FCC TEST REPORT

FCC ID: 2ASJJ-6072431

Product	:	P FINGER
Model Name	:	6072431
Brand	:	Lovely Planet
Report No.	:	PTC21042201201E-FC01

Prepared for

LOVELY PLANET

560 Avenue du Garlaban, 13420 Gémenos, France

Prepared by

Precise Testing & Certification (Guangdong) Co., Ltd.

Building 1, No. 6, Tongxin Road, Dongcheng Street, Dongguan, Guangdong, China.

TEST RESULT CERTIFICATION

Applicant's name	:	LOVELY PLANET
Address	:	560 Avenue du Garlaban, 13420 Gémenos, France
Manufacture's name	:	LOVELY PLANET
Address	:	560 Avenue du Garlaban, 13420 Gémenos, France
Product name	:	P FINGER
Model name	:	6072431
Standards	:	FCC CFR47 Part 15 Section 15.231
Test procedure	:	ANSI C63.10:2013
Test Date	:	Jun. 13, 2021 - Jun. 28, 2021
Date of Issue	:	Jun. 29, 2021
Test Result	:	Pass

The above equipment has been tested by Dongguan Precise Testing & Certification Corp., Ltd. and found compliance with the requirements in the technical standards mentioned above. The test results presented in this report only relate to the product/system tested. The Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Test Engineer:

Leo Yang / Engineer

Technical Manager:

Chris Du /Manager

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2 Test Summary

Test Items	Test Requirement	Result
Conducted Emissions	15.207	N/A
Radiated Emission	15.231(b) 15.209 15.205(b)	PASS
Periodic Operation	15.231(a)(1)	PASS
Outside of Band Emission	15.231(b) 15.205 15.209	PASS
20dB Bandwidth	15:231(c)	PASS
Antenna Requirement	15.203	PASS
Remark: N/A: Not Applicable		

3 General Information

3.1 General Description of E.U.T.

Product Name : P FINGER

Model Name : 6072431

Model Description : N/A

Operation Frequency: : 433.92MHz

Antenna installation: : Integrated Antenna

Antenna Gain: : 0dBi

Type of Modulation : ASK

The lowest oscillator : 433.92MHz

Power supply : DC 3V power by battery

3.2 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Modulation	Test mode	Low channel	Middle channel	High channel
ASK	continuously Transmitting	433.92MHz	\	\

3.3 Test Site

Precise Testing & Certification Co., LTD.

Address: Building 1, No.6 Tongxin Road, Dongcheng Street, Dongguan,China

FCC Registration Number: 790290

A2LA Certificate No.: 4408.01

IC Registration Number: 12191A-1

4 Equipment During Test

4.1 Equipments List

Radiated Emissions							
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	EMI Test Receiver	Rohde & Schwarz	ESCI	101417	Aug. 20, 2020	Aug. 19, 2021	1 year
2	EMC Analyzer (9k~26.5GHz)	Agilent	E4407B	MY45109572	Aug. 20, 2020	Aug. 19, 2021	1 year
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3355	Aug. 20, 2020	Aug. 19, 2021	1 year
4	Amplifier	EM	EM-30180	060538	Aug. 20, 2020	Aug. 19, 2021	1 year
5	Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1246	Aug. 20, 2020	Aug. 19, 2021	1 year
6	Coaxial Cable(below 1GHz)	LARGE	CALB1	-	Aug. 20, 2020	Aug. 19, 2021	1 year
7	Coaxial Cable(above 1GHz)	LARGE	CALB2	-	Aug. 20, 2020	Aug. 19, 2021	1 year
8	Spectrum Analyzer	Rohde & Schwarz	FSV40	101078	Aug. 20, 2020	Aug. 19, 2021	1 year

4.2 Measurement Uncertainty

Parameter	**Uncertainty**
RF output power, conducted	±1.0dB
Power Spectral Density, conducted	±2.2dB
Radio Frequency	$\pm 1 \times 10^{-6}$
Bandwidth	$\pm 1.5 \times 10^{-6}$
Time	±2%
Duty Cycle	±2%
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±3%
Conducted Emissions (150kHz~30MHz)	±3.64dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB

5 Conducted Emission

Test Requirement:	:	FCC CFR 47 Part 15 Section 15.207
Test Method:	:	ANSI C63.10:2013
Frequency Range:	:	150kHz to 30MHz
Class/Severity:	:	Class B
Limit:	:	66-56 dBμV between 0.15MHz & 0.5MHz
	:	56 dBμV between 0.5MHz & 5MHz
	:	60 dBμV between 5MHz & 30MHz
Detector:	:	Peak for pre-scan (9kHz Resolution Bandwidth)
Test Result:	:	The device is powered by battery, this test is not applicable

6 Periodic Operation

The duty cycle was determined by the following equation:

To calculate the actual field intensity, the duty cycle correction factor in decibel is needed for later use and can be obtained from following conversion

Duty Cycle(%)=Total On interval in a complete pulse train/ Length of a complete pulse train * %

Duty Cycle Correction Factor (dB)=20 * Log_{10}(Duty Cycle(%))

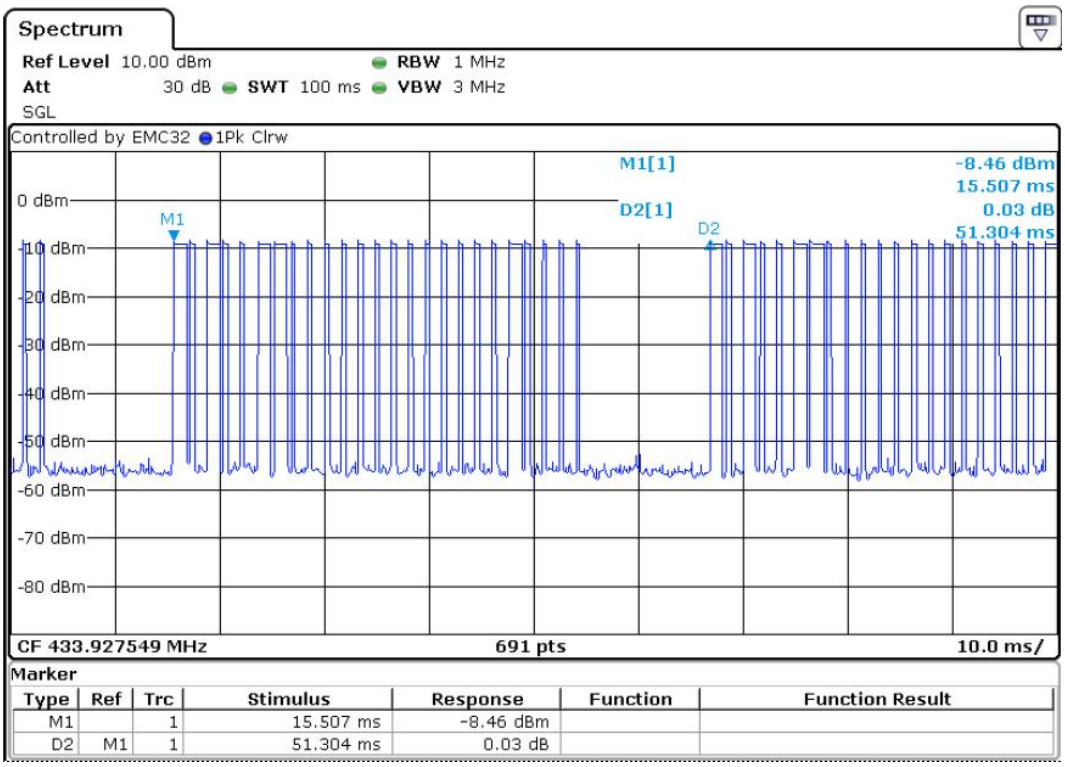
Total transmission time(ms)	1.304*5+0.435*20=15.22
Length of a complete transmission period(ms)	51.304
Duty Cycle(%)	29.667
Duty Cycle Correction Factor(dB)	-10.6

Refer to the duty cycle plot (as below), This device meets the FCC requirement.

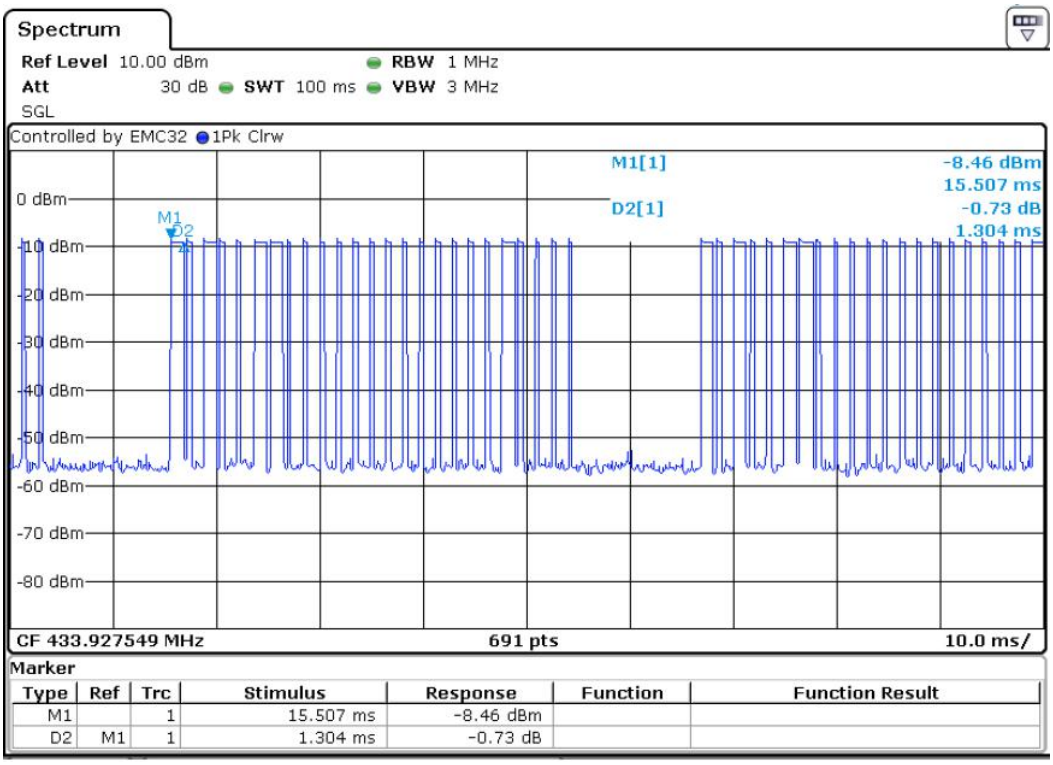
Length of a complete pulse train:

Remark: FCC part15.35(c) required that a complete pulse train is more than 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.

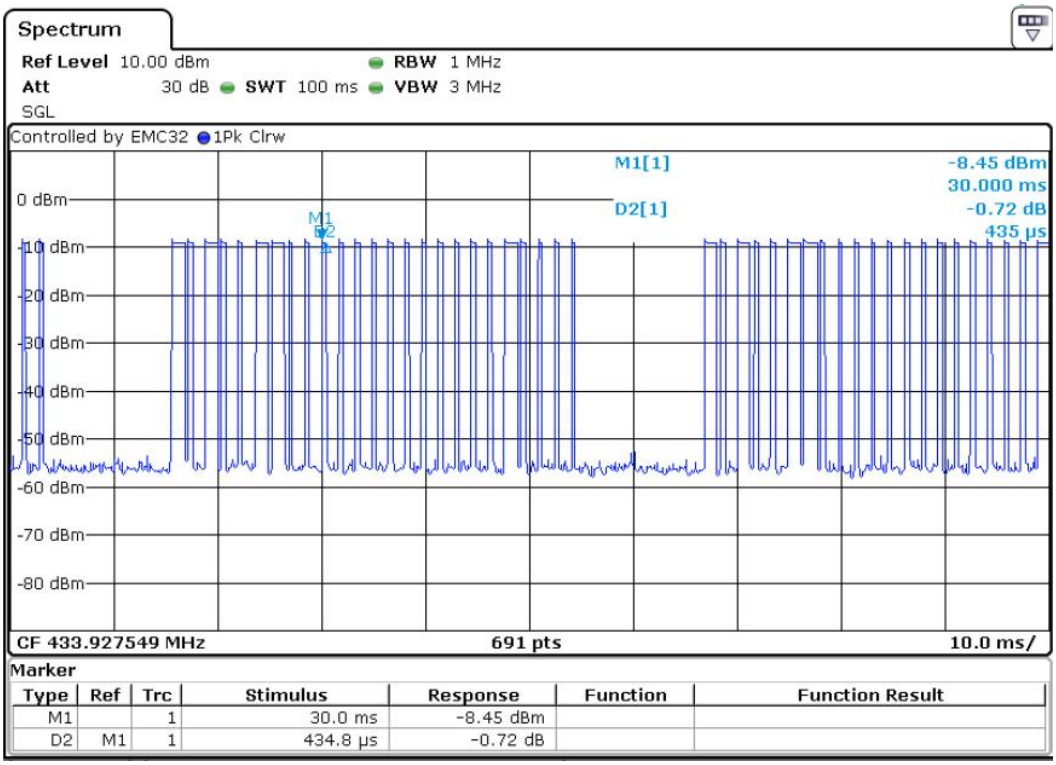
Tp



Pulse 1

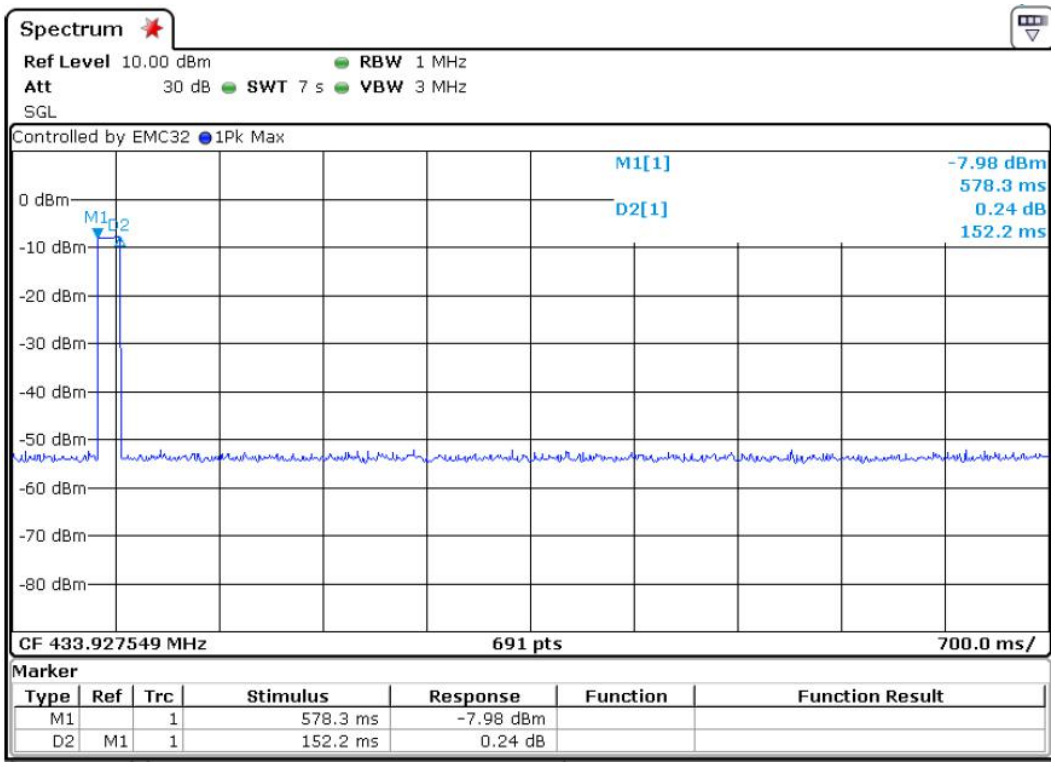


Pulse 2



FCC Part15.231 (a) (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

(2)A transmitter activated automatically shall cease transmission within 5 seconds after activation.



7 Radiated Spurious Emissions

Test Requirement: : FCC CFR47 Part 15 Section 15.231 & 15.207 &15.205

Test Method: : ANSI C63.10:2013

Test Result: : PASS

Measurement Distance: : 3m

Limit: : See the follow table

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

7.1 EUT Operation

Operating Environment :

Temperature: : 23.5 °C

Humidity: : 51.1 % RH

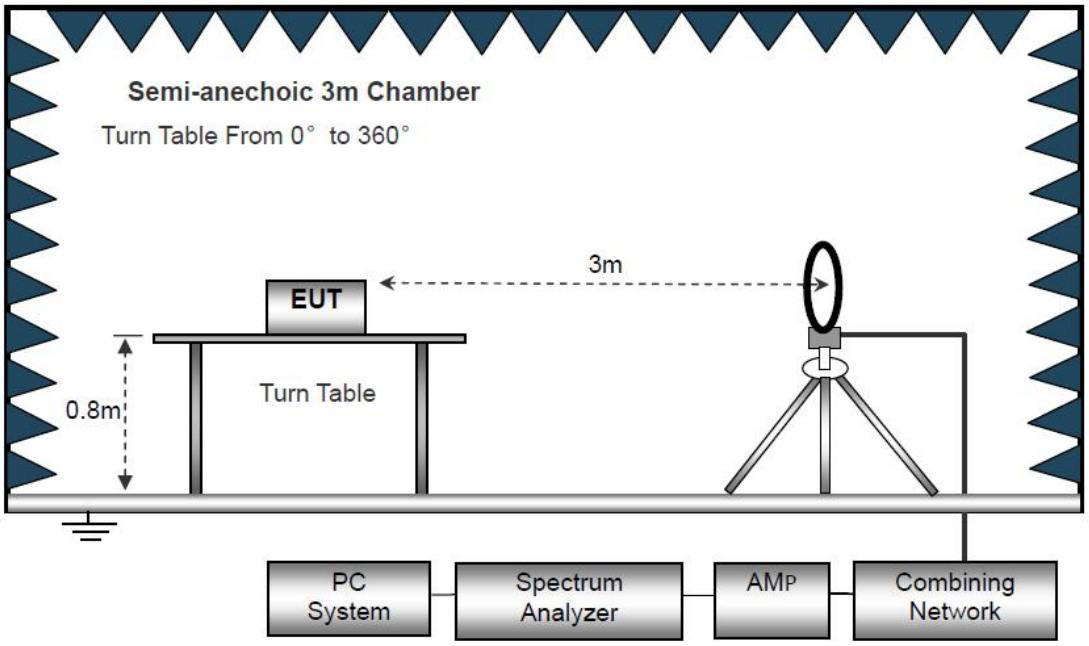
Atmospheric Pressure: : 101.2kPa

EUT Operation : : Refer to section 3.3

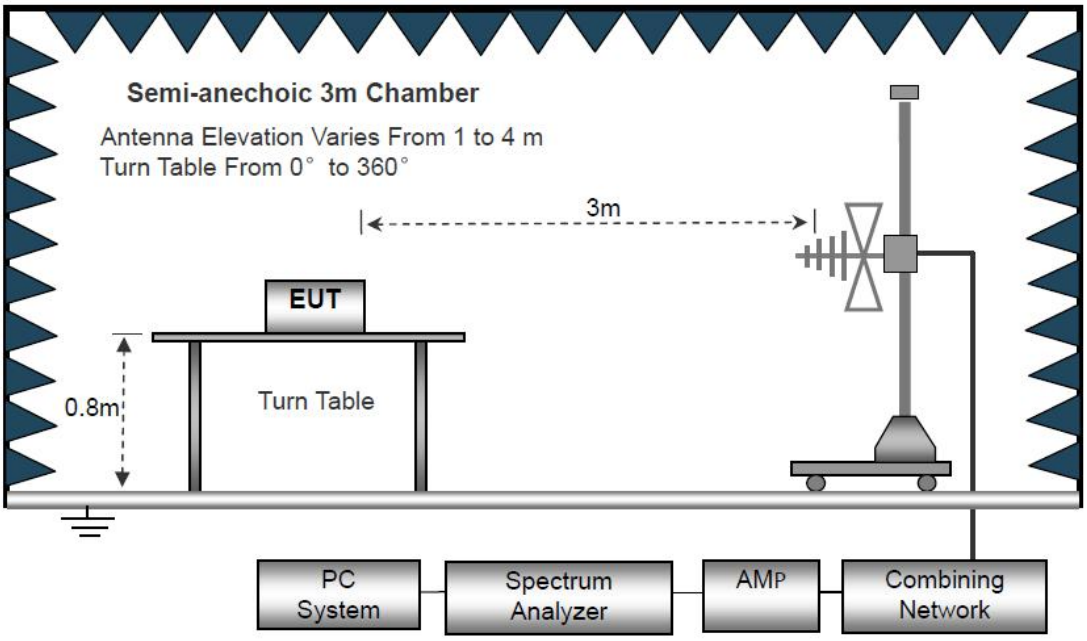
7.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site

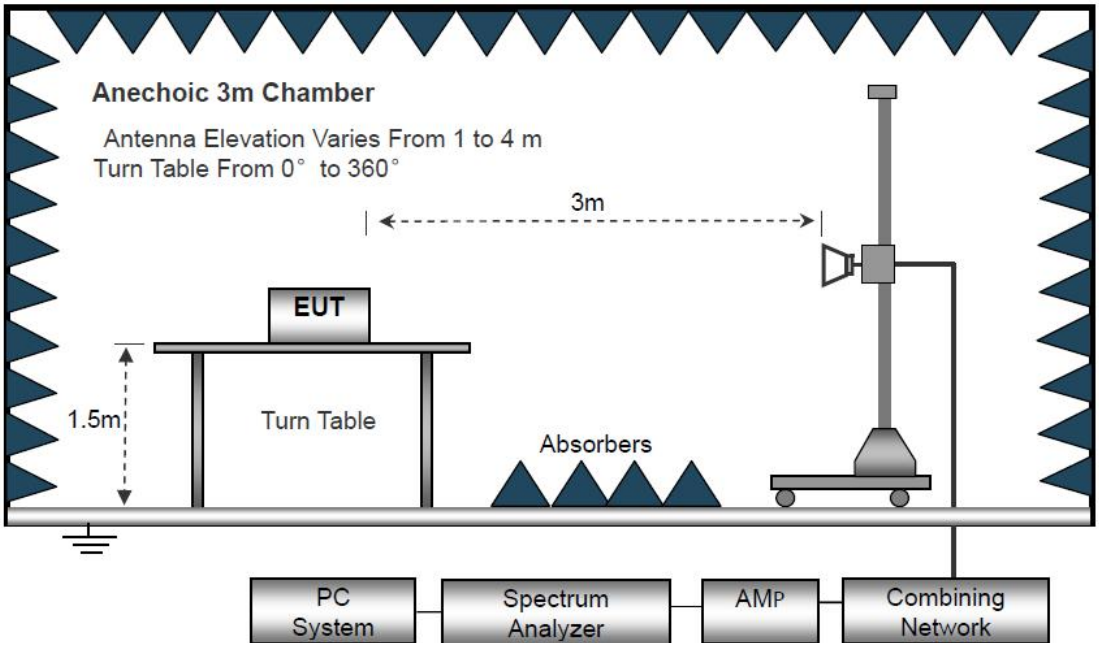
The test setup for emission measurement below 30MHz



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz



7.3 Spectrum Analyzer Setup

Below 30MHz

IF Bandwidth		10kHz
Resolution Bandwidth		10kHz
Video Bandwidth		10kHz

30MHz ~ 1GHz

Detector	:	PK
Resolution Bandwidth	:	100kHz
Video Bandwidth	:	300kHz
Detector	:	QP
Resolution Bandwidth	:	120kHz
Video Bandwidth	:	300kHz

Above 1GHz

Detector	:	PK
Resolution Bandwidth	:	1MHz
Video Bandwidth	:	3MHz
Detector	:	AV
Resolution Bandwidth	:	1MHz
Video Bandwidth	:	10Hz

7.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m or 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 moved from 1m to 4m to find out the maximum emissions. The spectrum was investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

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 radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.

8. The test above 1GHz must be use the fully anechoic room, and the test below 1GHz use the half anechoic room

7.5 Summary of Test Results

Test Frequency: Below 30MHz

The lowest oscillator is 433.92MHz, the test is not applicable

Test Frequency: 30MHz ~ 5GHz

All applicable test modes have been tested with TX mode(433.92MHz)

Frequency	Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.231/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)
65.32	46.79	QP	113	1.5	H	16.56	30.23	40	-9.77
65.32	42.33	QP	45	1.3	V	15.25	27.08	40	-12.92
89.34	43.65	QP	214	2.9	H	13.79	29.86	40	-10.14
89.34	41.36	QP	325	1.6	V	12.71	28.65	40	-11.35
156.76	42.38	QP	109	2.6	H	7.98	34.4	43.5	-9.1
156.76	43.37	QP	244	1.8	V	6.79	36.58	43.5	-6.92
257.32	44.92	QP	128	1.3	H	12.44	32.48	46	-13.52
257.32	47.99	QP	215	2.8	V	11.69	36.3	46	-9.7
413.44	48.36	QP	325	1.9	H	14.14	34.22	46	-11.78
413.44	46.37	QP	4	3.4	V	15.03	31.34	46	-14.66

Frequency	PK	Turn table Angle	RX Antenna		Duty cycle Factor	AV	FCC Part 15.231/209/205	
			Height	Polar			Limit	Margin
(MHz)	(dBμV/m)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
433.92	72.11	232	2.5	H	-10.6	61.51	80.83	-19.32
433.92	69.04	211	2.3	V	-10.6	58.44	80.83	-22.39
867.84	58.66	46	1.7	H	-10.6	48.06	60.83	-12.77
867.84	56.37	125	2.3	V	-10.6	45.77	60.83	-15.06
1301.76	48.03	169	1.5	H	-10.6	37.43	60.83	-23.40
1301.76	46.38	300	2.0	V	-10.6	35.78	60.83	-25.05
1735.68	44.11	151	1.6	H	-10.6	33.51	54	-20.49
1735.68	42.38	147	1.3	V	-10.6	31.78	54	-22.22

Note:

1. All other emissions more than 20dB below the limit.
2. Average=Peak Value+20log(Duty Cycle).
3. The results above show only the worst case

8 20dB Bandwidth Measurement

Test Requirement	:	FCC Part15.231(c)
Test Method	:	FCC Part15.231(c)
Test Mode	:	Refer to section 3.3
Limit	:	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.

8.1 Test Procedure

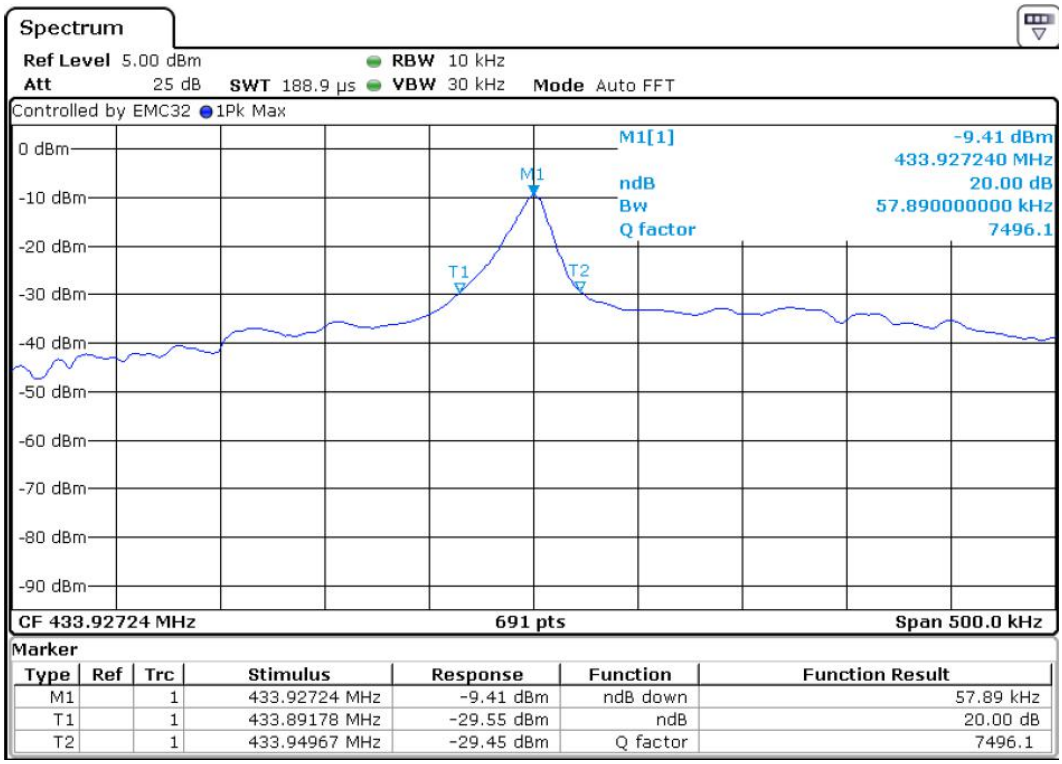
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;

2. Set the spectrum analyzer: For BLE, RBW = 10 kHz, VBW = 30kHz,

8.2 Test Result

Test Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Result
433.92	57.89	1084.80	pass

Test plots

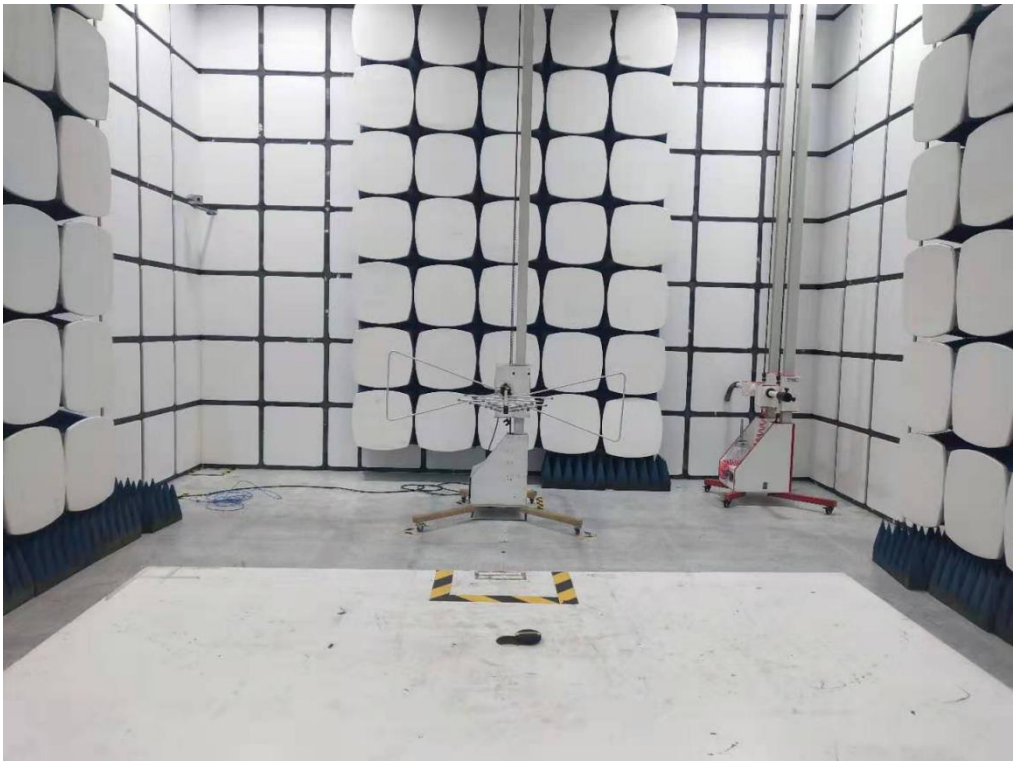


9 Antenna Requirement

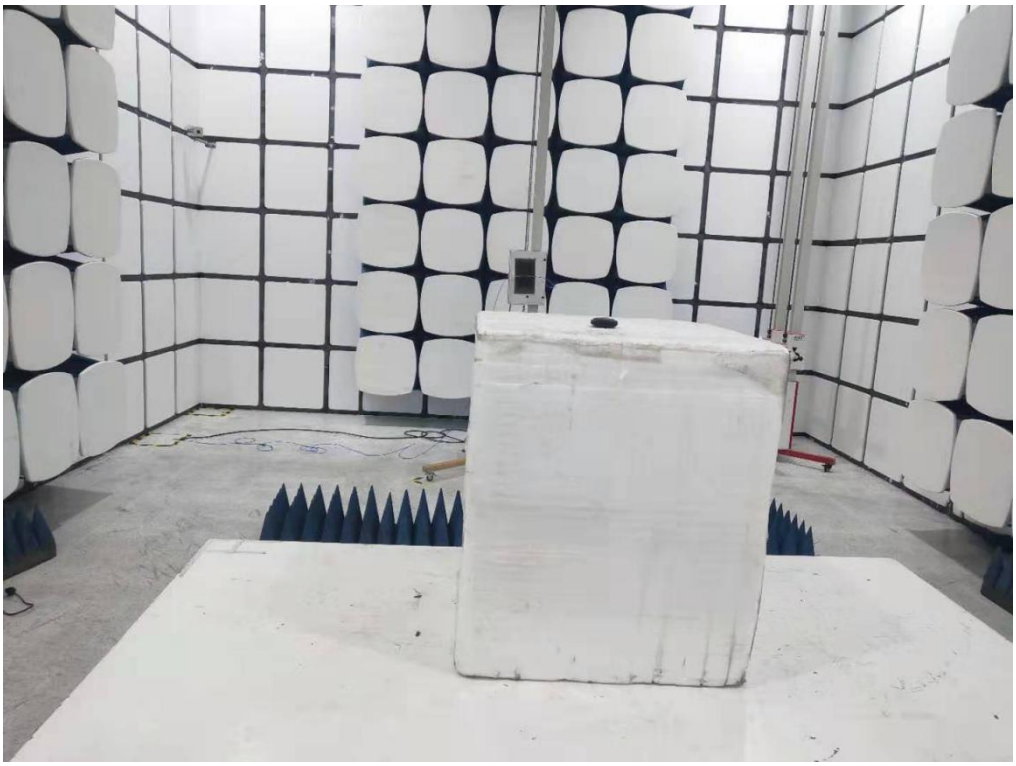
According to the FCC part15.203, a transmitter can only be sold or operated with antennas with which it was approved. This product has an internal permanent antenna which meet the requirement of this section.

10 Test Setup

Radiated Spurious Emissions
From 30MHz-1000MHz

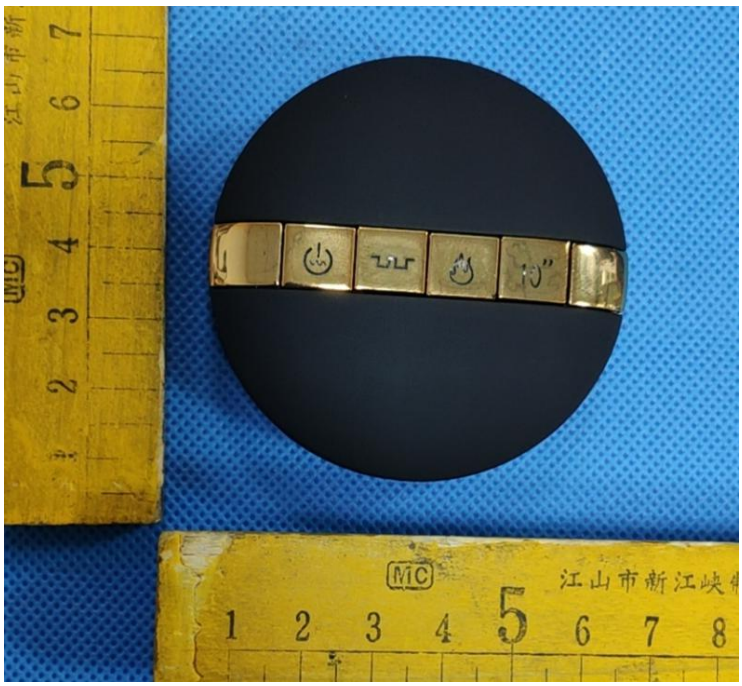


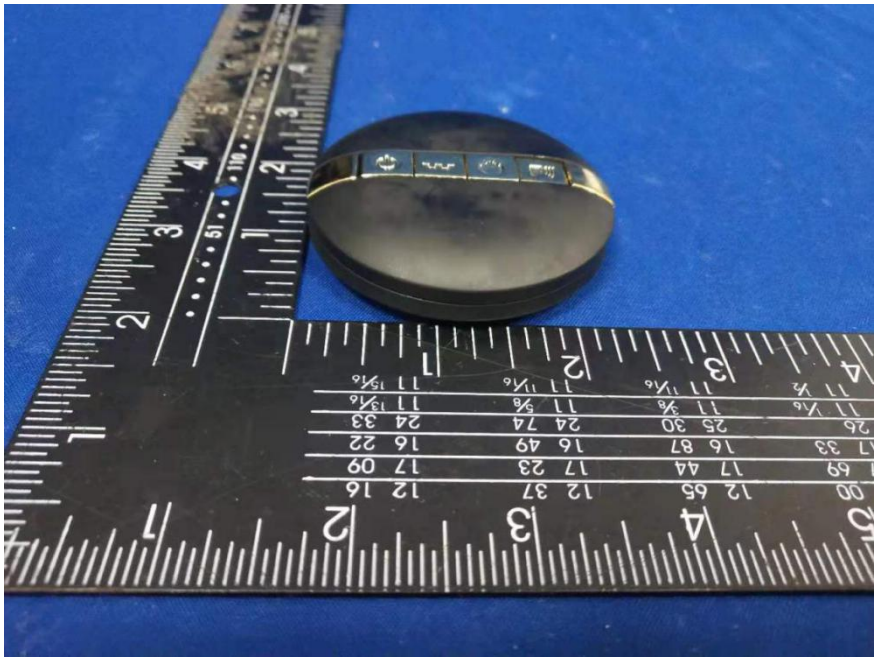
Above 1GHz

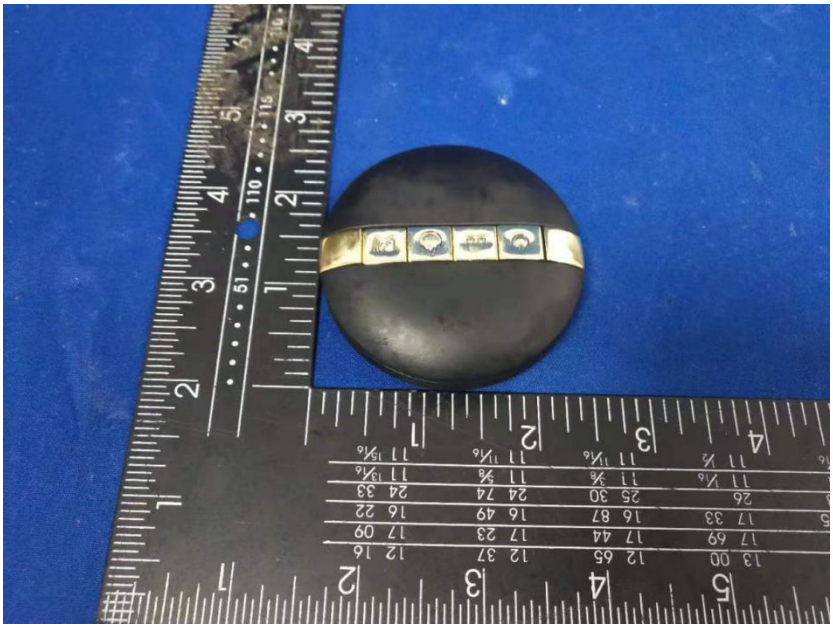


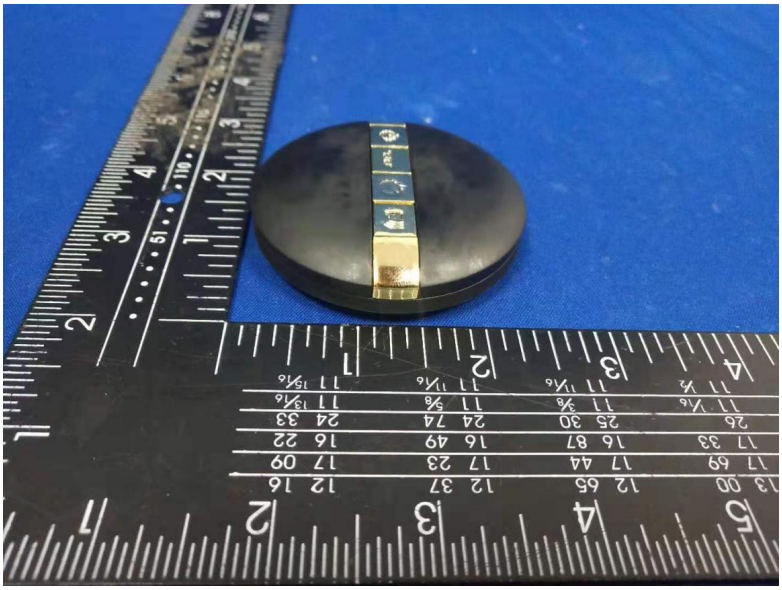
11 EUT Photos

External Photos

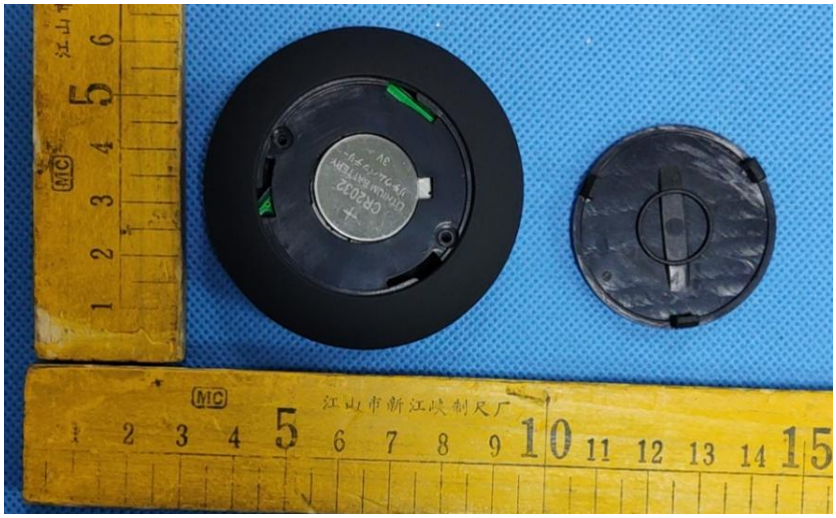








Internal Photos



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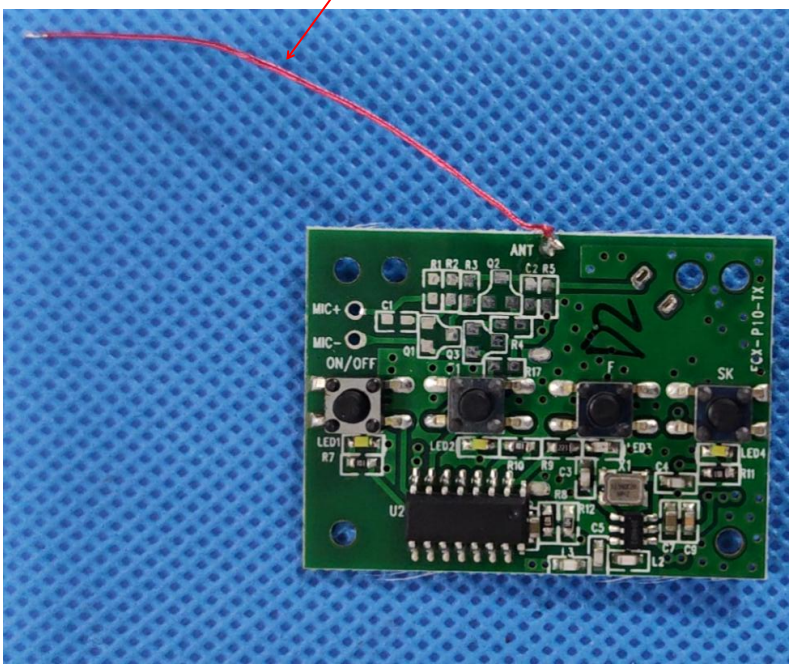

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