

FCC Test Report

Client Name : DGL Group LTD.

Address : 195 Raritan Center Parkway, Edison, New Jersey, United States 08837

Product Name : REMOTE CONTROL TOYS

Date : Sept.17, 2021

Shenzhen Anbotek Compliance Laboratory Limited



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TEST REPORT

Applicant : DGL Group LTD.
Manufacturer : DGL Group LTD.
Product Name : REMOTE CONTROL TOYS
Model No. : RSS-AW-ROBO-BTLE, RSS-AW-ROBO-XXX
Trade Mark : N.A.
Rating(s) : Input: DC 3V

Test Standard(s) : FCC Part15 Subpart C, Section 15.235

Test Method(s) : ANSI C63.10: 2020

The device described above is tested by Shenzhen Anbotech Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotech Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotech Compliance Laboratory Limited.

Date of Receipt

Jul. 29, 2021

Date of Test

Jul. 29~Sept.14, 2021

Prepared By



(Ella Liang)

Approved & Authorized Signer



(Kingkong Jin)

1. General Information

1.1. Client Information

Applicant	:	DGL Group LTD.
Address	:	195 Raritan Center Parkway, Edison, New Jersey,United States 08837
Manufacturer	:	DGL Group LTD.
Address	:	195 Raritan Center Parkway, Edison, New Jersey,United States 08837
Factory	:	DGL Group LTD.
Address	:	195 Raritan Center Parkway, Edison, New Jersey,United States 08837

1.2. Description of Device (EUT)

Product Name	:	REMOTE CONTROL TOYS	
Model No.	:	RSS-AW-ROBO-BTLE, RSS-AW-ROBO-XXX (Note: All samples are the same except the model number and appearance, so we prepare "RSS-AW-ROBO-BTLE" for test only.)	
Trade Mark	:	N.A.	
Test Power Supply	:	DC 3V	
Product Description	:	Operation Frequency:	49.86MHz
		Number of Channel:	1 Channels
		Modulation Type:	ASK
		Antenna Type:	Monopole Antenna
		Antenna Gain(Peak):	0 dBi
		Adapter:	N/A
Remark: 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. 2) This report is for 49.86MHz module.			

1.3. Auxiliary Equipment Used During Test

N/A

1.4. Description of Test Modes

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	On Mode

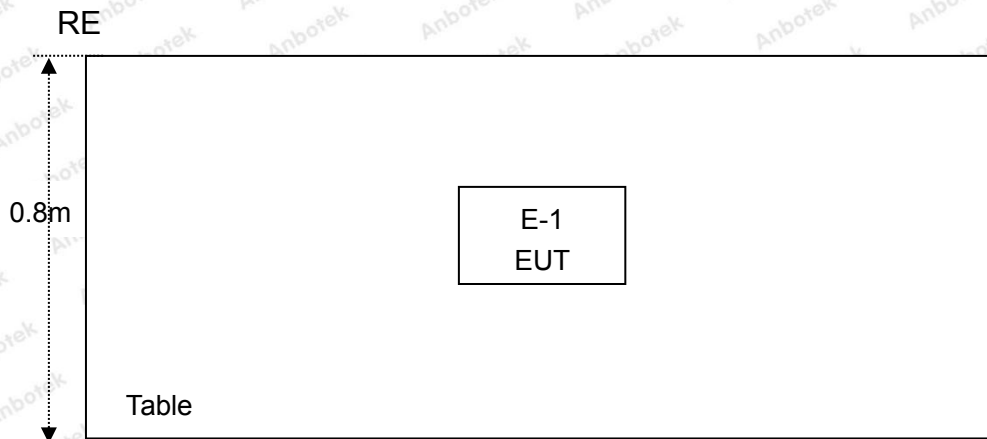
For Radiated Emission	
Final Test Mode	Description
Mode 1	On Mode

Note: During the test, the EUT was keeping continuous transmission.

1.5. List of channels

Channel	Freq. (MHz)	Note (Modulation Type)
01	49.86	ASK

1.6. Description Of Test Setup



1.7. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	Oct. 26, 2020	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Oct. 26, 2020	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESR26	101481	Oct. 26, 2020	1 Year
4.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Oct. 26, 2020	1 Year
5.	MAX Spectrum Analysis	Agilent	N9020A	MY51170037	Oct. 26, 2020	1 Year
6.	Preamplifier	SKET Electronic	BK1G18G30 D	KD17503	Oct. 26, 2020	1 Year
7.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Nov. 02, 2020	2 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Nov. 02, 2020	2 Year
9.	Loop Antenna	Schwarzbeck	FMZB1519B	00053	Nov. 02, 2020	2 Year
10.	Horn Antenna	A-INFO	LB-180400- KF	J211060628	Nov. 02, 2020	2 Year
11.	Pre-amplifier	SONOMA	310N	186860	Oct. 26, 2020	1 Year
12.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
13.	RF Test Control System	YIHENG	YH3000	2017430	Oct. 26, 2020	1 Year
14.	Power Sensor	DAER	RPR3006W	15I00041SN045	Oct. 26, 2020	1 Year
15.	Power Sensor	DAER	RPR3006W	15I00041SN046	Oct. 26, 2020	1 Year
16.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Oct. 26, 2020	1 Year
17.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Oct. 26, 2020	1 Year
18.	Signal Generator	Agilent	E4421B	MY41000743	Oct. 26, 2020	1 Year
19.	DC Power Supply	IVYTECH	IV3605	1804D360510	Oct. 26, 2020	1 Year
20.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80 B	N/A	Oct. 26, 2020	1 Year

1.8. Measurement Uncertainty

Radiation Uncertainty	:	Ur = 3.9 dB (Horizontal)
		Ur = 3.8 dB (Vertical)
Conduction Uncertainty	:	Uc = 3.4 dB

1.9. Description of Test Facility

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

FCC-Registration No.: 184111

Shenzhen Anbotech Compliance Laboratory Limited, 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 No. 184111, September 30, 2020.

ISED-Registration No.: 8058A

Shenzhen Anbotech Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A, September 30, 2020.

Test Location

Shenzhen Anbotech Compliance Laboratory Limited.

1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102

2. Summary of Test Results

Standard Section	Test Item	Result
15.203	Antenna Requirement	PASS
15.207	Conducted Emission	N/A
15.235(a)/15.235(b)/15.209	Spurious Emission	PASS
15.215(c)	20dB Occupied Bandwidth	PASS
Remark: "N/A" is an abbreviation for Not Applicable.		



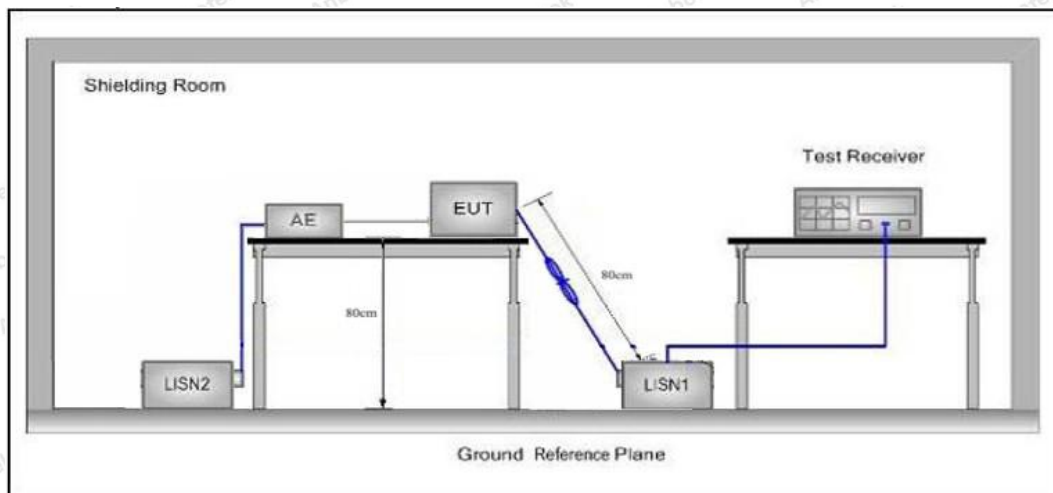
3. Conducted Emission Test

3.1. Test Standard and Limit

Test Standard	FCC Part15 Section 15.207		
Test Limit	Frequency	Maximum RF Line Voltage (dBuV)	
		Quasi-peak Level	Average Level
	150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
	500kHz~5MHz	56	46
	5MHz~30MHz	60	50

Remark: (1) *Decreasing linearly with logarithm of the frequency.
(2) The lower limit shall apply at the transition frequency.

3.2. Test Setup



3.3. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.10-2020 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

3.4. Test Data

Not applicable for equipment operated with DC power supply.

4. Radiation Spurious Emission and Band Edge

4.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.235(a)/15.235(b)/15.209				
Test Limit	Frequency (MHz)	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz~0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz~88MHz	100	40.0	Quasi-peak	3
	88MHz~216MHz	150	43.5	Quasi-peak	3
	216MHz~960MHz	200	46.0	Quasi-peak	3
	960MHz~1000MHz	500	54.0	Quasi-peak	3
	Above 1000MHz	500	54.0	Average	3
		-	74.0	Peak	3
Remark: (1)The lower limit shall apply at the transition frequency. (2) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.					

(a) The field strength of any emission within this band shall not exceed 10,000 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

(b) The field strength of any emissions appearing between the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 26 dB below the level of the unmodulated carrier or to the general limits in §15.209, whichever permits the higher emission levels. The field strength of any emissions removed by more than 10 kHz from the band edges shall not exceed the general radiated emission limits in §15.209. All signals exceeding 20 microvolts/meter at 3 meters shall be reported in the application for certification.

4.2. Test Setup

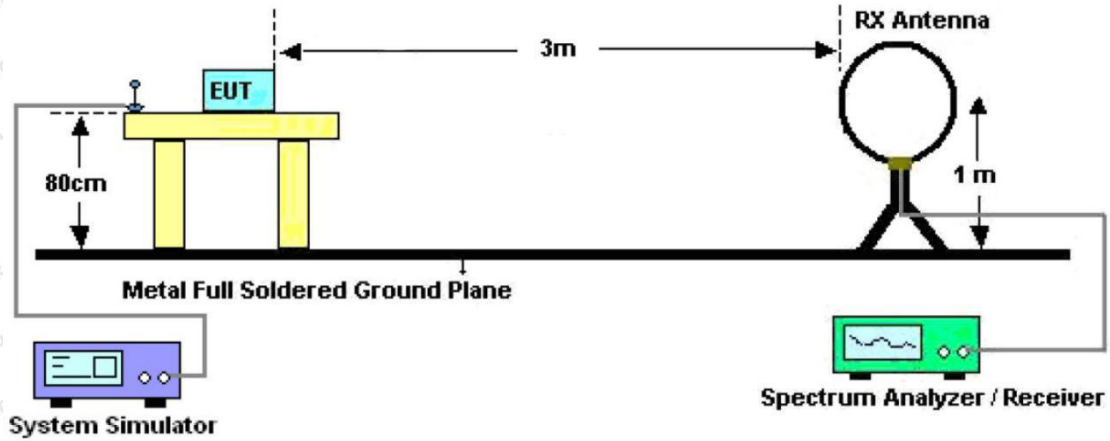


Figure 1. Below 30MHz

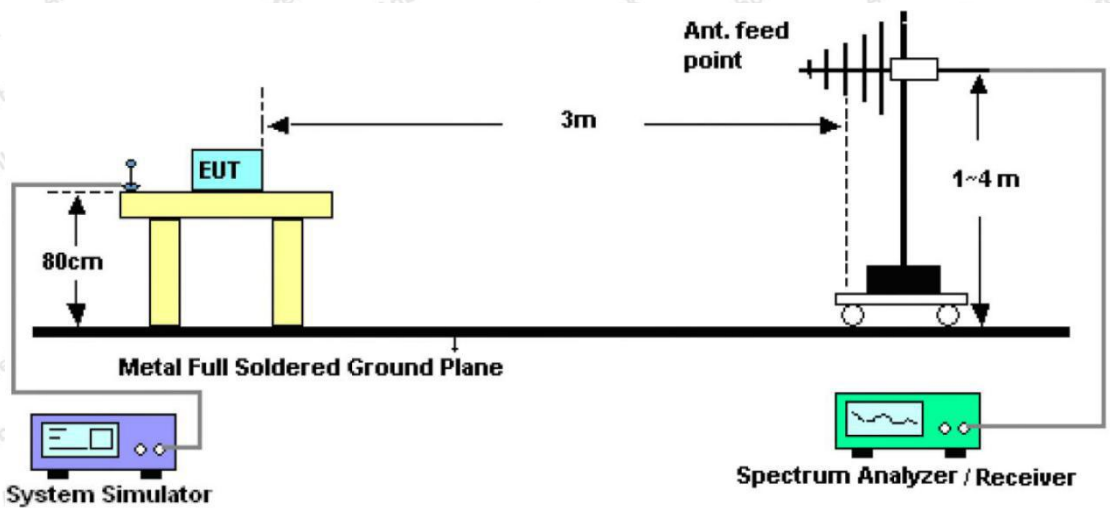


Figure 2. 30MHz to 1GHz

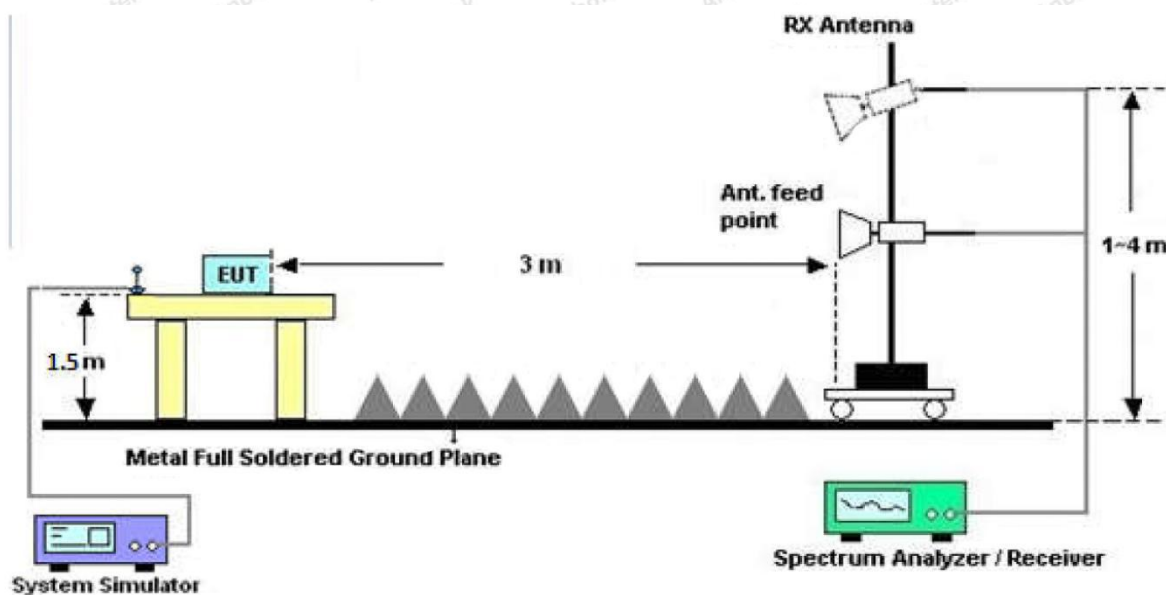


Figure 3. Above 1 GHz

4.3. Test Procedure

For below 1GHz: The EUT is placed on a turntable, which is 0.8m above the ground plane. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Rotated the EUT through three orthogonal axes to determine the maximum emissions, both horizontal and vertical polarization of the antenna are set on test. The EUT is tested in 9*6*6 Chamber. The device is evaluated in xyz orientation.

For 9kHz to 150kHz, Set the spectrum analyzer as:

RBW = 200Hz, VBW =1kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 150kHz to 30MHz, Set the spectrum analyzer as:

RBW = 9KHz, VBW =30kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 30MHz to 1000MHz, Set the spectrum analyzer as:

RBW = 100kHz, VBW =300kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For above 1GHz, Set the spectrum analyzer as:

RBW =1MHz, VBW =1MHz, Detector= Peak, Trace mode= Max hold, Sweep- auto couple.

RBW =1MHz, VBW =10Hz, Detector= Average, Trace mode= Max hold, Sweep- auto couple.

4.4. Test Data

PASS

During the test, Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the X-axis is the worst case.

Test Results (Fundamental)

Mode	Freq. (MHz)	Antenna Pol.	Readin (dBuV/m)	Cable Loss (dB)	Ant Factor (dB)	Amplifier (dB)	Results (dBuV/m)	Limits (dBuV/m)	Det. Mode
TX Mode	49.86	H	88.50	1.52	-15.91	31.45	42.66	100	PK
	49.86	H	78.00	1.52	-15.91	31.45	32.16	80	AV
	49.86	V	86.23	1.52	-15.91	31.45	40.39	100	PK
	49.86	V	75.64	1.52	-15.91	31.45	29.80	80	AV

Remark:

1. Result = Reading + Cable Loss +Ant Factor –Amplifier

Test Results (30~1000MHz)

Standard: FCC PART 15C

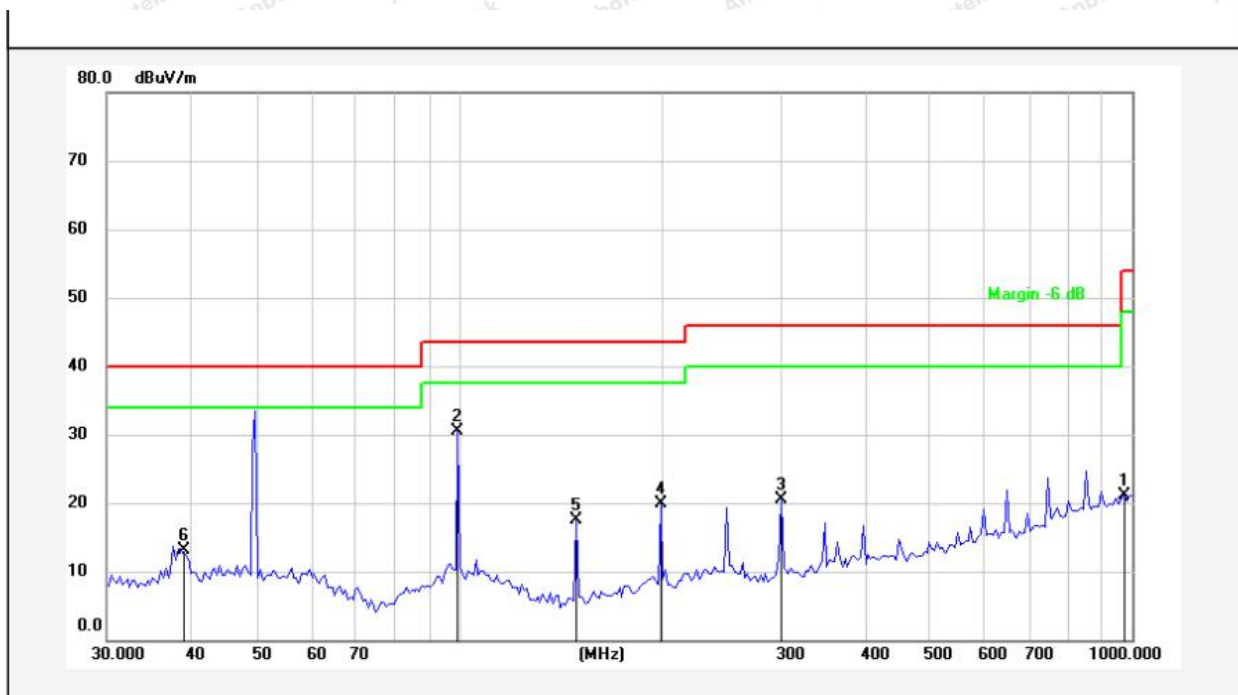
Temp.(°C)/Hum.(%RH): 24.2°C/57%RH

Test Mode: On Mode

Power Source: DC 3V

Polarization: Horizontal

Note:



No.	Freq. (MHz)	Reading (dBuV)	Factor ()	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	974.0434	27.94	-6.89	21.05	54.00	-32.95	peak			
2	99.7026	46.16	-15.71	30.45	43.50	-13.05	peak			
3	300.8942	37.50	-17.08	20.42	46.00	-25.58	peak			
4	199.2855	37.75	-17.81	19.94	43.50	-23.56	peak			
5	149.2238	37.92	-20.37	17.55	43.50	-25.95	peak			
6	38.6839	29.04	-15.91	13.13	40.00	-26.87	peak			

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Test Results (30~1000MHz)

Standard: FCC PART 15C

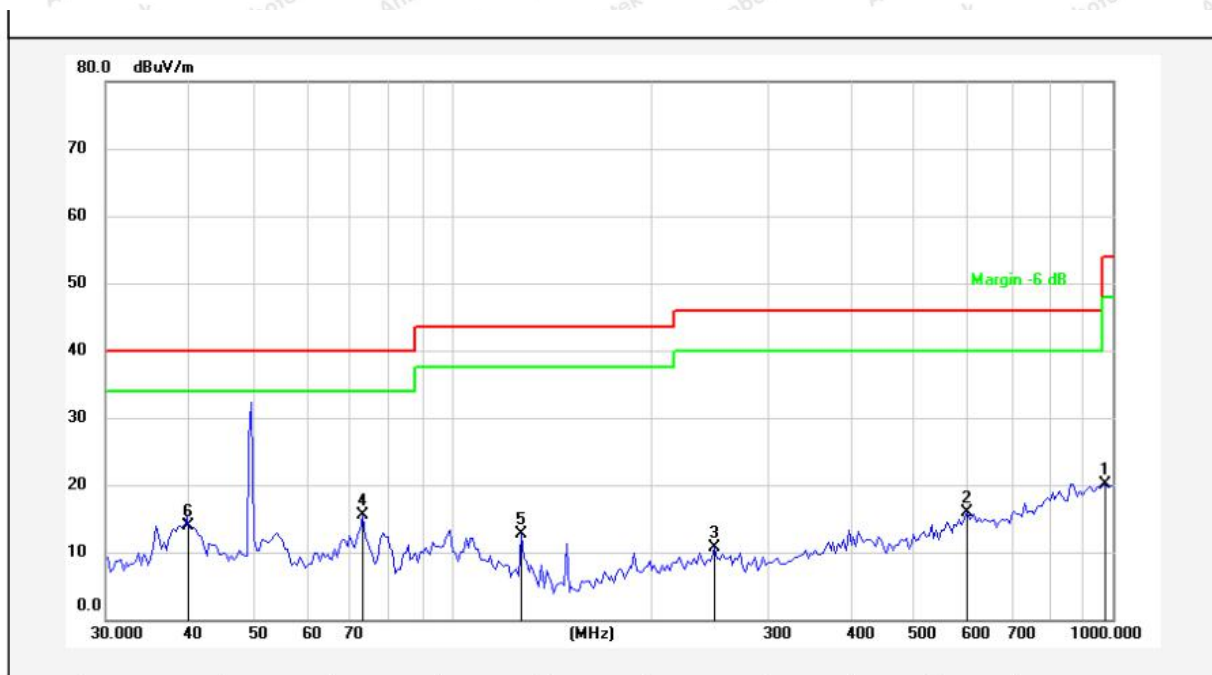
Temp.(°C)/Hum.(%RH): 24.2°C/57%RH

Test Mode: On Mode

Power Source: DC 3V

Polarization: Vertical

Note:



No.	Freq. (MHz)	Reading (dBuV)	Factor ()	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	974.0434	26.99	-6.89	20.10	54.00	-33.90	peak			
2	601.4265	27.95	-12.11	15.84	46.00	-30.16	peak			
3	250.3009	26.85	-16.19	10.66	46.00	-35.34	peak			
4	73.3593	36.51	-20.95	15.56	40.00	-24.44	peak			
5	127.4407	32.14	-19.39	12.75	43.50	-30.75	peak			
6	40.0643	29.43	-15.57	13.86	40.00	-26.14	peak			

Remark:

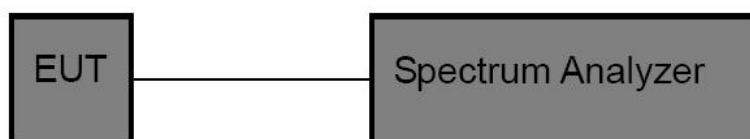
1. Results = Reading + Cable Loss +Ant Factor -Amplifier

5. 20DB Occupy Bandwidth Test

5.1. Test Standard and Limit

According to FCC section 15.215(c), the 20dB bandwidth should be contained within the frequency band designated in the rule section under which the EUT is operated, it was measured with a spectrum analyzer connected the EUT while the EUT is operating in transmission mode.

5.2. Test Setup



5.3. Test Procedure

The bandwidth of the fundamental frequency was measured by spectrum analyzer with 3kHz RBW and VBW $\geq$ 3*RBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

5.4. Test Data

Test Item : 20dB Bandwidth

Test Voltage : DC 3V

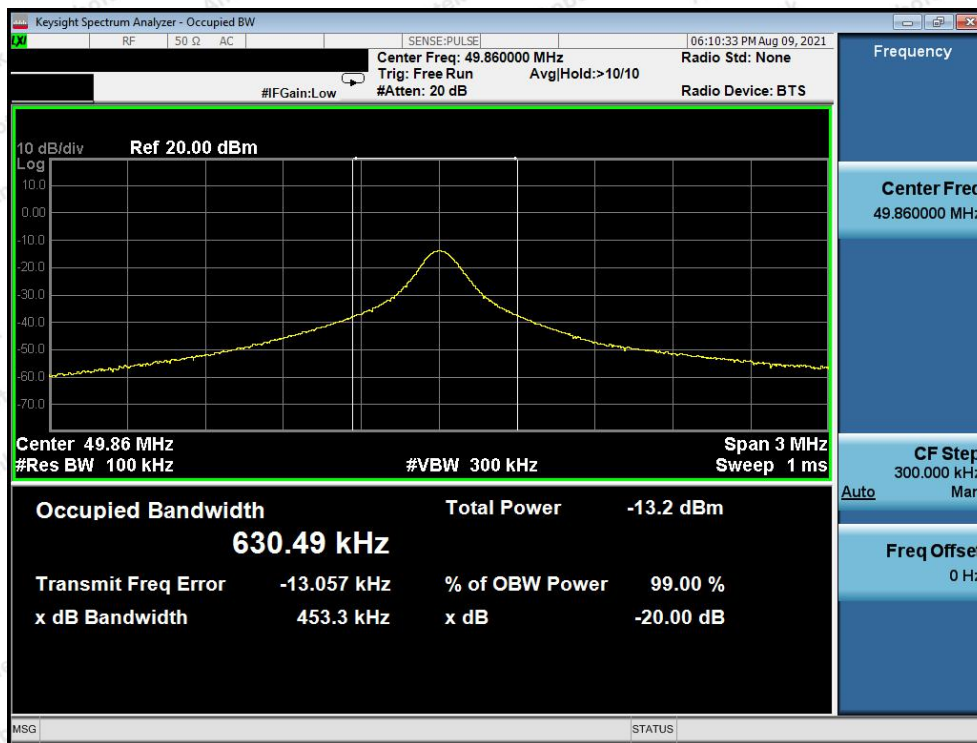
Test Result : PASS

Test Mode : Continuously transmitting

Temperature : 24℃

Humidity : 55%RH

Freq. (MHz)	Bandwidth (kHz)	Results
49.86	453.3	PASS



49.86MHz



6. Antenna Requirement

6.1. Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203
Requirement	1) 15.203 requirement: 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 requirement must meet at least one of the following: 1) Antenna must be permanently attached to device. 2) The antenna must use a unique type of connector to attach to the device. 3) Device must be professionally installed. The installer shall be responsible for ensuring that the correct antenna is employed by the device.

6.2. Antenna Connected Construction

The antenna is a Monopole Antenna which permanently attached, and the best case gain of the antenna is 0 dBi. It complies with the standard requirement.

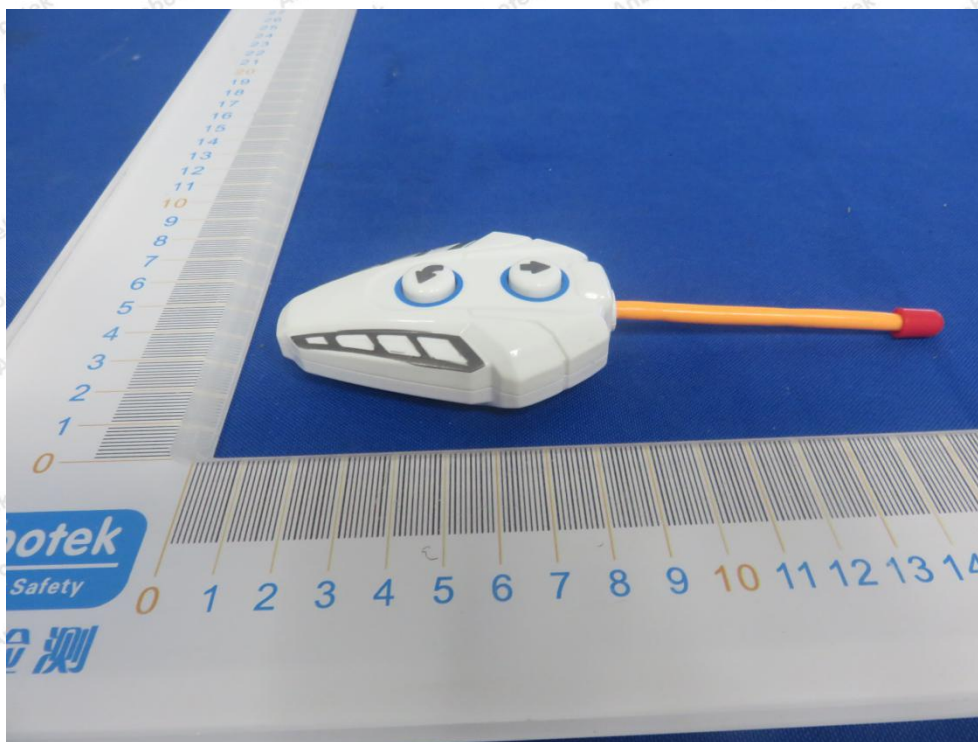
APPENDIX I -- TEST SETUP PHOTOGRAPH

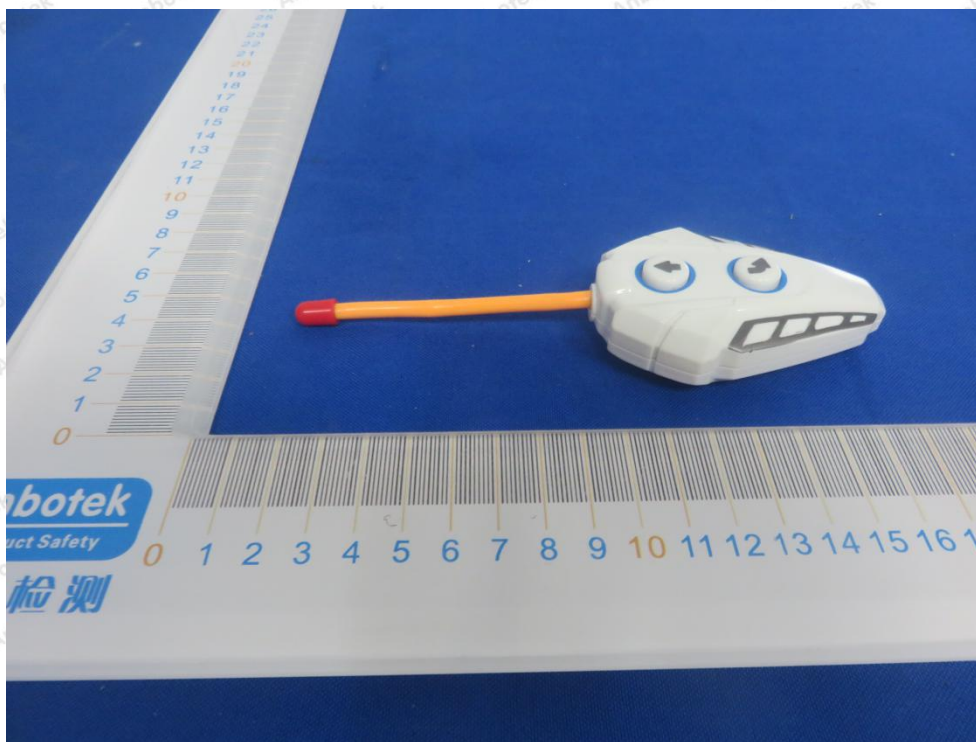
Photo of Radiation Emission Test



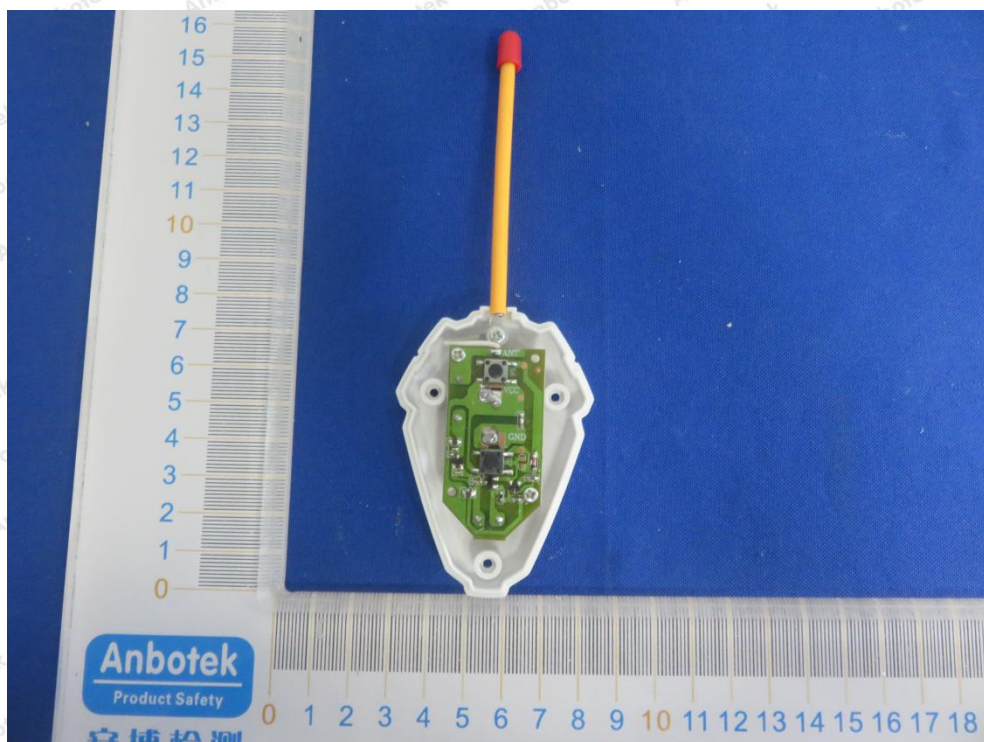
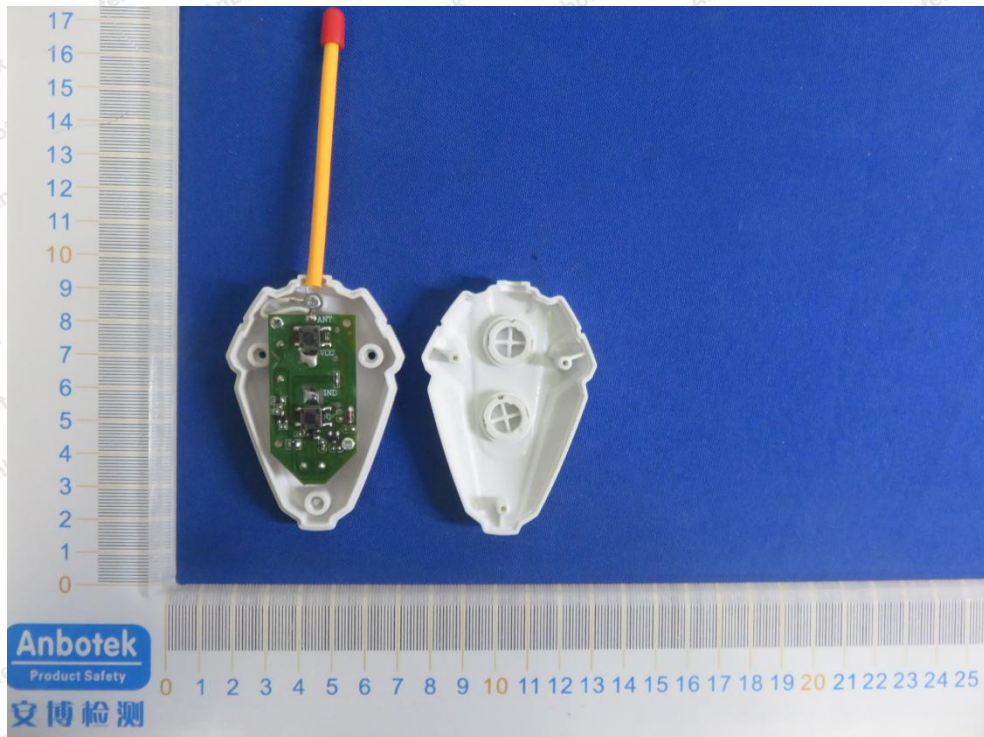
APPENDIX II -- EXTERNAL PHOTOGRAPH

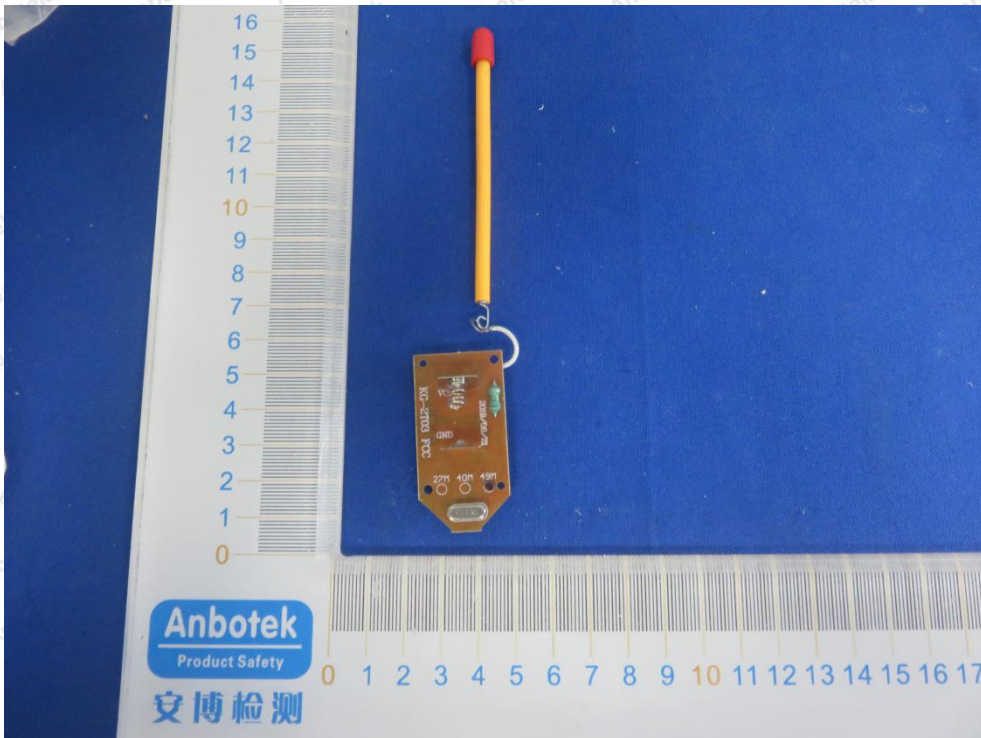






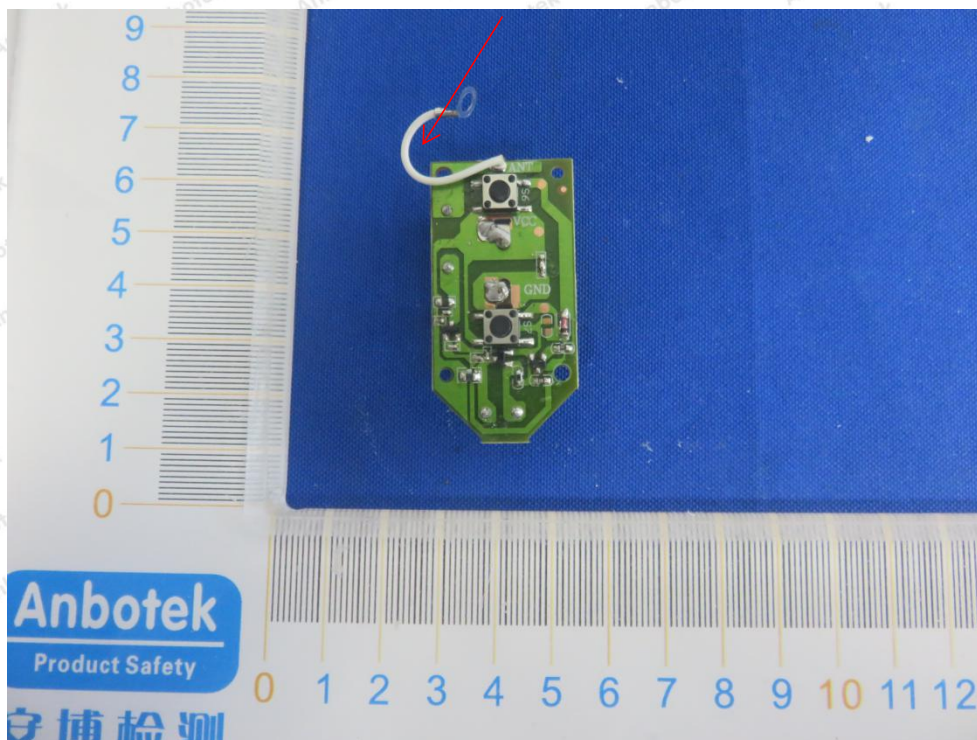


APPENDIX III -- INTERNAL PHOTOGRAPH





ANT



----- End of Report -----

