FCC PART 15.249
TEST REPORT

For

Shenzhen Baida Moxing Co.,Ltd.

2007 Building 11, Tianan Yungu Phase II, Bantian Street, Longgang District, Shenzhen

FCC ID: 2AT6XCETUS

Report Type:	**Product Type:**
Original Report	Cetus

Report Number: SZ4210621-24609E-RF

Report Date: 2021-07-07

Candy Li

Reviewed By: RF Engineer

Prepared By: Shenzhen Accurate Technology Co., Ltd.
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Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "★".

Shenzhen Accurate Technology Co., Ltd. is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk '*'. Customer model name, addresses, names, trademarks etc. are not considered data.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Cetus
Tested Model	Cetus Brushed Whoop Quadcopter
Frequency Range	5733~5866MHz
Modulation Technique	FM
Antenna Specification	2.0dBi
Voltage Range	DC 3.8V from battery
Date of Test	2021-06-30 to 2021-07-01
Sample serial number	SZ4210621-24609E-RF-S1(Assigned by ATC, Shenzhen)
Received date	2021-06-21
Sample/EUT Status	Good condition

Objective

This type approval report is prepared on behalf of *Shenzhen Baida Moxing Co.,Ltd.* in accordance with Part 2-Subpart J, and Part 15-Subparts A and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.209 and 15.249 rules.

Related Submittal(s)/Grant(s)

N/A

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

For Radiated Emissions testing, please refer to DA 00-705 Released March 30, 2000, Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Parameter		Uncertainty
Emissions, Radiated	30MHz - 1GHz	4.28dB
	1GHz- 18GHz	4.98dB
	18GHz- 26.5GHz	5.06dB
	26.5GHz- 40GHz	4.72dB
Temperature		1℃
Humidity		6%
Supply voltages		0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189. Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 429 7.01.

Listed by Innovation, Science and Economic Development Canada (ISEDC), the Registration Number is 5077A-2.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing by manufacturer.

8 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	5733	5	5809
2	5752	6	5828
3	5771	7	5847
4	5790	8	5866

Channel 1, Channel 5 and Channel 8 were selected for testing.

EUT Exercise Software

Test in the engineer mode via remote during testing and power level is default*.

Equipment Modifications

No modifications were made to the unit tested.

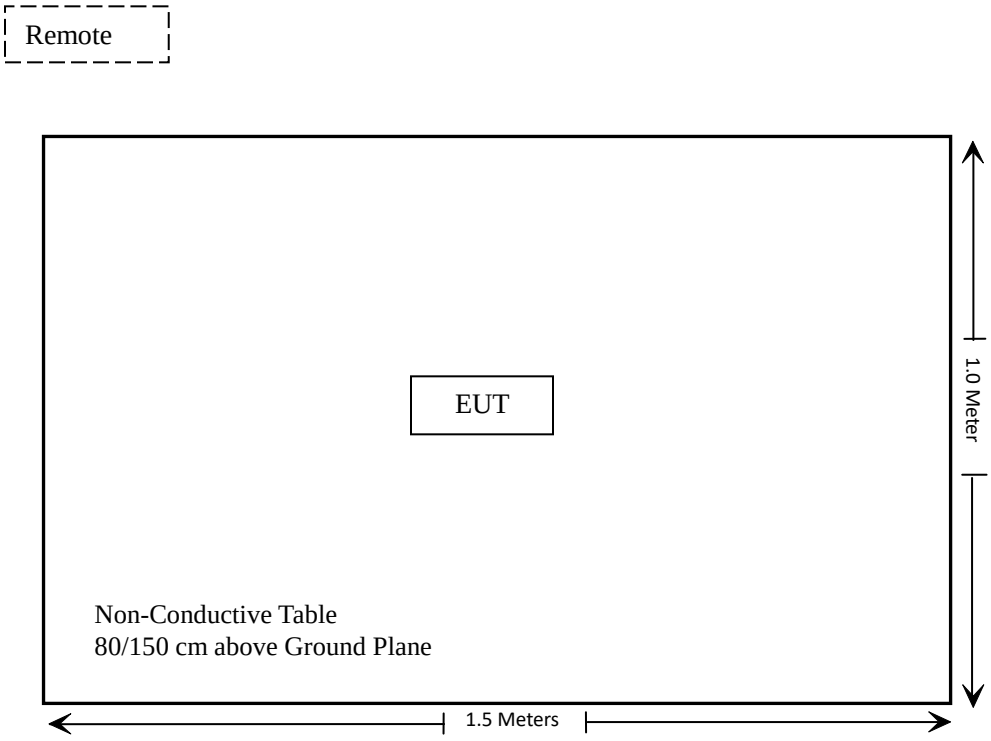
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
BETAFPV	Remote	Literadio 2	Unknown

Support Cable Descriptions

Cable Description	Length (m)	From/Port	To
/	/	/	/

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207(a)	Conduction Emissions	Not Applicable
15.205, §15.209, §15.249(d)	Radiated Emissions& Outside of Band Emission	Compliance
§15.215 (c)	20 dB Bandwidth	Compliance

Not Applicable: The equipment operating only by battery.

Test Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emissions Test					
Rohde&Schwarz	Test Receiver	ESR	101817	2020/12/24	2021/12/23
Rohde & Schwarz	Spectrum Analyzer	FSV-40	101495	2020/12/24	2021/12/23
A.H. Systems, inc.	Preamplifier	PAM-0118P	531	2020/07/08	2021/07/07
SONOMA INSTRUMENT	Amplifier	310 N	186131	2020/12/25	2021/12/24
Schwarzbeck	HORN ANTENNA	BBHA9170	9170-359	2020/01/05	2023/01/04
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2020/11/28	2021/11/27
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2020/01/04	2023/01/03
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2020/01/05	2023/01/04
Wainwright	High Pass Filter	WHNX6.0/26.5G-6SS	4	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-5m	No.3	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-5m	No.4	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-1m	No.5	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-1m	No.6	2020/12/25	2021/12/24

*** Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to FCC §15.203, 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 shall be considered sufficient to comply with the provisions of this Section. 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.

Antenna Connector Construction

The EUT has one internal antenna which was permanently attached and the antenna gain is 2 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliance.

FCC §15.205, §15.209 & §15.249(d) - RADIATED EMISSIONS

Applicable Standard

As per FCC §15.249 (a), except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

As per FCC §15.249 (c), Field strength limits are specified at a distance of 3 meters.

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

Test Equipment Setup

The spectrum analyzer or receiver is set as:

Below 1000MHz:

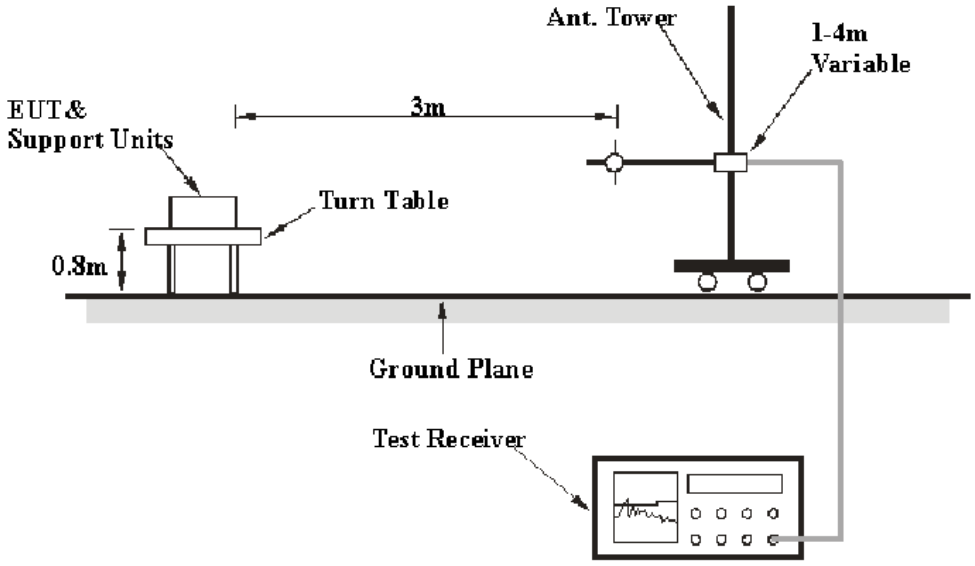
RBW = 100 kHz / VBW = 300 kHz / Sweep = Auto

Above 1000MHz:

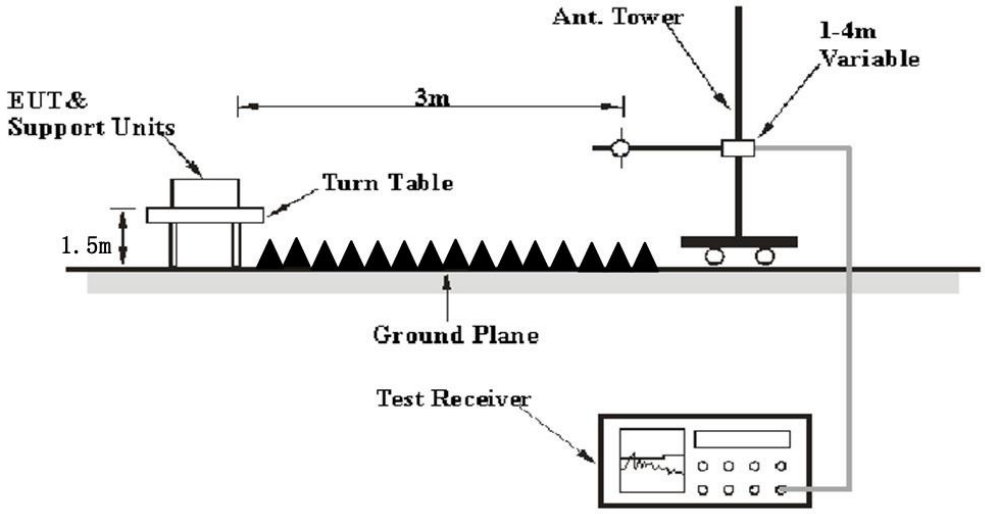
Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto
Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission and out of band emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209/15.205 and FCC 15.249 limits.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 mete, and the EUT is placed on a turntable, which is 0.8 meter above ground plane for below 1GHz or 1.5 meter for above 1GHz, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the EUT complied with the FCC Part 15.205, 15.209 & §15.249

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	60 %
ATM Pressure:	100.9 kPa

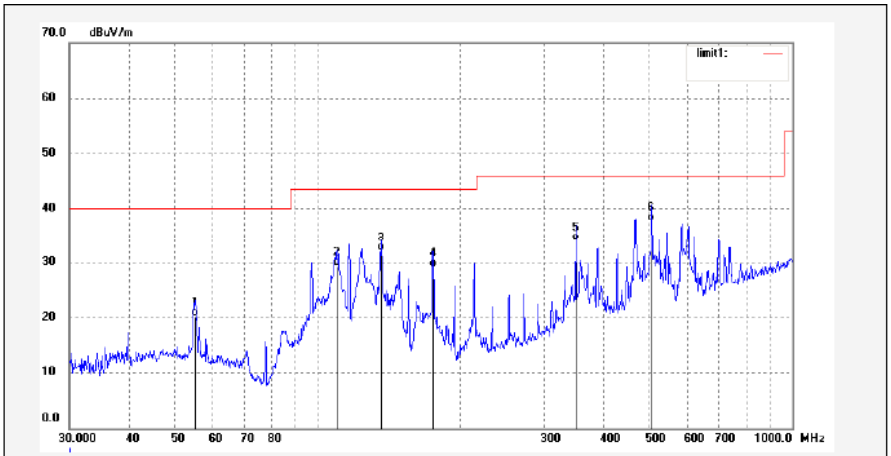
The testing was performed by Fan Yang on 2021-07-01.

Test Mode: Transmitting

30MHz-1GHz: (Worst case)

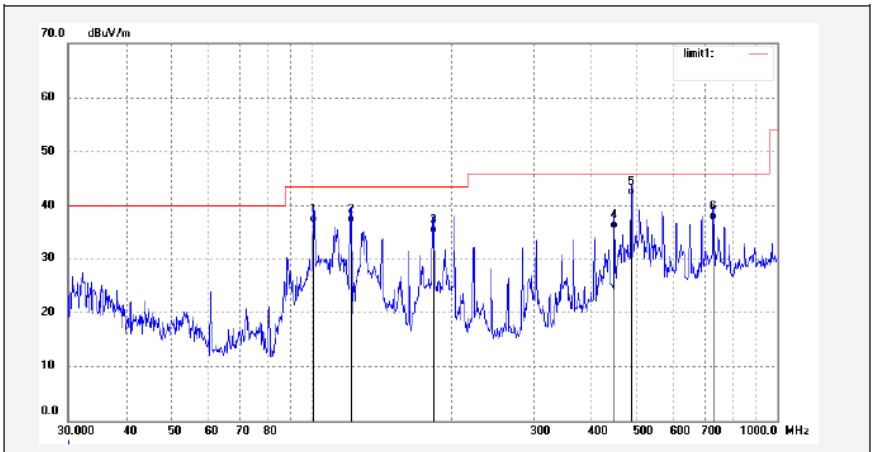
High Channel

Horizontal



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	55.2207	37.71	-17.45	20.26	40.00	-19.74	QP			
2	109.7960	48.21	-18.86	29.35	43.50	-14.15	QP			
3	135.9822	51.30	-19.22	32.08	43.50	-11.42	QP			
4	175.0368	47.75	-18.67	29.08	43.50	-14.42	QP			
5	350.4768	47.31	-13.30	34.01	46.00	-11.99	QP			
6	504.7062	48.02	-10.36	37.66	46.00	-8.34	QP			

Vertical



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	100.9339	55.03	-18.25	36.78	43.50	-6.72	QP			
2	121.5485	55.16	-18.26	36.90	43.50	-6.60	QP			
3	182.5592	53.16	-18.17	34.99	43.50	-8.51	QP			
4	446.4141	46.61	-10.78	35.83	46.00	-10.17	QP			
5	485.6093	52.64	-10.72	41.92	46.00	-4.08	QP			
6	729.3582	43.83	-6.40	37.43	46.00	-8.57	QP			

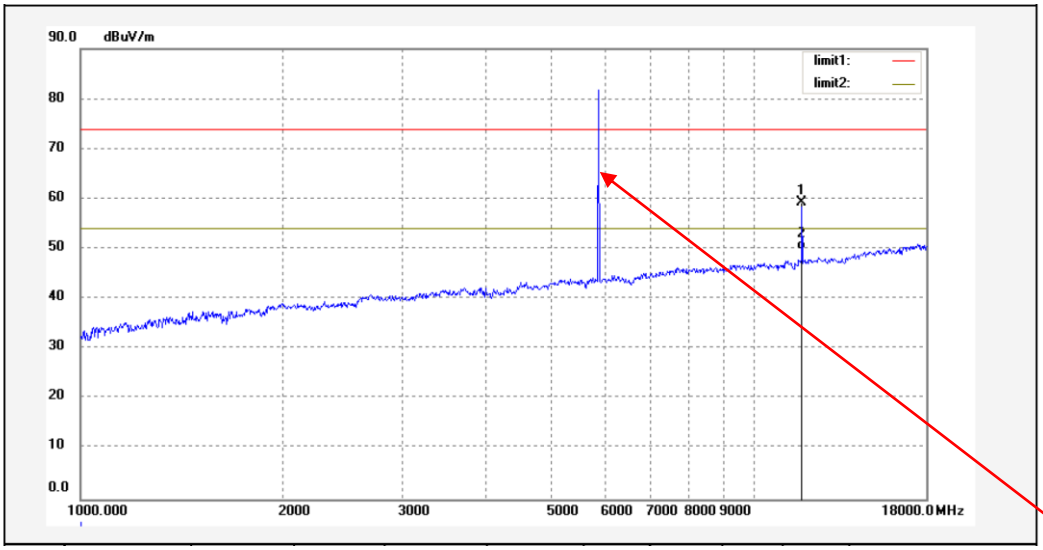
1-40 GHz:

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Absolute Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
	Reading (dBuV)	PK/Ave		Height (m)	Polar (H/V)				
Low Channel (5733 MHz)									
5725	52.04	PK	210	1.8	H	3.97	56.01	74	17.99
5725	42.96	AVG	319	1.9	H	3.97	46.93	54	7.07
5725	52.94	PK	107	2.1	V	3.97	56.91	74	17.09
5725	43.11	AVG	326	1.5	V	3.97	47.08	54	6.92
5733	95.24	PK	339	1.5	H	3.99	99.23	114	14.77
5733	87.96	AVG	249	1.9	H	3.99	91.95	94	2.05
5733	96.04	PK	178	2.1	V	3.99	100.03	114	13.97
5733	88.1	AVG	339	1.9	V	3.99	92.09	94	1.91
11466	42.06	PK	92	2.2	H	14.85	56.91	74	17.09
11466	32.32	AVG	284	1.8	H	14.85	47.17	54	6.83
11466	43.79	PK	255	1.9	V	14.85	58.64	74	15.36
11466	34.13	AVG	82	2.1	V	14.85	48.98	54	5.02
Middle Channel (5809 MHz)									
5809	95.21	PK	197	1.5	H	4.21	99.42	114	14.58
5809	87.75	AVG	9	1.4	V	4.21	91.96	94	2.04
5809	96.21	PK	192	1.6	H	4.21	100.42	114	13.58
5809	87.85	AVG	176	1.5	V	4.21	92.06	94	1.94
11618	43.96	PK	44	1.4	H	14.56	58.52	74	15.48
11618	33.87	AVG	4	2.1	H	14.56	48.43	54	5.57
11618	46.03	PK	83	1.7	V	14.56	60.59	74	13.41
11618	35.19	AVG	346	2.2	V	14.56	49.75	54	4.25
High Channel (5866 MHz)									
5866	94.74	PK	353	2.0	H	4.39	99.13	114	14.87
5866	87.36	AVG	169	2.0	V	4.39	91.75	94	2.25
5866	96.74	PK	81	2.0	H	4.39	101.13	114	12.87
5866	88.36	AVG	134	1.2	V	4.39	92.75	94	1.25
5875	50.94	PK	18	1.8	H	4.41	55.35	74	18.65
5875	42.32	AVG	227	1.7	H	4.41	46.73	54	7.27
5875	52.05	PK	208	1.3	V	4.41	56.46	74	17.54
5875	43.21	AVG	181	2	V	4.41	47.62	54	6.38
11732	44.97	PK	321	2.1	H	14.38	59.35	74	14.65
11732	35.35	AVG	175	2.0	H	14.38	49.73	54	4.27
11732	47.08	PK	30	1.0	V	14.38	61.46	74	12.54
11732	36.24	AVG	112	1.5	V	14.38	50.62	54	3.38

Note:
Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude
The other spurious emission which is 20dB to the limit was not recorded.

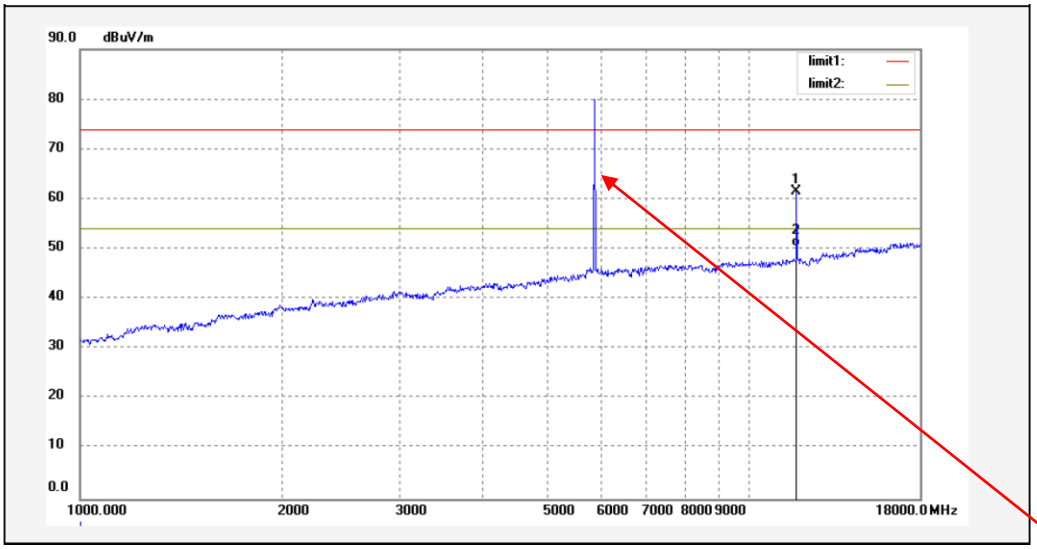
Pre-scan with high channel Peak
1-18GHz

Horizontal



Fundamental Test

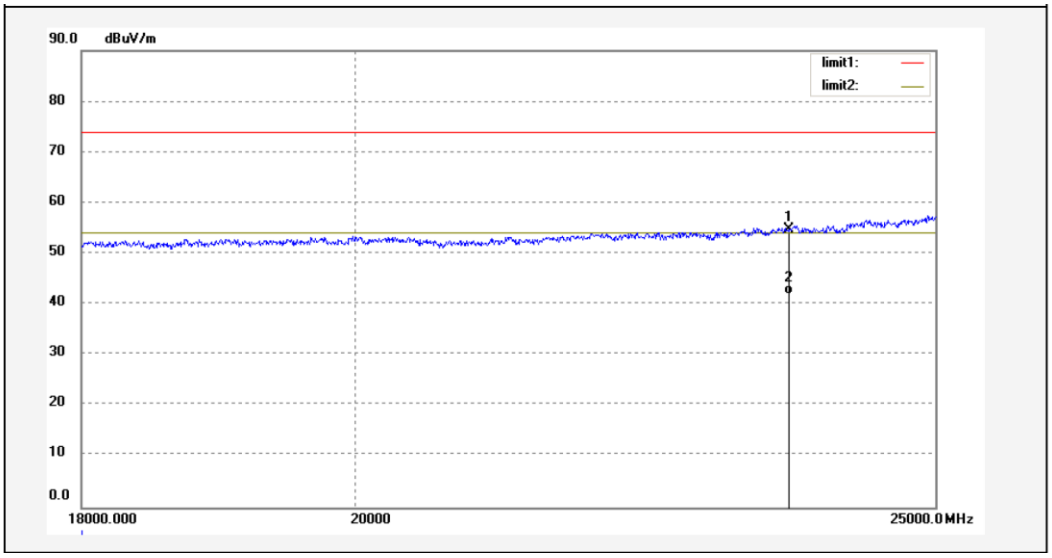
Vertical



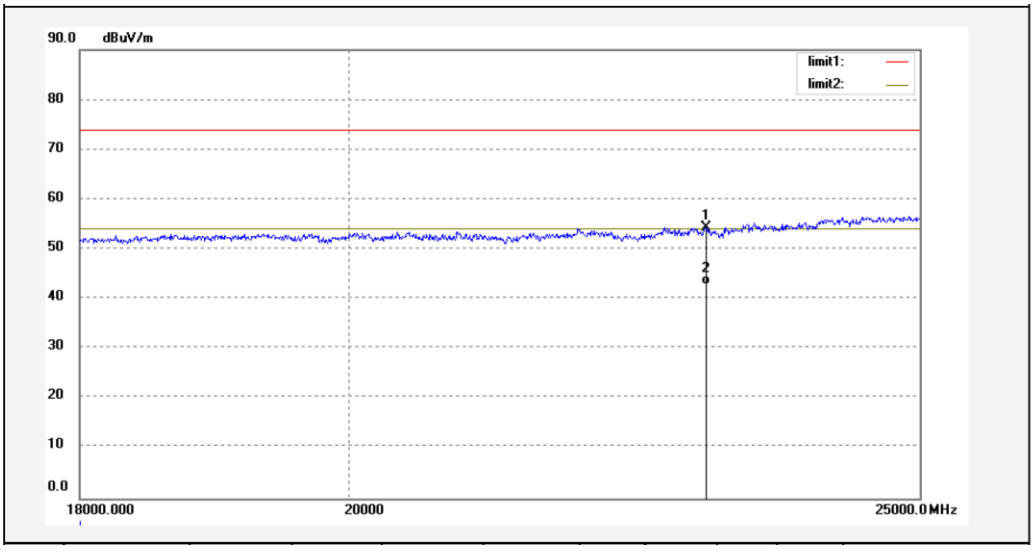
Fundamental Test

18-25GHz

Horizontal

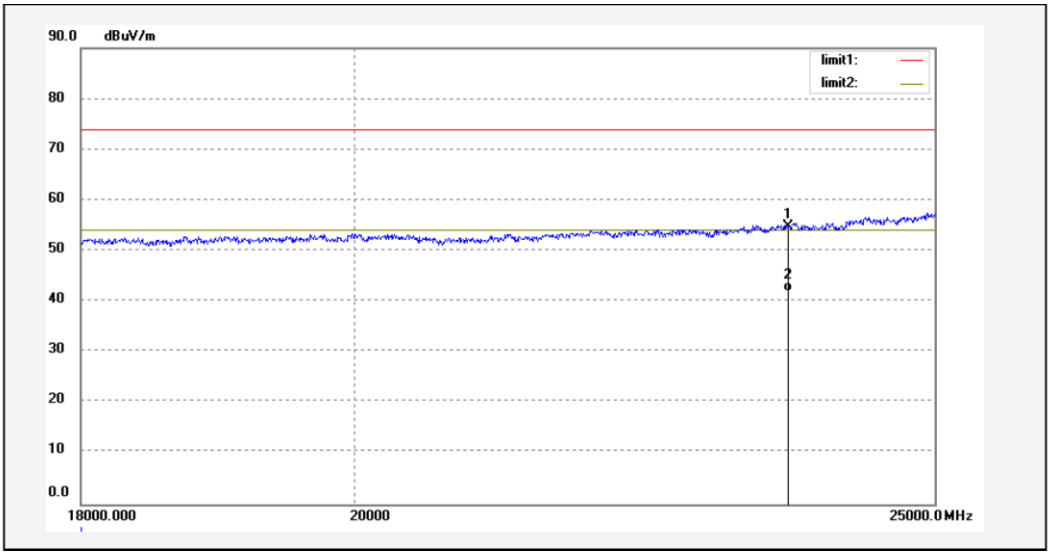


Vertical

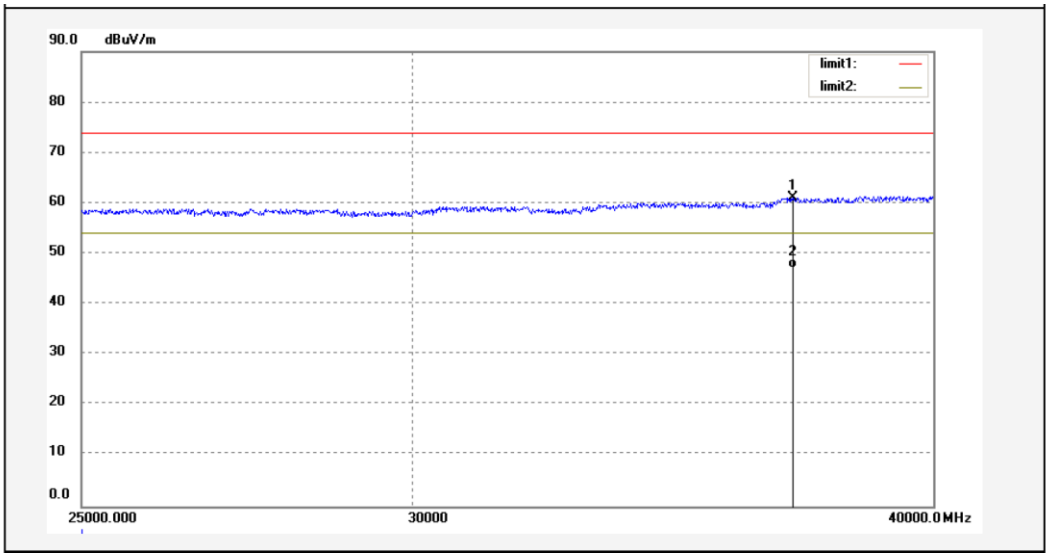


25-40GHz

Horizontal



Vertical



FCC §15.215(c) - 20dB EMISSION BANDWIDTH

Applicable Standard

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.

3. Measure the frequency difference of two frequencies that indicated 20dB bandwidth.

4. Repeat above procedures until all frequencies measured were complete.

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

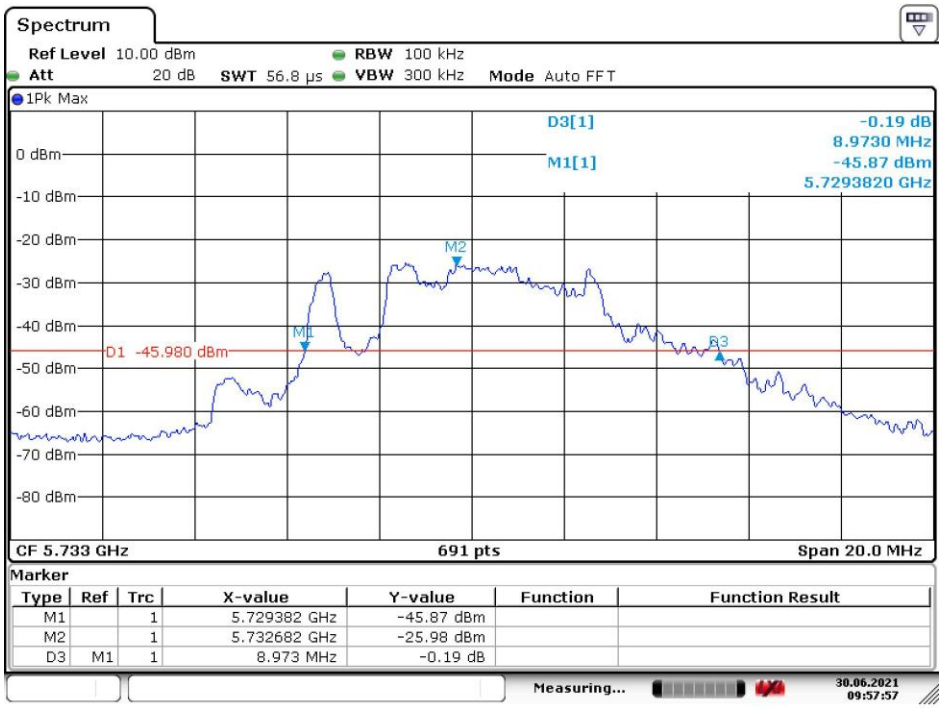
The testing was performed by Fan Yang on 2021-06-30.

Test Mode: Transmitting

Please refer to the following table and plots.

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
Low	5733	8.97
Middle	5809	8.68
High	5866	8.68

Low Channel



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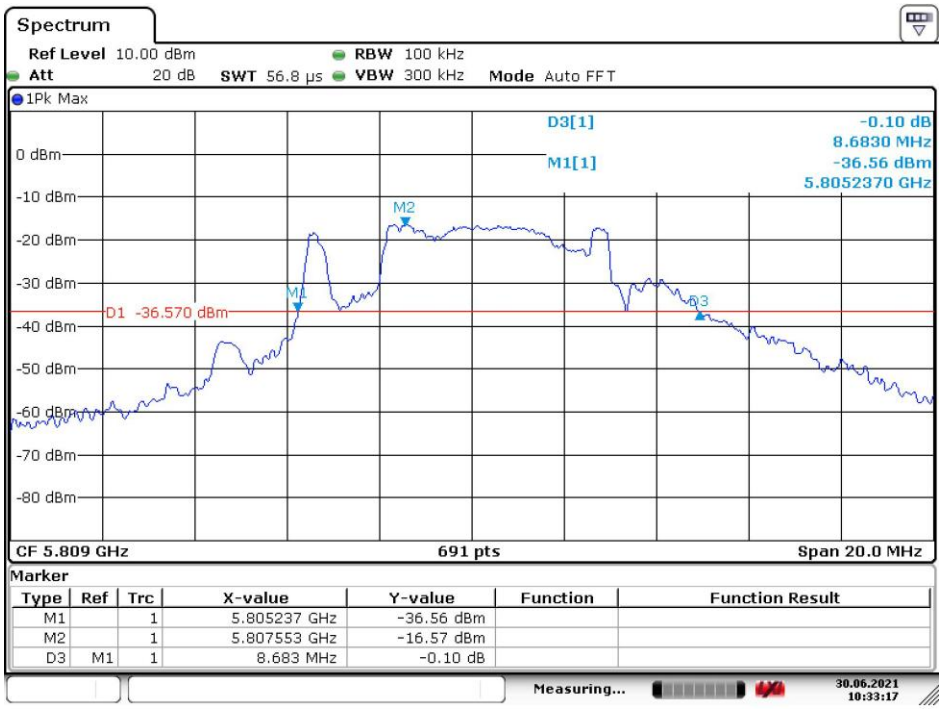
Middle Channel



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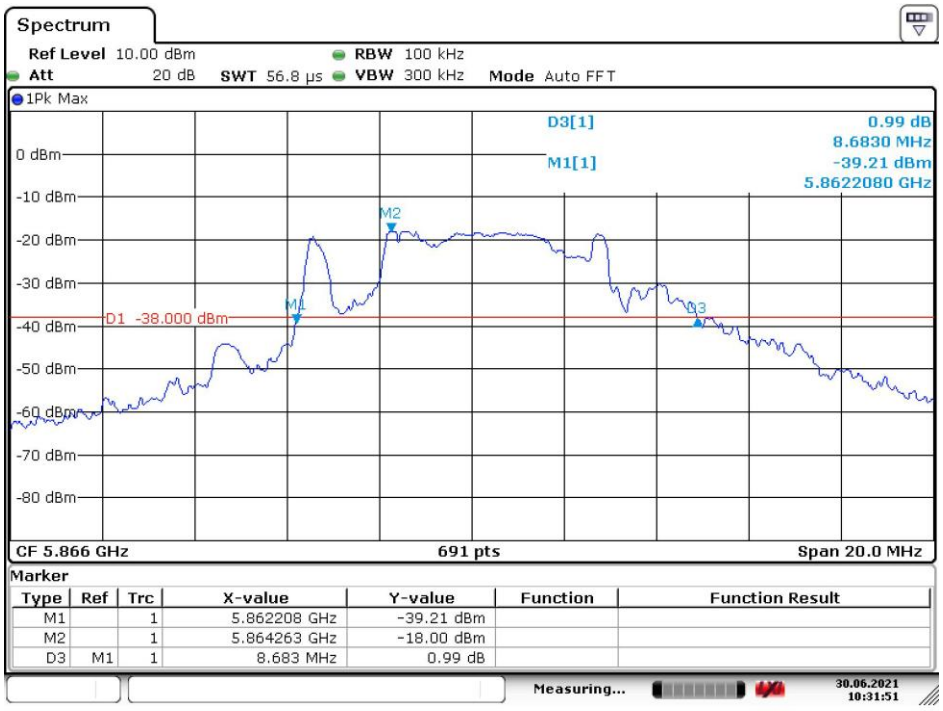
High Channel



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