

FCC TEST REPORT

For

ShenZhen YuYuanXin Electronic Technology Co., LTD.

2.4 G wireless keyboard

Model No.: TP4-022, SG20005

Prepared For : ShenZhen YuYuanXin Electronic Technology Co., LTD.
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TEST REPORT

Applicant : ShenZhen YuYuanXin Electronic Technology Co., LTD.
Manufacturer : ShenZhen YuYuanXin Electronic Technology Co., LTD.
Product Name : 2.4 G wireless keyboard
Model No. : TP4-022, SG20005
Trade Mark : N/A
Rating(s) : Input: DC 5V, 130mA (With DC 3.7V, 200mAh Battery inside)

Test Standard(s) : FCC Part15 Subpart C, Paragraph 15.249

Test Method(s) : ANSI C63.10: 2013

The device described above is tested by Shenzhen Anbotek 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 Anbotek 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 Anbotek Compliance Laboratory Limited.

Date of Test : Jan. 17~26, 2018

Prepared by :



Winkey Wang

(Tested Engineer / Winkey Wang)

Reviewer :

Tangcy. T.

(Project Manager / Tangcy. T)

Approved & Authorized Signer :

Tom Chen

(Manager / Tom Chen)

1. General Information

1.1. Client Information

Applicant	:	ShenZhen YuYuanXin Electronic Technology Co., LTD.
Address	:	Building 11, Tianluohu Industry Park, Guihua Industry Area, Guanguang Road, Guanlan Town, Longhua District, Shenzhen, Guangdong, China 518110.
Manufacturer	:	ShenZhen YuYuanXin Electronic Technology Co., LTD.
Address	:	Building 11, Tianluohu Industry Park, Guihua Industry Area, Guanguang Road, Guanlan Town, Longhua District, Shenzhen, Guangdong, China 518110.

1.2. Description of Device (EUT)

Product Name	:	2.4 G wireless keyboard	
Model No.	:	TP4-022, SG20005 (Note: The samples are the same except the model number and color, So we prepare “TP4-022” for test only.)	
Trade Mark	:	N/A	
Test Power Supply	:	DC 3.7V By Battery	
Product Description	:	Operation Frequency:	2405-2474MHz
		Number of Channel:	70 Channels
		Modulation Type:	GFSK
		Antenna Type:	PCB Antenna
		Antenna Gain(Peak):	2 dBi
Remark: 1)For a more detailed features description, please refer to the manufacturer’s specifications or the User’s Manual.			

1.3. Auxiliary Equipment Used During Test

N/A	:	
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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	Keeping Charging+TX mode
Mode 2	CH01
Mode 3	CH36
Mode 4	CH70

For Conducted Emission	
Final Test Mode	Description
Mode 1	Keeping Charging+TX mode

For Radiated Emission	
Final Test Mode	Description
Mode 2	CH01
Mode 3	CH36
Mode 4	CH70

Note:

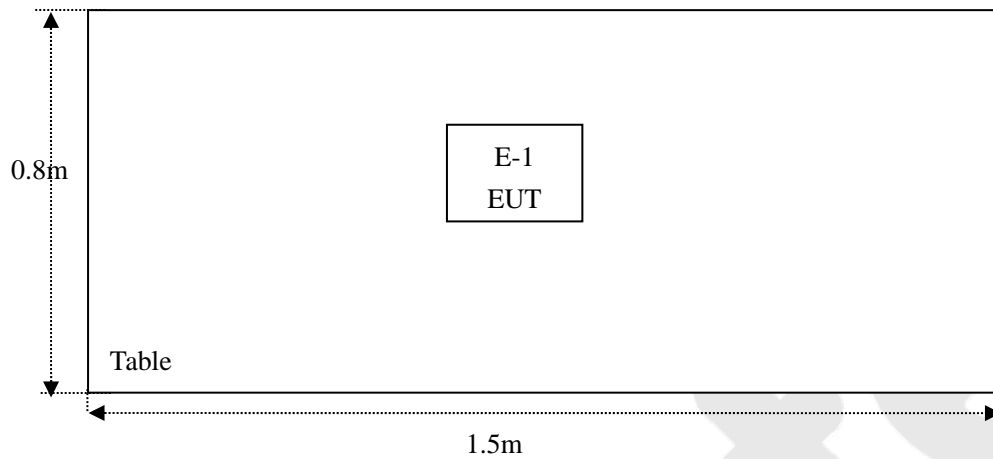
1. The engineering test program was provided and the EUT was programmed to be in continuously transmitting mode.
2. EUT built-in battery-powered, fully-charged battery use of the test battery.

1.5. List of Channels

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
1	2405	19	2423	37	2441	55	2459
2	2406	20	2424	38	2442	56	2460
3	2407	21	2425	39	2443	57	2461
4	2408	22	2426	40	2444	58	2462
5	2409	23	2427	41	2445	59	2463
6	2410	24	2428	42	2446	60	2464
7	2411	25	2429	43	2447	61	2465
8	2412	26	2430	44	2448	62	2466
9	2413	27	2431	45	2449	63	2467
10	2414	28	2432	46	2450	64	2468
11	2415	29	2433	47	2451	65	2469
12	2416	30	2434	48	2452	66	2470
13	2417	31	2435	49	2453	67	2471
14	2418	32	2436	50	2454	68	2472
15	2419	33	2437	51	2455	69	2473
16	2420	34	2438	52	2456	70	2474
17	2421	35	2439	53	2457	/	/
18	2422	36	2440	54	2458	/	/

1.6. Description of Test Setup

RE



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	Nov. 17, 2017	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Nov. 17, 2017	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Nov. 17, 2017	1 Year
4.	Spectrum Analysis	Agilent	E4407B	US39390582	Nov. 17, 2017	1 Year
5.	Spectrum Analysis	Agilent	N9038A	MY53227295	Nov. 17, 2017	1 Year
6.	Preamplifier	SKET Electronic	BK1G18G30 D	KD17503	Nov. 17, 2017	1 Year
7.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Nov. 17, 2017	1 Year
8.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Nov. 20, 2017	1 Year
9.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Nov. 20, 2017	1 Year
10.	Loop Antenna	Schwarzbeck	HFH2-Z2	100047	Apr. 03, 2017	1 Year
11.	Horn Antenna	Schwarzbeck	BBHA9170	9170-375	Apr. 03, 2017	1 Year
12.	Pre-amplifier	SONOMA	310N	186860	Nov. 17, 2017	1 Year
13.	Pre-amplifier	SKET Electronic	BK1G40G50 A	KD25352	Nov. 17, 2017	1 Year
14.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
15.	Power Sensor	DAER	RPR3006W	15I00041SN045	Nov. 17, 2017	1 Year
16.	Power Sensor	DAER	RPR3006W	15I00041SN046	Nov. 17, 2017	1 Year
17.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Nov. 17, 2017	1 Year
18.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Nov. 17, 2017	1 Year
19.	Signal Generator	Agilent	E4421B	MY41000743	Nov. 17, 2017	1 Year
20.	DC Power supply	IVYTECH	IV6003	1601D6030007	Nov.16, 2017	1 Year
21.	TEMP&HUMI PROGRAMMABLE CHAMBER	Sertep	ZJ-HWHS80 B	ZJ-17042804	Mar. 03, 2017	1 Year

Note: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

1.8. Measurement Uncertainty

Radiation Uncertainty	:	Ur = 4.1 dB (Horizontal)
		Ur = 4.3 dB (Vertical)
Conduction Uncertainty	:	Uc = 3.4dB

1.9. Description of Test Facility

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

FCC-Registration No.: 184111

Shenzhen Anbotek 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, July 31, 2017.

ISED-Registration No.: 8058A-1

Shenzhen Anbotek 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-1, June 13, 2016.

Test Location

All Emissions tests were performed at
Shenzhen Anbotek Compliance Laboratory Limited.
at 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
15.249	Radiated Emission	PASS
15.215(c)	20dB Bandwidth	PASS
15.249(c)	Band Edge	PASS
Remark: “N/A” is an abbreviation for Not Applicable.		

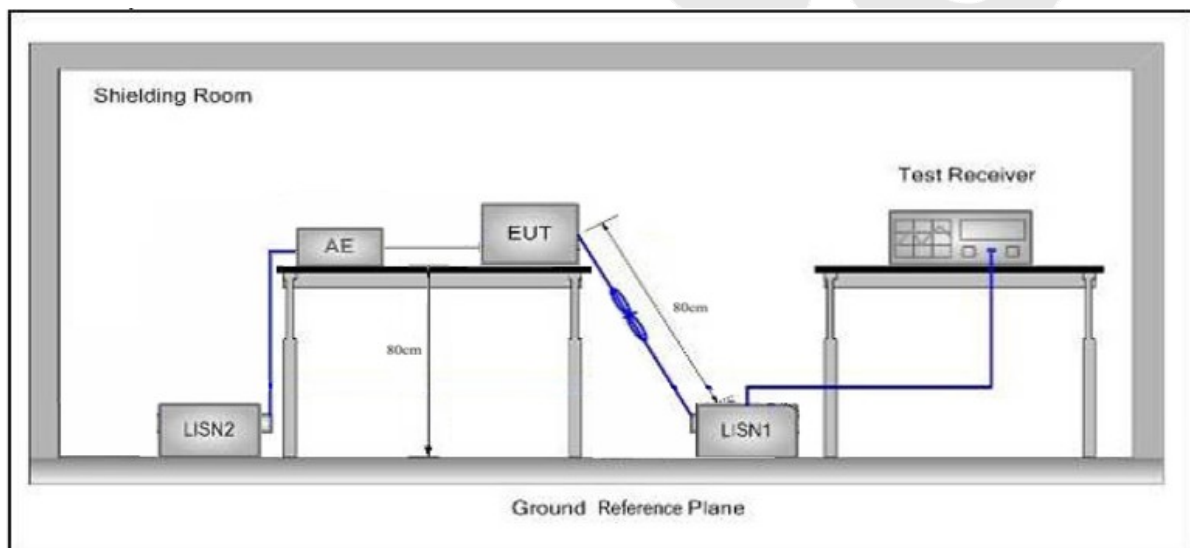
3. Conducted Emission Test

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 C63.10-2013 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

There is DC 3.7V Battery inside, So there is no need to test

4. Radiated Emission and Band Edge

4.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.209 and 15.205				
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.

Test Standard	FCC Part15 C Section 15.249					
Test Limit	Frequency (MHz)	Field Strength of fundamental ((millivolts /meter)	Field Strength of Harmonics (microvolts/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	2400~2483.5	50	-	114.0	Peak	3
	2400~2483.5	50	-	94.0	Average	3
	2400~2483.5	-	500	74.0	Peak	3
	2400~2483.5	-	500	54.0	Average	3

Remark:

(1) 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.

4.2. Test Setup

Figure 1. Below 30MHz

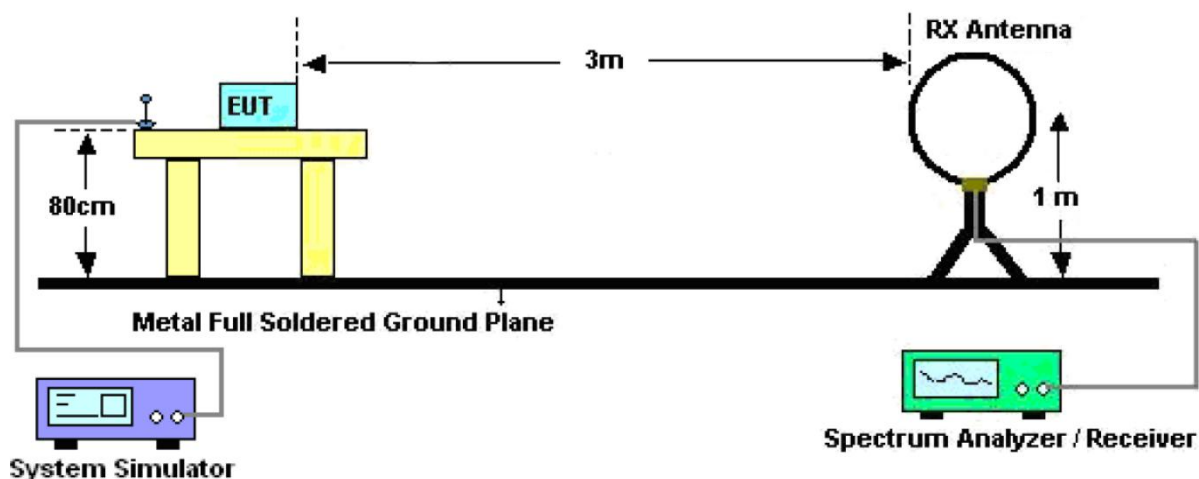


Figure 2. 30MHz to 1GHz

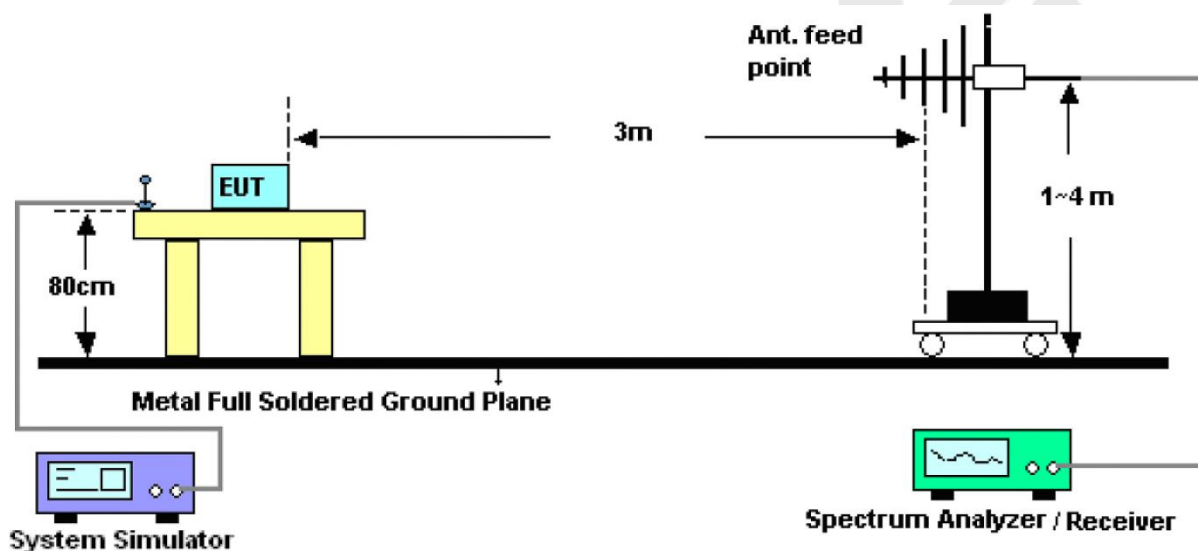
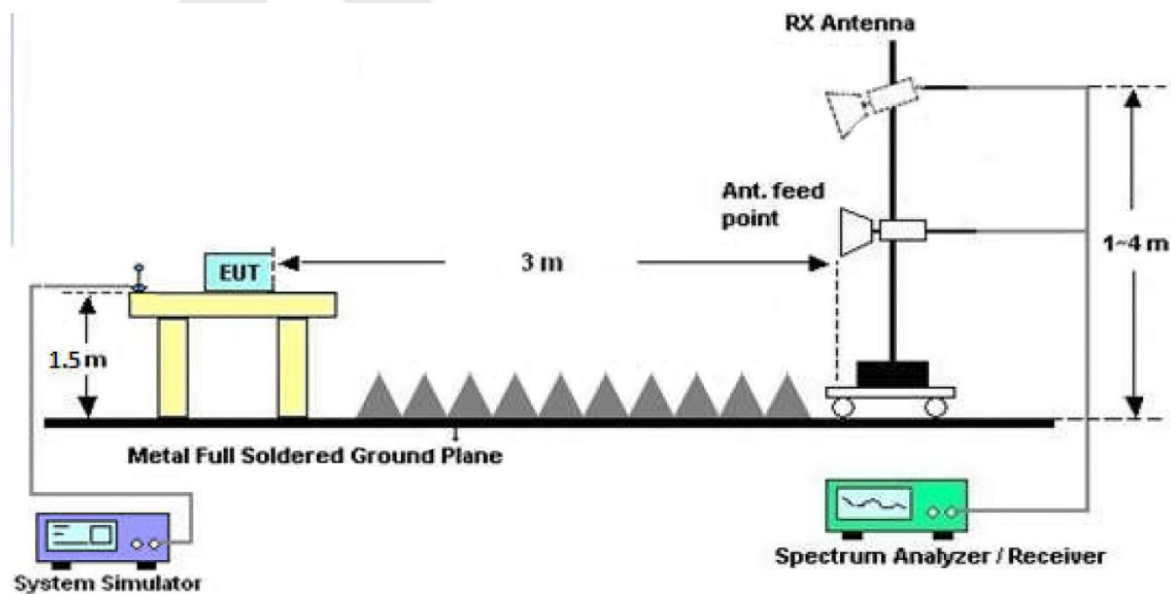


Figure 3. Above 1 GHz



4.3. Test Procedure

For below 1GHz: The EUT is placed on a turntable, which is 0.8m above the ground plane.

For above 1GHz: The EUT is placed on a turntable, which is 1.5m 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 the radiated emission test above 1GHz:

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.

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

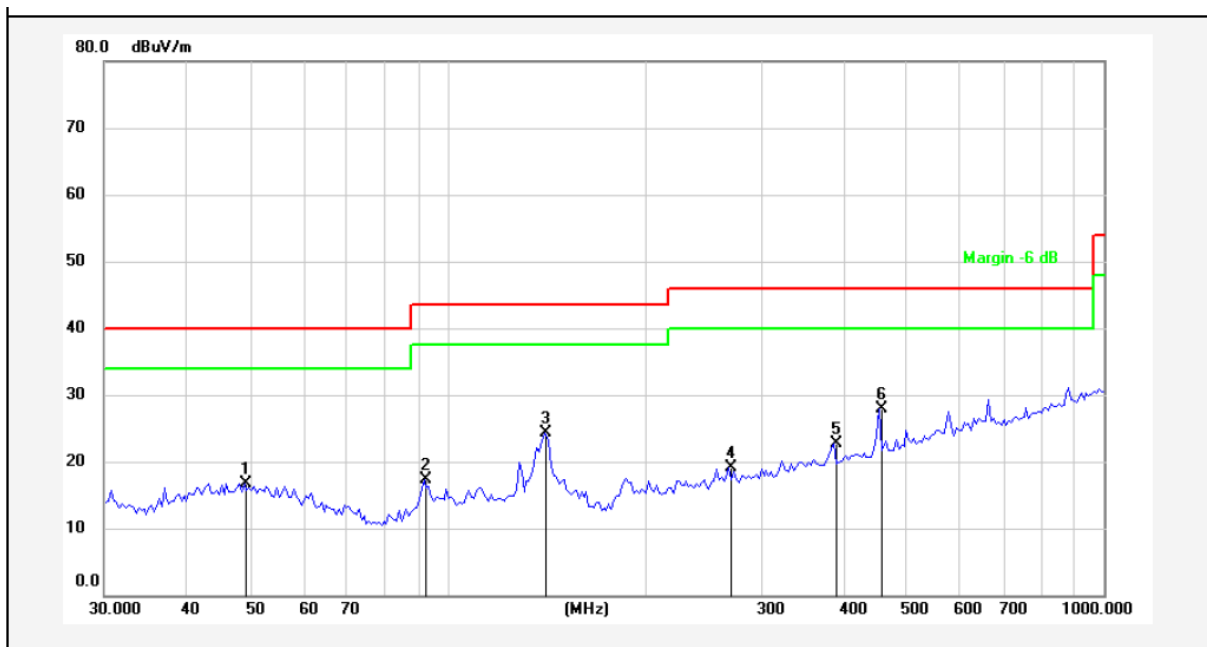
PASS

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.

The test results of 9kHz-30MHz was attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Test Results (30~1000MHz)

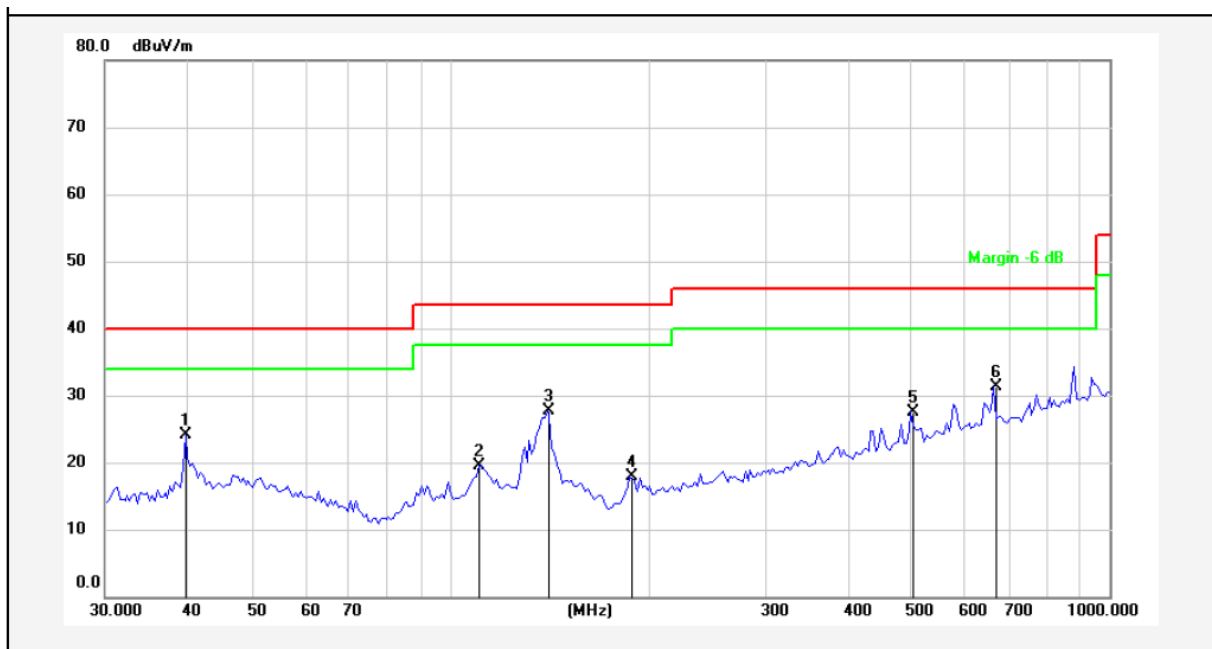
Job No.: SZAWW180117001 Temp.(°C)/Hum.(%RH): 23.2°C/53.4%RH
Standard: FCC PART 15C Power Source: DC 3.7V
Test Mode: Keeping Charging+TX mode Polarization: Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (°)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	49.0145	31.69	-14.92	16.77	40.00	-23.23	QP	300	24	
2	92.1388	35.32	-17.93	17.39	43.50	-26.11	QP	300	174	
3	140.3421	44.48	-20.20	24.28	43.50	-19.22	QP	300	231	
4	268.4853	33.40	-14.22	19.18	46.00	-26.82	QP	300	275	
5	387.9920	34.43	-11.64	22.79	46.00	-23.21	QP	300	311	
6	454.3100	38.37	-10.49	27.88	46.00	-18.12	QP	300	360	

Test Results (30~1000MHz)

Job No.: SZAWW180117001 Temp.(°C)/Hum.(%RH): 23.2°C/53.4%RH
Standard: FCC PART 15C Power Source: DC 3.7V
Test Mode: Keeping Charging+TX mode Polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (°)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	39.7146	40.02	-15.88	24.14	40.00	-15.86	QP	300	15	
2	110.7627	37.15	-17.56	19.59	43.50	-23.91	QP	300	77	
3	140.3421	47.86	-20.20	27.66	43.50	-15.84	QP	300	162	
4	187.4241	35.29	-17.38	17.91	43.50	-25.59	QP	300	214	
5	500.3011	37.15	-9.62	27.53	46.00	-18.47	QP	300	276	
6	668.1423	38.03	-6.73	31.30	46.00	-14.70	QP	300	360	

Test Results (1GHz-25GHz)

Test Mode: CH01 (Low channel)									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.	Detector
2405.0000	92.44	31.21	2.17	35.30	90.52	114.00	-23.48	V	Peak
2405.0000	85.26	31.21	2.17	35.30	83.34	94.00	-10.66	V	AVG
4810.0000	47.41	34.01	2.56	34.71	49.27	74.00	-24.73	V	Peak
4810.0000	41.76	34.01	2.56	34.71	43.62	54.00	-10.38	V	AVG
7215.0000	40.35	36.16	2.98	35.15	44.34	74.00	-29.66	V	Peak
7215.0000	34.65	36.16	2.98	35.15	38.64	54.00	-15.36	V	AVG
9620.0000	*								
12025.0000	*								
14430.0000	*								
16835.0000	*								
2405.0000	91.06	31.21	2.17	35.30	89.14	114.00	-24.86	H	Peak
2405.0000	80.13	31.21	2.17	35.30	78.21	94.00	-15.79	H	AVG
4810.0000	46.45	34.01	2.56	34.71	48.31	74.00	-25.69	H	Peak
4810.0000	39.88	34.01	2.56	34.71	41.74	54.00	-12.26	H	AVG
7215.0000	41.41	36.16	2.98	35.15	45.40	74.00	-28.60	H	Peak
7215.0000	32.71	36.16	2.98	35.15	36.70	54.00	-17.30	H	AVG
9620.0000	*								
12025.0000	*								
14430.0000	*								
16835.0000	*								

Note:

1. Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Test Mode: CH36 (Middle channel)									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.	Detector
2440.0000	91.56	31.12	2.20	34.51	90.37	114.00	-23.63	V	Peak
2440.0000	76.33	31.22	2.20	34.51	75.24	94.00	-18.76	V	AVG
4880.0000	51.47	34.98	2.49	34.14	54.80	74.00	-19.20	V	Peak
4880.0000	41.69	34.98	2.49	34.14	45.02	54.00	-8.98	V	AVG
7320.0000	40.67	36.01	3.01	34.56	45.13	74.00	-28.87	V	Peak
7320.0000	36.12	36.01	3.01	34.56	40.58	54.00	-13.42	V	AVG
9760.0000	*								
12200.0000	*								
14640.0000	*								
17080.0000	*								
2440.0000	91.07	31.12	2.20	34.51	89.88	114.00	-24.12	H	Peak
2440.0000	76.85	31.12	2.20	34.51	75.66	94.00	-18.34	H	AVG
4880.0000	42.15	34.98	2.49	34.14	45.48	74.00	-28.52	H	Peak
4880.0000	41.35	34.98	2.49	34.14	44.68	54.00	-9.32	H	AVG
7320.0000	42.17	36.01	3.01	34.56	46.63	74.00	-27.37	H	Peak
7320.0000	34.48	36.01	3.01	34.56	38.94	54.00	-15.06	H	AVG
9760.0000	*								
12200.0000	*								
14640.0000	*								
17080.0000	*								

Note:

1. Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Test Mode: CH70 (High channel)									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.	Detector
2474.0000	92.17	31.64	2.18	35.89	90.10	114.00	-23.90	V	Peak
2474.0000	86.55	31.64	2.18	35.89	84.48	94.00	-9.52	V	AVG
4948.0000	53.17	35.10	2.52	34.87	55.92	74.00	-18.08	V	Peak
4948.0000	40.42	35.10	2.52	34.87	43.17	54.00	-10.83	V	AVG
7422.0000	35.17	36.18	3.18	34.96	39.57	74.00	-34.43	V	Peak
7422.0000	33.49	36.18	3.18	34.96	37.89	54.00	-16.11	V	AVG
9896.0000	*								
12370.0000	*								
14844.0000	*								
17318.0000	*								
2474.0000	93.00	31.64	2.18	35.89	90.93	114.00	-23.07	H	Peak
2474.0000	75.96	31.64	2.18	35.89	73.89	94.00	-20.11	H	AVG
4948.0000	48.14	35.10	2.52	34.87	50.89	74.00	-23.11	H	Peak
4948.0000	41.39	35.10	2.52	34.87	44.14	54.00	-9.86	H	AVG
7422.0000	45.55	36.18	3.18	34.96	49.95	74.00	-24.05	H	Peak
7422.0000	36.28	36.18	3.18	34.96	40.68	54.00	-13.32	H	AVG
9896.0000	*								
12370.0000	*								
14844.0000	*								
17318.0000	*								

Note:

1. Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Radiated Band Edge:

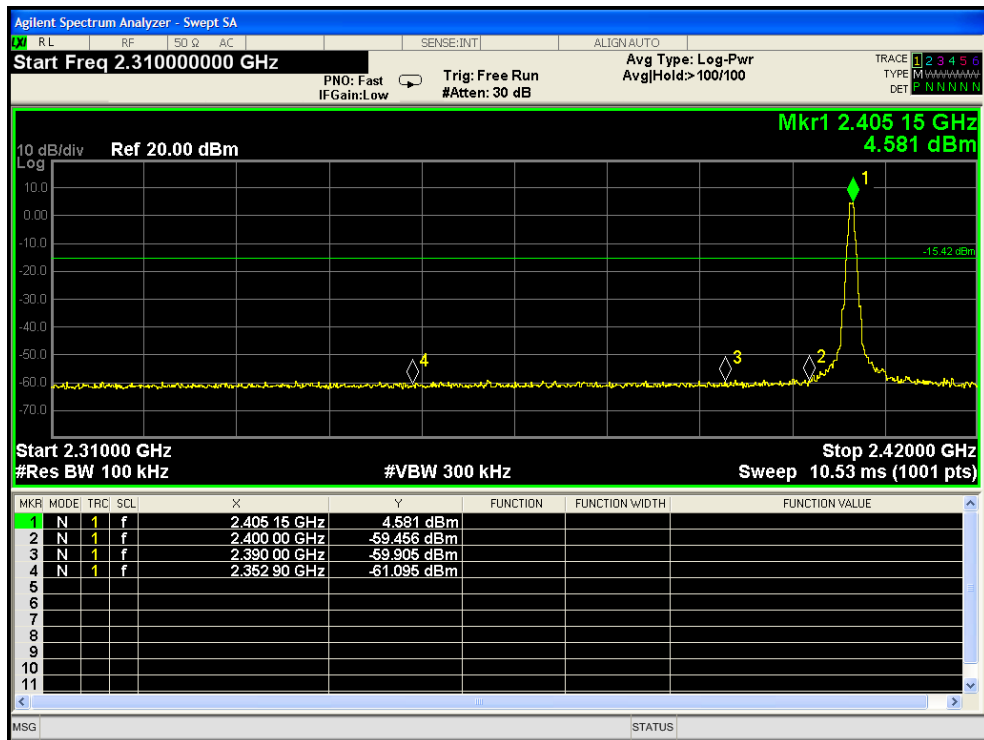
Test Mode:					Test channel: Lowest			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2390.00	53.22	29.15	3.41	34.01	51.77	74.00	-22.23	V
2400.00	60.47	29.16	3.43	34.01	59.05	74.00	-14.95	V
2390.00	52.33	29.15	3.41	34.01	50.88	74.00	-23.12	H
2400.00	62.47	29.16	3.43	34.01	61.05	74.00	-12.95	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2390.00	38.77	29.15	3.41	34.01	37.32	54.00	-16.68	V
2400.00	46.35	29.16	3.43	34.01	44.93	54.00	-9.07	V
2390.00	40.53	29.15	3.41	34.01	39.08	54.00	-14.92	H
2400.00	42.66	29.16	3.43	34.01	41.24	54.00	-12.76	H

Test Mode:					Test channel: Highest			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2483.50	50.86	29.28	3.53	34.03	49.64	74.00	-24.36	V
2500.00	47.55	29.30	3.56	34.03	46.38	74.00	-27.62	V
2483.50	53.38	29.28	3.53	34.03	52.16	74.00	-21.84	H
2500.00	52.66	29.30	3.56	34.03	51.49	74.00	-22.51	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2483.50	40.26	29.28	3.53	34.03	39.04	54.00	-14.96	V
2500.00	37.11	29.30	3.56	34.03	35.94	54.00	-18.06	V
2483.50	42.06	29.28	3.53	34.03	40.84	54.00	-13.16	H
2500.00	37.50	29.30	3.56	34.03	36.33	54.00	-17.67	H

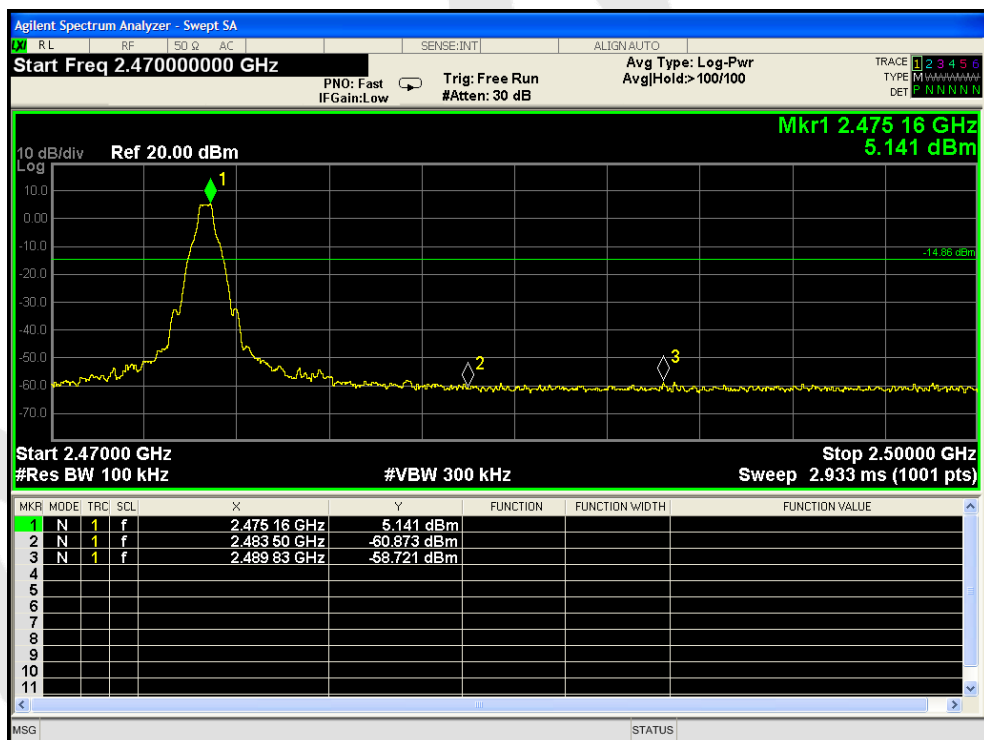
Remark:

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

Conducted band edge

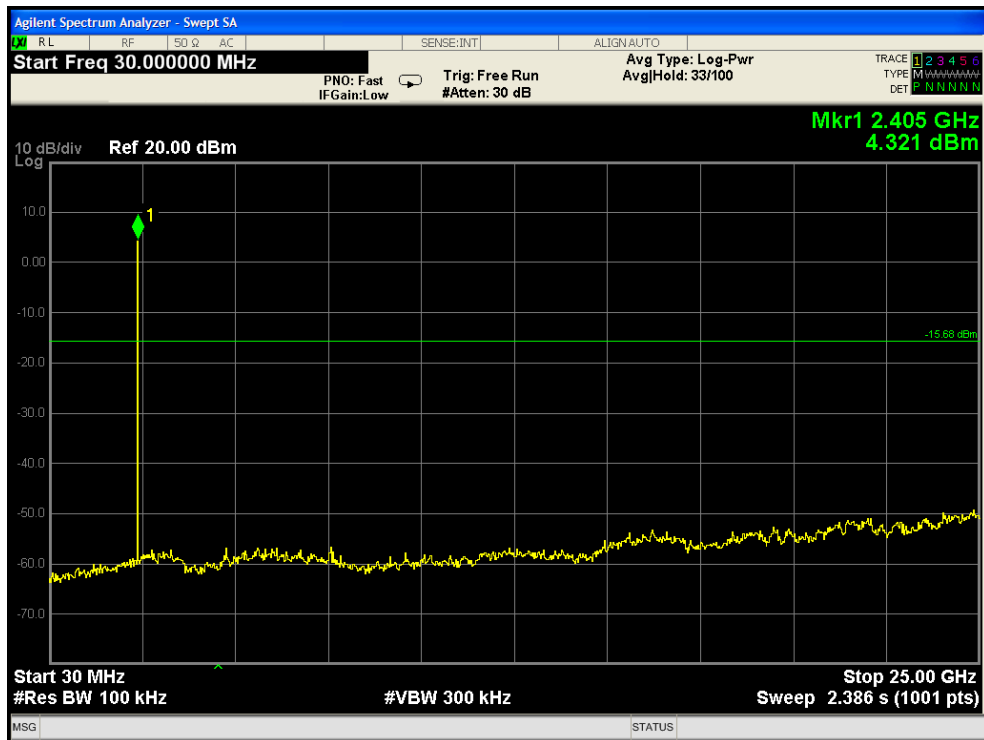


Lowest

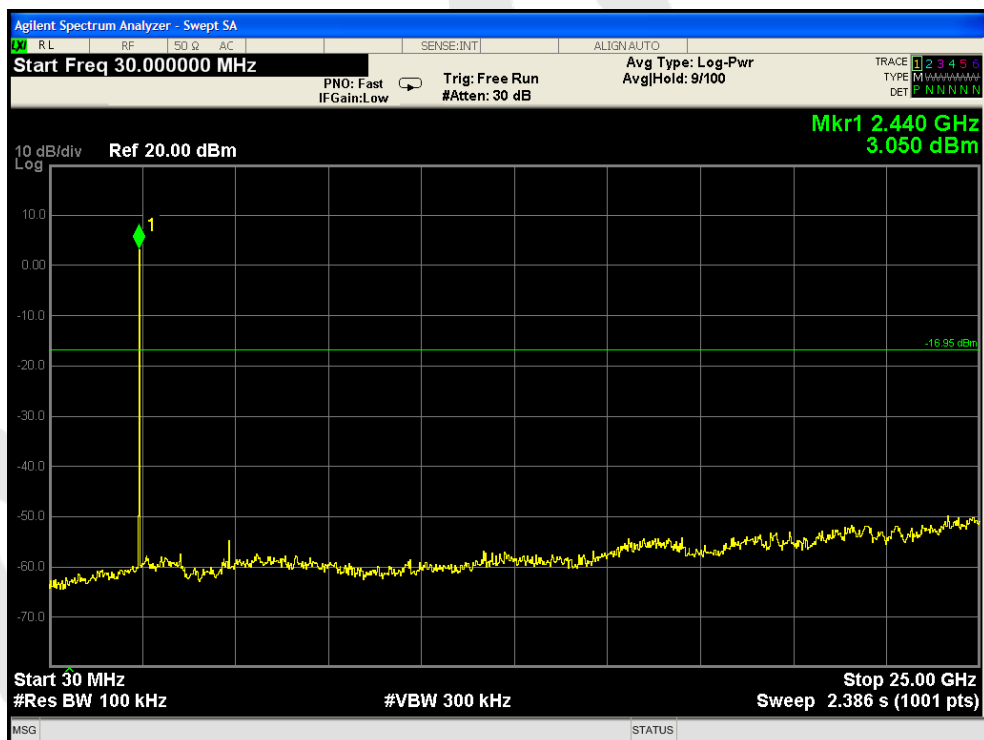


Highest

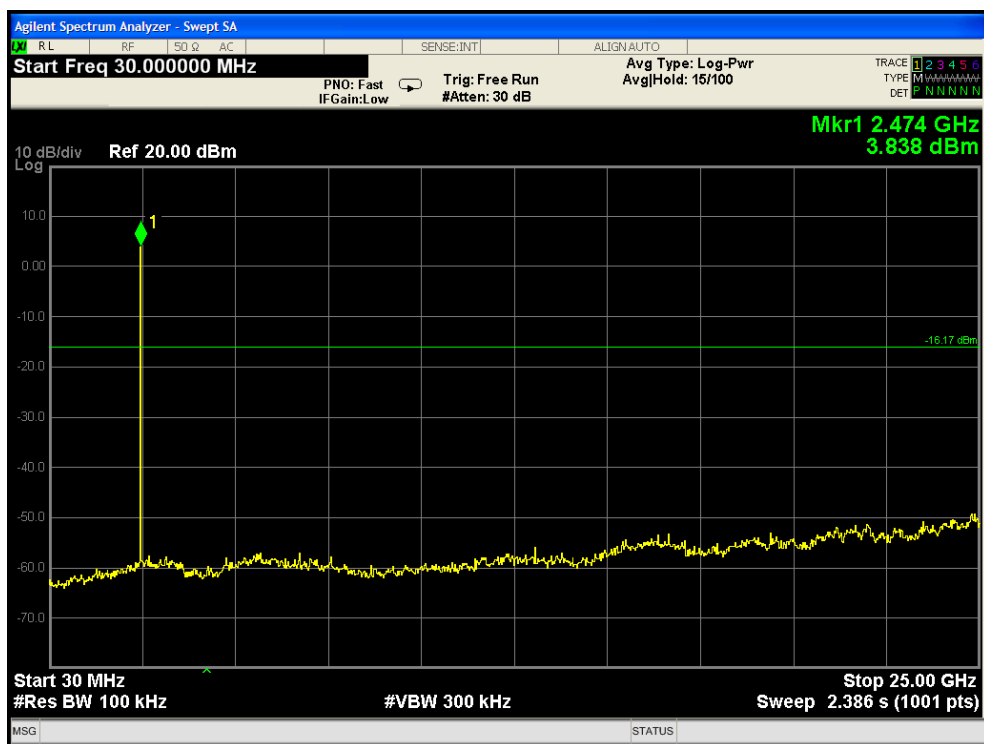
Conducted Emission Method



CH: Low



CH: Middle



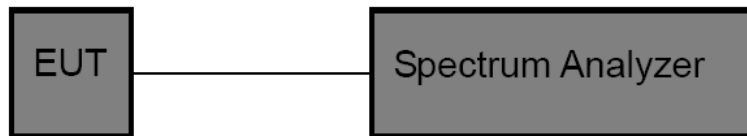
CH: High

5. 20dB Bandwidth Test

5.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.249
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5.2. Test Setup



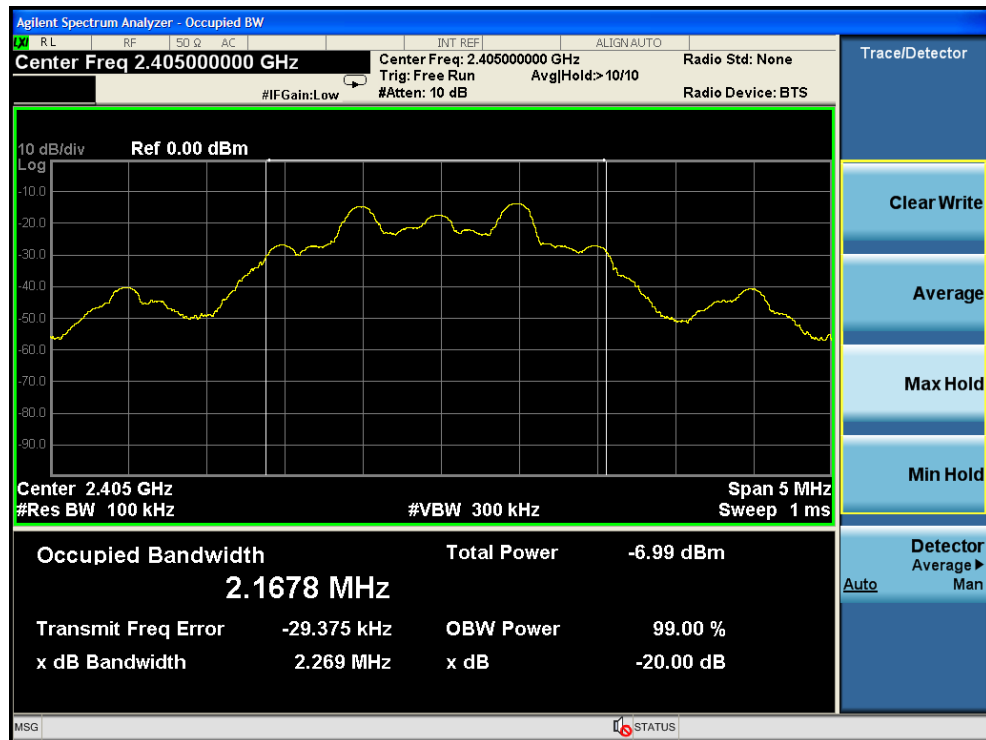
5.3. Test Procedure

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as:
 RBW = 30kHz, VBW \geq 3*RBW = 100kHz,
 Detector= Average
 Trace mode= Max hold.
 Sweep- auto couple.
4. Mark the peak frequency and -20dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

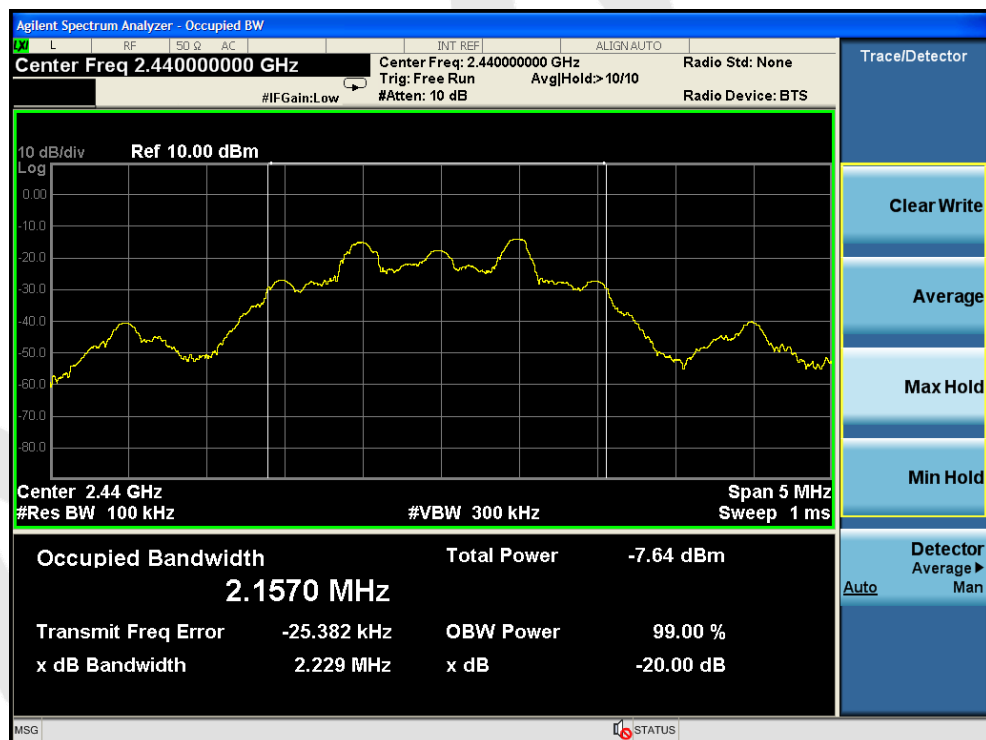
5.4. Test Data

Test Item	: 20dB Bandwidth	Test Mode	: Keeping Charging+TX mode
Test Voltage	: DC 3.7V	Temperature	: 24°C
Test Result	: PASS	Humidity	: 55%RH

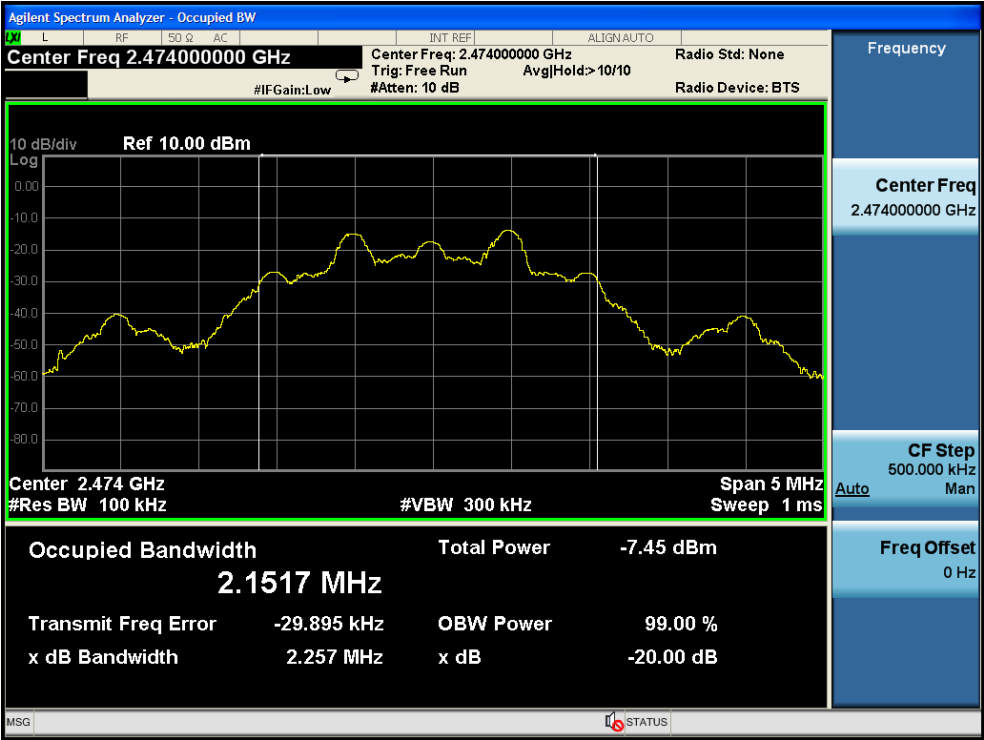
Frequency (MHz)	Bandwidth (kHz)	Result
2405MHZ	2269.0	PASS
2440MHZ	2229.0	PASS
2470MHZ	2257.0	PASS



Test Mode: Low



Test Mode: Middle



Test Mode: High

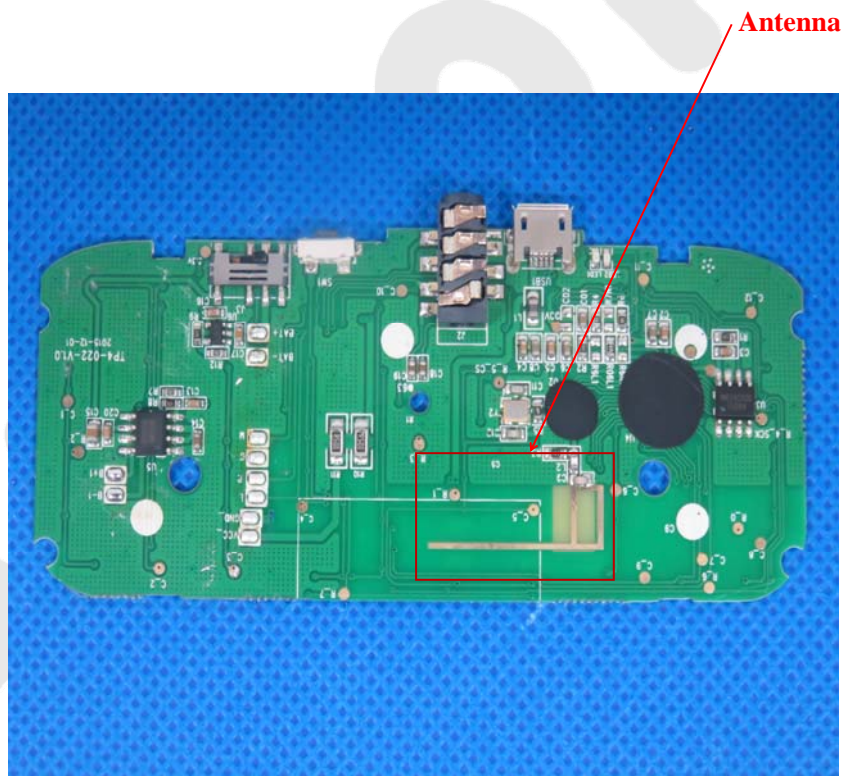
6. Antenna Requirement

6.1. Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203
Requirement	<p>1) 15.203 requirement:</p> <p>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.</p>

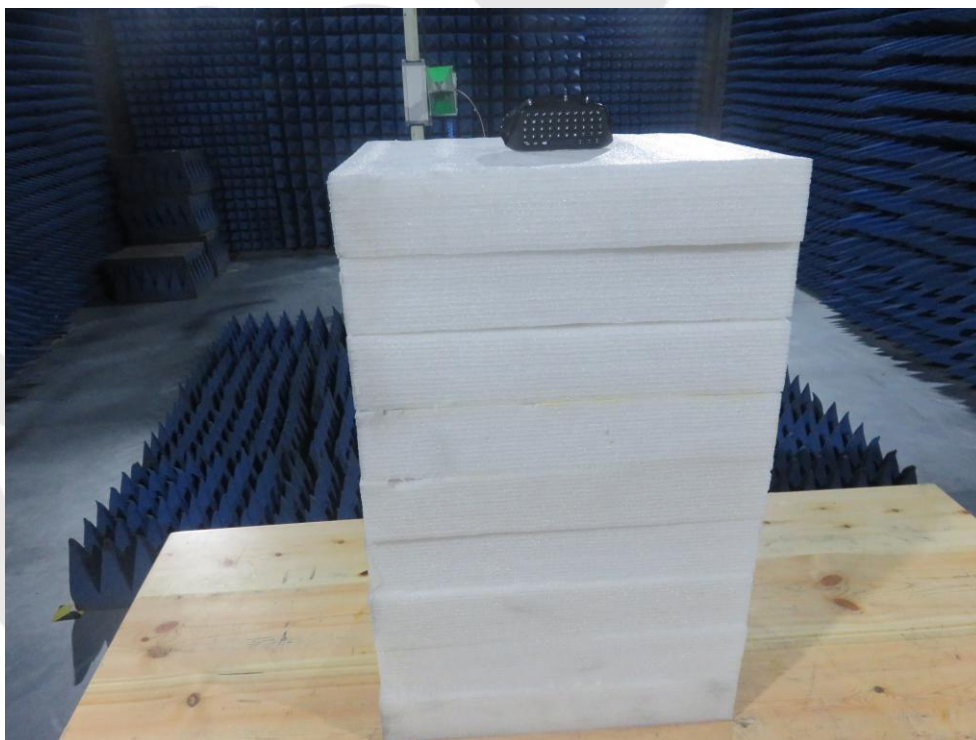
6.2. Antenna Connected Construction

The antenna is a PCB Antenna which permanently attached, and the best case gain of the antenna is 2 dBi. It complies with the standard requirement.



APPENDIX I -- TEST SETUP PHOTOGRAPH

Photo of Radiation Emission Test



APPENDIX II -- EXTERNAL PHOTOGRAPH

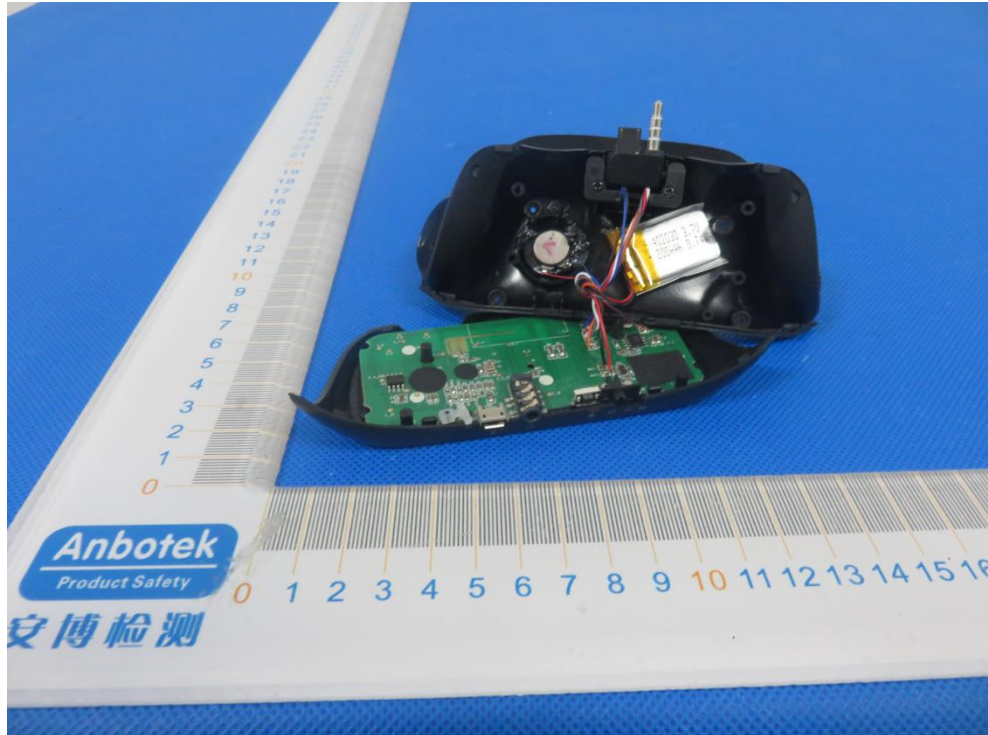


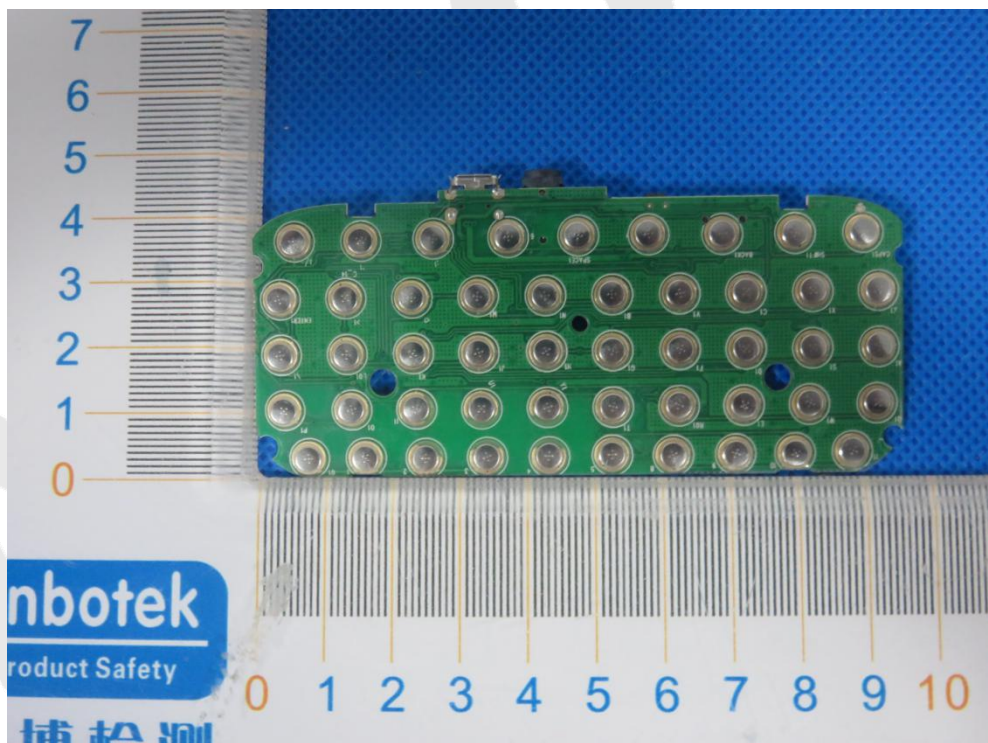


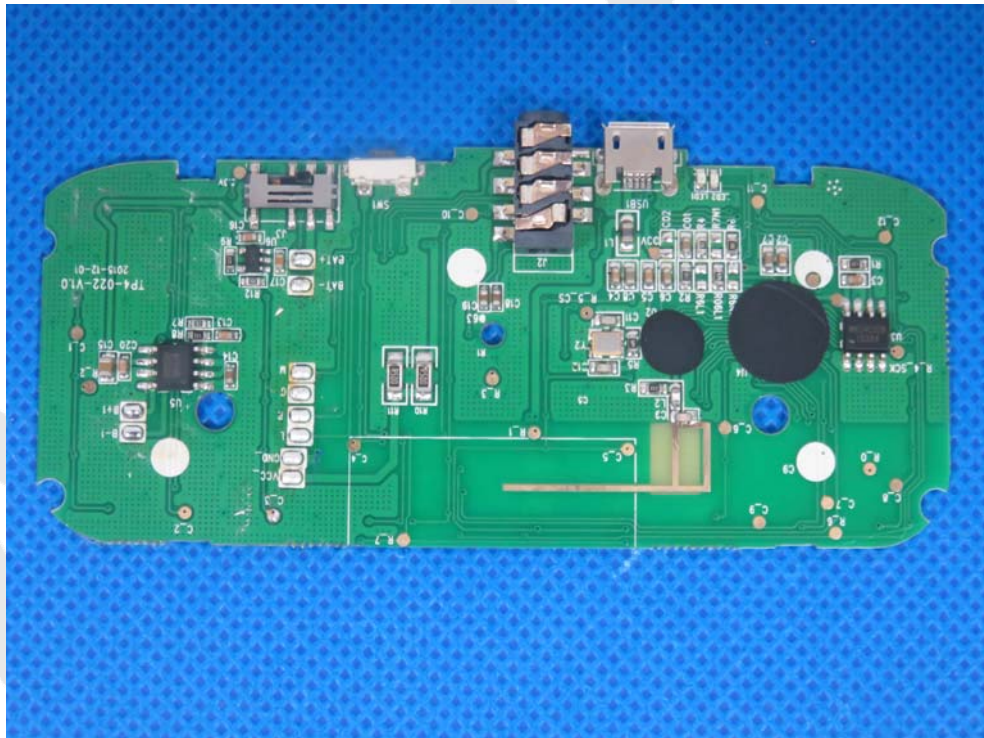




APPENDIX III -- INTERNAL PHOTOGRAPH







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