TECHNICAL REPORT

BSL

TEST REPORT

Report No:	BSL23050501-P01R02
FCC ID:	2AZ4E-828
Report Date:	May. 29, 2023
Applicant:	YIXUAN TOYS FACTORY
Product:	RC CAR
Brand Name:	N/A
Model No:	828-5
Listed Models:	685-1,685-2,685-3,KM661-1,KM661-2,KM661- 3,KM661-5,680,530-1,KM555-1,KM555-2, KM555-3, KM555-5, KM555-6,KM555-8,926-1,926-2,926-6,926-8
Test Standards:	FCC Part 15.227
Test result:	PASS

Approved By

Vivian Jiang
EMC Manager

Dated: May. 29, 2023

Results appearing herein relate only to the sample tested
The technical reports is issued errors and omissions exempt and is subject to withdrawal at

BSL Testing Co.,Ltd.
1/F, Building B, Xinshidai GR Park,Shiyan Street, Bao'an District, Shenzhen,Guangdong, 518052, People's Republic of China
Tel:+86-755- 26649703

T E S T R E P O R T

Equipment under Test	:	RC CAR
Model /Type	:	828-5
Listed Models	:	685-1,685-2,685-3, KM661-1, KM661-2, KM661- 3,KM661-5, 680,530-1, KM555-1, KM555-2, KM555-3, KM555-5, KM555-6, KM555-8, 926-1, 926-2,926-6,926-8
Model Declaration	:	PCB board, structure and internal of these model(s) are the same, So no additional models were tested.
Applicant	:	**YIXUAN TOYS FACTORY**
Address	:	No.3,Heng 6,Shunfa Road,Guangyi Street,Chenghai District,Shantou City
Manufacturer	:	**YIXUAN TOYS FACTORY**
Address	:	No.3,Heng 6,Shunfa Road,Guangyi Street,Chenghai District,Shantou City

Test Result:	**PASS**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.227:Operation within the band 26.96-27.28 MHz.
ANSI C63.10:2013 : American National Standard for Testing Unlicensed Wireless Devices

2 SUMMARY

2.1 General Remarks

Date of receipt of test sample	:	May. 05, 2023
Testing commenced on	:	May. 05, 2023
Testing concluded on	:	May. 28, 2023

2.2 Product Description

Product Name:	RC CAR
Model/Type reference:	828-5
Listed Models:	685-1,685-2,685-3, KM661-1, KM661-2, KM661- 3,KM661-5, 680,530-1, KM555-1, KM555-2, KM555-3, KM555-5, KM555-6, KM555-8, 926-1, 926-2,926-6,926-8
Testing sample ID：	BSL23050501-P01R02-1# (Normal sample)
Power supply:	DC 3.0V From Battery
Modulation:	FSK
Operation frequency:	27.144 MHz
Channel number:	1
Antenna type:	Metal Antenna
Antenna gain:	0 dBi

2.3 Equipment Under Test

Power supply system utilised

Power supply voltage	:	○	230V / 50 Hz	○	120V / 60Hz
		○	12 V DC	○	24 V DC
		●	Other (specified in blank below)		

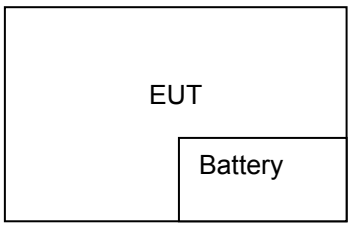
DC 3.0V From Battery

2.4 Short description of the Equipment under Test (EUT)

This is a RC CAR.

For more details, refer to the user's manual of the EUT.

2.5 Block Diagram of Test Setup



2.6 Special Accessories

Follow auxiliary equipment(s) test with EUT that provided by the manufacturer or laboratory is listed as follow:

Description	Manufacturer	Model	Technical Parameters	Certificate	Provided by
/	/	/	/	/	/

2.7 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for the device filing to comply with Section 15.227 of the FCC Part 15, Subpart C Rules.

2.8 Modifications

No modifications were implemented to meet testing criteria.

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

BSL Testing Co., Ltd.
1/F, Building B, Xinshidai GR Park,Shiyan Street, Bao'an District, Shenzhen,Guangdong, 518052, People’s Republic of China

3.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 562200 Designation Number: CN1338
BSL Testing Co.,Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

Industry Canada Registration Number. Is: 11093A CAB identifier: CN0019
The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing.

A2LA-Lab Cert. No.: 4707.01
BSL Testing Co.,Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

3.3 Environmental conditions

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

Radiated Emission:

Temperature:	25 ° C
Humidity:	45 %
Atmospheric pressure:	950-1050mbar

Conducted testing：

Temperature:	25 ° C
Humidity:	44 %
Atmospheric pressure:	950-1050mbar

3.4 Summary of measurement results

FCC Requirements		
FCC Part 15.207	Conducted Emission	N/A
FCC Part 15.203	Antenna requirement	PASS
FCC Part 15.215	-20dB bandwidth	PASS
FCC Part 15.227	Field Strength of the Fundamental Signal	PASS
FCC Part 15.227(b)/ 15.209	Radiated Emissions	PASS

Remark: The measurement uncertainty is not included in the test result.

3.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the BSL Testing Co.,Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.
Hereafter the best measurement capability for BSL Testing Co.,Ltd. :

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	9KHz~30MHz	3.20 dB	(1)
Radiated Emission	30~1000MHz	4.10 dB	(1)
Radiated Emission	1~18GHz	4.32 dB	(1)
Radiated Emission	18-40GHz	5.54 dB	(1)
Conducted Disturbance	0.9KHz~30MHz	3.12 dB	(1)
Occupied Channel Bandwidth	/	5%	(1)
RF Frequency	/	$0.082*10^{-7}$	(1)
RF output power, conducted	/	0. 73 dB	(1)
Unwanted Emission, conducted	/	1 .6dB	(1)
AC Power Lines Conducted Emissions|	/	2. 72dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.6 Equipments Used during the Test

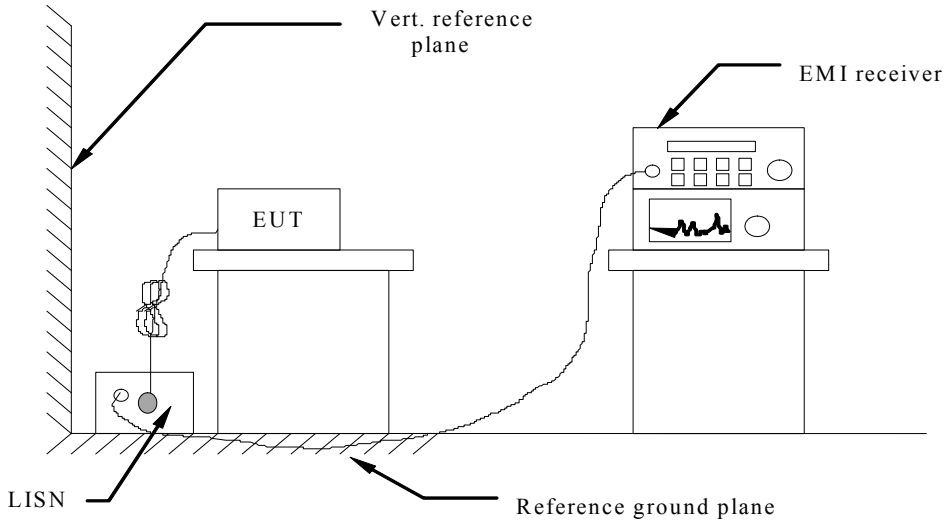
Test Equipment	Manufacturer	Model No.	Equipment No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	CTA-308	2022/08/06	2023/08/05
LISN	R&S	ENV216	CTA-314	2022/08/06	2023/08/05
EMI Test Receiver	R&S	ESPI	CTA-307	2022/08/06	2023/08/05
EMI Test Receiver	R&S	ESCI	CTA-306	2022/08/06	2023/08/05
Spectrum Analyzer	Agilent	N9020A	CTA-301	2022/08/06	2023/08/05
Spectrum Analyzer	R&S	FSP	CTA-337	2022/08/06	2023/08/05
Vector Signal generator	Agilent	N5182A	CTA-305	2022/08/06	2023/08/05
Analog Signal Generator	R&S	SML03	CTA-304	2022/08/06	2023/08/05
Universal Radio Communication	CMW500	R&S	CTA-302	2022/08/06	2023/08/05
Temperature and humidity meter	Chigo	ZG-7020	CTA-326	2022/08/06	2023/08/05
Ultra-Broadband Antenna	Schwarzbeck	VULB9163	CTA-310	2022/08/06	2023/08/05
Horn Antenna	Schwarzbeck	BBHA 9120D	CTA-309	2022/08/06	2023/08/05
Loop Antenna	Zhinan	ZN30900C	CTA-311	2022/08/06	2023/08/05
Horn Antenna	Beijing Hangwei Dayang	OBH100400	CTA-336	2022/08/06	2023/08/05
Amplifier	Schwarzbeck	BBV 9745	CTA-312	2022/08/06	2023/08/05
Amplifier	Taiwan chengyi	EMC051845B	CTA-313	2022/08/06	2023/08/05
Directional coupler	NARDA	4226-10	CTA-303	2022/08/06	2023/08/05
High-Pass Filter	XingBo	XBLBQ-GTA18	CTA-402	2022/08/06	2023/08/05
High-Pass Filter	XingBo	XBLBQ-GTA27	CTA-403	2022/08/06	2023/08/05
Automated filter bank	Tonscend	JS0806-F	CTA-404	2022/08/06	2023/08/05
Power Sensor	Agilent	U2021XA	CTA-405	2022/08/06	2023/08/05
Amplifier	Schwarzbeck	BBV9719	CTA-406	2022/08/06	2023/08/05

Note: The Cal.Interval was one year.

4 TEST CONDITIONS AND RESULTS

4.1 AC Power Conducted Emission

TEST CONFIGURATION



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 C63.10-2013.
2 Support equipment, if needed, was placed as per ANSI C63.10-2013
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013
4 The EUT received DC 12V power from adapter, the adapter received AC120V/60Hz and AC 240V/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.
8 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following：

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the frequency.		

TEST RESULTS

The EUT is powered by the Battery,So this test item is not applicable for the EUT.

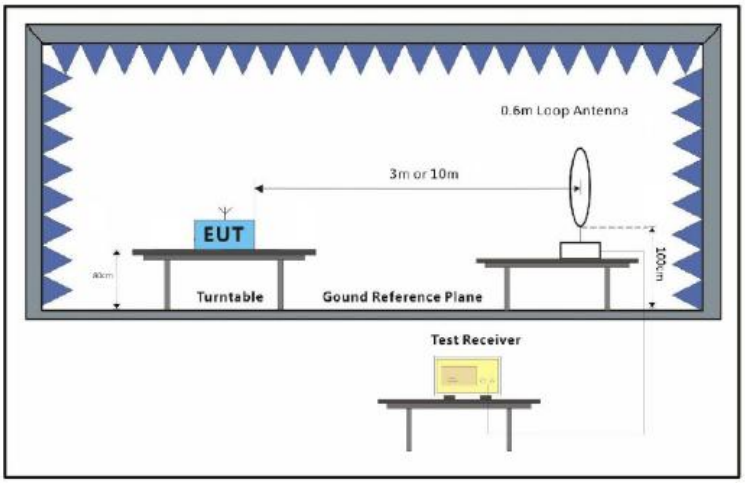
4.2 Field Strength of the Fundamental Signal

Limit

According to Part 15, Subpart C 15.227(a)

≤ 10000 microvolts/meter at 3 meters, the emission limit is based on measurement instrumentation employing an average Detector:. The provisions in §15.35 for limiting peak emissions apply.

Test Configuration



Measurement Procedure and Data

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground for below 1Ghz at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height 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.

d. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

g. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

150kHz-30MHz

EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

Test result

Temperature	23.7℃	Humidity	52.1%
Test Engineer	/	Configurations	TX

Spurious Emission below 30MHz (150KHz to 30MHz)

Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Detector	Remark
27.144	73.12	-8.57	64.55	80.00	-15.45	Vertical	PK	Fundamental
27.144	62.14	-8.57	53.57	60.00	-6.43	Vertical	AVG	
27.144	66.34	-6.41	59.93	80.00	-20.07	Horizontal	PK	
27.144	54.31	-6.41	47.90	60.00	-12.10	Horizontal	AVG	
26.960	33.25	-8.57	24.68	30.00	-5.32	Vertical	PK	Band edge
27.280	31.52	-6.38	25.14	30.00	-4.86	Vertical	PK	
26.960	30.67	-8.57	22.10	30.00	-7.90	Horizontal	PK	
27.280	28.96	-6.38	22.58	30.00	-7.42	Horizontal	PK	

Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

4.3 Radiated Emission

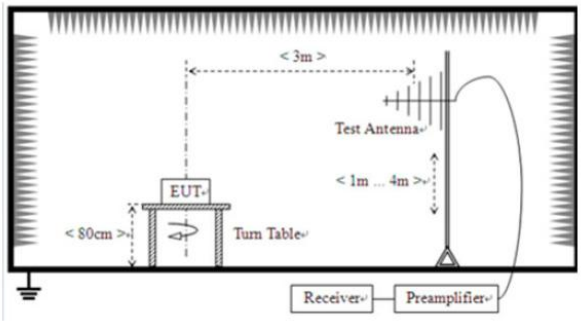
Limit

For intentional device, according to 15..227(b) & C 15.209 the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009-0.49	2400/F(KHz)	300
0.49-1.705	24000/F(KHz)	30
1.705-30	30	30
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz and 110-490kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.		
Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for above 1000MHz. Radiated emission limits above 1000MHz is based on measurements employing an average detector.		

In addition to the provisions of 15.227(b), the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

TEST CONFIGURATION



Measurement Procedure and Data

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground for below 1GHz at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height 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.

d. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

g. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.

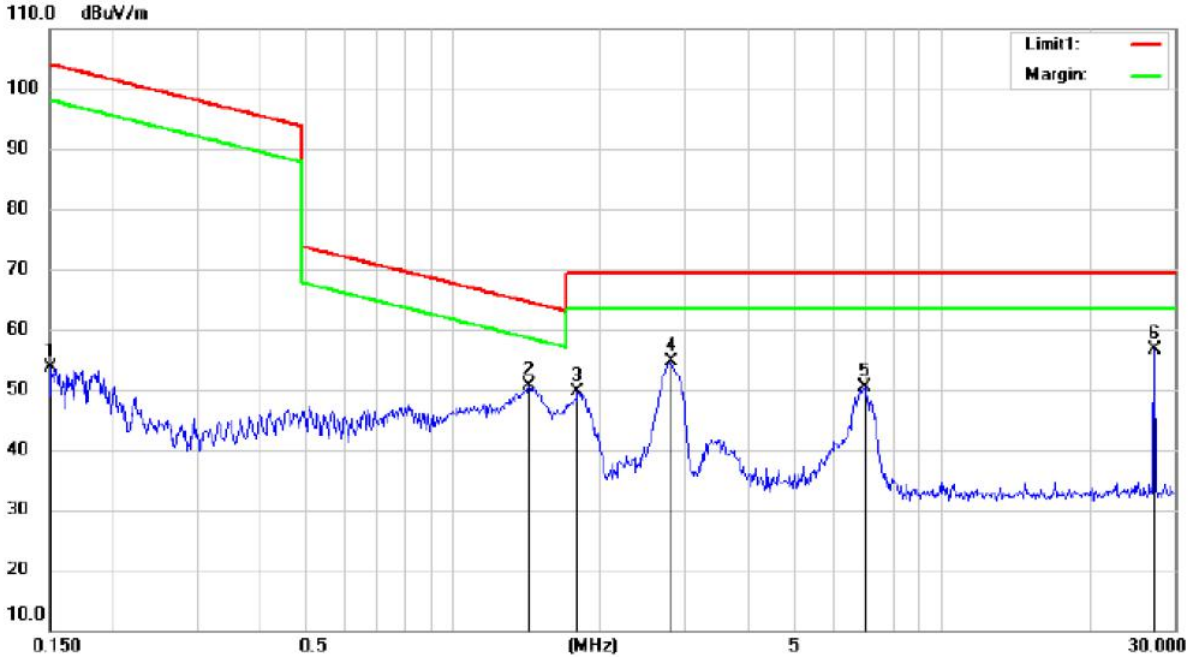
Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Spurious Emission below 150kHz (9KHz to 150kHz)

Note: The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

Spurious Emission below 30MHz (150KHz to 30MHz)

All mode have been tested, and the worst result was report as below:

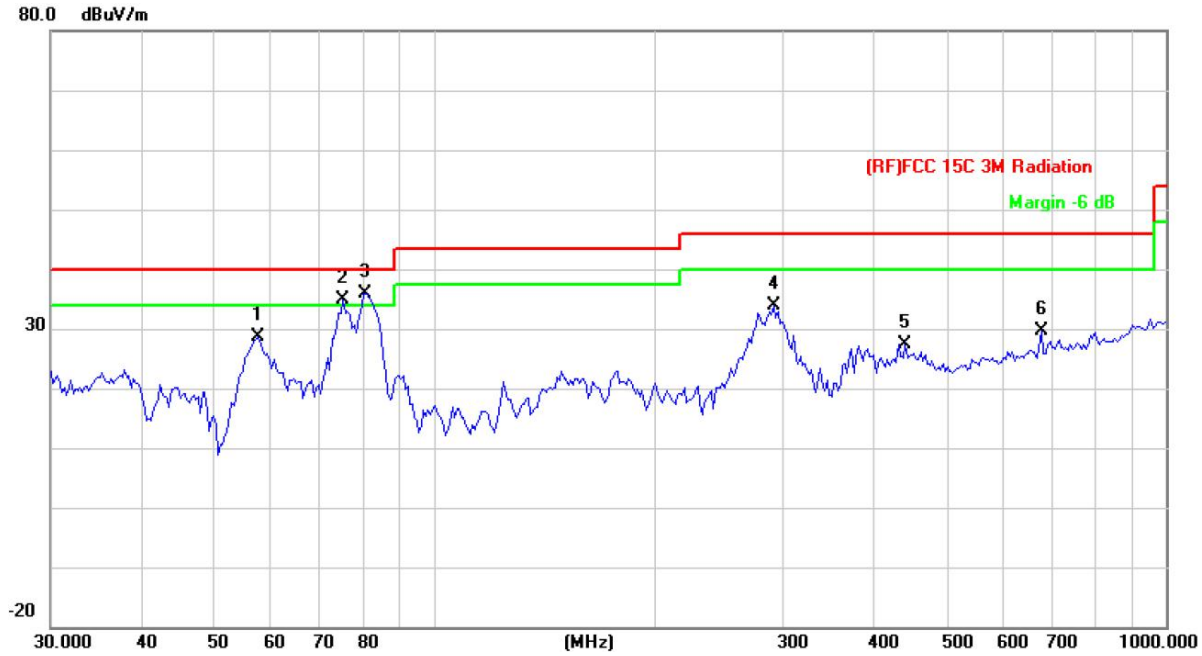


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		0.1508	33.24	20.29	53.53	104.03	-50.50	QP
2		1.4333	29.64	21.00	50.64	64.50	-13.86	QP
3		1.8000	28.67	20.91	49.58	69.50	-19.92	QP
4		2.7942	33.91	20.68	54.59	69.50	-14.91	QP
5		6.9508	29.73	20.58	50.31	69.50	-19.19	QP
6	*	27.2711	36.33	20.32	56.65	69.50	-12.85	QP

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.
Measurement Result=Reading Level +Correct Factor;
Over Limit= Measurement Result- Limit;

Spurious Emission above 30MHz (30MHz~1GHz)

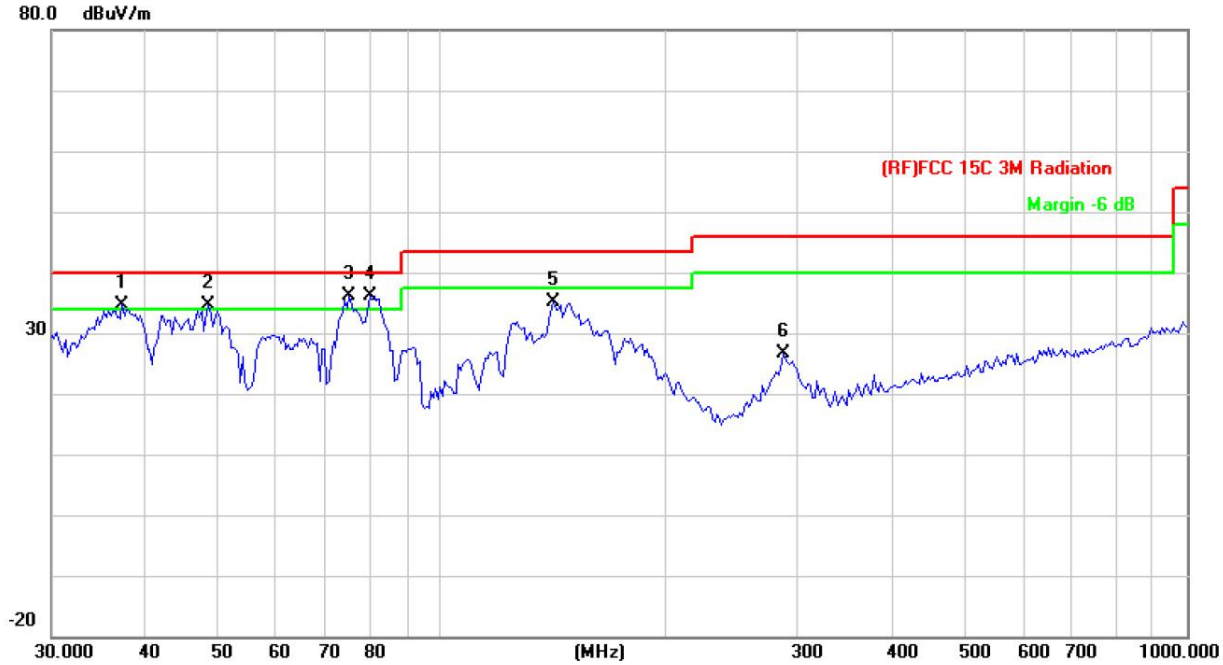
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		57.5939	52.93	-24.36	28.57	40.00	-11.43	peak
2	!	75.1822	58.14	-23.15	34.99	40.00	-5.01	peak
3	*	80.6442	58.58	-22.63	35.95	40.00	-4.05	peak
4		291.0360	50.38	-16.46	33.92	46.00	-12.08	peak
5		440.1963	39.53	-12.14	27.39	46.00	-18.61	peak
6		675.2080	37.06	-7.39	29.67	46.00	-16.33	peak

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.
Measurement Result=Reading Level +Correct Factor;
Over Limit= Measurement Result- Limit;

Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	!	37.2854	52.95	-18.20	34.75	40.00	-5.25	peak
2	!	48.6719	57.71	-23.12	34.59	40.00	-5.41	peak
3	!	75.1821	59.36	-23.15	36.21	40.00	-3.79	peak
4	*	80.0806	58.90	-22.66	36.24	40.00	-3.76	peak
5		141.3298	57.57	-22.49	35.08	43.50	-8.42	peak
6		286.9823	43.23	-16.56	26.67	46.00	-19.33	peak

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.
Measurement Result=Reading Level +Correct Factor;
Over Limit= Measurement Result- Limit;

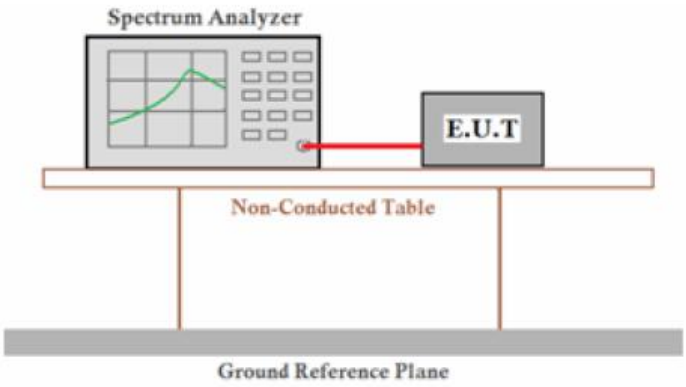
4.4 20dB Bandwidth

Limit

According to FCC Part15 C Section part 15.215(c):

Per 15.215 (C), Intentional radiators operating under the altermative provisions to the general emission limits, as contained in 815.217 through 15.257 and in subpart E of this part, must bc designed to cnsure 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 opcrated. 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 a 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.

Test Configuration



Test Procedure

The 20dB bandwidth and 99% bandwidth is measured with a spectrum analyzer connected via a receive antenna placed near the EUT while the EUT is operating in transmission mode.

The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

The occupied bandwidth (OBW), that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

EUT Operation during Test

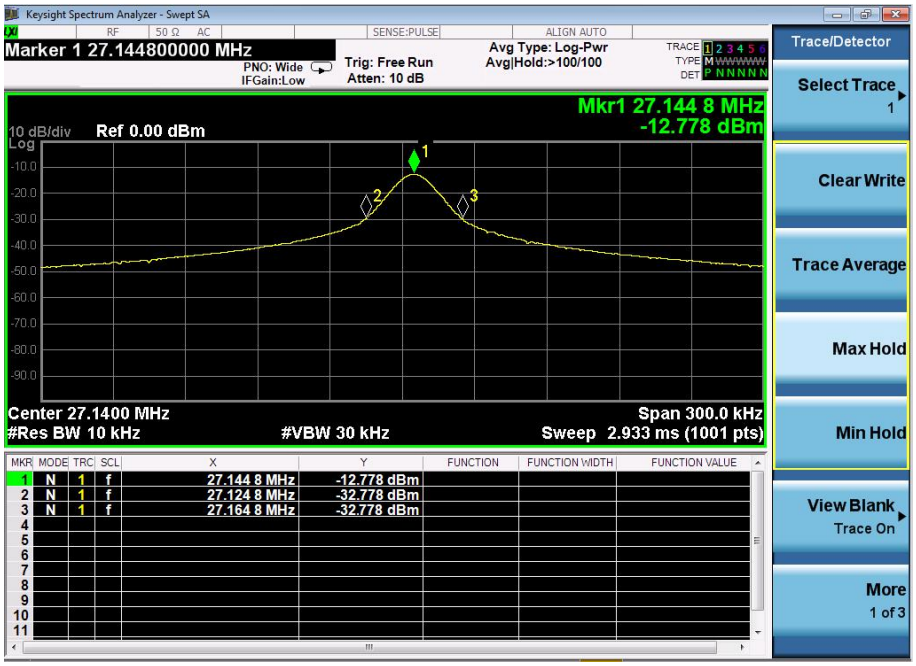
The EUT was programmed to be in continuously transmitting mode.

Test Results

Mode	Frequency (MHz)	-20dB bandwidth (KHz)	Limit (kHz)	Result
TX	27.144	40	N/A	Pass

Test plot as follows:

27.144 MHz



4.5 Antenna Requirement

Standard Applicable

According to FCC Part 15C 15.203

An intentional radiator shall be de-signed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Refer to statement below for compliance.

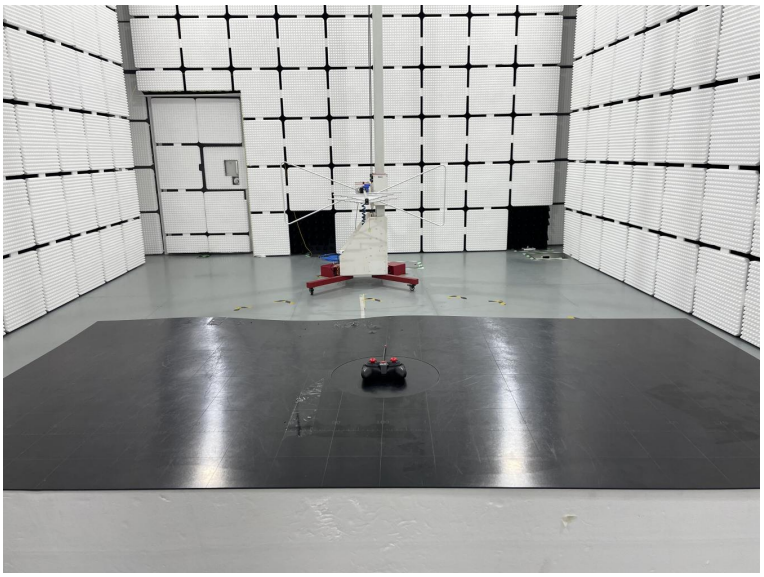
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

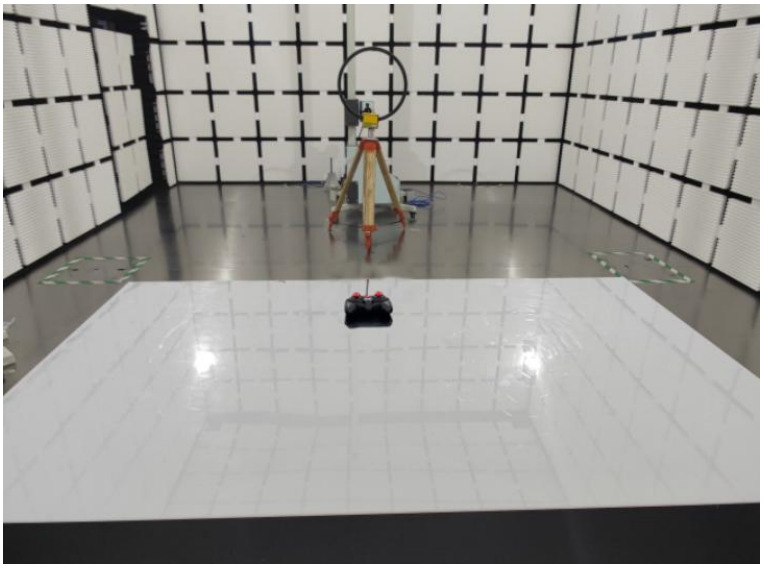
Antenna Connected Construction

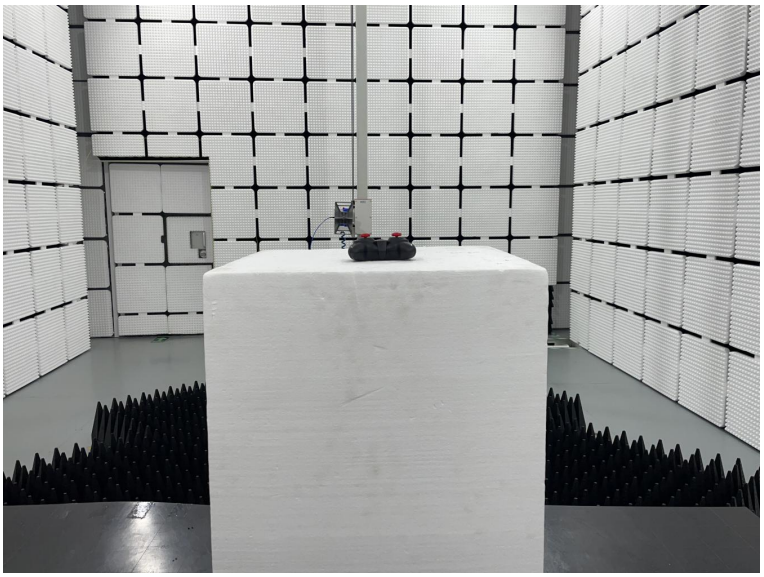
The antenna used in this product is a Metal Antenna, The directional gains of antenna used for transmitting is 0 dBi.

Remark:The antenna gain is provided by the customer , if the data provided by the customer is not accurate, BSL Testing Co., Ltd. does not assume any responsibility.

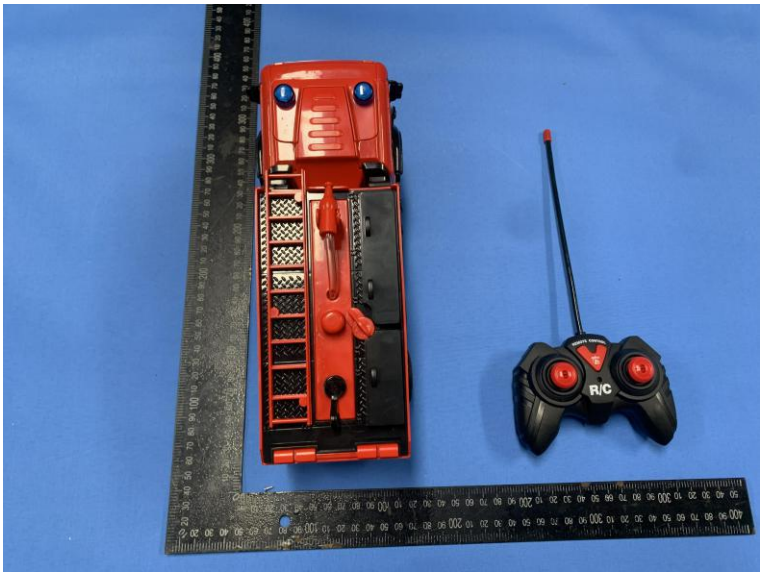
5 Test Setup Photos of the EUT



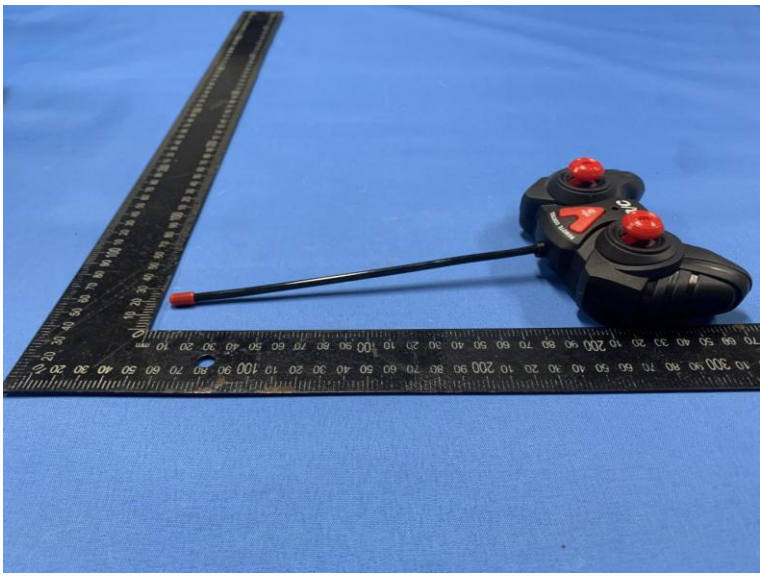


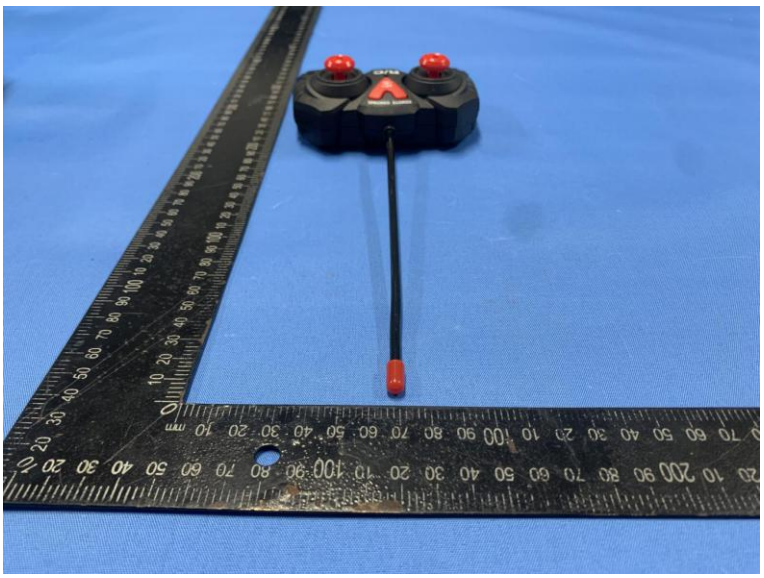


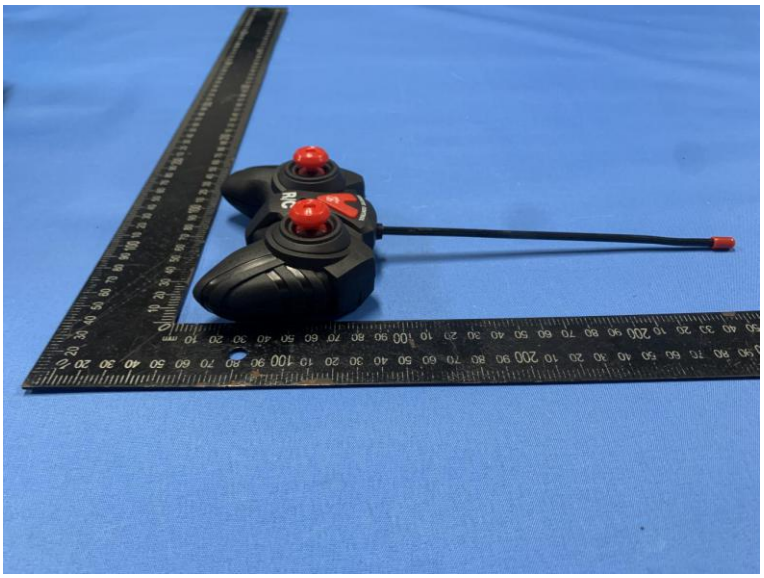
6 Photos of the EUT

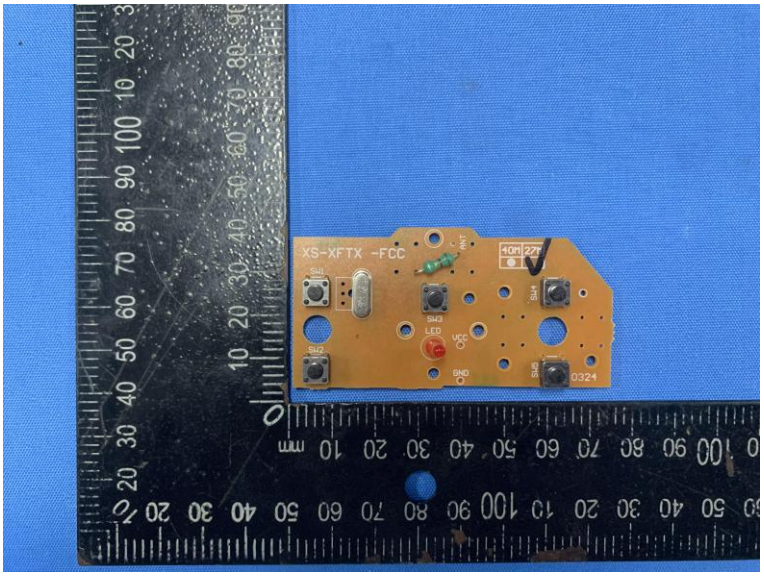


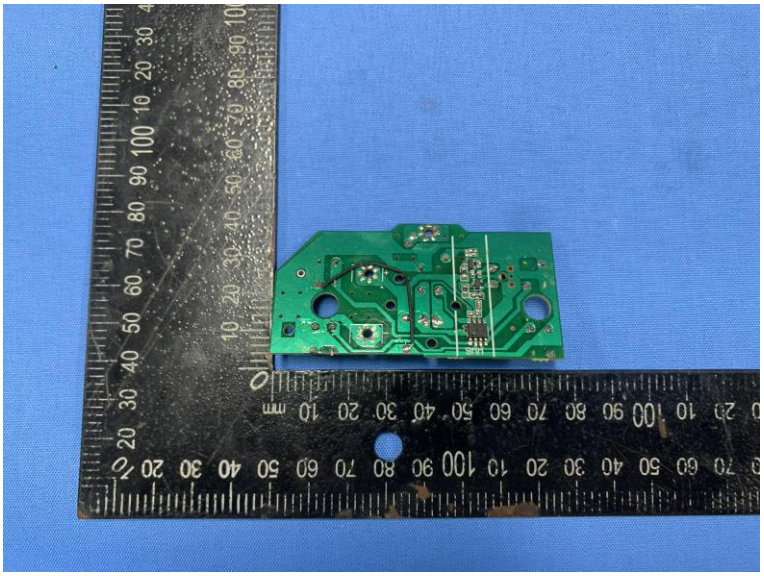

R/C

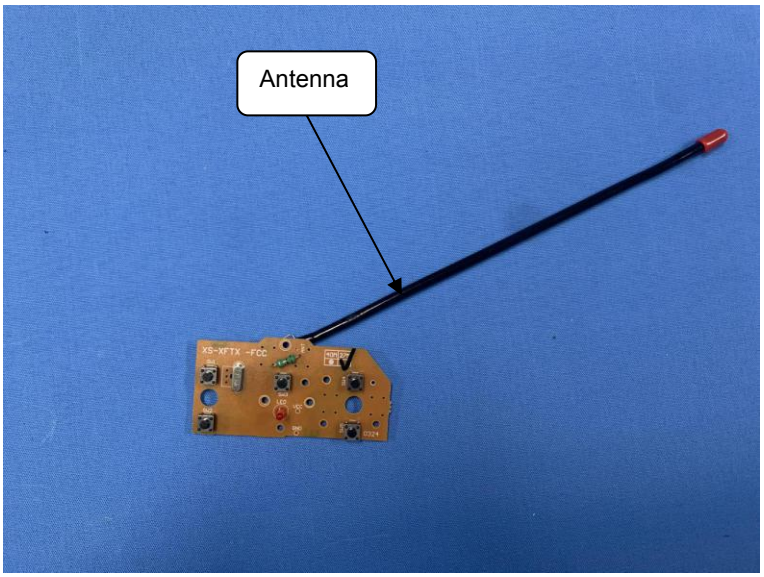







XS-XFTX -FCC





********** End of Report **********