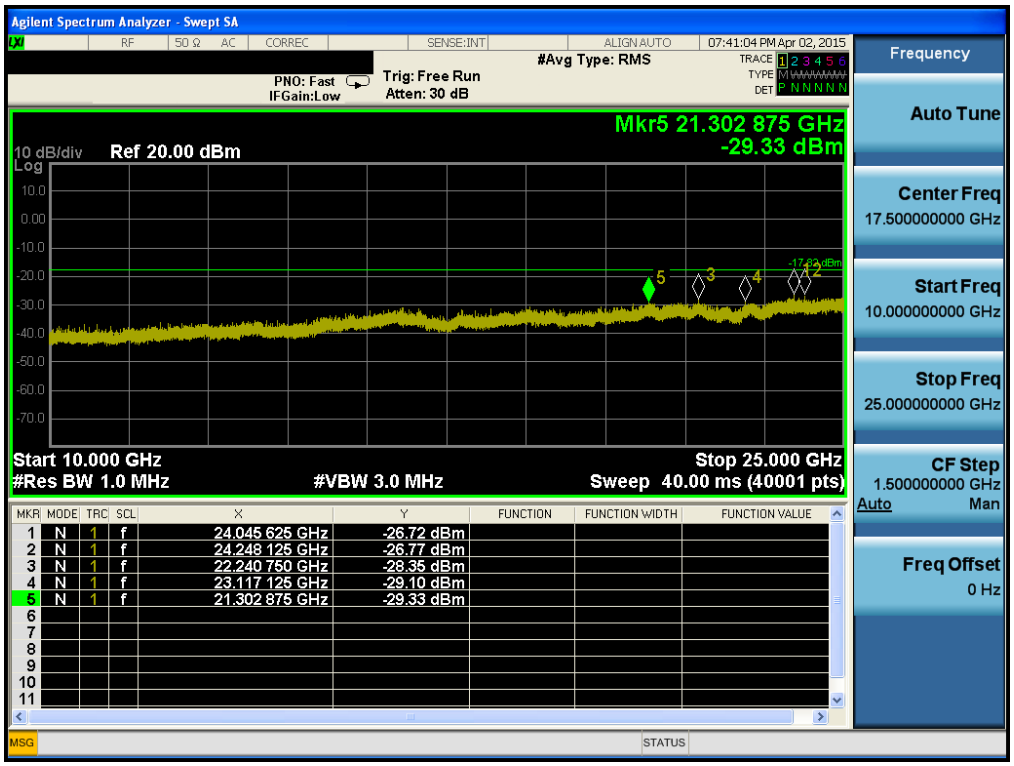
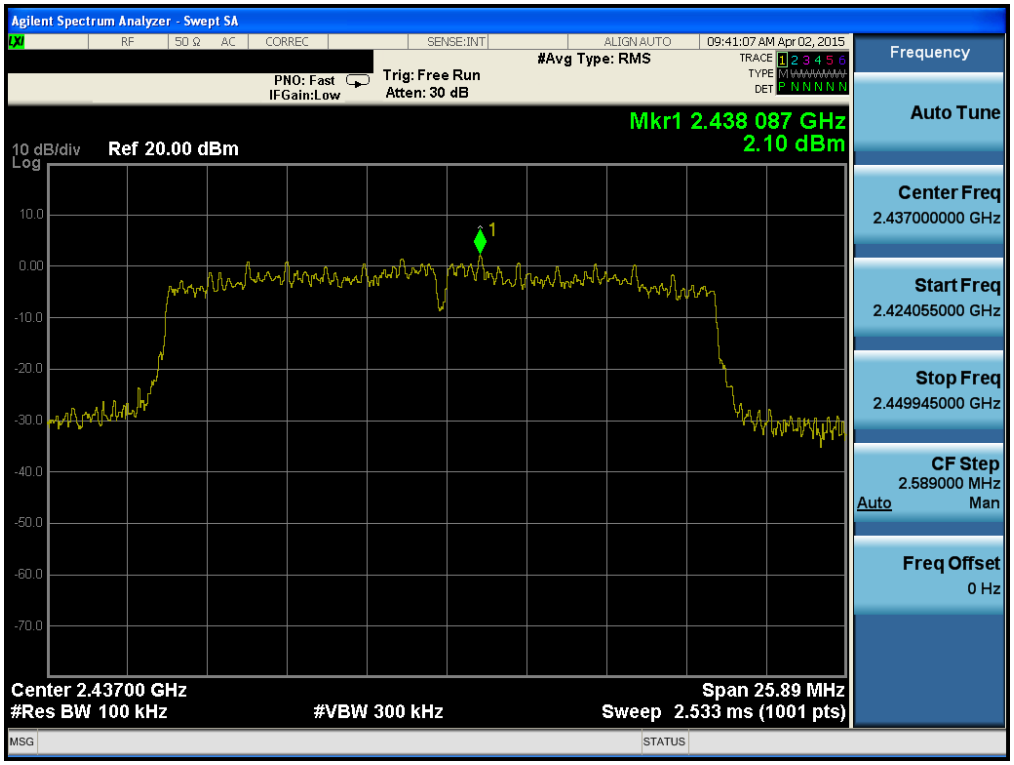
Conducted Spurious Emissions



802.11n(HT20) & MCS 7 & 2437 MHz

Reference



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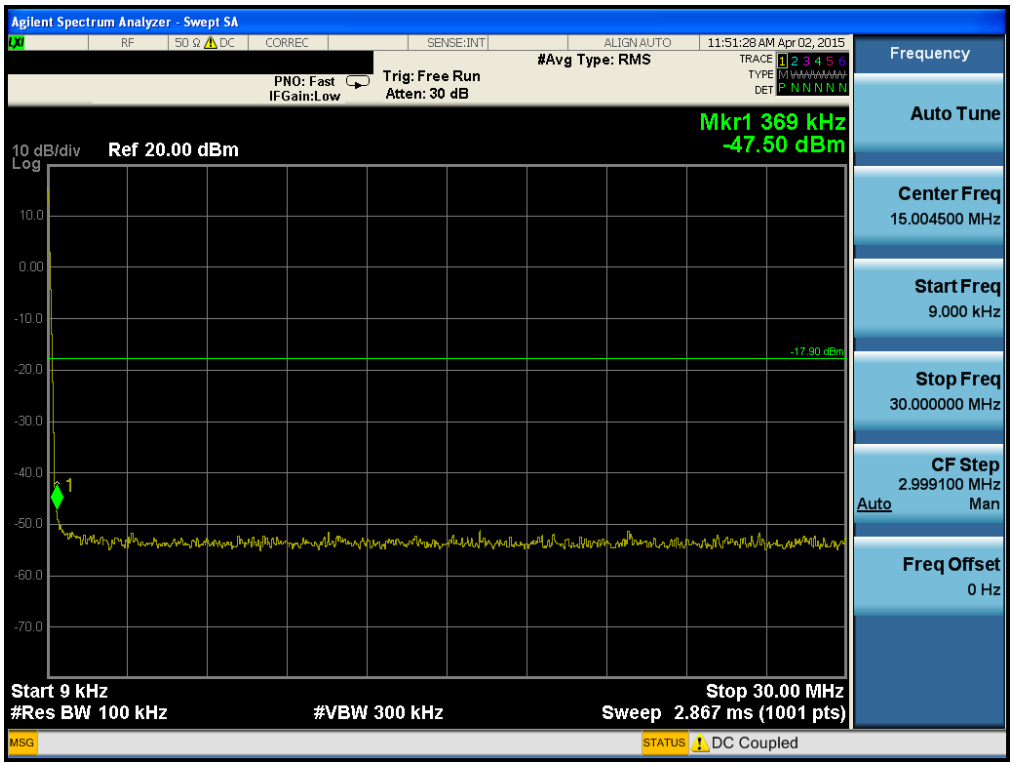

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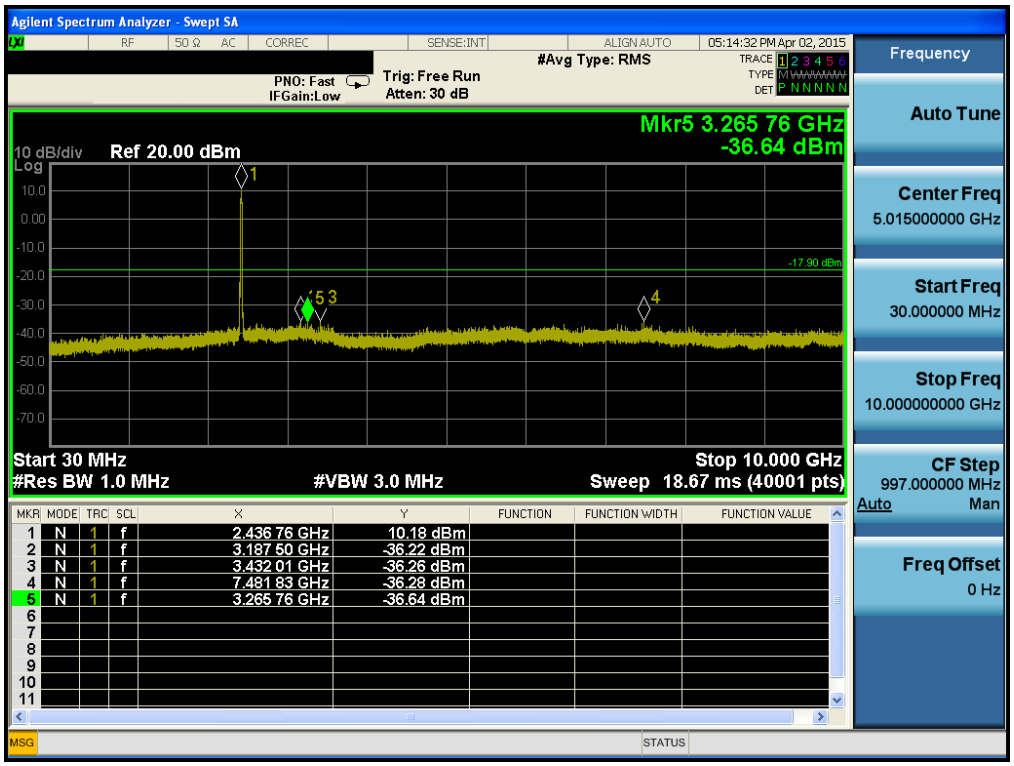
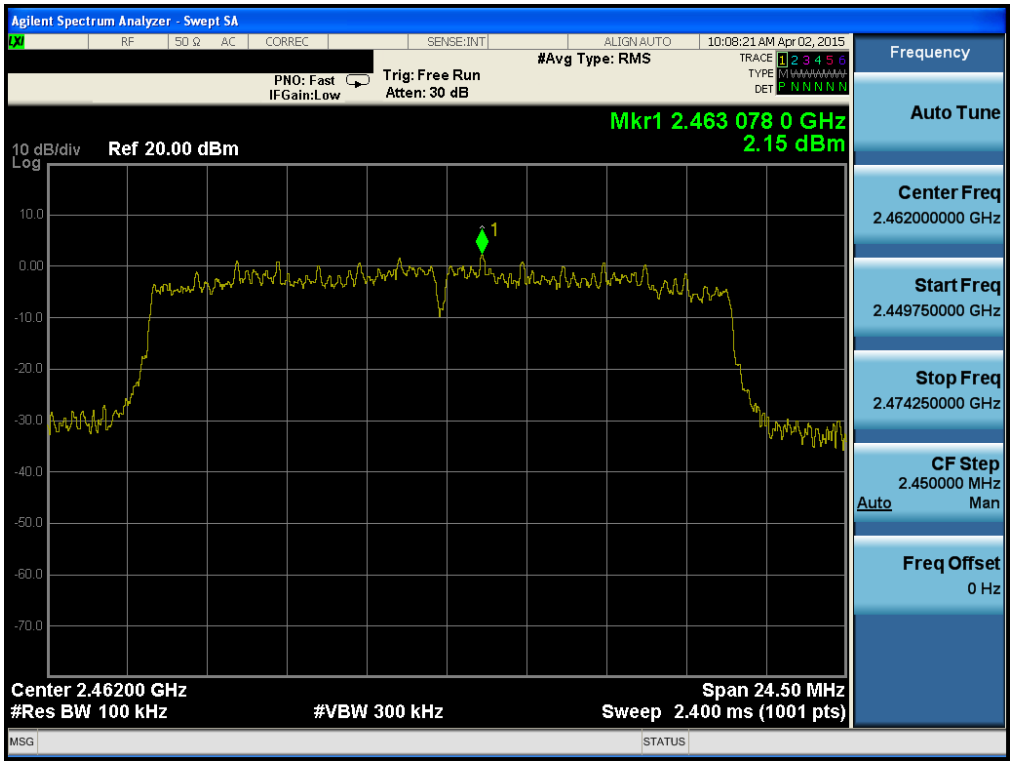
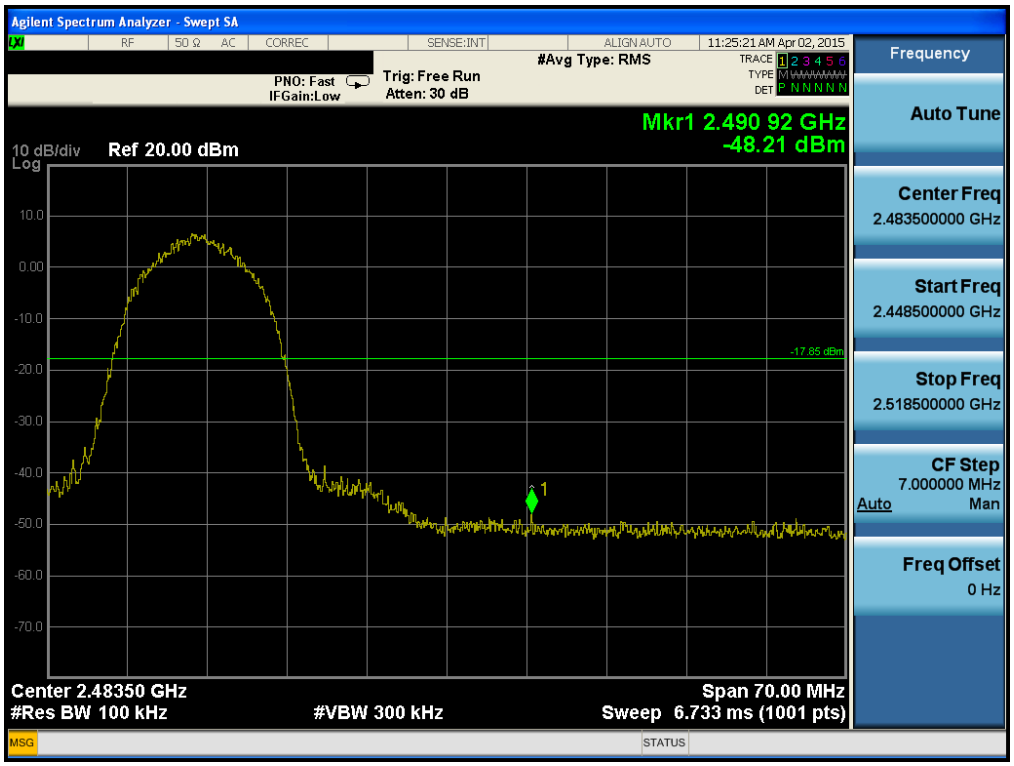


802.11n(HT20) & MCS 7 & 2462 MHz

Reference



High Band-edge



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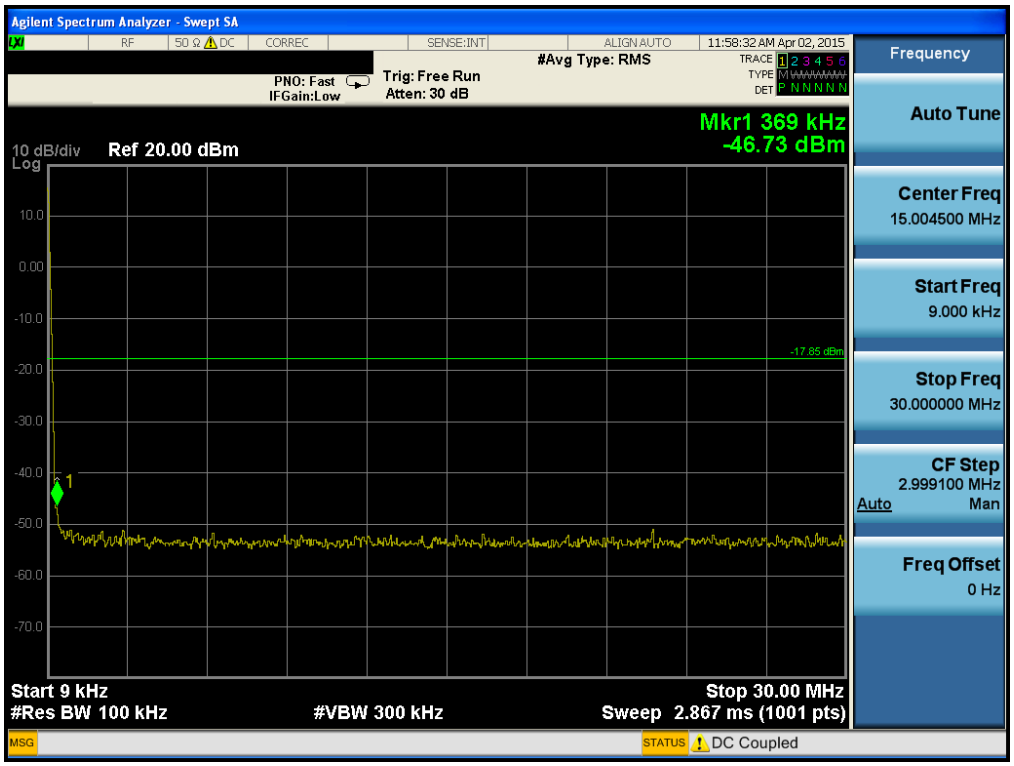

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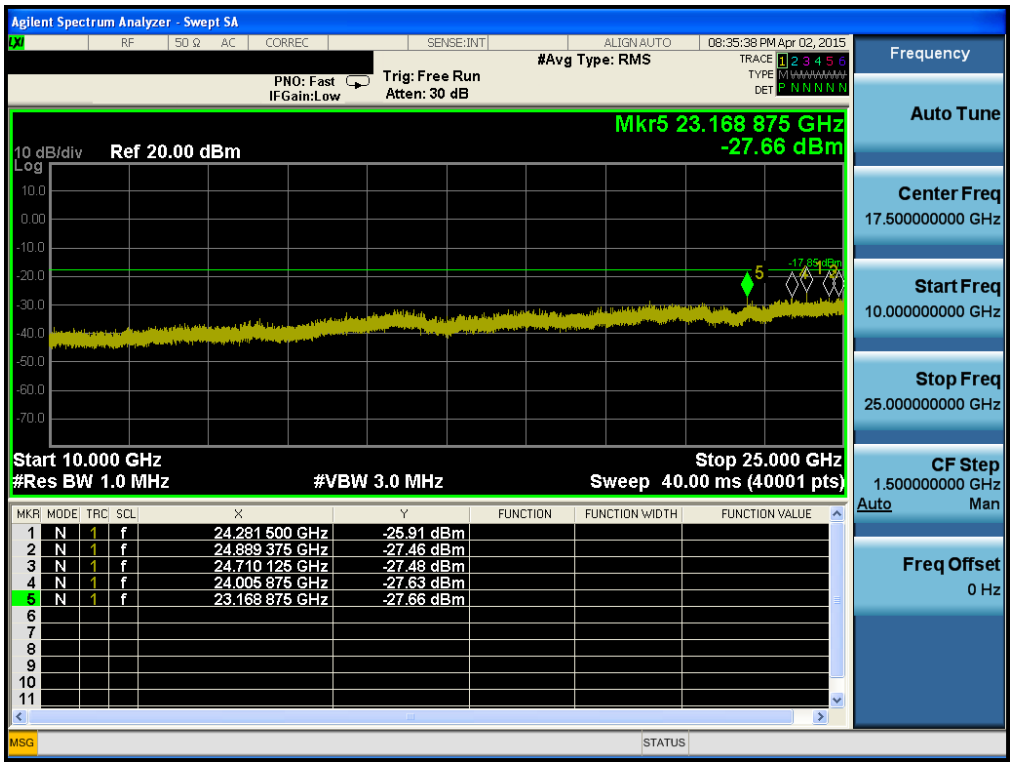
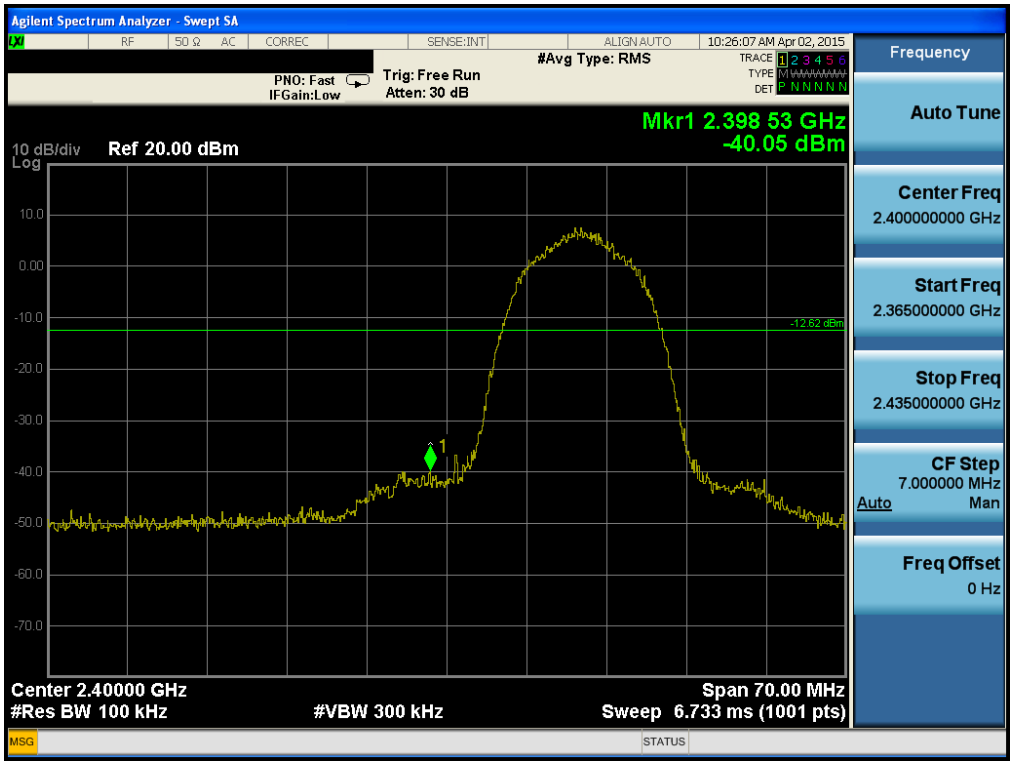


▣RESULT PLOTS (DC 48V(PoE))

802.11b & 11 Mbps & 2412 MHz

Reference

Low Band-edge



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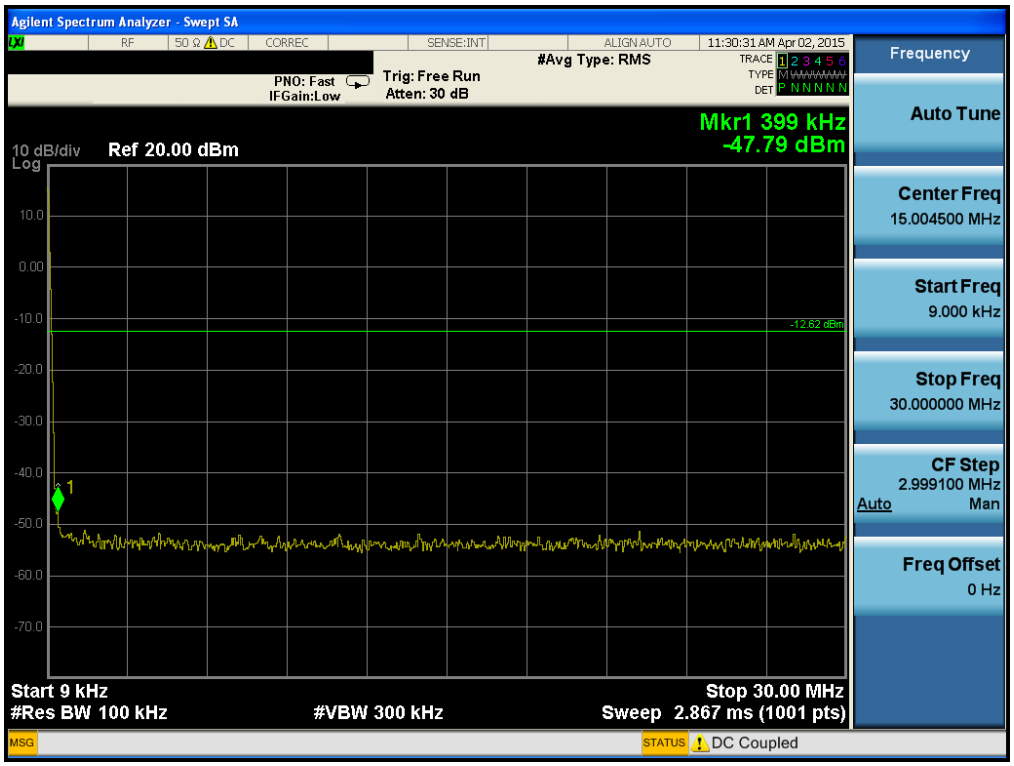
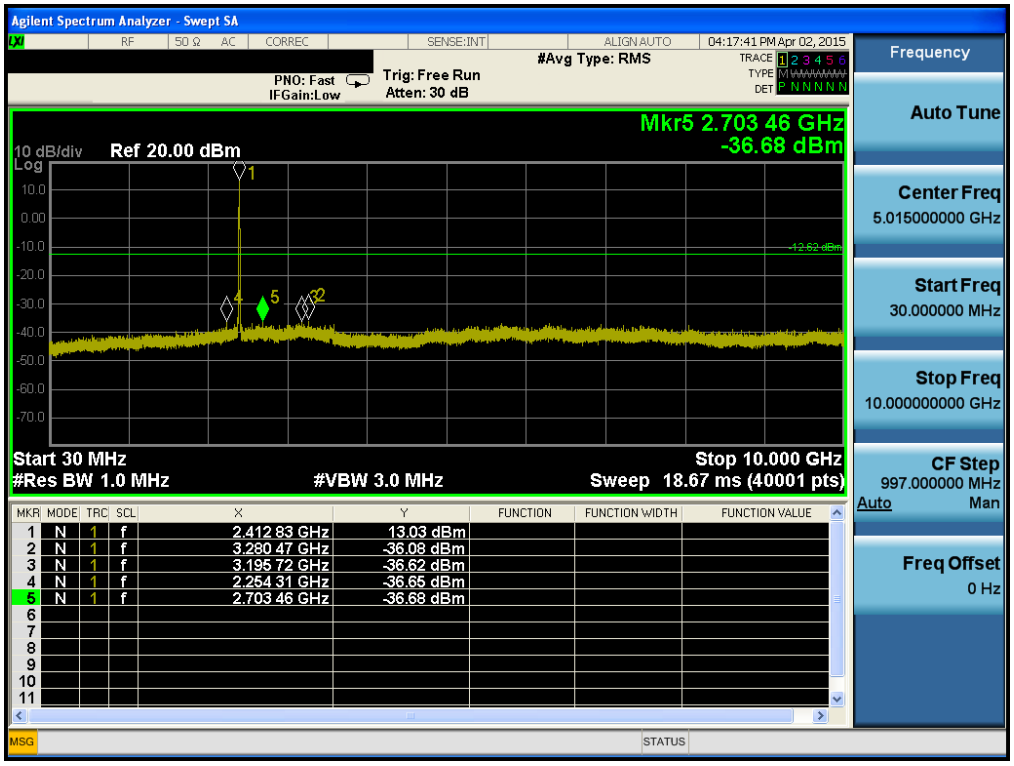
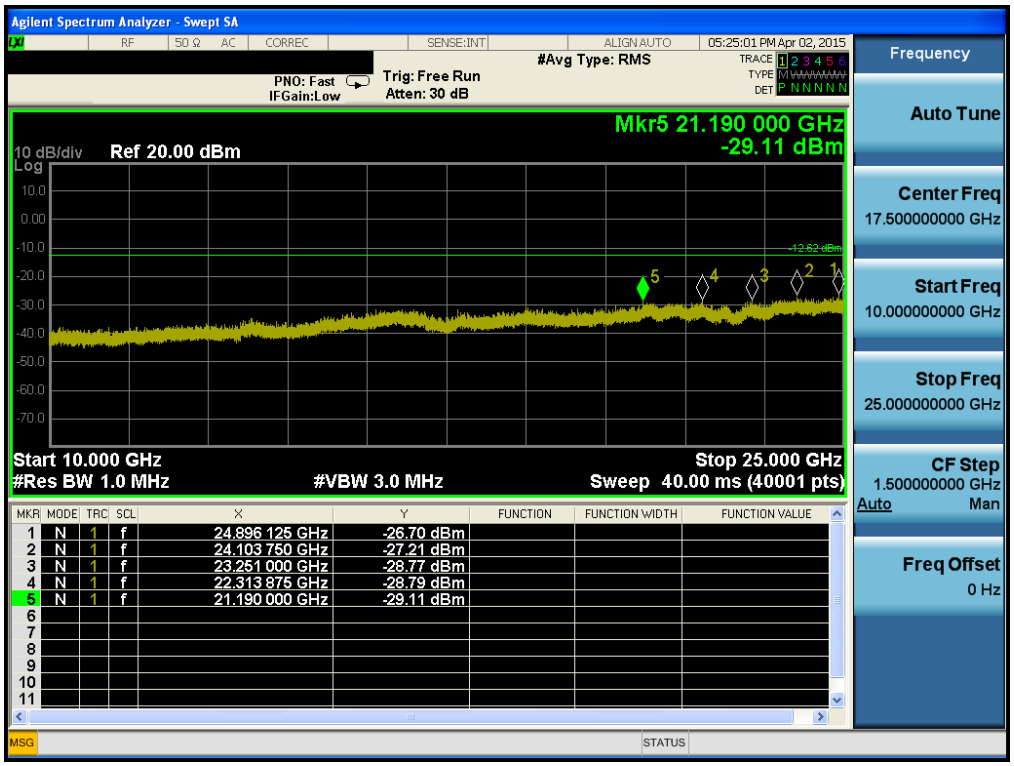




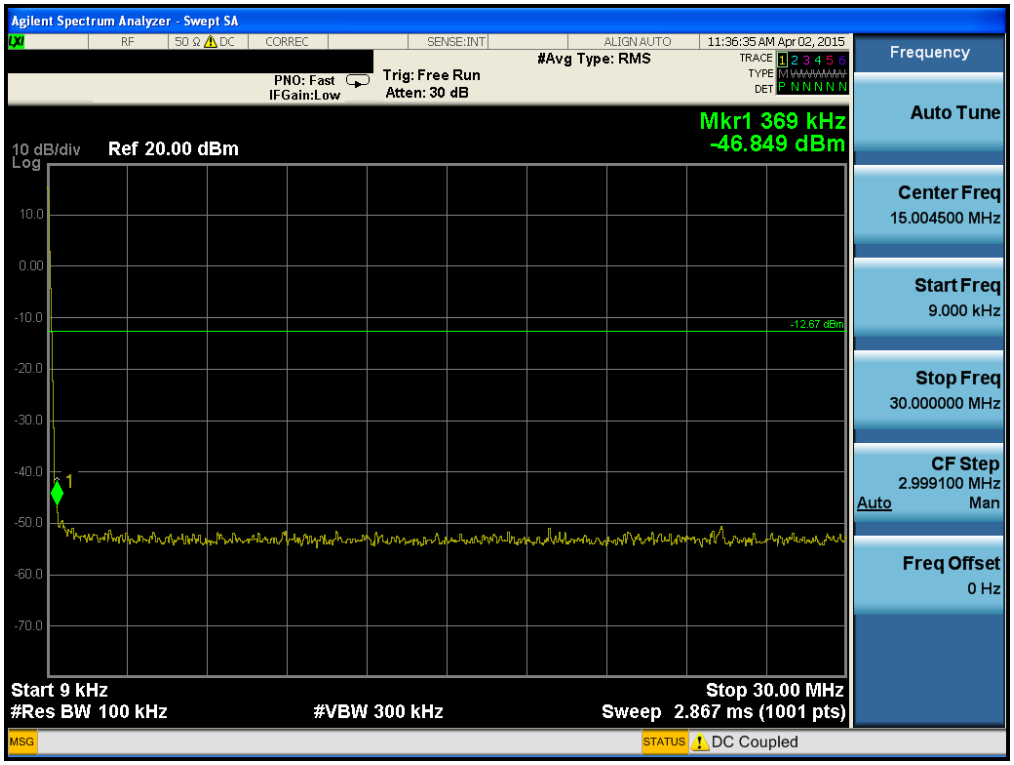
Conducted Spurious Emissions



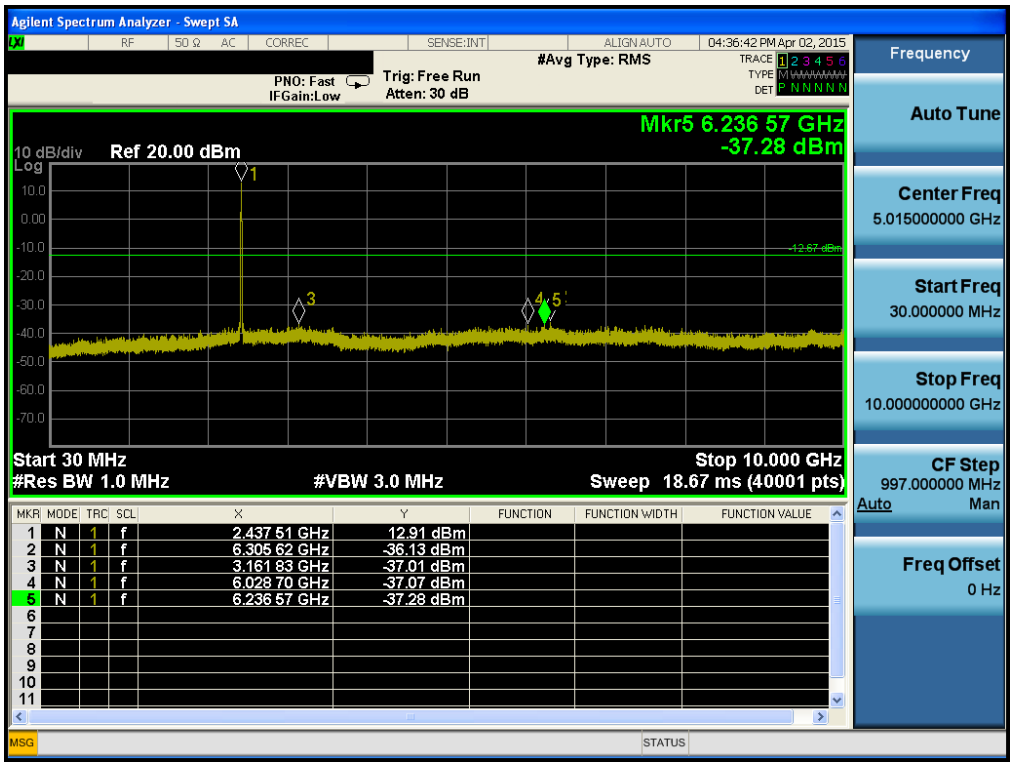
802.11b & 11 Mbps & 2437 MHz

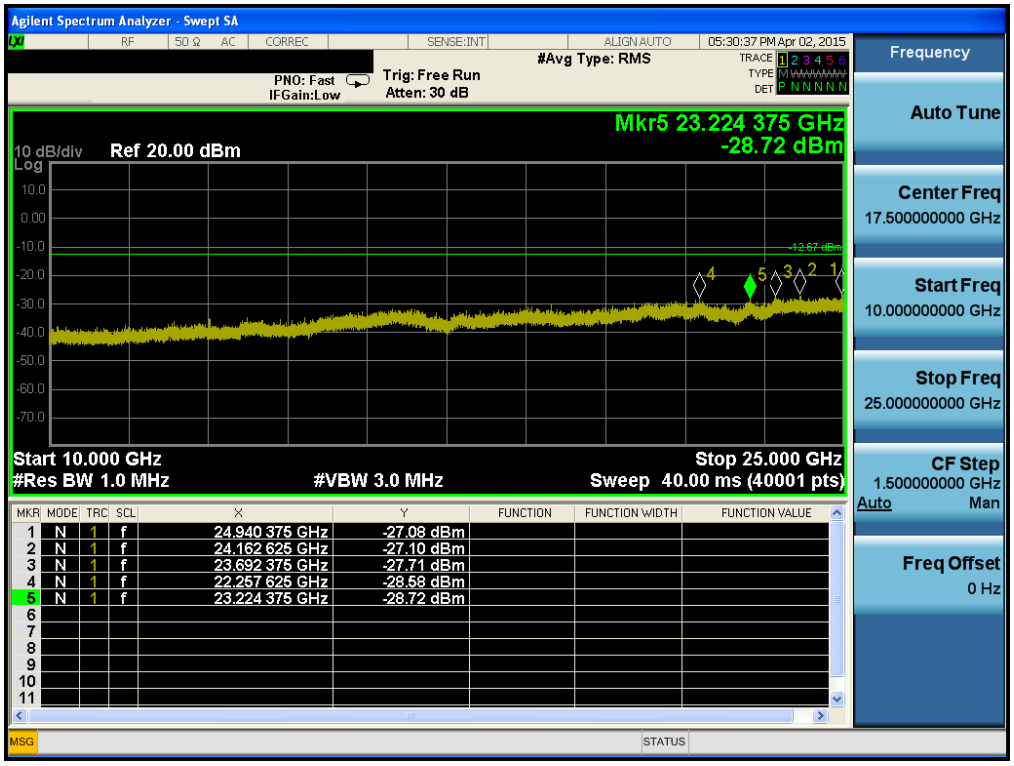
Reference

Conducted Spurious Emissions



Conducted Spurious Emissions

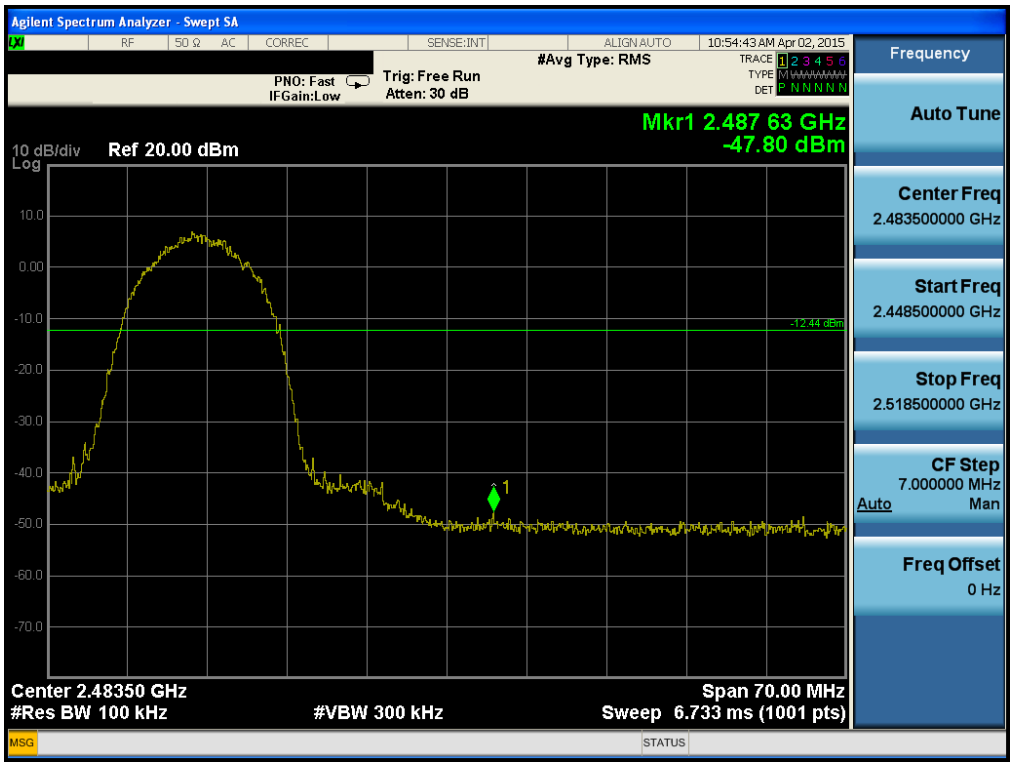




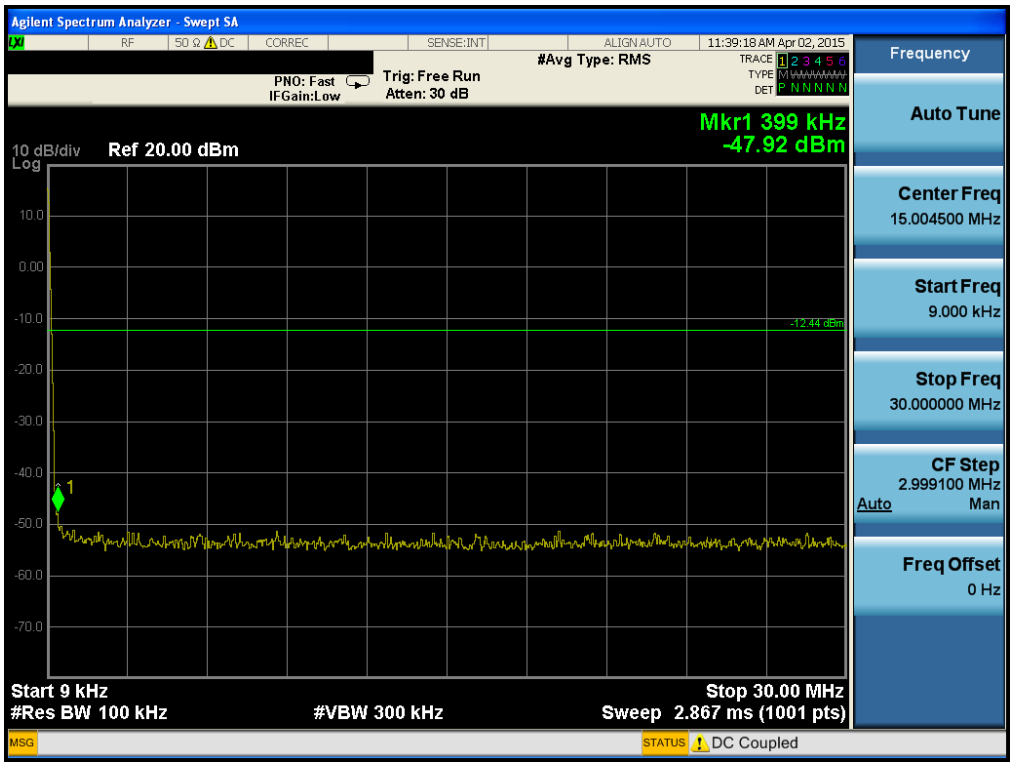
802.11b & 11 Mbps & 2462 MHz

Reference

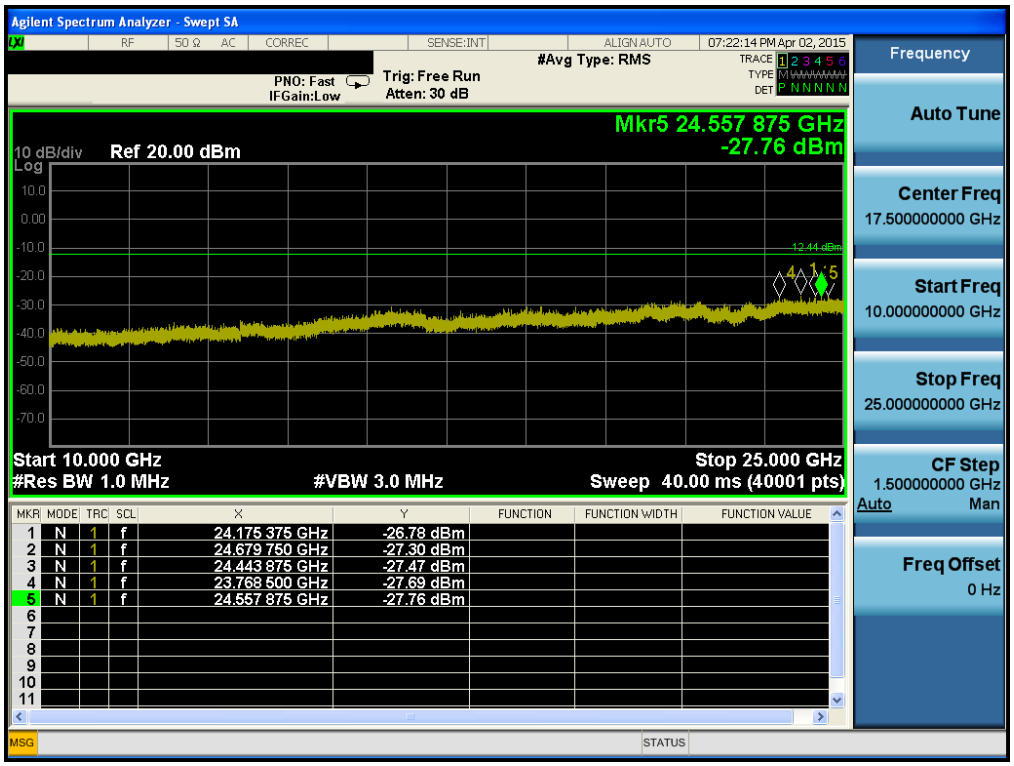
High Band-edge



Conducted Spurious Emissions

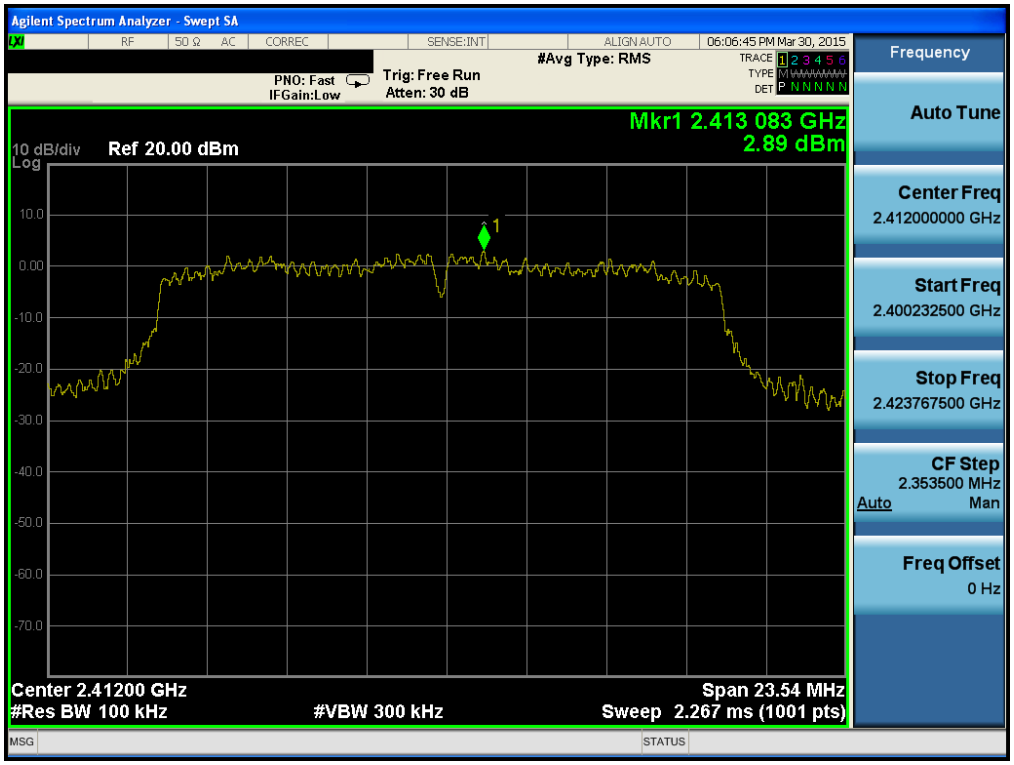


Conducted Spurious Emissions

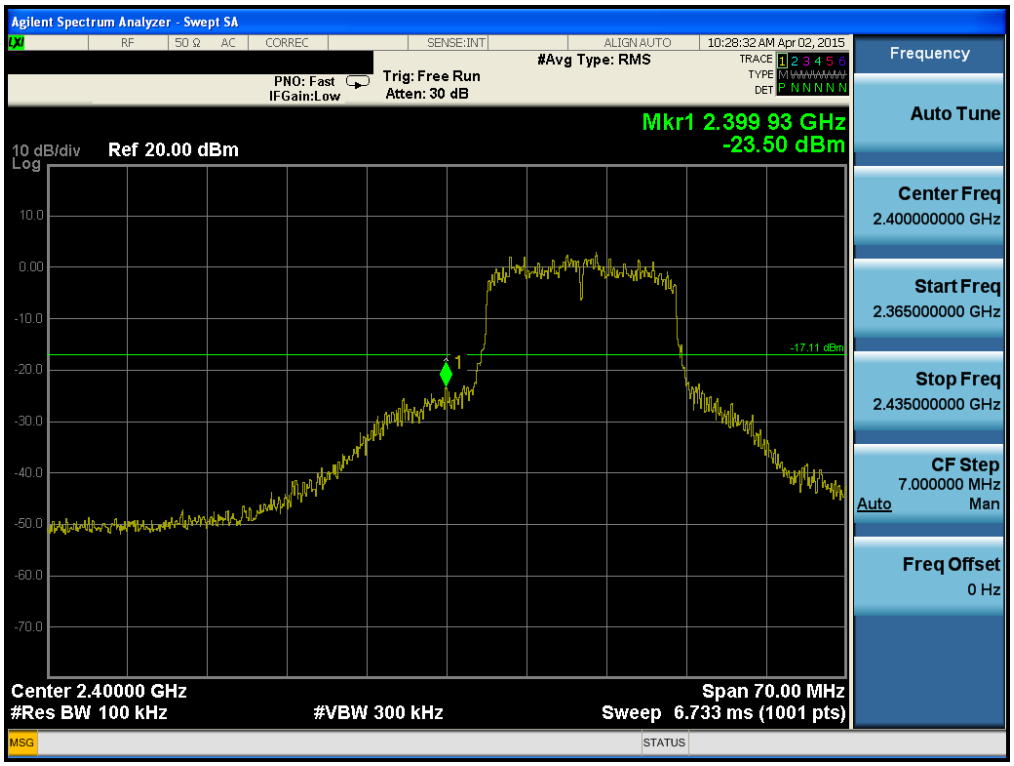


802.11g & 54 Mbps & 2412 MHz

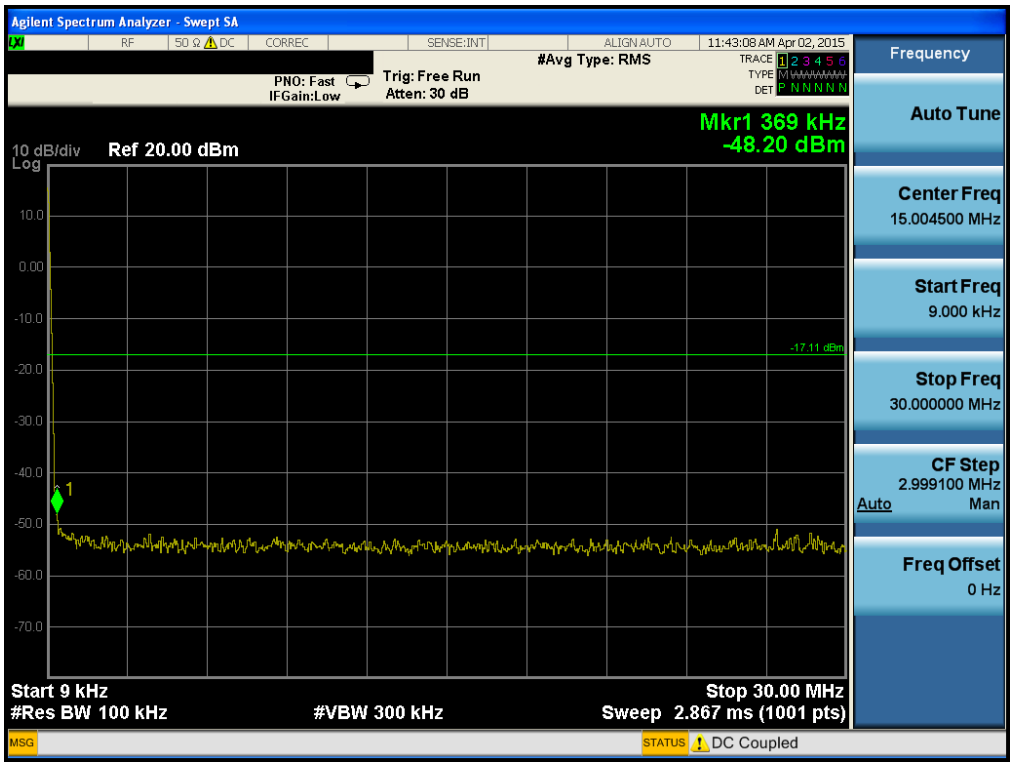
Reference



Low Band-edge



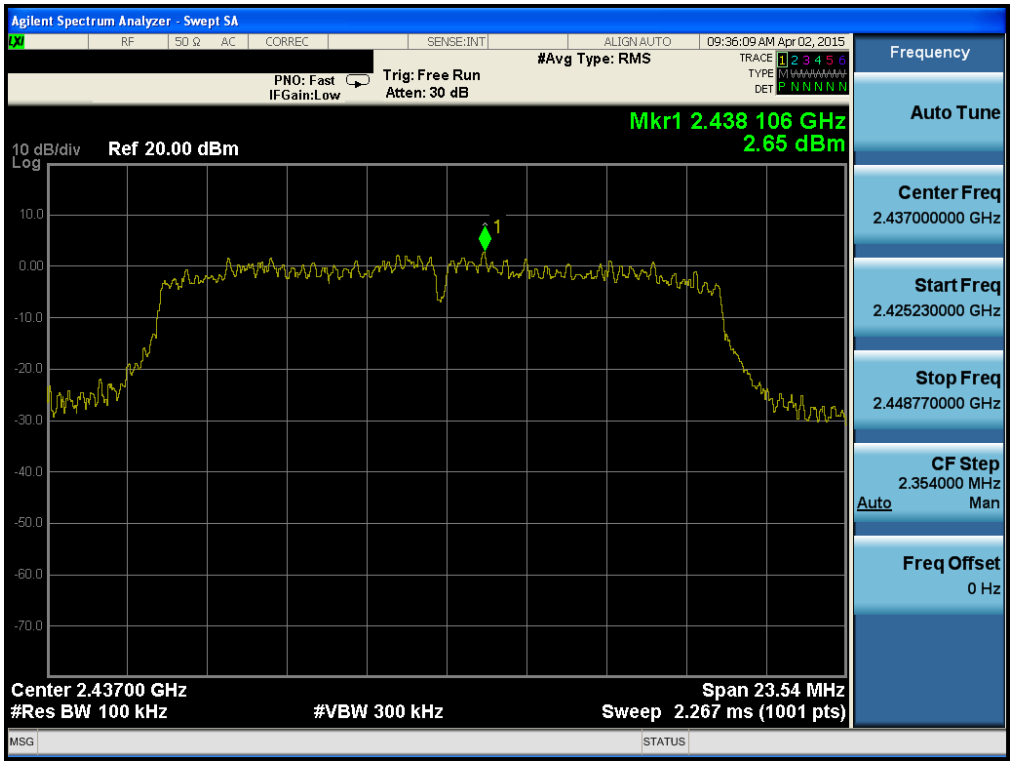
Conducted Spurious Emissions



Conducted Spurious Emissions

802.11g & 54 Mbps & 2437 MHz

Reference



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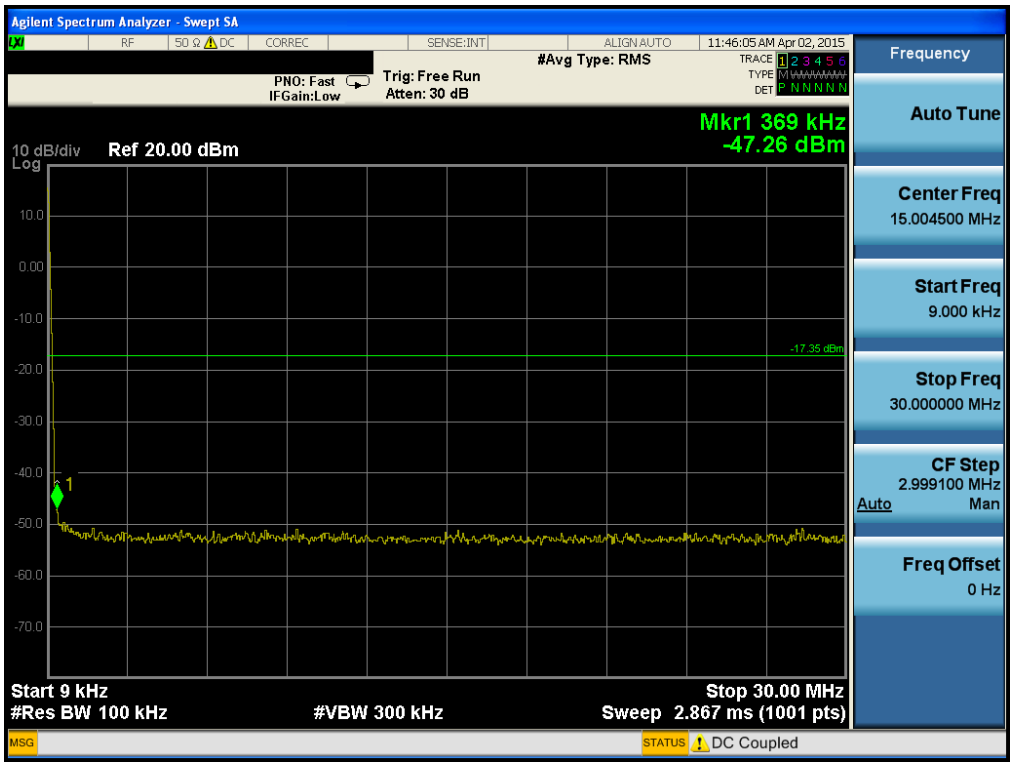
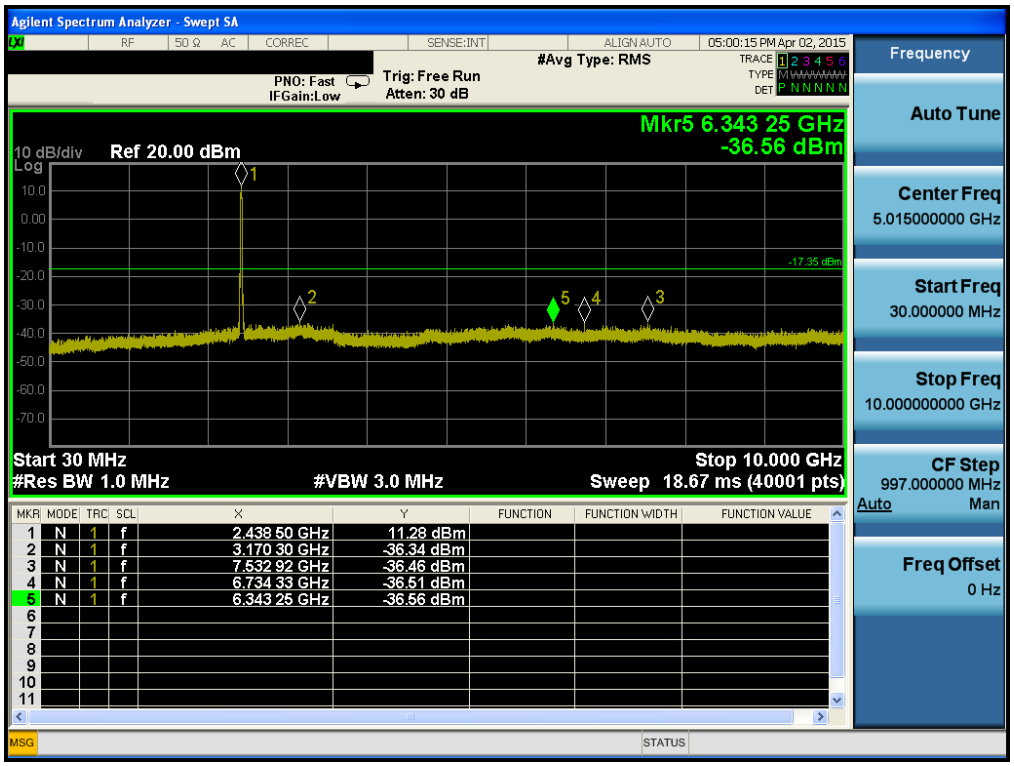
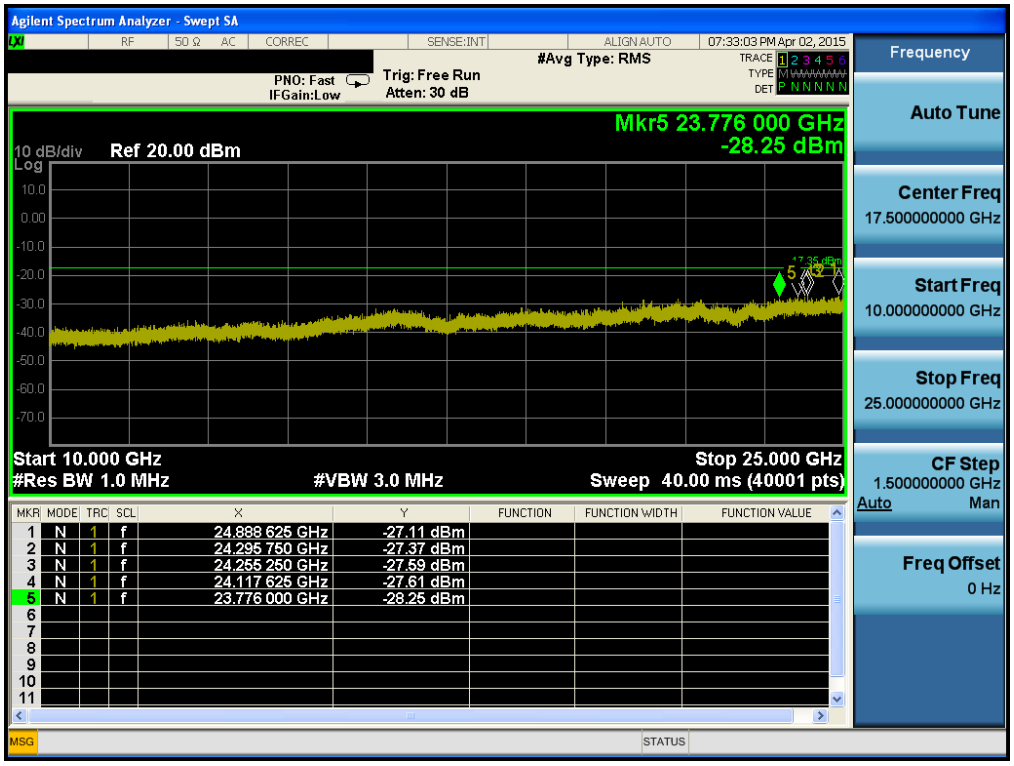


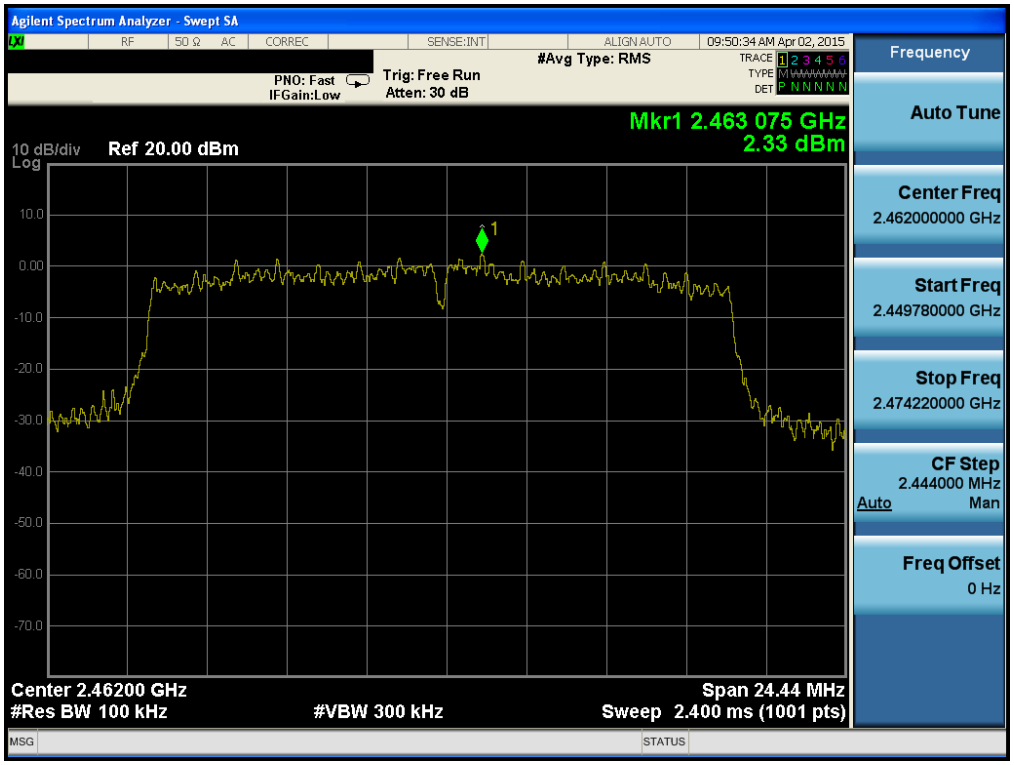
Conducted Spurious Emissions



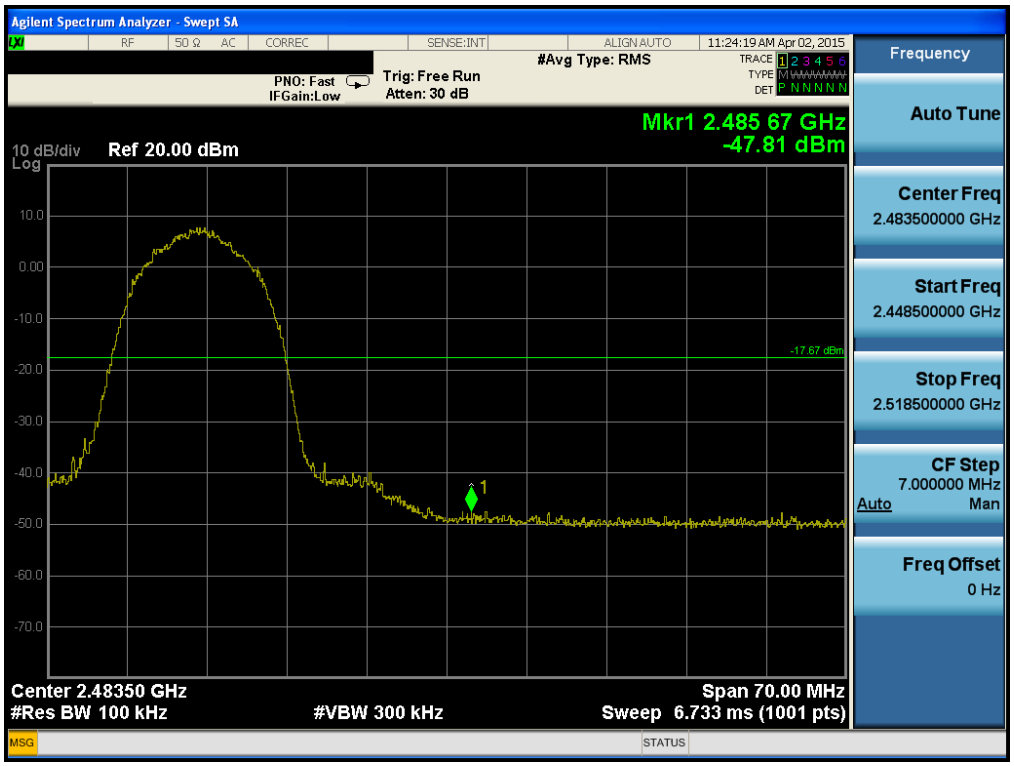


802.11g & 54 Mbps & 2462 MHz

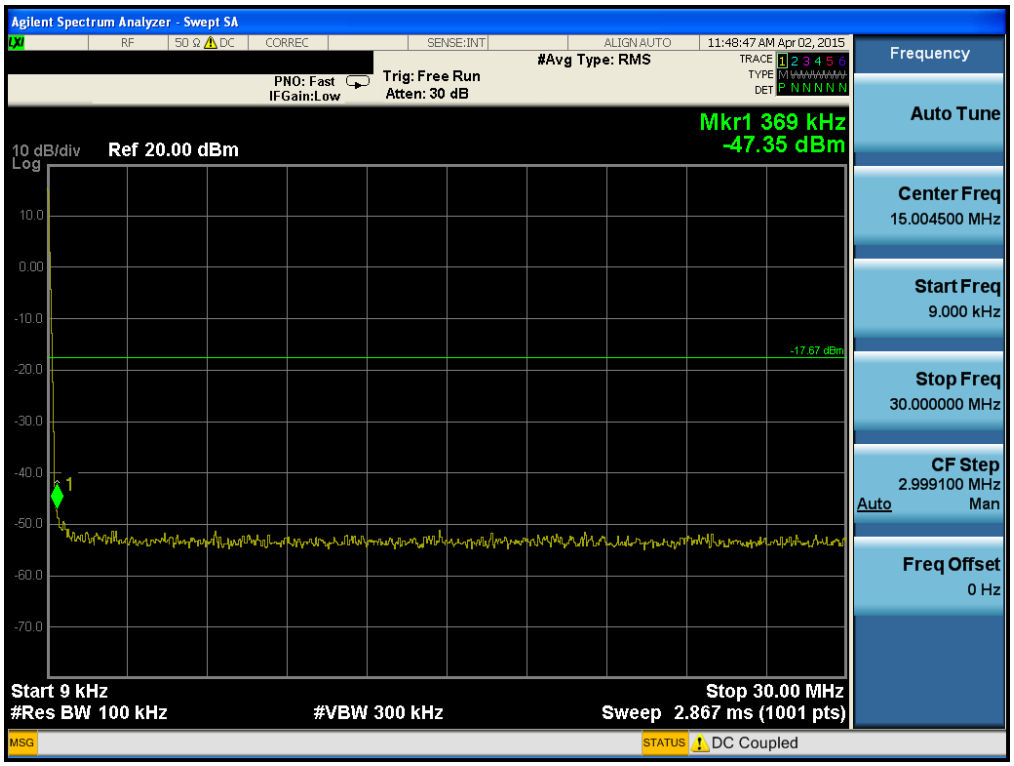
Reference



High Band-edge



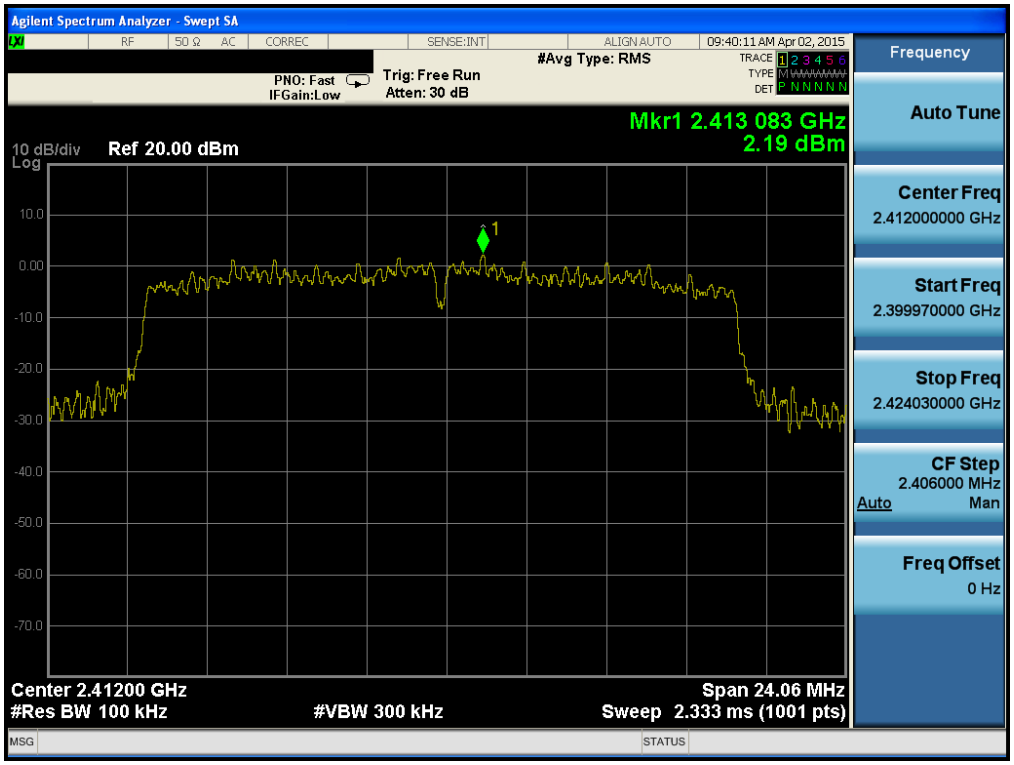
Conducted Spurious Emissions



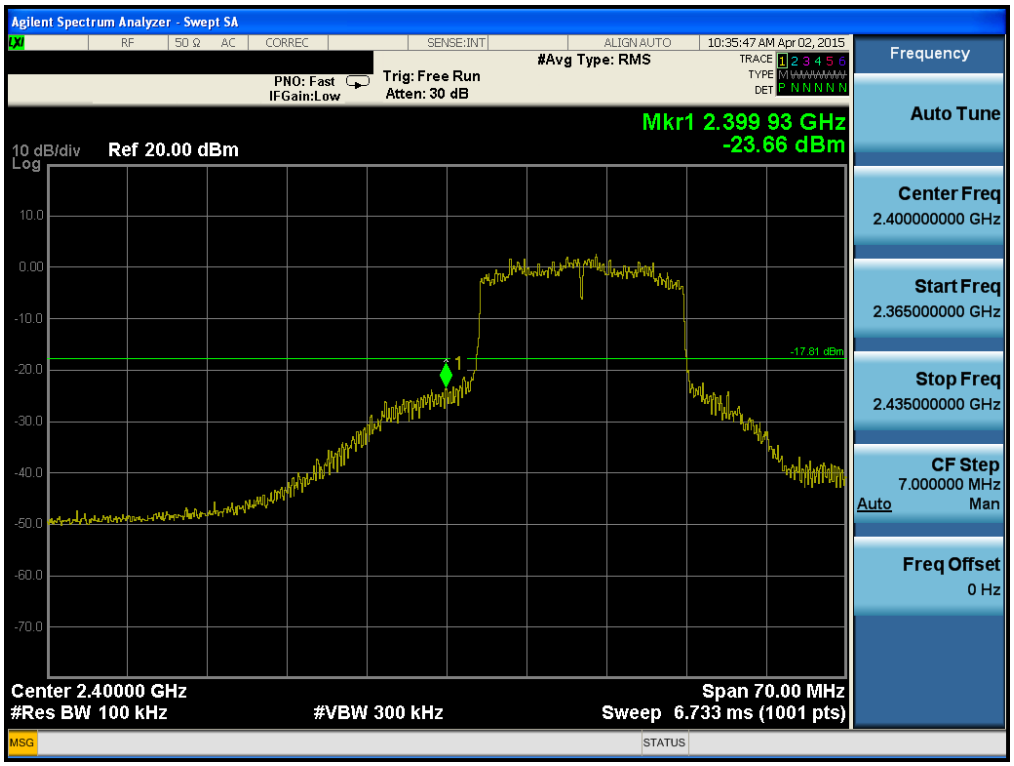
Conducted Spurious Emissions

802.11n(HT20) & MCS 7 & 2412 MHz

Reference



Low Band-edge



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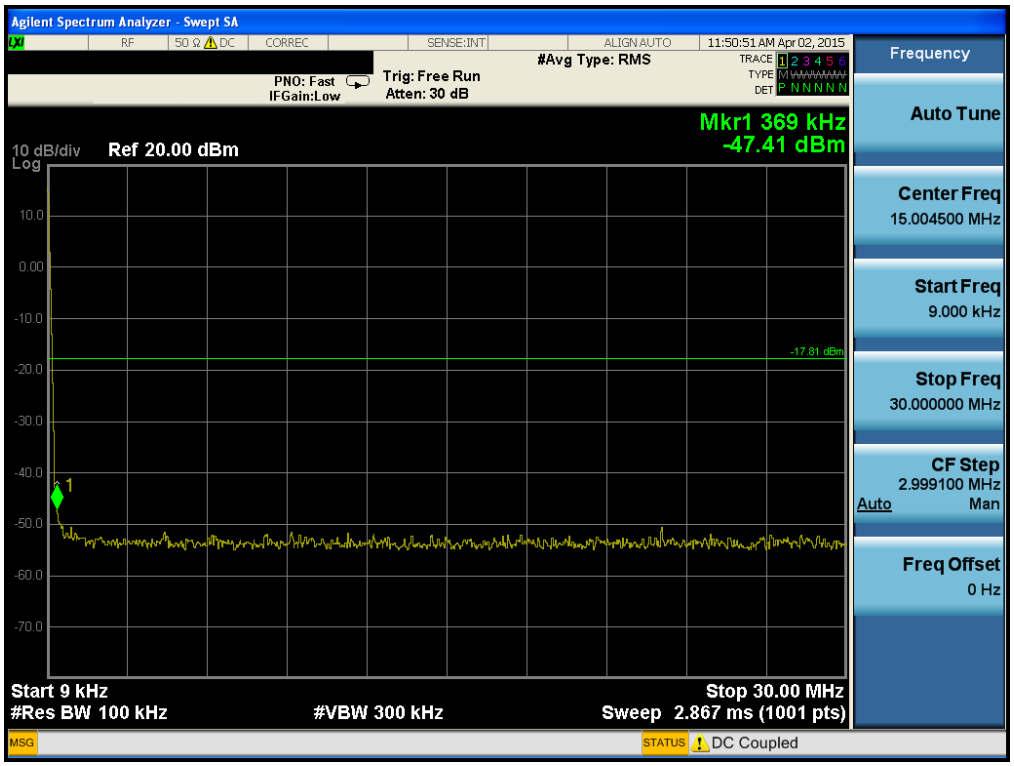
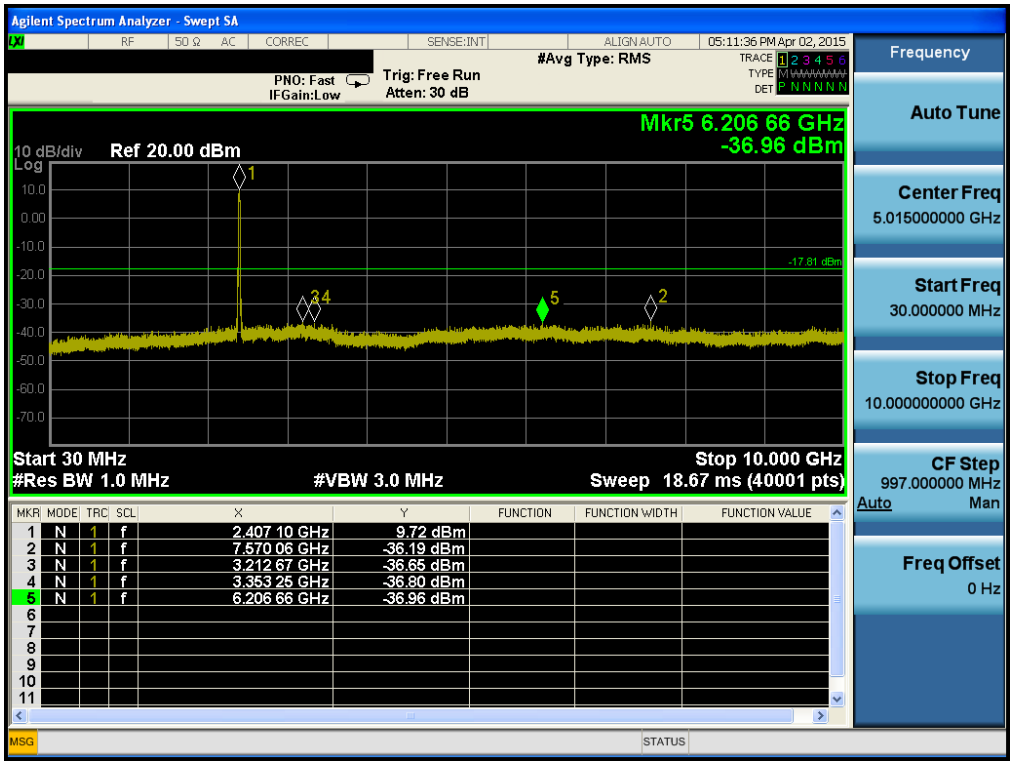
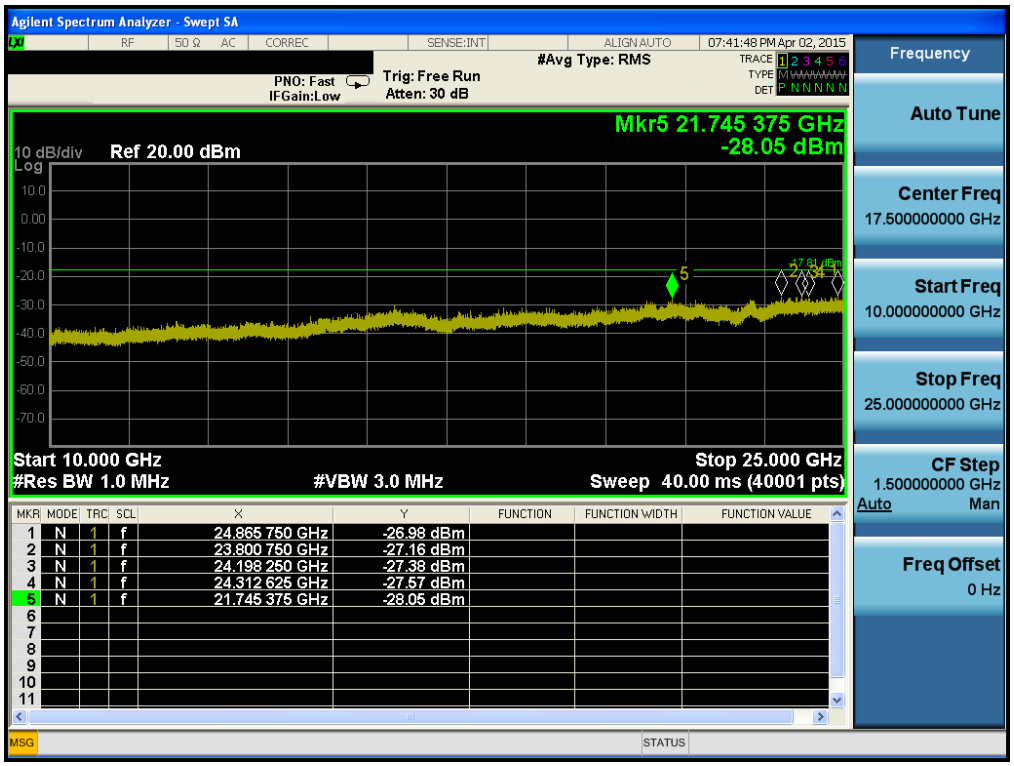


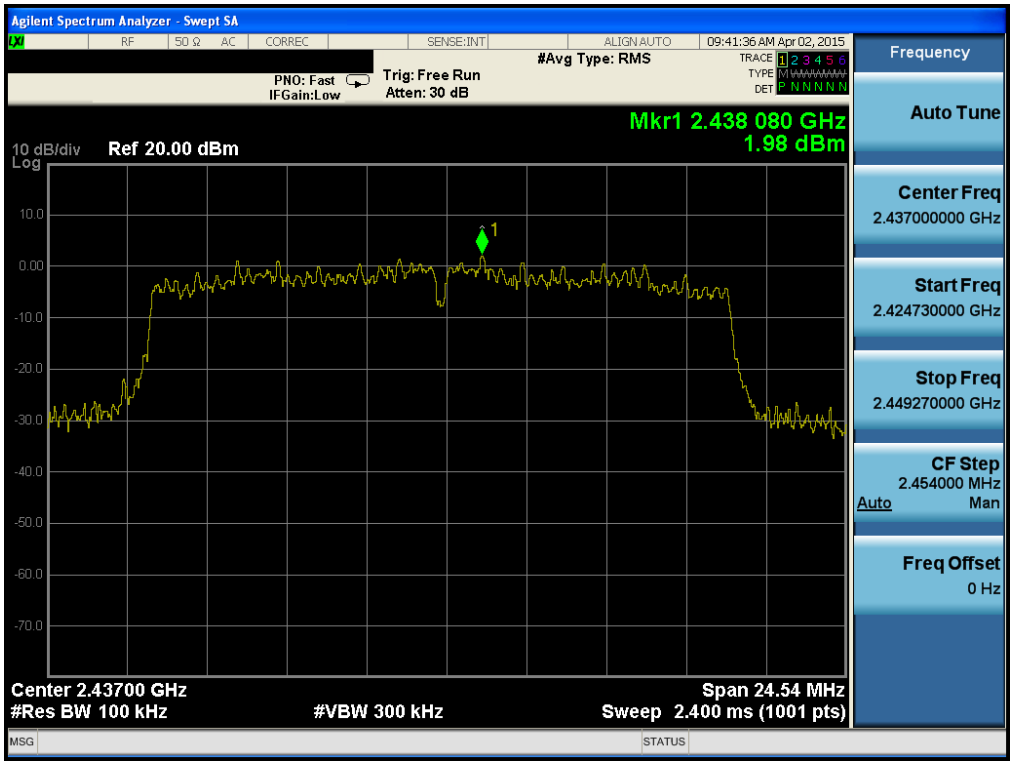


Conducted Spurious Emissions



802.11n(HT20) & MCS 7 & 2437 MHz

Reference



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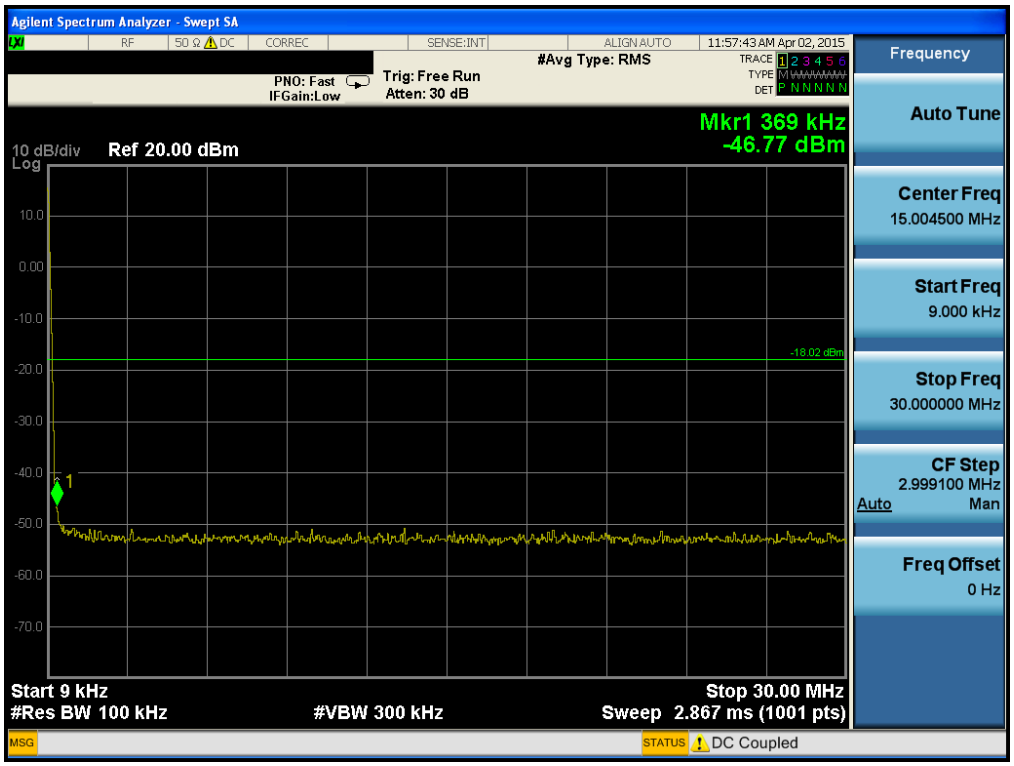

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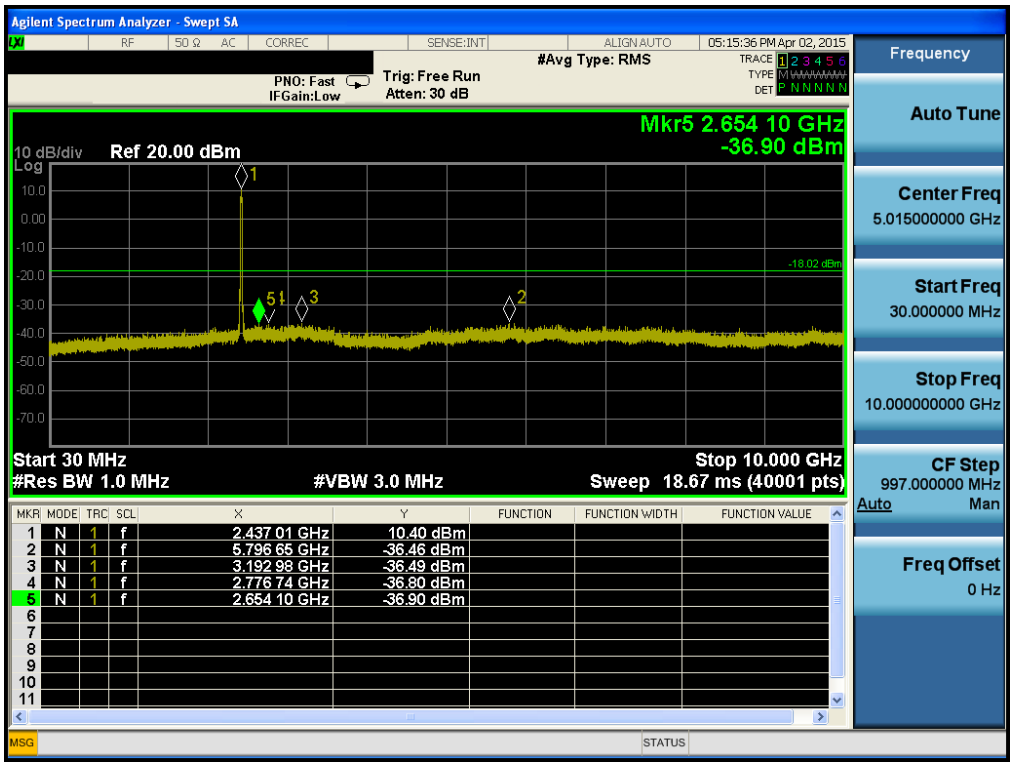
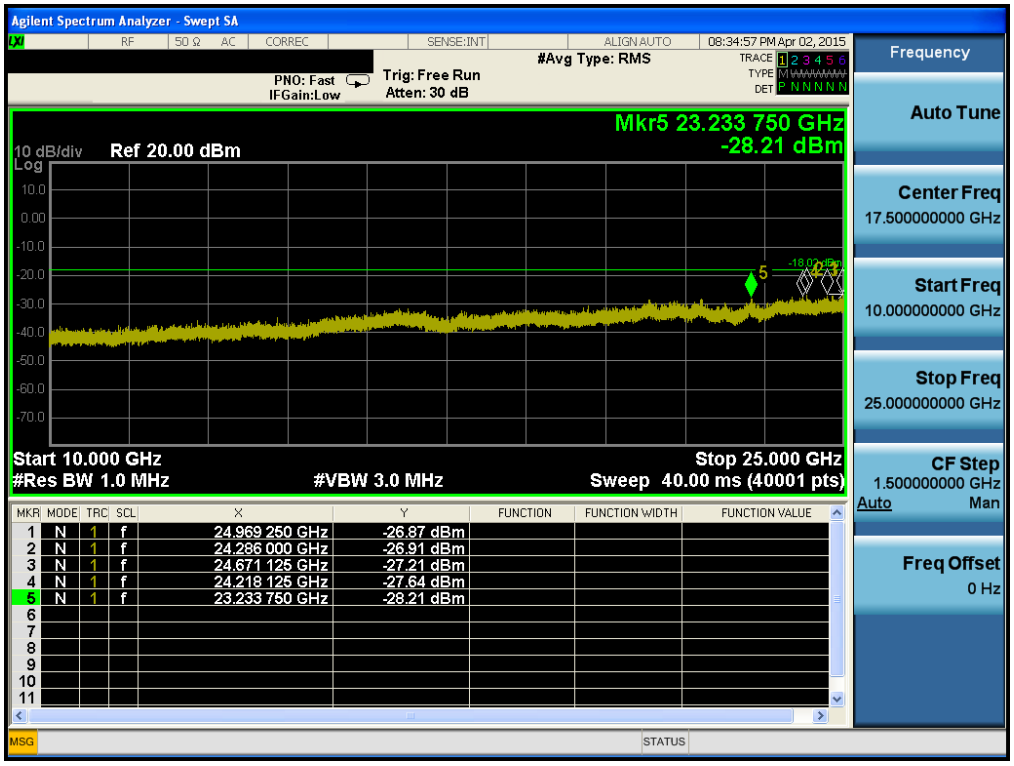
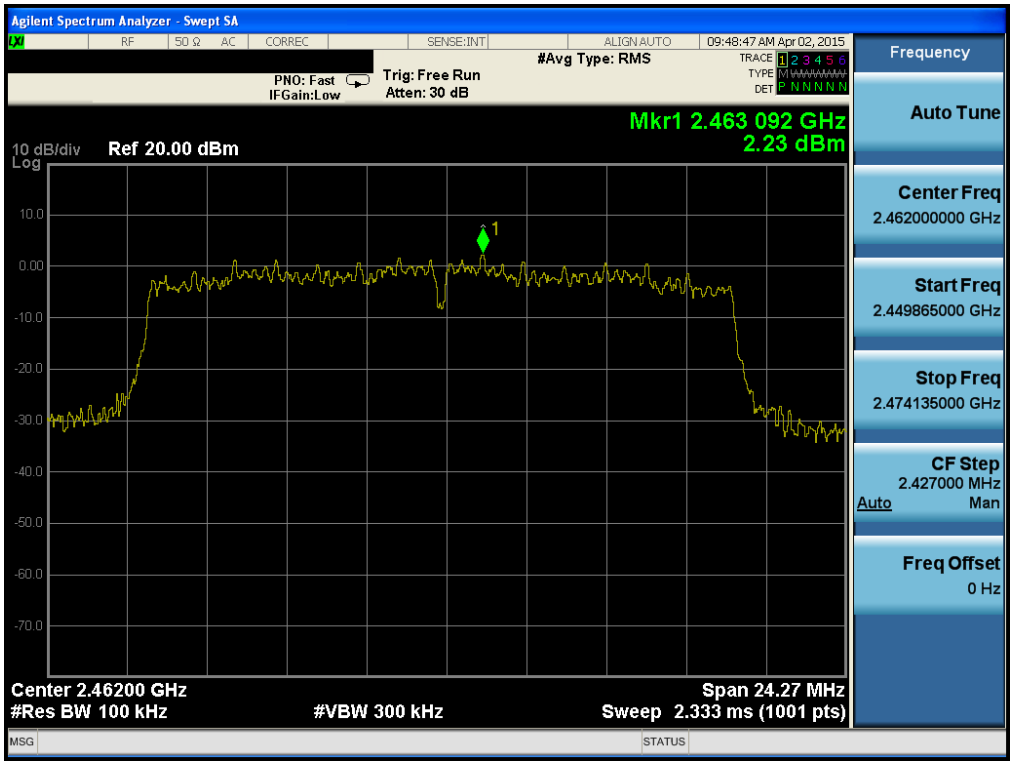


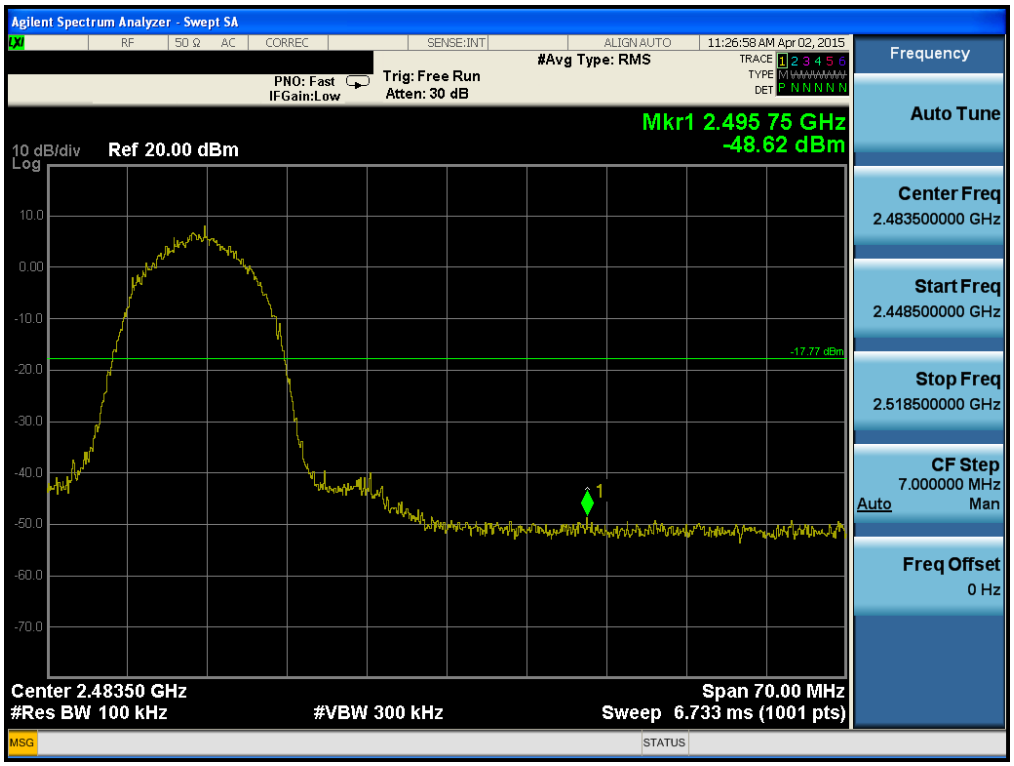


802.11n(HT20) & MCS 7 & 2462 MHz

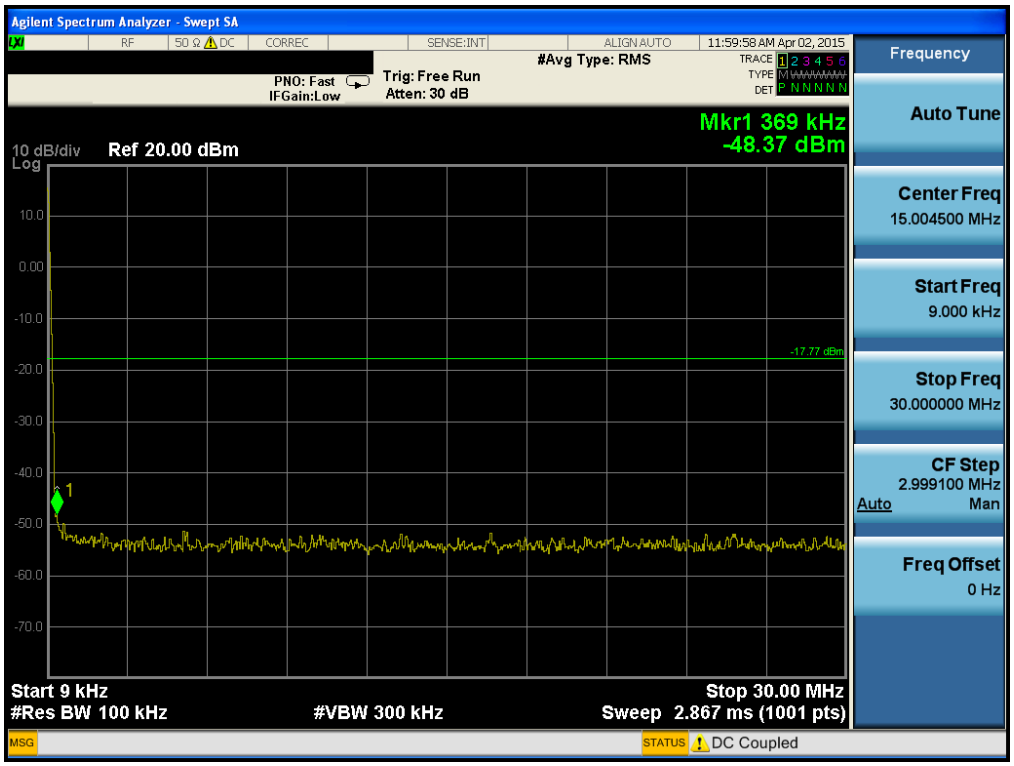
Reference

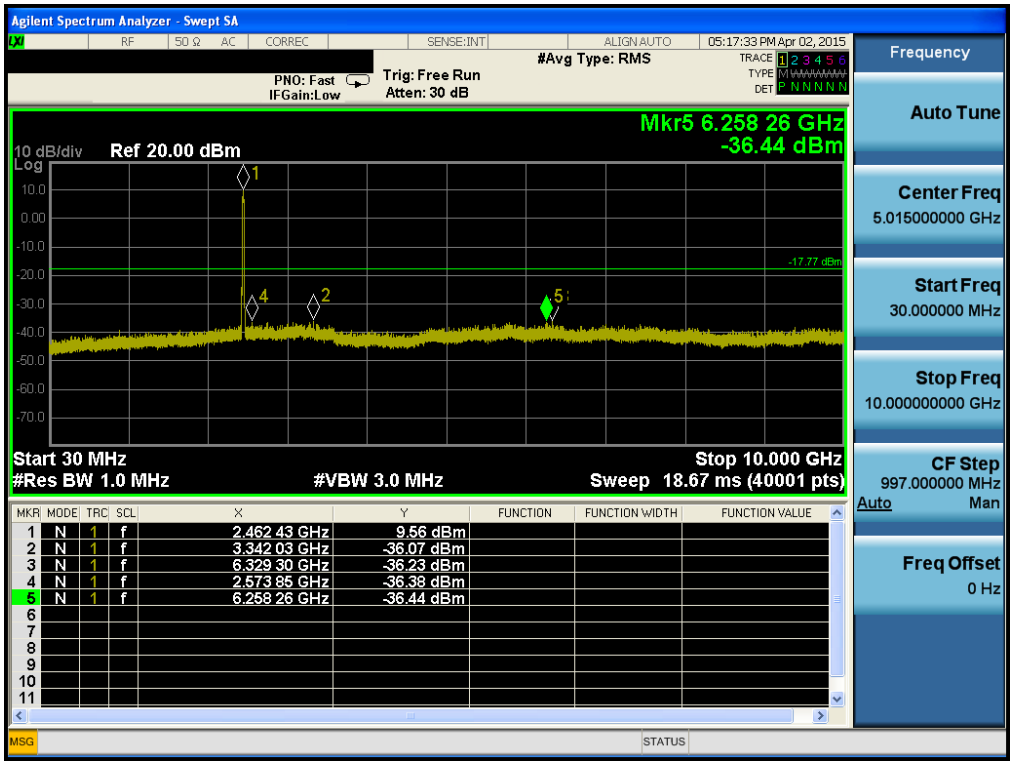


High Band-edge

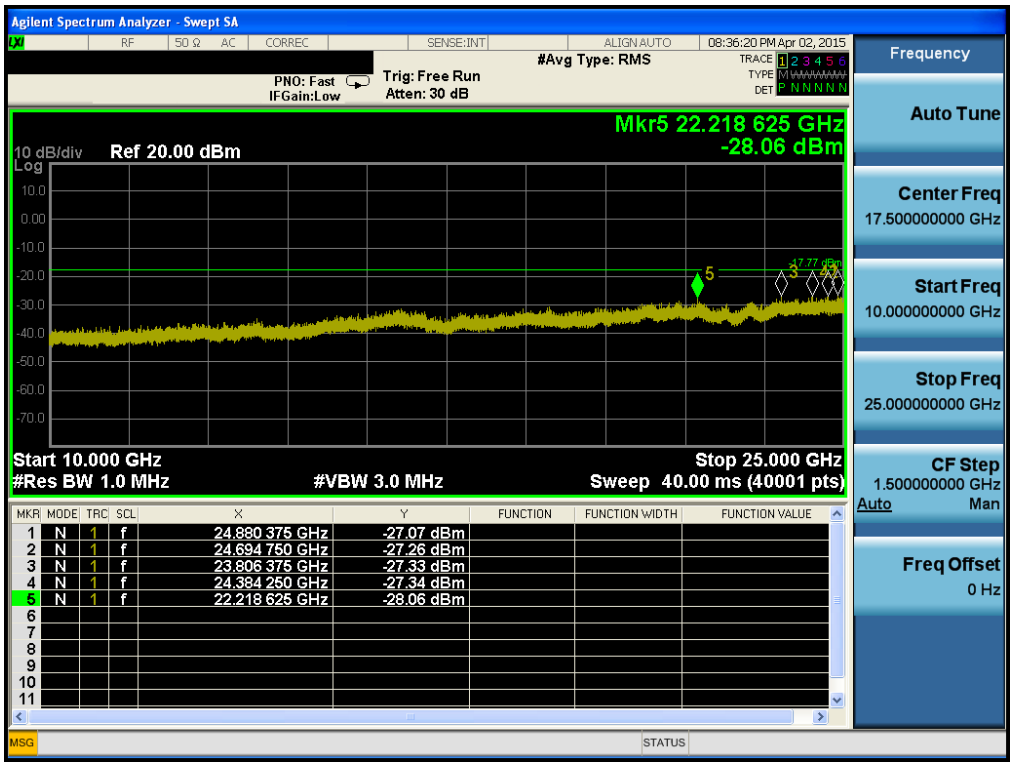


Conducted Spurious Emissions





Conducted Spurious Emissions



8.5 Radiated Spurious Emissions

Test Requirements and limit,

§15.247(d), §15.205, §15.209 & RSS-210 [A8.5], RSS-Gen [8.9], RSS-Gen [8.10]

In any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a) and (b), then the 15.209(a) limit in the table below has to be followed

▪ **FCC Part 15.209(a) and (b)**

Frequency (MHz)	Limit (uV/m)	Measurement Distance (meter)
0.009 – 0.490	2400/F(KHz)	300
0.490 – 1.705	24000/F(KHz)	30
1.705 – 30.0	30	30
30 ~ 88	100 **	3
88 ~ 216	150 **	3
216 ~ 960	200 **	3
Above 960	500	3

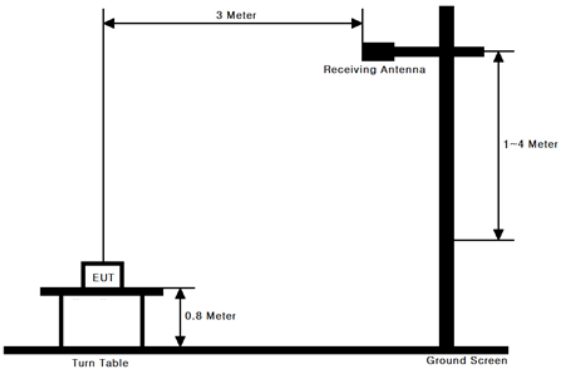
** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

▪ **FCC Part 15.205 (a):** Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	MHz	GHz	GHz
0.009 ~ 0.110	8.41425 ~ 8.41475	108 ~ 121.94	1300 ~ 1427	4.5 ~ 5.15	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1435 ~ 1626.5	5.35 ~ 5.46	15.35 ~ 16.2
2.1735 ~ 2.1905	12.51975 ~	149.9 ~ 150.05	1645.5 ~ 1646.5	7.25 ~ 7.75	17.7 ~ 21.4
4.125 ~ 4.128	12.52025	156.52475 ~	1660 ~ 1710	8.025 ~ 8.5	22.01 ~ 23.12
4.17725 ~ 4.17775	12.57675 ~	156.52525	1718.8 ~ 1722.2	9.0 ~ 9.2	23.6 ~ 24.0
4.20725 ~ 4.20775	12.57725	156.7 ~ 156.9	2200 ~ 2300	9.3 ~ 9.5	31.2 ~ 31.8
6.215 ~ 6.218	13.36 ~ 13.41	162.0125 ~ 167.17	2310 ~ 2390	10.6 ~ 12.7	36.43 ~ 36.5
6.26775 ~ 6.26825	16.42 ~ 16.423	167.72 ~ 173.2	2483.5 ~ 2500	13.25 ~ 13.4	Above 38.6
6.31175 ~ 6.31225	16.69475 ~	240 ~ 285	2655 ~ 2900		
8.291 ~ 8.294	16.69525	322 ~ 335.4	3260 ~ 3267		
8.362 ~ 8.366	16.80425 ~	399.90 ~ 410	3332 ~ 3339		
8.37625 ~ 8.38675	16.80475	608 ~ 614	3345.8 ~ 3358		
	25.5 ~ 25.67	960 ~ 1240	3600 ~ 4400		
	37.5 ~ 38.25				
	73 ~ 74.6				
	74.8 ~ 75.2				

▪ **FCC Part 15.205(b):** The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

Test Configuration



▣ TEST PROCEDURE

1. The EUT is placed on a non-conductive table, which is 0.8 m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.

▣ Measurement Instrument Setting for Radiated Emission Measurements.

The radiated emission was tested according to the section 6.3 6.4, 6.5 and 6.6 of the ANSI C63.10-2009 with following settings.

Peak Measurement :

RBW = As specified in below table , VBW ≥ 3 x RBW, Sweep = Auto, Detector = Peak, Trace mode = Max Hold until the trace stabilizes.

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

Average Measurement :

1.RBW = 1 MHz (unless otherwise specified).
2. VBW ≥ 3 x RBW.
3. Detector = RMS (Number of points ≥ 2 x Span / RBW)
4. Averaging type = power (i.e., RMS).
5. Sweep time = auto.
6. Perform a trace average of at least 100 traces.
7. A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:

1) If power averaging (RMS) mode was used in step 4, then the applicable correction factor is 10 log(1/x), where x is the duty cycle.
2) If linear voltage averaging mode was used in step 4, then the applicable correction factor is 20 log(1/x), where x is the duty cycle.
3) If a specific emission is demonstrated to be continuous (≥ 98 percent duty cycle) rather than turning on and off with the transmit cycle, then no duty cycle correction is required for that emission.

Duty Cycle Corrections (Refer to appendix II for duty cycle measurement procedure and plots)

Power Supply	Band	Duty Cycle(%)	T_{on}(ms)	T_{on}+ T_{off}(ms)	DCF = 10log(1/Duty) (dB)
DC 5V	802.11b	96.95	0.954	0.984	0.13
	802.11g	85.17	0.179	0.210	0.70
	802.11n(HT20)	85.17	0.179	0.210	0.70
DC 48V (PoE)	802.11b	97.25	0.954	0.981	0.12
	802.11g	85.17	0.179	0.210	0.70
	802.11n(HT20)	85.17	0.179	0.210	0.70

9 kHz ~ 25 GHz Data(*802.11b & 11 Mbps*) *DC 5V*

▪ Lowest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2387.92	H	Z	PK	55.04	2.76	0.00	N/A	57.80	74.00	16.20
2388.00	H	Z	AV	44.43	2.76	0.13	N/A	47.32	54.00	6.68
4829.46	H	X	PK	43.00	9.55	0.00	N/A	52.55	74.00	21.45
4829.20	H	X	AV	34.49	9.55	0.13	N/A	44.17	54.00	9.83
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

▪ Middle Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4875.14	H	X	PK	42.90	9.80	0.00	N/A	52.70	74.00	21.30
4875.22	H	X	AV	34.06	9.80	0.13	N/A	43.99	54.00	10.01
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

▪ Highest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2488.60	H	Z	PK	58.24	2.83	0.00	N/A	61.07	74.00	12.93
2488.11	H	Z	AV	47.55	2.83	0.13	N/A	50.51	54.00	3.49
4924.96	H	Z	PK	43.62	10.04	0.00	N/A	53.66	74.00	20.34
4824.66	H	Z	AV	34.06	10.04	0.13	N/A	44.23	54.00	9.77
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Note.

1. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz.
   So Distance Correction Factor :- 9.54dB = 20*log(1m/3m)
2. No other spurious and harmonic emissions were found greater than listed emissions on above table.
3. Above listed point data is the worst case data.
4. Sample Calculation.

Margin = Limit – Result / Result = Reading + T.F+ DCF + Distance Factor / T.F = AF + CL – AG
Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
DCF = Duty Cycle Correction Factor.

9 kHz ~ 25 GHz Data(*802.11g & 54 Mbps*) *DC 5V*

▪ Lowest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2389.12	H	Y	PK	61.14	2.76	0.00	N/A	63.90	74.00	10.10
2389.46	H	Y	AV	48.55	2.76	0.70	N/A	52.01	54.00	1.99
4820.18	H	X	PK	45.46	9.55	0.00	N/A	55.01	74.00	18.99
4820.26	H	X	AV	33.73	9.55	0.70	N/A	43.98	54.00	10.02
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

▪ Middle Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4868.86	H	X	PK	42.53	9.80	0.00	N/A	52.33	74.00	21.67
4868.70	H	X	AV	34.14	9.80	0.70	N/A	44.64	54.00	9.36
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

▪ Highest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2484.04	H	X	PK	57.61	2.83	0.00	N/A	60.44	74.00	13.56
2483.58	H	X	AV	46.22	2.83	0.70	N/A	49.75	54.00	4.25
4926.86	H	X	PK	44.39	10.04	0.00	N/A	54.43	74.00	19.57
4926.40	H	X	AV	34.14	10.04	0.70	N/A	44.88	54.00	9.12
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Note.

1. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz.
   So Distance Correction Factor :- 9.54dB = 20*log(1m/3m)
2. No other spurious and harmonic emissions were found greater than listed emissions on above table.
3. Above listed point data is the worst case data.
4. Sample Calculation.

   Margin = Limit – Result / Result = Reading + T.F+ DCF + Distance Factor / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
   DCF = Duty Cycle Correction Factor.

9 kHz ~ 25 GHz Data(*802.11n HT20 & MCS 7*) *DC 5V*

▪ Lowest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2389.84	H	Z	PK	61.78	2.76	0.00	N/A	64.54	74.00	9.46
2389.60	H	Z	AV	48.75	2.76	0.70	N/A	52.21	54.00	1.79
4831.20	H	X	PK	34.54	9.55	0.00	N/A	44.09	74.00	29.92
4831.30	H	X	AV	33.47	9.55	0.70	N/A	43.72	54.00	10.28
-	-	-	-	-	-	-	-	-	-	-

▪ Middle Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4878.20	H	X	PK	42.99	9.80	0.00	N/A	52.79	74.00	21.21
4878.00	H	X	AV	34.01	9.80	0.70	N/A	44.51	54.00	9.49
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

▪ Highest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2483.52	H	X	PK	60.05	2.83	0.00	N/A	62.88	74.00	11.12
2483.57	H	X	AV	48.22	2.83	0.70	N/A	51.75	54.00	2.25
4918.52	H	X	PK	42.99	10.04	0.00	N/A	53.03	74.00	20.97
4918.56	H	X	AV	34.10	10.04	0.70	N/A	44.84	54.00	9.16
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Note.

1. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz.
   So Distance Correction Factor :- 9.54dB = 20*log(1m/3m)
2. No other spurious and harmonic emissions were found greater than listed emissions on above table.
3. Above listed point data is the worst case data.
4. Sample Calculation.

   Margin = Limit – Result / Result = Reading + T.F+ DCF + Distance Factor / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
   DCF = Duty Cycle Correction Factor.

9 kHz ~ 25 GHz Data(*802.11b & 11 Mbps*) *DC 48V(PoE)*

▪ Lowest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2388.64	H	Z	PK	55.44	2.76	0.00	N/A	58.20	74.00	15.80
2375.04	H	Z	AV	44.64	2.76	0.13	N/A	47.53	54.00	6.47
4829.46	H	X	PK	43.00	9.55	0.00	N/A	52.55	74.00	21.45
4829.20	H	X	AV	34.49	9.55	0.13	N/A	44.17	54.00	9.83
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

▪ Middle Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4875.14	H	X	PK	42.90	9.80	0.00	N/A	52.70	74.00	21.30
4875.22	H	X	AV	34.06	9.80	0.13	N/A	43.99	54.00	10.01
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

▪ Highest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2487.34	H	Z	PK	57.95	2.83	0.00	N/A	60.78	74.00	13.22
2487.21	H	Z	AV	47.86	2.83	0.13	N/A	50.82	54.00	3.18
4924.96	H	Z	PK	43.62	10.04	0.00	N/A	53.66	74.00	20.34
4824.66	H	Z	AV	34.06	10.04	0.13	N/A	44.23	54.00	9.77
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Note.

1. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz.
   So Distance Correction Factor :- 9.54dB = 20*log(1m/3m)
2. No other spurious and harmonic emissions were found greater than listed emissions on above table.
3. Above listed point data is the worst case data.
4. Sample Calculation.

Margin = Limit – Result / Result = Reading + T.F+ DCF + Distance Factor / T.F = AF + CL – AG
Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
DCF = Duty Cycle Correction Factor.

9 kHz ~ 25 GHz Data(*802.11g & 54 Mbps*) *DC 48V(PoE)*

▪ Lowest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2389.22	H	Y	PK	61.16	2.76	0.00	N/A	63.92	74.00	10.08
2388.94	H	Y	AV	48.34	2.76	0.70	N/A	51.80	54.00	2.20
4820.18	H	X	PK	45.46	9.55	0.00	N/A	55.01	74.00	18.99
4820.26	H	X	AV	33.73	9.55	0.70	N/A	43.98	54.00	10.02
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

▪ Middle Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4868.86	H	X	PK	42.53	9.80	0.00	N/A	52.33	74.00	21.67
4868.70	H	X	AV	34.14	9.80	0.70	N/A	44.64	54.00	9.36
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

▪ Highest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2484.13	H	X	PK	58.16	2.83	0.00	N/A	60.99	74.00	13.01
2484.23	H	X	AV	46.12	2.83	0.70	N/A	49.65	54.00	4.35
4926.86	H	X	PK	44.39	10.04	0.00	N/A	54.43	74.00	19.57
4926.40	H	X	AV	34.14	10.04	0.70	N/A	44.88	54.00	9.12
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Note.

1. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz.
   So Distance Correction Factor :- 9.54dB = 20*log(1m/3m)
2. No other spurious and harmonic emissions were found greater than listed emissions on above table.
3. Above listed point data is the worst case data.
4. Sample Calculation.

   Margin = Limit – Result / Result = Reading + T.F+ DCF + Distance Factor / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
   DCF = Duty Cycle Correction Factor.

9 kHz ~ 25 GHz Data(*802.11n HT20 & MCS 7*) *DC 48V(PoE)*

▪ Lowest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2389.20	H	Z	PK	61.77	2.76	0.00	N/A	64.53	74.00	9.47
2389.76	H	Z	AV	48.71	2.76	0.70	N/A	52.17	54.00	1.83
4831.20	H	X	PK	34.54	9.55	0.00	N/A	44.09	74.00	29.92
4831.30	H	X	AV	33.47	9.55	0.70	N/A	43.72	54.00	10.28
-	-	-	-	-	-	-	-	-	-	-

▪ Middle Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4878.20	H	X	PK	42.99	9.80	0.00	N/A	52.79	74.00	21.21
4878.00	H	X	AV	34.01	9.80	0.70	N/A	44.51	54.00	9.49
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

▪ Highest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2483.87	H	X	PK	60.02	2.83	0.00	N/A	62.85	74.00	11.15
2483.63	H	X	AV	48.51	2.83	0.70	N/A	52.04	54.00	1.96
4918.52	H	X	PK	42.99	10.04	0.00	N/A	53.03	74.00	20.97
4918.56	H	X	AV	34.10	10.04	0.70	N/A	44.84	54.00	9.16
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Note.

1. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz.
   So Distance Correction Factor :- 9.54dB = 20*log(1m/3m)
2. No other spurious and harmonic emissions were found greater than listed emissions on above table.
3. Above listed point data is the worst case data.
4. Sample Calculation.

   Margin = Limit – Result / Result = Reading + T.F+ DCF + Distance Factor / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
   DCF = Duty Cycle Correction Factor.

8.6 Power-line conducted emissions

Test Requirements and limit, §15.207& RSS-Gen [8.8]

For an intentional radiator which 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 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

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 PROCEDURE

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to the test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.

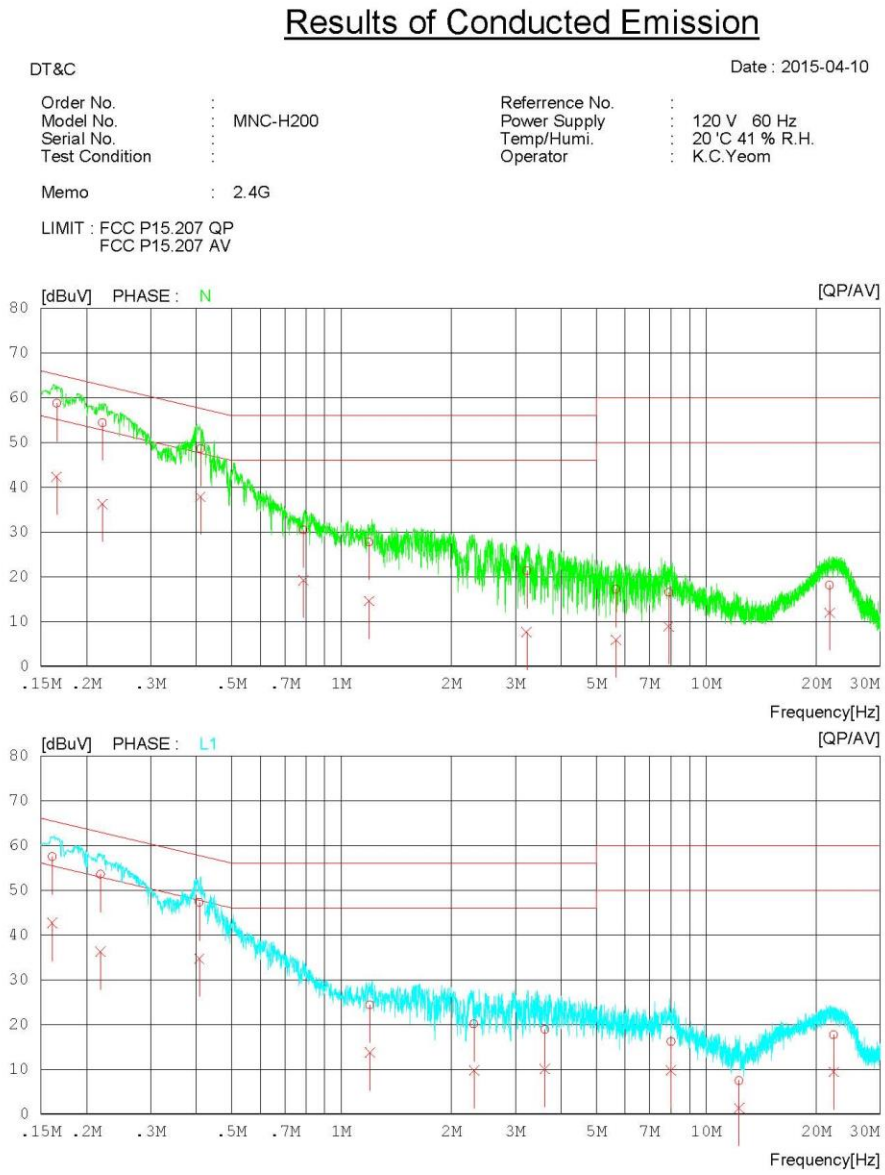
▣ Test Results: Comply(Refer to next page.)

The worst data was reported.

▣RESULT PLOTS

AC Line Conducted Emissions (Graph)

Test Mode: 802.11b & 11 Mbps & 2412 MHz & DC 5V



AC Line Conducted Emissions (List)

Test Mode: 802.11b & 11 Mbps & 2412 MHz & DC 5V

Results of Conducted Emission

DT&C

Date : 2015-04-10

Order No.	:		Referrence No.	:
Model No.	:	MNC-H200	Power Supply	: 120 V 60 Hz
Serial No.	:		Temp/Humi.	: 20 'C 41 % R.H.
Test Condition	:		Operator	: K.C.Yeom

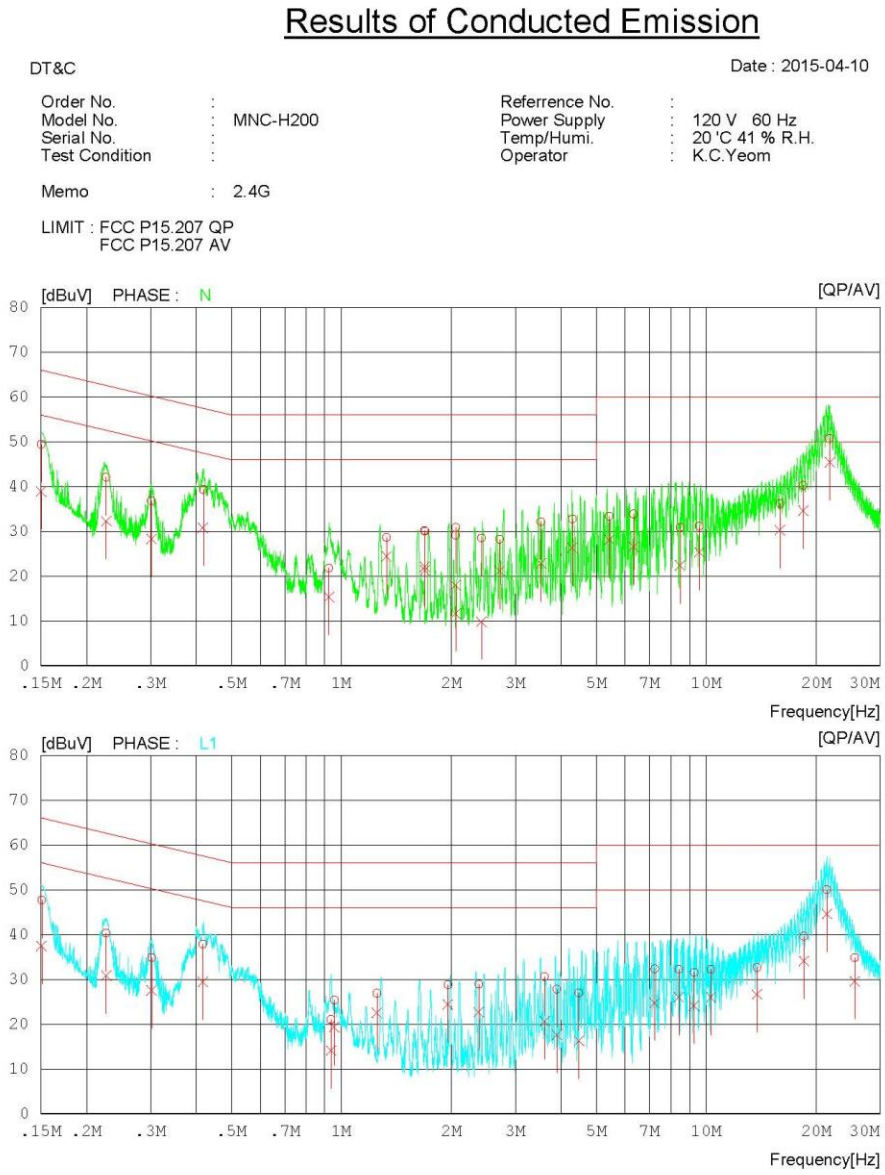
Memo : 2.4G

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

NO	FREQ	READING QP	READING AV	C.FACTOR	RESULT QP	RESULT AV	LIMIT QP	LIMIT AV	MARGIN QP	MARGIN AV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.16570	56.9	40.5	1.8	58.7	42.3	65.2	55.2	6.5	12.9	N
2	0.22130	53.1	34.9	1.3	54.4	36.2	62.8	52.8	8.4	16.6	N
3	0.41050	47.7	37.0	0.9	48.6	37.9	57.6	47.6	9.0	9.7	N
4	0.78663	29.8	18.6	0.6	30.4	19.2	56.0	46.0	25.6	26.8	N
5	1.19040	27.2	14.0	0.5	27.7	14.5	56.0	46.0	28.3	31.5	N
6	3.22200	20.8	7.1	0.5	21.3	7.6	56.0	46.0	34.7	38.4	N
7	5.66620	16.7	5.5	0.4	17.1	5.9	60.0	50.0	42.9	44.1	N
8	7.89200	15.9	8.5	0.5	16.4	9.0	60.0	50.0	43.6	41.0	N
9	21.81000	17.5	11.3	0.6	18.1	11.9	60.0	50.0	41.9	38.1	N
10	0.16108	55.6	40.8	1.8	57.4	42.6	65.4	55.4	8.0	12.8	L1
11	0.21844	52.2	34.9	1.3	53.5	36.2	62.9	52.9	9.4	16.7	L1
12	0.40750	46.3	33.8	0.9	47.2	34.7	57.7	47.7	10.5	13.0	L1
13	1.19700	23.8	13.1	0.5	24.3	13.6	56.0	46.0	31.7	32.4	L1
14	2.30920	19.6	9.2	0.5	20.1	9.7	56.0	46.0	35.9	36.3	L1
15	3.61040	18.4	9.5	0.5	18.9	10.0	56.0	46.0	37.1	36.0	L1
16	8.00840	15.7	9.2	0.5	16.2	9.7	60.0	50.0	43.8	40.3	L1
17	12.31820	6.8	0.7	0.6	7.4	1.3	60.0	50.0	52.6	48.7	L1
18	22.37640	17.0	8.7	0.6	17.6	9.3	60.0	50.0	42.4	40.7	L1

AC Line Conducted Emissions (Graph)

Test Mode: 802.11b & 11 Mbps & 2412 MHz & DC 48V(PoE)



AC Line Conducted Emissions (List)

Test Mode: 802.11b & 11 Mbps & 2412 MHz & DC 48V(PoE)

Results of Conducted Emission

DT&C

Date : 2015-04-10

Order No. :
Model No. : MNC-H200
Serial No. :
Test Condition :

Referrence No. :
Power Supply : 120 V 60 Hz
Temp/Humi. : 20 'C 41 % R.H.
Operator : K.C.Yeom

Memo : 2.4G

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

NO	FREQ	READING QP	READING AV	C.FACTOR	RESULT QP	RESULT AV	LIMIT QP	LIMIT AV	MARGIN QP	MARGIN AV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.15040	47.5	37.1	1.9	49.4	39.0	66.0	56.0	16.6	17.0	N
2	0.22644	40.8	31.1	1.2	42.0	32.3	62.6	52.6	20.6	20.3	N
3	0.30129	35.8	27.2	1.0	36.8	28.2	60.2	50.2	23.4	22.0	N
4	0.41759	38.4	29.9	0.9	39.3	30.8	57.5	47.5	18.2	16.7	N
5	0.92341	21.2	14.8	0.5	21.7	15.3	56.0	46.0	34.3	30.7	N
6	1.32960	28.1	23.9	0.5	28.6	24.4	56.0	46.0	27.4	21.6	N
7	1.69200	29.7	21.6	0.4	30.1	22.0	56.0	46.0	25.9	24.0	N
8	1.69540	29.7	20.8	0.4	30.1	21.2	56.0	46.0	25.9	24.8	N
9	2.05640	30.3	17.5	0.5	30.8	18.0	56.0	46.0	25.2	28.0	N
10	2.05640	28.6	11.2	0.5	29.1	11.7	56.0	46.0	26.9	34.3	N
11	2.42040	28.0	9.4	0.5	28.5	9.9	56.0	46.0	27.5	36.1	N
12	2.71320	27.7	20.7	0.5	28.2	21.2	56.0	46.0	27.8	24.8	N
13	3.52400	31.7	22.3	0.5	32.2	22.8	56.0	46.0	23.8	23.2	N
14	4.29620	32.2	25.8	0.5	32.7	26.3	56.0	46.0	23.3	19.7	N
15	5.42620	32.9	27.7	0.4	33.3	28.1	60.0	50.0	26.7	21.9	N
16	6.33020	33.3	26.0	0.5	33.8	26.5	60.0	50.0	26.2	23.5	N
17	8.48120	30.4	21.8	0.5	30.9	22.3	60.0	50.0	29.1	27.7	N
18	9.57600	30.6	24.8	0.5	31.1	25.3	60.0	50.0	28.9	24.7	N
19	15.93980	35.5	29.6	0.6	36.1	30.2	60.0	50.0	23.9	19.8	N
20	18.46600	39.6	34.0	0.6	40.2	34.6	60.0	50.0	19.8	15.4	N
21	21.79520	50.1	44.8	0.6	50.7	45.4	60.0	50.0	9.3	4.6	N
22	0.15079	45.7	35.5	1.9	47.6	37.4	66.0	56.0	18.4	18.6	L1
23	0.22657	38.9	29.5	1.3	40.2	30.8	62.6	52.6	22.4	21.8	L1
24	0.30180	33.8	26.5	1.0	34.8	27.5	60.2	50.2	25.4	22.7	L1
25	0.41747	37.0	28.5	0.9	37.9	29.4	57.5	47.5	19.6	18.1	L1
26	0.93635	20.5	13.6	0.5	21.0	14.1	56.0	46.0	35.0	31.9	L1
27	0.95600	24.8	18.8	0.5	25.3	19.3	56.0	46.0	30.7	26.7	L1
28	1.25160	26.3	21.9	0.5	26.8	22.4	56.0	46.0	29.2	23.6	L1
29	1.96020	28.2	23.8	0.5	28.7	24.3	56.0	46.0	27.3	21.7	L1
30	2.37800	28.3	22.1	0.5	28.8	22.6	56.0	46.0	27.2	23.4	L1
31	3.60480	30.0	20.1	0.5	30.5	20.6	56.0	46.0	25.5	25.4	L1
32	3.89400	27.3	17.1	0.5	27.8	17.6	56.0	46.0	28.2	28.4	L1
33	4.47920	26.5	15.8	0.5	27.0	16.3	56.0	46.0	29.0	29.7	L1
34	7.23200	31.8	24.3	0.5	32.3	24.8	60.0	50.0	27.7	25.2	L1
35	8.40560	31.7	25.5	0.5	32.2	26.0	60.0	50.0	27.8	24.0	L1
36	9.26660	30.9	23.5	0.5	31.4	24.0	60.0	50.0	28.6	26.0	L1
37	10.31200	31.7	25.4	0.5	32.2	25.9	60.0	50.0	27.8	24.1	L1
38	13.78580	32.0	26.0	0.6	32.6	26.6	60.0	50.0	27.4	23.4	L1
39	18.53880	38.9	33.4	0.6	39.5	34.0	60.0	50.0	20.5	16.0	L1
40	21.43840	49.3	43.8	0.7	50.0	44.5	60.0	50.0	10.0	5.5	L1
41	25.54800	34.2	28.9	0.6	34.8	29.5	60.0	50.0	25.2	20.5	L1

8.7 Occupied bandwidth

Test Requirements, RSS-Gen [6.6]

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

▣TEST CONFIGURATION

Refer to the APPENDIX I.

▣ TEST PROCEDURE

- The 99% power bandwidth was measured with a calibrated spectrum analyzer.
- Spectrum analyzer plots are included on the following pages.

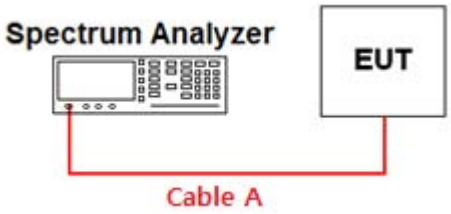
▣TEST RESULTS: NA

9. LIST OF TEST EQUIPMENT

Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
MXA Signal Analyzer	Agilent	N9020A	14/09/15	15/09/15	MY50200834
DIGITAL MULTIMETER	Agilent	34401A	15/01/06	16/01/06	US36099541
DC Power Supply	HP	6622A	15/02/25	16/02/25	3448A03760
Signal Generator	Rohde Schwarz	SMF100A	14/07/01	15/07/01	102341
Thermohygrometer	BODYCOM	BJ5478	14/05/13	15/05/13	120612-2
PreAmplifier	Agilent	8449B	15/02/26	16/02/26	3008A00370
LOOP Antenna	Schwarzbeck	FMZB1513	14/04/29	16/04/29	1513-128
Double-Ridged Guide Antenna	ETS	3117	14/05/12	16/05/12	140394
TRILOG Broadband Test-Antenna	Schwarzbeck	VULB 9160	13/12/16	15/12/16	3358
Low Noise Pre Amplifier	tsj	MLA-010K01-B01-27	14/04/09 15/04/09	15/04/09 16/04/09	1844538
EMI TEST RECEIVER	R&S	ESR7	14/10/21	15/10/21	101109
High-pass filter	Wainwright Instruments	WHKX3.0	15/01/06	16/01/06	12
EMI TEST RECEIVER	R&S	ESCI7	15/02/25	16/02/25	100910
FREQUENCY CONVERTER	Taejin Electronic	CVCF	14/09/11	15/09/11	ZU0033
ARTIFICIAL MAINS NETWORK	R&S	ESH2-Z5	14/09/11	15/09/11	828739/006
DC BLOCK	Kyoritsu	KFL-007D	NA	NA	8-2259-4
Power Meter Power Sensor	Anritsu	ML2496A MA2411B	14/10/21	16/10/21	1338004 1306053
Pyramidal Horn Antenna	ETS	22160	13/10/13	15/10/13	158433

APPENDIX I
Conducted Test set up Diagram &Path loss Information

▪Conducted Measurement



Path loss information

Frequency (GHz)	Path Loss (dB)	Frequency (GHz)	Path Loss (dB)
0.03	9.496	15	11.850
1	9.976	20	13.101
2412 ~ 2472	10.180	25	14.014
5	10.463	-	-
10	11.248	-	-

Note. 1: The path loss from EUT to Spectrum analyzer was measured and used for test.
Path loss (=S/A's offset value) = Cable A (Attenuator, Applied only when it was used externally)

APPENDIX II
Duty cycle plots

▣ TEST PROCEDURE

Duty Cycle measured using **section 6.0 b) of KDB558074 v03r2 :**

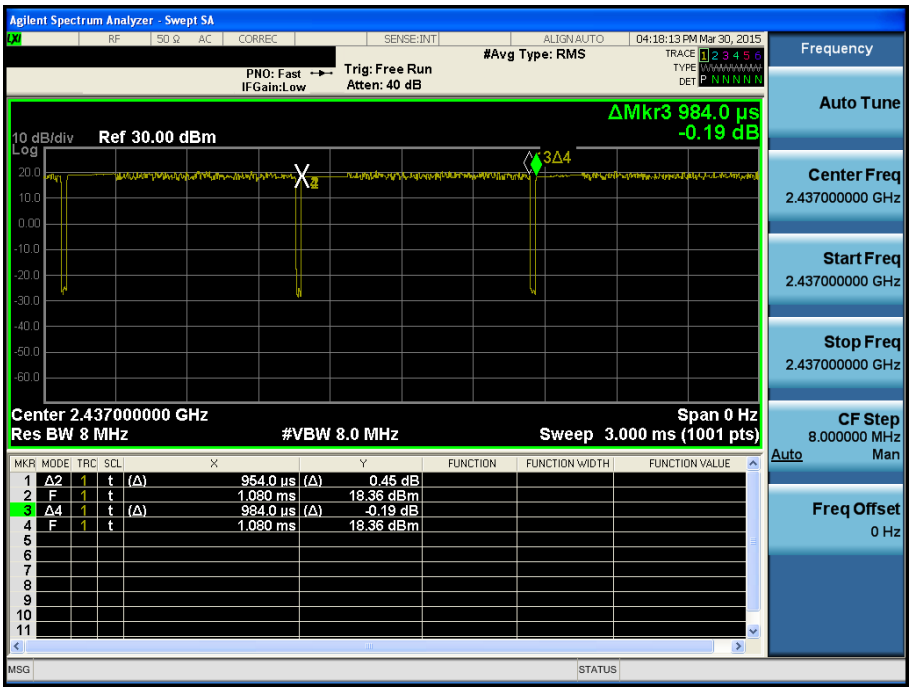
The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal.

Set the center frequency of the instrument to the center frequency of the transmission. Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value. Set VBW ≥ RBW. Set detector = peak or average.

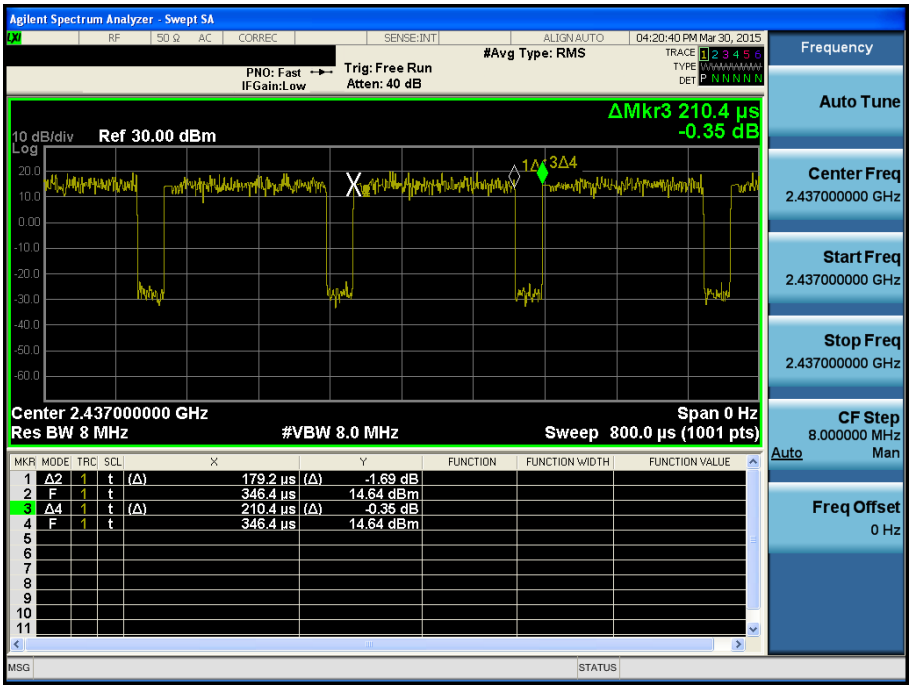
The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T ≤ 16.7 microseconds.)

Test Plots :

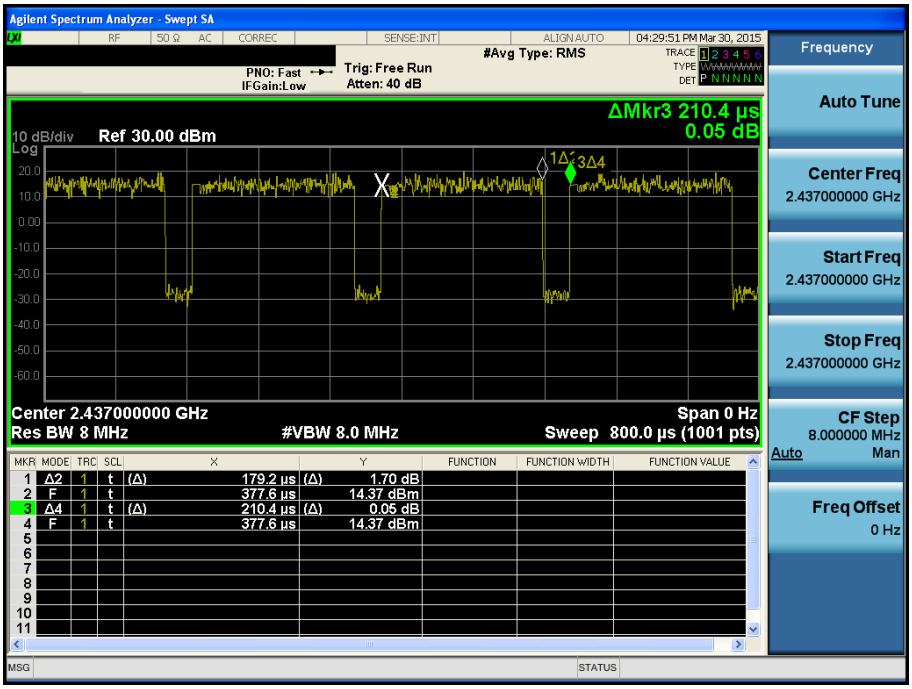
Duty Cycle Test Mode: 802.11b & 11 Mbps & 2437 MHz & DC 5V



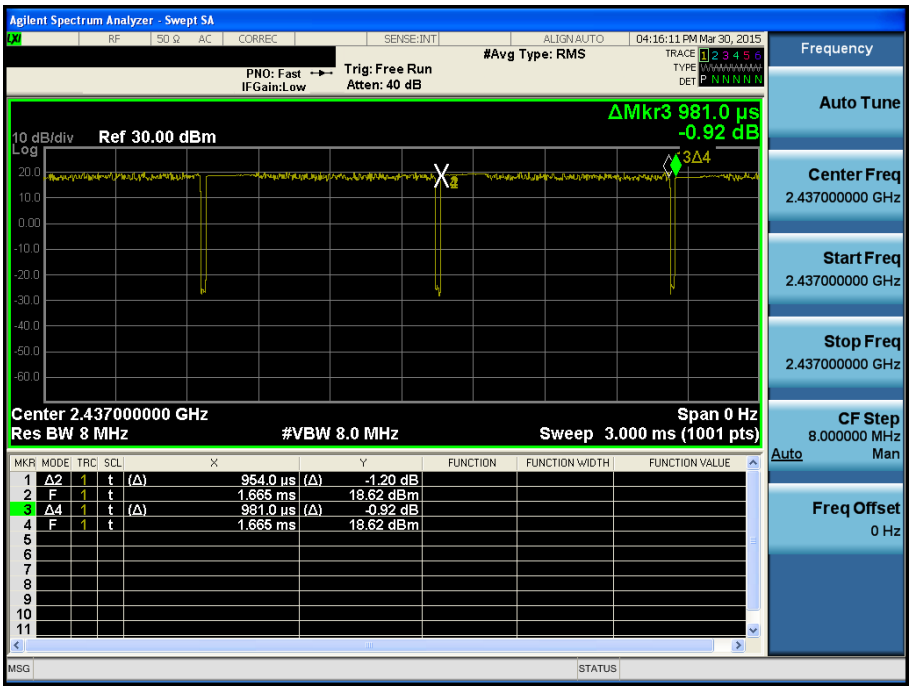
Duty Cycle Test Mode: 802.11g & 54 Mbps & 2437 MHz & DC 5V



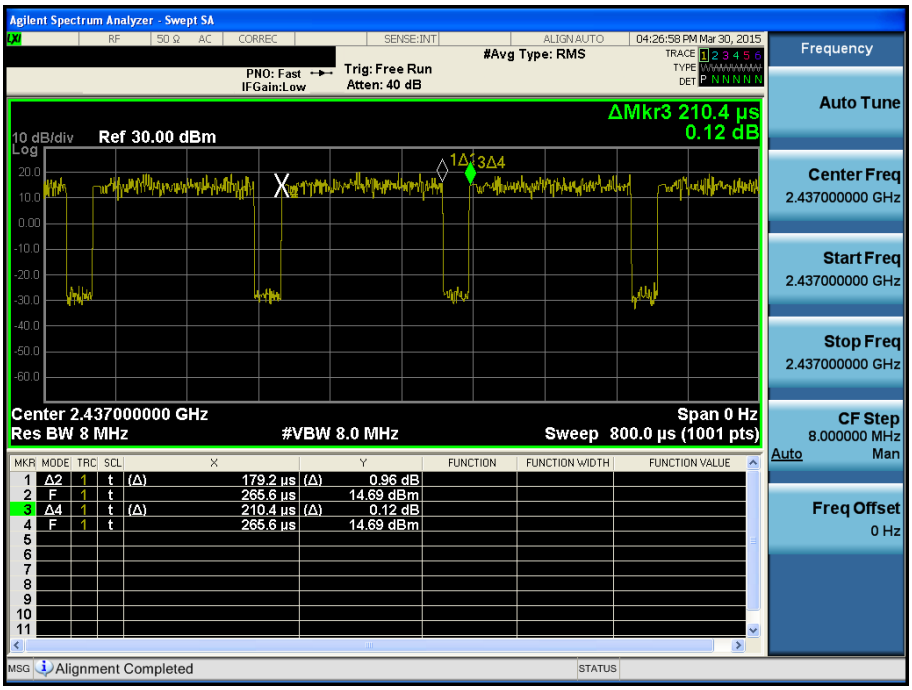
Duty Cycle Test Mode: 802.11n(HT20) & MCS 7 & 2437 MHz & DC 5V



Duty Cycle Test Mode: 802.11b & 11 Mbps & 2437 MHz & DC 48V(PoE)



Duty Cycle Test Mode: 802.11g & 54 Mbps & 2437 MHz & DC 48V(PoE)



Duty Cycle Test Mode: 802.11n(HT20) & MCS 7 & 2437 MHz & DC 48V(PoE)