

Measurement Data:

Radiated Spurious Emissions data(9 kHz ~ 40 GHz) : 802.11a

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 (5180 MHz)	5127.730	H	X	PK	47.65	4.99	N/A	N/A	52.64	74.00	21.36
		5127.800	H	X	AV	38.01	4.99	0.61	N/A	43.61	54.00	10.39
		10360.178	H	Y	PK	50.91	10.66	N/A	-9.54	52.03	68.20	16.17
	40 (5200 MHz)	10400.133	H	Y	PK	50.93	10.76	N/A	-9.54	52.15	68.20	16.05
	48 (5240 MHz)	10480.002	H	Y	PK	50.62	10.94	N/A	-9.54	52.02	68.20	16.18
U-NII 2A	52 (5260 MHz)	10520.302	H	Y	PK	50.98	11.05	N/A	-9.54	52.49	68.20	15.71
	60 (5300 MHz)	10599.935	H	Y	PK	49.95	11.30	N/A	-9.54	51.71	68.20	16.49
		10600.050	H	Y	AV	45.85	11.30	0.61	-9.54	48.22	54.00	5.78
	64 (5320 MHz)	5372.370	H	X	PK	46.58	5.14	N/A	N/A	51.72	74.00	22.28
		5372.480	H	X	AV	36.51	5.14	0.61	N/A	42.26	54.00	11.74
		10640.225	H	Y	PK	50.54	11.42	N/A	-9.54	52.42	74.00	21.58
		10640.100	H	Y	AV	46.07	11.42	0.61	-9.54	48.56	54.00	5.44
U-NII 2C	100 (5500 MHz)	5447.800	H	Z	PK	46.96	5.14	N/A	N/A	52.10	74.00	21.90
		5447.680	H	Z	AV	38.14	5.14	0.61	N/A	43.89	54.00	10.11
		5469.720	H	Z	PK	46.76	5.14	N/A	N/A	51.90	68.20	16.30
		11000.247	H	Y	PK	50.82	12.54	N/A	-9.54	53.82	74.00	20.18
		11000.003	H	Y	AV	45.19	12.54	0.61	-9.54	48.80	54.00	5.20
	116 (5600 MHz)	11160.333	H	Y	PK	49.14	12.67	N/A	-9.54	52.27	74.00	21.73
		11160.062	H	Y	AV	43.69	12.67	0.61	-9.54	47.43	54.00	6.57
	140 (5700 MHz)	5725.187	H	Z	PK	47.73	5.64	N/A	N/A	53.37	68.20	14.83
		11399.868	V	Z	PK	49.79	12.86	N/A	-9.54	53.11	74.00	20.89
		11400.078	V	Z	AV	45.19	12.86	0.61	-9.54	49.12	54.00	4.88
U-NII 3	149 (5745 MHz)	5647.710	H	Z	PK	44.03	5.63	N/A	N/A	49.66	68.20	18.54
		11490.215	V	Z	PK	50.25	12.93	N/A	-9.54	53.64	74.00	20.36
		11490.047	V	Z	AV	45.60	12.93	0.61	-9.54	49.60	54.00	4.40
	157 (5785 MHz)	11570.017	V	Z	PK	50.32	12.99	N/A	-9.54	53.77	74.00	20.23
		11570.078	V	Z	AV	46.04	12.99	0.61	-9.54	50.10	54.00	3.90
	165 (5825 MHz)	5935.590	H	Z	PK	44.71	6.24	N/A	N/A	50.95	68.20	17.25
		11650.013	V	Z	PK	50.59	13.05	N/A	-9.54	54.10	74.00	19.90
		11650.075	V	Z	AV	46.20	13.05	0.61	-9.54	50.32	54.00	3.68

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.
2. Sample Calculation.
Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG
Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
3. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz.
Therefore Distance Correction Factor(DCF) : - 9.54 dB = 20*log(1m/3m)
4. The limit is converted to field strength.
 $E[dBuV/m] = EIRP[dBm] + 95.2 \text{ dB} = -27 \text{ dBm} + 95.2 = 68.2 \text{ dBuV/m}$
5. The measured data for U-NII 3 band is satisfied with the emissions mask in 15.407(b)(4)(i), too.
The old rule 15.407(b)(4) is more tight than the new rule 15.407(b)(4)(i).

Measurement Data:

Radiated Spurious Emissions data(9 kHz ~ 40 GHz) : 802.11n(HT20)

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 (5180 MHz)	5127.670	H	X	PK	46.49	4.99	N/A	N/A	51.48	74.00	22.52
		5127.670	H	X	AV	37.45	4.99	0.66	N/A	43.10	54.00	10.90
		10360.048	H	Y	PK	51.88	10.66	N/A	-9.54	53.00	68.20	15.20
	40 (5200 MHz)	10399.953	H	Y	PK	51.85	10.76	N/A	-9.54	53.07	68.20	15.13
	48 (5240 MHz)	10480.208	H	Y	PK	51.63	10.94	N/A	-9.54	53.03	68.20	15.17
U-NII 2A	52 (5260 MHz)	10520.108	H	Y	PK	51.26	11.05	N/A	-9.54	52.77	68.20	15.43
		10599.993	H	Y	PK	50.51	11.30	N/A	-9.54	52.27	68.20	15.93
		10600.093	H	Y	AV	45.39	11.30	0.66	-9.54	47.81	54.00	6.19
	64 (5320 MHz)	5372.930	H	X	PK	45.39	5.14	N/A	N/A	50.53	74.00	23.47
		5372.610	H	X	AV	36.20	5.14	0.66	N/A	42.00	54.00	12.00
		10639.937	H	Y	PK	50.54	11.42	N/A	-9.54	52.42	74.00	21.58
		10640.108	H	Y	AV	45.72	11.42	0.66	-9.54	48.26	54.00	5.74
U-NII 2C	100 (5500 MHz)	5447.400	H	Z	PK	46.78	5.14	N/A	N/A	51.92	74.00	22.08
		5447.640	H	Z	AV	38.15	5.14	0.66	N/A	43.95	54.00	10.05
		5469.880	H	Z	PK	45.89	5.14	N/A	N/A	51.03	68.20	17.17
		11000.040	H	Y	PK	49.53	12.54	N/A	-9.54	52.53	74.00	21.47
		11000.103	H	Y	AV	44.46	12.54	0.66	-9.54	48.12	54.00	5.88
	116 (5600 MHz)	11159.972	H	Y	PK	49.26	12.67	N/A	-9.54	52.39	74.00	21.61
		11160.078	H	Y	AV	43.72	12.67	0.66	-9.54	47.51	54.00	6.49
	140 (5700 MHz)	5752.587	H	Z	PK	46.63	5.64	N/A	N/A	52.27	68.20	15.93
		11400.308	V	Z	PK	49.91	12.86	N/A	-9.54	53.23	74.00	20.77
		11400.085	V	Z	AV	43.94	12.86	0.66	-9.54	47.92	54.00	6.08
U-NII 3	149 (5745 MHz)	5642.530	H	Z	PK	45.92	5.63	N/A	N/A	51.55	68.20	16.65
		11490.005	V	Z	PK	49.23	12.93	N/A	-9.54	52.62	74.00	21.38
		11490.088	V	Z	AV	43.73	12.93	0.66	-9.54	47.78	54.00	6.22
	157 (5785 MHz)	11569.997	V	Z	PK	49.69	12.99	N/A	-9.54	53.14	74.00	20.86
		11570.065	V	Z	AV	44.87	12.99	0.66	-9.54	48.98	54.00	5.02
	165 (5825 MHz)	5927.050	H	Z	PK	44.69	6.24	N/A	N/A	50.93	68.20	17.27
		11649.973	V	Z	PK	50.04	13.05	N/A	-9.54	53.55	74.00	20.45
		11650.132	V	Z	AV	45.12	13.05	0.66	-9.54	49.29	54.00	4.71

Note.

- No other spurious and harmonic emissions were found greater than listed emissions on above table.
- Sample Calculation.
Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG
Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
- Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz.
Therefore Distance Correction Factor(DCF) : - 9.54 dB = 20*log(1m/3m)
- The limit is converted to field strength.
 $E[dBuV/m] = EIRP[dBm] + 95.2 \text{ dB} = -27 \text{ dBm} + 95.2 = 68.2 \text{ dBuV/m}$
- The measured data for U-NII 3 band is satisfied with the emissions mask in 15.407(b)(4)(i), too.
The old rule 15.407(b)(4) is more tight than the new rule 15.407(b)(4)(i).

Measurement Data:

Radiated Spurious Emissions data(9 kHz ~ 40 GHz) : 802.11n(HT40)

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 (5190 MHz)	5149.270	H	X	PK	49.54	4.99	N/A	N/A	54.53	74.00	19.47
		5149.850	H	X	AV	36.17	4.99	1.25	N/A	42.41	54.00	11.59
		10380.018	H	Y	PK	51.59	10.71	N/A	-9.54	52.76	68.20	15.44
	46 (5230 MHz)	10460.008	H	Y	PK	51.15	10.89	N/A	-9.54	52.50	68.20	15.70
U-NII 2A	54 (5270 MHz)	10540.072	H	Y	PK	50.28	11.11	N/A	-9.54	51.85	68.20	16.35
	62 (5310 MHz)	5351.200	H	X	PK	48.42	5.14	N/A	N/A	53.56	74.00	20.44
		5350.540	H	X	AV	36.29	5.14	1.25	N/A	42.68	54.00	11.32
		10619.978	H	Y	PK	49.62	11.36	N/A	-9.54	51.44	74.00	22.56
		10620.093	H	Y	AV	44.33	11.36	1.25	-9.54	47.40	54.00	6.60
U-NII 2C	102 (5510 MHz)	5459.680	H	Z	PK	45.23	5.14	N/A	N/A	50.37	74.00	23.63
		5459.150	H	Z	AV	34.11	5.14	1.25	N/A	40.50	54.00	13.50
		5468.720	H	Z	PK	49.48	5.14	N/A	N/A	54.62	68.20	13.58
		11020.225	H	Y	PK	49.58	12.56	N/A	-9.54	52.60	74.00	21.40
		11020.003	H	Y	AV	44.60	12.56	1.25	-9.54	48.87	54.00	5.13
	110 (5590 MHz)	11100.057	H	Y	PK	49.58	12.62	N/A	-9.54	52.66	74.00	21.34
		11100.045	H	Y	AV	44.11	12.62	1.25	-9.54	48.44	54.00	5.56
	134 (5670 MHz)	5773.430	H	Z	PK	45.61	5.72	N/A	N/A	51.33	68.20	16.87
		11340.052	V	Z	PK	49.73	12.81	N/A	-9.54	53.00	74.00	21.00
		11340.053	V	Z	AV	45.30	12.81	1.25	-9.54	49.82	54.00	4.18
U-NII 3	151 (5755 MHz)	5649.390	H	Z	PK	44.91	5.63	N/A	N/A	50.54	68.20	17.66
		11509.897	V	Z	PK	51.00	12.95	N/A	-9.54	54.41	74.00	19.59
		11510.143	V	Z	AV	45.86	12.95	1.25	-9.54	50.52	54.00	3.48
	159 (5795 MHz)	5939.880	H	Z	PK	44.28	6.24	N/A	N/A	50.52	68.20	17.68
		11590.063	V	Z	PK	50.53	13.01	N/A	-9.54	54.00	74.00	20.00
		11589.988	V	Z	AV	45.81	13.01	1.25	-9.54	50.53	54.00	3.47

Note.

- No other spurious and harmonic emissions were found greater than listed emissions on above table.
- Sample Calculation.
Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG
Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
- Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz.
Therefore Distance Correction Factor(DCF) : - 9.54 dB = 20*log(1m/3m)
- The limit is converted to field strength.
 $E[dBuV/m] = EIRP[dBm] + 95.2 \text{ dB} = -27 \text{ dBm} + 95.2 = 68.2 \text{ dBuV/m}$
- The measured data for U-NII 3 band is satisfied with the emissions mask in 15.407(b)(4)(i), too.
The old rule 15.407(b)(4) is more tight than the new rule 15.407(b)(4)(i).

7.7 AC Conducted Emission

■ Test Requirements

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.

1. The test procedure is performed in a 6.5 m $\times$ 3.5 m $\times$ 3.5 m (L $\times$ W $\times$ H) shielded room. The EUT along with its peripherals were placed on a 1.0 m (W) $\times$ 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.

■ Measurement Data: **Comply**

AC Line Conducted Emissions (Graph)

Test Mode: U-NII 1 & 802.11n(HT20) & 5240 MHz

Results of Conducted Emission

DT&C

Date 2017-06-22

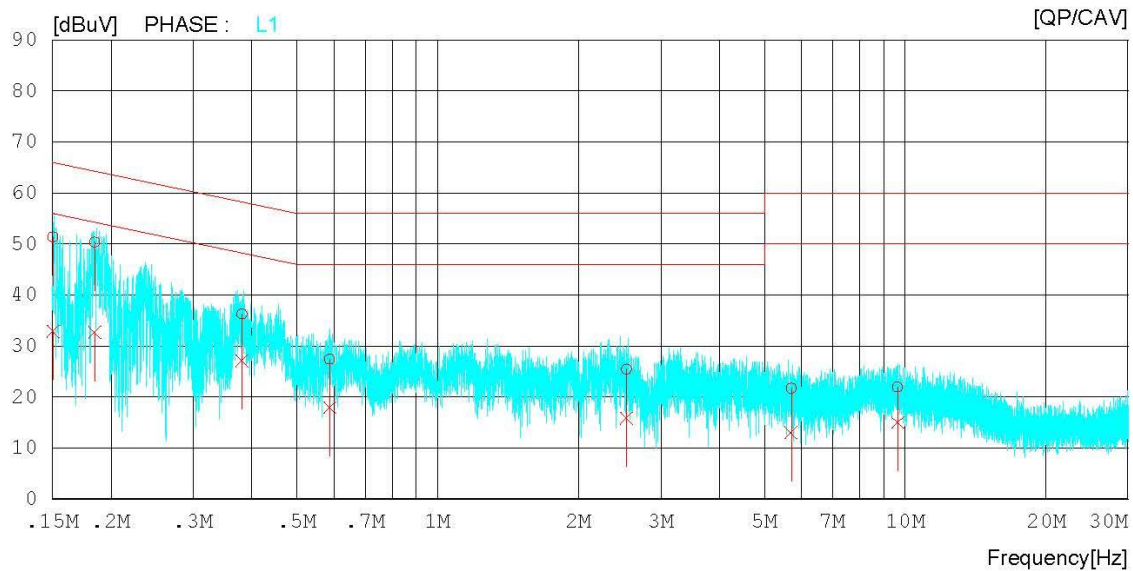
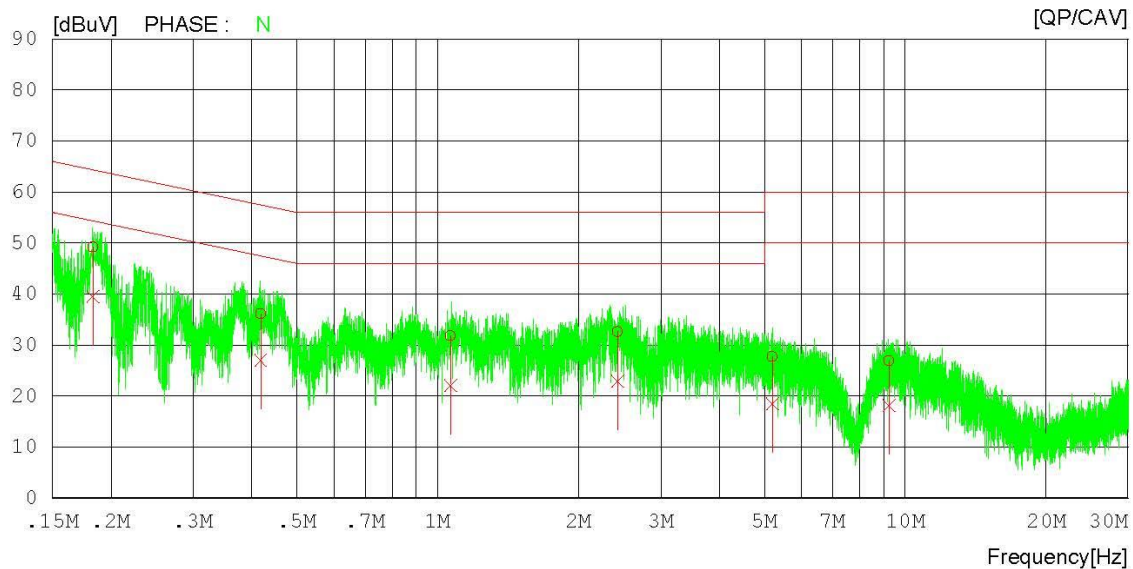
Model PM70
Function U-NII 1_0
Mode 802.11a
Test condition

Temp/Humi.
Power Supply
Operator

23 'C 48 %
AC 120 V 60 Hz
J.W.KIM

Memo

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



AC Line Conducted Emissions (Data List)

Test Mode: U-NII 1 & 802.11n(HT20) & 5240 MHz

Results of Conducted Emission

DT&C

Date 2017-06-22

Model PM70
Function U-NII 1_0
Mode 802.11a
Test condition

Temp/Humi. 23 'C 48 %
Power Supply AC 120 V 60 Hz
Operator J.W.KIM

Memo

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

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP	CAV		QP	CAV	QP	CAV	QP	CAV	
		[dBuV]	[dBuV]		[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.18311	49.05	39.26	0.21	49.26	39.47	64.34	54.34	15.08	14.87	N
2	0.41810	35.92	26.76	0.21	36.13	26.97	57.49	47.49	21.36	20.52	N
3	1.06540	31.56	21.83	0.26	31.82	22.09	56.00	46.00	24.18	23.91	N
4	2.42540	32.22	22.56	0.34	32.56	22.90	56.00	46.00	23.44	23.10	N
5	5.20000	27.27	18.00	0.45	27.72	18.45	60.00	50.00	32.28	31.55	N
6	9.23220	26.21	17.45	0.67	26.88	18.12	60.00	50.00	33.12	31.88	N
7	0.15043	51.14	32.68	0.18	51.32	32.86	65.98	55.98	14.66	23.12	L1
8	0.18449	50.07	32.45	0.18	50.25	32.63	64.28	54.28	14.03	21.65	L1
9	0.38150	35.98	26.86	0.20	36.18	27.06	58.25	48.25	22.07	21.19	L1
10	0.58823	27.10	17.69	0.21	27.31	17.90	56.00	46.00	28.69	28.10	L1
11	2.53280	25.15	15.51	0.32	25.47	15.83	56.00	46.00	30.53	30.17	L1
12	5.69860	21.13	12.46	0.50	21.63	12.96	60.00	50.00	38.37	37.04	L1
13	9.63540	21.04	14.14	0.79	21.83	14.93	60.00	50.00	38.17	35.07	L1

AC Line Conducted Emissions (Graph)

Test Mode: U-NII 2A & 802.11n(HT20) & 5320 MHz

Results of Conducted Emission

DT&C

Date 2017-06-23

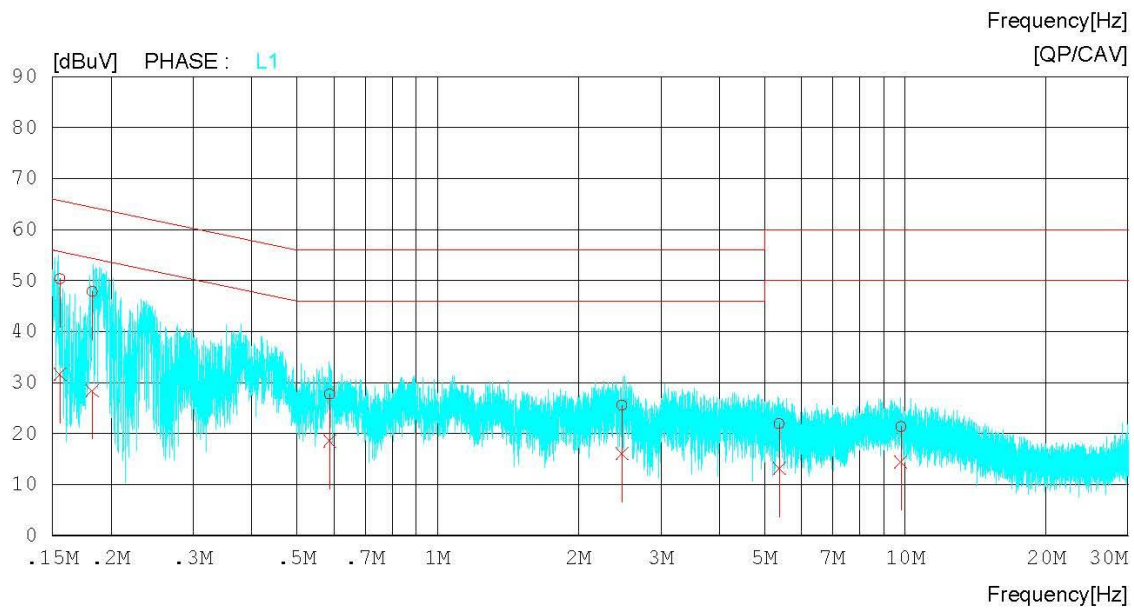
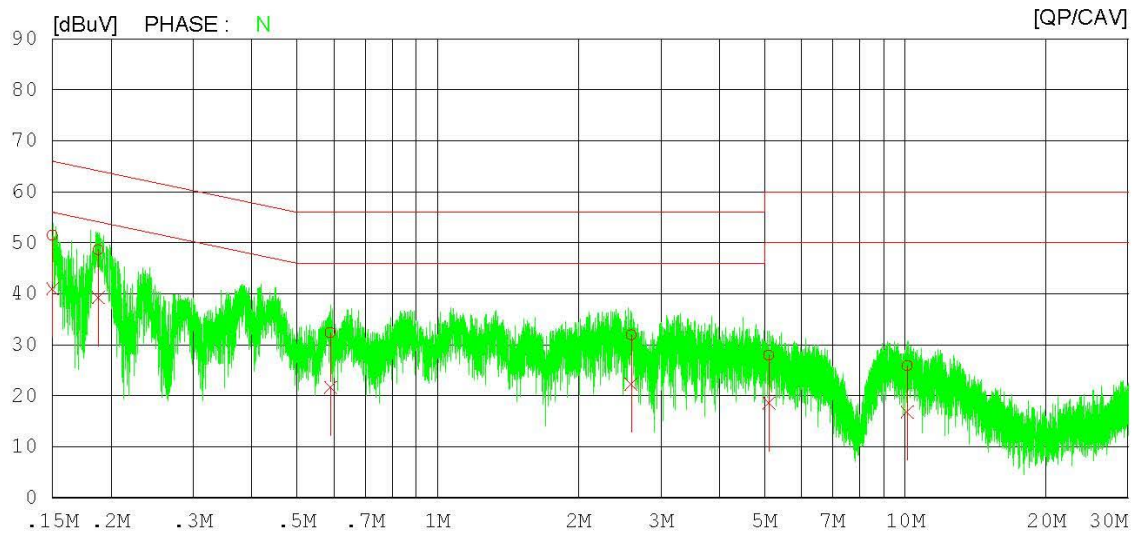
Model PM70
Function U-NII 2A_0
Mode 802.11a
Test condition

Temp/Humi.
Power Supply
Operator

23 'C 48 %
AC 120 V 60 Hz
J.W.KIM

Memo

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



AC Line Conducted Emissions (Data List)

Test Mode: U-NII 2A & 802.11n(HT20) & 5320 MHz

Results of Conducted Emission

DT&C

Date 2017-06-23

Model PM70
Function U-NII 2A_0
Mode 802.11a
Test condition

Temp/Humi. 23 'C 48 %
Power Supply AC 120 V 60 Hz
Operator J.W.KIM

Memo

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

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP	CAV		QP	CAV	QP	CAV	QP	CAV	
		[dBuV]	[dBuV]		[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.15000	51.25	40.80	0.22	51.47	41.02	66.00	56.00	14.53	14.98	N
2	0.18809	48.40	39.04	0.20	48.60	39.24	64.12	54.12	15.52	14.88	N
3	0.58990	32.14	21.48	0.22	32.36	21.70	56.00	46.00	23.64	24.30	N
4	2.59160	31.59	21.97	0.34	31.93	22.31	56.00	46.00	24.07	23.69	N
5	5.11080	27.47	18.18	0.44	27.91	18.62	60.00	50.00	32.09	31.38	N
6	10.09160	25.19	16.11	0.72	25.91	16.83	60.00	50.00	34.09	33.17	N
7	0.15563	50.18	31.43	0.18	50.36	31.61	65.69	55.69	15.33	24.08	L1
8	0.18253	47.66	28.20	0.18	47.84	28.38	64.37	54.37	16.53	25.99	L1
9	0.58722	27.50	18.33	0.21	27.71	18.54	56.00	46.00	28.29	27.46	L1
10	2.48000	25.18	15.73	0.32	25.50	16.05	56.00	46.00	30.50	29.95	L1
11	5.37760	21.45	12.67	0.47	21.92	13.14	60.00	50.00	38.08	36.86	L1
12	9.78560	20.52	13.64	0.80	21.32	14.44	60.00	50.00	38.68	35.56	L1

AC Line Conducted Emissions (Graph)

Test Mode: U-NII 2C & 802.11n(HT20) & 5700 MHz

Results of Conducted Emission

DT&C

Date 2017-06-23

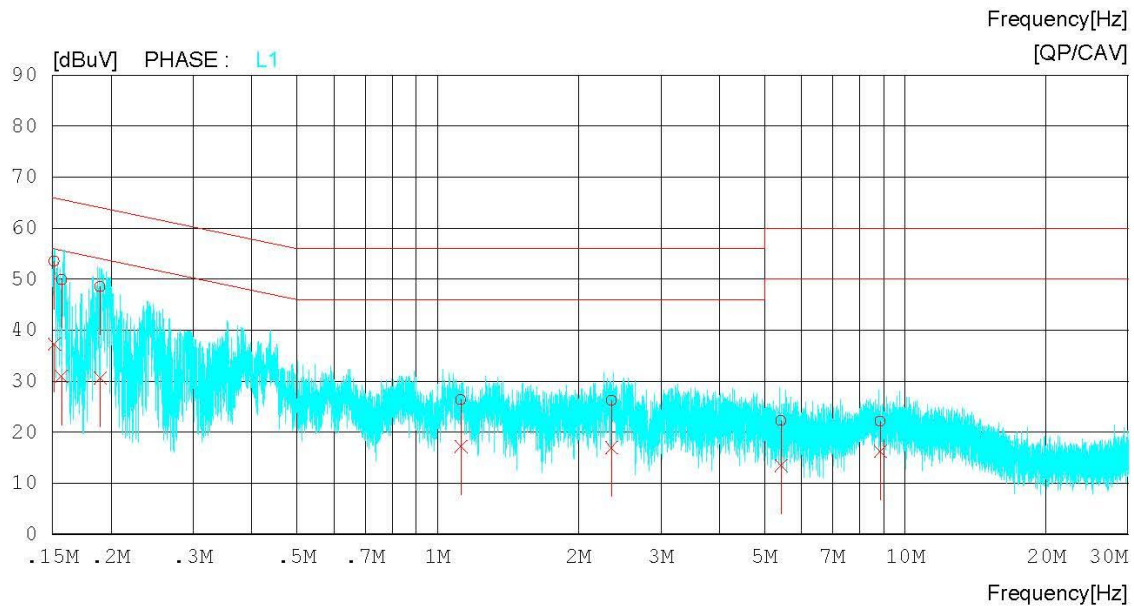
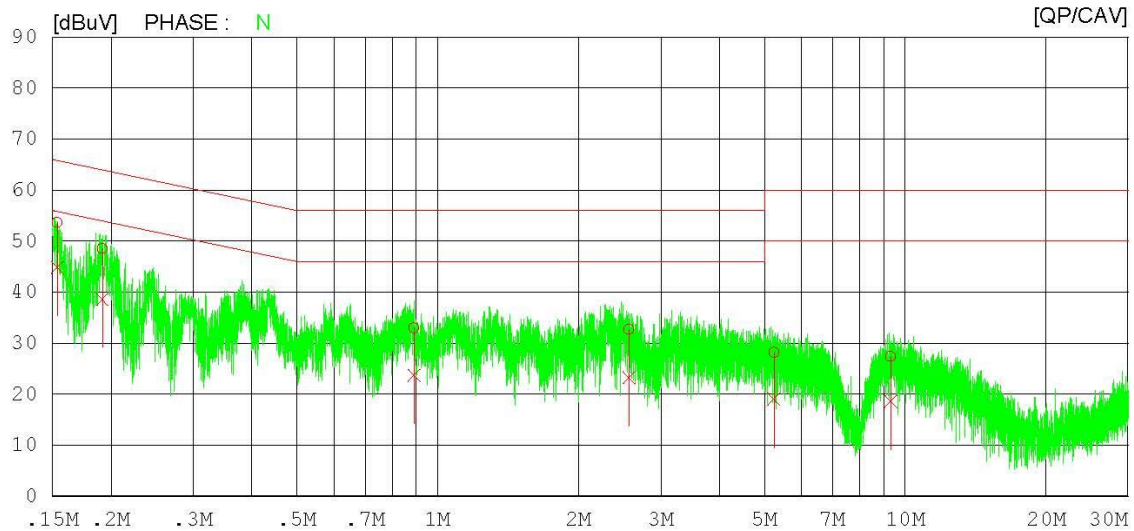
Model PM70
Function U-NII 2C_0
Mode 802.11a
Test condition

Temp/Humi.
Power Supply
Operator

23 'C 48 %
AC 120 V 60 Hz
J.W.KIM

Memo

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



AC Line Conducted Emissions (Data List)

Test Mode: U-NII 2C & 802.11n(HT20) & 5700 MHz

Results of Conducted Emission

DT&C

Date 2017-06-23

Model PM70
Function U-NII 2C_0
Mode 802.11a
Test condition

Temp/Humi. 23 'C 48 %
Power Supply AC 120 V 60 Hz
Operator J.W.KIM

Memo

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

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP	CAV		QP	CAV	QP	CAV	QP	CAV	
		[dBuV]	[dBuV]		[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.15356	53.45	44.64	0.22	53.67	44.86	65.81	55.81	12.14	10.95	N
2	0.19181	48.28	38.43	0.20	48.48	38.63	63.96	53.96	15.48	15.33	N
3	0.88978	32.77	23.41	0.24	33.01	23.65	56.00	46.00	22.99	22.35	N
4	2.56440	32.41	22.88	0.34	32.75	23.22	56.00	46.00	23.25	22.78	N
5	5.23560	27.72	18.58	0.45	28.17	19.03	60.00	50.00	31.83	30.97	N
6	9.31360	26.71	17.87	0.67	27.38	18.54	60.00	50.00	32.62	31.46	N
7	0.15142	53.30	37.04	0.18	53.48	37.22	65.92	55.92	12.44	18.70	L1
8	0.15685	49.70	30.70	0.18	49.88	30.88	65.63	55.63	15.75	24.75	L1
9	0.18959	48.34	30.37	0.17	48.51	30.54	64.05	54.05	15.54	23.51	L1
10	1.12160	26.01	16.94	0.25	26.26	17.19	56.00	46.00	29.74	28.81	L1
11	2.35440	25.92	16.65	0.30	26.22	16.95	56.00	46.00	29.78	29.05	L1
12	5.42740	21.73	12.97	0.47	22.20	13.44	60.00	50.00	37.80	36.56	L1
13	8.84080	21.45	15.51	0.73	22.18	16.24	60.00	50.00	37.82	33.76	L1

AC Line Conducted Emissions (Graph)

Test Mode: U-NII 3 & 802.11n(HT20) & 5825 MHz

Results of Conducted Emission

DT&C

Date 2017-06-23

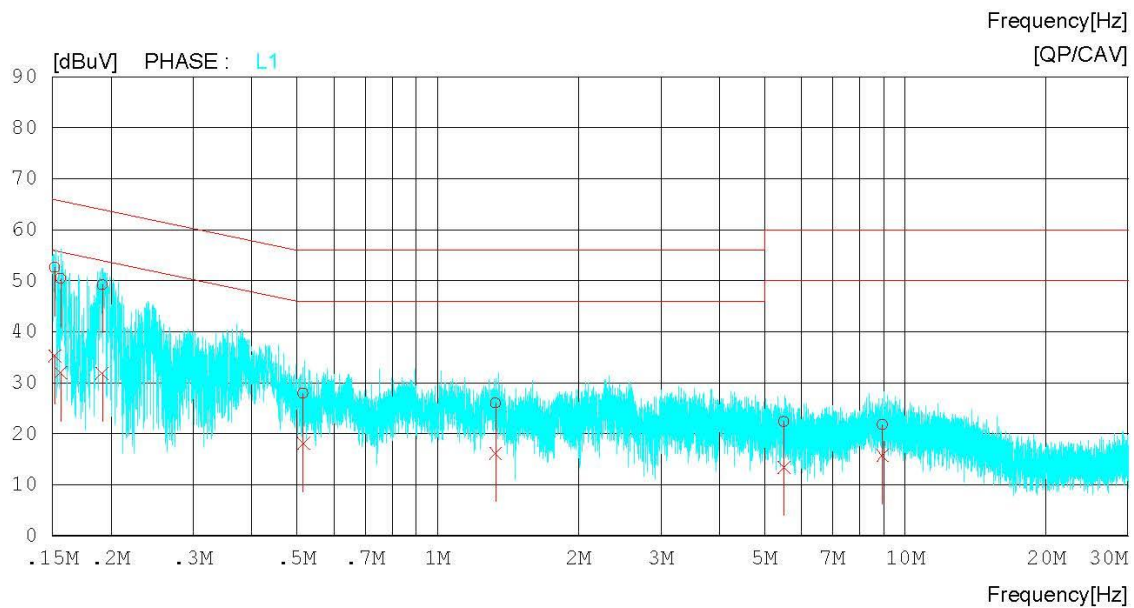
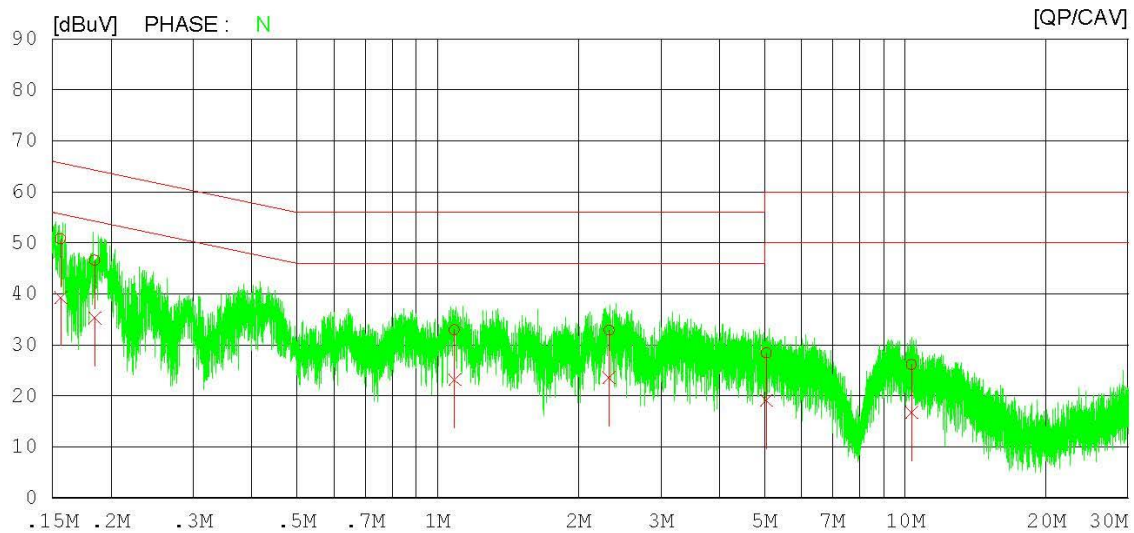
Model PM70
Function U-NII 3_0
Mode 802.11a
Test condition

Temp/Humi.
Power Supply
Operator

23 'C 48 %
AC 120 V 60 Hz
J.W.KIM

Memo

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



AC Line Conducted Emissions (Data List)

Test Mode: U-NII 3 & 802.11n(HT20) & 5825 MHz

Results of Conducted Emission

DT&C

Date 2017-06-23

Model PM70
Function U-NII 3_0
Mode 802.11a
Test condition

Temp/Humi. 23 'C 48 %
Power Supply AC 120 V 60 Hz
Operator J.W.KIM

Memo

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

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP	CAV		QP	CAV	QP	CAV	QP	CAV	
		[dBuV]	[dBuV]		[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.15626	50.63	39.08	0.22	50.85	39.30	65.66	55.66	14.81	16.36	N
2	0.18486	46.38	35.13	0.21	46.59	35.34	64.26	54.26	17.67	18.92	N
3	1.08660	32.68	22.92	0.26	32.94	23.18	56.00	46.00	23.06	22.82	N
4	2.32500	32.54	23.27	0.32	32.86	23.59	56.00	46.00	23.14	22.41	N
5	5.04760	27.98	18.65	0.44	28.42	19.09	60.00	50.00	31.58	30.91	N
6	10.31880	25.41	15.99	0.73	26.14	16.72	60.00	50.00	33.86	33.28	N
7	0.15182	52.35	35.03	0.18	52.53	35.21	65.90	55.90	13.37	20.69	L1
8	0.15618	50.19	31.76	0.18	50.37	31.94	65.66	55.66	15.29	23.72	L1
9	0.19165	49.01	31.72	0.17	49.18	31.89	63.96	53.96	14.78	22.07	L1
10	0.51556	27.70	17.85	0.20	27.90	18.05	56.00	46.00	28.10	27.95	L1
11	1.33000	25.67	15.92	0.26	25.93	16.18	56.00	46.00	30.07	29.82	L1
12	5.50600	21.80	12.93	0.49	22.29	13.42	60.00	50.00	37.71	36.58	L1
13	8.93860	21.07	14.95	0.74	21.81	15.69	60.00	50.00	38.19	34.31	L1

7.8 Occupied Bandwidth

■ Test Requirements, RSS-Gen[6.6]

When the occupied bandwidth limit is not stated in the applicable RSS or reference measurement method, the transmitted signal bandwidth shall be reported as the 99% emission bandwidth, as calculated or measured.

■ Test Configuration

Refer to the APPENDIX I.

■ Test Procedure

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

■ Test Result : **Comply**

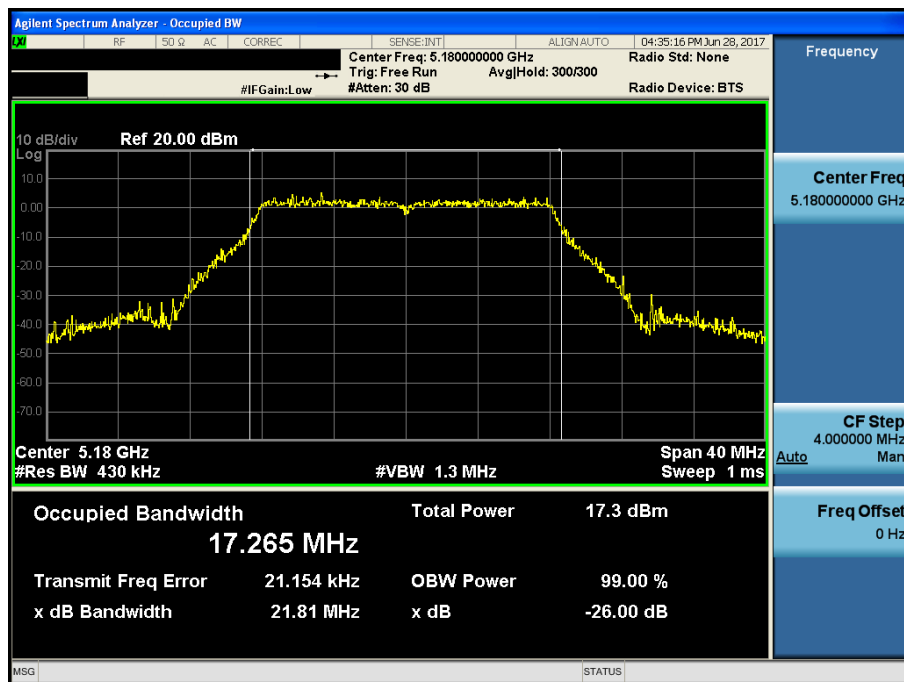
Multiple transmit

Mode	Bands	Channel	Frequency [MHz]	Test Result [MHz]
802.11a	U-NII 1	36	5180	17.265
		40	5200	17.331
		48	5240	17.345
	U-NII 2A	52	5260	17.332
		60	5300	17.276
		64	5320	17.292
	U-NII 2C	100	5500	17.292
		116	5580	17.346
		140	5700	17.346
	U-NII 3	149	5745	17.273
		157	5785	17.266
		165	5825	17.280
802.11n HT20	U-NII 1	36	5180	18.195
		40	5200	18.276
		48	5240	18.269
	U-NII 2A	52	5260	18.234
		60	5300	18.198
		64	5320	18.214
	U-NII 2C	100	5500	18.203
		116	5580	18.222
		140	5700	18.269
	U-NII 3	149	5745	18.205
		157	5785	18.166
		165	5825	18.272
802.11n HT40	U-NII 1	38	5190	36.289
		46	5230	36.320
	U-NII 2A	54	5270	36.321
		62	5310	36.220
	U-NII 2C	102	5510	36.274
		110	5550	36.393
		134	5670	36.181
	U-NII 3	151	5755	36.333
		159	5795	36.348

RESULT PLOTS

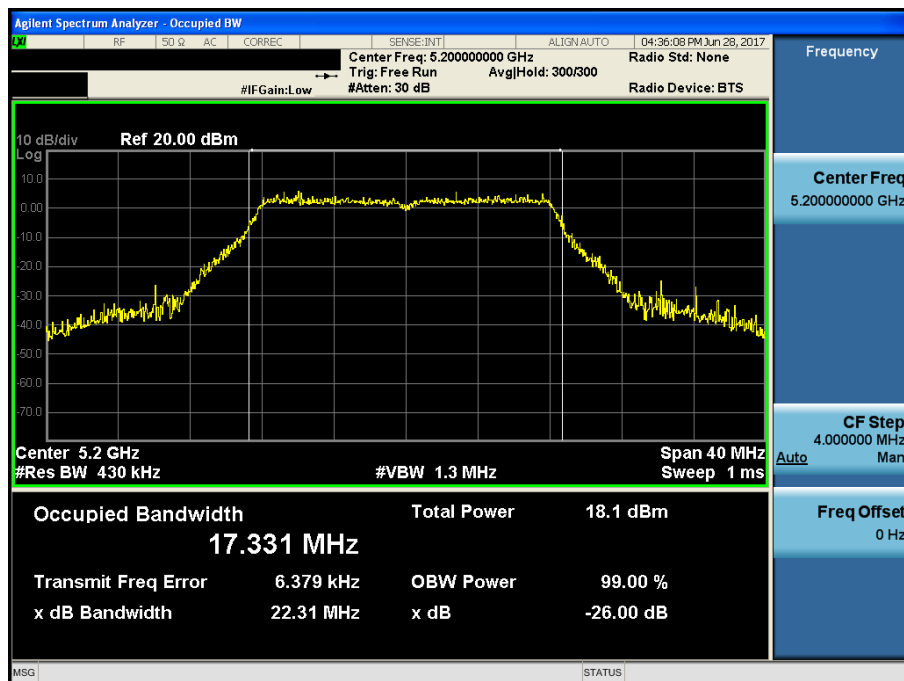
Occupied Bandwidth 99%

Test Mode: 802.11a & Ch.36



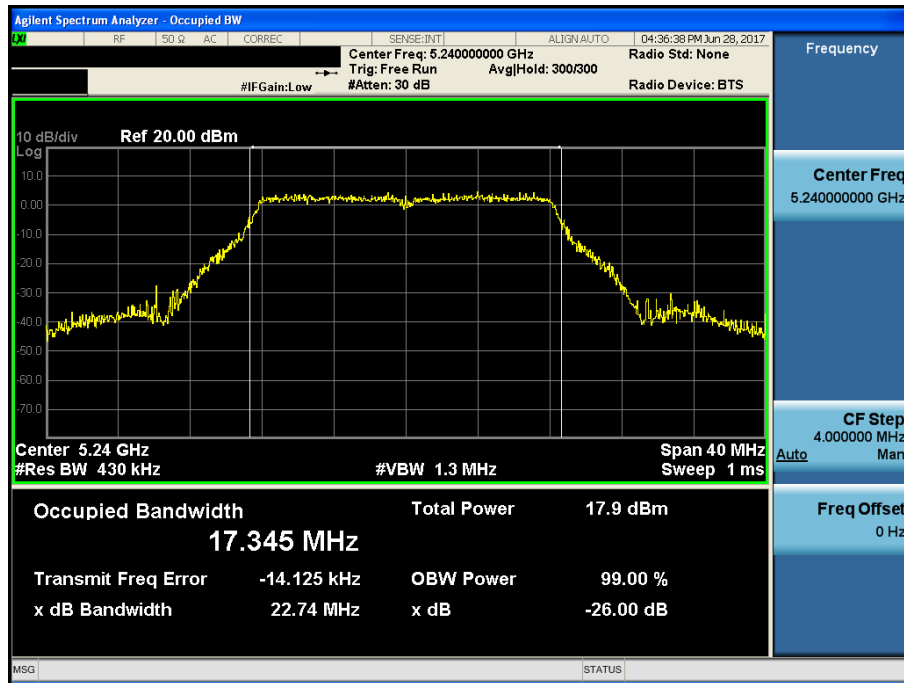
Occupied Bandwidth 99%

Test Mode: 802.11a & Ch.40



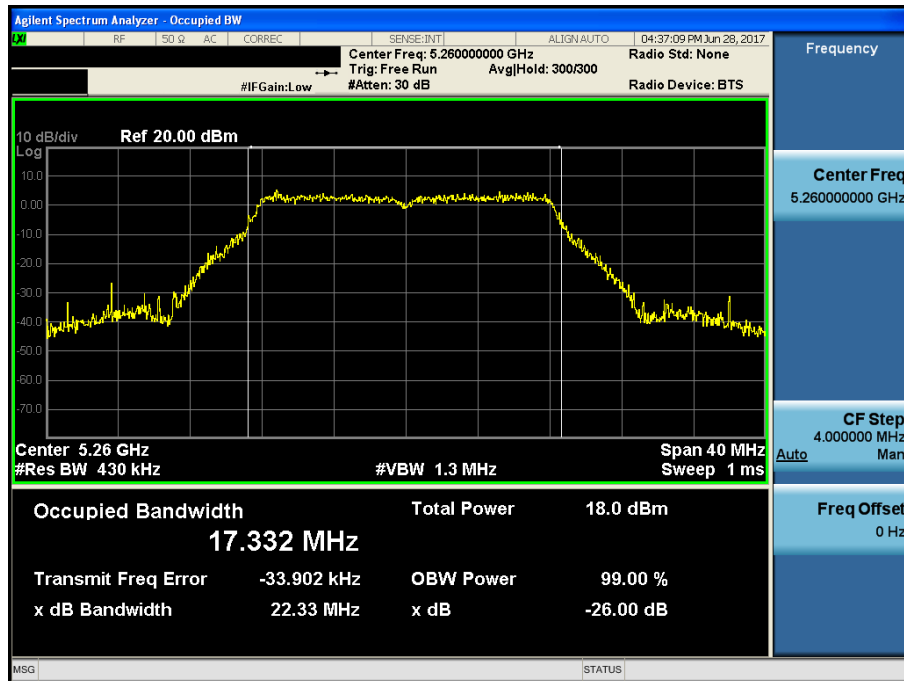
Occupied Bandwidth 99%

Test Mode: 802.11a & Ch.48



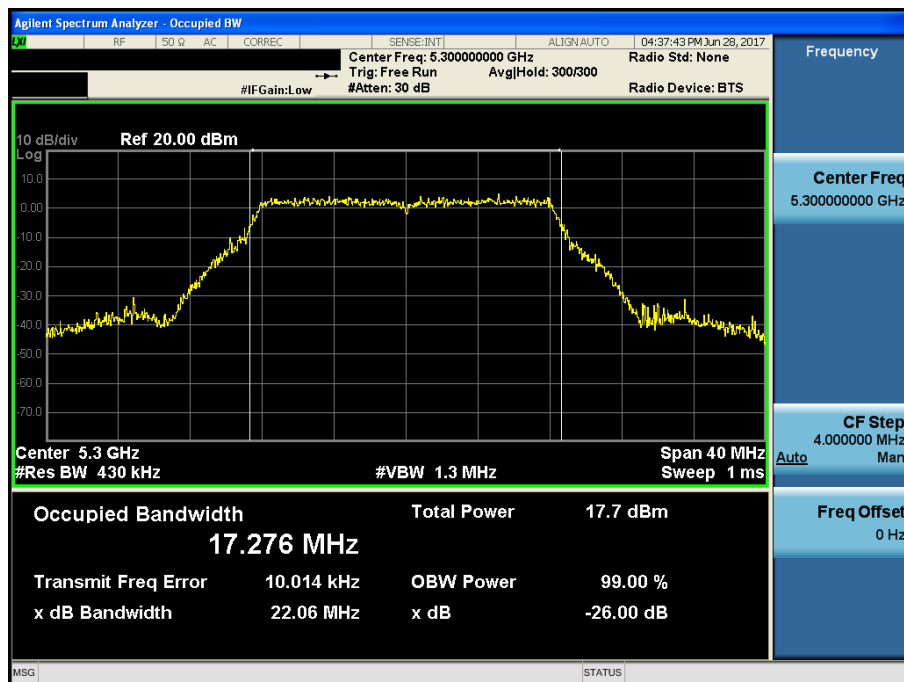
Occupied Bandwidth 99%

Test Mode: 802.11a & Ch.52



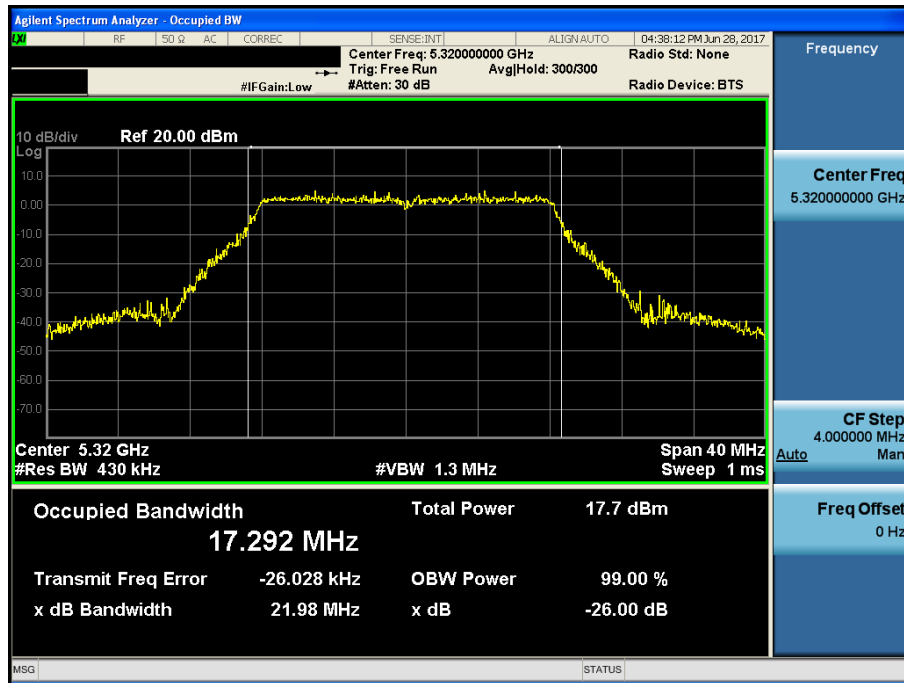
Occupied Bandwidth 99%

Test Mode: 802.11a & Ch.60



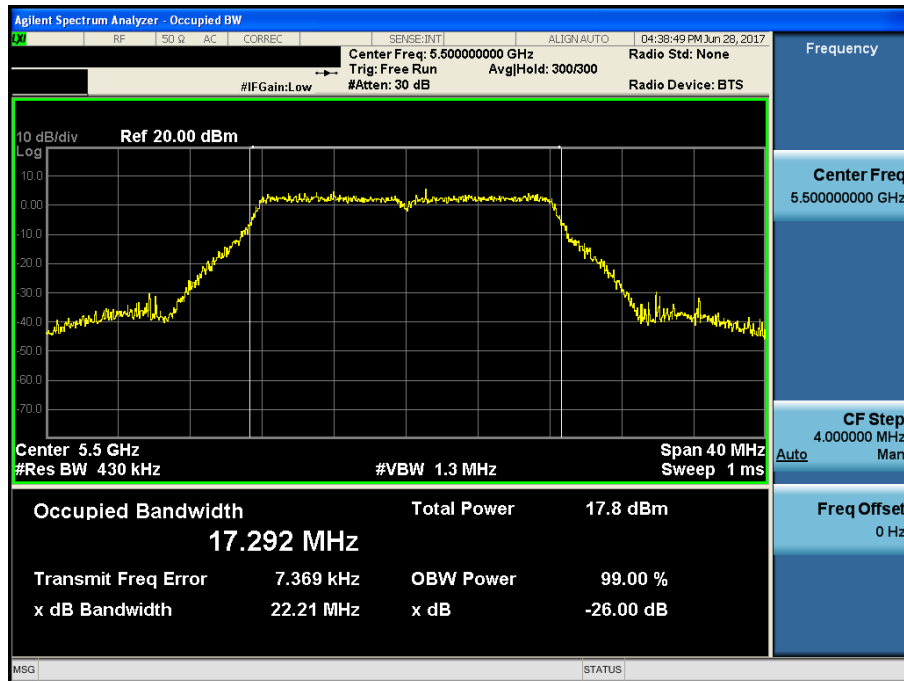
Occupied Bandwidth 99%

Test Mode: 802.11a & Ch.64



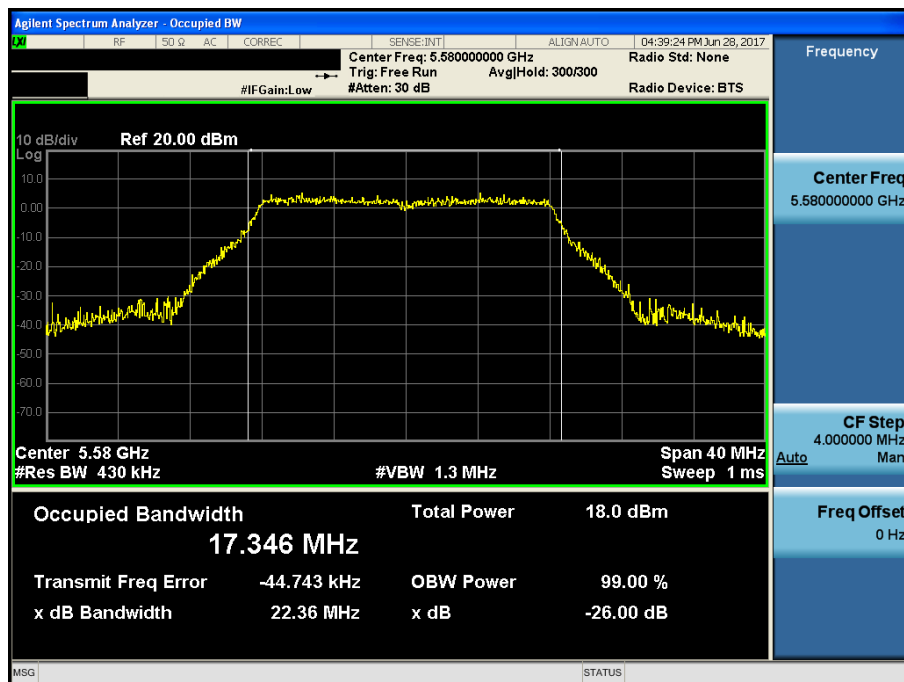
Occupied Bandwidth 99%

Test Mode: 802.11a & Ch.100



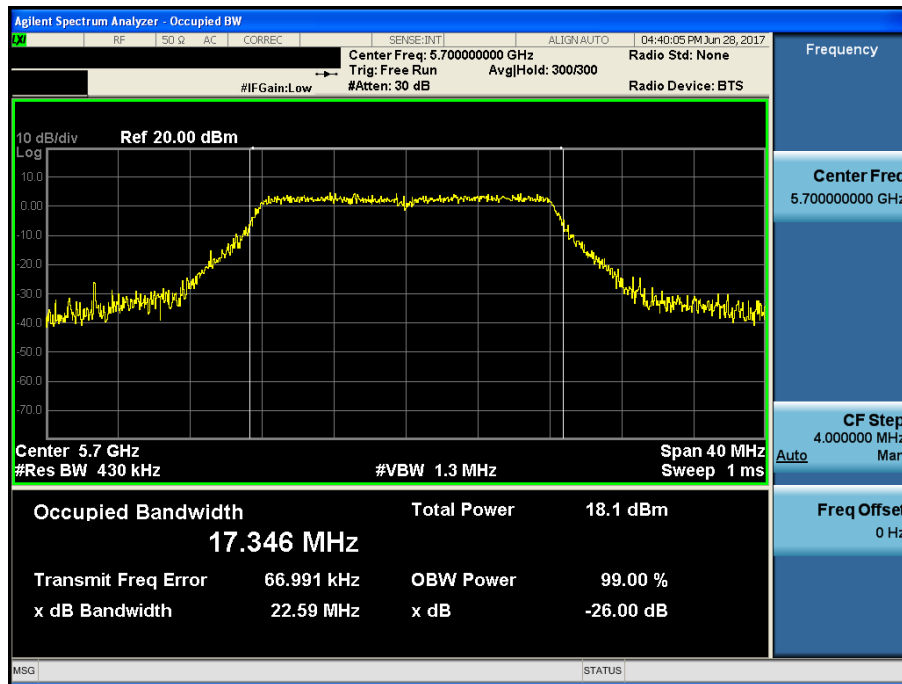
Occupied Bandwidth 99%

Test Mode: 802.11a & Ch.116



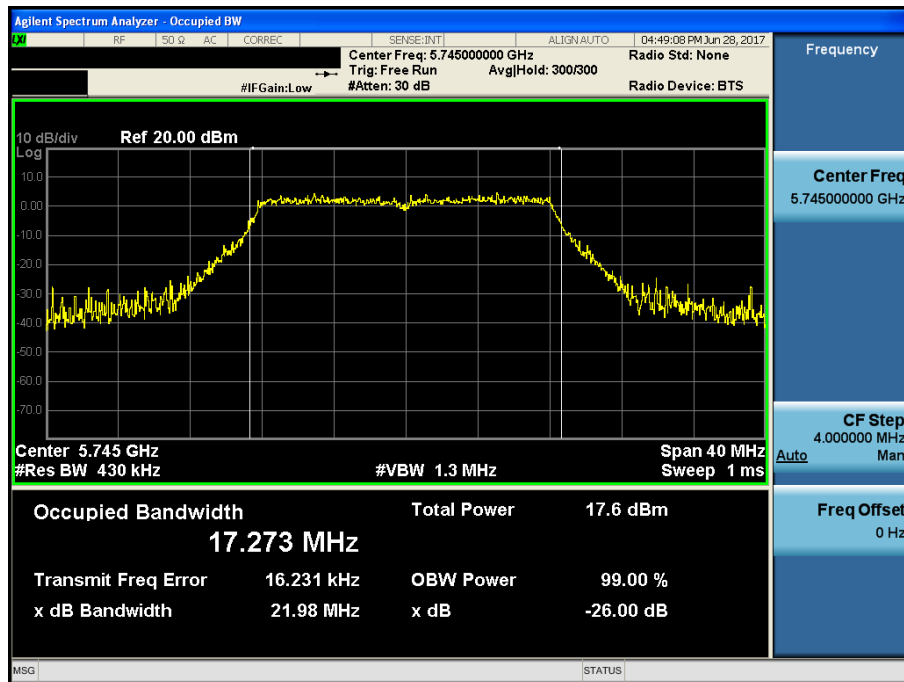
Occupied Bandwidth 99%

Test Mode: 802.11a & Ch.140



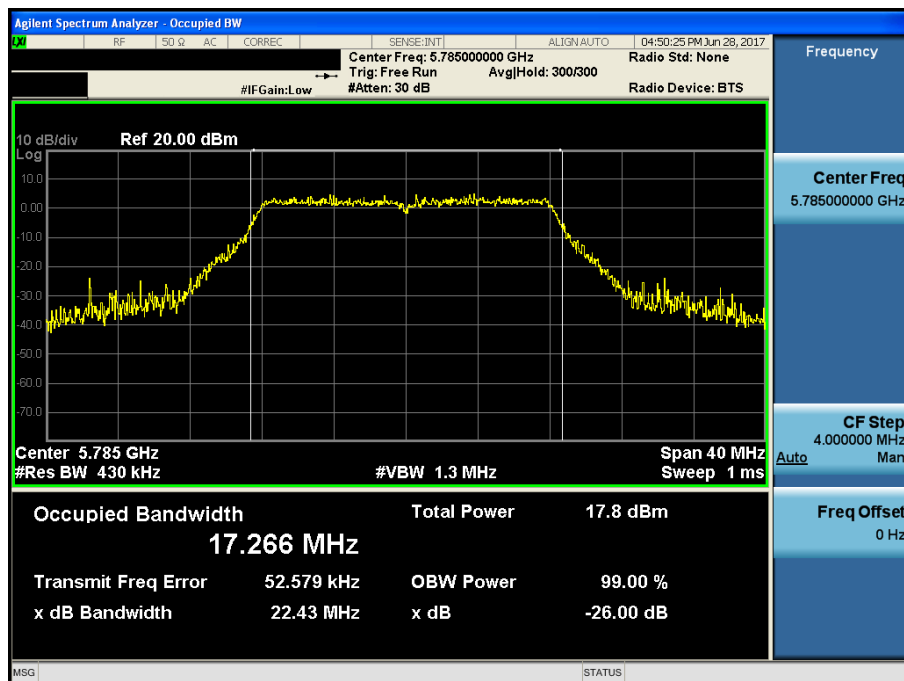
Occupied Bandwidth 99%

Test Mode: 802.11a & Ch.149



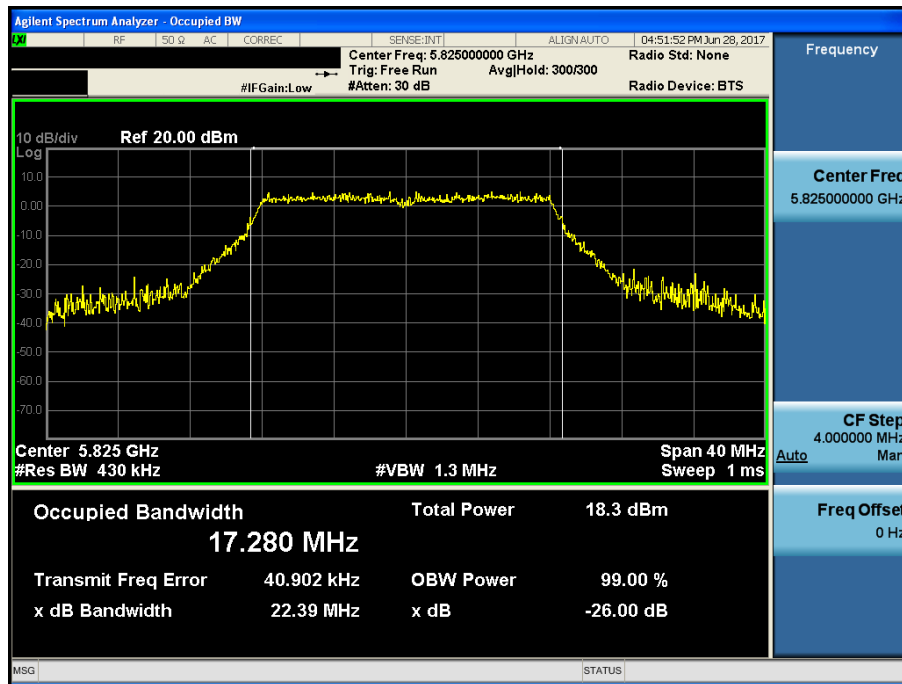
Occupied Bandwidth 99%

Test Mode: 802.11a & Ch.157



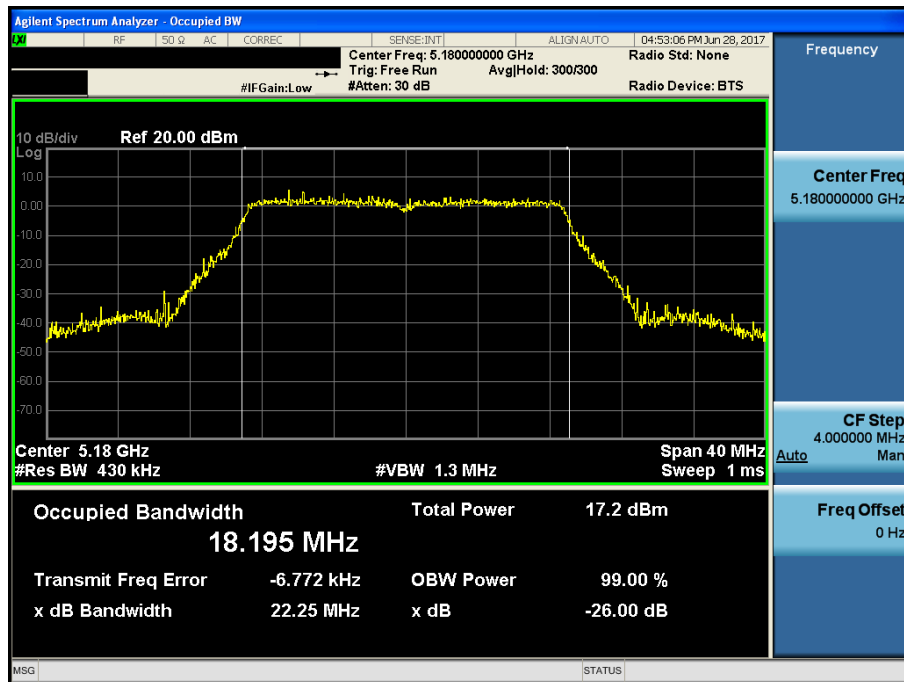
Occupied Bandwidth 99%

Test Mode: 802.11a & Ch.165



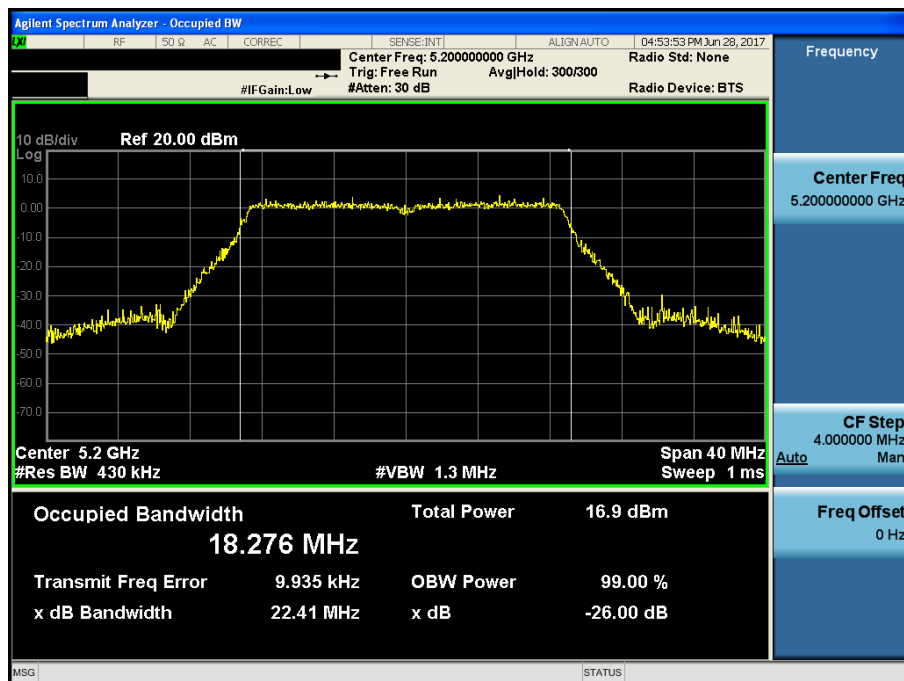
Occupied Bandwidth 99%

Test Mode: 802.11n(HT20) & Ch.36



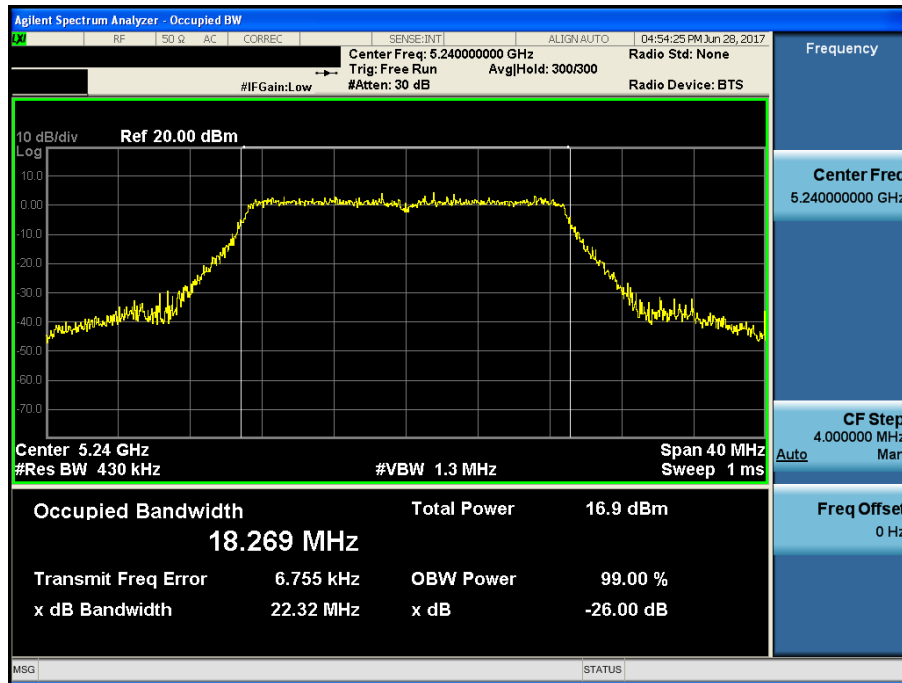
Occupied Bandwidth 99%

Test Mode: 802.11n(HT20) & Ch.40



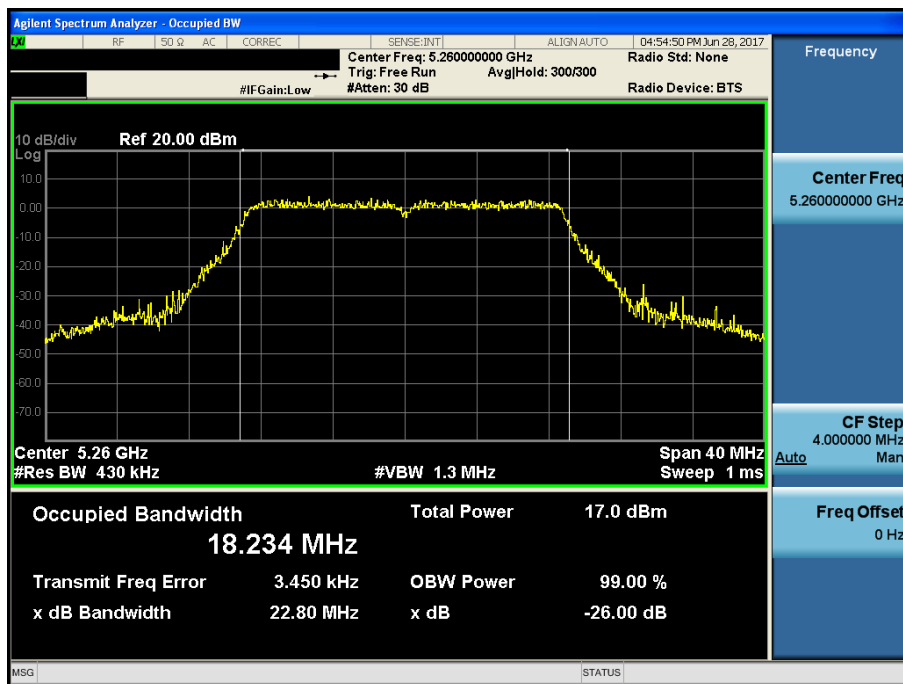
Occupied Bandwidth 99%

Test Mode: 802.11n(HT20) & Ch.48



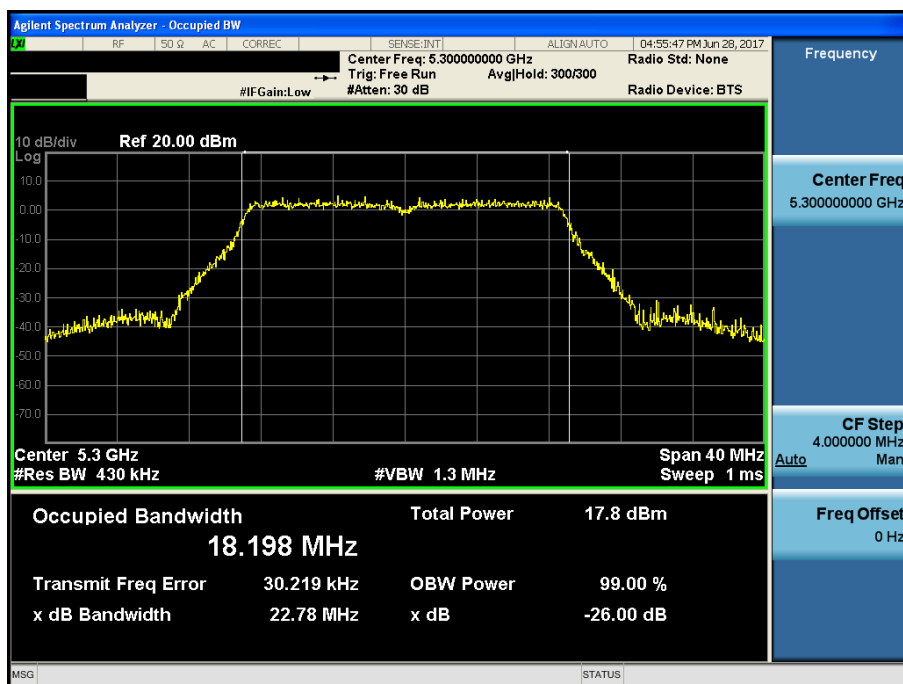
Occupied Bandwidth 99%

Test Mode: 802.11n(HT20) & Ch.52



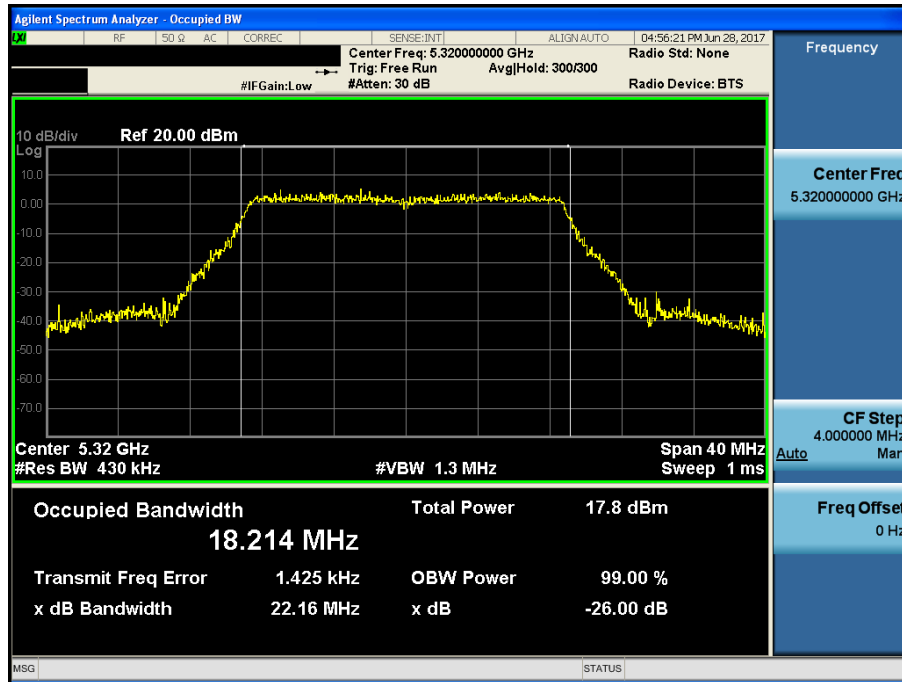
Occupied Bandwidth 99%

Test Mode: 802.11n HT20 & Ch.60



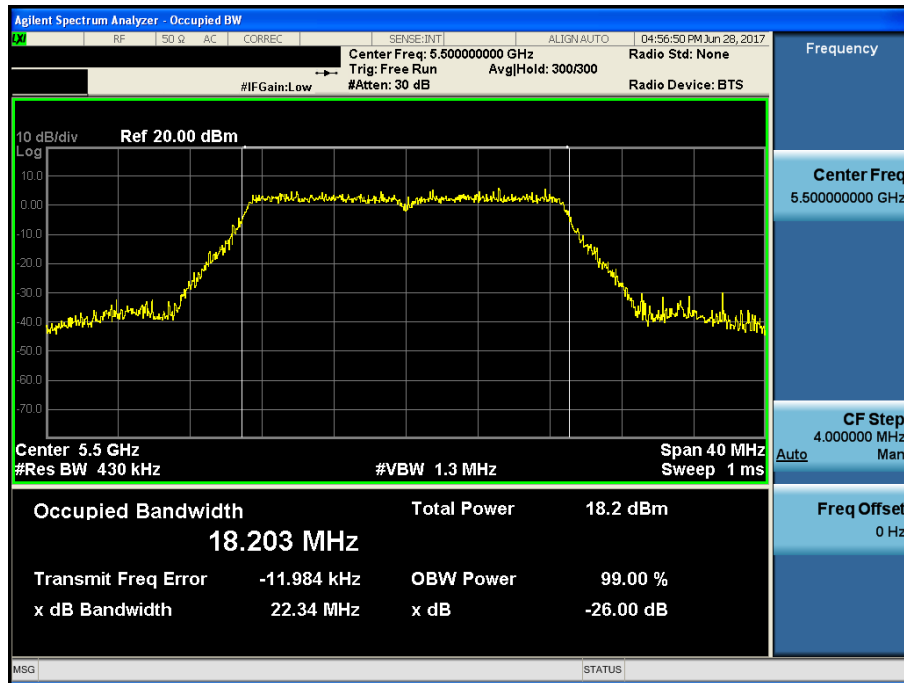
Occupied Bandwidth 99%

Test Mode: 802.11n(HT20) & Ch.64



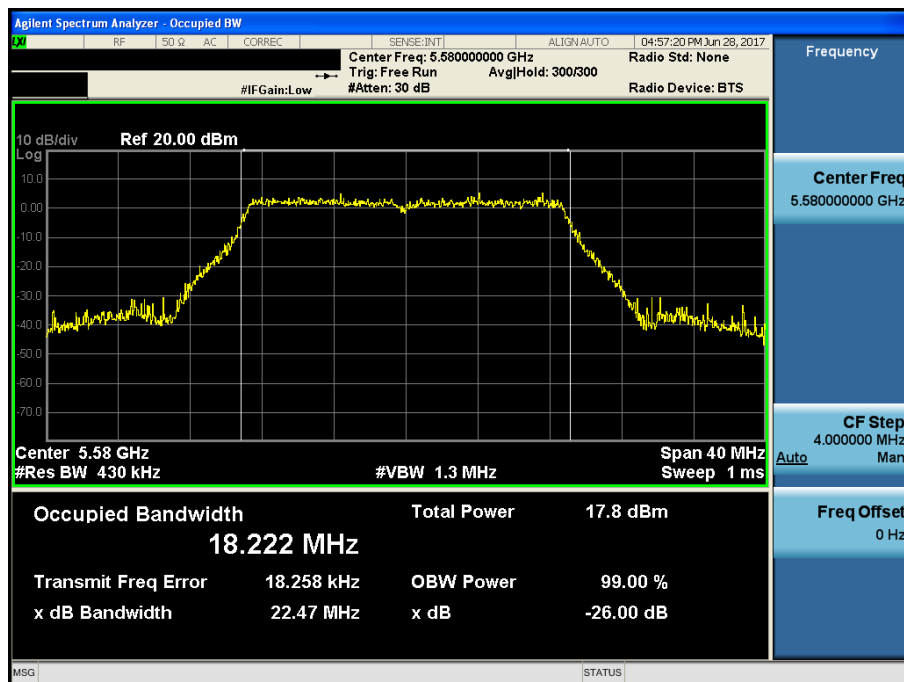
Occupied Bandwidth 99%

Test Mode: 802.11n(HT20) & Ch.100



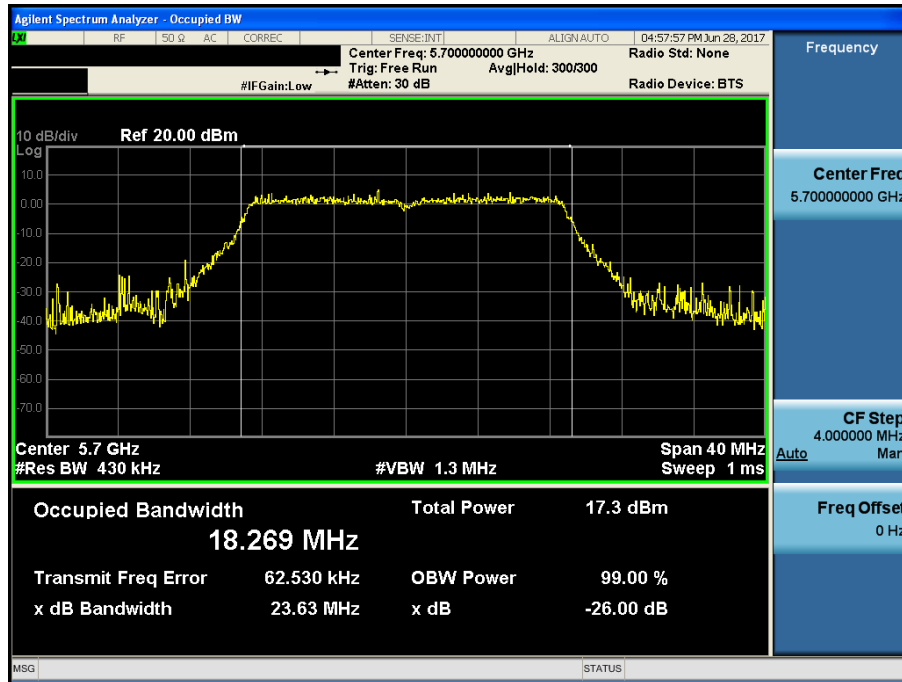
Occupied Bandwidth 99%

Test Mode: 802.11n(HT20) & Ch.116



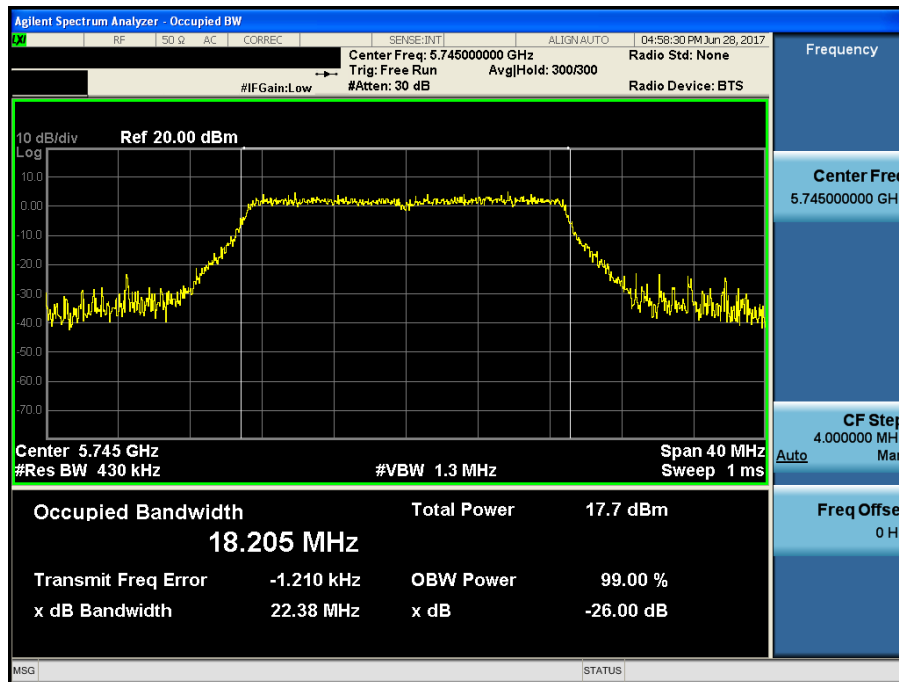
Occupied Bandwidth 99%

Test Mode: 802.11n(HT20) & Ch.140



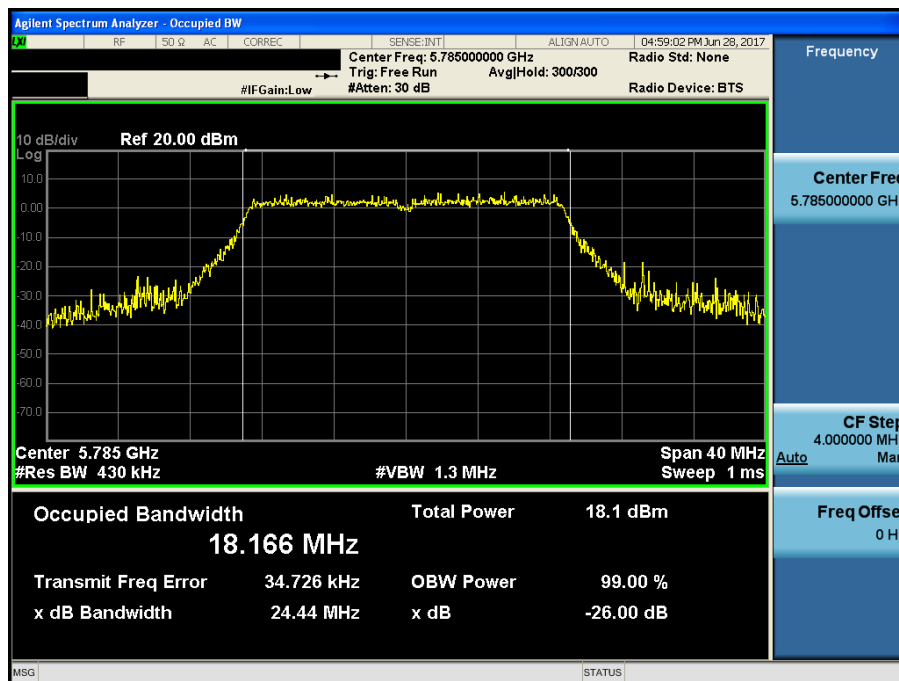
Occupied Bandwidth 99%

Test Mode: 802.11n(HT20) & Ch.149



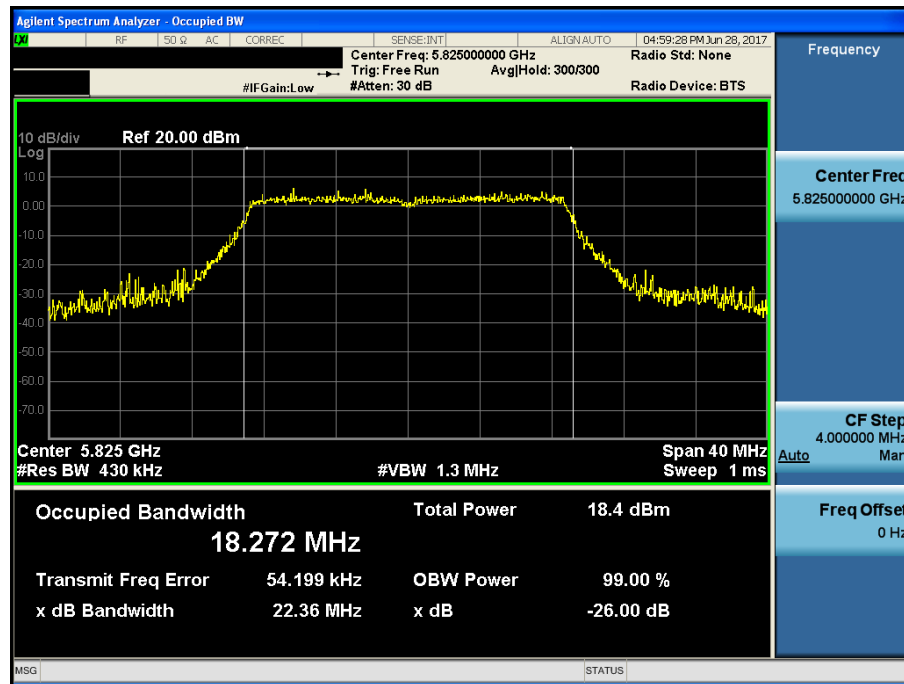
Occupied Bandwidth 99%

Test Mode: 802.11n(HT20) & Ch.157



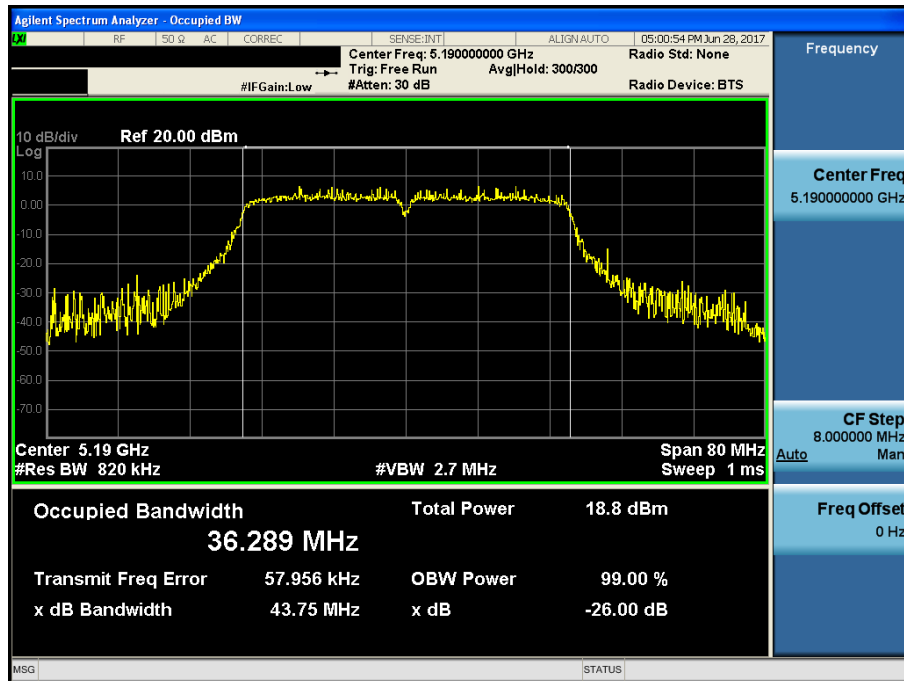
Occupied Bandwidth 99%

Test Mode: 802.11n(HT20) & Ch.165



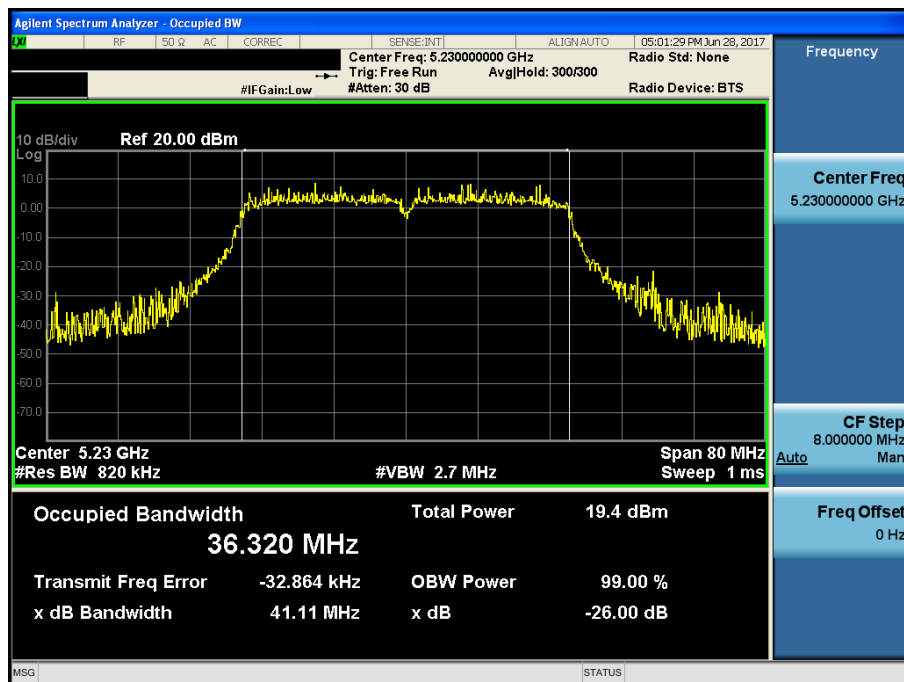
Occupied Bandwidth 99%

Test Mode: 802.11n(HT40) & Ch.38



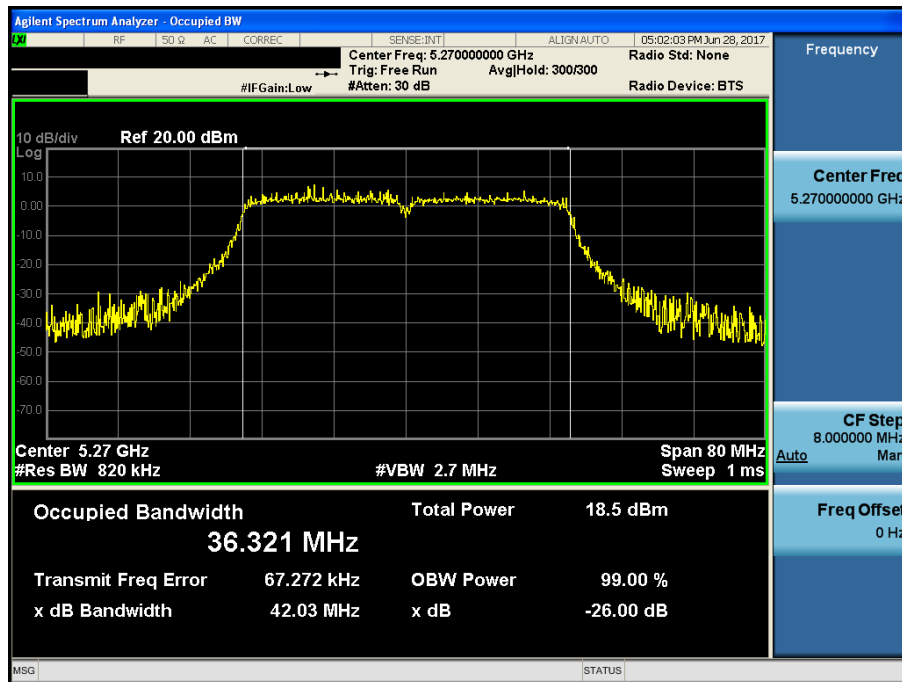
Occupied Bandwidth 99%

Test Mode: 802.11n(HT40) & Ch.46



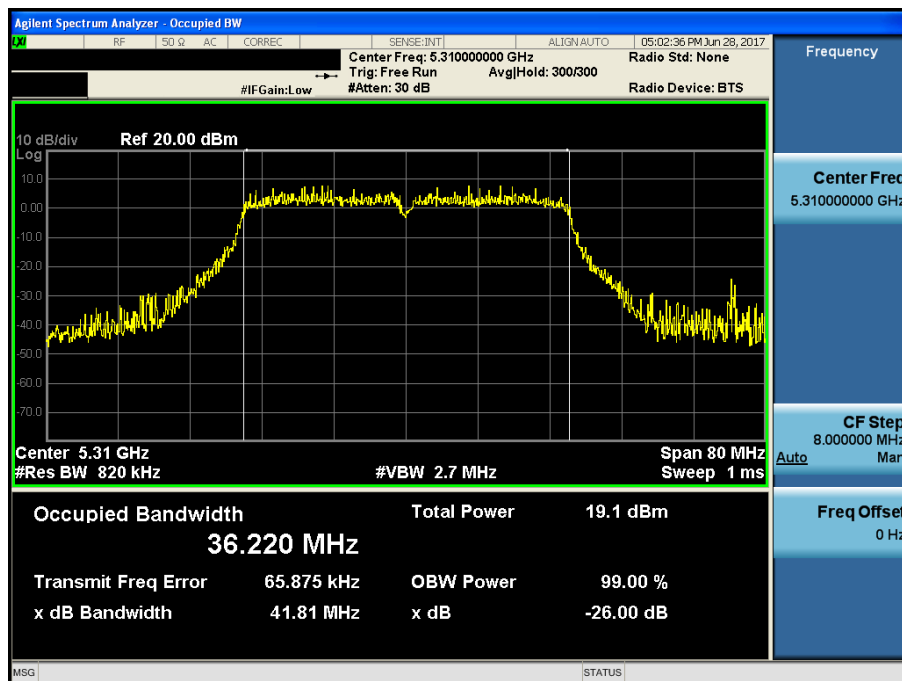
Occupied Bandwidth 99%

Test Mode: 802.11n(HT40) & Ch.54



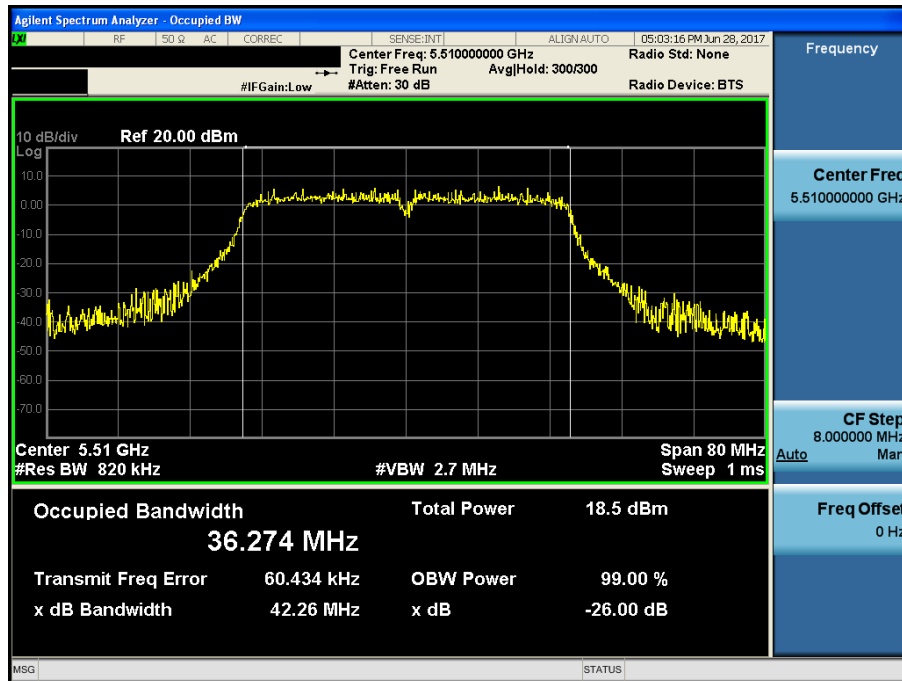
Occupied Bandwidth 99%

Test Mode: 802.11n(HT40) & Ch.62



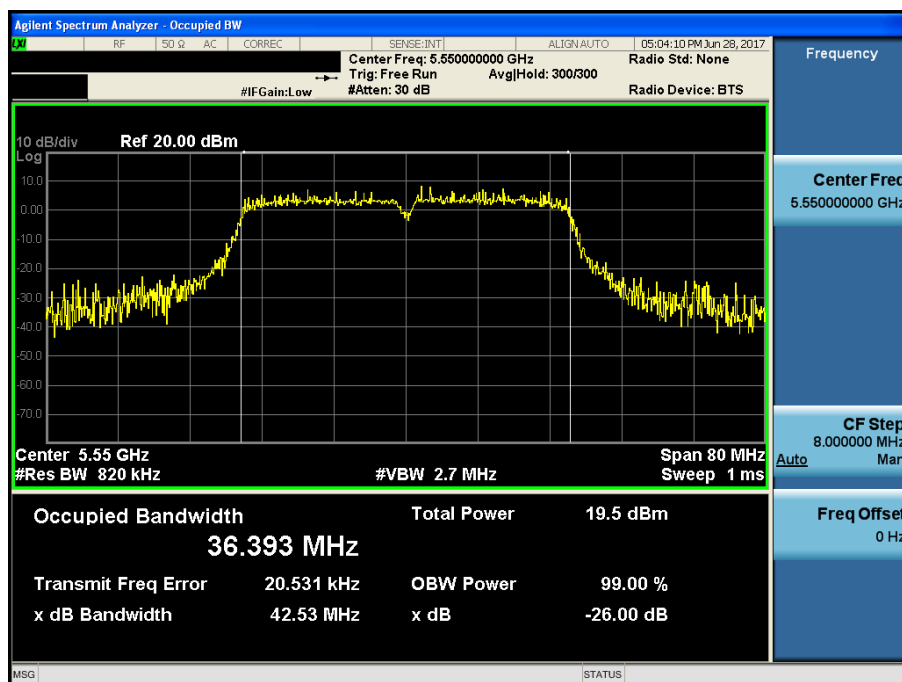
Occupied Bandwidth 99%

Test Mode: 802.11n(HT40) & Ch.102



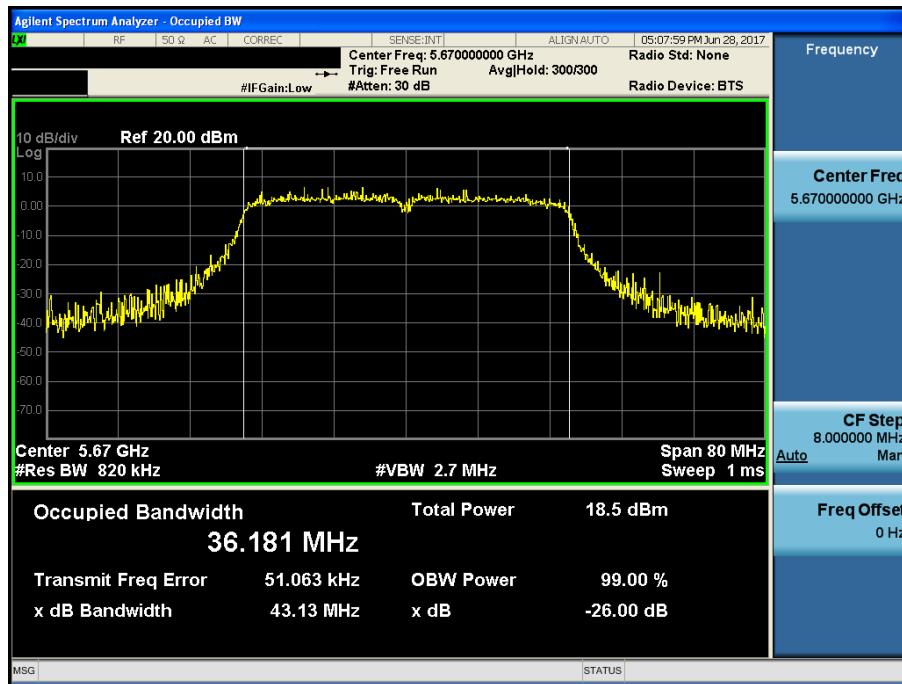
Occupied Bandwidth 99%

Test Mode: 802.11n(HT40) & Ch.110



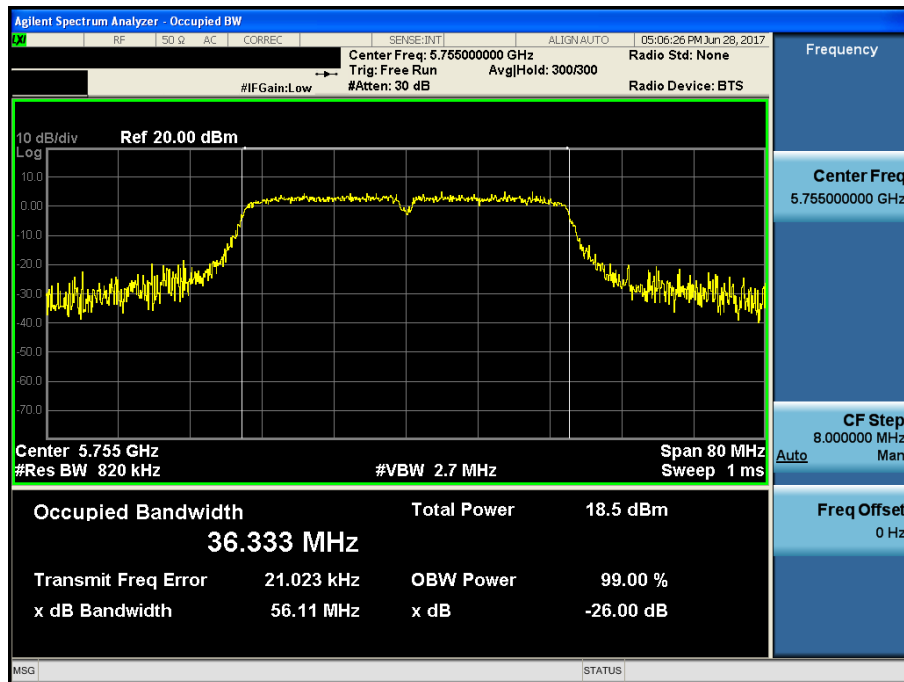
Occupied Bandwidth 99%

Test Mode: 802.11n(HT40) & Ch.134



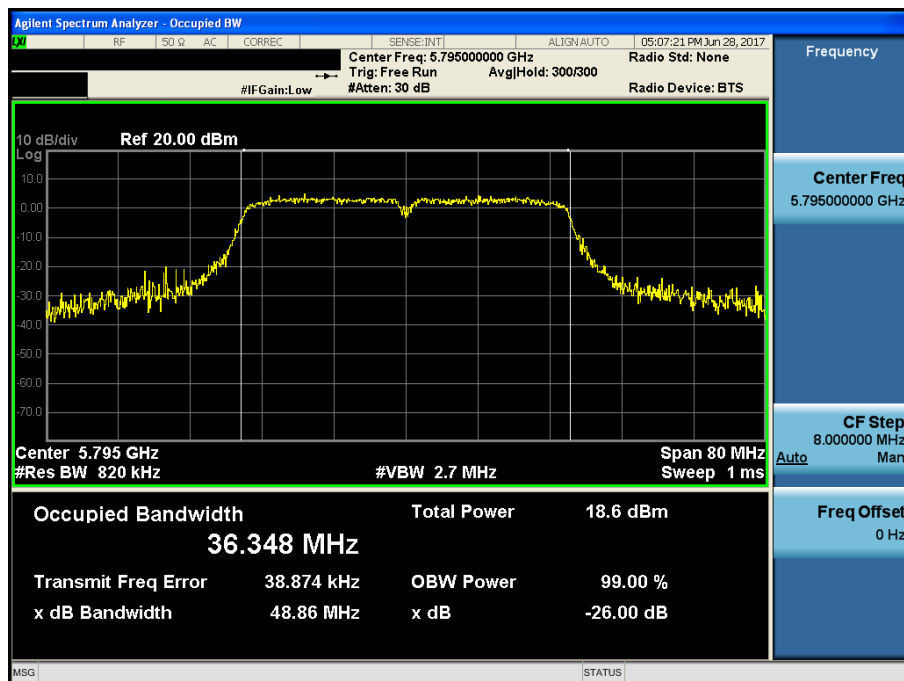
Occupied Bandwidth 99%

Test Mode: 802.11n(HT40) & Ch.151



Occupied Bandwidth 99%

Test Mode: 802.11n(HT40) & Ch.159



8. LIST OF TEST EQUIPMENT

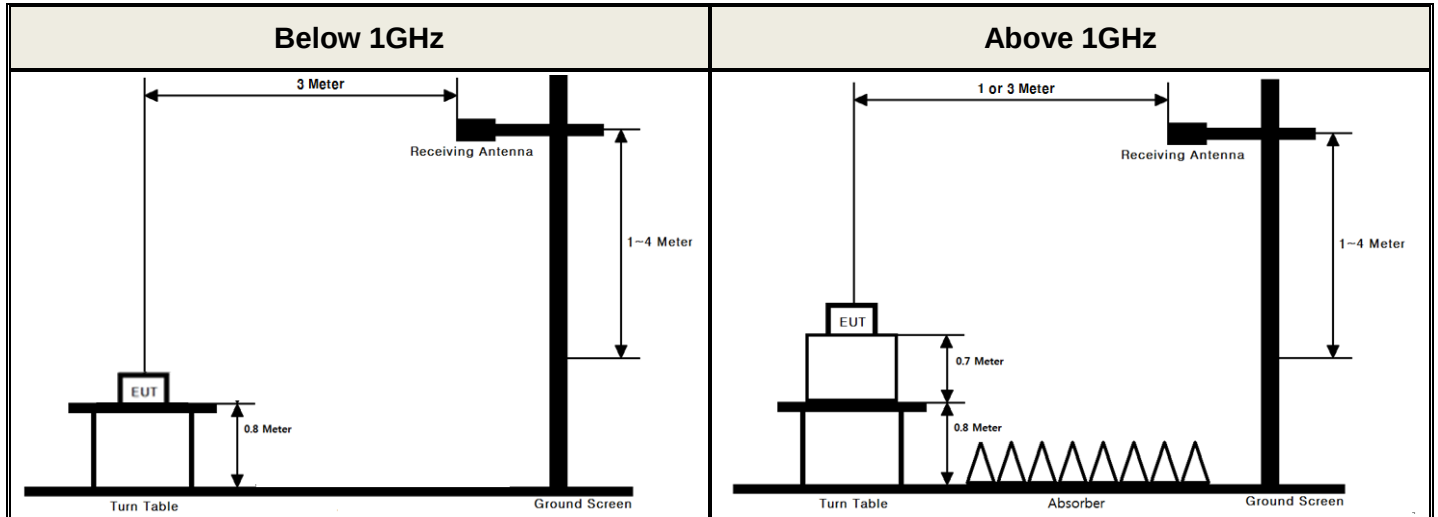
Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
Spectrum Analyzer	Agilent Technologies	N9020A	16/09/09	17/09/09	MY50200834
			17/09/06	18/09/06	
Spectrum Analyzer	Agilent Technologies	N9030A	16/10/18	17/10/18	MY53310140
			17/09/07	18/09/07	
Digital Multimeter	Agilent Technologies	34401A	17/01/04	18/01/04	US36099541
DC Power Supply	Agilent Technologies	66332A	16/09/08	17/09/08	US37473305
			17/09/05	18/09/05	
Signal Generator	Rohde Schwarz	SMBV100A	17/01/04	18/01/04	255571
Signal Generator	Rohde Schwarz	SMF100A	17/04/21	18/04/21	102341
Attenuator(10dB)	Hefei Shunze	SS5T2.92-10-40	17/01/11	18/01/11	16012202
Thermohygrometer	BODYCOM	BJ5478	17/04/11	18/04/11	120612-2
Loop Antenna	Schwarzbeck	FMZB1513	16/04/22	18/04/22	1513-128
BILOG Antenna	SCHWARZBECK	VULB9160	16/11/11	18/11/11	3151
Horn Antenna	ETS-LINDGREN	3117	16/05/03	18/05/03	00140394
Horn Antenna	A.H.Systems Inc.	SAS-574	17/04/25	19/04/25	154
PreAmplifier	Agilent Technologies	8449B	16/10/19	17/10/19	3008A02108
			17/09/05	18/09/05	
PreAmplifier	A.H.Systems Inc.	PAM-1840VH	16/12/04	17/12/04	163
			17/09/17	18/09/17	
Temp & Humi Test Chamber	SJ Science	SJ-TH-S50	17/01/25	18/01/25	SJ-TH-S50-140205
Low Noise Pre Amplifier	tsj	MLA-010K01-B01-27	17/03/06	18/03/06	1844539
EMI TEST RECEIVER	Rohde Schwarz	ESR7	17/02/16	18/02/16	101061
EMI TEST RECEIVER	Rohde Schwarz	ESCI	17/02/18	18/02/18	100364
High pass Filter	Wainwright Instruments	WHNX6-6320-8000-26500-40CC	16/09/13	17/09/13	1
			17/09/05	18/09/05	
Power Meter & Wide Bandwidth Sensor	Anritsu	ML2495A	17/04/11	18/04/11	1306007
Power Meter & Wide Bandwidth Sensor	Anritsu	MA2490A	17/04/11	18/04/11	1249001
ARTIFICIAL MAINS NETWORK	ROHDE&SCHWARZ	ESH2-Z5	16/09/08	17/09/08	828739/006
			17/09/06	18/09/06	
SINGLE-PHASE MASTER	NF	4420	16/09/08	17/09/08	3049354420023
			17/09/01	18/09/01	

Note: The measurement antennas were calibrated in accordance to the requirements of ANSI C63.5-2006.

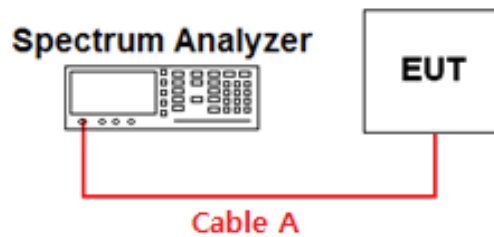
APPENDIX I

Test set up diagrams

▪ Radiated Measurement



▪ Conducted Measurement



APPENDIX II

Duty Cycle Information

■ Test Procedure

Duty Cycle $[X = \text{On Time} / (\text{On} + \text{Off time})]$ is measured using Measurement Procedure of **KDB789033 D02 V01**

1. Set the center frequency of the spectrum analyzer to the center frequency of the transmission.
2. Set RBW $\geq$ 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.

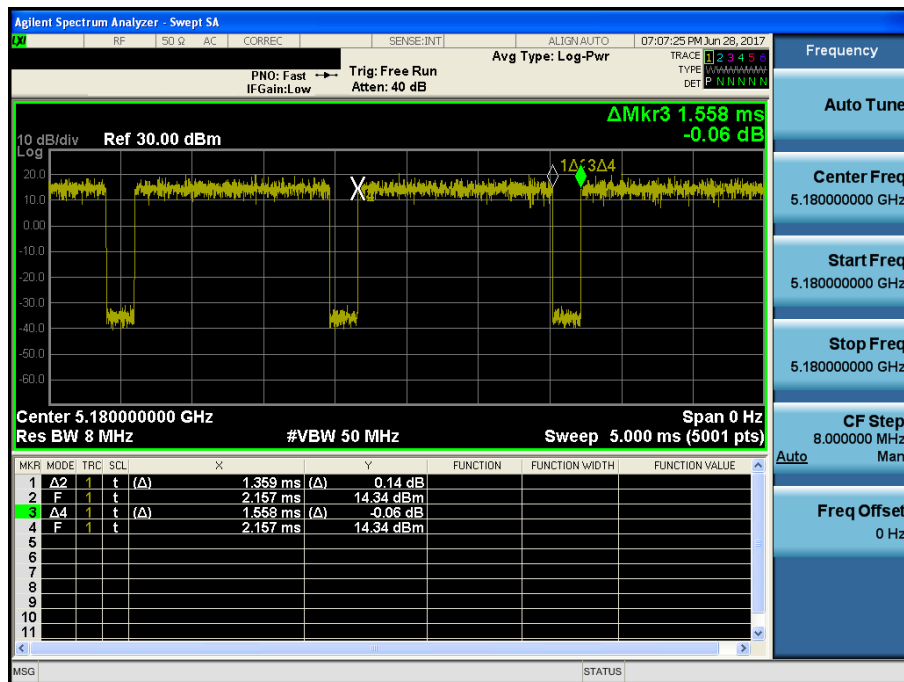
($T = \text{On time}$ of the above table since the EUT operates with above fixed Duty Cycle and it is the minimum On time)

■ Test Results:

Mode	Channel	Tested Frequency [MHz]	Maximum Achievable Duty Cycle (x) = On / (On+Off)			Duty Cycle Correction Factor [dB]	1/T [Hz]
			On Time [ms]	On+OffTime [ms]	x		
802.11a	36	5180	1.359	1.558	0.87	0.61	735.84
802.11n (HT20)	36	5180	1.272	1.470	0.86	0.66	786.17
802.11n (HT40)	38	5190	0.631	0.832	0.75	1.25	1584.29

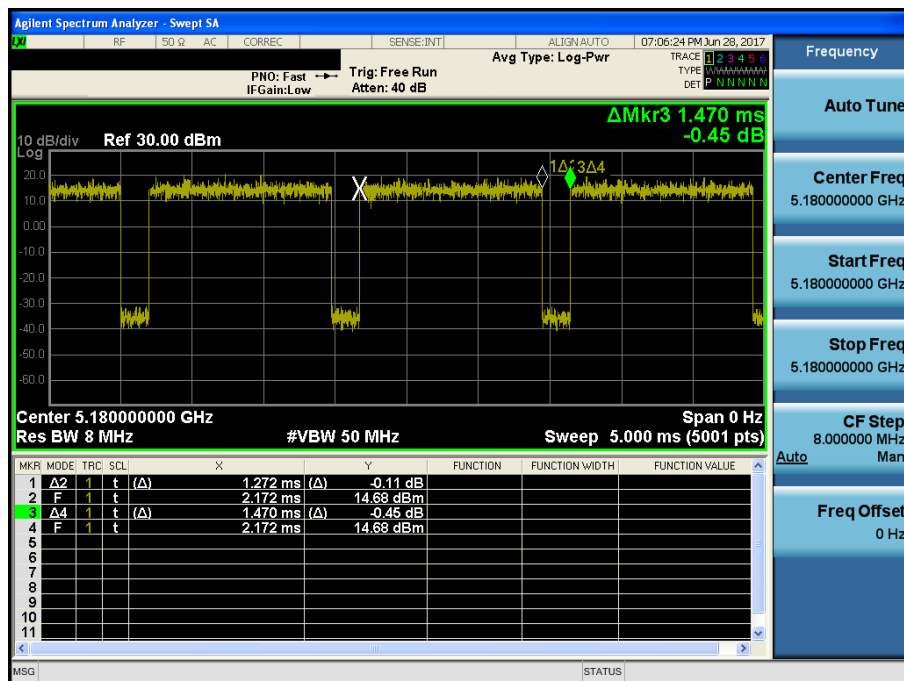
Duty Cycle

Test Mode: 802.11a & Ch.36



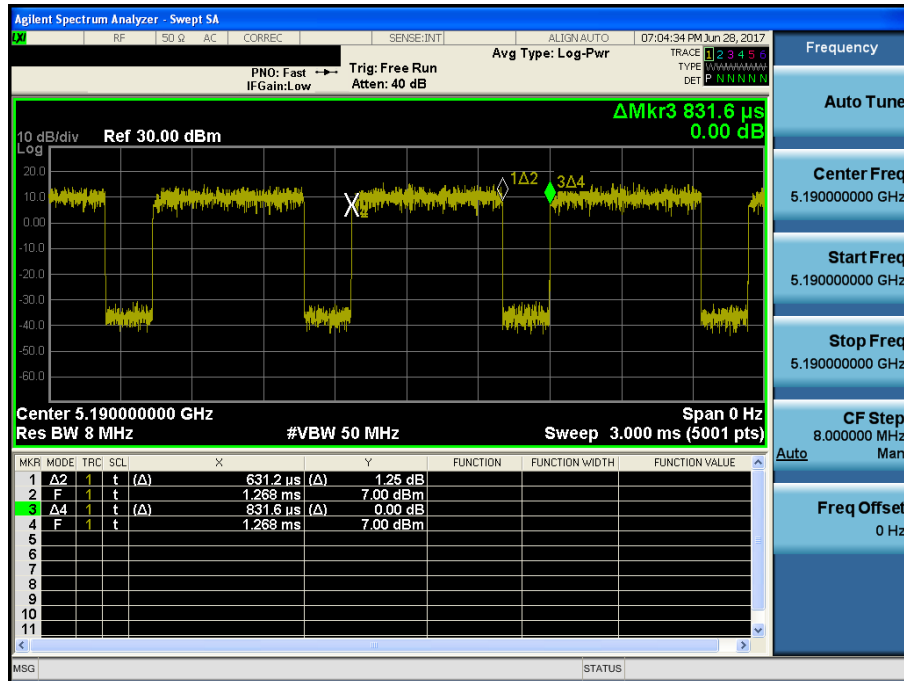
Duty Cycle

Test Mode: 802.11n(HT20) & Ch.36



Duty Cycle

Test Mode: 802.11n(HT40) & Ch.38

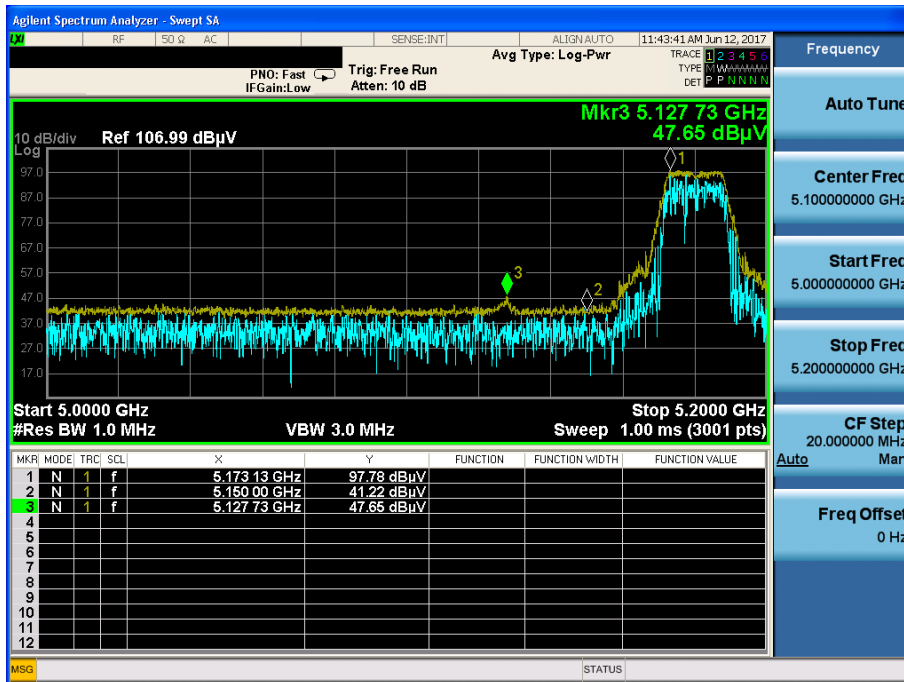


APPENDIX III

Unwanted Emissions (Radiated) Test Plot

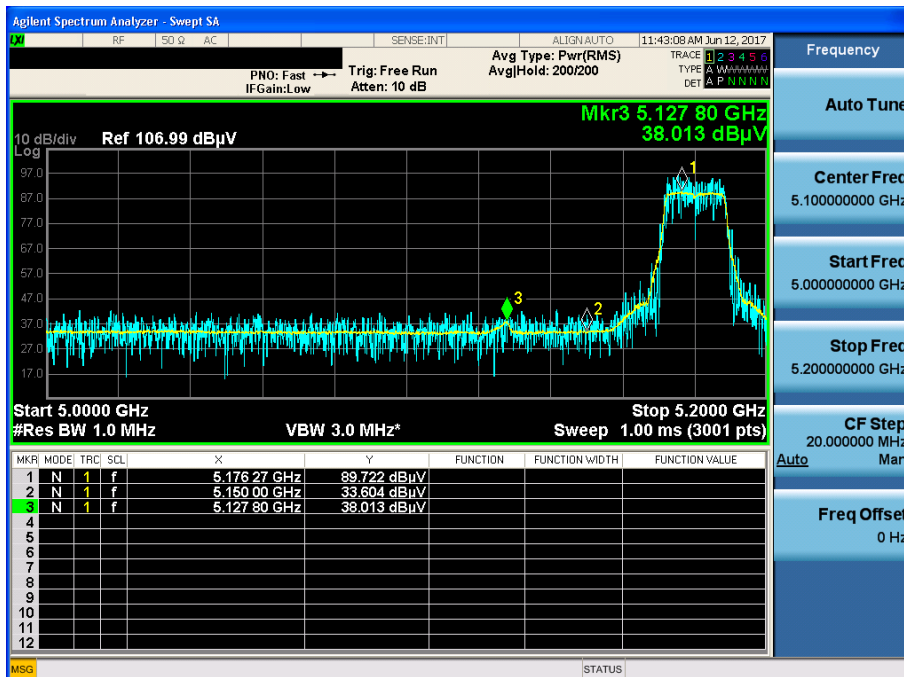
802.11a & U-NII 1 & Ch.36 & X axis & Hor

Detector Mode : PK



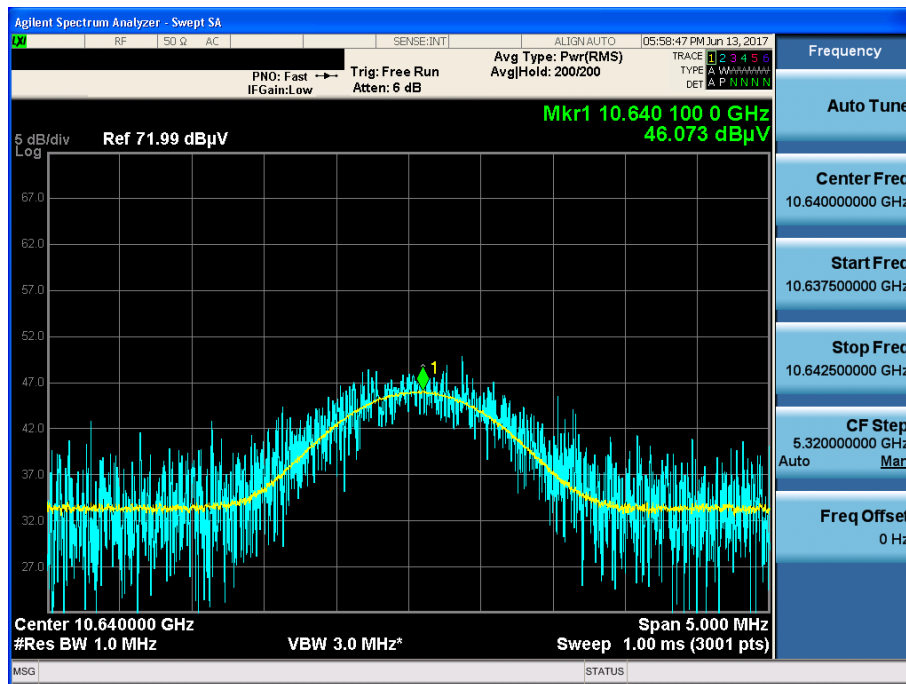
802.11a & U-NII 1 & Ch.36 & X axis & Hor

Detector Mode : AV

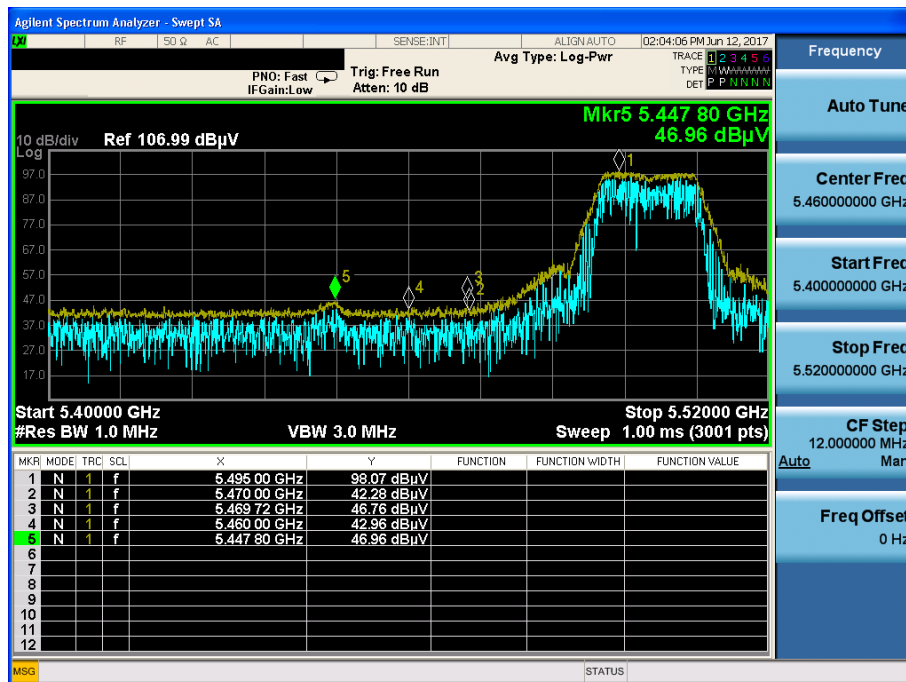


802.11a & U-NII 2A & Ch.64 & Y axis & Hor

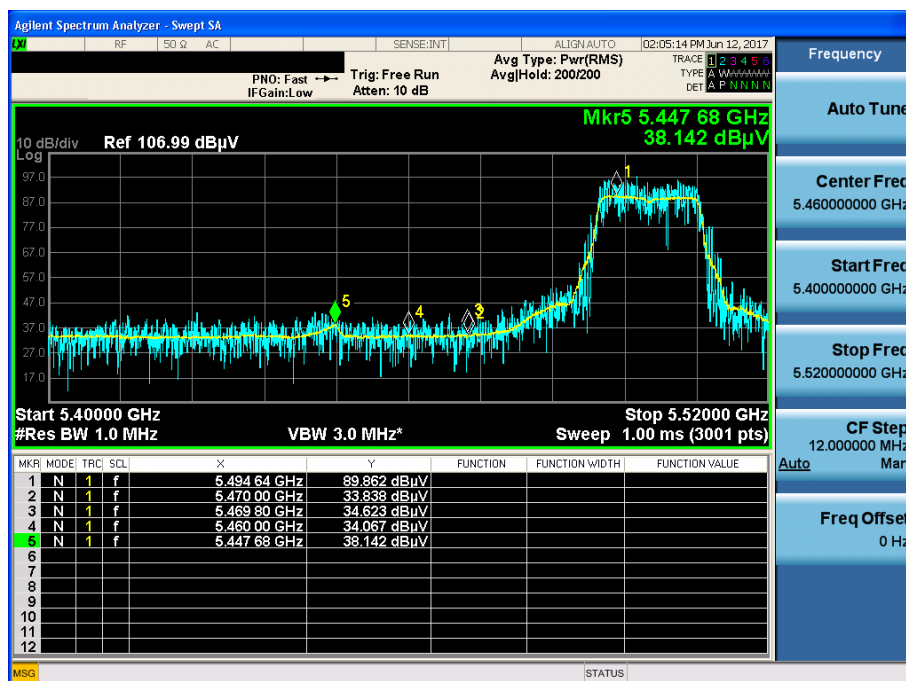
Detector Mode : AV



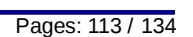
Detector Mode : PK



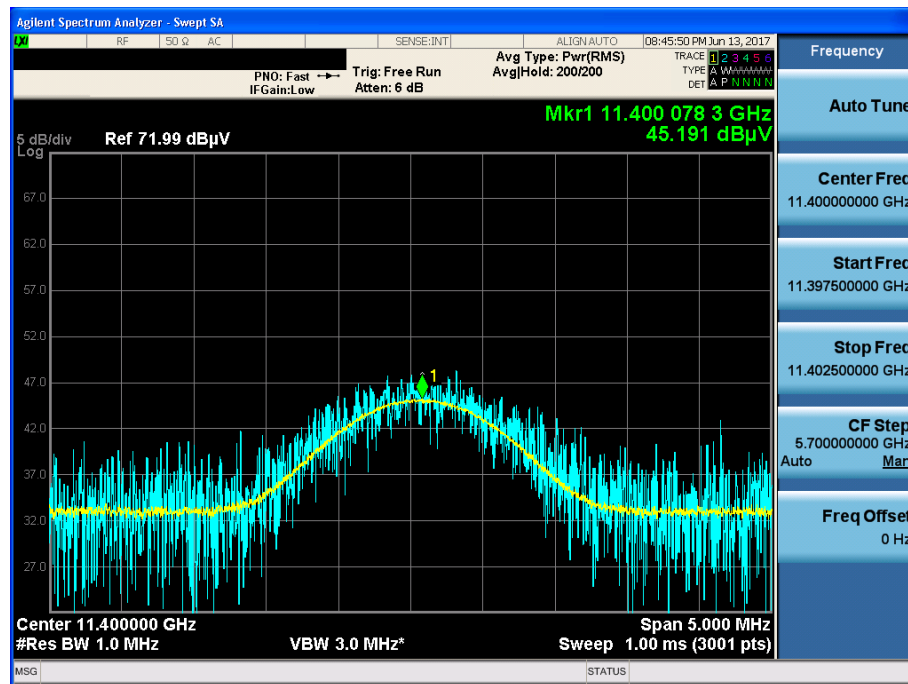
Detector Mode : AV



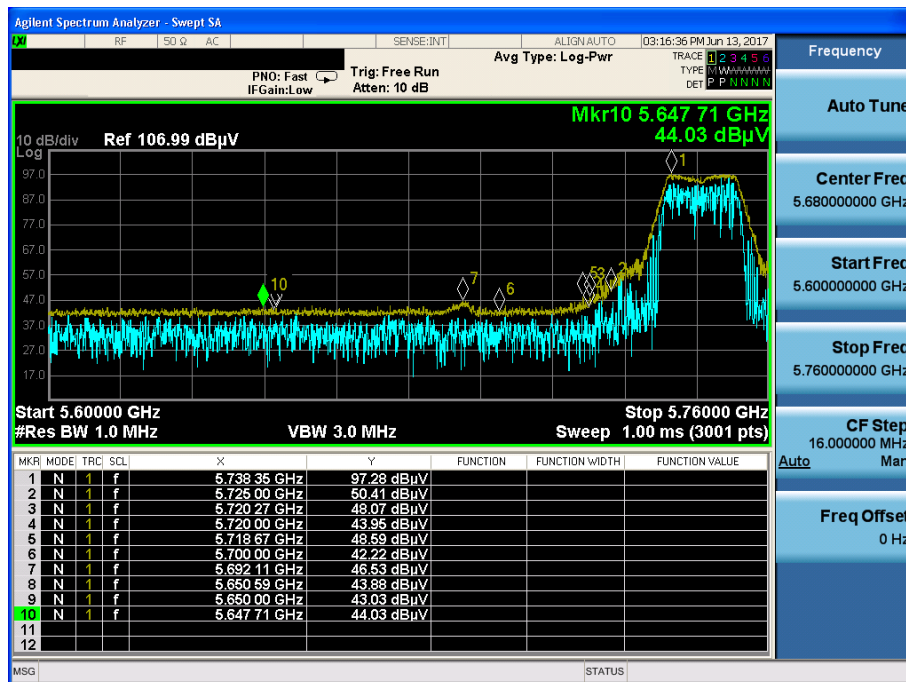
Detector Mode : PK



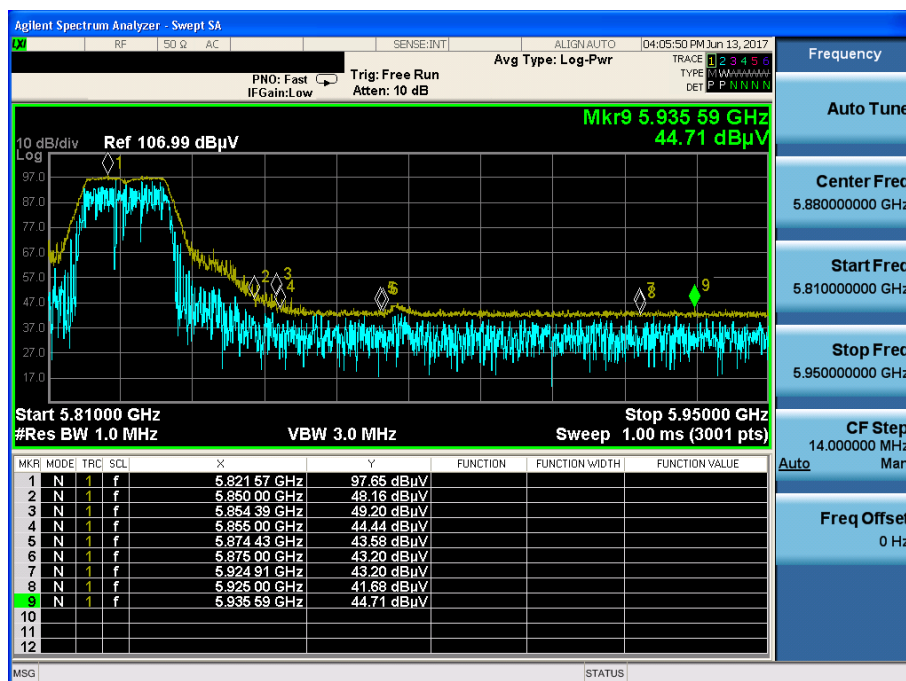
Detector Mode : AV



Detector Mode : PK

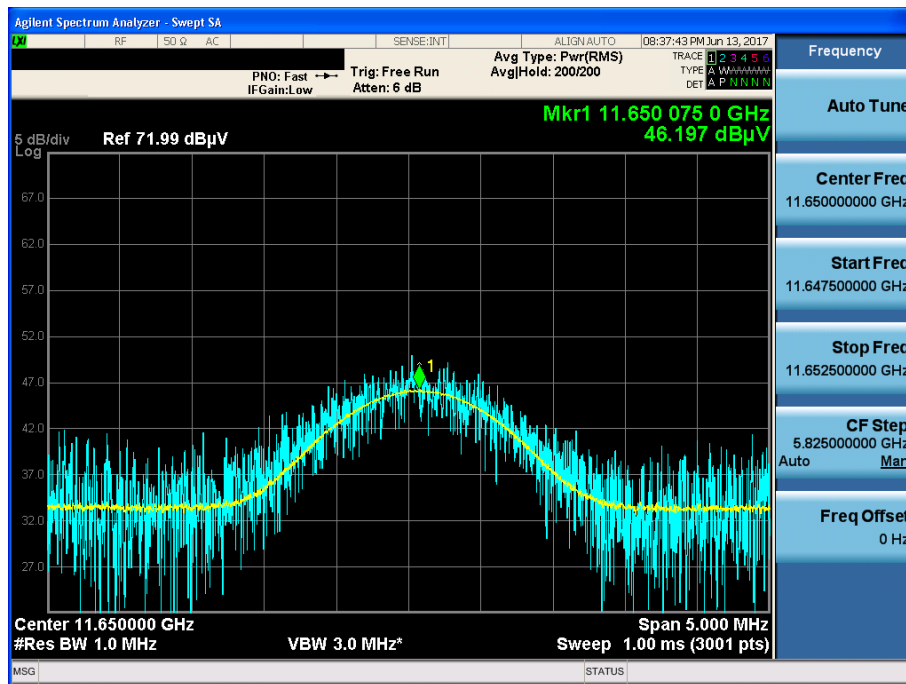


Detector Mode : PK

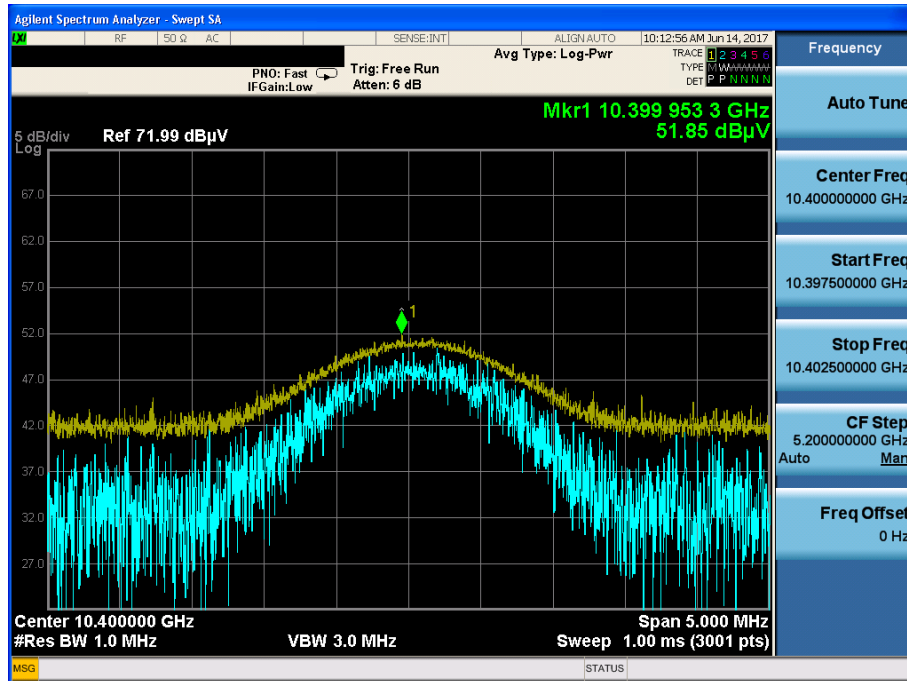


802.11a & U-NII 3 & Ch.165 & Z axis & Ver

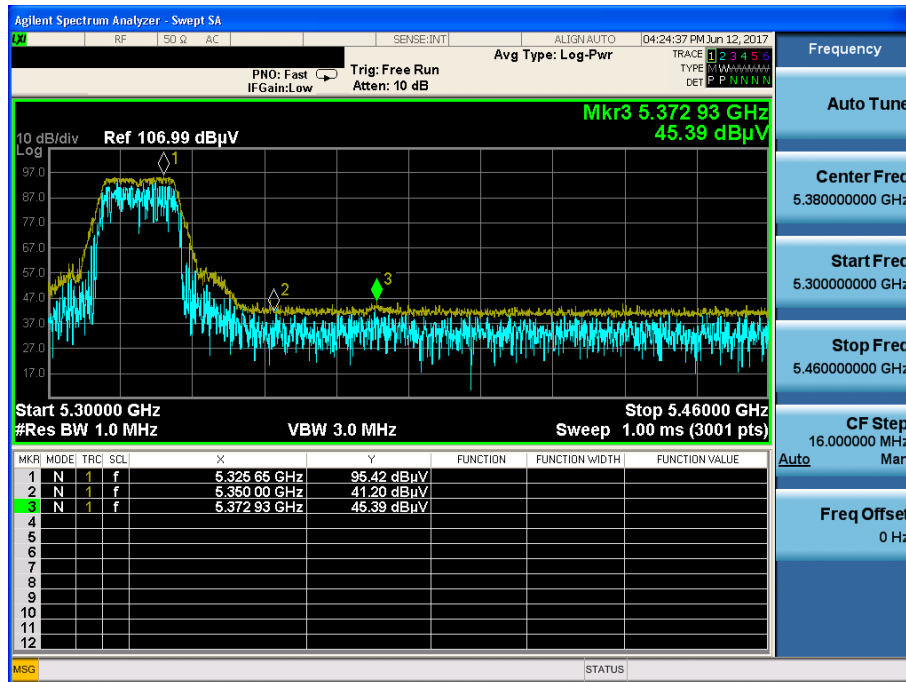
Detector Mode : AV



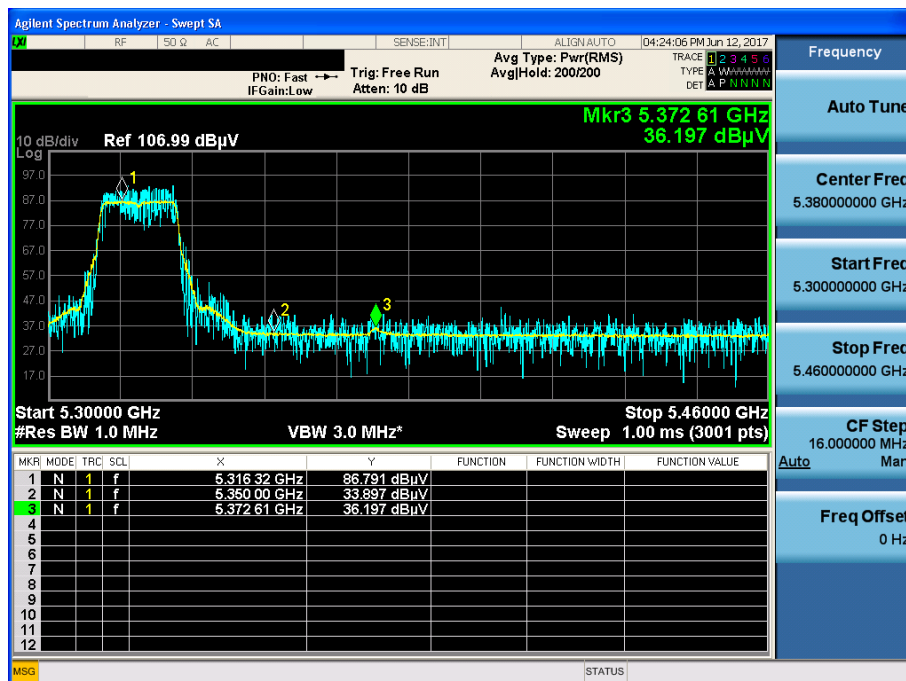
Detector Mode : PK



Detector Mode : PK

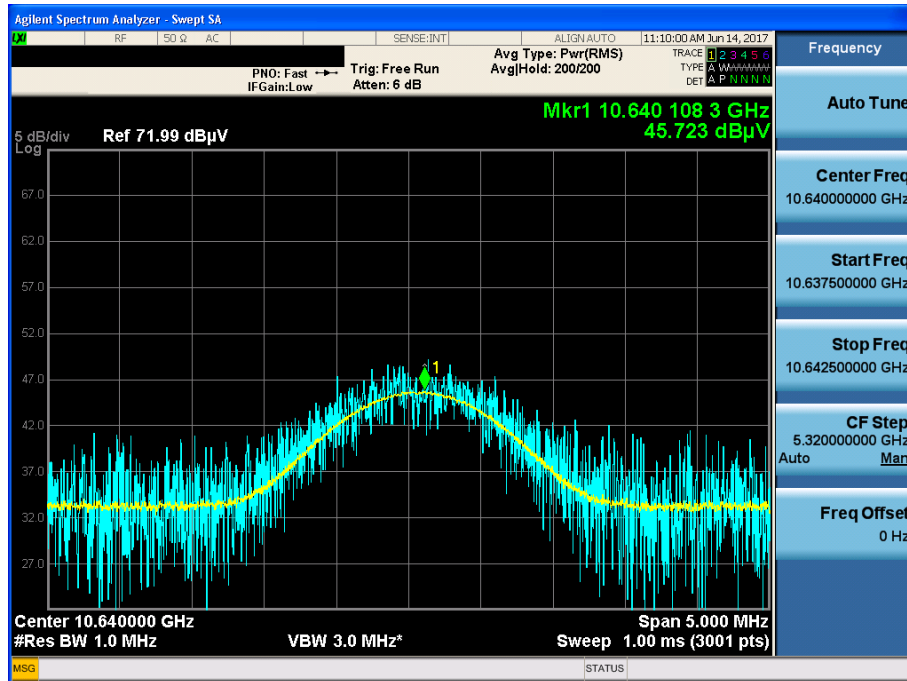


Detector Mode : AV



802.11n(HT20) & U-NII 2A & Ch.64 & Y axis & Hor

Detector Mode : AV



Detector Mode : PK



Detector Mode : PK

Agilent Spectrum Analyzer - Sweep SA

RF 50 Q AC SENSE:INT ALIGN AUTO 05:35:11 PM Jun 12, 2017

PNO: Fast IF Gain: Low Trig: Free Run Atten: 10 dB Avg Type: Log-Pwr

TRACE 1 2 3 4 5 6 TYPE MAX-HOLD DET P N N N N N

Ref 106.99 dBμV

Mkr4 5.752 587 GHz 46.63 dBμV

Start 5.69000 GHz #Res BW 1.0 MHz VBW 3.0 MHz Sweep 1.00 ms (3001 pts) Stop 5.77000 GHz

MRK	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	5.705 707 GHz	98.34 dBμV			
2	N	1	f	5.725 000 GHz	42.06 dBμV			
3	N	1	f	5.725 720 GHz	45.91 dBμV			
4	N	1	f	5.752 587 GHz	46.63 dBμV			
5								
6								
7								
8								
9								
10								
11								
12								

MSG STATUS

Frequency

Auto Tune

Center Frequency 5.730000000 GHz

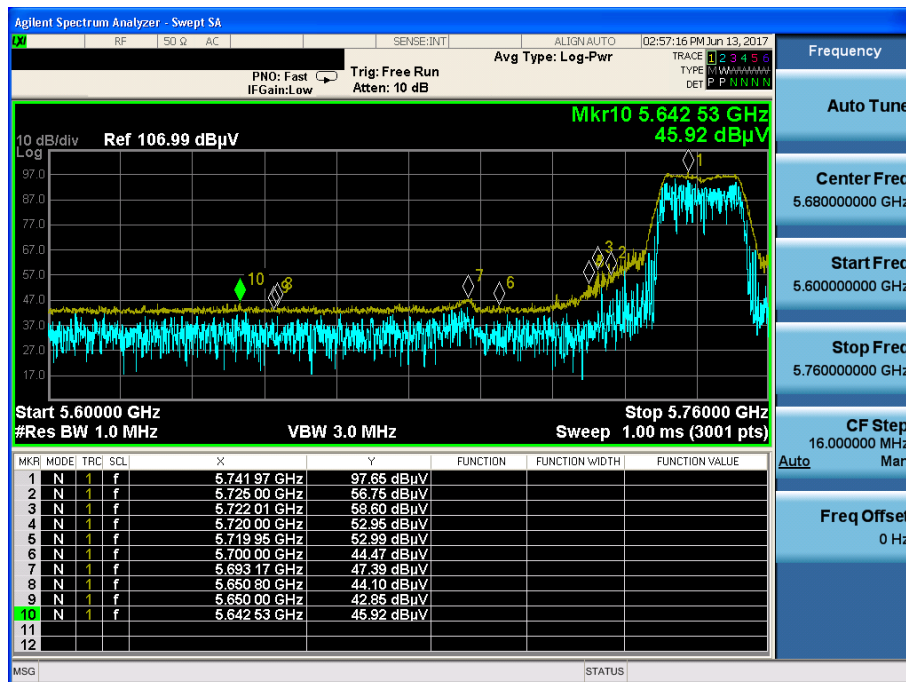
Start Frequency 5.690000000 GHz

Stop Frequency 5.770000000 GHz

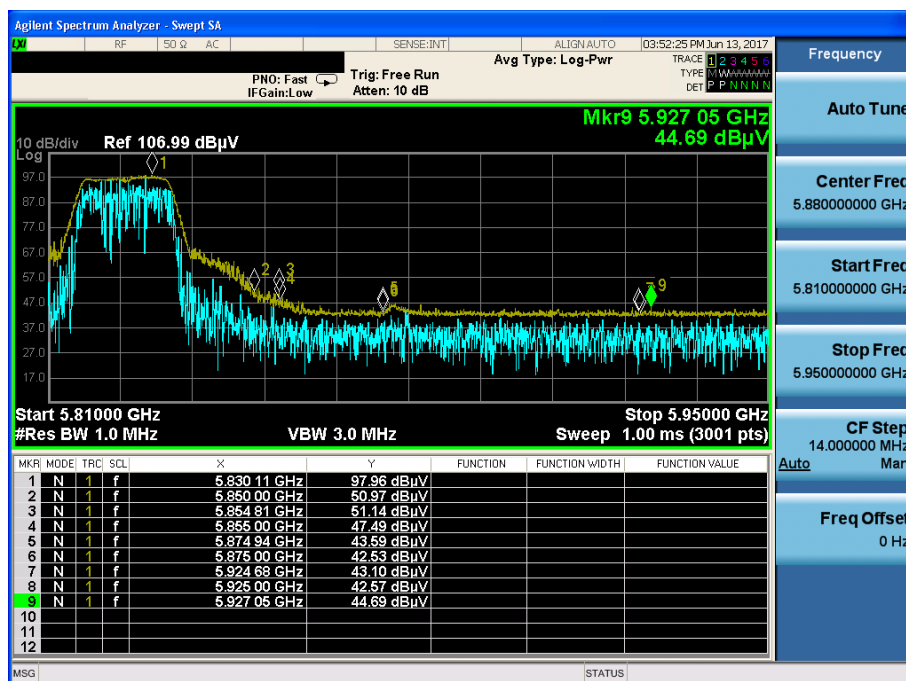
CF Stop 8.000000 MHz

Freq Offset 0 Hz

Detector Mode : PK

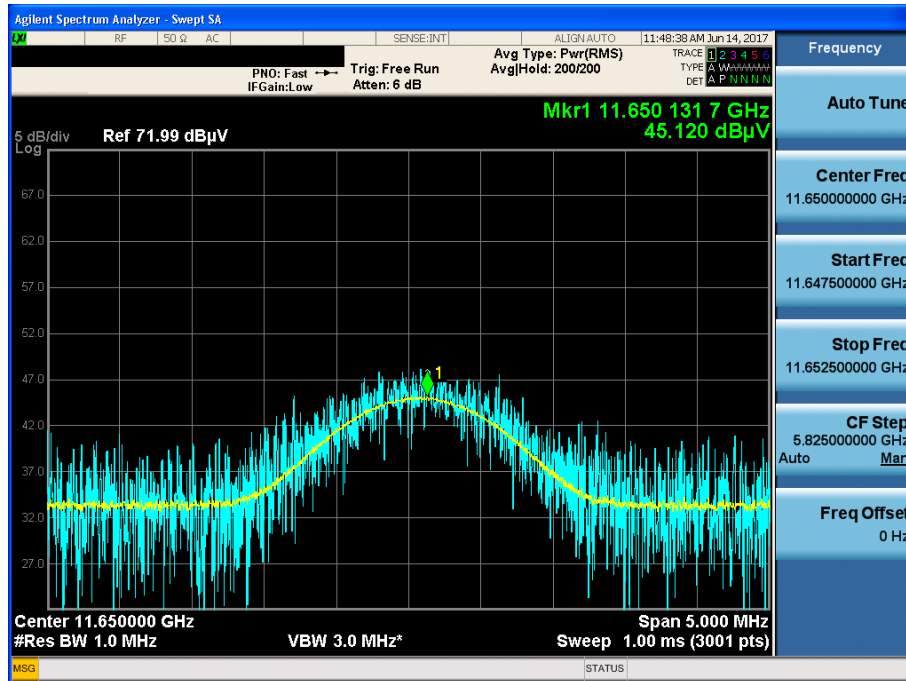


Detector Mode : PK



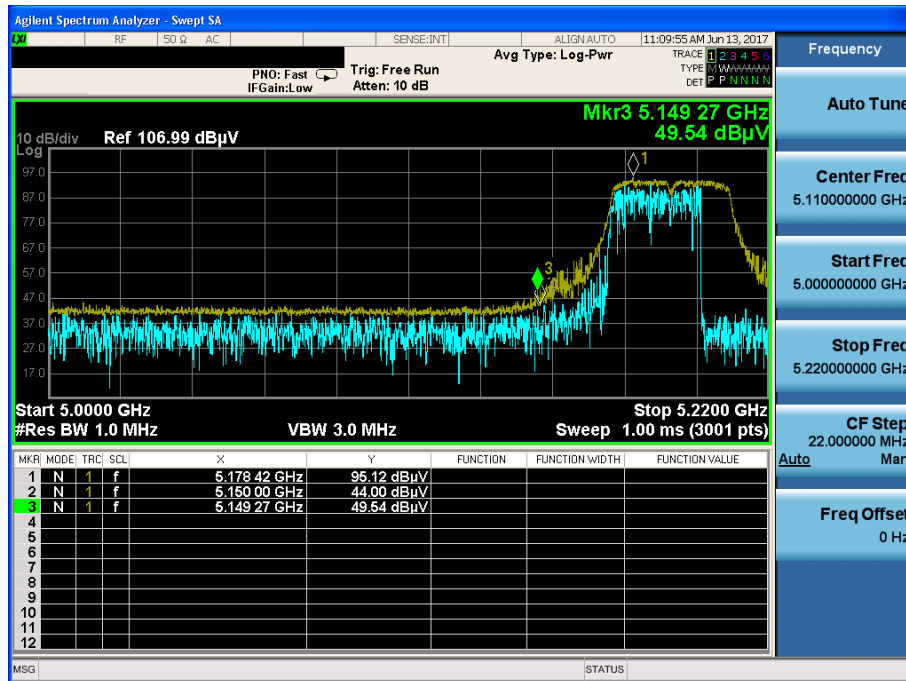
802.11n(HT20) & U-NII 3 & Ch.165 & Z axis & Ver

Detector Mode : AV



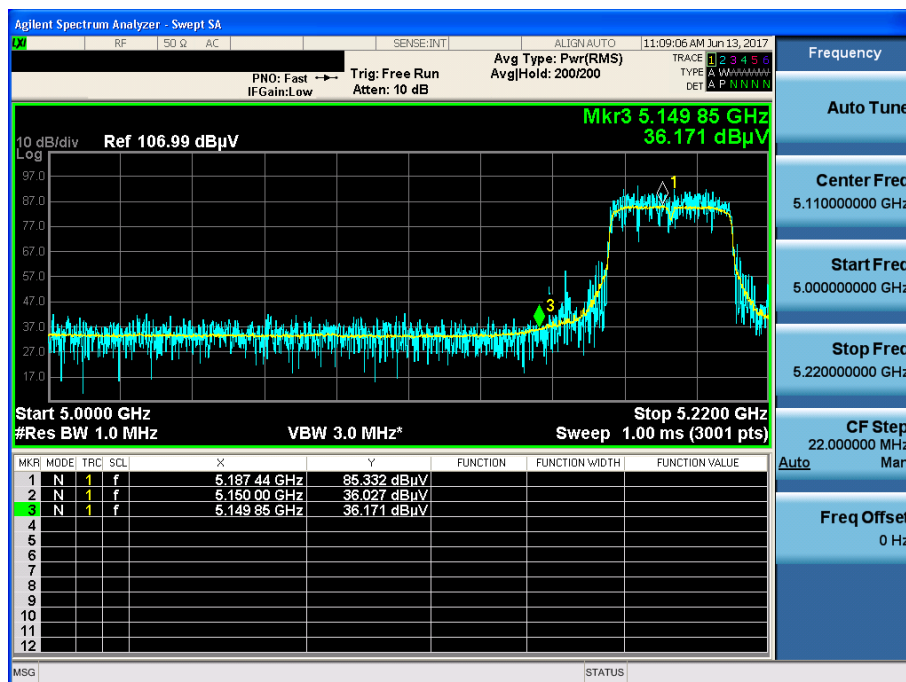
802.11n(HT40) & U-NII 1 & Ch.38 & X axis & Hor

Detector Mode : PK

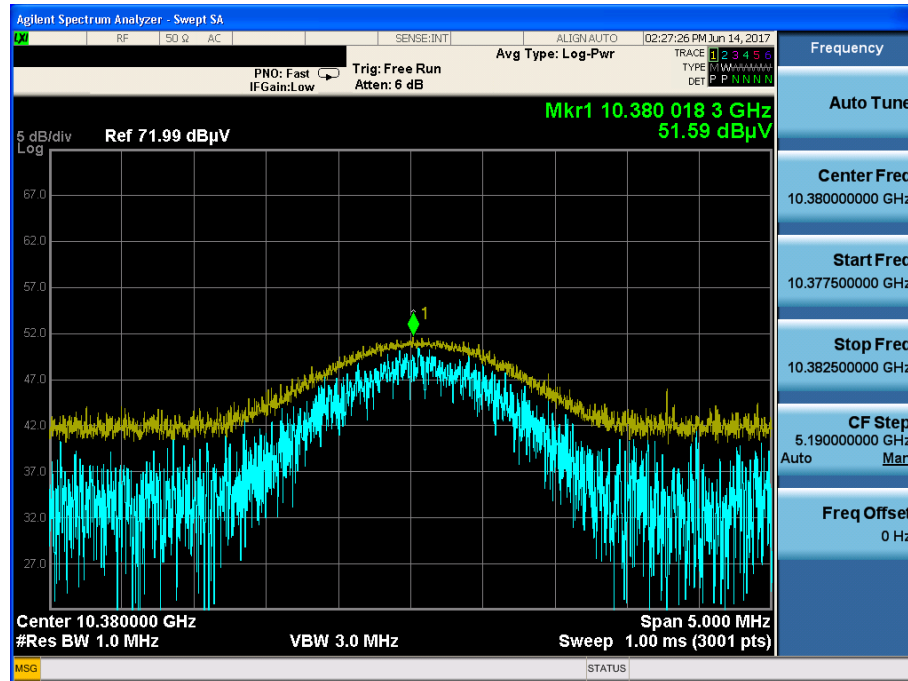


802.11n(HT40) & U-NII 1 & Ch.38 & X axis & Hor

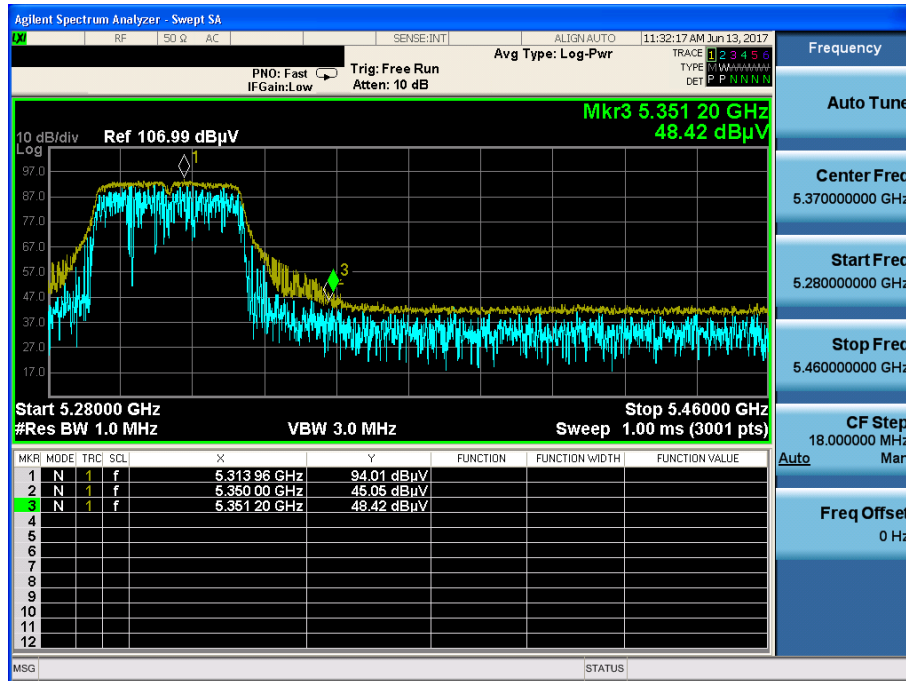
Detector Mode : AV



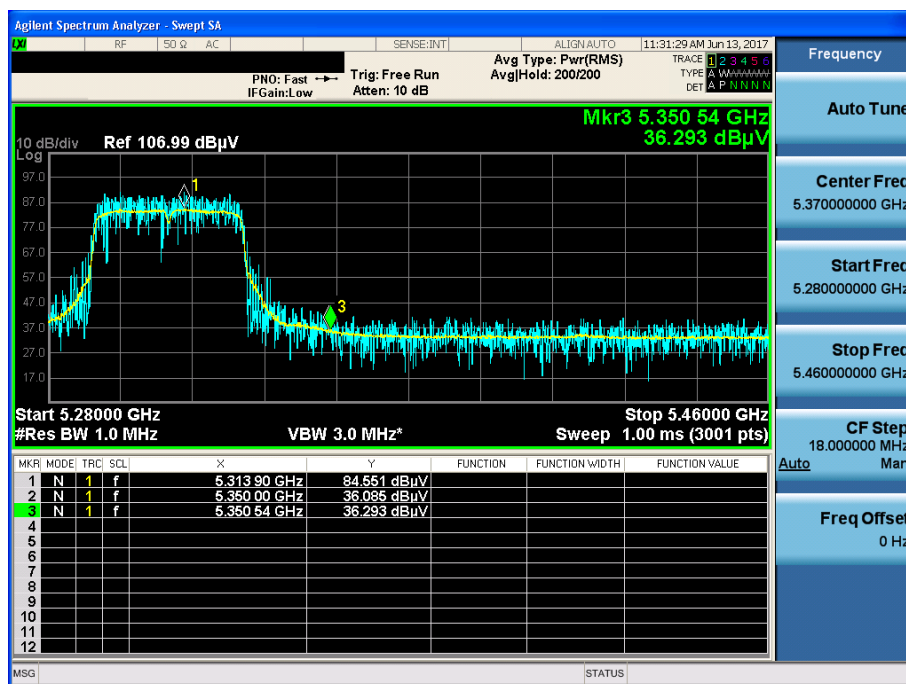
Detector Mode : PK



Detector Mode : PK

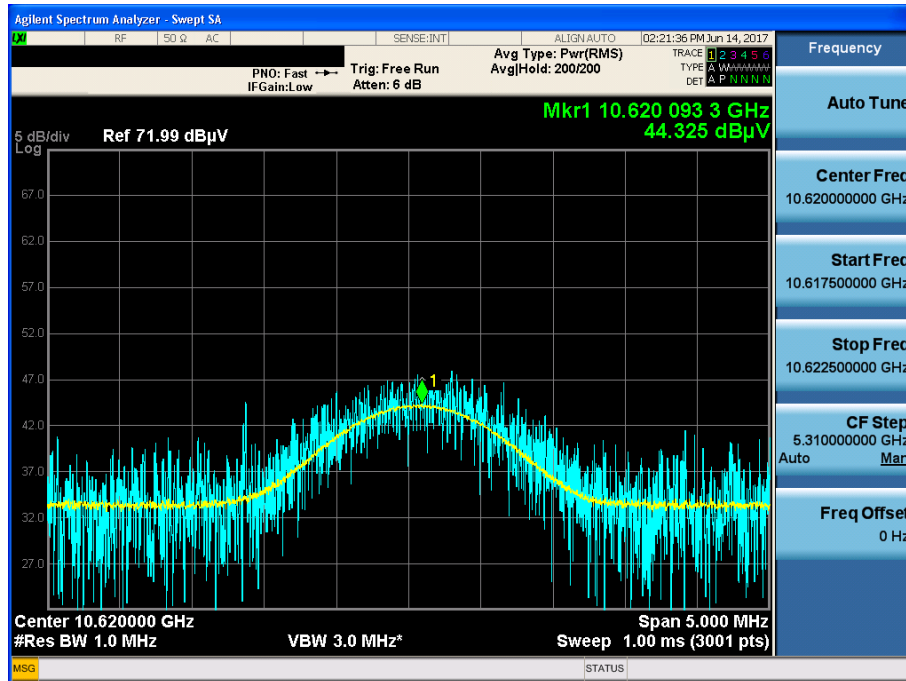


Detector Mode : AV



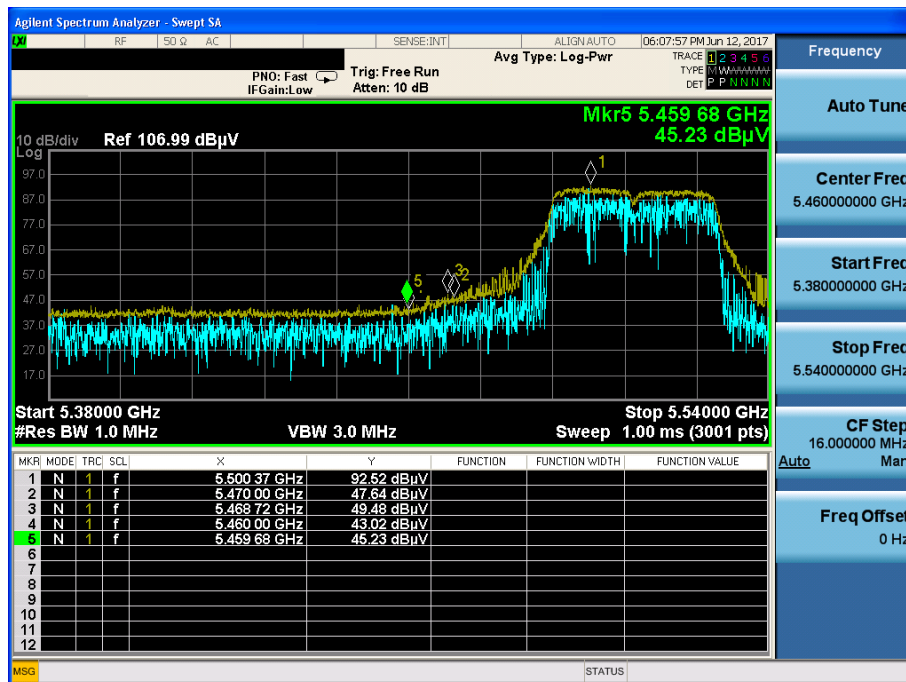
802.11n(HT40) & U-NII 2A & Ch.62 & Y axis & Hor

Detector Mode : AV



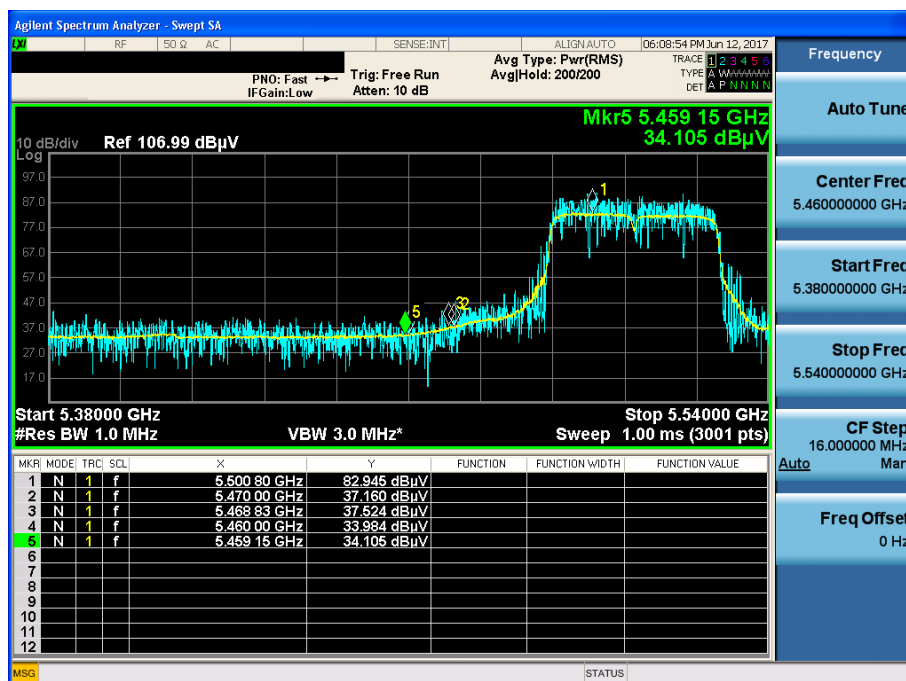
802.11n(HT40) & U-NII 2C & Ch.102 & Z axis & Hor

Detector Mode : PK



802.11n(HT40) & U-NII 2C & Ch.102 & Z axis & Hor

Detector Mode : AV



Detector Mode : PK

Agilent Spectrum Analyzer - Sweep SA

RF 50 Ω AC SENSE:INT ALIGN:AUTO [06:25:14 PM Jun 12, 2017]

PNO: Fast IF Gain: Low Trig: Free Run Atten: 10 dB Avg Type: Log-Pwr

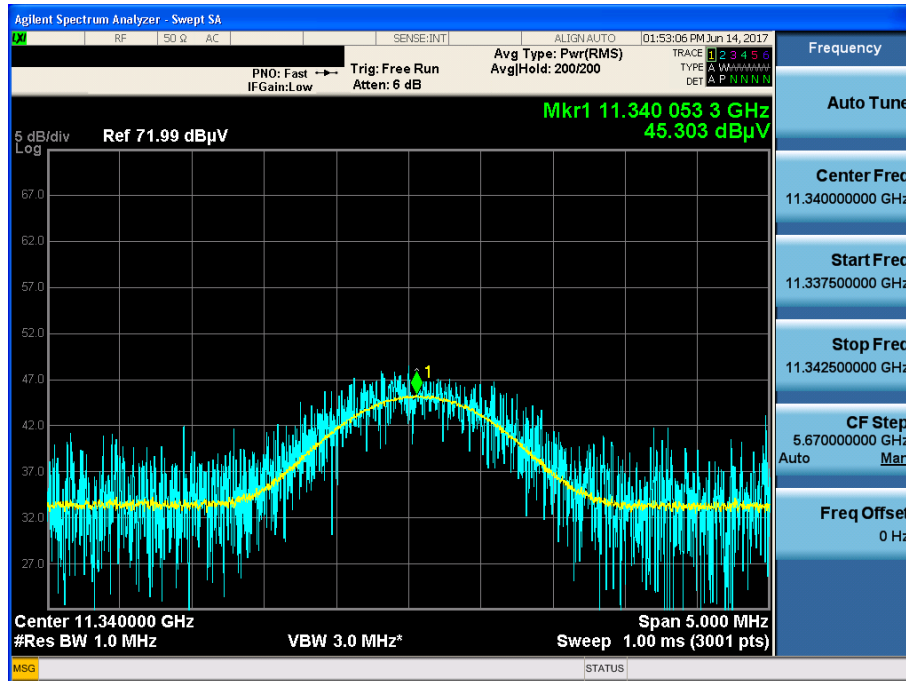
TRACE 1 2 3 4 5 6 TYPE M W H DET P N N N N

Start 5.65000 GHz Stop 5.79000 GHz
#Res BW 1.0 MHz VBW 3.0 MHz Sweep 1.00 ms (3001 pts)

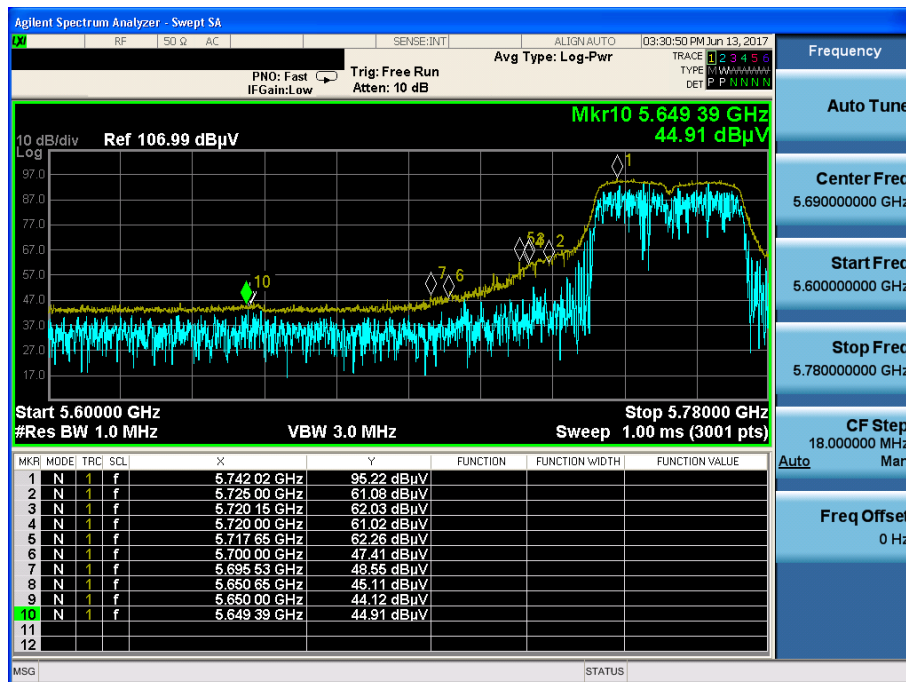
MKR	MODE	TFC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	5.676 04 GHz	95.87 dBμV			
2	N	1	f	5.725 00 GHz	43.06 dBμV			
3	N	1	f	5.729 15 GHz	44.31 dBμV			
4	N	1	f	5.773 43 GHz	45.61 dBμV			

802.11n(HT40) & U-NII 2C & Ch.134 & Z axis & Ver

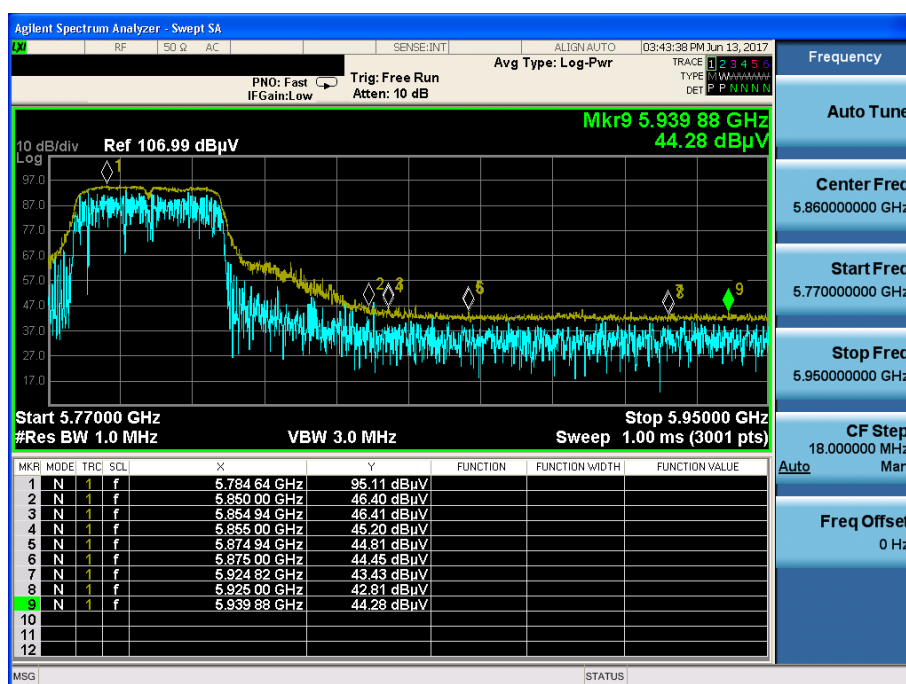
Detector Mode : AV



Detector Mode : PK



Detector Mode : PK



802.11n(HT40) & U-NII 3 & Ch.159 & Z axis & Ver

Detector Mode : AV

