



TEST REPORT

APPLICANT : Shenzhen Xhorse Electronics Co., Ltd.
PRODUCT NAME : KEY TOOL LITE
MODEL NAME : XDKML0
BRAND NAME : Xhorse
FCC ID : 2A14T-XDKML0
STANDARD(S) : 47 CFR Part 15 Subpart C
RECEIPT DATE : 2023-06-09
TEST DATE : 2023-06-16 to 2023-07-10
ISSUE DATE : 2023-08-15



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Change History		
Version	Date	Reason for change
1.0	2023-08-15	First edition



1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

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

1.2. Equipment Under Test (EUT) Description

Product Name:	KEY TOOL LITE
Sample No.:	1#
Hardware Version:	VN10V06
Software Version:	V149
Operating Frequency:	125 kHz
Modulation Type:	ASK
Antenna Type:	Loop Antenna

Note 1: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.



1.3. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15 (10-1-15 Edition)	Radio Frequency Devices

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

No.	Section	Description	Test Date	Test Engineer	Result	Method Determination /Remark
1	15.203	Antenna Requirement	N/A	N/A	PASS	No deviation
2	15.207	Conducted Emission	N/A	N/A	N/A ^{Note1}	N/A
3	15.209(a)	Radiated Emission	Jun. 26, 2023	Lin Hanbin	PASS	No deviation
4	15.215(c)	20 dB Bandwidth	Jul. 06, 2023	Lin Hanbin	PASS	No deviation

Note 1: Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

Note 2: The tests were performed according to the method of measurements prescribed in ANSI C63.10-2013. The EUT has been tested under continuous operating condition.

Note 3: Additions to, deviation, or exclusions from the method should be judged in the “method determination” column of add, deviate or exclude from the specific method should be explained in the “Remark” of the above table.

Note 4: When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% confidence intervals.

1.4. Environmental Conditions

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

Temperature (°C):	15–35
Relative Humidity (%):	30–60
Atmospheric Pressure (kPa):	86–106



2. 47 CFR Part 15C 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. Test Result: Compliant

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

2.2. Conducted Emission

2.2.1. Test Requirement

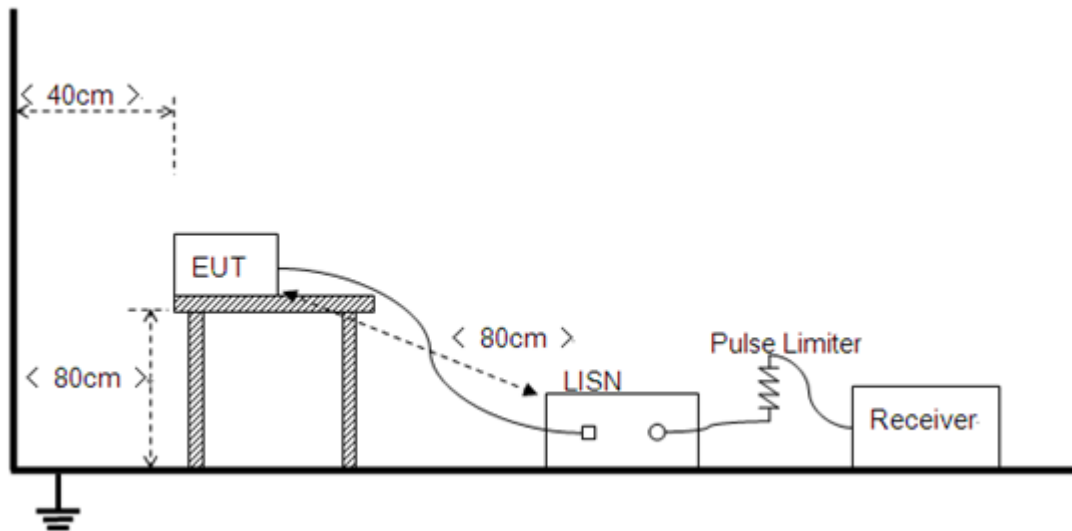
According to FCC section 15.207, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN).

Frequency Range (MHz)	Conducted Limit (dB μ V)	
	Quai-peak	Average
0.15–0.50	66 to 56	56 to 46
0.50–5	56	46
5–30	60	50

Note:

- (a) The lower limit shall apply at the band edges.
- (b) The limit decreases linearly with the logarithm of the frequency in the range 0.15–0.50 MHz.

2.2.2. Test Setup



The EUT is placed on a 0.8 m high insulating table, which stands on the grounded conducting floor, and keeps 0.4 m away from the grounded conducting wall. The EUT is connected to the power mains through a LISN which provides 50 Ω /50 μ H of coupling impedance for the measuring instrument. A Pulse Limiter is used to protect the measuring instrument. The factors of the whole test system are calibrated to correct the reading.



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2.2.3. Test Result

This test case does not apply this kind of EUT.



2.3. Radiated Emission

2.3.1. Test Requirement

Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table.

The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. For intentional radiators which operate under the provisions of other Sections within this Part and which are required to reduce their unwanted emissions to the limits specified in this table, the limits in this table are based on the frequency of the unwanted emissions and not the fundamental frequency. However, the level of any unwanted emission shall not exceed the level of the fundamental frequency.

The emission limits shown in the following table are based on measurements employing a CISPR quasi-peak detector except for the frequency 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

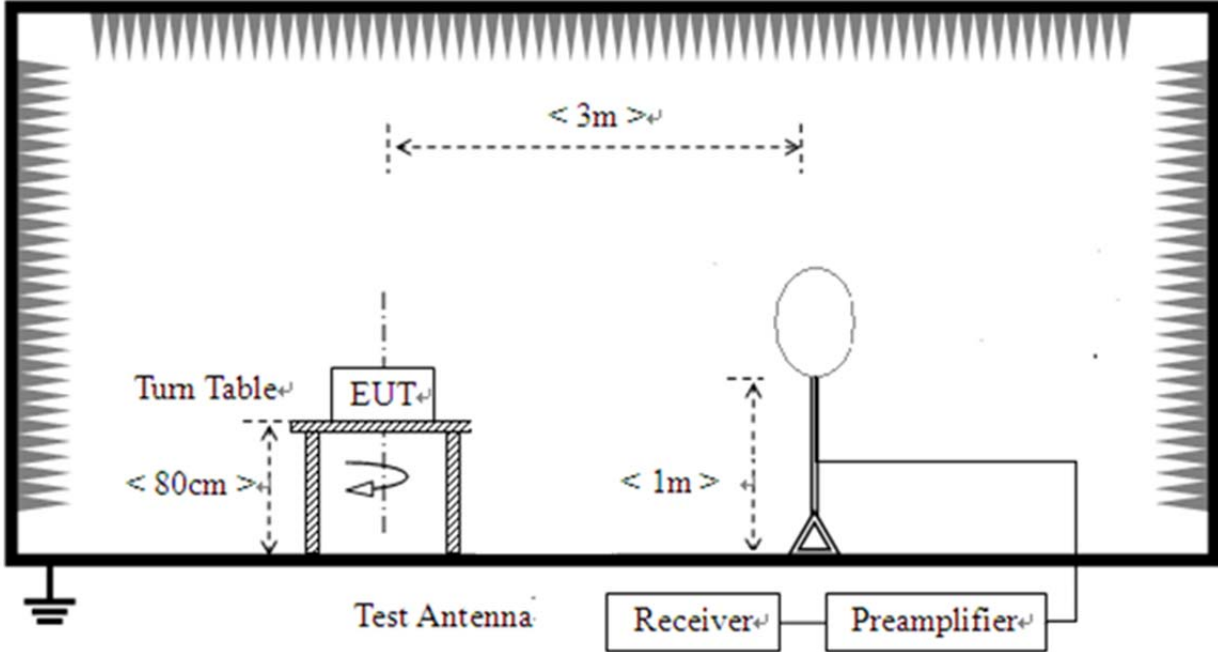
Frequency Range (MHz)	Field Strength($\mu\text{V}/\text{m}$)	Distance(m)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30	30	30
30–88	100	3
88–216	150	3
216–960	200	3
Above 960	500	3

NOTE:

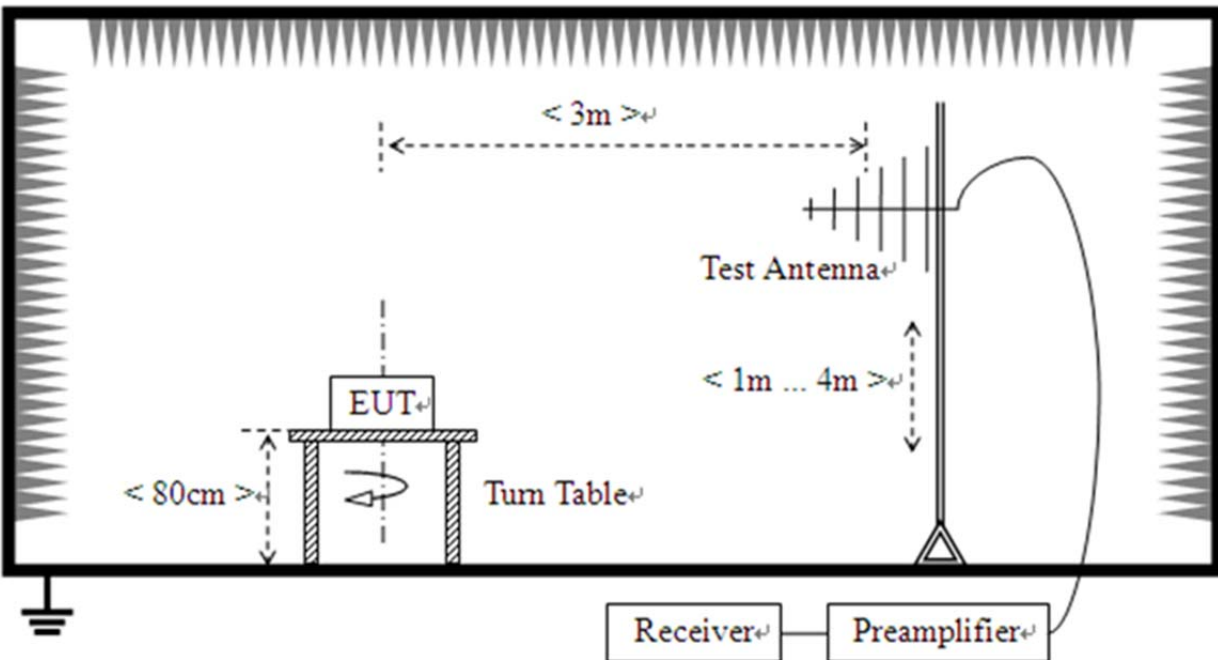
- Field Strength ($\text{dB}\mu\text{V}/\text{m}$) = $20 * \log[\text{Field Strength } (\mu\text{V}/\text{m})]$.
- If measurement is made at 3 m distance, then F.S Limitation at 3 m distance is adjusted by using the formula of $Ld1 = Ld2 * (d2/d1)^2$.
Example:
F.S Limit at 30 m distance is 30 $\mu\text{V}/\text{m}$, then F.S Limitation at 3 m distance is adjusted as $Ld1 = 30 \mu\text{V}/\text{m} * (10)^2 = 100 * 30 \mu\text{V}/\text{m}$
- In the emission tables above, the tighter limit applies at the band edges.

2.3.2. Test Setup

1) For radiated emissions below 30 MHz



2) For radiated emissions from 30 MHz to 1 GHz



The test is performed in a 3 m Semi-Anechoic Chamber; the antenna factor, cable loss and so on of the site (factors) is calculated to correct the reading. The EUT is placed on a 0.8 m high



insulating. Turn Table, and keeps 3 m away from the Test Antenna, which is mounted on a variable-height antenna master tower.

For the test Antenna:

In the frequency range of 9 kHz to 30 MHz, magnetic field is measured with Loop Test Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1 m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.

In the frequency range above 30 MHz, Bi-Log Test Antenna (30 MHz to 1 GHz) are used. Test Antenna is 3 m away from the EUT. Test Antenna height is varied from 1 m to 4 m above the ground to determine the maximum value of the field strength. The emission levels at both horizontal and vertical polarizations should be tested.

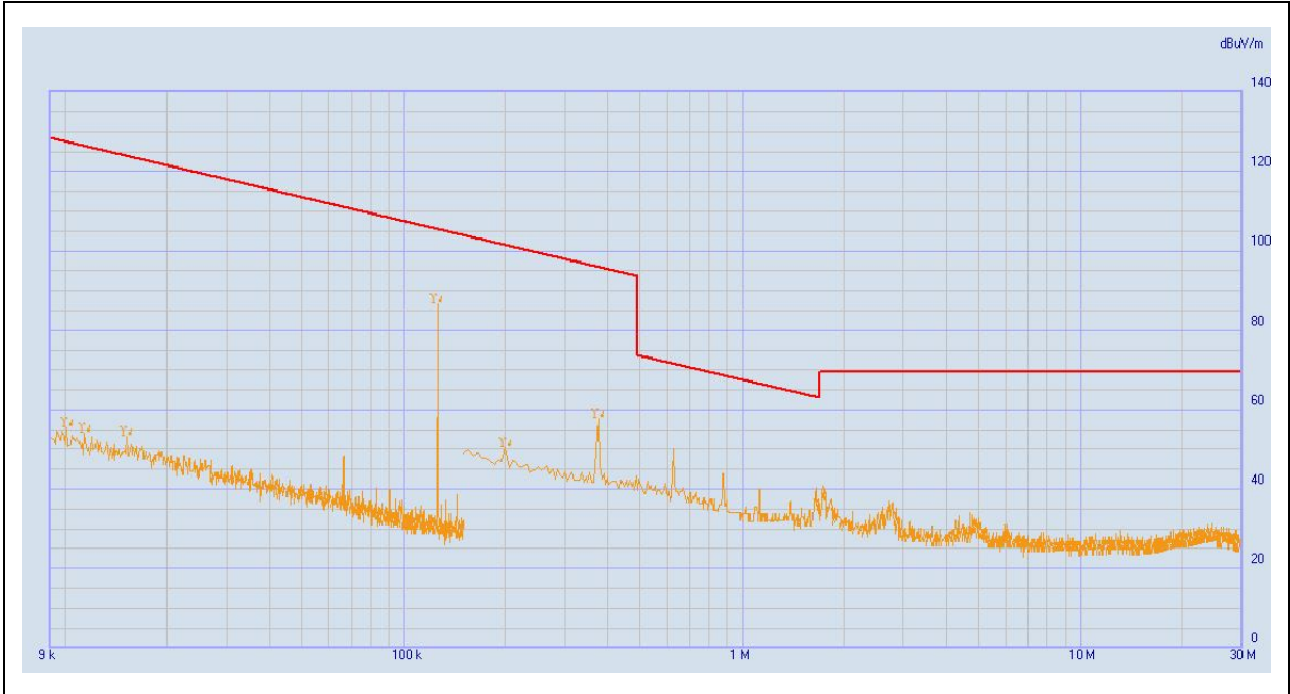
For measurements below 30 MHz, the emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9 kHz–90 kHz, 110 kHz–490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector. For measurements frequency range from 0.009 MHz to 0.15 MHz, the resolution bandwidth is set to 200 Hz. For measurements frequency range from 0.15 MHz to 30 MHz the resolution bandwidth is set to 9 kHz.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, the video bandwidth is set to 3 MHz for peak measurements and as applicable for average measurements.

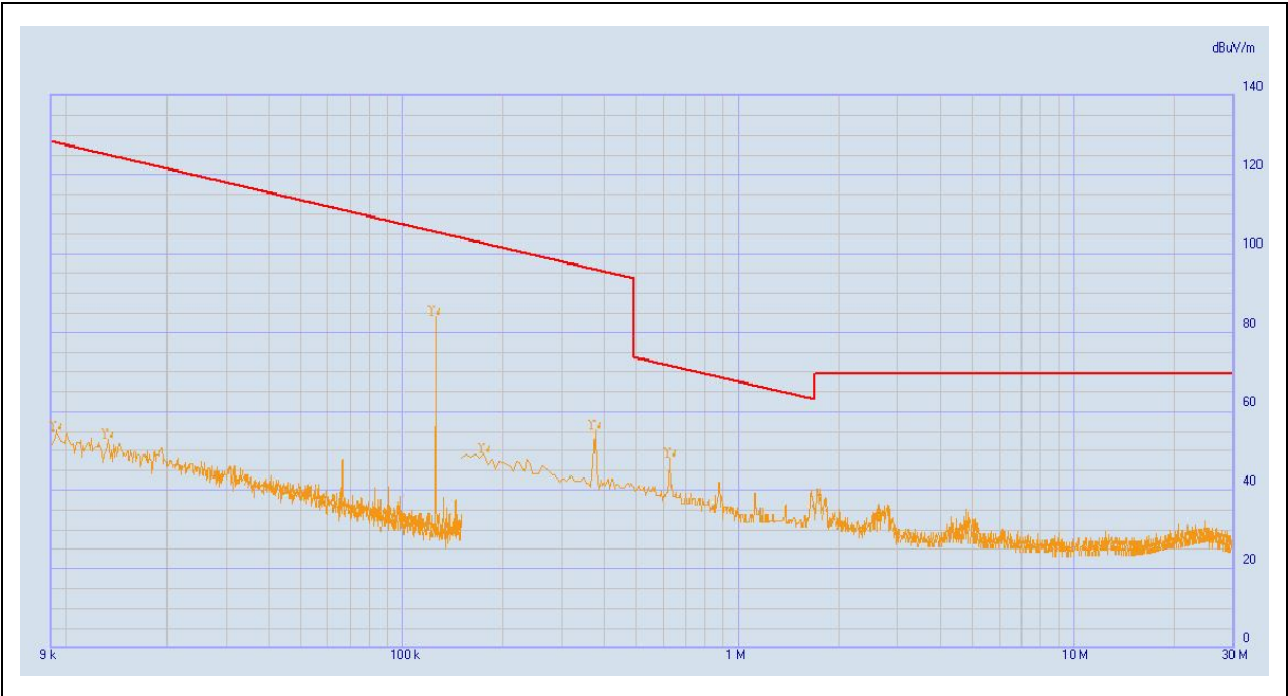
2.3.3. Test Result

A. Radiated Emission <30 MHz (9 kHz–30 MHz, parallel)



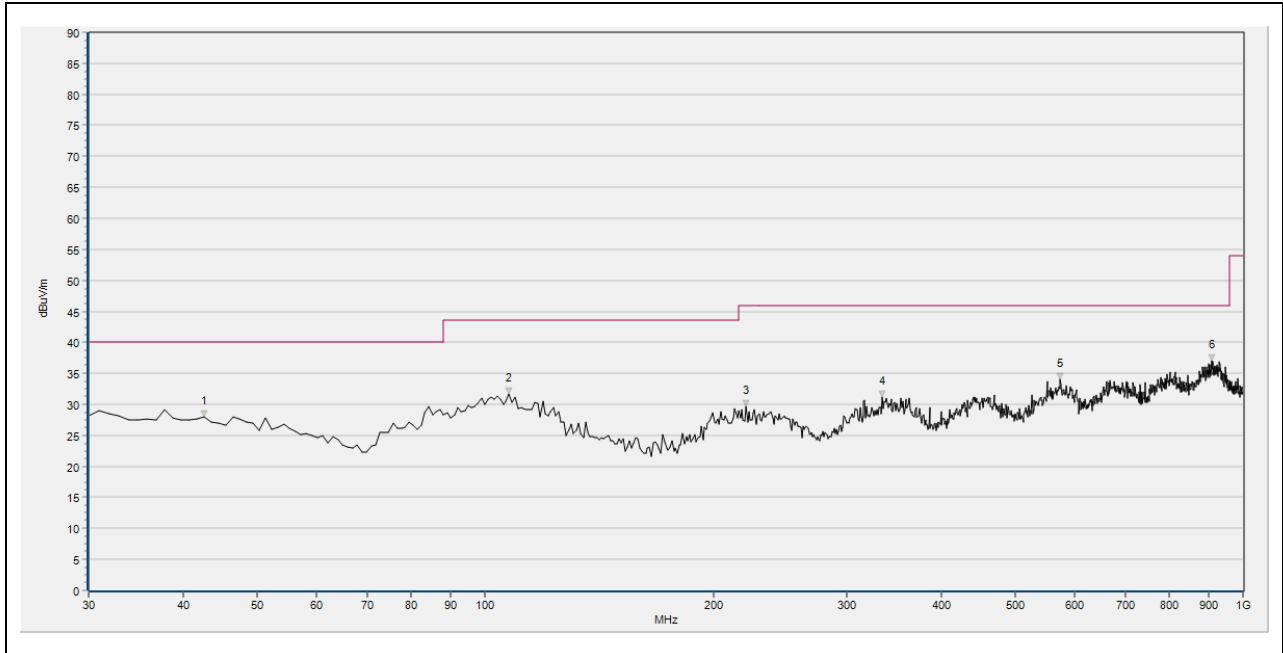
No.	Frequency (MHz)	Detector Type	Level at 3 m (dBμV/m)	Limit at 3 m (dBμV/m)
1	0.0101	Quasi Peak	55.45	127.52
2	0.0114	Quasi Peak	53.94	126.47
3	0.0151	Quasi Peak	53.27	124.02
4	0.125	Quasi Peak	86.61	105.67
5	0.2	Quasi Peak	50.53	101.58
6	0.375	Quasi Peak	57.76	96.12

B. Radiated Emission <30 MHz (9 kHz–30 MHz, perpendicular)



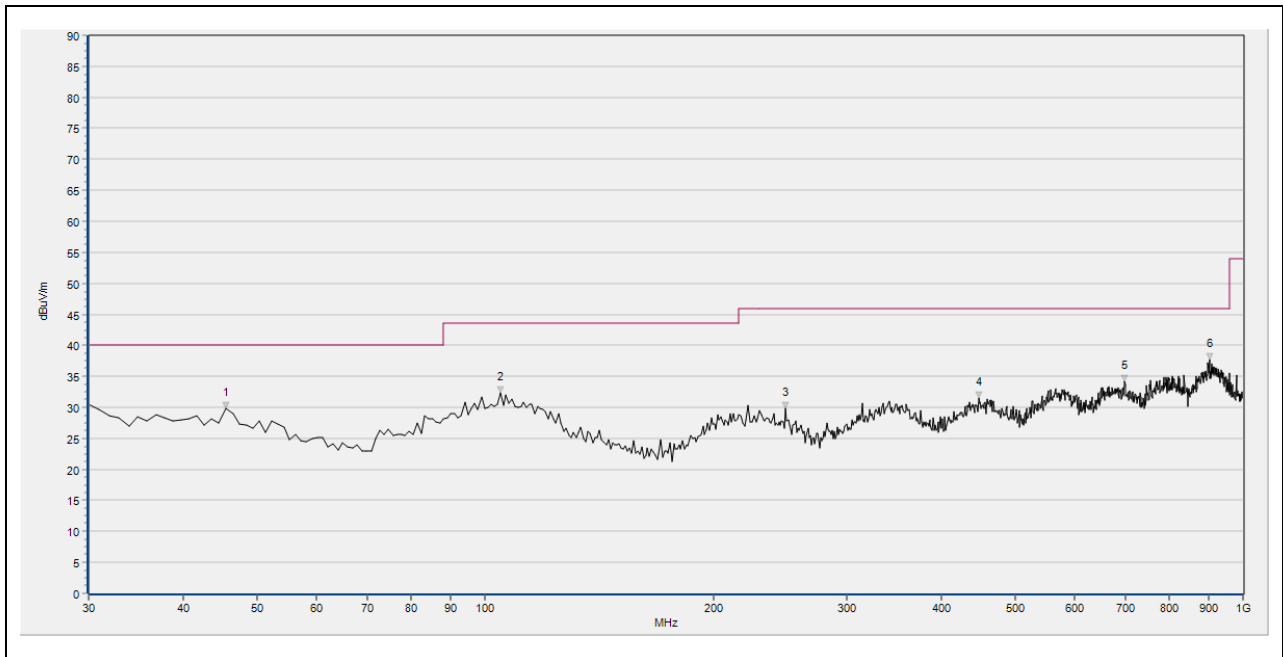
No.	Frequency (MHz)	Detector Type	Level at 3 m (dBμV/m)	Limit at 3 m (dBμV/m)
1	0.0093	Quasi Peak	55.05	128.23
2	0.0133	Quasi Peak	52.88	125.13
3	0.125	Quasi Peak	84.26	105.67
4	0.175	Quasi Peak	49.40	102.74
5	0.375	Quasi Peak	55.30	96.12
6	0.625	Quasi Peak	48.26	91.69

C. Radiated Emission >30 MHz (30 MHz–1 GHz)



(30 MHz–1 GHz, Test Antenna Horizontal)

No.	Fre. MHz	Pk dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	42.610	28.00	N/A	N/A	N/A	40.00	N/A	H	PASS
2	107.600	31.68	N/A	N/A	N/A	43.50	N/A	H	PASS
3	221.090	29.70	N/A	N/A	N/A	46.00	N/A	H	PASS
4	334.580	31.13	N/A	N/A	N/A	46.00	N/A	H	PASS
5	574.170	34.05	N/A	N/A	N/A	46.00	N/A	H	PASS
6	908.820	37.12	N/A	N/A	N/A	46.00	N/A	H	PASS



(30 MHz–1 GHz, Test Antenna Vertical)

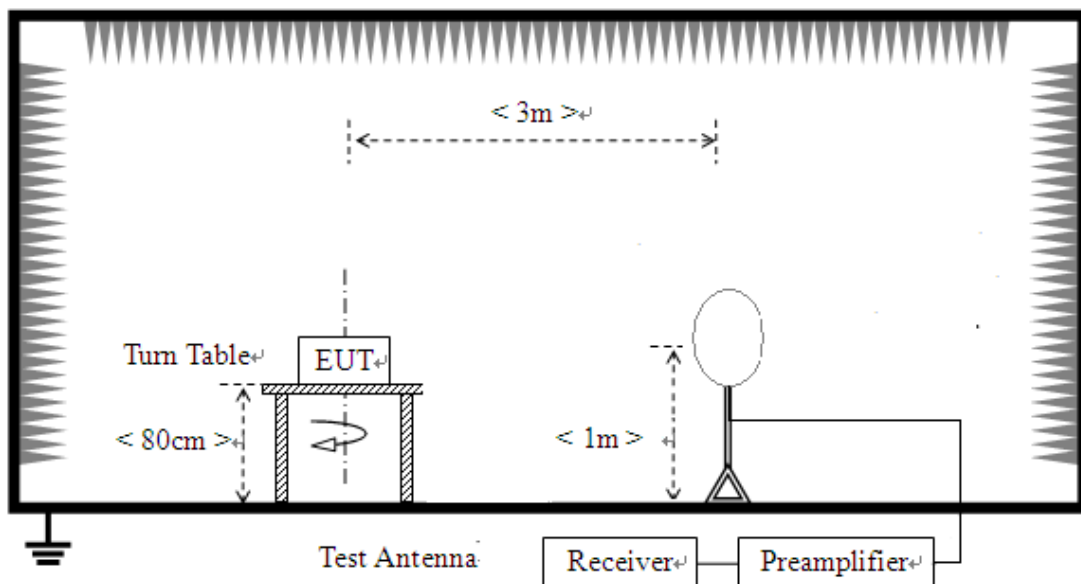
No.	Fre. MHz	Pk dBμV/m	QP dBμV/m	AV dBμV/m	Limit-PK dBμV/m	Limit-QP dBμV/m	Limit-AV dBμV/m	ANT	Verdict
1	45.520	29.90	N/A	N/A	N/A	40.00	N/A	V	PASS
2	104.690	32.34	N/A	N/A	N/A	43.50	N/A	V	PASS
3	249.220	29.87	N/A	N/A	N/A	46.00	N/A	V	PASS
4	448.070	31.44	N/A	N/A	N/A	46.00	N/A	V	PASS
5	698.330	34.12	N/A	N/A	N/A	46.00	N/A	V	PASS
6	903.000	37.71	N/A	N/A	N/A	46.00	N/A	V	PASS

2.4. 20 dB Bandwidth

2.4.1. Standard Applicable

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 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.

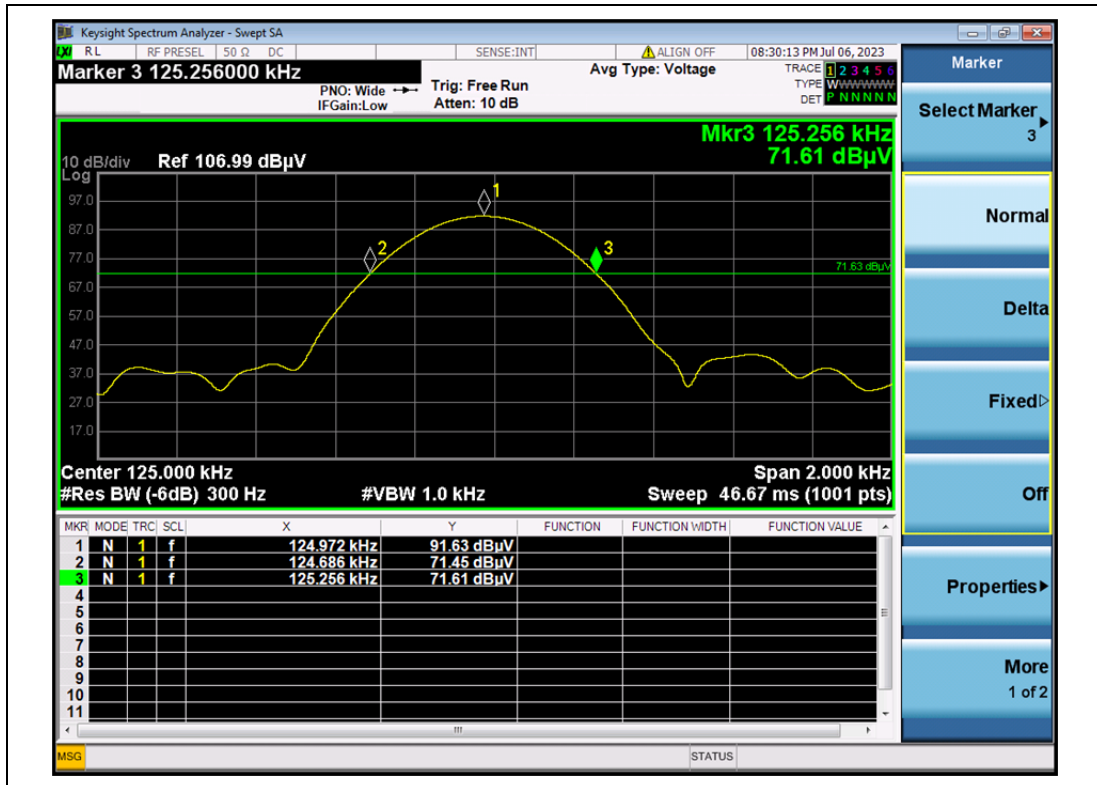
2.4.2. Test Setup





2.4.3. Test Result

Frequency(kHz)	20 dB Bandwidth (kHz)	Verdict
125	0.57	PASS





Annex A Test Uncertainty

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

Radiated Emission:	± 3.1 dB
Conducted Emission:	± 1.8 dB
Bandwidth	$\pm 5\%$



Annex B Testing Laboratory Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Laboratory Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

3. Facilities and Accreditations

All measurement facilities used to collect the measurement data are located at FL.3, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10-2013 and CISPR Publication 22; the FCC designation number is CN1192, the test firm registration number is 226174.



4. Test Equipments Utilized

4.1 Radiated Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Due Date
Receiver	MY54130016	N9038A	Agilent	2022.07.06	2023.07.05
				2023.06.21	2024.06.20
Test Antenna - Bi-Log	9163-519	VULB 9163	Schwarzbeck	2022.05.25	2025.05.24
Test Antenna - Loop	1520-022	FMZB1519	Schwarzbeck	2022.02.11	2025.02.10
Anechoic Chamber	N/A	9m*6m*6m	CRT	2022.05.10	2025.05.09

4.2 Test Software Utilized

Model	Software Version	Manufacturer
MORLAB EMCR V1.2	Version 1.0	MORLAB
PMM Emission Suite	Version 2.02	narda

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