8.8 Occupied Bandwidth

▣ **Test Requirements**
 When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth
 to be reported is to be its 99% emission bandwidth, as calculated or measured

▣ **Test Configuration**
 Refer to the Appendix I.

▣ **Test Procedure :**

- Procedure: RSS-Gen[6.6]
 • The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
 • The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.
 • The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video
  bandwidth (VBW) shall be approximately 3x RBW.

■ **Test Result : Comply**

Mode	Bands	Channel	Frequency [MHz]	Test Result [MHz]
802.11a	U-NII 1	36	5180	16.96
		40	5200	17.05
		48	5240	17.07
	U-NII 2A	52	5260	17.01
		60	5300	17.07
		64	5320	16.99
	U-NII 2C	100	5500	17.03
		116	5580	17.06
		140	5700	17.08
	U-NII 3	149	5745	17.05
		157	5785	17.11
		165	5825	17.02
802.11n (HT20)	U-NII 1	36	5180	18.03
		40	5200	18.09
		48	5240	18.03
	U-NII 2A	52	5260	18.08
		60	5300	18.05
		64	5320	18.14
	U-NII 2C	100	5500	18.07
		116	5580	18.07
		140	5700	18.11
	U-NII 3	149	5745	18.00
		157	5785	18.15
		165	5825	18.12
802.11n (HT40)	U-NII 1	38	5190	36.35
		46	5230	36.40
	U-NII 2A	54	5270	36.43
		62	5310	36.39
	U-NII 2C	102	5510	36.35
		110	5550	36.49
		134	5670	36.45
	U-NII 3	151	5755	36.42
		159	5795	36.48
802.11ac (VHT80)	U-NII 1	42	5210	75.76
	U-NII 2A	58	5290	75.75
	U-NII 2C	106	5530	75.79
	U-NII 3	155	5775	75.93
802.11a	U-NII 2C	144	5720	17.08
802.11n (HT20)	U-NII 2C	144	5720	18.09
802.11n (HT40)	U-NII 2C	142	5710	36.48
802.11ac (VHT80)	U-NII 2C	138	5690	75.89

◉ **RESULT PLOTS**

Occupied Bandwidth 99%   Test Mode: 802.11a & Ch.36
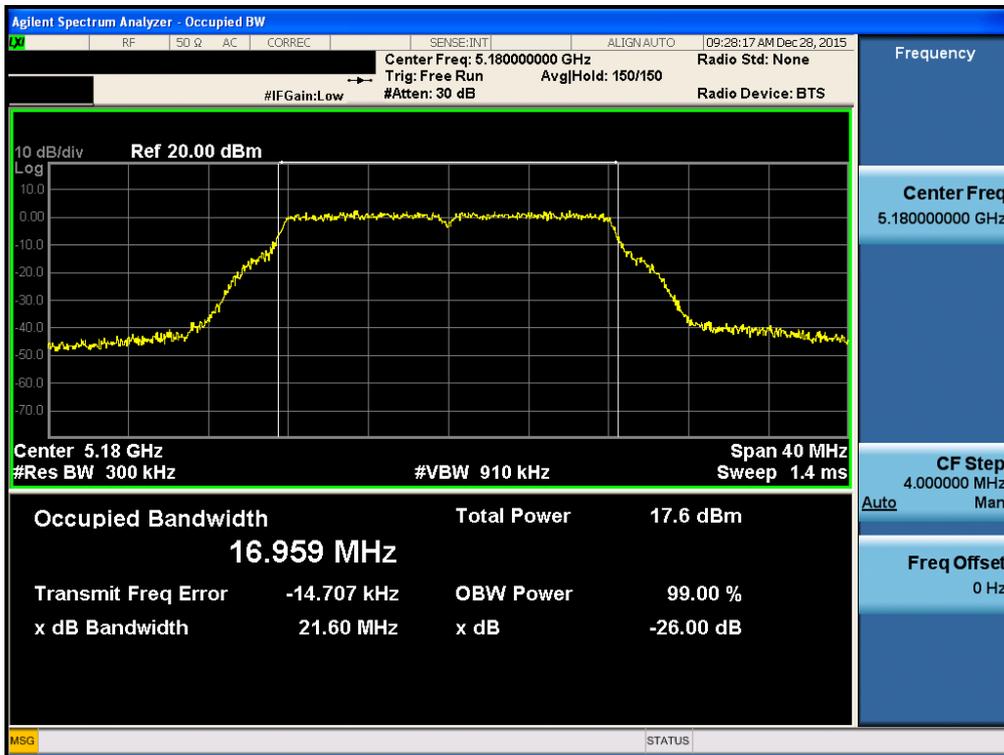
**Occupied Bandwidth 99%**   Test Mode: 802.11a & Ch.40

Occupied Bandwidth 99%   Test Mode: 802.11a & Ch.48
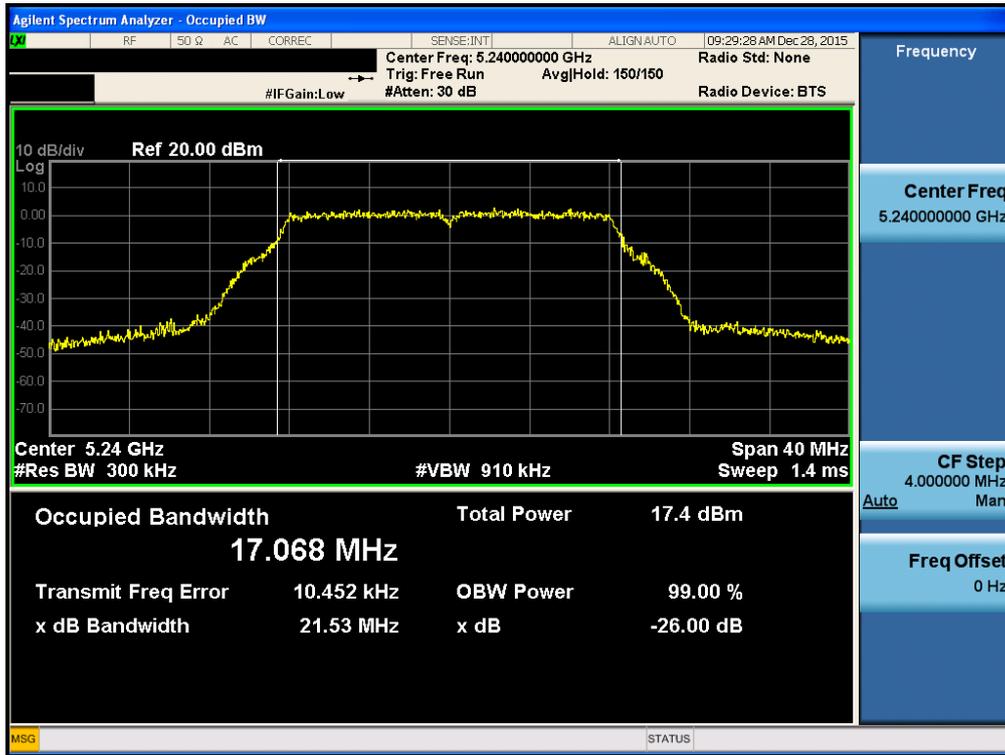
**Occupied Bandwidth 99%**   Test Mode: 802.11a & Ch.52
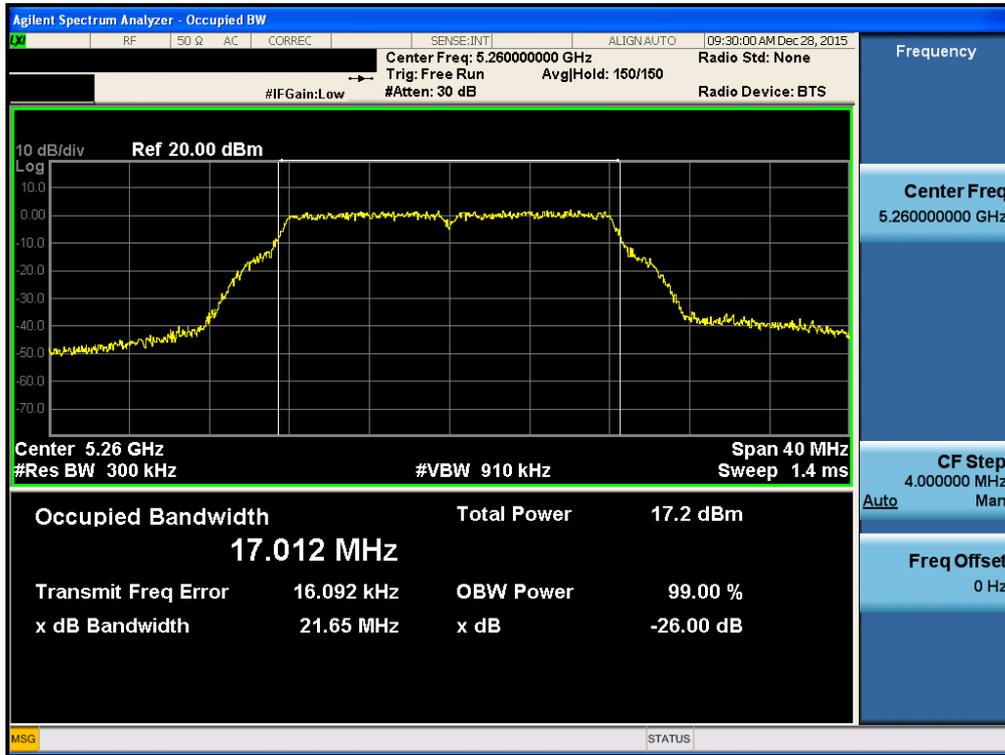
Occupied Bandwidth 99%   Test Mode: 802.11a & Ch.60
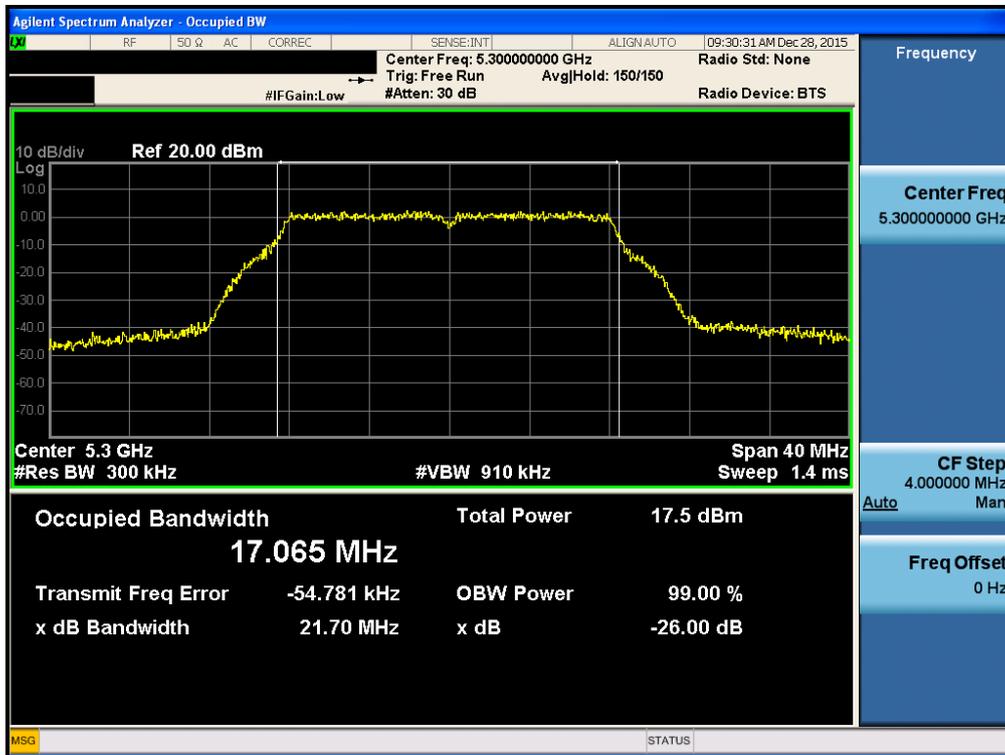
Occupied Bandwidth 99%　　　　　　Test Mode: 802.11a　&　Ch.64
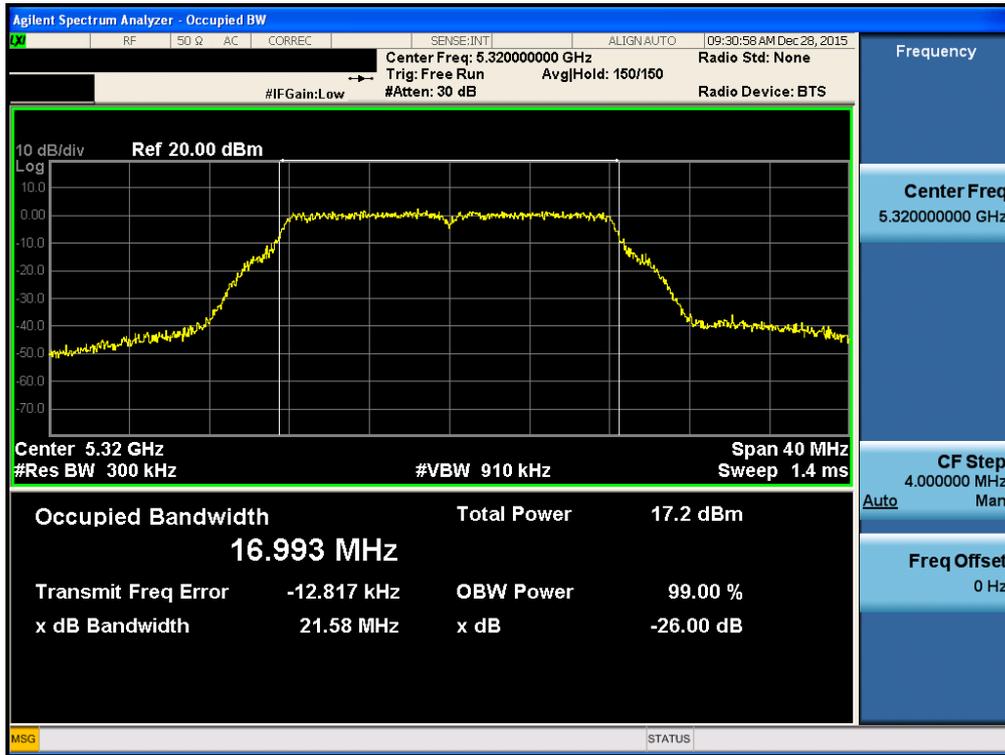
Occupied Bandwidth 99%   Test Mode: 802.11a & Ch.100
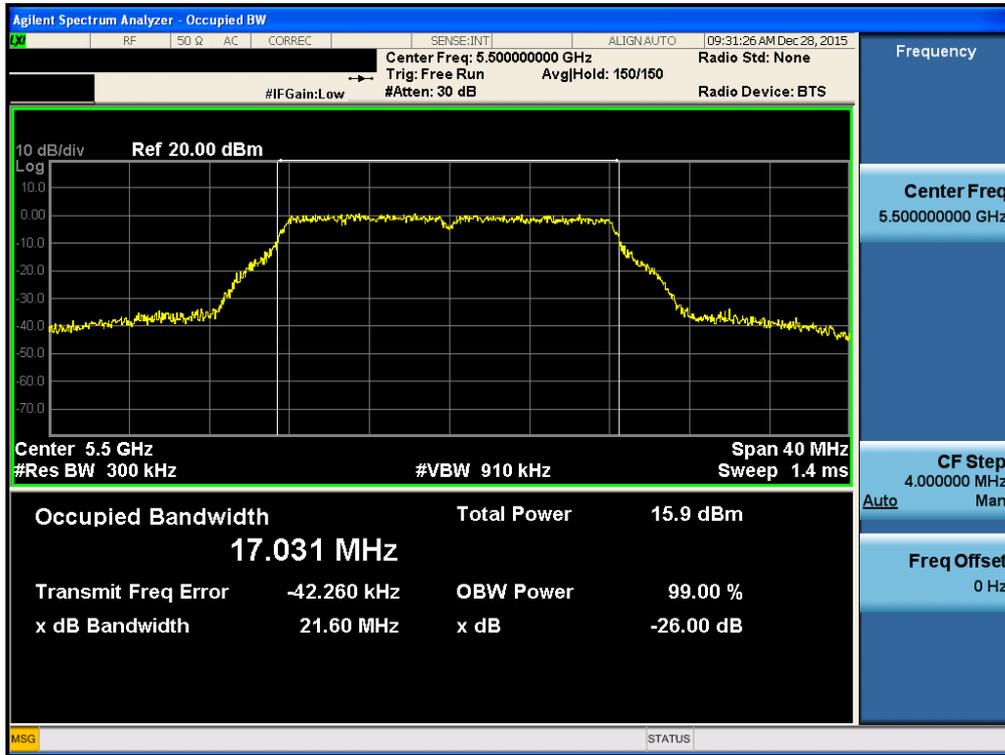
Occupied Bandwidth 99%   Test Mode: 802.11a & Ch.116
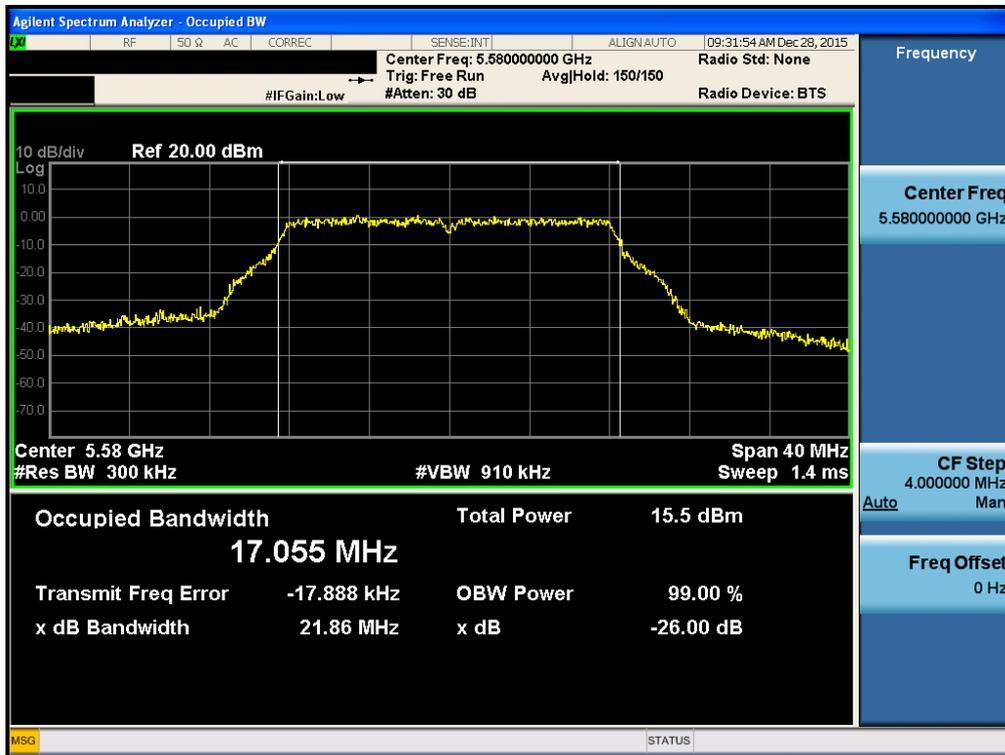
Occupied Bandwidth 99%   Test Mode: 802.11a & Ch.140

Occupied Bandwidth 99%   Test Mode: 802.11a & Ch.149
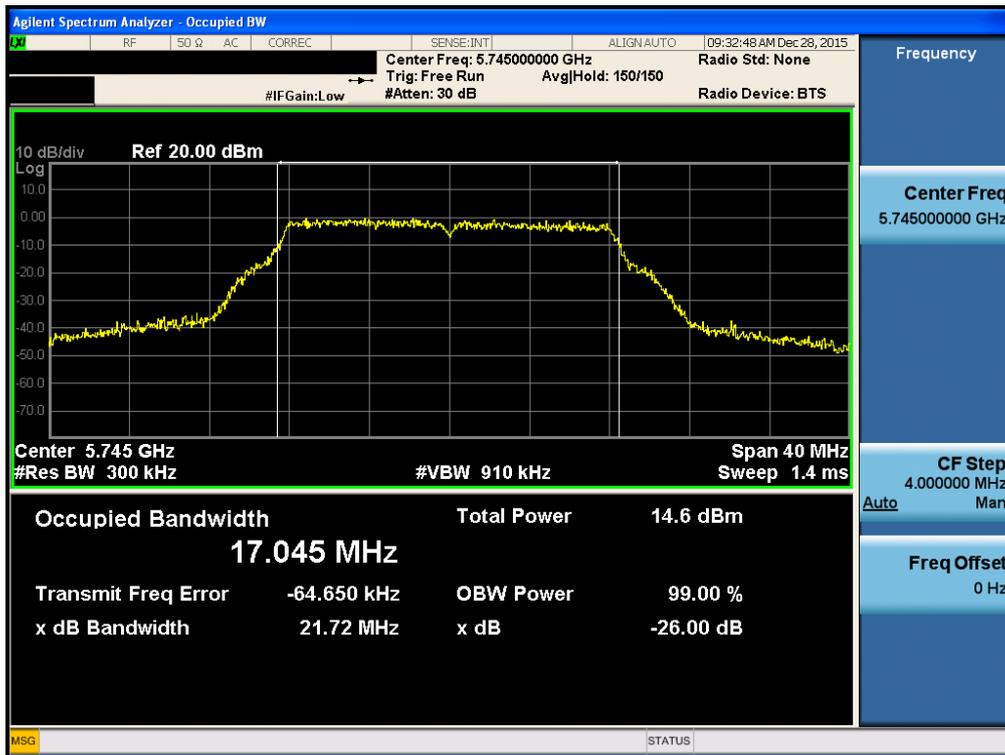
Occupied Bandwidth 99%   Test Mode: 802.11a & Ch.157
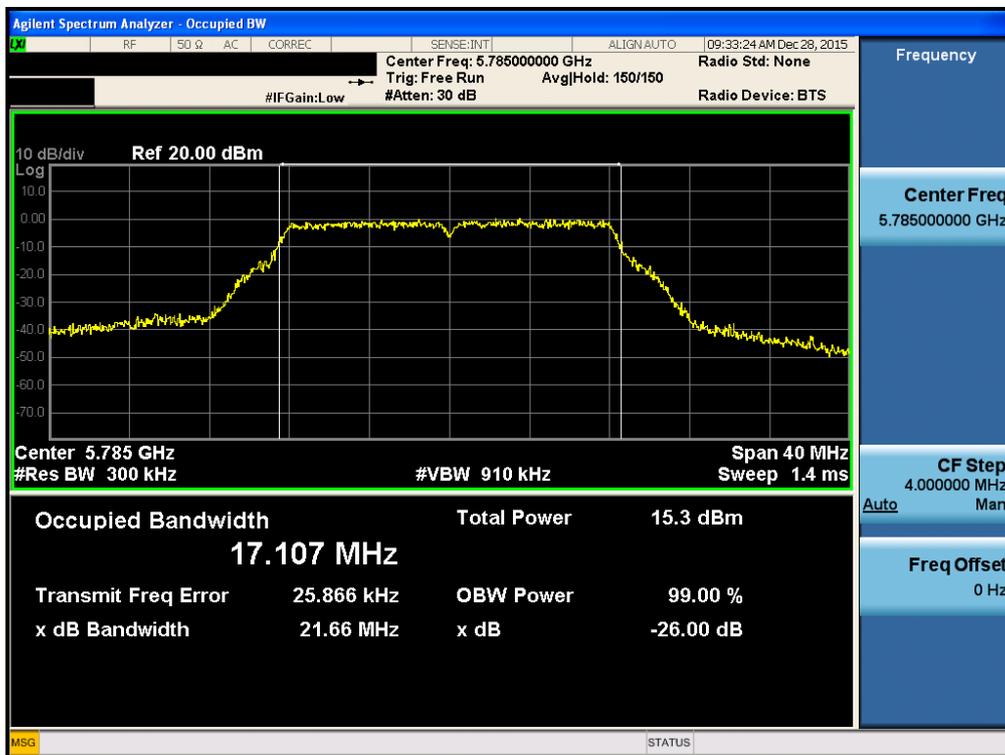
## Occupied Bandwidth 99%   Test Mode: 802.11a & Ch.165
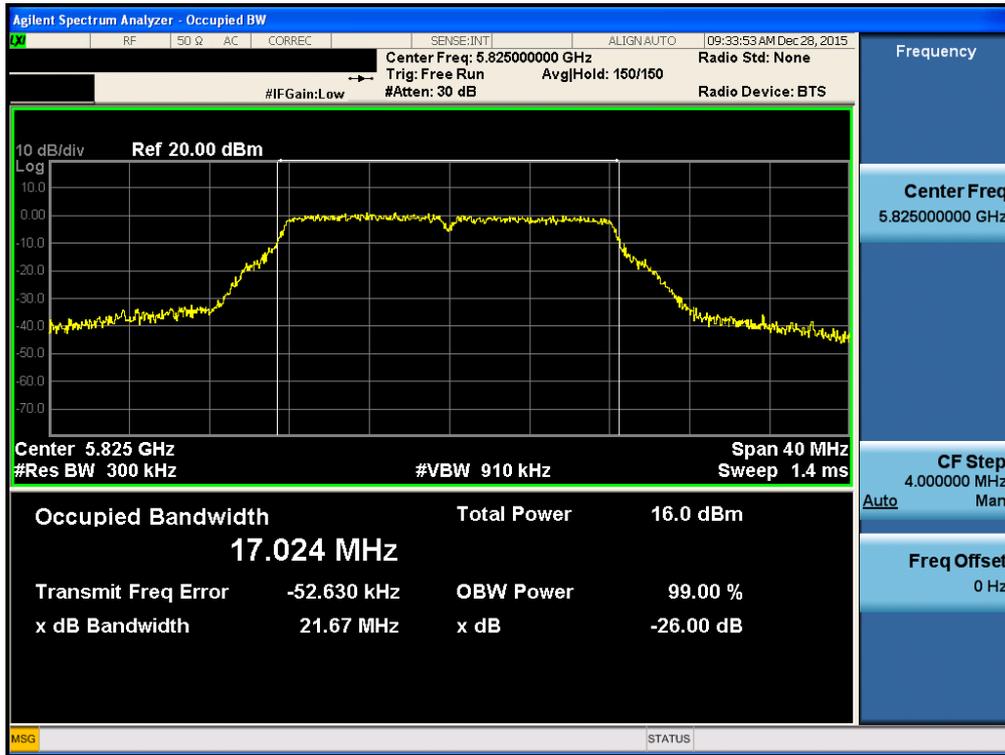
Occupied Bandwidth 99%   Test Mode: 802.11n(HT20)   &   Ch.36
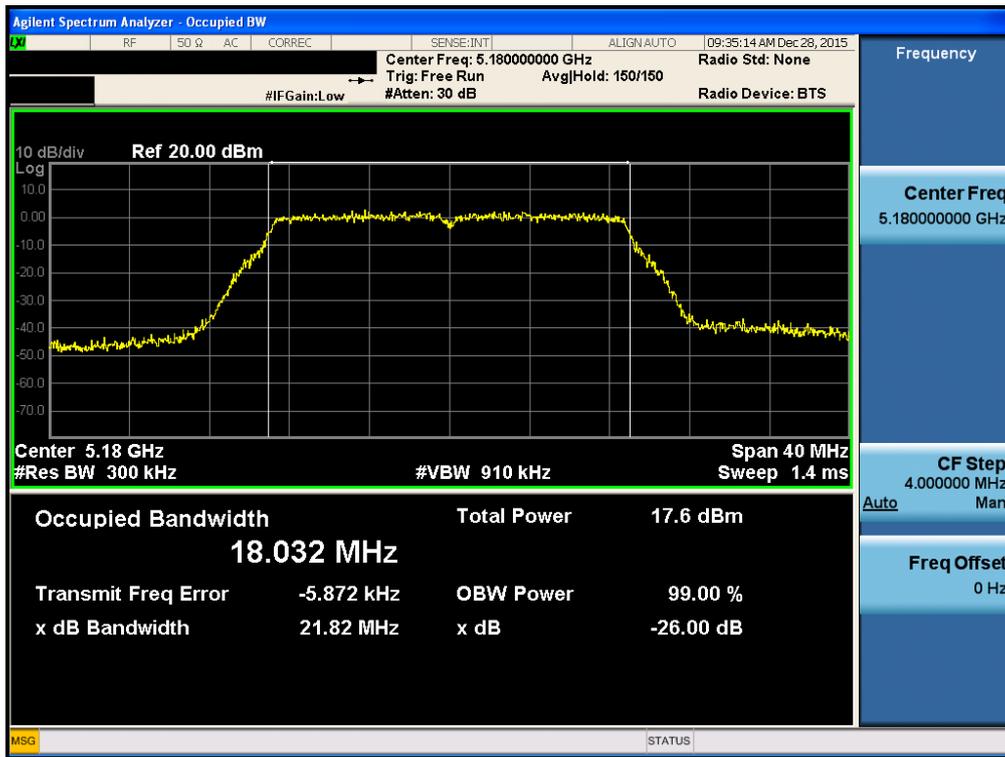
**Occupied Bandwidth 99%**   Test Mode: 802.11n(HT20)   & Ch.40
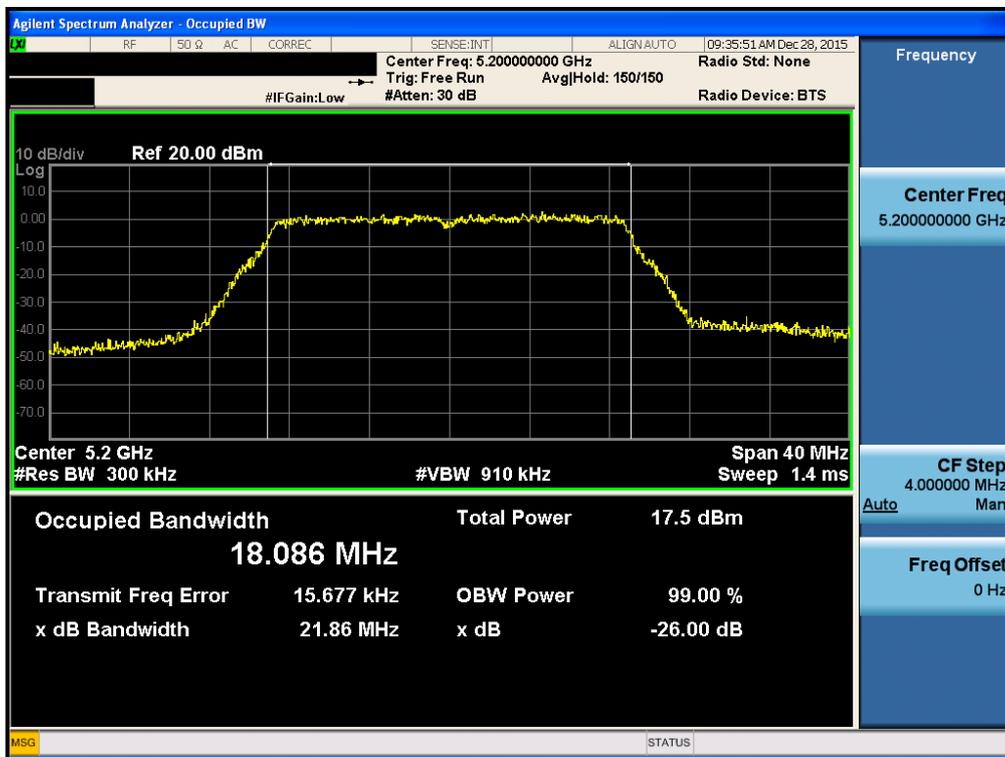
Occupied Bandwidth 99%   Test Mode: 802.11n(HT20)   &   Ch.48
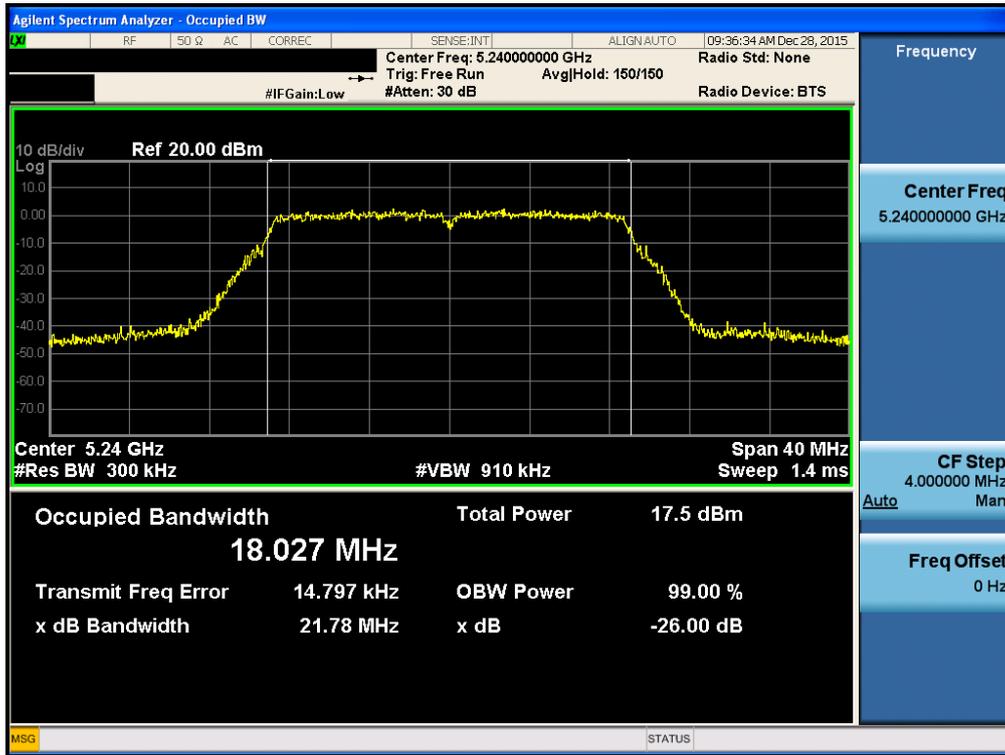
**Occupied Bandwidth 99%**   Test Mode: 802.11n HT20 & Ch.52
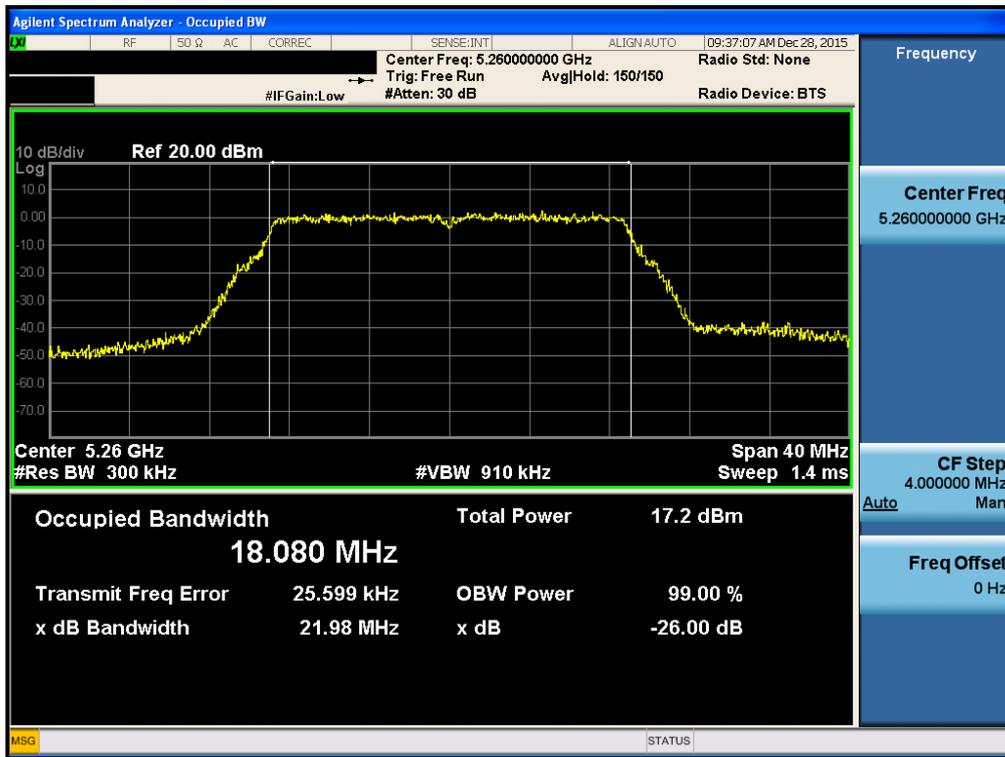
**Occupied Bandwidth 99%**   Test Mode: 802.11n HT20 & Ch.60
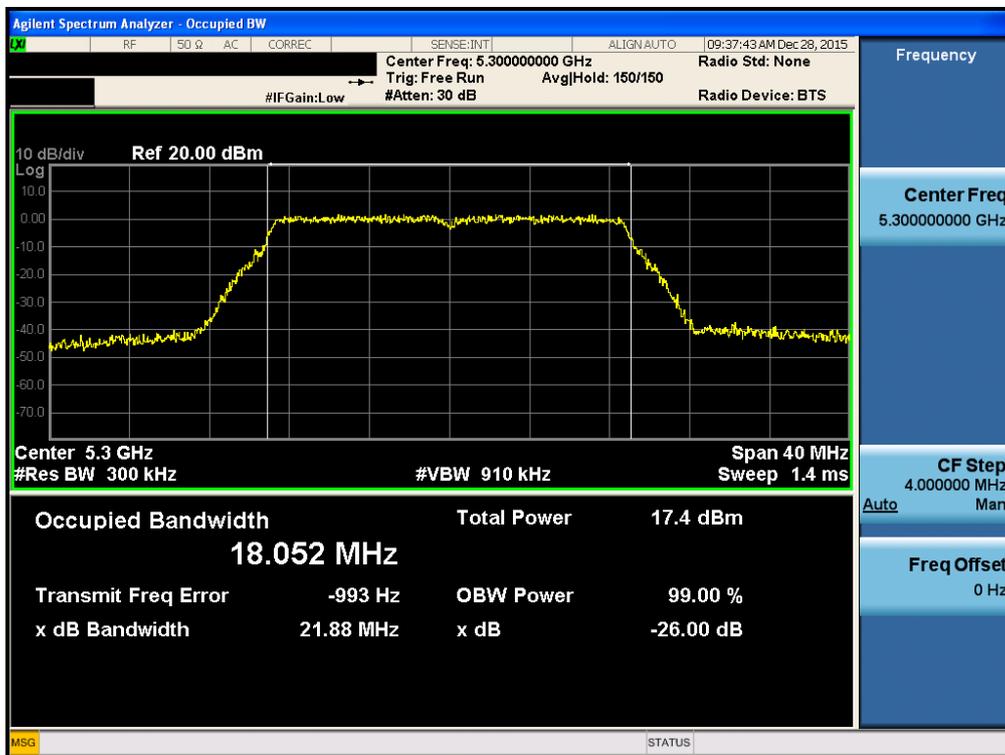
Occupied Bandwidth 99%   Test Mode: 802.11n HT20　&　Ch.64
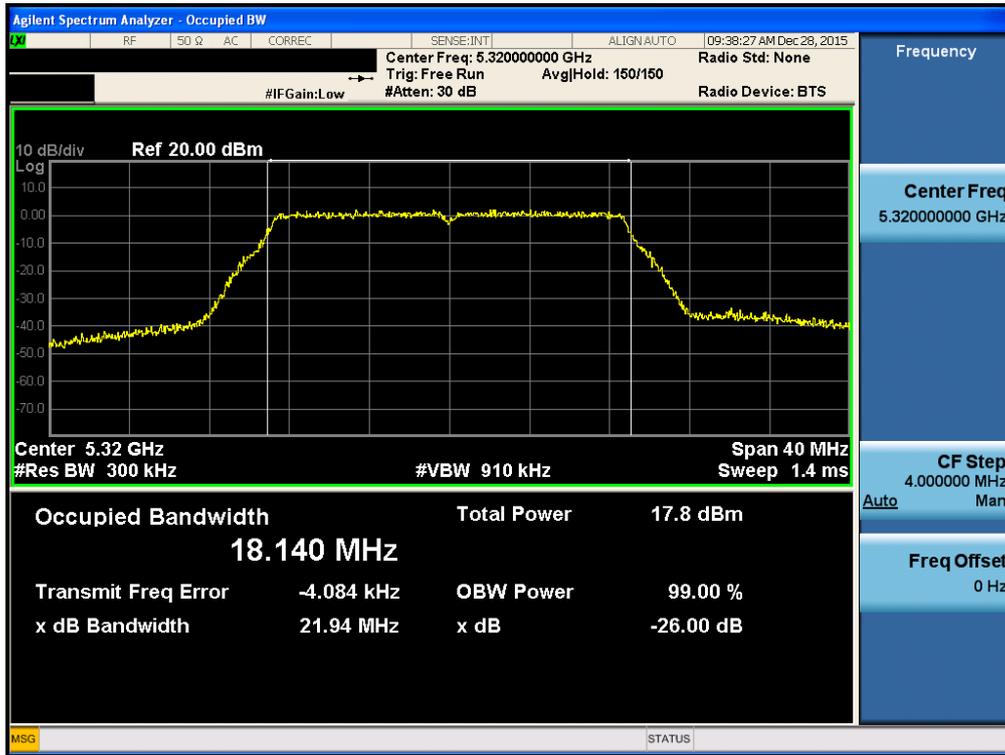
**Occupied Bandwidth 99%**   Test Mode: 802.11n HT20 & Ch.100
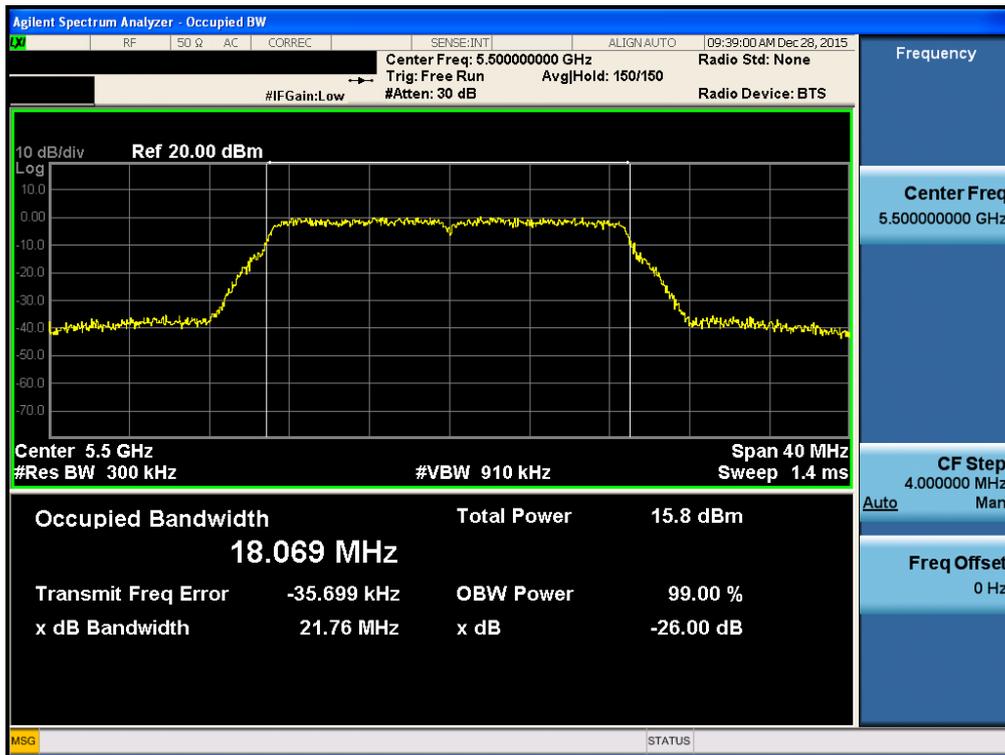
Occupied Bandwidth 99%   Test Mode: 802.11n HT20 & Ch.116

Occupied Bandwidth 99%   Test Mode: 802.11n HT20 & Ch.140
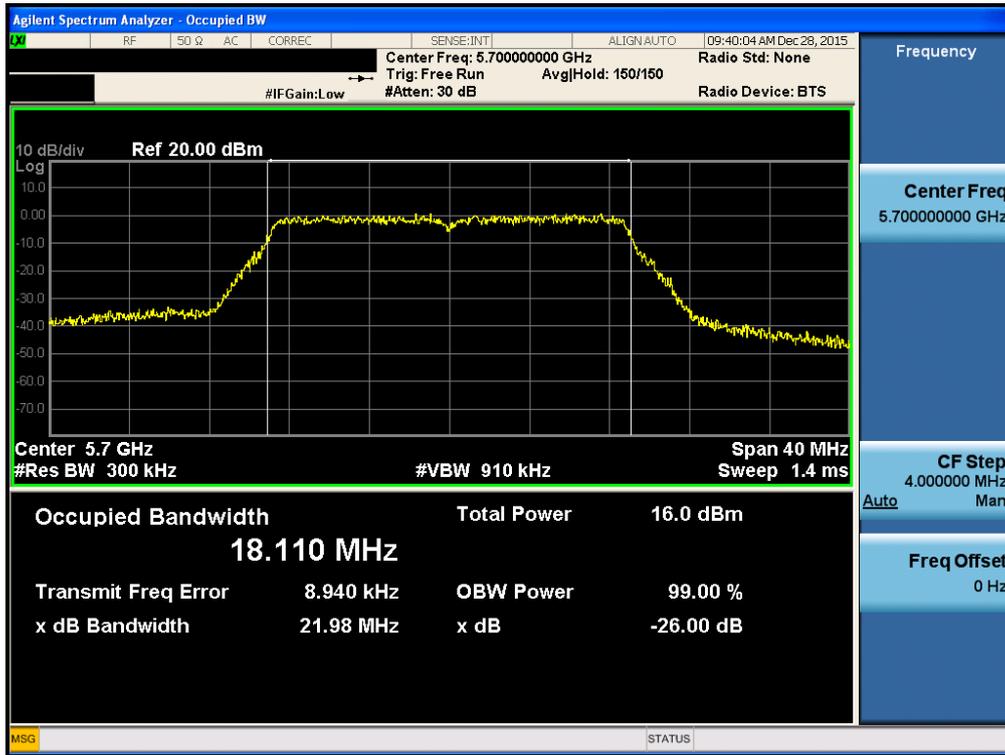
Occupied Bandwidth 99%   Test Mode: 802.11n HT20 & Ch.149
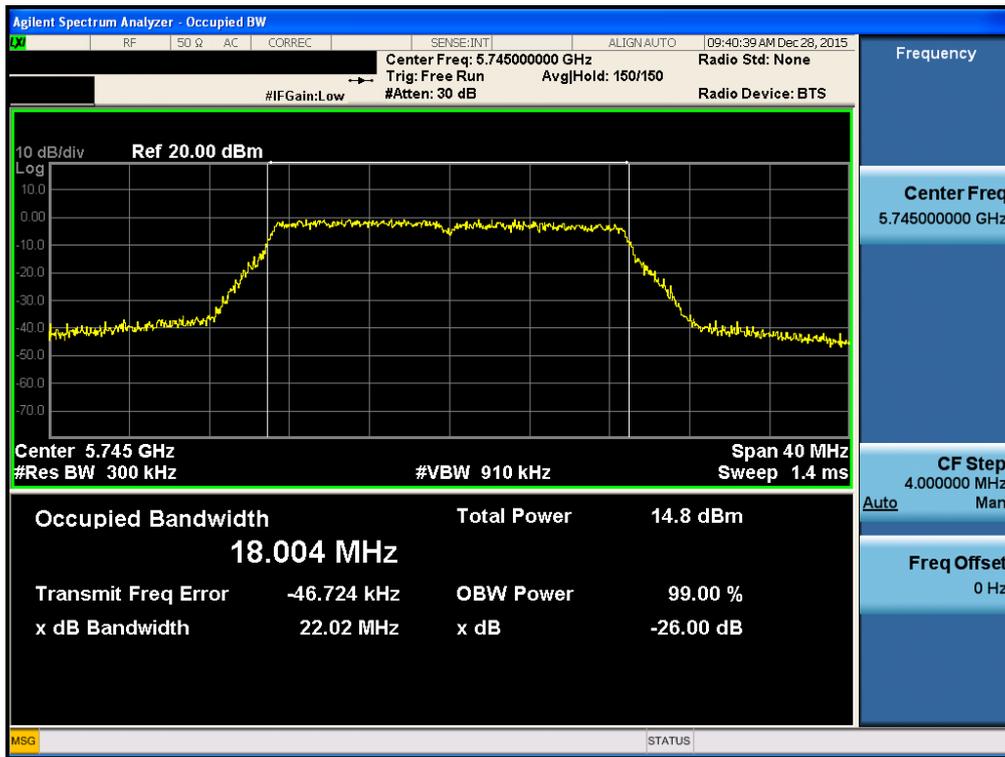
**Occupied Bandwidth 99%**   Test Mode: 802.11n HT20 & Ch.157
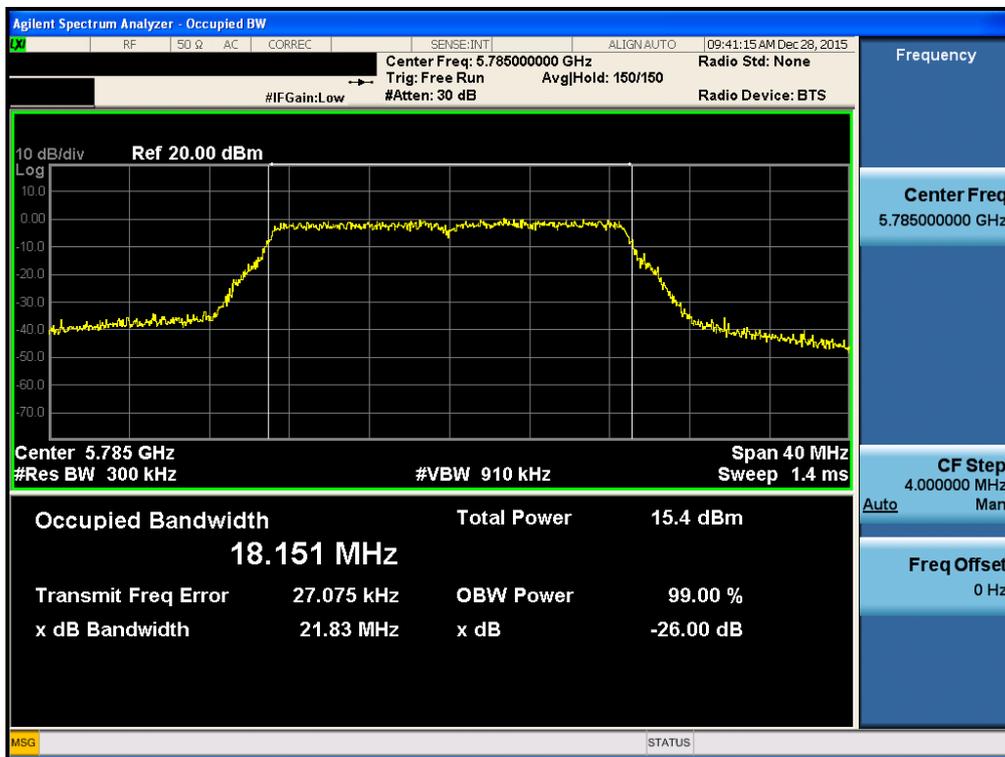
Occupied Bandwidth 99%   Test Mode: 802.11n HT20 & Ch.165

Occupied Bandwidth		Total Power	16.0 dBm
18.117 MHz			
Transmit Freq Error	-30.284 kHz	OBW Power	99.00 %
x dB Bandwidth	21.98 MHz	x dB	-26.00 dB
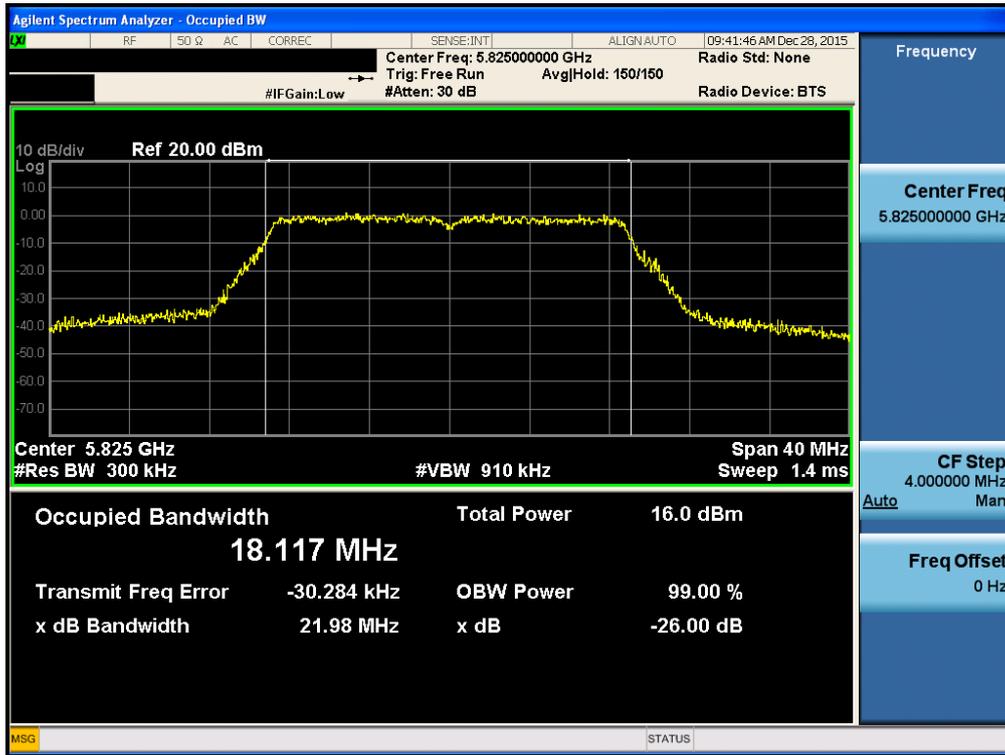
Occupied Bandwidth 99%   Test Mode: 802.11n HT40 & Ch.38
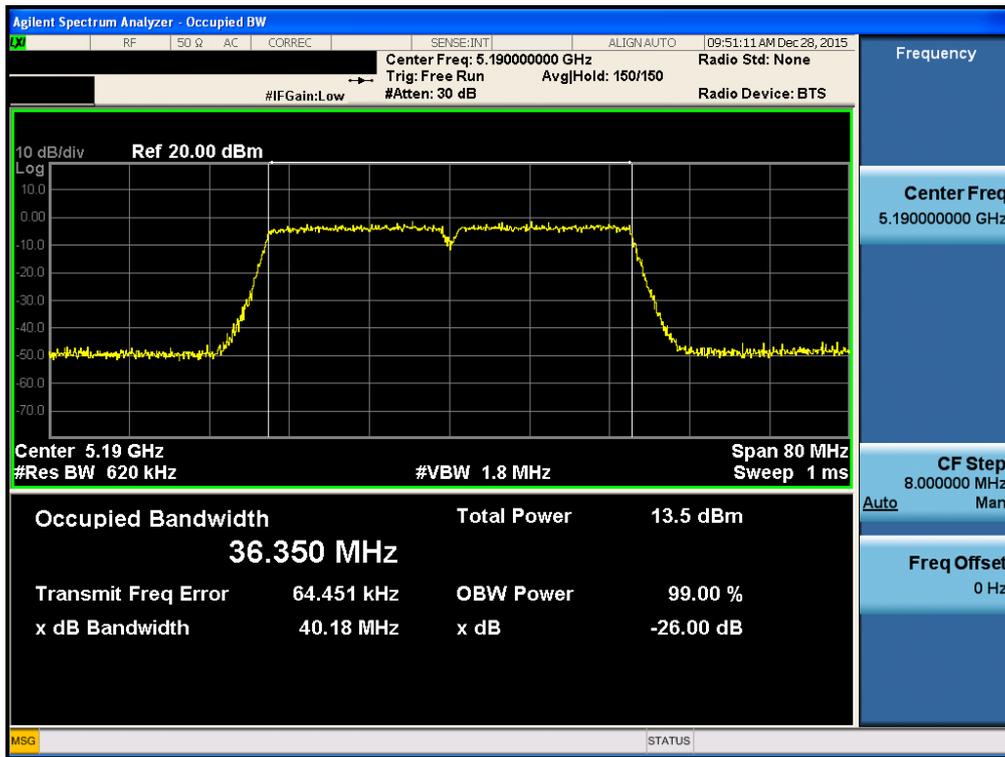
Occupied Bandwidth 99%   Test Mode: 802.11n HT40 & Ch.46
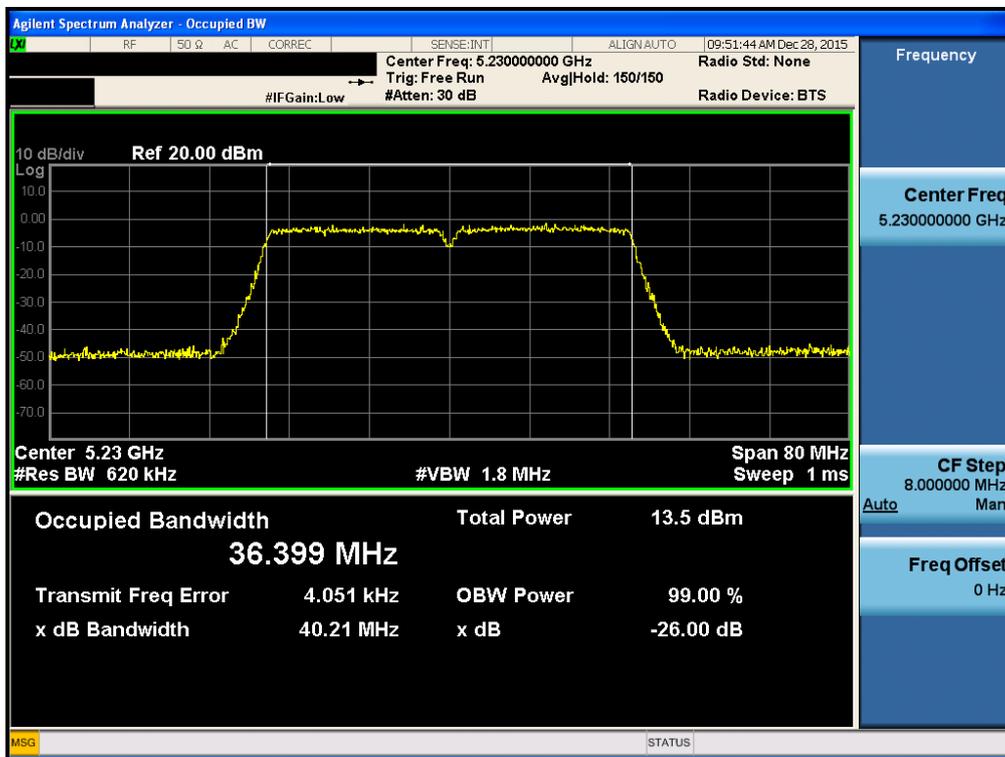
Occupied Bandwidth 99%   Test Mode: 802.11n HT40   &   Ch.54
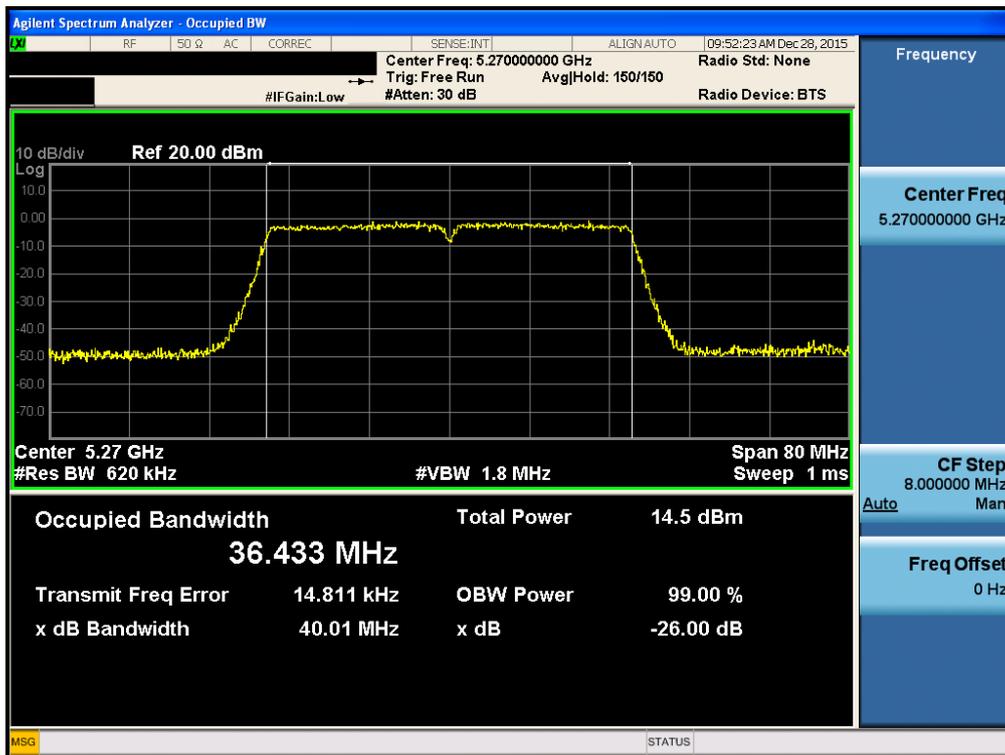

Occupied Bandwidth 99%   Test Mode: 802.11n HT40   &   Ch.62
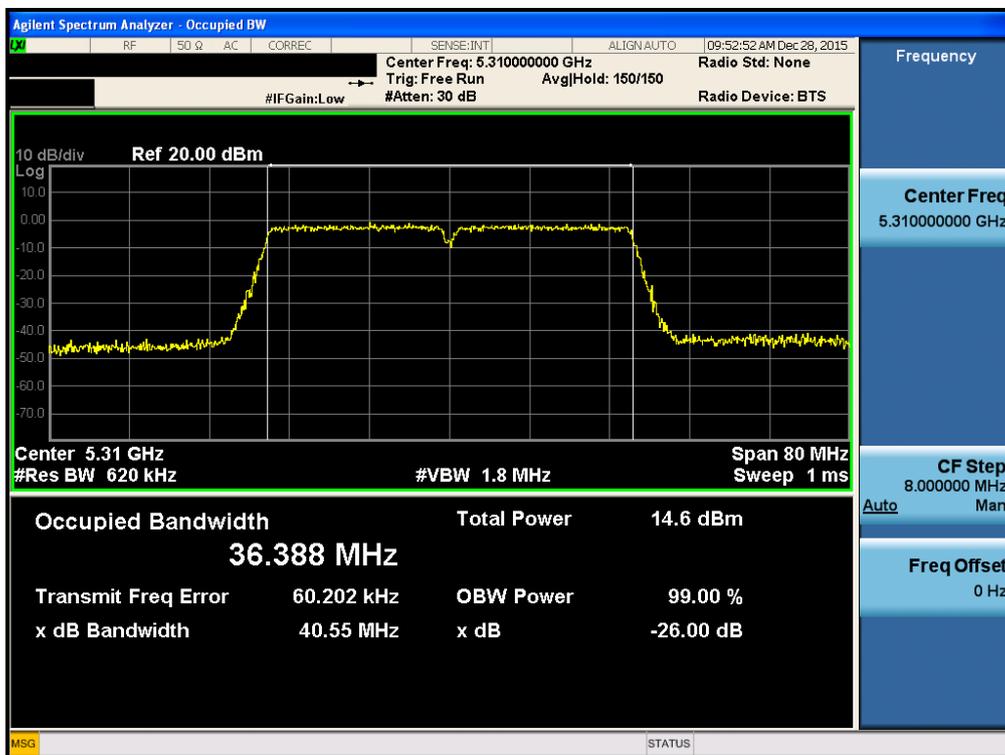
Occupied Bandwidth 99%   Test Mode: 802.11n HT40　&　Ch.102
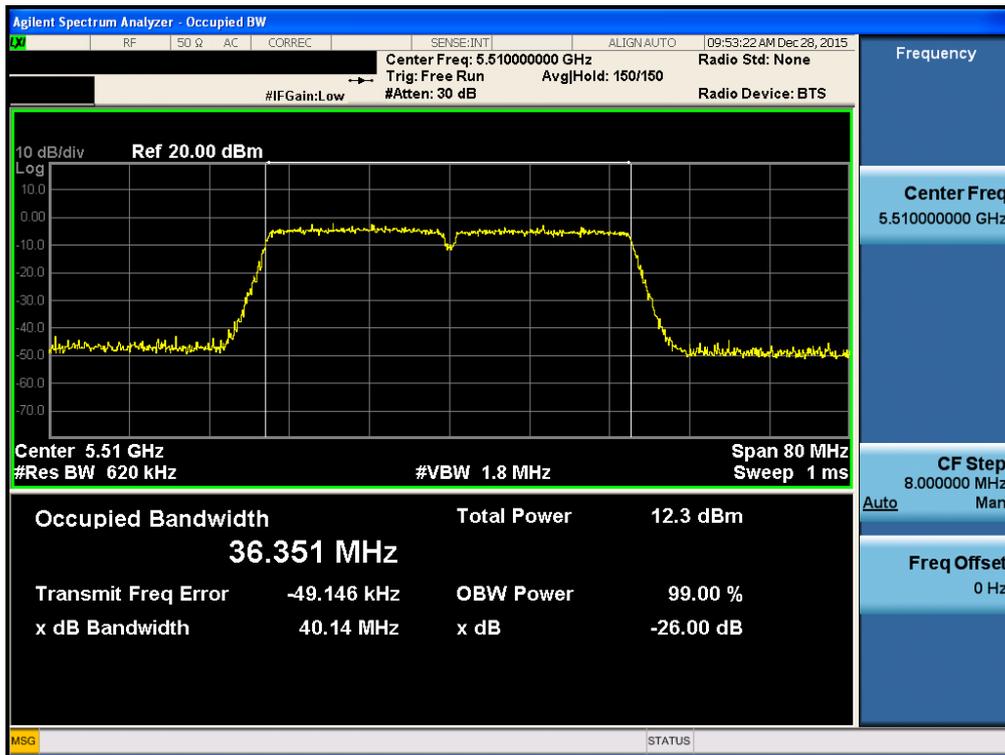
Occupied Bandwidth 99%   Test Mode: 802.11n HT40　&　Ch.110
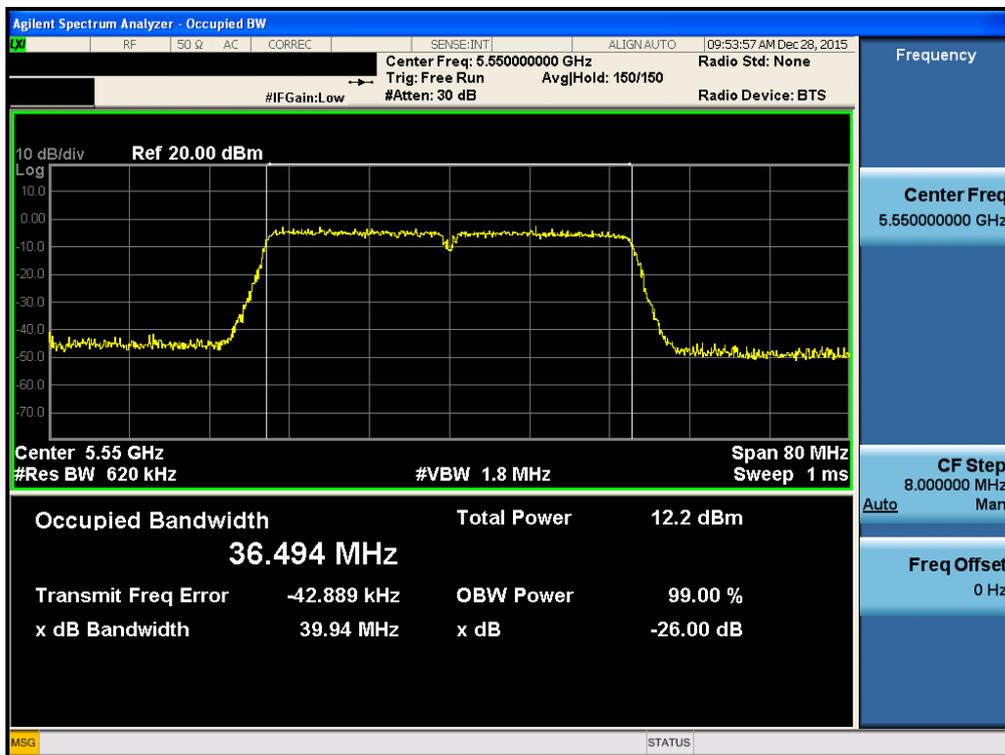
Occupied Bandwidth 99%   Test Mode: 802.11n HT40   &   Ch.134
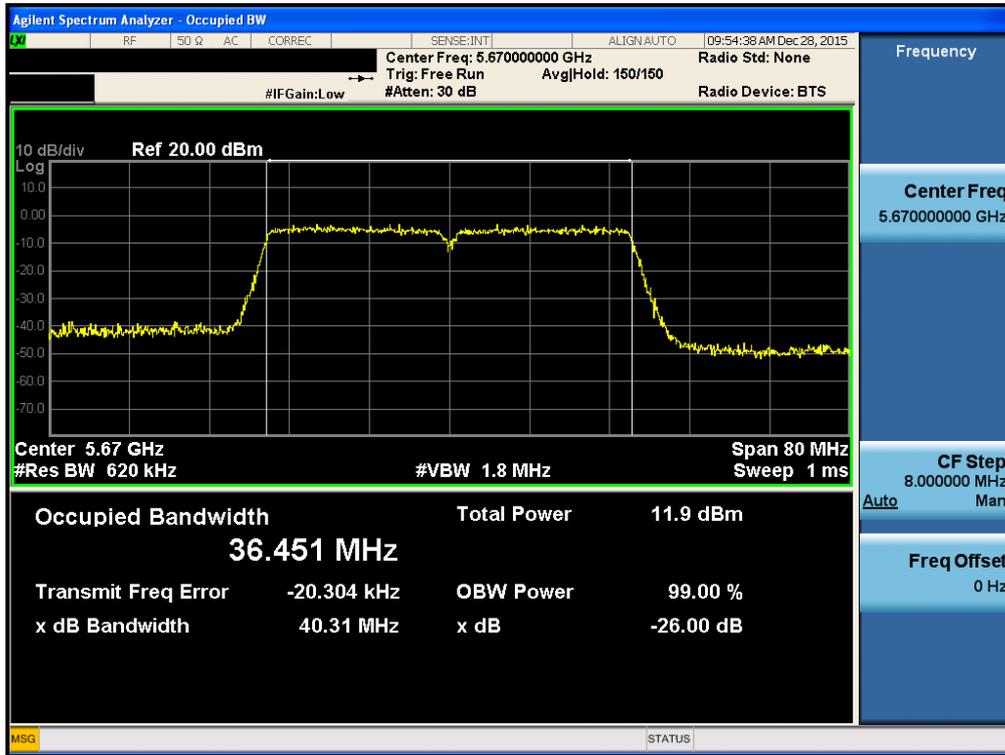
Occupied Bandwidth 99%   Test Mode: 802.11n HT40 & Ch.151
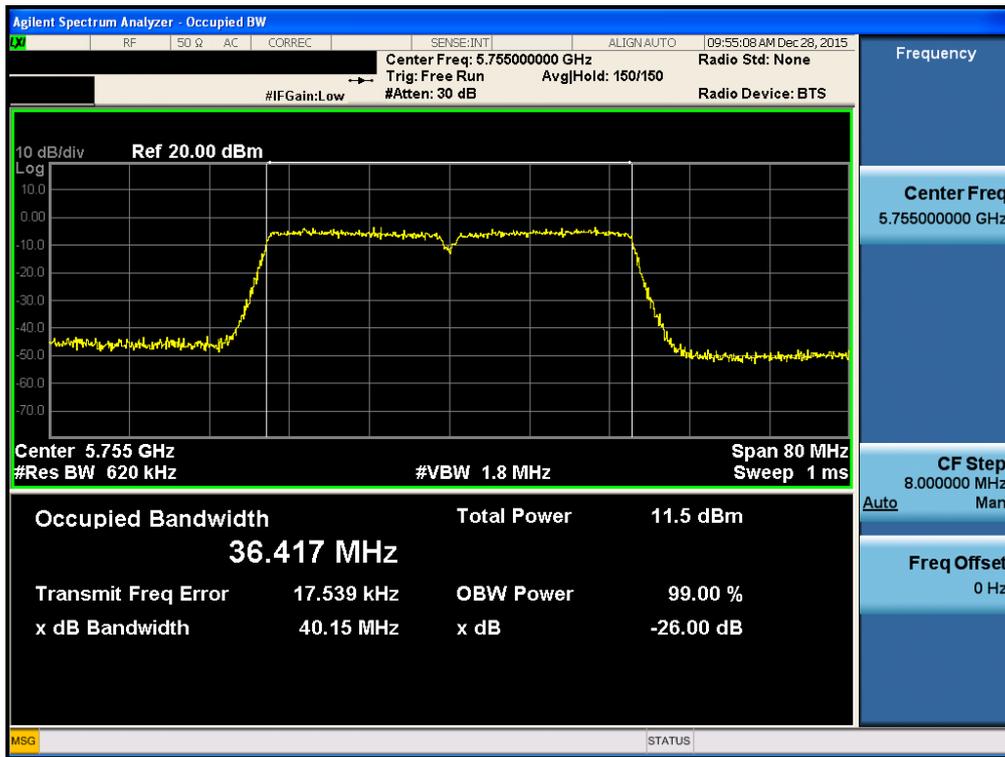

Occupied Bandwidth 99%   Test Mode: 802.11n HT40 & Ch.159
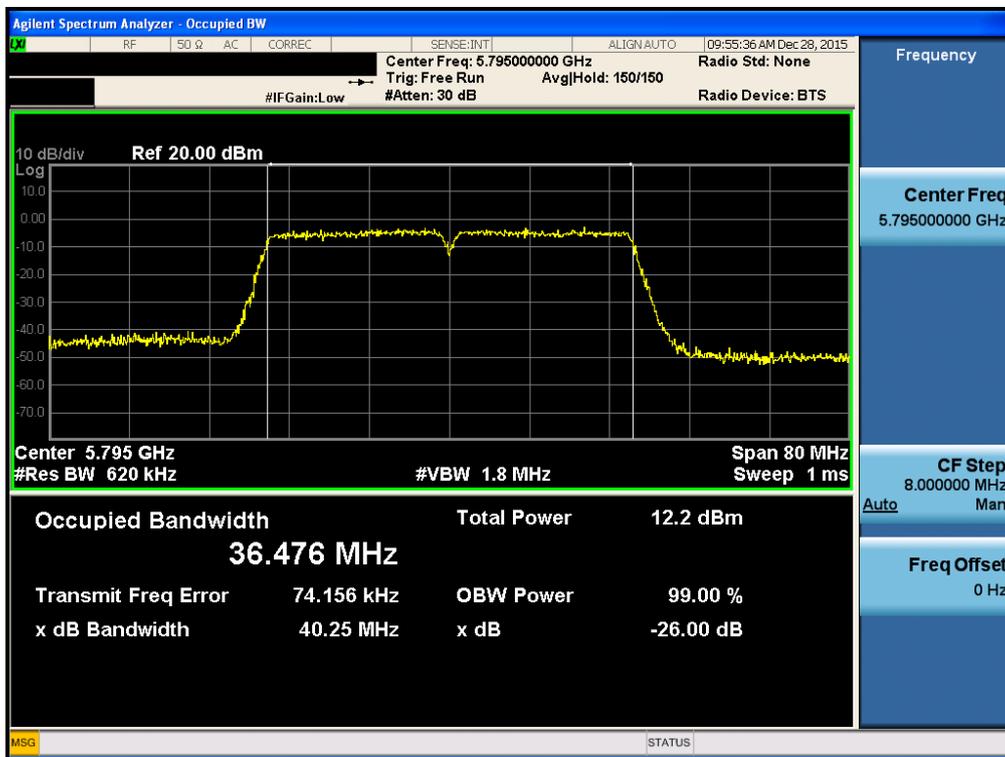
Occupied Bandwidth 99%   Test Mode: 802.11ac(VHT80) & Ch.42
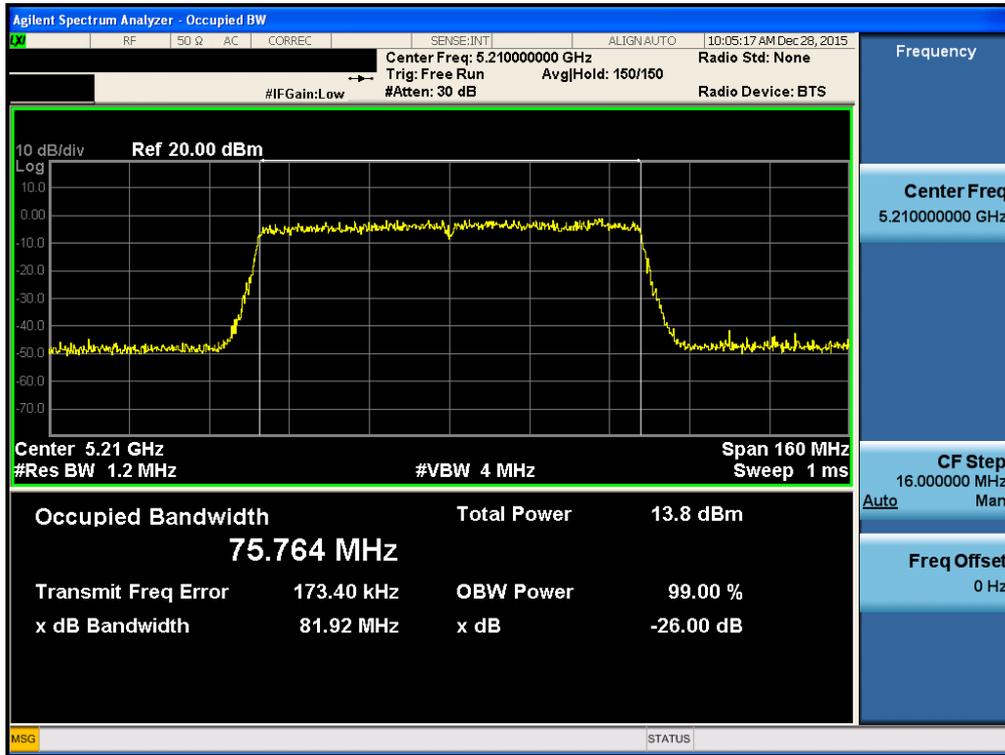

Occupied Bandwidth 99%   Test Mode: 802.11ac(VHT80) & Ch.58
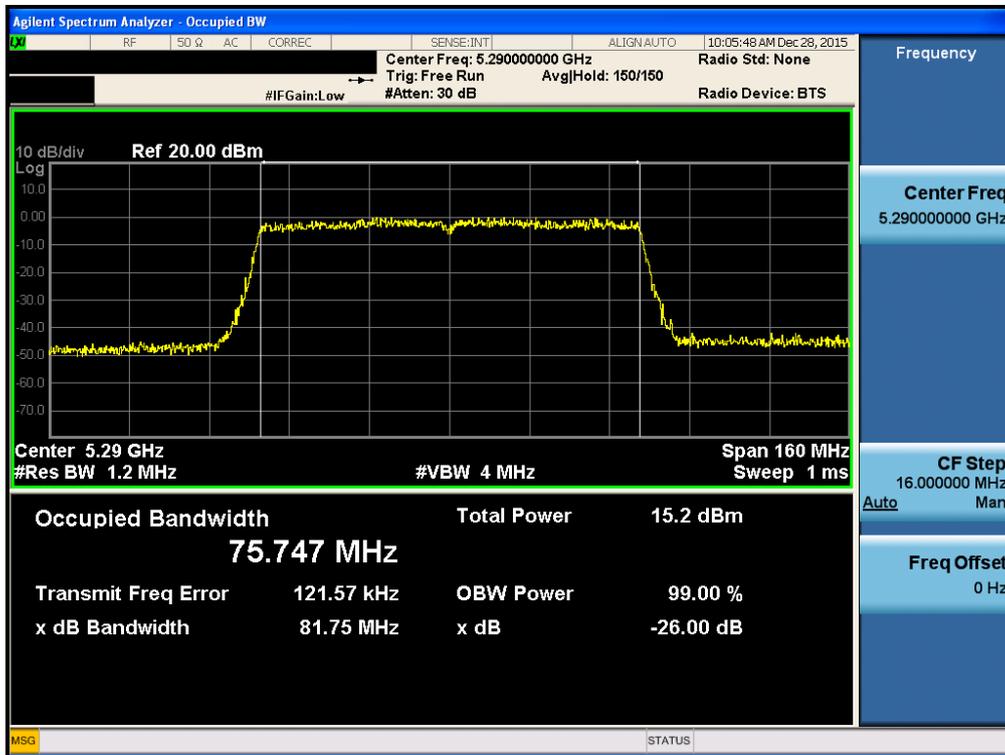
Occupied Bandwidth 99%   Test Mode: 802.11ac(VHT80) & Ch.106
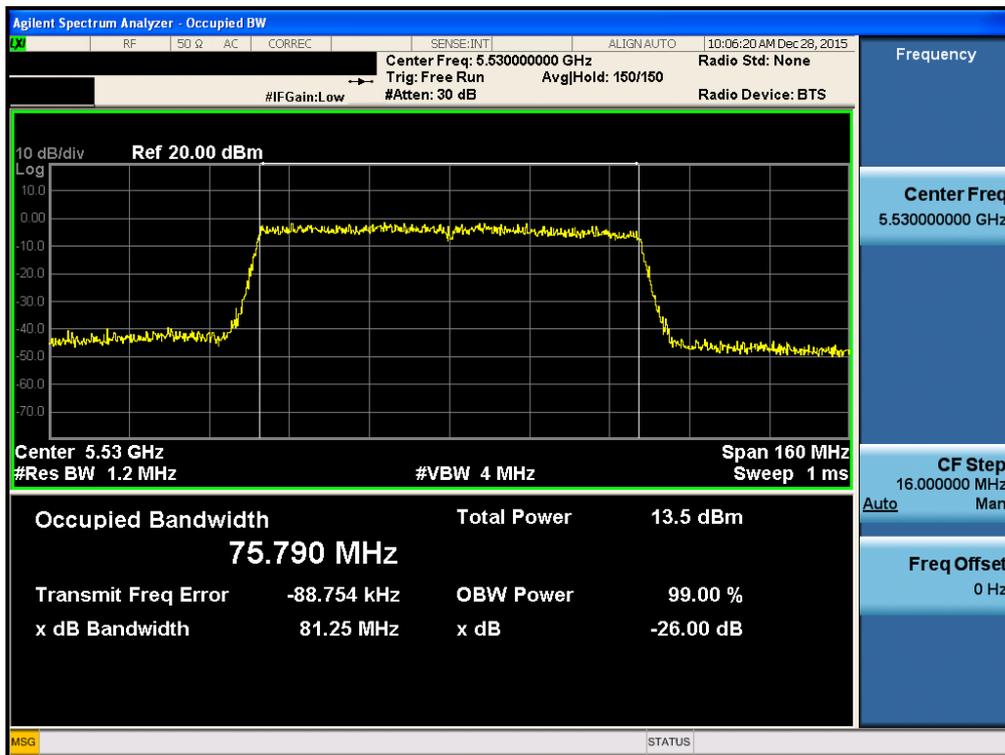
Occupied Bandwidth 99%   Test Mode: 802.11ac(VHT80) & Ch.155
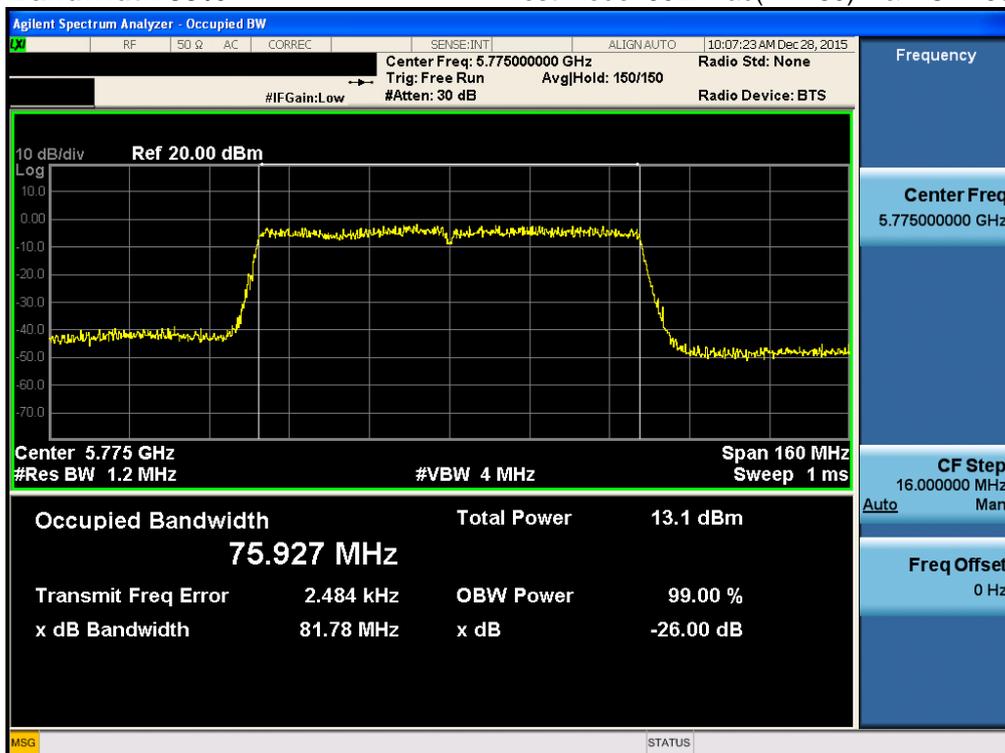
Occupied Bandwidth 99%   Test Mode: 802.11a & Ch.144
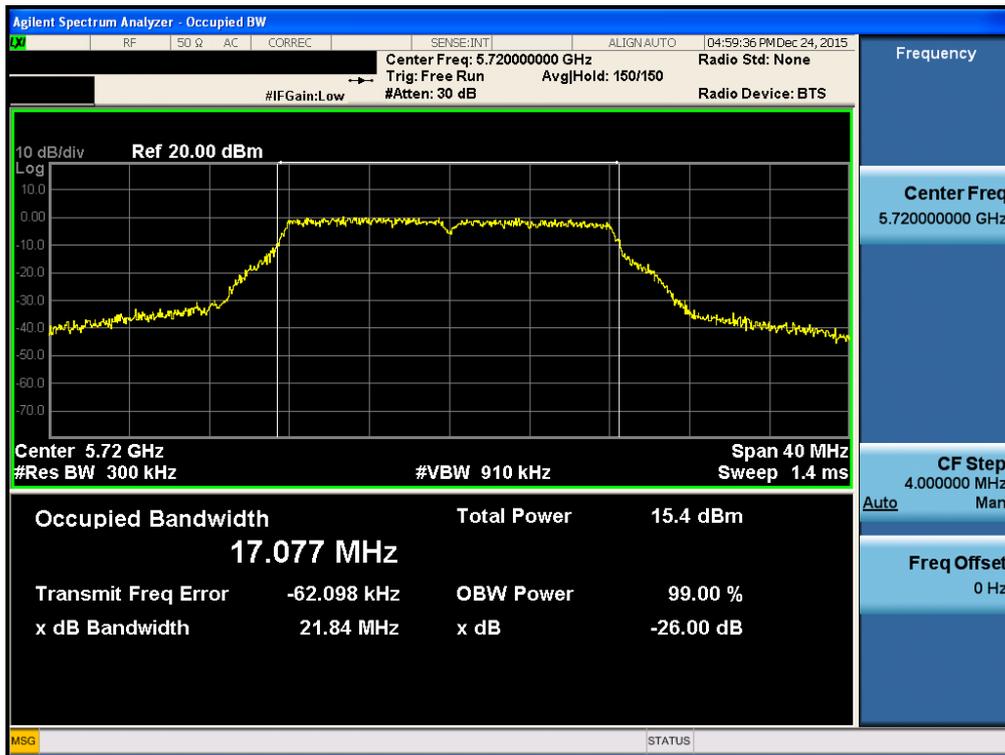
Occupied Bandwidth 99%   Test Mode: 802.11n HT20 & Ch.144

Occupied Bandwidth 99%   Test Mode: 802.11n HT40   &   Ch.142
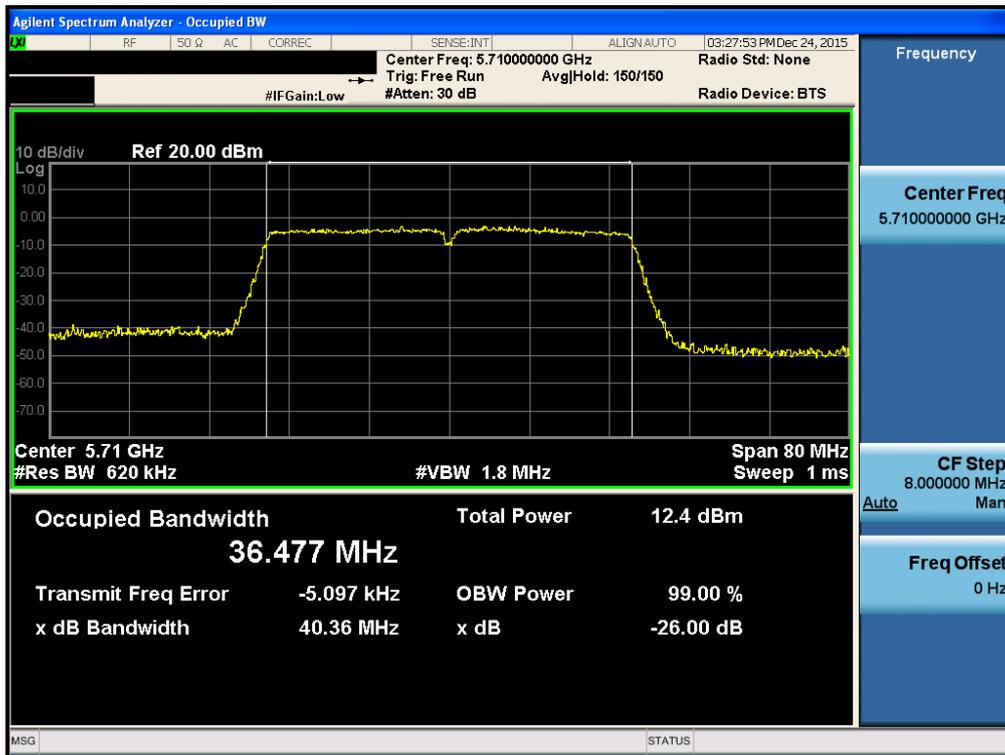
Occupied Bandwidth 99%   Test Mode: 802.11ac VHT80   &   Ch.138

9. List of Test Equipment

Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
MXA Signal Analyzer	Agilent Technologies	N9020A	15/09/09	16/09/09	MY46471248
MXA Signal Analyzer	Agilent Technologies	N9020A	15/01/19	16/01/19	MY46471096
PXA Signal Analyzer	Agilent Technologies	N9030A	15/10/19	16/10/19	MY53310140
Multimeter	FLUKE	17B	15/04/27	16/04/27	26030065WS
DC Power Supply	HP	66332A	15/01/22	16/01/22	US37471368
Vector Signal Generator	R&S	SMBV100A	15/01/06	16/01/06	255571
			16/01/05	17/01/05	
Signal Generator	R&S	SMF100A	15/06/29	16/06/29	102341
Thermohygrometer	BODYCOM	BJ5478	15/02/26	16/02/26	1209
Temp & Humi Test Chamber	SJ Science	SJ-TH-S50	15/10/19	16/10/19	SJ-TH-S50-130930
Power Meter Power Sensor	Anritsu	ML2496A / MA2411B	15/06/25	16/06/25	1338004 1306053
50W 10dB Attenuator	SMAJK	SMAJK-50-10	15/10/19	16/10/19	2-50-10
LOOP Antenna	Schwarzbeck	FMZB1513	14/04/29	16/04/29	1513-128
TRILOG Broadband Test-Antenna	Schwarzbeck	VULB 9160	14/04/30	16/04/30	3358
Double-Ridged Guide Antenna	ETS	3117	14/05/12	16/05/12	140394
Horn Antenna	A.H.Systems	SAS-574	15/04/30	17/04/30	154
Low Noise Pre Amplifier	tsj	MLA-010K01-B01-27	15/04/09	16/04/09	1844538
Amplifier (30dB)	Agilent	8449B	15/11/06	16/11/06	3008A02108
PreAmplifier	A.H. SYSTEMS	PAM-1840VH	15/12/03	16/12/03	163
High-pass filter	Wainwright Instruments	WHKX12-2580-3000-18000-80SS	15/09/23	16/09/23	3
High-pass filter	Wainwright	WHNX8.5	15/09/23	16/09/23	1
EMI TEST RECEIVER	R&S	ESR7	15/10/19	16/10/19	101109

APPENDIX I

Conducted Test set up Diagram

- **Conducted Measurement**
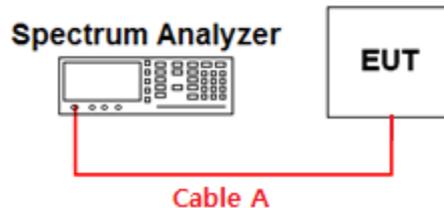
APPENDIX II

Duty Cycle Information

◼ **Test Procedure**

Duty Cycle [X = On Time / (On + Off time)] is measured using Measurement Procedure **of KDB789033 D02 V01**
1. Set the center frequency of the spectrum analyzer to the center frequency of the transmission.
2. Set RBW ≥ EBW if possible; otherwise, set RBW to the largest available value.
3. Set VBW ≥ RBW. Set detector = peak.
4. Note : The zero-span measurement method shall not be used unless both **RBW and VBW are > 50 / T**, where T is defined in section II.B.1.a), and **the number of sweep points across duration T exceeds 100**. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T ≤ 16.7 microseconds.)

   T: The minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
   (T = **On time** of the above table since the EUT operates with above fixed Duty Cycle and it is the minimum On time)

TEST DATA

Mode	Channel	Tested Frequency [MHz]	Maximum Achievable Duty Cycle (x) = On / (On+Off)			Duty Cycle Correction Factor [dB]	50/T [kHz]
			On Time [ms]	On+OffTime [ms]	x		
802.11a	100	5500	1.430	1.530	0.93	0.32	34.97
802.11n (HT20)	100	5500	1.335	1.435	0.93	0.32	37.45
802.11n (HT40)	102	5510	0.663	0.765	0.86	0.66	75.41
802.11ac (VHT80)	106	5530	0.332	0.434	0.76	1.20	150.60

Duty Cycle   Test Mode: 802.11a & Ch.100
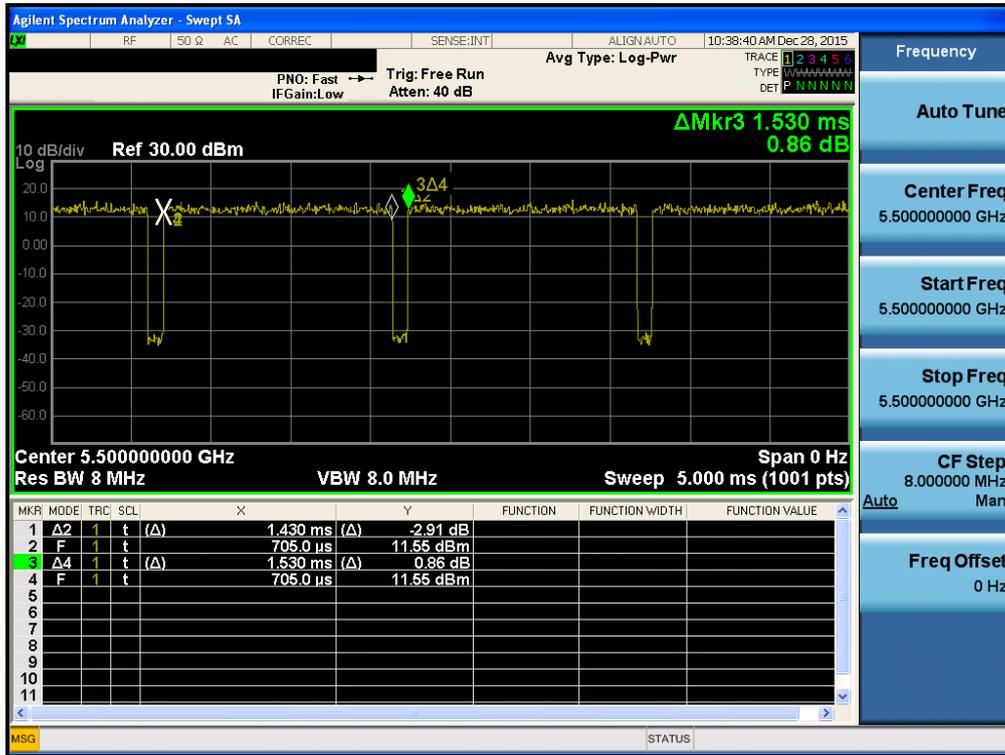
Duty Cycle   Test Mode: 802.11n(HT20) & Ch.100
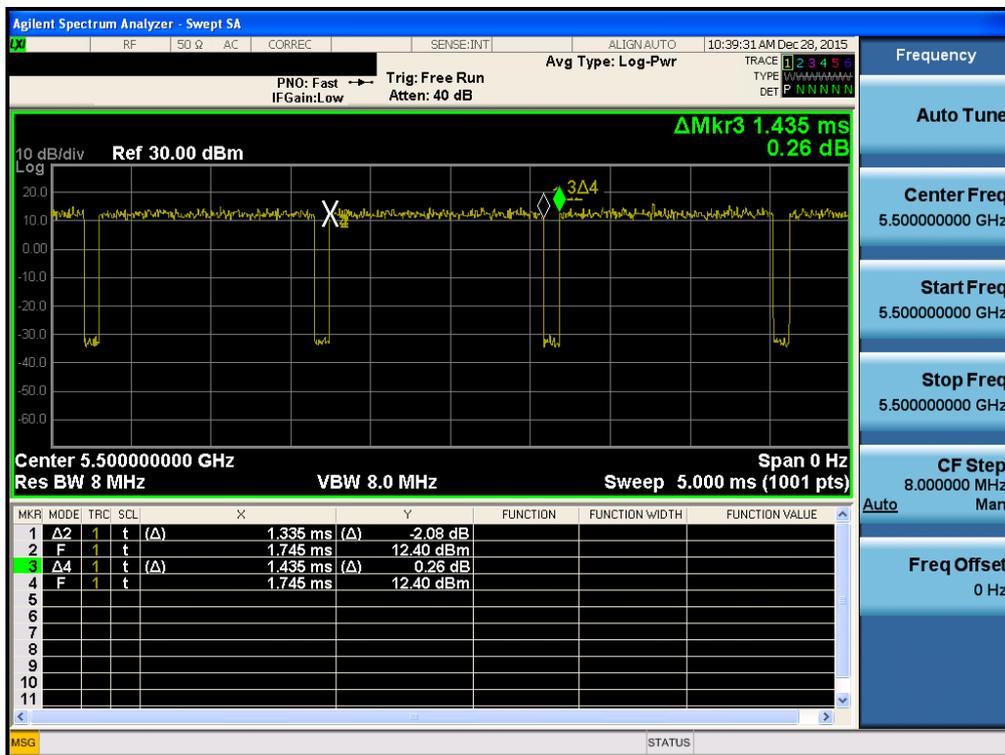
Duty Cycle   Test Mode: 802.11n HT40   &   Ch.102
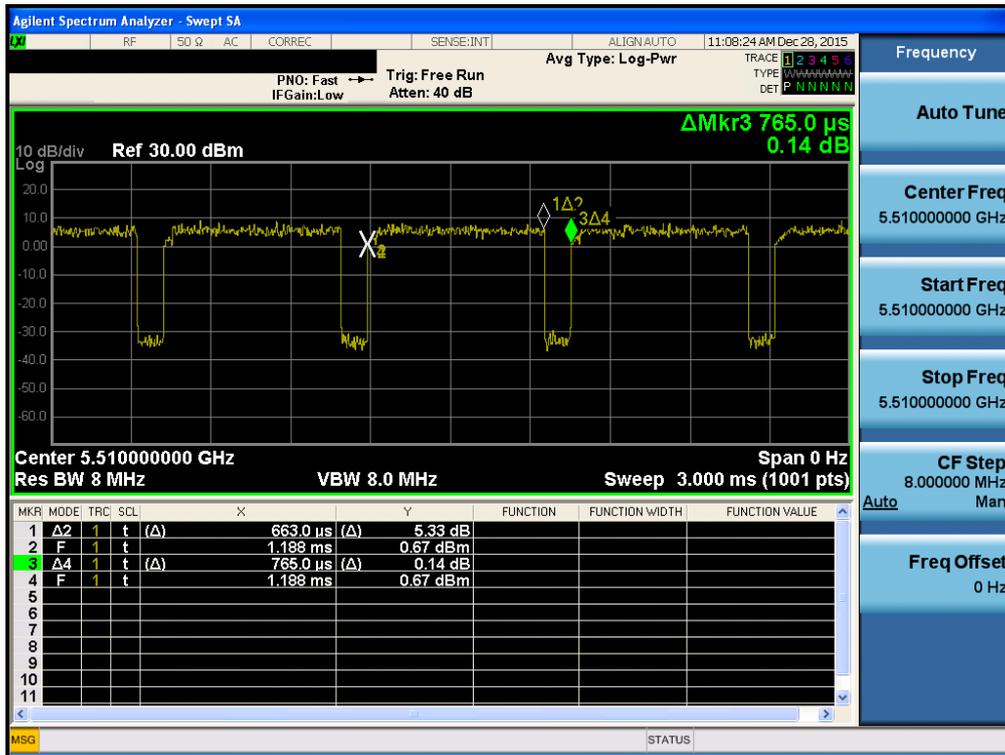
Duty Cycle   Test Mode: 802.11ac VHT80   &   Ch.106
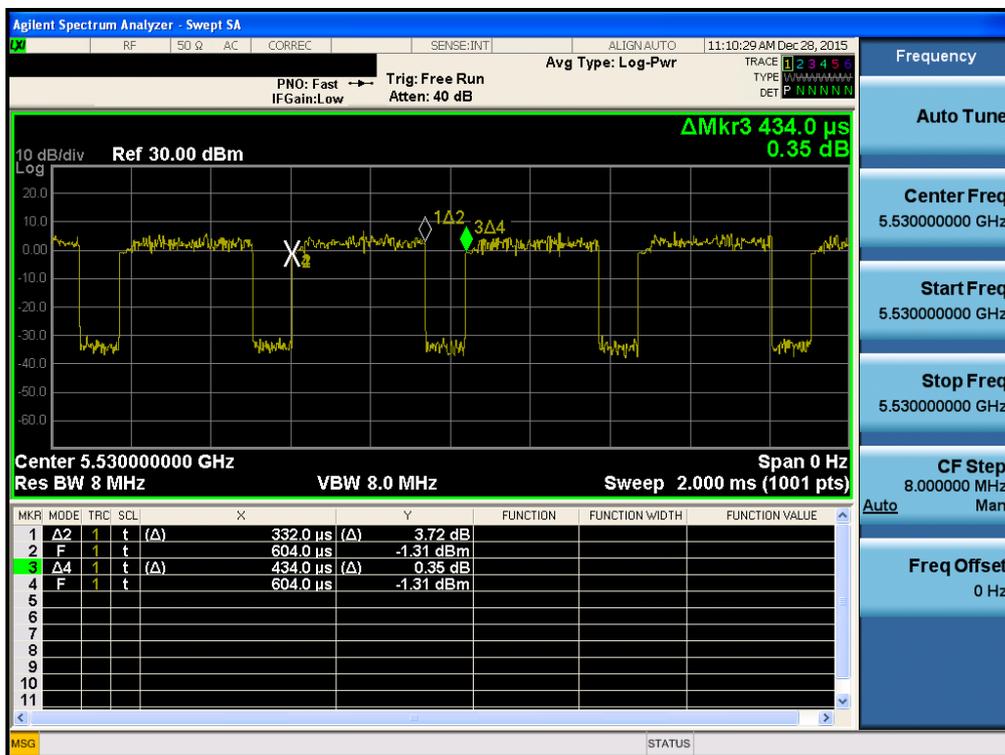
APPENDIX III

Band edge (Radiated) Test Plot

Note: The offset was not included in test plot.(Reading value) The results refer to the table of clause 8.6.

802.11a & U-NII 1 & Ch.36   **Detector Mode : PK**
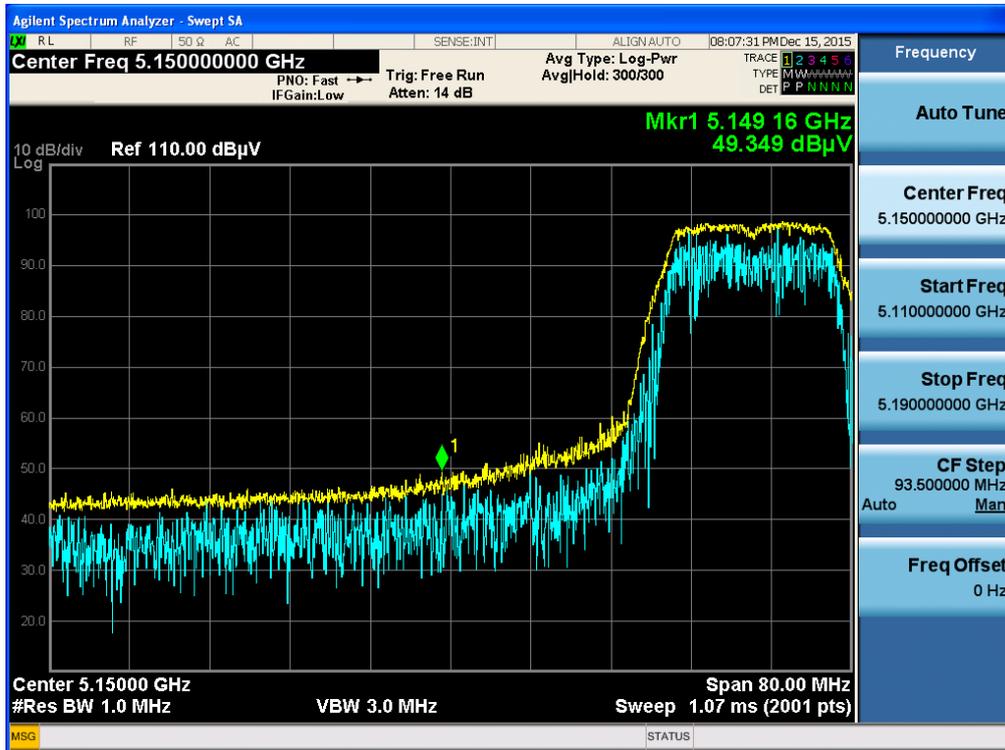
802.11a & U-NII 1 & Ch.36   **Detector Mode : AV**
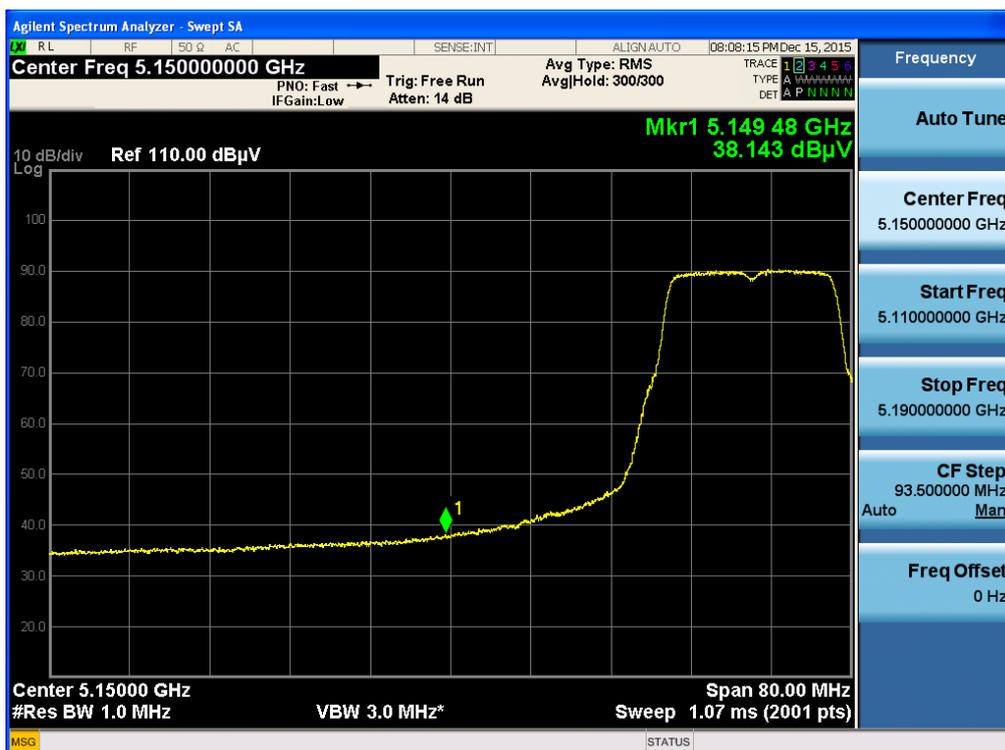
802.11a & U-NII 2A & Ch.64   **Detector Mode : PK**
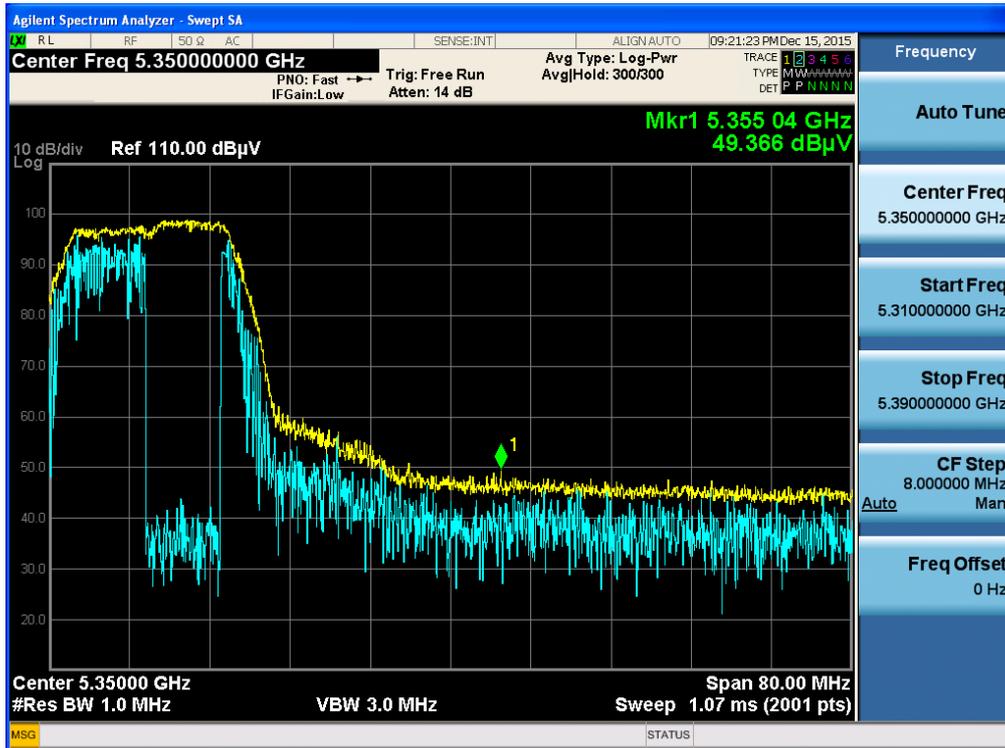
802.11a & U-NII 2A & Ch.64   **Detector Mode : AV**
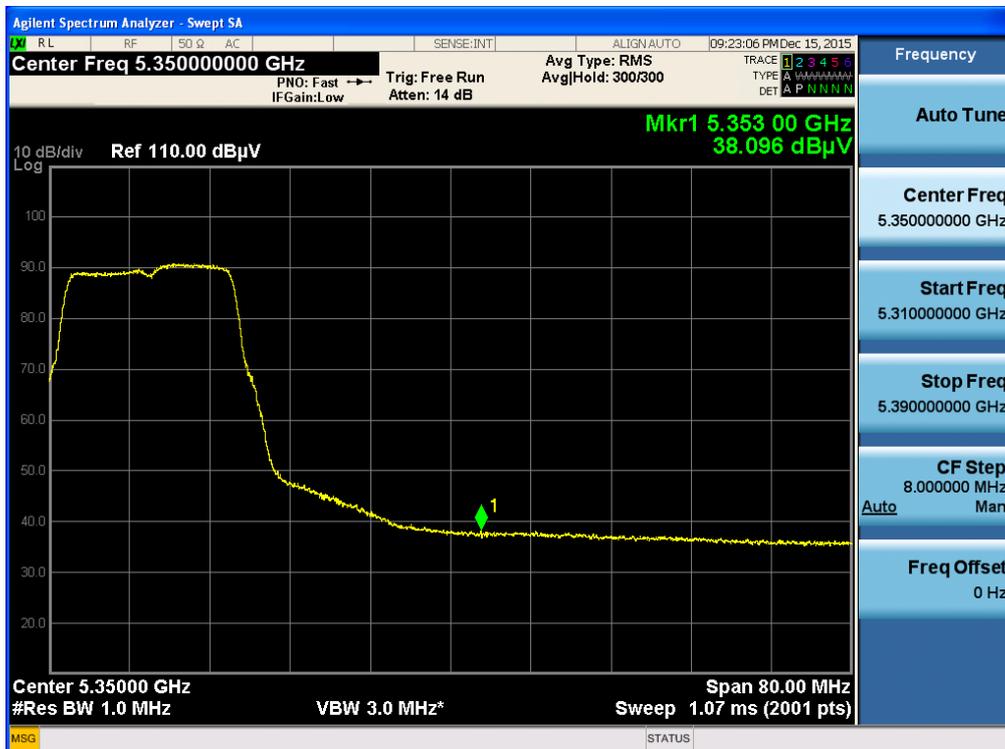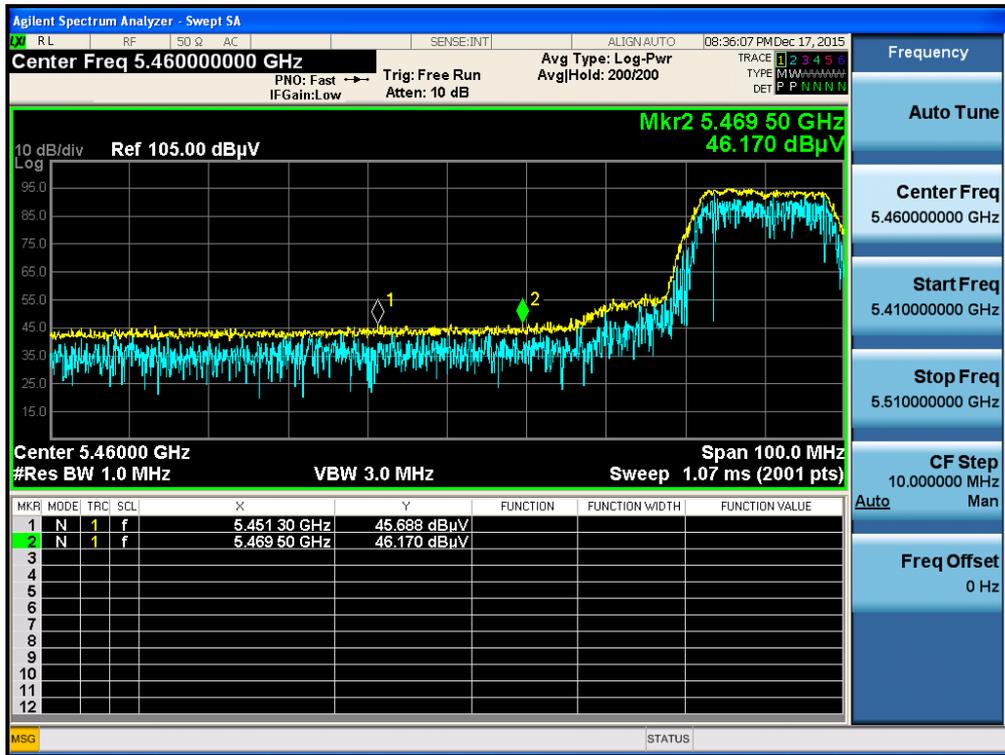
802.11a & U-NII 2C & Ch.100   **Detector Mode : PK**

802.11a & U-NII 2C & Ch.100   **Detector Mode : AV**
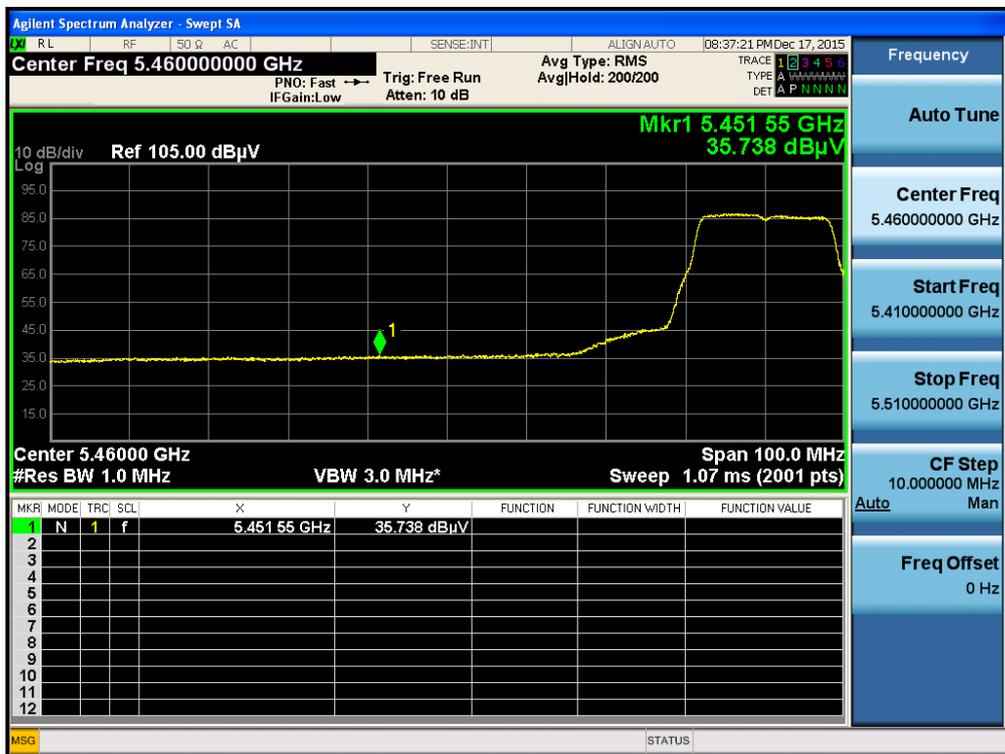
802.11a & U-NII 2C & Ch.140   Detector Mode : PK
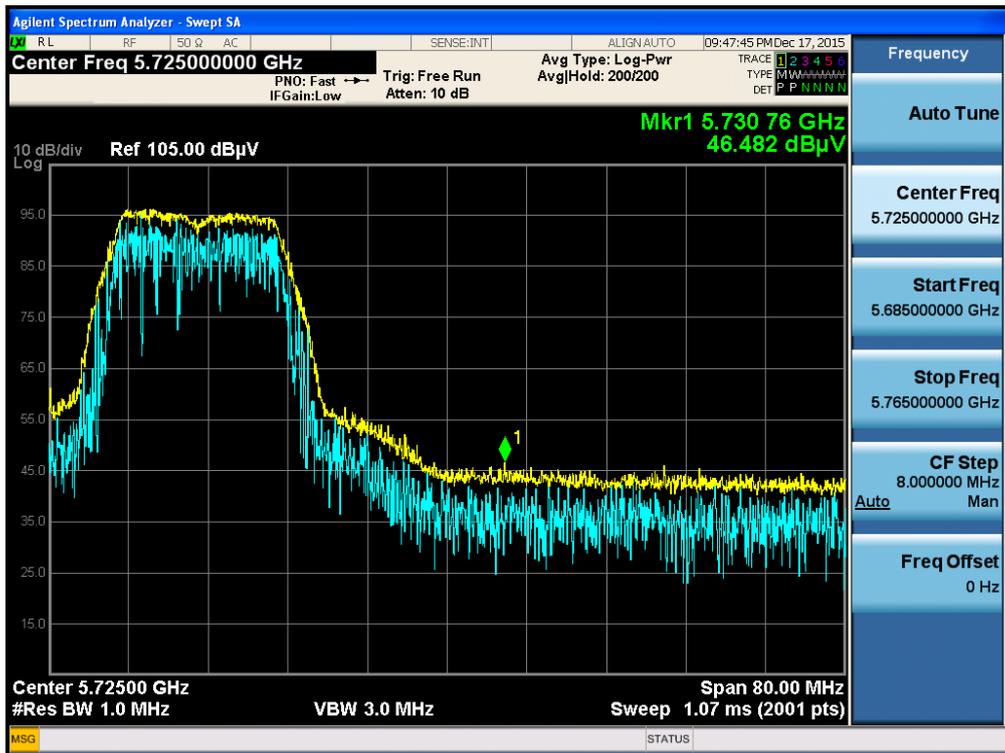
## 802.11a & U-NII 3 & Ch.149   Detector Mode : PK
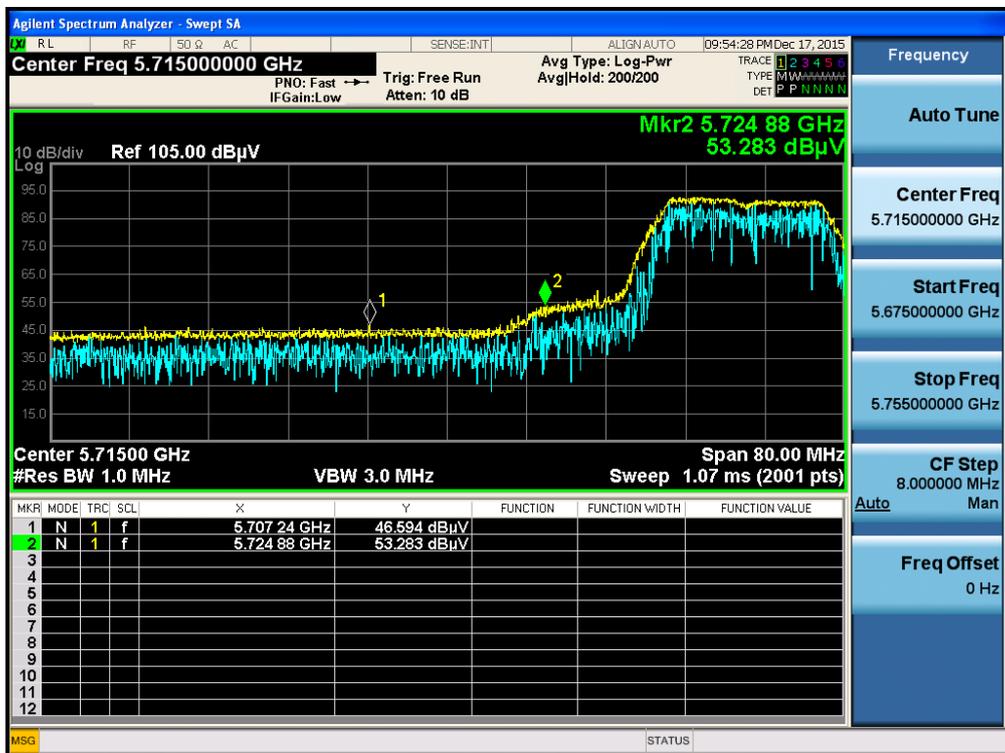
802.11a & U-NII 3 & Ch.165   Detector Mode : PK
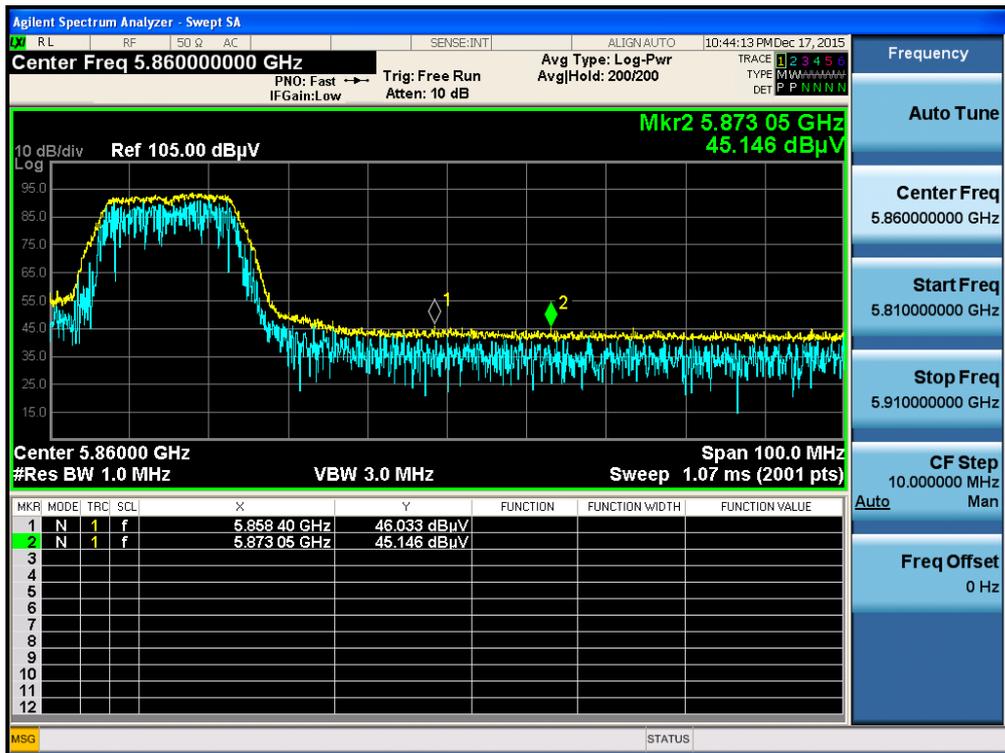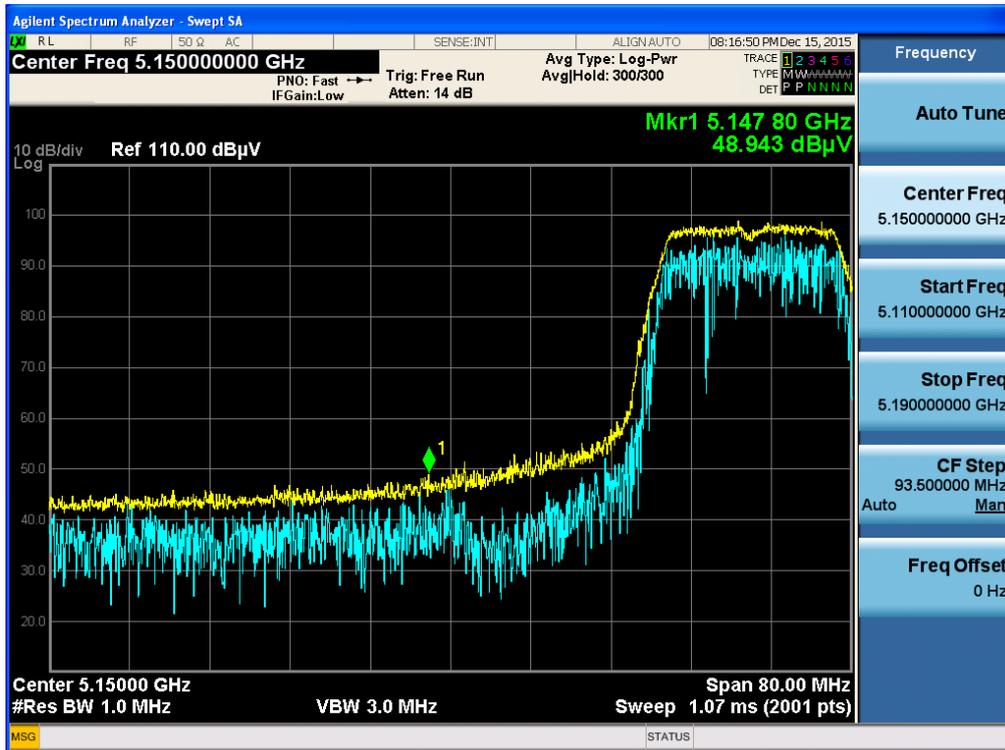
802.11n(HT20)   &   U-NII 1   &   Ch.36   **Detector Mode : PK**

802.11n(HT20)   &   U-NII 1   &   Ch.36   **Detector Mode : AV**
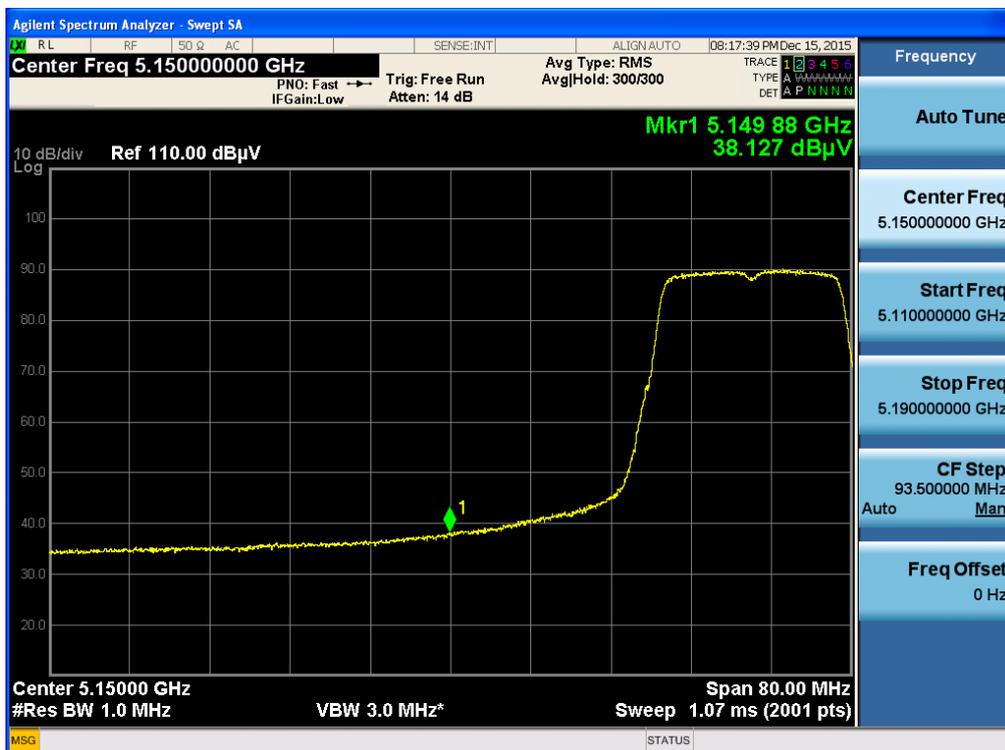
802.11n(HT20)   &   U-NII 2A   &   Ch.64   Detector Mode : PK
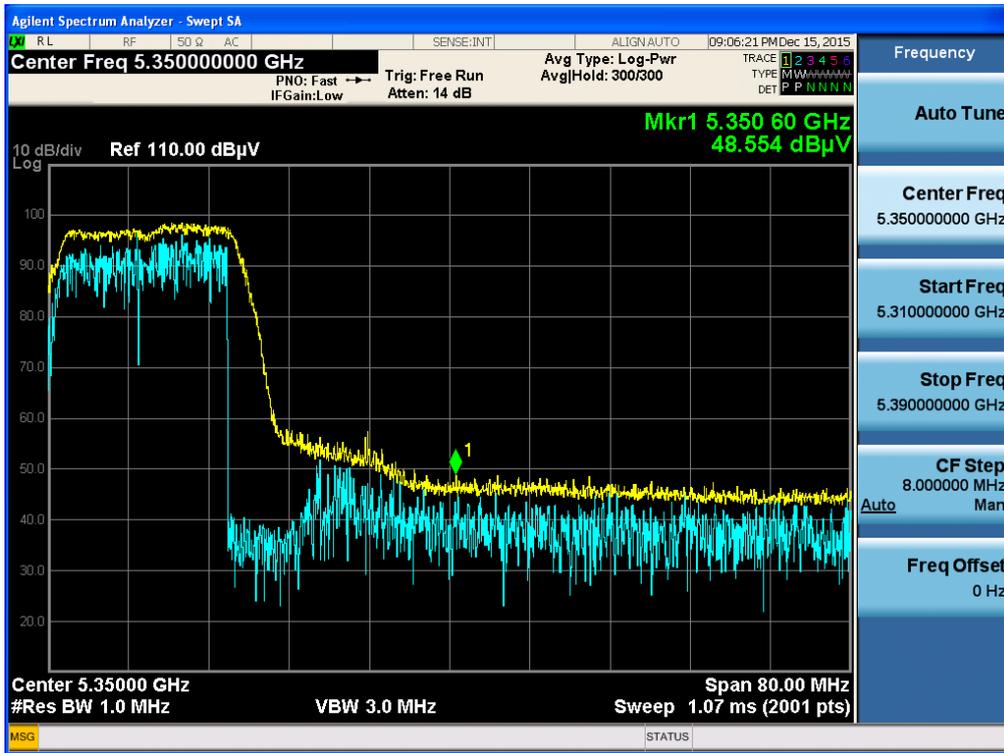
802.11n(HT20)   &   U-NII 2A   &   Ch.64   Detector Mode : AV
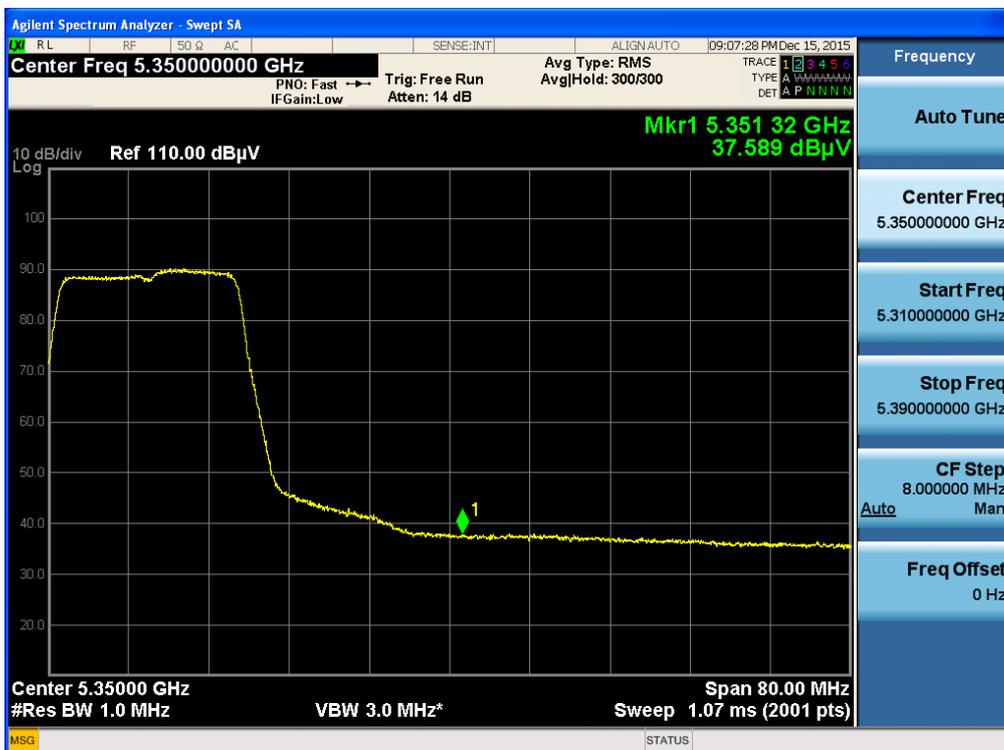
802.11n(HT20)   &   U-NII 2C   &   Ch.100   **Detector Mode : PK**
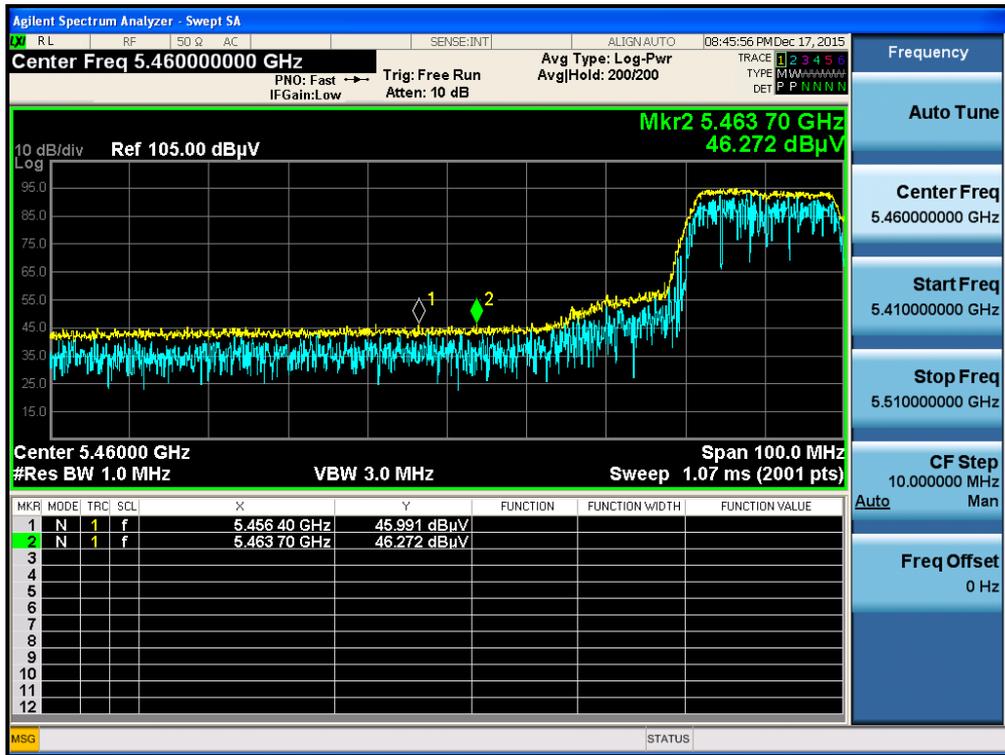
802.11n(HT20)   &   U-NII 2C   &   Ch.100   **Detector Mode : AV**

802.11n(HT20)   &   U-NII 2C   &   Ch.140   **Detector Mode : PK**
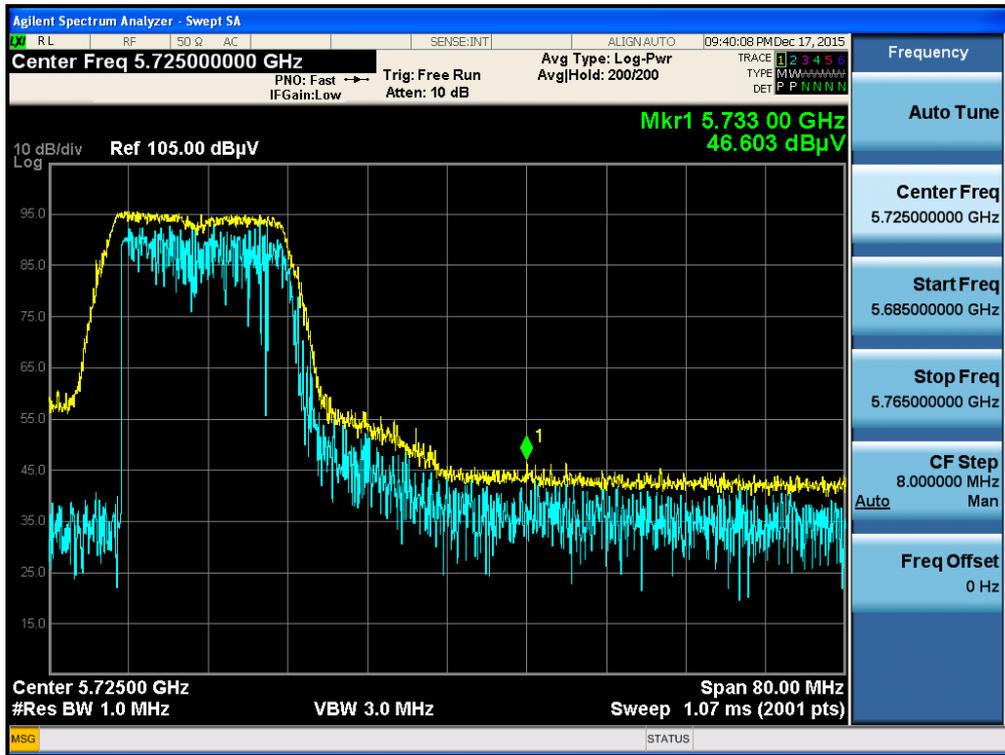
802.11n(HT20)   &   U-NII 3   &   Ch.149   **Detector Mode : PK**
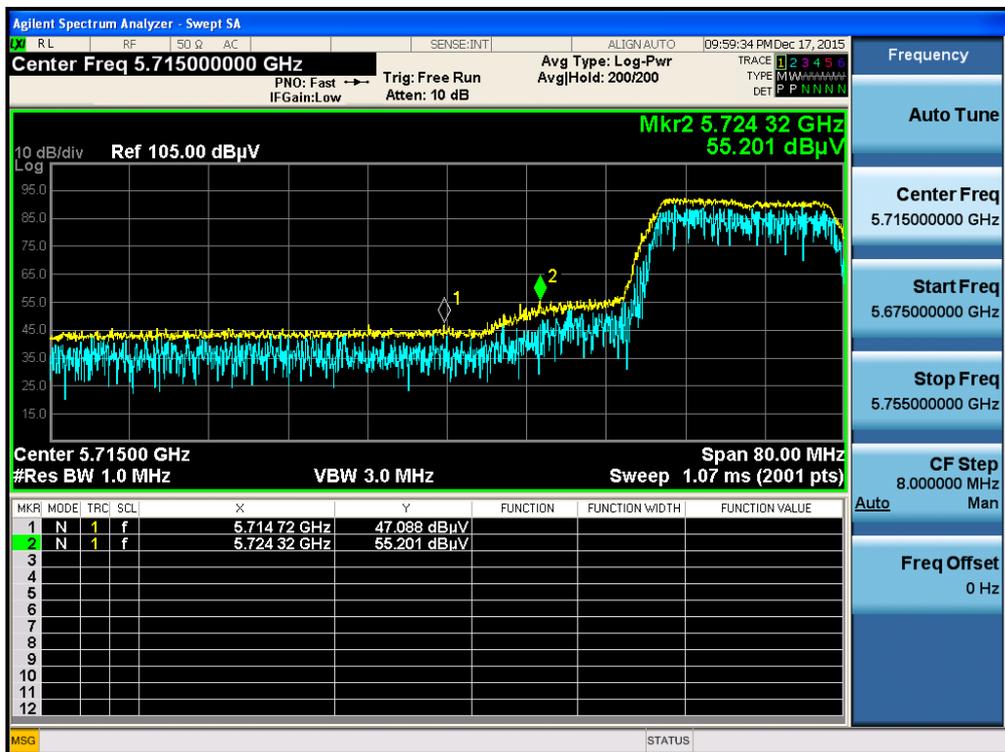
802.11n(HT20)   &   U-NII 2C   &   Ch.165   Detector Mode : PK
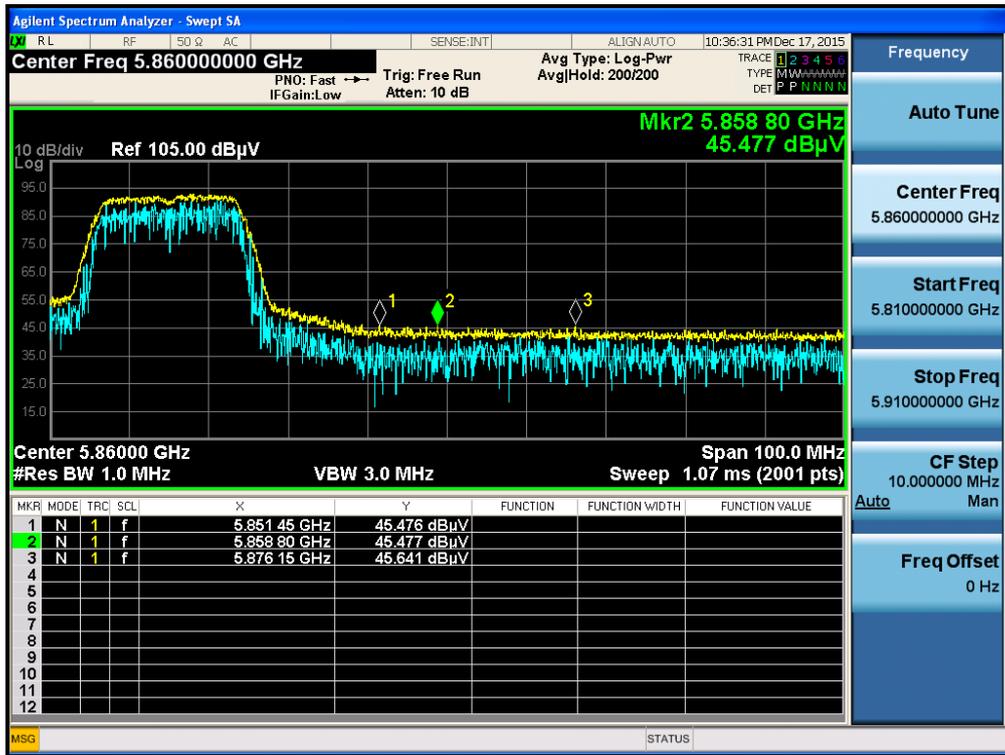
802.11n(HT40) & U-NII 1 & Ch.38   Detector Mode : PK
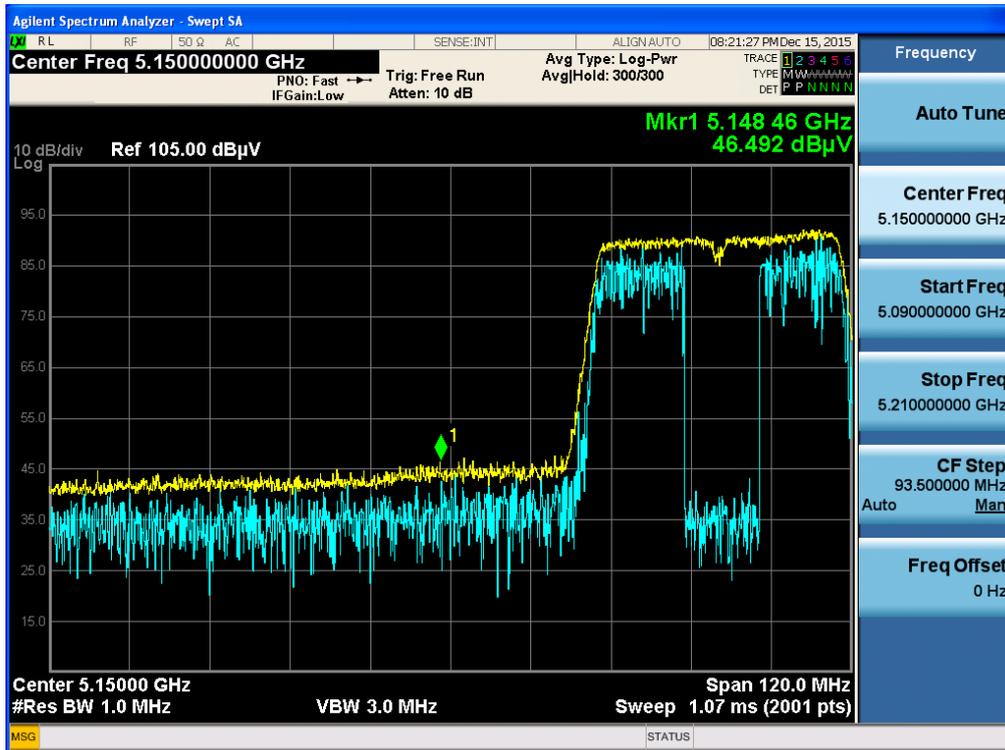

802.11n(HT40) & U-NII 2A & Ch.38   Detector Mode : AV
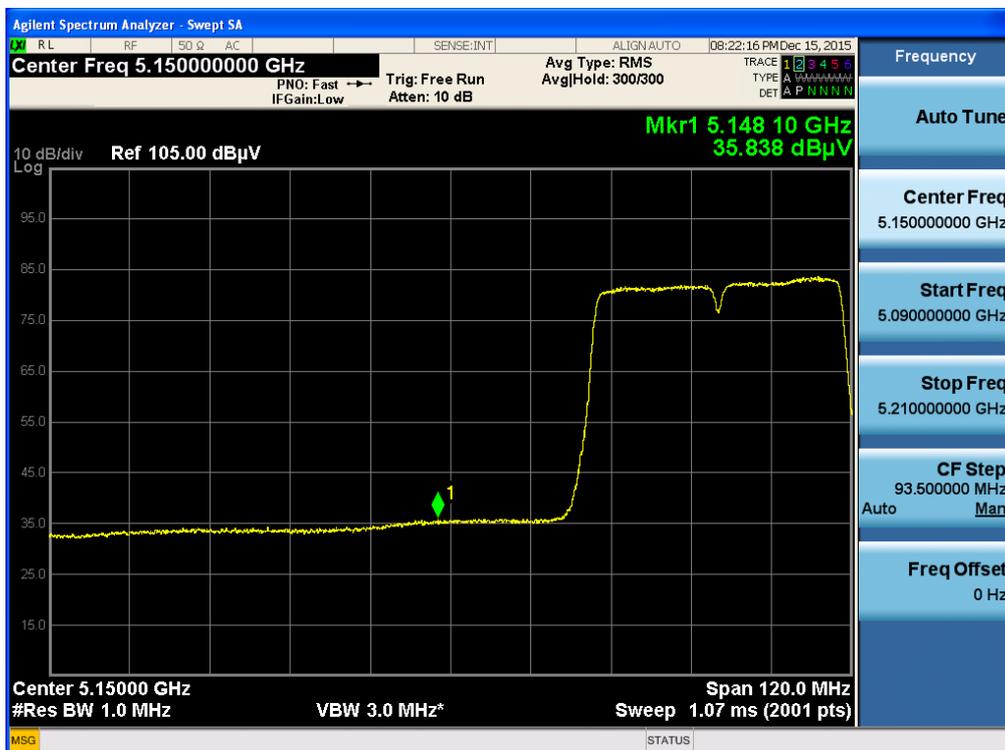
802.11n(HT40)   &   U-NII 2C   &   Ch.62   **Detector Mode : PK**
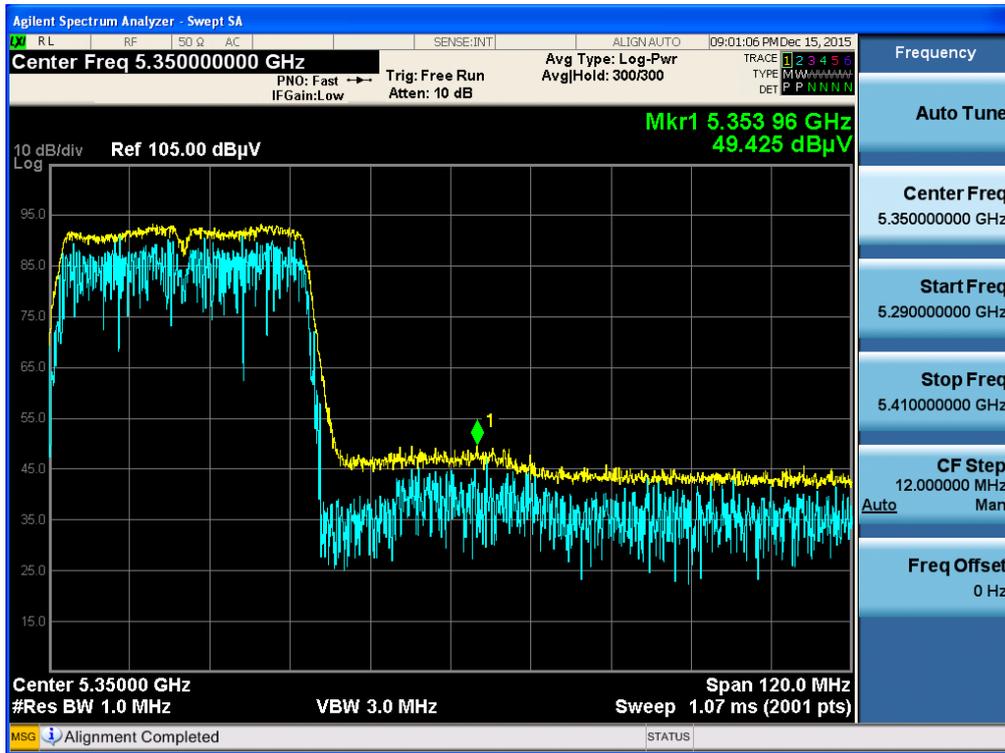
802.11n(HT40)   &   U-NII 2C   &   Ch.62   **Detector Mode : AV**

802.11n(HT40)   &   U-NII 2C   &   Ch.102   **Detector Mode : PK**
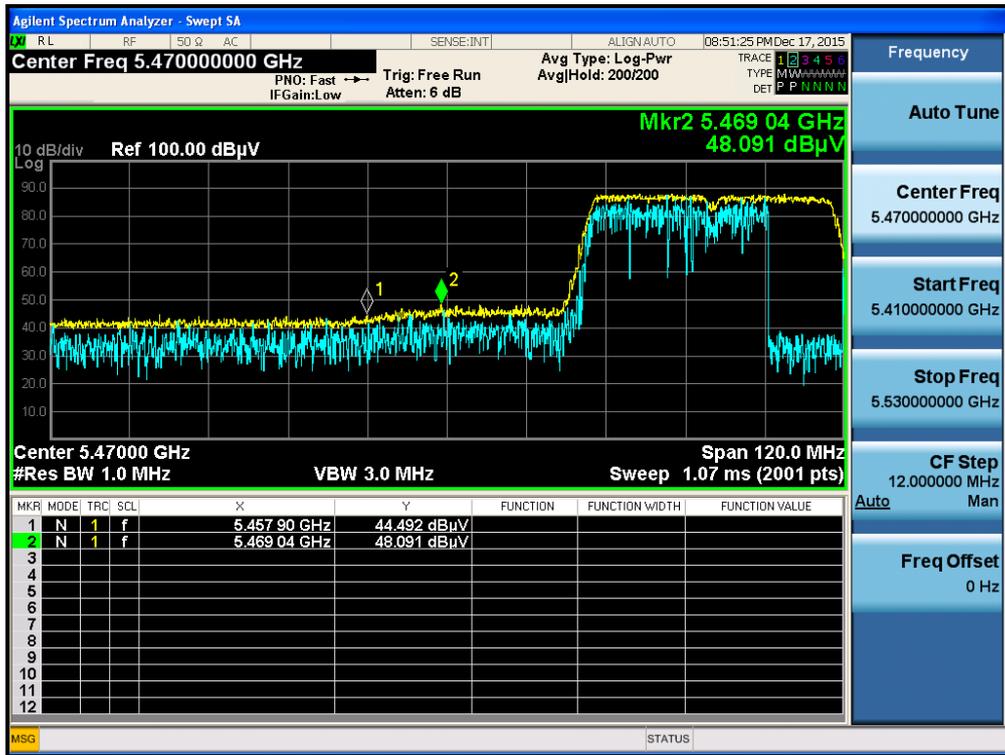
802.11n(HT40)   &   U-NII 2C   &   Ch.102   **Detector Mode : AV**
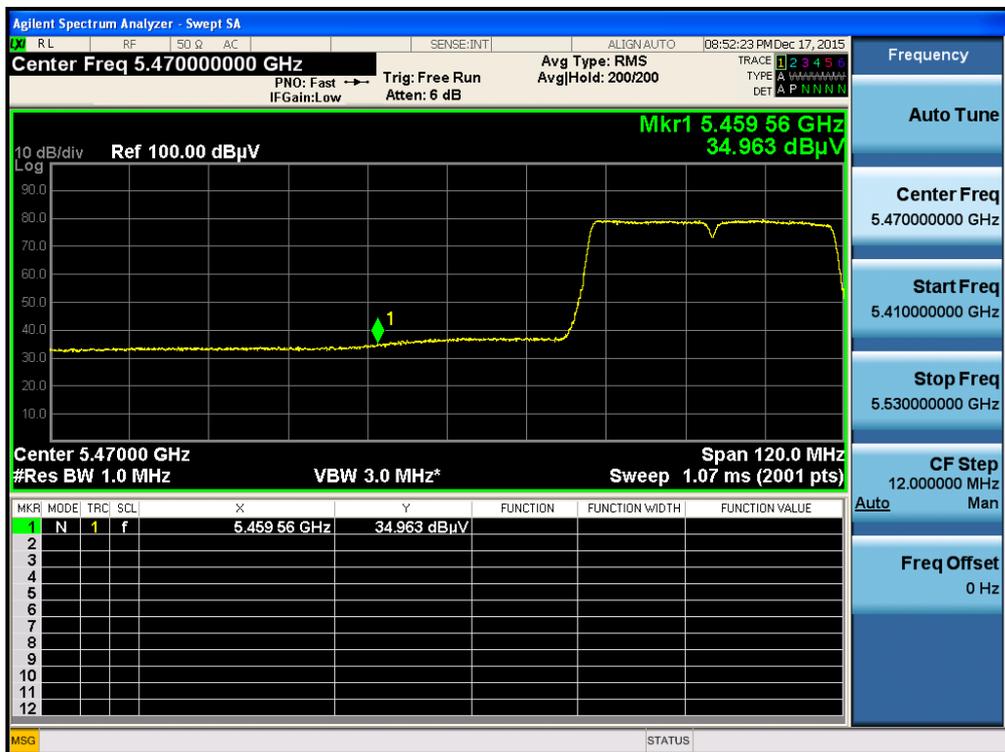
802.11n(HT40)   &   U-NII 2C   &   Ch.134   Detector Mode : PK
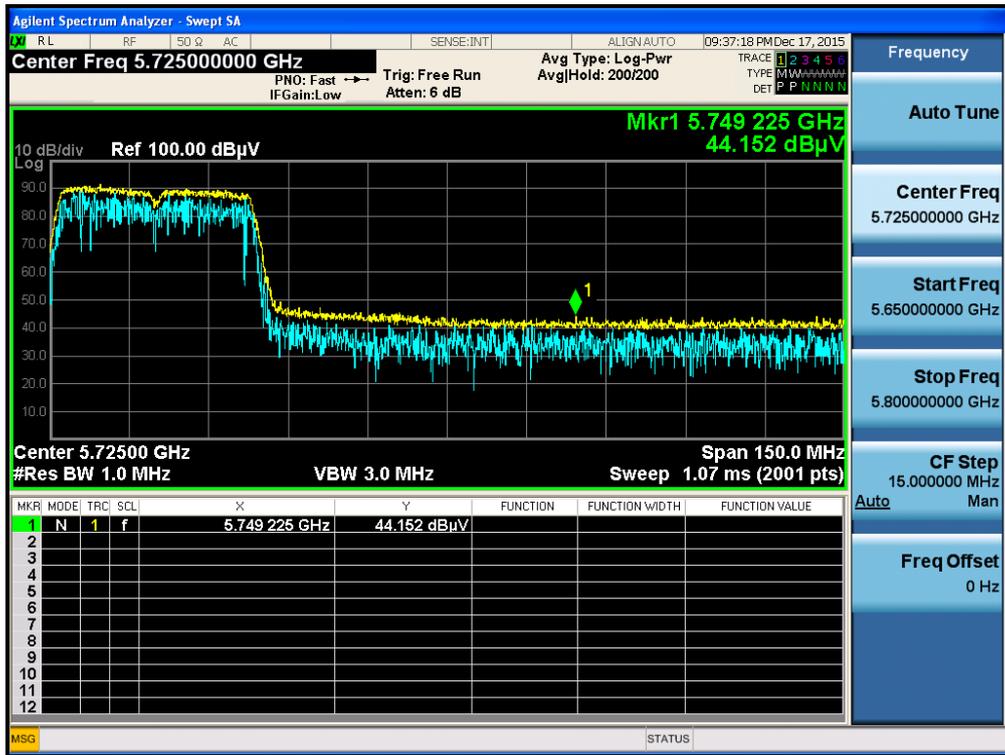
802.11n(HT40)   &   U-NII 3   &   Ch.151   Detector Mode : PK
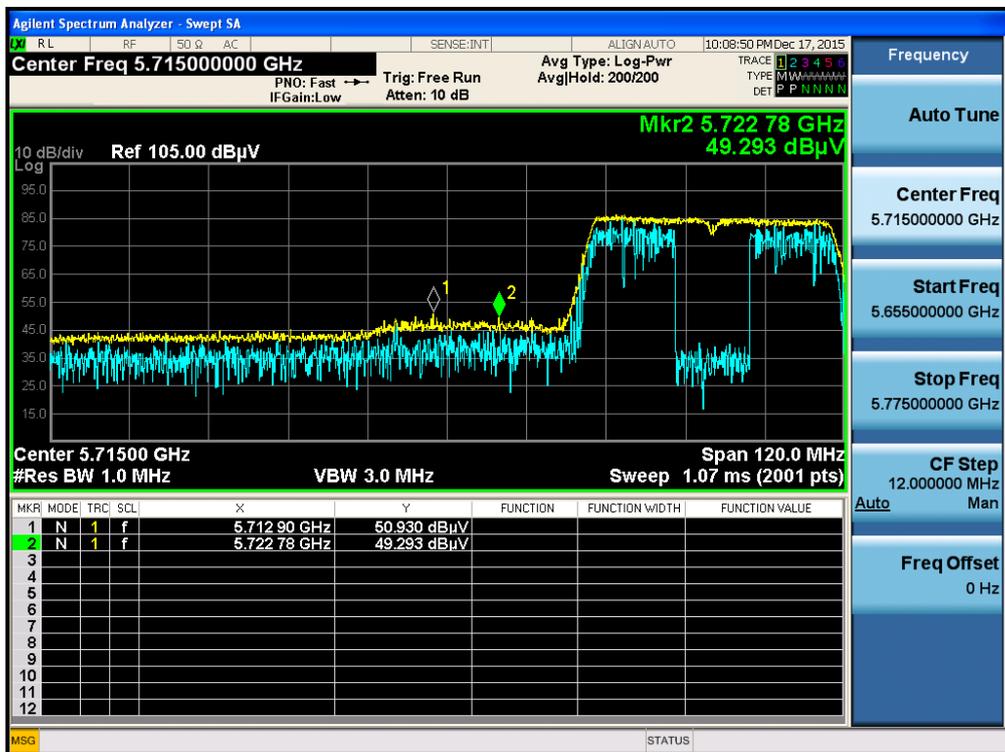
802.11n(HT40)   &   U-NII 3   &   Ch.159   Detector Mode : PK
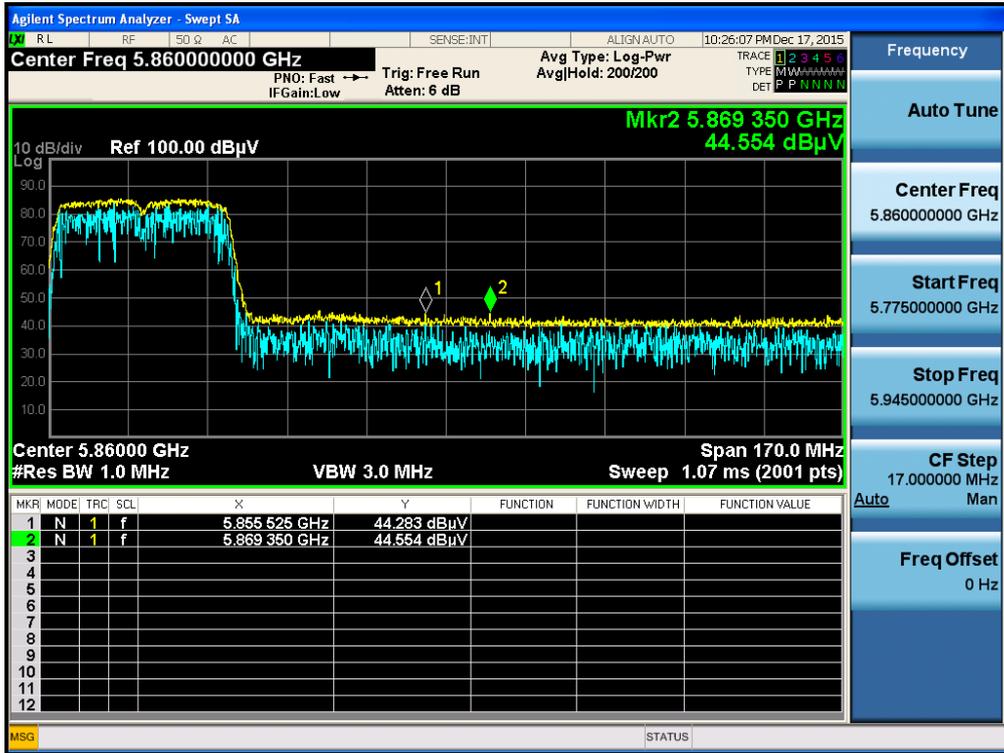
802.11ac(VHT80) & U-NII 1 & Ch.42   **Detector Mode : PK**
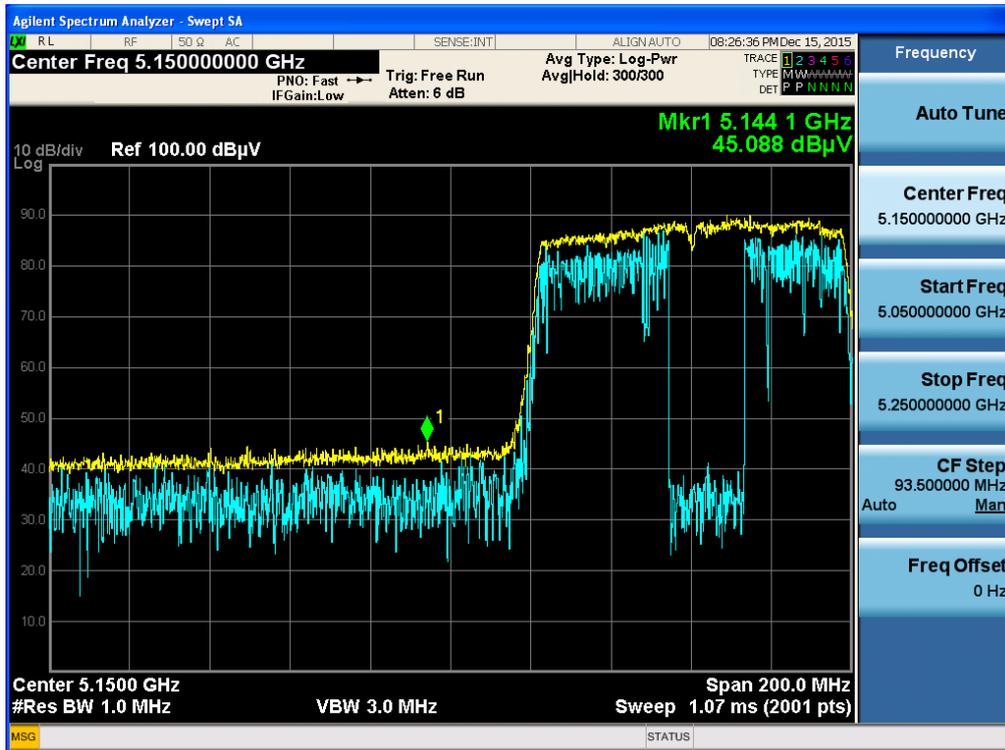
**802.11ac(VHT80) & U-NII 1 & Ch.42**   **Detector Mode : AV**
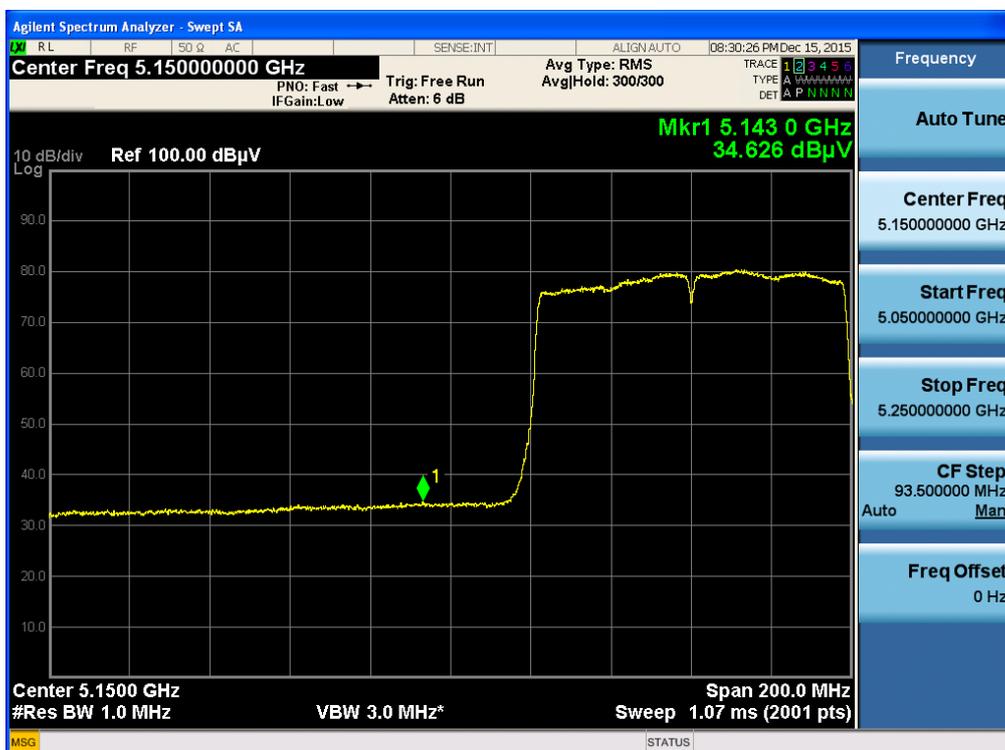
**802.11ac(VHT80)   &   U-NII 1   &   Ch.58**   **Detector Mode : PK**
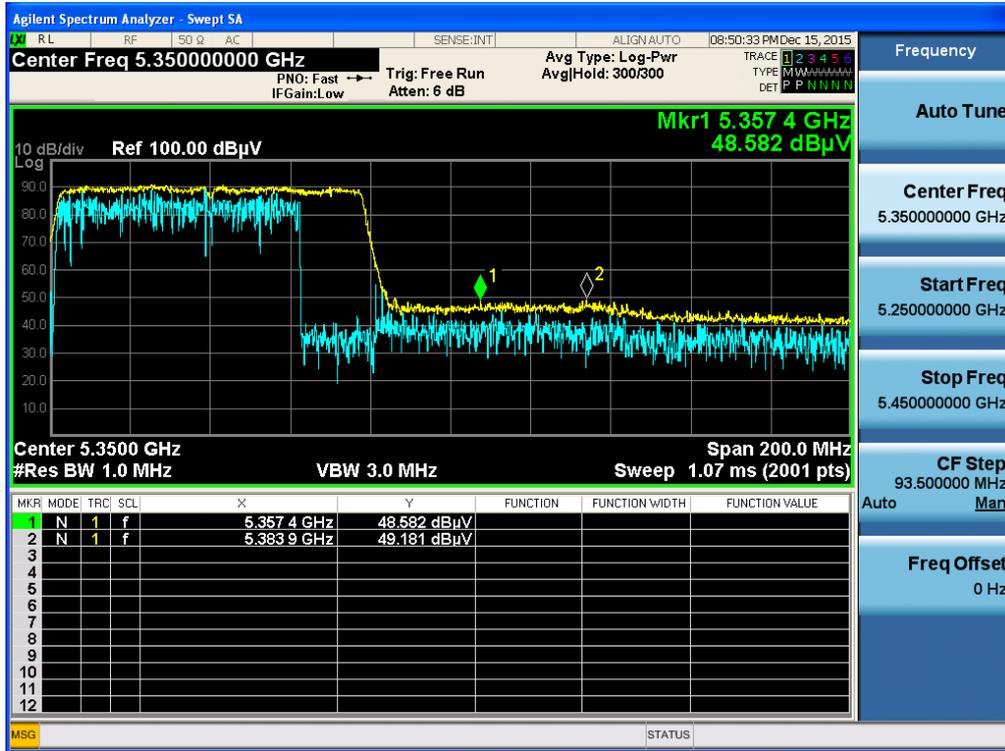
802.11ac(VHT80)   &   U-NII 1   &   Ch.58   **Detector Mode : AV**
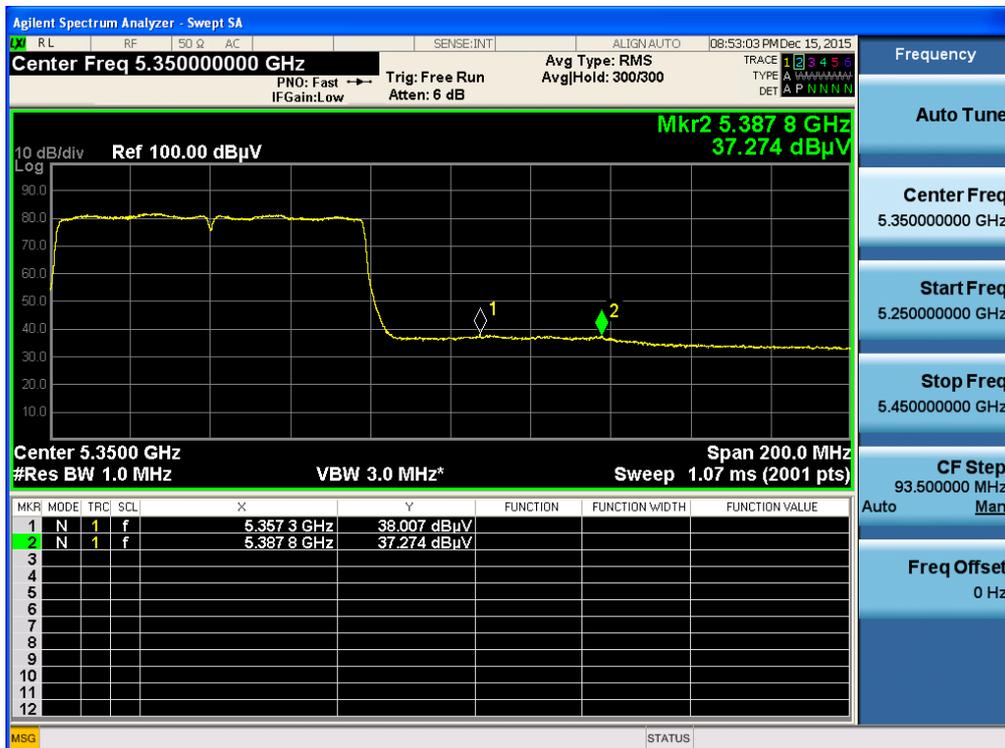
## 802.11ac(VHT80)　&　U-NII 2C　&　Ch.106　　　　　　　Detector Mode : PK
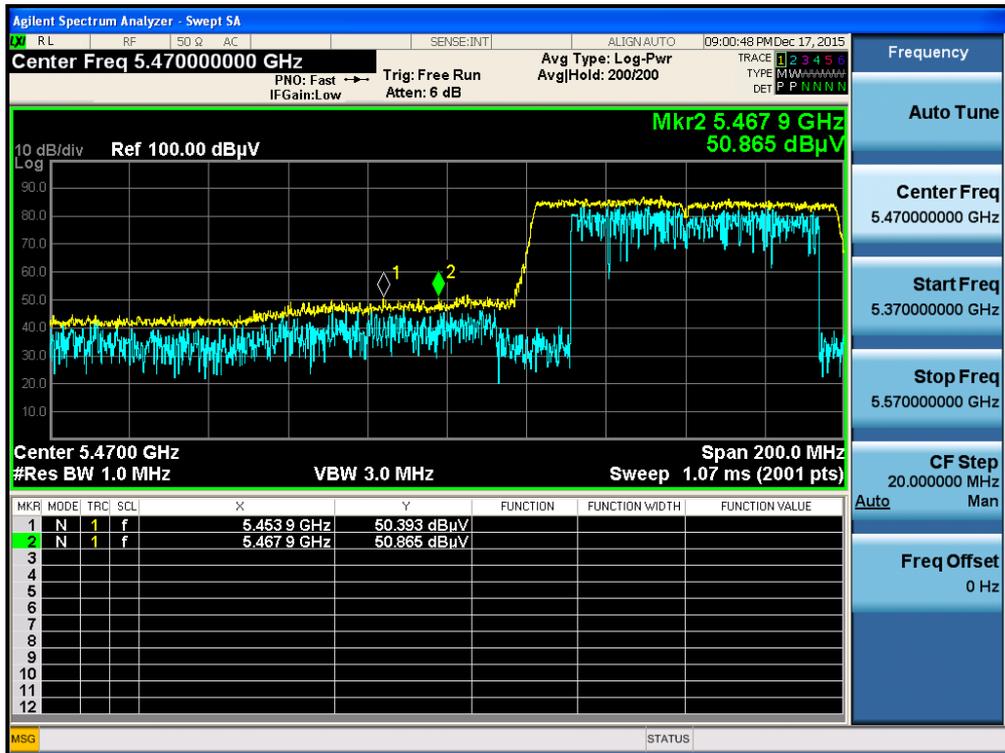
802.11ac(VHT80)　&　U-NII 3　&　Ch.106　　　　　　　　Detector Mode : AV
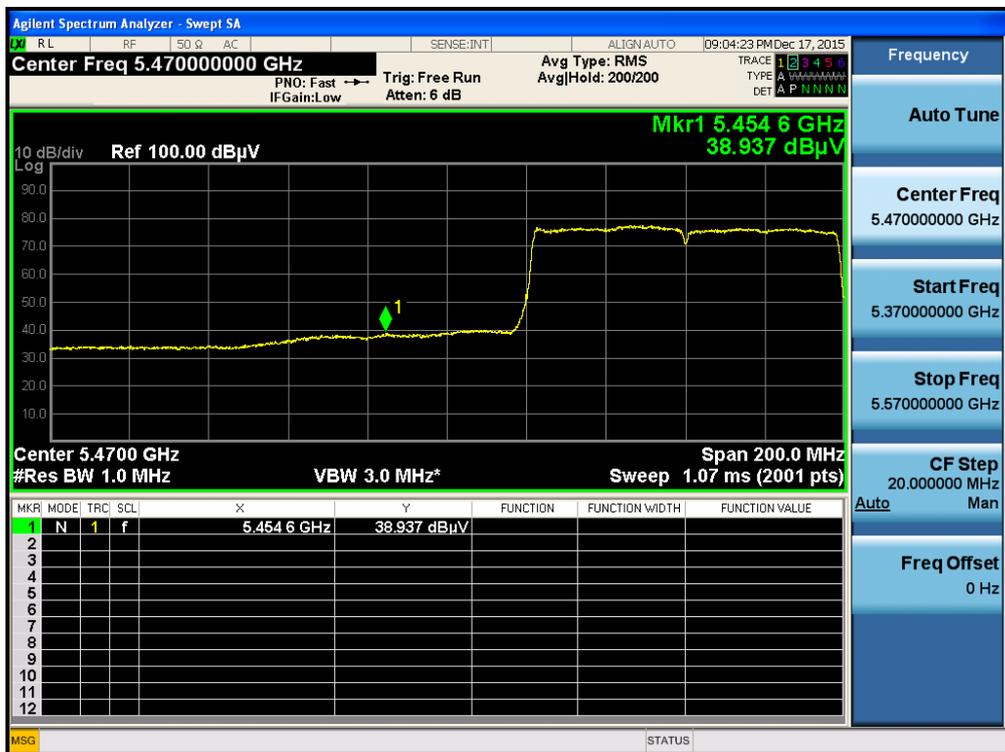
802.11ac(VHT80) & U-NII 3 & Ch.155   **Detector Mode : PK**
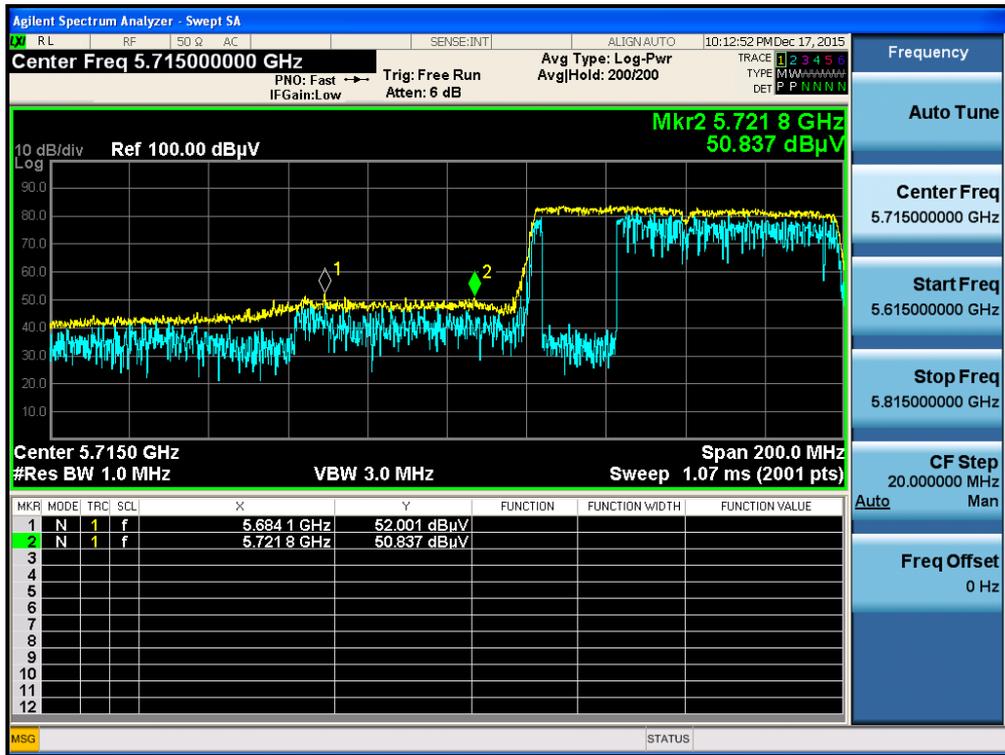
**802.11ac(VHT80) & U-NII 3 & Ch.155**   **Detector Mode : PK**
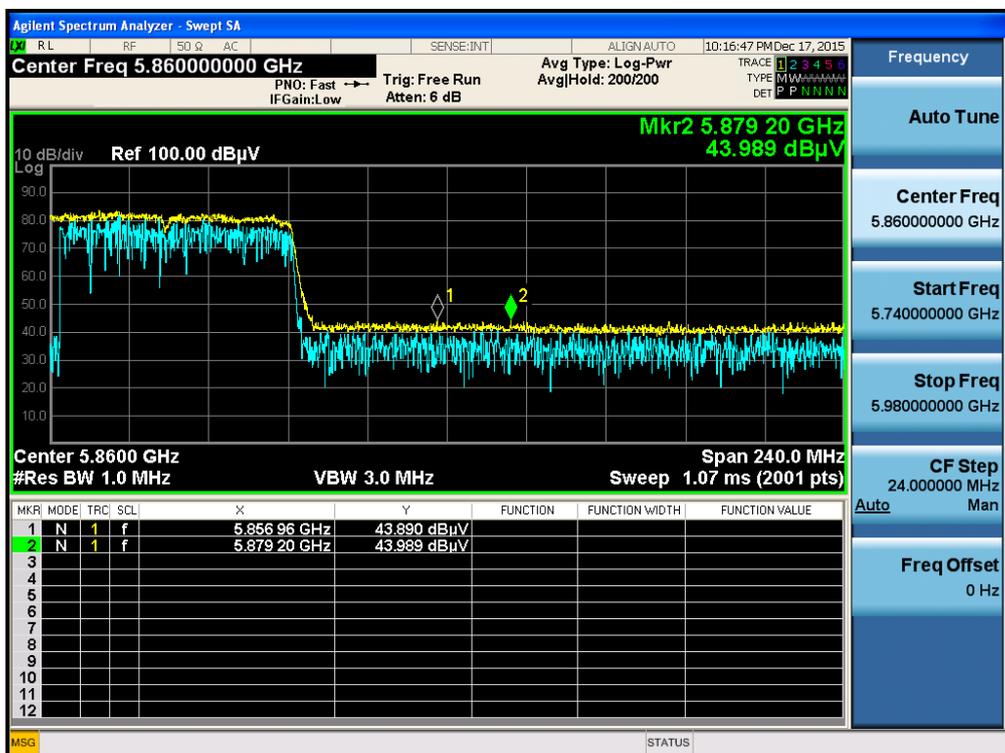
Spurious emission. (Radiated) Test Plot

Note: The offset was not included in test plot.(Reading value) The results refer to the table of clause 8.6.

802.11a   &   U-NII 2C   &   Ch.140   Detector Mode : PK
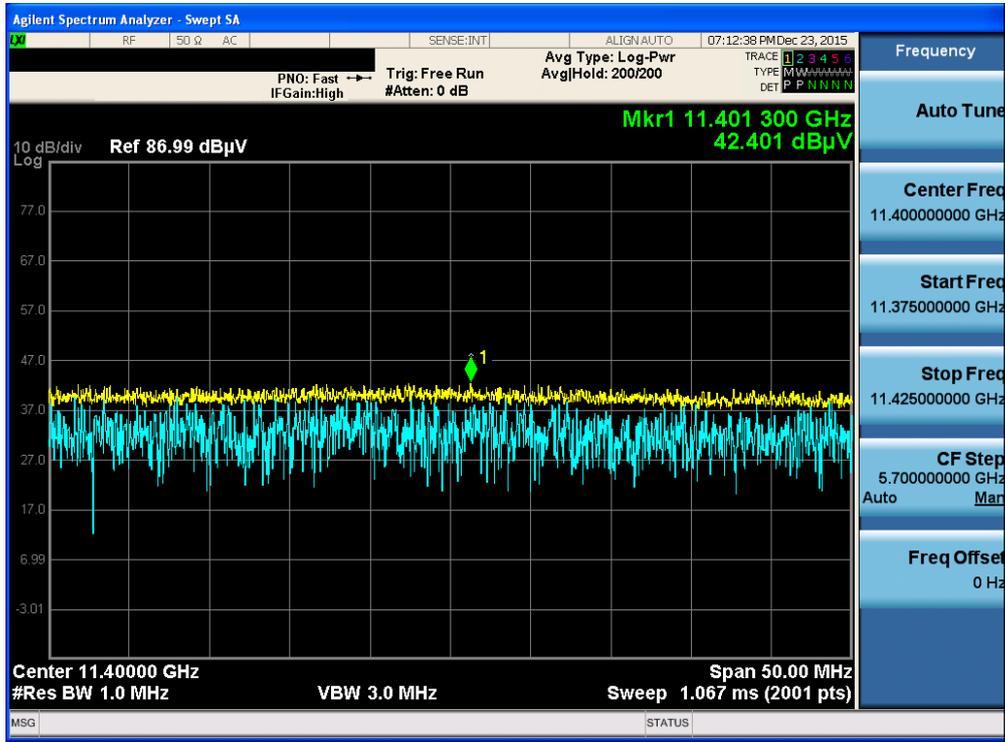

### 802.11a   &   U-NII 2C   &   Ch.140   Detector Mode : AV
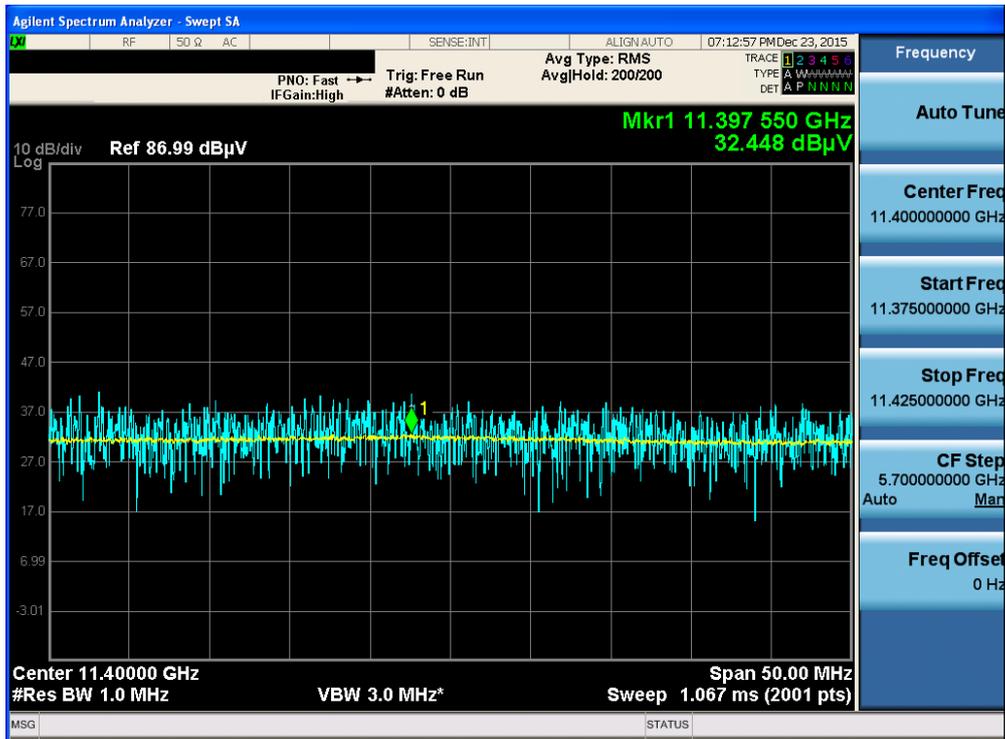
802.11n(HT20)   &   U-NII 3   &   Ch.165   **Detector Mode : PK**
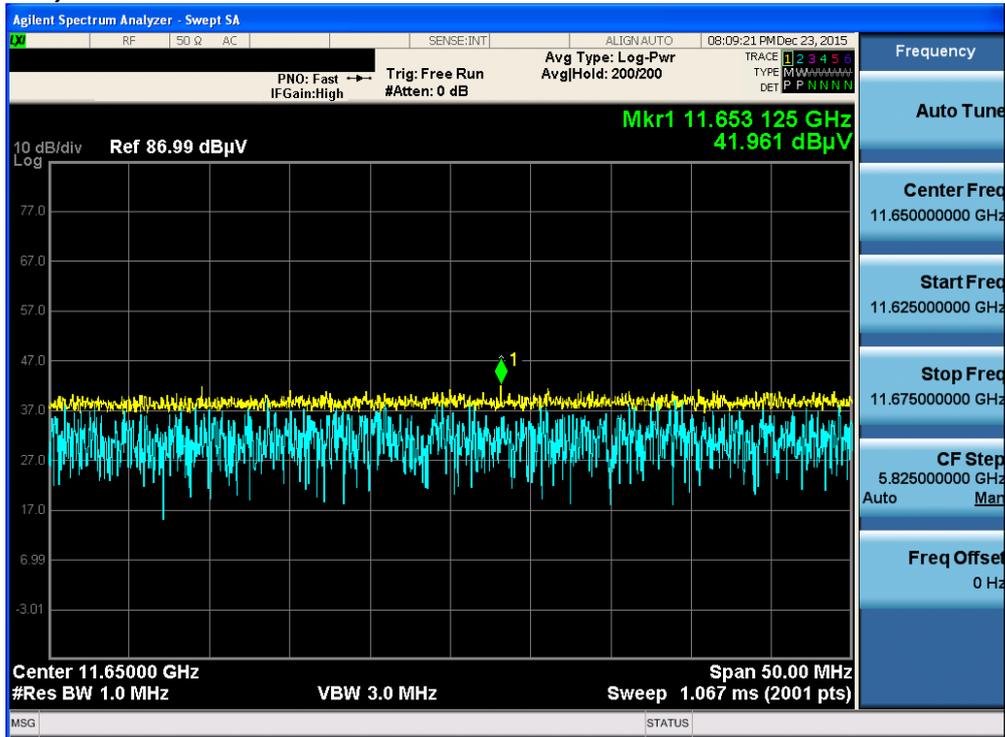
**802.11n(HT20)   &   U-NII 3   &   Ch.165**   **Detector Mode : AV**

802.11n(HT40)   &   U-NII 2C   &   Ch.134   **Detector Mode : PK**


802.11n(HT40)   &   U-NII 2C   &   Ch.134   **Detector Mode : AV**

802.11ac(VHT80)   &   U-NII 2C   &   Ch.138   **Detector Mode : PK**

802.11ac(VHT80)   &   U-NII 2C   &   Ch.138   **Detector Mode : AV**