

# EMC TEST REPORT

## For CE-RED

**Report No.** : SSP24070038-1E

**Applicant** : SHENZHEN HANGPIN INDUSTRIAL LIMITED COMPANY

**Product Name** : Mouse

**Model Name** : V16

**Test Standard** : EN 301489-1 V2.2.3 (2019-11)  
EN 301489-3 V2.3.2 (2023-01)

**Date of Issue** : 2024-07-08



**Shenzhen CCUT Quality Technology Co., Ltd.**

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This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen CCUT Quality Technology Co., Ltd.

**Test Report Basic Information**

<b>Applicant</b> .....:	SHENZHEN HANGPIN INDUSTRIAL LIMITED COMPANY Room 303, Ju de Building, No 15, zhengfeng south road, huaide community, fu yong street, BAOAN DISTRICT, SHENZHEN, CHINA
<b>Manufacturer</b> .....:	SHENZHEN HANGPIN INDUSTRIAL LIMITED COMPANY Room 303, Ju de Building, No 15, zhengfeng south road, huaide community, fu yong street, BAOAN DISTRICT, SHENZHEN, CHINA
<b>Product Name</b> .....:	Mouse
<b>Brand Name</b> .....:	-
<b>Main Model</b> .....:	V16
<b>Series Models</b> .....:	See section 1.1(page 5)
<b>Test Standard</b> .....:	EN 301489-1 V2.2.3 (2019-11) EN 301489-3 V2.3.2 (2023-01)
<b>Date of Test</b> .....	2023-04-03 to 2023-04-12
<b>Test Result</b> .....:	PASS
<b>Tested By</b> .....	<u>Walker Wu</u> (Walker Wu)
<b>Reviewed By</b> .....:	<u>Lieber Ouyang</u> (Lieber Ouyang)
<b>Authorized Signatory</b> .....:	<u>Lahm Peng</u> (Lahm Peng)
<p>Note : This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen CCUT Quality Technology Co., Ltd.. All test data presented in this test report is only applicable to presented test sample.</p>	



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Revision History

Revision	Issue Date	Description	Revised By
V1.0	2024-07-08	Initial Release	Lahm Peng

## 1. General Information

### 1.1 Product Information

Product Name:	Mouse
Trade Name:	-
Main Model:	V16
Series Models:	V62, V6, V100, V30, V28, V96, V97, V83, V80, V34, V43, V7, V61, V41, V63, V64, V65, V66, V67, V68, V69, V70, V71, V72, V73, D22, D97, D37, D51, D66, D60, D61, D62, D63, D64, D65, D66, D67, D68
Rated Voltage:	DC 1.5V by "AA" battery
Type of Equipment:	<input type="checkbox"/> Fixed-Use <input type="checkbox"/> Vehicle-Use <input checked="" type="checkbox"/> Portable-Use
Class of Equipment:	<input type="checkbox"/> Class A <input checked="" type="checkbox"/> Class B
Note 1: The test data is gathered from a production sample, provided by the manufacturer.	
Note 2: The color of appearance and model name of series models listed are different from the main model, but the circuit and the electronic construction are the same, declared by the manufacturer.	

### 1.2 Test Setup Information

List of Test Modes			
Test Mode	Description	Remark	
TM1	2.4G Linking Work	-	
List and Details of Auxiliary Cable			
Description	Length (cm)	Shielded/Unshielded	With/Without Ferrite
-	-	-	-
-	-	-	-
List and Details of Auxiliary Equipment			
Description	Manufacturer	Model	Serial Number
Note Book	Lenovo	ThlnkPad E15 Gen 2	SPP0P39975
-	-	-	-
The equipment under test (EUT) was configured to measure its highest possible emission and immunity level. The test modes were adapted according to the operation manual for use.			

### 1.3 Compliance Standards

Compliance Standards	
EN 301489-1 V2.2.3 (2019-11)	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility
EN 301489-3 V2.3.2 (2023-01)	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU
All measurements contained in this report were conducted with all above standards	
According to standards for test methodology	
EN 55032:2015+A11:2020	Electromagnetic compatibility of multimedia equipment - Emission requirements
EN 55035:2017+A11:2020	Electromagnetic compatibility of multimedia equipment - Immunity requirements
EN IEC 61000-3-2:2019/A1:2021	Electromagnetic compatibility (EMC) - Part 3-2: Limits -Limits for harmonic current emissions (equipment input current $\leq$ 16 A per phase)
EN 61000-3-3:2013+A11:2021	Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current $\leq$ 16 A per phase and not subject to conditional connection
IEC 61000-4-2:2008	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test
IEC 61000-4-3:2020	Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test
IEC 61000-4-4:2012	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test
IEC 61000-4-5:2017	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test
IEC 61000-4-6:2013	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
IEC 61000-4-11:2020	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests
Maintenance of compliance is the responsibility of the manufacturer or applicant. Any modification of the product, which result is lowering the emission, should be checked to ensure compliance has been maintained.	

## 1.4 Performance Criteria for EMS

Criterion	During test	After test
A	Operate as intended No loss of function No unintentional responses	Operate as intended No loss of function No degradation of performance No loss of stored data or user programmable functions
B	May show loss of function No unintentional responses	Operate as intended Lost function(s) shall be self-recoverable No degradation of performance No loss of stored data or user programmable functions

## 1.5 Test Facilities

Laboratory Name:	<b>Shenzhen CCUT Quality Technology Co., Ltd.</b> 1F, Building 35, Changxing Technology Industrial Park, Yutang Street, Guangming District, Shenzhen, Guangdong, China
CNAS Laboratory No.:	L18863
A2LA Certificate No.:	6893.01
FCC Registration No:	583813
ISED Registration No.:	CN0164
All measurement facilities used to collect the measurement data are located at 1F, Building 35, Changxing Technology Industrial Park, Yutang Street, Guangming District, Shenzhen, Guangdong, China.	

## 1.6 Measurement Uncertainty

Test Item	Conditions	Uncertainty
Conducted Emissions	9kHz ~ 30MHz	±1.64 dB
Radiated Emissions	30MHz ~ 1GHz	±3.32 dB
	1GHz ~ 6GHz	±3.50 dB

## 1.7 List of Measurement Instruments

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
<b>Radiated Emissions</b>					
EMI Test Receiver	ROHDE&SCHWARZ	ESPI	100154	2022-07-09	2023-07-08
Spectrum Analyzer	KEYSIGHT	N9020A	MY48030972	2022-07-09	2023-07-08
Amplifier	SCHWARZBECK	BBV 9743B	00251	2022-07-09	2023-07-08
Amplifier	HUABO	YXL0518-2.5-45	--	2022-07-09	2023-07-08
Loop Antenna	DAZE	ZN30900C	21104	2022-07-09	2023-07-08
Broadband Antenna	SCHWARZBECK	VULB 9168	01320	2022-07-09	2023-07-08
Horn Antenna	SCHWARZBECK	BBHA 9120D	02553	2022-07-09	2023-07-08
EMI Test Software	FARA	EZ-EMC	FA-03A2 RE+	N/A	N/A
<b>EMS Testing</b>					
ESD Generator	Shanghai LIONCEL	ESD-202B	0220104	2022-07-09	2023-07-08
CS Generator	Shanghai LIONCEL	RIS-6091	6091-0220601	2022-07-09	2023-07-08
Surges Test System	Shanghai LIONCEL	LCG-5411	5411-0220303	2022-07-09	2023-07-08
Voltage Regulator	Shanghai LIONCEL	MVR-16	--	2022-07-09	2023-07-08
Signal Generator	Aglient	N5181A	MY46240904	2022-07-09	2023-07-08
Amplifier 80M-1GHz	SKET	HAP_80M01G-250W	N/A	2022-07-09	2023-07-08
Amplifier 1GHz-3GHz	SKET	HAP_01G03G-75W	N/A	2022-07-09	2023-07-08
Amplifier 3GHz-6GHz	SKET	HAP_03G06G-75W	N/A	2022-07-09	2023-07-08
Forward Power Meter	R&S	NRP-Z11	138.3004.02-11610	2022-07-09	2023-07-08
Reverse Power Meter	R&S	NRP-Z11	138.3004.02-11694	2022-07-09	2023-07-08
Log-periodic Antenna	SKET	STLP 9129 Plus	N/A	2022-07-09	2023-07-08
EMS Software	SKET	EZ-EMC	EEMC-3A1	N/A	N/A



## 2. Summary of Test Results

Standards	Description of Test Items	Result
EN 301489-1 V2.2.3 (2019-11)	Conducted Emission	N/A
	Radiated Emission	Passed
	Harmonic Current Emission	N/A
	Voltage Fluctuation and Flicker	N/A
	Electrostatic Discharge	Passed
	Continuous Radiated Disturbances Immunity	Passed
	Electrical Fast Transient Immunity	N/A
	Surges Immunity	N/A
	Continuous Conducted Disturbances Immunity	N/A
	Voltage Dips and Interruptions Immunity	N/A
Passed: The EUT complies with the essential requirements in the standard Failed: The EUT does not comply with the essential requirements in the standard N/A: Not applicable		

### 3. Radiated Emission

#### 3.1 Standard and Limit

According to the standard EN 301489-1 section 8.2.3 , the limit for radiated emission as below:

**Table A.2 – Requirements for radiated emissions at frequencies up to 1 GHz for class A equipment**

Table clause	Frequency range MHz	Measurement			Class A limits dB(μV/m)
		Facility (see Table A.1)	Distance m	Detector type / bandwidth	
A2.1	30 to 230	OATS/SAC	10	Quasi Peak / 120 kHz	40
	230 to 1 000				47
A2.2	30 to 230	OATS/SAC	3		50
	230 to 1 000				57
A2.3	30 to 230	FAR	10	Quasi Peak / 120 kHz	42 to 35
	230 to 1 000				42
A2.4	30 to 230	FAR	3		52 to 45
	230 to 1 000				52
Apply only A2.1 or A2.2 or A2.3 or A2.4 across the entire frequency range.					

**Table A.3 – Requirements for radiated emissions at frequencies above 1 GHz for class A equipment**

Table clause	Frequency range MHz	Measurement			Class A limits dB(μV/m)
		Facility (see Table A.1)	Distance m	Detector type / bandwidth	
A3.1	1 000 to 3 000	FSOATS	3	Average / 1 MHz	56
	3 000 to 6 000				60
A3.2	1 000 to 3 000			Peak / 1 MHz	76
	3 000 to 6 000				80

Apply A3.1 and A3.2 across the frequency range from 1 000 MHz to the highest required frequency of measurement derived from Table 1.

**Table A.4 – Requirements for radiated emissions at frequencies up to 1 GHz for class B equipment**

Table clause	Frequency range MHz	Measurement			Class B limits dB(μV/m)
		Facility (see Table A.1)	Distance m	Detector type / bandwidth	
A4.1	30 to 230	OATS/SAC	10	Quasi Peak / 120 kHz	30
	230 to 1 000				37
A4.2	30 to 230	OATS/SAC	3		40
	230 to 1 000				47
A4.3	30 to 230	FAR	10	Quasi Peak / 120 kHz	32 to 25
	230 to 1 000				32
A4.4	30 to 230	FAR	3		42 to 35
	230 to 1 000				42

Apply only table clause A4.1 or A4.2 or A4.3 or A4.4 across the entire frequency range.

These requirements are not applicable to the local oscillator and harmonics frequencies of equipment covered by Table A.6.

**Table A.5 – Requirements for radiated emissions at frequencies above 1 GHz for class B equipment**

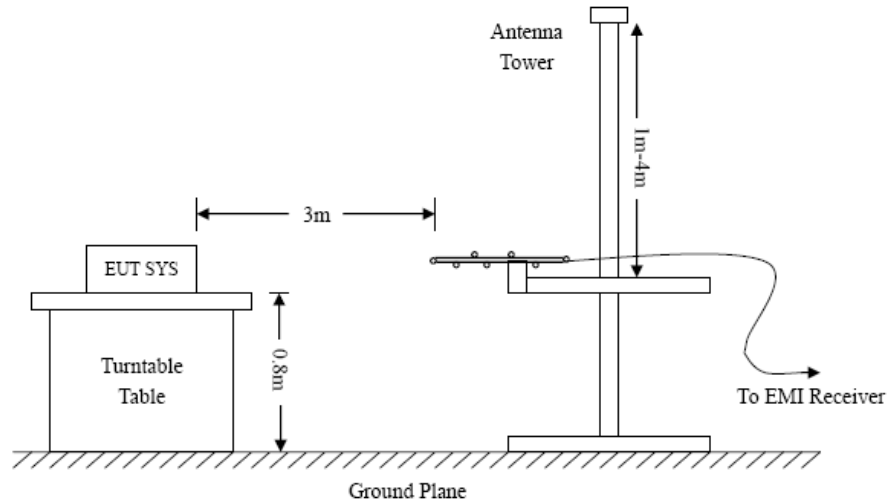
Table clause	Frequency range MHz	Measurement			Class B limits dB(μV/m)
		Facility (see Table A.1)	Distance m	Detector type/ bandwidth	
A5.1	1 000 to 3 000	FSOATS	3	Average/ 1 MHz	50
	3 000 to 6 000				54
A5.2	1 000 to 3 000			Peak/ 1 MHz	70
	3 000 to 6 000				74
Apply A5.1 and A5.2 across the frequency range from 1 000 MHz to the highest required frequency of measurement derived from Table 1.					

**Table A.6 – Requirements for radiated emissions from FM receivers**

Table Clause	Frequency Range MHz	Measurement			Class B Limit dB(μV/m)	
		Facility (see Table A.1)	Distance m	Detector type / Bandwidth	Fundamental	Harmonics
A6.1	30 to 230	OATS/SAC	10	Quasi Peak / 120 kHz	50	42
	230 to 300					42
	300 to 1 000					46
A6.2	30 to 230	OATS/SAC	3		60	52
	230 to 300					52
	300 to 1 000					56
A6.3	30 to 230	FAR	10	Quasi Peak / 120 kHz	52 to 45	44 to 37
	230 to 300				45	37
	300 to 1 000				45	41
A6.4	30 to 230	FAR	3		62 to 55	54 to 47
	230 to 300				55	47
	300 to 1 000				55	51
Apply only A6.1 or A6.2 or A6.3 or A6.4 across the entire frequency range.						
These relaxed limits apply only to emissions at the fundamental and harmonic frequencies of the LO. Signals at all other frequencies shall be compliant with the limits given in Table A.4.						

### 3.2 Test Procedure

Test is conducting under the description of EN 55032, annex C and annex D.

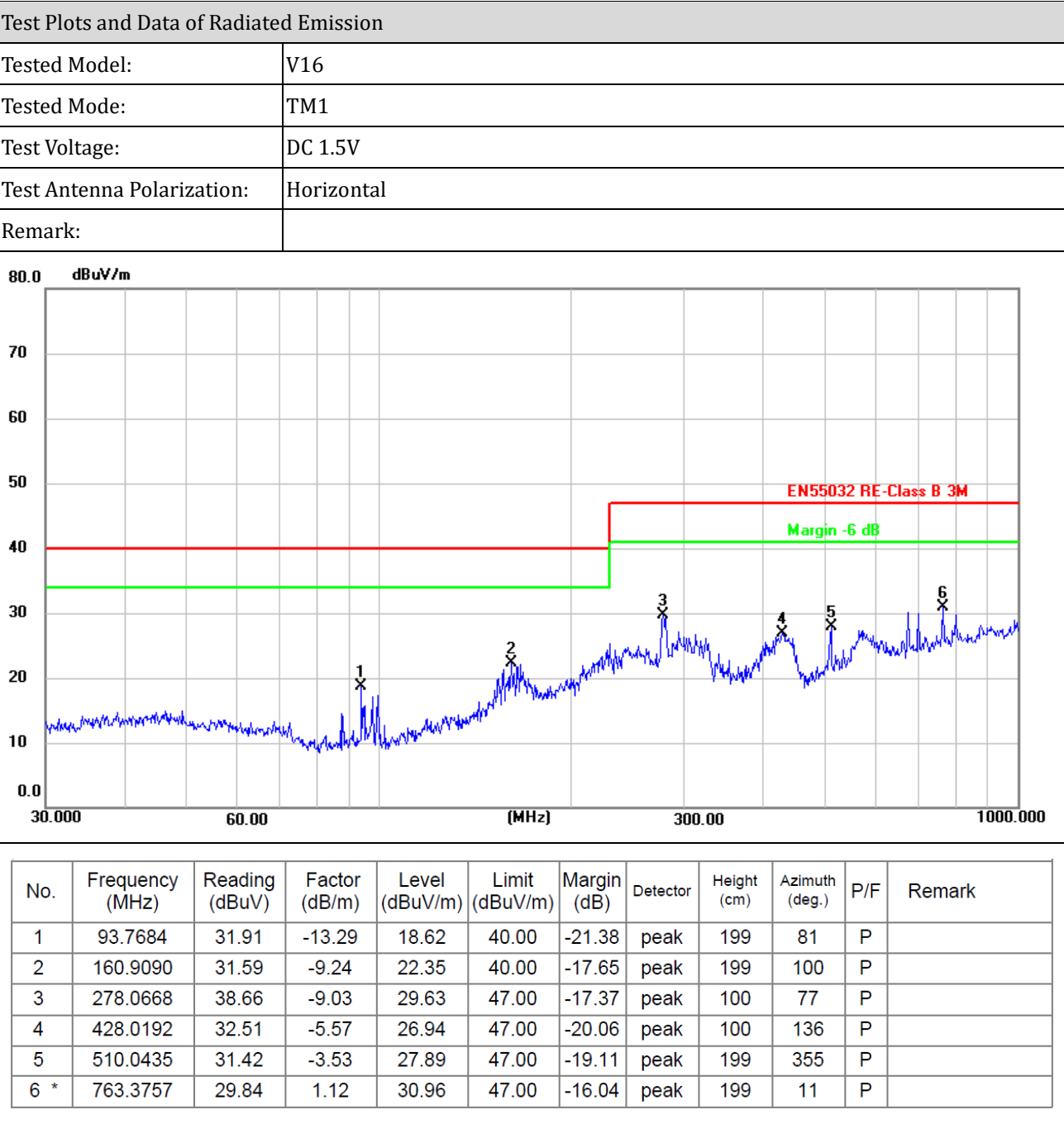


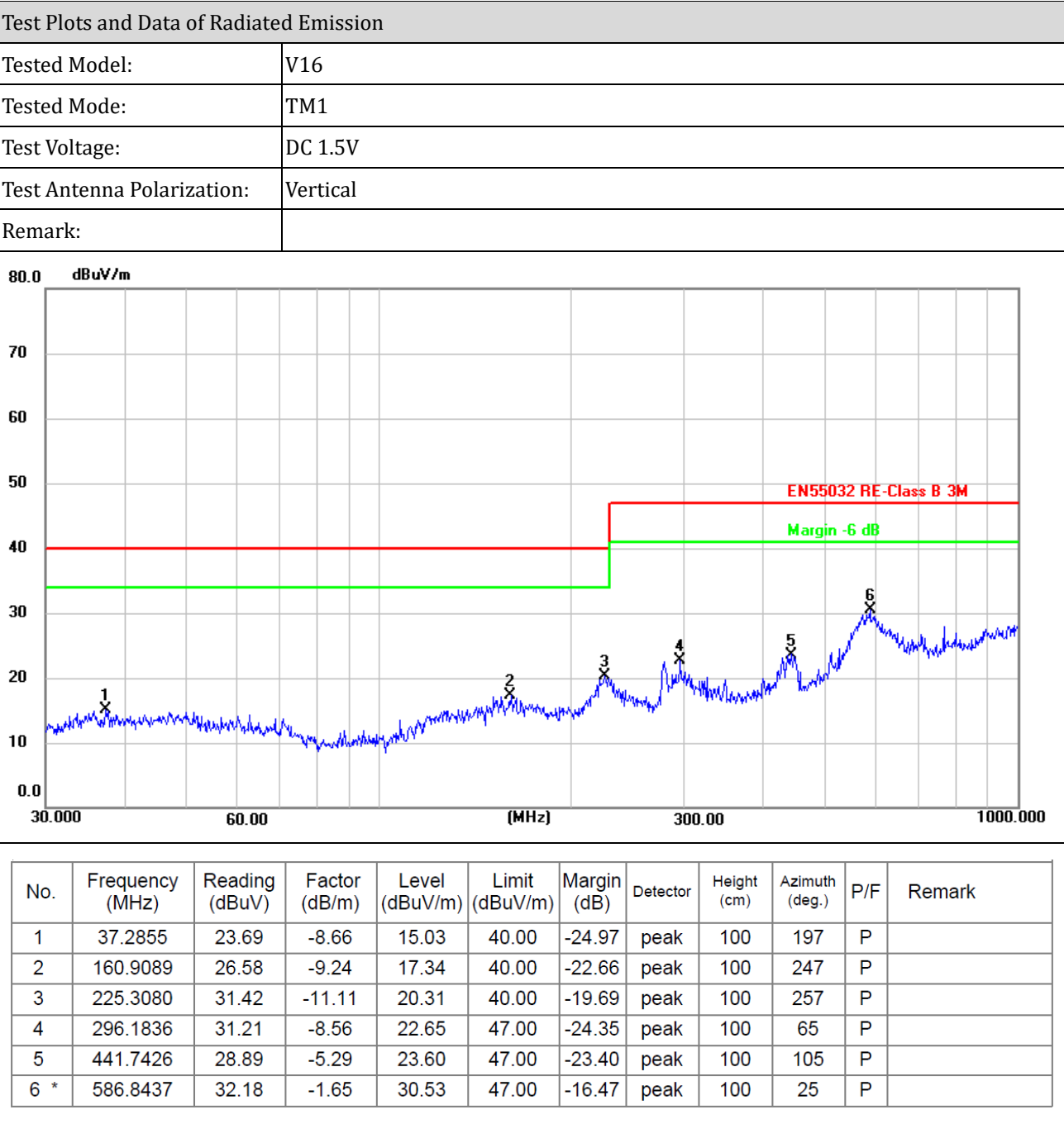
Test Setup Block Diagram

### 3.3 Test Data and Results

Based on all tested data, the EUT complied with the EN 55032 standard limit for a Class B device, and with the worst case as below:

Remark: Level = Reading + Factor, Margin = Level - Limit





## 4. Electrostatic Discharges (ESD)

### 4.1 Standard and Limit

According to the standard EN 301489-1 section 9.3.2 and 9.3.3 , Limit as below:

Test Specifications	Test Level	Performance Criterion
Air Discharge	8kV	B
Contact Discharge	4kV	B

### 4.2 Test Procedure

According to the standard EN 301489-1 section 9.3.2, Test is conducting under the description of IEC 61000-4-2.

### 4.3 Test Results

Air Discharge	Test Level (kV)							
Test Points	-2	+2	-4	+4	-8	+8	-15	+15
Buttons	A	A	A	A	A	A	-	-
LED	A	A	A	A	A	A	-	-
Slot	A	A	A	A	A	A	-	-
Switch	A	A	A	A	A	A	-	-
Contact Discharge	Test Level (kV)							
Test Points	-2	+2	-4	+4	-6	+6	-8	+8
HCP	A	A	A	A	-	-	-	-
VCP	A	A	A	A	-	-	-	-

## 5. Continuous Radiated Disturbances (RS)

### 5.1 Standard and Limit

According to the standard EN 301489-1 section 9.2.2 and 9.2.3 , Limit as below:

Test Specifications	Test Level	Performance Criterion
80MHz-1000MHz	3V/m	A
1GHz-6GHz	3V/m	A

### 5.2 Test Procedure

According to the standard EN 301489-1 section 9.2.2, Test is conducting under the description of IEC 61000-4-3.

### 5.3 Test Results

Frequency step: 1% of fundamental

Dwell time: 1 second

Modulation: AM by 1kHz sine wave with 80% modulation depth

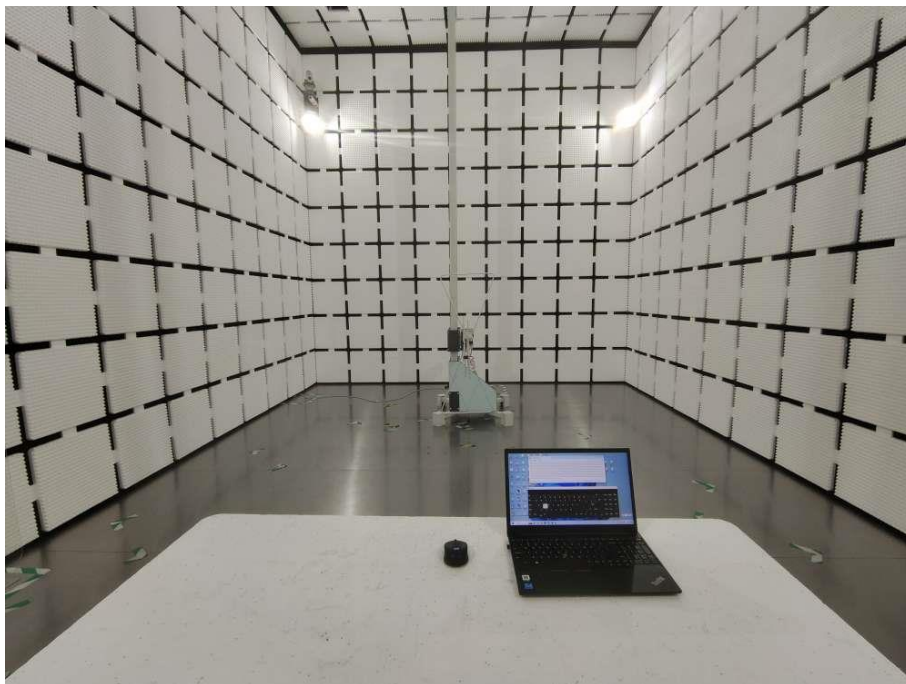
Frequency Range	EM Field	Polarization	Front	Rear	Left	Right
80MHz-1GHz	3V/m	Horizontal	A	A	A	A
80MHz-1GHz	3V/m	Vertical	A	A	A	A
1GHz-6GHz	3V/m	Horizontal	A	A	A	A
1GHz-6GHz	3V/m	Vertical	A	A	A	A



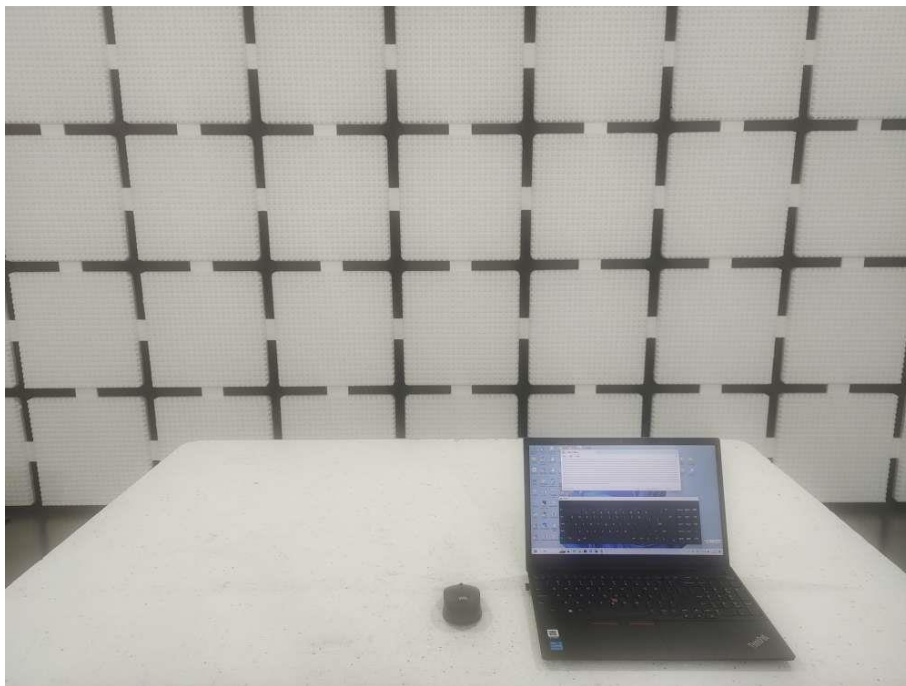
## Annex A. Test Photos

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### Radiated Emission Test View



### RS Test View



ESD Test View



## Annex B. EUT Photos

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EUT View 1



EUT View 2





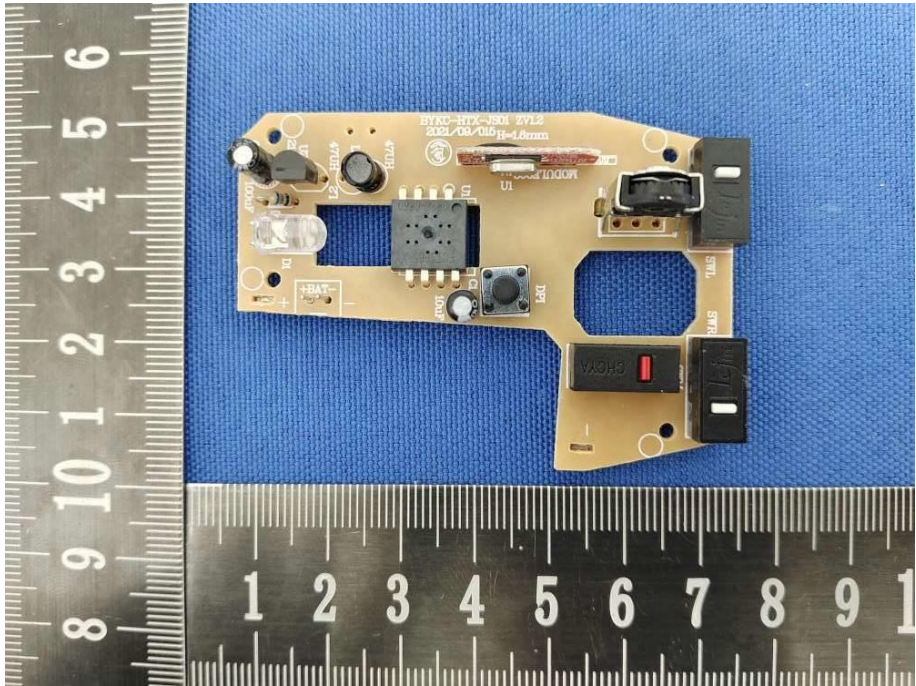
**EUT View 3****EUT View 4**

**EUT View 3****EUT View 4**

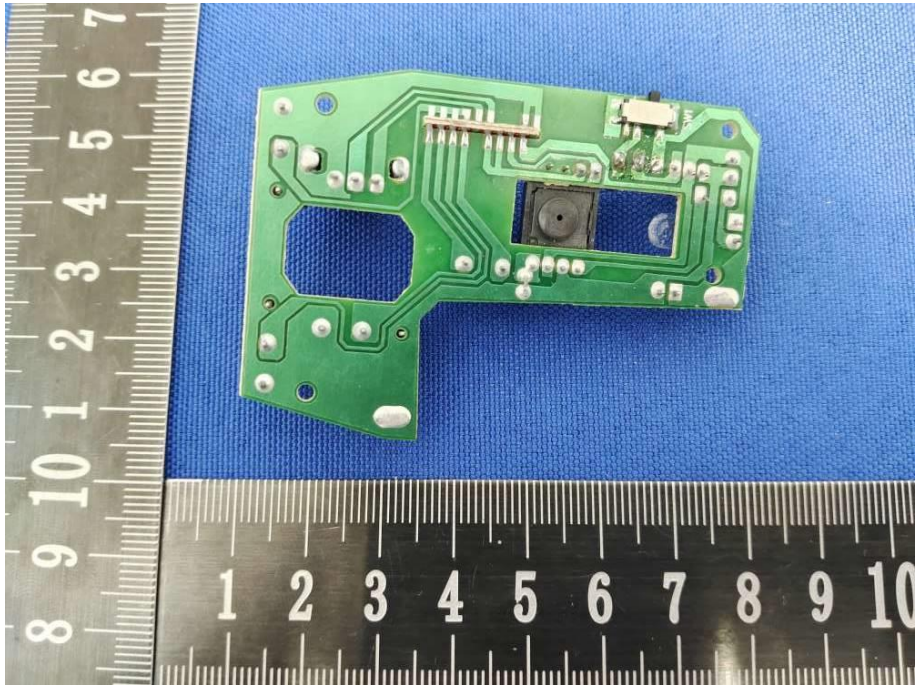


**EUT View 5****EUT View 6**

EUT View 7

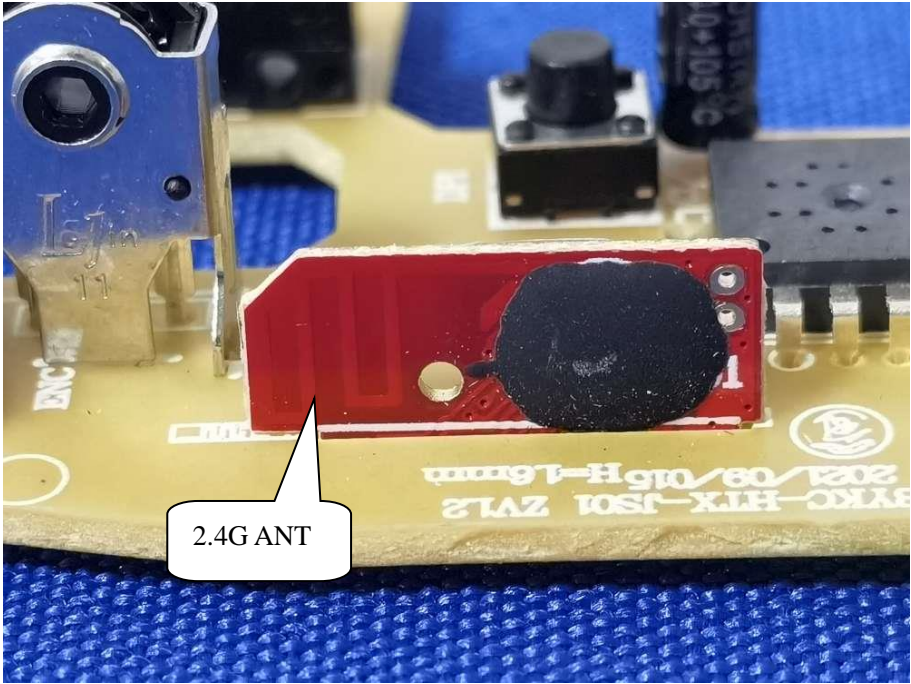


EUT View 8

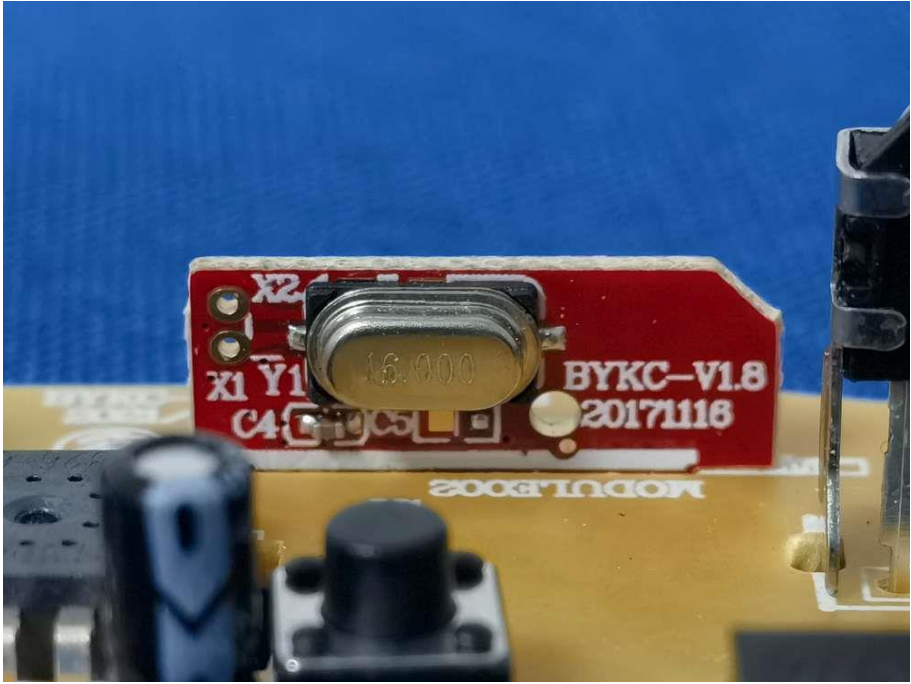




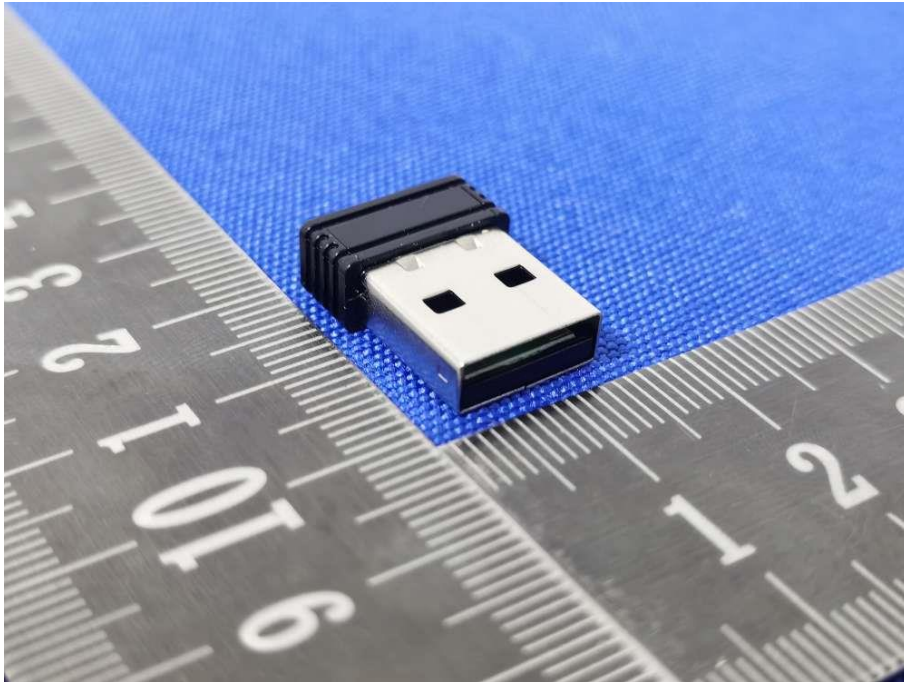
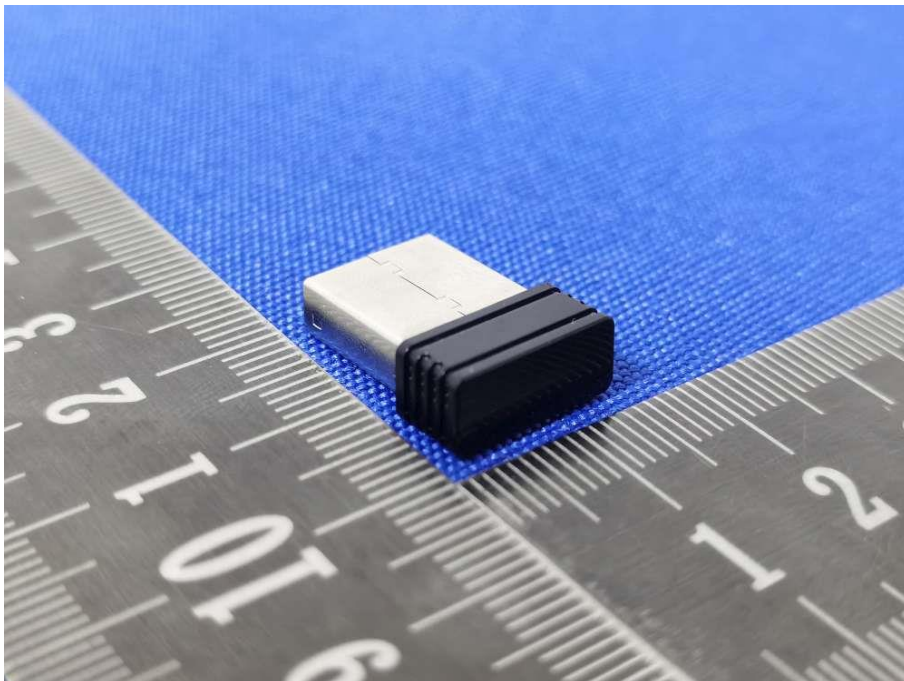
EUT View 9

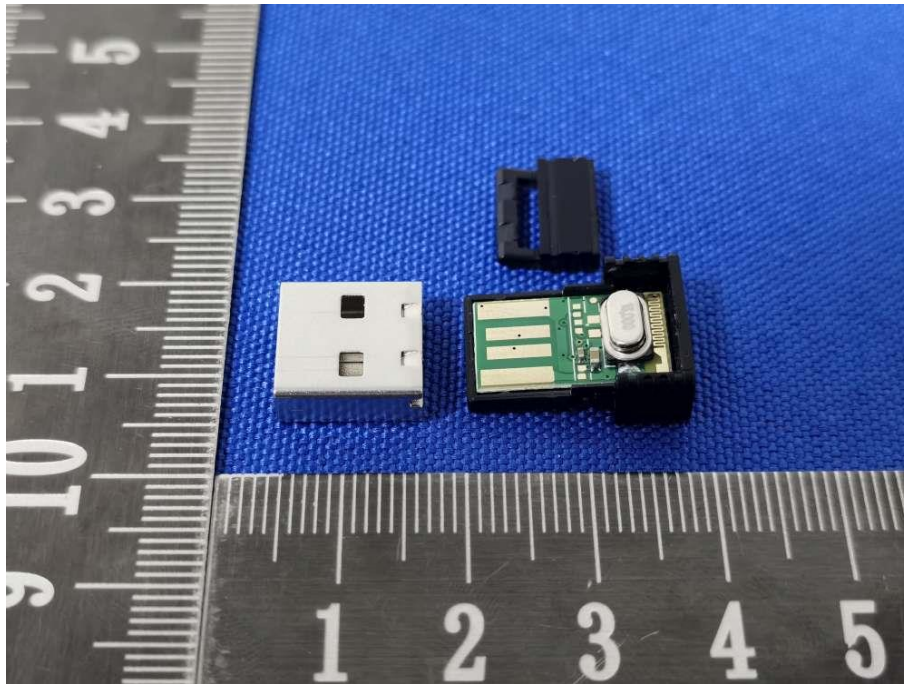
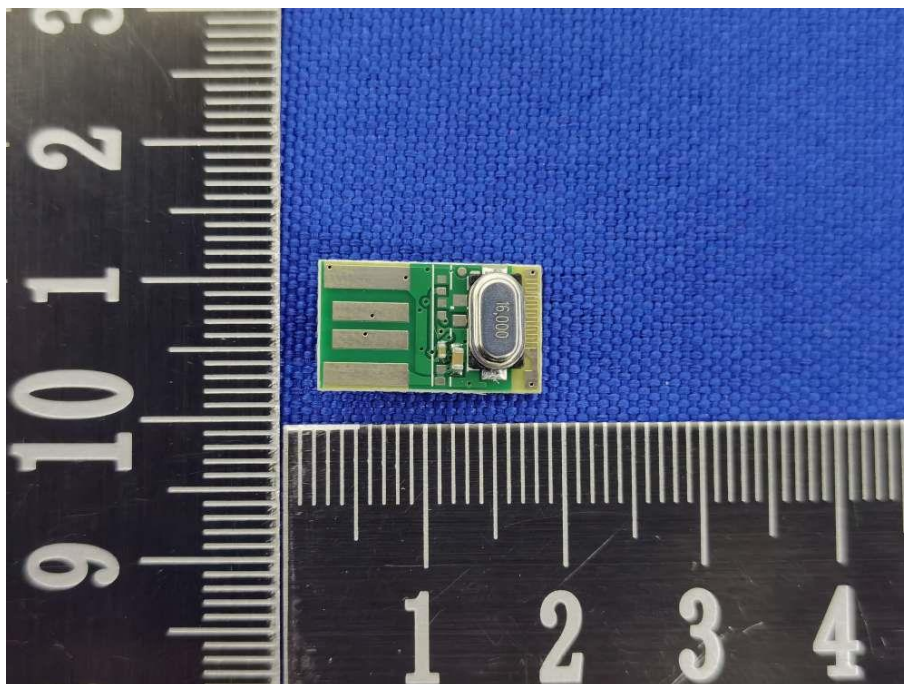


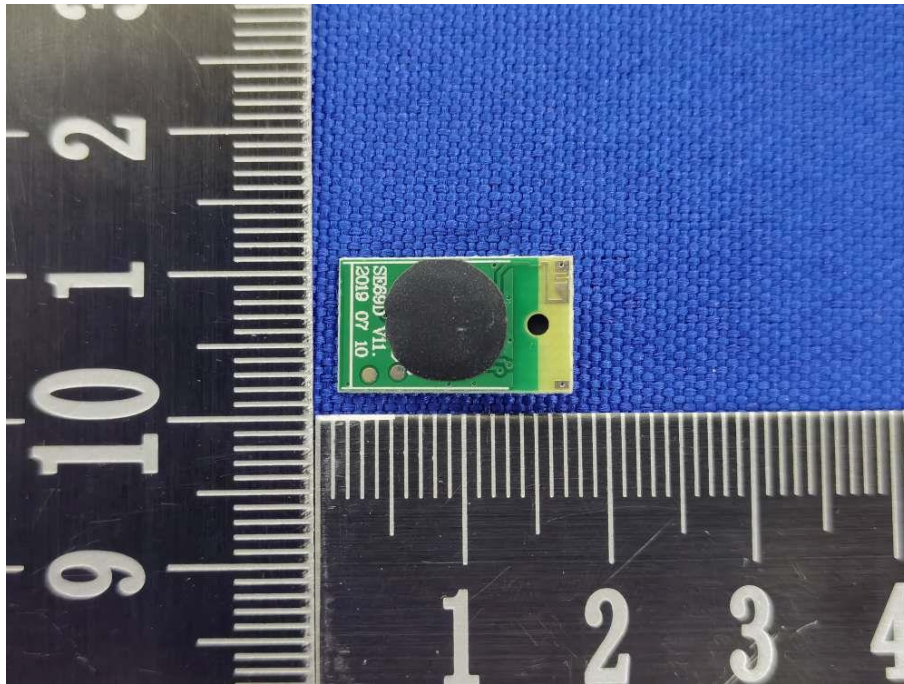
EUT View 10





**EUT View 11****EUT View 12**

**EUT View 13****EUT View 14**

**EUT View 15**

**\*\*\*\*\* END OF REPORT \*\*\*\*\***