

FCC TEST REPORT

Client Name : Shenzhen Yincheng Technology Co.,Ltd

Address : 6-18 Xinhe Ave, Xinqiao Street, Bao'an District,
Shenzhen, China

Product Name : Multi-host mechanical keyboard

Date : Mar. 03, 2022



Shenzhen Anbotech Compliance Laboratory Limited



Contents

1. General Information.....	4
1.1. Client Information.....	4
1.2. Description of Device (EUT).....	4
1.3. Auxiliary Equipment Used During Test.....	5
1.4. Description of Test Modes.....	5
1.5. List of Channels.....	6
1.6. Description of Test Setup.....	7
1.7. Test Equipment List.....	8
1.8. Measurement Uncertainty.....	9
1.9. Description of Test Facility.....	9
2. Summary of Test Results.....	10
3. Conducted Emission Test.....	11
3.1. Test Standard and Limit.....	11
3.2. Test Setup.....	11
3.3. Test Procedure.....	11
3.4. Test Data.....	11
4. Radiated Emission and Band Edge.....	16
4.1. Test Standard and Limit.....	16
4.2. Test Setup.....	17
4.3. Test Procedure.....	18
4.4. Test Data.....	18
5. 20dB Bandwidth Test.....	35
5.1. Test Standard and Limit.....	35
5.2. Test Setup.....	35
5.3. Test Procedure.....	35
5.4. Test Data.....	35
6. Antenna Requirement.....	38
6.1. Test Standard and Requirement.....	38
6.2. Antenna Connected Construction.....	38
APPENDIX I -- TEST SETUP PHOTOGRAPH.....	39
APPENDIX II -- EXTERNAL PHOTOGRAPH.....	41
APPENDIX III -- INTERNAL PHOTOGRAPH.....	41



TEST REPORT

Applicant : Shenzhen Yincheng Technology Co.,Ltd
Manufacturer : Shenzhen Yincheng Technology Co.,Ltd
Product Name : Multi-host mechanical keyboard
Model No. : 3068B, 3084B
Trade Mark : AKKO
Input: DC 5V, 1A
Rating(s) : 3068B battery capacity: DC 3.7V, 1800mAh
3084B battery capacity: DC 3.7V, 3000mAh

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

Test Method(s) : ANSI C63.10: 2020

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 Receipt

Feb. 11, 2022

Date of Test

Feb. 11~Mar. 03, 2022

Prepared by

Tu Tu Hong

(TuTu Hong)

Approved & Authorized Signer

Kingkong Jin

(Kingkong Jin)

1. General Information

1.1. Client Information

Applicant	:	Shenzhen Yincheng Technology Co.,Ltd
Address	:	6-18 Xinhe Ave, Xinqiao Street, Bao'an District, Shenzhen, China
Manufacturer	:	Shenzhen Yincheng Technology Co.,Ltd
Address	:	6-18 Xinhe Ave, Xinqiao Street, Bao'an District, Shenzhen, China
Factory	:	Shenzhen Yincheng Technology Co.,Ltd
Address	:	6-18 Xinhe Ave, Xinqiao Street, Bao'an District, Shenzhen, China

1.2. Description of Device (EUT)

Product Name	:	Multi-host mechanical keyboard
Model No.	:	3068B, 3084B (Note: All samples are the same except the size and number of keyboard keys, battery capacity, so we prepare "3068B" for test only.)
Trade Mark	:	AKKO
Test Power Supply	:	AC 120V, 60Hz for adapter / DC 3.7V Battery inside
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)
Product Description	Operation Frequency:	BT: 2402-2480MHZ SRD: 2402-2479MHZ
	Number of Channel:	BT BDR: 79 Channels BT BLE: 40 Channels SRD: 78Channels
	Modulation Type:	BT BDR+EDR: GFSK BT BLE: GFSK SRD: GFSK
	Antenna Type:	BT+SRD: PCB Antenna
	Antenna Gain(Peak):	BT/SRD: 1.58dBi (Provided by customer)
	Adapter:	N/A
Remark: 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. 2) This report is for SRD module.		

1.3. Auxiliary Equipment Used During Test

Adapter	:	M/N: A2023 Input: AC 100-240V 0.7A 50-60Hz USB1 Output: DC 5V 2.4A USB2 Output: DC 5V 2.4A
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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	CH01
Mode 2	CH45
Mode 3	CH78

For Conducted Emission	
Final Test Mode	Description
Mode 1	CH01
Mode 2	CH45
Mode 3	CH78

For Radiated Emission	
Final Test Mode	Description
Mode 1	CH01
Mode 2	CH45
Mode 3	CH78

Note:

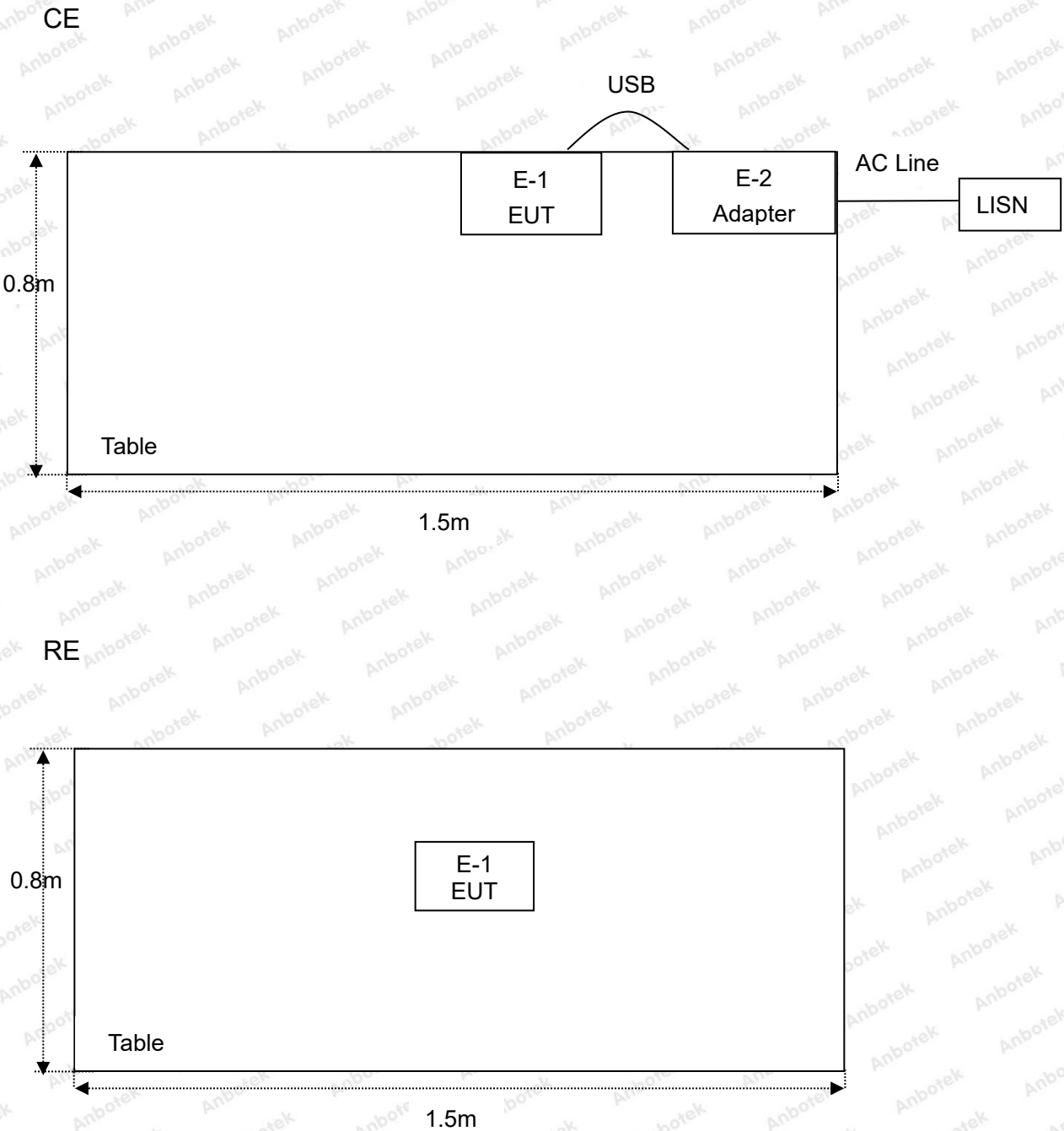
1. The engineering test program was provided and the EUT was programmed to be in continuously transmitting mode.



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



1.7. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Three Phase V-type Artificial Power Network	CYBERTEK	EM5040DT	E215040DT001	Jul 05, 2021	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Oct. 22, 2021	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESR26	101481	Oct. 22, 2021	1 Year
4.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Oct. 22, 2021	1 Year
5.	MAX Spectrum Analysis	Agilent	N9020A	MY51170037	Oct. 22, 2021	1 Year
6.	Preamplifier	SKET Electronic	BK1G18G30 D	KD17503	Oct. 22, 2021	1 Year
7.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Oct. 22, 2021	2 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Oct. 22, 2021	2 Year
9.	Loop Antenna	Schwarzbeck	FMZB1519B	00053	Oct. 22, 2021	2 Year
10.	Horn Antenna	A-INFO	LB-180400-K F	J211060628	Oct. 22, 2021	2 Year
11.	Pre-amplifier	SONOMA	310N	186860	Oct. 22, 2021	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	Oct. 22, 2021	1 Year
14.	Power Sensor	DAER	RPR3006W	15I00041SN045	Oct. 22, 2021	1 Year
15.	Power Sensor	DAER	RPR3006W	15I00041SN046	Oct. 22, 2021	1 Year
16.	MXA Spectrum Analysis	KEYSIGHT	N9020A	MY53280032	Oct. 22, 2021	1 Year
17.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Oct. 22, 2021	1 Year
18.	Signal Generator	Agilent	E4421B	MY41000743	Oct. 22, 2021	1 Year
19.	DC Power Supply	IVYTECH	IV3605	1804D360510	Oct. 22, 2021	1 Year
20.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80 B	N/A	Oct. 22, 2021	1 Year



1.8. Measurement Uncertainty

Radiation Uncertainty	:	Ur = 3.9 dB (Horizontal)
		Ur = 3.8 dB (Vertical)
Conduction Uncertainty	:	Uc = 3.4 dB

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.

ISED-Registration No.: 8058A

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.

Test Location

Shenzhen Anbotek 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.		



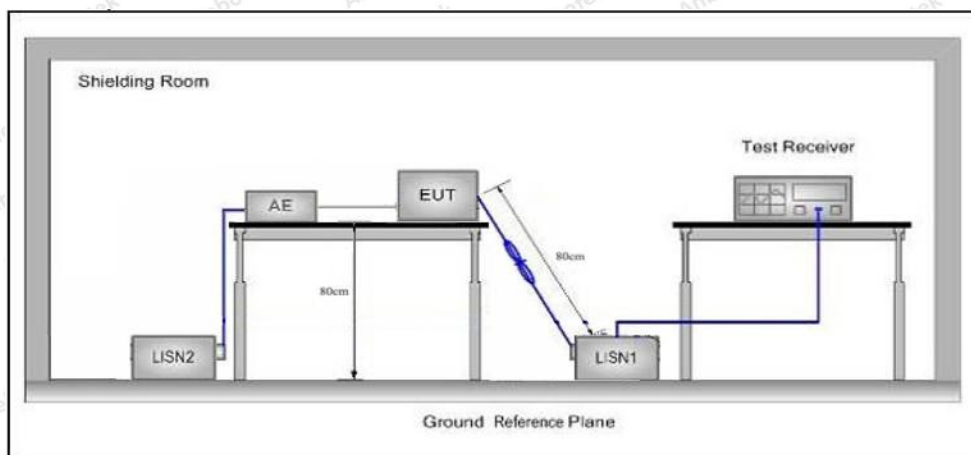
3. Conducted Emission Test

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 C63.10-2020 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

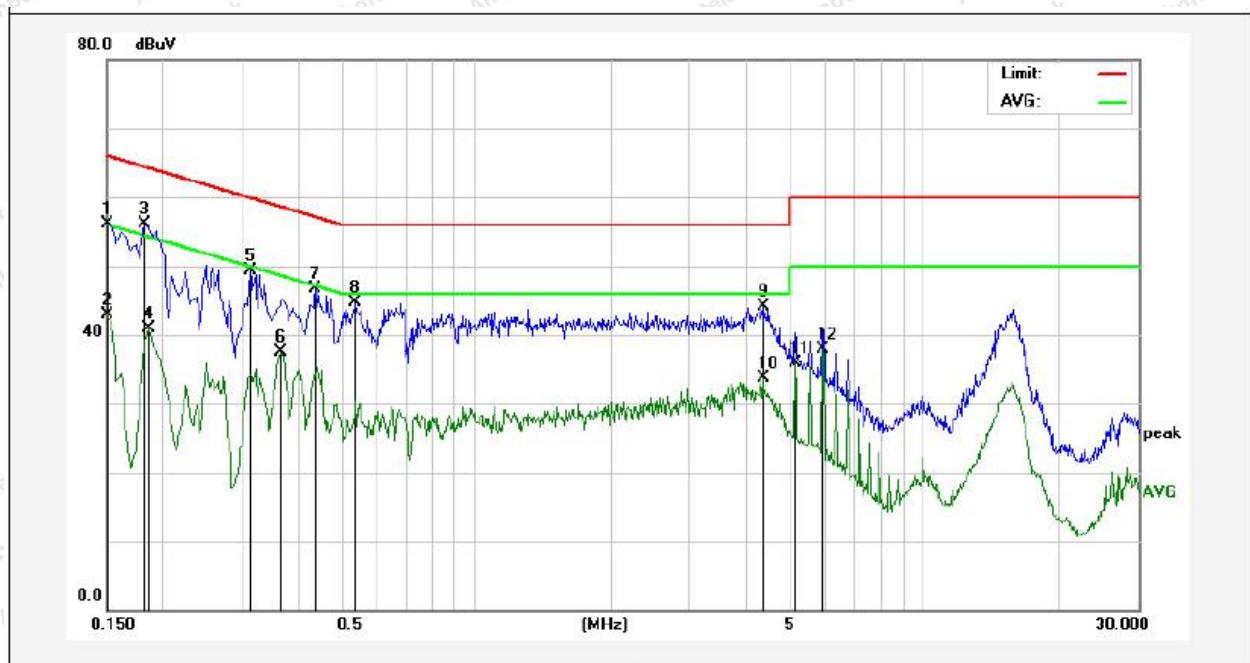
3.4. Test Data

During the test, pre-scan all the modes, only the worst case is recorded in the report.

Please to see the following pages.

Conducted Emission Test Data

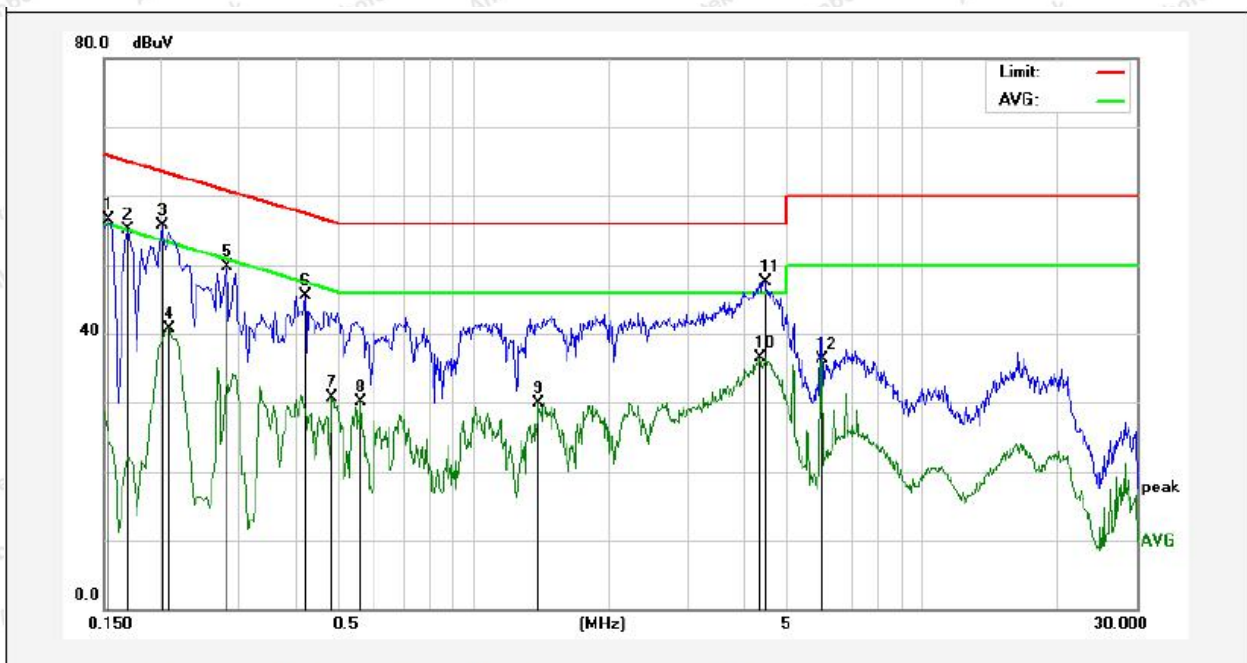
Test Site: 1# Shielded Room
Test Model: 3068B
Operating Condition: CH01
Test Specification: AC 120V, 60Hz for adapter
Comment: Live Line
Tem.: 23.1°C Hum.: 49%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1500	55.98	0.11	56.09	66.00	-9.91	QP	
2	0.1500	42.79	0.11	42.90	56.00	-13.10	AVG	
3	0.1819	55.93	0.12	56.05	64.39	-8.34	QP	
4	0.1860	40.88	0.12	41.00	54.21	-13.21	AVG	
5	0.3140	49.21	0.13	49.34	59.86	-10.52	QP	
6	0.3660	37.45	0.12	37.57	48.59	-11.02	AVG	
7	0.4380	46.51	0.13	46.64	57.10	-10.46	QP	
8	0.5380	44.48	0.15	44.63	56.00	-11.37	QP	
9	4.3699	43.96	0.11	44.07	56.00	-11.93	QP	
10	4.3699	33.68	0.11	33.79	46.00	-12.21	AVG	
11	5.1659	35.77	0.11	35.88	50.00	-14.12	AVG	
12	5.9579	37.70	0.11	37.81	50.00	-12.19	AVG	

Conducted Emission Test Data

Test Site: 1# Shielded Room
Test Model: 3068B
Operating Condition: CH01
Test Specification: AC 120V, 60Hz for adapter
Comment: Neutral Line
Tem.: 23.1°C Hum.: 49%

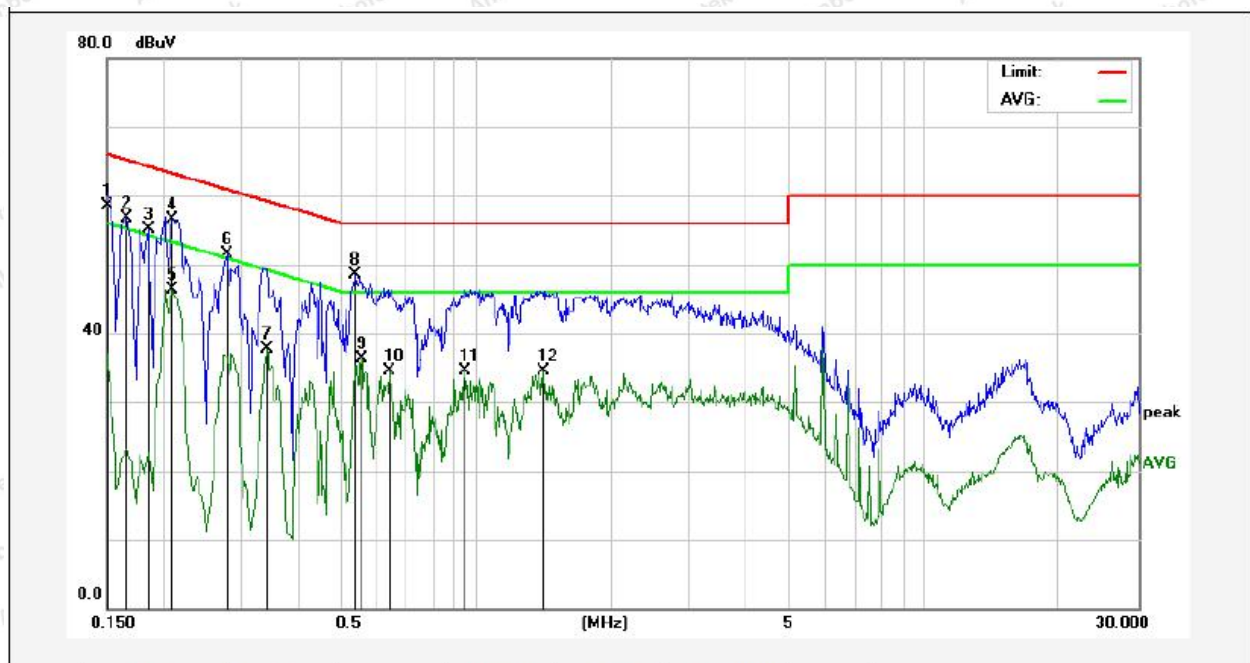


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1539	56.33	0.12	56.45	65.78	-9.33	QP	
2	0.1700	54.93	0.12	55.05	64.96	-9.91	QP	
3	0.2020	55.52	0.12	55.64	63.52	-7.88	QP	
4	0.2100	40.65	0.12	40.77	53.20	-12.43	AVG	
5	0.2819	49.61	0.13	49.74	60.76	-11.02	QP	
6	0.4220	45.33	0.12	45.45	57.41	-11.96	QP	
7	0.4860	30.56	0.14	30.70	46.24	-15.54	AVG	
8	0.5620	29.97	0.15	30.12	46.00	-15.88	AVG	
9	1.4020	29.83	0.14	29.97	46.00	-16.03	AVG	
10	4.3580	36.42	0.11	36.53	46.00	-9.47	AVG	
11	4.4699	47.39	0.11	47.50	56.00	-8.50	QP	
12	5.9620	36.12	0.11	36.23	50.00	-13.77	AVG	



Conducted Emission Test Data

Test Site: 1# Shielded Room
Test Model: 3084B
Operating Condition: CH01
Test Specification: AC 120V, 60Hz for adapter
Comment: Live Line
Tem.: 23.1°C Hum.: 49%

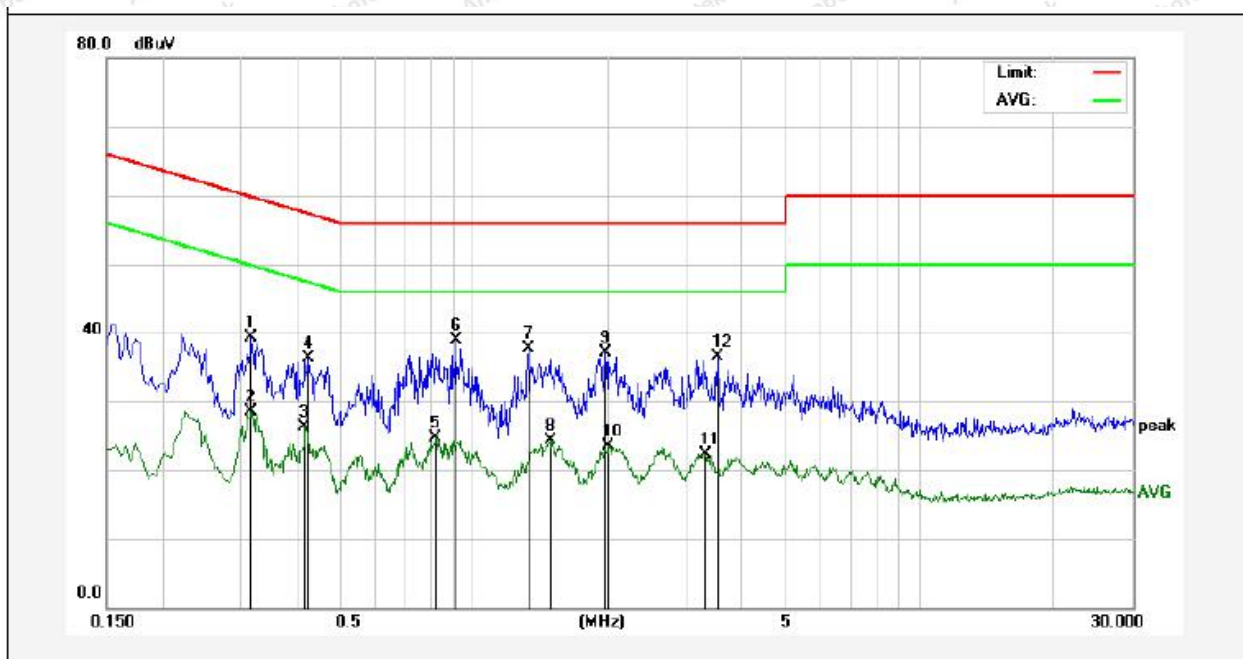


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1500	58.33	0.11	58.44	65.99	-7.55	QP	
2	0.1660	56.65	0.12	56.77	65.15	-8.38	QP	
3	0.1860	54.97	0.12	55.09	64.21	-9.12	QP	
4	0.2100	56.47	0.12	56.59	63.20	-6.61	QP	
5	0.2100	46.15	0.12	46.27	53.20	-6.93	AVG	
6	0.2779	51.43	0.13	51.56	60.88	-9.32	QP	
7	0.3420	37.50	0.12	37.62	49.15	-11.53	AVG	
8	0.5380	48.32	0.15	48.47	56.00	-7.53	QP	
9	0.5580	36.15	0.15	36.30	46.00	-9.70	AVG	
10	0.6419	34.29	0.15	34.44	46.00	-11.56	AVG	
11	0.9460	34.32	0.15	34.47	46.00	-11.53	AVG	
12	1.4180	34.37	0.14	34.51	46.00	-11.49	AVG	



Conducted Emission Test Data

Test Site: 1# Shielded Room
 Test Model: 3084B
 Operating Condition: CH01
 Test Specification: AC 120V, 60Hz for adapter
 Comment: Neutral Line
 Tem.: 23.1℃ Hum.: 49%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.3180	19.38	19.90	39.28	59.76	-20.48	QP	
2	0.3180	8.56	19.90	28.46	49.76	-21.30	AVG	
3	0.4180	6.44	19.94	26.38	47.49	-21.11	AVG	
4	0.4260	16.29	19.95	36.24	57.33	-21.09	QP	
5	0.8260	4.61	20.07	24.68	46.00	-21.32	AVG	
6	0.9100	18.88	20.10	38.98	56.00	-17.02	QP	
7	1.3260	17.50	20.13	37.63	56.00	-18.37	QP	
8	1.4819	4.18	20.13	24.31	46.00	-21.69	AVG	
9	1.9780	17.04	20.14	37.18	56.00	-18.82	QP	
10	2.0100	3.43	20.14	23.57	46.00	-22.43	AVG	
11	3.2980	2.07	20.17	22.24	46.00	-23.76	AVG	
12	3.5220	16.33	20.17	36.50	56.00	-19.50	QP	



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

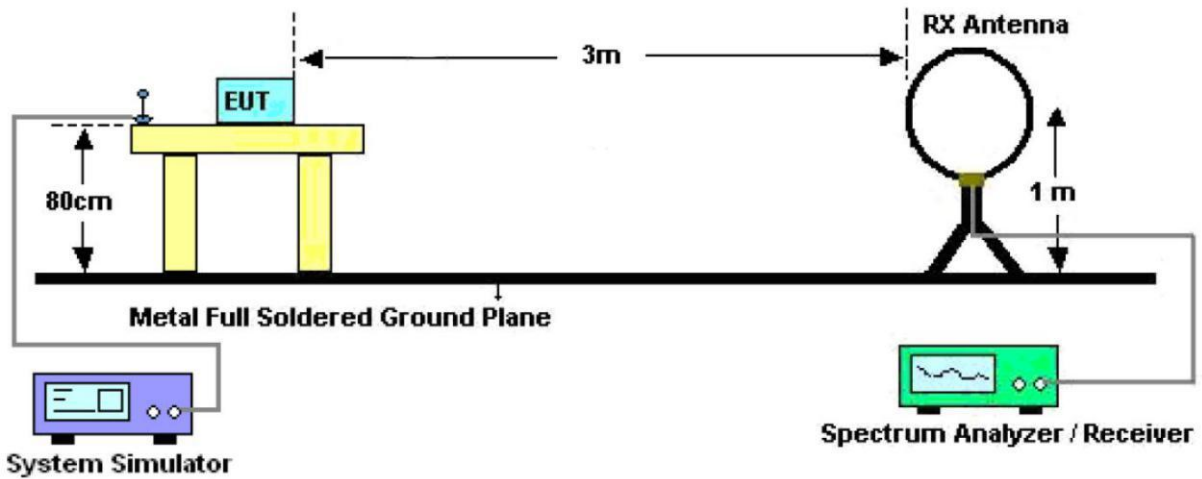


Figure 2. 30MHz to 1GHz

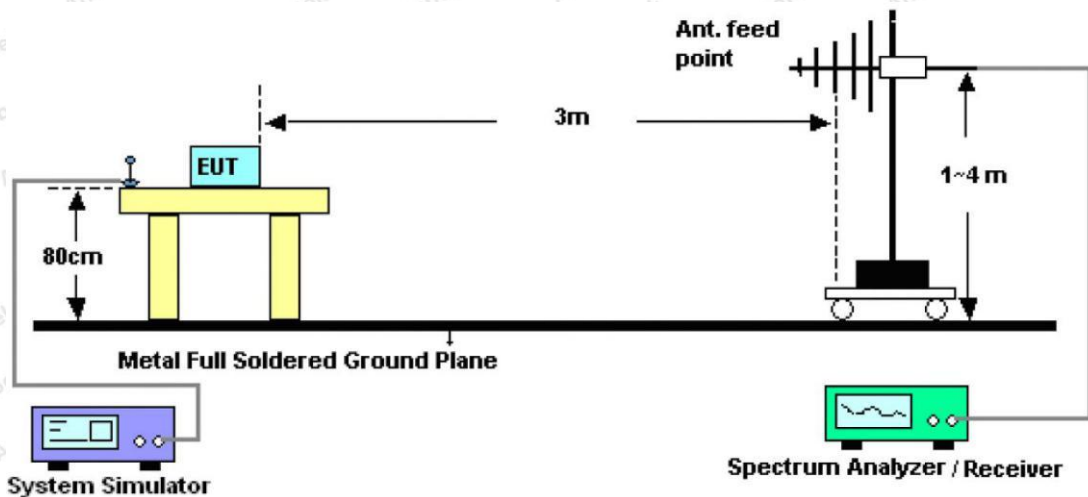
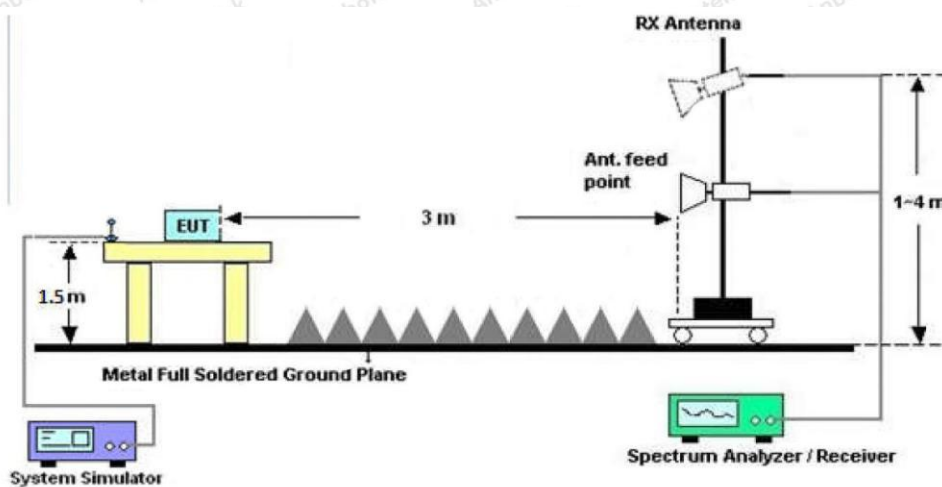


Figure 3. Above 1 GHz



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 modes, only the worst case is recorded in the report.

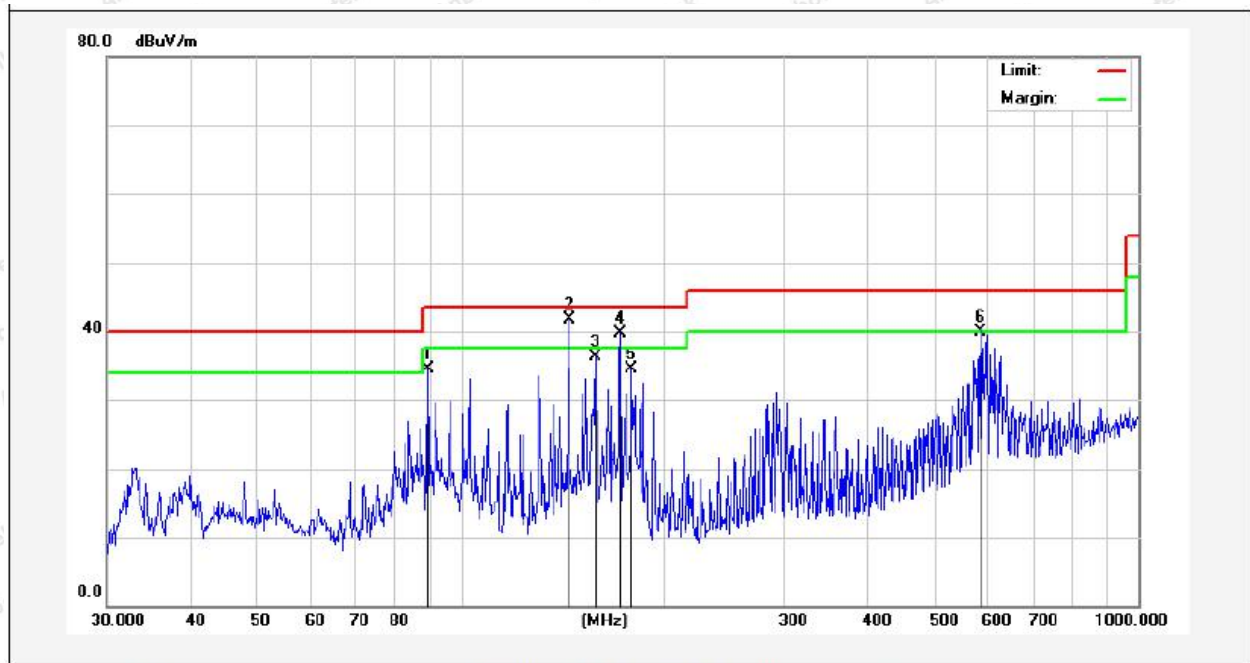
Report No.: 18220WC20016503

FCC ID: 2A4K8-3068B

Page19 of 41

Test Results (30~1000MHz)

Test Model: 3068B
 Test Mode: CH01
 Power Source: DC 3.7V battery inside
 Polarization: Vertical
 Temp.(°C)/Hum.(%RH): 21.5°C/49%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	89.2764	52.23	-17.71	34.52	43.50	-8.98	QP			
2	144.3348	63.80	-22.14	41.66	43.50	-1.84	QP			
3	158.1123	58.13	-21.74	36.39	43.50	-7.11	QP			
4	171.9946	60.82	-21.02	39.80	43.50	-3.70	QP			
5	178.7584	55.15	-20.66	34.49	43.50	-9.01	QP			
6	584.7895	50.90	-10.90	40.00	46.00	-6.00	QP			



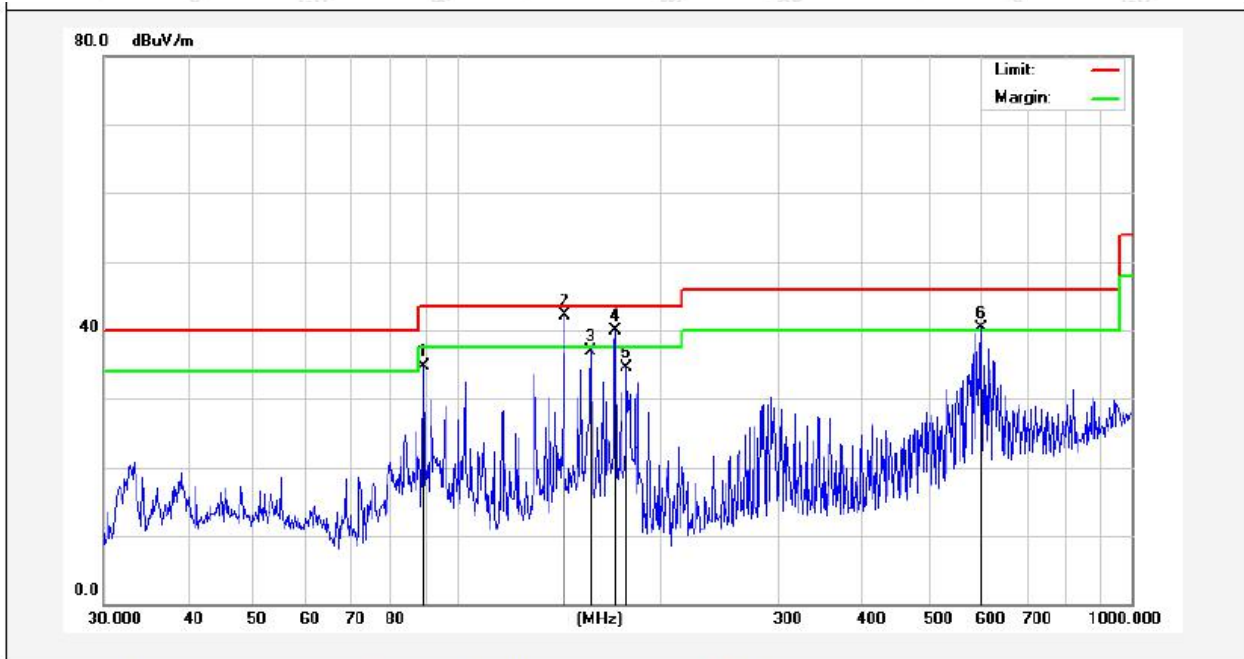
Report No.: 18220WC20016503

FCC ID: 2A4K8-3068B

Page20 of 41

Test Results (30~1000MHz)

Test Model: 3068B
Test Mode: CH01
Power Source: DC 3.7V battery inside
Polarization: Horizontal
Temp.(°C)/Hum.(%RH): 21.5°C/49%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	89.2764	52.37	-17.71	34.66	43.50	-8.84	QP			
2	144.3348	64.28	-22.14	42.14	43.50	-1.36	QP			
3	158.1123	58.74	-21.74	37.00	43.50	-6.50	QP			
4	171.9946	60.86	-21.02	39.84	43.50	-3.66	QP			
5	178.7584	55.10	-20.66	34.44	43.50	-9.06	QP			
6	599.3212	50.91	-10.54	40.37	46.00	-5.63	QP			



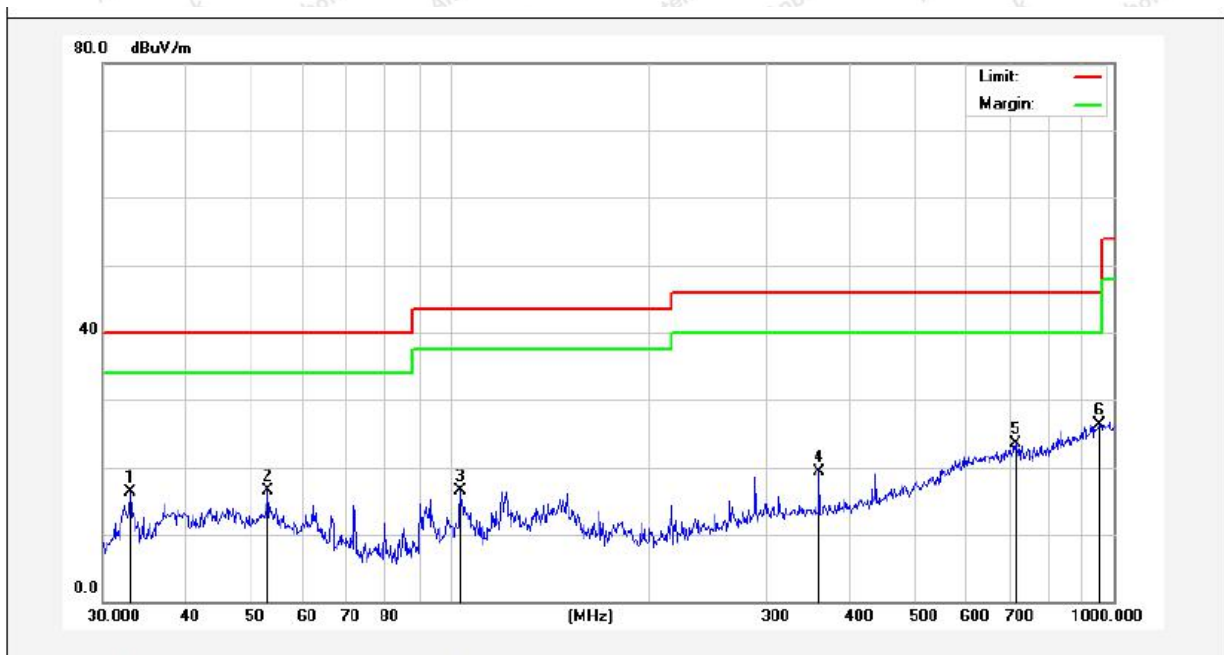
Report No.: 18220WC20016503

FCC ID: 2A4K8-3068B

Page 21 of 41

Test Results (30~1000MHz)

Test Model: 3084B
 Test Mode: Mode 1
 Power Source: DC 3.7V battery inside
 Polarization: Vertical
 Temp.(°C)/Hum.(%RH): 21.5°C/49%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	32.9791	33.72	-17.48	16.24	40.00	-23.76	QP			
2	53.1313	33.40	-16.93	16.47	40.00	-23.53	QP			
3	103.8055	33.59	-17.18	16.41	43.50	-27.09	QP			
4	360.4476	34.15	-14.88	19.27	46.00	-26.73	QP			
5	711.6734	33.33	-9.76	23.57	46.00	-22.43	QP			
6	952.0937	31.94	-5.61	26.33	46.00	-19.67	QP			



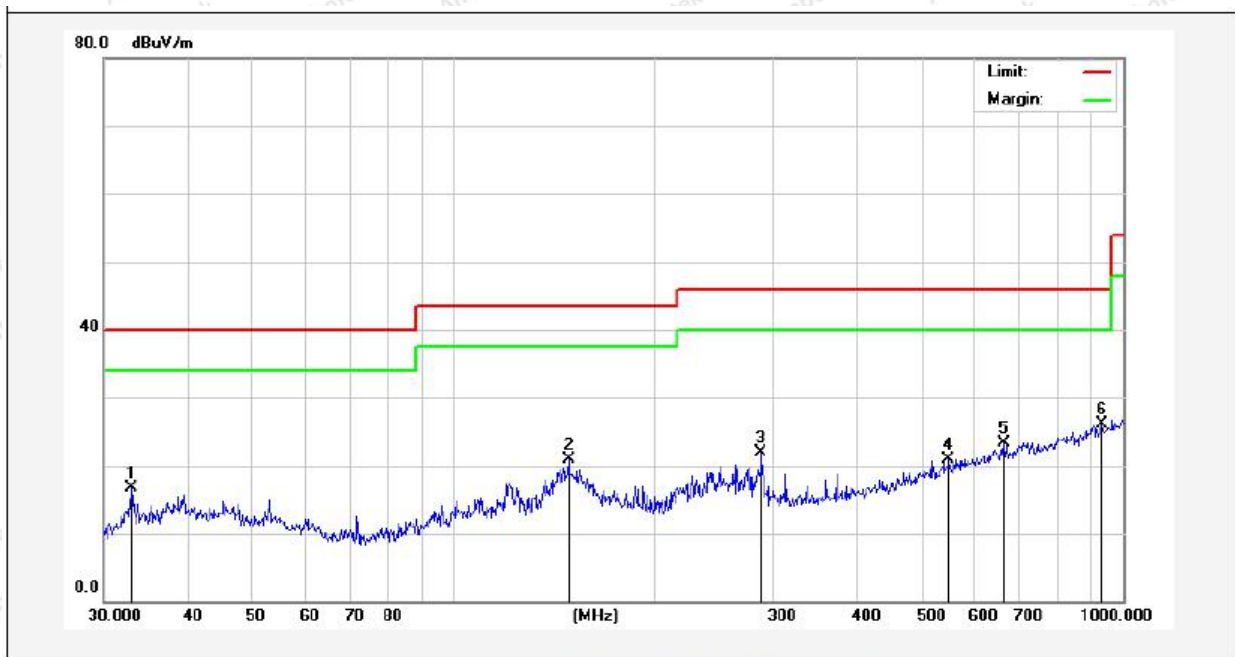
Report No.: 18220WC20016503

FCC ID: 2A4K8-3068B

Page 22 of 41

Test Results (30~1000MHz)

Test Model: 3084B
Test Mode: Mode 1
Power Source: DC 3.7V battery inside
Polarization: Horizontal
Temp.(°C)/Hum.(%RH): 21.5°C/49%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	32.9791	35.87	-19.18	16.69	40.00	-23.31	QP			
2	148.4410	43.75	-22.88	20.87	43.50	-22.63	QP			
3	287.9904	40.06	-18.20	21.86	46.00	-24.14	QP			
4	549.0195	32.73	-11.80	20.93	46.00	-25.07	QP			
5	663.4729	33.84	-10.46	23.38	46.00	-22.62	QP			
6	929.0082	31.98	-5.88	26.10	46.00	-19.90	QP			



Report No.: 18220WC20016503

FCC ID: 2A4K8-3068B

Page 23 of 41

Test Model: 3068B

Test Results (Fundamental)

Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
2402.00	92.34	9.75	102.09	114.00	-11.91	Vertical
2402.00	89.49	9.75	99.24	114.00	-14.76	Horizontal
2446.00	92.73	9.85	102.58	114.00	-11.42	Vertical
2446.00	91.16	9.85	101.01	114.00	-13.00	Horizontal
2479.00	91.09	9.90	100.99	114.00	-13.01	Vertical
2479.00	89.29	9.90	99.19	114.00	-14.81	Horizontal
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
2402.00	78.57	9.75	88.32	94.00	-5.68	Vertical
2402.00	75.88	9.75	85.63	94.00	-8.37	Horizontal
2446.00	80.10	9.85	89.95	94.00	-4.05	Vertical
2446.00	77.01	9.85	86.86	94.00	-7.14	Horizontal
2479.00	77.25	9.90	87.15	94.00	-6.85	Vertical
2479.00	75.08	9.90	84.98	94.00	-9.02	Horizontal



Test Results (1GHz-25GHz)

Test Mode: CH01

Test channel: Lowest

Peak value:

Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4804.00	28.50	15.27	43.77	74.00	-30.23	Vertical
7206.00	28.56	18.09	46.65	74.00	-27.35	Vertical
9608.00	29.43	23.76	53.19	74.00	-20.81	Vertical
12010.00	*			74.00		Vertical
14412.00	*			74.00		Vertical
4804.00	28.17	15.27	43.44	74.00	-30.56	Horizontal
7206.00	29.10	18.09	47.19	74.00	-26.81	Horizontal
9608.00	28.13	23.76	51.89	74.00	-22.11	Horizontal
12010.00	*			74.00		Horizontal
14412.00	*			74.00		Horizontal

Average value:

Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
4804.00	16.77	15.27	32.04	54.00	-21.96	Vertical
7206.00	17.61	18.09	35.70	54.00	-18.30	Vertical
9608.00	18.90	23.76	42.66	54.00	-11.34	Vertical
12010.00	*			54.00		Vertical
14412.00	*			54.00		Vertical
4804.00	16.50	15.27	31.77	54.00	-22.23	Horizontal
7206.00	18.13	18.09	36.22	54.00	-17.78	Horizontal
9608.00	17.64	23.76	41.40	54.00	-12.60	Horizontal
12010.00	*			54.00		Horizontal
14412.00	*			54.00		Horizontal



Test Results (1GHz-25GHz)

Test Mode: CH45

Test channel: Middle

Peak value:

Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4892.00	28.05	15.49	43.54	74.00	-30.46	Vertical
7338.00	28.53	18.11	46.64	74.00	-27.36	Vertical
9784.00	28.93	23.83	52.76	74.00	-21.24	Vertical
12230.00	*			74.00		Vertical
14676.00	*			74.00		Vertical
4892.00	27.98	15.49	43.47	74.00	-30.53	Horizontal
7338.00	28.97	18.11	47.08	74.00	-26.92	Horizontal
9784.00	27.85	23.83	51.68	74.00	-22.32	Horizontal
12230.00	*			74.00		Horizontal
14676.00	*			74.00		Horizontal

Average value:

Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
4892.00	16.86	15.49	32.35	54.00	-21.65	Vertical
7338.00	17.47	18.11	35.58	54.00	-18.42	Vertical
9784.00	18.75	23.83	42.58	54.00	-11.42	Vertical
12230.00	*			54.00		Vertical
14676.00	*			54.00		Vertical
4892.00	16.61	15.49	32.10	54.00	-21.90	Horizontal
7338.00	18.48	18.11	36.59	54.00	-17.41	Horizontal
9784.00	17.94	23.83	41.77	54.00	-12.23	Horizontal
12230.00	*			54.00		Horizontal
14676.00	*			54.00		Horizontal



Test Results (1GHz-25GHz)

Test Mode: CH78	Test channel: Highest
-----------------	-----------------------

Peak value:

Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4958.00	28.18	15.55	43.73	74.00	-30.27	Vertical
7437.00	28.69	17.90	46.59	74.00	-27.41	Vertical
9916.00	29.63	23.81	53.44	74.00	-20.56	Vertical
12395.00	*			74.00		Vertical
14874.00	*			74.00		Vertical
4958.00	28.12	15.55	43.67	74.00	-30.33	Horizontal
7437.00	29.18	17.90	47.08	74.00	-26.92	Horizontal
9916.00	28.23	23.81	52.04	74.00	-21.96	Horizontal
12395.00	*			74.00		Horizontal
14874.00	*			74.00		Horizontal

Average value:

Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
4958.00	17.98	15.55	33.53	54.00	-20.47	Vertical
7437.00	18.74	17.90	36.64	54.00	-17.36	Vertical
9916.00	19.40	23.81	43.21	54.00	-10.79	Vertical
12395.00				54.00		Vertical
14874.00				54.00		Vertical
4958.00	17.79	15.55	33.34	54.00	-20.66	Horizontal
7437.00	19.28	17.90	37.18	54.00	-16.82	Horizontal
9916.00	18.09	23.81	41.90	54.00	-12.10	Horizontal
12395.00	*			54.00		Horizontal
14874.00	*			54.00		Horizontal

Remark:

1. During the test, pre-scan the GFSK modulation, and found the GFSK modulation is worse case, the report only record this mode.
2. Result = Read level + Factor
3. "*" means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Report No.: 18220WC20016503

FCC ID: 2A4K8-3068B

Page27 of 41

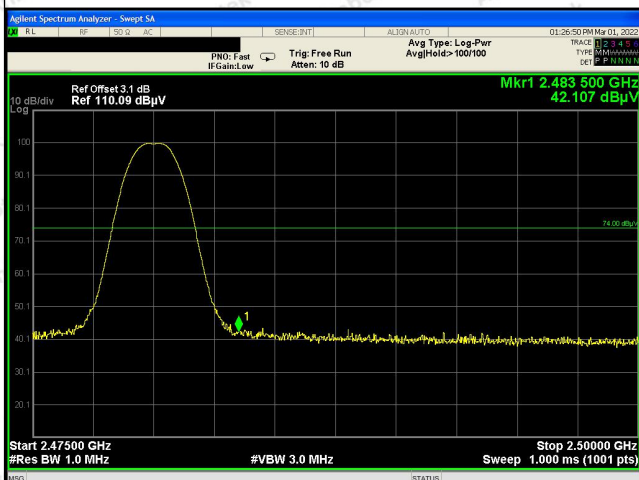
Radiated Band Edge:

Test Model: 3068B

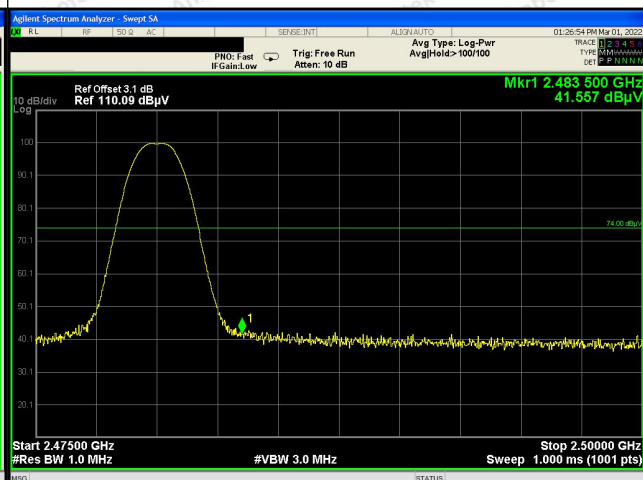


Test Mode: CH78

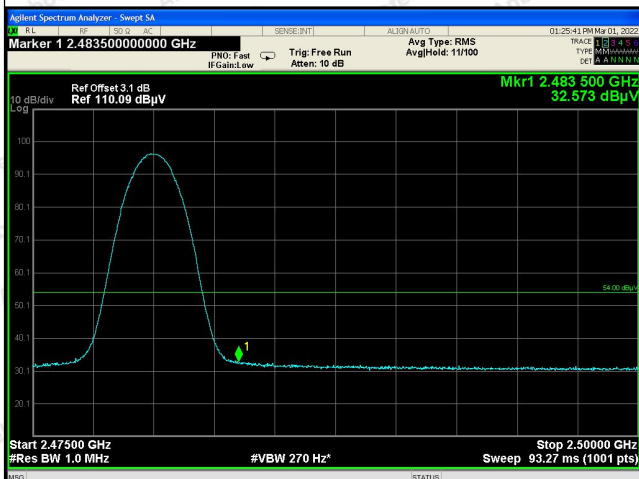
Test channel: Highest



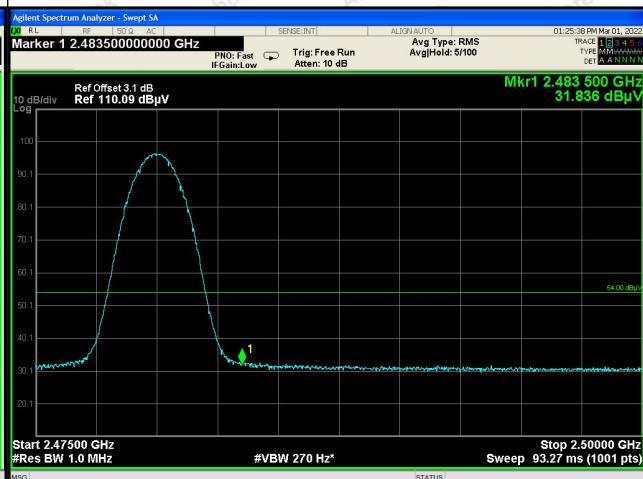
Peak Value(Vertical)



Peak Value(Horizontal)



Average Value(Vertical)



Average Value(Horizontal)



Report No.: 18220WC20016503

FCC ID: 2A4K8-3068B

Page 29 of 41

Test Model: 3084B

Test Results (Fundamental)

Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
2402.00	92.18	9.75	101.93	114.00	-12.07	Vertical
2402.00	89.37	9.75	99.12	114.00	-14.88	Horizontal
2446.00	92.64	9.85	102.49	114.00	-11.51	Vertical
2446.00	90.99	9.85	100.84	114.00	-13.16	Horizontal
2479.00	90.99	9.90	100.89	114.00	-13.11	Vertical
2479.00	89.16	9.90	99.06	114.00	-14.94	Horizontal
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
2402.00	78.47	9.75	88.22	94.00	-5.78	Vertical
2402.00	75.74	9.75	85.49	94.00	-8.51	Horizontal
2446.00	79.97	9.85	89.82	94.00	-4.18	Vertical
2446.00	76.85	9.85	86.70	94.00	-7.30	Horizontal
2479.00	77.18	9.90	87.08	94.00	-6.92	Vertical
2479.00	74.96	9.90	84.86	94.00	-9.14	Horizontal



Test Results (1GHz-25GHz)

Test Mode: CH01

Test channel: Lowest

Peak value:

Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4804.00	28.32	15.27	43.59	74.00	-30.41	Vertical
7206.00	28.41	18.09	46.50	74.00	-27.50	Vertical
9608.00	29.21	23.76	52.97	74.00	-21.03	Vertical
12010.00	*			74.00		Vertical
14412.00	*			74.00		Vertical
4804.00	28.00	15.27	43.27	74.00	-30.73	Horizontal
7206.00	28.88	18.09	46.97	74.00	-27.03	Horizontal
9608.00	28.05	23.76	51.81	74.00	-22.19	Horizontal
12010.00	*			74.00		Horizontal
14412.00	*			74.00		Horizontal

Average value:

Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
4804.00	16.59	15.27	31.86	54.00	-22.14	Vertical
7206.00	17.46	18.09	35.55	54.00	-18.45	Vertical
9608.00	18.68	23.76	42.44	54.00	-11.56	Vertical
12010.00	*			54.00		Vertical
14412.00	*			54.00		Vertical
4804.00	16.33	15.27	31.60	54.00	-22.40	Horizontal
7206.00	17.91	18.09	36.00	54.00	-18.00	Horizontal
9608.00	17.56	23.76	41.32	54.00	-12.68	Horizontal
12010.00	*			54.00		Horizontal
14412.00	*			54.00		Horizontal



Test Results (1GHz-25GHz)

Test Mode: CH45

Test channel: Middle

Peak value:

Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4892.00	27.87	15.49	43.36	74.00	-30.64	Vertical
7338.00	28.38	18.11	46.49	74.00	-27.51	Vertical
9784.00	28.71	23.83	52.54	74.00	-21.46	Vertical
12230.00	*			74.00		Vertical
14676.00	*			74.00		Vertical
4892.00	27.81	15.49	43.30	74.00	-30.70	Horizontal
7338.00	28.75	18.11	46.86	74.00	-27.14	Horizontal
9784.00	27.77	23.83	51.60	74.00	-22.40	Horizontal
12230.00	*			74.00		Horizontal
14676.00	*			74.00		Horizontal

Average value:

Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
4892.00	16.68	15.49	32.17	54.00	-21.83	Vertical
7338.00	17.32	18.11	35.43	54.00	-18.57	Vertical
9784.00	18.53	23.83	42.36	54.00	-11.64	Vertical
12230.00	*			54.00		Vertical
14676.00	*			54.00		Vertical
4892.00	16.44	15.49	31.93	54.00	-22.07	Horizontal
7338.00	18.26	18.11	36.37	54.00	-17.63	Horizontal
9784.00	17.86	23.83	41.69	54.00	-12.31	Horizontal
12230.00	*			54.00		Horizontal
14676.00	*			54.00		Horizontal



Test Results (1GHz-25GHz)

Test Mode: CH78	Test channel: Highest
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Peak value:

Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4958.00	28.00	15.55	43.55	74.00	-30.45	Vertical
7437.00	28.54	17.90	46.44	74.00	-27.56	Vertical
9916.00	29.41	23.81	53.22	74.00	-20.78	Vertical
12395.00	*			74.00		Vertical
14874.00	*			74.00		Vertical
4958.00	27.95	15.55	43.50	74.00	-30.50	Horizontal
7437.00	28.96	17.90	46.86	74.00	-27.14	Horizontal
9916.00	28.15	23.81	51.96	74.00	-22.04	Horizontal
12395.00	*			74.00		Horizontal
14874.00	*			74.00		Horizontal

Average value:

Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
4958.00	17.80	15.55	33.35	54.00	-20.65	Vertical
7437.00	18.59	17.90	36.49	54.00	-17.51	Vertical
9916.00	19.18	23.81	42.99	54.00	-11.01	Vertical
12395.00				54.00		Vertical
14874.00				54.00		Vertical
4958.00	17.62	15.55	33.17	54.00	-20.83	Horizontal
7437.00	19.06	17.90	36.96	54.00	-17.04	Horizontal
9916.00	18.01	23.81	41.82	54.00	-12.18	Horizontal
12395.00	*			54.00		Horizontal
14874.00	*			54.00		Horizontal

Remark:

1. Result = Read level + Factor

2. "*" means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Report No.: 18220WC20016503

FCC ID: 2A4K8-3068B

Page33 of 41

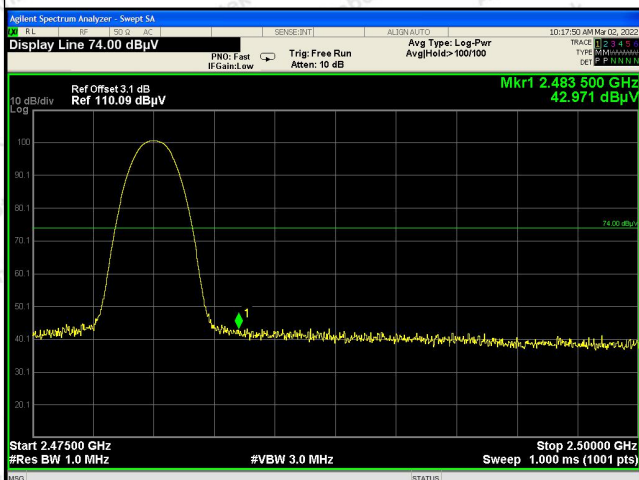
Radiated Band Edge:

Test Model: 3084B

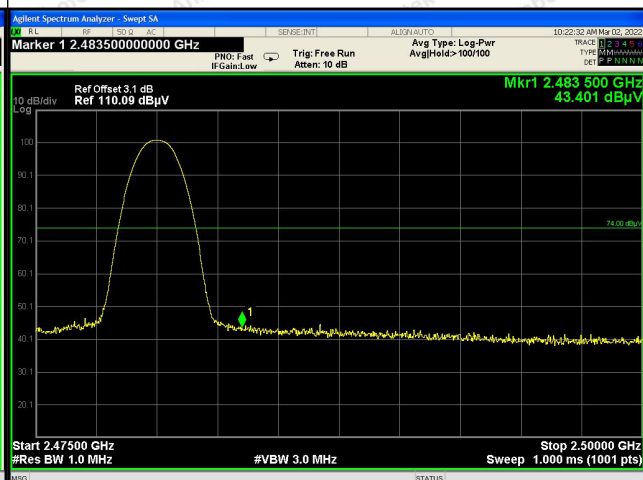


Test Mode: CH78

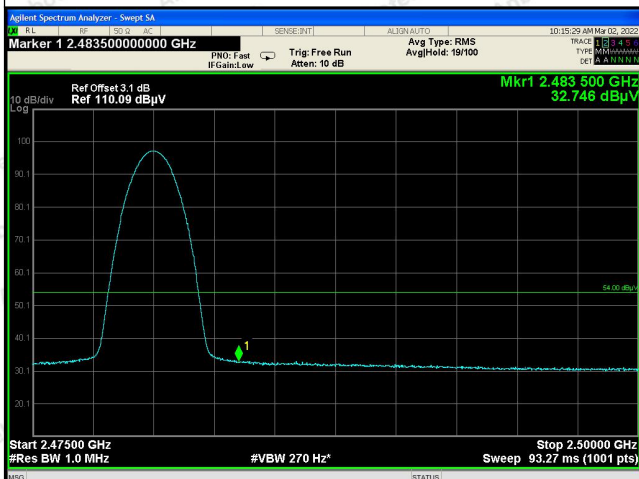
Test channel: Highest



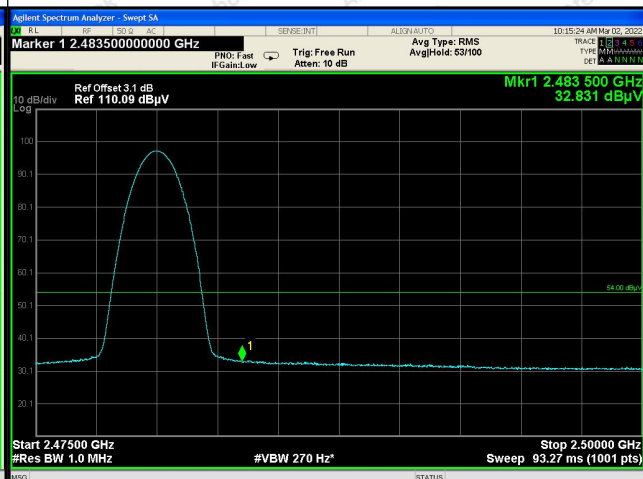
Peak Value(Vertical)



Peak Value(Horizontal)



Average Value(Vertical)



Average Value(Horizontal)

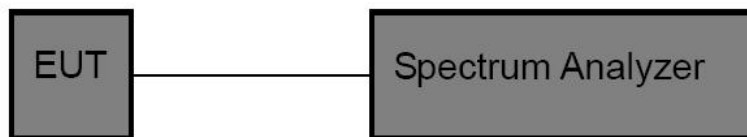


5. 20dB Bandwidth Test

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 Voltage	:	DC 3.7V Battery inside
Test Result	:	PASS

Test Mode	:	Mode 1
Temperature	:	22.4℃
Humidity	:	55%RH

Frequency (MHz)	Bandwidth (kHz)	Result
2402MHZ	1974	PASS
2446MHZ	1794	PASS
2479MHZ	1667	PASS



Test Mode: Low



Test Mode: Middle





Test Mode: High



6. Antenna Requirement

6.1. Test Standard and Requirement

Test Standard	FCC Part 15 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

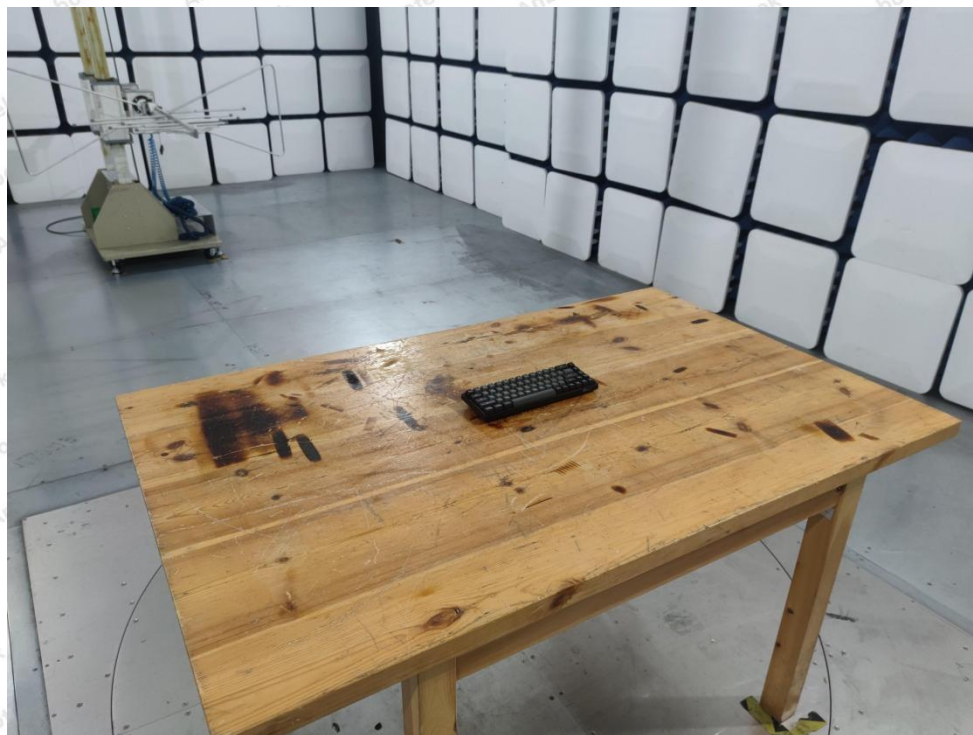
The antenna is PCB Antenna which permanently attached, and the best case gain of the antenna is 1.58dBi. It complies with the standard requirement.

APPENDIX I -- TEST SETUP PHOTOGRAPH

Photo of Conducted Emission Measurement



Photo of Radiation Emission Test





APPENDIX II -- EXTERNAL PHOTOGRAPH

Please refer to the test report 18220WC20016501.

APPENDIX III -- INTERNAL PHOTOGRAPH

Please refer to the test report 18220WC20016501.

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

