

# TEST REPORT

**Reference No.** ..... : WTS18S11129613-6W  
**FCC ID**..... : 2AQ5W-PD470  
**Applicant**..... : Hong Kong AMobile Intelligent Corp. Limited Taiwan Branch  
**Address** ..... : 8F.-1, No.700, Zhongzheng Rd., Zhonghe Dist., New Taipei City 235, Taiwan  
**Manufacturer** ..... : SHENZHEN SHENLAN ZHILIAN TECHNOLOGY.CO.,LTD.  
**Address** ..... : 1/F, building5, tanglang tongfu industrial city, xili street, nanshan district, shenzhen city, China  
**Product Name** ..... : Mobile Computing Device  
**Model No.** ..... : PD470  
**Brand** ..... : N/A  
**Standards** ..... : FCC CFR47 Part 15 E Section 15.407: 2017  
**Date of Receipt sample**..... : 2018-11-20  
**Date of Test**..... : 2018-11-21 to 2018-12-09  
**Date of Issue** ..... : 2018-12-10  
**Test Result** ..... : **Pass**

**Remarks:**

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company.  
The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

**Prepared By:**

**Waltek Services (Shenzhen) Co., Ltd.**

Address: 1/F., Fukangtai Building, West Baima Road, Songgang Street, Baoan District, Shenzhen, Guangdong, China

Tel :+86-755-83551033

Fax:+86-755-83552400

Compiled by:

*Ford Wang*

Ford Wang / Project Engineer

Approved by:



*Philo Zhong*

Philo Zhong / Manager

## 2 Laboratories Introduction

**Waltek Services (Shenzhen) Co., Ltd** is a professional third-party testing and certification laboratory with multi-year product testing and certification experience, established strictly in accordance with ISO/IEC 17025 requirements, and accredited by ILAC (International Laboratory Accreditation Cooperation) member. A2LA (American Association for Laboratory Accreditation, the certification number is 4243.01) of USA, CNAS (China National Accreditation Service for Conformity Assessment, the registration number is L3110) of China. Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC (The Federal Communications Commission), CEC (California energy efficiency), ISED (Innovation, Science and Economic Development Canada). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as Intertek (ETL-SEMKO), TÜV Rheinland, TÜV SÜD, etc.



Waltek Services (Shenzhen) Co., Ltd is one of the largest and the most comprehensive third party testing laboratory in China. Our test capability covered four large fields: safety test. Electro Magnetic Compatibility (EMC), and energy performance, wireless radio. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

**Test Facility:****A. Accreditations for Conformity Assessment (International)**

Country/Region	Scope Covered By	Scope	Note
USA	ISO/IEC 17025	FCC ID \ DOC \ VOC	1
Canada		IC ID \ VOC	2
Japan		MIC-T \ MIC-R	-
Europe		EMCD \ RED	-
Taiwan		NCC	-
Hong Kong		OFCA	-
Australia		RCM	-
India		WPC	-
Thailand		NTC	-
Singapore		IDA	-
Note:			
1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476.			
2. ISED Canada Registration No.: 7760A			

**B. TCBs and Notify Bodies Recognized Testing Laboratory.**

Recognized Testing Laboratory of ...	Notify body number
TUV Rheinland	Optional.
Intertek	
TUV SUD	
SGS	
Phoenix Testlab GmbH	0700
Element Materials Technology Warwick Ltd	0891
Timco Engineering, Inc.	1177
Eurofins Product Service GmbH	0681

### 3 Contents

	<b>Page</b>
<b>1 COVER PAGE</b> .....	<b>1</b>
<b>2 LABORATORIES INTRODUCTION</b> .....	<b>2</b>
<b>3 CONTENTS</b> .....	<b>4</b>
<b>4 REVISION HISTORY</b> .....	<b>6</b>
<b>5 GENERAL INFORMATION</b> .....	<b>7</b>
5.1 GENERAL DESCRIPTION OF E.U.T. ....	7
5.2 DETAILS OF E.U.T. ....	7
5.3 CHANNEL LIST.....	8
5.4 TEST MODE DESCRIPTION:.....	9
<b>6 EQUIPMENT USED DURING TEST</b> .....	<b>12</b>
6.1 EQUIPMENTS LIST.....	12
6.2 DESCRIPTION OF SUPPORT UNITS.....	13
6.3 MEASUREMENT UNCERTAINTY.....	13
6.4 TEST EQUIPMENT CALIBRATION.....	13
<b>7 TEST SUMMARY</b> .....	<b>14</b>
<b>8 CONDUCTED EMISSION</b> .....	<b>15</b>
8.1 E.U.T. OPERATION.....	15
8.2 EUT SETUP.....	15
8.3 MEASUREMENT DESCRIPTION.....	15
8.4 CONDUCTED EMISSION TEST RESULT.....	16
<b>9 RADIATED EMISSIONS</b> .....	<b>18</b>
9.1 EUT OPERATION.....	18
9.2 TEST SETUP.....	19
9.3 SPECTRUM ANALYZER SETUP.....	20
9.4 TEST PROCEDURE.....	21
9.5 CORRECTED AMPLITUDE & MARGIN CALCULATION.....	21
9.6 SUMMARY OF TEST RESULTS.....	22
<b>10 DUTY CYCLE</b> .....	<b>36</b>
10.1 SUMMARY OF TEST RESULTS.....	36
<b>11 BAND EDGE</b> .....	<b>43</b>
11.1 TEST PRODUCE.....	43
11.2 TEST RESULT.....	44
<b>12 6 DB BANDWIDTH</b> .....	<b>56</b>
12.1 TEST PROCEDURE:.....	56
12.2 TEST RESULT:.....	56
<b>13 26 DB BANDWIDTH AND 99% OCCUPIED BANDWIDTH</b> .....	<b>64</b>
13.1 TEST PROCEDURE:.....	64
13.2 TEST RESULT:.....	64
<b>14 CONDUCTED OUTPUT POWER</b> .....	<b>79</b>
14.1 TEST PROCEDURE:.....	79
14.2 TEST RESULT :.....	80
<b>15 POWER SPECTRAL DENSITY</b> .....	<b>95</b>
15.1 TEST PROCEDURE:.....	95
15.2 TEST RESULT:.....	96
<b>16 FREQUENCY STABILITY</b> .....	<b>111</b>

16.1	TEST PROCEDURE:.....	111
16.2	TEST RESULT: .....	112
<b>17</b>	<b>ANTENNA REQUIREMENT .....</b>	<b>113</b>
<b>18</b>	<b>RF EXPOSURE.....</b>	<b>114</b>
<b>19</b>	<b>PHOTOGRAPHS OF TEST SETUP AND EUT.....</b>	<b>115</b>

#### 4 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS18S11129 613-6W	2018-11-20	2018-11-21 to 2018-12- 09	2018-12-10	original	-	Valid

## 5 General Information

### 5.1 General Description of E.U.T.

Product:	Mobile Computing Device
Model(s):	PD470
Model Description:	N/A
GSM Band(s):	GSM 850/900/1800/1900MHz
GPRS/EGPRS Class:	12
WCDMA Band(s):	FDD Band I/II/IV/V/VIII
LTE Band(s):	FDD Band 2/4/5/7/12/17
Wi-Fi Specification:	2.4G-802.11b/g/n HT20/n HT40 5G-802.11a/n HT20/n HT40/ac HT20/ac HT40/ac HT80
Bluetooth Version:	Bluetooth v4.1 with BLE
GPS:	Support
NFC:	Support
Hardware Version:	S6_MB_V1.2
Software Version:	PD470_V02_20181127
Highest frequency (Exclude Radio):	2.0GHz
Storage Location:	Internal Storage
Note:	N/A

### 5.2 Details of E.U.T.

Operation Frequency:	5G WiFi: 802.11a/ n(HT20/40)/ac(HT20/40/80): 5150MHz to 5250MHz 802.11a/ n(HT20/40)/ac(HT20/40/80): 5725MHz to 5850MHz
Max. RF output power:	Band I: 6.97dBm Band IV: 7.0dBm
Type of Modulation:	OFDM
Antenna installation:	internal permanent antenna
Antenna Gain:	Band I: -2.0dBi Band IV: -2.0dBi
Ratings:	Battery DC 3.8V, 4000mAh DC 5V, 2.0A/9V,2.0A/12V,1.5A charging from adapter (Adapter Input: 100-240V~50/60Hz 0.6A)
Adapter:	Manufacturer: ShenZhen HuaJin Electronics CO.,LTD Model No.: HJ-FC010K7-US

### 5.3 Channel List

U-NII-1 (5.15-5.25GHz)		U-NII-3 (5.725-5.85GHz)	
channel	Frequency(MHz)	channel	Frequency(MHz)
36	5180	149	5745
38	5190	151	5755
40	5200	153	5765
42	5210	155	5785
44	5220	157	5785
46	5230	159	5795
48	5240	161	5805
		165	5825

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:

For 802.11a/n(HT20)/ac(HT20):

channel	Frequency(MHz)	channel	Frequency(MHz)
36	5180	149	5745
40	5200	157	5785
48	5240	165	5825

For 802.11 n(HT40)/ac(HT40):

channel	Frequency(MHz)	channel	Frequency(MHz)
38	5190	151	5755
46	5230	159	5795

For 802.11 ac(HT80):

channel	Frequency(MHz)	channel	Frequency(MHz)
42	5210	155	5775



#### 5.4 Test Mode Description:

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Transmitting duty cycle is no less 98%.

The software is installed in operation system, named "RFTestTool.apk", Version 1, date 20160518.

Test Items	Mode	Data Rate	Channel	TX/RX
Radiated Emissions	802.11a	6 Mbps	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11ac(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT80)	MCS0	U-NII-1 42 U-NII-3 155	TX
Duty Cycle	802.11a	6 Mbps	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11ac(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT80)	MCS0	U-NII-1 42 U-NII-3 155	TX
Band Edge	802.11a	6 Mbps	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11ac(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT80)	MCS0	U-NII-1 42 U-NII-3 155	TX

6dB Bandwidth	802.11a	6 Mbps	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11ac(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT80)	MCS0	U-NII-1 42 U-NII-3 155	TX
26dB Bandwidth and 99% Occupied Bandwidth	802.11a	6 Mbps	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11ac(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT80)	MCS0	U-NII-1 42 U-NII-3 155	TX
Conducted Output Power	802.11a	6 Mbps	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11ac(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT80)	MCS0	U-NII-1 42 U-NII-3 155	TX
Power Spectral Density	802.11a	6 Mbps	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX

	802.11ac(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT80)	MCS0	U-NII-1 42 U-NII-3 155	TX
Frequency Stability	Un-modulation	/	U-NII-1 36/40/48 U-NII-3 149/155/165	TX

## 6 Equipment Used during Test

### 6.1 Equipments List

Conducted Emissions Test Site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	100947	2018-09-14	2019-09-13
2.	LISN	R&S	ENV216	101215	2018-09-14	2019-09-13
3.	Cable	Top	TYPE16(3.5M)	-	2018-09-14	2019-09-13
Conducted Emissions Test Site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	101155	2018-09-14	2019-09-13
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	2018-09-14	2019-09-13
3.	Limitter	York	MTS-IMP-136	261115-001-0024	2018-09-14	2019-09-13
4.	Cable	LARGE	RF300	-	2018-09-14	2019-09-13
3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	EMC Analyzer	Agilent	E7405A	MY45114943	2018-09-14	2019-09-13
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	2018-09-14	2019-09-13
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	2018-09-14	2019-09-13
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	2018-09-14	2019-09-13
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2018-09-14	2019-09-13
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	2018-09-14	2019-09-13
7	Broadband Preampfier	COMPLIANCE DIRECTION	PAP-1G18	2004	2018-09-14	2019-09-13
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	2018-09-14	2019-09-13
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No	Last Calibration Date	Calibration Due Date
1	Test Receiver	R&S	ESCI	101296	2018-09-14	2019-09-13
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2018-09-14	2019-09-13
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	2018-09-14	2019-09-13
4	Cable	HUBER+SUHNER	CBL2	525178	2018-09-14	2019-09-13
RF Conducted Testing						

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	2018-09-14	2019-09-13
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	2018-09-14	2019-09-13
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	2018-09-14	2019-09-13

## 6.2 Description of Support Units

Equipment	Manufacturer	Model No.	Series No.
/	/	/	/

## 6.3 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-6}$
RF Power	$\pm 1.0$ dB
RF Power Density	$\pm 2.2$ dB
Radiated Spurious Emissions test	$\pm 5.03$ dB (30M~1000MHz)
	$\pm 5.47$ dB (1000M~25000MHz)
Conducted Spurious Emissions test	$\pm 3.64$ dB (AC mains 150KHz~30MHz)

## 6.4 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

## 7 Test Summary

Test Items	Test Requirement	Result
Conducted Emissions	15.207(a)	PASS
Radiated Emissions	15.407(a) 15.205(a) 15.209(a)	PASS
Duty Cycle	KDB 789033	--
6dB Bandwidth	15.407(a)	PASS
26 dB Emission Bandwidth & 99% Occupied Bandwidth	15.407(a)	PASS
Maximum Conducted Output Power	15.407(a)	PASS
Power Spectral Density	15.407(a)	PASS
Restricted bands around fundamental frequency	15.407(a)	PASS
Antenna Requirement	15.203	PASS
Maximum Permissible Exposure (Exposure of Humans to RF Fields)	1.1307(b)(1)	PASS

## 8 Conducted Emission

Test Requirement:	FCC CFR 47 Part 15 Section 15.207
Test Method:	ANSI C63.10:2013
Test Result:	PASS
Frequency Range:	150kHz to 30MHz
Class/Severity:	Class B
Limit:	66-56 dB $\mu$ V between 0.15MHz & 0.5MHz 56 dB $\mu$ V between 0.5MHz & 5MHz 60 dB $\mu$ V between 5MHz & 30MHz
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth)

### 8.1 E.U.T. Operation

Operating Environment :

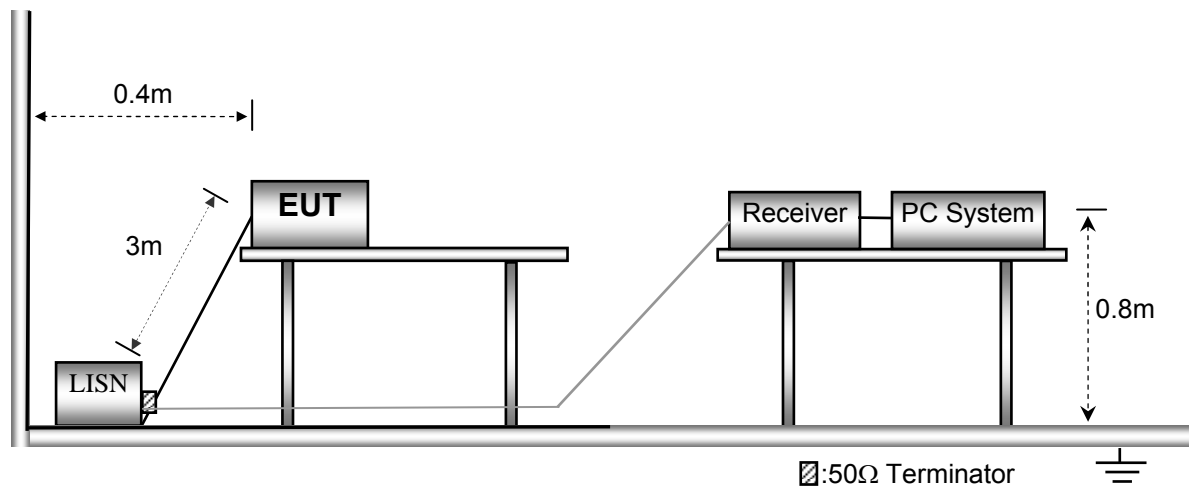
Temperature:	21.5 °C
Humidity:	51.9 % RH
Atmospheric Pressure:	101.2kPa

EUT Operation :

The test was performed in transmitting mode, the test data were shown in the report.

### 8.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10:2013.



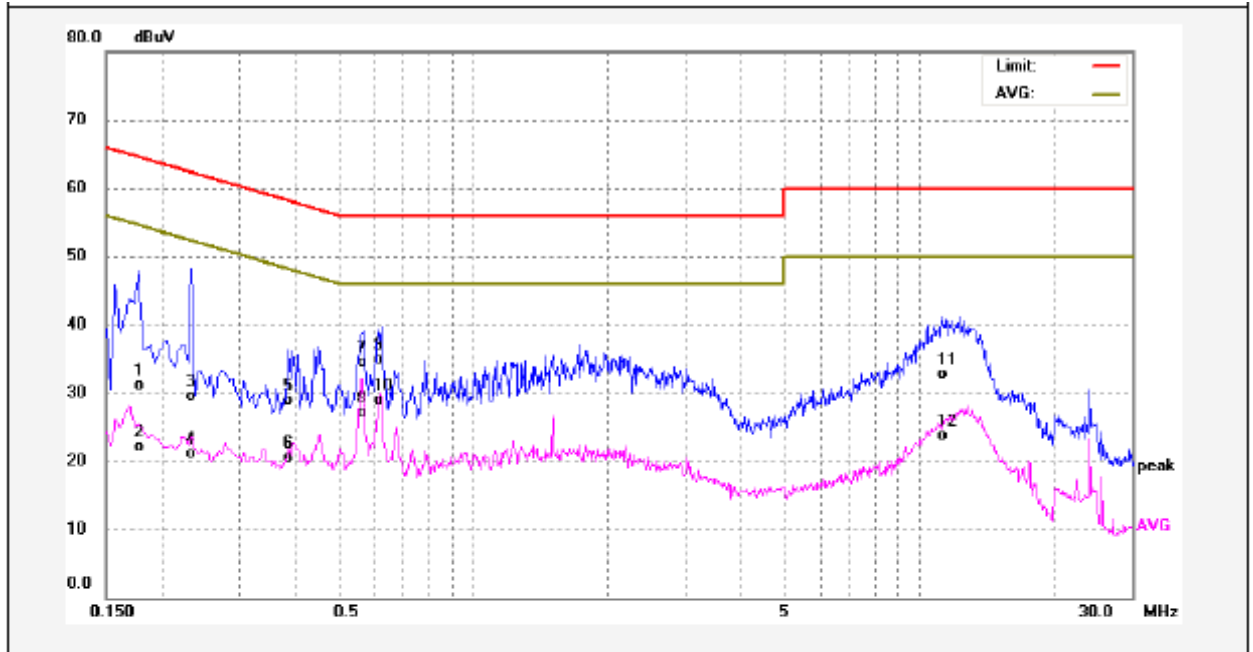
### 8.3 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

### 8.4 Conducted Emission Test Result

An initial pre-scan was performed on the live and neutral lines.

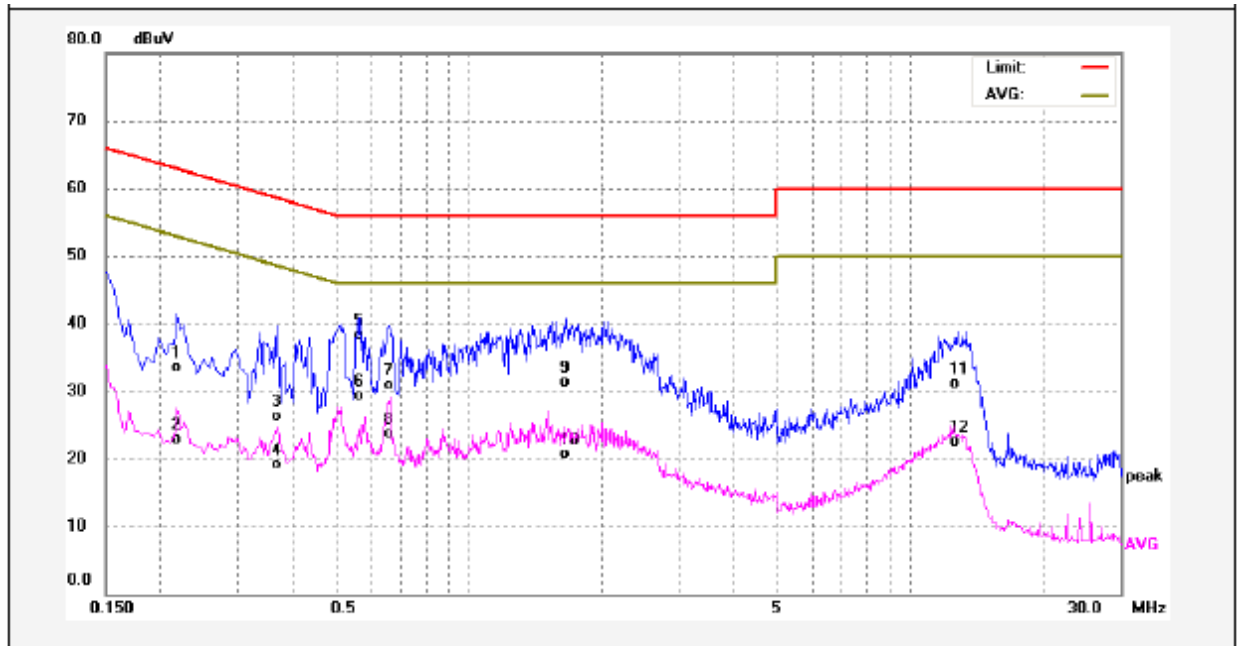
Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1780	20.88	10.30	31.18	64.57	-33.39	QP	
2	0.1780	11.78	10.30	22.08	54.57	-32.49	AVG	
3	0.2340	19.16	10.37	29.53	62.30	-32.77	QP	
4	0.2340	10.73	10.37	21.10	52.30	-31.20	AVG	
5	0.3860	18.39	10.42	28.81	58.15	-29.34	QP	
6	0.3860	10.06	10.42	20.48	48.15	-27.67	AVG	
7	0.5700	24.01	10.47	34.48	56.00	-21.52	QP	
8	0.5700	16.65	10.47	27.12	46.00	-18.88	AVG	
9	0.6220	24.47	10.48	34.95	56.00	-21.05	QP	
10	0.6220	18.41	10.48	28.89	46.00	-17.11	AVG	
11	11.2299	21.57	11.14	32.71	60.00	-27.29	QP	
12	11.2299	12.55	11.14	23.69	50.00	-26.31	AVG	



Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2180	23.08	10.35	33.43	62.89	-29.46	QP	
2	0.2180	12.46	10.35	22.81	52.89	-30.08	AVG	
3	0.3660	15.90	10.42	26.32	58.59	-32.27	QP	
4	0.3660	8.59	10.42	19.01	48.59	-29.58	AVG	
5	0.5660	27.89	10.47	38.36	56.00	-17.64	QP	
6	0.5660	18.90	10.47	29.37	46.00	-16.63	AVG	
7	0.6700	20.51	10.45	30.96	56.00	-25.04	QP	
8	0.6700	13.31	10.45	23.76	46.00	-22.24	AVG	
9	1.6660	20.88	10.51	31.39	56.00	-24.61	QP	
10	1.6660	10.16	10.51	20.67	46.00	-25.33	AVG	
11	12.8060	20.06	11.03	31.09	60.00	-28.91	QP	
12	12.8060	11.41	11.03	22.44	50.00	-27.56	AVG	

## 9 Radiated Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.407

Test Method: ANSI C63.10:2013

Test Result: PASS

Measurement Distance: 3m

Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Distance	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

### 9.1 EUT Operation

Operating Environment :

Temperature: 23.5 °C

Humidity: 52.1 % RH

Atmospheric Pressure: 101.2kPa

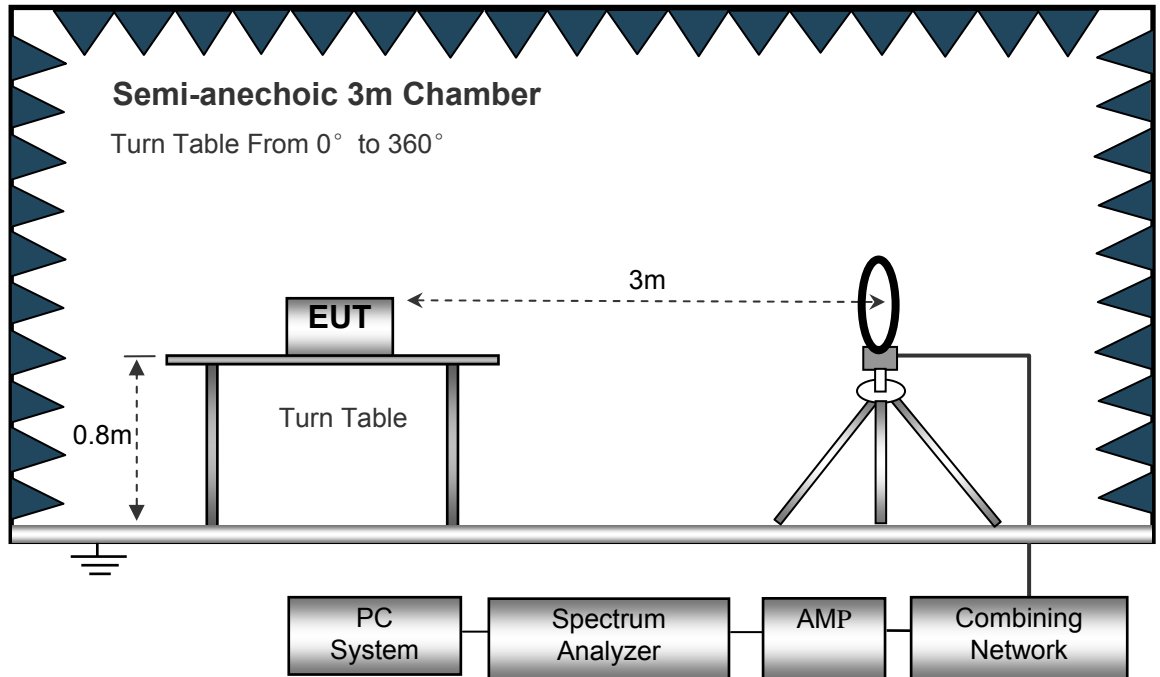
EUT Operation :

The test was performed in transmitting mode, the test data were shown in the report.

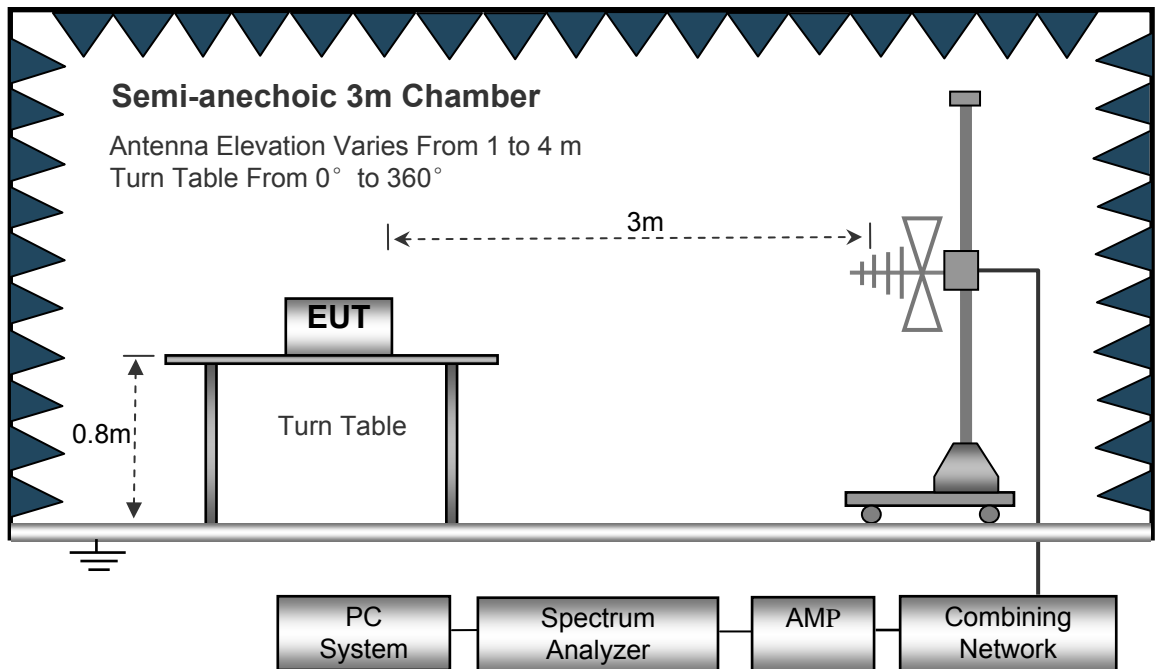
## 9.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10: 2013.

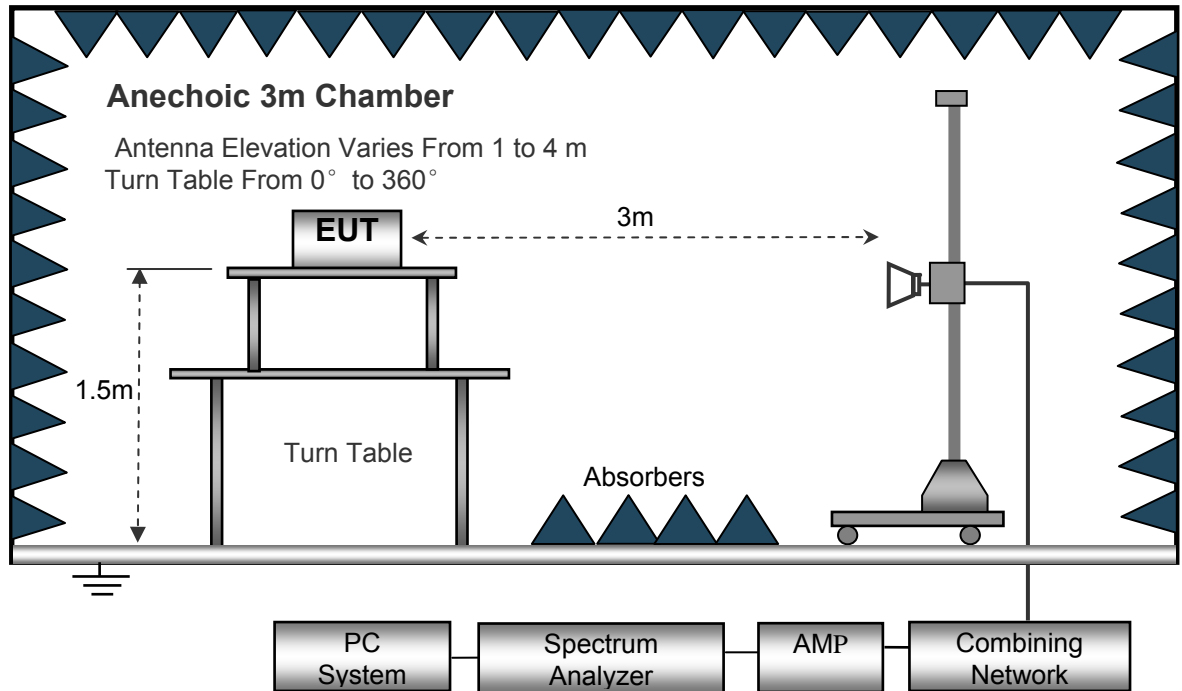
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



### 9.3 Spectrum Analyzer Setup

Below 30MHz

Sweep Speed ..... Auto  
 IF Bandwidth..... 10kHz  
 Video Bandwidth..... 10kHz  
 Resolution Bandwidth..... 10kHz

30MHz ~ 1GHz

Sweep Speed ..... Auto  
 Detector ..... PK  
 Resolution Bandwidth..... 100kHz  
 Video Bandwidth..... 300kHz

Above 1GHz

Sweep Speed ..... Auto  
 Detector ..... PK  
 Resolution Bandwidth..... 1MHz  
 Video Bandwidth..... 3MHz  
 Detector ..... Ave.  
 Resolution Bandwidth..... 1MHz  
 Video Bandwidth..... 10Hz

## 9.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane for below 1GHz and 1.5m for above 1GHz.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are performed in X,Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),the worst condition was tested putting the eut in X axis,so the worst data were shown as follow.
8. A 2.4GHz high -pass filter is used during radiated emissions above 1GHz measurement.

## 9.5 Corrected Amplitude & Margin Calculation

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

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

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

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

## 9.6 Summary of Test Results

Test Frequency: 32.768kHz~30MHz

Frequency (MHz)	Measurement results		Detector	Correct factor	Extrapolation factor	Measurement results (calculated)	Limits	Margin
	dB $\mu$ V	@3m	PK/QP	dB/m	dB	dB $\mu$ V/m @30m	dB $\mu$ V/m @30m	dB
25.661	24.93		QP	20.67	40.00	5.60	29.54	-23.94

Test Frequency : 30MHz ~ 18GHz

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
802.11a U-NII-1 Low Channel 5180MHz									
235.62	40.53	QP	191	1.4	H	-11.62	28.91	46.00	-17.09
235.62	38.67	QP	183	1.7	V	-11.62	27.05	46.00	-18.95
4510.99	50.22	PK	196	1.4	H	-2.03	48.19	74.00	-25.81
4510.99	44.93	Ave	196	1.4	H	-2.03	42.90	54.00	-11.10
5131.03	51.09	PK	145	1.1	H	-1.02	50.07	74.00	-23.93
5131.03	43.82	Ave	145	1.1	H	-1.02	42.80	54.00	-11.20
10360.00	40.92	PK	182	1.2	H	5.33	46.25	74.00	-27.75
10360.00	37.68	Ave	182	1.2	H	5.33	43.01	54.00	-10.99
802.11a U-NII-1 Middle channel 5200MHz									
235.62	40.86	QP	33	1.4	H	-11.62	29.24	46.00	-16.76
235.62	37.65	QP	183	1.6	V	-11.62	26.03	46.00	-19.97
4504.44	50.30	PK	163	1.3	H	-1.94	48.36	74.00	-25.64
4504.44	44.32	Ave	163	1.3	H	-1.94	42.38	54.00	-11.62
5114.57	52.58	PK	69	1.5	H	-1.06	51.52	74.00	-22.48
5114.57	45.23	Ave	69	1.5	H	-1.06	44.17	54.00	-9.83
10400.00	40.57	PK	21	1.2	H	5.21	45.78	74.00	-28.22
10400.00	36.99	Ave	21	1.2	H	5.21	42.20	54.00	-11.80

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
802.11a U-NII-1 High channel 5240MHz									
235.62	41.52	QP	132	1.1	H	-11.62	29.90	46.00	-16.10
235.62	36.59	QP	56	1.9	V	-11.62	24.97	46.00	-21.03
4538.02	48.86	PK	138	1.1	H	-2.24	46.62	74.00	-27.38
4538.02	43.03	Ave	138	1.1	H	-2.24	40.79	54.00	-13.21
5148.99	52.84	PK	205	1.2	H	-1.09	51.75	74.00	-22.25
5148.99	47.09	Ave	205	1.2	H	-1.09	46.00	54.00	-8.00
10480.00	39.94	PK	290	1.1	H	5.14	45.08	74.00	-28.92
10480.00	38.85	Ave	290	1.1	H	5.14	43.99	54.00	-10.01
802.11a U-NII-3 Low Channel 5745MHz									
235.62	42.02	QP	165	1.1	H	-11.62	30.40	46.00	-15.60
235.62	35.25	QP	139	1.5	V	-11.62	23.63	46.00	-22.37
4529.33	48.26	PK	109	1.1	H	-2.06	46.20	74.00	-27.80
4529.33	43.97	Ave	109	1.1	H	-2.06	41.91	54.00	-12.09
11490.00	40.42	PK	291	1.3	H	5.93	46.35	74.00	-27.65
11490.00	38.28	Ave	291	1.3	H	5.93	44.21	54.00	-9.79
5358.17	45.64	PK	328	1.7	H	-1.25	44.39	74.00	-29.61
5358.17	38.37	Ave	328	1.7	H	-1.25	37.12	54.00	-16.88

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
802.11a U-NII-3 Middle channel 5785MHz									
235.62	42.21	QP	48	1.8	H	-11.62	30.59	46.00	-15.41
235.62	35.39	QP	238	1.3	V	-11.62	23.77	46.00	-22.23
4506.55	47.87	PK	108	1.2	H	-2.03	45.84	74.00	-28.16
4506.55	43.14	Ave	108	1.2	H	-2.03	41.11	54.00	-12.89
11570.00	39.83	PK	117	1.6	H	5.81	45.64	74.00	-28.36
11570.00	38.90	Ave	117	1.6	H	5.81	44.71	54.00	-9.29
5356.22	45.49	PK	278	1.2	H	-1.22	44.27	74.00	-29.73
5356.22	38.13	Ave	278	1.2	H	-1.22	36.91	54.00	-17.09
802.11a U-NII-3 High channel 5825MHz									
235.62	42.04	QP	178	1.5	H	-11.62	30.42	46.00	-15.58
235.62	35.69	QP	279	1.0	V	-11.62	24.07	46.00	-21.93
4516.52	47.72	PK	75	2.0	H	-1.84	45.88	74.00	-28.12
4516.52	41.92	Ave	75	2.0	H	-1.84	40.08	54.00	-13.92
11650.00	40.81	PK	49	1.4	H	5.84	46.65	74.00	-27.35
11650.00	37.21	Ave	49	1.4	H	5.84	43.05	54.00	-10.95
5358.32	46.73	PK	256	1.7	H	-1.30	45.43	74.00	-28.57
5358.32	37.70	Ave	256	1.7	H	-1.30	36.40	54.00	-17.60



Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
802.11n(HT20) U-NII-1 Low Channel 5180MHz									
235.62	41.47	QP	7	1.5	H	-11.62	29.85	46.00	-16.15
235.62	36.44	QP	98	1.3	V	-11.62	24.82	46.00	-21.18
4528.38	48.96	PK	75	1.2	H	-2.14	46.82	74.00	-27.18
4528.38	41.17	Ave	75	1.2	H	-2.14	39.03	54.00	-14.97
5146.32	45.53	PK	131	1.1	H	-1.06	44.47	74.00	-29.53
5146.32	37.72	Ave	131	1.1	H	-1.06	36.66	54.00	-17.34
10360.00	42.36	PK	242	1.9	H	5.33	47.69	74.00	-26.31
10360.00	38.17	Ave	242	1.9	H	5.33	43.50	54.00	-10.50
802.11n(HT20) U-NII-1 Middle channel 5200MHz									
235.62	41.90	QP	321	1.4	H	-11.62	30.28	46.00	-15.72
235.62	37.76	QP	233	1.0	V	-11.62	26.14	46.00	-19.86
4532.16	47.85	PK	338	1.1	H	-2.12	45.73	74.00	-28.27
4532.16	39.77	Ave	338	1.1	H	-2.12	37.65	54.00	-16.35
5134.95	46.06	PK	305	1.7	H	-1.06	45.00	74.00	-29.00
5134.95	38.09	Ave	305	1.7	H	-1.06	37.03	54.00	-16.97
10400.00	39.87	PK	268	1.8	H	5.21	45.08	74.00	-28.92
10400.00	38.68	Ave	268	1.8	H	5.21	43.89	54.00	-10.11

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
802.11n(HT20) U-NII-1 High channel 5240MHz									
235.62	42.79	QP	325	1.8	H	-11.62	31.17	46.00	-14.83
235.62	36.56	QP	50	1.8	V	-11.62	24.94	46.00	-21.06
4527.15	46.98	PK	139	1.9	H	-1.96	45.02	74.00	-28.98
4527.15	38.83	Ave	139	1.9	H	-1.96	36.87	54.00	-17.13
5116.43	45.66	PK	283	1.5	H	-1.06	44.60	74.00	-29.40
5116.43	37.72	Ave	283	1.5	H	-1.06	36.66	54.00	-17.34
10480.00	41.71	PK	123	1.5	H	5.14	46.85	74.00	-27.15
10480.00	36.52	Ave	123	1.5	H	5.14	41.66	54.00	-12.34
802.11n(HT20) U-NII-3 Low Channel 5745MHz									
235.62	44.25	QP	190	1.6	H	-11.62	32.63	46.00	-13.37
235.62	36.53	QP	268	1.3	V	-11.62	24.91	46.00	-21.09
4520.52	44.84	PK	196	1.0	H	-1.85	42.99	74.00	-31.01
4520.52	35.94	Ave	196	1.0	H	-1.85	34.09	54.00	-19.91
11490.00	38.15	PK	203	1.7	H	5.93	44.08	74.00	-29.92
11490.00	35.94	Ave	203	1.7	H	5.93	41.87	54.00	-12.13
5369.10	46.48	PK	73	1.8	H	-1.01	45.47	74.00	-28.53
5369.10	37.28	Ave	73	1.8	H	-1.01	36.27	54.00	-17.73

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
802.11n(HT20) U-NII-3 Middle channel 5785MHz									
235.62	43.83	QP	82	1.7	H	-11.62	32.21	46.00	-13.79
235.62	36.11	QP	312	1.2	V	-11.62	24.49	46.00	-21.51
4528.21	44.39	PK	110	1.3	H	-1.89	42.50	74.00	-31.50
4528.21	36.81	Ave	110	1.3	H	-1.89	34.92	54.00	-19.08
11570.00	40.15	PK	306	1.9	H	5.81	45.96	74.00	-28.04
11570.00	37.28	Ave	306	1.9	H	5.81	43.09	54.00	-10.91
5365.07	45.82	PK	227	1.7	H	-1.04	44.78	74.00	-29.22
5365.07	37.60	Ave	227	1.7	H	-1.04	36.56	54.00	-17.44
802.11n(HT20) U-NII-3 High channel 5825MHz									
235.62	42.96	QP	53	1.6	H	-11.62	31.34	46.00	-14.66
235.62	36.16	QP	55	1.0	V	-11.62	24.54	46.00	-21.46
4538.35	44.87	PK	360	1.4	H	-1.97	42.90	74.00	-31.10
4538.35	36.49	Ave	360	1.4	H	-1.97	34.52	54.00	-19.48
11650.00	41.04	PK	60	1.8	H	5.84	46.88	74.00	-27.12
11650.00	36.75	Ave	60	1.8	H	5.84	42.59	54.00	-11.41
5374.49	45.59	PK	297	1.5	H	-1.12	44.47	74.00	-29.53
5374.49	37.61	Ave	297	1.5	H	-1.12	36.49	54.00	-17.51

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
802.11n(HT40) U-NII-1 Low Channel 5190MHz									
235.62	42.64	QP	16	2.0	H	-11.62	31.02	46.00	-14.98
235.62	35.48	QP	37	1.4	V	-11.62	23.86	46.00	-22.14
4535.87	42.55	PK	211	1.4	H	-1.86	40.69	74.00	-33.31
4535.87	34.09	Ave	211	1.4	H	-1.86	32.23	54.00	-21.77
5120.90	46.22	PK	324	1.7	H	-1.06	45.16	74.00	-28.84
5120.90	37.14	Ave	324	1.7	H	-1.06	36.08	54.00	-17.92
10360.00	39.81	PK	359	1.1	H	5.33	45.14	74.00	-28.86
10360.00	35.12	Ave	359	1.1	H	5.33	40.45	54.00	-13.55
802.11n(HT40) U-NII-1 High channel 5230MHz									
235.62	42.85	QP	338	1.8	H	-11.62	31.23	46.00	-14.77
235.62	34.86	QP	17	1.3	V	-11.62	23.24	46.00	-22.76
4504.01	41.70	PK	317	1.5	H	-1.82	39.88	74.00	-34.12
4504.01	34.52	Ave	317	1.5	H	-1.82	32.70	54.00	-21.30
5130.23	46.38	PK	130	1.1	H	-1.06	45.32	74.00	-28.68
5130.23	36.75	Ave	130	1.1	H	-1.06	35.69	54.00	-18.31
10400.00	40.66	PK	54	1.3	H	5.21	45.87	74.00	-28.13
10400.00	37.16	Ave	54	1.3	H	5.21	42.37	54.00	-11.63

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
802.11n(HT40) U-NII-3 Low Channel 5755MHz									
235.62	42.34	QP	214	2.0	H	-11.62	30.72	46.00	-15.28
235.62	35.31	QP	155	1.3	V	-11.62	23.69	46.00	-22.31
4536.36	41.35	PK	75	1.5	H	-1.81	39.54	74.00	-34.46
4536.36	34.89	Ave	75	1.5	H	-1.81	33.08	54.00	-20.92
5123.80	45.65	PK	328	1.4	H	-1.06	44.59	74.00	-29.41
5123.80	36.69	Ave	328	1.4	H	-1.06	35.63	54.00	-18.37
10480.00	41.77	PK	4	1.1	H	5.14	46.91	74.00	-27.09
10480.00	37.05	Ave	4	1.1	H	5.14	42.19	54.00	-11.81
802.11n(HT40) U-NII-3 High channel 5795MHz									
235.62	42.82	QP	358	1.6	H	-11.62	31.20	46.00	-14.80
235.62	33.89	QP	114	2.0	V	-11.62	22.27	46.00	-23.73
4504.24	39.69	PK	134	1.1	H	-1.92	37.77	74.00	-36.23
4504.24	31.93	Ave	134	1.1	H	-1.92	30.01	54.00	-23.99
11490.00	38.83	PK	211	2.0	H	5.93	44.76	74.00	-29.24
11490.00	35.83	Ave	211	2.0	H	5.93	41.76	54.00	-12.24
5360.52	45.43	PK	236	1.4	H	-1.03	44.40	74.00	-29.60
5360.52	39.94	Ave	236	1.4	H	-1.03	38.91	54.00	-15.09

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
802.11ac(HT20) U-NII-1 Low Channel 5180MHz									
235.62	43.38	QP	52	1.6	H	-11.62	31.76	46.00	-14.24
235.62	33.29	QP	47	1.3	V	-11.62	21.67	46.00	-24.33
4501.56	40.15	PK	283	1.0	H	-1.97	38.18	74.00	-35.82
4501.56	32.67	Ave	283	1.0	H	-1.97	30.70	54.00	-23.30
11570.00	40.85	PK	310	1.6	H	5.81	46.66	74.00	-27.34
11570.00	38.22	Ave	310	1.6	H	5.81	44.03	54.00	-9.97
5371.81	45.28	PK	222	1.7	H	-1.05	44.23	74.00	-29.77
5371.81	39.57	Ave	222	1.7	H	-1.05	38.52	54.00	-15.48
802.11ac(HT20) U-NII-1 Middle channel 5200MHz									
235.62	43.79	QP	322	1.5	H	-11.62	32.17	46.00	-13.83
235.62	33.97	QP	231	1.2	V	-11.62	22.35	46.00	-23.65
4519.54	40.55	PK	141	1.2	H	-1.88	38.67	74.00	-35.33
4519.54	33.46	Ave	141	1.2	H	-1.88	31.58	54.00	-22.42
11650.00	41.53	PK	123	2.0	H	5.84	47.37	74.00	-26.63
11650.00	37.44	Ave	123	2.0	H	5.84	43.28	54.00	-10.72
5372.44	45.80	PK	127	2.0	H	-1.06	44.74	74.00	-29.26
5372.44	37.05	Ave	127	2.0	H	-1.06	35.99	54.00	-18.01

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
802.11ac(HT20) U-NII-1 High channel 5240MHz									
235.62	44.85	QP	194	1.5	H	-11.62	33.23	46.00	-12.77
235.62	35.38	QP	150	1.7	V	-11.62	23.76	46.00	-22.24
4510.15	38.83	PK	24	1.2	H	-1.89	36.94	74.00	-37.06
4510.15	31.52	Ave	24	1.2	H	-1.89	29.63	54.00	-24.37
5146.97	46.71	PK	28	1.1	H	-1.06	45.65	74.00	-28.35
5146.97	38.73	Ave	28	1.1	H	-1.06	37.67	54.00	-16.33
10380.00	38.85	PK	67	1.5	H	5.26	44.11	74.00	-29.89
10380.00	34.90	Ave	67	1.5	H	5.26	40.16	54.00	-13.84
802.11ac(HT20) U-NII-3 Low Channel 5745MHz									
235.62	45.77	QP	183	1.0	H	-11.62	34.15	46.00	-11.85
235.62	35.62	QP	207	1.1	V	-11.62	24.00	46.00	-22.00
4534.48	38.81	PK	56	1.5	H	-1.94	36.87	74.00	-37.13
4534.48	31.44	Ave	56	1.5	H	-1.94	29.50	54.00	-24.50
5139.42	48.35	PK	10	1.3	H	-1.06	47.29	74.00	-26.71
5139.42	39.12	Ave	10	1.3	H	-1.06	38.06	54.00	-15.94
10460.00	41.88	PK	204	1.3	H	5.28	47.16	74.00	-26.84
10480.00	38.37	Ave	204	1.3	H	5.28	43.65	54.00	-10.35

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
802.11ac(HT20) U-NII-3 Middle channel 5785MHz									
235.62	46.54	QP	160	1.8	H	-11.62	34.92	74.00	-39.08
235.62	35.55	QP	207	1.1	V	-11.62	23.93	74.00	-50.07
4505.11	37.08	PK	139	1.8	H	-1.96	35.12	74.00	-38.88
4505.11	29.78	Ave	139	1.8	H	-1.96	27.82	54.00	-26.18
11510.00	39.46	PK	301	1.1	H	5.88	45.34	74.00	-28.66
11510.00	36.04	Ave	301	1.1	H	5.88	41.92	54.00	-12.08
5357.82	46.38	PK	49	2.0	H	-1.01	45.37	74.00	-28.63
5357.82	38.95	Ave	49	2.0	H	-1.01	37.94	54.00	-16.06
802.11ac(HT20) U-NII-3 High channel 5825MHz									
235.62	46.58	QP	116	1.8	H	-11.62	34.96	74.00	-39.04
235.62	36.27	QP	80	1.9	V	-11.62	24.65	74.00	-49.35
4526.54	37.83	PK	71	1.8	H	-1.92	35.91	74.00	-38.09
4526.54	29.45	Ave	71	1.8	H	-1.92	27.53	54.00	-26.47
11590.00	40.69	PK	240	1.4	H	5.63	46.32	74.00	-27.68
11590.00	37.86	Ave	240	1.4	H	5.63	43.49	54.00	-10.51
5374.85	45.03	PK	224	1.0	H	-1.04	43.99	74.00	-30.01
5374.85	39.93	Ave	224	1.0	H	-1.04	38.89	54.00	-15.11



Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
802.11ac(HT40) U-NII-1 Low Channel 5190MHz									
235.62	45.21	QP	263	1.4	H	-11.62	33.59	74.00	-40.41
235.62	36.48	QP	356	1.7	V	-11.62	24.86	74.00	-49.14
4501.35	36.42	PK	287	1.7	H	-1.91	34.51	74.00	-39.49
4501.35	27.33	Ave	287	1.7	H	-1.91	25.42	54.00	-28.58
5142.01	48.00	PK	301	1.1	H	-1.06	46.94	74.00	-27.06
5142.01	39.53	Ave	301	1.1	H	-1.06	38.47	54.00	-15.53
10380.00	39.09	PK	156	1.7	H	5.26	44.35	74.00	-29.65
10380.00	36.58	Ave	156	1.7	H	5.26	41.84	54.00	-12.16
802.11ac(HT40) U-NII-1 High channel 5230MHz									
235.62	45.08	QP	183	1.7	H	-11.62	33.46	74.00	-40.54
235.62	36.67	QP	298	1.9	V	-11.62	25.05	74.00	-48.95
4509.57	36.67	PK	14	1.9	H	-1.93	34.74	74.00	-39.26
4509.57	27.91	Ave	14	1.9	H	-1.93	25.98	54.00	-28.02
5111.29	48.75	PK	306	1.9	H	-1.06	47.69	74.00	-26.31
5111.29	39.19	Ave	306	1.9	H	-1.06	38.13	54.00	-15.87
10460.00	40.13	PK	204	1.2	H	5.28	45.41	74.00	-28.59
10480.00	37.03	Ave	204	1.2	H	5.28	42.31	54.00	-11.69

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
802.11ac(HT40) U-NII-3 Low Channel 5755MHz									
235.62	44.64	QP	348	1.7	H	-11.62	33.02	74.00	-40.98
235.62	35.99	QP	252	2.0	V	-11.62	24.37	74.00	-49.63
4507.78	33.74	PK	37	1.5	H	-1.92	31.82	74.00	-42.18
4507.78	25.10	Ave	37	1.5	H	-1.92	23.18	54.00	-30.82
11510.00	38.99	PK	244	1.2	H	5.88	44.87	74.00	-29.13
11510.00	35.69	Ave	244	1.2	H	5.88	41.57	54.00	-12.43
5352.52	46.43	PK	132	1.7	H	-1.07	45.36	74.00	-28.64
5352.52	38.83	Ave	132	1.7	H	-1.07	37.76	54.00	-16.24
802.11ac(HT40) U-NII-3 High channel 5795MHz									
235.62	44.90	QP	0	1.0	H	-11.62	33.28	74.00	-40.72
235.62	35.35	QP	261	1.0	V	-11.62	23.73	74.00	-50.27
4505.29	32.97	PK	116	1.7	H	-1.86	31.11	74.00	-42.89
4505.29	25.47	Ave	116	1.7	H	-1.86	23.61	54.00	-30.39
11590.00	40.18	PK	98	1.0	H	5.63	45.81	74.00	-28.19
11590.00	37.48	Ave	98	1.0	H	5.63	43.11	54.00	-10.89
5360.91	45.66	PK	69	1.2	H	-1.03	44.63	74.00	-29.37
5360.91	39.91	Ave	69	1.2	H	-1.03	38.88	54.00	-15.12

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
802.11ac(HT80) U-NII-1 Low Channel 5210MHz									
4523.49	38.38	QP	244	1.4	H	-11.62	26.76	74.00	-27.24
4523.49	35.51	QP	7	1.4	V	-11.62	23.89	74.00	-30.11
4523.40	32.77	PK	27	1.5	H	-1.88	30.89	74.00	-43.11
4523.40	39.70	Ave	27	1.5	H	-1.88	37.82	54.00	-16.18
5149.67	37.24	PK	25	1.7	H	-1.06	36.18	74.00	-37.82
5149.67	45.22	Ave	25	1.7	H	-1.06	44.16	54.00	-9.84
10420.00	41.03	PK	107	1.6	H	4.65	45.68	74.00	-28.32
10420.00	36.80	Ave	107	1.6	H	4.65	41.45	54.00	-12.55
802.11ac(HT80) U-NII-3 Low Channel 5775MHz									
4523.49	35.23	QP	245	1.9	H	-11.62	23.61	74.00	-50.39
4523.40	32.70	QP	306	1.3	V	-11.62	21.08	74.00	-52.92
4538.41	39.97	PK	276	1.8	H	-1.85	38.12	74.00	-35.88
4538.41	40.16	Ave	276	1.8	H	-1.85	38.31	54.00	-15.69
11550.00	40.91	PK	77	1.0	H	4.83	45.74	74.00	-28.26
11550.00	38.26	Ave	77	1.0	H	4.83	43.09	54.00	-10.91
5366.88	45.36	PK	58	1.1	H	-1.14	44.22	74.00	-29.78
5366.88	37.05	Ave	58	1.1	H	-1.14	35.91	54.00	-18.09

**Test Frequency: 18GHz~40GHz**

The measurements were more than 20 dB below the limit and not reported.

## 10 Duty cycle

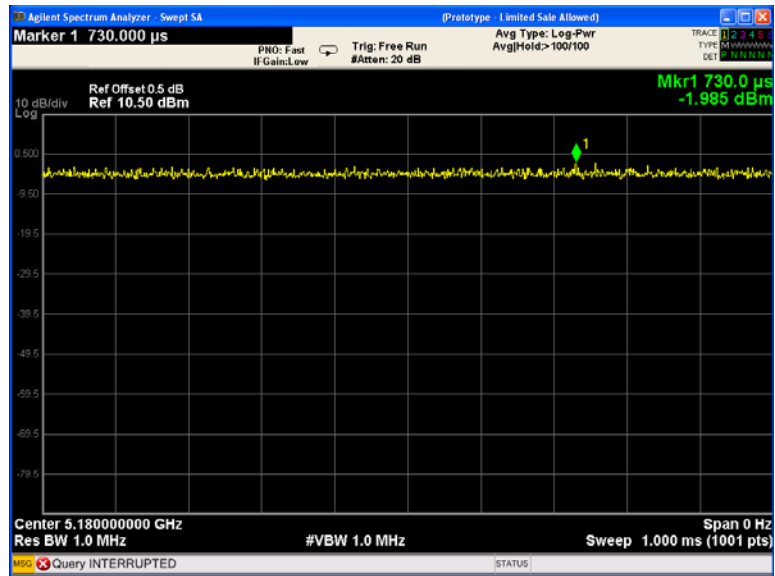
Test Requirement:	47 CFR Part 15C 15.407 KDB789033 D02 General U-NII Test Procedures New Rules v02r01, Section (B)
Test Method:	ANSI C63.10: 2013
Test Limit:	N/A
Test Result:	PASS
Remark:	Through Pre-scan, and found 802.11a at lowest channel is the worst case. Only the worst case is recorded in the report.

### 10.1 Summary of Test Results

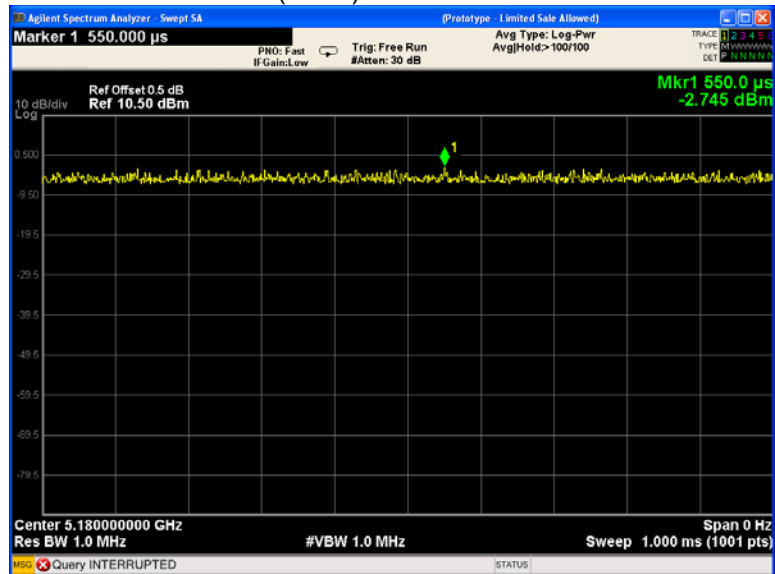
802.11a mode			
channel	On time(ms)	Period(ms)	Duty Cycle(%)
36	100	100	100
149	100	100	100
802.11n(HT20) mode			
channel	On time(ms)	Period(ms)	Duty Cycle(%)
36	100	100	100
149	100	100	100
802.11n(HT40) mode			
channel	On time(ms)	Period(ms)	Duty Cycle(%)
38	100	100	100
151	100	100	100
802.11ac(HT20) mode			
channel	On time(ms)	Period(ms)	Duty Cycle(%)
36	100	100	100
149	100	100	100
802.11ac(HT40) mode			
channel	On time(ms)	Period(ms)	Duty Cycle(%)
38	100	100	100
151	100	100	100
802.11ac(HT80) mode			
channel	On time(ms)	Period(ms)	Duty Cycle(%)
42	100	100	100
155	100	100	100

Test result plots shown as follows:

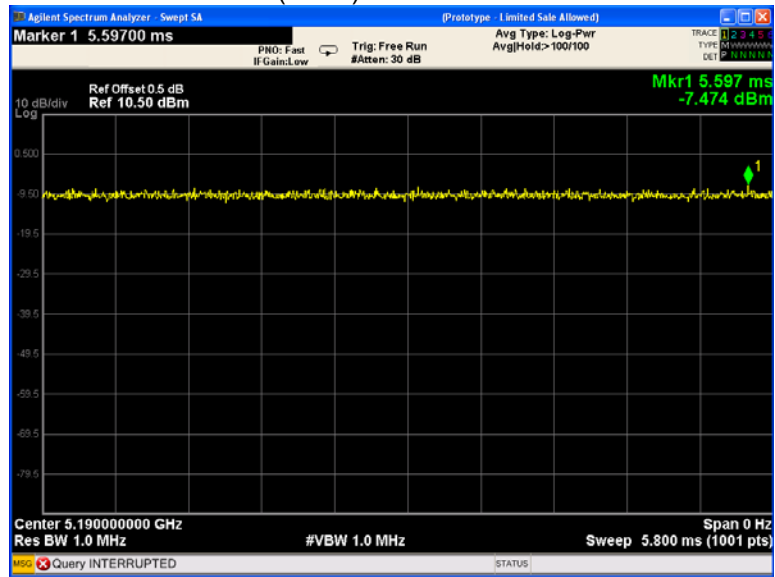
802.11a U-NII-1 Low channel



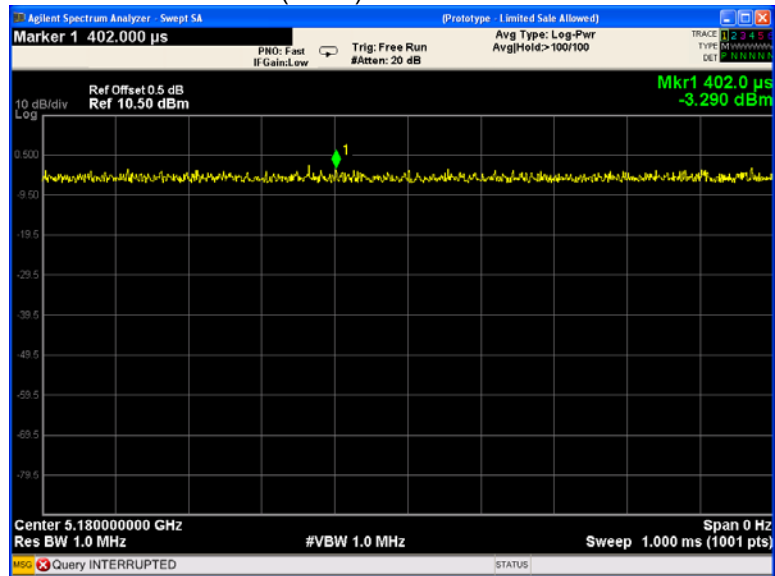
802.11n(HT20) U-NII-1 Low channel



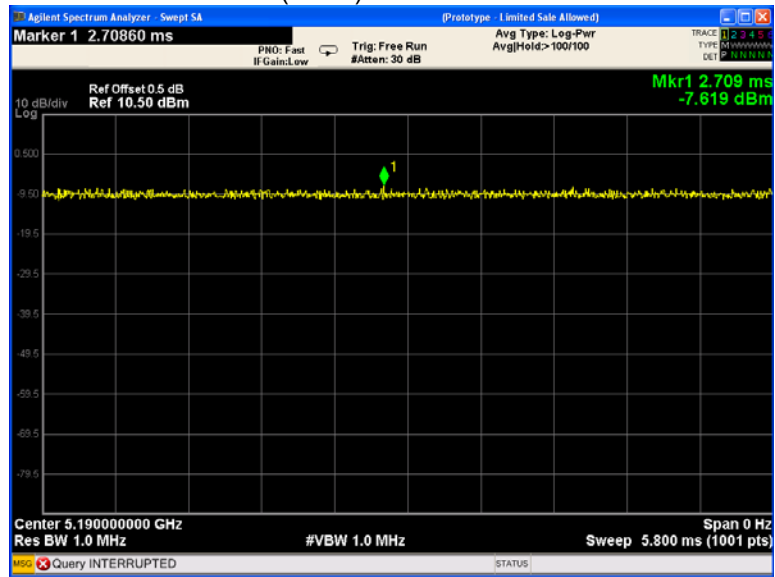
802.11n(HT40) U-NII-1 Low channel



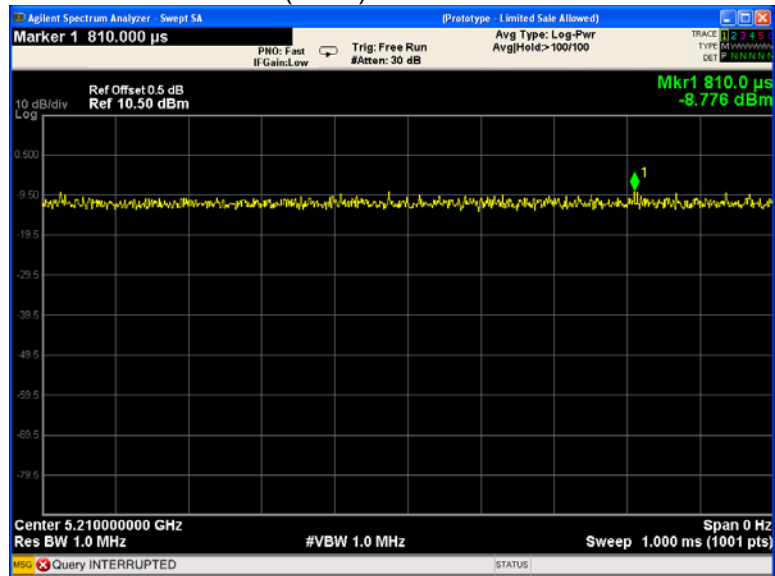
802.11ac(HT20) U-NII-1 Low channel



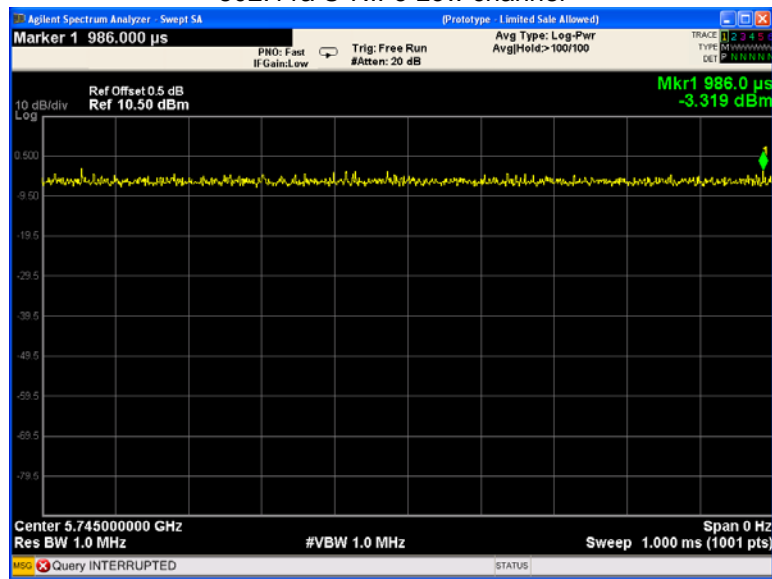
### 802.11ac(HT40) U-NII-1 Low channel



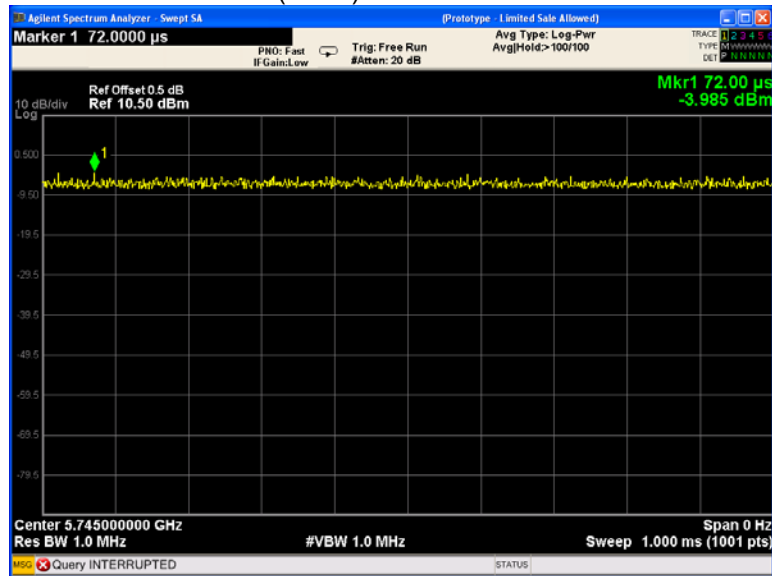
### 802.11ac(HT80) U-NII-1 Low channel



### 802.11a U-NII-3 Low channel

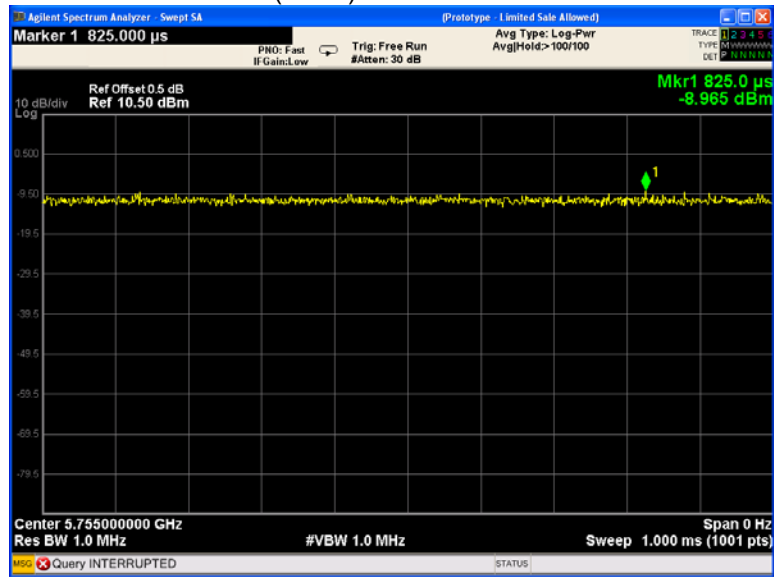


### 802.11n(HT20) U-NII-3 Low channel

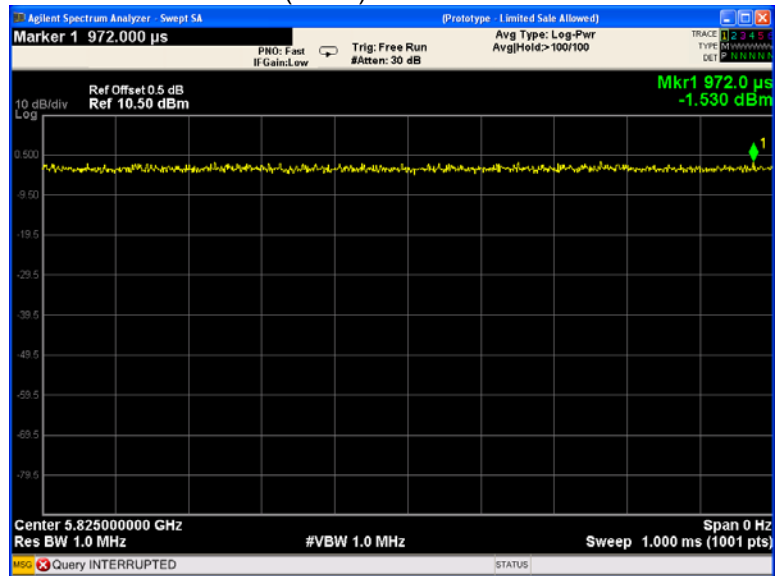




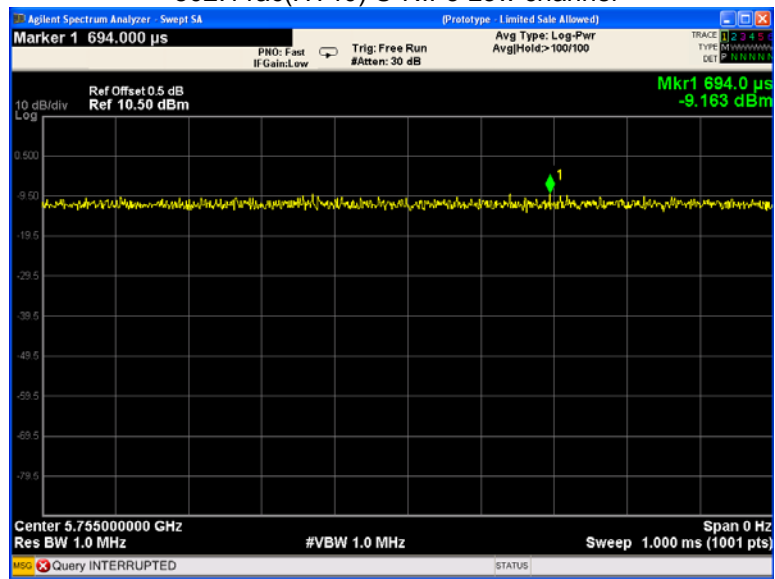
802.11n(HT40) U-NII-3 Low channel



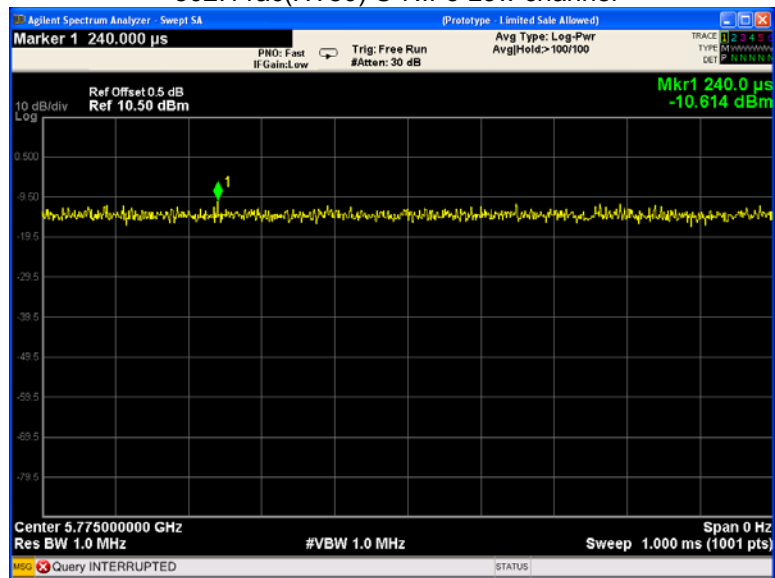
802.11ac(HT20) U-NII-3 Low channel



### 802.11ac(HT40) U-NII-3 Low channel



### 802.11ac(HT80) U-NII-3 Low channel



## 11 Band Edge

Test Requirement:	FCC CFR47 Part 15 Section 15.407
Test Method:	ANSI C63.10 2013
Test Limit:	(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of $-27\text{dBm/MHz}$ . (2) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of $-17\text{dBm/MHz}$ ; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of $-27\text{dBm/MHz}$ .
Test Result:	PASS

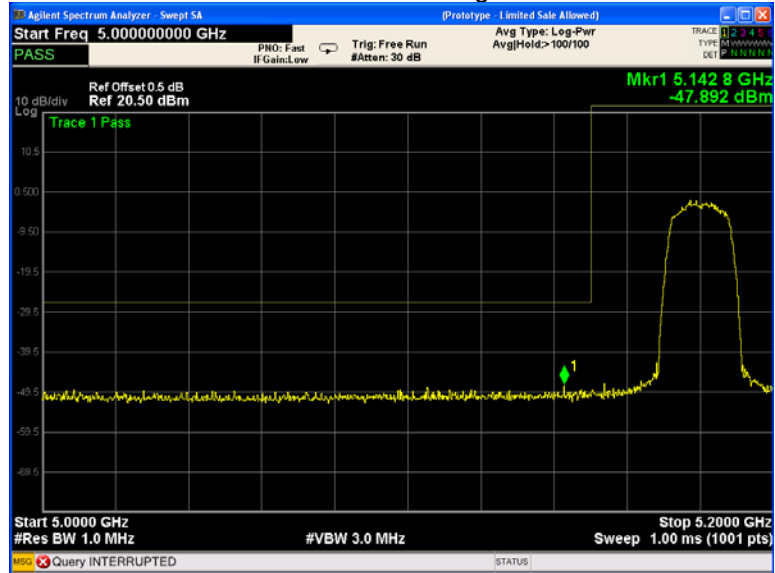
### 11.1 Test Produce

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

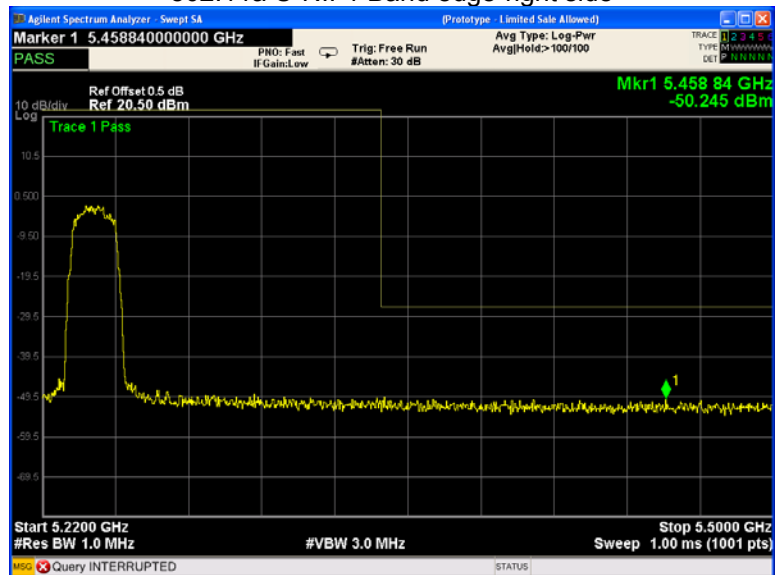
### 11.2 Test Result

Test result plots shown as follows:

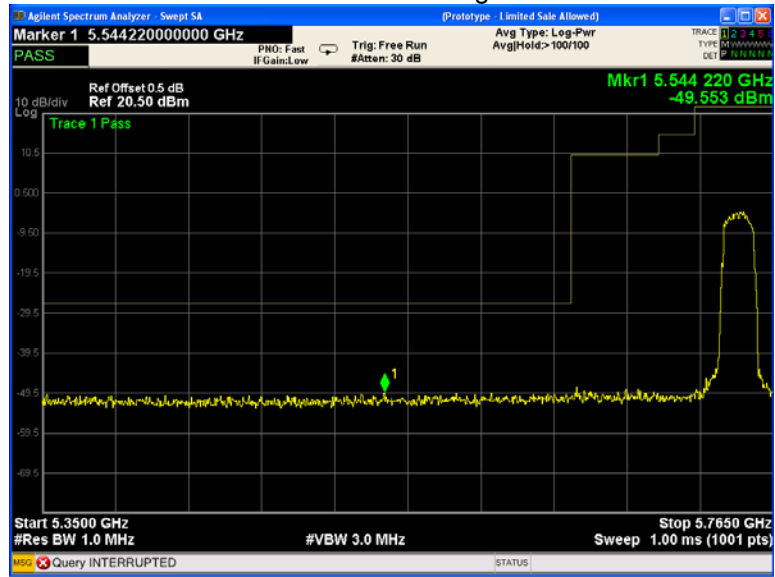
802.11a U-NII-1 Band edge-left side



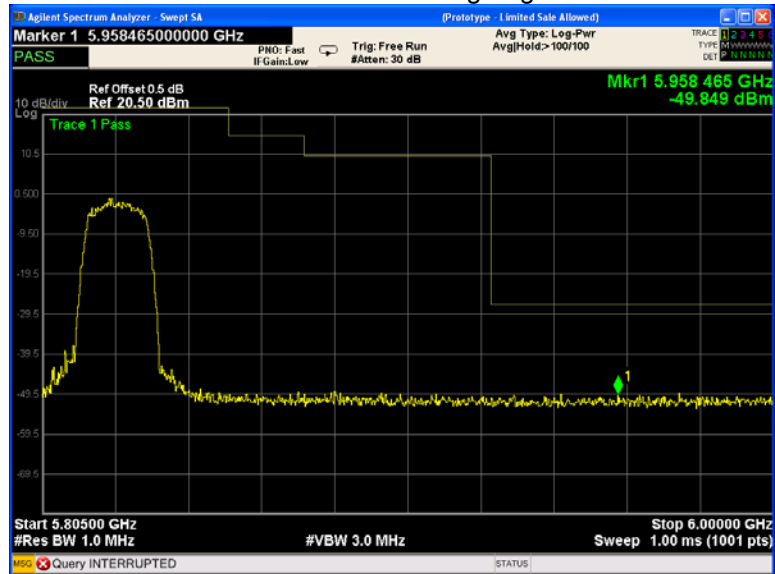
802.11a U-NII-1 Band edge-right side



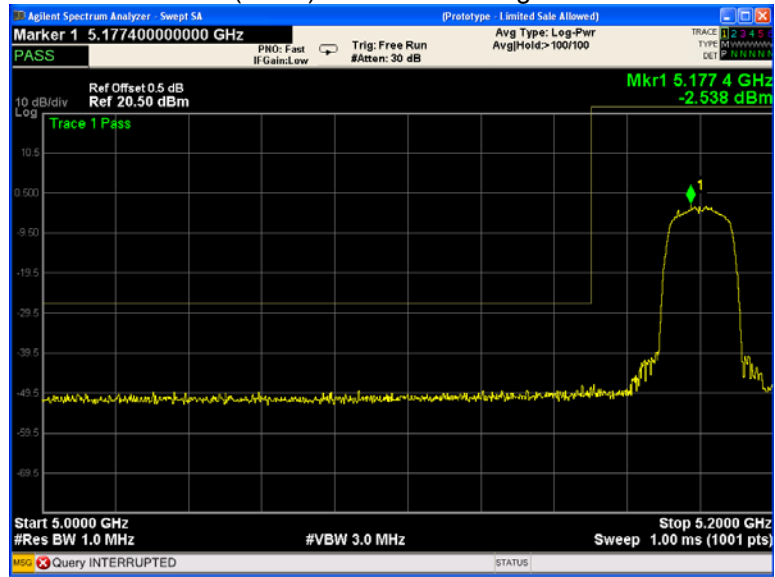
802.11a U-NII-3 Band edge-left side



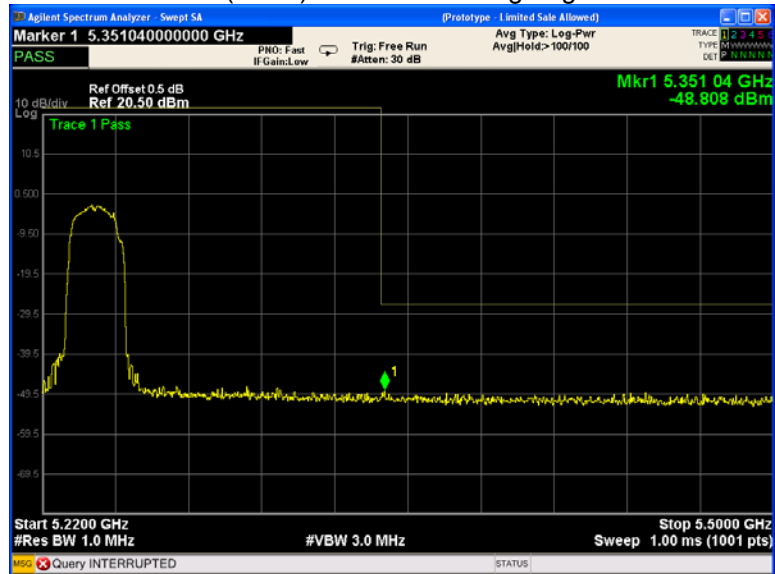
802.11a U-NII-3 Band edge-right side



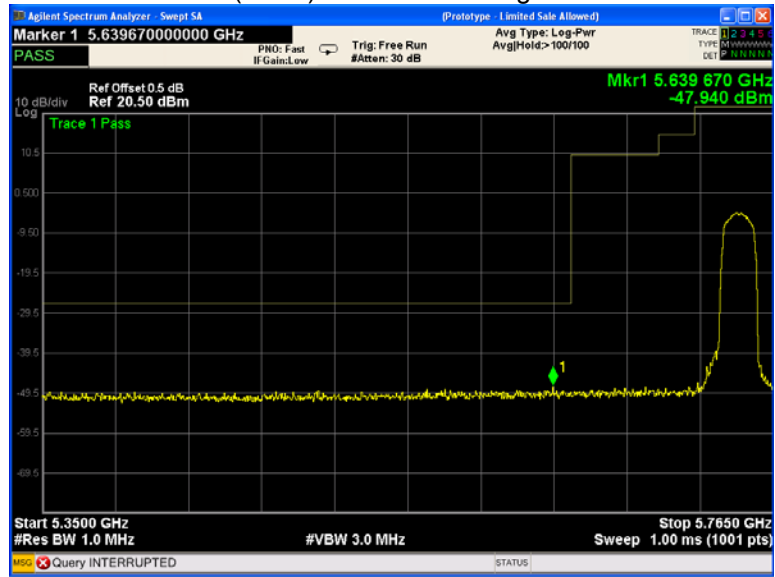
### 802.11n(HT20) U-NII-1 Band edge-left side



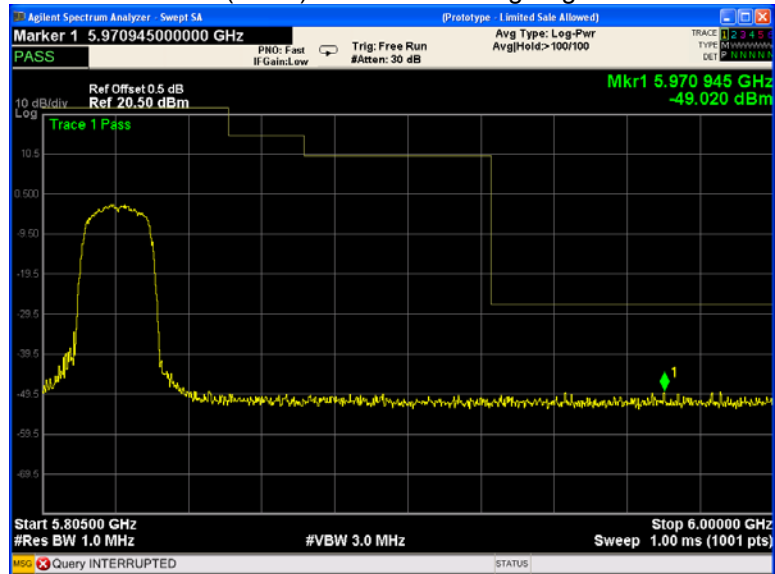
### 802.11n(HT20) U-NII-1 Band edge-right side



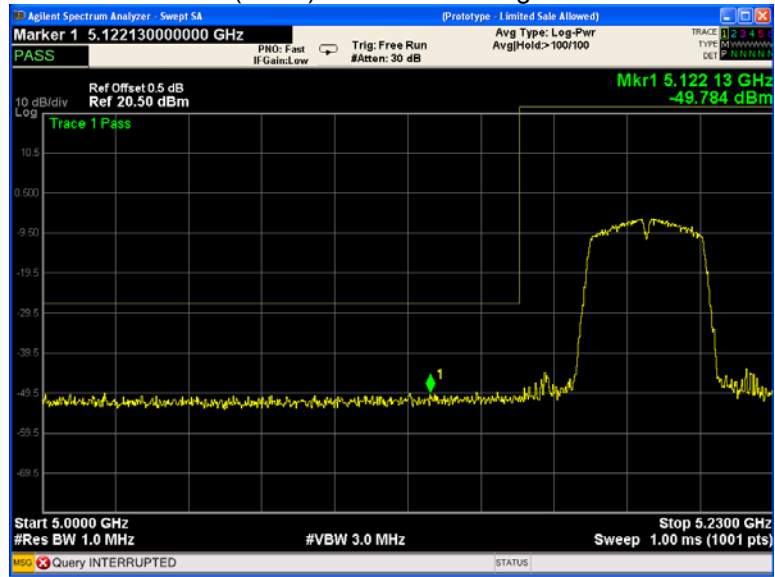
### 802.11n(HT20) U-NII-3 Band edge-left side



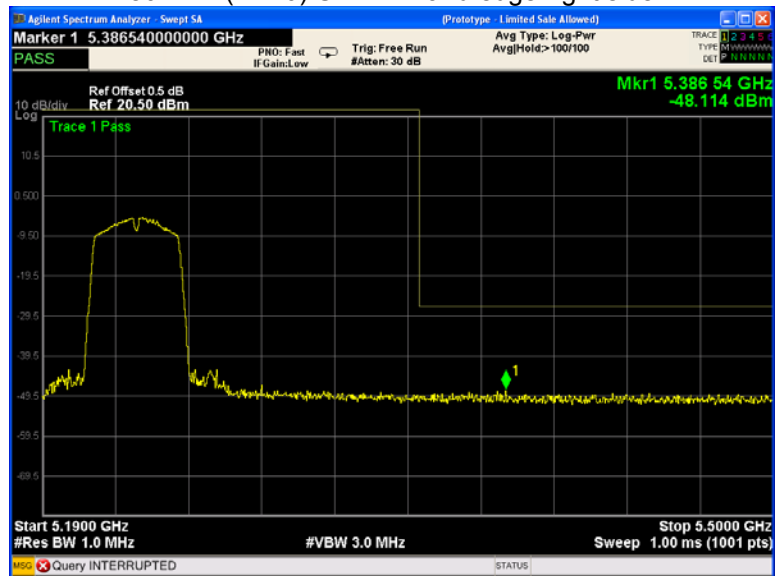
### 802.11n(HT20) U-NII-3 Band edge-right side



### 802.11n(HT40) U-NII-1 Band edge-left side

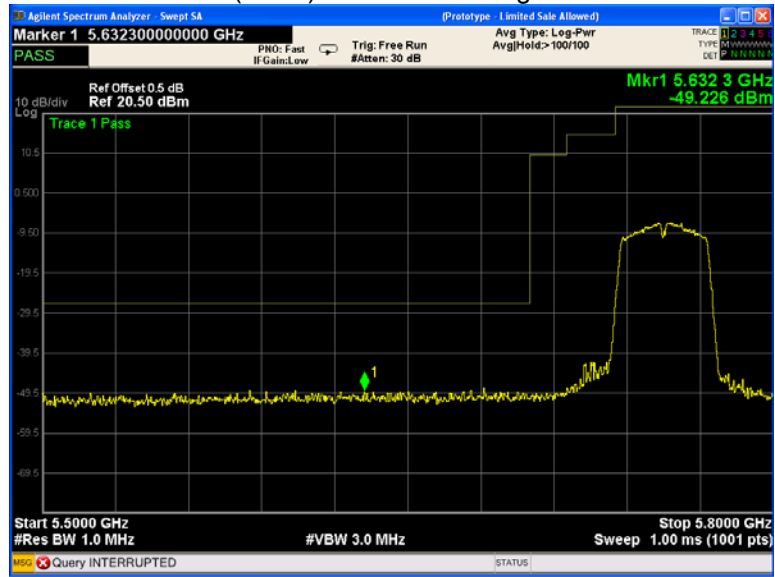


### 802.11n(HT40) U-NII-1 Band edge-right side

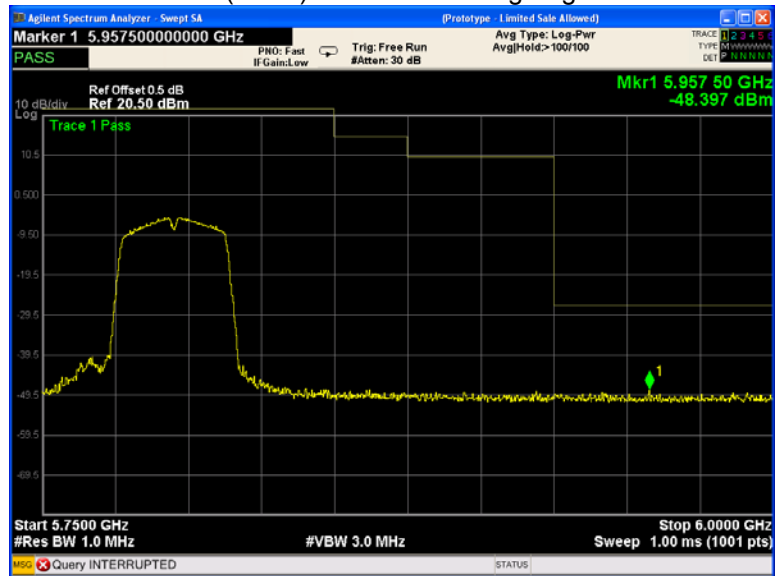




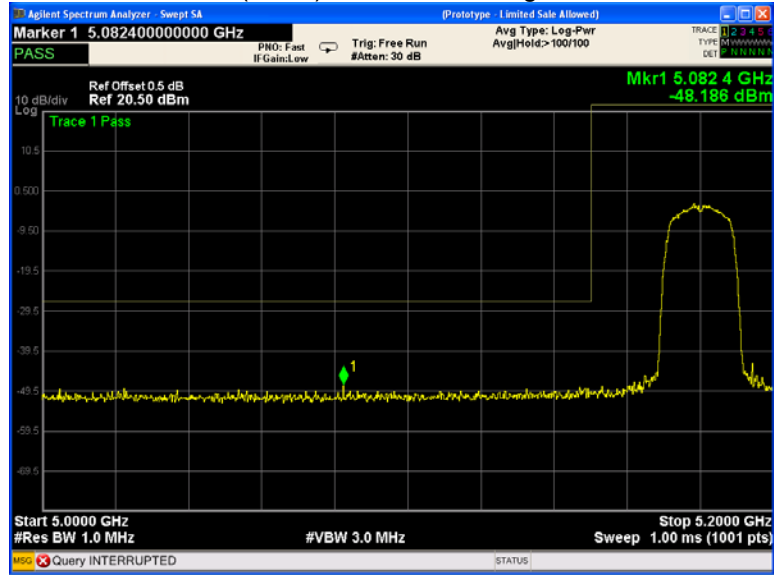
### 802.11n(HT40) U-NII-3 Band edge-left side



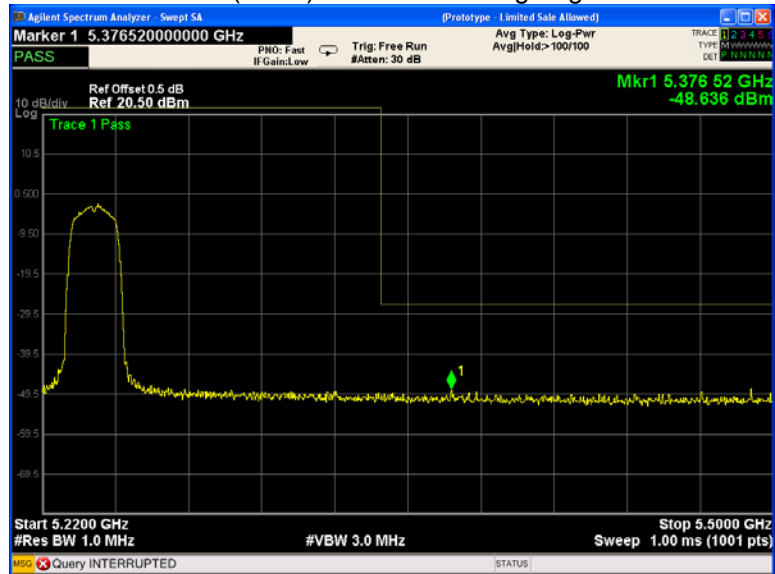
### 802.11n(HT40) U-NII-3 Band edge-right side



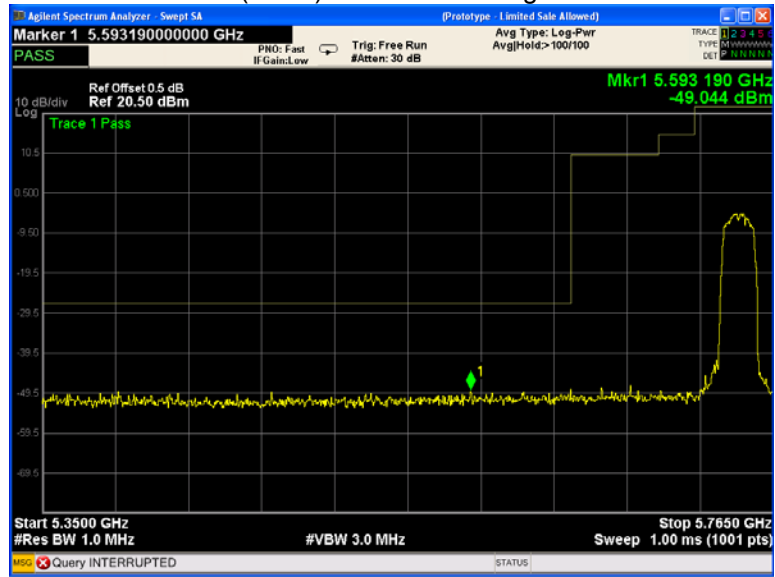
### 802.11ac(HT20) U-NII-1 Band edge-left side



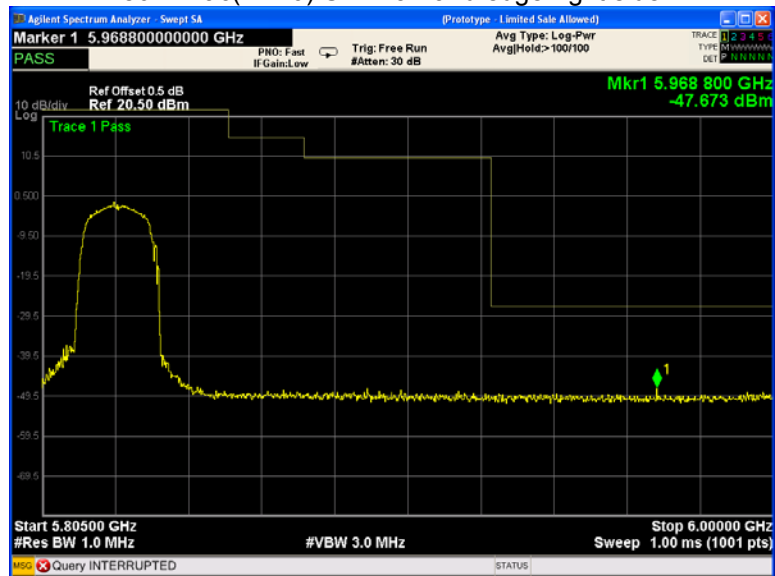
### 802.11ac(HT20) U-NII-1 Band edge-right side



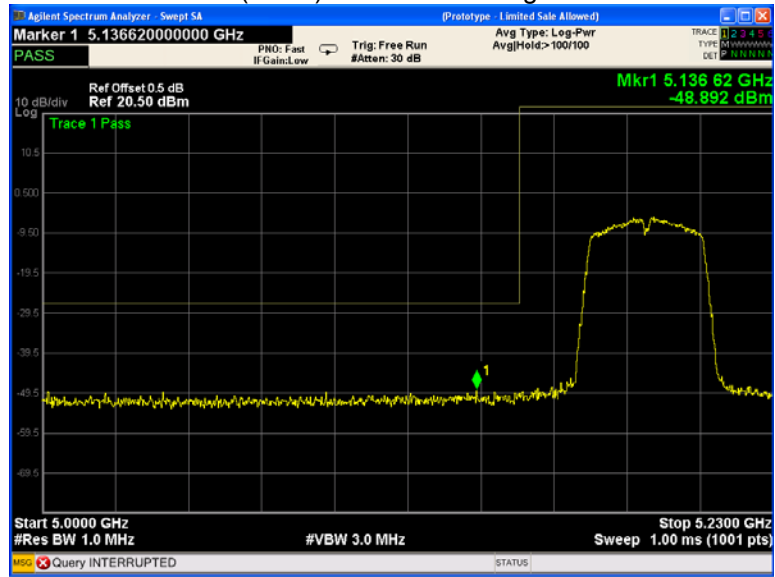
802.11ac(HT20) U-NII-3 Band edge-left side



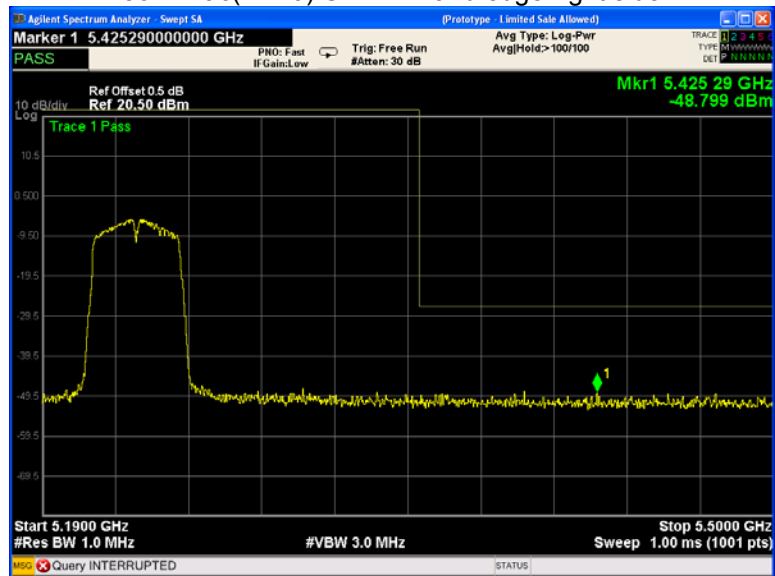
802.11ac(HT20) U-NII-3 Band edge-right side



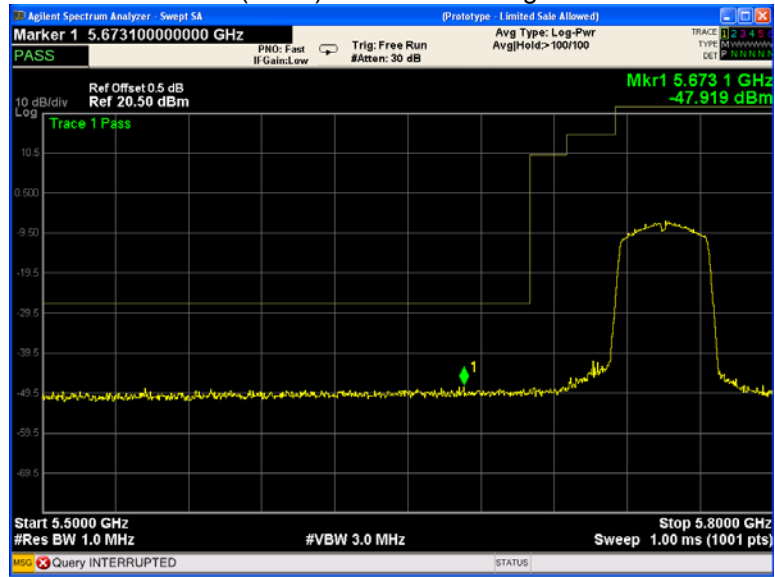
### 802.11ac(HT40) U-NII-1 Band edge-left side



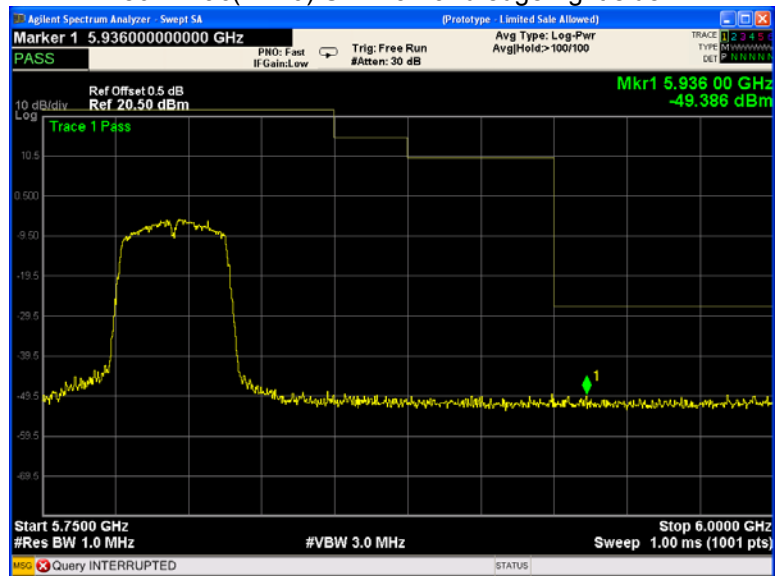
### 802.11ac(HT40) U-NII-1 Band edge-right side



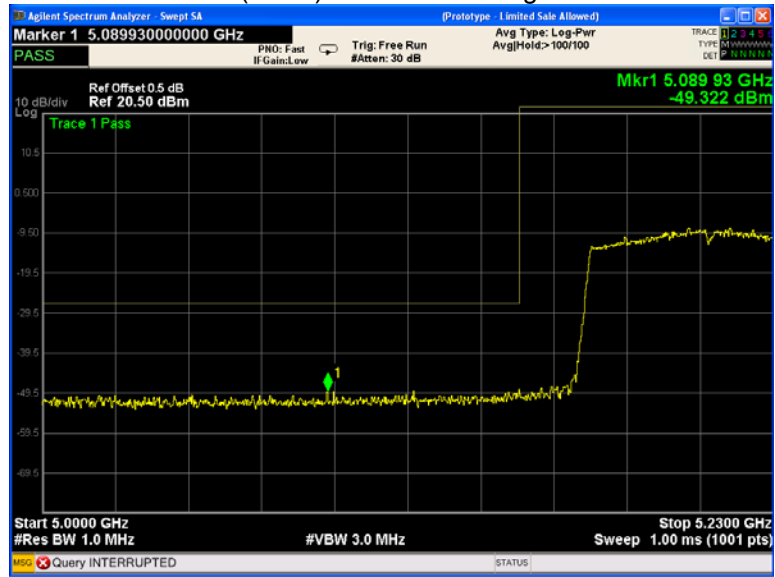
### 802.11ac(HT40) U-NII-3 Band edge-left side



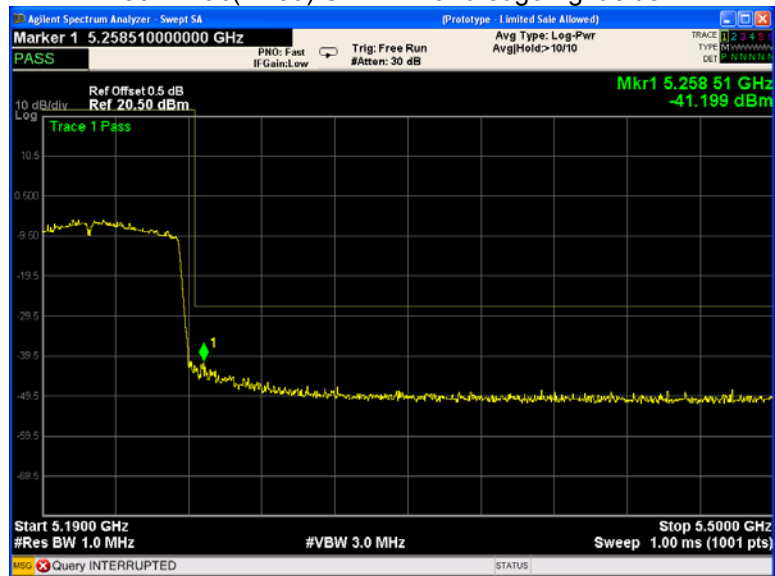
### 802.11ac(HT40) U-NII-3 Band edge-right side



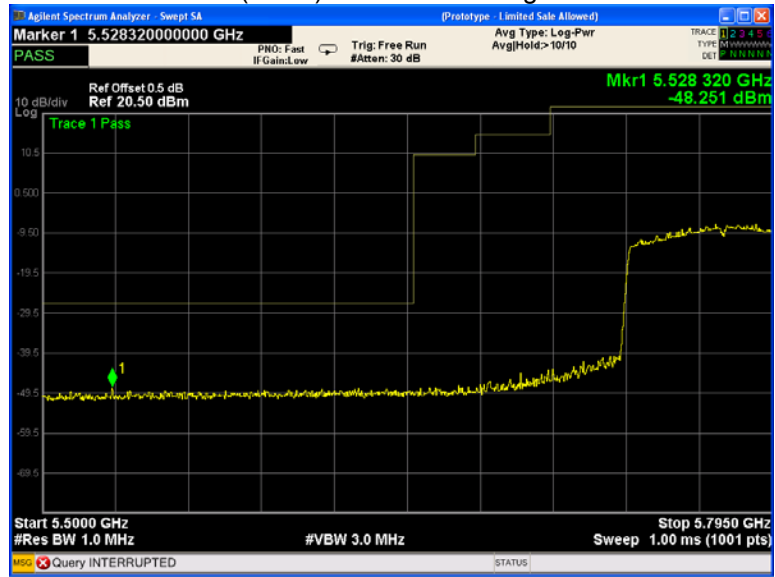
802.11ac(HT80) U-NII-1 Band edge-left side



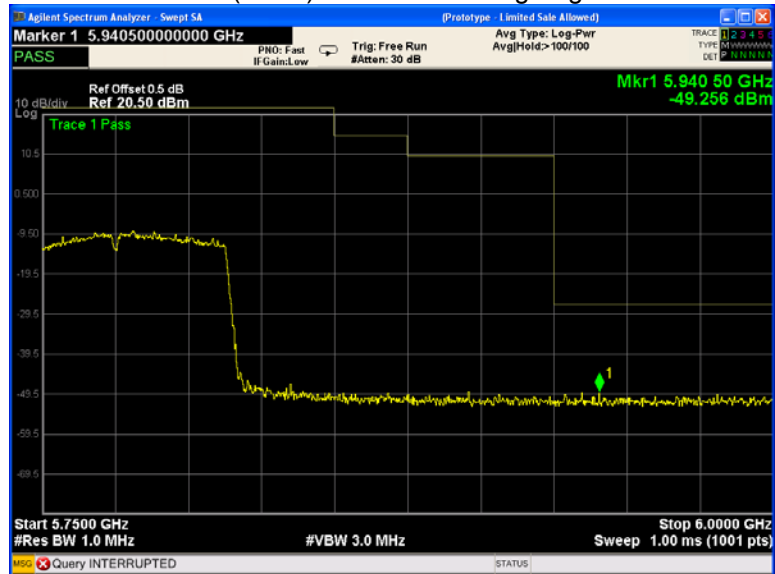
802.11ac(HT80) U-NII-1 Band edge-right side



### 802.11ac(HT80) U-NII-3 Band edge-left side



### 802.11ac(HT80) U-NII-3 Band edge-right side



## 12 6 dB Bandwidth

Test Requirement:	FCC CFR47 Part 15 Section 15.407(e) KDB662911 D01 Multiple Transmitter Output v02r01
Test Method:	KDB789033 D02 General U-NII Test Procedures New Rules v02r01 Section C
Test Limit:	≥ 500 kHz
Test Result:	PASS

### 12.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

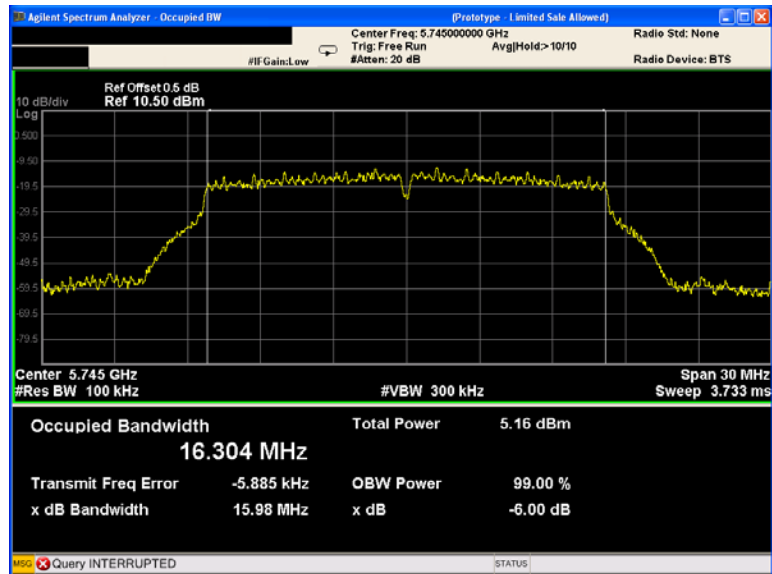
### 12.2 Test Result:

Band	Operation mode	6 dB Bandwidth (MHz)		
		Low	Middle	High
U-NII-3	802.11a	15.98	15.11	15.30
	802.11n(HT20)	13.89	14.39	14.97
	802.11n(HT40)	33.86	/	35.10
	802.11ac(HT20)	15.06	15.10	14.25
	802.11ac(HT40)	33.84	/	35.04
	802.11ac(HT80)	75.16	/	/

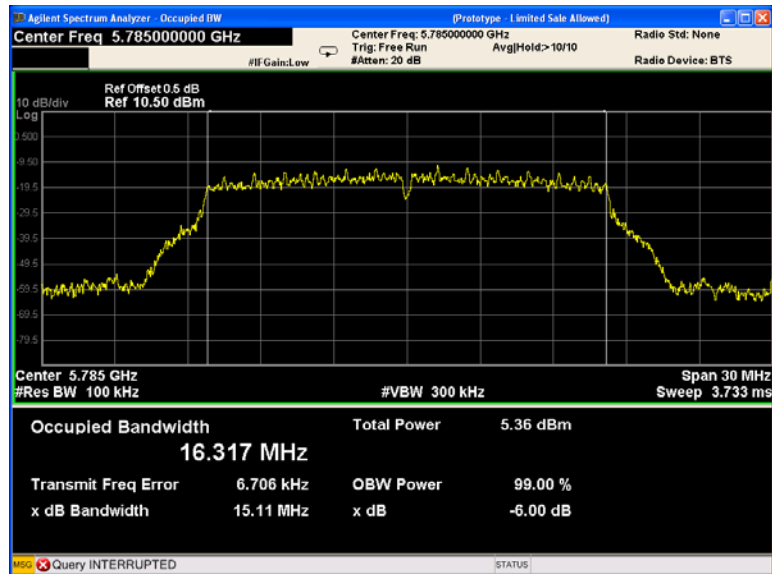


Test result plots shown as follows:

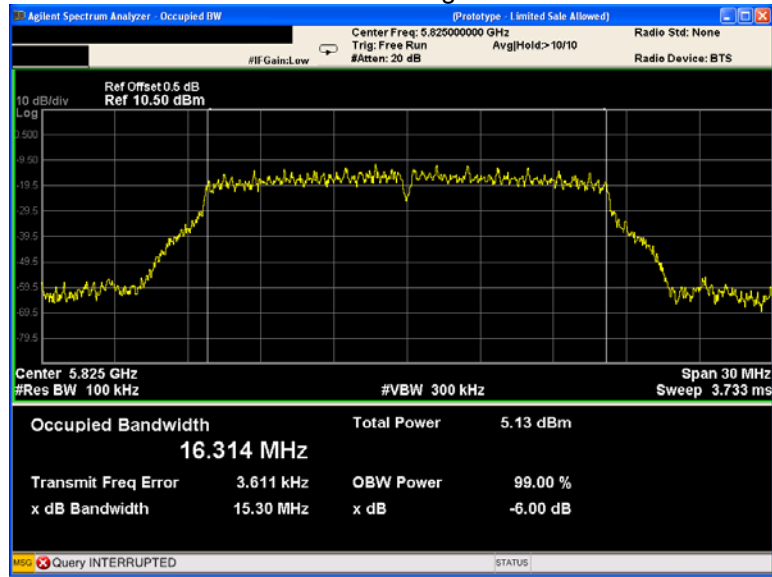
802.11a U-NII-3 Low channel



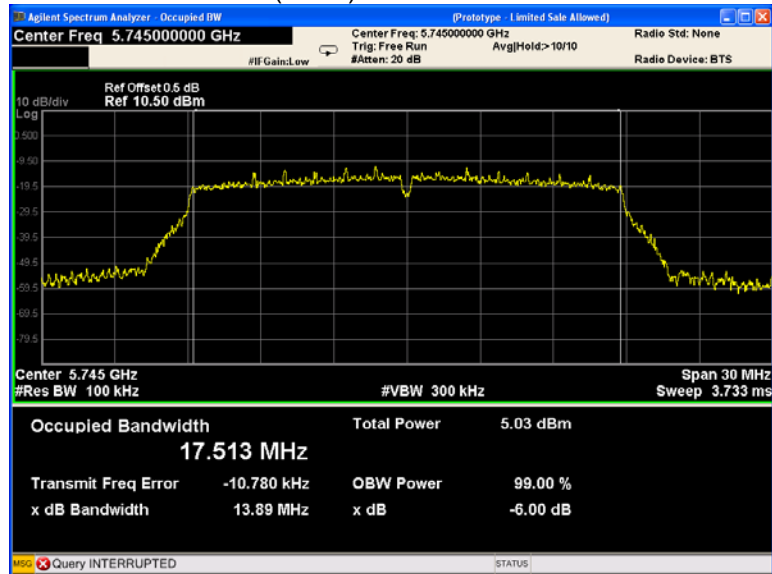
802.11a U-NII-3 Middle channel



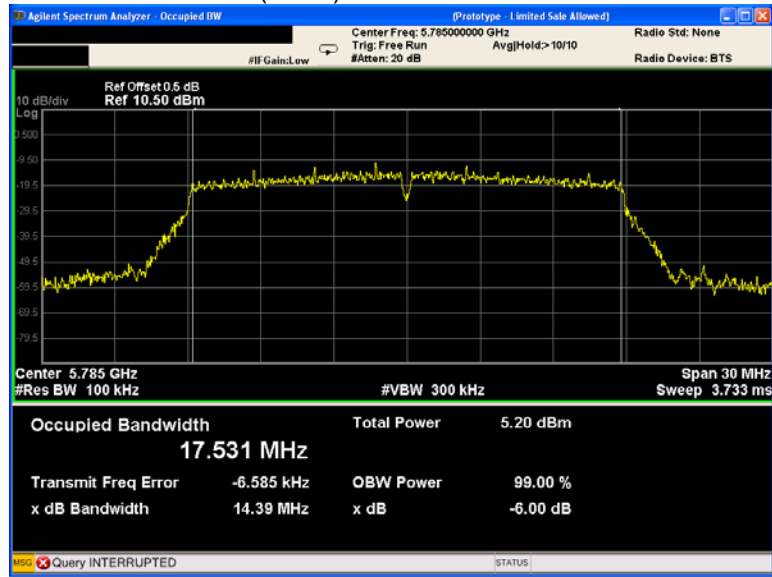
### 802.11a U-NII-3 High channel



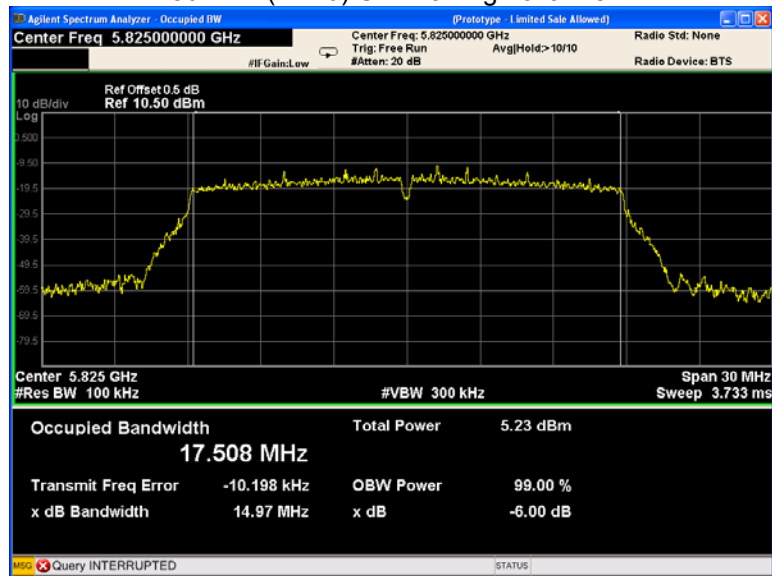
### 802.11n(HT20) U-NII-3 Low channel



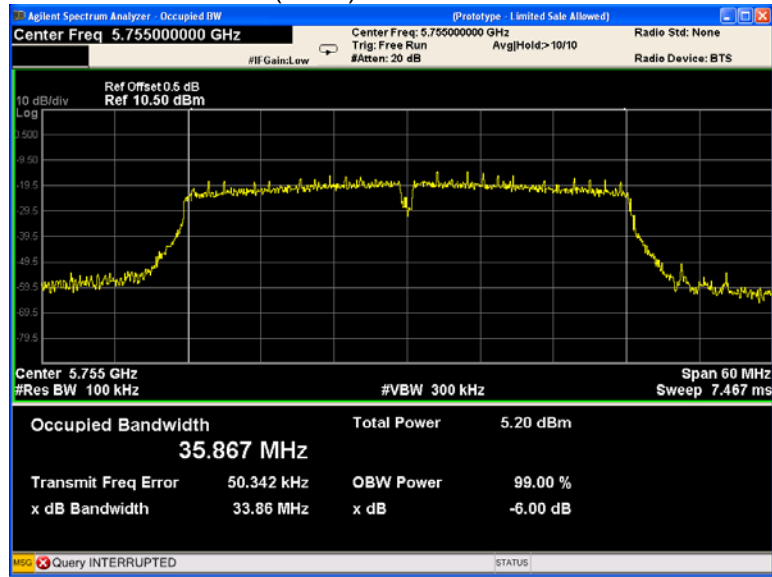
### 802.11n(HT20) U-NII-3 Middle channel



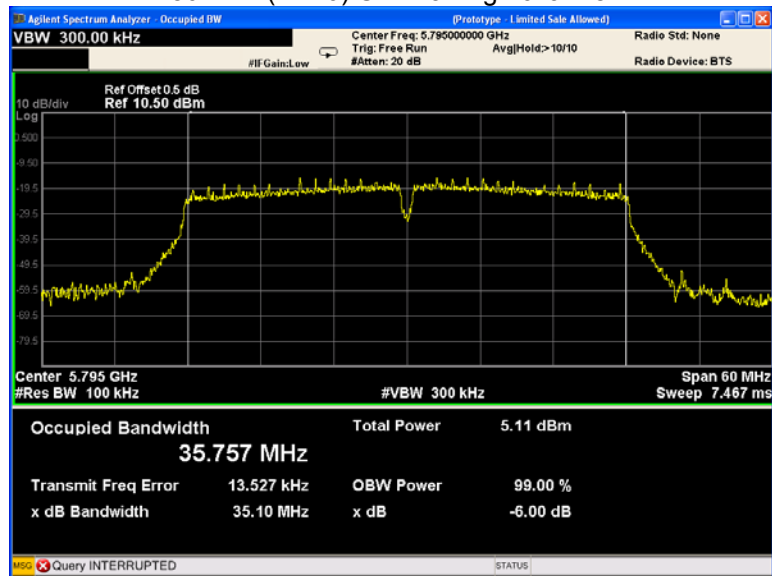
### 802.11n(HT20) U-NII-3 High channel



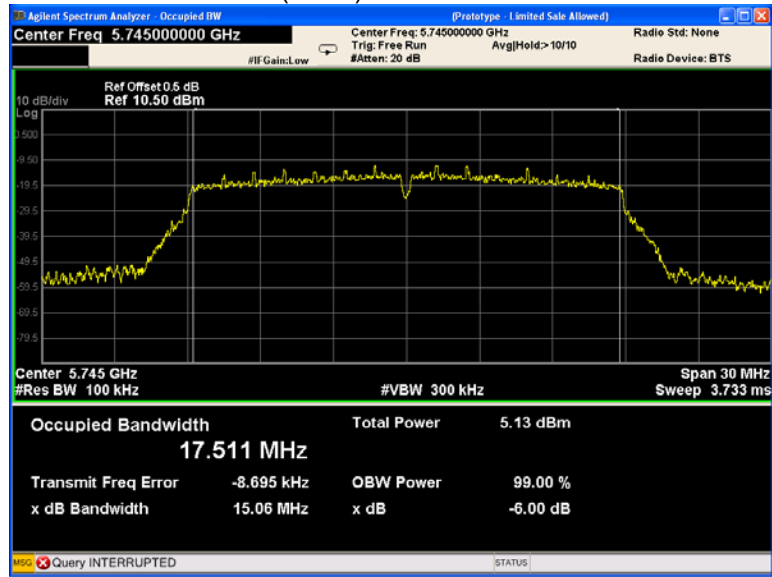
802.11n(HT40) U-NII-3 Low channel



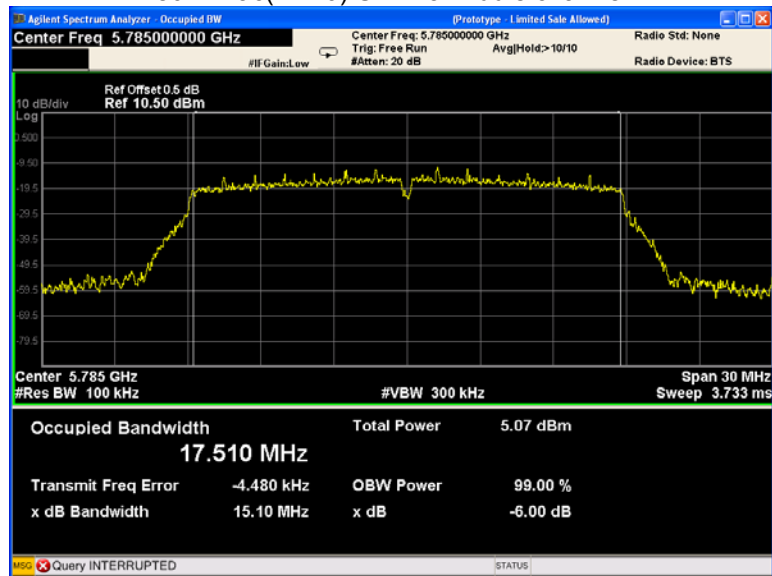
802.11n(HT40) U-NII-3 High channel



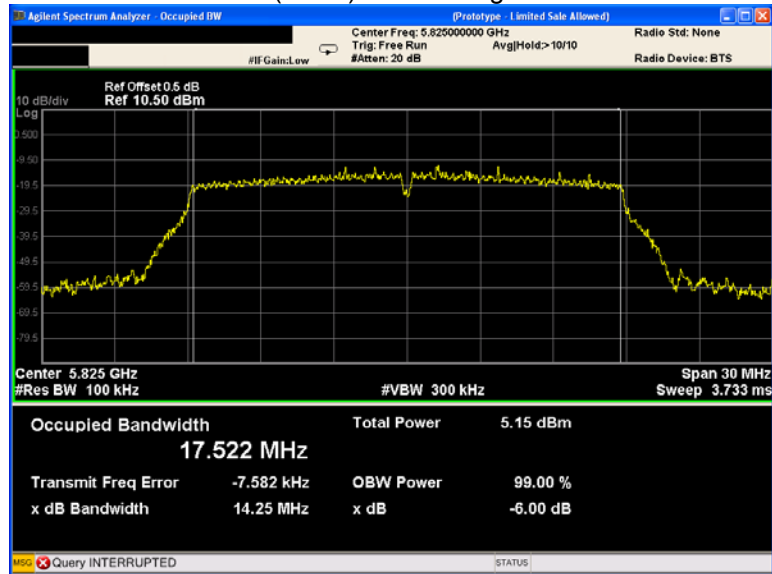
### 802.11ac(HT20) U-NII-3 Low channel



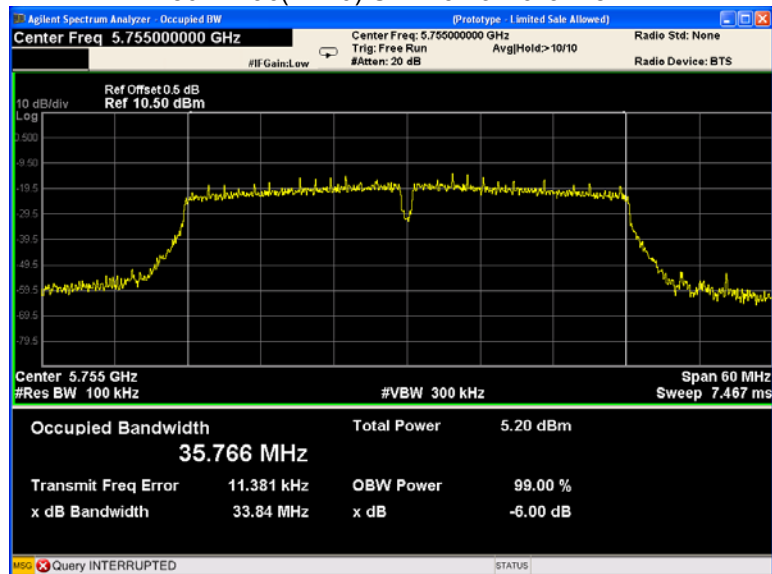
### 802.11ac(HT20) U-NII-3 Middle channel



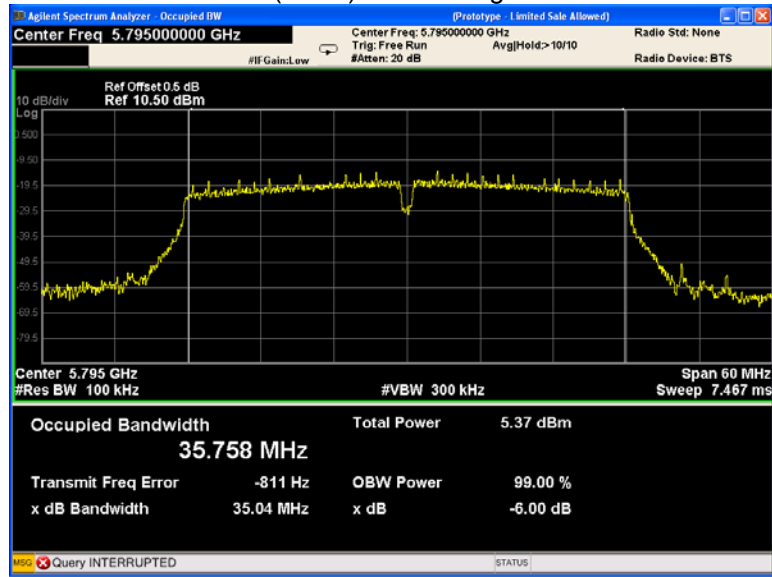
### 802.11ac(HT20) U-NII-3 High channel



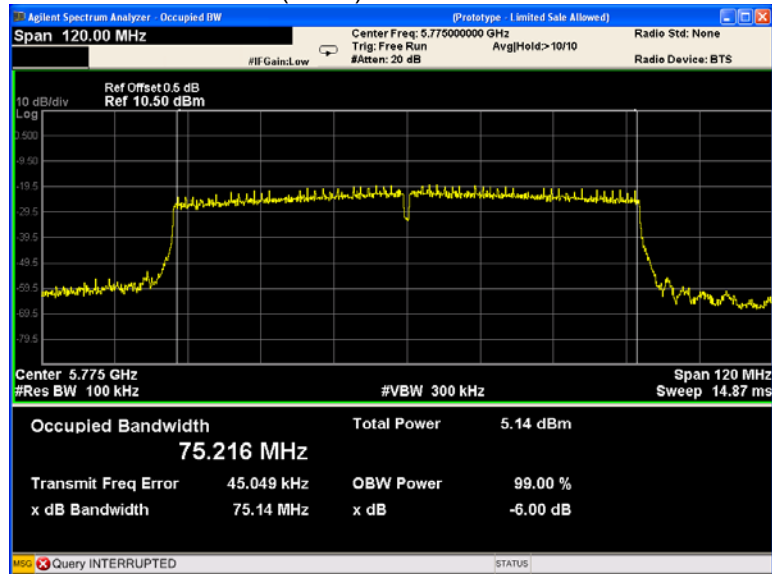
### 802.11ac(HT40) U-NII-3 Low channel



### 802.11ac(HT40) U-NII-3 High channel



### 802.11ac(HT80) U-NII-3 Low channel



### 13 26 dB Bandwidth and 99% Occupied Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.407 (a) KDB662911 D01 Multiple Transmitter Output v02r01
Test Method:	KDB789033 D02 General U-NII Test Procedures New Rules v02r01 Section D
Test Limit:	No restriction limits
Test Result:	PASS

#### 13.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

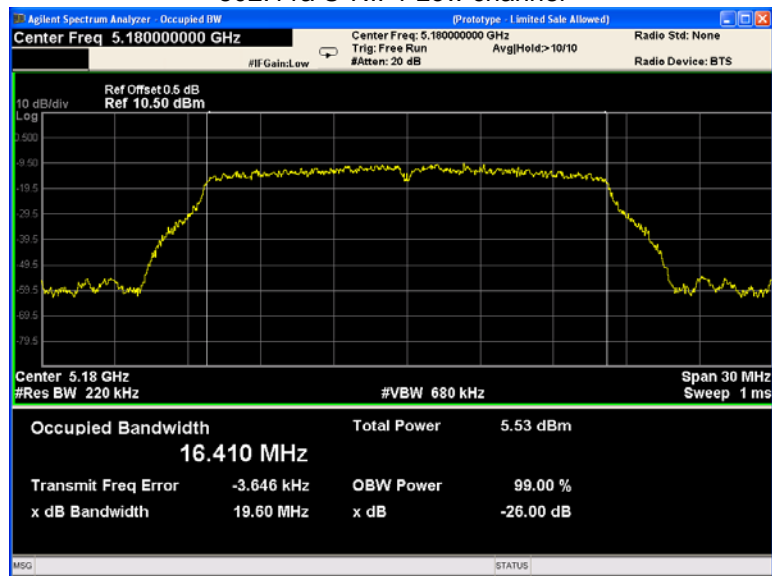
#### 13.2 Test Result:

Band	Operation mode	26 dB Bandwidth (MHz)			99% Bandwidth (MHz)		
		Low	Middle	High	Low	Middle	High
U-NII-1	802.11a	19.60	19.44	19.30	16.410	16.392	16.394
	802.11n(HT20)	20.21	20.03	20.02	17.541	17.545	17.576
	802.11n(HT40)	40.62	/	40.22	35.995	/	35.935
	802.11ac(HT20)	20.00	20.14	20.09	17.545	17.551	17.546
	802.11ac(HT40)	39.94	/	40.18	35.959	/	35.926
	802.11ac(HT80)	80.46	/	/	75.138	/	/
U-NII-3	802.11a	19.46	19.52	19.48	16.377	16.366	16.347
	802.11n(HT20)	20.06	19.85	20.13	17.540	17.534	17.525
	802.11n(HT40)	40.42	/	39.93	35.980	/	35.896
	802.11ac(HT20)	20.16	20.05	20.04	17.553	17.532	17.540
	802.11ac(HT40)	40.16	/	40.26	35.933	/	35.967
	802.11ac(HT80)	80.63	/	/	75.338	/	/

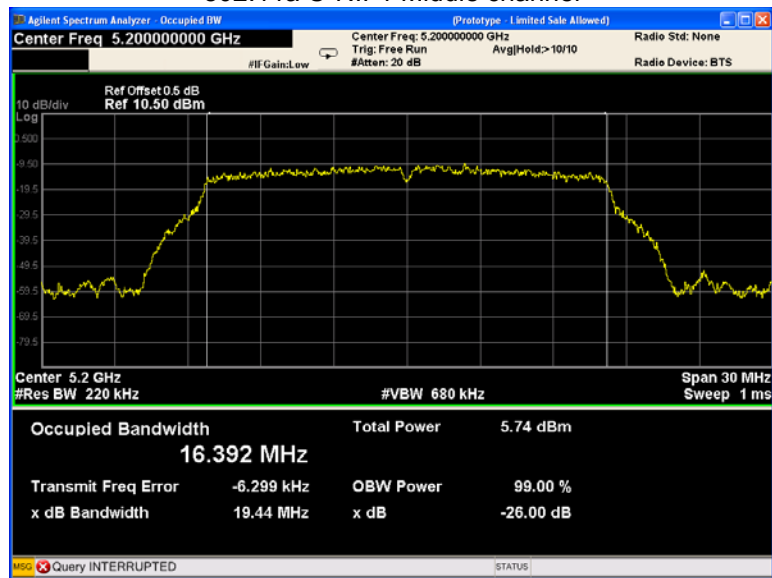


Test result plots shown as follows:

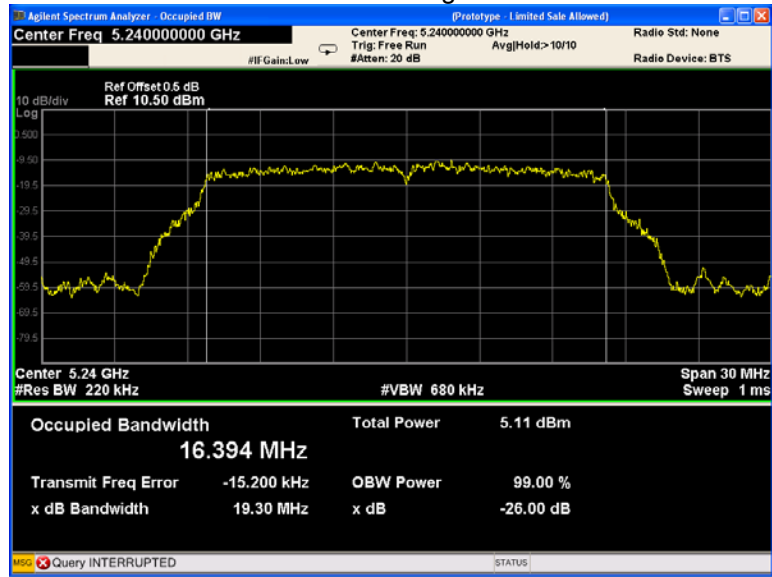
802.11a U-NII-1 Low channel



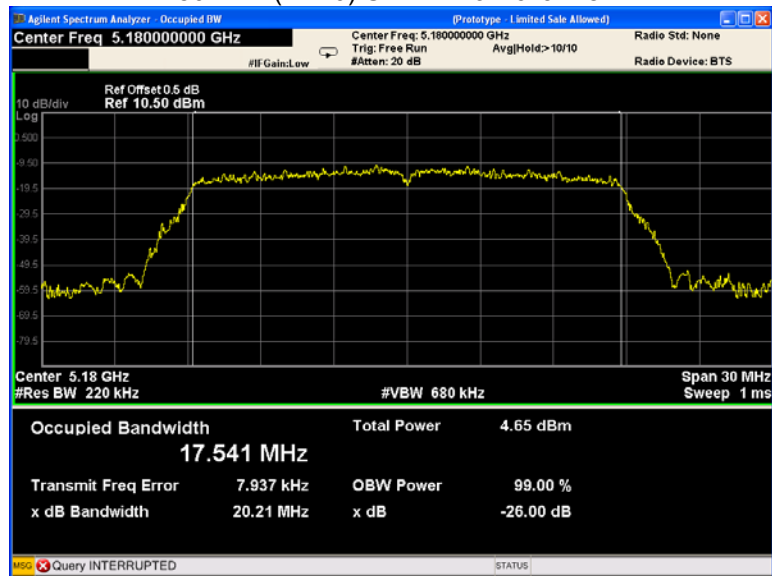
802.11a U-NII-1 Middle channel



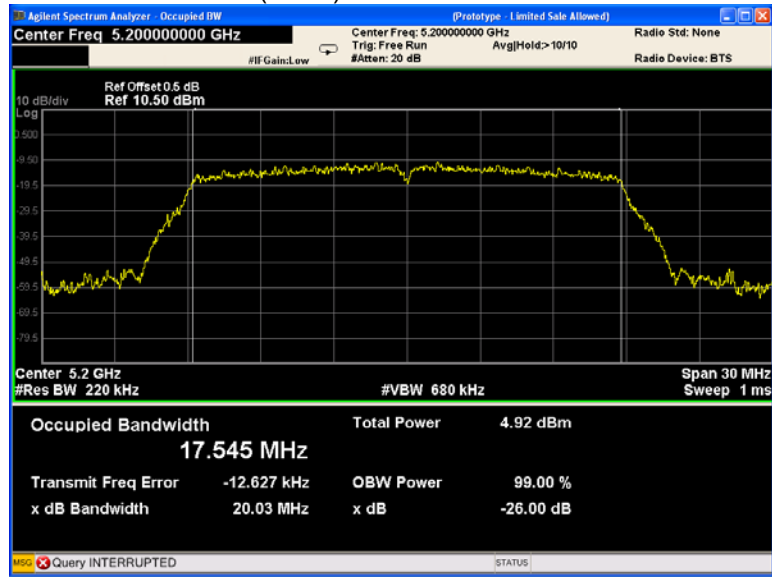
802.11a U-NII-1 High channel



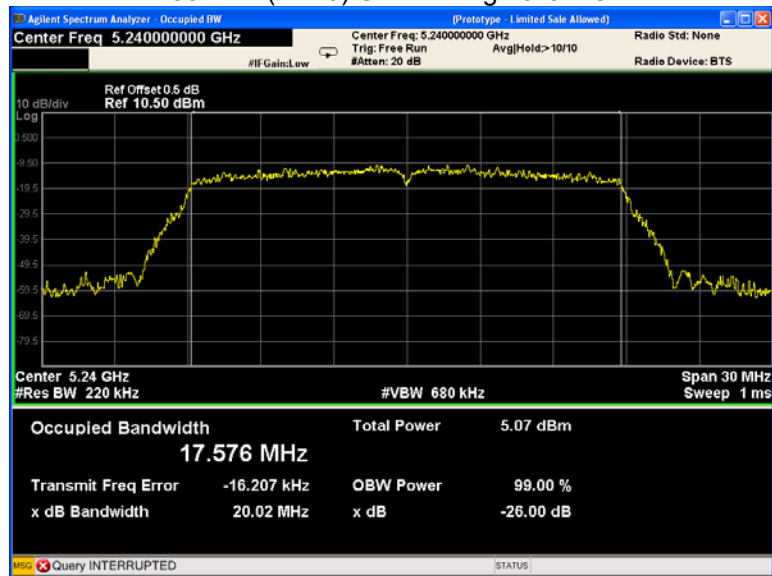
802.11n(HT20) U-NII-1 Low channel



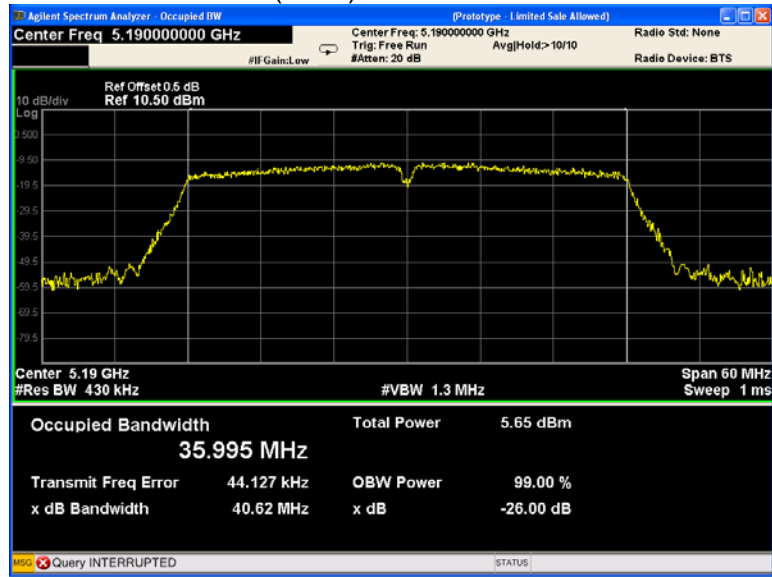
### 802.11n(HT20) U-NII-1 Middle channel



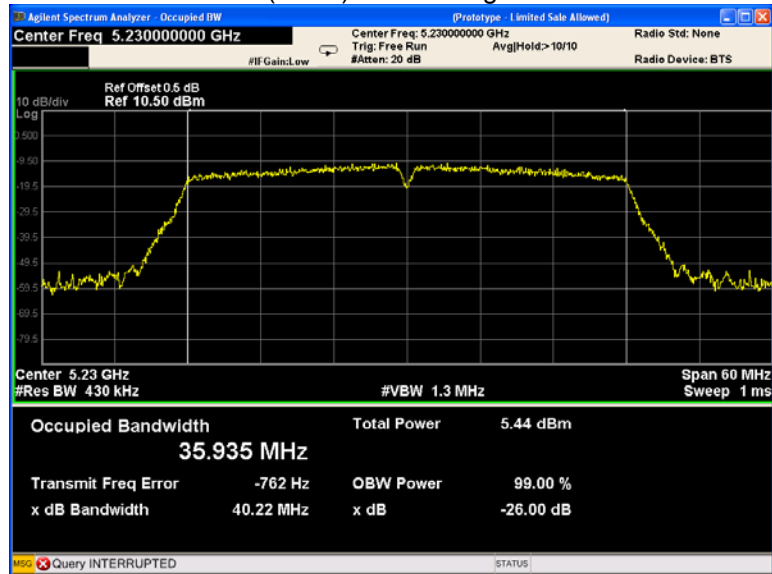
### 802.11n(HT20) U-NII-1 High channel



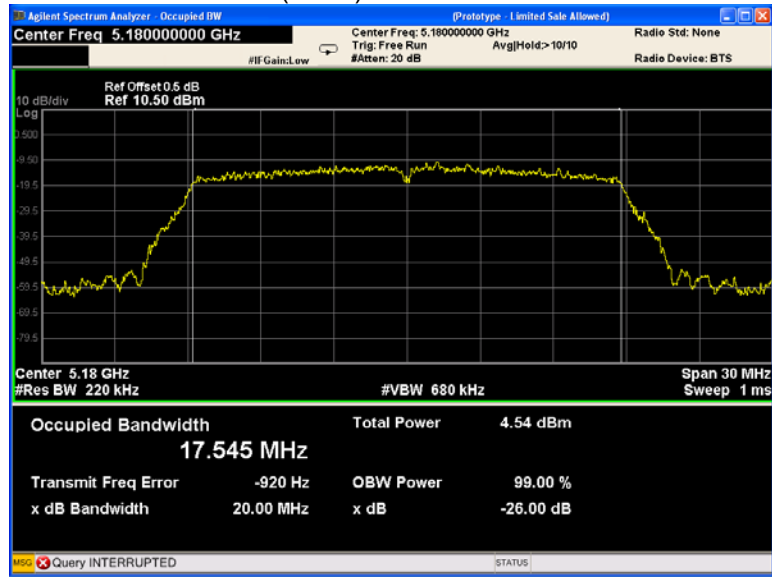
802.11n(HT40) U-NII-1 Low channel



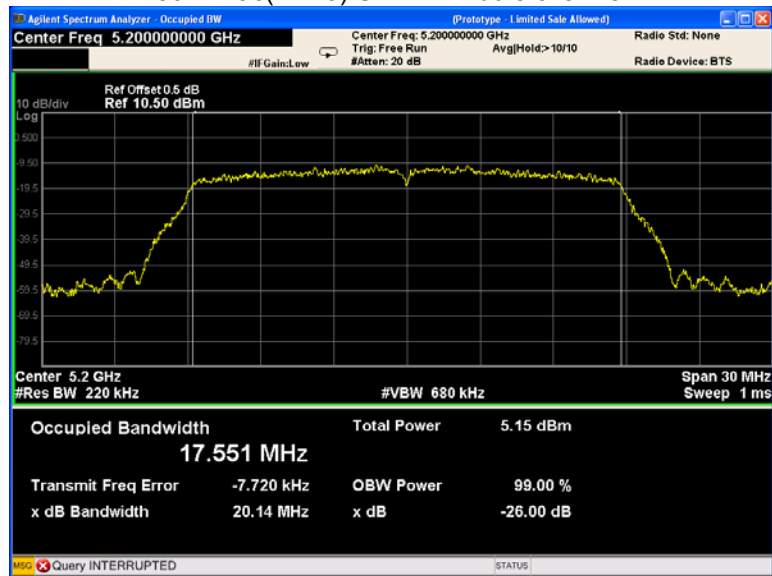
802.11n(HT40) U-NII-1 High channel



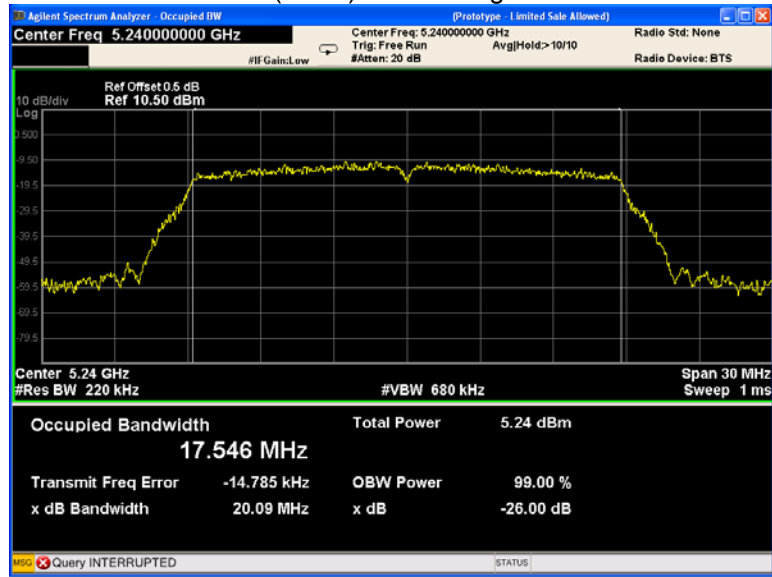
### 802.11ac(HT20) U-NII-1 Low channel



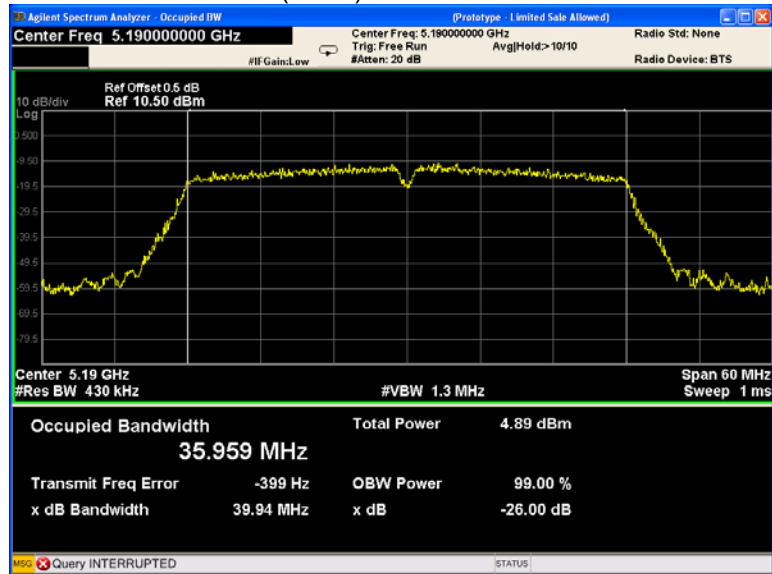
### 802.11ac(HT20) U-NII-1 Middle channel



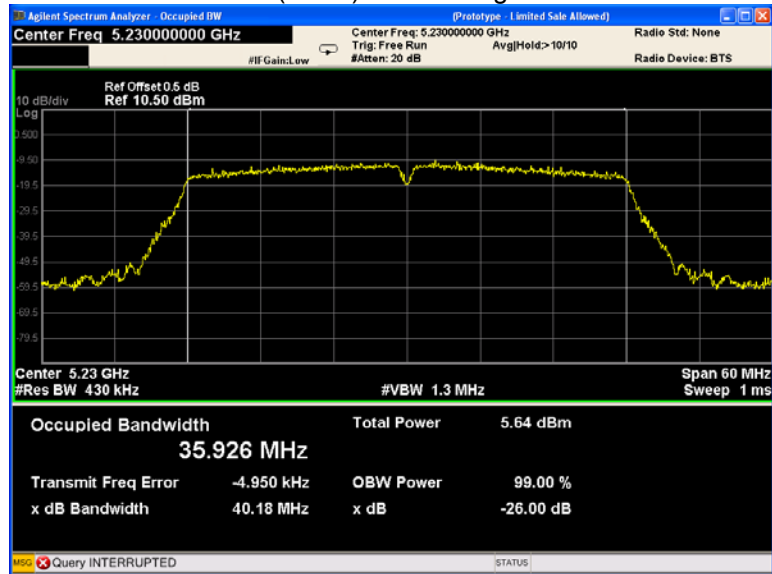
### 802.11ac(HT20) U-NII-1 High channel



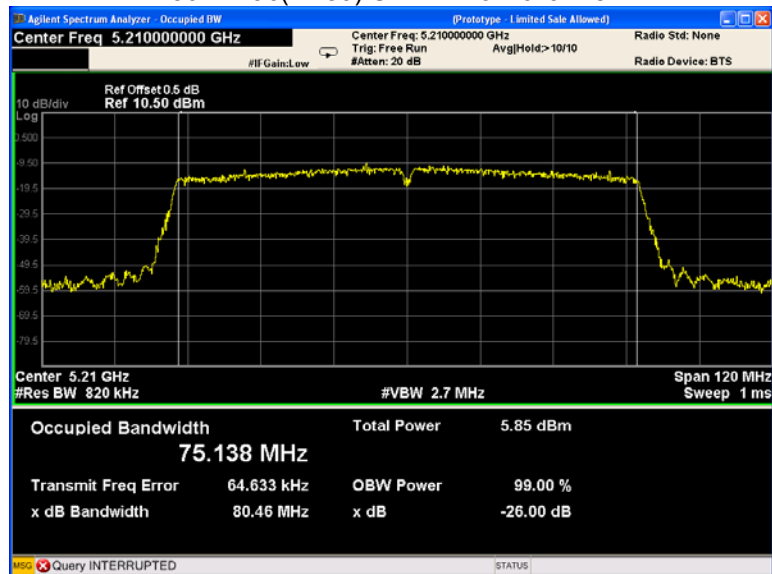
### 802.11ac(HT40) U-NII-1 Low channel



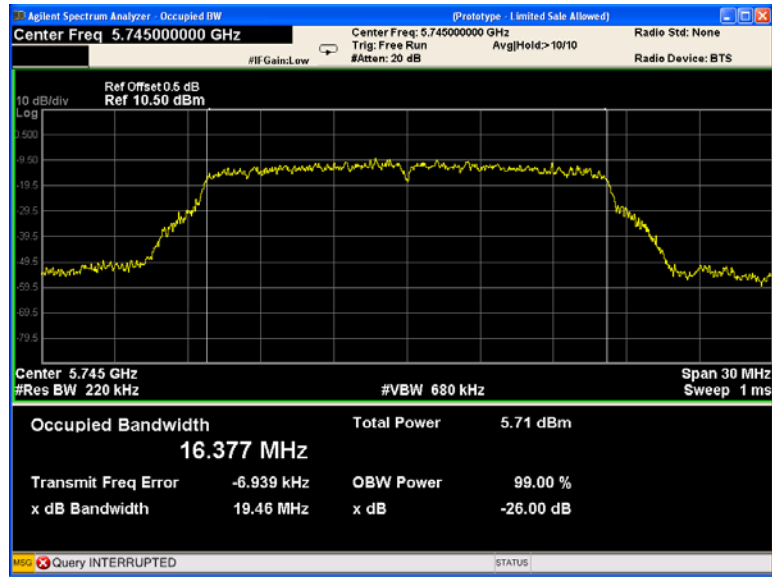
### 802.11 ac(HT40) U-NII-1 High channel



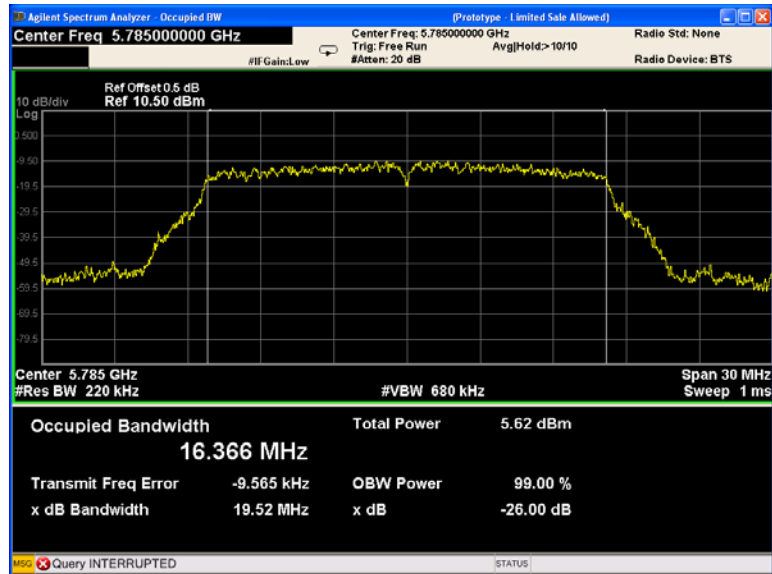
### 802.11ac(HT80) U-NII-1 Low channel



802.11a U-NII-3 Low channel

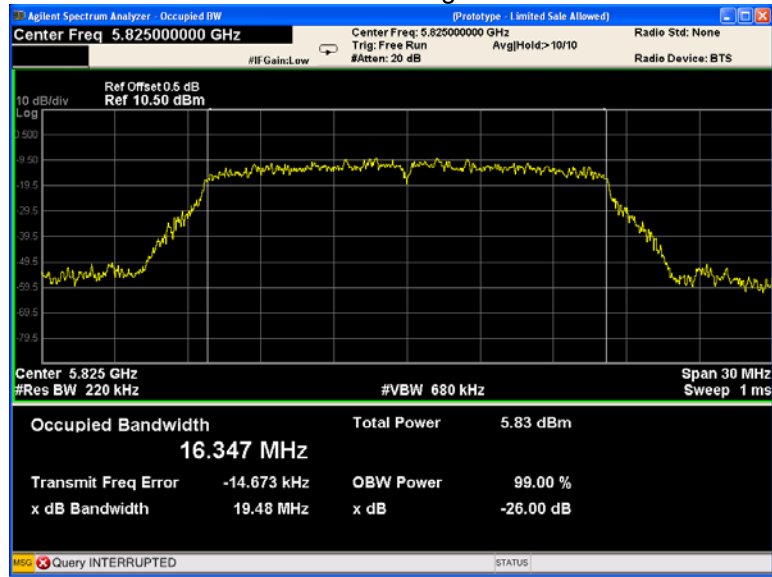


802.11a U-NII-3 Middle channel

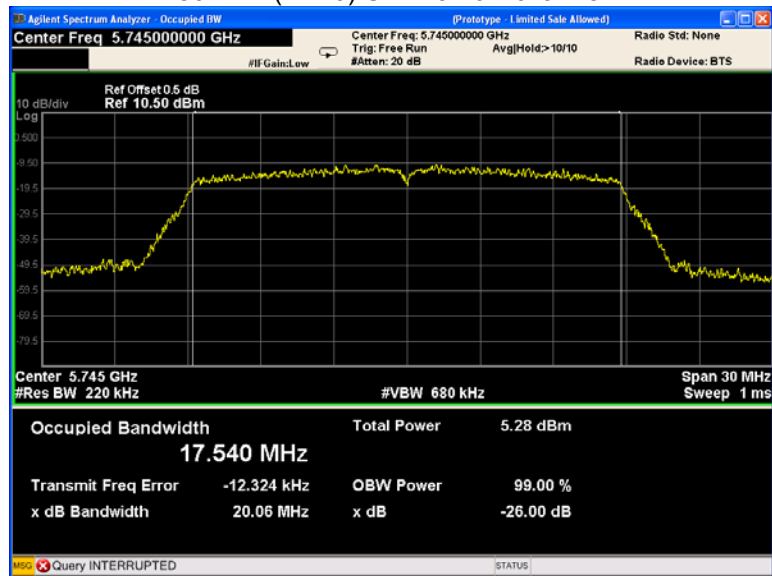




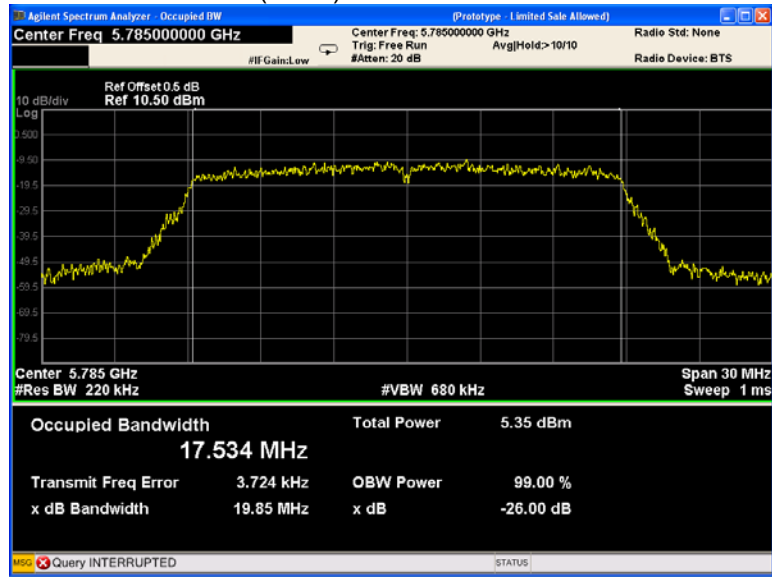
802.11a U-NII-3 High channel



802.11n(HT20) U-NII-3 Low channel



802.11n(HT20) U-NII-3 Middle channel



802.11n(HT20) U-NII-3 High channel

