

FCC Report

Applicant: Kyosho Corporation of America
Address of Applicant: 20322 Valencia Circle, Lake Forest, California, United States
Equipment Under Test (EUT)
Product Name: KYOSHO DRONE RACER
Model No.: DR-01
FCC ID: WIZKT231P
Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247:2016
Date of sample receipt: November 14, 2016
Date of Test: November 15-23, 2016
Date of report issued: November 24, 2016
Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

A circular blue ink stamp for GTS Global Testing Services Co., Ltd. is visible. The stamp contains the text "GLOBAL TESTING SERVICES CO., LTD." around the perimeter and "GTS" in the center. A handwritten signature in black ink is written across the stamp.

Robinson Lo
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the GTS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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2 Version

Version No.	Date	Description
00	November 24, 2016	Original

Prepared By:

Yang. Liu

Date:

November 24, 2016

Project Engineer

Check By:

Andy. Wu

Date:

November 24, 2016

Reviewer

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4 Test Summary

Test Item	Section	Result
Antenna Requirement	15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	N/A
Conducted Peak Output Power	15.247 (b)(1)	N/A
20dB Occupied Bandwidth	15.247 (a)(1)	N/A
Carrier Frequencies Separation	15.247 (a)(1)	N/A
Hopping Channel Number	15.247 (a)(1)	N/A
Dwell Time	15.247 (a)(1)	N/A
Pseudorandom Frequency Hopping Sequence	15.247(a)(1)	N/A
Radiated Emission	15.205/15.209	Pass
Band Edge	15.247(d)	N/A

Pass: The EUT complies with the essential requirements in the standard.

N/A: not applicable

Remark: Test according to ANSI C63.10:2013

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	$\pm 4.34\text{dB}$	(1)
Radiated Emission	30MHz ~ 1000MHz	$\pm 4.24\text{dB}$	(1)
Radiated Emission	1GHz ~ 26.5GHz	$\pm 4.68\text{dB}$	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	$\pm 3.45\text{dB}$	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

5 General Information

5.1 Client Information

Applicant:	Kyosho Corporation of America
Address of Applicant:	20322 Valencia Circle, Lake Forest, California, United States
Manufacturer/Factory:	Dongguan Flysky RC Model technology Co.,Ltd
Address of Manufacturer/ Factory:	West building 3, Huangjiangyuan Ind Park, Qiaoli North Gate, Changping Town, Dongguan ,China

5.2 General Description of EUT

Product Name:	KYOSHO DRONE RACER
Model No.:	DR-01
Operation Frequency:	2405.5MHz~2475.0MHz
Channel numbers:	140
Modulation technology:	GFSK
Antenna Type:	Integral Antenna
Antenna gain:	2dBi
Power supply:	DC 6.0V (4 * 1.5V size"AA")

Remark: The system works in the frequency range of 2405.5MHz to 2475MHz. This band has been divided to 140 independent channels. Each radio system uses 32 different channels, the minimum channel separation is ≥ 1 MHz. By using various switch-on times, hopping scheme and channel frequencies, the system can guarantee a jamming free radio transmission. The channel list is below.

Operation Frequency each of channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2405.50	36	2423.00	71	2440.50	106	2458.00
2	2406.00	37	2423.50	72	2441.00	107	2458.50
3	2406.50	38	2424.00	73	2441.50	108	2459.00
4	2407.00	39	2424.50	74	2442.00	109	2459.50
5	2407.50	40	2425.00	75	2442.50	110	2460.00
6	2408.00	41	2425.50	76	2443.00	111	2460.50
7	2408.50	42	2426.00	77	2443.50	112	2461.00
8	2409.00	43	2426.50	78	2444.00	113	2461.50
9	2409.50	44	2427.00	79	2444.50	114	2462.00
10	2410.00	45	2427.50	80	2445.00	115	2462.50
11	2410.50	46	2428.00	81	2445.50	116	2463.00
12	2411.00	47	2428.50	82	2446.00	117	2463.50
13	2411.50	48	2429.00	83	2446.50	118	2464.00
14	2412.00	49	2429.50	84	2447.00	119	2464.50
15	2412.50	50	2430.00	85	2447.50	120	2465.00
16	2413.00	51	2430.50	86	2448.00	121	2465.50
17	2413.50	52	2431.00	87	2448.50	122	2466.00
18	2414.00	53	2431.50	88	2449.00	123	2466.50
19	2414.50	54	2432.00	89	2449.50	124	2467.00
20	2415.00	55	2432.50	90	2450.00	125	2467.50
21	2415.50	56	2433.00	91	2450.50	126	2468.00
22	2416.00	57	2433.50	92	2451.00	127	2468.50
23	2416.50	58	2434.00	93	2451.50	128	2469.00
24	2417.00	59	2434.50	94	2452.00	129	2469.50
25	2417.50	60	2435.00	95	2452.50	130	2470.00
26	2418.00	61	2435.50	96	2453.00	131	2470.50
27	2418.50	62	2436.00	97	2453.50	132	2471.00
28	2419.00	63	2436.50	98	2454.00	133	2471.50
29	2419.50	64	2437.00	99	2454.50	134	2472.00
30	2420.00	65	2437.50	100	2455.00	135	2472.50
31	2420.50	66	2438.00	101	2455.50	136	2473.00
32	2421.00	67	2438.50	102	2456.00	137	2473.50
33	2421.50	68	2439.00	103	2456.50	138	2474.00
34	2422.00	69	2439.50	104	2457.00	139	2474.50
35	2422.50	70	2440.00	105	2457.50	140	2475.00

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2405.5MHz
The middle channel	2440.0MHz
The Highest channel	2475.0MHz

5.3 Test mode

Transmitting mode	Keep the EUT in transmitting mode.
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5.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations: • FCC —Registration No.: 600491 Global United Technology Services Co., Ltd., Shenzhen 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 files. Registration 600491, June 22, 2016. • Industry Canada (IC) —Registration No.: 9079A-2 The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, August 15, 2016.
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5.5 Test Location

All other tests were performed at:
Global United Technology Services Co., Ltd. Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102 Tel: 0755-27798480 Fax: 0755-27798960

5.6 Other Information Requested by the Customer

None.

5.7 Description of Support Units

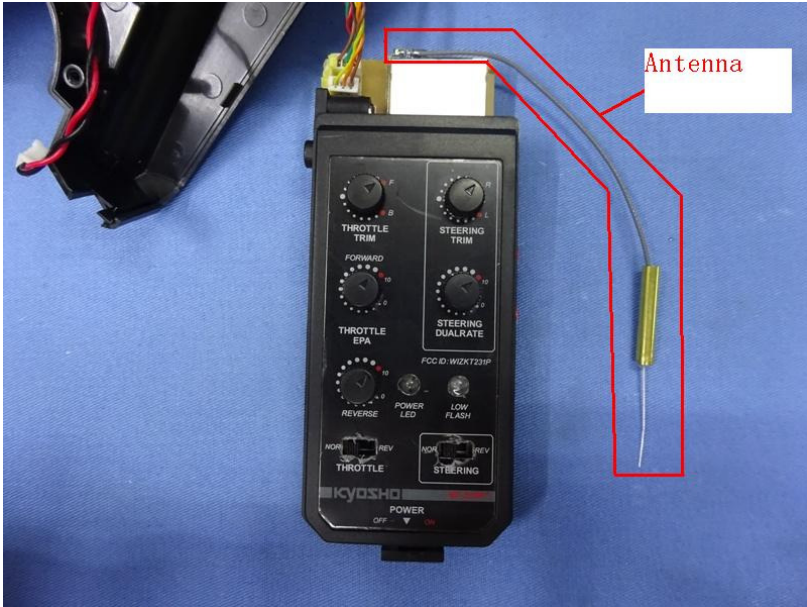
None.

5.8 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 03 2015	July. 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	Spectrum Analyzer	Agilent	E4440A	GTS536	June. 29 2016	June. 28 2017
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 29 2016	June. 28 2017
5	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 29 2016	June. 28 2017
6	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 29 2016	June. 28 2017
7	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June. 29 2016	June. 28 2017
8	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 29 2016	June. 28 2017
9	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
10	Coaxial Cable	GTS	N/A	GTS213	June. 29 2016	June. 28 2017
11	Coaxial Cable	GTS	N/A	GTS211	June. 29 2016	June. 28 2017
12	Coaxial cable	GTS	N/A	GTS210	June. 29 2016	June. 28 2017
13	Coaxial Cable	GTS	N/A	GTS212	June. 29 2016	June. 28 2017
14	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 29 2016	June. 28 2017
15	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	June. 29 2016	June. 28 2017
16	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 29 2016	June. 28 2017
17	Band filter	Amindeon	82346	GTS219	June. 29 2016	June. 28 2017
18	Power Meter	Anritsu	ML2495A	GTS540	June 29 2016	June 28 2017
19	Power Sensor	Anritsu	MA2411B	GTS541	June 29 2016	June 28 2017

6 Test results and Measurement Data

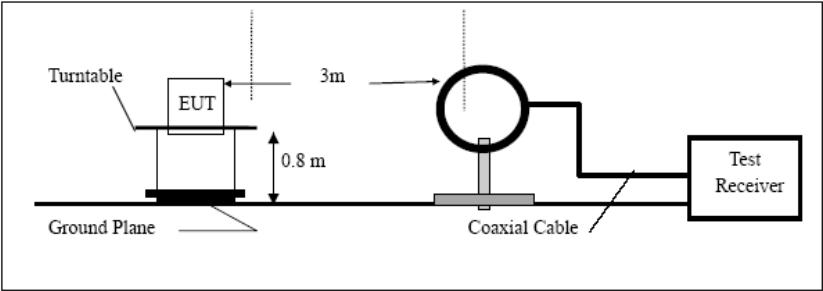
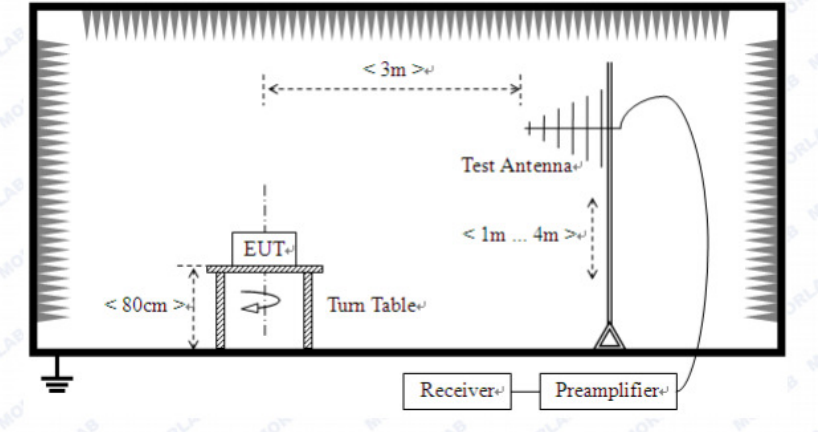
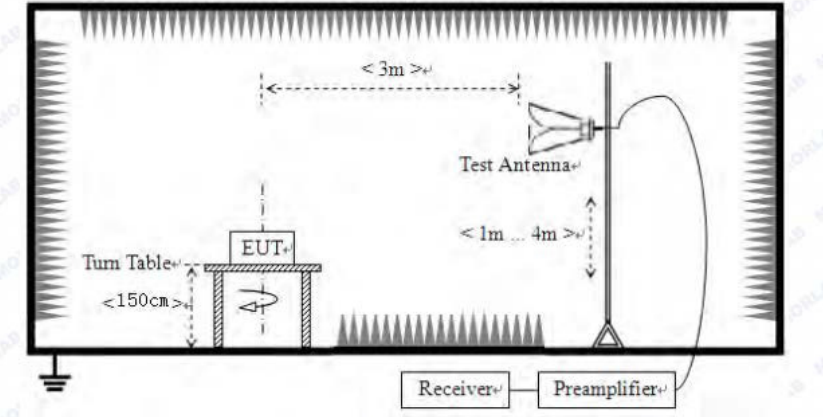
6.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, 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. 15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.	
EUT Antenna:	
<i>The antenna is integral antenna, the best case gain of the antenna is 2dBi</i> 	

6.2 Spurious Emission

6.2.1 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	9kHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
	150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Average	1MHz	10Hz	Average
Limit: (Spurious Emissions)	Frequency	Limit (uV/m)	Value	Measurement Distance	
	0.009MHz-0.490MHz	2400/F(KHz)	QP	300m	
	0.490MHz-1.705MHz	24000/F(KHz)	QP	300m	
	1.705MHz-30MHz	30	QP	30m	
	30MHz-88MHz	100	QP	3m	
	88MHz-216MHz	150	QP		
	216MHz-960MHz	200	QP		
	960MHz-1GHz	500	QP		
	Above 1GHz	500	Average		
		5000	Peak		

Test setup:	Below 30MHz  30MHz-1GHz  Above 1GHz 
Test Procedure:	1. The EUT was placed on the top of a rotating table (0.8 meters below 1G and 1.5 meters above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. 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. 4. 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 and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. 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.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

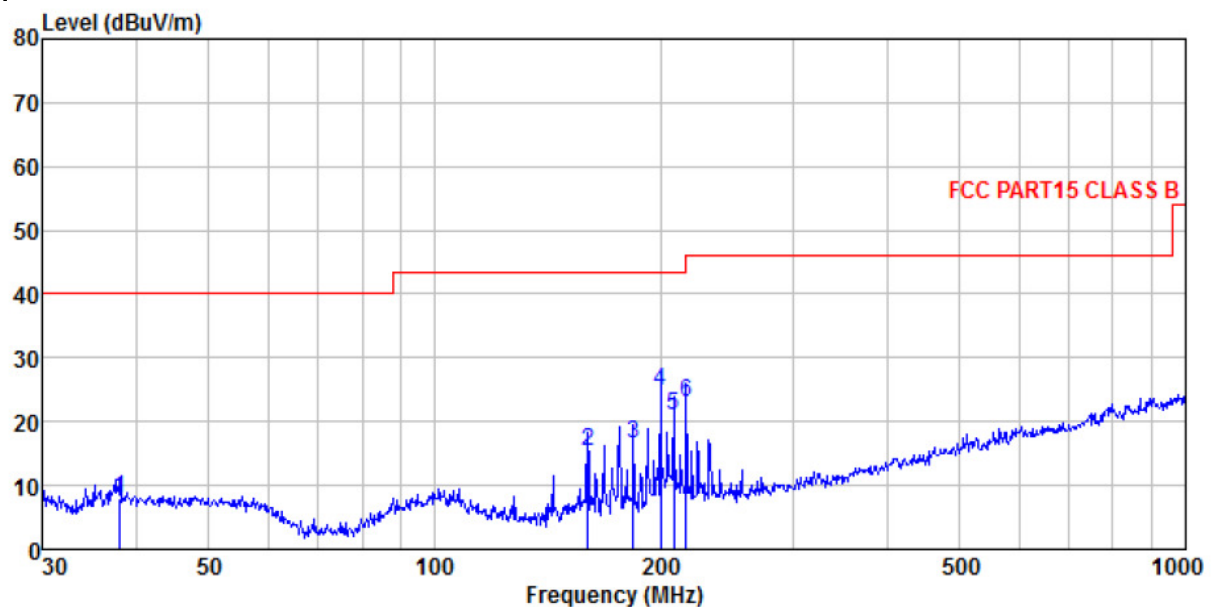
Remark:

- 1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.*
- 2. The measured filed strength at frequencies below 30MHz are lower than the limit over 30dB. So the data isn't reported.*

Measurement data:

■ 30MHz ~ 1GHz

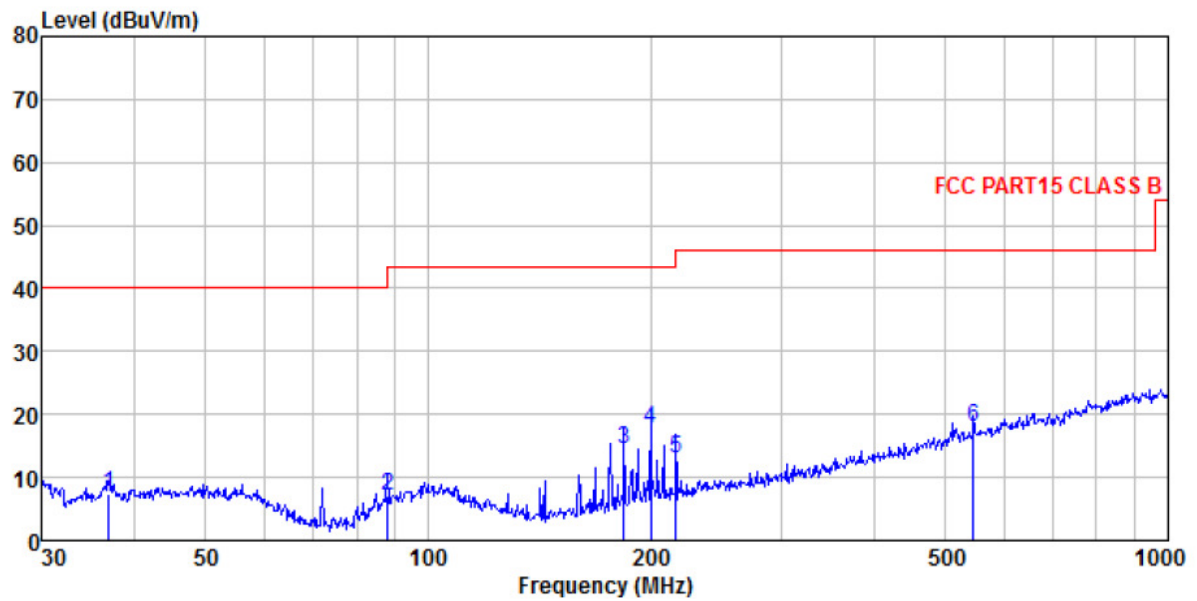
Vertical:



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VERTICAL
 Job No. : GTS201611000028
 Test Mode : Transmitting mode
 Test Engineer: Sky

	Read	Antenna	Cable	Preamp	Limit	Over	
Freq	Level	Factor	Loss	Factor	Line	Limit	Remark
-----MHz-----	-----dBuV-----	-----dB/m-----	-----dB-----	-----dB-----	-----dBuV/m-----	-----dBuV/m-----	-----dB-----
1	38.078	25.00	12.30	0.64	30.10	7.84	40.00 -32.16 QP
2	159.784	35.15	8.20	1.63	29.56	15.42	43.50 -28.08 QP
3	183.844	35.03	9.10	1.76	29.47	16.42	43.50 -27.08 QP
4	199.986	42.24	10.20	1.84	29.40	24.88	43.50 -18.62 QP
5	207.850	37.94	10.49	1.89	29.45	20.87	43.50 -22.63 QP
6	216.024	39.92	10.78	1.93	29.52	23.11	46.00 -22.89 QP

Horizontal:



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m HORIZONTAL
 Job No. : GTS201611000028
 Test Mode : Transmitting mode
 Test Engineer: Sky

	Freq	ReadAntenna Level	Cable Factor	Preamp Loss	Limit Level	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB
1	37.025	25.66	11.20	0.63	30.10	7.39	40.00 -32.61 QP
2	88.033	25.37	10.60	1.09	29.87	7.19	43.50 -36.31 QP
3	183.844	33.20	9.10	1.76	29.47	14.59	43.50 -28.91 QP
4	199.986	35.21	10.20	1.84	29.40	17.85	43.50 -25.65 QP
5	216.024	29.77	10.78	1.93	29.52	12.96	46.00 -33.04 QP
6	545.183	25.56	18.29	3.50	29.45	17.90	46.00 -28.10 QP

■ Above 1GHz

Test channel:	Lowest
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4811.00	45.19	31.78	8.60	32.09	53.48	74.00	-20.52	Vertical
7216.50	30.41	36.15	11.66	31.99	46.23	74.00	-27.77	Vertical
9622.00	31.70	38.01	14.14	31.60	52.25	74.00	-21.75	Vertical
12027.50	*					74.00		Vertical
14433.00	*					74.00		Vertical
4811.00	42.00	31.78	8.60	32.09	50.29	74.00	-23.71	Horizontal
7216.50	29.68	36.15	11.66	31.99	45.50	74.00	-28.50	Horizontal
9622.00	28.93	38.01	14.14	31.60	49.48	74.00	-24.52	Horizontal
12027.50	*					74.00		Horizontal
14433.00	*					74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4811.00	33.98	31.78	8.60	32.09	42.27	54.00	-11.73	Vertical
7216.50	20.38	36.15	11.66	31.99	36.20	54.00	-17.80	Vertical
9622.00	20.67	38.01	14.14	31.60	41.22	54.00	-12.78	Vertical
12027.50	*					54.00		Vertical
14433.00	*					54.00		Vertical
4811.00	32.03	31.78	8.60	32.09	40.32	54.00	-13.68	Horizontal
7216.50	19.98	36.15	11.66	31.99	35.80	54.00	-18.20	Horizontal
9622.00	17.78	38.01	14.14	31.60	38.33	54.00	-15.67	Horizontal
12027.50	*					54.00		Horizontal
14433.00	*					54.00		Horizontal

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “*”, means this data is the too weak instrument of signal is unable to test.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

Test channel:	Middle
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4880.00	39.43	31.85	8.66	32.12	47.82	74.00	-26.18	Vertical
7320.00	30.76	36.37	11.72	31.89	46.96	74.00	-27.04	Vertical
9760.00	30.56	38.35	14.25	31.59	51.57	74.00	-22.43	Vertical
12200.00	*					74.00		Vertical
14640.00	*					74.00		Vertical
4880.00	40.03	31.85	8.66	32.12	48.42	74.00	-25.58	Horizontal
7425.00	30.15	36.56	11.79	31.80	46.70	74.00	-27.30	Horizontal
9900.00	27.63	38.81	14.35	31.85	48.94	74.00	-25.06	Horizontal
12200.00	*					74.00		Horizontal
14640.00	*					74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4880.00	29.57	31.85	8.66	32.12	37.96	54.00	-16.04	Vertical
7320.00	19.95	36.37	11.72	31.89	36.15	54.00	-17.85	Vertical
9760.00	19.81	38.35	14.25	31.59	40.82	54.00	-13.18	Vertical
12200.00	*					54.00		Vertical
14640.00	*					54.00		Vertical
4880.00	31.41	31.85	8.66	32.12	39.80	54.00	-14.20	Horizontal
7320.00	20.91	36.37	11.72	31.89	37.11	54.00	-16.89	Horizontal
9760.00	18.76	38.35	14.25	31.59	39.77	54.00	-14.23	Horizontal
12200.00	*					54.00		Horizontal
14640.00	*					54.00		Horizontal

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “*”, means this data is the too weak instrument of signal is unable to test.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

Test channel:	Highest
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4950.00	40.98	31.91	8.71	32.16	49.44	74.00	-24.56	Vertical
7425.00	29.90	36.56	11.79	31.80	46.45	74.00	-27.55	Vertical
9900.00	29.02	38.81	14.35	31.85	50.33	74.00	-23.67	Vertical
12375.00	*					74.00		Vertical
14850.00	*					74.00		Vertical
4950.00	39.81	31.91	8.71	32.16	48.27	74.00	-25.73	Horizontal
7425.00	28.93	36.56	11.79	31.80	45.48	74.00	-28.52	Horizontal
9900.00	28.74	38.81	14.35	31.85	50.05	74.00	-23.95	Horizontal
12375.00	*					74.00		Horizontal
14850.00	*					74.00		Horizontal

Average value:

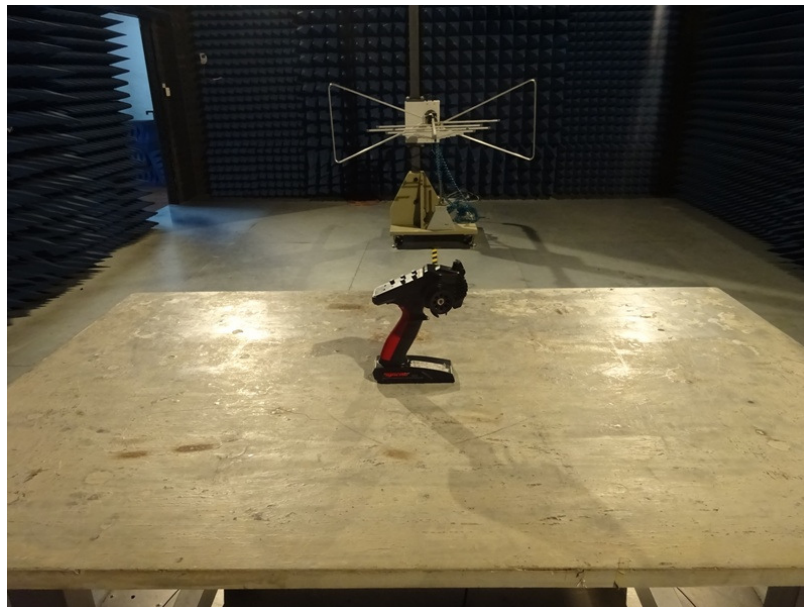
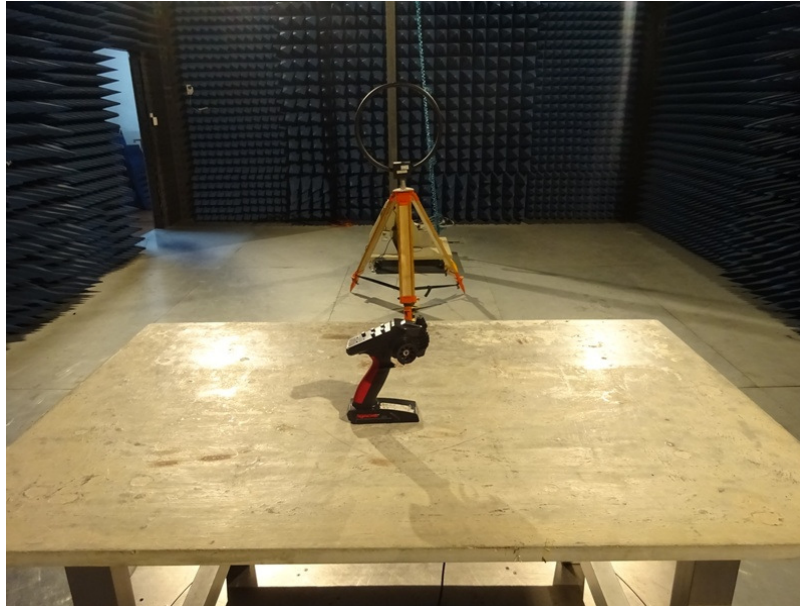
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4950.00	30.87	31.91	8.71	32.16	39.33	54.00	-14.67	Vertical
7425.00	21.03	36.56	11.79	31.80	37.58	54.00	-16.42	Vertical
9900.00	19.52	38.81	14.35	31.85	40.83	54.00	-13.17	Vertical
12375.00	*					54.00		Vertical
14850.00	*					54.00		Vertical
4950.00	29.27	31.91	8.71	32.16	37.73	54.00	-16.27	Horizontal
7425.00	20.62	36.56	11.79	31.80	37.17	54.00	-16.83	Horizontal
9900.00	18.19	38.81	14.35	31.85	39.50	54.00	-14.50	Horizontal
12375.00	*					54.00		Horizontal
14850.00	*					54.00		Horizontal

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “*”, means this data is the too weak instrument of signal is unable to test.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

7 Test Setup Photo

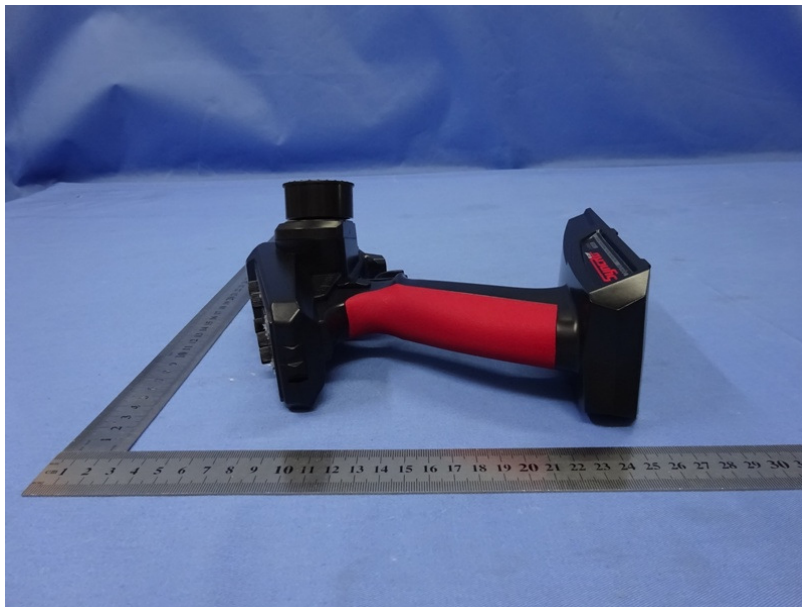
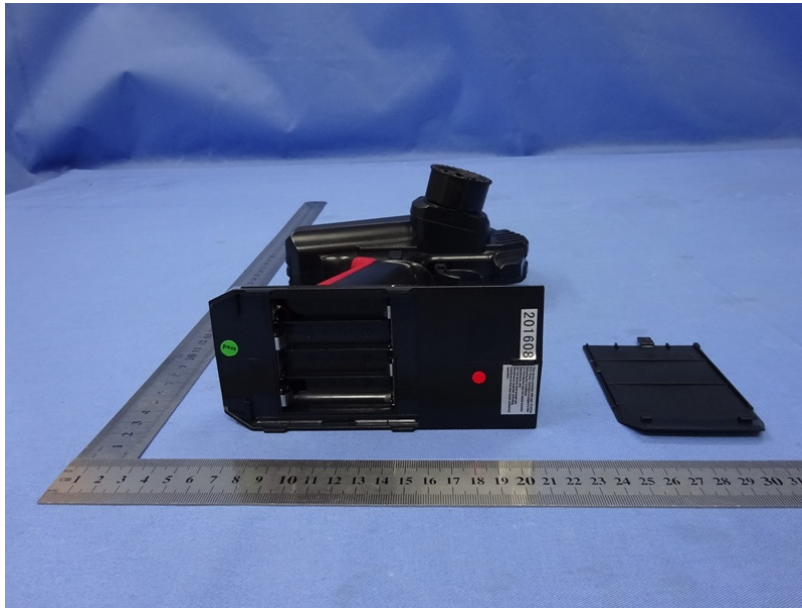
Radiated Emission





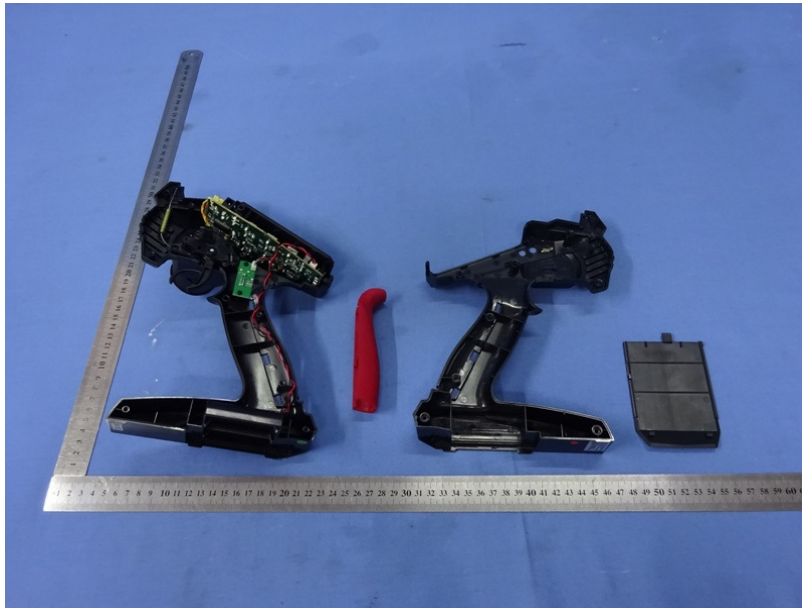
8 EUT Constructional Details

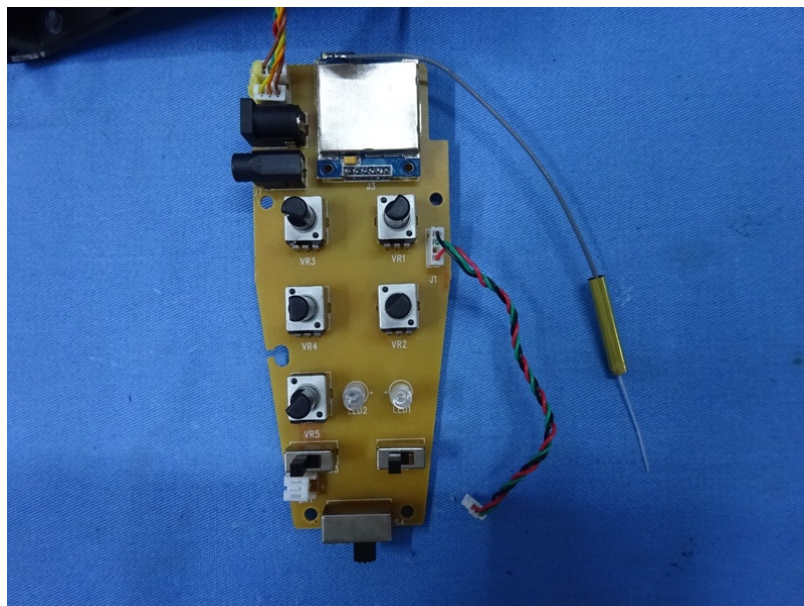


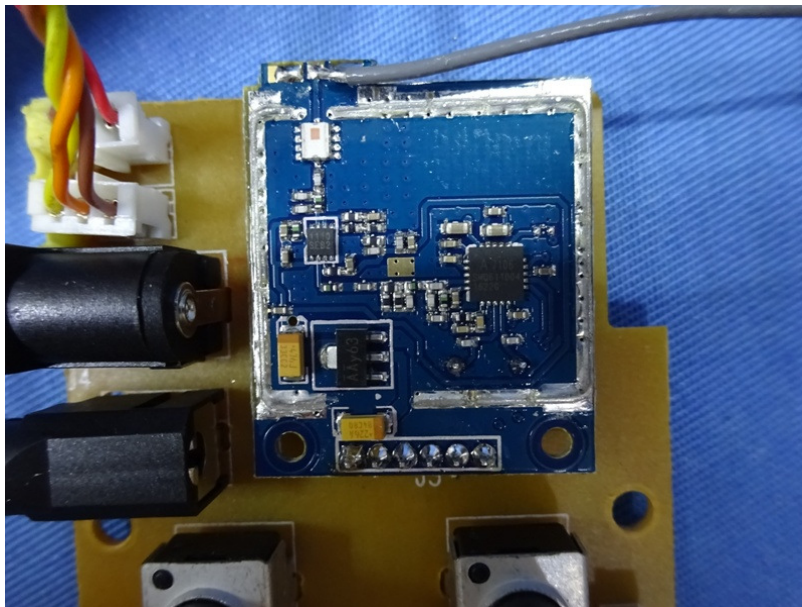
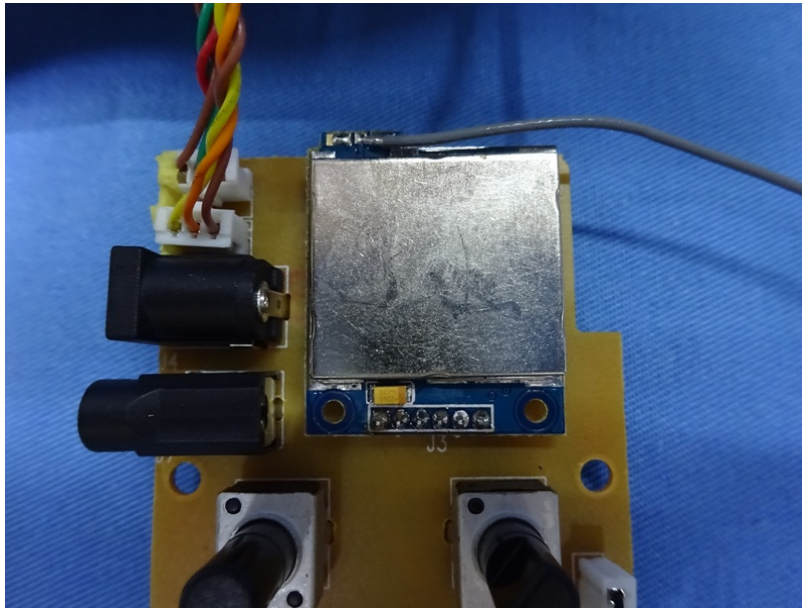


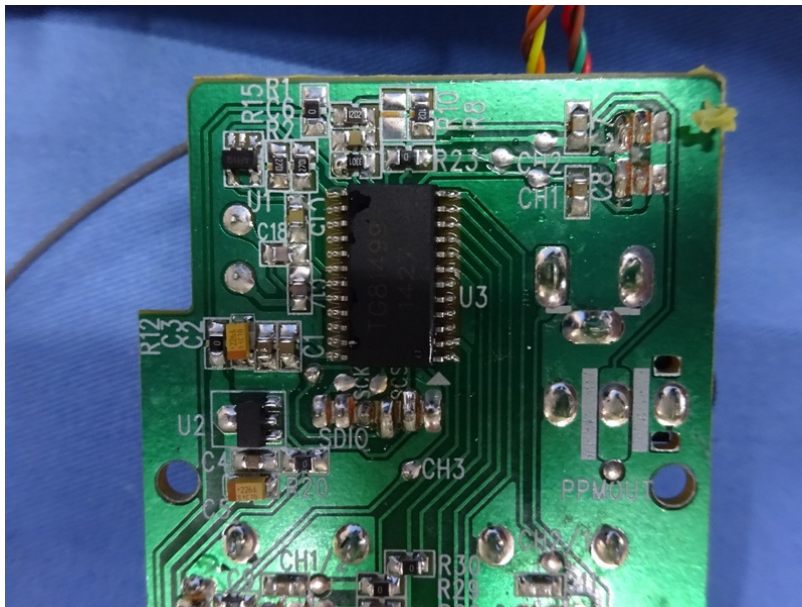
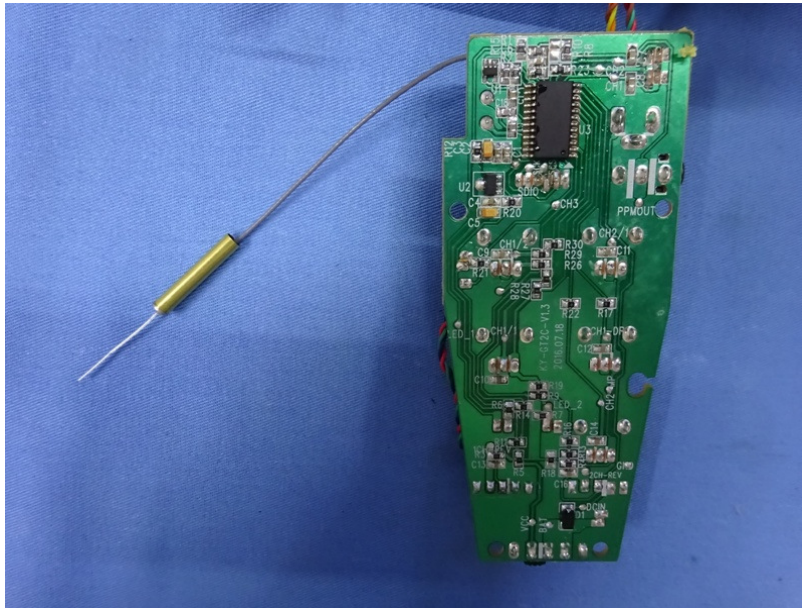


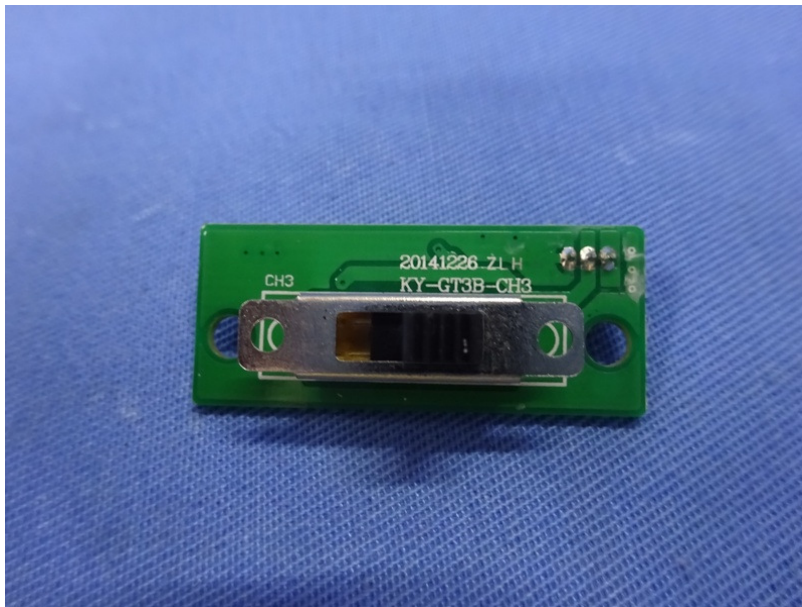
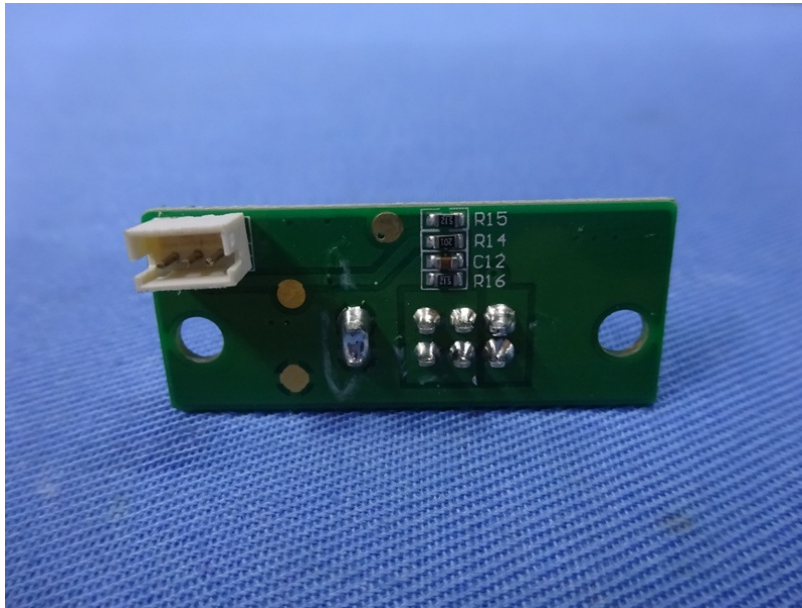












---End---