FCC TEST REPORT

Test report
On Behalf of
GuangZhou Chicken Run Network Technology Co,Ltd.
For
GameSir Gaming Keyboard
Model No.:GK300

FCC ID: 2AF9S-GK300

Prepared for :	**GuangZhou Chicken Run Network Technology Co,Ltd.** **301A-1,NO.68-1,Huacui Street,Jianye Road,Tianhe District,GuangZhou**
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:	**May. 15, 2019 ~ May. 24, 2019**
Date of Report:	**May. 24, 2019**
Report Number:	**HK1905241144-E**

TEST RESULT CERTIFICATION

Applicant's name	:	GuangZhou Chicken Run Network Technology Co,Ltd.
Address	:	301A-1,NO.68-1,Huacui Street,Jianye Road,Tianhe District, GuangZhou
Manufacture's Name	:	GuangZhou Chicken Run Network Technology Co,Ltd.
Address	:	301A-1,NO.68-1,Huacui Street,Jianye Road,Tianhe District, GuangZhou

Product description

Trade Mark:		N/A
Product name	:	GameSir Gaming Keyboard
Model and/or type reference	:	GK300
Standards	:	FCC Rules and Regulations Part 15 Subpart C Section 15.249 ANSI C63.10: 2013

Date of Test	:	
Date (s) of performance of tests	:	**May. 15, 2019 ~ May. 24, 2019**
Date of Issue	:	**May. 24, 2019**
Test Result	:	**Pass**

Testing Engineer : Gary Qian

(Gary Qian)

Technical Manager : Eden Hu

(Eden Hu)

Authorized Signatory : Jason Zhou

(Jason Zhou)

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1.1TEST PROCEDURES AND RESULTS

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OCCUPIED BANDWIDTH MEASUREMENT	COMPLIANT
ANTENNA REQUIREMENT	COMPLIANT

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

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

2.1GENERAL DESCRIPTION OF EUT

Equipment	GameSir Gaming Keyboard
Model Name	GK300
Serial No.	N/A
Trade Mark	N/A
Model Difference	N/A
Antenna Type	PCB Antenna
Antenna Gain	0dBi
Operation frequency	2402-2480MHz
Number of Channels	BT BLE:40CH 2.4G: 79CH
Modulation Type	BT: GFSK 2.4G: GFSK
Power Source	DC 5V by Adapter AC 100V/60Hz 2*18650,1800mA 3.7V Battery
Power Rating	DC 5V by Adapter AC 100V/60Hz 2*18650,1800mA 3.7V Battery

2.2 Carrier Frequency of Channels

2.4G Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

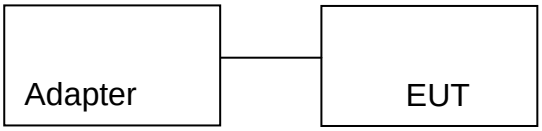
BT4.2 BLE Channel List							
Channel	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
01	2402	11	2422	21	2442	31	2462
02	2404	12	2424	22	2444	32	2464
03	2406	13	2426	23	2446	33	2466
04	2408	14	2428	24	2448	34	2468
05	2410	15	2430	25	2450	35	2470
06	2412	16	2432	26	2452	36	2472
07	2414	17	2434	27	2454	37	2474
08	2416	18	2436	28	2456	38	2476
09	2418	19	2438	29	2458	39	2478
10	2420	20	2440	30	2460	40	2480

2.3 Operation of EUT during testing

Operating Mode
The mode is used: **Transmitting mode**
Low Channel: 2402MHz
Middle Channel: 2440MHz
High Channel: 2480MHz

2.4DESCRIPTION OF TEST SETUP

Operation of EUT during Conducted testing:



Operation of EUT during Radiation and Above1GHz Radiation testing:

2.5MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	R&S	ENV216	HKE-002	Dec. 28, 2018	1 Year
2.	Receiver	R&S	ESCI 7	HKE-010	Dec. 28, 2018	1 Year
3.	RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 28, 2018	1 Year
4.	Spectrum analyzer	R&S	FSP40	HKE-025	Dec. 28, 2018	1 Year
5.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 28, 2018	1 Year
6.	Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Dec. 28, 2018	1 Year
7.	EMI Test Receiver	Rohde & Schwarz	ESCI 7	HKE-010	Dec. 28, 2018	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	Dec. 28, 2018	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Dec. 28, 2018	1 Year
10.	Horn Antenna	Schewarzbeck	9120D	HKE-013	Dec. 28, 2018	1 Year
11.	Pre-amplifier	EMCI	EMC051845 SE	HKE-015	Dec. 28, 2018	1 Year
12.	Pre-amplifier	Agilent	83051A	HKE-016	Dec. 28, 2018	1 Year
13.	EMI Test Software EZ-EMC	Tonscend	JS1120-B Version	HKE-083	Dec. 28, 2018	N/A
14.	Power Sensor	Agilent	E9300A	HKE-086	Dec. 28, 2018	1 Year
15.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 28, 2018	1 Year
16.	Signal generator	Agilent	N5182A	HKE-029	Dec. 28, 2018	1 Year
17.	Signal Generator	Agilent	83630A	HKE-028	Dec. 28, 2018	1 Year
18.	Shielded room	Shiel Hong	4*3*3	HKE-039	Dec. 28, 2018	3 Year

3. CONDUCTED EMISSIONS TEST

3.1 Conducted Power Line Emission Limit

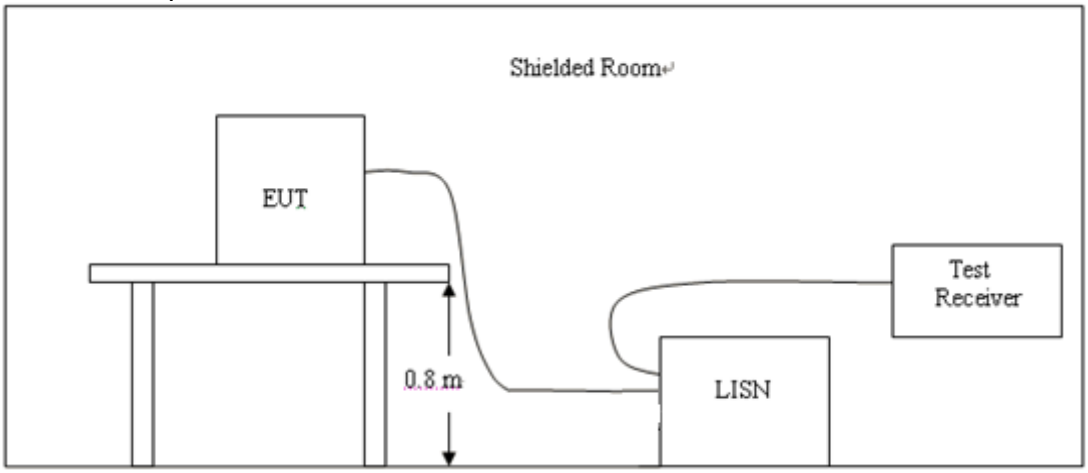
For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following

Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

3.2 Test Setup



3.3 Test Procedure

1, The equipment was set up as per the test configuration to simulate typical actual usage per the user'smanual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed onthe ground plane as per ANSI C63.10.
2, Support equipment, if needed, was placed as per ANSI C63.10.
3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4,If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hzpower through a Line Impedance Stabilization Network (LISN) which supplied power source and wasgrounded 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 EUTusing a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has twomonitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1connected 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.

3.4 Test Result

*****N/A*****

NOTE：RF function is not available when charging.

4 RADIATED EMISSION TEST

4.1 Radiation Limit

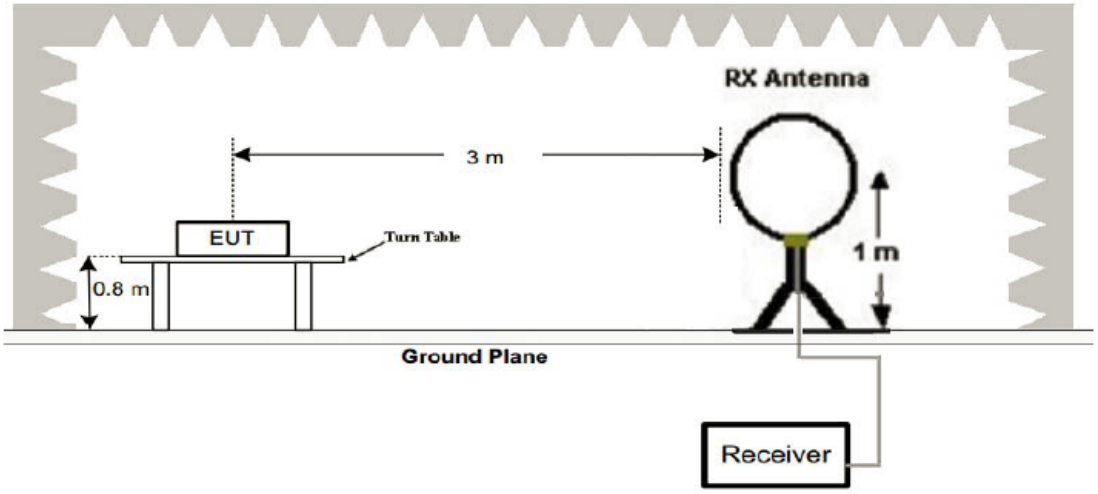
For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength ofradiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the followingvalues：

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
30-88	3	40	100
88-216	3	43.5	150
216-960	3	46	200
Above 960	3	54	500

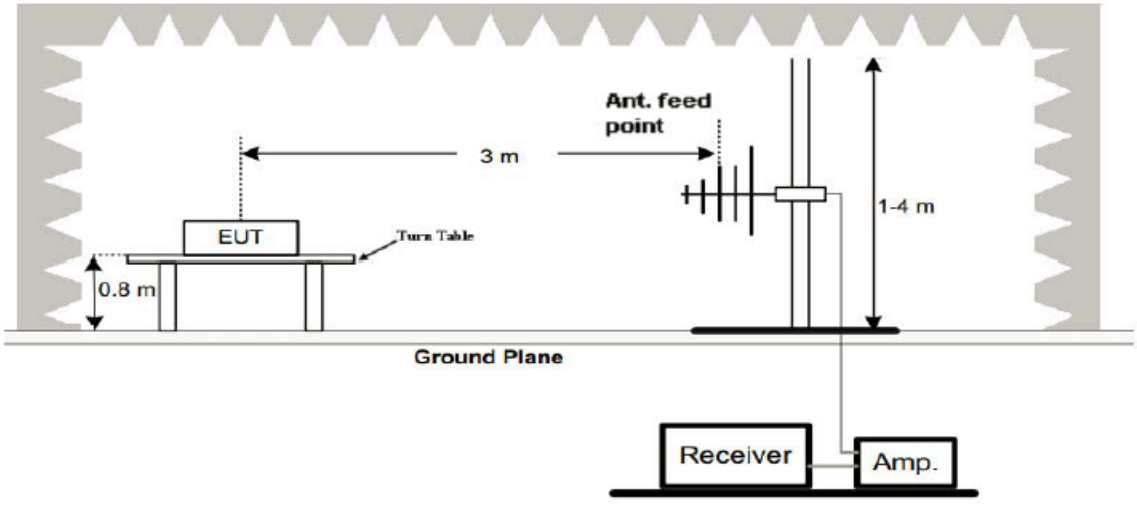
For intentional device, according to § 15.209(a), the general requirement of field strength of radiatedemissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

4.2 Test Setup

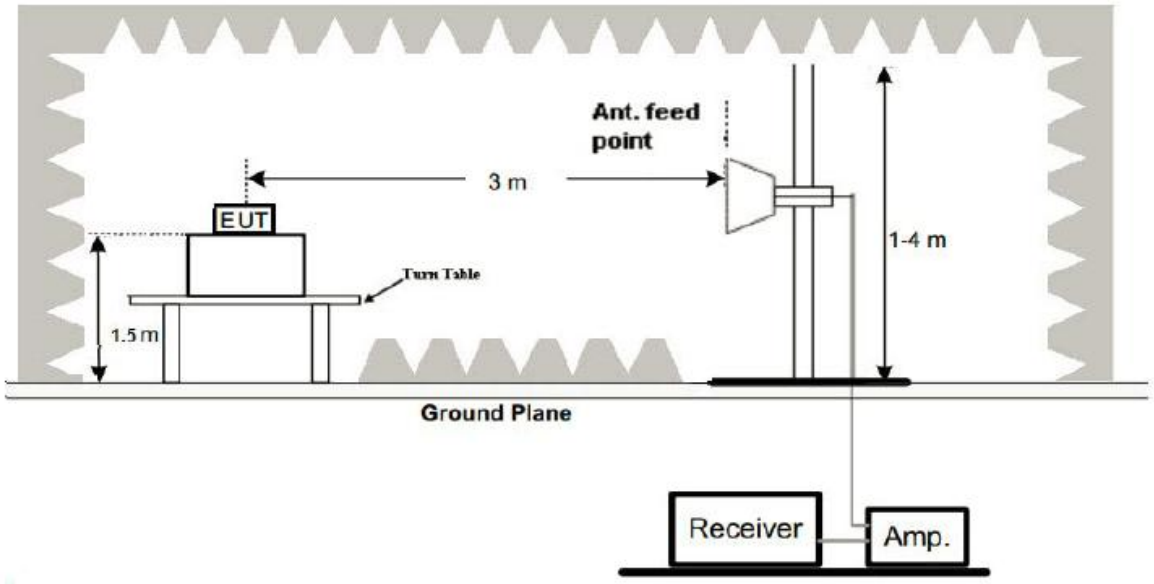
（1）Radiated Emission Test-Up Frequency Below 30MHz



（2）Radiated Emission Test-Up Frequency 30MHz~1GHz



（3）Radiated Emission Test-Up Frequency Above 1GHz



4.3 Test Procedure

1. Below 1GHz measurement the EUT is placed on turntable which is 0.8m above ground plane. And above 1GHz measurement EUT was placed on low permittivity and low tangent turn table which is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highestemissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna bothhorizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The test frequency range from 9KHz to25GHz per FCC PART 15.33(a).

Note:
For battery operated equipment, the equipment tests shall be performed using a new battery.

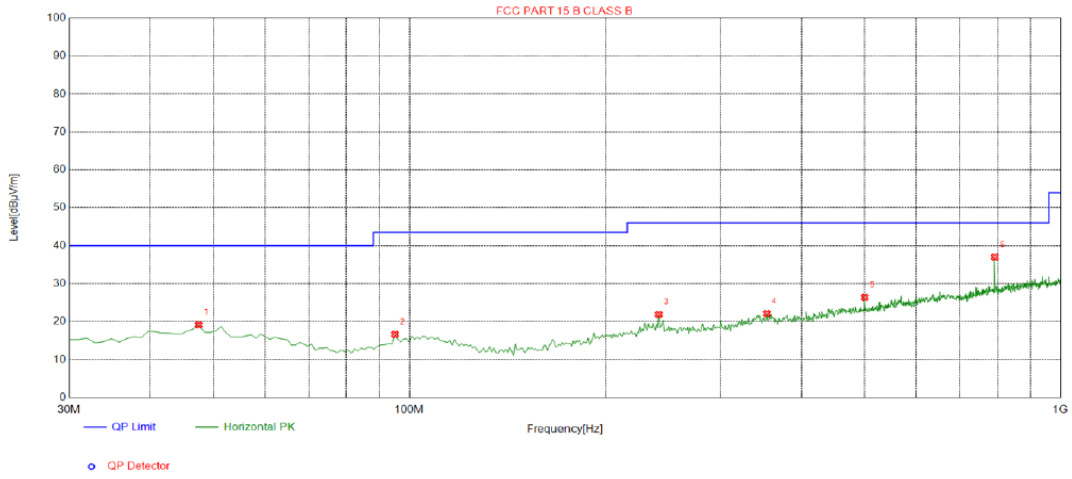
4.4 Test Result

PASS
All the test modes completed for test. The worst case of Radiated Emission is CH 2402; the test data of this mode was reported.

Below 1GHz Test Results:

EUT：	GameSir Gaming Keyboard	Model Name：	RF-300
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date：	2019-02-23
Test Mode：	2.4G	Polarization：	Horizontal
Test Power：	2*18650,1800mA 3.7V Battery		

Test Graph



Suspected List

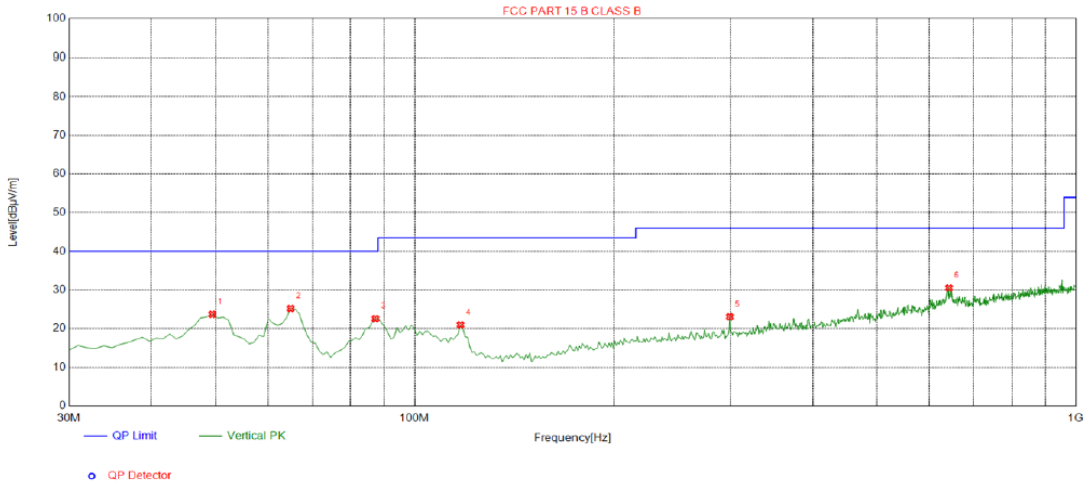
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	47.4600	19.13	-13.65	40.00	20.87	100	81	Horizontal
2	94.9900	16.65	-16.24	43.50	26.85	100	331	Horizontal
3	241.460	21.89	-13.79	46.00	24.11	100	12	Horizontal
4	353.980	22.13	-11.55	46.00	23.87	100	359	Horizontal
5	500.450	26.40	-8.29	46.00	19.60	100	15	Horizontal
6	792.420	37.02	-3.23	46.00	8.98	100	100	Horizontal

Final Data List

Remark: Transd = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit – Level

EUT：	GameSir Gaming Keyboard	Model Name：	RF-300
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date：	2019-02-23
Test Mode：	2.4G	Polarization：	Vertical
Test Power：	2*18650,1800mA 3.7V Battery		

Test Graph



Suspected List

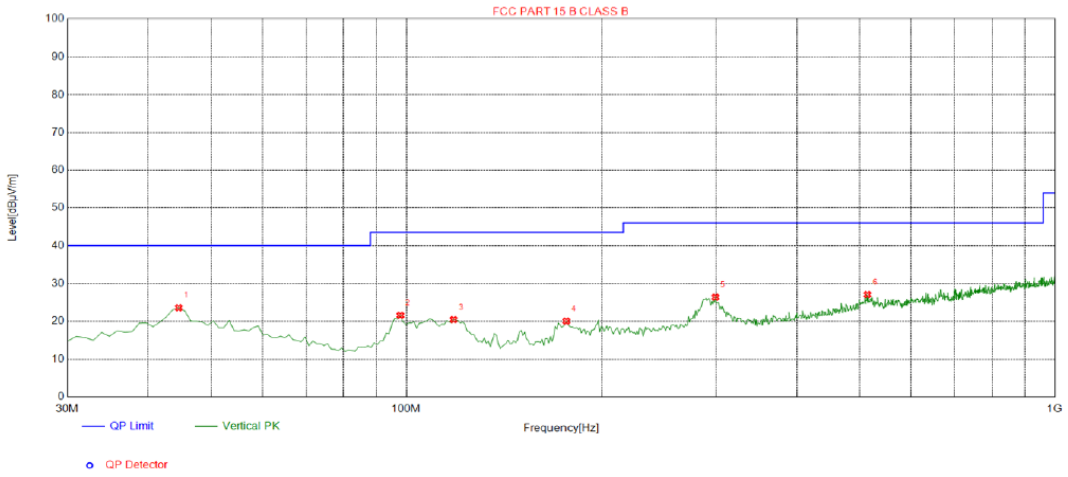
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	49.4000	23.70	-13.65	40.00	16.30	100	92	Vertical
2	64.9200	25.20	-16.39	40.00	14.80	100	11	Vertical
3	87.2300	22.57	-17.73	40.00	17.43	100	140	Vertical
4	117.300	20.98	-16.65	43.50	22.52	100	162	Vertical
5	299.660	23.05	-12.74	46.00	22.95	100	143	Vertical
6	643.040	30.52	-5.70	46.00	15.48	100	0	Vertical

Final Data List

Remark: Transd = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit – Level

EUT：	GameSir Gaming Keyboard	Model Name：	RF-300
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date：	2019-02-23
Test Mode：	BT	Polarization：	Horizontal
Test Power：	2*18650,1800mA 3.7V Battery		

Test Graph



Suspected List

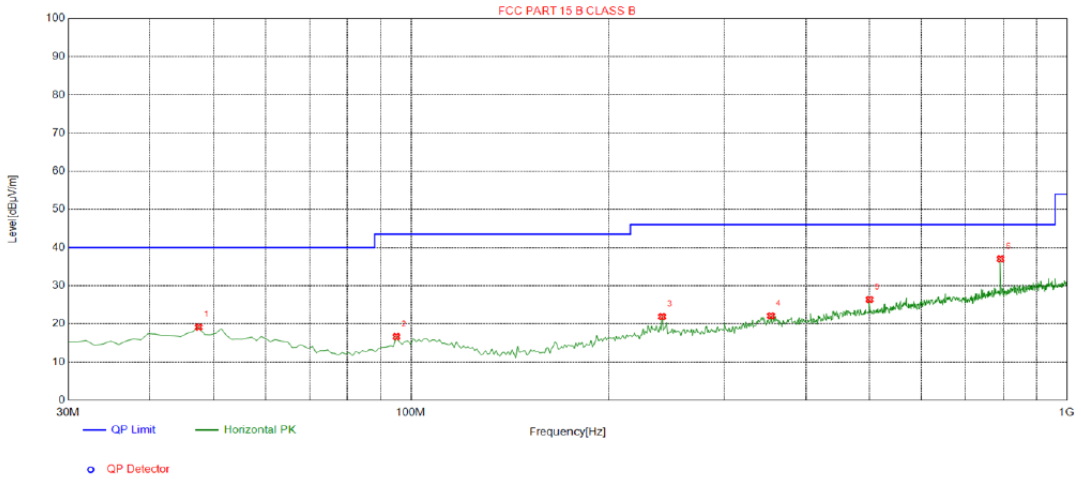
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	44.5500	23.59	-13.73	40.00	16.41	100	94	Vertical
2	97.9000	21.59	-15.75	43.50	21.91	100	233	Vertical
3	118.270	20.45	-16.81	43.50	23.05	100	272	Vertical
4	176.470	20.06	-17.01	43.50	23.44	100	205	Vertical
5	299.660	26.40	-12.74	46.00	19.60	100	345	Vertical
6	514.030	27.09	-7.90	46.00	18.91	100	348	Vertical

Final Data List

Remark: Transd = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit – Level

EUT：	GameSir Gaming Keyboard	Model Name：	RF-300
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date：	2019-02-23
Test Mode：	BT	Polarization：	Vertical
Test Power：	2*18650,1800mA 3.7V Battery		

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	47.4600	19.13	-13.65	40.00	20.87	100	81	Horizontal
2	94.9900	16.65	-16.24	43.50	26.85	100	331	Horizontal
3	241.460	21.89	-13.79	46.00	24.11	100	12	Horizontal
4	353.980	22.13	-11.55	46.00	23.87	100	359	Horizontal
5	500.450	26.40	-8.29	46.00	19.60	100	15	Horizontal
6	792.420	37.02	-3.23	46.00	8.98	100	100	Horizontal

Final Data List

Remark: Transd = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit – Level

Remark：
(1) Measuring frequencies from 9 KHz to the 1 GHz, Radiated emission test from 9KHz to 30MHzwas verified, and no any emission was found except system noise floor.
(2) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
(3) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.

Above 1 GHz Test Results: 2.4G

CH Low (2402MHz)

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2402	105.46	-5.84	99.62	114	-14.38	peak
2402	85.73	-5.84	79.89	94	-14.11	AVG
4804	54.27	-3.64	50.63	74	-23.37	peak
4804	42.18	-3.64	38.54	54	-15.46	AVG
7206	57.24	-0.95	56.29	74	-17.71	peak
7206	39.72	-0.95	38.77	54	-15.23	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2402	105.43	-5.84	99.59	114	-14.41	peak
2402	81.97	-5.84	76.13	94	-17.87	AVG
4804	56.72	-3.64	53.08	74	-20.92	peak
4804	41.08	-3.64	37.44	54	-16.56	AVG
7206	53.85	-0.95	52.9	74	-21.1	peak
7206	39.79	-0.95	38.84	54	-15.16	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

CH Middle (2440MHz)

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2440	105.73	-5.71	100.02	114	-13.98	peak
2440	82.64	-5.71	76.93	94	-17.07	AVG
4880	56.97	-3.51	53.46	74	-20.54	peak
4880	41.06	-3.51	37.55	54	-16.45	AVG
7320	56.18	-0.82	55.36	74	-18.64	peak
7320	40.23	-0.82	39.41	54	-14.59	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2440	106.05	-5.71	100.34	114	-13.66	peak
2440	81.49	-5.71	75.78	94	-18.22	AVG
4880	53.18	-3.51	49.67	74	-24.33	peak
4880	42.05	-3.51	38.54	54	-15.46	AVG
7320	56.71	-0.82	55.89	74	-18.11	peak
7320	40.35	-0.82	39.53	54	-14.47	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

CH High (2480MHz)

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2480	107.32	-5.65	101.67	114	-12.33	peak
2480	82.41	-5.65	76.76	94	-17.24	AVG
4960	57.25	-3.43	53.82	74	-20.18	peak
4960	43.16	-3.43	39.73	54	-14.27	AVG
7440	56.51	-0.75	55.76	74	-18.24	peak
7440	39.86	-0.75	39.11	54	-14.89	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2480	107.64	-5.65	101.99	114	-12.01	peak
2480	82.16	-5.65	76.51	94	-17.49	AVG
4960	57.49	-3.43	54.06	74	-19.94	peak
4960	44.57	-3.43	41.14	54	-12.86	AVG
7440	54.89	-0.75	54.14	74	-19.86	peak
7440	40.52	-0.75	39.77	54	-14.23	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Above 1 GHz Test Results: BT4.2

CH Low (2402MHz)

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2402	106.75	-5.84	100.91	114	-13.09	peak
2402	83.16	-5.84	77.32	94	-16.68	AVG
4804	55.72	-3.64	52.08	74	-21.92	peak
4804	41.92	-3.64	38.28	54	-15.72	AVG
7206	56.34	-0.95	55.39	74	-18.61	peak
7206	40.52	-0.95	39.57	54	-14.43	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2402	106.82	-5.84	100.98	114	-13.02	peak
2402	82.34	-5.84	76.5	94	-17.5	AVG
4804	55.81	-3.64	52.17	74	-21.83	peak
4804	40.29	-3.64	36.65	54	-17.35	AVG
7206	54.84	-0.95	53.89	74	-20.11	peak
7206	40.25	-0.95	39.3	54	-14.7	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

CH Middle (2440MHz)

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2440	106.85	-5.71	101.14	114	-12.86	peak
2440	81.34	-5.71	75.63	94	-18.37	AVG
4880	55.27	-3.51	51.76	74	-22.24	peak
4880	39.61	-3.51	36.1	54	-17.9	AVG
7320	55.95	-0.82	55.13	74	-18.87	peak
7320	39.84	-0.82	39.02	54	-14.98	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2440	106.52	-5.71	100.81	114	-13.19	peak
2440	82.37	-5.71	76.66	94	-17.34	AVG
4880	54.82	-3.51	51.31	74	-22.69	peak
4880	43.83	-3.51	40.32	54	-13.68	AVG
7320	55.29	-0.82	54.47	74	-19.53	peak
7320	39.81	-0.82	38.99	54	-15.01	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

CH High (2480MHz)

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2480	106.95	-5.65	101.3	114	-12.7	peak
2480	82.74	-5.65	77.09	94	-16.91	AVG
4960	55.34	-3.43	51.91	74	-22.09	peak
4960	44.95	-3.43	41.52	54	-12.48	AVG
7440	55.28	-0.75	54.53	74	-19.47	peak
7440	40.16	-0.75	39.41	54	-14.59	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2480	105.47	-5.65	99.82	114	-14.18	peak
2480	81.69	-5.65	76.04	94	-17.96	AVG
4960	56.28	-3.43	52.85	74	-21.15	peak
4960	41.08	-3.43	37.65	54	-16.35	AVG
7440	53.61	-0.75	52.86	74	-21.14	peak
7440	39.86	-0.75	39.11	54	-14.89	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Remark：
(1) Measuring frequencies from 1 GHz to the 25 GHz。
(2) “F” denotes fundamental frequency; “H” denotes spurious frequency. “E” denotes band edge frequency.
(3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
(4) Data of measurement within this frequency range shown “--- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
(5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.The resolution bandwidth of test receiver/spectrum analyzer is 1MHzand video bandwidth is 3MHz for peak measurement with peak detectorat frequency above 1GHz.The resolution bandwidth of test receiver/spectrum analyzer is 1MHzand video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
(6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.
(7)All modes of operation were investigated and the worst-case emissions are reported.

5 BAND EDGE

5.1 Limits

FCC PART 15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics,shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emissionlimits in §15.209, whichever is the lesser attenuation.

5.2 Test Procedure

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSIC63.10 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT issituated in three orthogonal planes (if appropriate), adjusting the measurement antenna height andpolarization etc. Set RBW to 100KHz and VBM to 300KHz to measure the peak field strength and setRBW to 1MHz and VBW to 10Hz to measure the average radiated field strength.The conducted RF band edge was measured by using a spectrum analyzer. Set span wide enough to capture the highest in-band emission and the emission at the band edge. Set RBW to 100 KHz and VBW to 300 KHz,to measure the conducted peak band edge.

5.3 Test Result

PASS

Radiated Band Edge Test: **2.4G**

Operation Mode: TX CH Low (2402MHz)

Horizontal (Worst case)

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2310.00	54.84	-5.81	49.03	74	-24.97	peak
2310.00	41.16	-5.81	35.35	54	-18.65	peak
2390.00	53.18	-5.84	47.34	74	-26.66	peak
2390.00	43.56	-5.84	37.72	54	-16.28	peak
2400.00	56.56	-5.95	50.61	74	-23.39	peak
2400.00	44.15	-5.95	38.2	54	-15.8	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2310.00	53.19	-5.81	47.38	74	-26.62	peak
2310.00	42.57	-5.81	36.76	54	-17.24	peak
2390.00	52.64	-5.84	46.8	74	-27.2	peak
2390.00	43.09	-5.84	37.25	54	-16.75	peak
2400.00	55.41	-5.95	49.46	74	-24.54	peak
2400.00	43.86	-5.95	37.91	54	-16.09	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High (2480MHz)

Horizontal (Worst case)

Horizontal (Worst case)

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.50	55.84	-5.81	50.03	74	-23.97	peak
2483.50	44.29	-5.81	38.48	54	-15.52	AVG
2500.00	52.17	-6.06	46.11	74	-27.89	peak
2500.00	43.56	-6.06	37.5	54	-16.5	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.50	56.49	-5.81	50.68	74	-23.32	peak
2483.50	45.71	-5.81	39.9	54	-14.1	AVG
2500.00	57.24	-6.06	51.18	74	-22.82	peak
2500.00	43.38	-6.06	37.32	54	-16.68	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Radiated Band Edge Test: **BT4.2**

Operation Mode: TX CH Low (2402MHz)

Horizontal (Worst case)

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
2310.00	53.18	-5.81	47.37	74	-26.63	peak
2310.00	40.03	-5.81	34.22	54	-19.78	peak
2390.00	52.81	-5.84	46.97	74	-27.03	peak
2390.00	43.97	-5.84	38.13	54	-15.87	peak
2400.00	55.14	-5.95	49.19	74	-24.81	peak
2400.00	45.32	-5.95	39.37	54	-14.63	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
2310.00	54.73	-5.81	48.92	74	-25.08	peak
2310.00	43.18	-5.81	37.37	54	-16.63	peak
2390.00	53.27	-5.84	47.43	74	-26.57	peak
2390.00	42.94	-5.84	37.1	54	-16.9	peak
2400.00	53.16	-5.95	47.21	74	-26.79	peak
2400.00	42.83	-5.95	36.88	54	-17.12	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High (2480MHz)

Horizontal (Worst case)

Horizontal (Worst case)

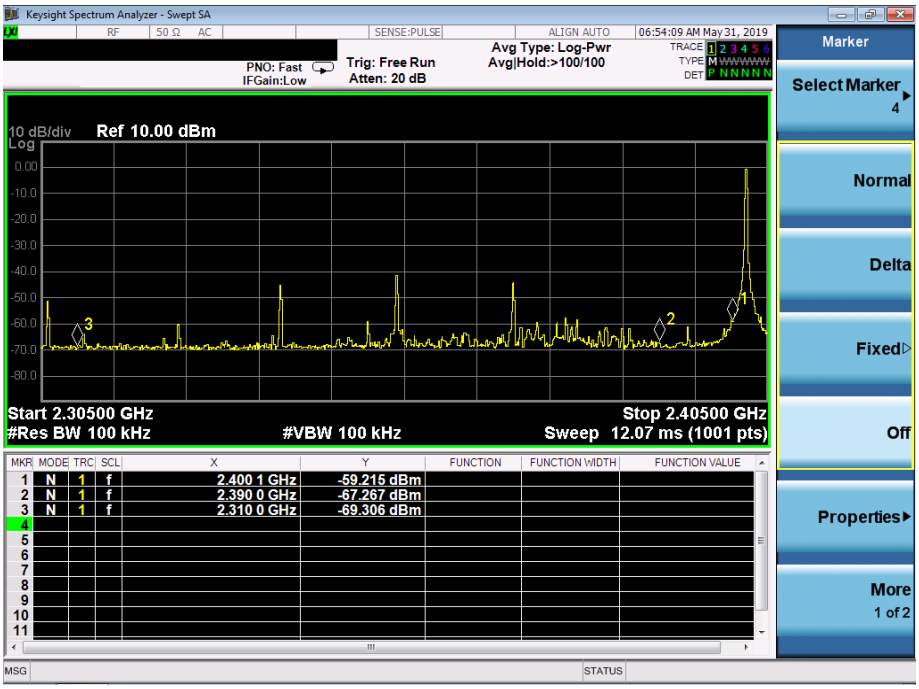
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.50	57.28	-5.81	51.47	74	-22.53	peak
2483.50	43.08	-5.81	37.27	54	-16.73	AVG
2500.00	56.72	-6.06	50.66	74	-23.34	peak
2500.00	42.18	-6.06	36.12	54	-17.88	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

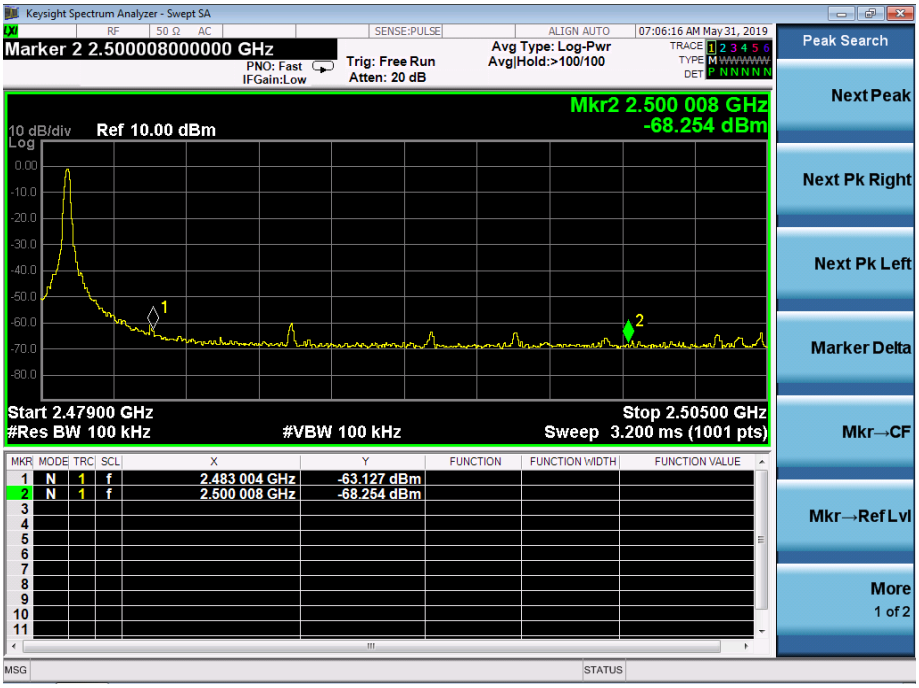
Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.50	54.34	-5.81	48.53	74	-25.47	peak
2483.50	45.79	-5.81	39.98	54	-14.02	AVG
2500.00	56.41	-6.06	50.35	74	-23.65	peak
2500.00	42.96	-6.06	36.9	54	-17.1	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

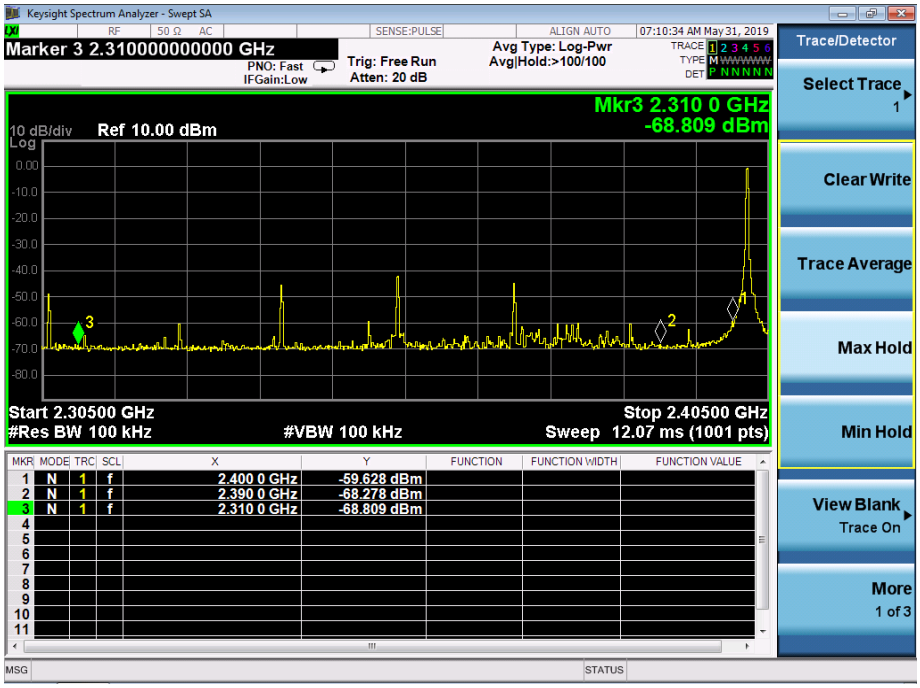
Conducted Emission Band Edge

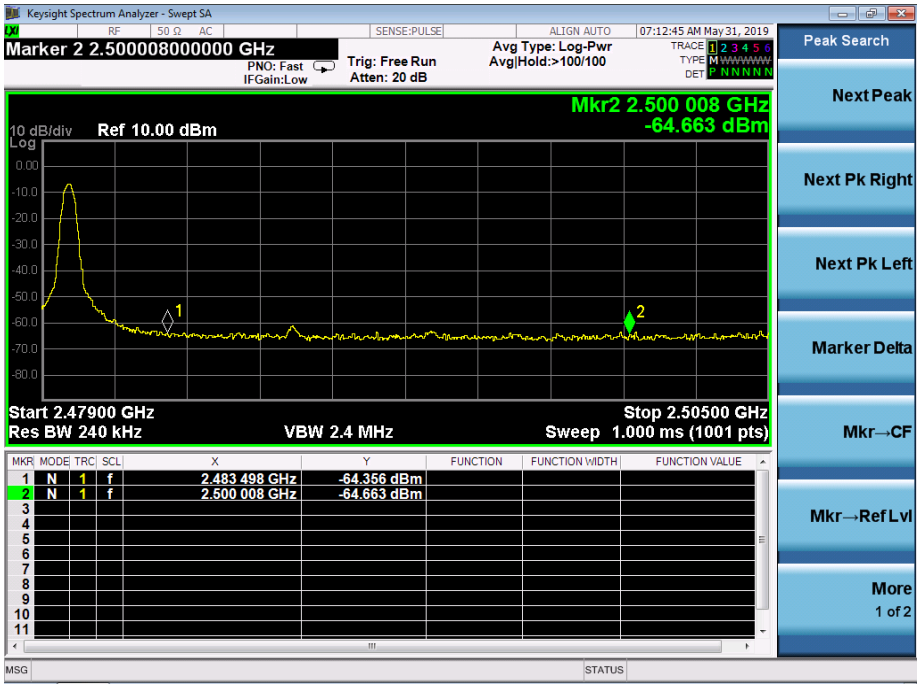
2.4G





BT4.2


Keysight Spectrum Analyzer - Swept SA
Marker 3 2.310000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
07:10:34 AM May 31, 2019
Mkr3 2.310 0 GHz
-68.809 dBm
10 dB/div
Ref 10.00 dBm
Log
Start 2.30500 GHz
#Res BW 100 kHz
#VBW 100 kHz
Stop 2.40500 GHz
Sweep 12.07 ms (1001 pts)
1 N 1 f 2.400 0 GHz -59.628 dBm
2 N 1 f 2.390 0 GHz -68.278 dBm
3 N 1 f 2.310 0 GHz -68.809 dBm
Trace/Detector
Select Trace 1
Clear Write
Trace Average
Max Hold
Min Hold
View Blank Trace On
More 1 of 3


Keysight Spectrum Analyzer - Swept SA
Marker 2 2.500008000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
07:12:45 AM May 31, 2019
Mkr2 2.500 008 GHz
-64.663 dBm
10 dB/div
Ref 10.00 dBm
Log
Start 2.47900 GHz
Res BW 240 kHz
VBW 2.4 MHz
Stop 2.50500 GHz
Sweep 1.000 ms (1001 pts)
1 N 1 f 2.483 498 GHz -64.356 dBm
2 N 1 f 2.500 008 GHz -64.663 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More 1 of 2

6 OCCUPIED BANDWIDTH MEASUREMENT

6.1 Test Setup

Same asRadiated Emission Measurement

6.2 Test Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation.
3. Based on ANSI C63.10 section 6.9.2: RBW= 30KHz. VBW= 100 KHz, Span=4MHz.
4. The useful radiated emission from the EUT was detected by the spectrum analyser with peak detector.

6.3 Measurement Equipment Used

Same asRadiated Emission Measurement

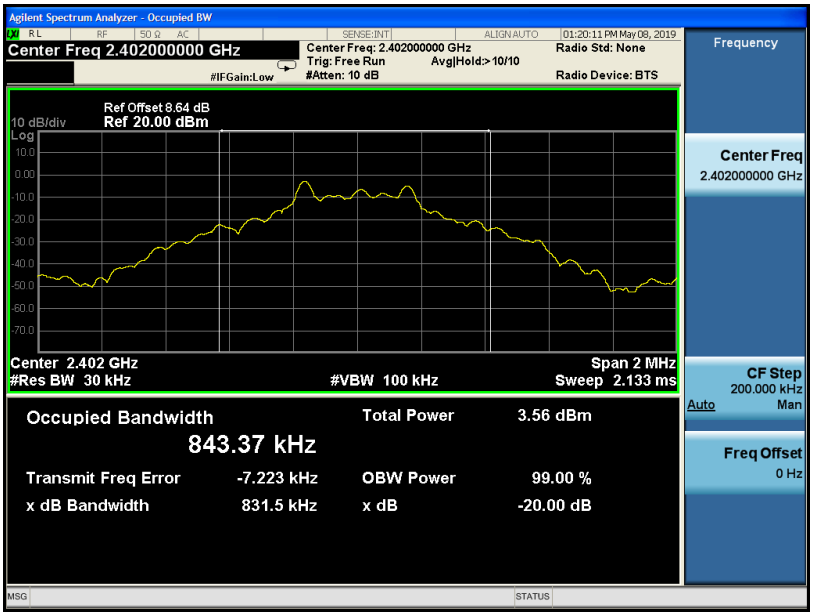
6.4 Test Result

PASS

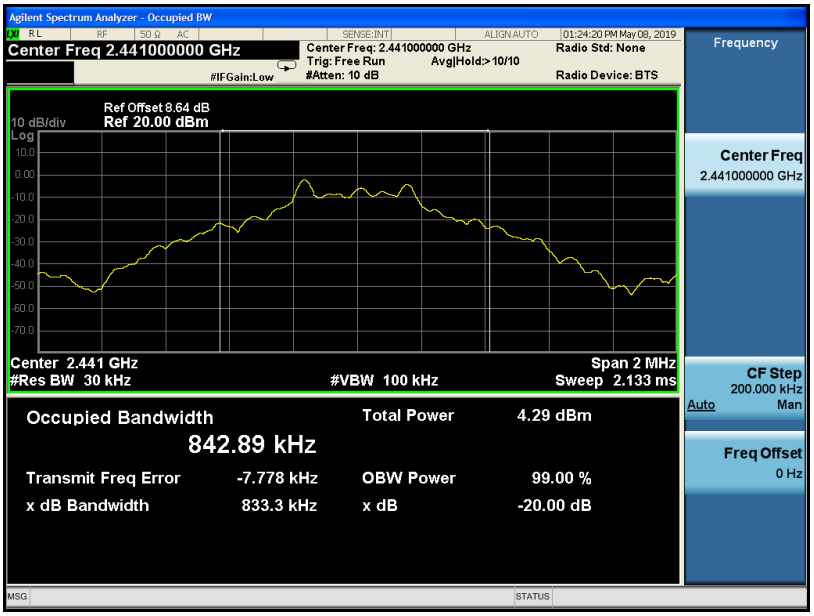
2.4G

Frequency	20dB Bandwidth (MHz)	Result
2402 MHz	0.843	**PASS**
2440 MHz	0.843	**PASS**
2480 MHz	0.843	**PASS**

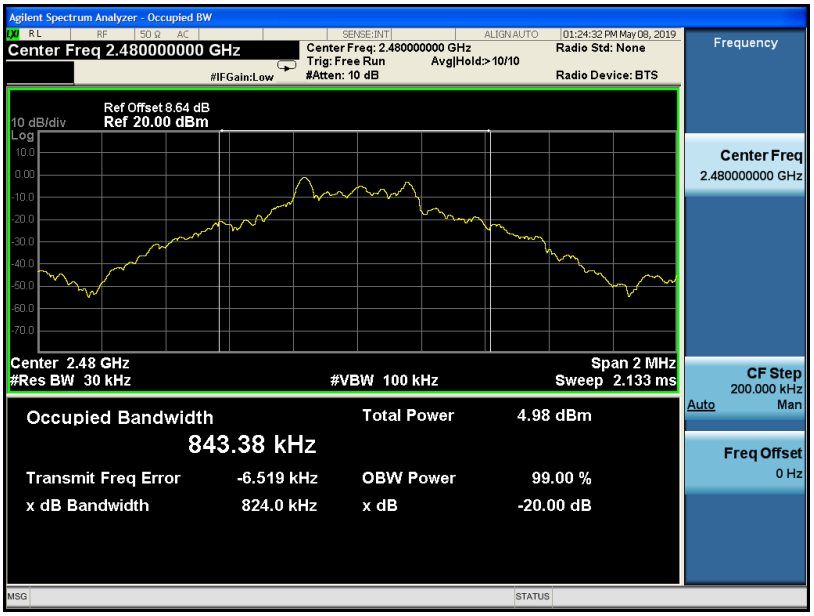
CH: 2402MHz



CH: 2440MHz



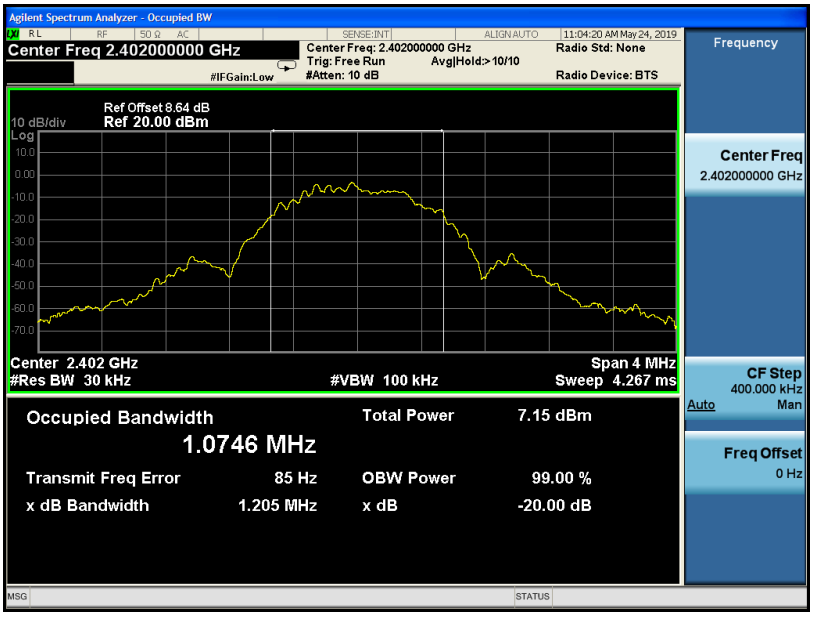
CH: 2480MHz



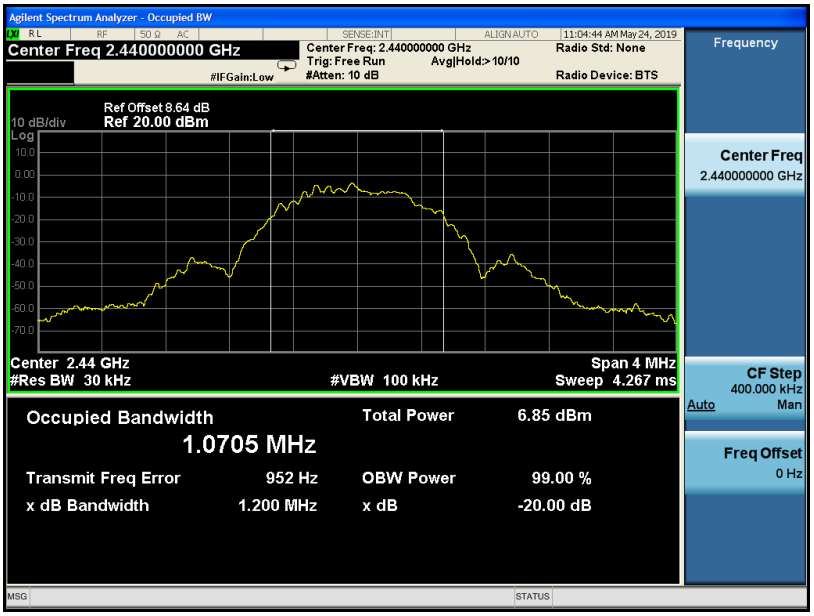
BT 4.2

Frequency	20dB Bandwidth (MHz)	Result
2402 MHz	1.075	**PASS**
2440 MHz	1.071	**PASS**
2480 MHz	1.068	**PASS**

CH: 2402MHz



CH: 2440MHz



CH: 2480MHz


Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#IFGain:Low
#Atten: 10 dB
Radio Std: None
Radio Device: BTS
11:04:56 AM May 24, 2019
Frequency
Ref Offset 8.64 dB
10 dB/div
Ref 20.00 dBm
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 4 MHz
Sweep 4.267 ms
Occupied Bandwidth
1.0681 MHz
Total Power 6.79 dBm
Transmit Freq Error 983 Hz
OBW Power 99.00 %
x dB Bandwidth 1.199 MHz
x dB -20.00 dB
Center Freq
2.480000000 GHz
CF Step
400.000 kHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

7 ANTENNA REQUIREMENT

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed toensure that no antenna other than that furnished by the responsible party shall be used with the device.And according to FCC 47 CFR Section 15.249, if transmitting antennas of directional gain greater than6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antennaexceeds 6dBi.

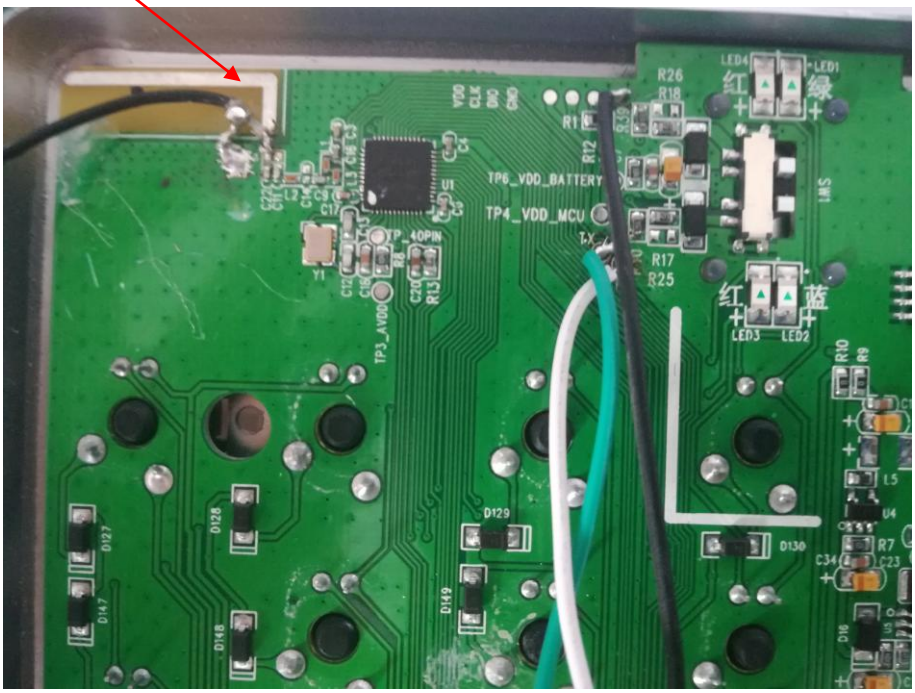
Refer to statement below for compliance.

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of astandard antenna jack or electrical connector is prohibited. Further, this requirement does not apply tointentional radiators that must be professionally installed.

Antenna Connected Construction

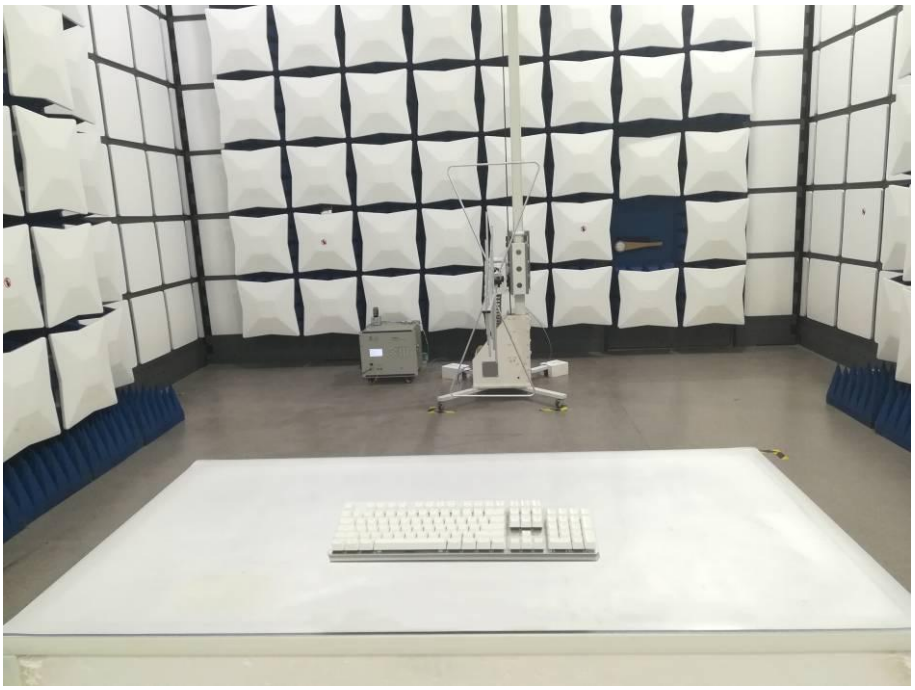
The antenna used in this product is a Internal Antenna, The directional gains of antenna used for transmitting is 0dBi.

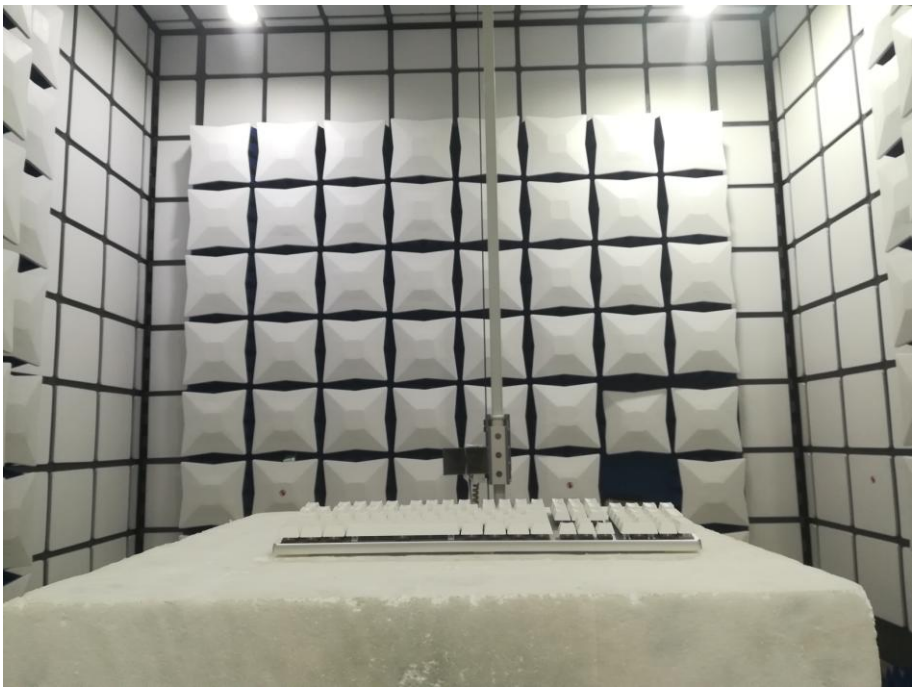
ANTENNA



8 PHOTOGRAPH OF TEST

Radiated Emission





EUT
Photo 1

Photo 2

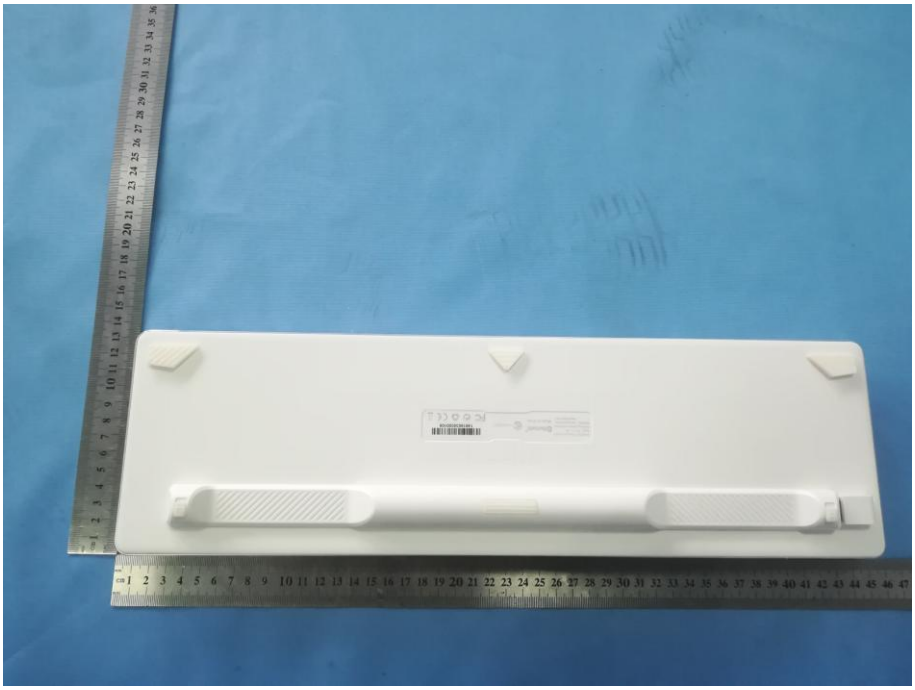


Photo 3

Photo 4

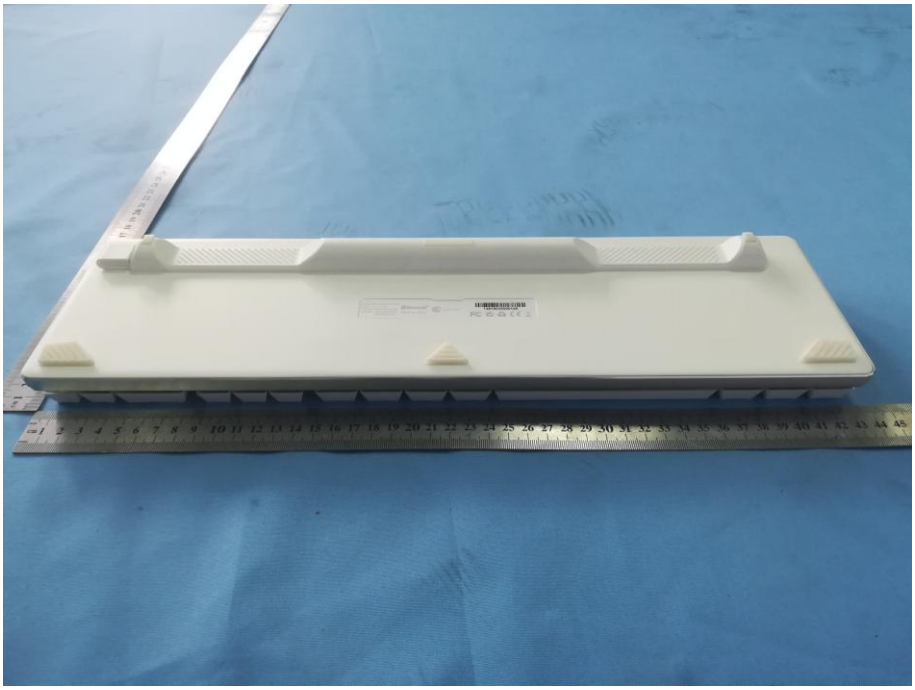


Photo 5

Photo 6

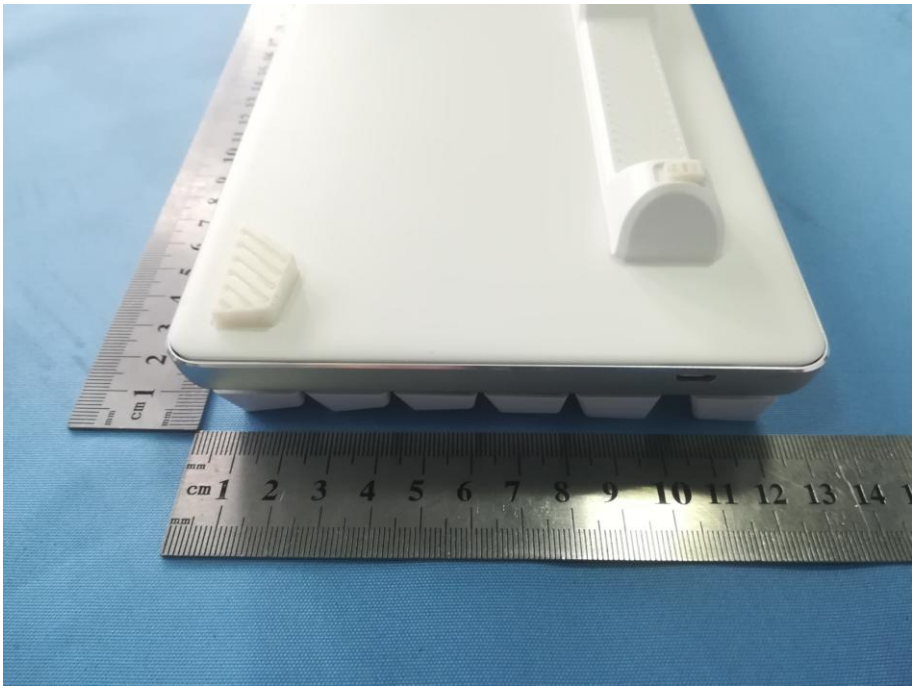


Photo 7

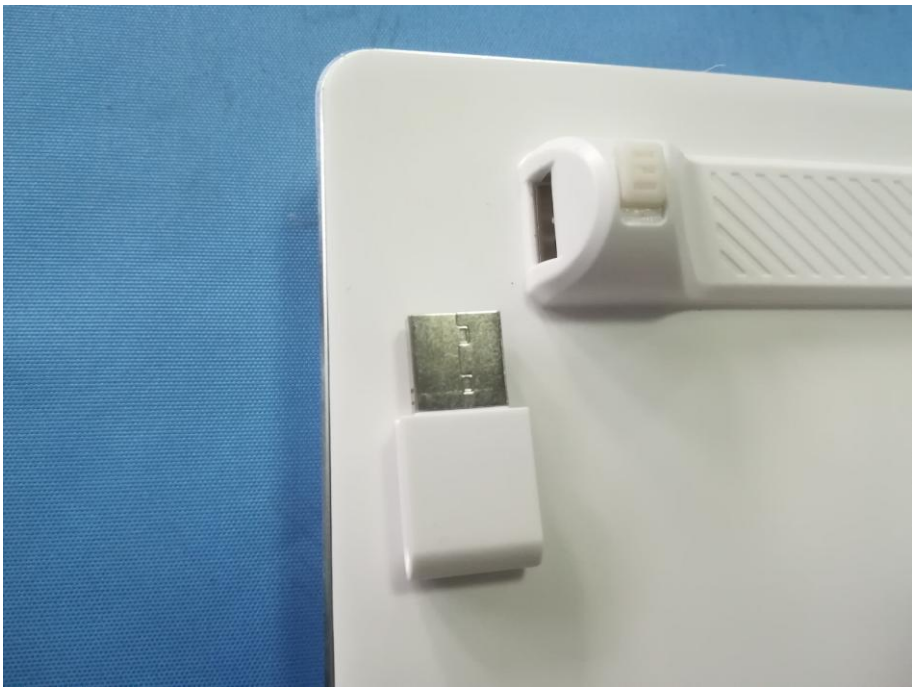


Photo 8

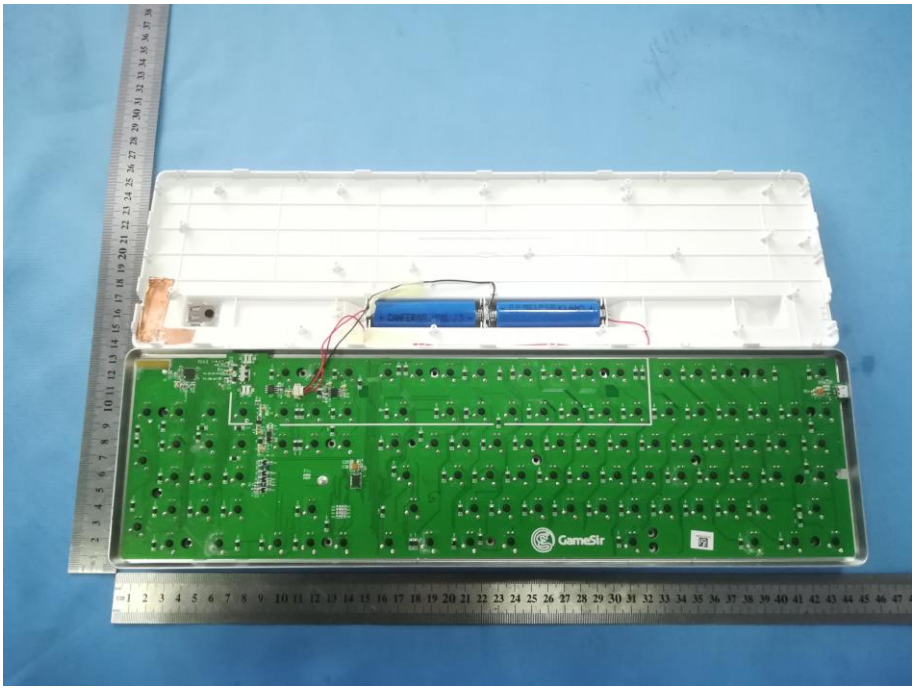


Photo 9

Photo 10

Photo 11

--The end of report--