

9.2 99% Bandwidth

9.2.1 Test Requirement:

Measure 99% power bandwidth.

9.2.2 Test Method:

Measurements are performed according to the procedure defined in ANSI C63.10 (2013).

Spectrum Analyzer settings:

Set analyzer center frequency to the nominal EUT channel frequency

Span to between 1.5 and 5.0 times the DTS bandwidth

RBW to: 1% to 5% of the OBW

VBW \geq 3 RBW

Detector = Peak

Sweep time = auto couple

Trace mode = max hold

Use the 99% power bandwidth function of the instrument.

9.2.3 Limit:

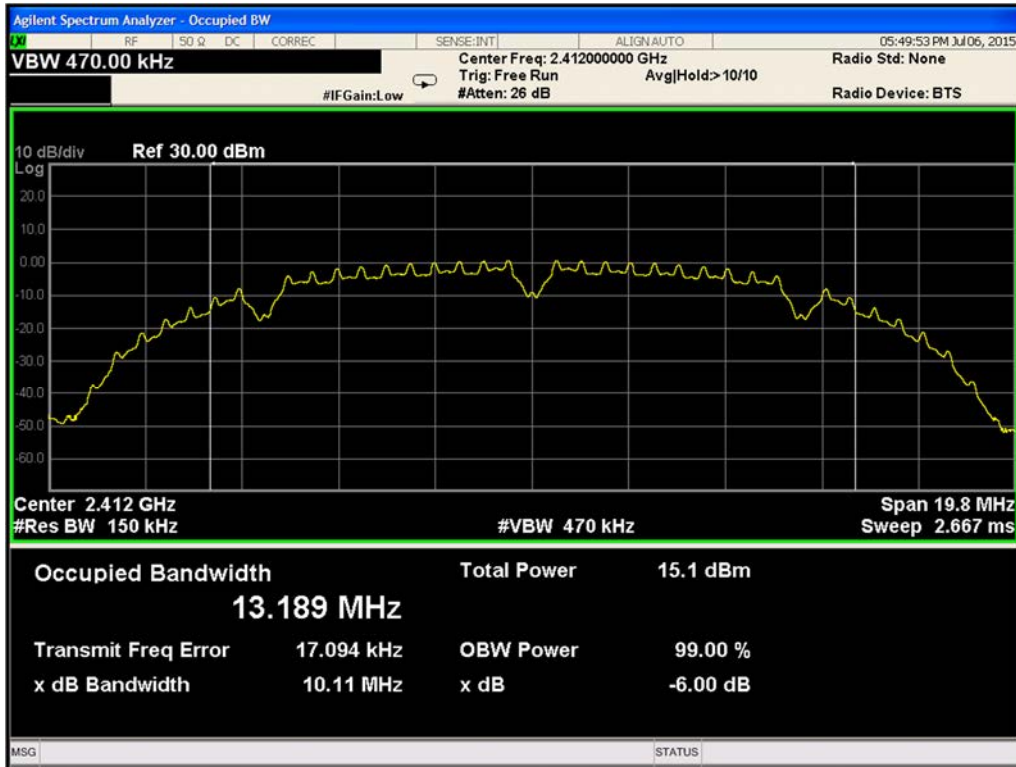
For reporting purpose only.

9.2.4 Test Results:

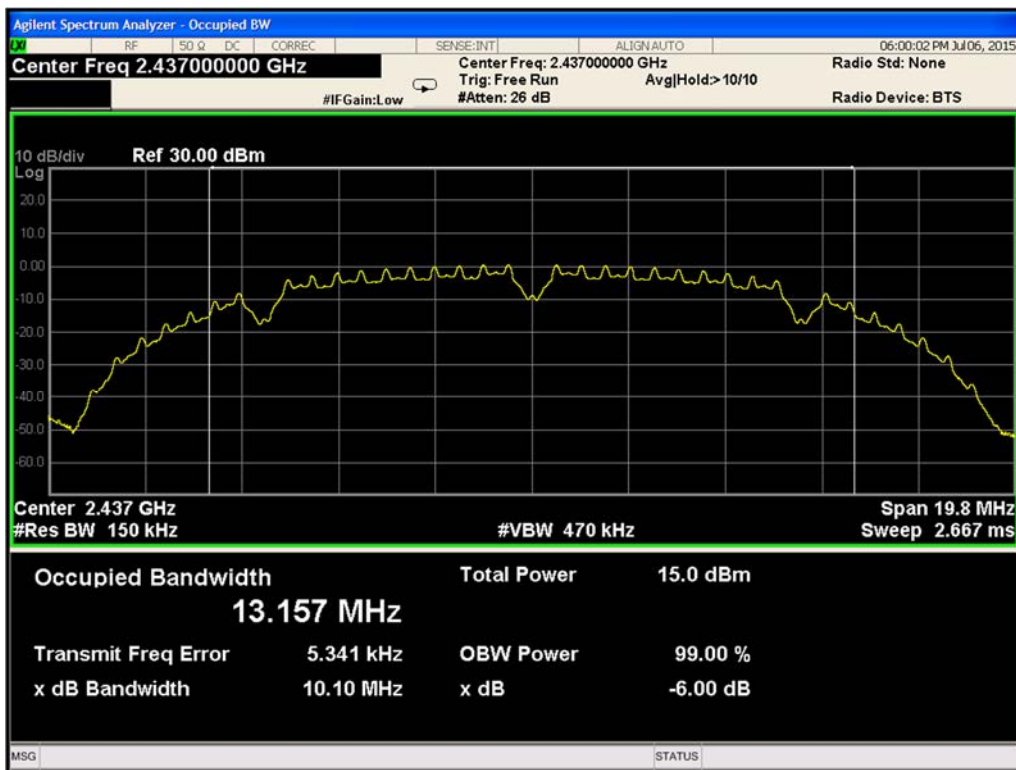
Frequency (MHz)	Transmission Chain	802.11 Mode	Data Rate (Mbps)	99% Bandwidth (MHz)
2412	A	b	1	13.189
2437	A	b	1	13.157
2462	A	b	1	13.162
2472	A	b	1	13.255
2412	A	g	6	16.557
2437	A	g	6	16.549
2462	A	g	6	16.543
2472	A	g	6	16.502
2412	A	n	MCS0	17.560
2437	A	n	MCS0	17.556
2462	A	n	MCS0	17.554
2472	A	n	MCS0	17.579

Frequency (MHz)	Transmission Chain	802.11 Mode	Data Rate (Mbps)	99% Bandwidth (MHz)
2412	B	b	1	13.064
2437	B	b	1	13.040
2462	B	b	1	13.045
2472	B	b	1	13.124
2412	B	g	6	16.573
2437	B	g	6	16.559
2462	B	g	6	16.588
2472	B	g	6	16.535
2412	B	n	MCS0	17.554
2437	B	n	MCS0	17.561
2462	B	n	MCS0	17.558
2472	B	n	MCS0	17.585

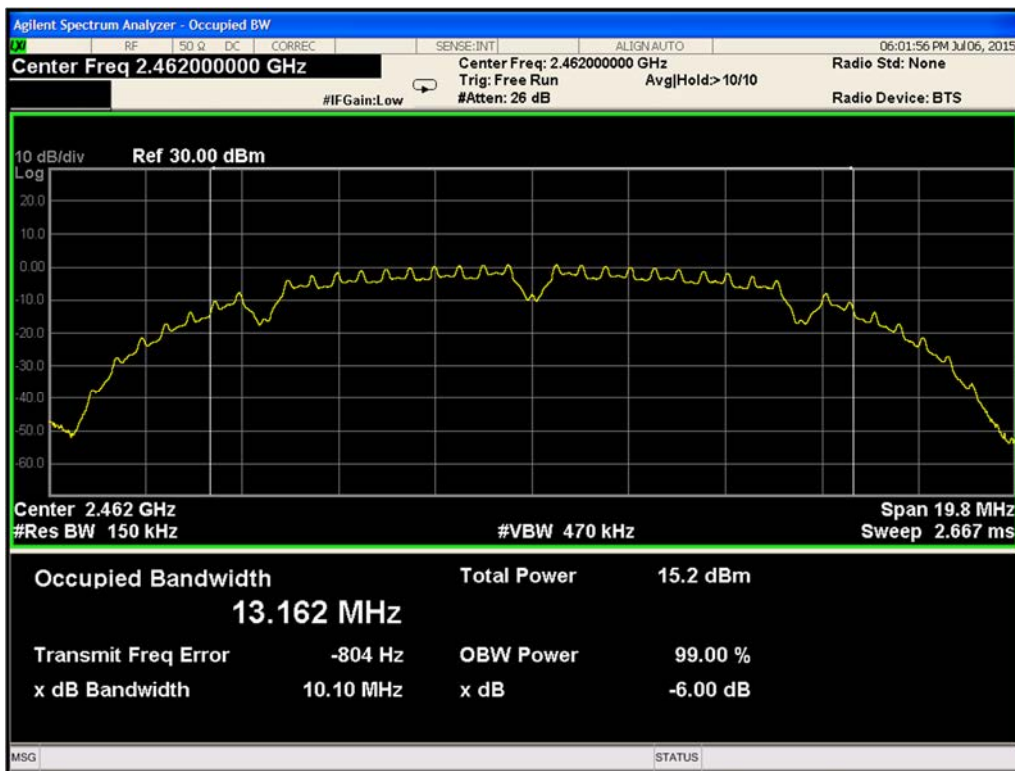
9.2.5 Test Data:



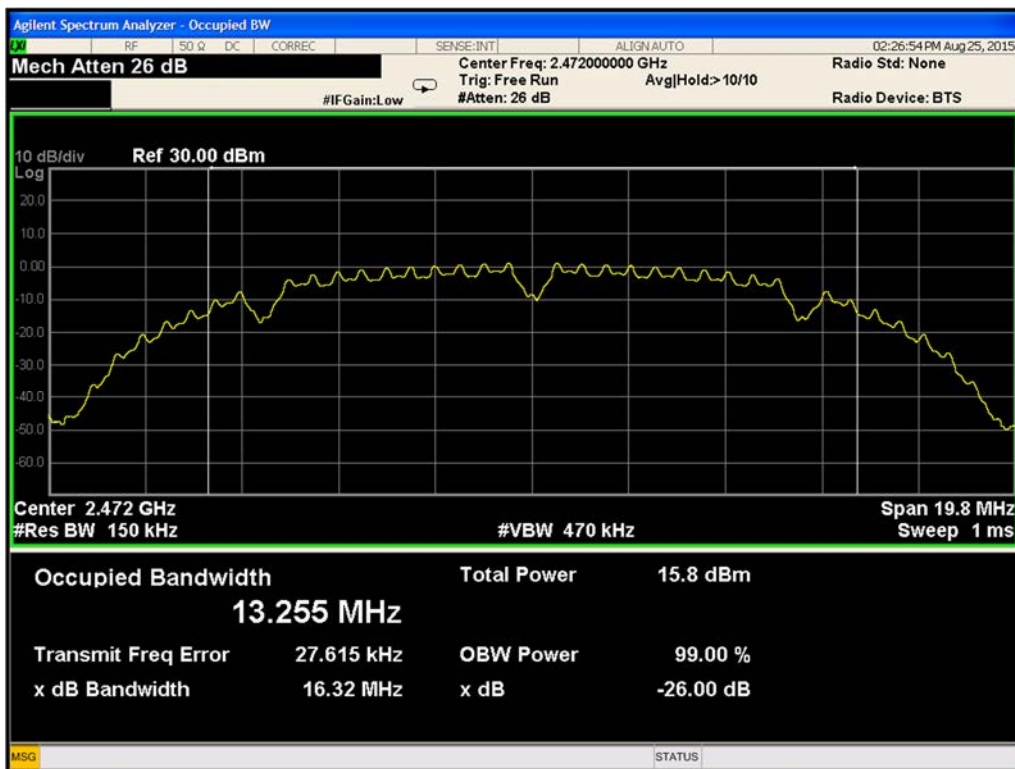
Plot-25. 99% Bandwidth 802.11b Path A Channel 2412MHz



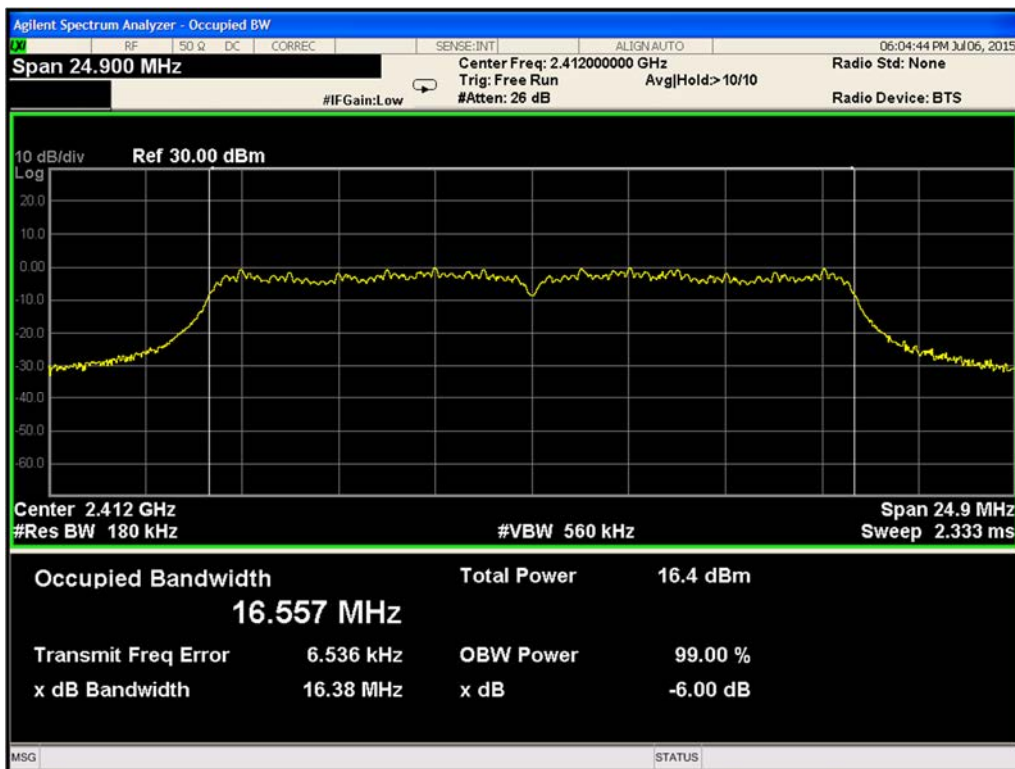
Plot-26. 99% Bandwidth 802.11b Path A Channel 2437MHz



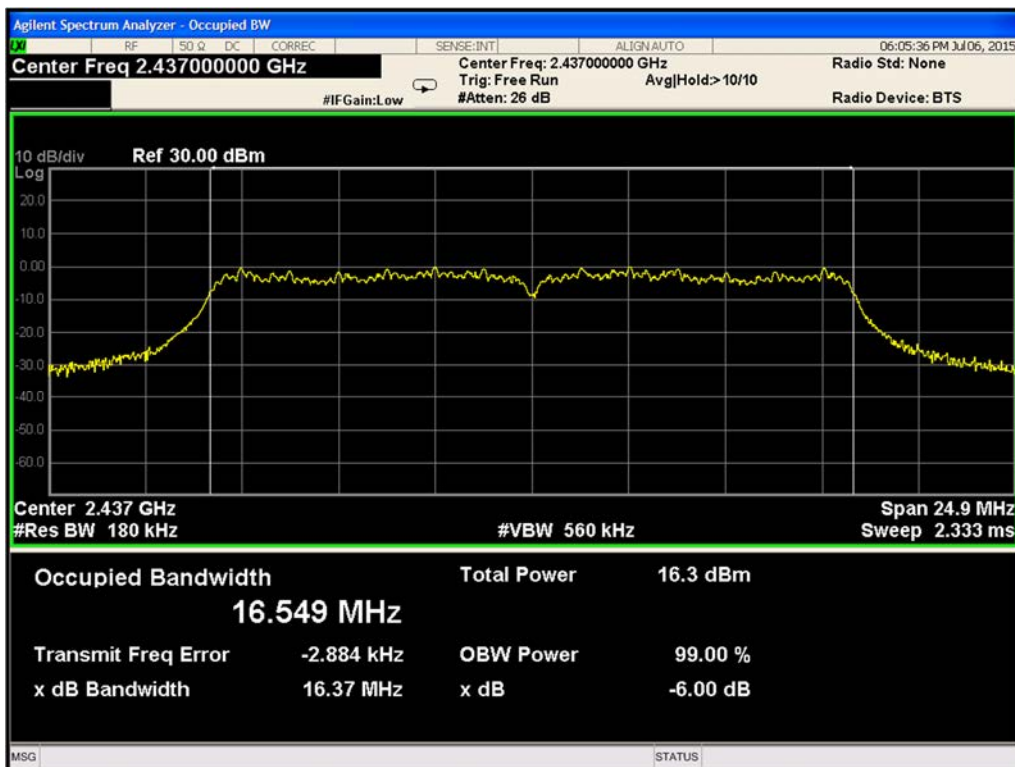
Plot-27. 99% Bandwidth 802.11b Path A Channel 2462MHz



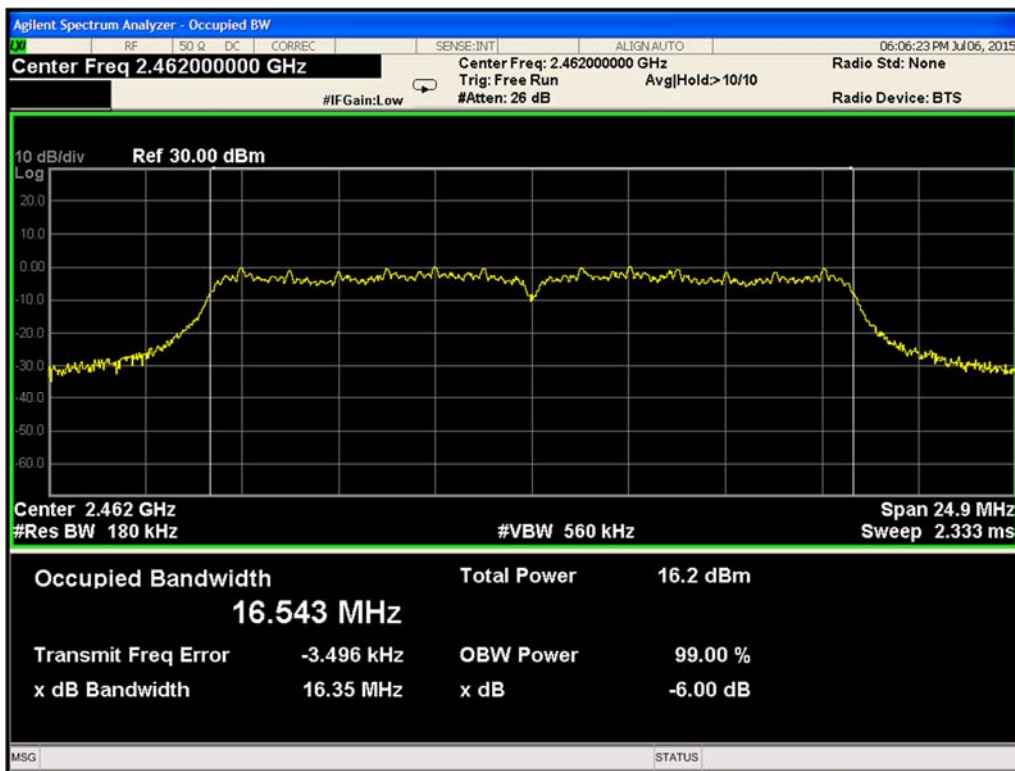
P Plot-28. 99% Bandwidth 802.11b Path A Channel 2472MHz



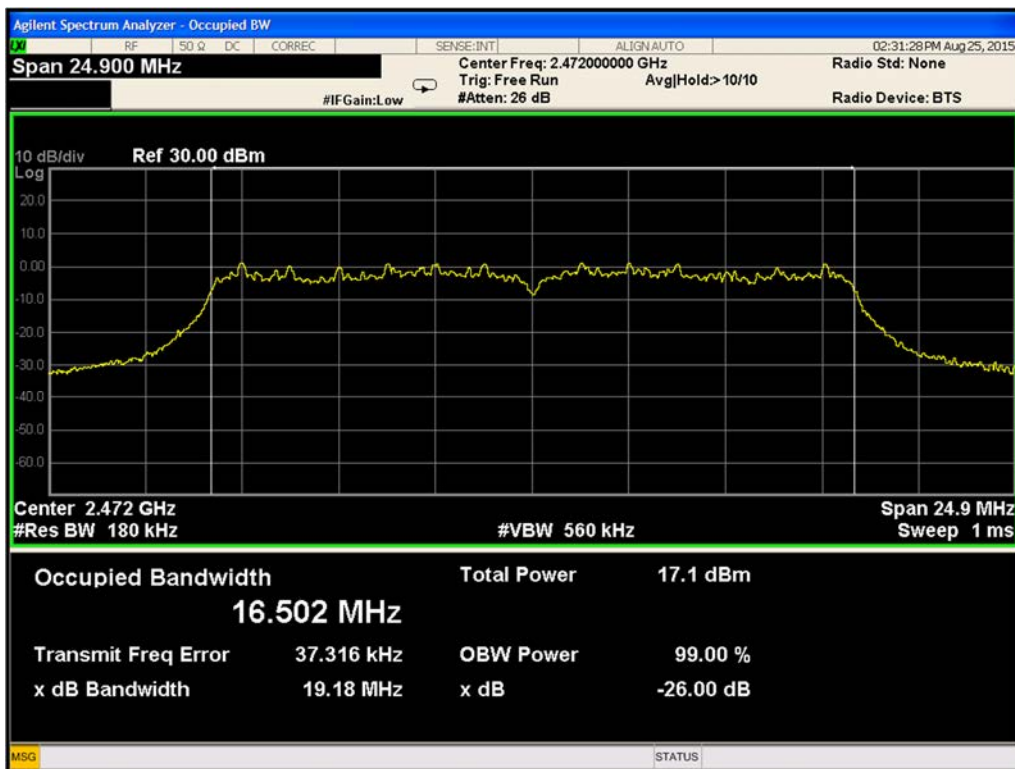
Plot-29. 99% Bandwidth 802.11g Path A Channel 2412MHz



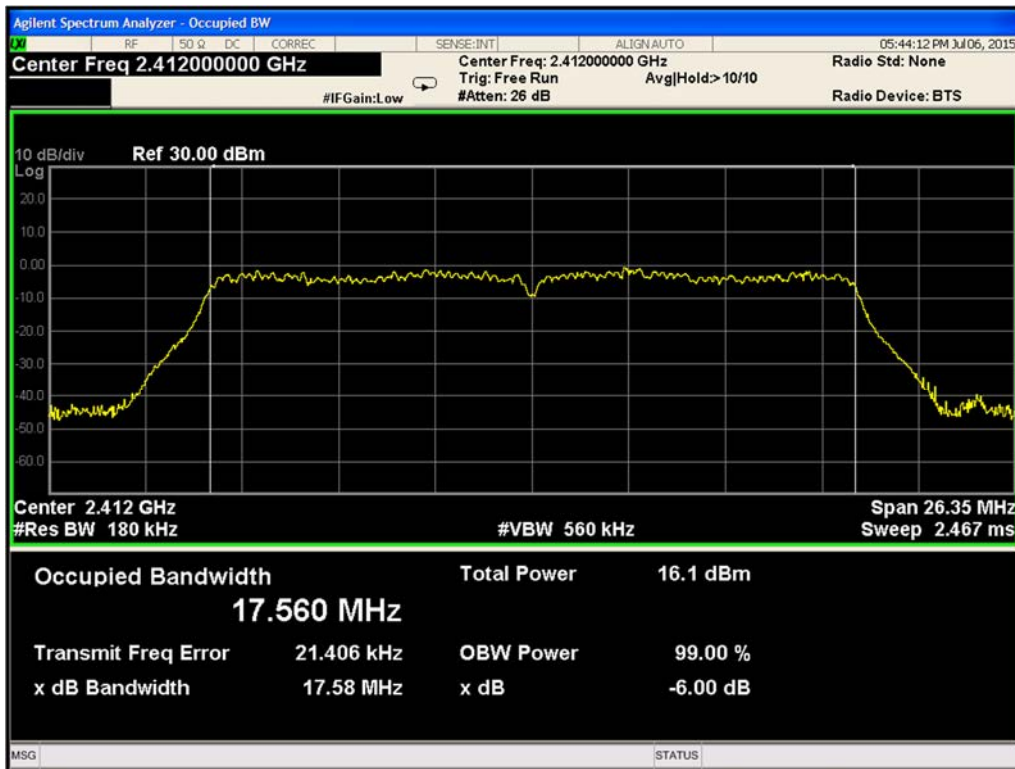
Plot-30. 99% Bandwidth 802.11g Path A Channel 2437MHz



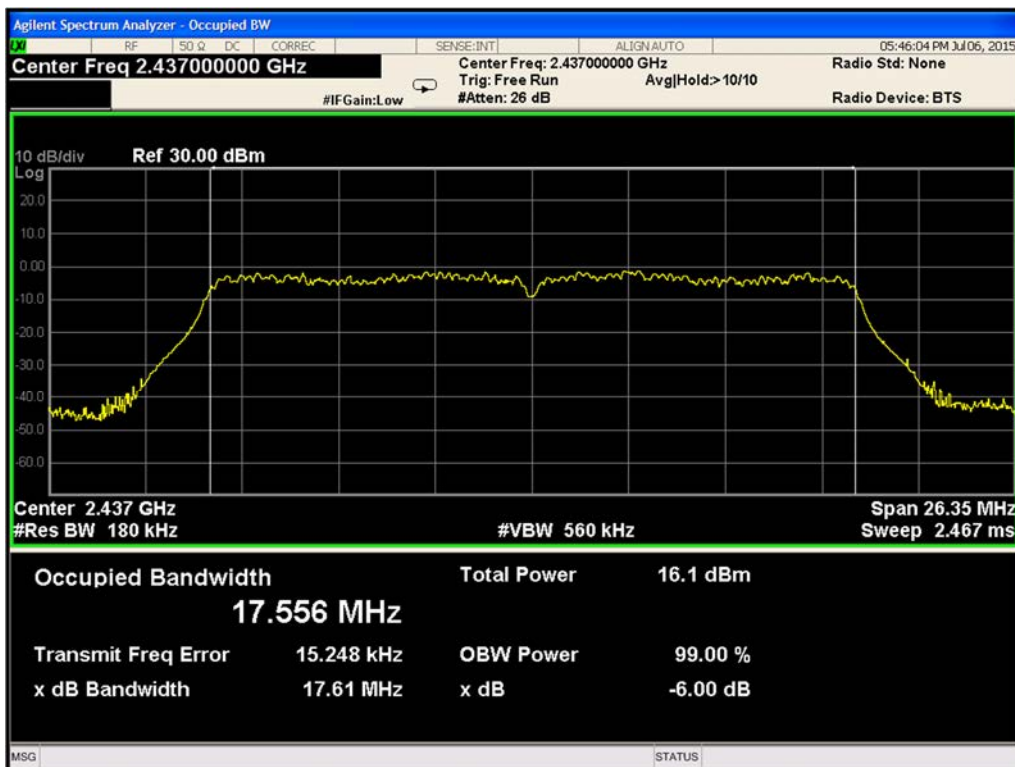
Plot-31. 99% Bandwidth 802.11g Path A Channel 2462MHz



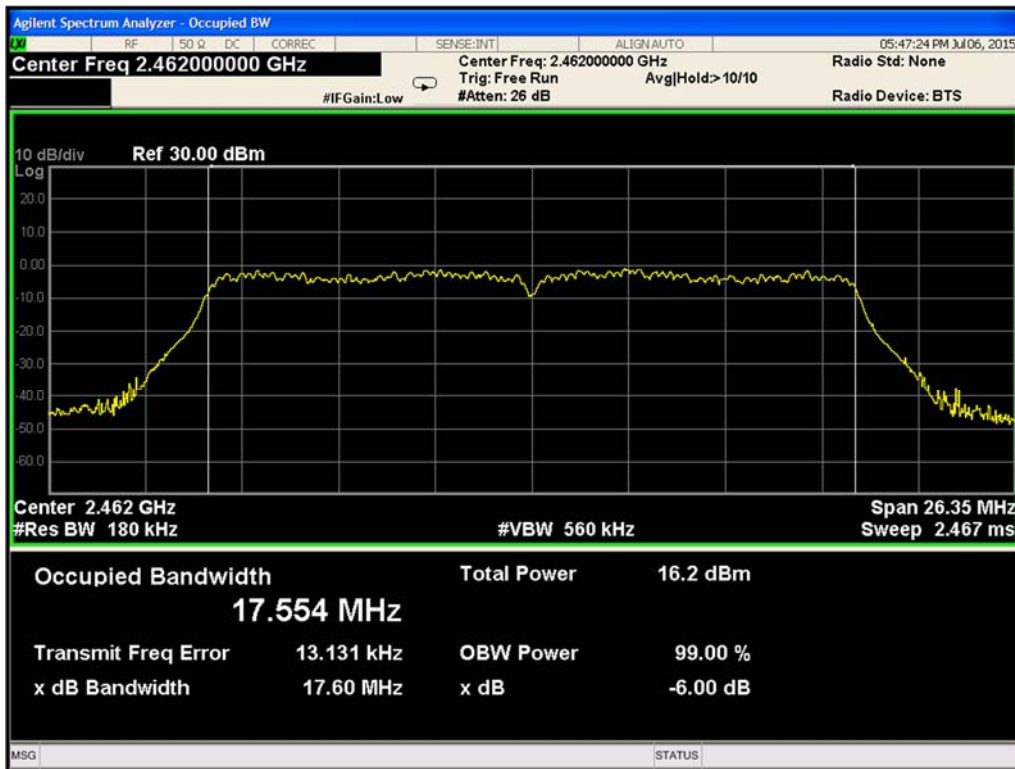
Plot-32. 99% Bandwidth 802.11g Path A Channel 2472MHz



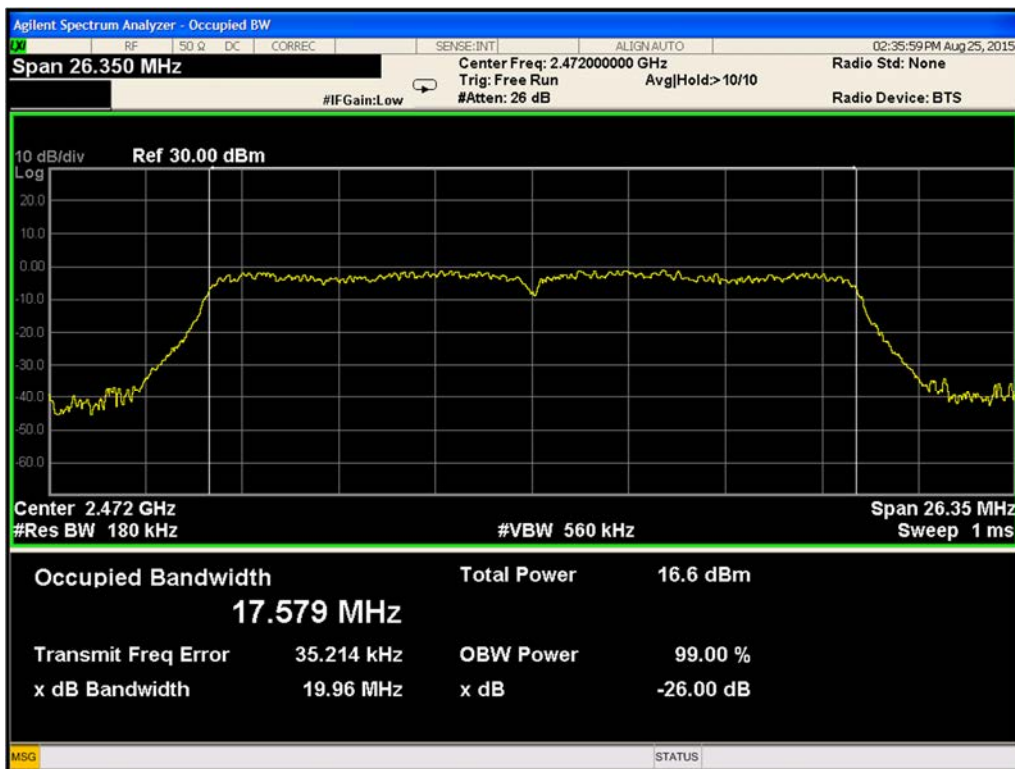
Plot-33. 99% Bandwidth 802.11n Path A Channel 2412MHz



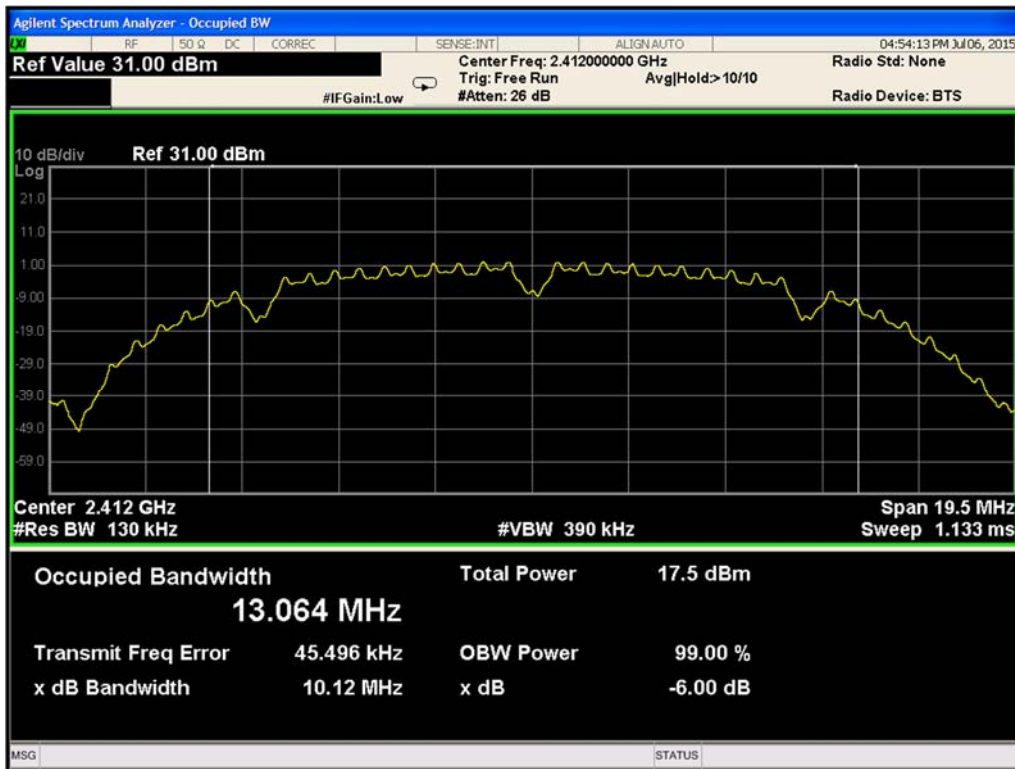
Plot-34. 99% Bandwidth 802.11n Path A Channel 2437MHz



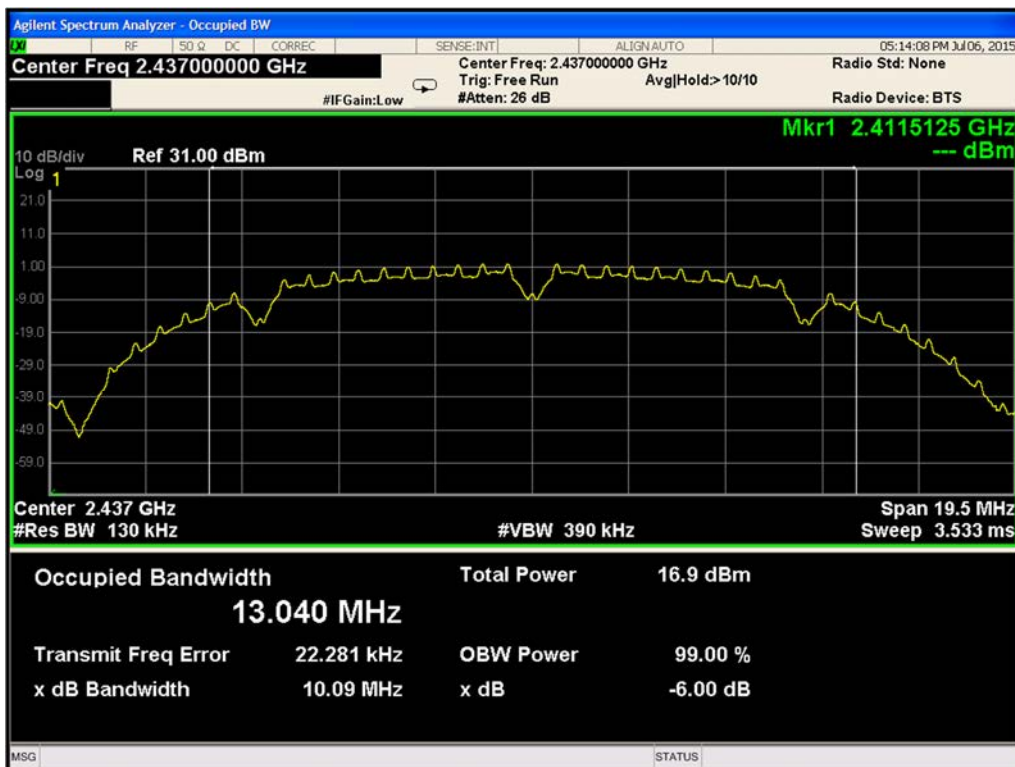
Plot-35. 99% Bandwidth 802.11n Path A Channel 2462MHz



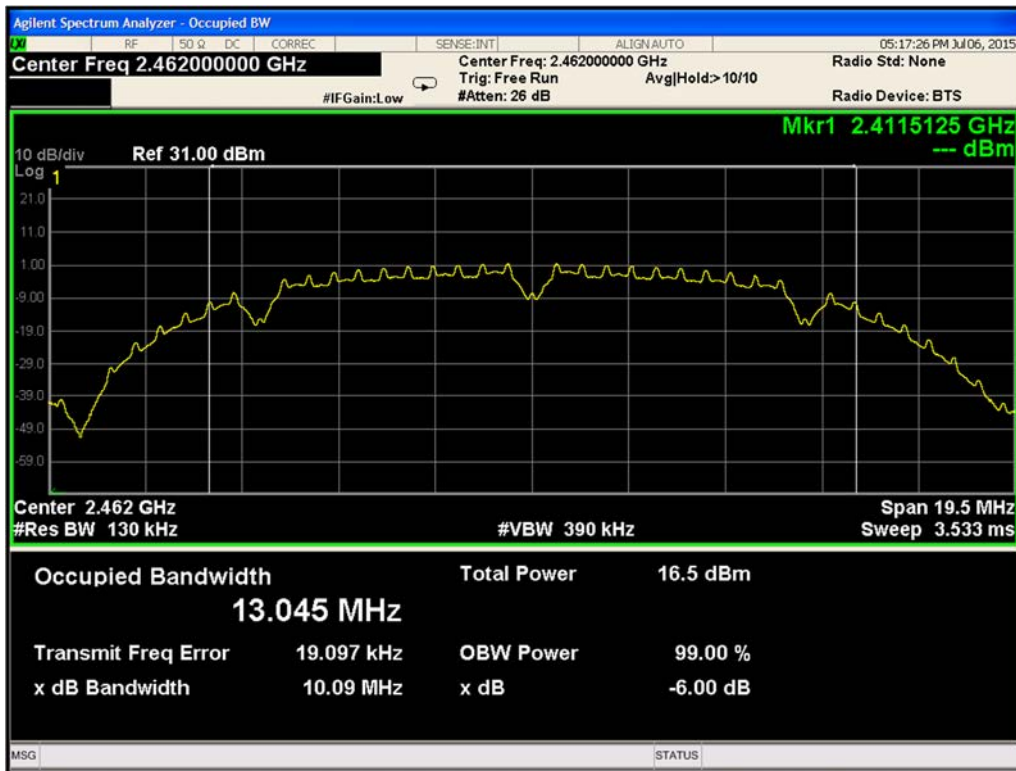
Plot-36. 99% Bandwidth 802.11n Path A Channel 2472MHz



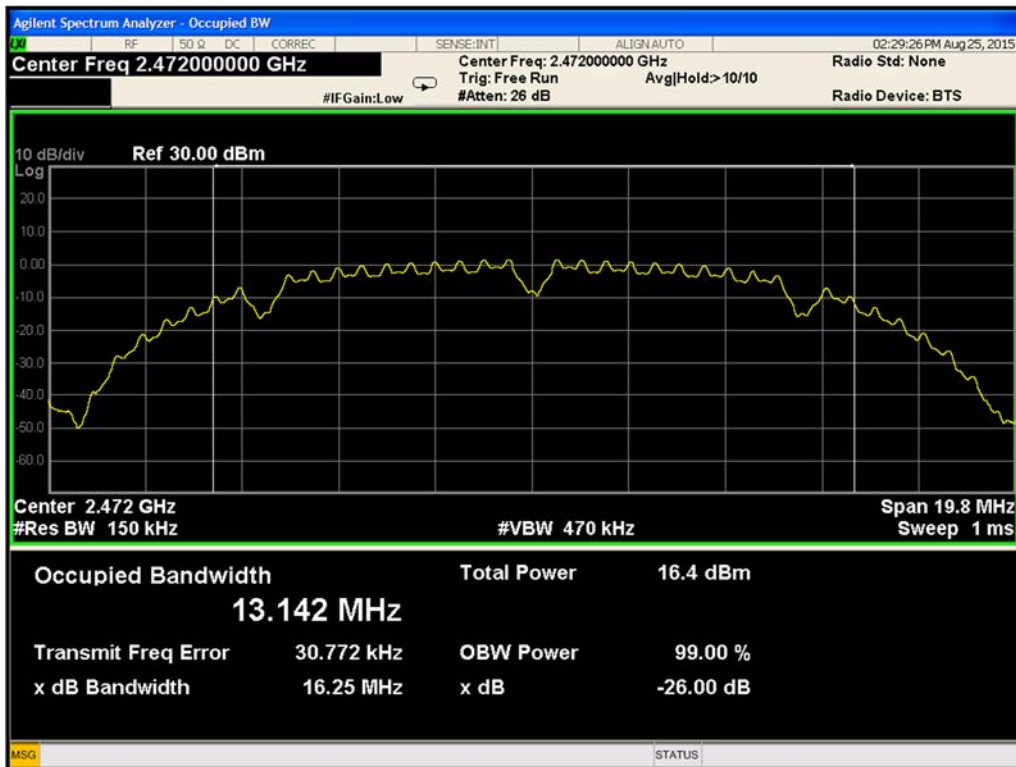
Plot-37. 99% Bandwidth 802.11b Path B Channel 2412MHz



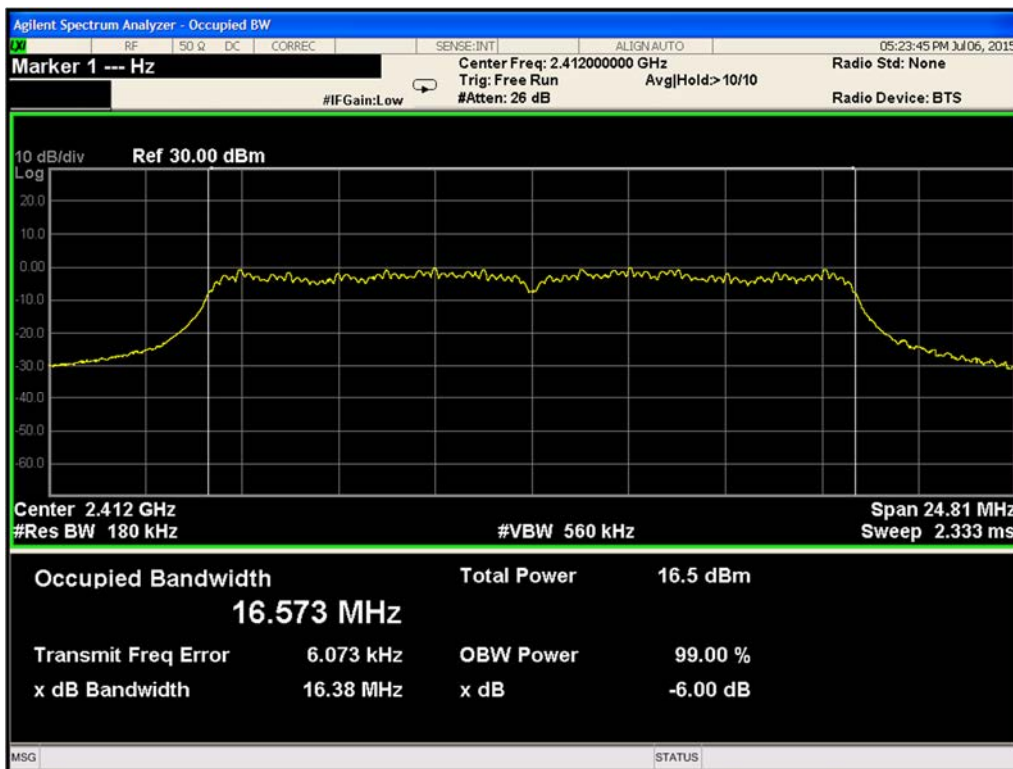
Plot-38. 99% Bandwidth 802.11b Path B Channel 2437MHz



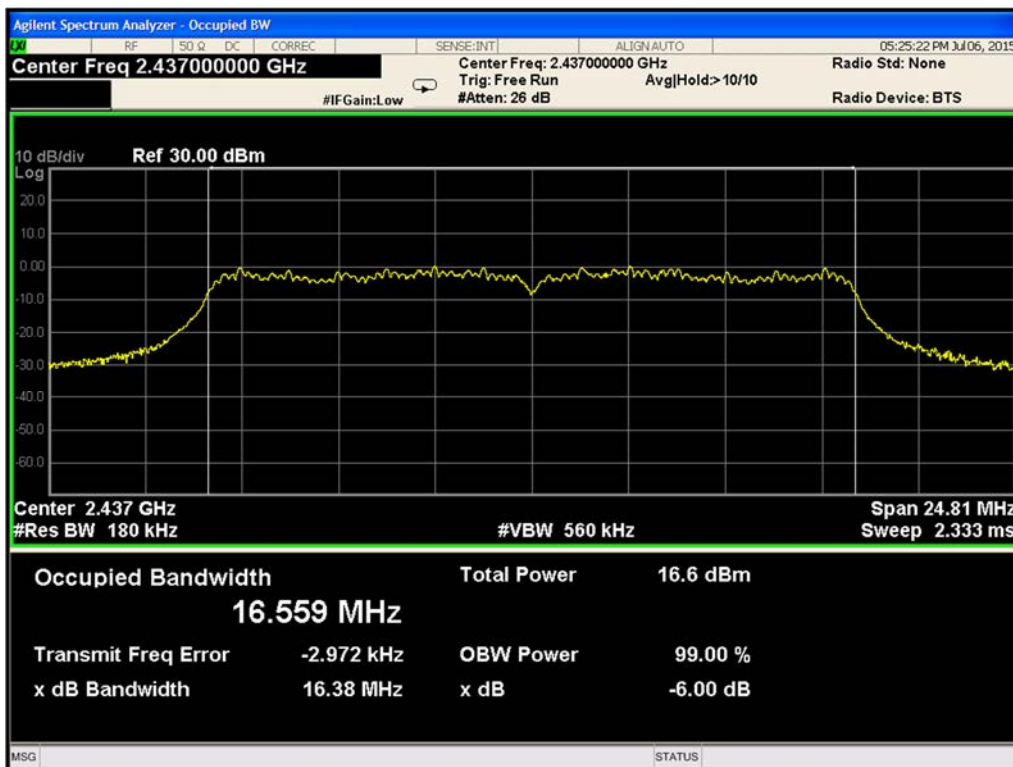
Plot-39. 99% Bandwidth 802.11b Path B Channel 2462MHz



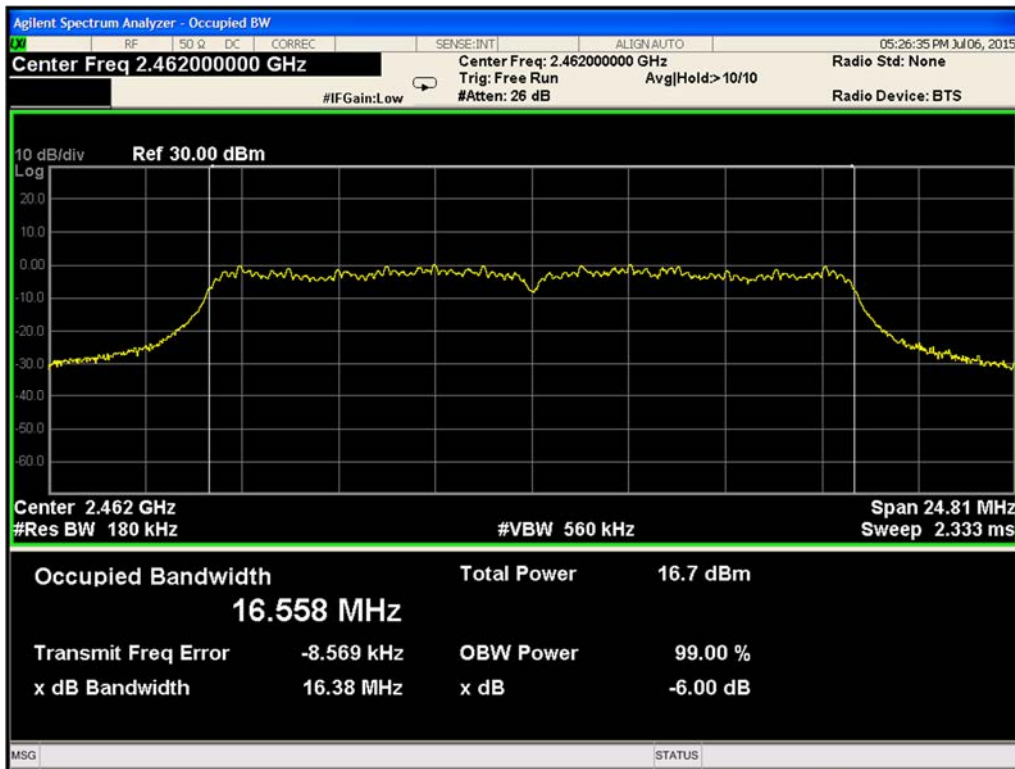
Plot-40. 99% Bandwidth 802.11b Path B Channel 2472MHz



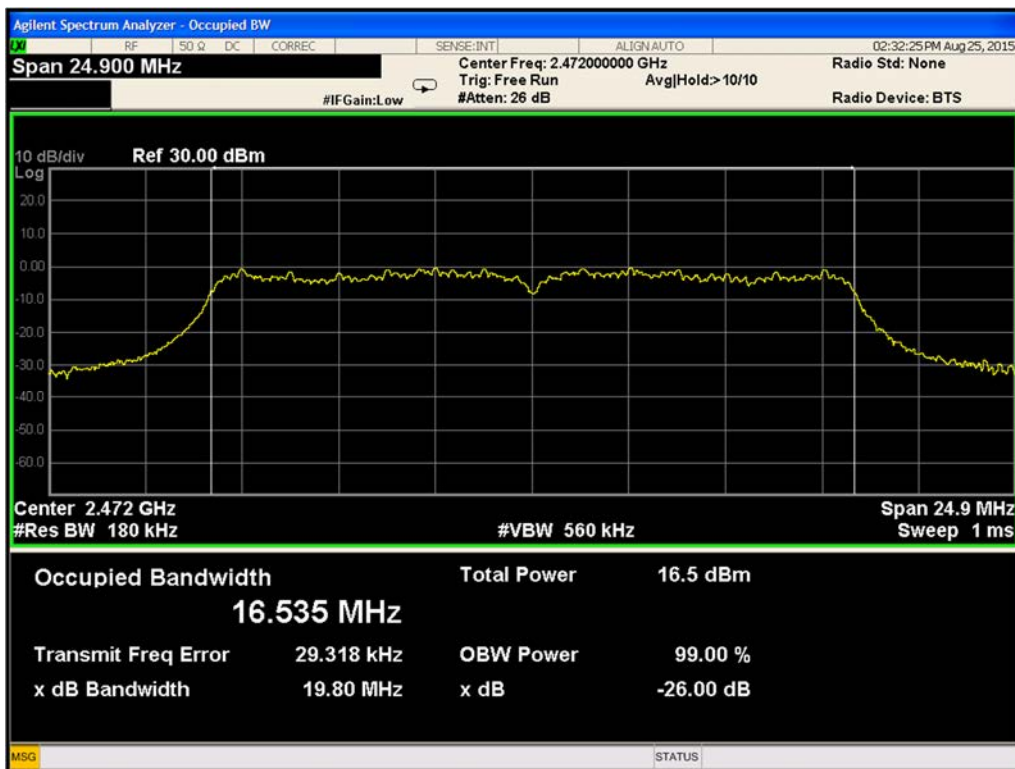
Plot-41. 99% Bandwidth 802.11g Path B Channel 2412MHz



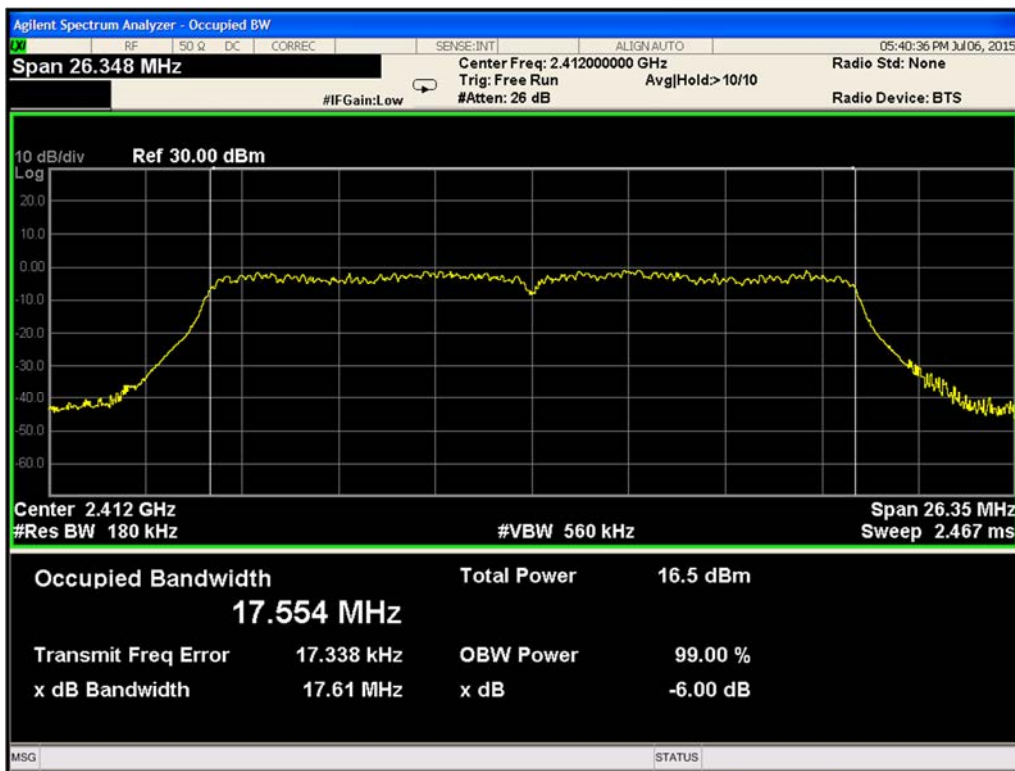
Plot-42. 99% Bandwidth 802.11g Path B Channel 2437MHz



Plot-43. 99% Bandwidth 802.11g Path B Channel 2462MHz



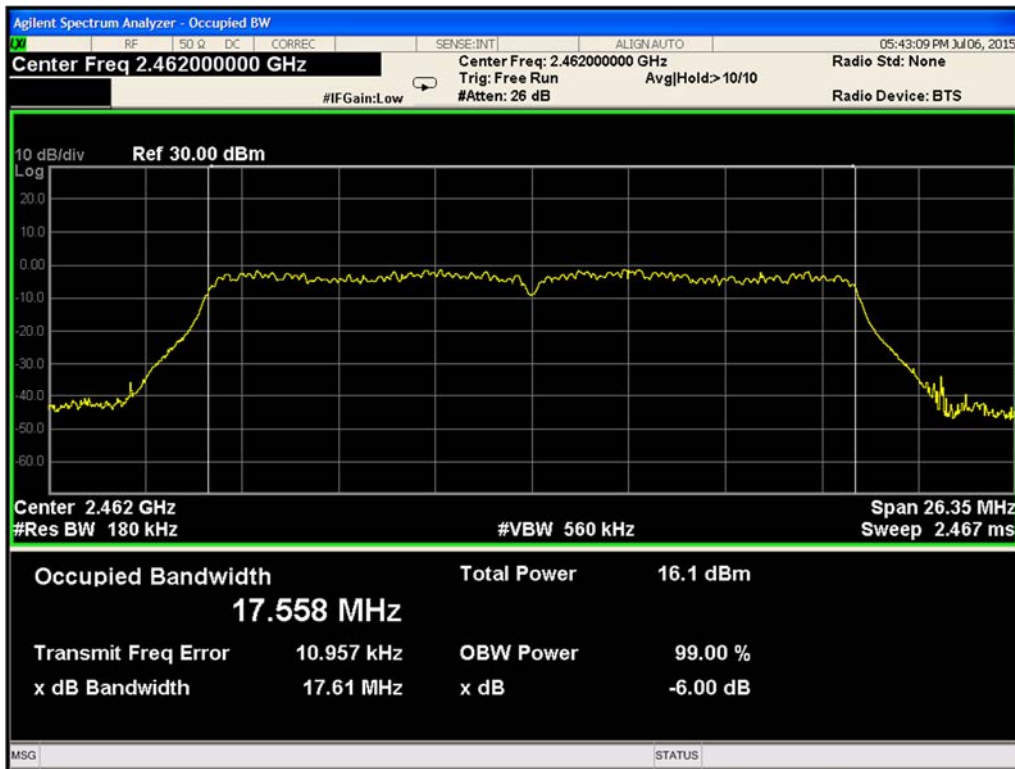
Plot-44. 99% Bandwidth 802.11g Path B Channel 2472MHz



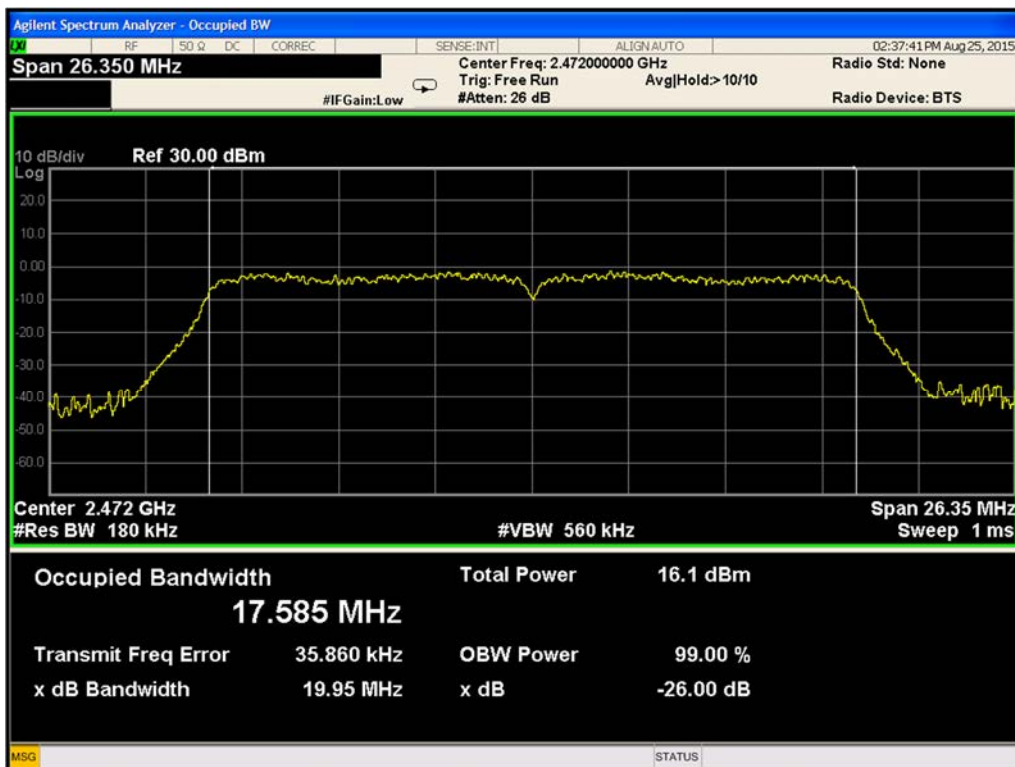
Plot-45. 99% Bandwidth 802.11n Path B Channel 2412MHz



Plot-46. 99% Bandwidth 802.11n Path B Channel 2437MHz



Plot-47. 99% Bandwidth 802.11n Path B Channel 2462MHz



Plot-48. 99% Bandwidth 802.11n Path B Channel 2472MHz

9.3 Output Power

9.3.1 Test Requirement:

FCC CFR 47 Rule Part 15.247 (b)(3)

Industry Canada RSS-247 [5.2]

9.3.2 Test Method:

Measurements are performed according to the procedure defined in KDB 558074- Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 V03R03 and ANSI C63.10 2013.

Spectrum Analyzer settings:

Average Power:

AVGSA-1 Alternative Method of KDB 558074.

RBW= 1-5% of the OBW, not to exceed 1 MHz

VBW \geq 3 x RBW

Trace Mode= Average Detector (Max Hold)

Number of points in sweep \geq 2 x span / RBW

Sweep time= Auto

Trace average at least 100 traces in power average mode

Power integration over Occupied BW.

9.3.3 Limits:

15.247: Max conducted output power= 1 Watt (30dBm).

RSS-247: 1 W (30dBm) conducted and 4 W (36dBm) EIRP.

9.3.4 Test Results:

Average Power									
Frequency (MHz)	Path	802.11 Mode	Data Rate	Measured Conducted Output Power (dBm)	Duty Cycle Correction Factor (dB)	Corrected Power (dBm)	Limit-Conducted (dBm)	Margin (dB)	Result
2412	A	b	1 Mbps	8.32	0.02	8.34	30	-21.66	Pass
2437	A	b	1 Mbps	8.33	0.02	8.35	30	-21.65	Pass
2462	A	b	1 Mbps	8.90	0.02	8.92	30	-21.08	Pass
2472	A	b	1 Mbps	9.43	0.02	9.45	30	-20.55	Pass
2412	A	g	6 Mbps	8.78	0.01	8.79	30	-21.21	Pass
2437	A	g	6 Mbps	8.83	0.01	8.84	30	-21.16	Pass
2462	A	g	6 Mbps	8.63	0.01	8.64	30	-21.36	Pass
2472	A	g	6 Mbps	9.20	0.01	9.21	30	-20.79	Pass
2412	A	n	MCS0	8.62	0.01	8.63	30	-21.37	Pass
2437	A	n	MCS0	8.74	0.01	8.75	30	-21.25	Pass
2462	A	n	MCS0	8.90	0.01	8.91	30	-21.09	Pass
2472	A	n	MCS0	9.43	0.01	9.44	30	-20.56	Pass
2412	B	b	1 Mbps	9.34	0.02	9.36	30	-20.64	Pass
2437	B	b	1 Mbps	9.48	0.02	9.50	30	-20.50	Pass
2462	B	b	1 Mbps	9.51	0.02	9.53	30	-20.47	Pass
2472	B	b	1 Mbps	9.85	0.02	9.87	30	-20.83	Pass
2412	B	g	6 Mbps	8.61	0.01	8.62	30	-21.38	Pass
2437	B	g	6 Mbps	8.56	0.01	8.57	30	-21.43	Pass
2462	B	g	6 Mbps	8.46	0.01	8.47	30	-21.53	Pass
2472	B	g	6 Mbps	9.03	0.01	9.04	30	-20.96	Pass
2412	B	n	MCS0	8.30	0.01	8.31	30	-21.69	Pass
2437	B	n	MCS0	8.60	0.01	8.61	30	-21.39	Pass
2462	B	n	MCS0	8.48	0.01	8.49	30	-21.51	Pass
2472	B	n	MCS0	9.14	0.01	9.15	30	-20.85	Pass

Table 9-3. Output Power

Path A and B Average Power									
Frequency (MHz)	Path	802.11 Mode	Data Rate	Measured Conducted Output Power (dBm)	Antenna Gain dBi	E.I.R.P Output Power (dBm)	FCC Conducted Limit (dBm)	Margin (dB)	Result
2412	AB	b	1 Mbps	11.89	4.00	15.89	30	-18.11	Pass
2437	AB	b	1 Mbps	11.97	4.00	15.97	30	-18.03	Pass
2462	AB	b	1 Mbps	12.25	4.00	16.25	30	-17.75	Pass
2472	AB	b	1 Mbps	12.68	4.00	16.68	30	-17.32	Pass
2412	AB	g	6 Mbps	11.72	4.00	15.72	30	-18.28	Pass
2437	AB	g	6 Mbps	11.72	4.00	15.72	30	-18.28	Pass
2462	AB	g	6 Mbps	11.57	4.00	15.57	30	-18.43	Pass
2472	AB	g	6 Mbps	12.36	4.00	16.36	30	-17.64	Pass
2412	AB	n	MCS0	11.49	4.00	15.49	30	-18.51	Pass
2437	AB	n	MCS0	11.69	4.00	15.69	30	-18.31	Pass
2462	AB	n	MCS0	11.72	4.00	15.72	30	-18.28	Pass
2472	AB	n	MCS0	12.31	4.00	16.31	30	-17.69	Pass

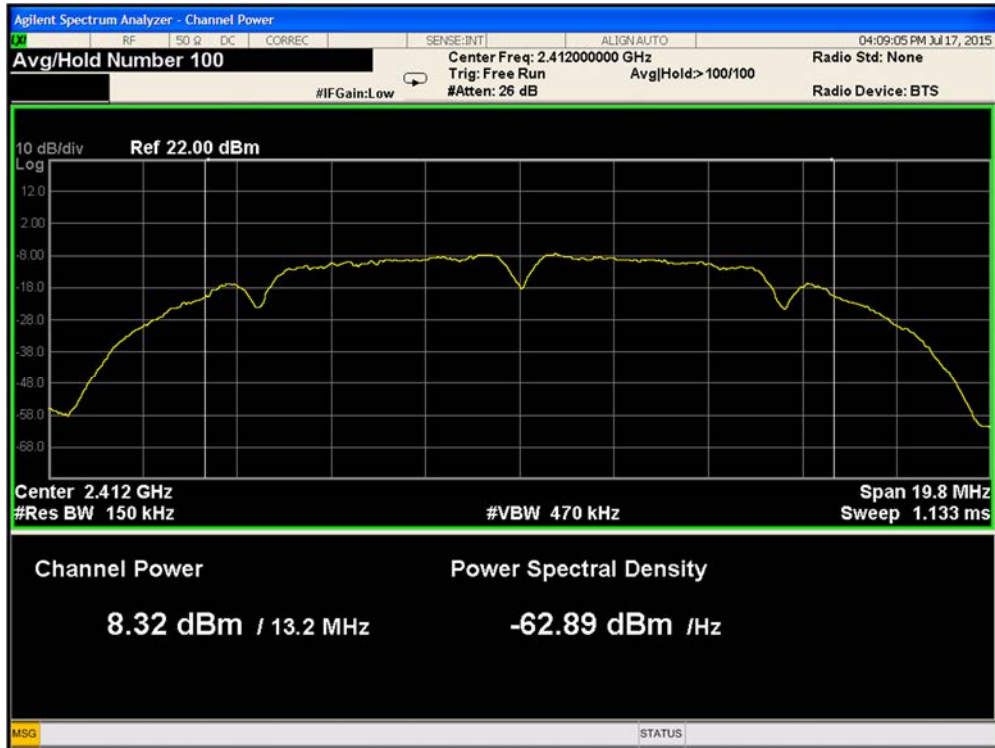
Table 9-4. Path A and B Average Power

Path A and B Average Power									
Frequency (MHz)	Path	802.11 Mode	Data Rate	Measured Output Power (dBm)	Antenna Gain dBi	E.I.R.P Output Power (dBm)	IC E.I.R.P Limit (dBm)	Margin (dB)	Result
2412	AB	b	1 Mbps	11.89	4.00	15.89	36	-20.11	Pass
2437	AB	b	1 Mbps	11.97	4.00	15.97	36	-20.03	Pass
2462	AB	b	1 Mbps	12.25	4.00	16.25	36	-19.75	Pass
2472	AB	b	1 Mbps	12.68	4.00	16.68	36	-19.32	Pass
2412	AB	g	6 Mbps	11.72	4.00	15.72	36	-20.28	Pass
2437	AB	g	6 Mbps	11.72	4.00	15.72	36	-20.28	Pass
2462	AB	g	6 Mbps	11.57	4.00	15.57	36	-20.43	Pass
2472	AB	g	6 Mbps	12.36	4.00	16.36	36	-19.64	Pass
2412	AB	n	MCS0	11.49	4.00	15.49	36	-20.51	Pass
2437	AB	n	MCS0	11.69	4.00	15.69	36	-20.31	Pass
2462	AB	n	MCS0	11.72	4.00	15.72	36	-20.28	Pass
2472	AB	n	MCS0	12.31	4.00	16.31	36	-19.69	Pass

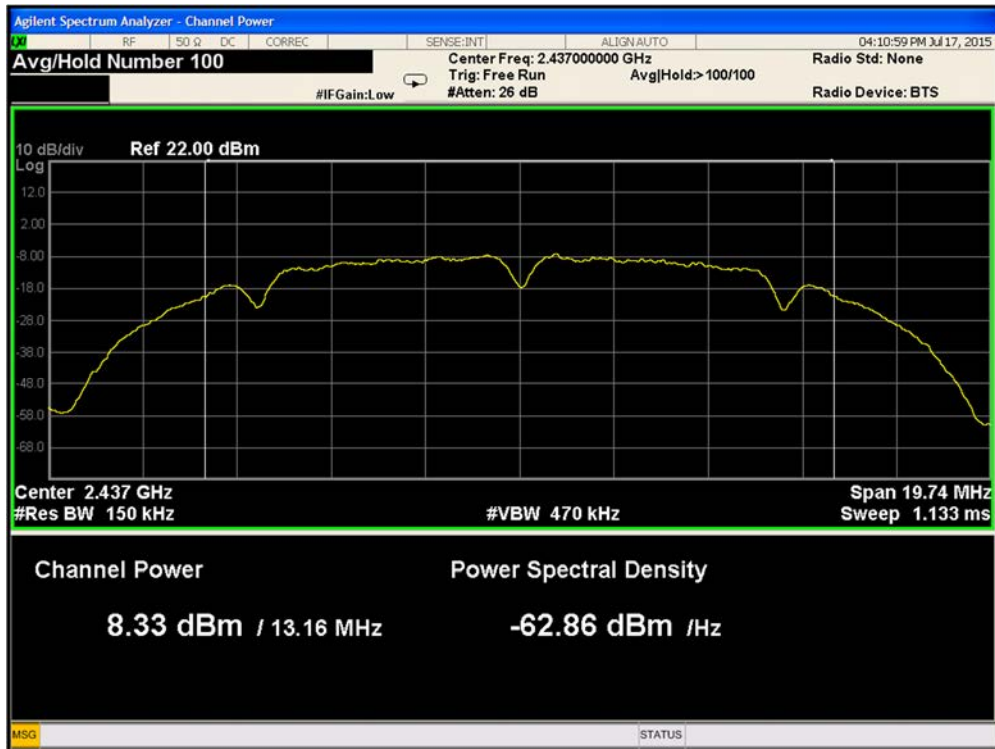
Table 9-5. Path A and B Average Power

Note: All Transmit signal are completely uncorrelated with each other.
 Directional antenna Gain = 4 dBi

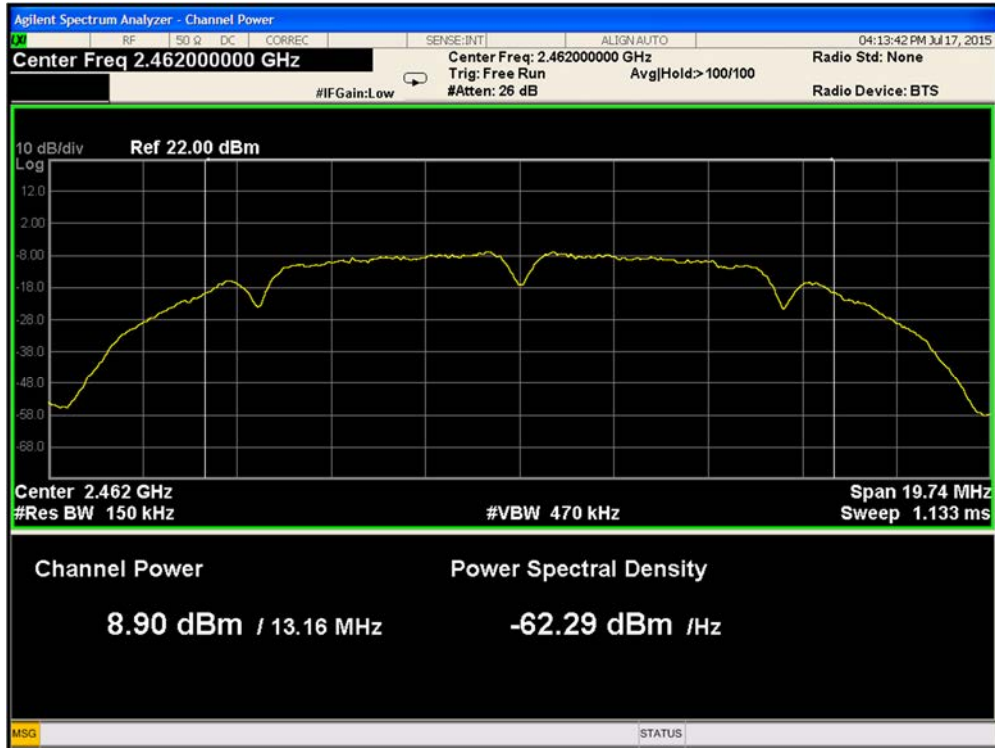
9.3.5 Test Data:



Plot 9-49. Average Power 802.11b Path A Channel 2412MHz



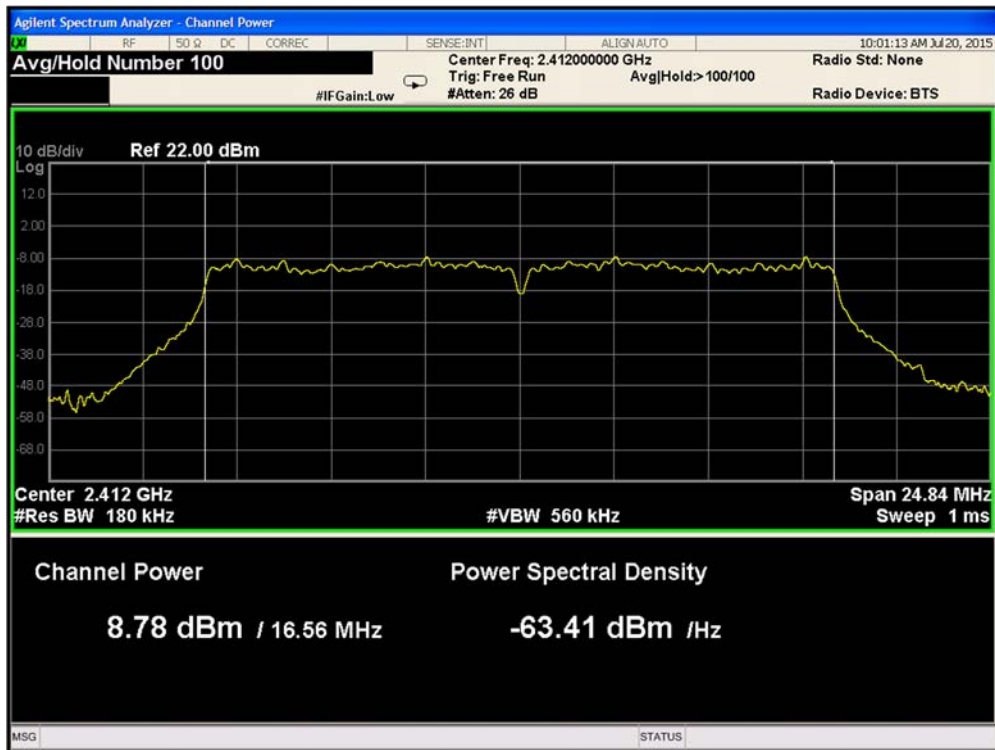
Plot 9-50. Average Power 802.11b Path A Channel 2437MHz



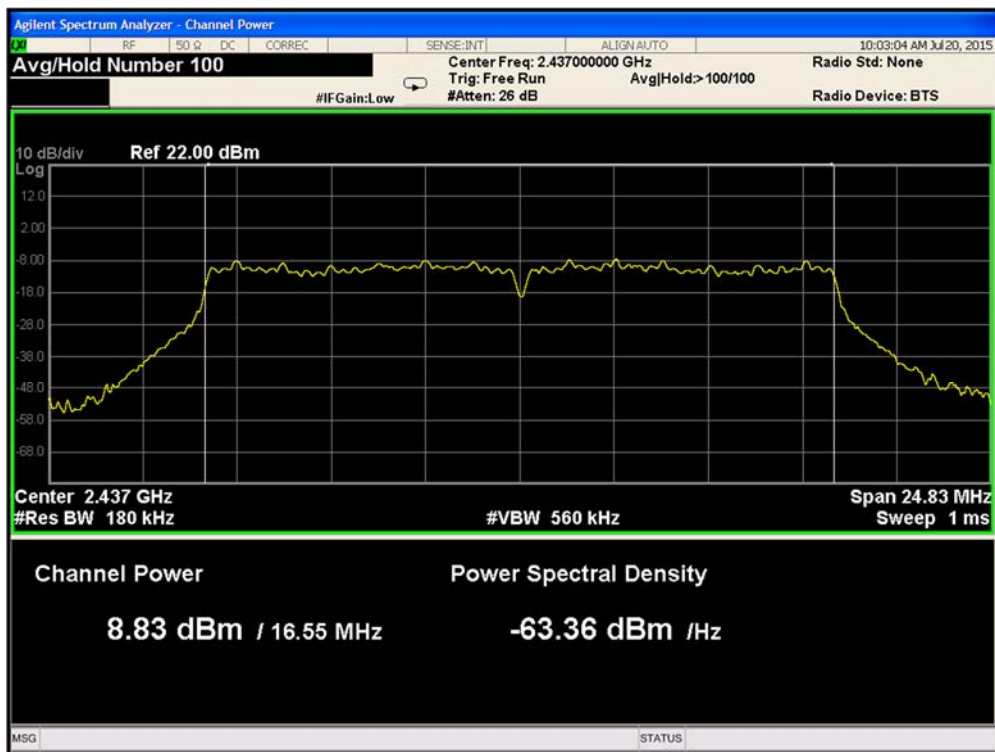
Plot 9-51. Average Power 802.11b Path A Channel 2462MHz



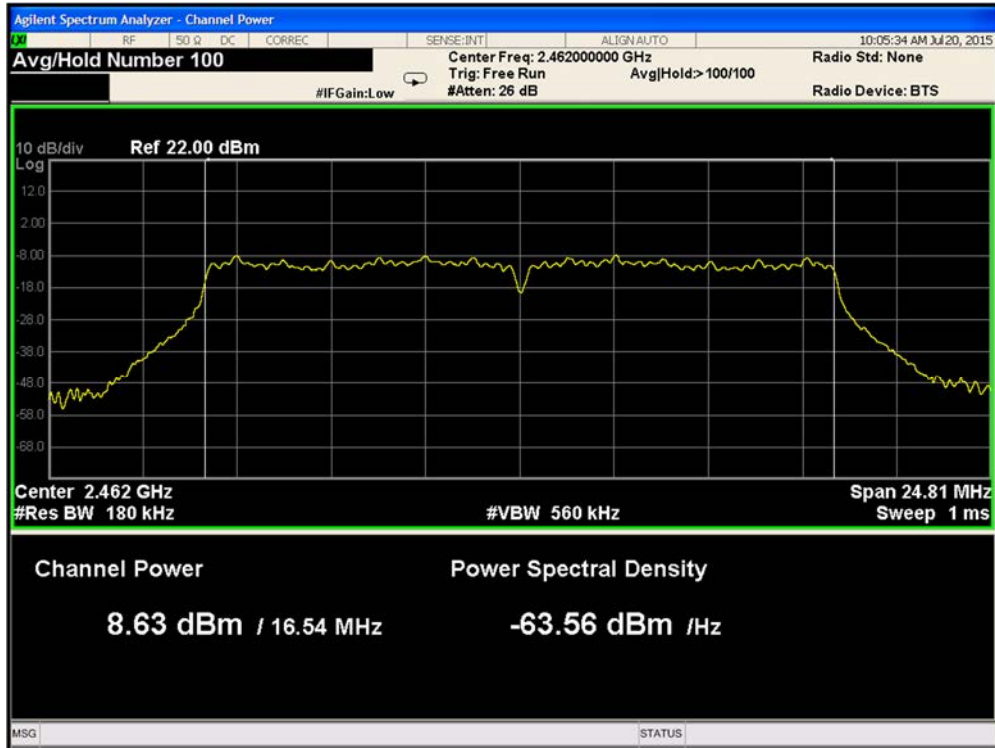
Plot 9-52. Average Power 802.11b Path A Channel 2472MHz



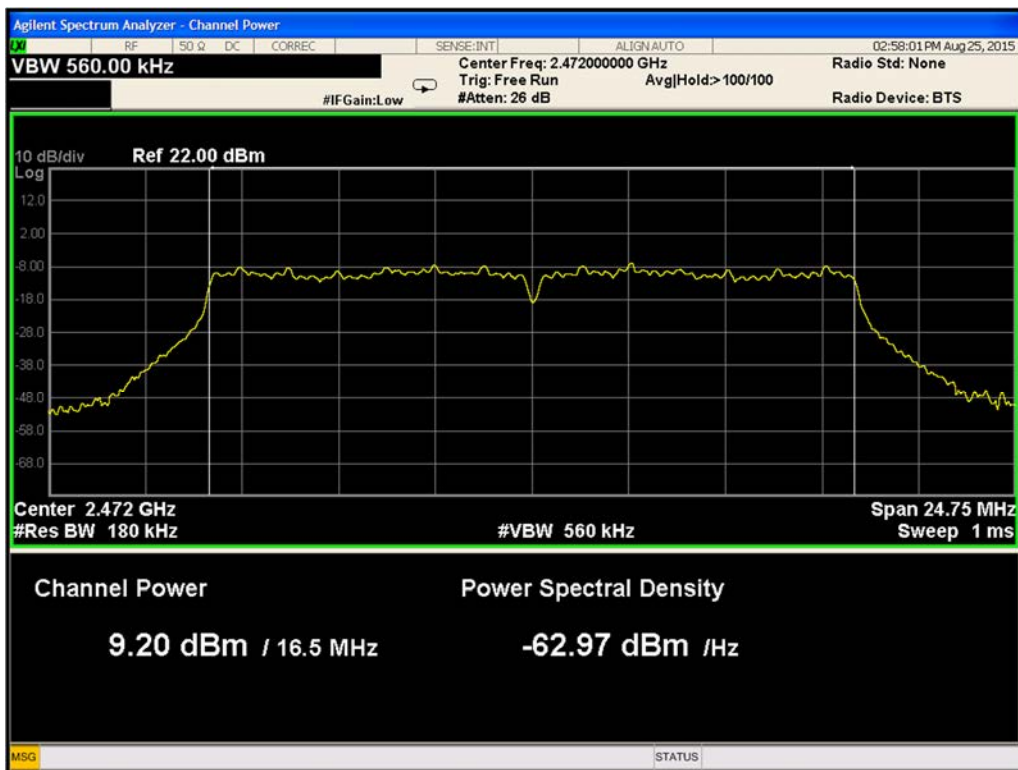
Plot 9-53. Average Power 802.11g Path A Channel 2412MHz



Plot 9-54. Average Power 802.11g Path A Channel 2437MHz



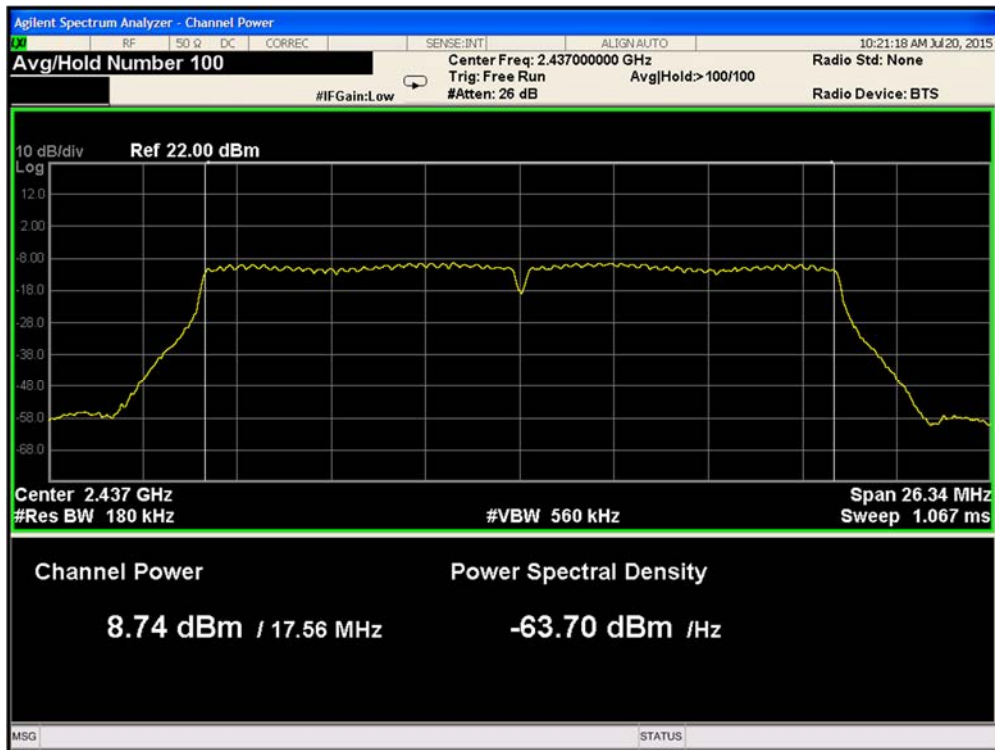
Plot 9-55. Average Power 802.11g Path A Channel 2462MHz



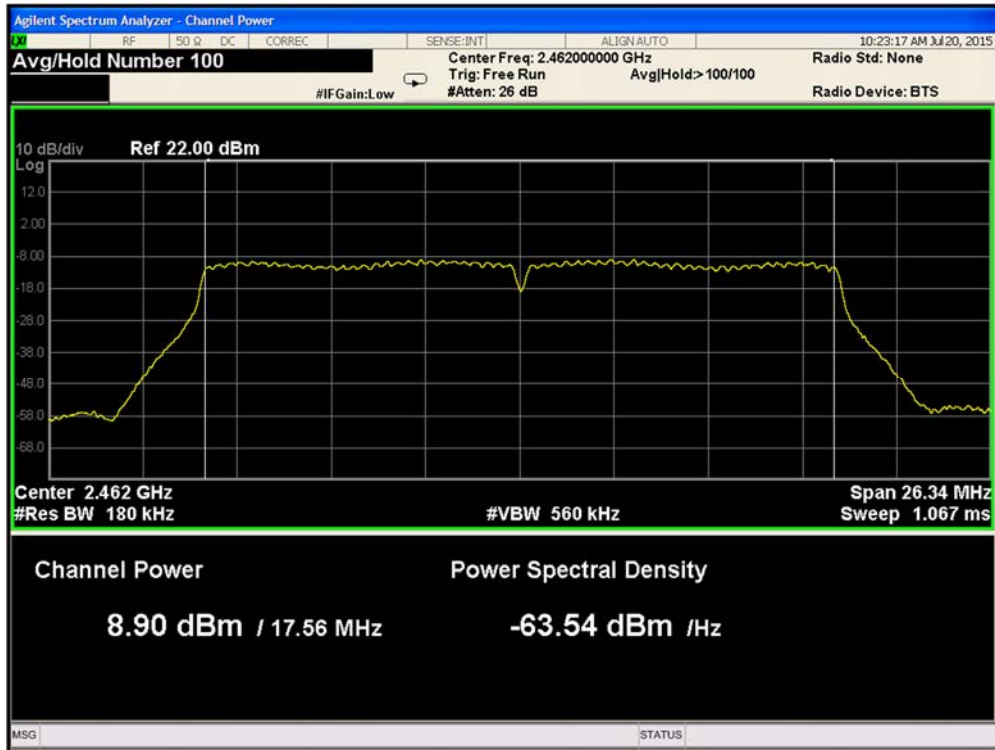
Plot 9-56. Average Power 802.11g Path A Channel 2472MHz



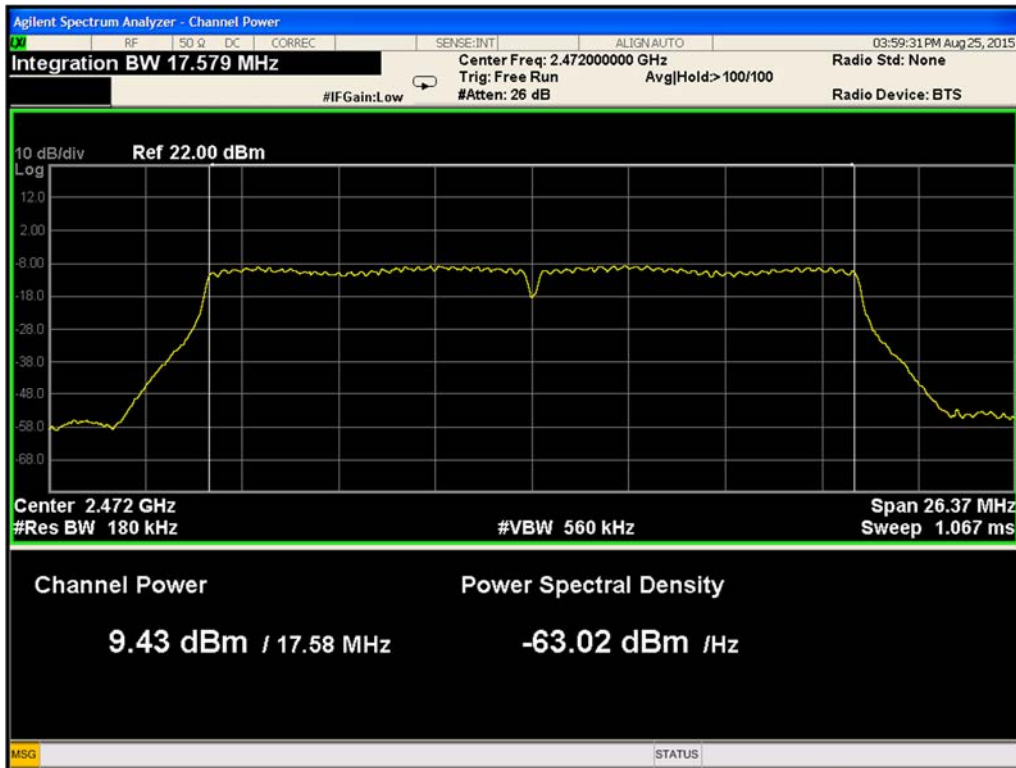
Plot 9-57. Average Power 802.11n Path A Channel 2412MHz



Plot 9-58. Average Power 802.11n Path A Channel 2437MHz



Plot 9-59. Average Power 802.11n Path A Channel 2462MHz



Plot 9-60. Average Power 802.11n Path A Channel 2472MHz



Plot 9-61. Average Power 802.11b Path B Channel 2412MHz



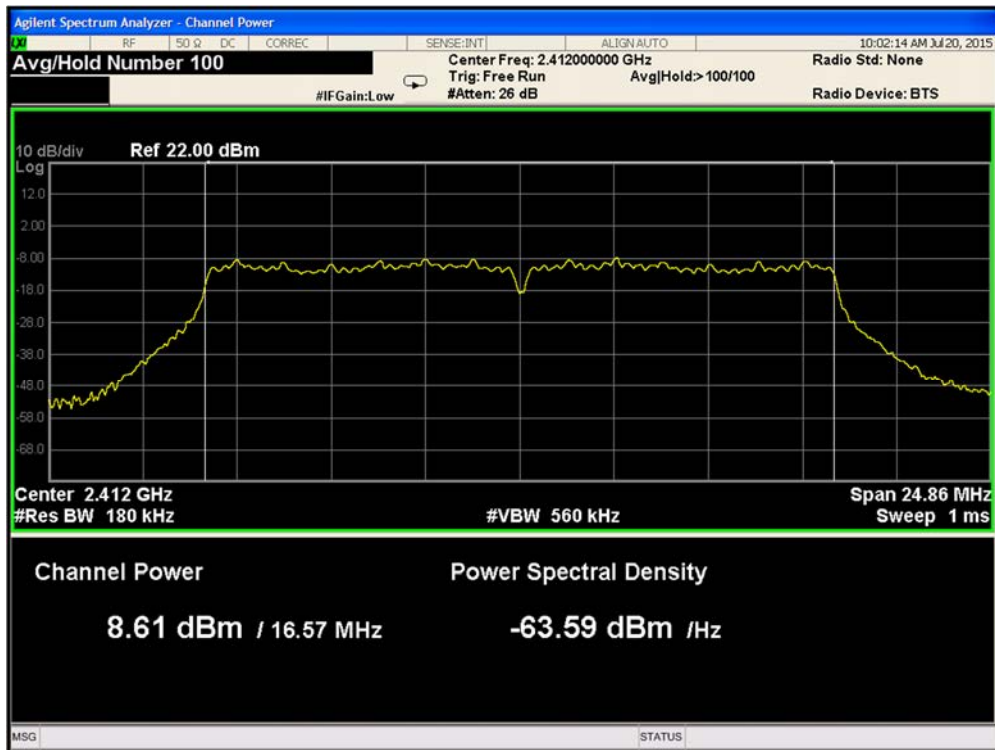
Plot 9-62. Average Power 802.11b Path B Channel 2437MHz



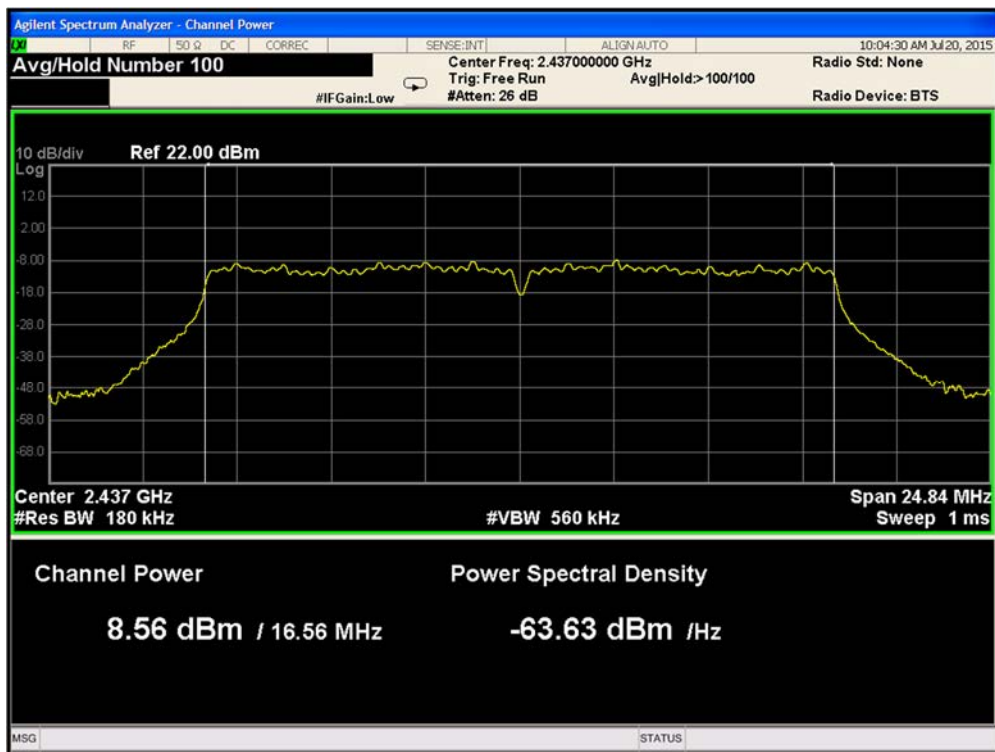
Plot 9-63. Average Power 802.11b Path B Channel 2462MHz



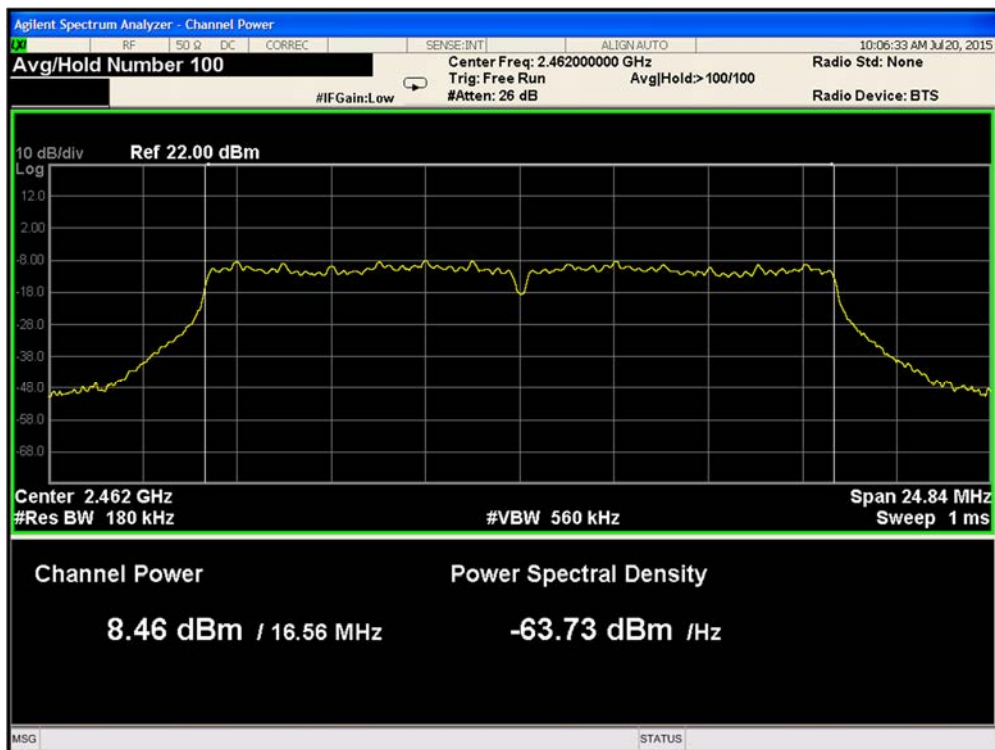
Plot 9-64. Average Power 802.11b Path B Channel 2472MHz



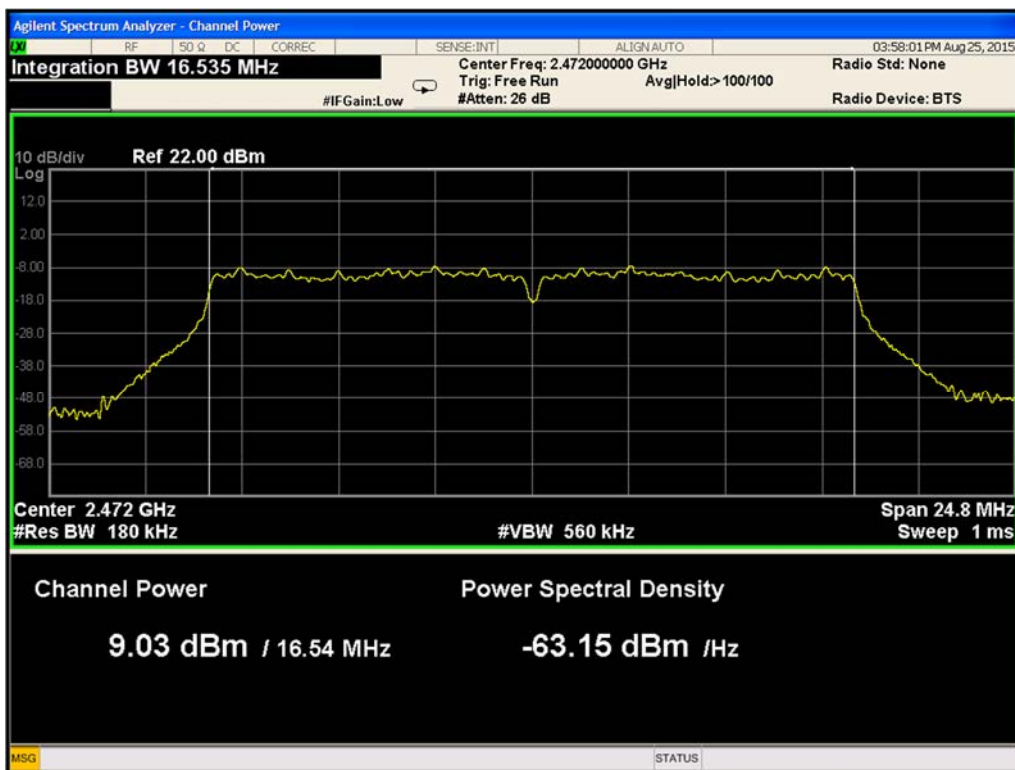
Plot 9-65. Average Power 802.11g Path B Channel 2412MHz



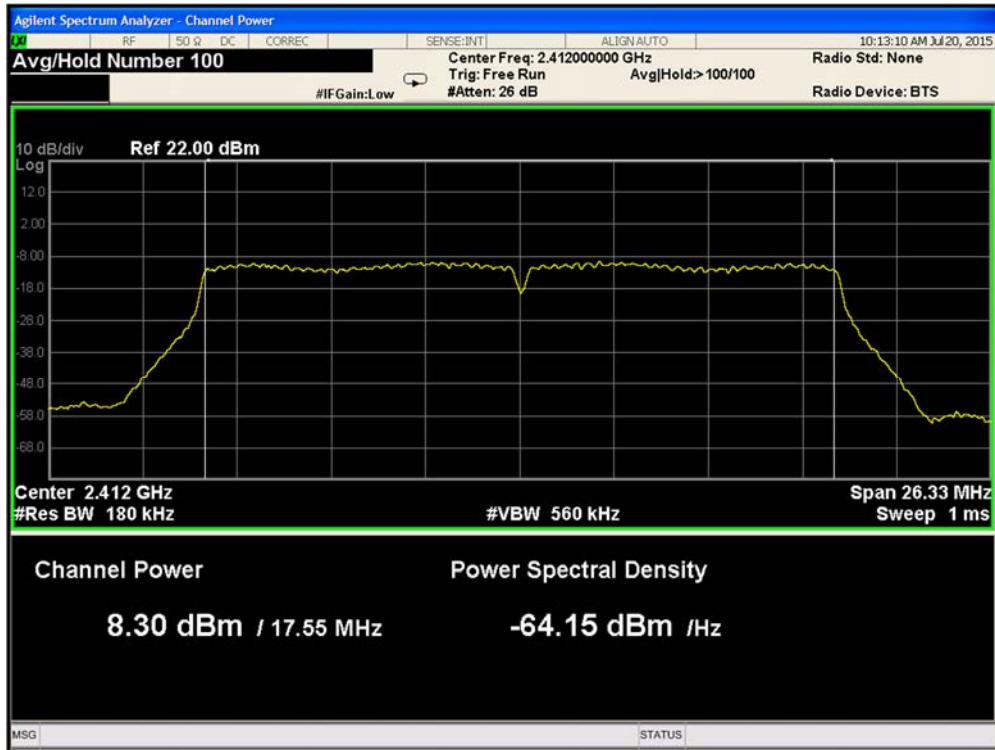
Plot 9-66. Average Power 802.11g Path B Channel 2437MHz



Plot 9-67. Average Power 802.11g Path B Channel 2462MHz



Plot 9-68. Average Power 802.11g Path B Channel 2472MHz



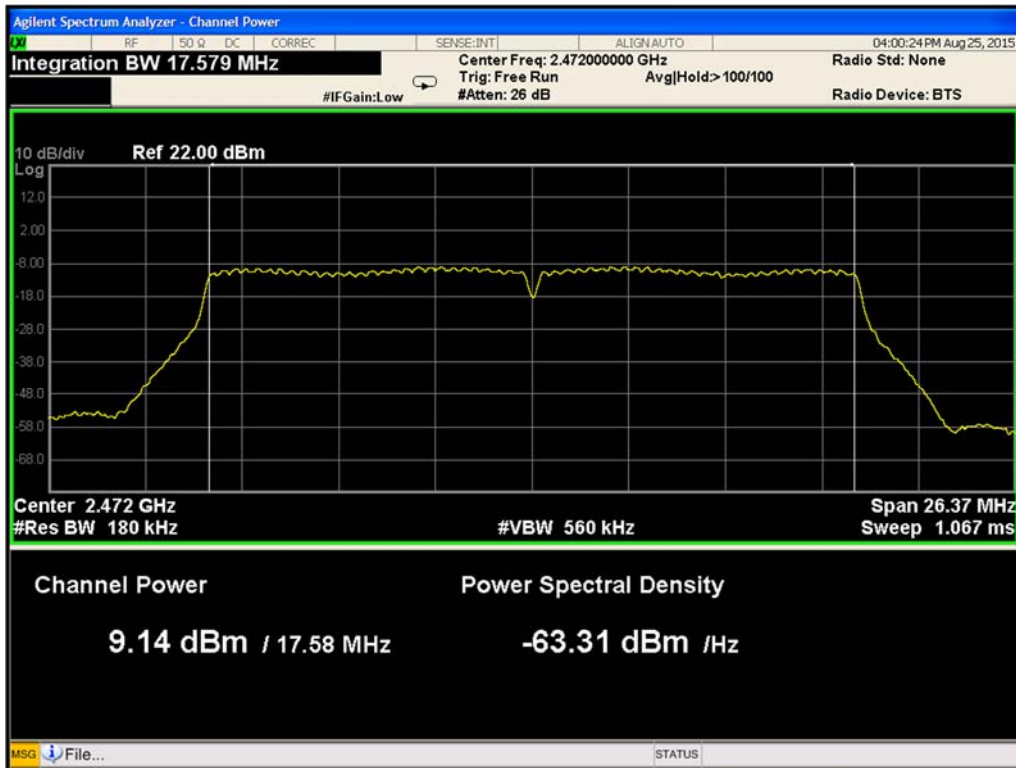
Plot 9-69. Average Power 802.11n Path B Channel 2412MHz



Plot 9-70. Average Power 802.11n Path B Channel 2437MHz



Plot 9-71. Average Power 802.11n Path B Channel 2462MHz



Plot 9-72. Average Power 802.11n Path B Channel 2472MHz

9.4 Power Density

9.4.1 Test Requirement:

FCC CFR 47 Rule Part 15.247 (e)

Industry Canada RSS-247 Issue 1 [5.2]

9.4.2 Test Method:

Measurements are performed according to the procedure defined in KDB 558074- Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 V03R03 and ANSI C63.10.

Spectrum Analyzer settings:

Set analyzer center frequency to DTS channel center frequency.

Span to at least 1.5 times the DTS bandwidth

RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$

VBW ≥ 3 RBW

Detector = power averaging (RMS)

Sweep time = auto couple

Trace mode = max hold

Use the peak marker function to determine the maximum amplitude level within the RBW

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

9.4.3 Limits:

The maximum permissible power density is 8 dBm/3kHz.

9.4.4 Test Results:

Frequency (MHz)	Path	802.11 Mode	Data Rate	Power Spectral Density (dBm/100kHz)	Power Spectral Density Limit (dBm/3kHz)	Pass/Fail
2412	A	b	1Mbps	-8.99	8	Pass
2437	A	b	1Mbps	-9.10	8	Pass
2462	A	b	1Mbps	-8.78	8	Pass
2472	A	b	1Mbps	-7.94	8	Pass
2412	A	g	6Mbps	-9.19	8	Pass
2437	A	g	6Mbps	-8.57	8	Pass
2462	A	g	6Mbps	-8.86	8	Pass
2472	A	g	6Mbps	-8.04	8	Pass
2412	A	n	MCS0	-11.25	8	Pass
2437	A	n	MCS0	-11.35	8	Pass
2462	A	n	MCS0	-11.61	8	Pass
2472	A	n	MCS0	-10.91	8	Pass
2412	B	b	1Mbps	-8.38	8	Pass
2437	B	b	1Mbps	-8.51	8	Pass
2462	B	b	1Mbps	-8.37	8	Pass
2472	B	b	1Mbps	-6.99	8	Pass
2412	B	g	6Mbps	-8.92	8	Pass
2437	B	g	6Mbps	-9.91	8	Pass
2462	B	g	6Mbps	-9.24	8	Pass
2472	B	g	6Mbps	-8.04	8	Pass
2412	B	n	MCS0	-11.61	8	Pass
2437	B	n	MCS0	-11.96	8	Pass
2462	B	n	MCS0	-11.50	8	Pass
2472	B	n	MCS0	-11.17	8	Pass

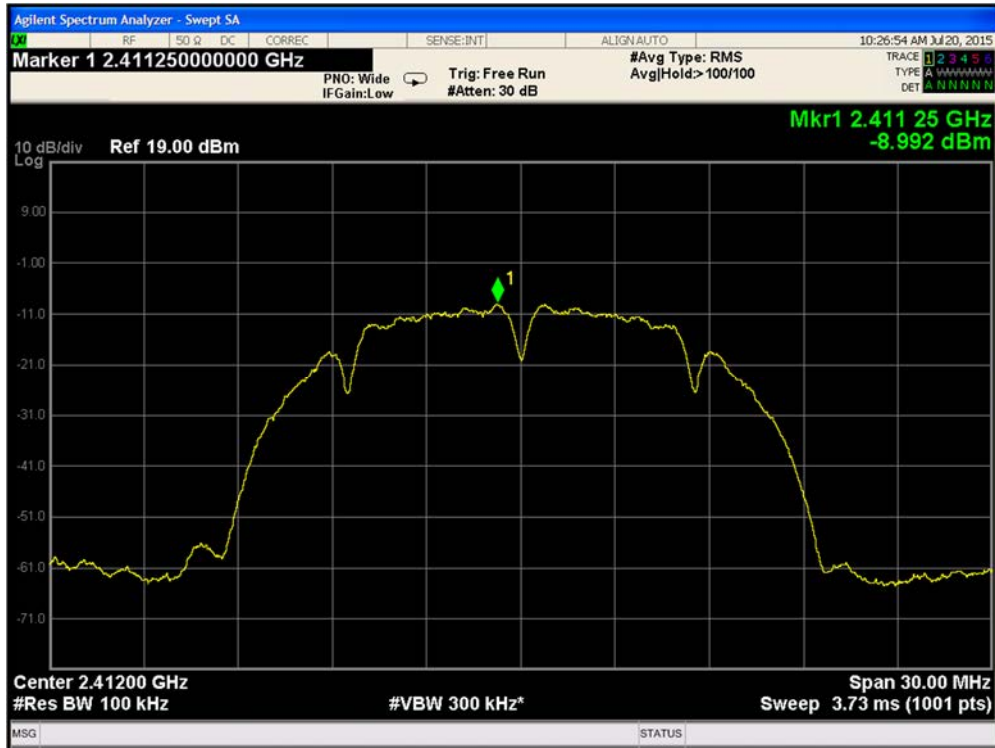
Table 9-4. Peak Power Density

Frequency (MHz)	Path	802.11 Mode	Data Rate	Power Spectral Density (dBm/100kHz)	Power Spectral Density Limit (dBm/3kHz)	Pass/Fail
2412	AB	b	1Mbps	-1.66	8	Pass
2437	AB	b	1Mbps	-1.78	8	Pass
2462	AB	b	1Mbps	-1.56	8	Pass
2472	AB	b	1Mbps	-0.74	8	Pass
2412	AB	g	6Mbps	-2.04	8	Pass
2437	AB	g	6Mbps	-2.18	8	Pass
2462	AB	g	6Mbps	-2.04	8	Pass
2472	AB	g	6Mbps	-1.21	8	Pass
2412	AB	n	MCS0	-4.41	8	Pass
2437	AB	n	MCS0	-4.64	8	Pass
2462	AB	n	MCS0	-4.55	8	Pass
2472	AB	n	MCS0	-4.03	8	Pass

Table 9-5. Combined Power Density

Note: All Transmit signal are completely uncorrelated with each other.
 Directional antenna Gain = 4 dBi

9.4.5 Test Data:



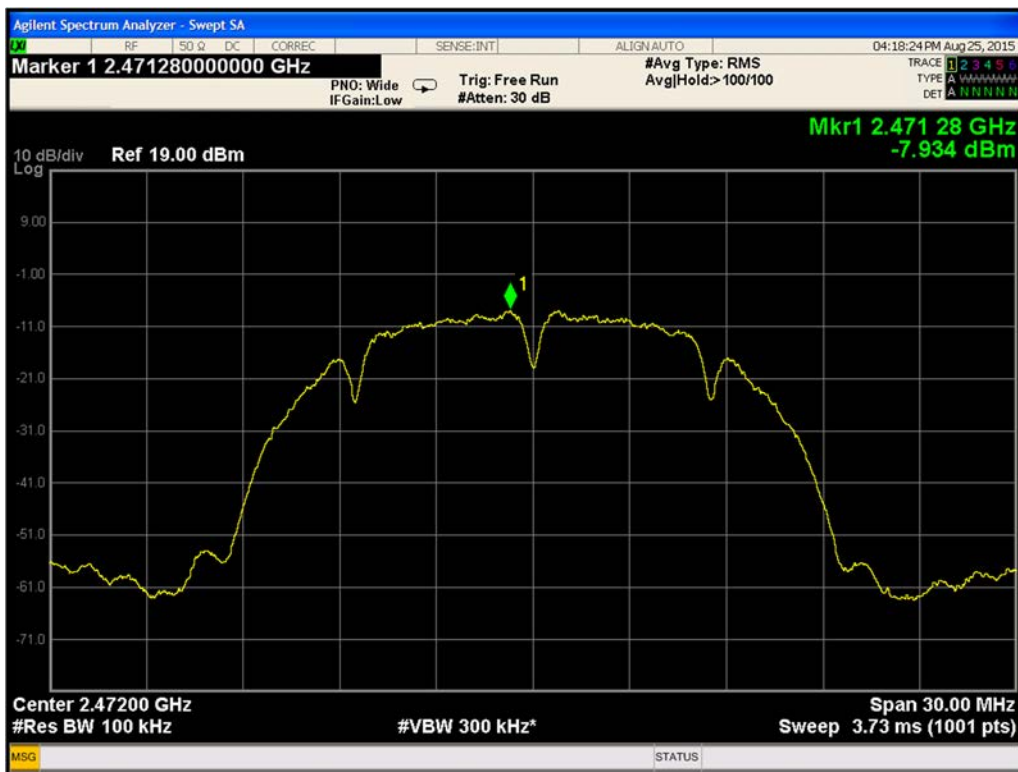
Plot 9-73. Power Spectral Density 802.11b Path A Channel 2412MHz



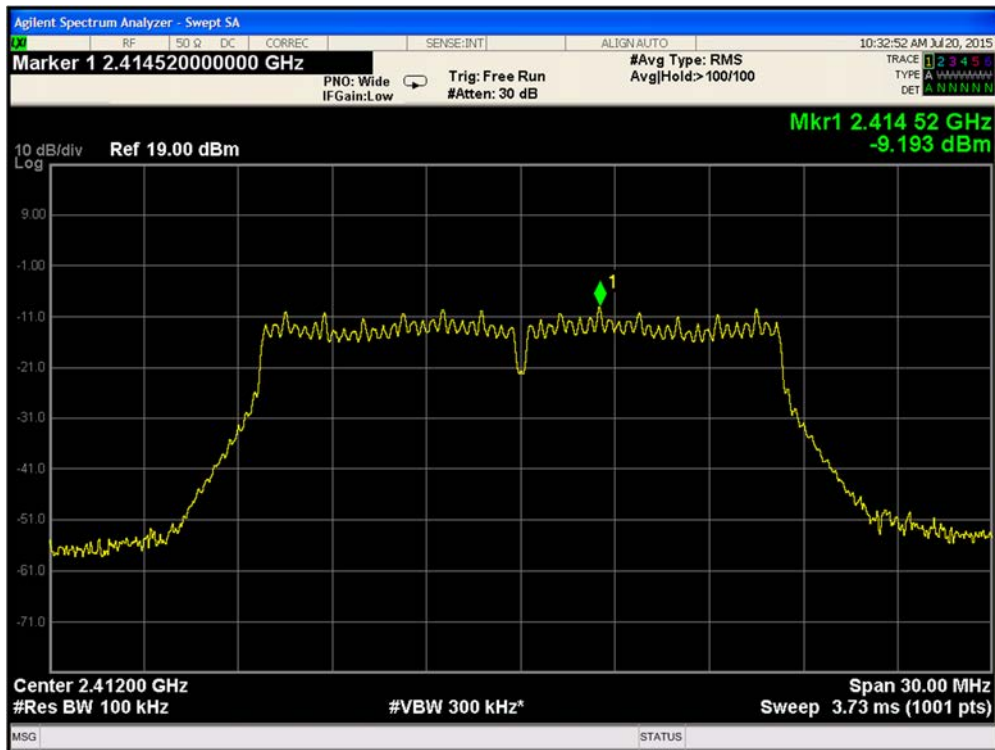
Plot 9-74. Power Spectral Density 802.11b Path A Channel 2437MHz



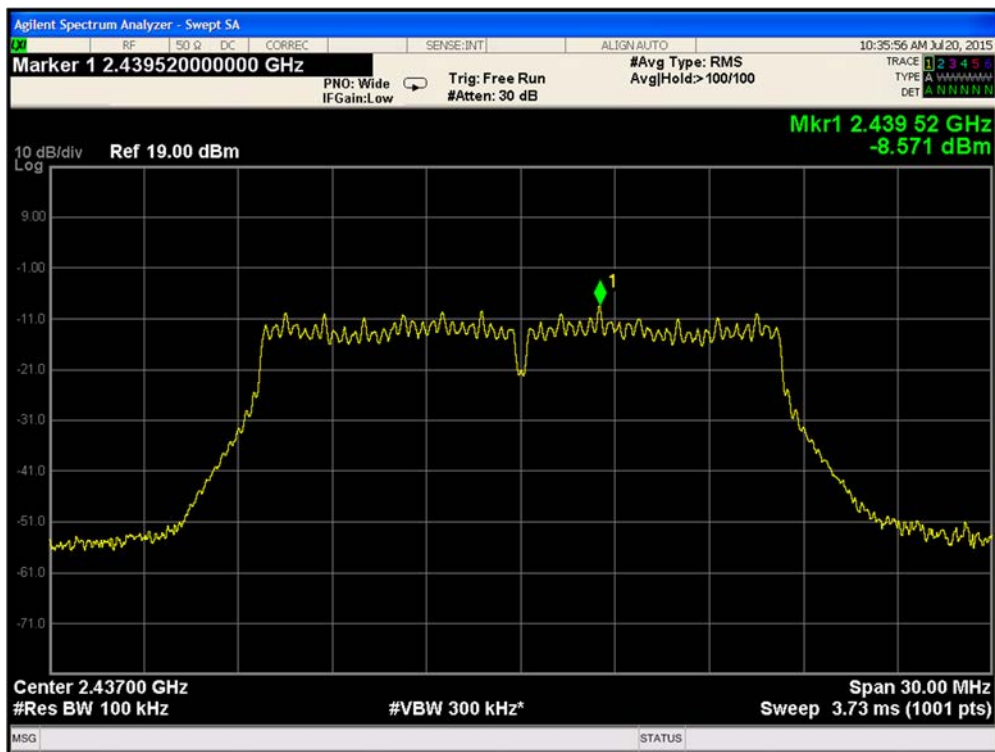
Plot 9-75. Power Spectral Density 802.11b Path A Channel 2462MHz



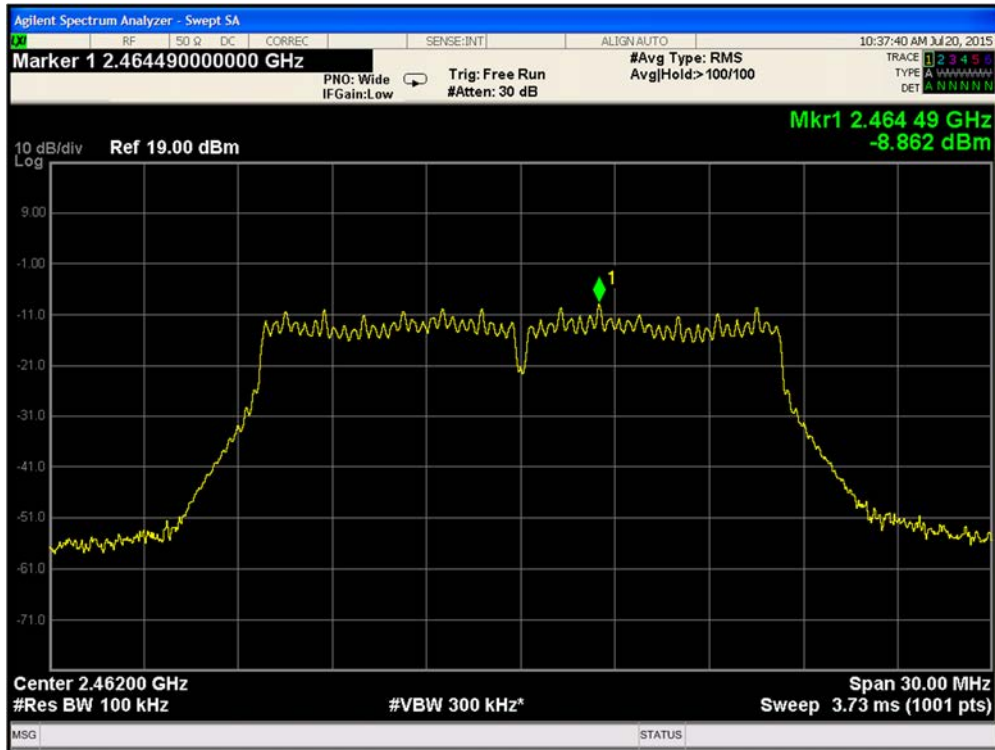
Plot 9-76. Power Spectral Density 802.11b Path A Channel 2472MHz



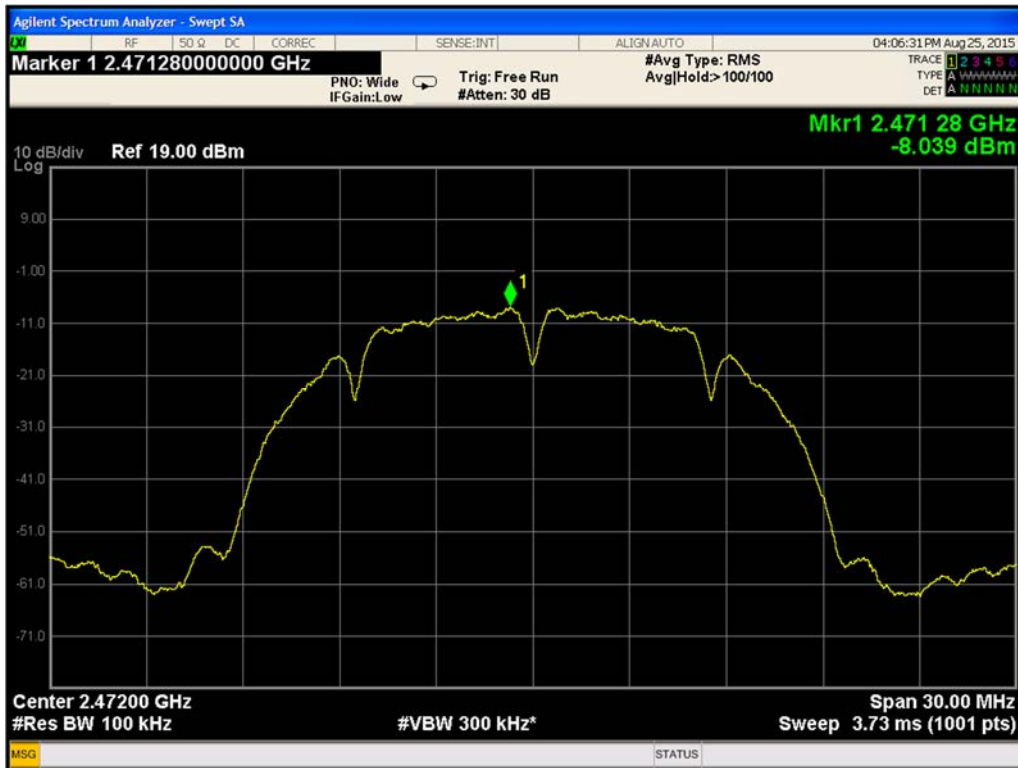
Plot 9-77. Power Spectral Density 802.11g Path A Channel 2412MHz



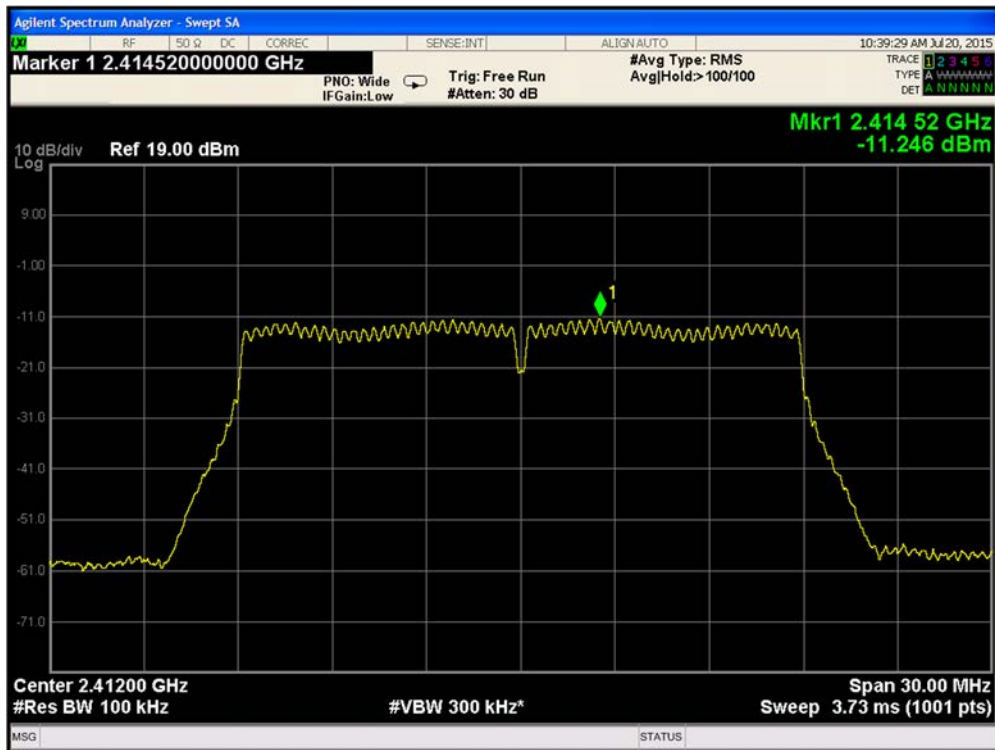
Plot 9-78. Power Spectral Density 802.11g Path A Channel 2437MHz



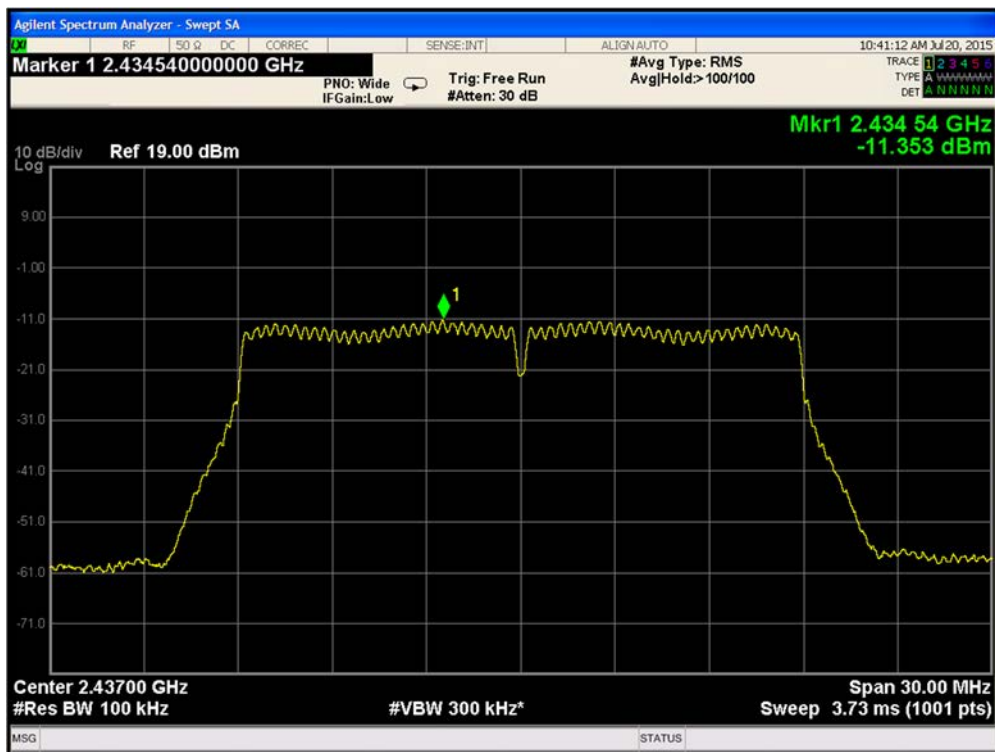
Plot 9-79. Power Spectral Density 802.11g Path A Channel 2462MHz



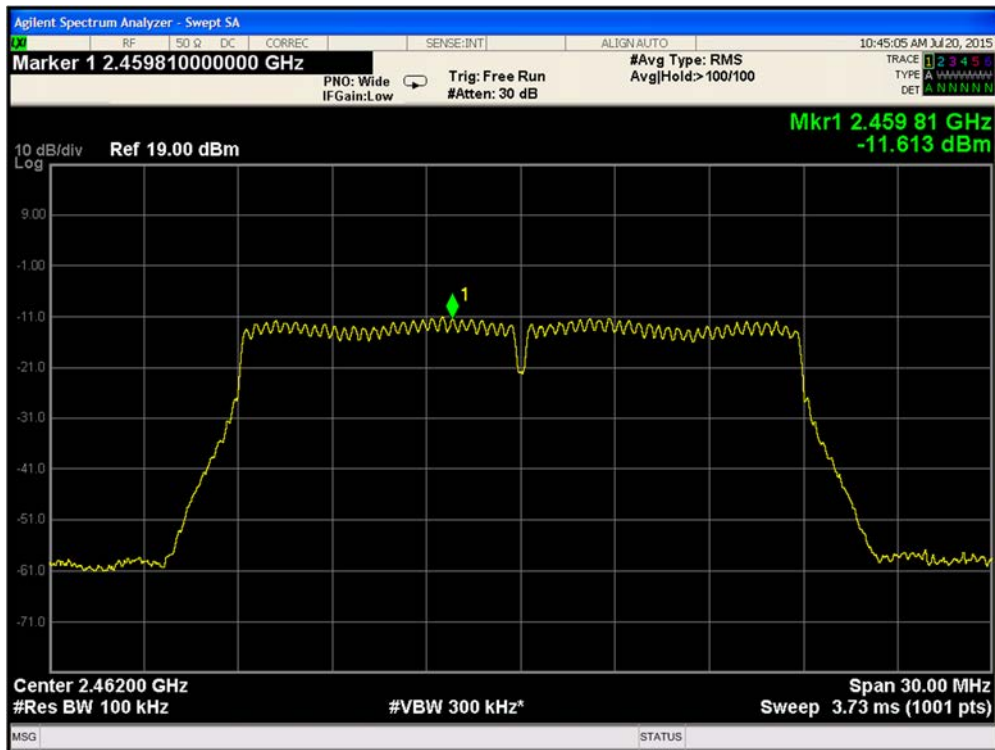
Plot 9-80. Power Spectral Density 802.11g Path A Channel 2472MHz



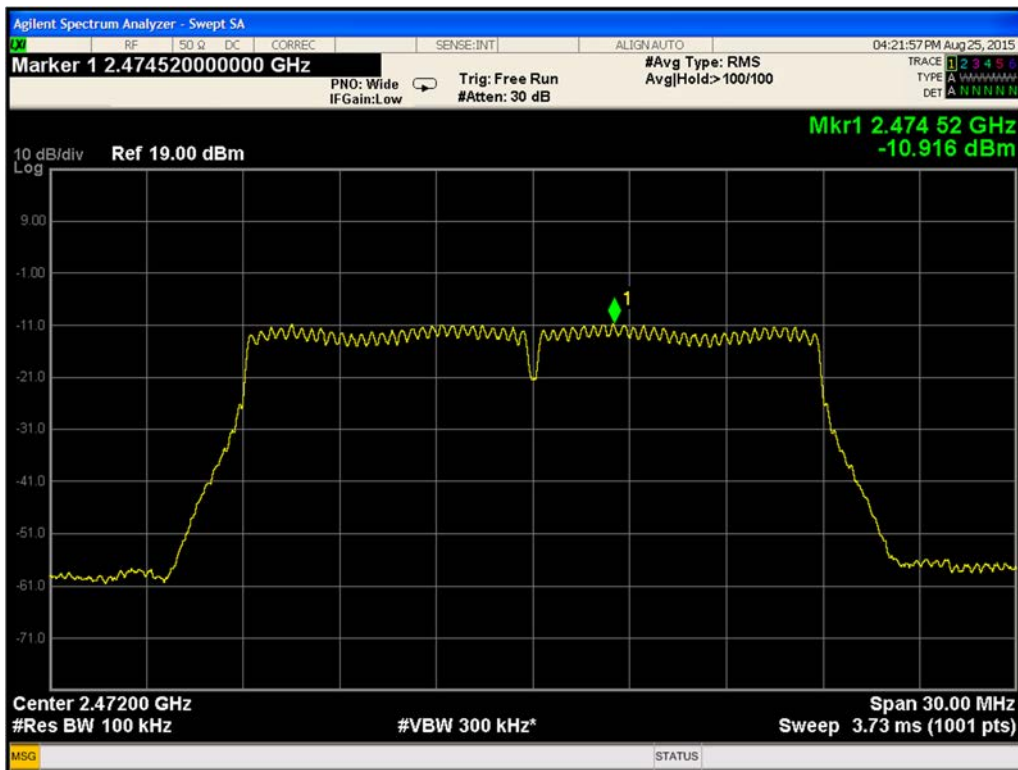
Plot 9-81. Power Spectral Density 802.11n Path A Channel 2412MHz



Plot 9-82. Power Spectral Density 802.11n Path A Channel 2437MHz



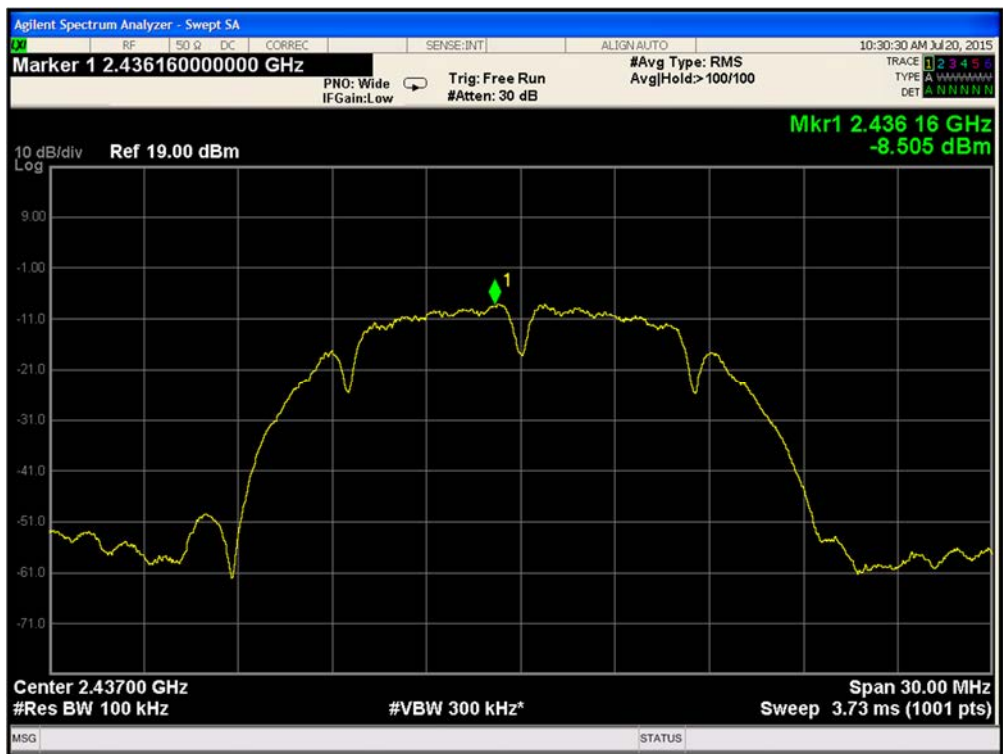
Plot 9-83. Power Spectral Density 802.11n Path A Channel 2462MHz



Plot 9-84. Power Spectral Density 802.11n Path A Channel 2472MHz



Plot 9-85. Power Spectral Density 802.11b Path B Channel 2412MHz



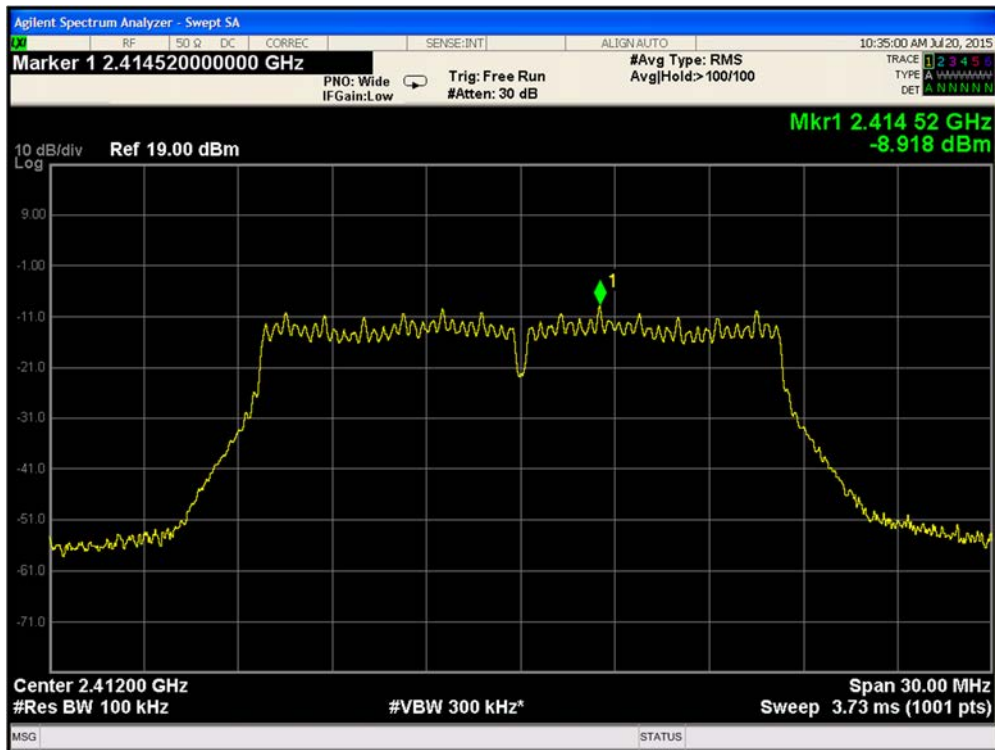
Plot 9-86. Power Spectral Density 802.11b Path B Channel 2437MHz



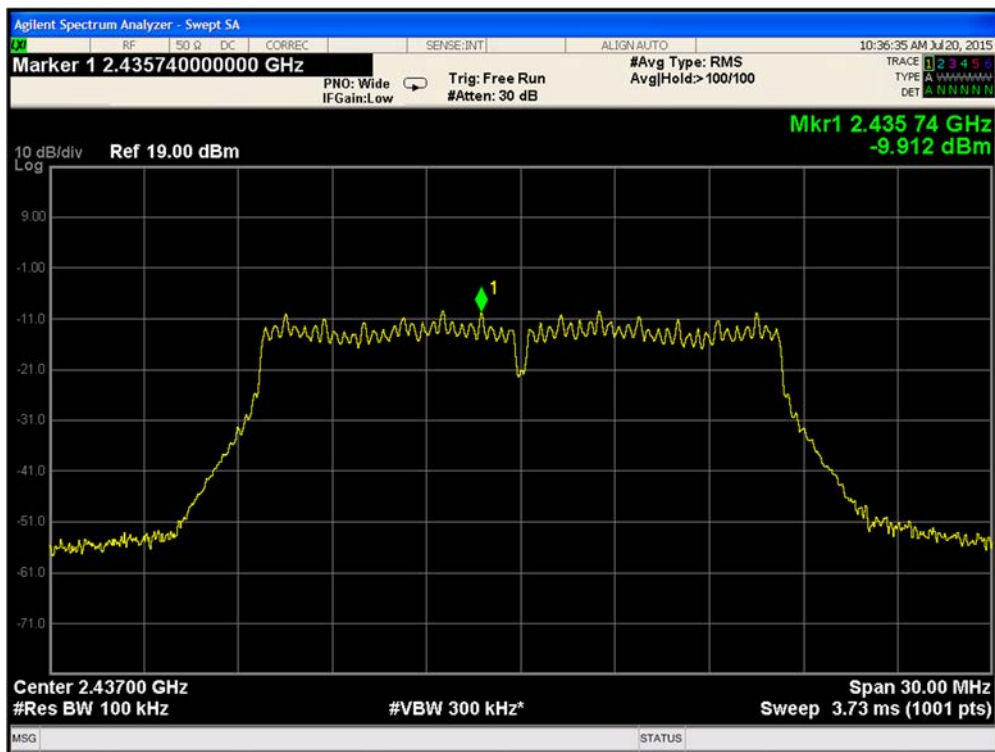
Plot 9-87. Power Spectral Density 802.11b Path B Channel 2462MHz



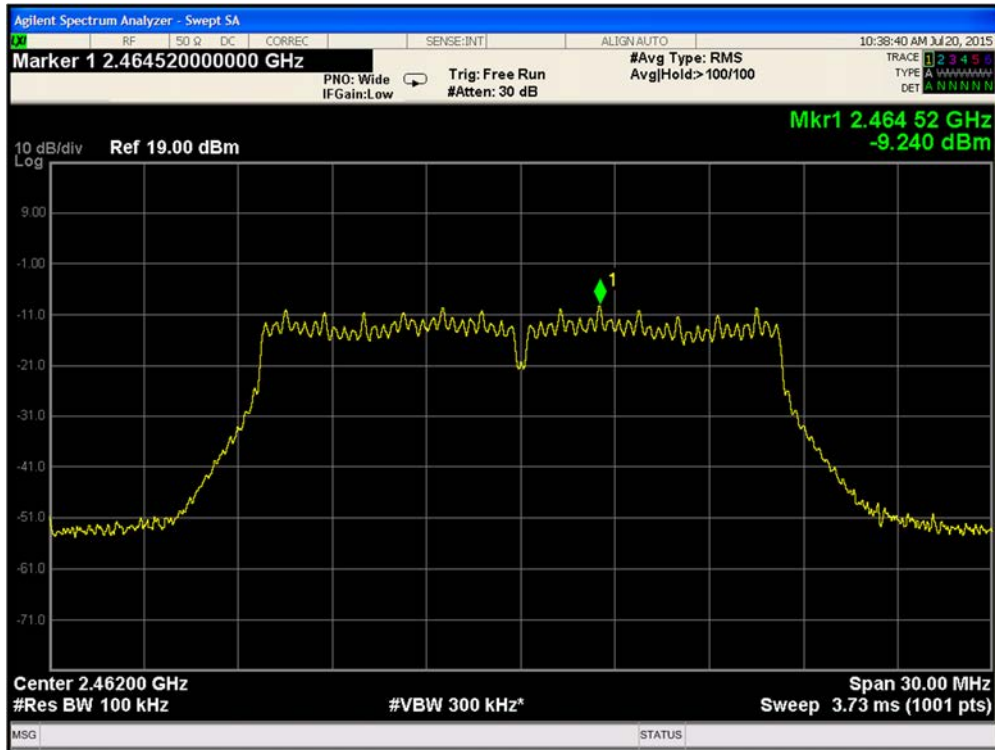
Plot 9-88. Power Spectral Density 802.11b Path B Channel 2472MHz



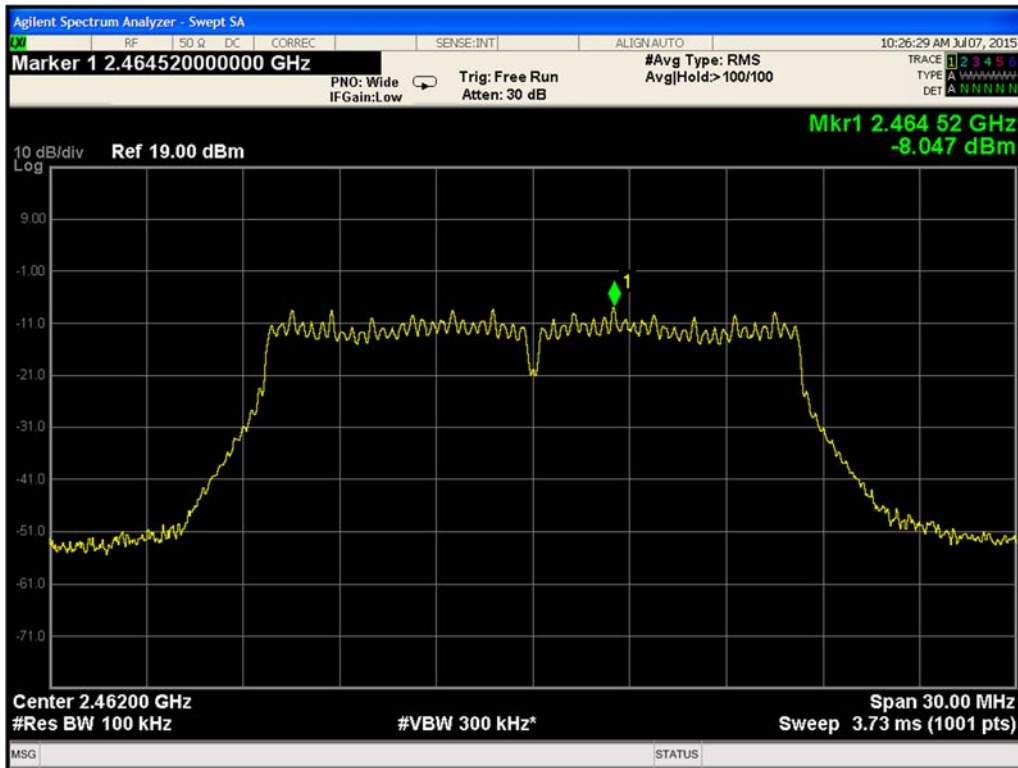
Plot 9-89. Power Spectral Density 802.11g Path B Channel 2412MHz



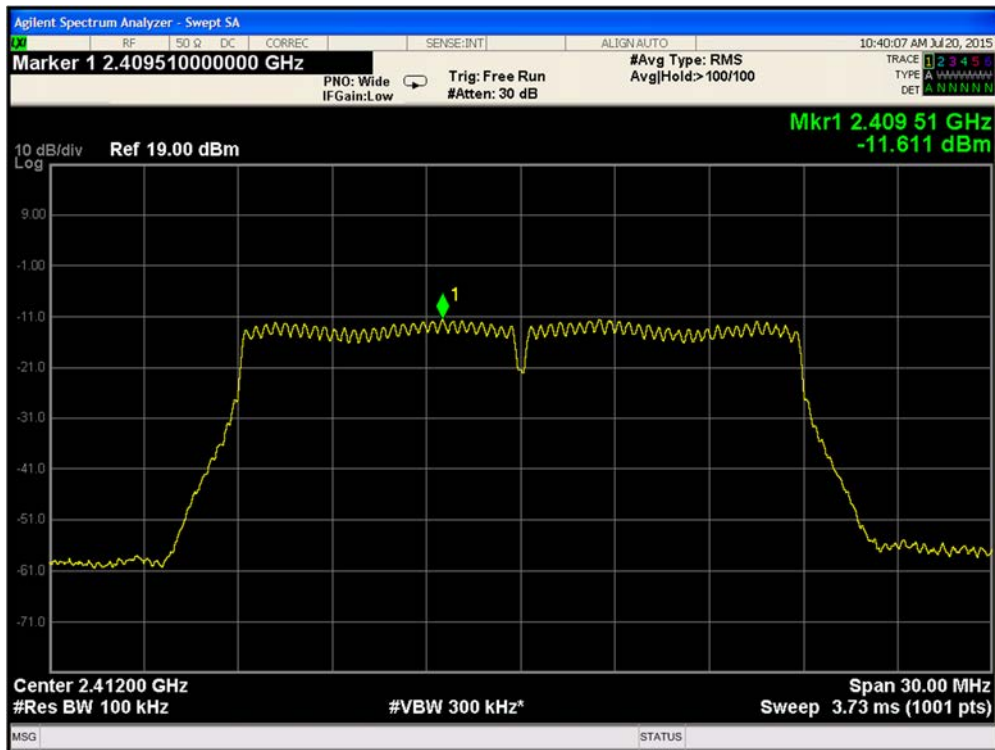
Plot 9-90. Power Spectral Density 802.11g Path B Channel 2437MHz



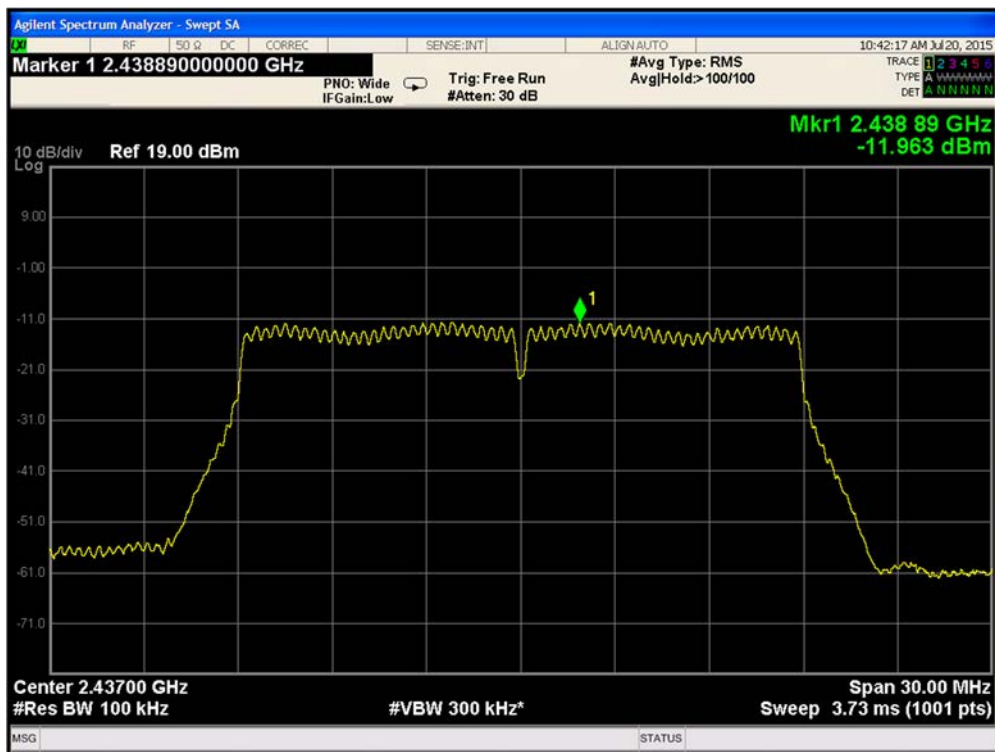
Plot 9-91. Power Spectral Density 802.11g Path B Channel 2462MHz



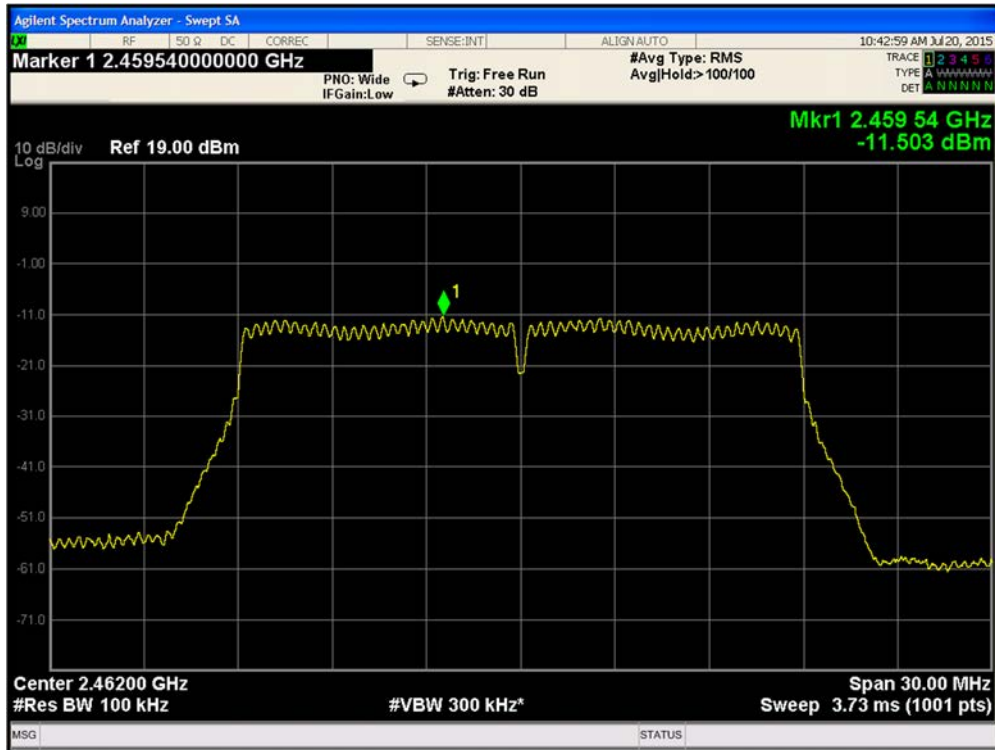
Plot 9-92. Power Spectral Density 802.11g Path B Channel 2472MHz



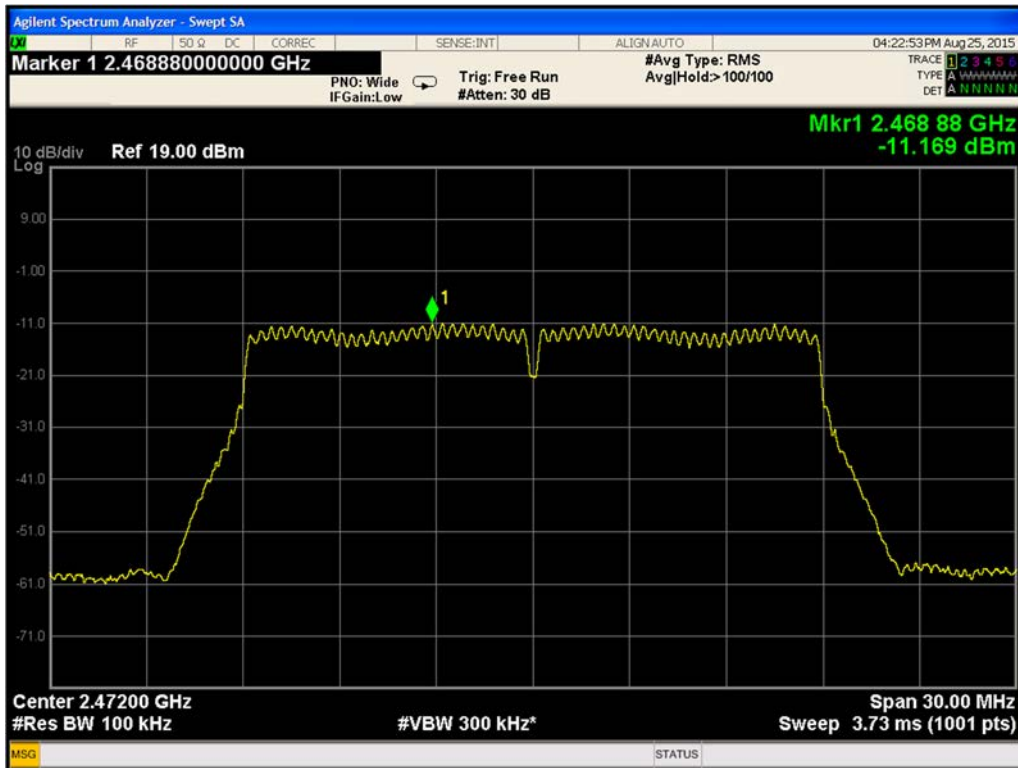
Plot 9-93. Power Spectral Density 802.11n Path B Channel 2412MHz



Plot 9-94. Power Spectral Density 802.11n Path B Channel 2437MHz



Plot 9-95. Power Spectral Density 802.11n Path B Channel 2462MHz



Plot 9-96. Power Spectral Density 802.11n Path B Channel 2472MHz