



# MEASUREMENT REPORT

## FCC PART 15.249

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**FCC ID:** 2AN5RFSV2703

**APPLICANT:** SHENZHEN FATSHARK ELECTRONIC CO., LTD

**Application Type:** Certification

**Product:** Fat Shark 101 Mini Shark Quad

**Model No.:** FSV2703

**Brand Name:** FAT SHARK

**FCC Classification:** Low Power Communication Device Transmitter (DXX)

**FCC Rule Part(s):** Part 15.249

**Test Procedure(s):** ANSI C63.10 - 2013

**Test Date:** October 20 ~ November 06, 2017

Reviewed By : Kevin Guo  
( Kevin Guo )

Approved By : Marlin Chen  
( Marlin Chen )



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

## Revision History

Report No.	Version	Description	Issue Date	Note
1710RSU02801	Rev. 01	Initial report	11-09-2017	Valid

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## §2.1033 General Information

<b>Applicant:</b>	SHENZHEN FATSHARK ELECTRONIC CO., LTD
<b>Applicant Address:</b>	2/F, Bldg8, Block1, Guangyayuan Industrial Zone, Guangyayuan Road, Wuhe Community, Bantian Longgang District, Shenzhen City, China
<b>Manufacturer:</b>	SHENZHEN FATSHARK ELECTRONIC CO., LTD
<b>Manufacturer Address:</b>	2/F, Bldg8, Block1, Guangyayuan Industrial Zone, Guangyayuan Road, Wuhe Community, Bantian Longgang District, Shenzhen City, China
<b>Test Site:</b>	MRT Technology (Suzhou) Co., Ltd
<b>Test Site Address:</b>	D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
<b>FCC Registration No.:</b>	893164
<b>FCC Rule Part(s):</b>	Part 15.249
<b>Test Device Serial No.:</b>	N/A <input type="checkbox"/> Production <input checked="" type="checkbox"/> Pre-Production <input type="checkbox"/> Engineering
<b>FCC Classification:</b>	Low Power Communication Device Transmitter (DXX)

### Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- MRT facility is a FCC registered (MRT Reg. No. 893164) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules.
- MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.
- MRT facility is a VCCI registered (R-4179, G-814, C-4664, T-2206) test laboratory with the site description on file at VCCI Council.
- MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications and Radio testing for FCC, Industry Canada, EU and TELEC Rules.



## 1. INTRODUCTION

### 1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

### 1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on September 30, 2013.



## 2. PRODUCT INFORMATION

### 2.1. Equipment Description

Product Name	Fat Shark 101 Mini Shark Quad
Model No.	FSV2703
Frequency Range	5740 - 5860 MHz

### 2.2. Operation Frequency and Channel List

Channel	Frequency	Channel	Frequency	Channel	Frequency
01	5740MHz	02	5760MHz	03	5780MHz
04	5800MHz	05	5820MHz	06	5840MHz
07	5860MHz	--	--	--	--

### 2.3. Test Configuration

The EUT was tested as described in this report is in compliance with the requirements limits of FCC Rules Part 15.207, 15.209, 15.215 and 15.249. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

### 2.4. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

## **2.5. Labeling Requirements**

Per 2.1074 & 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase.

However, when the device is so small wherein placement of the label with specified statement is not practical, only the FCC ID must be displayed on the device per Section 15.19(a)(5). Please see attachment for FCC ID label and label location.



### 3. DESCRIPTION OF TEST

#### 3.1. Evaluation Procedure

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013), and the requirements provided in FCC 15.207, 15.209, 15.215 and 15.249 were performed in the report of the EUT.

**Deviation from measurement procedure.....None**

#### 3.2. AC Line Conducted Emissions

The line-conducted facility is located inside an 8'x4'x4' shielded enclosure. A 1m x 2m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50 $\Omega$ /50uH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground-plane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the receiver and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The receiver was scanned from 150kHz to 30MHz. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 9kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was also maximized by varying: power lines, the mode of operation or data exchange speed, or support equipment whichever determined the worst-case emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions are used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

An extension cord was used to connect to a single LISN which powered by EUT. The extension cord was calibrated with LISN, the impedance and insertion loss are compliance with the requirements as stated in ANSI C63.10-2013.

### **3.3. Radiated Emissions**

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. A MF Model 210SS turntable is used for radiated measurement. It is a continuously rotatable, remote controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm high PVC support structure is placed on top of the turntable.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up for frequencies below 1GHz was placed on top of the 0.8 meter high, 1 x 1.5 meter table; and test set-up for frequencies 1-25GHz was placed on top of the 1.5 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions. According to 3dB Beam-Width of horn antenna, the horn antenna should be always directed to the EUT when rising height.

## 4. ANTENNA REQUIREMENTS

### **Excerpt from §15.203 of the FCC Rules/Regulations:**

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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 antenna of the EUT **is permanently attached**.
- There are no provisions for connection to an external antenna.

### **Conclusion:**

This unit complies with the requirement of §15.203.

## 5. TEST EQUIPMENT CALIBRATION DATE

### Conducted Emissions - SR2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2018/06/20
Two-Line V-Network	R&S	ENV216	MRTSUE06002	1 year	2018/06/20
Two-Line V-Network	R&S	ENV216	MRTSUE06003	1 year	2018/06/20
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06181	1 year	2017/12/20
Shielding Anechoic Chamber	Mikebang	Chamber-SR2	MRTSUE06214	1 year	2018/05/10

### Radiated Emission - AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cal. Due Date
MXE EMI Receiver	Agilent	N9038A	MRTSUE06125	1 year	2018/08/03
Microwave System Amplifier	Agilent	83017A	MRTSUE06076	1 year	2018/03/28
Loop Antenna	Schwarzbeck	FMZB1519	MRTSUE06025	1 year	2017/11/21
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2017/11/19
Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06023	1 year	2018/10/21
Broadband Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06024	1 year	2018/01/04
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06183	1 year	2017/12/20
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06212	1 year	2018/05/10

### Conducted Test Equipment - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
MXE EMI Receiver	Agilent	N9038A	MRTSUE06125	1 year	2017/08/03
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06180	1 year	2017/12/20

Software	Version	Function
e3	V8.3.5	EMI Test Software

## 6. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k = 2$ .

<b>AC Conducted Emission Measurement - SR2</b>
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2U_c(y)$ ): 150kHz~30MHz: 3.46dB
<b>Radiated Emission Measurement - AC1</b>
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2U_c(y)$ ): 9kHz ~ 1GHz: 4.18dB 1GHz ~ 25GHz: 4.76dB

## 7. TEST RESULT

### 7.1. Summary

**Product Name:** Fat Shark 101 Mini Shark Quad

**FCC ID:** 2AN5RFSV2703

**FCC Classification:** Low Power Communication Device Transmitter (DXX)

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.207	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits	Line Conducted	N/A	Section 7.2
15.209 15.249	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	Radiated	Pass	Section 7.3 & 7.4
15.215(c)	20dB Spectrum Bandwidth	20 dB bandwidth of the emission in the specific band	Conducted	Pass	Section 7.5

**Notes:**

- 1) All modes of operation and data rates were investigated. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.

Remark: Full battery is used during all test

## 7.2. Conducted Emission

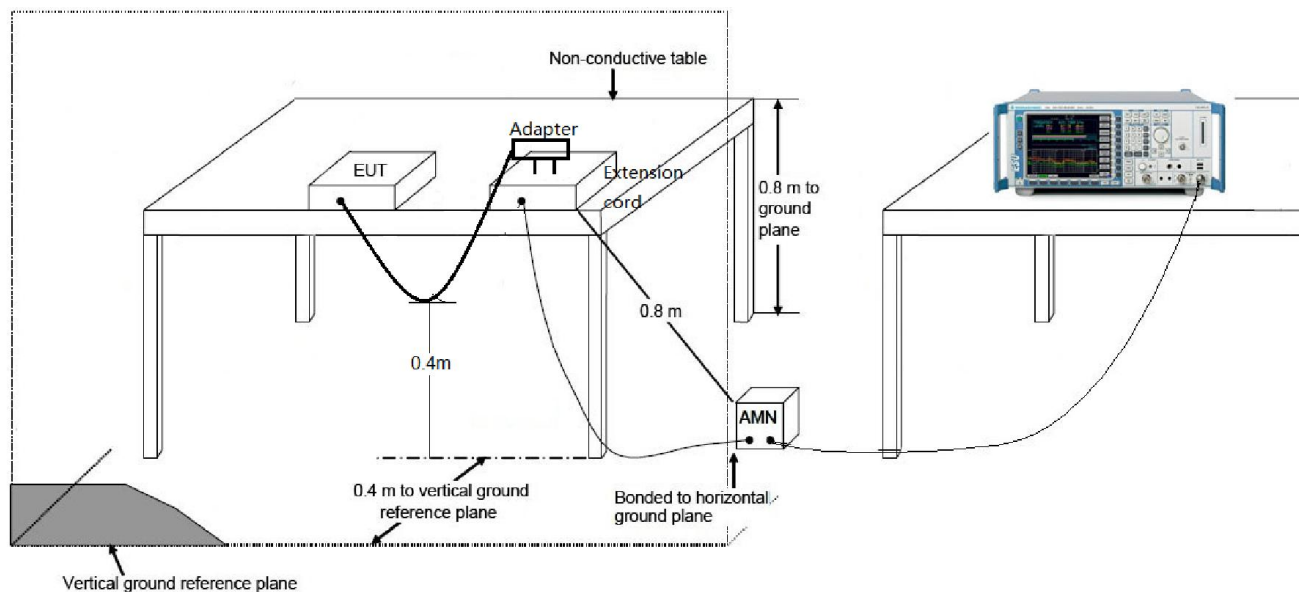
### 7.2.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

### 7.2.2. Test Setup



### 7.2.3. Test Result

The EUT is powered by battery, so not applicable.

### 7.3. Radiated Emission

#### 7.3.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.209		
Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (uV/m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 80	100**	3
80 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

Note 1: The lower limit shall apply at the transition frequency.

Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m).

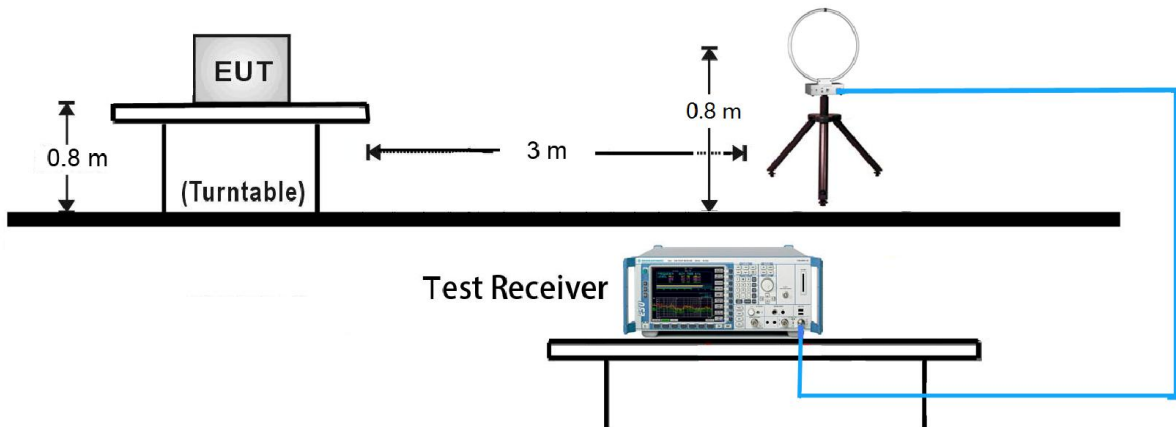
FCC Part 15 Subpart C Paragraph 15.249		
Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902 - 928(MHz)	50	500
2400 - 2483.5(MHz)	50	500
5725 - 5875(MHz)	50	500
24.0 - 24.25(GHz)	250	2500

FCC Part 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.

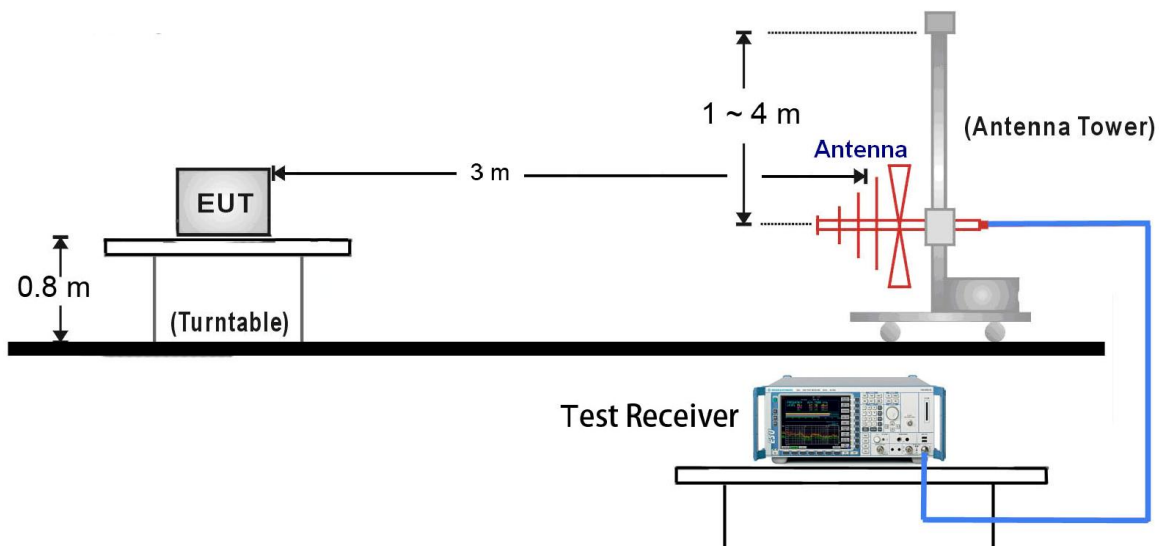


### 7.3.2. Test Setup

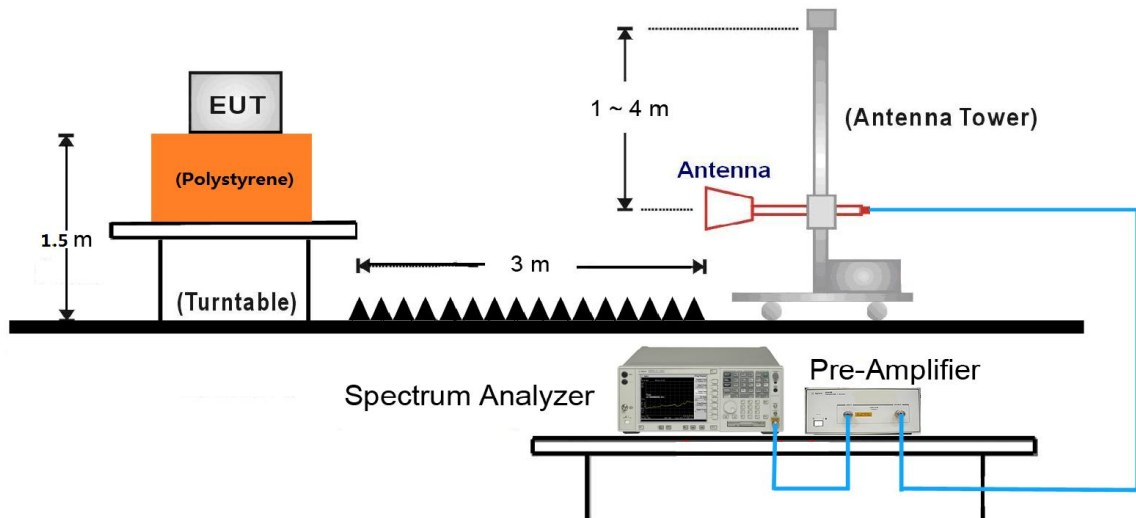
#### 9kHz ~ 30MHz Test Setup:



#### 30MHz ~ 1GHz Test Setup:



### 1GHz ~ 25GHz Test Setup:



### 7.3.3.Test Result

Test Site:	AC1	Test Engineer:	Will Yan
Remark:	<b>Fundamental Radiated Emission</b>		

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
5740	85.16	3.84	89.00	114	-25.00	PK	Horizontal
	83.81	3.84	87.65	94	-6.35	AV	Horizontal
	88.38	3.84	92.22	114	-21.78	PK	Vertical
	87.21	3.84	91.05	94	-2.95	AV	Vertical
5800	85.46	3.96	89.42	114	-24.58	PK	Horizontal
	84.33	3.96	88.29	94	-5.71	AV	Horizontal
	86.08	3.96	90.04	114	-23.96	PK	Vertical
	84.98	3.96	88.94	94	-5.06	AV	Vertical
5860	83.52	4.06	87.58	114	-26.42	PK	Horizontal
	82.41	4.06	86.47	94	-7.53	AV	Horizontal
	85.97	4.06	90.03	114	-23.97	PK	Vertical
	85.09	4.06	89.15	94	-4.85	AV	Vertical

Note 1: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: RBW = 10MHz, VBW=28MHz.

Note 3: All readings below 1GHz are peak, above 1GHz are performed with peak and/or average measurements as necessary.

Test Site:	AC1	Test Engineer:	Will Yan
Remark:	<b>General Radiated Emission</b>		

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Low Channel							
30.5	3.3	13.6	16.9	40.0	-23.1	QP	Horizontal
105.2	5.9	11.5	17.4	43.5	-26.1	QP	Horizontal
63.5	9.2	12.7	21.9	40.0	-18.1	QP	Vertical
123.6	4.5	13.4	17.9	43.5	-25.6	QP	Vertical
11472.0	51.7	12.7	64.4	74	-9.6	PK	Horizontal
11482.6	37.1	12.7	49.8	54	-4.2	AV	Horizontal
17201.0	45.1	15.9	61.0	74	-13.0	PK	Horizontal
17201.0	31.3	15.9	47.2	54	-6.8	AV	Horizontal
11481.2	47.9	12.7	60.6	74	-13.4	PK	Vertical
11481.2	35.7	12.7	48.4	54	-5.6	AV	Vertical
17218.0	42.9	16.0	58.9	74	-15.1	PK	Vertical
17218.0	30.3	16.0	46.3	54	-7.7	AV	Vertical
Mid Channel							
53.3	8.1	13.8	21.9	40.0	-18.1	QP	Horizontal
155.6	3.2	15.2	18.4	43.5	-25.1	QP	Horizontal
55.2	15.9	13.7	29.6	40.0	-10.4	QP	Vertical
159.5	4.9	15.2	20.1	43.5	-23.4	QP	Vertical
11602.5	50.7	12.5	63.2	74	-10.8	PK	Horizontal
11602.5	37.5	12.5	50.0	54	-4.0	AV	Horizontal
17405.0	41.7	17.1	58.8	74	-15.2	PK	Horizontal
17405.0	28.2	17.1	45.3	54	-8.7	AV	Horizontal
11602.1	48.8	12.6	61.4	74	-12.6	PK	Vertical
11602.1	35.3	12.6	47.9	54	-6.1	AV	Vertical
17405.0	42.5	17.1	59.6	74	-14.4	PK	Vertical
17405.0	29.2	17.1	46.3	54	-7.7	AV	Vertical

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
High Channel							
330.2	3.4	15.1	18.5	46.0	-27.5	QP	Horizontal
493.2	3.5	18.4	21.9	46.0	-24.1	QP	Horizontal
41.2	4.3	14.5	18.8	40.0	-21.2	QP	Vertical
594.1	5.6	20.3	25.9	46.0	-20.1	QP	Vertical
11720.5	49.7	12.0	61.7	74	-12.3	PK	Horizontal
11720.5	35.7	12.0	47.7	54	-6.3	AV	Horizontal
17575.0	40.4	18.1	58.5	74	-15.5	PK	Horizontal
17575.0	26.4	18.1	44.5	54	-9.5	AV	Horizontal
11722.4	50.9	12.0	62.9	74	-11.1	PK	Vertical
11722.4	36.0	12.0	47.9	54	-6.1	AV	Vertical
17583.5	40.9	18.1	59.1	74	-14.9	PK	Vertical
17583.5	26.4	18.1	44.5	54	-9.5	AV	Vertical

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre Amplifier Gain (dB)

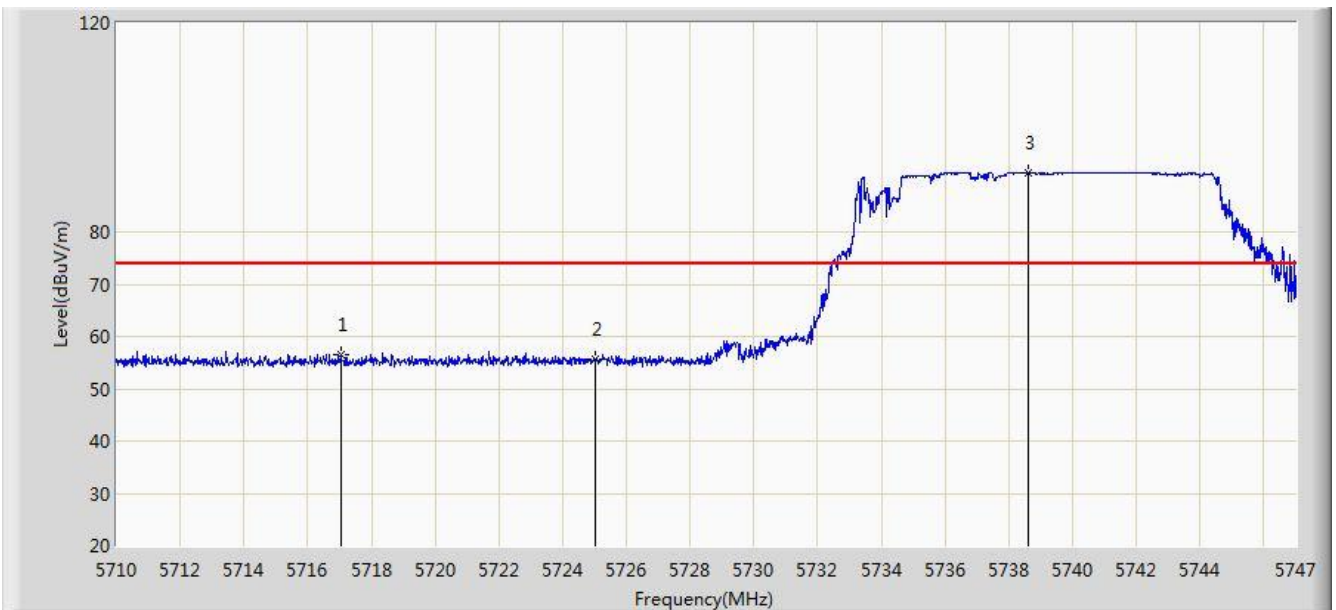
Note 2: Average measurement was not performed when the peak level lower than average limit.

Note 3: The test trace is same as the ambient noise (the test frequency range: 9 kHz ~ 30 MHz and 18 GHz ~ 25 GHz), therefore no data appear in the report.

## 7.4. Radiated Restricted Band Edge Measurement

### 7.4.1. Test Result

Site: AC1	Time: 2017/11/02 - 11:32
Limit: FCC_Part15.209_RE(3m)	Engineer: Alex Ma
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Fat Shark 101 Mini Shark Quad	Power: By Battery
Test Mode: Transmit at channel 5740MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5717.030	56.489	52.722	-17.511	74.000	3.766	PK
2			5725.000	55.749	51.958	-18.251	74.000	3.791	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2017/11/02 - 11:34
Limit: FCC_Part15.209_RE(3m)	Engineer: Alex Ma
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Fat Shark 101 Mini Shark Quad	Power: By Battery
Test Mode: Transmit at channel 5740MHz	

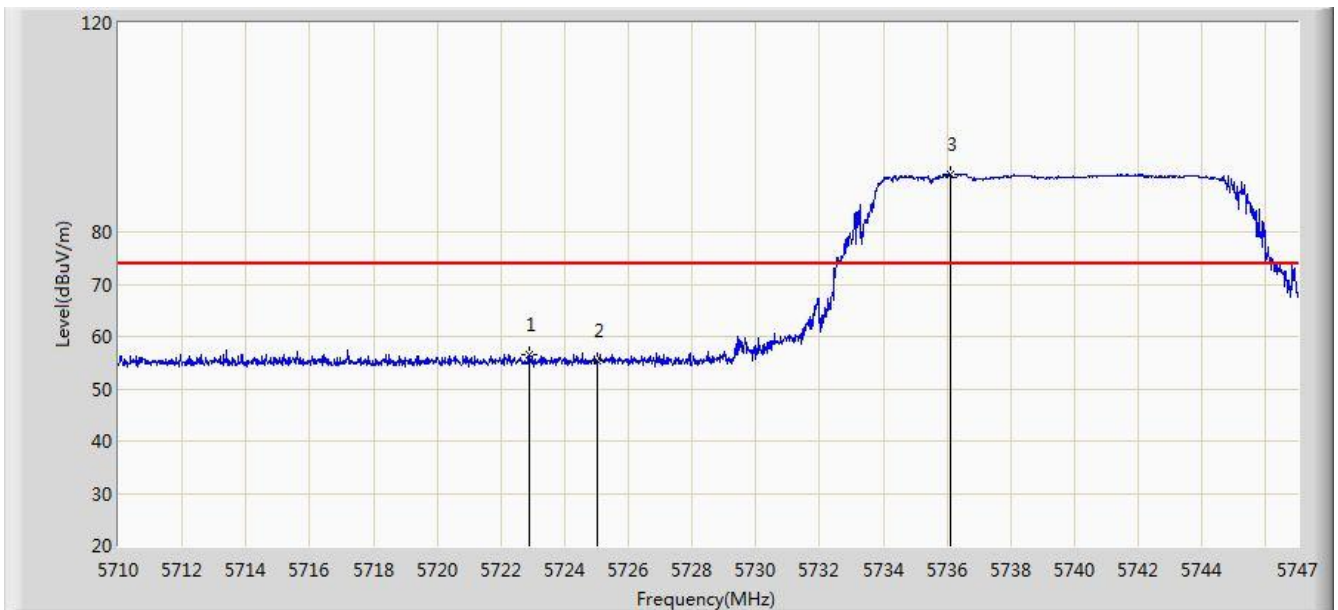


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5722.562	42.761	38.978	-11.239	54.000	3.784	AV
2			5725.000	42.419	38.628	-11.581	54.000	3.791	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2017/11/02 - 11:39
Limit: FCC_Part15.209_RE(3m)	Engineer: Alex Ma
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Fat Shark 101 Mini Shark Quad	Power: By Battery
Test Mode: Transmit at channel 5740MHz	



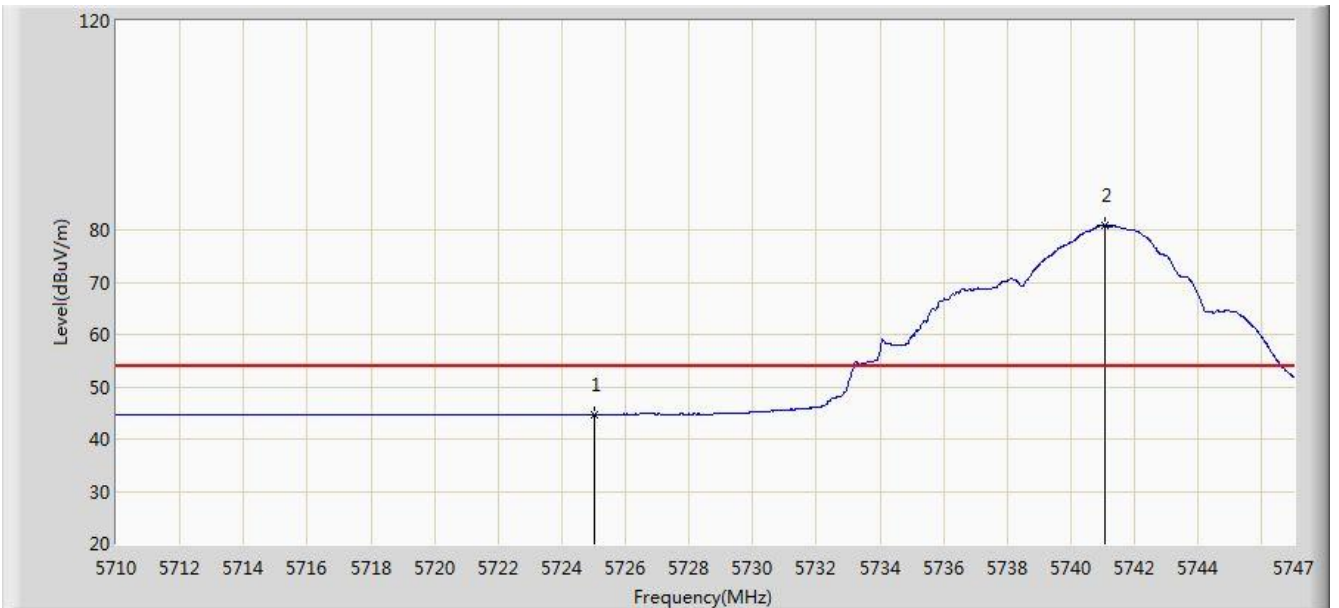
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5725.000	55.373	51.582	-18.627	74.000	3.791	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)



Site: AC1	Time: 2017/11/02 - 11:42
Limit: FCC_Part15.209_RE(3m)	Engineer: Alex Ma
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Fat Shark 101 Mini Shark Quad	Power: By Battery
Test Mode: Transmit at channel 5740MHz	

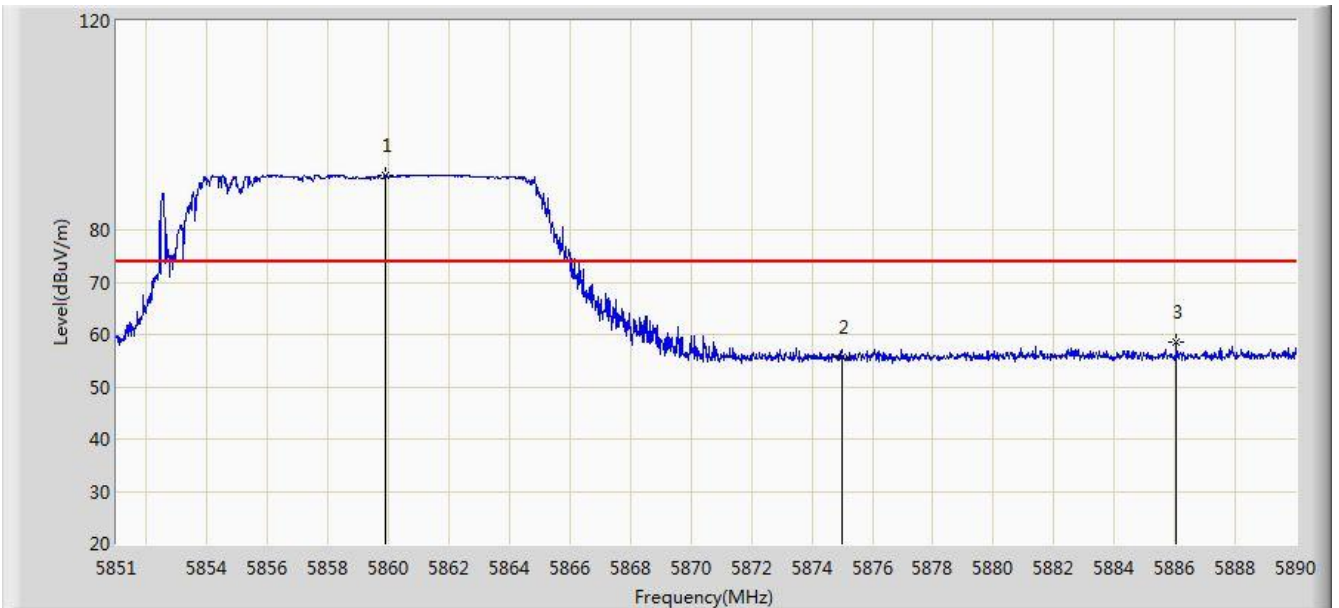


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5725.000	44.716	40.925	-9.284	54.000	3.791	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2017/11/02 - 13:12
Limit: FCC_Part15.209_RE(3m)	Engineer: Alex Ma
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Fat Shark 101 Mini Shark Quad	Power: By Battery
Test Mode: Transmit at channel 5860MHz	

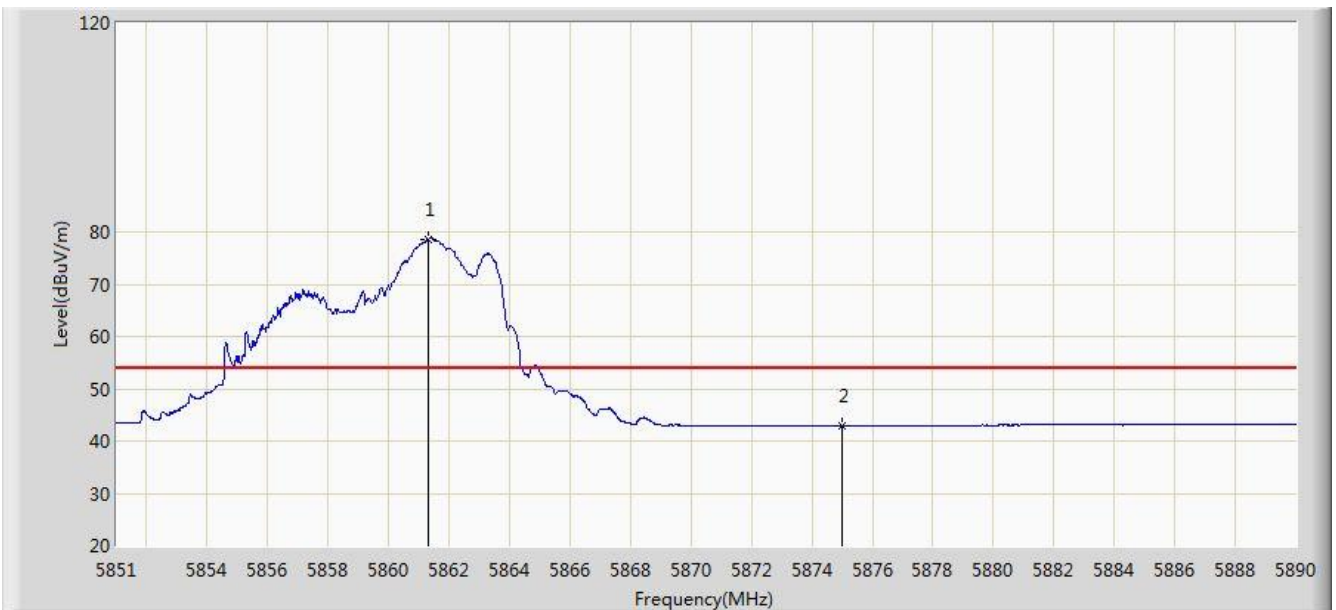


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5875.000	55.777	51.672	-18.223	74.000	4.105	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2017/11/02 - 13:19
Limit: FCC_Part15.209_RE(3m)	Engineer: Alex Ma
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Fat Shark 101 Mini Shark Quad	Power: By Battery
Test Mode: Transmit at channel 5860MHz	

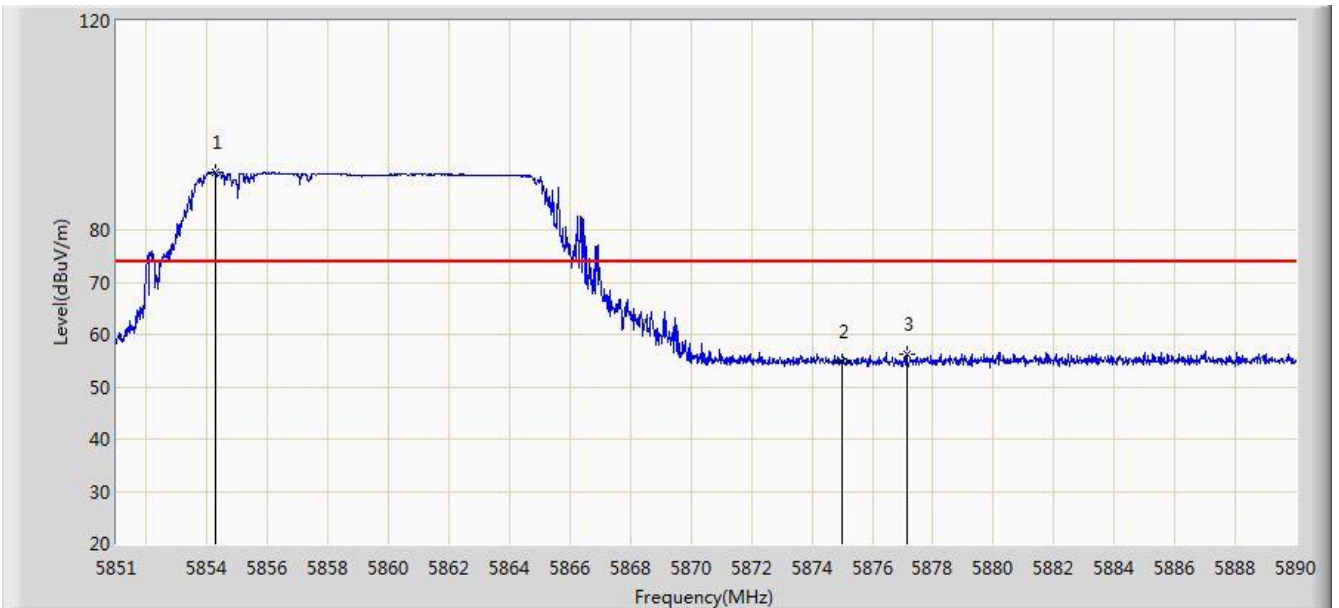


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5875.000	42.833	38.728	-11.167	54.000	4.105	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2017/11/02 - 13:31
Limit: FCC_Part15.209_RE(3m)	Engineer: Alex Ma
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Fat Shark 101 Mini Shark Quad	Power: By Battery
Test Mode: Transmit at channel 5860MHz	

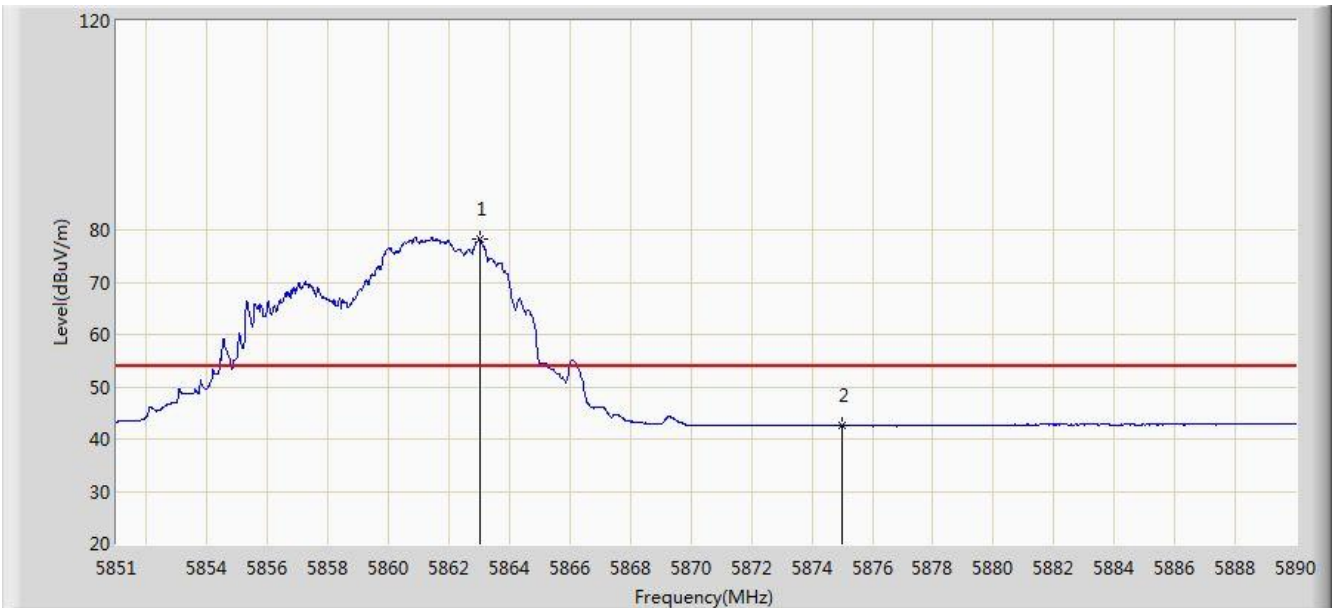


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5875.000	54.842	50.737	-19.158	74.000	4.105	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2017/11/02 - 13:32
Limit: FCC_Part15.209_RE(3m)	Engineer: Alex Ma
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Fat Shark 101 Mini Shark Quad	Power: By Battery
Test Mode: Transmit at channel 5860MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5875.000	42.505	38.400	-11.495	54.000	4.105	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

## 7.5. 20dB Spectrum Bandwidth Measurement

### 7.5.1. Test Limit

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emission in the specific band (5725 ~ 5875MHz).

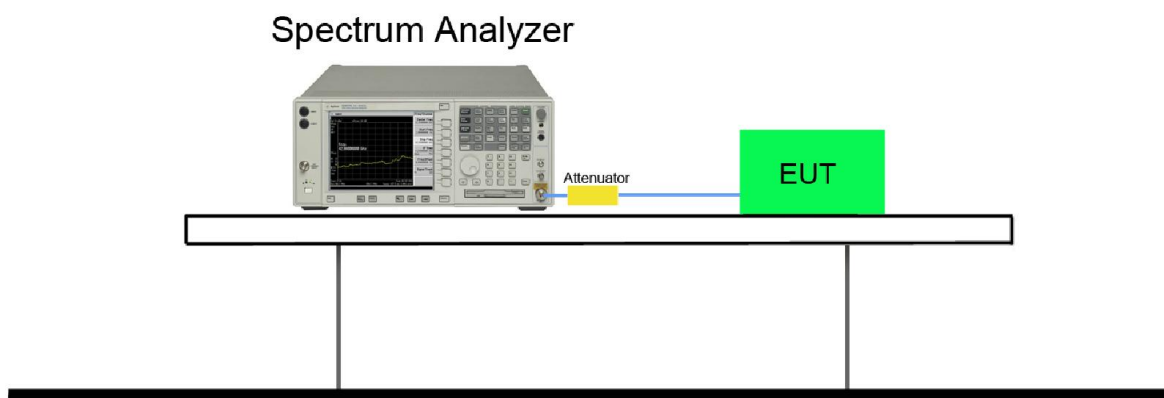
### 7.5.2. Test Procedure used

ANSI C63.10 Clause 6.9.2

### 7.5.3. Test Setting

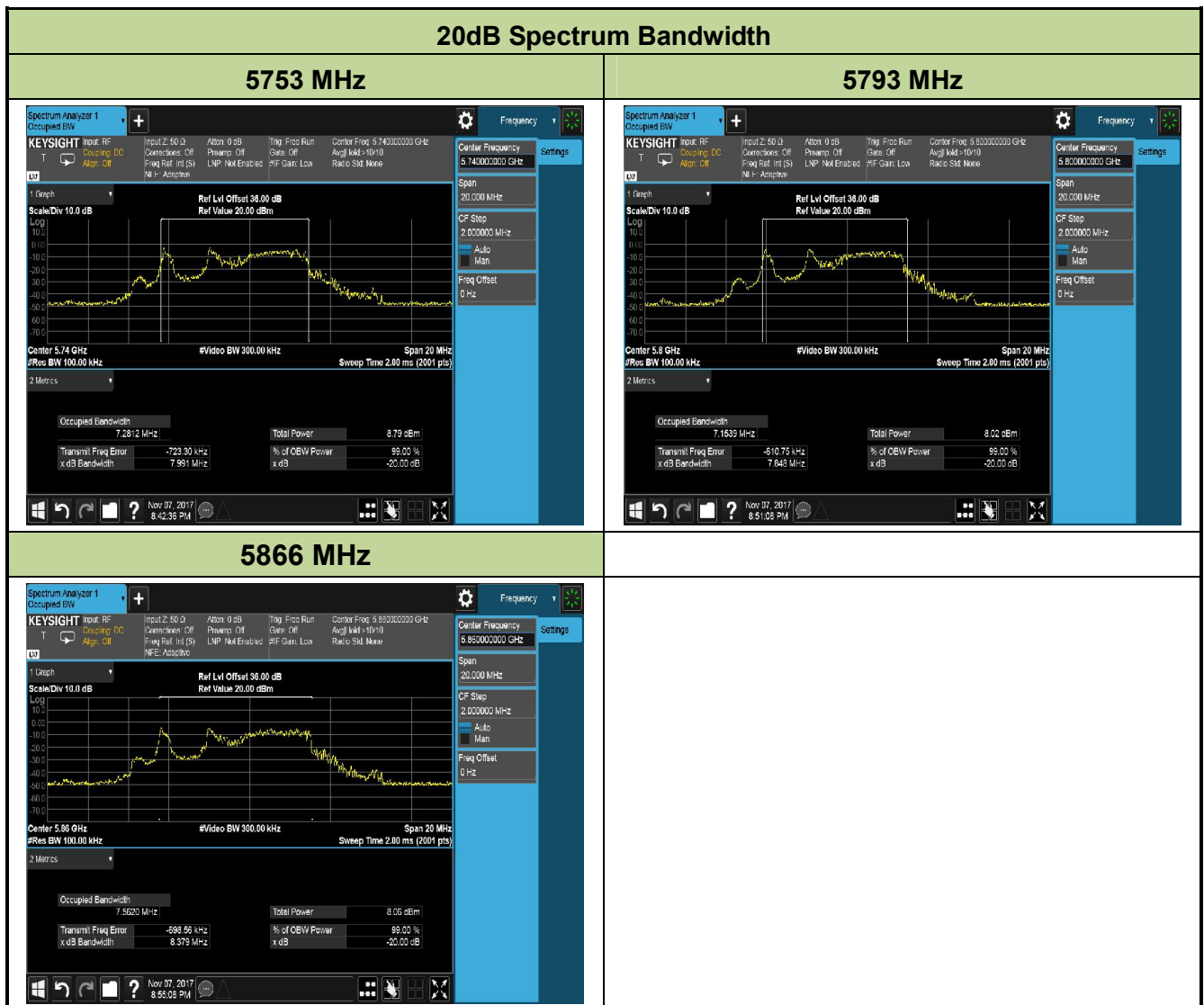
1. Set the spectrum span range to overlap the nominal center frequency
2. Set RBW = 100 kHz
3. VBW  $\geq 3 \times$  RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. Allow the trace was allowed to stabilize and marker the highest level.
8. Determine the display level (the highest level - 20dB) and place two markers, one at the lowest frequency and the other at the highest frequency.

### 7.5.4. Test Setup



### 7.5.5.Test Result

Test Frequency (MHz)	20dB Bandwidth (MHz)	Low Frequency Range (MHz)	High Frequency Range (MHz)	Limit (MHz)	Result
5740	7.99	5736.01	--	$\geq 5725$	Pass
5800	7.85	--	--	--	Pass
5860	8.38	--	5864.19	$\leq 5875$	Pass



## 8. CONCLUSION

The data collected relate only the item(s) tested and show that the **Fat Shark 101 Mini Shark Quad** **FCC ID: 2AN5RFSV2703** is in compliance with Part 15C of the FCC Rules.

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The End