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TEST REPORT

FCC PART 15.229

Report Reference No. : CTL2501083071-WF

Compiled by: Happy Guo
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Happy Guo



Tested by: James Yu
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Ivan Xie

Product Name : Radio Frequency Identification

Model/Type reference : 601

List Model(s) : Please look at page 2.

Trade Mark : N/A

FCC ID : 2BP3O-RFI601

Applicant's name : QIAN XING TOYS FACTORY

Address of applicant : SOUTH OF BINHEZHOU LIANSHANG INDUSTRIAL AVENUE,
YONGXIN VILLAGE, LIANSHANG TOWN, CHENGHAI
DISTRICT, SHANTOU CITY, GUANGDONG PROVINCE, CHINA

Test Firm : Shenzhen CTL Testing Technology Co., Ltd.

Address of Test Firm : Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road,
Nanshan District, Shenzhen, China 518055

Test specification :

Standard : FCC Part 15.229: Operation within the band 40.66-40.70 MHz.

TRF Originator : Shenzhen CTL Testing Technology Co., Ltd.

Master TRF : Dated 2011-01

Date of receipt of test item : Jan. 09, 2025

Date of Test Date : Jan. 09, 2025-Apr. 16, 2025

Date of Issue : Apr. 16, 2025

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TEST REPORT

Test Report No. :	CTL2501083071-WF	Apr. 16, 2025 Date of issue
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Equipment under Test : Radio Frequency Identification

Sample No : CTL2501083071

Model /Type : 601

Listed Models : 501, 502, 503, 504, 505, 506, 507, 508, 509, 602, 603, 604, 605, 606, 607, 608, 609, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 881, 881-A, 881-B, 881-C, 381, 382, 383, 384, 385, 386, 387, 388, 389, 111, 112, 113, 114, 115, 116, 117, 118, 119, 101, 102, 103, 105, 106, 107, 108, 301, 302, 303, 304, 305, 311, 312, 313, 314, 315, 321, 322, 323, 325, 326, 331, 332, 333, 335, 336, 801, 802, 803, 805, 806, 811, 812, 813, 815, 816, 820, 821, 822, 823, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 711-2

Applicant : QIAN XING TOYS FACTORY

Address : SOUTH OF BINHEZHOU LIANSHANG INDUSTRIAL AVENUE, YONGXIN VILLAGE, LIANSHANG TOWN, CHENGHAI DISTRICT, SHANTOU CITY, GUANGDONG PROVINCE, CHINA

Manufacturer : QIAN XING TOYS FACTORY

Address : SOUTH OF BINHEZHOU LIANSHANG INDUSTRIAL AVENUE, YONGXIN VILLAGE, LIANSHANG TOWN, CHENGHAI DISTRICT, SHANTOU CITY, GUANGDONG PROVINCE, CHINA

Test result	Pass *
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* In the configuration tested, the EUT complied with the standards specified page 5.

The test results presented in this report relate only to the object tested.

This report shall not be reproduced, except in full, without the written approval of the issuing testing laboratory.

** Modified History **

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1. SUMMARY

1.1. TEST STANDARDS

The tests were performed according to following standards:

[**FCC Rules Part 15.229**](#): Operation within the band 40.66-40.70 MHz.

[**ANSI C63.10:2013**](#) : American National Standard for Testing Unlicensed Wireless Devices

1.2. Test Description

FCC PART 15 .229		
FCC Part 15.207	AC Power Conducted Emission	N/A
FCC Part 15.215	20dB Bandwidth	PASS
FCC Part 15.229&15.209&15.205	Radiated Emissions	PASS
FCC Part 15.229	Frequency Tolerance	PASS
FCC Part 15.203/15.247 (c)	Antenna Requirement	PASS

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

1.3. Test Facility

1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.

Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 32/EN 55032 requirements.

1.3.2 Laboratory accreditation

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

CNAS-Lab Code: L7497

Shenzhen CTL Testing Technology Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No. 4343.01

Shenzhen CTL Testing Technology Co., Ltd, EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

IC Registration No.: 9618B

CAB identifier: CN0041

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements with Registration No.: 9618B.

FCC-Registration No.: 399832

Designation No.: CN1216

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 399832.

1.4. 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 CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the Shenzhen CTL Testing Technology 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 CTL laboratory is reported:

Test	Measurement Uncertainty	Notes
Transmitter power conducted	±0.57 dB	(1)
Transmitter power Radiated	±2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	±1.6 dB	(1)
Occupied Bandwidth	±0.20ppm	(1)
Radiated Emission 0.01~30MHz	±4.03dB	(1)

Radiated Emission 30~1000MHz	$\pm 1.5\text{dB}$	(1)
Radiated Emission Above 1GHz	$\pm 2.2\text{dB}$	(1)
Conducted Disturbance 0.15~30MHz	$\pm 3.20\text{dB}$	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95%
(2) confidence level using a coverage factor of $k=1.96$.

2. GENERAL INFORMATION

2.1. Environmental conditions

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

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2. General Description of EUT

Product Name:	Radio Frequency Identification
Model/Type reference:	601
Power supply:	DC 3V from battery
Wireless technology	
Operation frequency:	40.68MHz
Modulation :	FSK
No. of Channel :	1
Antenna type:	Internal antenna

Note1: For more details, please refer to the user's manual of the EUT.

Note2: Antenna gain provided by the applicant.

2.3. Equipments Used during the Test

Radiated Emission						
Test Equipment	Manufacturer	Model No.	Serial No.	Previous calibration	Last Cal.	Cal.Due
Active Loop Antenna	Da Ze	ZN30900A	/	2021/05/13	2024/04/30	2025/04/29
Double cone logarithmic antenna	Schwarzbeck	VULB 9168	824	/	2023/02/13	2026/02/12
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	/	2024/11/25	2027/11/24
Horn Antenna	Ocean Microwave	OBH100400	26999002	/	2025/02/21	2028/02/20
Amplifier	MRT-AP01M06	MRT	S-001	2023/05/04	2024/04/30	2025/04/29
Amplifier	Agilent	8449B	3008A02306	2023/05/04	2024/04/30	2025/04/29
Amplifier	Brief&Smart	LNA-4018	2104197	2023/05/05	2024/05/03	2025/05/02
EMI Test Receiver	ROHDE & SCHWARZ	ESCI	1166.5950.03	2023/05/04	2024/04/30	2025/04/29
Spectrum Analyzer	RS	FSP	1164.4391.38	2023/05/05	2024/05/03	2025/05/02
Software:						
Name of Software:			Version:			
EZ_EMC(Below 1GHz)			V1.1.4.2			
EZ_EMC(Above 1GHz)			V1.1.4.2			

RF Conducted						
Test Equipment	Manufacturer	Model No.	Serial No.	Previous calibration	Last Cal.	Cal.Due
Spectrum Analyzer	Keysight	N9020A	MY53420874	2023/05/04	2024/05/01	2025/04/30
Temperature/Humidity Meter	Ji Yu	MC501	/	2023/05/09	2024/05/04	2025/05/03
Software:						
Name of Software:			Version:			
TST-PASS			V2.0			

2.4. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: filing to comply with Section 15.229 of the FCC Part 15, Subpart C Rules.

2.5. Modifications

No modifications were implemented to meet testing criteria.

3. TEST CONDITIONS AND RESULTS

3.1. Conducted Emissions Test

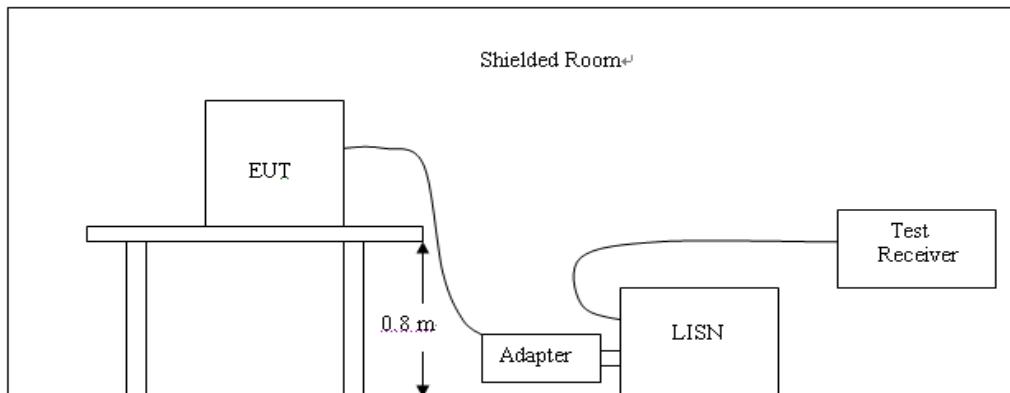
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

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 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 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.
8. During the above scans, the emissions were maximized by cable manipulation.

TEST RESULTS

The EUT is powered by battery

3.2. Radiated Emissions and Band Edge

Applicable Standard

As per FCC Part 15.229

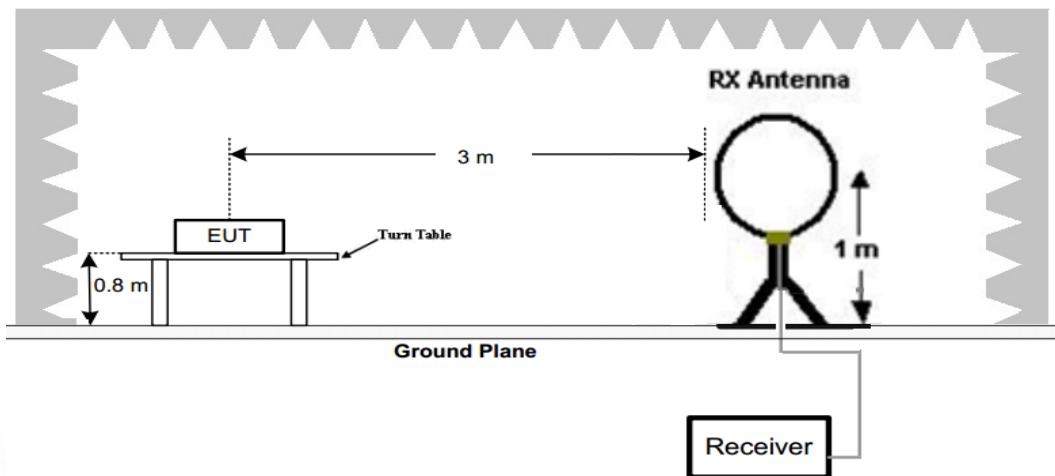
(a) Unless operating pursuant to the provisions in §15.231, the field strength of any emissions within this band shall not exceed 1,000 microvolts/meter at 3 meters.

(b) As an alternative to the limit in paragraph (a) of this section, perimeter protection systems may demonstrate compliance with the following: the field strength of any emissions within this band shall not exceed 500 microvolts/meter at 3 meters, as determined using measurement instruments employing an average detector. The provisions in §15.35 for limiting peak emissions apply where compliance of these devices is demonstrated under this alternative emission limit.

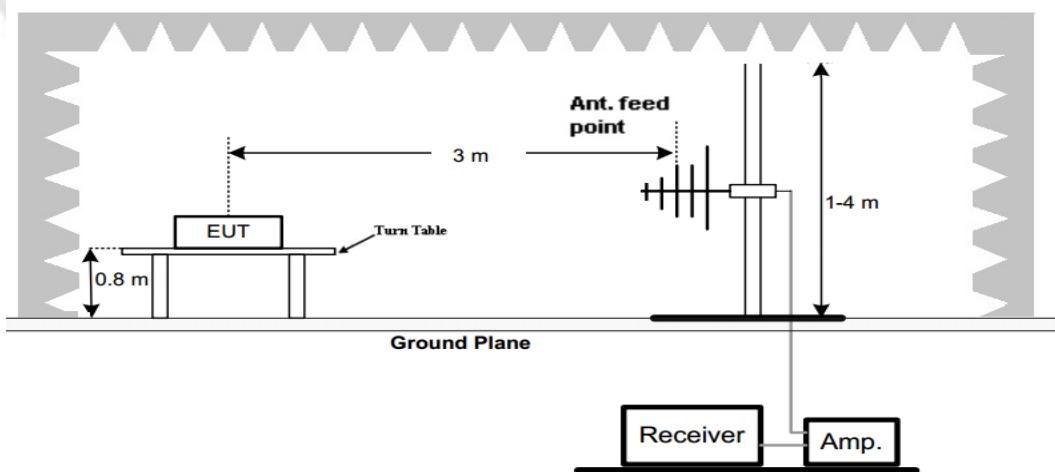
(c) The field strength of any emissions appearing outside of this band shall not exceed the general radiated emission limits in §15.209.

Test Configuration

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



The radiated emission tests were performed in the 3 meters, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC Part 15.205 and 15.209 and 15.229 limits.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 1000 MHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All final data out of band was recorded in Quasi-peak detection mode for frequency range of 30 MHz - 1 GHz, within the operating band was recorded in peak and averaged detection mode.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results

Frequency (MHz)	Corrected Amplitude (dB μ V/m)	Reading (dB μ V/m)	PK/QP/Ave.	Turntable Degree	Rx Antenna		Corrected Factor (dB)	FCC PART 15.229		Remark
					Height (m)	Polar (H / V)		Limit (dB μ V/m)	Margin (dB)	
40.68	56.64	44.38	PK	238	1.1	H	12.26	80	23.36	Fundamental
40.68	36.59	24.33	Ave.	238	1.1	H	12.26	60	23.41	
40.68	64.06	51.80	PK	238	1.2	V	12.26	80	15.94	
40.68	40.42	28.16	Ave.	238	1.2	V	12.26	60	19.58	
40.66	35.72	23.44	PK	150	1.2	V	12.28	40	4.28	Band edge
40.70	36.98	24.70	PK	150	1.2	V	12.28	40	3.02	Band edge

Note:

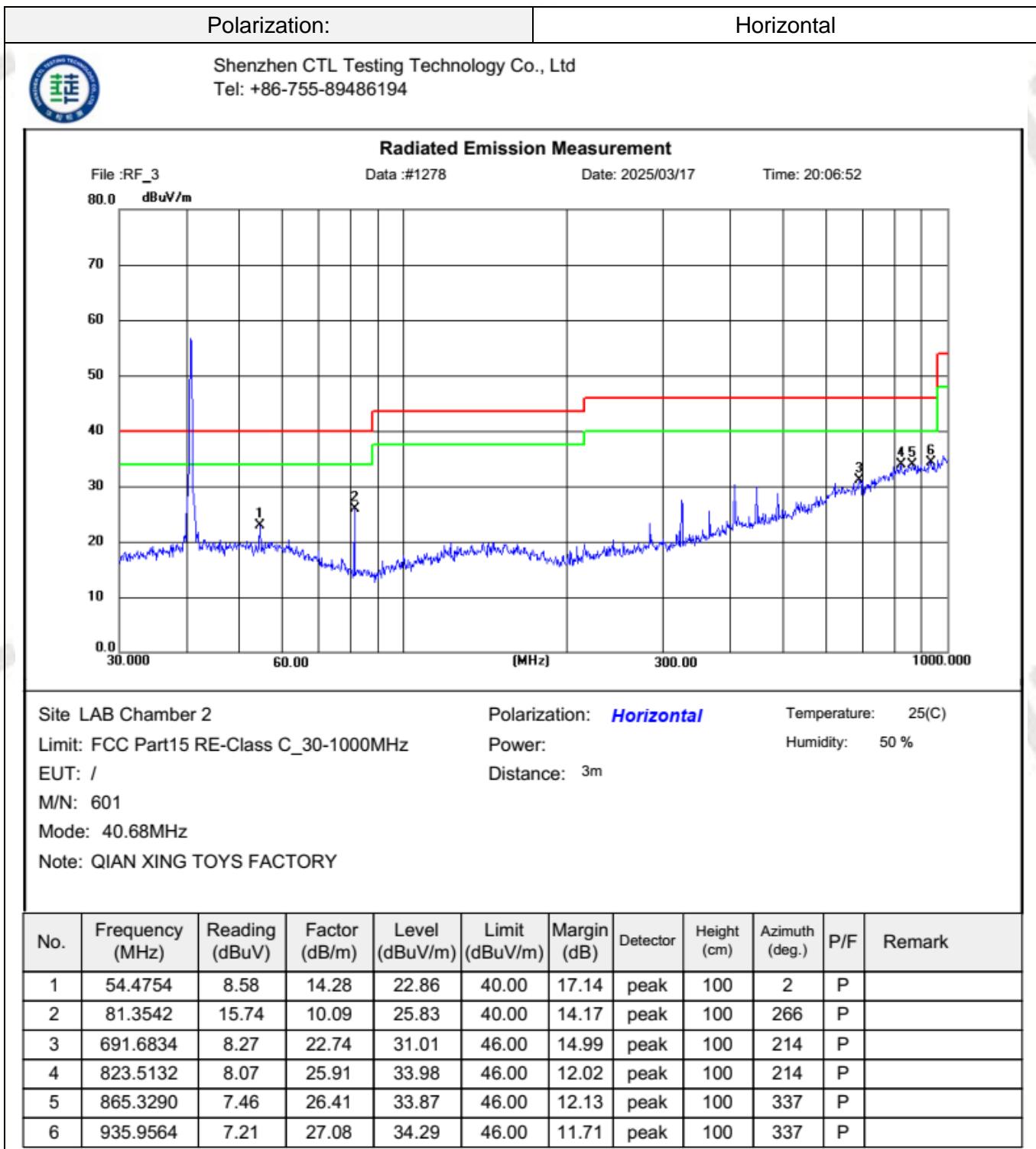
Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor

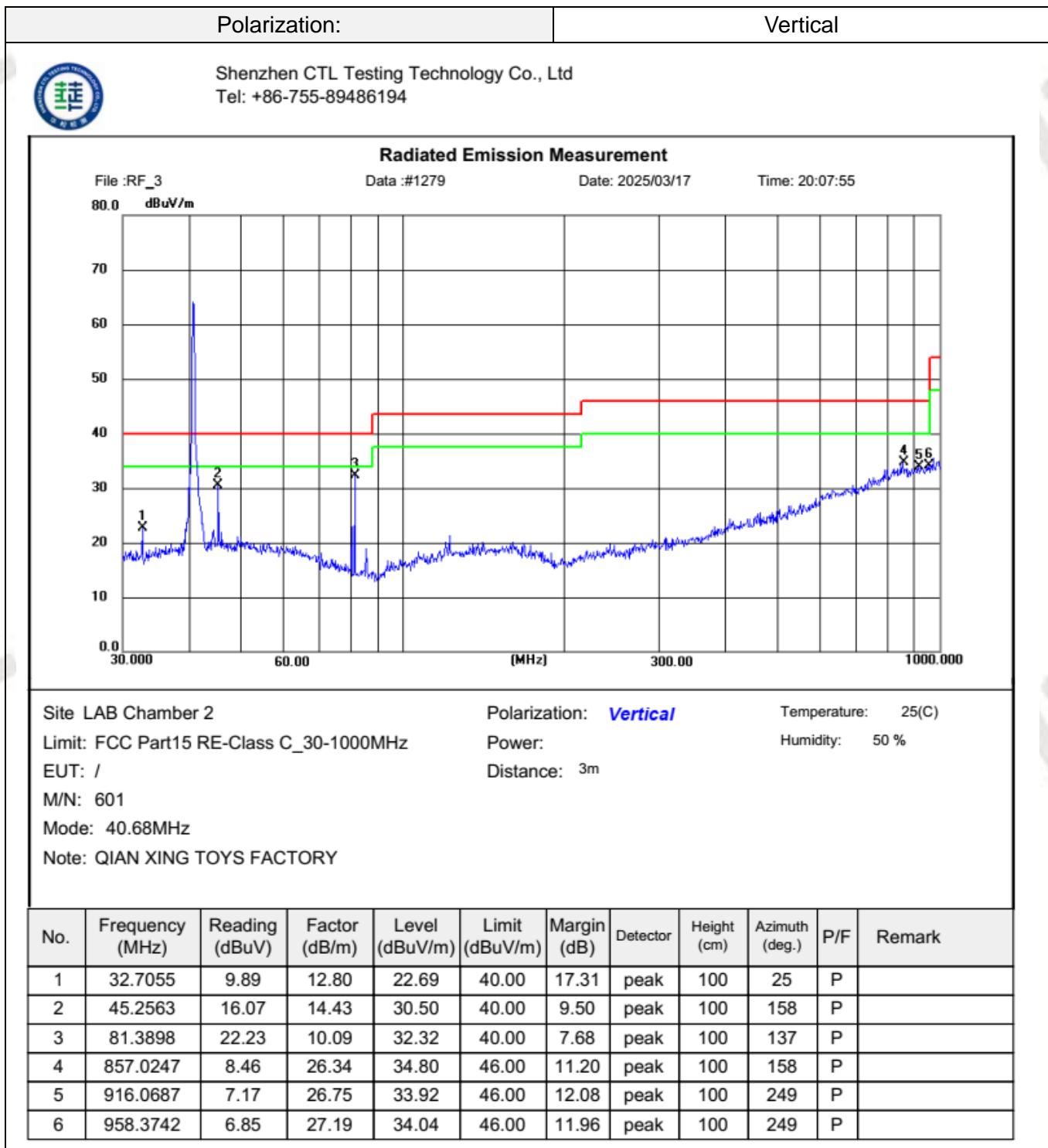
Corrected Amplitude = Corrected Factor + Reading

Margin = Limit - Corrected. Amplitude

The other spurious emission which is 20dB to the limit was not recorded.

For 30MHz-1GHz





3.3. 20dB Bandwidth

Applicable Standard

Per 15.215 (c), 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 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 Procedure

Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.

Test Configuration



Test Results

Fl(MHz)	Fh(MHz)	20dB bandwidth (kHz)	Permitted frequency range(MHz)	Result
40.67232	40.68732	6.522	40.66-40.70	Pass



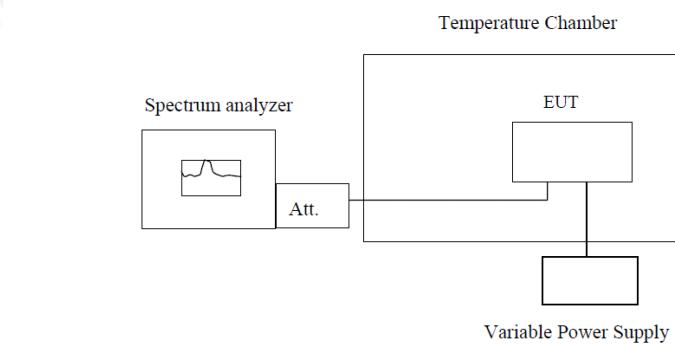


3.4. Frequency Stability Test Data

Applicable Standard

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to $+ 50$ degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

TEST CONFIGURATION



Note : Measurement setup for testing on Antenna connector

TEST PROCEDURE

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.

TEST RESULTS

Reference Frequency:40.68MHz				
Voltage (V)	Temperature (°C)	Frequency (MHz)	Frequency Deviation(MHz)	Deviation (%)
3.0	+20(Ref)	40.680097	0.000097	0.00024
	-20	40.680044	0.000044	0.00011
	-10	40.680074	0.000074	0.00018
	0	40.680071	0.000071	0.00017
	+10	40.680084	0.000084	0.00021
	+20	40.680012	0.000012	0.00003
	+25	40.680069	0.000069	0.00017
	+30	40.680088	0.000088	0.00022
	+40	40.680017	0.000017	0.00004
	+50	40.680092	0.000092	0.00023

3.5. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203:

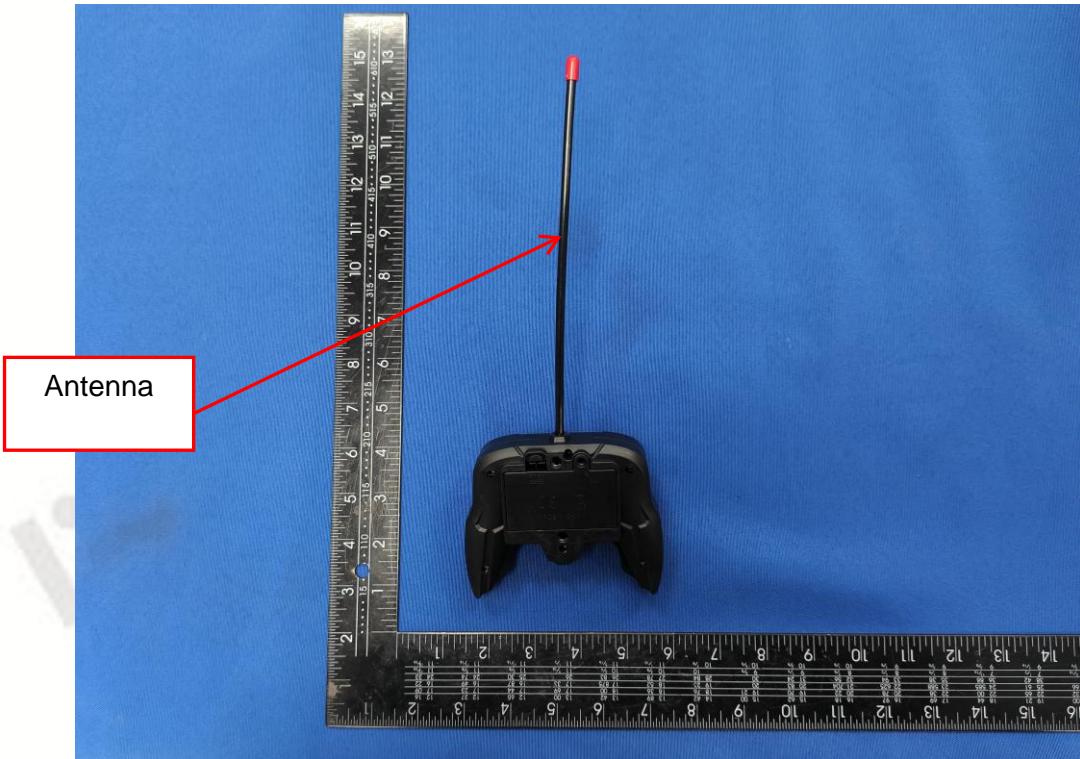
According to FCC § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. 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.

Antenna Connector Construction

The EUT has a whip antenna arrangement, which was permanently attached and the antenna gain is 0 dBi, fulfill the requirement of this section. Please refer to EUT photos.

Test Result:

The maximum gain of antenna was 0dBi.



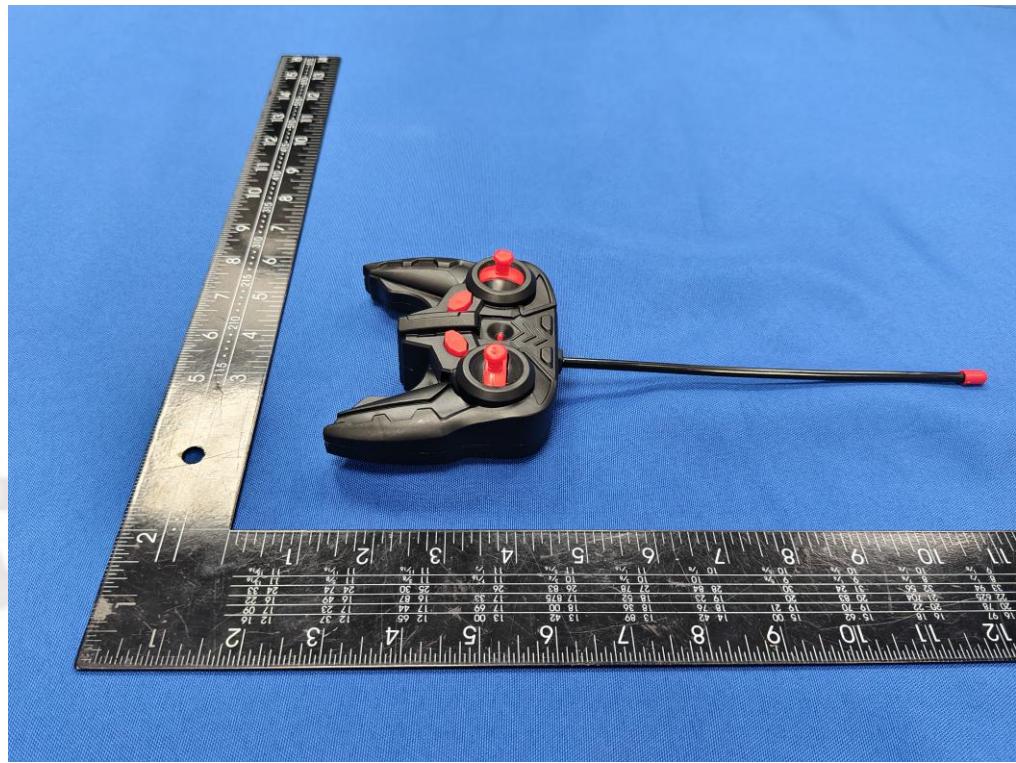
4. Test Setup Photos of the EUT

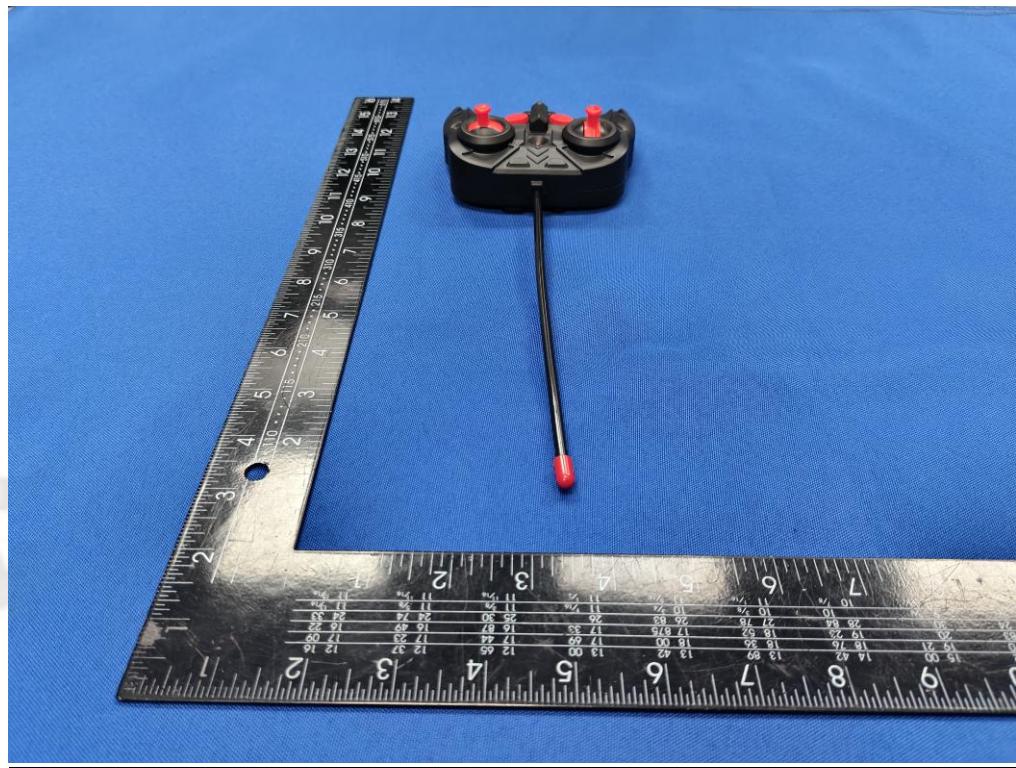
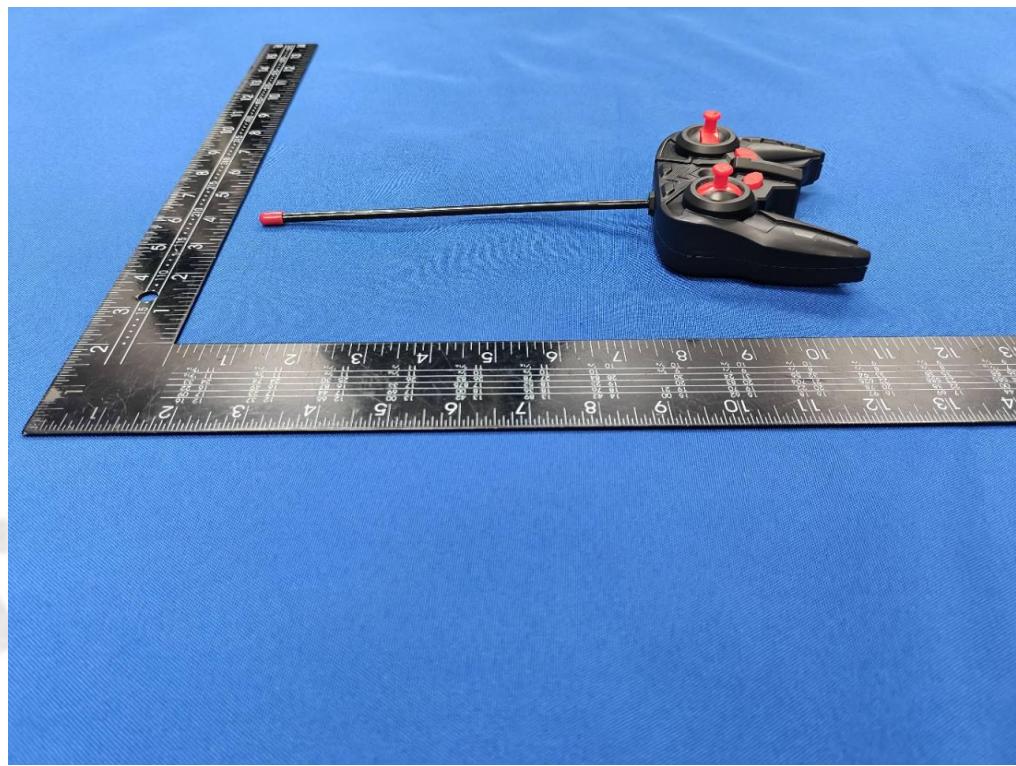


5. External and Internal Photos of the EUT

External Photos

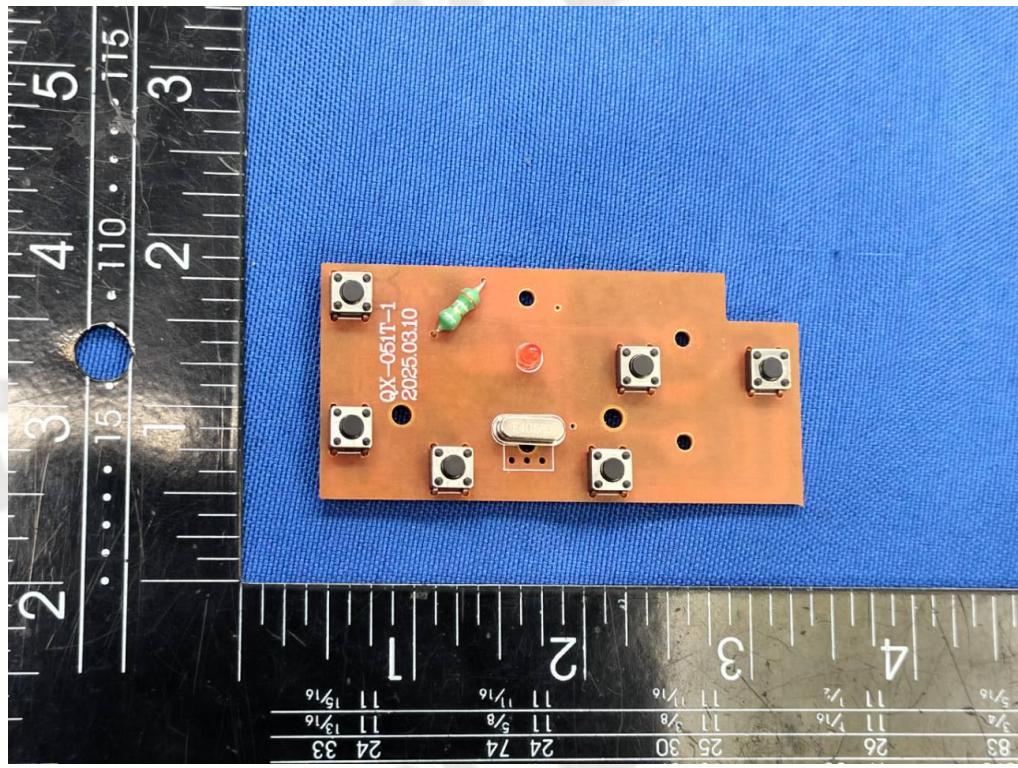


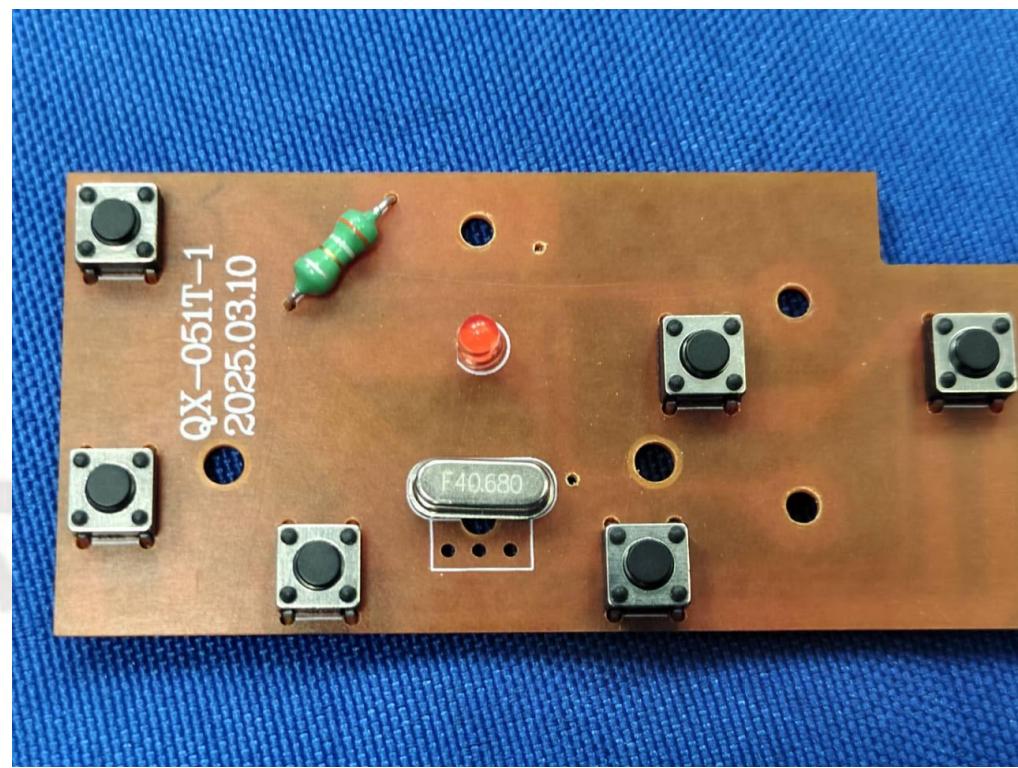
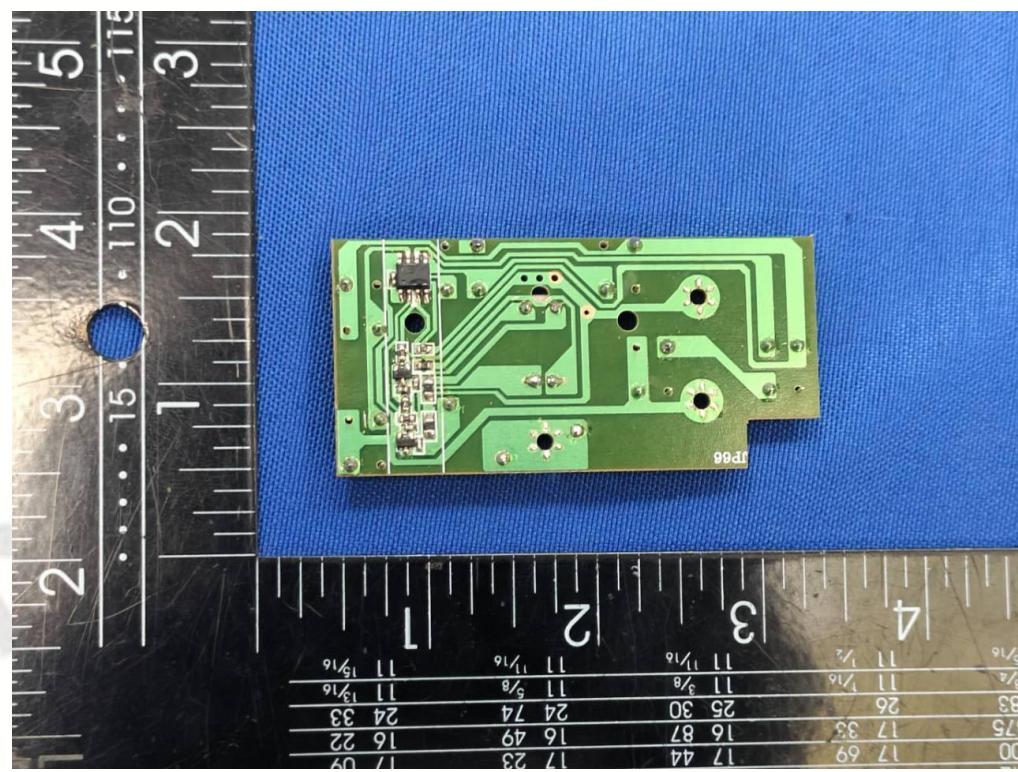






Internal Photos





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