TÜVRheinland®

Produkte
Products

Prüfbericht - Nr.: *Test Report No.:*	**15054729 001**	**Seite 1 von 24** *Page 1 of 24*
Auftraggeber: *Client:*	**GE Power Electronics (Shanghai) Co., Ltd.** 1-2F, Building #58, No. 461 Hongcao Road, Caohejing Hi-Tech Park, Shanghai 200233, P.R. China	
Gegenstand der Prüfung: *Test item:*	**AC-Supplied Electronic Ballast For Electrodeless Fluorescent Lamp**	
Bezeichnung: *Identification:*	**SP792-Y01A , SP792-Z01A**	**Serien-Nr.:** *Serial No.:* **N/A**
Wareneingangs-Nr.: *Receipt No.:*	**154007185**	**Eingangsdatum:** *Date of receipt:* **31.07.2012**
Zustand des Prüfgegenstandes bei Anlieferung: *Condition of test item at delivery:*	**The sample is OK for testing and not damaged.**	
Prüfort: *Testing location:*	**Refer to section 1.1**	
Prüfgrundlage: *Test specification:*	**FCC Part 18:2011**	
Prüfergebnis: *Test Result:*	**Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).** *The test item passed the test specification(s).*	
Prüflaboratorium: *Testing Laboratory:*	**TÜV Rheinland (Shanghai) Co., Ltd.**	

geprüft/ *tested by:* **kontrolliert/** *reviewed by:*

Datum *Date*	Name/Stellung *Name/Position*	Unterschrift *Signature*	Datum *Date*	Name/Stellung *Name/Position*	Unterschrift *Signature*
25.10.2012	Zhang Xuelan/PE	Zhang Xuelan	25.10.2012	Zhou Jiayi/TC	Zhou Jiayi

Sonstiges/ *Other Aspects:*

FCC ID: X82-BLST-SP792
The above models SP792-Y01A and SP792-Z01A are the same in electrical characteristics, the only difference between them is that SP792-Z01A is a RoHS compliant version and SP792-Y01A is a RoHS version with lead free exemption, which will not affect the EMC performance of the product. Therefore, all the EMC tests were performed on sample SP792-Y01A.

Abkürzungen:				*Abbreviations:*			
	P(ass)	=	entspricht Prüfgrundlage		P(ass)	=	passed
	F(ail)	=	entspricht nicht Prüfgrundlage		F(ail)	=	failed
	N/A	=	nicht anwendbar		N/A	=	not applicable
	N/T	=	nicht getestet		N/T	=	not tested

TEST SUMMARY

4.1.1 CONDUCTED EMISSION ON AC POWER PORT
Result:
Passed
4.1.2 RADIATED EMISSION UP TO 30MHZ
Result:
Passed
4.2.1 RADIATED EMISSION ABOVE 30MHZ
Result:
Passed

Contents

1 Test Sites

1.1 Test Facilities

Laboratory: AUDIX Technology (Shanghai) Co., Ltd.
Address: 3F #34 Building, No. 680 Guiping Road, Caohejing Hi-Tech Park, Shanghai 200233, P. R. China
(FCC registration No.: 91789)

The used test equipment is in accordance with CISPR 16-1 series standards for measurement of radio interference.
The performed tests have been conducted by "AUDIX Technology (Shanghai) Co., Ltd." under supervision of TÜV Rheinland's engineer.

1.2 List of Test and Measurement Instruments

Table 1: List of test and measurement equipment

No.	Equipment	Model	Serial no.	Cal. due date
1.	Test Receiver	ESCI	100841	22.05.2013
2.	Artificial Mains Network	ESH2-Z5	843890/011	13.02.2013
3.	50 Ω Coaxial Switch	MP59B	6200426389	18.09.2012
4.	Test Receiver	ESVS10	844594/001	22.05.2013
5.	Preamplifier	8447D	2944A10548	18.09.2012
6.	Bi-log Antenna	CBL6112D	23192	01.12.2012
7.	Spectrum	E7405A	MY45106600	22.05.2013
8.	50 Ω Coaxial Switch	MP59B	6200426390	18.09.2012
9.	Test Receiver	ESHS10	844077/020	22.05.2013
10.	Loop Antenna	HLA6120	1193	03.05.2013
11.	50 Ω Coaxial Switch	MP59B	6200426390	18.09.2012

2 General Product Information

2.1 Product Function and Intended Use

The EUT (equipment under test) is an AC-Supplied Electronic Ballast For Electrodeless Fluorescent Lamp for lighting and similar use. For the further information, refer to the user's manual.

2.2 Ratings and System Details

System input voltage	:	AC 120-277V
Frequency	:	50-60Hz
Rated wattage for lamp	:	300W (SP792-Y01A and SP792-Z01A)
Rated current	:	2.83-1.27A (SP792-Y01A and SP792-Z01A)
Protection class	:	I

2.3 Independent Operation Modes

The basic operation modes are: "On", "Off".

2.4 Noise Generating and Noise Suppressing Parts

Refer to circuit diagram for further information.

2.5 Submitted Documents

Circuit diagram, PCB layout and label.

3 Test Set-up and Operation Modes

3.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible emission level. The test conditions were adapted accordingly in reference to the instructions for use.

Refer to the related paragraph of this report.

3.2 Physical Configuration for Testing

Refer to the related paragraph of this report.

3.3 Test Operation and Test Software

Refer to the related paragraph of this report.

3.4 Special Accessories and Auxiliary Equipment

Following lamps were used during all the tests,
Manufacturer: Shanghai AJA Enterprise Development Co., Ltd.;
Type: AJA-WJY-300W

3.5 Countermeasures to achieve EMC Compliance

The tested sample contained noise suppression capacitors, inductors and common mode choke as described in the circuit diagram. No special measure is employed to achieve the requirement.

4 Test Results E M I S S I O N

4.1 Emission in the Frequency Range up to 30 MHz

4.1.1 Conducted Emission on AC power port

Result:	**Passed**

Date of testing	:	31.07.2012
Test procedure	:	MP-5 specified by FCC Part 18:2011
Frequency range	:	450kHz - 30MHz
Kind of test site	:	Shielded room
Limit	:	15.307(c) of FCC Part 18:2011: 48dBµV (0.45-2.51MHz); 69.5dBµV (2.51-3MHz); 48dBµV (3-30MHz)
Ambient condition	:	Temperature: 22°C; Relative humidity: 48%

Test Setup

Supply voltage	:	AC 120V, 60Hz & AC 277V, 60Hz
Operational mode	:	Continuous operation with lighting
Earthing	:	Through power cord (as class I equipment)

The measurement setup was made in a shielded room. The tested object was operated under its rated voltage and rated frequency. Prior to the measurements the test object operated about 15 minutes (warm-up) in order to stabilize its operating conditions and to ensure reliable measurement values.

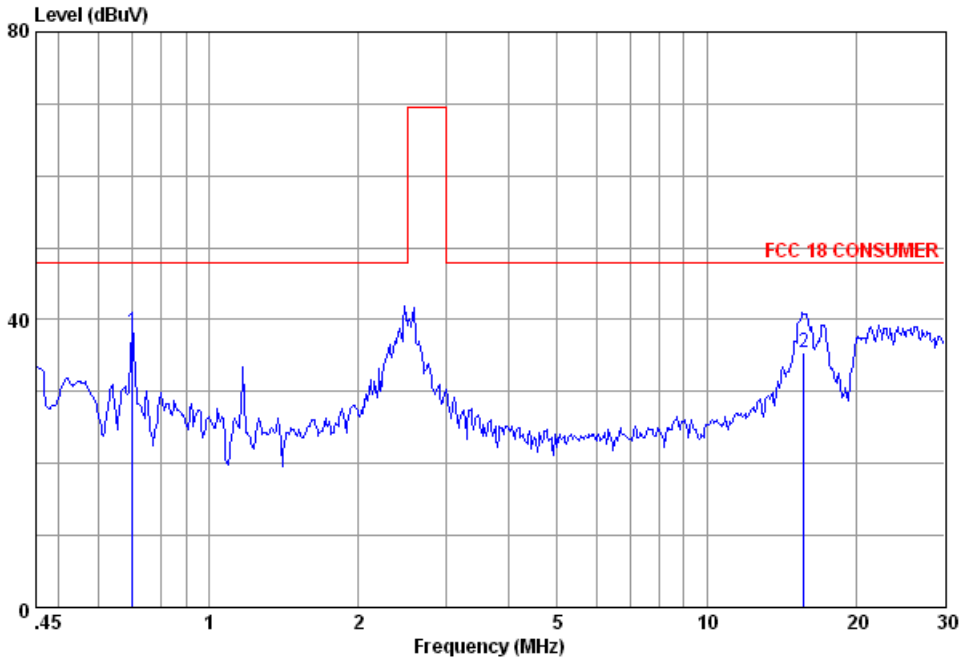
Furthermore an internal calibration with the test receiver was conducted prior to each measurement.

The tested object was set-up on a 0.8m wooden table. The EUT was set 0.8m away from the AMN. The cord longer than necessary to be connected to the AMN was folded forth and back parallel so as to form a bundle with a length between 0.3m and 0.4m.

The disturbance voltage was determined by measuring the line and neutral conductor by turns.

The following figures and data were those measured by an automatic measuring system. Quasi-peak values were measured and listed where they had a maximum in previous scanning survey.

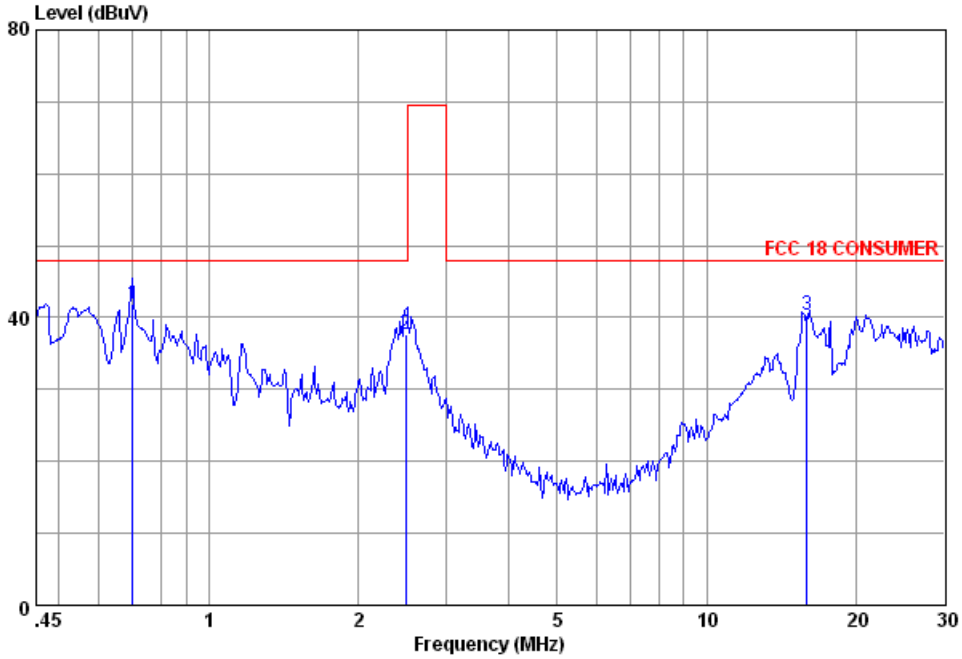
Figure 1: Spectral diagram, Conducted Emission, L (AC 120V)



Final quasi-peak measurement results:

	Freq	Level	Read Level	Cable Loss	LISN Factor	Factor	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dB	dBuV	dB	
1	0.703700	38.23	38.04	0.05	0.14	0.19	48.00	-9.77	QP
2	15.660000	35.50	34.66	0.35	0.49	0.84	48.00	-12.50	QP

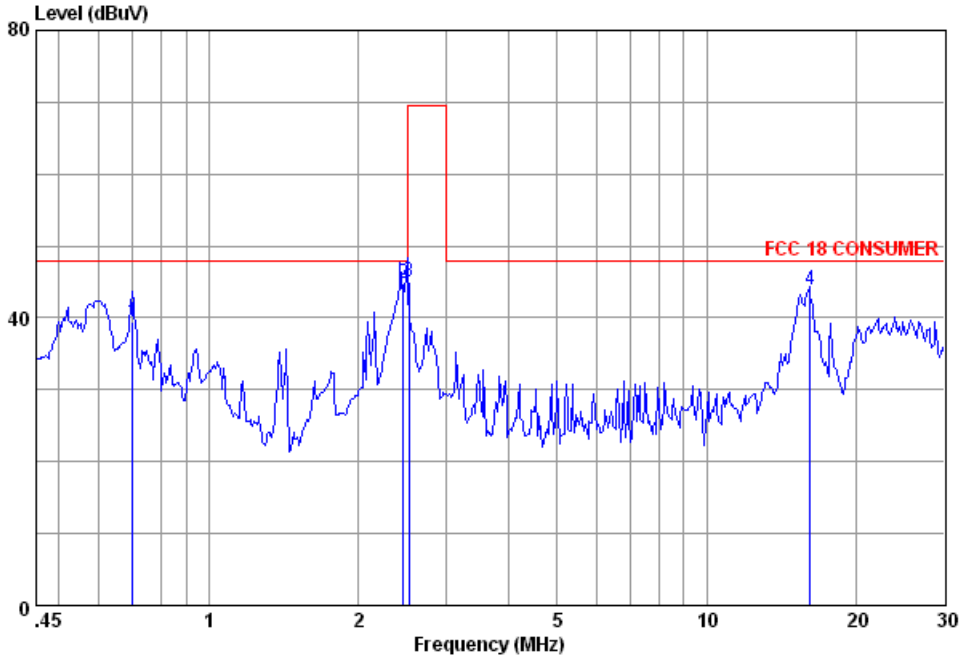
Figure 2: Spectral diagram, Conducted Emission, N (AC 120V)



Final quasi-peak measurement results:

	Freq	Level	Read Level	Cable Loss	LISN Factor	Factor	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dB	dBuV	dB	
1	0.702600	41.96	41.76	0.05	0.15	0.20	48.00	-6.04	QP
2	2.487000	37.65	37.46	0.10	0.09	0.19	48.00	-10.35	QP
3	15.920000	40.29	39.55	0.35	0.39	0.74	48.00	-7.71	QP

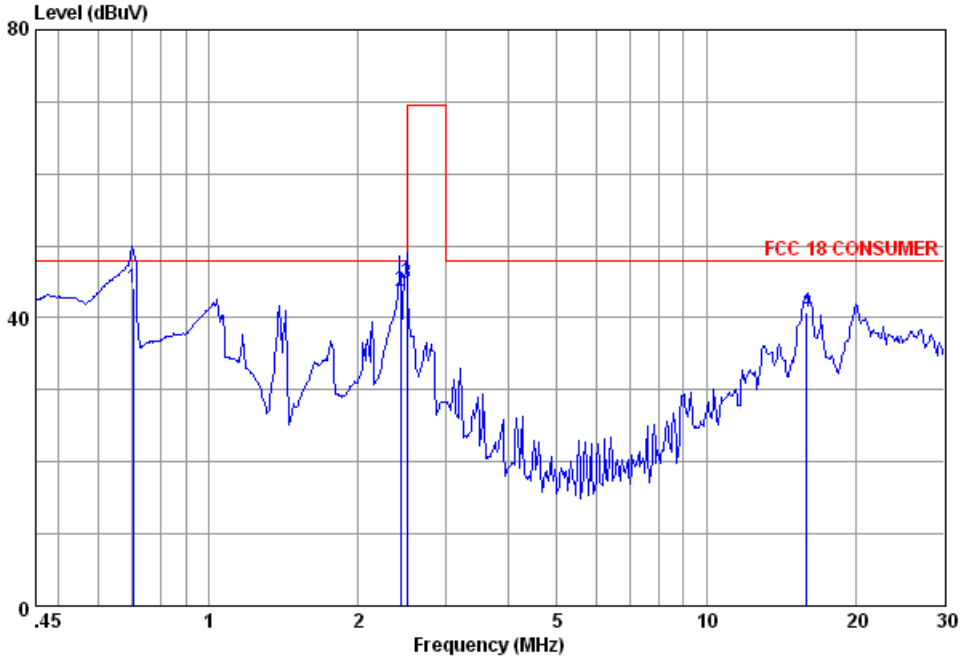
Figure 3: Spectral diagram, Conducted Emission, L (AC 277V)



Final quasi-peak measurement results:

	Freq	Level	Read Level	Cable Loss	LISN Factor	Factor	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dB	dBuV	dB	
1	0.703200	39.48	39.29	0.05	0.14	0.19	48.00	-8.52	QP
2	2.454000	44.72	44.32	0.10	0.30	0.40	48.00	-3.28	QP
3	2.523000	45.05	44.65	0.10	0.30	0.40	69.50	-24.45	QP
4	16.150000	43.98	43.13	0.35	0.50	0.85	48.00	-4.02	QP

Figure 4: Spectral diagram, Conducted Emission, N (AC 277V)



Final quasi-peak measurement results:

	Freq	Level	Read Level	Cable Loss	LISN Factor	Factor	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dB	dBuV	dB	
1	0.704800	44.21	44.01	0.05	0.15	0.20	48.00	-3.79	QP
2	2.434000	43.65	43.46	0.10	0.09	0.19	48.00	-4.35	QP
3	2.507000	44.78	44.58	0.10	0.10	0.20	48.00	-3.22	QP
4	15.920000	40.72	39.98	0.35	0.39	0.74	48.00	-7.28	QP

4.1.2 Radiated Emission up to 30MHz

Result:	**Passed**

Date of testing	:	31.07.2012
Test procedure	:	MP-5 specified by FCC Part 18:2011
Frequency range	:	9kHz - 30MHz
Kind of test site	:	Semi anechoic chamber
Measurement distance	:	3m
Limit	:	No limit
Detector	:	Quasi-peak
Measurement BW	:	200Hz (9-150kHz) 9kHz (150kHz-30MHz)
Supply voltage	:	AC 120V, 60Hz & AC 277V, 60Hz
Ambient condition	:	Temperature: 22°C; Relative humidity: 60%

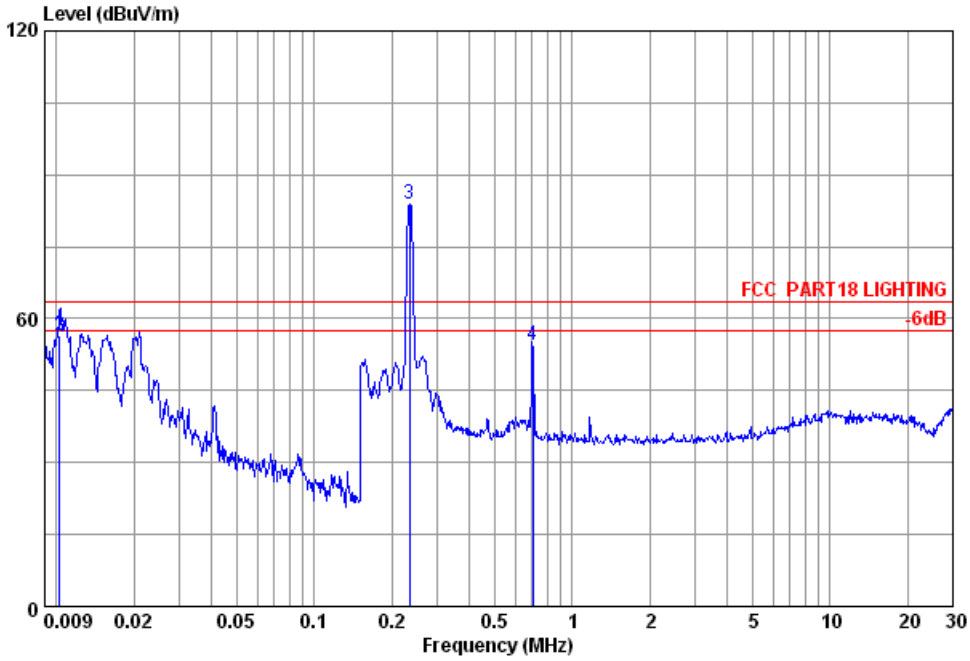
The radiated emission measurement was made at 3m. The EUT was placed on a wooden table 1m above the ground plane. The loop antenna height was set at 2m. The spectrum was examined from 9kHz - 30MHz. At each frequency, the EUT was rotated 360° in order to determine the emission's maximum level. Measurements were taken using 3 antenna polarizations.

The following figures and tables were those measured by an automatic measurement system. A preview test was firstly performed with Peak detector. The final test was performed with Quasi-peak detector at those critical frequencies during the preview test.

The field strength level was established by adding the meter reading of the EMI test receiver to the factors associated with antenna correction factor & cable loss.

The equation is expressed as follows:
FS = R + AF + CF
Where FS = Field strength level in dBµV/m;
R = Reading of EMI test receiver in dBµV;
AF = Antenna factor in dB/m;
CF = Cable attenuation factor in dB.

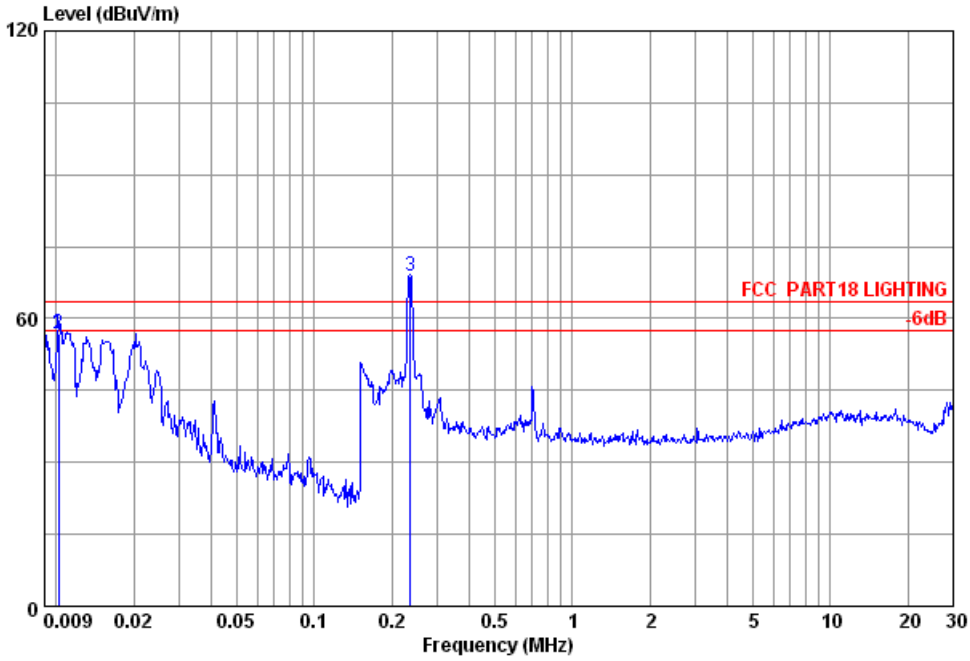
Figure 5: Spectral diagram, Radiated Emission, 9kHz - 30MHz, Horizontal (AC 120V)



Final quasi-peak measurement results:

		Freq	Level	ReadAntenna Level	Factor	Cable Loss
		MHz	dBuV/m	dBuV	dB/m	dB
1		0.01	56.49	34.44	21.99	0.06
2		0.01	56.49	34.44	21.99	0.06
3	X	0.23	83.89	62.75	21.08	0.06
4		0.70	54.62	33.87	20.69	0.06

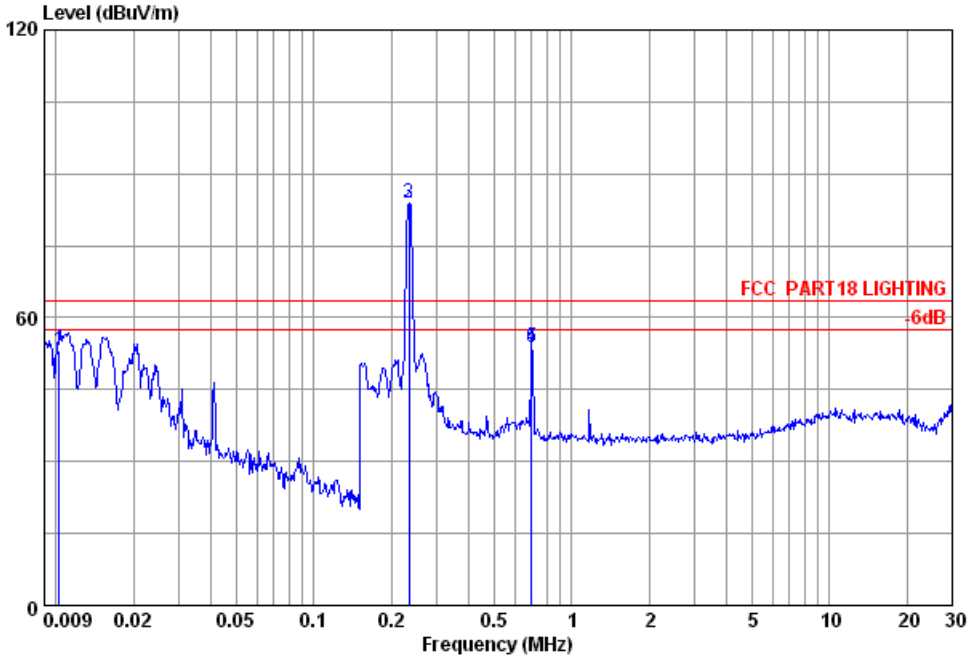
Figure 6: Spectral diagram, Radiated Emission, 9kHz - 30MHz, Vertical (AC 120V)



Final quasi-peak measurement results:

		Freq	Level	Read Level	Antenna Factor	Cable Loss
		MHz	dBuV/m	dBuV	dB/m	dB
1		0.01	56.94	34.89	21.99	0.06
2		0.01	56.94	34.89	21.99	0.06
3	X	0.24	69.02	47.88	21.08	0.06

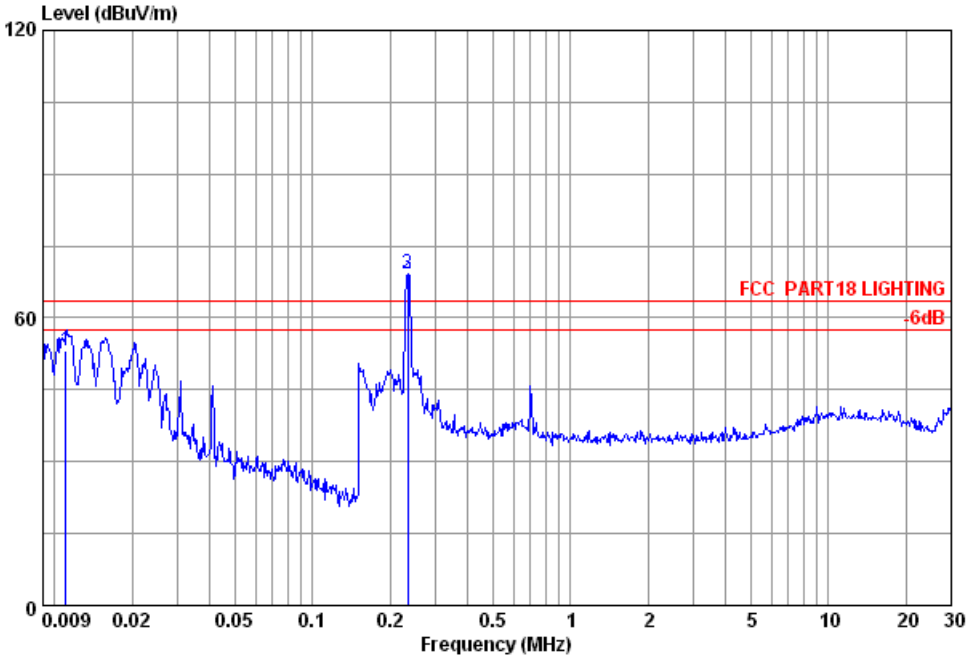
Figure 7: Spectral diagram, Radiated Emission, 9kHz - 30MHz, Horizontal (AC 277V)



Final quasi-peak measurement results:

		Freq	Level	ReadAntenna Level	Factor	Cable Loss
		MHz	dBuV/m	dBuV	dB/m	dB
1		0.01	53.23	31.18	21.99	0.06
2	X	0.23	83.85	62.71	21.08	0.06
3	X	0.23	83.85	62.71	21.08	0.06
4		0.70	53.76	33.01	20.69	0.06
5		0.70	53.76	33.01	20.69	0.06

Figure 8: Spectral diagram, Radiated Emission, 9kHz - 30MHz, Vertical (AC 277V)



Final quasi-peak measurement results:

		Freq	Level	Read Level	Antenna Factor	Cable Loss
		MHz	dBuV/m	dBuV	dB/m	dB
1		0.01	53.30	31.28	21.96	0.06
2	X	0.23	69.30	48.16	21.08	0.06
3	X	0.23	69.30	48.16	21.08	0.06

4.2 Emission in the Frequency Range above 30 MHz

4.2.1 Radiated Emission above 30MHz

Result:	**Passed**

Date of testing	:	31.07.2012
Test procedure	:	MP-5 specified by FCC Part 18:2011
Frequency range	:	30 - 1000MHz
Detector	:	Quasi-peak
Bandwidth	:	120kHz
Kind of test site	:	Semi-anechoic chamber
Limit	:	18.305(c) of FCC Part 18:2011 at 30m, consumer equipment: 10µV/m (30-88MHz); 15µV/m (88-216MHz); 20µV/m (216-1000MHz)
Measuring distance	:	3m
Supply voltage	:	AC 120V, 60Hz & AC 277V, 60Hz
Ambient condition	:	Temperature: 22°C; Relative humidity: 60%

Measuring configuration and description

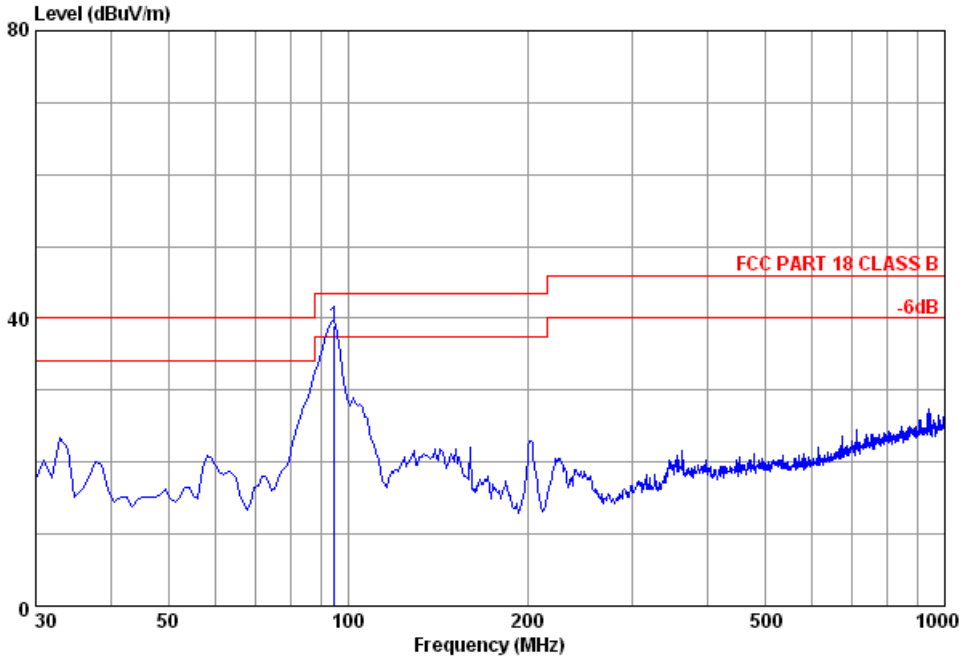
The radiated disturbance test was carried out in a semi-anechoic chamber. The test distance from the receiving antenna to the EUT is 3m. The normalized site attenuation of the semi-anechoic chamber is regularly calibrated to ensure the radiated disturbance test results are valid. During the test, the EUT was placed on a wooden table, which is 1m high. The wooden table was rotated 360° around, and the antenna was varied from 1m to 4m to find the maximum disturbance. The test was performed with the antenna both in its horizontal and vertical polarizations.

The following figures and tables were those measured by an automatic measurement system. A preview test was firstly performed with Peak detector. The final test was performed with Quasi-peak detector at those critical frequencies during the preview test.

The field strength level was established by adding the meter reading of the EMI test receiver to the factors associated with antenna correction factor & cable loss.

The equation is expressed as follows:
FS = R + AF + CF
Where FS = Field strength level in dBµV/m;
R = Reading of EMI test receiver in dBµV;
AF = Antenna factor in dB/m;
CF = Cable attenuation factor in dB.

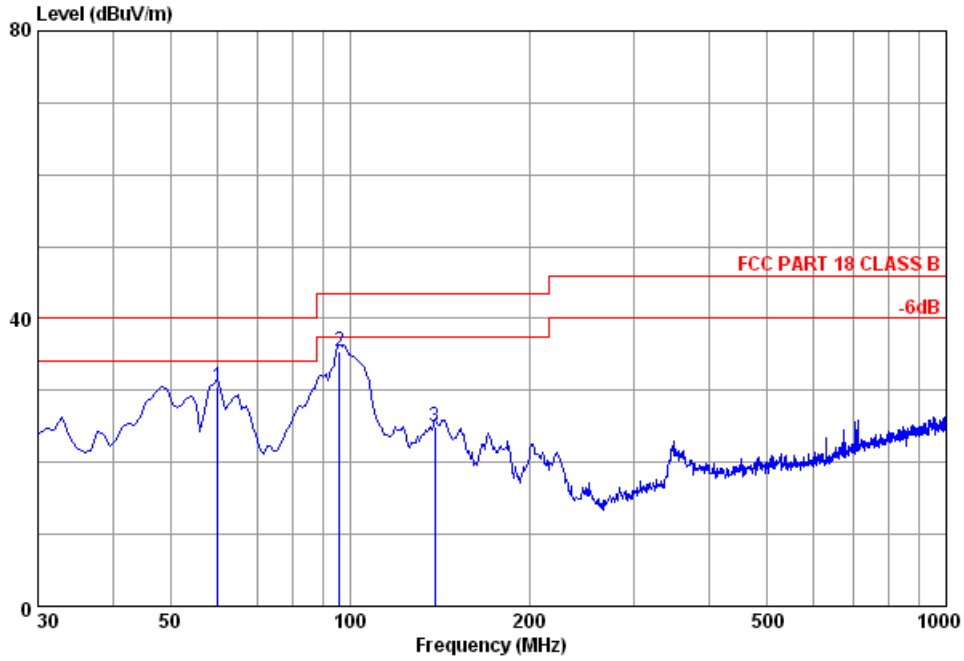
Figure 9: Spectral diagram, Radiated Emission, 30-1000MHz, Horizontal (AC 120V)



Final quasi-peak measurement results:

	Freq	Level	Read Level	Antenna Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV/m	dBuV	dB/m	dB	dBuV/m	dB	
1 !	94.89	38.96	26.00	11.18	1.78	43.50	-4.54	QP

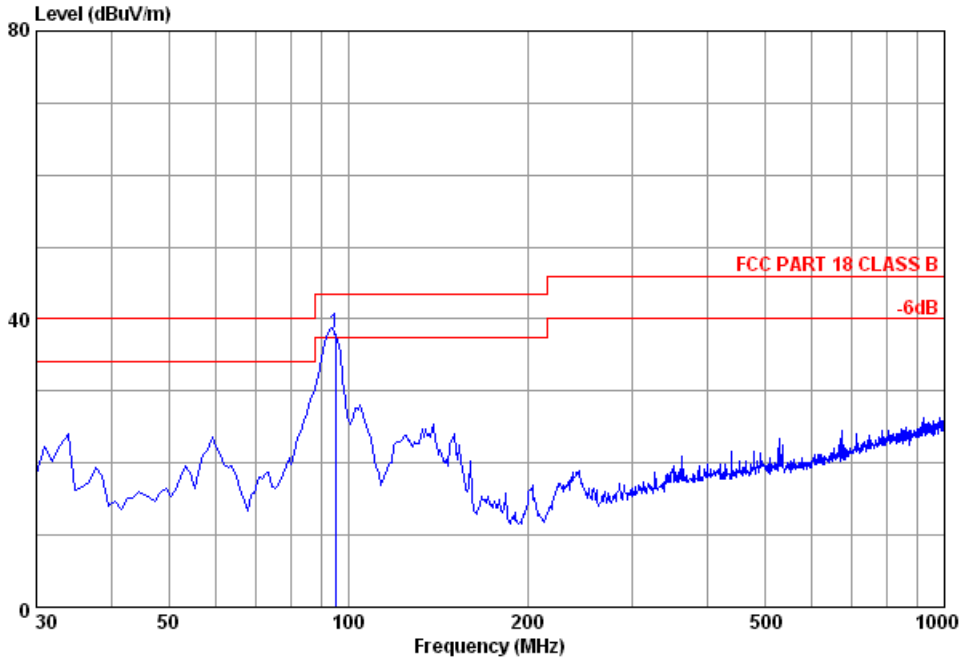
Figure 10: Spectral diagram, Radiated Emission, 30-1000MHz, Vertical (AC 120V)



Final quasi-peak measurement results:

	Freq	Level	Read Level	Antenna Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV/m	dBuV	dB/m	dB	dBuV/m	dB	
1	60.07	30.56	20.23	9.14	1.19	40.00	-9.44	QP
2	95.96	35.37	22.35	11.22	1.80	43.50	-8.13	QP
3	138.64	25.03	12.22	10.65	2.16	43.50	-18.47	QP

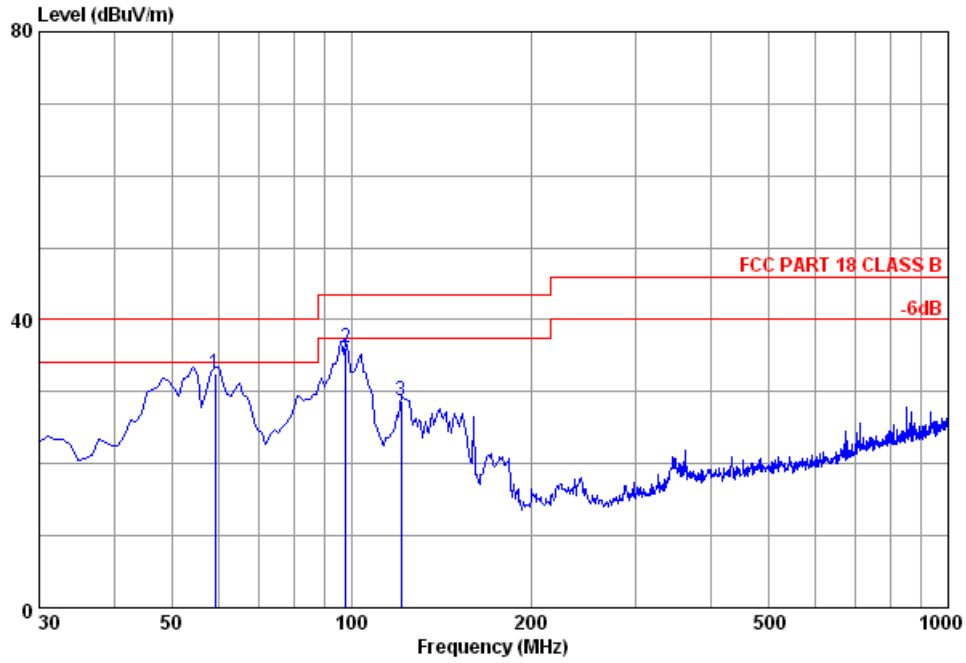
Figure 11: Spectral diagram, Radiated Emission, 30-1000MHz, Horizontal (AC 277V)



Final quasi-peak measurement results:

	Freq	Level	ReadAntenna Level	Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV/m	dBuV	dB/m	dB	dBuV/m	dB	
1 !	95.12	38.19	25.20	11.19	1.80	43.50	-5.31	QP

Figure 12: Spectral diagram, Radiated Emission, 30-1000MHz, Vertical (AC 277V)

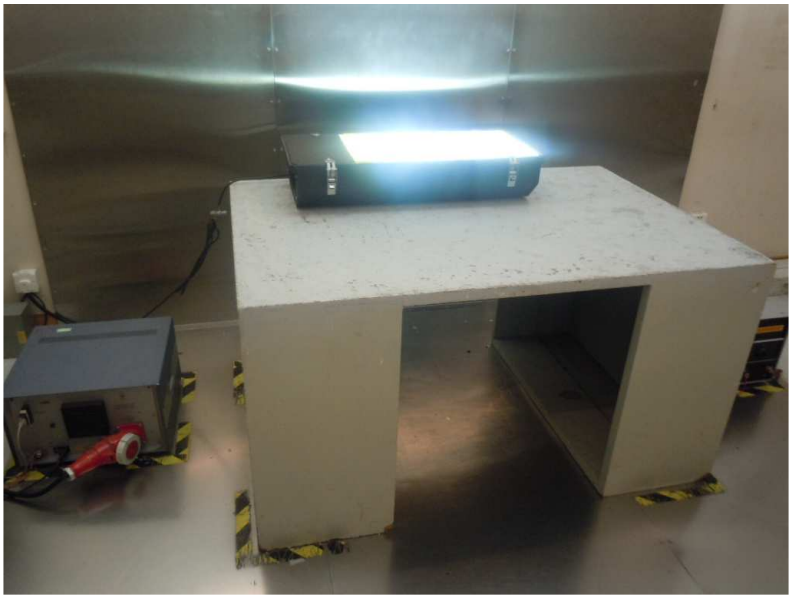


Final quasi-peak measurement results:

	Freq	Level	Read Level	Antenna Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV/m	dBuV	dB/m	dB	dBuV/m	dB	
1	59.10	32.47	22.24	9.07	1.16	40.00	-7.53	QP
2	97.90	36.14	23.03	11.28	1.83	43.50	-7.36	QP
3	121.18	28.68	15.66	10.99	2.03	43.50	-14.82	QP

5 Photographs of the Test Set-Up

Photograph 1: Set-up for conducted emission



Photograph 2: Set-up for radiated emission

9kHz-30MHz

30-1000MHz

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