8.5 Radiated Spurious Emissions

Test Requirements and limit, §15.247(d), §15.205, §15.209 & RSS-210 [A8.5]

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

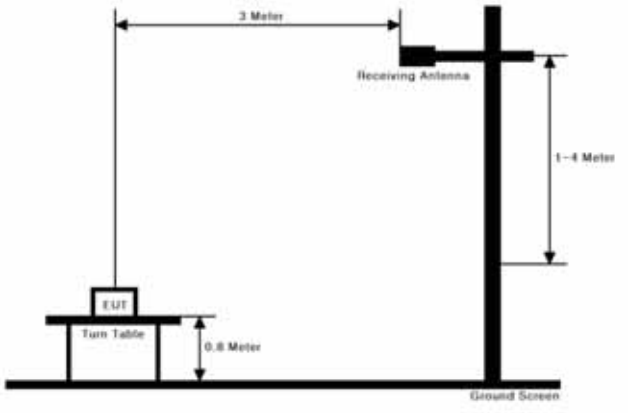
** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, 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	3600 ~ 4400	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1435 ~ 1626.5	4.5 ~ 5.15	15.35 ~ 16.2
2.1735 ~ 2.1905	12.51975 ~	149.9 ~ 150.05	1645.5 ~ 1646.5	5.35 ~ 5.46	17.7 ~ 21.4
4.125 ~ 4.128	12.52025	156.52475 ~	1660 ~ 1710	7.25 ~ 7.75	22.01 ~ 23.12
4.17725 ~ 4.17775	12.57675 ~	156.52525	1718.8 ~ 1722.2	8.025 ~ 8.5	23.6 ~ 24.0
4.20725 ~ 4.20775	12.57725	156.7 ~ 156.9	2200 ~ 2300	9.0 ~ 9.2	31.2 ~ 31.8
6.215 ~ 6.218	13.36 ~ 13.41	162.0125 ~ 167.17	2310 ~ 2390	9.3 ~ 9.5	36.43 ~ 36.5
6.26775 ~ 6.26825	16.42 ~ 16.423	167.72 ~ 173.2	2483.5 ~ 2500	10.6 ~ 12.7	Above 38.6
6.31175 ~ 6.31225	16.69475 ~	240 ~ 285	2655 ~ 2900	13.25 ~ 13.4	
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			
	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 turntable, 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.

Note : Measurement Instrument Setting for Radiated Emission Measurements.

1. **Frequency Range Below 1 GHz**
   RBW = 100 or 120 KHz, VBW = 3 x RBW , Detector = Peak or Quasi Peak
2. **Frequency Range > 1 GHz**
   Peak Measurement
   RBW = 1 MHz , VBW = 3 MHz, Detector = Peak
   Average Measurement
   1. RBW = 1 MHz (unless otherwise specified).
   2. VBW ≥ 3 x RBW.
   3. Detector = RMS
   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.

Band	Duty Cycle(%)	T_{on}(ms)	T_{on}+ T_{off} (ms)	DCF (10log(1/Duty)) (dB)
802.11b	96.62	1.285	1.330	0.15
802.11g	89.90	0.516	0.574	0.46
2.4GHz 802.11n(HT20)	94.12	0.960	1.020	0.26
2.4GHz 802.11n(HT40)	92.78	0.488	0.526	0.33
5.7GHz 802.11a	91.20	0.518	0.568	0.40
5.7GHz 802. 11n(HT20)	94.12	0.960	1.020	0.26
5.7GHz 802. 11n(HT40)	82.61	0.152	0.184	0.83

9kHz ~ 25GHz Data(*Chain 0 & 802.11b & 11Mbps*)

▪ 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)
2386.48	H	Y	PK	62.59	-5.24	-	-	57.35	74.00	16.65
2386.40	H	Y	AV	54.04	-5.24	0.15	-	48.95	54.00	5.05
4823.91	H	Y	PK	51.61	1.91	-	-	53.52	74.00	20.48
4823.91	H	Y	AV	47.67	1.91	0.15	-	49.73	54.00	4.27
7234.22	H	Y	PK	48.95	6.07	-	-	55.02	74.00	18.98
7234.96	H	Y	AV	43.74	6.07	0.15	-	49.96	54.00	4.04

▪ 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)
4873.98	H	Y	PK	51.33	2.15	-	-	53.48	74.00	20.52
4873.92	H	Y	AV	47.40	2.15	0.15	-	49.70	54.00	4.30
7310.15	H	Y	PK	47.59	6.46	-	-	54.05	74.00	19.95
7309.98	H	Y	AV	41.71	6.46	0.15	-	48.32	54.00	5.68

▪ 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)
2483.73	V	Z	PK	63.82	-4.99	-	-	58.83	74.00	15.17
2483.67	V	Z	AV	53.68	-4.99	0.15	-	48.84	54.00	5.16
4923.76	H	Y	PK	47.04	1.93	-	-	48.97	74.00	25.03
4923.88	H	Y	AV	40.06	1.93	0.15	-	42.14	54.00	11.86
7387.46	H	Y	PK	42.66	6.39	-	-	49.05	74.00	24.95
7386.72	H	Y	AV	33.20	6.39	0.15	-	39.74	54.00	14.26

Note.

1. Measurement Distance = 3 m below 10 GHz , Measurement Distance = 1 m 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.

9kHz ~ 25GHz Data(*Chain 0 & 802.11g & 24Mbps*)

▪ 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)
2389.78	V	Y	PK	70.49	-5.24	-	-	65.25	74.00	8.75
2389.92	V	Y	AV	55.35	-5.24	0.46	-	50.57	54.00	3.43
4823.92	H	Y	PK	46.48	1.91	-	-	48.39	74.00	25.61
4823.96	H	Y	AV	35.37	1.91	0.46	-	37.74	54.00	16.26
7235.10	H	Y	PK	46.99	6.07	-	-	53.06	74.00	20.94
7234.95	H	Y	AV	34.22	6.07	0.46	-	40.75	54.00	13.25

▪ 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)
4874.46	H	Y	PK	53.51	2.15	-	-	55.66	74.00	18.34
4873.83	H	Y	AV	39.65	2.15	0.46	-	42.26	54.00	11.74
7309.16	H	Y	PK	53.95	6.46	-	-	60.41	74.00	13.59
7308.46	H	Y	AV	41.59	6.46	0.46	-	48.51	54.00	5.49

▪ 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)
2483.57	V	Y	PK	73.21	-4.99	-	-	68.22	74.00	5.78
2483.51	V	Y	AV	54.17	-4.99	0.46	-	49.64	54.00	4.36
4923.77	H	Y	PK	44.77	1.93	-	-	46.70	74.00	27.30
4923.83	H	Y	AV	33.63	1.93	0.46	-	36.02	54.00	17.98
7385.53	H	Y	PK	43.44	6.39	-	-	49.83	74.00	24.17
7385.58	H	Y	AV	32.51	6.39	0.46	-	39.36	54.00	14.64

Note.

1. Measurement Distance = 3 m below 10 GHz , Measurement Distance = 1 m 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.

9kHz ~ 25GHz Data(*2TX (Chain 0, 1) & 802.11n HT20 & MCS 8*)

▪ 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)
2389.92	V	Y	PK	71.33	-5.24	-	-	66.09	74.00	7.91
2390.00	V	Y	AV	55.50	-5.24	0.26	-	50.52	54.00	3.48
4823.84	H	Y	PK	45.13	1.91	-	-	47.04	74.00	26.96
4824.09	H	Y	AV	34.18	1.91	0.26	-	36.35	54.00	17.65
7235.73	H	Y	PK	45.15	6.07	-	-	51.22	74.00	22.78
7235.67	H	Y	AV	33.01	6.07	0.26	-	39.34	54.00	14.66

▪ 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)
4874.22	H	Y	PK	45.29	2.15	-	-	47.44	74.00	26.56
4874.27	H	Y	AV	35.09	2.15	0.26	-	37.50	54.00	16.50
7310.61	H	Y	PK	44.91	6.46	-	-	51.37	74.00	22.63
7310.42	H	Y	AV	34.12	6.46	0.26	-	40.84	54.00	13.16

▪ 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)
2483.53	V	Y	PK	72.84	-4.99	-	-	67.85	74.00	6.15
2483.54	V	Y	AV	55.19	-4.99	0.26	-	50.46	54.00	3.54
4923.72	H	Y	PK	44.70	1.93	-	-	46.63	74.00	27.37
4923.67	H	Y	AV	33.46	1.93	0.26	-	35.65	54.00	18.35
7385.85	H	Y	PK	4.18	6.39	-	-	10.57	74.00	63.43
7385.68	H	Y	AV	32.60	6.39	0.26	-	39.25	54.00	14.75

Note.

1. Measurement Distance = 3 m below 10 GHz , Measurement Distance = 1 m 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.

9kHz ~ 25GHz Data(*2TX (Chain 0, 1) & 802.11n HT40 & MCS 8*)

▪ 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)
2388.76	V	Y	PK	75.22	-5.24	-	-	69.98	74.00	4.02
2389.21	V	Y	AV	55.28	-5.24	0.33	-	50.37	54.00	3.63
4844.07	H	Y	PK	44.16	1.90	-	-	46.06	74.00	27.94
4843.84	H	Y	AV	33.93	1.90	0.33	-	36.16	54.00	17.84
7266.21	H	Y	PK	43.22	6.07	-	-	49.29	74.00	24.71
7266.45	H	Y	AV	32.44	6.07	0.33	-	38.84	54.00	15.16

▪ 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)
4874.07	H	Y	PK	49.24	2.15	-	-	51.39	74.00	22.61
4874.15	H	Y	AV	34.96	2.15	0.33	-	37.44	54.00	16.56
7308.85	H	Y	PK	44.46	6.46	-	-	50.92	74.00	23.08
7308.80	H	Y	AV	33.81	6.46	0.33	-	40.60	54.00	13.40

▪ 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)
2483.61	V	Y	PK	74.17	-4.99	-	-	69.18	74.00	4.82
2483.59	V	Y	AV	55.14	-4.99	0.33	-	50.48	54.00	3.52
4903.50	H	Y	PK	43.74	1.89	-	-	45.63	74.00	28.37
4903.30	H	Y	AV	33.33	1.89	0.33	-	35.55	54.00	18.45
7355.98	H	Y	PK	42.66	6.39	-	-	49.05	74.00	24.95
7355.90	H	Y	AV	32.43	6.39	0.33	-	39.15	54.00	14.85

Note.

1. Measurement Distance = 3 m below 10 GHz , Measurement Distance = 1 m 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.

9kHz ~ 40GHz Data(*Chain 0 & 802.11a & 24Mbps*)

▪ 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)
11488.300	V	Y	PK	58.82	12.72	-	-9.54	62.00	74.00	12.00
11490.350	V	Y	AV	47.38	12.72	0.40	-9.54	50.96	54.00	3.04
-	-	-	-	-	-	-	-	-	-	-

▪ 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)
11568.850	V	Y	PK	59.58	12.83	-	-9.54	62.87	74.00	11.13
11569.100	V	Y	AV	47.19	12.83	0.40	-9.54	50.88	54.00	3.12
-	-	-	-	-	-	-	-	-	-	-

▪ 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)
11646.600	V	Y	PK	59.18	13.28	-	-9.54	62.92	74.00	11.08
11645.850	V	Y	AV	46.71	13.28	0.40	-9.54	50.85	54.00	3.15
-	-	-	-	-	-	-	-	-	-	-

Note.

1. Measurement Distance = 3 m below 10 GHz , Measurement Distance = 1 m 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.

9kHz ~ 40GHz Data(*2TX (Chain 0, 1) & 802.11n HT20 & MCS 8*)

▪ 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)
11491.040	V	Y	PK	58.69	12.72	-	-9.54	61.87	74.00	12.13
11490.920	V	Y	AV	47.18	12.72	0.26	-9.54	50.62	54.00	3.38
-	-	-	-	-	-	-	-	-	-	-

▪ 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)
11568.600	V	Y	PK	58.49	12.83	-	-9.54	61.78	74.00	12.22
11568.880	V	Y	AV	46.99	12.83	0.26	-9.54	50.54	54.00	3.46
-	-	-	-	-	-	-	-	-	-	-

▪ 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)
11650.520	V	Y	PK	58.26	13.28	-	-9.54	62.00	74.00	12.00
11650.920	V	Y	AV	46.58	13.28	0.26	-9.54	50.58	54.00	3.42
-	-	-	-	-	-	-	-	-	-	-

Note.

1. Measurement Distance = 3 m below 10 GHz , Measurement Distance = 1 m 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.

9kHz ~ 40GHz Data(*2TX (Chain 0, 1) & 802.11n HT40 & MCS 11*)

▪ 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)
11512.300	V	Y	PK	58.89	12.86	-	-9.54	62.21	74.00	11.79
11511.900	V	Y	AV	46.43	12.86	0.83	-9.54	50.58	54.00	3.42
-	-	-	-	-	-	-	-	-	-	-

▪ 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)
11589.600	V	Y	PK	58.72	12.87	-	-9.54	62.05	74.00	11.95
11589.950	V	Y	AV	46.61	12.87	0.83	-9.54	50.77	54.00	3.23
-	-	-	-	-	-	-	-	-	-	-

Note.

1. Measurement Distance = 3 m below 10 GHz , Measurement Distance = 1 m 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 [7.2.2]

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 Configuration

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

Test Mode

The all modes of EUT operation were investigated and the worst case mode was reported.

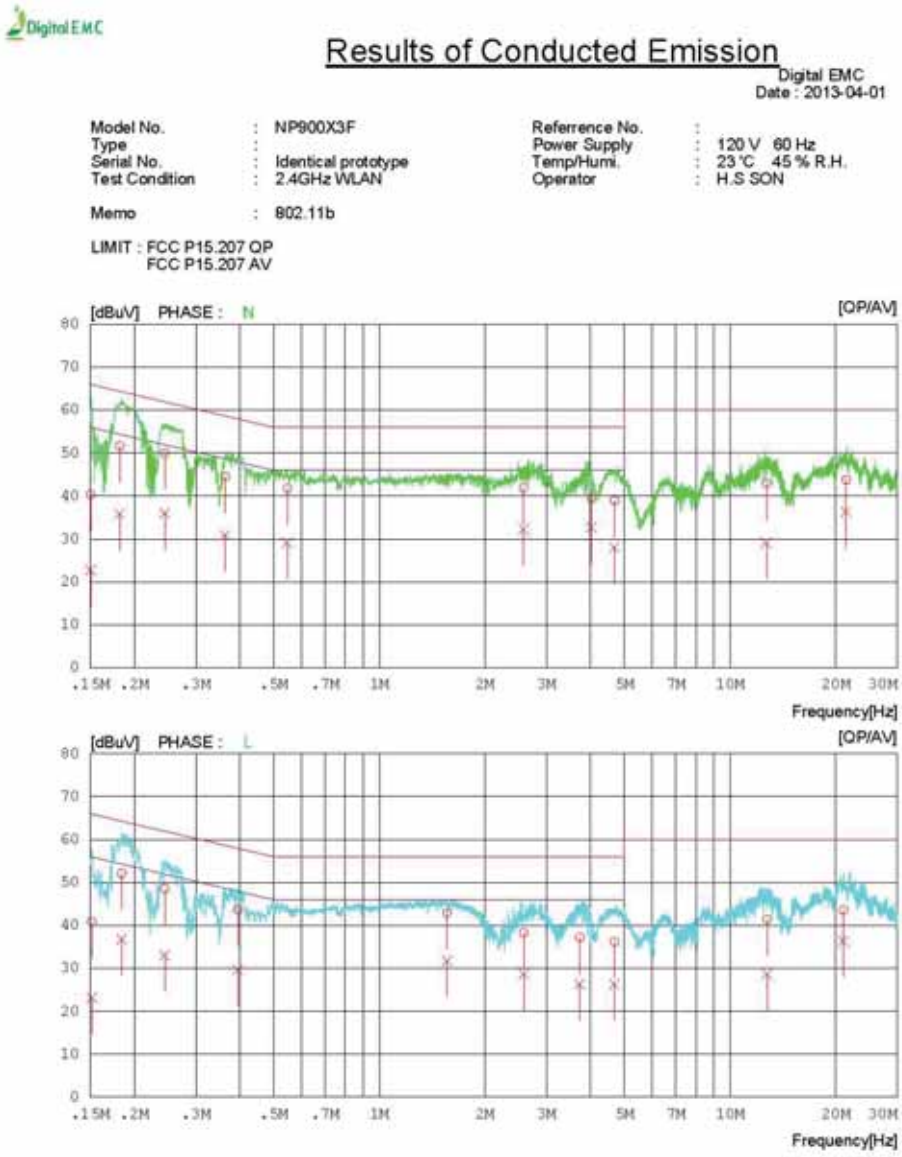
TEST PROCEDURE

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

▣ RESULT PLOTS

AC Line Conducted Emissions (Graph)

Test Mode: 802.11b (2.4GHz Band)



AC Line Conducted Emissions (List)

Test Mode: 802.11b (2.4GHz Band)

Results of Conducted Emission

Digital EMC
Date : 2013-04-01

Model No.	: NP900X3F	Referrence No.	:
Type	:	Power Supply	: 120 V 60 Hz
Serial No.	: Identical prototype	Temp/Humi.	: 23 'C 45 % R.H.
Test Condition	: 2.4GHz WLAN	Operator	: H.S SON

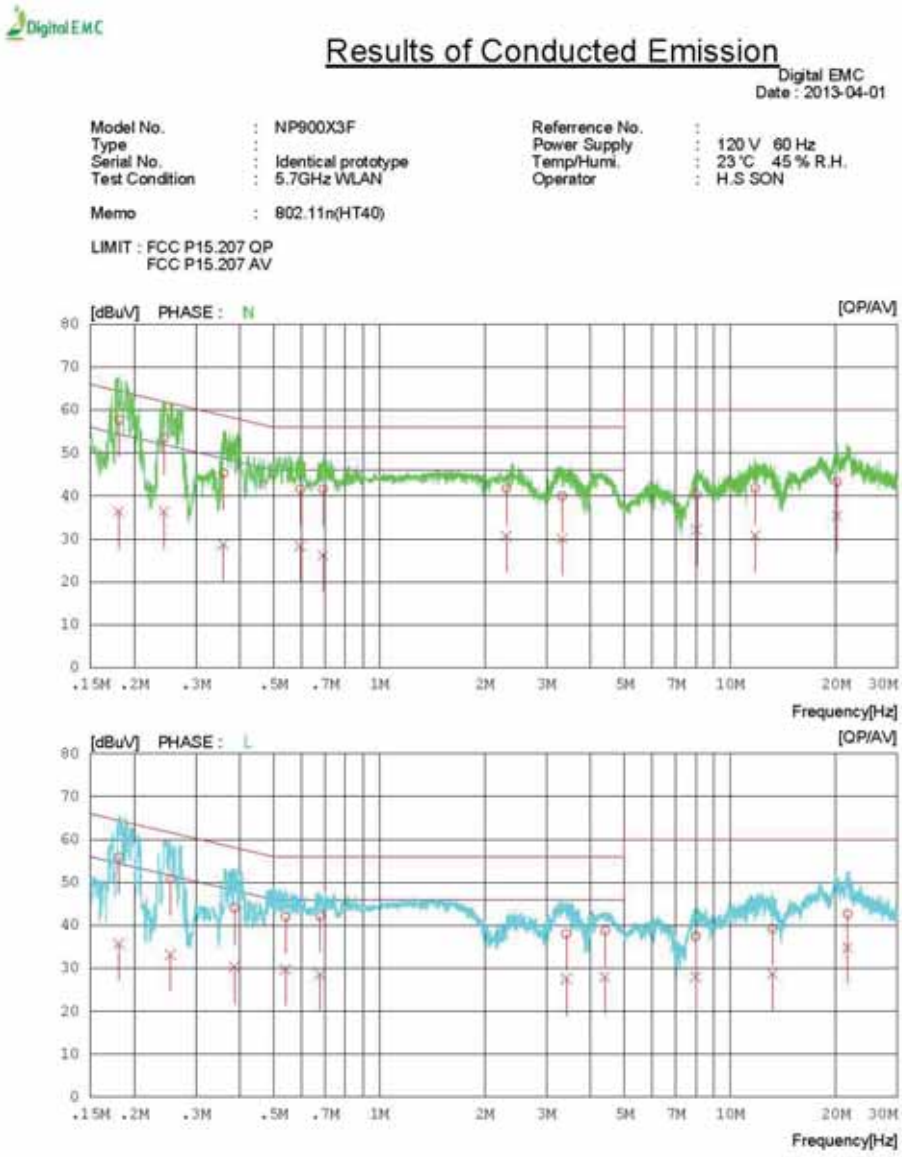
Memo : 802.11b

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	0.15025	40.2	22.6	0.2	40.4	22.8	66.0	56.0	25.6	33.2	N
2	0.18208	51.5	35.6	0.2	51.7	35.8	64.4	54.4	12.7	18.6	N
3	0.24463	49.8	35.7	0.2	50.0	35.9	61.9	51.9	11.9	16.0	N
4	0.36355	44.4	30.7	0.2	44.6	30.9	58.6	48.6	14.0	17.7	N
5	0.54653	41.5	28.9	0.2	41.7	29.1	56.0	46.0	14.3	16.9	N
6	2.57850	41.6	31.9	0.3	41.9	32.2	56.0	46.0	14.1	13.8	N
7	4.02100	39.1	32.4	0.3	39.4	32.7	56.0	46.0	16.6	13.3	N
8	4.68550	38.5	27.6	0.4	38.9	28.0	56.0	46.0	17.1	18.0	N
9	12.69250	42.3	28.5	0.7	43.0	29.2	60.0	50.0	17.0	20.8	N
10	21.40500	42.9	35.4	0.9	43.8	36.3	60.0	50.0	16.2	13.7	N
11	0.15153	40.6	22.9	0.2	40.8	23.1	65.9	55.9	25.1	32.8	L
12	0.18420	51.9	36.6	0.2	52.1	36.8	64.3	54.3	12.2	17.5	L
13	0.24450	48.4	32.8	0.2	48.6	33.0	61.9	51.9	13.3	18.9	L
14	0.39491	43.4	29.6	0.2	43.6	29.8	58.0	48.0	14.4	18.2	L
15	1.56050	42.7	31.5	0.3	43.0	31.8	56.0	46.0	13.0	14.2	L
16	2.58050	38.0	28.4	0.3	38.3	28.7	56.0	46.0	17.7	17.3	L
17	3.72950	36.9	26.0	0.3	37.2	26.3	56.0	46.0	18.8	19.7	L
18	4.68700	35.8	26.0	0.4	36.2	26.4	56.0	46.0	19.8	19.6	L
19	12.75400	40.7	27.8	0.7	41.4	28.5	60.0	50.0	18.6	21.5	L
20	21.03550	42.7	35.5	0.9	43.6	36.4	60.0	50.0	16.4	13.6	L

AC Line Conducted Emissions (Graph)

Test Mode: 802.11n HT40 (5.7GHz Band)



AC Line Conducted Emissions (List)

Test Mode: 802.11n HT40 (5.7GHz Band)

Results of Conducted Emission

Digital EMC
Date : 2013-04-01

Model No.	: NP900X3F	Referrence No.	:
Type	:	Power Supply	: 120 V 60 Hz
Serial No.	: Identical prototype	Temp/Humi.	: 23 'C 45 % R.H.
Test Condition	: 5.7GHz WLAN	Operator	: H.S SON

Memo : 802.11n(HT40)

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	0.18099	57.5	36.2	0.2	57.7	36.4	64.4	54.4	6.7	18.0	N
2	0.24350	53.3	36.1	0.2	53.5	36.3	62.0	52.0	8.5	15.7	N
3	0.35948	45.1	28.6	0.2	45.3	28.8	58.7	48.7	13.4	19.9	N
4	0.59526	41.3	28.1	0.2	41.5	28.3	56.0	46.0	14.5	17.7	N
5	0.69176	41.4	26.0	0.2	41.6	26.2	56.0	46.0	14.4	19.8	N
6	2.30400	41.5	30.4	0.3	41.8	30.7	56.0	46.0	14.2	15.3	N
7	3.32450	39.7	29.8	0.3	40.0	30.1	56.0	46.0	16.0	15.9	N
8	8.03450	39.9	31.7	0.5	40.4	32.2	60.0	50.0	19.6	17.8	N
9	11.80300	41.1	30.1	0.7	41.8	30.8	60.0	50.0	18.2	19.2	N
10	20.16000	42.4	34.5	0.9	43.3	35.4	60.0	50.0	16.7	14.6	N
11	0.18096	55.7	35.5	0.2	55.9	35.7	64.4	54.4	8.5	18.7	L
12	0.25411	50.6	33.1	0.2	50.8	33.3	61.6	51.6	10.8	18.3	L
13	0.38633	43.9	30.2	0.2	44.1	30.4	58.1	48.1	14.0	17.7	L
14	0.54050	41.8	29.6	0.2	42.0	29.8	56.0	46.0	14.0	16.2	L
15	0.67850	42.0	28.5	0.2	42.2	28.7	56.0	46.0	13.8	17.3	L
16	3.41450	37.8	27.3	0.3	38.1	27.6	56.0	46.0	17.9	18.4	L
17	4.40600	38.5	27.7	0.3	38.8	28.0	56.0	46.0	17.2	18.0	L
18	7.98650	36.9	27.4	0.5	37.4	27.9	60.0	50.0	22.6	22.1	L
19	13.21900	38.6	28.0	0.7	39.3	28.7	60.0	50.0	20.7	21.3	L
20	21.64700	41.8	33.9	0.9	42.7	34.8	60.0	50.0	17.3	15.2	L

8.7 Occupied Bandwidth

Test Requirements, RSS-Gen [4.6.1]

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

▣ TEST PROCEDURE

The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%.
The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted.
Where practical, a sampling detector shall be used given that a peak or peak hold may produce a wider bandwidth than actual.

▣ TEST RESULTS: Comply

Test Mode	Data Rate	Frequency [MHz]	Test Results [MHz]	
			Chain 0	Chain 1
802.11b	11Mbps	2412	13.75	-
		2437	13.75	-
		2462	13.74	-
802.11g	24Mbps	2412	16.79	-
		2437	16.84	-
		2462	17.52	-
802.11n (20MHz)	MCS 8	2412	18.10	18.08
		2437	18.21	18.09
		2462	18.81	18.07
802.11n (40MHz)	MCS 8	2422	37.70	37.58
		2437	37.70	37.73
		2452	38.72	38.55
802.11a	24Mbps	5745	16.83	-
		5785	16.83	-
		5825	16.90	-
802.11n (20MHz)	MCS 8	5745	18.14	18.15
		5785	18.10	18.13
		5825	18.16	18.16
802.11n (40MHz)	MCS 11	5755	36.19	36.92
		5795	36.18	36.94

Note 1: See next pages for actual measured spectrum plots.

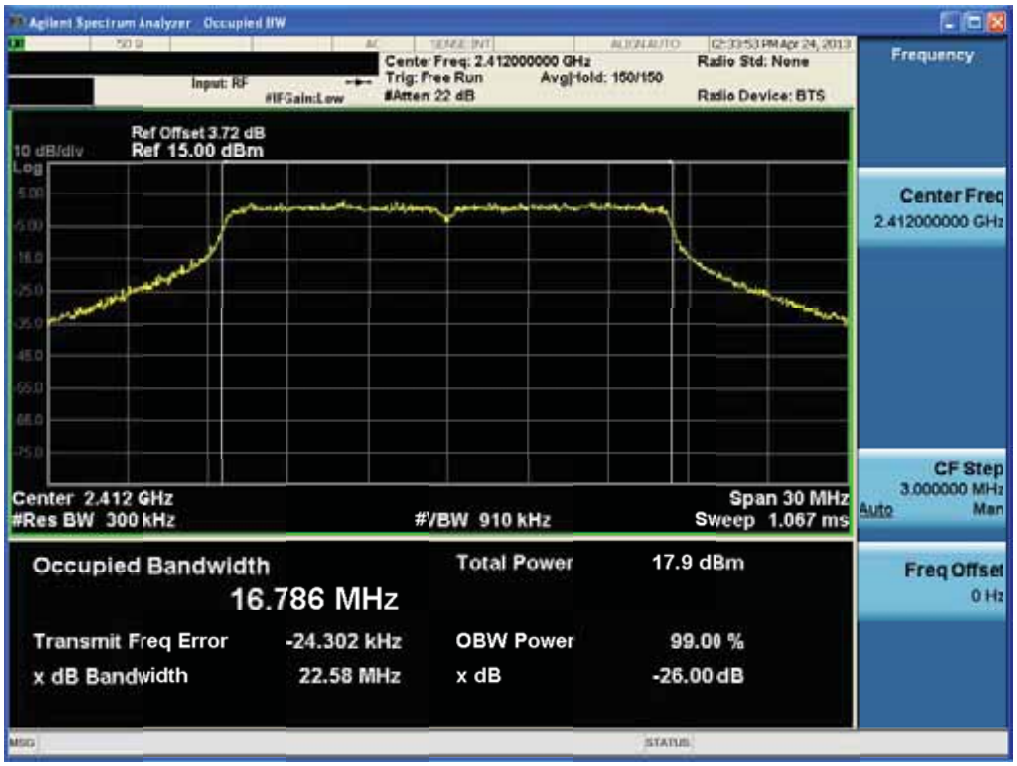
▣ RESULT PLOTS

Occupied Bandwidth (99%) Test Mode: Chain 0 & 802.11b & 11Mbps & 2412MHz

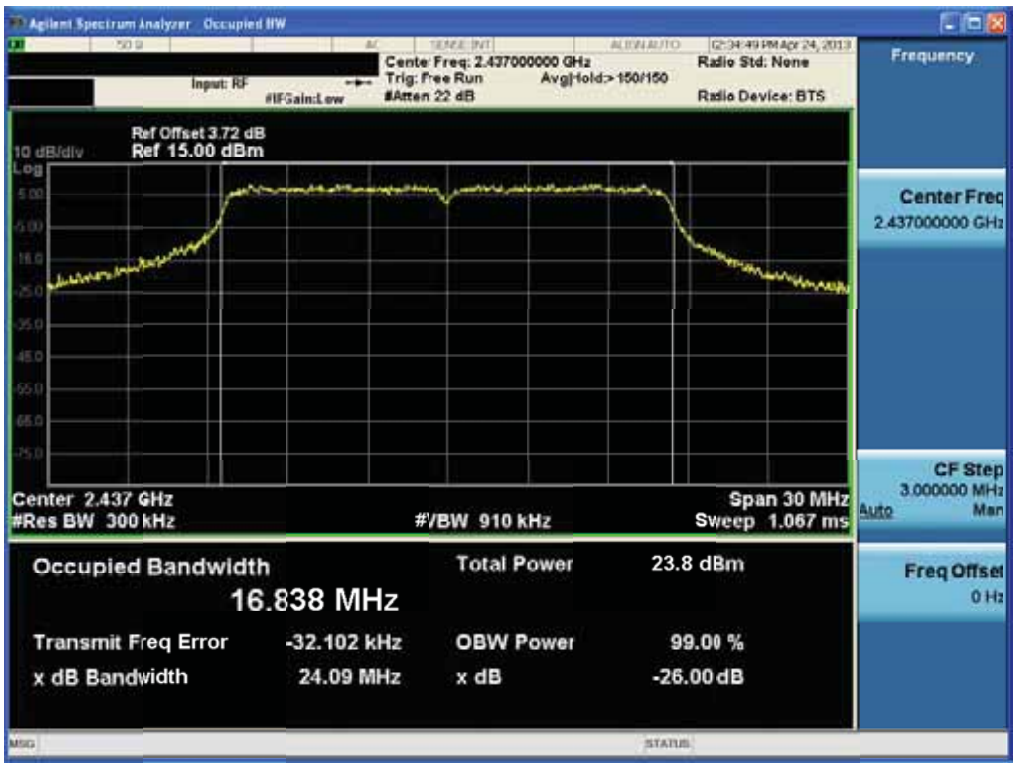
Occupied Bandwidth (99%) Test Mode: Chain 0 & 802.11b & 11Mbps & 2437MHz

Occupied Bandwidth (99%) Test Mode: Chain 0 & 802.11b & 11Mbps & 2462MHz

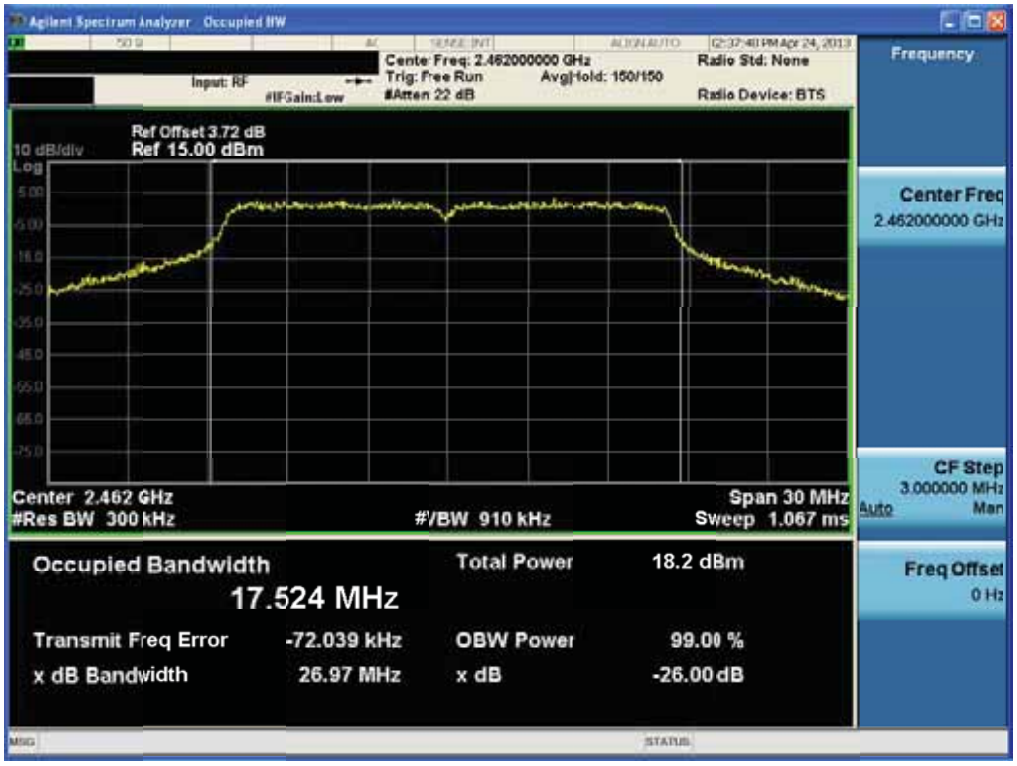
Occupied Bandwidth (99%) Test Mode: Chain 0 & 802.11g & 24Mbps & 2412MHz



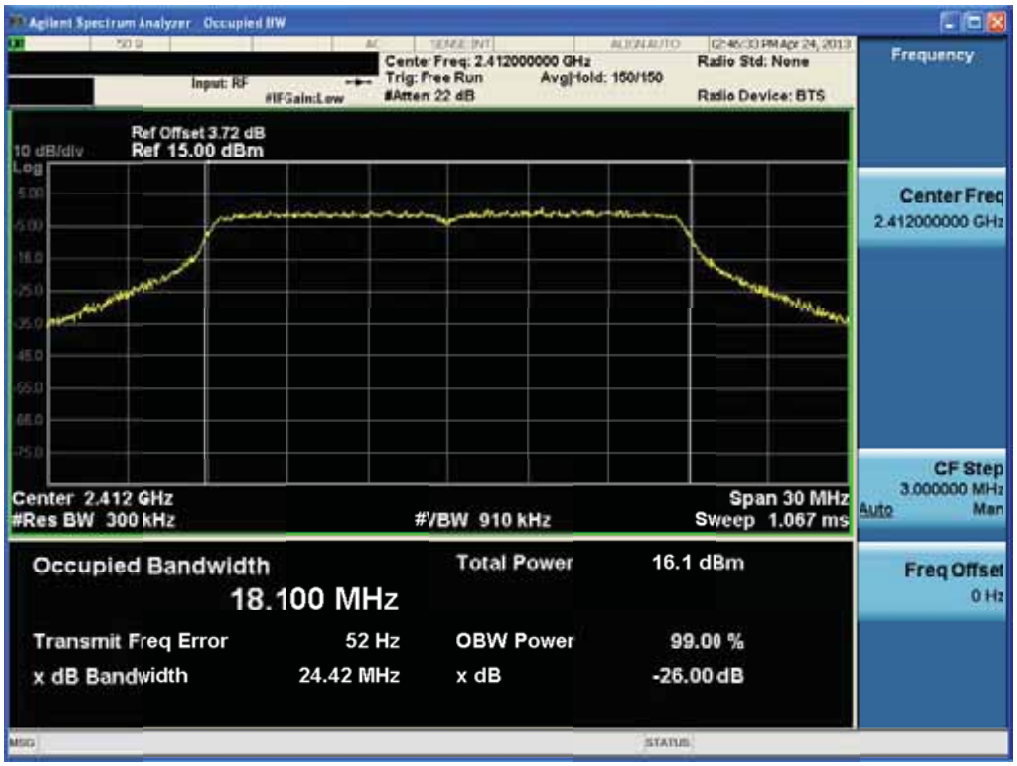
Occupied Bandwidth (99%) Test Mode: Chain 0 & 802.11g & 24Mbps & 2437MHz



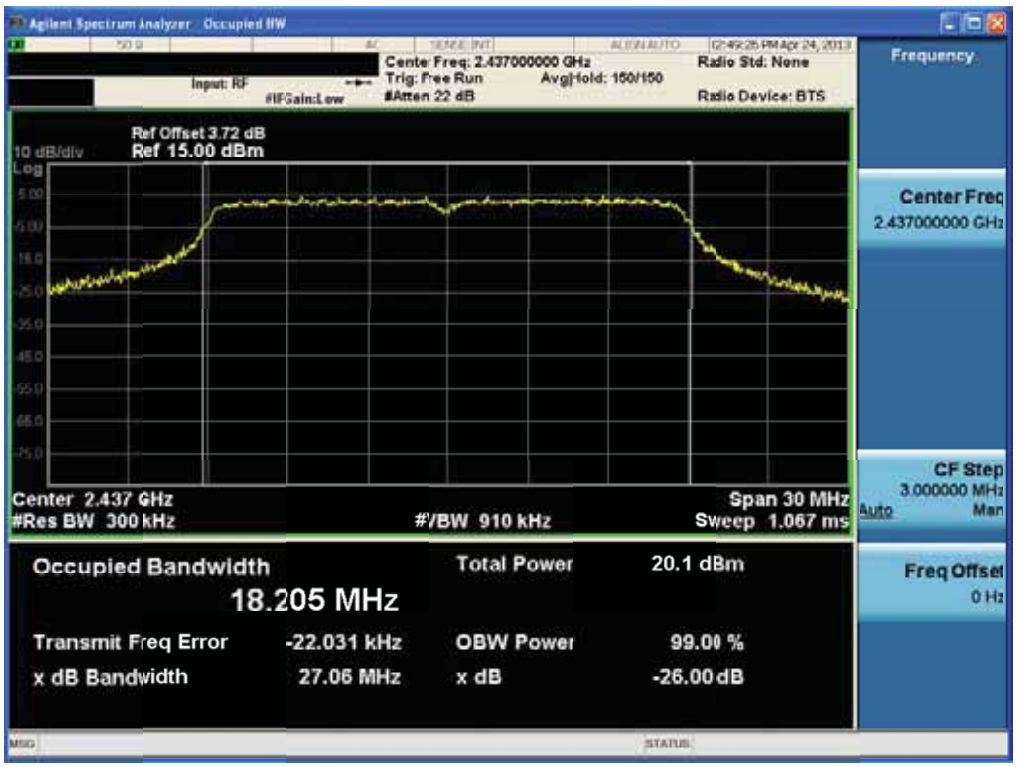
Occupied Bandwidth (99%) Test Mode: Chain 0 & 802.11g & 24Mbps & 2462MHz



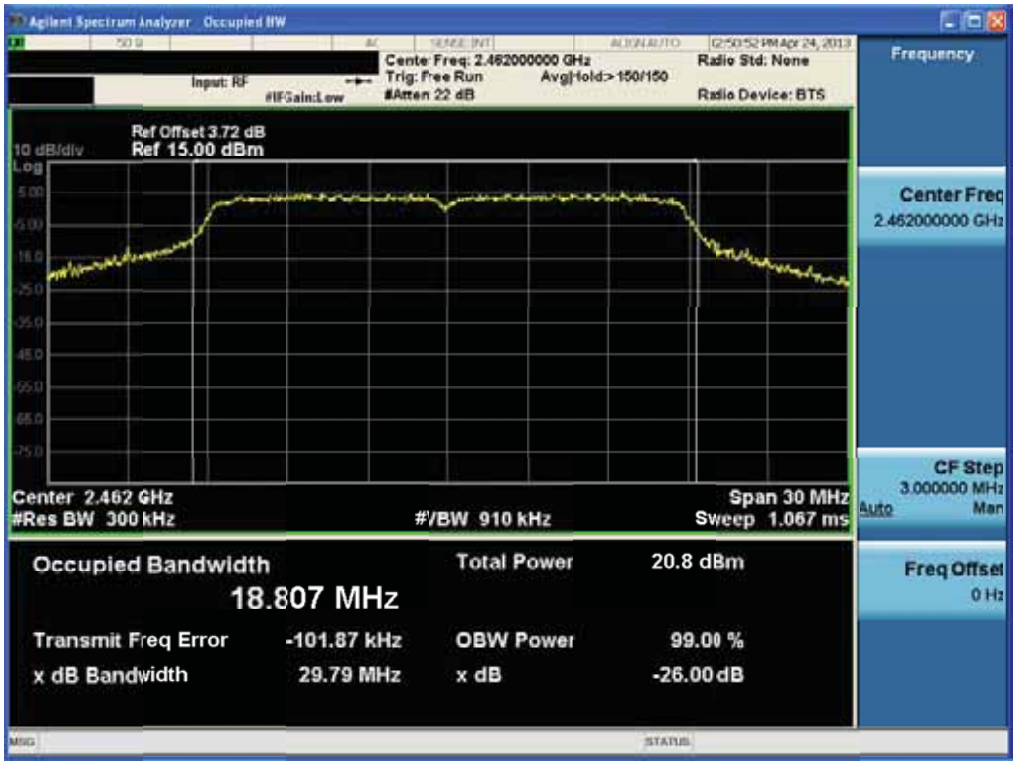
Occupied Bandwidth (99%) Test Mode: Chain 0 & 802.11n HT20 & MCS 8 & 2412MHz



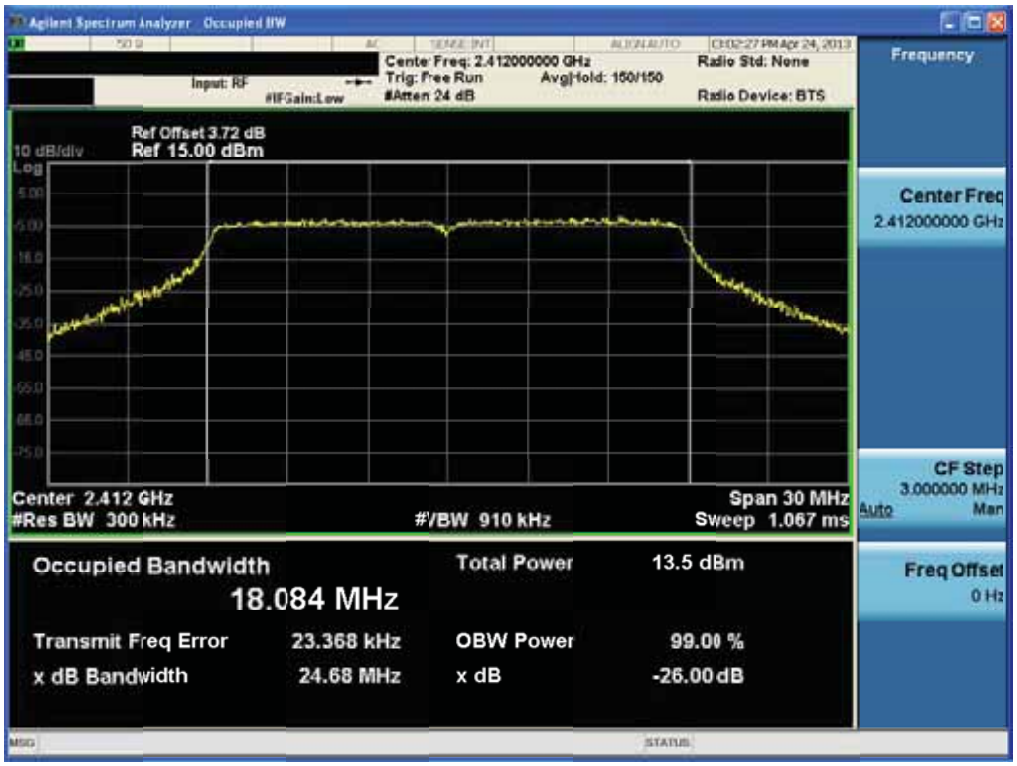
Occupied Bandwidth (99%) Test Mode: Chain 0 & 802.11n HT20 & MCS 8 & 2437MHz



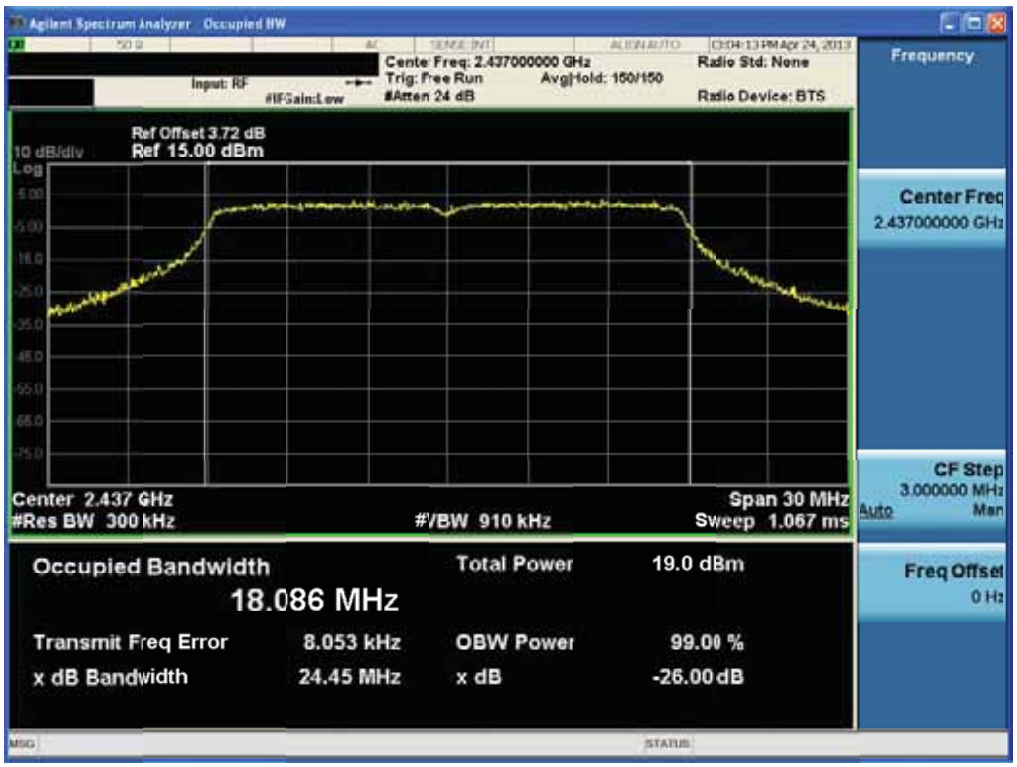
Occupied Bandwidth (99%) Test Mode: Chain 0 & 802.11n HT20 & MCS 8 & 2462MHz



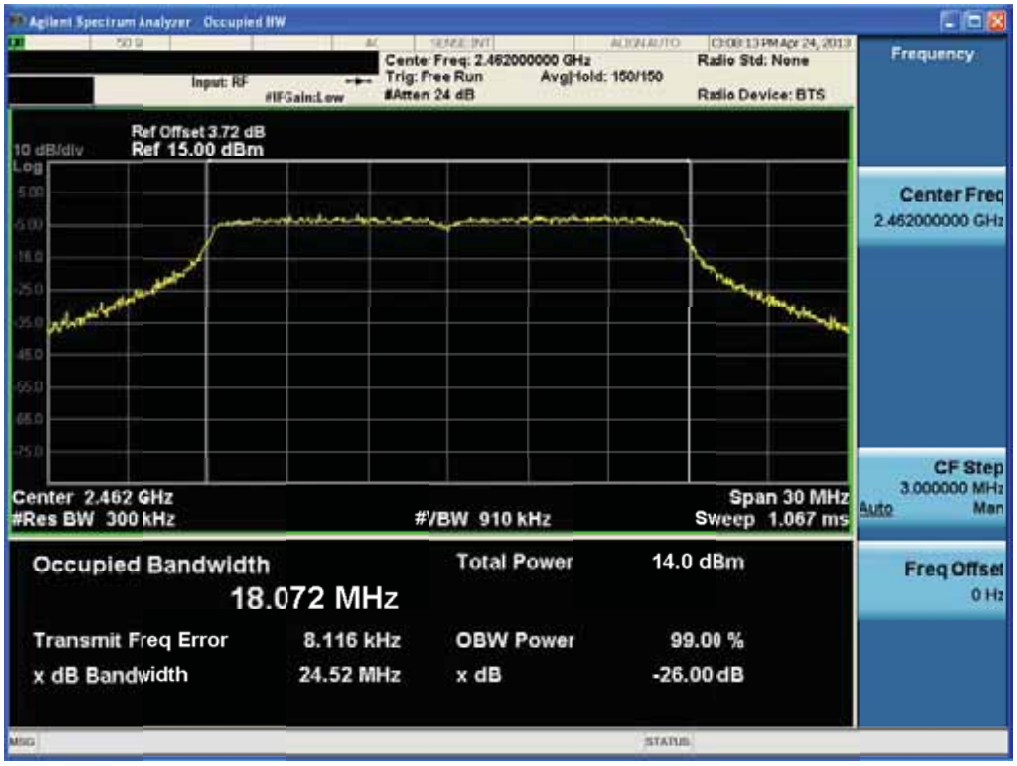
Occupied Bandwidth (99%) Test Mode: Chain 1 & 802.11n HT20 & MCS 8 & 2412MHz



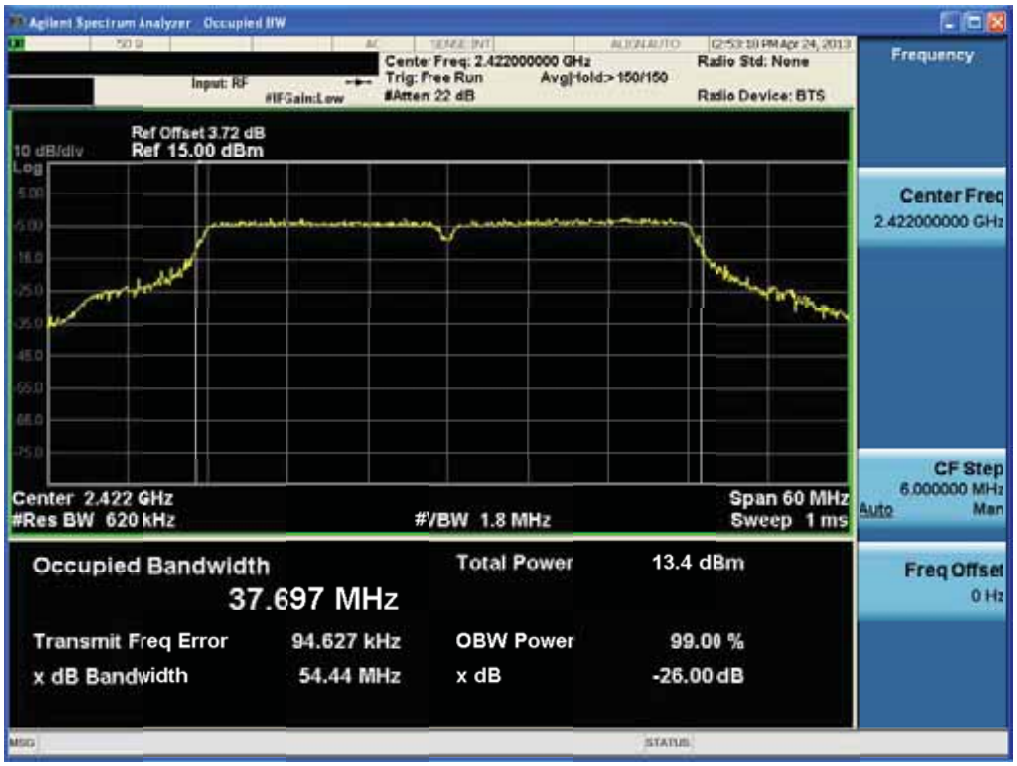
Occupied Bandwidth (99%) Test Mode: Chain 1 & 802.11n HT20 & MCS 8 & 2437MHz



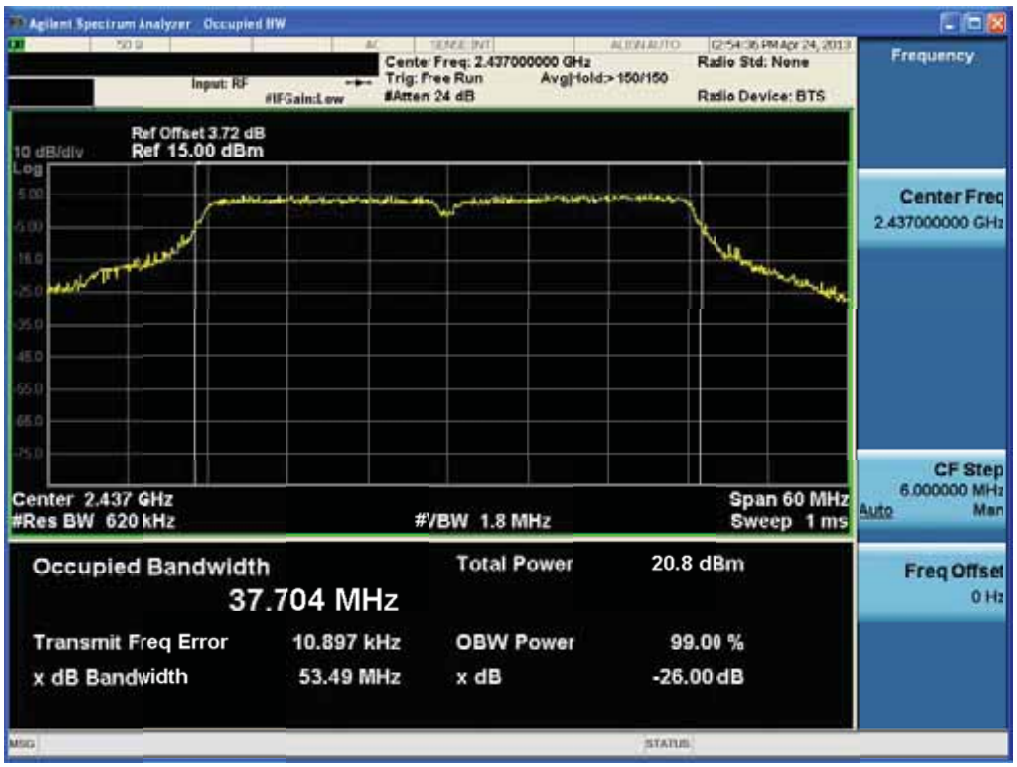
Occupied Bandwidth (99%) Test Mode: Chain 1 & 802.11n HT20 & MCS 8 & 2462MHz



Occupied Bandwidth (99%) Test Mode: Chain 0 & 802.11n HT40 & MCS 8 & 2422MHz

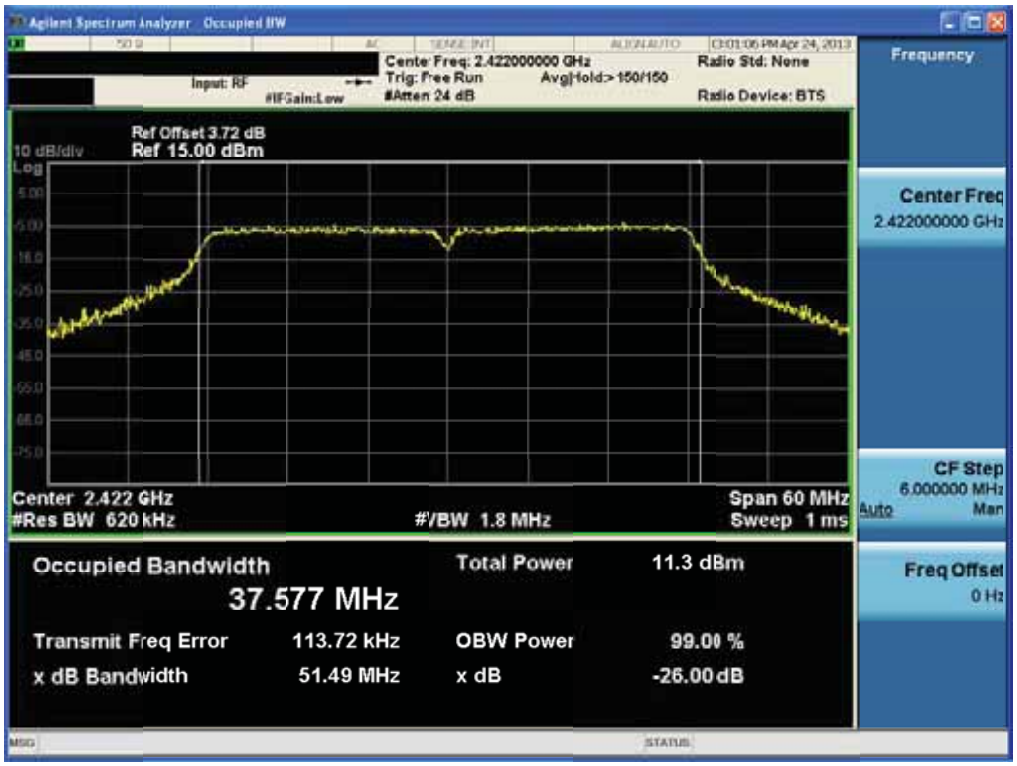


Occupied Bandwidth (99%) Test Mode: Chain 0 & 802.11n HT40 & MCS 8 & 2437MHz

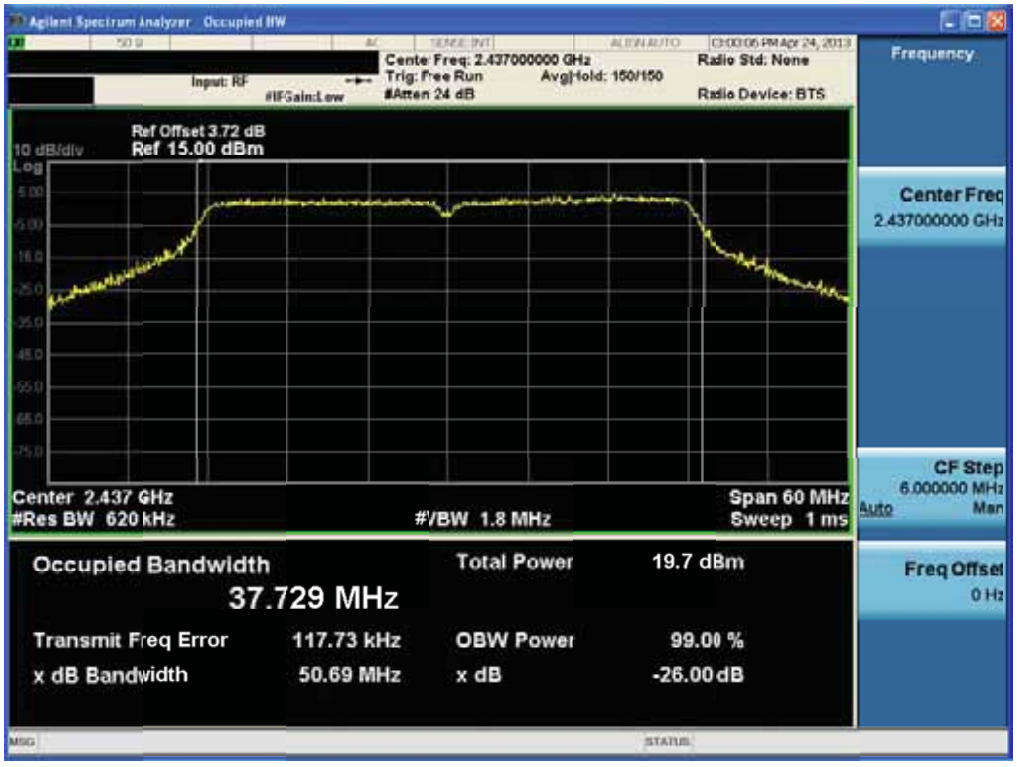


Occupied Bandwidth (99%) Test Mode: Chain 0 & 802.11n HT40 & MCS 8 & 2452MHz

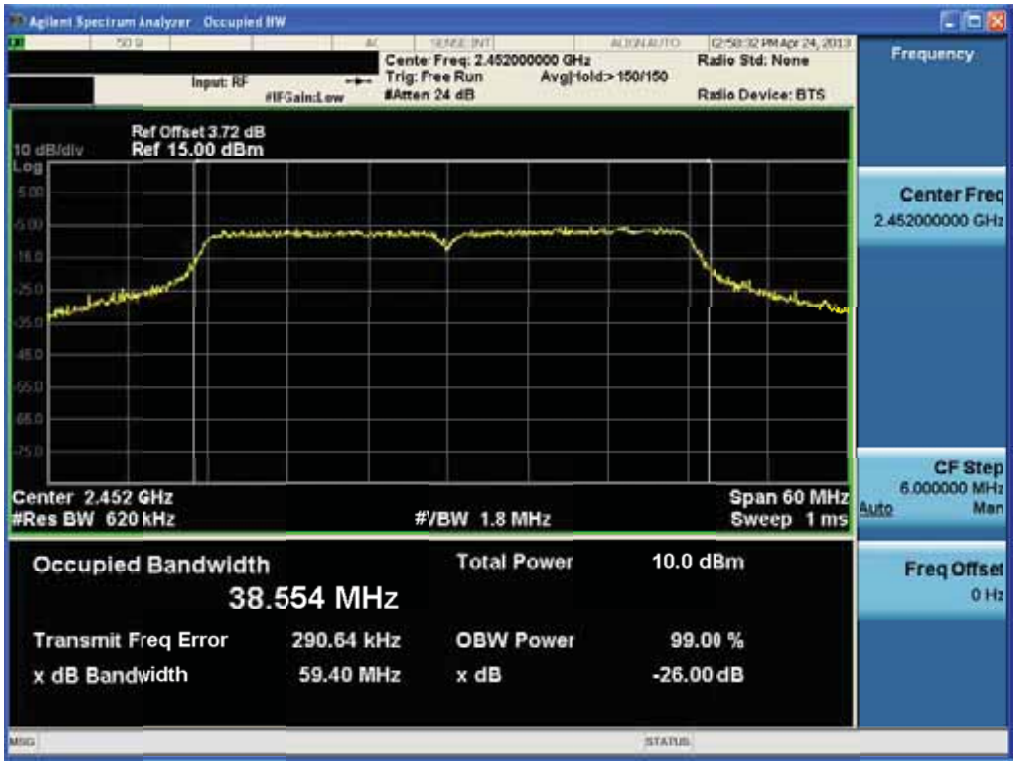
Occupied Bandwidth (99%) Test Mode: Chain 1 & 802.11n HT40 & MCS 8 & 2422MHz



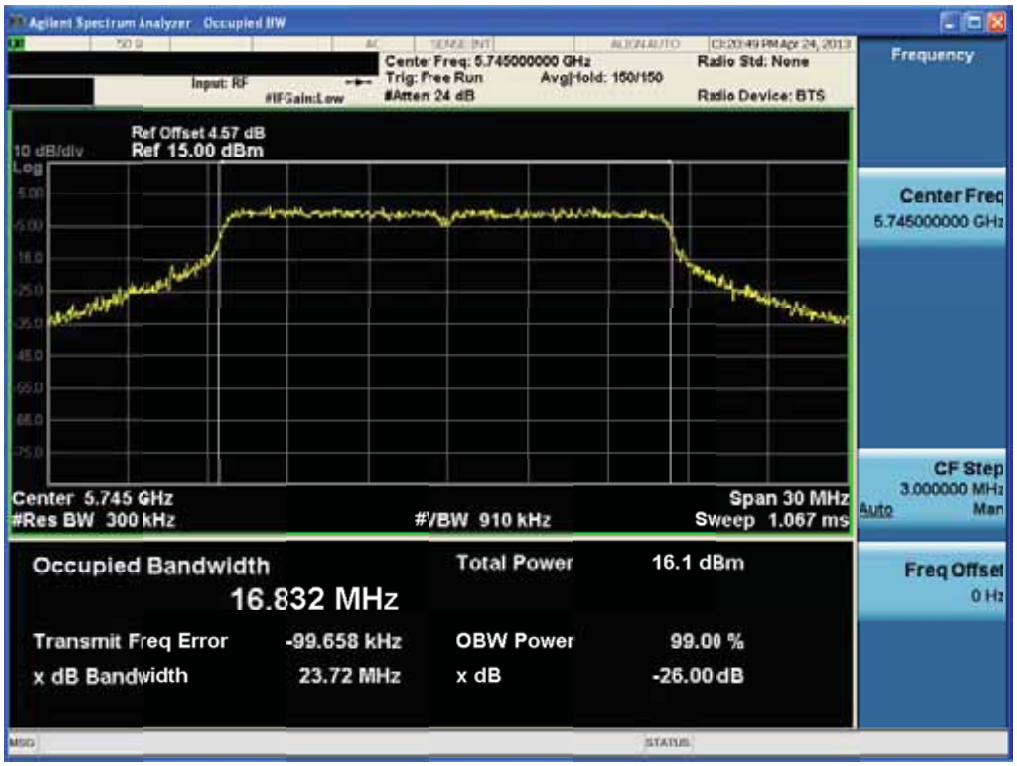
Occupied Bandwidth (99%) Test Mode: Chain 1 & 802.11n HT40 & MCS 8 & 2437MHz



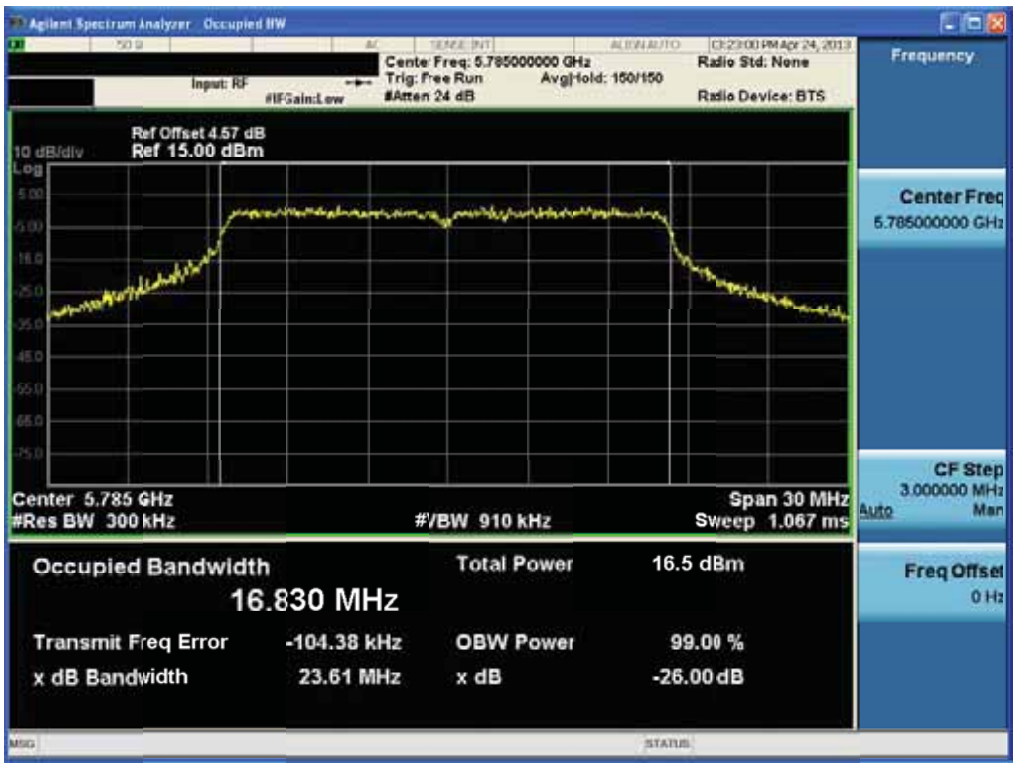
Occupied Bandwidth (99%) Test Mode: Chain 1 & 802.11n HT40 & MCS 8 & 2452MHz



Occupied Bandwidth (99%) Test Mode: Chain 0 & 802.11a & 24Mbps & 5745MHz

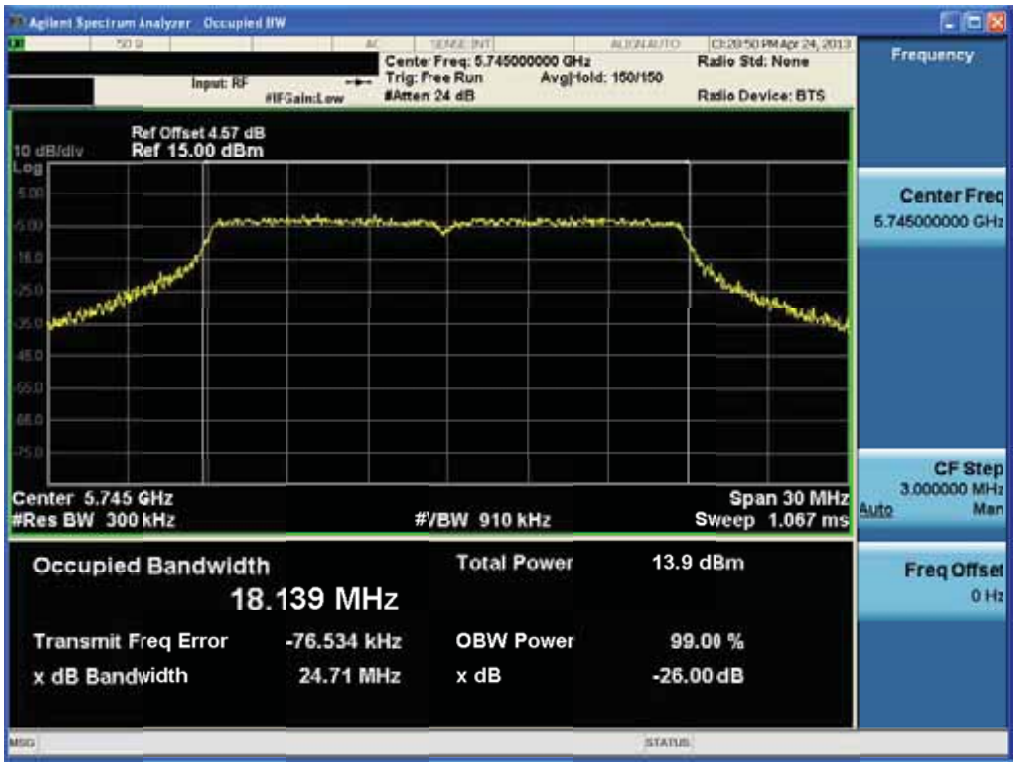


Occupied Bandwidth (99%) Test Mode: Chain 0 & 802.11a & 24Mbps & 5785MHz

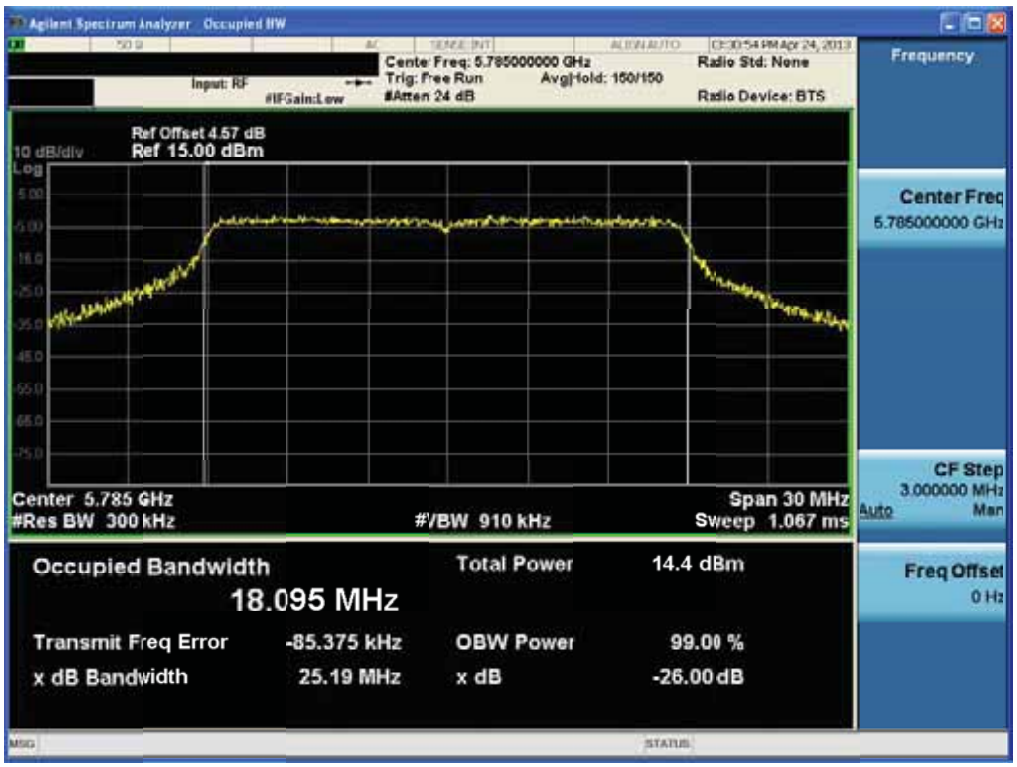


Occupied Bandwidth (99%) Test Mode: Chain 0 & 802.11a & 24Mbps & 5825MHz

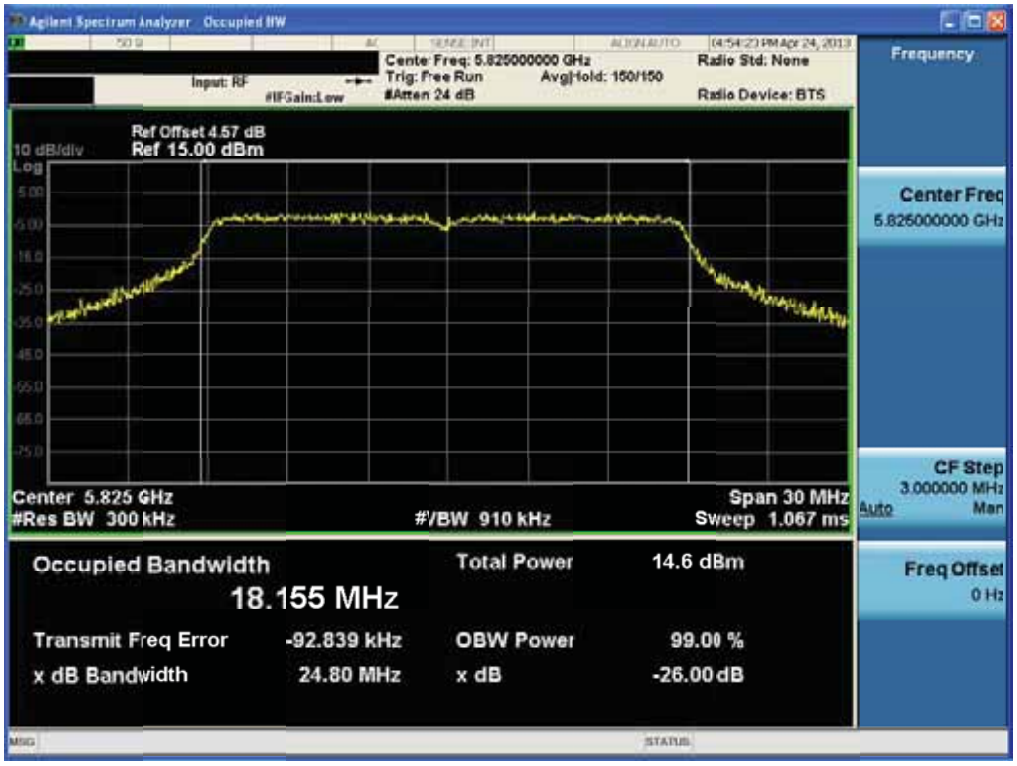
Occupied Bandwidth (99%) Test Mode: Chain 0 & 802.11n HT20 & MCS 8 & 5745MHz



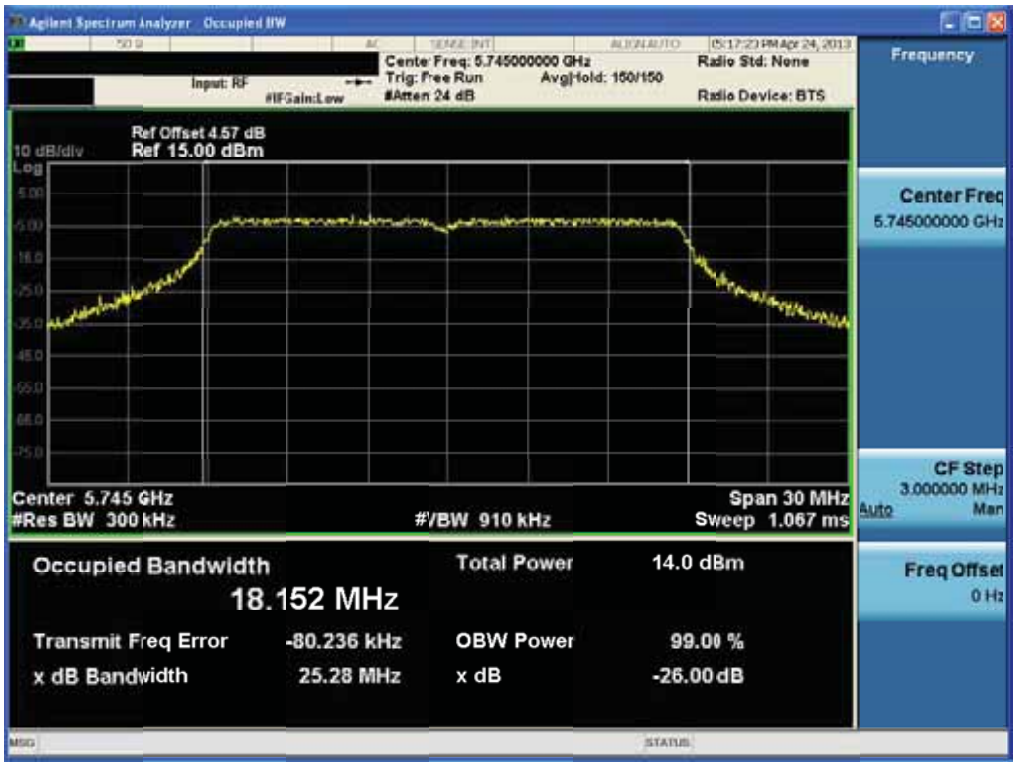
Occupied Bandwidth (99%) Test Mode: Chain 0 & 802.11n HT20 & MCS 8 & 5785MHz



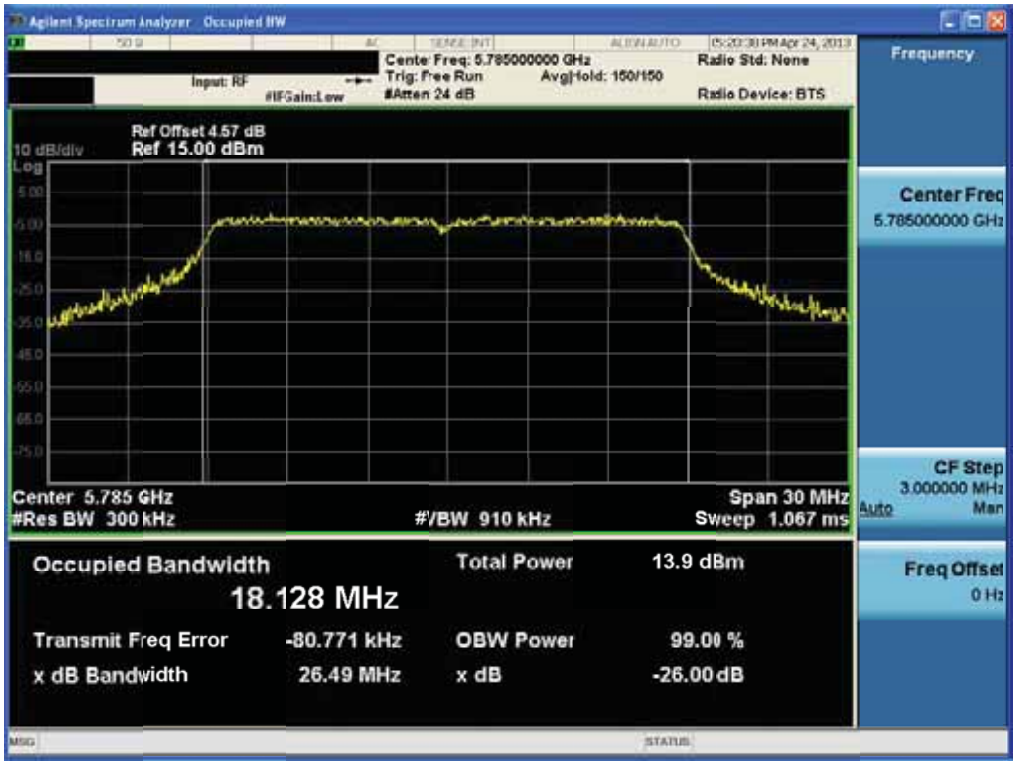
Occupied Bandwidth (99%) Test Mode: Chain 0 & 802.11n HT20 & MCS 8 & 5825MHz



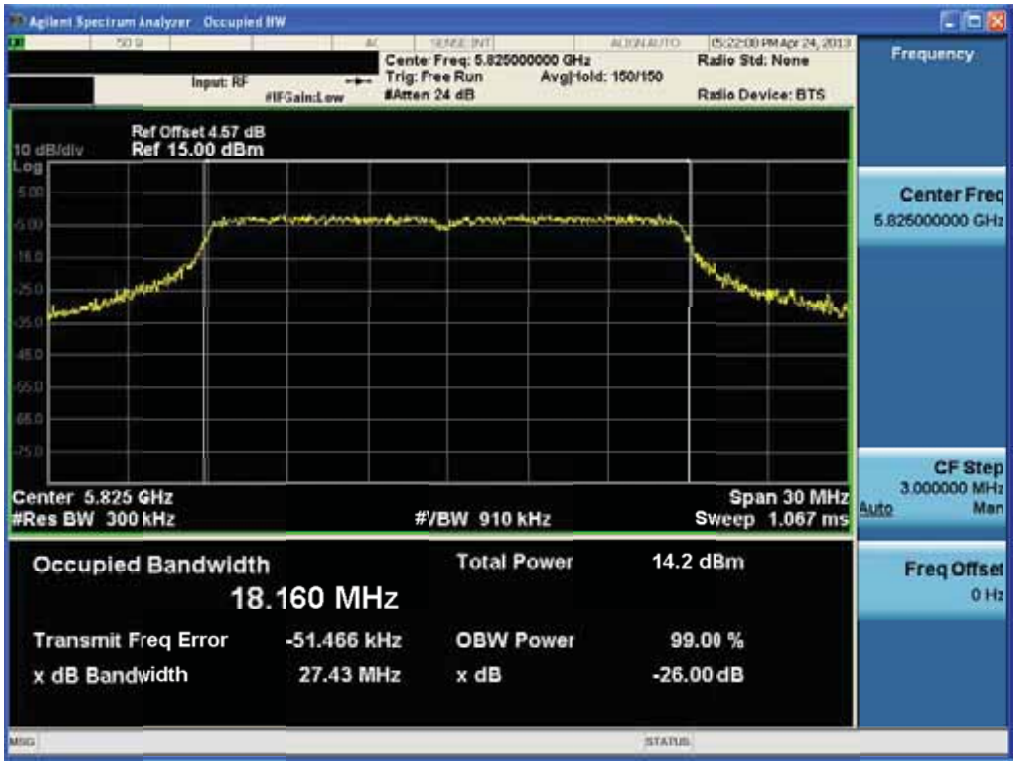
Occupied Bandwidth (99%) Test Mode: Chain 1 & 802.11n HT20 & MCS 8 & 5745MHz



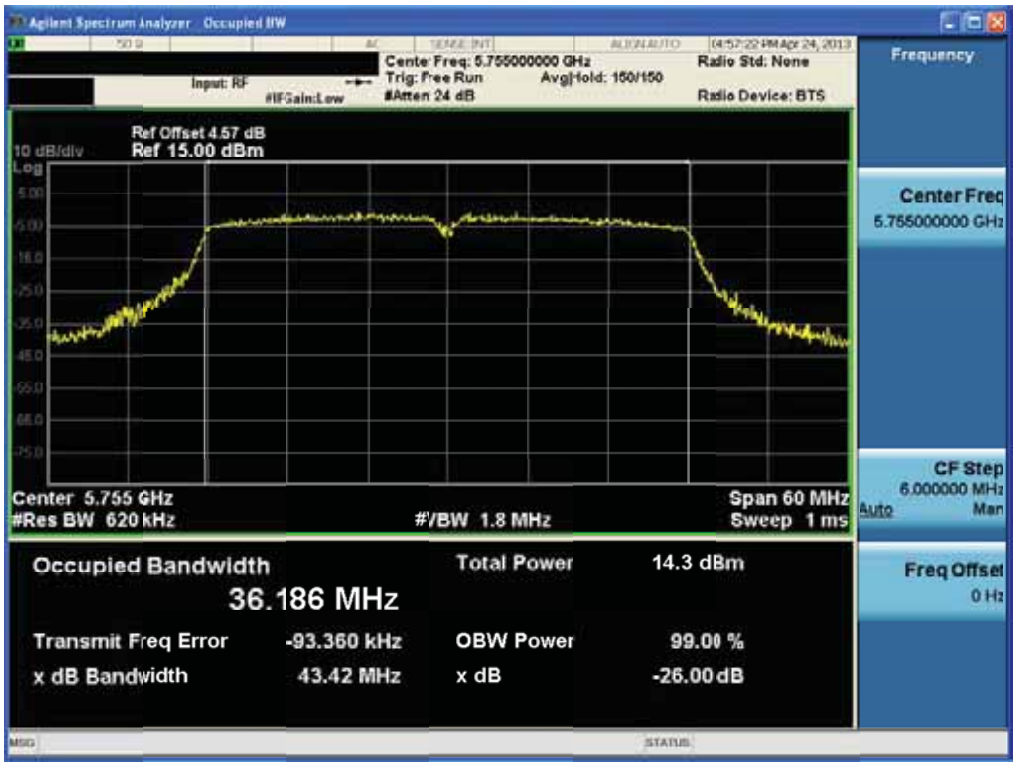
Occupied Bandwidth (99%) Test Mode: Chain 1 & 802.11n HT20 & MCS 8 & 5785MHz



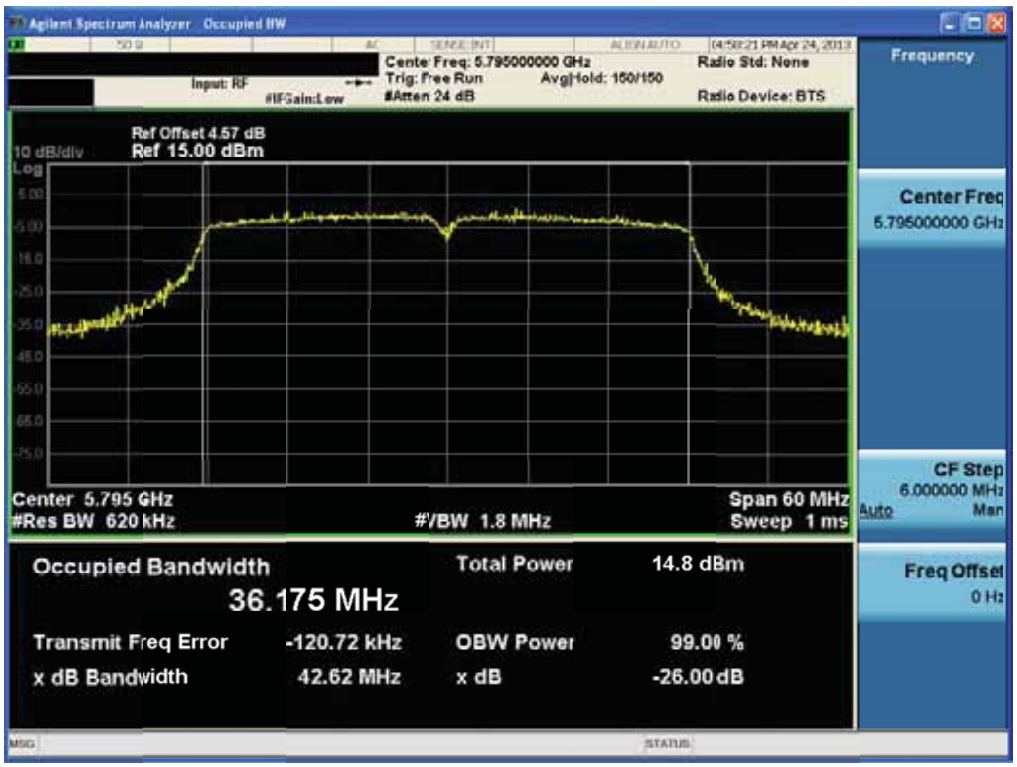
Occupied Bandwidth (99%) Test Mode: Chain 1 & 802.11n HT20 & MCS 8 & 5825MHz



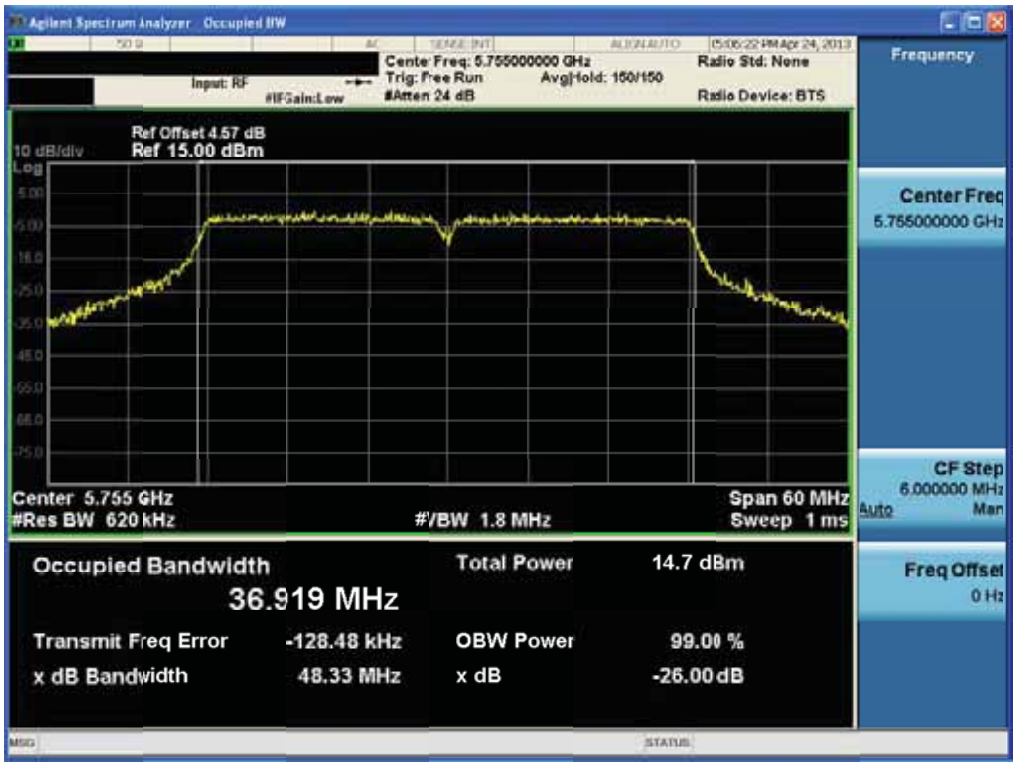
Occupied Bandwidth (99%) Test Mode: Chain 0 & 802.11n HT40 & MCS 11 & 5755MHz



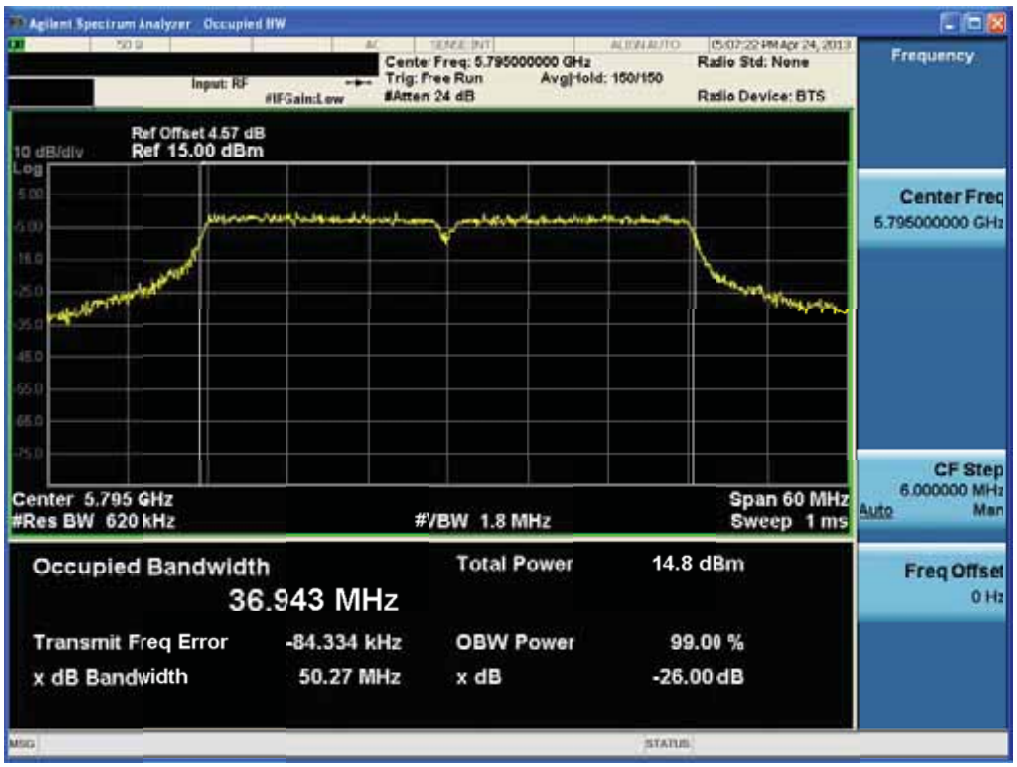
Occupied Bandwidth (99%) Test Mode: Chain 0 & 802.11n HT40 & MCS 11 & 5795MHz



Occupied Bandwidth (99%) Test Mode: Chain 1 & 802.11n HT40 & MCS 11 & 5755MHz



Occupied Bandwidth (99%) Test Mode: Chain 1 & 802.11n HT40 & MCS 11 & 5795MHz

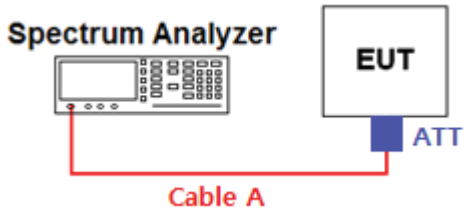


9. LIST OF TEST EQUIPMENT

Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
Spectrum Analyzer	Agilent	N9020A	13/01/08	14/01/08	MY49100833
Spectrum Analyzer	Agilent	E4440A	12/10/22	13/10/22	US45303051
Spectrum Analyzer	Rohde Schwarz	FSQ26	13/02/14	14/02/14	200445
Power Sensor	Rohde Schwarz	NRP-Z81	12/06/28	13/06/28	1137.9009.02-101001-EA
Virtual Power Meter(S/W)	Rohde Schwarz	R&S Power Viewer Plus	-	-	V 4.1.0
Harmonic Mixer	OML	M28HWD	13/02/14	14/02/14	Ka100224-1
Digital Multimeter	H.P	34401A	13/02/27	14/02/27	3146A13475
Signal Generator	Rohde Schwarz	SMR20	13/02/27	14/02/27	101251
Vector Signal Generator	Rohde Schwarz	SMJ100A	13/01/08	14/01/08	100148
Thermo hygrometer	BODYCOM	BJ5478	12/06/20	13/06/20	120612-2
DC Power Supply	HP	6622A	13/02/27	14/02/27	3448A03760
High-pass filter	Wainwright	WHNX3.0	12/09/17	13/09/17	9
High-Pass Filter	Wainwright	WHKX8.5	12/09/17	13/09/17	1
BILOG ANTENNA	SCHAFFNER	CBL6112B	12/11/06	14/11/06	2737
LOOP Antenna	Schwarzbeck	FMZB1513	12/09/24	13/09/24	1513-128
HORN ANT	ETS	3115	12/02/20	14/02/20	6419
HORN ANT	A.H.Systems	SAS-574	13/03/20	15/03/20	154
Attenuator (3dB)	WEINSCHEL	56-3	12/09/17	13/09/17	Y2342
Amplifier (22dB)	H.P	8447E	13/01/08	14/01/08	2945A02865
Amplifier (30dB)	Agilent	8449B	13/02/27	14/02/27	3008A00370
EMI TEST RECEIVER	R&S	ESCI	13/02/27	14/02/27	100364
EMI TEST RECEIVER	R&S	ESU	13/01/08	14/01/08	100014
CVCF	KIKUSUI	PCR1000L	12/09/15	13/09/15	14110610
LISN	R&S	ESH2-Z5	12/09/18	13/09/18	828739/006

APPENDIX I

Test set Diagram & path loss information for 6dB Bandwidth & Maximum Peak Conducted Output Power



Offset value information

Frequency (GHz)	Offset Value (dB)	Frequency (GHz)	Offset Value (dB)
2.412 ~ 2.462	3.72	5.745 ~ 5.825	4.57

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 (ATT)