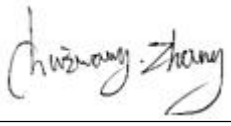
RF TEST REPORT

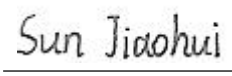
Report No.:	20250517G11391X-W3
Product Name:	BLUETOOTH DIGITAL SMART KEY
Model No. :	XSBTK0
FCC ID:	2AI4T-XSBTK0
Applicant:	Shenzhen Xhorse Electronics Co., Ltd.
Address:	Floor 28, Block A, Building NO.6, International Innovation Valley, Nanshan District, Shenzhen
Dates of Testing:	05/20/2025–06/19/2025
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.....:	BLUETOOTH DIGITAL SMART KEY
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 15.231 ANSI C63.10-2020
Test Result.....:	Pass

Tested by .....:  2025.06.19

Gu Taocheng, Test Engineer

Reviewed by.....:  2025.06.19

Sun Jiaohui, Senior Engineer

Approved by.....:  2025.06.19

Chris You, Manager

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Change History		
Issue	Date	Reason for change
1.0	2025.06.19	First edition

1. General Information

1.1. EUT Description

Product Name	BLUETOOTH DIGITAL SMART KEY
Model No.	XSBTK0
Operation Frequency	315 MHz; 433.92 MHz
Modulation technology	ASK
Antenna Type	Internal Antenna
Antenna Gain	2.0 dBi
Power supply	DC 12 V

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	§ 15.231(c)	20 dB Bandwidth	PASS
3	§ 15.231(b)	Field Strength of Fundamental	PASS
4	§ 15.231(b), § 15.209	Field Strength of Spurious Emissions	PASS
5	§15.231(a)(1)	Duration Time	PASS
6	§15.207	AC Power Line Conducted Emission	N/A[Note 1]

Note 1: Not applicable, the EUT is powered by a DC12 V supply.

1.3. Table for Supporting Units

No.	Equipment	Model Name	Manufacturer	FCC ID
1	KEY TOOL MIDI	XDKMD	Xhorse	2AI4T-XDKMD

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	BLUETOOTH DIGITAL SMART KEY	315 MHz; 433.92 MHz	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

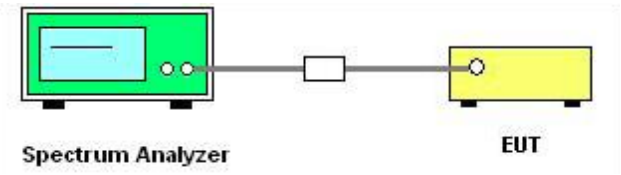
2.2.1. Limit of 20 dB Bandwidth

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

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

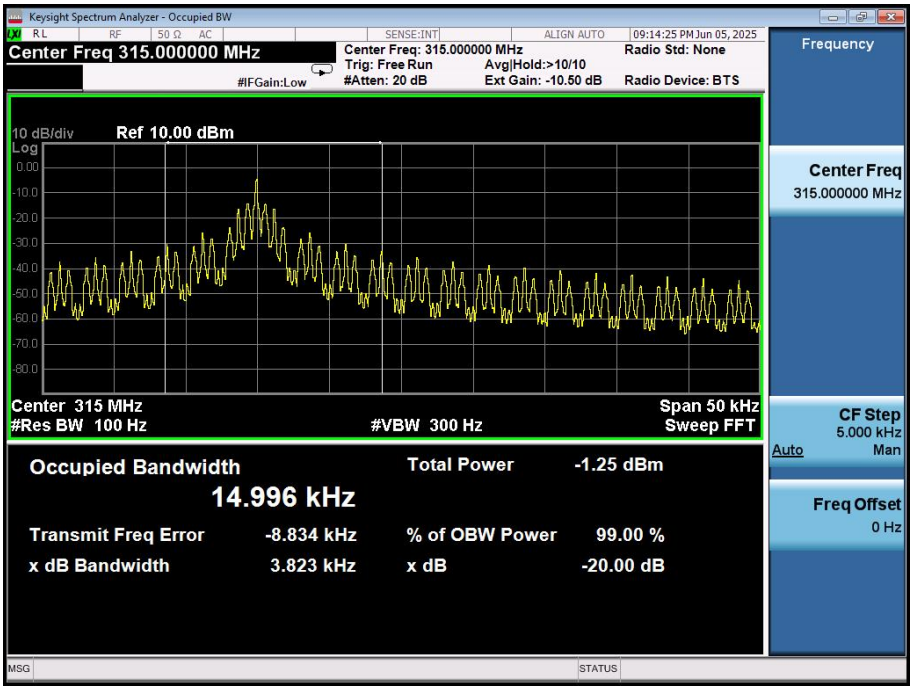
1. The testing follows the Measurement Procedure of ANSI C63.10-2020 Section 6.9.2.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit 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 span to be approximately 2 to 5 times the OBW, Set the ≥ 1% to 5% of the OBW, VBW ≥ 3 × RBW, Detector = Peak, Trace mode = Max hold, Sweep time = Auto couple, Allow trace to fully stabilize.
6. Record the measurement results in the test report.

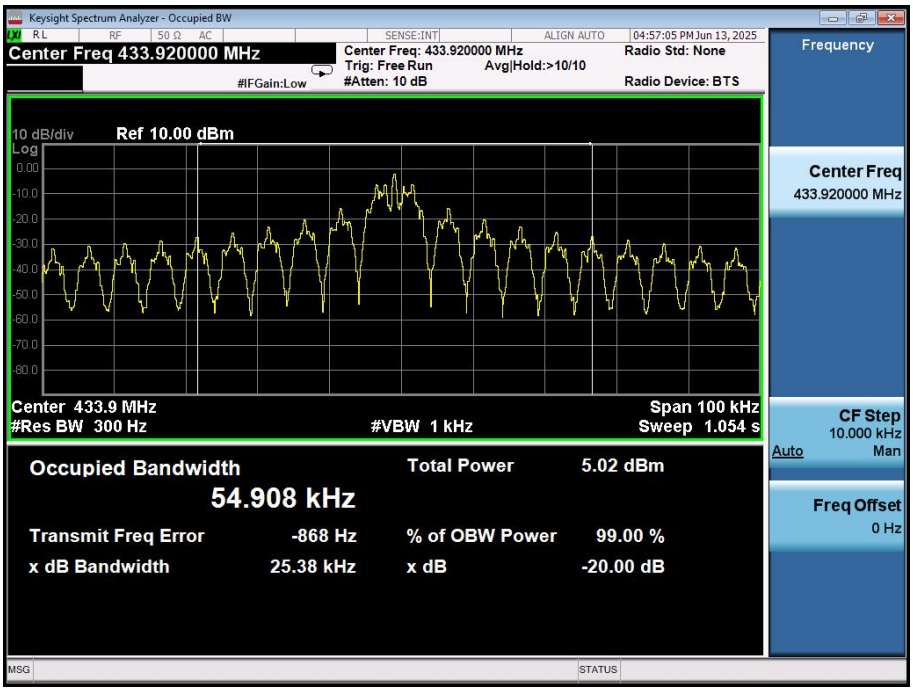
2.2.5. Test Results of 20 dB Bandwidth

Frequency (MHz)	20 dB Bandwidth (kHz)	Limit (kHz)	Result
315	3.823	787.5	PASS
433.92	25.38	1084.8	PASS

315 MHz



433.92 MHz



2.3. Duty Cycle Factor

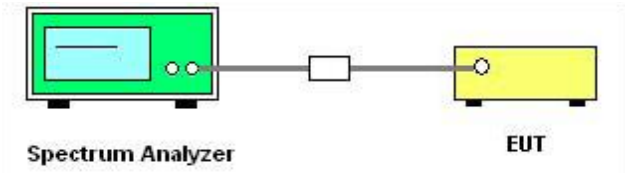
2.3.1. Limit of Duty Cycle Factor

For reporting purposes only.

2.3.2. Measuring Instruments

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

2.3.3. Test Setup



2.3.4. Test Procedures

1. The testing follows the Measurement Procedure of ANSI C63.10-2020 Section 7.4.
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 following spectrum analyzer settings:

   Set instrument center frequency to operation frequency, Set the Span = 0 Hz, Set the RBW = 1 MHz, VBW = 3 MHz, Detector = Normal, Trace mode = Clear Write, Set sweep time greater than the specified time for periodic operation.
5. Calculation of duty cycle factor according to ANSI C63.10-2020 Section 7.6.3.
6. Record the measurement results in the test report.

2.3.5. Test Results of Duty cycle factor

Frequency (MHz)	Total On Time (ms)	Period Time (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)
315	19	120	15.83	-16.01
433.92	1.02	121.1	52.68	-5.57

Note 1: According to ANSI C63.10-2013 section 7.6.3:

$T_{Total\ On\ Time} = T_{On\ 1} \times N_{Burst\ 1} + T_{On\ 2} \times N_{Burst\ 2} + \cdots T_{On\ n} \times N_{Burst\ n}$.

$N_{Burst\ n}$ is the number of Burst n in one period.

$T_{On\ n}$ is the pulse width of Burst n.

For fundamental frequency 315 MHz:

$T_{Total\ On\ Time}$ = 1.24 ms × 10 + 0.44 ms × 15 = 19 ms.

Duty Cycle = (Total On Time / Period Time) * 100% = (19 / 120) * 100% = 15.83%.

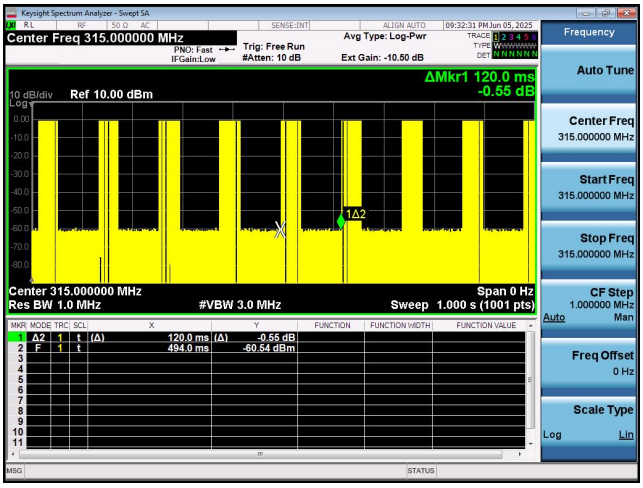
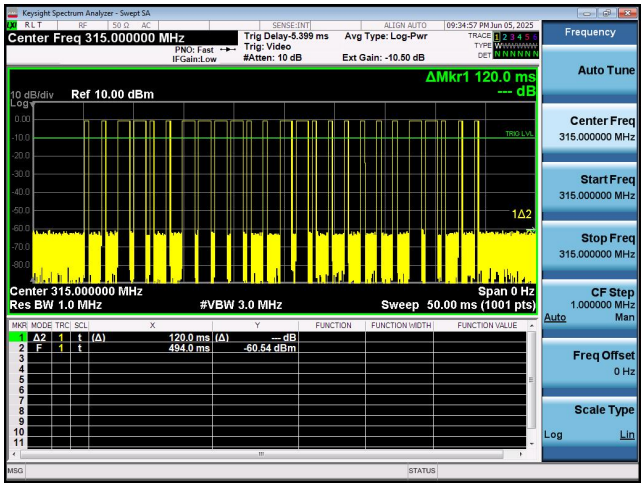
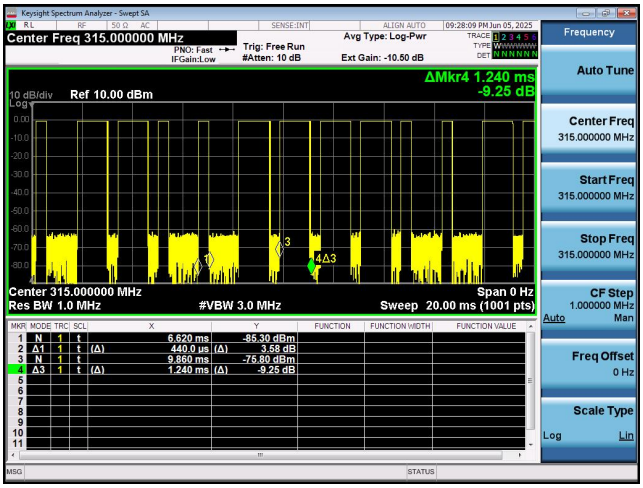
Duty Cycle Factor = 20 × log(Duty Cycle) = 20 × log(15.83%) = -16.01.

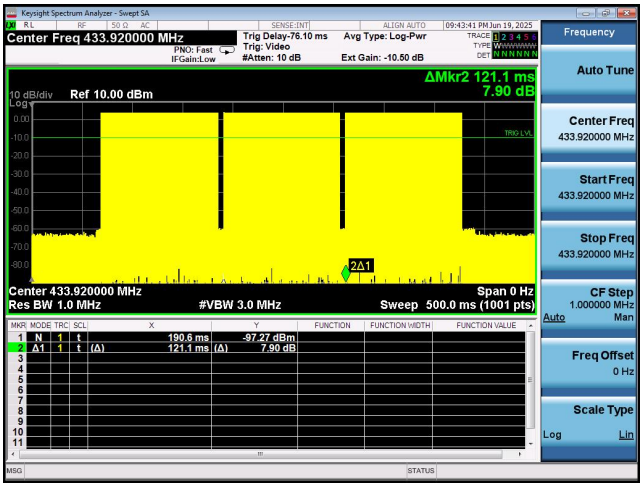
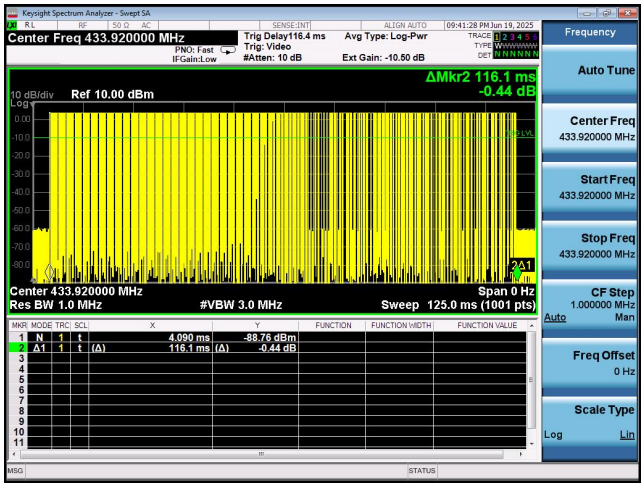
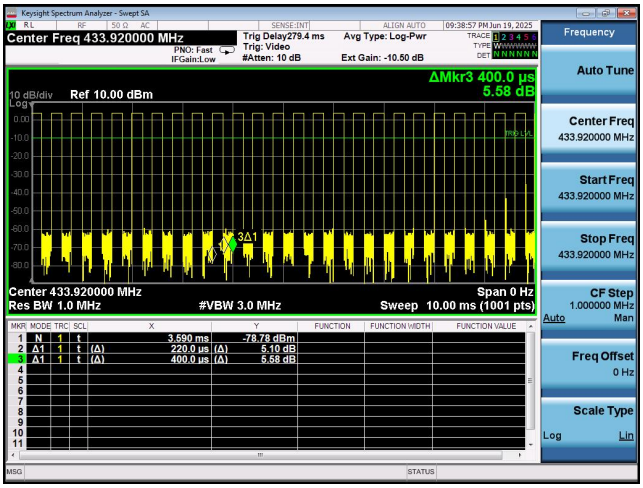
For fundamental frequency 433.92 MHz:

$T_{Total\ On\ Time}$ = 0.22 ms × 290 = 63.8 ms.

Duty Cycle = (Total On Time / Period Time) * 100% = (63.8 / 121.1) * 100% = 52.68%.

Duty Cycle Factor = 20 × log(Duty Cycle) = 20 × log(43.03%) = -5.57.

315 MHz: Period Time	315 MHz: Total Burst
	
315 MHz: Burst 1 & Burst 2	/
	/

433.92 MHz: Period Time	433.92 MHz: Total Burst
	
433.92 MHz: Burst 1	/
	/

2.4. Field Strength of Fundamental and Spurious emissions

2.4.1. Limit of Field Strength of Fundamental and Spurious emissions

According to §15.231(b), In addition to the provisions of § 15.205, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66–40.70	2250	225
70–130	1250	125
130–174	[1]1250 to 3750	[1]125 to 375
174–260	3750	375
260–470	[1]3750 to 12500	[1]375 to 1250
Above 470	12500	1250
Note: [1] Linear interpolations.		

(1) The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.

(2) Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in § 15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of § 15.205 shall be demonstrated using the measurement instrumentation specified in that section.

(3) The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in § 15.209, whichever limit permits a higher field strength.

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

Fundamental Frequency (MHz)	Field Strength of Fundamental	
	Peak Limit (dBμV/m)@3 m	Average Limit (dBμV/m)@3 m
315	95.62	75.62
433.92	100.83	80.83
Fundamental Frequency (MHz)	Field Strength of Spurious emissions	
	Peak Limit (dBμV/m)@3 m	Average Limit (dBμV/m)@3 m
315	75.62	55.62
433.92	80.83	60.83

Note 1: According to ANSI C63.10:2013 section 7.6.2, the effective limit at the frequency of interest is found by linearly interpolating using the familiar slope-intercept formula, y = mx + b, rewritten as in Equation:

Limit[μV/m] = Lim_{lower} + ΔF[(Lim_{upper} - Lim_{lower}) / (f_{upper} - f_{lower})]

For fundamental frequency 315 MHz:

Average Limit (μV/m) = 3750 + (315 - 260) * [(12500 - 3750) / (470 - 260)] = 6041.666667.

Average Limit (dBμV/m) = 20log[Average Limit (μV/m)] = 20log(6041.666667) = 75.62.

Note 2: According to § 15.35(b):

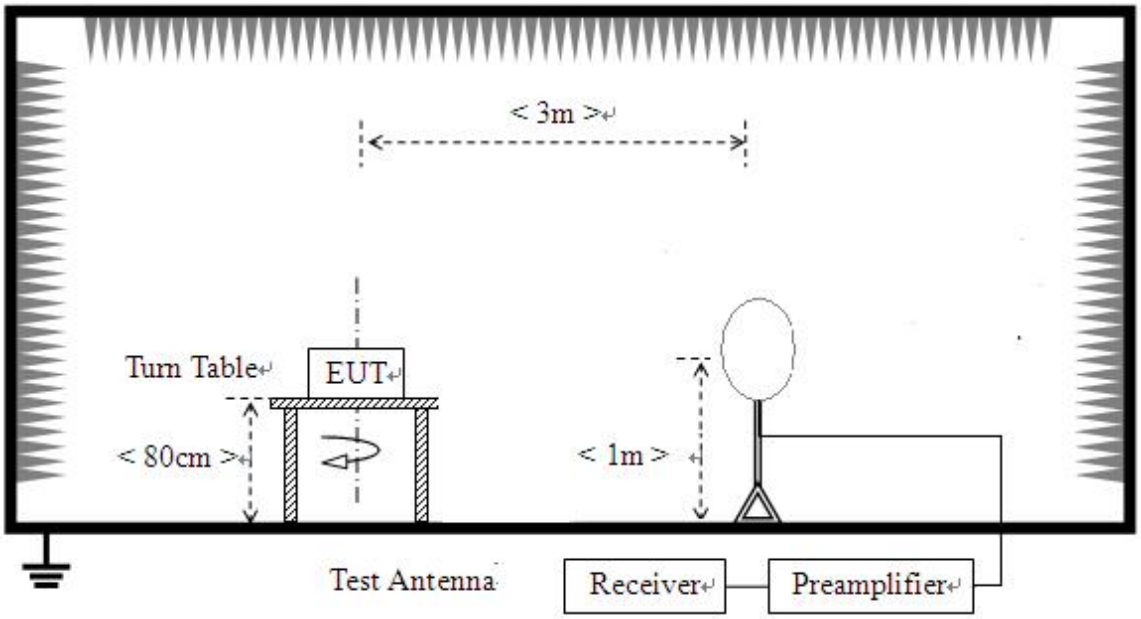
Peak Limit (dBμV/m) = Average Limit (dBμV/m) + 20 dB = 75.62 + 20 = 95.62.

2.4.2. Measuring Instruments

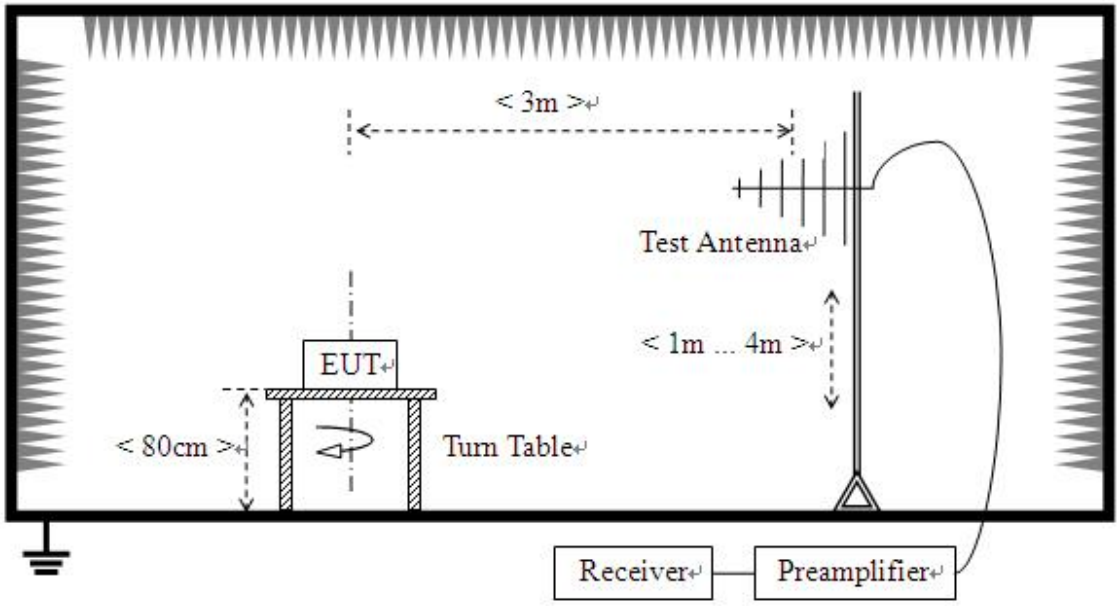
The measuring equipment is listed in the section 3 of this test report.

2.4.3. Test Setup

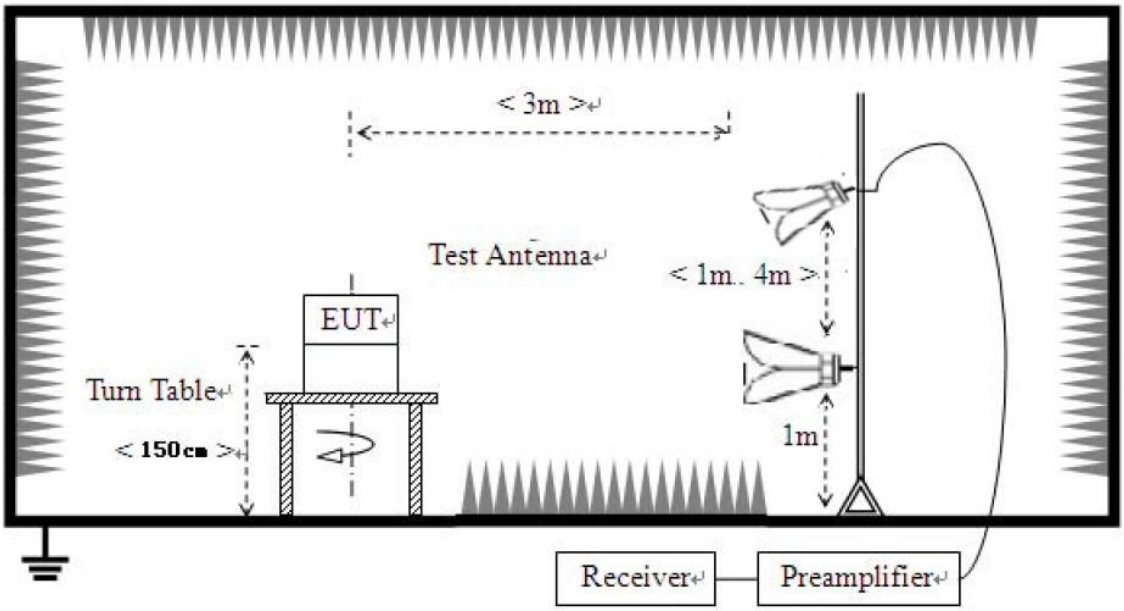
For radiated emissions from 9 kHz to 30 MHz:



For radiated emissions from 30 MHz to 1 GHz:



For radiated emissions above 1 GHz:



2.4.4. Test Procedures

1. The EUT was placed on the top of a rotating table 0.8 m (below 1 GHz)/1.5 m (above 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. For the radiated emission test above 1 GHz:

   Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. 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.

Note 2: For 9 kHz to 30 MHz, The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

Spectrum Analyzer Setting:

SA Parameters	9 kHz–150 kHz	150 kHz–30 MHz	30 MHz–1 GHz	1 GHz–5 GMz
RBW	200 Hz	9 kHz	120 kHz	1 MHz
VBW	620 Hz	30 kHz	300 kHz	3 MHz
Sweep Time	Auto	Auto	Auto	Auto
Detector	Peak/QP	Peak/QP	Peak/QP	Peak
Trace Mode	Max Hold	Max Hold	Max Hold	Max Hold

2.4.5. Test Results of Field Strength of Fundamental

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dBμV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	315.0	44.72	12.85	95.62	50.90	PK	100	292	Horizontal
2	315.0	46.52	12.85	95.62	49.10	PK	100	281	Vertical
3	433.92	73.64	16.84	100.83	27.19	PK	100	35	Horizontal
4	433.92	60.91	16.84	100.83	39.92	PK	100	303	Vertical
NO.	Freq. [MHz]	Level [dBμV/m]	DC Factor [dB]	Limit [dBμV/m]	Margin [dBμV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	315.0	28.71	-16.01	75.62	46.91	AV	100	260	Horizontal
2	315.0	30.51	-16.01	75.62	45.11	AV	100	57	Vertical
3	433.92	57.63	-5.57	80.83	23.20	AV	100	190	Horizontal
4	433.92	44.90	-5.57	80.83	35.93	AV	100	143	Vertical

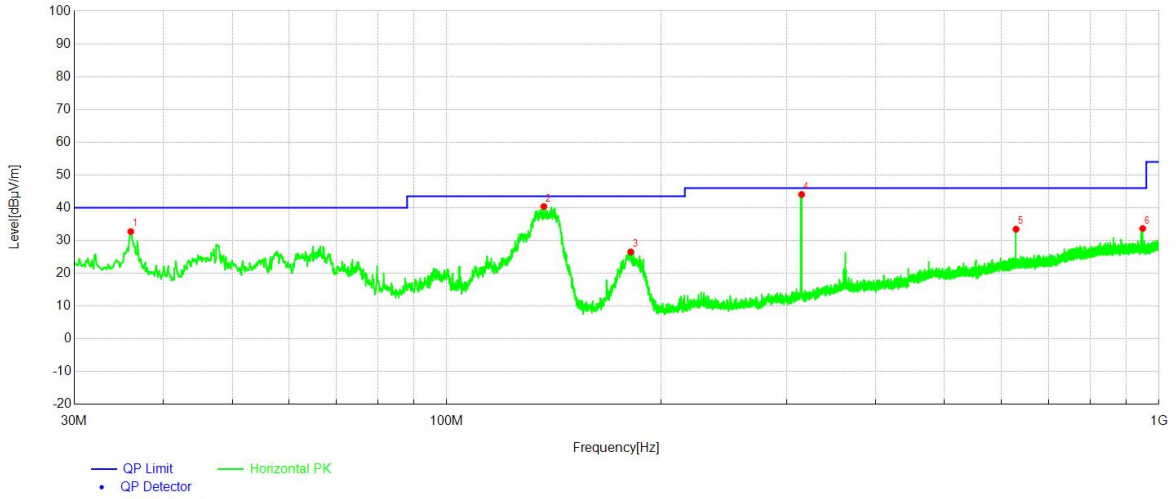
Remark:

1. Level = Raw Value + Factor (Antenna Factor + Cable Loss - Preamplifier Factor).
2. Margin = Limit - Level.
3. Average value = Peak value + Duty Cycle Factor (Please to clause 2.3).
4. Only the antenna height (from 1 m to 4 m) at maximum reading are recorded.

2.4.6. Test Results of Field Strength of Spurious emissions

For 30 MHz to 1 GHz:

Test site:	5 M anechoic chamber	Environment:	Temp: 23℃; Humi: 48%; 101 kPa
Operator:	Gu Taocheng	Test Date:	2025.06.12
Test Mode:	315 MHz_TX	Test Result:	Pass

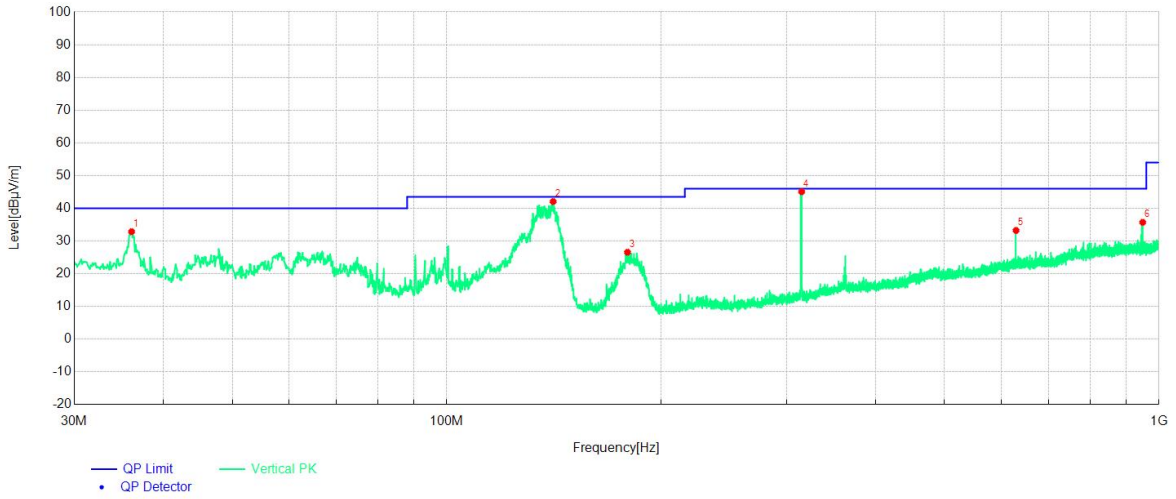


NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dBµV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	36.01	32.73	18.95	40.00	7.27	PK	100	176	Horizontal
2	136.90	40.37	10.83	43.50	3.13	PK	100	99	Horizontal
3	181.34	26.52	9.44	43.50	16.98	PK	100	112	Horizontal
4	315.00	44.04	12.86	95.62	51.58	PK	100	276	Horizontal
5	630.00	33.45	21.82	75.62	42.17	PK	100	292	Horizontal
6	945.00	33.66	26.75	75.62	41.96	PK	100	298	Horizontal
NO.	Freq. [MHz]	Level [dBµV/m]	DC Factor [dB]	Limit [dBµV/m]	Margin [dBµV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	315.00	28.03	-16.01	75.62	47.59	AV	100	276	Horizontal
2	630.00	17.44	-16.01	55.62	38.18	AV	100	292	Horizontal
3	945.00	17.65	-16.01	55.62	37.97	AV	100	298	Horizontal

Remark:

1. Level = Raw Value + Factor (Antenna Factor + Cable Loss - Preamplifier Factor).
2. Margin = Limit - Level.
3. Average value = Peak value + Duty Cycle Factor (Please to clause 2.3).
4. Only the antenna height (from 1 m to 4 m) at maximum reading are recorded.

Test site:	5 M anechoic chamber	Environment:	Temp: 23℃; Humi: 48%; 101 kPa
Operator:	Gu Taocheng	Test Date:	2025.06.12
Test Mode:	315 MHz_TX	Test Result:	Pass



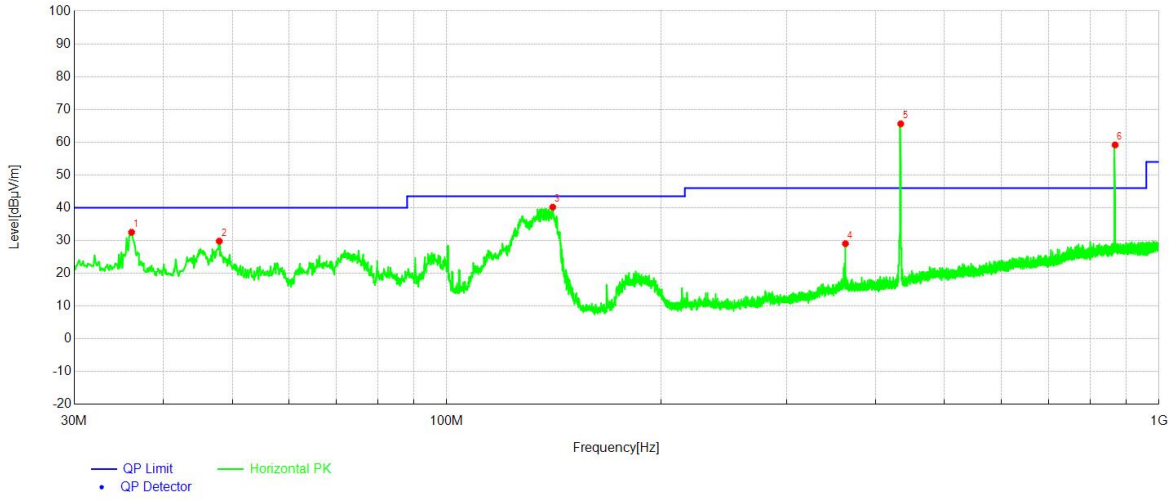
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dBµV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	36.11	32.86	18.94	40.00	7.14	PK	100	188	Vertical
2	141.08	42.07	10.55	43.50	1.43	PK	100	108	Vertical
3	179.39	26.57	9.49	43.50	16.93	PK	100	102	Vertical
4	315.00	45.06	12.86	95.62	50.56	PK	100	255	Vertical
5	630.00	33.24	21.82	75.62	42.38	PK	100	298	Vertical
6	945.00	35.72	26.75	75.62	39.90	PK	100	259	Vertical

NO.	Freq. [MHz]	Level [dBµV/m]	DC Factor [dB]	Limit [dBµV/m]	Margin [dBµV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	315.00	29.05	-16.01	75.62	46.57	AV	100	255	Vertical
2	630.00	17.23	-16.01	55.62	38.39	AV	100	298	Vertical
3	945.00	19.71	-16.01	55.62	35.91	AV	100	259	Vertical

Remark:

1. Level = Raw Value + Factor (Antenna Factor + Cable Loss - Preamplifier Factor).
2. Margin = Limit - Level.
3. Average value = Peak value + Duty Cycle Factor (Please to clause 2.3).
4. Only the antenna height (from 1 m to 4 m) at maximum reading are recorded.

Test site:	5 M anechoic chamber	Environment:	Temp: 23℃; Humi: 48%; 101 kPa
Operator:	Gu Taocheng	Test Date:	2025.06.12
Test Mode:	433.92 MHz_TX	Test Result:	Pass

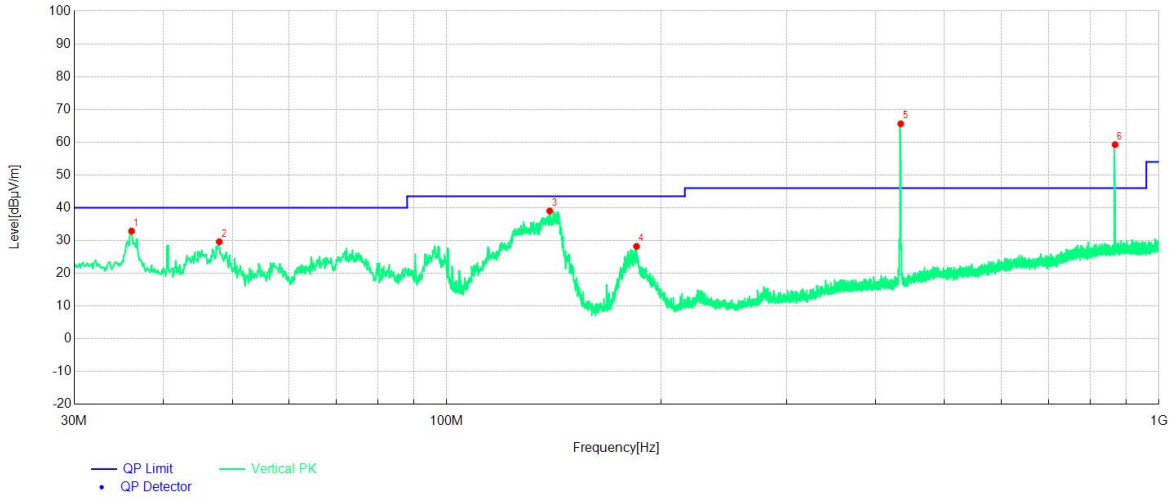


NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dBµV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	36.11	32.52	18.94	40.00	7.48	PK	100	0	Horizontal
2	47.95	29.82	13.26	40.00	10.18	PK	100	210	Horizontal
3	140.88	40.19	10.57	43.50	3.31	PK	100	13	Horizontal
4	362.94	29.05	15.87	46.00	16.95	PK	100	178	Horizontal
5	433.92	65.61	16.84	100.83	35.22	PK	100	78	Horizontal
6	867.84	59.17	26.05	80.83	21.66	PK	100	344	Horizontal
NO.	Freq. [MHz]	Level [dBµV/m]	DC Factor [dB]	Limit [dBµV/m]	Margin [dBµV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	433.92	60.04	-5.57	80.83	20.79	AV	100	78	Horizontal
2	867.84	53.60	-5.57	60.83	7.23	AV	100	344	Horizontal

Remark:

1. Level = Raw Value + Factor (Antenna Factor + Cable Loss - Preamplifier Factor).
2. Margin = Limit - Level.
3. Average value = Peak value + Duty Cycle Factor (Please to clause 2.3).
4. Only the antenna height (from 1 m to 4 m) at maximum reading are recorded.

Test site:	5 M anechoic chamber	Environment:	Temp: 23℃; Humi: 48%; 101 kPa
Operator:	Gu Taocheng	Test Date:	2025.06.12
Test Mode:	433.92 MHz_TX	Test Result:	Pass



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dBµV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	36.11	32.89	18.94	40.00	7.11	PK	100	78	Vertical
2	47.95	29.64	13.26	40.00	10.36	PK	100	0	Vertical
3	139.52	39.01	10.65	43.50	4.49	PK	100	335	Vertical
4	184.73	28.22	9.40	43.50	15.28	PK	100	325	Vertical
5	433.92	65.61	16.84	100.83	35.22	PK	100	72	Vertical
6	867.84	59.25	26.05	80.83	21.58	PK	100	325	Vertical

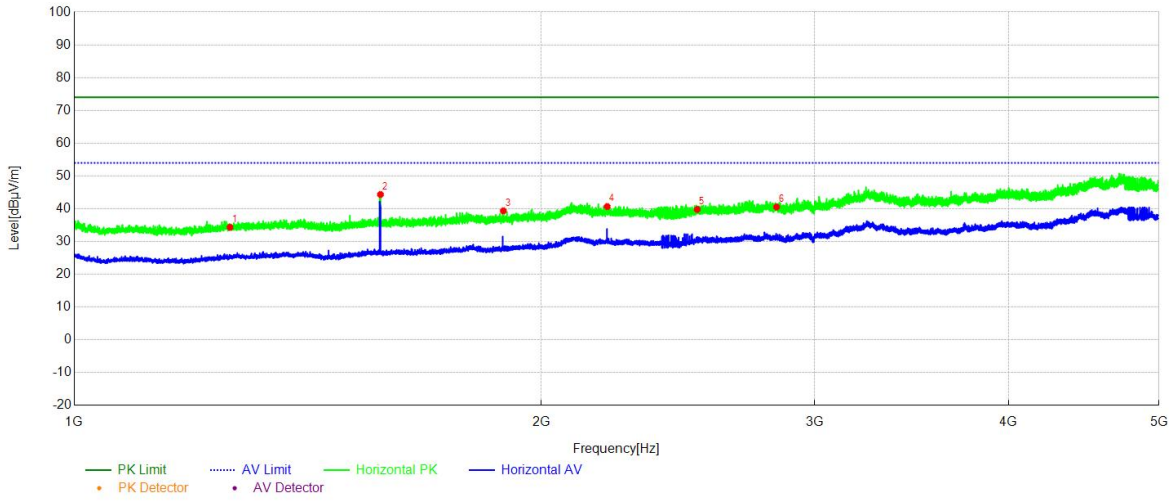
NO.	Freq. [MHz]	Level [dBµV/m]	DC Factor [dB]	Limit [dBµV/m]	Margin [dBµV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	433.92	60.04	-5.57	80.83	20.79	AV	100	72	Vertical
2	867.84	53.68	-5.57	60.83	7.15	AV	100	325	Vertical

Remark:

1. Level = Raw Value + Factor (Antenna Factor + Cable Loss - Preamplifier Factor).
2. Margin = Limit - Level.
3. Average value = Peak value + Duty Cycle Factor (Please to clause 2.3).
4. Only the antenna height (from 1 m to 4 m) at maximum reading are recorded.

For 1 GHz to 5 GHz:

Test site:	5 M anechoic chamber	Environment:	Temp: 23℃; Humi: 48%; 101 kPa
Operator:	Gu Taocheng	Test Date:	2025.06.12
Test Mode:	315 MHz_TX	Test Result:	Pass

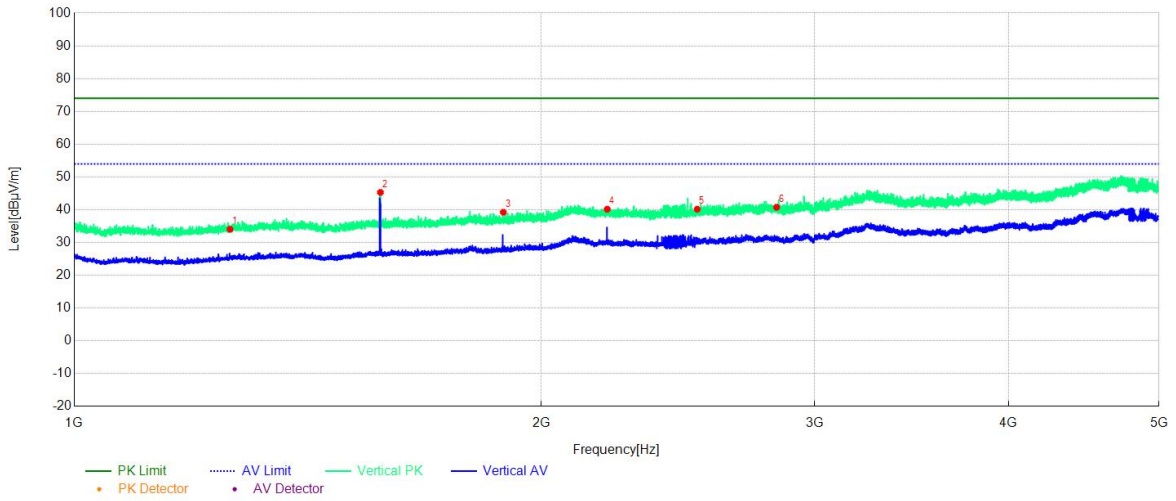


NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dBµV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	1260.00	34.35	-12.58	75.62	41.27	PK	150	12	Horizontal
2	1575.00	44.35	-11.37	74.00	29.65	PK	150	28	Horizontal
3	1890.00	39.36	-10.45	75.62	36.26	PK	150	222	Horizontal
4	2205.00	40.68	-8.29	74.00	33.32	PK	150	166	Horizontal
5	2520.00	39.81	-7.75	75.62	35.81	PK	150	0	Horizontal
6	2835.00	40.53	-6.90	74.00	33.47	PK	150	357	Horizontal
NO.	Freq. [MHz]	Level [dBµV/m]	DC Factor [dB]	Limit [dBµV/m]	Margin [dBµV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	1260.00	18.34	-16.01	55.62	37.28	AV	150	12	Horizontal
2	1575.00	28.34	-16.01	54.00	25.66	AV	150	28	Horizontal
3	1890.00	23.35	-16.01	55.62	32.27	AV	150	222	Horizontal
4	2205.00	24.67	-16.01	54.00	29.33	AV	150	166	Horizontal
5	2520.00	23.80	-16.01	55.62	31.82	AV	150	0	Horizontal
6	2835.00	24.52	-16.01	54.00	29.48	AV	150	357	Horizontal

Remark:

1. Level = Raw Value + Factor (Antenna Factor + Cable Loss - Preamplifier Factor).
2. Margin = Limit - Level.
3. Average value = Peak value + Duty Cycle Factor (Please to clause 2.3).
4. Only the antenna height (from 1 m to 4 m) at maximum reading are recorded.

Test site:	5 M anechoic chamber	Environment:	Temp: 23℃; Humi: 48%; 101 kPa
Operator:	Gu Taocheng	Test Date:	2025.06.12
Test Mode:	315 MHz_TX	Test Result:	Pass

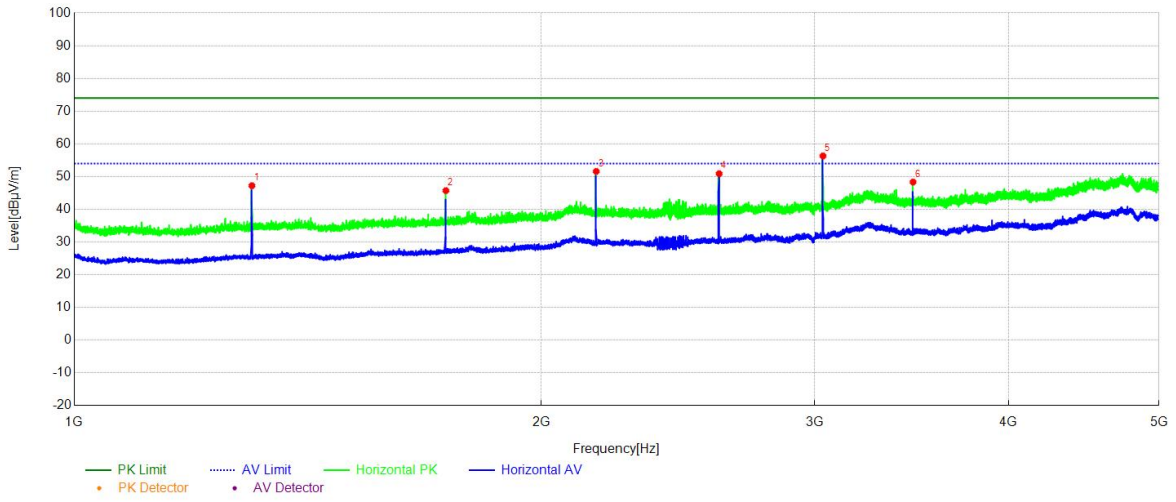


NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dBµV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	1260.00	34.07	-12.58	75.62	41.55	PK	150	217	Vertical
2	1575.00	45.30	-11.37	74.00	28.70	PK	150	19	Vertical
3	1890.00	39.23	-10.45	75.62	36.39	PK	150	272	Vertical
4	2205.00	40.16	-8.29	74.00	33.84	PK	150	225	Vertical
5	2520.00	40.16	-7.75	75.62	35.46	PK	150	280	Vertical
6	2835.00	40.76	-6.90	74.00	33.24	PK	150	328	Vertical
NO.	Freq. [MHz]	Level [dBµV/m]	DC Factor [dB]	Limit [dBµV/m]	Margin [dBµV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	1260.00	18.06	-16.01	55.62	37.56	AV	150	217	Vertical
2	1575.00	29.29	-16.01	54.00	24.71	AV	150	19	Vertical
3	1890.00	23.22	-16.01	55.62	32.40	AV	150	272	Vertical
4	2205.00	24.15	-16.01	54.00	29.85	AV	150	225	Vertical
5	2520.00	24.15	-16.01	55.62	31.47	AV	150	280	Vertical
6	2835.00	24.75	-16.01	54.00	29.25	AV	150	328	Vertical

Remark:

1. Level = Raw Value + Factor (Antenna Factor + Cable Loss - Preamplifier Factor).
2. Margin = Limit - Level.
3. Average value = Peak value + Duty Cycle Factor (Please to clause 2.3).
4. Only the antenna height (from 1 m to 4 m) at maximum reading are recorded.

Test site:	5 M anechoic chamber	Environment:	Temp: 23℃; Humi: 48%; 101 kPa
Operator:	Gu Taocheng	Test Date:	2025.06.12
Test Mode:	433.92 MHz_TX	Test Result:	Pass



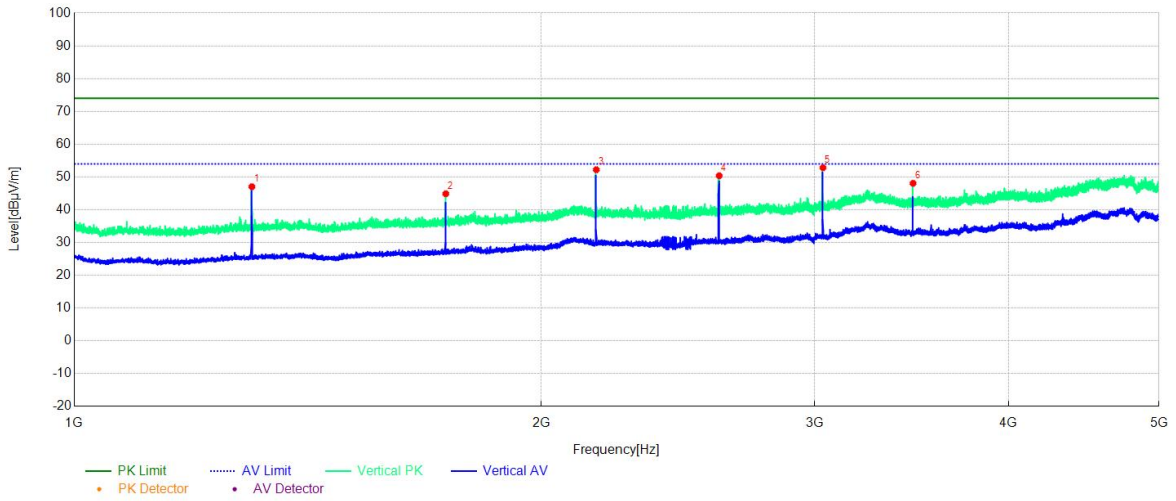
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dBµV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	1301.76	47.22	-12.64	74.00	26.78	PK	150	168	Horizontal
2	1735.68	45.73	-11.01	80.83	35.10	PK	150	104	Horizontal
3	2169.60	51.60	-8.24	80.83	29.23	PK	150	4	Horizontal
4	2603.52	50.89	-8.00	80.83	29.94	PK	150	55	Horizontal
5	3037.44	56.31	-5.90	80.83	24.52	PK	150	360	Horizontal
6	3471.36	48.34	-4.41	80.83	32.49	PK	150	176	Horizontal

NO.	Freq. [MHz]	Level [dBµV/m]	DC Factor [dB]	Limit [dBµV/m]	Margin [dBµV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	1301.76	41.65	-5.57	54.00	12.35	AV	150	168	Horizontal
2	1735.68	40.16	-5.57	60.83	20.67	AV	150	104	Horizontal
3	2169.60	46.03	-5.57	60.83	14.80	AV	150	4	Horizontal
4	2603.52	45.32	-5.57	60.83	15.51	AV	150	55	Horizontal
5	3037.44	50.74	-5.57	60.83	10.09	AV	150	360	Horizontal
6	3471.36	42.77	-5.57	60.83	18.06	AV	150	176	Horizontal

Remark:

1. Level = Raw Value + Factor (Antenna Factor + Cable Loss - Preamplifier Factor).
2. Margin = Limit - Level.
3. Average value = Peak value + Duty Cycle Factor (Please to clause 2.3).
4. Only the antenna height (from 1 m to 4 m) at maximum reading are recorded.

Test site:	5 M anechoic chamber	Environment:	Temp: 23℃; Humi: 48%; 101 kPa
Operator:	Gu Taocheng	Test Date:	2025.06.12
Test Mode:	433.92 MHz_TX	Test Result:	Pass



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dBµV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	1301.76	47.02	-12.64	74.00	26.98	PK	150	185	Vertical
2	1735.68	44.89	-11.01	80.83	35.94	PK	150	114	Vertical
3	2169.60	52.21	-8.24	80.83	28.62	PK	150	66	Vertical
4	2603.52	50.37	-7.99	80.83	30.46	PK	150	90	Vertical
5	3037.44	52.83	-5.90	80.83	28.00	PK	150	358	Vertical
6	3471.36	48.07	-4.41	80.83	32.76	PK	150	359	Vertical
NO.	Freq. [MHz]	Level [dBµV/m]	DC Factor [dB]	Limit [dBµV/m]	Margin [dBµV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	1301.76	41.45	-5.57	54.00	12.55	AV	150	185	Vertical
2	1735.68	39.32	-5.57	60.83	21.51	AV	150	114	Vertical
3	2169.60	46.64	-5.57	60.83	14.19	AV	150	66	Vertical
4	2603.52	44.80	-5.57	60.83	16.03	AV	150	90	Vertical
5	3037.44	47.26	-5.57	60.83	13.57	AV	150	358	Vertical
6	3471.36	42.50	-5.57	60.83	18.33	AV	150	359	Vertical

Remark:

1. Level = Raw Value + Factor (Antenna Factor + Cable Loss - Preamplifier Factor).
2. Margin = Limit - Level.
3. Average value = Peak value + Duty Cycle Factor (Please to clause 2.3).
4. Only the antenna height (from 1 m to 4 m) at maximum reading are recorded.

2.5. Duration Time

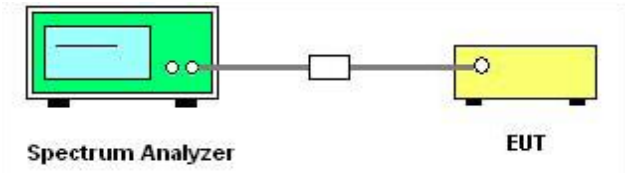
2.5.1. Limit of Duration Time

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

2.5.2. Measuring Instruments

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

2.5.3. Test Setup



2.5.4. Test Procedures

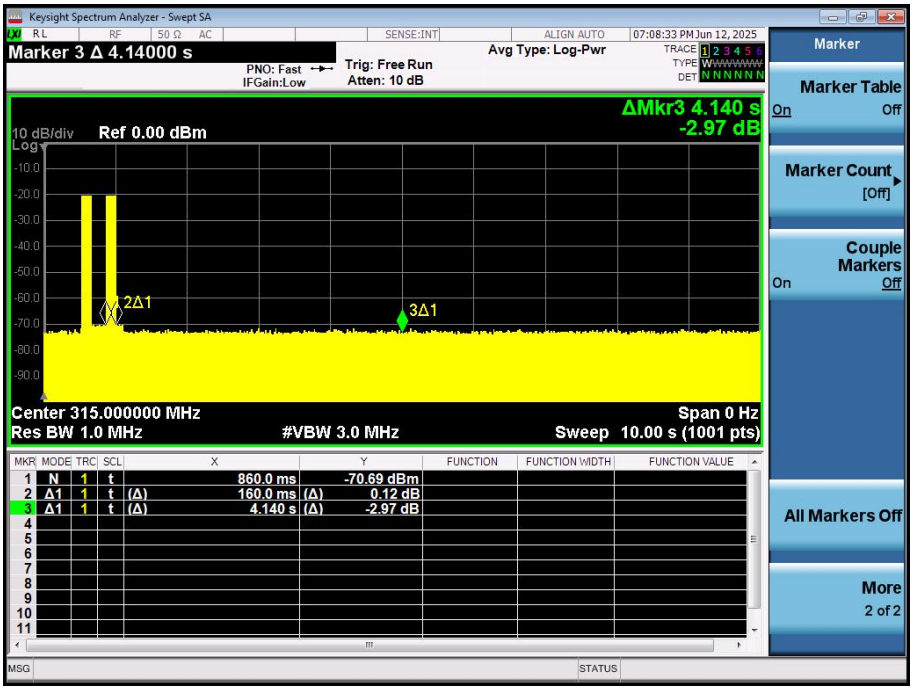
1. The testing follows the Measurement Procedure of ANSI C63.10-2020 Section 7.4.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings:

   Set instrument center frequency to operation frequency, Set the Span = 0 Hz, Set the RBW = 1 MHz, VBW = 3 MHz, Detector = Peak, Trace mode = Max hold, Sweep time = 10 s.
5. Record the measurement results in the test report.

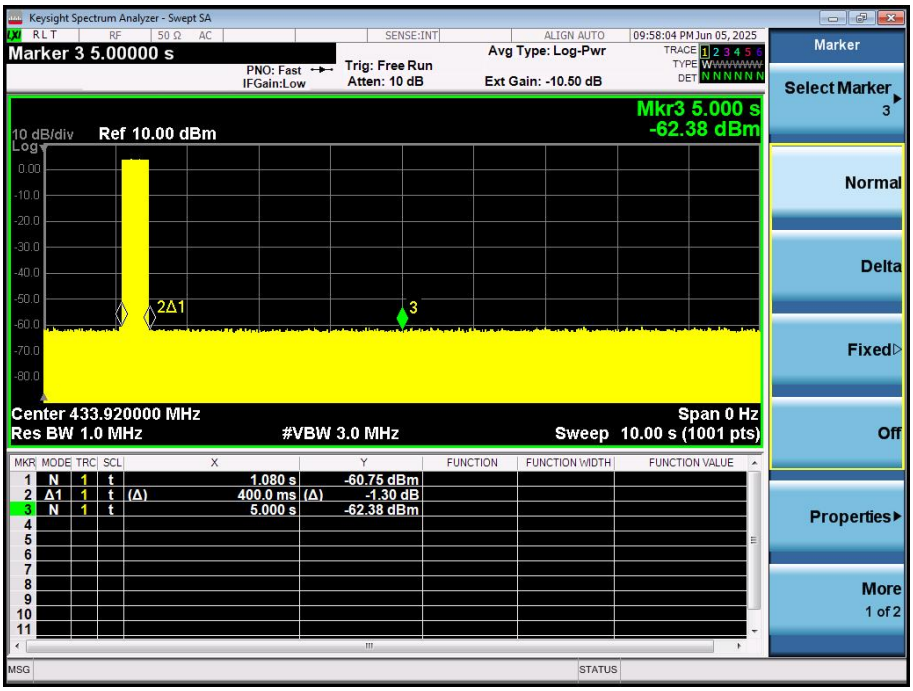
2.5.5. Test Results of Duration Time

Frequency (MHz)	Pulse On Time (s)	Limit (s)	Result
315	0.16	5	PASS
433.92	0.4	5	PASS

315 MHz



433.92 MHz



2.6. AC Power Line Conducted Emission

2.6.1. Limit of AC Power Line Conducted Emission

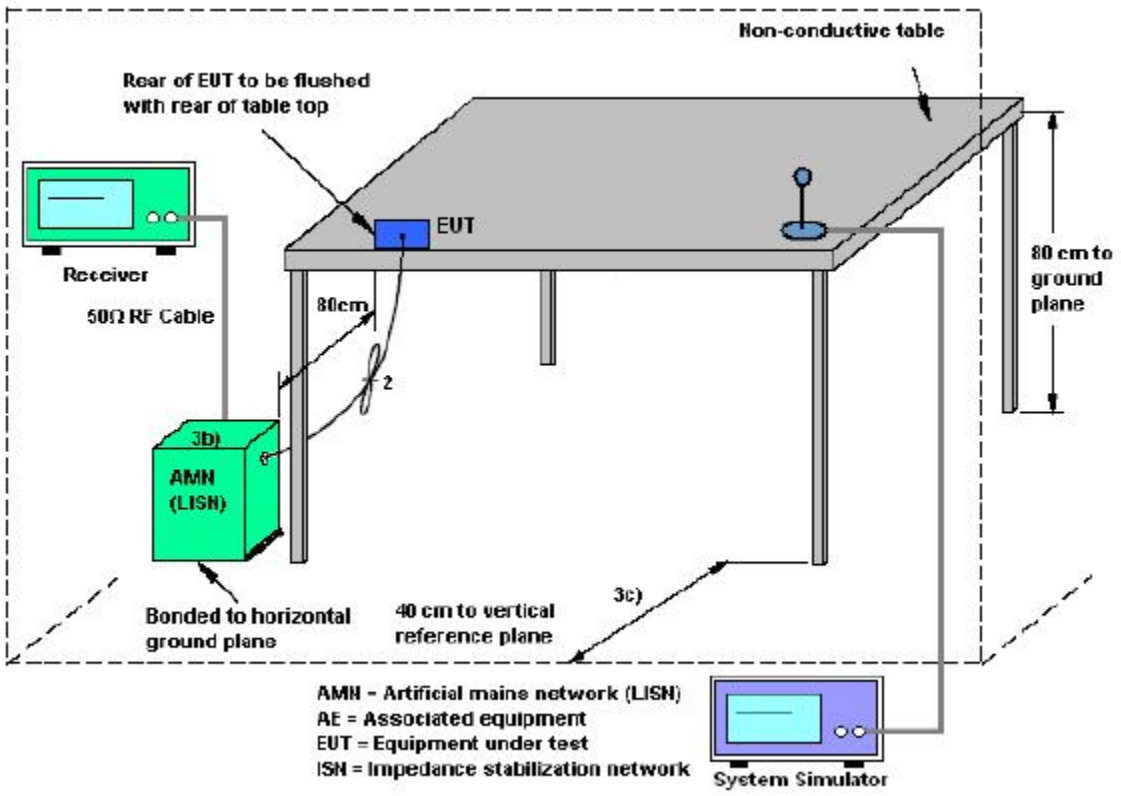
For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

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

2.6.2. Measuring Instruments

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

2.6.3. Test Setup



2.6.4. 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.

2.6.5. Test Results of Conducted Emission

Note: Not applicable, the EUT is powered by a DC 12 V supply.

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	2024.12.26	2025.12.25
3	Loop Antenna	SCHWARZBECK	FMZB 1519-60 C	A240204134	2023.12.13	2026.12.12
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	2024.12.26	2025.12.25
9	Spectrum Analyzer	KEYSIGHT	N9020A	A240604409	2024.08.22	2025.08.21
10	Test Receiver	KEYSIGHT	N9038A	A141202036	2024.06.05	2025.06.04
					2025.06.04	2026.06.03
11	LISN	ROHDE&SCHWARZ	ENV216	A140701847	2025.04.14	2026.04.13
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
15	10dB Attenuator (Radiated)	Schwarzbeck	DGA 9552 N	A181103396	2024.12.31	2025.12.30
16	10dB Attenuator (Conducted)	XINQY	XQY-SMAJKS-08-2W-10dB	A250204143	2025.04.29	2026.04.28

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