

# **Wi-Fi 5GHz Conducted Measurements Test Report**

**FCC ID: 2ADDK360FLY4K**

**IC: 12404A-360FLY4K**

**FCC Rule Part: 15.407**

**IC Radio Standards Specification: RSS-247**

**Manufacturer: 360fly Inc.**

**Model: 360FLY4K**

**Test Facility: 12 Ang Mo Kio St 64 #03-01  
UE BizHub Central (Blk A), 569088 Singapore.**

**Test Begin Date: Mar 24, 2016**

**Test End Date: Apr 19, 2016**

**Report Issue Date: Apr 19, 2016**

**Test By:**

**Name: PS Yeo**

**Reviewed By:**

**Name: CC Pang**

**Signature: *PSYeo***

**Signature: *CCPang***

## 1 List of Test Equipment

Manufacturer	Model	Equipment Type	Serial No.	Last Calibration Date	Calibration Due Date
Agilent	E4404B	Spectrum Analyzer	MY44220422	10 Feb 15	10 Feb 17
Advantest	R3273	Spectrum Analyzer	95090358	06 Oct 15	06 Oct 16
Agilent	N1911A	Power Meter	MY53150005	12 Jun 15	12 Jun 17
Agilent	N1921A	Power Sensor	MY53160021	23 Jun 15	23 Jun 16

## 2 Applicable Standard References

The following standards were used:

FCC Rules	IC Rules	Description of Test	Result
§ 15.407 (e)	RSS 247 6.2	6 dB, 26dB and 99% Bandwidth	Pass
§ 15.407 (a)	RSS 247 6.2.1, 6.2.4	RF Output Power	Pass
§ 15.407 (a)	RSS 247 6.2.1, 6.2.4	Peak Power Spectral Density	Pass
§ 15.407 (g)	RSS Gen 8.11	Frequency Stability	Pass

## 3 Summary of Tests

### 3.1 6dB Bandwidth – FCC Section 15.407 (e) Emission Bandwidth(EBW) 99% bandwidth IC : RSS-247 section 6.2

#### 3.1.1 Measurement Procedure

The 6dB bandwidth was measured in accordance with the FCC KDB Publication No. 789033 D02 General UNII Test Procedures New Rules v01 "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E" Minimum Emission Bandwidth for the band 5.725-5.85 GHz. The RBW of the spectrum analyzer was set to 100 kHz and VBW 300 kHz. Span was set large enough to capture the entire emissions and >> RBW.

The 26 dB Emission Bandwidth (EBW) was measured in accordance with the FCC KDB Publication No. 789033 D02 General UNII Test Procedures New Rules v01 "Guidelines for Compliance Testing of Unlicensed National Information

Infrastructure (U-NII) Devices Part 15, Subpart E" Emission Bandwidth (EBW). The RBW was set to approximately 1% of the emission bandwidth. The bandwidth was measured as the maximum width of the emission that is 26 dB down from the maximum of the emission.

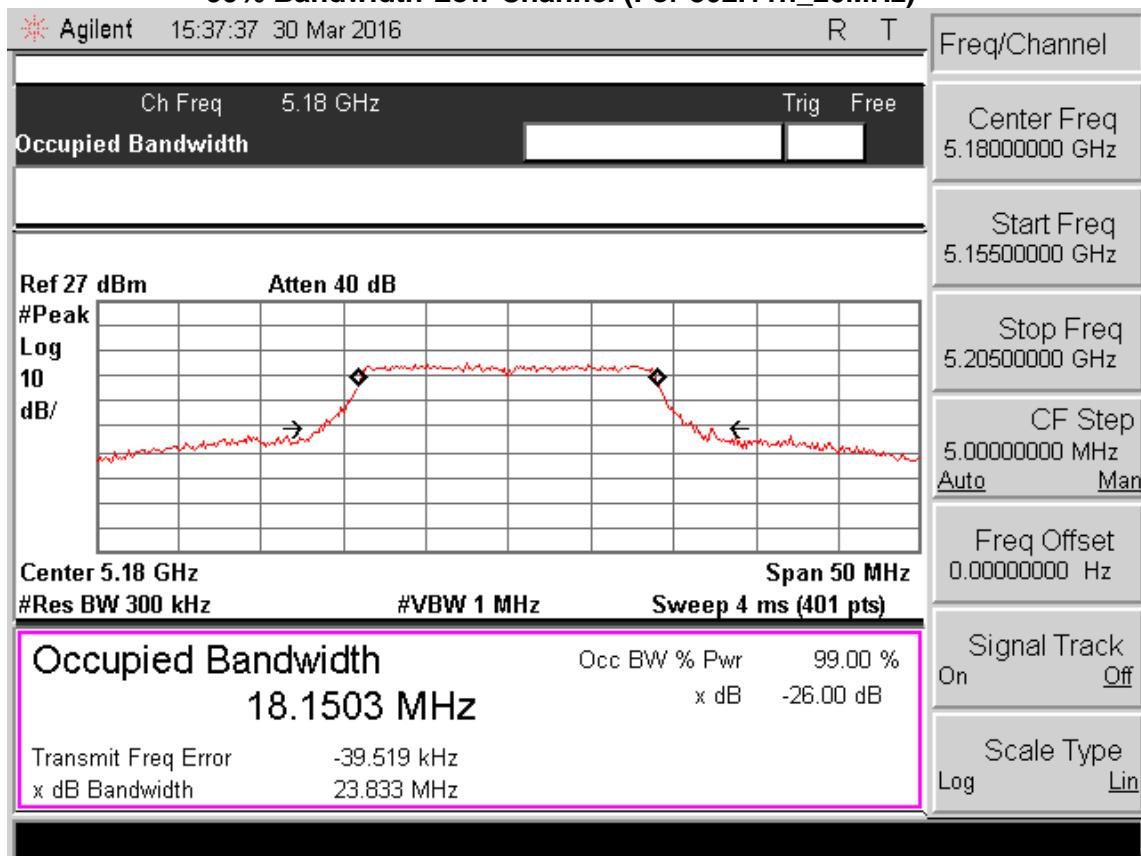
The 99% occupied bandwidth was measured with the spectrum analyzer span set to fully display the emission, including the emissions skirts. The RBW of the spectrum analyzer was set to greater than or equal to the 1% to 5% of the 99% bandwidth. The occupied 99% bandwidth was measured using the occupied bandwidth function of the analyzer.

### **3.1.2 Measurement Result**

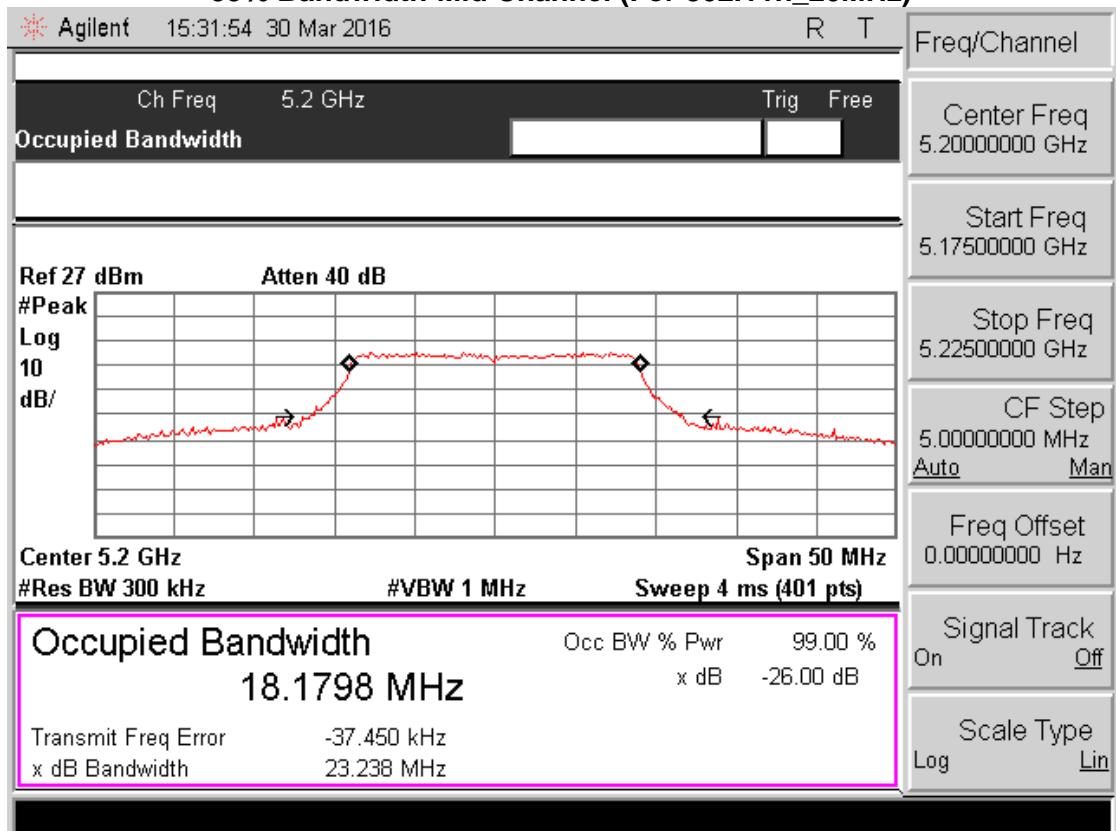
<b>Frequency (MHz)</b>	<b>For 802.11n: 26dB Bandwidth (MHz)</b>	<b>For 802.11n: 99% Bandwidth (MHz)</b>
5180	23.833	18.150
5200	23.238	18.180
5240	23.598	18.214

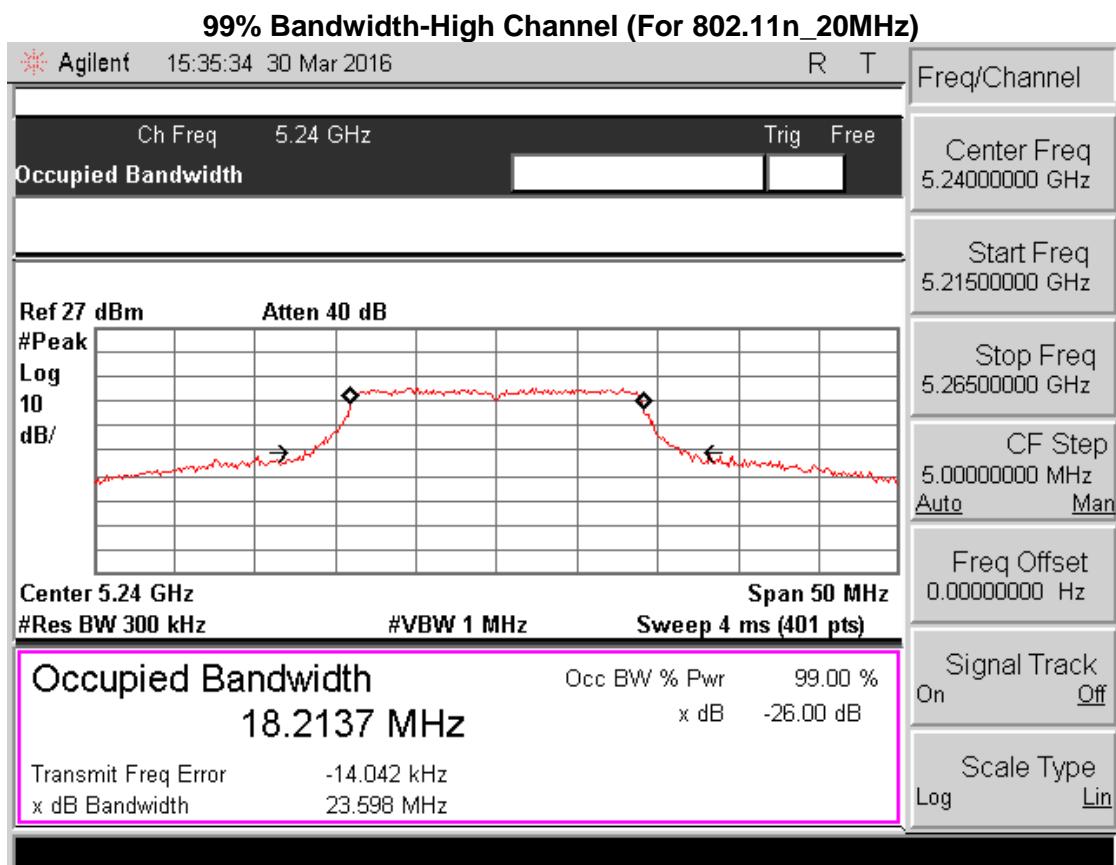
<b>Frequency (MHz)</b>	<b>For 802.11n_40MHz: 6dB Bandwidth (MHz)</b>	<b>For 802.11n_40MHz: 99% Bandwidth (MHz)</b>
5190	36.2266	37.6819
5230	36.1149	36.9038

### 99% Bandwidth-Low Channel (For 802.11n\_20MHz)

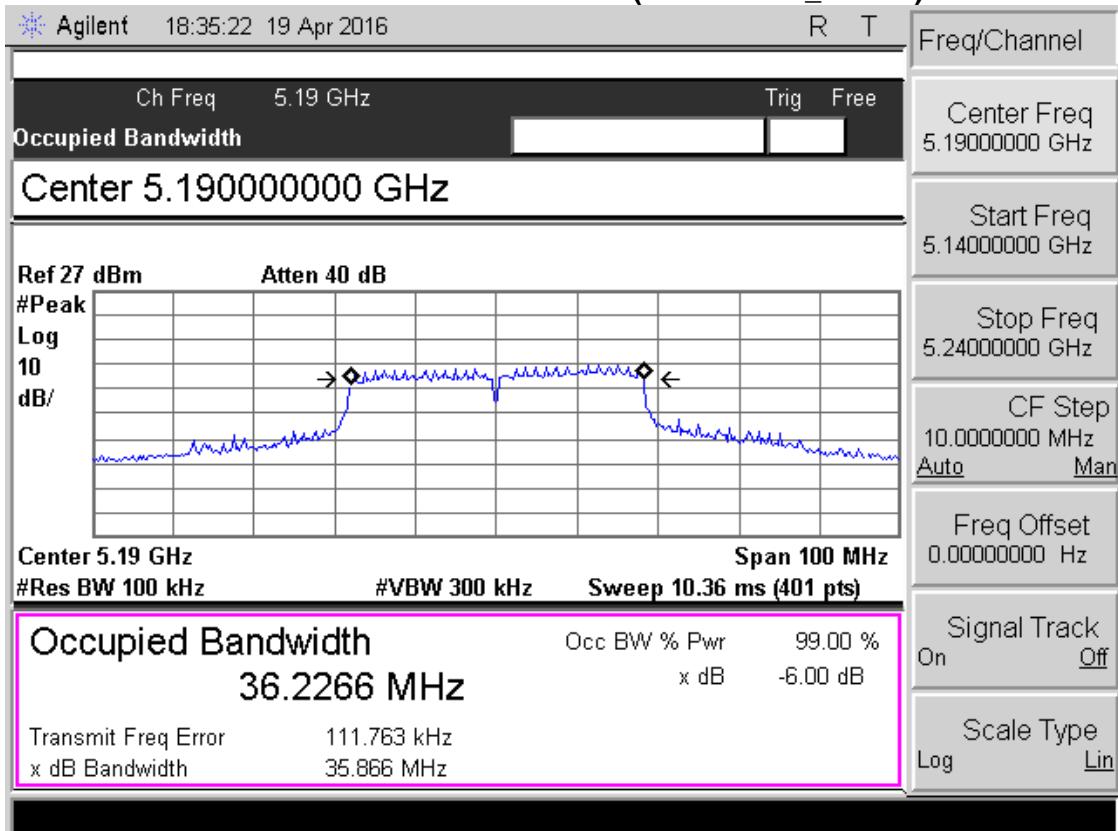


### 99% Bandwidth-Mid Channel (For 802.11n\_20MHz)

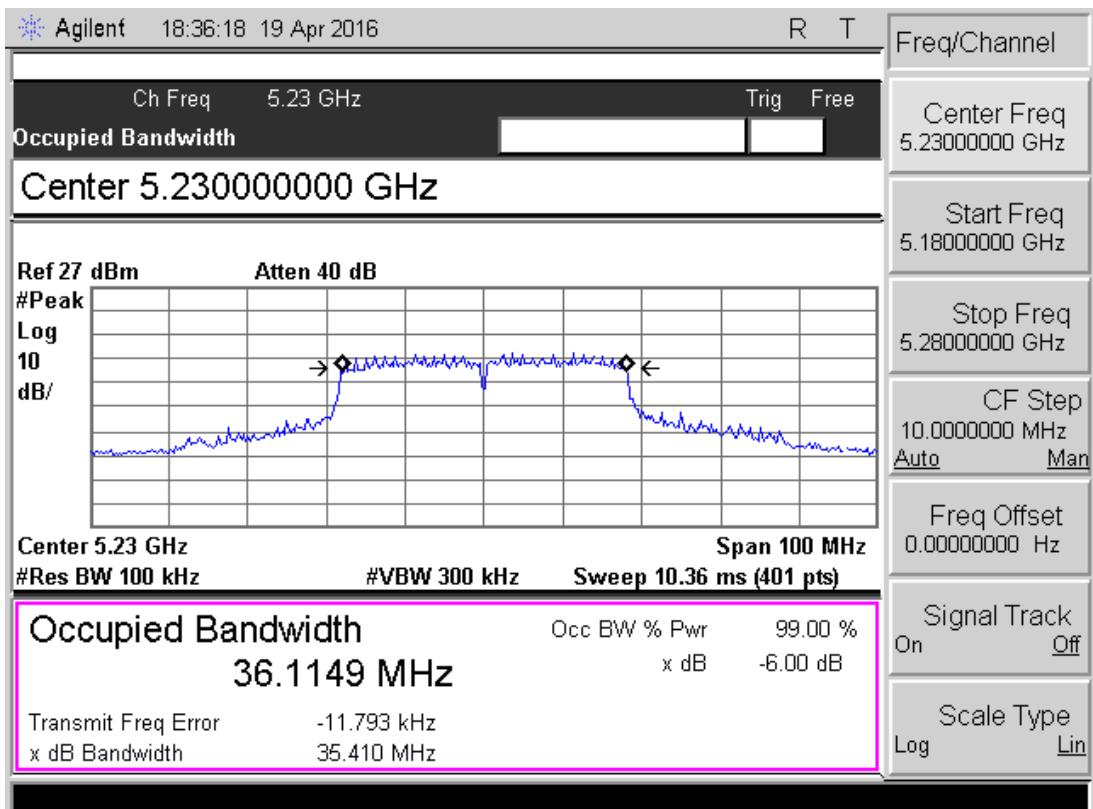




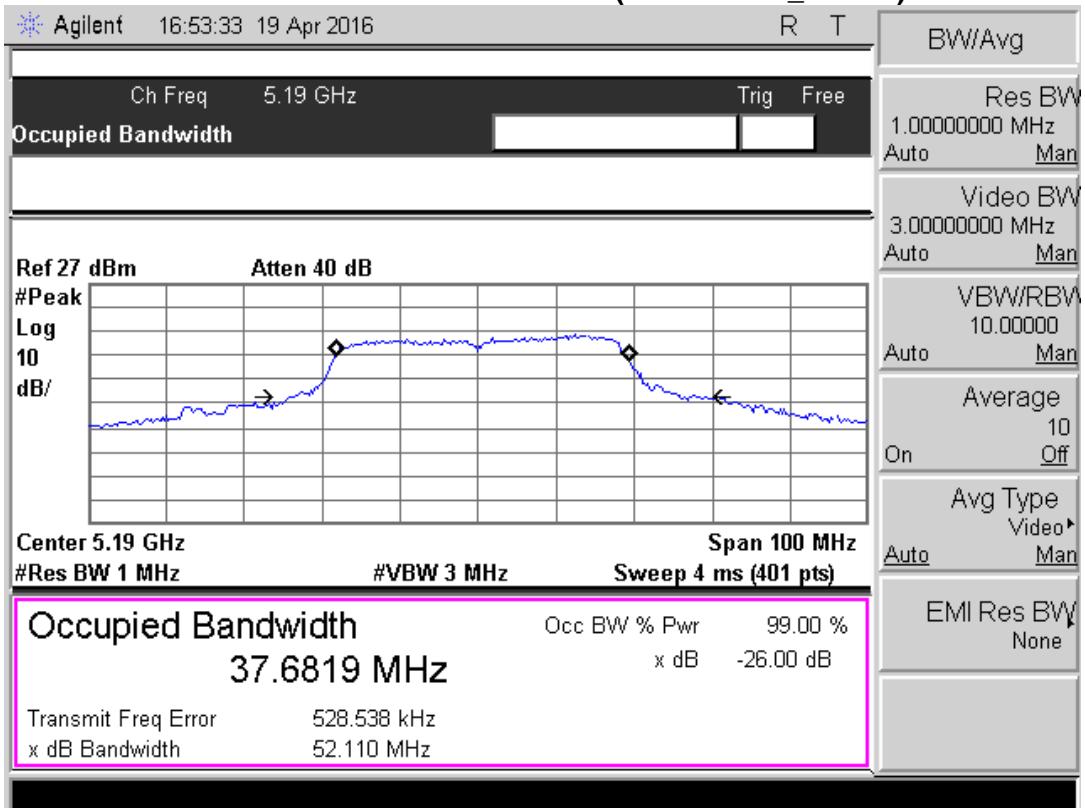
### 6dB Bandwidth-Low Channel (For 802.11n\_40MHz)



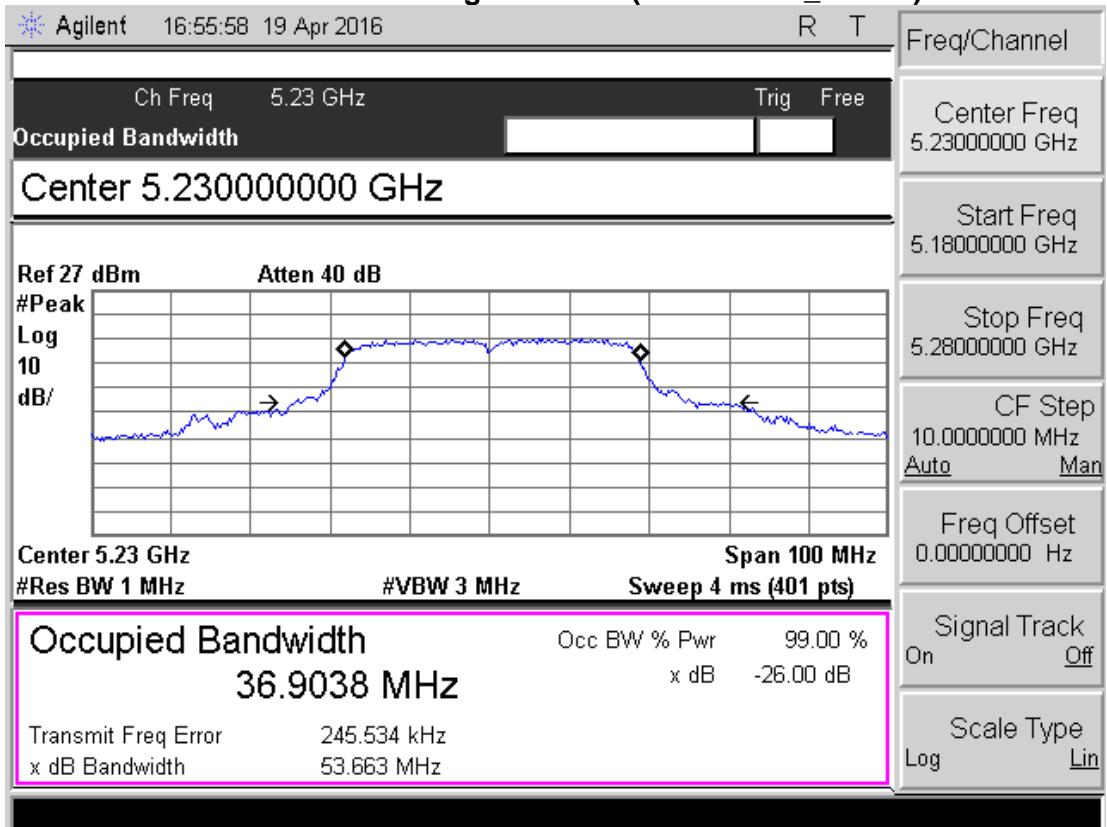
### 6dB Bandwidth-High Channel (For 802.11n\_40MHz)



### 99% Bandwidth-Low Channel (For 802.11n\_40MHz)

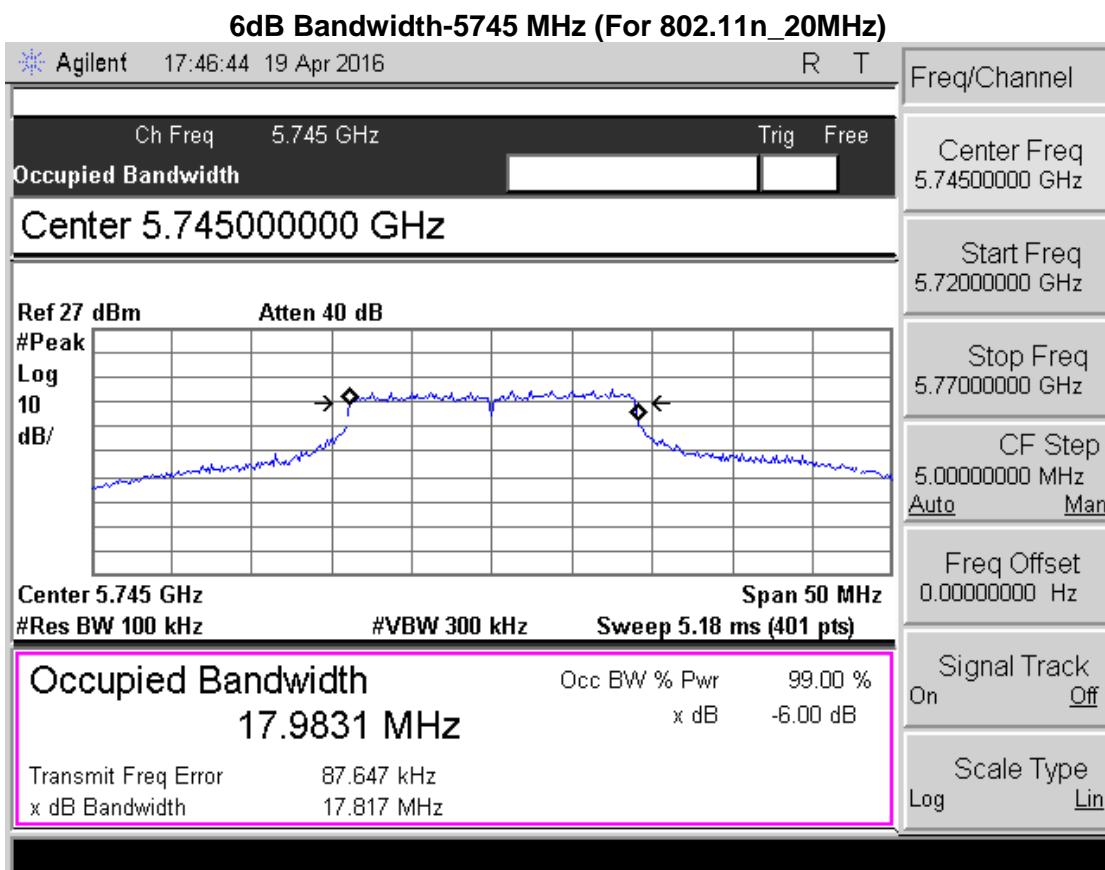


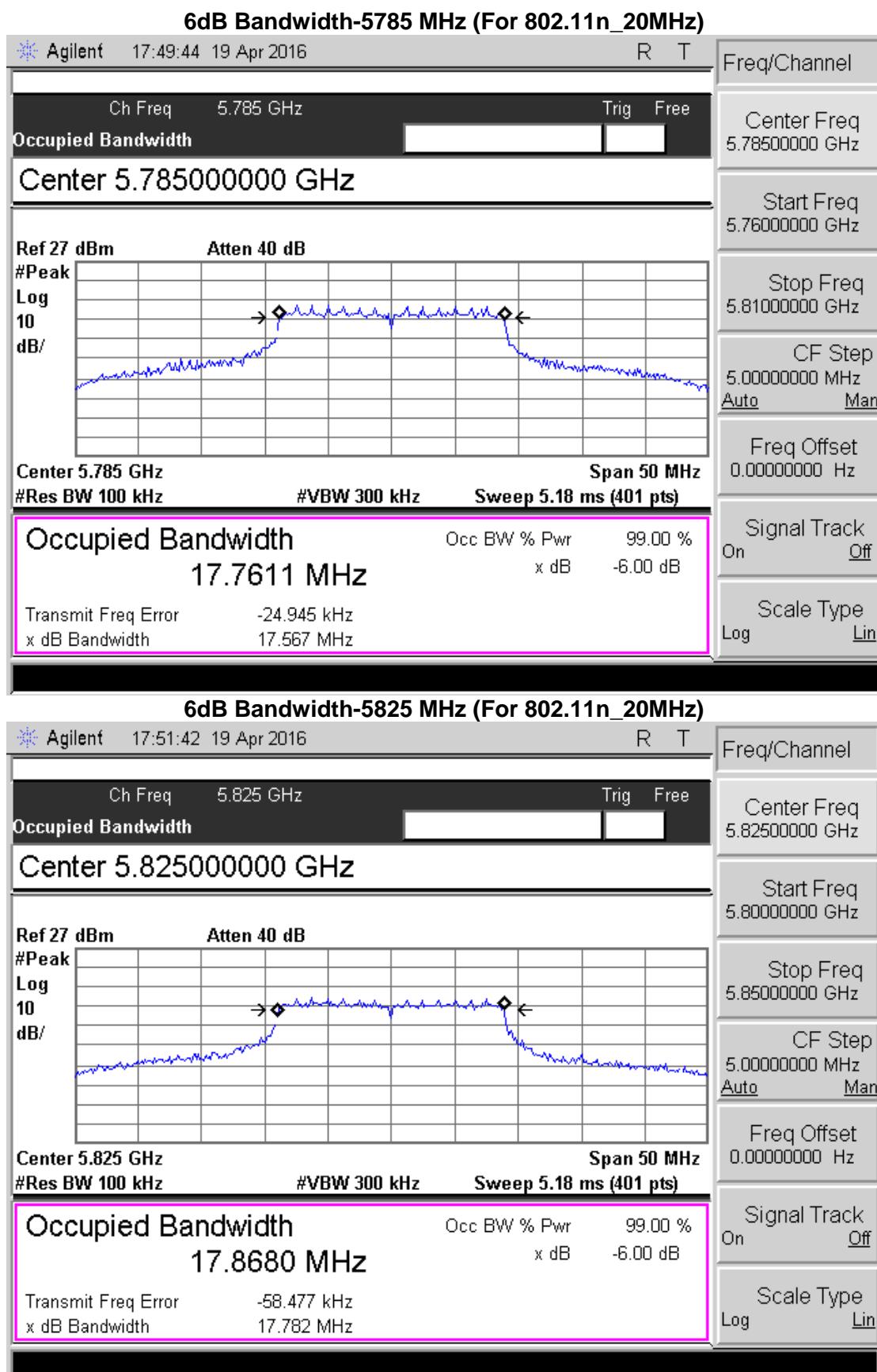
### 99% Bandwidth-High Channel (For 802.11n\_40MHz)



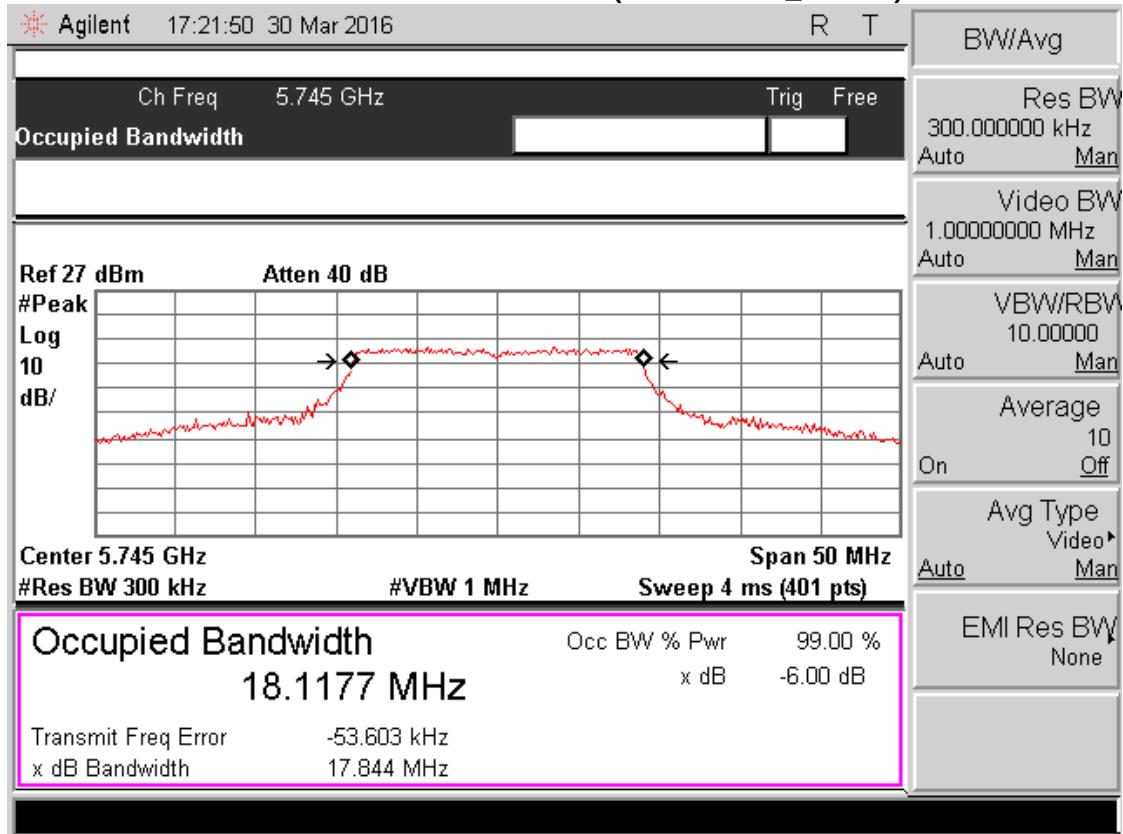
**Band 5725 – 5850 MHz, 802.11N 20 MHz**

Frequency [MHz]	6dB Bandwidth [MHz]	26dB Bandwidth [MHz]	99% Bandwidth (MHz)
5745	17.9831	23.020	18.118
5785	17.8761	23.081	18.172
5825	17.8680	23.424	18.160

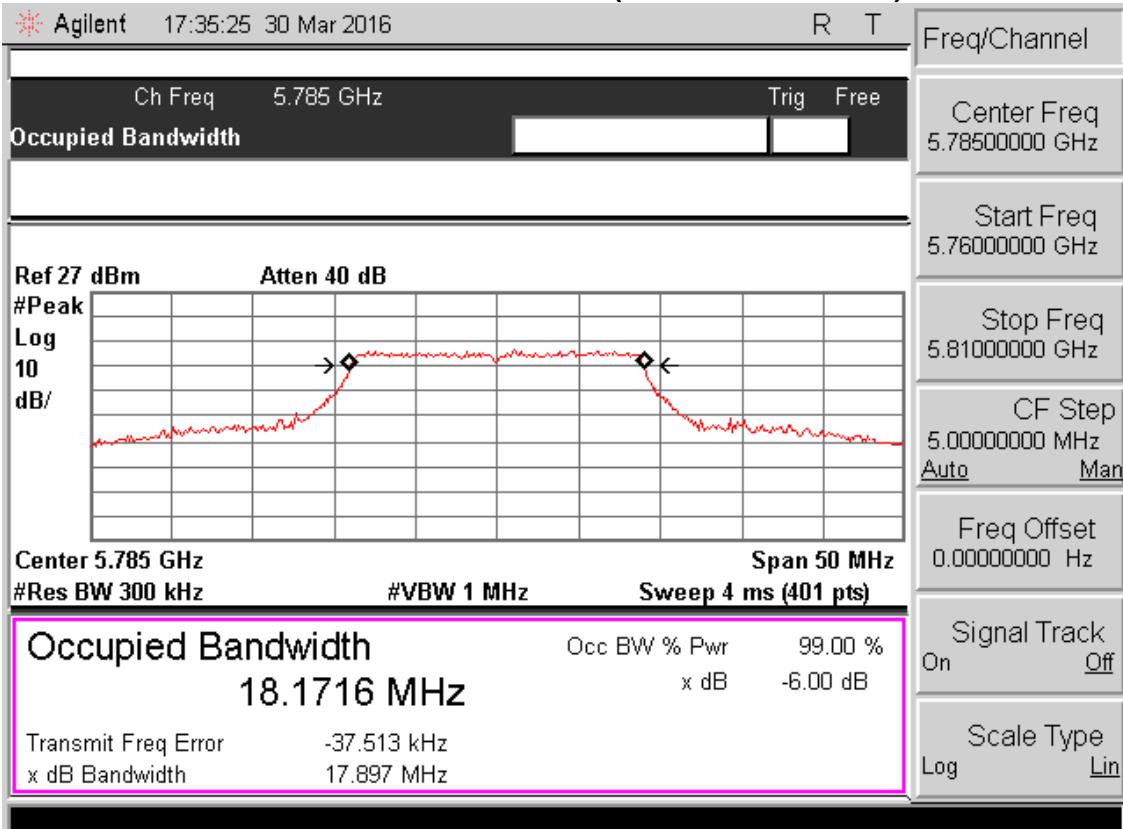




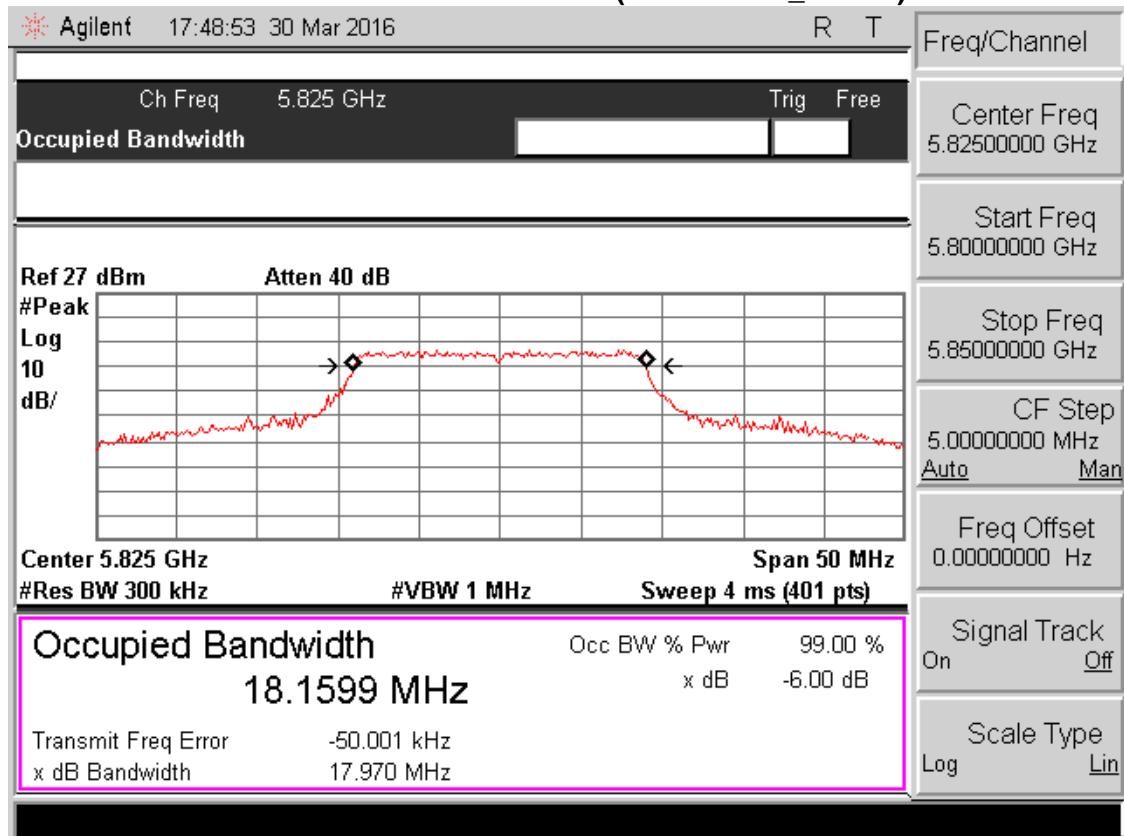
### 99% Bandwidth-5745 MHz (For 802.11n\_20MHz)



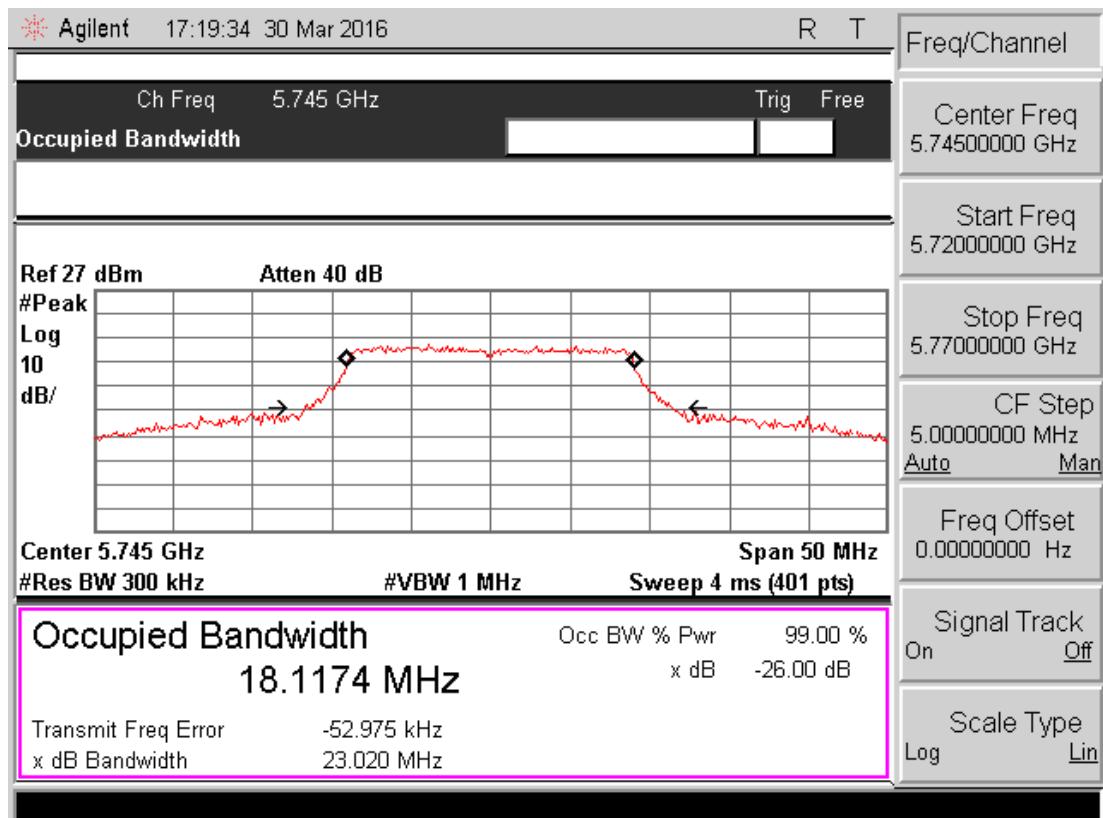
### 99% Bandwidth-5785 MHz (For 802.11n\_20MHz)



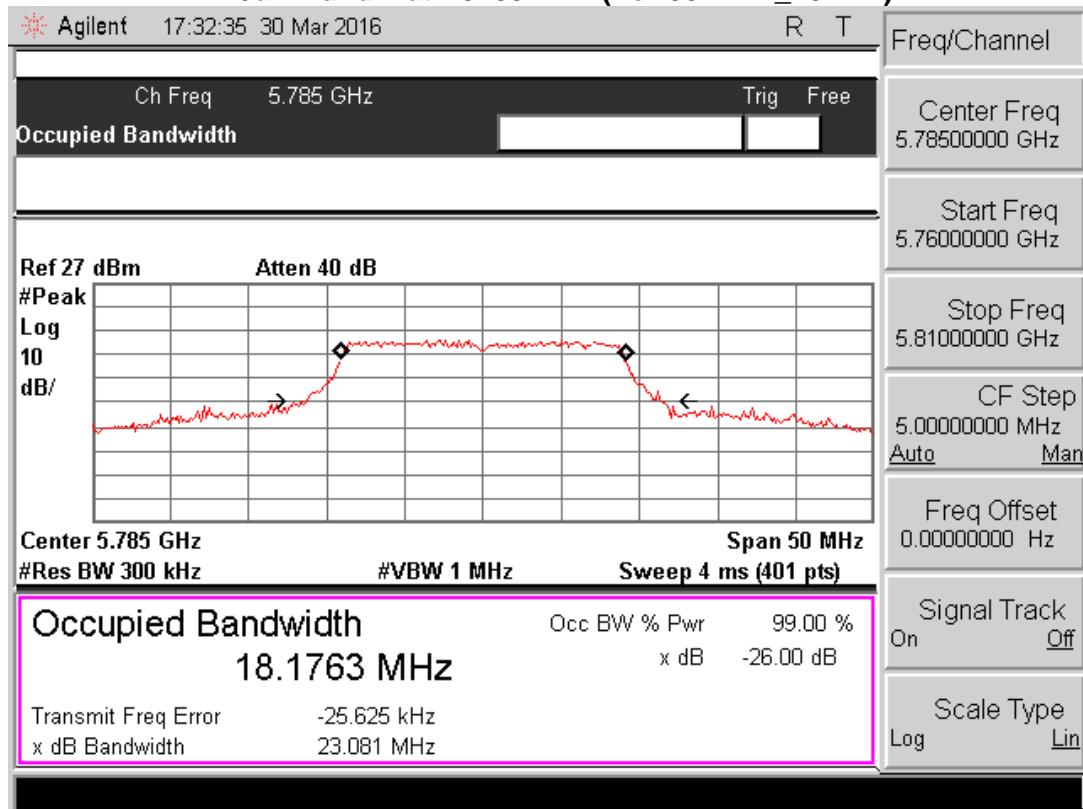
### 99% Bandwidth-5825 MHz (For 802.11n\_20MHz)



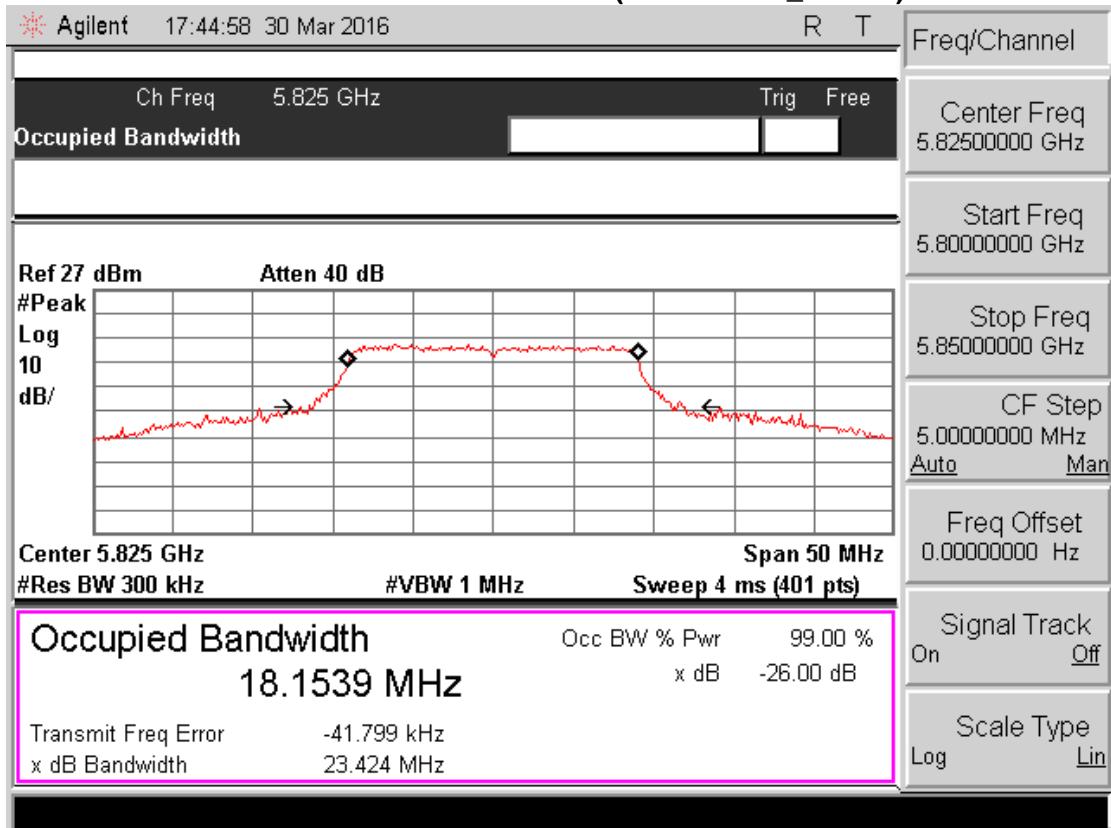
### 26dB Bandwidth-5745 MHz (For 802.11n\_20MHz)



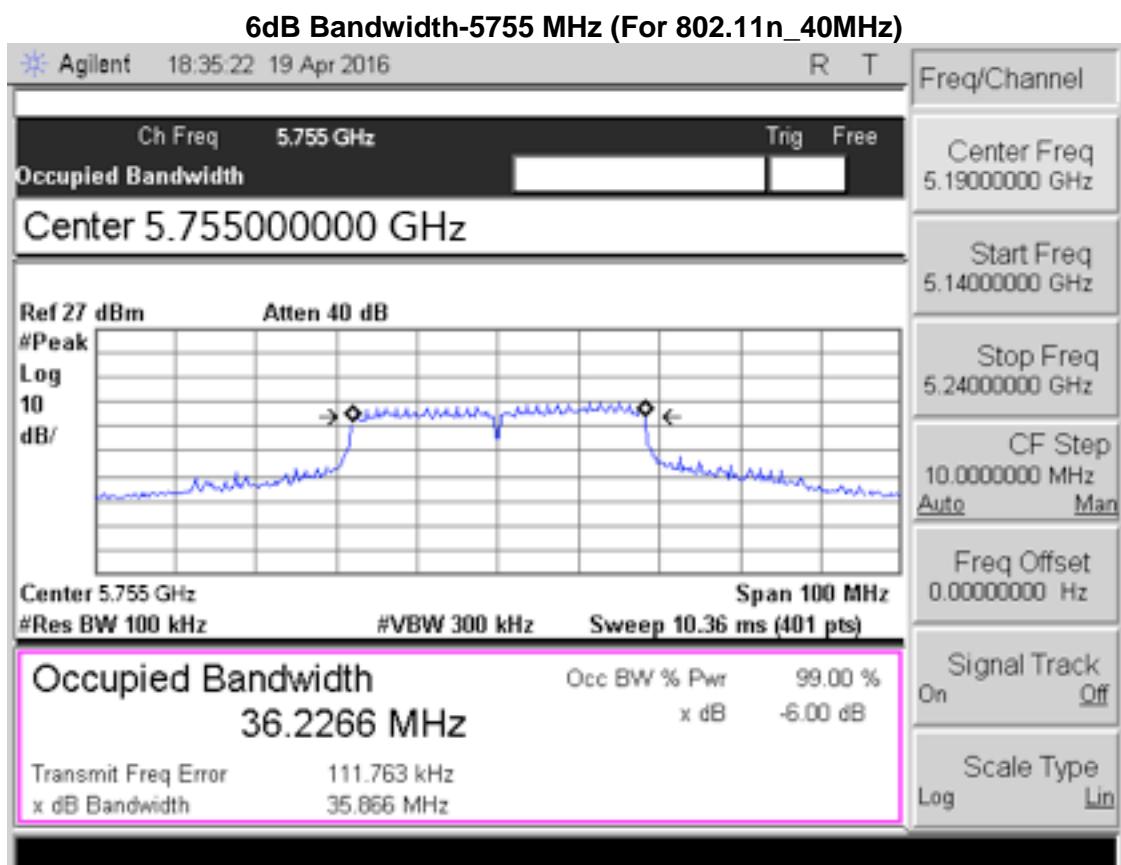
### 26dB Bandwidth-5785 MHz (For 802.11n\_20MHz)



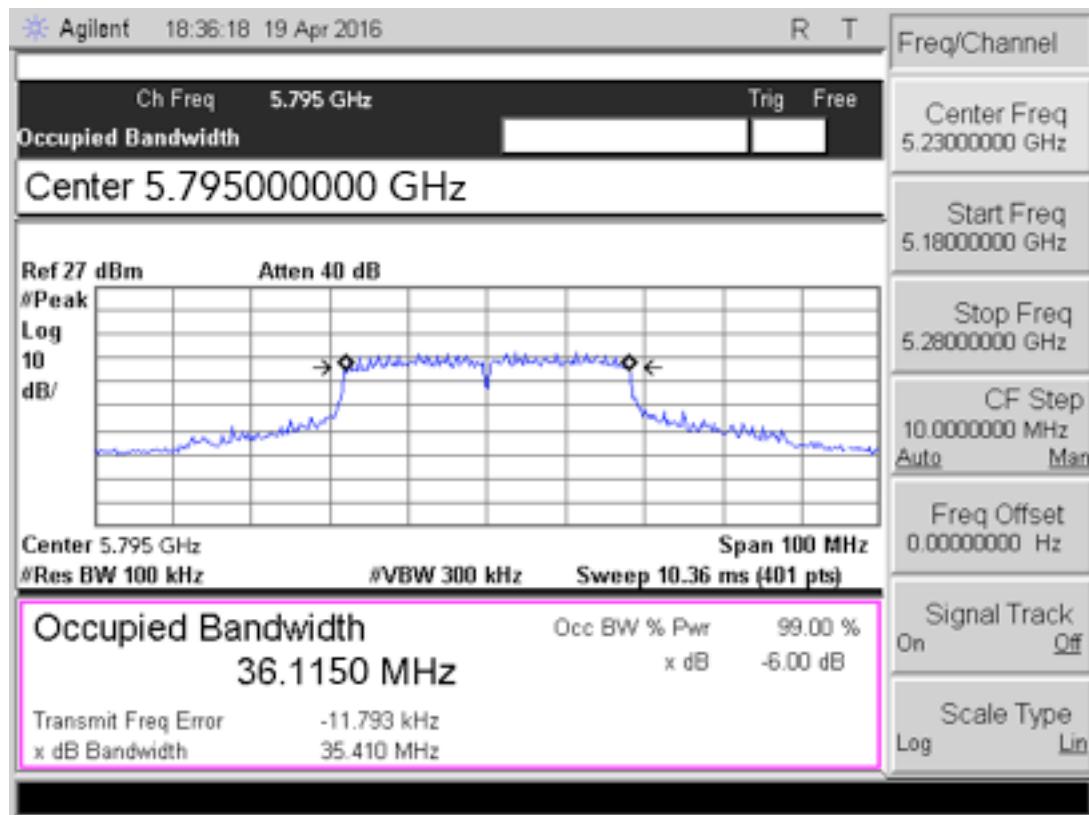
### 26dB Bandwidth-5825 MHz (For 802.11n\_20MHz)



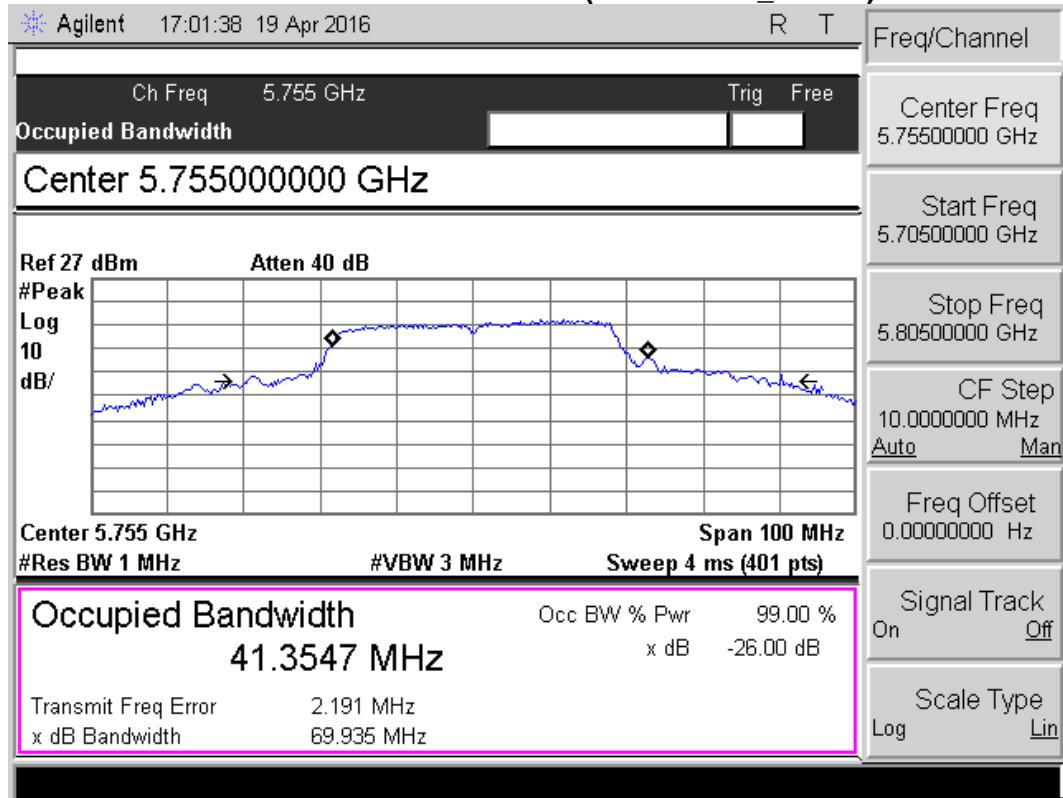
Frequency [MHz]	6dB Bandwidth [MHz]	26dB Bandwidth [MHz]	99% Bandwidth [MHz]
5755	36.8051	36.8307	41.3547
5795	36.6771	36.7002	38.3434

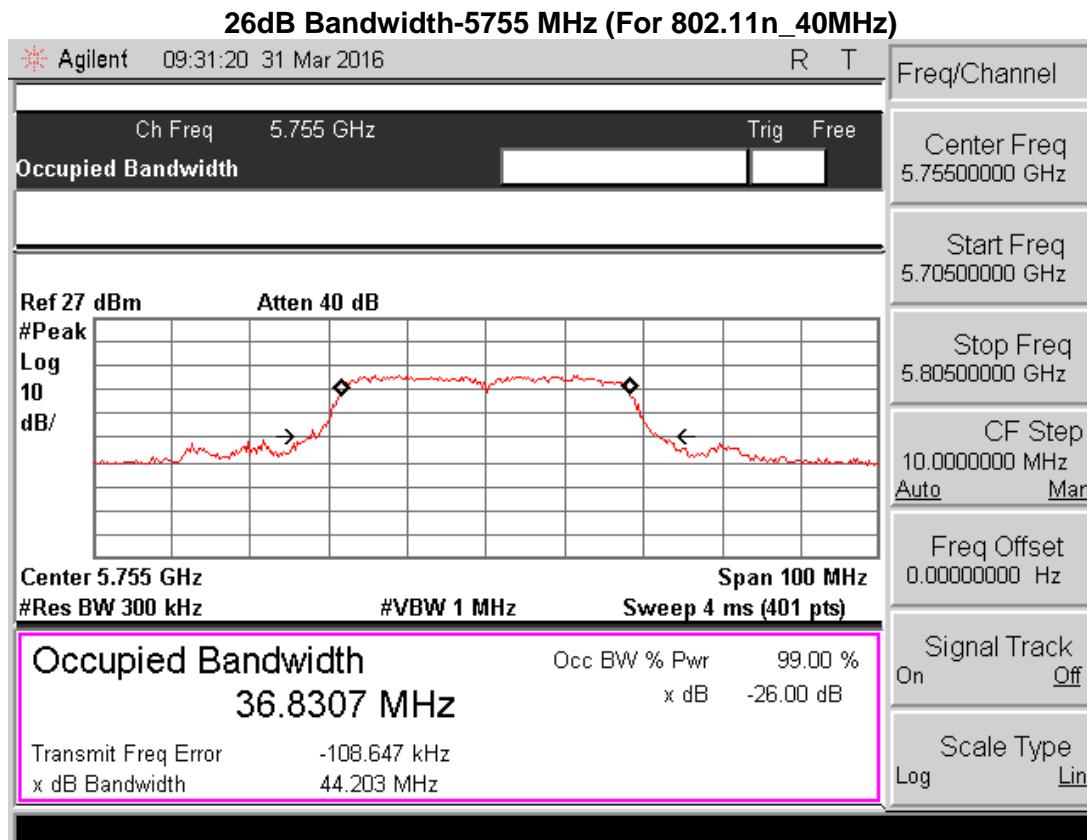
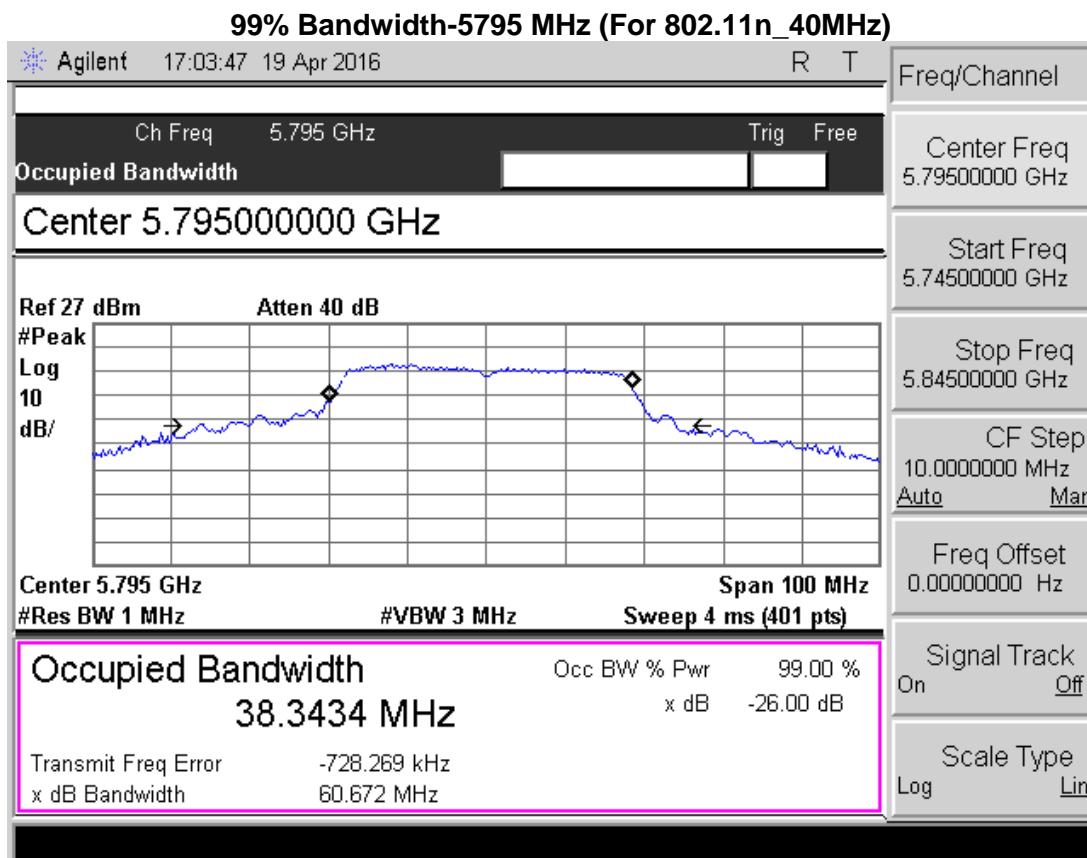


### 6dB Bandwidth-5795 MHz (For 802.11n\_40MHz)

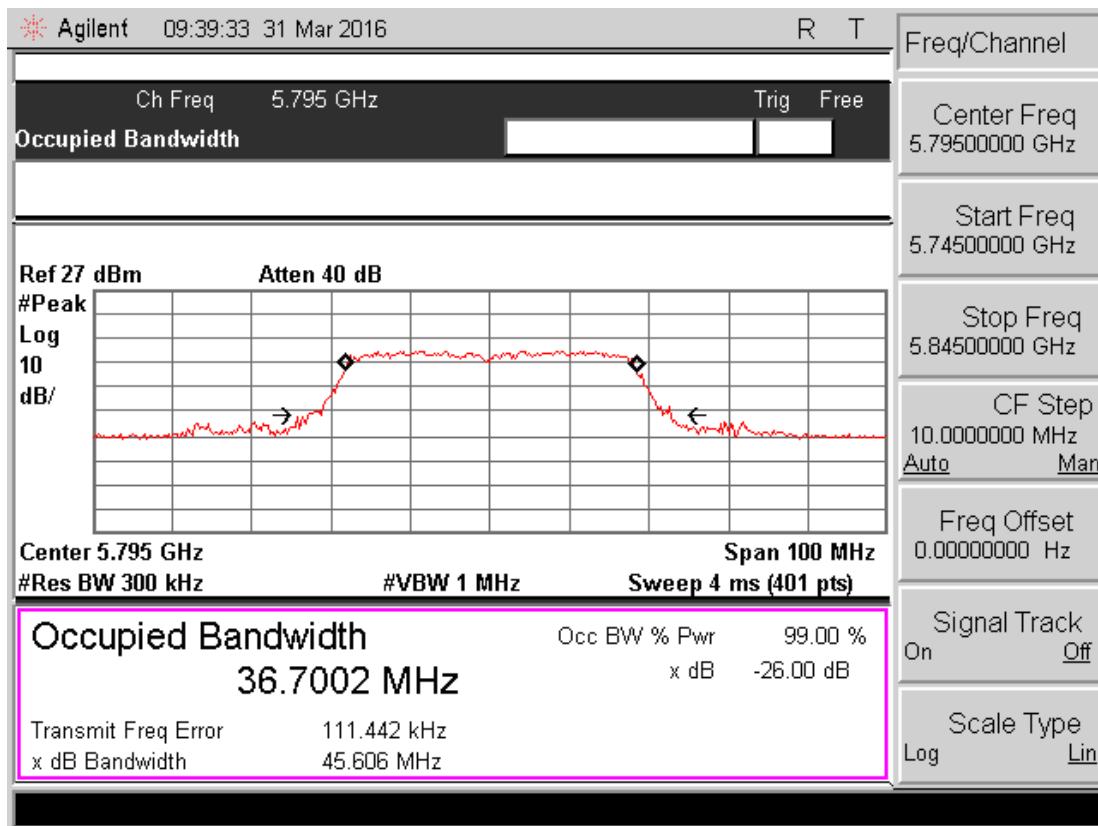


### 99% Bandwidth-5755 MHz (For 802.11n\_40MHz)





### 26dB Bandwidth-5795 MHz (For 802.11n\_40MHz)



## 3.2 RF Output Power – FCC Section 15.407 (a)(1), RSS 247 6.2.1, 6.2.4

### 3.2.1 Measurement Procedure

The peak output power was measured in accordance with the FCC Section 15.407 KDB Publication 789033 D02 “Guidance for Compliance testing of Unlicensed National Information Infrastructure Devices” Section 2.E.3 Measurement using Power Meter Method.

Manufacturer	Model	Equipment Type	Serial No.	Last Calibration Date	Calibration Due Date
Agilent	N1911A	Power Meter	MY53150005	12 Jun 15	12 Jun 17
Agilent	N1921A	Power Sensor	MY53160021	23 Jun 15	23 Jun 16

### 3.2.2 Measurement Result

Band 5.15 GHZ – 5.25 GHz

Frequency (MHz)	For 802.11n: RF Output Power (dBm)
5180	11.01
5200	11.23
5240	11.24

Frequency (MHz)	For 802.11n_40MHz: RF Output Power (dBm)
5190	7.70
5230	7.64

### Band 5.725 GHZ – 5.85 GHz

Frequency (MHz)	For 802.11n: RF Output Power (dBm)
5745	12.28
5785	11.79
5825	12.16

Frequency (MHz)	For 802.11n_40MHz: RF Output Power (dBm)
5755	8.63
5795	8.81

## 3.3 Power Spectral Density – FCC Section 15.407(a)(1), RSS 247 6.2.1, 6.2.4

### 3.3.1 Measurement Procedure

The power spectral density was measured in accordance with the FCC KDB Publication No. 789033 D02 General UNII Test Procedures New Rules v01 “Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E” Maximum Power Spectral Density (PSD). The RF output port of the EUT was directly connected to the input of the spectrum analyzer.

For devices operating in the 5.15-5.25 GHz, 5.25-5.35 GHz and 5.47-5.725 GHz bands, the spectrum analyzer RBW was set to 1 MHz and VBW => 3 MHz Trace average 100 traces in power averaging mode.

For devices operating in the band 5.725 – 5.85 GHz, the power spectral density should be measured as the maximum level from the average power over 500 kHz reference bandwidth. The spectrum analyzer RBW was set to 300 kHz and VBW =>3\*RBW.. A correction factor of  $10\log(500\text{kHz}/\text{RBW})$  (2.21dB) was added to the measurement.

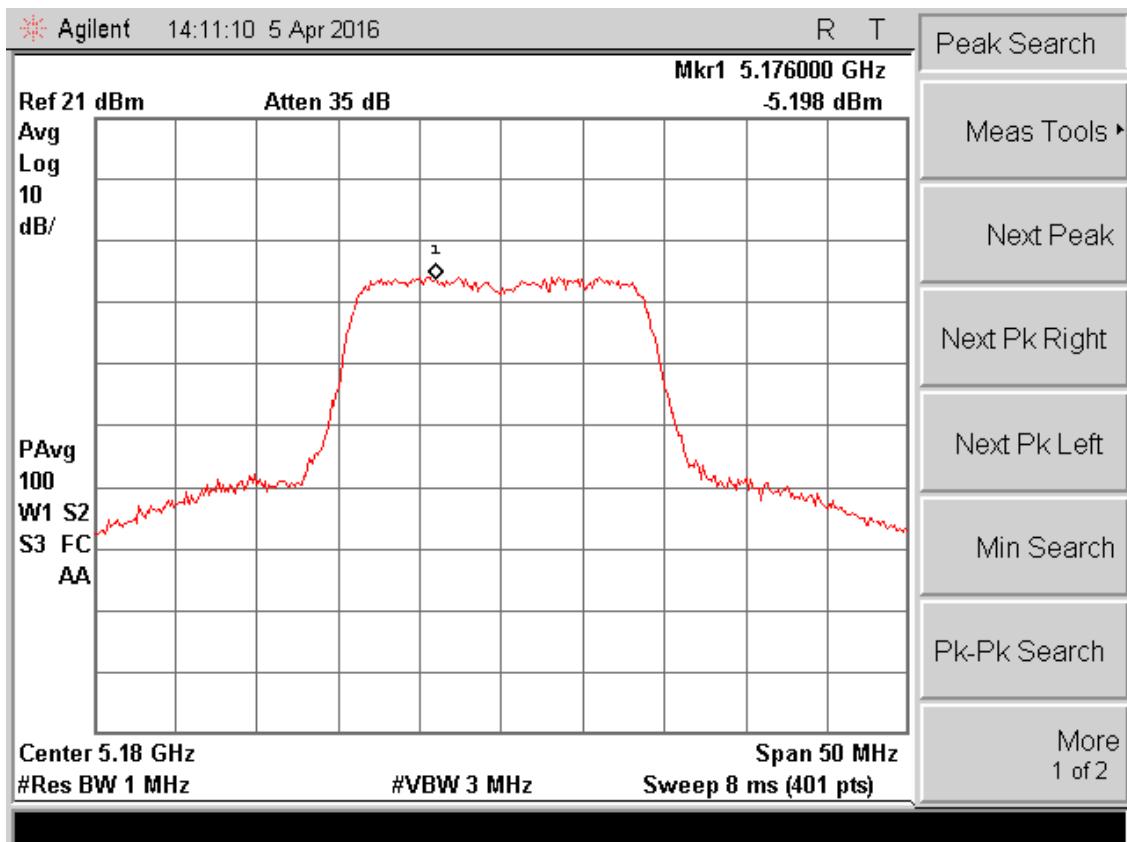
## Measurement Result

### 5.15 GHz – 5.25 GHz

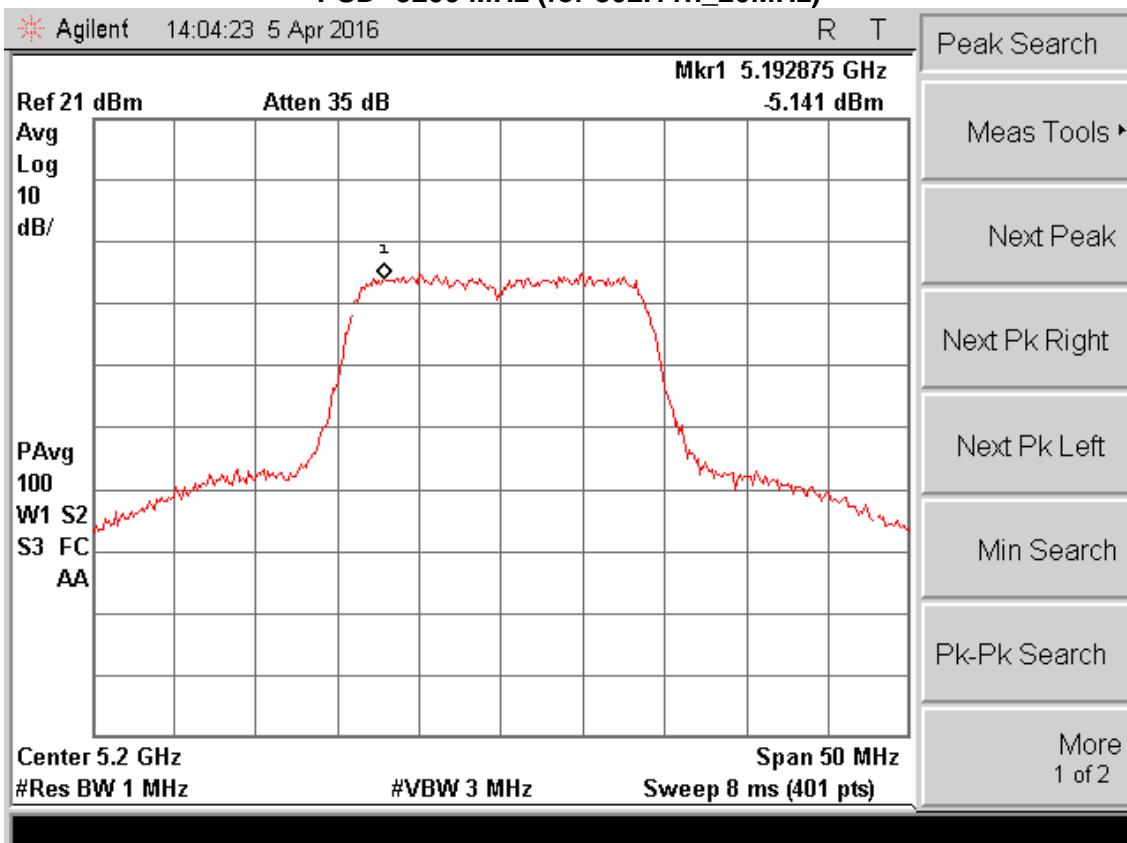
Frequency (MHz)	For 802.11n_20MHz: PSD (dBm)	PSD Limit (dBm)	Margin (dB)
5180	-5.19	11	16.19
5200	-5.14	11	16.14
5240	-4.74	11	15.74

Frequency (MHz)	For 802.11n_40MHz: PSD (dBm)	PSD Limit (dBm)	Margin (dB)
5190	-11.45	11	22.45
5230	-11.53	11	22.53

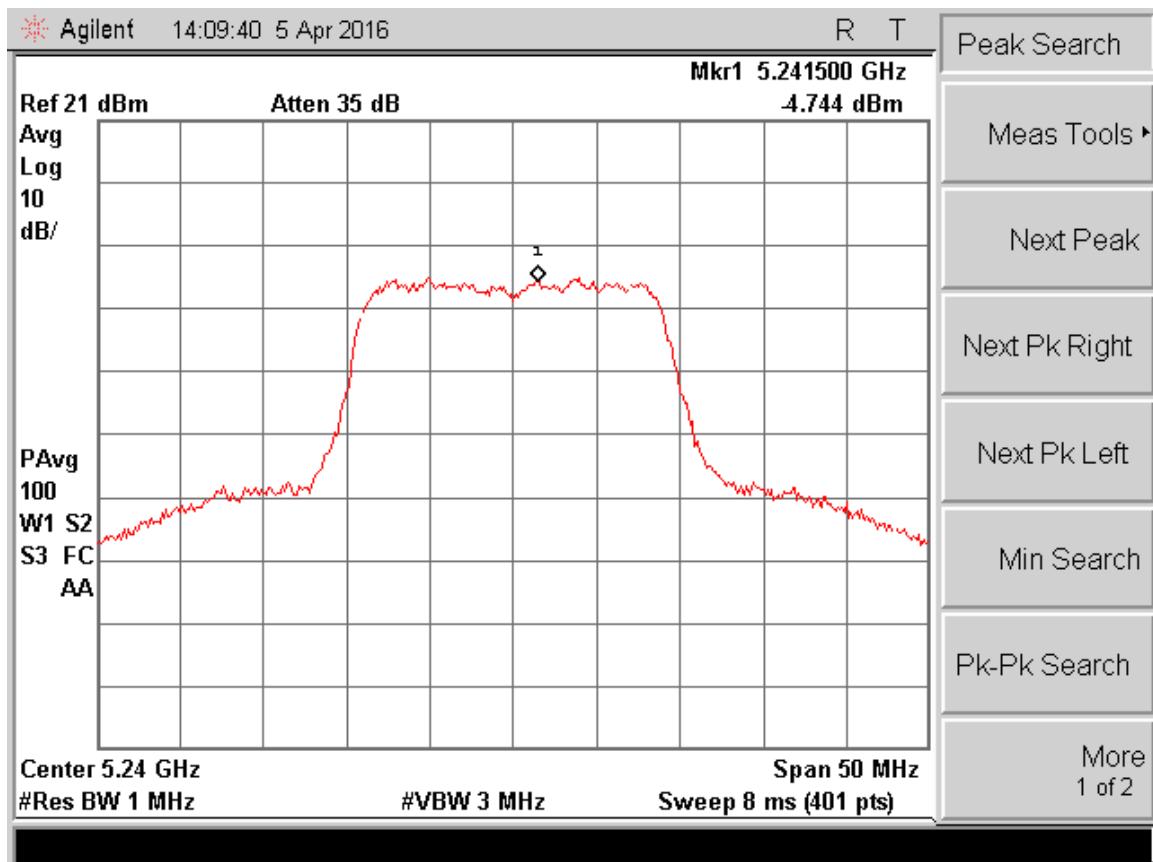
**PSD-5180 MHz (for 802.11n\_20MHz)**



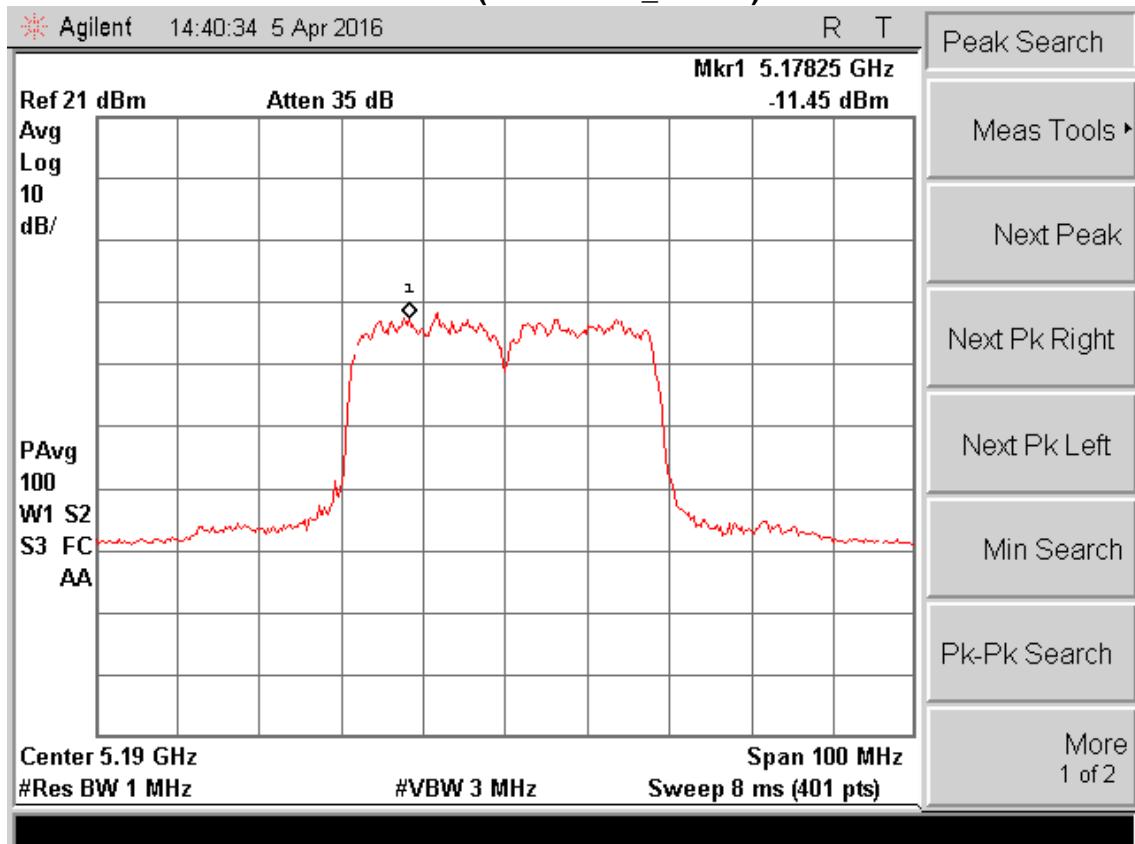
### PSD- 5200 MHz (for 802.11n\_20MHz)



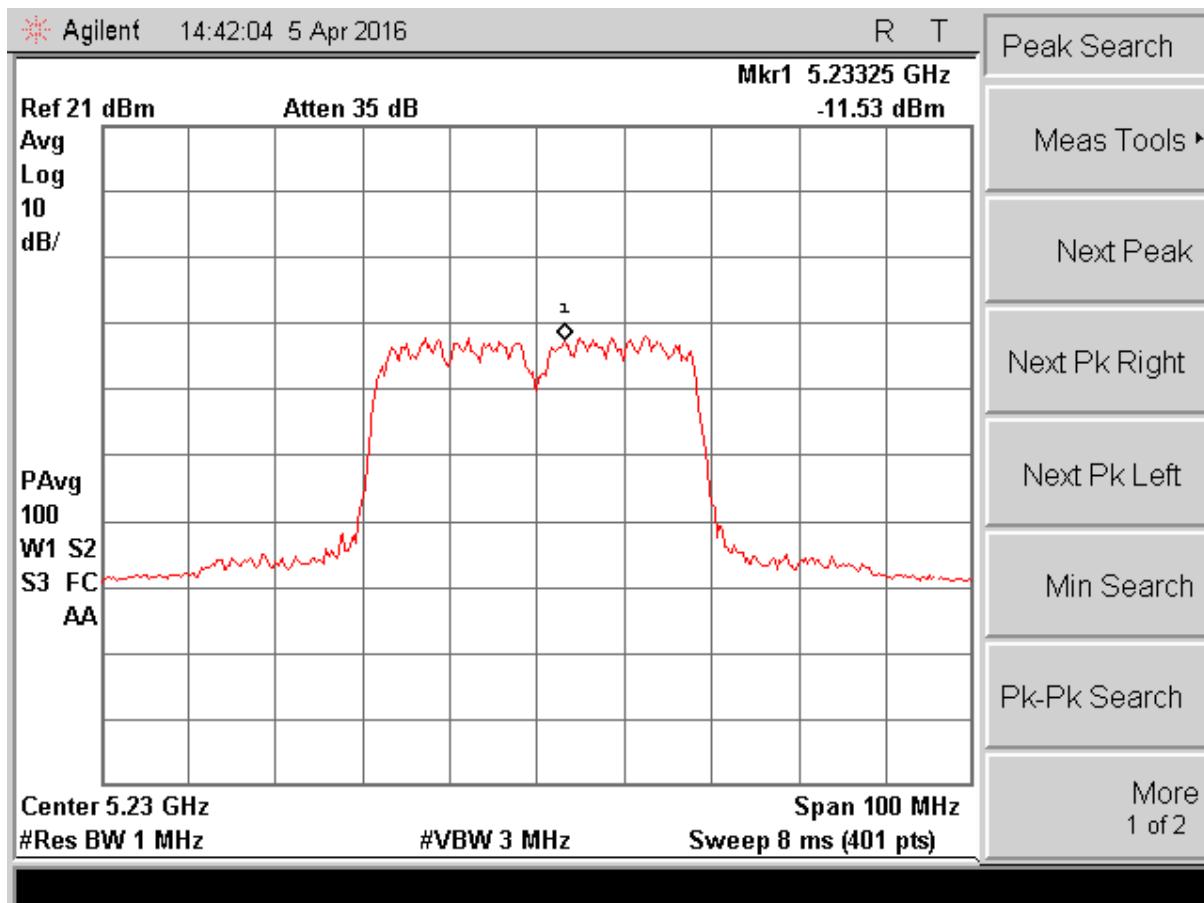
### PSD-5240 MHz (for 802.11n\_20MHz)



### PSD-5190 MHz (for 802.11n\_40MHz)



### PSD-5230 MHz (for 802.11n\_40MHz)

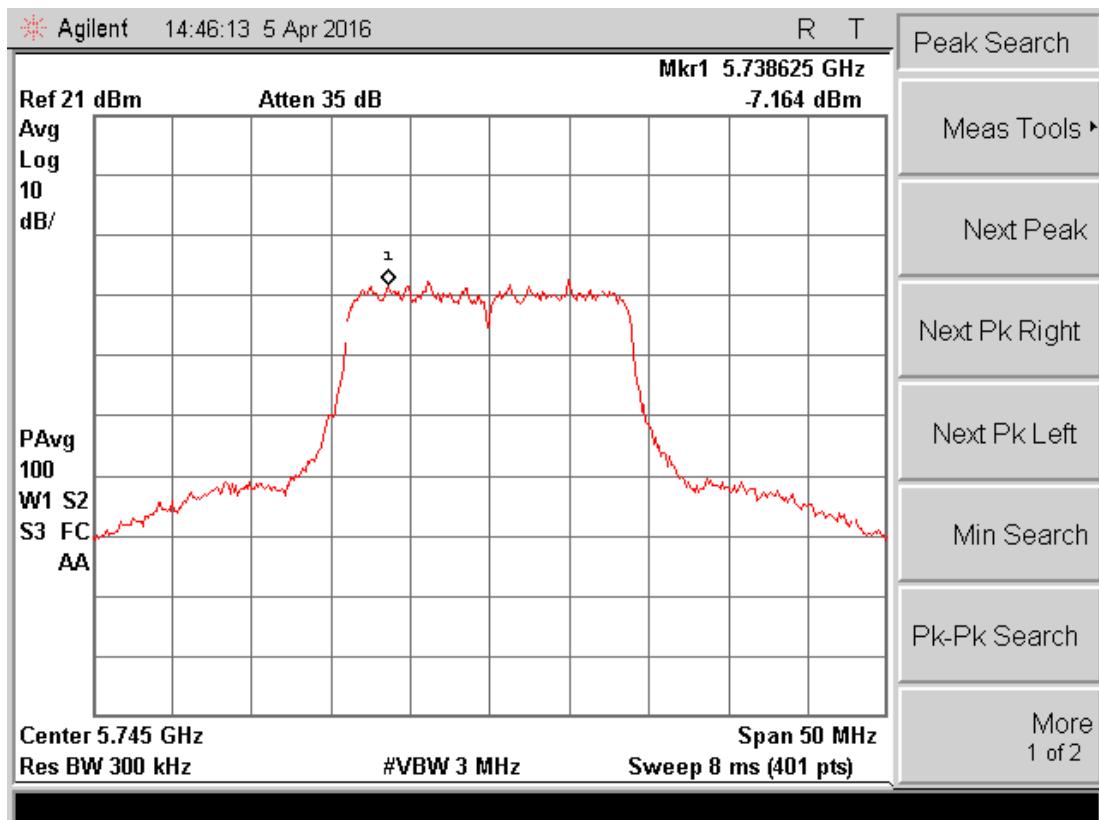


### 5.725 GHz – 5.85 GHz

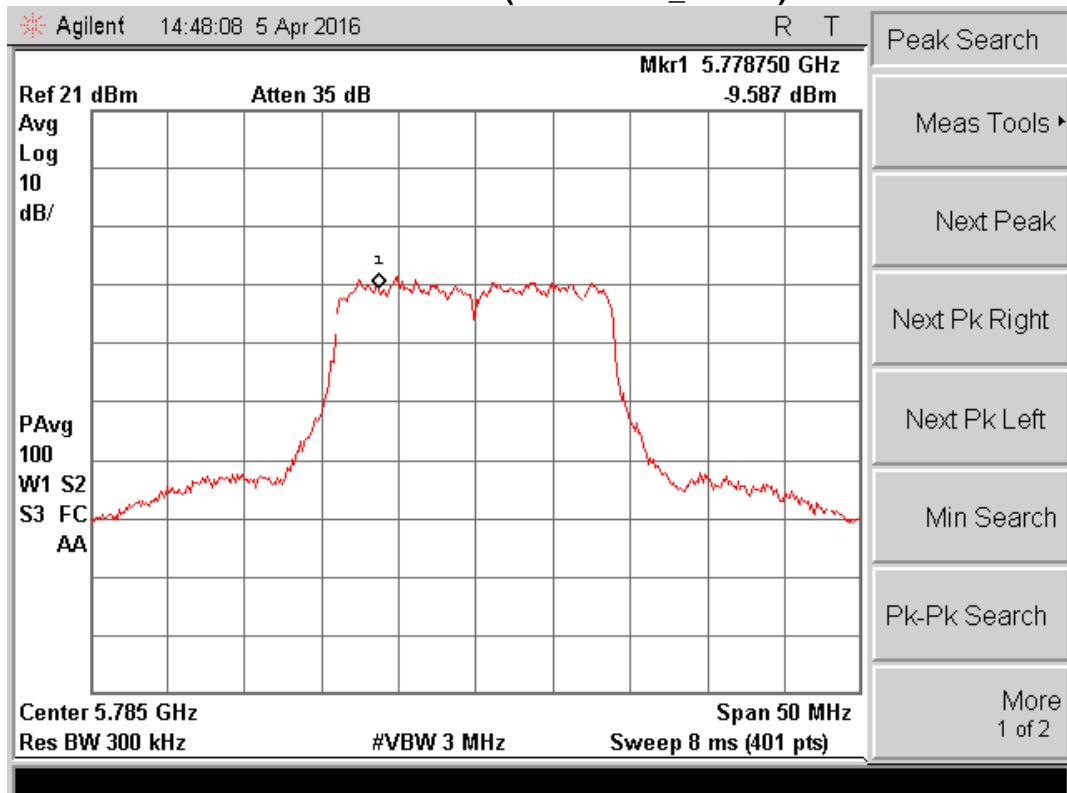
Frequency (MHz)	For 802.11n_20MHz: PSD (dBm)	Corrected PSD (dBm)	PSD Limit (dBm)	Corrected Margin (dB)
5745	-7.16	-4.95	30	34.95
5785	-9.59	-7.38	30	37.38
5825	-7.88	-5.67	30	35.67

Frequency (MHz)	For 802.11n_40MHz: PSD (dBm)	Corrected PSD (dBm)	PSD Limit (dBm)	Corrected Margin (dB)
5755	-13.15	-11.15	30	41.15
5795	-15.49	-13.49	30	43.49

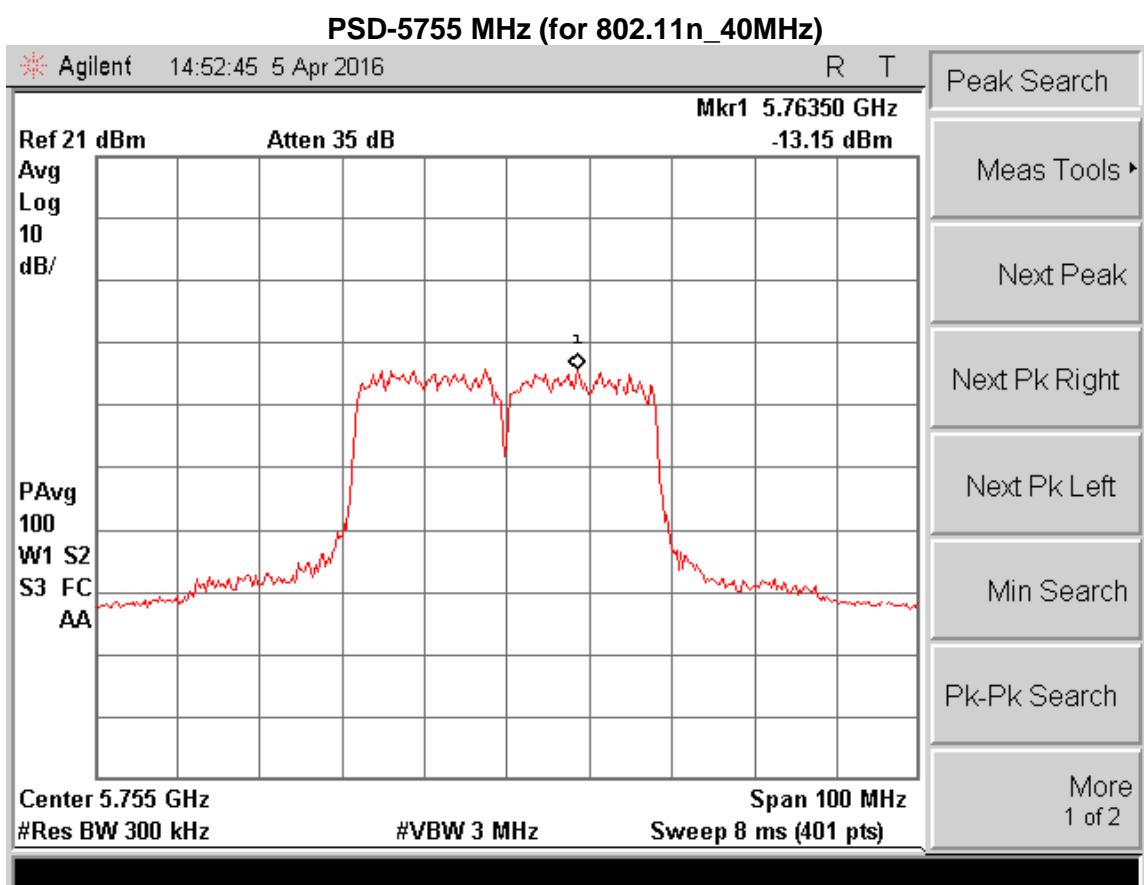
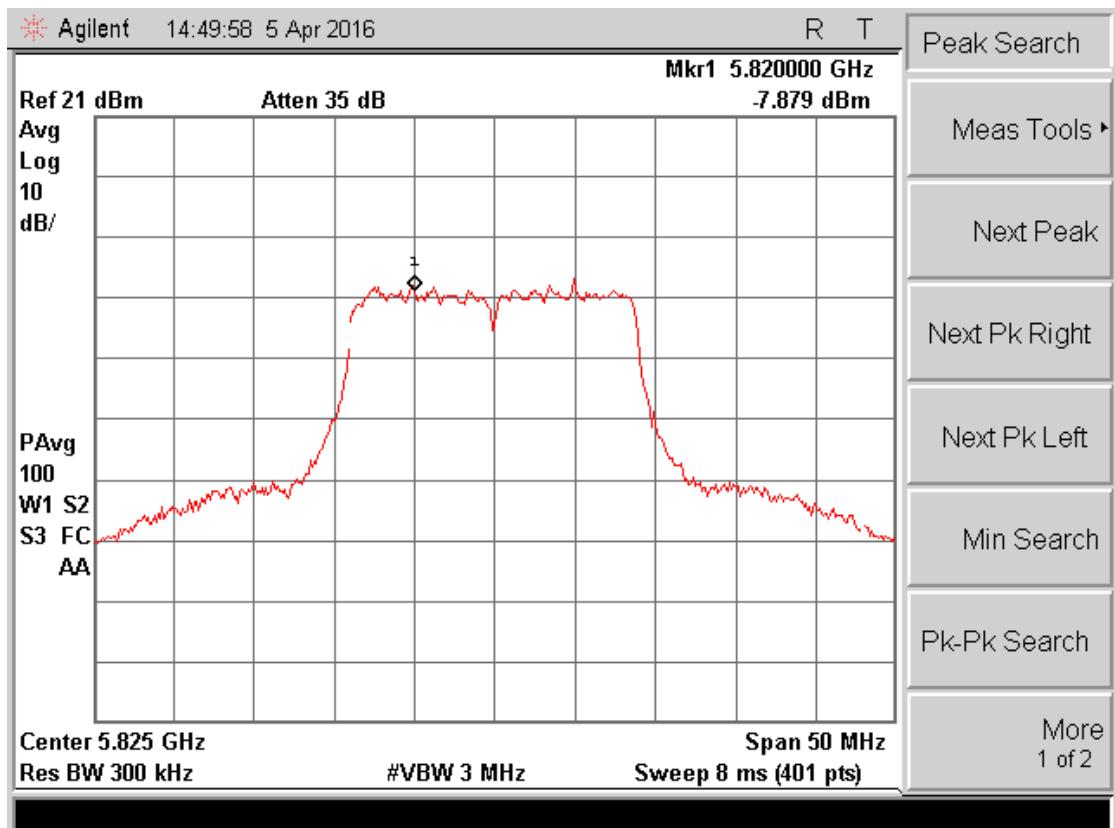
PSD-5745 MHz (for 802.11n\_20MHz)

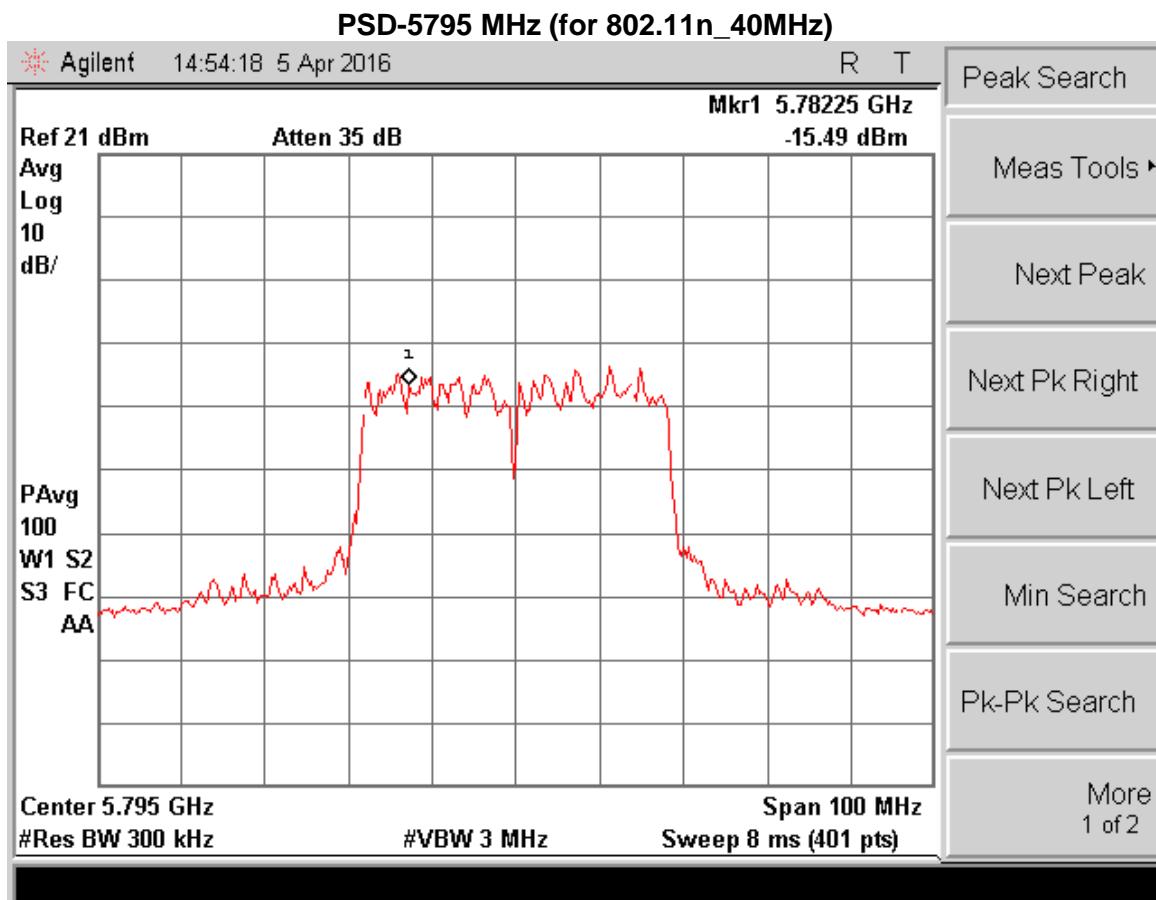


### PSD-5785 MHz (for 802.11n\_20MHz)



### PSD-5825 MHz (for 802.11n\_20MHz)





### 3.4 Frequency Stability – FCC Section 15.407(g), IC RSS-Gen 8.11

#### 3.4.1 Measurement Procedure

The equipment under test is placed inside an environmental chamber. The RF output is directly coupled to the input of the measurement equipment and a power supply is attached to the primary supply voltage.

Frequency measurements were made at the extremes of the of temperature range -30° C to +50° C and at intervals of 10° C at normal supply voltage. A period of time sufficient to stabilize all components of the equipment was allowed at each frequency measurement. At a temperature 20° C the supply voltage was also reduced to the endpoint. The maximum variation of frequency was recorded.

Results of the test are shown below

#### 3.4.2 Measurement Results

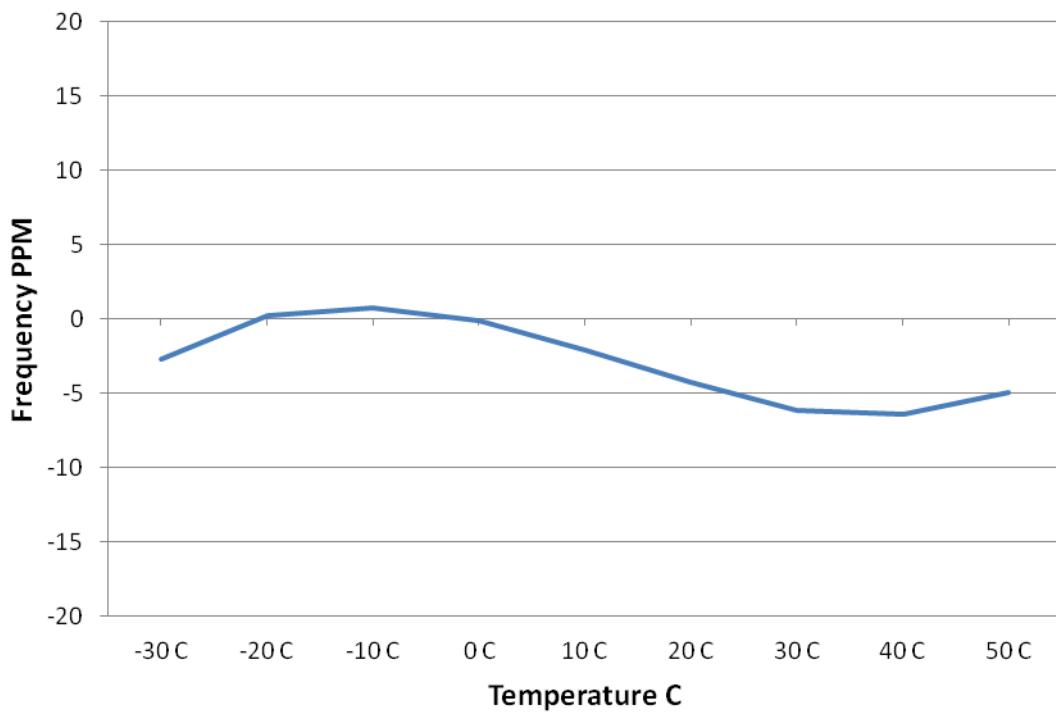
## Frequency Stability

Frequency (MHz): 5180

Deviation Limit (PPM)::

Temperature	Frequency	Frequency Error	Voltage	Voltage
C	MHz	(PPM)	(%)	(VDC)
-30 C	5179.986000	-2.703	100%	3.70
-20 C	5180.001000	0.193	100%	3.70
-10 C	5180.004000	0.772	100%	3.70
0 C	5179.999500	-0.097	100%	3.70
10 C	5179.989000	-2.124	100%	3.70
20 C	5179.978000	-4.247	100%	3.70
30 C	5179.968000	-6.178	100%	3.70
40 C	5179.967000	-6.371	100%	3.70
50 C	5179.974500	-4.923	100%	3.70
20 C	5179.977500	-4.344	end point	3.50

### Frequency Stability vs Temperature



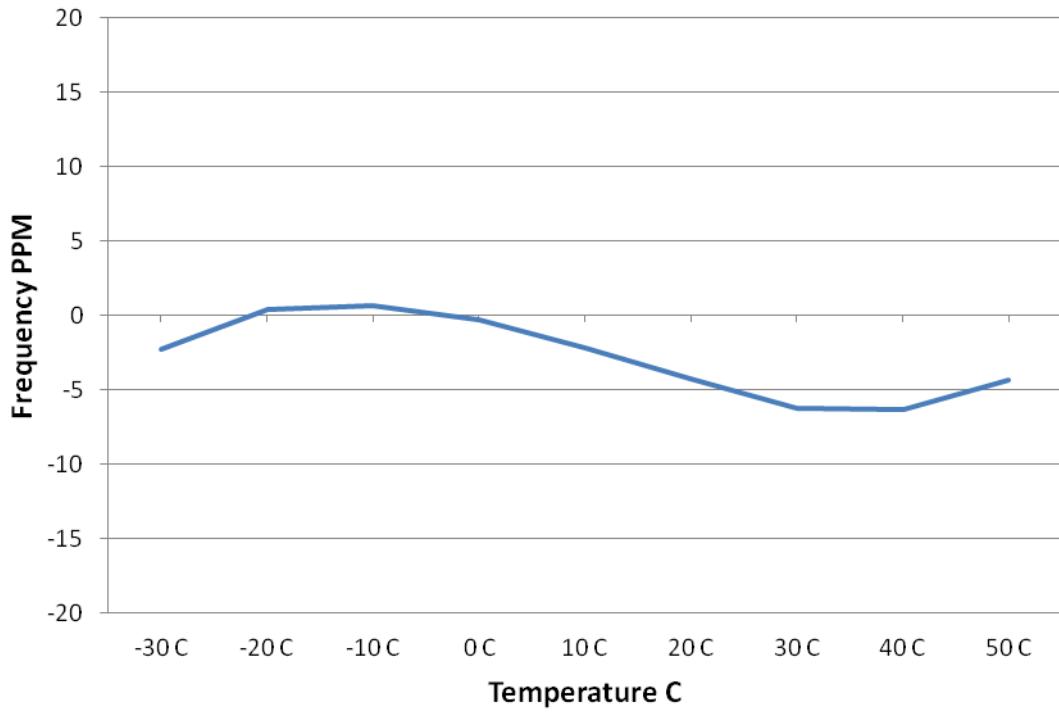
Frequency Stability 5.15 GHz – 5.25 GHz

## Frequency Stability

Frequency (MHz): 5825  
 Deviation Limit (PPM):

Temperature	Frequency	Frequency Error	Voltage	Voltage
C	MHz	(PPM)	(%)	(VDC)
-30 C	5824.987000	-2.232	100%	3.70
-20 C	5825.002500	0.429	100%	3.70
-10 C	5825.004000	0.687	100%	3.70
0 C	5824.998500	-0.258	100%	3.70
10 C	5824.987500	-2.146	100%	3.70
20 C	5824.975000	-4.292	100%	3.70
30 C	5824.963500	-6.266	100%	3.70
40 C	5824.963000	-6.352	100%	3.70
50 C	5824.974500	-4.378	100%	3.70
20 C	5824.974500	-4.378	end point	3.50

### Frequency Stability vs Temperature



Frequency Stability 5.725 GHz – 5.85 GHz

