

FCC TEST REPORT

Product Name: LCD Monitor
Trade Mark: AOC
Model No.: Q24G4E
Add. Model No.: **Q24G4*****
Report Number: 24040910656EMC-1
Test Standards: FCC 47 CFR Part 15 Subpart B,
ANSI C63.4-2014,
ANSI C63.4a-2017
Test Result: PASS
Date of Issue: May 22, 2024

Prepared for:

TPV Electronics (Fujian) Co., Ltd.
Rongqiao Economic and Technological Development Zone, Fuqing
City, Fujian Province, P.R. China

Prepared by:

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May 22, 2024

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Version

Version No.	Date	Description
V1.0	May 22, 2024	Original



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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	TPV Electronics (Fujian) Co., Ltd.
Address of Applicant:	Rongqiao Economic and Technological Development Zone, Fuqing City, Fujian Province, P.R. China

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	LCD Monitor
Model No. :	Q24G4E
Add. Model No.:	**Q24G4*****
Trade Mark:	AOC
Rated Voltage:	100-240V~50/60Hz 1.5A
Classification of digital devices:	Class B
Highest Internal Frequency:	720 MHz
I/O Port:	1 x AC Power Cord; 1 x HDMI input Ports; 1 x DP Port; 1 x Audio Out Port;
Sample Received Date:	February 7, 2024
Sample Tested Date:	April 16, 2024 to April 29, 2024
Note: The additional model **Q24G4***** is identical with the test model Q24G4E except the model number for marketing purpose.	

Remark: The above EUT's information was provided by customer. Please refer to the specifications or user's manual for more detailed description.

1.2.2 Description of Accessories

HDMI Cable	
Description:	HDMI Cable
Cable Type:	Shielded without ferrite
Length:	1.5/1.8Meter

DP Cable	
Description:	DP Cable
Cable Type:	Shielded without ferrite
Length:	1.5/1.8Meter

AC Power Cord	
Description:	AC Power Cord
Cable Type:	Unshielded without ferrite
Length:	1.5/1.8Meter

Audio Out Port	
Description:	Audio Out Port
Cable Type:	Unshielded without ferrite
Length:	1.5/1.8Meter

1.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.	Serial Number	Supplied by
PC	DELL	XPS8900	2015AP3055	UnionTrust
keyboard	DELL	KB212-B	CN-0N291F-715	UnionTrust
mouse	DELL	MS111	CN-011D3V-738	UnionTrust
DVD Player	GIEC	BDP-G4305	N/A	UnionTrust
PC work station	DELL	5820	BEC20190001	UnionTrust
Earphone	N/A	QTER01JY	N/A	UnionTrust
Dummy load	N/A	E214887	N/A	UnionTrust

1.4 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

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Tests were sub-contracted. [Radiated Emission (10 m)]

Shenzhen Academy of Metrology & Quality Inspection .

Address: Songshahu Lab ,No.7 of Industrial North Road, Songshan Lake Hi-Tech Industrial Zone, Dongguan, Guangdong, People's Republic of China

Telephone: +86 (0) 769-2332 4610 Fax: +86 (0) 769-2332 4601

1.5 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

- **Shenzhen UnionTrust Quality and Technology Co., Ltd.**

CNAS-Lab Code: L9069

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories. (This standard version ANSI C63.4a-2017 is not within the scope of UnionTrust CNAS authorization)

A2LA-Lab Certificate No.: 4312.01

Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

ISED Wireless Device Testing Laboratories

CAB identifier: CN0032

FCC Accredited Lab.

Designation Number: CN1194

Test Firm Registration Number: 259480

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➤ Shenzhen Academy of Metrology & Quality Inspection.
CNAS-Lab Code: L0579

1.6 DEVIATION FROM STANDARDS

None.

1.7 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.9 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

No.	Item	Measurement Uncertainty
1	Conducted emission 9kHz-150kHz	± 3.2 dB
2	Conducted emission 150kHz-30MHz	± 2.7 dB
3	Radiated emission 9kHz-30MHz	± 4.7 dB
4	Radiated emission 30MHz-1GHz	± 4.6 dB
5	Radiated emission 1GHz-18GHz	± 4.4 dB
6	Radiated emission 18GHz-26GHz	± 4.6 dB
7	Radiated emission 26GHz-40GHz	± 4.6 dB

2. TEST SUMMARY

FCC 47 CFR Part 15 Subpart B Test Cases			
Test Item	Test Requirement	Test Method	Result
Conducted Emission	FCC 47 CFR Part 15.107	ANSI C63.4-2014	PASS
Radiated Emission	FCC 47 CFR Part 15.109	ANSI C63.4-2014	PASS



3. EQUIPMENT LIST

Radiated Emission (3m) Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date	Cal. Due date
☒	3m SAC	ETS-LINDGREN	3M	Euroshiedpn-CT001270-1317	11-Nov-2023	10-Nov-2026
☒	Receiver	R&S	ESIB26	100114	27-Oct-2023	26-Oct-2024
☐	Loop Antenna	ETS-LINDGREN	6502	00202525	30-Oct-2023	29-Oct-2024
☐	Broadband Antenna	ETS-LINDGREN	3142E	00201566	30-Oct-2023	29-Oct-2024
☐	6dB Attenuator	Talent	RA6A5-N-18	18103001	30-Oct-2023	29-Oct-2024
☐	Preamplifier	HP	8447F	2805A02960	31-Oct-2023	30-Oct-2024
☒	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201541	1-Apr-2024	31-Mar-2025
☒	Pre-amplifier	ETS-LINDGREN	00118385	00201874	1-Apr-2024	31-Mar-2025
☐	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	30-Oct-2023	29-Oct-2024
☐	Pre-amplifier	ETS-LINDGREN	00118384	00202652	30-Oct-2023	29-Oct-2024
☒	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
☒	Test Software	Audix	e3	Software Version: 9.160323		

Conducted Emission Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date	Cal. Due date
☒	Receiver	R&S	ESR7	101181	27-Oct-2023	26-Oct-2024
☒	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	27-Oct-2023	26-Oct-2024
☒	LISN	R&S	ESH2-Z5	860014/024	27-Oct-2023	26-Oct-2024
☒	LISN	ETS-Lindgren	3816/2SH	00201088	27-Oct-2023	26-Oct-2024
☒	Test Software	EZ-EMC	EZ-CON	Software Version: EMC-CON 3A1.1		

Radiated Emission (10m SAC) Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. Due date	Cal. Interval
☒	10m SAC	Albatross Projects	10m SAC	SB19656	2025-08-28	3 year
☒	EMI Test Receiver	R&S	ESI26	SB3436	2024-10-12	1 year
☒	Antenna	Schwarzbeck	VULB9163	SB19658/01	2024-07-23	1 year
☒	Test Software	Tonscend	JS32-RE	Software Version: Ver.5.0.5		

4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

4.1.1 Normal or Extreme Test Conditions

Environment Parameter	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage	Relative Humidity (%)
NT/NV	+15 to +35	120V~60Hz or 240V~50Hz	20 to 75
Remark: 1) NV: Normal Voltage; NT: Normal Temperature			

4.1.2 Record of Normal Environment and Test Sample

Test Item	Temp. (°C)	Relative Humidity (%)	Pressure (kPa)	Sample No.	Tested by
Conducted Emission	24.0	56.6	99.9	S202404073074-ZJA01/1	Linson Xie
Radiated Emission (10m)	22.5	51.9	101		Shuifu You
Radiated Emission (3m)	24.2	56.9	99.8		Bowie Zhang

4.2 TEST MODES

Test Modes									
No.	Test Voltage	Input ports	Input source	Cable Length (Meter)	Pattern	Resolution	Rotatio	Stand Position	Audio
1	120V~60Hz	HDMI 1	PC	1.8	H Pattern	800*600@60Hz	Landscape	UP	With Earphone
2			PC	1.8	H Pattern	1920*1080@60Hz	Landscape	UP	With Earphone
3			PC	1.8	H Pattern	2560*1440@60Hz	Landscape	UP	With Earphone
4*			PC	1.8	H Pattern	2560*1440@180Hz	Landscape	UP	With Earphone
5			PC	1.8	BT 471-1	2560*1440@180Hz	Landscape	UP	Without Earphone
6			PC	1.8	BT 471-1	2560*1440@180Hz	Landscape	UP	With Earphone
7			PC	1.5	H Pattern	2560*1440@180Hz	Landscape	UP	Without Earphone
8			DVD	1.8	BT 471-1	--	Landscape	UP	With Earphone
9			DVD	1.5	BT 471-1	--	Landscape	UP	Without Earphone
10		DP 1	PC	1.8	H Pattern	800*600@60Hz	Landscape	UP	With Earphone
11			PC	1.8	H Pattern	1920*1080@60Hz	Landscape	UP	With Earphone
12			PC	1.8	H Pattern	2560*1440@60Hz	Landscape	UP	With Earphone
13			PC	1.8	H Pattern	2560*1440@180Hz	Landscape	UP	With Earphone
14			PC	1.5	H Pattern	2560*1440@180Hz	Landscape	UP	Without Earphone
15	Worst case from Test mode 1~14 with 1.5m Power Cord						Landscape	Down	With Earphone
16	240V~50Hz	Worst case from Test mode 1~15							
Note: 1) "*"Means the worst test mode. 2) All test modes are performed at maximum brightness, contrast, and volume.									

4.3 TEST SETUP

4.3.1 For Radiated Emissions test setup

Figure 1. 30MHz to 1GHz (3 Meter test distance)

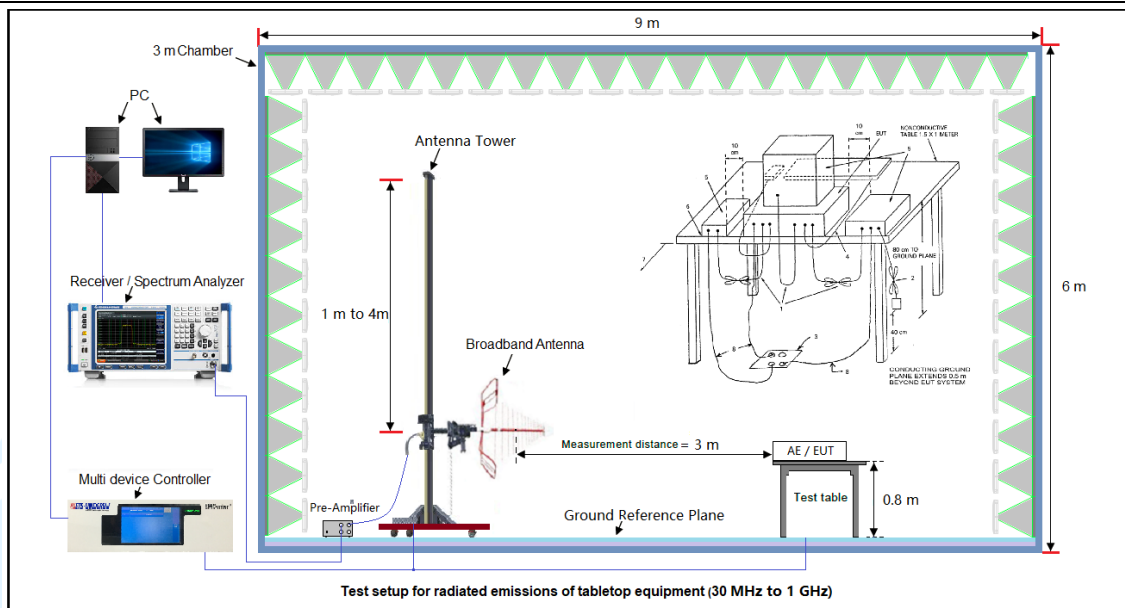


Figure 2. 30MHz to 1GHz (10 Meter test distance)

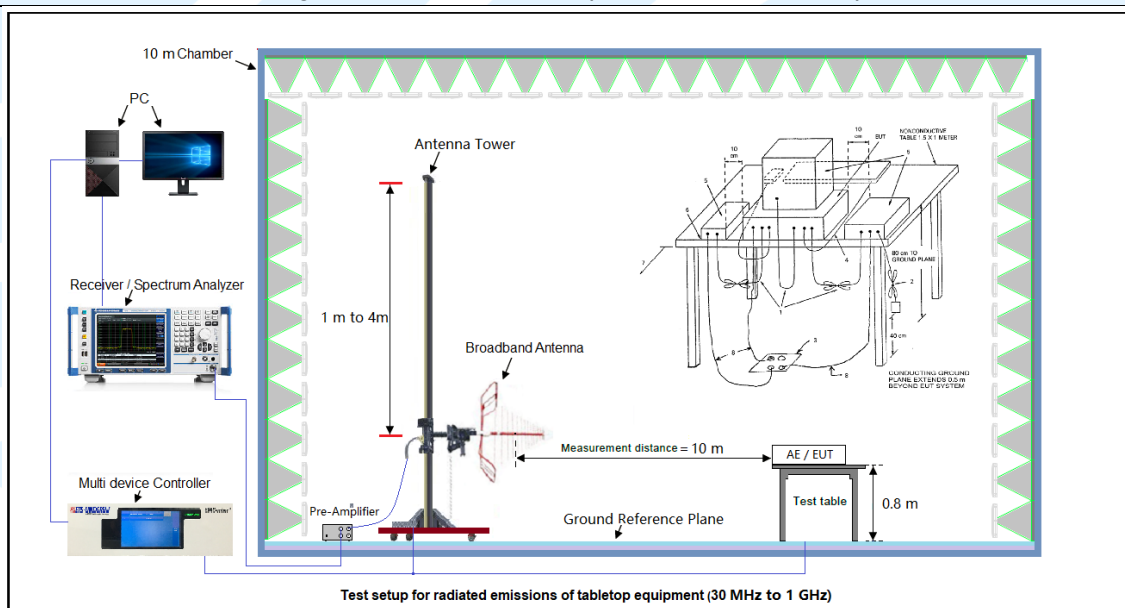
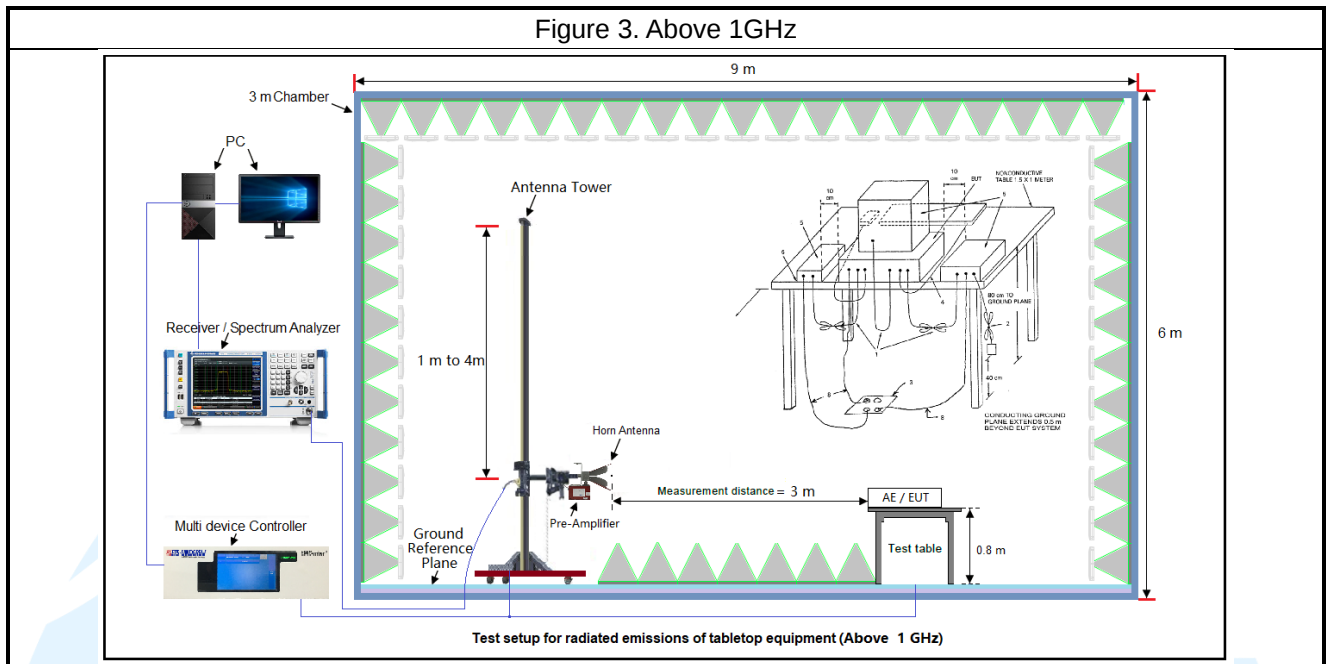
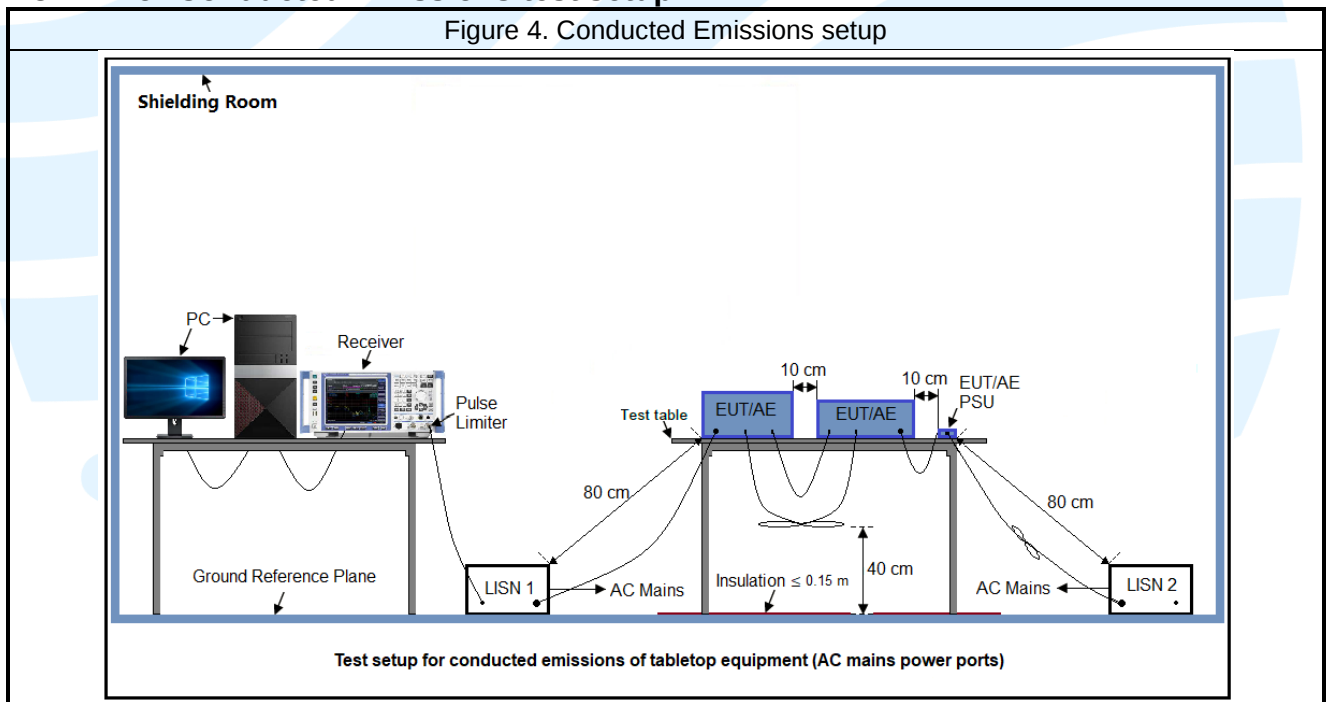


Figure 3. Above 1GHz



4.3.2 For Conducted Emissions test setup

Figure 4. Conducted Emissions setup



4.4 SYSTEM TEST CONFIGURATION

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000MHz. The resolution is 1 MHz or greater for frequencies above 1000MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic (according to KDB 896810 D02 SDoC FAQ v01r01) of the highest fundamental frequency or to 40 GHz, whichever is lower.

5. REFERENCE DOCUMENTS FOR TESTING

No.	Identity	Document Title
1	FCC 47 CFR Part15 Subpart B	Unintentional Radiators
2	ANSI C63.4-2014 ANSI C63.4a-2017	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
3	KDB 174176 D01 Line Conducted FAQ v01r01	AC power-line conducted emission frequency asked questions
4	KDB 896810 D02 SDoC FAQ v01r02	Supplier's Declaration of Conformity frequency asked questions

6. EMC REQUIREMENTS SPECIFICATION

6.1 RADIATED EMISSION

Test Requirement: FCC 47 CFR Part 15.109

Test Method: ANSI C63.4-2014

Receiver Setup:

Frequency: (f) (MHz)	Detector type	Measurement receiver bandwidth	
		RBW	VBW
$30 \leq f \leq 1\,000$	Quasi Peak	120 kHz	300 kHz
$f \geq 1000$	Peak	1 MHz	3 MHz
	Average	1 MHz	3 MHz

Measured frequency range

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30.
1.705-108	1000.
108-500	2000.
500-1000	5000.
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

Limits:

Limits for Class B devices

FCC 47 CFR Part 15 Subpart B

Frequency (MHz)	limits at 10m (dB μ V/m)	limits at 3m (dB μ V/m)		
	QP Detector	QP Detector	PK Detector	AV Detector
30 – 88	29.5	40.0	--	--
88 – 216	33.1	43.5	--	--
216 – 960	35.6	46.0		
960 – 1000	43.5	54.0	--	--
Above 1000	--	--	74.0	54.0

Remark:

- The lower limit shall apply at the transition frequencies.
- Emission level (dB μ V/m) = 20 log Emission level (μ V/m).
- For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

Test Setup: Refer to section 4.3.1 for details.

Test Procedures:

- From 30 MHz to 1GHz test procedure as below:

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- 1) The Product was placed on the non-conductive turntable 0.8 m above the ground at a chamber.
- 2) Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
- 3) For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.

2. Above 1GHz test procedure as below:

- 1) The Product was placed on the non-conductive turntable 0.8 m above the ground at a chamber.
- 2) Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
- 3) For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

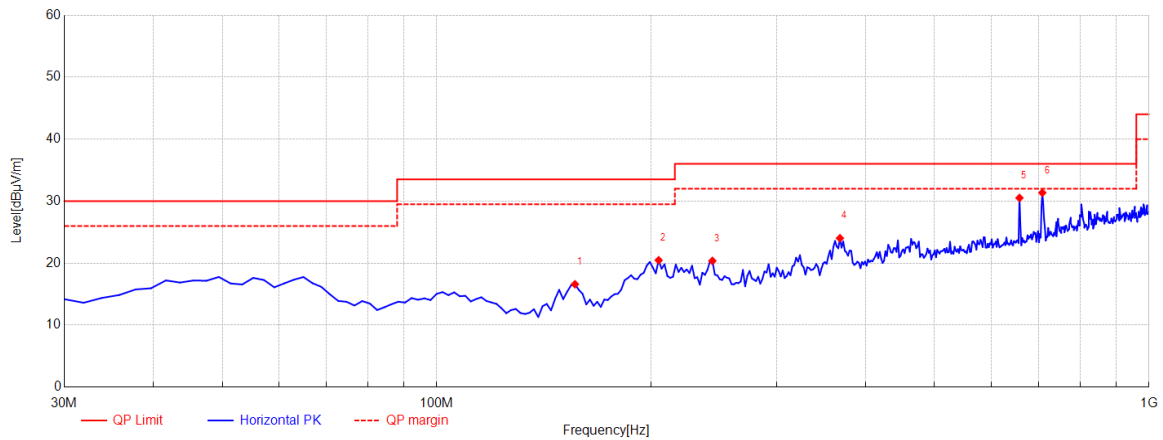
Equipment Used: Refer to section 3 for details.

Test Result: Pass

The measurement data as follows:

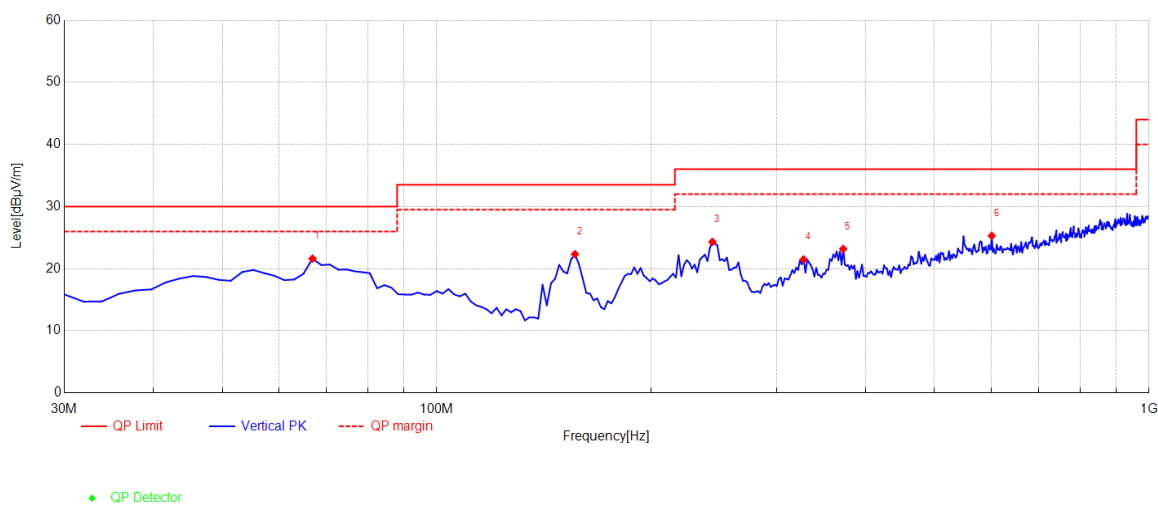
The worst measurement data as follows:

Below 1GHz(Quasi Peak): 10 Meter test distance
Test Mode4
Horizontal



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	156.353	7.5	9.12	16.6	33.50	-16.9	Peak
2	204.950	8.4	12.05	20.5	33.50	-13.0	Peak
3	243.828	7.0	13.35	20.4	36.00	-15.6	Peak
4	368.236	7.9	16.13	24.0	36.00	-12.0	Peak
5	657.876	9.4	21.17	30.5	36.00	-5.5	Peak
6	708.417	9.7	21.69	31.4	36.00	-4.6	Peak

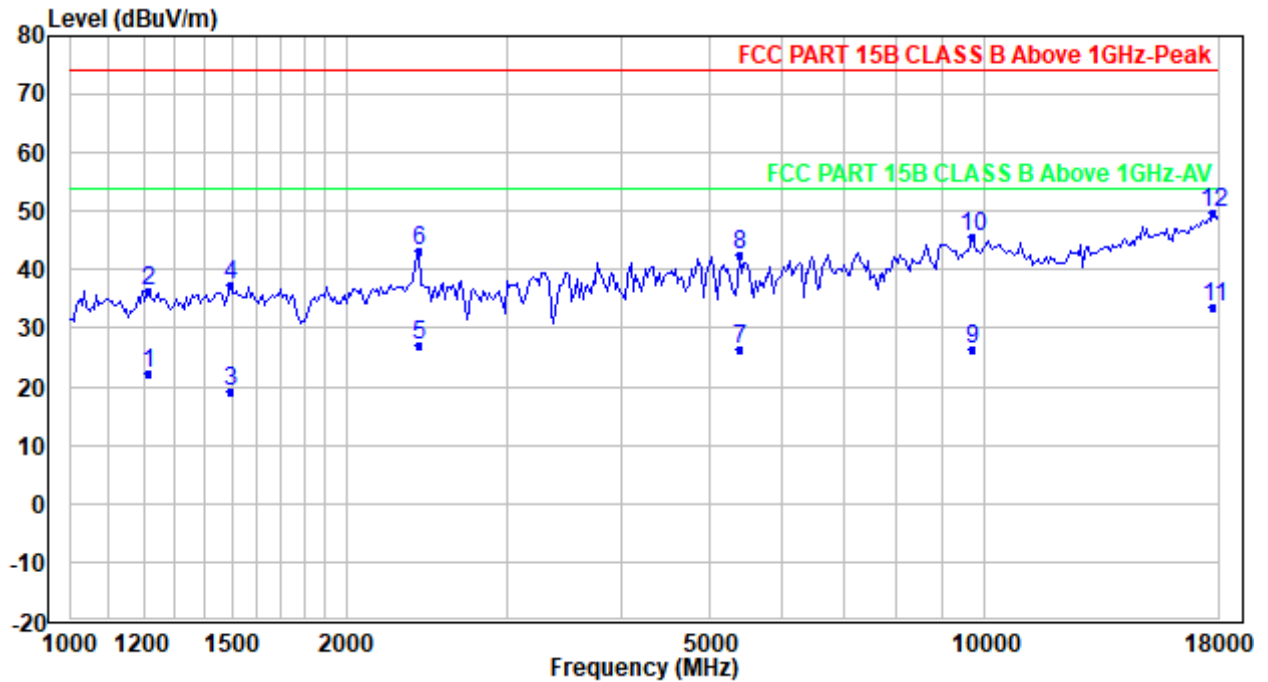
Vertical



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	66.934	10.1	11.51	21.6	30.00	-8.4	Peak
2	156.353	13.2	9.12	22.3	33.50	-11.2	Peak
3	243.828	11.0	13.35	24.3	36.00	-11.7	Peak
4	327.415	6.2	15.29	21.5	36.00	-14.5	Peak
5	372.124	7.0	16.19	23.2	36.00	-12.8	Peak
6	601.503	4.6	20.74	25.3	36.00	-10.7	Peak

Remark: The testing of Radiated Emissions @10 Meter test distance was performed in Shenzhen Academy of Metrology & Quality Inspection.

Above 1GHz(Peak & Average)
Test Mode4
Horizontal



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1217.670	34.55	-12.39	22.16	54.00	-31.84	Average
2	1217.670	48.70	-12.39	36.31	74.00	-37.69	Peak
3	1491.333	30.45	-11.36	19.09	54.00	-34.91	Average
4	1491.333	48.63	-11.36	37.27	74.00	-36.73	Peak
5	2398.016	34.76	-7.54	27.22	54.00	-26.78	Average
6	2398.016	50.92	-7.54	43.38	74.00	-30.62	Peak
7	5395.512	25.89	0.39	26.28	54.00	-27.72	Average
8	5395.512	42.05	0.39	42.44	74.00	-31.56	Peak
9	9685.139	20.40	5.96	26.36	54.00	-27.64	Average
10	9685.139	39.60	5.96	45.56	74.00	-28.44	Peak
11	17792.680	17.96	15.51	33.47	54.00	-20.53	Average
12	17792.680	34.12	15.51	49.63	74.00	-24.37	Peak

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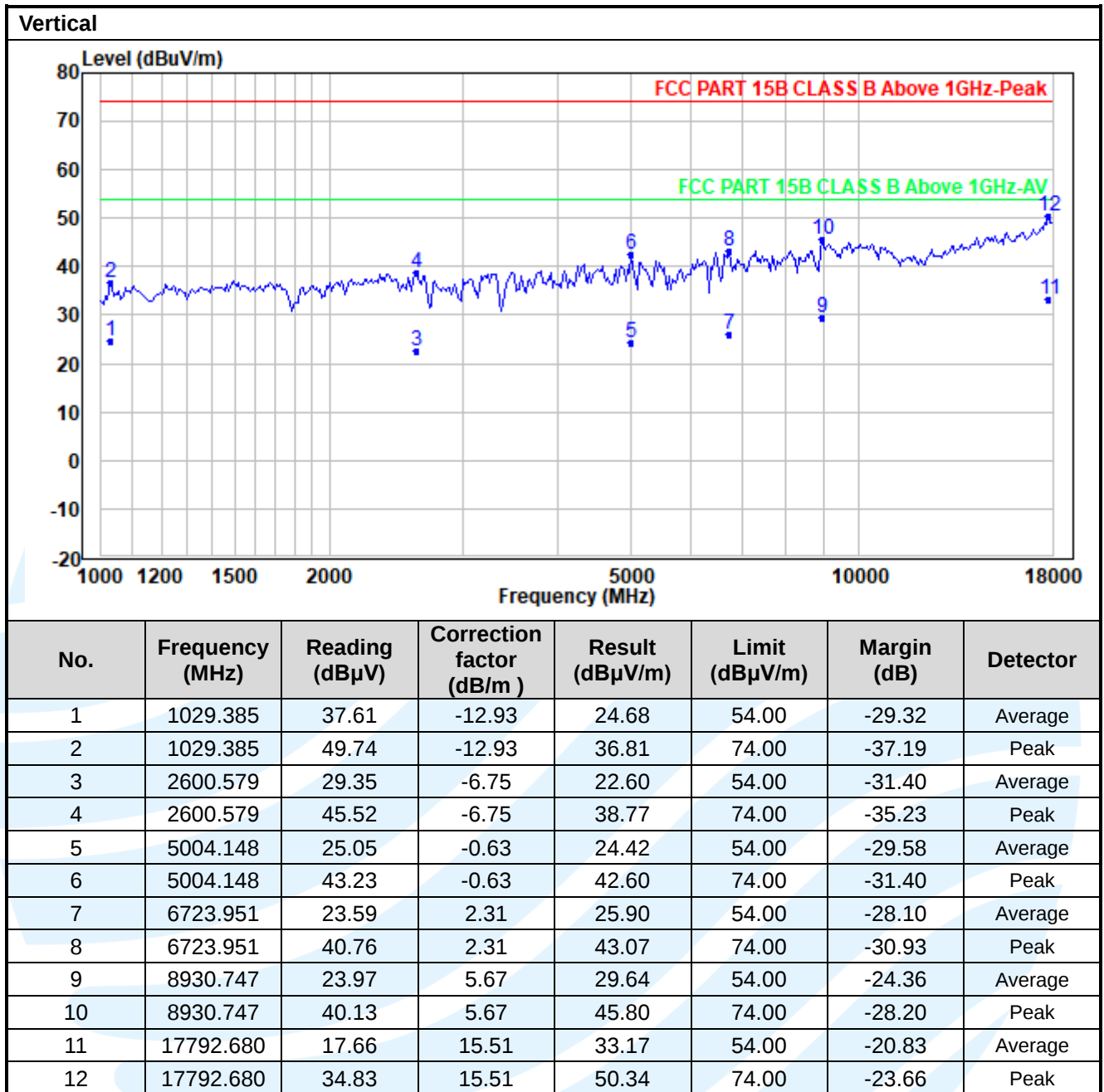
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Remark:

1. Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result – Limit
4. All possible modes of operation were investigated, and testing at two nominal voltages of 240V~50Hz and 120V~60Hz, only the worst case emissions reported.

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6.2 CONDUCTED EMISSION

Test Requirement: FCC 47 CFR Part 15.107

Test Method: ANSI C63.4-2014

Limits:

Limits for Class B devices

Frequency range (MHz)	Limits (dB(μV))	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

Remark:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

Test Setup: Refer to section 4.3.2 for details.

Test Procedures:

- 1) The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).
- 2) The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.
- 3) For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

Equipment Used: Refer to section 3 for details.

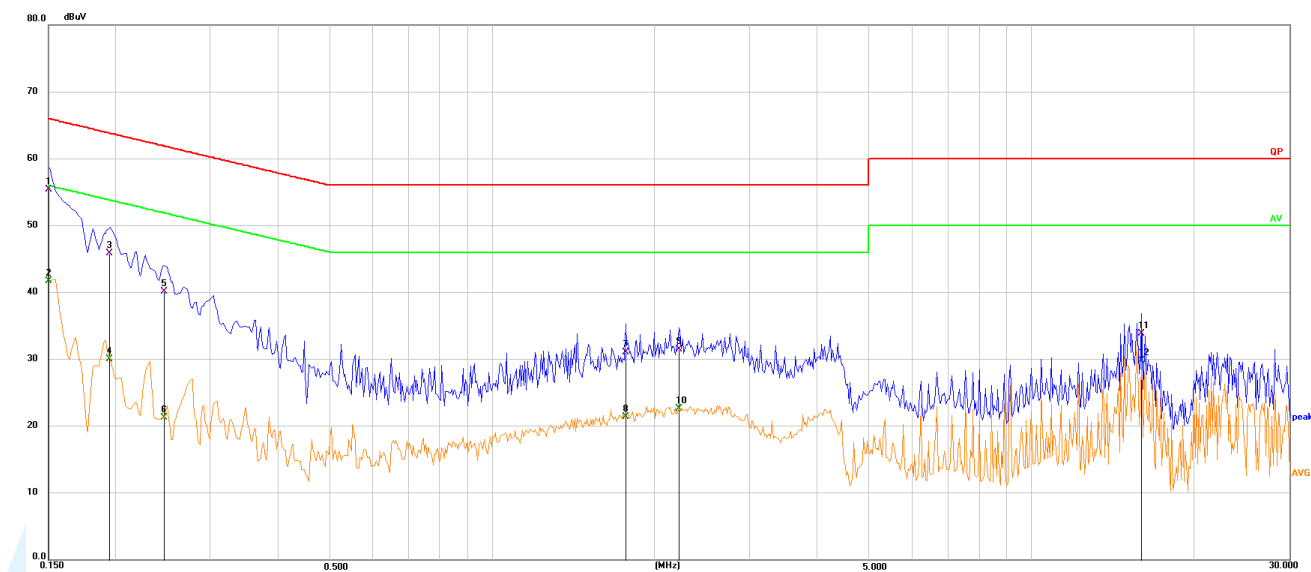
Test Result: Pass

The worst measurement data as follows:

Quasi Peak and Average:

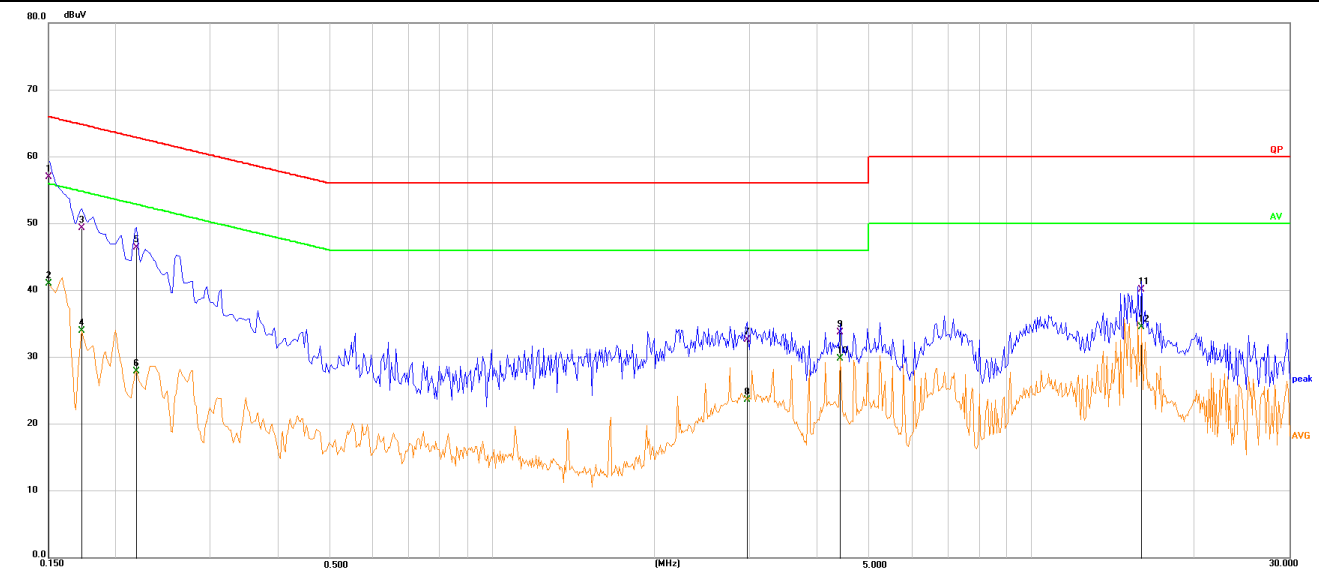
Test Mode4

Live Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.1500	45.14	10.20	55.34	66.00	-10.66	QP
2	0.1500	31.43	10.20	41.63	56.00	-14.37	AVG
3	0.1949	35.62	10.16	45.78	63.83	-18.05	QP
4	0.1949	19.87	10.16	30.03	53.83	-23.80	AVG
5	0.2445	29.87	10.19	40.06	61.94	-21.88	QP
6	0.2445	11.08	10.19	21.27	51.94	-30.67	AVG
7	1.7655	20.78	10.25	31.03	56.00	-24.97	QP
8	1.7655	11.13	10.25	21.38	46.00	-24.62	AVG
9	2.2200	21.25	10.23	31.48	56.00	-24.52	QP
10	2.2200	12.41	10.23	22.64	46.00	-23.36	AVG
11	15.9990	23.27	10.56	33.83	60.00	-26.17	QP
12	15.9990	19.24	10.56	29.80	50.00	-20.20	AVG

Neutral Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.1500	46.76	10.19	56.95	66.00	-9.05	QP
2	0.1500	30.82	10.19	41.01	56.00	-14.99	AVG
3	0.1724	39.12	10.14	49.26	64.84	-15.58	QP
4	0.1724	23.78	10.14	33.92	54.84	-20.92	AVG
5	0.2174	36.33	10.06	46.39	62.92	-16.53	QP
6	0.2174	17.81	10.06	27.87	52.92	-25.05	AVG
7	2.9624	22.34	10.24	32.58	56.00	-23.42	QP
8	2.9624	13.36	10.24	23.60	46.00	-22.40	AVG
9	4.4203	23.49	10.27	33.76	56.00	-22.24	QP
10	4.4203	19.50	10.27	29.77	46.00	-16.23	AVG
11	15.9990	29.46	10.66	40.12	60.00	-19.88	QP
12	15.9990	23.79	10.66	34.45	50.00	-15.55	AVG

Remark:

1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result - Limit
4. An initial pre-scan was performed on the Phase and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.
5. All possible modes of operation were investigated, and testing at two nominal voltages of 240V~50Hz and 120V~60Hz, only the worst case emissions reported.

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UTTR-EMC-FCCPART15B-V1.1

7. PHOTOS OF TEST SETUP

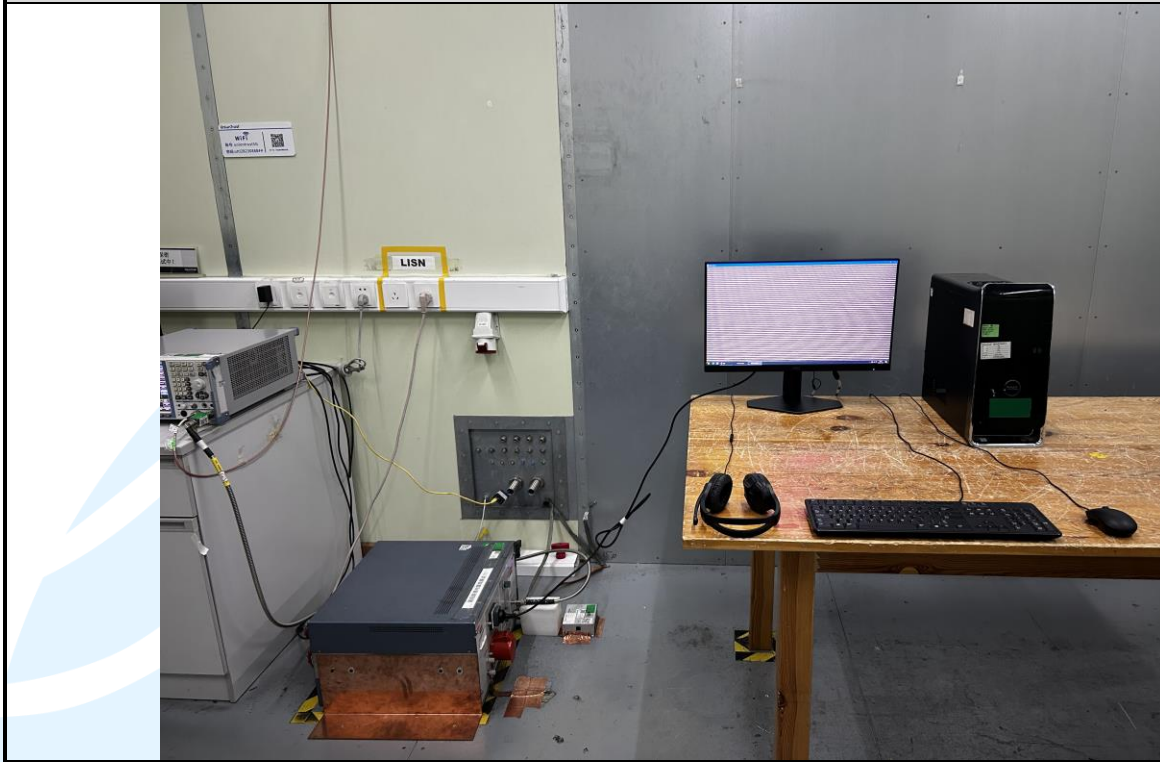
Radiated emission Test Setup (30 MHz~1 GHz) 10 Meter test distance



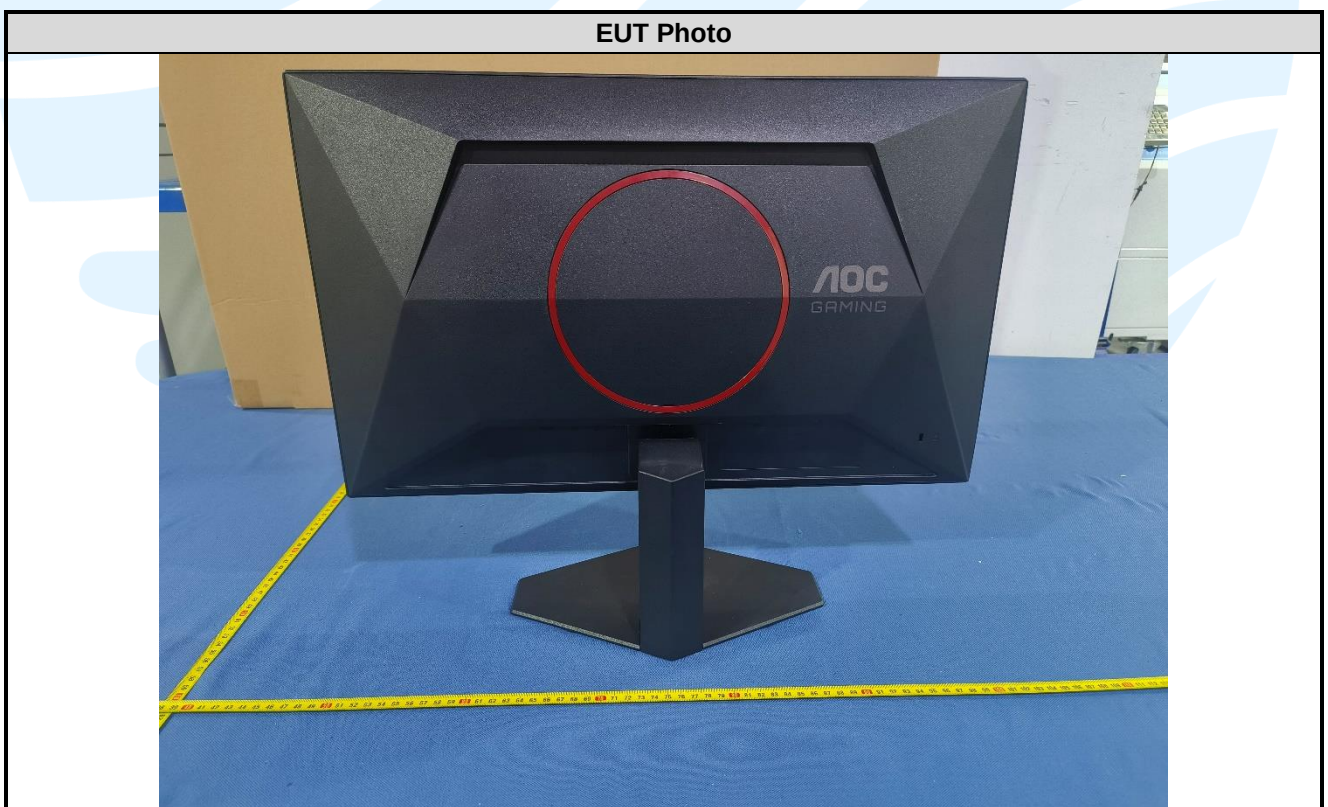
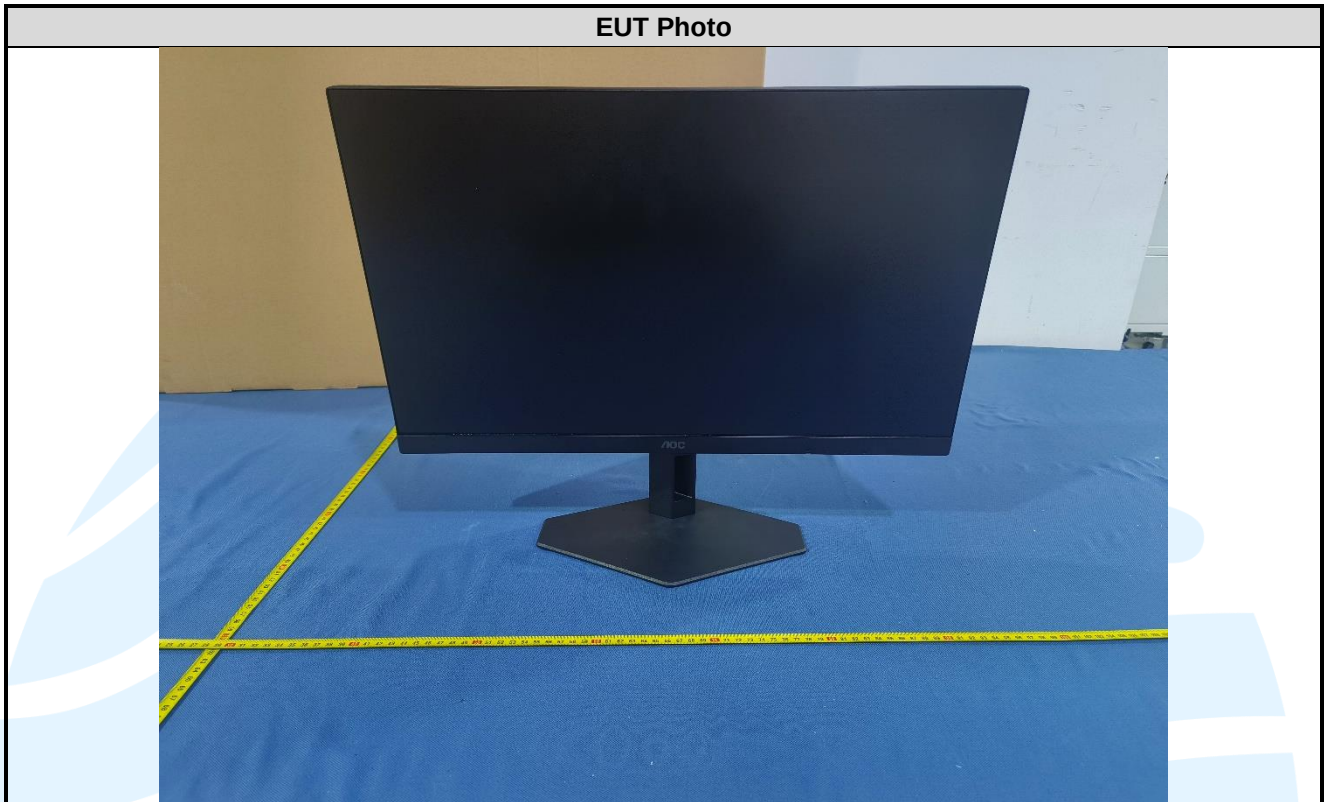
Radiated emission Test Setup (Above 1 GHz)



Conducted Emission Test Setup



8. PHOTOGRAPHS OF EUT



EUT Photo



EUT Photo



***** End of Report *****

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