FCC&IC REPORT
(UNII)

Applicant:	Horizon Hobby, LLC
Address of Applicant:	4105 Fieldstone Rd., Champaign, IL 62822 USA
Equipment Under Test (EUT)	
Product Name:	Sync WiFi Drone
Model No.:	DIDH1100C
Trade mark:	Dromida
FCC ID:	BRWDIDH1100C
Canada IC:	6157A-DIDH1100C
Applicable standards:	FCC CFR Title 47 Part 15 Subpart E Section 15.407 RSS-Gen Issue 5, April 2018 RSS-247 Issue 2, February 2017
Date of sample receipt:	31 Aug., 2018
Date of Test:	31 Aug., to 06 Sep., 2018
Date of report issued:	07 Sep., 2018
Test Result:	PASS*

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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2 Version

Version No.	Date	Description
00	*07 Sep., 2018*	*Original*

Tested by: Carey Chen ***Date:*** *07 Sep., 2018*

Test Engineer

Reviewed by: Winner Zhang ***Date:*** *07 Sep., 2018*

Project Engineer

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4 Test Summary

Test Item	Section in CFR 47	Section in CFR 47	Test Result
Antenna requirement	15.203	RSS-GEN Section 6.8	Pass
AC Power Line Conducted Emission	15.207	RSS-GEN Section 8.8	N/A
MAX Conducted Output Power	15.407 (a)(3)	RSS-247 Section 6.2.4.1	Pass
6dB Bandwidth 99% Occupied Bandwidth	15.407 (e)	RSS-247 Section 6.2.4.1 RSS-GEN Section 6.7	Pass
Power Spectral Density	15.407 (a)(3)	RSS-247 Section 6.2.4.1	Pass
Band Edge	15.407(b) (4)	RSS-GEN Section 8.9 8.10 RSS-247 Section 6.2.4.2	Pass
Spurious Emission	15.407 (b) & 15.205 & 15.209	RSS-GEN Section 8.9 8.10 RSS-247 Section 6.2.4.2	Pass
Frequency Stability	15.407(g)	RSS-Gen section 6.11 8.11	Pass
Pass: The EUT complies with the essential requirements in the standard. *N/A: N/A: Not Applicable.*			

5 General Information

5.1 Client Information

Applicant:	Horizon Hobby, LLC
Address:	4105 Fieldstone Rd., Champaign, IL 62822 USA
Manufacturer	Horizon Hobby, LLC
Address:	4105 Fieldstone Rd., Champaign, IL 62822 USA
Factory:	ShenZhen Yitianfu Electronics Technology Co., Ltd
Address:	3F, Bldg E, Jinchangda Technological Park, ZhangKengjin, Baoan District, ShenZhen 518110,China

5.2 General Description of E.U.T.

Product Name:	Sync WiFi Drone
Model No.:	DIDH1100C
Operation Frequency:	5745 MHz ~ 5825 MHz
Channel numbers:	802.11a/802.11n20: 5
Channel separation:	802.11a/802.11n20: 20MHz
Modulation technology (IEEE 802.11a):	BPSK, QPSK, 16-QAM, 64-QAM
Modulation technology (IEEE 802.11n):	BPSK, QPSK, 16-QAM, 64-QAM
Data speed (IEEE 802.11a):	6Mbps, 9Mbps,12Mbps,18Mbps, 24Mbps, 36Mbps, 48Mbps, 54Mbps
Data speed (IEEE 802.11n20):	MCS0: 6.5Mbps, MCS1:13Mbps,MCS2:19.5Mbps, MCS3:26Mbps, MCS4:39Mbps, MCS5:52Mbps, MCS6:58.5Mbps, MCS7:65Mbps
Antenna Type:	Internal Antenna
Antenna gain:	2.0 dBi
Power supply:	Rechargeable Li-Po polymer Battery DC3.7V/900mAh
USB adapter:	Model No.: DROMIDA Input: DC 5V

Remark:
Antenna number is 2,
802.11a is SISO mode only
802.11n20 is MIMO mode only
The transmit signals are completely uncorrelated, so the Directional gain = GANT=2dBi.

Operation Frequency each of channel	
Band 4	
802.11a/802.11n20	
Channel	Frequency
149	5745MHz
153	5765MHz
157	5785MHz
161	5805MHz
165	5825MHz

Note:
In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Band 4	
802.11a/802.11n20	
Channel	Frequency
Lowest channel	5745MHz
Middle channel	5785MHz
Highest channel	5825MHz

5.3 Test environment and test mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Continuously transmitting mode	Keep the EUT in 100% duty cycle transmitting with modulation.
We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:	
Per-scan all kind of data rate, and found the follow list were the worst case.	
Mode	Data rate
802.11a	6 Mbps
802.11n20	6.5 Mbps

5.4 Description of Support Units

N/A

5.5 Measurement Uncertainty

Parameters	Expanded Uncertainty
Conducted Emission (9kHz ~ 30MHz)	±2.22 dB (k=2)
Radiated Emission (9kHz ~ 30MHz)	±2.76 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	±4.28 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	±5.72 dB (k=2)
Radiated Emission (18GHz ~ 40GHz)	±2.88 dB (k=2)

5.6 Related Submittal(s) / Grant (s)

This is an original grant, no related submittals and grants.

5.7 Laboratory Facility

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

- **FCC - Registration No.: 727551**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC (Federal Communications Commission). The Registration No. is 727551.

- **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf

5.8 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info@ccis-cb.com, Website: http://www.ccis-cb.com

5.9 Test Instruments list

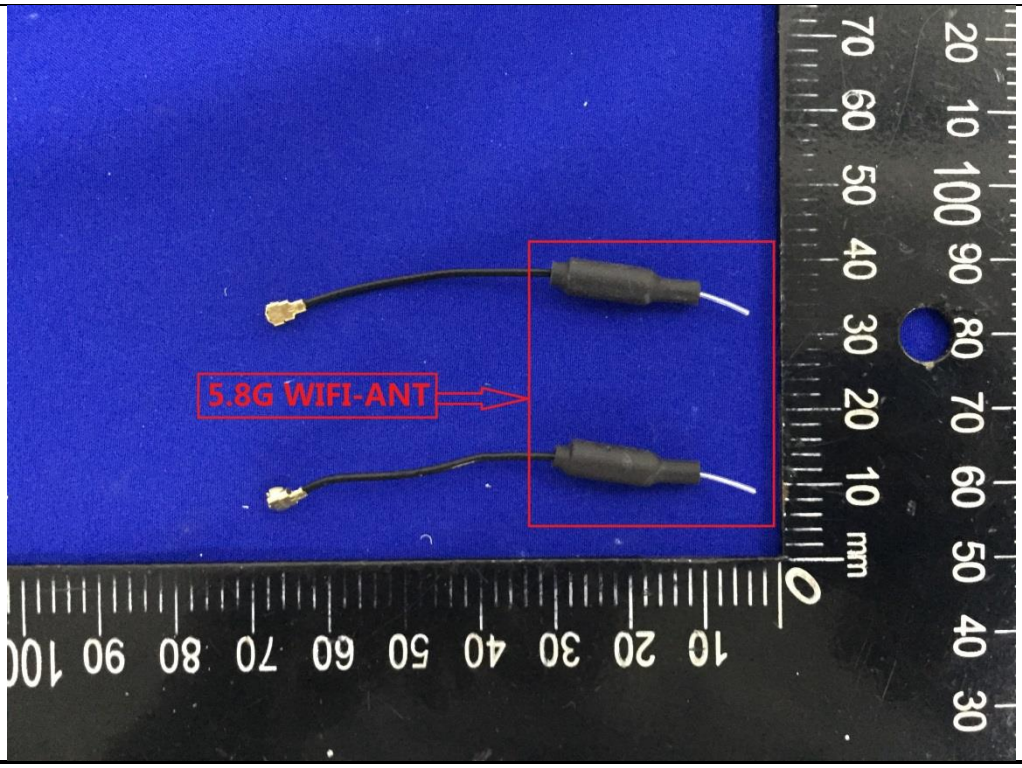
Radiated Emission:					
Test Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
3m SAC	SAEMC	9m*6m*6m	966	07-22-2017	07-21-2020
Loop Antenna	SCHWARZBECK	FMZB1519B	00044	03-16-2018	03-15-2019
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-16-2018	03-15-2019
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-16-2018	03-15-2019
EMI Test Software	AUDIX	E3	6.110919b	N/A	N/A
Pre-amplifier	HP	8447D	2944A09358	03-07-2018	03-06-2019
Pre-amplifier	CD	PAP-1G18	11804	03-07-2018	03-06-2019
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-07-2018	03-06-2019
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-07-2018	03-06-2019
Cable	ZDECL	Z108-NJ-NJ-81	1608458	03-07-2018	03-06-2019
Cable	MICRO-COAX	MFR64639	K10742-5	03-07-2018	03-06-2019
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-07-2018	03-06-2019

Conducted Emission:					
Test Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
EMI Test Receiver	Rohde & Schwarz	ESCI	101189	03-07-2018	03-06-2019
Pulse Limiter	SCHWARZBECK	OSRAM 2306	9731	03-07-2018	03-06-2019
LISN	CHASE	MN2050D	1447	03-19-2018	03-18-2019
LISN	Rohde & Schwarz	ESH3-Z5	8438621/010	07-21-2018	07-20-2019
Cable	HP	10503A	N/A	03-07-2018	03-06-2019
EMI Test Software	AUDIX	E3	6.110919b	N/A	N/A

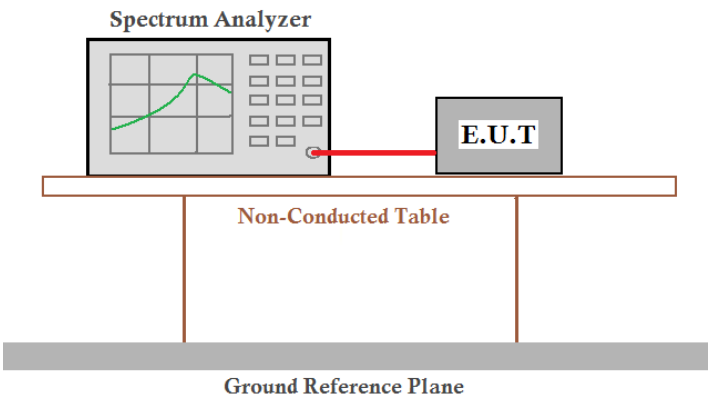
6 Test results and Measurement Data

6.1 Antenna requirement

Standard requirement:	FCC Part15 E Section 15.203
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. 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.	
E.U.T Antenna:	
The 5.8G WiFi antenna is an Internal antenna which cannot replace by end-user, the best case gain of the antenna is 2 dBi.	



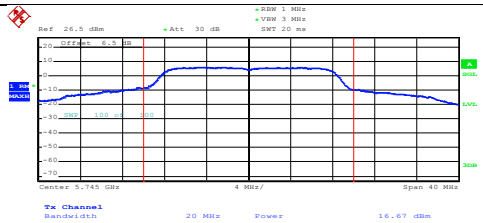
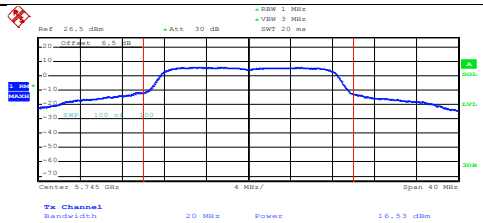
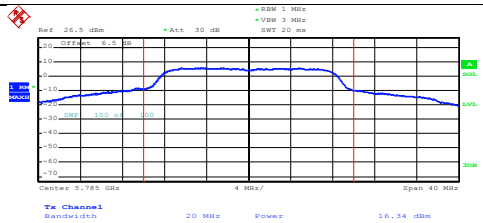
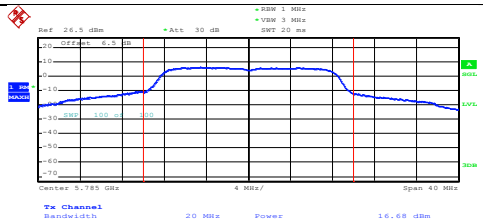
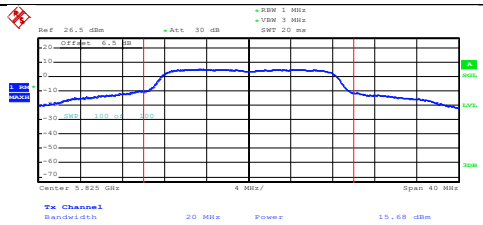
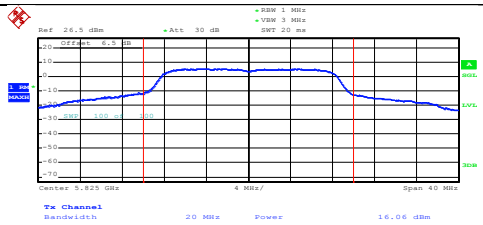
6.2 Max Conducted Output Power

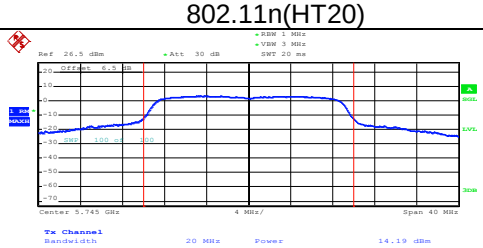
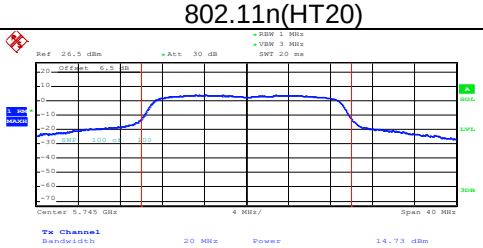
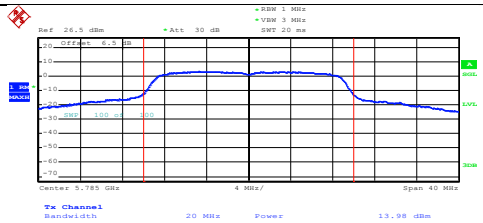
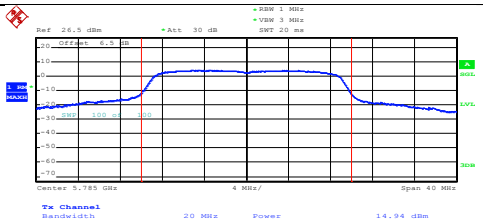
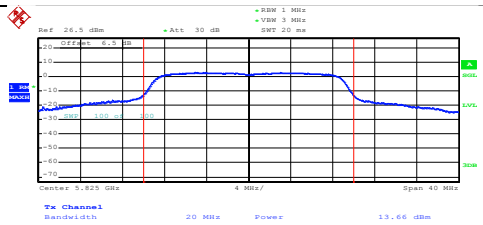
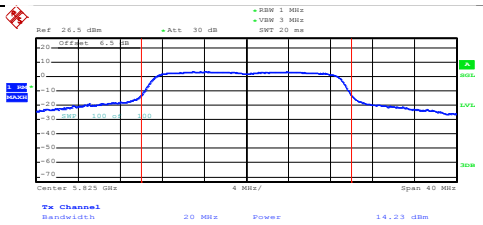
Test Requirement:	FCC Part15 E Section 15.407 (a)(3) ;RSS-247 Section 6.2.4.1
Test Method:	ANSI C63.10: 2013, KDB789033
Limit:	30dBm
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

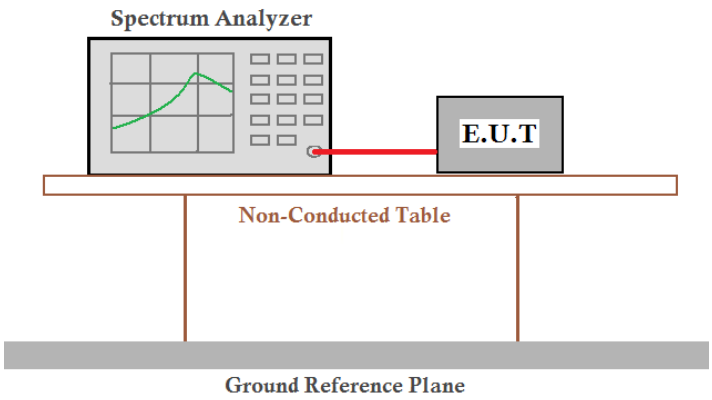
Band 4						
Mode	Test CH	Ant. Port	Conducted Output power (dBm)	Total Power (dBm)	Limit (dBm)	Result
802.11a	Lowest	ANT 1	16.67	/	30.00	Pass
		ANT 2	16.53			
	Middle	ANT 1	16.34	/		
		ANT 2	16.68			
	Highest	ANT 1	15.68	/		
		ANT 2	16.06			
802.11n20	Lowest	ANT 1	14.19	17.48	30.00	Pass
		ANT 2	14.73			
	Middle	ANT 1	13.98	17.50		
		ANT 2	14.94			
	Highest	ANT 1	13.66	16.96		
		ANT 2	14.23			

Test plot as follows:
Band 4:

ANT Port 1	ANT Port 2
802.11a	802.11a
 Date: 6.SEP.2018 21:03:06	 Date: 6.SEP.2018 20:59:03
Lowest channel	Lowest channel
 Date: 6.SEP.2018 21:02:47	 Date: 6.SEP.2018 20:59:21
Middle channel	Middle channel
 Date: 6.SEP.2018 21:02:29	 Date: 6.SEP.2018 20:59:38
Highest channel	Highest channel

ANT Port 1	ANT Port 2
802.11n(HT20)	802.11n(HT20)
 Date: 6.SEP.2018 21:01:22	 Date: 6.SEP.2018 21:00:51
Lowest channel	Lowest channel
 Date: 6.SEP.2018 21:01:38	 Date: 6.SEP.2018 21:00:33
Middle channel	Middle channel
 Date: 6.SEP.2018 21:02:03	 Date: 6.SEP.2018 21:00:03
Highest channel	Highest channel

6.3 Occupy Bandwidth

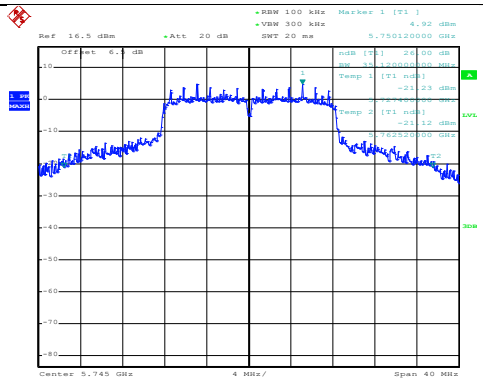
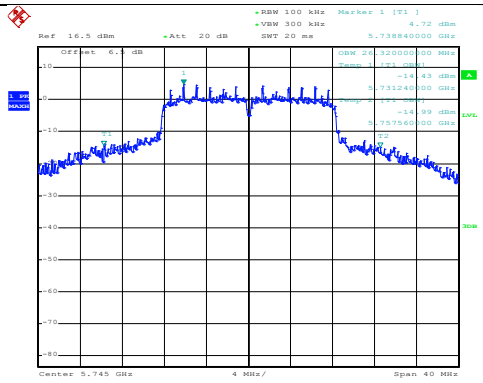
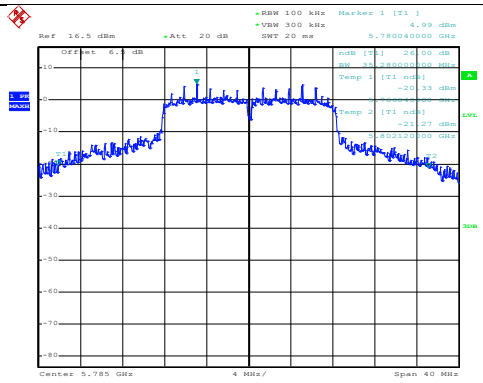
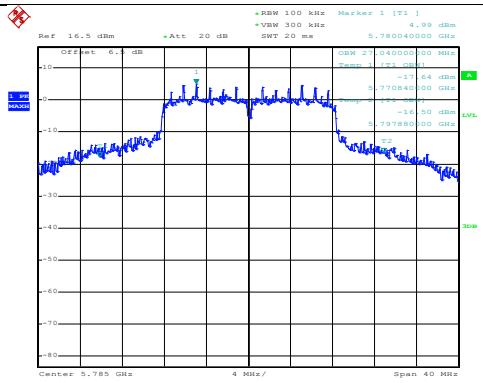
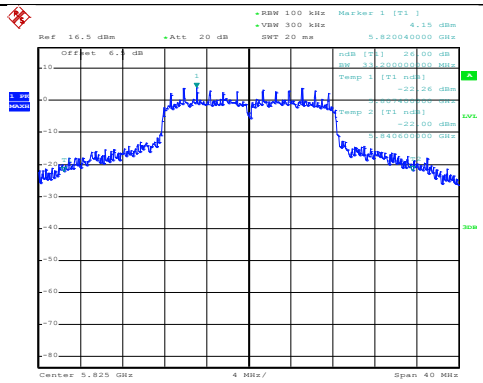
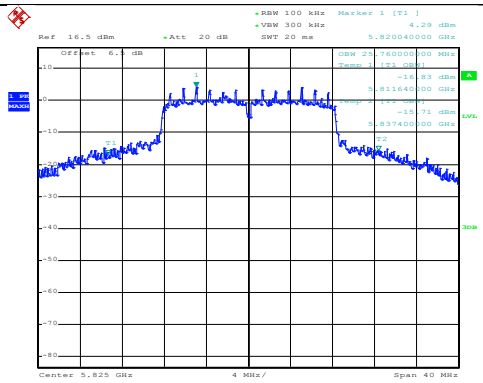
Test Requirement:	FCC Part15 E Section 15.407 (e) RSS-247 Section 6.2.4.1 RSS-GEN Section 6.7
Test Method:	ANSI C63.10:2013 and KDB 789033
Limit:	Band 4: N/A (26dB Emission Bandwidth and 99% Occupy Bandwidth) Band 4: >500kHz (6dB Bandwidth)
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

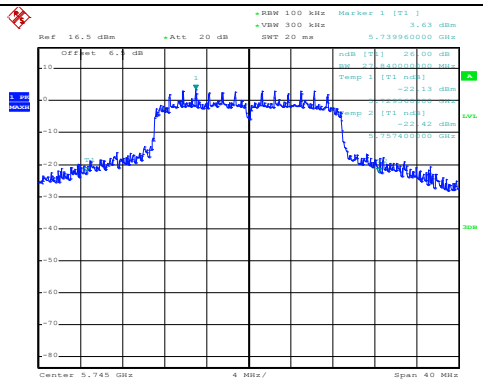
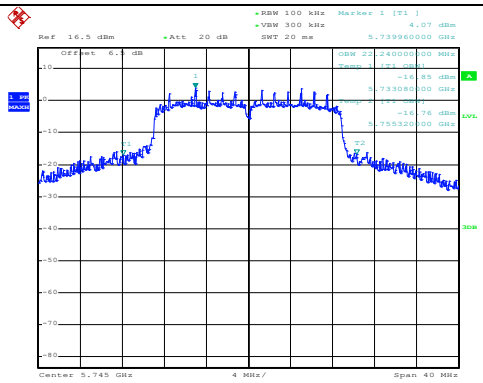
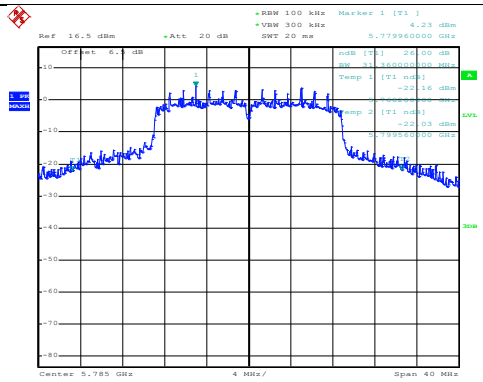
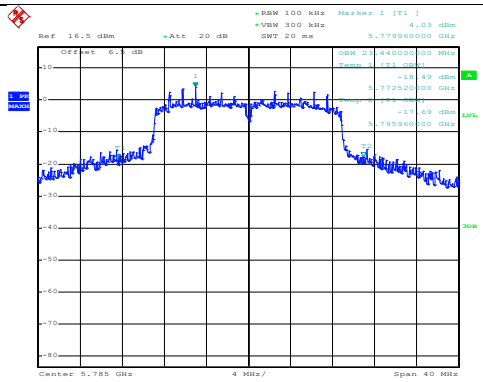
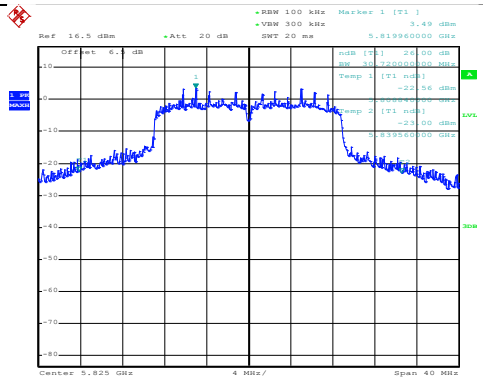
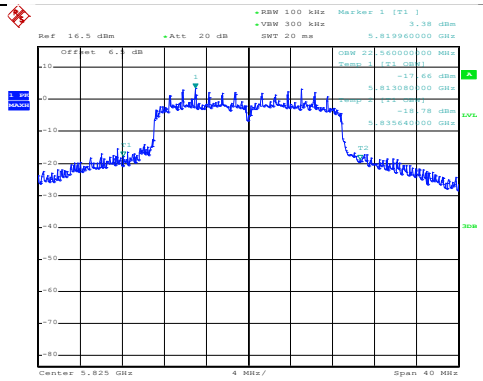
Measurement Data:

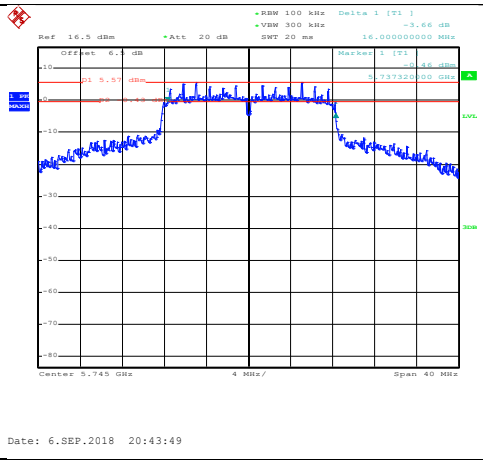
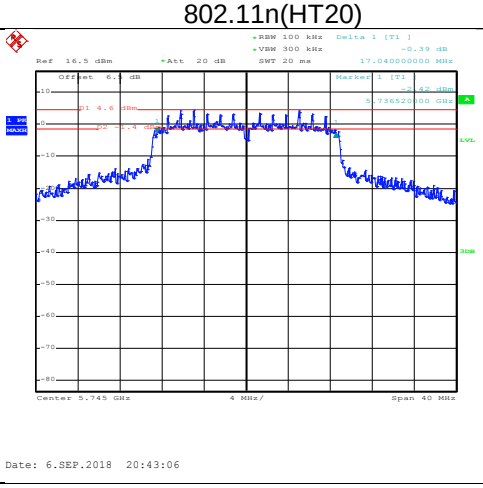
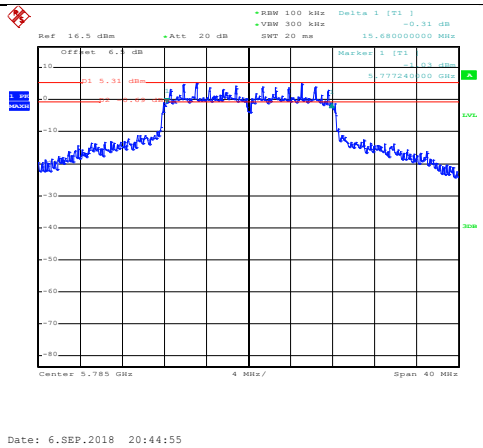
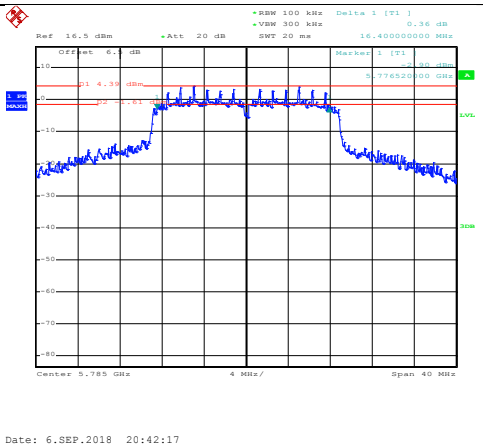
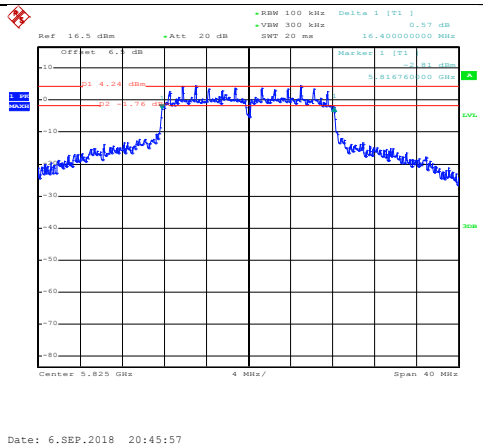
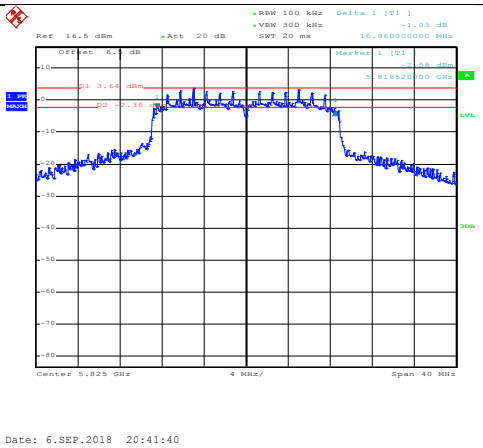
Band 4:

Test Channel	26dB Emission Bandwidth (MHz)		Limit	Result
	802.11a	802.11n (HT20)		
Lowest	35.12	27.84	N/A	PASS
Middle	35.28	31.36		
Highest	33.20	30.72		
Test Channel	99% Occupy Bandwidth (MHz)		Limit	Result
	802.11a	802.11n (HT20)		
Lowest	26.32	22.24	N/A	PASS
Middle	27.04	23.44		
Highest	25.76	22.56		
Test Channel	6dB Emission Bandwidth (MHz)		Limit	Result
	802.11a	802.11n (HT20)		
Lowest	16.00	17.04	>500kHz	PASS
Middle	15.68	16.40		
Highest	16.40	16.96		

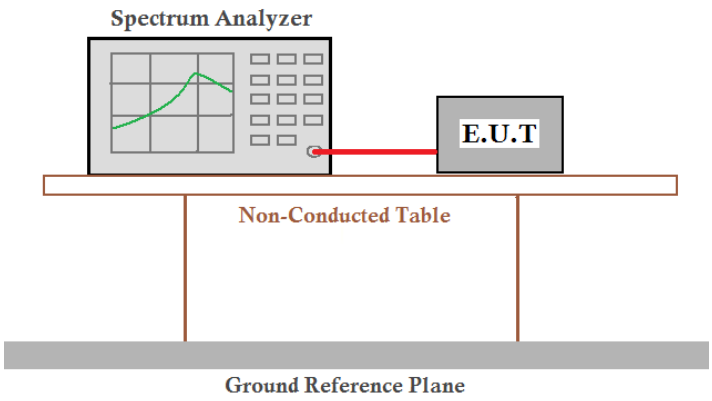
Test plot as follows:
Band 4:

802.11a	
26 dB EBW	99% OBW
	
Date: 6.SEP.2018 20:25:02	Date: 6.SEP.2018 20:24:52
Lowest channel	
	
Date: 6.SEP.2018 20:24:07	Date: 6.SEP.2018 20:24:21
Middle channel	
	
Date: 6.SEP.2018 20:23:44	Date: 6.SEP.2018 20:23:34
Highest channel	

802.11n(HT20)	
26 dB EBW	99% OBW
 Date: 6.SEP.2018 20:27:21	 Date: 6.SEP.2018 20:27:28
Lowest channel	
 Date: 6.SEP.2018 20:27:51	 Date: 6.SEP.2018 20:27:43
Middle channel	
 Date: 6.SEP.2018 20:28:13	 Date: 6.SEP.2018 20:28:20
Highest channel	

6dB BW	
802.11a	802.11n(HT20)
	
Lowest channel	Lowest channel
	
Middle channel	Middle channel
	
Highest channel	Highest channel

6.4 Power Spectral Density

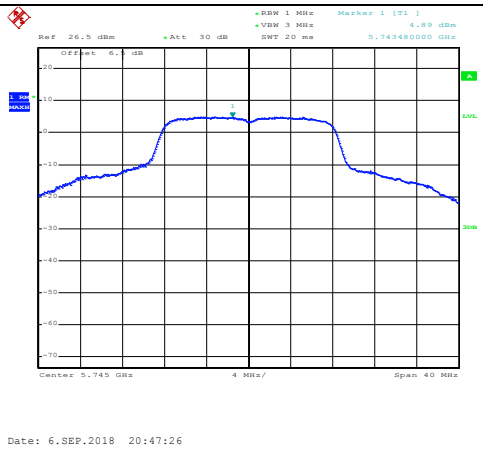
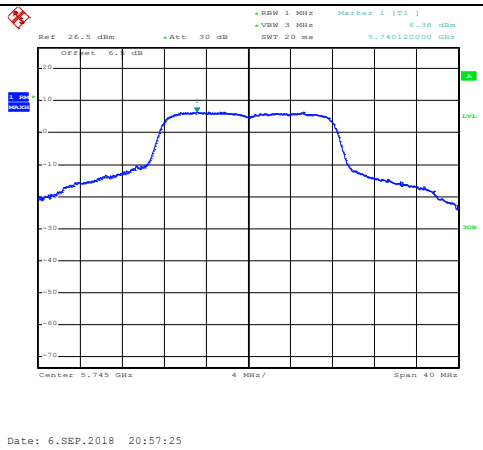
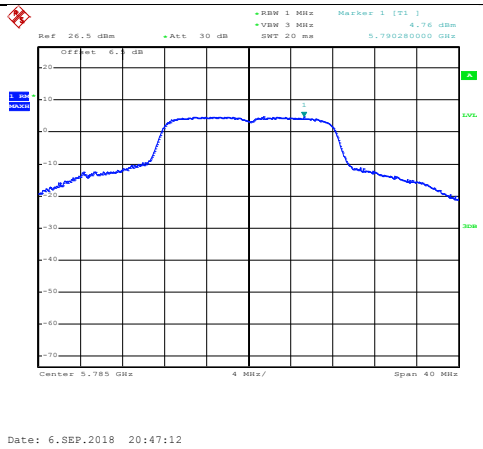
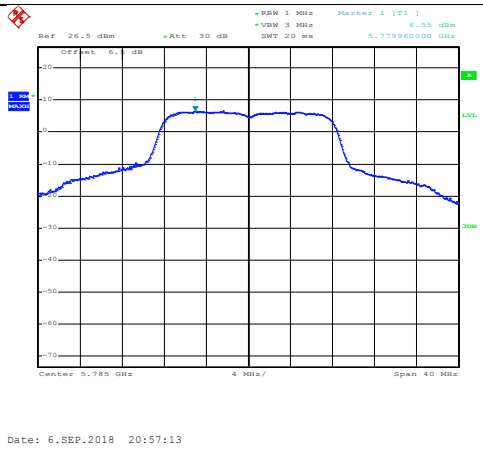
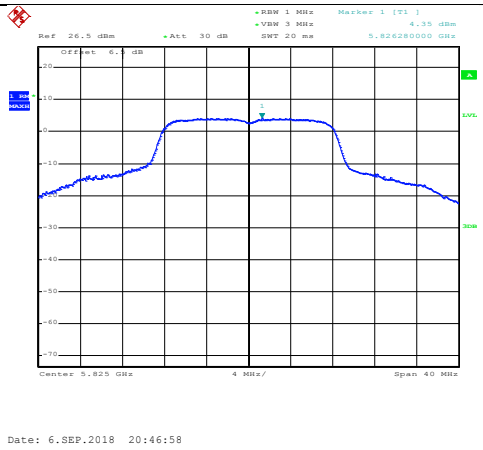
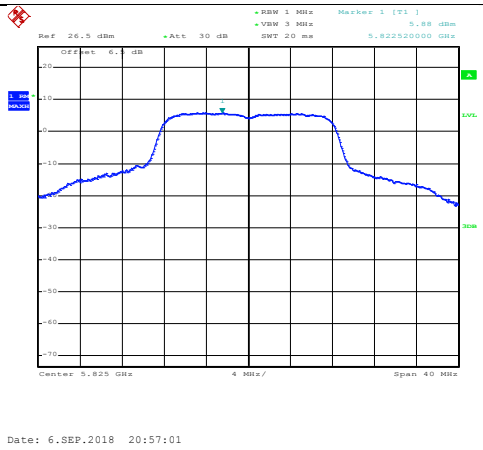
Test Requirement:	FCC Part15 E Section 15.407 (a)(3) RSS-247 Section 6.2.4.1
Test Method:	ANSI C63.10:2013, KDB 789033
Limit:	Band 4: 30 dBm/500kHz
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

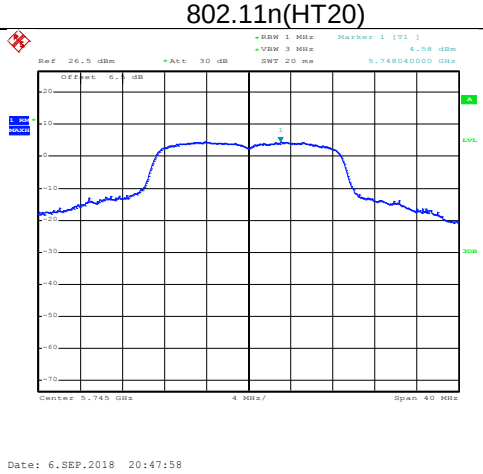
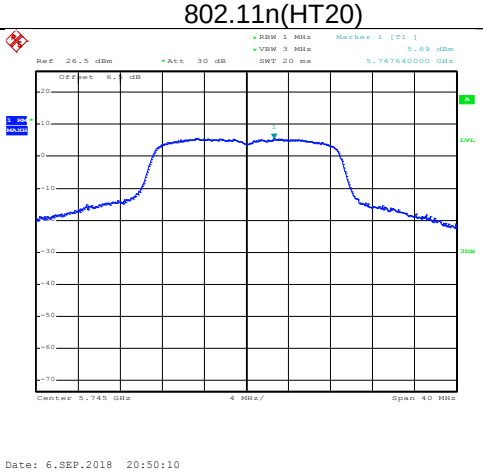
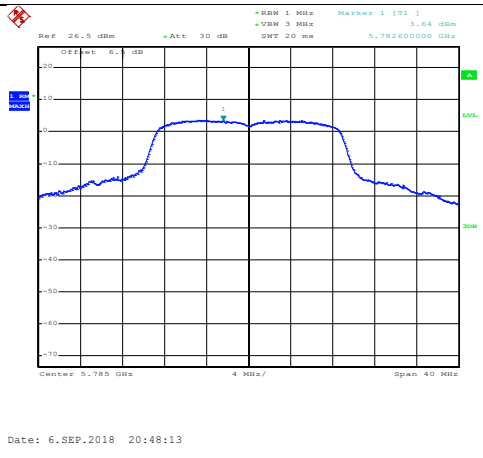
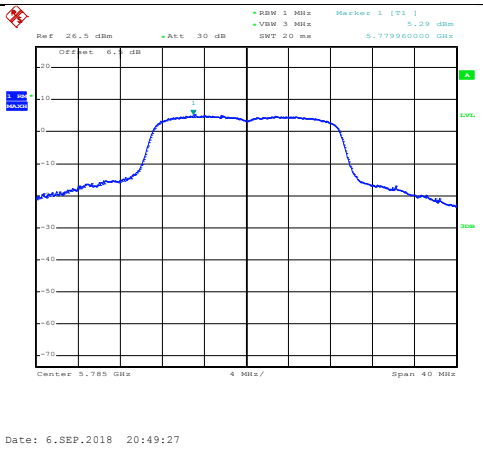
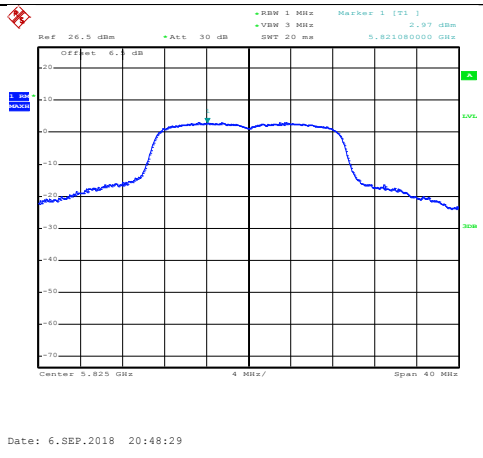
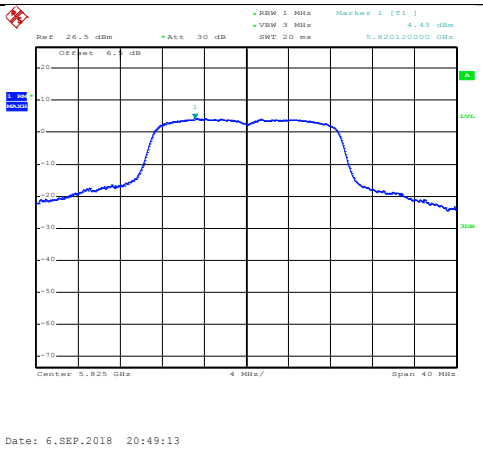
Measurement Data:

Band 4						
Mode	Test CH	Ant. Port	PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Result
802.11a	Lowest	ANT 1	4.89	/	30.00	Pass
		ANT 2	6.38			
	Middle	ANT 1	4.76	/		
		ANT 2	6.55			
	Highest	ANT 1	4.35	/		
		ANT 2	5.88			
802.11n20	Lowest	ANT 1	4.58	8.18	30.00	Pass
		ANT 2	5.69			
	Middle	ANT 1	3.64	7.55		
		ANT 2	5.29			
	Highest	ANT 1	2.97	6.77		
		ANT 2	4.43			

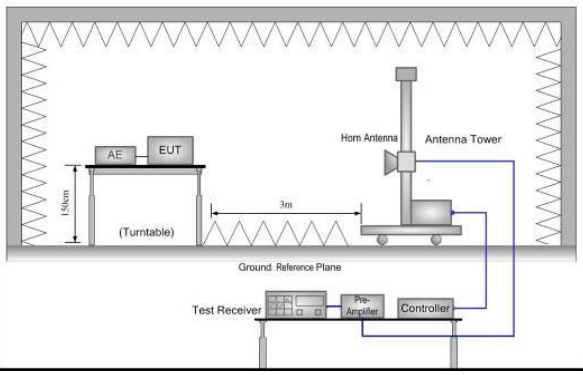
Remark:
1. Because the transmit signals are completely uncorrelated, so the Directional gain = G_{ANT}.

Test plot as follows:

ANT Port 1	ANT Port 2
802.11a	802.11a
	
Lowest channel	Middle channel
	
Middle channel	Middle channel
	
Highest channel	Highest channel

ANT Port 1	ANT Port 2
802.11n(HT20)	802.11n(HT20)
	
Lowest channel	Middle channel
	
Middle channel	Middle channel
	
Highest channel	Highest channel

6.5 Band Edge

Test Requirement:	15.407(b)(4) & 15.205 & 15.209,RSS-GEN 8.9 8.10 ,RSS-247 6.2.4.2
Test Method:	ANSI C63.10:2013 , KDB 789033
Receiver setup:	Detector / RBW / VBW / Remark Quasi-peak / 120kHz / 300kHz / Quasi-peak Value RMS / 1MHz / 3MHz / Average Value
Limit:	Band / Limit (dBuV/m @3m) / Remark Band 4 / 68.20 for 75 MHz or more above or below the band edge / Peak Value Band 4 / 54.00 / Average Value Band 4 limit: For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasinglinearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
Test Procedure:	1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Note:E[dBμV/m] = EIRP[dBm] + 95.2, for d= 3m

Measurement Data (worst case):

Band 4:

802.11a (ANT Port 1)							
Test channel: Lowest channel							
Detector: Peak Value							
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Polarization
5725.00	45.68	34.65	11.62	40.54	51.41	68.20	Horizontal
5725.00	46.09	34.65	11.62	40.54	51.82	68.20	Vertical
Detector: Average Value							
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Polarization
5725.00	32.86	34.65	11.62	40.54	38.59	54.00	Horizontal
5725.00	37.12	34.65	11.62	40.54	42.85	54.00	Vertical
Test channel: Highest channel							
Detector: Peak Value							
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Polarization
5850.00	44.65	34.63	11.75	40.69	50.34	68.20	Horizontal
5850.00	44.80	34.63	11.75	40.69	50.49	68.20	Vertical
Detector: Average Value							
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Polarization
5850.00	32.59	34.63	11.75	40.69	38.28	54.00	Horizontal
5850.00	32.64	34.63	11.75	40.69	38.33	54.00	Vertical

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11a (ANT Port 2)							
Test channel: Lowest channel							
Detector: Peak Value							
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Polarization
5650.00	53.59	32.68	7.45	41.85	51.87	68.20	Horizontal
5725.00	65.39	34.65	7.69	41.94	65.79	74.00	Horizontal
5650.00	53.24	32.68	7.45	41.85	51.52	68.20	Vertical
5725.00	69.81	34.65	7.69	41.94	70.21	74.00	Vertical
Detector: Average Value							
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Polarization
5650.00	41.36	32.68	7.45	41.85	39.64	54.00	Horizontal
5725.00	45.24	34.65	7.69	41.94	45.64	54.00	Horizontal
5650.00	41.56	32.68	7.45	41.85	39.84	54.00	Vertical
5725.00	48.61	34.65	7.69	41.94	49.01	54.00	Vertical
Test channel: Highest channel							
Detector: Peak Value							
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Polarization
5850.00	64.21	34.63	7.90	42.03	64.71	68.20	Horizontal
5850.00	60.74	34.63	7.90	42.03	61.24	68.20	Vertical
Detector: Average Value							
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Polarization
5850.00	43.82	34.63	7.90	42.03	44.32	54.00	Horizontal
5850.00	42.25	34.63	7.90	42.03	42.75	54.00	Vertical

Remark:

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

4. The emission levels of other frequencies are very lower than the limit and not show in test report.

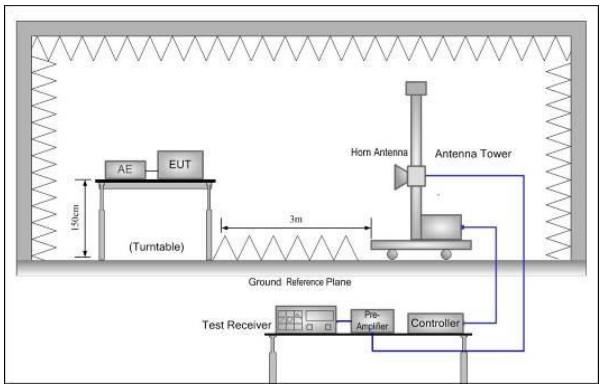
802.11n (HT20) (MIMO ANT)							
Test channel: Lowest channel							
Detector: Peak							
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Polarization
5650.00	53.39	32.68	7.45	41.85	51.67	68.20	Horizontal
5725.00	65.92	34.65	7.69	41.94	66.32	74.00	Horizontal
5650.00	63.57	32.68	7.45	41.85	61.85	68.20	Vertical
5725.00	71.65	34.65	7.69	41.94	72.05	74.00	Vertical
Detector: Average							
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Polarization
5650.00	41.25	32.68	7.45	41.85	39.53	54.00	Horizontal
5725.00	45.37	34.65	7.69	41.94	45.77	54.00	Horizontal
5650.00	41.82	32.68	7.45	41.85	40.10	54.00	Vertical
5725.00	49.36	34.65	7.69	41.94	49.76	54.00	Vertical
Test channel: Highest channel							
Detector: Peak Value							
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Polarization
5850.00	63.96	34.63	7.90	42.03	64.46	68.20	Horizontal
5850.00	60.58	34.63	7.90	42.03	61.08	68.20	Vertical
Detector: Average Value							
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Polarization
5850.00	43.59	34.63	7.90	42.03	44.09	54.00	Horizontal
5850.00	41.36	34.63	7.90	42.03	41.86	54.00	Vertical

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

6.6 Spurious Emission

6.6.1 Restricted Band

Test Requirement:	15.407(b)(4) & 15.205 & 15.209,RSS-GEN 8.9 8.10 ,RSS-247 6.2.4.2				
Test Method:	ANSI C63.10: 2013				
Test Frequency Range:	5.35GHz to 5.46GHz is worse case in all restriction band				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		RMS	1MHz	3MHz	Average Value
Limit:	Frequency	Limit (dBuV/m @3m)			Remark
	Above 1GHz	74.00			Peak Value
		54.00			Average Value
Test Procedure:	1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.				
Test setup:					
Test Instruments:	Refer to section 5.9 for details				
Test mode:	Refer to section 5.3 for details				
Test results:	Passed				

Measurement Data (worst case):

Band 4:

802.11a (ANT Port 1)								
Test channel: Lowest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	47.24	35.37	7.11	41.89	47.83	74.00	-26.17	Horizontal
5350.00	45.72	35.37	7.11	41.89	46.31	74.00	-27.69	Vertical
Detector: Average Value								
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	34.52	35.37	7.11	41.89	35.11	54.00	-18.89	Horizontal
5350.00	34.35	35.37	7.11	41.89	34.94	54.00	-19.06	Vertical
Test channel: Highest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	46.99	34.90	7.18	41.85	47.22	74.00	-26.78	Horizontal
5460.00	46.21	34.90	7.18	41.85	46.44	74.00	-27.56	Vertical
Detector: Average Value								
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	33.22	34.90	7.18	41.85	33.45	54.00	-20.55	Horizontal
5460.00	33.24	34.90	7.18	41.85	33.47	54.00	-20.53	Vertical

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11a (ANT Port 2)								
Test channel: Lowest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	46.39	35.37	7.11	41.89	46.98	74.00	-27.02	Horizontal
5350.00	46.24	35.37	7.11	41.89	46.83	74.00	-27.17	Vertical
Detector: Average Value								
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	34.22	35.37	7.11	41.89	34.81	54.00	-19.19	Horizontal
5350.00	34.82	35.37	7.11	41.89	35.41	54.00	-18.59	Vertical
Test channel: Highest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	46.89	34.90	7.18	41.85	47.12	74.00	-26.88	Horizontal
5460.00	46.36	34.90	7.18	41.85	46.59	74.00	-27.41	Vertical
Detector: Average Value								
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	33.82	34.90	7.18	41.85	34.05	54.00	-19.95	Horizontal
5460.00	33.14	34.90	7.18	41.85	33.37	54.00	-20.63	Vertical

Remark:

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

4. The emission levels of other frequencies are very lower than the limit and not show in test report.

802.11n(HT20) (MIMO ANT)								
Test channel: Lowest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	47.49	35.37	7.11	41.89	48.08	74.00	-25.92	Horizontal
5350.00	46.02	35.37	7.11	41.89	46.61	74.00	-27.39	Vertical
Detector: Average Value								
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	34.15	35.37	7.11	41.89	34.74	54.00	-19.26	Horizontal
5350.00	34.63	35.37	7.11	41.89	35.22	54.00	-18.78	Vertical
Test channel: Highest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	46.67	34.90	7.18	41.85	46.90	74.00	-27.10	Horizontal
5460.00	46.58	34.90	7.18	41.85	46.81	74.00	-27.19	Vertical
Detector: Average Value								
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	33.14	34.90	7.18	41.85	33.37	54.00	-20.63	Horizontal
5460.00	33.95	34.90	7.18	41.85	34.18	54.00	-19.82	Vertical

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

6.6.2 Unwanted Emissions out of the Restricted Bands

Test Requirement:	15.407(b)(4) & 15.205 & 15.209, RSS-GEN 8.9 8.10 ,RSS-247 6.2.4.2
Test Method:	ANSI C63.10: 2013
Test Frequency Range:	30MHz to 40GHz
Test site:	Measurement Distance: 3m
Receiver setup:	

Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	RMS	1MHz	3MHz	Average Value

Limit:

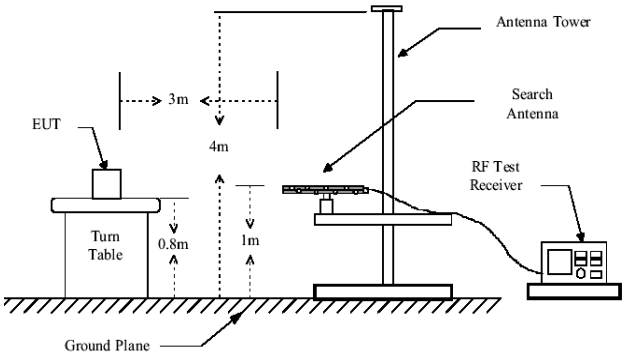
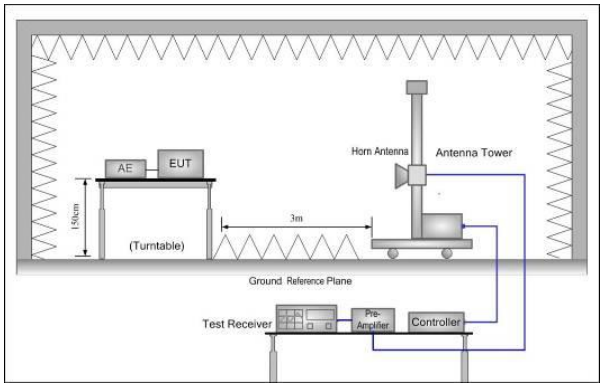
Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	68.20	Peak Value
	54.00	Average Value

Remark:
Above 1GHz limit:
E[dBμV/m] = EIRP[dBm] + 95.2=68.2 dBuV/m, for EIPR[dBm]=-27dBm.

Test Procedure:

1. The EUT was placed on the top of a rotating table 0.8m(below 1GHz)/1.5m(above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

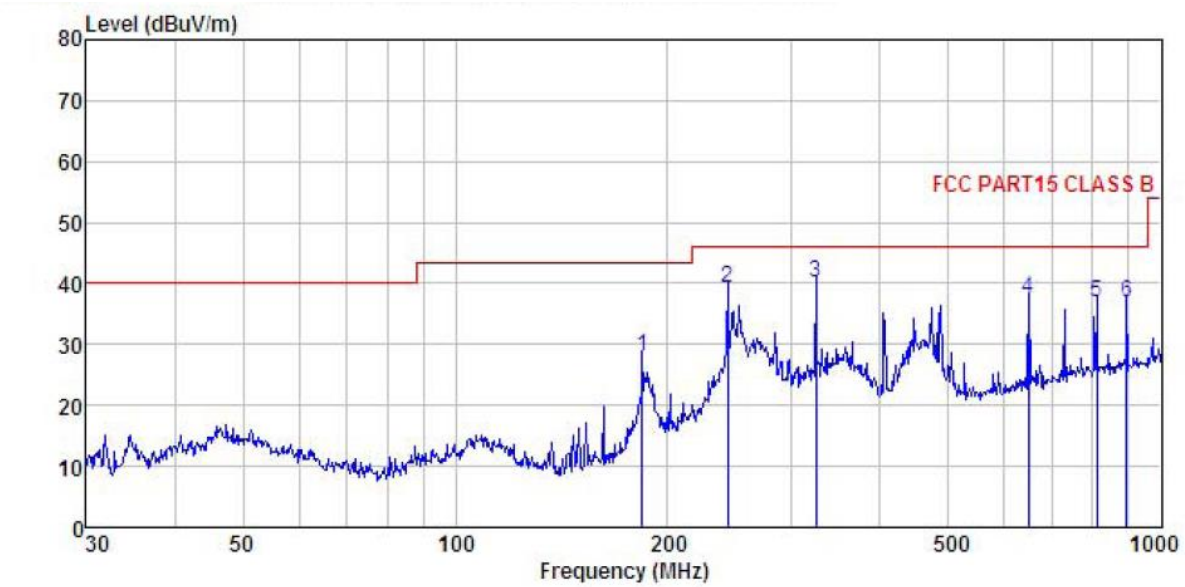
Test setup: Below 1GHz

	 Above 1GHz 
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data (worst case):

Below 1GHz

Test Polarization: Horizontal



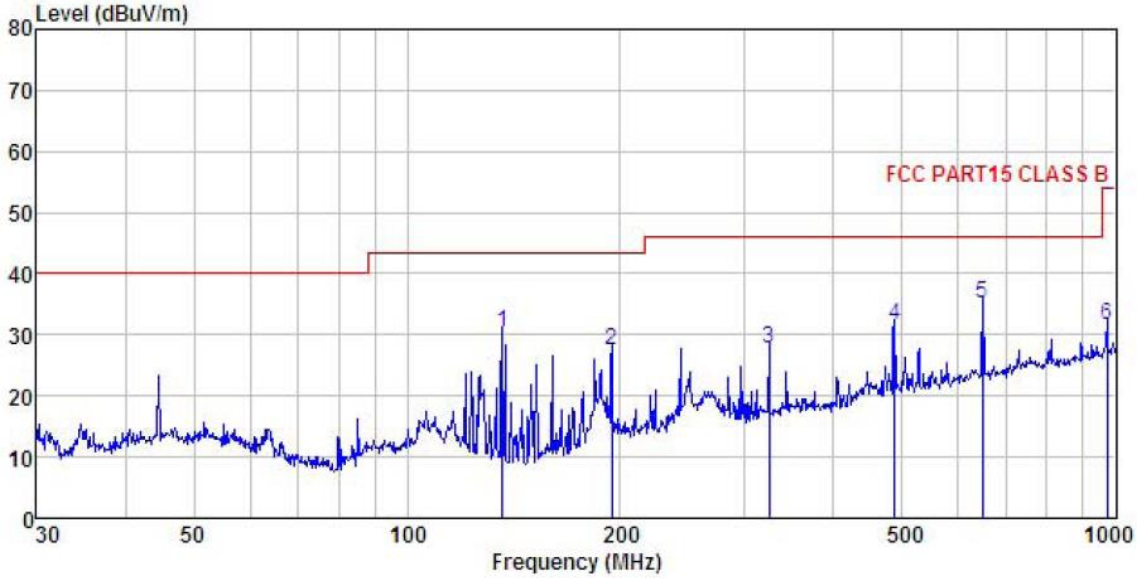
Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163(30M2G) HORIZONTAL
EUT : Sync Wifi Drone
Model : DIDH1100C
Test mode : WIFI mode
Power Rating : DC 3.7V
Environment : Temp:25.5℃ Huni:55%
Test Engineer: Carey
REMARK :

	Freq	ReadLevel	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	183.844	43.80	10.35	2.75	28.94	27.96	43.50	-15.54	QP
2	243.377	51.96	13.08	2.82	28.58	39.28	46.00	-6.72	QP
3	324.456	51.66	14.11	3.02	28.51	40.28	46.00	-5.72	QP
4	649.660	42.56	19.80	3.86	28.78	37.44	46.00	-8.56	QP
5	810.265	39.78	21.06	4.32	28.16	37.00	46.00	-9.00	QP
6	893.857	38.84	22.18	3.77	27.89	36.90	46.00	-9.10	QP

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Test Polarization: Vertical



Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163(30M2G) VERTICAL
EUT : Sync Wifi Drone
Model : DIDH1100C
Test mode : WIFI mode
Power Rating : DC 3.7V
Environment : Temp:25.5℃ Huni:55%
Test Engineer: Carey
REMARK :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	136.460	49.01	8.31	2.36	29.29	30.39	43.50	-13.11	QP
2	194.453	42.01	11.34	2.83	28.87	27.31	43.50	-16.19	QP
3	324.456	39.12	14.11	3.02	28.51	27.74	46.00	-18.26	QP
4	487.315	39.77	17.16	3.51	28.93	31.51	46.00	-14.49	QP
5	649.660	40.24	19.80	3.86	28.78	35.12	46.00	-10.88	QP
6	972.337	32.14	22.58	4.33	27.59	31.46	54.00	-22.54	QP

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Above 1GHz:
Band 4:

802.11a (ANT Port 1)								
Test channel: Lowest channel								
Detector: 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)	polarization
11490.00	50.30	41.50	10.81	42.29	60.32	74.00	-13.68	Vertical
11490.00	52.22	41.50	10.81	42.29	62.24	74.00	-11.76	Horizontal
Detector: 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)	polarization
11490.00	34.69	41.50	10.81	42.29	44.71	54.00	-9.29	Vertical
11490.00	34.79	41.50	10.81	42.29	44.81	54.00	-9.19	Horizontal
Test channel: Middle channel								
Detector: 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)	polarization
11570.00	51.35	41.38	10.78	42.27	61.24	74.00	-12.76	Vertical
11570.00	51.54	41.38	10.78	42.27	61.43	74.00	-12.57	Horizontal
Detector: 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)	polarization
11570.00	34.02	41.38	10.78	42.27	43.91	54.00	-10.09	Vertical
11570.00	34.37	41.38	10.78	42.27	44.26	54.00	-9.74	Horizontal
Test channel: Highest channel								
Detector: 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)	polarization
11650.00	47.68	41.26	10.76	42.26	57.44	74.00	-16.56	Vertical
11650.00	49.27	41.26	10.76	42.26	59.03	74.00	-14.97	Horizontal
Detector: 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)	polarization
11650.00	34.45	41.26	10.76	42.26	44.21	54.00	-9.79	Vertical
11650.00	34.37	41.26	10.76	42.26	44.13	54.00	-9.87	Horizontal

Remark:
1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

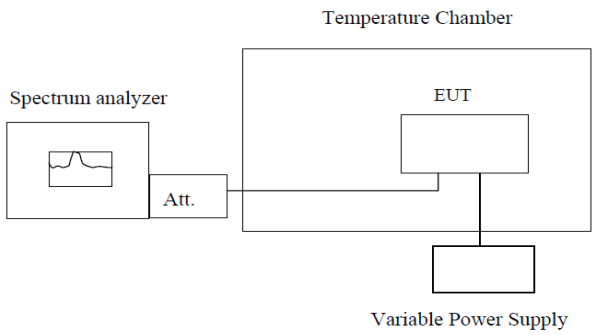
802.11a (ANT Port 2)								
Test channel: Lowest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11490.00	51.51	41.50	10.81	42.29	61.53	74.00	-12.47	Vertical
11490.00	52.82	41.50	10.81	42.29	62.84	74.00	-11.16	Horizontal
Detector: 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)	polarization
11490.00	35.53	41.50	10.81	42.29	45.55	54.00	-8.45	Vertical
11490.00	35.67	41.50	10.81	42.29	45.69	54.00	-8.31	Horizontal
Test channel: Middle channel								
Detector: 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)	polarization
11570.00	50.15	41.38	10.78	42.27	60.04	74.00	-13.96	Vertical
11570.00	51.88	41.38	10.78	42.27	61.77	74.00	-12.23	Horizontal
Detector: 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)	polarization
11570.00	35.76	41.38	10.78	42.27	45.65	54.00	-8.35	Vertical
11570.00	35.25	41.38	10.78	42.27	45.14	54.00	-8.86	Horizontal
Test channel: Highest channel								
Detector: 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)	polarization
11650.00	49.68	41.26	10.76	42.26	59.44	74.00	-14.56	Vertical
11650.00	48.92	41.26	10.76	42.26	58.68	74.00	-15.32	Horizontal
Detector: 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)	polarization
11650.00	34.39	41.26	10.76	42.26	44.15	54.00	-9.85	Vertical
11650.00	34.96	41.26	10.76	42.26	44.72	54.00	-9.28	Horizontal

Remark:
3. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

802.11n(HT20) (MIMO ANT)								
Test channel: Lowest channel								
Detector: 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)	polarization
11490.00	49.32	41.50	10.81	42.29	59.34	74.00	-14.66	Vertical
11490.00	50.82	41.50	10.81	42.29	60.84	74.00	-13.16	Horizontal
Detector: 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)	polarization
11490.00	34.37	41.50	10.81	42.29	44.39	54.00	-9.61	Vertical
11490.00	34.41	41.50	10.81	42.29	44.43	54.00	-9.57	Horizontal
Test channel: Middle channel								
Detector: 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)	polarization
11570.00	50.87	41.38	10.78	42.27	60.76	74.00	-13.24	Vertical
11570.00	49.68	41.38	10.78	42.27	59.57	74.00	-14.43	Horizontal
Detector: 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)	polarization
11570.00	34.51	41.38	10.78	42.27	44.40	54.00	-9.60	Vertical
11570.00	34.94	41.38	10.78	42.27	44.83	54.00	-9.17	Horizontal
Test channel: Highest channel								
Detector: 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)	polarization
11650.00	47.96	41.26	10.76	42.26	57.72	74.00	-16.28	Vertical
11650.00	48.25	41.26	10.76	42.26	58.01	74.00	-15.99	Horizontal
Detector: 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)	polarization
11650.00	34.76	41.26	10.76	42.26	44.52	54.00	-9.48	Vertical
11650.00	37.52	41.26	10.76	42.26	47.28	54.00	-6.72	Horizontal

Remark:
1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

6.7 Frequency stability

Test Requirement:	FCC Part15 E Section 15.407 (g), RSS-Gen section 6.11 8.11
Limit:	Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.
Test setup:	 **Note :** Measurement setup for testing on Antenna connector
Test procedure:	1. The EUT is installed in an environment test chamber with external power source. 2. Set the chamber to operate at 50 centigrade and external power source to output at nominal voltage ofEUT. 3. A sufficient stabilization period at each temperature is used prior to each frequency measurement. 4. When temperature is stabled, measure the frequency stability. 5. The test shall be performed under -20 to 50 centigrade and 85 to 115 percent of the nominal voltage.Change setting of chamber and external power source to complete all conditions.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Unmodulated carrier is not available, test at modulated carrier mode.
Test results:	Passed

Measurement Data (the worst channel):

Voltage vs. Frequency Stability (Lowest channel=5745MHz)

Band 4			
Test conditions		Frequency(MHz)	Max. Deviation (ppm)
Temp(℃)	Voltage(ac)		
20℃	3.145Vdc	5744.974766	4.39
	3.7Vdc	5744.993381	1.15
	4.255Vdc	5744.998588	0.25

Temperature vs. Frequency Stability (Lowest channel=5745MHz)

Band 4			
Test conditions		Frequency(MHz)	Max. Deviation (ppm)
Voltage(dc)	Temp(℃)		
3.7Vdc	-20	5744.994798	0.91
	-10	5744.993693	1.10
	0	5744.994771	0.91
	10	5744.985355	2.55
	20	5744.993864	1.07
	30	5744.994481	0.96
	40	5744.999347	0.11
	50	5744.992458	1.31