FCC TEST REPORT

FCC PART 15 SUBPART C 15.227

Test report

On Behalf of

DGL Group LTD.

For

Remote Control

Model No.: NFL-TD-RC-CHI, NFL-TD-RC-CIN, NFL-TD-RC-DAL, NFL-TD-RC-DEN, NFL-TD-RC-DET, NFL-TD-RC-GBY, NFL-TD-RC-IND, NFL-TD-RC-MV, NFL-TD-RC-NE, NFL-TD-RC-NYG, NFL-TD-RC-PHI, NFL-TD-RC-PIT, NFL-TD-RC-SEA

FCC ID: 2AANZTDRC

Prepared for :	**DGL Group LTD.** **195 Raritan Center Parkway Edison, New Jersey United States 08837**
Prepared By :	**Shenzhen HUAK Testing Technology Co., Ltd.** **1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China**
Date of Test:	**Oct. 29, 2018 ~ Oct. 31, 2018**
Date of Report:	**Oct. 31, 2018**
Report Number:	**HK1810301405E**

TEST RESULT CERTIFICATION

Applicant's name ..... :	DGL Group LTD.
Address ..... :	195 Raritan Center Parkway Edison, New Jersey United States 08837
Manufacture's Name ..... :	DGL Group LTD.
Address ..... :	195 Raritan Center Parkway Edison, New Jersey United States 08837

Product description

Trade Mark:	NFL
Product name ..... :	Remote Control
Model and/or type reference ... :	NFL-TD-RC-CHI
Series Modele	NFL-TD-RC-CIN, NFL-TD-RC-DAL, NFL-TD-RC-DEN, NFL-TD-RC-DET, NFL-TD-RC-GBY, NFL-TD-RC-IND, NFL-TD-RC-MV, NFL-TD-RC-NE, NFL-TD-RC-NYG, NFL-TD-RC-PHI, NFL-TD-RC-PIT, NFL-TD-RC-SEA
Declaration of Difference	All the same except for the appearance color.
Standards ..... :	FCC Rules and Regulations Part 15 Subpart C Section 15.227 ANSI C63.10: 2013

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Date of Test ..... :	
Date (s) of performance of tests ..... :	Oct. 29, 2018 ~ Oct. 31, 2018
Date of Issue ..... :	Oct. 31, 2018
Test Result ..... :	**Pass**

Testing Engineer : 

(Gary Qian)

Technical Manager : 

(Eden Hu)

Authorized Signatory : 

(Jason Zhou)

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1. TEST SUMMARY

1.1 TEST PROCEDURES AND RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.227&15.209	Radiated Emission and Band Edges	Compliant
§15.215	20dB bandwidth	Compliant
§15.207	Conducted Emission	N/A

1.2 TEST FACILITY

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

Address : 1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China

Designation Number: : CN1229

Test Firm Registration Number : 616276

1.3 MEASUREMENT UNCERTAINTY

Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty(9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty(Above 1GHz)	=	4.06dB, k=2

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Operation Frequency	27.145MHZ
Field Strength(3m)	64.6dBuV/m(Peak)@3m
Modulation	FM
Number of channels	1
Hardware Version	TXM TX-2B
Software Version	V1.0
Antenna Designation	Fixed antenna
Antenna Gain	2dBi
Power Supply	DC3V by Battery

2.2 OPERATION OF EUT DURING TESTING

NO.	TEST MODE DESCRIPTION
1	Transmitting mode

Note:
1. Only the data of the worst case recorded in the test report.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.

2.3 DESCRIPTION OF TEST SETUP

Operation of EUT during Radiation:

2.4 MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum analyzer	R&S	FSP40	HKE-025	Dec. 28, 2017	1 Year
2.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 28, 2017	1 Year
3.	Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Dec. 28, 2017	1 Year
4.	EMI Test Receiver	Rohde & Schwarz	ESCI 7	HKE-010	Dec. 28, 2017	1 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	Dec. 28, 2017	1 Year
6.	Loop Antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Dec. 28, 2017	1 Year
7.	EMI Test Software EZ-EMC	Tonscend	JS1120-B Version	HKE-083	Dec. 28, 2017	N/A
8.	Shielded room	Shiel Hong	4*3*3	HKE-039	Dec. 28, 2017	3 Year

3. RADIATED EMISSION

3.1. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 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 values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RBW 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RBW 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RBW 120KHz for QP

Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RBW 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RBW 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RBW 120KHz for QP

Test limit for Standard FCC15.227

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.

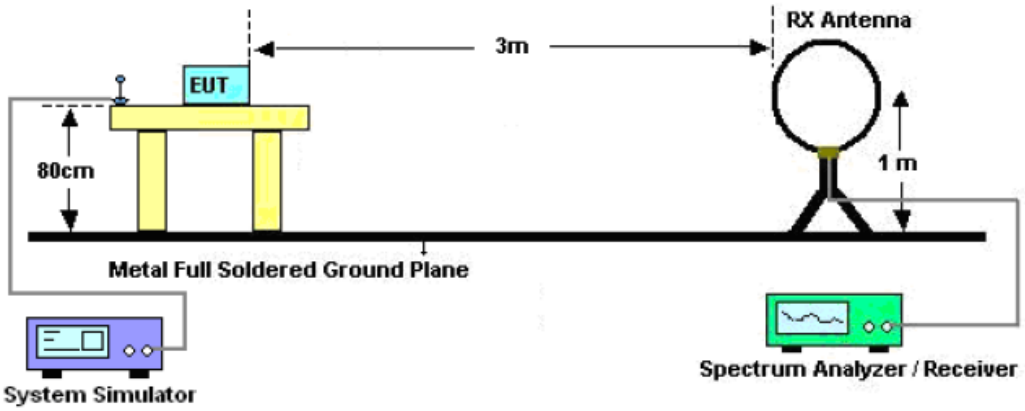
The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in §15.209.

Test limit for Standard FCC 15.209

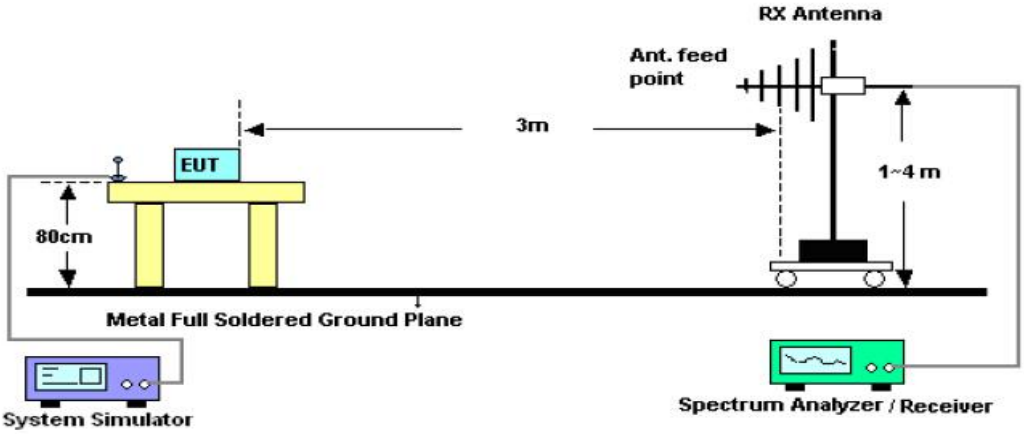
Frequency (MHz)	**Distance Meters**	**Field Strengths Limit**	
		μ V/m	**dB(μV)/m**
0.009 ~ 0.490	300	2400/F(kHz)	---
0.490 ~ 1.705	30	24000/F(kHz)	---
1.705 ~ 30	30	30	---
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	Other:74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	
Remark： (1) Emission level dBμ V = 20 log Emission level μ V/m (2) The smaller limit shall apply at the cross point between two frequency bands. (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.			

3.2. TEST SETUP

Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



3.3. TEST RESULT

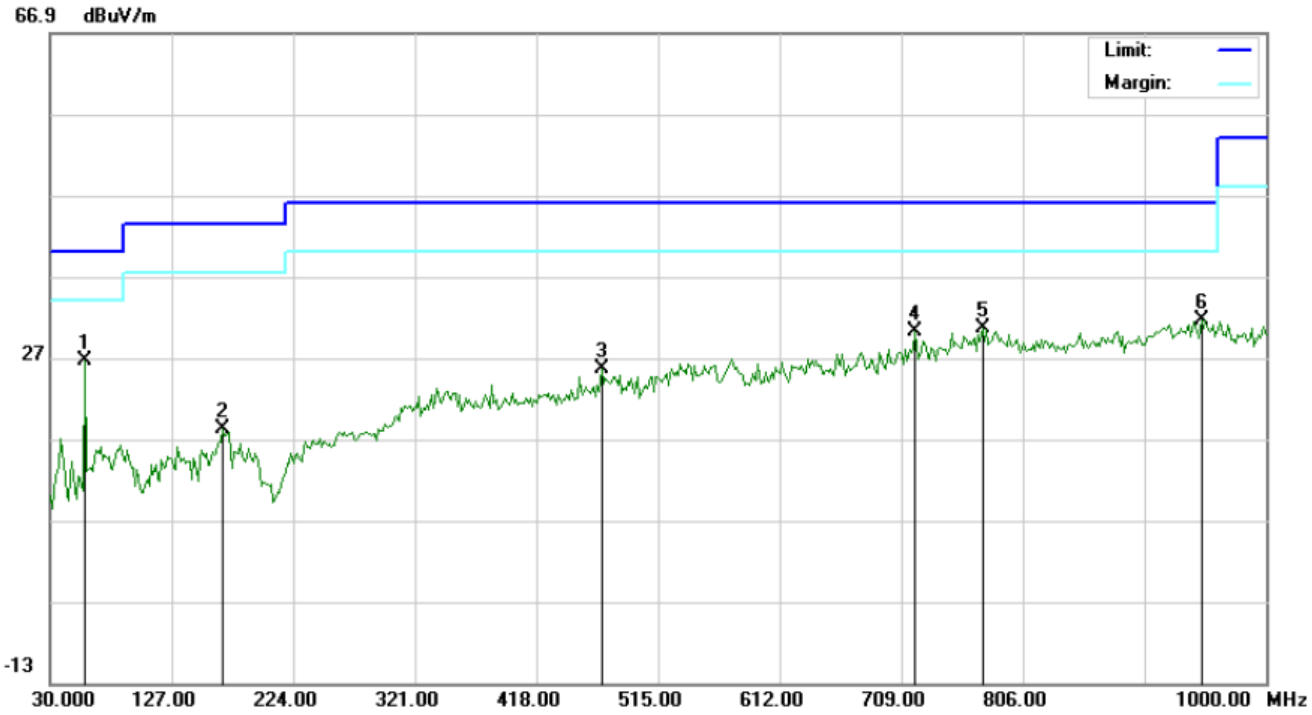
RADIATED EMISSION BELOW 30MHZ

EUT：	Remote Control	Model Name. ：	NFL-TD-RC-CHI
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 3V
Test Mode ：	Mode 1	Polarization :	--

Frequency MHz	Polarization	Reading dB(uV) PK	Factor dB (1/m)	Level dB(uV/m) PK	Limit dB(uV/m) AV	Margin dB	Pass/Fail
27.145	Face	50.1	14.5	64.6	80	15.4	Pass
27.145	Side	43.2	14.5	57.7	80	22.3	Pass

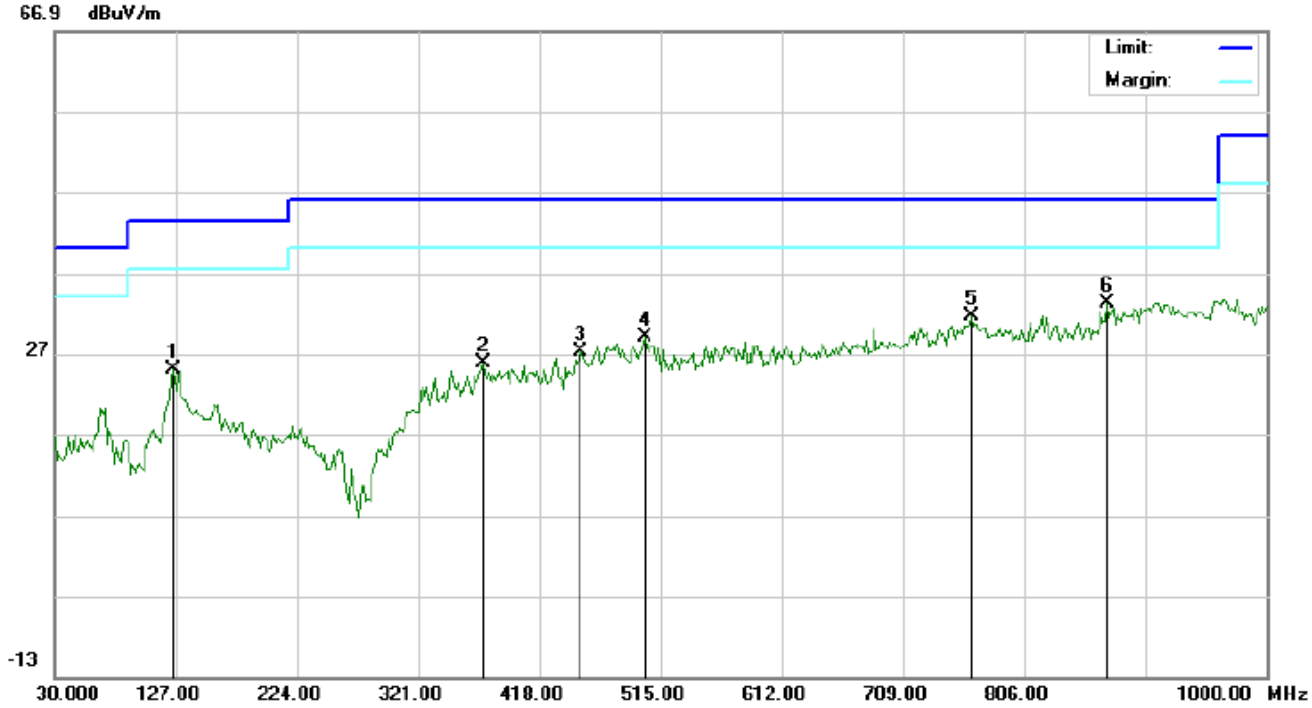
Note: The level of peak emission is less than the average limit, so the level of average emission need not to be tested. Other emissions from 9kHz to 30MHz are considered as ambient noise. No recording in the test report.

RADIATED EMISSION BELOW 1GHZ-Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	57.4831	18.52	8.17	26.69	40.00	-13.31	peak	
2		167.4165	3.40	14.86	18.26	43.50	-25.24	peak	
3		469.7330	4.83	20.80	25.63	46.00	-20.37	peak	
4		720.3165	4.35	25.77	30.12	46.00	-15.88	peak	
5		773.6666	3.64	26.96	30.60	46.00	-15.40	peak	
6		948.2667	1.71	29.95	31.66	46.00	-14.34	peak	

RADIATED EMISSION BELOW 1GHZ-Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		125.3833	16.67	8.37	25.04	43.50	-18.46	peak	
2		372.7331	6.91	18.89	25.80	46.00	-20.20	peak	
3		450.3333	6.71	20.59	27.30	46.00	-18.70	peak	
4		502.0667	7.76	21.19	28.95	46.00	-17.05	peak	
5		763.9663	4.75	26.82	31.57	46.00	-14.43	peak	
6	*	872.2833	5.36	27.89	33.25	46.00	-12.75	peak	

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin=Measurement-Limit.

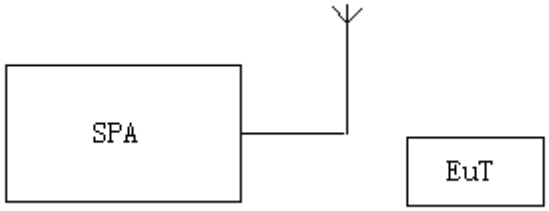
2. The “Factor” value can be calculated automatically by software of measurement system.

4. BANDWIDTH

4.1. MEASUREMENT PROCEDURE

1. Set the parameters of SPA as below:
   Centre frequency = Operation Frequency
   RBW=100Hz
   VBW=300Hz
   Span: 50kHz
   Sweep time: Auto
2. Set the EUT to continue transmitting mode. Allow the trace to stabilize. Use the “N dB down” function of SPA to define the bandwidth.
3. Record the plots and Reported.

4.2. TEST SETUP

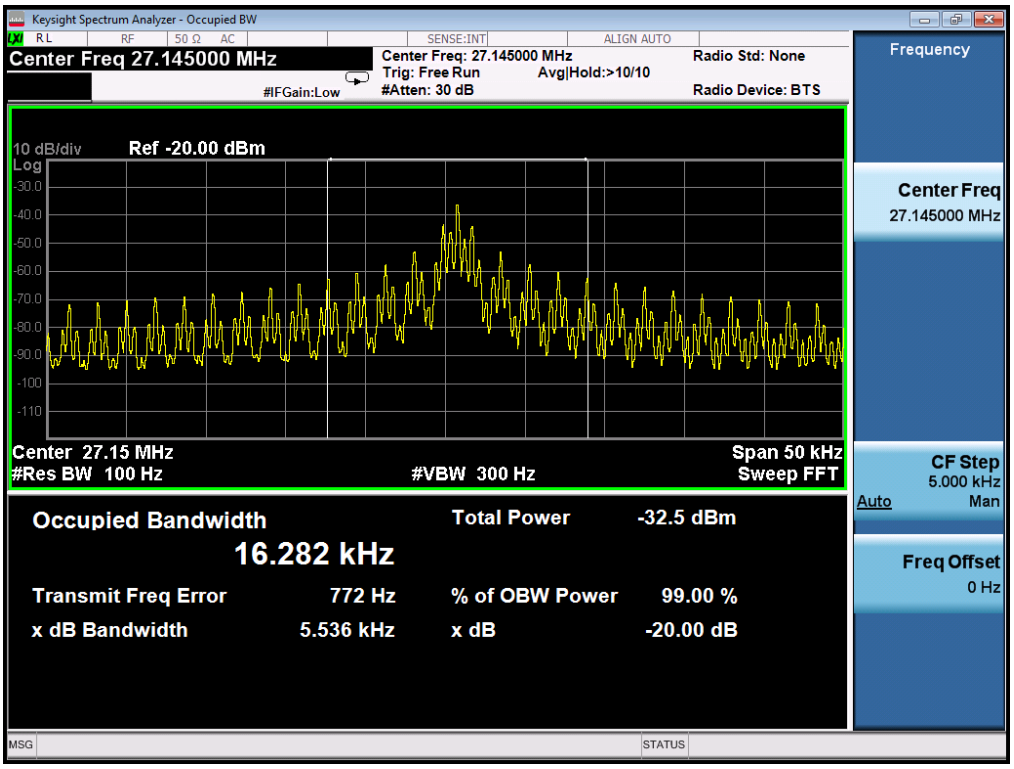


4.3. TEST RESULT

TEST ITEM	20DB BANDWIDTH
TEST MODULATION	FM

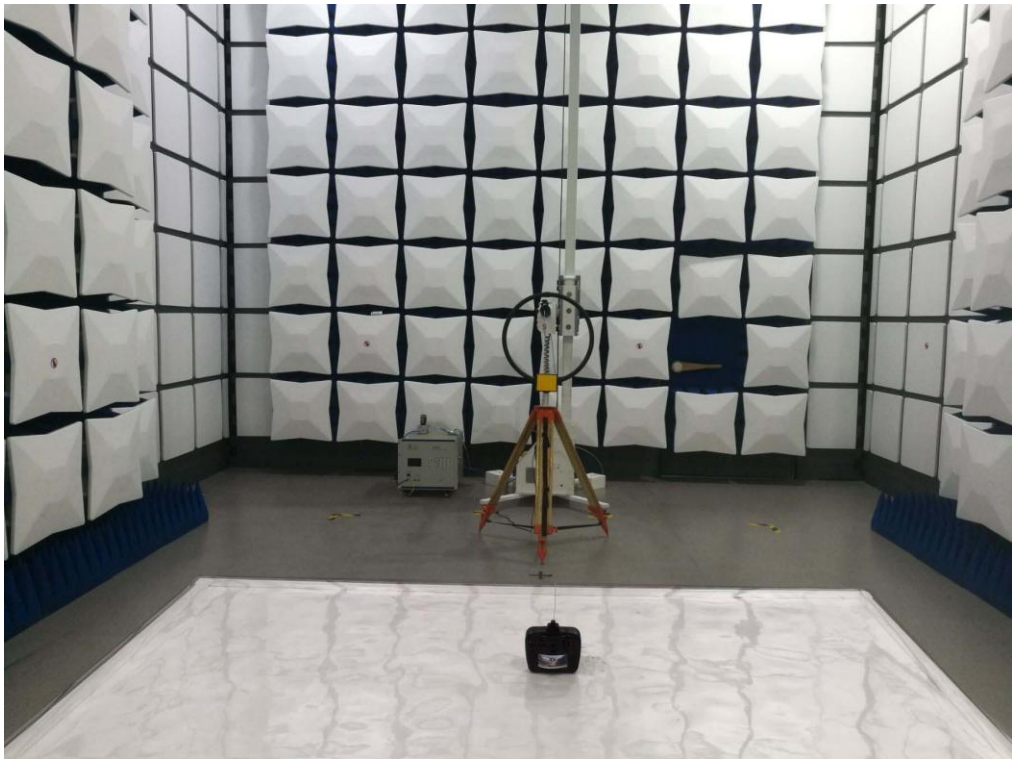
Test Data (kHz)		Criteria
Operate Channel	5.536	PASS

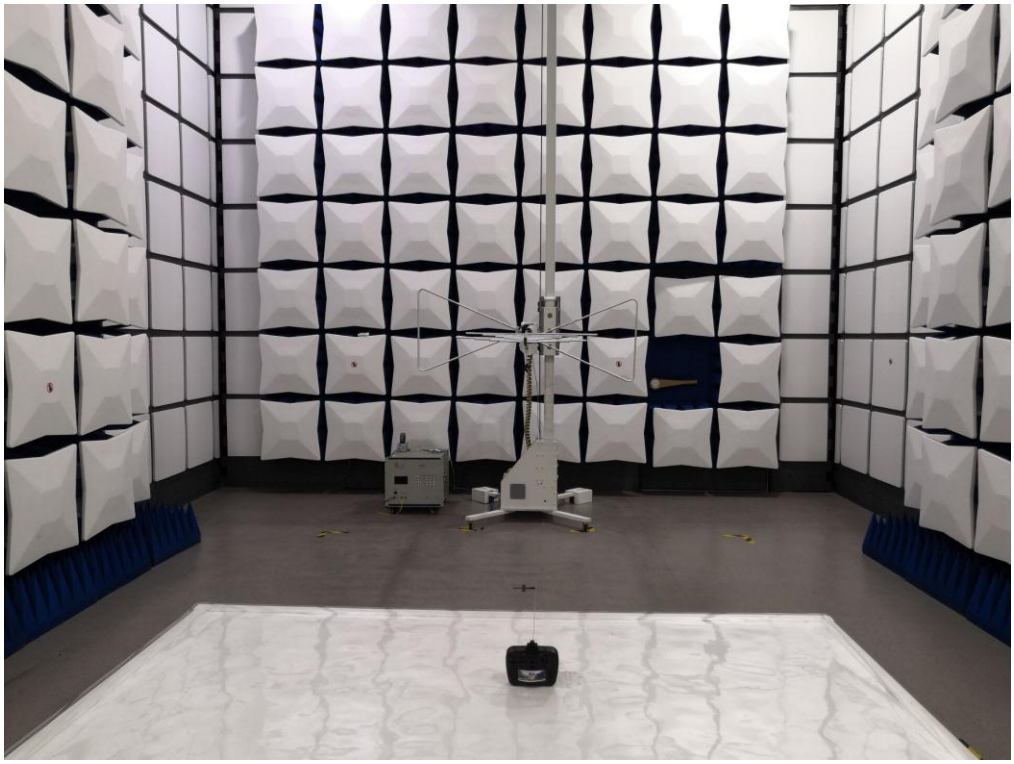
TEST PLOT OF BANDWIDTH



5. PHOTOGRAPH OF TEST

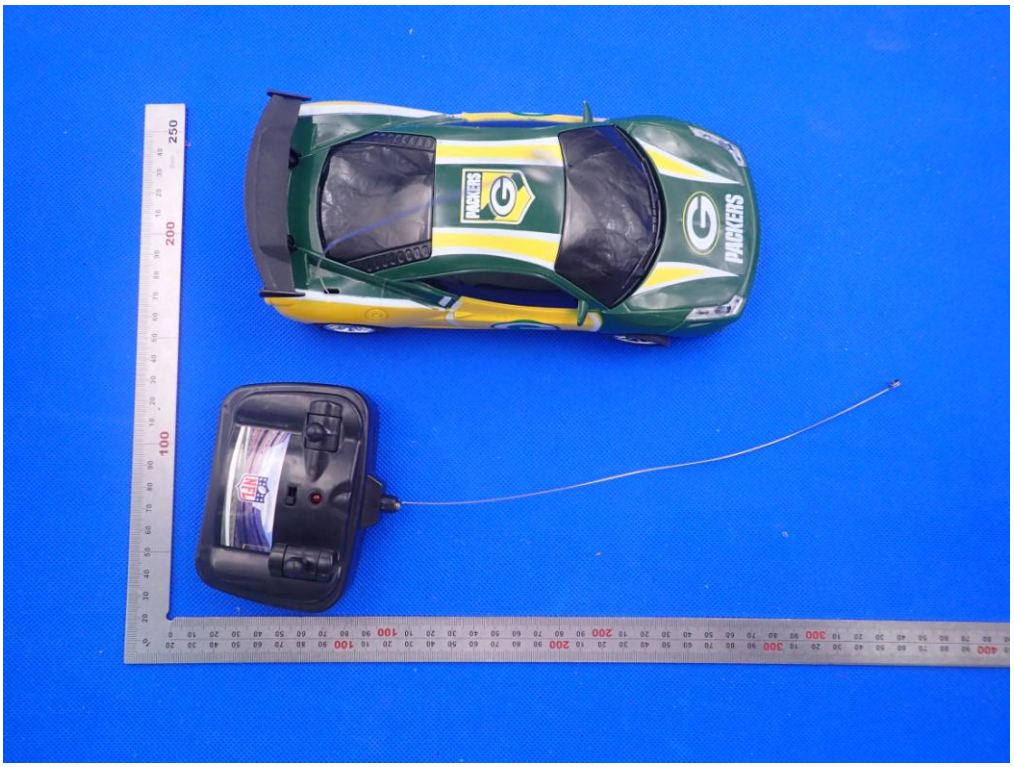
Radiated Emission



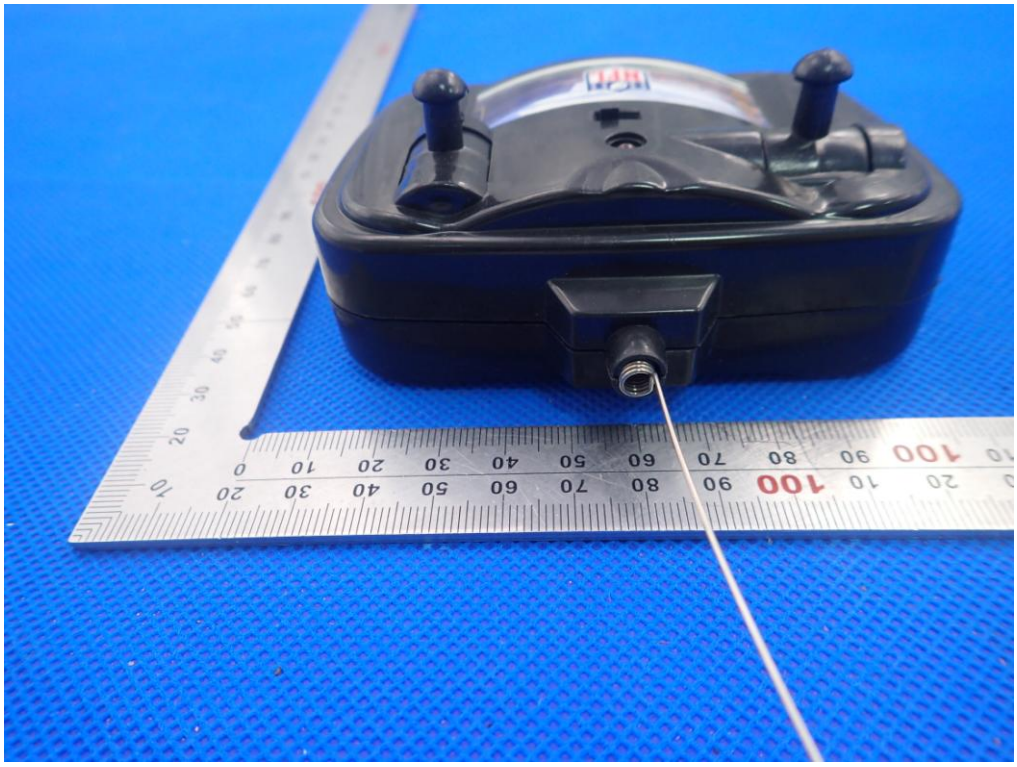


6. PHOTOGRAPH OF EUT

ALL VEIW OF EUT

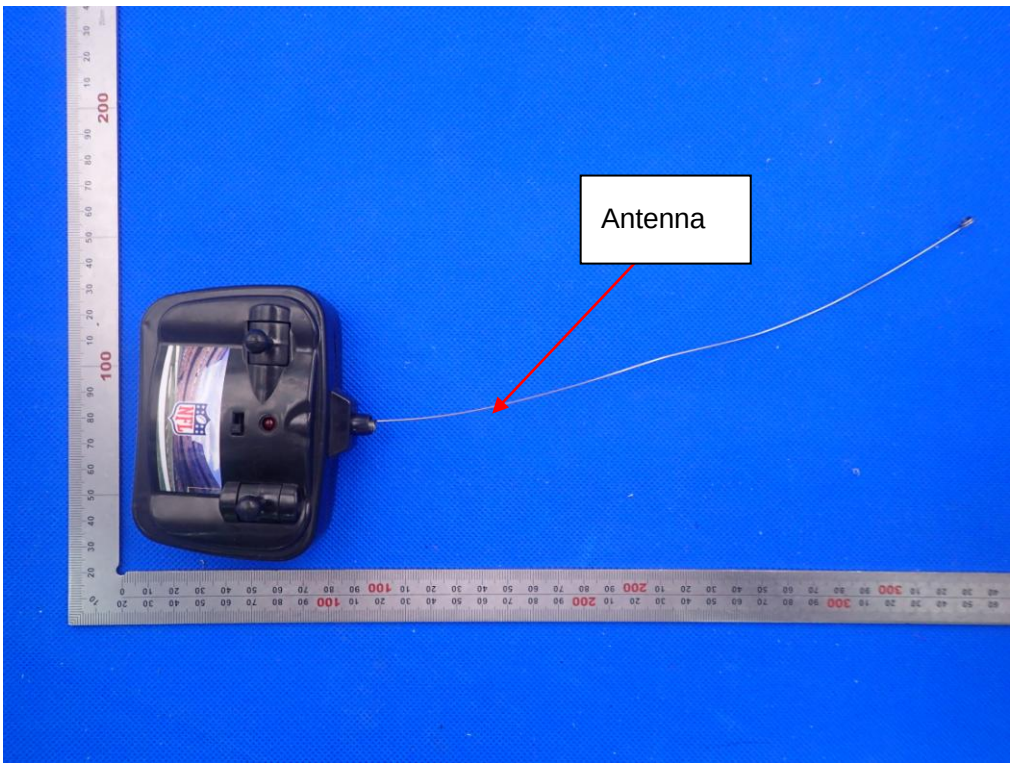


TOP VIEW OF EUT

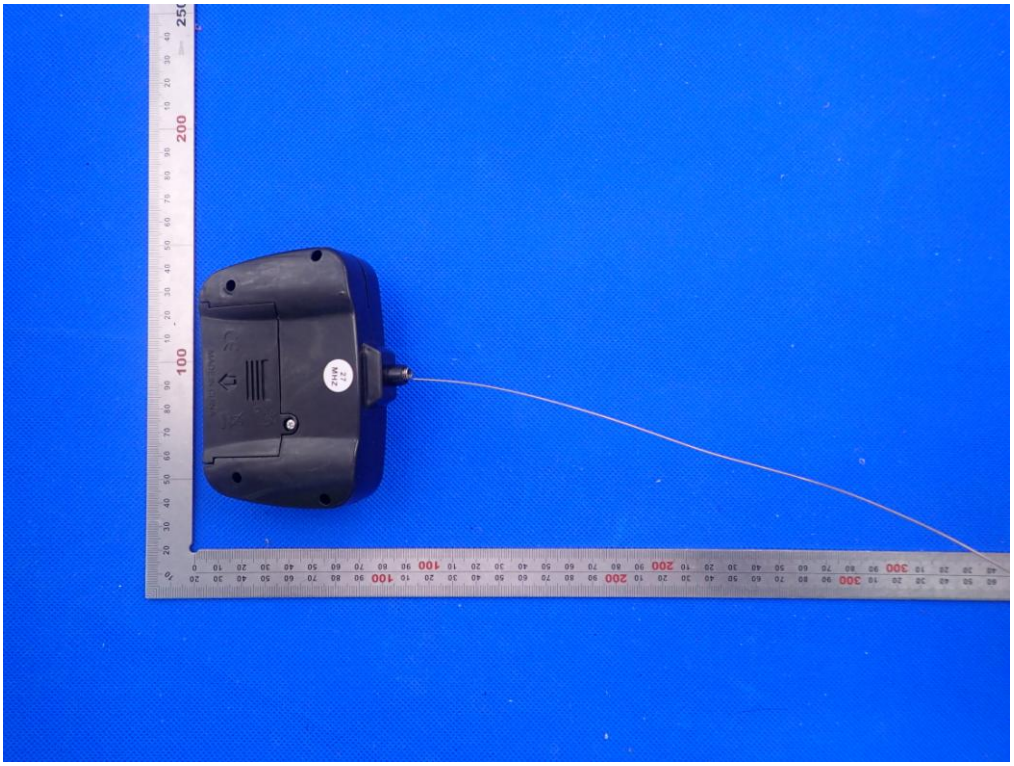


BOTTOM VIEW OF EUT

FRONT VIEW OF EUT

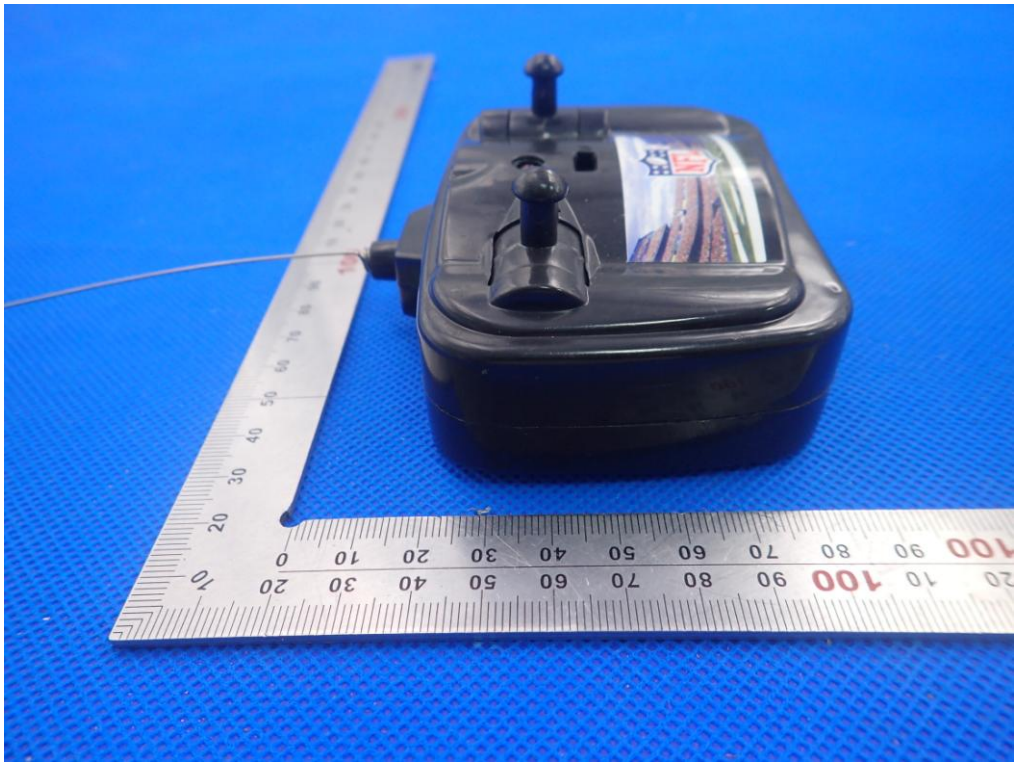


BACK VIEW OF EUT

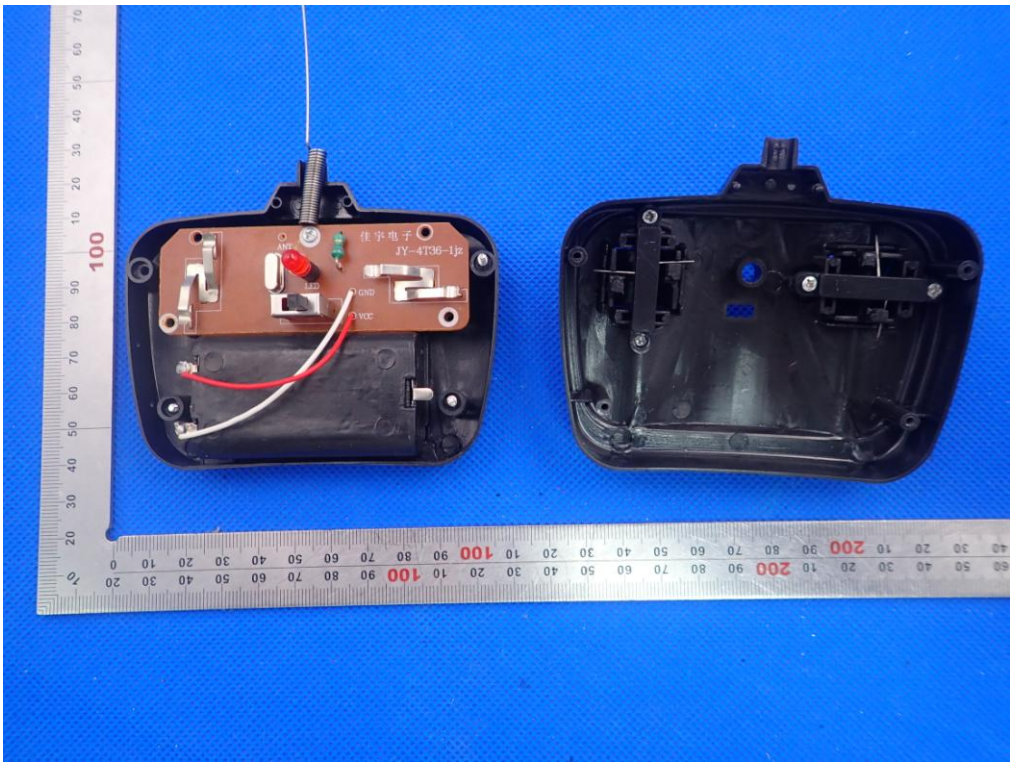


LEFT VIEW OF EUT

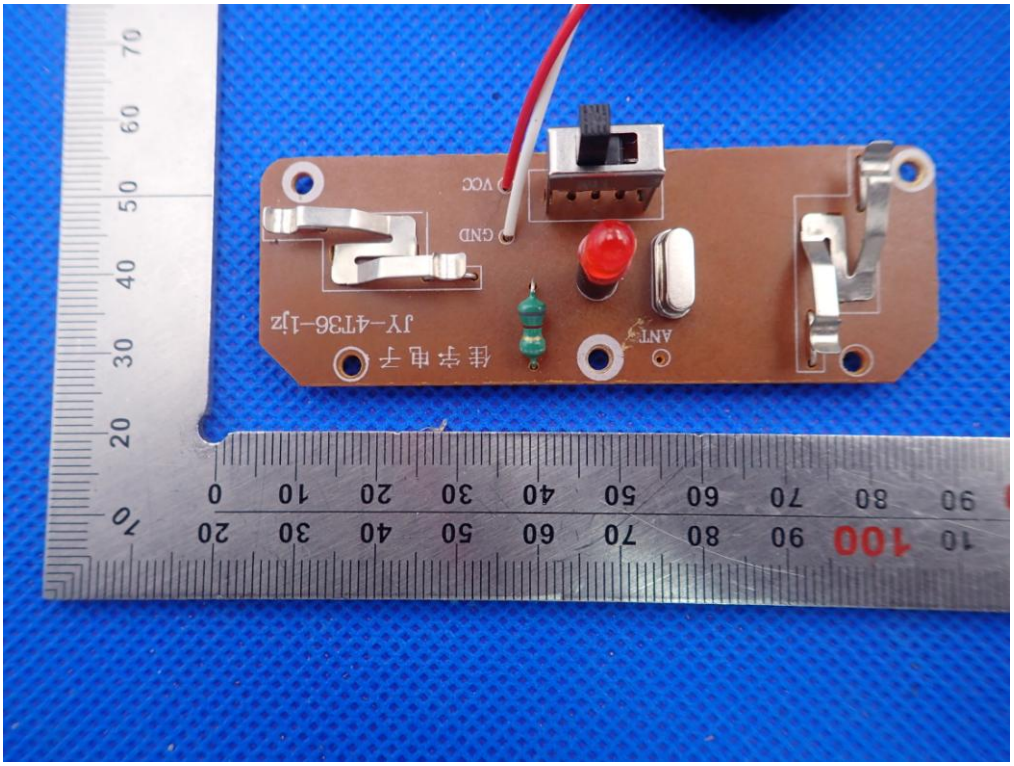
RIGHT VIEW OF EUT



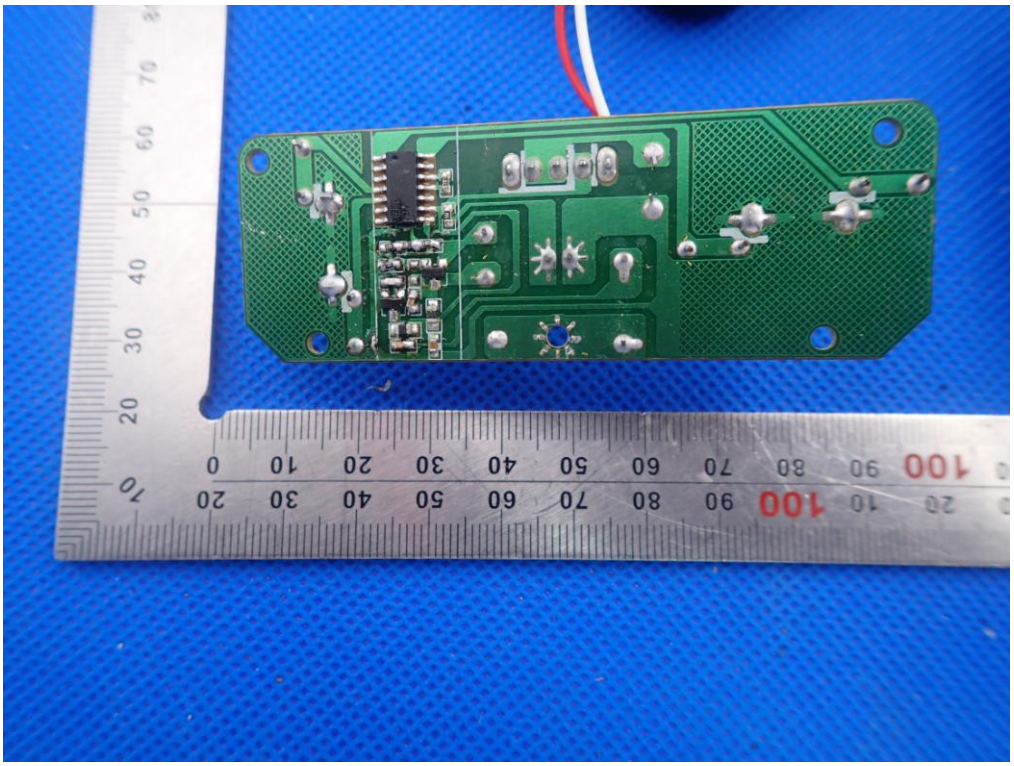
OPEN VIEW OF EUT



INTERNAL VIEW OF EUT-1



INTERNAL VIEW OF EUT-2



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