

FCC Part 15C Measurement and Test Report

For

HOBBYWING TECHNOLOGY CO.,LTD

Building 4, Yasen Chuangxin Hi-tech Industrial Park 8 Chengxin Road,

Longgang District, Shenzhen, China

FCC ID: 2AIWP-VTX5G8

FCC Rule(s):	<u>FCC Part 15.249</u>
Product Description:	<u>Video Transmitter</u>
Tested Model:	<u>XRotor Micro VTX 5.8G</u>
Report No.:	<u>STR18067001E</u>
Sample Receipt Date:	<u>2018-06-07</u>
Tested Date:	<u>2018-06-15 to 2018-06-26</u>
Issued Date:	<u>2018-06-27</u>
Tested By:	<u>Jason Su / Engineer</u>
Reviewed By:	<u>Silin Chen / EMC Manager</u>
Approved & Authorized By:	<u>Jandy So / PSQ Manager</u>
Prepared By:	

Jason Su
Silin Chen
Jandy So

Shenzhen SEM Test Technology Co., Ltd

1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road,
Bao'an District, Shenzhen, 518101, China

Tel.: +86-755-33663308 Fax.: +86-755-33663309 Website: www.semtest.com.cn

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM Test Technology Co., Ltd.

TABLE OF CONTENTS

1. GENERAL INFORMATION.....	3
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....	3
1.2 TEST STANDARDS.....	4
1.3 TEST METHODOLOGY.....	4
1.4 TEST FACILITY.....	4
1.5 EUT SETUP AND TEST MODE.....	5
1.6 MEASUREMENT UNCERTAINTY.....	5
1.7 TEST EQUIPMENT LIST AND DETAILS.....	6
2. SUMMARY OF TEST RESULTS.....	7
3. ANTENNA REQUIREMENTS.....	8
3.1 STANDARD APPLICABLE.....	8
3.2 TEST RESULT.....	8
4. RADIATED EMISSIONS.....	9
4.1 STANDARD APPLICABLE.....	9
4.2 TEST PROCEDURE.....	9
4.3 CORRECTED AMPLITUDE & MARGIN CALCULATION.....	11
4.4 ENVIRONMENTAL CONDITIONS.....	11
4.5 SUMMARY OF TEST RESULTS/PLOTS.....	11
5. OUT OF BAND EMISSIONS.....	20
5.1 STANDARD APPLICABLE.....	20
5.2 TEST PROCEDURE.....	20
5.3 ENVIRONMENTAL CONDITIONS.....	20
5.4 SUMMARY OF TEST RESULTS/PLOTS.....	20
6. EMISSION BANDWIDTH.....	23
6.1 STANDARD APPLICABLE.....	23
6.2 TEST PROCEDURE.....	23
6.3 ENVIRONMENTAL CONDITIONS.....	24
6.4 SUMMARY OF TEST RESULTS/PLOTS.....	24
7. CONDUCTED EMISSIONS.....	26
7.1 TEST PROCEDURE.....	26
7.2 BASIC TEST SETUP BLOCK DIAGRAM.....	26
7.3 ENVIRONMENTAL CONDITIONS.....	26
7.4 TEST RECEIVER SETUP.....	27
7.5 SUMMARY OF TEST RESULTS/PLOTS.....	27
7.6 CONDUCTED EMISSIONS TEST DATA.....	错误！未定义书签。

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: HOBBYWING TECHNOLOGY CO.,LTD
Address of applicant: Building 4, Yasen Chuangxin Hi-tech Industrial Park
8 Chengxin Road, Longgang District, Shenzhen,
China
Manufacturer: HOBBYWING TECHNOLOGY CO.,LTD
Address of manufacturer: Building 4, Yasen Chuangxin Hi-tech Industrial Park
8 Chengxin Road, Longgang District, Shenzhen,
China

General Description of EUT	
Product Name:	Video Transmitter
Trade Name:	N/A
Model No.:	XRotor Micro VTX 5.8G
Adding Model(s):	N/A
Rated Voltage:	DC 12V, 0.1A, 1.2W
Power Adapter Model:	N/A
Note: The test data is gathered from a production sample, provided by the manufacturer.	

Technical Characteristics of EUT	
Frequency Range:	5732~5847MHz
Max. Field Strength:	79.1 dBuV/m
Modulation:	FM
Quantity of Channels:	23
Channel Separation:	20MHz; 19MHz; 37MHz
Antenna Type:	Rod Antenna
Antenna Gain:	2.5dBi

1.2 Test Standards

The following report is prepared on behalf of the **HOBBYWING TECHNOLOGY CO.,LTD** in accordance with FCC Part 15 Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.249 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.249 of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which results in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

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

1.4 Test Facility

FCC – Registration No.: 125990

Shenzhen SEM Test Technology Co., Ltd 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 and the Registration is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

CNAS Registration No.: L4062

Shenzhen SEM.Test Technology Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C (518101).

1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing were performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	Low Channel	5732MHz
TM2	Middle Channel	5780MHz
TM3	High Channel	5847MHz

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
Signal Cable	0.05	Unshielded	Without Ferrite
Wire	0.2	Unshielded	Without Ferrite

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Battery	CSB BATTERY (GUANGZ ZHOU) CO., LTD.	GP 1272 F2	/

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	$\pm 0.42\text{dB}$
Occupied Bandwidth	Conducted	$\pm 1.5\%$
Conducted Spurious Emission	Conducted	$\pm 2.17\text{dB}$
Conducted Emissions	Conducted	$\pm 2.88\text{dB}$
Transmitter Spurious Emissions	Radiated	$\pm 5.1\text{dB}$

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2018-06-04	2019-06-03
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2018-06-04	2019-06-03
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2018-06-04	2019-06-03
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2018-06-04	2019-06-03
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2018-06-04	2019-06-03
SEMT-1011	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2018-06-04	2019-06-03
SEMT-1042	Horn Antenna	ETS	3117	00086197	2018-06-04	2019-06-03
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2018-06-04	2019-06-03
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2018-06-04	2019-06-03

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 15.203	Antenna Requirement	Compliant
§15.205	Restricted Band of Operation	Compliant
§ 15.207(a)	Conducted Emission	N/A
§ 15.209(a)(f)	Radiated Spurious Emissions	Compliant
§15.249(a)	Field Strength of Emissions	Compliant
§15.249(d)	Out of Band Emission	Compliant
§15.215 (c)	Emission Bandwidth	Compliant

N/A: Not Applicable.

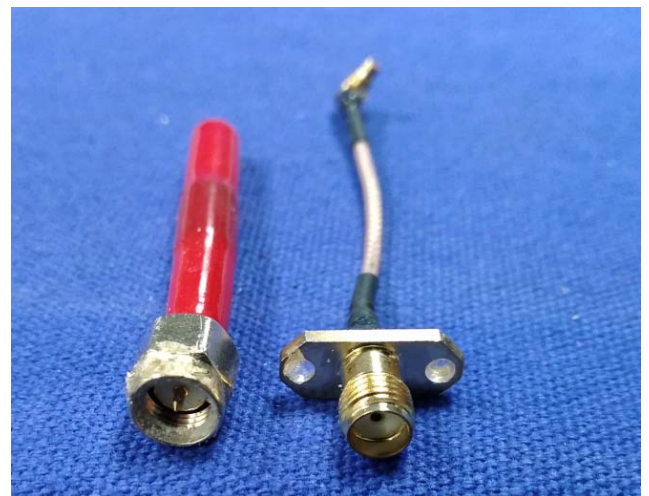
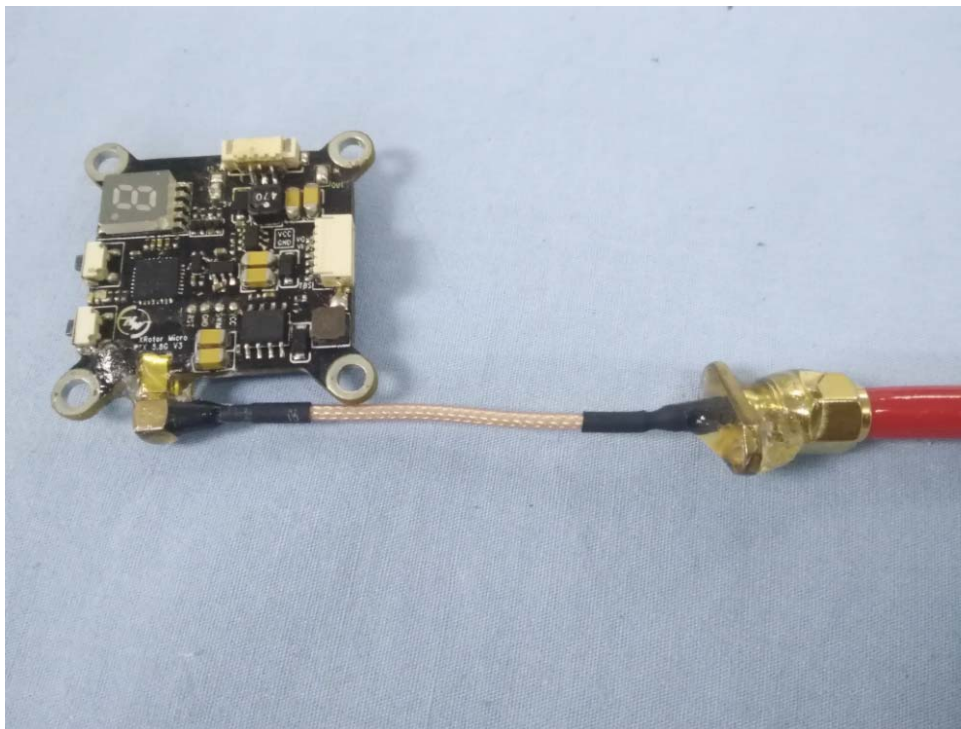
3. Antenna Requirements

3.1 Standard Applicable

According to FCC Part 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.

3.2 Test Result

The antenna adaptor is SMA-to-MMCX fixed with glue, fulfill the requirement of this section.



4. Radiated Emissions

4.1 Standard Applicable

According to §15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field strength of fundamental (milli-volts/meter)	Field strength of Harmonics (micro-volts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

(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.

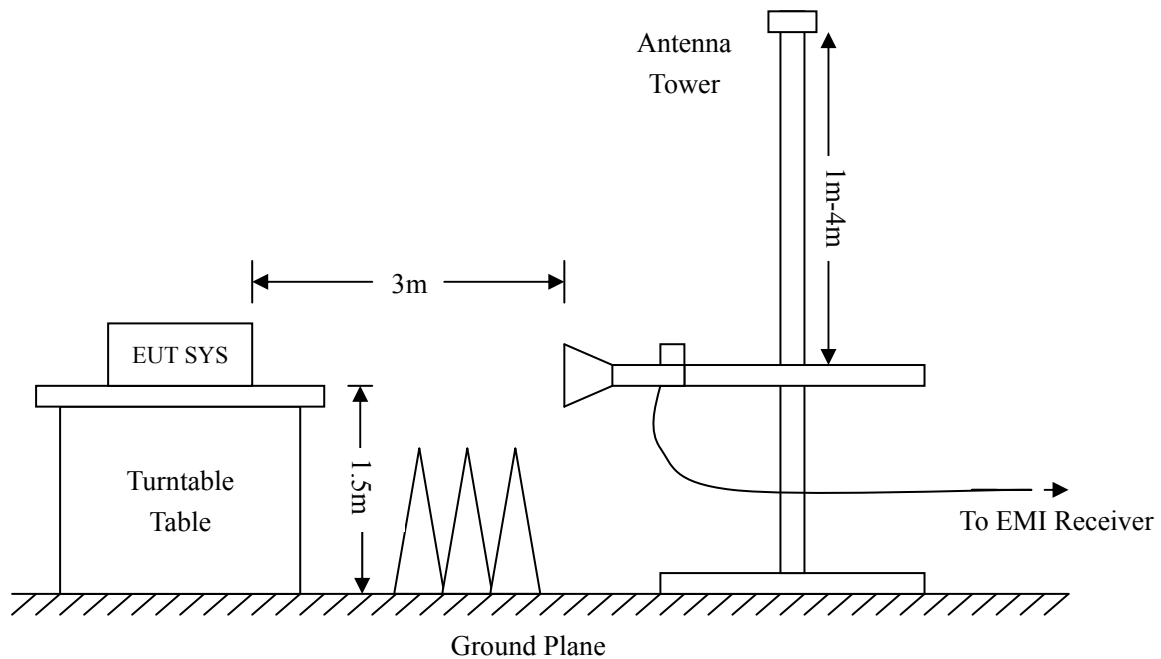
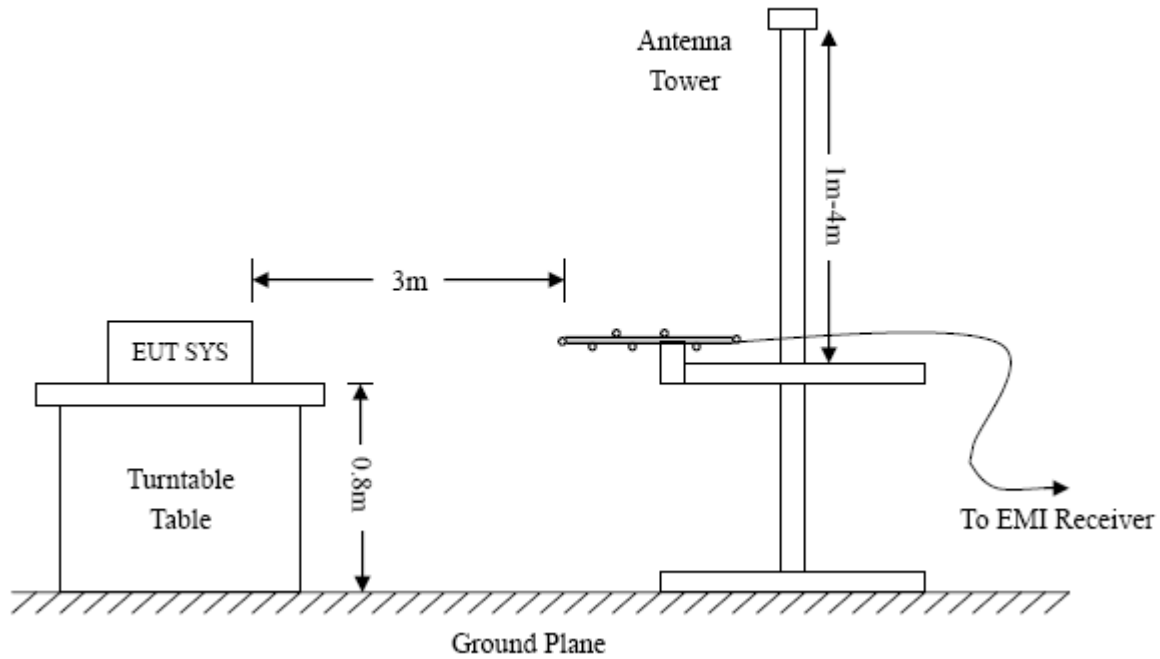
The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

4.2 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.249(a) and FCC Part 15.209 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.



Frequency :9kHz-30MHz
 RBW=10KHz,
 VBW =30KHz
 Sweep time= Auto
 Trace = max hold
 Detector function = peak

Frequency :30MHz-1GHz
 RBW=120KHz,
 VBW=300KHz
 Sweep time= Auto
 Trace = max hold
 Detector function = peak, QP

Frequency :Above 1GHz
 RBW=1MHz,
 VBW=3MHz(Peak), 10Hz(AV)
 Sweep time= Auto
 Trace = max hold
 Detector function = peak, AV

Radiated fundamental Test

Frequency: 5732MHz, 54780MHz, 5847MHz

RBW: 10MHz

VBW: 10MHz

Trace = max hold

Detector function = peak, AV

4.3 Corrected Amplitude & Margin Calculation

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

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15C Limit}$$

4.4 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	60 %
ATM Pressure:	1012 mbar

4.5 Summary of Test Results/Plots

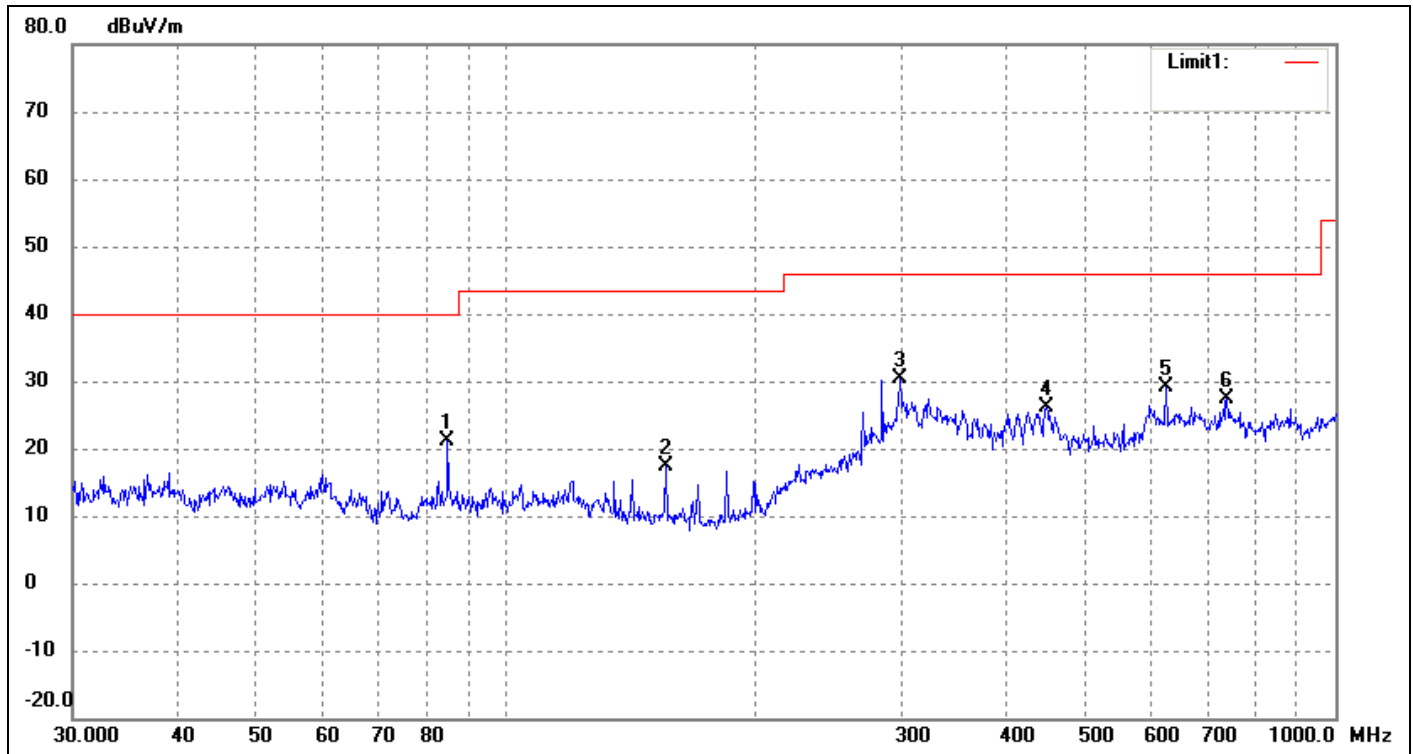
According to the data below, the FCC Part 15.205, 15.209 and 15.249 standards.

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

Plot of Radiated Emissions Test Data (30MHz to 1GHz)

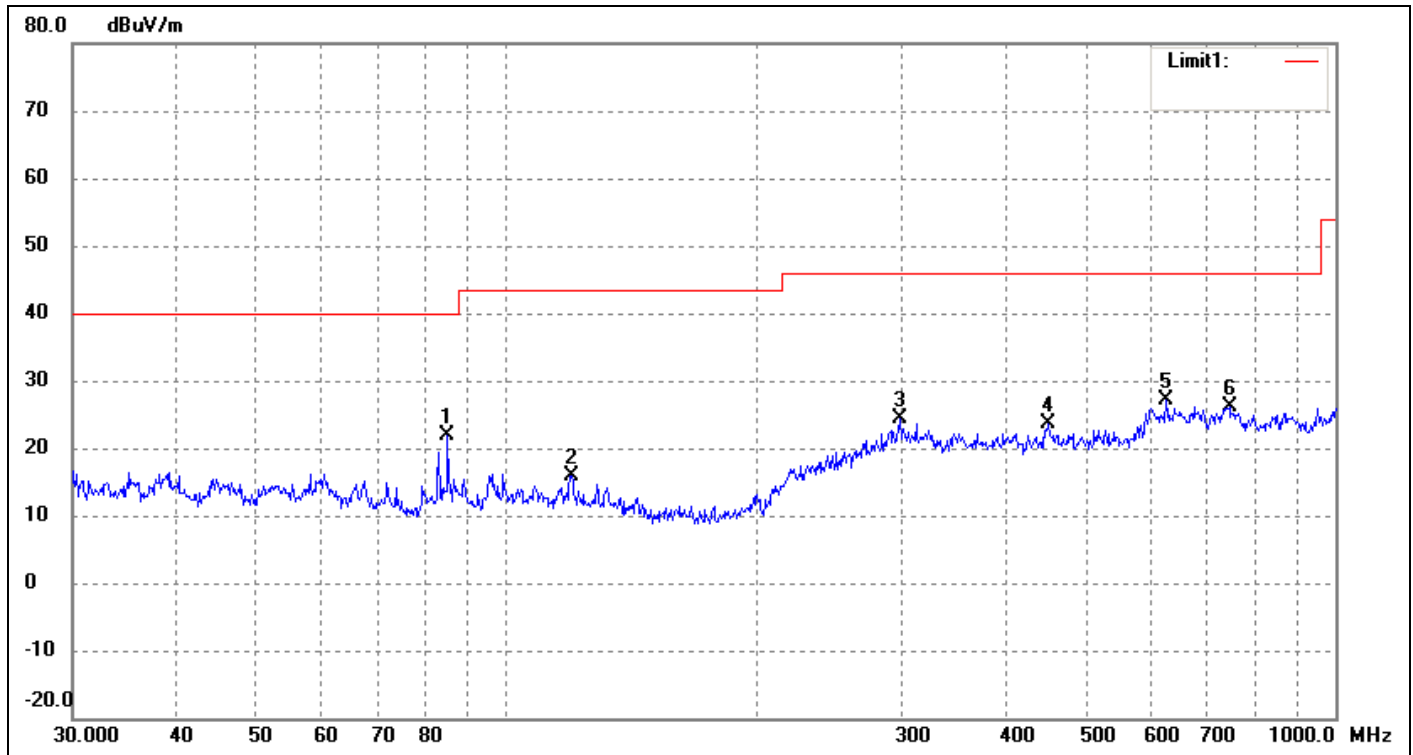
EUT: Video Transmitter
Tested Model: XRotor Micro VTX 5.8G
Operating Condition: Transmitting Low Channel (5732MHz)
Comment: DC 12V

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Remark
1	84.9995	41.73	-20.70	21.03	40.00	-18.97	100	peak
2	155.9101	37.02	-19.59	17.43	43.50	-26.07	200	peak
3	298.2681	38.31	-8.01	30.30	46.00	-15.70	100	peak
4	447.9822	34.19	-7.94	26.25	46.00	-19.75	200	peak
5	625.0780	32.84	-3.77	29.07	46.00	-16.93	100	QP
6	739.6604	29.79	-2.39	27.40	46.00	-18.60	100	peak

Test Specification: Vertical

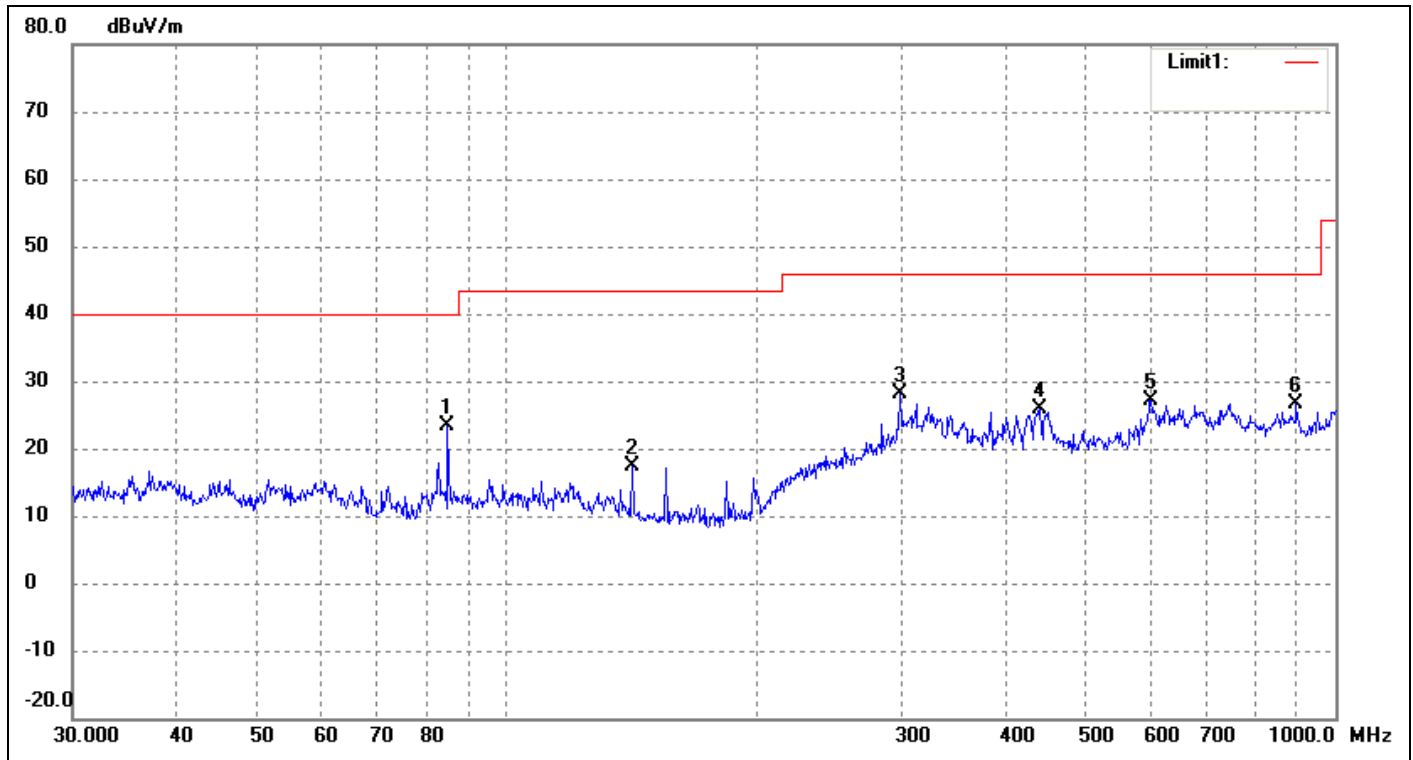


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Remark
1	84.9995	42.52	-20.70	21.82	40.00	-18.18	100	peak
2	119.8556	33.82	-17.86	15.96	43.50	-27.54	100	peak
3	298.2681	32.37	-8.01	24.36	46.00	-21.64	100	peak
4	451.1350	31.44	-7.87	23.57	46.00	-22.43	100	peak
5	625.0780	30.84	-3.77	27.07	46.00	-18.93	100	peak
6	744.8661	28.69	-2.59	26.10	46.00	-19.90	100	peak

Operating Condition: Transmitting Middle Channel (5780MHz)

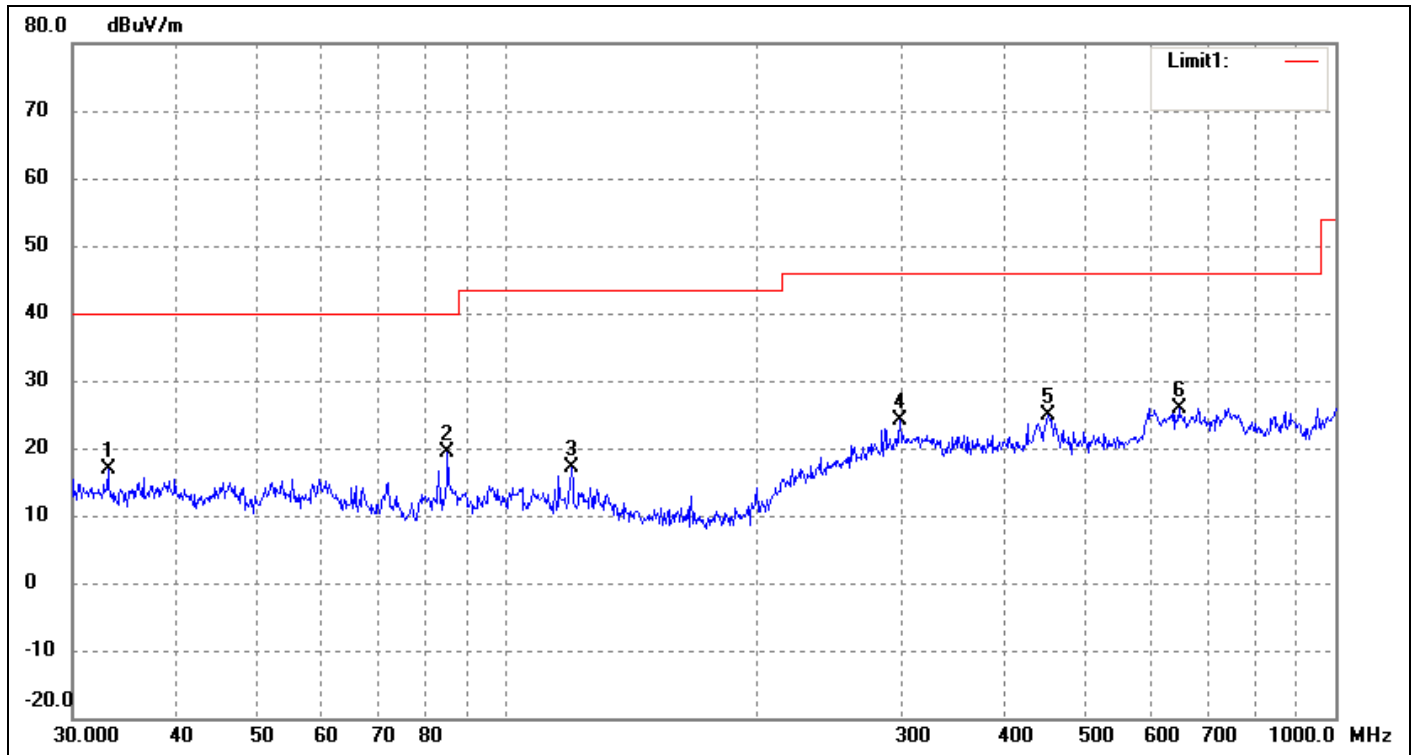
Comment: DC 12V

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Remark
1	84.9995	44.01	-20.70	23.31	40.00	-16.69	100	peak
2	141.8262	36.56	-19.17	17.39	43.50	-26.11	100	peak
3	298.2681	36.14	-8.01	28.13	46.00	-17.87	100	peak
4	440.1963	34.00	-8.08	25.92	46.00	-20.08	100	peak
5	599.3212	29.91	-2.68	27.23	46.00	-18.77	100	peak
6	896.9965	30.58	-3.83	26.75	46.00	-19.25	100	peak

Test Specification: Vertical

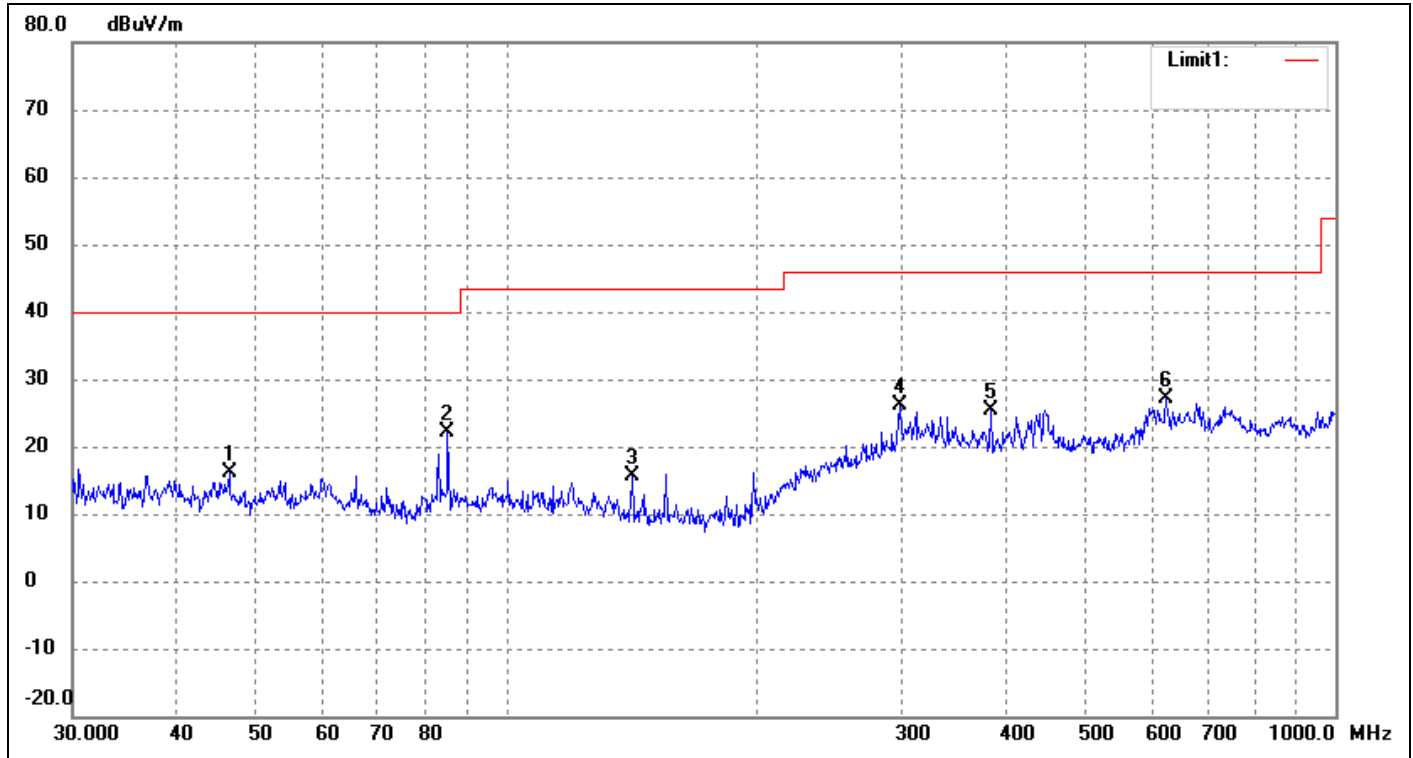


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Remark
1	33.0950	36.62	-19.65	16.97	40.00	-23.03	100	peak
2	84.9995	40.10	-20.70	19.40	40.00	-20.60	100	peak
3	119.8556	34.96	-17.86	17.10	43.50	-26.40	100	peak
4	298.2681	32.03	-8.01	24.02	46.00	-21.98	100	peak
5	451.1350	32.80	-7.87	24.93	46.00	-21.07	100	peak
6	647.3856	29.36	-3.43	25.93	46.00	-20.07	100	peak

Operating Condition: Transmitting High Channel (5847MHz)

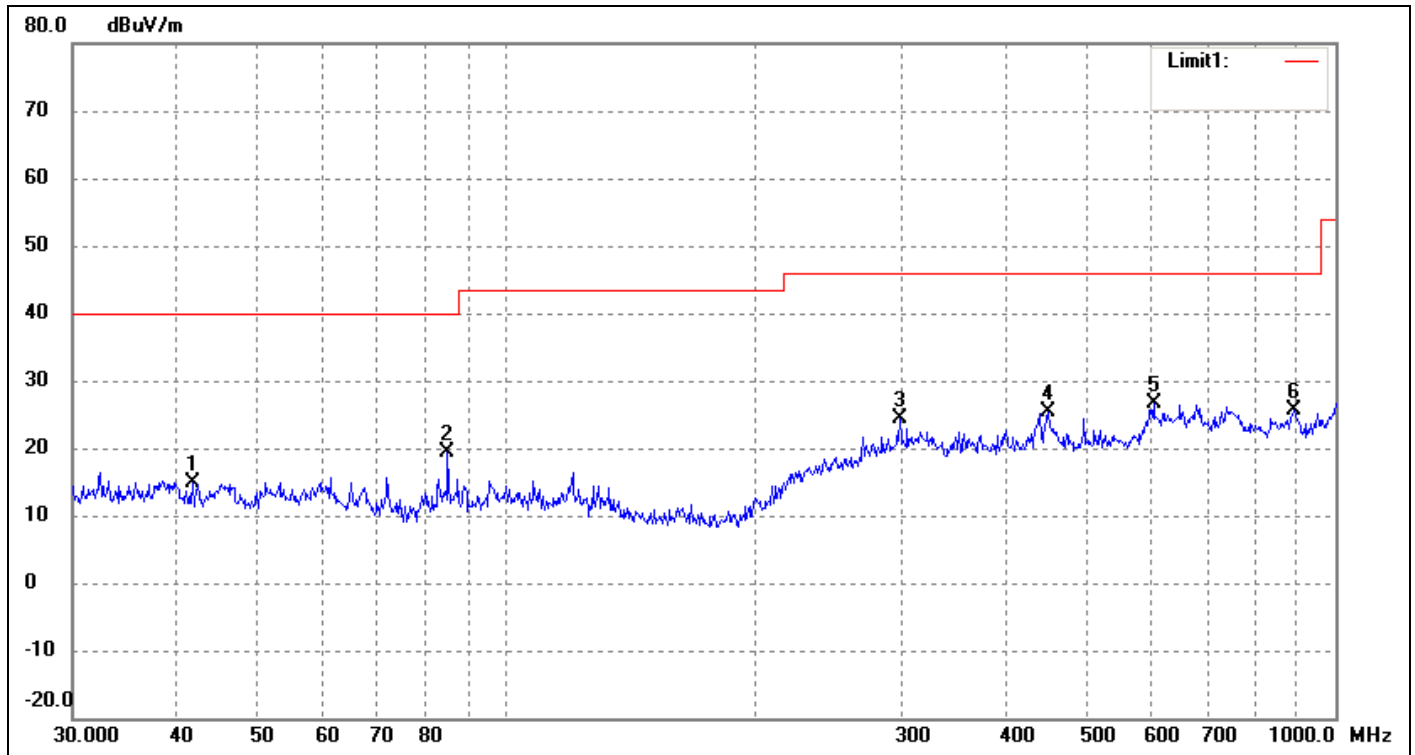
Comment: DC 12V

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Remark
1	46.3402	34.69	-18.57	16.12	40.00	-23.88	100	peak
2	84.9995	42.80	-20.70	22.10	40.00	-17.90	100	peak
3	141.8262	34.78	-19.17	15.61	43.50	-27.89	100	peak
4	298.2681	34.13	-8.01	26.12	46.00	-19.88	100	peak
5	383.9318	33.68	-8.31	25.37	46.00	-20.63	100	peak
6	625.0780	30.84	-3.77	27.07	46.00	-18.93	100	peak

Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Remark
1	41.8596	33.53	-18.54	14.99	40.00	-25.01	100	peak
2	84.9995	39.98	-20.70	19.28	40.00	-20.72	100	peak
3	298.2681	32.44	-8.01	24.43	46.00	-21.57	100	peak
4	451.1350	33.19	-7.87	25.32	46.00	-20.68	100	peak
5	603.5392	29.46	-2.80	26.66	46.00	-19.34	100	peak
6	890.7278	29.35	-3.61	25.74	46.00	-20.26	100	peak

Spurious Emissions Above 1GHz

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-5732MHz							
5730	90.05	-0.95	89.1	114	-24.9	H	PK
5730	75.84	-0.95	74.89	94	-19.11	H	AV
11460	52.52	-3.2	49.32	74	-24.68	H	PK
11460	37.72	-3	34.72	54	-19.28	H	AV
17200	46.15	2.16	48.31	74	-25.69	H	PK
17200	32.33	2.26	34.59	54	-19.41	H	AV
22930	53.39	-3.3	50.09	74	-23.91	H	PK
22930	38.99	-2.9	36.09	54	-17.91	H	AV
5730	88.48	-0.95	87.53	114	-26.47	V	PK
5730	71.68	-0.95	70.73	94	-23.27	V	AV
11460	52.52	-3.2	49.32	74	-24.68	V	PK
11460	37.72	-3	34.72	54	-19.28	V	AV
17200	46.15	2.16	48.31	74	-25.69	V	PK
17200	32.33	2.26	34.59	54	-19.41	V	AV
22930	53.39	-3.3	50.09	74	-23.91	V	PK
22930	38.99	-2.9	36.09	54	-17.91	V	AV
Middle Channel-5780MHz							
5780	86.28	0.63	86.91	114	-27.09	H	PK
5780	72.36	0.63	72.99	94	-21.01	H	AV
11560	51.8	-3.04	48.76	74	-25.24	H	PK
11560	37.35	-2.84	34.51	54	-19.49	H	AV
17340	44.55	2.57	47.12	74	-26.88	H	PK
17340	31.8	2.67	34.47	54	-19.53	H	AV
23120	52.91	-3.14	49.77	74	-24.23	H	PK
23120	39.52	-2.74	36.78	54	-17.22	H	AV
5780	85.35	0.63	85.98	114	-28.02	V	PK
5780	71.86	0.63	72.49	94	-21.51	V	AV
11560	45.15	2.27	47.42	74	-26.58	V	PK
11560	33.37	2.27	35.64	54	-18.36	V	AV
17340	51.8	-3.04	48.76	74	-25.24	V	PK
17340	37.35	-2.84	34.51	54	-19.49	V	AV
23120	44.55	2.57	47.12	74	-26.88	V	PK
23120	31.8	2.67	34.47	54	-19.53	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
High Channel-5847MHz							
5850	84.65	0.52	85.17	114	-28.83	H	PK
5850	70.32	0.52	70.84	94	-23.16	H	AV
11690	51.92	-2.93	48.99	74	-25.01	H	PK
11690	38.84	-2.73	36.11	54	-17.89	H	AV
17540	45.3	2.72	48.02	74	-25.98	H	PK
17540	30.5	2.82	33.32	54	-20.68	H	AV
23390	54.01	-3.03	50.98	74	-23.02	H	PK
23390	40.4	-2.63	37.77	54	-16.23	H	AV
5850	81.59	0.52	82.11	114	-31.89	V	PK
5850	68.36	0.52	68.88	94	-25.12	V	AV
11690	47.55	2.42	49.97	74	-24.03	V	PK
11690	34.49	2.42	36.91	54	-17.09	V	AV
17540	51.92	-2.93	48.99	74	-25.01	V	PK
17540	38.84	-2.73	36.11	54	-17.89	V	AV
23390	45.3	2.72	48.02	74	-25.98	V	PK
23390	30.5	2.82	33.32	54	-20.68	V	AV

*Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 5th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
The measurements greater than 20dB below the limit from 9kHz to 30MHz..*

5. Out of Band Emissions

5.1 Standard Applicable

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.

5.2 Test Procedure

As the radiation test, set the Lowest and Highest Transmitting Channel, mark the higher-level emission for comparing with the FCC rules.

5.3 Environmental Conditions

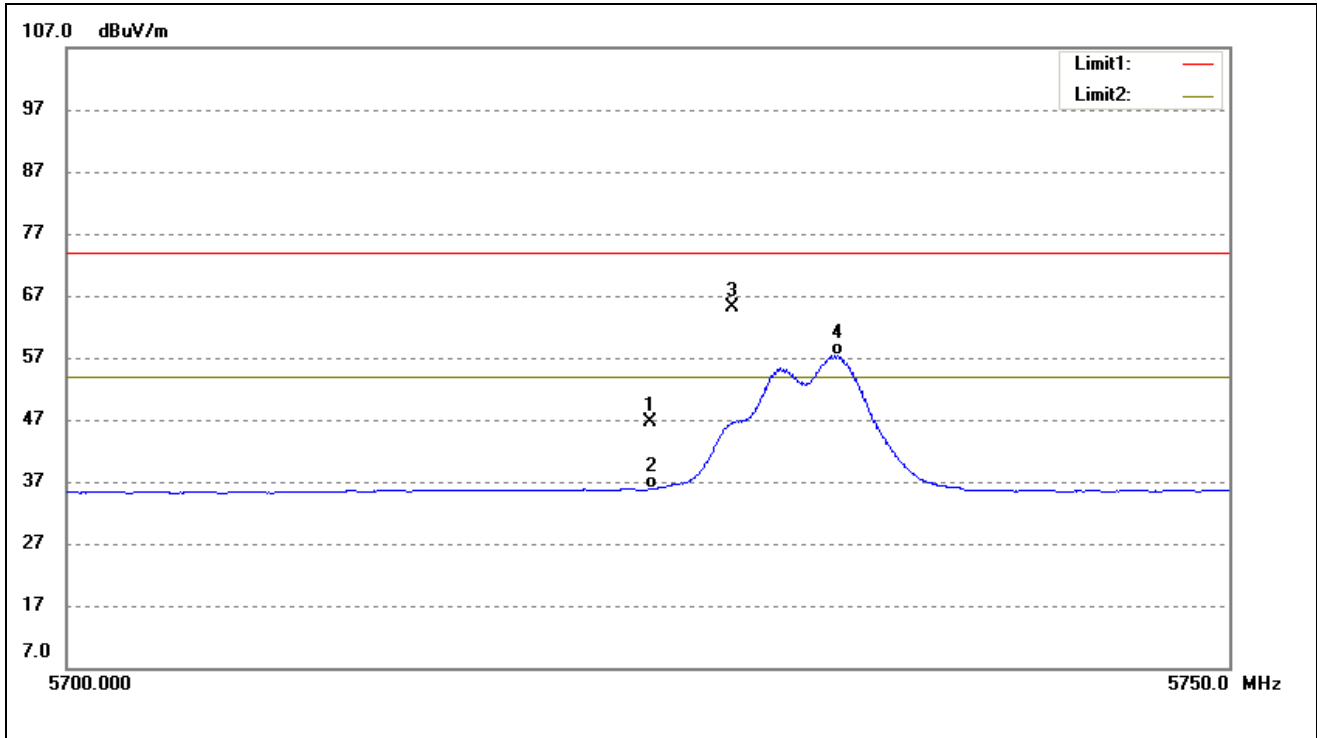
Temperature:	24 °C
Relative Humidity:	60 %
ATM Pressure:	1012 mbar

5.4 Summary of Test Results/Plots

The edge emissions are below the FCC 15.209 Limits or complies with the 15.249 requirements.

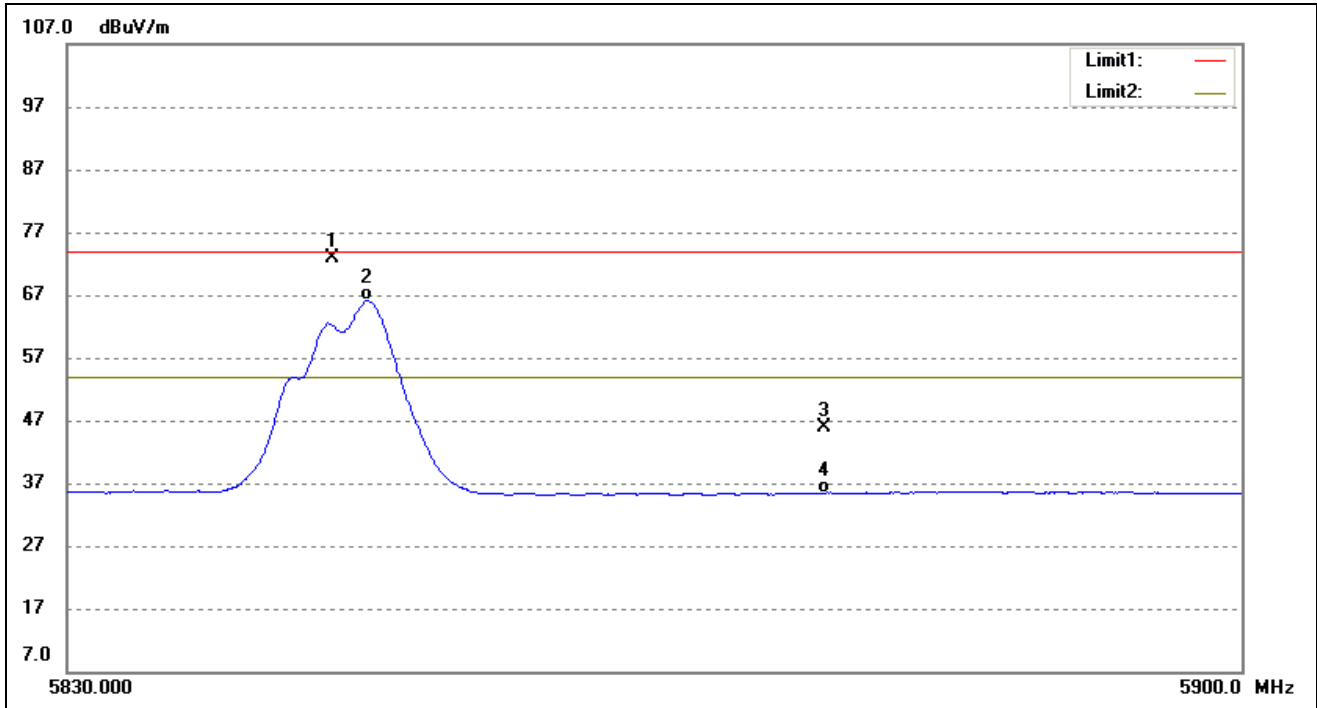
Please refer to the test plots as below.

Lowest Bandedge
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5725.000	47.56	-0.95	46.61	74.00	-27.39	peak
2	5725.000	36.76	-0.95	35.81	54.00	-18.19	AVG
3	5728.550	65.99	-0.94	65.05	/	/	peak
4	5733.101	58.30	-0.92	57.38	/	/	AVG

Highest Bandedge
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5845.750	73.49	-0.52	72.97	/	/	peak
2	5847.771	66.68	-0.50	66.18	/	/	AVG
3	5875.000	46.22	-0.40	45.82	74.00	-28.18	peak
4	5875.000	35.83	-0.40	35.43	54.00	-18.57	AVG

6. Emission Bandwidth

6.1 Standard Applicable

According to 15.215 (c), 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. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

6.2 Test Procedure

According to the ANSI 63.10-2013, the emission bandwidth test method as follows.

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW.
- b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW, unless otherwise specified by the applicable requirement.
- c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than $[10 \log (\text{OBW}/\text{RBW})]$ below the reference level.
- d) Steps a) through c) might require iteration to adjust within the specified tolerances.
- e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target “-xx dB down” requirement; that is, if the requirement calls for measuring the -20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value.
- f) Set detection mode to peak and trace mode to max hold.
- g) Determine the reference value: Set the EUT to transmit an unmodulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
- h) Determine the “-xx dB down amplitude” using $[(\text{reference value}) - \text{xx}]$. Alternatively, this calculation may be made by using the marker-delta function of the instrument.
- i) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step j).
- j) Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the “-xx dB down amplitude” determined in step h). If a marker is below this “-xx dB down amplitude” value, then it shall be as close as possible to this value. The occupied bandwidth is the frequency difference between the two markers. Alternatively, set a marker at the lowest

frequency of the envelope of the spectral display, such that the marker is at or slightly below the “-xx dB down amplitude” determined in step h). Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth.

k) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

6.3 Environmental Conditions

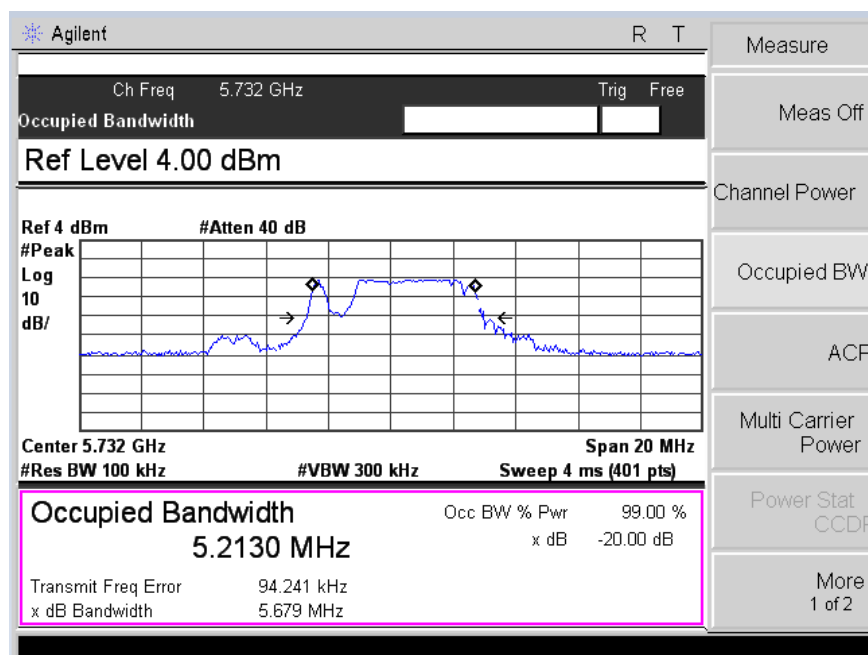
Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

6.4 Summary of Test Results/Plots

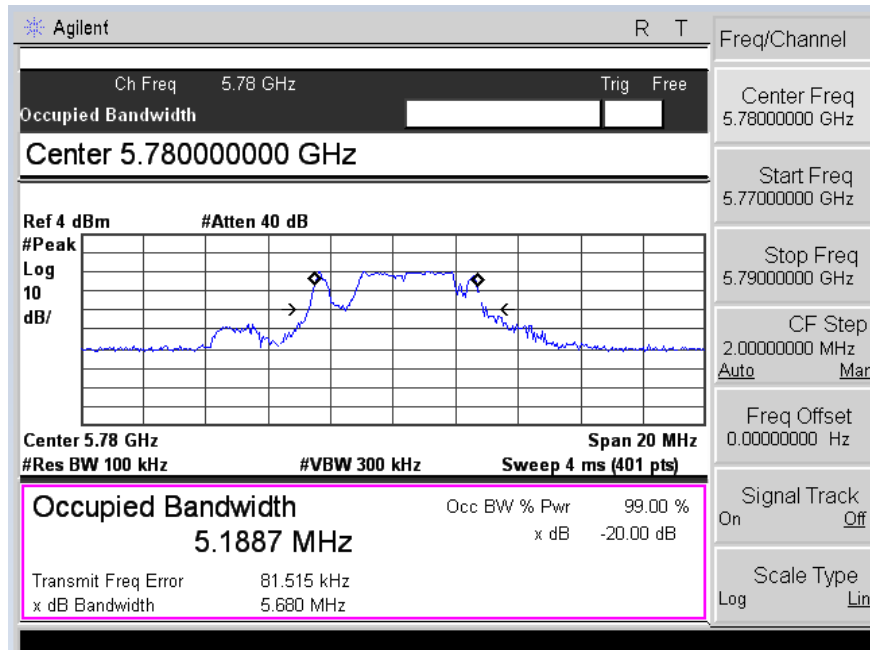
Channel	Frequency MHz	20dB Bandwidth MHz	99% Bandwidth MHz
Low Channel	5732	5.679	5.213
Middle Channel	5780	5.680	5.1887
High Channel	5847	5.965	5.4484

Please refer to the following test plots

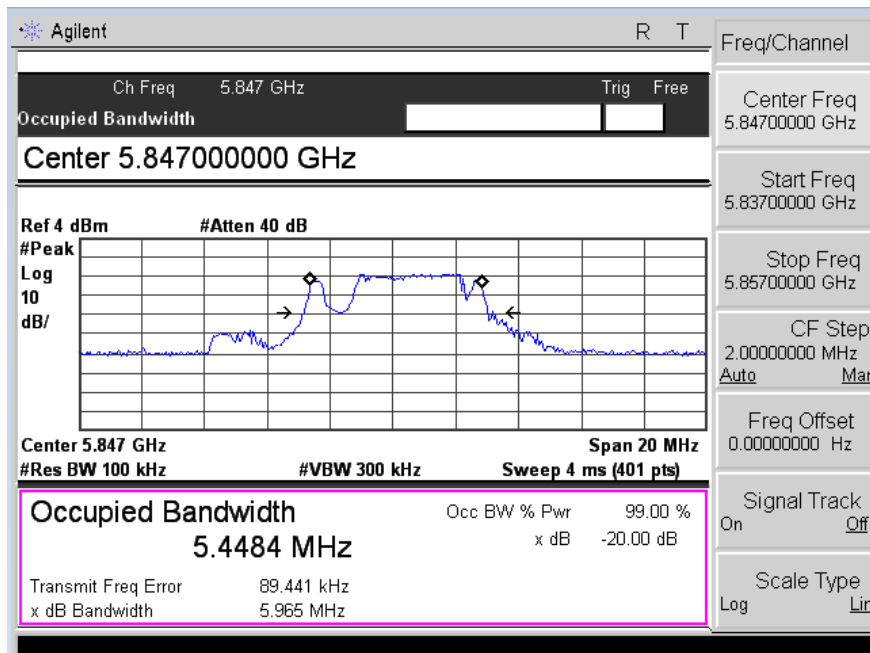
Low Channel:



Middle Channel:



High Channel:



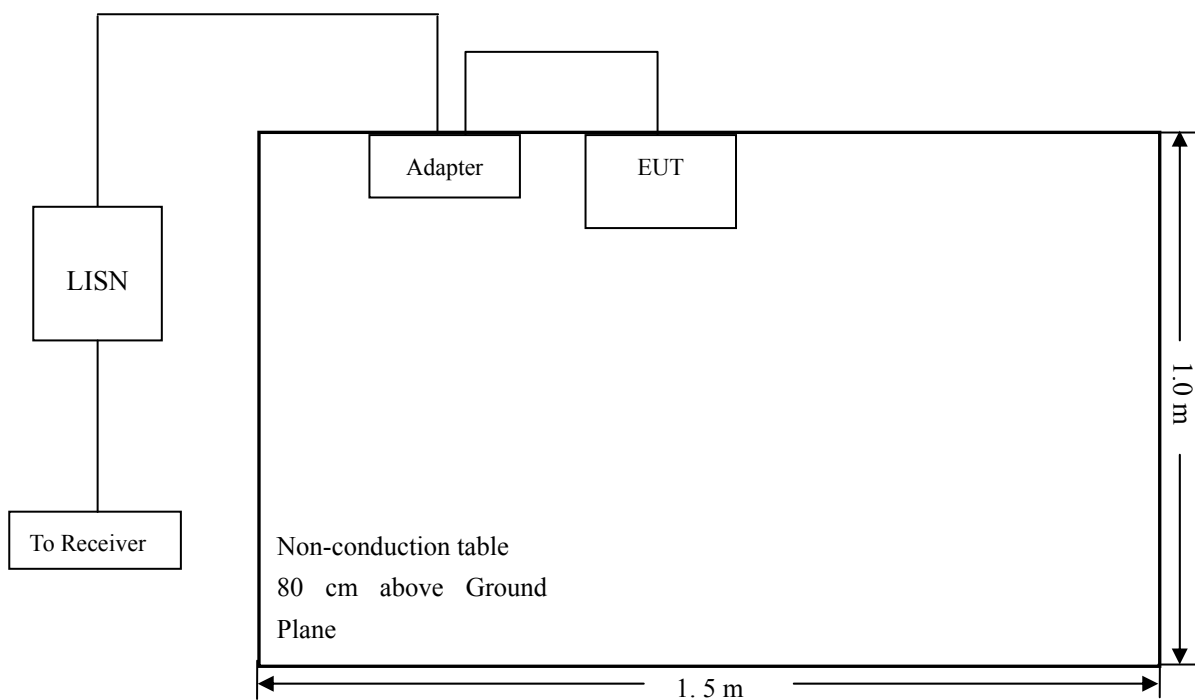
7. Conducted Emissions

7.1 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle. The spacing between the peripherals was 10 cm.

7.2 Basic Test Setup Block Diagram



7.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

7.4 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency	150 kHz
Stop Frequency.....	30 MHz
Sweep Speed	Auto
IF Bandwidth.....	10 kHz
Quasi-Peak Adapter Bandwidth	9 kHz
Quasi-Peak Adapter Mode	Normal

7.5 Summary of Test Results/Plots

Not Applicable, because this device is powered by battery.

******* END OF REPORT *******