AC Line Conducted Emissions (Graph)

Test Mode: U-NII 2C   &   802.11a   &   MIMO(CDD)   &   5785 MHz

Results of Conducted Emission
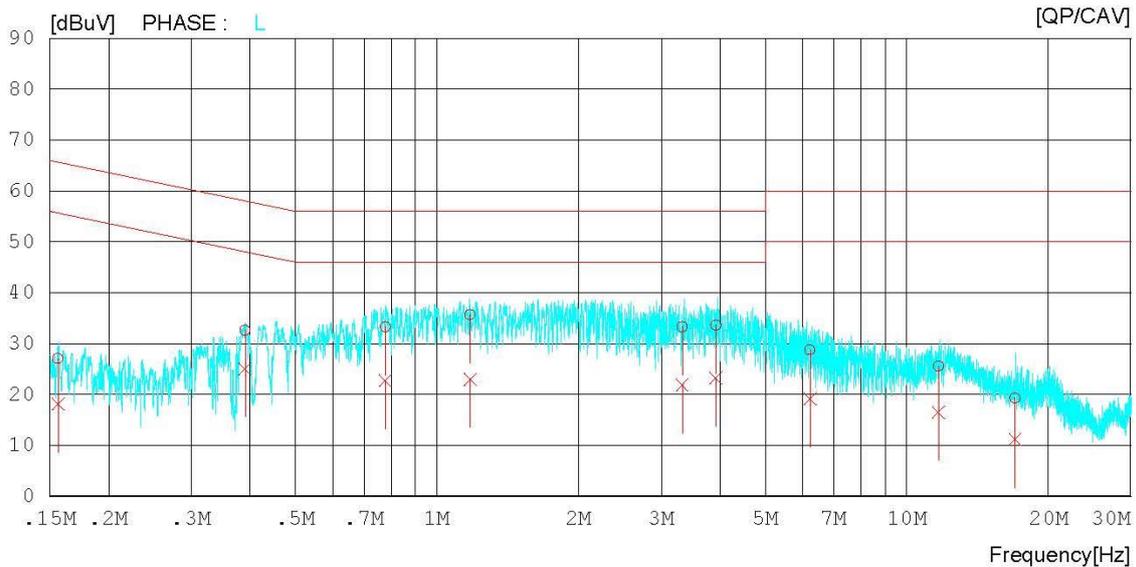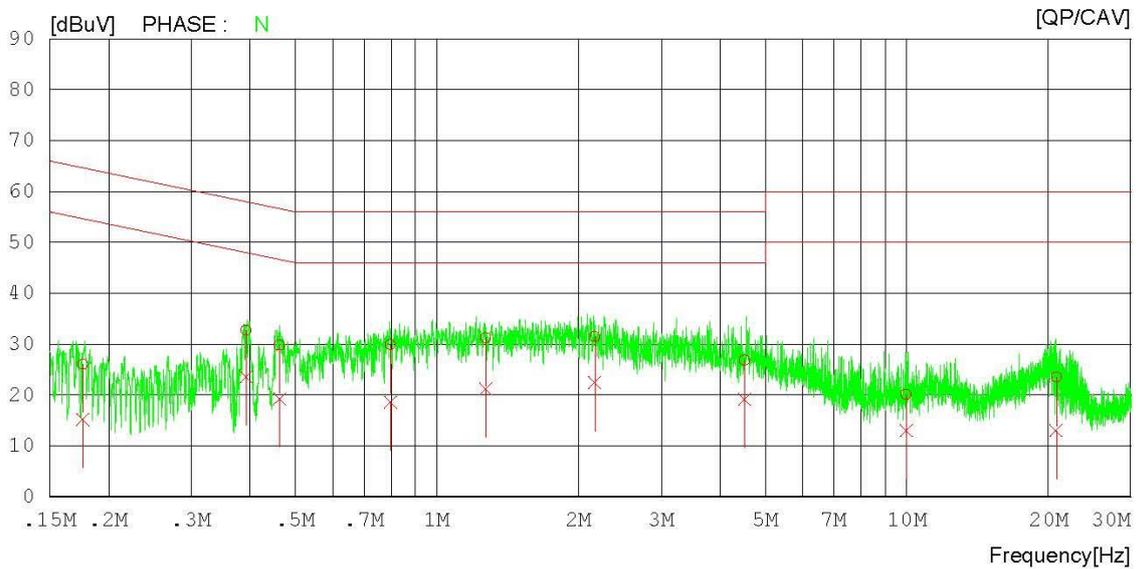
DTNC   Date 2020-02-14

Order No.   Referrence No.
Model No.   OA2006   Power Supply   120 V, 60 Hz
Serial No.   Temp/Humi.   23 'C / 35 %
Test Condition   5.7G   Operator   J.W.Kim

Memo

LIMIT : FCC P15.207 QP
        FCC P15.207 AV

AC Line Conducted Emissions (Data List)

Test Mode: U-NII 2C & 802.11a & MIMO(CDD) & 5785 MHz

Results of Conducted Emission

DTNC   Date 2020-02-14

Order No.		Referrence No.	
Model No.	OA2006	Power Supply	120 V, 60 Hz
Serial No.		Temp/Humi.	23 'C / 35 %
Test Condition	5.7G	Operator	J.W.Kim

Memo

LIMIT : FCC P15.207 QP
       FCC P15.207 AV

NO	FREQ	READING		C.FACTOR	RESULT		LIMIT		MARGIN		PHASE
		QP	CAV		QP	CAV	QP	CAV	QP	CAV	
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.17646	16.14	5.18	9.94	26.08	15.12	64.65	54.65	38.57	39.53	N
2	0.39278	22.81	13.61	9.95	32.76	23.56	58.00	48.00	25.24	24.44	N
3	0.46271	19.86	9.36	9.95	29.81	19.31	56.64	46.64	26.83	27.33	N
4	0.79616	19.97	8.64	9.97	29.94	18.61	56.00	46.00	26.06	27.39	N
5	1.26897	21.22	11.17	9.99	31.21	21.16	56.00	46.00	24.79	24.84	N
6	2.16517	21.50	12.37	10.03	31.53	22.40	56.00	46.00	24.47	23.60	N
7	4.51439	16.64	8.98	10.15	26.79	19.13	56.00	46.00	29.21	26.87	N
8	9.96419	9.74	2.66	10.34	20.08	13.00	60.00	50.00	39.92	37.00	N
9	20.79772	12.91	2.41	10.56	23.47	12.97	60.00	50.00	36.53	37.03	N
10	0.15619	17.10	8.12	9.94	27.04	18.06	65.66	55.66	38.62	37.60	L
11	0.39040	22.60	15.07	9.95	32.55	25.02	58.06	48.06	25.51	23.04	L
12	0.77697	23.25	12.74	9.96	33.21	22.70	56.00	46.00	22.79	23.30	L
13	1.17681	25.66	13.03	9.98	35.64	23.01	56.00	46.00	20.36	22.99	L
14	3.32651	23.16	11.72	10.08	33.24	21.80	56.00	46.00	22.76	24.20	L
15	3.91962	23.48	13.07	10.11	33.59	23.18	56.00	46.00	22.41	22.82	L
16	6.22080	18.47	8.91	10.20	28.67	19.11	60.00	50.00	31.33	30.89	L
17	11.68335	15.20	6.14	10.38	25.58	16.52	60.00	50.00	34.42	33.48	L
18	16.99558	8.84	0.69	10.49	19.33	11.18	60.00	50.00	40.67	38.82	L

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	19/06/26	20/06/26	US47360812
Spectrum Analyzer	Agilent Technologies	N9020A	19/12/16	20/12/16	MY48011700
Spectrum Analyzer	Agilent Technologies	N9020A	19/12/16	20/12/16	MY48010133
Spectrum Analyzer	Agilent Technologies	N9030A	19/12/16	20/12/16	MY53310140
DC power supply	Agilent Technologies	66332A	19/06/25	20/06/25	MY43001172
Multimeter	FLUKE	17B	19/12/16	20/12/16	26030065WS
Signal Generator	Rohde Schwarz	SMBV100A	19/12/16	20/12/16	255571
Signal Generator	ANRITSU	MG3695C	19/12/16	20/12/16	173501
Thermohygrometer	BODYCOM	BJ5478	19/12/18	20/12/18	120612-1
Thermohygrometer	BODYCOM	BJ5478	19/12/18	20/12/18	120612-2
Thermohygrometer	BODYCOM	BJ5478	19/07/03	20/07/03	N/A
Loop Antenna	ETS-Lindgren	6502	19/09/18	21/09/18	00226186
BILOG ANTENNA	Schwarzbeck	VULB 9160	19/04/23	21/04/23	9160-3362
Horn Antenna	ETS-Lindgren	3115	19/01/11	21/01/11	9202-3820
Horn Antenna	A.H.Systems Inc.	SAS-574	19/07/03	21/07/03	155
PreAmplifier	tsj	MLA-0118-B01-40	19/12/16	20/12/16	1852267
PreAmplifier	tsj	MLA-1840-J02-45	19/06/27	20/06/27	16966-10728
PreAmplifier	H.P	8447D	19/12/16	20/12/16	2944A07774
High Pass Filter	Wainwright Instruments	WHKX12-935-1000-15000-40SS	19/06/26	20/06/26	8
High Pass Filter	Wainwright Instruments	WHKX10-2838-3300-18000-60SS	19/06/26	20/06/26	1
High Pass Filter	Wainwright Instruments	WHNX8.0/26.5-6SS	19/06/27	20/06/27	3
Attenuator	Hefei Shunze	SS5T2.92-10-40	19/06/27	20/06/27	16012202
Attenuator	SRTechnology	F01-B0606-01	19/06/27	20/06/27	13092403
Attenuator	Aeroflex/Weinschel	20515	19/06/27	20/06/27	Y2370
Attenuator	SMAJK	SMAJK-2-3	19/06/27	20/06/27	2
Power Meter & Wide Bandwidth Sensor	Anritsu	ML2495A MA2490A	19/06/24	20/06/24	1306007 1249001
EMI Receiver	ROHDE&SCHWARZ	ESW44	19/07/30	20/07/30	101645
HYGROMETER	TESTO	608-H1	20/01/21	21/01/21	34862883
EMI Test Receiver	Rohde Schwarz	ESCI7	20/01/20	21/01/20	100910
PULSE LIMITER	Rohde Schwarz	ESH3-Z2	19/09/17	20/09/17	101333
LISN	SCHWARZBECK	NNLK 8121	19/05/23	20/05/23	6183
Cable	Junkosha	MWX241	20/01/13	21/01/13	G-04
Cable	Junkosha	MWX241	20/01/13	21/01/13	G-07
Cable	DT&C	Cable	20/01/13	21/01/13	G-13
Cable	DT&C	Cable	20/01/13	21/01/13	G-14
Cable	HUBER+SUHNER	SUCOFLEX 104	20/01/13	21/01/13	G-15
Cable	Radiall	TESTPRO3	20/01/16	21/01/16	M-01
Cable	Junkosha	MWX315	20/01/16	21/01/16	M-05
Cable	Junkosha	MWX221	20/01/16	21/01/16	M-06
Cable	DT&C	Cable	20/01/16	21/01/16	RF-09
Cable	DT&C	Cable	20/01/16	21/01/16	RF-82

Note 1: The measurement antennas were calibrated in accordance to the requirements of ANSI C63.5-2017
Note 2: The cable is not a regular calibration item, so it has been calibrated by DT & C itself.

APPENDIX I

Conducted Test set up Diagram

▪ **Conducted Measurement**
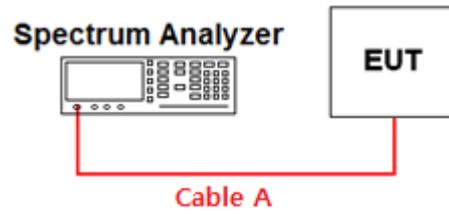
APPENDIX II

Duty Cycle Information

▣ **Test Procedure**

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

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	2.030	2.066	0.9826	0.08	24.63
802.11n (HT20)	MCS0	5180	1.890	1.926	0.9813	0.08	26.46
802.11n (HT40)	MCS0	5190	1.274	1.310	0.9725	0.12	39.25
802.11ac (VHT80)	MCS0	5210	1.173	1.208	0.9710	0.13	42.63

Duty cycle: SDM

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		
802.11n (HT20)	MCS8	5180	0.970	1.005	0.9652	0.15	51.55
802.11n (HT40)	MCS8	5190	0.662	0.697	0.9498	0.22	75.56
802.11ac (VHT80)	MCS0	5210	0.612	0.648	0.9435	0.25	81.74

▣ **Test Plot:**

Single Transmit

Duty Cycle   Test Mode: 802.11a & Ch.36

Duty Cycle   Test Mode: 802.11n HT20 & Ch.36

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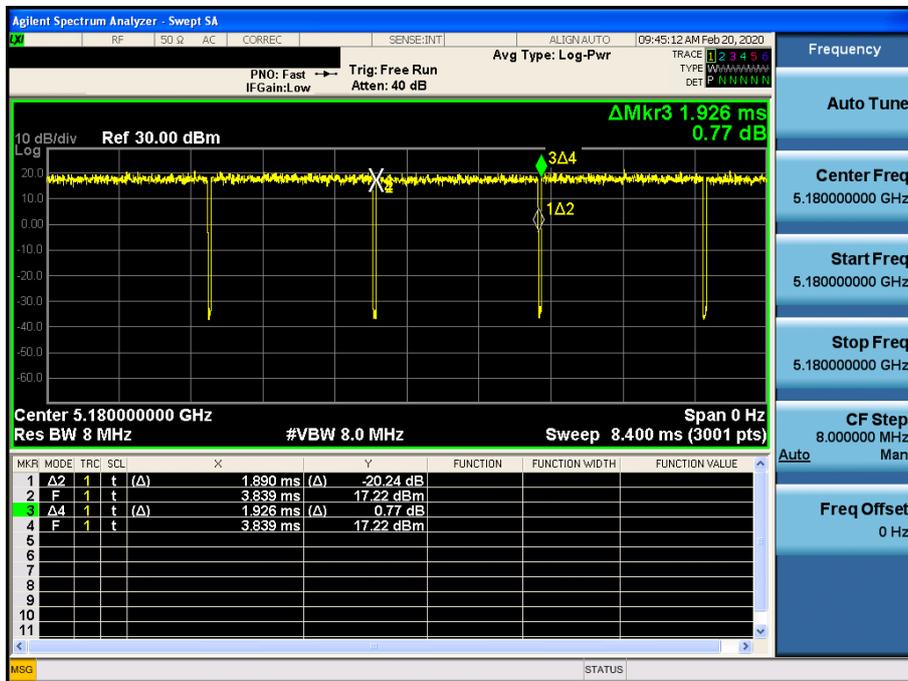
Duty Cycle   Test Mode: 802.11n HT40   &   Ch.38

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

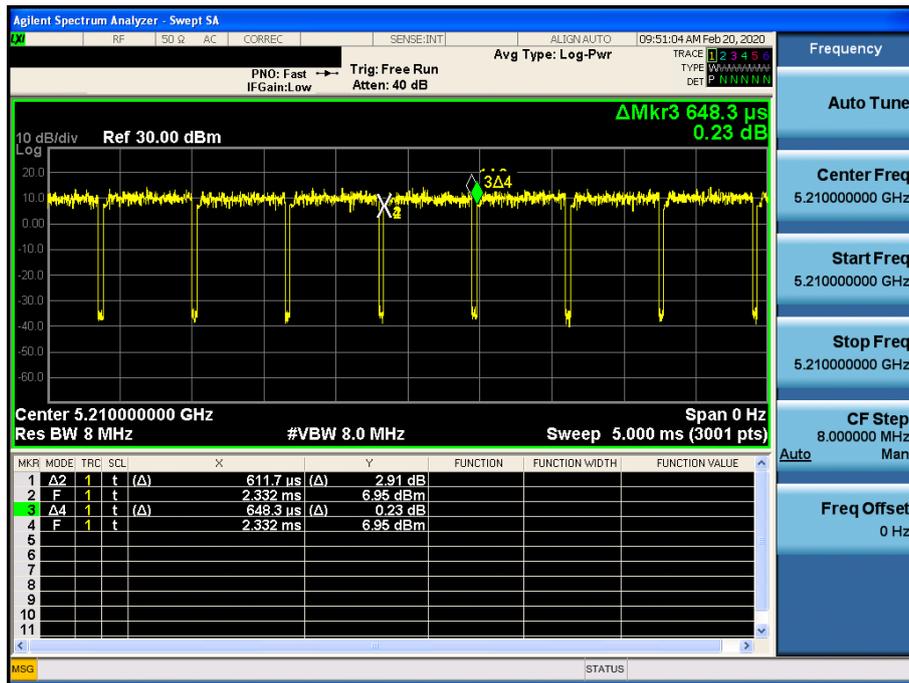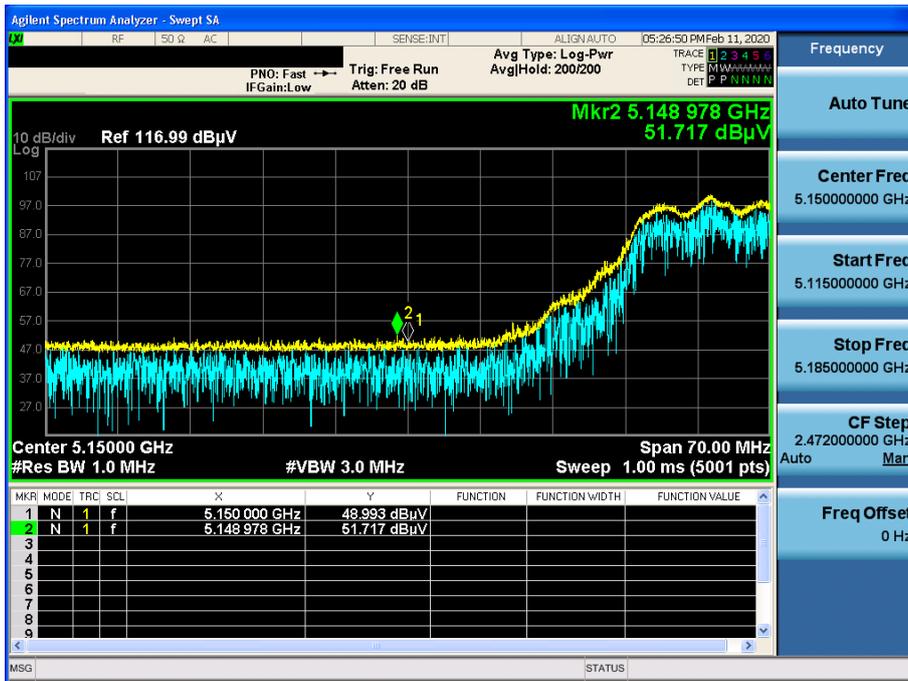## Multiple Transmit _ SDM

Duty Cycle   Test Mode: 802.11n HT20   &   Ch.36
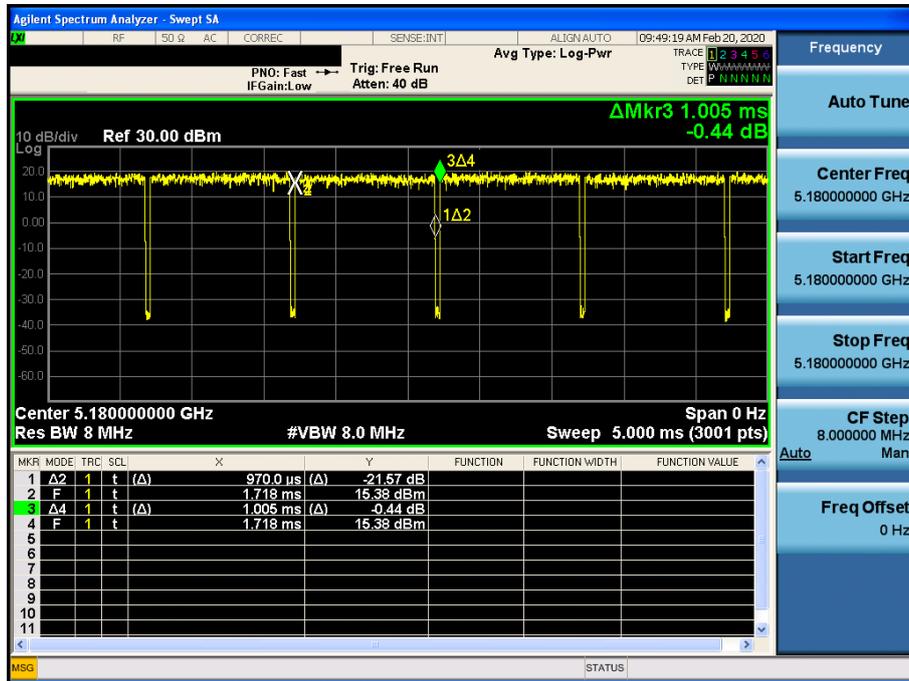
Duty Cycle   Test Mode: 802.11n HT40   &   Ch.38
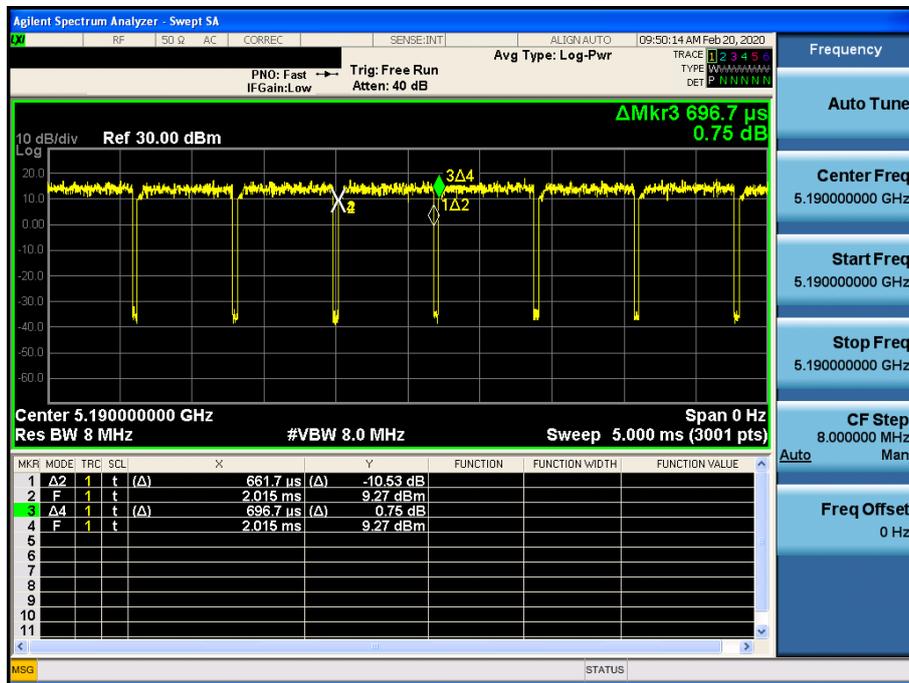
Duty Cycle

Test Mode: 802.11ac VHT80 & Ch.42

APPENDIX III

Unwanted Emissions (Radiated) Test Plot: MIMO(CDD)

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

802.11a　&　U-NII 1　&　Ch.36　&　X axis　&　Ver　　　　　　**Detector Mode : AV**
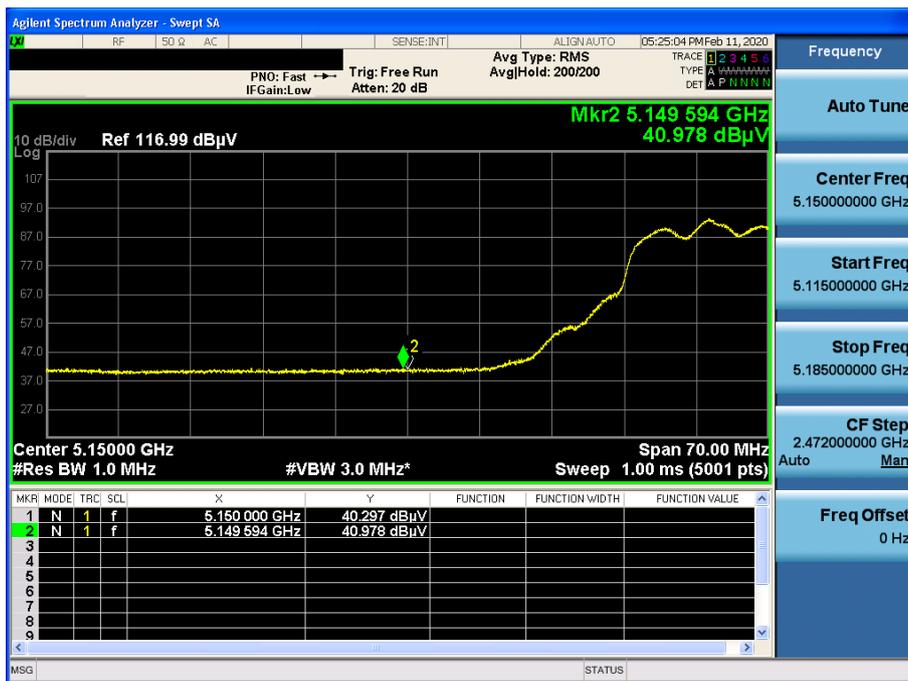
802.11a & U-NII 1 & Ch.36 & X axis & Hor **Detector Mode : PK**
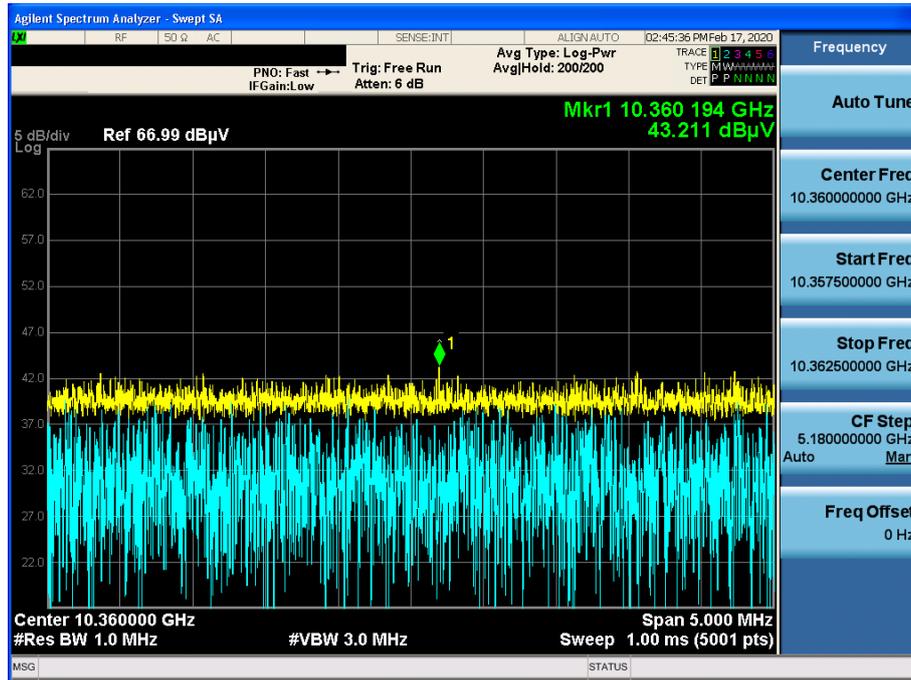
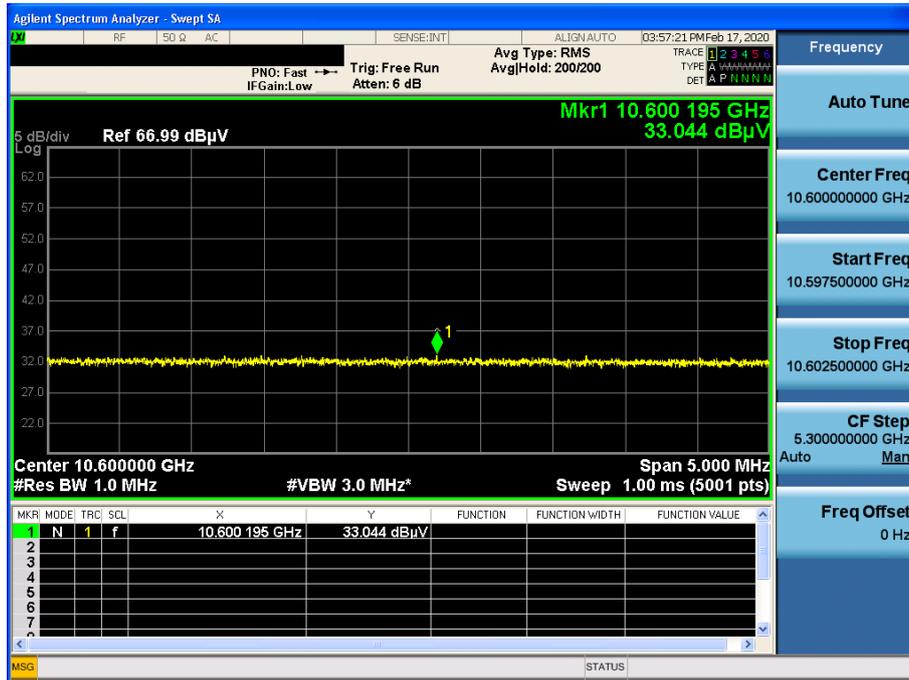**802.11a   &   U-NII 2A   &   Ch.64   &   X axis   &   Ver**   **Detector Mode : PK**
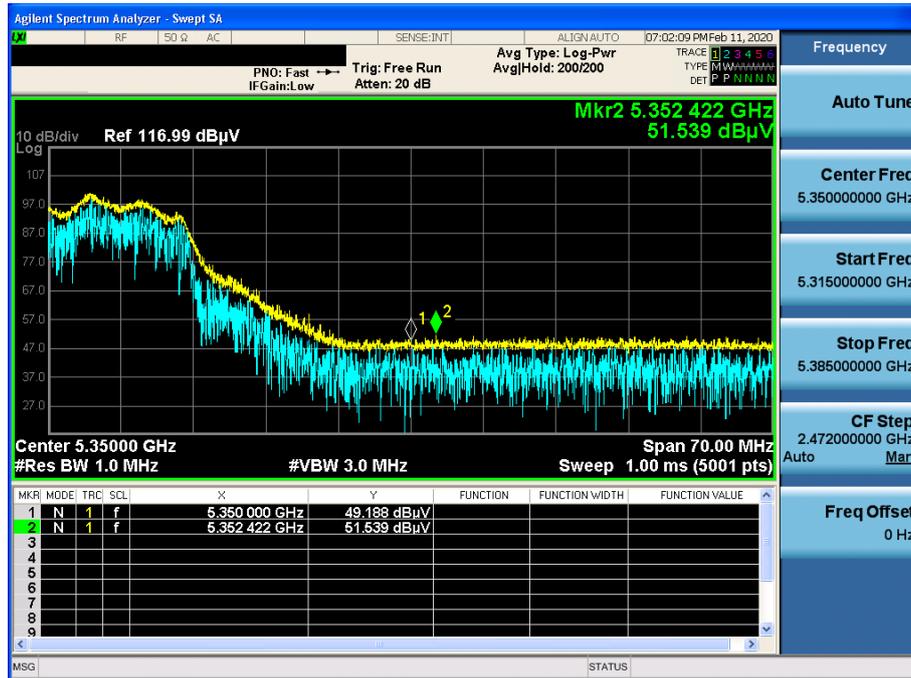
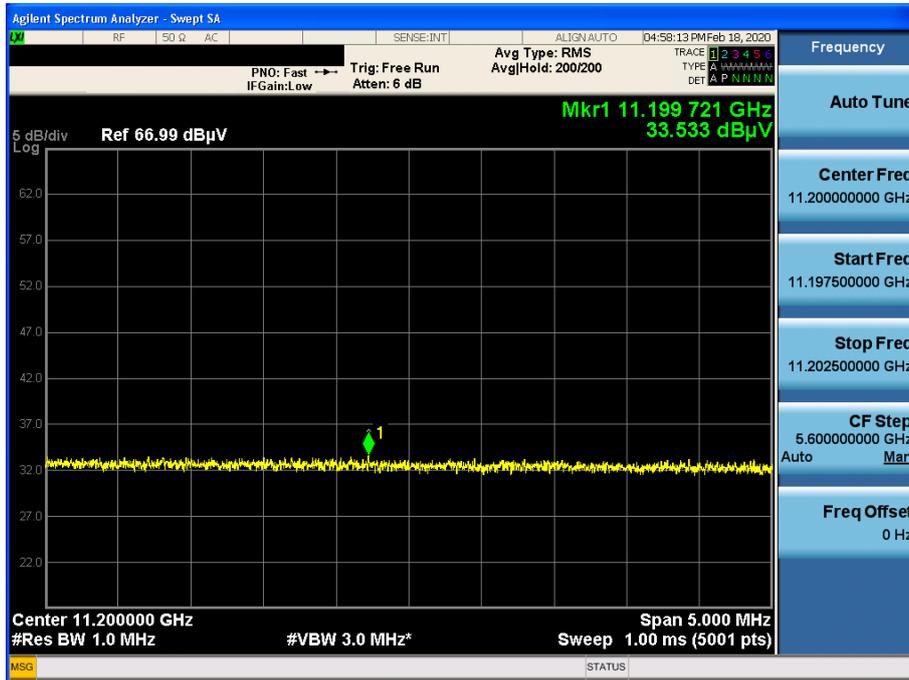**802.11a   &   U-NII 2A   &   Ch.64   &   X axis   &   Ver**   **Detector Mode : AV**

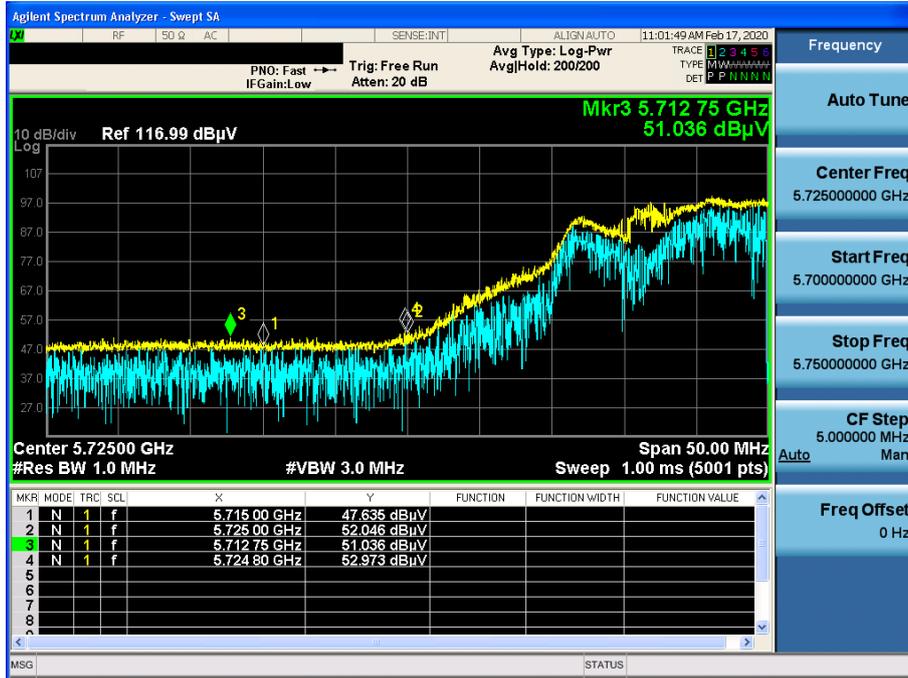**802.11a & U-NII 2A & Ch.60 & X axis & Hor**   **Detector Mode : AV**
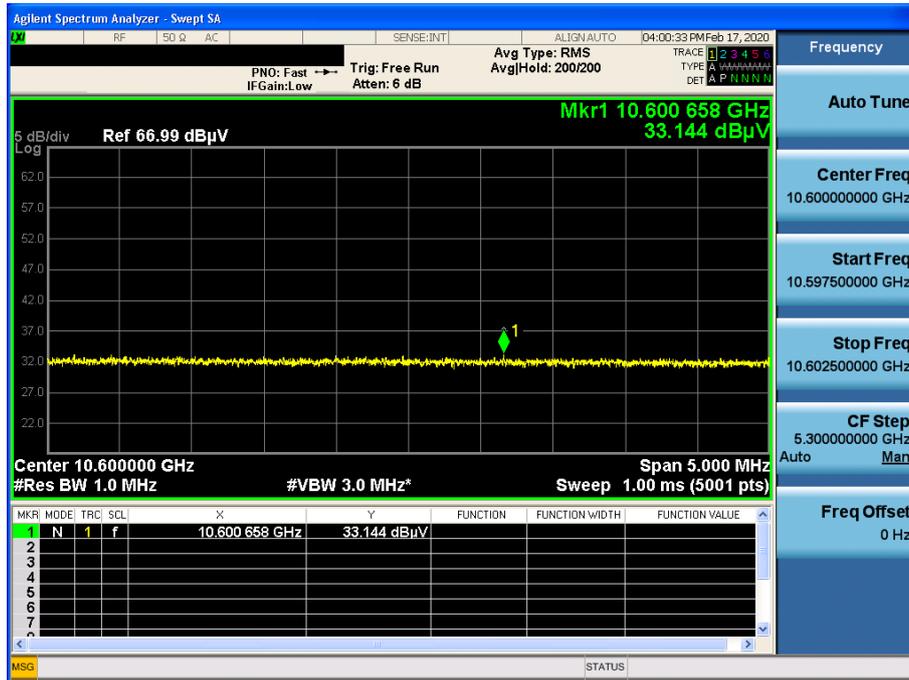
802.11a & U-NII 2C & Ch.100 & X axis & Ver **Detector Mode : PK**
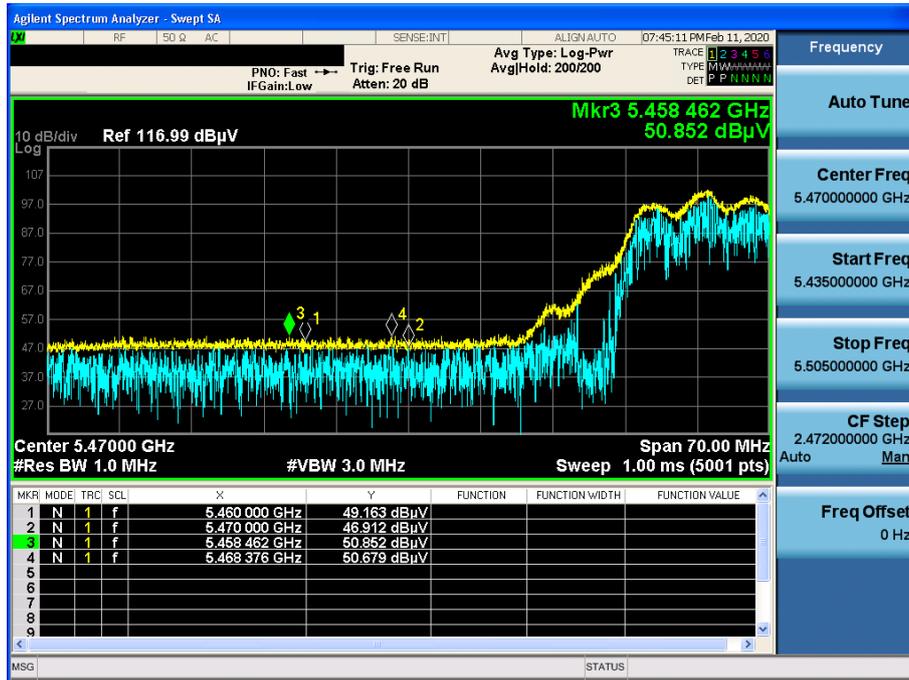
802.11a & U-NII 2C & Ch.100 & X axis & Ver **Detector Mode : AV**

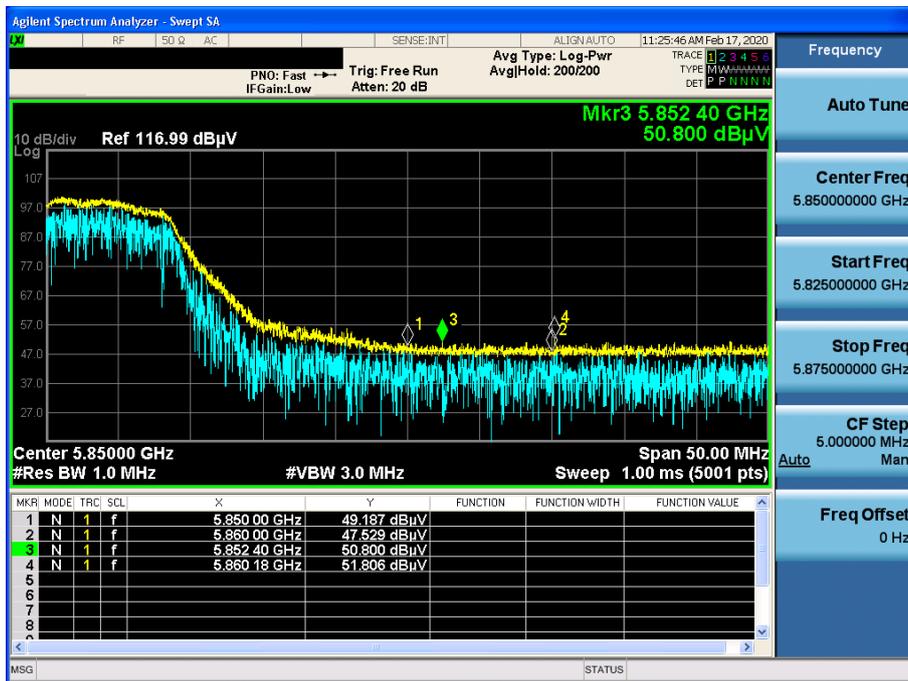**802.11a & U-NII 2C & Ch.120 & X axis & Hor   Detector Mode : AV**

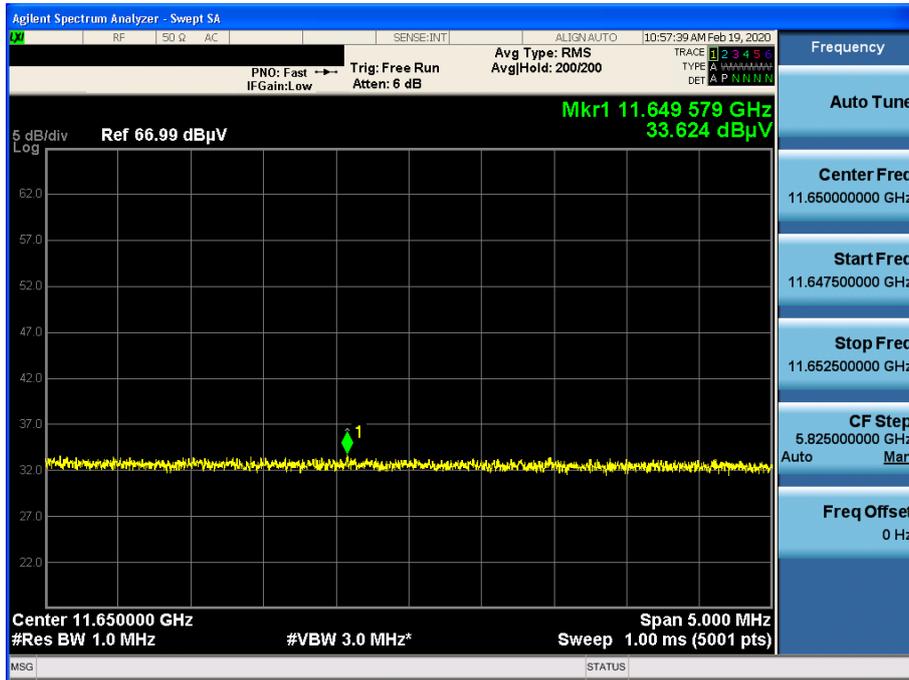**802.11a   &   U-NII 3   &   Ch.149   &   X axis   &   Ver**   **Detector Mode : PK**

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

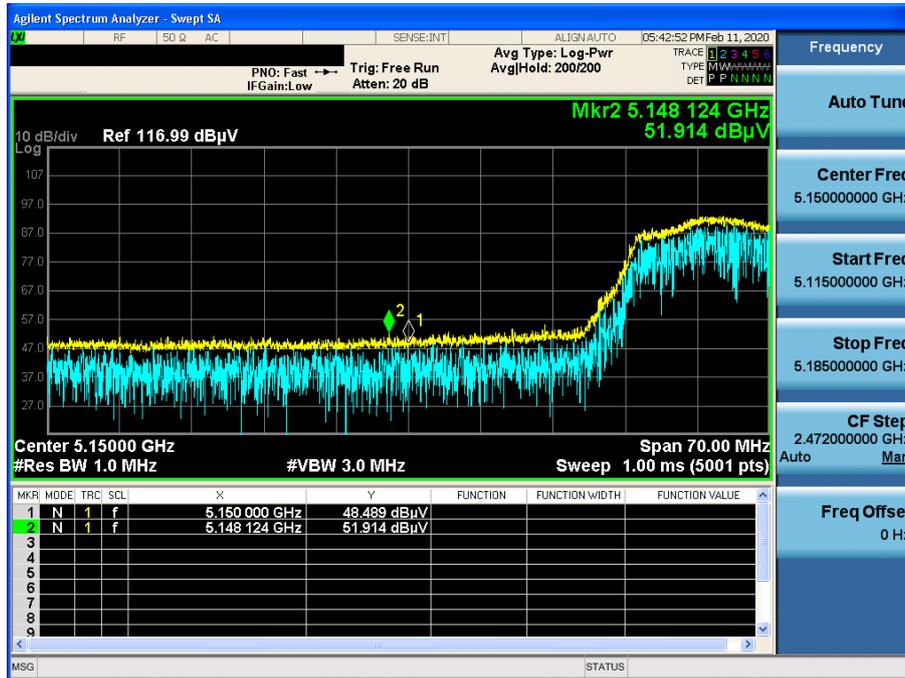**802.11a & U-NII 3 & Ch.165 & X axis & Hor**   **Detector Mode : AV**

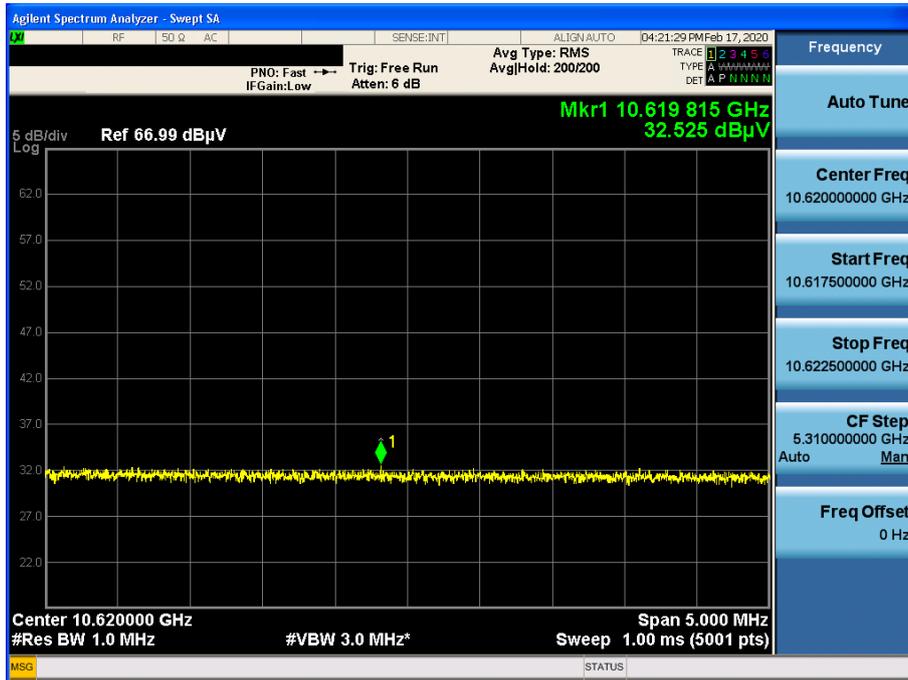**802.11n(HT20)   &   U-NII 1   &   Ch.36   &   X axis   &   Ver**   **Detector Mode : PK**

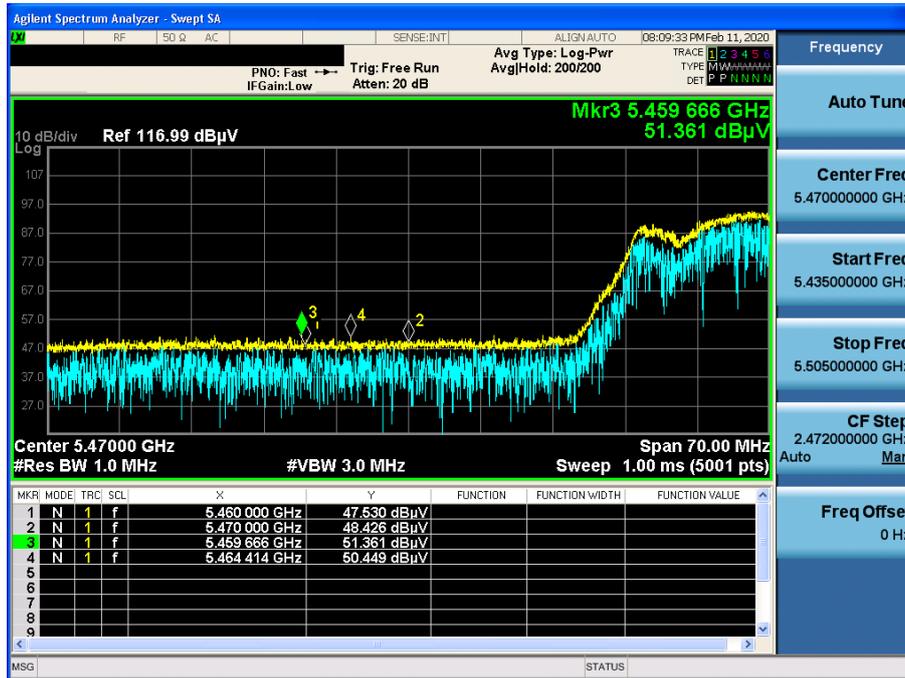**802.11n(HT20)   &   U-NII 1   &   Ch.36   &   X axis   &   Ver**   **Detector Mode : AV**

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

802.11n(HT20)   &   U-NII 2A   &   Ch.64   &   X axis   &   Ver   **Detector Mode : PK**

802.11n(HT20)   &   U-NII 2A   &   Ch.64   &   X axis   &   Ver   **Detector Mode : AV**

802.11n(HT20)   &   U-NII 2A   &   Ch.60   &   X axis   &   Hor   Detector Mode : AV
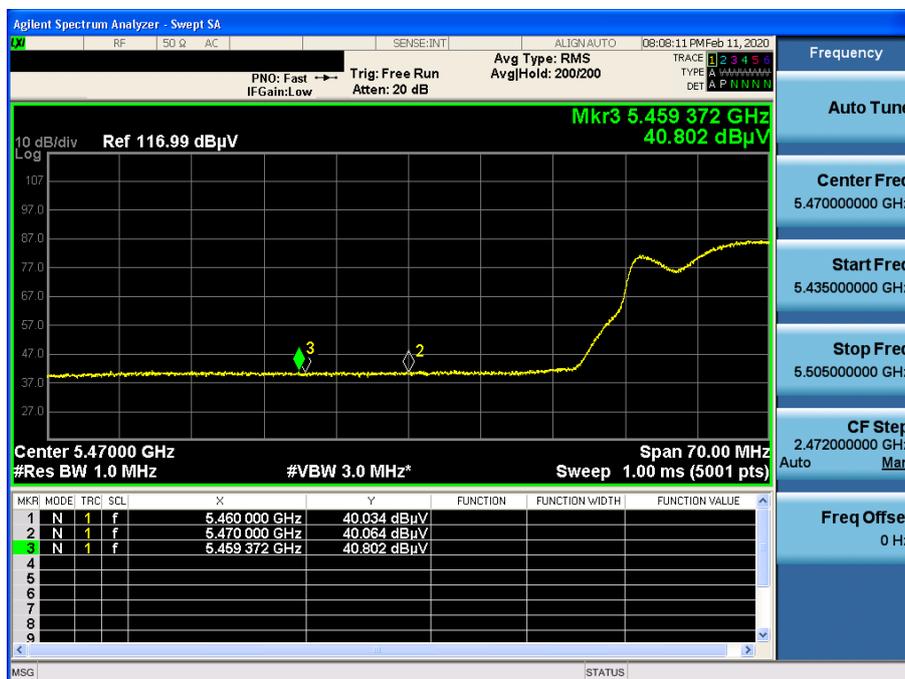
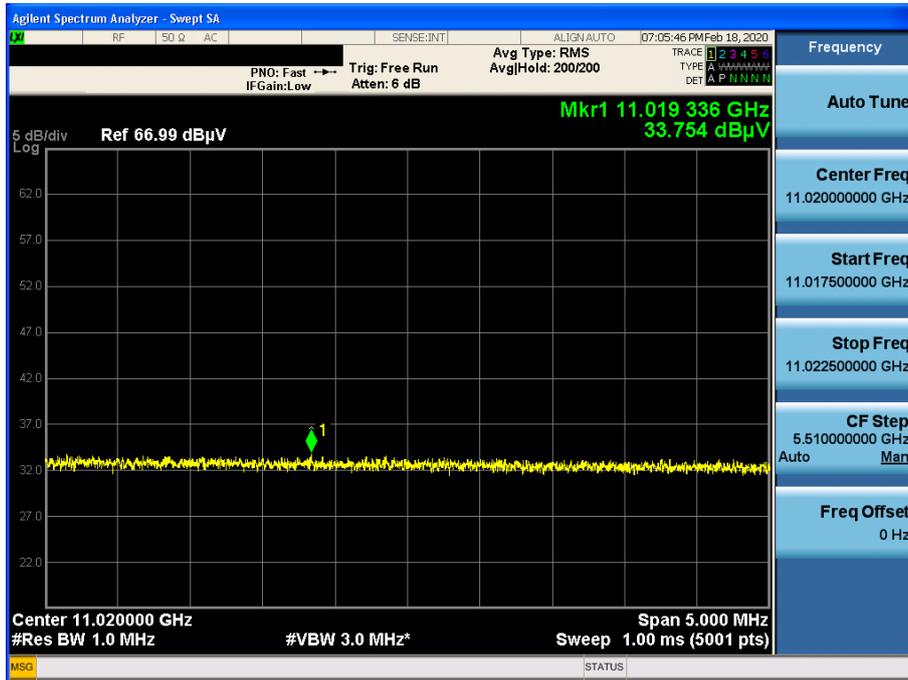**802.11n(HT20)   &   U-NII 2C   &   Ch.100   &   X axis   &   Ver   Detector Mode : PK**

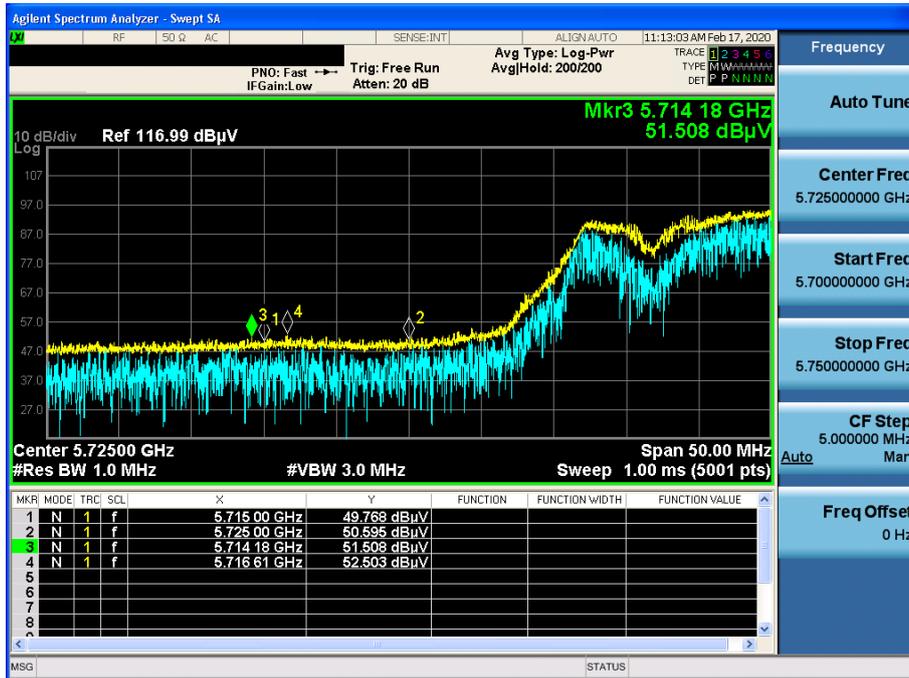**802.11n(HT20)   &   U-NII 2C   &   Ch.100   &   X axis   &   Ver   Detector Mode : AV**

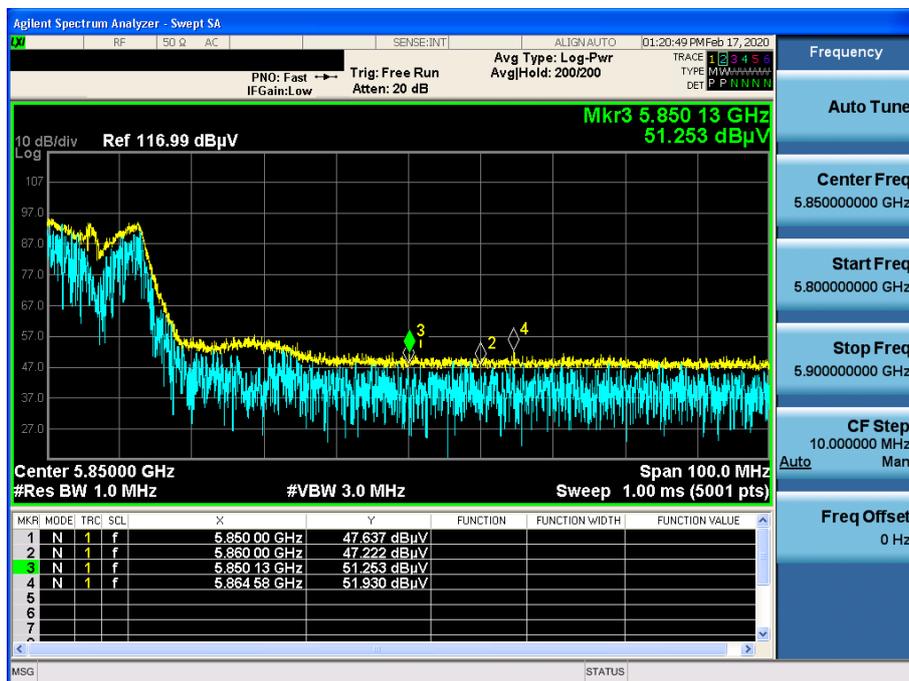**802.11n(HT20)   &   U-NII 2C   &   Ch.120   &   X axis   &   Hor   Detector Mode : AV**

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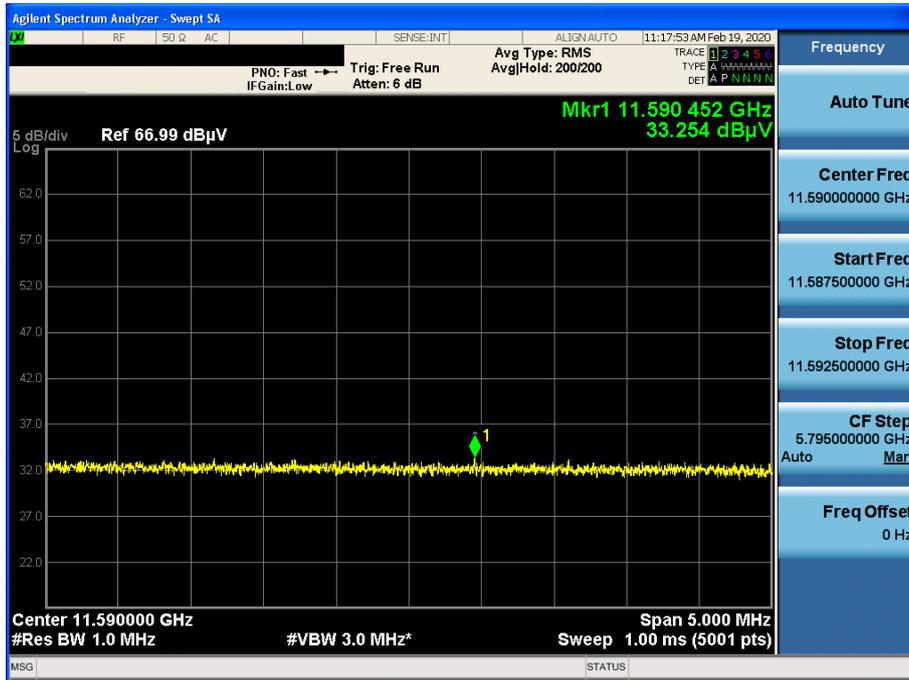

802.11n(HT20)   &   U-NII 3   &   Ch.165   &   X axis   &   Ver   **Detector Mode : PK**

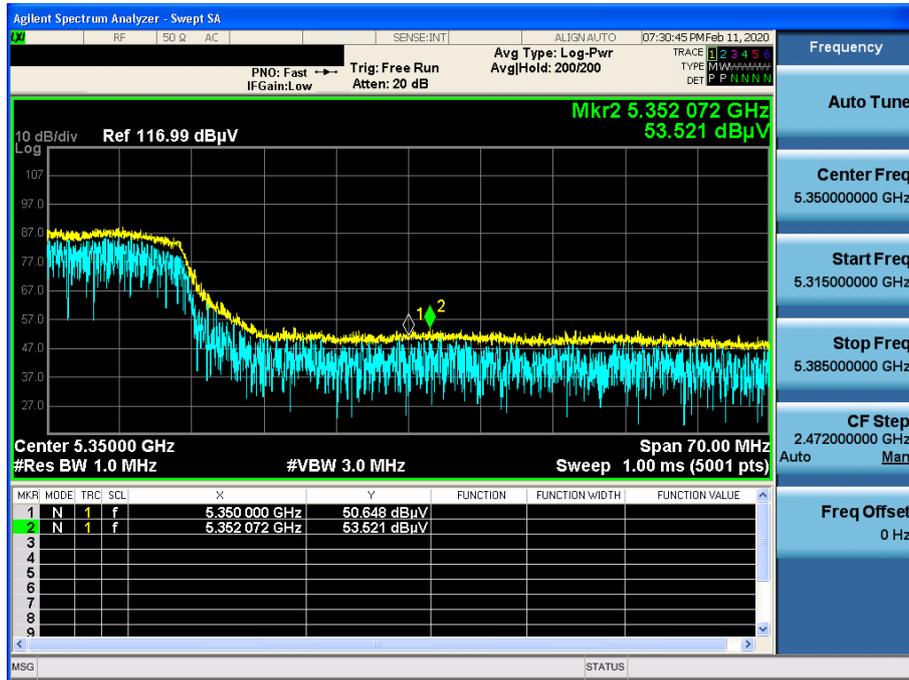**802.11n(HT20)   &   U-NII 3   &   Ch.165   &   X axis   &   Hor   Detector Mode : AV**

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

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

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

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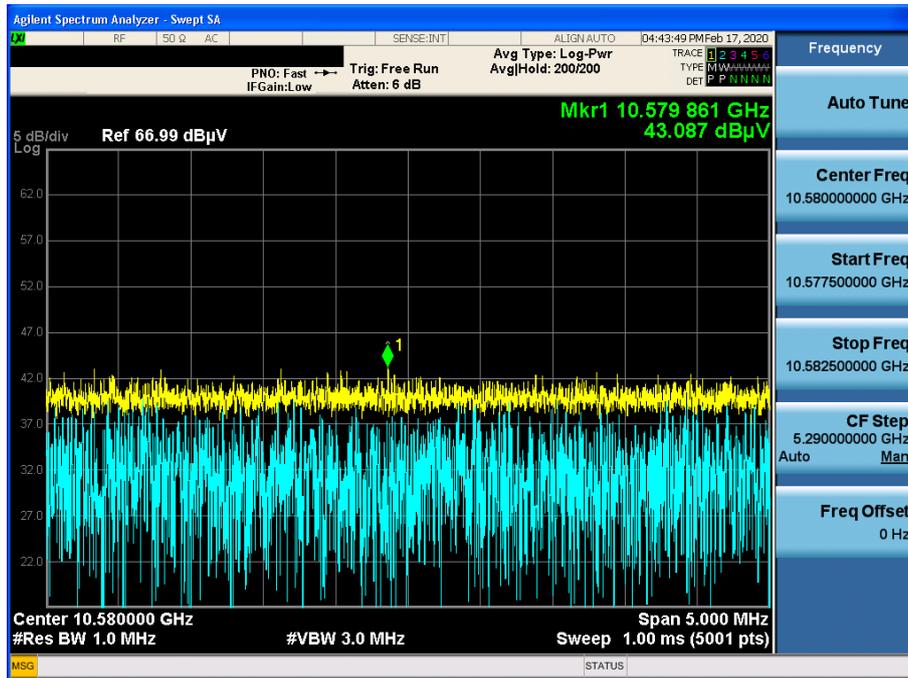

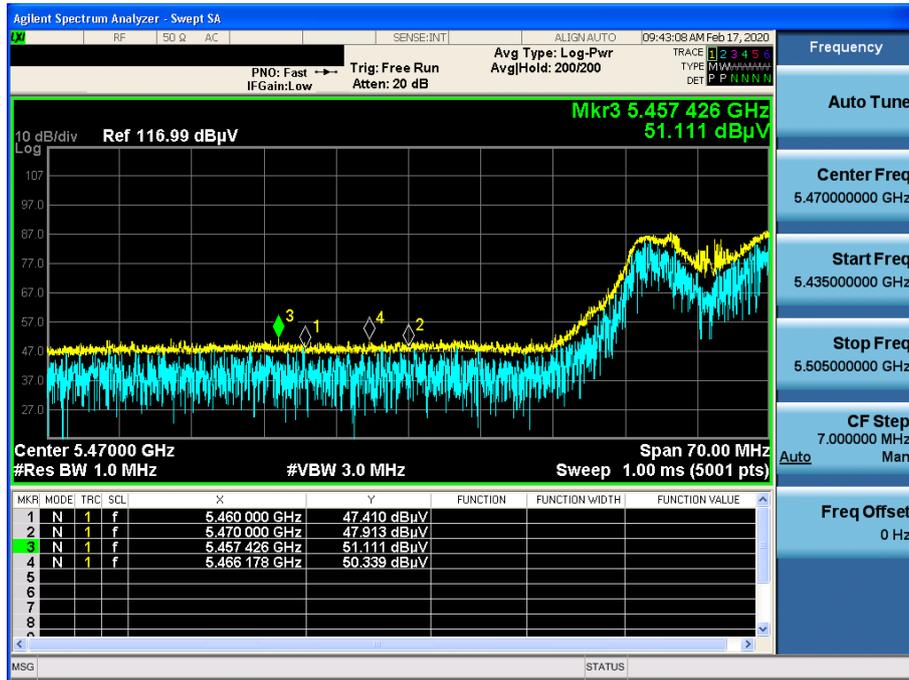**802.11n(HT40)   &   U-NII 2A   &   Ch.62   &   X axis   &   Ver**   **Detector Mode : AV**

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

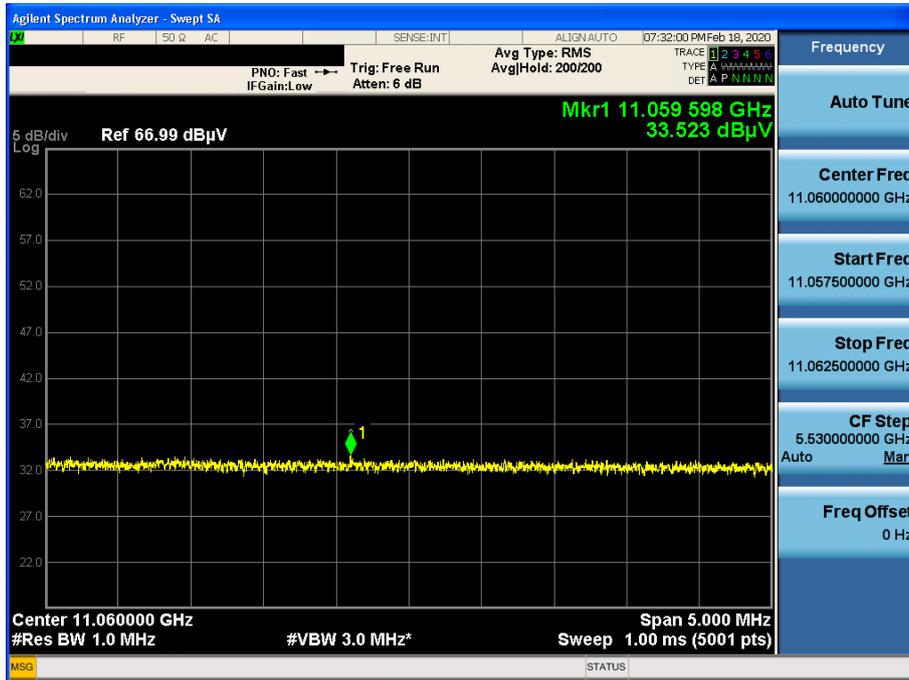**802.11n(HT40) & U-NII 2C & Ch.102 & X axis & Ver** **Detector Mode : PK**

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

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

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

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

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

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

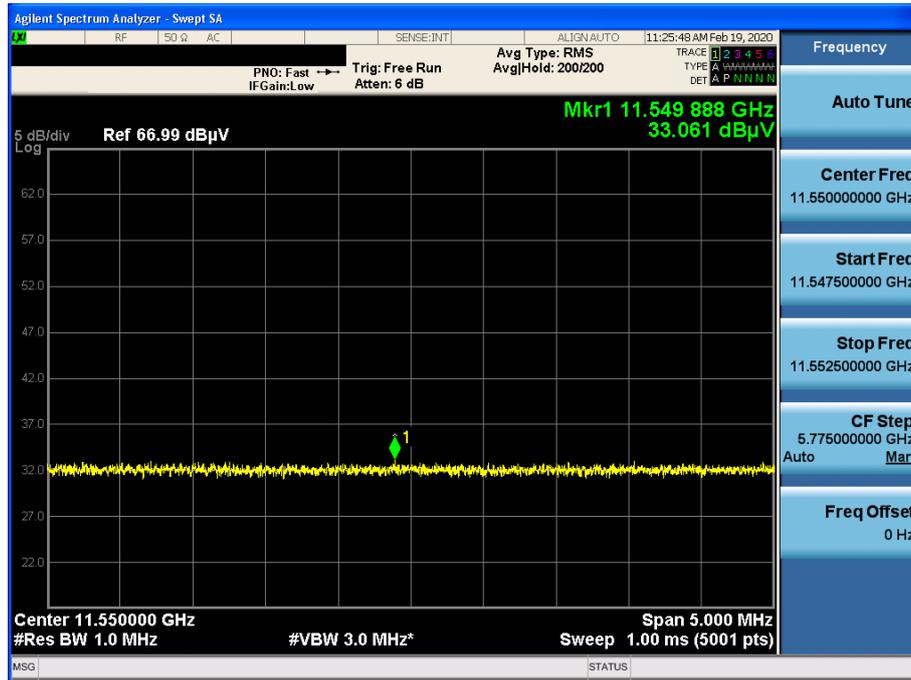**802.11ac(VHT80)　&　U-NII 1　&　Ch.42　&　X axis　&　Ver　　　　　Detector Mode : AV**

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

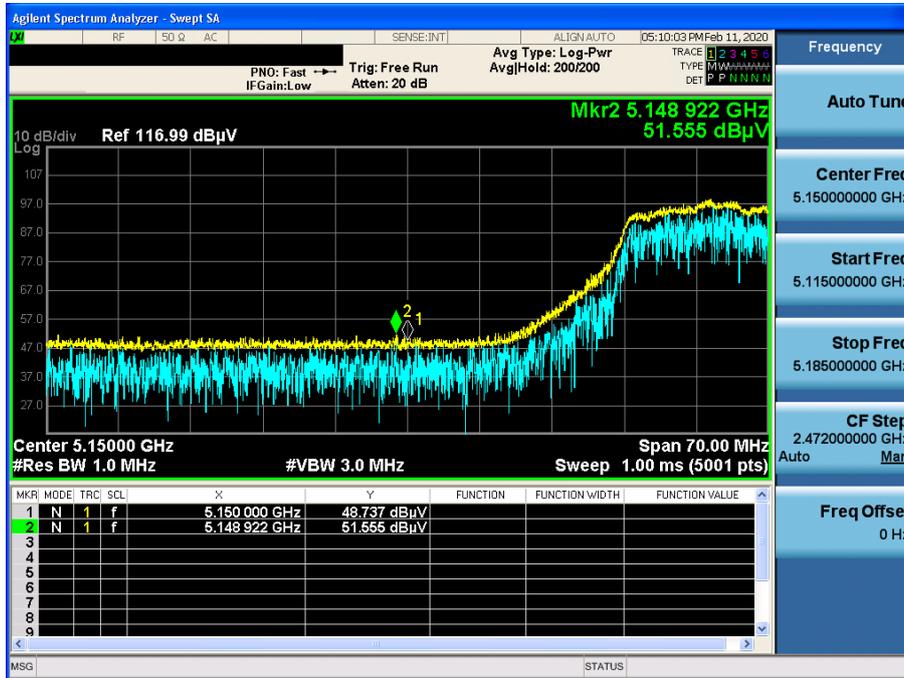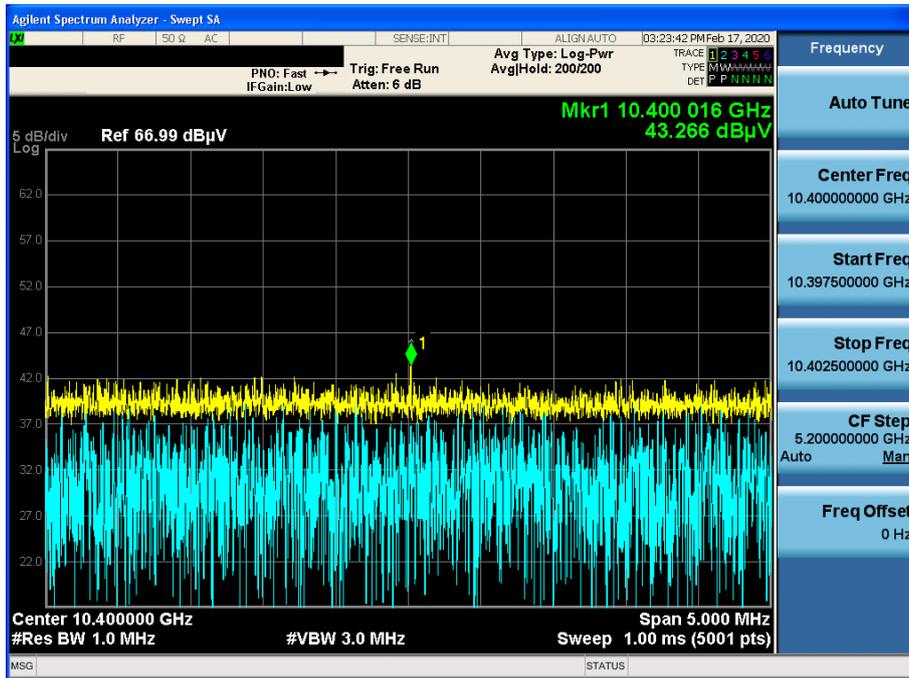**802.11ac(VHT80) & U-NII 2A & Ch.58 & X axis & Ver   Detector Mode : PK**

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

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

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

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

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

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

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

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

Dt&C

Unwanted Emissions (Radiated) Test Plot : SDM
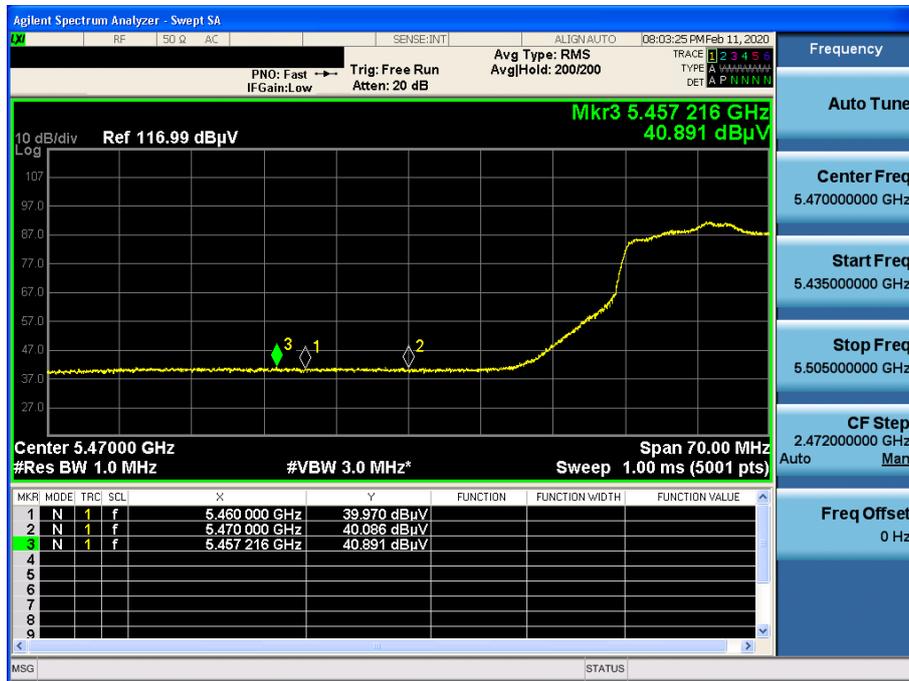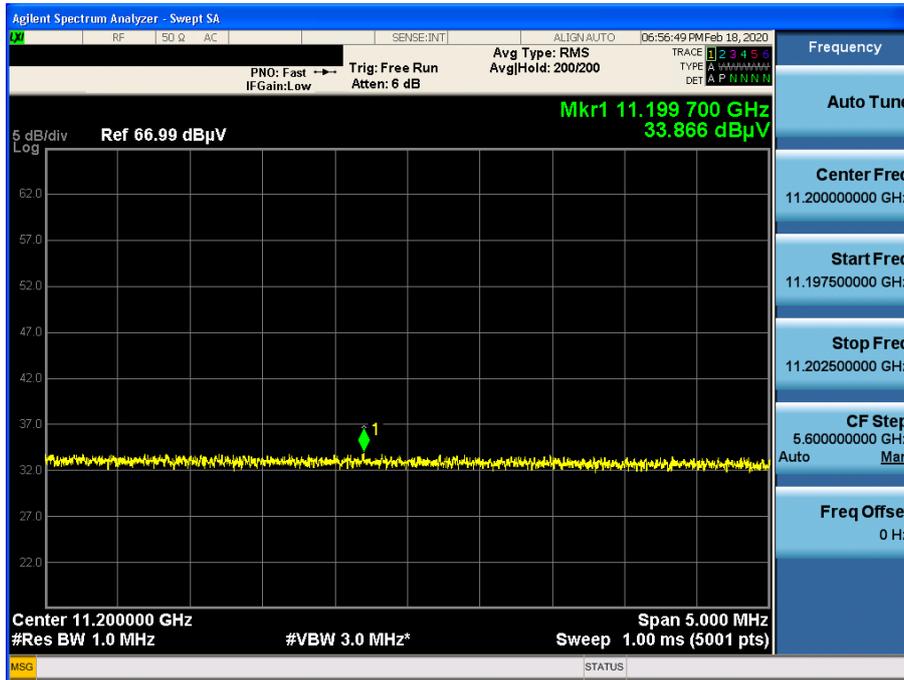
802.11n(HT20) & U-NII 1 & Ch.36 & X axis & Ver   Detector Mode : PK

802.11n(HT20) & U-NII 1 & Ch.36 & X axis & Ver   Detector Mode : AV

802.11n(HT20) & U-NII 1 & Ch.40 & X axis & Hor   **Detector Mode : PK**
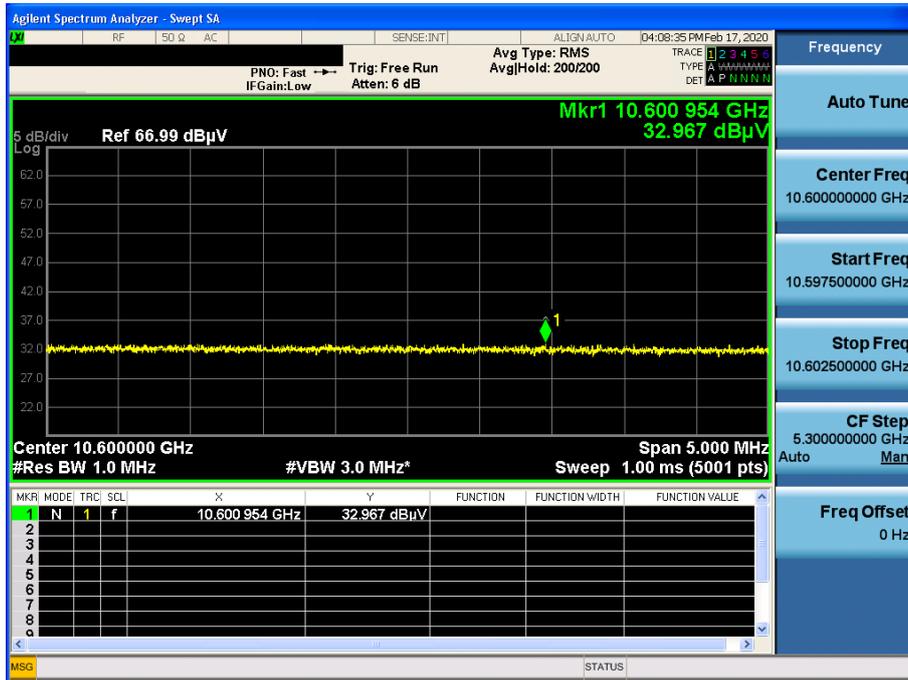
802.11n(HT20) & U-NII 2A & Ch.64 & X axis & Ver   **Detector Mode : PK**

802.11n(HT20) & U-NII 2A & Ch.64 & X axis & Ver   **Detector Mode : AV**

802.11n(HT20) & U-NII 2A & Ch.60 & X axis & Hor   **Detector Mode : AV**

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

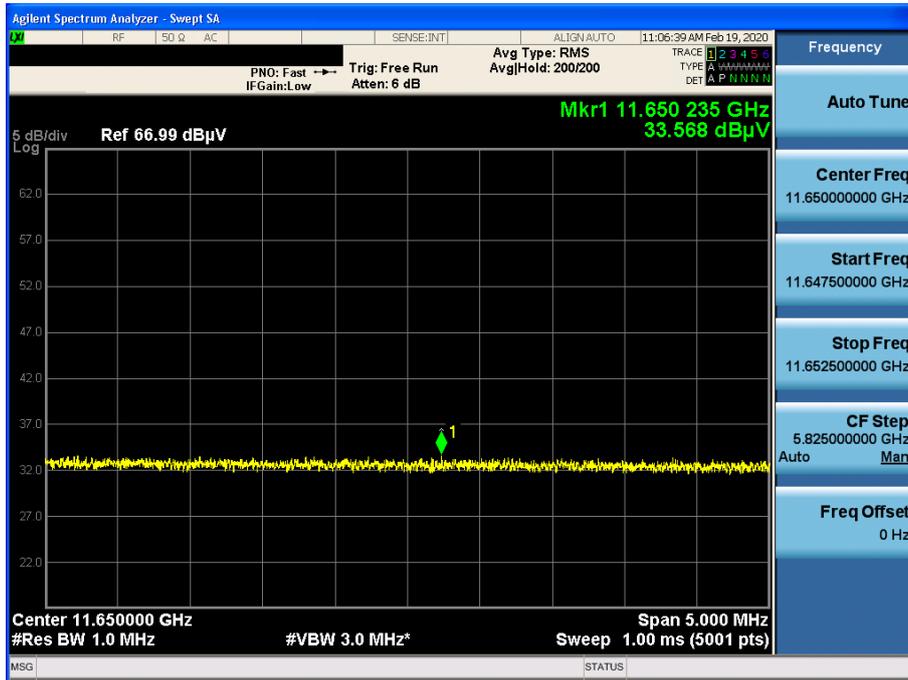**802.11n(HT20)   &   U-NII 2C   &   Ch.100   &   X axis   &   Ver**   **Detector Mode : AV**
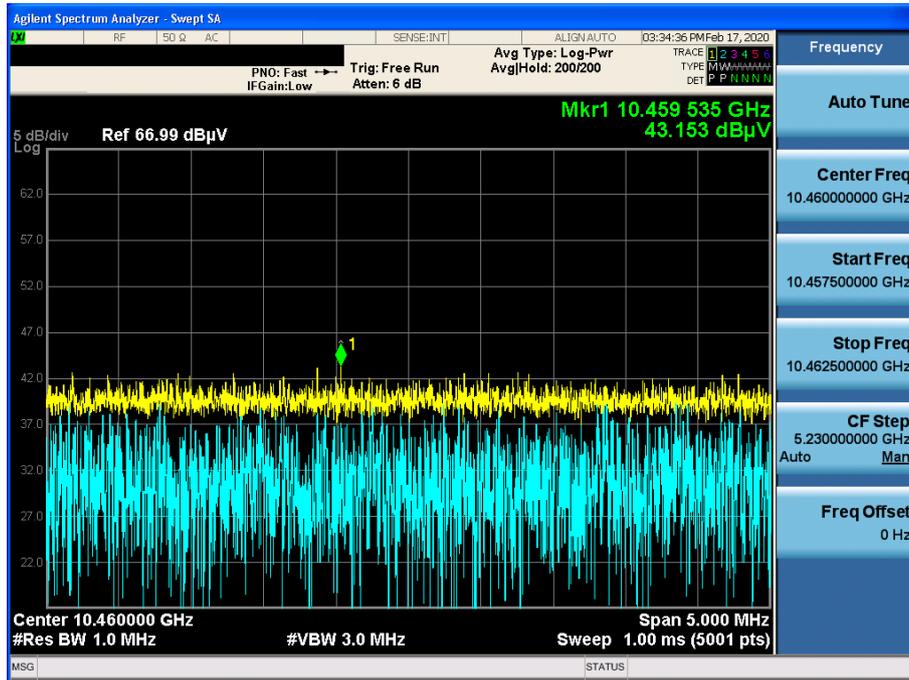
802.11n(HT20) & U-NII 2C & Ch.120 & X axis & Hor   **Detector Mode : AV**

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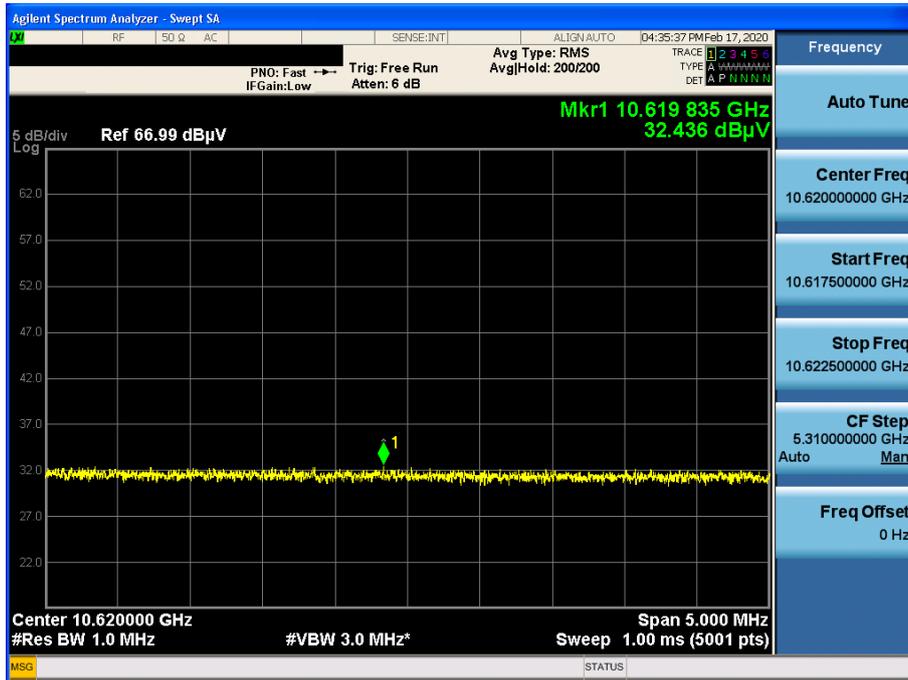

802.11n(HT20) & U-NII 3 & Ch.165 & X axis & Ver   **Detector Mode : PK**
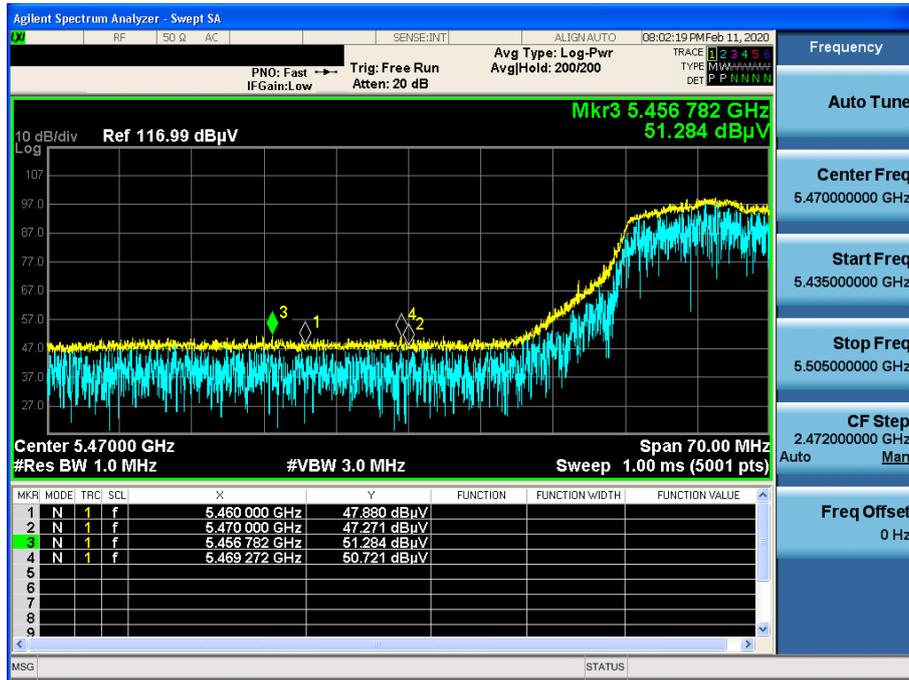
802.11n(HT20) & U-NII 3 & Ch.165 & X axis & Hor **Detector Mode : AV**

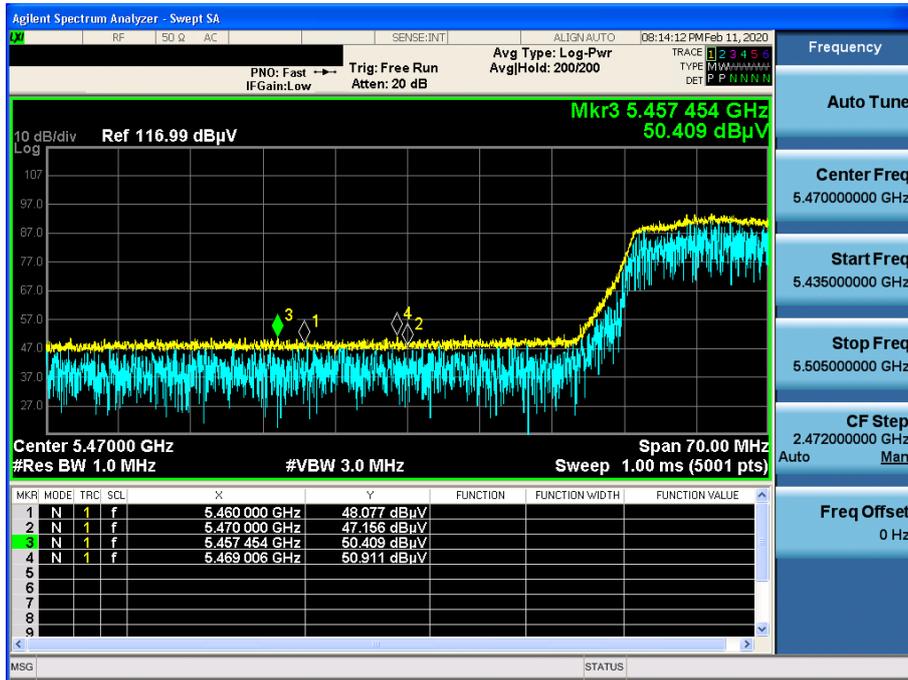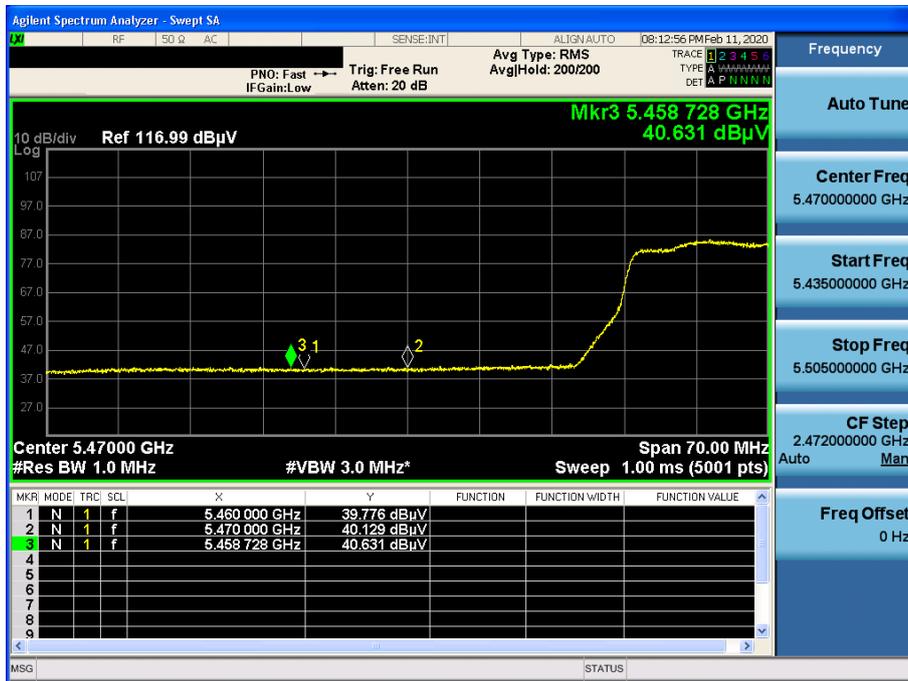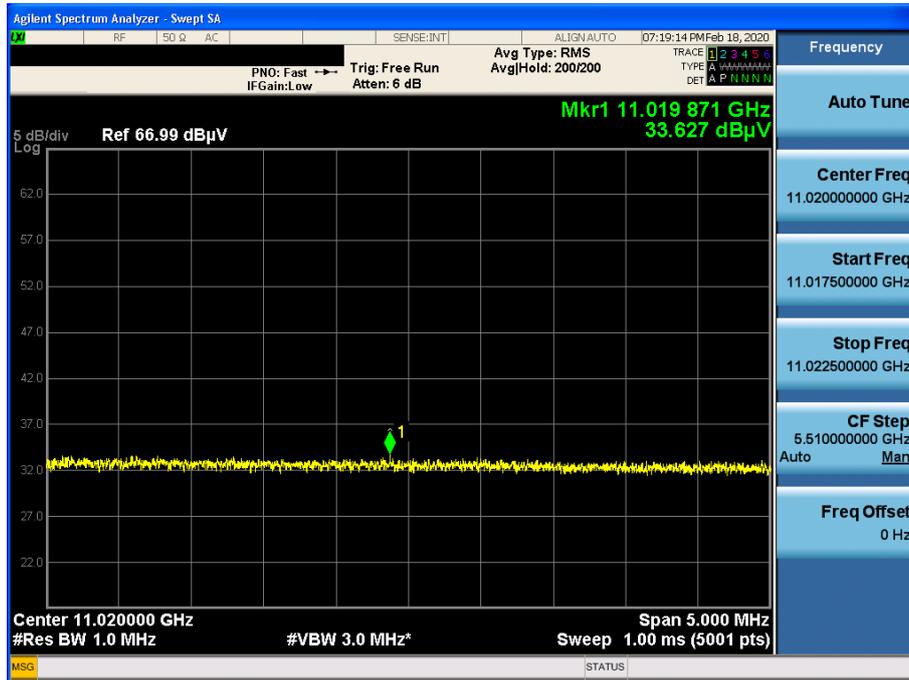**802.11n(HT40)   &   U-NII 1   &   Ch.38   &   X axis   &   Ver   Detector Mode : PK**

802.11n(HT40)   &   U-NII 1   &   Ch.38   &   X axis   &   Ver   Detector Mode : AV

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

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

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

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

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

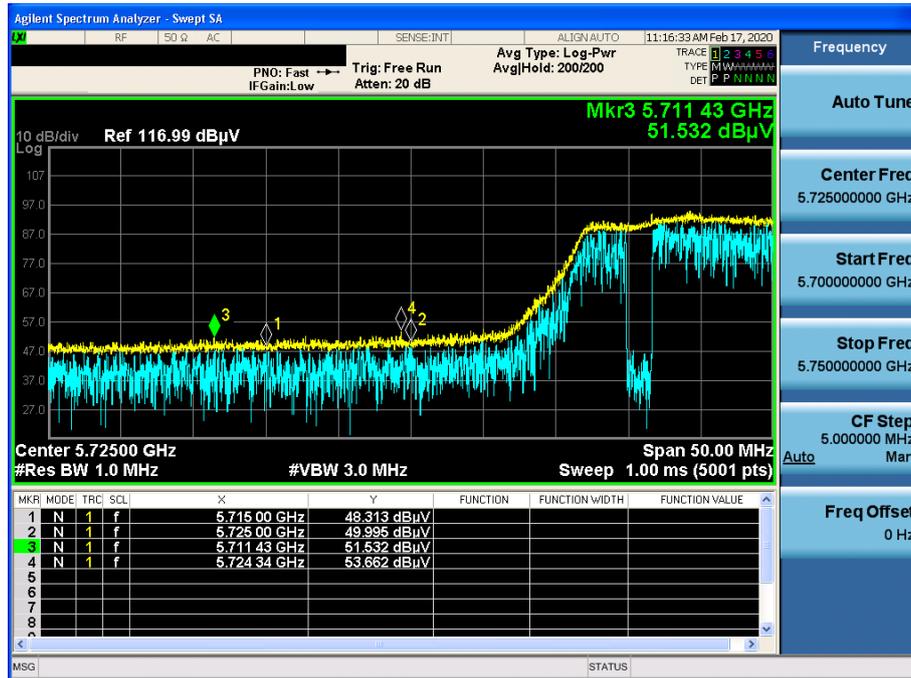**802.11n(HT40)   &   U-NII 2C   &   Ch.102   &   X axis   &   Ver   Detector Mode : AV**

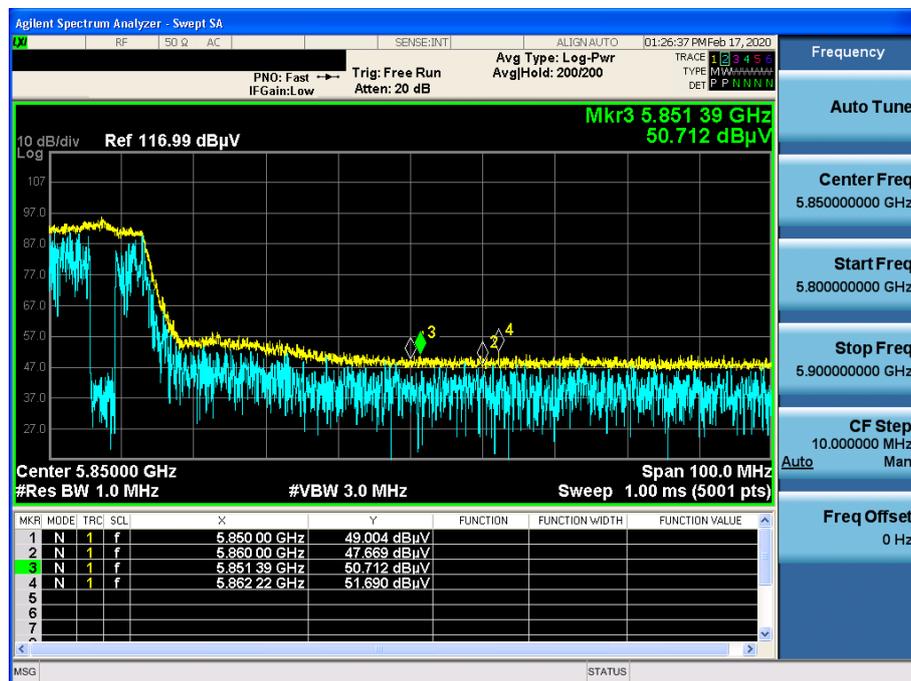**802.11n(HT40) & U-NII 2C & Ch.102 & X axis & Hor   Detector Mode : AV**

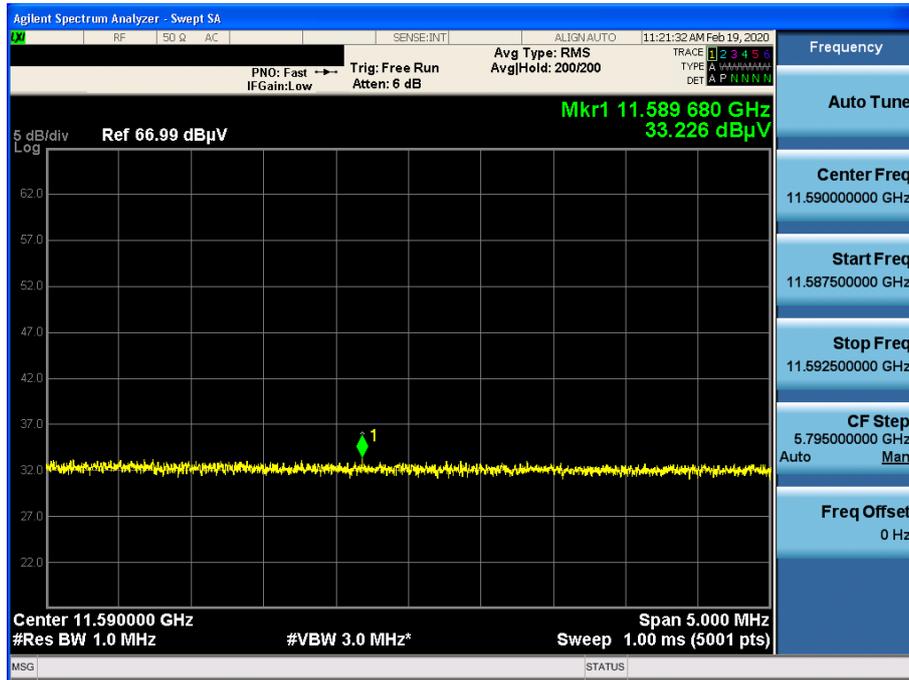## 802.11n(HT40) & U-NII 3 & Ch.151 & X axis & Ver   Detector Mode : PK

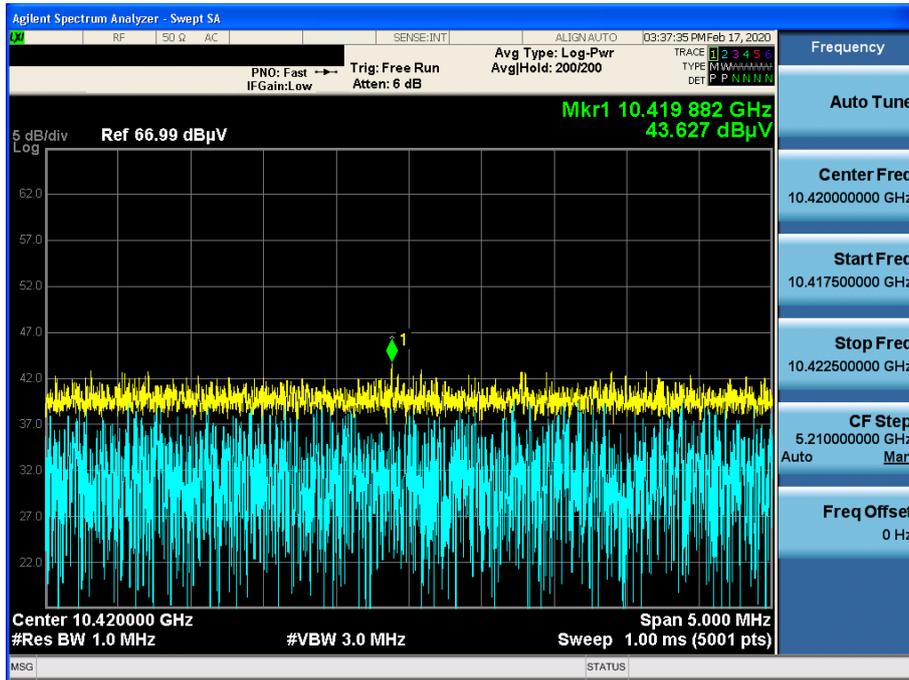## 802.11n(HT40) & U-NII 3 & Ch.159 & X axis & Ver   Detector Mode : PK

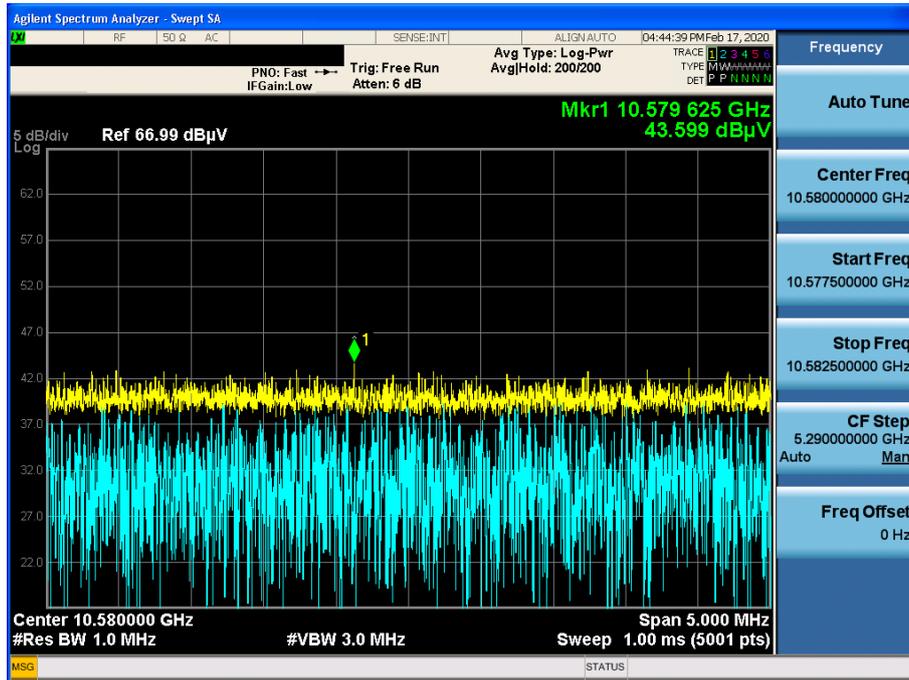**802.11n(HT40) & U-NII 3 & Ch.159 & X axis & Hor**   **Detector Mode : AV**

Dt&C

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

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

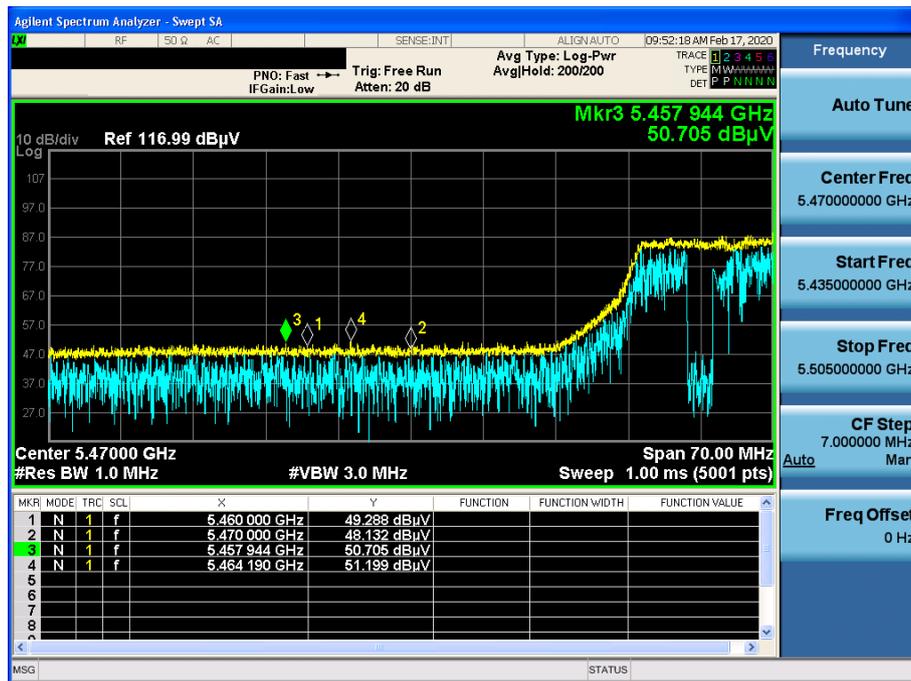**802.11ac(VHT80)   &   U-NII 1   &   Ch.42   &   X axis   &   Hor   Detector Mode : PK**

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

802.11ac(VHT80)   &   U-NII 2A   &   Ch.58   &   X axis   &   Ver   Detector Mode : AV

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

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

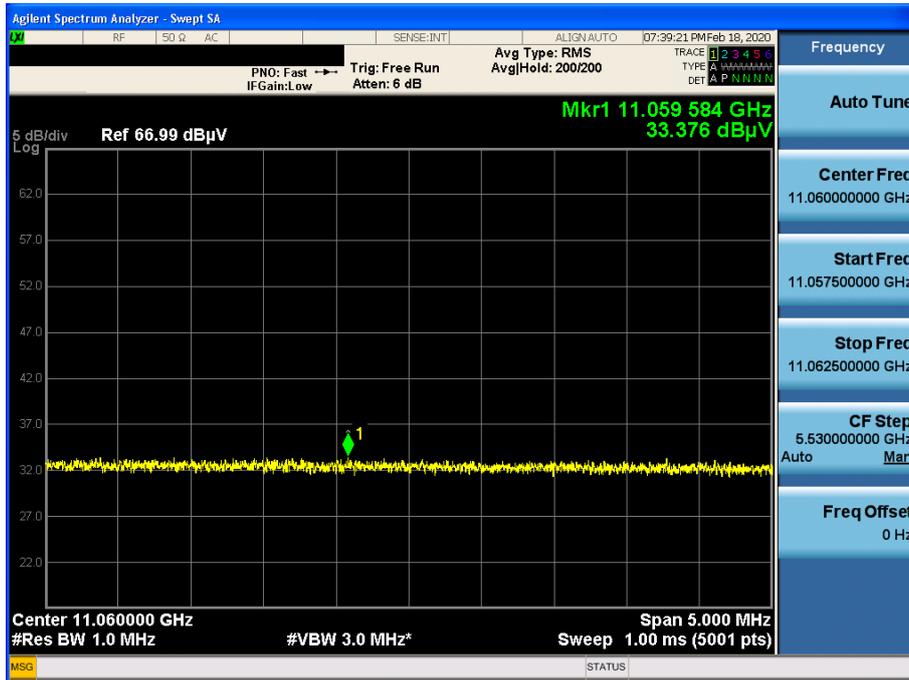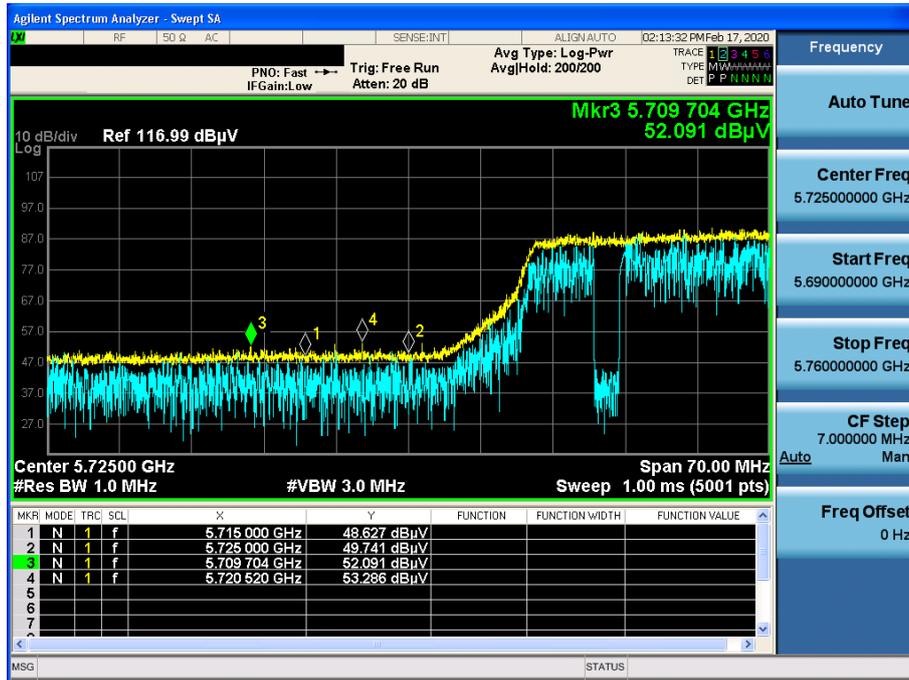**802.11ac(VHT80) & U-NII 2C & Ch.106 & X axis & Ver   Detector Mode : AV**

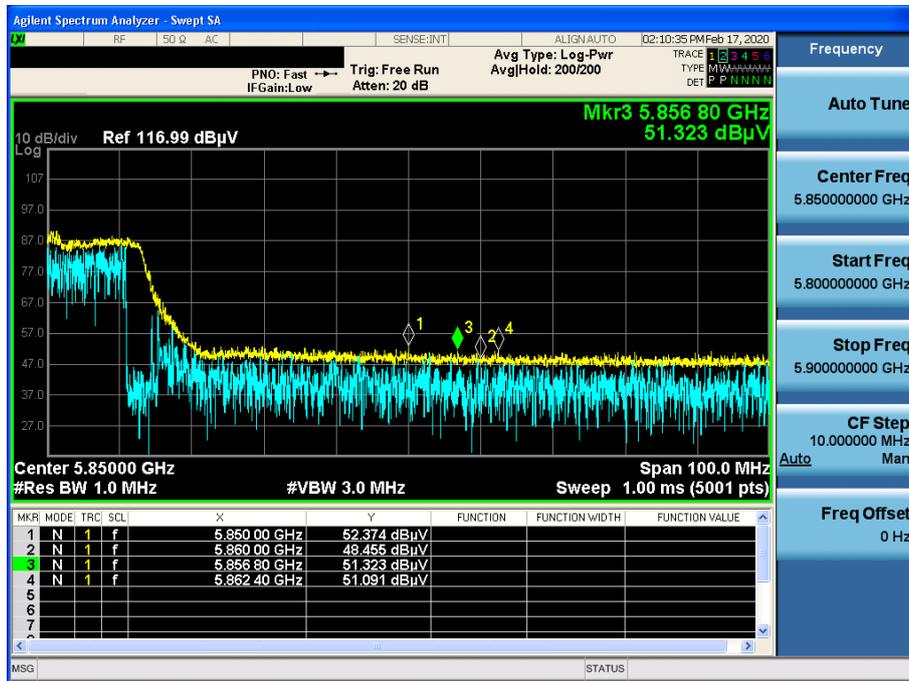**802.11ac(VHT80) & U-NII 2C & Ch.106 & X axis & Hor Detector Mode : AV**

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

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

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