FCC 47 CFR PART 15 SUBPART B

TEST REPORT

For

Applicant:	**Shenyang Torch-Bigtide Digital Technology Co., Ltd**
Address:	**NO.18-6B ,Yaoyang Road , Huishan Economic Development Area, Shenbei New District, Shenyang,China**
Product Name:	**32 LCD Monitor**
Model Number:	**HL3116ST**
Brand Name:	**N/A**
FCC Number:	**FCC ID: W6532LCD3116ST**
Report No.:	**MTE/TYW/S16122656**
Date of Issue:	**Feb.16, 2017**

Issued by:	**Most Technology Service Co., Ltd.**
Address:	**No.5, Langshan 2nd Rd., North Hi-Tech Industrial park, Nanshan, Shenzhen, Guangdong, China**
Tel:	**86-755-86026850**
Fax:	**86-755-26013350**

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1. VERIFICATION OF CONFORMITY

Equipment Under Test:	32 LCD Monitor
Brand Name:	N/A
Model Number:	HL3116ST
Series Number:	N/A
FCC Number:	FCC ID: W6532LCD3116ST
Applicant:	Shenyang Torch-Bigtide Digital Technology Co., Ltd NO.18-6B ,Yaoyang Road , Huishan Economic Development Area, Shenbei New District, Shenyang,China
Manufacturer:	Shenyang Torch-Bigtide Digital Technology Co., Ltd NO.18-6B ,Yaoyang Road , Huishan Economic Development Area, Shenbei New District, Shenyang,China
Technical Standards:	FCC Part 15 B
File Number:	MTE/TYW/S16122656
Date of test:	Jan.3-Feb.16, 2017
Deviation:	None
Condition of Test Sample:	Normal

The above equipment was tested by MOST for compliance with the requirements set forth in FCC Part 15 and the Technical Standards mentioned above. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment and the level of the immunity endurance of the equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.

Tested by (+ signature): Tammy

Tammy Wang Jan.3-Feb.16, 2017

Review by (+ signature):

John Lin Feb.16, 2017

Approved by (+ signature):

Yvette Zhou(Manager) Feb.16, 2017

2. GENERAL INFORMATION

2.1 PRODUCT INFORMATION

Description:	32 LCD Monitor
Model Name:	HL3116ST
Series Number:	N/A
Model Difference description:	N/A
Power Supply:	DC 24V
Temperature Range:	+10°C ~+35°C

NOTE:

1. For a more detailed features description about the EUT, please refer to User's Manual.

2.2 OBJECTIVE

Perform FCC Part 15 Subpart B tests for FCC Marking.

2.3 TEST STANDARDS AND RESULTS

Test items and the results are as bellow:

EMISSION			
Standard	**Item**	**Result**	**Remarks**
FCC 47 CFR Part 15 Subpart B	Conducted	PASS	Meet Class B limit
	Radiated	PASS	Meet Class B limit

Note: 1. The test result judgment is decided by the limit of measurement standard
2. The information of measurement uncertainty is available upon the customer's request.
3. This device is a 24V DC power supply, can not directly or indirectly access to the AC power network, so do not test AC conduction.

2.4 ENVIRONMENTAL CONDITIONS

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 15-35ºC
- Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

2.5 MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

The report uncertainty of measurement y±U, where expended uncertainly U is based on a standard uncertainty multiplied by a coverage factor of k=2,Providing a level of confidence of approximately 95%

- Uncertainty of Conducted Emission, Uc = ±1.8dB
- Uncertainty of Radiated Emission, Uc = ±3.2dB

3. TEST METHODOLOGY

3. 1TEST FACILITY

Test Site:	Most Technology Service Co., Ltd.
Location:	No.5, Langshan 2nd Rd, North Hi-Tech Industrial park, Nanshan, Shenzhen, Guangdong, China
Description:	There is one 3m semi-anechoic an area test sites and two line conducted labs for final test. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2014 and CISPR 16 requirements. The FCC Registration Number is **490827.** The **CNAS** Registration Number is **CNAS L3573.**
Site Filing:	The site description is on file with the Federal Communications Commission, 7435 Oakland Mills Road, Columbia, MD 21046.
Instrument Tolerance:	All measuring equipment is in accord with ANSI C63.4:2014 and CISPR 16 requirements that meet industry regulatory agency and accreditation agency requirement.
Ground Plane:	Two conductive reference ground planes were used during the Line Conducted Emission, one in vertical and the other in horizontal. The dimensions of these ground planes are as below. The vertical ground plane was placed distancing 40 cm to the rear of the wooden test table on where the EUT and the support equipment were placed during test. The horizontal ground plane projected 50 cm beyond the footprint of the EUT system and distanced 80 cm to the wooden test table. For Radiated Emission Test, one horizontal conductive ground plane extended at least 1m beyond the periphery of the EUT and the largest measuring antenna, and covered the entire area between the EUT and the antenna. It has no holes or gaps having longitudinal dimensions larger than one-tenth of a wavelength at the highest frequency of measurement up to 1GHz.

3.2 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4:2014,Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4:2014.

4 SETUP OF EQUIPMENT UNDER TEST

4.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

4.2 EUT configuration

Interface cables:

Interface cable	Length [m]	Type	Line shielded	Line unshielded	Line termination
Power cord	1.5	three wires	☐	☒	PC
Power cord	1.5	three wires	☐	☒	Printer
DVI Cord	1.8	Video type	☐	☒	PC
DP Cord	1.8	Video type	☐	☒	PC

Peripheral devices:

List out all peripheral not inclued with EuT used during the test

Kind of equipment	Manufacturer	Model no.
Mouse	Lenovo	M-UAE96
Keyboard	HP	SK-2880
PC	Lenovo	SS05750640
Printer	Canon	L11121E
Headphone	SOMC	SM-906

Peripheral adapter:

Device Type	Manufacturer	Model Name	Serial No.	Input	Output
Adapter	FSP GROUP INC.	PSP220-KAAM1	---	100-240V~ 50/60Hz	24V~9.17A

Remark:

All the equipment/cables were placed in the worst-case [-configuration to maximize the emission during the test.

Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use

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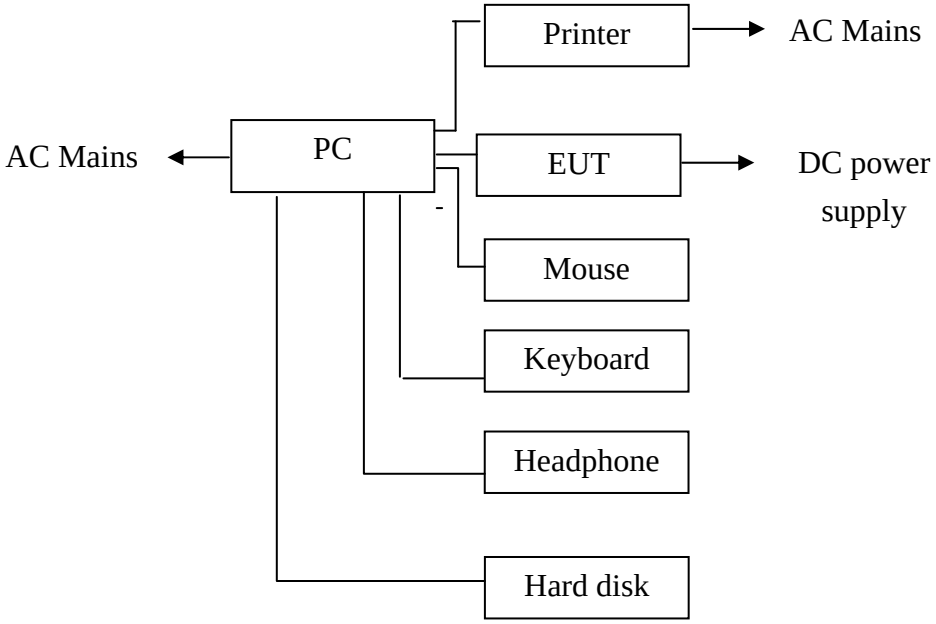
4.3 Block Diagram of connection between EUT and simulation



4. 3 TEST EQUIPMENT LIST

Instrumentation: The following list contains equipment used at MOST for testing. The equipment conforms to the CISPR 16-1 / ANSI C63.2 Specifications for Electromagnetic Interference and Field Strength Instrumentation from 10 kHz to 1.0 GHz or above.

No.	Equipment	Manufacturer	Model No.	S/N	Calibration due date
1	Test Receiver	Rohde & Schwarz	ESCI	100492	2016/03/31
2	L.I.S.N.	Rohde & Schwarz	ENV216	100093	2016/03/31
3	Coaxial Switch	Anritsu Corp	MP59B	6200283933	2016/03/31
4	Terminator	Hubersuhner	50Ω	No.1	2016/03/31
5	RF Cable	SchwarzBeck	N/A	No.1	2016/03/31
6	Test Receiver	Rohde & Schwarz	ESPI	101202	2016/03/31
7	Bilog Antenna	Sunol	JB3	A121206	2016/03/31
8	Test Antenna - Horn	SCHWARZBECK	BBHA9120D	756	2016/03/31
9	Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	--	2016/03/31
10	Cable	Resenberger	N/A	NO.1	2016/03/31
11	Cable	SchwarzBeck	N/A	NO.2	2016/03/31
12	Cable	SchwarzBeck	N/A	NO.3	2016/03/31
13	DC Power Filter	DuoJi	DL2×30B	N/A	2016/03/31
14	Single Phase Power Line Filter	DuoJi	FNF 202B30	N/A	2016/03/31
15	3 Phase Power Line Filter	DuoJi	FNF 402B30	N/A	2016/03/31
16	Test Receiver	Rohde & Schwarz	ESCI	100492	2016/03/31
17	Absorbing Clamp	Luthi	MDS21	3635	2016/03/31
18	Coaxial Switch	Anritsu Corp	MP59B	6200283933	2016/03/31
19	AC Power Source	Kikusui	AC40MA	LM003232	2016/03/31
20	Test Analyzer	Kikusui	KHA1000	LM003720	2016/03/31
21	Line Impendence Network	Kikusui	LIN40MA-PCR-L	LM002352	2016/03/31
22	ESD Tester	Kikusui	KES4021	LM003537	2016/03/31
23	EMCPRO System	EM Test	UCS-500-M4	V0648102026	2016/03/31
24	Signal Generator	IFR	2032	203002/100	2016/03/31
25	Amplifier	A&R	150W1000	301584	2016/03/31
26	CDN	FCC	FCC-801-M2-25	47	2016/03/31
27	CDN	FCC	FCC-801-M3-25	107	2016/03/31
28	EM Injection Clamp	FCC	F-203I-23mm	403	2016/03/31
29	RF Cable	MIYAZAKI	N/A	No.1/No.2	2016/03/31
30	Universal Radio Communication Tester	ROHDE&SCHWARZ	CMU200	0304789	2016/03/31
31	Telecommunication Antenna	European Antennas	PSA 75301R/170	0304213	2016/03/31

NOTE: *Equipments listed above have been calibrated and are in the period of validation.*

5. 47 CFR PART 15B REQUIREMENTS

5.1 GENERAL INFORMATION

The field strength of radiation emission was measured in the following position: EUT stand-up position (Y axis), lie-down position (X, Z axis).

The following data show only with the worst case setup.

The worst case of X axis was reported.

Based on client request, all normal using modes of the normal function were tested but only the worst test data of the worst mode is reported by this report.

EUT Test Procedure:

1. Put EUT on the test table.
2. Power on the EUT.
3. Make sure the EUT operates normally during the test.

Mode 1: Running H Pattern

During the measurement, A Communication link was established by EUT between two ports. The EUT was playing the data exchange function.

The EUT configuration of the emission test was

PC + Mouse + Keyboard + Printer + Earphone+ Hard disk + EUT.

6. AC Power Line Conducted Emission

6.1Requirement

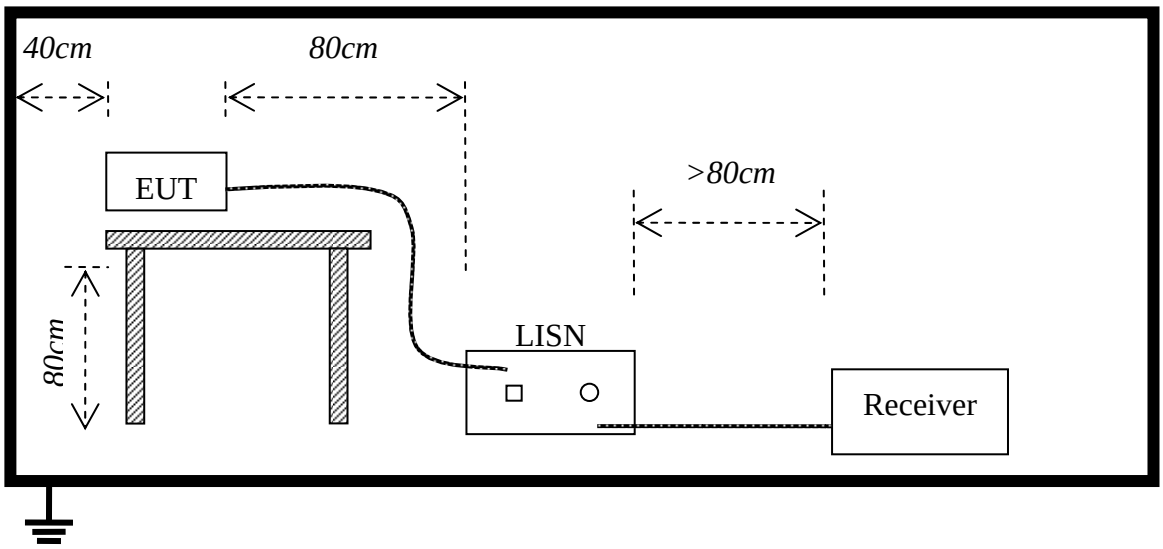
A radio apparatus that is designed to be connected to the public utility (AC) power line shall ensure that the radio frequency voltage, which is conducted back onto the AC power line on any frequency or frequencies within the and 150 kHz-30 MHz, shall not exceed the limits in the following table:

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz-500kHz	66-56	56-46
500kHz-5MHz	56	46
5MHz-30MHz	60	50

**Note: 1. * Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

6.2 Block Diagram of Test Setup



6. 3

Test procedure

1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.

2. Exploratory measurements were made to identify the frequency of the emission that has the highest amplitude relative to the limit;

3. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).

4. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4:2014 on conducted measurement.

5. The bandwidth of test receiver (ESCI) set at 9 KHz.

6. All data was recorded in the Quasi-peak and average detection mode.

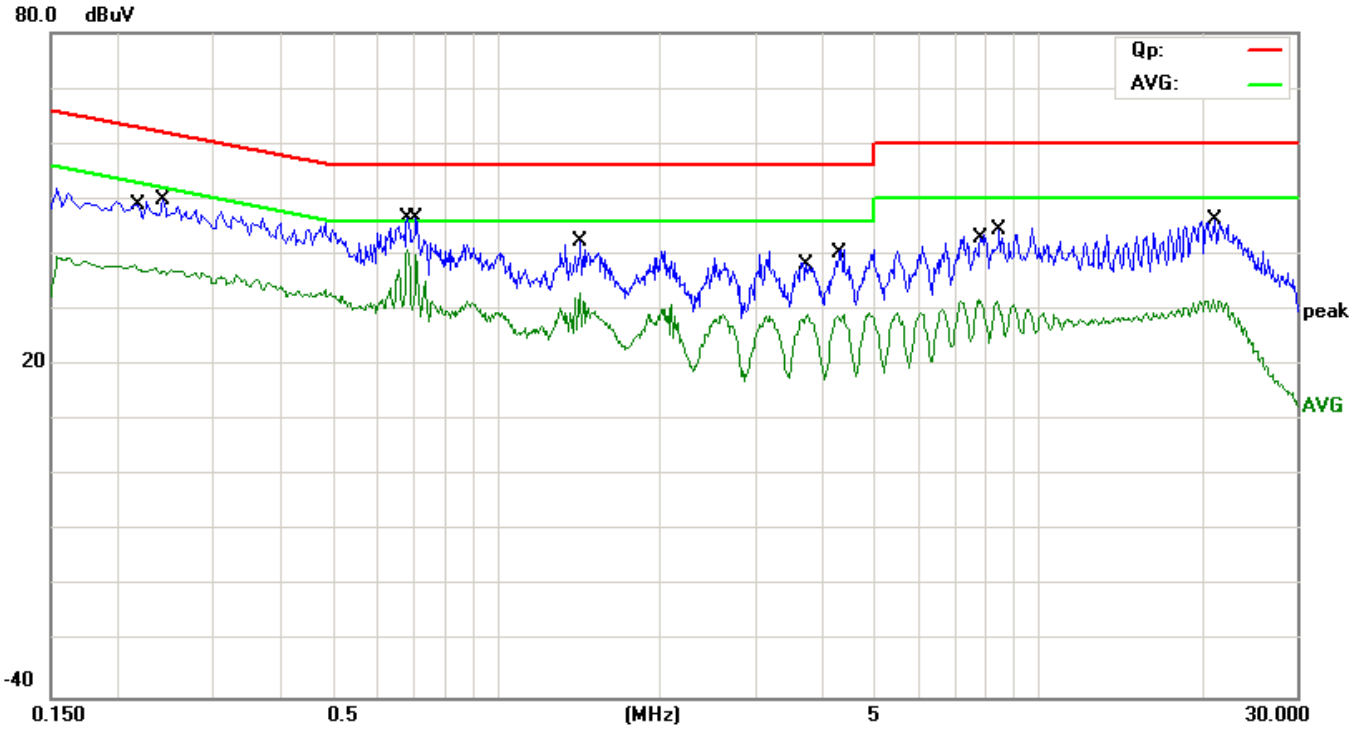
6.4 Test Result

PASS

Note: All test modes are performed, only the worst case is recorded in this report.

Please refer the following pages.

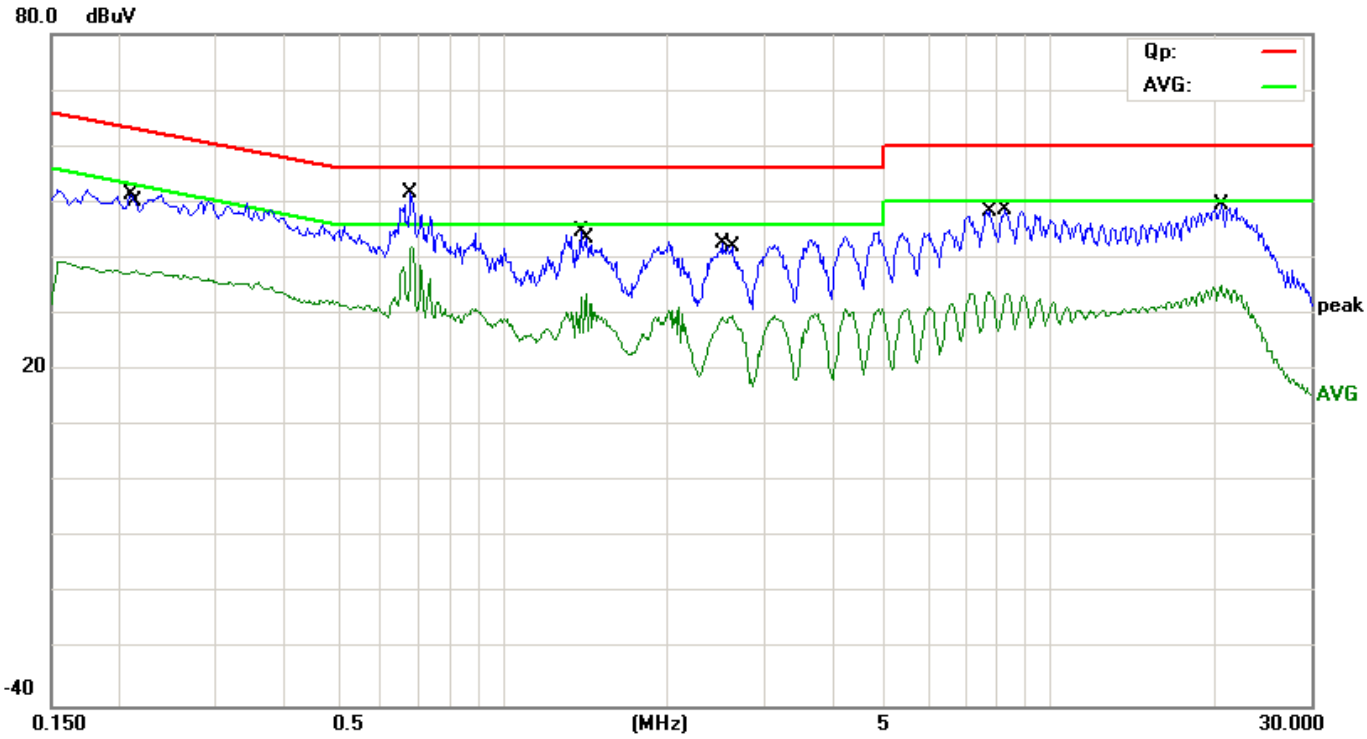
EUT:	32 LCD Monitor	M/N:	HL3116ST
Mode:	Running"H"Pattern (DP+DVI)	Phase:	L1
Tested by:	Sunny Deng(Engineer)	Power:	DC 24V
Temperature: / Humidity	23.4℃/ 52.9%	Test date:	2017-2-16



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2140	28.43	9.60	38.03	53.05	-15.02	AVG	
2		0.2420	40.25	9.60	49.85	62.03	-12.18	QP	
3	*	0.6860	31.12	9.60	40.72	46.00	-5.28	AVG	
4		0.7100	37.10	9.60	46.70	56.00	-9.30	QP	
5		1.4220	23.56	9.60	33.16	46.00	-12.84	AVG	
6		1.4260	32.67	9.60	42.27	56.00	-13.73	QP	
7		3.7420	19.55	9.62	29.17	46.00	-16.83	AVG	
8		4.2380	29.10	9.62	38.72	56.00	-17.28	QP	
9		7.7460	22.06	9.66	31.72	50.00	-18.28	AVG	
10		8.4700	34.84	9.67	44.51	60.00	-15.49	QP	
11		21.1260	22.06	9.73	31.79	50.00	-18.21	AVG	
12		21.1900	36.66	9.73	46.39	60.00	-13.61	QP	

*:Maximum data x:Over limit !:over margin

EUT:	32 LCD Monitor	M/N:	HL3116ST
Mode:	Running"H"Pattern (DP+DVI)	Phase:	N
Tested by:	Sunny Deng(Engineer)	Power:	DC 24V
Temperature: / Humidity	23.4℃/ 52.9%	Test date:	2017-2-16



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2100	41.79	9.60	51.39	63.21	-11.82	QP	
2		0.2140	28.20	9.60	37.80	53.05	-15.25	AVG	
3		0.6820	42.04	9.60	51.64	56.00	-4.36	QP	
4	*	0.6860	32.39	9.60	41.99	46.00	-4.01	AVG	
5		1.3940	35.02	9.60	44.62	56.00	-11.38	QP	
6		1.4220	24.18	9.60	33.78	46.00	-12.22	AVG	
7		2.5140	32.91	9.61	42.52	56.00	-13.48	QP	
8		2.6260	20.12	9.61	29.73	46.00	-16.27	AVG	
9		7.8060	24.31	9.66	33.97	50.00	-16.03	AVG	
10		8.3220	39.07	9.67	48.74	60.00	-11.26	QP	
11		20.5180	25.35	9.73	35.08	50.00	-14.92	AVG	
12		20.6260	39.93	9.73	49.66	60.00	-10.34	QP	

*:Maximum data x:Over limit !:over margin

7. RADIATED EMISSION TEST

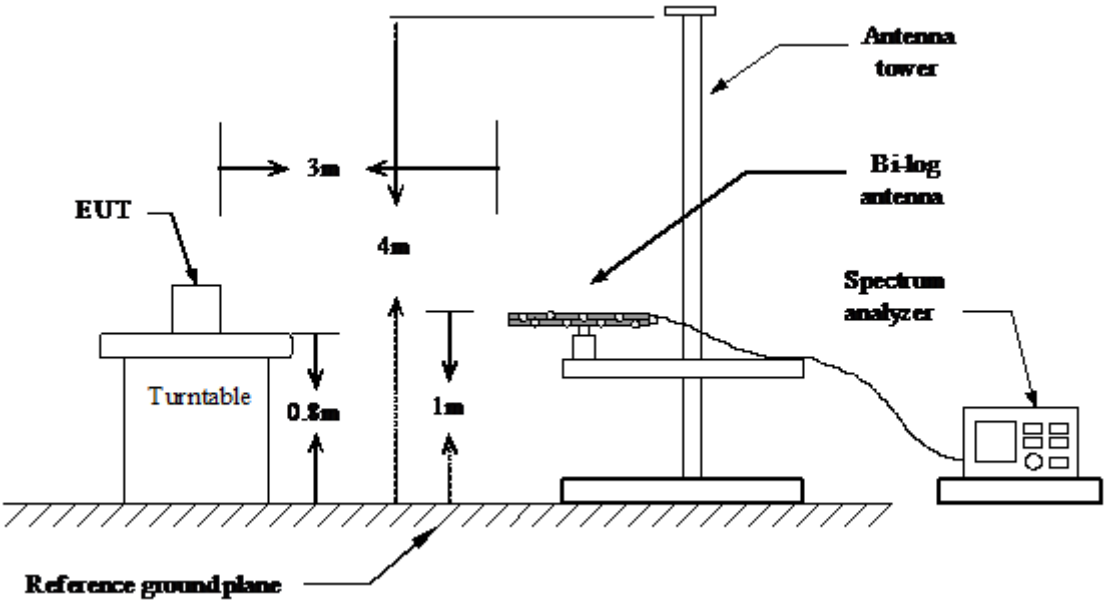
7.1. LIMITS OF RADIATED DISTURBANCES AT 3M DISTANCES FOR CLASS B

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

As shown in FCC section 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector. When average radiated emission measurements are specified in this part, including emission measurements below 1000MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

7.2 TEST DESCRIPTION



(1) The EUT was placed on a turntable with 0.8 meter above ground.

(2) The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

(3) The table was rotated 360 degrees to determine the position of the highest radiation.

(4) The antenna is a Bi-Log antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.

(5) For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1m to 4m) and turntable(from 0 degree to 360 degrees) to find the maximum reading.

(6) Set the test-receiver system to Peak Detect Function and specified bandwidth with maximum hold mode.

(7) If the emission level of the EUT in peak mode was 3dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the quasi-peak method and reported.

(8) Emission level(dBuV/m)=20 log Emission level(uv/m).

(9) Corrected reading: Antenna Factor + cable loss + read level - Preamp Factor = level

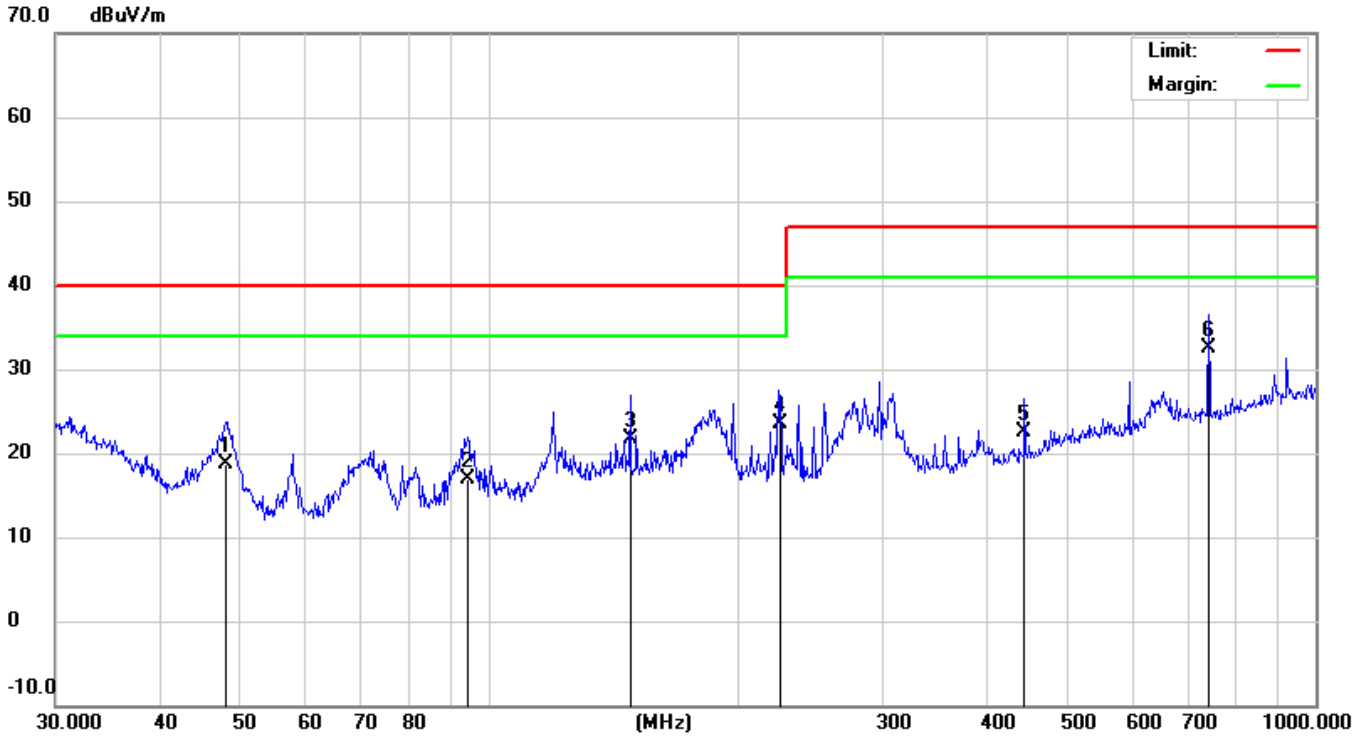
7.3 TEST RESULT

Preliminary Radiated Emission Test				
Frequency Range Investigated			30 MHz TO 1000 MHz	
Mode of operation	**Date**	**Report No.**	**Data#**	**Worst Mode**
Running H Pattern	2017.1.11	MTE/TYW/S16122656	HL3116ST _1_(H, V)	☒

Note:

The test modes were carried out for all operation modes, The worst data was shown as the follow.

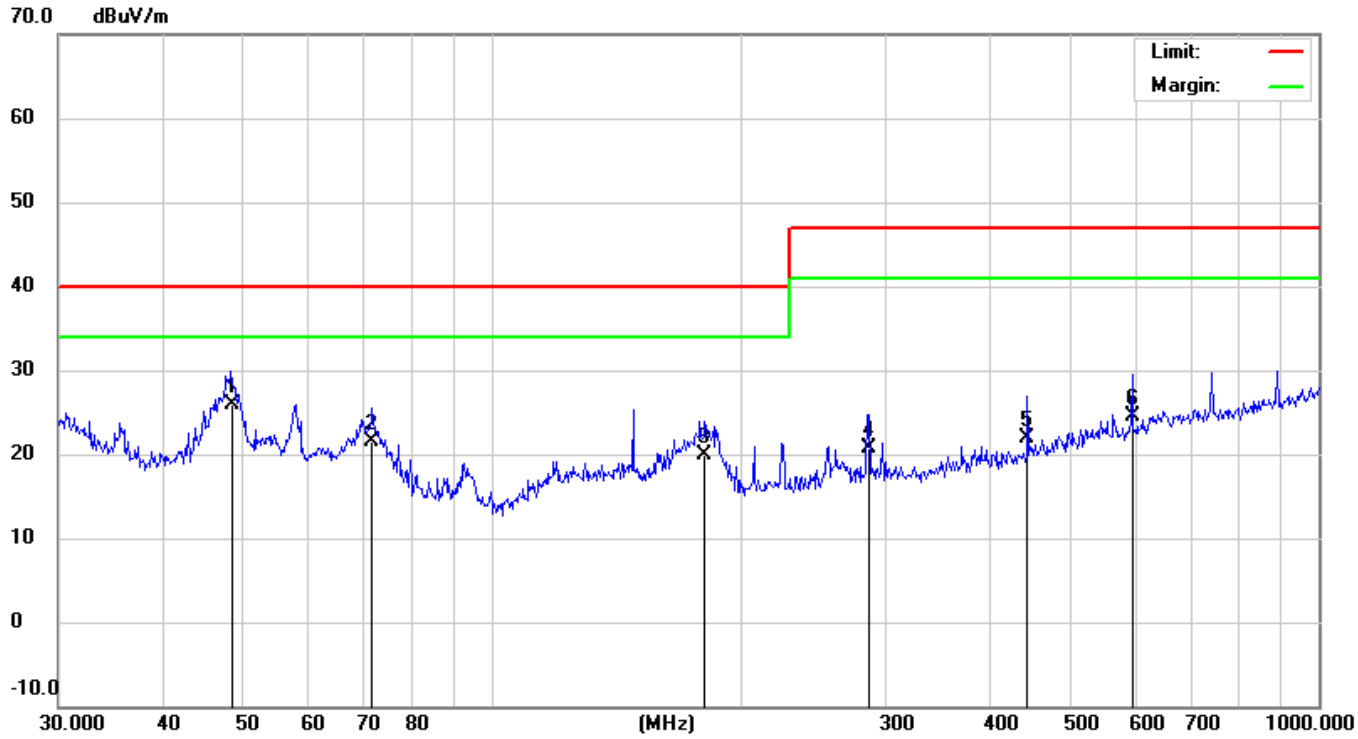
EUT:	32 LCD Monitor	M/N:	HL3116ST
Mode:	Running"H"Pattern (DP+DVI)	Phase:	Horizontal
Test by:	sunny	Power:	DC 24V by DC Source
Temperature: / Humidity	24.5℃/ 52.5%	Test date:	2017-2-16



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		48.1625	9.72	8.98	18.70	40.00	-21.30	QP			
2		94.4283	8.33	8.65	16.98	40.00	-23.02	QP			
3		148.4410	8.97	12.81	21.78	40.00	-18.22	QP			
4		224.5193	11.51	12.00	23.51	40.00	-16.49	QP			
5		444.8514	6.16	16.43	22.59	47.00	-24.41	QP			
6	*	742.2587	12.14	20.44	32.58	47.00	-14.42	QP			

*:Maximum data x:Over limit !:over margin

EUT:	32 LCD Monitor	M/N:	HL3116ST
Mode:	Running"H"Pattern (DP+DVI)	Phase:	Vertical
Test by:	sunny	Power:	DC 24V by DC Source
Temperature: / Humidity	24.5℃/ 52.5%	Test date:	2017-2-16

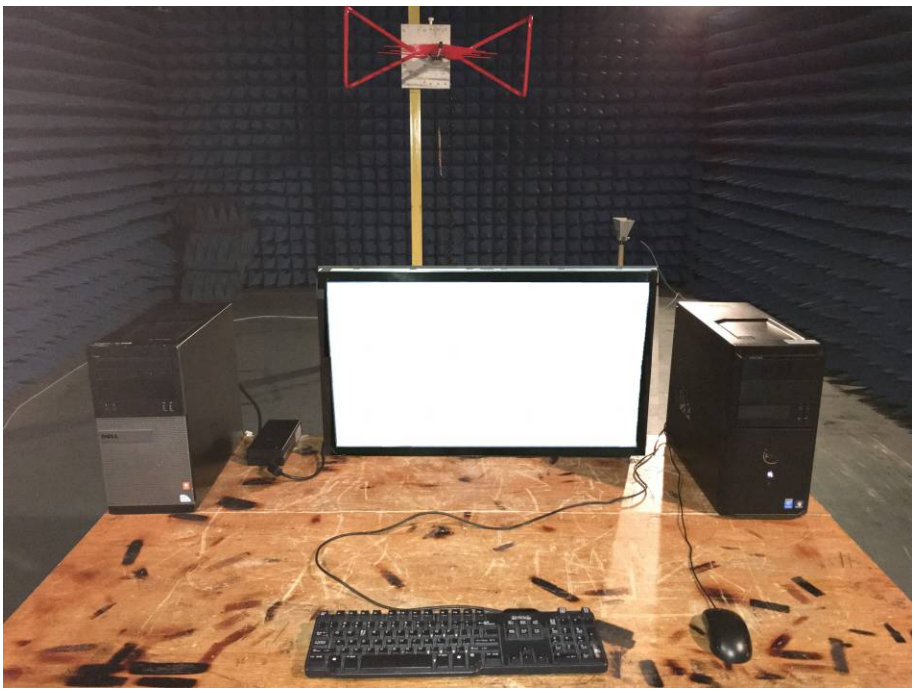


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	48.5016	17.13	8.82	25.95	40.00	-14.05	QP			
2		71.8320	13.29	8.26	21.55	40.00	-18.45	QP			
3		181.2834	8.35	11.64	19.99	40.00	-20.01	QP			
4		284.9767	7.79	12.99	20.78	47.00	-26.22	QP			
5		444.8514	5.50	16.43	21.93	47.00	-25.07	QP			
6		595.1327	5.77	18.75	24.52	47.00	-22.48	QP			

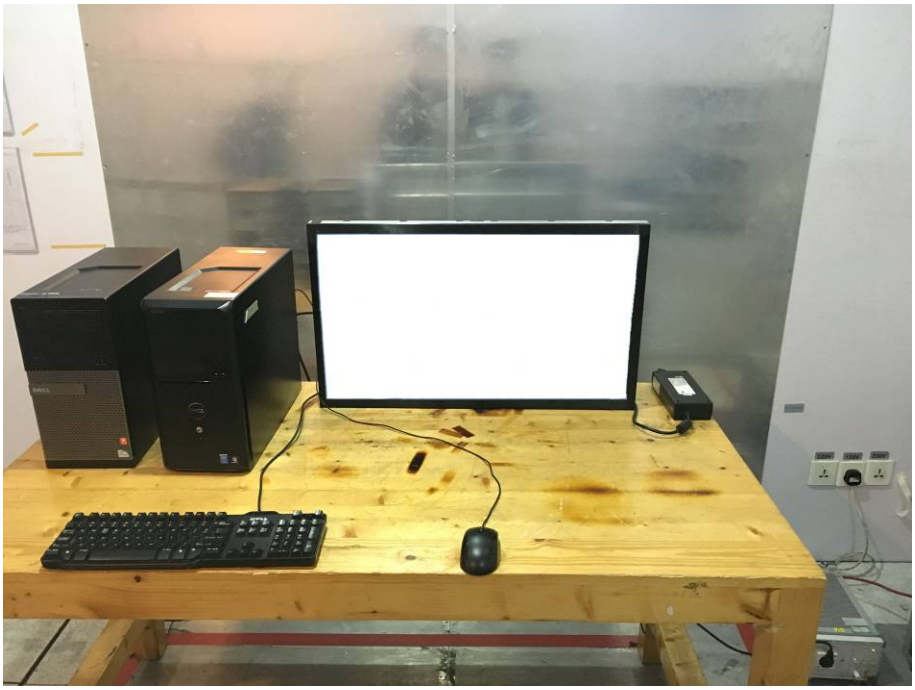
*:Maximum data x:Over limit !:over margin

APPENDIX 1
PHOTOGRAPHS OF TEST SETUP

RE TEST SETUP OF HL3116ST



CE TEST SETUP OF HL3116ST



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