

FCC PART 15C TEST REPORT FOR CERTIFICATION

On Behalf of

Lenovo (Beijing) Limited

LCD Monitor

Model No.: A20270DL0

Brand Name: Lenovo

FCC ID: A5M- A20270DL0

Prepared for : Lenovo (Beijing) Limited
201-H2-6, Floor2, Building 2, No.6 Shangdi West Road,
Haidian District, Beijing, China

Prepared By: Audix Technology (Shenzhen) Co., Ltd.
No. 6, Kefeng Road, Science & Technology Park,
Nanshan District , Shenzhen, Guangdong, China

Tel: (0755) 26639496

Fax: (0755) 26632877

Report Number : ACS-F20160

Date of Test : Aug.05~11,2020

Date of Report : Aug.24,2020

TABLE OF CONTENTS

Description	Page
1. SUMMARY OF STANDARDS AND RESULTS.....	4
1.1. Description of Standards and Results	4
2. GENERAL INFORMATION	5
2.1. Description of Equipment Under Test	5
2.2. Tested Supporting System Details	6
2.3. Block Diagram of Test Setup	6
2.4. Test Facility.....	7
2.5. Measurement Uncertainty (95% confidence levels, k=2).....	7
3. POWER LINE CONDUCTED EMISSION MEASUREMENT	8
3.1. Test Equipment	8
3.2. Block Diagram of Test Setup	8
3.3. Power Line Conducted Emission Test Limits.....	8
3.4. Configuration of EUT on Test	9
3.5. Operating Condition of EUT.....	9
3.6. Test Procedure.....	9
3.7. Conducted Emission at Mains Terminals Test Results.....	9
4. RADIATED EMISSION TEST	12
4.1. Test Equipments	12
4.2. Block Diagram of Test Setup	12
4.3. Radiated Emission Limit.....	13
4.4. EUT Configuration on Test.....	13
4.5. Operating Condition of EUT.....	13
4.6. Test Procedure.....	13
4.7. Radiated Disturbance Test Results	13
5. 20 dB BANDWIDTH TEST	16
5.1. Test Equipment	16
5.2. Limit.....	16
5.3. Test Procedure.....	16
5.4. Test Results	17
6. DEVIATION TO TEST SPECIFICATIONS.....	18
7. PHOTOGRAPH.....	19
7.1. Photos of Power Line Conducted Emission Test.....	19
7.2. Photos of Radiated Emission Test	20
8. PHOTOS OF THE EUT	21

TEST REPORT CERTIFICATION

Applicant : Lenovo (Beijing) Limited
Product : LCD Monitor
Brand : Lenovo
FCC ID : A5M- A20270DL0
(A) Model No. : A20270DL0
(B) Test Voltage : AC 120V/60Hz

Measurement Standard Used:

FCC CFR 47 Part 15 Subpart C

Test procedure used:

ANSI C63.10: 2013

The device described above is tested by AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. to confirm comply with all the FCC Part 15 Subpart C requirements. The test results are contained in this test report and AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. is assumed full responsibility for the accuracy and completeness of these tests. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC and IC requirements. This report contains data that are not covered by the NVLAP accreditation.

This Report is made under FCC Part 2.1075. No modifications were required during testing to bring this product into compliance.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Date of Test : Aug.05~11,2020 Report of date: Aug.24,2020Prepared by : Brave Zhang Reviewed by : Sunny Lu
Brave Zhang / Assistant Sunny Lu / Deputy ManagerApproved & Authorized Signer : David Jin
David Jin / Deputy General Manager

1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION		
Description of Test Item	Standard	Results
Power Line Conducted Emission Test	FCC Part 15: 15.207 ANSI C63.10: 2013	PASS
Radiated Emission Test	FCC Part 15: 15.209 ANSI C63.10: 2013	PASS
20dB Bandwidth	FCC Part 15: 15.215 ANSI C63.10 2013	PASS

2. GENERAL INFORMATION

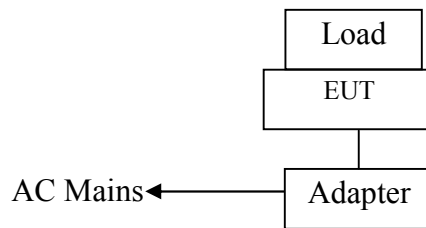
2.1. Description of Equipment Under Test

Applicant	Lenovo (Beijing) Limited
Applicant Address	201-H2-6, Floor2, Building 2, No.6 Shangdi West Road, Haidian District, Beijing, China
Manufacturer	Lenovo (Beijing) Limited
Manufacturer Address	201-H2-6, Floor2, Building 2, No.6 Shangdi West Road, Haidian District, Beijing, China
Factory	TPV Electronics (Fujian) Co., Ltd.
Factory Address	Rongqiao Economic and Technological Development Zone, Fuqing City, Fujian Province, P.R. China.
Product	LCD Monitor
Model No.	A20270DL0
Brand	Lenovo
Adapter	Manufacturer: Lenovo; M/N: ADP-170CB B Input: AC 100-240V 50-60Hz, 2.5A Output: DC 20V, 8.5A Cable: Unshielded,Undetachable,1.5m(with one core)
Radio Frequency	127.7kHz
Modulation Type	FSK
Sample Type	Prototype production
Date of Receipt	Jul.14,2020
Date of Test	Aug.05~11,2020

2.2. Tested Supporting System Details

No.	Description	ACS No.	Manufacturer	Model	Serial Number
1.	Load (iPhone 11)	---	Apple	MWN82CH/A	C6KZF1YJN742

2.3. Block Diagram of Test Setup



(EUT: LCD Monitor)

2.4. Test Facility

Site Description

Audix Technology (Shenzhen) Co., Ltd.

Name of Firm

: No. 6, Kefeng Road, Science & Technology Park,
Nanshan District , Shenzhen, Guangdong, China

EMC Lab.

Certificated by FCC, USA

: Designation No: CN5022
Valid Date: Mar.31, 2021

Certificated by Industry Canada

: Registration Number: IC 5183A-1
Valid Date: Mar.31, 2021

Accredited by DAkkS, Germany

: Registration No: D-PL-12151-01-00
Valid Date: Dec.07, 2021

Accredited by NVLAP, USA

: NVLAP Code: 200372-0
Valid Date: Mar.31, 2021

2.5. Measurement Uncertainty (95% confidence levels, k=2)

Test Item	Uncertainty
Uncertainty for Conduction emission test in No. 2 Conduction	2.4dB (150kHz~30MHz)
Uncertainty for Radiated Spurious Emissions at frequency below 30MHz	2.6dB(9kHz~30MHz)
Uncertainty for Bandwidth test	83kHz
Uncertainty for test site temperature and humidity	0.6°C
	3%

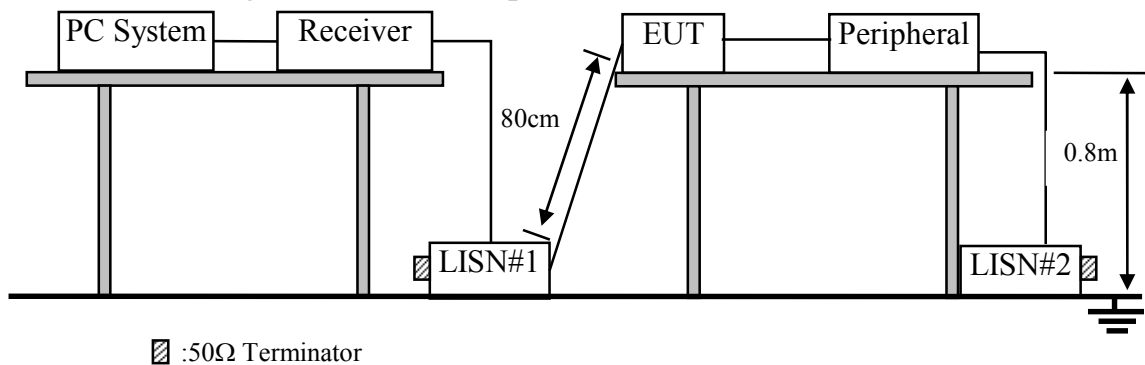
3. POWER LINE CONDUCTED EMISSION MEASUREMENT

3.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	2# Shielding Room	AUDIX	N/A	N/A	Apr.15,18	3 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100843	Oct.12,19	1 Year
3.	L.I.S.N.#1	Rohde & Schwarz	ENV4200	100041	Apr.12,20	1 Year
4.	L.I.S.N.#2	Kyoritsu	KNW-407	8-1628-5	Apr.12,20	1 Year
5.	Terminator	Hubersuhner	50Ω	No.4	Apr.12,20	1 Year
6.	Terminator	Hubersuhner	50Ω	No.5	Apr.12,20	1 Year
7.	RF Cable	Fujikura	RG55/U	No.2	Apr.12,20	1 Year
8.	Test Software	AUDIX	e3	6.100913a	N/A	N/A

Note: N/A means Not applicable.

3.2. Block Diagram of Test Setup



3.3. Power Line Conducted Emission Test Limits

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

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

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

3.4. Configuration of EUT on Test

The following equipment are installed on Power Line Conducted Emission Test to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

3.4.1. LCD Monitor (EUT)

Model No. : A20270DL0
Serial No. : N/A

3.4.2. Support Equipment : As Tested Supporting System Detail, in Section 2.2.

3.5. Operating Condition of EUT

3.5.1. Setup the EUT and simulator as shown as Section 3.2.

3.5.2. Turn on the power of all equipment.

3.5.3. PC run test software to control EUT work in Tx mode.

3.6. Test Procedure

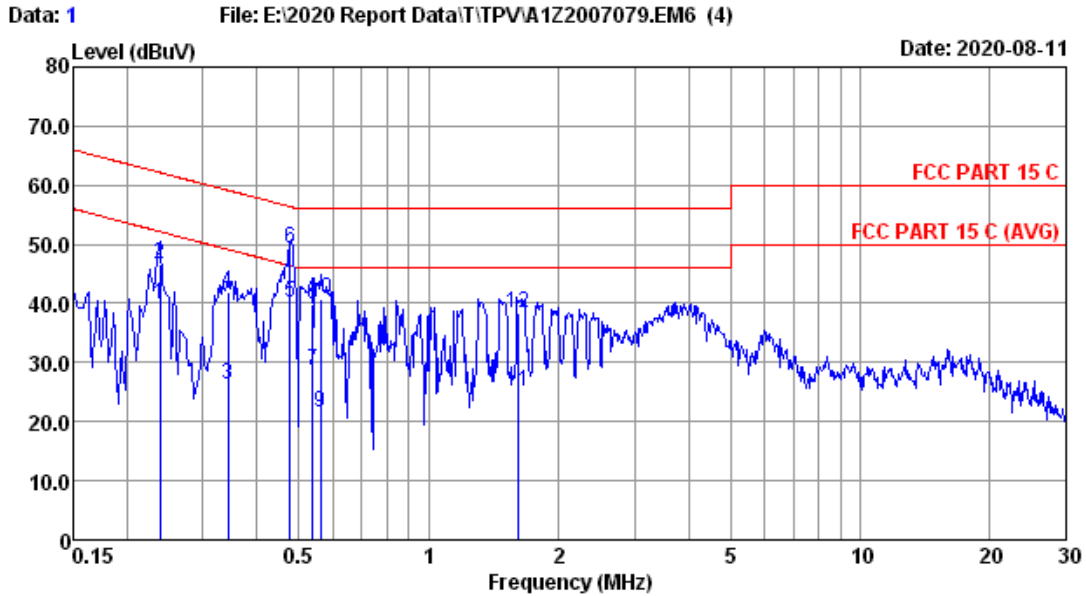
The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power Via AC unit connected to the power mains through a line impedance stabilization network (L.I.S.N. 1#). This provides a 50 ohm coupling impedance for the EUT (Please refer the block diagram of the test setup and photographs). The AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10: 2013 on Conducted Emission Test.

The bandwidth of test receiver (R & S ESCI) is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

3.7. Conducted Emission at Mains Terminals Test Results

PASS. (All emissions not reported below are too low against the prescribed limits.)

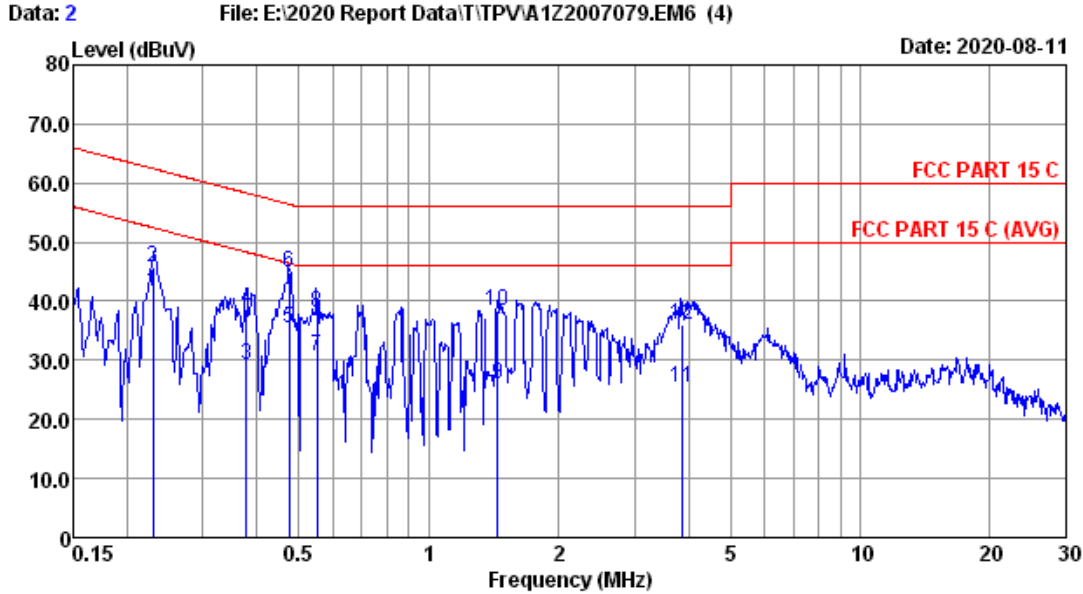


```

Site no      :2# Conduction           Data No     :1
Dis./Lisn   :2020 ENV4200-L1        LISN phase  :LINE
Limit       :FCC PART 15 C
Env./Ins.   :24+C/56%               Engineer    :Saxon
EUT         :A20270DL0
Power Rating :AC 120V/60Hz
Test Mode    :TX Mode
    
```

No	Freq (MHz)	LISN Factor (dB)	Cable loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.238	10.50	0.23	29.10	39.83	52.17	12.34	Average
2	0.238	10.50	0.23	36.00	46.73	62.17	15.44	QP
3	0.342	10.61	0.23	15.30	26.14	49.15	23.01	Average
4	0.342	10.61	0.23	31.00	41.84	59.15	17.31	QP
5	0.478	10.79	0.23	29.00	40.02	46.37	6.35	Average
6	0.478	10.79	0.23	38.40	49.42	56.37	6.95	QP
7	0.538	10.84	0.23	17.60	28.67	46.00	17.33	Average
8	0.538	10.84	0.23	28.80	39.87	56.00	16.13	QP
9	0.562	10.84	0.23	10.60	21.67	46.00	24.33	Average
10	0.562	10.84	0.23	29.60	40.67	56.00	15.33	QP
11	1.606	10.90	0.25	13.80	24.95	46.00	21.05	Average
12	1.606	10.90	0.25	27.10	38.25	56.00	17.75	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss+Reading.
 2.If the average limit is met when using a quasi-peak detector. the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.



```

Site no      :2# Conduction           Data No     :2
Dis./Lisn   :2020 ENV4200-N         LISN phase:NEUTRAL
Limit        :FCC PART 15 C
Env./Ins.   :24*C/56%              Engineer    :Saxon
EUT          :A20270DL0
Power Rating :AC 120V/60Hz
Test Mode    :TX Mode
    
```

No	Freq (MHz)	LISN Factor (dB)	Cable loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.230	9.95	0.23	31.50	41.68	52.45	10.77	Average
2	0.230	9.95	0.23	35.70	45.88	62.45	16.57	QP
3	0.378	9.88	0.23	19.00	29.11	48.32	19.21	Average
4	0.378	9.88	0.23	28.50	38.61	58.32	19.71	QP
5	0.474	9.83	0.23	25.30	35.36	46.44	11.08	Average
6	0.474	9.83	0.23	34.70	44.76	56.44	11.68	QP
7	0.550	9.82	0.23	20.70	30.75	46.00	15.25	Average
8	0.550	9.82	0.23	27.90	37.95	56.00	18.05	QP
9	1.442	9.80	0.25	15.90	25.95	46.00	20.05	Average
10	1.442	9.80	0.25	28.20	38.25	56.00	17.75	QP
11	3.850	9.82	0.27	15.40	25.49	46.00	20.51	Average
12	3.850	9.82	0.27	25.90	35.99	56.00	20.01	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss+Reading.
 2.If the average limit is met when using a quasi-peak detector. the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

4. RADIATED EMISSION TEST

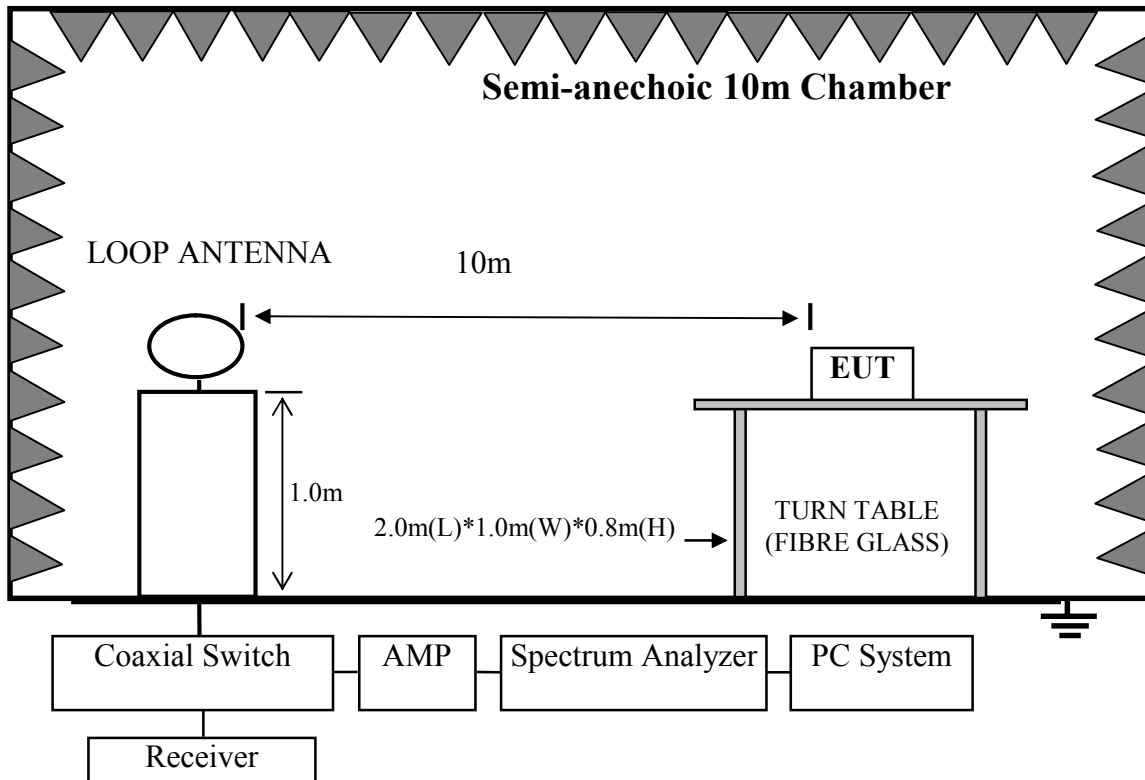
4.1. Test Equipments

4.1.1. Frequency Range: 9kHz -30MHz (In 10m Anechoic Chamber)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	10m Chamber(NSA)	AUDIX	N/A	N/A	Apr.14,20	1 Year
2.	10m Chamber(SE)	AUDIX	N/A	N/A	Apr.15,18	3 Year
3.	Signal Analyzer	Rohde & Schwarz	FSV30	103669	Oct.13,19	1 Year
4.	Loop Antenna	Chase	HLA6120	1062	Apr.29,20	1 Year
5.	Amplifier	HP	8449B	3008A00863	Apr.11,20	1 Year
6.	Coaxial Switch	Anritsu	MP59B	6201397221	Apr.12,20	1 Year
7.	Test Receiver	Rohde & Schwarz	ESCI	100843	Oct.12,19	1 Year
8.	RF Cable	SPUMA	CFD400NL-LW	No.4	Apr.12,20	1 Year

4.2. Block Diagram of Test Setup

4.2.1. In 10m Anechoic Chamber Test Setup Diagram for 9kHz-30MHz



4.3. Radiated Emission Limit

Radiated emission Limit

Frequency (MHz)	Field strength (microvolts/meter)	Measurement Distance(meters)
0.009-0.490	2400/F(KHz)	300
0.490-1.705	24000/f(KHz)	30
1.705-30.0	30	30

Remark: (1) Emission level $\text{dB}\mu\text{V} = 20 \log \text{Emission level } \mu\text{V/m}$

(2) In the emission table above, the tighter limit applies at the band edges.

(3) The limit 1.705MHz to 30MHz in clause 4.3 are specified at 30 meters, and measurements were made at 10 meters, the limit is translated to 10 meters by using a formula as follows: $\text{Limit}_{10\text{m}} = \text{Limit}_{30\text{m}} + 40\log(30\text{m}/10\text{m})$ or $\text{Limit}_{10\text{m}} = \text{Limit}_{300\text{m}} + 40\log(300\text{m}/10\text{m})$

4.4. EUT Configuration on Test

The configurations of EUT are listed in Section 3.4

4.5. Operating Condition of EUT

Same as Conducted Emission test that is listed in Section 3.5. except the test set up replaced by Section 4.2.

4.6. Test Procedure

The EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.10-2013 on radiated emission Test.

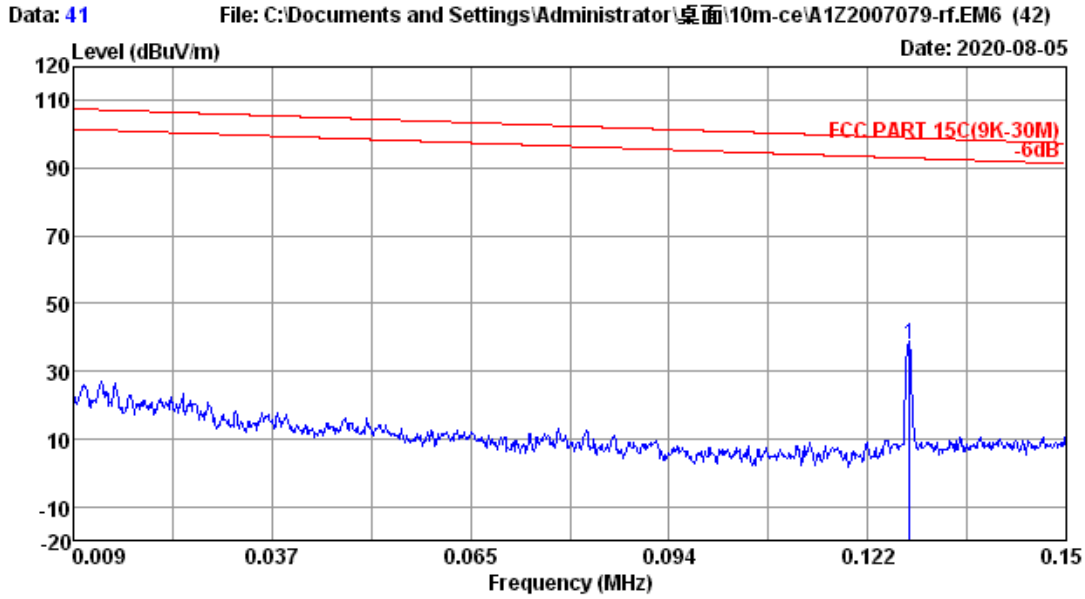
This test was performed with EUT in X, Y, Z position, and the worse case was found when EUT in X position as the test photo indicated.

For emissions below 30MHz:

This test was performed on anechoic chamber with a conductive ground plane, EUT was put to 0.8m high turn table and at a distance of 10m from test antenna.

4.7. Radiated Disturbance Test Results

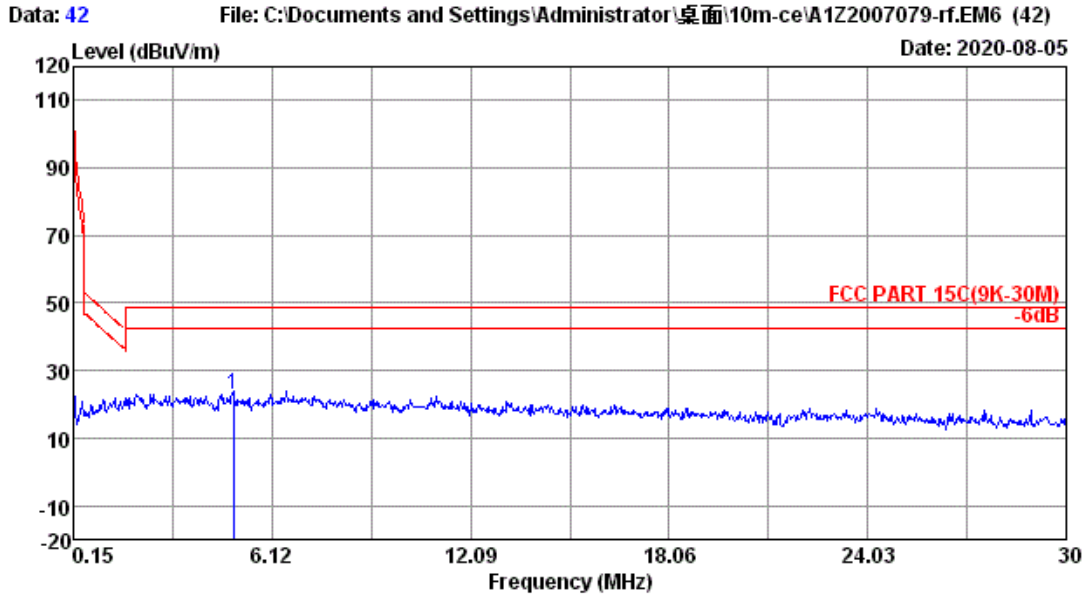
PASS. (All emissions not reported below are too low against the prescribed limits.)



Site no. : 10m Chamber Data no. : 41
 Dis. / Ant. : 10m 2020 HLA6120-10-E Ant. pol. :
 Limit : FCC PART 15C(9K-30M)
 Env. / Ins. : 22.5°C/49% Engineer : Zero
 EUT : LCD Monitor M/N:A20270DL0
 Power rating : AC 120V/60Hz
 Test Mode : Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	0.128	20.10	0.05	17.94	38.09	99.02	60.93	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 10m Chamber Data no. : 42
 Dis. / Ant. : 10m 2020 HLA6120-10-E Ant. pol. :
 Limit : FCC PART 15C(9K-30M)
 Env. / Ins. : 22.5°C/49% Engineer : Zero
 EUT : LCD Monitor M/N:A20270DL0
 Power rating : AC 120V/60Hz
 Test Mode : Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	4.956	18.61	0.33	3.95	22.89	48.62	25.73	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

5. 20 dB BANDWIDTH TEST

5.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Apr.12,20	1 Year
2.	Attenuator	Agilent	8491B	MY39269201	Oct.13,19	1 Year
3.	RF Cable	EMCI	EMC102-KM-KM 3500	170702	Apr.12,20	1 Year

5.2. Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

5.3. Test Procedure

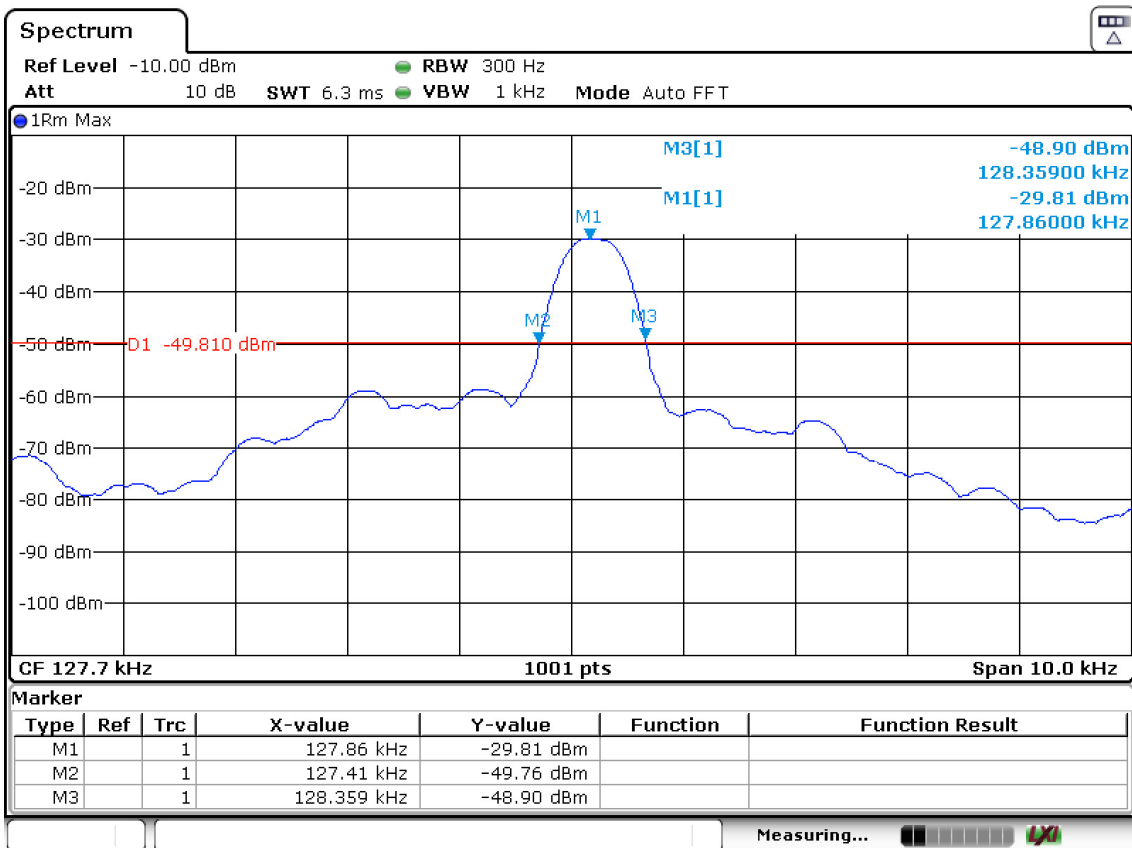
1. Connect the antenna port of the EUT to the spectrum analyzer.
2. Let the EUT transmit at Low/ Mid/ High channel with test software.
3. Setting of SA is following as: RBW: 0.3kHz / VBW: 1kHz
Sweep Mode: Continuous sweep
Detect mode: Positive peak
Trace mode: Max hold.
4. Use the occupied bandwidth function of the SA measure the 20dB bandwidth directly.

5.4. Test Results

EUT: LCD Monitor		
M/N: A20270DL0		
Test date: 2020-08-10	Pressure: 102.7±1.0 kpa	Humidity: 53.3±3.0%
Tested by: Lynn	Test site: RF Site	Temperature: 22.3±0.6°C

Test Mode	Frequency (kHz)	20dB bandwidth (kHz)	Limit (kHz)
Tx	127.7	0.949	N/A

Conclusion : PASS



Date: 10.AUG.2020 17:33:54

6. DEVIATION TO TEST SPECIFICATIONS

[NONE]