



# FCC RADIO TEST REPORT

**FCC ID** : UDX-60067020  
**Equipment** : 802.11a/b/g/n/ac Wireless Access Point  
**Brand Name** : CISCO  
**Model Name** : GR60-HW, GR60-HW-US, GR60-HW-INTL  
**Applicant** : Cisco Systems, Inc.  
170 West Tasman Drive, San Jose, CA 95134 USA  
**Manufacturer** : Cisco Systems, Inc.  
170 West Tasman Drive, San Jose, CA 95134 USA  
**Standard** : 47 CFR FCC Part 15.407

The product was received on Aug. 22, 2017, and testing was started from Aug. 31, 2017 and completed on Sep. 05, 2017. We, SPORTON INTERTIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERTIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

**SPORTON INTERTIONAL INC. EMC & Wireless Communications Laboratory**

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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### Appendix A. Test Results of Radiated Emission Co-location

### Appendix B. Test Photos

#### Photographs of EUT v01



## **History of this test report**



## Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	15.203	Antenna Requirement	PASS	-
3.1	15.207	AC Power-line Conducted Emissions	PASS	-
3.2	15.407(a)	Emission Bandwidth	PASS	-
3.3	15.407(a)	Maximum Conducted Output Power	PASS	-
3.4	15.407(a)	Peak Power Spectral Density	PASS	-
3.5	15.407(b)	Unwanted Emissions	PASS	-
3.6	15.407(g)	Frequency Stability	PASS	-

Reviewed by: Sam Chen

Report Producer: Vicky Huang



# 1 General Description

## 1.1 Information

### 1.1.1 RF General Information

Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number
5250-5350	a, n (HT20), ac (VHT20)	5260-5320	52-64 [4]
5470-5725		5500-5720	100-140 [12]
5250-5350	n (HT40), ac (VHT40)	5270-5310	54-62 [2]
5470-5725		5510-5710	102-142 [6]
5250-5350	ac (VHT80)	5290	58 [1]
5470-5725		5530-5690	106-138 [3]

Band	Mode	BWch (MHz)	Nant
5.25-5.35GHz	802.11a	20	2TX
5.25-5.35GHz	802.11n HT20	20	2TX
5.25-5.35GHz	802.11n HT20-BF	20	2TX
5.25-5.35GHz	802.11ac VHT20	20	2TX
5.25-5.35GHz	802.11ac VHT20-BF	20	2TX
5.25-5.35GHz	802.11n HT40	40	2TX
5.25-5.35GHz	802.11n HT40-BF	40	2TX
5.25-5.35GHz	802.11ac VHT40	40	2TX
5.25-5.35GHz	802.11ac VHT40-BF	40	2TX
5.25-5.35GHz	802.11ac VHT80	80	2TX
5.25-5.35GHz	802.11ac VHT80-BF	80	2TX
5.47-5.725GHz	802.11a	20	2TX
5.47-5.725GHz	802.11n HT20	20	2TX
5.47-5.725GHz	802.11n HT20-BF	20	2TX
5.47-5.725GHz	802.11ac VHT20	20	2TX
5.47-5.725GHz	802.11ac VHT20-BF	20	2TX
5.47-5.725GHz	802.11n HT40	40	2TX
5.47-5.725GHz	802.11n HT40-BF	40	2TX
5.47-5.725GHz	802.11ac VHT40	40	2TX
5.47-5.725GHz	802.11ac VHT40-BF	40	2TX
5.47-5.725GHz	802.11ac VHT80	80	2TX
5.47-5.725GHz	802.11ac VHT80-BF	80	2TX



## Note:

- 11a, HT20 and HT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.
- VHT20, VHT40, VHT80 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.
- BWch is the nominal channel bandwidth.
- Nss-Min is the minimum number of spatial streams.
- Nant is the number of outputs. e.g., 2(2,3) means have 2 outputs for port 2 and port 3. 2 means have 2 outputs for port 1 and port 2.

### 1.1.2 Antenna Information

Ant.	Port	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	
						2.4GHz	5GHz
1	1	WNC	48XKAA1Z.SGA.X02	Dipole Antenna	I-PEX	4.84	4.87
2	2	WNC	48XKAA1Z.SGA.X02	Dipole Antenna	I-PEX	4.37	4.86
<b>2TX Correlated Composite Gain(dBi)</b>						4.96	5.15

Note: The EUT has two antennas.

#### 2.4GHz Functions

##### For IEEE 802.11b/g/n/ac mode (2TX, 2RX):

Ant. 1 and Ant. 2 could transmit/receive simultaneously.

#### 5GHz Functions

##### For IEEE 802.11a/n/ac mode (2TX, 2RX):

Ant. 1 and Ant. 2 could transmit/receive simultaneously.



### 1.1.3 Mode Test Duty Cycle

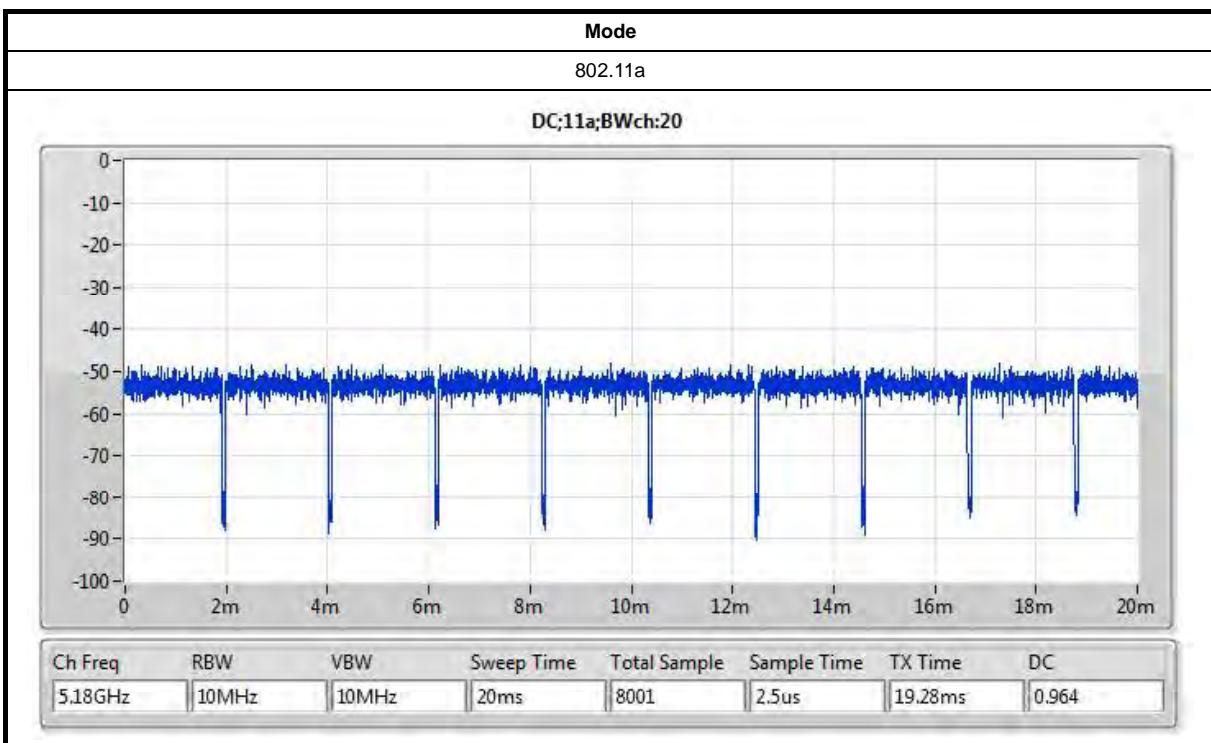
Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
802.11a	0.964	0.159	2.033m	1k
802.11ac VHT20	0.984	0.07	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11ac VHT20-BF	0.911	0.405	1.823m	1k
802.11ac VHT40	0.961	0.173	2.403m	1k
802.11ac VHT40-BF	0.913	0.395	1.753m	1k
802.11ac VHT80	0.926	0.334	1.125m	1k
802.11ac VHT80-BF	0.885	0.531	2.015m	1k

Note:

The test procedure refers to ANSI C63.10:2013 clause 11.6 b). The ON and OFF times of the transmitted signal is measured by spectrum analyzer and the setting as follows:

- 1) Set the center frequency of the instrument to the center frequency of the transmission.
- 2) Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value.
- 3) Set VBW ≥ RBW. Set detector = peak or average.

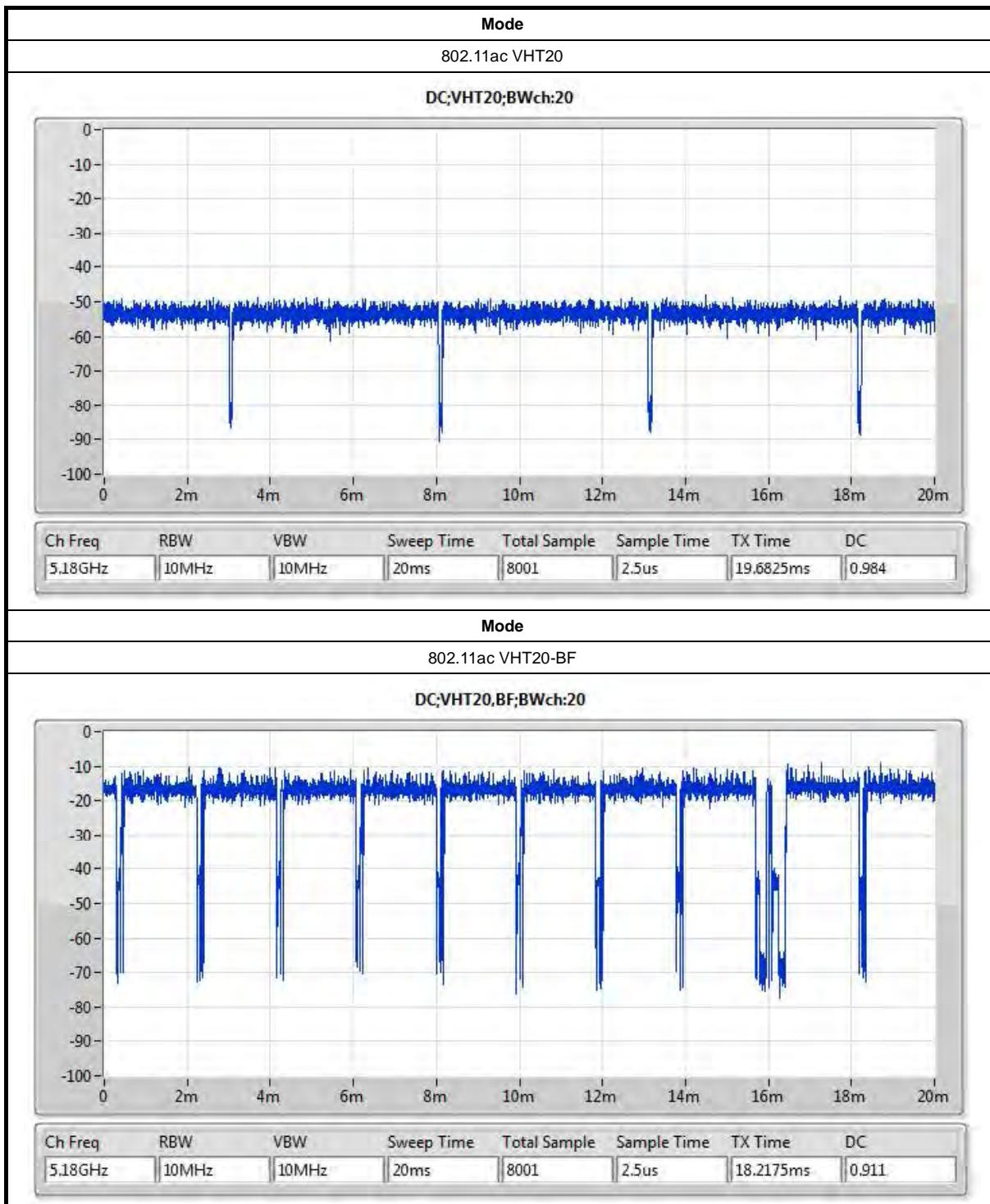
The measured result and plots are recorded in 1.1.3.

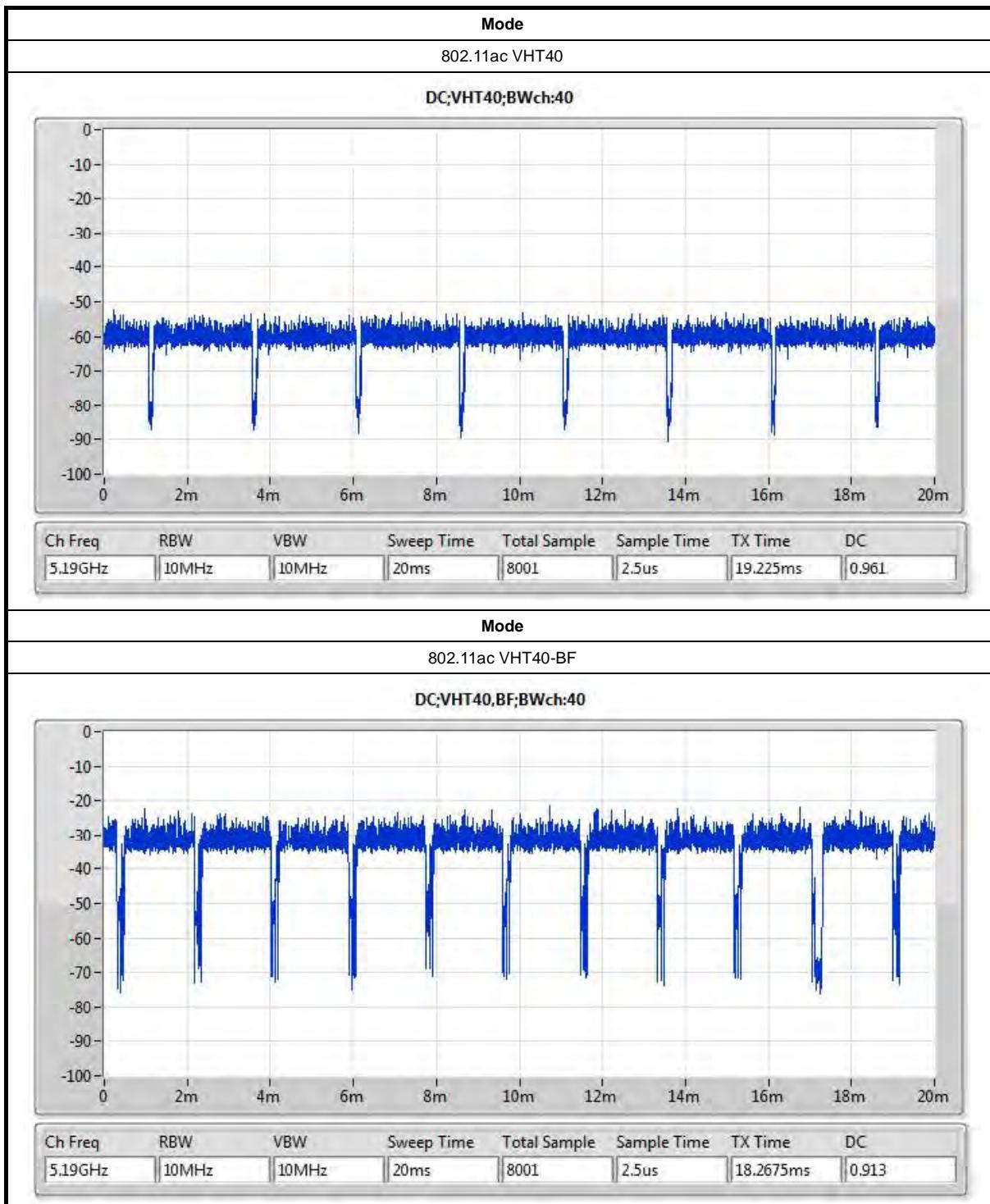




## FCC RADIO TEST REPORT

Report No. : FR782229-04AC

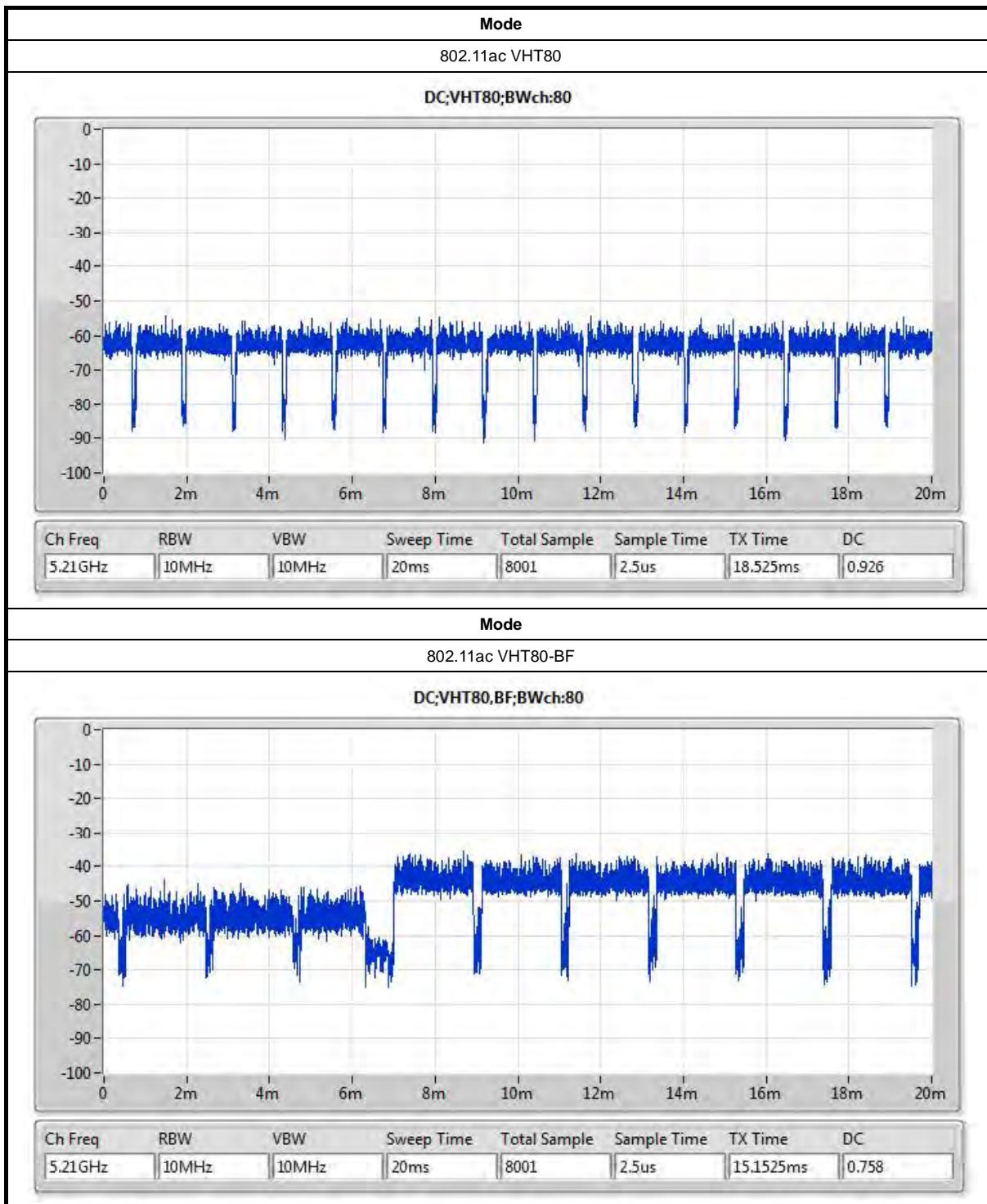






## FCC RADIO TEST REPORT

Report No. : FR782229-04AC





#### 1.1.4 EUT Operational Condition

EUT Power Type	From Power Adapter or PoE		
Beamforming Function	<input checked="" type="checkbox"/> With beamforming for 802.11n/ac in 2.4GHz/5GHz.	<input type="checkbox"/>	Without beamforming
Weather Band	<input checked="" type="checkbox"/> With 5600~5650MHz	<input type="checkbox"/>	Without 5600~5650MHz
Function	<input checked="" type="checkbox"/> Outdoor P2M	<input checked="" type="checkbox"/>	Indoor P2M
	<input type="checkbox"/> Fixed P2P	<input type="checkbox"/>	Client
TPC Function	<input checked="" type="checkbox"/> With TPC	<input type="checkbox"/>	Without TPC

#### 1.1.5 Table for Multiple Listing

The model names in the following table are all refer to the identical product.

Model Name	Description
GR60-HW	All the models are identical, the different model names served as marketing strategy.
GR60-HW-US	
GR60-HW-INTL	

From the above models, model: GR60-HW was selected as representative model for the test and its data was recorded in this report.



## 1.2 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ◆ 47 CFR FCC Part 15
- ◆ ANSI C63.10-2013
- ◆ FCC KDB 789033 D02 v02r01
- ◆ FCC KDB 662911 D01 v02r01
- ◆ FCC KDB 412172 D01 v01r01

## 1.3 Testing Location Information

Testing Location				
<input type="checkbox"/>	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-318-0055		
<input checked="" type="checkbox"/>	JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085		

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH01-CB	Gary Chu & Ron Huang	26.9°C / 62%	Sep. 04, 2017
Radiated	03CH01-CB	Justin Lin & Paul Chen	22°C / 54%	Aug. 31, 2017 ~ Sep. 05, 2017
AC Conduction	CO01-CB	Deven Huang	23°C / 60%	Sep. 05, 2017

Test site Designation No. TW0006 with FCC

Test site registered number IC 4086D with Industry Canada.

## 1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.2 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%
Output Power Measurement	1.33 dB	Confidence levels of 95%
Power Density Measurement	1.27 dB	Confidence levels of 95%
Bandwidth Measurement	9.74 x10 <sup>-8</sup>	Confidence levels of 95%
Frequency Stability	6.06 x10 <sup>-8</sup>	Confidence levels of 95%



## 2 Test Configuration of EUT

### 2.1 Test Channel Mode

Mode	Power Setting
802.11a_(6Mbps)_2TX	-
5260MHz	21
5300MHz	20.5
5320MHz	20.5
5500MHz	20.5
5580MHz	21
5700MHz	15.5
5720MHz Straddle 5.47-5.725GHz	18
5720MHz Straddle 5.725-5.85GHz	18
802.11ac VHT20_Nss1,(MCS0)_2TX	-
5260MHz	21.5
5300MHz	20.5
5320MHz	18
5500MHz	19
5580MHz	21
5700MHz	16.5
5720MHz Straddle 5.47-5.725GHz	21
5720MHz Straddle 5.725-5.85GHz	21
802.11ac VHT40_Nss1,(MCS0)_2TX	-
5270MHz	20.5
5310MHz	15.5
5510MHz	15.5
5550MHz	20.5
5670MHz	18.5
5710MHz Straddle 5.47-5.725GHz	20.5
5710MHz Straddle 5.725-5.85GHz	20.5
802.11ac VHT80_Nss1,(MCS0)_2TX	-
5290MHz	15
5530MHz	16.5
5610MHz	19.5
5690MHz Straddle 5.47-5.725GHz	20.5



Mode	Power Setting
5690MHz Straddle 5.725-5.85GHz	20.5
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	-
5260MHz	21
5300MHz	21
5320MHz	20
5500MHz	21
5580MHz	21
5700MHz	19
5720MHz Straddle 5.47-5.725GHz	21
5720MHz Straddle 5.725-5.85GHz	21
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	-
5270MHz	21
5310MHz	19
5510MHz	20
5550MHz	21
5670MHz	21
5710MHz Straddle 5.47-5.725GHz	21
5710MHz Straddle 5.725-5.85GHz	21
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-
5290MHz	19
5530MHz	19
5610MHz	21
5690MHz Straddle 5.47-5.725GHz	21
5690MHz Straddle 5.725-5.85GHz	21

## Note:

- VHT20/VHT40 covers HT20/HT40, due to same modulation. The power setting for 802.11n HT20 and HT40 are the same or lower than 802.11ac VHT20 and VHT40.
- There are two modes of EUT for 802.11ac in 2.4GHz/5GHz. One is beamforming mode, and the other is non-beamforming mode. Both modes have been tested and recorded in this test report.



## 2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
<b>Tests Item</b>	AC power-line conducted emissions
<b>Condition</b>	AC power-line conducted measurement for line and neutral
<b>Operating Mode</b>	Normal Link
1	EUT + Adapter
2	EUT + PoE

For operating mode 2 is the worst case and it was record in this test report.

The Worst Case Mode for Following Conformance Tests	
<b>Tests Item</b>	Emission Bandwidth Maximum Conducted Output Power Peak Power Spectral Density Frequency Stability
<b>Test Condition</b>	Conducted measurement at transmit chains

The Worst Case Mode for Following Conformance Tests	
<b>Tests Item</b>	Unwanted Emissions
<b>Test Condition</b>	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.
<b>Operating Mode &lt; 1GHz</b>	Normal Link
1	EUT in Y axis + Adapter
2	EUT in Z axis + Adapter
Mode 2 has been evaluated to be the worst case among Mode 1~2, thus measurement for Mode 3 will follow this same test mode.	
3	EUT in Z axis + PoE
For operating mode 2 is the worst case and it was record in this test report.	
<b>Operating Mode &gt; 1GHz</b>	CTX The EUT was performed at Y axis and Z axis position for Radiated emission above 1GHz test, and the worst case was found at Z axis. So the measurement will follow this same test configuration.
1	EUT in Z axis



The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis - Radiated Emission Co-location
Test Condition	Radiated measurement
Operating Mode	Normal Link The EUT was performed at Y axis and Z axis position for radiated emission below 1GHz test, and the worst case was found at Z axis. So the measurement will follow this same test configuration.
1	WLAN 2.4GHz + WLAN 5GHz

Refer to Appendix A for Radiated Emission Co-location.

The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis - Co-location RF Exposure Evaluation
Operating Mode	
1	WLAN 2.4GHz + WLAN 5GHz

Refer to Sporton Test Report No.: FA782229-04AA for Co-location RF Exposure Evaluation.

Note1: The PoE was for measurement only, would not be marketed.

The PoE information as below:

Support Unit	Brand	Model Number
PoE	CISCO	MA-INJ-4

## 2.3 EUT Operation during Test

For CTX Mode:

non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

beamforming mode:

For Conducted Mode:

The EUT was programmed to be in continuously transmitting mode.

For Radiated Mode:

During the test, the following programs under WIN 7 were executed.

The program was executed as follows:

1. During the test, the EUT operation to normal function.
2. Executed command fixed test channel under Telnet.
3. Executed "Lantest.exe" to link with the remote workstation to transmit and receive packet by RX Device and transmit duty cycle no less than 98%.

For Normal Link:

During the test, the EUT operation to normal function.



## 2.4 Accessories

Accessories			
Equipment Name	Brand Name	Model Name	Rating
Adapter	CISCO	KSAS0361200250HU	INPUT: 100-240V ~ 50/60Hz 1.0A OUTPUT: 12V, 2.5A
Other			
Wall-mounted rack*1			

## 2.5 Support Equipment

For Test Site No: CO01-CB

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	NB	DELL	E6430	DoC
2	NB	DELL	E6430	DoC
3	NB	DELL	E6430	DoC
4	PoE	CISCO	MA-INJ-4	DoC

For Test Site No: 03CH01-CB (below 1GHz)

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	NB	DELL	E4300	DoC
2	NB	Apple	Mac Book	DoC
3	NB	Apple	Mac Book	DoC

For Test Site No: 03CH01-CB (above 1GHz)

<For Non-Beamforming Mode>

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	NB	DELL	E4300	DoC

<For Beamforming Mode>

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	NB	DELL	E4300	DoC
2	NB	DELL	E4300	DoC
3	RX Device	CISCO	GR60-HW	UDX-60067010

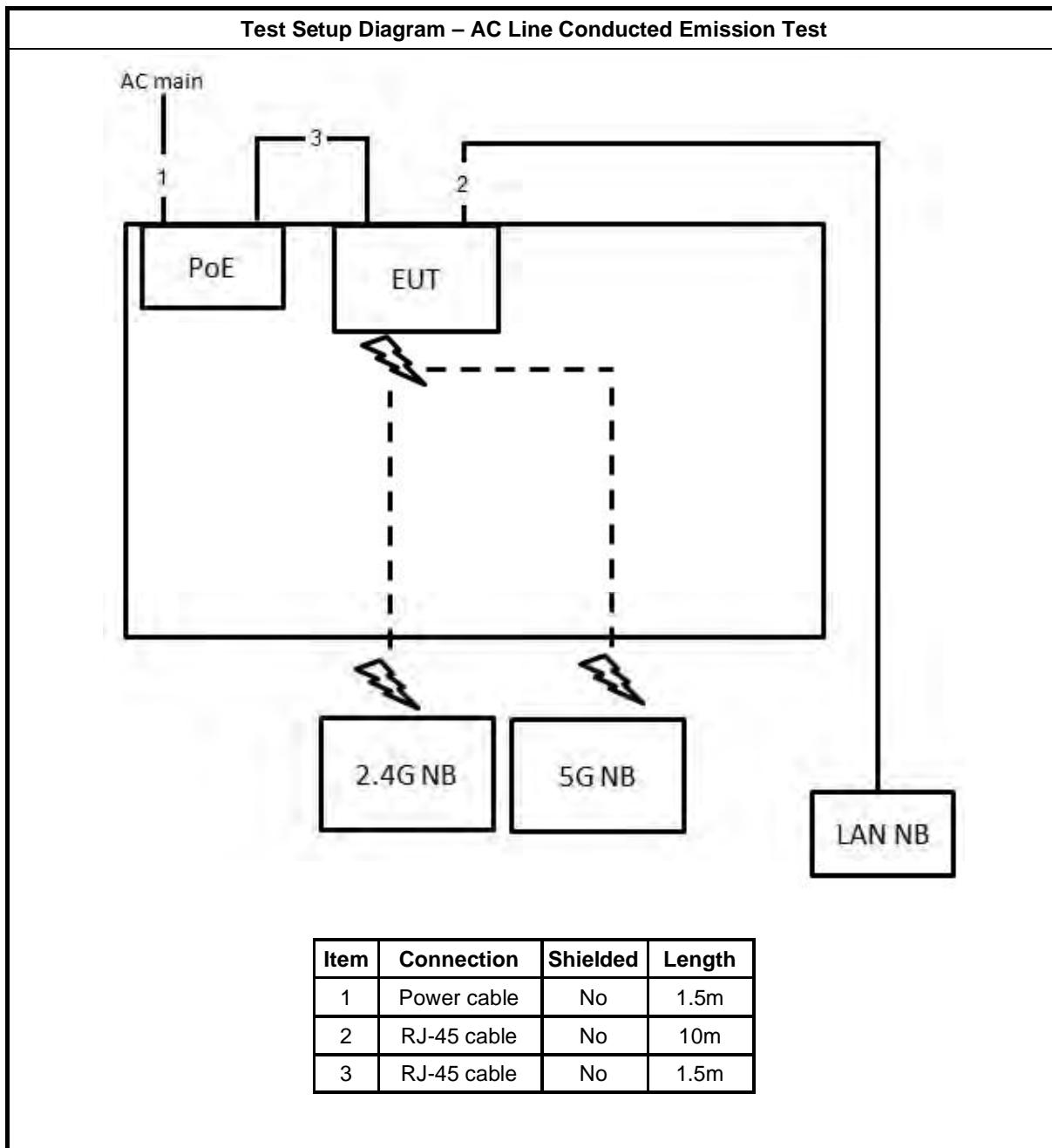


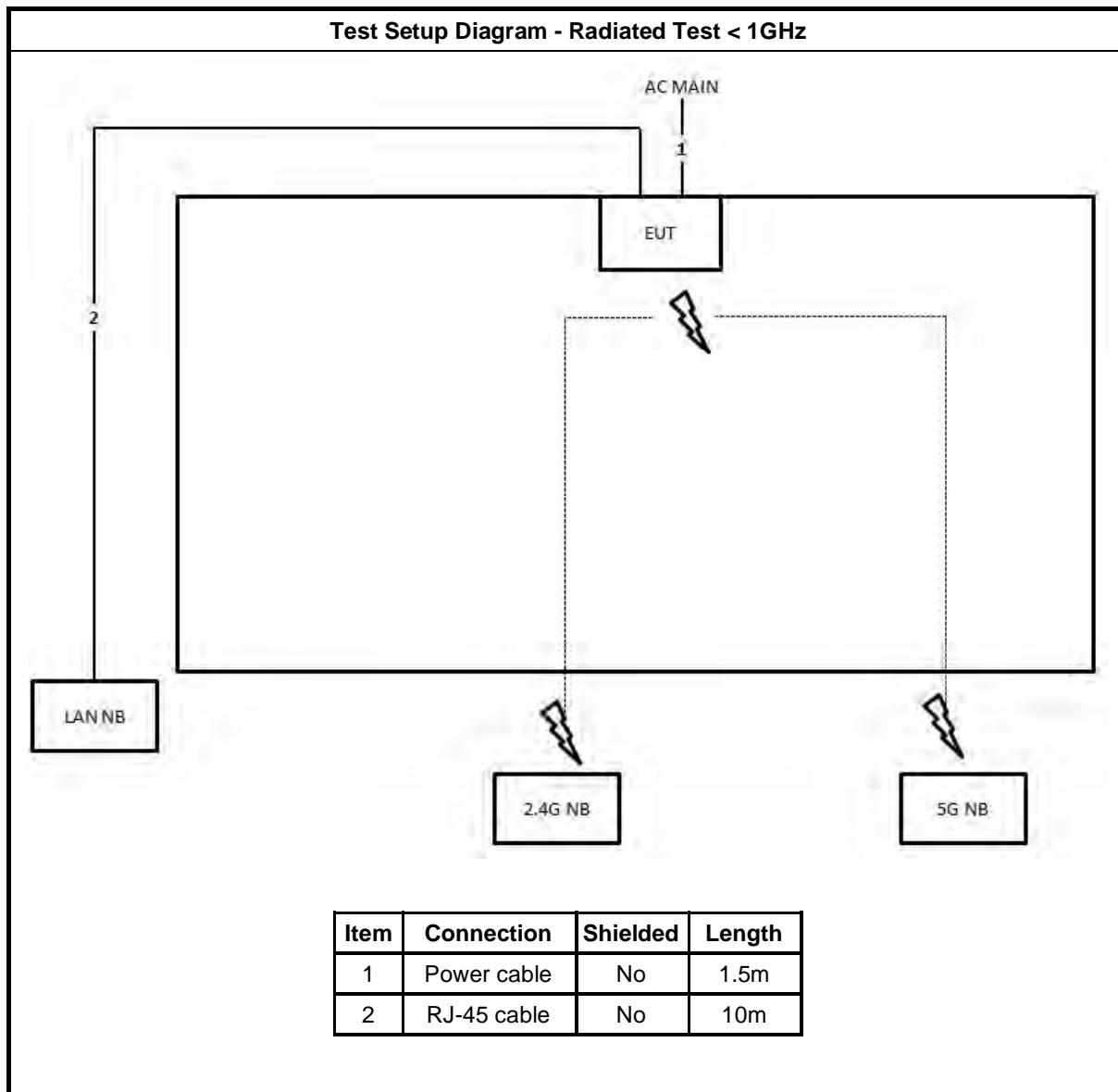
For Test Site No: TH01-CB

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	NB	DELL	E4300	DoC



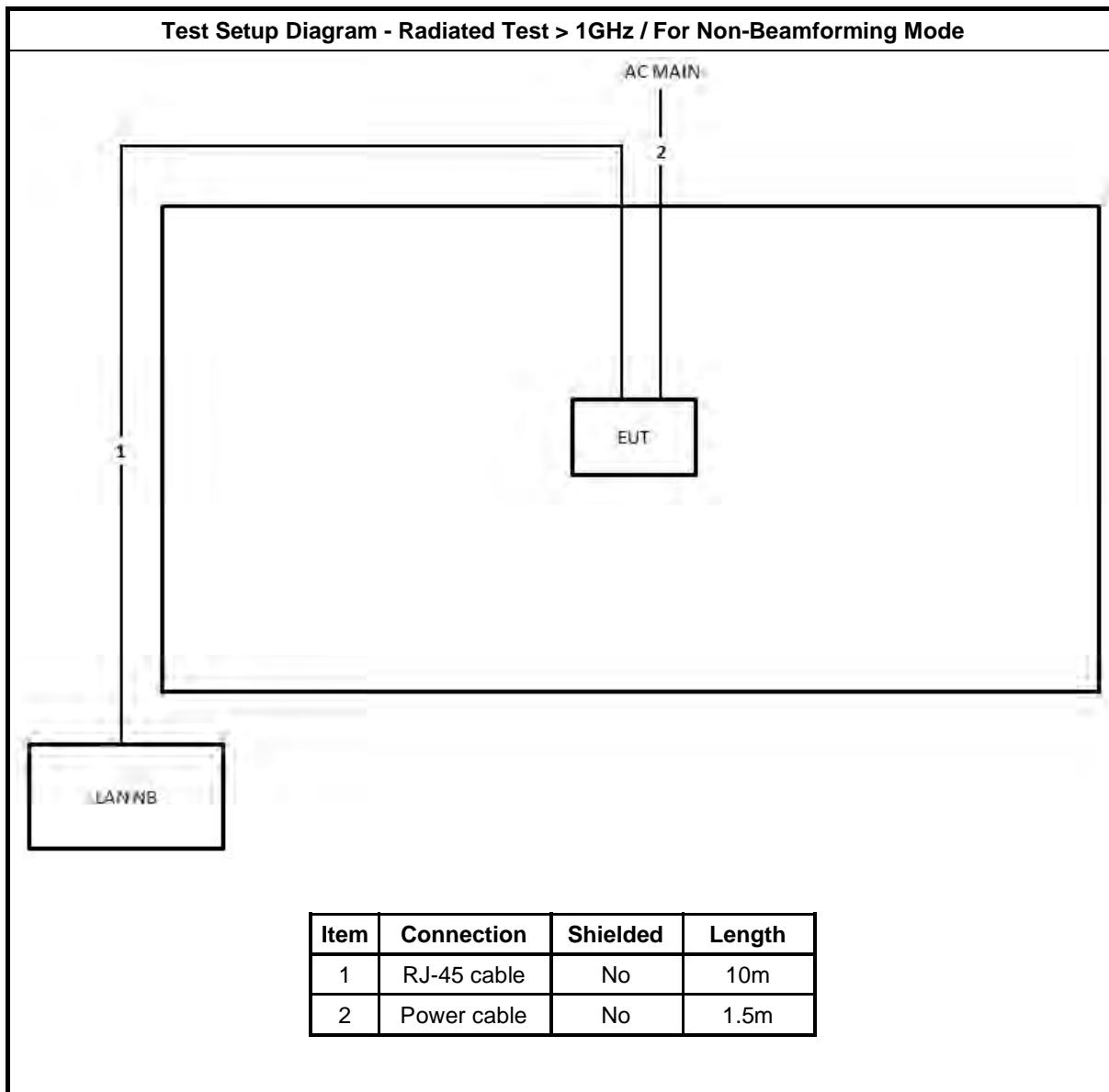
## 2.6 Test Setup Diagram

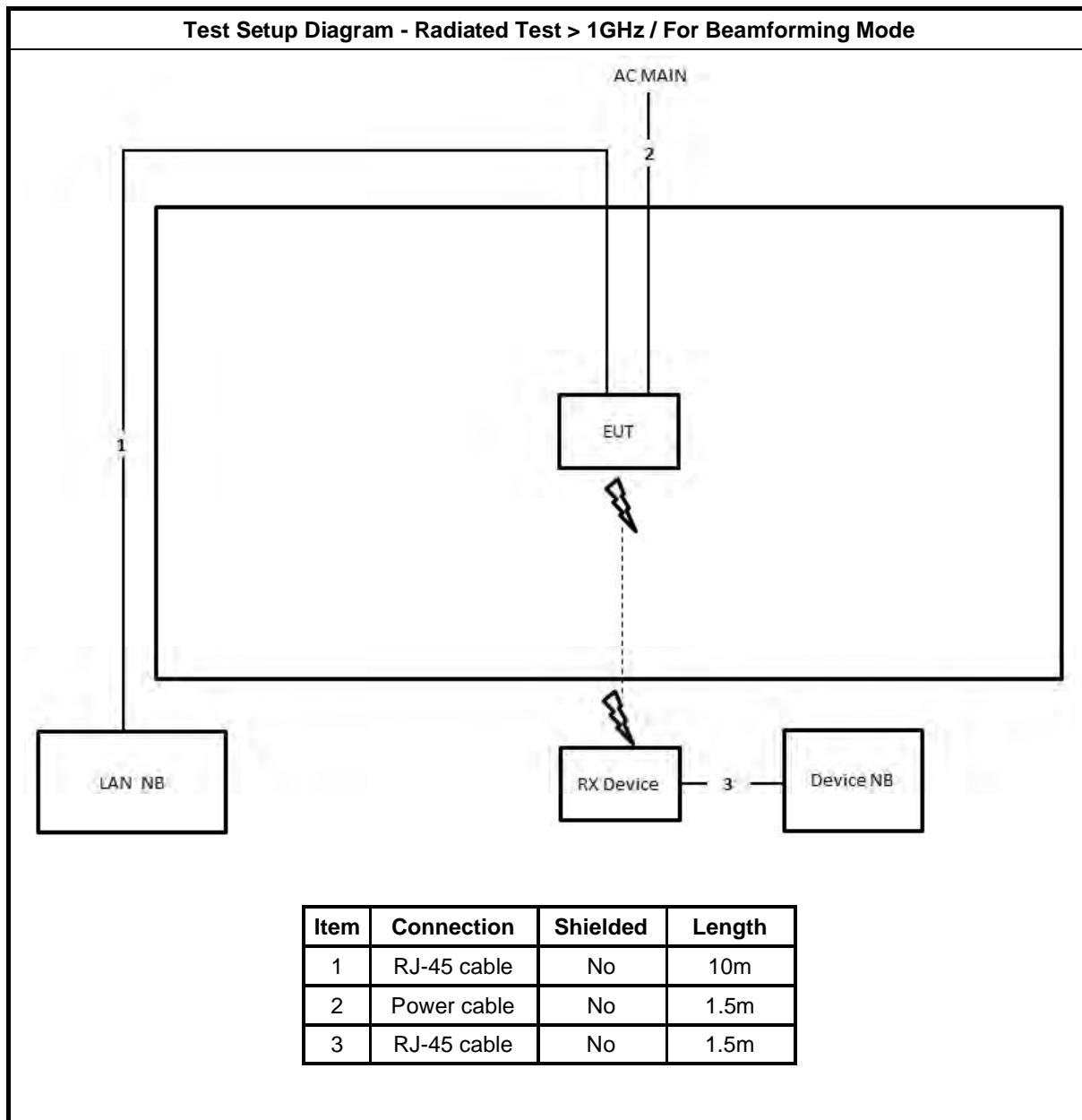






## Test Setup Diagram - Radiated Test &gt; 1GHz / For Non-Beamforming Mode







### 3 Transmitter Test Result

#### 3.1 AC Power-line Conducted Emissions

##### 3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: \* Decreases with the logarithm of the frequency.

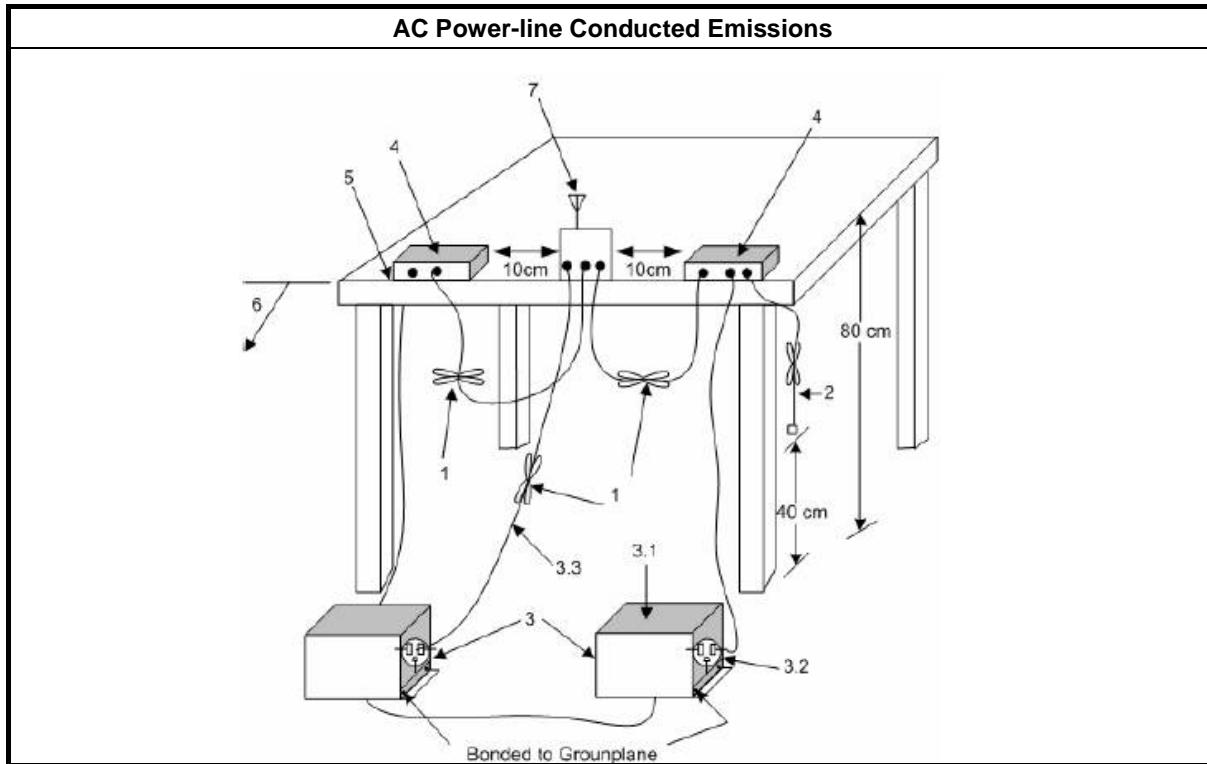
##### 3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

##### 3.1.3 Test Procedures

Test Method
<input checked="" type="checkbox"/> Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.

##### 3.1.4 Test Setup





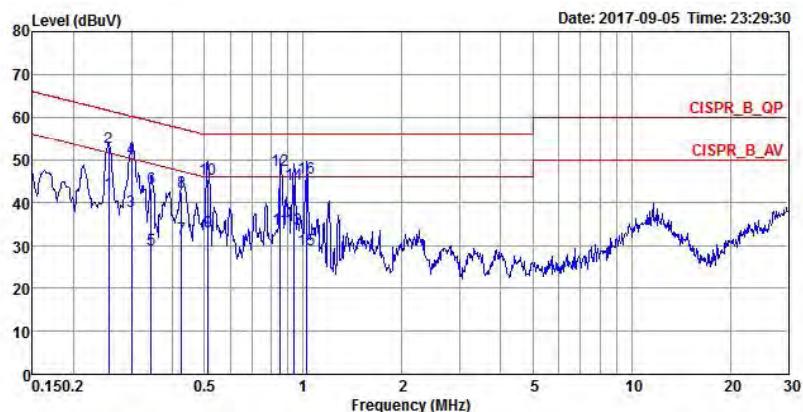
### 3.1.5 Test Result of AC Power-line Conducted Emissions

AC Power-line Conducted Emissions Result																																																																																																																																																																																													
Operating Mode		2	Power Phase		Neutral																																																																																																																																																																																								
Operating Function		Normal Link																																																																																																																																																																																											
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<table border="1"> <thead> <tr> <th>Freq</th> <th>Level</th> <th>Over Limit</th> <th>Line</th> <th>Read Level</th> <th>LISN Factor</th> <th>Cable Loss</th> <th>Remark</th> <th colspan="2">Pol/Phase</th> </tr> <tr> <th>MHz</th> <th>dBuV</th> <th>dB</th> <th>dBuV</th> <th>dBuV</th> <th>dB</th> <th>dB</th> <th></th> <th colspan="2"></th> </tr> </thead> <tbody> <tr><td>1</td><td>0.2535</td><td>40.93</td><td>-10.71</td><td>51.64</td><td>30.76</td><td>10.08</td><td>0.09 Average</td><td colspan="2">NEUTRAL</td></tr> <tr><td>2</td><td>0.2535</td><td>52.59</td><td>-9.05</td><td>61.64</td><td>42.42</td><td>10.08</td><td>0.09 QP</td><td colspan="2">NEUTRAL</td></tr> <tr><td>3</td><td>0.3003</td><td>38.32</td><td>-11.92</td><td>50.24</td><td>28.11</td><td>10.15</td><td>0.06 Average</td><td colspan="2">NEUTRAL</td></tr> <tr><td>4</td><td>0.3003</td><td>50.69</td><td>-9.55</td><td>60.24</td><td>40.48</td><td>10.15</td><td>0.06 QP</td><td colspan="2">NEUTRAL</td></tr> <tr><td>5</td><td>0.3446</td><td>29.83</td><td>-19.26</td><td>49.09</td><td>19.60</td><td>10.19</td><td>0.04 Average</td><td colspan="2">NEUTRAL</td></tr> <tr><td>6</td><td>0.3446</td><td>43.82</td><td>-15.27</td><td>59.09</td><td>33.59</td><td>10.19</td><td>0.04 QP</td><td colspan="2">NEUTRAL</td></tr> <tr><td>7</td><td>0.4305</td><td>32.06</td><td>-15.18</td><td>47.24</td><td>21.79</td><td>10.25</td><td>0.02 Average</td><td colspan="2">NEUTRAL</td></tr> <tr><td>8</td><td>0.4305</td><td>43.04</td><td>-14.20</td><td>57.24</td><td>32.77</td><td>10.25</td><td>0.02 QP</td><td colspan="2">NEUTRAL</td></tr> <tr><td>9</td><td>0.5128</td><td>33.86</td><td>-12.14</td><td>46.00</td><td>23.58</td><td>10.22</td><td>0.06 Average</td><td colspan="2">NEUTRAL</td></tr> <tr><td>10</td><td>0.5128</td><td>46.23</td><td>-9.77</td><td>56.00</td><td>35.95</td><td>10.22</td><td>0.06 QP</td><td colspan="2">NEUTRAL</td></tr> <tr><td>11</td><td>0.8528</td><td>34.30</td><td>-11.70</td><td>46.00</td><td>24.04</td><td>10.10</td><td>0.16 Average</td><td colspan="2">NEUTRAL</td></tr> <tr style="outline: 2px solid red;"><td>12</td><td>0.8528</td><td>47.85</td><td>-8.15</td><td>56.00</td><td>37.59</td><td>10.10</td><td>0.16 QP</td><td colspan="2">NEUTRAL</td></tr> <tr><td>13</td><td>0.9381</td><td>34.41</td><td>-11.59</td><td>46.00</td><td>24.16</td><td>10.07</td><td>0.18 Average</td><td colspan="2">NEUTRAL</td></tr> <tr><td>14</td><td>0.9381</td><td>44.60</td><td>-11.40</td><td>56.00</td><td>34.35</td><td>10.07</td><td>0.18 QP</td><td colspan="2">NEUTRAL</td></tr> <tr><td>15</td><td>1.0211</td><td>29.50</td><td>-16.50</td><td>46.00</td><td>19.26</td><td>10.05</td><td>0.19 Average</td><td colspan="2">NEUTRAL</td></tr> <tr><td>16</td><td>1.0211</td><td>46.01</td><td>-9.99</td><td>56.00</td><td>35.77</td><td>10.05</td><td>0.19 QP</td><td colspan="2" rowspan="2">NEUTRAL</td></tr> </tbody> </table> <td data-kind="ghost"></td>	Freq	Level	Over Limit	Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase		MHz	dBuV	dB	dBuV	dBuV	dB	dB				1	0.2535	40.93	-10.71	51.64	30.76	10.08	0.09 Average	NEUTRAL		2	0.2535	52.59	-9.05	61.64	42.42	10.08	0.09 QP	NEUTRAL		3	0.3003	38.32	-11.92	50.24	28.11	10.15	0.06 Average	NEUTRAL		4	0.3003	50.69	-9.55	60.24	40.48	10.15	0.06 QP	NEUTRAL		5	0.3446	29.83	-19.26	49.09	19.60	10.19	0.04 Average	NEUTRAL		6	0.3446	43.82	-15.27	59.09	33.59	10.19	0.04 QP	NEUTRAL		7	0.4305	32.06	-15.18	47.24	21.79	10.25	0.02 Average	NEUTRAL		8	0.4305	43.04	-14.20	57.24	32.77	10.25	0.02 QP	NEUTRAL		9	0.5128	33.86	-12.14	46.00	23.58	10.22	0.06 Average	NEUTRAL		10	0.5128	46.23	-9.77	56.00	35.95	10.22	0.06 QP	NEUTRAL		11	0.8528	34.30	-11.70	46.00	24.04	10.10	0.16 Average	NEUTRAL		12	0.8528	47.85	-8.15	56.00	37.59	10.10	0.16 QP	NEUTRAL		13	0.9381	34.41	-11.59	46.00	24.16	10.07	0.18 Average	NEUTRAL		14	0.9381	44.60	-11.40	56.00	34.35	10.07	0.18 QP	NEUTRAL		15	1.0211	29.50	-16.50	46.00	19.26	10.05	0.19 Average	NEUTRAL		16	1.0211	46.01	-9.99	56.00	35.77	10.05	0.19 QP	NEUTRAL										
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Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit. Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)																																																																																																																																																																																													



## AC Power-line Conducted Emissions Result

Operating Mode	2	Power Phase	Line
Operating Function	Normal Link		



Freq	Level	Over	Limit	Read	LISN	Cable	Remark	Pol/Phase
		Limit	Line	Level	Factor	Loss		
MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.2562	42.23	9.33	51.56	32.22	9.92	0.09 Average	LINE
2	0.2562	52.73	-8.83	61.56	42.72	9.92	0.09 QP	LINE
3	0.3003	38.18	-12.06	50.24	28.19	9.93	0.06 Average	LINE
4	0.3003	50.26	-9.98	60.24	40.27	9.93	0.06 QP	LINE
5	0.3446	29.34	-19.75	49.09	19.36	9.94	0.04 Average	LINE
6	0.3446	43.34	-15.75	59.09	33.36	9.94	0.04 QP	LINE
7	0.4260	31.91	-15.42	47.33	21.94	9.95	0.02 Average	LINE
8	0.4260	42.46	-14.87	57.33	32.49	9.95	0.02 QP	LINE
9	0.5128	33.28	-12.72	46.00	23.27	9.95	0.06 Average	LINE
10	0.5128	45.59	-10.41	56.00	35.58	9.95	0.06 QP	LINE
11	0.8528	33.87	-12.13	46.00	23.75	9.96	0.16 Average	LINE
12	0.8528	47.44	-8.56	56.00	37.32	9.96	0.16 QP	LINE
13	0.9381	33.86	-12.14	46.00	23.72	9.96	0.18 Average	LINE
14	0.9381	44.33	-11.67	56.00	34.19	9.96	0.18 QP	LINE
15	1.0211	29.22	-16.78	46.00	19.07	9.96	0.19 Average	LINE
16	1.0211	45.75	-10.25	56.00	35.60	9.96	0.19 QP	LINE

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)



## 3.2 Emission Bandwidth

### 3.2.1 Emission Bandwidth Limit

Emission Bandwidth Limit	
<b>UNII Devices</b>	
<input type="checkbox"/>	For the 5.15-5.25 GHz band, N/A
<input checked="" type="checkbox"/>	For the 5.25-5.35 GHz band, the maximum conducted output power shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz.
<input checked="" type="checkbox"/>	For the 5.47-5.725 GHz band, the maximum conducted output power shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz.
<input checked="" type="checkbox"/>	For the 5.725-5.85 GHz band, 6 dB emission bandwidth $\geq$ 500kHz.
<b>LE-LAN Devices</b>	
<input type="checkbox"/>	For the band 5.15-5.25 GHz, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
<input type="checkbox"/>	For the 5.25-5.35 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz
<input type="checkbox"/>	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz
<input type="checkbox"/>	For the 5.725-5.85 GHz band, 6 dB emission bandwidth $\geq$ 500kHz.

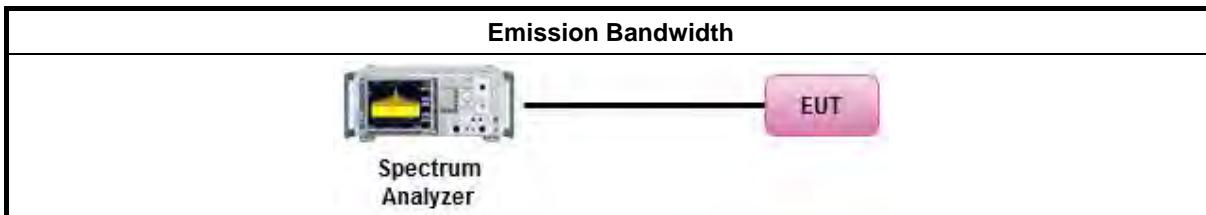
### 3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

### 3.2.3 Test Procedures

Test Method	
▪	For the emission bandwidth shall be measured using one of the options below:
<input checked="" type="checkbox"/>	Refer as FCC KDB 789033, clause C for EBW and clause D for OBW measurement.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.
<input checked="" type="checkbox"/>	Refer as IC RSS-Gen, clause 4.6 for bandwidth testing.

### 3.2.4 Test Setup





### 3.2.5 Test Result of Emission Bandwidth

#### Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
802.11a_(6Mbps)_2TX	-	-	-	-	-
5.25-5.35GHz	41.45M	19.865M	19M9D1D	35.75M	16.592M
5.47-5.725GHz	39.175M	16.992M	17M0D1D	14.91M	13.238M
5.725-5.85GHz	3.14M	3.738M	3M74D1D	3.12M	3.418M
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-
5.25-5.35GHz	43.05M	19.89M	19M9D1D	21.4M	17.641M
5.47-5.725GHz	40.175M	18.066M	18M1D1D	19.975M	13.898M
5.725-5.85GHz	3.76M	13.013M	13M0D1D	3.74M	9.535M
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-
5.25-5.35GHz	89.9M	39.73M	39M7D1D	39.45M	35.882M
5.47-5.725GHz	81.35M	36.432M	36M4D1D	39.55M	33.058M
5.725-5.85GHz	3.22M	26.147M	26M1D1D	3.12M	22.089M
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-
5.25-5.35GHz	83.5M	75.662M	75M7D1D	82.6M	75.562M
5.47-5.725GHz	149.8M	75.862M	75M9D1D	83.7M	72.864M
5.725-5.85GHz	3.12M	36.562M	36M6D1D	3.1M	33.583M
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-
5.25-5.35GHz	23.575M	17.691M	17M7D1D	20.65M	17.641M
5.47-5.725GHz	21.125M	17.641M	17M6D1D	15.03M	13.808M
5.725-5.85GHz	3.76M	4.058M	4M06D1D	3.74M	3.918M
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-
5.25-5.35GHz	68.65M	36.232M	36M2D1D	39.45M	35.982M
5.47-5.725GHz	56.7M	36.182M	36M2D1D	34.895M	32.884M
5.725-5.85GHz	3.12M	13.893M	13M9D1D	3.12M	3.778M
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-	-	-	-	-
5.25-5.35GHz	83.7M	75.762M	75M8D1D	82.8M	75.662M
5.47-5.725GHz	83.9M	75.762M	75M8D1D	76.725M	72.714M
5.725-5.85GHz	3.12M	24.668M	24M7D1D	3.12M	5.897M

Max-N dB = Maximum 6dB down bandwidth for 5.725-5.85GHz band / Maximum 26dB down bandwidth for other band;

Max-OBW = Maximum 99% occupied bandwidth;

Min-N dB = Minimum 6dB down bandwidth for 5.725-5.85GHz band / Maximum 26dB down bandwidth for other band;

Min-OBW = Minimum 99% occupied bandwidth;



## Result

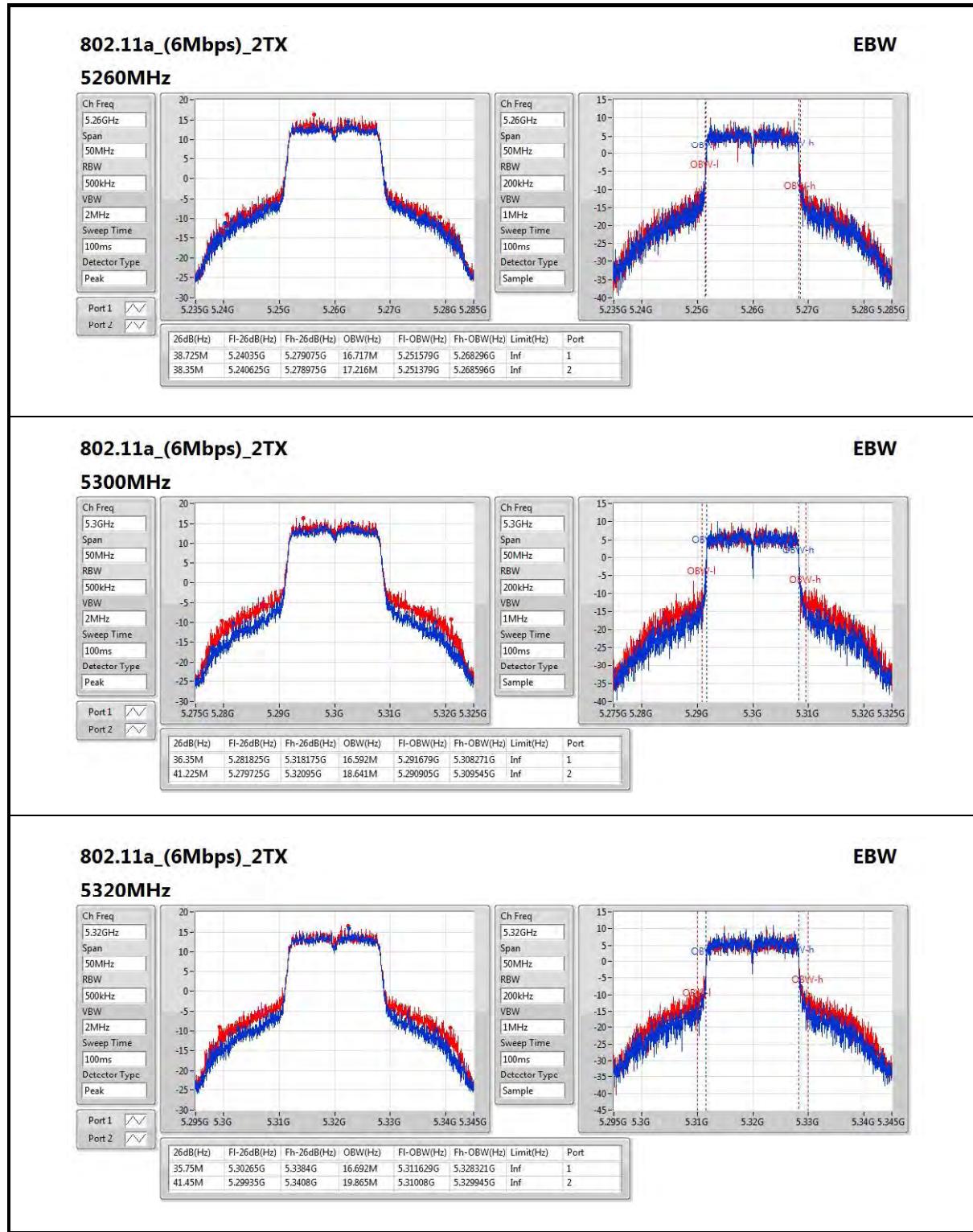
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)	Port 2-N dB (Hz)	Port 2-OBW (Hz)
802.11a_(6Mbps)_2TX	-	-	-	-	-	-
5260MHz	Pass	Inf	38.725M	16.717M	38.35M	17.216M
5300MHz	Pass	Inf	36.35M	16.592M	41.225M	18.641M
5320MHz	Pass	Inf	35.75M	16.692M	41.45M	19.865M
5500MHz	Pass	Inf	31.675M	16.517M	36.95M	16.692M
5580MHz	Pass	Inf	39.175M	16.992M	36.175M	16.667M
5700MHz	Pass	Inf	19.275M	16.442M	18.95M	16.417M
5720MHz Straddle 5.47-5.725GHz	Pass	Inf	15.645M	13.238M	14.91M	13.238M
5720MHz Straddle 5.725-5.85GHz	Pass	500k	3.12M	3.738M	3.14M	3.418M
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5260MHz	Pass	Inf	43.05M	18.541M	42.825M	19.89M
5300MHz	Pass	Inf	37.725M	17.791M	41.25M	18.966M
5320MHz	Pass	Inf	21.4M	17.641M	27.75M	17.716M
5500MHz	Pass	Inf	21.2M	17.616M	26.05M	17.641M
5580MHz	Pass	Inf	40.175M	18.066M	37.275M	17.841M
5700MHz	Pass	Inf	20.5M	17.616M	19.975M	17.616M
5720MHz Straddle 5.47-5.725GHz	Pass	Inf	24.885M	14.363M	20.535M	13.898M
5720MHz Straddle 5.725-5.85GHz	Pass	500k	3.74M	13.013M	3.76M	9.535M
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5270MHz	Pass	Inf	81.65M	36.532M	89.9M	39.73M
5310MHz	Pass	Inf	39.45M	35.882M	39.5M	35.932M
5510MHz	Pass	Inf	39.55M	35.982M	39.6M	36.032M
5550MHz	Pass	Inf	79.65M	36.332M	81.35M	36.432M
5670MHz	Pass	Inf	70.75M	36.132M	40.15M	36.032M
5710MHz Straddle 5.47-5.725GHz	Pass	Inf	60.06M	34.668M	56.21M	33.058M
5710MHz Straddle 5.725-5.85GHz	Pass	500k	3.22M	26.147M	3.12M	22.089M
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5290MHz	Pass	Inf	83.5M	75.562M	82.6M	75.662M
5530MHz	Pass	Inf	84.1M	75.562M	83.7M	75.862M
5610MHz	Pass	Inf	149.8M	75.762M	115.9M	75.862M
5690MHz Straddle 5.47-5.725GHz	Pass	Inf	130.875M	73.538M	114.525M	72.864M
5690MHz Straddle 5.725-5.85GHz	Pass	500k	3.1M	36.562M	3.12M	33.583M
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5260MHz	Pass	Inf	23.1M	17.691M	23.575M	17.666M
5300MHz	Pass	Inf	21.25M	17.666M	22.75M	17.666M
5320MHz	Pass	Inf	20.65M	17.641M	21.175M	17.666M
5500MHz	Pass	Inf	20.475M	17.591M	21.125M	17.616M
5580MHz	Pass	Inf	20.5M	17.641M	20.625M	17.591M
5700MHz	Pass	Inf	19.975M	17.616M	20M	17.616M
5720MHz Straddle 5.47-5.725GHz	Pass	Inf	15.42M	13.823M	15.03M	13.808M
5720MHz Straddle 5.725-5.85GHz	Pass	500k	3.74M	4.058M	3.76M	3.918M

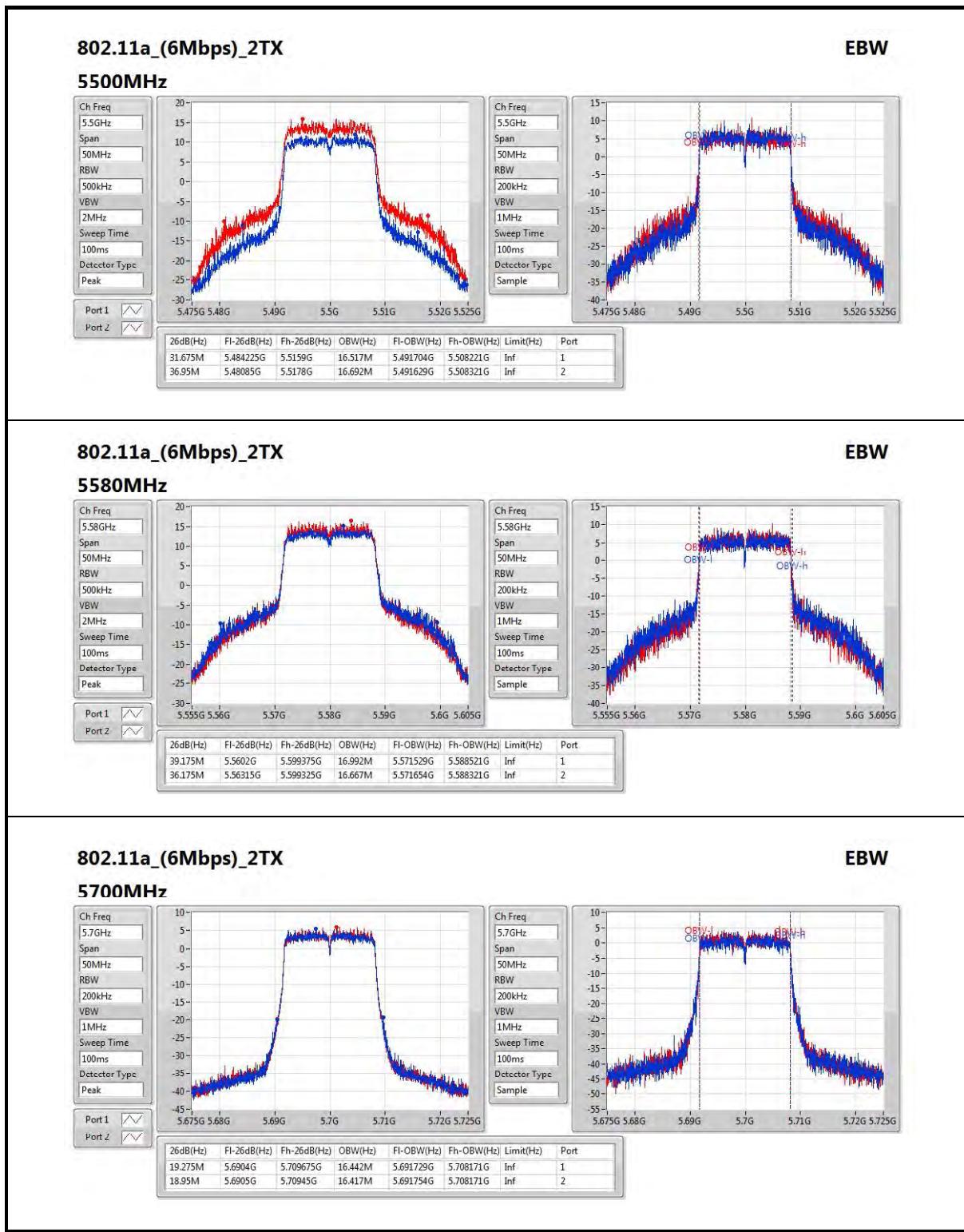
**FCC RADIO TEST REPORT**

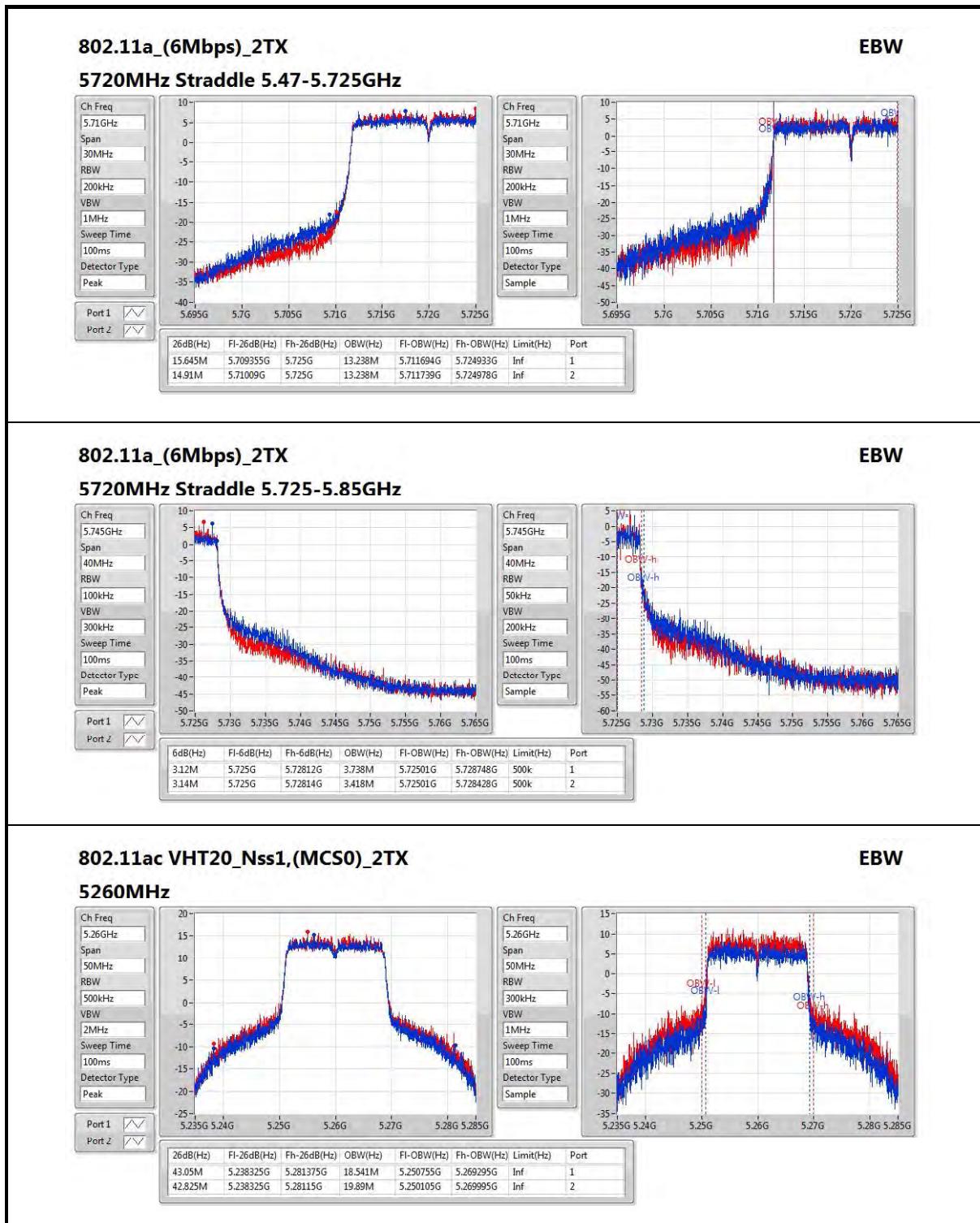
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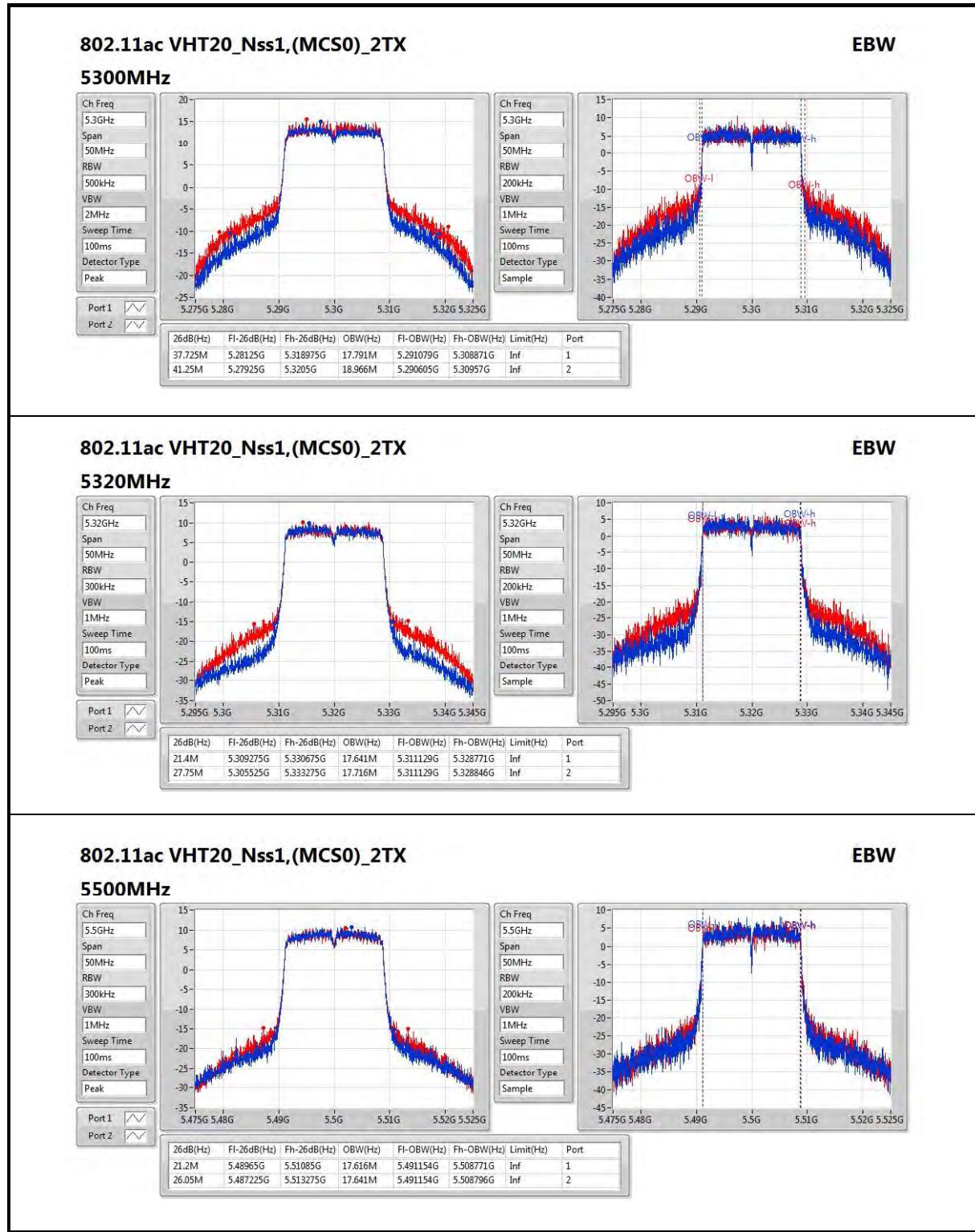
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)	Port 2-N dB (Hz)	Port 2-OBW (Hz)
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5270MHz	Pass	Inf	49.1M	36.032M	68.65M	36.232M
5310MHz	Pass	Inf	39.65M	35.982M	39.45M	35.982M
5510MHz	Pass	Inf	39.65M	36.032M	39.65M	36.032M
5550MHz	Pass	Inf	39.75M	36.082M	39.75M	36.032M
5670MHz	Pass	Inf	56.7M	36.182M	39.65M	36.032M
5710MHz Straddle 5.47-5.725GHz	Pass	Inf	41.72M	32.919M	34.895M	32.884M
5710MHz Straddle 5.725-5.85GHz	Pass	500k	3.12M	13.893M	3.12M	3.778M
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5290MHz	Pass	Inf	83.7M	75.762M	82.8M	75.662M
5530MHz	Pass	Inf	83.1M	75.562M	83.2M	75.762M
5610MHz	Pass	Inf	83.9M	75.762M	83.3M	75.762M
5690MHz Straddle 5.47-5.725GHz	Pass	Inf	76.95M	72.714M	76.725M	72.714M
5690MHz Straddle 5.725-5.85GHz	Pass	500k	3.12M	24.668M	3.12M	5.897M

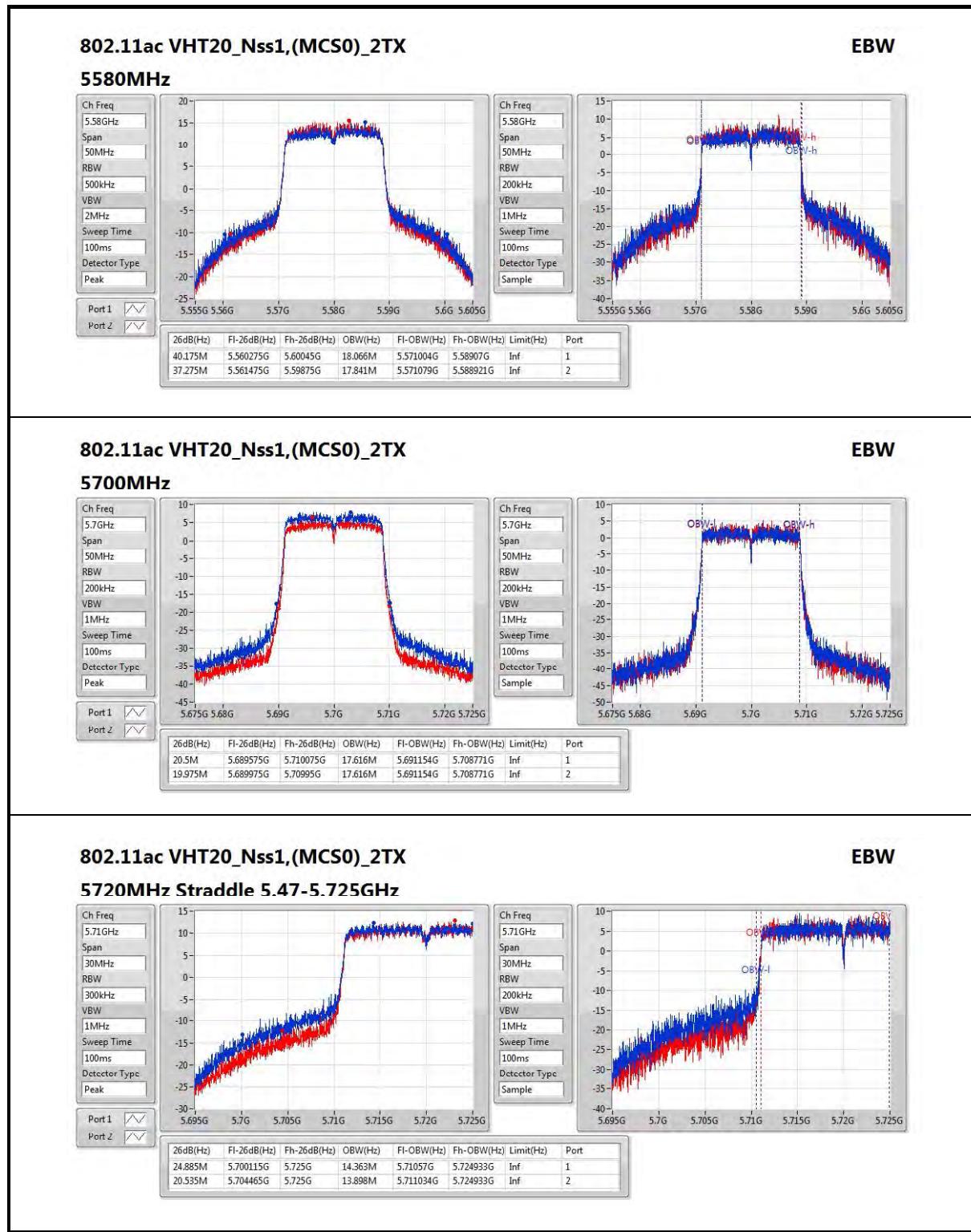
**Port X-N dB** = Port X 6dB down bandwidth for 5.725-5.85GHz band / 26dB down bandwidth for other band**Port X-OBW** = Port X 99% occupied bandwidth;

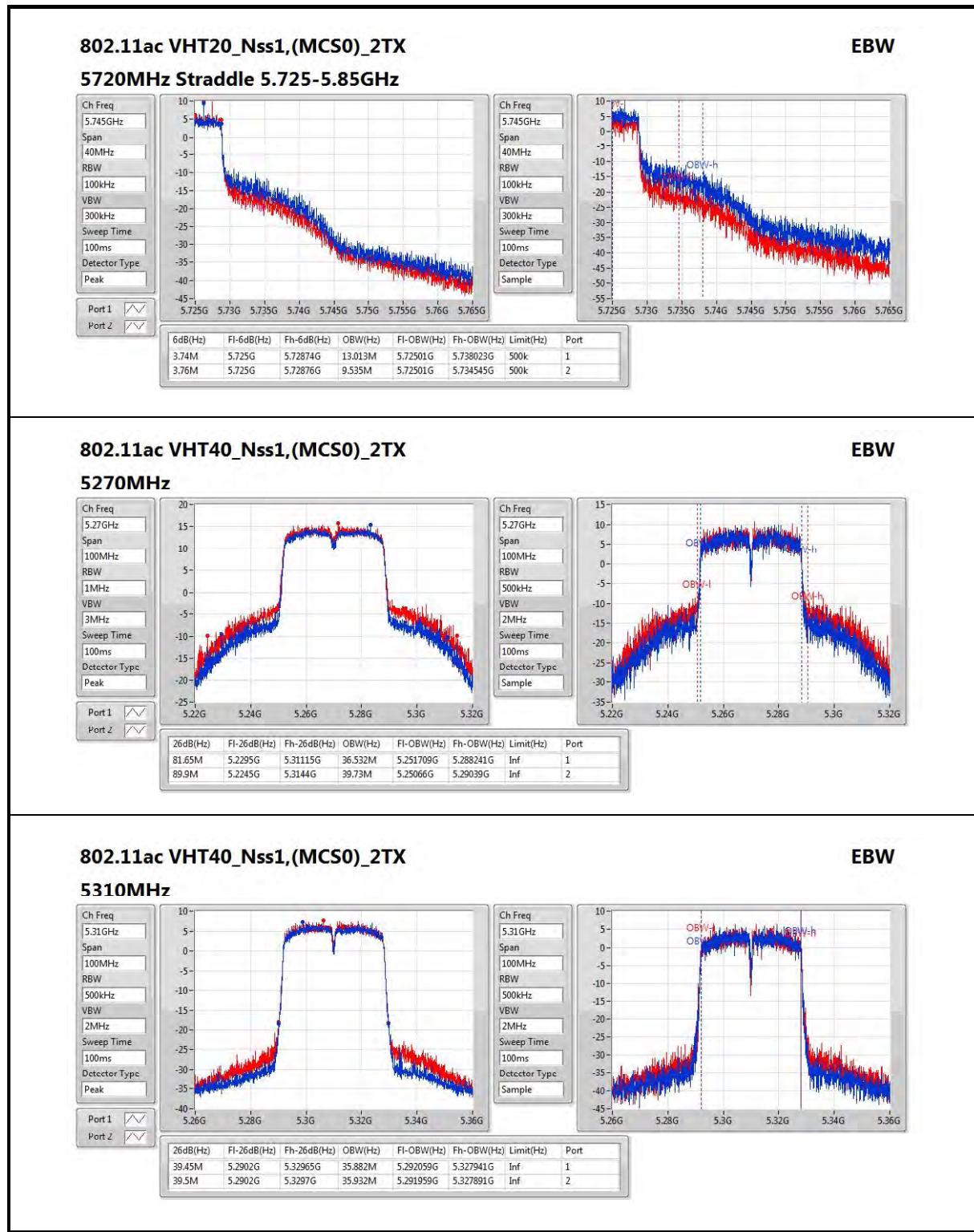


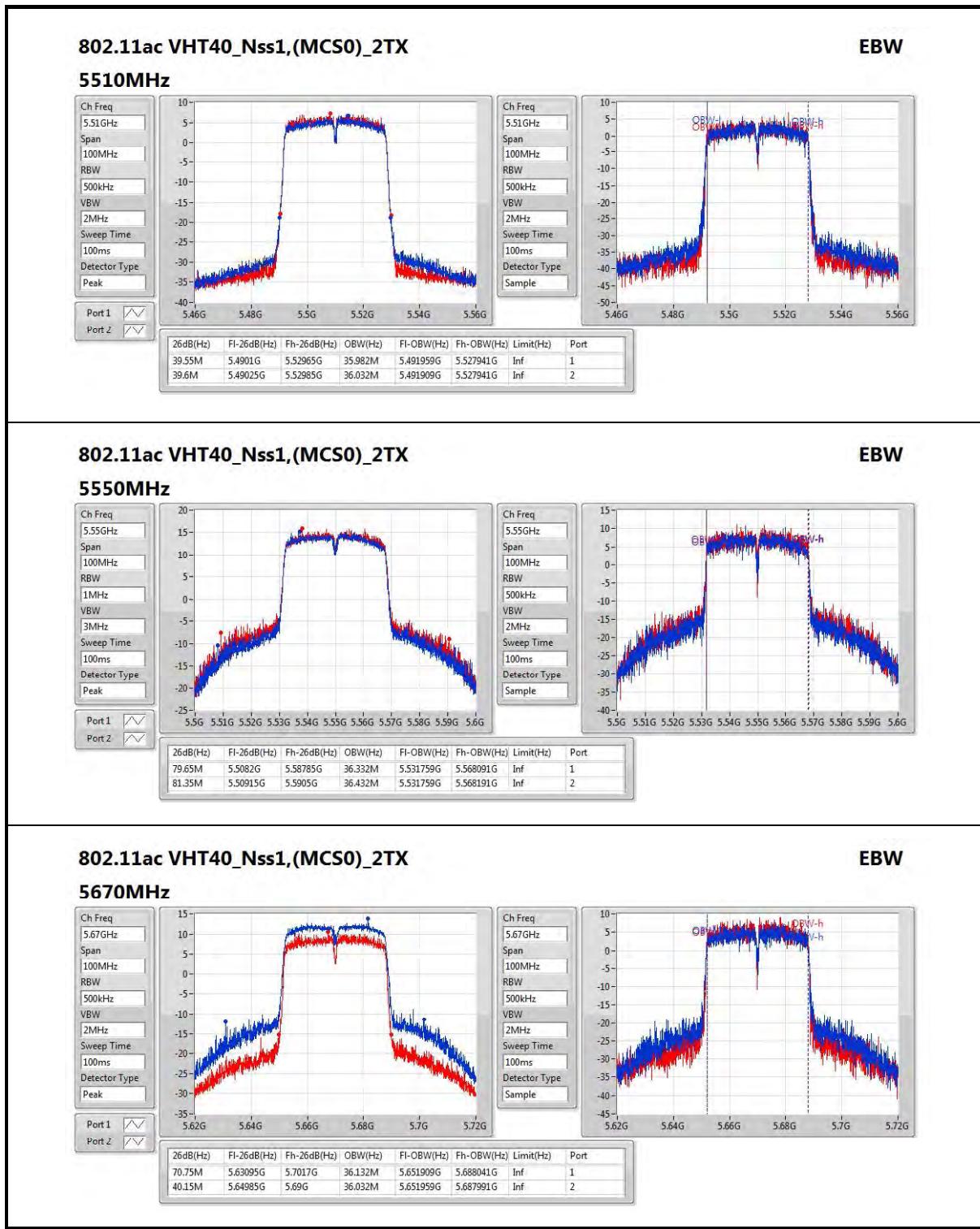


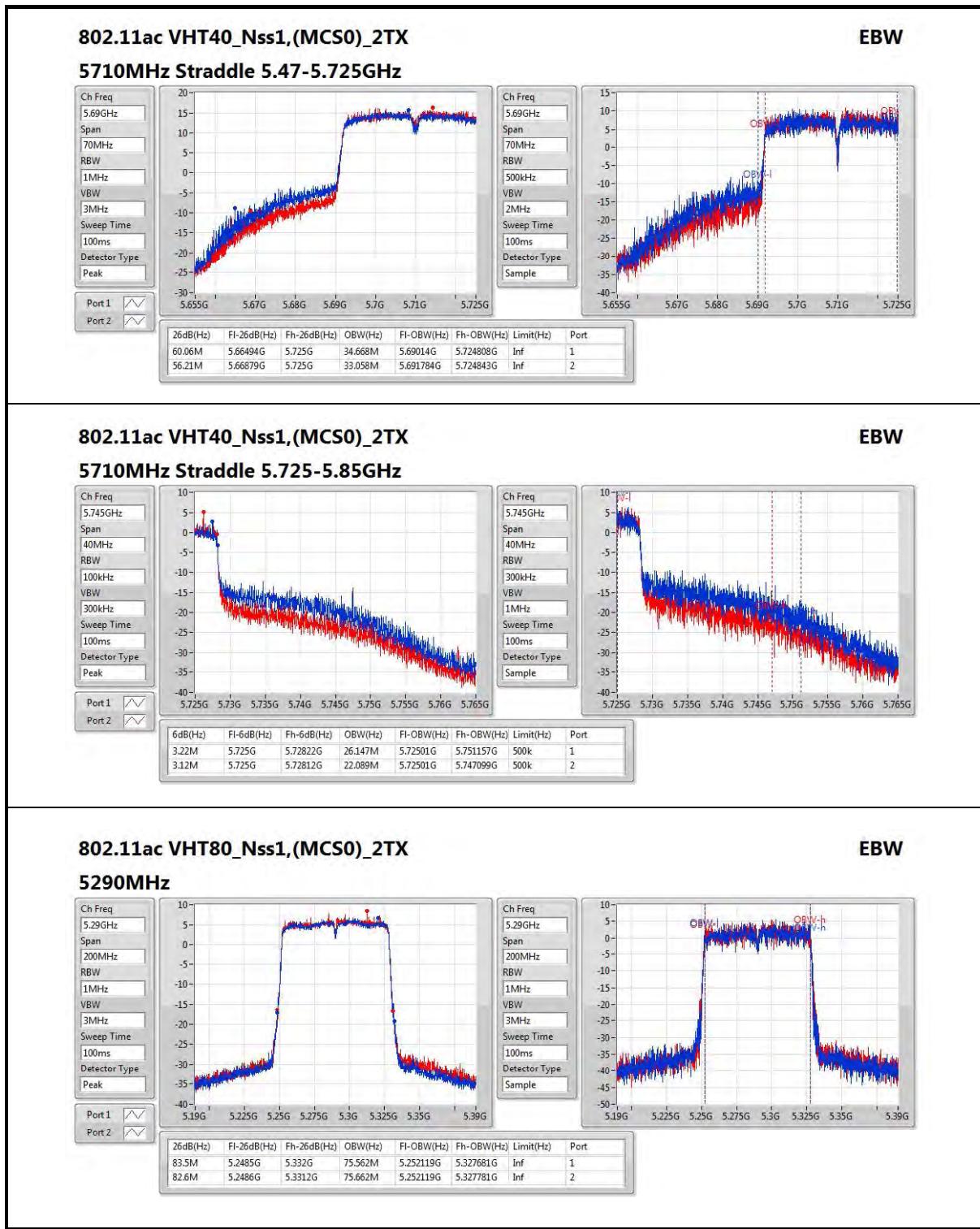


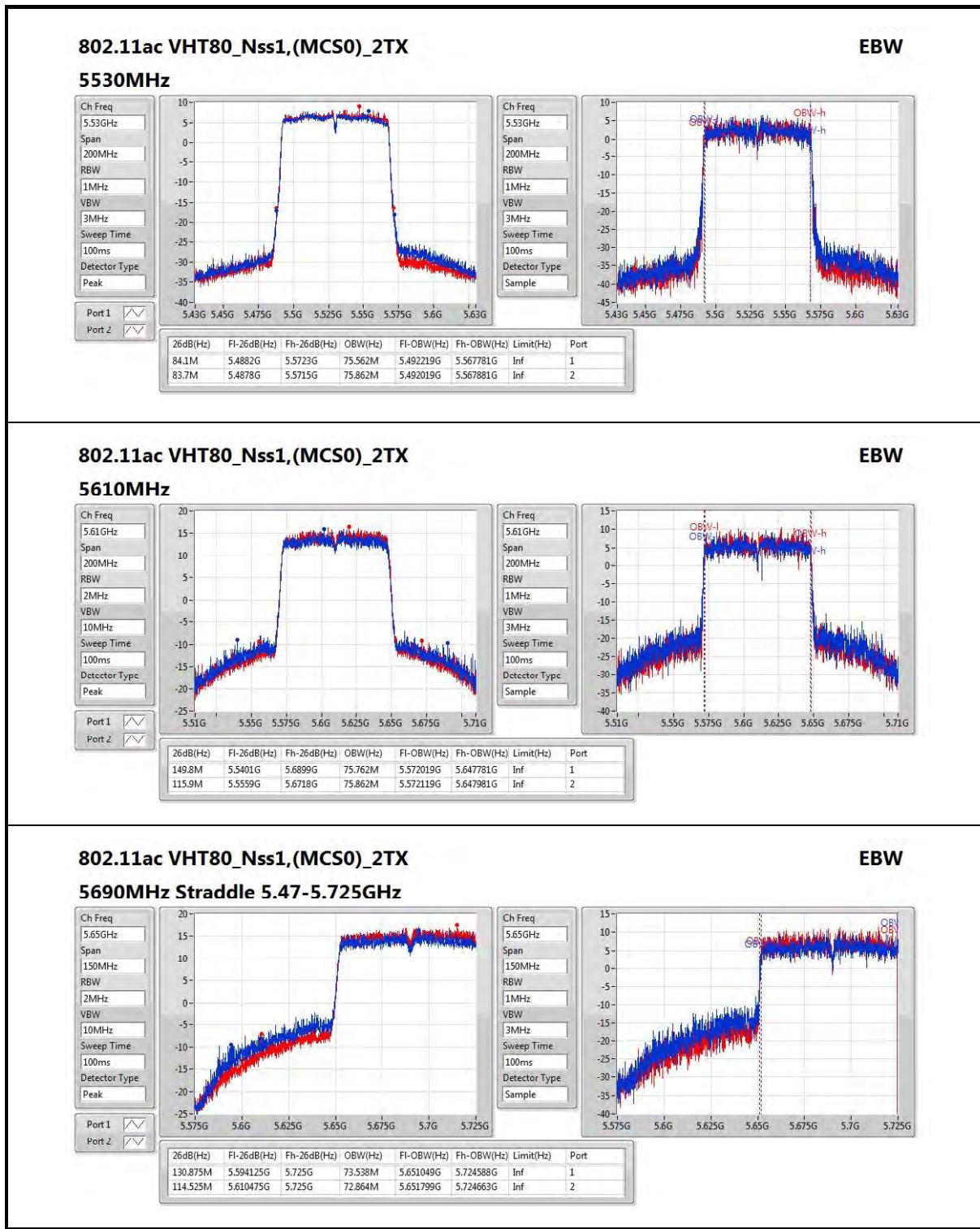


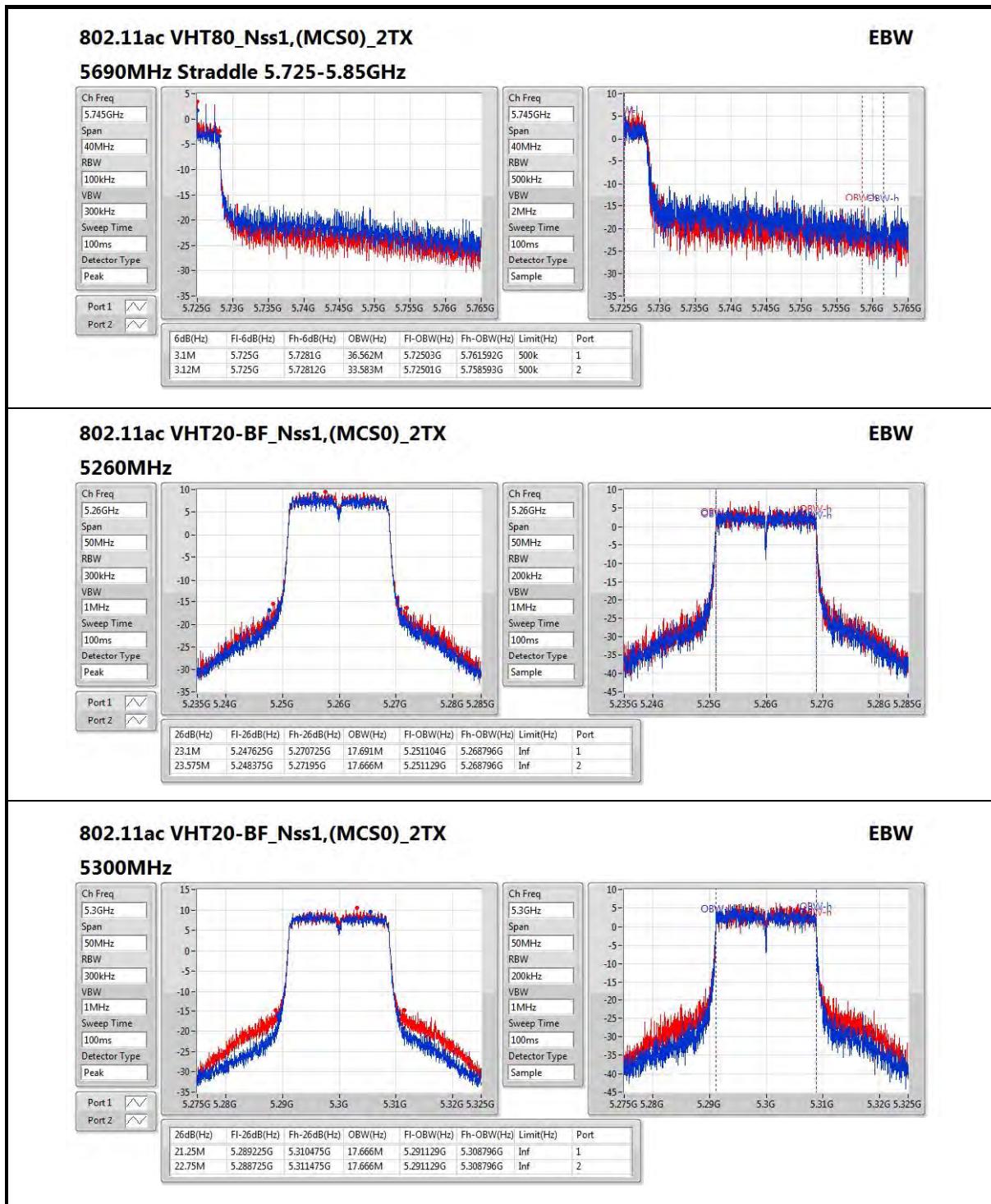


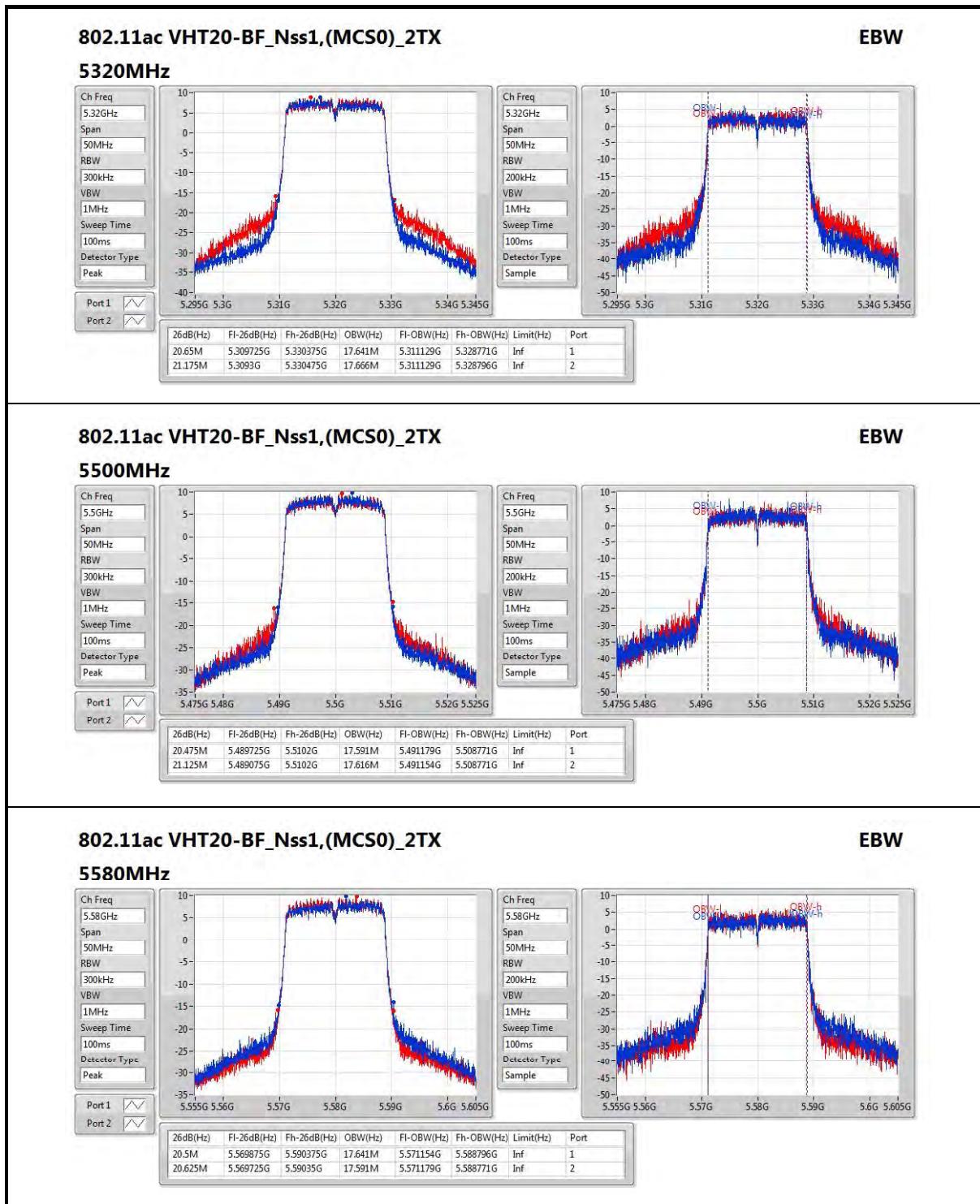


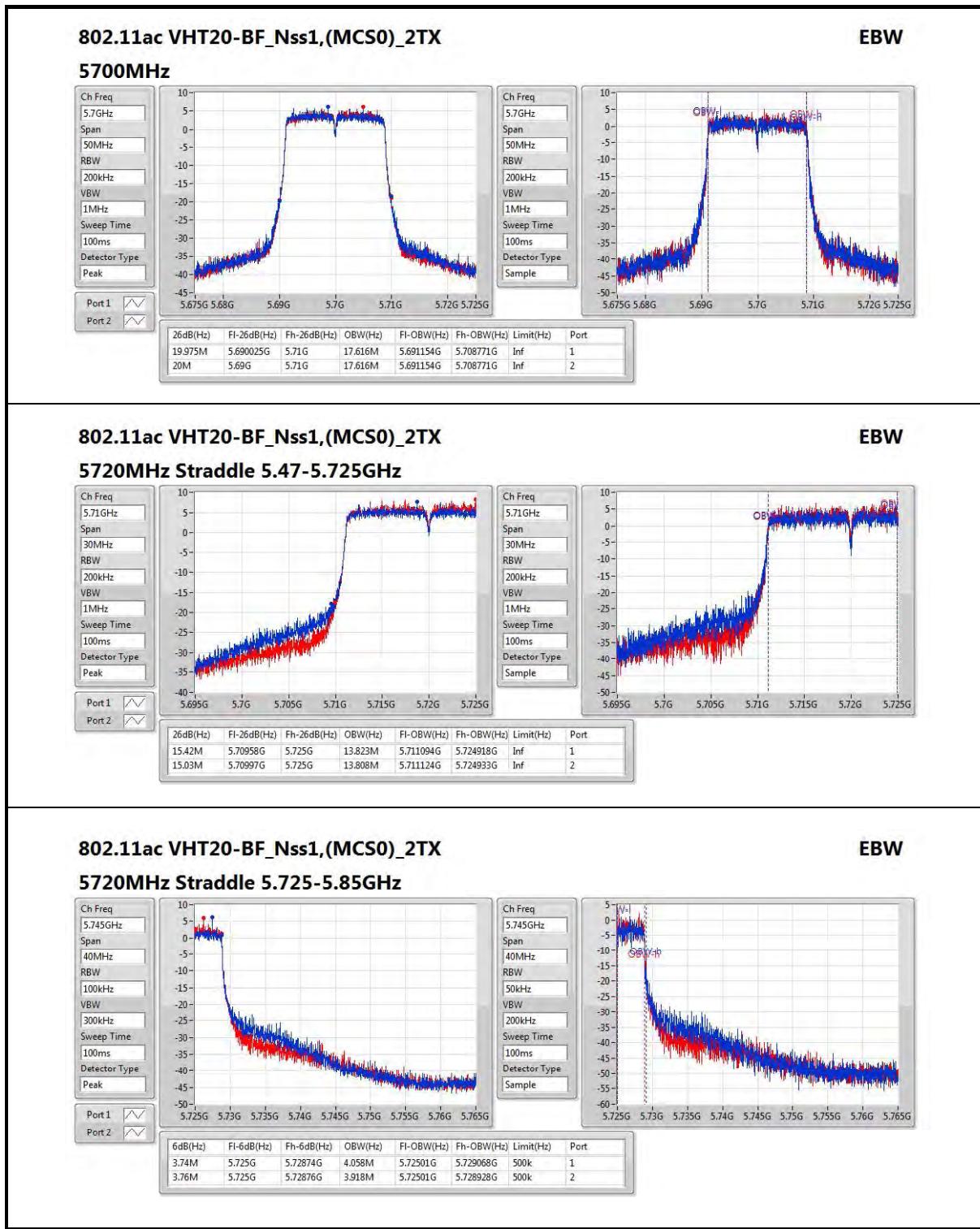


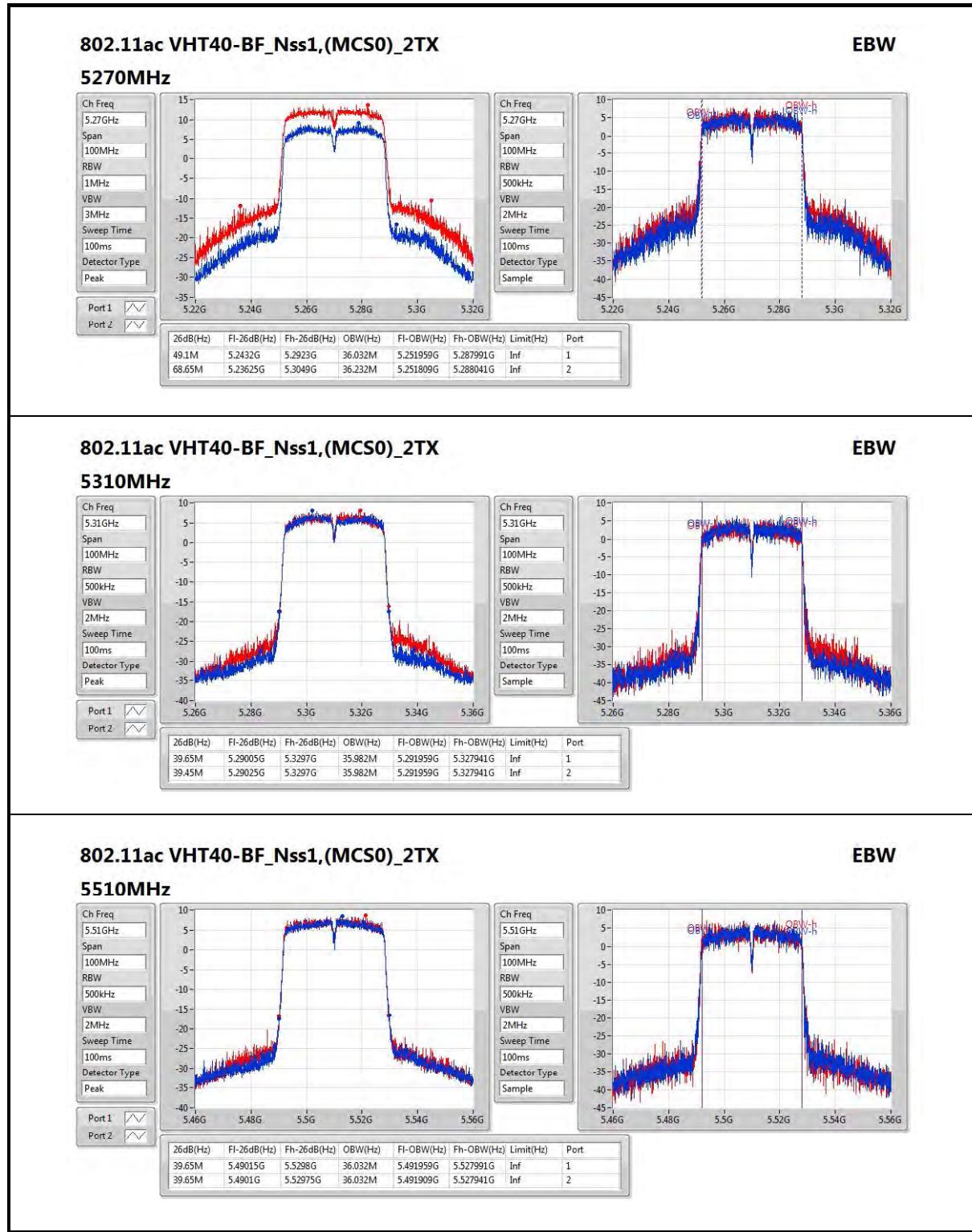


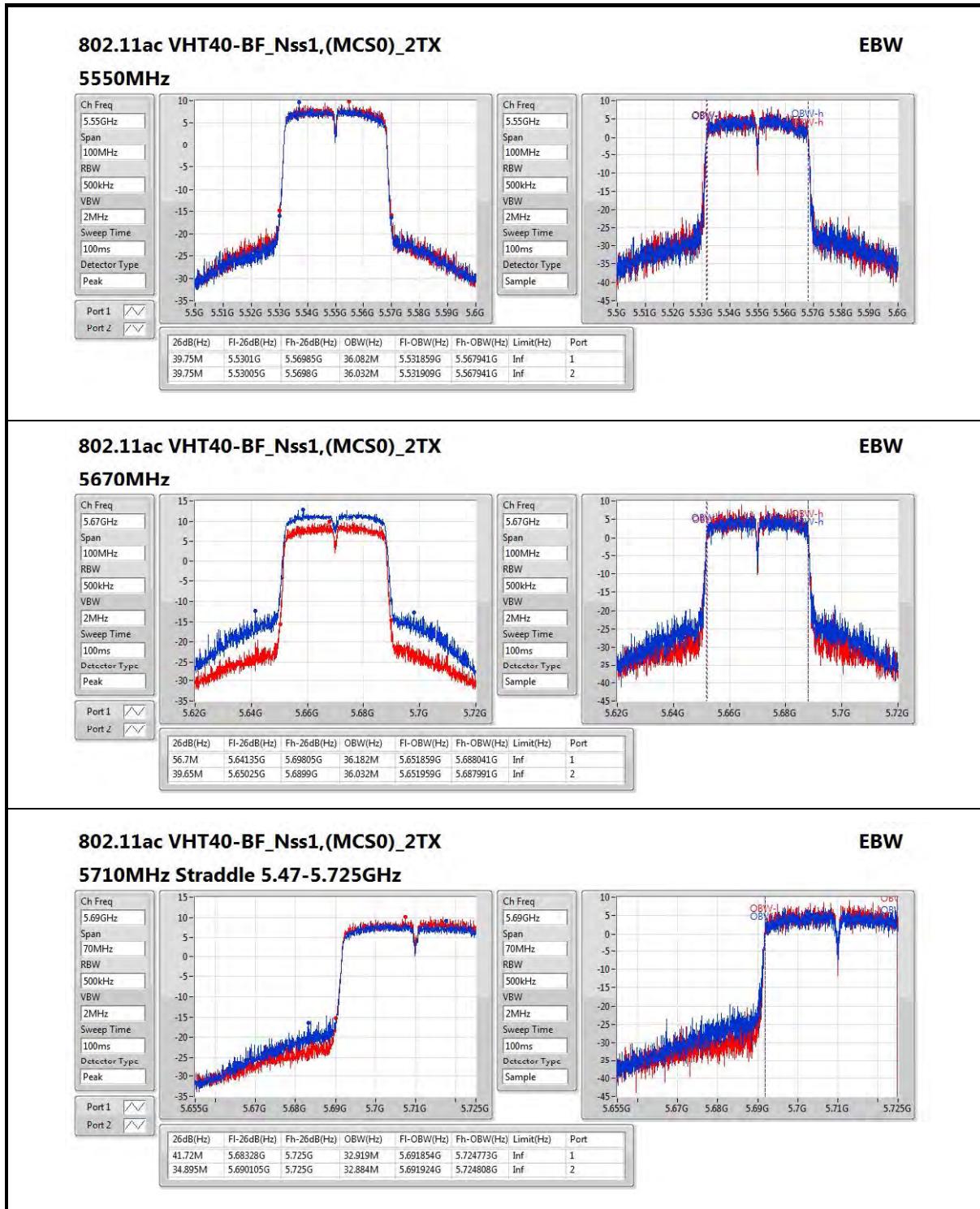


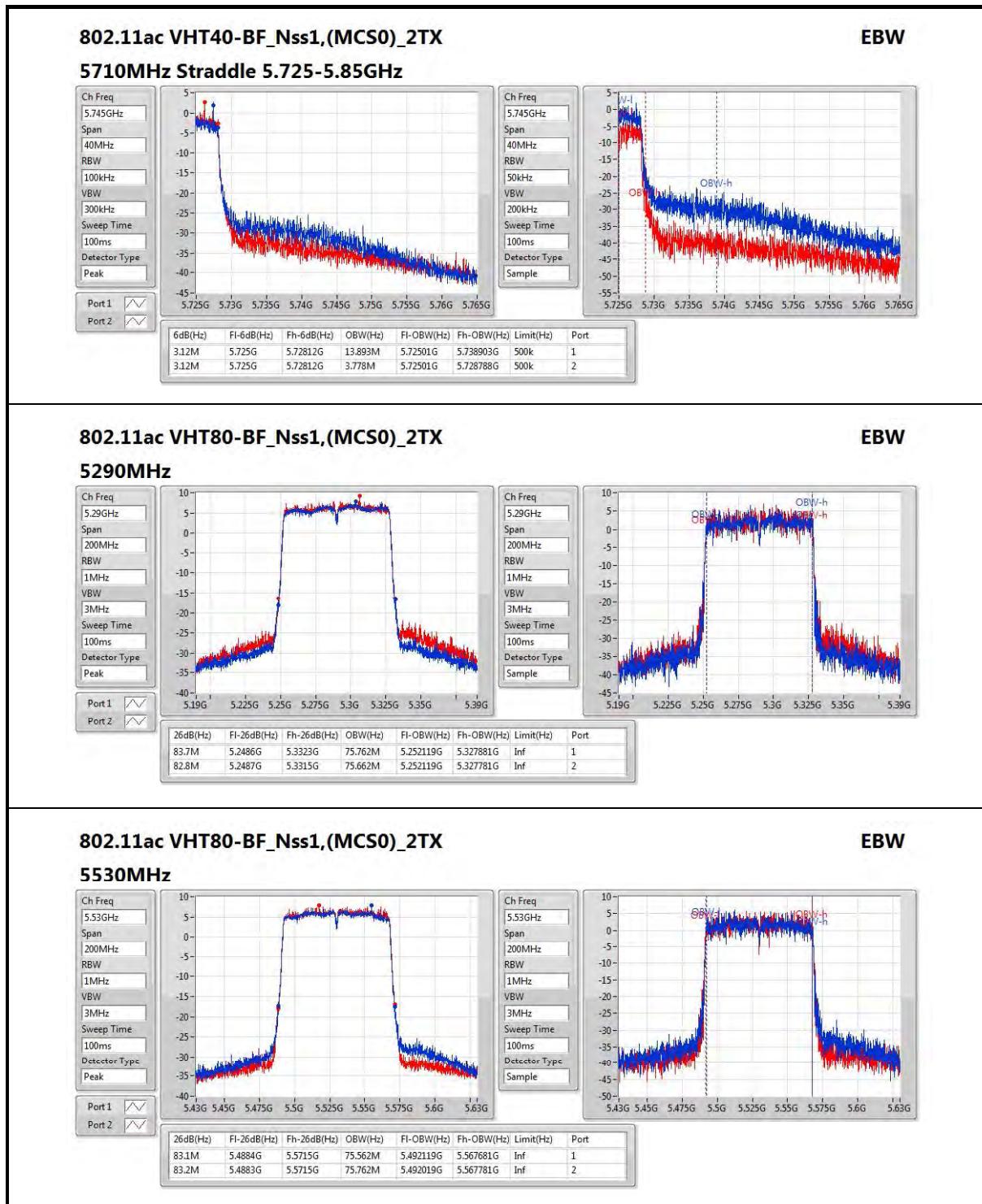


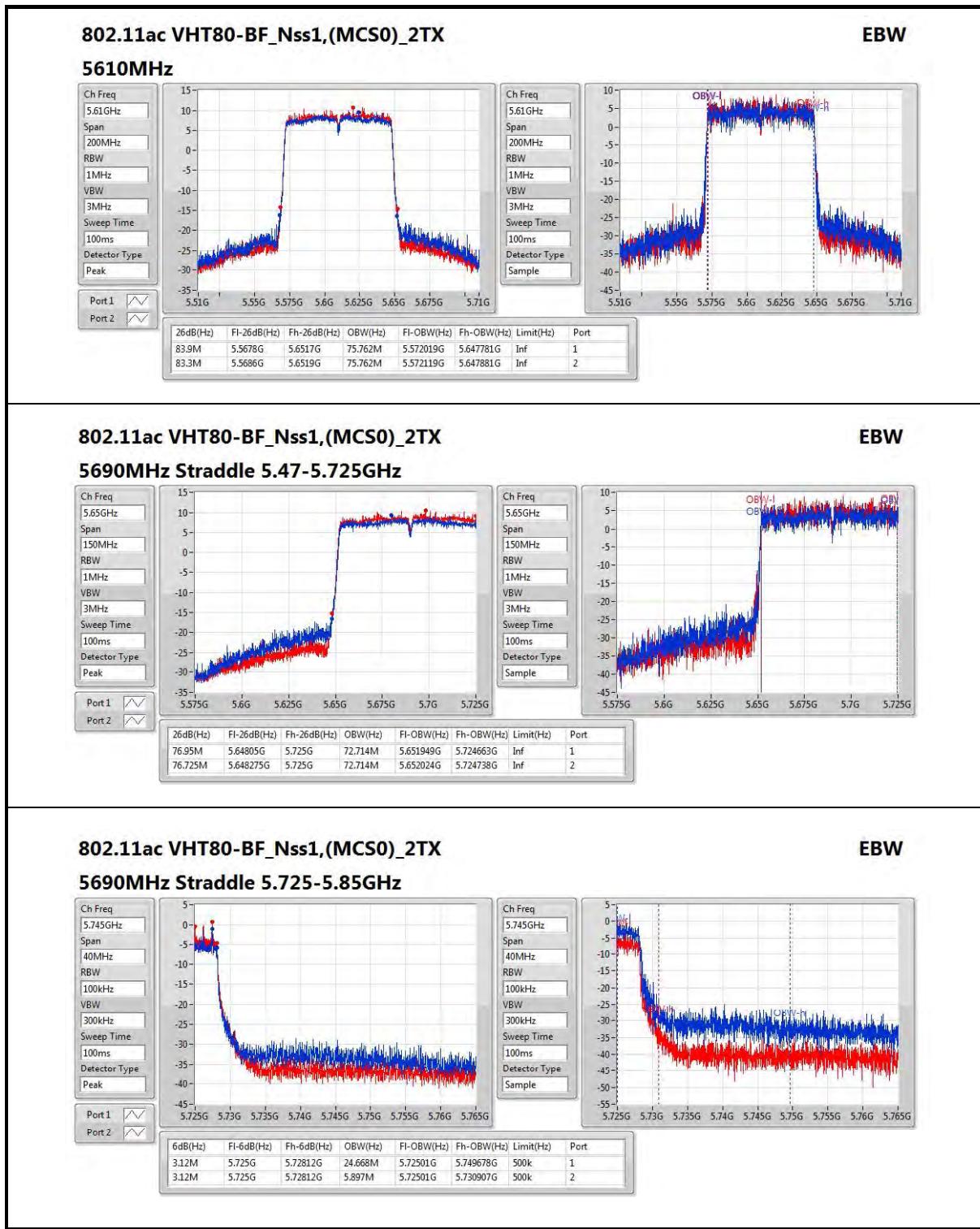














### 3.3 Maximum Conducted Output Power

#### 3.3.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit	
<b>UNII Devices</b>	
<input type="checkbox"/> For the 5.15-5.25 GHz band:	<ul style="list-style-type: none"><li>▪ Outdoor AP: the maximum conducted output power (<math>P_{Out}</math>) shall not exceed the lesser of 1 W. If <math>G_{TX} &gt; 6 \text{ dBi}</math>, then <math>P_{Out} = 30 - (G_{TX} - 6)</math>. e.i.r.p. at any elevation angle above 30 degrees <math>\leq 125\text{mW}</math> [21dBm]</li><li>▪ Indoor AP: the maximum conducted output power (<math>P_{Out}</math>) shall not exceed the lesser of 1 W. If <math>G_{TX} &gt; 6 \text{ dBi}</math>, then <math>P_{Out} = 30 - (G_{TX} - 6)</math></li><li>▪ Point-to-point AP: the maximum conducted output power (<math>P_{Out}</math>) shall not exceed the lesser of 1 W. If <math>G_{TX} &gt; 23 \text{ dBi}</math>, then <math>P_{Out} = 30 - (G_{TX} - 23)</math>.</li><li>▪ Mobile or Portable Client: the maximum conducted output power (<math>P_{Out}</math>) shall not exceed the lesser of 250 mW. If <math>G_{TX} &gt; 6 \text{ dBi}</math>, then <math>P_{Out} = 24 - (G_{TX} - 6)</math>.</li></ul>
<input checked="" type="checkbox"/> For the 5.25-5.35 GHz band, the maximum conducted output power ( $P_{Out}$ ) shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6 \text{ dBi}$ , then $P_{Out} = 24 - (G_{TX} - 6)$ .	
<input checked="" type="checkbox"/> For the 5.47-5.725 GHz band, the maximum conducted output power ( $P_{Out}$ ) shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6 \text{ dBi}$ , then $P_{Out} = 24 - (G_{TX} - 6)$ .	
<input checked="" type="checkbox"/> For the 5.725-5.85 GHz band:	<ul style="list-style-type: none"><li>▪ Point-to-multipoint systems (P2M): the maximum conducted output power (<math>P_{Out}</math>) shall not exceed the lesser of 1 W. If <math>G_{TX} &gt; 6 \text{ dBi}</math>, then <math>P_{Out} = 30 - (G_{TX} - 6)</math>.</li><li>▪ Point-to-point systems (P2P): the maximum conducted output power (<math>P_{Out}</math>) shall not exceed the lesser of 1 W.</li></ul>
<b>LE-LAN Devices</b>	
<input type="checkbox"/> For the 5.15-5.25 GHz band, the maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log B$ , dBm, whichever power is less. B is the 99% emission bandwidth in MHz.	
<input type="checkbox"/> For the 5.25-5.35 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \log B$ , dBm, whichever power is less. B is the 99% emission bandwidth in MHz	
<input type="checkbox"/> For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \log B$ , dBm, whichever power is less. B is the 99% emission bandwidth in MHz	
<input type="checkbox"/> For the 5.725-5.85 GHz band:	<ul style="list-style-type: none"><li>▪ Point-to-multipoint systems (P2M): the maximum conducted output power (<math>P_{Out}</math>) shall not exceed the lesser of 1 W. If <math>G_{TX} &gt; 6 \text{ dBi}</math>, then <math>P_{Out} = 30 - (G_{TX} - 6)</math>.</li><li>▪ Point-to-point systems (P2P): the maximum conducted output power (<math>P_{Out}</math>) shall not exceed the lesser of 1 W.</li></ul>
$P_{Out}$ = maximum conducted output power in dBm, $G_{TX}$ = the maximum transmitting antenna directional gain in dBi.	



### 3.3.2 Measuring Instruments

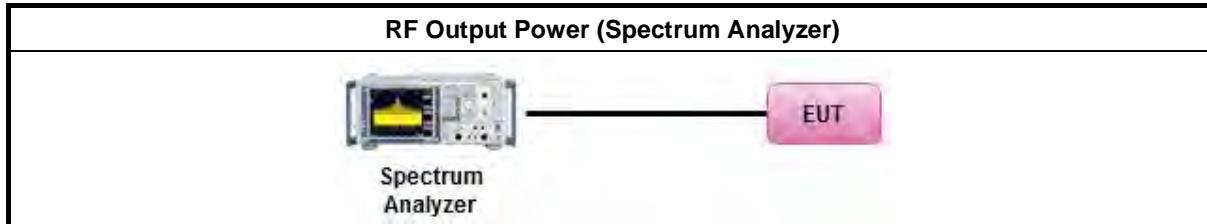
Refer a test equipment and calibration data table in this test report.

### 3.3.3 Test Procedures

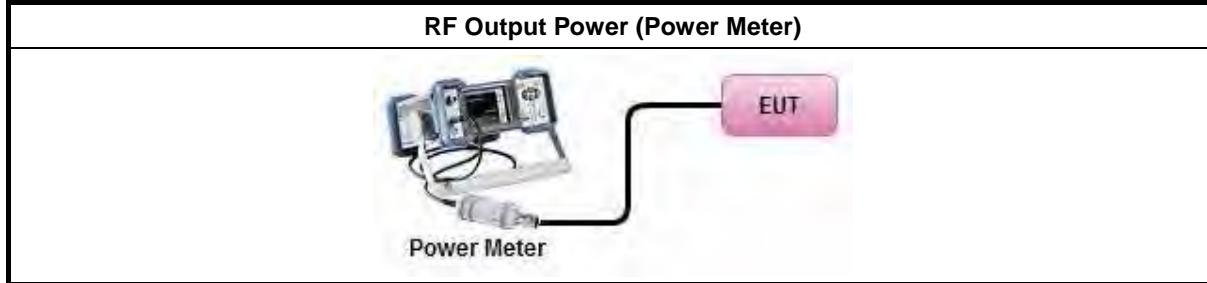
Test Method	
▪ Maximum Conducted Output Power	Average over on/off periods with duty factor <input checked="" type="checkbox"/> Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging). <input type="checkbox"/> Refer as FCC KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed) Wideband RF power meter and average over on/off periods with duty factor <input checked="" type="checkbox"/> Refer as FCC KDB 789033, clause E Method PM-G (using an RF average power meter).
▪ For conducted measurement.	<ul style="list-style-type: none"><li>▪ If the EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.</li><li>▪ If multiple transmit chains, EIRP calculation could be following as methods: <math>P_{total} = P_1 + P_2 + \dots + P_n</math> (calculated in linear unit [mW] and transfer to log unit [dBm]) <math>EIRP_{total} = P_{total} + DG</math></li></ul>

### 3.3.4 Test Setup

For straddle channel



For other channel





### 3.3.5 Test Result of Maximum Conducted Output Power

#### Summary

Mode	Total Power (dBm)	Total Power (W)	EIRP (dBm)	EIRP (W)
802.11a_(6Mbps)_2TX	-	-	-	-
5.25-5.35GHz	23.57	0.22751	28.44	0.69823
5.47-5.725GHz	23.79	0.23933	28.66	0.73451
5.725-5.85GHz	14.17	0.02612	19.04	0.08017
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-
5.25-5.35GHz	23.97	0.24946	28.84	0.76560
5.47-5.725GHz	23.89	0.24491	28.76	0.75162
5.725-5.85GHz	17.65	0.05821	22.52	0.17865
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-
5.25-5.35GHz	23.81	0.24044	28.68	0.73790
5.47-5.725GHz	23.87	0.24378	28.74	0.74817
5.725-5.85GHz	12.50	0.01778	17.37	0.05458
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-
5.25-5.35GHz	18.20	0.06607	23.07	0.20277
5.47-5.725GHz	23.80	0.23988	28.67	0.73621
5.725-5.85GHz	9.71	0.00935	14.58	0.02871
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	-	-	-	-
5.25-5.35GHz	21.17	0.13092	26.32	0.42855
5.47-5.725GHz	21.27	0.13397	26.42	0.43853
5.725-5.85GHz	14.87	0.03069	20.02	0.10046
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-
5.25-5.35GHz	21.02	0.12647	26.17	0.41400
5.47-5.725GHz	21.47	0.14028	26.62	0.45920
5.725-5.85GHz	10.09	0.01021	15.24	0.03342
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-	-	-	-
5.25-5.35GHz	18.96	0.07870	24.11	0.25763
5.47-5.725GHz	21.57	0.14355	26.72	0.46989
5.725-5.85GHz	7.63	0.00579	12.78	0.01897



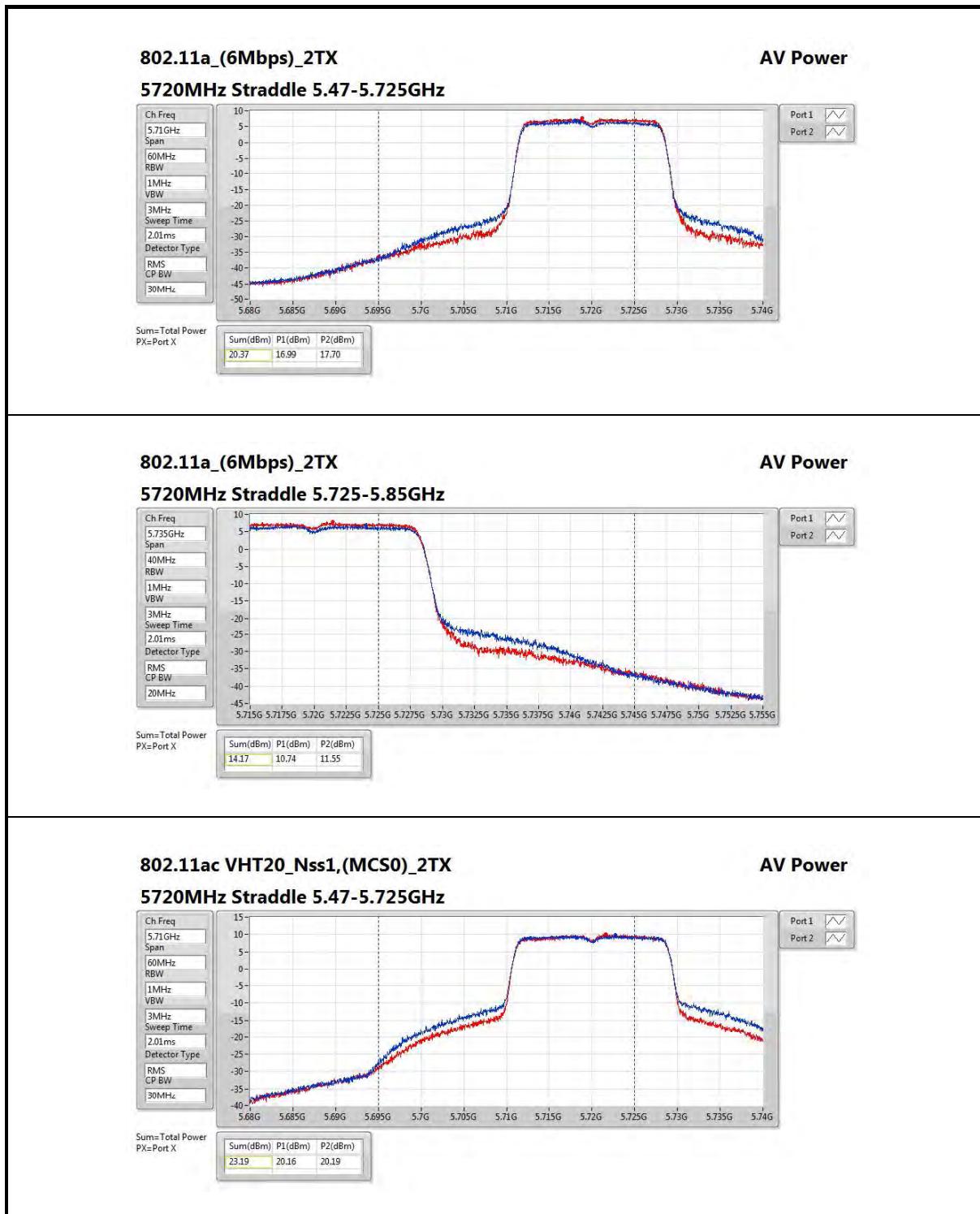
## Result

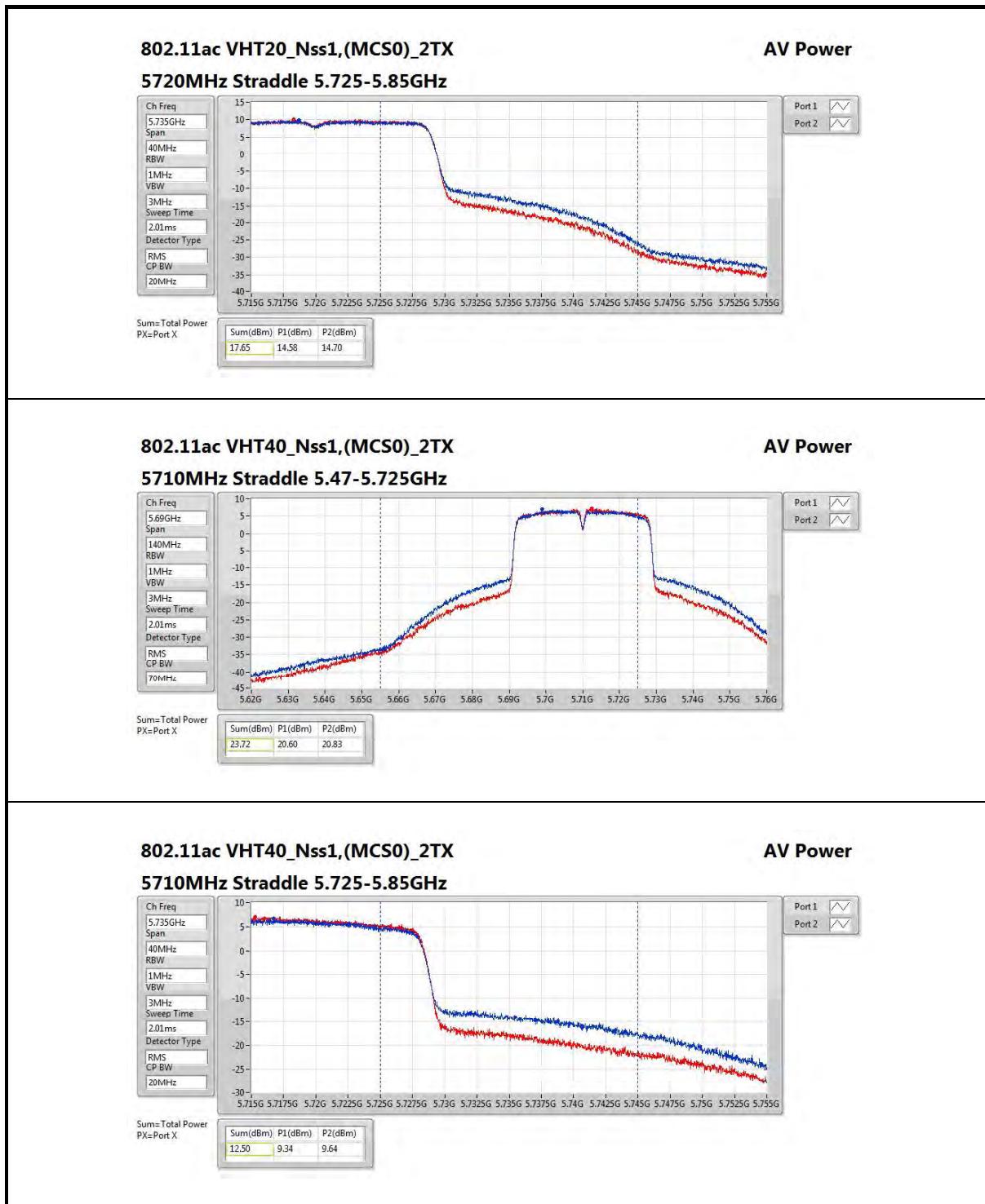
Mode	Result	DG (dB)	Port 1 (dBm)	Port 2 (dBm)	Total Power (dBm)	Power Limit (dBm)
802.11a_(6Mbps)_2TX	-	-	-	-	-	-
5260MHz	Pass	4.87	20.51	20.60	23.57	23.98
5300MHz	Pass	4.87	20.32	20.53	23.44	23.98
5320MHz	Pass	4.87	20.24	20.40	23.33	23.98
5500MHz	Pass	4.87	20.56	20.54	23.56	23.98
5580MHz	Pass	4.87	20.59	20.97	23.79	23.98
5700MHz	Pass	4.87	14.92	15.72	18.35	23.78
5720MHz Straddle 5.47-5.725GHz	Pass	4.87	16.99	17.70	20.37	22.73
5720MHz Straddle 5.725-5.85GHz	Pass	4.87	10.74	11.55	14.17	30.00
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5260MHz	Pass	4.87	20.85	21.06	23.97	23.98
5300MHz	Pass	4.87	20.44	20.56	23.51	23.98
5320MHz	Pass	4.87	18.31	18.24	21.29	23.98
5500MHz	Pass	4.87	19.34	19.17	22.27	23.98
5580MHz	Pass	4.87	20.64	21.10	23.89	23.98
5700MHz	Pass	4.87	16.39	16.69	19.55	23.98
5720MHz Straddle 5.47-5.725GHz	Pass	4.87	20.16	20.19	23.19	23.98
5720MHz Straddle 5.725-5.85GHz	Pass	4.87	14.58	14.70	17.65	30.00
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5270MHz	Pass	4.87	20.60	21.00	23.81	23.98
5310MHz	Pass	4.87	15.99	16.17	19.09	23.98
5510MHz	Pass	4.87	15.74	16.06	18.91	23.98
5550MHz	Pass	4.87	20.68	21.04	23.87	23.98
5670MHz	Pass	4.87	18.16	18.73	21.46	23.98
5710MHz Straddle 5.47-5.725GHz	Pass	4.87	20.60	20.83	23.73	23.98
5710MHz Straddle 5.725-5.85GHz	Pass	4.87	9.34	9.64	12.50	30.00
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5290MHz	Pass	4.87	15.17	15.21	18.20	23.98
5530MHz	Pass	4.87	16.55	16.71	19.64	23.98
5610MHz	Pass	4.87	19.44	19.94	22.71	23.98
5690MHz Straddle 5.47-5.725GHz	Pass	4.87	20.35	21.18	23.80	23.98
5690MHz Straddle 5.725-5.85GHz	Pass	4.87	6.12	7.21	9.71	30.00
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5260MHz	Pass	5.15	17.55	17.85	20.71	23.98
5300MHz	Pass	5.15	18.05	18.27	21.17	23.98
5320MHz	Pass	5.15	17.26	17.18	20.23	23.98
5500MHz	Pass	5.15	18.28	18.24	21.27	23.98
5580MHz	Pass	5.15	17.87	18.16	21.03	23.98
5700MHz	Pass	5.15	16.01	16.16	19.10	23.98
5720MHz Straddle 5.47-5.725GHz	Pass	5.15	17.09	17.83	20.49	22.77
5720MHz Straddle 5.725-5.85GHz	Pass	5.15	11.42	12.26	14.87	30.00

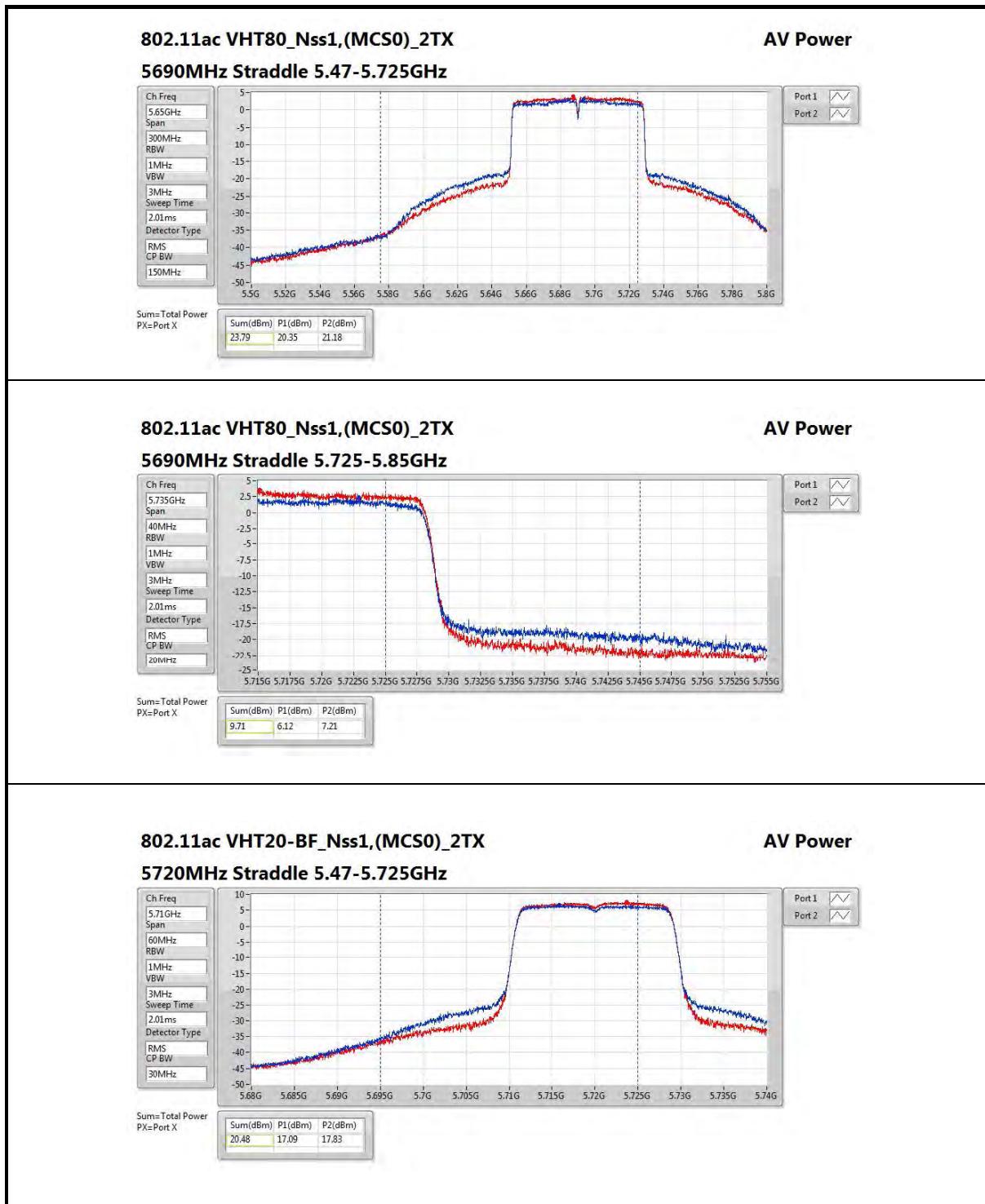
**FCC RADIO TEST REPORT****Report No. : FR782229-04AC**

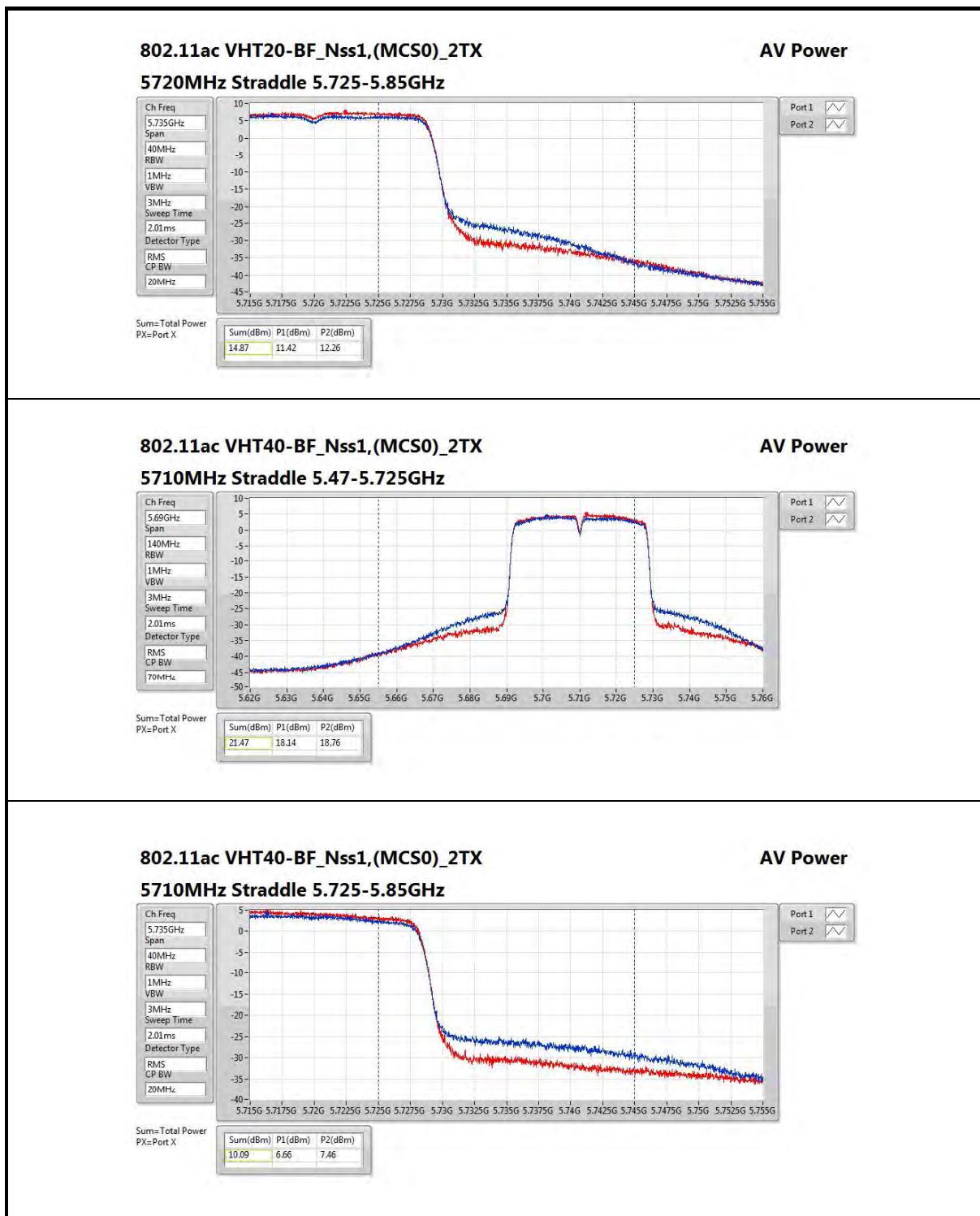
Mode	Result	DG	Port 1	Port 2	Total Power	Power Limit
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5270MHz	Pass	5.15	17.82	18.19	21.02	23.98
5310MHz	Pass	5.15	16.34	16.35	19.36	23.98
5510MHz	Pass	5.15	17.37	17.41	20.40	23.98
5550MHz	Pass	5.15	18.09	18.26	21.19	23.98
5670MHz	Pass	5.15	18.02	18.22	21.13	23.98
5710MHz Straddle 5.47-5.725GHz	Pass	5.15	18.14	18.76	21.47	23.98
5710MHz Straddle 5.725-5.85GHz	Pass	5.15	6.66	7.46	10.09	30.00
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5290MHz	Pass	5.15	15.87	16.02	18.96	23.98
5530MHz	Pass	5.15	15.90	16.05	18.99	23.98
5610MHz	Pass	5.15	17.92	18.37	21.16	23.98
5690MHz Straddle 5.47-5.725GHz	Pass	5.15	18.14	18.95	21.57	23.98
5690MHz Straddle 5.725-5.85GHz	Pass	5.15	4.08	5.10	7.63	30.00

DG = Directional Gain; Port X = Port X output power







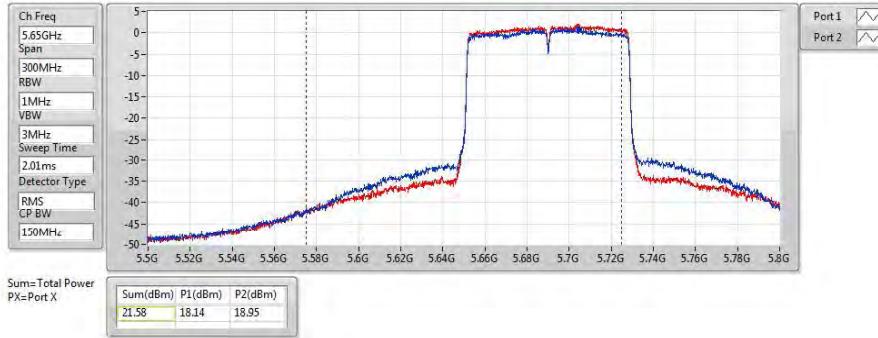




## 802.11ac VHT80-BF\_Nss1,(MCS0)\_2TX

AV Power

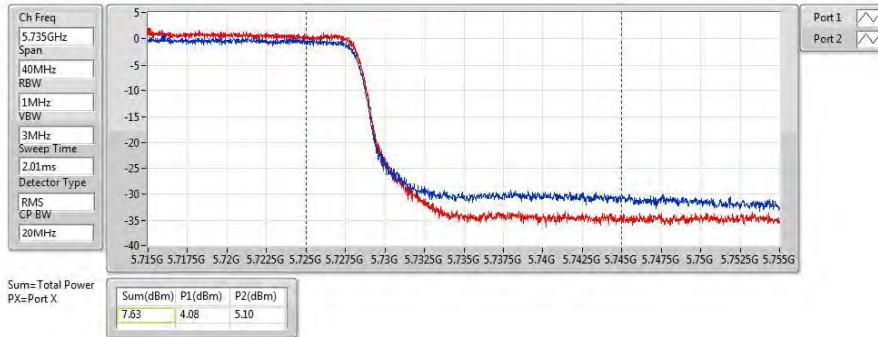
## 5690MHz Straddle 5.47-5.725GHz



## 802.11ac VHT80-BF\_Nss1,(MCS0)\_2TX

AV Power

## 5690MHz Straddle 5.725-5.85GHz





## 3.4 Peak Power Spectral Density

### 3.4.1 Peak Power Spectral Density Limit

Peak Power Spectral Density Limit	
<b>UNII Devices</b>	
<input type="checkbox"/> For the 5.15-5.25 GHz band:	<ul style="list-style-type: none"><li>▪ Outdoor AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If <math>G_{TX} &gt; 6 \text{ dBi}</math>, then <math>P_{Out} = 17 - (G_{TX} - 6)</math>.</li><li>▪ Indoor AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If <math>G_{TX} &gt; 6 \text{ dBi}</math>, then <math>P_{Out} = 17 - (G_{TX} - 6)</math>.</li><li>▪ Point-to-point AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If <math>G_{TX} &gt; 23 \text{ dBi}</math>, then <math>P_{Out} = 17 - (G_{TX} - 23)</math>.</li><li>▪ Mobile or Portable Client: the peak power spectral density (PPSD) <math>\leq 11 \text{ dBm/MHz}</math>. If <math>G_{TX} &gt; 6 \text{ dBi}</math>, then PPSD= <math>11 - (G_{TX} - 6)</math>..</li></ul>
<input checked="" type="checkbox"/> For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) $\leq 11 \text{ dBm/MHz}$ . If $G_{TX} > 6 \text{ dBi}$ , then PPSD= $11 - (G_{TX} - 6)$ .	
<input checked="" type="checkbox"/> For the 5.47-5.725 GHz band, the peak power spectral density (PPSD) $\leq 11 \text{ dBm/MHz}$ . If $G_{TX} > 6 \text{ dBi}$ , then PPSD= $11 - (G_{TX} - 6)$ .	
<input checked="" type="checkbox"/> For the 5.725-5.85 GHz band:	<ul style="list-style-type: none"><li>▪ Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) <math>\leq 30 \text{ dBm/500kHz}</math>. If <math>G_{TX} &gt; 6 \text{ dBi}</math>, then PPSD= <math>30 - (G_{TX} - 6)</math>.</li><li>▪ Point-to-point systems (P2P): the peak power spectral density (PPSD) <math>\leq 30 \text{ dBm/500kHz}</math>.</li></ul>
<b>LE-LAN Devices</b>	
<input type="checkbox"/> For the 5.15-5.25 GHz band, the peak power spectral density (PPSD) $\leq 4 \text{ dBm/MHz}$ and the e.i.r.p. peak power spectral density (PPSD) $\leq 10 \text{ dBm/MHz}$ .	
<input type="checkbox"/> For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) $\leq 11 \text{ dBm/MHz}$ and the e.i.r.p. peak power spectral density (PPSD) $\leq 17 \text{ dBm/MHz}$ .	
<input type="checkbox"/> e.i.r.p. greater than 200 mW shall comply with the following e.i.r.p. at different elevations, where $\theta$ is the angle above the local horizontal plane (of the Earth) as shown below: -13 dBW/MHz for $0^\circ \leq \theta < 8^\circ$ ; -13 – 0.716 ( $\theta$ -8) dBW/MHz for $8^\circ \leq \theta < 40^\circ$ -35.9 – 1.22 ( $\theta$ -40) dBW/MHz for $40^\circ \leq \theta \leq 45^\circ$ ; -42 dBW/MHz for $\theta > 45^\circ$	
<input type="checkbox"/> For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the peak power spectral density (PPSD) $\leq 11 \text{ dBm/MHz}$ and the e.i.r.p. peak power spectral density (PPSD) $\leq 17 \text{ dBm/MHz}$ .	
<input type="checkbox"/> For the 5.725-5.85 GHz band:	<ul style="list-style-type: none"><li>▪ Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) <math>\leq 30 \text{ dBm/500kHz}</math>. If <math>G_{TX} &gt; 6 \text{ dBi}</math>, then PPSD= <math>30 - (G_{TX} - 6)</math>.</li><li>▪ Point-to-point systems (P2P): the peak power spectral density (PPSD) <math>\leq 30 \text{ dBm/500kHz}</math>.</li></ul>
<b>PPSD</b> = peak power spectral density that he same method as used to determine the conducted output power shall be used to determine the power spectral density. And power spectral density in dBm/MHz <b>G<sub>TX</sub></b> = the maximum transmitting antenna directional gain in dBi.	



### 3.4.2 Measuring Instruments

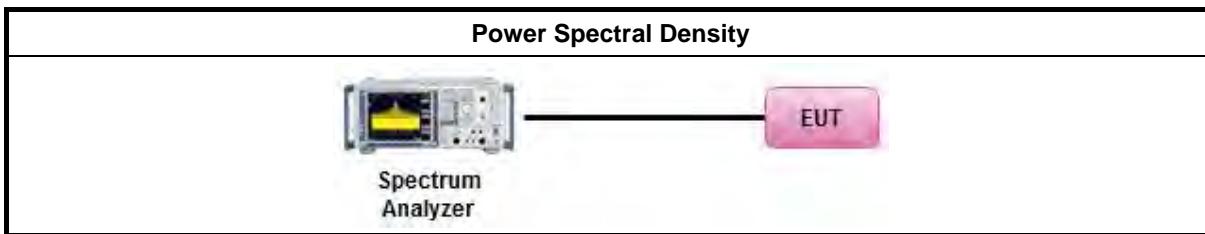
Refer a test equipment and calibration data table in this test report.

### 3.4.3 Test Procedures

Test Method	
▪ Peak power spectral density procedures that the same method as used to determine the conducted output power shall be used to determine the peak power spectral density and use the peak search function on the spectrum analyzer to find the peak of the spectrum. For the peak power spectral density shall be measured using below options:	<input type="checkbox"/> Refer as FCC KDB 789033, F(5) power spectral density can be measured using resolution bandwidths < 1 MHz provided that the results are integrated over 1 MHz bandwidth [duty cycle ≥ 98% or external video / power trigger] <input checked="" type="checkbox"/> Refer as FCC KDB 789033, clause E Method SA-1 (spectral trace averaging). <input type="checkbox"/> Refer as FCC KDB 789033, clause E Method SA-1 Alt. (RMS detection with slow sweep speed) duty cycle < 98% and average over on/off periods with duty factor <input checked="" type="checkbox"/> Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging). <input type="checkbox"/> Refer as FCC KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)
▪ For conducted measurement.	<input type="checkbox"/> If the EUT supports multiple transmit chains using options given below: <input checked="" type="checkbox"/> Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace. <input type="checkbox"/> Option 2: Measure and sum spectral maxima across the outputs. With this technique, spectra are measured at each output of the device at the required resolution bandwidth. The maximum value (peak) of each spectrum is determined. These maximum values are then summed mathematically in linear power units across the outputs. These operations shall be performed separately over frequency spans that have different out-of-band or spurious emission limits, <input type="checkbox"/> Option 3: Measure and add $10 \log(N)$ dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with $10 \log(N)$ . Or each transmit chains shall be add $10 \log(N)$ to compared with the limit. <input type="checkbox"/> If multiple transmit chains, EIRP PPSD calculation could be following as methods: $\text{PPSD}_{\text{total}} = \text{PPSD}_1 + \text{PPSD}_2 + \dots + \text{PPSD}_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $\text{EIRP}_{\text{total}} = \text{PPSD}_{\text{total}} + \text{DG}$



### 3.4.4 Test Setup





### 3.4.5 Test Result of Peak Power Spectral Density

#### Summary

Mode	PD (dBm/RBW)	EIRP PD (dBm/RBW)
802.11a_(6Mbps)_2TX	-	-
5.25-5.35GHz	10.98	16.13
5.47-5.725GHz	10.99	16.14
5.725-5.85GHz	6.73	11.88
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-
5.25-5.35GHz	10.97	16.12
5.47-5.725GHz	10.73	15.88
5.725-5.85GHz	9.19	14.34
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-
5.25-5.35GHz	8.10	13.25
5.47-5.725GHz	8.04	13.19
5.725-5.85GHz	5.15	10.30
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-
5.25-5.35GHz	-0.47	4.68
5.47-5.725GHz	4.65	9.80
5.725-5.85GHz	2.05	7.20
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	-	-
5.25-5.35GHz	8.60	13.75
5.47-5.725GHz	8.44	13.59
5.725-5.85GHz	6.58	11.73
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	-	-
5.25-5.35GHz	5.71	10.86
5.47-5.725GHz	5.77	10.92
5.725-5.85GHz	2.86	8.01
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-	-
5.25-5.35GHz	0.64	5.79
5.47-5.725GHz	2.36	7.51
5.725-5.85GHz	-0.20	4.95

RBW = 500kHz for 5.725-5.85GHz band / 1MHz for other band;



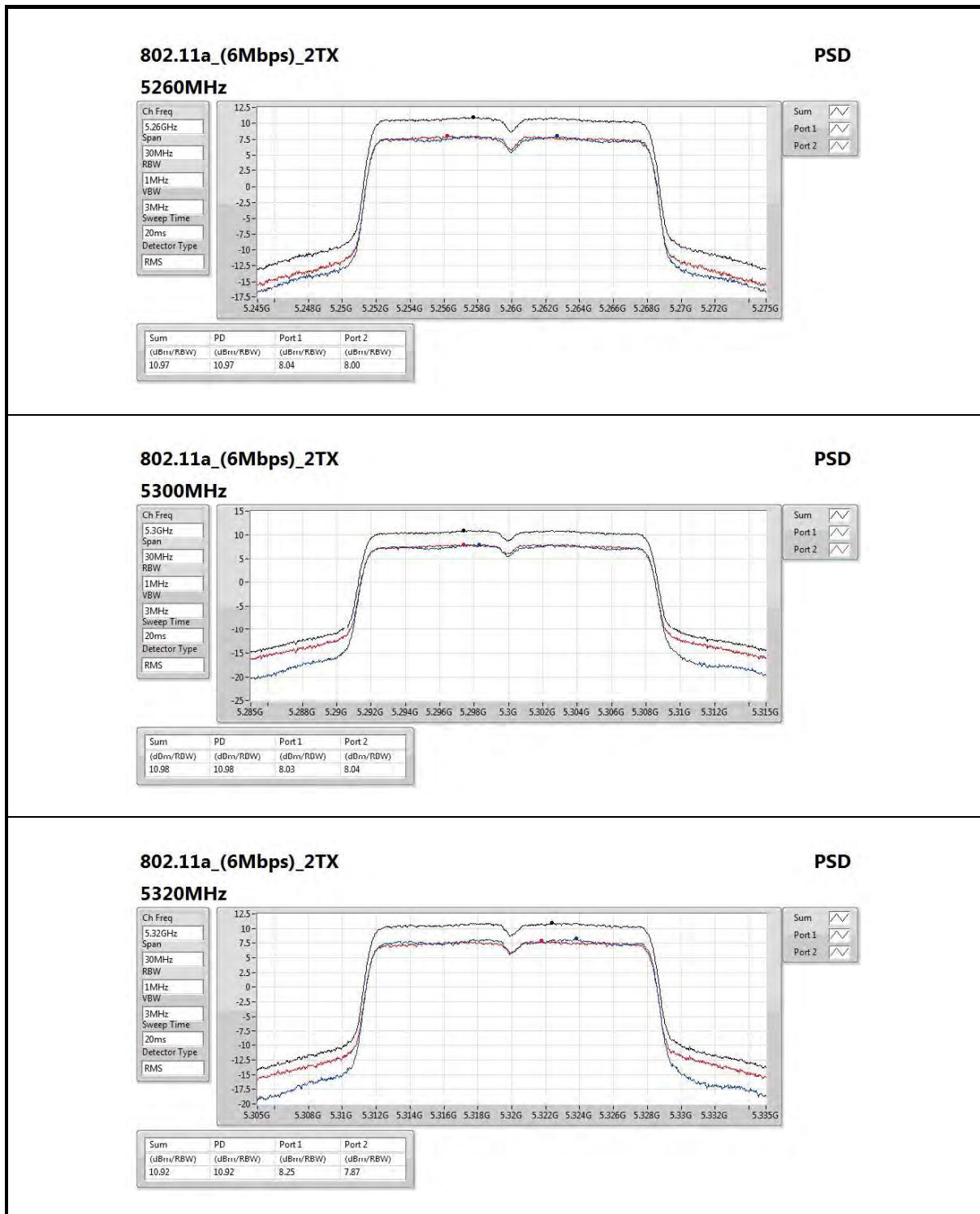
## Result

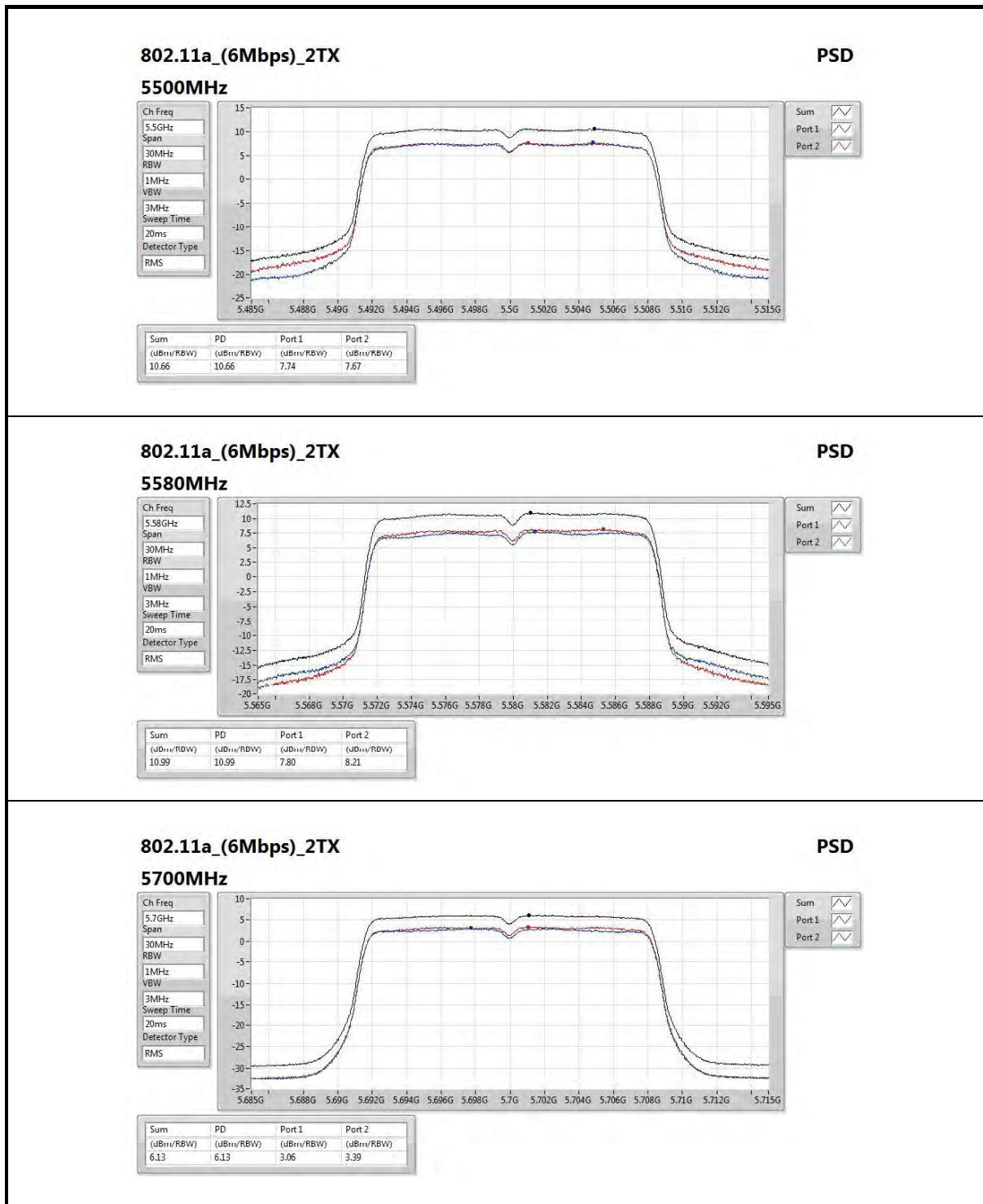
Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	Port 2 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
802.11a_(6Mbps)_2TX	-	-	-	-	-	-
5260MHz	Pass	5.15	8.04	8.00	10.97	11.00
5300MHz	Pass	5.15	8.03	8.04	10.98	11.00
5320MHz	Pass	5.15	8.25	7.87	10.92	11.00
5500MHz	Pass	5.15	7.74	7.67	10.66	11.00
5580MHz	Pass	5.15	7.80	8.21	10.99	11.00
5700MHz	Pass	5.15	3.06	3.39	6.13	11.00
5720MHz Straddle 5.47-5.725GHz	Pass	5.15	5.05	5.92	8.46	11.00
5720MHz Straddle 5.725-5.85GHz	Pass	5.15	3.18	4.25	6.73	30.00
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5260MHz	Pass	5.15	7.89	8.17	10.97	11.00
5300MHz	Pass	5.15	7.59	7.65	10.53	11.00
5320MHz	Pass	5.15	5.56	5.42	8.34	11.00
5500MHz	Pass	5.15	6.17	6.01	9.09	11.00
5580MHz	Pass	5.15	7.50	8.00	10.73	11.00
5700MHz	Pass	5.15	3.45	4.04	6.71	11.00
5720MHz Straddle 5.47-5.725GHz	Pass	5.15	7.17	8.26	10.69	11.00
5720MHz Straddle 5.725-5.85GHz	Pass	5.15	5.90	6.49	9.19	30.00
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5270MHz	Pass	5.15	5.00	5.41	8.10	11.00
5310MHz	Pass	5.15	0.68	0.69	3.58	11.00
5510MHz	Pass	5.15	0.18	0.23	3.16	11.00
5550MHz	Pass	5.15	5.00	5.08	7.95	11.00
5670MHz	Pass	5.15	2.53	3.35	5.82	11.00
5710MHz Straddle 5.47-5.725GHz	Pass	5.15	5.04	5.46	8.04	11.00
5710MHz Straddle 5.725-5.85GHz	Pass	5.15	2.00	2.32	5.15	30.00
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5290MHz	Pass	5.15	-3.39	-3.31	-0.47	11.00
5530MHz	Pass	5.15	-2.38	-2.38	0.56	11.00
5610MHz	Pass	5.15	0.56	1.07	3.69	11.00
5690MHz Straddle 5.47-5.725GHz	Pass	5.15	1.25	1.99	4.65	11.00
5690MHz Straddle 5.725-5.85GHz	Pass	5.15	-1.51	-0.40	2.05	30.00
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5260MHz	Pass	5.15	4.97	5.32	8.08	11.00
5300MHz	Pass	5.15	5.60	5.84	8.60	11.00
5320MHz	Pass	5.15	4.79	4.72	7.63	11.00
5500MHz	Pass	5.15	5.60	5.34	8.44	11.00
5580MHz	Pass	5.15	5.20	5.53	8.34	11.00
5700MHz	Pass	5.15	3.43	3.75	6.52	11.00
5720MHz Straddle 5.47-5.725GHz	Pass	5.15	4.92	5.81	8.33	11.00
5720MHz Straddle 5.725-5.85GHz	Pass	5.15	3.15	4.10	6.58	30.00

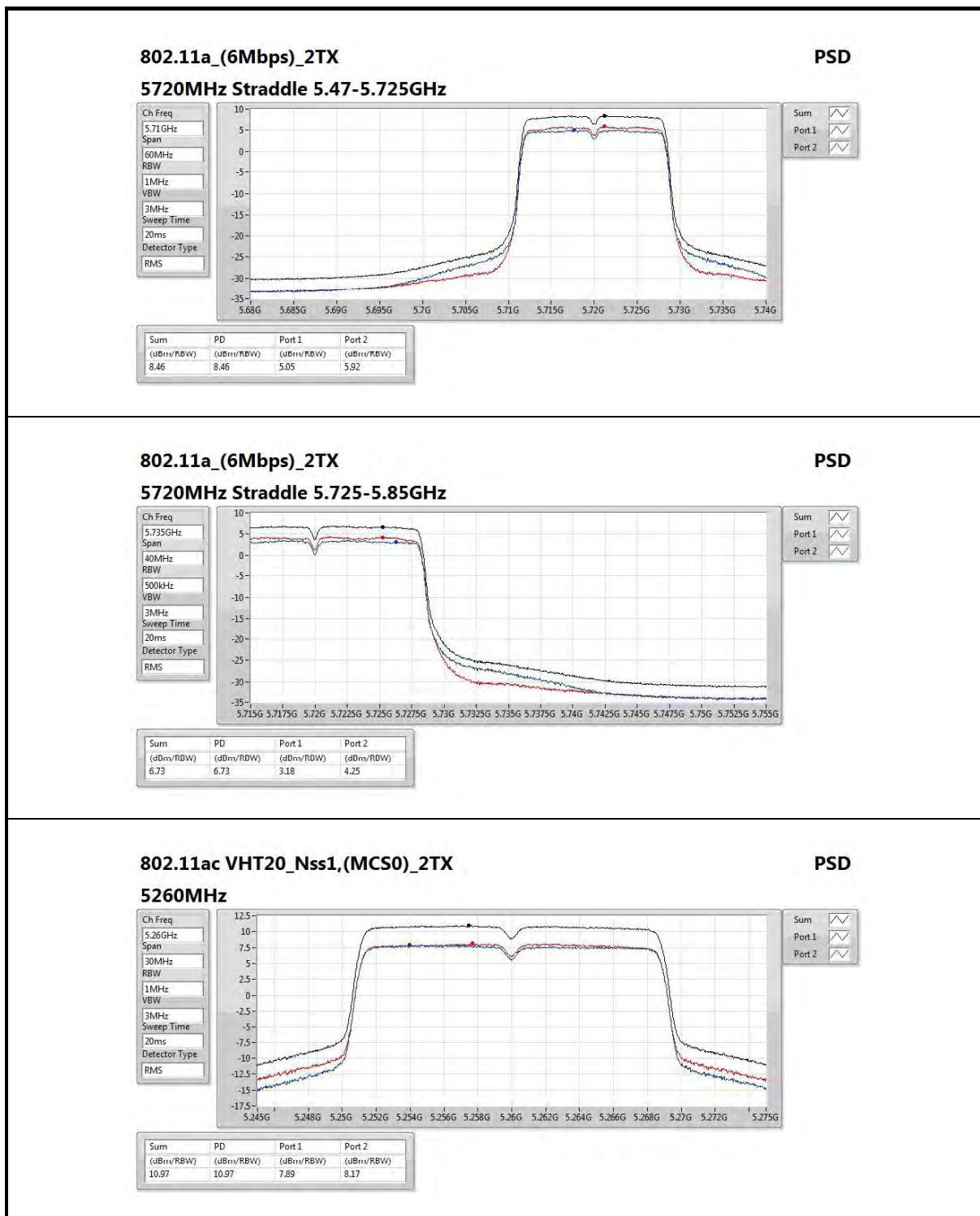
**FCC RADIO TEST REPORT****Report No. : FR782229-04AC**

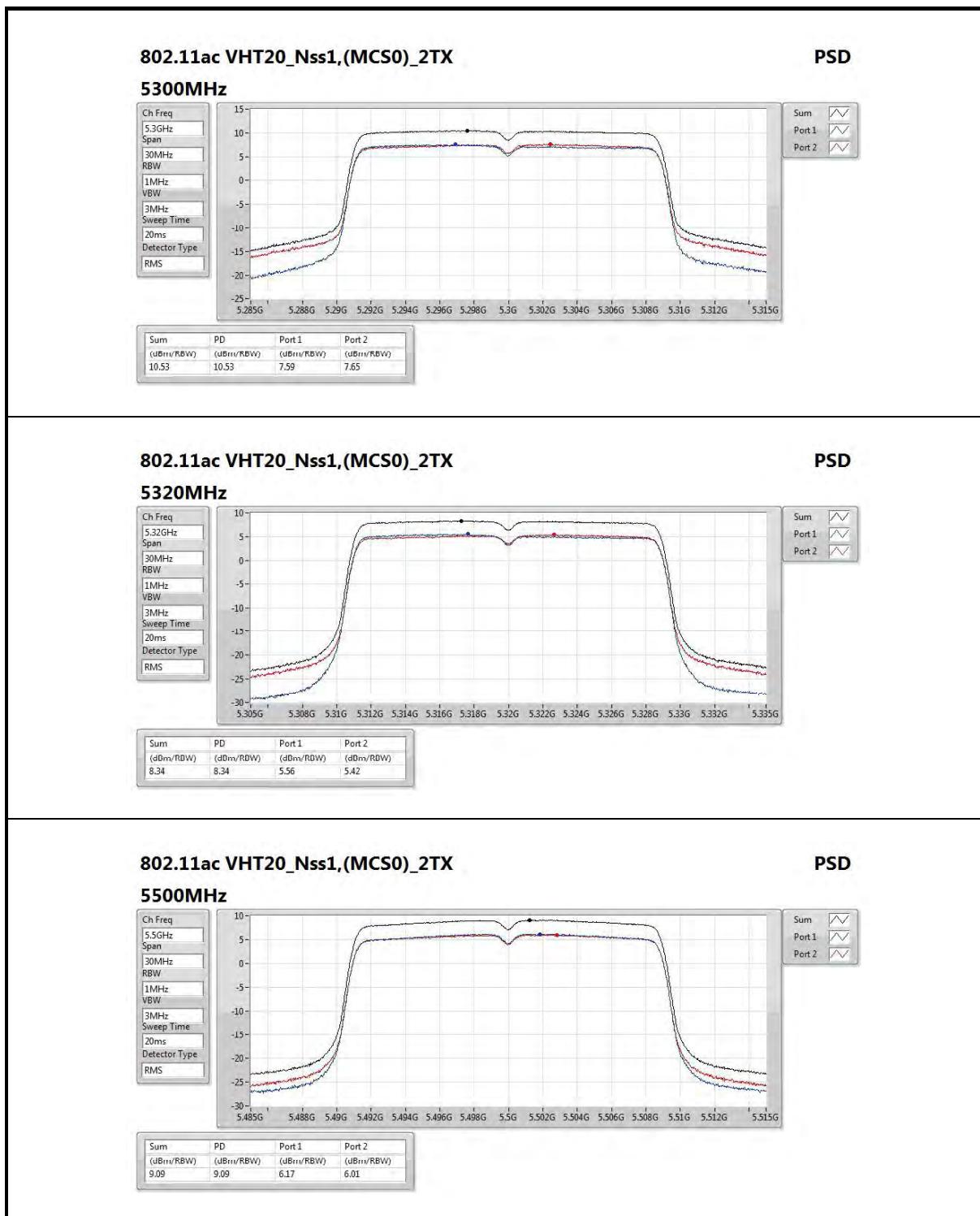
Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	Port 2 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5270MHz	Pass	5.15	2.69	2.92	5.71	11.00
5310MHz	Pass	5.15	1.36	1.05	4.15	11.00
5510MHz	Pass	5.15	1.92	1.86	4.88	11.00
5550MHz	Pass	5.15	2.55	2.57	5.57	11.00
5670MHz	Pass	5.15	2.19	3.09	5.54	11.00
5710MHz Straddle 5.47-5.725GHz	Pass	5.15	2.56	3.22	5.77	11.00
5710MHz Straddle 5.725-5.85GHz	Pass	5.15	-0.40	0.16	2.86	30.00
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5290MHz	Pass	5.15	-2.09	-2.27	0.64	11.00
5530MHz	Pass	5.15	-2.71	-2.79	0.21	11.00
5610MHz	Pass	5.15	-0.76	-0.39	2.36	11.00
5690MHz Straddle 5.47-5.725GHz	Pass	5.15	-0.95	-0.25	2.30	11.00
5690MHz Straddle 5.725-5.85GHz	Pass	5.15	-3.67	-2.69	-0.20	30.00

**DG** = Directional Gain; **RBW** = 500kHz for 5.725-5.85GHz band / 1MHz for other band;**PD** = trace bin-by-bin of each transmits port summing can be performed maximum power density; **Port X** = Port X power density;











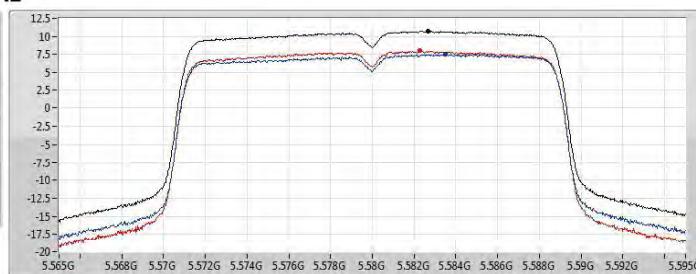
## 802.11ac VHT20\_Nss1,(MCS0)\_2TX

PSD

## 5580MHz

Ch Freq  
5.58GHz  
Span  
30MHz  
RBW  
1MHz  
VBW  
3MHz  
Sweep Time  
20ms  
Detector Type  
RMS

Sum	PD	Port 1	Port 2
(uBm/RBW)	(uBm/RBW)	(uBm/RBW)	(uBm/RBW)
10.73	10.73	7.50	8.00



Sum   
Port 1   
Port 2

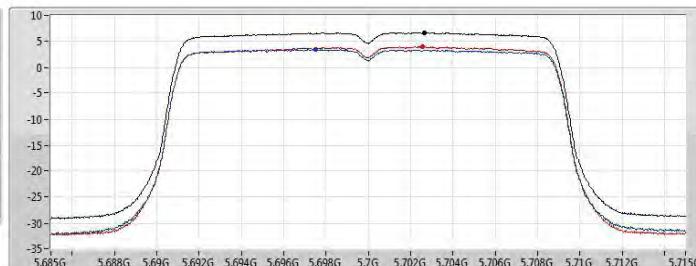
## 802.11ac VHT20\_Nss1,(MCS0)\_2TX

PSD

## 5700MHz

Ch Freq  
5.7GHz  
Span  
30MHz  
RBW  
1MHz  
VBW  
3MHz  
Sweep Time  
20ms  
Detector Type  
RMS

Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
6.71	6.71	3.45	4.04



Sum   
Port 1   
Port 2

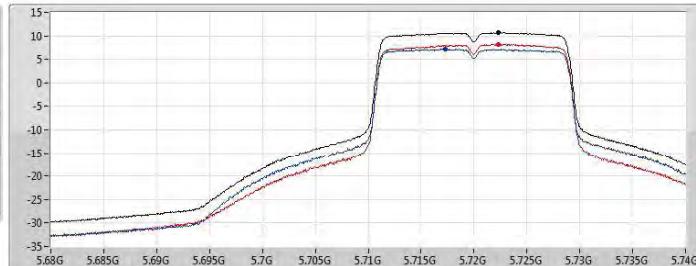
## 802.11ac VHT20\_Nss1,(MCS0)\_2TX

PSD

## 5720MHz Straddle 5.47-5.725GHz

Ch Freq  
5.71GHz  
Span  
60MHz  
RBW  
1MHz  
VBW  
3MHz  
Sweep Time  
20ms  
Detector Type  
RMS

Sum	PD	Port 1	Port 2
(uBm/RBW)	(uBm/RBW)	(uBm/RBW)	(uBm/RBW)
10.69	10.69	7.17	8.26



Sum   
Port 1   
Port 2

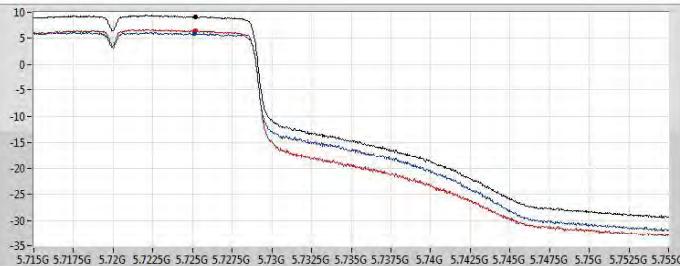


## 802.11ac VHT20\_Nss1,(MCS0)\_2TX

PSD

## 5720MHz Straddle 5.725-5.85GHz

Ch Freq  
5.735GHz  
Span  
40MHz  
RBW  
500kHz  
VBW  
3MHz  
Sweep Time  
20ms  
Detector Type  
RMS



Sum   
Port 1   
Port 2

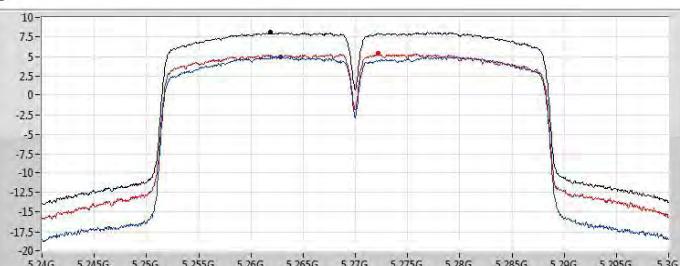
Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
9.19	9.19	5.90	6.49

## 802.11ac VHT40\_Nss1,(MCS0)\_2TX

PSD

## 5270MHz

Ch Freq  
5.27GHz  
Span  
60MHz  
RBW  
1MHz  
VBW  
3MHz  
Sweep Time  
20ms  
Detector Type  
RMS



Sum   
Port 1   
Port 2

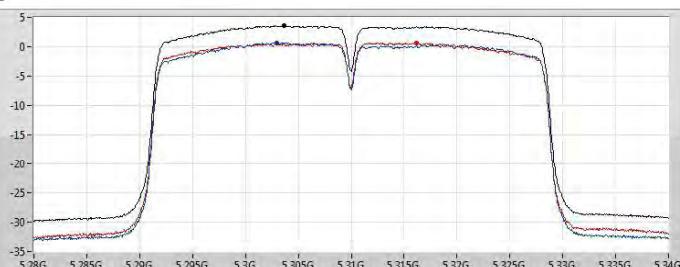
Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
8.10	8.10	5.00	5.41

## 802.11ac VHT40\_Nss1,(MCS0)\_2TX

PSD

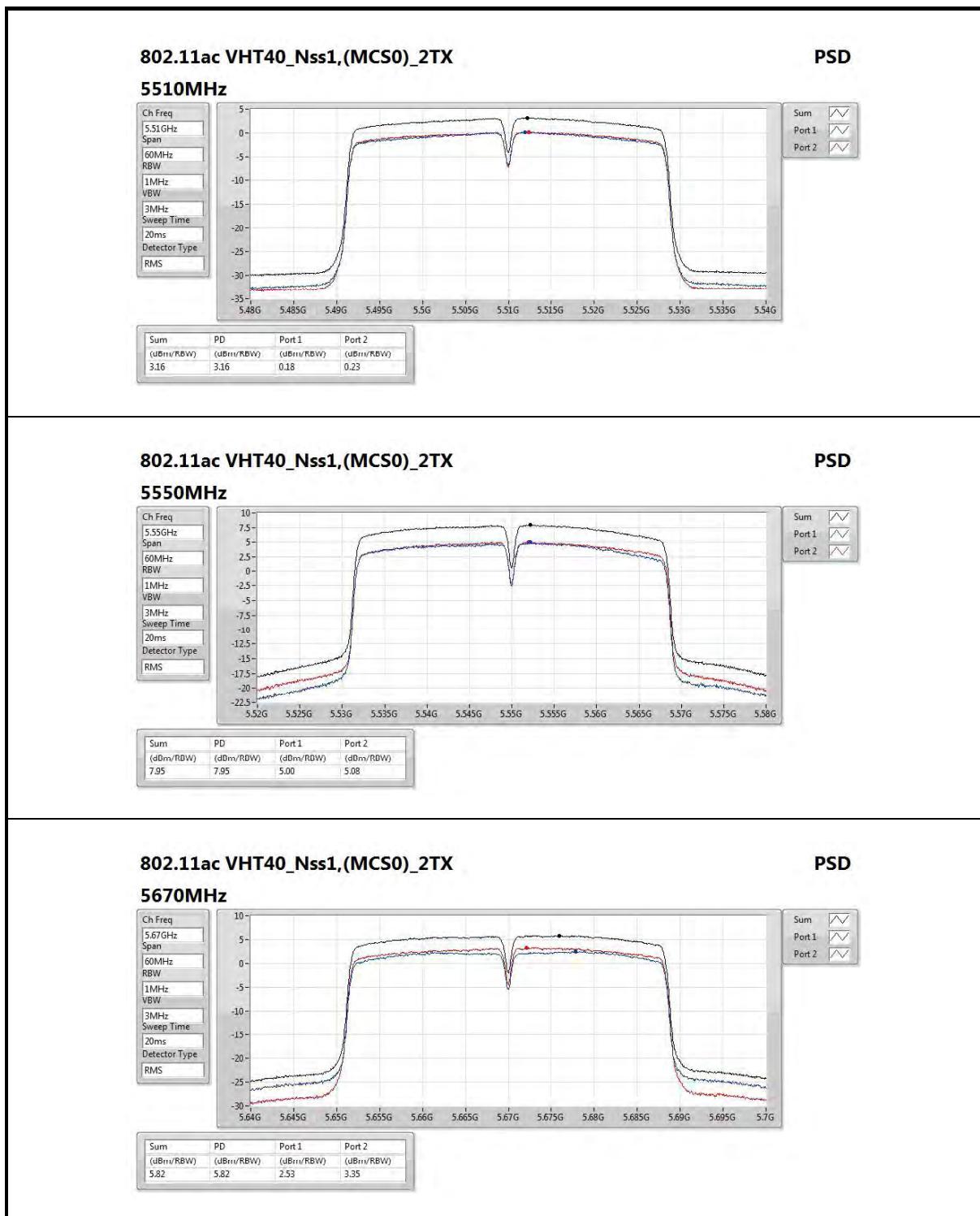
## 5310MHz

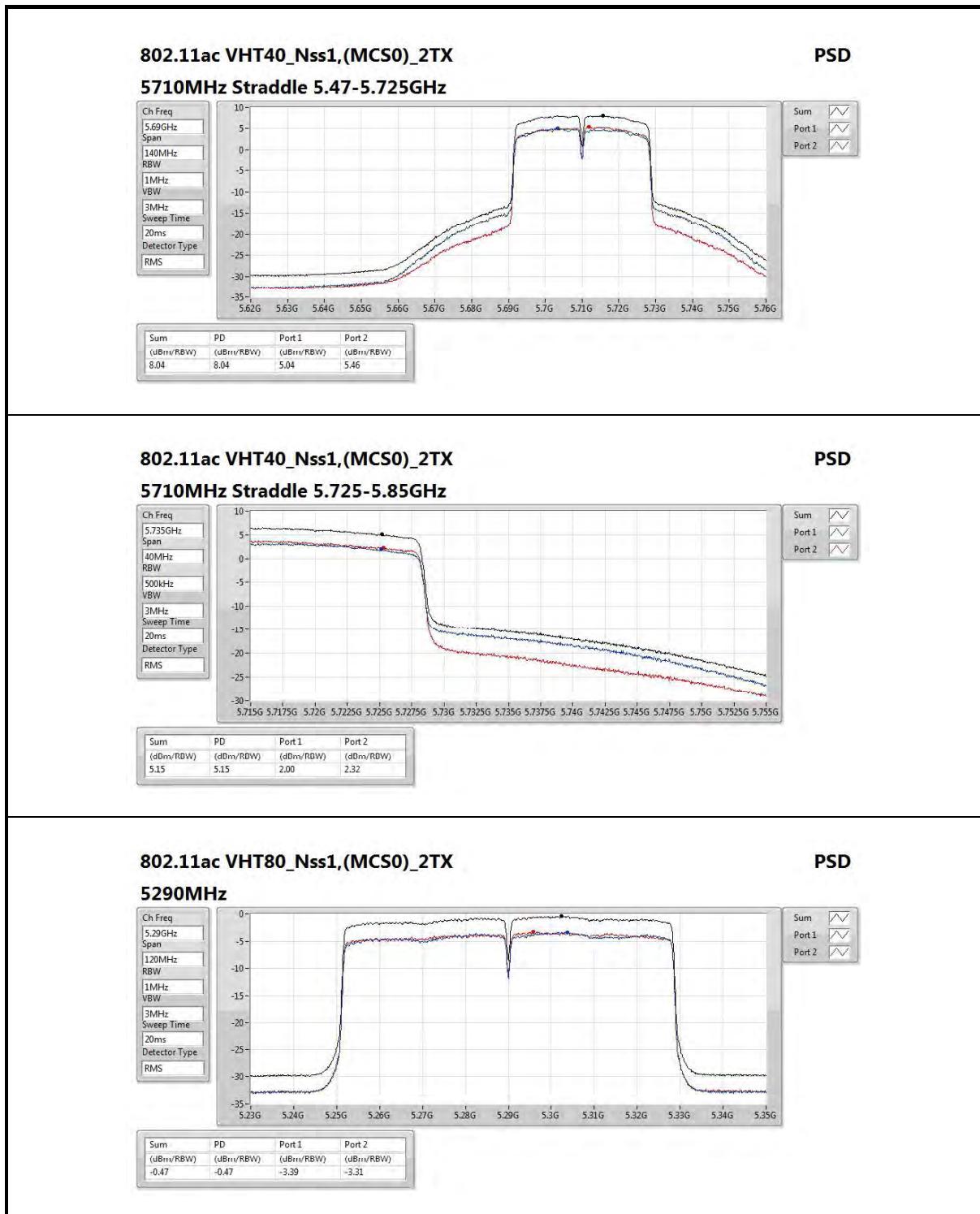
Ch Freq  
5.31GHz  
Span  
60MHz  
RBW  
1MHz  
VBW  
3MHz  
Sweep Time  
20ms  
Detector Type  
RMS



Sum   
Port 1   
Port 2

Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
3.58	3.58	0.68	0.69





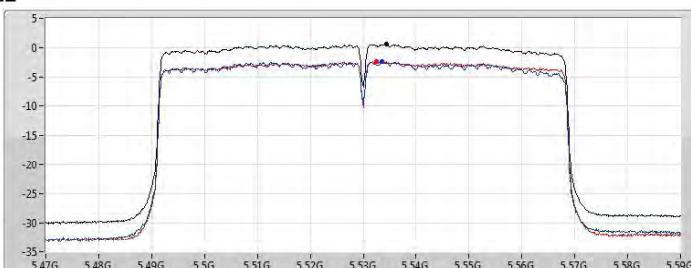


## 802.11ac VHT80\_Nss1,(MCS0)\_2TX

PSD

5530MHz

Ch Freq  
5.53GHz  
Span  
120MHz  
RBW  
1MHz  
VBW  
3MHz  
Sweep Time  
20ms  
Detector Type  
RMS



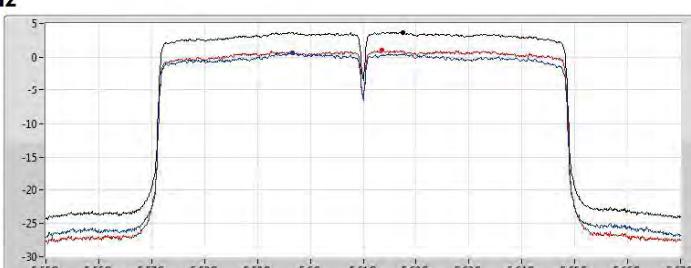
Sum   
Port 1   
Port 2

## 802.11ac VHT80\_Nss1,(MCS0)\_2TX

PSD

5610MHz

Ch Freq  
5.61GHz  
Span  
120MHz  
RBW  
1MHz  
VBW  
3MHz  
Sweep Time  
20ms  
Detector Type  
RMS



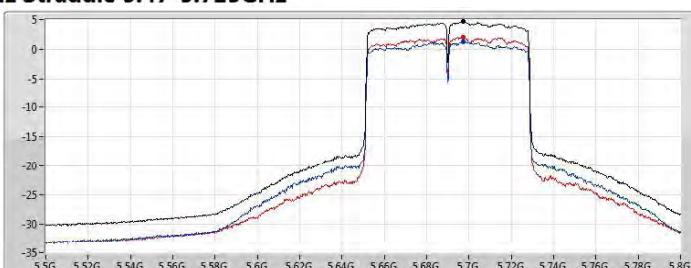
Sum   
Port 1   
Port 2

## 802.11ac VHT80\_Nss1,(MCS0)\_2TX

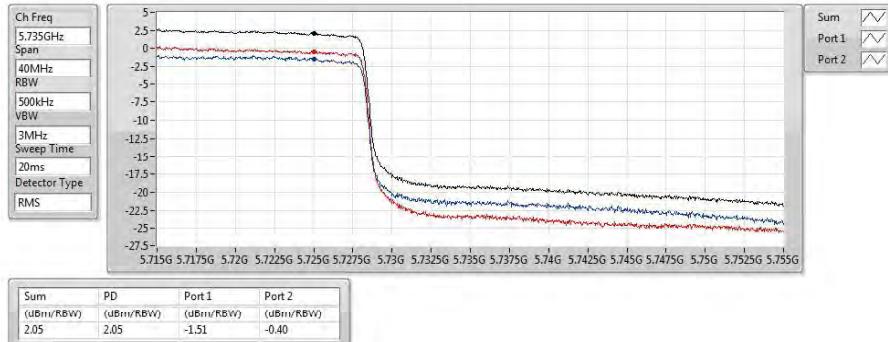
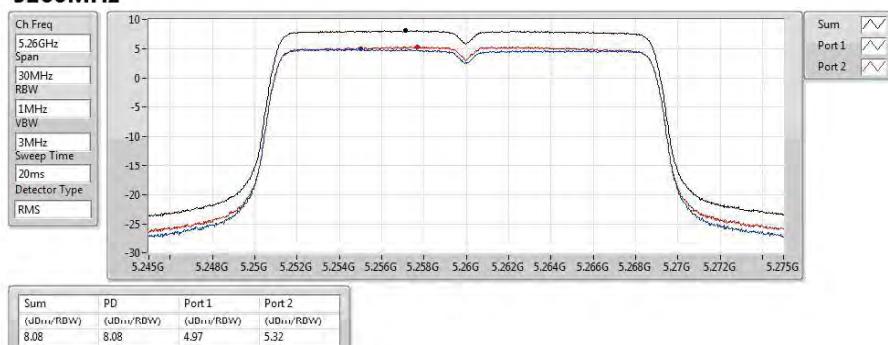
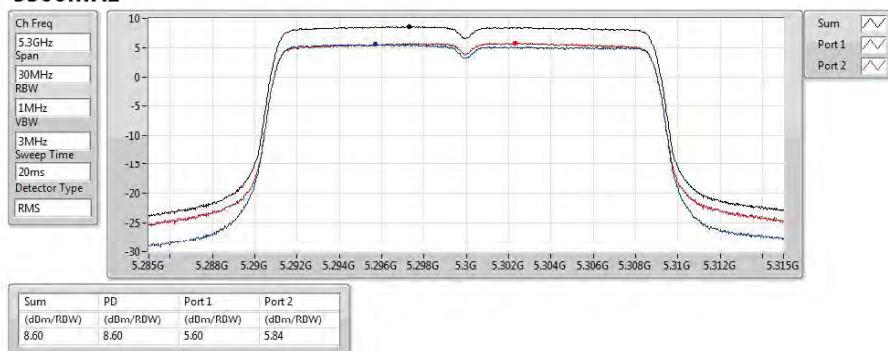
PSD

5690MHz Straddle 5.47-5.725GHz

Ch Freq  
5.65GHz  
Span  
300MHz  
RBW  
1MHz  
VBW  
3MHz  
Sweep Time  
20ms  
Detector Type  
RMS



Sum   
Port 1   
Port 2

**802.11ac VHT80\_Nss1,(MCS0)\_2TX****PSD****5690MHz Straddle 5.725-5.85GHz****802.11ac VHT20-BF\_Nss1,(MCS0)\_2TX****PSD****5260MHz****802.11ac VHT20-BF\_Nss1,(MCS0)\_2TX****PSD****5300MHz**



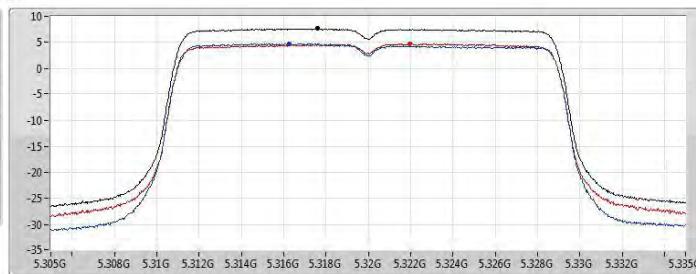
## 802.11ac VHT20-BF\_Nss1,(MCS0)\_2TX

PSD

## 5320MHz

Ch Freq  
5.32GHz  
Span  
30MHz  
RBW  
1MHz  
VBW  
3MHz  
Sweep Time  
20ms  
Detector Type  
RMS

Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
7.63	7.63	4.79	4.72



Sum   
Port 1   
Port 2

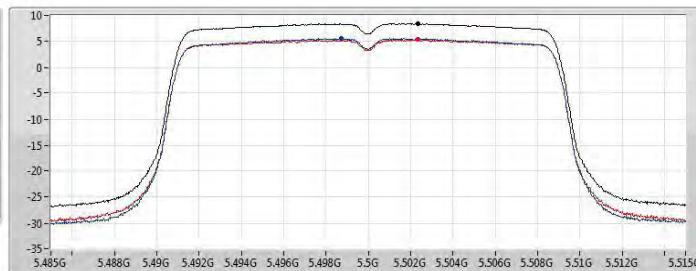
## 802.11ac VHT20-BF\_Nss1,(MCS0)\_2TX

PSD

## 5500MHz

Ch Freq  
5.5GHz  
Span  
30MHz  
RBW  
1MHz  
VBW  
3MHz  
Sweep Time  
20ms  
Detector Type  
RMS

Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
8.44	8.44	5.60	5.34



Sum   
Port 1   
Port 2

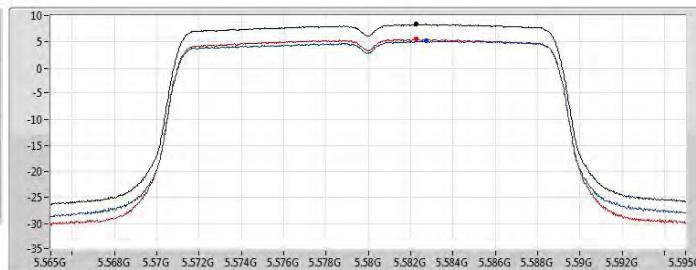
## 802.11ac VHT20-BF\_Nss1,(MCS0)\_2TX

PSD

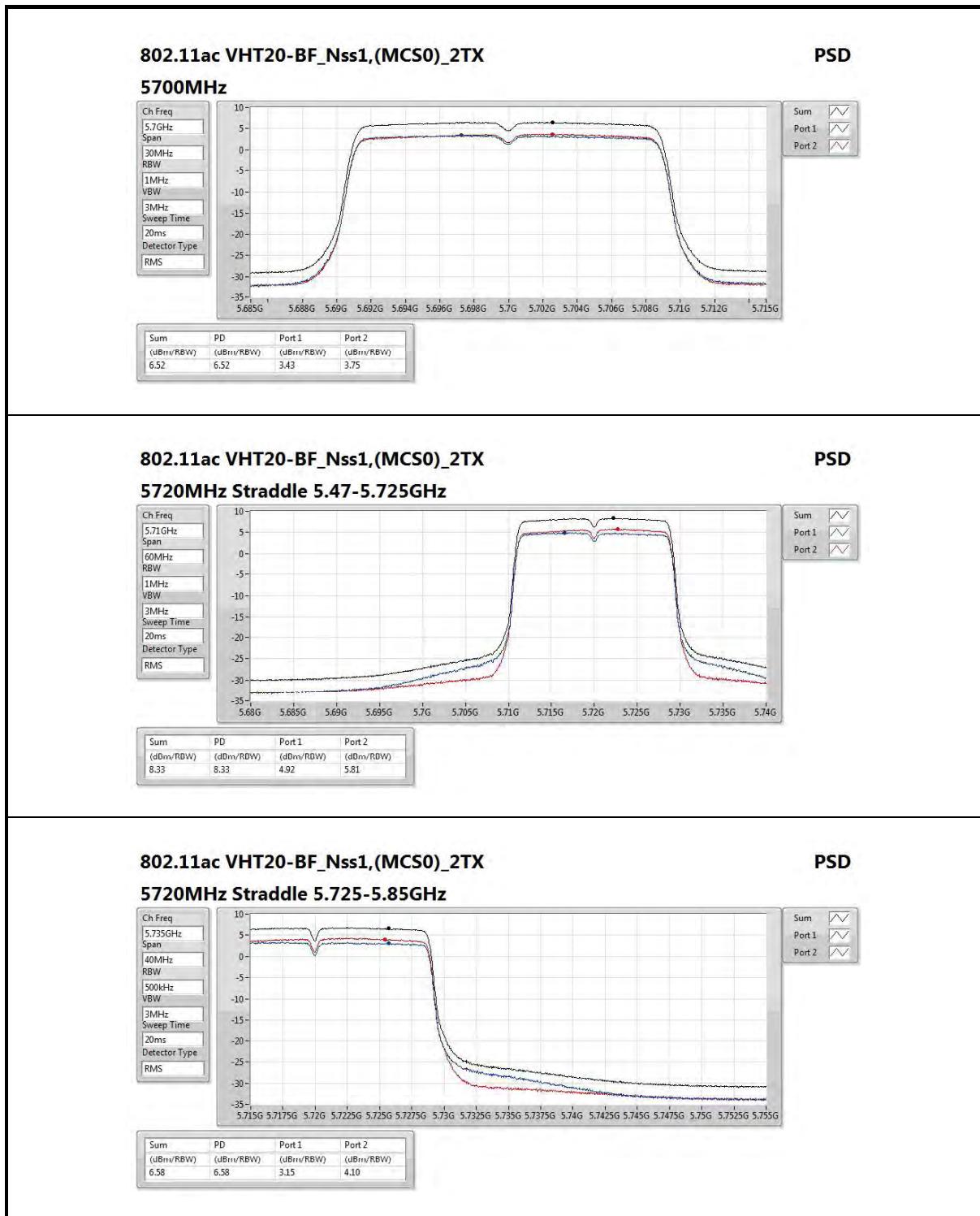
## 5580MHz

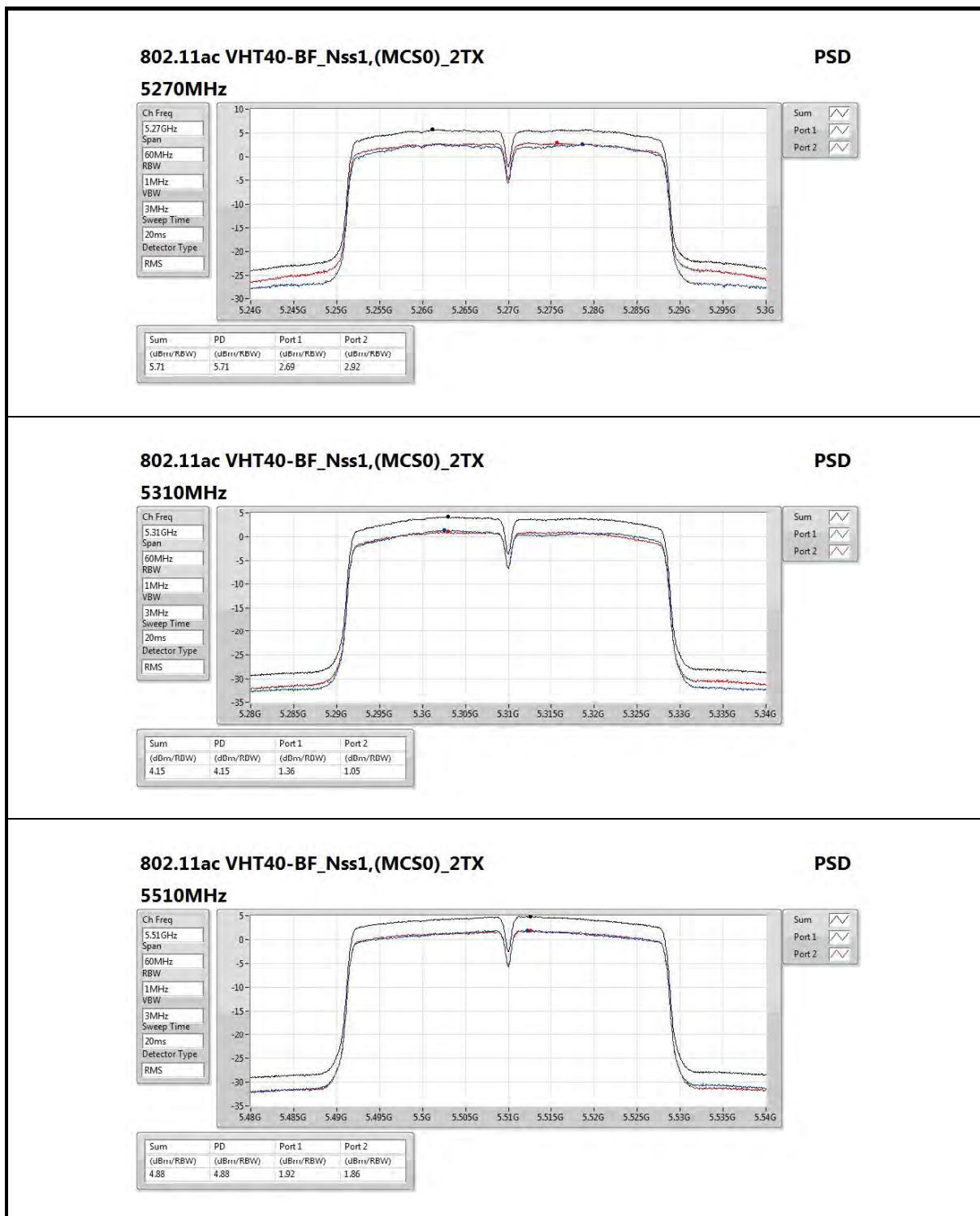
Ch Freq  
5.58GHz  
Span  
30MHz  
RBW  
1MHz  
VBW  
3MHz  
Sweep Time  
20ms  
Detector Type  
RMS

Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
8.34	8.34	5.20	5.53



Sum   
Port 1   
Port 2







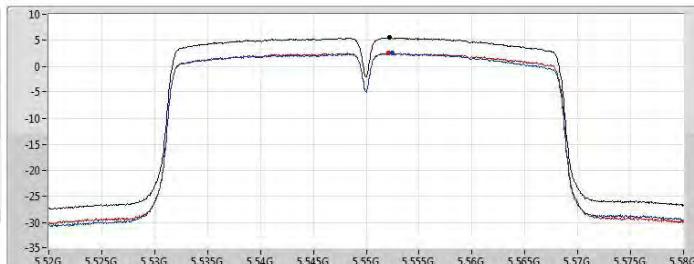
## 802.11ac VHT40-BF\_Nss1,(MCS0)\_2TX

PSD

## 5550MHz

Ch Freq  
5.55GHz  
Span  
60MHz  
RBW  
1MHz  
VBW  
3MHz  
Sweep Time  
20ms  
Detector Type  
RMS

Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
5.57	5.57	2.55	2.57



Sum   
Port 1   
Port 2

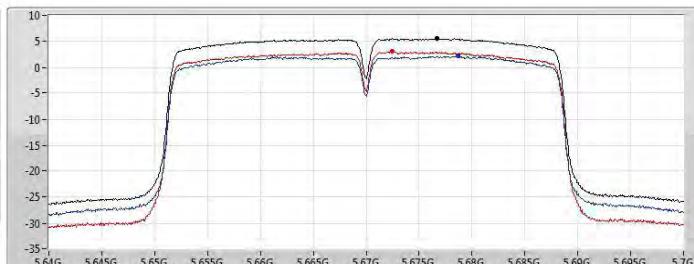
## 802.11ac VHT40-BF\_Nss1,(MCS0)\_2TX

PSD

## 5670MHz

Ch Freq  
5.67GHz  
Span  
60MHz  
RBW  
1MHz  
VBW  
3MHz  
Sweep Time  
20ms  
Detector Type  
RMS

Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
5.54	5.54	2.19	3.09



Sum   
Port 1   
Port 2

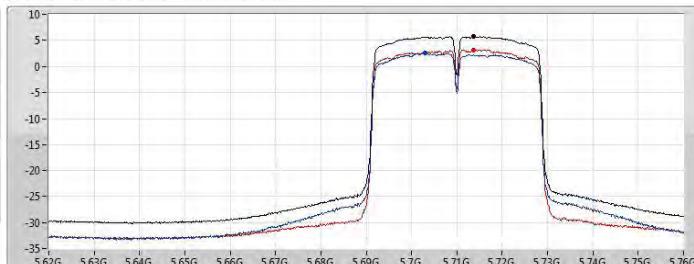
## 802.11ac VHT40-BF\_Nss1,(MCS0)\_2TX

PSD

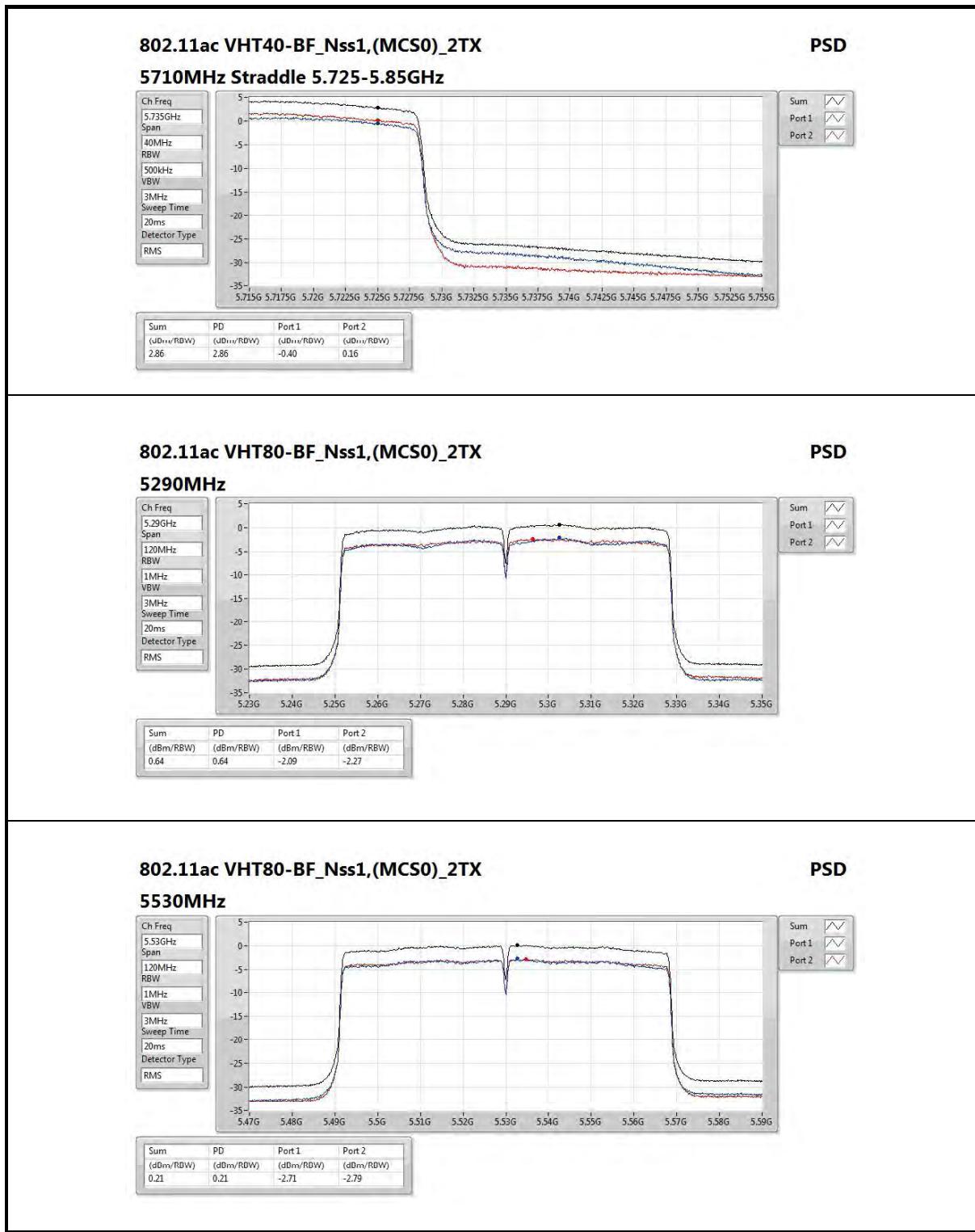
## 5710MHz Straddle 5.47-5.725GHz

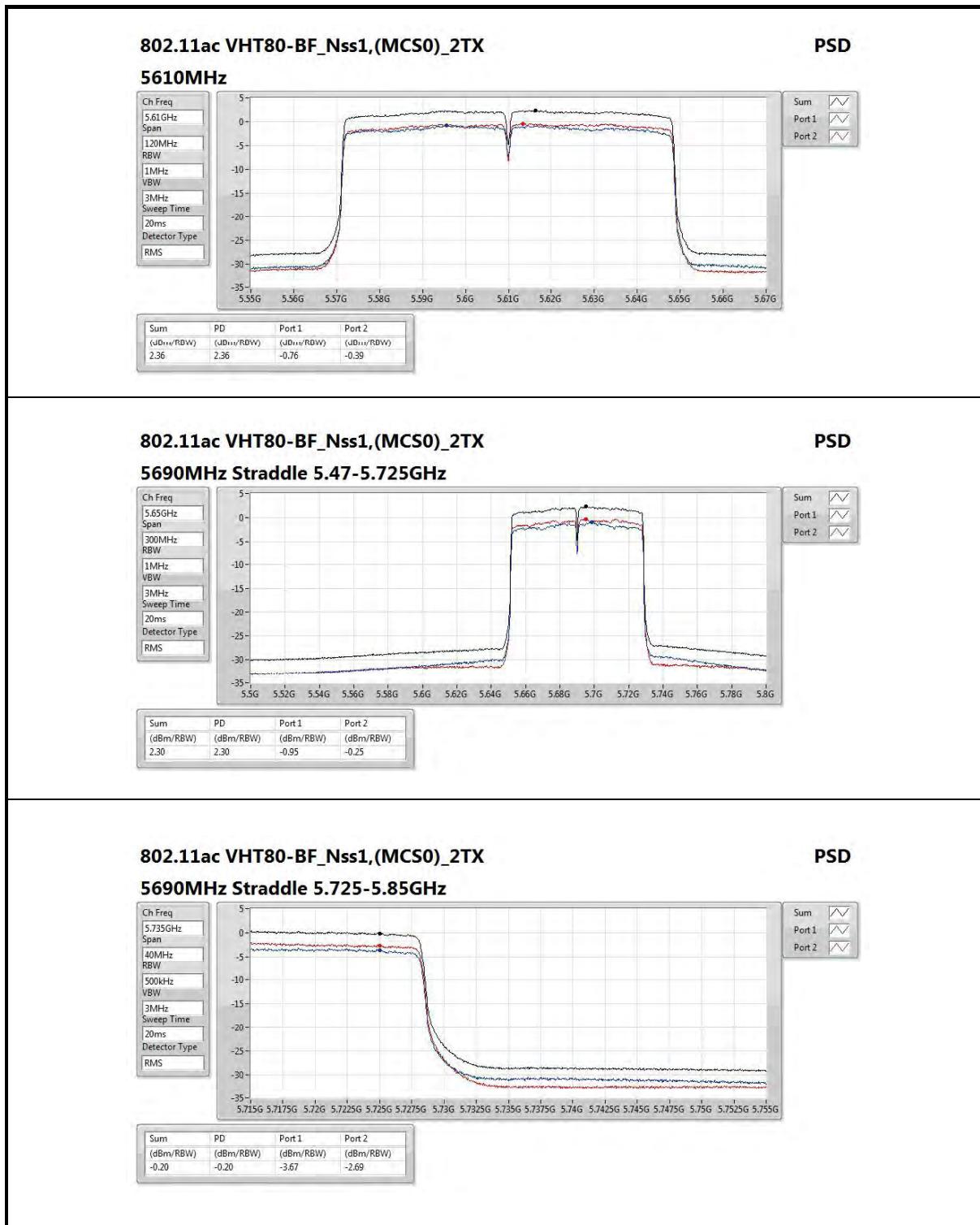
Ch Freq  
5.69GHz  
Span  
140MHz  
RBW  
1MHz  
VBW  
3MHz  
Sweep Time  
20ms  
Detector Type  
RMS

Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
5.77	5.77	2.56	3.22



Sum   
Port 1   
Port 2







### 3.5 Unwanted Emissions

#### 3.5.1 Transmitter Radiated Unwanted Emissions Limit

Unwanted emissions below 1 GHz and restricted band emissions above 1GHz limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Un-restricted band emissions above 1GHz Limit	
Operating Band	Limit
5.15 - 5.25 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.25 - 5.35 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.47 - 5.725 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.725 - 5.85 GHz	all emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly 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.

Note 1: Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).



### 3.5.2 Measuring Instruments

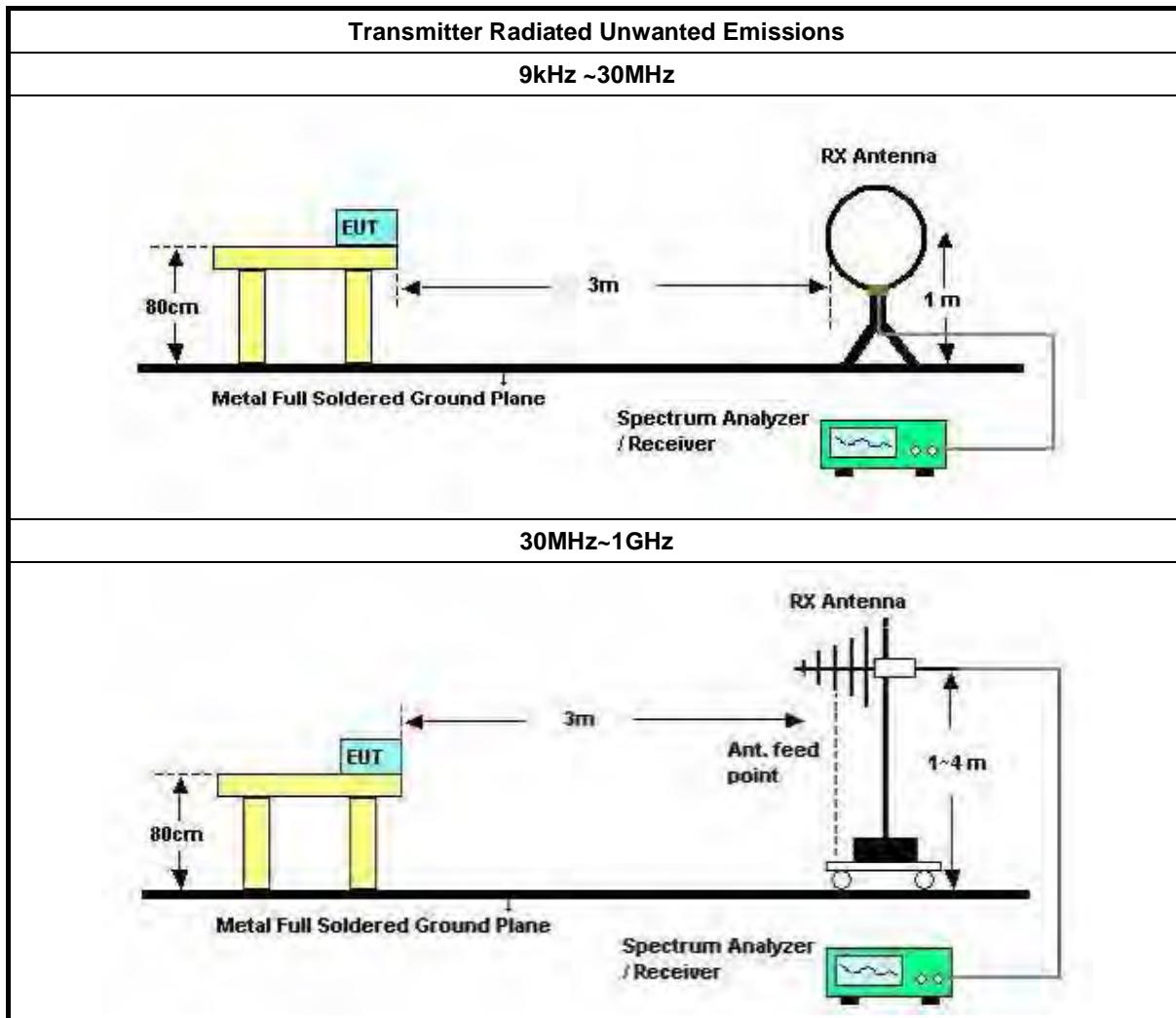
Refer a test equipment and calibration data table in this test report.

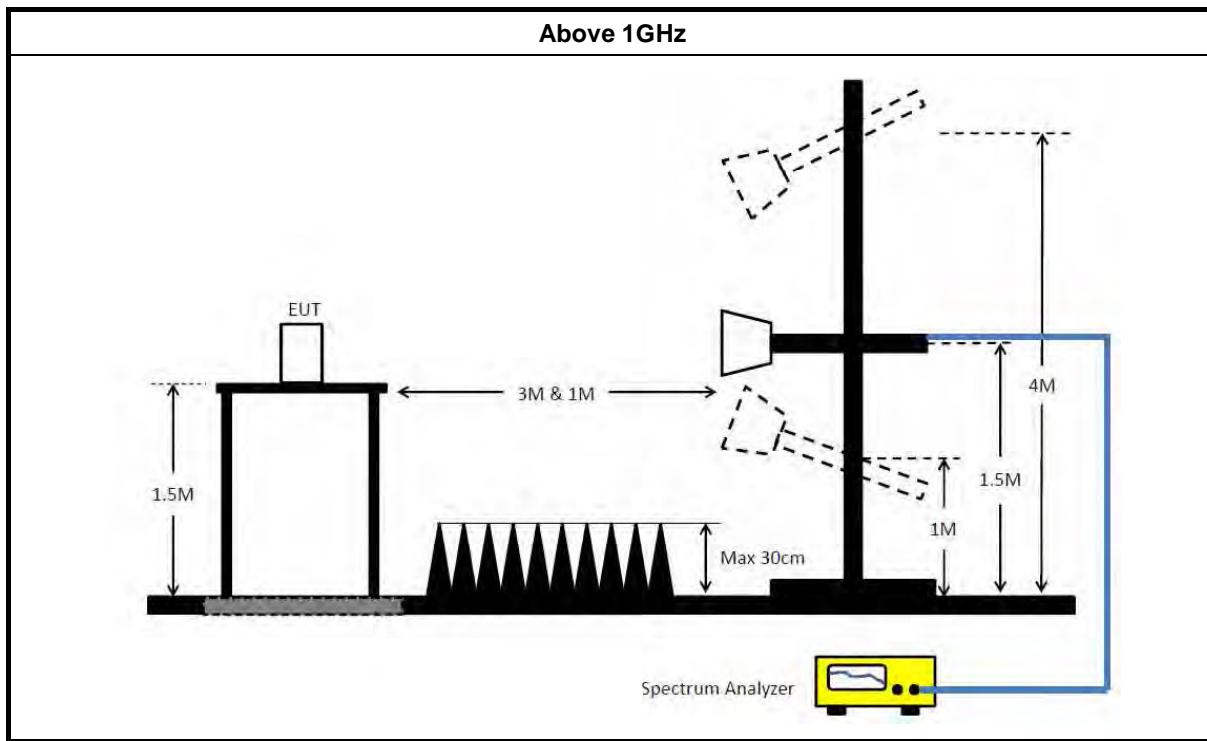
### 3.5.3 Test Procedures

Test Method	
▪ Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 m for frequencies above 30 MHz, unless it can be further demonstrated that measurements at a distance of 30 m or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).	
▪ The average emission levels shall be measured in [duty cycle $\geq$ 98 or duty factor].	
▪ For the transmitter unwanted emissions shall be measured using following options below:	
	▪ Refer as FCC KDB 789033, clause H)2) for unwanted emissions into non-restricted bands.
	▪ Refer as FCC KDB 789033, clause H)1) for unwanted emissions into restricted bands.
	<input type="checkbox"/> Refer as FCC KDB 789033, H)6) Method AD (Trace Averaging).
	<input checked="" type="checkbox"/> Refer as FCC KDB 789033, H)6) Method VB (Reduced VBW).
	<input type="checkbox"/> Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). VBW $\geq$ 1/T, where T is pulse time.
	<input type="checkbox"/> Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
	<input checked="" type="checkbox"/> Refer as FCC KDB 789033, clause H)5) measurement procedure peak limit.
	<input type="checkbox"/> Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.
▪ For radiated measurement.	
	▪ Refer as ANSI C63.10, clause 6.4 for radiated emissions below 30 MHz and test distance is 3m.
	▪ Refer as ANSI C63.10, clause 6.5 for radiated emissions 30 MHz to 1 GHz and test distance is 3m.
	▪ Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1GHz.
▪ The any unwanted emissions level shall not exceed the fundamental emission level.	
▪ All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.	



## 3.5.4 Test Setup



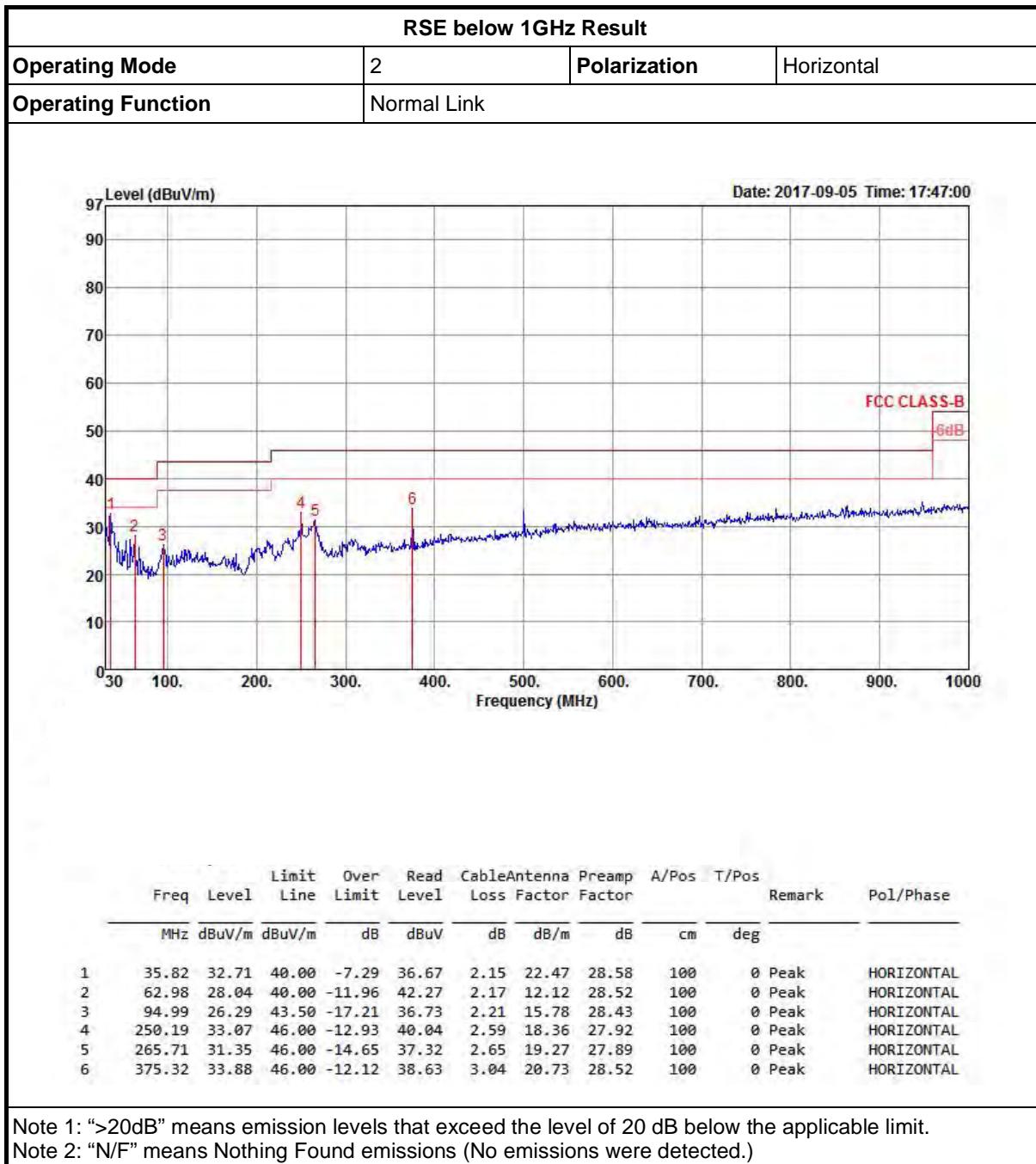


### 3.5.5 Transmitter Unwanted Emissions (Below 30MHz)

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.



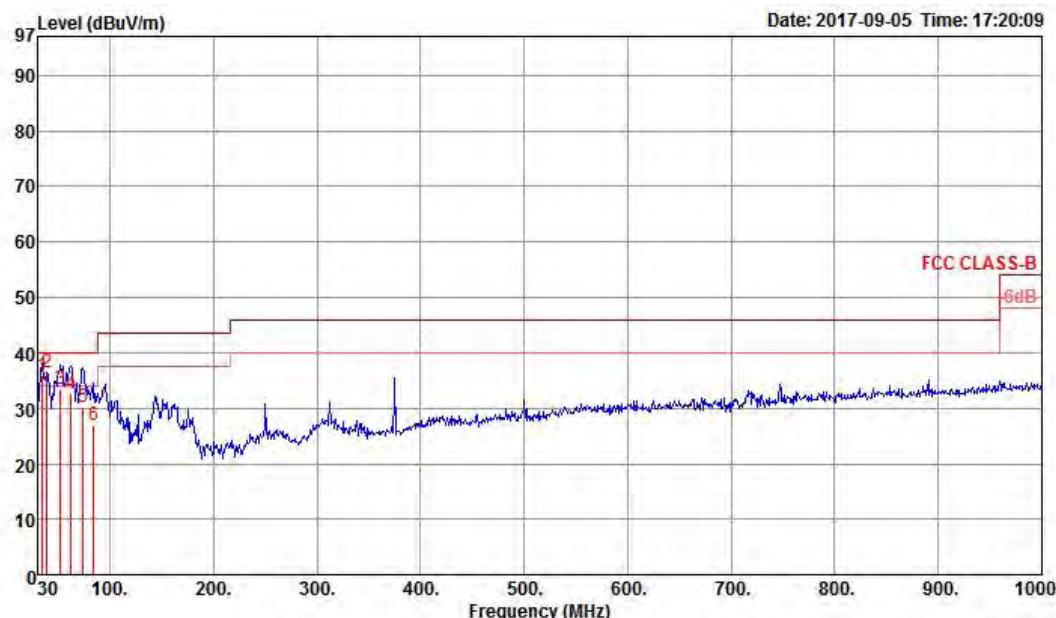
## 3.5.6 Test Result of Transmitter Unwanted Emissions





## RSE below 1GHz Result

Operating Mode	2	Polarization	Vertical
Operating Function	Normal Link		



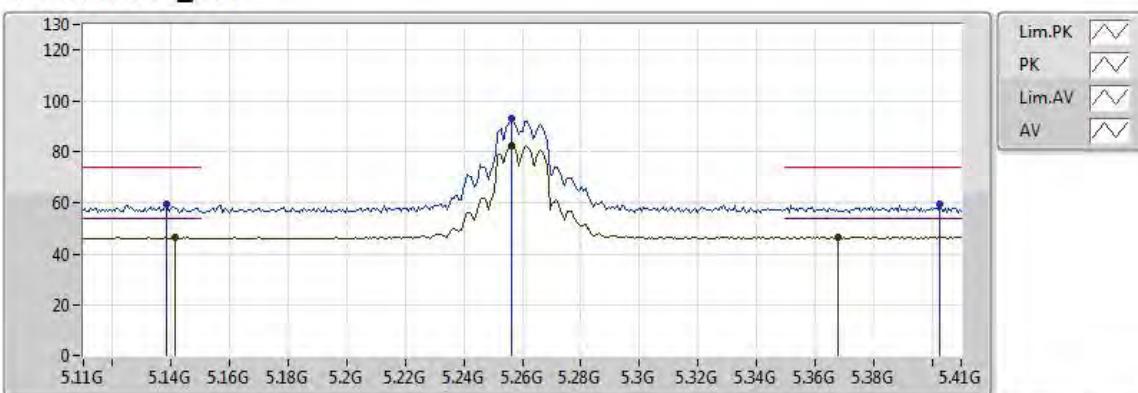
Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
		Line	Limit		Loss	Factor	Factor	cm	deg		
MHz	dBuV/m	dBuV/m		dB	dB	dB/m	dB				
1	34.85	35.89	40.00	-4.11	39.20	2.16	23.11	28.58	227	141 QP	VERTICAL
2	38.73	36.53	40.00	-3.47	42.44	2.12	20.55	28.58	100	221 Peak	VERTICAL
3	52.31	33.48	40.00	-6.52	46.40	2.17	13.47	28.56	100	74 QP	VERTICAL
4	62.01	32.76	40.00	-7.24	47.00	2.17	12.11	28.52	145	8 QP	VERTICAL
5	73.65	30.22	40.00	-9.78	44.10	2.19	12.42	28.49	100	8 QP	VERTICAL
6	84.32	26.95	40.00	-13.05	39.40	2.20	13.81	28.46	100	196 QP	VERTICAL

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)

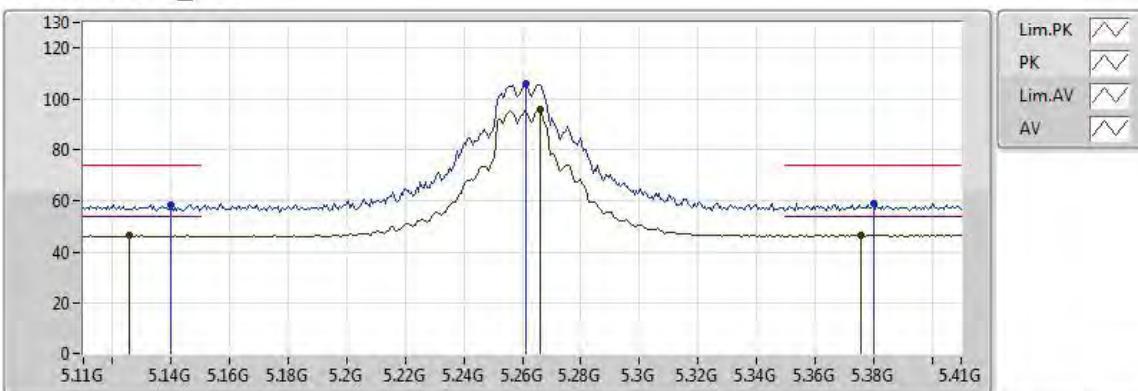
**RSE Above 1GHz Result  
Summary**

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Pol. (H/V)	Azimuth (°)	Height (m)	Comments
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-	-	-	-	-
5.47-5.725GHz	Pass	AV	5.7252G	53.97	54.00	-0.03	9.91	3	H	253	1.02	-

**802.11a\_(6Mbps)\_2TX****5260MHz\_TX**

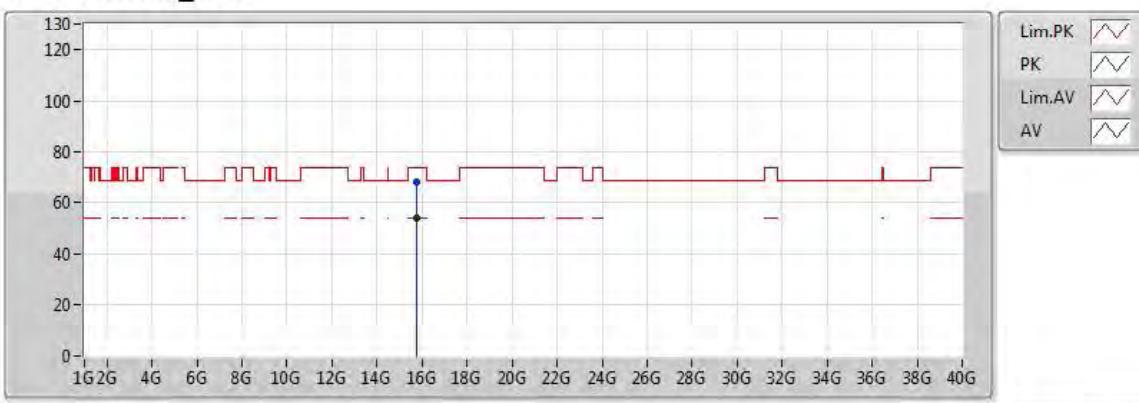
20170831  
EUT Z\_2TX  
Setting 22  
02-Z-1-10  
FSU

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	5.1412G	46.31	54.00	-7.69	9.01	3	V	311	1.02	-
AV	5.2564G	82.62	Inf	-Inf	9.27	3	V	311	1.02	-
AV	5.368G	46.62	54.00	-7.38	9.47	3	V	311	1.02	-
PK	5.1382G	59.57	74.00	-14.43	9.01	3	V	311	1.02	-
PK	5.2564G	93.16	Inf	-Inf	9.27	3	V	311	1.02	-
PK	5.4028G	59.22	74.00	-14.78	9.53	3	V	311	1.02	-

**802.11a\_(6Mbps)\_2TX****5260MHz\_TX**

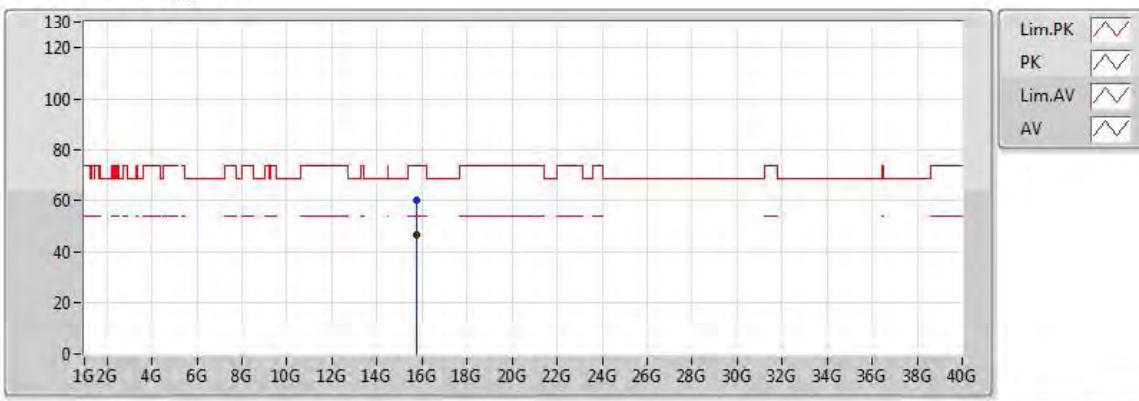
20170831  
EUT Z\_2TX  
Setting 22  
02-Z-1-10  
FSU

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	5.1256G	46.32	54.00	-7.68	8.97	3	H	87	1.03	-
AV	5.266G	95.58	Inf	-Inf	9.29	3	H	87	1.03	-
AV	5.3758G	46.66	54.00	-7.34	9.48	3	H	87	1.03	-
PK	5.14G	58.35	74.00	-15.65	9.01	3	H	87	1.03	-
PK	5.2612G	105.80	Inf	-Inf	9.28	3	H	87	1.03	-
PK	5.38G	58.97	74.00	-15.03	9.49	3	H	87	1.03	-

**802.11a\_(6Mbps)\_2TX****5260MHz\_TX**

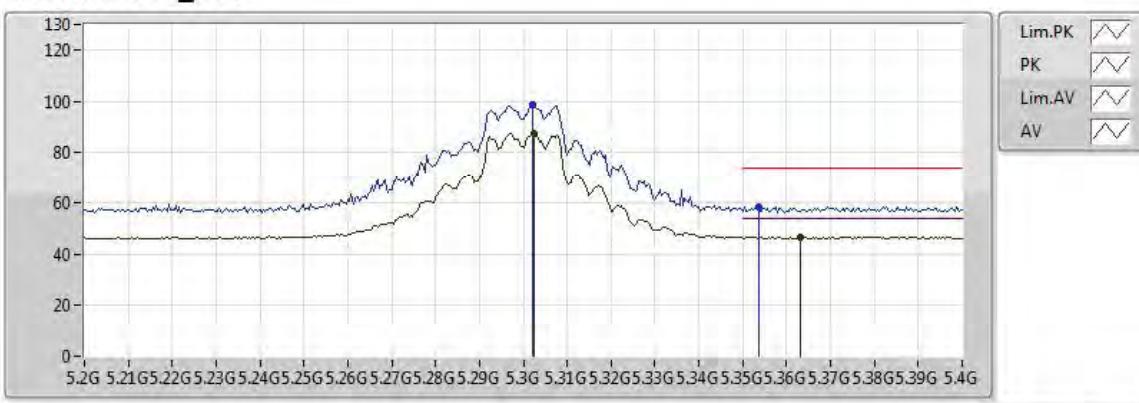
20170831  
EUT Z\_2TX  
Setting 22  
02-Z-1  
FSU

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	15.77784G	53.68	54.00	-0.32	17.51	3	V	320	2.14	-
PK	15.78212G	67.62	74.00	-6.38	17.50	3	V	320	2.14	-

**802.11a\_(6Mbps)\_2TX****5260MHz\_TX**

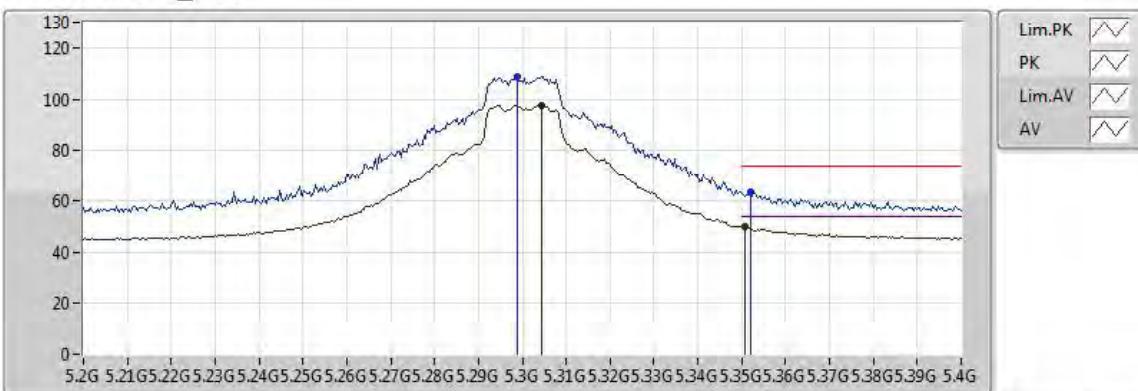
20170831  
EUT Z\_2TX  
Setting 22  
02-Z-1  
FSU

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	15.77764G	46.76	54.00	-7.24	17.51	3	H	210	1.02	-
PK	15.77676G	59.98	74.00	-14.02	17.51	3	H	210	1.02	-

**802.11a\_(6Mbps)\_2TX****5300MHz\_TX**

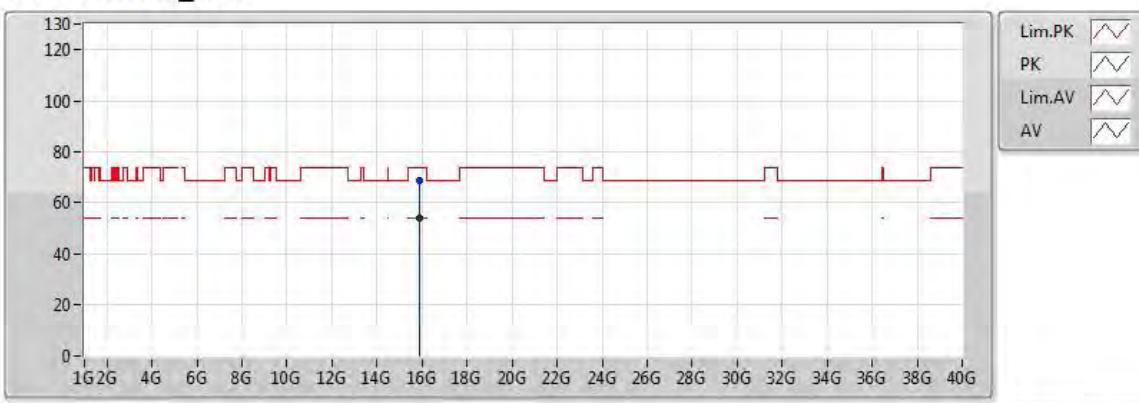
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EUT Z\_2TX  
Setting 22.5  
02-Z-1-10  
FSU

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	5.3024G	81.46	Inf	-Inf	9.35	3	V	13	2.67	-
AV	5.3632G	46.55	54.00	-7.45	9.46	3	V	13	2.67	-
PK	5.302G	98.73	Inf	-Inf	9.35	3	V	13	2.67	-
PK	5.3536G	58.40	74.00	-15.60	9.44	3	V	13	2.67	-

**802.11a\_(6Mbps)\_2TX****5300MHz\_TX**

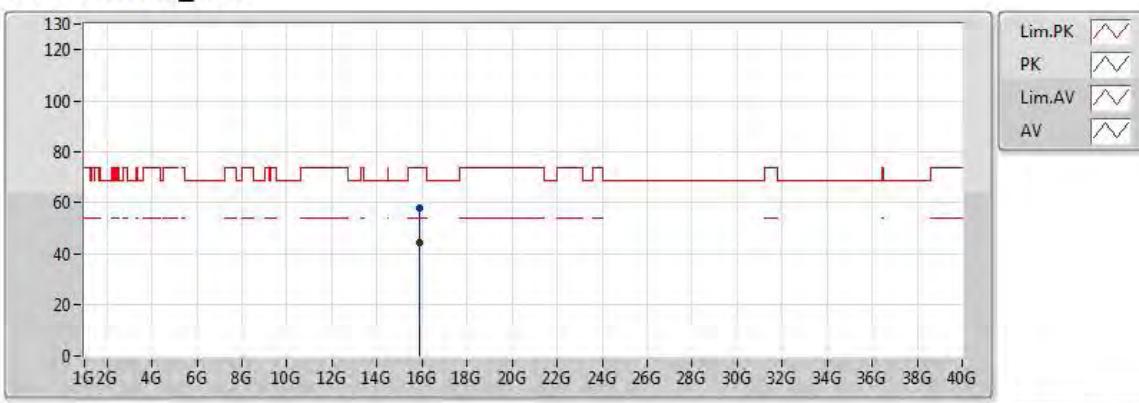
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Setting 22.5  
02-Z-1-10  
FSU

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	5.3044G	91.14	Inf	-Inf	9.36	3	H	55	1.80	-
AV	5.3508G	49.68	54.00	-4.32	9.44	3	H	55	1.80	-
PK	5.2988G	108.76	Inf	-Inf	9.35	3	H	55	1.80	-
PK	5.352G	63.41	74.00	-10.59	9.44	3	H	55	1.80	-

**802.11a\_(6Mbps)\_2TX****5300MHz\_TX**

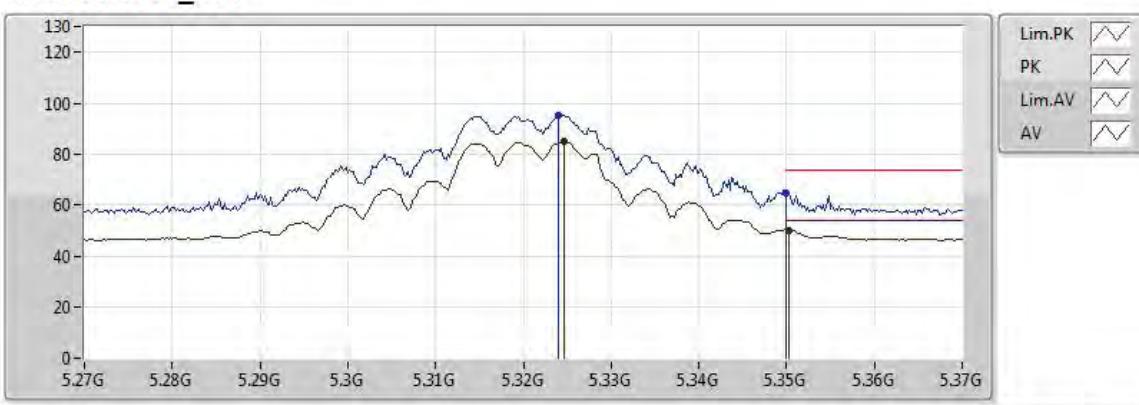
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EUT Z\_2TX  
Setting 22.5  
02-Z-1  
FSU

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	15.90388G	53.92	54.00	-0.08	17.24	3	V	342	2.14	-
PK	15.9088G	68.27	74.00	-5.73	17.23	3	V	342	2.14	-

**802.11a\_(6Mbps)\_2TX****5300MHz\_TX**

20170831  
EUT Z\_2TX  
Setting 22.5  
02-Z-1  
FSU

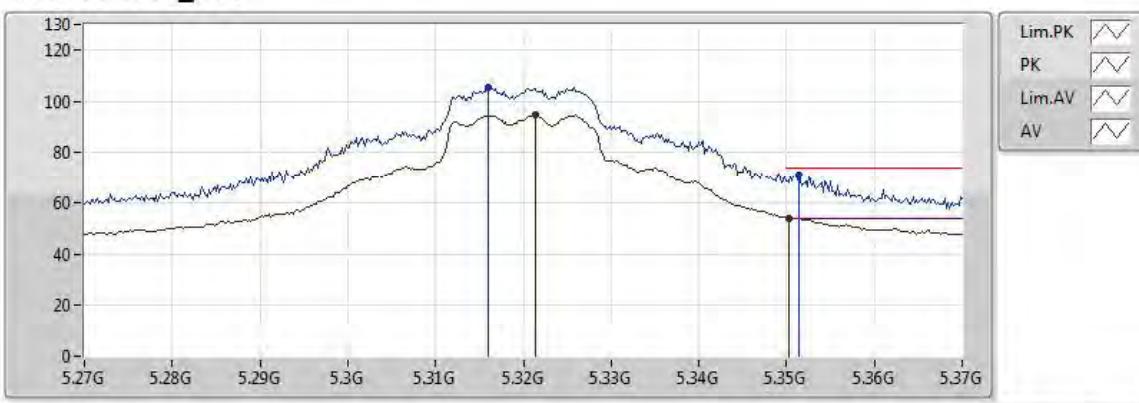
Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	15.89796G	44.46	54.00	-9.54	17.25	3	H	192	2.50	-
PK	15.89392G	57.45	74.00	-16.55	17.26	3	H	192	2.50	-

**802.11a\_(6Mbps)\_2TX****5320MHz\_TX**

Lim.PK	
PK	
Lim.AV	
AV	

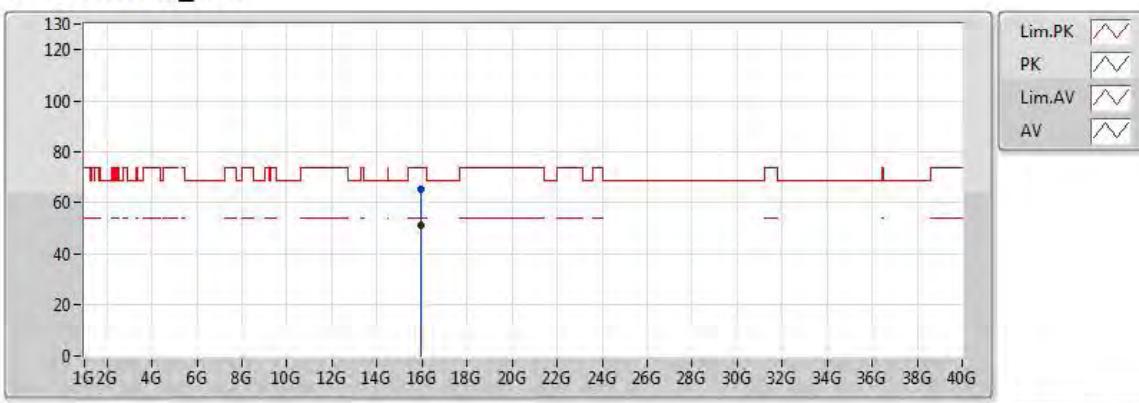
20170831  
EUT Z\_2TX  
Setting 21.5  
02-Z-1-10  
FSU

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	5.3246G	84.91	Inf	-Inf	9.39	3	V	257	2.33	-
AV	5.3502G	50.13	54.00	-3.87	9.44	3	V	257	2.33	-
PK	5.324G	95.52	Inf	-Inf	9.39	3	V	257	2.33	-
PK	5.350005G	64.58	74.00	-9.42	9.44	3	V	257	2.33	-

**802.11a\_(6Mbps)\_2TX****5320MHz\_TX**

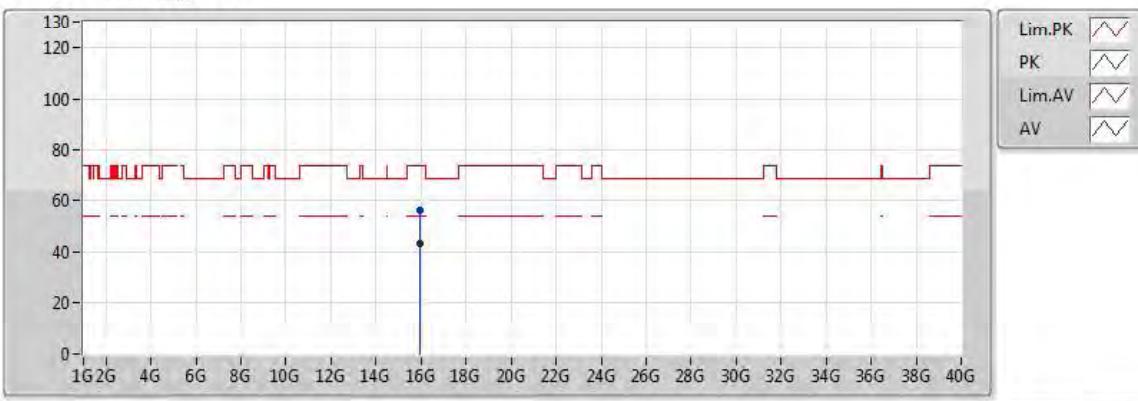
20170831  
EUT Z\_2TX  
Setting 21.5  
02-Z-1-10  
FSU

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	5.3114G	94.69	Inf	-Inf	9.39	3	H	99	1.12	-
AV	5.3502G	53.56	54.00	-0.44	9.44	3	H	99	1.12	-
PK	5.316G	105.44	Inf	-Inf	9.38	3	H	99	1.12	-
PK	5.3514G	71.24	74.00	-2.76	9.44	3	H	99	1.12	-

**802.11a\_(6Mbps)\_2TX****5320MHz\_TX**

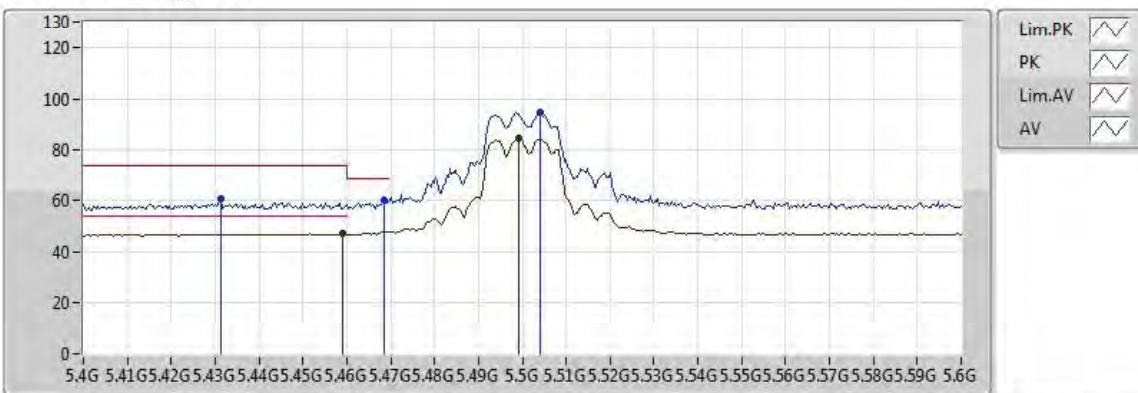
20170831  
EUT Z\_2TX  
Setting 21.5  
02-Z-1  
FSU

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	15.95888G	50.73	54.00	-3.27	17.12	3	V	331	1.11	-
PK	15.95844G	65.21	74.00	-8.79	17.12	3	V	331	1.11	-

**802.11a\_(6Mbps)\_2TX****5320MHz\_TX**

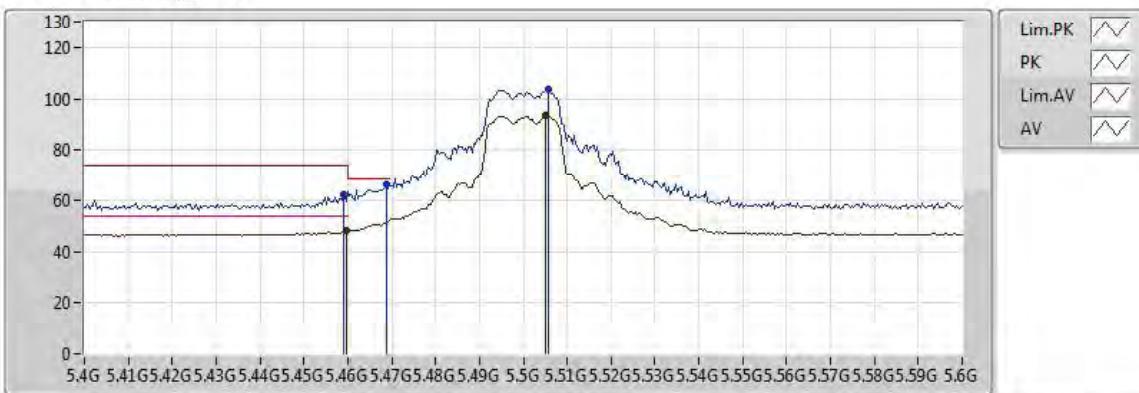
20170831  
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Setting 21.5  
02-Z-1  
FSU

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	15.95888G	43.29	54.00	-10.71	17.12	3	H	155	2.45	-
PK	15.95808G	55.89	74.00	-18.11	17.12	3	H	155	2.45	-

**802.11a\_(6Mbps)\_2TX****5500MHz\_TX**

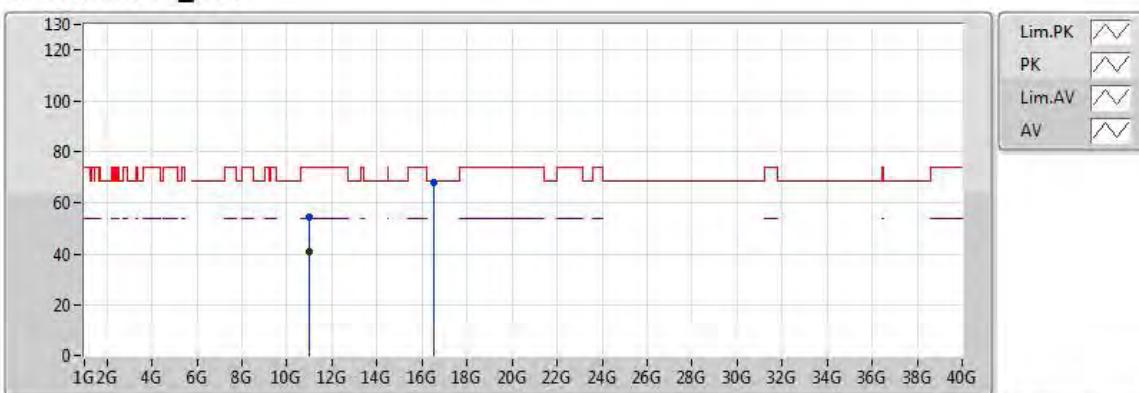
20170831  
EUT Z\_2TX  
Setting 21.5  
02-Z-1-10  
FSU

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	5.4592G	46.93	54.00	-7.07	9.68	3	V	285	1.08	-
AV	5.4992G	84.61	Inf	-Inf	9.79	3	V	285	1.08	-
PK	5.4312G	60.47	74.00	-13.53	9.60	3	V	285	1.08	-
PK	5.4684G	59.80	68.20	-8.40	9.70	3	V	285	1.08	-
PK	5.504G	94.67	Inf	-Inf	9.79	3	V	285	1.08	-

**802.11a\_(6Mbps)\_2TX****5500MHz\_TX**

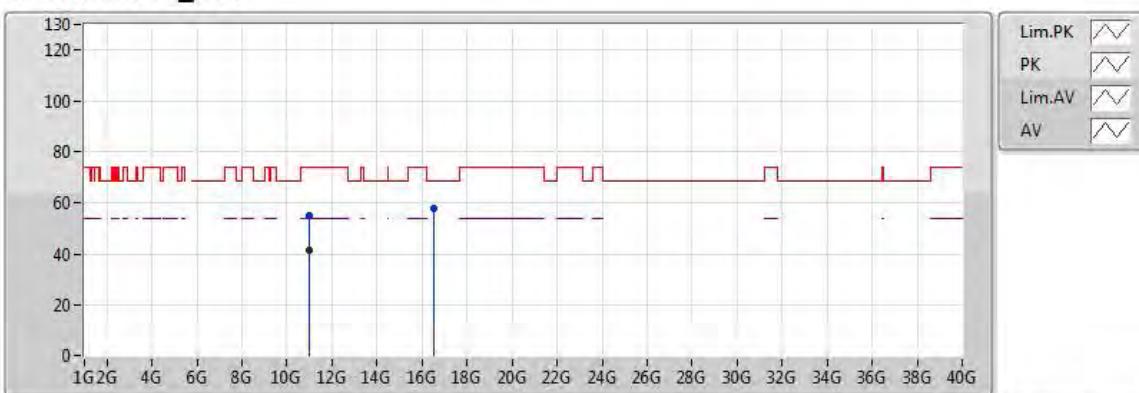
20170831  
EUT Z\_2TX  
Setting 21.5  
02-Z-1-10  
FSU

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	5.4596G	48.26	54.00	-5.74	9.68	3	H	267	1.03	-
AV	5.5052G	93.47	Inf	-Inf	9.79	3	H	267	1.03	-
PK	5.4592G	62.02	74.00	-11.98	9.68	3	H	267	1.03	-
PK	5.4688G	66.12	68.20	-2.08	9.71	3	H	267	1.03	-
PK	5.5056G	103.72	Inf	-Inf	9.80	3	H	267	1.03	-

**802.11a\_(6Mbps)\_2TX****5500MHz\_TX**

20170831  
EUT Z\_2TX  
Setting 21.5  
02-Z-1  
FSU

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	10.99128G	41.13	54.00	-12.87	15.83	3	V	154	1.48	-
PK	10.99604G	54.20	74.00	-19.80	15.83	3	V	154	1.48	-
PK	16.494G	67.94	68.20	-0.26	18.95	3	V	357	2.65	-

**802.11a\_(6Mbps)\_2TX****5500MHz\_TX**

20170831  
EUT Z\_2TX  
Setting 21.5  
02-Z-1  
FSU

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	10.99012G	41.24	54.00	-12.76	15.83	3	H	240	1.13	-
PK	11.00444G	54.88	74.00	-19.12	15.83	3	H	240	1.73	-
PK	16.50468G	57.64	68.20	-10.56	18.99	3	H	17	1.50	-