8.8 Occupied Bandwidth (99%)

▣ 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

RSS-Gen[6.7]

- 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.

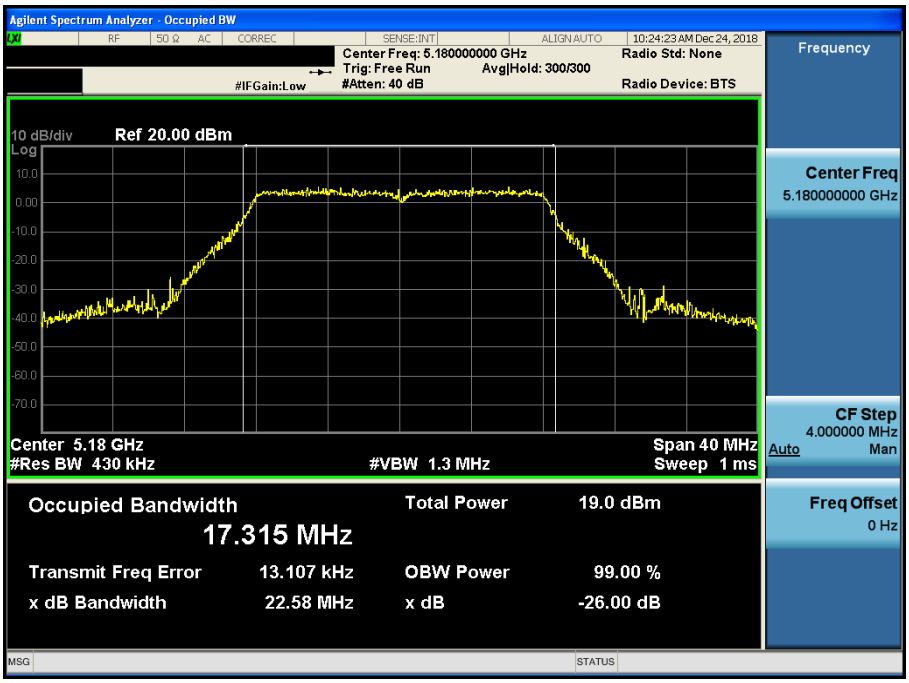
▣ Test Results : Comply

. Mode	Bands	Channel	Frequency [MHz]	Test Result [MHz]
802.11a	U-NII 1	36	5180	17.32
		40	5200	17.28
		48	5240	17.30
	U-NII 2A	52	5260	17.28
		60	5300	17.28
		64	5320	17.29
	U-NII 2C	100	5500	17.24
		116	5580	17.25
		140	5700	17.26
	U-NII 3	149	5745	17.27
		157	5785	17.33
		165	5825	17.26
802.11n(HT20)	U-NII 1	36	5180	18.24
		40	5200	18.23
		48	5240	18.25
	U-NII 2A	52	5260	18.19
		60	5300	18.22
		64	5320	18.24
	U-NII 2C	100	5500	18.18
		116	5580	18.26
		140	5700	18.18
	U-NII 3	149	5745	18.22
		157	5785	18.31
		165	5825	18.25
802.11n(HT40)	U-NII 1	38	5190	36.33
		46	5230	36.29
	U-NII 2A	54	5270	36.16
		62	5310	36.29
	U-NII 2C	102	5510	36.26
		110	5550	36.31
		134	5670	36.30
	U-NII 3	151	5755	36.32
		159	5795	36.34
802.11ac(VHT80)	U-NII 1	42	5210	74.86
	U-NII 2A	58	5290	74.78
	U-NII 2C	106	5530	74.84
	U-NII 3	155	5775	74.93

▣ Result Plots

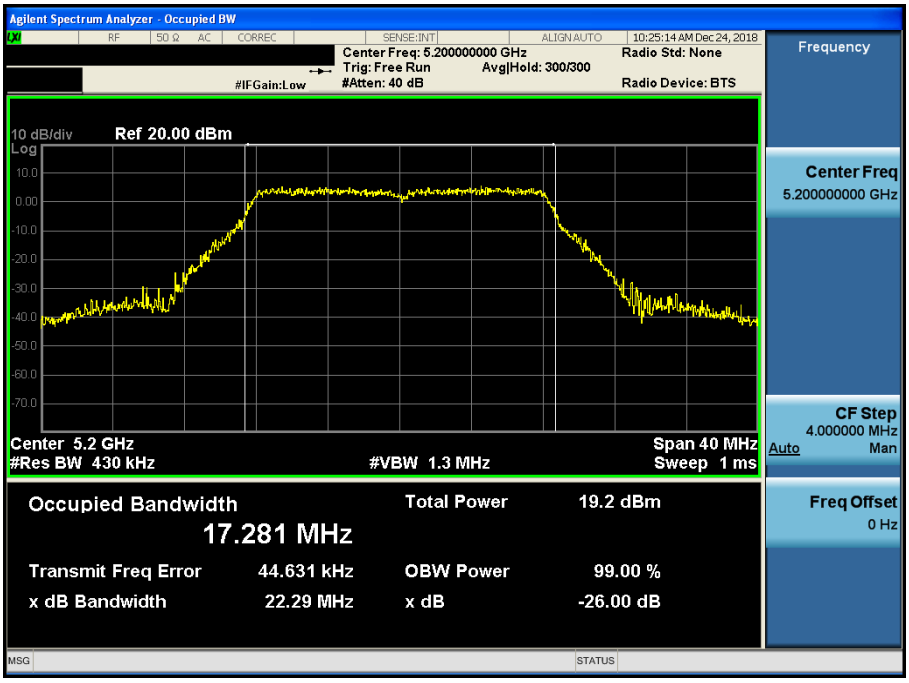
Occupied Bandwidth 99%

Test Mode: 802.11a & Ch.36

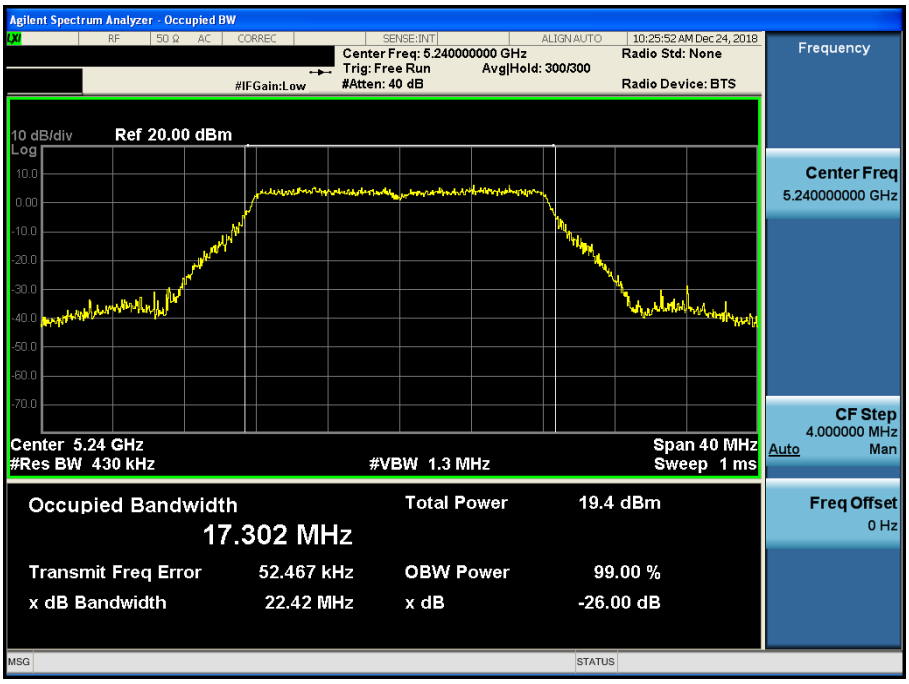


Occupied Bandwidth 99%

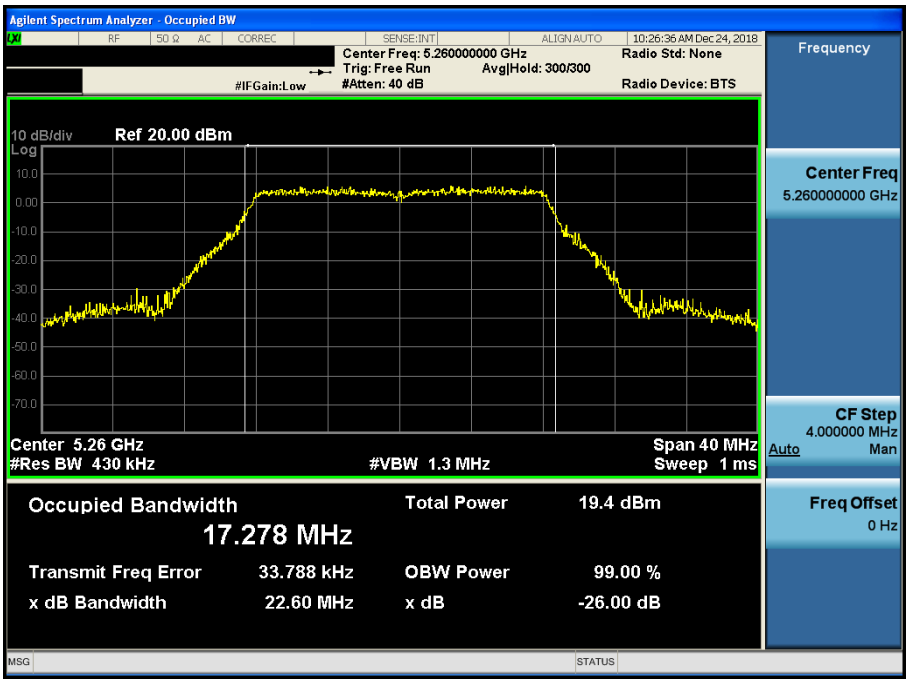
Test Mode: 802.11a & Ch.40



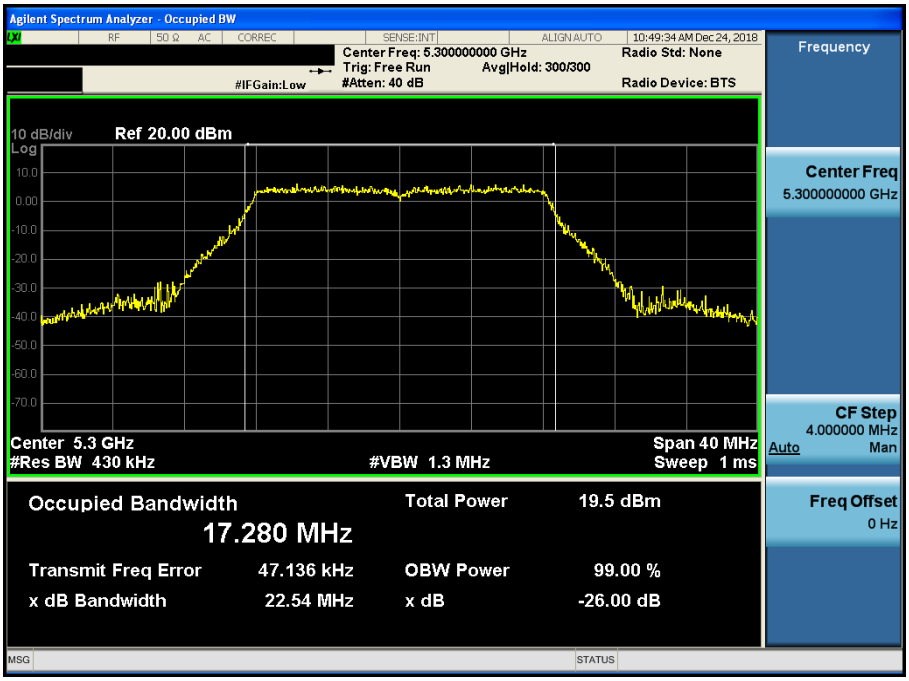
Occupied Bandwidth 99% Test Mode: 802.11a & Ch.48



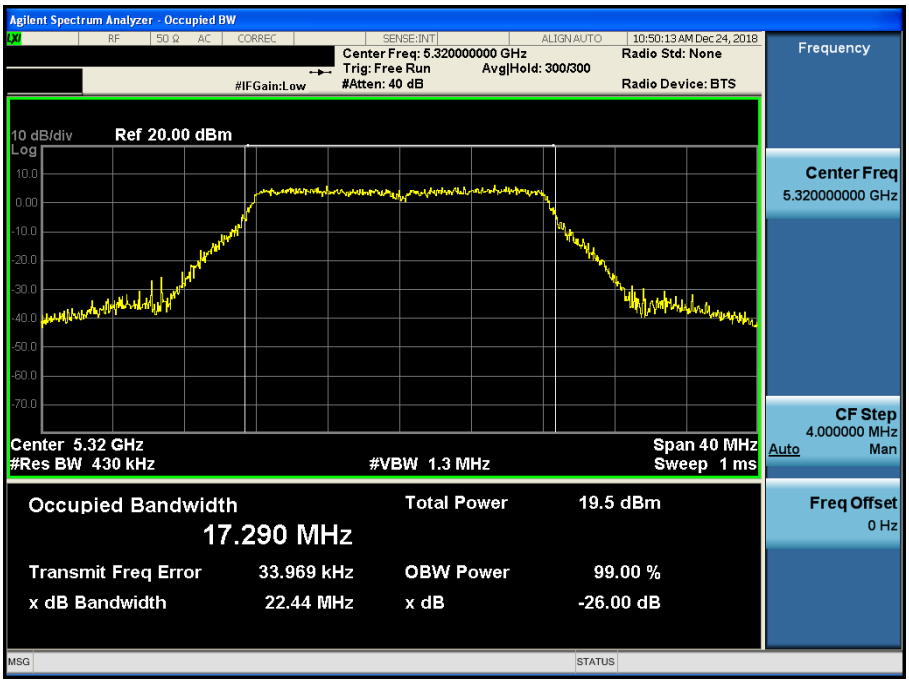
Occupied Bandwidth 99% Test Mode: 802.11a & Ch.52



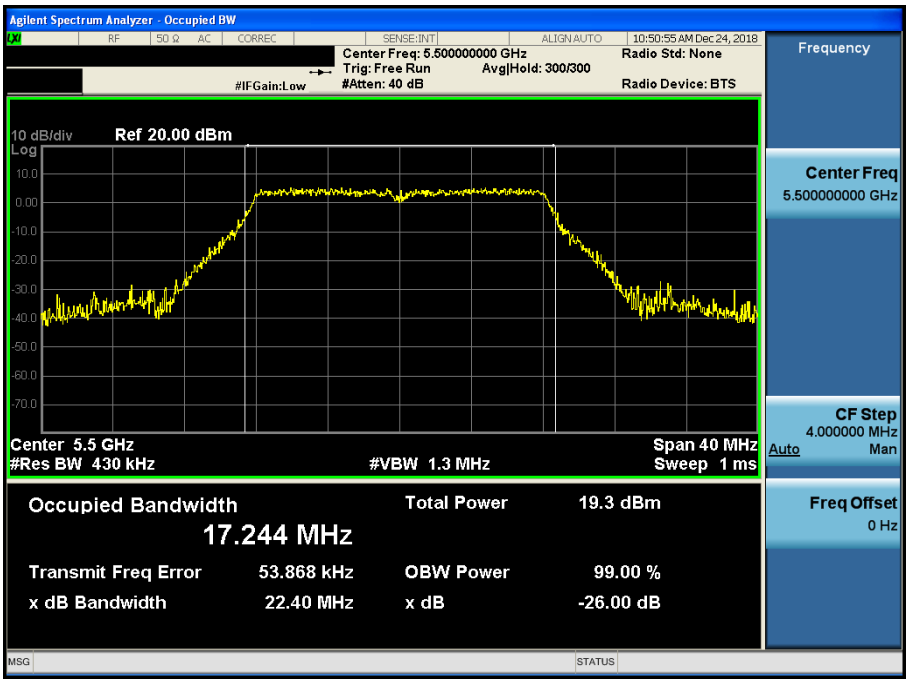
Occupied Bandwidth 99% Test Mode: 802.11a & Ch.60



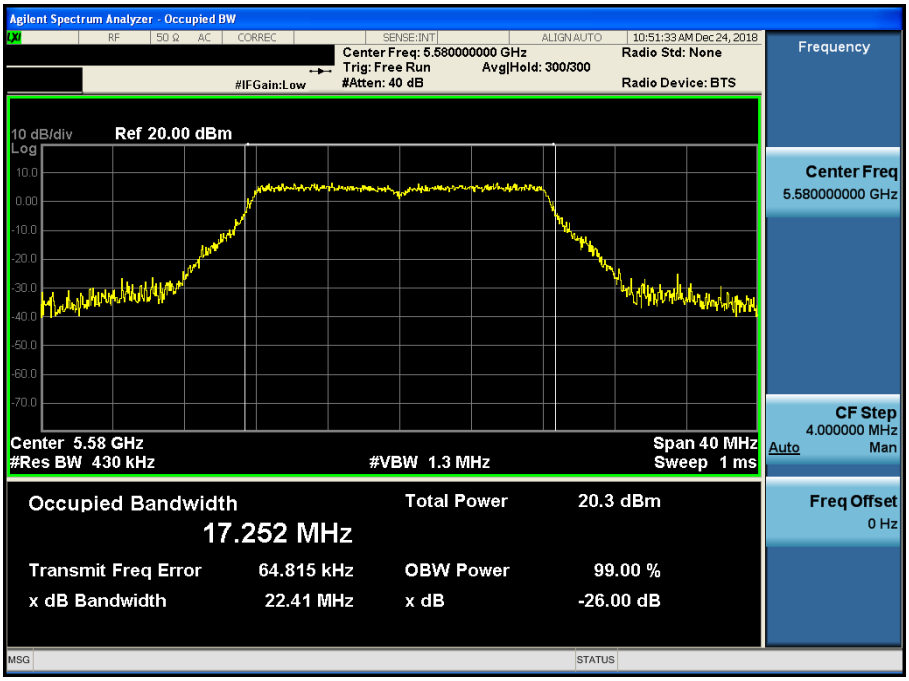
Occupied Bandwidth 99% Test Mode: 802.11a & Ch.64



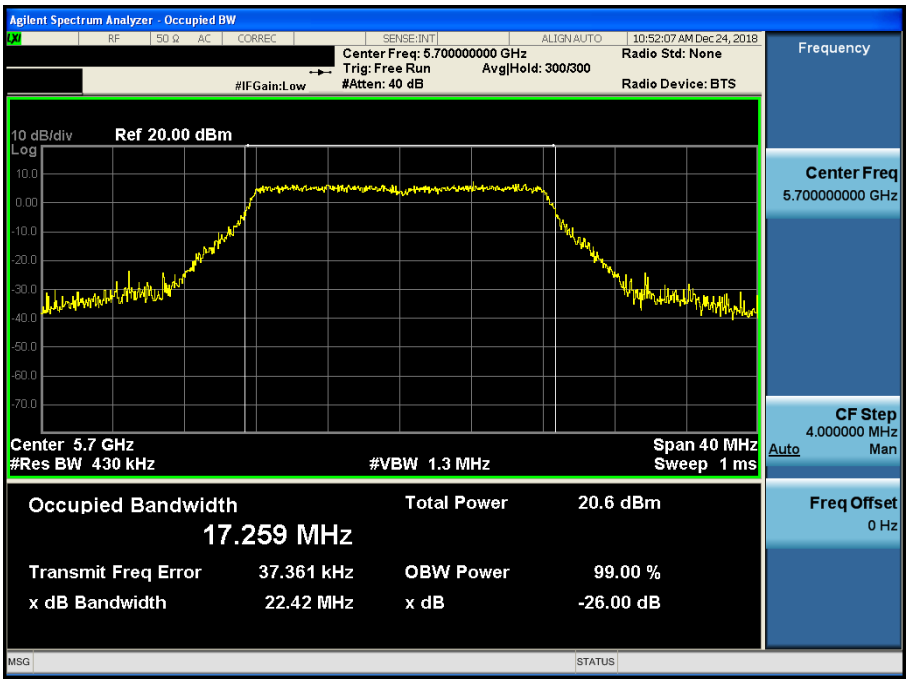
Occupied Bandwidth 99% Test Mode: 802.11a & Ch.100



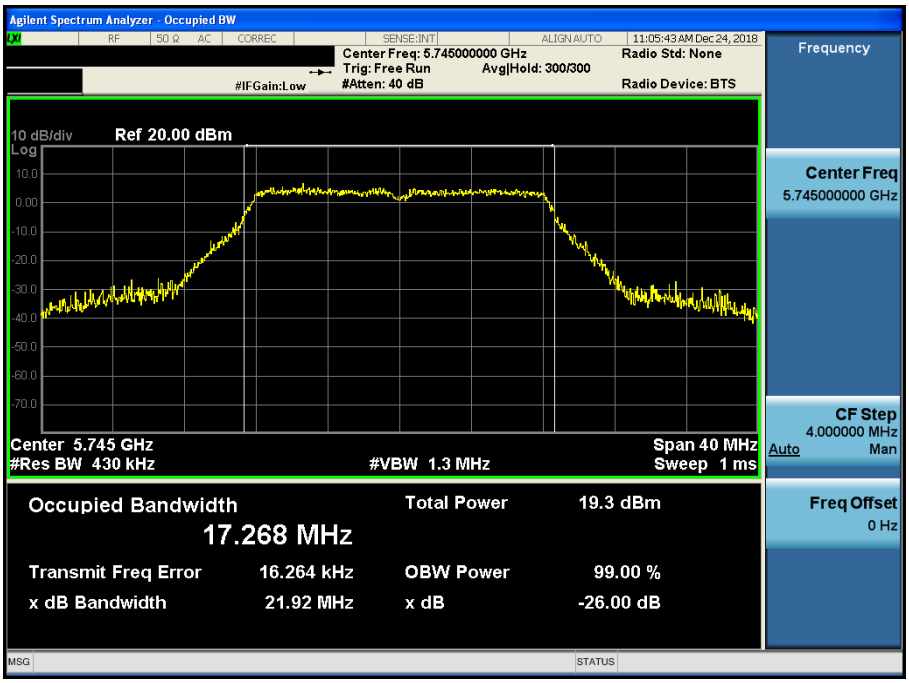
Occupied Bandwidth 99% Test Mode: 802.11a & Ch.116



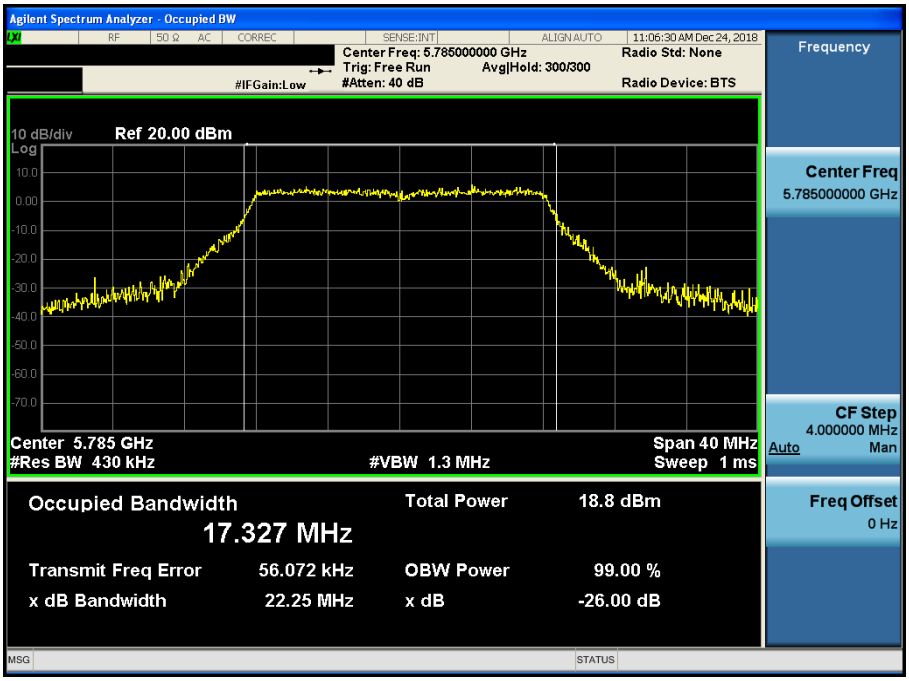
Occupied Bandwidth 99% Test Mode: 802.11a & Ch.140



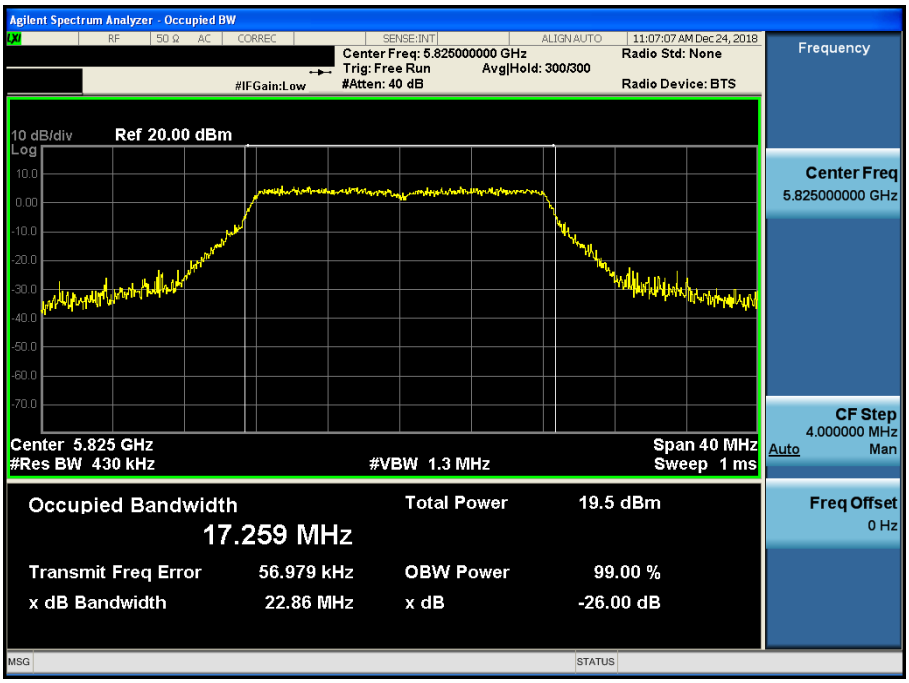
Occupied Bandwidth 99% Test Mode: 802.11a & Ch.149



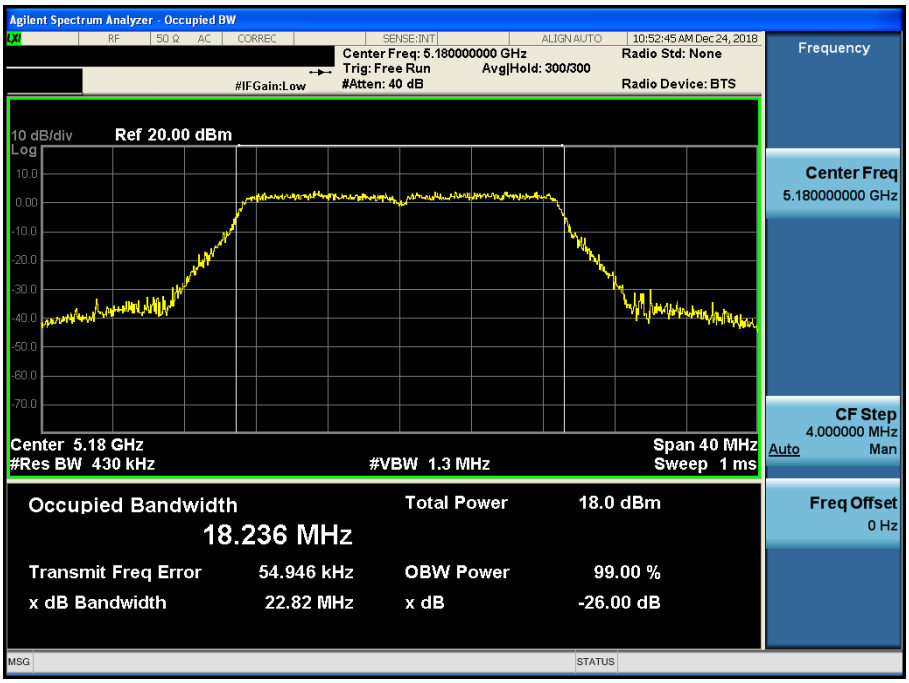
Occupied Bandwidth 99% Test Mode: 802.11a & Ch.157



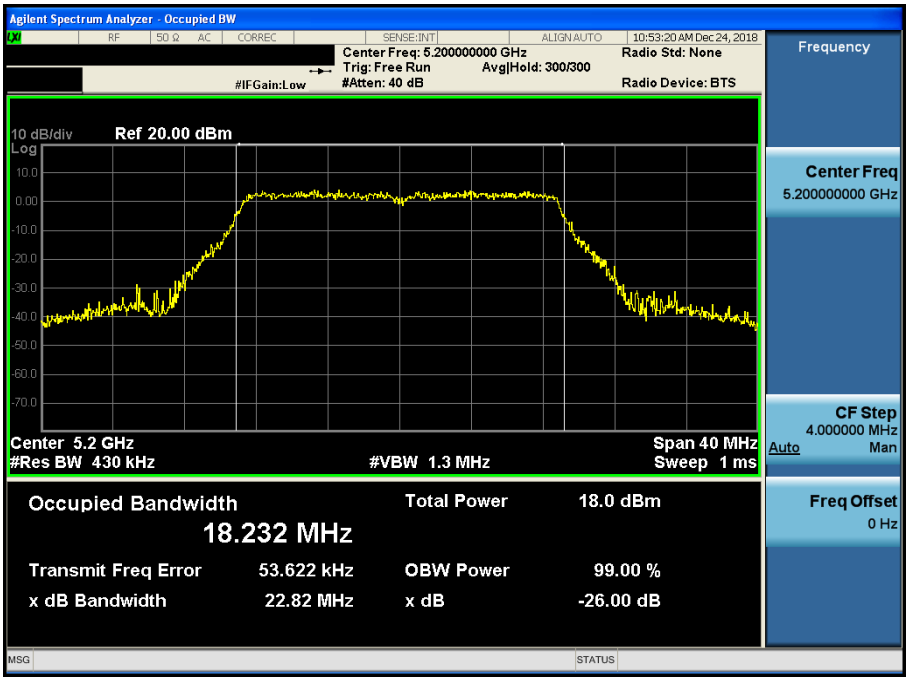
Occupied Bandwidth 99% Test Mode: 802.11a & Ch.165



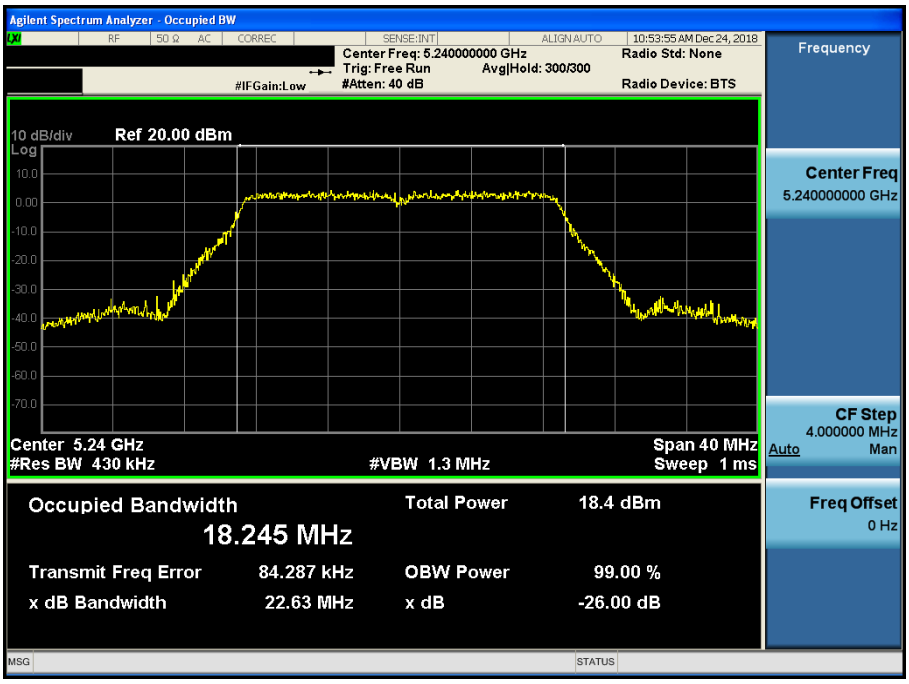
Occupied Bandwidth 99% Test Mode: 802.11n(HT20) & Ch.36



Occupied Bandwidth 99% Test Mode: 802.11n(HT20) & Ch.40

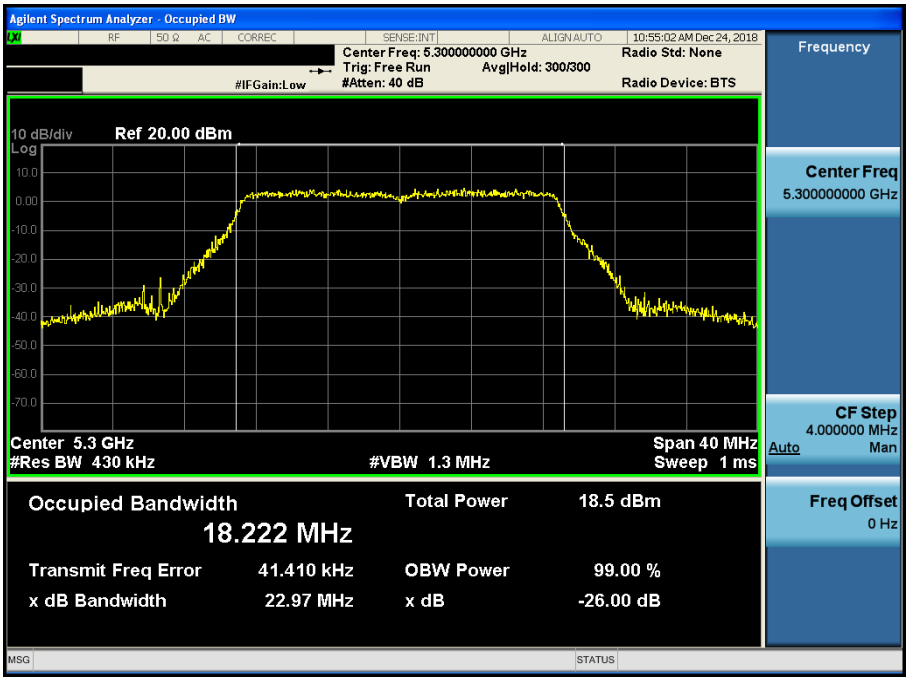


Occupied Bandwidth 99% Test Mode: 802.11n(HT20) & Ch.48

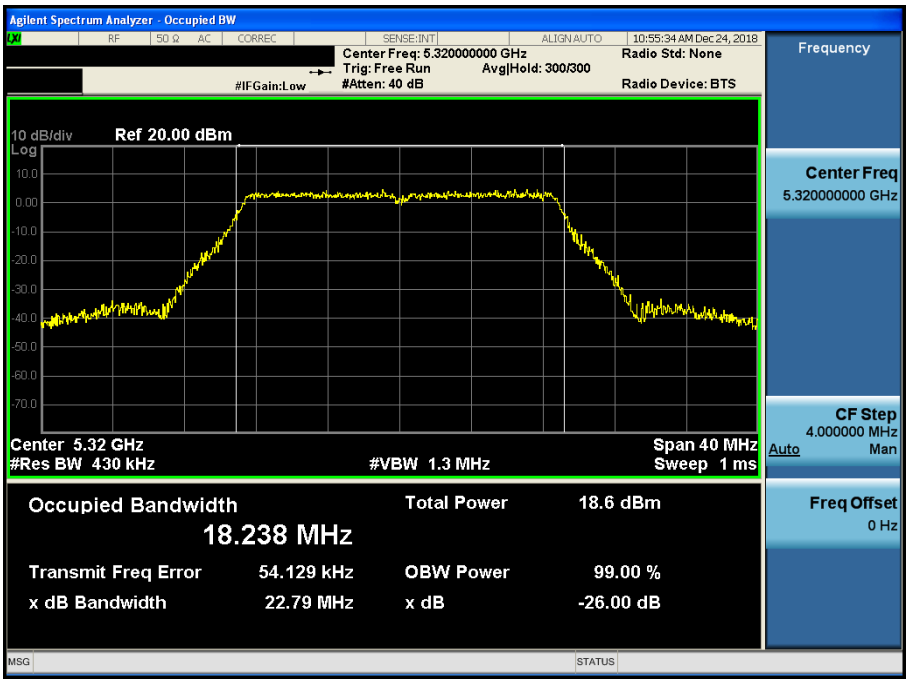


Occupied Bandwidth 99% Test Mode: 802.11n(HT20) & Ch.52

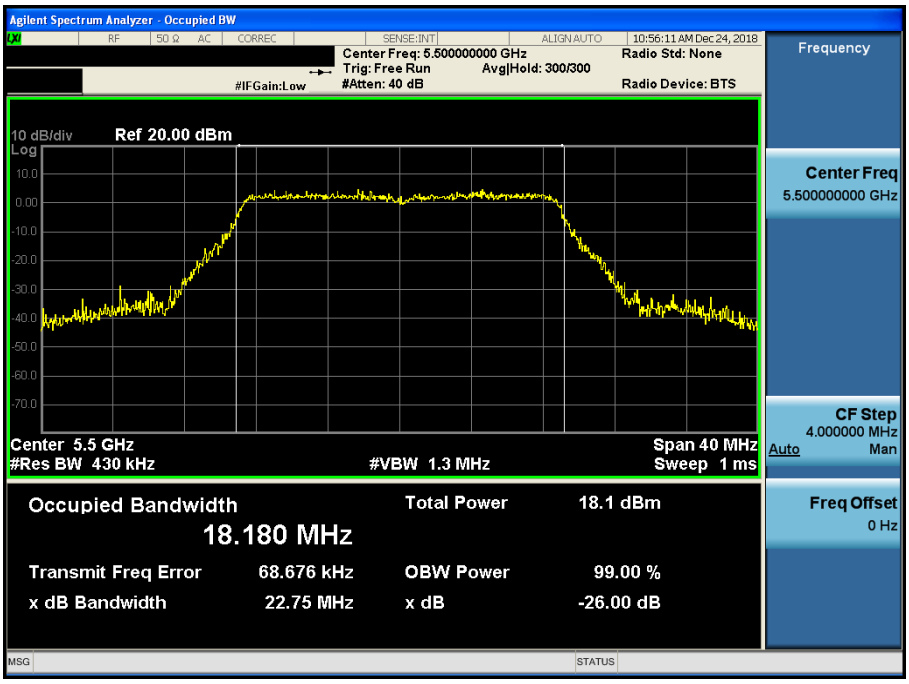
Occupied Bandwidth 99% Test Mode: 802.11n(HT20) & Ch.60



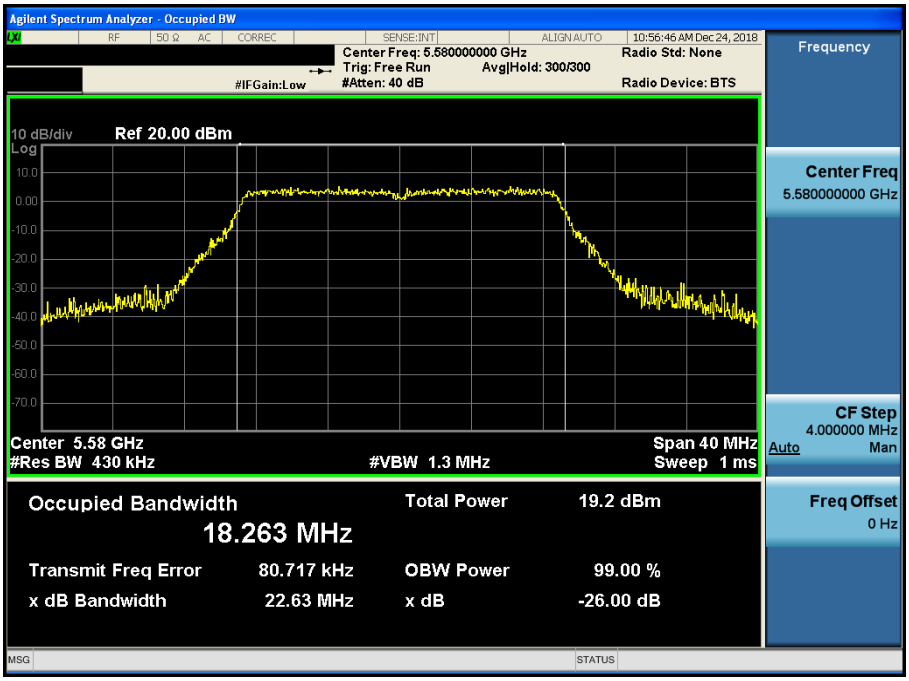
Occupied Bandwidth 99% Test Mode: 802.11n(HT20) & Ch.64



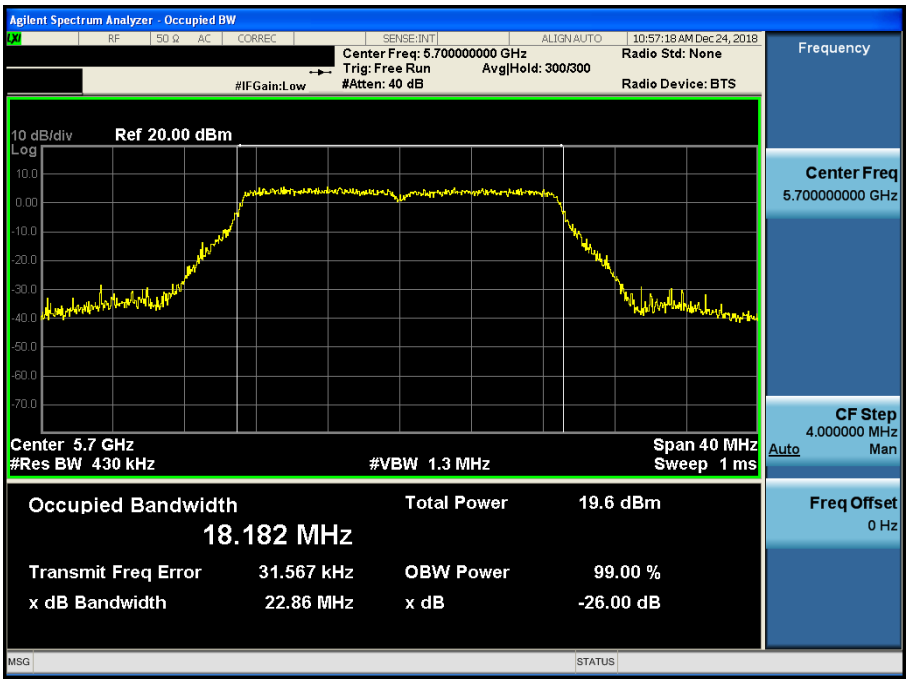
Occupied Bandwidth 99% Test Mode: 802.11n(HT20) & Ch.100



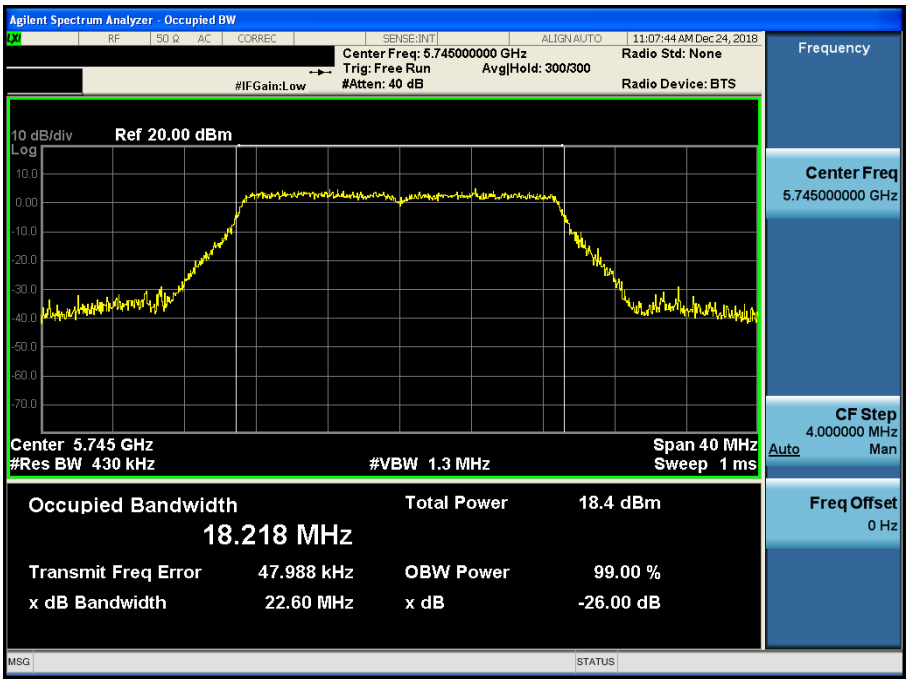
Occupied Bandwidth 99% Test Mode: 802.11n(HT20) & Ch.116



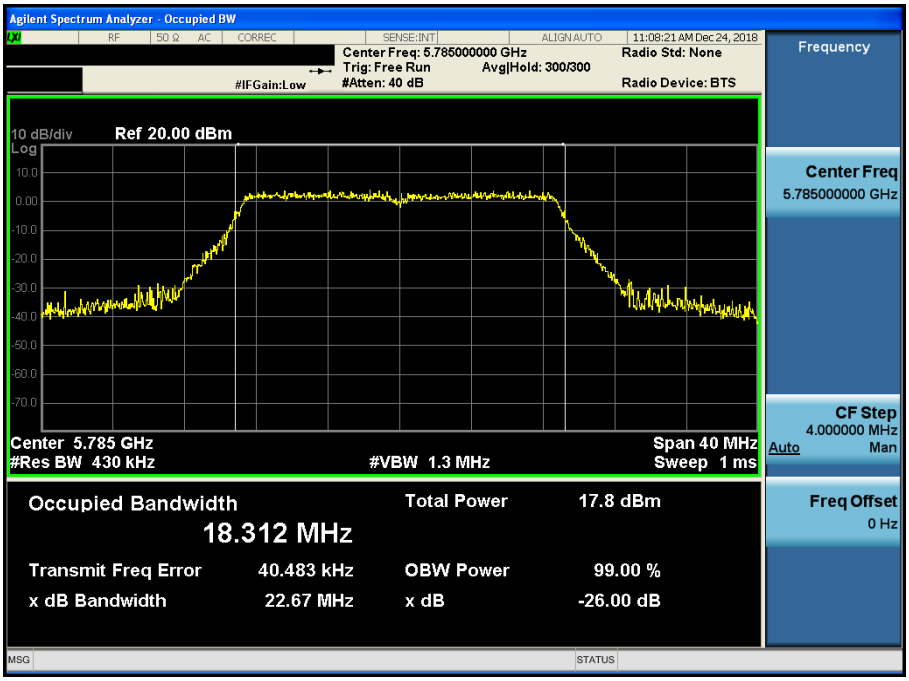
Occupied Bandwidth 99% Test Mode: 802.11n(HT20) & Ch.140



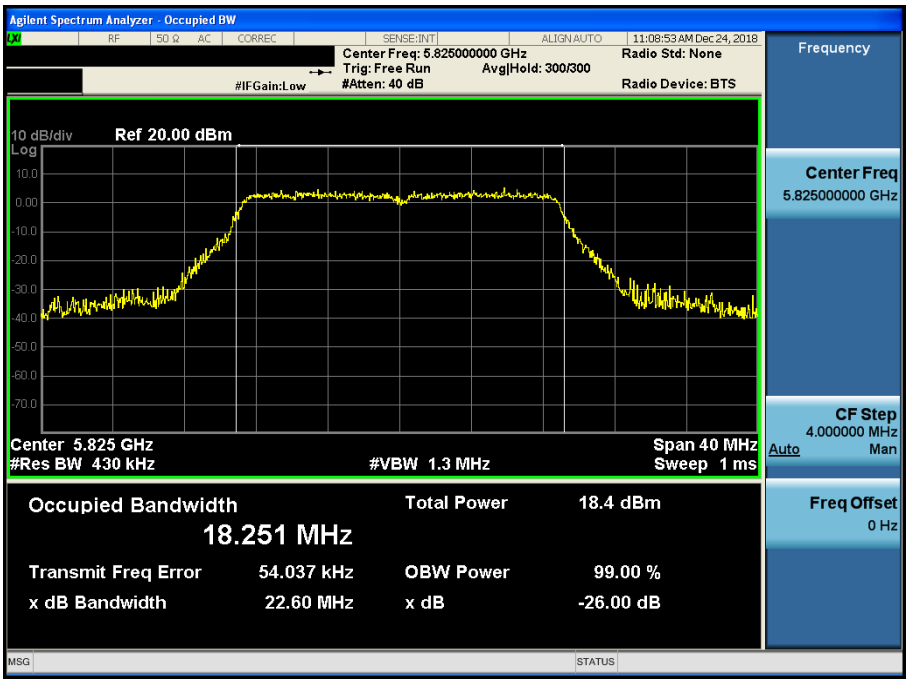
Occupied Bandwidth 99% Test Mode: 802.11n(HT20) & Ch.149



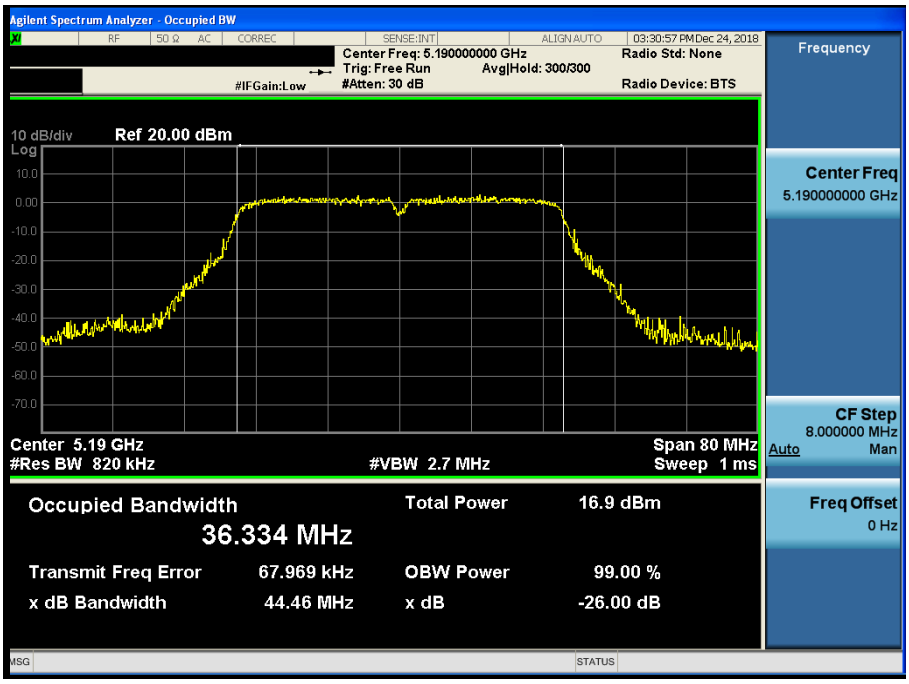
Occupied Bandwidth 99% Test Mode: 802.11n(HT20) & Ch.157



Occupied Bandwidth 99% Test Mode: 802.11n(HT20) & Ch.165

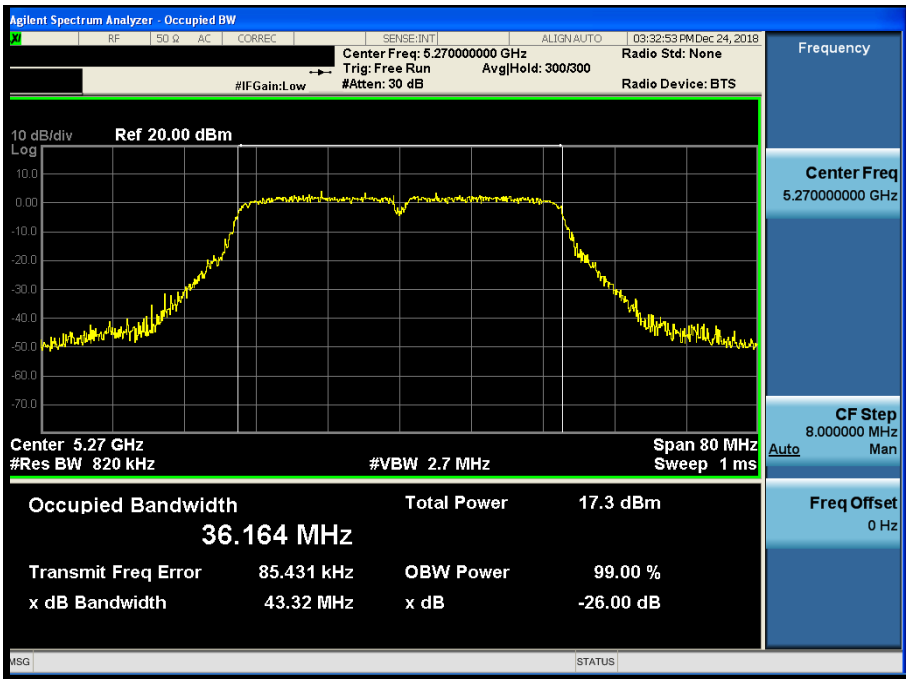


Occupied Bandwidth 99% Test Mode: 802.11n(HT40) & Ch.38

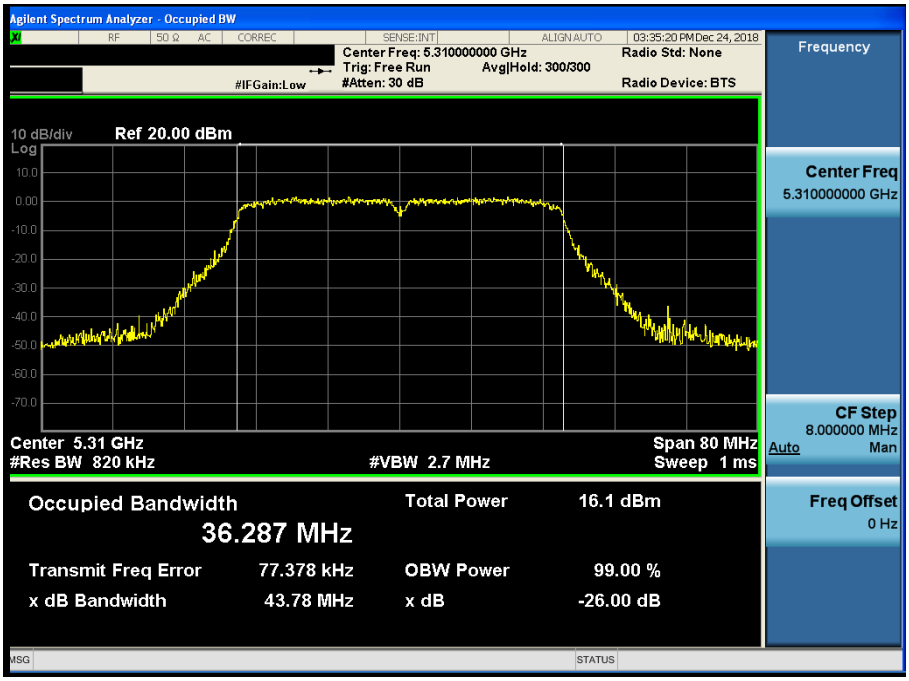


Occupied Bandwidth 99% Test Mode: 802.11n(HT40) & Ch.46

Occupied Bandwidth 99% Test Mode: 802.11n(HT40) & Ch.54

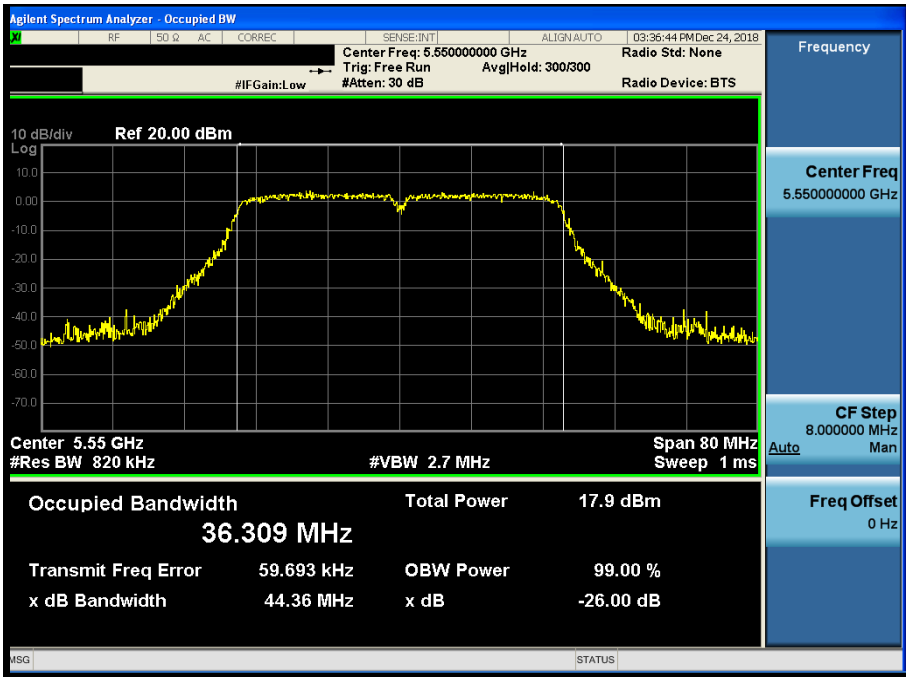


Occupied Bandwidth 99% Test Mode: 802.11n(HT40) & Ch.62

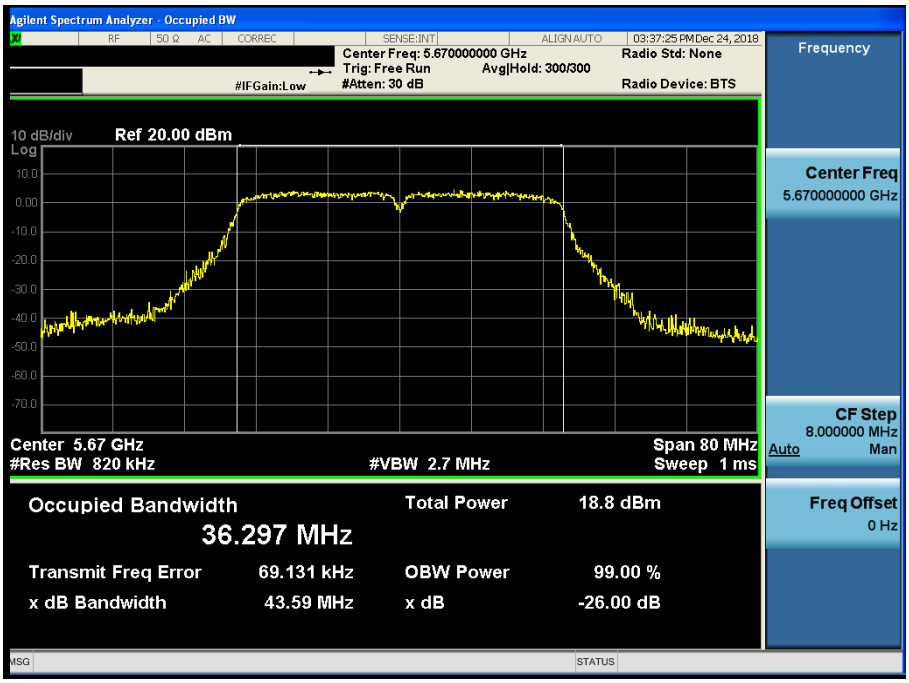


Occupied Bandwidth 99% Test Mode: 802.11n(HT40) & Ch.102

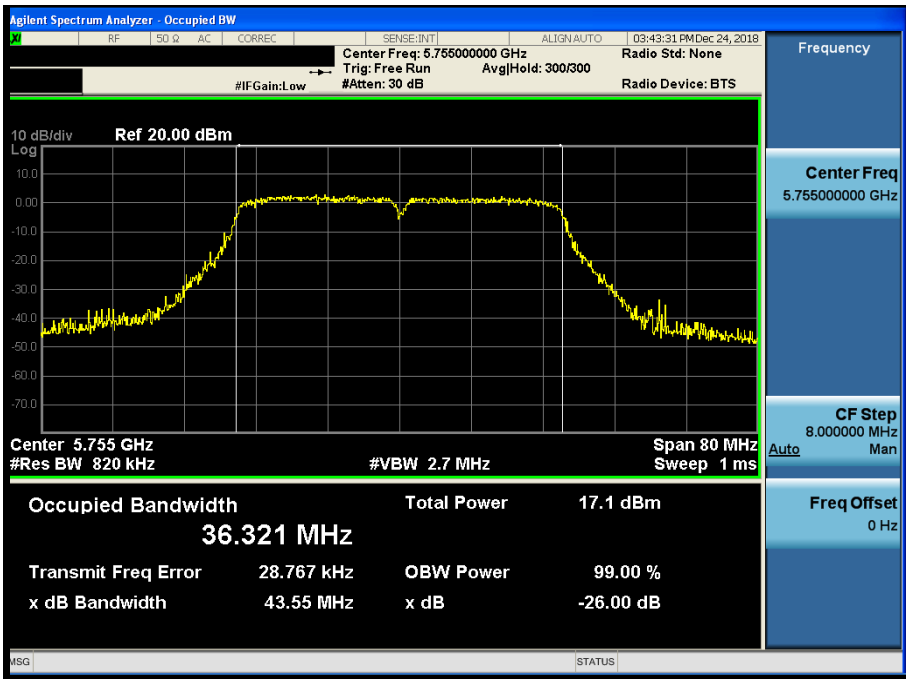
Occupied Bandwidth 99% Test Mode: 802.11n(HT40) & Ch.110



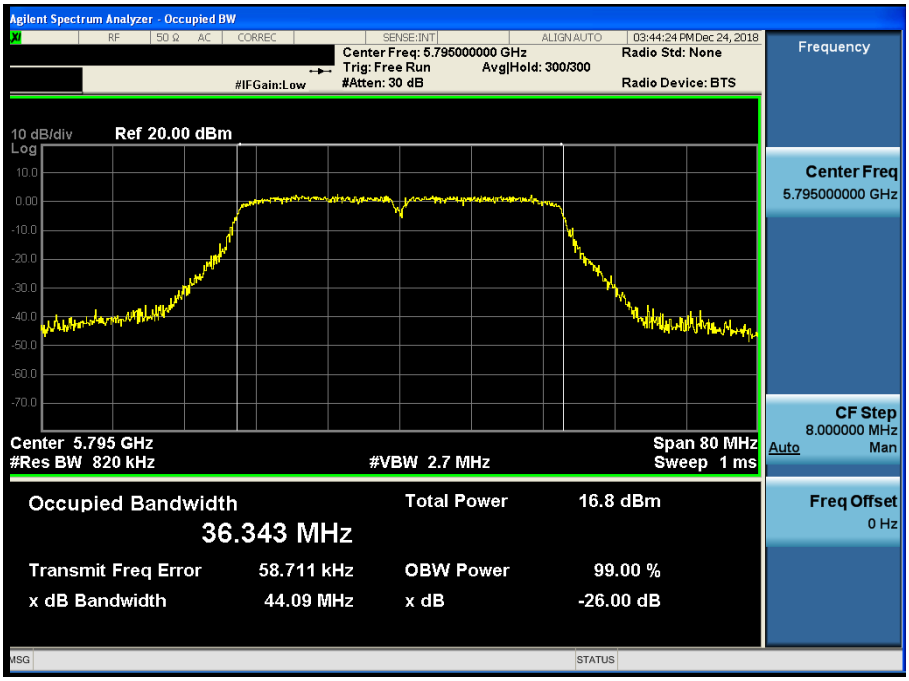
Occupied Bandwidth 99% Test Mode: 802.11n(HT40) & Ch.134



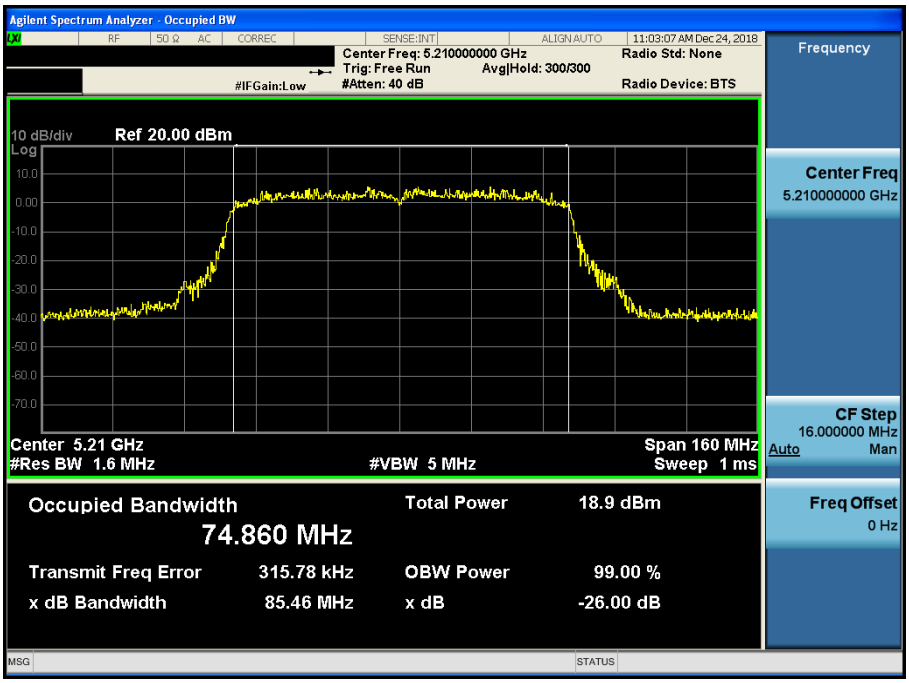
Occupied Bandwidth 99% Test Mode: 802.11n(HT40) & Ch.151



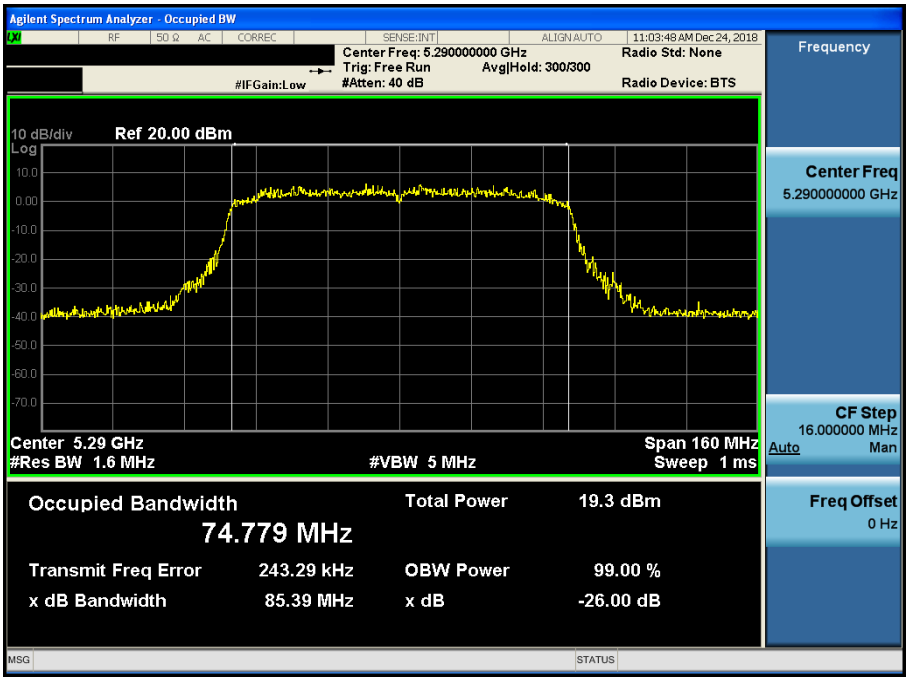
Occupied Bandwidth 99% Test Mode: 802.11n(HT40) & Ch.159



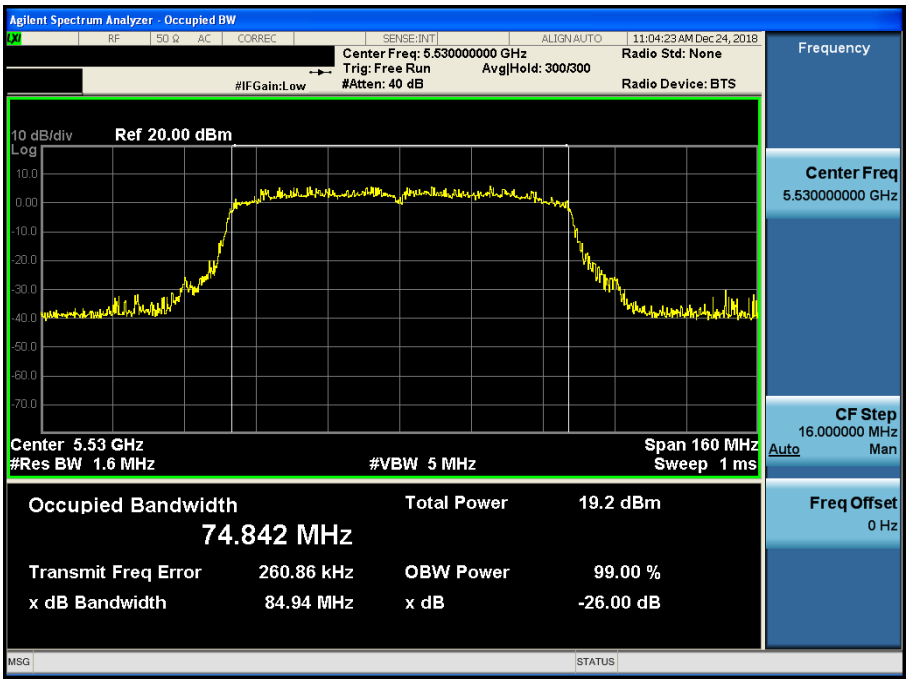
Occupied Bandwidth 99% Test Mode: 802.11ac(VHT80) & Ch.42



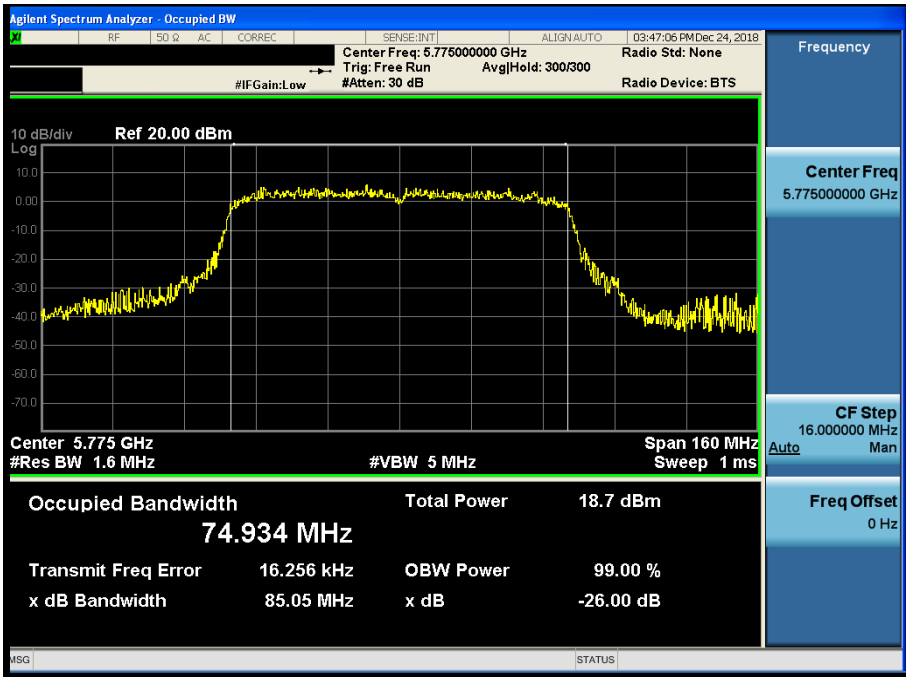
Occupied Bandwidth 99% Test Mode: 802.11ac(VHT80) & Ch.58



Occupied Bandwidth 99% Test Mode: 802.11ac(VHT80) & Ch.106



Occupied Bandwidth 99% Test Mode: 802.11ac(VHT80) & Ch.155



9. LIST OF TEST EQUIPMENT

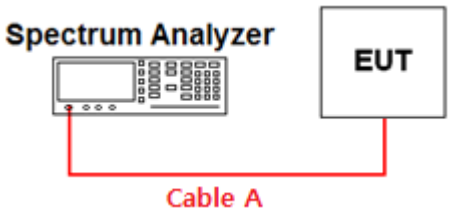
Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
Spectrum Analyzer	Agilent Technologies	N9020A	18/07/09	19/07/09	MY50200834
Spectrum Analyzer	Agilent Technologies	N9020A	18/01/03	19/01/03	MY48011700
Spectrum Analyzer	Agilent Technologies	N9030A	18/07/09	19/07/09	MY53310140
DC Power Supply	Agilent Technologies	66332A	18/07/02	19/07/02	US37473422
Multimeter	FLUKE	17B	17/12/26	18/12/26	26030065WS
Signal Generator	Rohde Schwarz	SMBV100A	17/12/27	18/12/27	255571
Signal Generator	ANRITSU	MG3695C	18/02/12	19/02/12	173501
Thermohygrometer	BODYCOM	BJ5478	18/01/03	19/01/03	120612-1
Thermohygrometer	BODYCOM	BJ5478	18/01/03	19/01/03	120612-2
Thermohygrometer	BODYCOM	BJ5478	18/07/09	19/07/09	N/A
HYGROMETER	TESTO	608-H1	18/02/10	19/02/10	34862883
Temp & Humi Test Chamber	SJ Science	SJ-TH-S50	18/07/06	19/07/06	U5542113
Loop Antenna	Schwarzbeck	FMZB1513	18/01/30	20/01/30	1513-128
BILOG ANTENNA	Schwarzbeck	VULB 9160	18/07/13	20/07/13	3359
Horn Antenna	ETS-Lindgren	3115	17/01/13	19/01/13	9202-3820
Horn Antenna	Schwarzbeck	BBHA 9120C	17/12/04	19/12/04	9120C-561
Horn Antenna	A.H.Systems Inc.	SAS-574	17/07/31	19/07/31	155
PreAmplifier	tsj	MLA-0118-J01-45	18/02/08	19/02/08	17138
PreAmplifier	tsj	MLA-1840-J02-45	18/07/06	19/07/06	16966-10728
PreAmplifier	H.P	8447D	17/12/26	18/12/26	2944A07774
Attenuator	SMAJK	SMAJK-2-3	18/07/02	19/07/02	3
Attenuator	Aeroflex/Weinschel	56-3	18/07/02	19/07/02	Y2370
Attenuator	SRTechnology	F01-B0606-01	18/07/02	19/07/02	13092403
Attenuator	Hefei Shunze	SS5T2.92-10-40	18/07/03	19/07/03	16012202
High Pass Filter	Wainwright Instruments	WHNX8.0/26.5-6SS	18/07/03	19/07/03	3
High Pass Filter	Wainwright Instruments	WHKX12-935-1000-15000-40SS	18/07/02	19/07/02	8
High Pass Filter	Wainwright Instruments	WHKX10-2838-3300-18000-60SS	18/07/02	19/07/02	1
Power Meter & Wide Bandwidth Sensor	Anritsu	ML2495A MA2490A	18/04/17	19/04/17	1306007 1249001
EMI Test Receiver	Rohde Schwarz	ESR7	18/02/13	19/02/13	101061
EMI Test Receiver	Rohde Schwarz	ESCI7	18/02/12	19/02/12	100910
PULSE LIMITER	Rohde Schwarz	ESH3-Z2	18/09/27	19/09/27	101333
LISN	SCHWARZBECK	NNLK 8121	18/03/20	19/03/20	06183
Cable	Radiall	TESTPRO3	18/07/06	19/07/06	M-01
Cable	Junkosha	MWX315	18/11/19	19/11/19	M-05
Cable	Junkosha	MWX221	18/11/19	19/11/19	M-06
Cable	Junkosha	MWX241	18/06/25	19/06/25	G-04
Cable	Junkosha	MWX241	18/06/25	19/06/25	G-07
Cable	DT&C	Cable	18/07/06	19/07/06	G-13
Cable	DT&C	Cable	18/07/06	19/07/06	G-14
Cable	HUBER+SUHNER	SUCOFLEX 104	18/07/06	19/07/06	G-15
Cable	DT&C	CABLE	18/07/05	19/07/05	RF-82

Note1: The measurement antennas were calibrated in accordance to the requirements of ANSI C63.5-2017
Note2: The cable is not a regular calibration item, so it has been calibrated by DT & C itself.

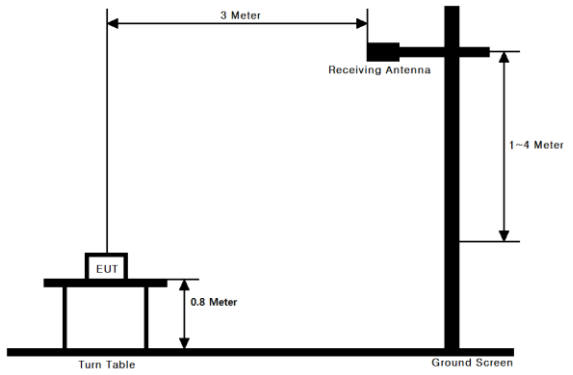
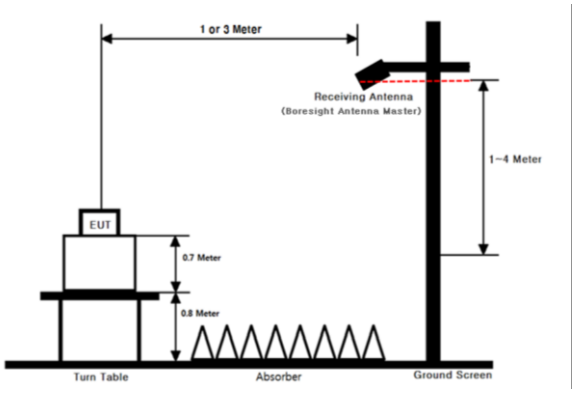
APPENDIX I

Test set up Diagram

▪ Conducted Measurement



▪ Radiated Measurement

Below 1GHz	Above 1GHz
	

APPENDIX II

Duty Cycle Information

▣ Test Procedure

Duty Cycle [X = On Time / (On + Off time)] is measured using Measurement Procedure **of KDB789033 D02v02r01**

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 Results:

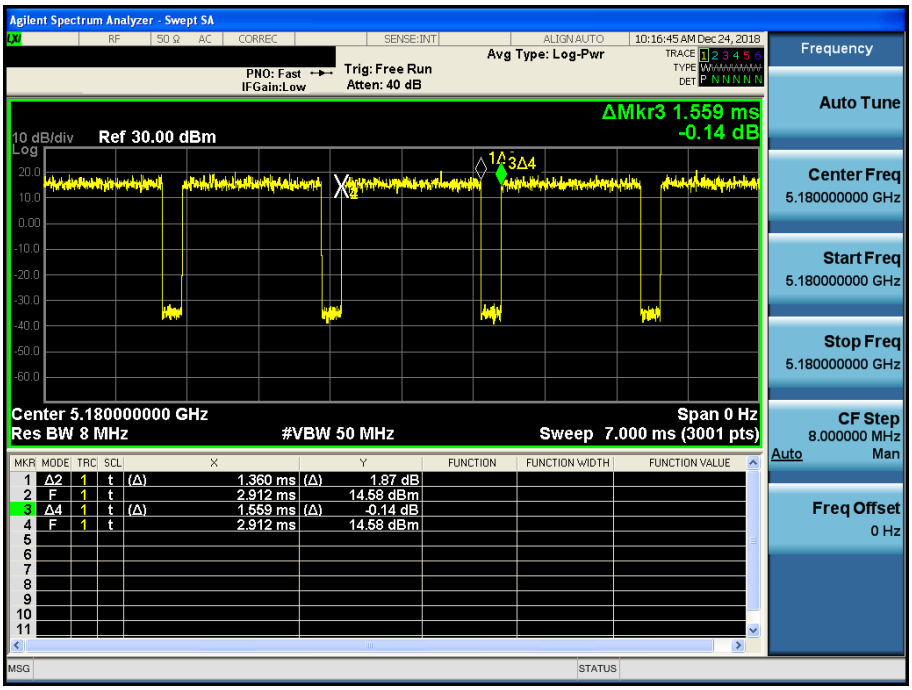
Duty cycle

Mode	Data Rate	Tested Frequency [MHz]	Maximum Achievable Duty Cycle (*x*) = On / (On+Off)			Duty Cycle Correction Factor [dB]	50/*T* [kHz]
			On Time [ms]	(On+Off) Time [ms]	*x*		
802.11a	6Mbps	5180	1.36	1.56	87.24	0.60	36.76
802.11n (HT20)	MCS0	5180	1.27	1.47	86.53	0.63	39.37
802.11n (HT40)	MCS0	5190	0.49	0.69	70.74	1.51	102.04
802.11ac (VHT80)	MCS0	5210	0.25	0.45	55.36	2.57	200.00

Single Transmit

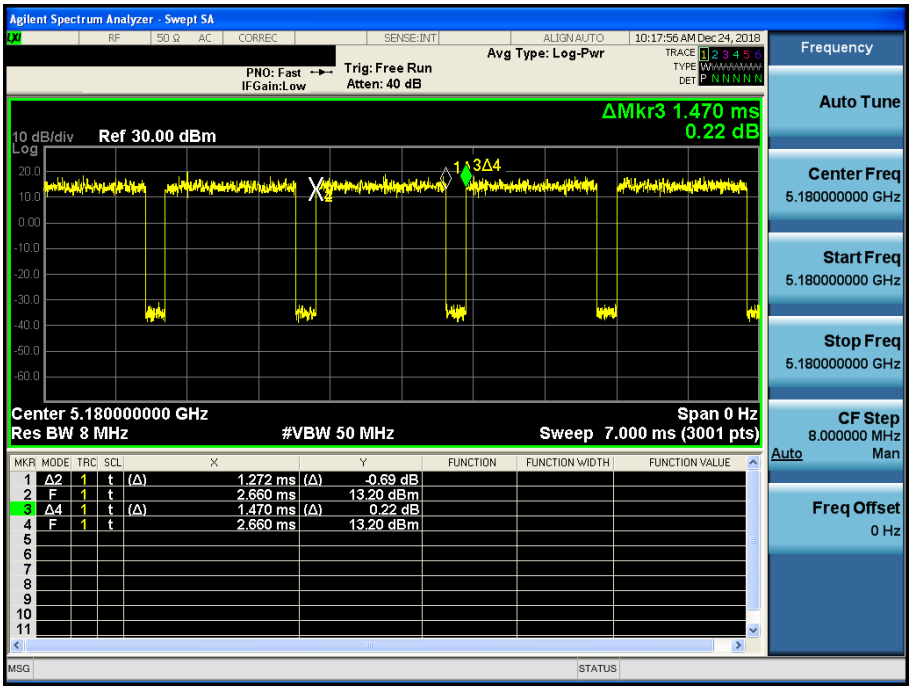
Duty Cycle

Test Mode: 802.11a & Ch.36

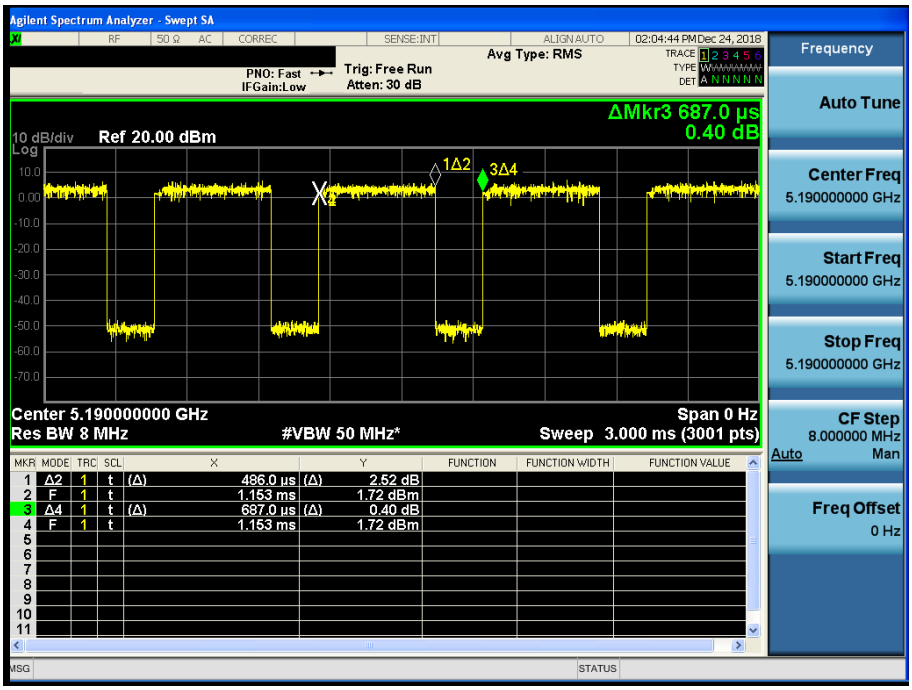


Duty Cycle

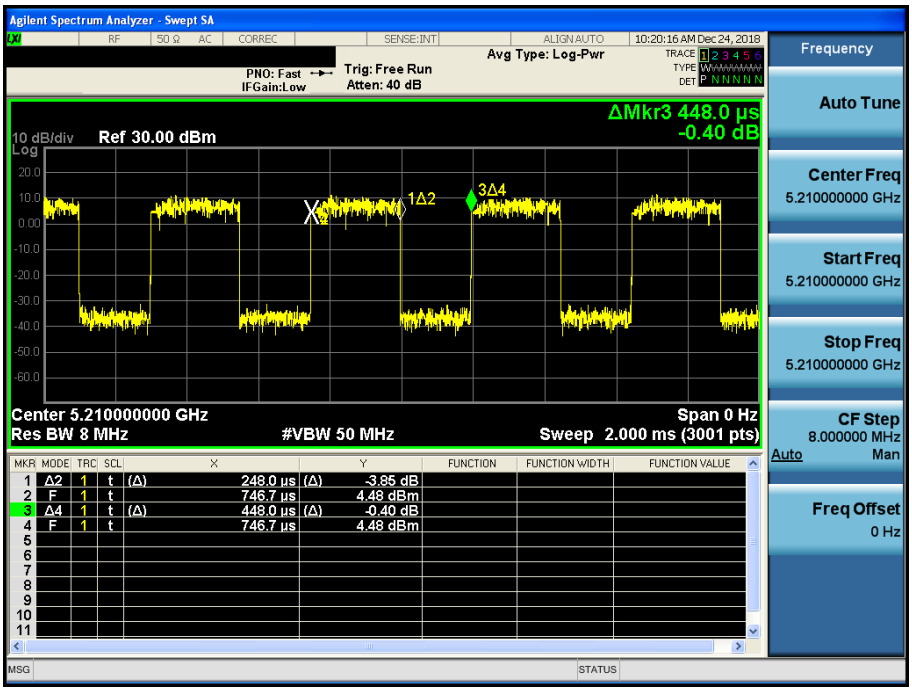
Test Mode: 802.11n HT20 & Ch.36



Duty Cycle Test Mode: 802.11n HT40 & Ch.38



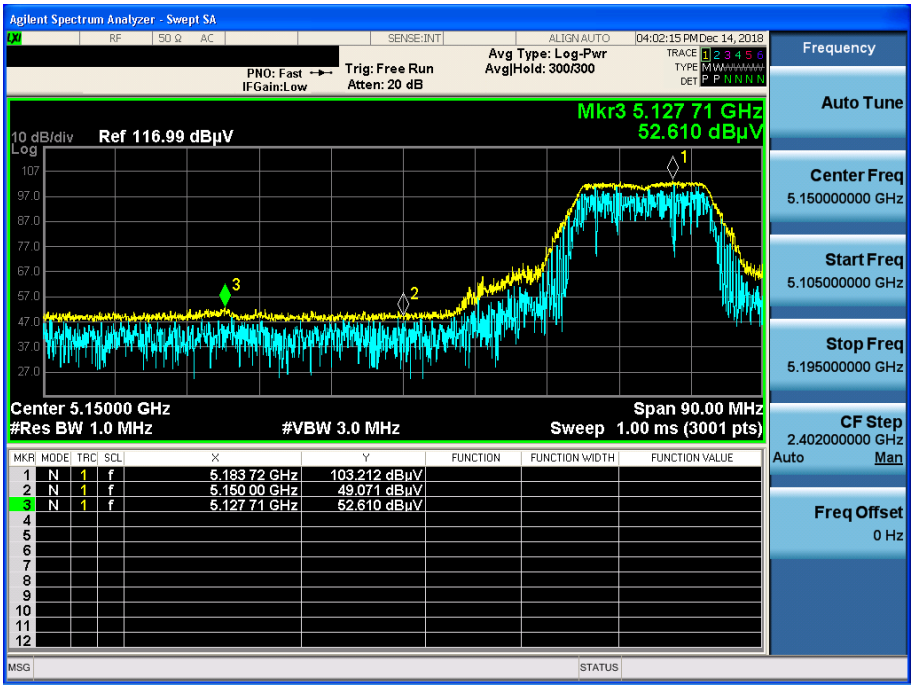
Duty Cycle Test Mode: 802.11ac VHT80 & Ch.42



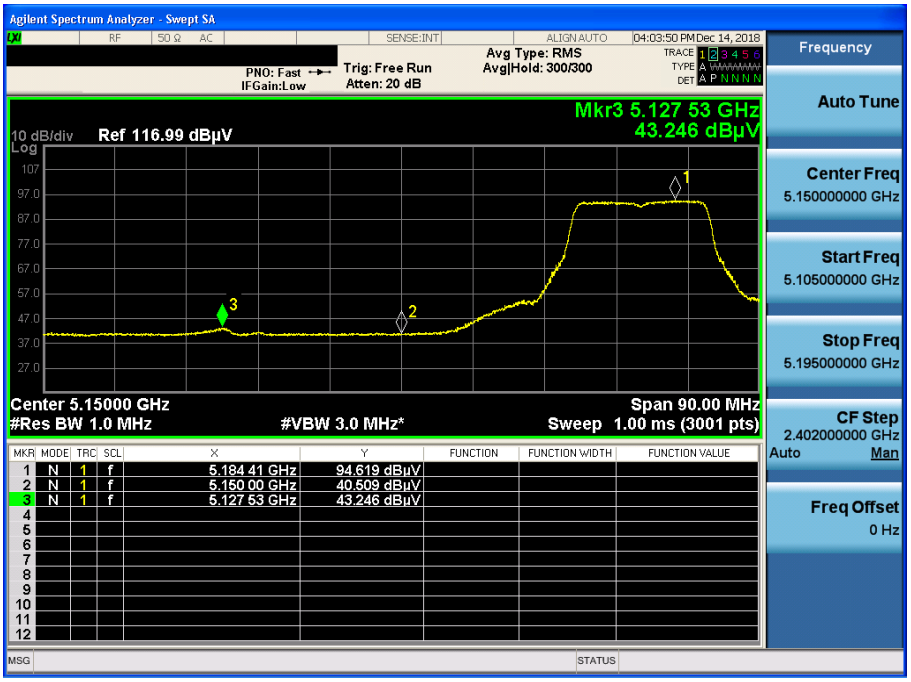
APPENDIX III

Unwanted Emissions (Radiated) Test Plot

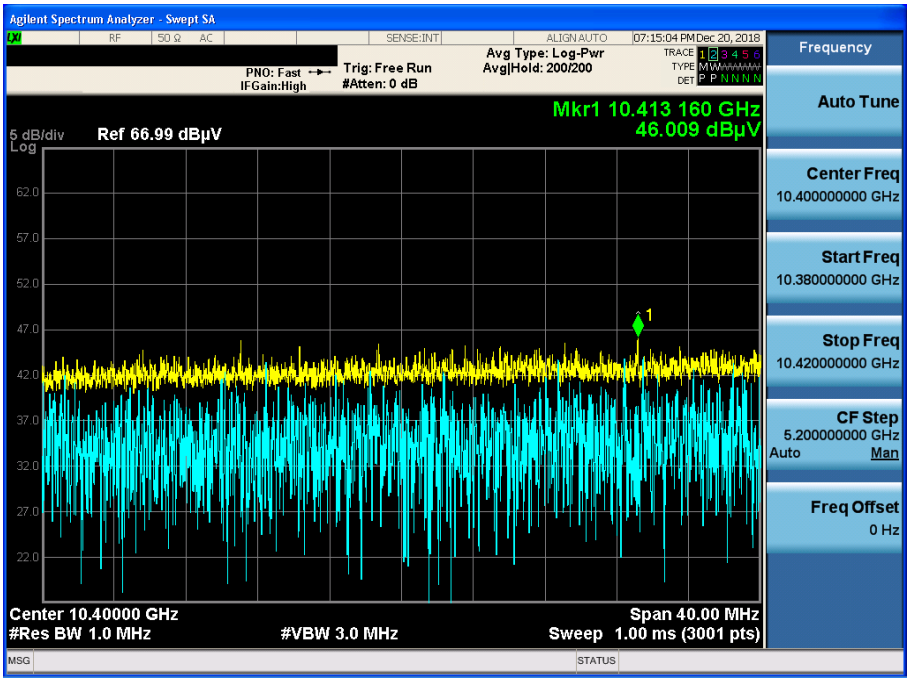
802.11a & U-NII 1 & Ch.36 & Z axis & Hor **Detector Mode : PK**



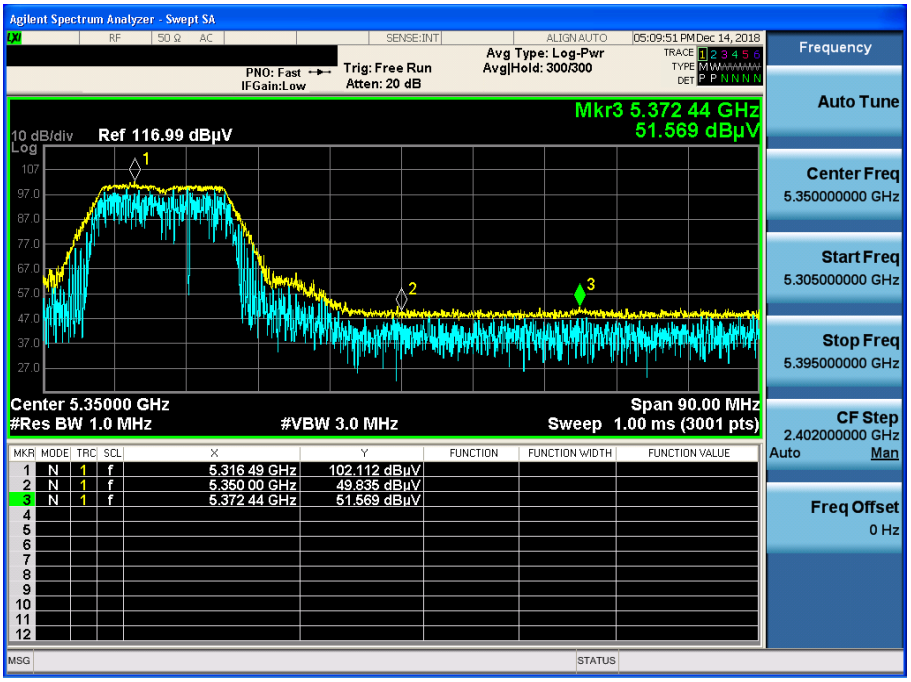
802.11a & U-NII 1 & Ch.36 & Z axis & Hor **Detector Mode : AV**



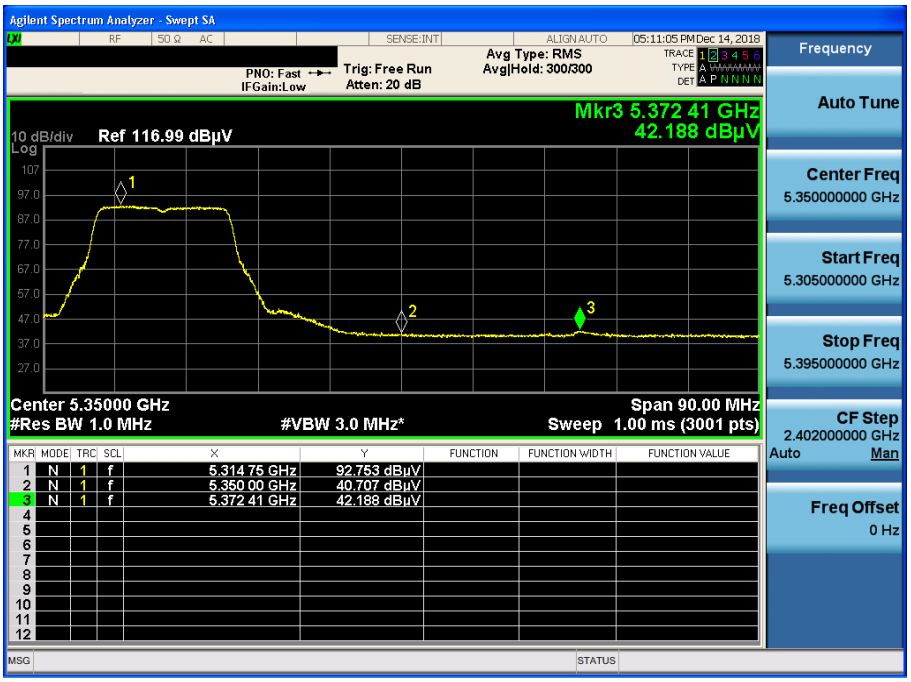
802.11a & U-NII 1 & Ch.40 & Z axis & Hor **Detector Mode : PK**



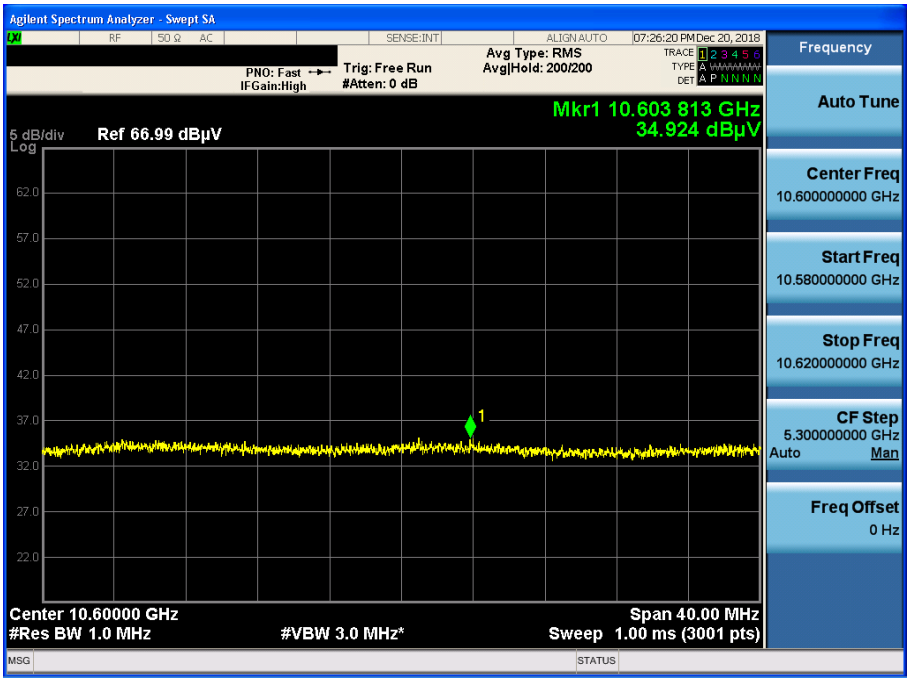
802.11a & U-NII 2A & Ch.64 & Z axis & Hor **Detector Mode : PK**



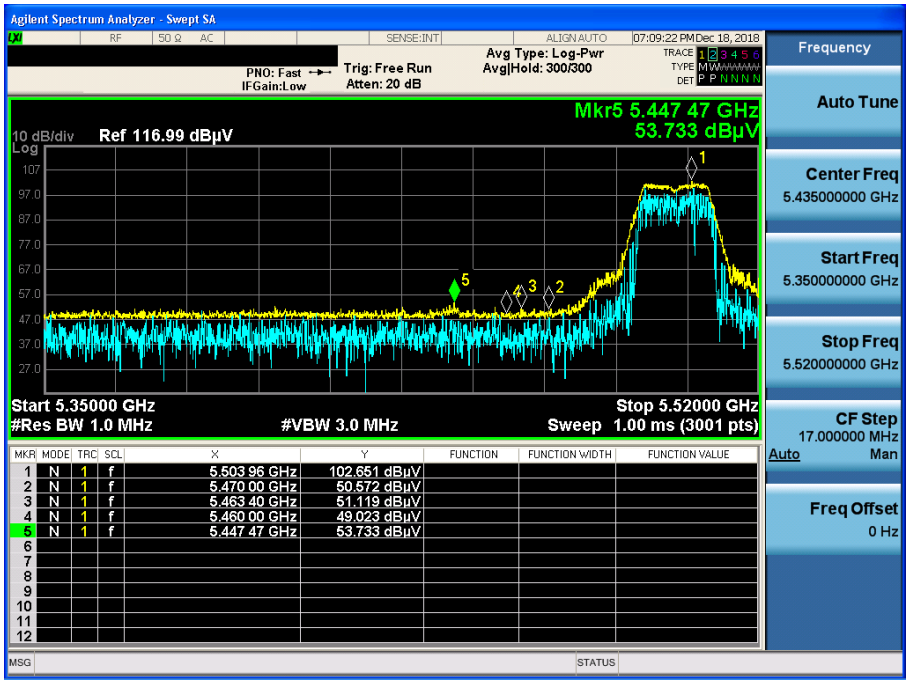
802.11a & U-NII 2A & Ch.64 & Z axis & Hor **Detector Mode : AV**



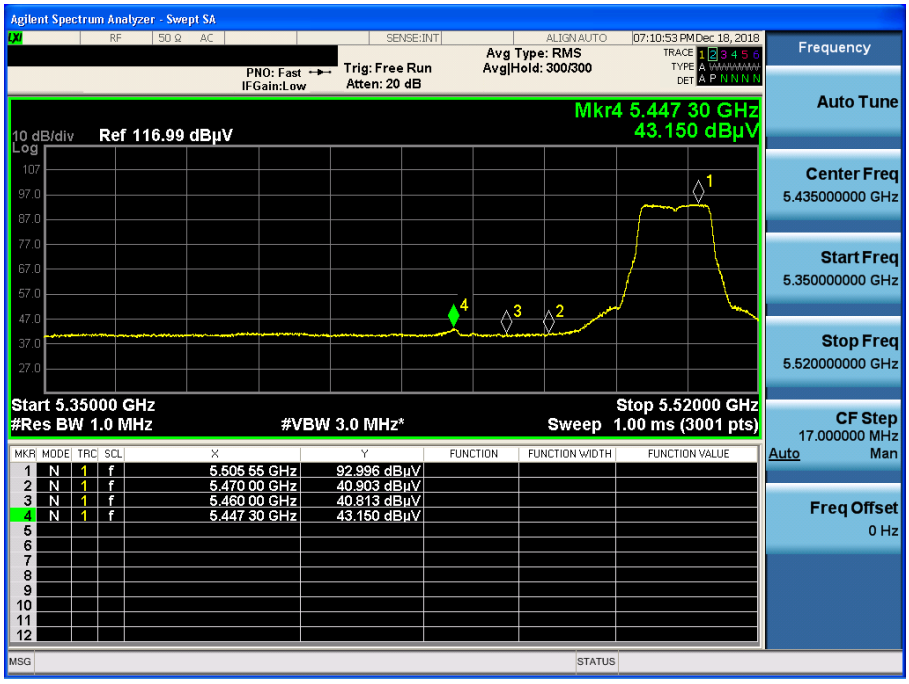
802.11a & U-NII 2A & Ch.60 & Z axis & Hor **Detector Mode : AV**



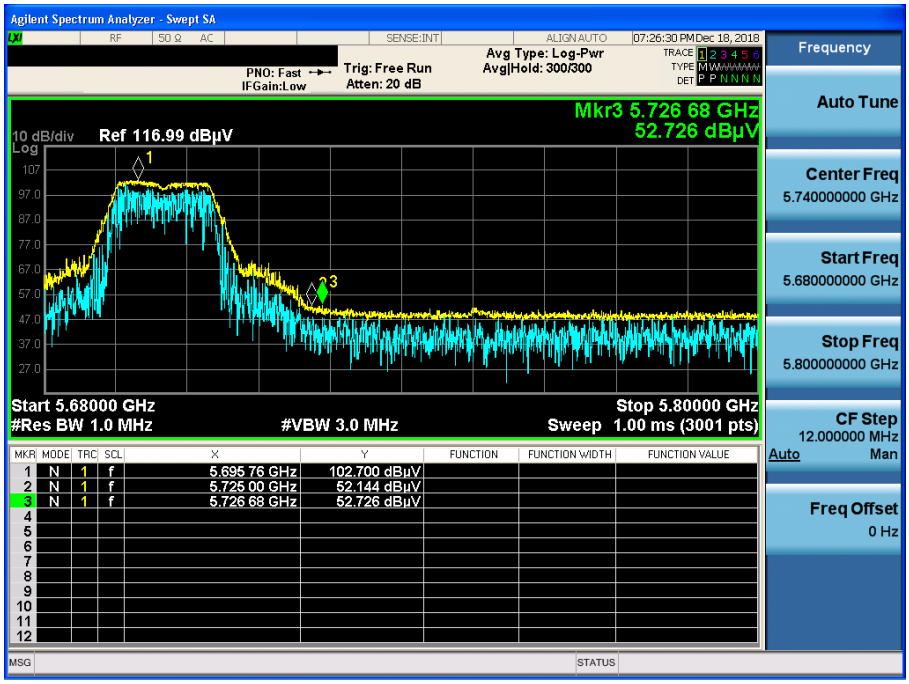
802.11a & U-NII 2C & Ch.100 & X axis & Hor **Detector Mode : PK**



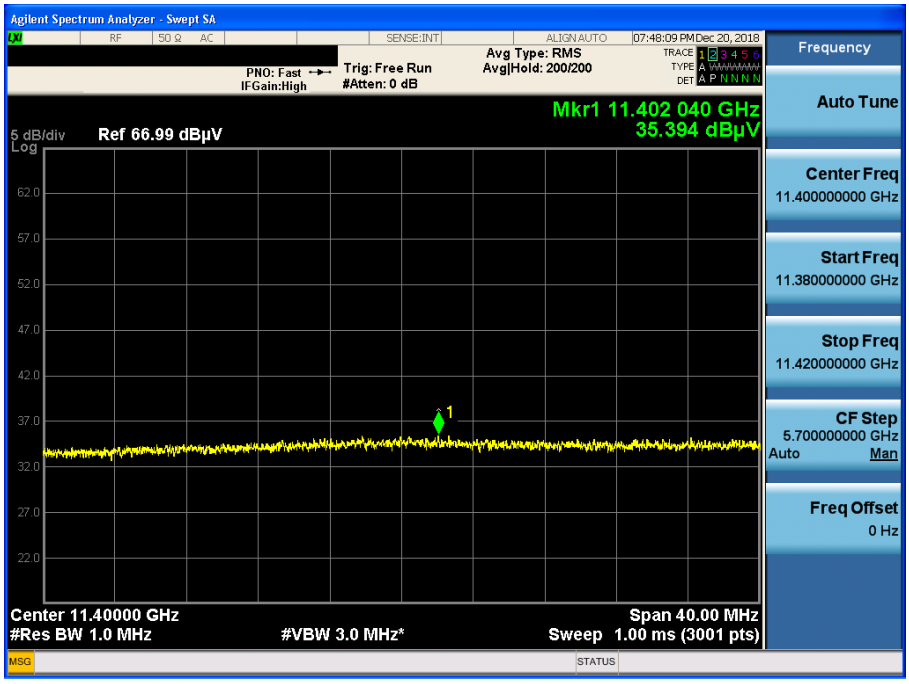
802.11a & U-NII 2C & Ch.100 & X axis & Hor **Detector Mode : AV**



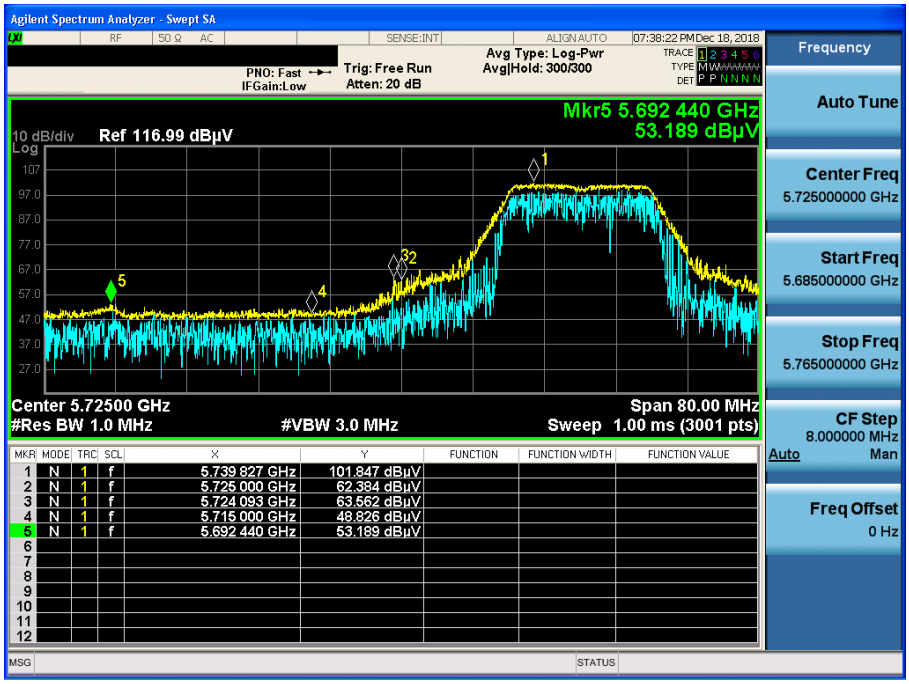
802.11a & U-NII 2C & Ch.140 & X axis & Hor **Detector Mode : PK**



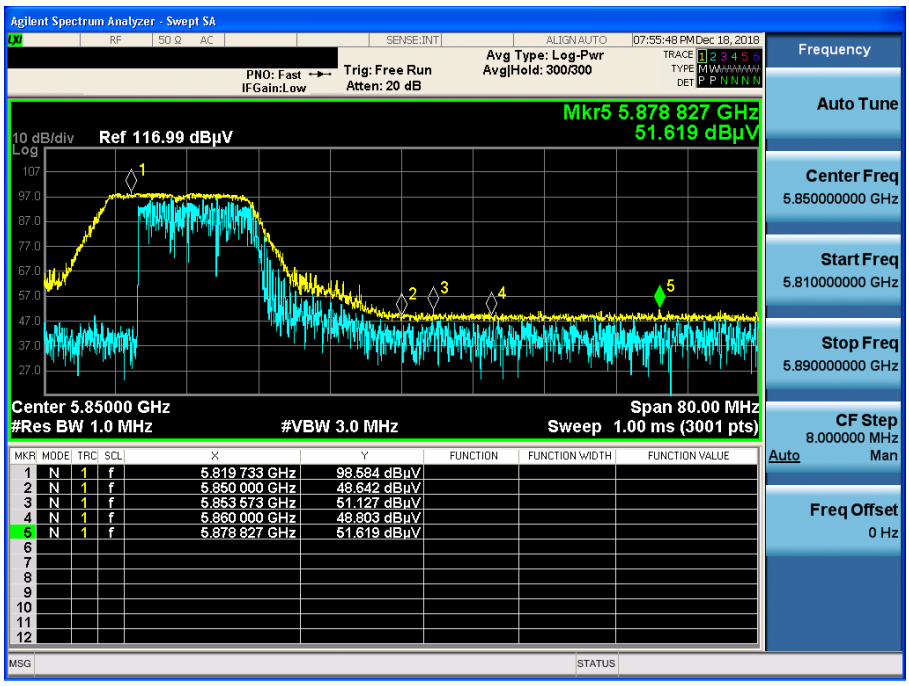
802.11a & U-NII 2C & Ch.140 & X axis & Hor **Detector Mode : AV**



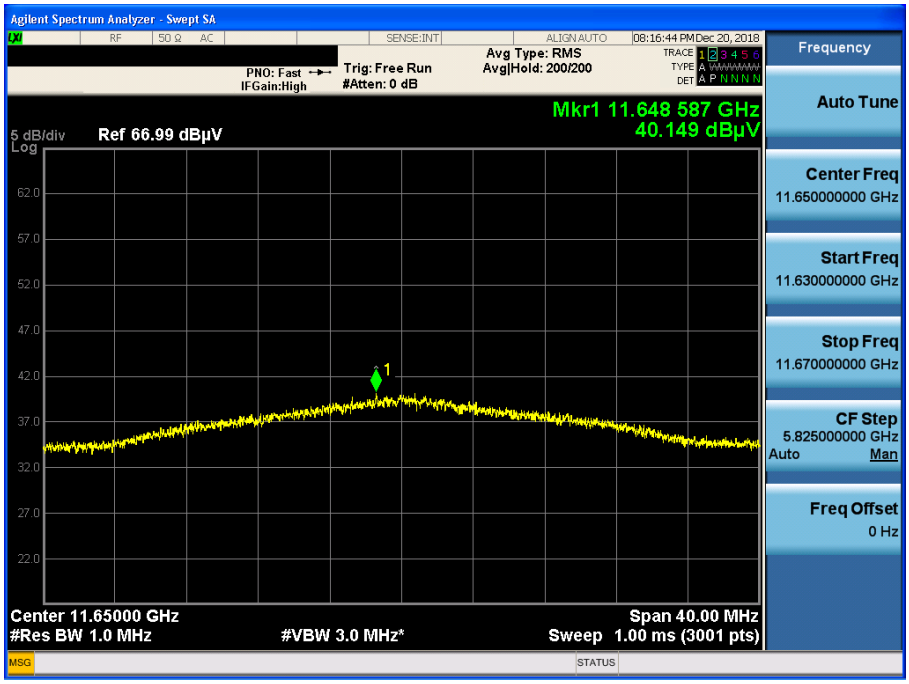
802.11a & U-NII 3 & Ch.149 & X axis & Hor **Detector Mode : PK**



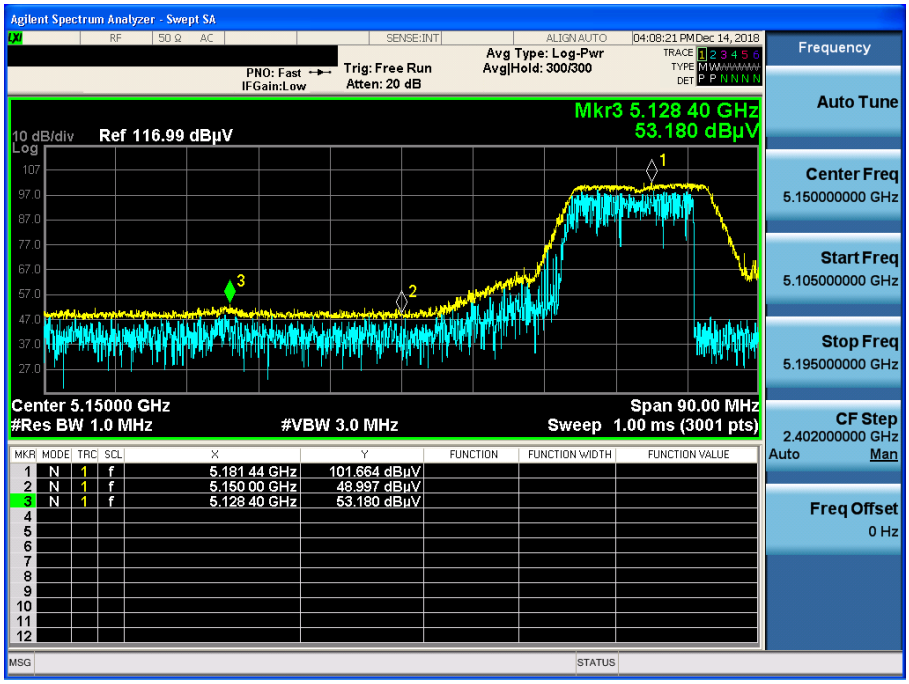
802.11a & U-NII 3 & Ch.165 & X axis & Hor **Detector Mode : PK**



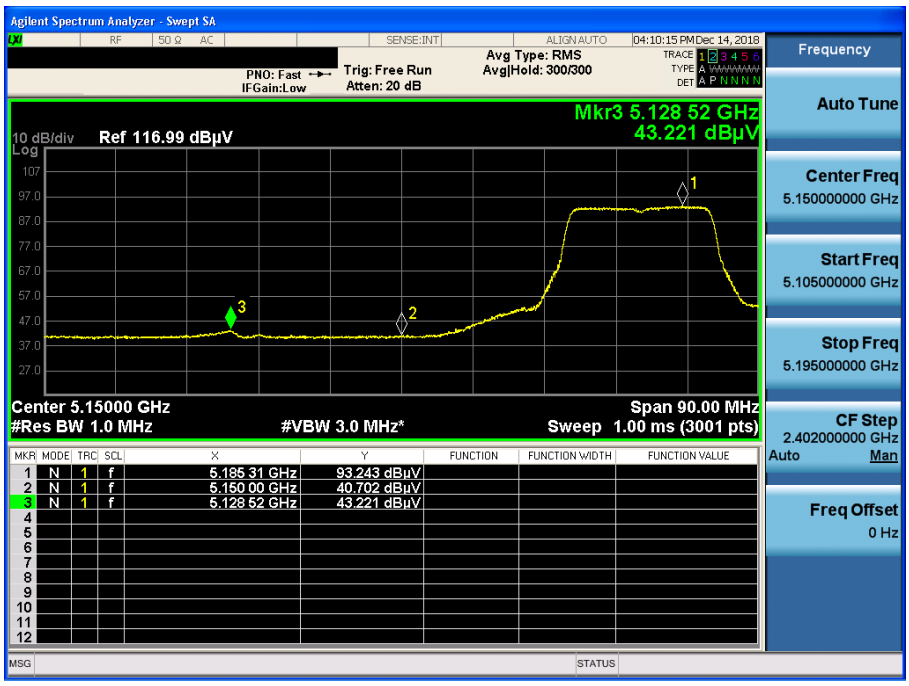
802.11a & U-NII 3 & Ch.165 & X axis & Hor **Detector Mode : AV**



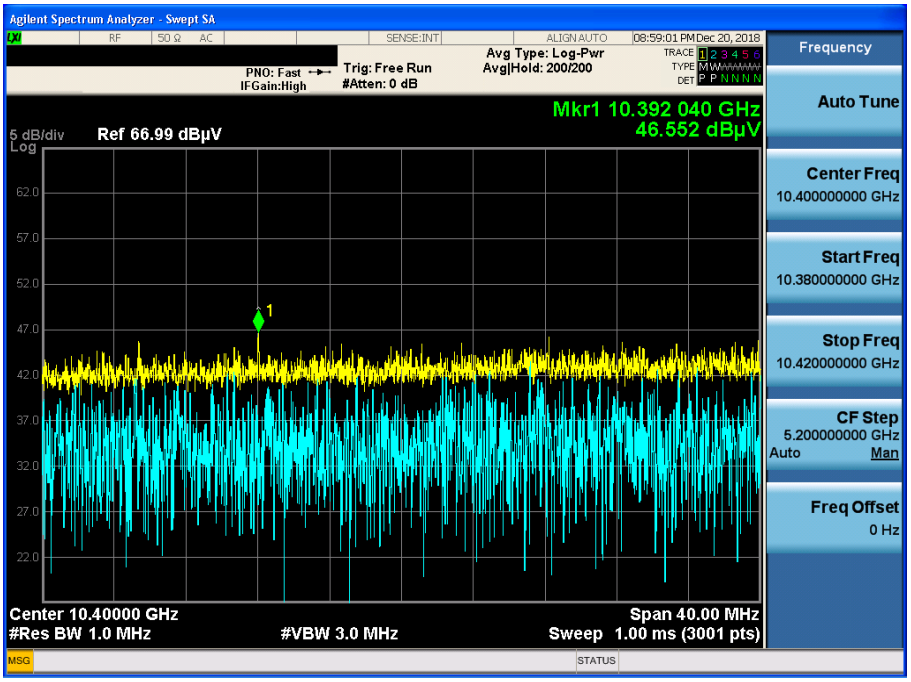
802.11n(HT20) & U-NII 1 & Ch.36 & Z axis & Hor **Detector Mode : PK**



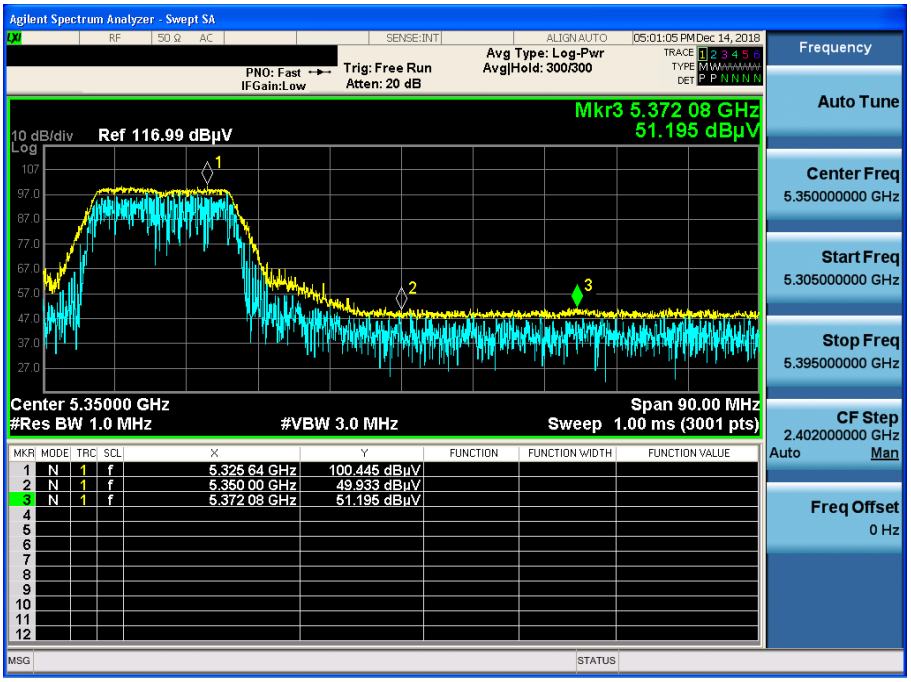
802.11n(HT20) & U-NII 1 & Ch.36 & Z axis & Hor **Detector Mode : AV**



802.11n(VHT20) & U-NII 1 & Ch.40 & Z axis & Hor **Detector Mode : PK**



802.11n(VHT20) & U-NII 2A & Ch.64 & Z axis & Hor **Detector Mode : PK**



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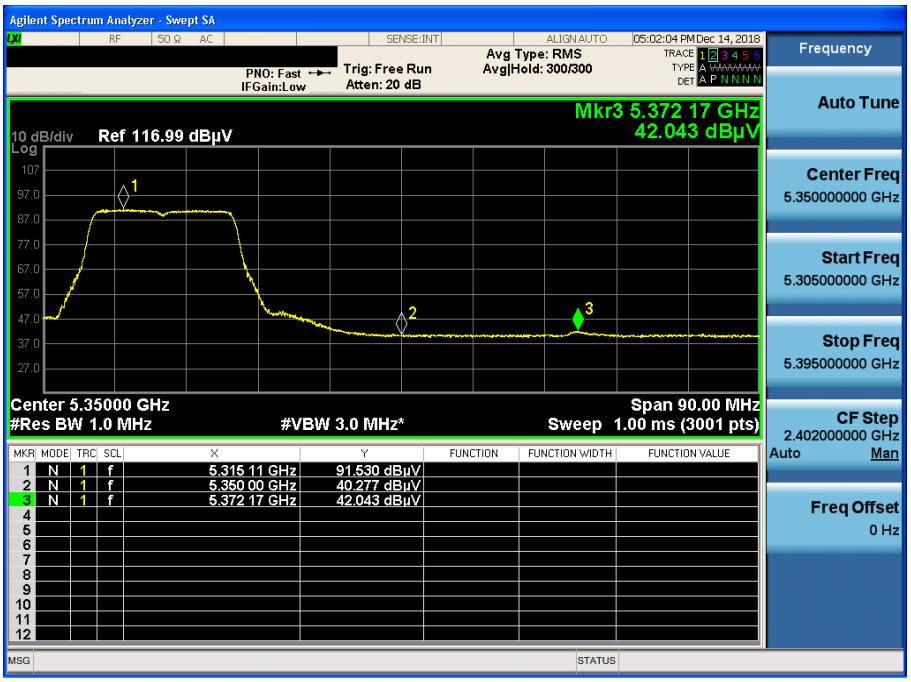

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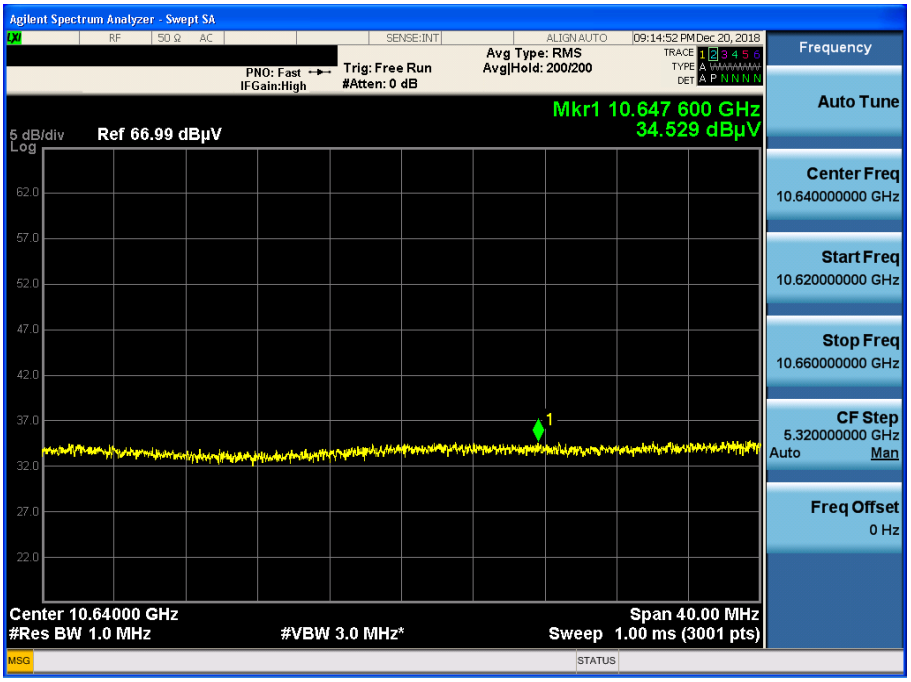
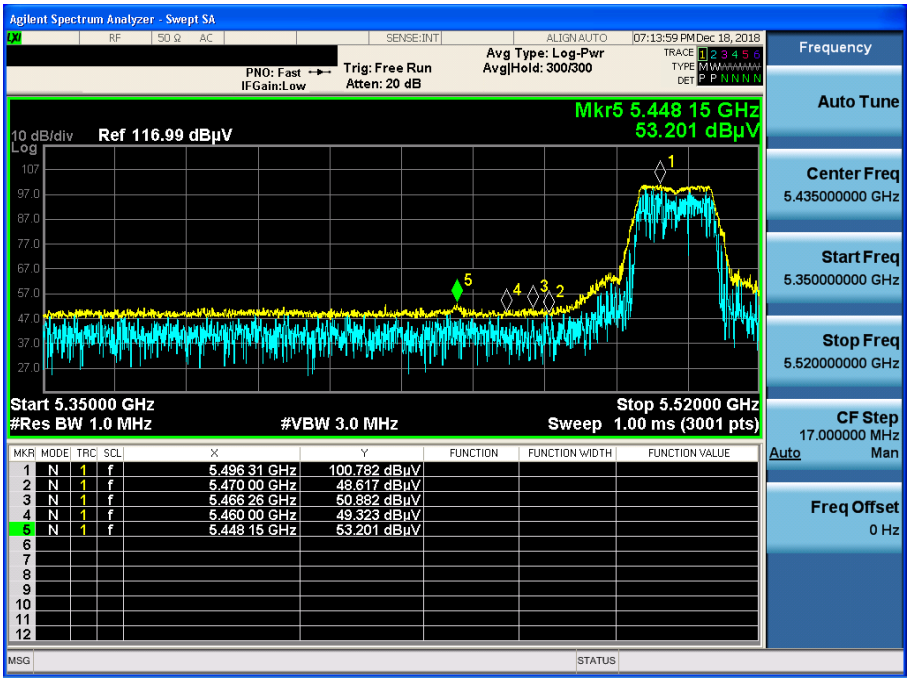
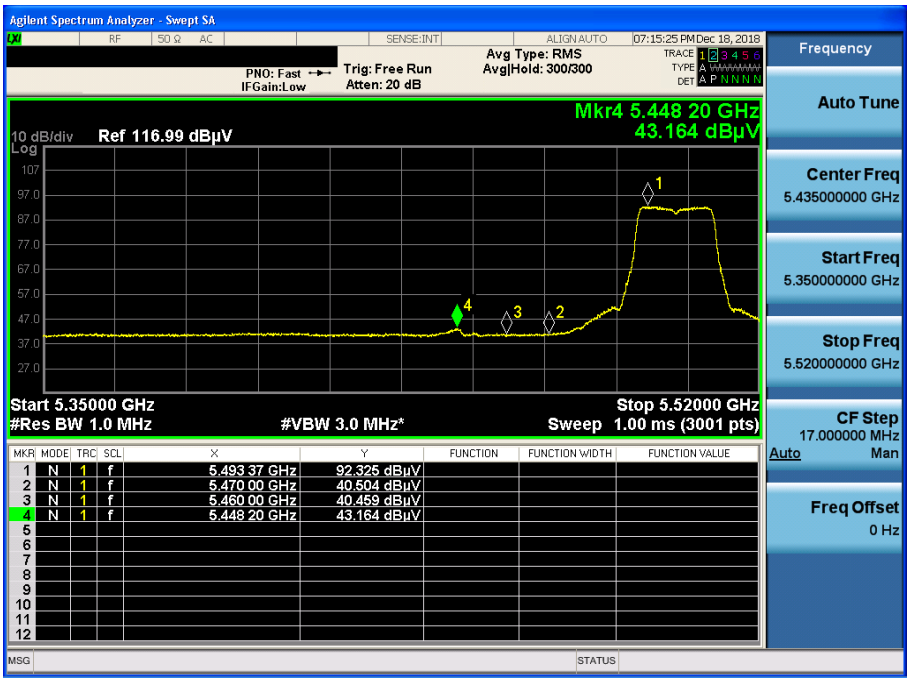


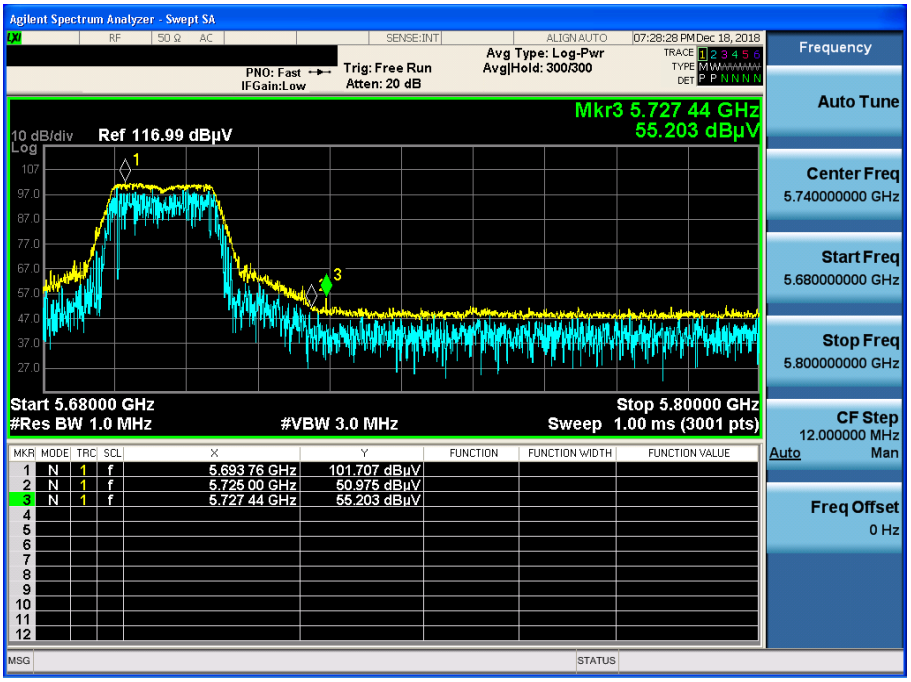
802.11n(HT20) & U-NII 2C & Ch.100 & X axis & Hor **Detector Mode : PK**



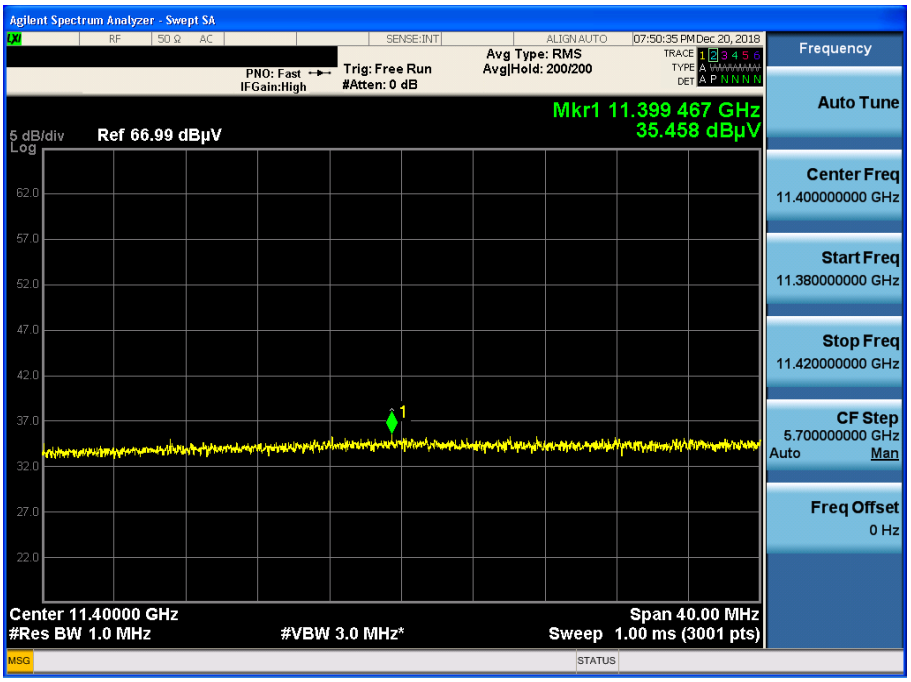
802.11n(HT20) & U-NII 2C & Ch.100 & X axis & Hor **Detector Mode : AV**



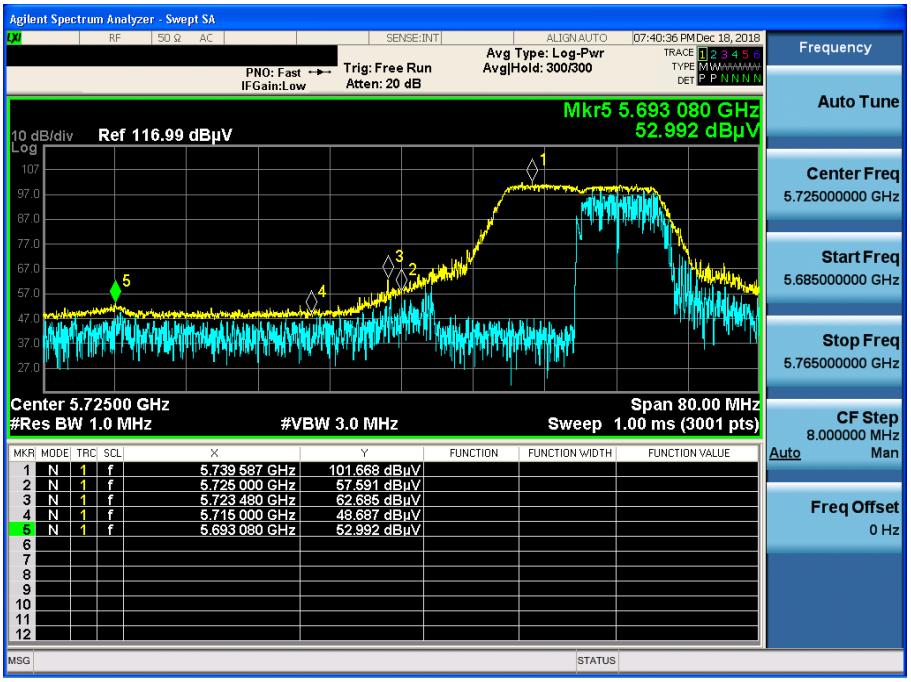
802.11n(VHT20) & U-NII 2C & Ch.140 & X axis & Hor Detector Mode : PK



802.11n(VHT20) & U-NII 2C & Ch.140 & X axis & Hor Detector Mode : AV



802.11n(HT20) & U-NII 3 & Ch.149 & X axis & Hor **Detector Mode : PK**



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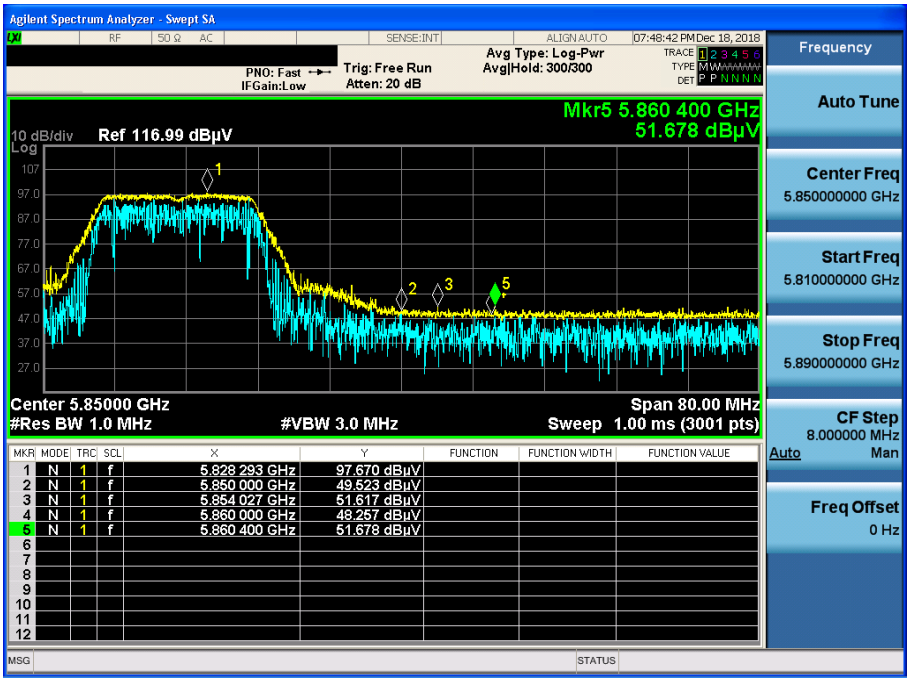
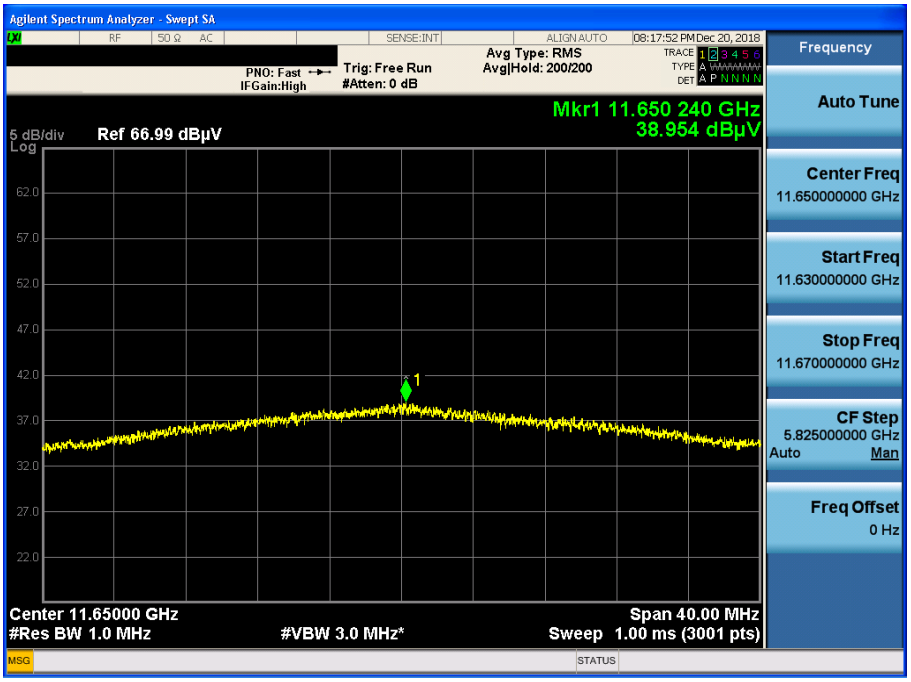
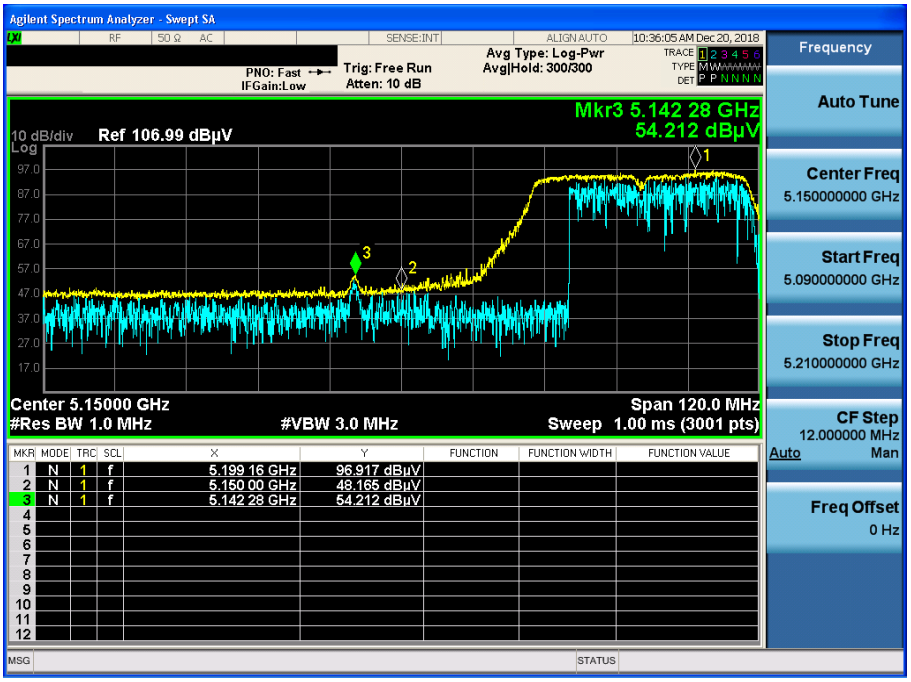


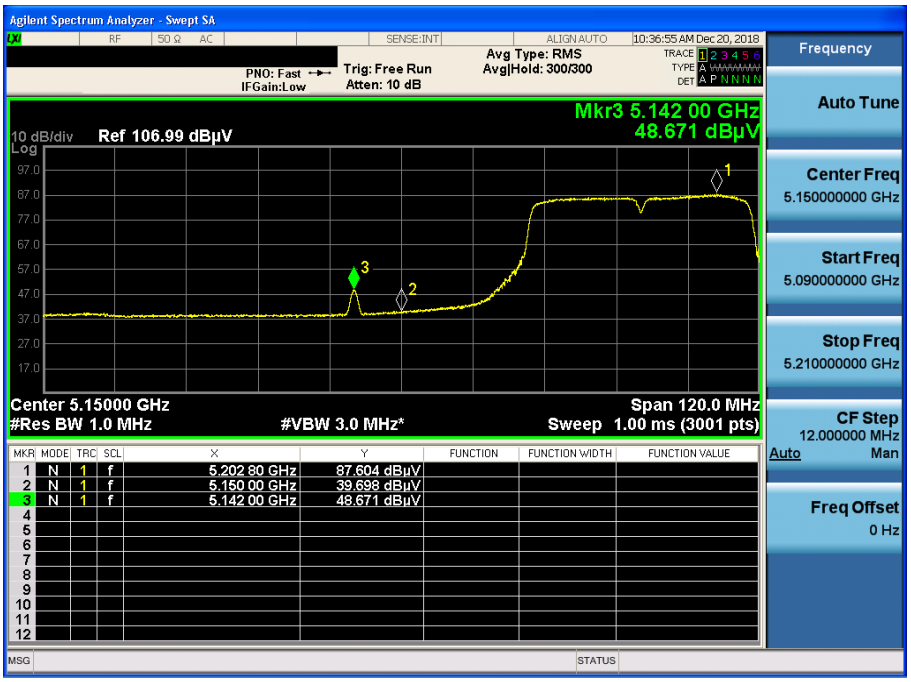
802.11n(HT20) & U-NII 3 & Ch.165 & X axis & Hor Detector Mode : AV



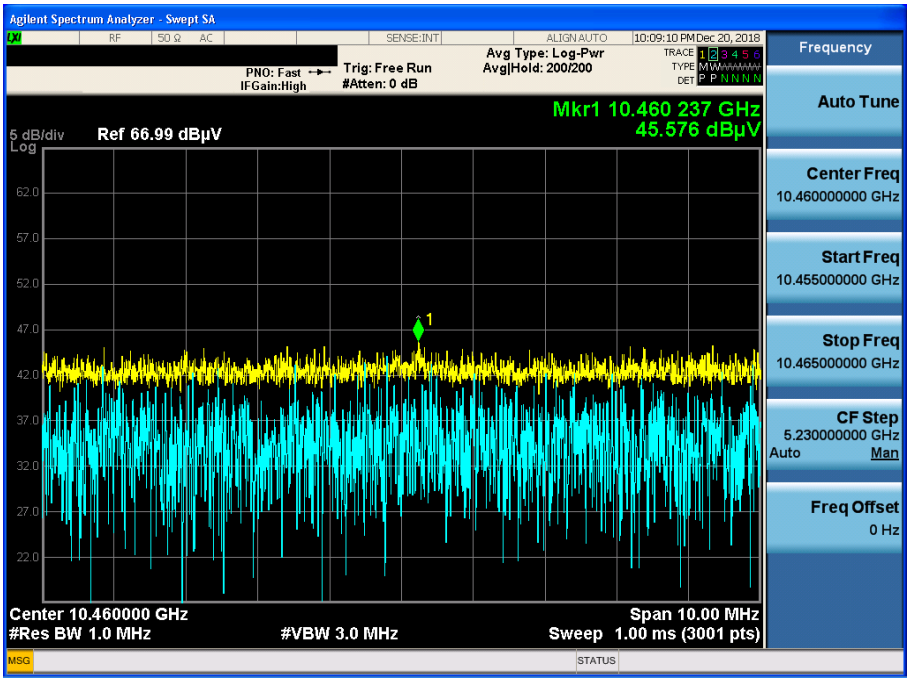
802.11n(HT40) & U-NII 1 & Ch.38 & Z axis & Hor **Detector Mode : PK**



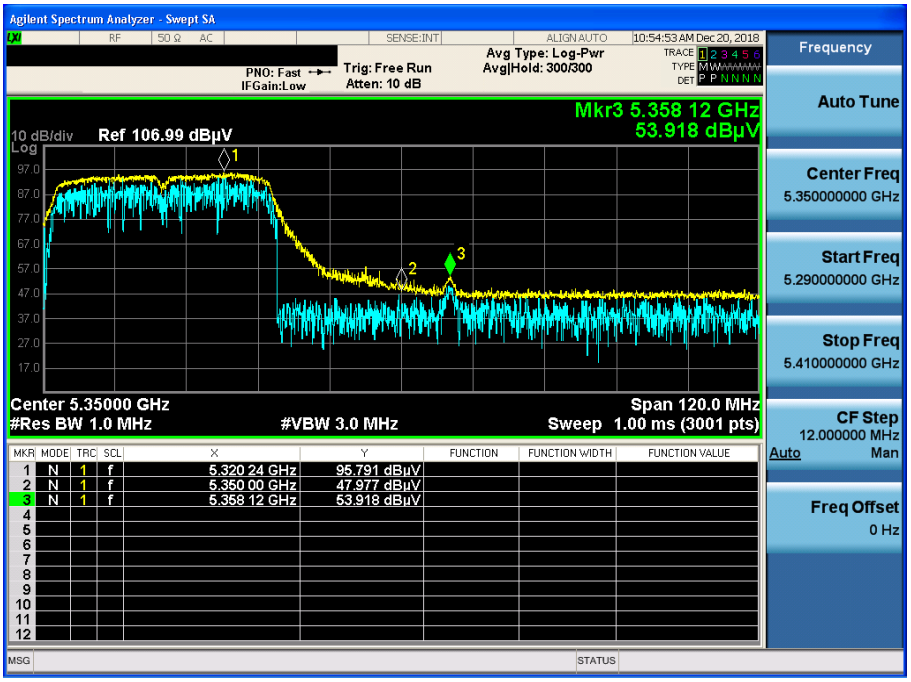
802.11n(HT40) & U-NII 1 & Ch.38 & Z axis & Hor **Detector Mode : AV**



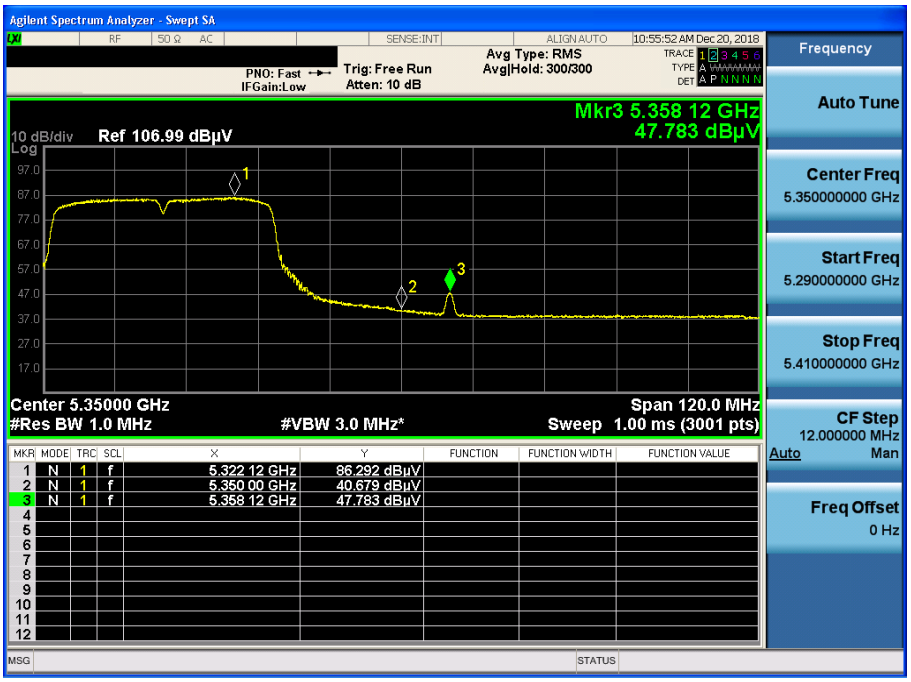
802.11n(HT40) & U-NII 1 & Ch.46 & Z axis & Hor **Detector Mode : PK**



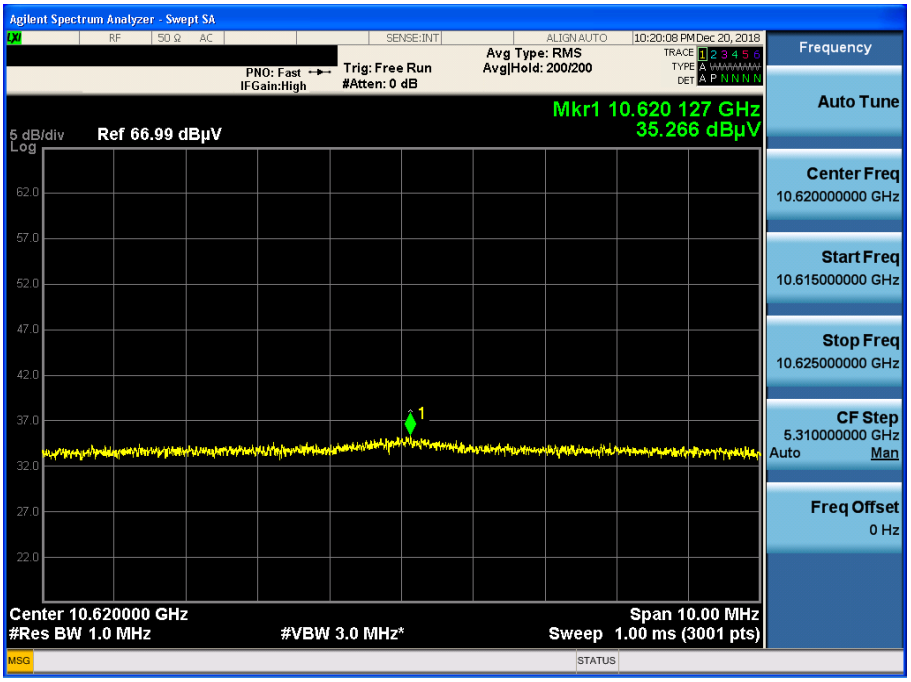
802.11n(HT40) & U-NII 2A & Ch.62 & X axis & Hor **Detector Mode : PK**



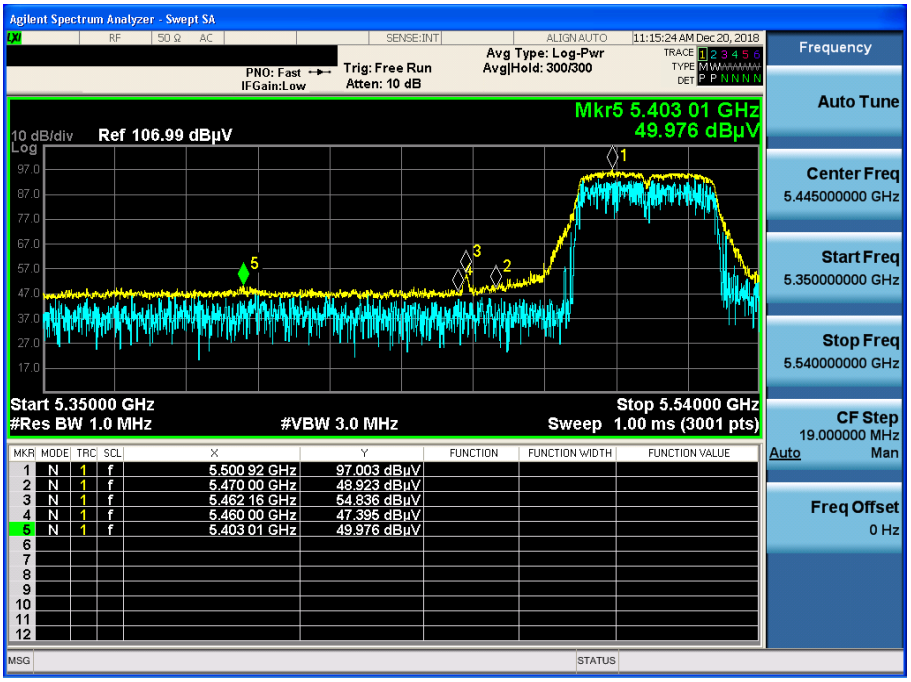
802.11n(HT40) & U-NII 2A & Ch.62 & X axis & Hor **Detector Mode : AV**



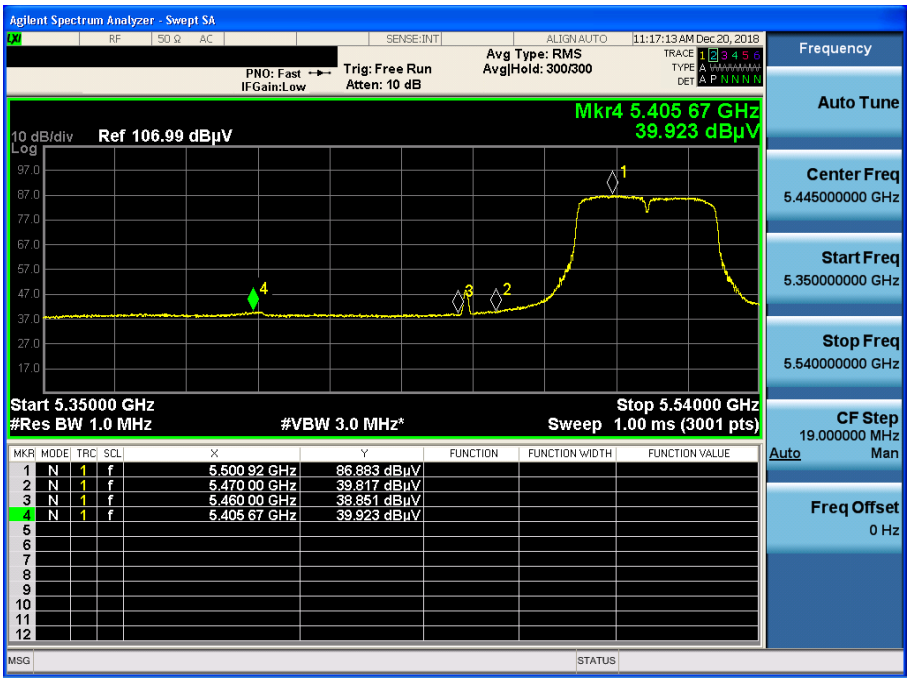
802.11n(HT40) & U-NII 2A & Ch.62 & Z axis & Hor **Detector Mode : AV**



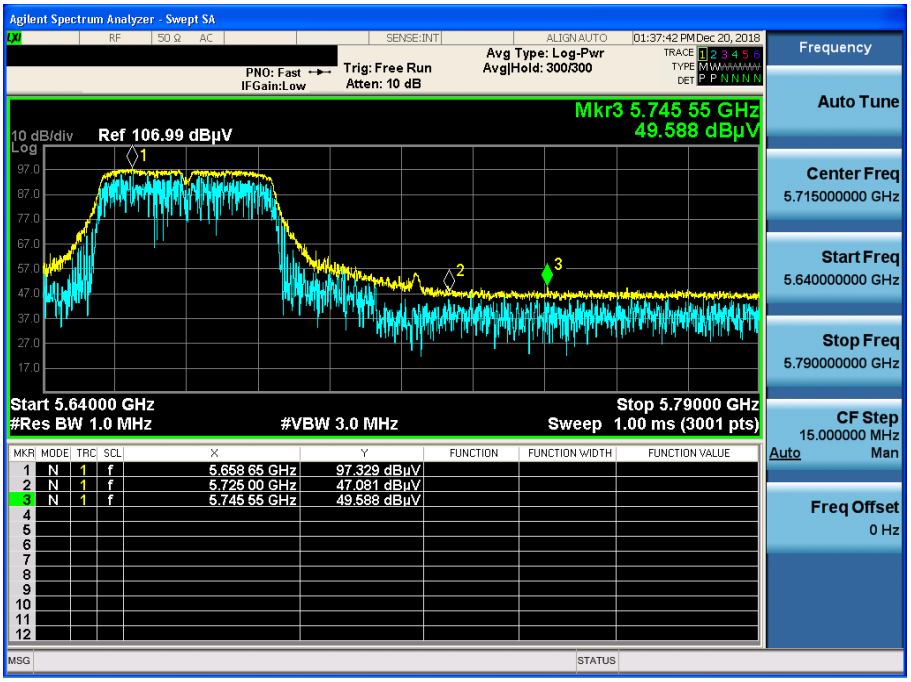
802.11n(HT40) & U-NII 2C & Ch.102 & X axis & Hor Detector Mode : PK



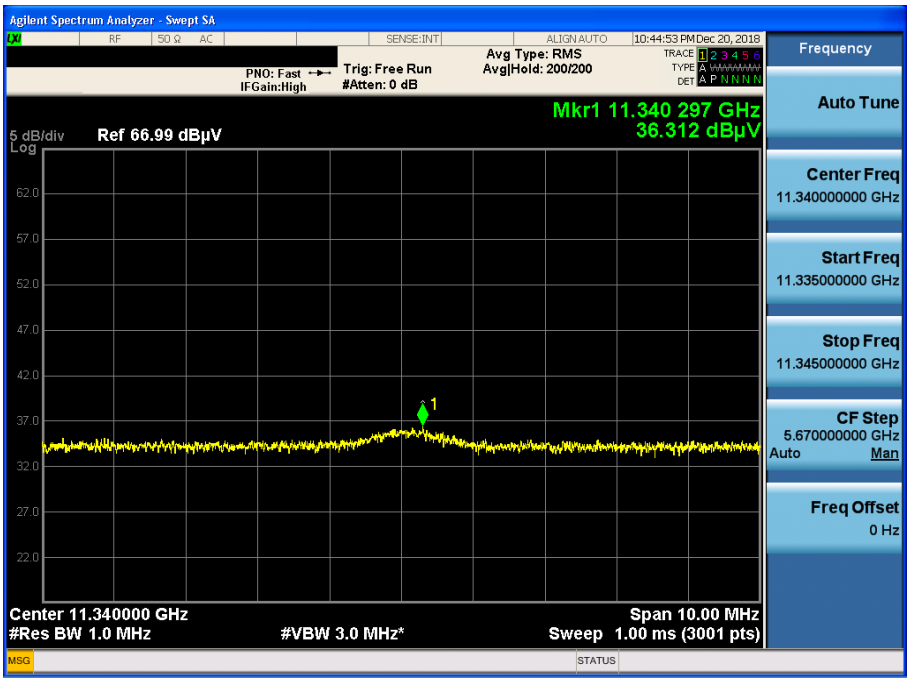
802.11n(HT40) & U-NII 2C & Ch.102 & X axis & Hor Detector Mode : AV



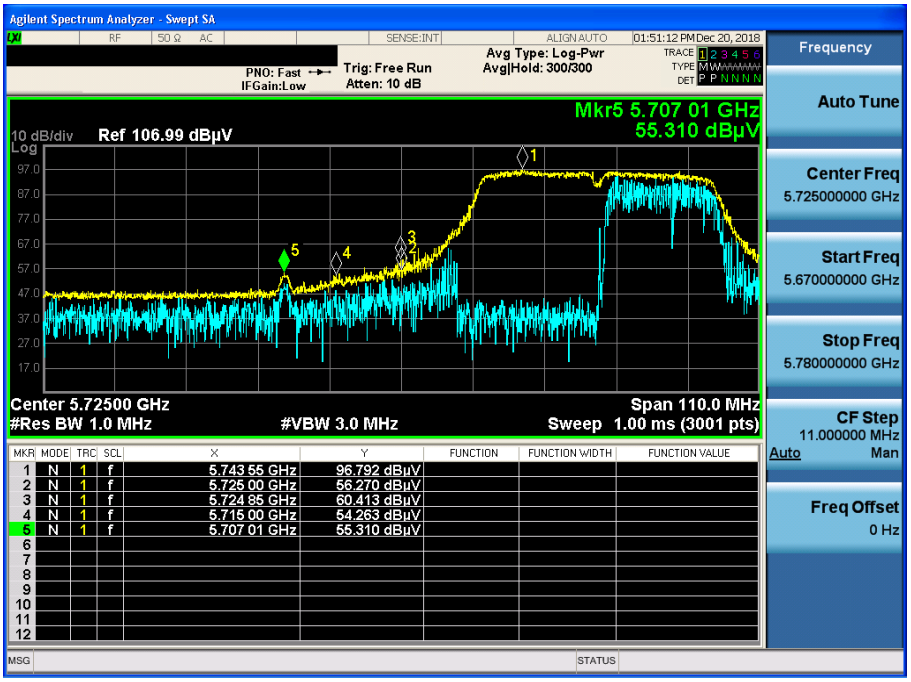
802.11n(HT40) & U-NII 2C & Ch.134 & Y axis & Ver Detector Mode : PK



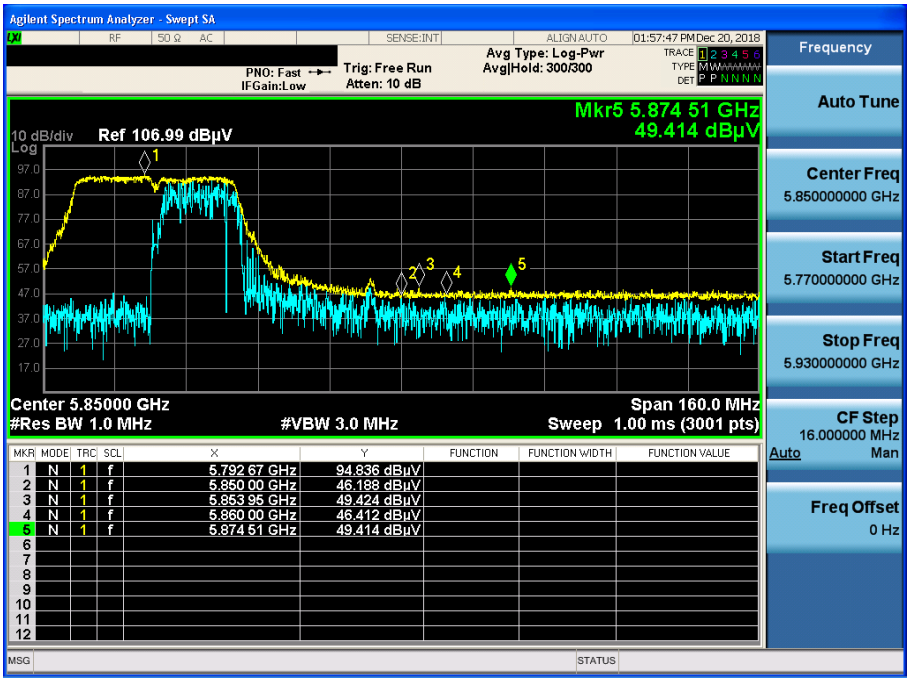
802.11n(HT40) & U-NII 2C & Ch.134 & Z axis & Hor Detector Mode : AV



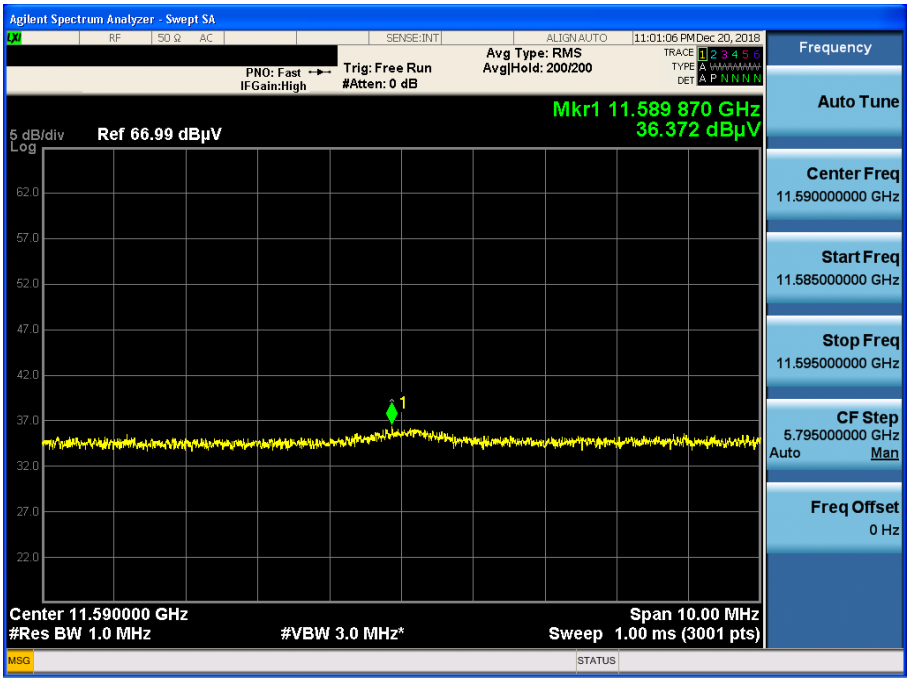
802.11n(HT40) & U-NII 3 & Ch.151 & Y axis & Ver Detector Mode : PK



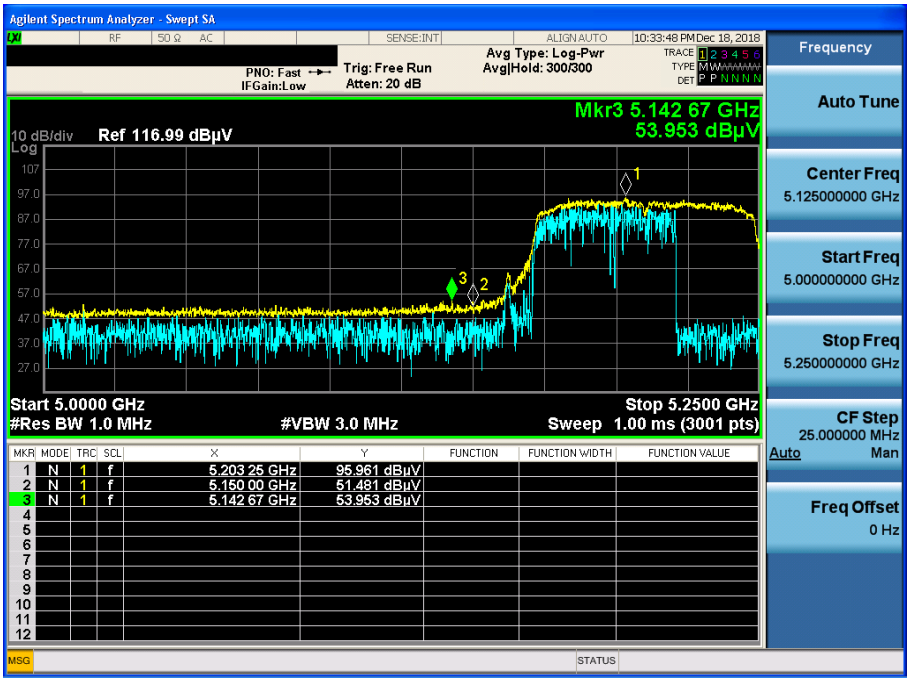
802.11n(HT40) & U-NII 3 & Ch.159 & Y axis & Ver Detector Mode : PK



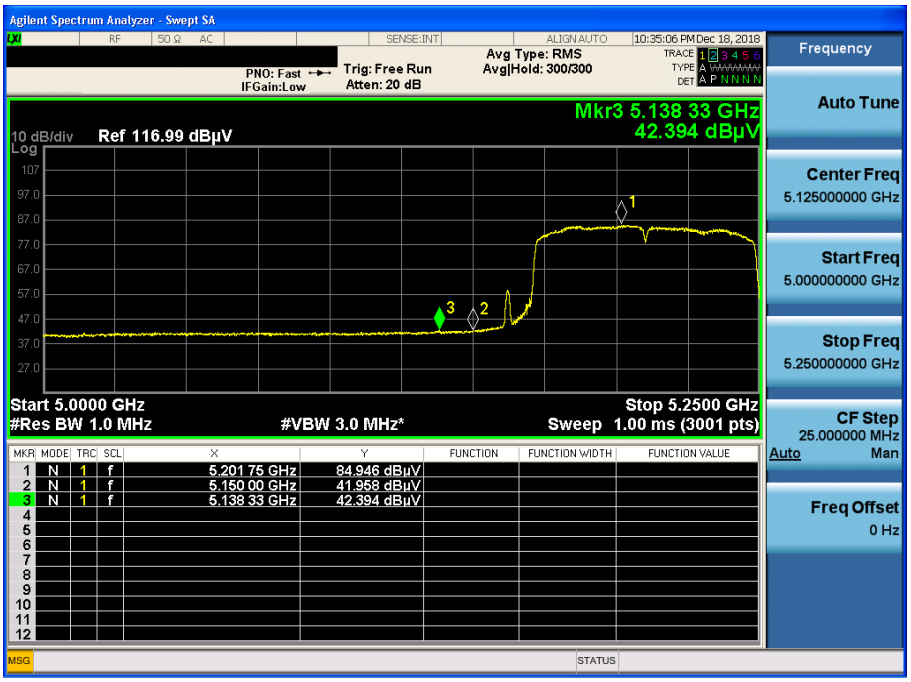
802.11n(HT40) & U-NII 3 & Ch.159 & Y axis & Ver Detector Mode : AV



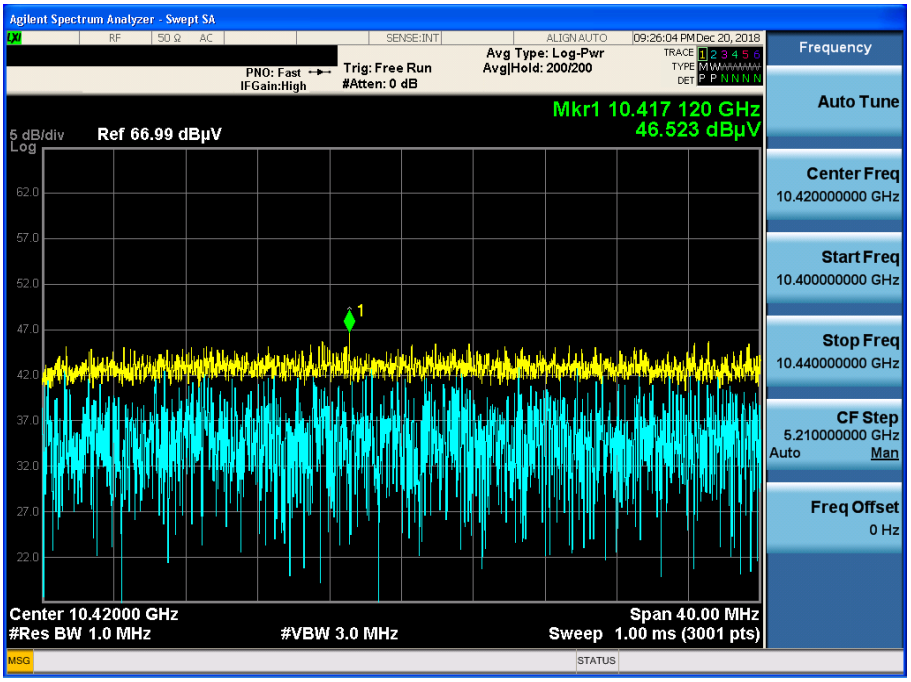
802.11ac(VHT80) & U-NII 1 & Ch.42 & Z axis & Hor Detector Mode : PK



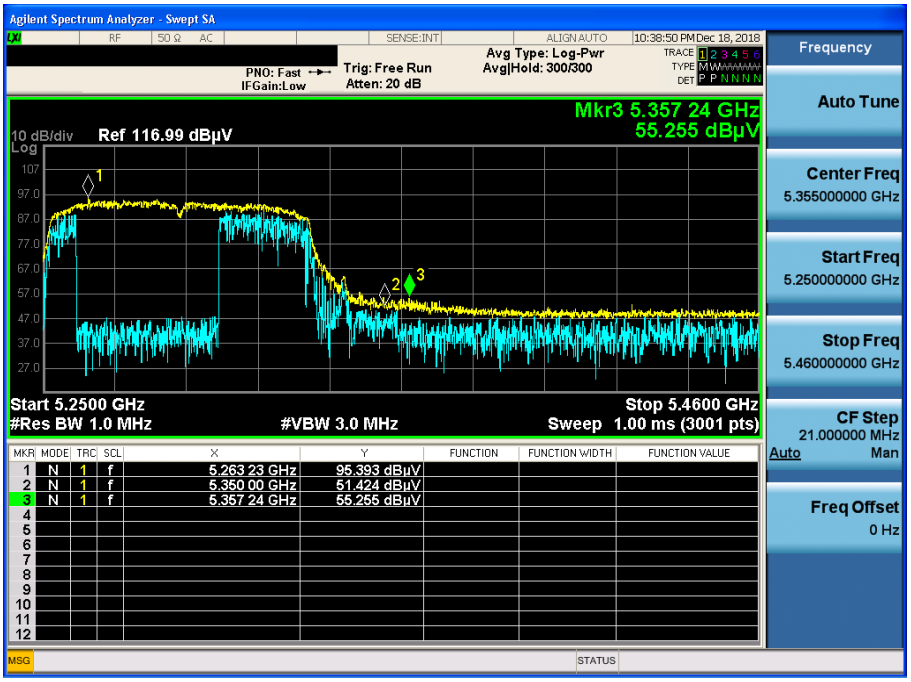
802.11ac(VHT80) & U-NII 1 & Ch.42 & Z axis & Hor Detector Mode : AV



802.11ac(VHT80) & U-NII 1 & Ch.42 & Z axis & Hor Detector Mode : PK



802.11ac(VHT80) & U-NII 2A & Ch.58 & Z axis & Hor Detector Mode : PK



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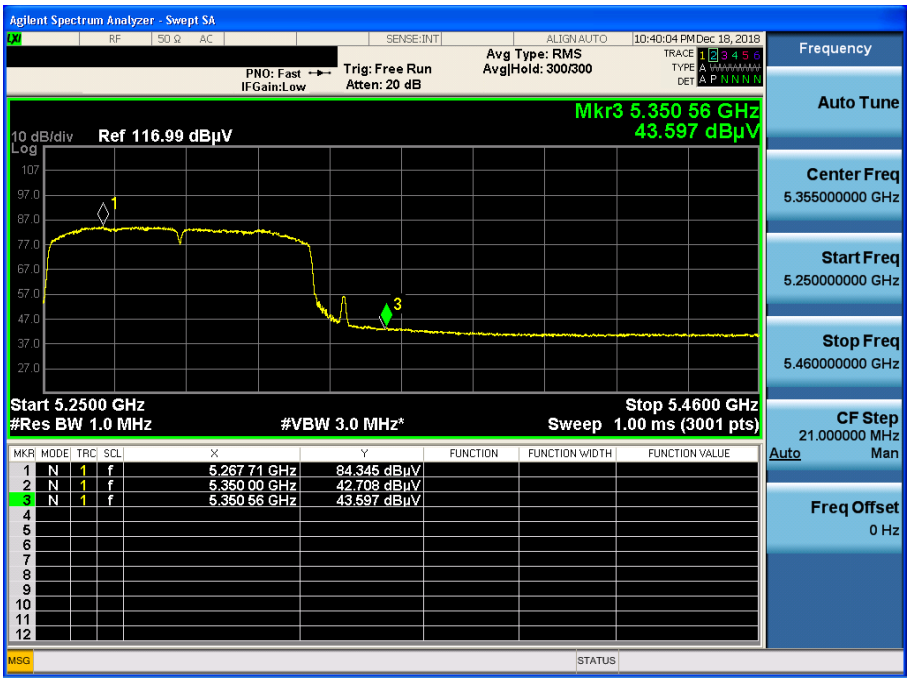
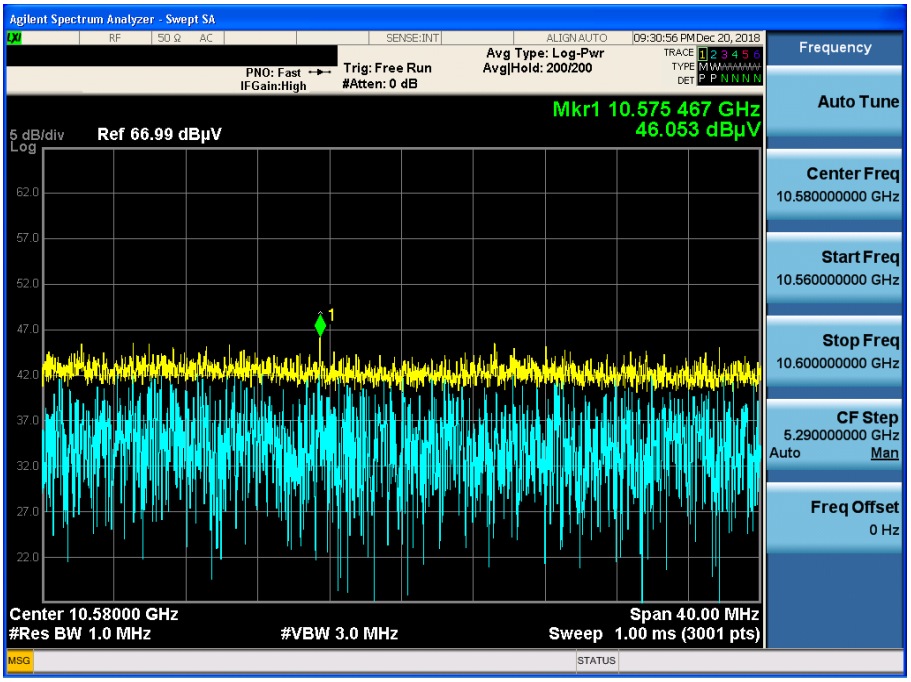
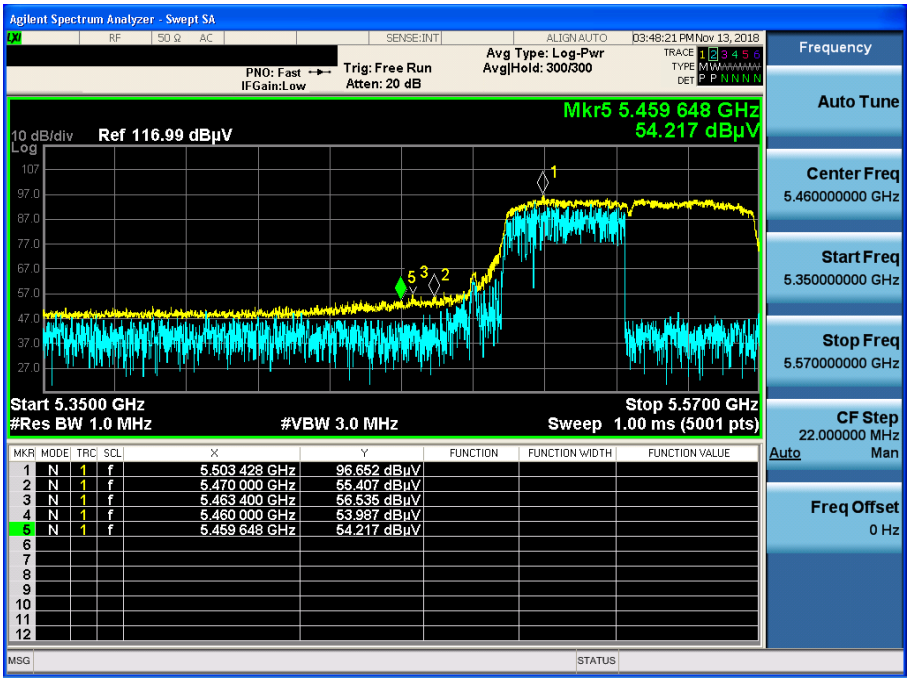


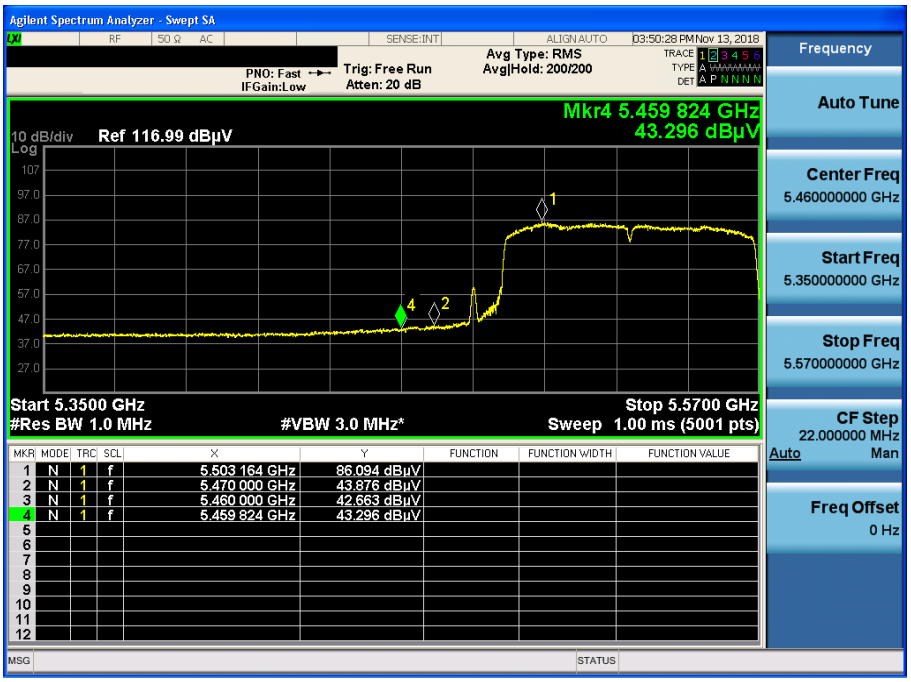
802.11ac(VHT80) & U-NII 2A & Ch.58 & Z axis & Hor Detector Mode : PK



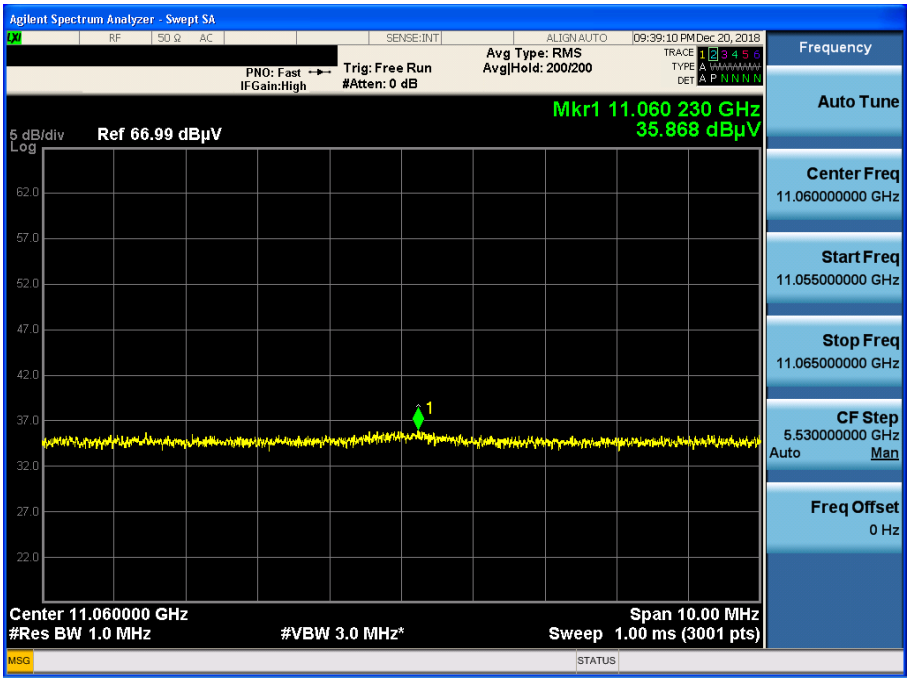
802.11ac(VHT80) & U-NII 2C & Ch.106 & X axis & Hor Detector Mode : PK



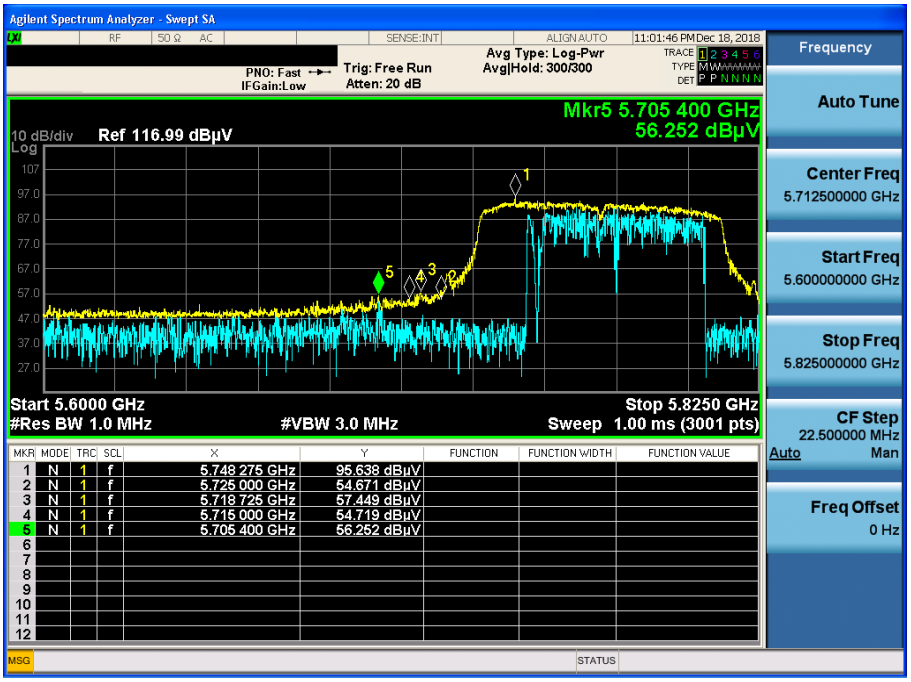
802.11ac(VHT80) & U-NII 2C & Ch.106 & X axis & Hor Detector Mode : AV



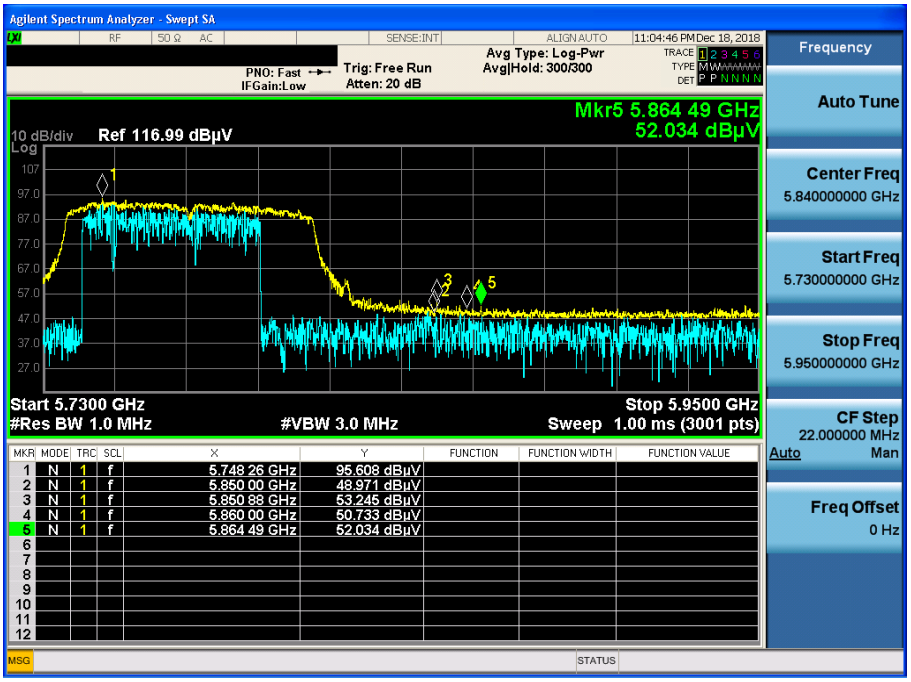
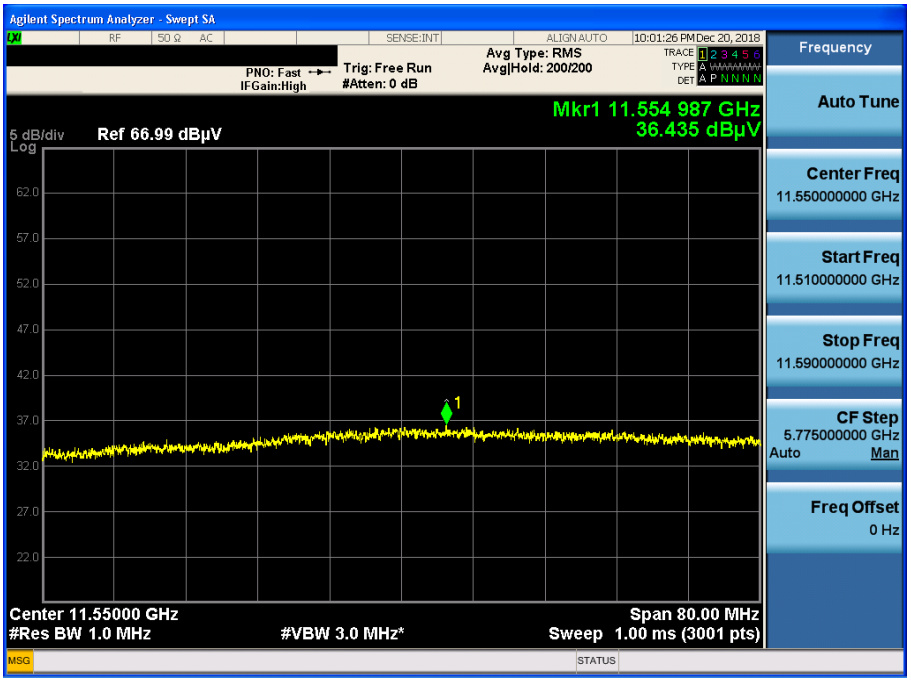
802.11ac(VHT80) & U-NII 2C & Ch.106 & Z axis & Hor Detector Mode : AV



802.11ac(VHT80) & U-NII 3 & Ch.155 & X axis & Hor **Detector Mode : PK**



802.11ac(VHT80) & U-NII 3 & Ch.155 & X axis & Hor **Detector Mode : PK**



802.11ac(VHT80) & U-NII 3 & Ch.155 & Z axis & Hor Detector Mode : AV