FCC TEST REPORT

For

Shenzhen Funsnap Technology Co.,Ltd

iDol Drone

Model No.: iDol-01, iDol-A01, iDol-01XM, iDol-01JZ

Prepared For	:	Shenzhen Funsnap Technology Co.,Ltd
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Report Number	:	SZAWW180514004-01
Date of Test	:	May 14~Jul. 09, 2018
Date of Report	:	Jul. 09, 2018

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TEST REPORT

Applicant	:	Shenzhen Funsnap Technology Co.,Ltd
Manufacturer	:	FLYSKY Model Ltd
Product Name	:	iDol Drone
Model No.	:	iDol-01, iDol-A01, iDol-01XM, iDol-01JZ
Trade Mark	:	FUNSNAP 逗映科技
Rating(s)	:	Input: DC 12V, 10A(Via adapter Input: AC 100~240V, 50/60Hz, Max: 0.8A; DC 7.6V, 1800mah battery inside)
Test Standard(s)	**:**	**FCC Part15 Subpart E 2017, Paragraph 15.407**
Test Method(s)	**:**	**ANSI C63.10: 2013** **KDB 789033 D02 General UNII Test Procedures New Rules v02r01**

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart E requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Test May 14~Jul. 09, 2018

Prepared by (Engineer / Oliay Yang)

Reviewer (Supervisor / Calvin Liu)

Approved & Authorized Signer (Manager / Tom Chen)

1. General Information

1.1. Client Information

Applicant	:	Shenzhen Funsnap Technology Co.,Ltd
Address	:	1506 South Wing, YuanXing Technology Building, NanShan, ShenZhen, China
Manufacturer	:	FLYSKY Model Ltd
Address	:	Huangjinyuan Industrial Zone, Libeimen Village, Changping Town, Dongguan

1.2. Description of Device (EUT)

Product Name	:	iDol Drone	
Model No.	:	iDol-01, iDol-A01, iDol-01XM, iDol-01JZ (Note: All samples are the same except the appearance colour, so we prepare "iDol-01" for test only.)	
Trade Mark	:	FUNSNAP 逗映科技	
Test Power Supply	:	AC 240V, 60Hz for adapter/AC 120V, 60Hz for adapter/ DC 7.6V Battery inside	
Test Sample No.	:	S1, S2	
Product Description	:	Operation Frequency:	WIFI 5G: 5745MHz~5825MHz / 5755MHz~5795MHz
		Number of Channel:	WIFI 5G: 5 Channels for 802.11a 5 Channels for 802.11n(HT20) 2 Channels for 802.11n(HT40)
		Modulation Type:	OFDM with BPSK/QPSK/16QAM/64QAM for 802.11a/n
		Antenna Type:	Ceramic Antenna
		Antenna Gain(Peak):	5.0 dBi
Remark: 1) 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

Adapter	:	Model: KC122000CV1 Input: 100-240V~50/60Hz, 0.8A MAX Output: DC 12V, 2A

1.4. Description of Test Modes

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Mode	Test channel	Frequency (MHz)
OFDM(802.11a/n20)	CH 149	5745MHz
	CH 157	5785MHz
	CH 165	5825MHz
OFDM(802.11n40)	CH 151	5755MHz
	CH159	5795MHz

Note:

1. The measurements are performed at the highest, middle, lowest available channels.
2. The EUT has been tested as an independent unit. And Continual Transmitting in maximum power.
3. For the relevant Conducted Measurement, the temporary antenna connector is used during the measurement. Antenna Connector Impedance: 50Ω, Cable Loss: 1.0 dB
4. The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is more than 98%

1.5. List of channels

802.11a/n20

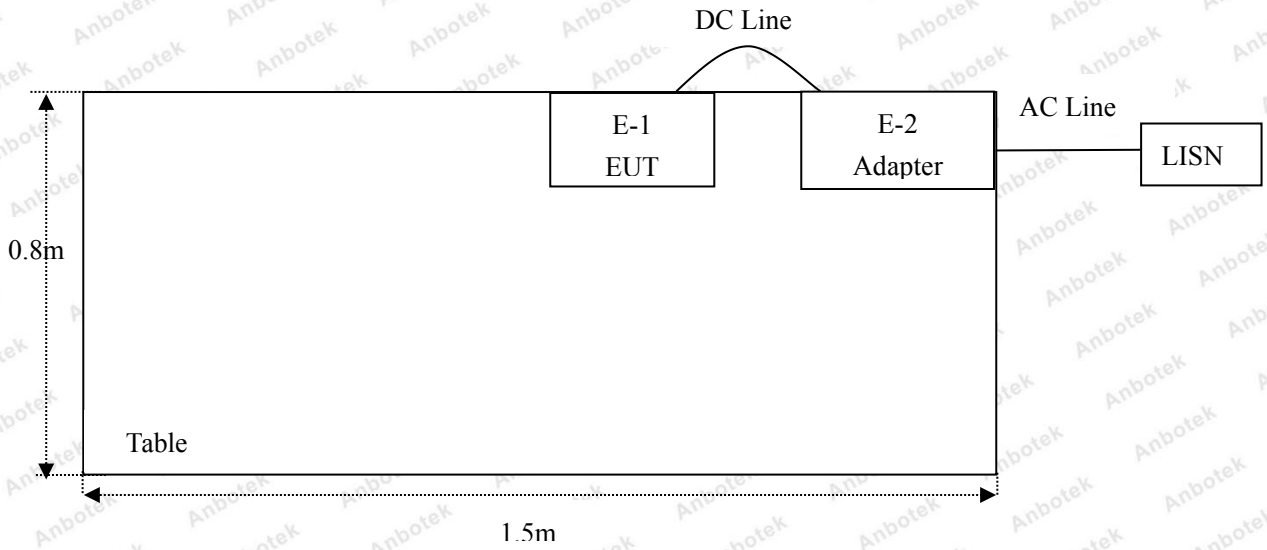
Channel	Freq. (MHz)	Channel	Freq. (MHz)
149	5745	153	5765
157	5785	161	5805
165	5825		

802.11n40

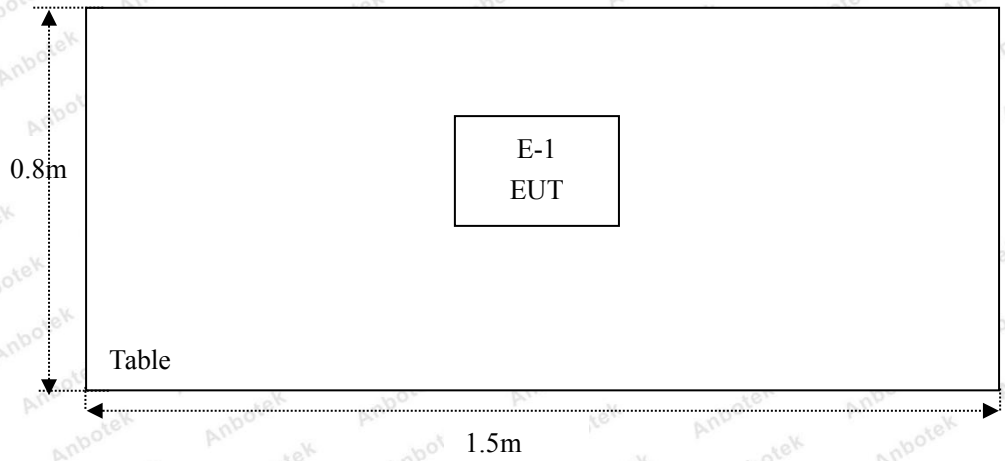
Channel	Freq. (MHz)	Channel	Freq. (MHz)
151	5755	159	5795

1.6. Description Of Test Setup

CE



RE



1.7. 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	Nov. 17, 2017	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Nov. 17, 2017	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Nov. 17, 2017	1 Year
4.	Spectrum Analysis	Agilent	E4407B	US39390582	Nov. 17, 2017	1 Year
5.	Spectrum Analysis	Agilent	N9038A	MY53227295	Nov. 17, 2017	1 Year
6.	Preamplifier	SKET Electronic	BK1G18G30 D	KD17503	Nov. 17, 2017	1 Year
7.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Nov. 17, 2017	1 Year
8.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Nov. 20, 2017	1 Year
9.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Nov. 20, 2017	1 Year
10.	Loop Antenna	Schwarzbeck	HFH2-Z2	100047	Nov. 17, 2017	1 Year
11.	Horn Antenna	Schewarzbeck	BBHA9170	9170-375	Nov. 17, 2017	1 Year
12.	Pre-amplifier	SONOMA	310N	186860	Nov. 17, 2017	1 Year
13.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
14.	RF Test Control System	YIHENG	YH3000	2017430	Nov. 18, 2017	1 Year
15.	Power Sensor	DAER	RPR3006W	15I00041SN045	Nov. 17, 2017	1 Year
16.	Power Sensor	DAER	RPR3006W	15I00041SN046	Nov. 17, 2017	1 Year
17.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Nov. 18, 2017	1 Year
18.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Nov. 18, 2017	1 Year
19.	Signal Generator	Agilent	E4421B	MY41000743	Nov. 18, 2017	1 Year
20.	DC Power Supply	LW	TPR-6410D	349315	Nov. 01, 2017	1 Year
21.	Constant Temperature Humidity Chamber	Sertep	ZJ-HWHS80B	ZJ-17042804	Nov. 01, 2017	1 Year

1.8. Measurement Uncertainty

Radiation Uncertainty	:	Ur = 3.9 dB (Horizontal)
		Ur = 3.8 dB (Vertical)
Conduction Uncertainty	:	Uc = 3.4 dB

1.9. Description of Test Facility

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

FCC-Registration No.: 184111

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registed 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. 184111, July 31, 2017.

ISED-Registration No.: 8058A-1

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-1, June 13, 2016.

Test Location

All Emissions tests were performed at Shenzhen Anbotek Compliance Laboratory Limited. at 1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102

2. Summary of Test Results

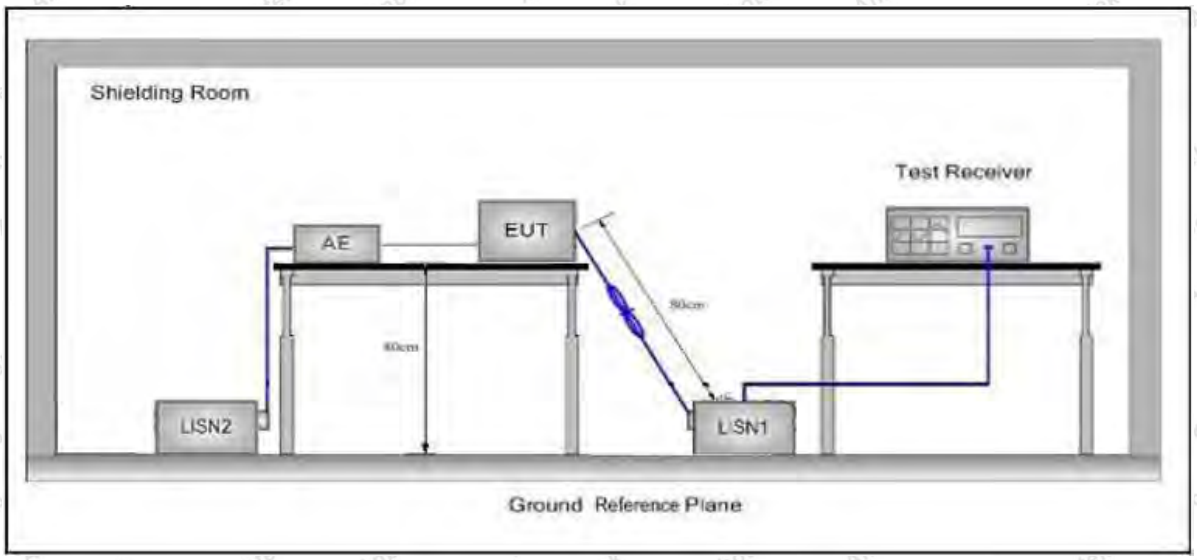
Standard	Test Type	Result
15.207 & 15.407	Conducted Emission	PASS
15.205/15.209	Spurious Emission	PASS
15.407(b)	Band Edge	PASS
15.407(a)(5)	Occupy Bandwidth	PASS
15.407(a)(1)(3)	Maximum Conducted Output Power	PASS
15.407(a)(1)(3)	Peak Power Spectral Density	PASS
15.203/15.407g	Antenna Requirement	PASS

3. Conducted Emission Test

3.1. Test Standard and Limit

Test Standard	FCC Part15 Section 15.207&15.407		
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 C63.10-2013 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9kHz.

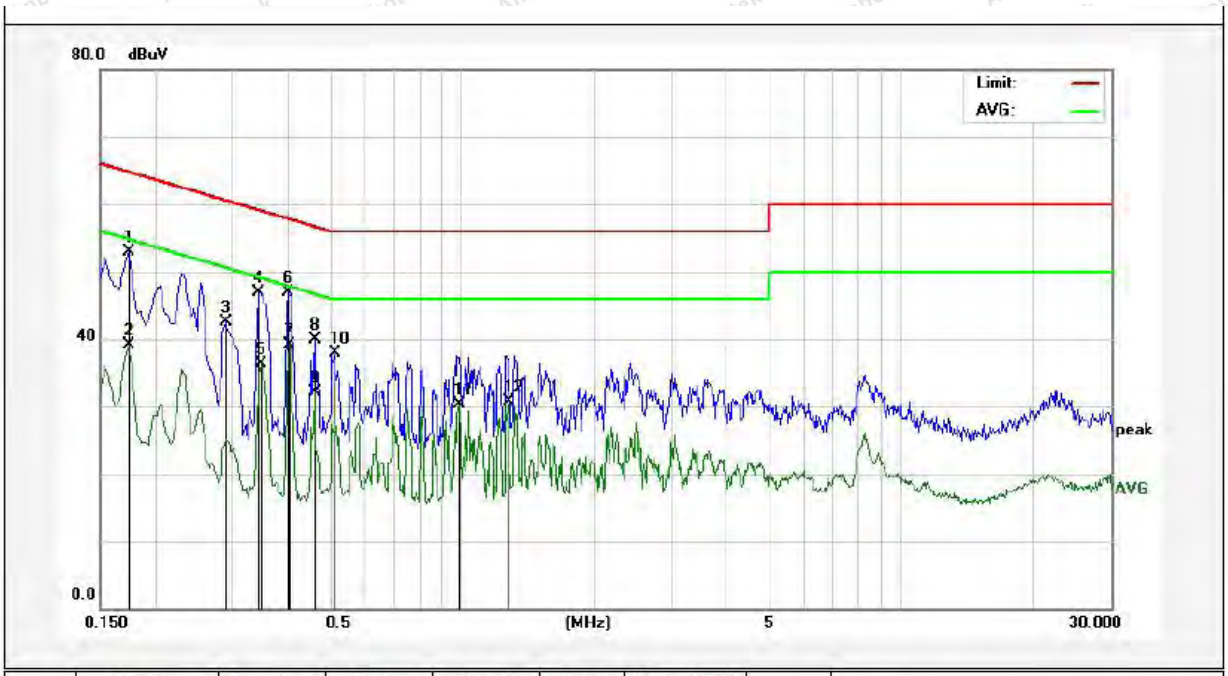
The frequency range from 150kHz to 30MHz is checked.

3.4. Test Data

Please to see the following pages.

Conducted Emission Test Data

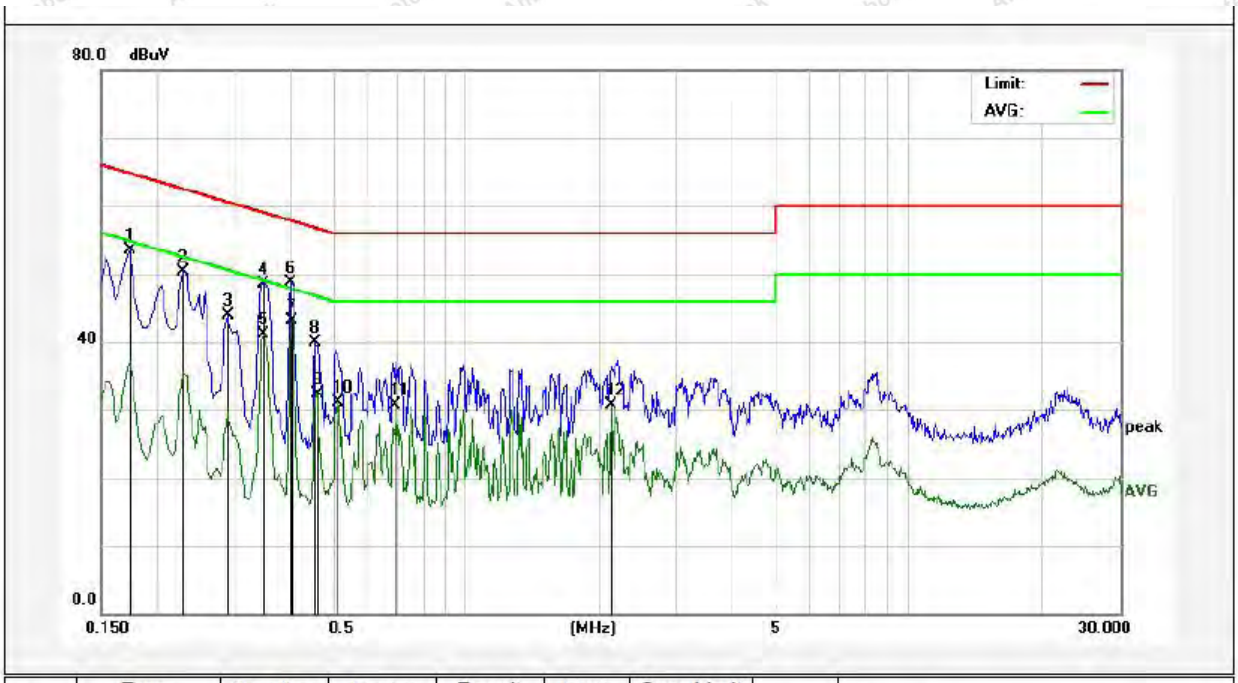
Test Site:	1# Shielded Room
Operating Condition:	Keeping TX mode
Test Specification:	AC 240V, 60Hz for adapter
Comment:	Live Line
	Tem.: 24.7℃ Hum.: 51%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1740	33.10	19.90	53.00	64.76	-11.76	QP	
2	0.1740	19.18	19.90	39.08	54.76	-15.68	AVG	
3	0.2900	22.63	19.89	42.52	60.52	-18.00	QP	
4	0.3460	27.07	19.91	46.98	59.06	-12.08	QP	
5	0.3500	16.36	19.91	36.27	48.96	-12.69	AVG	
6	0.4020	26.97	19.94	46.91	57.81	-10.90	QP	
7	0.4060	19.08	19.94	39.02	47.73	-8.71	AVG	
8	0.4620	19.99	19.96	39.95	56.66	-16.71	QP	
9	0.4620	12.16	19.96	32.12	46.66	-14.54	AVG	
10	0.5140	18.02	19.98	38.00	56.00	-18.00	QP	
11	0.9860	10.19	20.12	30.31	46.00	-15.69	AVG	
12	1.2820	10.59	20.13	30.72	46.00	-15.28	AVG	

Conducted Emission Test Data

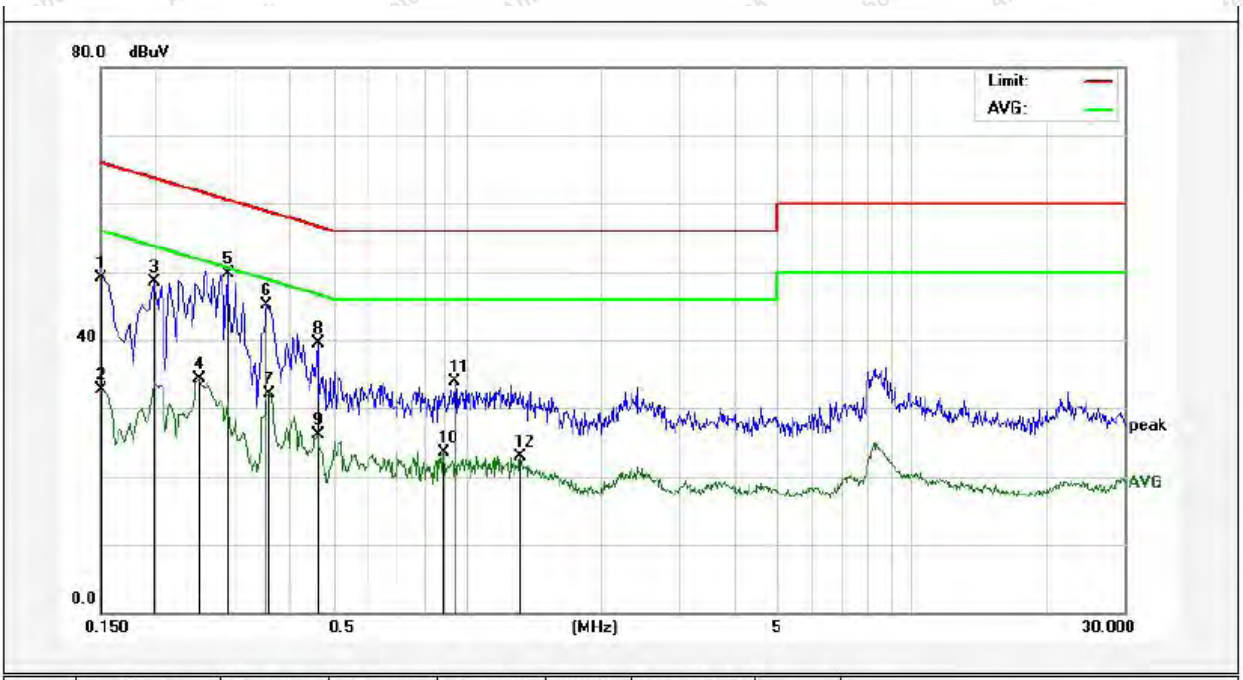
Test Site:	1# Shielded Room
Operating Condition:	Keeping TX mode
Test Specification:	AC 240V, 60Hz for adapter
Comment:	Neutral Line
	Tem.: 24.7℃ Hum.: 51%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1740	33.68	19.90	53.58	64.76	-11.18	QP	
2	0.2300	30.50	19.89	50.39	62.45	-12.06	QP	
3	0.2900	23.92	19.89	43.81	60.52	-16.71	QP	
4	0.3500	28.61	19.91	48.52	58.96	-10.44	QP	
5	0.3500	21.17	19.91	41.08	48.96	-7.88	AVG	
6	0.4020	28.70	19.94	48.64	57.81	-9.17	QP	
7	0.4060	23.20	19.94	43.14	47.73	-4.59	AVG	
8	0.4580	19.87	19.96	39.83	56.73	-16.90	QP	
9	0.4620	12.38	19.96	32.34	46.66	-14.32	AVG	
10	0.5180	11.12	19.99	31.11	46.00	-14.89	AVG	
11	0.6940	10.58	20.04	30.62	46.00	-15.38	AVG	
12	2.1300	10.48	20.14	30.62	46.00	-15.38	AVG	

Conducted Emission Test Data

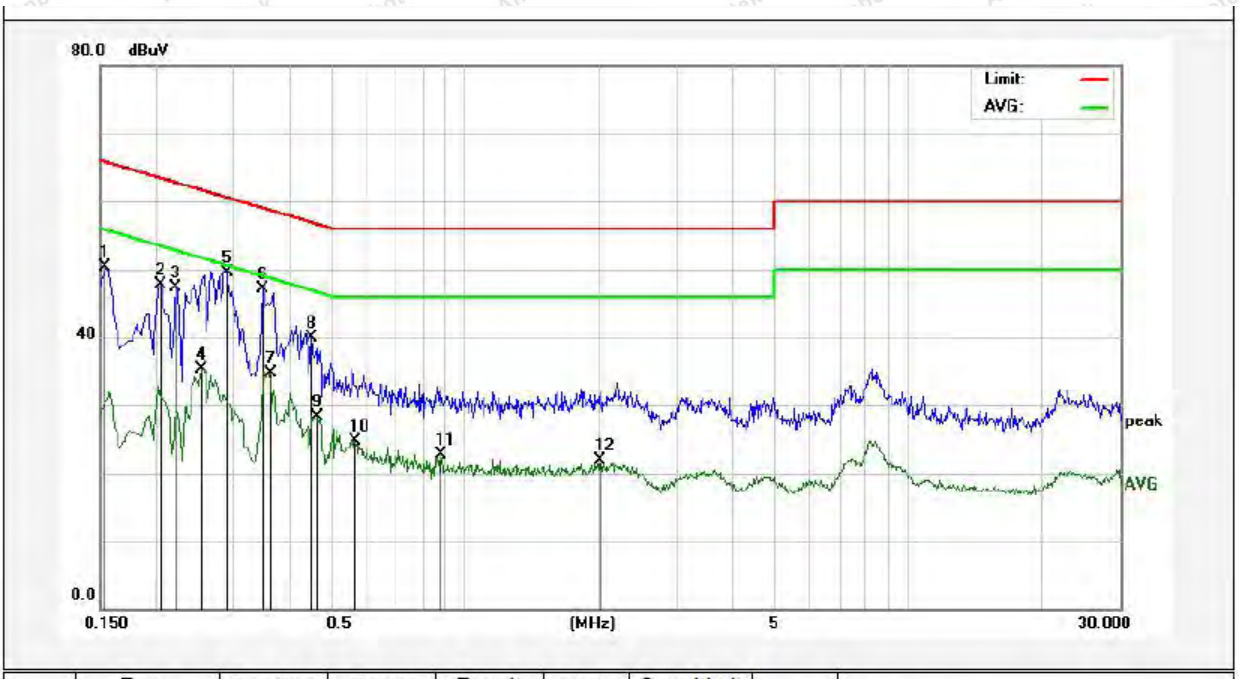
Test Site:	1# Shielded Room
Operating Condition:	Keeping TX mode
Test Specification:	AC 120V, 60Hz for adapter
Comment:	Live Line
	Tem.: 24.7℃ Hum.: 51%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1500	29.28	19.90	49.18	65.99	-16.81	QP	
2	0.1500	12.77	19.90	32.67	55.99	-23.32	AVG	
3	0.1980	28.60	19.90	48.50	63.69	-15.19	QP	
4	0.2500	14.45	19.89	34.34	51.75	-17.41	AVG	
5	0.2900	29.76	19.89	49.65	60.52	-10.87	QP	
6	0.3540	25.29	19.91	45.20	58.87	-13.67	QP	
7	0.3580	12.14	19.92	32.06	48.77	-16.71	AVG	
8	0.4620	19.51	19.96	39.47	56.66	-17.19	QP	
9	0.4620	6.18	19.96	26.14	46.66	-20.52	AVG	
10	0.8860	3.48	20.09	23.57	46.00	-22.43	AVG	
11	0.9420	13.77	20.10	33.87	56.00	-22.13	QP	
12	1.3220	2.77	20.13	22.90	46.00	-23.10	AVG	

Conducted Emission Test Data

Test Site:	1# Shielded Room
Operating Condition:	Keeping TX mode
Test Specification:	AC 120V, 60Hz for adapter
Comment:	Neutral Line
	Tem.: 24.7℃ Hum.: 51%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1539	30.39	19.90	50.29	65.78	-15.49	QP	
2	0.2060	27.73	19.90	47.63	63.36	-15.73	QP	
3	0.2220	27.47	19.90	47.37	62.74	-15.37	QP	
4	0.2540	15.41	19.89	35.30	51.62	-16.32	AVG	
5	0.2900	29.70	19.89	49.59	60.52	-10.93	QP	
6	0.3500	27.24	19.91	47.15	58.96	-11.81	QP	
7	0.3620	14.80	19.92	34.72	48.68	-13.96	AVG	
8	0.4500	19.85	19.96	39.81	56.87	-17.06	QP	
9	0.4620	8.34	19.96	28.30	46.66	-18.36	AVG	
10	0.5660	4.77	20.00	24.77	46.00	-21.23	AVG	
11	0.8820	2.56	20.09	22.65	46.00	-23.35	AVG	
12	2.0220	1.84	20.14	21.98	46.00	-24.02	AVG	

4. Radiation Spurious Emission and Band Edge

4.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.209, 15.205 and 15.407, KDB 789033 D02 General UNII Test Procedures New Rules v02r01

Unwanted spurious emissions fallen in restricted bands per FCC Part15.205 shall comply with the general field strength limits set forth in § 15.209 as below table,

	Frequency (MHz)	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
Test Limit	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

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[dBμV/m] = EIRP[dBm] + 95.2=68.2 dBuV/m, for EIPR[dBm]=-27dBm.

For transmitters operating in the 5.725-5.85GHz band:
15.407(b)(4)(i) All emissions shall be limited to a level of -27dBm/MHz at 75MHz or more above or below the band edge increasing linearly to 10dBm/MHz at 25MHz above or below the band edge, and from 25MHz above or below the band edge increasing linearly to a level of 15.6dBm/MHz at 5MHz above or below the band edge, and from 5MHz above or below the band edge increasing linearly to a level of 27dBm/MHz at the band edge.

KDB789033 D02 v02r01 (G)(2)(c)
(i) Sections 15.407(b)(1) to (b)(3) specify the unwanted emission limits for the U-NII-1 and U-NII-2 bands. As specified, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27dBm/MHz.[3]
(ii) Section 15.407(b)(4) specifies the unwanted emission limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). The emission limits are in terms of a Peak detector. An alternative to the band emissions mask is specified in Section 15.407(b)(4)(ii). The alternative limits are based on the highest antenna gain specified in the filing. There are also marketing and importation restrictions for the devices using the alternative limit.[4]

Note 3: An out-of-band emission that complies with both the average and peak limits of Section 15.209 is not required to satisfy the -27 dBm/MHz peak emission limit.

Note 4: Only devices with antenna gains of 10 dBi or less may be approved using the emission limits specified in Section 15.247(d) till March 2, 2018; all other devices operating in this band must use the mask specified in Section 15.407(b)(4)(i).

4.2. Test Setup

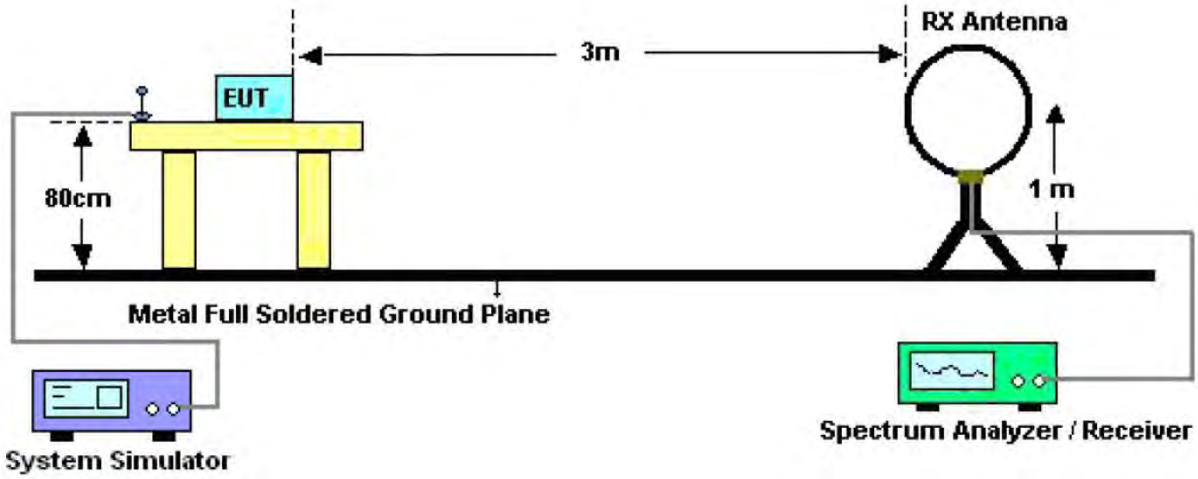


Figure 1. Below 30MHz

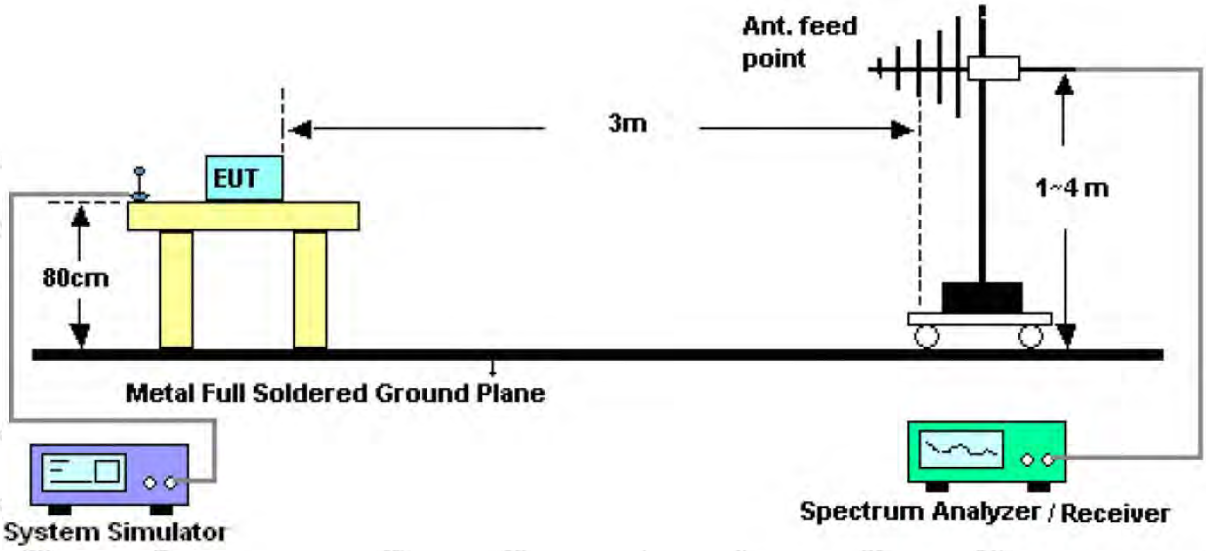


Figure 2. 30MHz to 1GHz

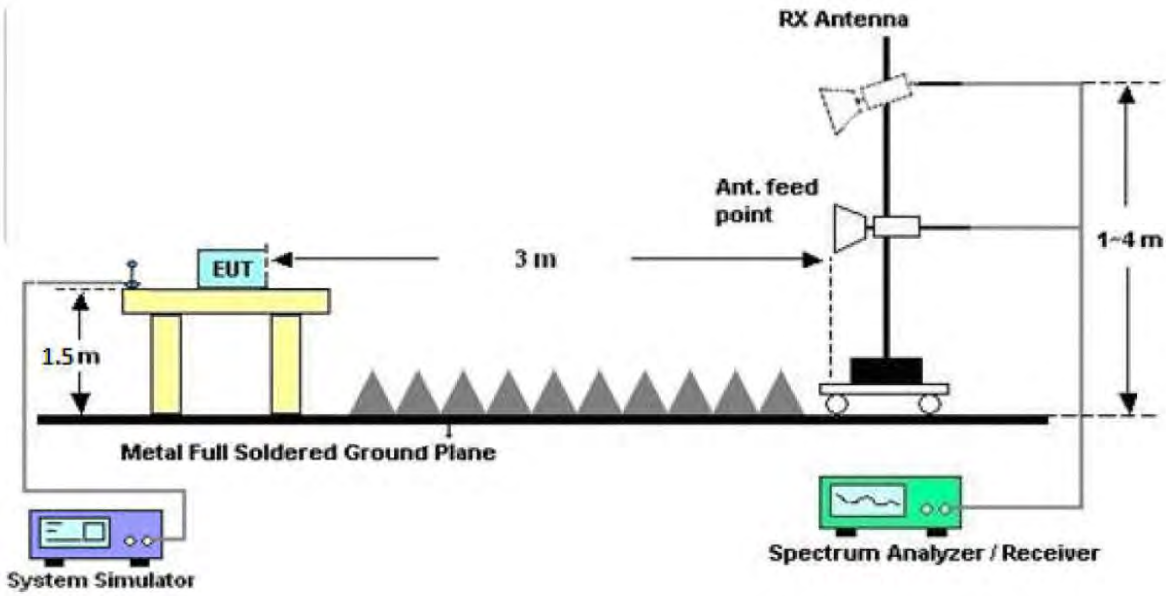


Figure 3. Above 1 GHz

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

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

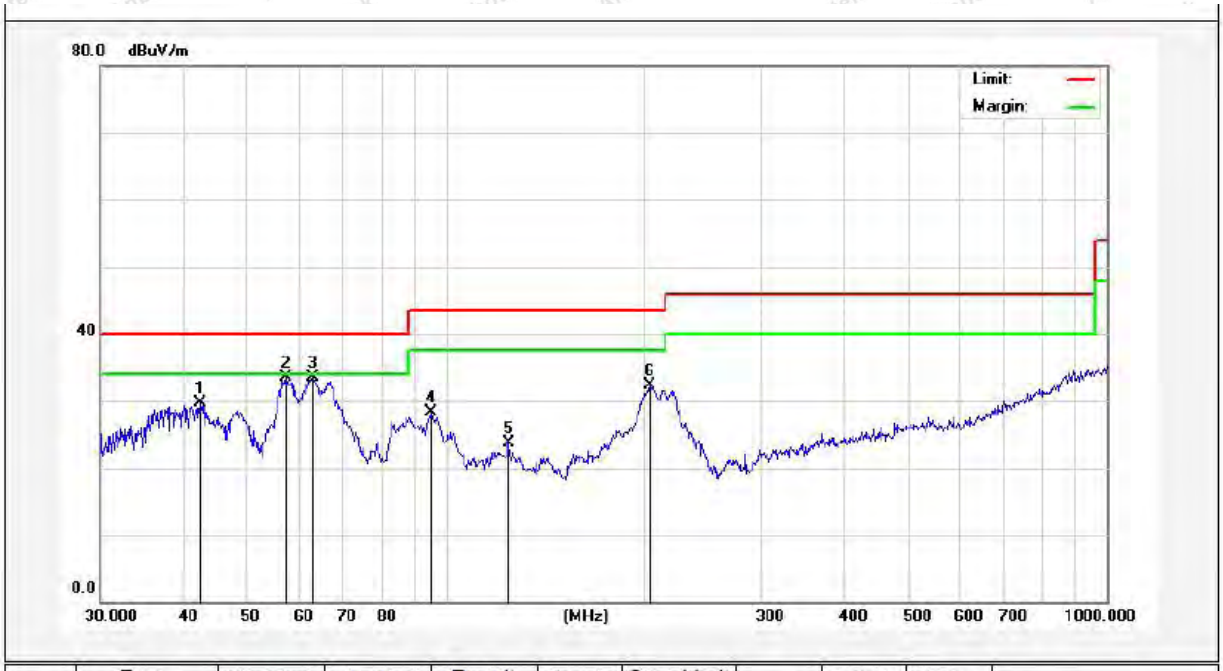
Test Results (30~1000MHz)

Job No.:	SZAWW180514004-01	Temp.(℃)/Hum.(%RH):	23.2℃/54%RH
Standard:	FCC PART 15C	Power Source:	DC 7.6V Battery inside
Test Mode:	TX Mode	Polarization:	Horizontal

No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	59.6493	38.58	-10.98	27.60	40.00	-12.40	QP	300	33	
2	103.4421	34.14	-14.71	19.43	43.50	-24.07	QP	300	112	
3	199.2855	44.02	-12.94	31.08	43.50	-12.42	QP	300	147	
4	219.8446	48.63	-13.31	35.32	46.00	-10.68	QP	300	169	
5	301.4224	38.81	-11.51	27.30	46.00	-18.70	QP	300	210	
6	497.6765	32.43	-5.02	27.41	46.00	-18.59	QP	300	263	

Test Results (30~1000MHz)

Job No.:	SZAWW180514004-01	Temp.(℃)/Hum.(%RH):	23.2℃/54%RH
Standard:	FCC PART 15C	Power Source:	DC 7.6V Battery inside
Test Mode:	TX Mode	Polarization:	Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	42.4508	37.47	-7.84	29.63	40.00	-10.37	QP	300	16	
2	57.3922	43.38	-9.86	33.52	40.00	-6.48	QP	300	77	
3	62.8708	44.51	-11.07	33.44	40.00	-6.56	QP	300	152	
4	95.0930	37.59	-9.20	28.39	43.50	-15.11	QP	300	159	
5	124.5690	33.76	-10.01	23.75	43.50	-19.75	QP	300	210	
6	203.5227	41.00	-8.77	32.23	43.50	-11.27	QP	300	269	

Test Results (Above 1000MHz)

Test mode:	IEEE 802.11a	Test channel:	Low CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11490.00	44.55	32.66	18.21	34.01	61.41	74.00	-12.59	V
17235.00	35.63	33.42	20.20	35.00	54.25	68.20	-13.95	V
11490.00	36.32	32.66	18.21	34.01	53.18	74.00	-20.82	H
17235.00	35.77	33.42	20.20	35.00	54.39	68.20	-13.81	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11490.00	28.68	32.66	18.21	34.01	45.54	54.00	-8.46	V
17235.00	27.33	33.42	20.20	35.00	45.95	54.00	-8.05	V
11490.00	26.55	32.66	18.21	34.01	43.41	54.00	-10.59	H
17235.00	24.33	33.42	20.20	35.00	42.95	54.00	-11.05	H

Test mode:	IEEE 802.11a	Test channel:	Mid CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11570.00	42.36	32.67	18.24	34.02	59.25	74.00	-14.75	V
17355.00	34.77	33.44	20.22	35.01	53.42	68.20	-14.78	V
11570.00	36.47	32.67	18.24	34.02	53.36	74.00	-20.64	H
17355.00	33.69	33.44	20.22	35.01	52.34	68.20	-15.86	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11570.00	30.11	32.67	18.24	34.02	47.00	54.00	-7.00	V
17355.00	26.11	33.44	20.22	35.01	44.76	54.00	-9.24	V
11570.00	28.62	32.67	18.24	34.02	45.51	54.00	-8.49	H
17355.00	27.11	33.44	20.22	35.01	45.76	54.00	-8.24	H

Test mode:	IEEE 802.11a	Test channel:	High CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11650.00	40.06	32.69	18.26	34.04	56.97	74.00	-17.03	V
17475.00	38.77	33.46	20.23	35.02	57.44	68.20	-10.76	V
11650.00	42.30	32.69	18.26	34.04	59.21	74.00	-14.79	H
17475.00	39.29	33.46	20.23	35.02	57.96	68.20	-10.24	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11650.00	30.77	32.69	18.26	34.04	47.68	54.00	-6.32	V
17475.00	27.89	33.46	20.23	35.02	46.56	54.00	-7.44	V
11650.00	29.66	32.69	18.26	34.04	46.57	54.00	-7.43	H
17475.00	27.98	33.46	20.23	35.02	46.65	54.00	-7.35	H

Test mode:	IEEE 802.11n(HT20)	Test channel:	Low CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11490.00	43.52	32.66	18.21	34.01	60.38	74.00	-13.62	V
17235.00	37.69	33.42	20.20	35.00	56.31	68.20	-11.89	V
11490.00	41.78	32.66	18.21	34.01	58.64	74.00	-15.36	H
17235.00	38.66	33.42	20.20	35.00	57.28	68.20	-10.92	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11490.00	30.96	32.66	18.21	34.01	47.82	54.00	-6.18	V
17235.00	27.18	33.42	20.20	35.00	45.80	54.00	-8.20	V
11490.00	29.36	32.66	18.21	34.01	46.22	54.00	-7.78	H
17235.00	27.63	33.42	20.20	35.00	46.25	54.00	-7.75	H

Test mode:	IEEE 802.11n(HT20)	Test channel:	Mid CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11570.00	40.25	32.67	18.24	34.02	57.14	74.00	-16.86	V
17355.00	39.65	33.44	20.22	35.01	58.30	68.20	-9.90	V
11570.00	36.88	32.67	18.24	34.02	53.77	74.00	-20.23	H
17355.00	34.58	33.44	20.22	35.01	53.23	68.20	-14.97	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11570.00	27.96	32.67	18.24	34.02	44.85	54.00	-9.15	V
17355.00	25.62	33.44	20.22	35.01	44.27	54.00	-9.73	V
11570.00	26.14	32.67	18.24	34.02	43.03	54.00	-10.97	H
17355.00	25.43	33.44	20.22	35.01	44.08	54.00	-9.92	H

Test mode:	IEEE 802.11n(HT20)	Test channel:	High CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11650.00	42.33	32.69	18.26	34.04	59.24	74.00	-14.76	V
17475.00	39.52	33.46	20.23	35.02	58.19	68.20	-10.01	V
11650.00	37.59	32.69	18.26	34.04	54.50	74.00	-19.50	H
17475.00	39.42	33.46	20.23	35.02	58.09	68.20	-10.11	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11650.00	31.29	32.69	18.26	34.04	48.20	54.00	-5.80	V
17475.00	30.44	33.46	20.23	35.02	49.11	54.00	-4.89	V
11650.00	28.47	32.69	18.26	34.04	45.38	54.00	-8.62	H
17475.00	26.55	33.46	20.23	35.02	45.22	54.00	-8.78	H

Test mode:	IEEE 802.11n(HT40)	Test channel:	Low CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11510.00	36.95	32.66	18.21	34.01	53.81	74.00	-20.19	V
17265.00	34.57	33.43	20.21	35.00	53.21	68.20	-14.99	V
11510.00	39.56	32.66	18.21	34.01	56.42	74.00	-17.58	H
17265.00	38.62	33.43	20.21	35.00	57.26	68.20	-10.94	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11510.00	31.29	32.66	18.21	34.01	48.15	54.00	-5.85	V
17265.00	26.58	33.43	20.21	35.00	45.22	54.00	-8.78	V
11510.00	30.17	32.66	18.21	34.01	47.03	54.00	-6.97	H
17265.00	25.64	33.43	20.21	35.00	44.28	54.00	-9.72	H

Test mode:	IEEE 802.11n(HT40)	Test channel:	High CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11590.00	41.59	32.68	18.24	34.03	58.48	74.00	-15.52	V
17385.00	36.74	33.45	20.22	35.02	55.39	68.20	-12.81	V
11590.00	38.42	32.68	18.24	34.03	55.31	74.00	-18.69	H
17385.00	37.55	33.45	20.22	35.02	56.20	68.20	-12.00	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11590.00	30.1	32.68	18.24	34.03	46.99	54.00	-7.01	V
17385.00	28.16	33.45	20.22	35.02	46.81	54.00	-7.19	V
11590.00	30.26	32.68	18.24	34.03	47.15	54.00	-6.85	H
17385.00	29.84	33.45	20.22	35.02	48.49	54.00	-5.51	H

1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

Radiated Band Edge:

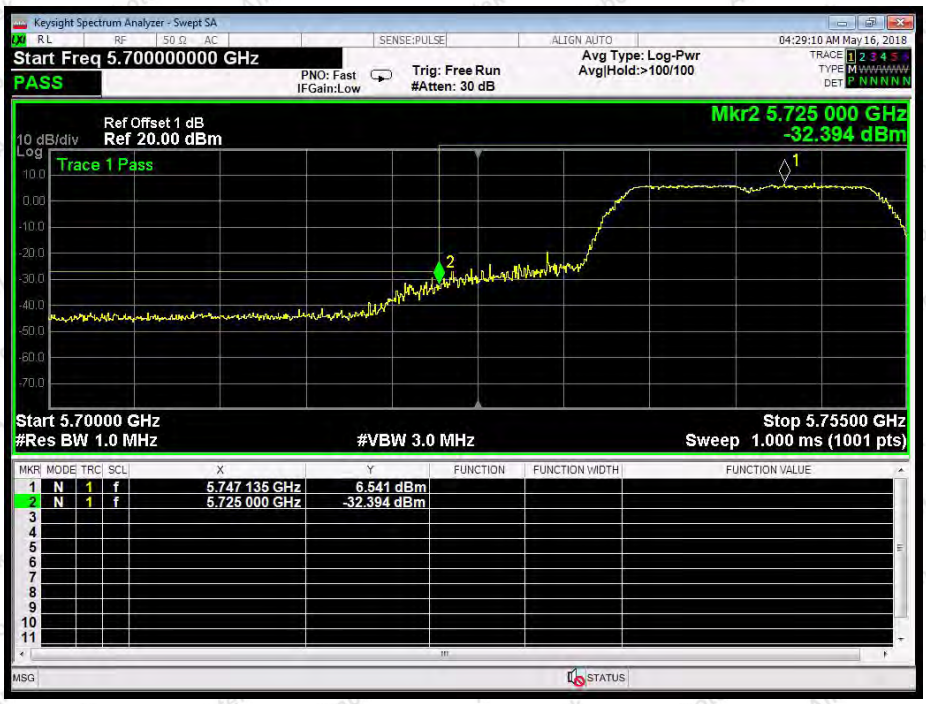
Test Mode: 802.11a								
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
5725.00	41.77	29.78	15.69	31.08	56.16	68.20	-12.04	H
5850.00	38.62	30.01	16.82	32.09	53.36	68.20	-14.84	H
5725.00	42.69	29.78	15.69	31.08	57.08	68.20	-11.12	V
5850.00	43.18	30.01	16.82	32.09	57.92	68.20	-10.28	V
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
5725.00	32.19	29.78	15.69	31.08	46.58	54.00	-7.42	H
5850.00	30.14	30.01	16.82	32.09	44.88	54.00	-9.12	H
5725.00	31.47	29.78	15.69	31.08	45.86	54.00	-8.14	V
5850.00	32.11	30.01	16.82	32.09	46.85	54.00	-7.15	V

Test Mode: 802.11n20								
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
5725.00	40.66	29.78	15.69	31.08	55.05	68.20	-13.15	H
5850.00	42.33	30.01	16.82	32.09	57.07	68.20	-11.13	H
5725.00	43.62	29.78	15.69	31.08	58.01	68.20	-10.19	V
5850.00	41.55	30.01	16.82	32.09	56.29	68.20	-11.91	V
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
5725.00	31.29	29.78	15.69	31.08	45.68	54.00	-8.32	H
5850.00	32.98	30.01	16.82	32.09	47.72	54.00	-6.28	H
5725.00	33.74	29.78	15.69	31.08	48.13	54.00	-5.87	V
5850.00	32.48	30.01	16.82	32.09	47.22	54.00	-6.78	V

Test Mode: 802.11n40								
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
5725.00	39.65	29.78	15.69	31.08	54.04	68.20	-14.16	H
5850.00	38.77	30.01	16.82	32.09	53.51	68.20	-14.69	H
5725.00	41.36	29.78	15.69	31.08	55.75	68.20	-12.45	V
5850.00	42.11	30.01	16.82	32.09	56.85	68.20	-11.35	V
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
5725.00	30.59	29.78	15.69	31.08	44.98	54.00	-9.02	H
5850.00	32.84	30.01	16.82	32.09	47.58	54.00	-6.42	H
5725.00	32.17	29.78	15.69	31.08	46.56	54.00	-7.44	V
5850.00	33.55	30.01	16.82	32.09	48.29	54.00	-5.71	V

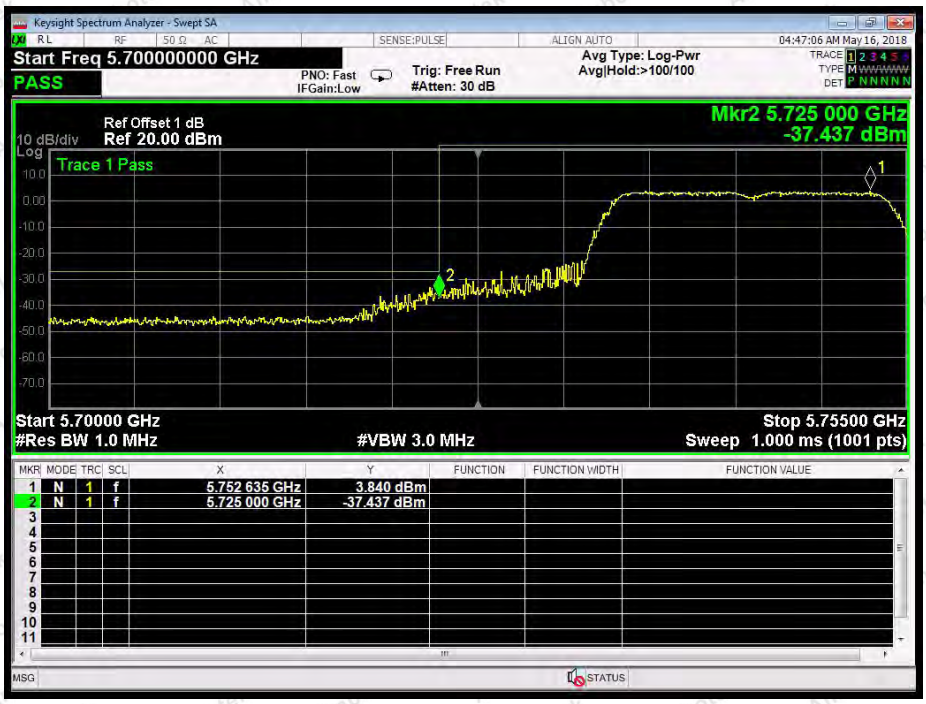
For conducted test:

802.11a: Band Edge, Left Side



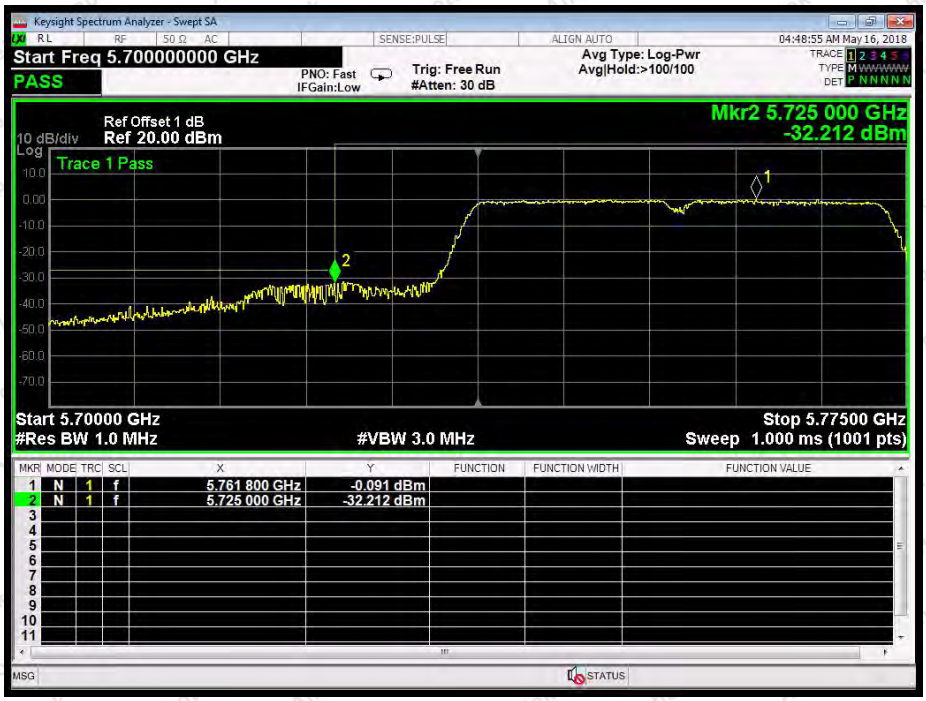
802.11a: Band Edge, Right Side

802.11n(20): Band Edge, Left Side



802.11n(20): Band Edge, Right Side

802.11ac(40): Band Edge, Left Side



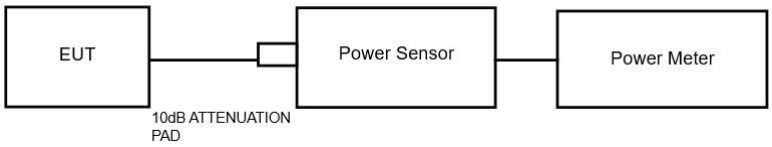
802.11ac(40): Band Edge, Right Side

5. Maximum Peak Output Power Test

5.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.407 (a)(1) (3)
Test Limit	30dBm (1W)

5.2. Test Setup



5.3. Test Procedure

1. The Transmitter output (antenna port) was connected to the power meter.
2. Turn on the EUT and power meter and then record the power value.
3. Repeat above procedures on all channels needed to be tested.

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

5.4. Test Data

Test Item	:	Max. peak output power	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 7.6V Battery inside	Temperature	:	24℃
Test Result	:	PASS	Humidity	:	55%RH

Mode	Channel Frequency (MHz)	Peak Power output (dBm)		Correctional Limit (dBm)	Results
		ANT	SUM		
802.11a	5745	13.03	N/A	30.00	PASS
	5785	13.38		30.00	PASS
	5825	**13.72**		30.00	PASS
802.11n20	5745	12.07		30.00	PASS
	5785	12.33		30.00	PASS
	5825	12.74		30.00	PASS
802.11n40	5755	12.90		30.00	PASS
	5795	12.24		30.00	PASS

Note:

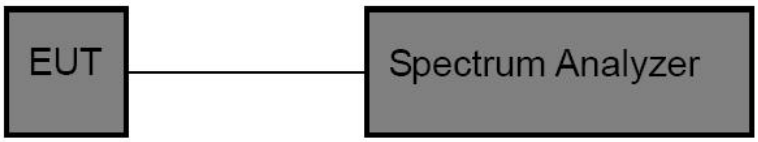
1) For power test the duty cycle is 100% in continuous transmitting mode. Please see the plot of next page.

6. Occupy Bandwidth Test

6.1. Test Standard

Test Standard	FCC Part15 C Section 15.403(i), 15.407 (e)

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.

6 dB bandwidth

RBW = 100kHz;
Set the video bandwidth (VBW) ≥ 3 RBW;
Detector= Peak
Trace mode= Max hold.
Sweep- auto couple.

4. Measure the maximum width of the emission that is 26dB /6dB 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.

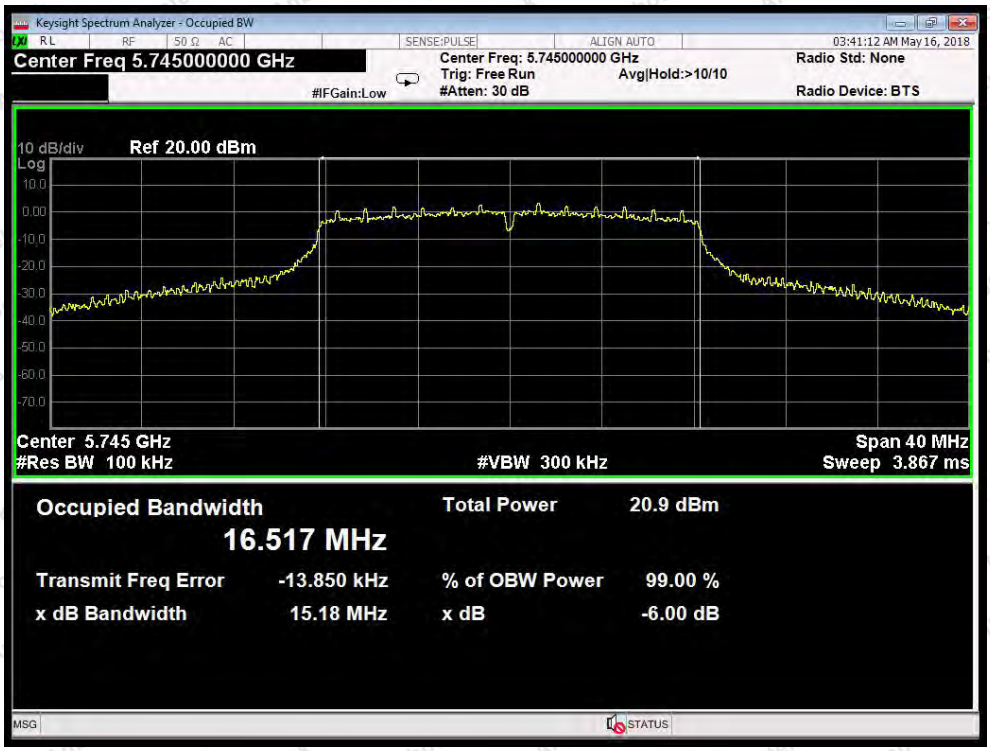
6.4. Test Data

Test Item	:	6dB &26dB BW	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 7.6V Battery inside	Temperature	:	24℃
Test Result	:	PASS	Humidity	:	55%RH

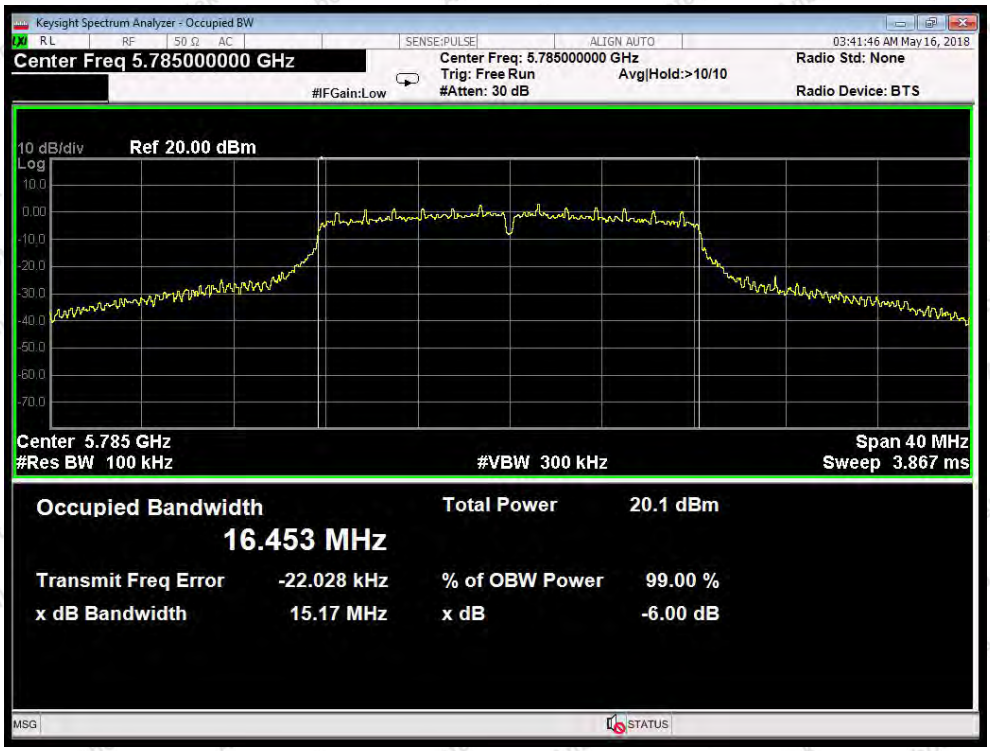
Mode	Channel Frequency (MHz)	6dB BW(MHz)	Limit	Results
802.11a	5745	15.18	>0.5MHz	PASS
	5785	15.17		PASS
	5825	14.24		PASS
802.11n20	5745	15.16		PASS
	5785	15.97		PASS
	5825	15.18		PASS
802.11n40	5755	35.28		PASS
	5795	35.43		PASS

Mode	Channel Frequency (MHz)	26dB BW(MHz)	99% Bandwidth (MHz)
802.11a	5745	22.62	16.691
	5785	22.96	16.705
	5825	21.21	16.656
802.11n20	5745	23.26	17.703
	5785	22.89	17.696
	5825	22.27	17.719
802.11n40	5755	66.25	36.459
	5795	65.33	36.576

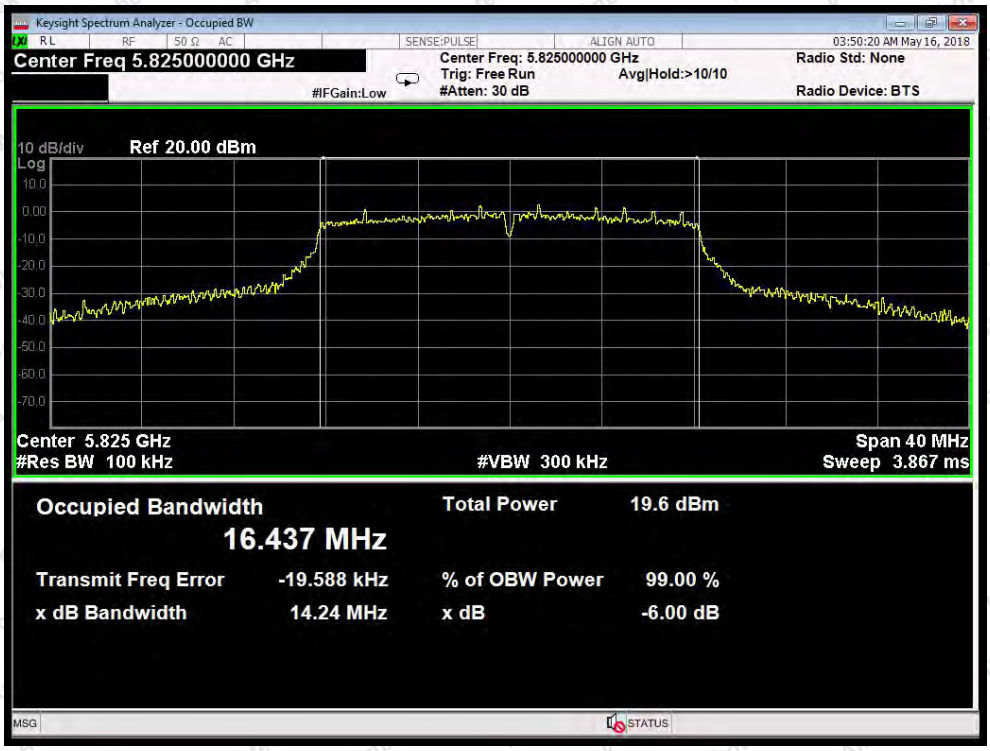
6dB Bandwidth



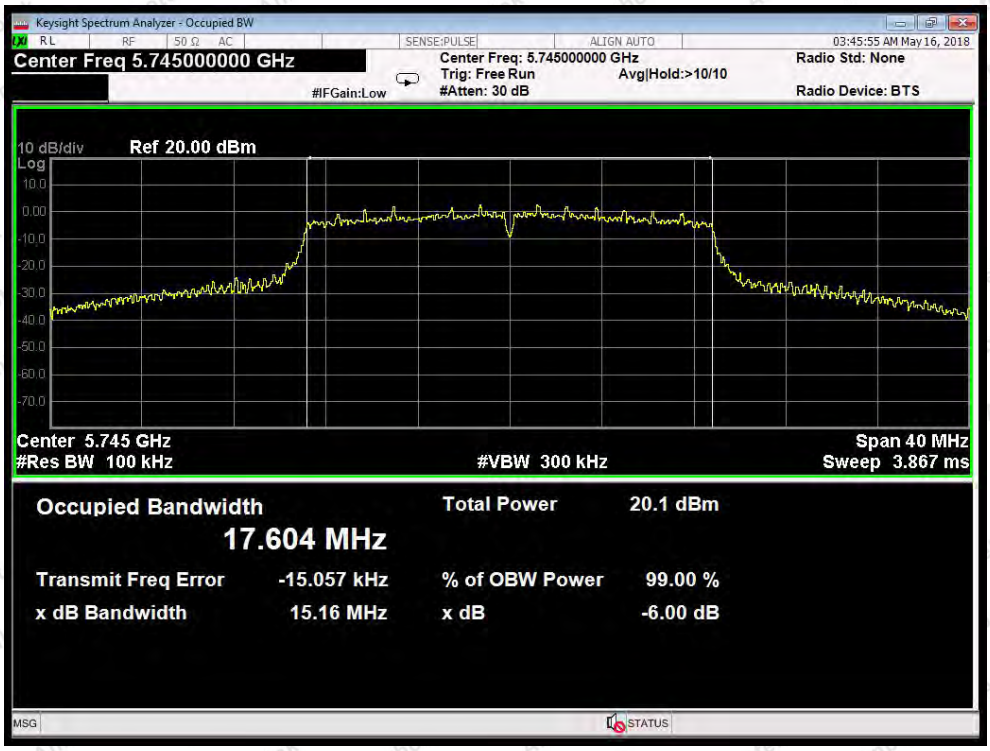
Test Mode: 802.11a--Low



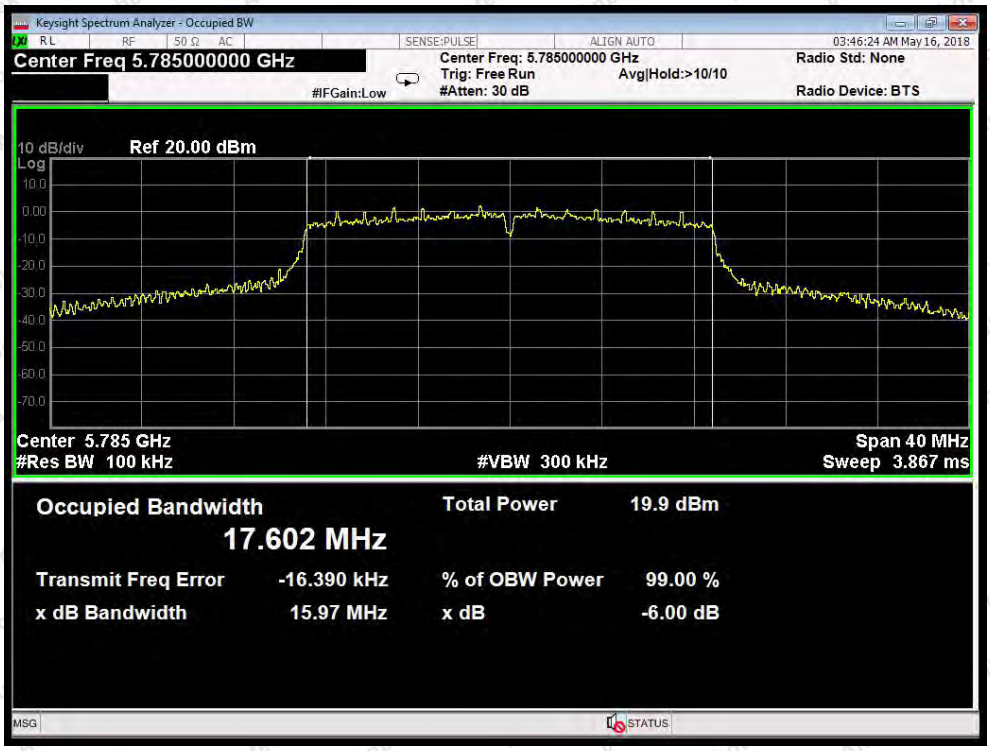
Test Mode: 802.11a---Middle



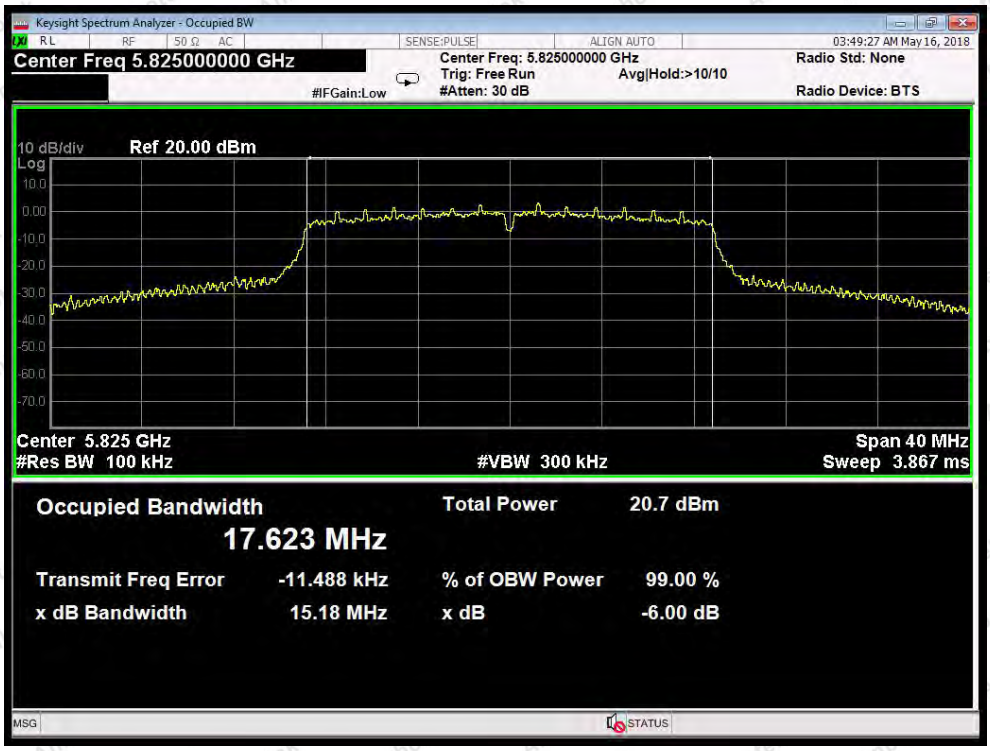
Test Mode: 802.11a---High



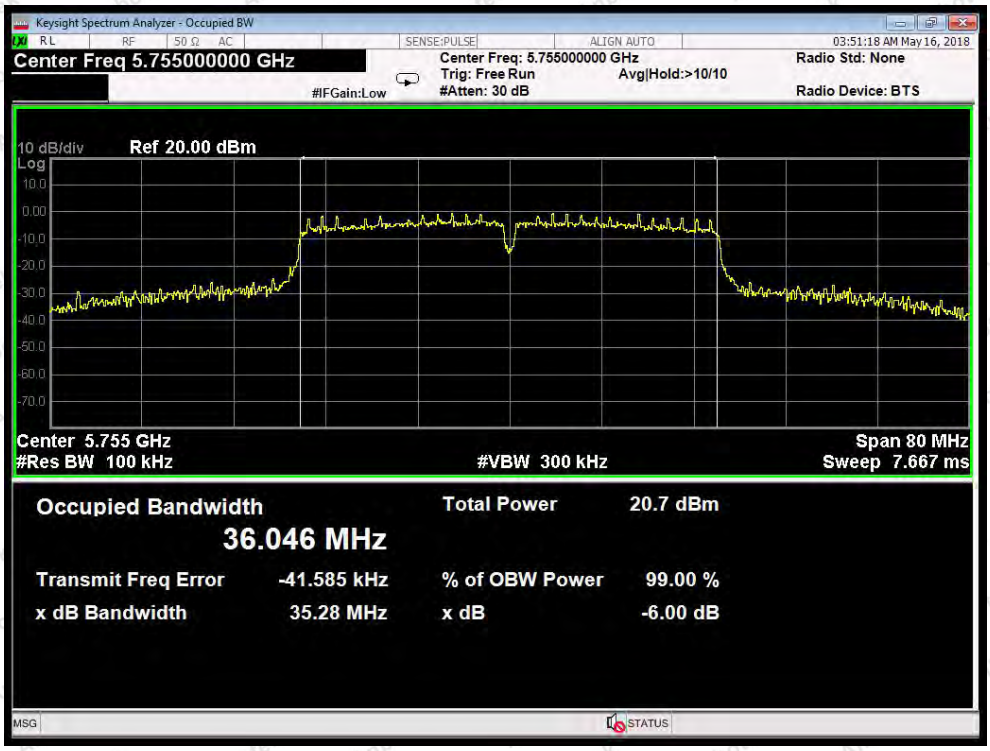
Test Mode: 802.11n20---Low



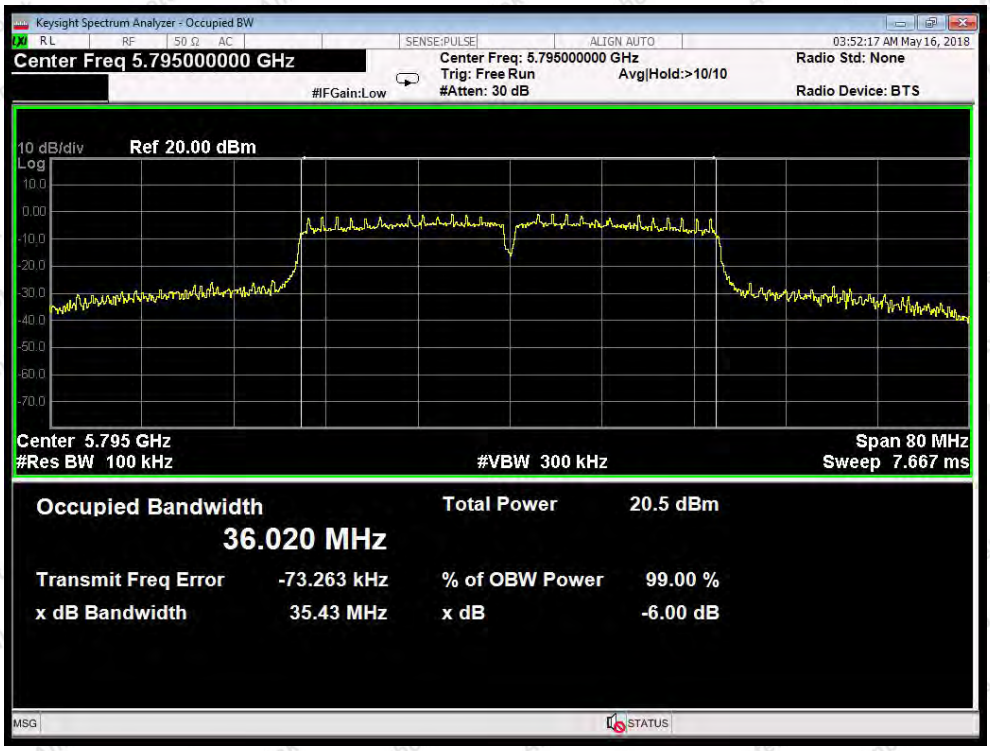
Test Mode: 802.11n20---Middle



Test Mode: 802.11n20---High

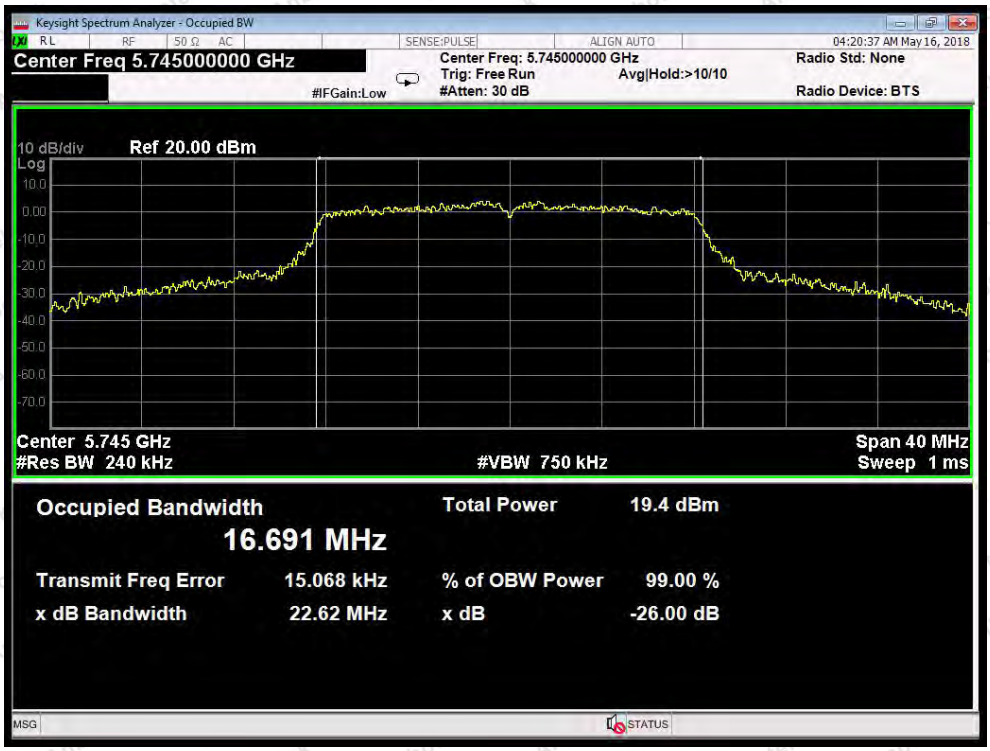


Test Mode: 802.11n40---Low

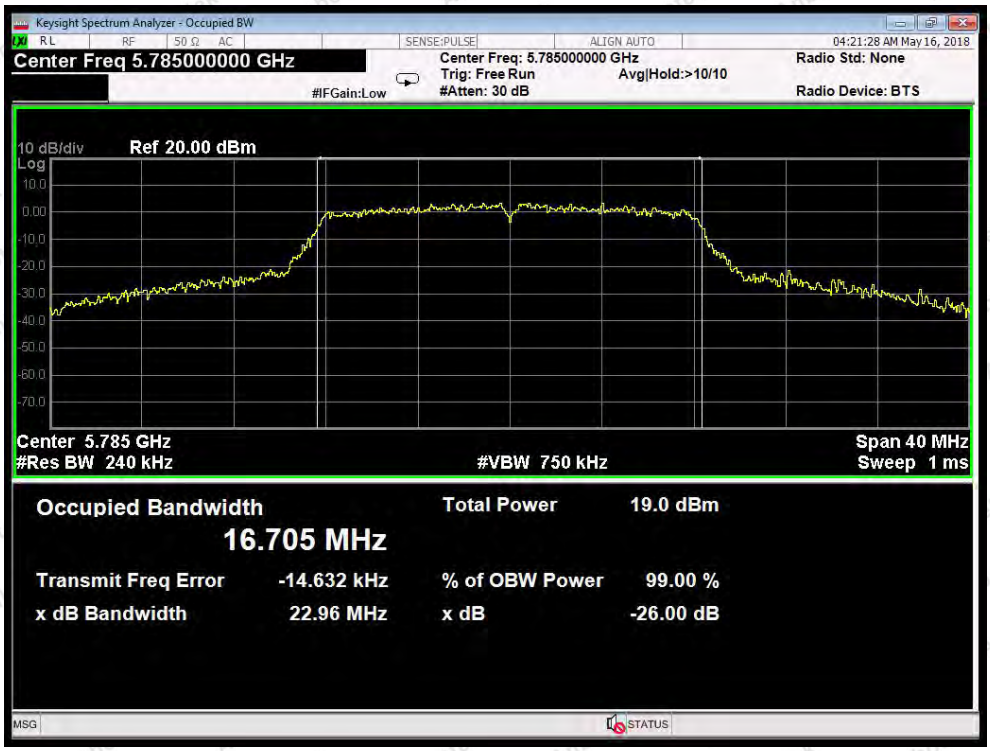


Test Mode: 802.11n40---High

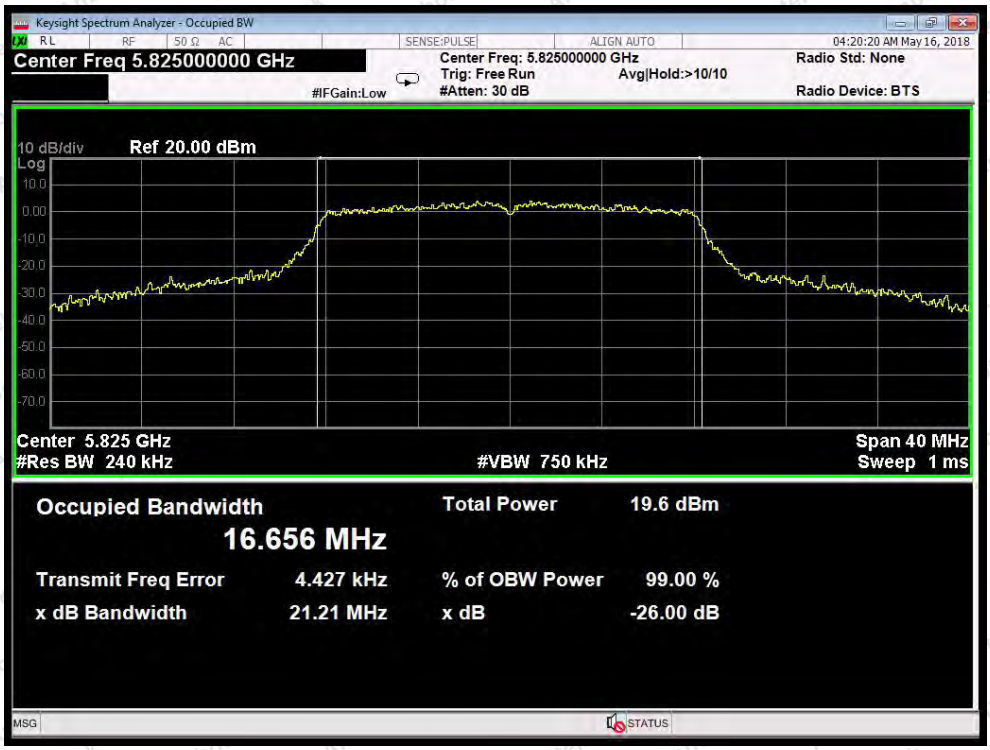
26dB &99% Bandwidth



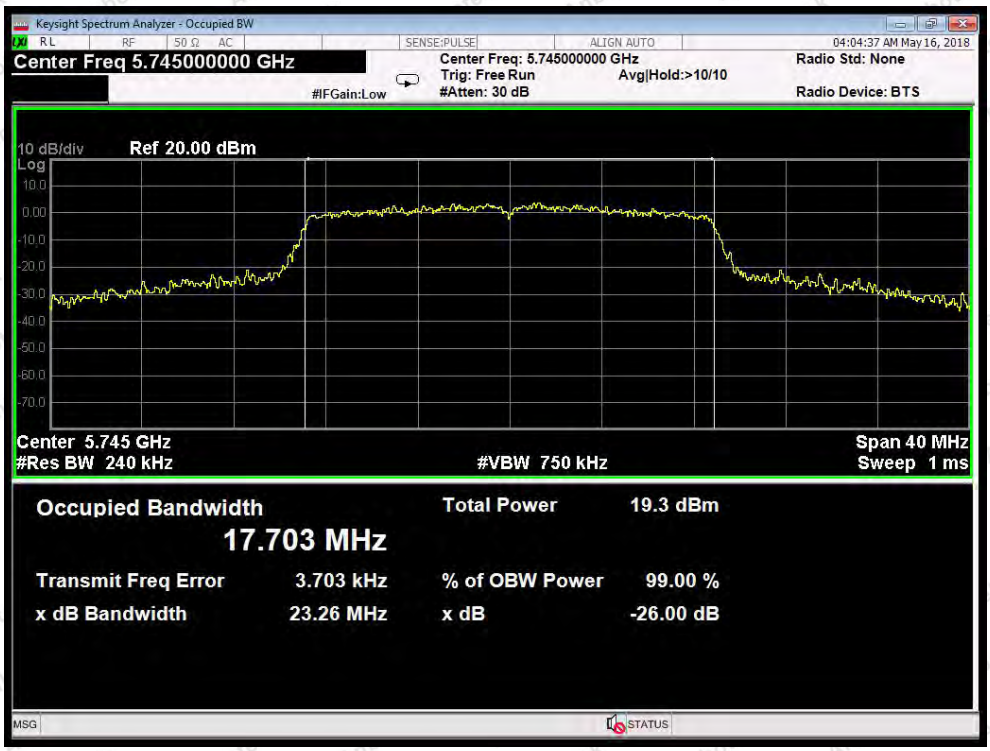
Test Mode: 802.11a--Low



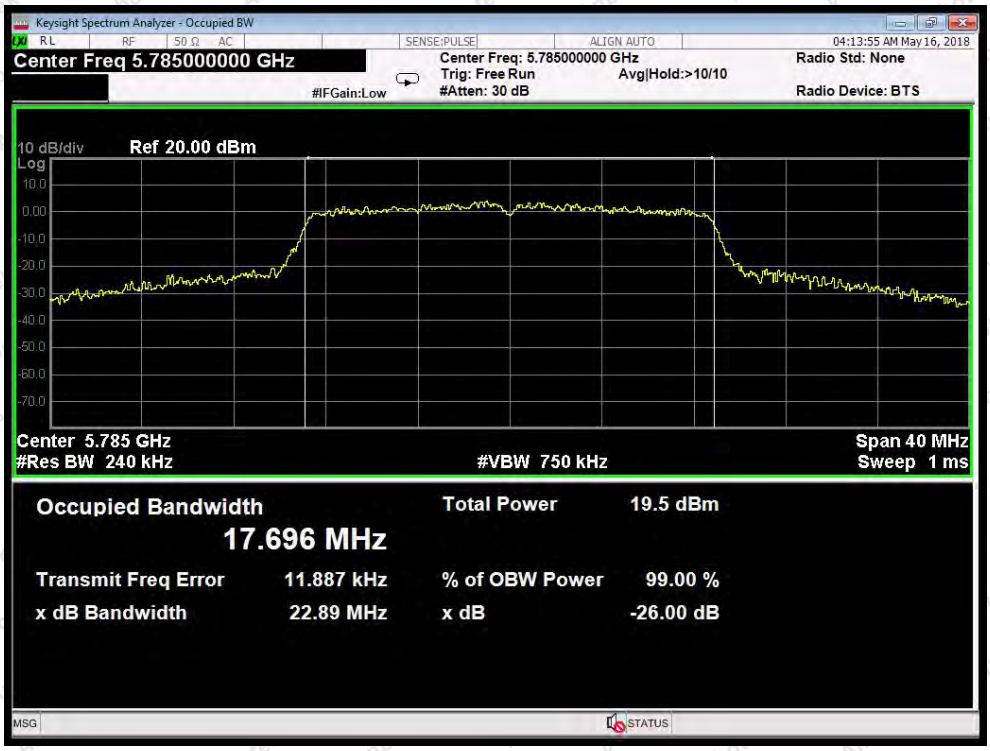
Test Mode: 802.11a---Middle



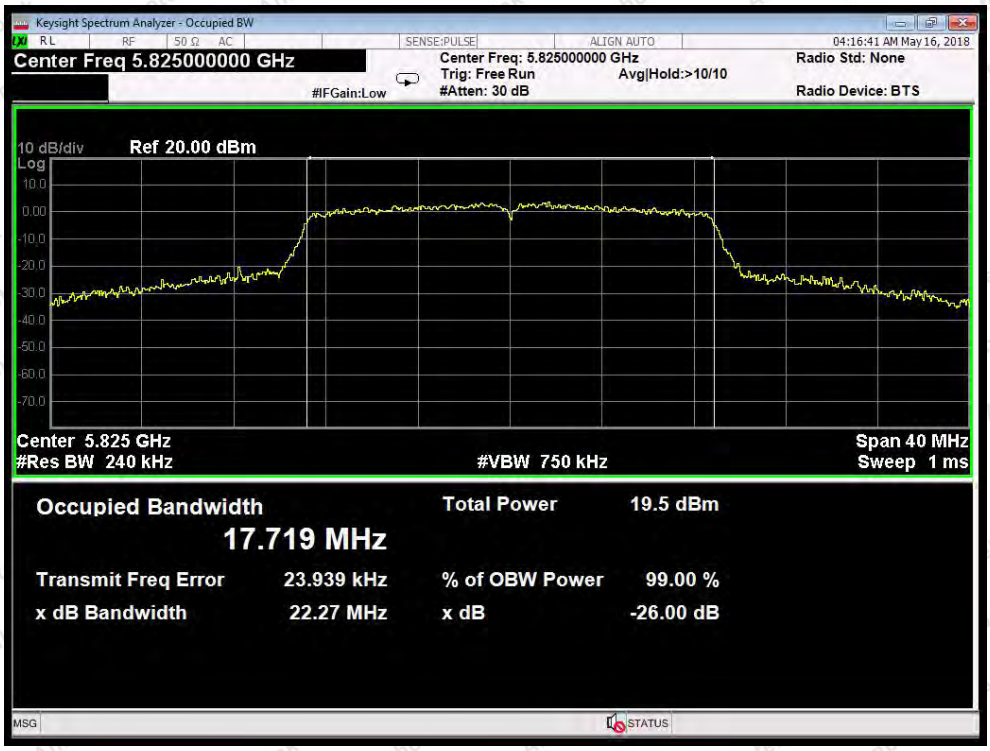
Test Mode: 802.11a---High



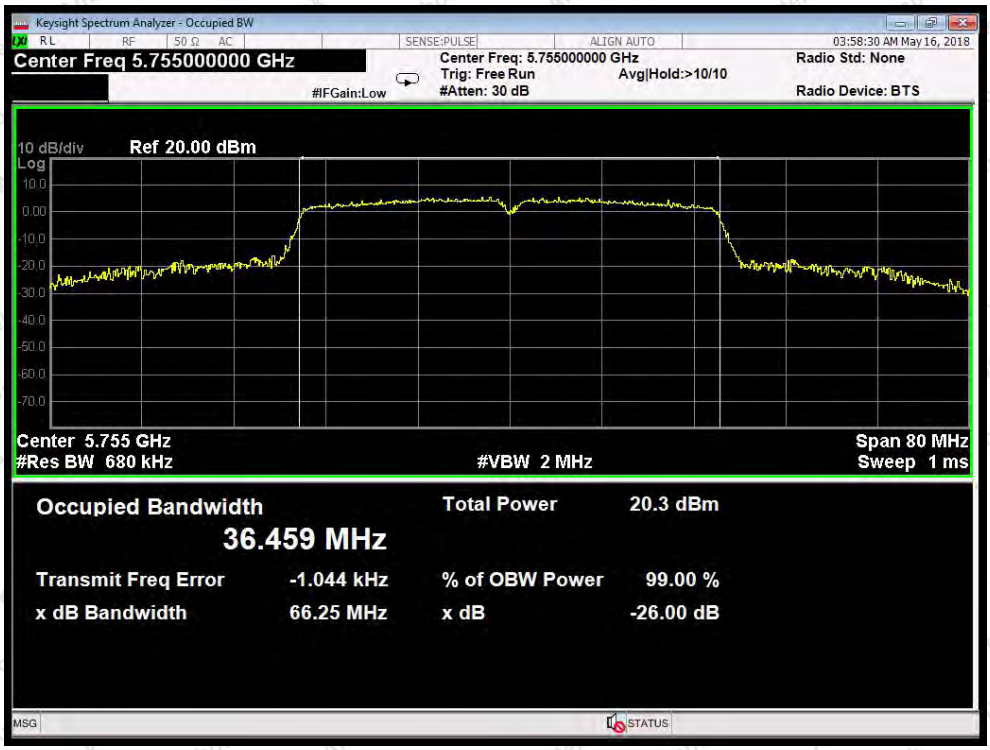
Test Mode: 802.11n20---Low



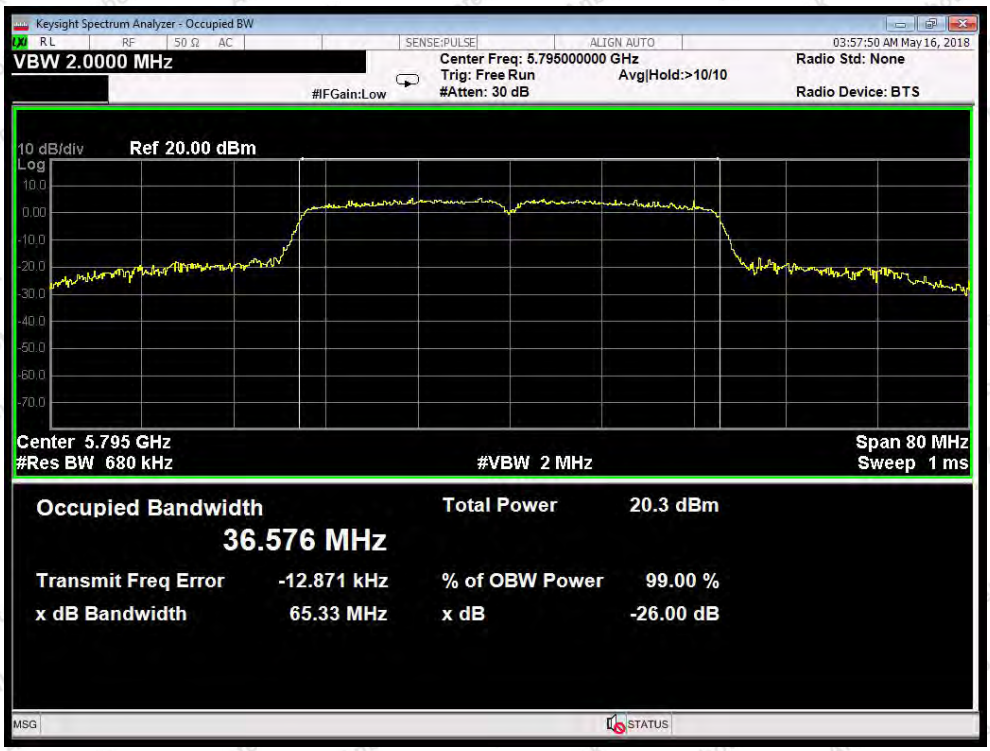
Test Mode: 802.11n20---Middle



Test Mode: 802.11n20---High



Test Mode: 802.11n40---Low



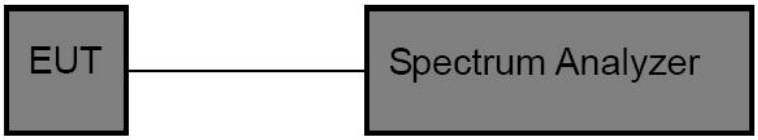
Test Mode: 802.11n40---High

7. Power Spectral Density Test

7.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.407 (a) (3)
Test Limit	not exceed 30dBm/500kHz

7.2. Test Setup



7.3. Test Procedure

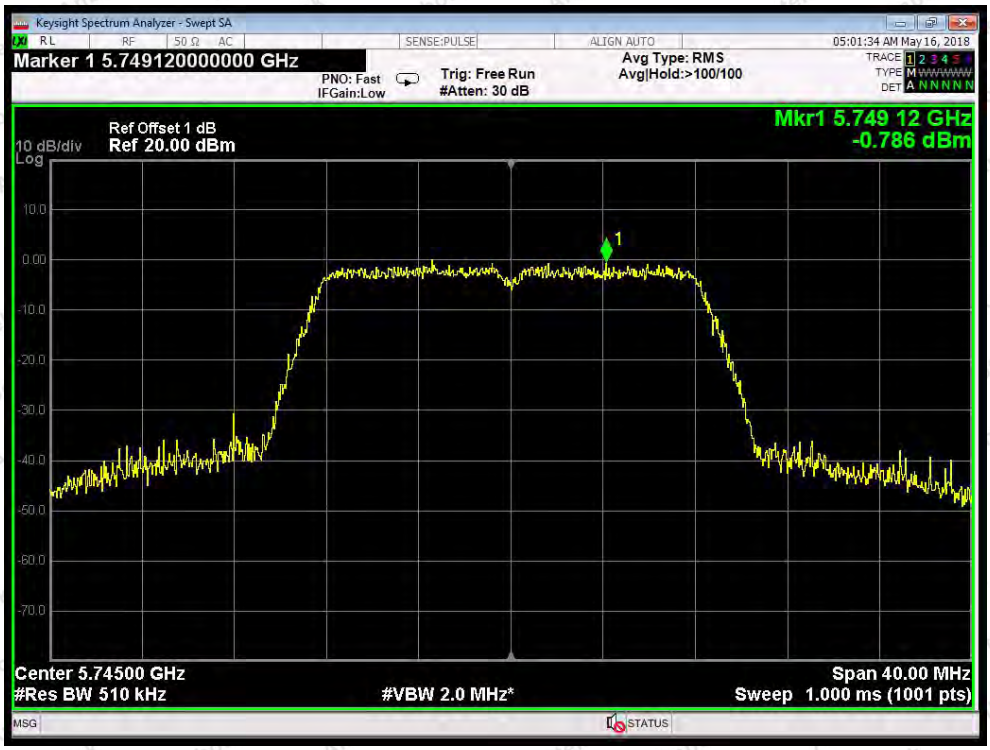
For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 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 =510KHz;
3. Set VBW ≥ 3 RBW;
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;

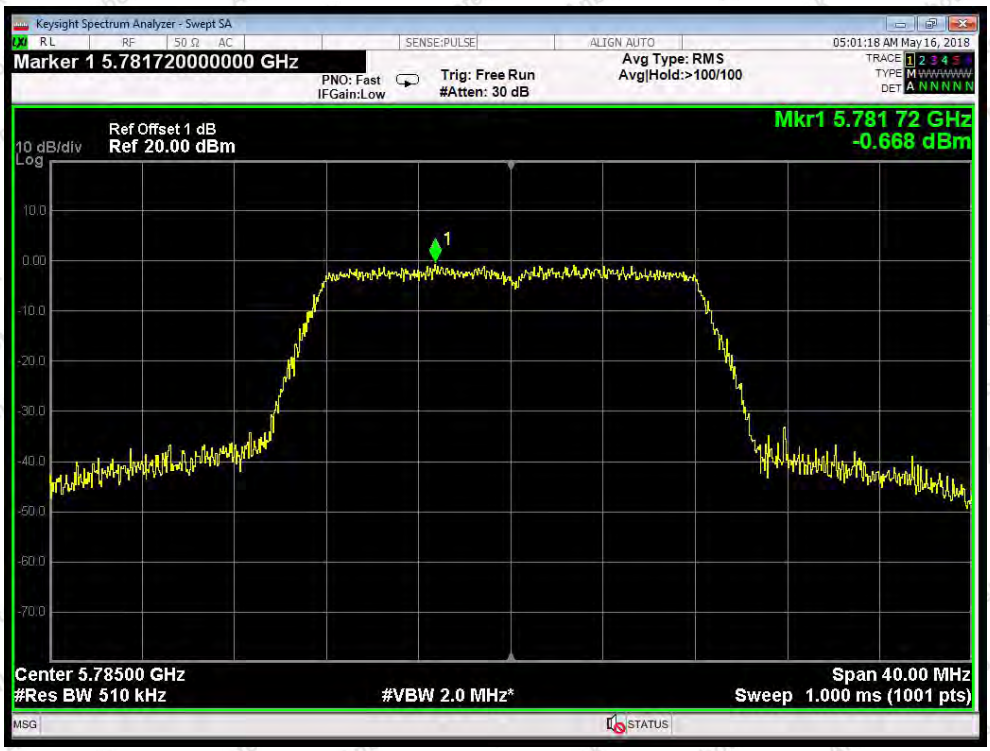
7.4. Test Data

Test Item	:	Power Spectral Density	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 7.6V Battery inside	Temperature	:	24℃
Test Result	:	PASS	Humidity	:	55%RH

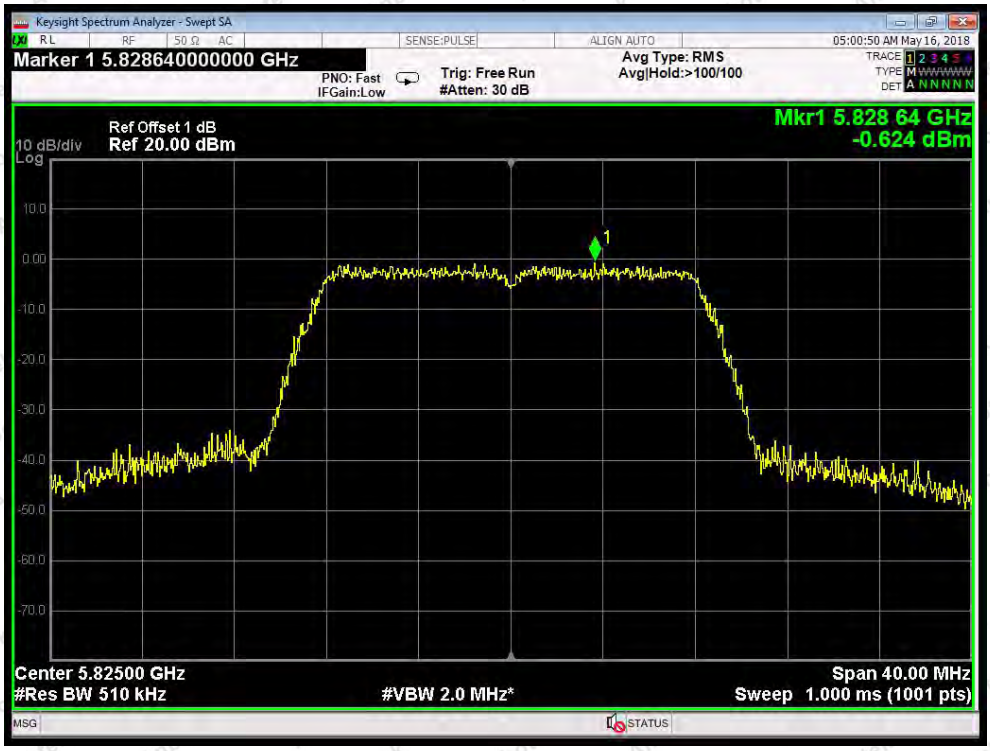
Test Mode	Channel Frequency (MHz)	Final Power Spectral Density (dBm)		Correctional Limit (dBm)	Results
		ANT	SUM		
802.11a	5745	-0.786	N/A	30.00	PASS
	5785	-0.668		30.00	PASS
	5825	-0.624		30.00	PASS
802.11n20	5745	-0.670		30.00	PASS
	5785	**-0.995**		30.00	PASS
	5825	-1.875		30.00	PASS
802.11n40	5755	-3.427		30.00	PASS
	5795	-2.434		30.00	PASS



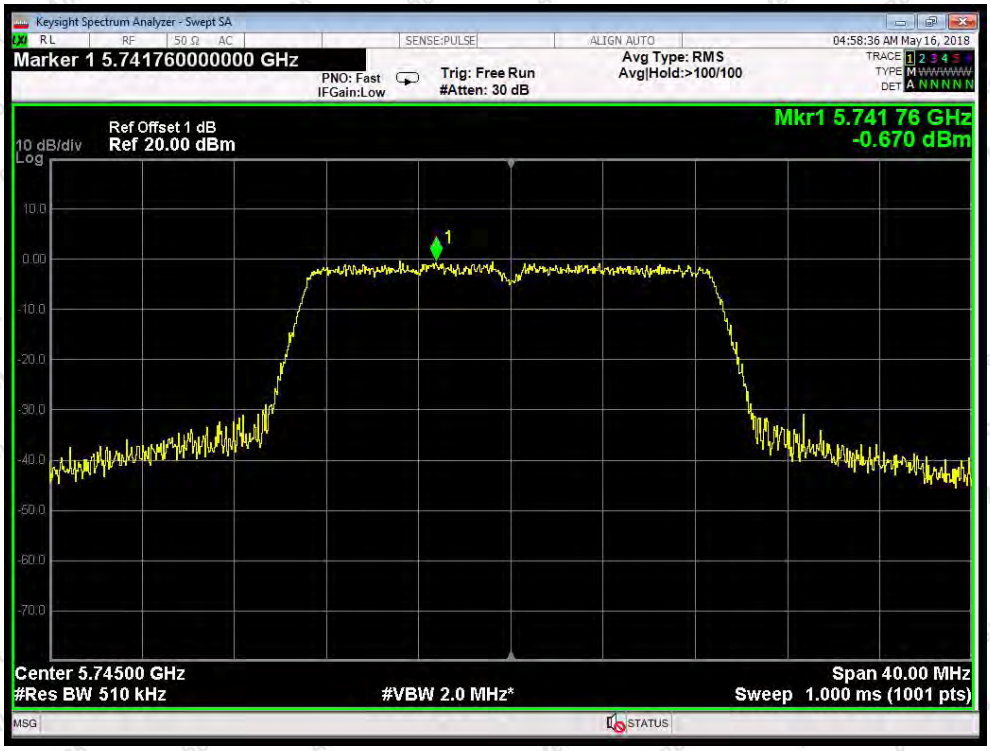
Test Mode: 802.11a--Low



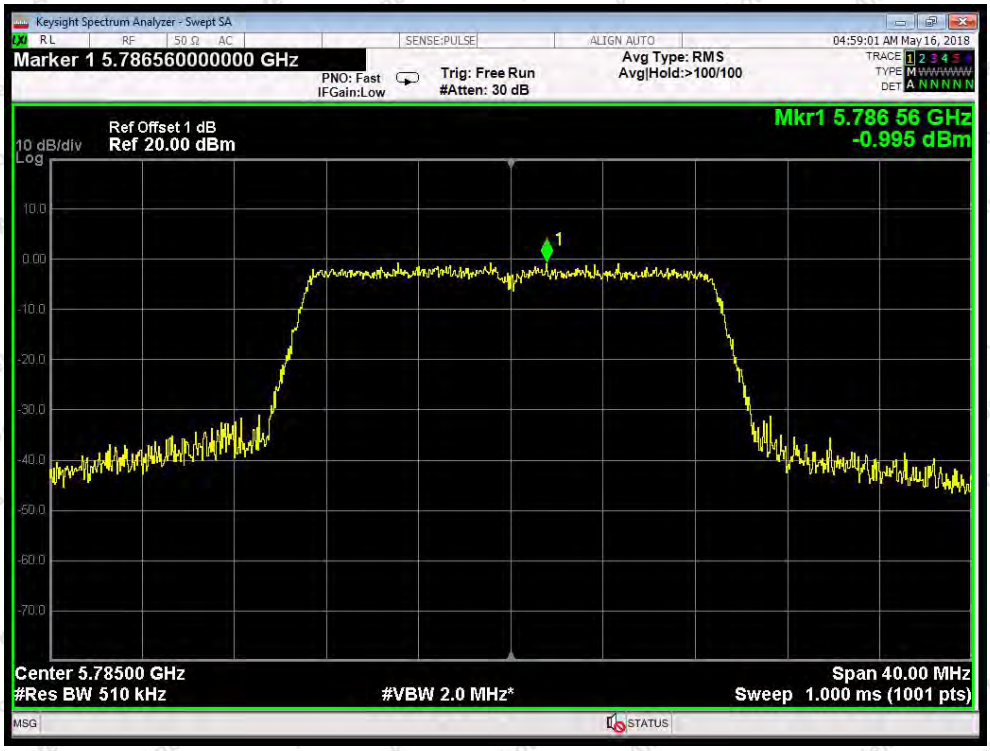
Test Mode: 802.11a---Middle



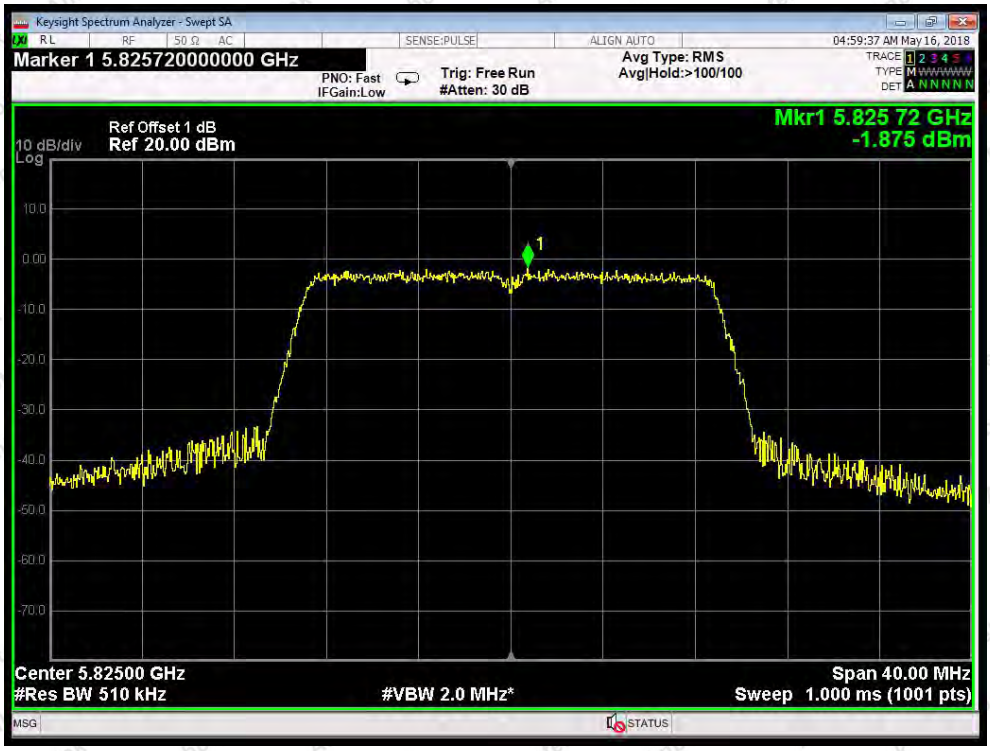
Test Mode: 802.11a---High



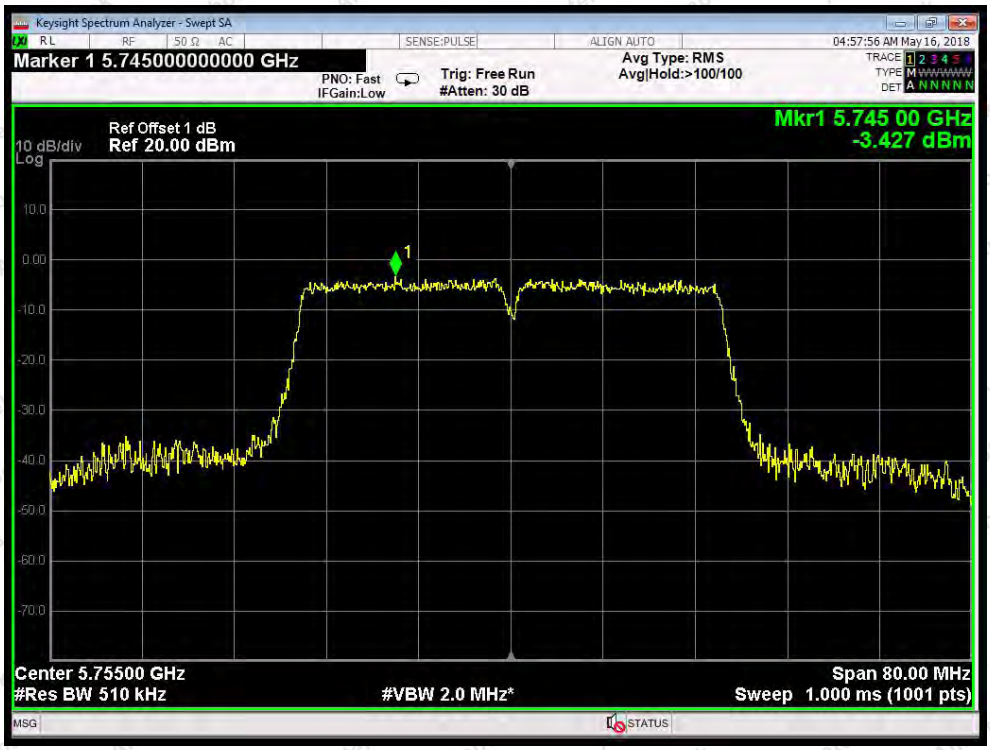
Test Mode: 802.11n20---Low



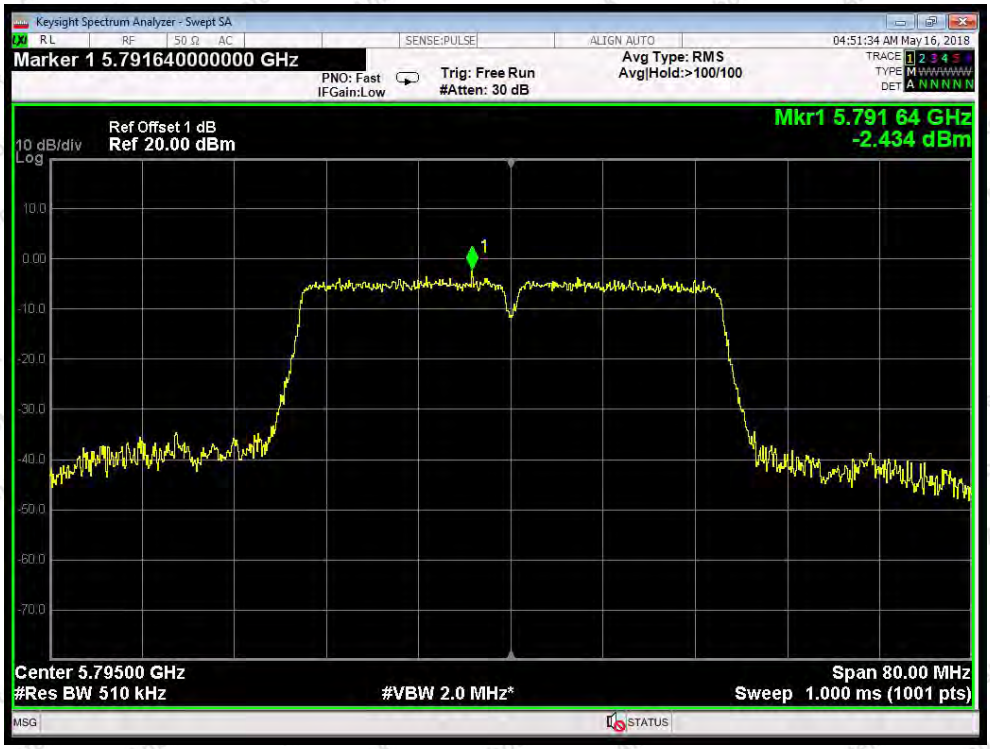
Test Mode: 802.11n20---Middle



Test Mode: 802.11n20---High



Test Mode: 802.11n40---Low



Test Mode: 802.11n40---High

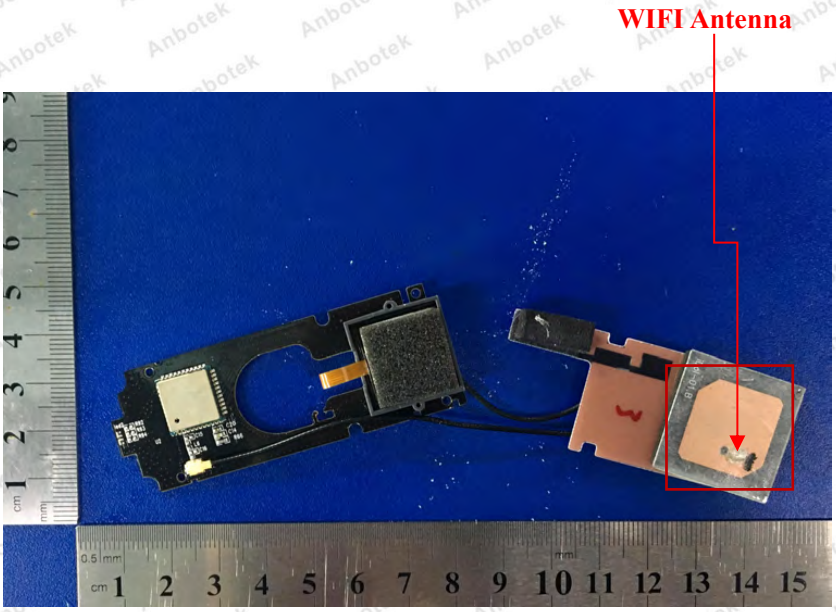
8. Antenna Requirement

8.1. 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: 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

8.2. Antenna Connected Construction

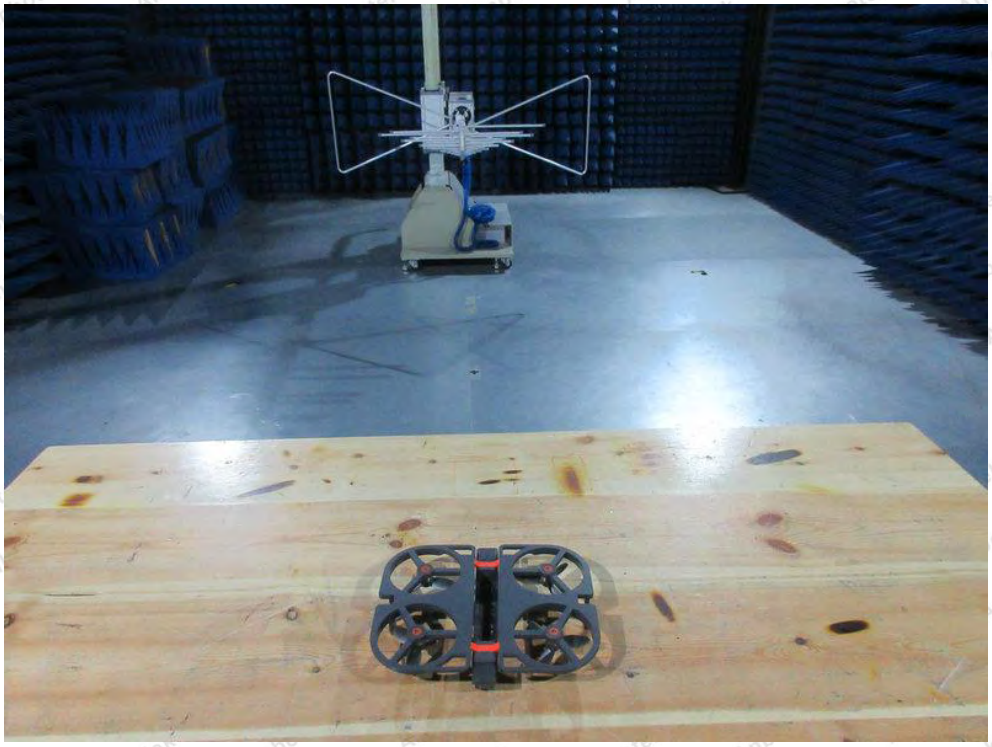
The WIFI antenna is a Ceramic Antenna which permanently attached, and the best case gain of the antenna is 5.0 dBi. It complies with the standard requirement.

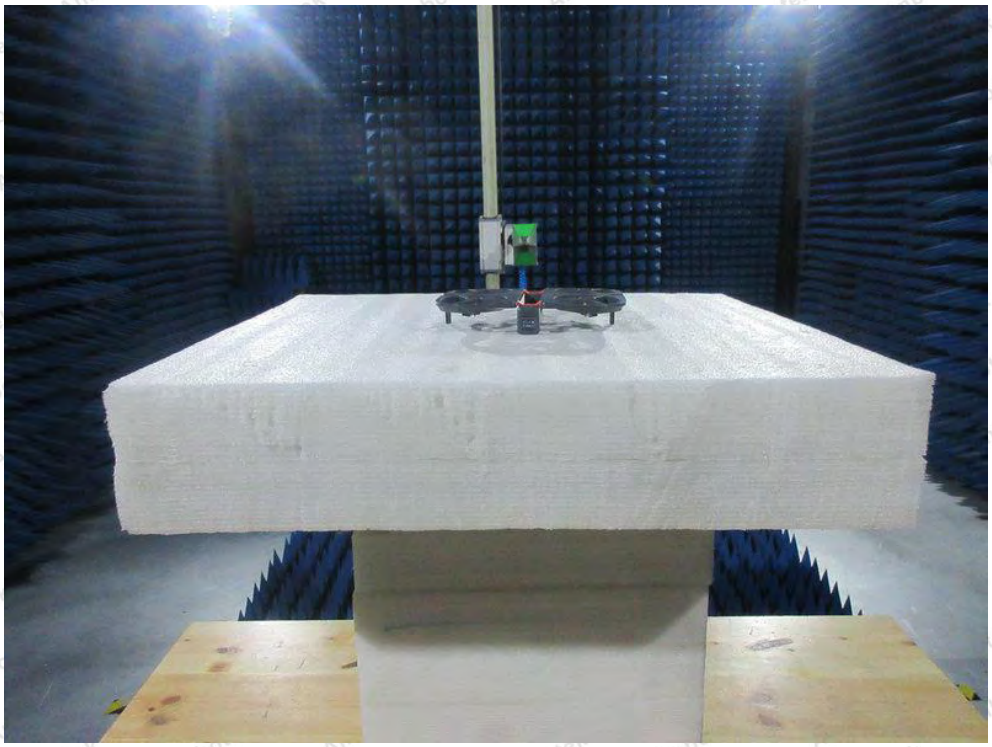


APPENDIX I -- TEST SETUP PHOTOGRAPH

Photo of Power Line Conducted Emission Test

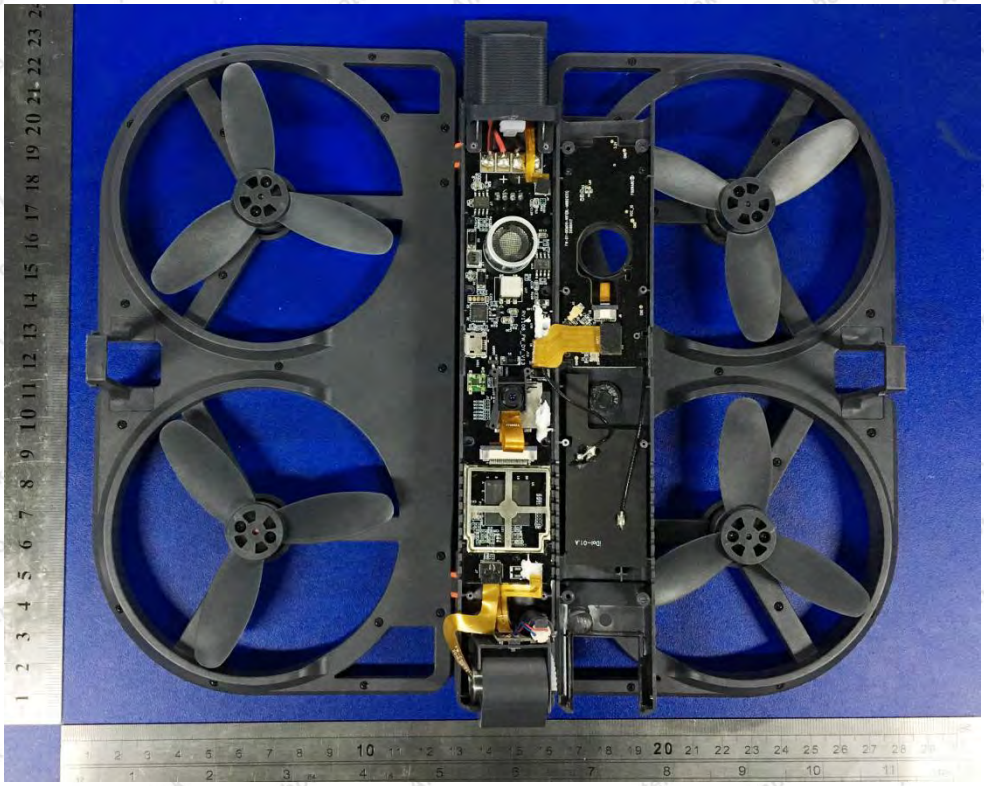
Photo of Radiation Emission Test

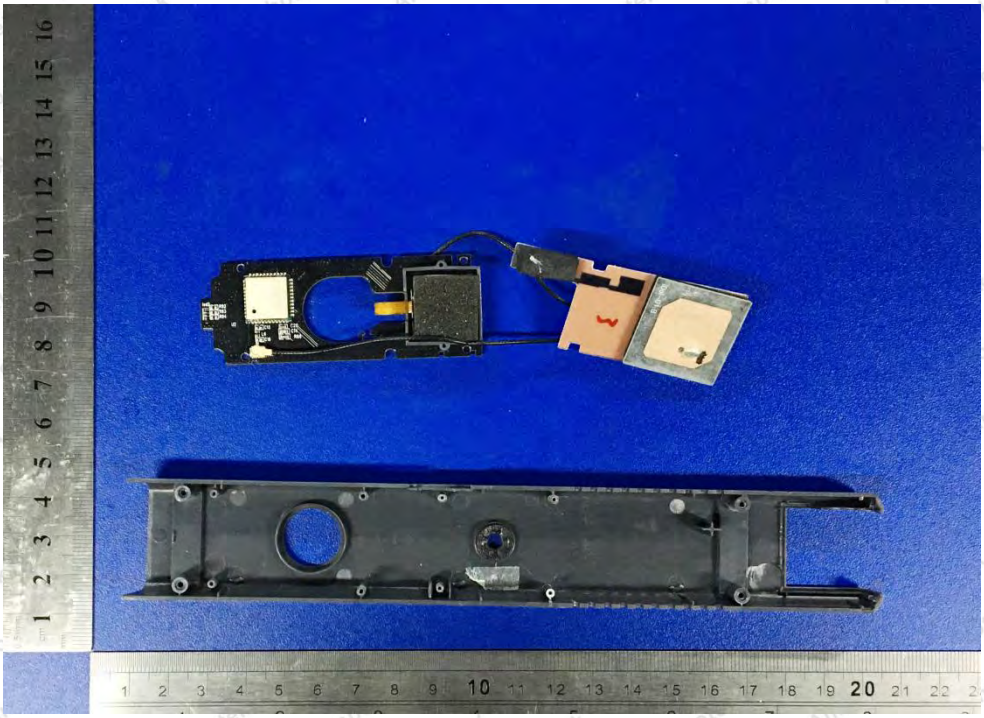


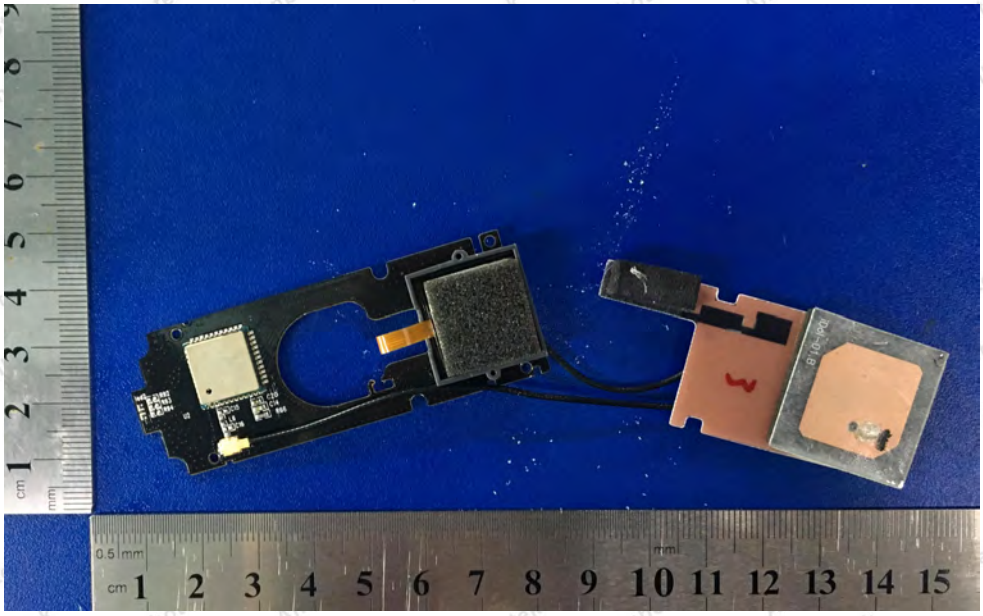


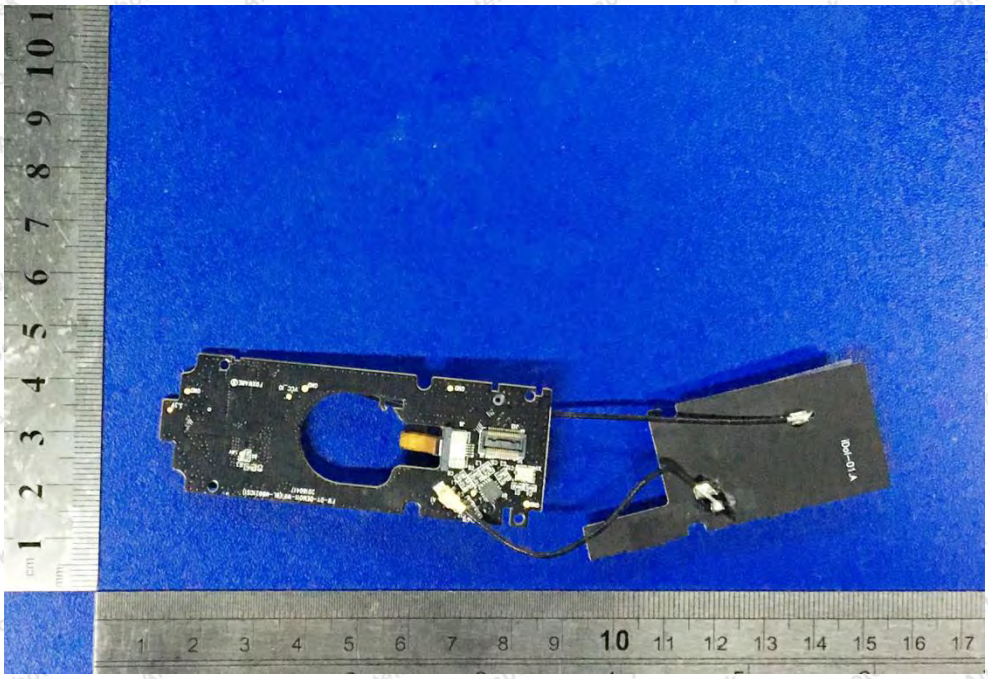
APPENDIX II -- EXTERNAL PHOTOGRAPH

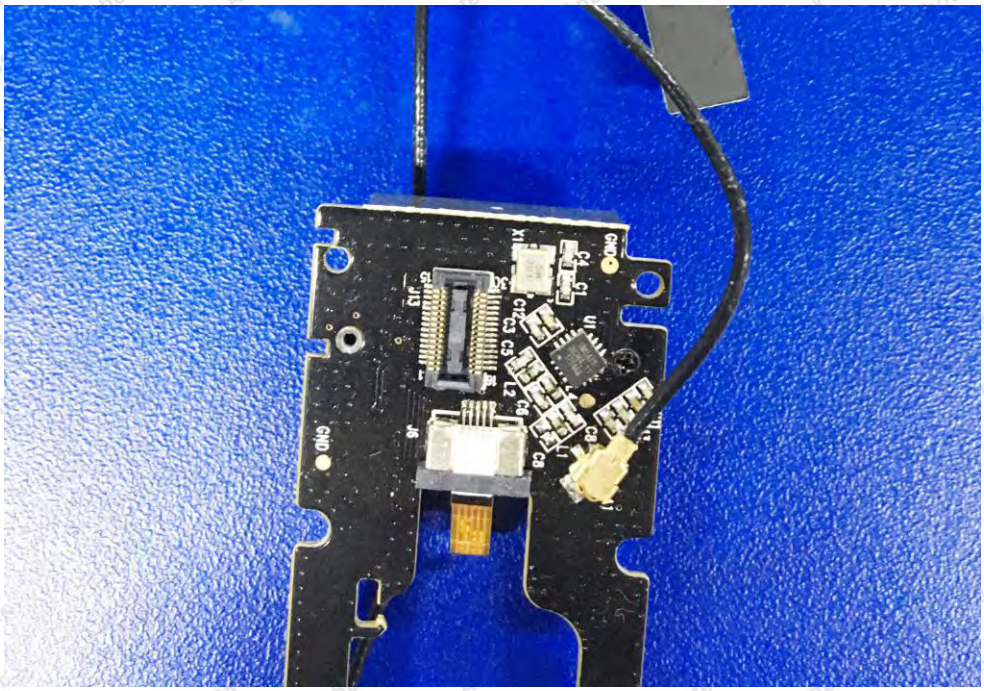
APPENDIX III -- INTERNAL PHOTOGRAPH

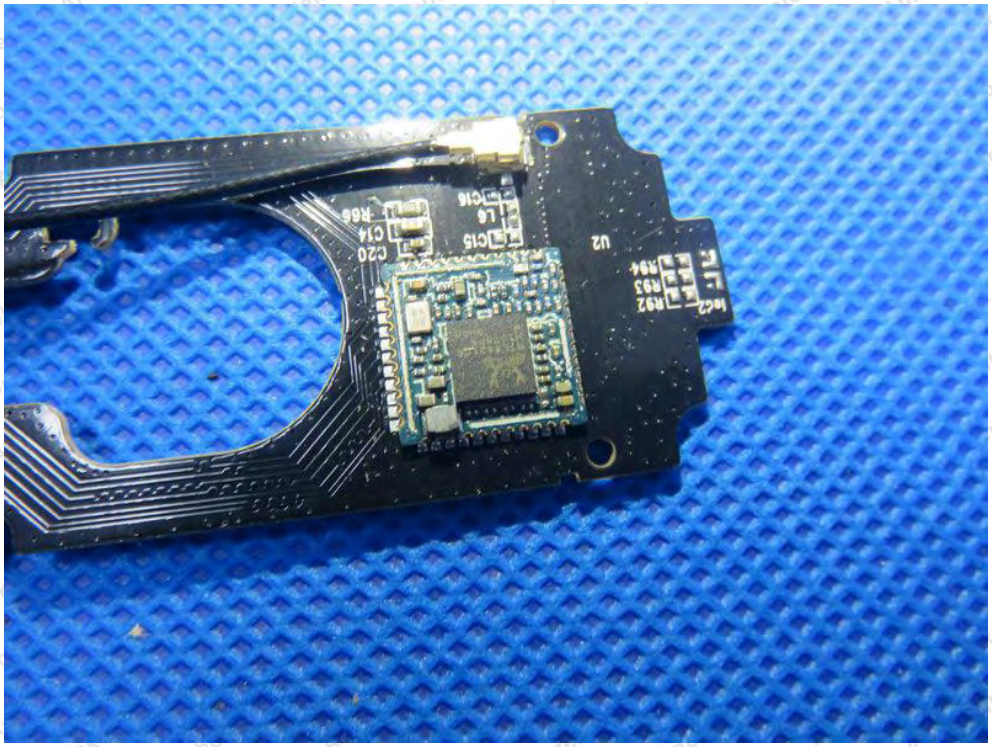


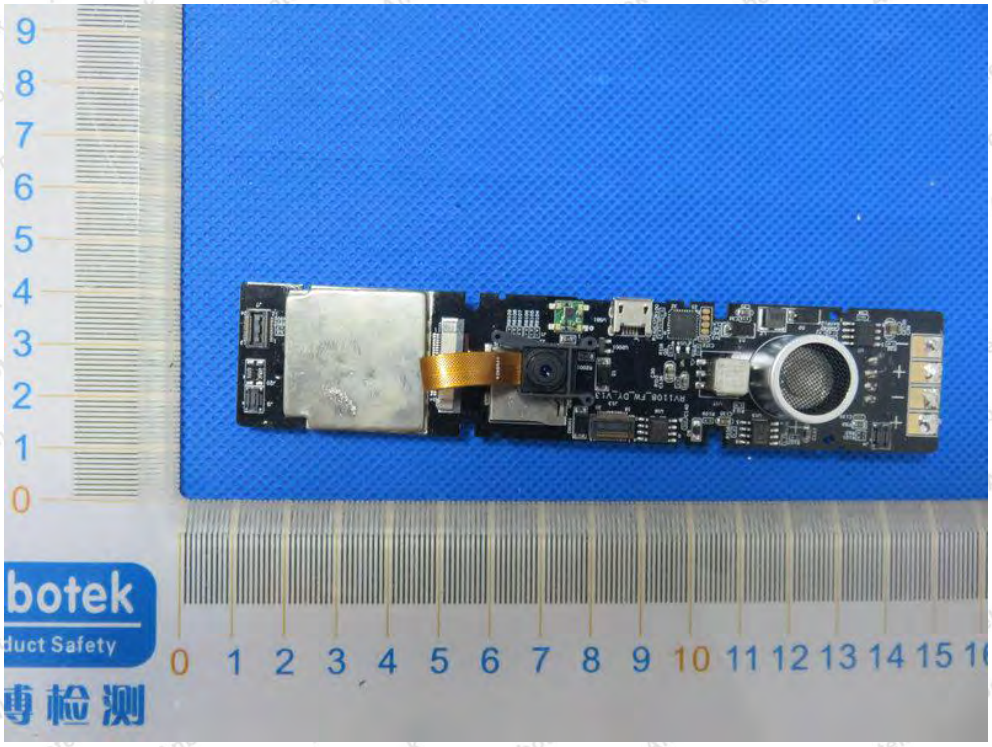


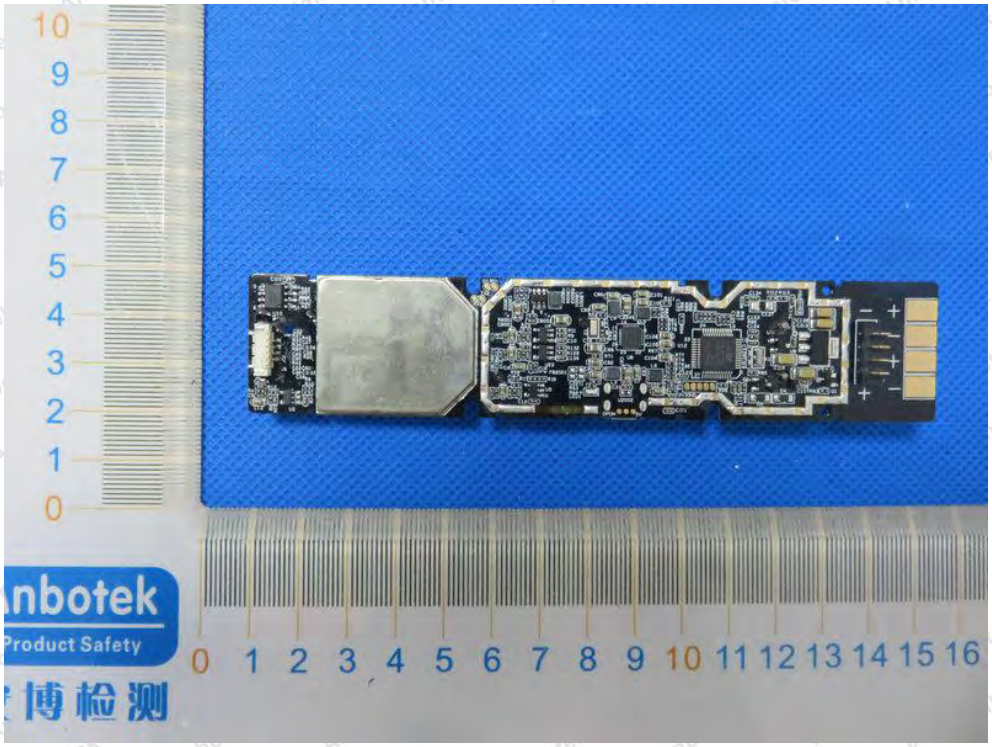


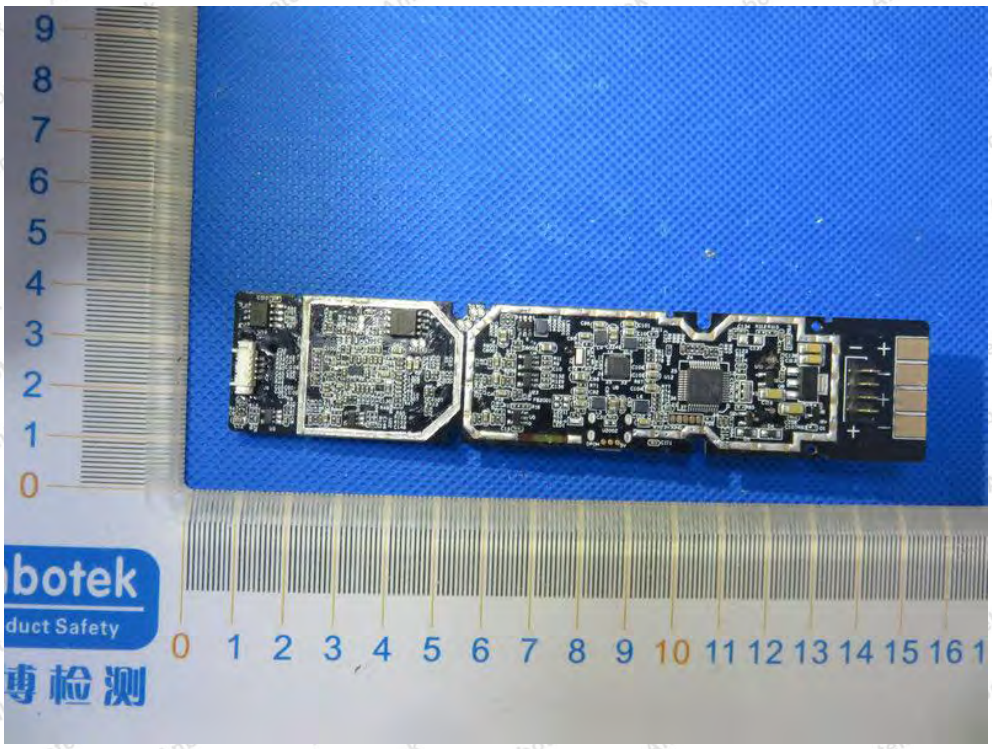


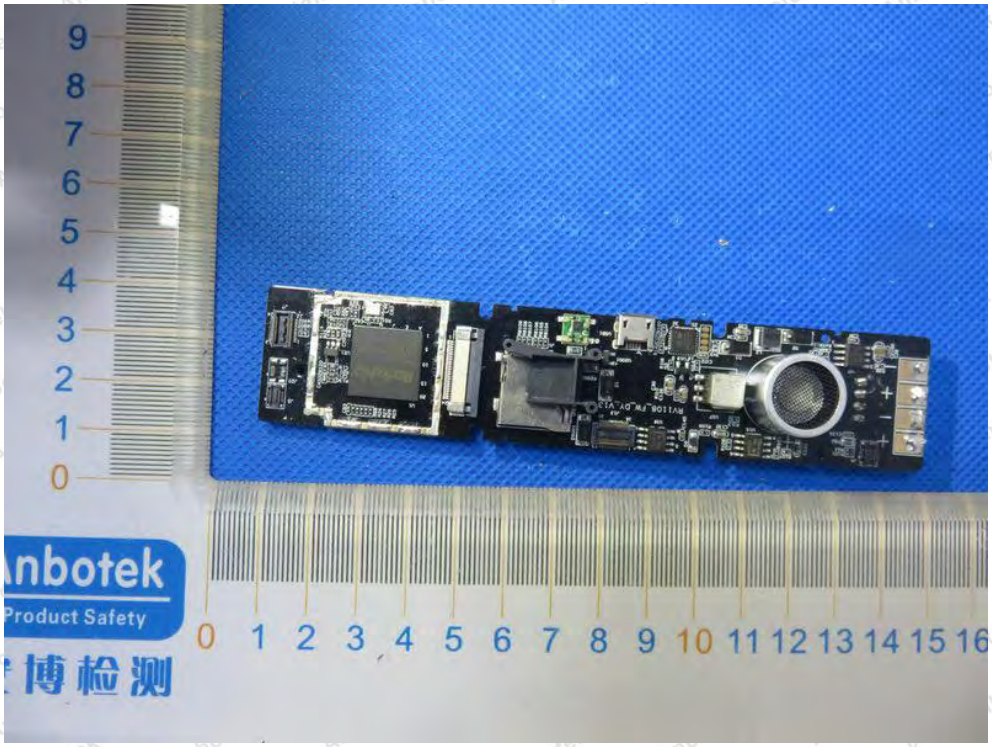


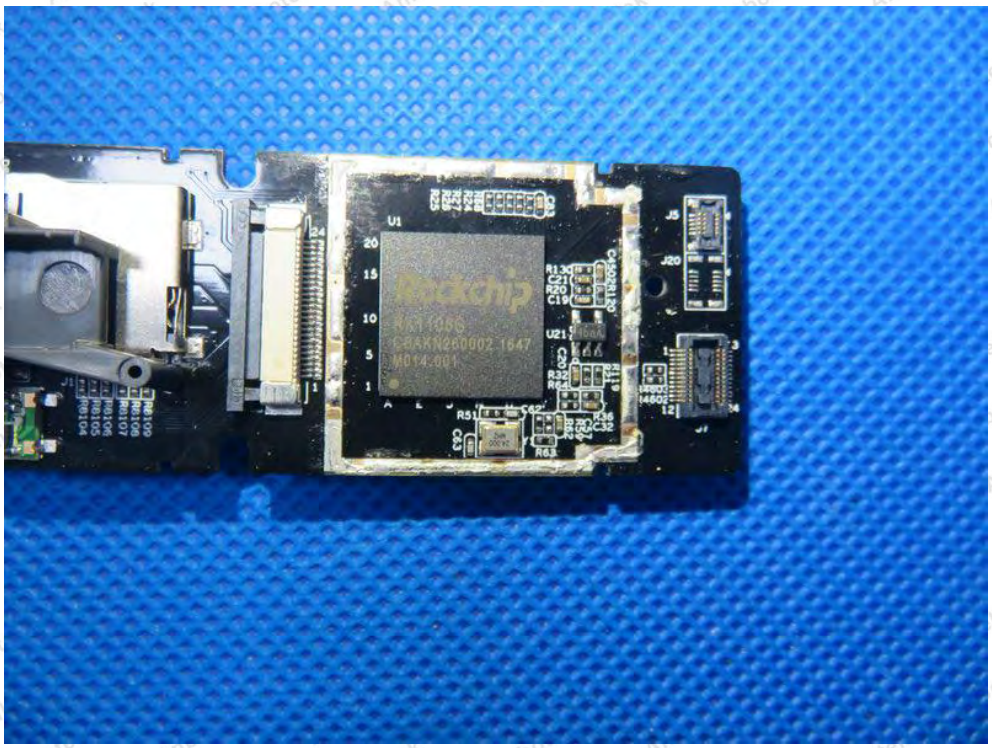


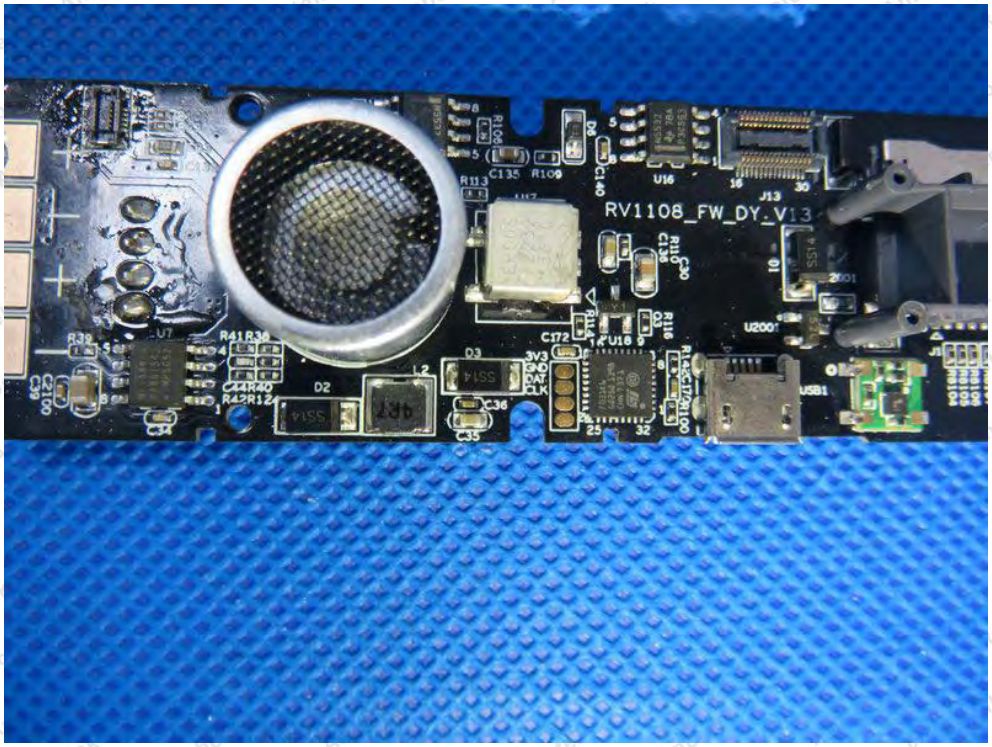


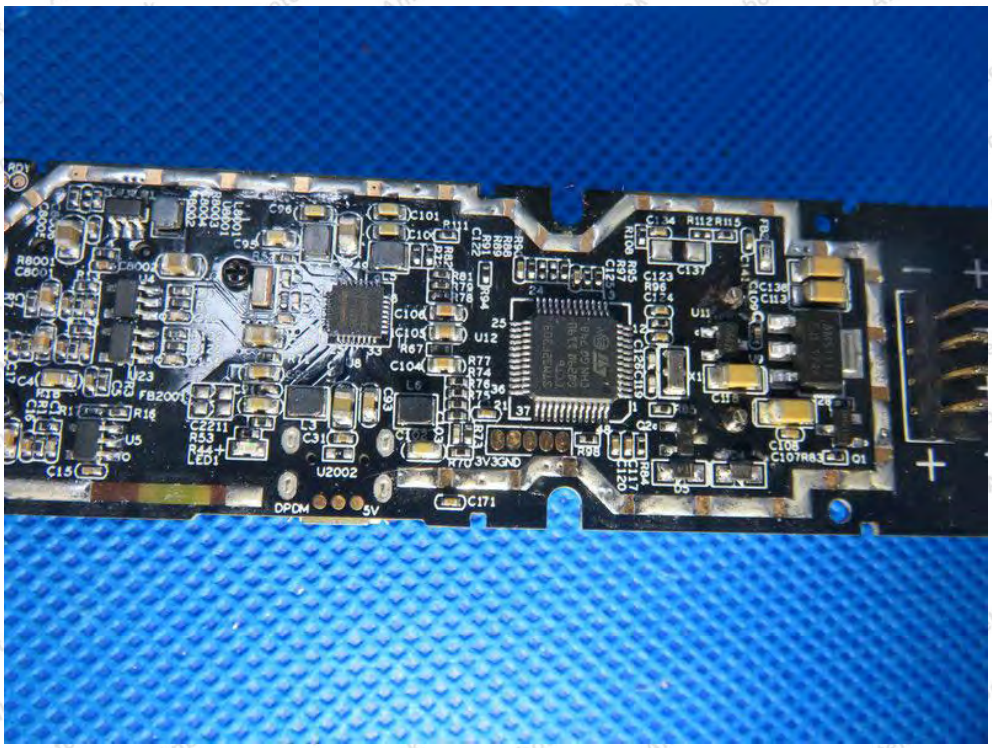


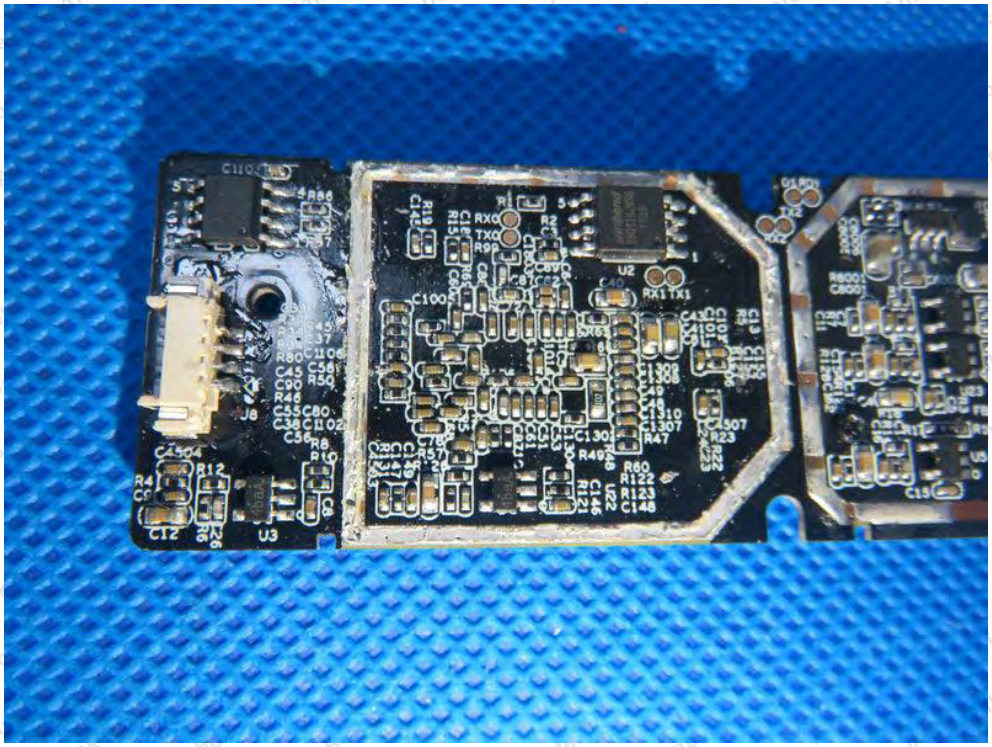


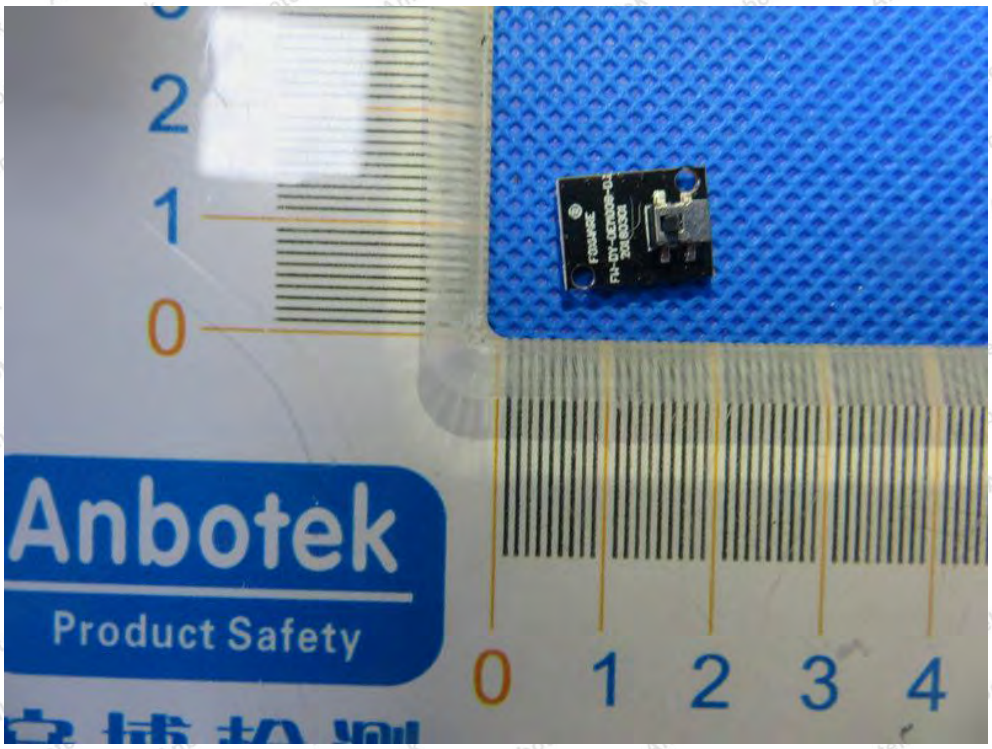





RV1108_FW_DY_V13






Anbotek
Product Safety

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