZATION



SETUP WITH MAXIMUM DETECTED EMISSION AT VERTICAL POLARIZATION

13.3.Photos of Harmonic & Flicker Measurement

M/N FSP150-601U



M/N FSP200-601U



13.4.Photos of Electrostatic Discharge Measurement

M/N FSP150-601U

Air & Contact Discharge Tests



HCP & VCP Tests



M/N FSP200-601U

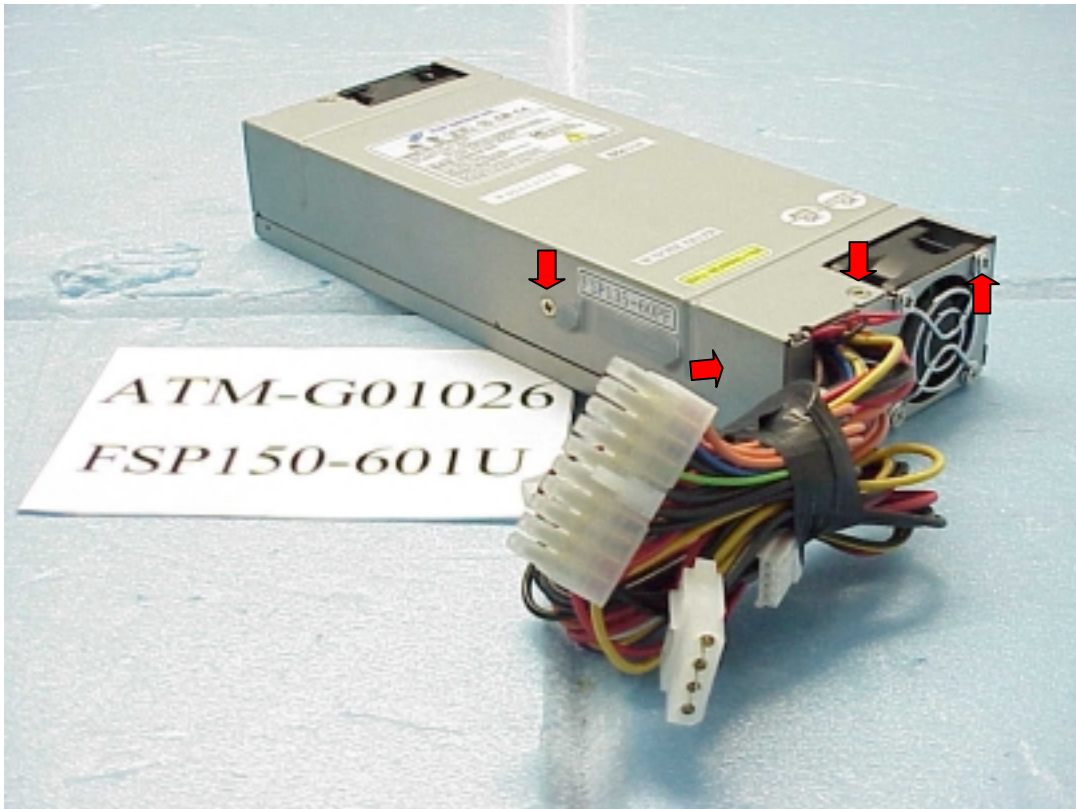
Air & Contact Discharge Tests



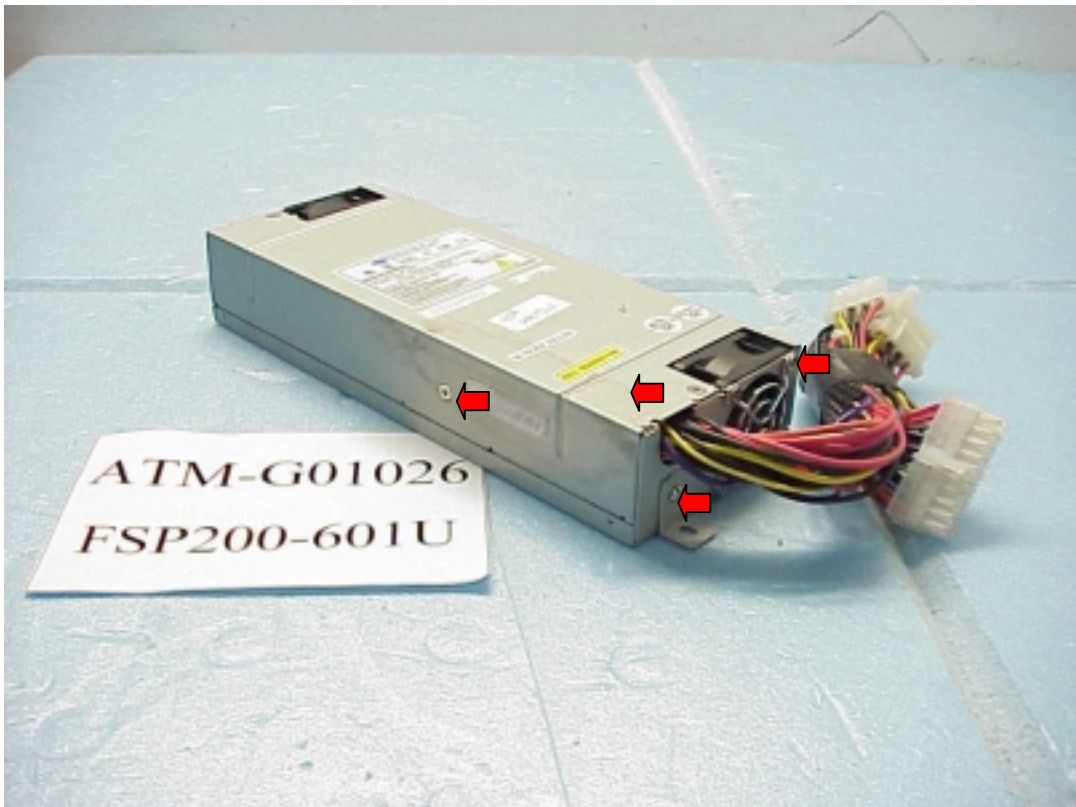
HCP & VCP Tests



M/N FSP150-601U
Photos of Points



M/N FSP200-601U
Photos of Points



13.5.Photos of RF Strength Susceptibility Measurement M/N FSP150-601U



FRONT VIEW OF R/S TEST



BACK VIEW OF R/S TEST

M/N FSP200-601U



FRONT VIEW OF R/S TEST



BACK VIEW OF R/S TEST

13.6.Photos of Electrical Fast Transient/Burst Measurement
M/N FSP150-601U

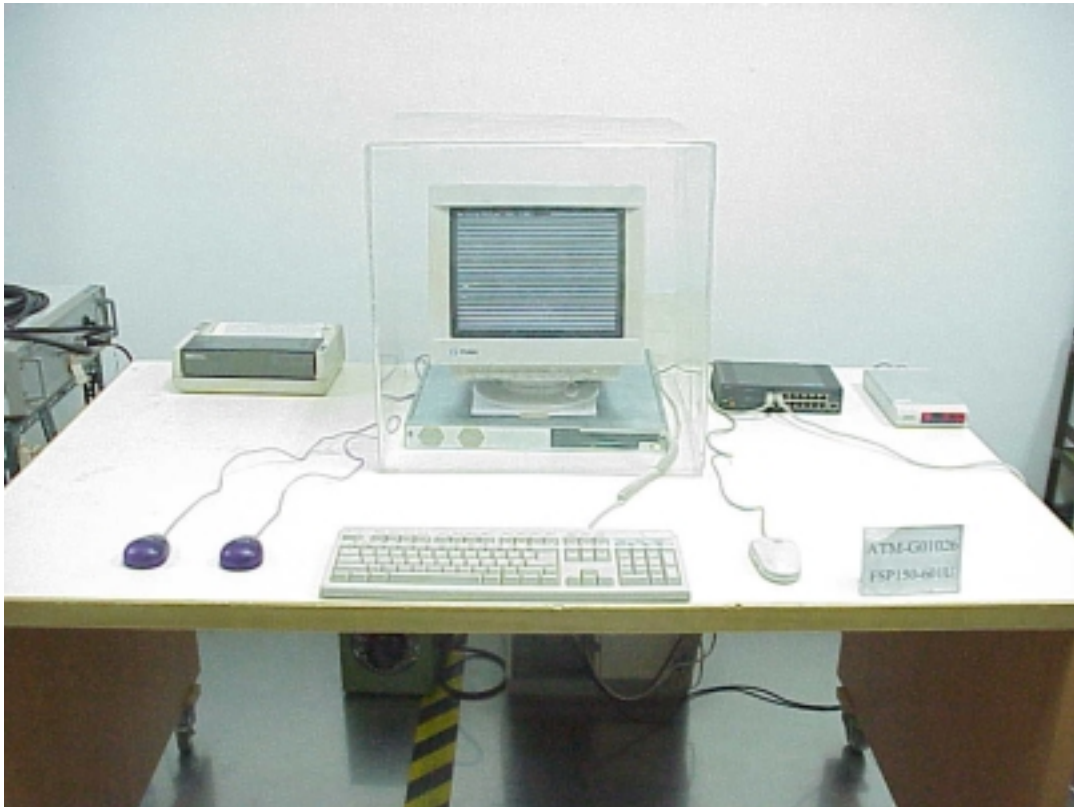


M/N FSP200-601U



13.7.Photos of Surge Immunity Test

M/N FSP150-601U



M/N FSP200-601U



13.8.Photos of Injected Currents Measurement

M/N FSP150-601U



M/N FSP200-601U



13.9. Power Frequency Magnetic Field Immunity Measurement

M/N FSP150-601U



M/N FSP200-601U



13.10.Photos of Voltage Dips and Interruptions Test

M/N FSP150-601U



M/N FSP200-601U



APPENDIX (Photos of EUT)

Total Pages : 8

Figure 1
Switching Power Supply, M/N FSP150-601U
General Appearance (Front & Side View)

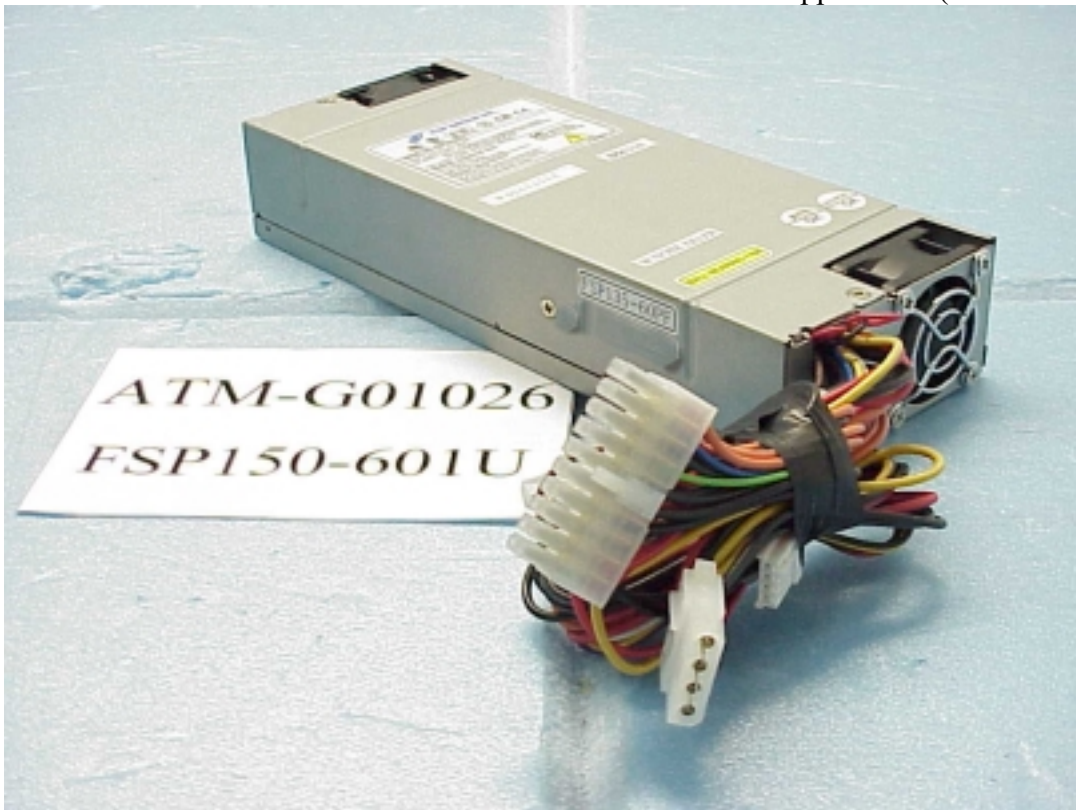


Figure 2
Switching Power Supply, M/N FSP150-601U
General Appearance (Rear & Side View)

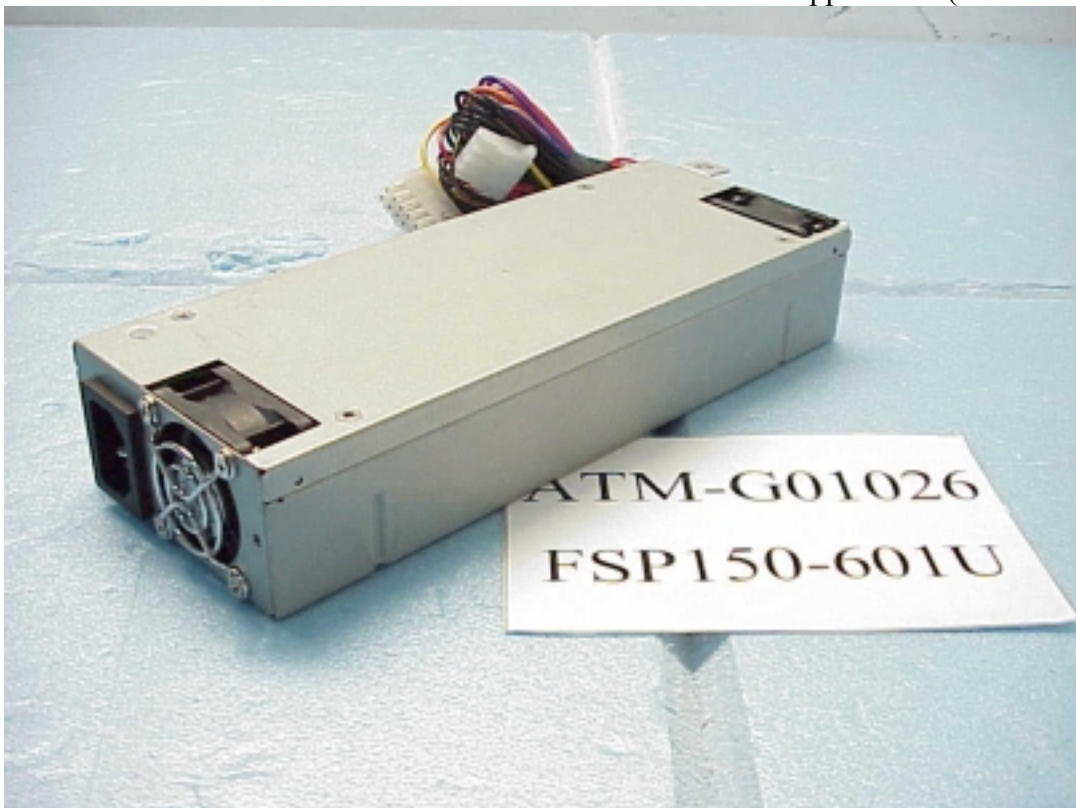


Figure 3
Switching Power Supply, M/N FSP150-601U
General Appearance (Label)



Figure 4
Switching Power Supply, M/N FSP150-601U
Cover Removed, Internal View



Figure 5
Switching Power Supply, M/N FSP150-601U
Main Board (Component Side)



Figure 6
Switching Power Supply, M/N FSP150-601U
Main Board (Foil Side)

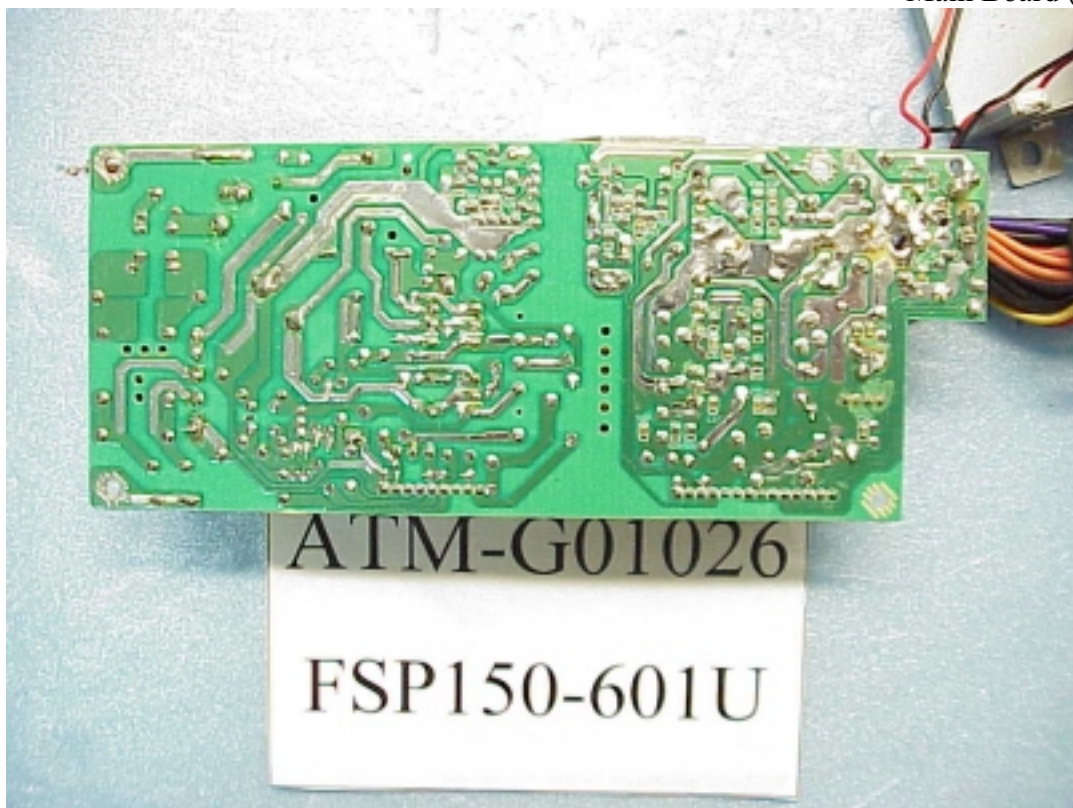


Figure 7
Switching Power Supply, M/N FSP150-601U
Main Board (Foil Side)

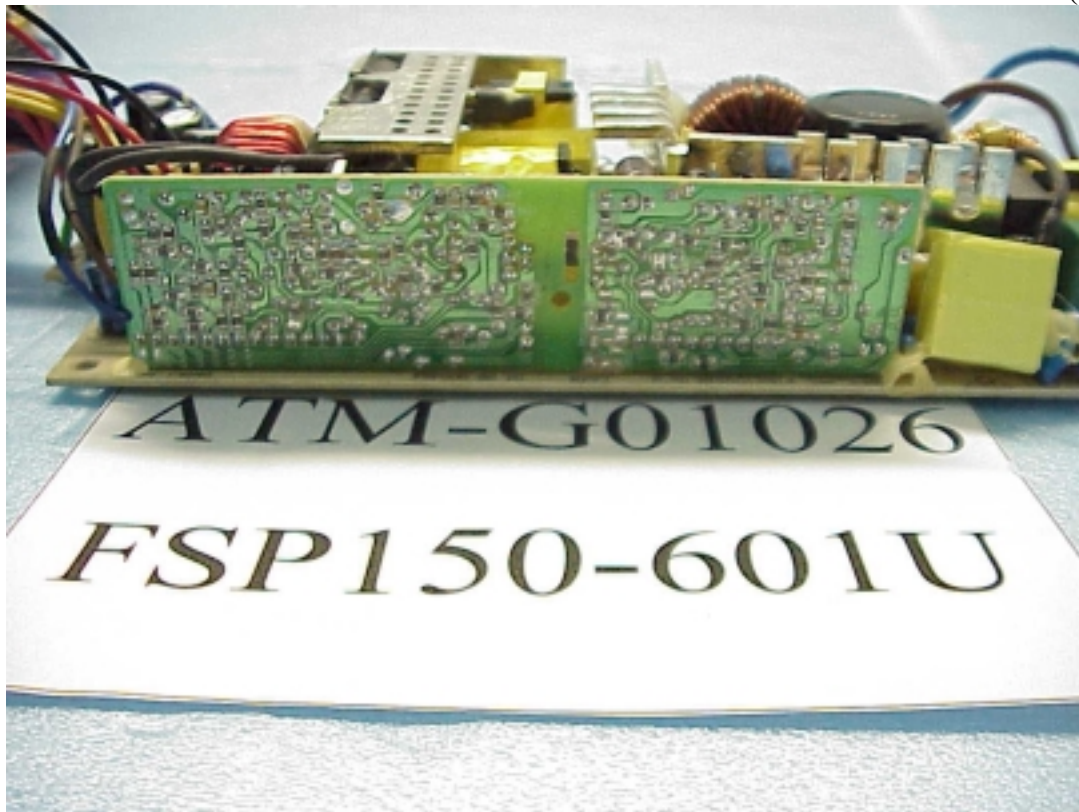


Figure 8
Switching Power Supply, M/N FSP150-601U
I/O Port

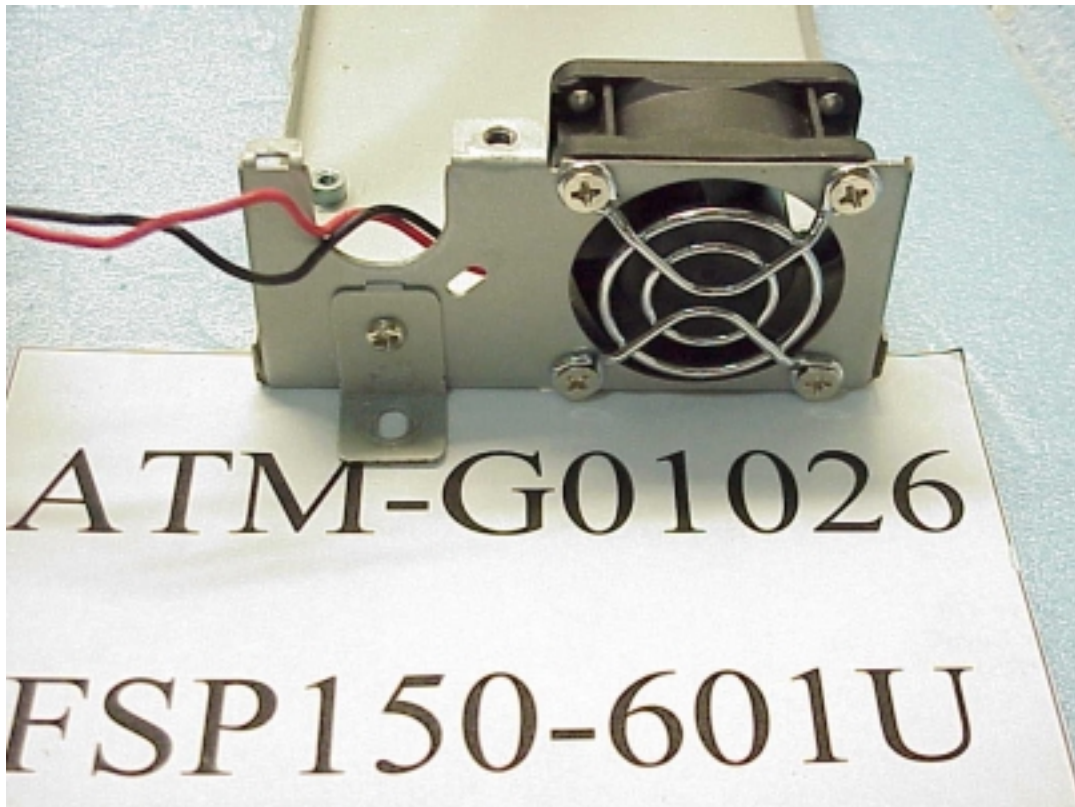


Figure 9
Switching Power Supply, M/N FSP200-601U
General Appearance (Front & Side View)



Figure 10
Switching Power Supply, M/N FSP200-601U
General Appearance (Rear & Side View)



Figure 11
Switching Power Supply, M/N FSP200-601U
General Appearance (Label)



Figure 12
Switching Power Supply, M/N FSP200-601U
Cover Removed, Internal View



Figure 13
Switching Power Supply, M/N FSP200-601U
Main Board (Component Side)



Figure 14
Switching Power Supply, M/N FSP200-601U
Main Board (Foil Side)

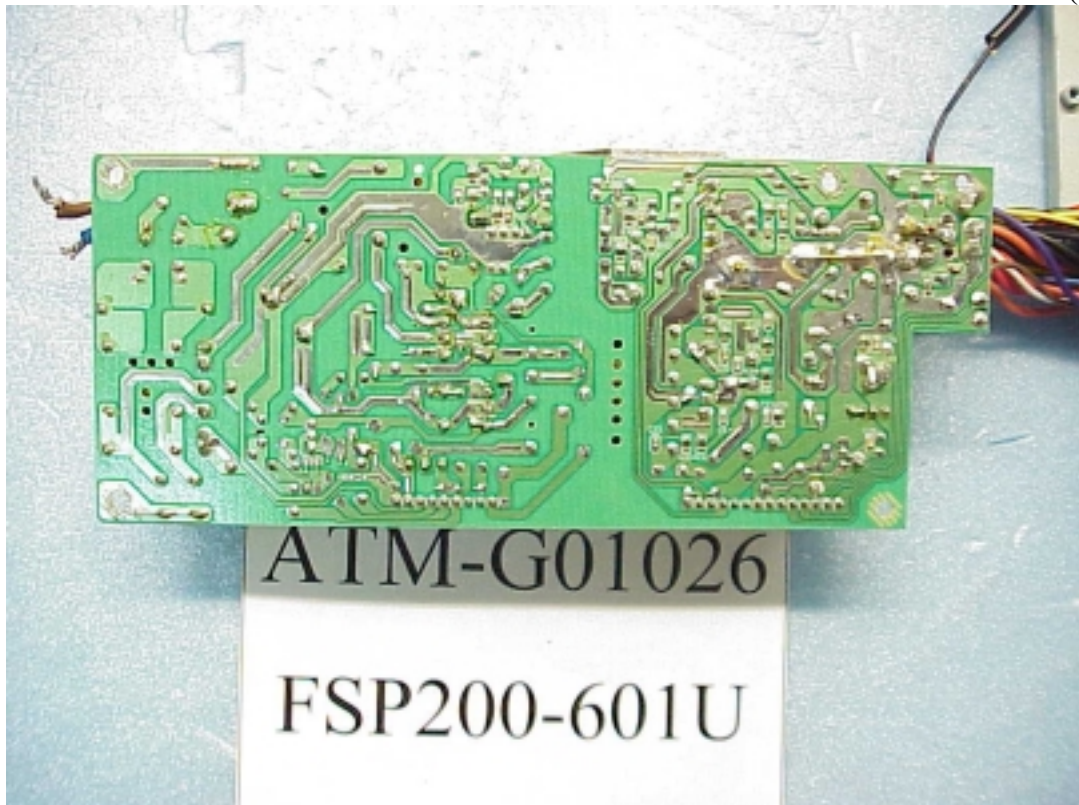


Figure 15
Switching Power Supply, M/N FSP200-601U
Main Board (Foil Side)

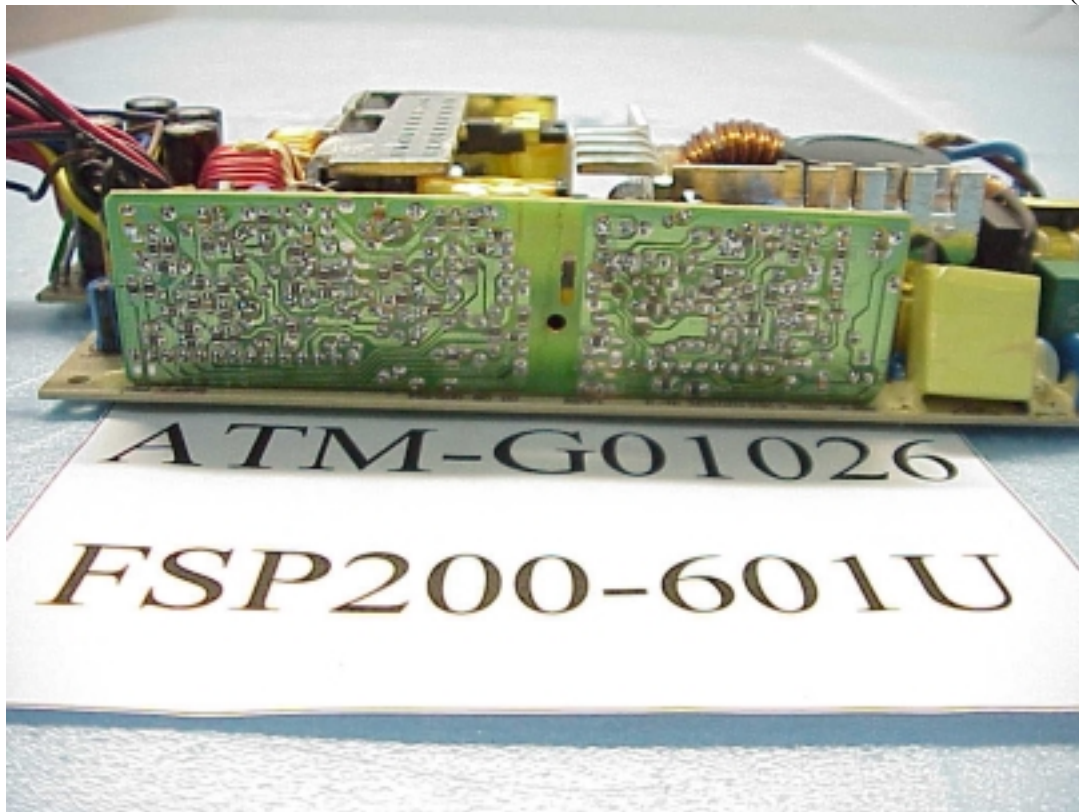
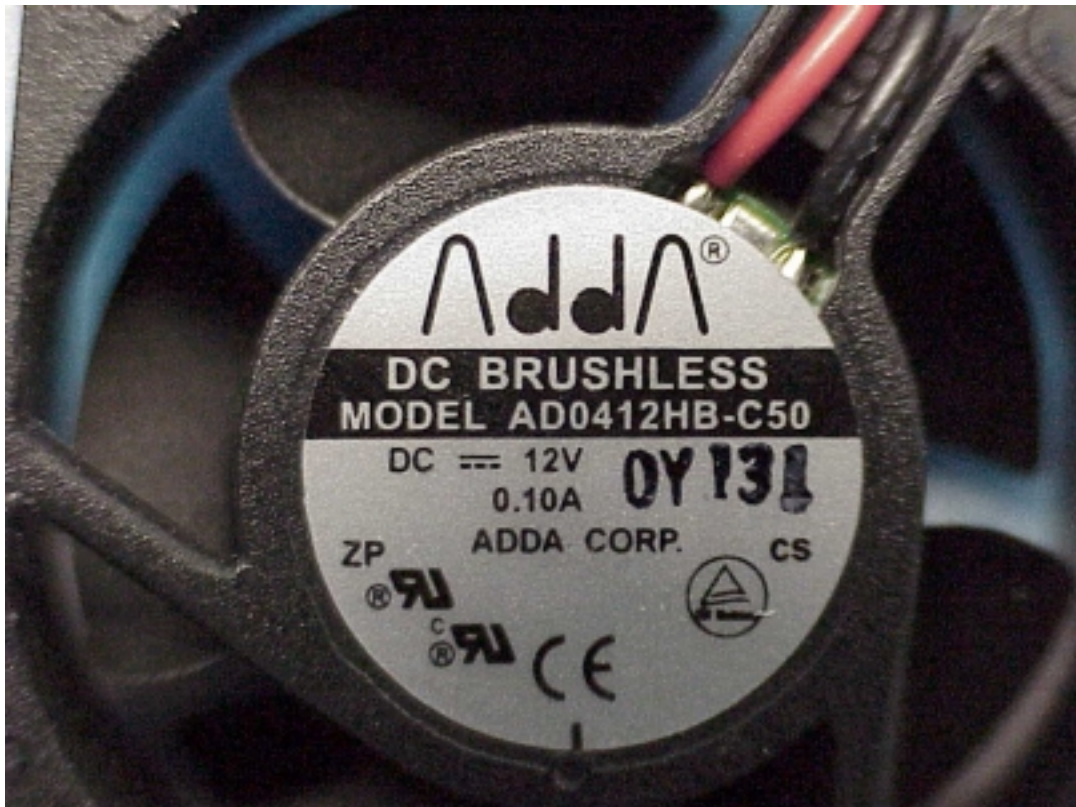


Figure 16
Switching Power Supply, M/N FSP200-601U
Fan



TOKIN

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Taiwan, R.O.C.
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Technical Compliance Statement

No. ATM-E01081

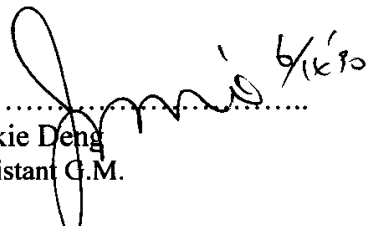
The following products has been tested by us with the listed standards and found in compliance with the council EMC directive 89/336/EEC. It is possible to use CE marking to demonstrate the compliance with this EMC Directive.

Submittor : **FSP Group Inc.**
6F-1, NO. 487, Ta-Yu Rd., Taoyuan City,
Taiwan, R.O.C.

Product : **Switching Power Supply**
M/N (1)FSP150-601U (2)FSP200-601U

Test Standards	
EN 55022/1998	Limits and methods of measurement of radio disturbance characteristics of information technology equipment
EN 61000-3-2/1995 +A12/1996 +A13/1997 +A1/1998 +A2/1998 +A14/2000	Part 3 : Limits -Section 2 : Limits for harmonic current emission (equipment input current <=16A phase)
EN 61000-3-3/1995	Part 3 : Limits-Section 3 : Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current <=16A
EN 55024/1998	Information technology equipment-Immunity characteristics Limits and methods of measurement
	IEC 61000-4-2/1995 Electrostatic discharge immunity test
	IEC 61000-4-3/1995 Radiated, radio-frequency electromagnetic field immunity test
	IEC 61000-4-4/1995 Electrical fast transient / burst immunity test
	IEC 61000-4-5/1995 Surge immunity test
	IEC 61000-4-6/1996 Immunity to conducted disturbances, induced by radio-frequency fields
	IEC 61000-4-8/1993 Power Frequency Magnetic field immunity test
	IEC 61000-4-11/1994 Voltage dips, short interruptions and voltage variations immunity test




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Jackie Deng
Assistant G.M.

The verification is based on a single evaluation of one sample of above mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab. logo.