

Test Results

Test Notes

1. The radiated emissions were investigated 9 kHz to 40 GHz. And no other spurious and harmonic emissions were found below listed frequencies.
2. Sample Calculation.
 $Margin = Limit - Result$ / $Result = Reading + T.F + DCCF + DCF$ / $T.F = AF + CL + HL + AL - AG$
 Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain, HL = High pass filter Loss, AL = Attenuator Loss,
 DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor.
3. Information of Distance Correction Factor
 For finding emissions, measurements may be performed at a distance closer than that specified in the regulations.
 In this case, the distance correction factor is applied to the result.
 - Calculation of distance correction factor
 At frequencies below 30 MHz = $40 \log(\text{tested distance} / \text{specified distance})$
 At frequencies at or above 30 MHz = $20 \log(\text{tested distance} / \text{specified distance})$
4. The limit is converted to field strength.
 $E[dBuV/m] = EIRP[dBm] + 95.2 \text{ dB} = -27 \text{ dBm} + 95.2 = 68.2 \text{ dBuV/m}$

Radiated Spurious Emissions data(9 kHz ~ 40 GHz) : TM1 CDD

Band	Tested Channel	Freq. (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
U-NII 1	36 (5 180 MHz)	5149.37	V	Z	PK	48.25	2.49	N/A	N/A	50.74	74.00	23.26
		5149.02	V	Z	AV	39.48	2.49	0.23	N/A	42.20	54.00	11.80
		10362.91	V	X	PK	47.88	10.06	N/A	N/A	57.94	68.20	10.26
	40 (5 200 MHz)	10402.96	V	X	PK	46.91	10.02	N/A	N/A	56.93	68.20	11.27
		48 (5 240 MHz)	10478.22	V	X	PK	46.87	9.96	N/A	N/A	56.83	68.20
U-NII 2A	52 (5 260 MHz)	10522.94	V	X	PK	45.39	9.99	N/A	N/A	55.38	68.20	12.82
		60 (5 300 MHz)	10603.14	V	X	PK	45.85	10.05	N/A	N/A	55.90	74.00
	64 (5 320 MHz)	10604.04	V	X	AV	35.91	10.06	0.23	N/A	46.20	54.00	7.80
		5350.65	V	Z	PK	50.18	3.43	N/A	N/A	53.61	74.00	20.39
		5350.72	V	Z	AV	40.44	3.43	0.23	N/A	44.10	54.00	9.90
		10639.06	V	X	PK	46.17	10.20	N/A	N/A	56.37	74.00	17.63
10639.07	V	X	AV	36.39	10.20	0.23	N/A	46.82	54.00	7.18		
U-NII 2C	100 (5 500 MHz)	5458.61	V	Z	PK	51.36	3.75	N/A	N/A	55.11	74.00	18.89
		5458.73	V	Z	AV	40.57	3.75	0.23	N/A	44.55	54.00	9.45
		5468.62	V	Z	PK	50.06	3.77	N/A	N/A	53.83	68.20	14.37
		11003.26	V	X	PK	44.00	10.36	N/A	N/A	54.36	74.00	19.64
	116 (5 580 MHz)	11002.58	V	X	AV	34.29	10.35	0.23	N/A	44.87	54.00	9.13
		11164.21	V	X	PK	45.85	10.49	N/A	N/A	56.34	74.00	17.66
	144 (5 720 MHz)	11161.76	V	X	AV	36.26	10.49	0.23	N/A	46.98	54.00	7.02
		11442.06	V	X	PK	45.18	10.48	N/A	N/A	55.66	74.00	18.34
11442.40	V	X	AV	35.43	10.48	0.23	N/A	46.14	54.00	7.86		
U-NII 3	149 (5 745 MHz)	5713.65	V	Z	PK	49.18	4.04	N/A	N/A	53.22	68.20	14.98
		5722.92	V	Z	PK	49.33	3.87	N/A	N/A	53.20	78.20	25.00
		11490.17	V	X	PK	44.69	10.46	N/A	N/A	55.15	74.00	18.85
		11489.80	V	X	AV	34.34	10.46	0.23	N/A	45.03	54.00	8.97
	157 (5 785 MHz)	11570.01	V	X	PK	43.96	10.51	N/A	N/A	54.47	74.00	19.53
		11569.82	V	X	AV	34.72	10.51	0.23	N/A	45.46	54.00	8.54
	165 (5 825 MHz)	5854.83	V	Z	PK	50.45	4.48	N/A	N/A	54.93	78.20	23.27
		5861.50	V	Z	PK	49.64	4.44	N/A	N/A	54.08	68.20	14.12
		11650.47	V	X	PK	45.39	10.56	N/A	N/A	55.95	74.00	18.05
11649.39		V	X	AV	36.32	10.55	0.23	N/A	47.10	54.00	6.90	

Radiated Spurious Emissions data(9 kHz ~ 40 GHz) : TM2 CDD

Band	Tested Channel	Freq. (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
U-NII 1	36 (5 180 MHz)	5 148.16	V	Z	PK	49.87	2.49	N/A	N/A	52.36	74.00	21.64
		5 148.30	V	Z	AV	40.65	2.49	0.24	N/A	43.38	54.00	10.62
		10 358.27	V	X	PK	47.29	10.06	N/A	N/A	57.35	68.20	10.85
	40 (5 200 MHz)	10 397.93	V	X	PK	45.52	10.03	N/A	N/A	55.55	68.20	12.65
	48 (5 240 MHz)	10 476.03	V	X	PK	45.24	9.96	N/A	N/A	55.20	68.20	13.00
U-NII 2A	52 (5 260 MHz)	10 515.37	V	X	PK	45.13	9.97	N/A	N/A	55.10	68.20	13.10
	60 (5 300 MHz)	10 601.43	V	X	PK	45.74	10.05	N/A	N/A	55.79	74.00	18.21
		10 600.30	V	X	AV	34.67	10.04	0.24	N/A	44.95	54.00	9.05
	64 (5 320 MHz)	5 351.52	V	Z	PK	50.36	3.44	N/A	N/A	53.80	74.00	20.20
		5 351.42	V	Z	AV	40.97	3.44	0.24	N/A	44.65	54.00	9.35
		10 635.28	V	X	PK	45.11	10.18	N/A	N/A	55.29	74.00	18.71
		10 638.10	V	X	AV	35.44	10.20	0.24	N/A	45.88	54.00	8.12
U-NII 2C	100 (5 500 MHz)	5 458.43	V	Z	PK	49.92	3.75	N/A	N/A	53.67	74.00	20.33
		5 458.29	V	Z	AV	40.40	3.75	0.24	N/A	44.39	54.00	9.61
		5 464.77	V	Z	PK	50.50	3.76	N/A	N/A	54.26	68.20	13.94
		11 000.22	V	X	PK	43.69	10.35	N/A	N/A	54.04	74.00	19.96
		11 000.35	V	X	AV	34.27	10.35	0.24	N/A	44.86	54.00	9.14
	116 (5 580 MHz)	11 160.98	V	X	PK	46.49	10.49	N/A	N/A	56.98	74.00	17.02
		11 164.18	V	X	AV	36.12	10.49	0.24	N/A	46.85	54.00	7.15
	144 (5 720 MHz)	11 445.10	V	X	PK	44.56	10.48	N/A	N/A	55.04	74.00	18.96
		11 446.12	V	X	AV	34.78	10.48	0.24	N/A	45.50	54.00	8.50
	U-NII 3	149 (5 745 MHz)	5 714.59	V	Z	PK	49.55	4.04	N/A	N/A	53.59	68.20
5 723.90			V	Z	PK	50.17	3.84	N/A	N/A	54.01	78.20	24.19
11 489.33			V	X	PK	44.79	10.46	N/A	N/A	55.25	74.00	18.75
11 485.33			V	X	AV	34.90	10.47	0.24	N/A	45.61	54.00	8.39
157 (5 785 MHz)		11566.08	V	X	PK	43.85	10.51	N/A	N/A	54.36	74.00	19.64
		11570.43	V	X	AV	34.73	10.51	0.24	N/A	45.48	54.00	8.52
165 (5 825 MHz)		5 850.49	V	Z	PK	50.29	4.47	N/A	N/A	54.76	78.20	23.44
		5 863.53	V	Z	PK	50.69	4.38	N/A	N/A	55.07	68.20	13.13
	11 649.90	V	X	PK	45.98	10.55	N/A	N/A	56.53	74.00	17.47	
	11 650.62	V	X	AV	35.91	10.56	0.24	N/A	46.71	54.00	7.29	

Radiated Spurious Emissions data(9 kHz ~ 40 GHz) : TM3 CDD

Band	Tested Channel	Freq. (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
U-NII 1	38 (5 190 MHz)	5 148.25	V	Z	PK	50.56	2.49	N/A	N/A	53.05	74.00	20.95
		5 148.51	V	Z	AV	41.12	2.49	0.16	N/A	43.77	54.00	10.23
		10 373.90	V	X	PK	43.81	10.05	N/A	N/A	53.86	68.20	14.34
	46 (5 230 MHz)	10 468.98	V	X	PK	43.69	9.97	N/A	N/A	53.66	68.20	14.54
U-NII 2A	54 (5 270 MHz)	10 533.65	V	X	PK	43.45	10.01	N/A	N/A	53.46	68.20	14.74
	62 (5 310 MHz)	5 351.21	V	Z	PK	51.53	3.43	N/A	N/A	54.96	74.00	19.04
		5 351.19	V	Z	AV	42.00	3.43	0.16	N/A	45.59	54.00	8.41
		10 620.22	V	X	PK	43.25	10.12	N/A	N/A	53.37	74.00	20.63
		10 615.92	V	X	AV	33.96	10.11	0.16	N/A	44.23	54.00	9.77
U-NII 2C	102 (5 510 MHz)	5 457.77	V	Z	PK	50.67	3.75	N/A	N/A	54.42	74.00	19.58
		5 457.84	V	Z	AV	40.67	3.75	0.16	N/A	44.58	54.00	9.42
		5 467.60	V	Z	PK	50.05	3.77	N/A	N/A	53.82	68.20	14.38
		11 017.47	V	X	PK	44.46	10.38	N/A	N/A	54.84	74.00	19.16
		11 011.07	V	X	AV	34.06	10.37	0.16	N/A	44.59	54.00	9.41
	110 (5 550 MHz)	11 002.92	V	X	PK	43.51	10.35	N/A	N/A	53.86	74.00	20.14
		10 997.20	V	X	AV	33.39	10.35	0.16	N/A	43.90	54.00	10.10
	142 (5 710 MHz)	11 417.62	V	X	PK	43.89	10.49	N/A	N/A	54.38	74.00	19.62
11 423.65		V	X	AV	34.41	10.49	0.16	N/A	45.06	54.00	8.94	
U-NII 3	151 (5 755 MHz)	5 712.96	V	Z	PK	49.84	4.04	N/A	N/A	53.88	68.20	14.32
		5 720.66	V	Z	PK	49.83	3.92	N/A	N/A	53.75	78.20	24.45
		11 509.80	V	X	PK	44.64	10.47	N/A	N/A	55.11	74.00	18.89
		11 505.70	V	X	AV	34.11	10.47	0.16	N/A	44.74	54.00	9.26
	159 (5 795 MHz)	5 850.33	V	Z	PK	49.95	4.47	N/A	N/A	54.42	78.20	23.78
		5 861.93	V	Z	PK	50.07	4.43	N/A	N/A	54.50	68.20	13.70
		11 599.65	V	X	PK	42.91	10.49	N/A	N/A	53.40	74.00	20.60
		11 599.67	V	X	AV	33.62	10.49	0.16	N/A	44.27	54.00	9.73

Radiated Spurious Emissions data(9 kHz ~ 40 GHz) : TM4 CDD

Band	Tested Channel	Freq. (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
U-NII 1	42 (5 210 MHz)	5 148.40	V	Z	PK	49.90	2.49	N/A	N/A	52.39	74.00	21.61
		5 148.75	V	Z	AV	41.31	2.49	0.33	N/A	44.13	54.00	9.87
		10 427.92	V	X	PK	43.57	10.00	N/A	N/A	53.57	68.20	14.63
U-NII 2A	58 (5 290 MHz)	5 352.99	V	Z	PK	52.64	3.44	N/A	N/A	56.08	74.00	17.92
		5 353.29	V	Z	AV	42.74	3.44	0.33	N/A	46.51	54.00	7.49
		10 583.85	V	X	PK	43.90	10.04	N/A	N/A	53.94	68.20	14.26
U-NII 2C	106 (5 530 MHz)	5 459.64	V	Z	PK	50.02	3.75	N/A	N/A	53.77	74.00	20.23
		5 459.48	V	Z	AV	41.33	3.75	0.33	N/A	45.41	54.00	8.59
		5 465.89	V	Z	PK	50.94	3.76	N/A	N/A	54.70	68.20	13.50
		11 064.93	V	X	PK	42.85	10.43	N/A	N/A	53.28	74.00	20.72
		11 062.78	V	X	AV	33.60	10.43	0.33	N/A	44.36	54.00	9.64
	138 (5 690 MHz)	11 385.60	V	X	PK	44.65	10.50	N/A	N/A	55.15	74.00	18.85
		11 387.68	V	X	AV	34.31	10.50	0.33	N/A	45.14	54.00	8.86
U-NII 3	155 (5 775 MHz)	5 713.19	V	Z	PK	49.36	4.04	N/A	N/A	53.40	68.20	14.80
		5 723.08	V	Z	PK	50.58	3.86	N/A	N/A	54.44	78.20	23.76
		5 851.73	V	Z	PK	50.55	4.48	N/A	N/A	55.03	78.20	23.17
		5 863.33	V	Z	PK	51.22	4.38	N/A	N/A	55.60	68.20	12.60
		11 548.05	V	X	PK	43.73	10.52	N/A	N/A	54.25	74.00	19.75
		11 548.52	V	X	AV	33.25	10.52	0.33	N/A	44.10	54.00	9.90

8.6 AC Conducted Emissions

■ Test Requirements and limit, §15.207

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

■ Test Configuration

See test photographs for the actual connections between EUT and support equipment.

■ Test Procedure

Conducted emissions from the EUT were measured according to the ANSI C63.10-2013.

1. The test procedure is performed in a 6.5 m x 3.5 m x 3.5 m (L x W x H) shielded room. The EUT along with its peripherals were placed on a 1.0 m (W) x 1.5 m (L) and 0.8 m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
2. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room.
3. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.
4. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

■ Test Results: **Comply**

Note 1: See next pages for actual measured spectrum plots and data for worst case result.

AC Line Conducted Emissions (Graph)

Test Mode: U-NII 1 & 802.11a & MIMO(CDD) & 5 240 MHz

Results of Conducted Emission

DTNC

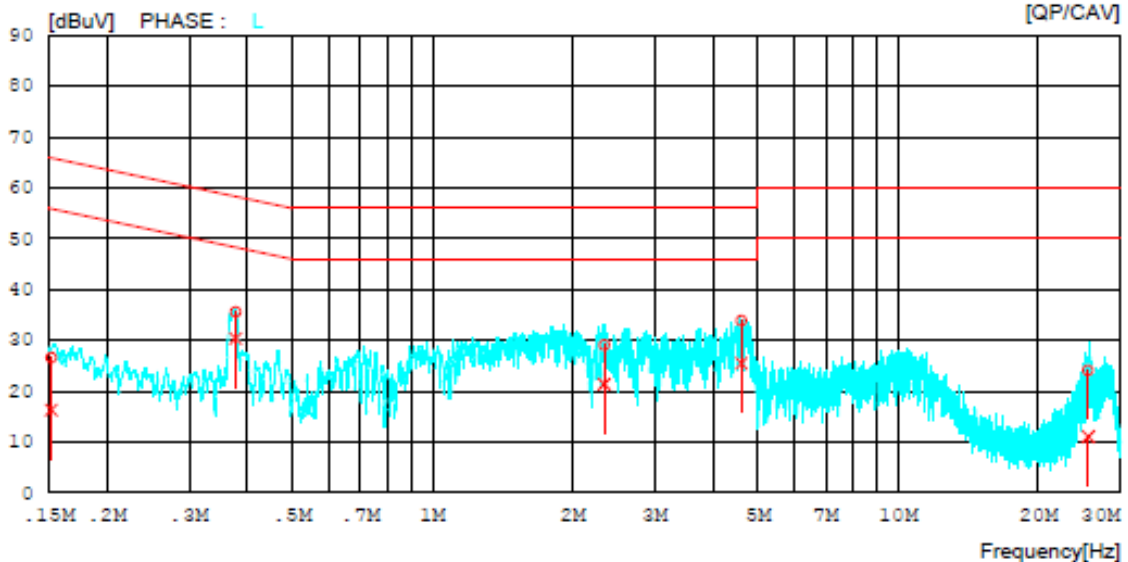
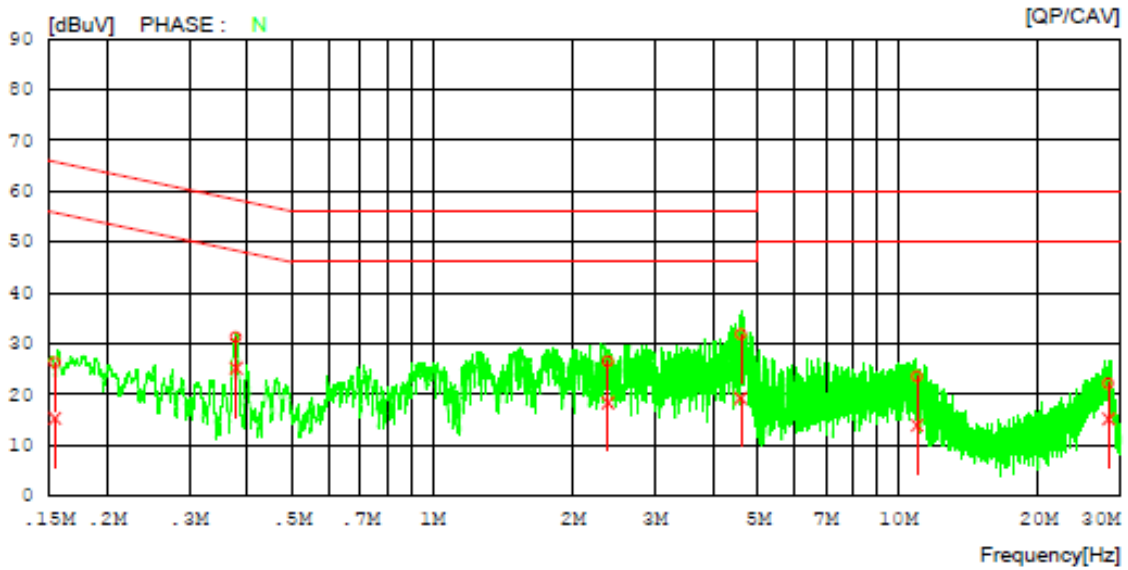
Date 2021-01-08

Order No.
Model No. EF550
Serial No.
Test Condition 5.1G WLAN

Reference No.
Power Supply 120 V, 60 Hz
Temp/Humi. 23 °C / 40 %
Operator J.H.Bang

Memo

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



AC Line Conducted Emissions (Data List)

Test Mode: U-NII 1 & 802.11a & MIMO(CDD) & 5 240 MHz

Results of Conducted Emission

DTNC

Date 2021-01-08

Order No.		Reference No.	
Model No.	EF550	Power Supply	120 V, 60 Hz
Serial No.		Temp/Humi.	23 'C / 40 %
Test Condition	5.1G WLAN	Operator	J.H.Bang

Memo

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

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	CAV [dBuV]		QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	
1	0.15484	16.29	5.35	9.94	26.23	15.29	65.74	55.74	39.51	40.45	N
2	0.37880	21.34	15.19	9.97	31.31	25.16	58.31	48.31	27.00	23.15	N
3	2.38109	16.50	8.34	10.04	26.54	18.38	56.00	46.00	29.46	27.62	N
4	4.58758	21.67	9.13	10.14	31.81	19.27	56.00	46.00	24.19	26.73	N
5	10.97276	13.13	3.57	10.34	23.47	13.91	60.00	50.00	36.53	36.09	N
6	28.29054	11.57	4.54	10.65	22.22	15.19	60.00	50.00	37.78	34.81	N
7	0.15195	16.59	6.31	9.95	26.54	16.26	65.89	55.89	39.35	39.63	L
8	0.37825	25.55	20.40	9.95	35.50	30.35	58.32	48.32	22.82	17.97	L
9	2.33968	19.03	11.29	10.04	29.07	21.33	56.00	46.00	26.93	24.67	L
10	4.60669	23.75	15.36	10.13	33.88	25.49	56.00	46.00	22.12	20.51	L
11	25.58094	13.54	0.44	10.55	24.09	10.99	60.00	50.00	35.91	39.01	L

AC Line Conducted Emissions (Graph)

Test Mode: U-NII 2A & 802.11a & MIMO(CDD) & 5 320 MHz

Results of Conducted Emission

DTNC

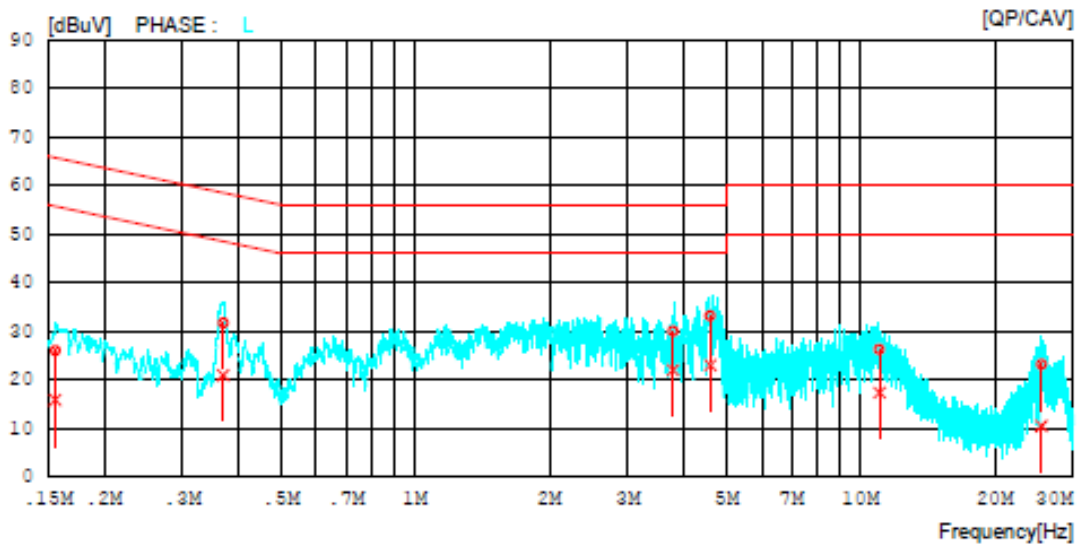
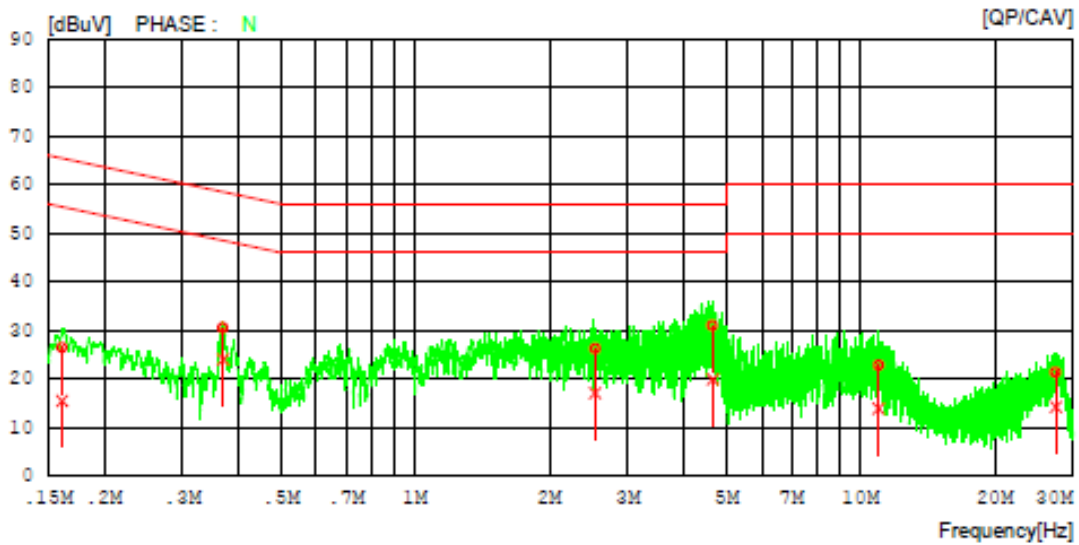
Date 2021-01-08

Order No.
Model No. EF550
Serial No.
Test Condition 5.3G WLAN

Reference No.
Power Supply 120 V, 60 Hz
Temp/Humi. 23 °C / 40 %
Operator J.H.Bang

Memo

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



AC Line Conducted Emissions (Data List)

Test Mode: U-NII 2A & 802.11a & MIMO(CDD) & 5 320 MHz

Results of Conducted Emission

DTNC

Date 2021-01-08

Order No.		Reference No.	
Model No.	EF550	Power Supply	120 V, 60 Hz
Serial No.		Temp/Humi.	23 °C / 40 %
Test Condition	5.3G WLAN	Operator	J.H.Bang

Memo

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

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	CAV [dBuV]		QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]			
1	0.16113	16.52	5.58	9.95	26.47	15.53	65.41	55.41	38.94	39.88	N
2	0.37033	20.61	14.10	9.96	30.57	24.06	58.49	48.49	27.92	24.43	N
3	2.53506	16.18	7.03	10.06	26.24	17.09	56.00	46.00	29.76	28.91	N
4	4.64787	20.85	9.80	10.14	30.99	19.94	56.00	46.00	25.01	26.06	N
5	10.97079	12.55	3.59	10.34	22.89	13.93	60.00	50.00	37.11	36.07	N
6	27.39205	10.71	3.66	10.63	21.34	14.29	60.00	50.00	38.66	35.71	N
7	0.15541	16.08	5.83	9.95	26.03	15.78	65.71	55.71	39.68	39.93	L
8	0.37050	21.74	11.00	9.96	31.70	20.96	58.49	48.49	26.79	27.53	L
9	3.78885	19.91	11.91	10.10	30.01	22.01	56.00	46.00	25.99	23.99	L
10	4.59442	22.96	12.81	10.13	33.09	22.94	56.00	46.00	22.91	23.06	L
11	11.01647	15.85	7.01	10.33	26.18	17.34	60.00	50.00	33.82	32.66	L
12	25.46991	12.64	-0.11	10.55	23.19	10.44	60.00	50.00	36.81	39.56	L

AC Line Conducted Emissions (Graph)

Test Mode: U-NII 2C & 802.11a & MIMO(CDD) & 5 500 MHz

Results of Conducted Emission

DTNC

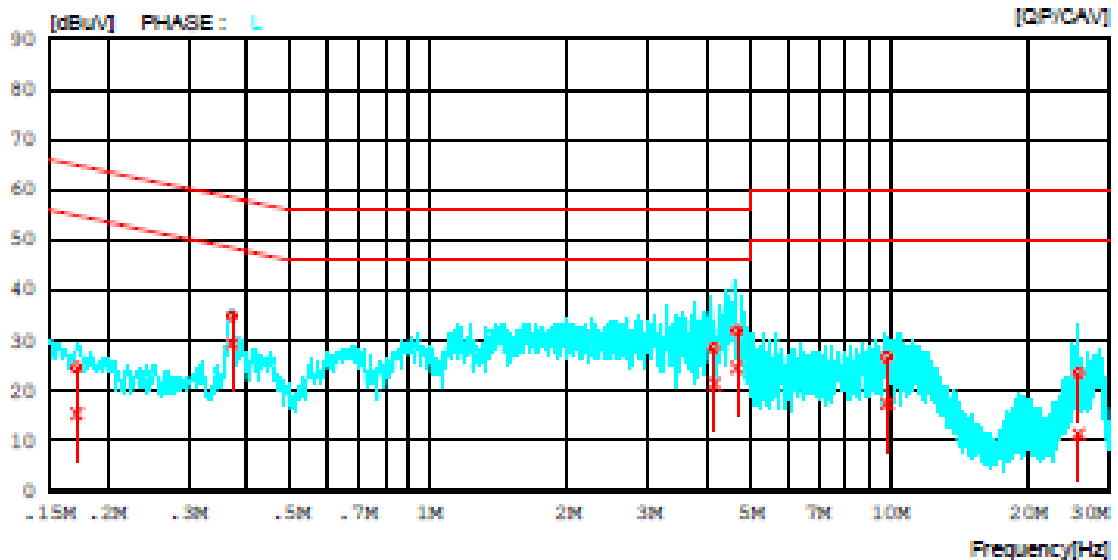
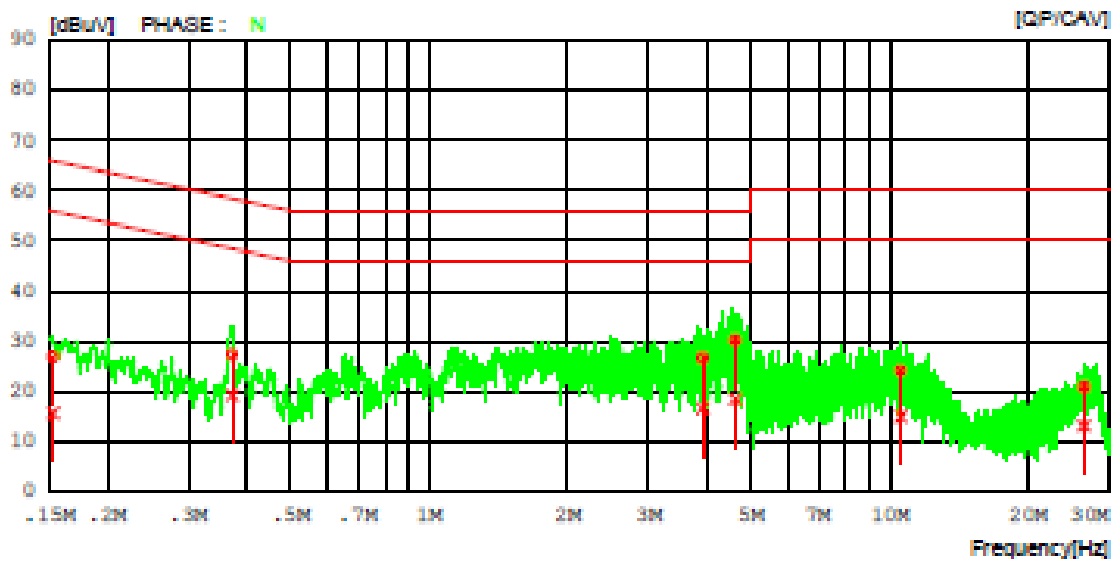
Date 2021-01-08

Order No.
Model No. EF550
Serial No.
Test Condition 5.5G WLAN

Reference No.
Power Supply 120 V, 60 Hz
Temp/Humi. 23 °C / 40 %
Operator J.H.Bang

Memo

LIMIT : FCC P15.207 GP
FCC P15.207 AV



AC Line Conducted Emissions (Data List)

Test Mode: U-NII 2C & 802.11a & MIMO(CDD) & 5 500 MHz

Results of Conducted Emission

DTNC

Date 2021-01-08

Order No.		Reference No.	
Model No.	EF550	Power Supply	120 V, 60 Hz
Serial No.		Temp/Humi.	23 °C / 40 %
Test Condition	5.5G WLAN	Operator	J.H.Bang

Memo

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

NO	FREQ [MHz]	READING		C. FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	CAV [dBuV]		QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]			
1	0.15260	16.96	5.75	9.94	26.90	15.69	65.86	55.86	38.96	40.17	N
2	0.37343	17.39	9.28	9.96	27.35	19.24	58.42	48.42	31.07	29.18	N
3	3.92382	16.63	6.50	10.11	26.74	16.61	56.00	46.00	29.26	29.39	N
4	4.62000	20.07	8.32	10.14	30.21	18.46	56.00	46.00	25.79	27.54	N
5	10.54946	13.82	4.68	10.34	24.16	15.02	60.00	50.00	35.84	34.98	N
6	26.43638	10.33	2.62	10.61	20.94	13.23	60.00	50.00	39.06	36.77	N
7	25.71524	12.94	0.81	10.57	23.51	11.38	60.00	50.00	36.49	38.62	L
8	0.17170	14.61	5.52	9.94	24.55	15.46	64.88	54.88	40.33	39.42	L
9	0.37321	24.93	19.42	9.96	34.89	29.38	58.43	48.43	23.54	19.05	L
10	4.15797	18.41	11.28	10.11	28.52	21.39	56.00	46.00	27.48	24.61	L
11	4.65676	21.78	14.42	10.13	31.91	24.55	56.00	46.00	24.09	21.45	L
12	9.85715	16.34	7.07	10.31	26.65	17.38	60.00	50.00	33.35	32.62	L

AC Line Conducted Emissions (Graph)

Test Mode: U-NII 2C & 802.11a & MIMO(CDD) & 5 785 MHz

Results of Conducted Emission

DTNC

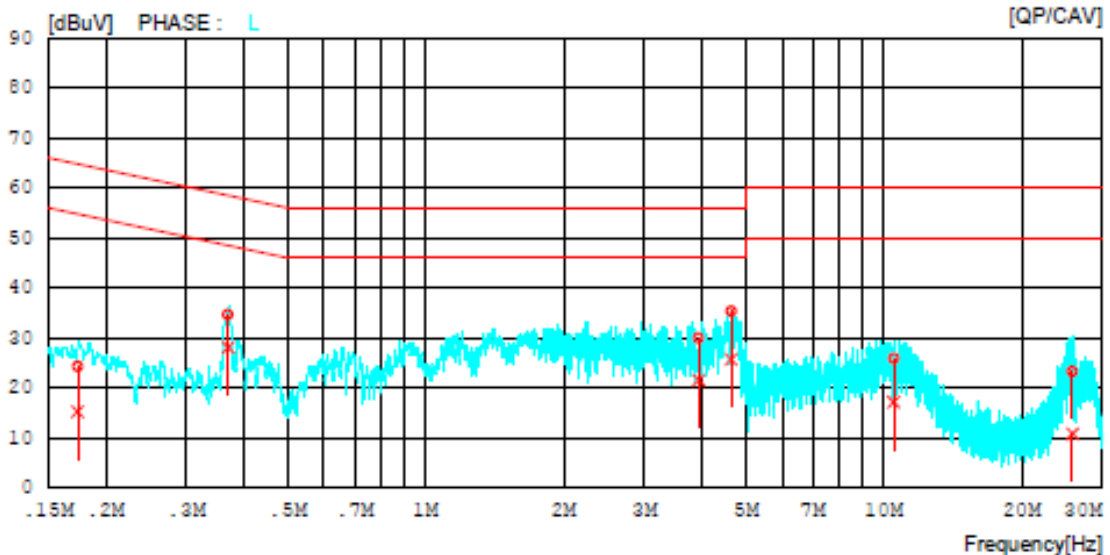
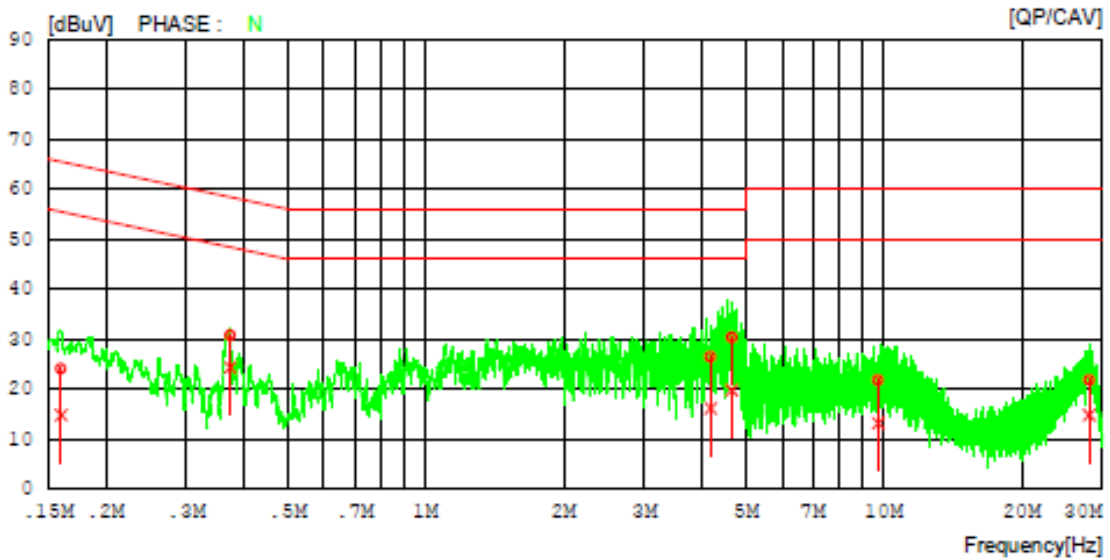
Date 2021-01-08

Order No.
Model No. EF550
Serial No.
Test Condition 5.7G WLAN

Reference No.
Power Supply 120 V, 60 Hz
Temp/Humi. 23 °C / 40 %
Operator J.H.Bang

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) & 5 785 MHz

Results of Conducted Emission

DTNC

Date 2021-01-08

Order No.		Reference No.	
Model No.	EF550	Power Supply	120 V, 60 Hz
Serial No.		Temp/Humi.	23 °C / 40 %
Test Condition	5.7G WLAN	Operator	J.H.Bang

Memo

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

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	CAV [dBuV]		QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]			
1	0.15987	14.20	4.92	9.94	24.14	14.86	65.47	55.47	41.33	40.61	N
2	0.37422	20.86	14.46	9.96	30.82	24.42	58.41	48.41	27.59	23.99	N
3	4.18256	16.40	6.09	10.12	26.52	16.21	56.00	46.00	29.48	29.79	N
4	4.65381	20.23	9.65	10.14	30.37	19.79	56.00	46.00	25.63	26.21	N
5	9.71726	11.54	2.94	10.32	21.86	13.26	60.00	50.00	38.14	36.74	N
6	28.05823	11.18	4.24	10.63	21.81	14.87	60.00	50.00	38.19	35.13	N
7	0.17396	14.40	5.29	9.94	24.34	15.23	64.77	54.77	40.43	39.54	L
8	0.37040	24.67	18.14	9.96	34.63	28.10	58.49	48.49	23.86	20.39	L
9	3.93787	19.82	11.45	10.10	29.92	21.55	56.00	46.00	26.08	24.45	L
10	4.64587	25.18	15.58	10.13	35.31	25.71	56.00	46.00	20.69	20.29	L
11	10.50987	15.53	6.84	10.33	25.86	17.17	60.00	50.00	34.14	32.83	L
12	25.80529	12.68	0.20	10.57	23.25	10.77	60.00	50.00	36.75	39.23	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	20/12/16	21/12/16	MY46471096
Spectrum Analyzer	Agilent Technologies	N9020A	20/12/16	21/12/16	MY48011700
Spectrum Analyzer	Agilent Technologies	N9030A	20/12/16	21/12/16	MY53310140
DC Power Supply	Agilent Technologies	66332A	20/06/24	21/06/24	MY43001172
Multimeter	FLUKE	17B+	20/12/16	21/12/16	3630701WS
Signal Generator	Rohde Schwarz	SMBV100A	20/12/16	21/12/16	255571
Signal Generator	ANRITSU	MG3695C	20/12/16	21/12/16	173501
Thermohygrometer	BODYCOM	BJ5478	20/12/16	21/12/16	120612-1
Thermohygrometer	BODYCOM	BJ5478	20/12/16	21/12/16	120612-2
Thermohygrometer	BODYCOM	BJ5478	20/07/01	21/07/01	N/A
Loop Antenna	ETS-Lindgren	6502	20/04/24	22/04/24	203480
BILOG ANTENNA	Schwarzbeck	VULB 9160	19/04/23	21/04/23	9160-3362
Horn Antenna	ETS-Lindgren	3117	20/10/23	21/10/23	00143278
Horn Antenna	A.H.Systems Inc.	SAS-574	20/06/24	21/06/24	155
PreAmplifier	tsj	MLA-0118-B01-40	20/12/16	21/12/16	1852267
PreAmplifier	tsj	MLA-1840-J02-45	20/06/24	21/06/24	16966-10728
PreAmplifier	H.P	8447D	20/12/16	21/12/16	2944A07774
High Pass Filter	Wainwright Instruments	WHKX12-935-1000-15000-40SS	20/06/24	21/06/24	8
High Pass Filter	Wainwright Instruments	WHKX10-2838-3300-18000-60SS	20/06/24	21/06/24	1
High Pass Filter	Wainwright Instruments	WHNX8.0/26.5-6SS	20/06/24	21/06/24	3
Attenuator	Hefei Shunze	SS5T2.92-10-40	20/06/24	21/06/24	16012202
Attenuator	SRTechnology	F01-B0606-01	20/06/24	21/06/24	13092403
Attenuator	Aeroflex/Weinschel	56-3	20/06/24	21/06/24	Y2370
Attenuator	SMAJK	SMAJK-2-3	20/06/24	21/06/24	2
Attenuator	Hefei Shunze	SS5T2.92-10-40	20/06/24	21/06/24	16012202
Attenuator	SMAJK	SMAJK-50-10	20/06/24	21/06/24	15081903
Power Meter & Wide Bandwidth Sensor	Anritsu	ML2488B MA2491A	20/12/16	21/12/16	0910025 0845333
EMI Test Receiver	ROHDE&SCHWARZ	ESU	20/01/20	21/01/20	100538
PULSE LIMITER	Rohde Schwarz	ESH3-Z2	20/08/25	21/08/25	101333
LISN	SCHWARZBECK	NSLK 8128 RC	20/10/23	21/10/23	8128 RC-387
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	DT&C	Cable	21/01/08	22/01/08	M-01
Cable	DT&C	Cable	21/01/08	22/01/08	M-02
Cable	DT&C	Cable	21/01/08	22/01/08	M-03
Cable	DT&C	Cable	21/01/08	22/01/08	M-07
Cable	DT&C	Cable	21/01/08	22/01/08	M-09
Cable	Radiall	TESTPRO3	20/01/16	21/01/16	RF-82
Test Software	tsj	Raidated Emission Measurement	NA	NA	Version 2.00.0177
Test Software	tsj	Noise Terminal Measurement	NA	NA	Version 2.00.0170

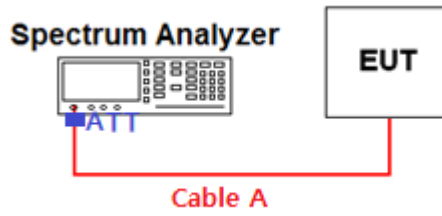
Note 1: The measurement antennas were calibrated in accordance to the requirements of ANSI C63.5-2017

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 \geq EBW if possible; otherwise, set RBW to the largest available value.
3. Set VBW \geq 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 $T \leq 16.7$ 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

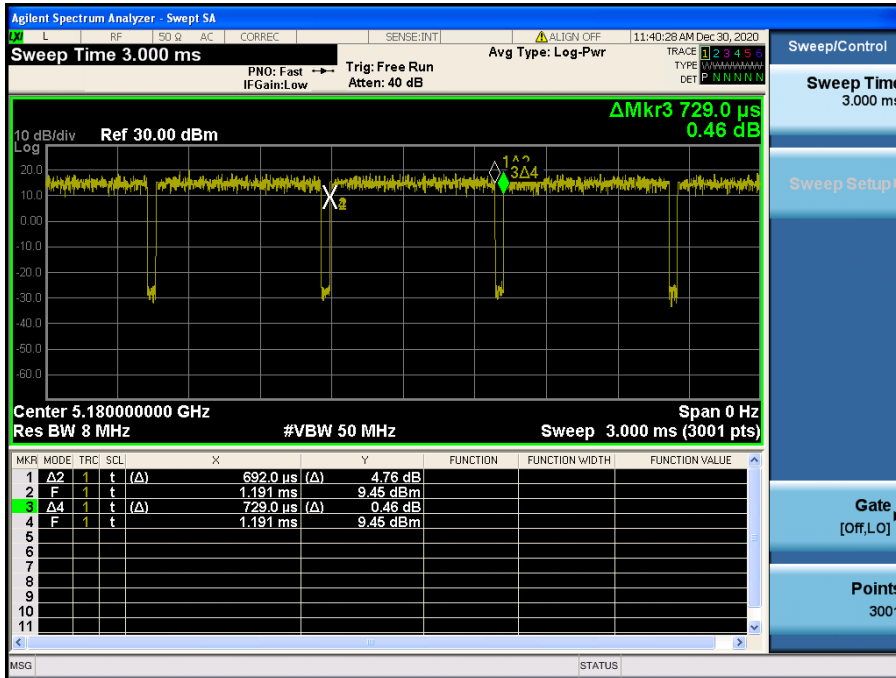
Mode	Data Rate	Tested Frequency [MHz]	Maximum Achievable Duty Cycle (x) = On / (On+Off)			DCCF= $10 \log(1/x)$ [dB]	50/T [kHz]
			T=On Time [ms]	(On+Off) Time [ms]	x		
802.11a	18Mbps	5 180	0.692	0.729	0.949 2	0.23	72.25
802.11n (HT20)	MCS2	5 180	0.656	0.693	0.946 6	0.24	76.22
802.11ac (VHT40)	MCS0	5 190	0.936	0.972	0.963 0	0.16	53.42
802.11ac (VHT80)	MCS0	5 210	0.456	0.492	0.926 8	0.33	109.65

Test Plot:

Single Transmit

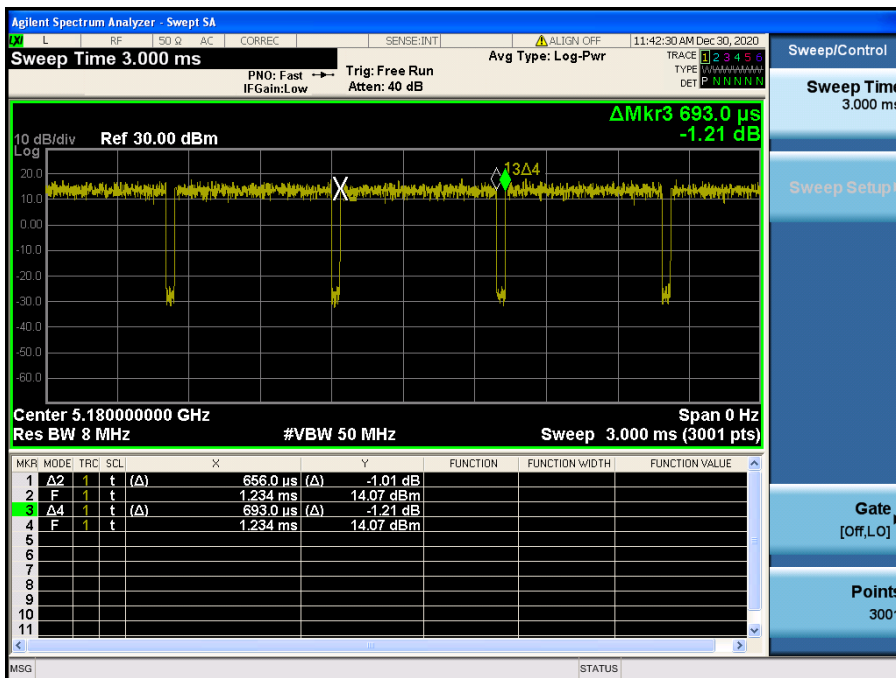
Duty Cycle

Test Mode: 802.11a & Ch.36



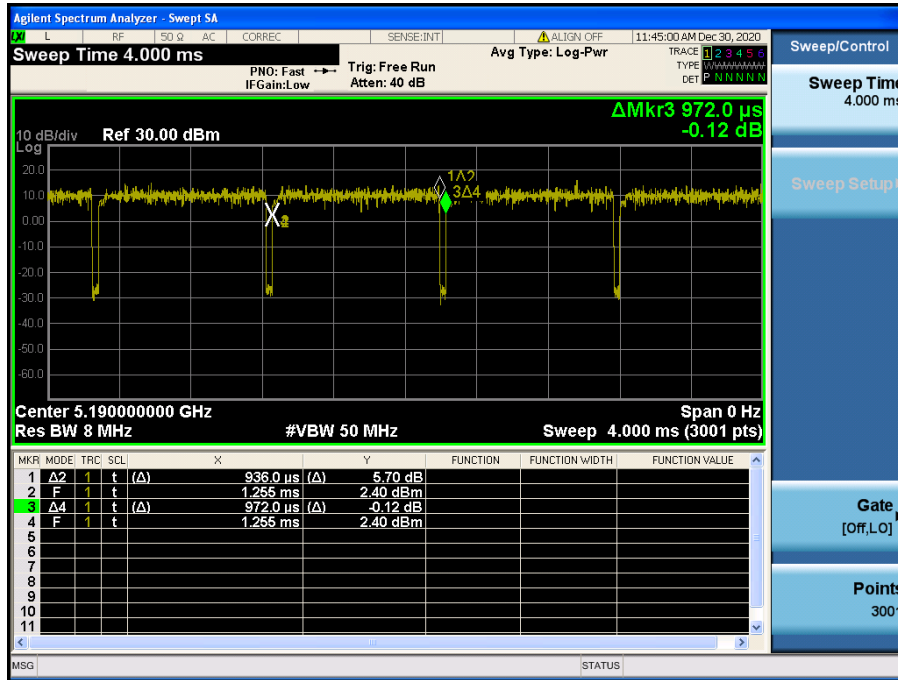
Duty Cycle

Test Mode: 802.11n HT20 & Ch.36



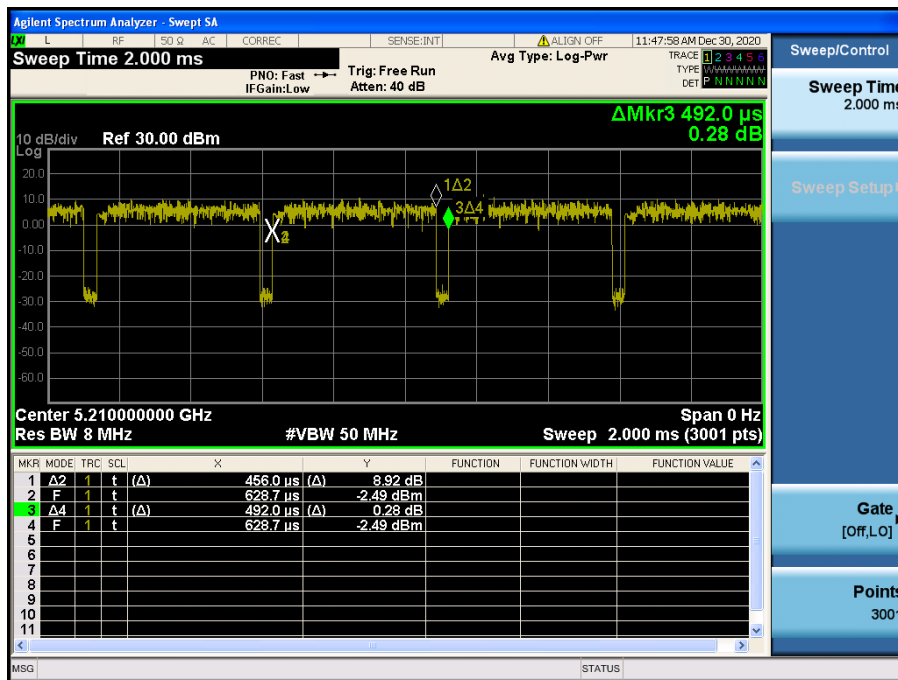
Duty Cycle

Test Mode: 802.11ac VHT40 & Ch.38



Duty Cycle

Test Mode: 802.11ac VHT80 & Ch.24

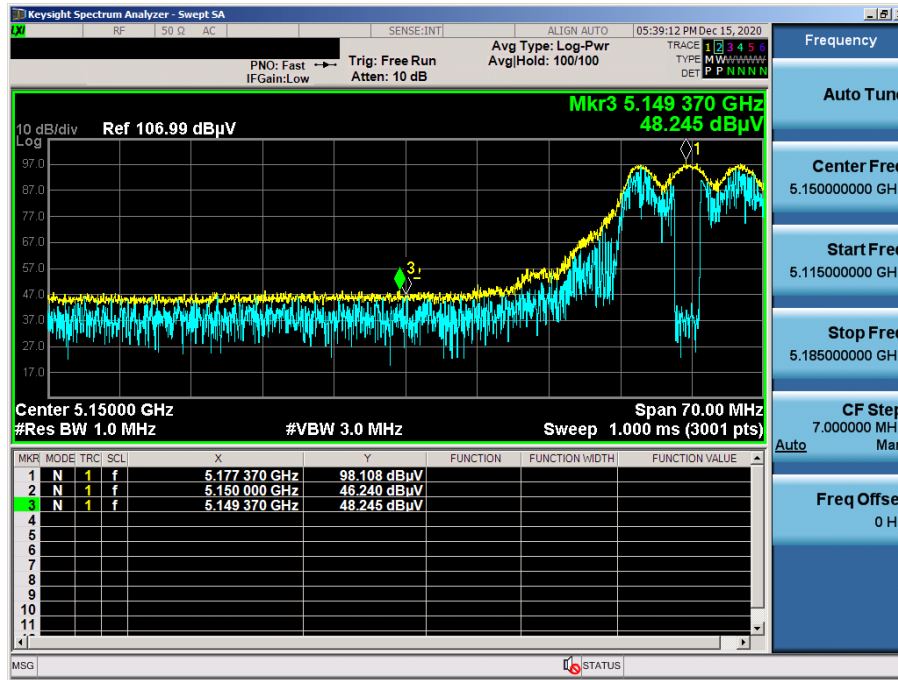


APPENDIX III

Unwanted Emissions (Radiated) Test Plot:

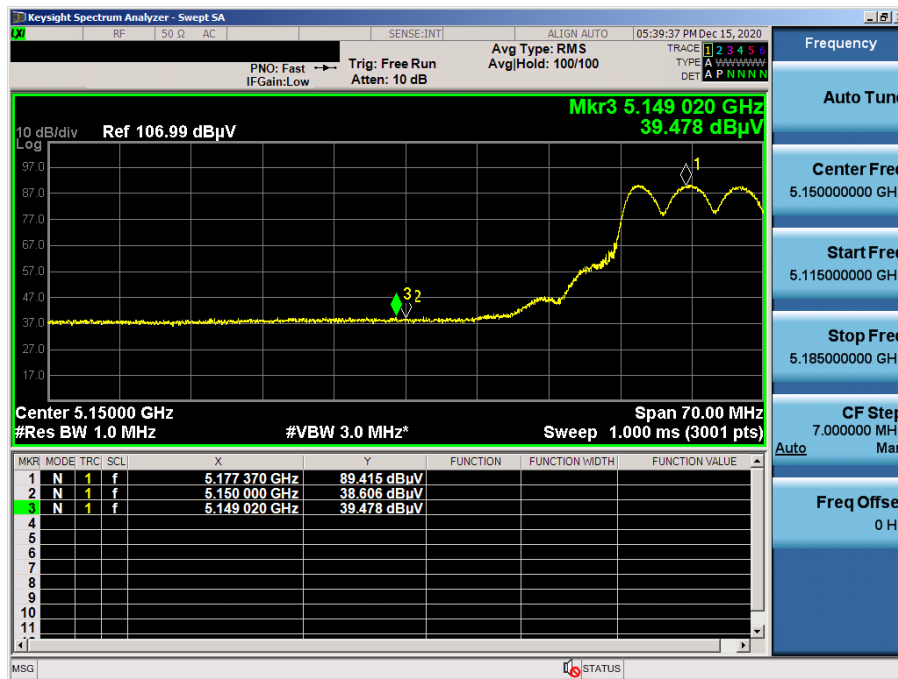
802.11a & U-NII 1 & Ch.36 & Z axis & Ver

Detector Mode : PK



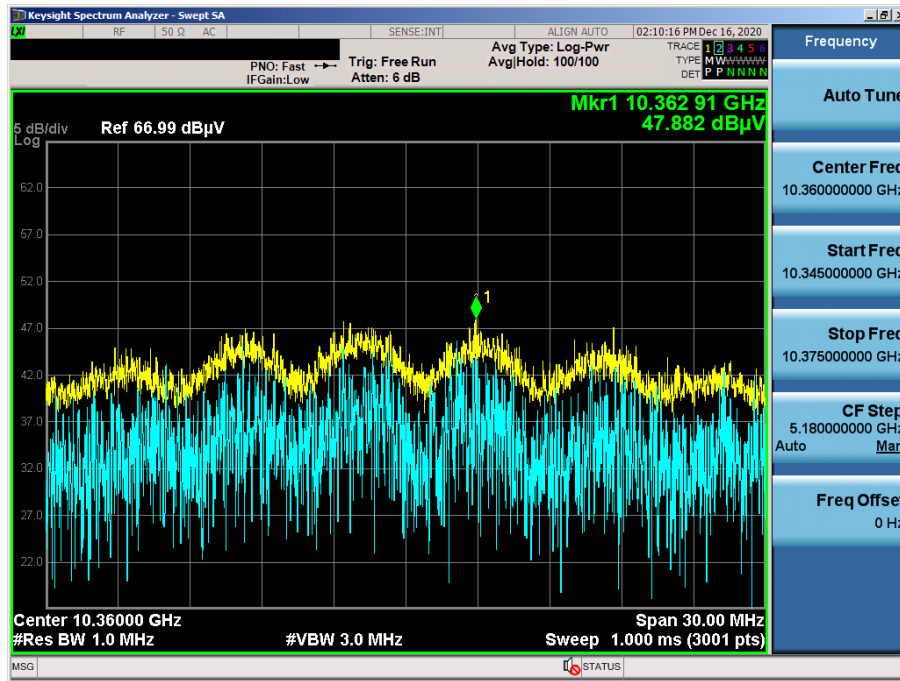
802.11a & U-NII 1 & Ch.36 & Z axis & Ver

Detector Mode : AV



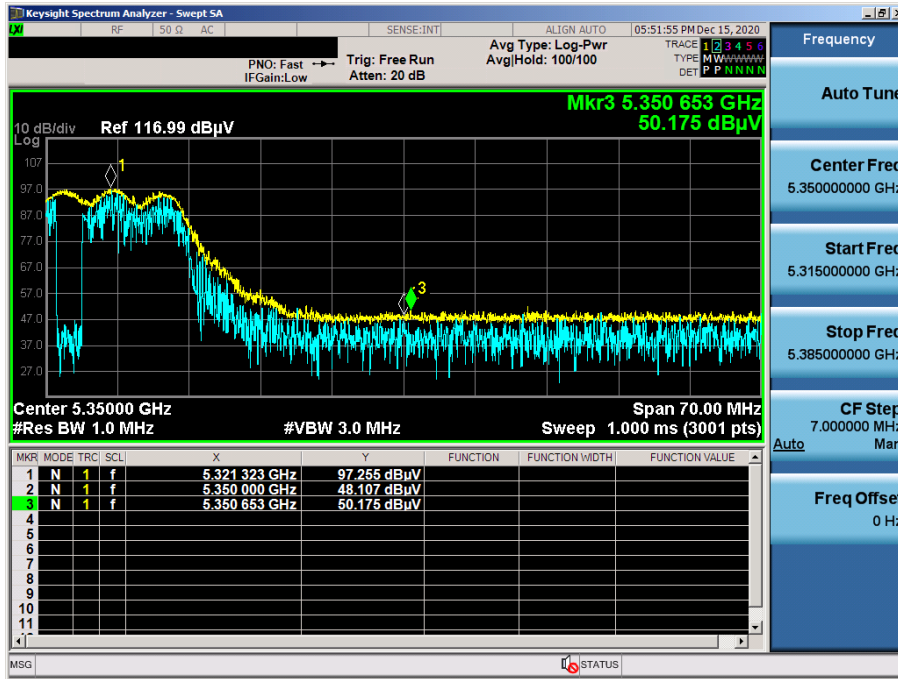
802.11a & U-NII 1 & Ch.36 & X axis & Ver

Detector Mode : PK



802.11a & U-NII 2A & Ch.64 & Z axis & Ver

Detector Mode : PK



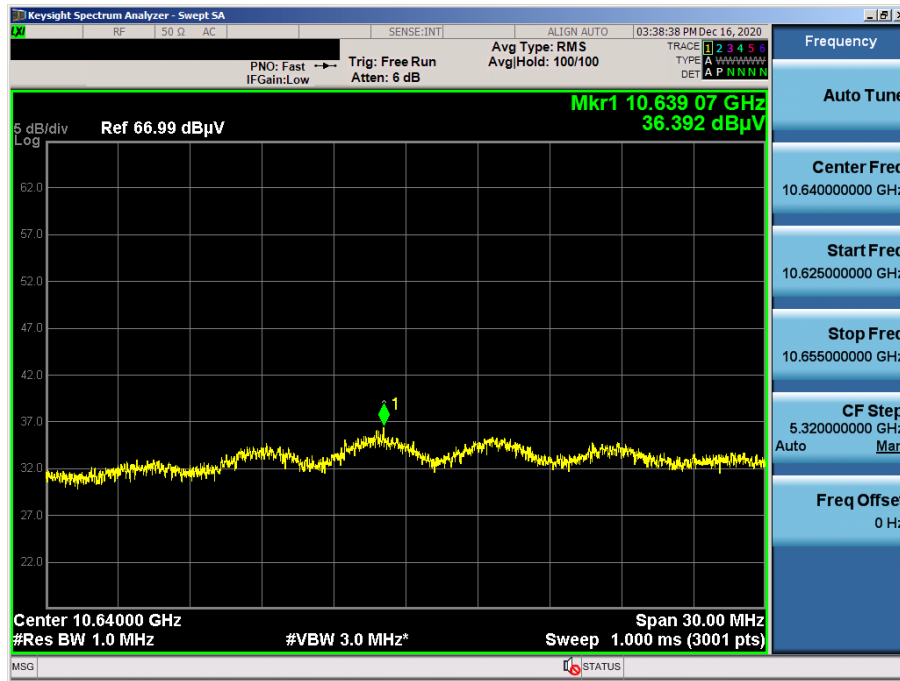
802.11a & U-NII 2A & Ch.64 & Z axis & Ver

Detector Mode : AV



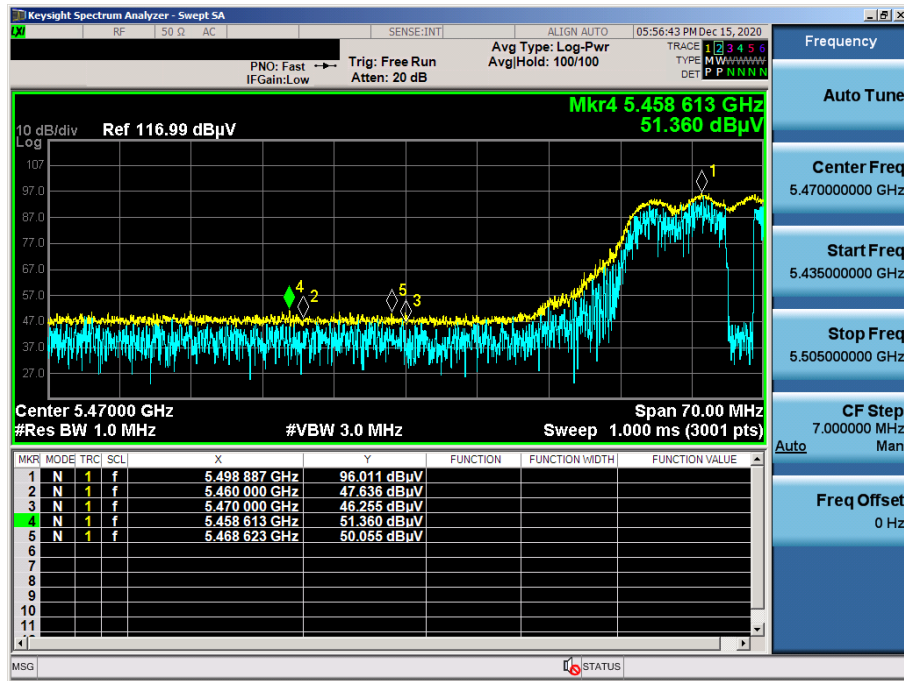
802.11a & U-NII 2A & Ch.64 & X axis & Ver

Detector Mode : AV



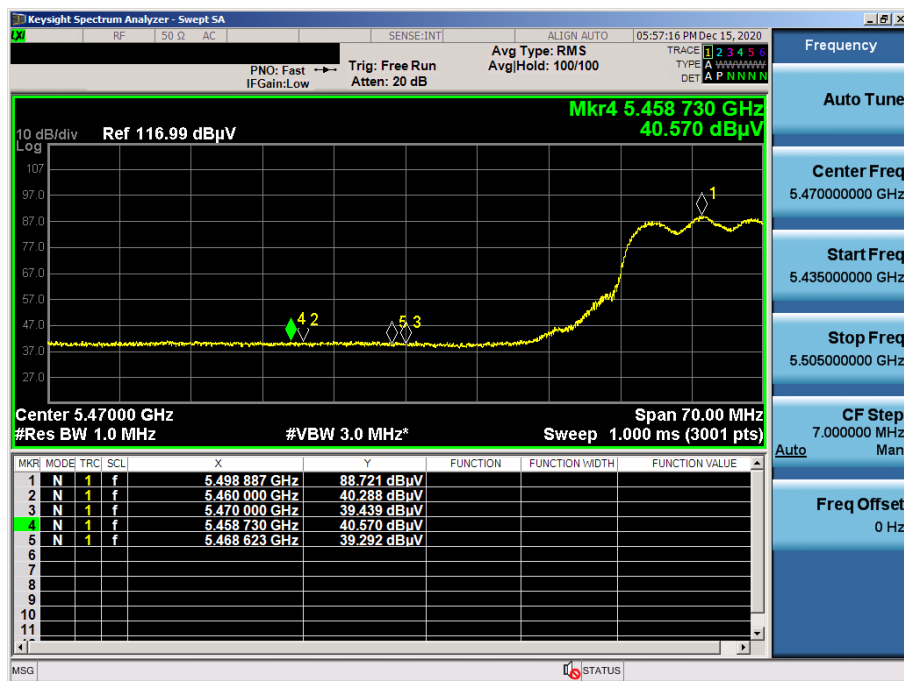
802.11a & U-NII 2C & Ch.100 & Z axis & Ver

Detector Mode : PK



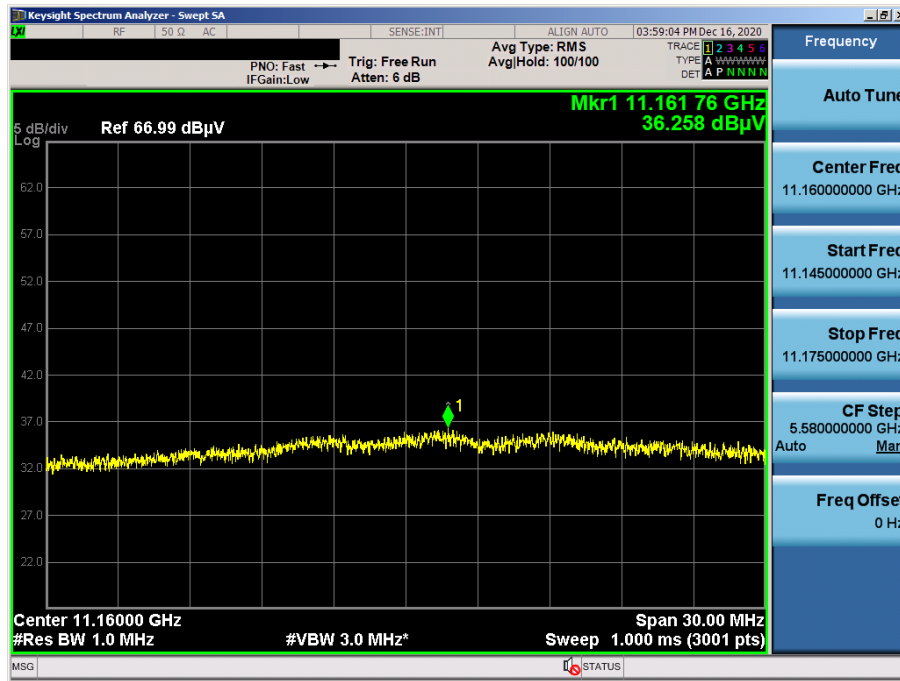
802.11a & U-NII 2C & Ch.100 & Z axis & Ver

Detector Mode : AV



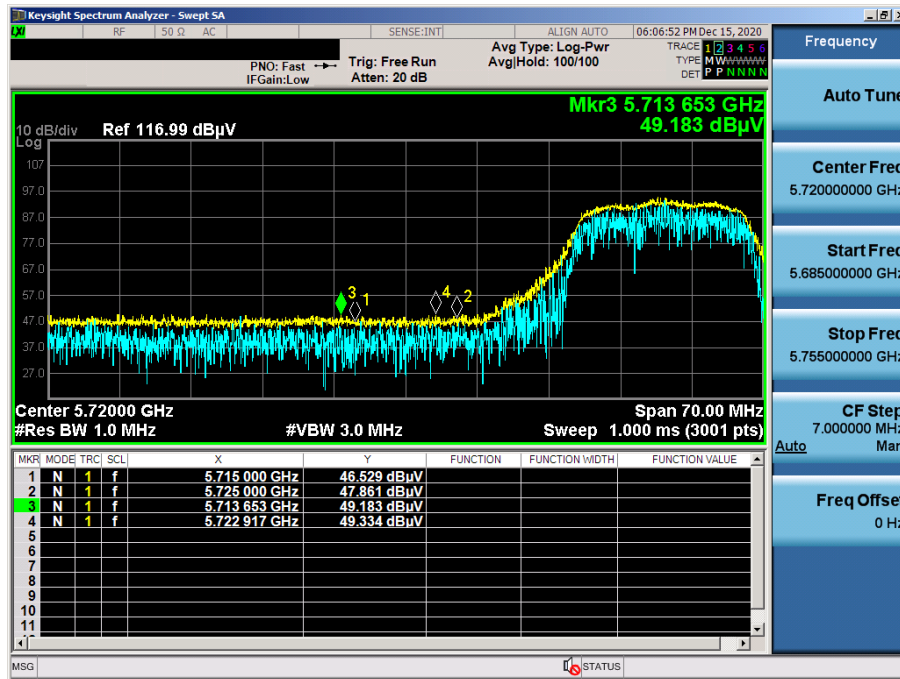
802.11a & U-NII 2C & Ch.116 & X axis & Ver

Detector Mode : AV



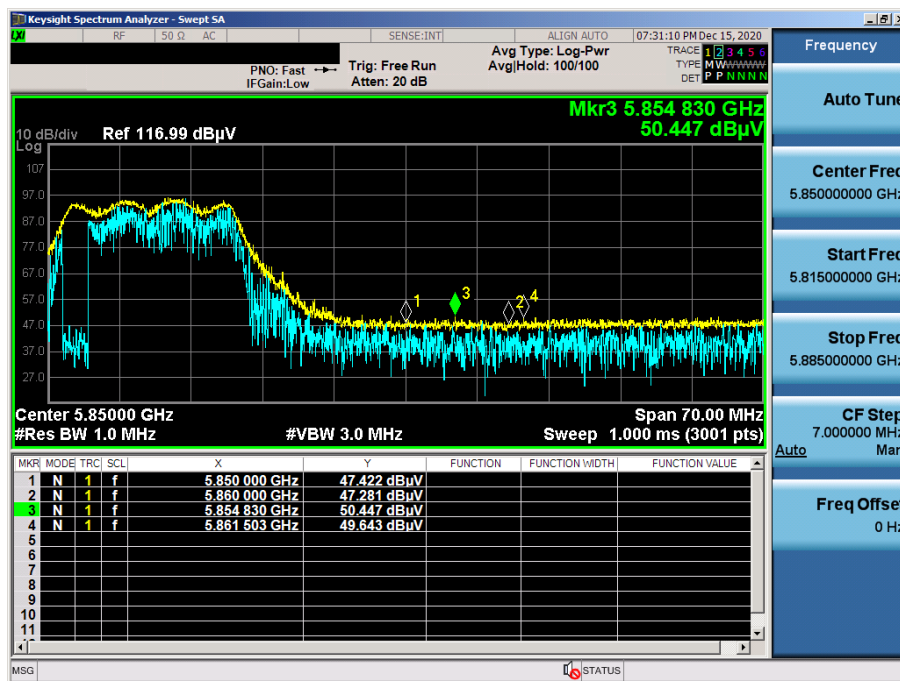
802.11a & U-NII 3 & Ch.149 & Z axis & Ver

Detector Mode : PK



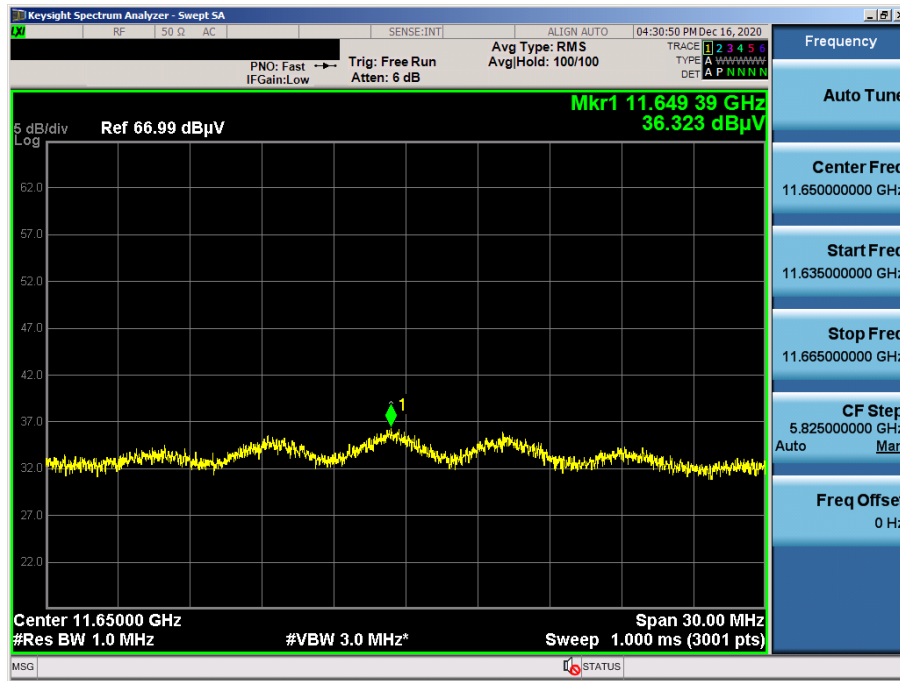
802.11a & U-NII 3 & Ch.165 & Z axis & Ver

Detector Mode : PK



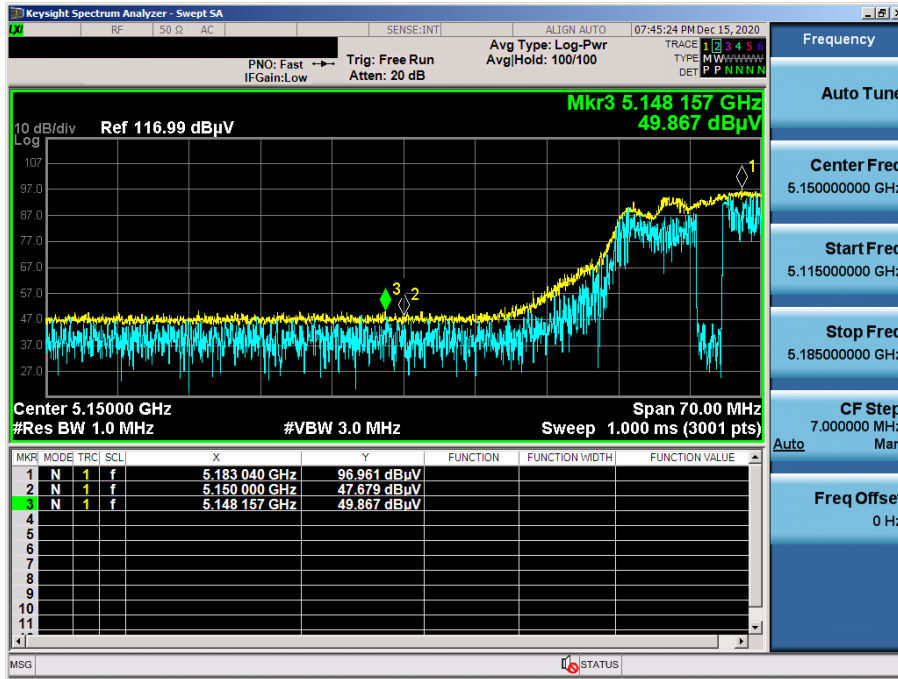
802.11a & U-NII 3 & Ch.165 & X axis & Ver

Detector Mode : AV



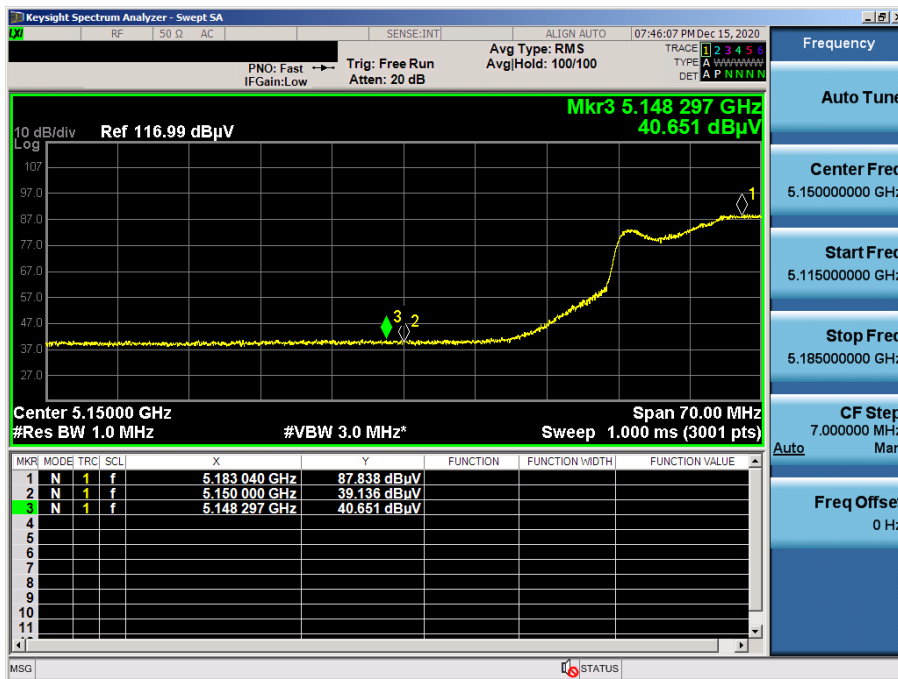
802.11n(HT20) & U-NII 1 & Ch.36 & Z axis & Ver

Detector Mode : PK



802.11n(HT20) & U-NII 1 & Ch.36 & Z axis & Ver

Detector Mode : AV



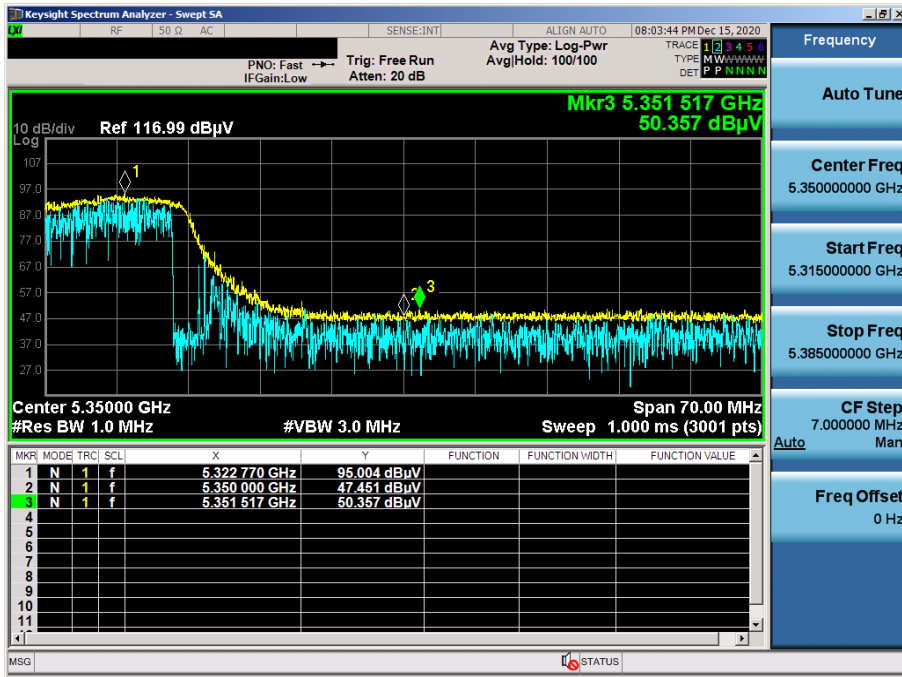
802.11n(HT20) & U-NII 1 & Ch.36 & X axis & Ver

Detector Mode : PK



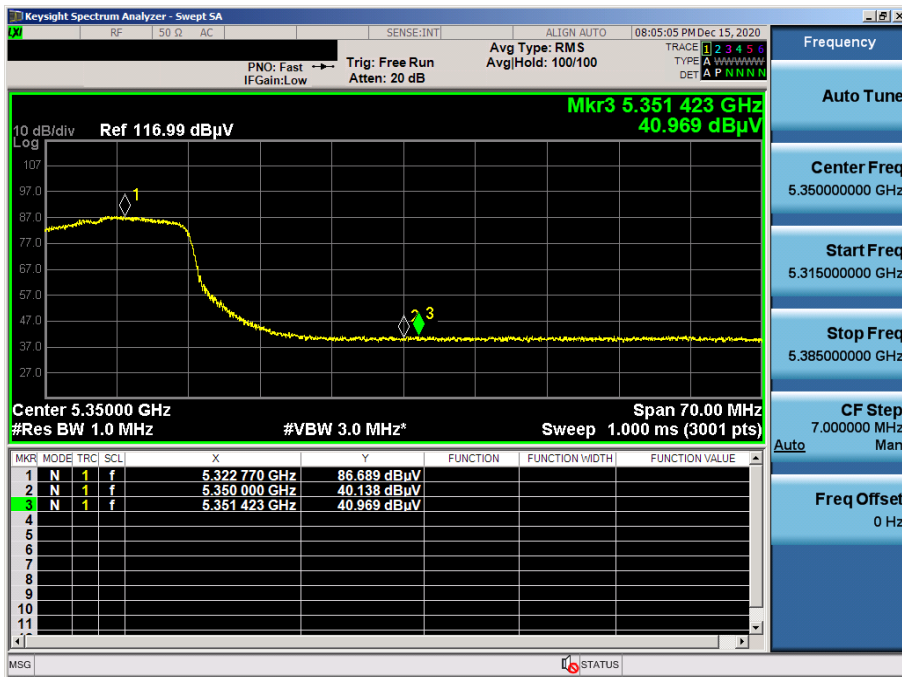
802.11n(HT20) & U-NII 2A & Ch.64 & Z axis & Ver

Detector Mode : PK



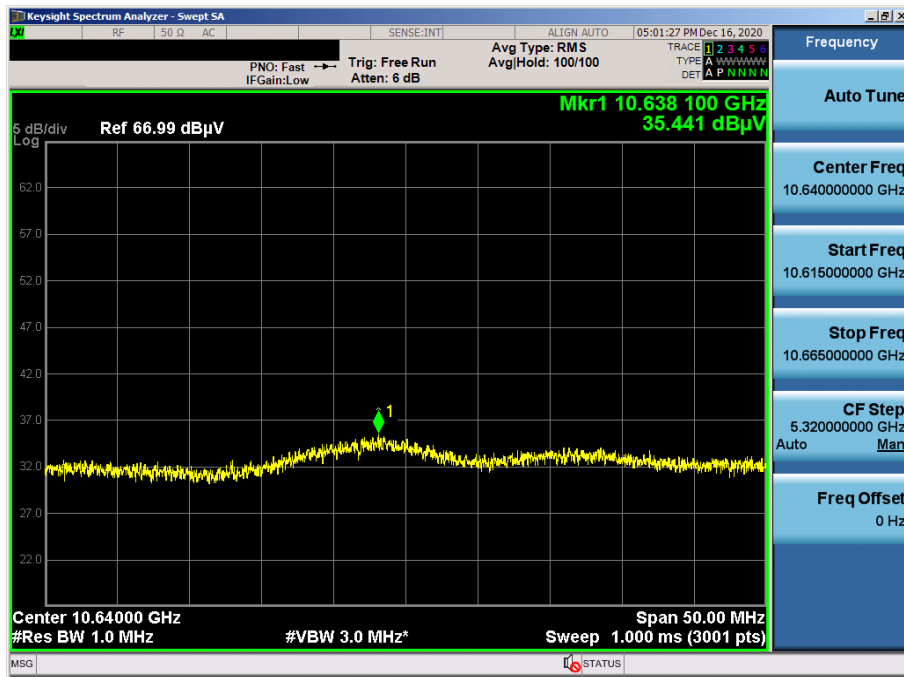
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Detector Mode : AV



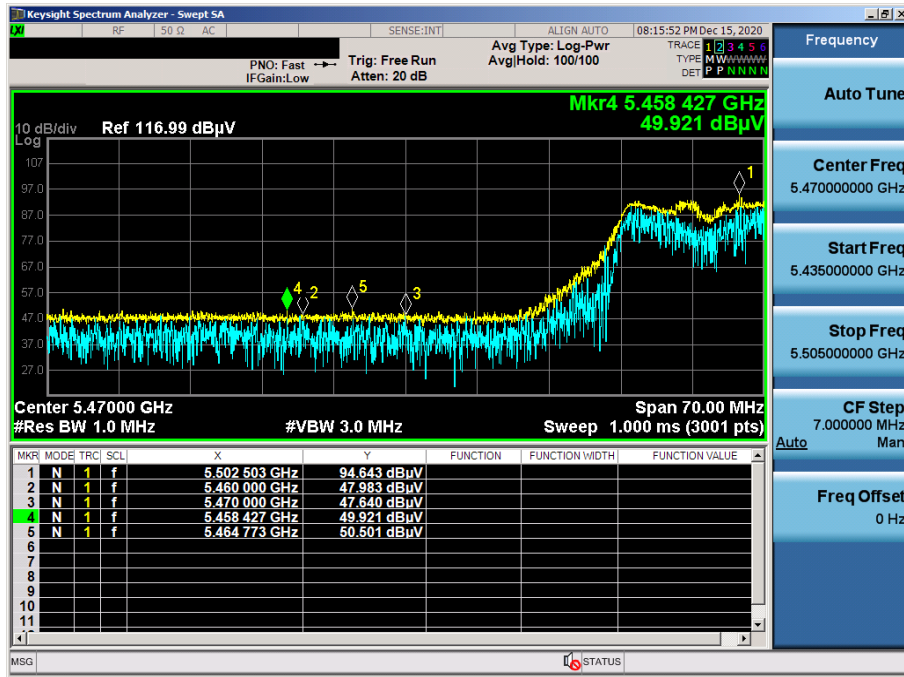
802.11n(HT20) & U-NII 2A & Ch.64 & Z axis & Ver

Detector Mode : AV



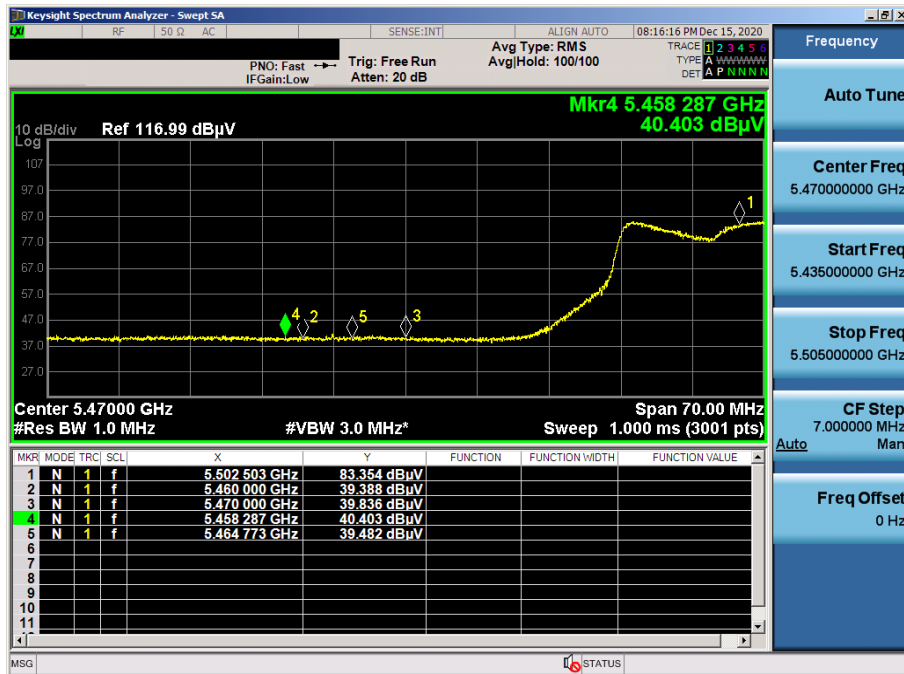
802.11n(HT20) & U-NII 2C & Ch.100 & Z axis & Ver

Detector Mode : PK



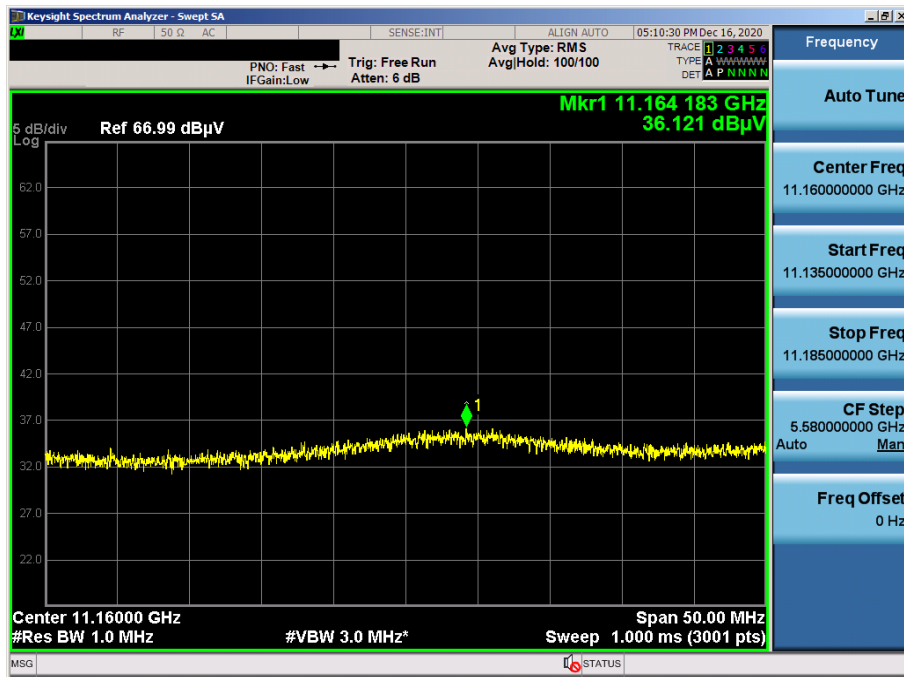
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Detector Mode : AV



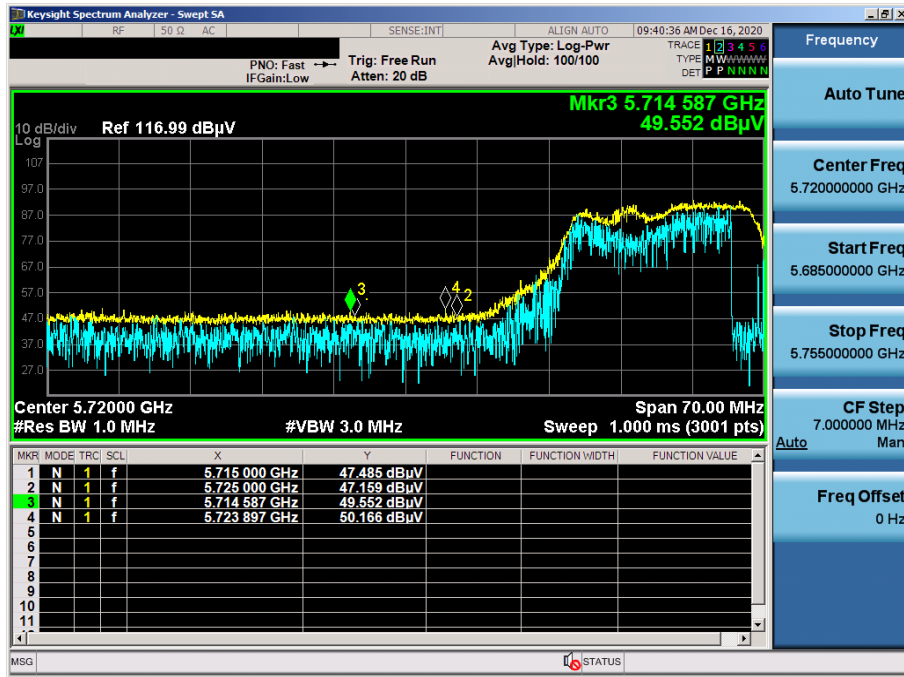
802.11n(HT20) & U-NII 2C & Ch.116 & X axis & Ver

Detector Mode : AV



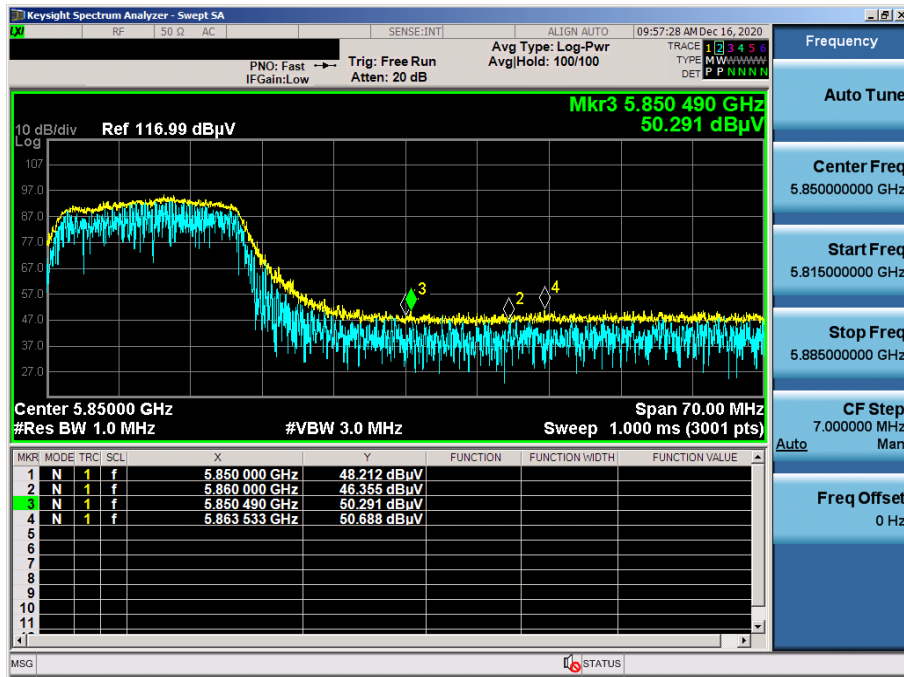
802.11n(HT20) & U-NII 3 & Ch.149 & Z axis & Ver

Detector Mode : PK



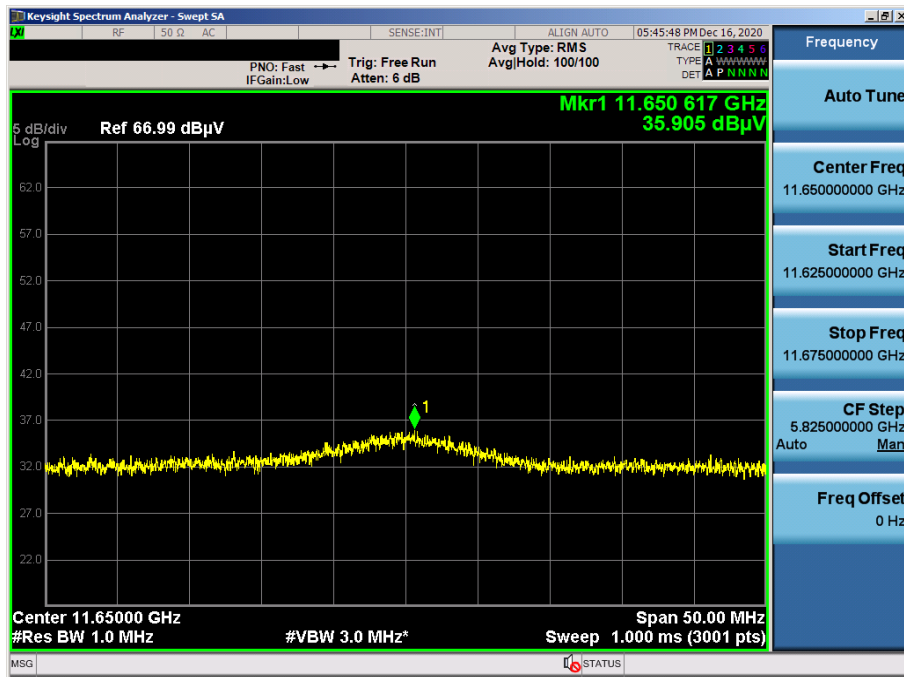
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Detector Mode : PK



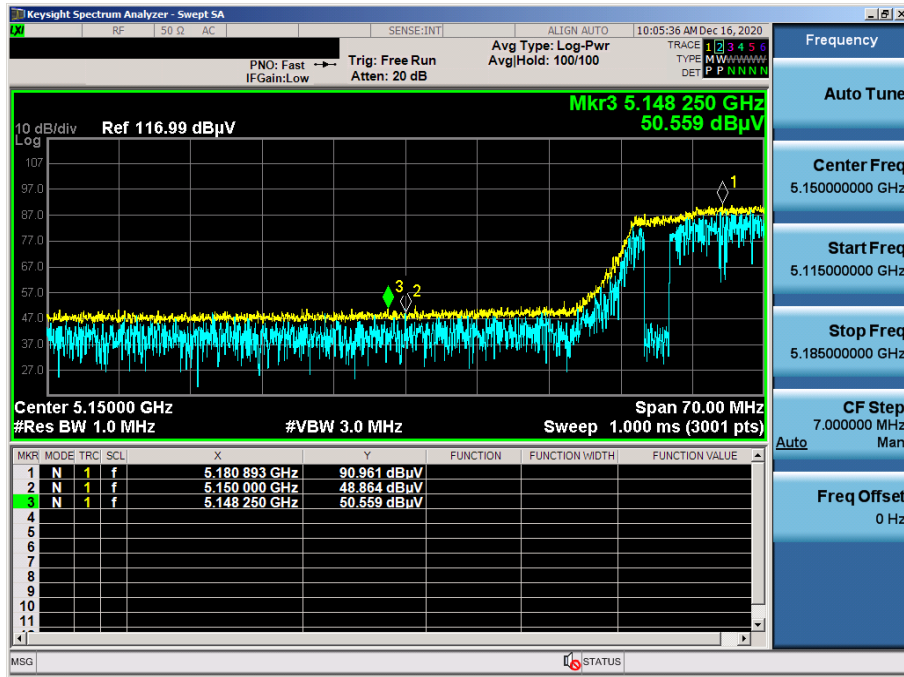
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Detector Mode : AV



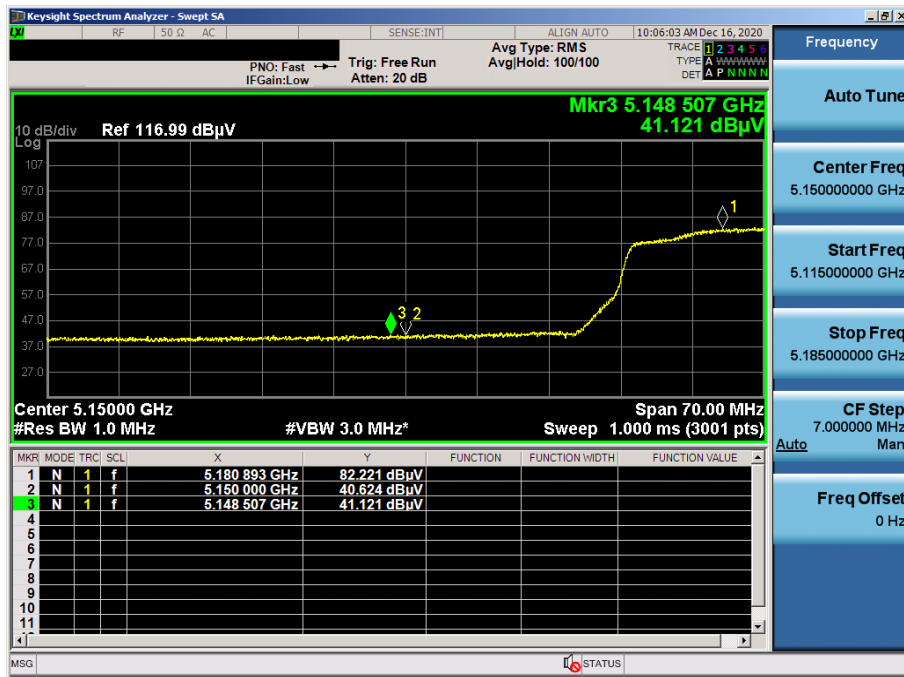
802.11ac(VHT40) & U-NII 1 & Ch.38 & Z axis & Ver

Detector Mode : PK



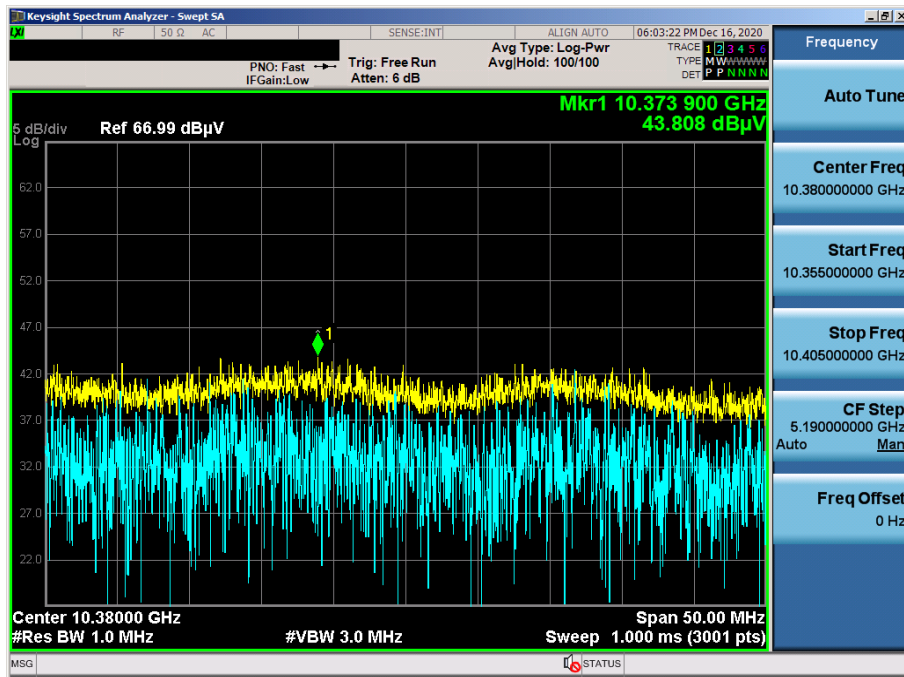
802.11ac(VHT40) & U-NII 1 & Ch.38 & Z axis & Ver

Detector Mode : AV



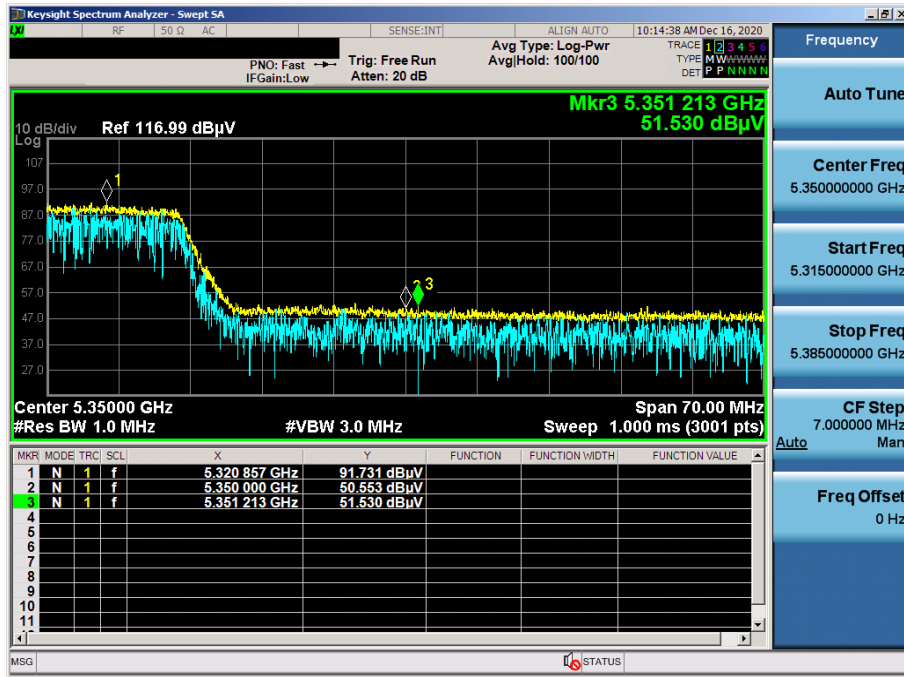
802.11ac(VHT40) & U-NII 1 & Ch.38 & X axis & Ver

Detector Mode : PK



802.11ac(VHT40) & U-NII 2A & Ch.62 & Z axis & Ver

Detector Mode : PK



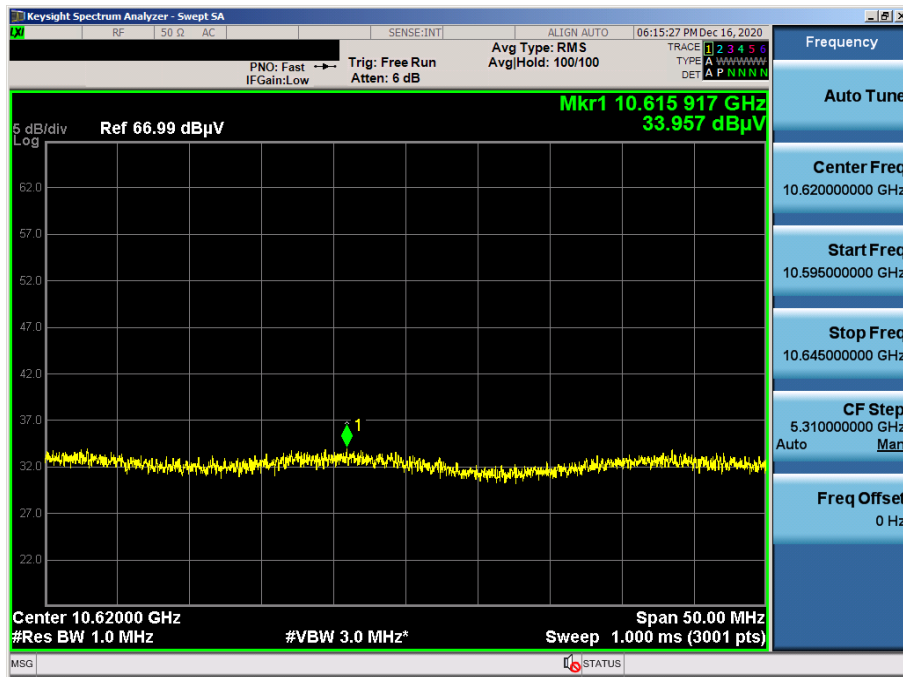
802.11ac(VHT40) & U-NII 2A & Ch.62 & Z axis & Ver

Detector Mode : AV



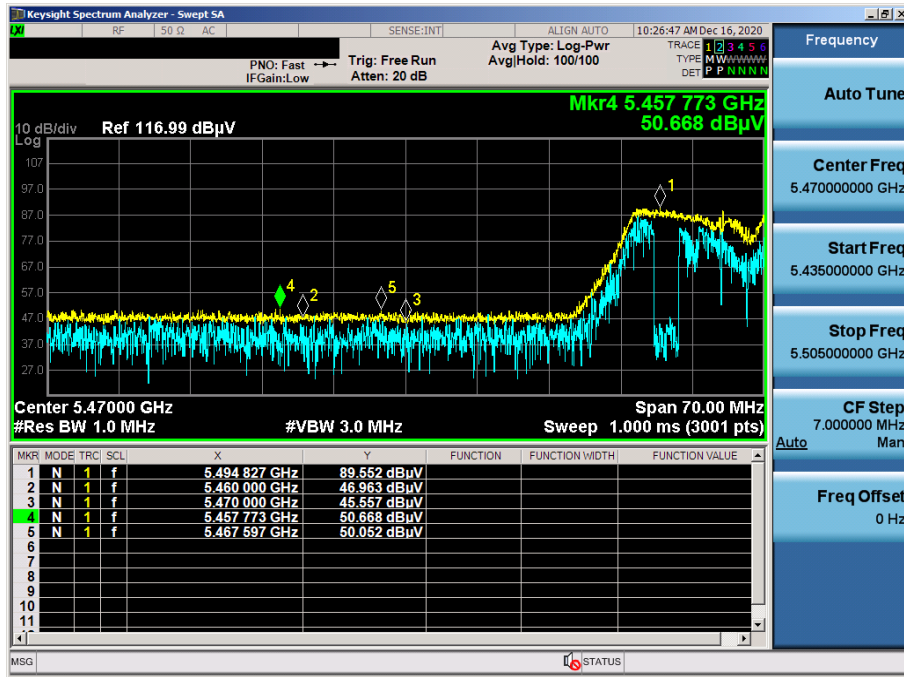
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Detector Mode : AV



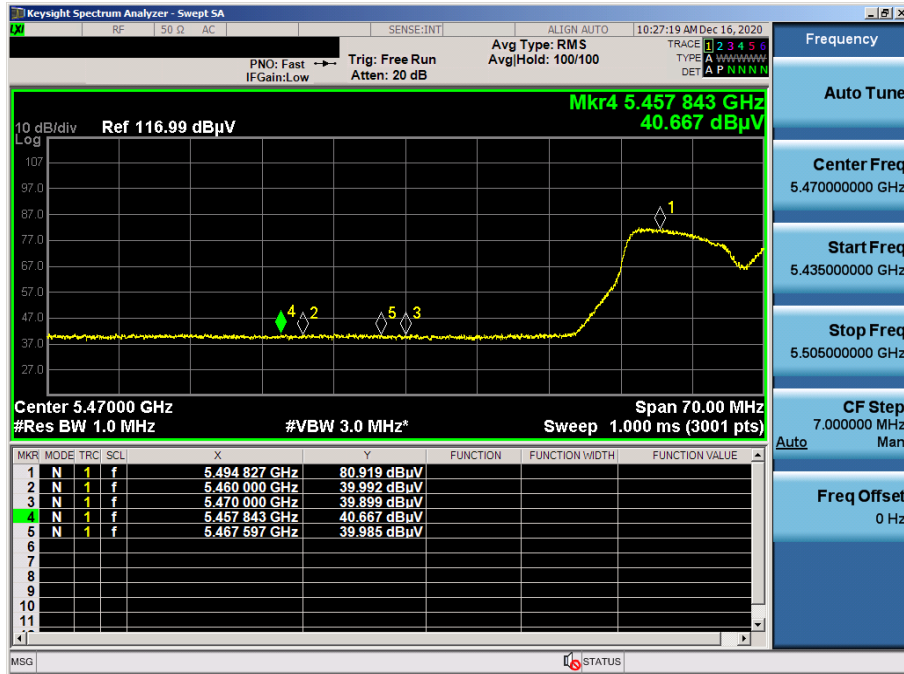
802.11ac(VHT40) & U-NII 2C & Ch.102 & Z axis & Ver

Detector Mode : PK



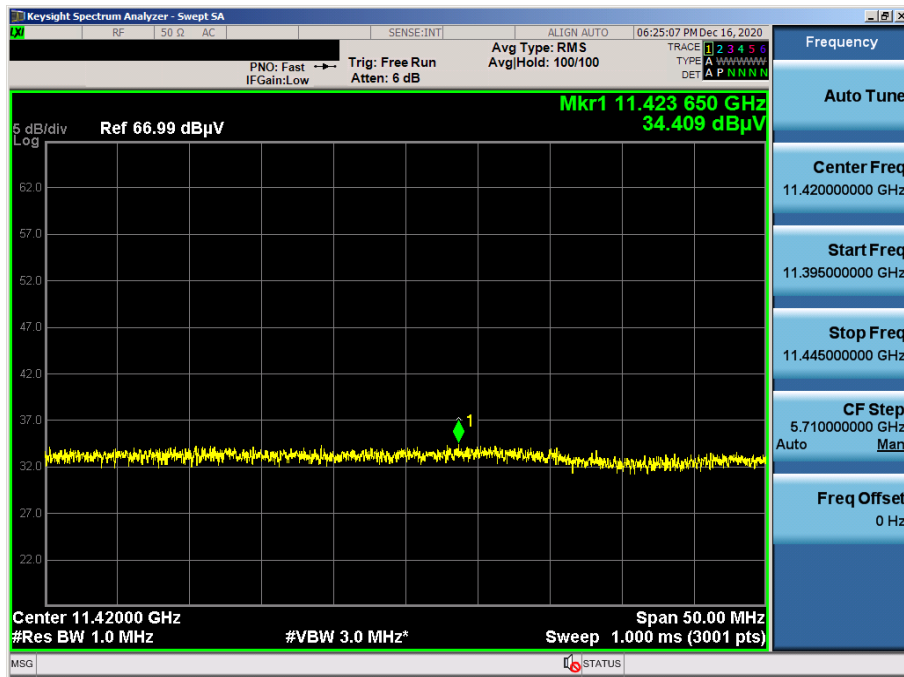
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Detector Mode : AV



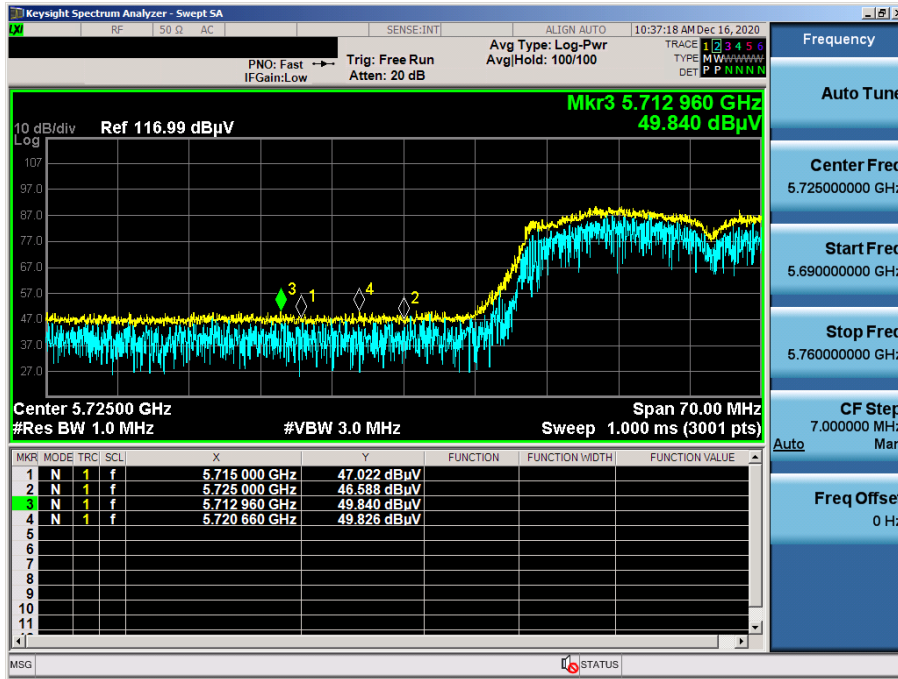
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Detector Mode : AV



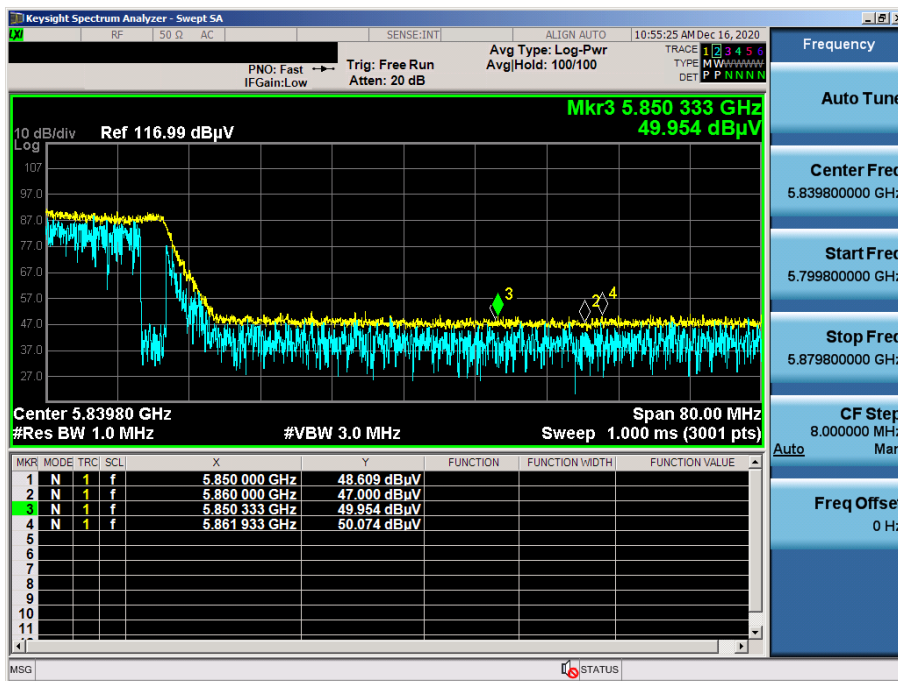
802.11ac(VHT40) & U-NII 3 & Ch.151 & Z axis & Ver

Detector Mode : PK



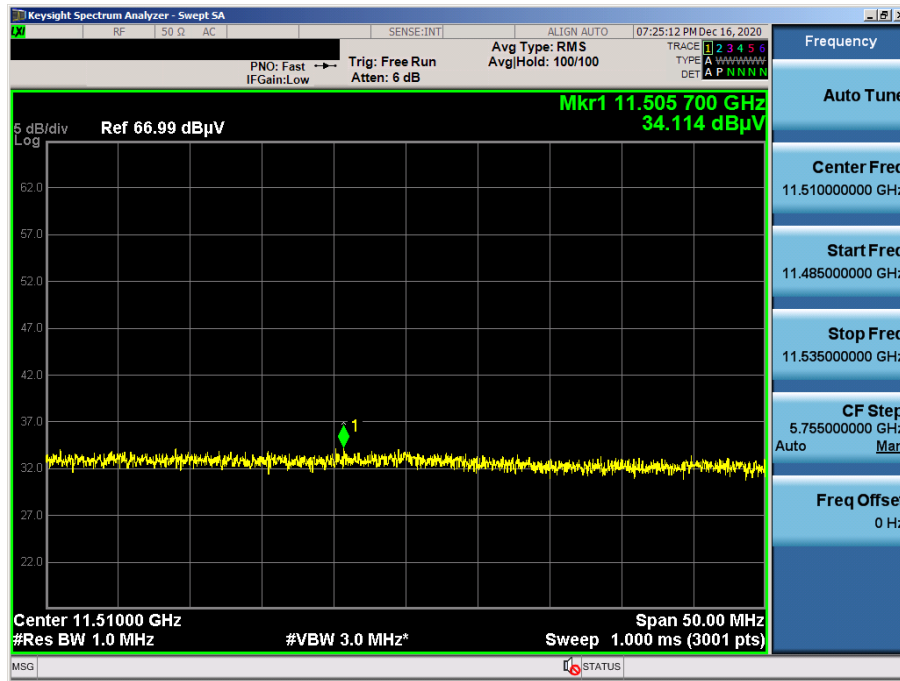
802.11ac(VHT40) & U-NII 3 & Ch.159 & Z axis & Ver

Detector Mode : PK



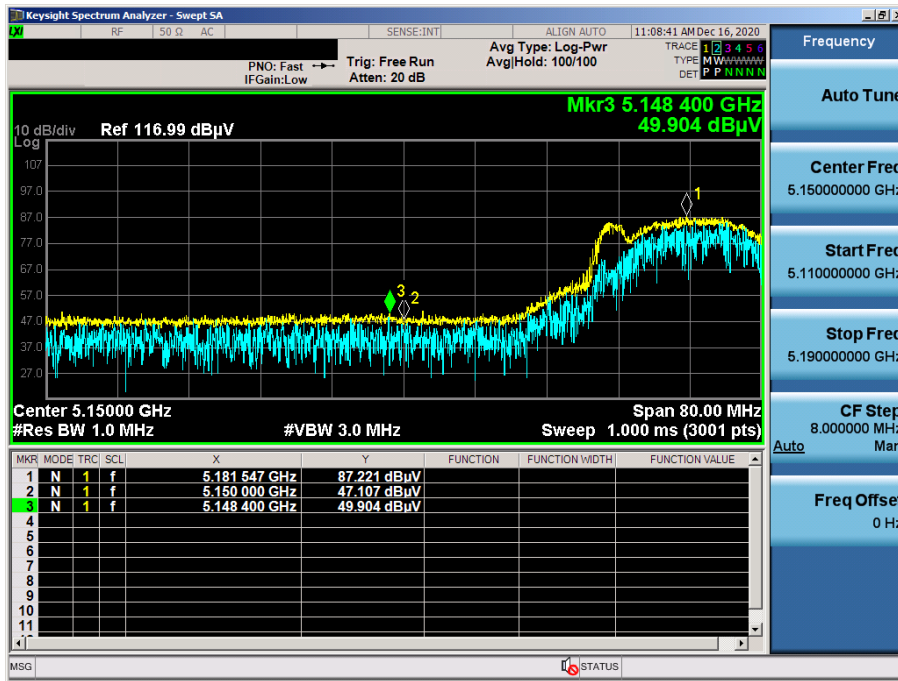
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Detector Mode : AV



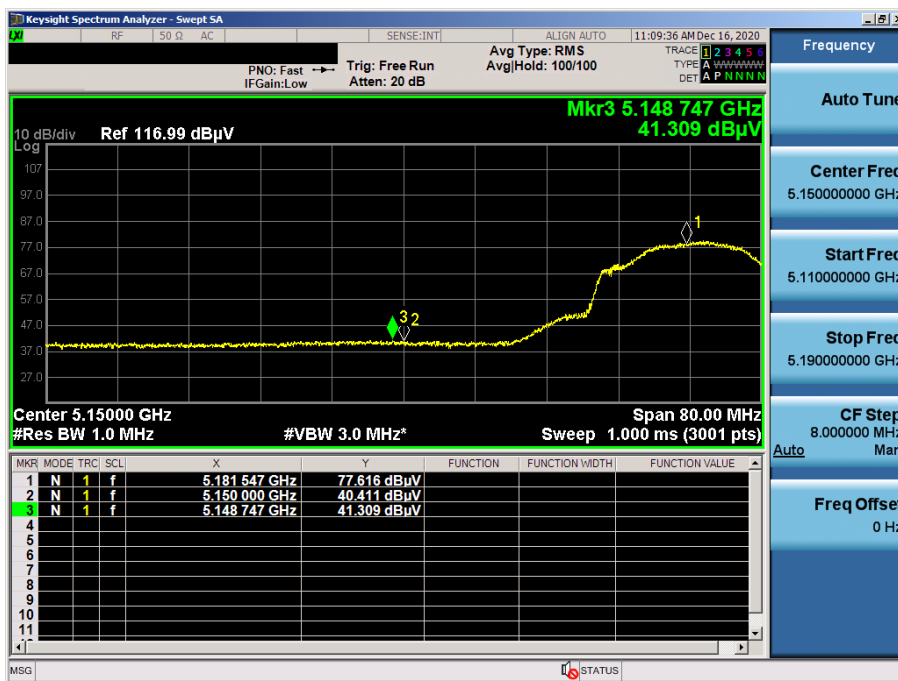
802.11ac(VHT80) & U-NII 1 & Ch.42 & Z axis & Ver

Detector Mode : PK



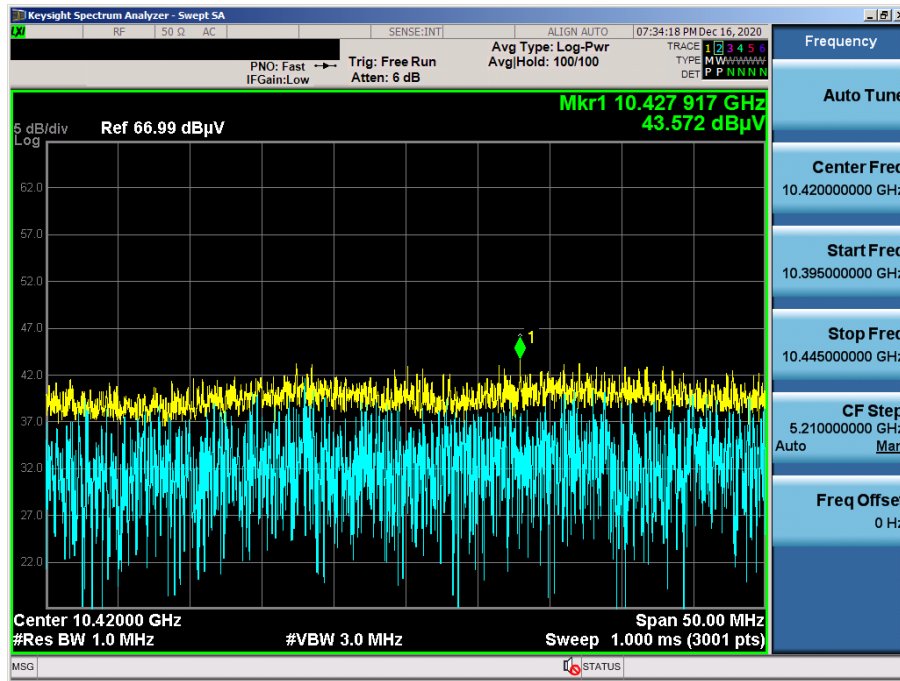
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Detector Mode : AV



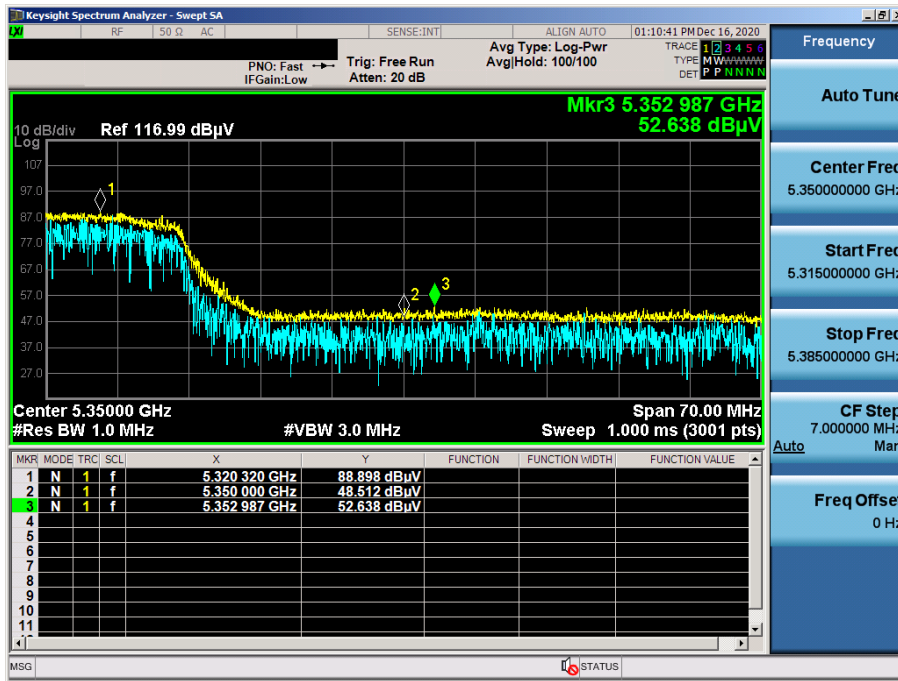
802.11ac(VHT80) & U-NII 1 & Ch.42 & X axis & Ver

Detector Mode : PK



802.11ac(VHT80) & U-NII 3 & Ch.58 & Z axis & Ver

Detector Mode : PK



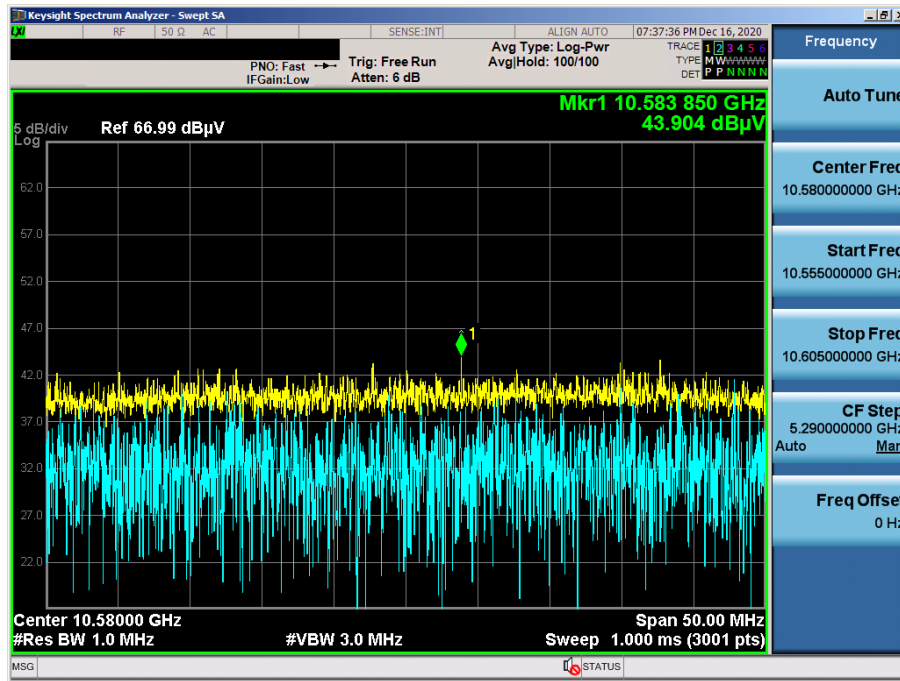
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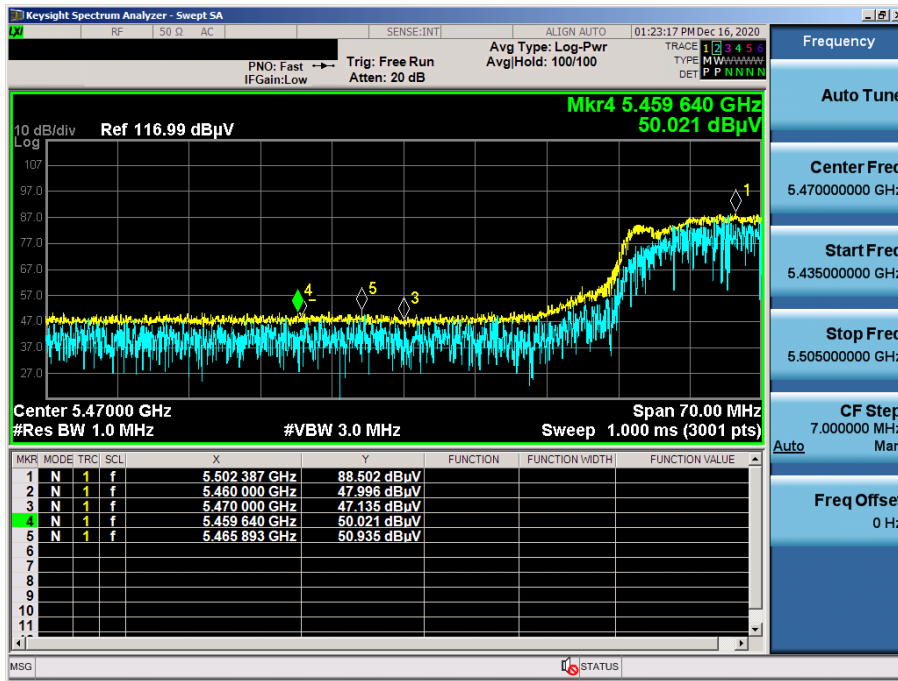
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Detector Mode : PK



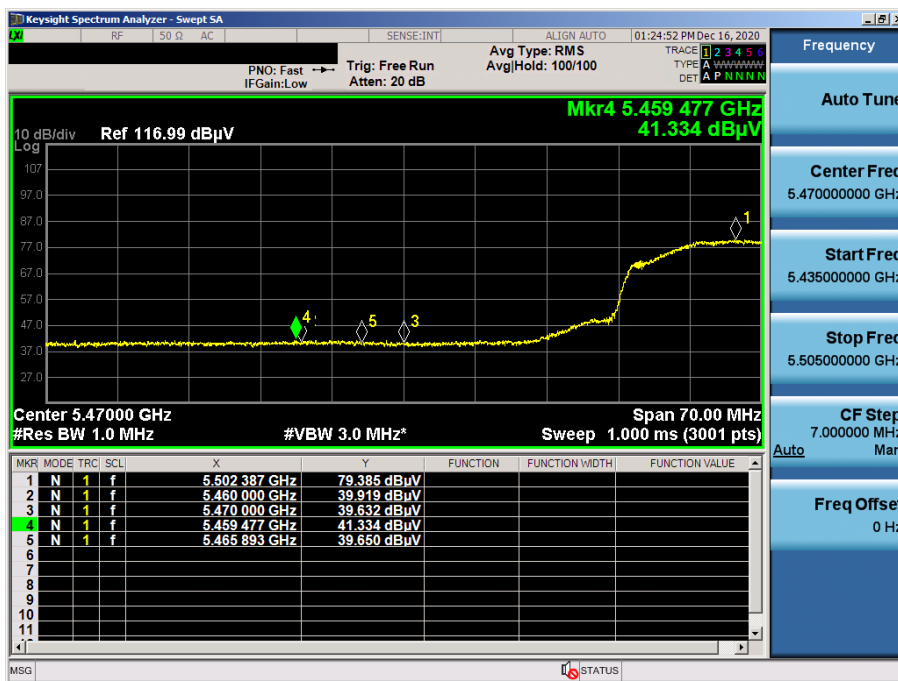
802.11ac(VHT80) & U-NII 2A & Ch.106 & Z axis & Ver

Detector Mode : PK



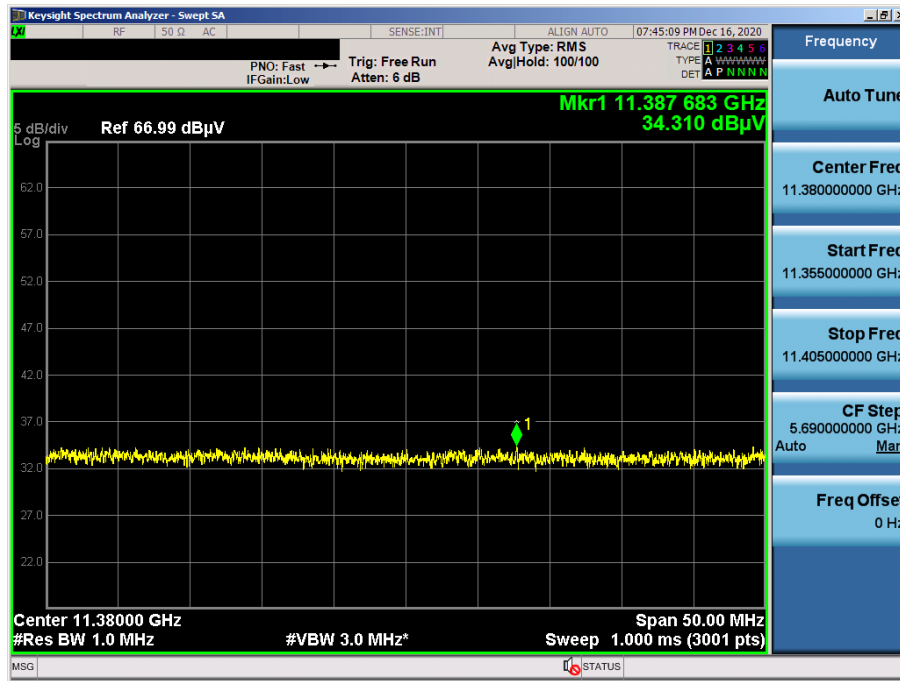
802.11ac(VHT80) & U-NII 2A & Ch.106 & Z axis & Ver

Detector Mode : AV



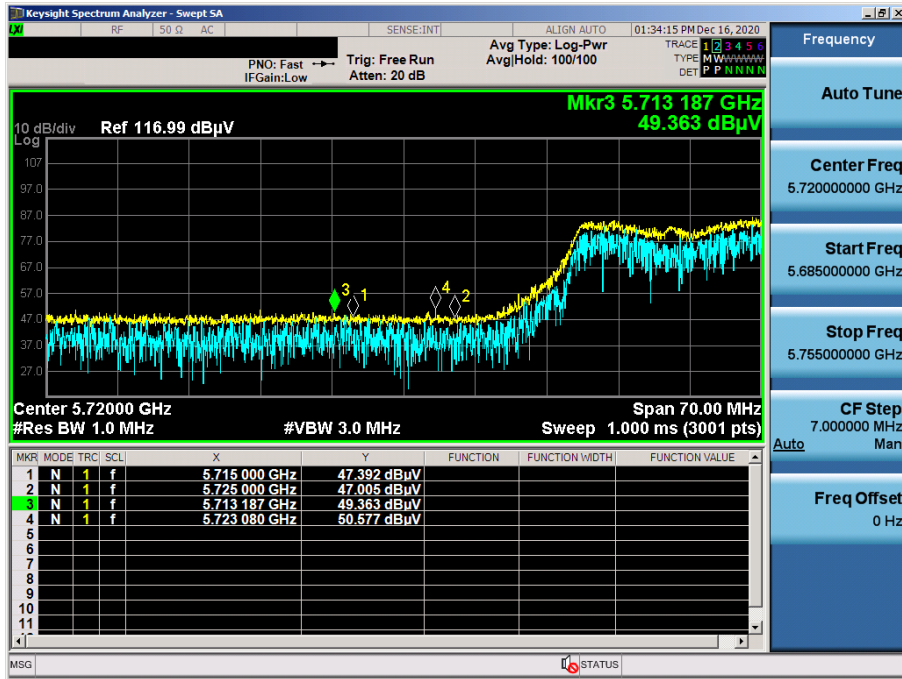
802.11ac(VHT80) & U-NII 2A & Ch.138 & X axis & Ver

Detector Mode : AV



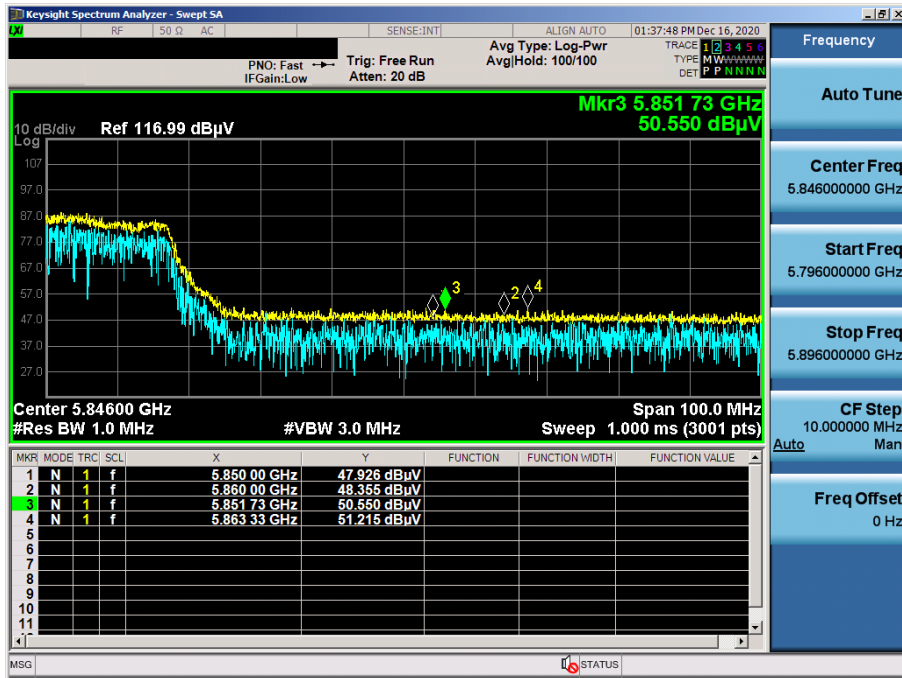
802.11ac(VHT80) & U-NII 2C & Ch.155 & Z axis & Ver

Detector Mode : PK



802.11ac(VHT80) & U-NII 2C & Ch.155 & Z axis & Ver

Detector Mode : PK



802.11ac(VHT80) & U-NII 2C & Ch.155 & X axis & Ver

Detector Mode : AV

