FCC Test Report

Applicant	:	**Shenzhen Radiomaster Co.,Ltd**
Address	:	**4F Yangtian Building, Xin'an Street, Bao'an District, Shenzhen, Guangdong, China**
Product Name	:	**MT12**
Report Date	:	**Dec. 18, 2023**

Shenzhen Anbotek Compliance Laboratory Limited

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TEST REPORT

Applicant	:	Shenzhen Radiomaster Co.,Ltd
Manufacturer	:	Shenzhen Radiomaster Co.,Ltd
Product Name	:	MT12
Test Model No.	:	MT12 ELRS
Reference Model No.	:	N/A
Trade Mark	:	Radiomaster
Rating(s)	:	Input: DC 6.6-8.4V

Test Standard(s)	:	**FCC Part15 Subpart C, Section 15.247**
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	Aug. 29, 2023
Date of Test	Aug. 29 ~ Nov. 08, 2023
Prepared by	Ella Liang (Ella Liang)
Approved & Authorized Signer	Edward pan (Edward Pan)

Revision History

Report Version	Description	Issued Date
R00	Original Issue.	Dec. 18, 2023

1. General Information

1.1. Client Information

Applicant	:	Shenzhen Radiomaster Co.,Ltd
Address	:	4F Yangtian Building, Xin'an Street, Bao'an District, Shenzhen, Guangdong, China
Manufacturer	:	Shenzhen Radiomaster Co.,Ltd
Address	:	4F Yangtian Building, Xin'an Street, Bao'an District, Shenzhen, Guangdong, China
Factory	:	Shenzhen Radiomaster Co.,Ltd
Address	:	4F Yangtian Building, Xin'an Street, Bao'an District, Shenzhen, Guangdong, China

1.2. Description of Device (EUT)

Product Name	:	MT12
Test Model No.	:	MT12 ELRS
Reference Model No.	:	N/A
Trade Mark	:	Radiomaster
Test Power Supply	:	AC 120V, 60Hz for adapter/DC 4.2V battery inside
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)
Adapter	:	N/A
RF Specification		
Operation Mode	:	☐ DSSS ☒ FHSS
Operation Frequency	:	2402.4~2479.4 MHz
Number of Channel	:	78 Channels
Modulation Type	:	GFSK
Antenna Type	:	Copper tube antenna
Antenna Gain(Peak)	:	2.02dBi
Remark: 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. 2) All of the RF specification are provided by customer.		

1.3. Auxiliary Equipment Used During Test

Description	Rating(s)
Adapter	Model: MDY-11-EX Input: 100-240VAC,50-60Hz, 0.7A Output: 5V⎓ 3A,9V⎓ 3A,12V⎓ 2.25A,20V⎓ 1.35A,11V⎓ 3A

1.4. Description of Test Configuration

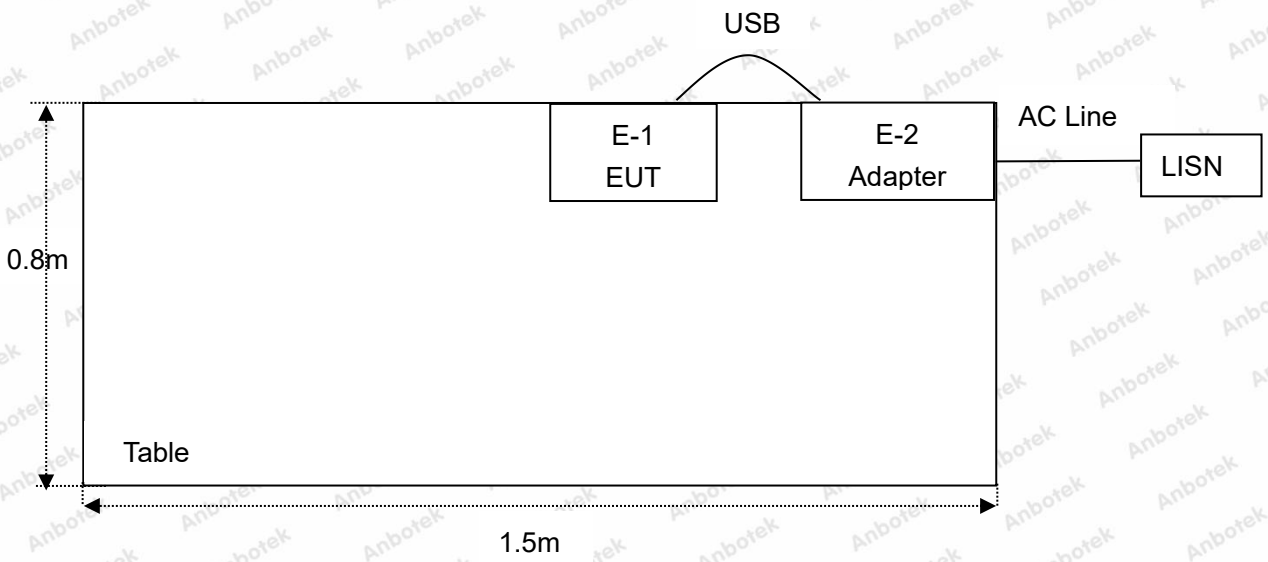
Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
1	**2402.4**	17	2418.4	33	2434.4	49	2450.4	65	2466.4
2	2403.4	18	2419.4	34	2435.4	50	2451.4	66	2467.4
3	2404.4	19	2420.4	35	2436.4	51	2452.4	67	2468.4
4	2405.4	20	2421.4	36	2437.4	52	2453.4	68	2469.4
5	2406.4	21	2422.4	37	2438.4	53	2454.4	69	2470.4
6	2407.4	22	2423.4	38	2439.4	54	2455.4	70	2471.4
7	2408.4	23	2424.4	39	2440.4	55	2456.4	71	2472.4
8	2409.4	24	2425.4	**40**	**2441.4**	56	2457.4	72	2473.4
9	2410.4	25	2426.4	41	2442.4	57	2458.4	73	2474.4
10	2411.4	26	2427.4	42	2443.4	58	2459.4	74	2475.4
11	2412.4	27	2428.4	43	2444.4	59	2460.4	75	2476.4
12	2413.4	28	2429.4	44	2445.4	60	2461.4	76	2477.4
13	2414.4	29	2430.4	45	2446.4	61	2462.4	77	2478.4
14	2415.4	30	2431.4	46	2447.4	62	2463.4	**78**	**2479.4**
15	2416.4	31	2432.4	47	2448.4	63	2464.4	/	/
16	2417.4	32	2433.4	48	2449.4	64	2465.4	/	/

Note:

1. The engineering test program was provided and the EUT was programmed to be in continuously transmitting mode.
2. EUT was tested with channel 01, 40 and 78.

1.5. Description Of Test Setup

CE



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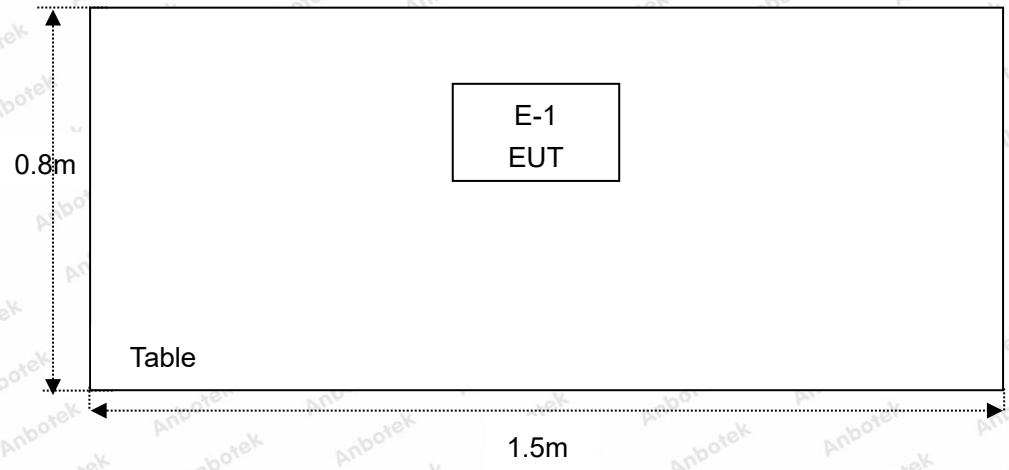


1.6. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	Oct. 12, 2023	1 Year
2.	Three Phase V-type Artificial Power Network	CYBERTEK	EM5040DT	E215040DT001	Jul. 05, 2023	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Oct. 12, 2023	1 Year
4.	EMI Test Receiver	Rohde & Schwarz	ESR26	101481	Oct. 12, 2023	1 Year
5.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Oct. 12, 2023	1 Year
6.	EMI Preamplifier	SKET Electronic	LNPA-0118G-45	SKET-PA-002	Oct. 12, 2023	1 Year
7.	Double Ridged Horn Antenna	SCHWARZBECK	BBHA 9120D	02555	Oct. 16, 2022	3 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	345	Oct. 23, 2022	3 Year
9.	Loop Antenna	Schwarzbeck	FMZB1519B	00053	Oct. 12, 2023	1 Year
10.	Horn Antenna	A-INFO	LB-180400-KF	J211060628	Oct. 12, 2023	1 Year
11.	Pre-amplifier	SONOMA	310N	186860	Oct. 12, 2023	1 Year
12.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
13.	MXA Spectrum Analysis	KEYSIGHT	N9020A	MY53280032	Oct. 12, 2023	1 Year
14.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Oct. 12, 2023	1 Year
15.	Signal Generator	Agilent	E4421B	MY41000743	Oct. 12, 2023	1 Year
16.	DC Power Supply	IVYTECH	IV3605	1804D360510	Oct. 20, 2023	1 Year
17.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80B	N/A	Oct. 16, 2023	1 Year
18.	Power Meter	Agilent	N1914A	MY50001102	Oct. 20, 2023	1 Year
19.	Spectrum Analyzer	Rohde & Schwarz	FSV40-N	101792	May. 26, 2023	1 Year

1.7. Measurement Uncertainty

Parameter	Uncertainty
Conducted emissions (AMN 150kHz~30MHz)	3.8dB
Occupied Bandwidth	925Hz
Conducted Output Power	0.76dB
Conducted Spurious Emission	1.24dB
Radiated spurious emissions (Below 30MHz)	3.53dB
Radiated spurious emissions (30MHz~1GHz)	Horizontal: 3.92dB; Vertical: 4.52dB
Radiated spurious emissions (above 1GHz)	1G-6GHz: 4.78dB; 6G-18GHz: 4.88dB 18G-40GHz: 5.68dB
The measurement uncertainty and decision risk evaluated according to AB/WI-RF-F-032. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

1.8. Description of Test Facility

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

FCC-Registration No.: 434132

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. 434132.

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.

1.9. Disclaimer

1. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
2. The test report is invalid if there is any evidence and/or falsification.
3. The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
4. This document may not be altered or revised in any way unless done so by Anbotek and all revisions are duly noted in the revisions section.
5. Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
6. The authenticity of the information provided by the customer is the responsibility of the customer and the laboratory is not responsible for its authenticity.

The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

2. Summary of Test Results

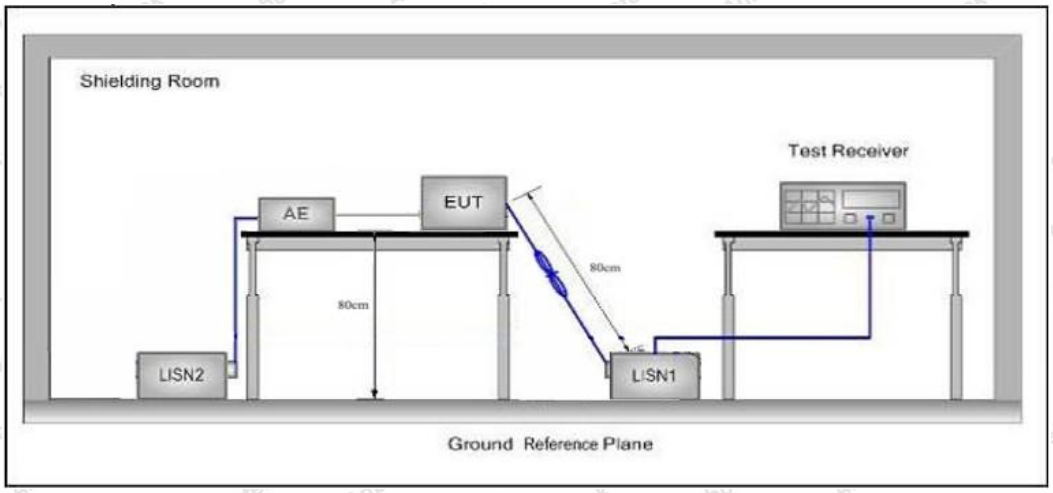
Standard Section	Test Item	Result
15.203/15.247(c)	Antenna Requirement	PASS
15.207	Conducted Emission	PASS
15.205/15.209	Spurious Emission	PASS
15.247(b)(1)	Conducted Peak Output Power	PASS
15.247(a)(1)	20dB Occupied Bandwidth	PASS
15.247(a)(1)	Carrier Frequencies Separation	PASS
15.247(a)(1)(iii)	Number of Hopping Channel	PASS
15.247(a)(1)(iii)	Dwell Time	PASS
15.247(d)	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

PASS

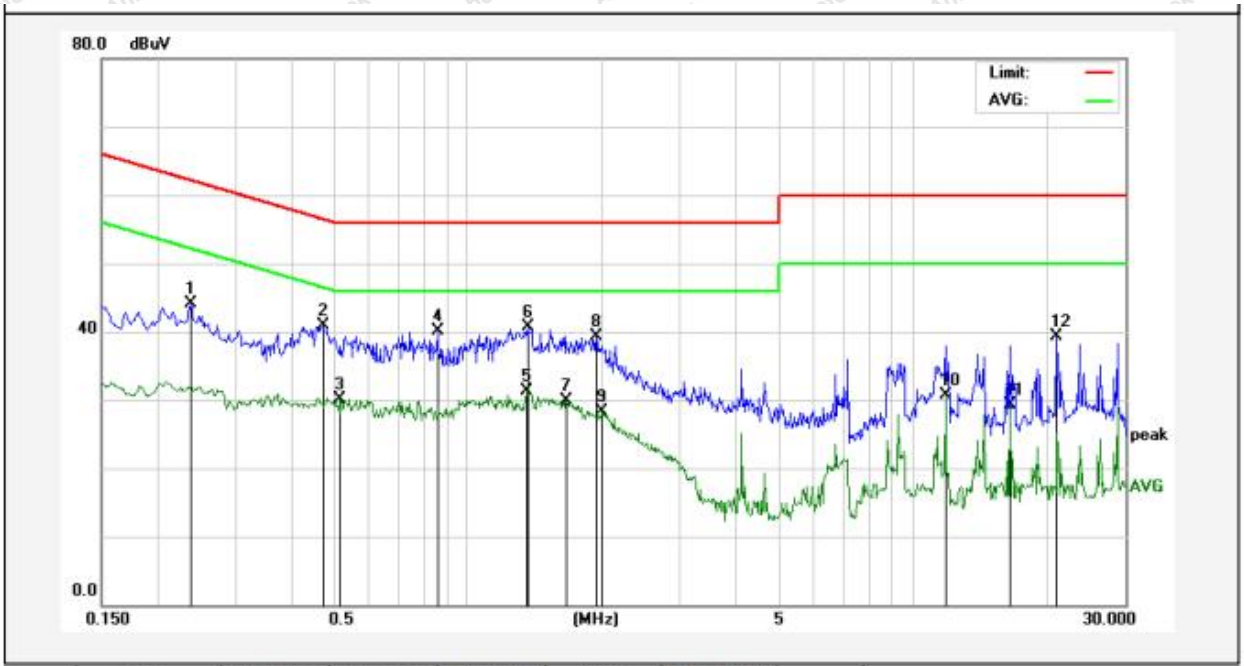
During the test, pre-scan all modes, only the worst case is recorded in the report.

AC conducted emission pre-test at both at AC 120V/60Hz and AC 240V/60Hz modes, recorded worst case AC 120V/60Hz.

Please to see the following pages.

Conducted Emission Test Data

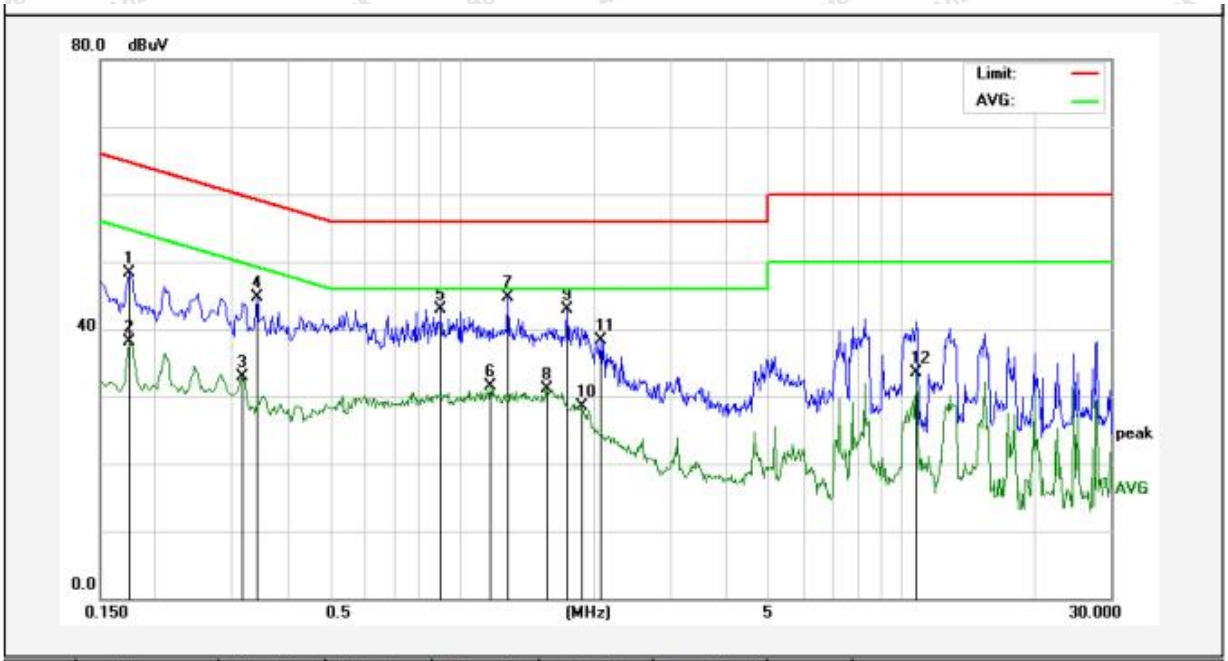
Test Site:	1# Shielded Room
Operating Condition:	High CH (2479.4MHz)
Test Specification:	AC 120V, 60Hz for adapter
Comment:	Live Line
Temp.(℃)/Hum.(%RH):	22.8℃/51%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.2379	24.18	19.83	44.01	62.17	-18.16	QP	
2	0.4711	21.00	19.84	40.84	56.49	-15.65	QP	
3	0.5180	10.17	19.85	30.02	46.00	-15.98	AVG	
4	0.8538	20.31	19.86	40.17	56.00	-15.83	QP	
5	1.3540	11.53	19.84	31.37	46.00	-14.63	AVG	
6	1.3660	20.95	19.84	40.79	56.00	-15.21	QP	
7	1.6653	10.15	19.84	29.99	46.00	-16.01	AVG	
8	1.9415	19.43	19.83	39.26	56.00	-16.74	QP	
9	2.0099	8.45	19.83	28.28	46.00	-17.72	AVG	
10	11.8579	10.61	20.06	30.67	50.00	-19.33	AVG	
11	16.5015	9.10	20.22	29.32	50.00	-20.68	AVG	
12	21.0060	18.76	20.46	39.22	60.00	-20.78	QP	

Conducted Emission Test Data

Test Site:	1# Shielded Room
Operating Condition:	High CH (2479.4MHz)
Test Specification:	AC 120V, 60Hz for adapter
Comment:	Neutral Line
Temp.(℃)/Hum.(%RH):	22.8℃/51%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1737	28.47	19.83	48.30	64.78	-16.48	QP	
2	0.1737	18.21	19.83	38.04	54.78	-16.74	AVG	
3	0.3180	13.12	19.83	32.95	49.76	-16.81	AVG	
4	0.3420	24.87	19.82	44.69	59.15	-14.46	QP	
5	0.8980	23.12	19.86	42.98	56.00	-13.02	QP	
6	1.1613	11.62	19.85	31.47	46.00	-14.53	AVG	
7	1.2700	24.82	19.84	44.66	56.00	-11.34	QP	
8	1.5620	11.19	19.84	31.03	46.00	-14.97	AVG	
9	1.7419	22.97	19.84	42.81	56.00	-13.19	QP	
10	1.8773	8.70	19.83	28.53	46.00	-17.47	AVG	
11	2.0659	18.45	19.83	38.28	56.00	-17.72	QP	
12	10.8338	13.50	20.01	33.51	50.00	-16.49	AVG	

4. Radiation Spurious 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.

4.2. Test Setup

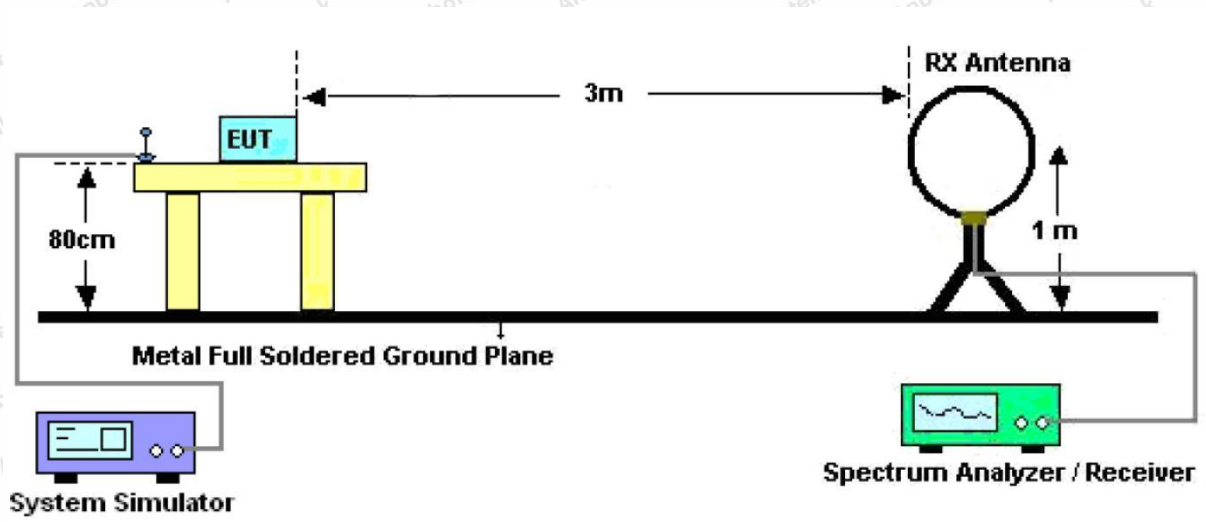


Figure 1. Below 30MHz

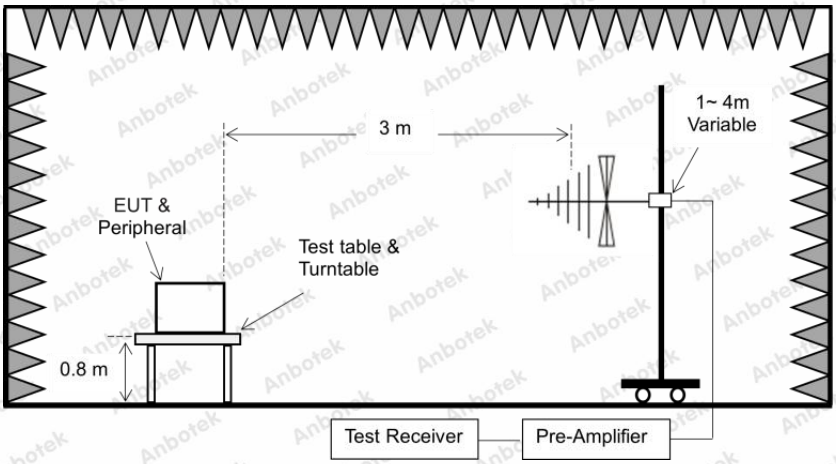


Figure 2. 30MHz to 1GHz

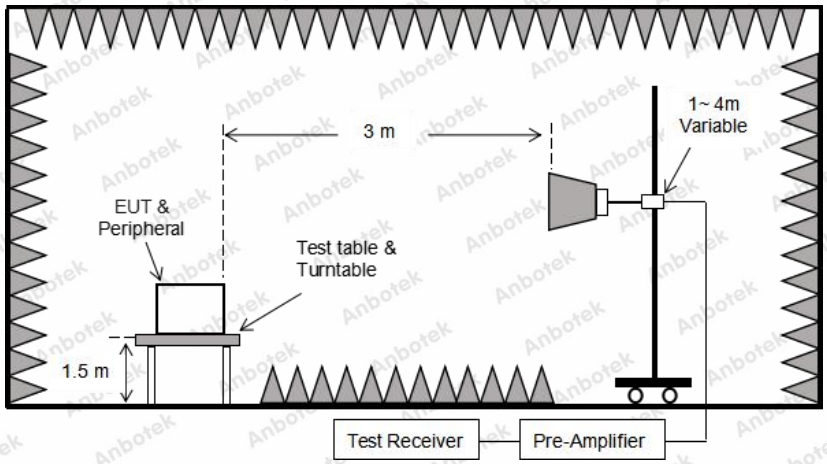


Figure 3. Above 1 GHz

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 = 120kHz, 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.

For average measurement: use duty cycle correction factor method (DCCF)

Average level = Peak level + DCCF

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

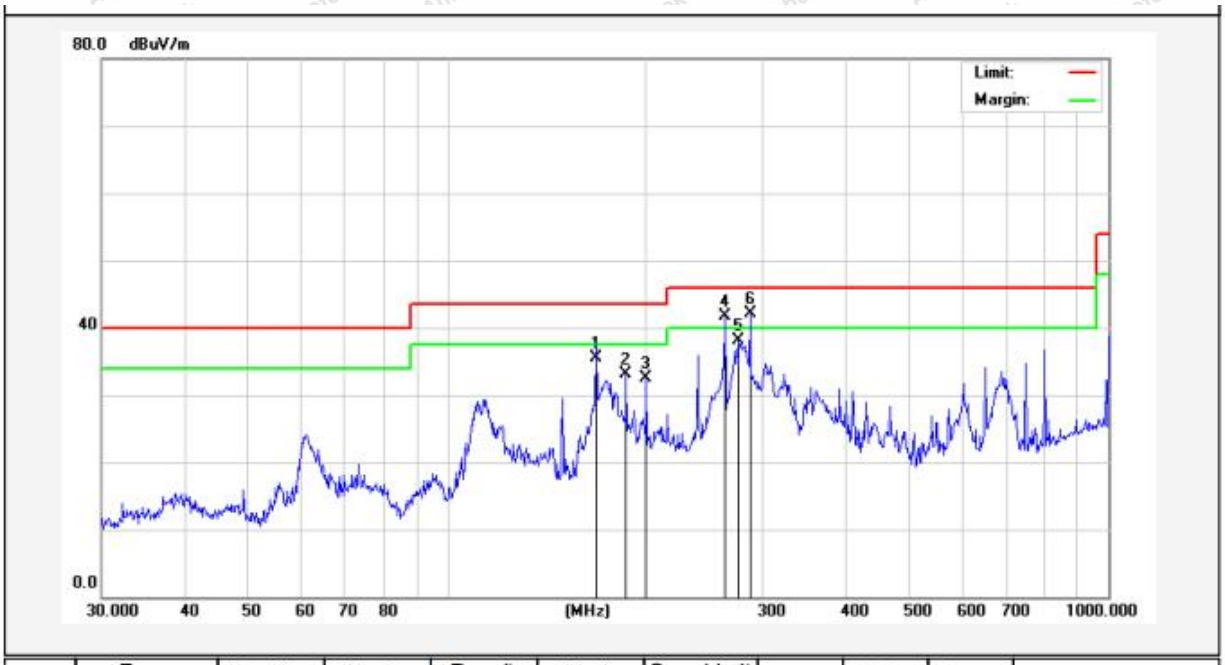
Test Results (30~1000MHz)

Test Mode:	High CH (2479.4MHz)
Power Source:	DC 4.2V battery inside
Polarization:	Vertical
Temp.(℃)/Hum.(%RH):	24.1℃/48%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	61.1316	46.24	-17.90	28.34	40.00	-11.66	QP			
2	119.4361	50.92	-19.83	31.09	43.50	-12.41	QP			
3	149.4857	55.36	-22.09	33.27	43.50	-10.23	QP			
4	167.8243	55.40	-21.24	34.16	43.50	-9.34	QP			
5	601.4265	47.74	-10.53	37.21	46.00	-8.79	QP			
6	993.0114	39.11	-4.90	34.21	54.00	-19.79	QP			

Test Results (30~1000MHz)

Test Mode:	High CH (2479.4MHz)
Power Source:	DC 4.2V battery inside
Polarization:	Horizontal
Temp.(℃)/Hum.(%RH):	24.1℃/48%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	167.9743	59.28	-23.68	35.60	43.50	-7.90	QP			
2	186.4409	56.09	-22.91	33.18	43.50	-10.32	QP			
3	199.9856	54.81	-22.33	32.48	43.50	-11.02	QP			
4	262.8955	62.17	-20.38	41.79	46.00	-4.21	QP			
5	276.1235	57.28	-19.24	38.04	46.00	-7.96	QP			
6	286.9823	60.32	-18.29	42.03	46.00	-3.97	QP			

Test Results (1GHz-25GHz)

Test channel: Lowest						
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4804.80	31.28	15.27	46.55	74.00	-27.46	Vertical
7207.20	32.32	18.09	50.41	74.00	-23.59	Vertical
9609.60	34.06	23.76	57.82	74.00	-16.19	Vertical
12012.00	*			74.00		Vertical
14414.40	*			74.00		Vertical
4804.80	31.59	15.27	46.86	74.00	-27.14	Horizontal
7207.20	32.15	18.09	50.24	74.00	-23.76	Horizontal
9609.60	30.45	23.76	54.21	74.00	-19.80	Horizontal
12012.00	*			74.00		Horizontal
14414.40	*			74.00		Horizontal
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
4804.80	20.66	15.27	35.93	54.00	-18.08	Vertical
7207.20	21.35	18.09	39.44	54.00	-14.56	Vertical
9609.60	23.08	23.76	46.84	54.00	-7.17	Vertical
12012.00	*			54.00		Vertical
14414.40	*			54.00		Vertical
4804.80	19.94	15.27	35.21	54.00	-18.79	Horizontal
7207.20	21.21	18.09	39.30	54.00	-14.70	Horizontal
9609.60	19.76	23.76	43.52	54.00	-10.49	Horizontal
12012.00	*			54.00		Horizontal
14414.40	*			54.00		Horizontal

Test Results (1GHz-25GHz)

Test channel: Middle						
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4882.80	31.30	15.42	46.72	74.00	-27.29	Vertical
7324.20	32.17	18.02	50.19	74.00	-23.81	Vertical
9765.60	33.07	23.80	56.87	74.00	-17.14	Vertical
12207.00	*			74.00		Vertical
14648.40	*			74.00		Vertical
4882.80	31.29	15.42	46.71	74.00	-27.29	Horizontal
7324.20	32.14	18.02	50.16	74.00	-23.84	Horizontal
9765.60	30.15	23.80	53.95	74.00	-20.06	Horizontal
12207.00	*			74.00		Horizontal
14648.40	*			74.00		Horizontal
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
4882.80	20.39	15.42	35.81	54.00	-18.20	Vertical
7324.20	21.45	18.02	39.47	54.00	-14.53	Vertical
9765.60	22.94	23.80	46.74	54.00	-7.27	Vertical
12207.00	*			54.00		Vertical
14648.40	*			54.00		Vertical
4882.80	19.85	15.42	35.27	54.00	-18.73	Horizontal
7324.20	20.77	18.02	38.79	54.00	-15.21	Horizontal
9765.60	20.27	23.80	44.07	54.00	-9.94	Horizontal
12207.00	*			54.00		Horizontal
14648.40	*			54.00		Horizontal

Test Results (1GHz-25GHz)

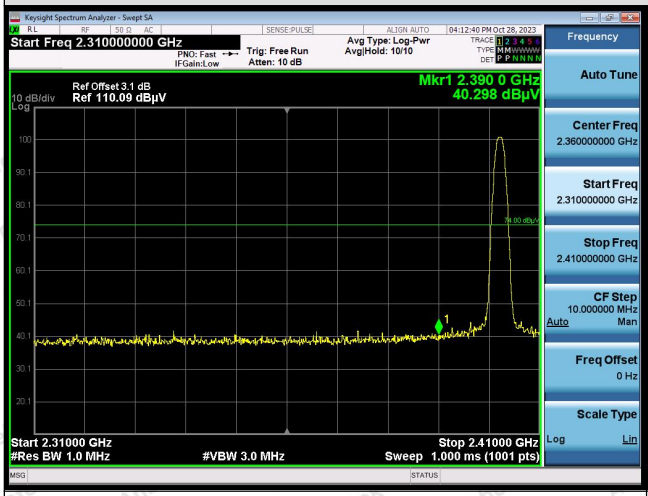
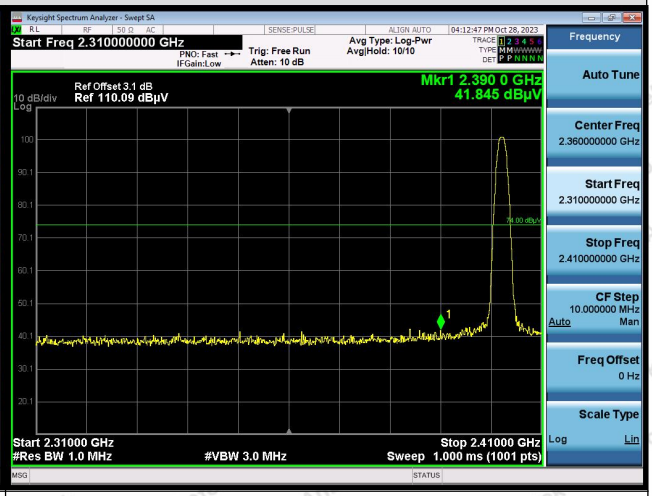
Test channel: Highest						
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4958.80	31.57	15.58	47.15	74.00	-26.86	Vertical
7438.20	32.18	17.93	50.11	74.00	-23.89	Vertical
9917.60	33.62	23.83	57.45	74.00	-16.56	Vertical
12397.00	*			74.00		Vertical
14876.40	*			74.00		Vertical
4958.80	31.36	15.58	46.94	74.00	-27.06	Horizontal
7438.20	32.17	17.93	50.10	74.00	-23.90	Horizontal
9917.60	30.83	23.83	54.66	74.00	-19.35	Horizontal
12397.00	*			74.00		Horizontal
14876.40	*			74.00		Horizontal
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
4958.80	21.51	15.58	37.09	54.00	-16.92	Vertical
7438.20	22.46	17.93	40.39	54.00	-13.61	Vertical
9917.60	23.49	23.83	47.32	54.00	-6.69	Vertical
12397.00	*			54.00		Vertical
14876.40	*			54.00		Vertical
4958.80	21.29	15.58	36.87	54.00	-17.13	Horizontal
7438.20	22.14	17.93	40.07	54.00	-13.93	Horizontal
9917.60	20.17	23.83	44.00	54.00	-10.01	Horizontal
12397.00	*			54.00		Horizontal
14876.40	*			54.00		Horizontal

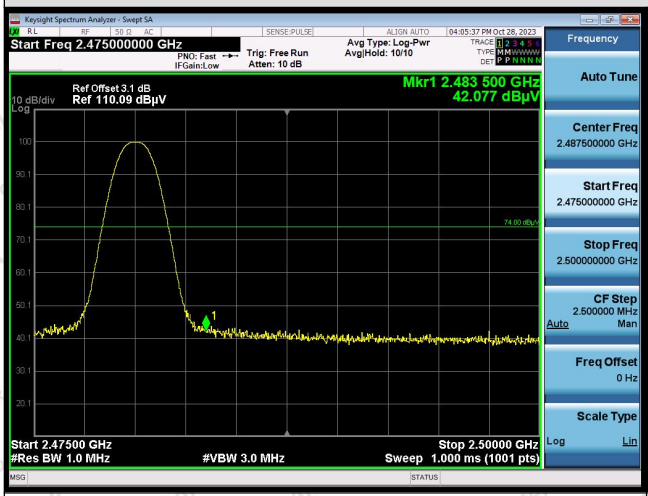
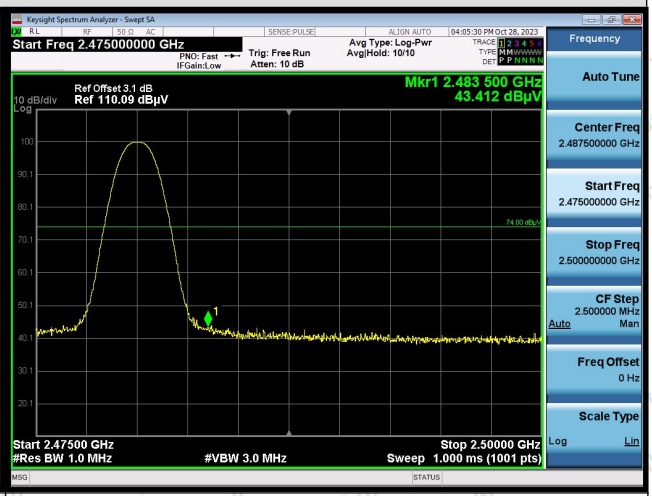
Remark:

1. Result =Reading + Factor

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

Radiated Band Edge:

Test Mode: Lowest	
	
Peak Value(Vertical)	Peak Value(Horizontal)

Test Mode: Highest	
	
Peak Value(Vertical)	Peak Value(Horizontal)

Average:

Test Channel	Peak Value (dBuV/m)	DCCF	Average Value (dBuV/m)	Limit (dBuV/m)	Polarization	Verdict
Lowest	40.298	-7.13	33.167	54.00	Vertical	Pass
	41.845	-7.13	34.714	54.00	Horizontal	Pass
Highest	42.077	-7.13	34.946	54.00	Vertical	Pass
	43.412	-7.13	36.281	54.00	Horizontal	Pass

Remark:

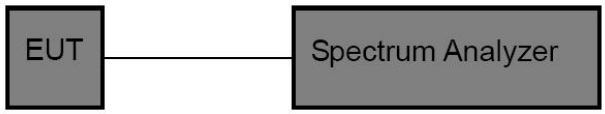
1. DCCF=20log(Duty Cycle)
2. Average Value=Peak Value+DCCF

5. Maximum Peak Output Power Test

5.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (b)(1)
Test Limit	For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

5.2. Test Setup



5.3. Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above,
2. Spectrum Setting:
   RBW > the 20 dB bandwidth of the emission being measured
   Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
   VBW ≥ RBW
   Sweep = auto
   Detector function = peak
   Trace = max hold

5.4. Test Data

Pass

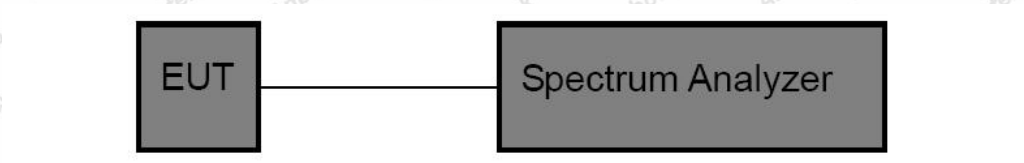
Please refer to Appendix C of the Appendix Test Data.

6. 20DB Occupy Bandwidth Test

6.1. Test Standard

Test Standard	FCC Part15 C Section 15.247 (a)(1)

6.2. Test Setup



6.3. Test Procedure

Using the following spectrum analyzer settings:

1. Span= approximately 2 to 3 times the 20dB bandwidth, centered on a hopping channel.
2. Set the RBW ≥1% of the 20 dB bandwidth.
3. Set the VBW ≥RBW
4. Sweep time = auto couple.
5. Detector function = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.

6.4. Test Data

Pass

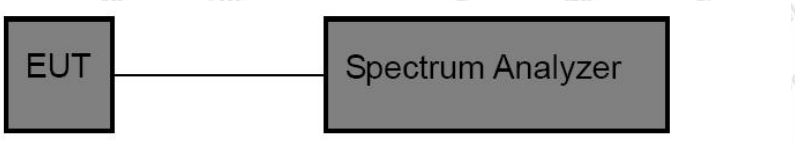
Please refer to Appendix A of the Appendix Test Data.

7. Carrier Frequency Separation Test

7.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (a)(1)
Test Limit	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

7.2. Test Setup



7.3. Test Procedure

The EUT must have its hopping function enabled. Using the following spectrum analyzer settings:

1. Span= Wide enough to capture the peaks of two adjacent channels
2. Set the RBW =approximately 30% of the channel spacing.
3. Set the VBW ≥ RBW.
4. Sweep time = auto couple.
5. Detector function = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.

7.4. Test Data

Pass

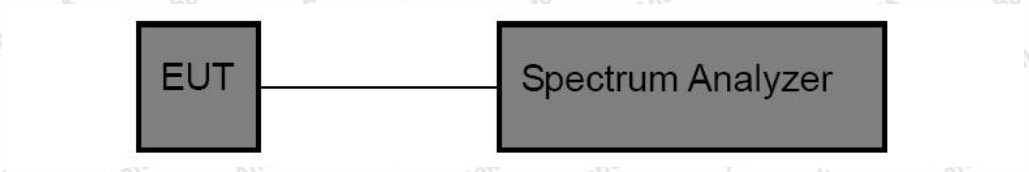
Please refer to Appendix D of the Appendix Test Data.

8. Number of Hopping Channel Test

8.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (a)(1)(iii)
Test Limit	>15 channels

8.2. Test Setup



8.3. Test Procedure

The EUT must have its hopping function enabled. Using the following spectrum analyzer setting:

1. Span= the frequency band of operation
2. Set the RBW = less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
3. Set the VBW ≥ RBW.
4. Sweep time = auto couple.
5. Detector function = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.

8.4. Test Data

Pass

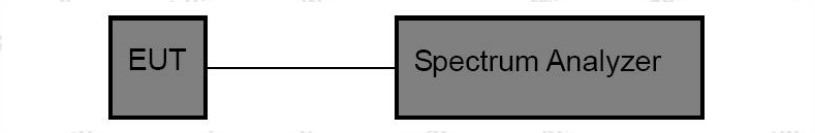
Please refer to Appendix F of the Appendix Test Data.

9. Dwell Time Test

9.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (a)(1)(iii)
Test Limit	0.4 s

9.2. Test Setup



9.3. Test Procedure

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span= zero span, centered on a hopping channel
2. Set the RBW = 1 MHz.
3. Set the VBW ≥ RBW.
4. Sweep time = as necessary to capture the entire dwell time per hopping channel.
5. Detector function = peak.
6. Trace mode = clear write.

9.4. Test Data

Pass

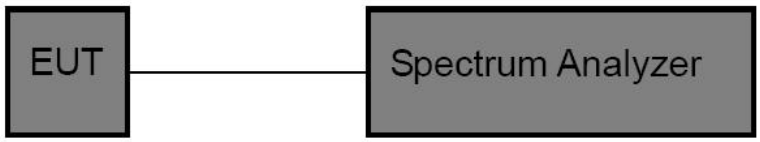
Please refer to Appendix E of the Appendix Test Data.

10. 100kHz Bandwidth of Frequency Band Edge Requirement

10.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (d)
Test Limit	In any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

10.2. Test Setup



10.3. Test Procedure

The EUT must have its hopping/Non-hopping function enabled. Using the following spectrum analyzer setting:

1. Set the RBW = 100kHz.
2. Set the VBW = 300kHz.
3. Sweep time = auto couple.
4. Detector function = peak.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.

10.4. Test Data

Pass

Please refer to Appendix G & Appendix H of the Appendix Test Data.

11. Antenna Requirement

11.1. Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203 /247(c)
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. 2) 15.247(c) (1)(i) requirement: Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

11.2. Antenna Connected Construction

The antenna is Copper tube antenna which permanently attached, and the best case gain of the antenna is 2.02dBi. It complies with the standard requirement.

APPENDIX I -- TEST SETUP PHOTOGRAPH

Please refer to separated files Appendix I -- Test Setup Photograph

APPENDIX II -- EXTERNAL PHOTOGRAPH

Please refer to separated files Appendix II -- External Photograph

APPENDIX III -- INTERNAL PHOTOGRAPH

Please refer to separated files Appendix III -- Internal Photograph

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