

Wi-Fi 2.4GHz Conducted Measurements Test Report

FCC ID: 2AA9WV360

IC: 11665A-V360

FCC Rule Part: FCC Part 15 Subpart C

Manufacturer: VSN Technologies Inc.

Model: V360

**Test Facility: 12 Ang Mo Kio St 64 #03-01
UE BizHub Central (Blk A), 569088 Singapore.**

Test Begin Date: Oct 1, 2014

Test End Date: Nov 12 2014

Report Issue Date: Nov 12, 2014

Test By:

Name: Christy Lim

Signature: *Christy*

Reviewed By:

Name: Yu Xue Dong

Signature: *Xue Dong*

1 List of Test Equipment

Manufacturer	Model	Equipment Type	Serial No.	Last Calibration Date	Calibration Due Date
Agilent	E4404B	Spectrum Analyzer	MY44220422	06 Jan 14	06 Jan 16
Advantest	R3273	Spectrum Analyzer	95090358	06 Oct 14	06 Oct 15
Agilent	N1911A	Power Meter	MY50150005	24 Apr 13	24 Apr 15
Agilent	N1921A	Power Sensor	MY50150006	16 Jun 13	16 Jun 15

2 Applicable Standard References

The following standards were used:

FCC Rules	Description of Test	Result
§ 15.247 (a) (2)	6dB Bandwidth	Pass
§ 15.247 (b) (3)	Peak Output Power	Pass
§ 15.247 (d)	100kHz Bandwidth of Frequency Band Edges	Pass
§ 15.247 (e)	Power Spectral Density	Pass
§ 15.209	Spurious Emission	Pass

3 Summary of Tests

3.1 6 dB Bandwidth – FCC Section 15.247 (a)(2)

3.1.1 Measurement Procedure

The 6dB bandwidth was measured in accordance with the FCC KDB Publication No.558074 v03r02 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (47 CFR 15.247)” DTS 6-dB Signal Bandwidth Option 1. The RBW of the spectrum analyzer was set to 100 kHz and VBW 300 kHz. Span was set large enough to capture the entire emissions and >> RBW.

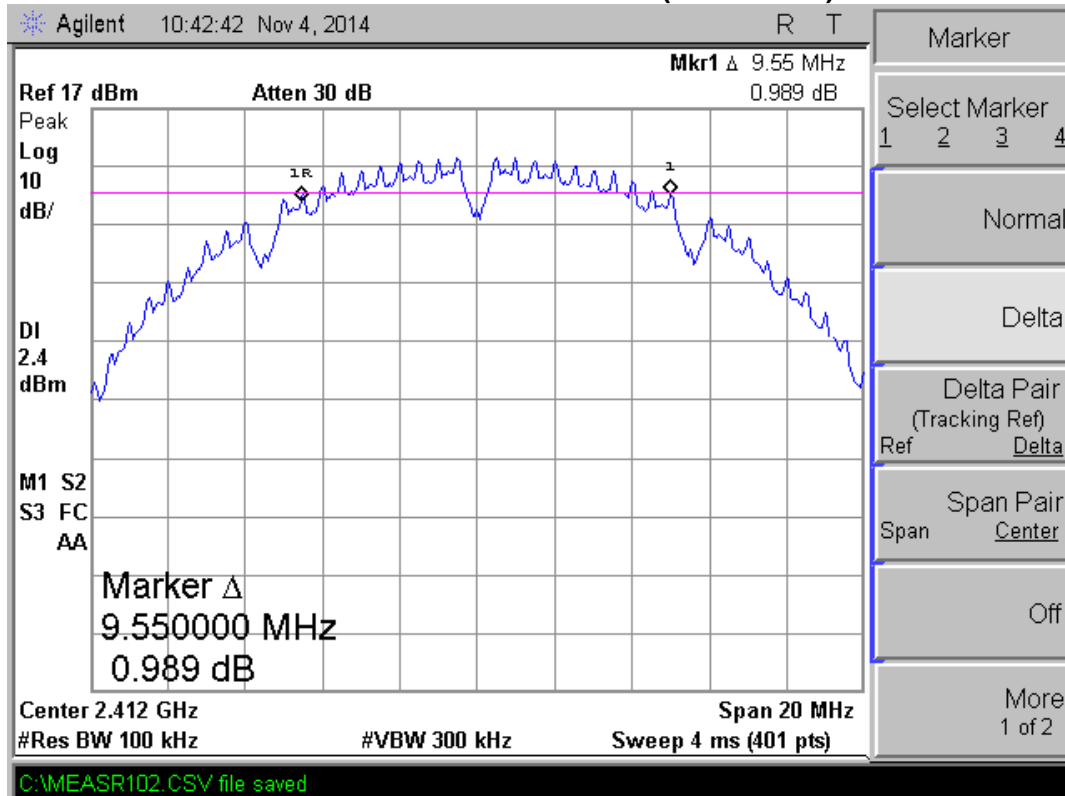
3.1.2 Measurement Result

Frequency (MHz)	For 802.11b: 6dB Bandwidth (MHz)	For 802.11g: 6dB Bandwidth (MHz)	For 802.11n_20MHz: 6dB Bandwidth (MHz)
2412	9.55	16.50	17.633
2437	9.50	16.55	17.75
2462	10.0	16.55	17.596

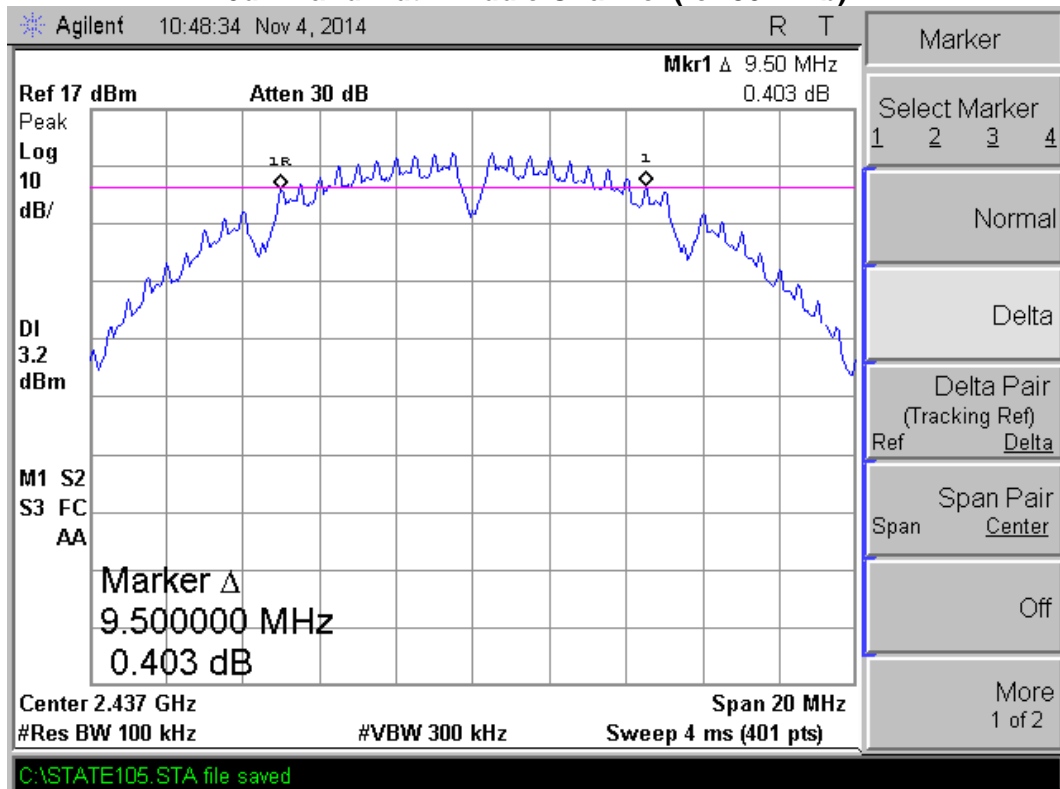
Frequency (MHz)	For 802.11b: 99% Bandwidth (MHz)	For 802.11g: 99% Bandwidth (MHz)	For 802.11n_20MHz: 99% Bandwidth (MHz)
2412	13.7194	17.2328	18.2821
2437	14.1618	18.4909	19.0797
2462	13.9748	17.7003	18.6356

Frequency (MHz)	For 802.11n_40MHz: 6dB Bandwidth (MHz)	For 802.11n_40MHz: 99% Bandwidth (MHz)
2422	35.098	37.9074
2437	36.2	40.9098
2452	36.3	42.8122

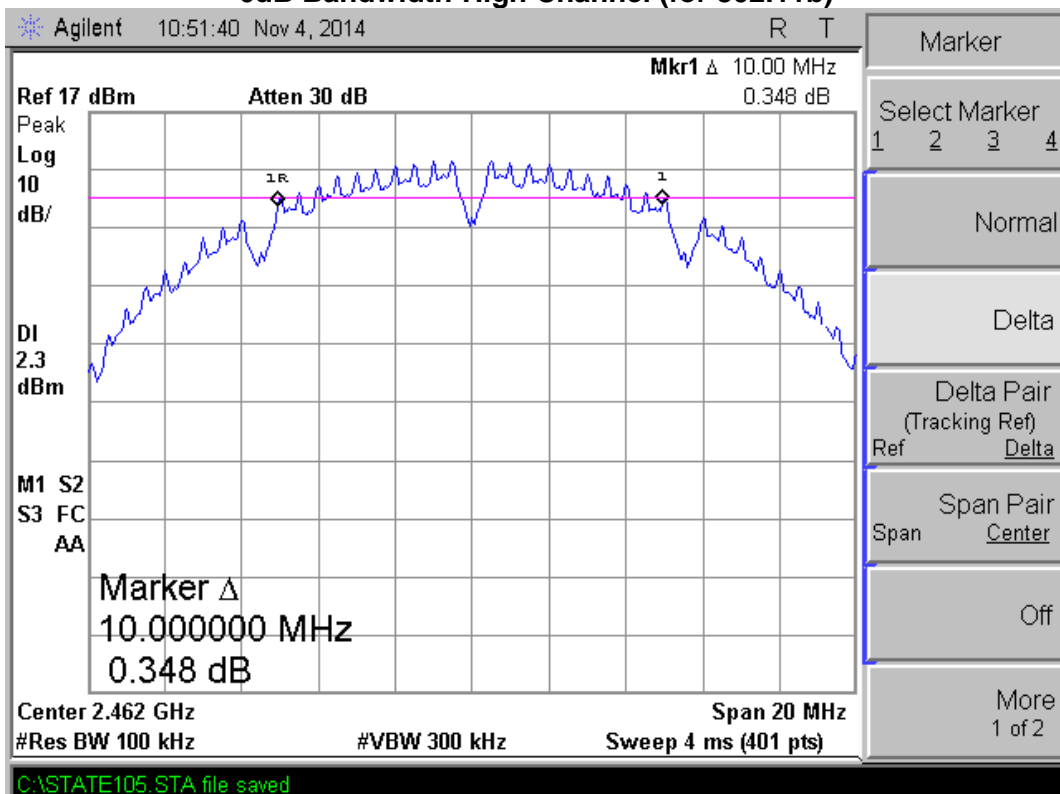
6dB Bandwidth-Low Channel (for 802.11b)



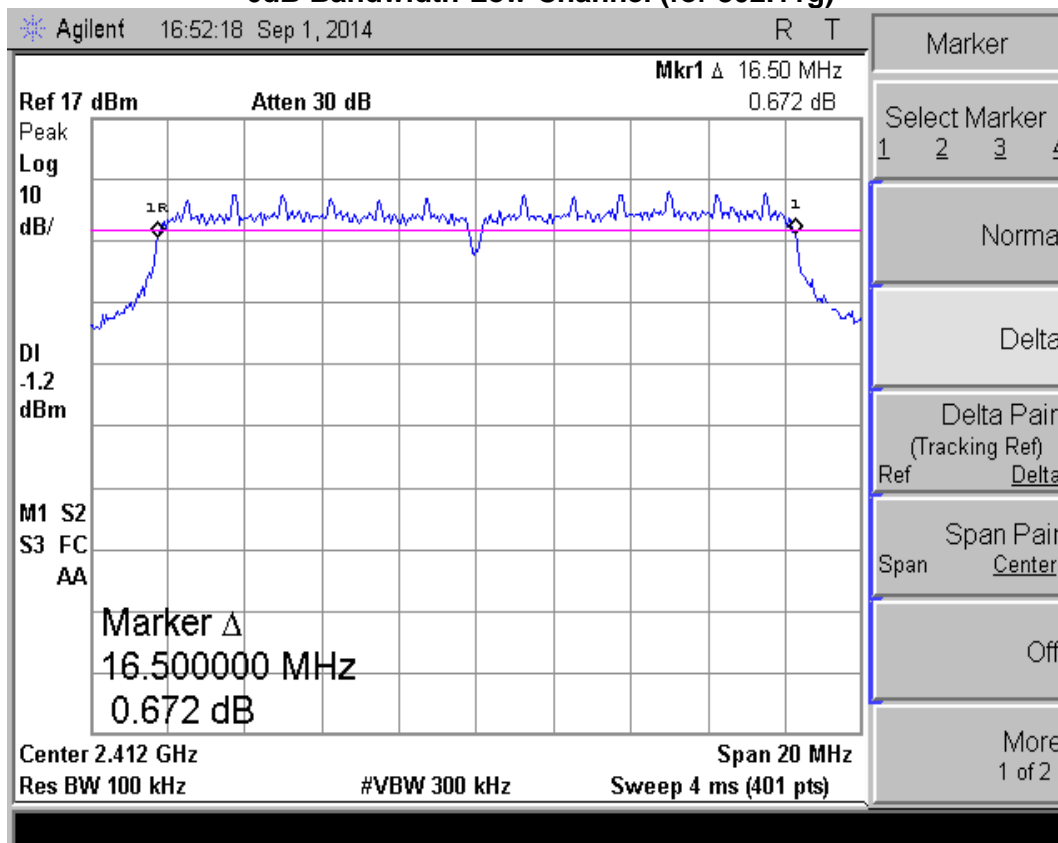
6dB Bandwidth-Middle Channel (for 802.11b)



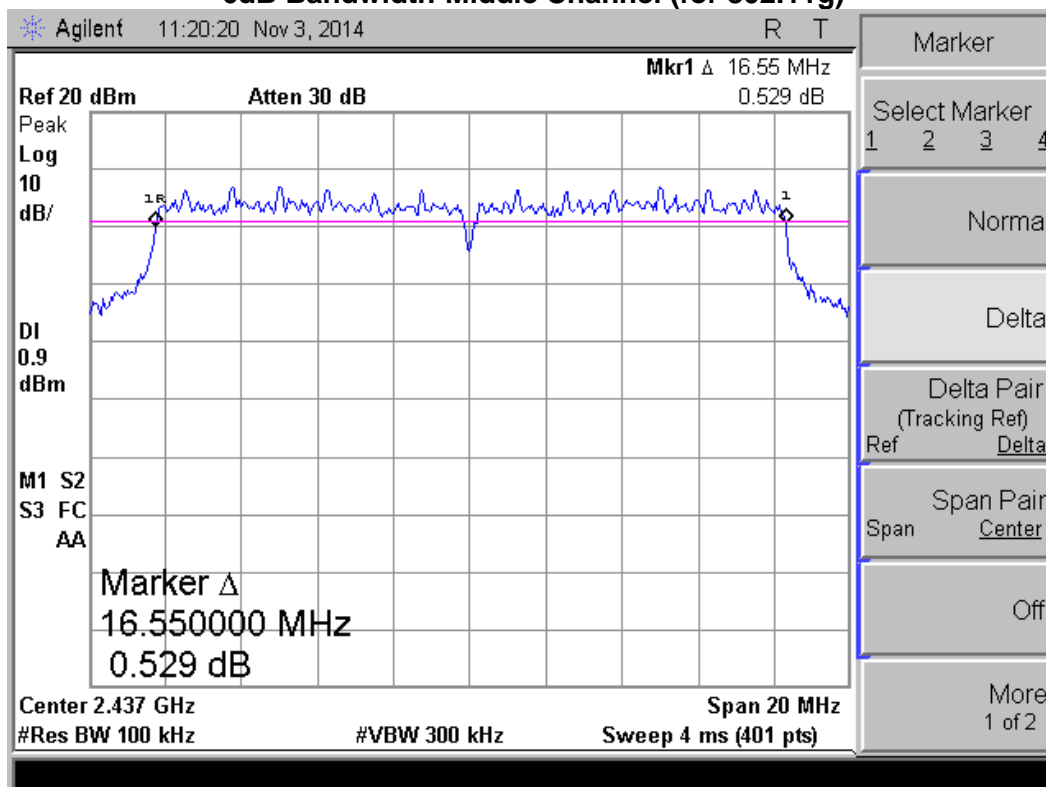
6dB Bandwidth-High Channel (for 802.11b)



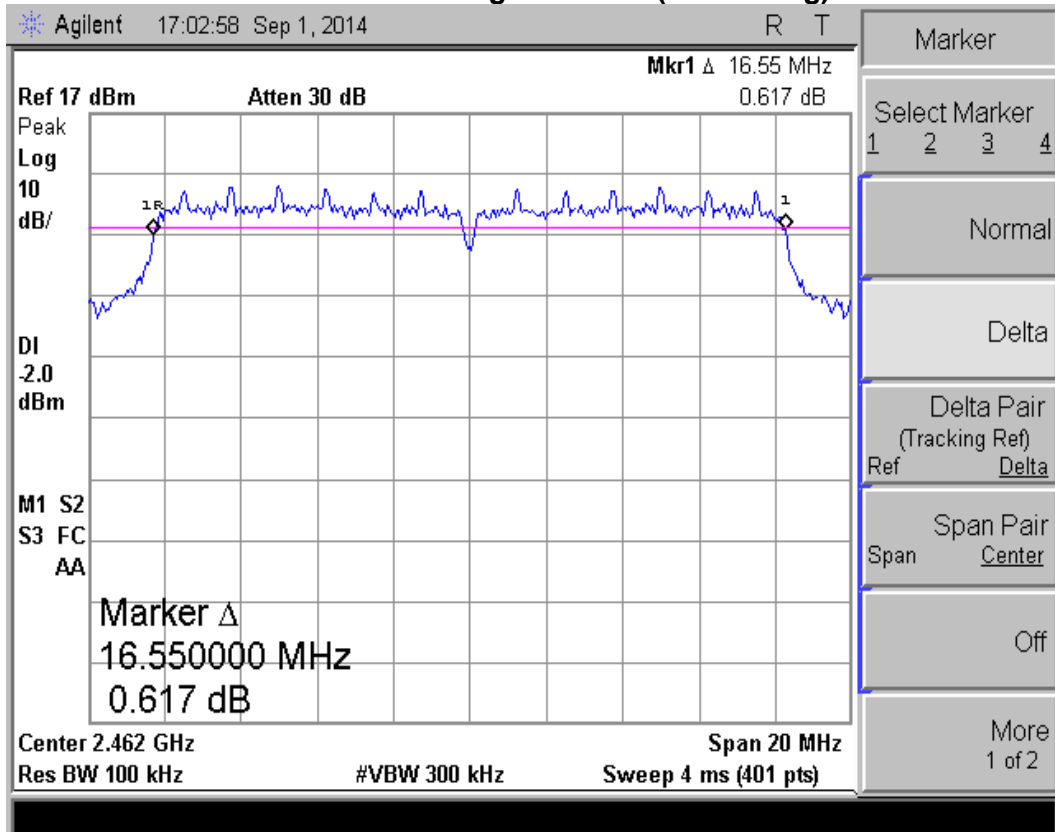
6dB Bandwidth-Low Channel (for 802.11g)



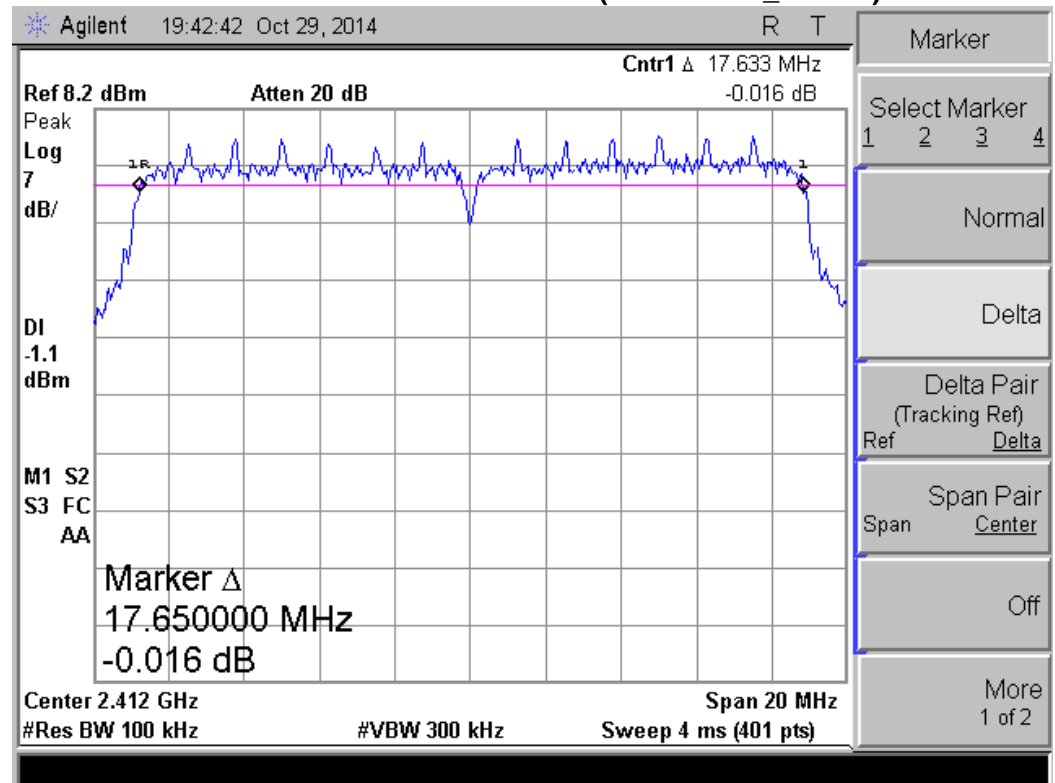
6dB Bandwidth-Middle Channel (for 802.11g)



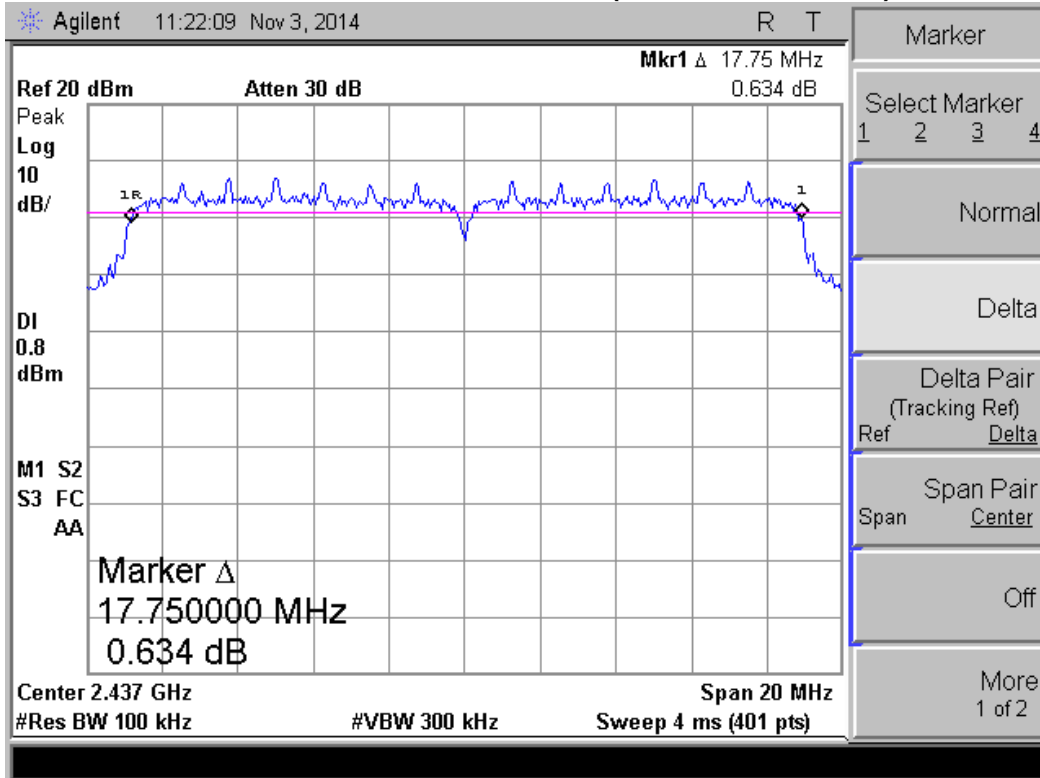
6dB Bandwidth-High Channel (for 802.11g)



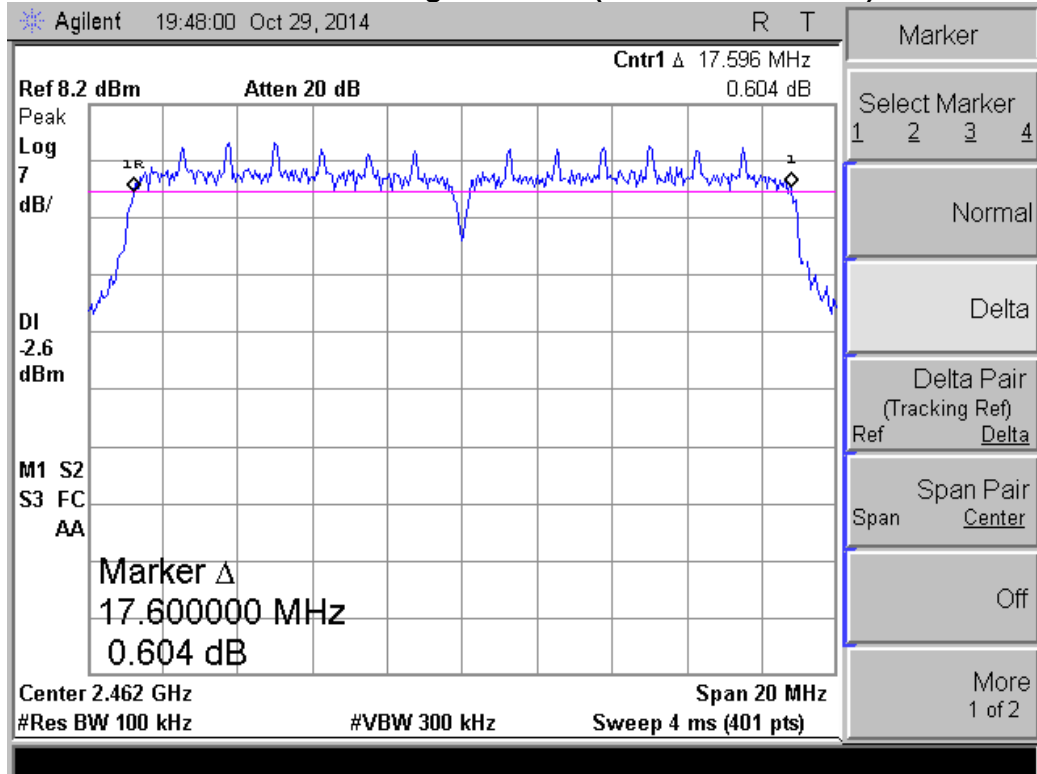
6dB Bandwidth-Low Channel (for 802.11n_20MHz)



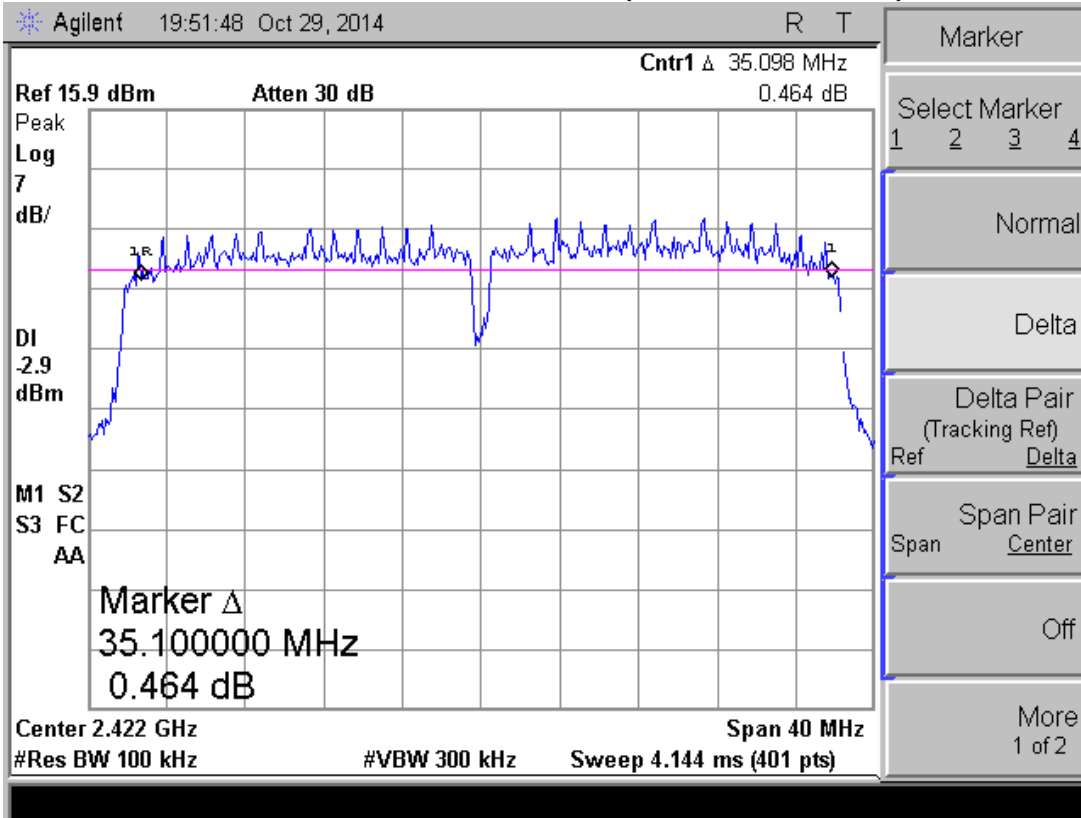
6dB Bandwidth-Middle Channel (for 802.11n_20MHz)



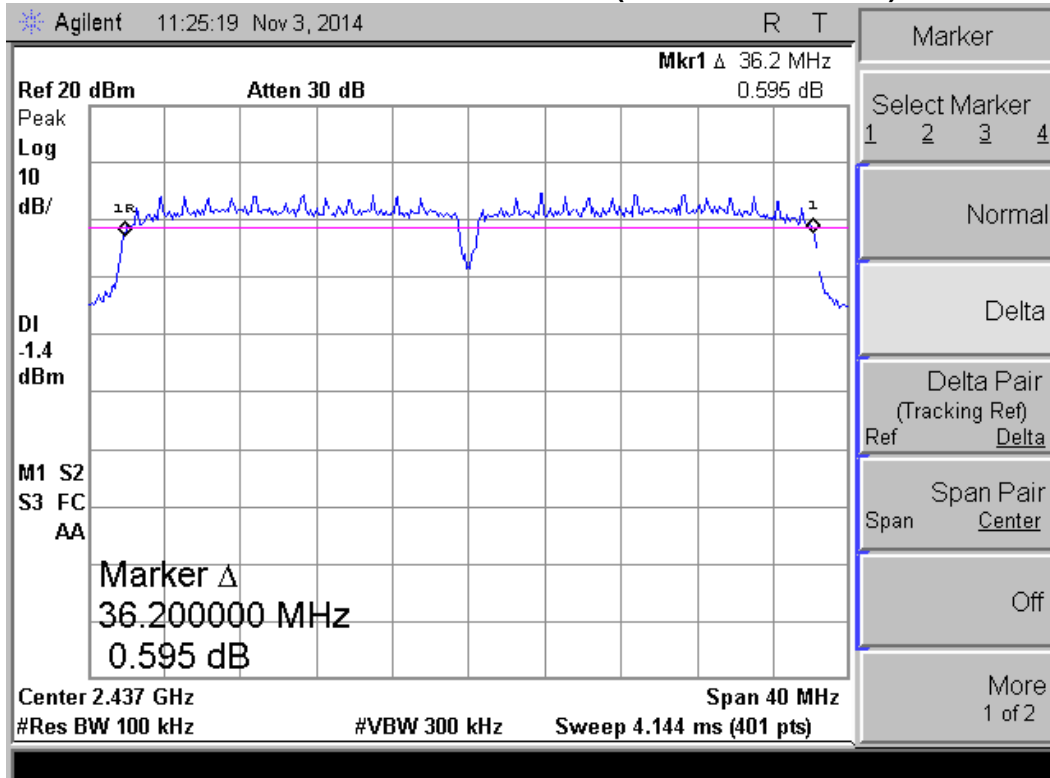
6dB Bandwidth-High Channel (for 802.11n_20MHz)



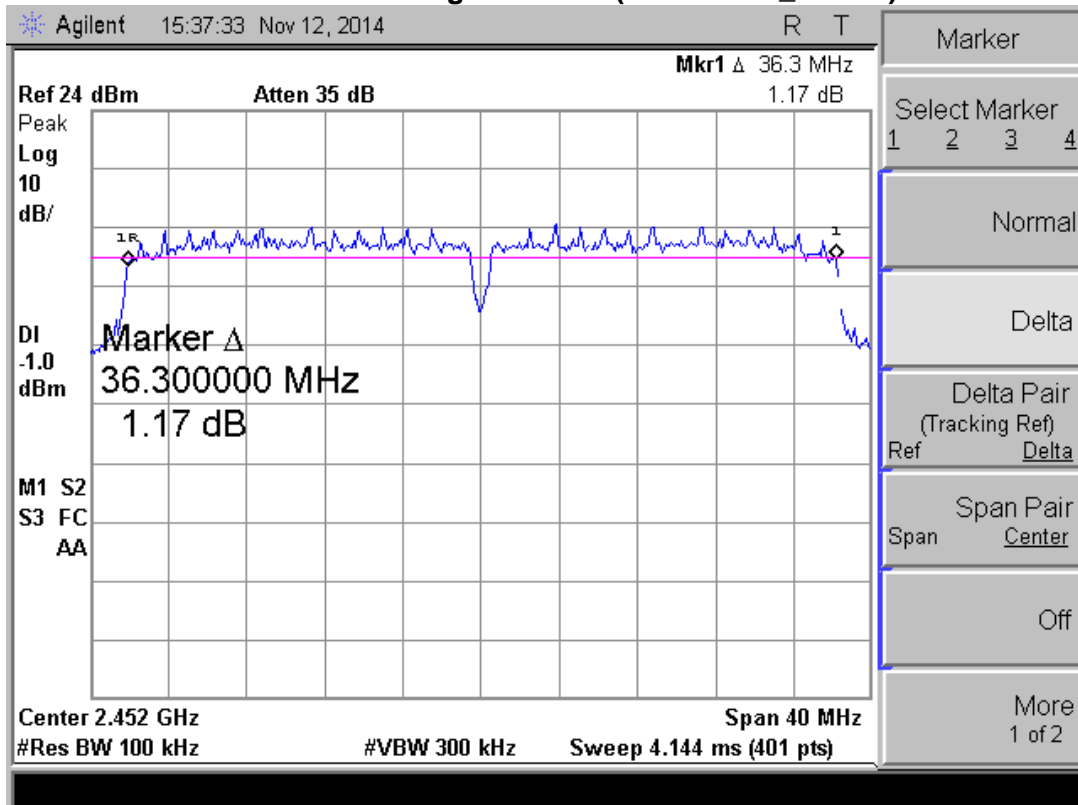
6dB Bandwidth-Low Channel (for 802.11n_40MHz)



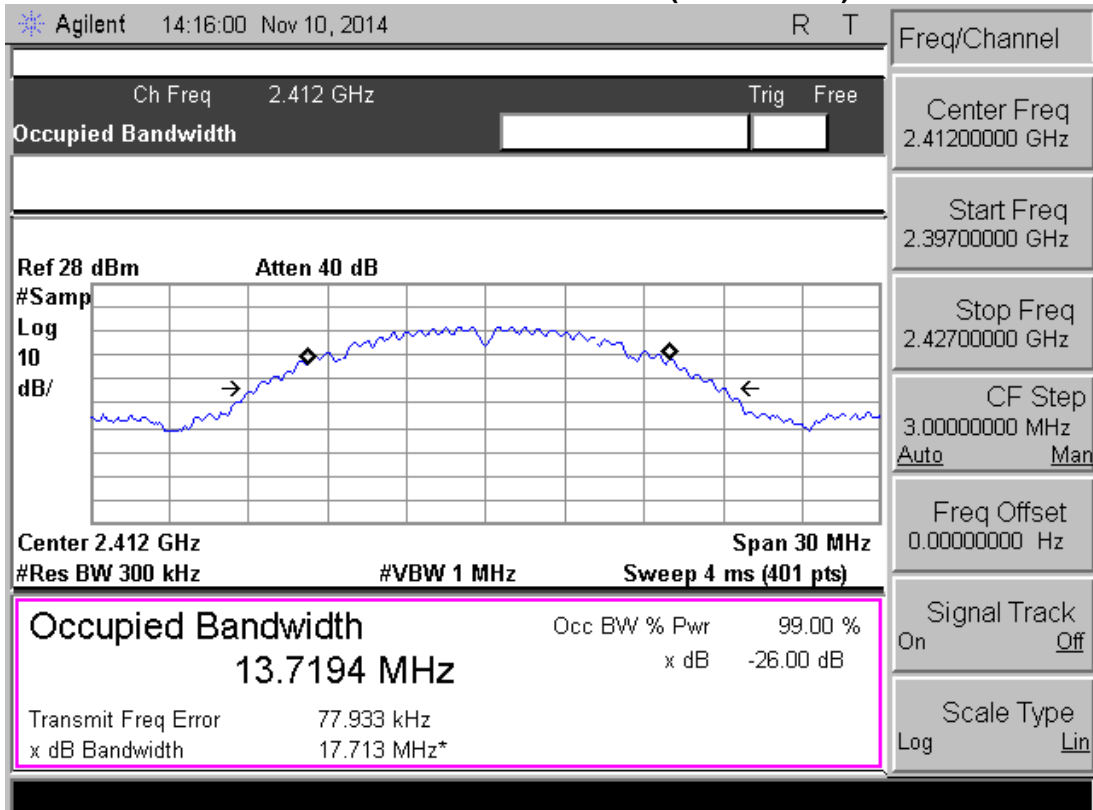
6dB Bandwidth-Middle Channel (for 802.11n_40MHz)



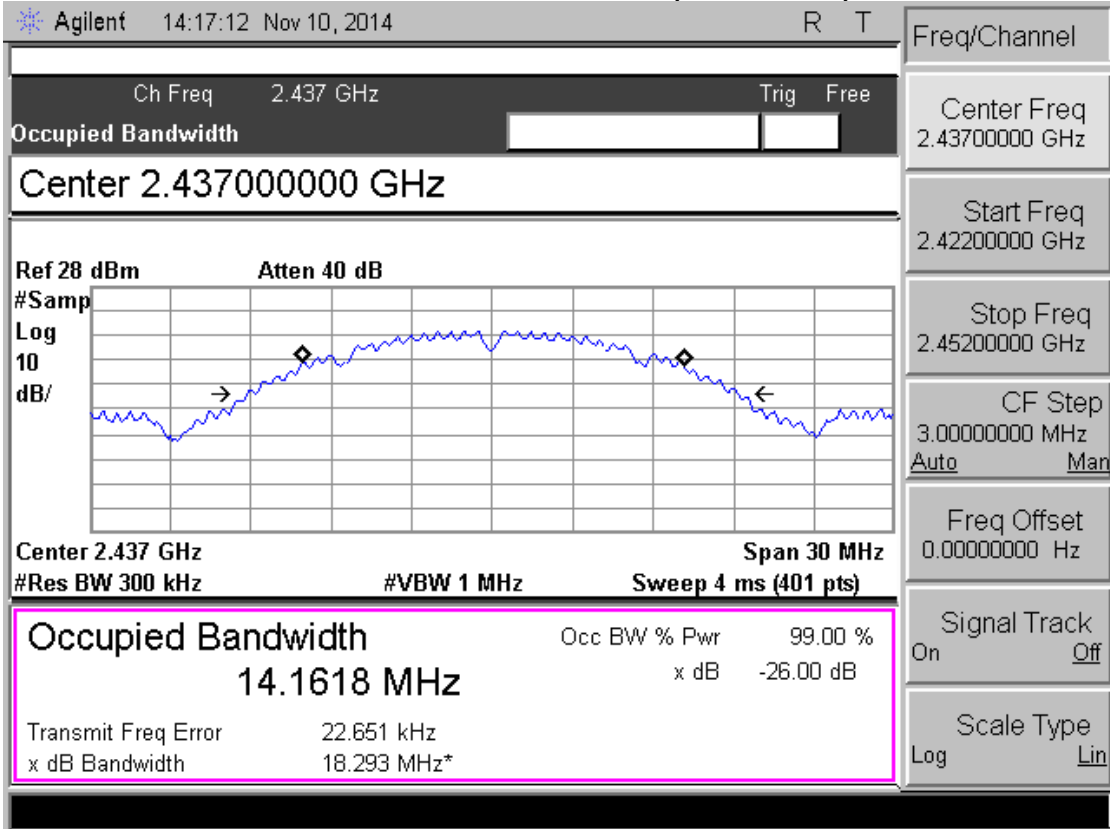
6dB Bandwidth-High Channel (for 802.11n_40MHz)



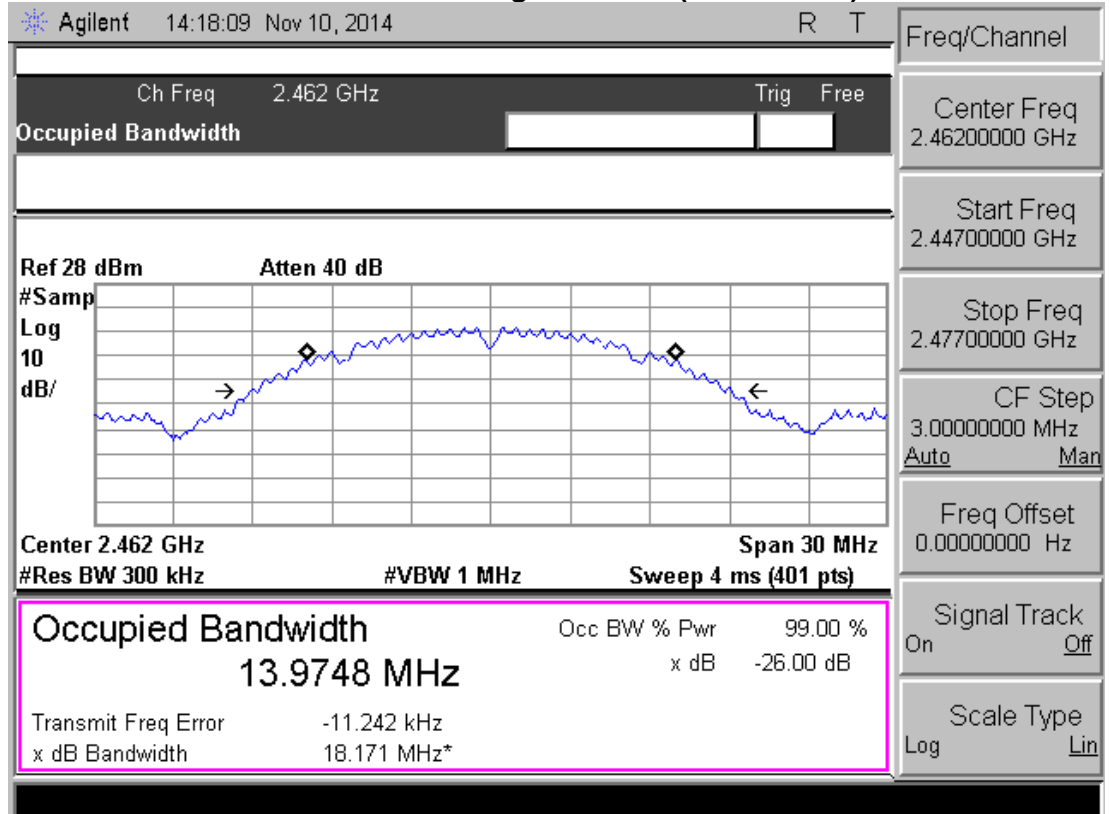
99% Bandwidth-Low Channel (For 802.11b)



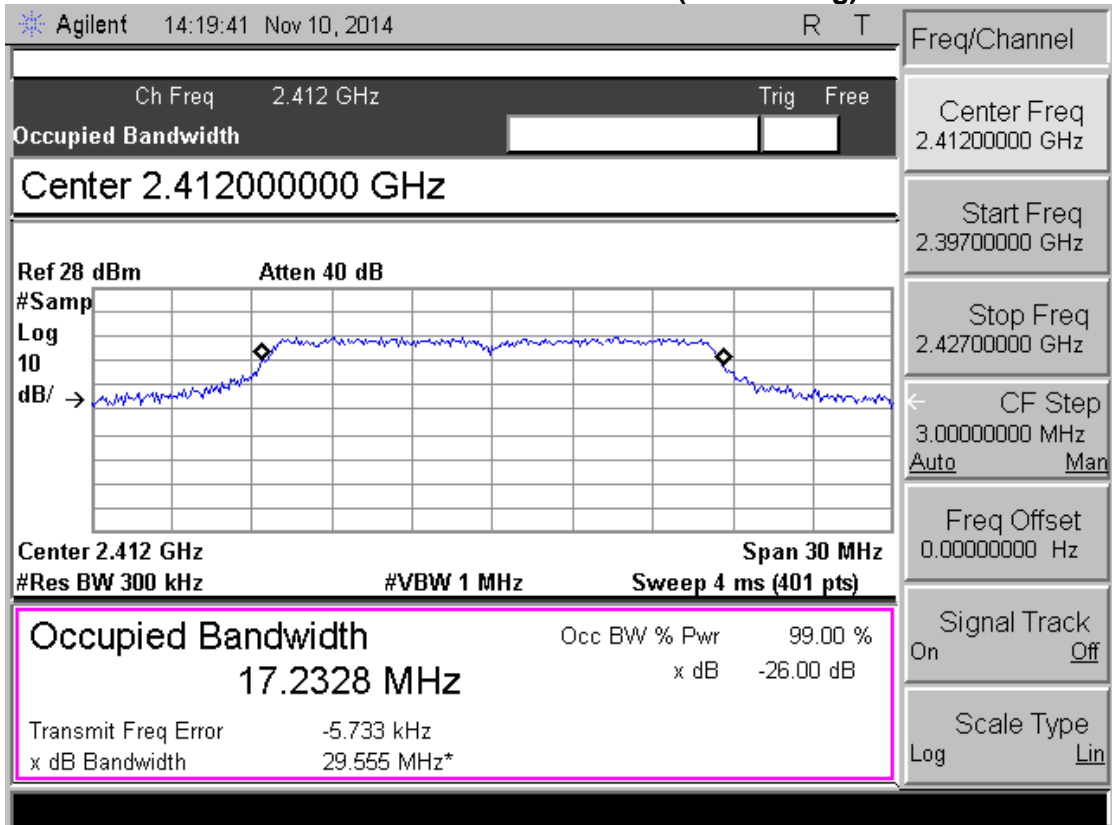
99% Bandwidth-Mid Channel (For 802.11b)



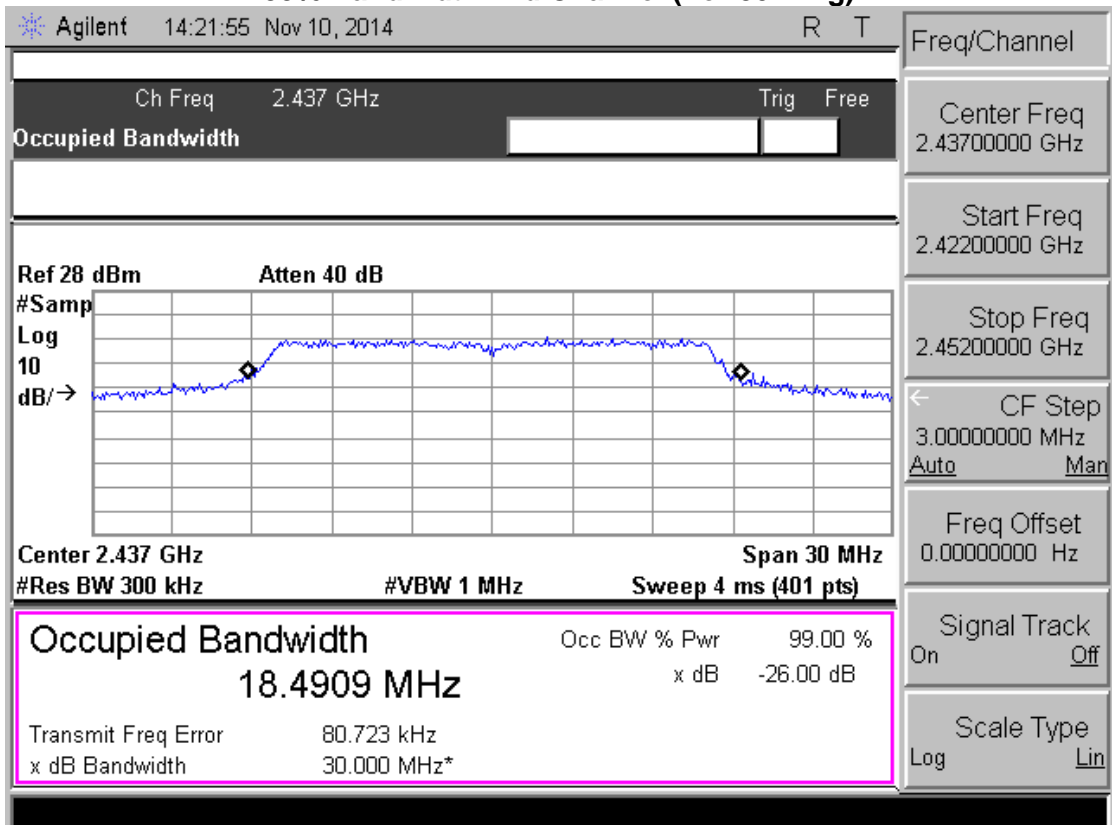
99% Bandwidth-High Channel (For 802.11b)



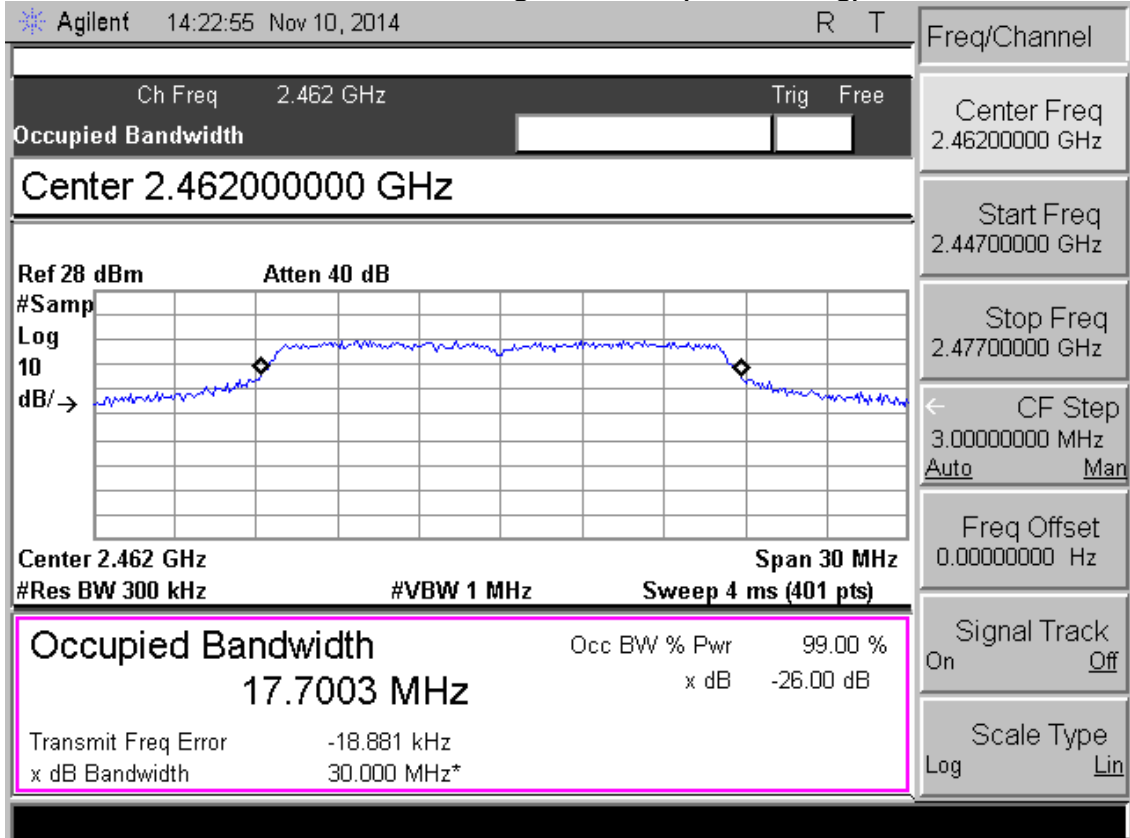
99% Bandwidth-Low Channel (For 802.11g)



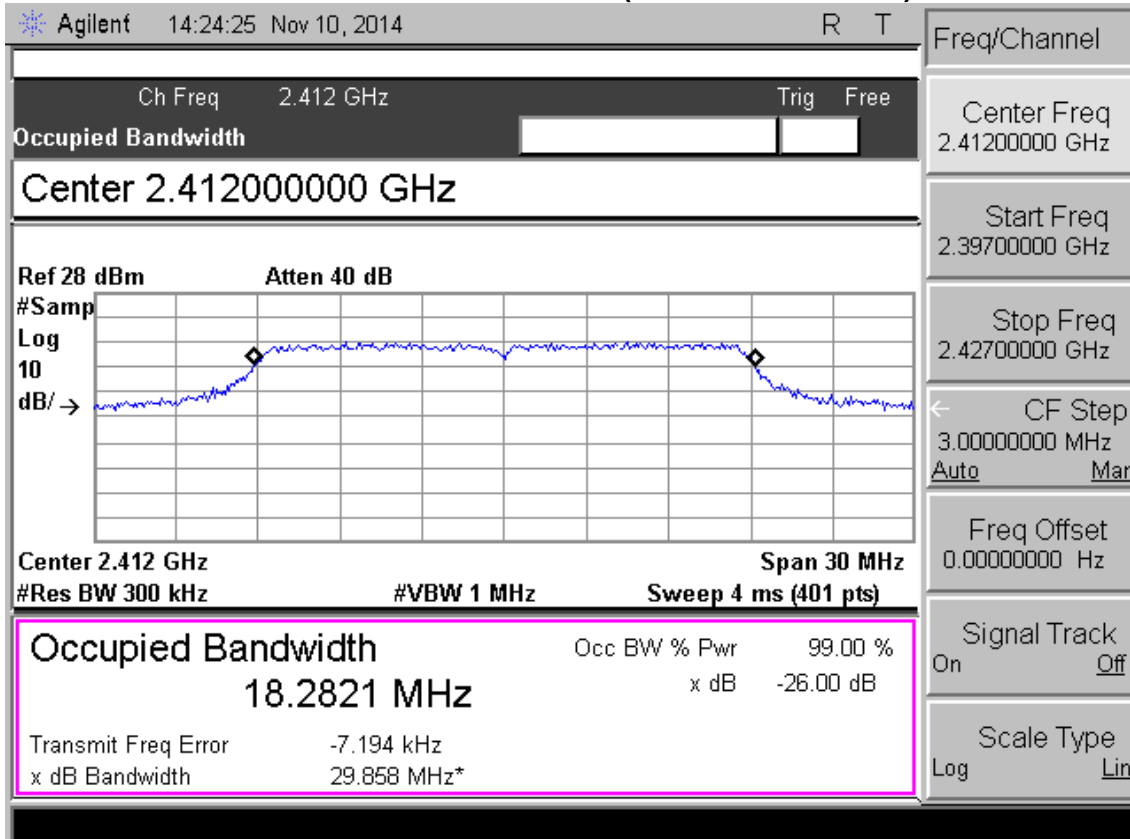
99% Bandwidth-Mid Channel (For 802.11g)



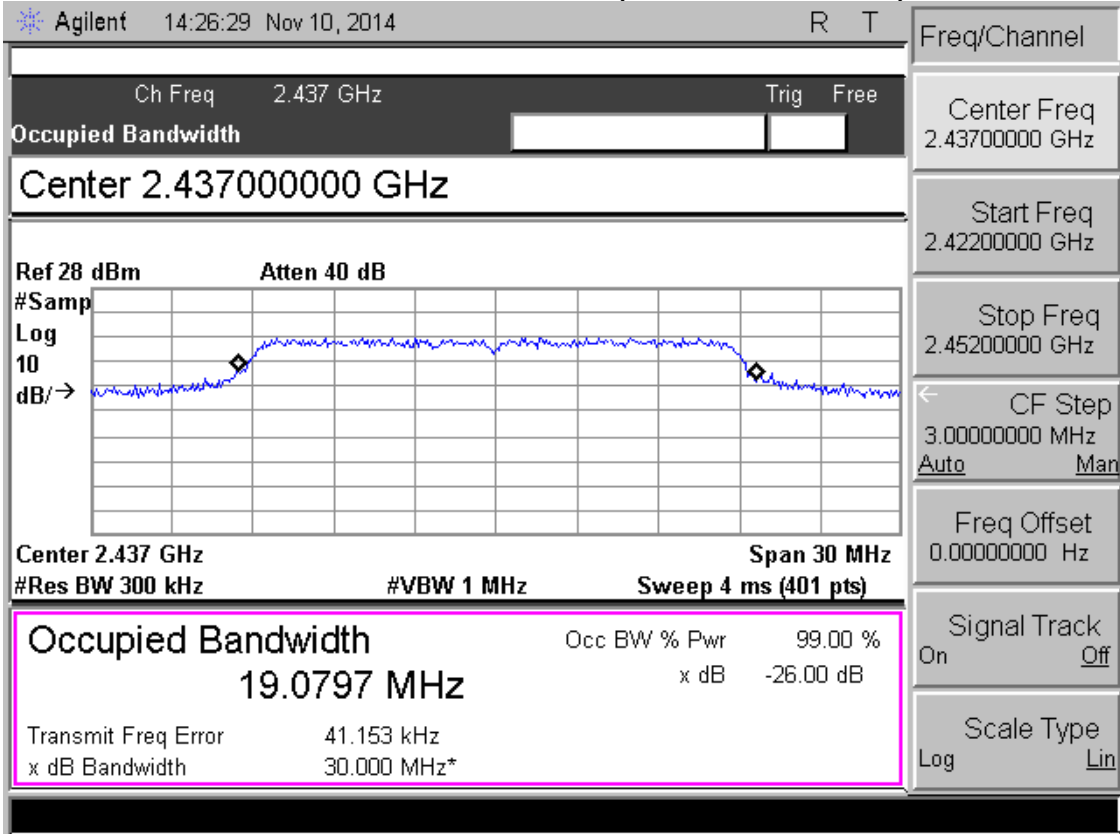
99% Bandwidth-High Channel (For 802.11g)



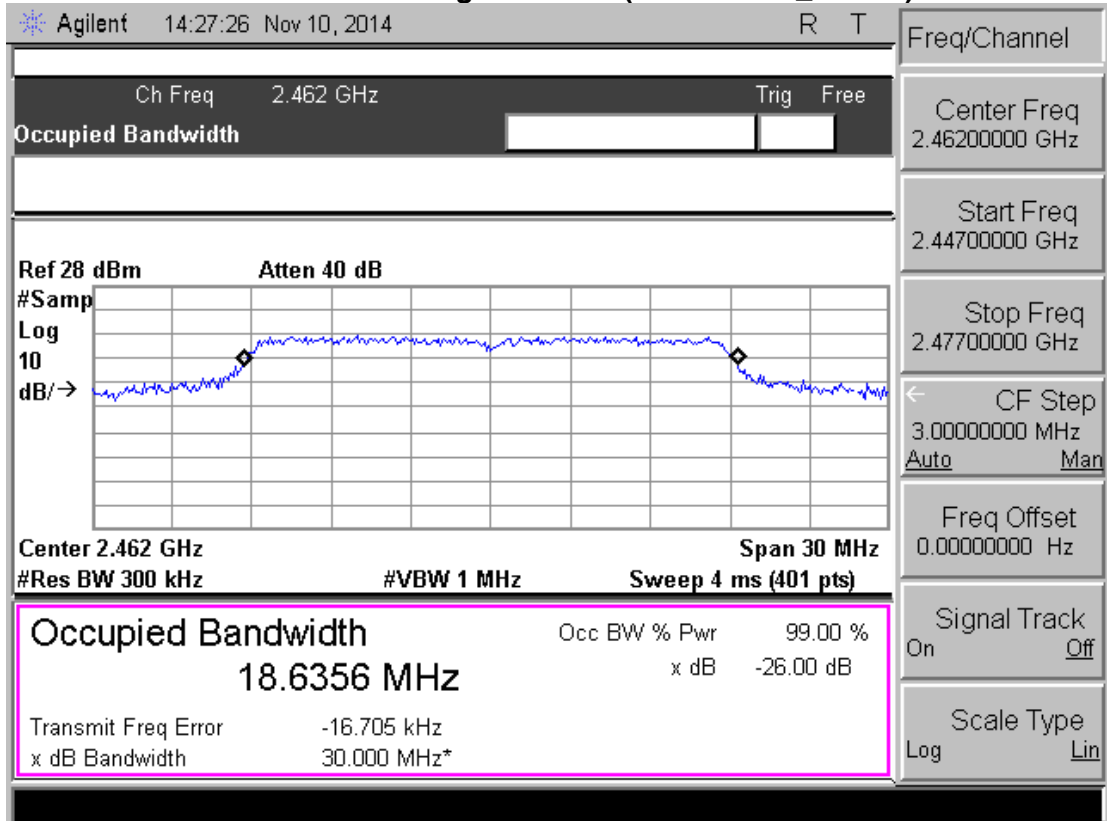
99% Bandwidth-Low Channel (For 802.11n_20MHz)



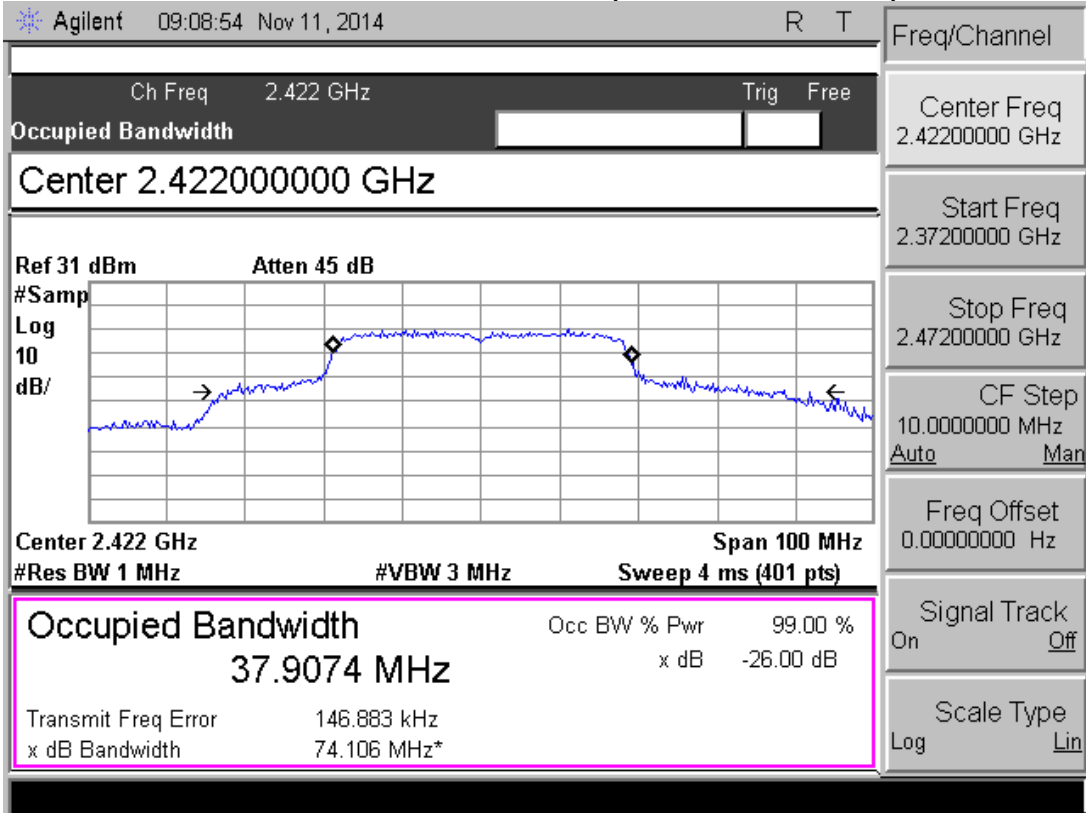
99% Bandwidth-Mid Channel (For 802.11n_20MHz)



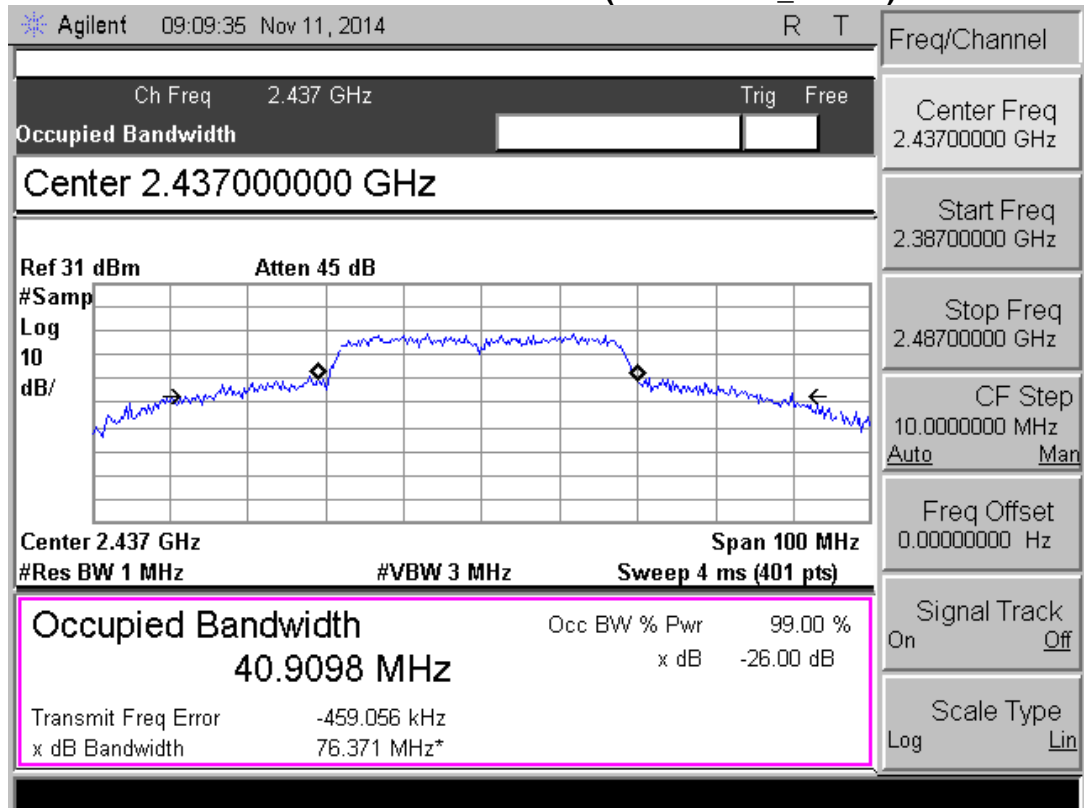
99% Bandwidth-High Channel (For 802.11n_20MHz)

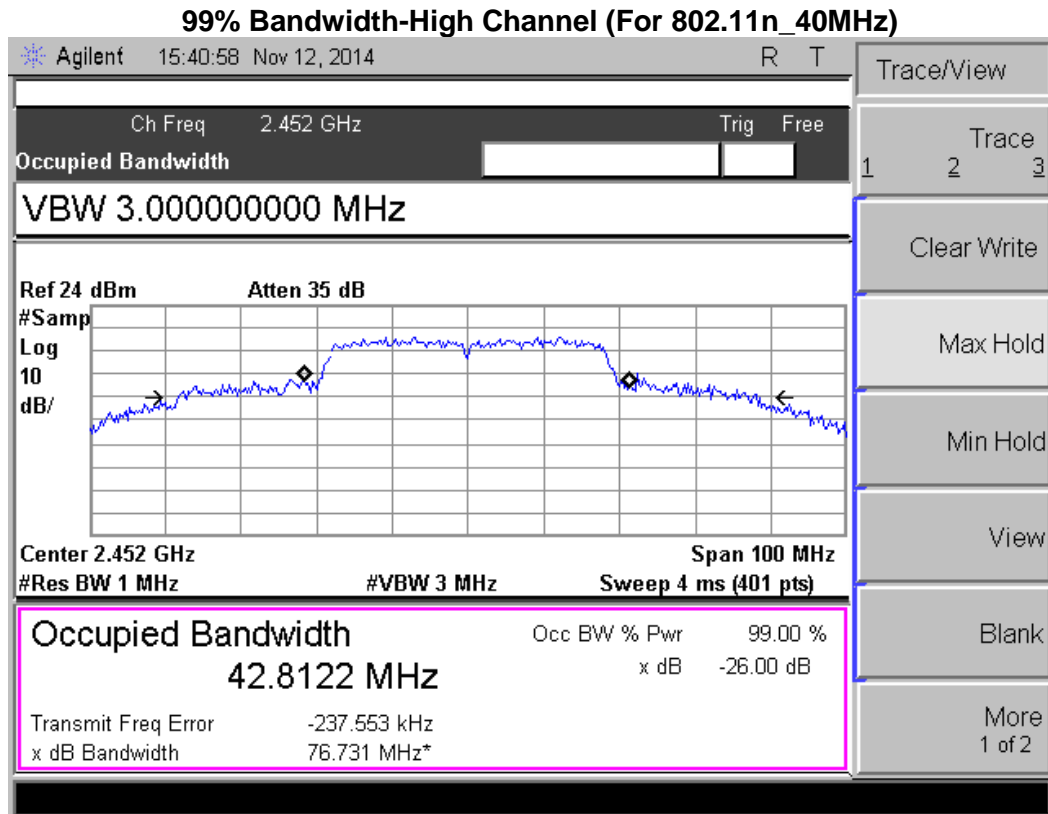


99% Bandwidth-Low Channel (For 802.11n_40MHz)



99% Bandwidth-Mid Channel (For 802.11n_40MHz)





3.2 Peak Output Power – FCC Section 15.247 (b)(3)

3.2.1 Measurement Procedure

The peak output power was measured in accordance with the FCC KDB Publication No.558074 v03r02 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (47 CFR 15.247)” Section 9.1.3 Peak Power Meter Method.

3.2.2 Measurement Result

Frequency (MHz)	For 802.11b: RF Output Power (dBm)	For 802.11g: RF Output Power (dBm)	For 802.11n_20MHz: RF Output Power (dBm)
2412	17.51	16.90	16.76
2437	18.09	16.82	16.85
2462	17.54	16.16	16.13

Frequency (MHz)	For 802.11n_40MHz: RF Output Power (dBm)
2422	12.54
2437	12.75
2452	12.25

3.3 Band-Edge Compliance of RF Conducted Emissions – FCC Section 15.247(d)

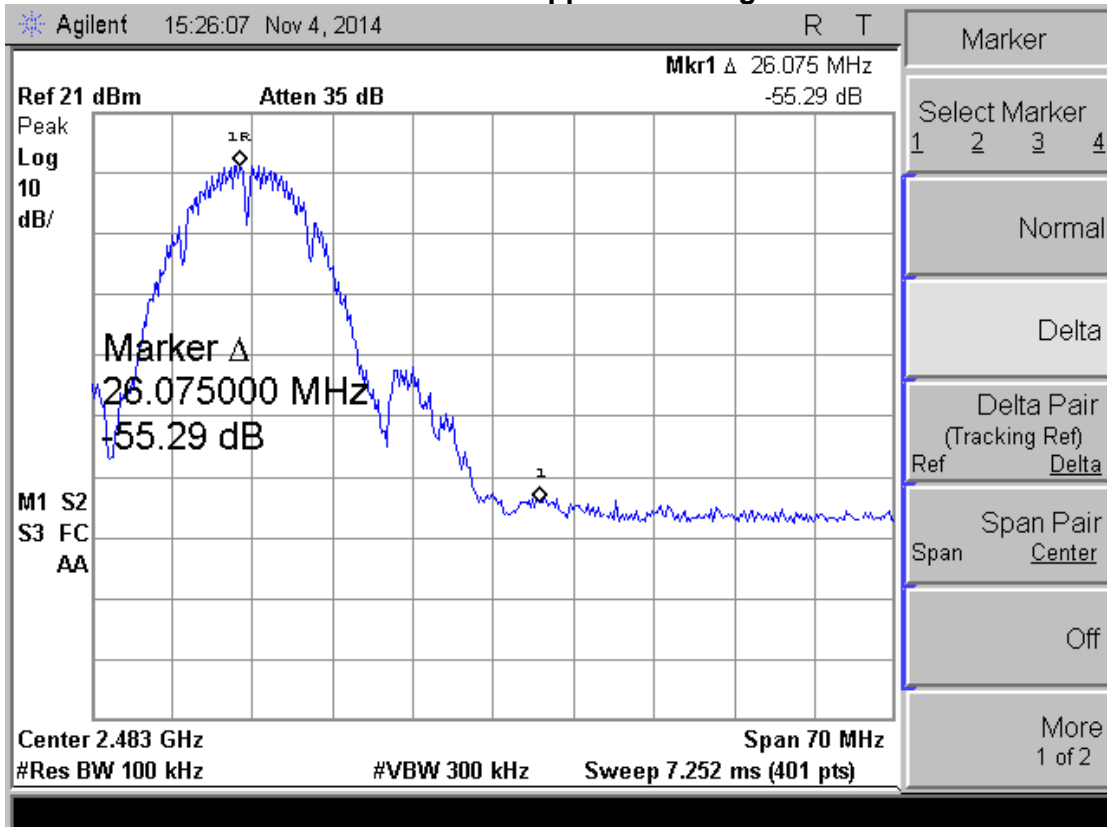
3.3.1 Measurement Procedure

The band-edge measurement was measured in accordance with the FCC KDB Publication No.558074 v03r02 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (47 CFR 15.247)” Section 13.2 Marker-delta Method. The RF output of the equipment under test was directly connected to the input of the spectrum analyzer through suitable attenuation. The EUT was investigated at the lowest and highest channel available to determine band-edge compliance. The RBW of the spectrum analyzer was set to 100 kHz and VBW 300 kHz. The reference level was determined by measuring the Peak PSD level in any 100 kHz bandwidth within the DTS channel bandwidth.

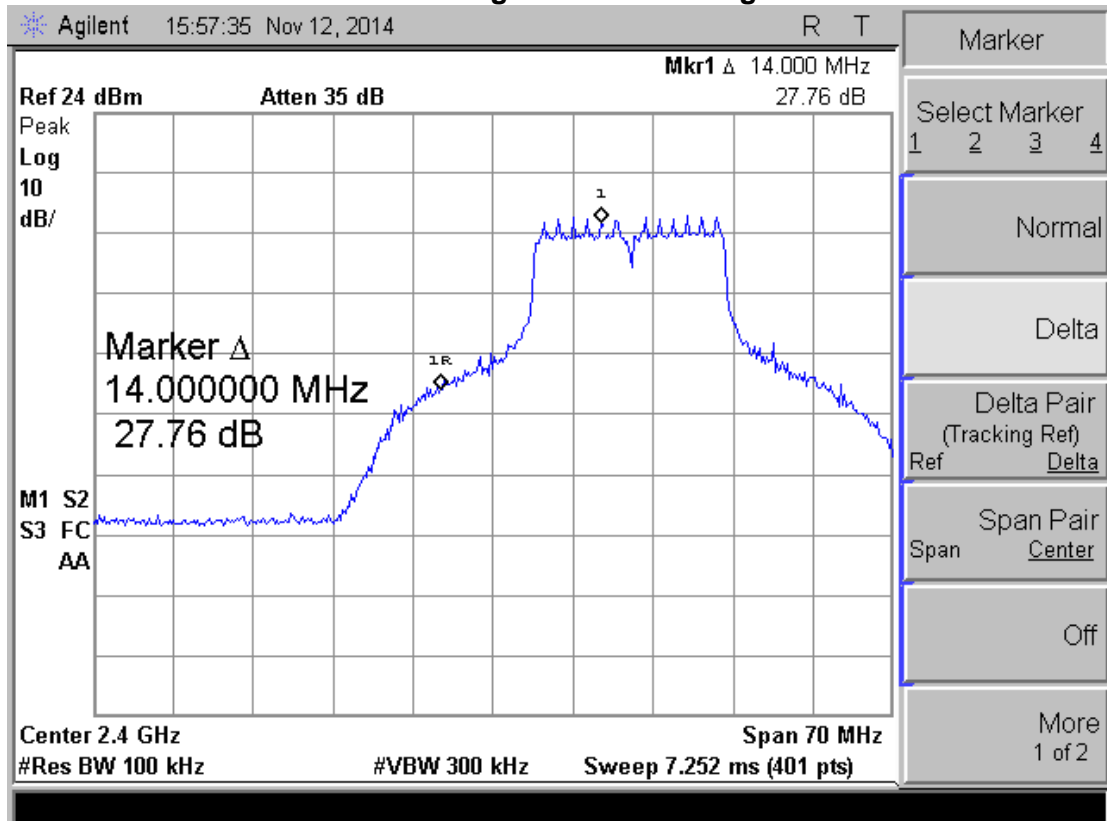
3.3.2 Measurement Result



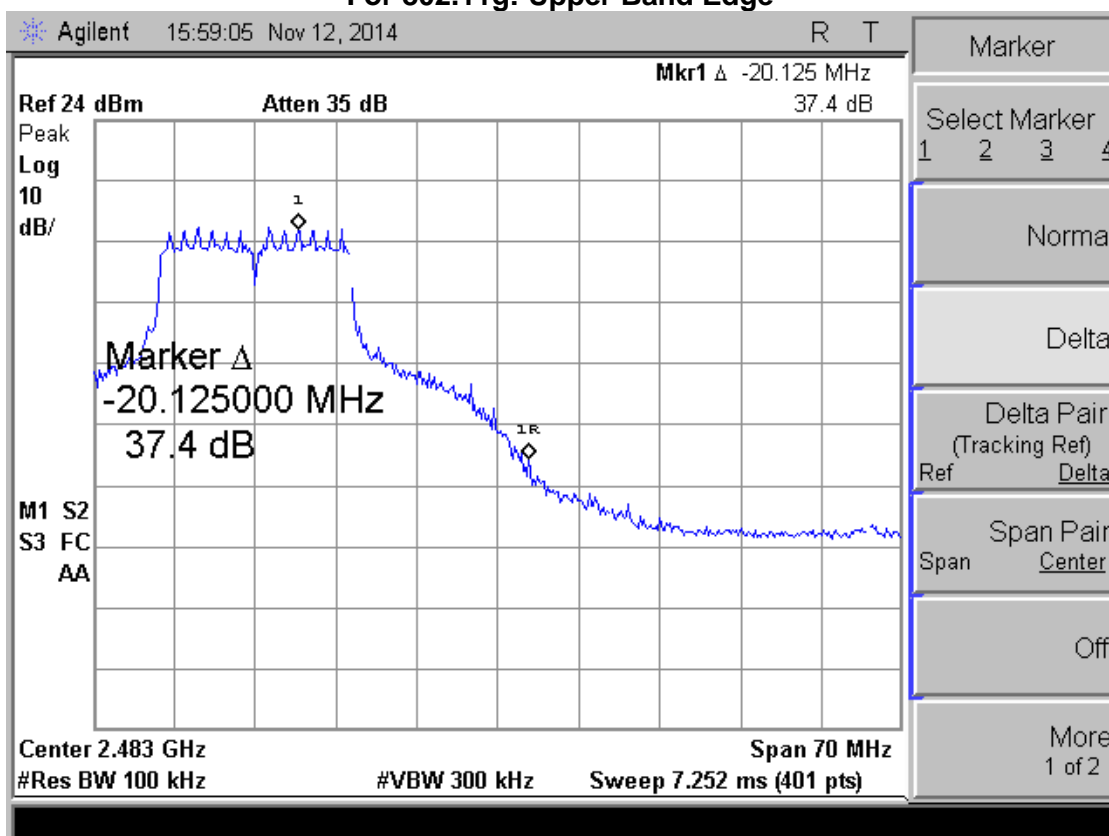
For 802.11b: Upper Band Edge



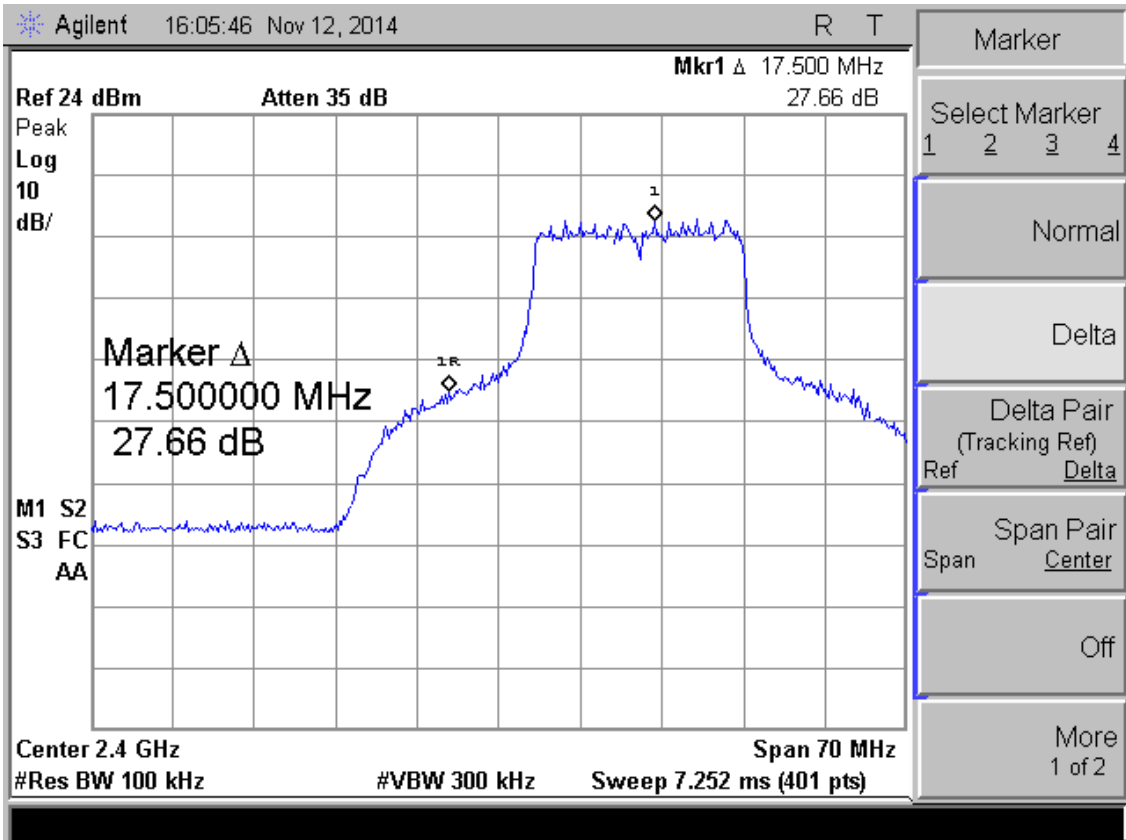
For 802.11g: Lower Band Edge



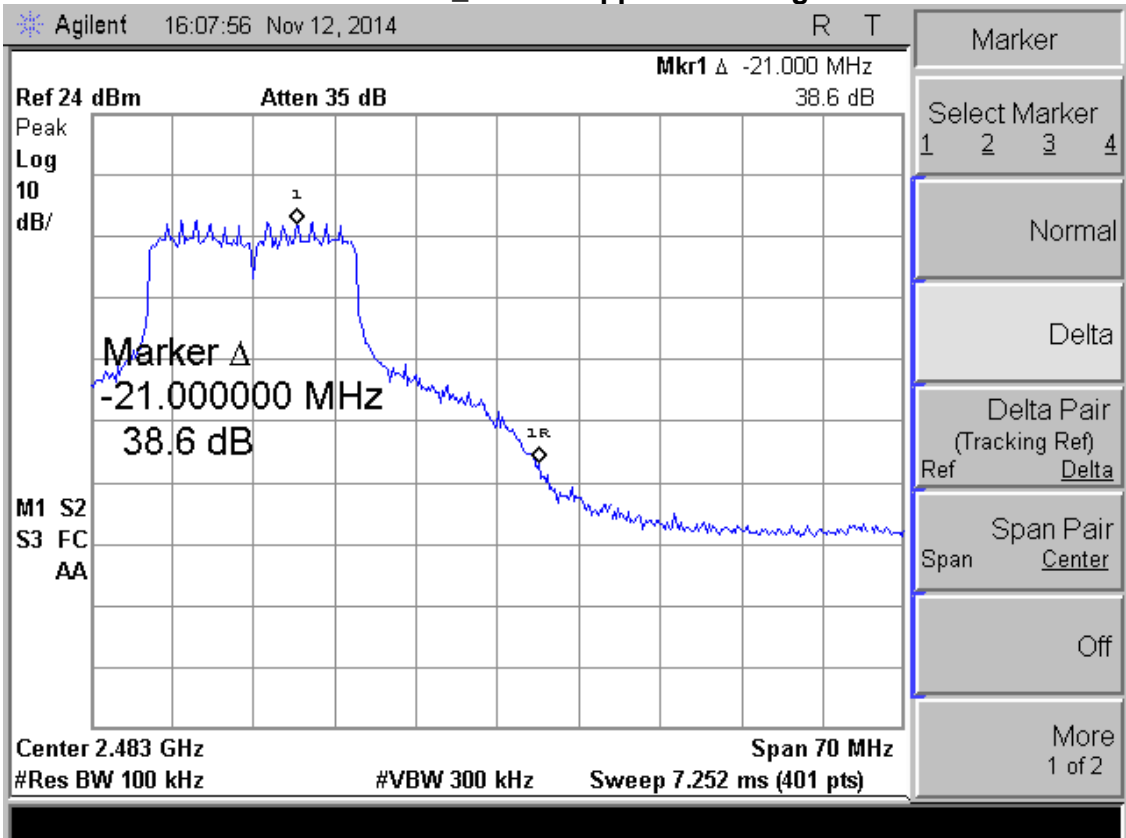
For 802.11g: Upper Band Edge



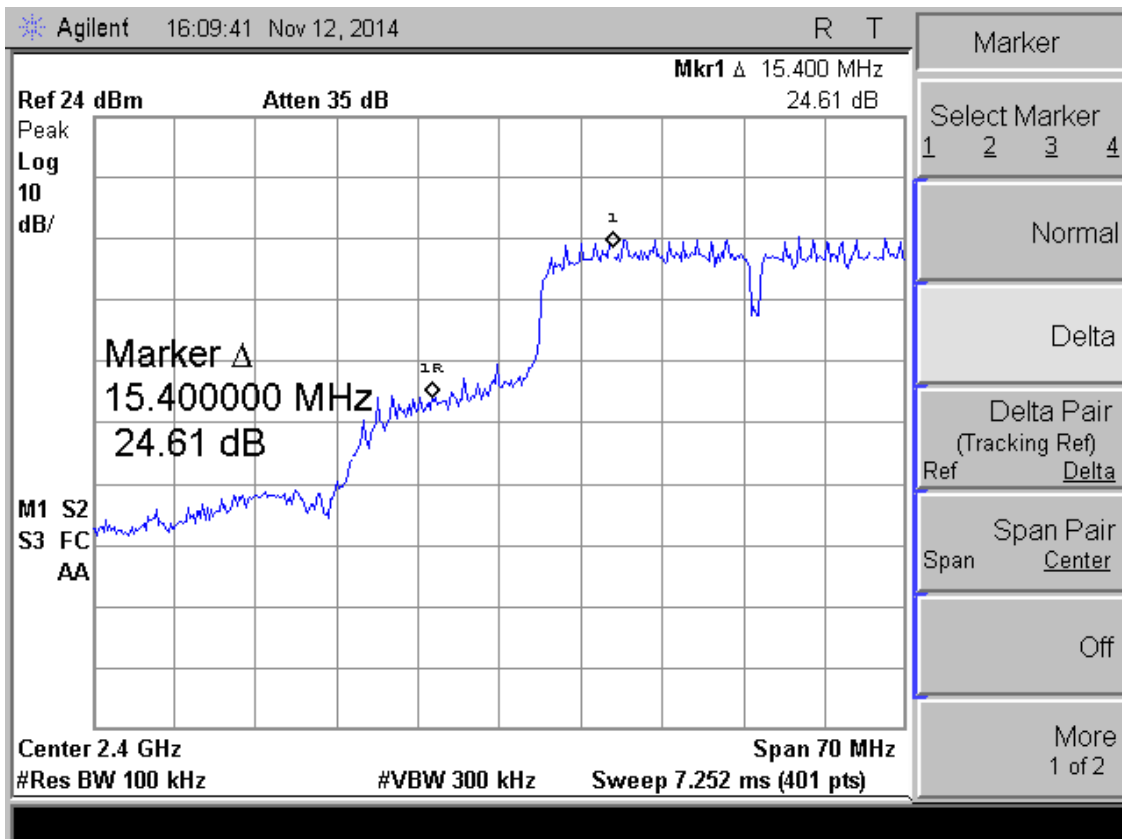
For 802.11n_20MHz: Lower Band Edge



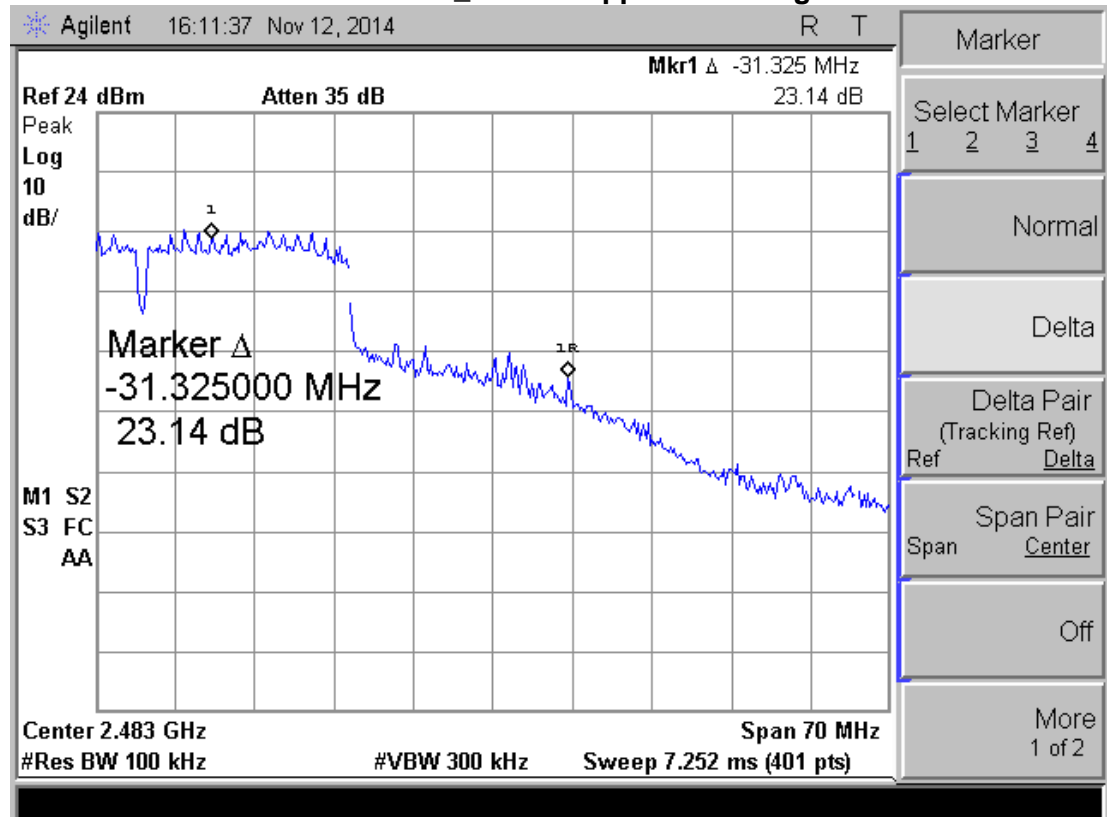
For 802.11n_20MHz: Upper Band Edge



For 802.11n_40MHz: Lower Band Edge



For 802.11n_40MHz: Upper Band Edge



3.4 Power Spectral Density – FCC Section 15.247(e)

3.4.1 Measurement Procedure

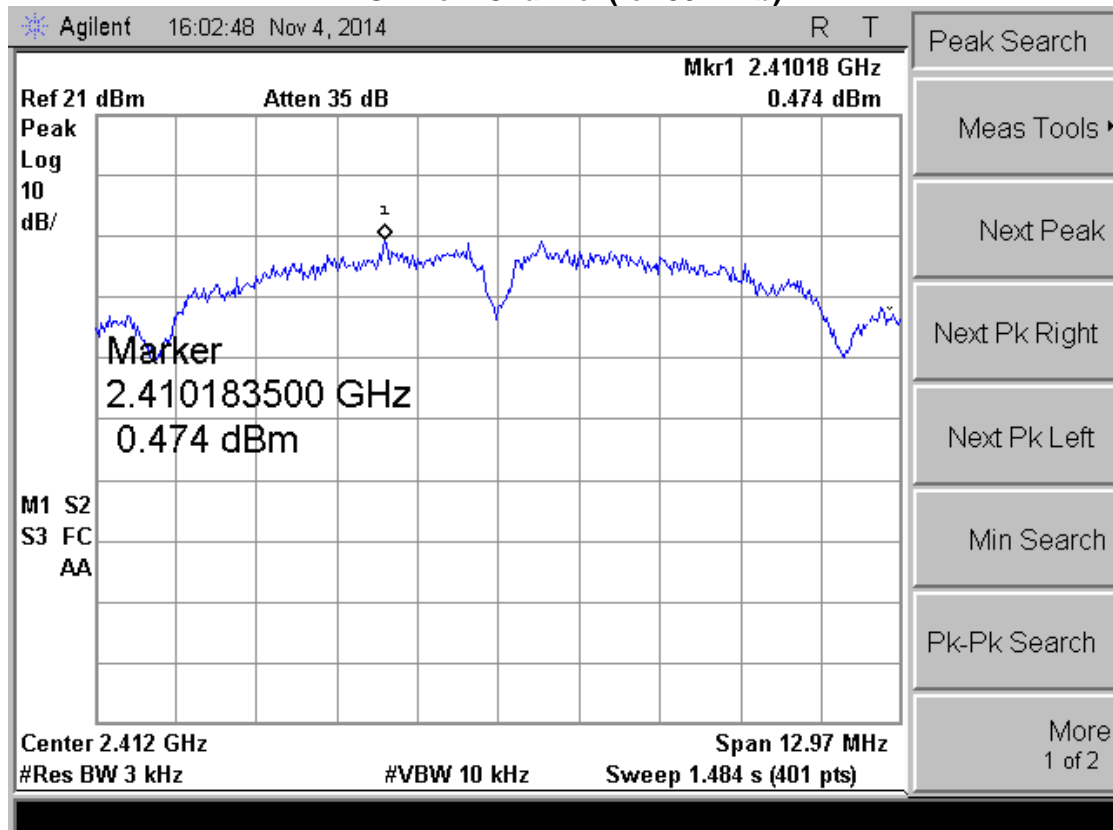
The power spectral density was measured in accordance with the FCC KDB Publication No.558074 v03r02 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (47 CFR 15.247)” Section 10.2 Peak PSD Method. The RBW of the spectrum analyzer was set to 100 kHz and VBW 300 kHz. The peak marker function was used to determine the maximum amplitude level within the RBW.

3.4.2 Measurement Result

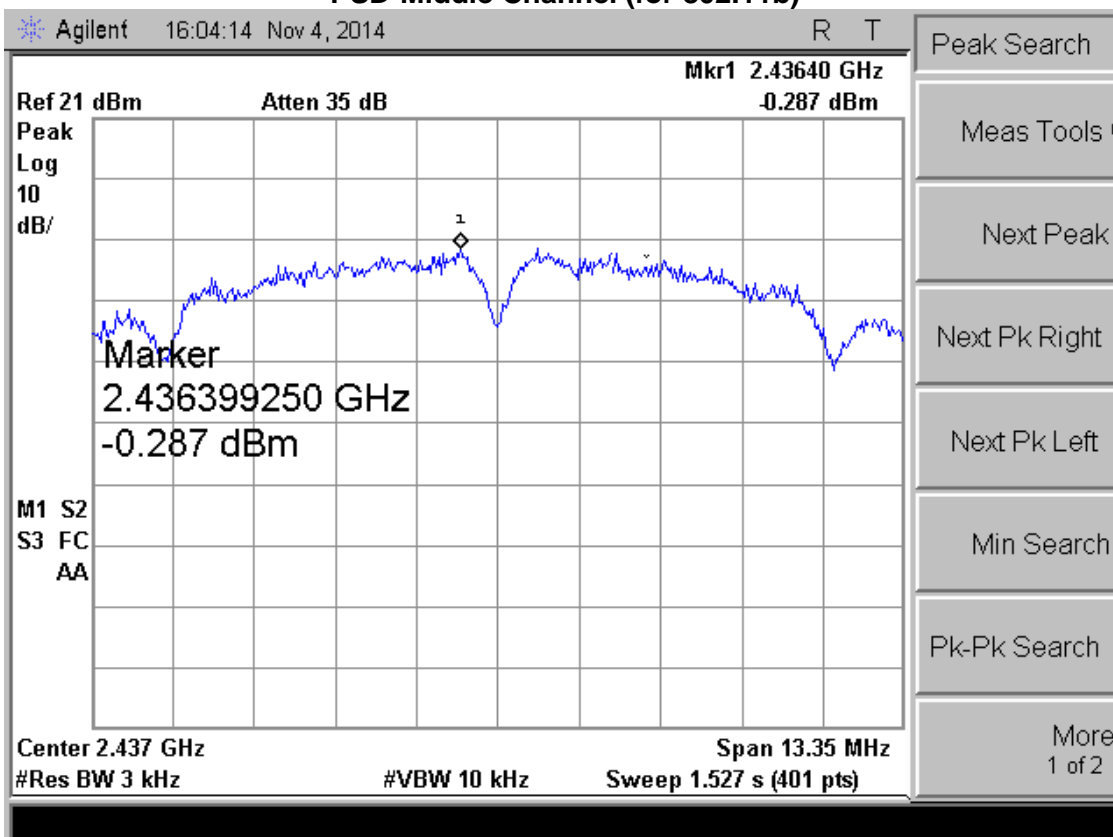
Frequency (MHz)	For 802.11b: PSD(dBm)	For 802.11g: PSD (dBm)	For 802.11n_20MHz: PSD(dBm)
2412	0.474	-4.36	-5.225
2437	-0.287	-3.915	-4.197
2462	-0.916	-4.364	-5.423

Frequency (MHz)	For 802.11n_40MHz: PSD (dBm)
2422	-9.691
2437	-10.99
2452	-12.55

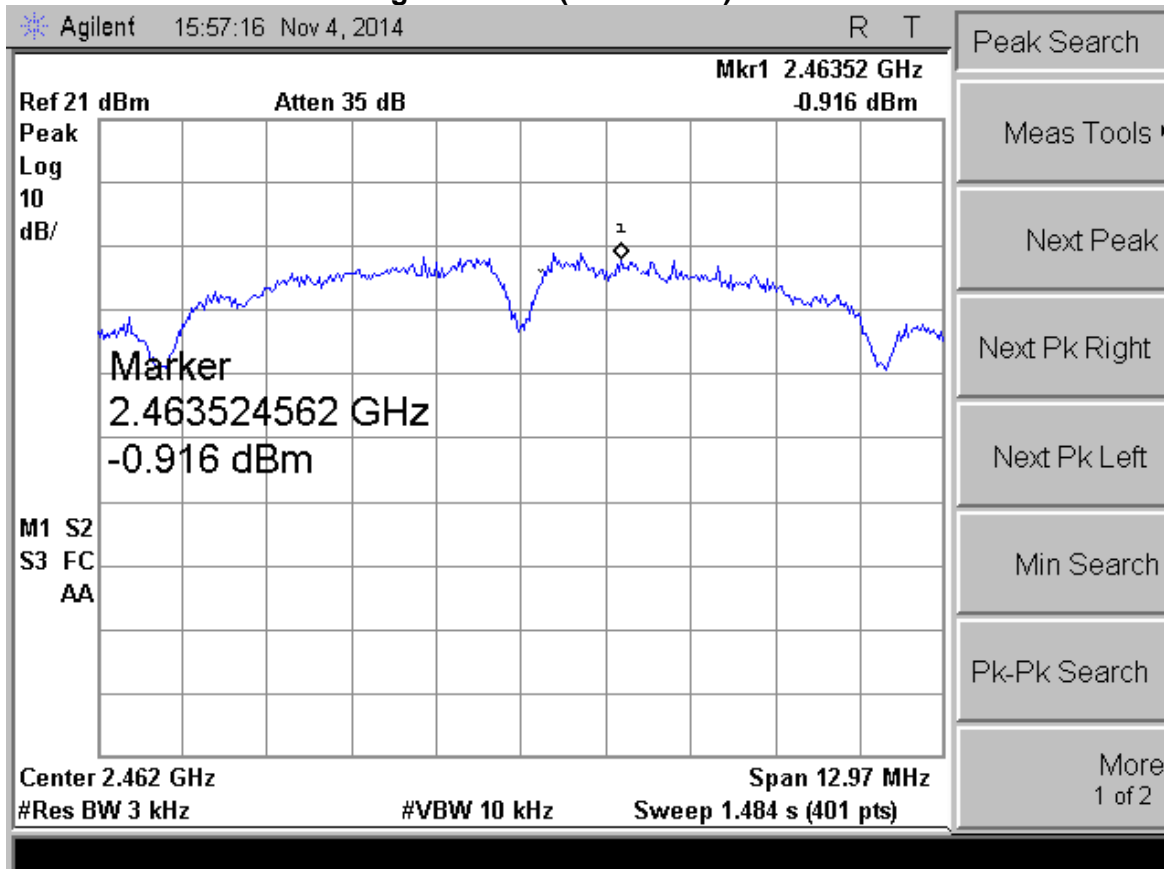
PSD-Low Channel (for 802.11b)



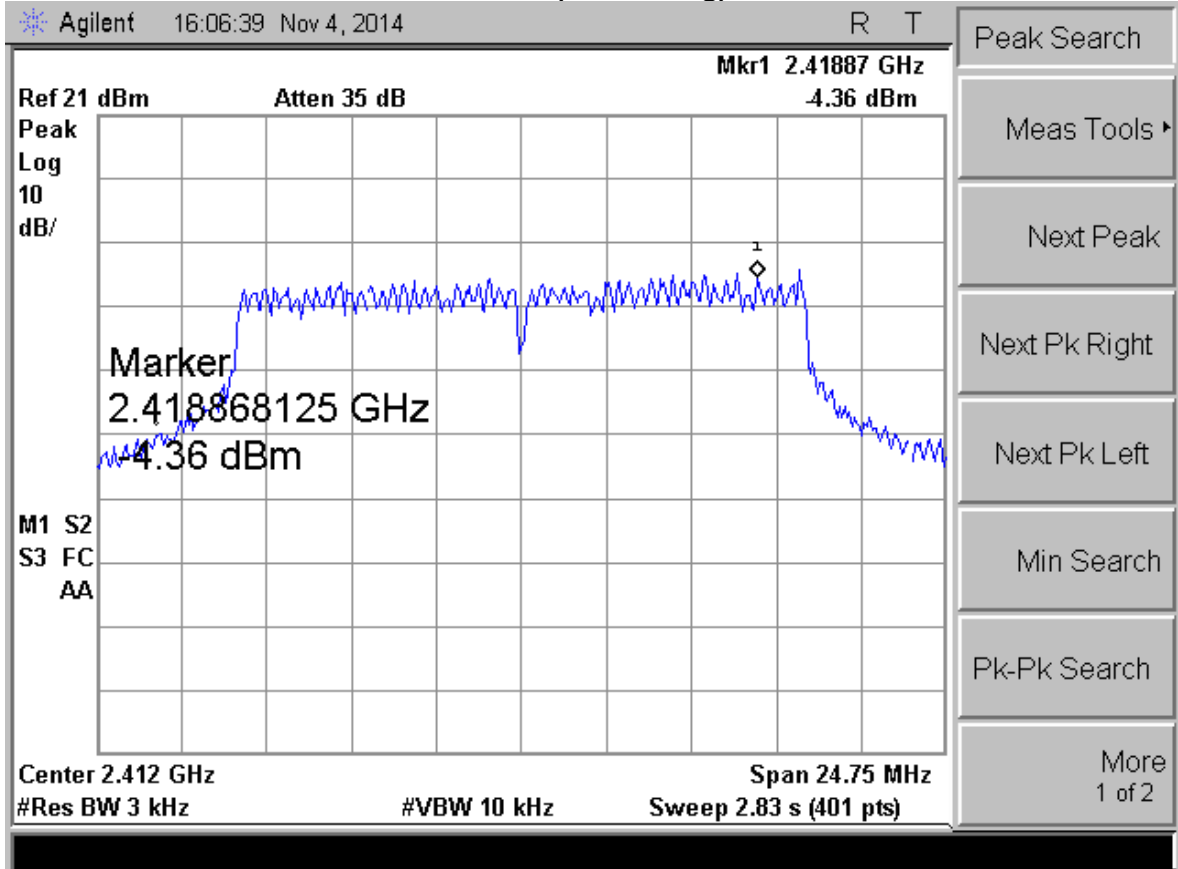
PSD-Middle Channel (for 802.11b)



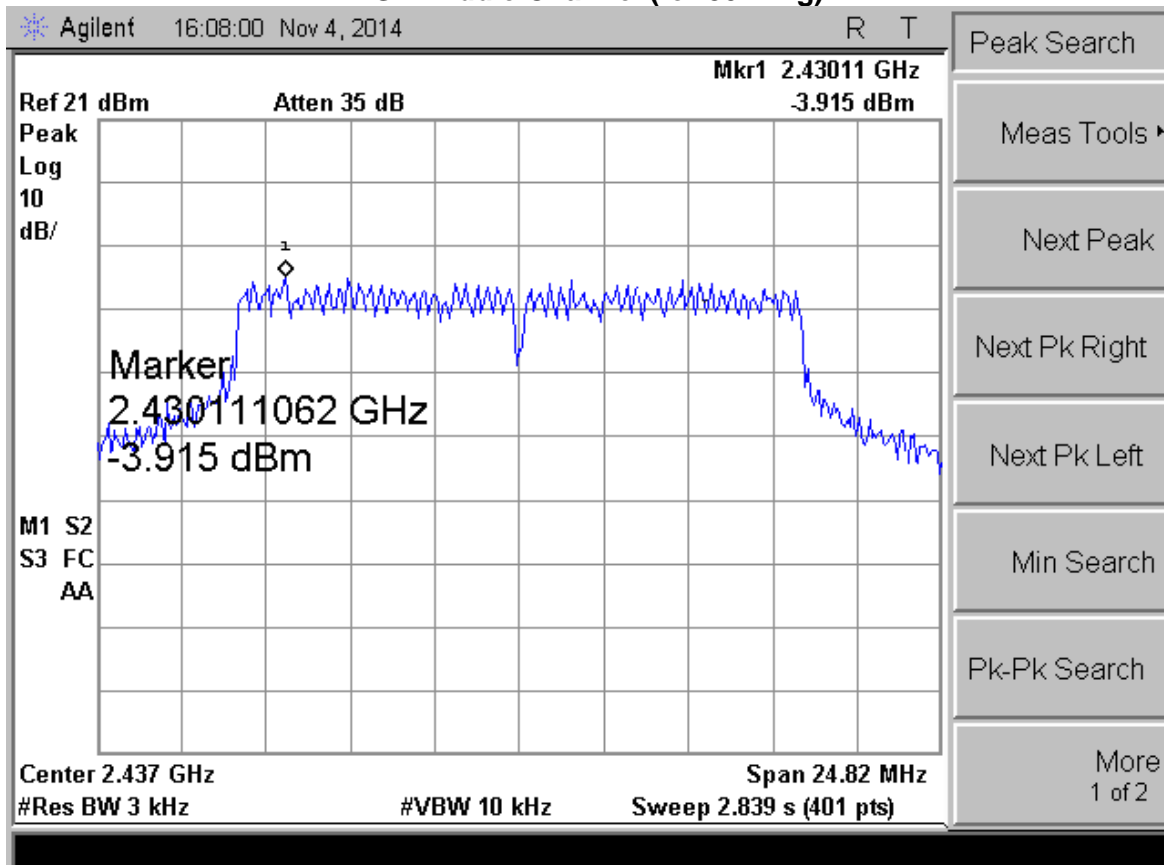
PSD-High Channel (for 802.11b)



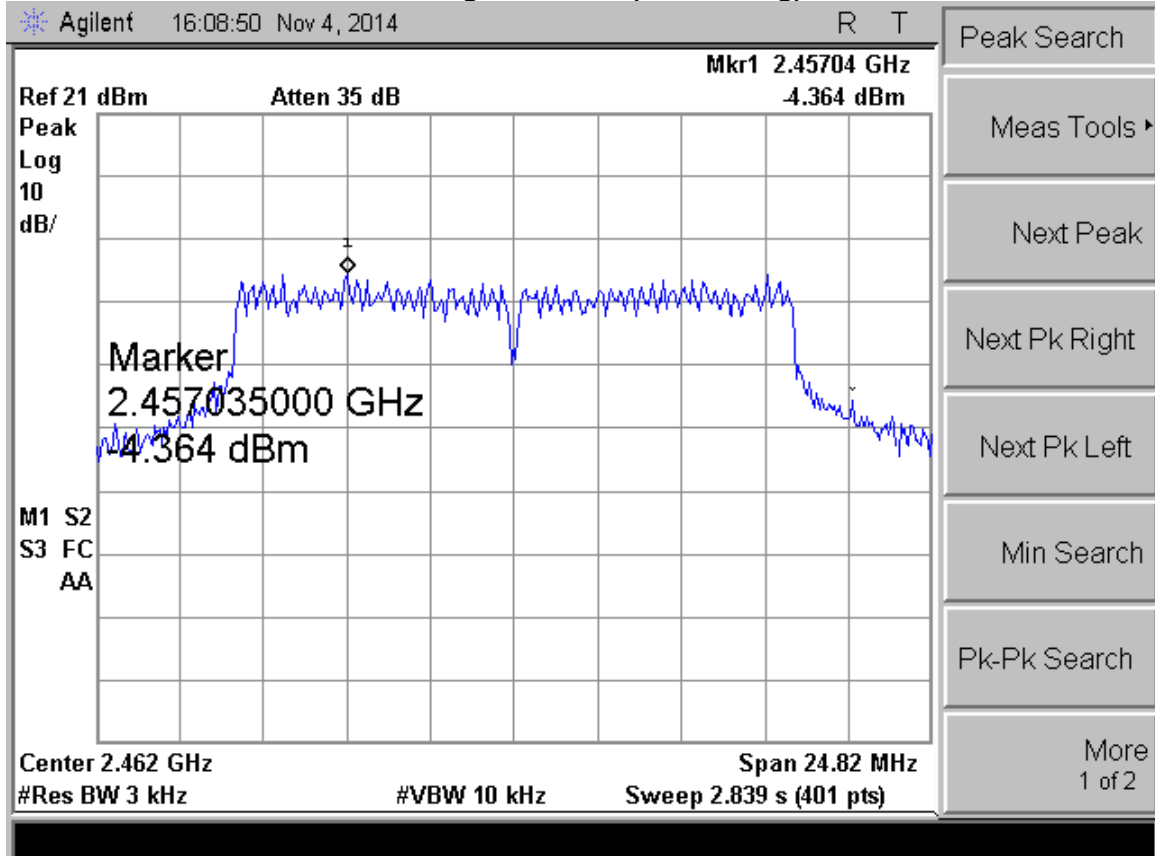
PSD-Low Channel (for 802.11g)



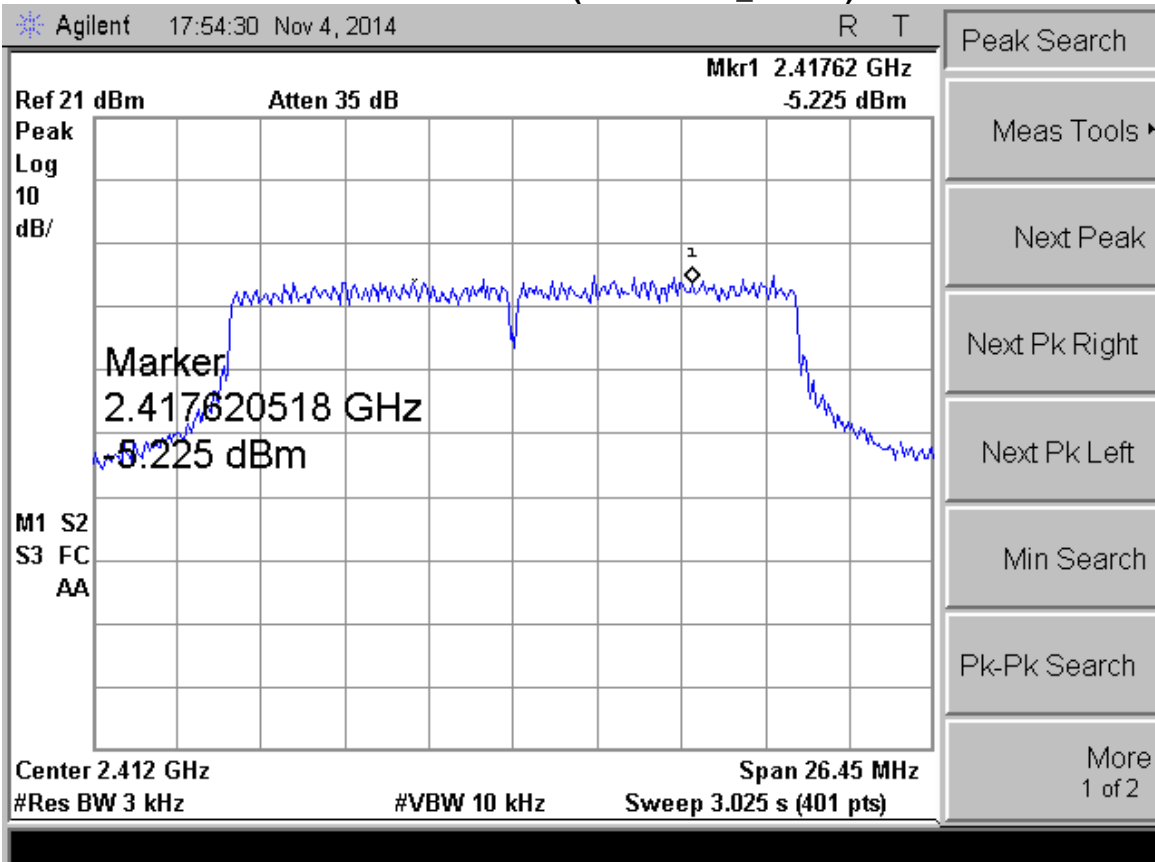
PSD-Middle Channel (for 802.11g)



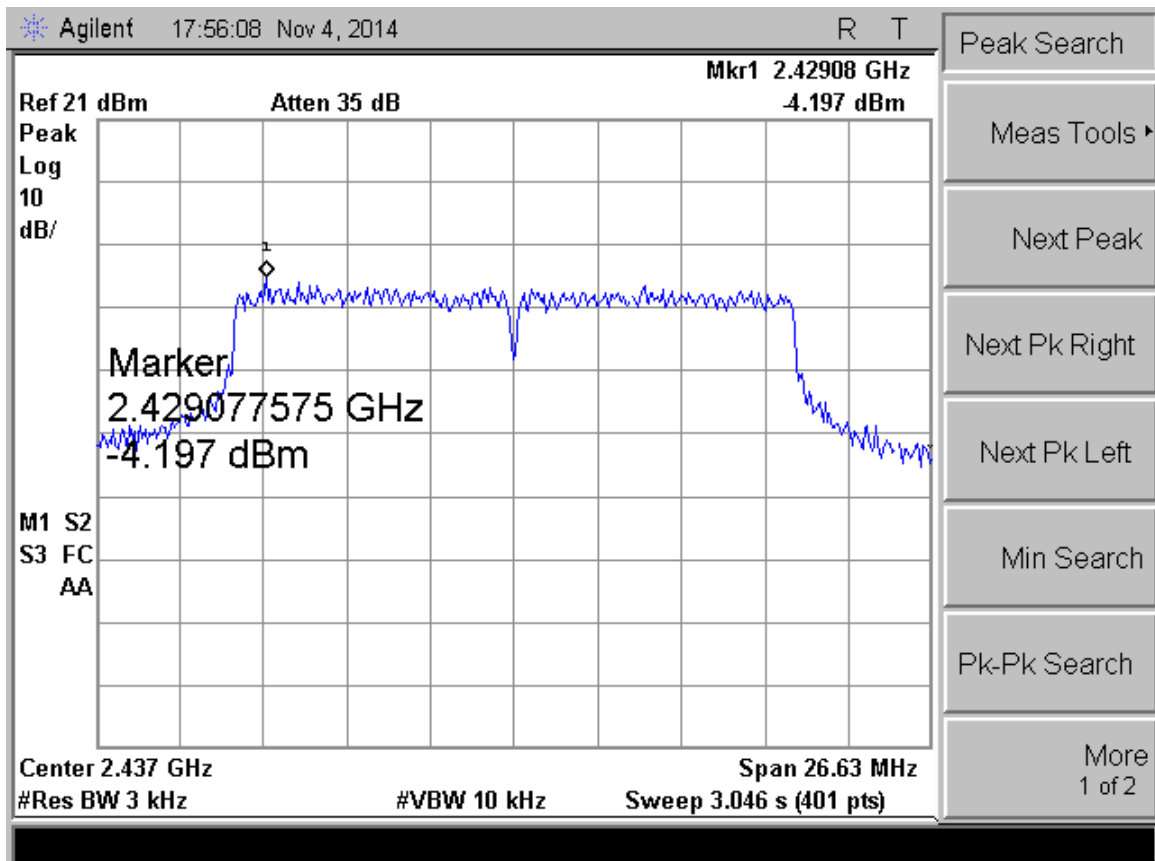
PSD-High Channel (for 802.11g)



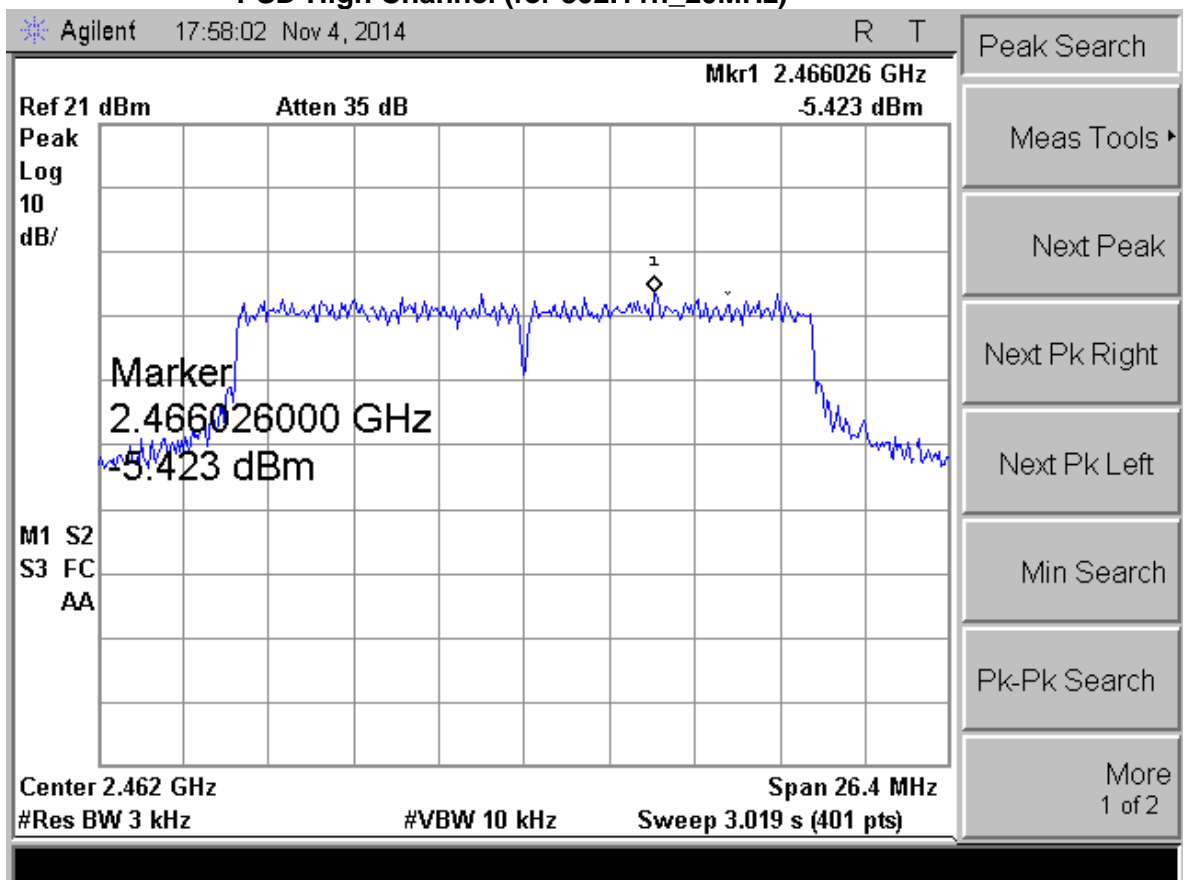
PSD-Low Channel (for 802.11n_20MHz)



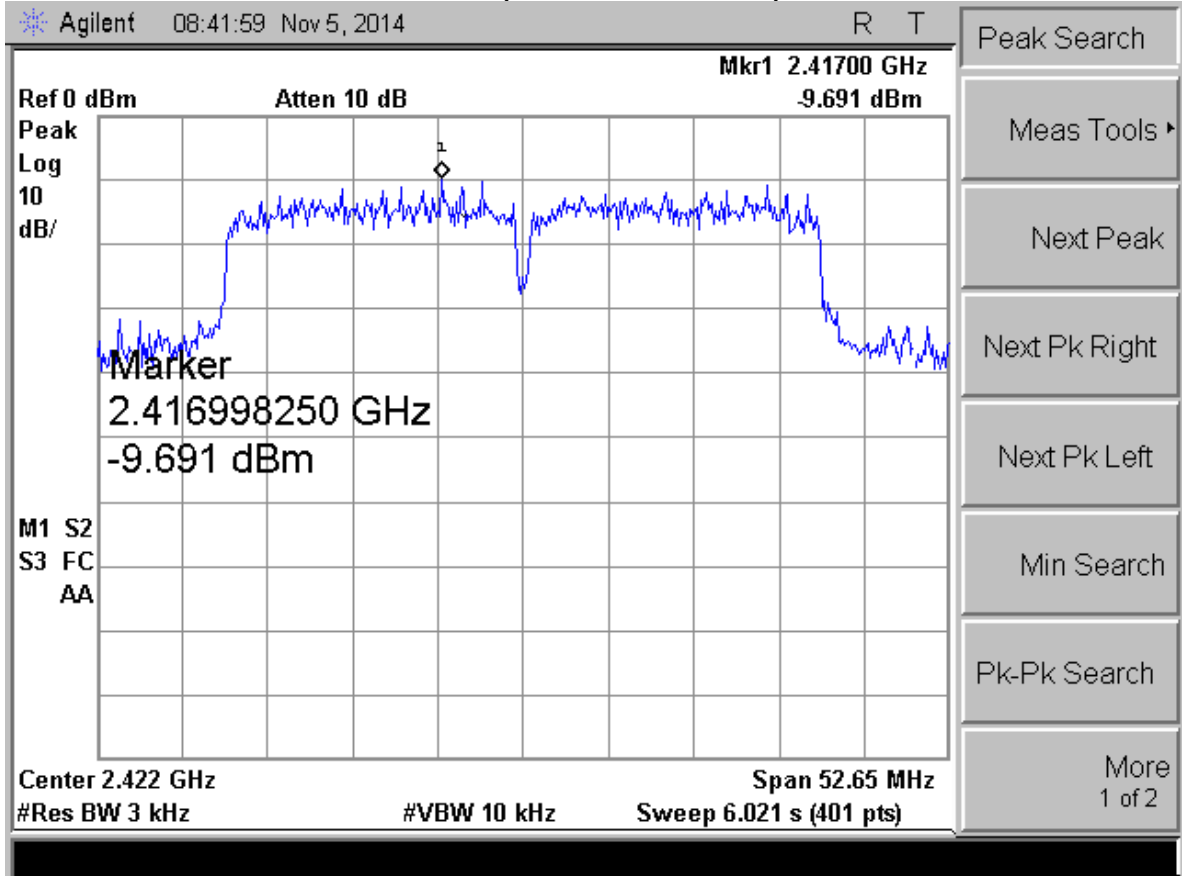
PSD-Middle Channel (for 802.11n_20MHz)



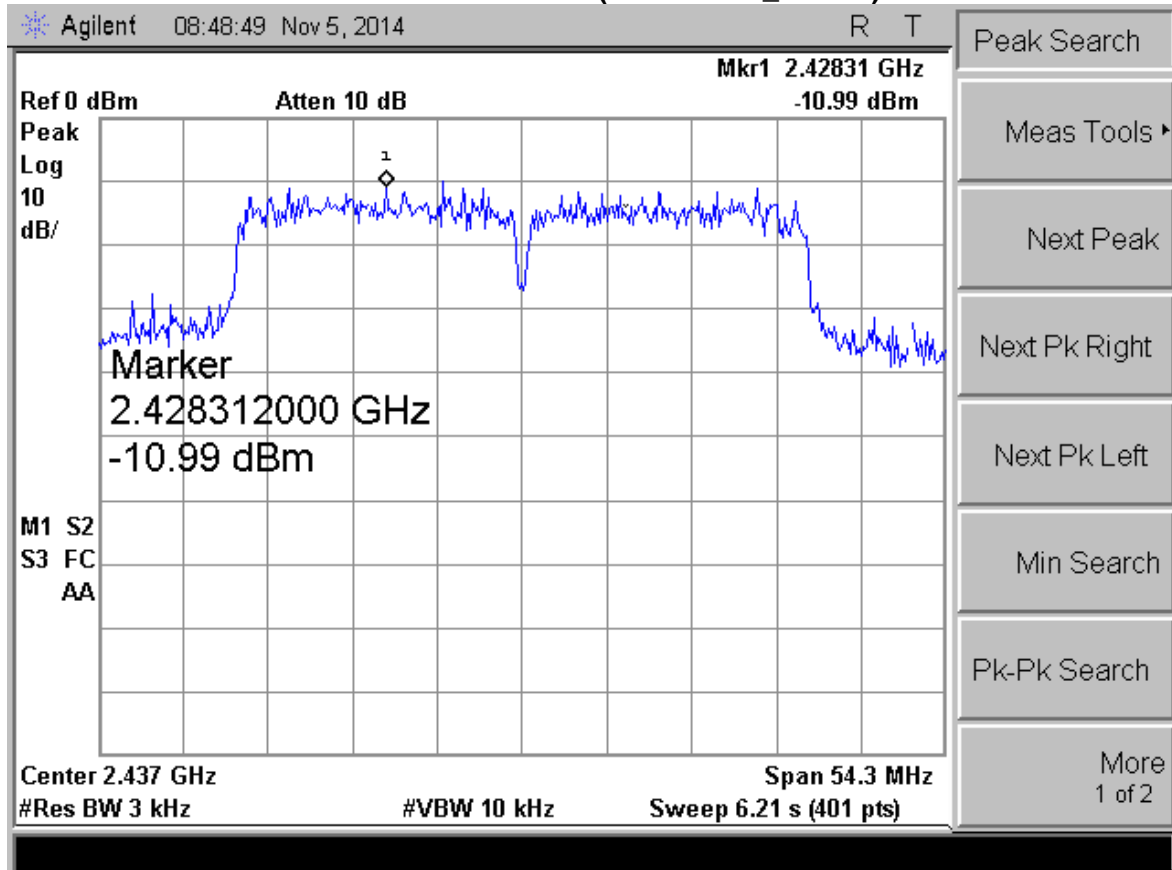
PSD-High Channel (for 802.11n_20MHz)

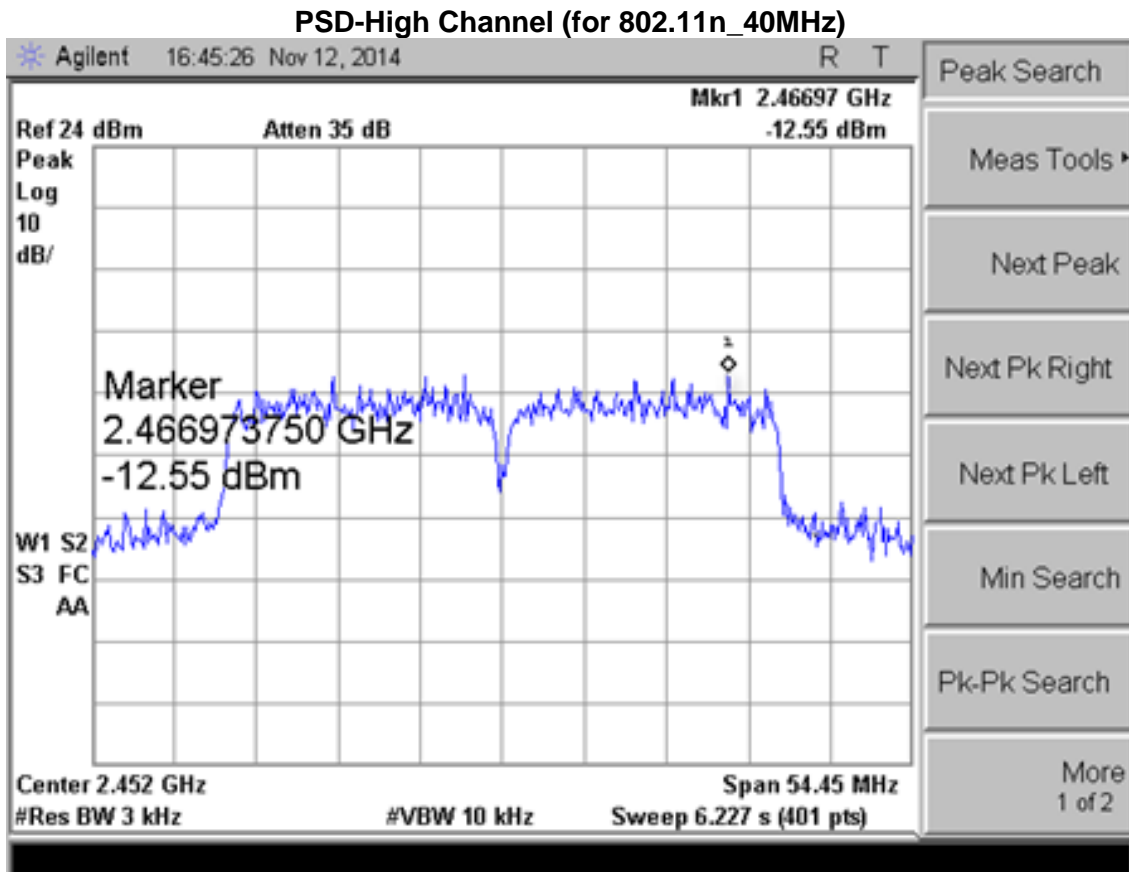


PSD-Low Channel (for 802.11n_40MHz)



PSD-Middle Channel (for 802.11n_40MHz)





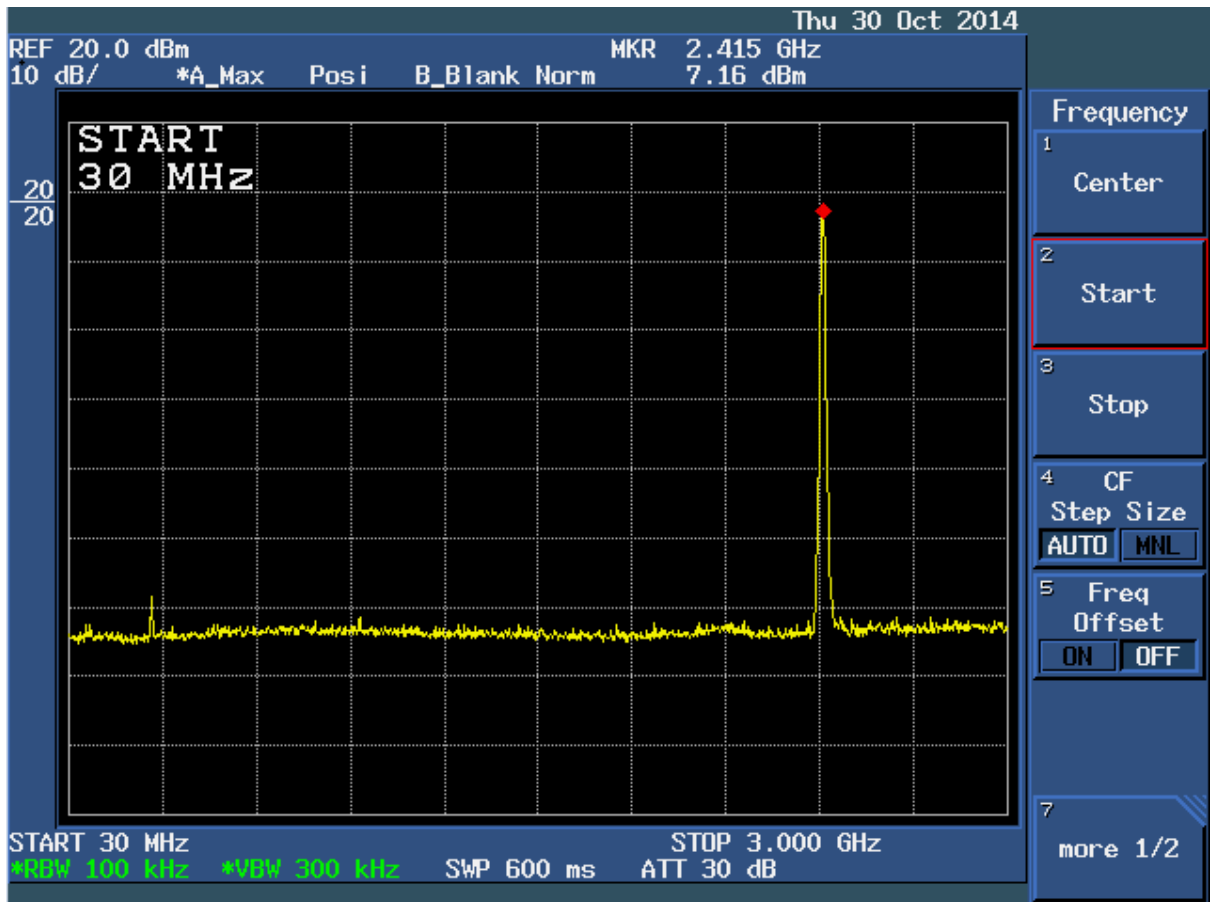
3.5 Conducted Spurious Emissions – FCC Section 15.209

3.5.1 Measurement Procedure

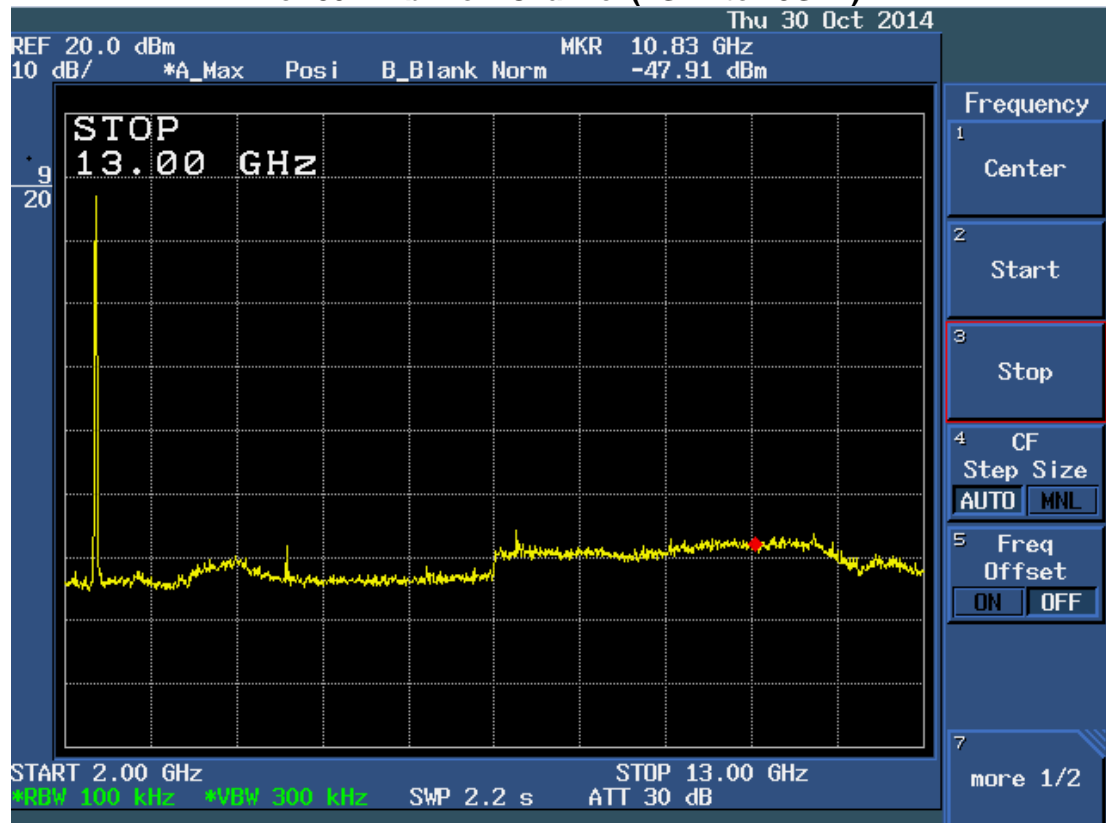
The RF conducted spurious emissions were measured in accordance with the FCC KDB Publication No.558074 v03r02 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (47 CFR 15.247)”. The RF output of the equipment under test was directly connected to the input of the spectrum analyzer. The EUT was investigated for conducted spurious emissions from 30MHz to 26GHz, 10 times the highest fundamental frequency. Measurements were made at the low, middle and high channels of the EUT. For each measurement, the RBW of the spectrum analyzer was set to 100 kHz and VBW 300 kHz. The reference level was determined by measuring the peak PSD level in any of the 100 kHz bandwidth within the DTS channel bandwidth.

4 Measurement Result

For 802.11b: Low Channel (30MHz to 3GHz)



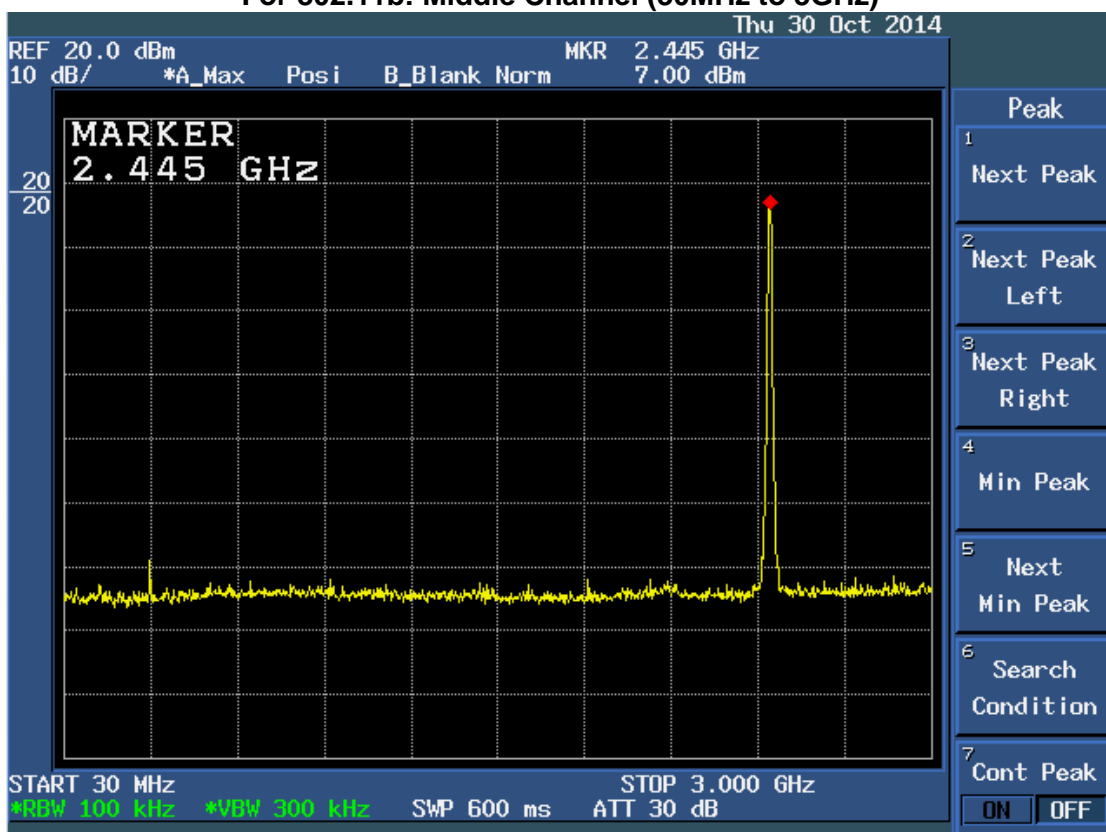
For 802.11b: Low Channel (2GHz to 13GHz)



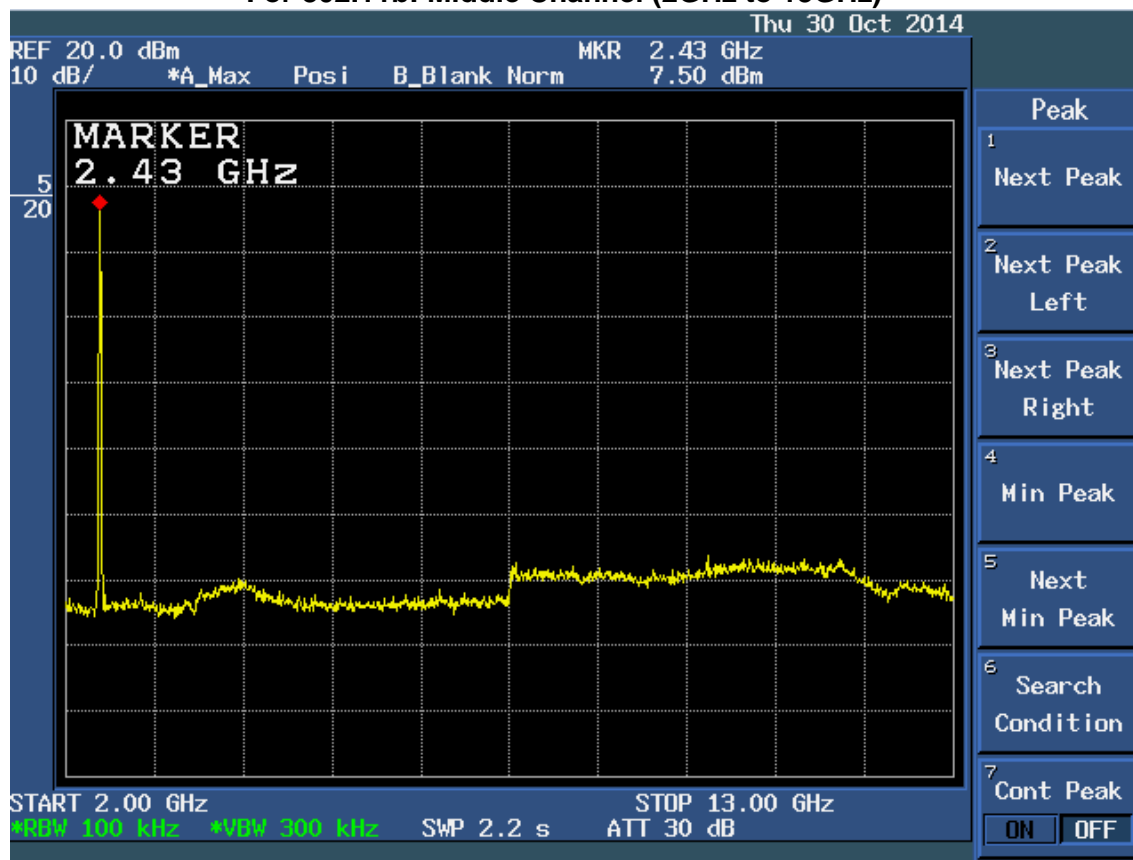
For 802.11b: Low Channel (13GHz to 26GHz)



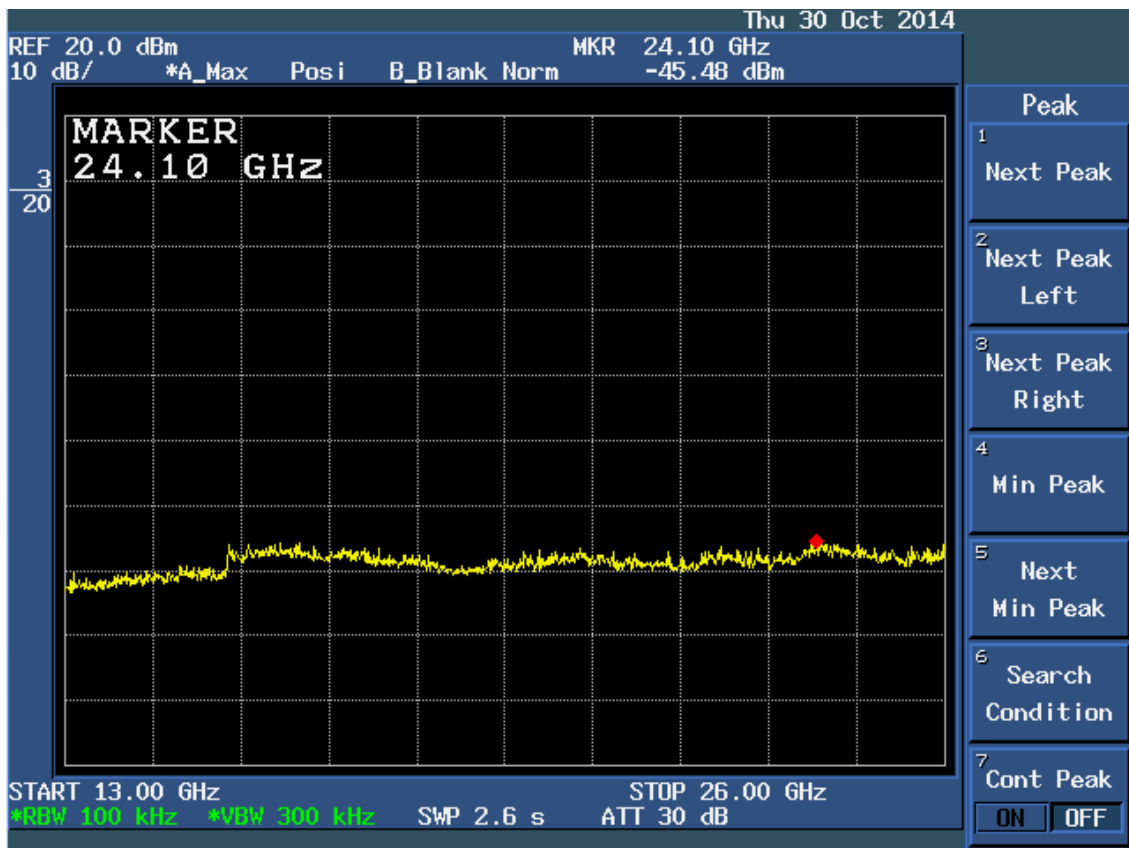
For 802.11b: Middle Channel (30MHz to 3GHz)



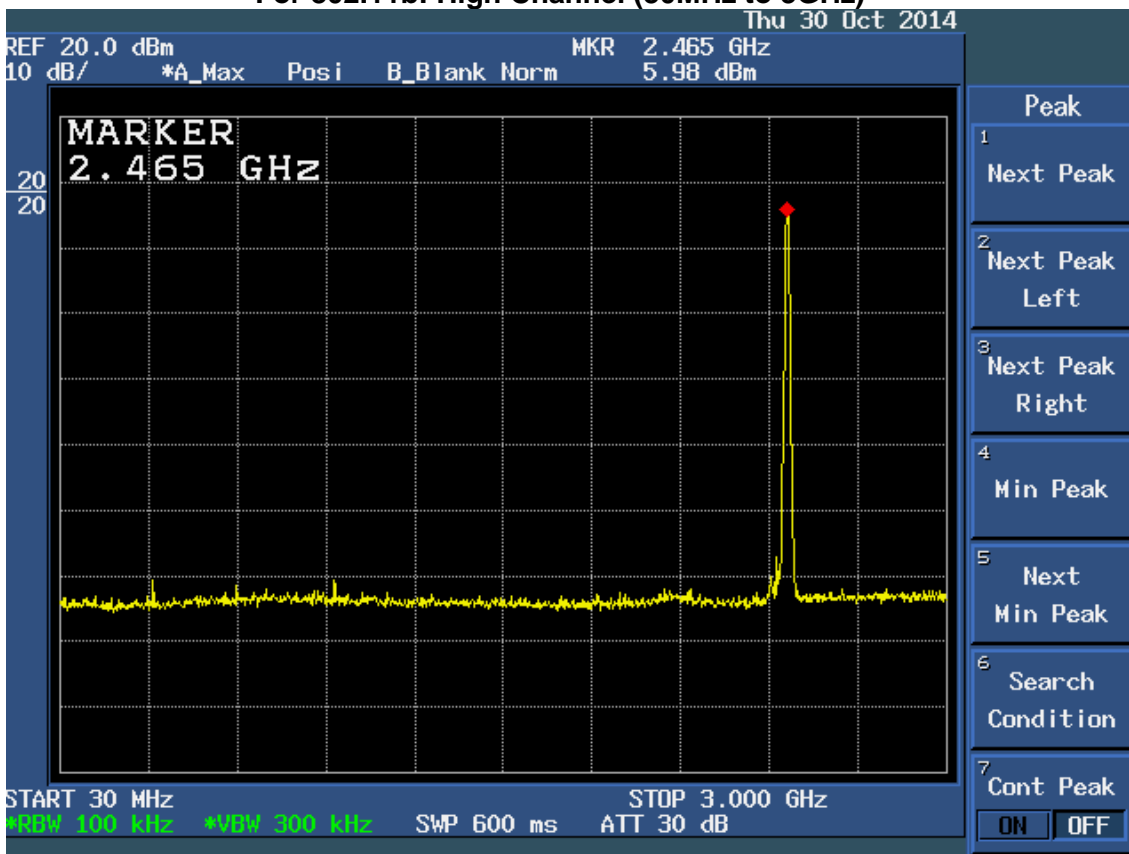
For 802.11b: Middle Channel (2GHz to 13GHz)



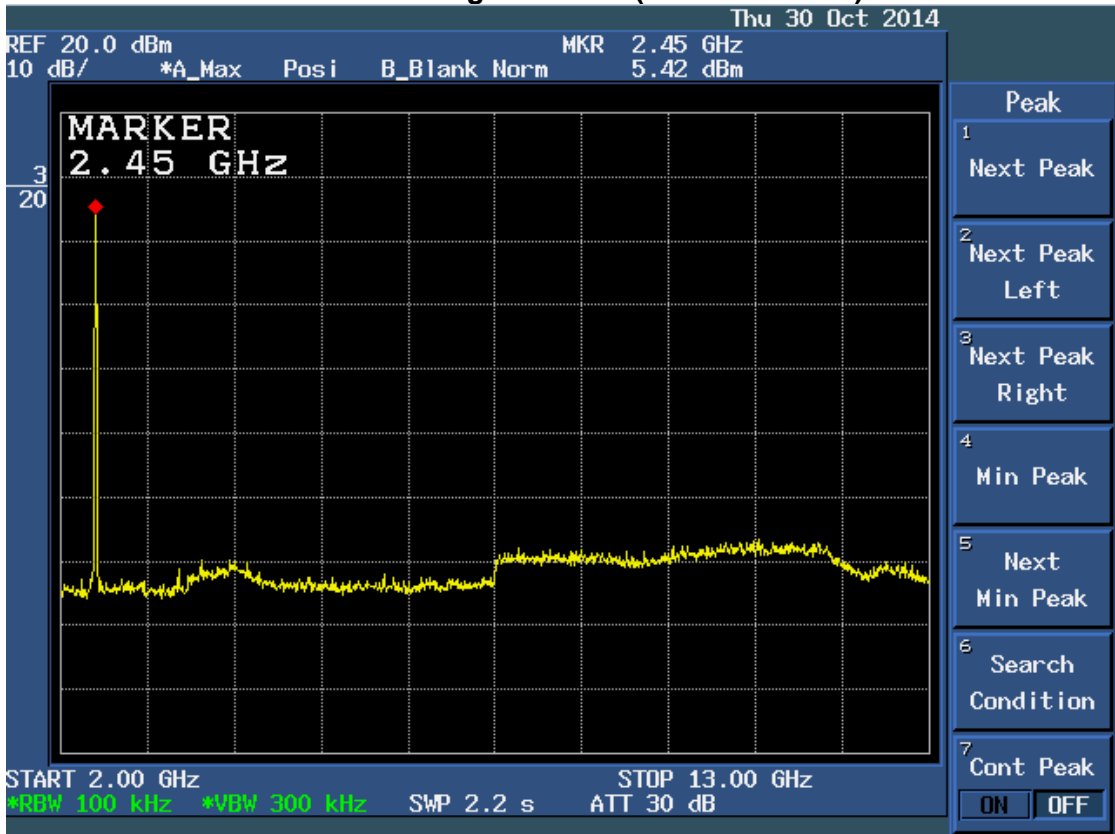
For 802.11b: Middle Channel (13GHz to 26GHz)



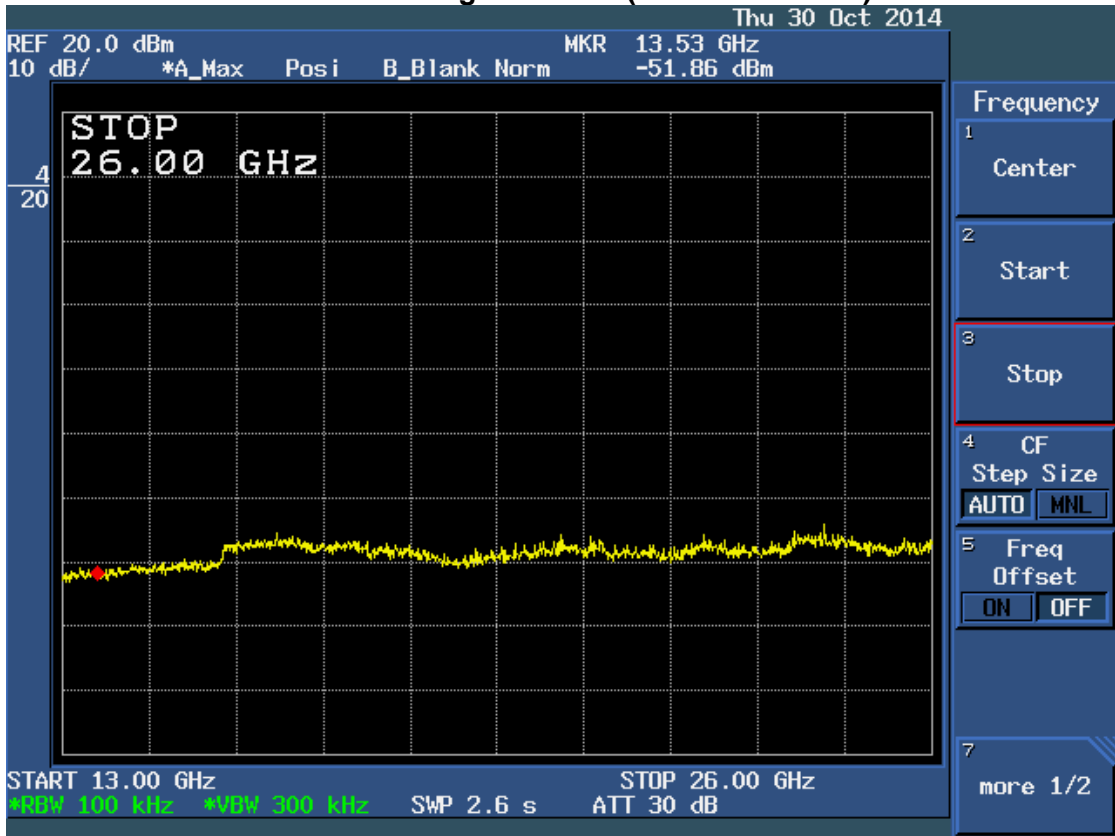
For 802.11b: High Channel (30MHz to 3GHz)



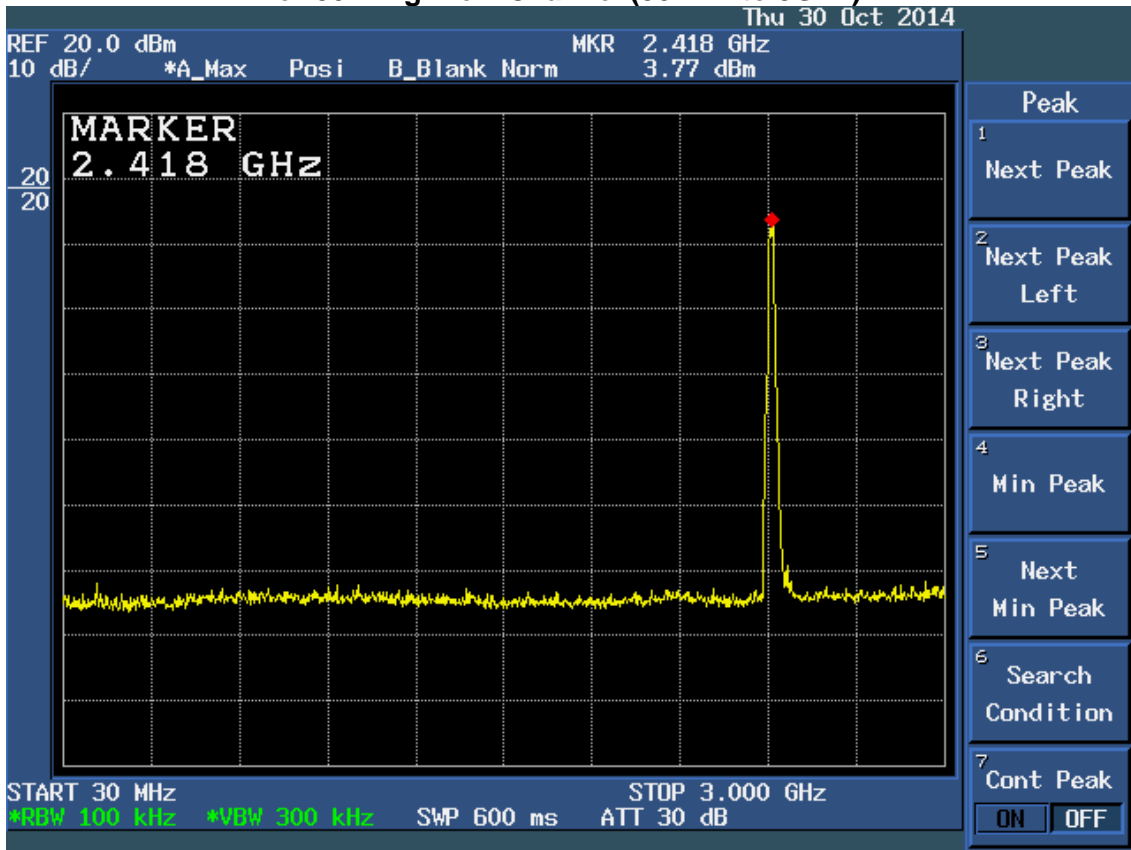
For 802.11b: High Channel (2GHz to 13GHz)



For 802.11b: High Channel (13GHz to 26GHz)



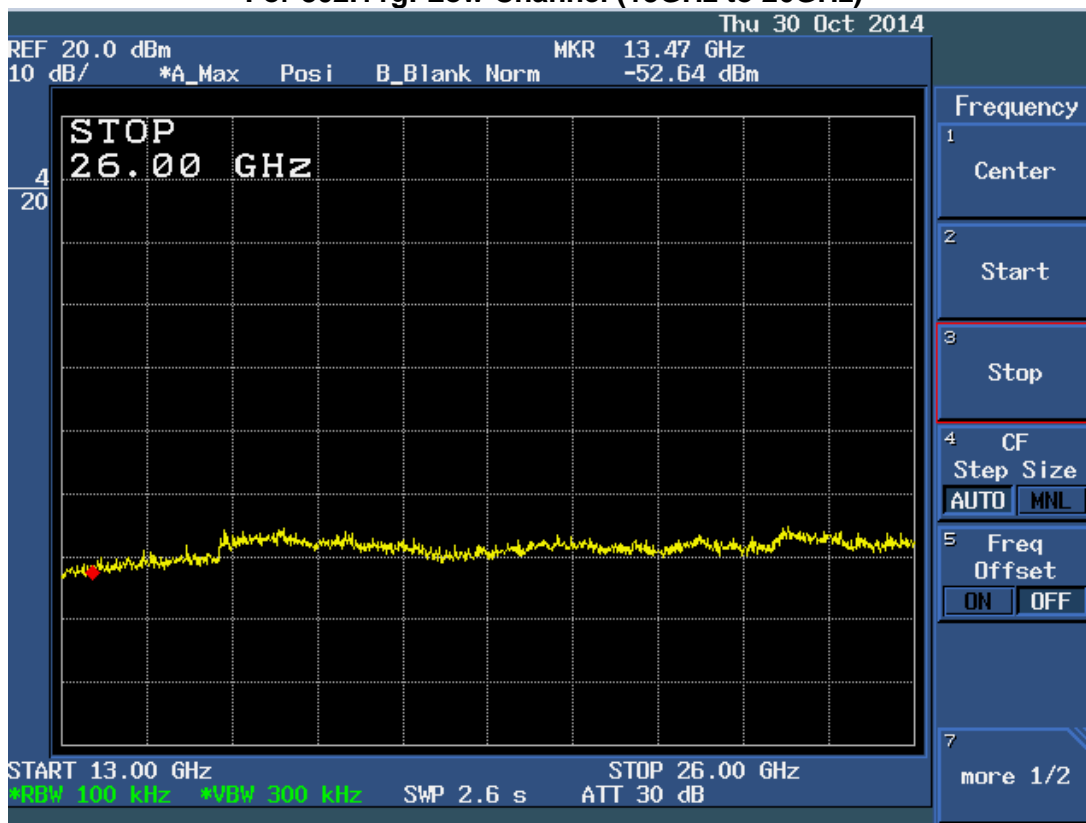
For 802.11g: Low Channel (30MHz to 3GHz)



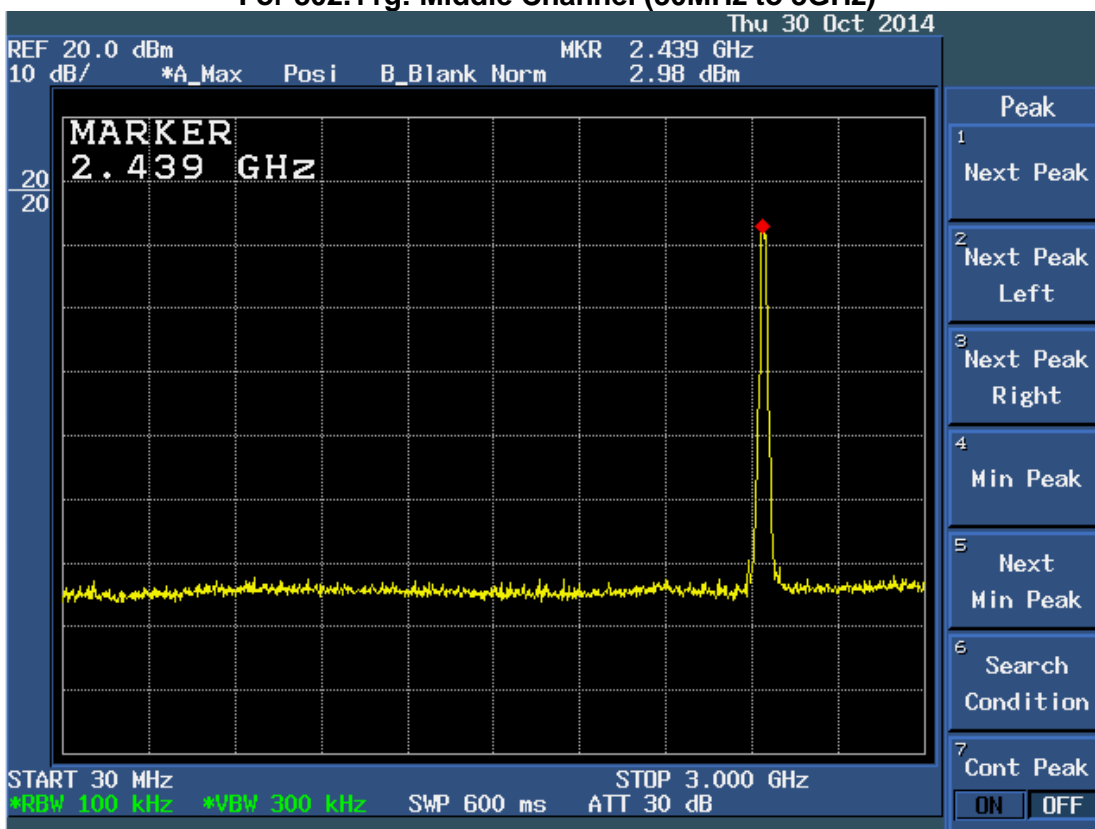
For 802.11g: Low Channel (2GHz to 13GHz)



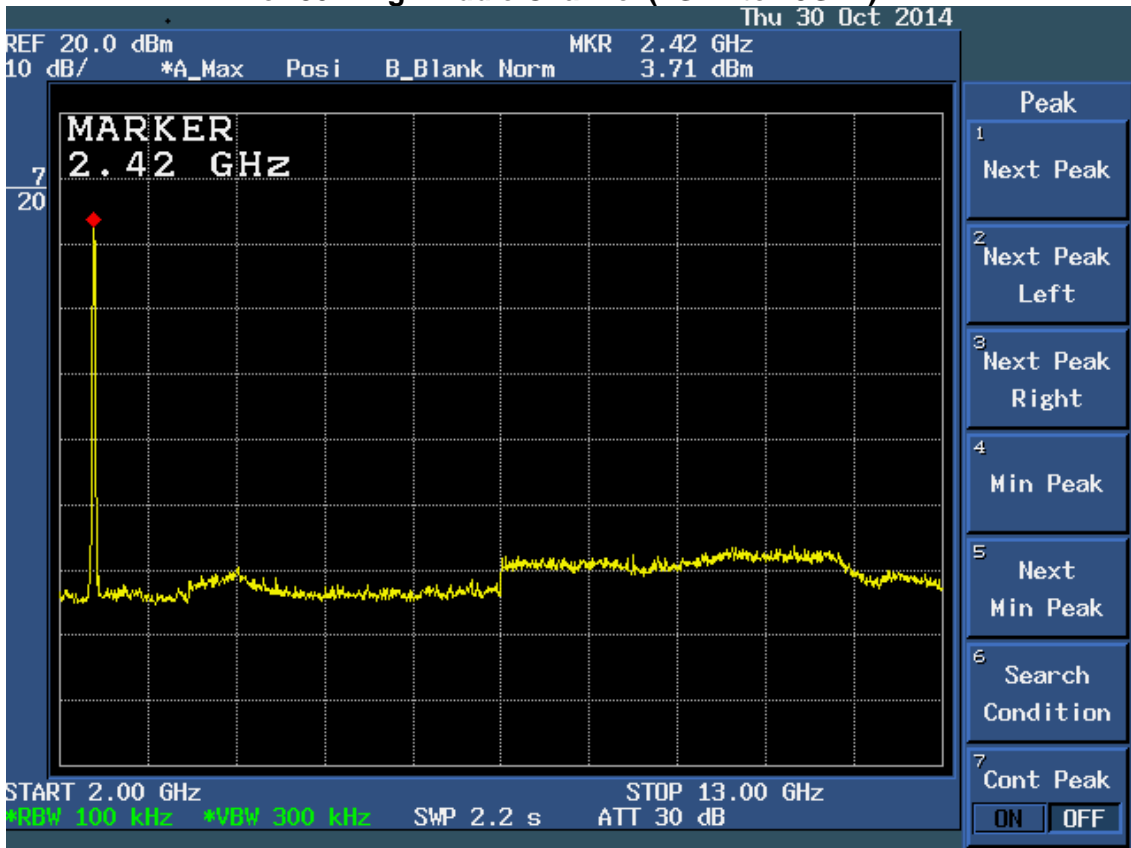
For 802.11g: Low Channel (13GHz to 26GHz)



For 802.11g: Middle Channel (30MHz to 3GHz)



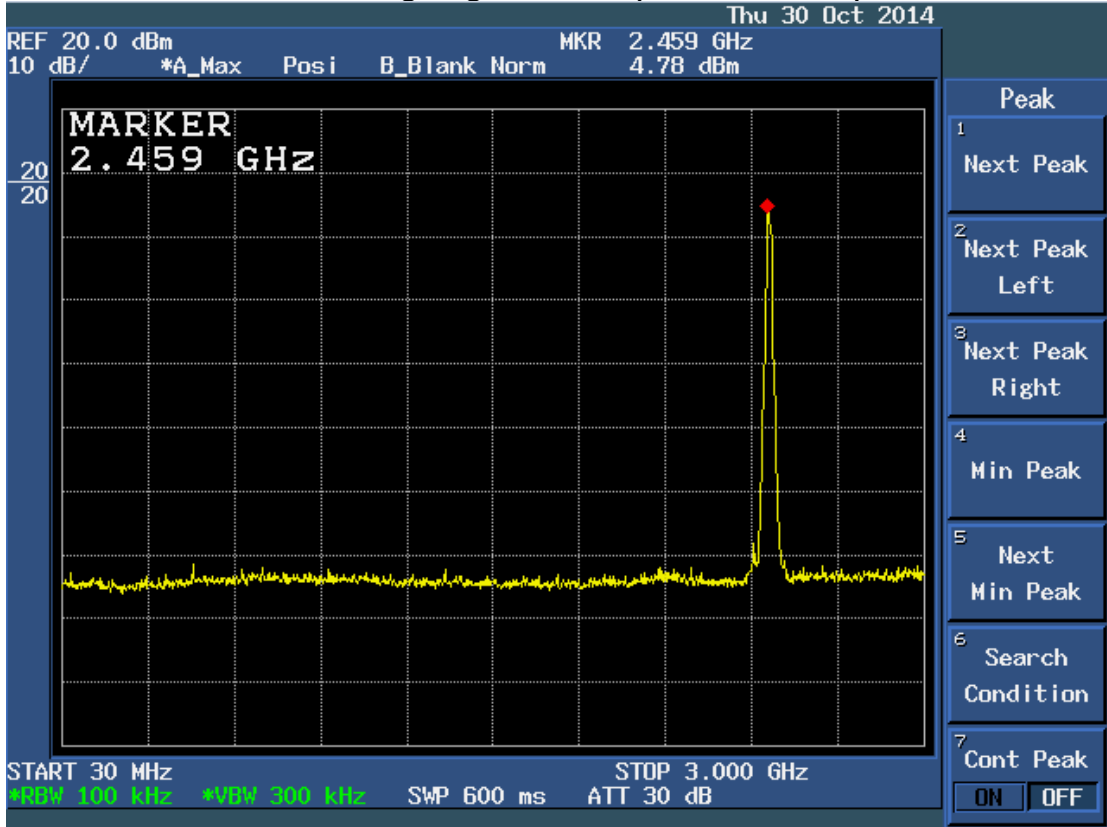
For 802.11g: Middle Channel (2GHz to 13GHz)



For 802.11g: Middle Channel (13GHz to 26GHz)



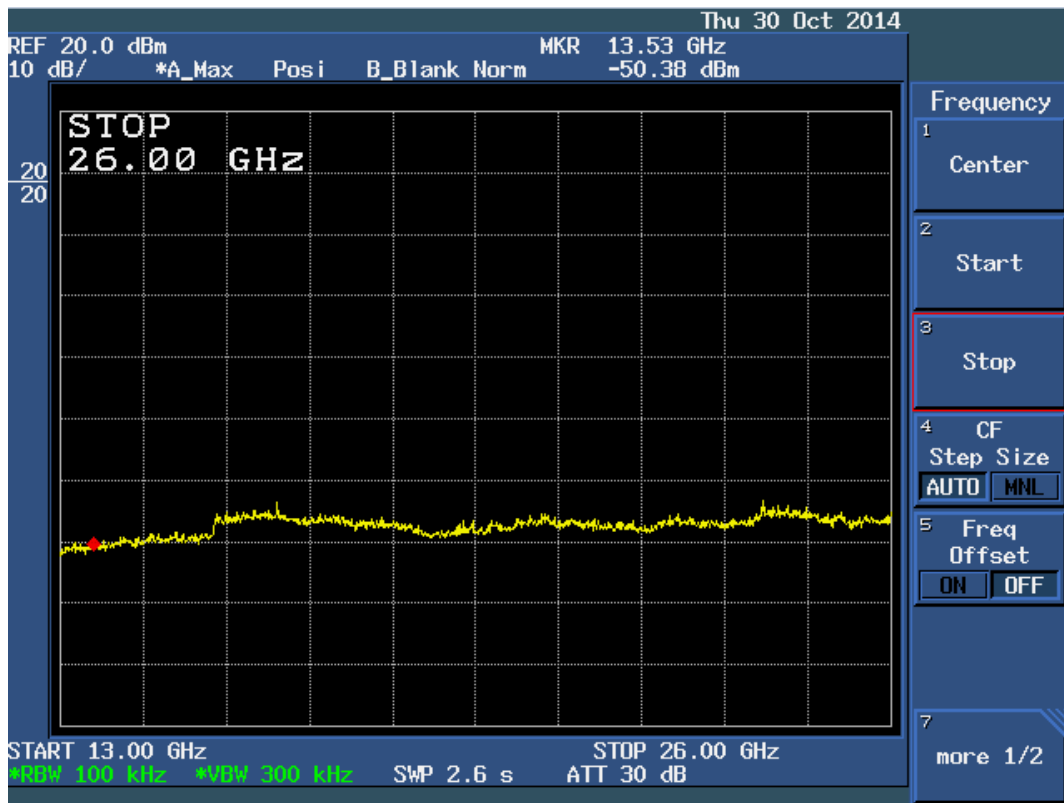
For 802.11g: High Channel (30MHz to 3GHz)



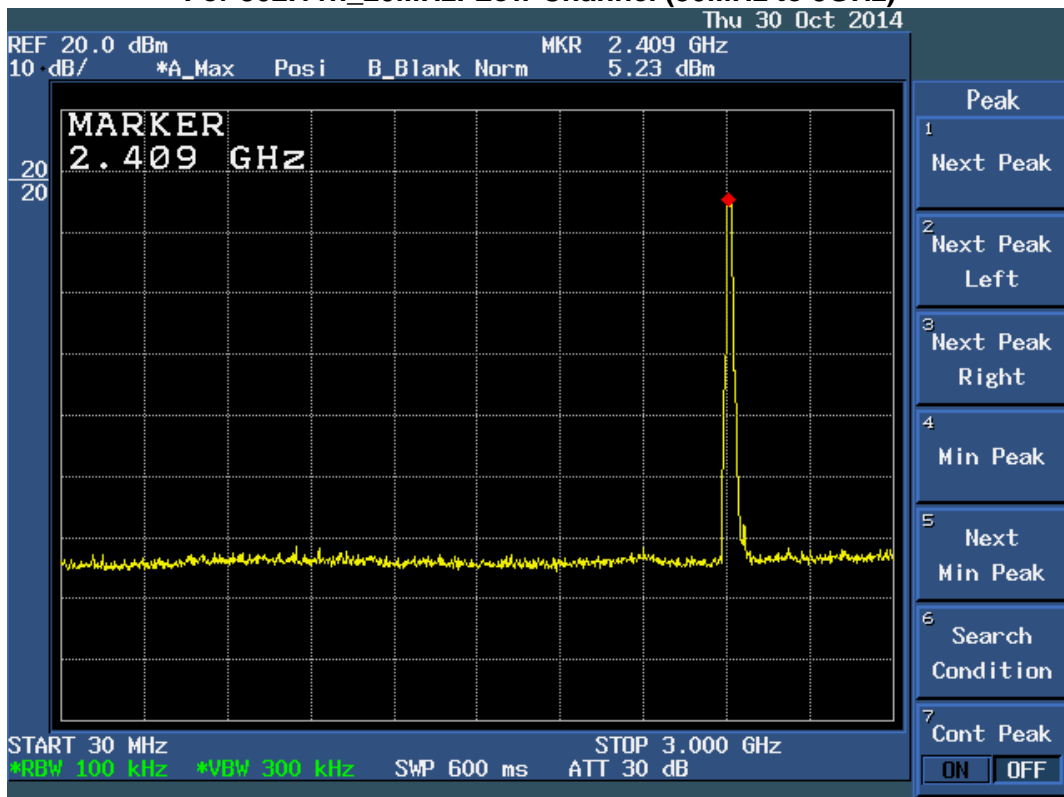
For 802.11g: High Channel (2GHz to 13GHz)



For 802.11g: High Channel (13GHz to 26GHz)



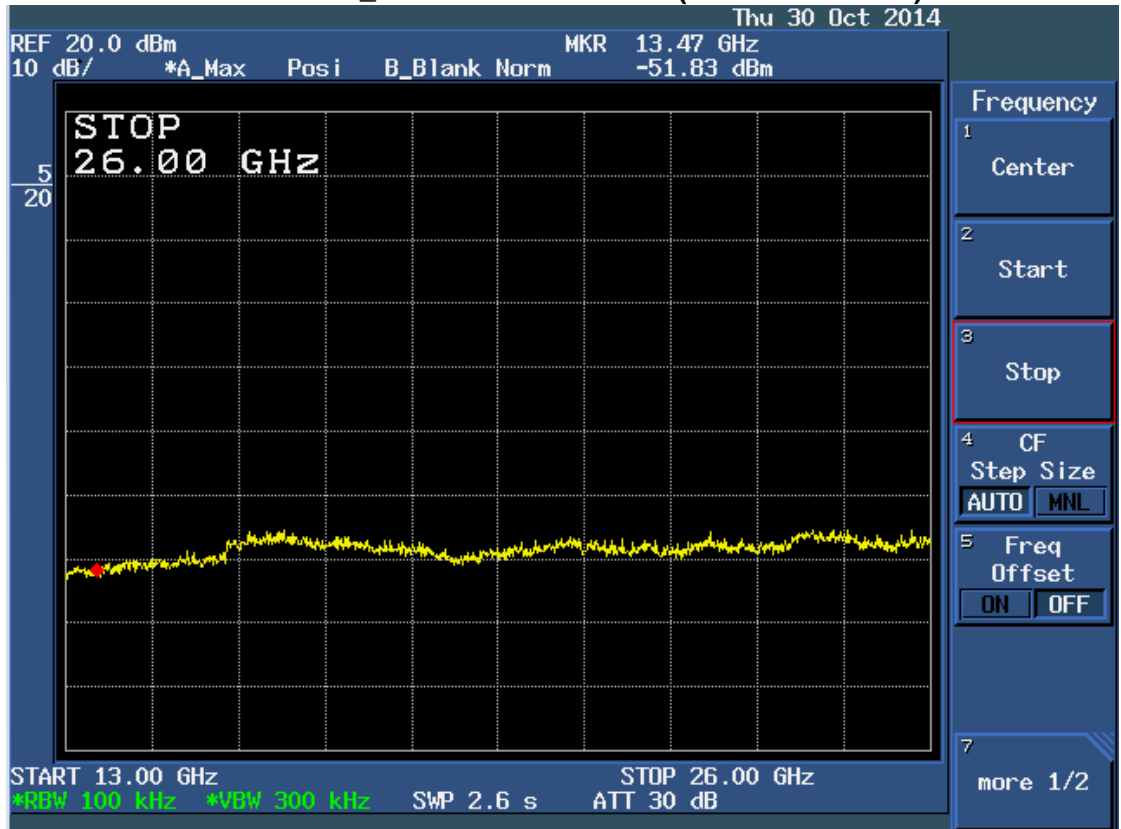
For 802.11n_20MHz: Low Channel (30MHz to 3GHz)



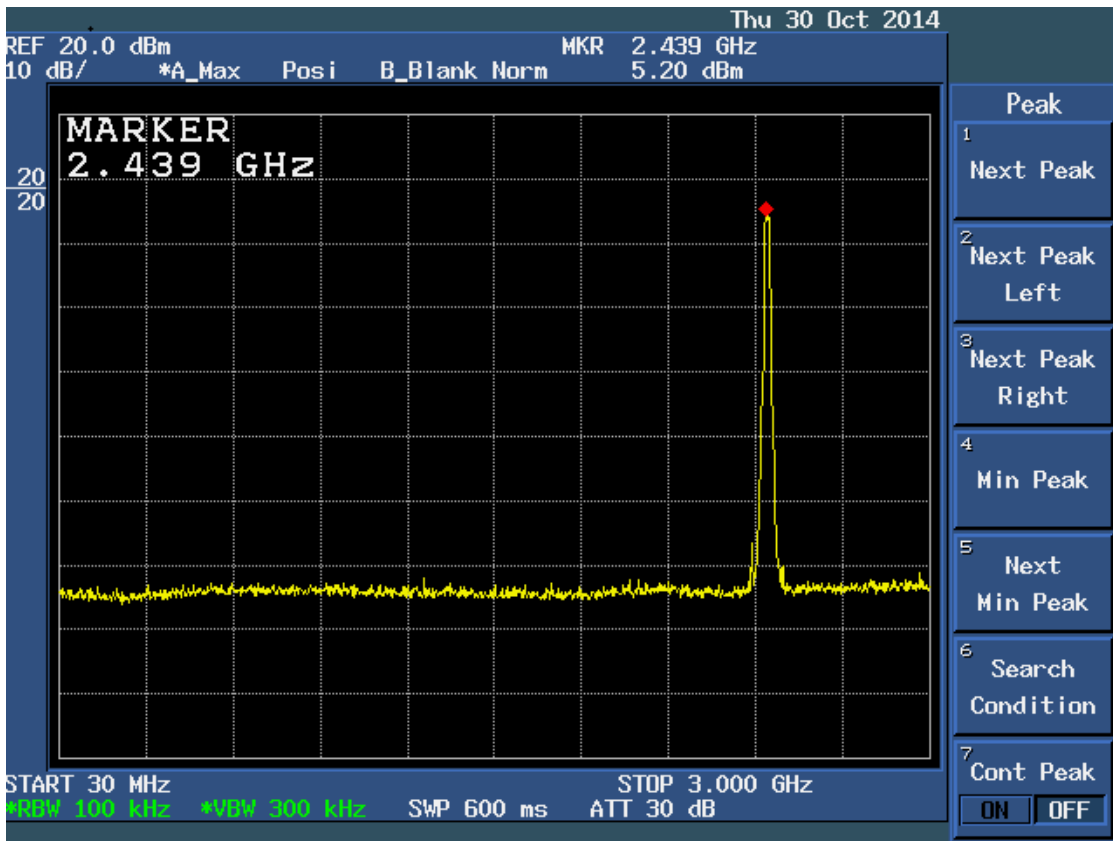
For 802.11n_20MHz: Low Channel (2GHz to 13GHz)



For 802.11n_20MHz: Low Channel (13GHz to 26GHz)



For 802.11n_20MHz: Middle Channel (30MHz to 3GHz)



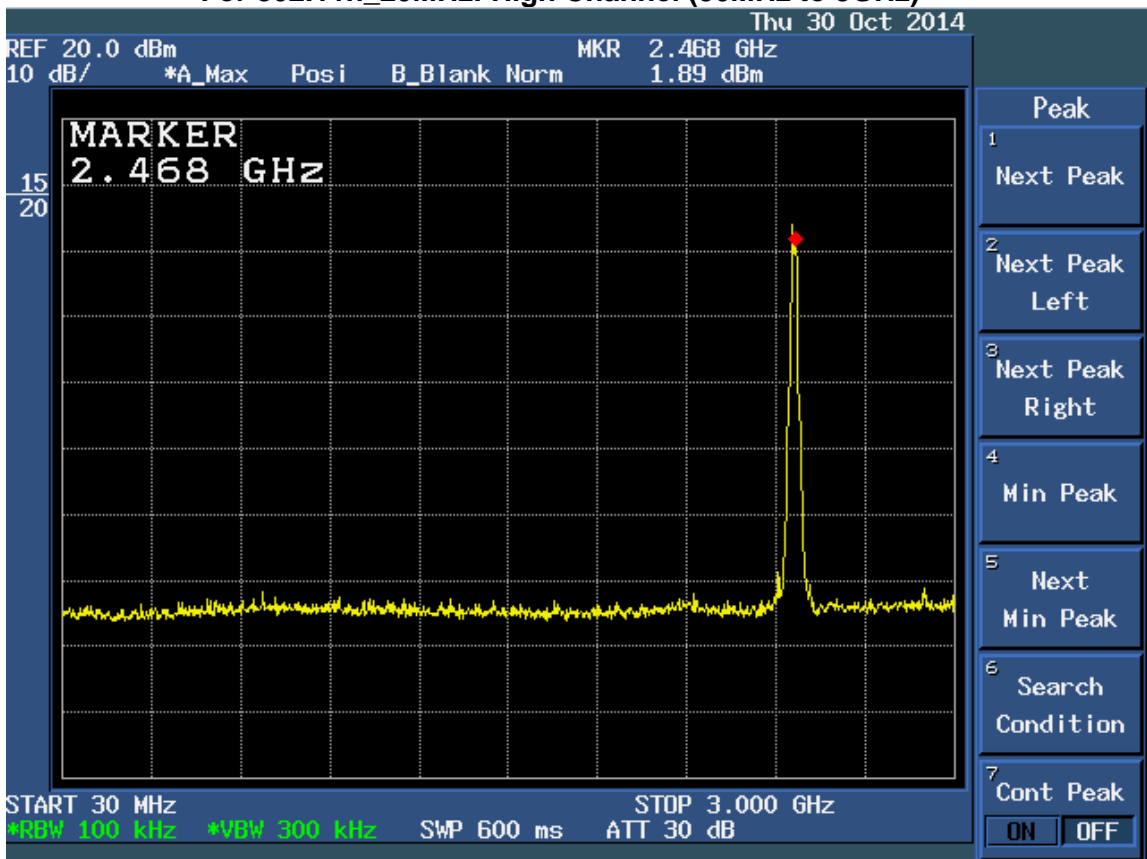
For 802.11n_20MHz: Middle Channel (2GHz to 13GHz)



For 802.11n_20MHz: Middle Channel (13GHz to 26GHz)



For 802.11n_20MHz: High Channel (30MHz to 3GHz)



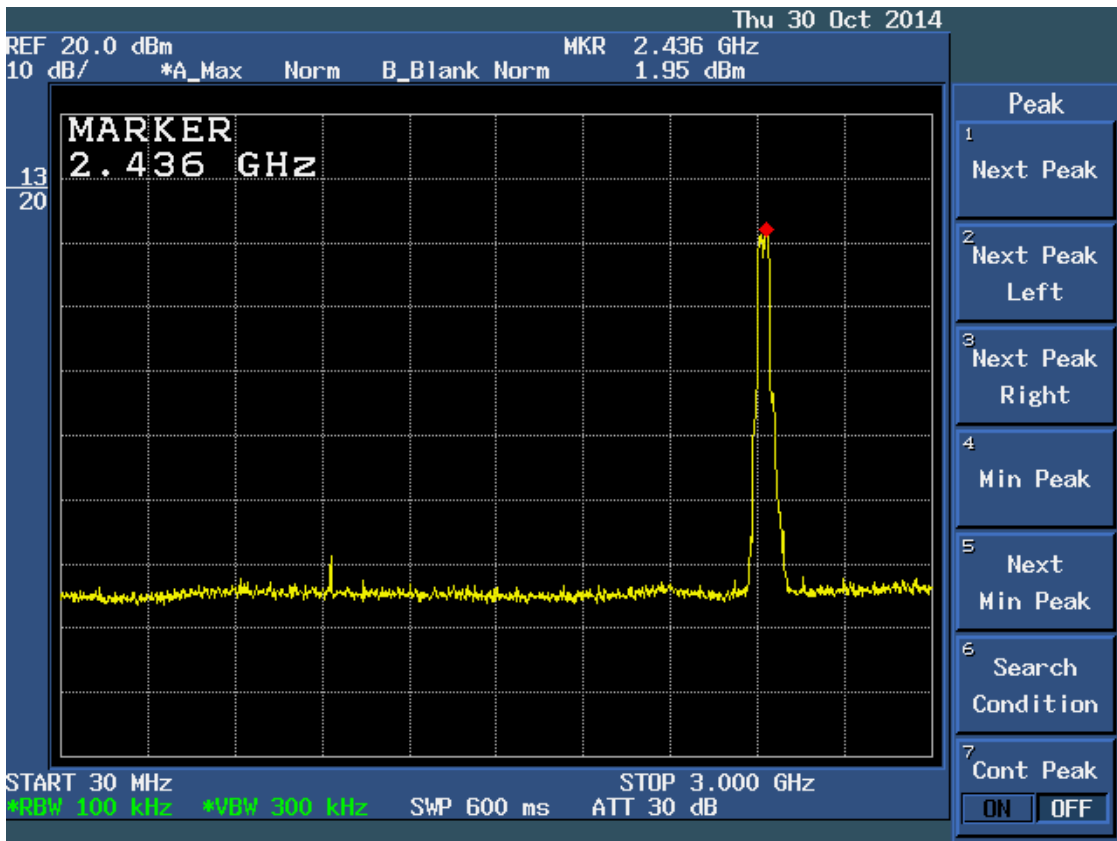
For 802.11n_20MHz: High Channel (2GHz to 13GHz)



For 802.11n_20MHz: High Channel (13GHz to 26GHz)



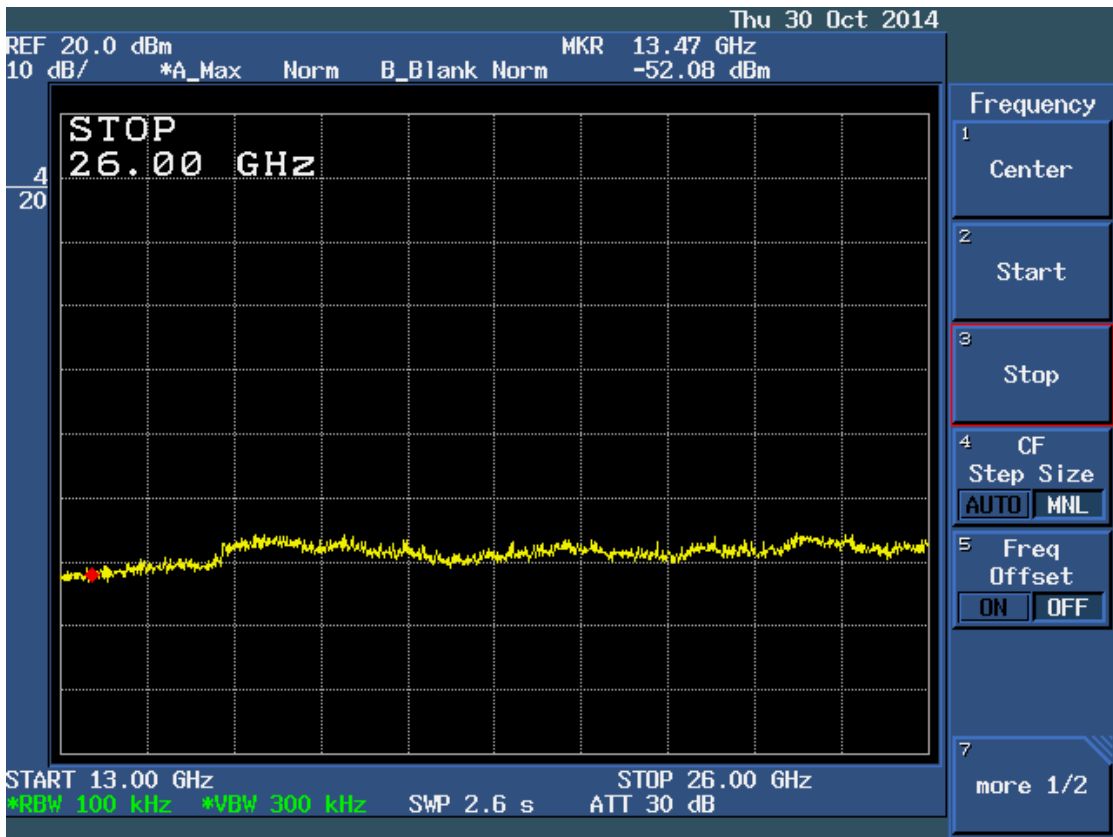
For 802.11n_40MHz: Low Channel (30MHz to 3GHz)



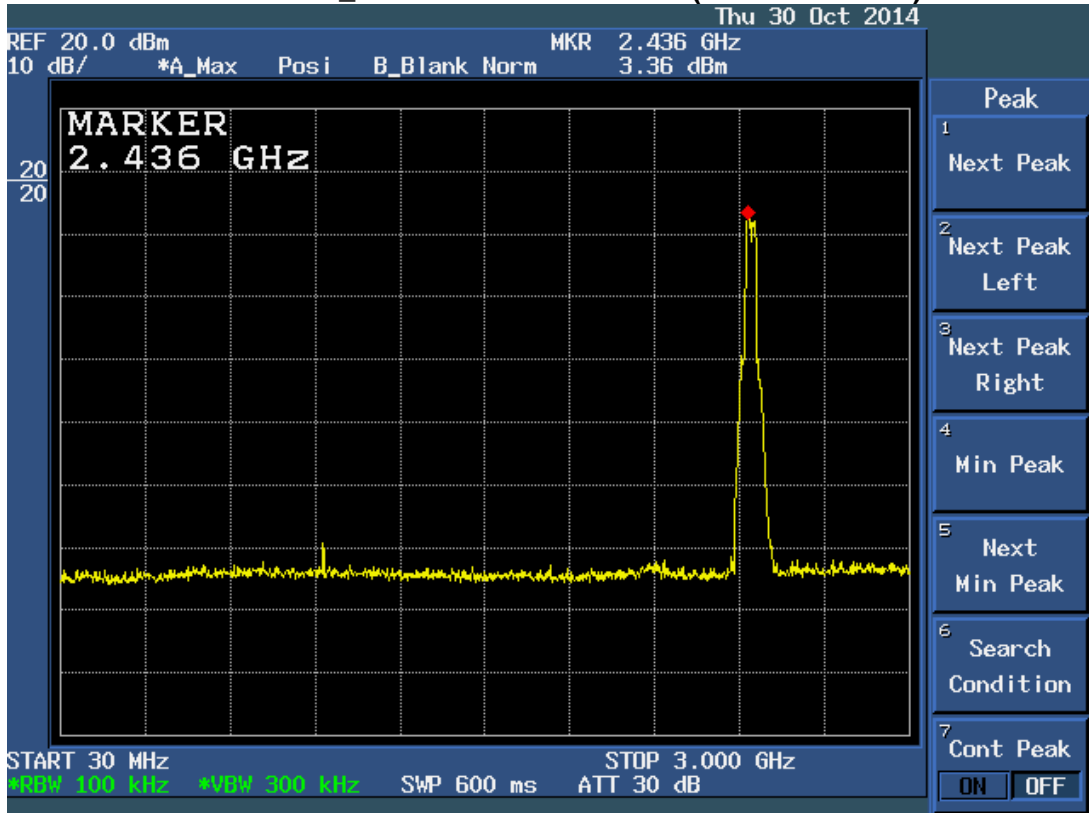
For 802.11n_40MHz: Low Channel (2GHz to 13GHz)



For 802.11n_40MHz: Low Channel (13GHz to 26GHz)



For 802.11n_40MHz: Middle Channel (30MHz to 3GHz)



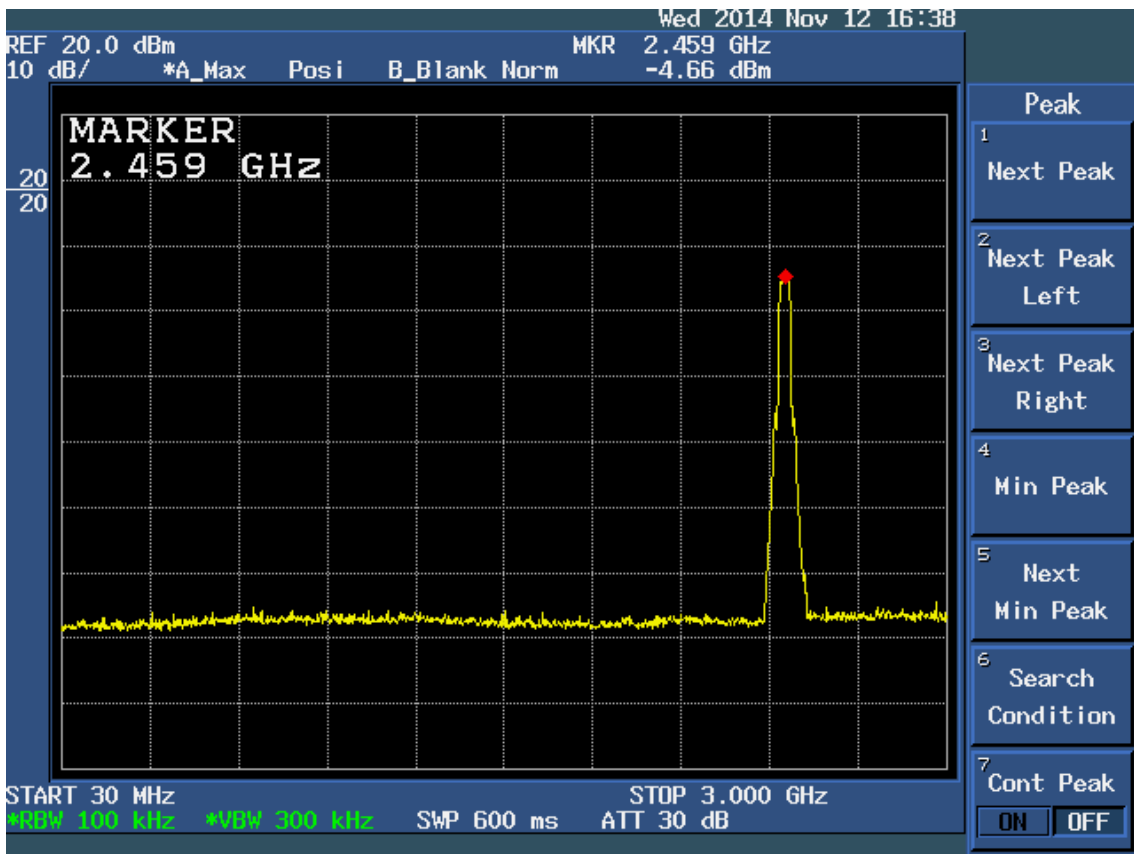
For 802.11n_40MHz: Middle Channel (2GHz to 13GHz)



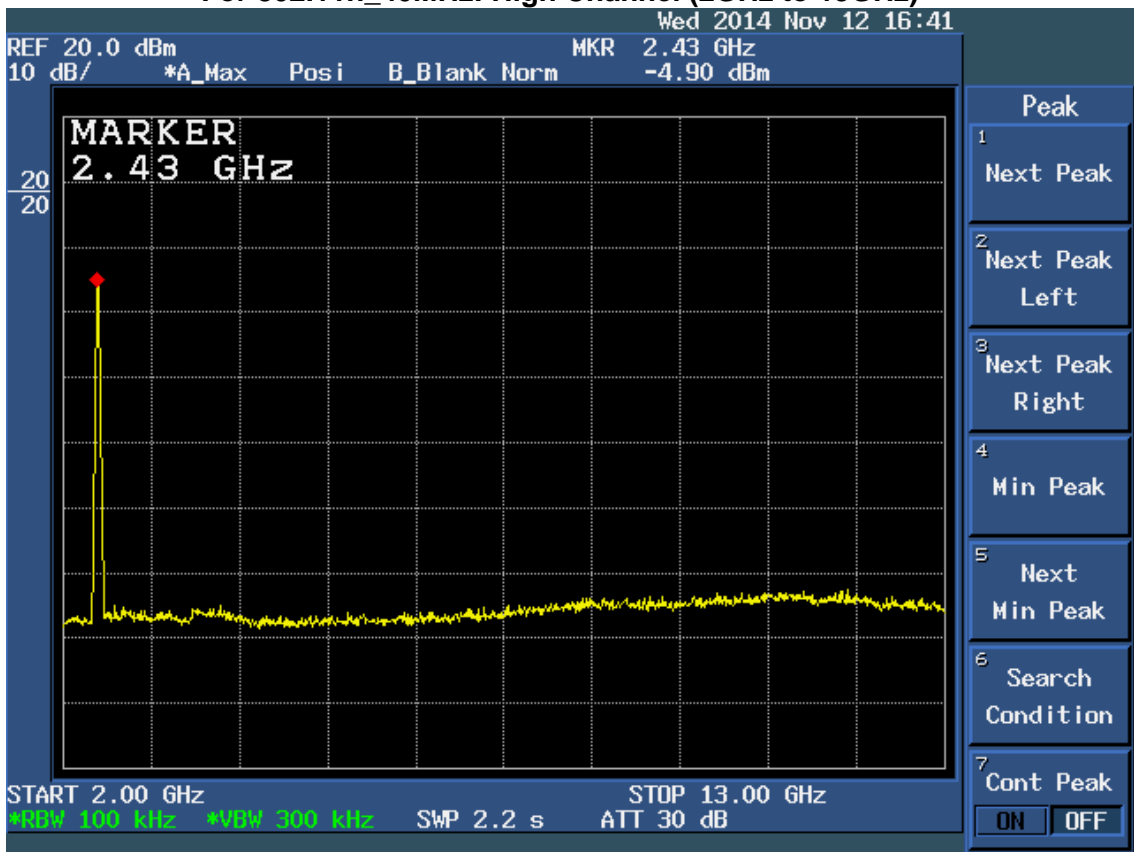
For 802.11n_40MHz: Middle Channel (13GHz to 26GHz)



For 802.11n_40MHz: High Channel (30MHz to 3GHz)



For 802.11n_40MHz: High Channel (2GHz to 13GHz)



For 802.11n_40MHz: High Channel (13GHz to 26GHz)

