

FCC Test Report

**Test Report
On Behalf of
Dongguan Zhenghao Electronics & Technology Co., Ltd.**

**For
EK8890 Mouse**

Model No.: EK8890, M3100, I330, N36, EK923, E500, M701, V8, E368

FCC ID: 2BEPSEK8890

Prepared For: Dongguan Zhenghao Electronics & Technology Co., Ltd.
Room 302, Building 6, No.8, Xiegang Xinlong Road, Xiegang Town, Dongguan, China

Prepared By: Shenzhen HUAK Testing Technology Co., Ltd.
1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Date of Test: Aug. 05, 2025 ~ Aug. 21, 2025
Date of Report: Aug. 21, 2025
Report Number: HK2508054303-E

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Product Description

Trade Mark.....: N/A

Product Name.....: EK8890 Mouse

Model and/or Type Reference..: EK8890, M3100, I330, N36, EK923, E500, M701, V8, E368

FCC Rules and Regulations Part 15 Subpart C Section 15.249

Standards: **ANSI C63.10: 2020**

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Date of Test.....:

Date (s) of Performance of Tests.....: **Aug. 05, 2025 ~ Aug. 21, 2025**

Date of Issue.....: **Aug. 21, 2025**

Test Result: **Pass**

Testing Engineer

len liao

(Len Liao)

Technical Manager

Sliver Wan

(Sliver Wan)

Authorized Signatory

Jason Zhou

(Jason Zhou)

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**** Modified History ****

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	Aug. 21, 2025	Jason Zhou

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1. Test Summary

1.1 Test Procedures and Results

DESCRIPTION OF TEST	SECTION NUMBER	RESULT
AC CONDUCTED EMISSIONS TEST	15.207	N/A
RADIATED EMISSION TEST	15.249(a)/15.209	COMPLIANT
BAND EDGE	15.249(d)/15.205	COMPLIANT
OCCUPIED BANDWIDTH MEASUREMENT	15.215(c)	COMPLIANT
ANTENNA REQUIREMENT	15.203	COMPLIANT

1.2 Information of the Test Laboratory

Shenzhen HUAK Testing Technology Co., Ltd.

Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Testing Laboratory Authorization:

A2LA Accreditation Code is 4781.01.

FCC Designation Number is CN1229.

Canada IC CAB identifier is CN0045.

CNAS Registration Number is L9589.

1.3 Measurement Uncertainty

Measurement Uncertainty

Conducted Emission Expanded Uncertainty = 2.71dB, k=2

Radiated emission expanded uncertainty(9kHz-30MHz) = 3.90dB, k=2

Radiated emission expanded uncertainty(30MHz-1000MHz) = 3.90dB, k=2

Radiated emission expanded uncertainty(Above 1GHz) = 4.28dB, k=2

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2. General Information

2.1 General Description of EUT

Equipment:	EK8890 Mouse
Model Name:	EK8890
Series Model(s):	M3100, I330, N36, EK923, E500, M701, V8, E368
Model Difference:	All model's the function, software and electric circuit are the same, only with product model named different. Test sample model: EK8890.
FCC ID:	2BEPSEK8890
Antenna Type:	PCB antenna
Antenna Gain:	0dBi
Operation Frequency:	2403.75-2479.75MHz
Number of Channels:	16CH
Modulation Type:	GFSK
Power Source:	DC1.5V from Battery
Power Rating:	DC1.5V from Battery
Note:	<ol style="list-style-type: none">1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.2. Antenna gain Refer to the antenna specifications.3. The cable loss data is obtained from the supplier.4. The test results in the report only apply to the tested sample.

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2.2 Carrier Frequency of Channels

Channel	HUAK TESTING Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2403.75	7	2436.75	13	2463.75
2	2407.75	8	2439.75	14	2466.75
3	2414.75	9	2441.75	15	2473.75
4	2419.75	10	2445.75	16	2479.75
5	2422.75	11	2453.75		
6	2426.75	12	2459.75		

2.3 Operation of EUT during Testing

Operating Mode

The mode is used: **Transmitting mode**

Low Channel: 2403.75MHz

Low Channel: 2100.75MHz

High Channel: 2479.75MHz

2.5 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
3. For conducted measurements (Output Power, 6dB Emission Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.



3. AC Conducted Emissions Test

3.1 AC Conducted Power Line Emission Limit

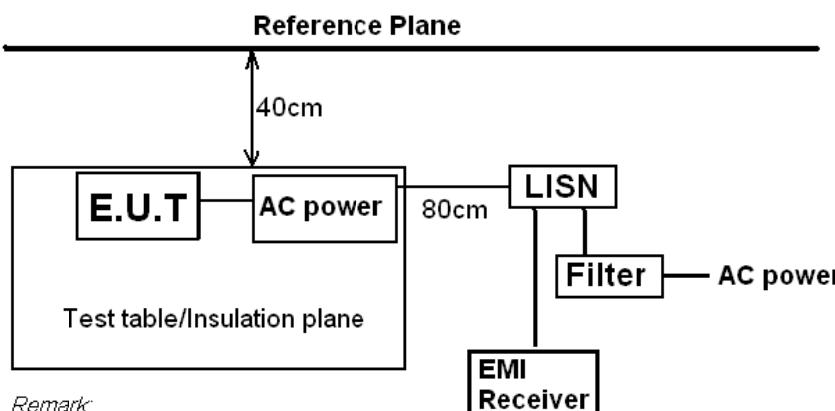
For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following.

Frequency (MHz)	Maximum RF Line Voltage (dB μ V)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency.

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

3.2 Test Setup



Remark:

E.U.T: Equipment Under Test

LISN: Line Impedance Stabilization Network

Test table height=0.8m

3.3 Test Procedure

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.



3.4 Test Result

Not applicable.

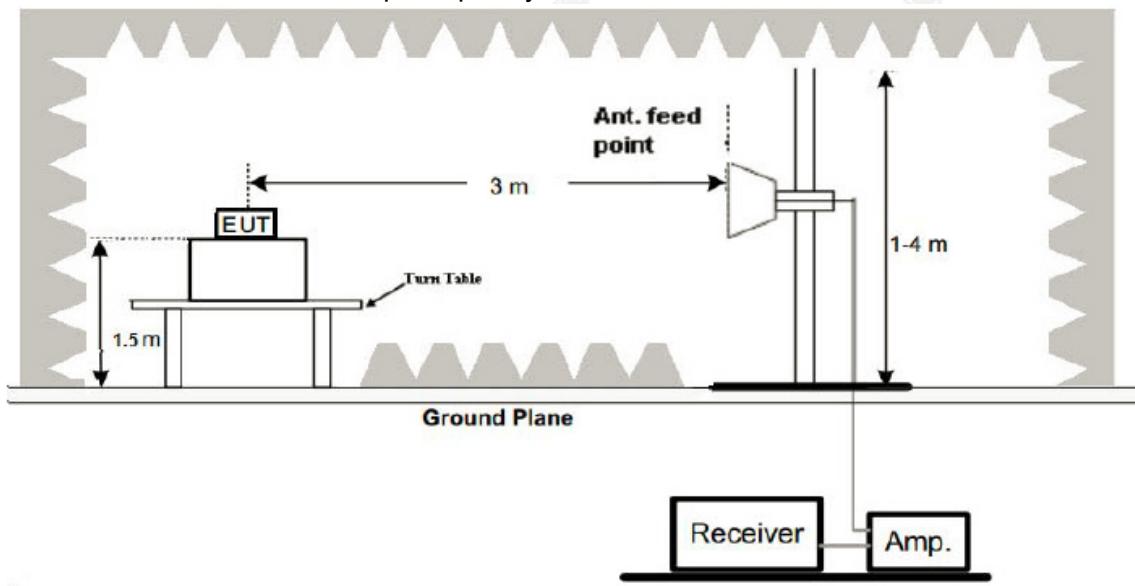
Note: EUT power supply by Battery Powered, so this test item not applicable.



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(3) Radiated Emission Test-Up Frequency Above 1GHz



4.3 Test Procedure

1. Below 1GHz measurement the EUT is placed on turntable which is 0.8m above ground plane. And above 1GHz measurement EUT was placed on low permittivity and low tangent turn table which is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The test frequency range from 9KHz to 25GHz per FCC PART 15.33(a).

Note:

For battery operated equipment, the equipment tests shall be performed using a new battery.

4.4 Test Result

PASS

All the test modes completed for test. The worst case of Radiated Emission is CH 01; the test data of this mode was reported.

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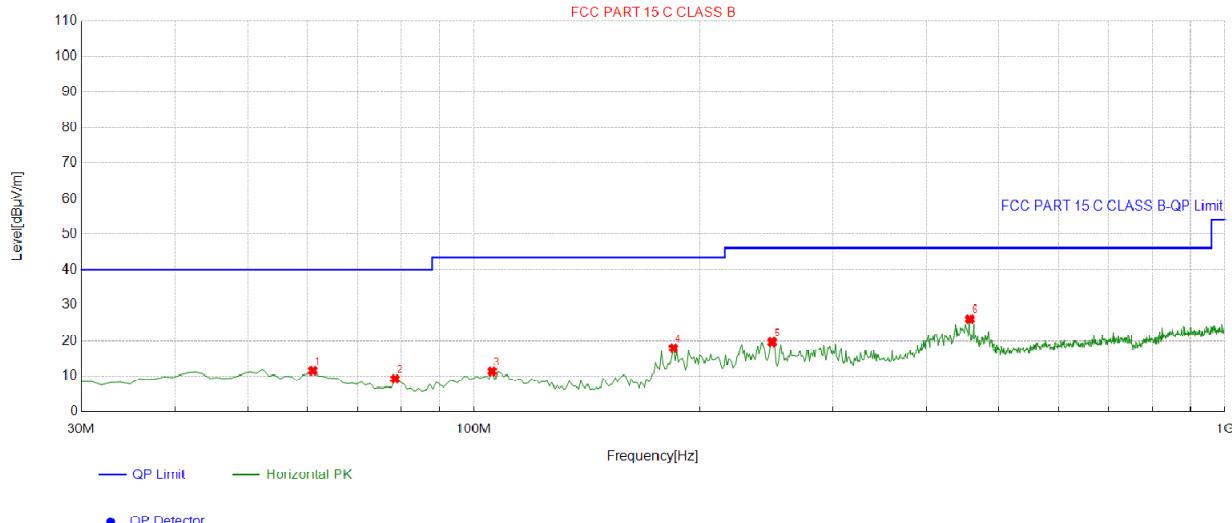
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Below 1GHz Test Results:

Antenna polarity: H



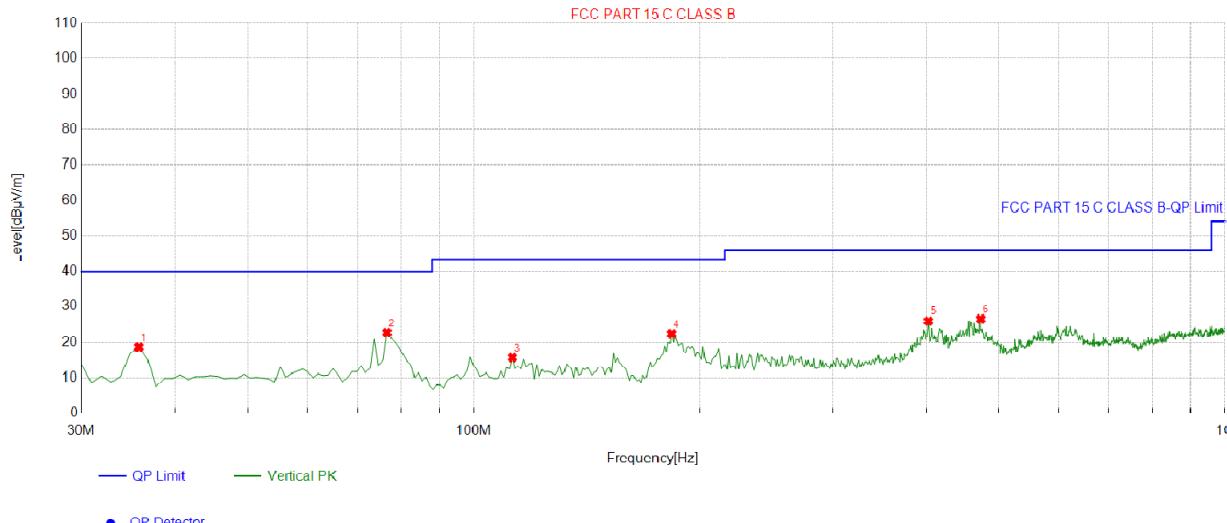
Suspected List

NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	61.0711	-13.82	25.26	11.44	40.00	28.56	100	300	Horizontal
2	78.5485	-17.92	27.07	9.15	40.00	30.85	100	160	Horizontal
3	105.7357	-14.49	25.75	11.26	43.50	32.24	100	30	Horizontal
4	184.3844	-15.77	33.71	17.94	43.50	25.56	100	314	Horizontal
5	249.4394	-13.41	33.05	19.64	46.00	26.36	100	105	Horizontal
6	457.2272	-8.88	34.99	26.11	46.00	19.89	100	260	Horizontal

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level;



Antenna polarity: V



Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	35.8258	-14.54	33.19	18.65	40.00	21.35	100	257	Vertical
2	76.6066	-17.96	40.76	22.80	40.00	17.20	100	332	Vertical
3	112.5325	-14.72	30.36	15.64	43.50	27.86	100	24	Vertical
4	183.4134	-15.63	38.08	22.45	43.50	21.05	100	282	Vertical
5	402.8529	-9.84	35.84	26.00	46.00	20.00	100	157	Vertical
6	472.7628	-8.35	34.91	26.56	46.00	19.44	100	128	Vertical

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level;

Harmonics and Spurious Emissions

Frequency Range (9 kHz-30MHz)

Frequency (MHz)	Level@3m (dBμV/m)	Limit@3m (dBμV/m)
--	--	--
--	--	--
--	--	--
--	--	--

Note: 1. Emission Level=Reading+ Cable loss+ Antenna factor-Amp factor.

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement.

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Above 1 GHz Test Results

CH Low (2403.75MHz)

Horizontal:

Frequency (MHz)	Meter Reading (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
2403.75	102.96	-5.84	97.12	114	16.88	peak
2403.75	85.36	-5.84	79.52	94	14.48	AVG
4807.50	52.87	-3.64	49.23	74	24.77	peak
4807.50	42.39	-3.64	38.75	54	15.25	AVG
7211.25	52.33	-0.95	51.38	74	22.62	peak
7211.25	41.28	-0.95	40.33	54	13.67	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator - Preamplifier; Level = Reading + Factor;
Margin = Limit - Level.

Vertical:

Frequency (MHz)	Meter Reading (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
2403.75	103.08	-5.84	97.24	114	16.76	peak
2403.75	87.25	-5.84	81.41	94	12.59	AVG
4807.50	52.46	-3.64	48.82	74	25.18	peak
4807.50	42.98	-3.64	39.34	54	14.66	AVG
7211.25	53.36	-0.95	52.41	74	21.59	peak
7211.25	42.07	-0.95	41.12	54	12.88	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator - Preamplifier; Level = Reading + Factor;
Margin = Limit - Level.



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CH Middle (2441.75MHz)

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
2441.75	103.98	-5.71	98.27	114	15.73	peak
2441.75	84.57	-5.71	78.86	94	15.14	AVG
4883.50	53.12	-3.51	49.61	74	24.39	peak
4883.50	43.66	-3.51	40.15	54	13.85	AVG
7325.25	52.17	-0.82	51.35	74	22.65	peak
7325.25	43.25	-0.82	42.43	54	11.57	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator - Preamplifier; Level = Reading + Factor;
Margin = Limit - Level.

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
2441.75	103.65	-5.71	97.94	114	16.06	peak
2441.75	82.65	-5.71	76.94	94	17.06	AVG
4883.50	53.38	-3.51	49.87	74	24.13	peak
4883.50	43.26	-3.51	39.75	54	14.25	AVG
7325.25	53.24	-0.82	52.42	74	21.58	peak
7325.25	43.27	-0.82	42.45	54	11.55	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator - Preamplifier; Level = Reading + Factor;
Margin = Limit - Level.

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CH High (2479.75MHz)

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
2479.75	104.27	-5.65	98.62	114	15.38	peak
2479.75	85.32	-5.65	79.67	94	14.33	AVG
4959.50	53.66	-3.43	50.23	74	23.77	peak
4959.50	43.21	-3.43	39.78	54	14.22	AVG
7439.25	52.78	-0.75	52.03	74	21.97	peak
7439.25	41.09	-0.75	40.34	54	13.66	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator - Preamplifier; Level = Reading + Factor;

Margin = Limit - Level.

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
2479.75	103.86	-5.65	98.21	114	15.79	peak
2479.75	82.78	-5.65	77.13	94	16.87	AVG
4959.50	54.32	-3.43	50.89	74	23.11	peak
4959.50	45.97	-3.43	42.54	54	11.46	AVG
7439.25	52.66	-0.75	51.91	74	22.09	peak
7439.25	42.17	-0.75	41.42	54	12.58	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator - Preamplifier; Level = Reading + Factor;

Margin = Limit - Level.

Remark :
(1) Measuring frequencies from 1 GHz to the 25 GHz.
(2) "F" denotes fundamental frequency; "H" denotes spurious frequency; "E" denotes band edge frequency.
(3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
(4) The emissions are attenuated more than 20dB below the permissible limits are not record in the report.
(5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
(6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dB μ V/m(PK Value) < 93.98(AV Limit), at harmonic 53.20 dB μ V/m(PK Value) < 54 dB μ V/m(AV Limit), the Average Detected not need to completed.
(7) All modes of operation were investigated and the worst-case emissions are reported.

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5. Band Edge

5.1 Limits

FCC PART 15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

5.2 Test Procedure

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW to 1MHz and VBM to 3MHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz to measure the average radiated field strength. The conducted RF band edge was measured by using a spectrum analyzer. Set span wide enough to capture the highest in-band emission and the emission at the band edge. Set RBW to 1MHz and VBW to 3MHz, to measure the conducted peak band edge.

5.3 Test Result

PASS

Radiated Band Edge Test:

Operation Mode: TX CH Low (2403.75MHz)

Horizontal (Worst case):

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
2310	55.08	-5.81	49.27	74	24.73	peak
2310	/	-5.81	/	54	/	AVG
2390	54.96	-5.84	49.12	74	24.88	peak
2390	/	-5.84	/	54	/	AVG
2400	54.28	-5.84	48.44	74	25.56	peak
2400	/	-5.84	/	54	/	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator - Preamplifier; Level = Reading + Factor; Margin = Limit - Level.

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
2310	55.13	-5.81	49.32	74	24.68	peak
2310	/	-5.81	/	54	/	AVG
2390	54.07	-5.84	48.23	74	25.77	peak
2390	/	-5.84	/	54	/	AVG
2400	55.31	-5.84	49.47	74	24.53	peak
2400	/	-5.84	/	54	/	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator - Preamplifier; Level = Reading + Factor; Margin = Limit - Level.



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Operation Mode: TX CH High (2479.75MHz)

Horizontal (Worst case):

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
2483.50	55.27	-5.65	49.62	74	24.38	peak
2483.50	/	-5.65	/	54	/	AVG
2500.00	53.68	-5.65	48.03	74	25.97	peak
2500.00	/	-5.65	/	54	/	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator - Preamplifier; Level = Reading + Factor; Margin = Limit - Level.

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
2483.50	54.21	-5.65	48.56	74	25.44	peak
2483.50	/	-5.65	/	54	/	AVG
2500.00	54.33	-5.65	48.68	74	25.32	peak
2500.00	/	-5.65	/	54	/	AVG

Remark:

1. If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.
2. In restricted bands of operation, the spurious emissions below the permissible value more than 20dB.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

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6. Occupied Bandwidth Measurement

6.1 Test Setup

Same as Radiated Emission Measurement

6.2 Test Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation.
3. Based on ANSI C63.10 section 6.9.2: RBW= 20KHz. VBW= 62KHz, Span= 3MHz.
4. The useful radiated emission from the EUT was detected by the spectrum analyzer with peak detector.

6.3 Measurement Equipment Used

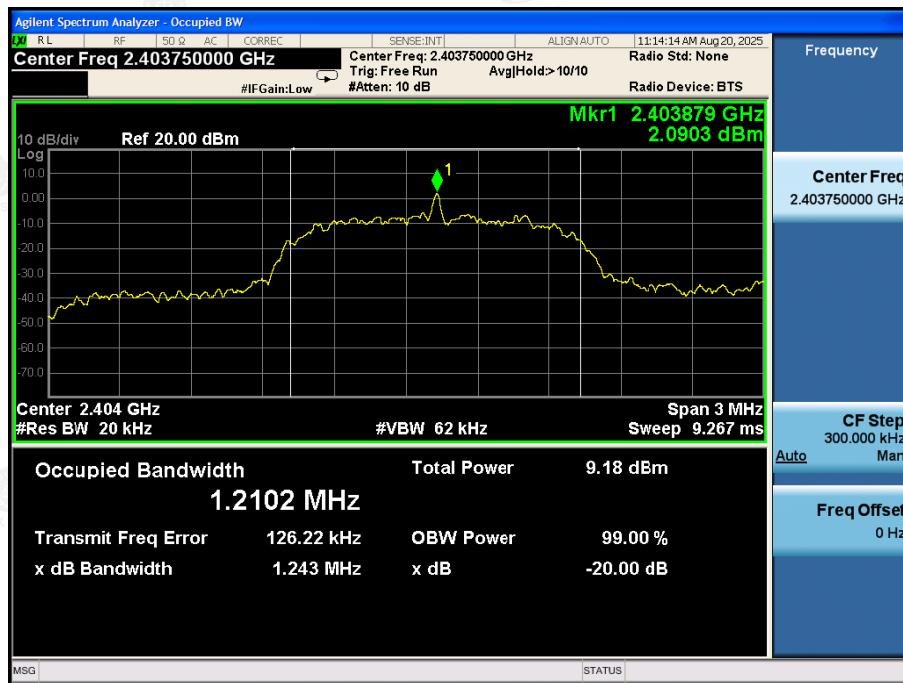
Same as Radiated Emission Measurement

6.4 Test Result

PASS

Frequency HUAK TESTING	20dB Bandwidth HUAK TESTING (MHz)	Result
2403.75 MHz	1.243	PASS
2441.75 MHz	1.243	PASS
2479.75 MHz	1.243	PASS

CH: 2403.75MHz



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CH: 2441.75MHz



CH: 2479.75MHz



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Shenzhen HUAK Testing Technology Co., Ltd. Tel.: +86-0755-2302 9901 E-mail: info@huak.com Web.: www.huak.com

Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China



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7. Antenna Requirement

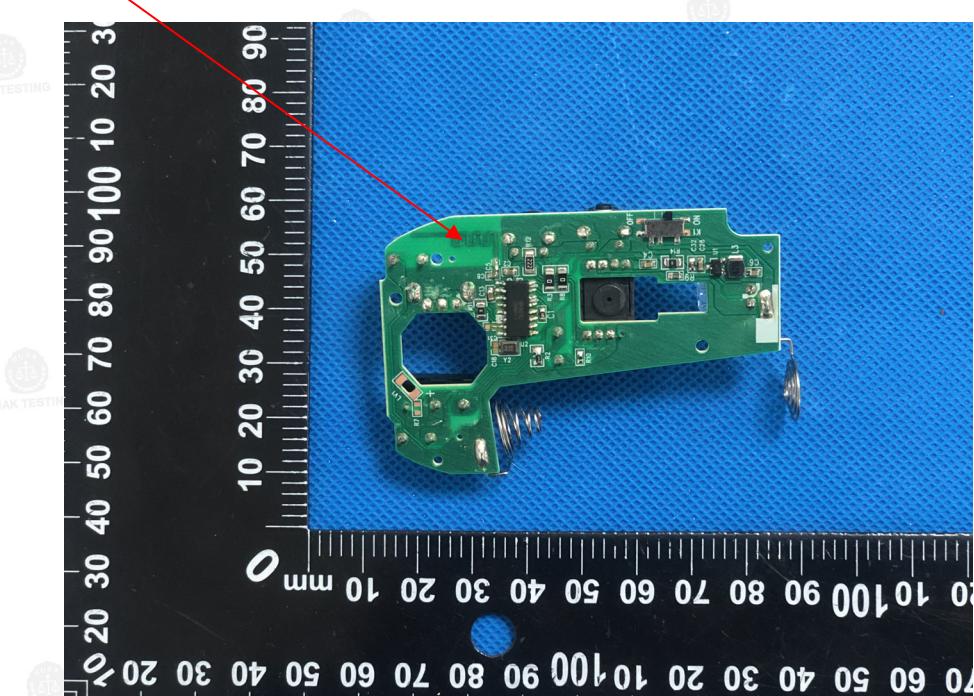
Standard Applicable

For intentional device, according to FCC 47 CFR Section 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.

Antenna Connected Construction

The antenna used in this product is a PCB Antenna, is a permanently attached antenna on the PCB. It conforms to the standard requirements. The directional gains of antenna used for transmitting is 0dBi.

Antenna





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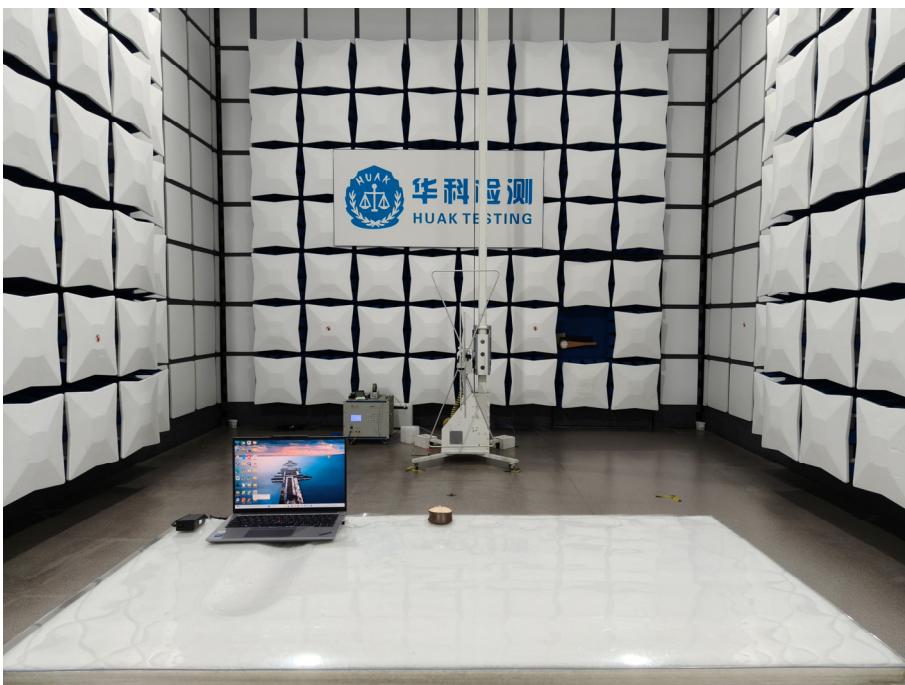
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8. Photographs of Test

Radiated Emission



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Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

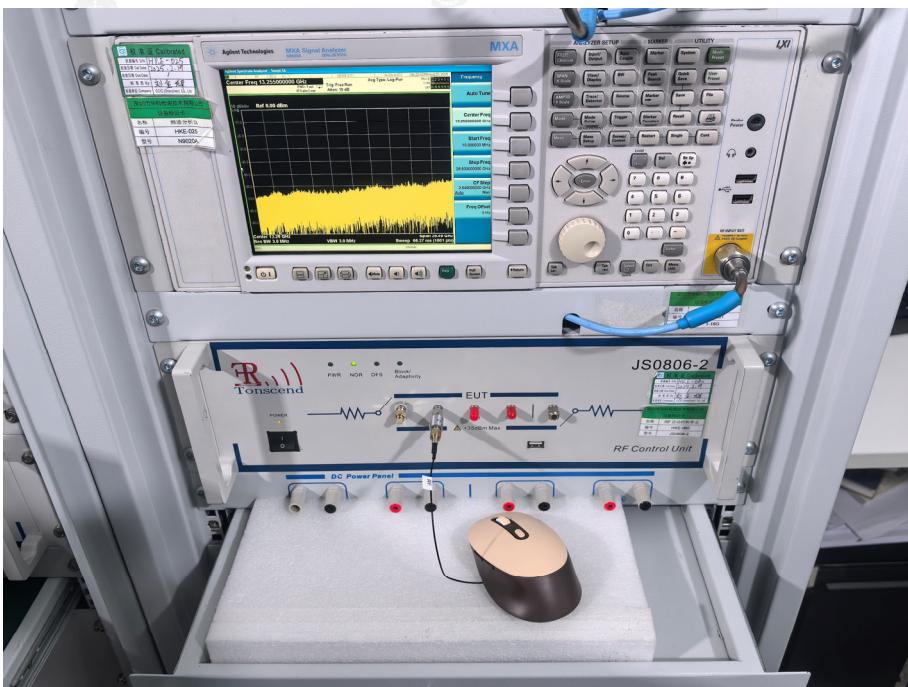


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RF Conducted Emission



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Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China



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9. Photos of the EUT

Reference to the report: ANNEX A of external photos and ANNEX B of internal photos.

-----End of test report-----



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