

FCC TEST REPORT

For

Shenzhen Delux Industry Co., Ltd.

Wirelesskey Gaming Mouse

Model No.: M627

Prepared For : Shenzhen Delux Industry Co., Ltd.
Address : Delux Industrial Park, Lanzhu Street, Shenzhen City, China

Prepared By : Shenzhen Anbotech Compliance Laboratory Limited
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TEST REPORT

Applicant : Shenzhen Delux Industry Co., Ltd.
Manufacturer : Wuhu Delux Mobile Internet Device Company Limited
Product Name : Wirelesskey Gaming Mouse
Model No. : M627
Trade Mark : N.A.
Rating(s) : Input: DC 5V, 500mA (with DC 3.7V, 500mAh 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 Anbotech Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotech Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

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

Date of Test

Nov. 24~Dec. 26, 2018

Prepared by



Oliay Yang

(Engineer / Oliay Yang)

Reviewer

Snowy Meng

(Supervisor / Snowy Meng)

Approved & Authorized Signer

Sally Zhang

(Manager / Sally Zhang)

1. General Information

1.1. Client Information

Applicant	:	Shenzhen Delux Industry Co., Ltd.
Address	:	Delux Industrial Park, Lanzhu Street, Shenzhen City, China
Manufacturer	:	Wuhu Delux Mobile Internet Device Company Limited
Address	:	Delux Industrial Park, Xici 3 Road, Xinwu Development Zone, Wanzhi Town, Wuhu County, Anhui Province, China
Factory	:	Wuhu Delux Mobile Internet Device Company Limited
Address	:	Delux Industrial Park, Xici 3 Road, Xinwu Development Zone, Wanzhi Town, Wuhu County, Anhui Province, China

1.2. Description of Device (EUT)

Product Name	:	Wirelesskey Gaming Mouse
Model No.	:	M627
Trade Mark	:	N.A.
Test Power Supply	:	DC 3.7V battery inside
Test Sample No.	:	S1(Normal Sample), S2(Engineering Sample)
Product Description	Operation Frequency:	2402-2479MHz
	Number of Channel:	78 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

Adapter	:	Manufacturer: ZTE
		M/N: STC-A2050I1000USBA-C S/N: 201202102100876 Input: 100-240V~ 50/60Hz, 0.3A Output: DC 5V, 1000mA

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	CH01
Mode 2	CH38
Mode 3	CH78
Mode 4	CH01+ Charging Mode
Mode 5	CH38+ Charging Mode
Mode 6	CH78+ Charging Mode

For Conducted Emission	
Final Test Mode	Description
Mode 4	CH01+ Charging Mode
Mode 5	CH38+ Charging Mode
Mode 6	CH78+ Charging Mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	CH01
Mode 2	CH38
Mode 3	CH78
Mode 4	CH01+ Charging Mode
Mode 5	CH38+ Charging Mode
Mode 6	CH78+ Charging Mode

Note:

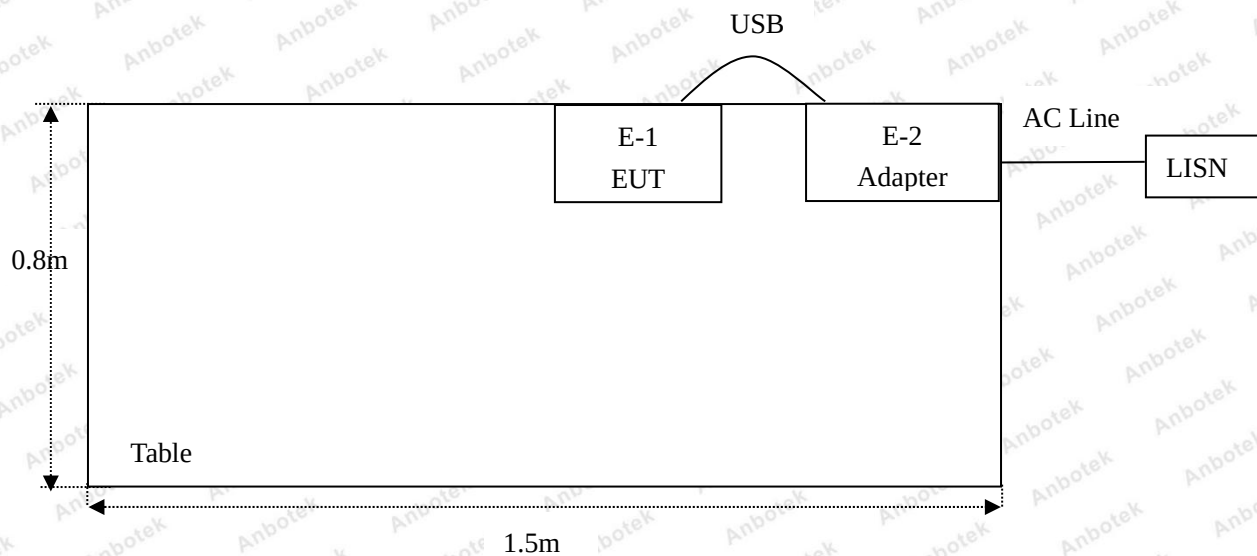
1. The engineering test program was provided and the EUT was programmed to be in continuously transmitting mode.
2. EUT built-in battery-powered, fully-charged battery use of the test battery.

1.5. List of Channels

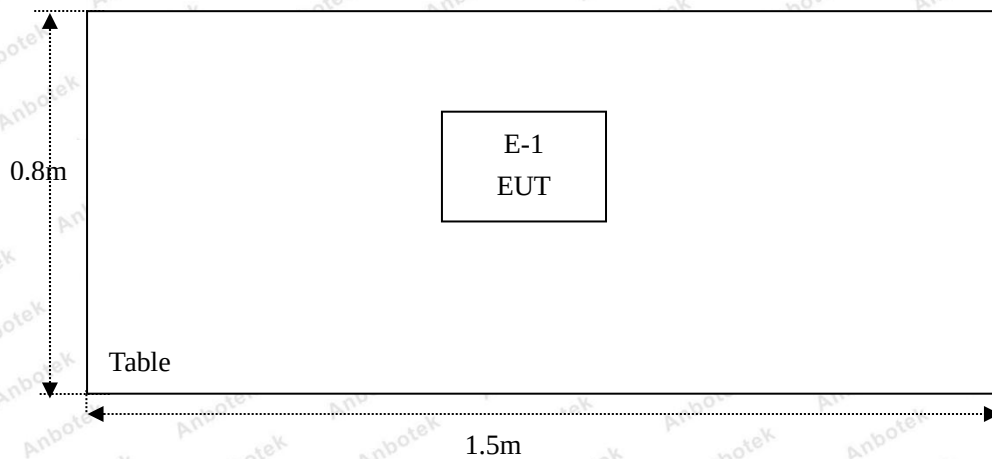
Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
01	2402	18	2419	35	2436	52	2453	69	2470
02	2403	19	2420	36	2437	53	2454	70	2471
03	2404	20	2421	37	2438	54	2455	71	2472
04	2405	21	2422	38	2439	55	2456	72	2473
05	2406	22	2423	39	2440	56	2457	73	2474
06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

1.6. Description of Test Setup

CE



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. 05, 2018	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESPI3	101604	Nov. 05, 2018	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Nov. 05, 2018	1 Year
4.	Spectrum Analysis	Agilent	E4407B	US39390582	Nov. 05, 2018	1 Year
5.	MAX Spectrum Analysis	Agilent	N9020A	MY51170037	Nov. 05, 2018	1 Year
6.	Preamplifier	SKET Electronic	BK1G18G30D	KD17503	Nov. 05, 2018	1 Year
7.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Nov. 20, 2018	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Nov. 19, 2018	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB1519B	00053	Nov. 20, 2018	1 Year
10.	Horn Antenna	A-INFO	LB-180400-K F	J211060628	Nov. 20, 2018	1 Year
11.	Pre-amplifier	SONOMA	310N	186860	Nov. 05, 2018	1 Year
12.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
13.	RF Test Control System	YIHENG	YH3000	2017430	Nov. 05, 2018	1 Year
14.	Power Sensor	DAER	RPR3006W	15I00041SN045	Nov. 05, 2018	1 Year
15.	Power Sensor	DAER	RPR3006W	15I00041SN046	Nov. 05, 2018	1 Year
16.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Nov. 05, 2018	1 Year
17.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Nov. 05, 2018	1 Year
18.	Signal Generator	Agilent	E4421B	MY41000743	Nov. 05, 2018	1 Year
19.	DC Power Supply	IVYTECH	IV3605	1804D360510	Apr. 02, 2018	1 Year
20.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80B	N/A	Nov. 01, 2018	1 Year

1.8. Description of Test Facility

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

FCC-Registration No.: 184111

Shenzhen Anbotech Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No. 184111, July 31, 2017.

ISED-Registration No.: 8058A-1

Shenzhen Anbotech Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A-1, June 13, 2016.

Test Location

Shenzhen Anbotech Compliance Laboratory Limited.

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

2. Summary of Test Results

Standard Section	Test Item	Result
15.203	Antenna Requirement	PASS
15.207	Conducted Emission	PASS
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.		

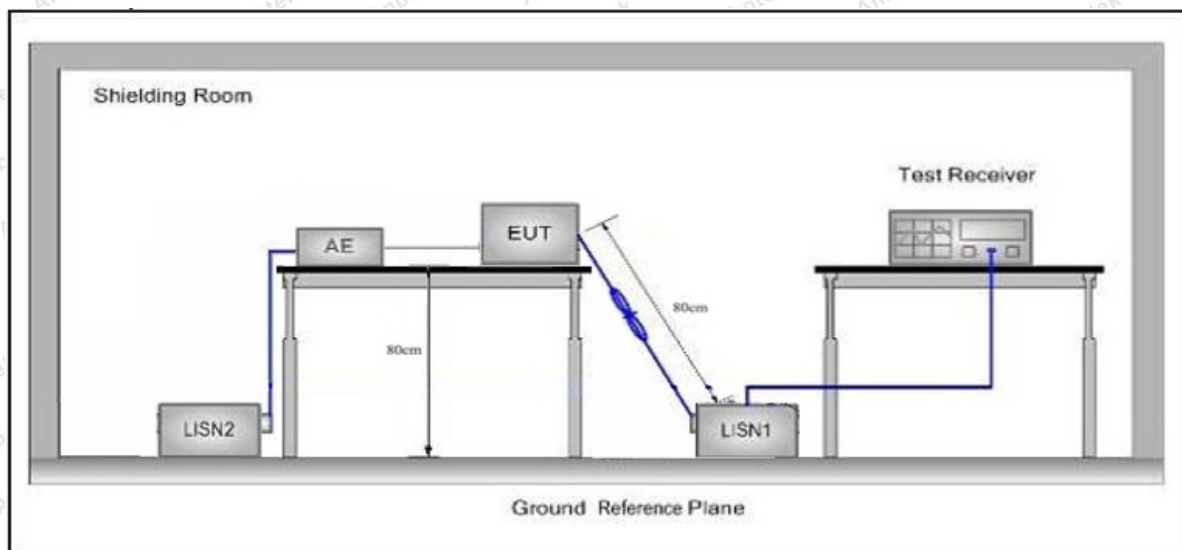
3. Conducted Emission Test

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.

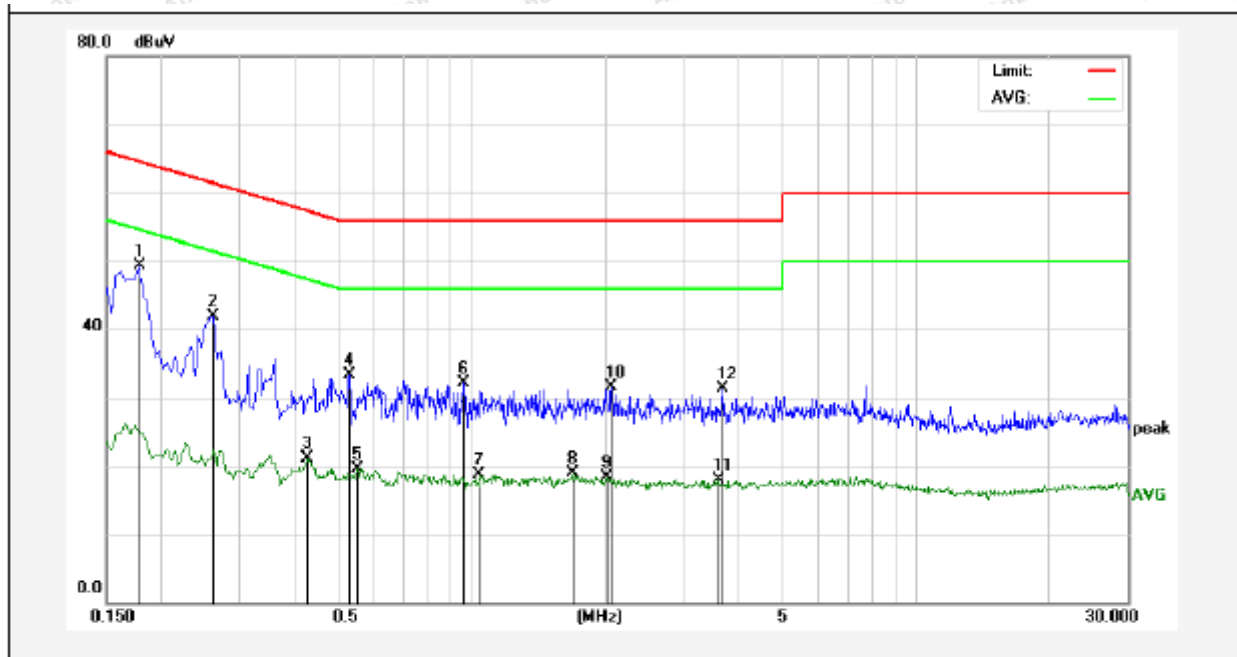
3.4. Test Data

Please see the following pages

During the test, pre-scan all the modes, and found the High channel which is the worst case, only the worst case is recorded in the report.

Conducted Emission Test Data

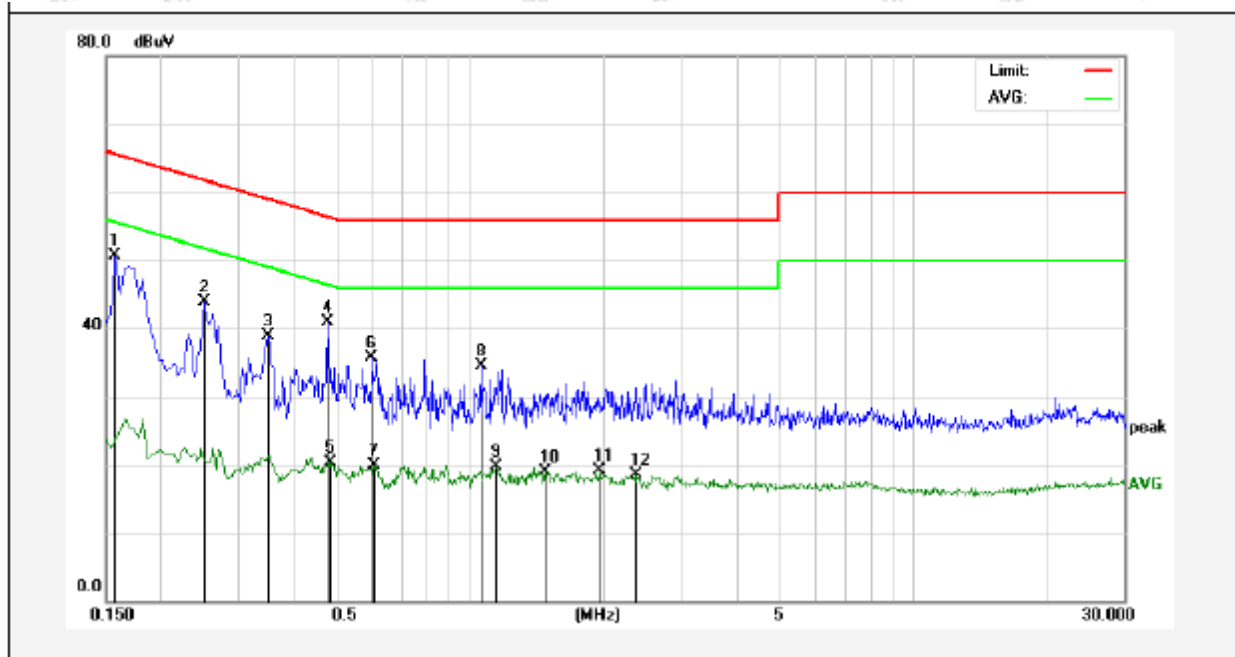
Test Site: 1# Shielded Room
Operating Condition: Mode 6
Test Specification: AC 120V, 60Hz for adapter
Comment: Live Line
Tem.: 23.0°C Hum.: 46%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1780	29.33	19.90	49.23	64.57	-15.34	QP	
2	0.2620	22.00	19.89	41.89	61.36	-19.47	QP	
3	0.4260	1.22	19.95	21.17	47.33	-26.16	AVG	
4	0.5299	13.28	19.99	33.27	56.00	-22.73	QP	
5	0.5540	-0.52	20.00	19.48	46.00	-26.52	AVG	
6	0.9620	12.08	20.11	32.19	56.00	-23.81	QP	
7	1.0420	-1.32	20.12	18.80	46.00	-27.20	AVG	
8	1.6860	-1.32	20.13	18.81	46.00	-27.19	AVG	
9	2.0140	-1.92	20.14	18.22	46.00	-27.78	AVG	
10	2.0620	11.45	20.14	31.59	56.00	-24.41	QP	
11	3.5860	-2.21	20.17	17.96	46.00	-28.04	AVG	
12	3.6660	11.22	20.17	31.39	56.00	-24.61	QP	

Conducted Emission Test Data

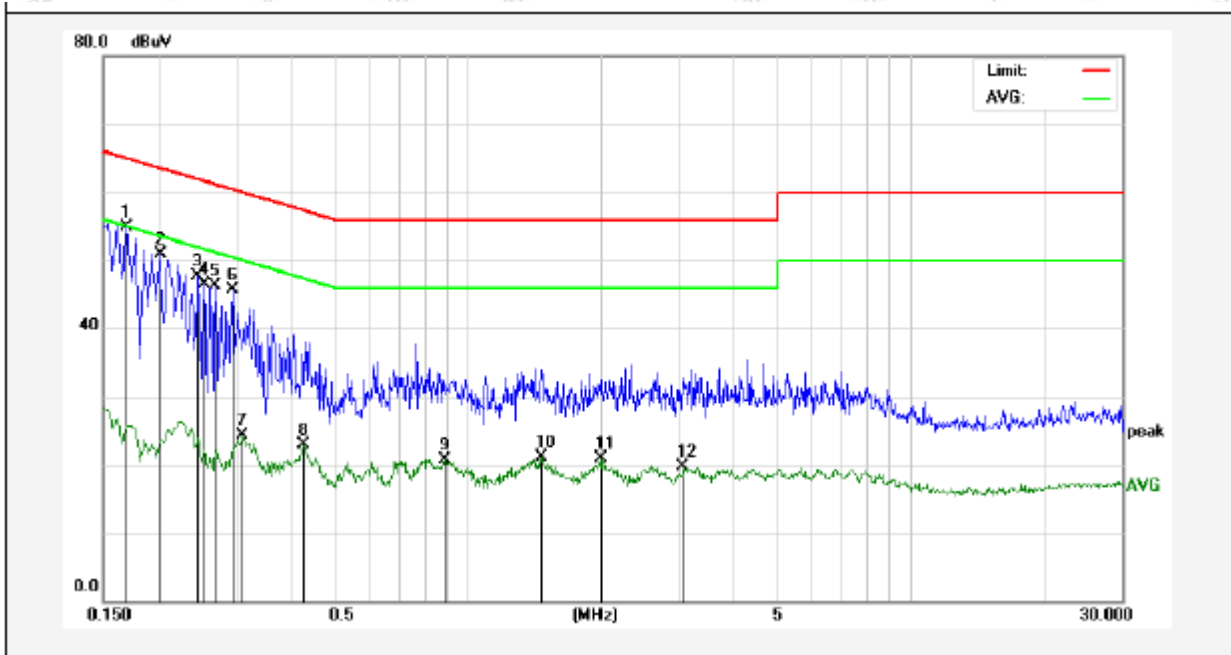
Test Site: 1# Shielded Room
Operating Condition: Mode 6
Test Specification: AC 120V, 60Hz for adapter
Comment: Neutral Line
Tem.: 23.0°C Hum.: 46%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1580	30.85	19.90	50.75	65.56	-14.81	QP	
2	0.2500	24.03	19.89	43.92	61.75	-17.83	QP	
3	0.3500	19.08	19.91	38.99	58.96	-19.97	QP	
4	0.4780	20.90	19.97	40.87	56.37	-15.50	QP	
5	0.4860	0.32	19.97	20.29	46.24	-25.95	AVG	
6	0.5980	15.66	20.01	35.67	56.00	-20.33	QP	
7	0.6060	-0.12	20.01	19.89	46.00	-26.11	AVG	
8	1.0580	14.36	20.12	34.48	56.00	-21.52	QP	
9	1.1420	-0.34	20.12	19.78	46.00	-26.22	AVG	
10	1.4780	-1.13	20.13	19.00	46.00	-27.00	AVG	
11	1.9620	-0.99	20.14	19.15	46.00	-26.85	AVG	
12	2.3620	-1.74	20.15	18.41	46.00	-27.59	AVG	

Conducted Emission Test Data

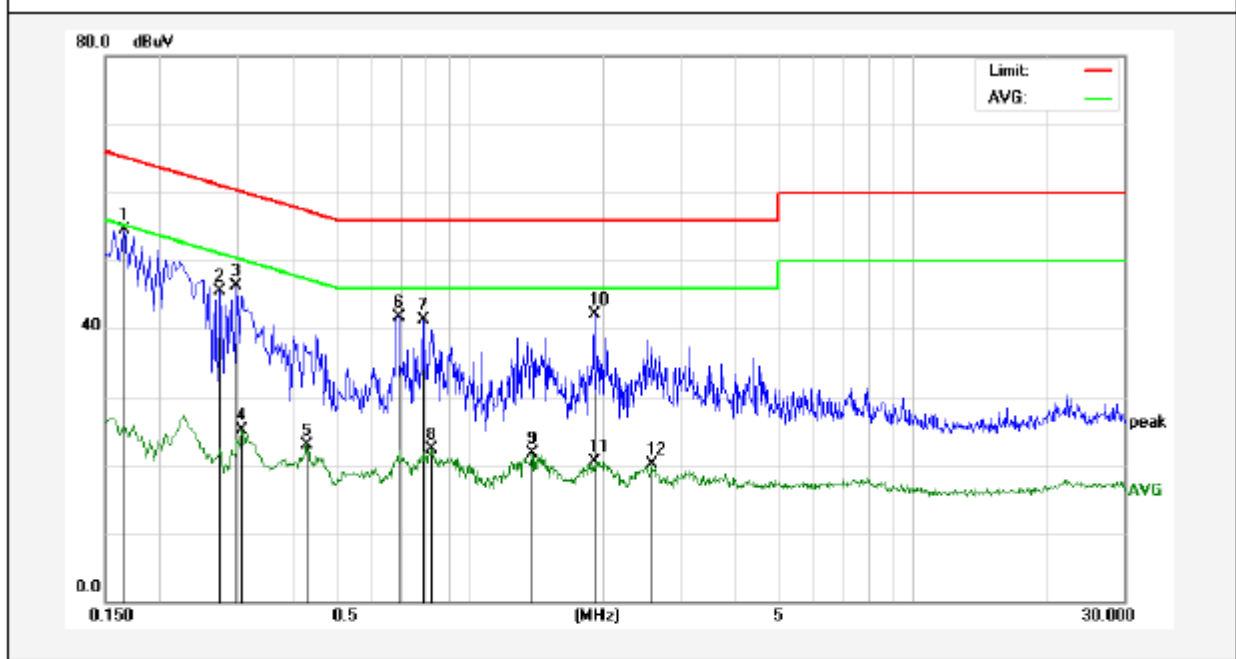
Test Site: 1# Shielded Room
Operating Condition: Mode 6
Test Specification: AC 240V, 60Hz for adapter
Comment: Live Line
Tem.: 23.0°C Hum.: 46%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1700	35.05	19.90	54.95	64.96	-10.01	QP	
2	0.2020	31.09	19.90	50.99	63.52	-12.53	QP	
3	0.2460	27.82	19.89	47.71	61.89	-14.18	QP	
4	0.2540	26.59	19.89	46.48	61.62	-15.14	QP	
5	0.2700	26.48	19.89	46.37	61.12	-14.75	QP	
6	0.2940	25.72	19.89	45.61	60.41	-14.80	QP	
7	0.3100	4.50	19.89	24.39	49.97	-25.58	AVG	
8	0.4260	2.92	19.95	22.87	47.33	-24.46	AVG	
9	0.8860	0.63	20.09	20.72	46.00	-25.28	AVG	
10	1.4660	0.89	20.13	21.02	46.00	-24.98	AVG	
11	1.9940	0.85	20.14	20.99	46.00	-25.01	AVG	
12	3.0660	-0.50	20.16	19.66	46.00	-26.34	AVG	

Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: Mode 6
Test Specification: AC 240V, 60Hz for adapter
Comment: Neutral Line
Tem.: 23.0℃ Hum.: 46%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1660	34.68	19.90	54.58	65.15	-10.57	QP	
2	0.2740	25.60	19.89	45.49	60.99	-15.50	QP	
3	0.2980	26.51	19.89	46.40	60.30	-13.90	QP	
4	0.3060	5.23	19.89	25.12	50.08	-24.96	AVG	
5	0.4300	2.95	19.95	22.90	47.25	-24.35	AVG	
6	0.6900	21.71	20.04	41.75	56.00	-14.25	QP	
7	0.7860	21.27	20.06	41.33	56.00	-14.67	QP	
8	0.8180	2.27	20.07	22.34	46.00	-23.66	AVG	
9	1.3860	1.56	20.13	21.69	46.00	-24.31	AVG	
10	1.9100	21.98	20.14	42.12	56.00	-13.88	QP	
11	1.9100	0.43	20.14	20.57	46.00	-25.43	AVG	
12	2.5780	-0.13	20.15	20.02	46.00	-25.98	AVG	

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

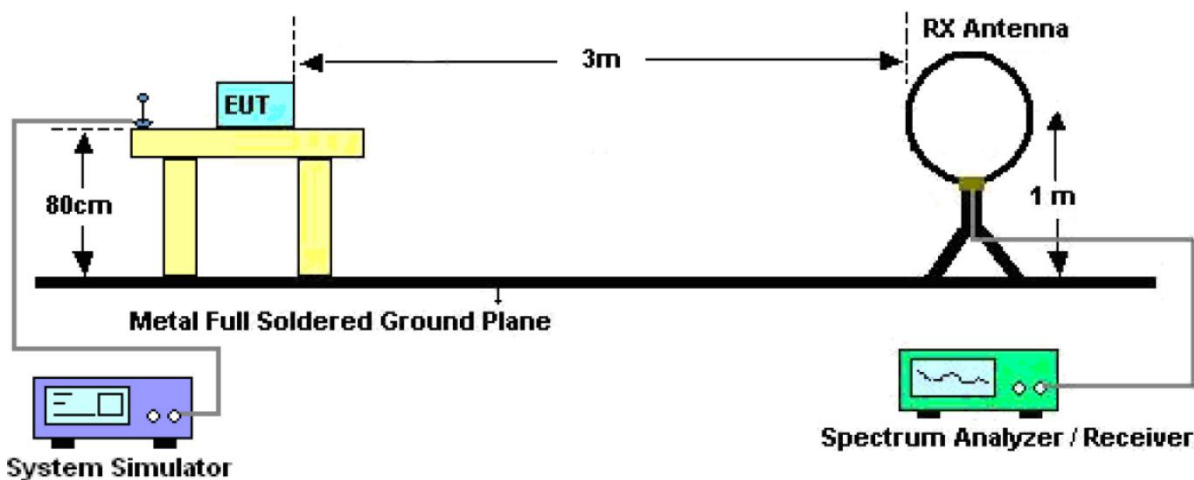


Figure 2. 30MHz to 1GHz

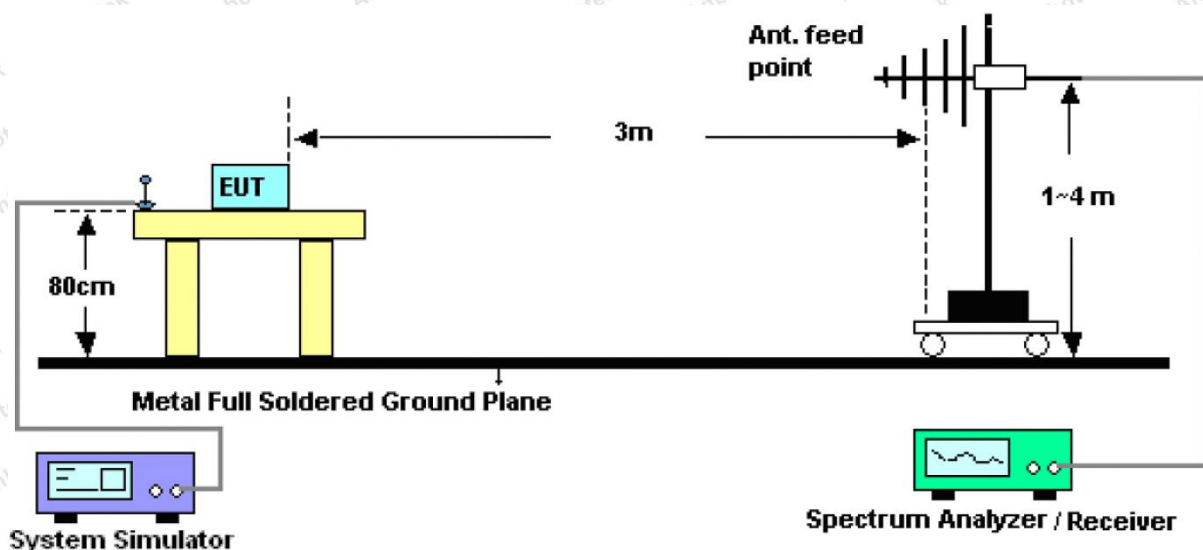
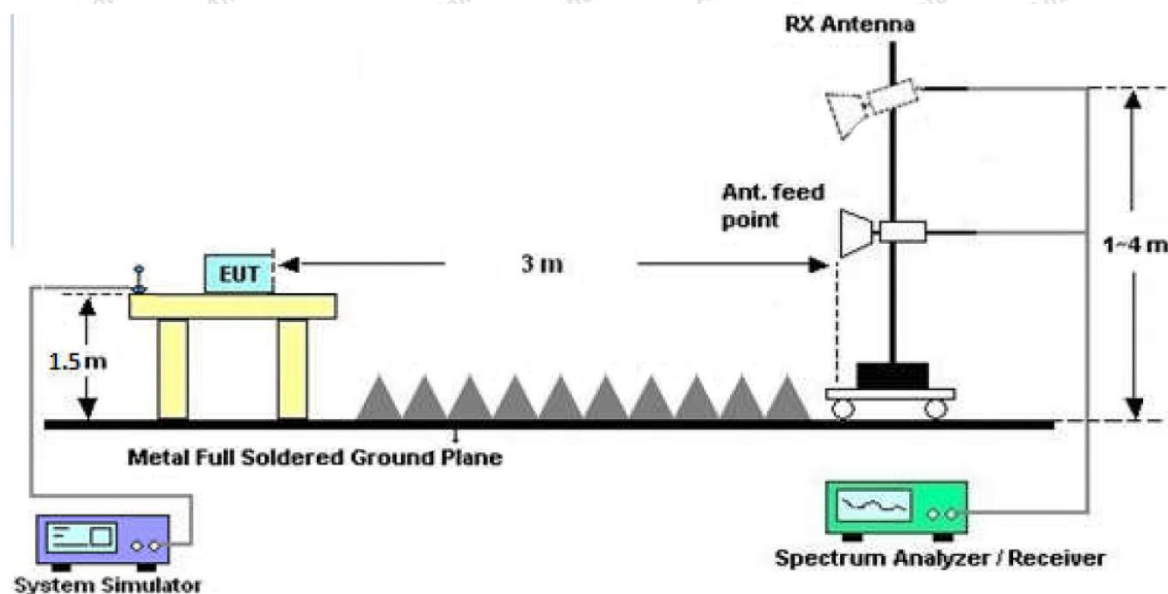


Figure 3. Above 1 GHz



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

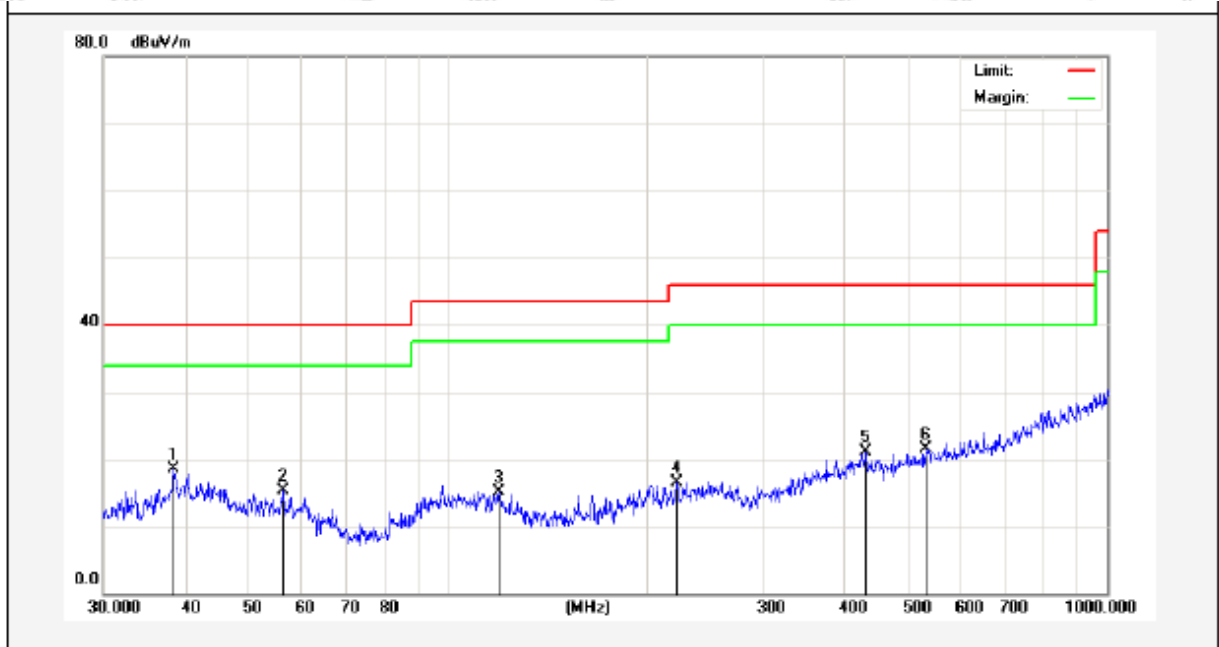
During the test, Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the X-axis is the worst case.

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

During the test, pre-scan all the mode, and found the Middle channel which is the worst case, only the worst case is recorded in the report

Test Results (30~1000MHz)

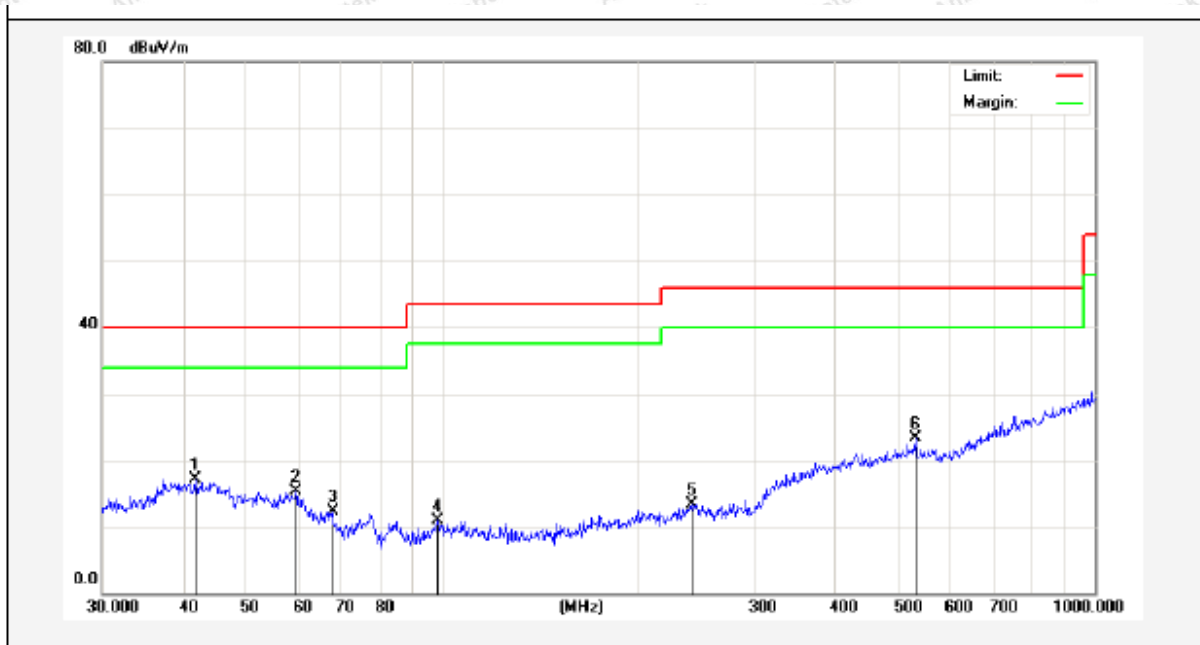
Job No.: SZAWW181124004-01 Temp.(°C)/Hum.(%RH): 25.2°C/52%RH
Standard: FCC PART 15C Power Source: DC 3.7V battery inside
Test Mode: Mode 2 Polarization: Horizontal



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	38.3462	33.74	-15.26	18.48	40.00	-21.52	peak			
2	56.1974	33.17	-17.80	15.37	40.00	-24.63	peak			
3	119.4361	37.35	-22.29	15.06	43.50	-28.44	peak			
4	222.1698	36.65	-20.11	16.54	46.00	-29.46	peak			
5	429.5228	33.33	-12.30	21.03	46.00	-24.97	peak			
6	530.1014	32.49	-11.04	21.45	46.00	-24.55	peak			

Test Results (30~1000MHz)

Job No.: SZAWW181124004-01 Temp.(°C)/Hum.(%RH): 25.2°C/52%RH
Standard: FCC PART 15C Power Source: DC 3.7V battery inside
Test Mode: Mode 2 Polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	41.7129	31.01	-13.87	17.14	40.00	-22.86	peak			
2	59.4405	32.28	-16.96	15.32	40.00	-24.68	peak			
3	67.6751	32.28	-19.91	12.37	40.00	-27.63	peak			
4	98.1419	26.75	-15.94	10.81	43.50	-32.69	peak			
5	240.8304	27.74	-14.50	13.24	46.00	-32.76	peak			
6	530.1014	33.83	-10.44	23.39	46.00	-22.61	peak			

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
2402.0000	95.59	31.12	2.18	35.33	93.56	114.00	-20.44	V	Peak
2402.0000	83.26	31.12	2.18	35.33	81.23	94.00	-12.77	V	AVG
4804.0000	49.46	34.01	2.58	34.65	51.40	74.00	-22.60	V	Peak
4804.0000	39.77	34.01	2.58	34.65	41.71	54.00	-12.29	V	AVG
7206.0000	46.18	36.16	2.97	35.07	50.24	74.00	-23.76	V	Peak
7206.0000	36.97	36.16	2.97	35.07	41.03	54.00	-12.97	V	AVG
9608.0000	*								
12010.0000	*								
14412.0000	*								
16814.0000	*								
2402.0000	94.75	31.12	2.18	35.33	92.72	114.00	-21.28	H	Peak
2402.0000	83.07	31.12	2.18	35.33	81.04	94.00	-12.96	H	AVG
4804.0000	47.90	34.01	2.58	34.65	49.84	74.00	-24.16	H	Peak
4804.0000	41.67	34.01	2.58	34.65	43.61	54.00	-10.39	H	AVG
7206.0000	45.33	36.16	2.97	35.07	49.39	74.00	-24.61	H	Peak
7206.0000	35.32	36.16	2.97	35.07	39.38	54.00	-14.62	H	AVG
9608.0000	*								
12010.0000	*								
14412.0000	*								
16814.0000	*								

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: CH38 (Middle 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
2439.0000	94.43	31.12	2.20	34.51	93.24	114.00	-20.76	V	Peak
2439.0000	85.77	31.22	2.20	34.51	84.68	94.00	-9.32	V	AVG
4878.0000	48.92	34.98	2.49	34.14	52.25	74.00	-21.75	V	Peak
4878.0000	41.23	34.98	2.49	34.14	44.56	54.00	-9.44	V	AVG
7317.0000	45.37	36.01	3.01	34.56	49.83	74.00	-24.17	V	Peak
7317.0000	35.62	36.01	3.01	34.56	40.08	54.00	-13.92	V	AVG
9756.0000	*								
12195.0000	*								
14634.0000	*								
17073.0000	*								
2439.0000	95.05	31.12	2.20	34.51	93.86	114.00	-20.14	H	Peak
2439.0000	85.04	31.12	2.20	34.51	83.85	94.00	-10.15	H	AVG
4878.0000	47.42	34.98	2.49	34.14	50.75	74.00	-23.25	H	Peak
4878.0000	39.72	34.98	2.49	34.14	43.05	54.00	-10.95	H	AVG
7317.0000	48.61	36.01	3.01	34.56	53.07	74.00	-20.93	H	Peak
7317.0000	38.23	36.01	3.01	34.56	42.69	54.00	-11.31	H	AVG
9756.0000	*								
12195.0000	*								
14634.0000	*								
17073.0000	*								

Note:

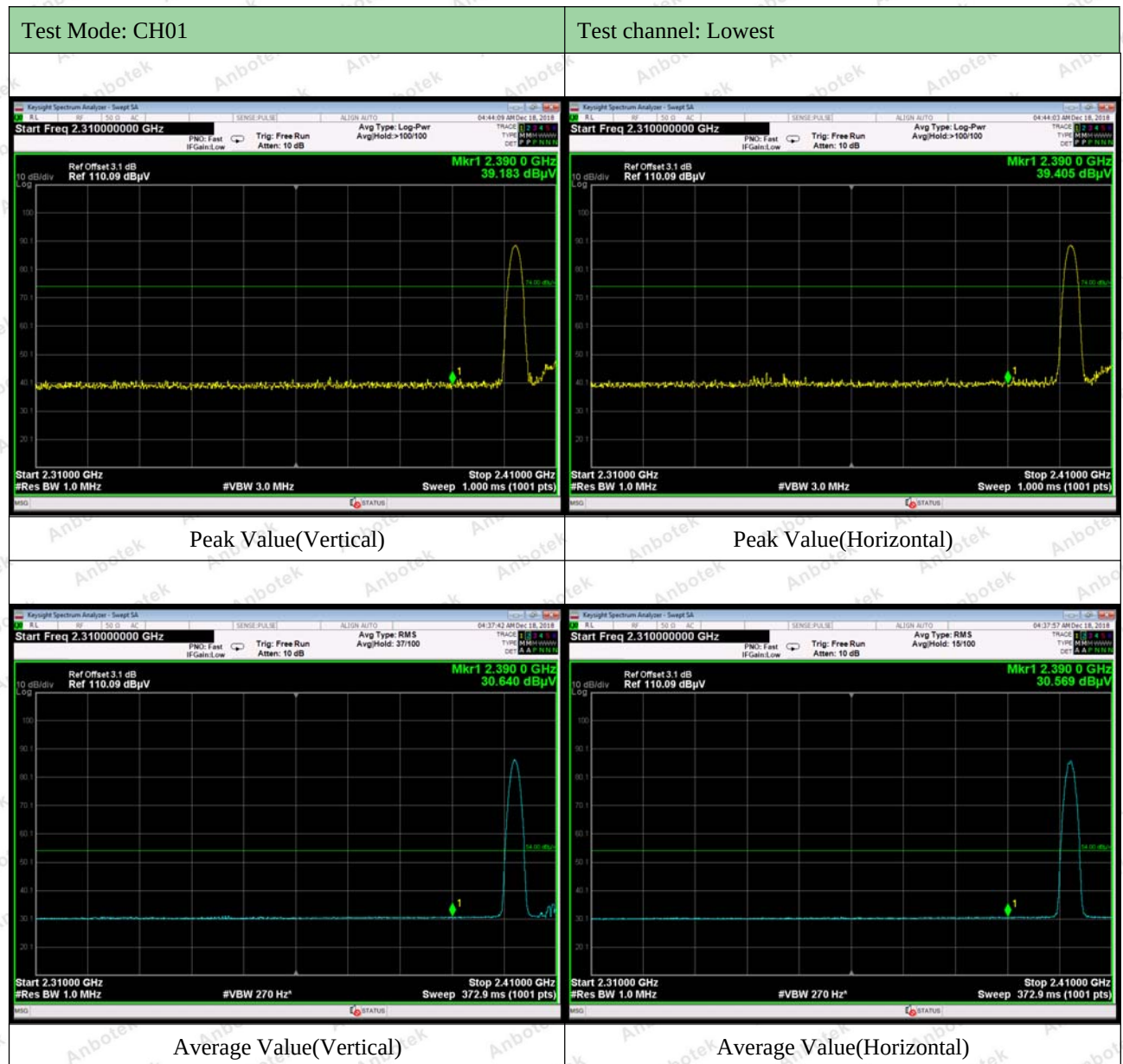
1. Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

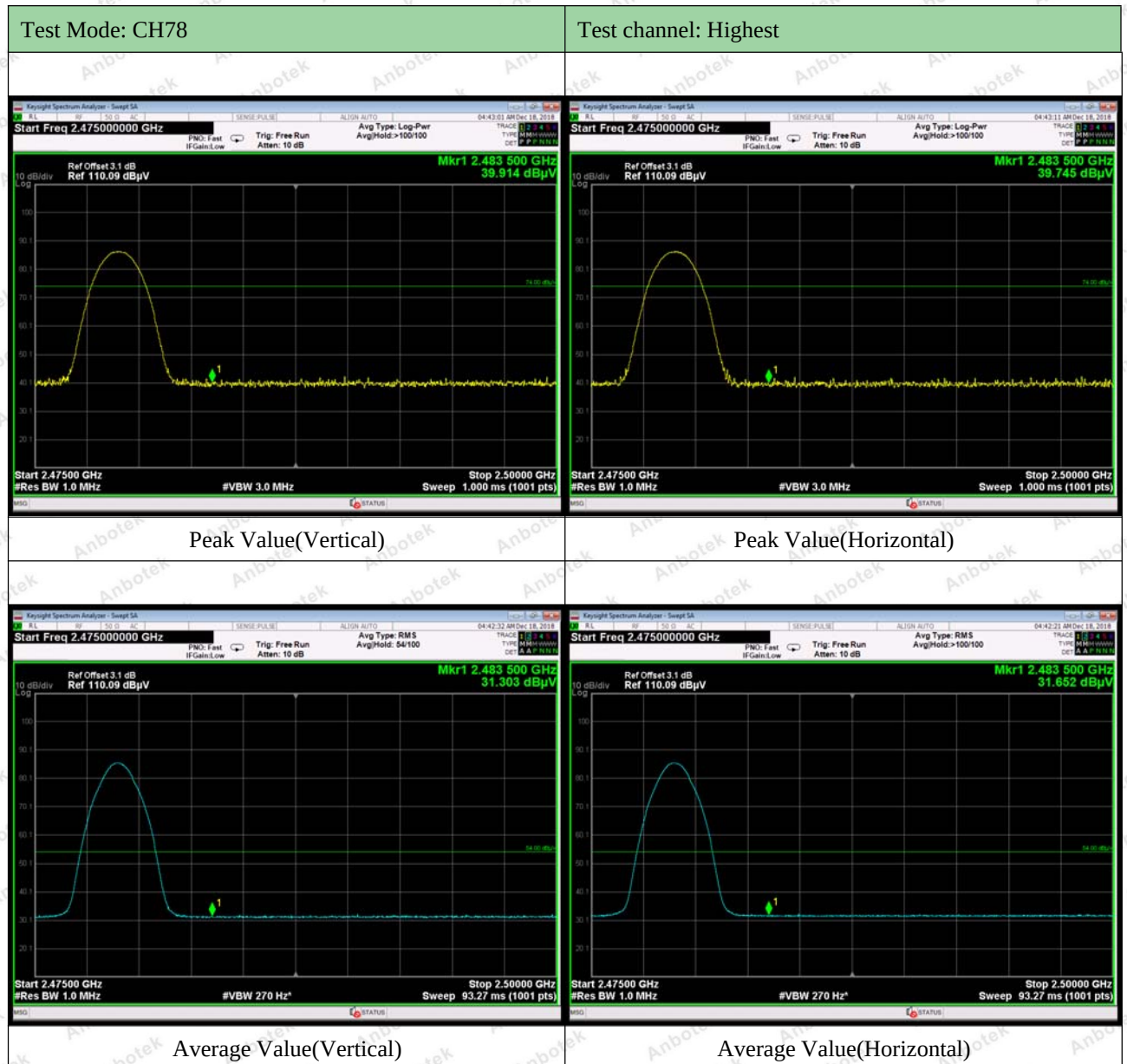
Test Mode: CH78 (High channel)									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.	Detector
2479.0000	94.78	31.65	2.23	36.07	92.59	114.00	-21.41	V	Peak
2479.0000	82.35	31.65	2.23	36.07	80.16	94.00	-13.84	V	AVG
4958.0000	49.12	35.06	2.60	34.93	51.85	74.00	-22.15	V	Peak
4958.0000	39.65	35.06	2.60	34.93	42.38	54.00	-11.62	V	AVG
7437.0000	45.05	36.19	3.12	35.11	49.25	74.00	-24.75	V	Peak
7437.0000	38.51	36.19	3.12	35.11	42.71	54.00	-11.29	V	AVG
9916.0000	*								
12395.0000	*								
14874.0000	*								
17353.0000	*								
2479.0000	95.35	31.65	2.23	36.07	93.16	114.00	-20.84	H	Peak
2479.0000	82.87	31.65	2.23	36.07	80.68	94.00	-13.32	H	AVG
4958.0000	49.55	35.06	2.60	34.93	52.28	74.00	-21.72	H	Peak
4958.0000	40.55	35.06	2.60	34.93	43.28	54.00	-10.72	H	AVG
7437.0000	47.57	36.19	3.12	35.11	51.77	74.00	-22.23	H	Peak
7437.0000	35.76	36.19	3.12	35.11	39.96	54.00	-14.04	H	AVG
9916.0000	*								
12395.0000	*								
14874.0000	*								
17353.0000	*								

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:

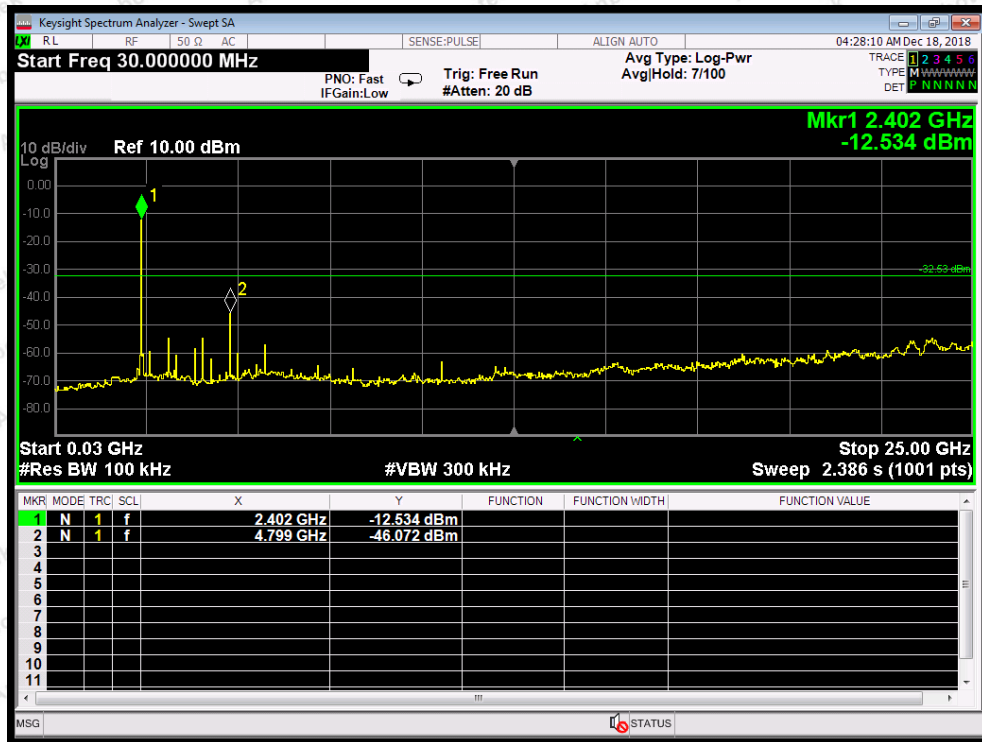




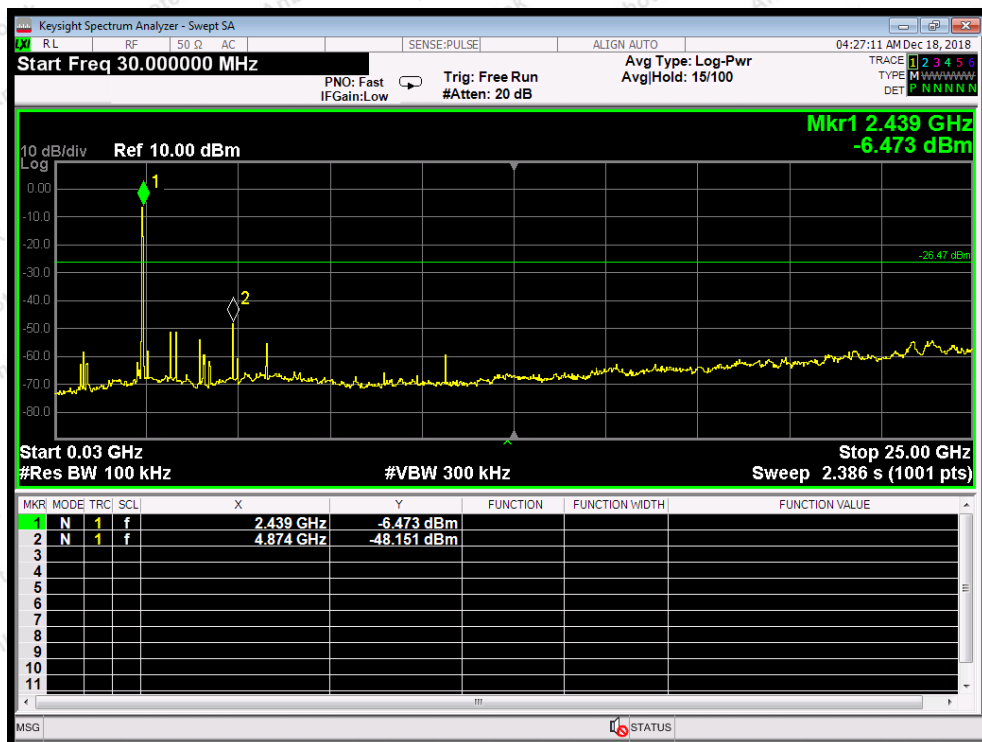
Remark:

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

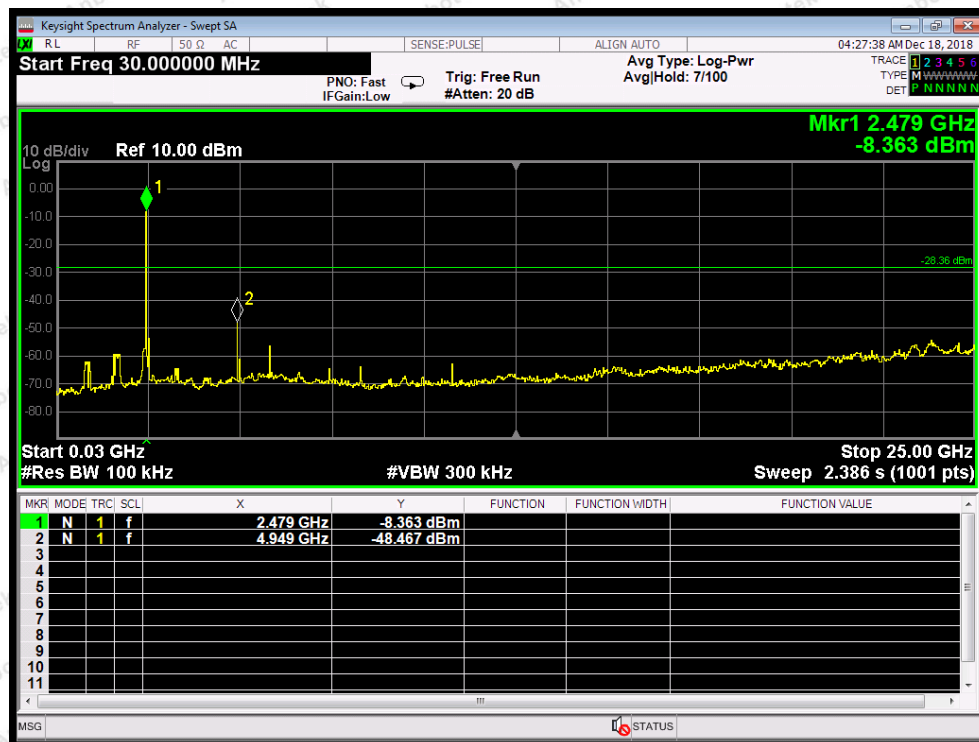
Conducted Emission Method



CH: Low



CH: Middle



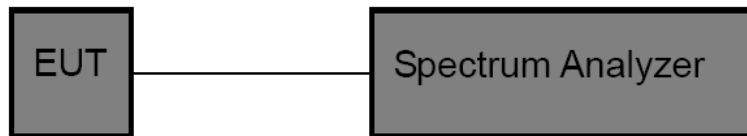
CH: High

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



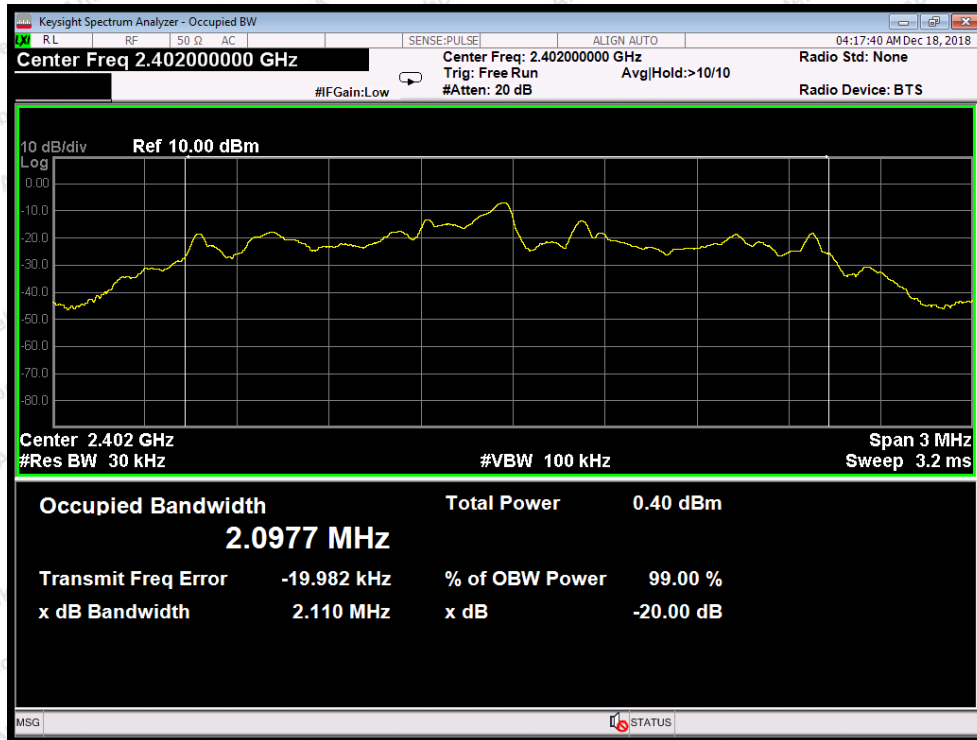
5.3. Test Procedure

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 ≥ 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.

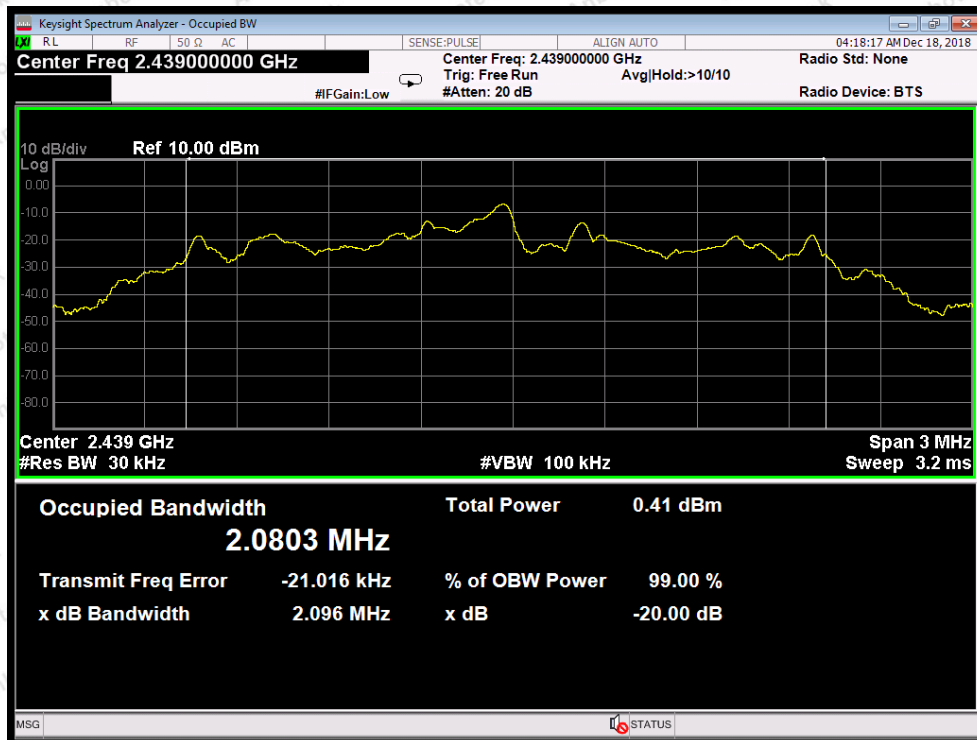
5.4. Test Data

Test Item	: 20dB Bandwidth	Test Mode	: Mode 1
Test Voltage	: DC 3.7V battery inside	Temperature	: 24°C
Test Result	: PASS	Humidity	: 55%RH

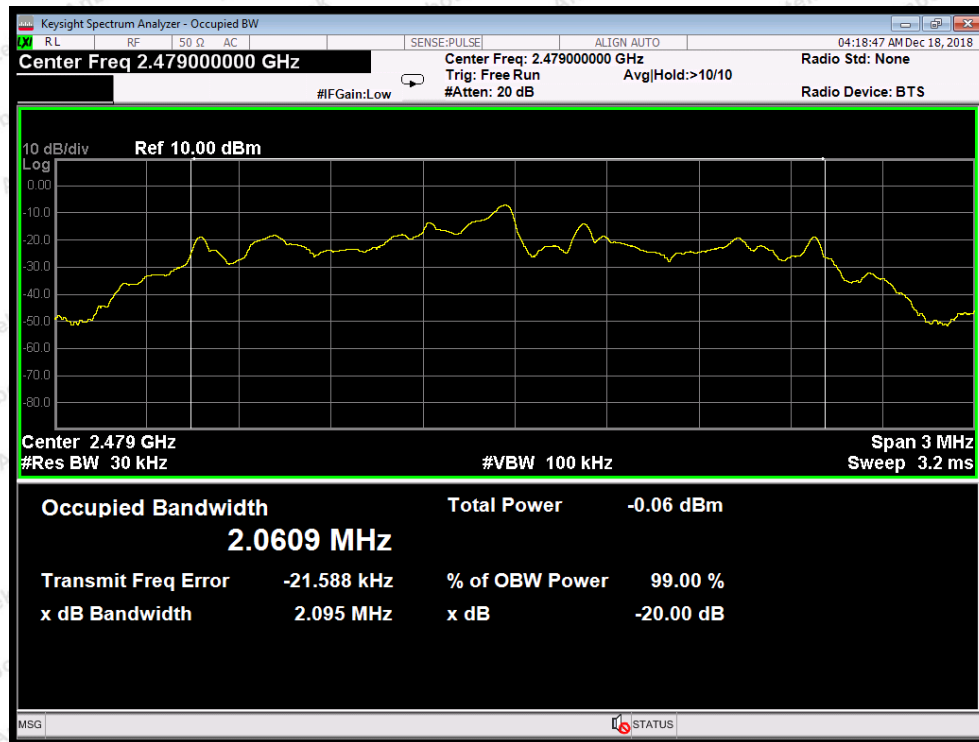
Frequency (MHz)	Bandwidth (kHz)	Result
2402MHZ	2110	PASS
2439MHZ	2096	PASS
2479MHZ	2095	PASS



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	1) 15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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.

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.

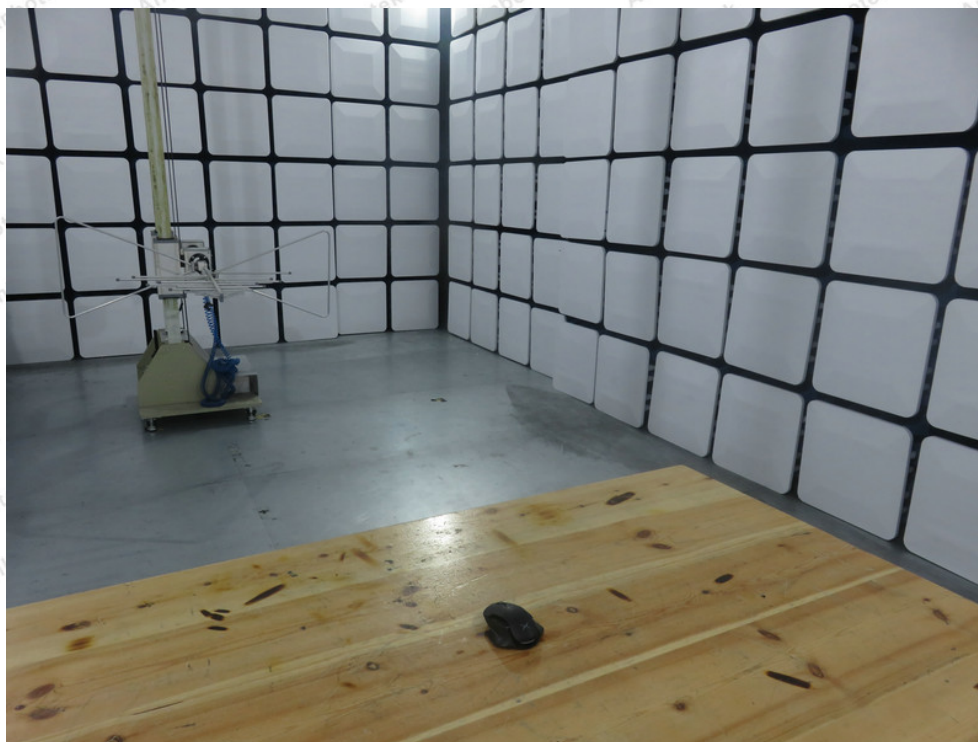


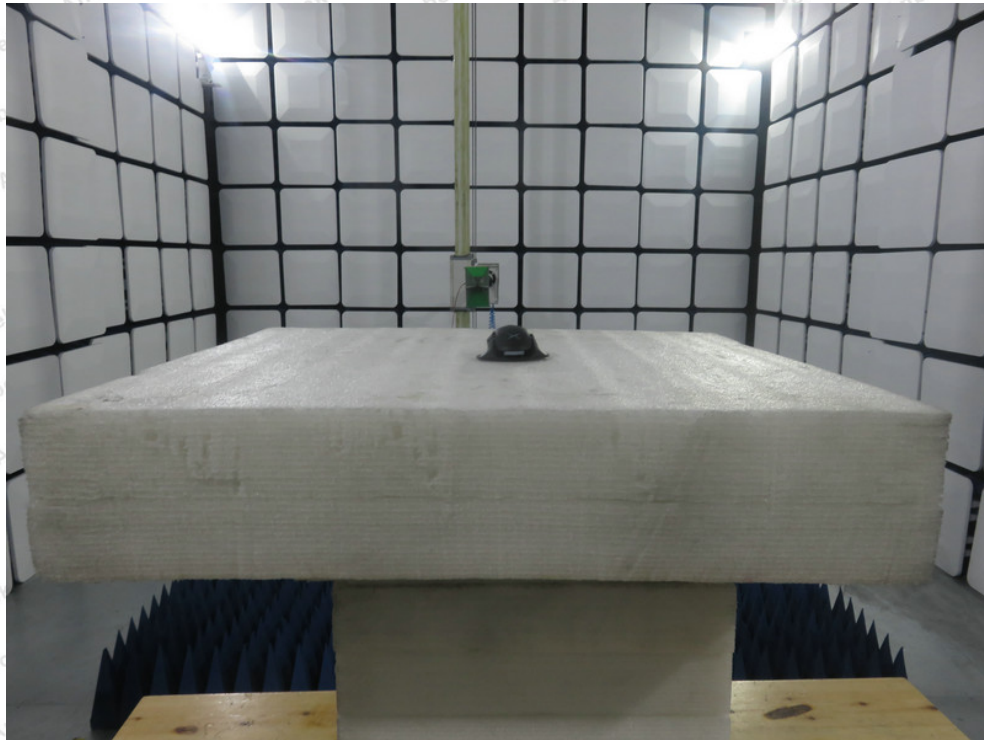
APPENDIX I -- TEST SETUP PHOTOGRAPH

Photo of Conducted Emission Measurement

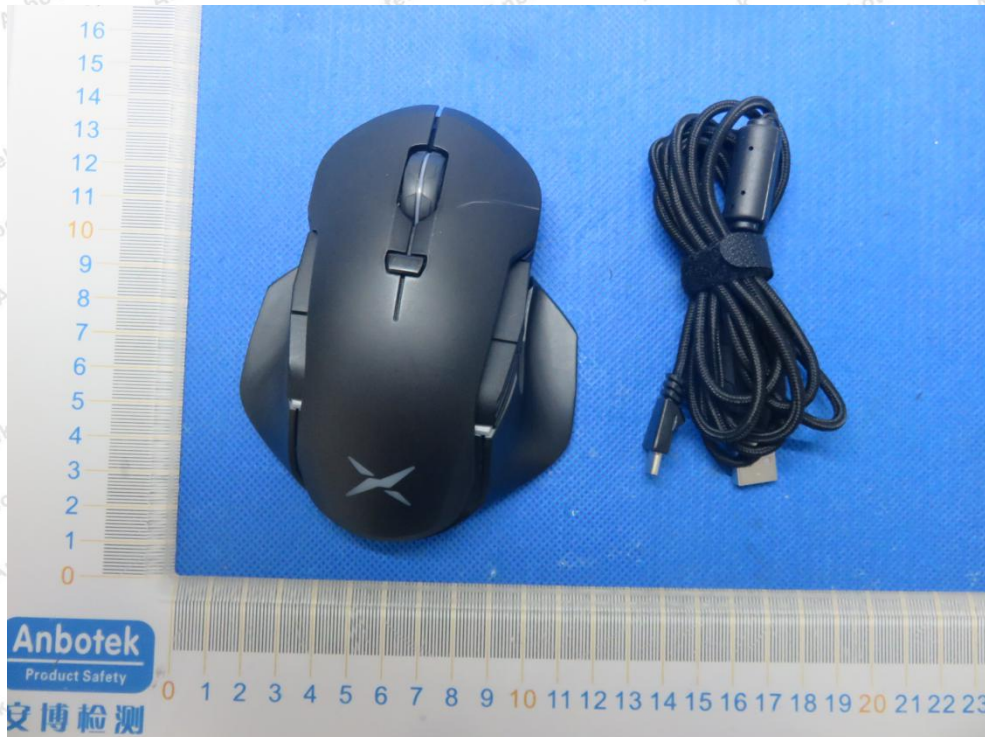


Photo of Radiation Emission Test





APPENDIX II -- EXTERNAL PHOTOGRAPH

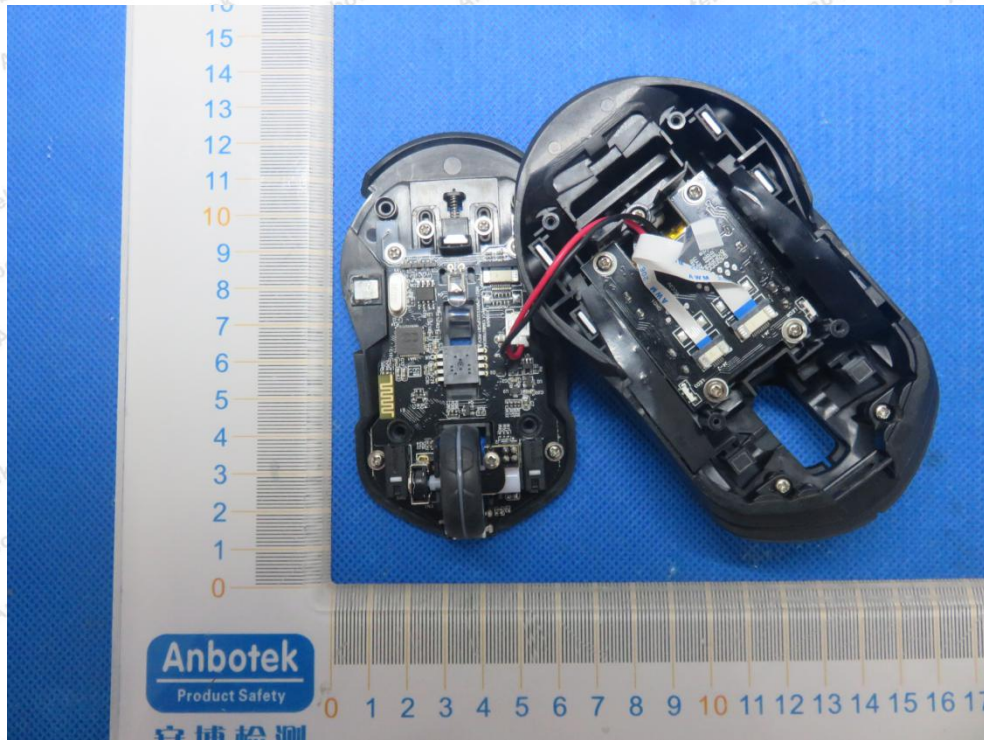


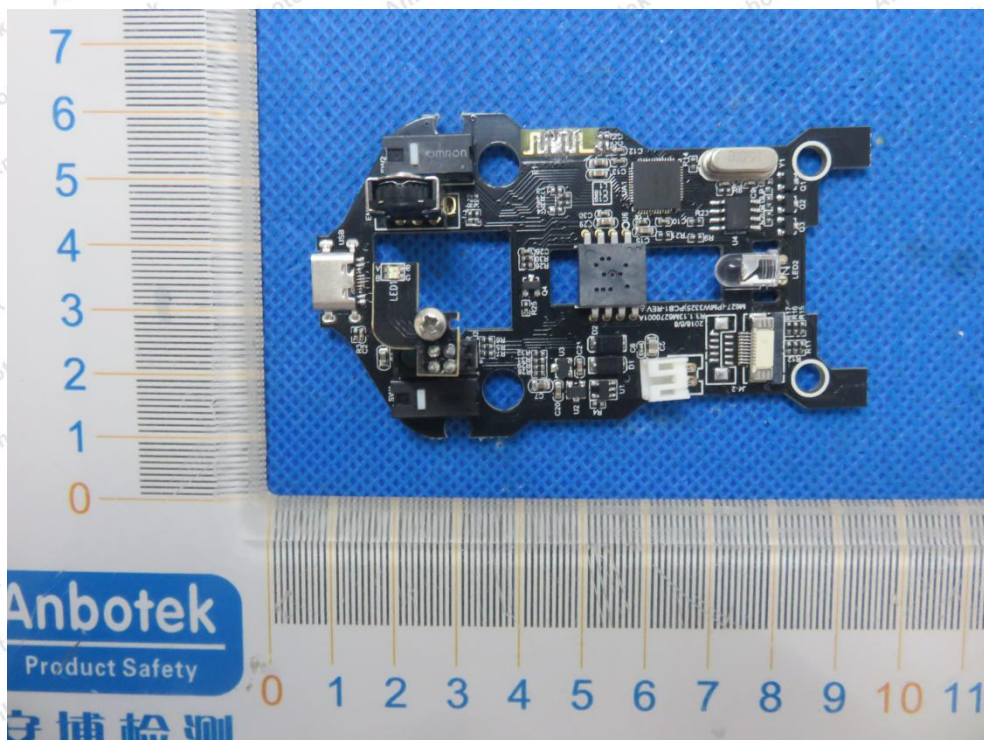
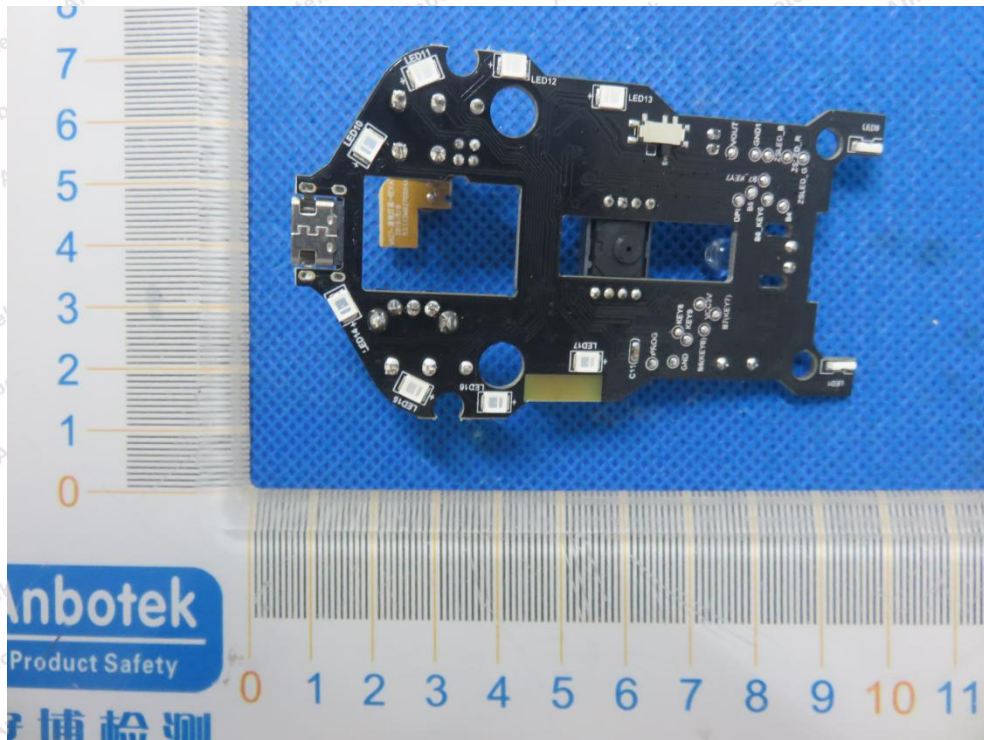


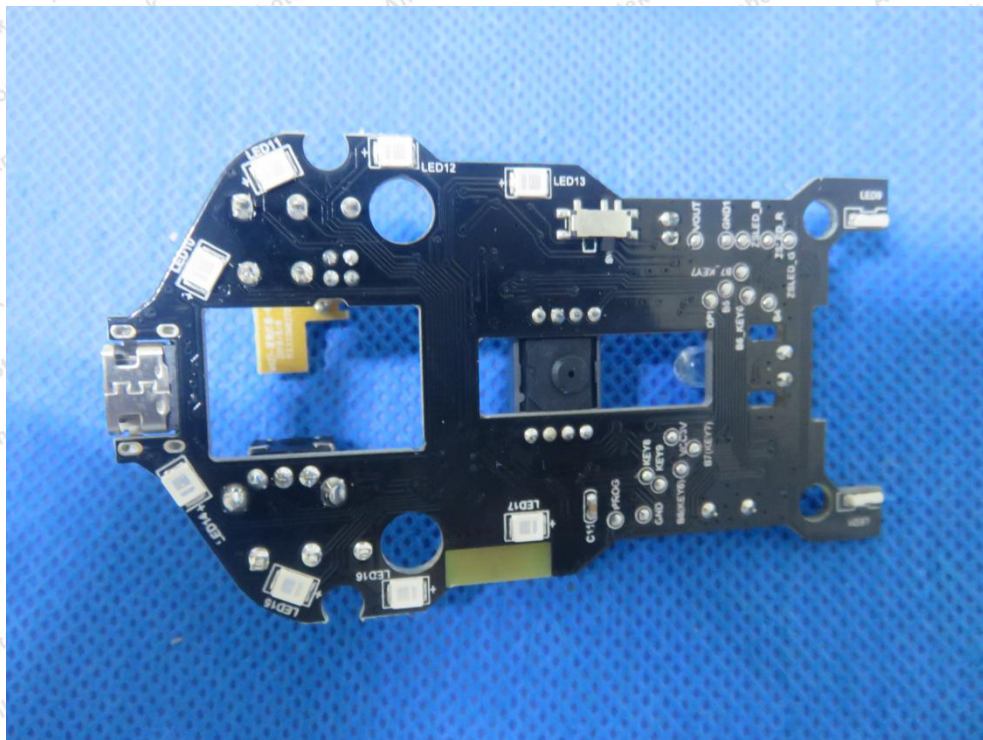
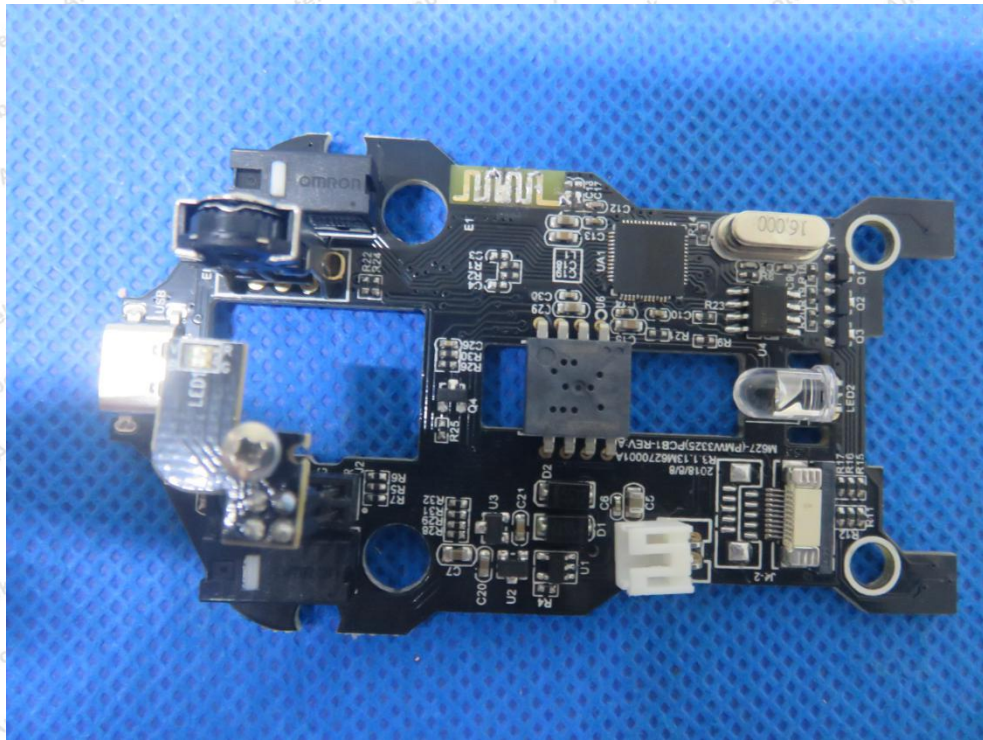


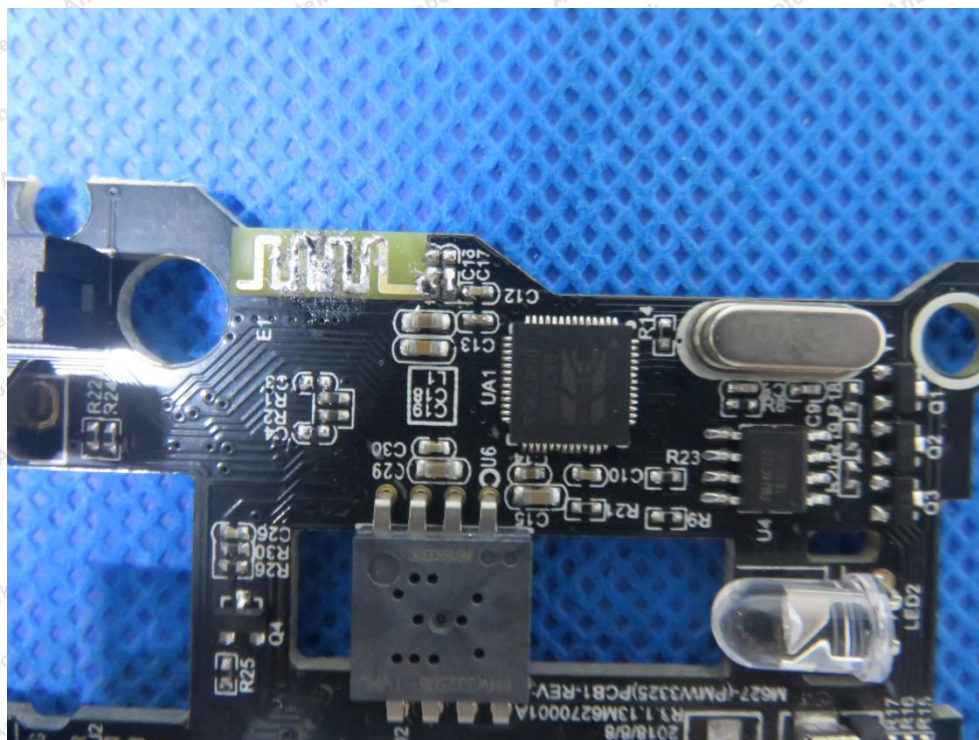


APPENDIX III -- INTERNAL PHOTOGRAPH









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