RF TEST REPORT

Report No.:	20250117G01666X-W10
Product Name:	KEY TOOL MIDI
Model No. :	XDKMD
FCC ID:	2AI4T-XDKMD
Applicant:	Shenzhen Xhorse Electronics Co., Ltd.
Address:	Floor 28, Block A, Building NO.6, International Innovation Valley, Nanshan District, Shenzhen
Dates of Testing:	01/27/2025–04/11/2025
Issued by:	CCIC Southern Testing Co., Ltd.
Lab Location:	Electronic Testing Building, No.43, Shahe Road, Xili Street, Nanshan District, Shenzhen, Guangdong, China. Query E-Mail: manager@ccic-set.com Feedback E-Mail: integrity@ccic-set.com Report Query Tel: 0755-26627338 Feedback Tel: 0755-86185963

Test Report

Product.....:	KEY TOOL MIDI
Trade Name .....:	Xhorse
Applicant.....:	Shenzhen Xhorse Electronics Co., Ltd.
Applicant Address.....:	Floor 28, Block A, Building NO.6, International Innovation Valley, Nanshan District, Shenzhen
Manufacturer.....:	Shenzhen Xhorse Electronics Co., Ltd.
Manufacturer Address.....:	Floor 28, Block A, Building NO.6, International Innovation Valley, Nanshan District, Shenzhen
Test Standards.....:	47 CFR Part 15 Subpart C 15.209 ANSI C63.10-2020
Test Result.....:	Pass

Tested by .....: 2025.04.11

Gu Taocheng, Test Engineer

Reviewed by.....: Sun Jiaohui 2025.04.11

Sun Jiaohui, Senior Engineer

Approved by.....: Chris You 2025.04.11

Chris You, Manager

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Change History		
Issue	Date	Reason for change
1.0	2025.04.11	First edition

1. General Information

1.1. EUT Description

Product Name	KEY TOOL MIDI
Model No.	XDKMD
Operation Frequency	22 kHz; 125 kHz
Modulation technology	ASK
Antenna Type	Internal Antenna
Antenna Gain	2.0 dBi
Power supply	Rechargeable Li-ion Battery DC 3.7 V/6760 mAh

Note 1: The information of antenna gain and cable loss is provided by the manufacturer and our lab is not responsible for the accuracy of the antenna gain and cable loss information.

1.2. Test Standards and Results

The purpose of the report is to conduct testing according to the following FCC certification standards:

No.	Identity	Document Title
1	47 CFR Part 15 Subpart C	Radio Frequency Devices
2	ANSI C63.10-2020	American National Standard for Testing Unlicensed Wireless Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section in CFR 47	Description	Result
1	§ 15.203	Antenna Requirement	PASS
2	§ 15.215(c)	20 dB Bandwidth	PASS
3	§ 15.209	Field Strength of Spurious Emissions	PASS
4	§15.207	AC Power Line Conducted Emission	PASS

1.3. Table for Supporting Units

No.	Equipment	Brand Name	Model Name	Manufacturer	Serial No.	FCC ID/DoC
1	N/A					

1.4. EUT Operation Test Setup

For RF test items, an engineering test program was provided and enable to make EUT transmitting.

1.5. Test environment and mode

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

Operating Environment	
Temperature	15°C to 35°C
Humidity	30% to 60%
Atmospheric Pressure	86 kPa to 106 kPa
Test Mode:	
Transmitting mode	Keep the EUT in transmitting mode with modulation

Note: The EUT was placed on three different polar directions tested: i.e. X axis, Y axis, Z axis, and found the test results are both the “worst case” and “worst setup”: Z axis, so the report only reflects the test data of worst mode.

1.6. Laboratory Facilities and Accreditation Certificate

☒**CCIC-SET Lab 1**

Address: Electronic Testing Building, No.43, Shahe Road, Xili Street, Nanshan District, Shenzhen, Guangdong, China

FCC-Registration No.: CN1283

CCIC Southern Testing Co., Ltd EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Designation Number: CN1283, valid time is until Jun. 30th, 2025.

ISED Registration: 11185A, CAB number: CN0064

CCIC Southern Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A on Aug. 04, 2016, valid time is until Jun. 30th, 2025.

A2LA Code: 5721.01

CCIC-SET is a third party testing organization accredited by A2LA according to ISO/IEC 17025. The accreditation certificate number is 5721.01.

CNAS L1659

CCIC Southern Testing Co., Ltd. CCIC is a third party testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659.

☐**CCIC-SET Lab 4**

Address: No.125, Hongmei Section, Wangsha Road, Hongmei Town, Dongguan City, Guangdong Province, China

CNAS L1659

CCIC Southern Testing Co., Ltd. CCIC is a third party testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659.

2. Test Requirements

2.1. Antenna requirement

2.1.1. Applicable Standard

According to FCC 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

2.1.2. Antenna Information

Antenna Category: Internal Antenna

The antenna of EUT is an Spring Antenna. See product internal photos for details.

Antenna General Information:

No.	EUT	Operating Frequency	Ant. Type	Ant. Gain
1	KEY TOOL MIDI	22 kHz; 125 kHz	Internal	2.0 dBi

2.1.3. Result: comply

The EUT has a permanently and irreplaceable PCB antenna. Please refer to the EUT internal photos.

2.2. 20 dB Bandwidth

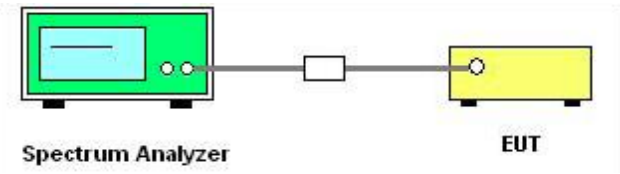
2.2.1. Limit of 20 dB Bandwidth

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. In the case of intentional radiators operating under the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

2.2.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.2.3. Test Setup



2.2.4. Test Procedures

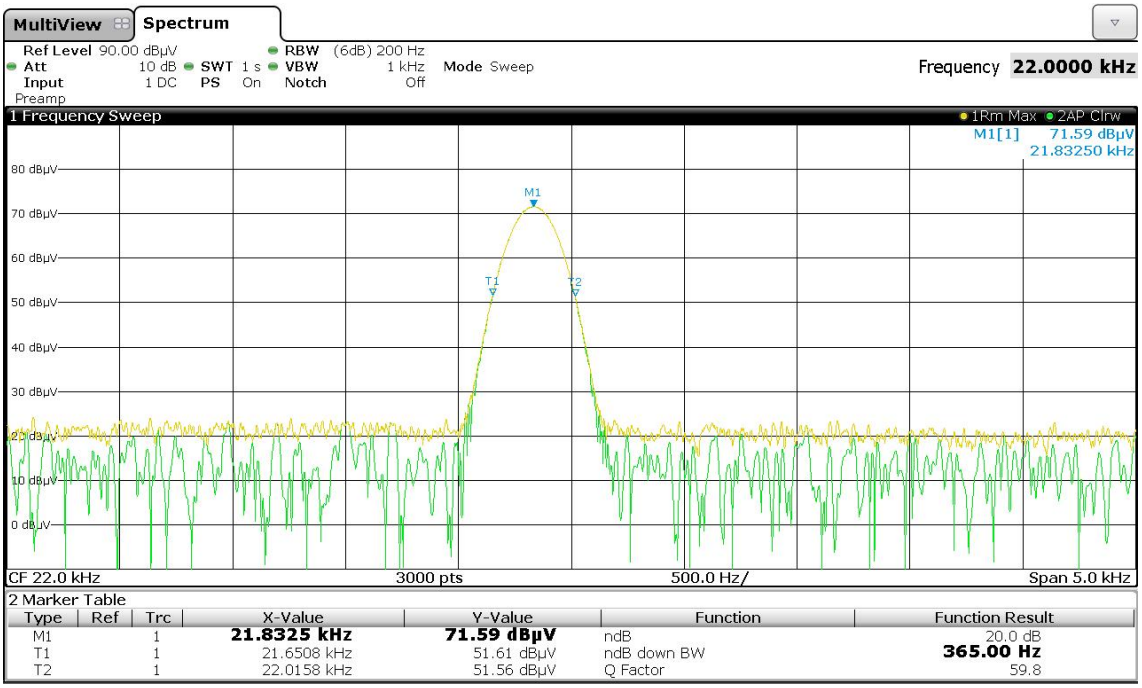
1. The testing follows the Measurement Procedure of ANSI C63.10-2020 Section 6.9.2.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the spectrum analyzer “Channel Bandwidth” function to easurement the 20 dB EBW.
5. For 20 dB EBW Use the following spectrum analyzer settings:

   Set instrument center frequency to operation frequency, Set the Span = 50 kHz, Set the RBW = 200 Hz, VBW = 1 kHz, Detector = Peak, Trace mode = Max hold, Sweep time = Auto couple, Allow trace to fully stabilize.
6. Record the measurement results in the test report.

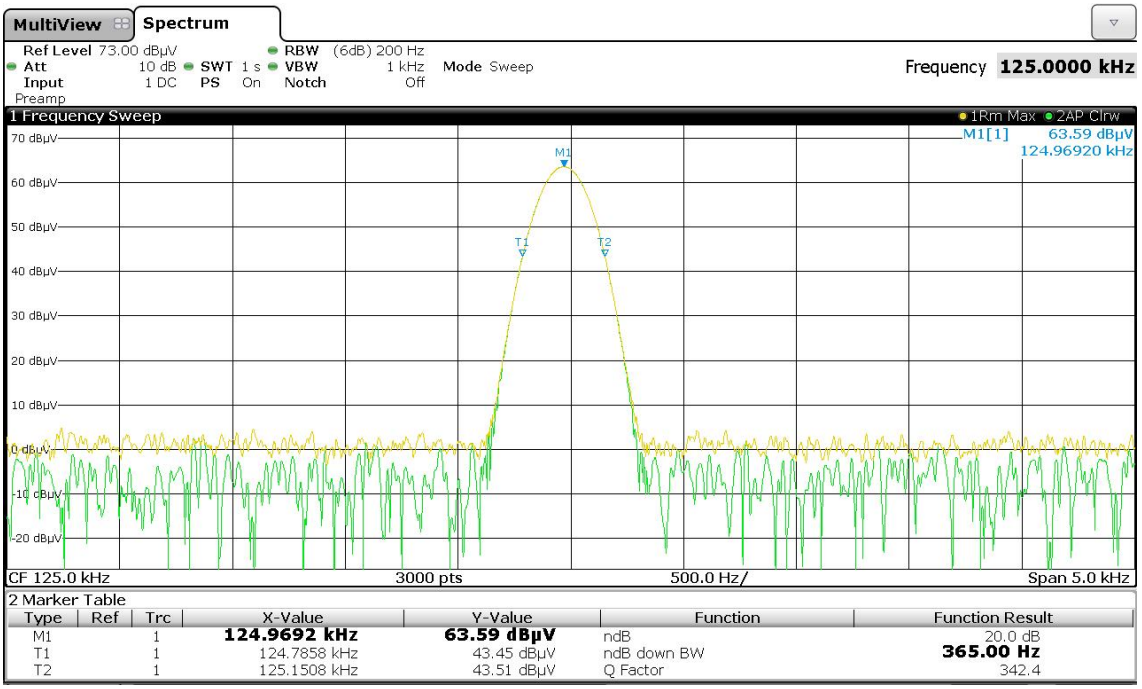
2.2.5. Test Results of 20 dB Bandwidth

Frequency (kHz)	20 dB Bandwidth (kHz)	Limit (kHz)	Result
22	0.365	--	PASS
125	0.365	--	PASS

22 kHz



125 kHz



2.3. Field Strength of Fundamental and Spurious emissions

2.3.1. Limit of Field Strength of Fundamental and Spurious emissions

According to § 15.209(a), the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

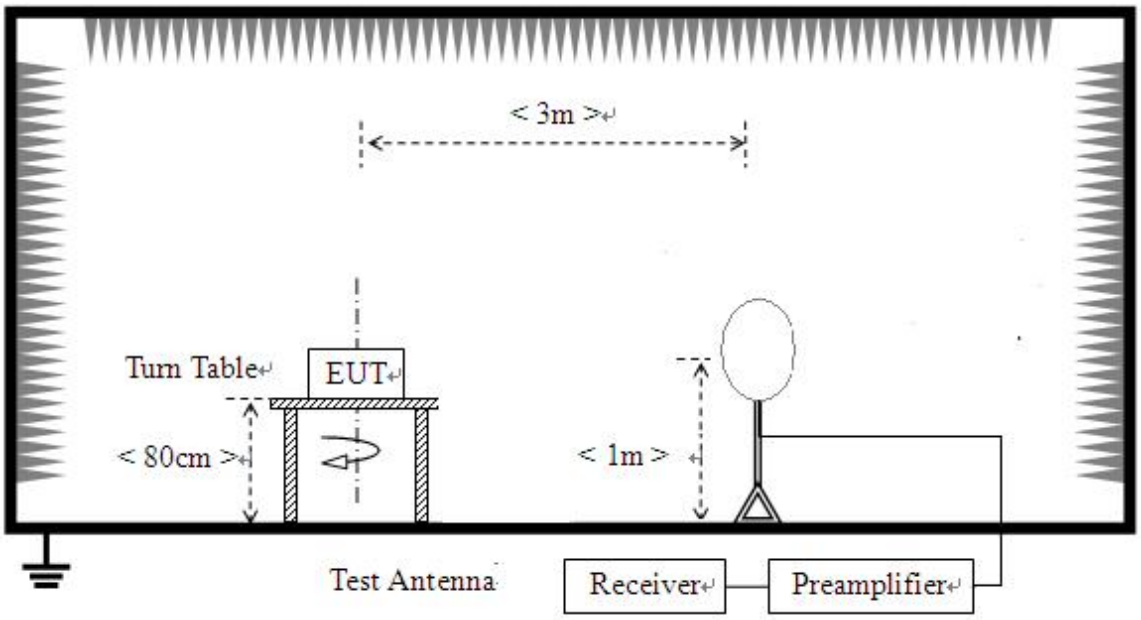
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)	Limit (dBμV/m)@3 m
0.009–0.490	2400/F (kHz)	300	128.52–104.84
0.490–1.705	24000/F (kHz)	30	73.80–62.97
1.705–30.0	30	30	69.54
30–88	100	3	40.0
88–216	150	3	43.5
216–960	200	3	46.0
Above 960	500	3	54.0

2.3.2. Measuring Instruments

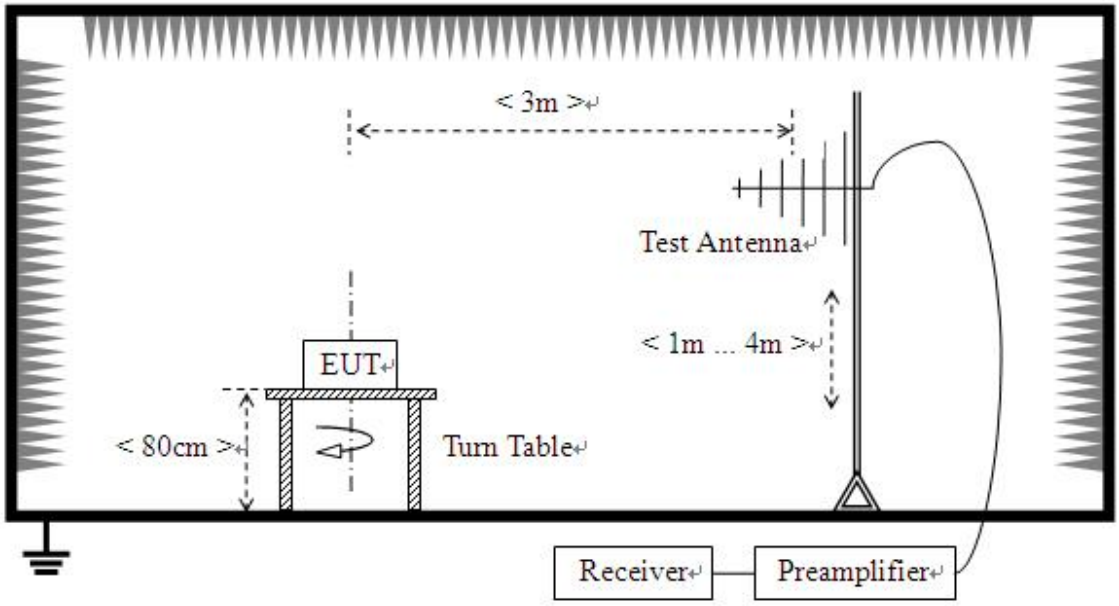
The measuring equipment is listed in the section 3 of this test report.

2.3.3. Test Setup

For radiated emissions from 9 kHz to 30 MHz:



For radiated emissions from 30 MHz to 1 GHz:



2.3.4. Test Procedures

1. The EUT was placed on the top of a rotating table 0.8 m (below 1 GHz) above the ground at a 3 meters chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on thetop of a variable height antenna tower.
3. Height of receiving antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The measurement receivers was set to peak detect Function and maximum hold trace mode.
6. Repeat above procedures until the measurements for all frequencies are complete, record the results in the test report.

Note 1: All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

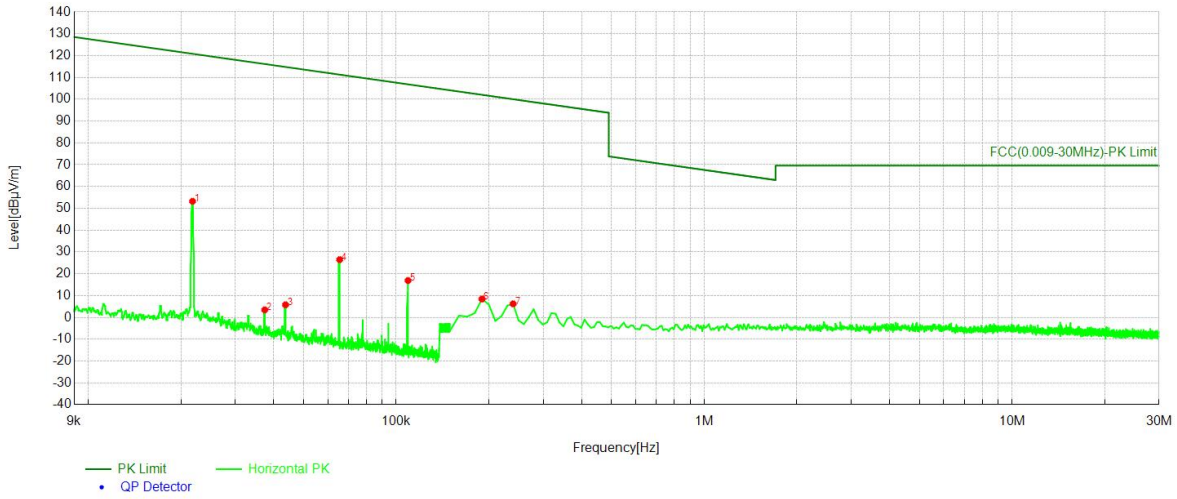
Spectrum Analyzer Setting:

SA Parameters	9 kHz–150 kHz	150 kHz–30 MHz	30 MHz–1 GHz
RBW	200 Hz	9 kHz	120 kHz
VBW	620 Hz	30 kHz	300 kHz
Sweep Time	Auto	Auto	Auto
Detector	Peak/QP	Peak/QP	Peak/QP
Trace Mode	Max Hold	Max Hold	Max Hold

2.3.5. Test Results of Field Strength of Spurious emissions

For 9 kHz to 30 MHz:

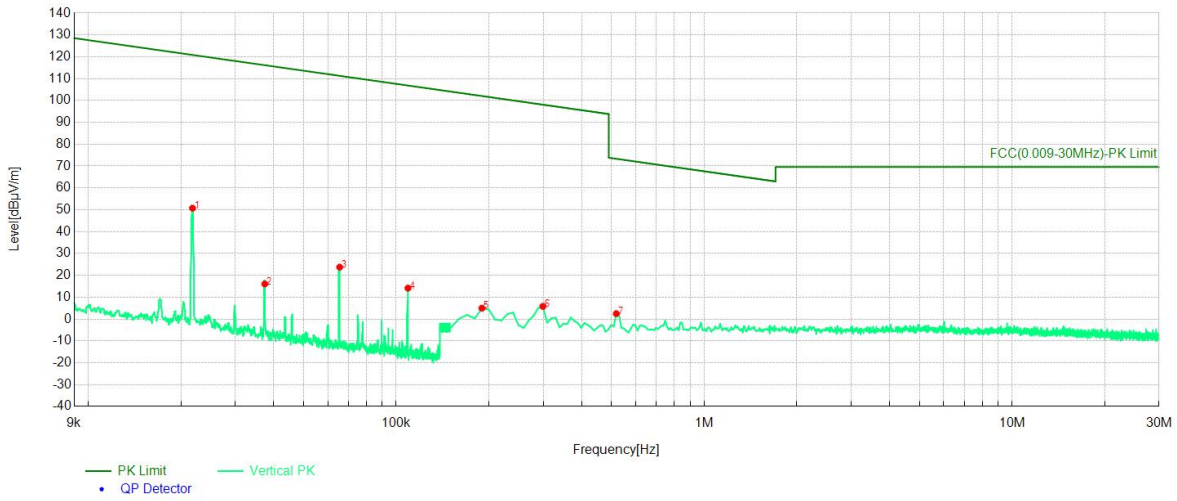
Test site:	5 M anechoic chamber	Environment:	Temp: 23℃; Humi: 59%; 101 kPa
Operator:	Gu Taocheng	Test Date:	2025.03.05
Test Mode:	22 kHz - TX	Polarization:	Horizontal



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dBµV/m]	Height [cm]	Angle [°]	Polarity
1	0.022*	53.22	-19.23	120.84	67.62	100	188	Horizontal
2	0.04	3.45	-19.20	116.15	111.83	100	36	Horizontal
3	0.04	5.78	-19.18	114.80	109.02	100	183	Horizontal
4	0.07	26.48	-19.15	111.28	84.78	100	191	Horizontal
5	0.11	16.92	-19.07	106.84	89.92	100	194	Horizontal
6	0.19	8.44	-19.01	102.04	93.60	100	185	Horizontal
7	0.24	6.22	-18.97	100.02	93.80	100	359	Horizontal

Test Result : Pass

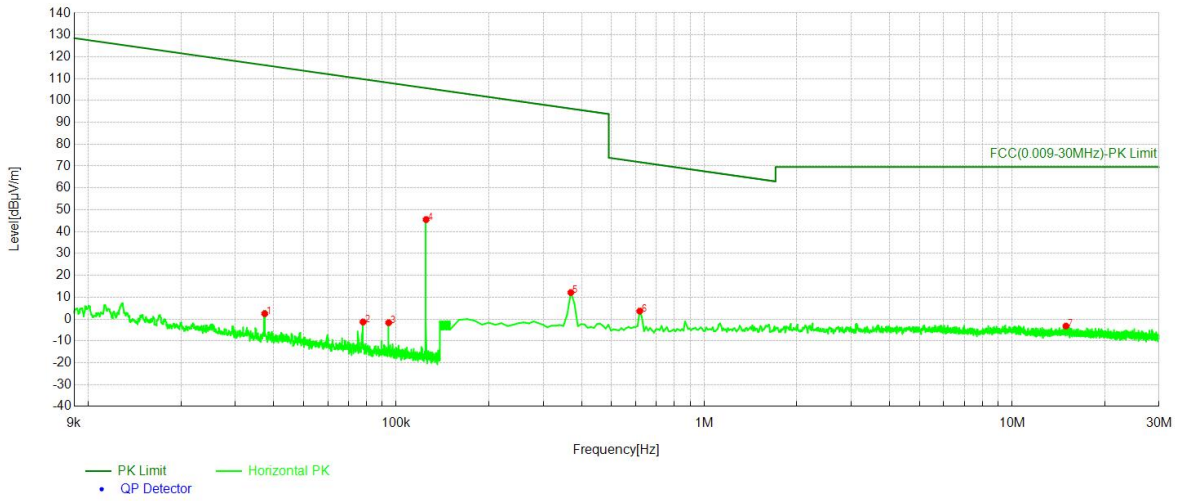
Test site:	5 M anechoic chamber	Environment:	Temp: 23℃; Humi: 59%; 101 kPa
Operator:	Gu Taocheng	Test Date:	2025.03.05
Test Mode:	22 kHz - TX	Polarization:	Horizontal



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dBµV/m]	Height [cm]	Angle [°]	Polarity
1	0.022*	50.71	-19.23	120.84	70.13	100	270	Vertical
2	0.04	16.06	-19.20	116.14	98.49	100	299	Vertical
3	0.07	23.75	-19.15	111.28	87.51	100	279	Vertical
4	0.11	14.14	-19.07	106.84	92.70	100	273	Vertical
5	0.19	4.97	-19.01	102.04	97.07	100	78	Vertical
6	0.30	5.78	-18.96	98.08	92.30	100	135	Vertical
7	0.52	2.48	-18.80	73.31	70.83	100	355	Vertical

Test Result : Pass

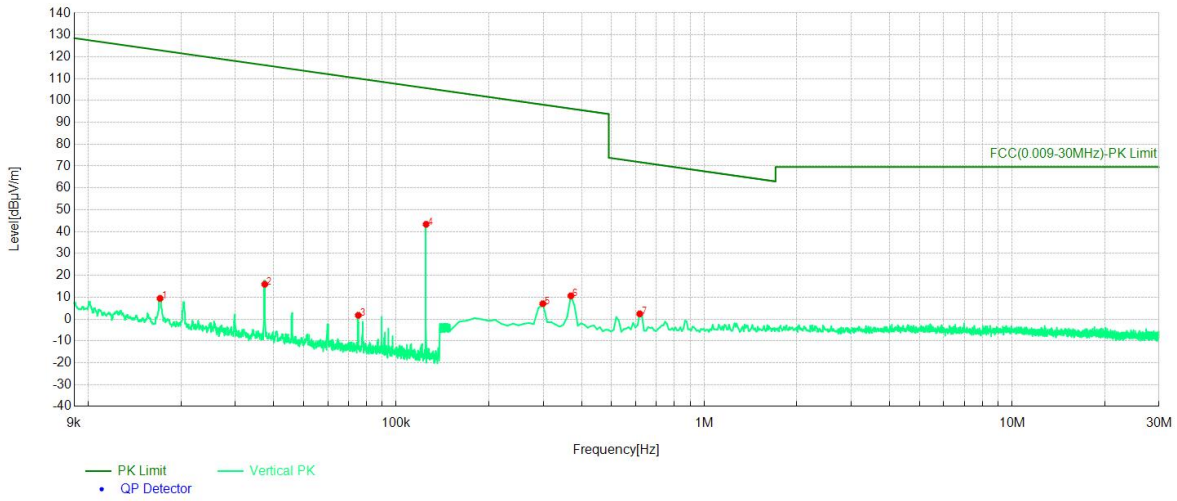
Test site:	5 M anechoic chamber	Environment:	Temp: 23℃; Humi: 59%; 101 kPa
Operator:	Gu Taocheng	Test Date:	2025.03.05
Test Mode:	125 kHz - TX	Polarization:	Horizontal



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dBµV/m]	Height [cm]	Angle [°]	Polarity
1	0.04	2.46	-19.20	116.14	112.26	100	254	Horizontal
2	0.08	-1.34	-19.10	109.77	111.11	100	321	Horizontal
3	0.09	-1.66	-19.08	108.09	109.51	100	356	Horizontal
4	0.125*	45.50	-19.06	105.67	60.17	100	188	Horizontal
5	0.37	12.13	-18.93	96.26	84.13	100	185	Horizontal
6	0.62	3.64	-18.81	71.79	68.15	100	185	Horizontal
7	14.96	-3.21	-18.35	69.54	72.75	100	160	Horizontal

Test Result : Pass

Test site:	5 M anechoic chamber	Environment:	Temp: 23℃; Humi: 59%; 101 kPa
Operator:	Gu Taocheng	Test Date:	2025.03.05
Test Mode:	125 kHz - TX	Polarization:	Horizontal

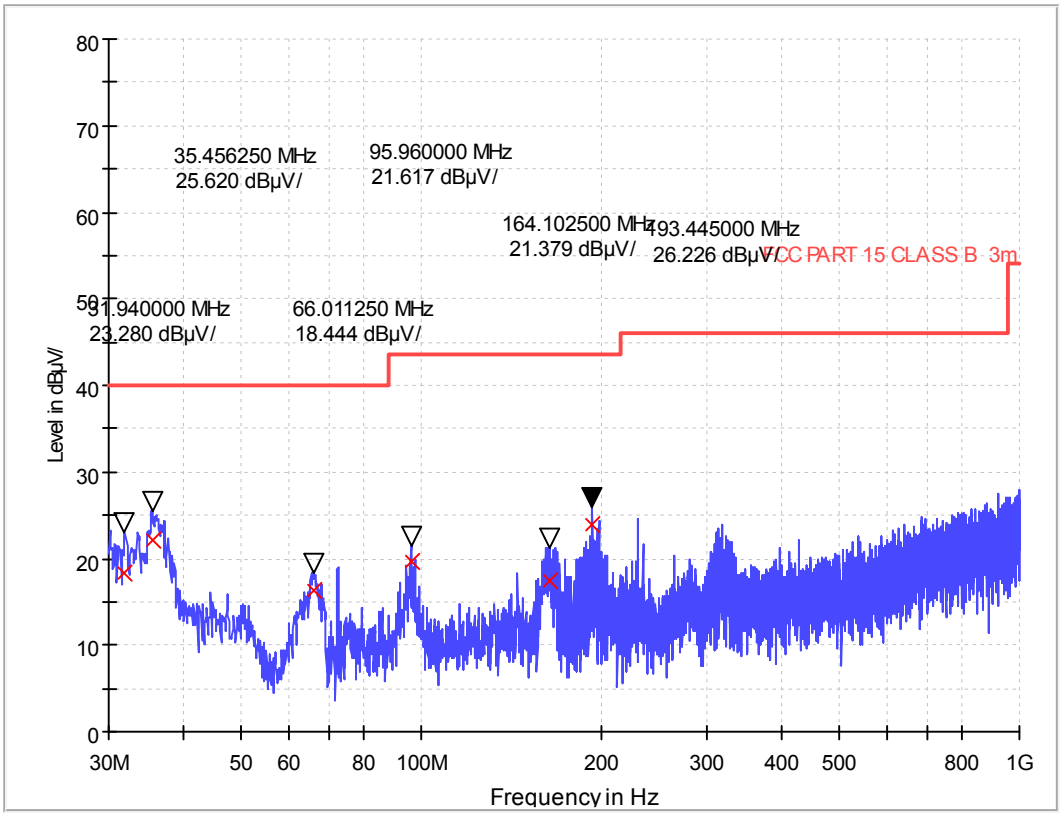


NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dBµV/m]	Height [cm]	Angle [°]	Polarity
1	0.02	9.45	-19.21	122.95	113.50	100	108	Vertical
2	0.04	15.91	-19.20	116.14	98.52	100	80	Vertical
3	0.08	1.71	-19.10	110.07	108.36	100	236	Vertical
4	0.125*	43.34	-19.06	105.67	62.33	100	268	Vertical
5	0.30	7.02	-18.96	98.08	91.06	100	3	Vertical
6	0.37	10.61	-18.93	96.26	85.65	100	278	Vertical
7	0.62	2.38	-18.81	71.79	69.41	100	270	Vertical

Test Result : Pass

For 30 MHz to 1 GHz (22 kHz mode is worst case):

Test site:	3 M anechoic chamber	Environment:	Temp: 23℃; Humi: 48%; 101 kPa
Operator:	Huang Chaoming	Test Date:	2025.02.10
Test Mode:	22 kHz - TX	Test Result:	Pass

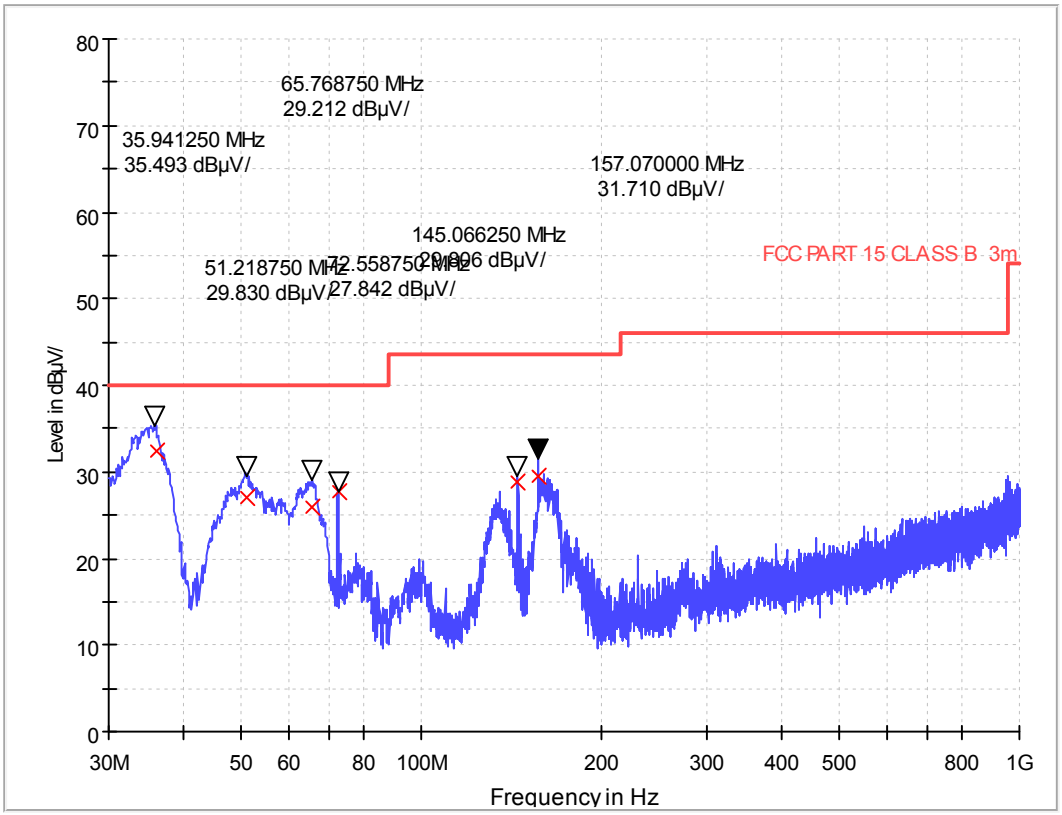


Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarity	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
31.920000	18.29	120.000	100.0	H	18.3	21.71	40.0
35.440000	22.22	120.000	100.0	H	16.4	17.78	40.0
66.000000	16.22	120.000	100.0	H	6.0	23.78	40.0
95.960000	19.58	120.000	100.0	H	9.7	23.92	43.5
164.120000	17.36	120.000	100.0	H	12.0	26.14	43.5
193.440000	23.90	120.000	100.0	H	11.7	19.60	43.5

Remark:

1. Emission Level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. Margin value = Limit value - Emission Level.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. Only the antenna height (from 1 m to 4 m) at maximum reading are recorded.

Test site:	3 M anechoic chamber	Environment:	Temp: 23℃; Humi: 48%; 101 kPa
Operator:	Huang Chaoming	Test Date:	2025.02.10
Test Mode:	22 kHz - TX	Test Result:	Pass



Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarity	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
35.960000	32.44	120.000	100.0	V	16.2	7.56	40.0
51.200000	27.07	120.000	100.0	V	8.5	12.93	40.0
65.760000	25.98	120.000	100.0	V	6.0	14.02	40.0
72.560000	27.82	120.000	100.0	V	6.8	12.18	40.0
145.080000	28.78	120.000	100.0	V	11.9	14.72	43.5
157.080000	29.40	120.000	100.0	V	12.0	14.10	43.5

Remark:

1. Emission Level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. Margin value = Limit value - Emission Level.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. Only the antenna height (from 1 m to 4 m) at maximum reading are recorded.

2.4. AC Power Line Conducted Emission

2.4.1. Limit of AC Power Line Conducted Emission

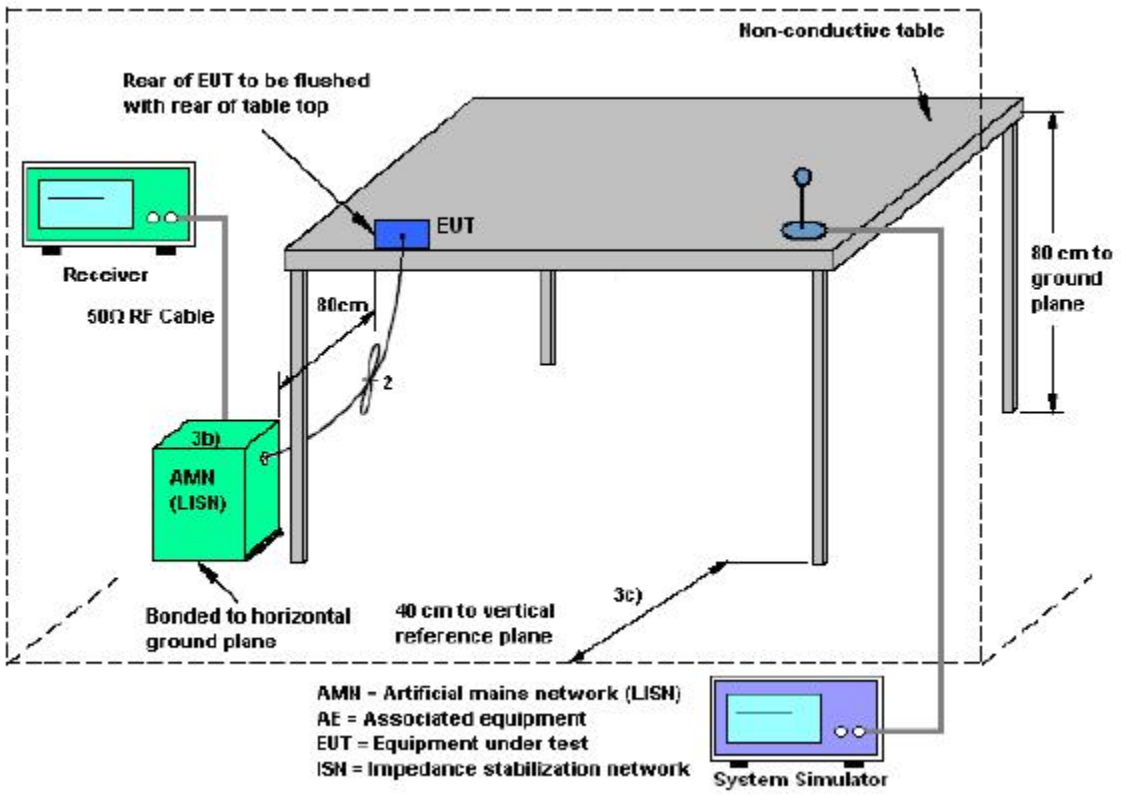
For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency range (MHz)	Conducted Limit (dBμV)	
	Quai-peak	Average
0.15–0.50	66 to 56	56 to 46
0.50–5	56	46
5–30	60	50

2.4.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.4.3. Test Setup



2.4.4. Test Procedures

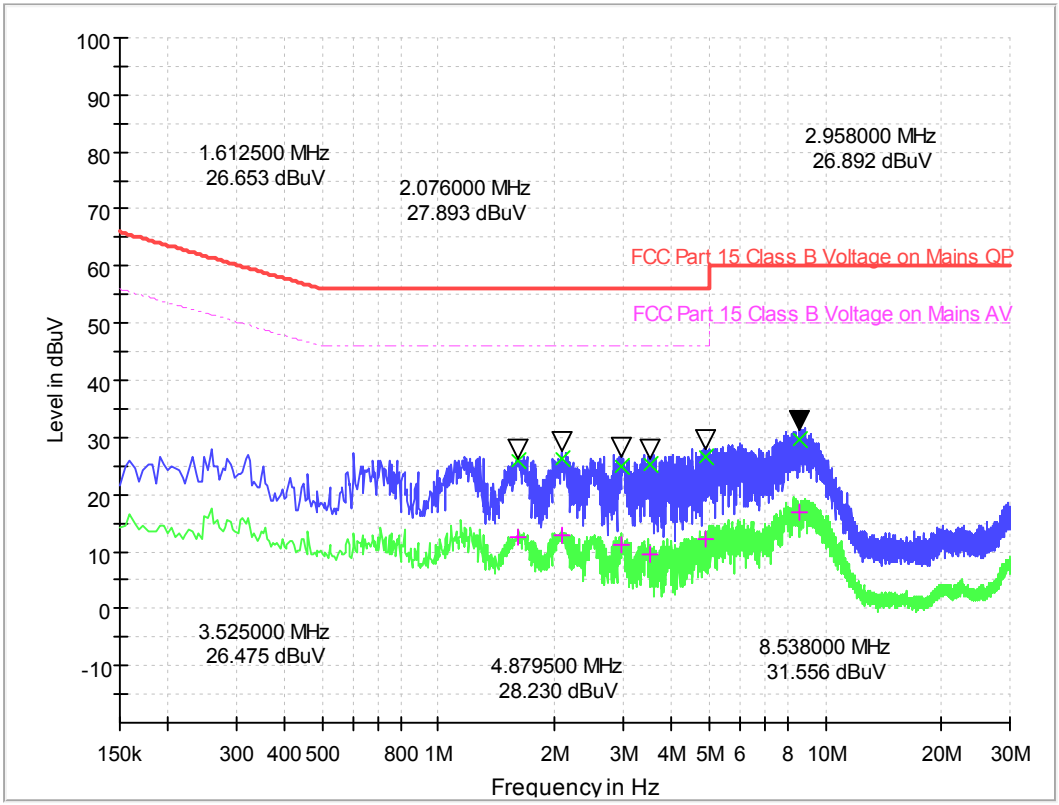
1. The EUT was placed 0.4 meters from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 micrometry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9 kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

2.4.5. Test Results of Conducted Emission

The EUT configuration of the emission tests is 22 kHz TX + USB Cable (Charging from Adapter).

All of the EUT Configure mode were tested and found 22 kHz channel is the worst mode, the worst case is recorded in this report.

Test site:	Shield ROOM 1	Environment:	Temp: 23℃; Humi: 53%; 101 kPa
Operator:	CAIFUJIE	Test Date:	2025.02.08
Test Mode:	22 kHz- TX	Test Part:	L Line

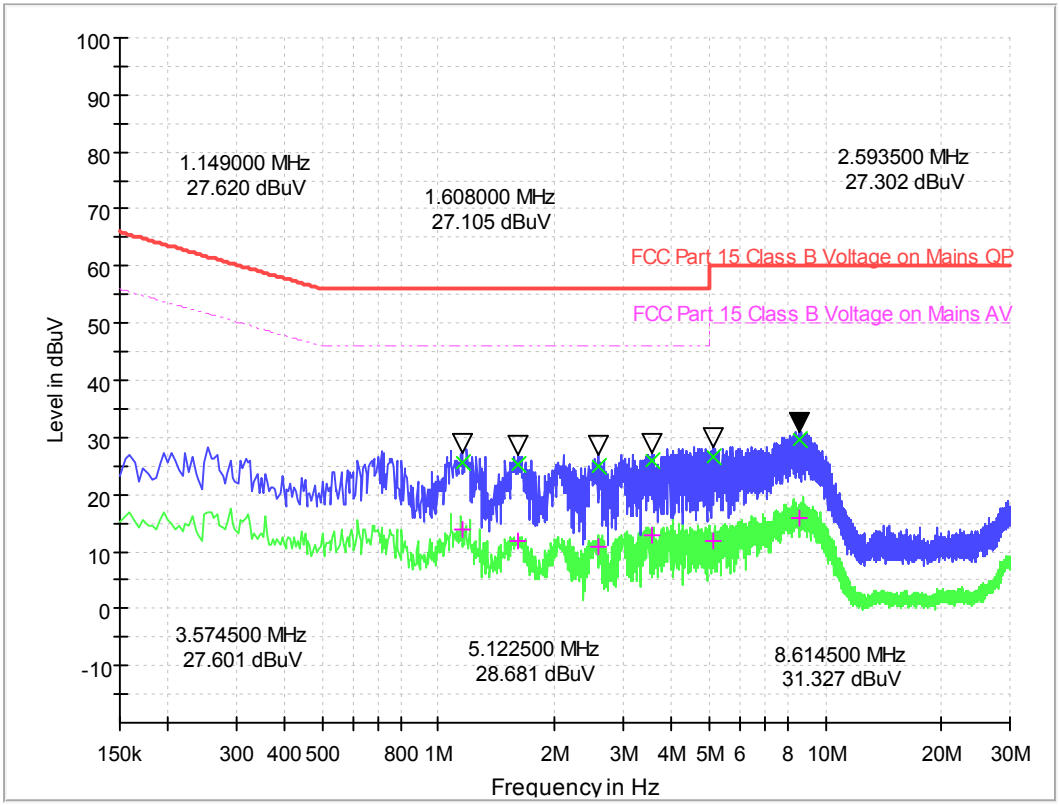


Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Corr.Factor (dB)	Margin - QPK	Limit - QPK (dBµV)	Margin - AV (dB)	Limit - AV (dBµV)
1.612500	25.89	12.63	10.0	30.11	56.0	33.37	46.0
2.076000	26.19	12.69	10.1	29.81	56.0	33.31	46.0
2.958000	24.79	11.24	10.2	31.21	56.0	34.76	46.0
3.525000	25.15	9.41	10.2	30.85	56.0	36.59	46.0
4.879500	26.54	12.28	10.3	29.46	56.0	33.72	46.0
8.538000	29.48	16.75	10.5	30.52	60.0	33.25	50.0

Test Result : Pass

Note: Final Level = Receiver Read level + Correction factor.

Test site:	Shield ROOM 1	Environment:	Temp: 23℃; Humi: 53%; 101 kPa
Operator:	CAIFUJIE	Test Date:	2025.02.08
Test Mode:	22 kHz- TX	Test Part:	N Line



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Corr.Factor (dB)	Margin - QPK	Limit - QPK (dBµV)	Margin - AV (dB)	Limit - AV (dBµV)
1.149000	25.52	13.92	10.0	30.48	56.0	32.08	46.0
1.608000	25.27	11.91	10.0	30.73	56.0	34.09	46.0
2.593500	24.98	10.80	10.1	31.02	56.0	35.20	46.0
3.574500	25.97	12.88	10.2	30.03	56.0	33.12	46.0
5.122500	26.52	11.69	10.4	33.48	60.0	38.31	50.0
8.614500	29.72	16.01	10.5	30.28	60.0	33.99	50.0

Test Result : Pass

Note: Final Level = Receiver Read level + Correction factor.

3. List of measuring equipment

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	5M Anechoic Chamber	Albatross	SAC-5MAC 12.8x6.8x6.4m	A0304210	2023.08.01	2026.07.31
2	EMI Test Receiver	ROHDE&SCHWARZ	ESW26	A180502935	2024.05.23	2025.05.22
3	Loop Antenna	Schwarz beck	HFH2-Z2	A0304220	2022.05.02	2025.05.01
4	Broadband antenna (30MHz~1GHz)	R&S	HL562	A0304224	2023.06.08	2026.06.07
5	EMI Horn Ant. (1-18G)	ETC	MCTD-1209	A150402241	2023.05.16	2026.05.15
6	Horn antenna (18GHz~26.5GHz)	AR	AT4510	A0804450	2023.06.01	2026.05.31
7	Amplifier 30M~1GHz	TESEQ	CBA1G-600B	A190503534	2024.09.05	2025.09.04
8	Amplifier 1G~18GHz	MILMEGA	AS0104R-800/400	A160302517	2024.05.25	2025.05.24
9	Spectrum Analyzer	KEYSIGHT	N9030A	A160702554	2024.12.31	2025.12.30
10	Test Receiver	KEYSIGHT	N9038A	A141202036	2024.06.05	2025.06.04
11	LISN	ROHDE&SCHWARZ	ENV216	A140701847	2024.05.23	2025.05.22
12	Cable(9kHz~30MHz)	/	/	C230800587	2023.08.21	2026.08.20
13	Cable(30MHz~18GHz)	/	XSMJA750-SMNM(RA)-12M	C230800588	2023.08.21	2026.08.20
14	Cable(18GHz~40GHz)	/	SUCOFLEX102	C230800590	2023.08.21	2026.08.20

4. Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2020. All the measurement uncertainty value were shown with a coverage K = 2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of AC Power Line Conducted Emission Measurement (150 kHz–30 MHz)

Measuring Uncertainty for a level of confidence of 95% (U = 2Uc(y))	2.8 dB

Uncertainty of Radiated Emission Measurement (9 kHz–30 MHz)

Measuring Uncertainty for a level of confidence of 95% (U = 2Uc(y))	3.5 dB

Uncertainty of Radiated Emission Measurement (30 MHz–1 GHz)

Measuring Uncertainty for a level of confidence of 95% (U = 2Uc(y))	3.91 dB

Uncertainty of Radiated Emission Measurement (1 GHz–18 GHz)

Measuring Uncertainty for a level of confidence of 95% (U = 2Uc(y))	4.5 dB

Uncertainty of Radiated Emission Measurement (18 GHz–40 GHz)

Measuring Uncertainty for a level of confidence of 95% (U = 2Uc(y))	4.9 dB

Uncertainty of RF Conducted Measurement (9 kHz–40 GHz)

Measuring Uncertainty for a level of confidence of 95% (U = 2Uc(y))	1.3 dB

END OF REPORT