

FCC Test Report

Applicant : Shenzhen Baida Moxing Co.,Ltd.

Address : Rm. 1103, Honghua Center, No. 52, Heping
Rd. Qinghua Community, Longhua St.,
Longhua Dist., Shenzhen, China

Product Name : Cetus X Brushless Quadcopter

Report Date : Jul. 05, 2024



Shenzhen Anbotek Compliance Laboratory Limited



Contents

1. General Information	6
1.1. Client Information	6
1.2. Description of Device (EUT)	6
1.3. Auxiliary Equipment Used During Test	7
1.4. Description of Test Configuration	7
1.5. Description Of Test Setup	8
1.6. Test Equipment List	9
1.7. Measurement Uncertainty	10
1.8. Description of Test Facility	10
1.9. Disclaimer	11
2. Summary of Test Results	12
3. Conducted Emission Test	13
3.1. Test Standard and Limit	13
3.2. Test Setup	13
3.3. Test Procedure	13
3.4. Test Data	13
4. Radiation Spurious Emission and Restricted Band Test	16
4.1. Test Standard and Limit	16
4.2. Test Setup	17
4.3. Test Procedure	18
4.4. Test Data	19
5. Maximum Conducted Output Power Test	24
5.1. Test Standard and Limit	24
5.2. Test Setup	24
5.3. Test Procedure	24
5.4. Test Data	25
6. 26dB Bandwidth & 99% Occupied Bandwidth Test	26
6.1. Test Standard	26
6.2. Test Setup	26
6.3. Test Procedure	26
6.4. Test Data	26
7. Maximum Power Spectral Density Test	27
7.1. Test Standard and Limit	27
7.2. Test Setup	27
7.3. Test Procedure	27
7.4. Test Data	28
8. Conducted Band Edge Test	29
8.1. Test Standard and Limit	29
8.2. Test Setup	29



8.3. Test Procedure	29
8.4. Test Data	29
9. Frequency Stability	30
9.1. Test Standard and Limit	30
9.2. Test Setup	30
9.3. Test Procedure	30
9.4. Test Data	30
10. Antenna Requirement	32
10.1. Test Standard and Requirement	32
10.2. Antenna Connected Construction	32
APPENDIX I -- TEST SETUP PHOTOGRAPH	33
APPENDIX II -- EXTERNAL PHOTOGRAPH	33
APPENDIX III -- INTERNAL PHOTOGRAPH	33



TEST REPORT

Applicant : Shenzhen Baida Moxing Co.,Ltd.
Manufacturer : Shenzhen Baida Moxing Co.,Ltd.
Product Name : Cetus X Brushless Quadcopter
Model No. : Cetus X ELRS
Trade Mark : BETAFPV
Rating(s) : Charge base: Input: 5V $\Rightarrow$ 2A, output *2: 4.35V $\Rightarrow$ 0.45A
Powered by Battery: DC 7.6V, 450mAh
Test Standard(s) : 47 CFR Part 15E
Test Method(s) : ANSI C63.10: 2020
KDB 789033 D02 General UNII Test Procedures New Rules v02r01

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 47 CFR Part 15E 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 Receipt

Mar. 03, 2023

Date of Test

Mar. 03, 2023 ~ Jul. 03, 2024

Prepared By

Nian Xiu Chen

(Nianxiu Chen)

Approved & Authorized Signer

Edward Pan

(Edward Pan)



Revision History

Report Version	Description	Issued Date
R00	Original Issue.	Jun. 07, 2023
R01	Reference Note 1	Jul. 05, 2024

Note 1: The test report 18220WC30031901-M1 supersedes the test report 18220WC30031901 which is withdrawn.



1. General Information

1.1. Client Information

Applicant	:	Shenzhen Baida Moxing Co.,Ltd.
Address	:	Rm. 1103, Honghua Center, No. 52, Heping Rd. Qinghua Community, Longhua St., Longhua Dist., Shenzhen, China
Manufacturer	:	Shenzhen Baida Moxing Co.,Ltd.
Address	:	Rm. 1103, Honghua Center, No. 52, Heping Rd. Qinghua Community, Longhua St., Longhua Dist., Shenzhen, China
Factory	:	Shenzhen Baida Moxing Co.,Ltd.
Address	:	Rm. 1103, Honghua Center, No. 52, Heping Rd. Qinghua Community, Longhua St., Longhua Dist., Shenzhen, China

1.2. Description of Device (EUT)

Product Name	:	Cetus X Brushless Quadcopter
Test Model No.	:	Cetus X ELRS
Trade Mark	:	BETAFPV
Test Power Supply	:	AC 120V, 60Hz for Adapter/ DC 7.6V battery inside
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)
Adapter	:	N/A

RF Specification

Operation Frequency	:	5733~5845MHZ
Number of Channel	:	21 Channels
Modulation Type	:	FM
Antenna Type	:	Monopole Antenna
Antenna Gain(Peak)	:	3.68 dBi

Remark: 1) All of the RF specification are provided by customer. 2) 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

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

1.4. Description of Test Configuration

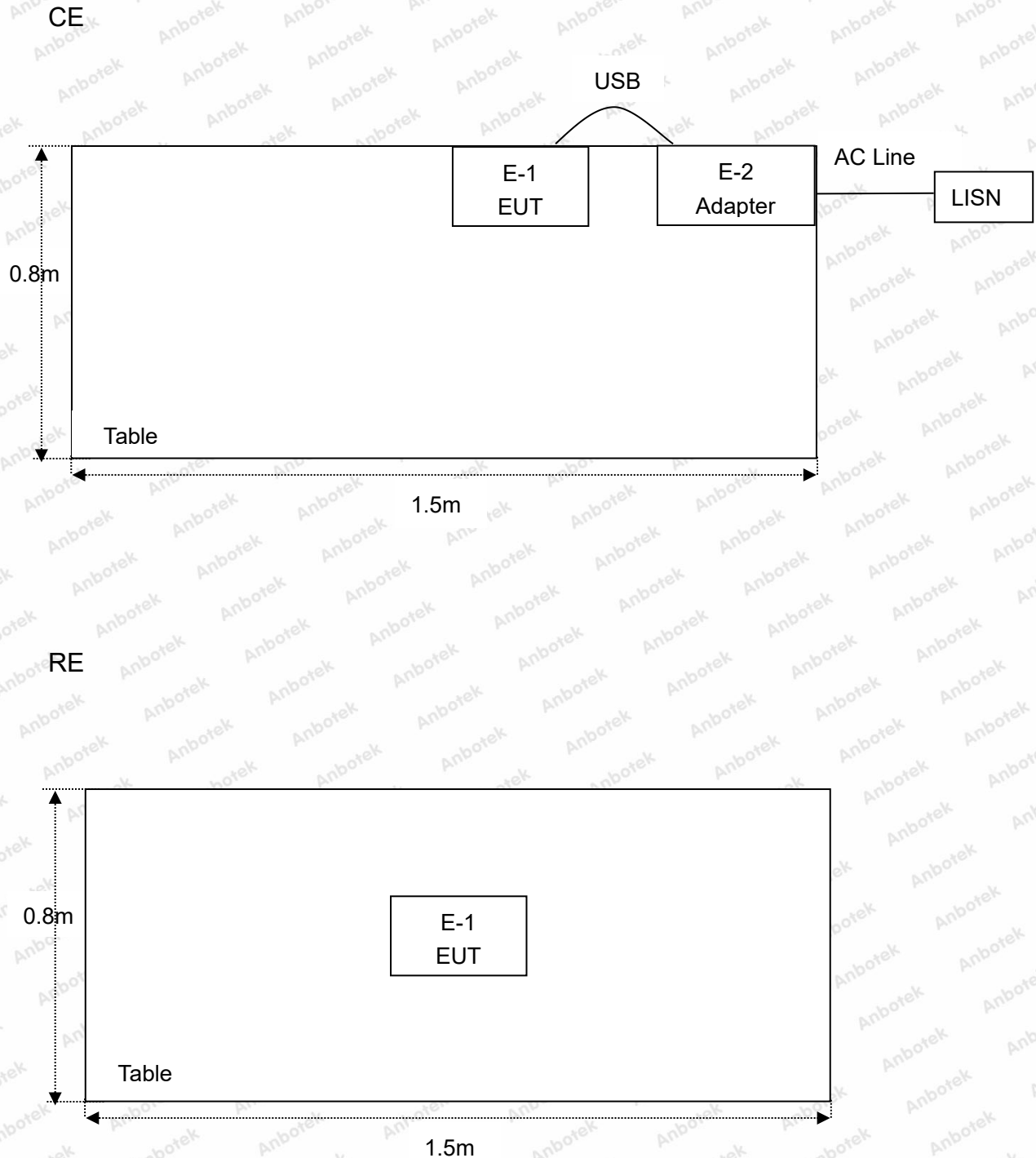
Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
01	5733	06	5765	11	5790	16	5820	21	5845
02	5740	07	5769	12	5800	17	5825	/	/
03	5745	08	5771	13	5805	18	5828	/	/
04	5752	09	5780	14	5806	19	5840	/	/
05	5760	10	5785	15	5809	20	5843	/	/

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, 12 and 21.



1.5. Description Of Test Setup



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	Jan. 18, 2024	1 Year
2.	Three Phase V-type Artificial Power Network	CYBERTEK	EM5040DT	E215040DT00 1	Jan. 17, 2024	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Jan. 17, 2024	1 Year
4.	EMI Test Receiver	Rohde & Schwarz	ESR26	101481	Jan. 23, 2024	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	Jan. 17, 2024	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-K F	J211060628	Oct. 12, 2023	1 Year
11.	Pre-amplifier	SONOMA	310N	186860	Jan. 17, 2024	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.	Spectrum Analyzer	Rohde & Schwarz	FSV40-N	101792	May. 26, 2024	1 Year



1.7. Measurement Uncertainty

Parameter	Uncertainty
Conducted emissions (AMN 150kHz~30MHz)	3.8dB
Occupied Bandwidth	925Hz
Conducted Output Power	0.76dB
Power Spectral Density	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 Anbotech 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	Test Type	Result
15.207 & 15.407(b)	Conducted Emission	PASS
15.205 & 15.209 & 15.407(b)	Radiated Spurious Emission and Restricted Band	PASS
15.407(b)	Conducted Band Edge	PASS
15.407(a) & 2.1049	26dB Bandwidth & 99% Occupied Bandwidth	PASS
15.407(a)	Maximum Conducted Output Power	PASS
15.407(a)	Maximum Power Spectral Density	PASS
15.407(g)	Frequency Stability	PASS
15.203	Antenna Requirement	PASS
Remark: "N/A" is an abbreviation for Not Applicable.		

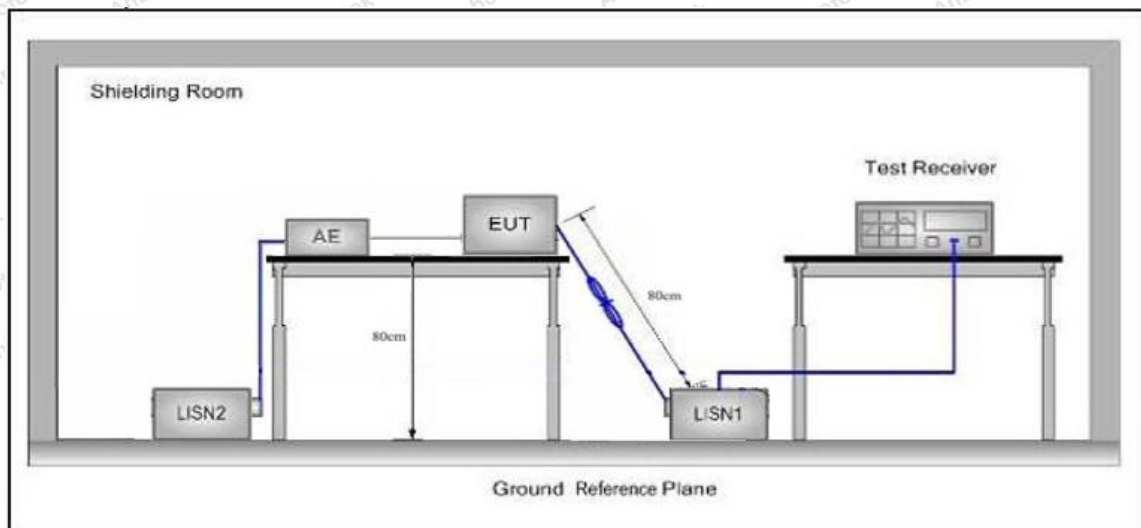


3. Conducted Emission Test

3.1. Test Standard and Limit

Test Standard	FCC Part15 Section 15.207 & 15.407(b)		
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

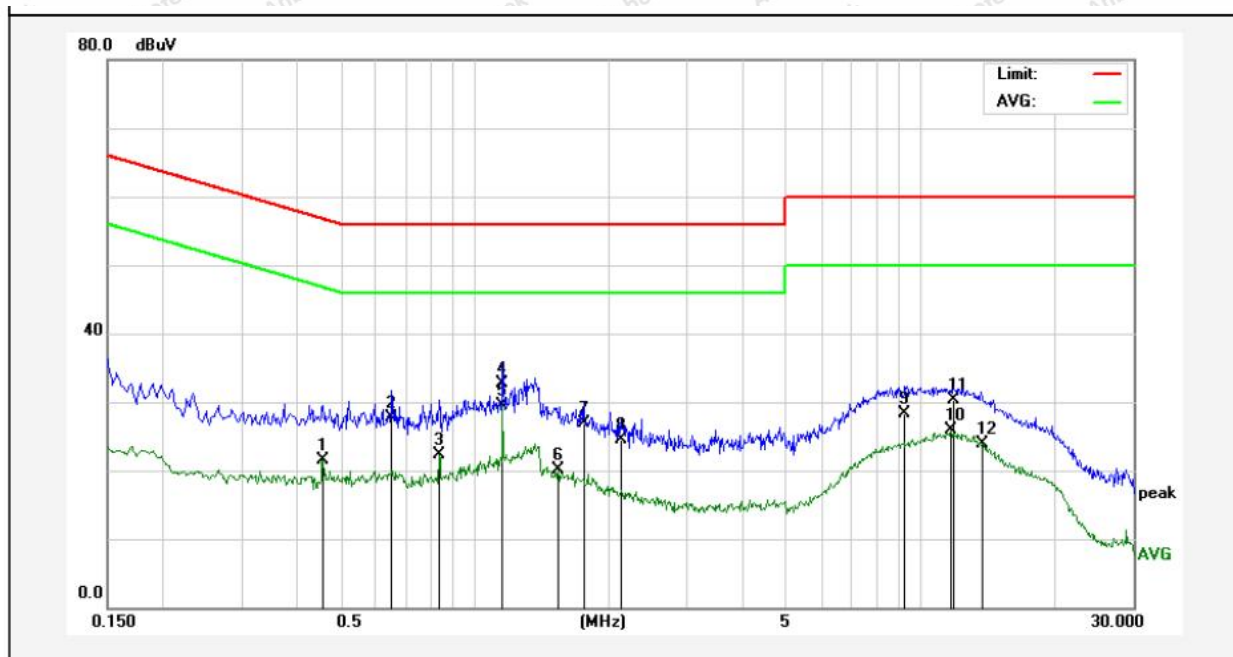
During the test, pre-scan all modes, only the worst case is recorded in the report.

Please to see the following pages.



Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: 5845MHz
Test Specification: AC 120V, 60Hz for Adapter
Comment: Live Line
Temp.(°C)/Hum.(%RH): 22.6°C/44%RH

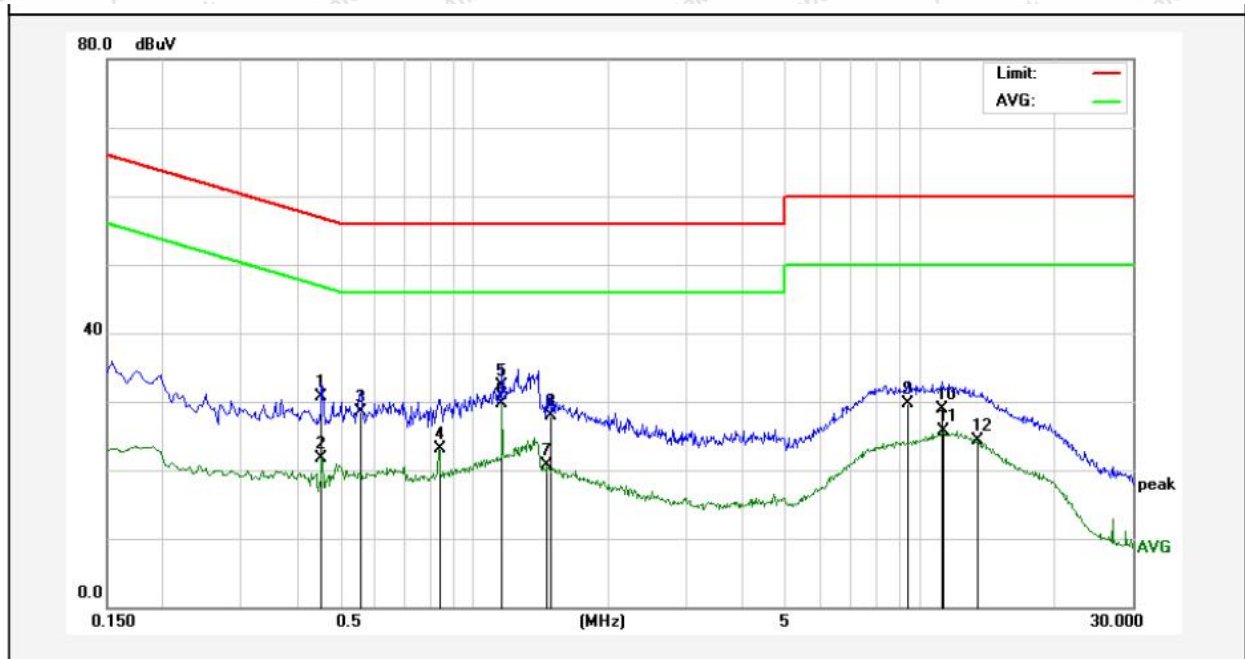


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.4580	11.77	9.83	21.60	46.73	-25.13	AVG	
2	0.6540	17.92	9.87	27.79	56.00	-28.21	QP	
3	0.8340	12.41	9.86	22.27	46.00	-23.73	AVG	
4	1.1580	22.81	9.85	32.66	56.00	-23.34	QP	
5	1.1580	19.66	9.85	29.51	46.00	-16.49	AVG	
6	1.5420	10.25	9.84	20.09	46.00	-25.91	AVG	
7	1.7580	16.98	9.84	26.82	56.00	-29.18	QP	
8	2.1300	14.68	9.83	24.51	56.00	-31.49	QP	
9	9.2420	18.37	9.95	28.32	60.00	-31.68	QP	
10	11.6940	15.90	10.05	25.95	50.00	-24.05	AVG	
11	11.8580	20.28	10.06	30.34	60.00	-29.66	QP	
12	13.7060	13.83	10.13	23.96	50.00	-26.04	AVG	



Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: 5845MHz
Test Specification: AC 120V, 60Hz for Adapter
Comment: Neutral Line
Temp.(°C)/Hum.(%RH): 22.6°C/44%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.4540	20.90	9.83	30.73	56.80	-26.07	QP	
2	0.4540	11.86	9.83	21.69	46.80	-25.11	AVG	
3	0.5580	18.72	9.86	28.58	56.00	-27.42	QP	
4	0.8340	13.17	9.86	23.03	46.00	-22.97	AVG	
5	1.1580	22.44	9.85	32.29	56.00	-23.71	QP	
6	1.1580	19.90	9.85	29.75	46.00	-16.25	AVG	
7	1.4580	10.94	9.84	20.78	46.00	-25.22	AVG	
8	1.4819	18.03	9.84	27.87	56.00	-28.13	QP	
9	9.4420	19.66	9.96	29.62	60.00	-30.38	QP	
10	11.2540	18.89	10.03	28.92	60.00	-31.08	QP	
11	11.2860	15.69	10.03	25.72	50.00	-24.28	AVG	
12	13.5140	14.15	10.13	24.28	50.00	-25.72	AVG	



4. Radiation Spurious Emission and Restricted Band Test

4.1. Test Standard and Limit

Radiated Spurious Emission					
Test Standard	FCC Part15 C Section 15.205 & 15.209 & 15.407(b)				
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
		-	68.2	Peak	3
Band Edge					
Test Standard	15.407(b)				
Test Limit	Operating Band	Frequency	EIRP Limit	Remark	
	5150-5250MHz	Out of operation band	-27dBm/MHz(68.2dBuV/m)@3m	Peak	
	5250-5350MHz	Out of operation band	-27dBm/MHz(68.2dBuV/m)@3m	Peak	
	5470-5725MHz	Out of operation band	-27dBm/MHz(68.2dBuV/m)@3m	Peak	
	5725-5850 MHz	Below 5.65GHz	-27dBm/MHz(68.2dBuV/m)@3m	Peak	
		5.65GHz-5.7GHz	-27*dBm/MHz to 10dBm/MHz (68.2* dBuV/m to 105.6dBuV/m)	Peak	
		5.7GHz-5.72GHz	10*dBm/MHz to 15.6dBm/MHz (105.6*dBuV/m to 110.8dBuV/m)	Peak	
		5.72GHz-5.725GHz	15.6*dBm/MHz to 27dBm/MHz (110.8dBuV/m to * 122.2dBuV/m)	Peak	
		5.85GHz-5.855GHz	27dBm/MHz to 15.6*dBm/MHz (122.2dBuV/m to 110.8* dBuV/m)	Peak	
		5.855GHz-5.875GHz	15.6dBm/MHz to 10*dBm/MHz	Peak	



		(110.8dBuV/m to 105.6* dBuV/m)	
	5.875GHz-5.925GHz	10dBm/MHz to -27*dBm/MHz (105.6dBuV/m to 68.2* dBuV/m)	Peak
	Above 5.925GHz	-27 dBm/MHz(68.2dBuV/m)@3m	Peak

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.

(3)Above 1GHz limit: $E[dBuV/m] = EIRP[dBm] + 95.2 = 68.2 \text{ dBuV/m}$, for $EIPR[dBm] = -27dBm$.

4.2. Test Setup

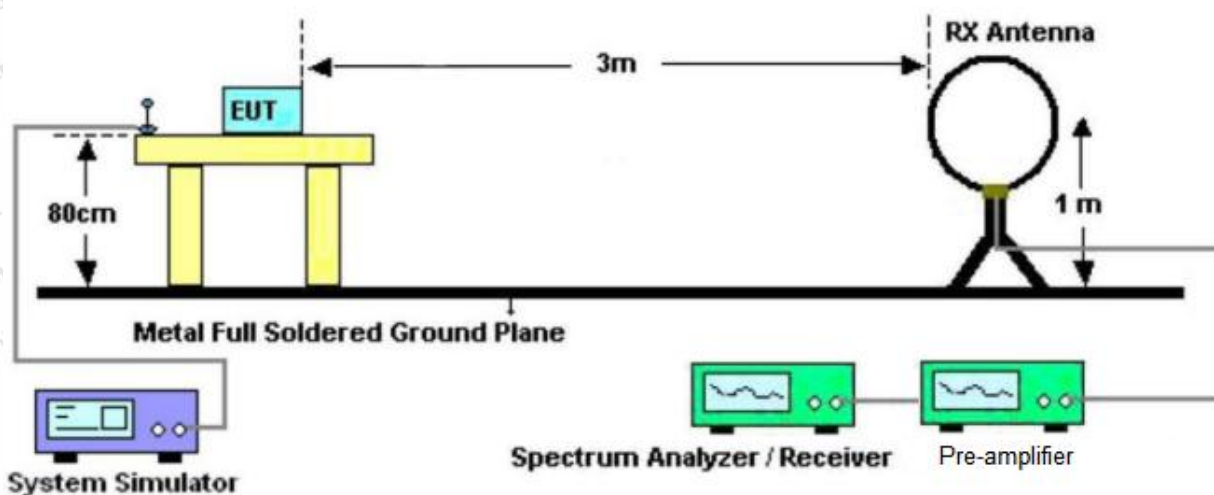


Figure 1. Below 30MHz



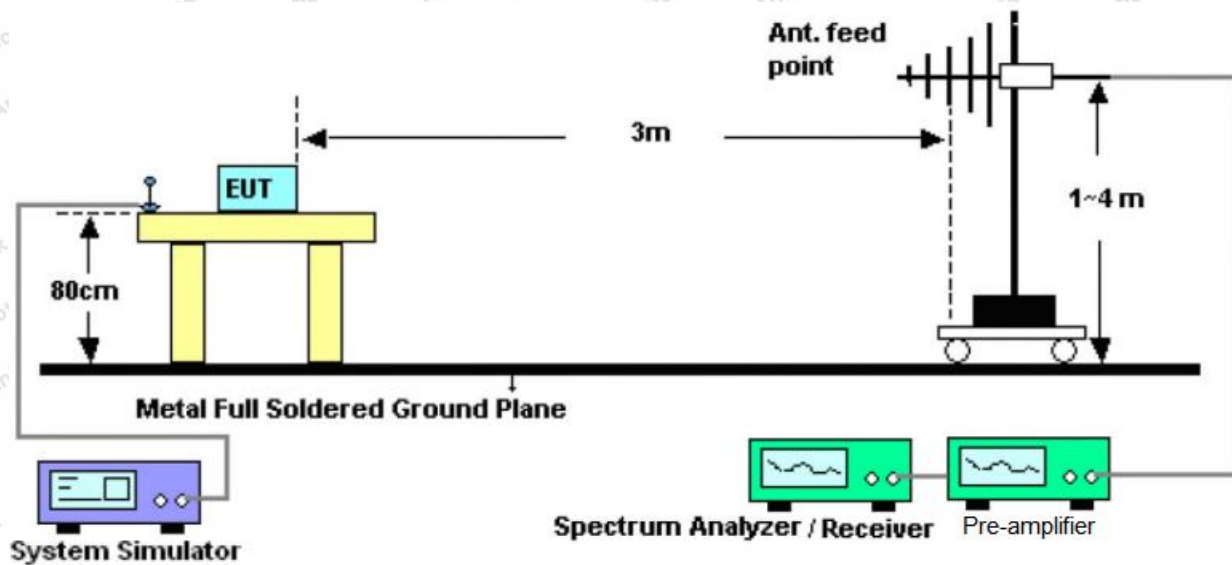


Figure 2. 30MHz to 1GHz

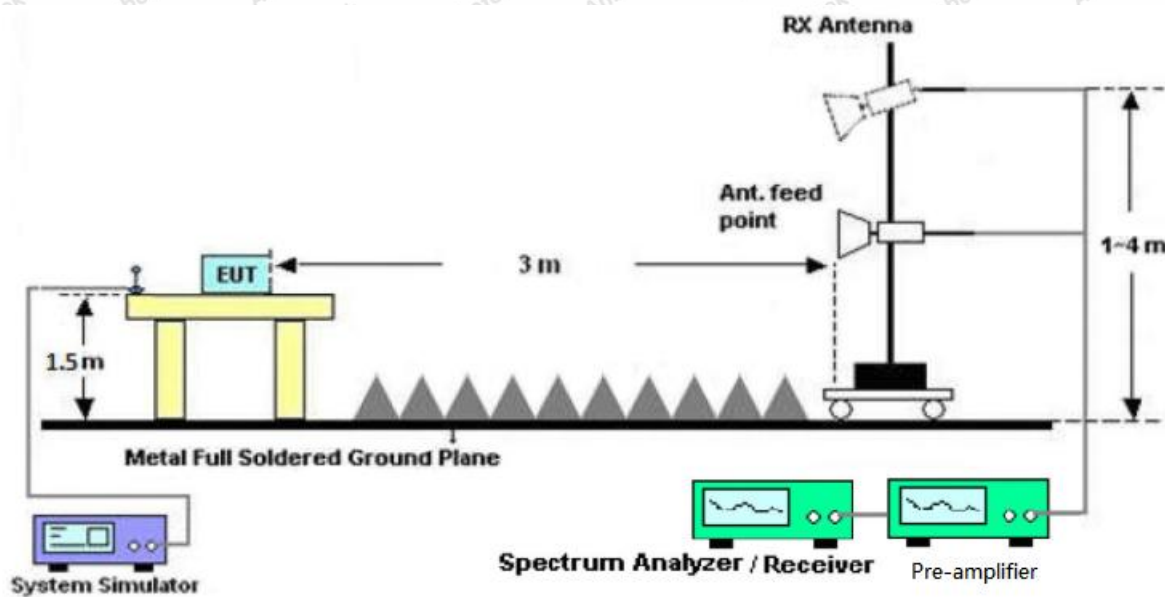


Figure 3. Above 1 GHz

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.

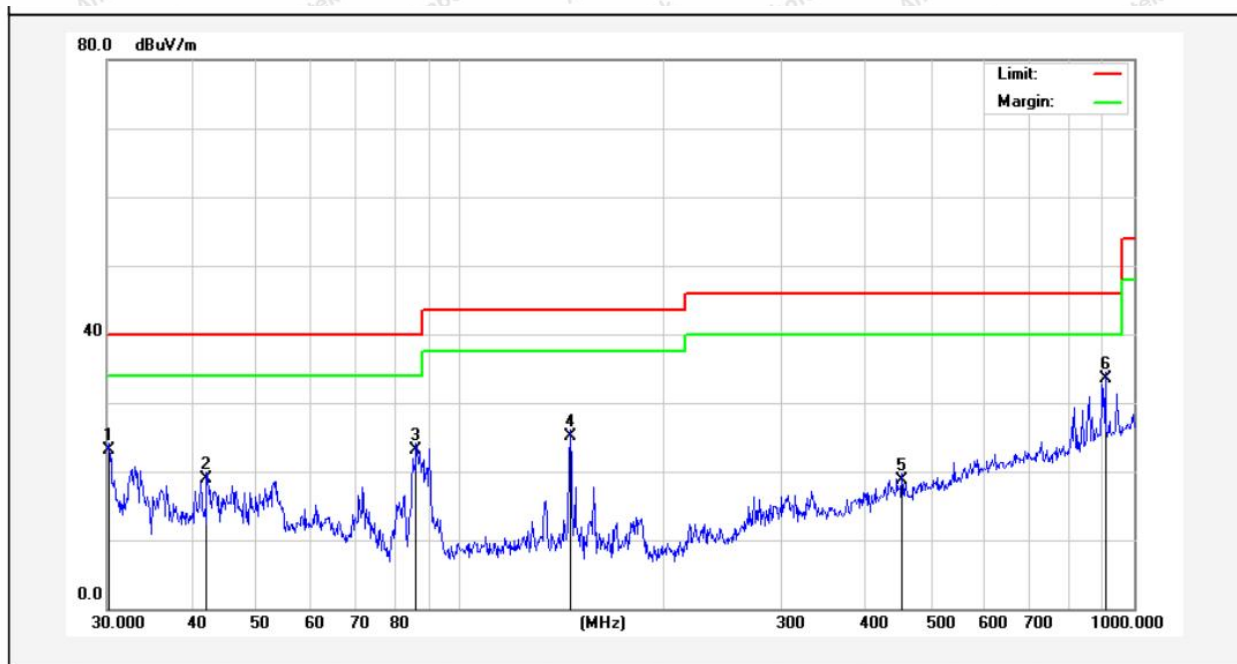
The test results of 9kHz-30MHz was attenuated more than 20dB below the permissible limits, so the results don't record in the report.

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



Test Results (30~1000MHz)

Test Mode: 5845MHz
Power Source: DC 7.6V battery inside
Polarization: Vertical
Temp.(°C)/Hum.(%RH): 22.5°C/50%RH

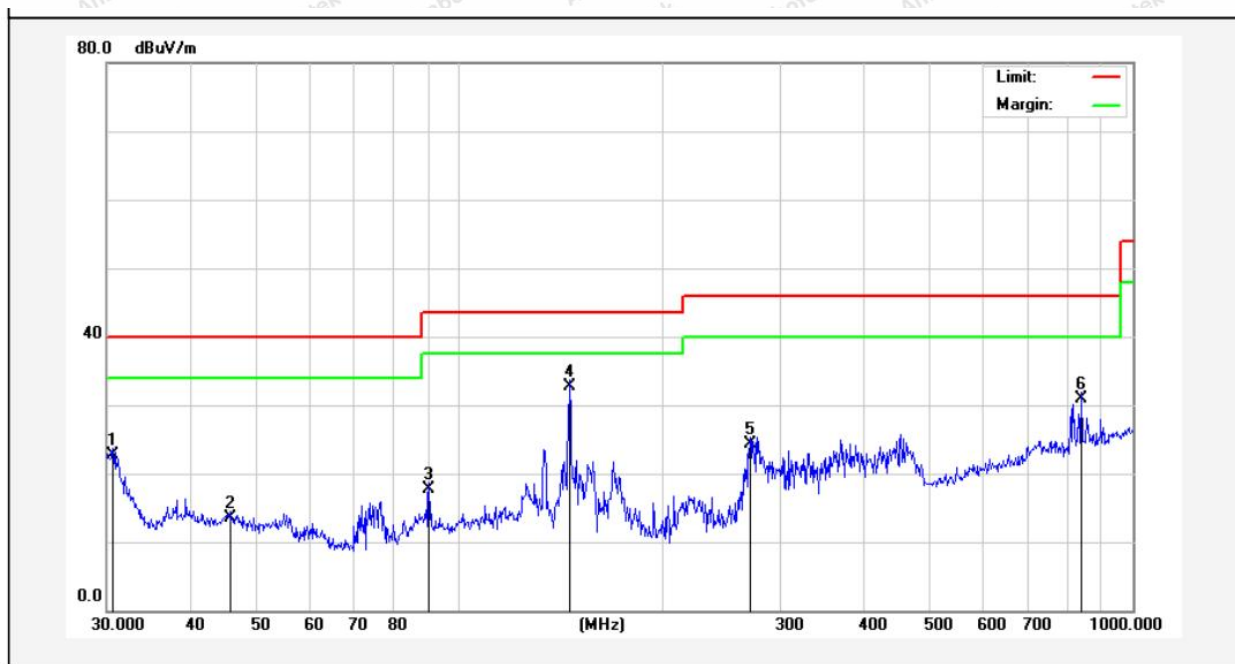


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	30.2111	40.94	-17.93	23.01	40.00	-16.99	QP			
2	42.1542	33.65	-14.78	18.87	40.00	-21.13	QP			
3	86.2001	41.45	-18.31	23.14	40.00	-16.86	QP			
4	145.8611	47.15	-22.13	25.02	43.50	-18.48	QP			
5	452.7197	32.26	-13.60	18.66	46.00	-27.34	QP			
6	906.4824	39.56	-6.14	33.42	46.00	-12.58	QP			



Test Results (30~1000MHz)

Test Mode: 5845MHz
Power Source: DC 7.6V battery inside
Polarization: Horizontal
Temp.(°C)/Hum.(%RH): 22.5°C/50%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	30.6379	42.69	-20.03	22.66	40.00	-17.34	QP			
2	45.6948	28.76	-15.28	13.48	40.00	-26.52	QP			
3	90.2205	40.20	-22.44	17.76	43.50	-25.74	QP			
4	145.8611	55.69	-22.94	32.75	43.50	-10.75	QP			
5	270.3748	44.08	-19.72	24.36	46.00	-21.64	QP			
6	839.1818	38.60	-7.66	30.94	46.00	-15.06	QP			



Test Results (Above 1000MHz)

Test channel: Low CH							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
11466.000	28.70	23.36	52.06	68.20	-16.14	V	Peak
17199.000	30.19	31.97	62.16	68.20	-6.04	V	Peak
11466.000	29.37	23.36	52.73	68.20	-15.47	H	Peak
17199.000	30.34	31.97	62.31	68.20	-5.89	H	Peak
11466.000	18.14	23.36	41.50	54.00	-12.50	V	AVG
17199.000	19.05	31.97	51.02	54.00	-2.98	V	AVG
11466.000	18.40	23.36	41.76	54.00	-12.24	H	AVG
17199.000	18.23	31.97	50.20	54.00	-3.80	H	AVG
Test channel: Middle CH							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
11600.000	29.28	23.42	52.70	68.20	-15.50	V	Peak
17400.000	30.07	32.18	62.25	68.20	-5.95	V	Peak
11600.000	29.57	23.42	52.99	68.20	-15.21	H	Peak
17400.000	30.43	32.18	62.61	68.20	-5.59	H	Peak
11600.000	19.412	23.42	42.83	54.00	-11.17	V	AVG
17400.000	19.371	32.18	51.55	54.00	-2.45	V	AVG
11600.000	19.392	23.42	42.81	54.00	-11.19	H	AVG
17400.000	18.613	32.18	50.79	54.00	-3.21	H	AVG
Test channel: High CH							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
11690.000	28.79	23.49	52.28	68.20	-15.92	V	Peak
17535.000	30.31	32.39	62.70	68.20	-5.50	V	Peak
11690.000	29.31	23.49	52.80	68.20	-15.40	H	Peak
17535.000	30.04	32.39	62.43	68.20	-5.77	H	Peak
11690.000	18.48	23.49	41.97	54.00	-12.03	V	AVG
17535.000	19.17	32.39	51.56	54.00	-2.44	V	AVG
11690.000	18.57	23.49	42.06	54.00	-11.94	H	AVG
17535.000	18.58	32.39	50.97	54.00	-3.03	H	AVG

Remark:

1. Result=Reading + Factor



Radiated Band Edge:

Test channel: Lowest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5725.00	37.62	16.37	53.99	74.00	-20.01	H	Peak
5725.00	38.80	16.37	55.17	74.00	-18.83	V	Peak
5725.00	28.63	16.70	45.33	54.00	-8.67	H	AVG
5725.00	29.70	16.70	46.40	54.00	-7.60	V	AVG
Test channel: Highest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5850.00	38.47	17.21	55.68	74.00	-18.32	H	Peak
5850.00	38.73	17.21	55.94	74.00	-18.06	V	Peak
5850.00	28.55	17.21	45.76	54.00	-8.24	H	AVG
5850.00	28.67	17.21	45.88	54.00	-8.12	V	AVG

Remark: 1. Result = Reading + Factor

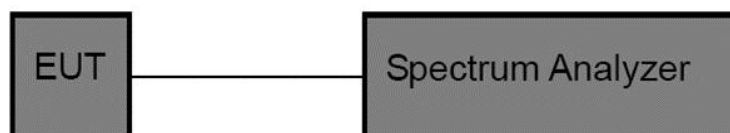


5. Maximum Conducted Output Power Test

5.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.407(a)	
Test Limit	5.15 - 5.25GHz	1) Outdoor AP The maximum conducted output power (Pout) shall not exceed the lesser of 1W (30dBm). if $GT_x > 6\text{dBi}$, then $P_{out} = 30 - (GT_x - 6)$. e.i.r.p. at any elevation angle above 30 degrees $\leq 125\text{mW}$ (21dBm) 2) Indoor AP The maximum conducted output power (Pout) shall not exceed the lesser of 1W (30dBm). if $GT_x > 6\text{dBi}$, then $P_{out} = 30 - (GT_x - 6)$. 3) Point-to-point AP The maximum conducted output power (Pout) shall not exceed the lesser of 1W (30dBm). if $GT_x > 23\text{dBi}$, then $P_{out} = 30 - (GT_x - 23)$. 4) Client devices The maximum conducted output power (Pout) shall not exceed the lesser of 250W (23.98dBm). if $GT_x > 6\text{dBi}$, then $P_{out} = 24 - (GT_x - 6)$.
	5.25 - 5.35GHz	The maximum conducted output power (Pout) shall not exceed the lesser of 250mW (24dBm) or $11\text{dBm} + 10 \log B$, where B is the 26dB emission bandwidth in MHz. if $GT_x > 6\text{dBi}$, then $P_{out} = 24 - (GT_x - 6)$.
	5.47- 5.725GHz	The maximum conducted output power (Pout) shall not exceed the lesser of 250mW (23.98dBm) or $11\text{dBm} + 10 \log B$, where B is the 26dB emission bandwidth in MHz. if $GT_x > 6\text{dBi}$, then $P_{out} = 24 - (GT_x - 6)$.
	5.725 - 5.85GHz	1) Point-to-multipoint systems (P2M) The maximum conducted output power (Pout) shall not exceed the lesser of 1W (30dBm). if $GT_x > 6\text{dBi}$, then $P_{out} = 30 - (GT_x - 6)$. 2) Point-to-point systems (P2P) The maximum conducted output power (Pout) shall not exceed the lesser of 1W (30dBm).

5.2. Test Setup



5.3. Test Procedure

1. Measure the duty cycle D of the transmitter output signal.
2. Set span to encompass the entire 99% OBW of the signal.
3. Set RBW = 1 MHz.



4. Set VBW $\geq [3 \times \text{RBW}]$.
5. Number of points in sweep $\geq [2 \times \text{span} / \text{RBW}]$.
6. Sweep time = auto.
7. Detector = RMS
8. Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the ON and OFF periods of the transmitter.
9. Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
10. Add $[10 \log (1 / D)]$, where D is the duty cycle, to the measured power to compute the average power during the actual transmission times.

Note: The cable loss and attenuator loss were offset into measure device as amplitude offset.

5.4. Test Data

Pass

Please refer to Appendix C of the Appendix Test Data.

Additional test for duty cycle.

Please refer to Appendix B of the Appendix Test Data.

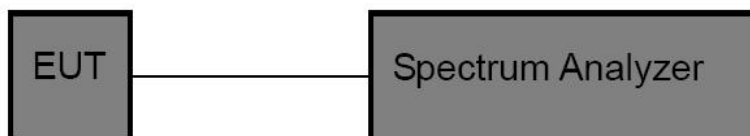


6. 26dB Bandwidth & 99% Occupied Bandwidth Test

6.1. Test Standard

Test Standard	FCC Part15 C Section 15.407(a) & 2.1049
Test Limit	N/A

6.2. Test Setup



6.3. 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:

26 dB & 99% bandwidth

RBW = approximately 1% of the emission bandwidth;

Set the VBW > RBW;

Detector= Peak

Trace mode= Max hold.

Sweep- auto couple.

4. Measure the maximum width of the emission that is 26dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer.
5. Repeat until all the rest channels are investigated.

6.4. Test Data

Pass

Please refer to Appendix A1&A2 of the Appendix Test Data.

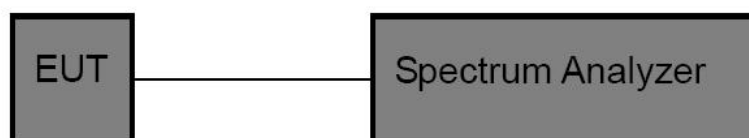


7. Maximum Power Spectral Density Test

7.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.407(a)	
Test Limit	5.15 - 5.25GHz	1) Outdoor AP The peak power spectral density (PSD) shall not exceed the lesser of 17dBm/MHz. if $GT_x > 6\text{dBi}$, then $PSD = 17 - (GT_x - 6)$. 2) Indoor AP The peak power spectral density (PSD) shall not exceed the lesser of 17dBm/MHz. if $GT_x > 6\text{dBi}$, then $PSD = 17 - (GT_x - 6)$. 3) Point-to-point AP The peak power spectral density (PSD) shall not exceed the lesser of 17dBm/MHz. if $GT_x > 23\text{dBi}$, then $PSD = 17 - (GT_x - 23)$. 4) Client devices The peak power spectral density (PSD) shall not exceed the lesser of 11dBm/MHz. if $GT_x > 6\text{dBi}$, then $PSD = 11 - (GT_x - 6)$.
	5.25 - 5.35GHz	The peak power spectral density (PSD) shall not exceed the lesser of 11dBm/MHz. if $GT_x > 6\text{dBi}$, then $PSD = 11 - (GT_x - 6)$.
	5.47- 5.725GHz	The peak power spectral density (PSD) shall not exceed the lesser of 11dBm/MHz. if $GT_x > 6\text{dBi}$, then $PSD = 11 - (GT_x - 6)$.
	5.725 - 5.85GHz	1) Point-to-multipoint systems (P2M) The peak power spectral density (PSD) shall not exceed the lesser of 30dBm/500kHz. if $GT_x > 6\text{dBi}$, then $PSD = 30 - (GT_x - 6)$. 2) Point-to-point systems (P2P) The peak power spectral density (PSD) shall not exceed the lesser of 30dBm/500kHz.

7.2. Test Setup



7.3. Test Procedure

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz).

1. The EUT is directly connected to the spectrum analyzer;
2. Set RBW =1MHz;



3. Set VBW $\geq$ 3 RBW=3MHz;
3. Set the span to encompass the entire emissions bandwidth (EBW) of the signal;
5. Detector=RMS;
6. Sweep time= auto couple;
7. Trace mode=max. hold;

7.4. Test Data

Pass

Please refer to Appendix D of the Appendix Test Data.

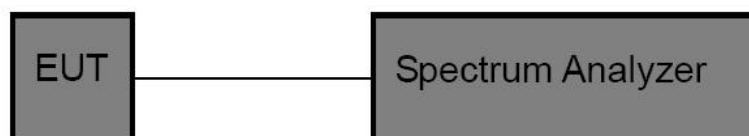


8. Conducted Band Edge Test

8.1. Test Standard and Limit

Test Standard	15.407(b)			
Test Limit	Operating Band	Frequency	EIRP Limit	Remark
	5150-5250MHz	Out of operation band	-27dBm/MHz	Peak
	5250-5350MHz	Out of operation band	-27dBm/MHz	Peak
	5470-5725MHz	Out of operation band	-27dBm/MHz	Peak
	5725-5850 MHz	Below 5.65GHz	-27dBm/MHz	Peak
		5.65GHz-5.7GHz	-27dBm/MHz to 10dBm/MHz	Peak
		5.7GHz-5.72GHz	10dBm/MHz to 15.6dBm/MHz	Peak
		5.72GHz-5.725GHz	15.6dBm/MHz to 27dBm/MHz	Peak
		5.85GHz-5.855GHz	27dBm/MHz to 15.6dBm/MHz	Peak
		5.855GHz-5.875GHz	15.6dBm/MHz to 10dBm/MHz	Peak
		5.875GHz-5.925GHz	10dBm/MHz to -27dBm/MHz	Peak
		Above 5.925GHz	-27dBm/MHz	Peak

8.2. Test Setup



8.3. Test Procedure

Using the following spectrum analyzer setting:

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

8.4. Test Data

Pass

Please refer to Appendix E of the Appendix Test Data.

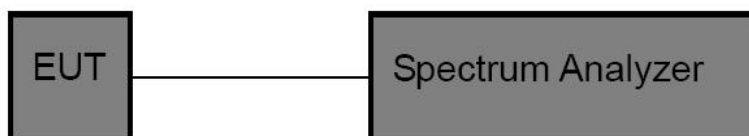


9. Frequency Stability

9.1. Test Standard and Limit

Test Standard	FCC Part15 Section 15.407(g)
Test Limit	The frequency tolerance shall be maintained within the band of operation frequency over a temperature variation of 0 degrees to 35 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

9.2. Test Setup



9.3. Test Procedure

The EUT was placed inside the environmental test chamber and powered by nominal AC/DC voltage. b. Turn the EUT on and couple its output to a spectrum analyzer. c. Turn the EUT off and set the chamber to the highest temperature specified. d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature. f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

9.4. Test Data

Pass

Please to see the following pages.



Mode	TX Type	Frequency (MHz)	Temperature (°C)	Voltage (VDC)	Measured Frequency (MHz)	Limit	Verdict
5.8G	SISO	5733	20	6.46	5733.001	5732.6 to 5733.4	Pass
				7.60	5733.004	5732.6 to 5733.4	Pass
				8.74	5733.006	5732.6 to 5733.4	Pass
			-20	7.60	5733.003	5732.6 to 5733.4	Pass
			50	7.60	5733.005	5732.6 to 5733.4	Pass
		5800	20	6.46	5800.001	5799.6 to 5800.4	Pass
				7.60	5800.016	5799.6 to 5800.4	Pass
				8.74	5800.002	5799.6 to 5800.4	Pass
			-20	7.60	5800.001	5799.6 to 5800.4	Pass
			50	7.60	5800.010	5799.6 to 5800.4	Pass
		5845	20	6.46	5845.014	5844.6 to 5845.4	Pass
				7.60	5845.019	5844.6 to 5845.4	Pass
				8.74	5845.014	5844.6 to 5845.4	Pass
			-20	7.60	5845.013	5844.6 to 5845.4	Pass
			50	7.60	5845.018	5844.6 to 5845.4	Pass



10. Antenna Requirement

10.1. Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203 /15.407
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) 15.407 requirement: if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

10.2. Antenna Connected Construction

The antenna is a Monopole Antenna which permanently attached, and the best case gain of the 3.68 dBi. 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 -----

