EMC TEST REPORT

Authorized under **D**eclaration **o**f **C**onformity

According to

EN 55032: 2012+AC:2013(Class B)

CISPR 32 : 2012

AS/NZS CISPR 32 : 2013

EN 61000-3-2 : 2014

EN 61000-3-3 : 2013

Applicant	:	TPV Electronics (Fujian) Co., Ltd.
Address	:	Shangzheng, Yuanhong Road, Fuqing City, Fujian Province, P.R.China
Equipment	:	LCD Monitor
Model No.	:	270LM00009;E2770*** (The "*" could be any alphanumeric character including blank for marketing differentiation.)

I HEREBY CERTIFY THAT :

The sample was received on Dec. 05, 2016 and the testing was carried out on Dec.15, 2016 at Cerpass Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of Cerpass Technology Corp., the test report shall not be reproduced except in full.

EMC TEST REPORT

Issued by:

Cerpass Technology (Suzhou) Co.,Ltd

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The test record, data evaluation & Equipment Under Test configurations represented herein are true and accurate accounts of the measurements of the samples EMC characteristics under the conditions specified in this report.

The above equipment was tested by Cerpass Technology Corp. for compliance with the requirements of technical standards specified above under the EMC Directive. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties

Approved by:

Miro Chueh
EMC/RF B.U. Manager

Laboratory Accreditation:

☐ Cerpass Technology Corporation Test Laboratory

NVLAP LAB Code:	**200954-0**
TAF LAB Code:	**1439**

☒ Cerpass Technology(SuZhou) Co., Ltd.

NVLAP LAB Code:	**200814-0**
CNAS LAB Code:	**L5515**

Contents

History of this test report

■ ORIGINAL.

☐ Additional attachment as following record:

Report No	Version	Date	Description
SECE1612011	Rev 01	Dec 22, 2016	Initial Issue

1. Summary of Test Procedure and Test Results

EMISSION【EN55032】			
Standard	**Item**	**Result**	**Remarks**
EN 55032: 2012+AC:2013 AS/NZS CISPR 32 : 2013 CISPR 32 : 2012	Conducted (Power Port)	PASS	Meet Class B Limit Minimum passing margin(AV) is -10.79 dB at 0.5620 MHz
	Conducted (Telecom port)	PASS	N/A
	Radiated	PASS	Meets Class B Limit Minimum passing margin(Peak) is -5.49 dB at 809.3200 MHz
EN 61000-3-2: 2014	Harmonic current emissions	PASS	Meet Class D Limit
EN61000-3-3:2013	Voltage fluctuations & flicker	PASS	Meets the requirements

2. Test Configuration of Equipment under Test

2.1. Feature of Equipment under Test

Product Name:	LCD Monitor
Model Name:	270LM00009;E2770*** (The "*" could be any alphanumeric character including blank for marketing differentiation.)
Power Cable:	Non-shielding, 1.2m&1.5m&1.8m

Note: Please refer to user manual.

2.2. Test Manner

a. During testing, the interface cables and equipment positions were varied according to Europe Standard.
b. The complete test system includes PC, Keyboard, Mouse and EUT for EMC test.
c. The Pre-test mode of conduction test as follow:
Mode 1: Full system (HDMI2 mode 1920*1080@60Hz) (110V/60Hz)
Mode 2: Full system (HDMI2 mode 1920*1080@60Hz) (230V/50Hz)
The final mode of conduction test as follow
Mode 1: Full system (HDMI2 mode 1920*1080@60Hz) (110V/60Hz)
Mode 2: Full system (HDMI2 mode 1920*1080@60Hz) (230V/50Hz)

The Pre-test mode of radiation (30MHz-1000MHz) test as follow:
Mode 1: Full system (VGA mode 1920*1080@60Hz) (110V/60Hz)
Mode 2: Full system (VGA mode 1920*1080@60Hz) (230V/50Hz)
The final mode of radiation (30MHz-1000MHz) test as follow
Mode 1: Full system (VGA mode 1920*1080@60Hz) (110V/60Hz)
Mode 2: Full system (VGA mode 1920*1080@60Hz) (230V/50Hz)

The Pre-test mode of radiation (1000MHz-6000MHz) test as follow:
Mode 1: Full system (HDMI2 mode 1920*1080@60Hz) (110V/60Hz)
Mode 2: Full system (HDMI2 mode 1920*1080@60Hz) (230V/50Hz)
The final mode of radiation (1000MHz-6000MHz) test as follow
Mode 1: Full system (HDMI2 mode 1920*1080@60Hz) (110V/60Hz)
Mode 2: Full system (HDMI2 mode 1920*1080@60Hz) (230V/50Hz)
The Pre-test mode of H&F test as follow:
Mode 1: Full system (VGA mode 1920*1080@60Hz)
The final mode of H&F test as follow
Mode 1: Full system (VGA mode 1920*1080@60Hz)

2.3. Description of Support Unit

No.	Device	Manufacturer	Model No.	Description
1	PC	DELL	DCMF	N/A
2	USB Keyboard	DELL	SK-8115	N/A
3	USB Mouse	DELL	G0K02XYK	N/A

No.	Cable	Quantity	Description
A	VGA Cable	1	Shielded, 1.5m&1.8m&1.2m, with two ferrites core bonded
B	DVI Cable	1	Shielded, 1.5m&1.8m&1.2m, with two ferrites core bonded
C	Audio Cable	1	Shielded, 1.5m&1.8m&1.2m
D	USB Cable	1	Shielded, 1.8m, with one ferrite core bonded
E	USB Cable	1	Shielded, 1.2m

2.4. General Information of Test

☐	Test Site	**Cerpass Technology Corporation Test Laboratory** Address: No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan City 33848, Taiwan (R.O.C.) Tel:+886-3-3226-888 Fax:+886-3-3226-881 Address: No.68-1, Shihbachongsi, Shihding Township, New Taipei City 223, Taiwan, R.O.C. Tel: +886-2-2663-8582
	FCC	TW1079, TW1061,390316, 228391, 641184
	IC	4934B-1, 4934E-1, 4934E-2
	VCCI	T-2205 for Telecommunication Test C-4663 for Conducted emission test R-3428, R-4218 for Radiated emission test G-812, G-813 for radiated disturbance above 1GHz
☒	Test Site	**Cerpass Technology (Suzhou) Co.,Ltd** Address: No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China Tel: +86-512-6917-5888 Fax: +86-512-6917-5666
	FCC	331395
	IC	7290A-1, 7290A-2
	VCCI	T-1945 for Telecommunication Test C-2919 for Conducted emission test R-2670 for Radiated emission test G-227 for radiated disturbance above 1GHz
Frequency Range Investigated:		Conducted: from 150kHz to 30 MHz Radiation: from 30 MHz to 6000MHz
Test Distance :		The test distance of radiated emission below 1GHz from antenna to EUT is 10 M. The test distance of radiated emission above 1GHz from antenna to EUT is 3 M.

2.5. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Uncertainty
Conducted emissions(LINE)	9KHz-30MHz	+/- 0.7738 dB
Conducted emissions(NEUTRAL)	9KHz-30MHz	+/- 0.7886 dB
Conducted emissions(10Mbps)	150KHz-30MHz	+/- 1.3013dB
Conducted emissions(100Mbps)	150KHz-30MHz	+/- 1.3197 dB
Conducted emissions(1000Mbps)	150KHz-30MHz	+/- 1.2987 dB

Measurement	Polarity	Frequency	Uncertainty
Radiated emissions (below 1GHz)	H	30MHz ~ 200MHz	+/- 3.8909dB
		200MHz ~1000MHz	+/- 3.6555dB
	V	30MHz ~ 200MHz	+/- 3.8948dB
		200MHz ~1000MHz	+/- 3.6538dB
Radiated emissions (above 1GHz)	H	1000MHz ~18000MHz	+/- 3.8948 dB
		18000MHz ~40000MHz	+/-3.8844dB
	V	1000MHz ~18000MHz	+/- 3.8906dB
		18000MHz ~40000MHz	+/- 3.8744dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Consistent with industry standard (e.g. CISPR 22: 2008, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.

3. Test of Conducted Emission

3.1. Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 kHz and return leads of the EUT according to the methods defined in European Standard EN 55032.

Table A.8 – Requirements for conducted emissions from the AC mains power ports of Class A equipment

Applicable to 1. AC mains power ports (3.1.1)				
Table clause	**Frequency range** MHz	**Coupling device** (see Table A.7)	**Detector type / bandwidth**	**Class A limits dB(µV)**
A8.1	0,15 – 0,5	AMN	Quasi Peak / 9 kHz	79
	0,5 – 30			73
A8.2	0,15 – 0,5	AMN	Average / 9 kHz	66
	0,5 – 30			60
NOTE Apply A8.1 and A8.2 across the entire frequency range.				

Table A.9 – Requirements for conducted emissions from the AC mains power ports of Class B equipment

Applicable to 1. AC mains power ports (3.1.1)				
Table clause	**Frequency range** MHz	**Coupling device** (see Table A.7)	**Detector type / bandwidth**	**Class B limits dB(µV)**
A9.1	0,15 – 0,5	AMN	Quasi Peak / 9 kHz	66 – 56
	0,5 – 5			56
	5 – 30			60
A9.2	0,15 – 0,5	AMN	Average / 9 kHz	56 – 46
	0,5 – 5			46
	5 – 30			50
NOTE Apply A9.1 and A9.2 across the entire frequency range.				

Table A.10 – Requirements for asymmetric mode conducted emissions from Class A equipment

Applicable to

1. wired network ports (3.1.30)
2. optical fibre ports (3.1.24) with metallic shield or tension members
3. antenna ports (3.1.3)

Table clause	Frequency range MHz	Coupling device (see Table A.7)	Detector type / bandwidth	Class A voltage limits dB(µV)	Class A current limits dB(µA)
A10.1	0,15 – 0,5	AAN	Quasi Peak / 9 kHz	97 – 87	n/a
	0,5 – 30			87	
	0,15 – 0,5	AAN	Average / 9 kHz	84 – 74	
	0,5 – 30			74	
A10.2	0,15 – 0,5	CVP and current probe	Quasi Peak / 9 kHz	97 – 87	53 – 43
	0,5 – 30			87	43
	0,15 – 0,5	CVP and current probe	Average / 9 kHz	84 – 74	40 – 30
	0,5 – 30			74	30
A10.3	0,15 – 0,5	Current Probe	Quasi Peak / 9 kHz	n/a	53 – 43
	0,5 – 30				43
	0,15 – 0,5	Current Probe	Average / 9 kHz		40 – 30
	0,5 – 30				30

NOTE 1 The choice of coupling device and measurement procedure is defined in Annex C.

NOTE 2 AC mains power ports shall meet the limits given in Table A.8.

NOTE 3 The test shall cover the entire frequency range.

NOTE 4 The application of the voltage and/or current limits is dependent on the measurement procedure used. Refer to Table C.1 for applicability.

NOTE 5 Testing is required at only one EUT supply voltage and frequency.

NOTE 6 Applicable to ports listed above and intended to connect to cables longer than 3 m.

Table A.11 – Requirements for asymmetric mode conducted emissions from Class B equipment

Applicable to

1. wired network ports (3.1.30)
2. optical fibre ports (3.1.24) with metallic shield or tension members
3. broadcast receiver tuner ports (3.1.8)
4. antenna ports (3.1.3)

Table clause	Frequency range MHz	Coupling device (see Table A.7)	Detector type / bandwidth	Class B voltage limits dB(µV)	Class B current limits dB(µA)
A11.1	0,15 – 0,5	AAN	Quasi Peak / 9 kHz	84 – 74	n/a
	0,5 – 30			74	
	0,15 – 0,5	AAN	Average / 9 kHz	74 – 64	
	0,5 – 30			64	
A11.2	0,15 – 0,5	CVP and current probe	Quasi Peak / 9 kHz	84 – 74	40 – 30
	0,5 – 30			74	30
	0,15 – 0,5	CVP and current probe	Average / 9 kHz	74 – 64	30 – 20
	0,5 – 30			64	20
A11.3	0,15 – 0,5	Current Probe	Quasi Peak / 9 kHz	n/a	40 – 30
	0,5 – 30				30
	0,15 – 0,5	Current Probe	Average / 9 kHz		30 – 20
	0,5 – 30				20

NOTE 1 The choice of coupling device and measurement procedure is defined in Annex C.

NOTE 2 Screened ports including TV broadcast receiver tuner ports are tested with a common-mode impedance of 150 Ω. This is typically accomplished with the screen terminated by 150 Ω to earth.

NOTE 3 AC mains power ports shall meet the limits given in Table A.**9**.

NOTE 4 The test shall cover the entire frequency range.

NOTE 5 The application of the voltage and/or current limits is dependent on the measurement procedure used. Refer to Table C.1 for applicability.

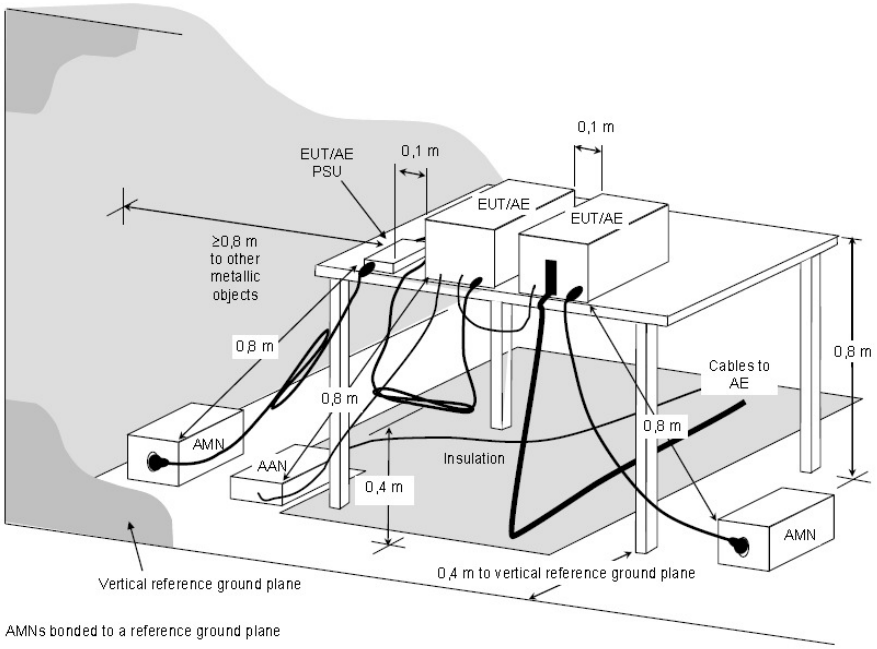
NOTE 6 Testing is required at only one EUT supply voltage and frequency.

NOTE 7 Applicable to ports listed above and intended to connect to cables longer than 3 m.

3.2. Test Procedures

a. The EUT was placed on a desk 0.8 meters height from the metal ground plane and 0.4 meter from the conducting wall of the shielding room and it was kept at least 0.8 meters from any other grounded conducting surface.
b. Connect EUT to the power mains through a Artificial Mains Network (AMN).
c. All the support units are connecting to the other AMN.
d. The AMN provides 50 ohm coupling impedance for the measuring instrument.
e. The CISPR states that a 50 ohm, 50 micro-Henry AMN should be used.
f. Both sides of AC line were checked for maximum conducted interference.
g. The frequency range from 150 kHz to 30 MHz was searched
h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

3.3. Typical Test Setup



NOTE The 0,8 m distance specified between EUT/AE/PSU and AMN/AAN, is applicable only to the EUT being measured. If the device is AE then it shall be ≥0,8 m.

Figure D.2 – Example measurement arrangement for table-top EUT (Conducted emission measurement – alternative 1)

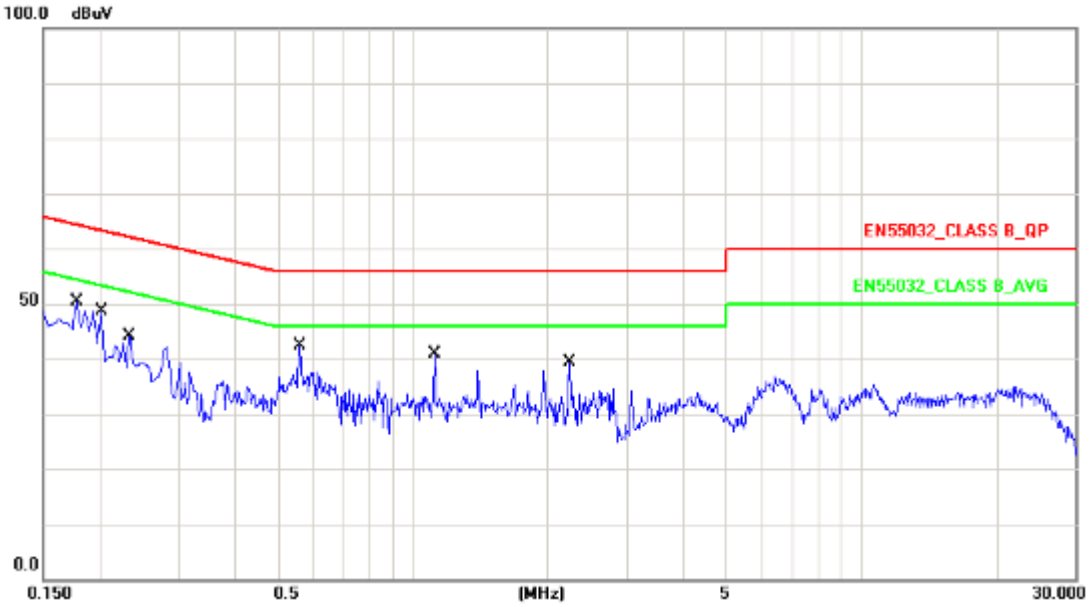
3.4. Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
Test Receiver	R&S	ESCI	100565	2016.07.07	2017.07.06
AMN	R&S	ESH2-Z5	100182	2016.08.31	2017.08.30
Two-Line V-Network	R&S	ENV216	100325	/	/
ISN	FCC	FCC-TLISN-T2-02	20379	2016.03.26	2017.03.25
ISN	FCC	FCC-TLISN-T4-02	20380	2016.06.24	2017.06.24
ISN	FCC	FCC-TLISN-T8-02	20381	2016.03.26	2017.03.25
ISN	TESEQ	ISN ST08	30175	2016.03.26	2017.03.25
Current Probe	R&S	EZ-17	100303	2016.03.26	2017.03.25
Passive Voltage Probe	R&S	ESH2-Z3	100026	2016.03.26	2017.03.25
Pulse Limiter	R&S	ESH3-Z2	100529	2016.03.26	2017.03.25
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-004	2016.03.29	2017.03.28
EZ-EMC	Fala	Ver CT3A1	N/A	N/A	N/A

3.5. Test Result and Data

3.5.1 Conducted Emission for Power Port Test Data

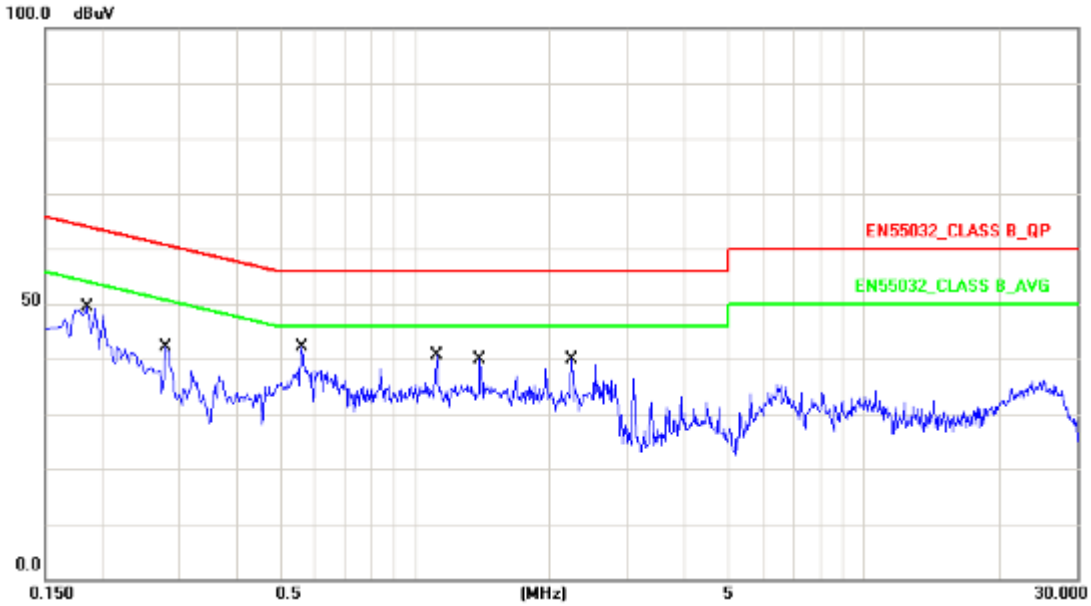
Test Mode :	Mode 1: Full system (HDMI2 mode 1920*1080@60Hz) (110V/60Hz)		
AC Power :	AC 110V/60Hz	Phase :	LINE
Equipment :	LCD Monitor	Model No :	E2770SH
Temperature :	23°C	Humidity :	50%
Pressure(mbar) :	1001	Date:	2016/12/15



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1780	10.12	35.87	45.99	64.57	-18.58	QP
2	0.1780	10.12	22.21	32.33	54.57	-22.24	AVG
3	0.2020	10.12	31.87	41.99	63.52	-21.53	QP
4	0.2020	10.12	14.21	24.33	53.52	-29.19	AVG
5	0.2340	10.12	26.75	36.87	62.30	-25.43	QP
6	0.2340	10.12	11.53	21.65	52.30	-30.65	AVG
7	0.5620	10.16	29.58	39.74	56.00	-16.26	QP
8	0.5620	10.16	25.13	35.29	46.00	-10.71	AVG
9	1.1220	10.16	26.89	37.05	56.00	-18.95	QP
10	1.1220	10.16	23.45	33.61	46.00	-12.39	AVG
11	2.2420	10.17	26.66	36.83	56.00	-19.17	QP
12	2.2420	10.17	23.08	33.25	46.00	-12.75	AVG

Note: Measurement Level = Reading Level + Correct Factor

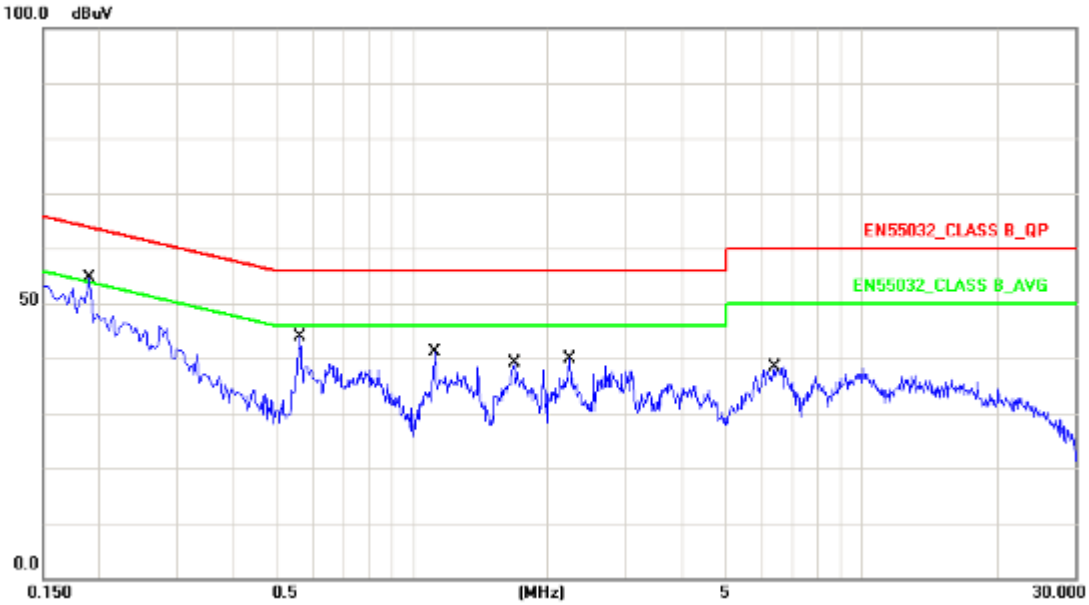
Test Mode :	Mode 1: Full system (HDMI2 mode 1920*1080@60Hz) (110V/60Hz)		
AC Power :	AC 110V/60Hz	Phase :	NEUTRAL
Equipment :	LCD Monitor	Model No :	E2770SH
Temperature :	23°C	Humidity :	50%
Pressure(mbar) :	1001	Date:	2016/12/15



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1860	10.13	36.05	46.18	64.21	-18.03	QP
2	0.1860	10.13	23.37	33.50	54.21	-20.71	AVG
3	0.2779	10.14	29.39	39.53	60.88	-21.35	QP
4	0.2779	10.14	26.29	36.43	50.88	-14.45	AVG
5	0.5620	10.15	29.44	39.59	56.00	-16.41	QP
6	0.5620	10.15	24.78	34.93	46.00	-11.07	AVG
7	1.1220	10.18	27.36	37.54	56.00	-18.46	QP
8	1.1220	10.18	23.53	33.71	46.00	-12.29	AVG
9	1.4020	10.18	26.26	36.44	56.00	-19.56	QP
10	1.4020	10.18	22.05	32.23	46.00	-13.77	AVG
11	2.2460	10.18	25.27	35.45	56.00	-20.55	QP
12	2.2460	10.18	21.48	31.66	46.00	-14.34	AVG

Note: Measurement Level = Reading Level + Correct Factor

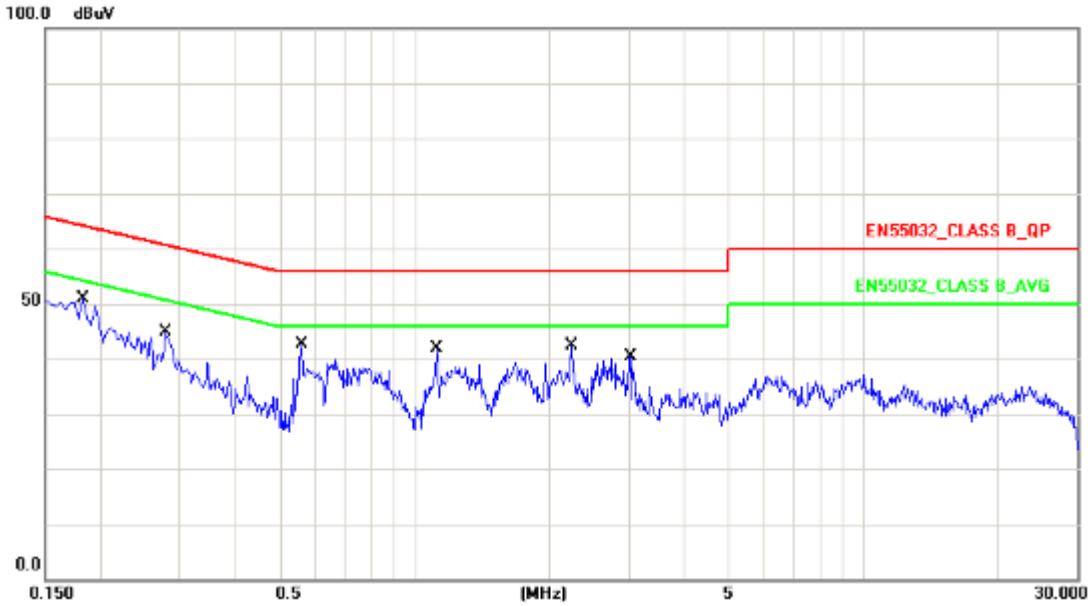
Test Mode :	Mode 2: Full system (HDMI2 mode 1920*1080@60Hz) (230V/50Hz)		
AC Power :	AC 230V/50Hz	Phase :	LINE
Equipment :	LCD Monitor	Model No :	E2770SH
Temperature :	23°C	Humidity :	50%
Pressure(mbar) :	1001	Date:	2016/12/15



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1900	10.12	35.03	45.15	64.03	-18.88	QP
2	0.1900	10.12	20.51	30.63	54.03	-23.40	AVG
3	0.5620	10.16	28.79	38.95	56.00	-17.05	QP
4	0.5620	10.16	24.61	34.77	46.00	-11.23	AVG
5	1.1180	10.16	27.48	37.64	56.00	-18.36	QP
6	1.1180	10.16	23.46	33.62	46.00	-12.38	AVG
7	1.6820	10.17	23.21	33.38	56.00	-22.62	QP
8	1.6820	10.17	17.09	27.26	46.00	-18.74	AVG
9	2.2420	10.17	26.23	36.40	56.00	-19.60	QP
10	2.2420	10.17	22.00	32.17	46.00	-13.83	AVG
11	6.3900	10.25	20.57	30.82	60.00	-29.18	QP
12	6.3900	10.25	11.97	22.22	50.00	-27.78	AVG

Note: Measurement Level = Reading Level + Correct Factor

Test Mode :	Mode 2: Full system (HDMI2 mode 1920*1080@60Hz) (230V/50Hz)		
AC Power :	AC 230V/50Hz	Phase :	NEUTRAL
Equipment :	LCD Monitor	Model No :	E2770SH
Temperature :	23°C	Humidity :	50%
Pressure(mbar) :	1001	Date:	2016/12/15



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1819	10.13	36.27	46.40	64.39	-17.99	QP
2	0.1819	10.13	24.92	35.05	54.39	-19.34	AVG
3	0.2779	10.14	31.19	41.33	60.88	-19.55	QP
4	0.2779	10.14	27.24	37.38	50.88	-13.50	AVG
5	0.5620	10.15	28.23	38.38	56.00	-17.62	QP
6	0.5620	10.15	23.53	33.68	46.00	-12.32	AVG
7	1.1220	10.18	26.34	36.52	56.00	-19.48	QP
8	1.1220	10.18	21.69	31.87	46.00	-14.13	AVG
9	2.2380	10.18	29.48	39.66	56.00	-16.34	QP
10	2.2380	10.18	25.25	35.43	46.00	-10.57	AVG
11	3.0260	10.20	18.81	29.01	56.00	-26.99	QP
12	3.0260	10.20	7.82	18.02	46.00	-27.98	AVG

Note: Measurement Level = Reading Level + Correct Factor

Test engineer: Sun. Zhang

3.5.2 Conducted Emission for Telecommunication Port Test Data

Note: The EUT doesn't have the telecommunication port.

3.6. Test Photographs of Power Port

Front View

Rear View

4. Test of Radiated Emission

4.1. Test Limit

The EUT shall meet the limits of below Table when measured at the measuring distance R in accordance with the methods described in European Standard EN 55032. If the reading on the measuring receiver shows fluctuations close to the limit, the reading shall be observed for at least 15 s at each measurement frequency; the highest reading shall be recorded, with the exception of any brief isolated high reading, which shall be ignored.

Table 1 – Required highest frequency for radiated measurement

Highest internal frequency (F_x)	Highest measured frequency
$F_x \leq 108$ MHz	1 GHz
108 MHz $< F_x \leq$ 500 MHz	2 GHz
500 MHz $< F_x \leq$ 1 GHz	5 GHz
$F_x >$ 1 GHz	$5 \times F_x$ up to a maximum of 6 GHz
NOTE 1 For FM and TV broadcast receivers, F_x is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies. NOTE 2 F_x is defined in 3.1.19.	

Where the F_x is unknown, the radiated emission measurements shall be performed up to 6 GHz.

Table A.2 – Requirements for radiated emissions at frequencies up to 1 GHz for Class A equipment

Table clause	Frequency range MHz	Measurement		Class A limits dB(µV/m)
		Distance m	Detector type/ bandwidth	OATS/SAC (see Table A.1)
A2.1	30 – 230	10	Quasi Peak / 120 kHz	40
	230 – 1 000			47
A2.2	30 – 230	3		50
	230 – 1 000			57
NOTE Apply only A2.1 or A2.2 across the entire frequency range.				

Table A.3 – Requirements for radiated emissions at frequencies above 1 GHz for Class A equipment

Table clause	Frequency range MHz	Measurement		Class A limits dB(µV/m)
		Distance m	Detector type/ bandwidth	FSOATS (see Table A.1)
A3.1	1 000 – 3 000	3	Average / 1 MHz	56
	3 000 – 6 000			60
A3.2	1 000 – 3 000		Peak / 1 MHz	76
	3 000 – 6 000			80
NOTE Apply A3.1 and A3.2 across the frequency range from 1 000 MHz to the highest required frequency of measurement derived from Table 1.				

Table A.4 – Requirements for radiated emissions at frequencies up to 1 GHz for Class B equipment

Table clause	Frequency range MHz	Measurement		Class B limits dB(µV/m)
		Distance m	Detector type/ bandwidth	OATS/SAC (see Table A.1)
A4.1	30 – 230	10	Quasi Peak / 120 kHz	30
	230 – 1 000			37
A4.2	30 – 230	3		40
	230 – 1 000			47
NOTE Apply only table clause A4.1 or A4.2 across the entire frequency range.				

Table A.5 – Requirements for radiated emissions at frequencies above 1 GHz for Class B equipment

Table clause	Frequency range MHz	Measurement		Class B limits dB(µV/m)
		Distance m	Detector type/ bandwidth	FSOATS (see Table A.1)
A5.1	1 000 – 3 000	3	Average/ 1 MHz	50
	3 000 – 6 000			54
A5.2	1 000 – 3 000		Peak/ 1 MHz	70
	3 000 – 6 000			74
NOTE Apply A5.1 and A5.2 across the frequency range from 1 000 MHz to the highest required frequency of measurement derived from Table 1.				

Table A.6 – Requirements for radiated emissions from FM receivers

Table clause	Frequency range MHz	Measurement		Class B limit dB(µV/m)	
		Distance m	Detector type/ bandwidth	Fundamental	Harmonics
				OATS/SAC (see Table A.1)	OATS/SAC (see Table A.1)
A6.1	30 – 230	10	Quasi peak/ 120 kHz	50	42
	230 – 300				42
	300 – 1 000				46
A6.2	30 – 230	3		60	52
	230 – 300				52
	300 – 1 000				56
NOTE 1 Apply only A.6.1 or A.6.2 across the entire frequency range. NOTE 2 These relaxed limits apply only to emissions at the fundamental and harmonic frequencies of the local oscillator. Signals at all other frequencies shall be compliant with the limits given in Table A.4.					

Table A.12 – Requirements for conducted differential voltage emissions from Class B equipment

Applicable to
1. TV broadcast receiver tuner ports (3.1.8) with an accessible connector
2. RF modulator output ports (3.1.27)
3. FM broadcast receiver tuner ports (3.1.8) with an accessible connector

Table clause	Frequency range MHz	Detector type/ bandwidth	Class B limits dB(μV) 75 Ω			Applicability
			Other	Local Oscillator Fundamental	Local Oscillator Harmonics	
A12.1	30 – 950	For frequencies ≤1 GHz Quasi Peak/ 120 kHz	46	46	46	See NOTE 1
	950 – 2 150		46	54	54	
A12.2	950 – 2 150		46	54	54	See NOTE 2
A12.3	30 – 300		46	54	50	See NOTE 3
	300 – 1 000				52	
A12.4	30 – 300	For frequencies ≥1 GHz Peak/ 1 MHz	46	66	59	See NOTE 4
	300 – 1 000				52	
A12.5	30 – 950		46	76	46	See NOTE 5
	950 – 2 150			n/a	54	

NOTE 1 Television receivers (analogue or digital), video recorders and PC TV broadcast receiver tuner cards working in channels between 30 MHz and 1 GHz, and digital audio receivers.

NOTE 2 Tuner units (not the LNB) for satellite signal reception.

NOTE 3 Frequency modulation audio receivers and PC tuner cards.

NOTE 4 Frequency modulation car radios.

NOTE 5 Applicable to EUTs with RF modulator output ports (for example DVD equipment, video recorders, camcorders and decoders etc.) designed to connect to TV broadcast receiver tuner ports.

NOTE 6 Testing is required at only one EUT supply voltage and frequency.

NOTE 7 The term 'other' refers to all emissions other than the fundamental and the harmonics of the local oscillator.

NOTE 8 The test shall be performed with the device operating at each reception channel.

NOTE 9 The test shall cover the entire frequency range.

4.2. Test Procedures

a. The EUT was placed on a rotatable table top 0.8 meter above ground.
b. The EUT was set 3/10 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
c. The table was rotated 360 degrees to determine the position of the highest radiation.
d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.

4.3. Typical Test Setup

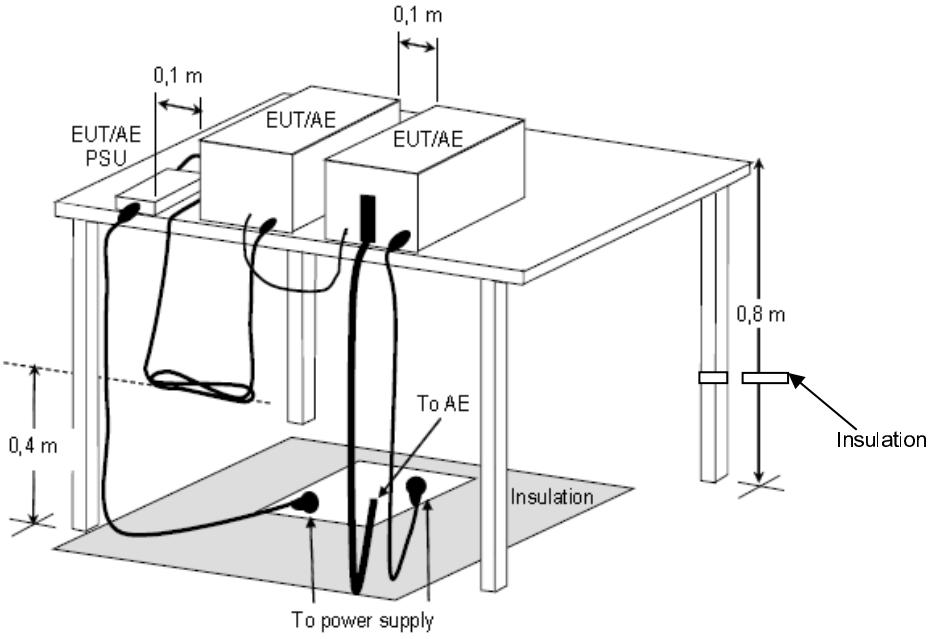


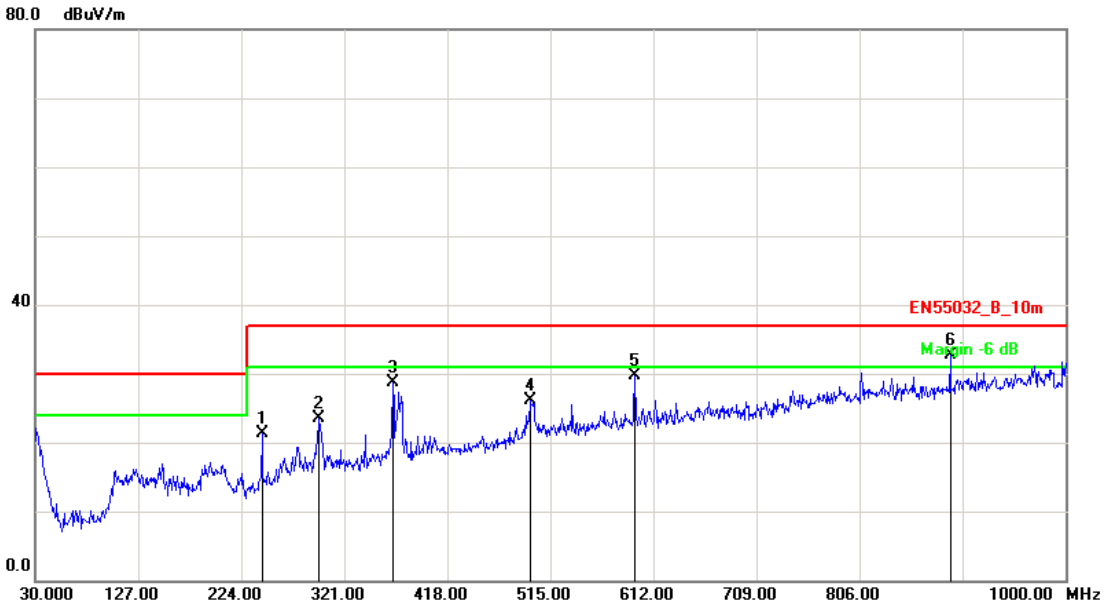
Figure D.8 – Example measurement arrangement for table-top EUT (Radiated emission measurement)

4.4. Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
EMI Test Receiver	R&S	ESCI7	100968	2016.07.21	2017.07.20
Preamplifier	Agilent	87405B	My39500554	2016.03.26	2017.03.25
Preamplifier	Agilent	8449B	3008A02342	2016.03.26	2017.03.25
Bilog Antenna	Sunol Science	JB1	A072414-1	2016.04.16	2017.04.15
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-618	2016.04.16	2017.04.15
Spectrum Analyzer	R&S	FSP40	100324	2016.08.02	2017.08.01
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-001	2016.03.29	2017.03.28
EZ-EMC	Fala	Ver CT3A1	N/A	N/A	N/A

4.5. Test Result and Data (30MHz ~ 1GHz)

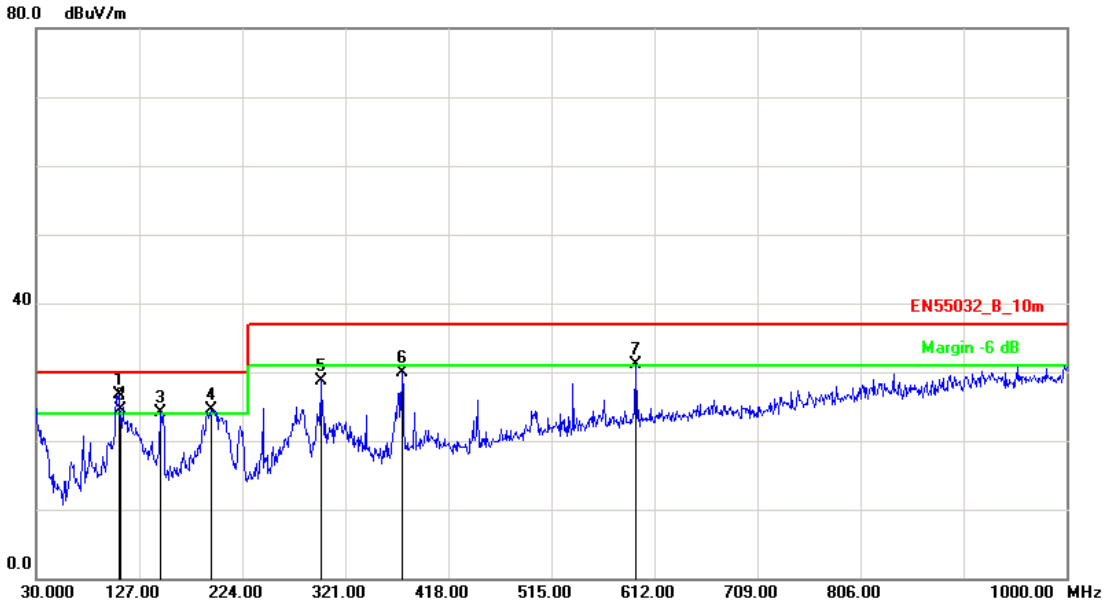
Test Mode :	Mode 1: Full system (VGA mode 1920*1080@60Hz) (110V/60Hz)		
AC Power :	AC 110V/60Hz	Ant. Polarization:	Horizontal
Equipment :	LCD Monitor	Model No :	E2770SH
Temperature :	23°C	Humidity :	50%
Pressure(mbar) :	1001	Date:	2016/12/15



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	243.4000	-10.71	31.99	21.28	37.00	-15.72	peak	400	46
2	296.7500	-8.77	32.34	23.57	37.00	-13.43	peak	400	303
3	366.5899	-6.68	35.41	28.73	37.00	-8.27	peak	400	185
4	495.6000	-3.15	29.33	26.18	37.00	-10.82	peak	400	329
5	594.5399	-1.32	31.11	29.79	37.00	-7.21	peak	100	261
6	891.3600	3.32	29.34	32.66	37.00	-4.34	peak	100	135

Note: Measurement Level = Reading Level + Correct Factor

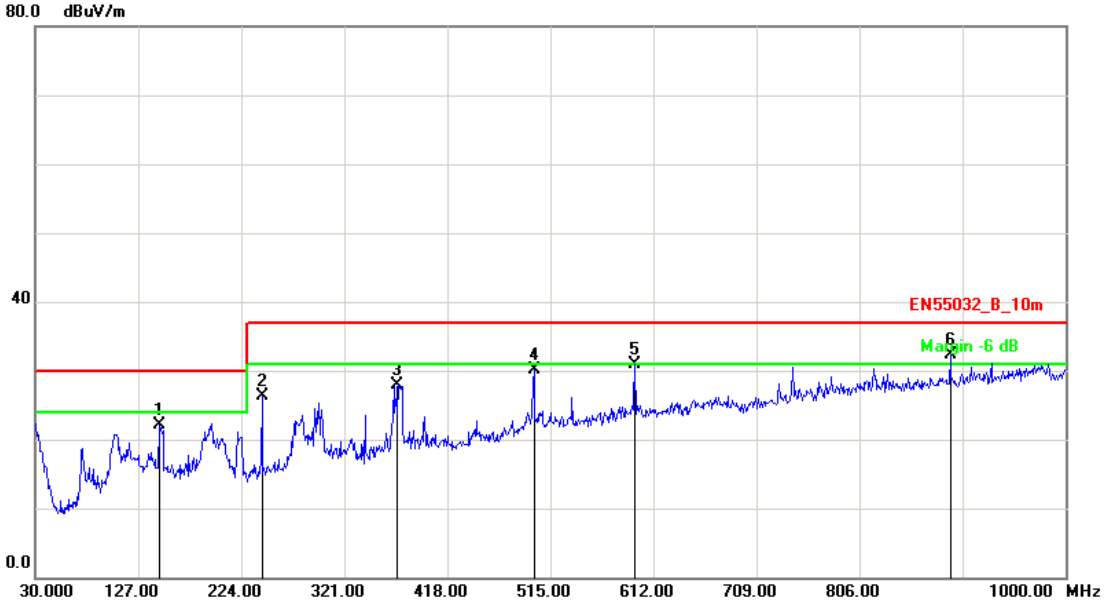
Test Mode :	Mode 1: Full system (VGA mode 1920*1080@60Hz) (110V/60Hz)		
AC Power :	AC 110V/60Hz	Ant. Polarization:	Vertical
Equipment :	LCD Monitor	Model No :	E2770SH
Temperature :	23°C	Humidity :	50%
Pressure(mbar) :	1001	Date:	2016/12/15



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	107.6000	-12.19	38.89	26.70	30.00	-3.30	peak	100	37
2	109.7400	-11.73	36.21	24.48	30.00	-5.52	QP	100	37
3	146.4000	-10.56	34.74	24.18	30.00	-5.82	peak	100	150
4	194.9000	-10.32	34.87	24.55	30.00	-5.45	peak	100	192
5	297.7200	-8.77	37.57	28.80	37.00	-8.20	peak	100	174
6	374.3500	-6.49	36.38	29.89	37.00	-7.11	peak	100	116
7	594.5400	-1.32	32.43	31.11	37.00	-5.89	peak	100	46

Note: Measurement Level = Reading Level + Correct Factor

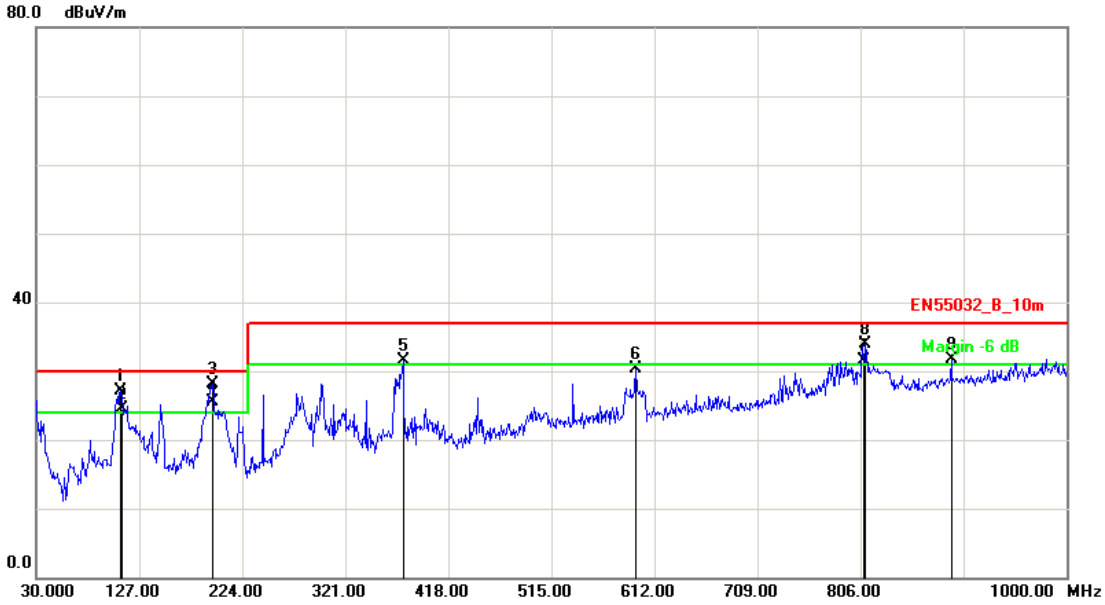
Test Mode :	Mode 2: Full system (VGA mode 1920*1080@60Hz) (230V/50Hz)		
AC Power :	AC 230V/50Hz	Ant. Polarization:	Horizontal
Equipment :	LCD Monitor	Model No :	E2770SH
Temperature :	23°C	Humidity :	50%
Pressure(mbar) :	1001	Date:	2016/12/15



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	146.4000	-10.56	32.67	22.11	30.00	-7.89	peak	400	319
2	243.4000	-10.71	37.01	26.30	37.00	-10.70	peak	400	146
3	371.4399	-6.56	34.49	27.93	37.00	-9.07	peak	400	151
4	499.4800	-3.03	33.06	30.03	37.00	-6.97	peak	100	124
5	594.5399	-1.32	32.32	31.00	37.00	-6.00	peak	100	92
6	891.3600	3.32	29.04	32.36	37.00	-4.64	peak	100	222

Note: Measurement Level = Reading Level + Correct Factor

Test Mode :	Mode 2: Full system (VGA mode 1920*1080@60Hz) (230V/50Hz)		
AC Power :	AC 230V/50Hz	Ant. Polarization:	Vertical
Equipment :	LCD Monitor	Model No :	E2770SH
Temperature :	23°C	Humidity :	50%
Pressure(mbar) :	1001	Date:	2016/12/15

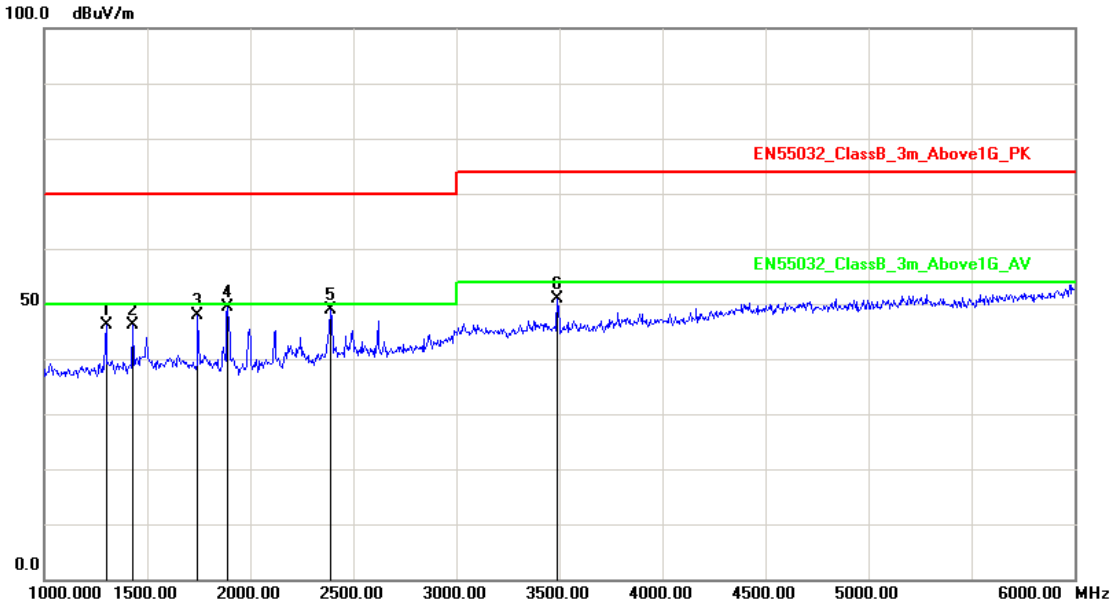


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	109.5400	-11.77	38.78	27.01	30.00	-2.99	peak	100	15
2	110.5700	-11.55	35.97	24.42	30.00	-5.58	QP	100	15
3	195.8700	-10.24	38.29	28.05	30.00	-1.95	peak	100	176
4	196.0200	-10.23	35.73	25.50	30.00	-4.50	QP	100	176
5	375.3200	-6.47	37.97	31.50	37.00	-5.50	peak	400	85
6	594.5400	-1.32	31.70	30.38	37.00	-6.62	peak	100	130
7	809.3200	2.19	29.32	31.51	37.00	-5.49	QP	400	179
8	809.8800	2.20	31.69	33.89	37.00	-3.11	peak	400	179
9	891.3600	3.32	28.33	31.65	37.00	-5.35	peak	400	67

Note: Measurement Level = Reading Level + Correct Factor

4.6. Test Result and Data (1GHz ~ 6GHz)

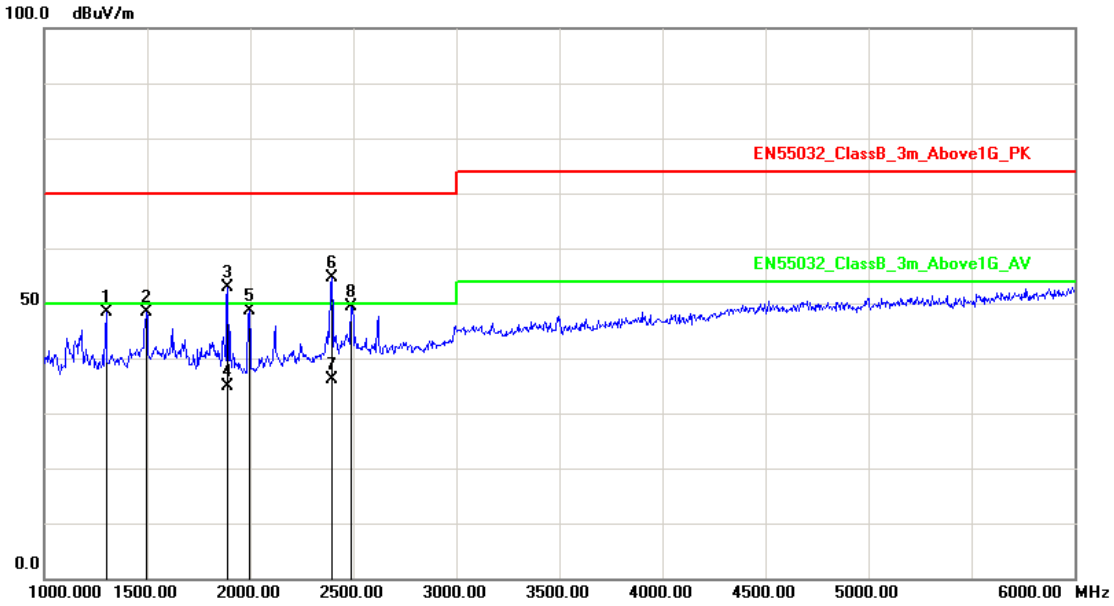
Test Mode :	Mode 1: Full system (HDMI2 mode 1920*1080@60Hz) (110V/60Hz)		
AC Power :	AC 110V/60Hz	Ant. Polarization:	Horizontal
Equipment :	LCD Monitor	Model No :	E2770SH
Temperature :	23°C	Humidity :	50%
Pressure(mbar) :	1001	Date:	2016/12/15



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1300.000	-3.98	50.09	46.11	70.00	-23.89	peak	200	261
2	1430.000	-3.11	49.31	46.20	70.00	-23.80	peak	100	119
3	1745.000	-1.93	49.76	47.83	70.00	-22.17	peak	145	360
4	1890.000	-1.52	51.01	49.49	70.00	-20.51	peak	100	357
5	2390.000	0.79	47.98	48.77	70.00	-21.23	peak	100	0
6	3490.000	5.63	45.21	50.84	74.00	-23.16	peak	100	289

Note: Measurement Level = Reading Level + Correct Factor

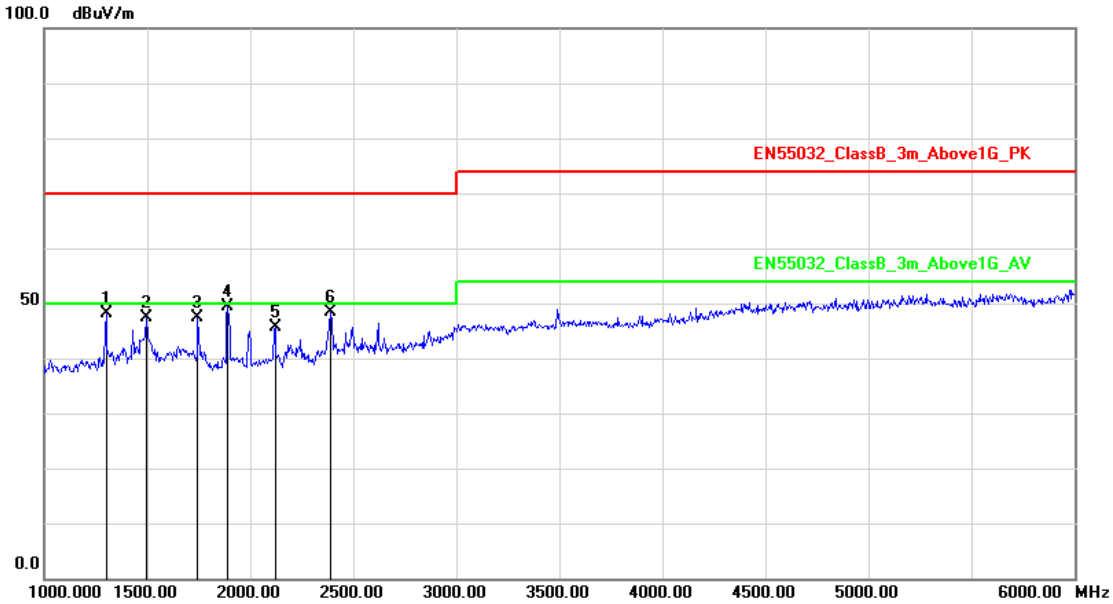
Test Mode :	Mode 1: Full system (HDMI2 mode 1920*1080@60Hz) (110V/60Hz)		
AC Power :	AC 110V/60Hz	Ant. Polarization:	Vertical
Equipment :	LCD Monitor	Model No :	E2770SH
Temperature :	23°C	Humidity :	50%
Pressure(mbar) :	1001	Date:	2016/12/15



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1300.000	-3.98	52.27	48.29	70.00	-21.71	peak	100	192
2	1495.000	-2.67	51.05	48.38	70.00	-21.62	peak	100	358
3	1890.000	-1.52	54.34	52.82	70.00	-17.18	peak	130	360
4	1891.000	-1.51	36.28	34.77	50.00	-15.23	AVG	130	360
5	1995.000	-1.21	49.89	48.68	70.00	-21.32	peak	100	15
6	2395.000	0.81	53.93	54.74	70.00	-15.26	peak	100	356
7	2396.000	0.82	35.19	36.01	50.00	-13.99	AVG	100	356
8	2490.000	1.30	48.10	49.40	70.00	-20.60	peak	100	221

Note: Measurement Level = Reading Level + Correct Factor

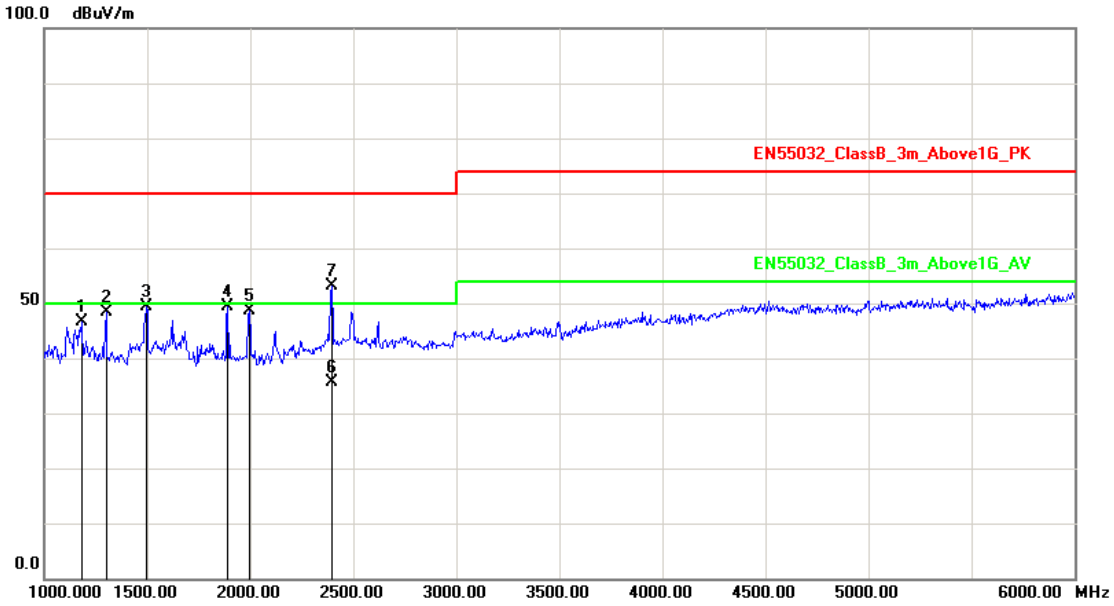
Test Mode :	Mode 2: Full system (HDMI2 mode 1920*1080@60Hz) (230V/50Hz)		
AC Power :	AC 230V/50Hz	Ant. Polarization:	Horizontal
Equipment :	LCD Monitor	Model No :	E2770SH
Temperature :	23°C	Humidity :	50%
Pressure(mbar) :	1001	Date:	2016/12/15



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1300.000	-3.98	52.09	48.11	70.00	-21.89	peak	200	153
2	1495.000	-2.67	50.03	47.36	70.00	-22.64	peak	200	118
3	1745.000	-1.93	49.26	47.33	70.00	-22.67	peak	200	0
4	1890.000	-1.52	51.01	49.49	70.00	-20.51	peak	100	0
5	2120.000	-0.59	46.30	45.71	70.00	-24.29	peak	100	14
6	2390.000	0.79	47.48	48.27	70.00	-21.73	peak	100	216

Note: Measurement Level = Reading Level + Correct Factor

Test Mode :	Mode 2: Full system (HDMI2 mode 1920*1080@60Hz) (230V/50Hz)		
AC Power :	AC 230V/50Hz	Ant. Polarization:	Vertical
Equipment :	LCD Monitor	Model No :	E2770SH
Temperature :	23°C	Humidity :	50%
Pressure(mbar) :	1001	Date:	2016/12/15



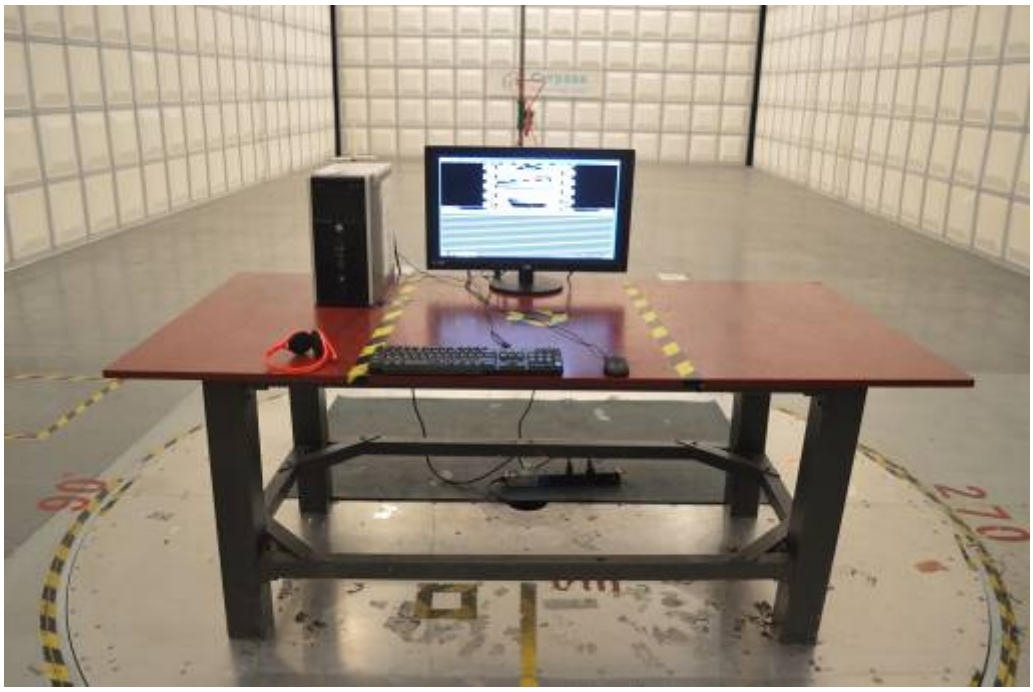
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1180.000	-4.78	51.53	46.75	70.00	-23.25	peak	183	21
2	1300.000	-3.98	52.27	48.29	70.00	-21.71	peak	100	74
3	1495.000	-2.67	52.05	49.38	70.00	-20.62	peak	100	118
4	1890.000	-1.52	50.84	49.32	70.00	-20.68	peak	130	139
5	1995.000	-1.21	49.89	48.68	70.00	-21.32	peak	100	25
6	2394.000	0.81	34.87	35.68	50.00	-14.32	AVG	100	120
7	2395.000	0.81	52.43	53.24	70.00	-16.76	peak	100	154

Note: Measurement Level = Reading Level + Correct Factor

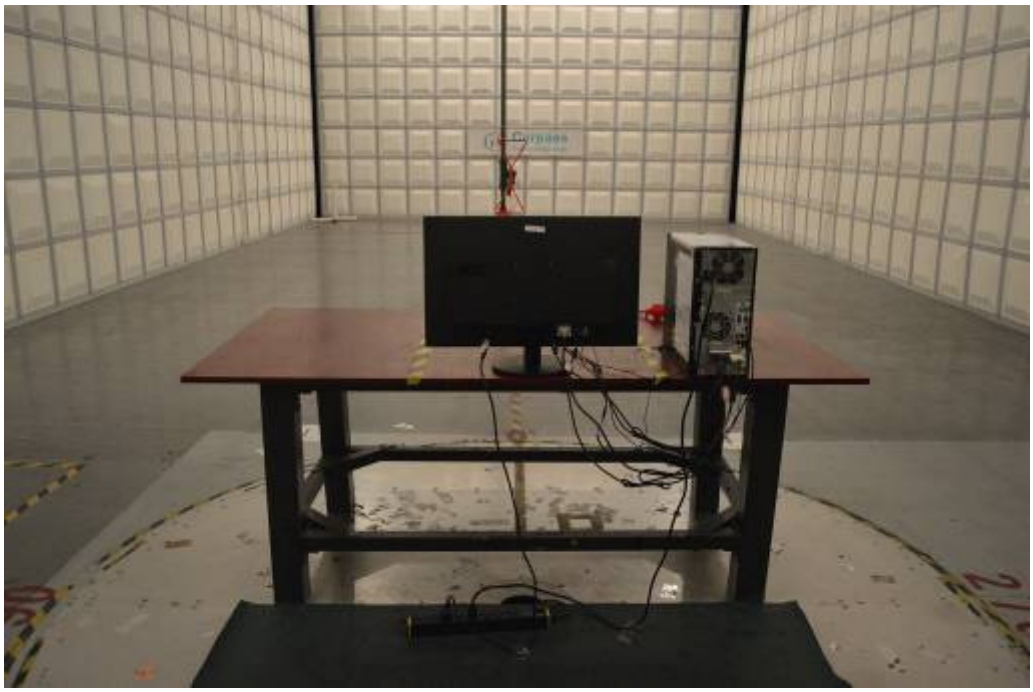
Test engineer: Sun. Zhang

4.7. Test Photographs(30MHz-1GHz)

Front View

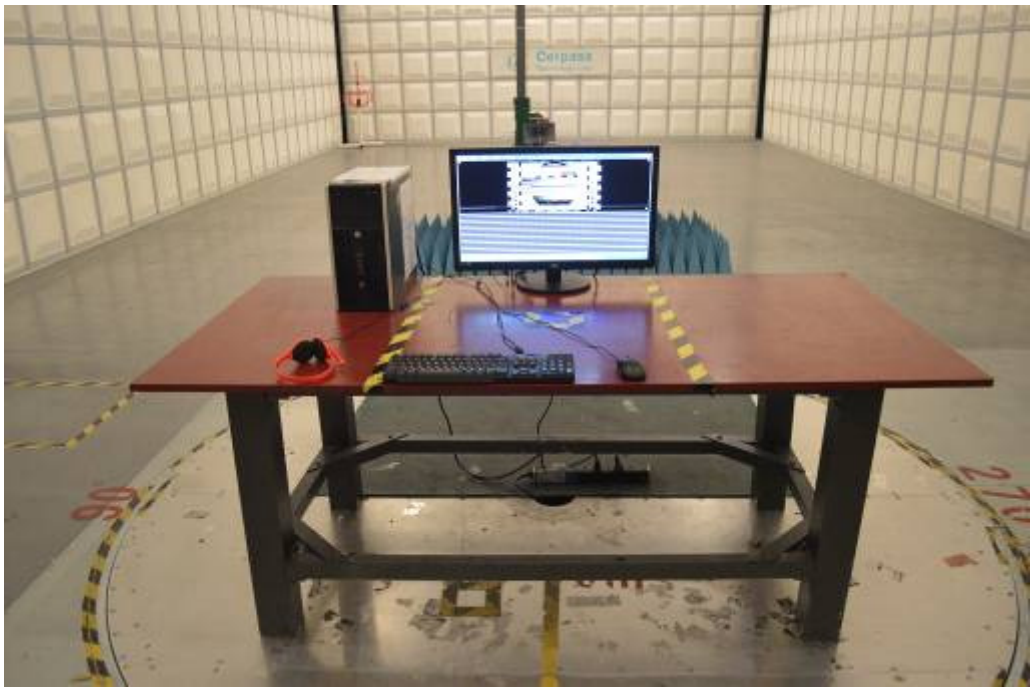


Rear View

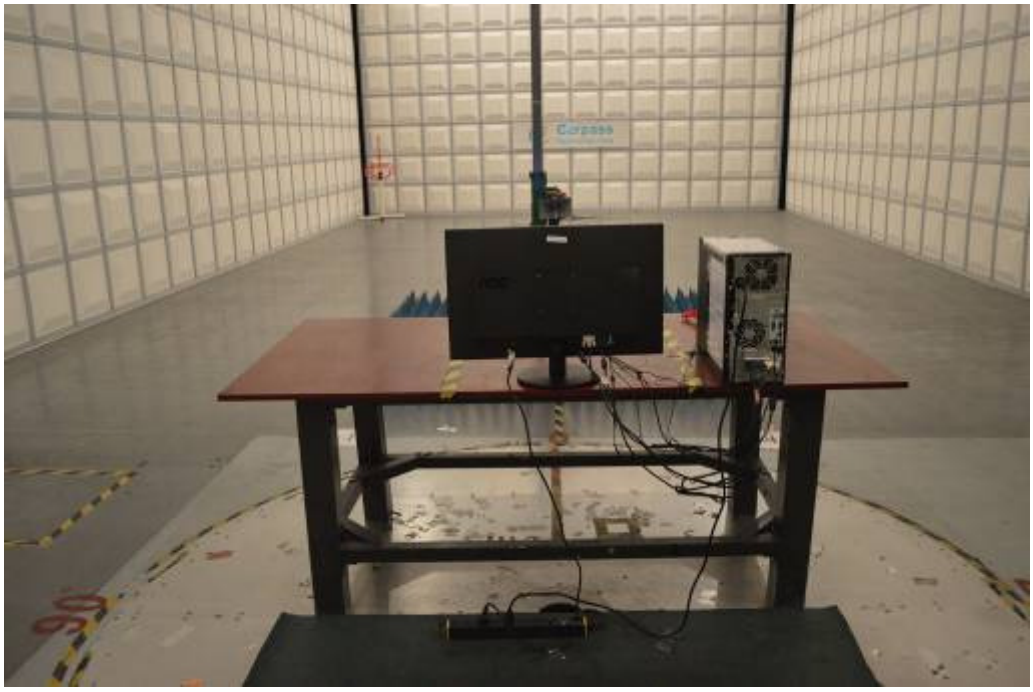


4.8. Test Photographs(1GHz-6GHz)

Front View



Rear View



5. Harmonics Test

5.1. Limits of Harmonics Current Measurement

Limits for Class A equipment

Harmonics Order n	Max. permissible harmonics current A	Harmonics Order n	Max. permissible harmonics current A
Odd harmonics		Even harmonics	
3	2.30	2	1.08
5	1.14	4	0.43
7	0.77	6	0.30
9	0.40	8<=n<=40	0.23x8/n
11	0.33		
13	0.21		
15<=n<=39	0.15x15/n		

(b) Limits for Class B equipment

For Class B equipment, the harmonics of the input current shall not exceed the values given in Table that is the limit of Class A multiplied by a factor of 1,5.

(c) Limits for Class C equipment

Harmonics 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<n<39 (odd harmonics only)	3
* λ is the circuit power factor	

(d) Limits for Class D equipment

Harmonics Order 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
11 < n < 39 (odd harmonics only)	3.85/n	See limit of Class A

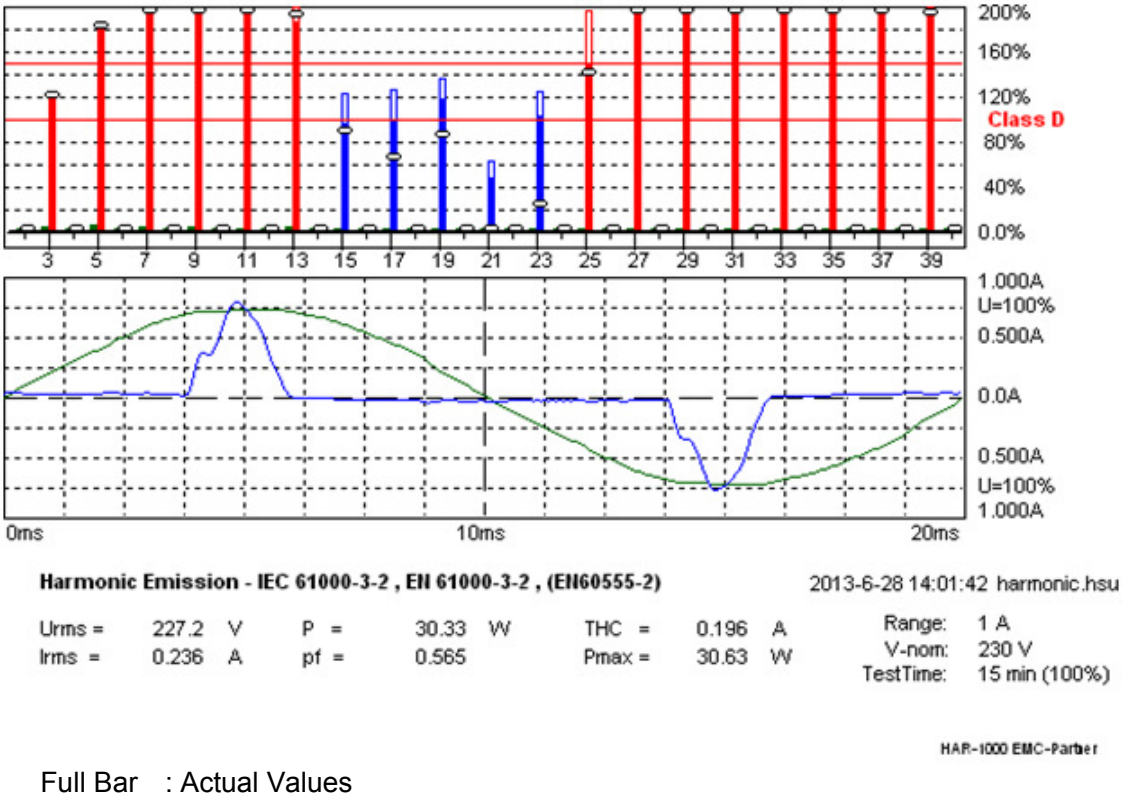
NOTE: According to section 7 of EN 61000-3-2, the above limits for all equipment except for lighting equipment having an active input power > 75 W and no limits apply for equipment with an active input power up to and including 75 W.

5.2. Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
EMC Emission Tester	EMCPARTNER	Harmonics-1000	159	2012.04.20	2013.04.19
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-004	2012.03.12	2013.03.11

5.3. Test Result and Data

Basic Standard	:	EN 61000-3-2
Final Test Result	:	PASS
Test Mode	:	Mode1
Model No.	:	E2770SH
Temperature	:	20℃
Humidity	:	50 %
Atmospheric Pressure	:	100 kPa
Test Date	:	Jun 28, 2013



Full Bar : Actual Values
Empty Bar : Maximum Values
Blue : Current , Green : Voltage , Red : Failed

Urms =	227.2V	Freq =	49.987	Range:	1 A
Irms =	0.236A	Ipk =	0.793A	cf =	3.355
P =	30.33W	S =	53.68VA	pf =	0.565
THDi =	81.6 %	THDu =	2.00 %	Class D	
Test - Time :		15min	(100 %)		
Limit Reference:		Pmax = 30.626W			

Test completed, Result: N/L

Order	Freq. [Hz]	Irms [A]	Irms%L [%]	Imax [A]	Imax%L [%]	Limit [A]	Status
1	50	0.1389		0.1401			
2	100	0.0006		0.0013			
3	150	0.1239	118.99	0.1252	120.28	0.00	N/L
4	200	0.0007		0.0014			
5	250	0.1039	178.63	0.1066	183.24	0.00	N/L
6	300	0.0007		0.0016			
7	350	0.0826	269.84	0.0871	284.39	0.00	N/L
8	400	0.0007		0.0016			
9	450	0.0565	369.08	0.0621	405.75	0.00	N/L
10	500	0.0007		0.0016			
11	550	0.0333	310.32	0.0392	365.55	0.00	N/L
12	600	0.0006		0.0015			
13	650	0.0167	184.38	0.0219	241.58	0.00	N/L
14	700	0.0005		0.0013			
15	750	0.0073	93.174	0.0095	121.13	0.00	N/L
16	800	0.0005		0.0013			
17	850	0.0067	95.918	0.0087	124.96	0.00	N/L
18	900	0.0006		0.0013			
19	950	0.0072	116.05	0.0084	134.74	0.00	N/L
20	1000	0.0006		0.0012			
21	1050	0.0026	45.655	0.0034	59.787	0.00	N/L
22	1100	0.0006		0.0012			
23	1150	0.0051	100.01	0.0063	122.63	0.00	N/L
24	1200	0.0005		0.0012			
25	1250	0.0070	147.53	0.0092	194.11	0.00	N/L
26	1300	0.0004		0.0012			
27	1350	0.0102	233.40	0.0120	275.33	0.00	N/L
28	1400	0.0003		0.0010			
29	1450	0.0089	217.67	0.0121	297.23	0.00	N/L
30	1500	0.0003		0.0012			
31	1550	0.0103	271.19	0.0108	284.03	0.00	N/L
32	1600	0.0004		0.0011			
33	1650	0.0090	252.81	0.0096	268.19	0.00	N/L
34	1700	0.0004		0.0010			
35	1750	0.0089	264.51	0.0095	282.63	0.00	N/L
36	1800	0.0004		0.0009			
37	1850	0.0067	208.76	0.0088	275.80	0.00	N/L
38	1900	0.0003		0.0007			
39	1950	0.0058	191.78	0.0087	286.67	0.00	N/L
40	2000	0.0002		0.0005			

The power of EUT is less than 75W after the testing. According the standard, the equipment with a rated power of 75W or less, other than lighting equipment, limits are not specified in this standard. So the test data needn't list.

Test engineer: 

5.4. Test Photographs

Mode1

6. Voltage Fluctuations Test

6.1. Test Procedure

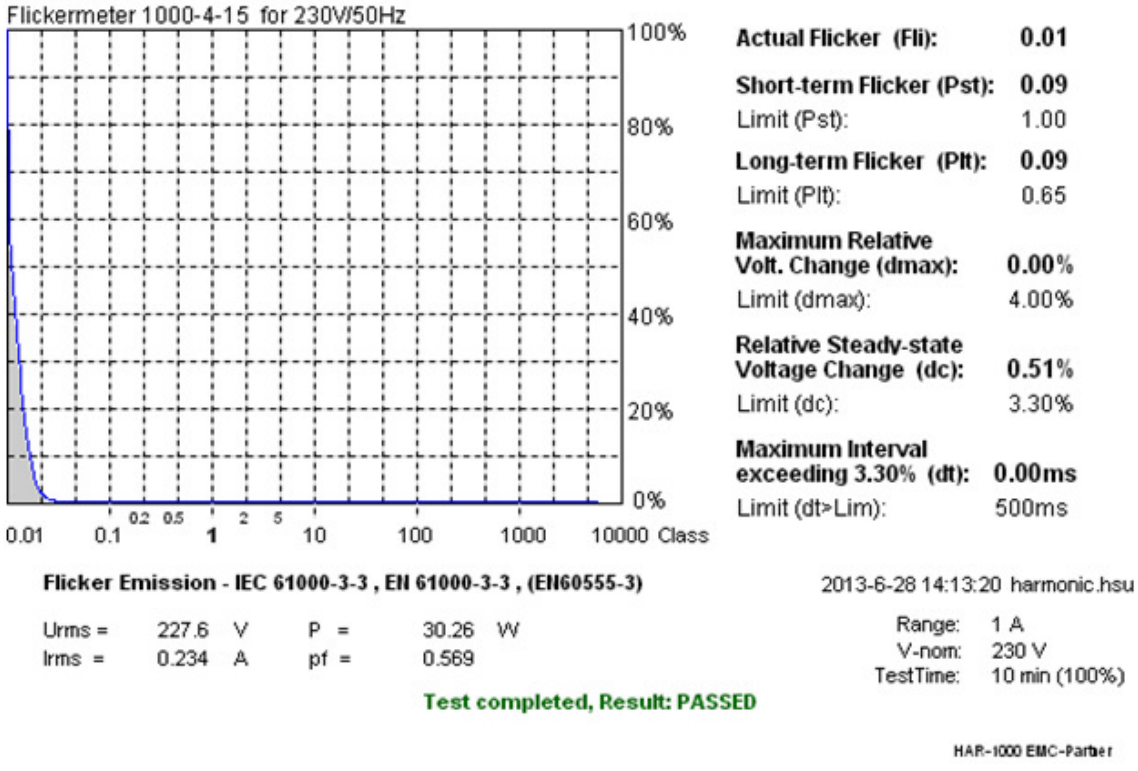
The equipment shall be tested under the conditions of **Clause 5.**
The total impedance of the test circuit, excluding the appliance under test, but including the internal impedance of the supply source, shall be equal to the reference impedance.
The stability and tolerance of the reference impedance shall be adequate to ensure that the overall accuracy of ±8% is achieved during the whole assessment procedure.

6.2. Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
EMC Emission Tester	EMCPARTNER	Harmonics-1000	159	2012.04.20	2013.04.19
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-004	2012.03.12	2013.03.11

6.3. Test Result and Data

Basic Standard	:	EN 61000-3-3
Final Test Result	:	PASS
Test Mode	:	Mode1
Model No.	:	E2770SH
Temperature	:	20℃
Humidity	:	50 %
Atmospheric Pressure	:	100 kPa
Test Date	:	Jun 28, 2013



Full Bar : Actual Values

Empty Bar : Maximum Values

Circles : Average Values

Blue : Current , Green : Voltage , Red : Failed

Urms =	227.6V	Freq =	49.987	Range:	1 A
Irms =	0.234A	Ipk =	0.781A	cf =	3.338
P =	30.26W	S =	53.22VA	pf =	0.569

Test - Time : 1 x 10min = 10min (100 %)

LIN (Line Impedance Network) : No LIN

Limits :	Plt :	0.65	Pst :	1.00	
		dmax :	4.00 %	dc :	3.30 %
		dtLim:	3.30 %	dt>Lim:	500ms

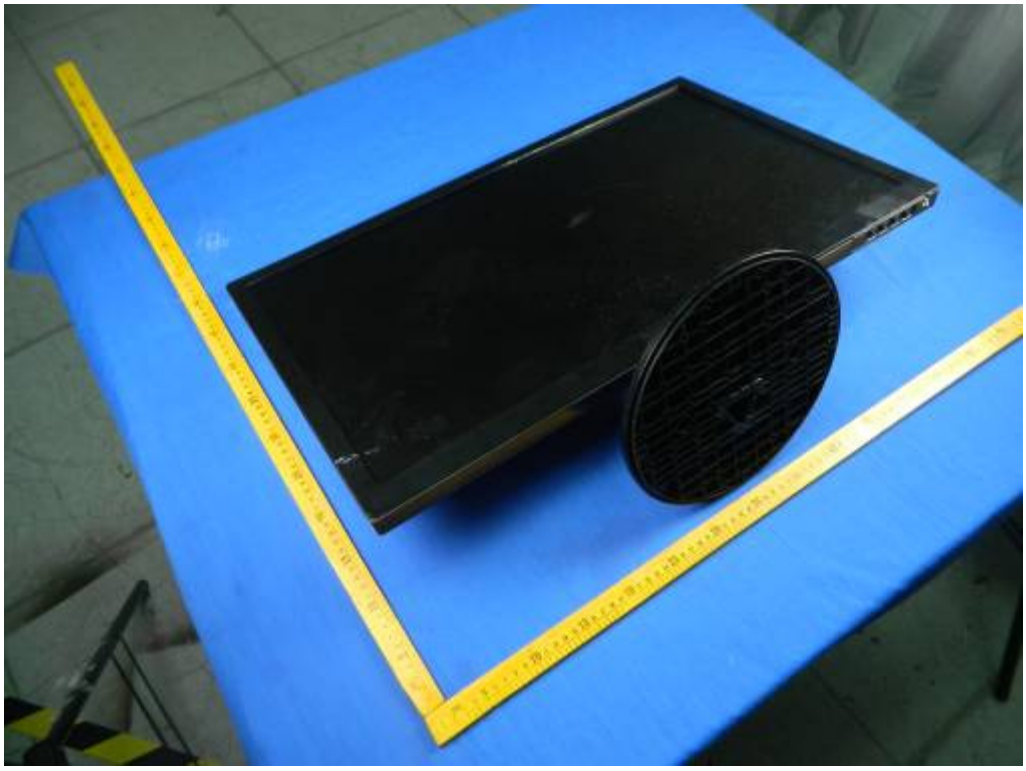
Test completed, Result: PASSED

6.4. Test Photographs

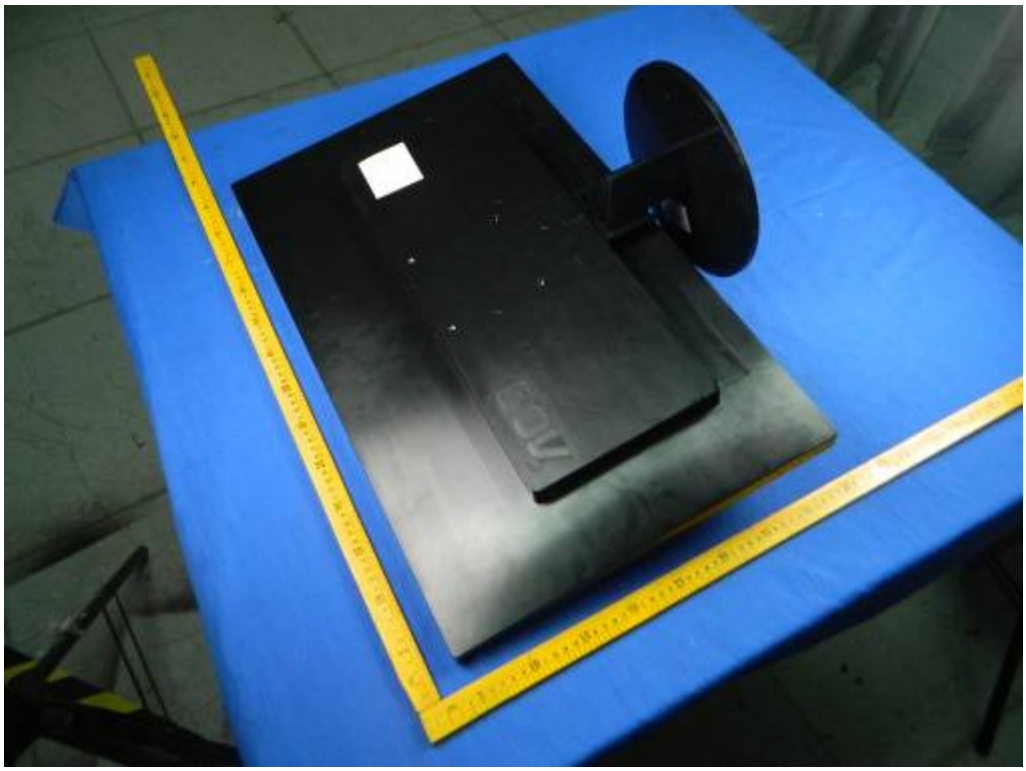
Mode1

7. Photographs of EUT

1) EUT Photo



2) EUT Photo



3) EUT Photo

4) EUT Photo

5) EUT Photo