BAND EDGE

XMit 2015.01.14

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval (mo)
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFE	6/22/2015	12
Attenuator	Fairview Microwave	SA4014-20	TKV	3/4/2016	12
Block - DC	Fairview Microwave	SD3379	AMJ	6/6/2015	12
Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	NC5	6/6/2015	12
Generator - Signal	Agilent	N5183A	TID	11/26/2014	36

TEST DESCRIPTION

The -26 dB emission bandwidth of the carrier was measured to ensure that no part of the emission of the carrier operating in a non-DFS band was operating in a band where DFS testing is required. This test is done with the U-NII-1 band (5.2 GHz band) to ensure no portion of the carrier is contained within the U-NII-2A band and with the U-NII-3 band (5.8 GHz band) to ensure no portion of the carrier is contained in the U-NII-2C band.

The transmit frequencies and data rates listed in the datasheet were measured. The transmit power was set to its default maximum.

A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input.

BAND EDGE

NORTHWEST EMC

XMit 2015.01.14

EUT:	Model 1631			**Work Order:**	MCSO1748
Serial Number:	041152140753			**Date:**	04/12/16
Customer:	Microsoft Corporation			**Temperature:**	23°C
Attendees:	None			**Humidity:**	33%
Project:	None			**Barometric Pres.:**	1019 mbar
Tested by:	Richard Mellroth	**Power:**	110VAC/60Hz	**Job Site:**	NC02

TEST SPECIFICATIONS	Test Method
FCC 15.407:2016	ANSI C63.10:2013

COMMENTS

Power setting at 11dBm for 20MHz and 40MHz channels. Power Setting at 10dBm for 80MHz channels. Client supplied adapter cable loss of 1.3dB included in reference level offset. Signal setting at > 95% Duty Cycle.

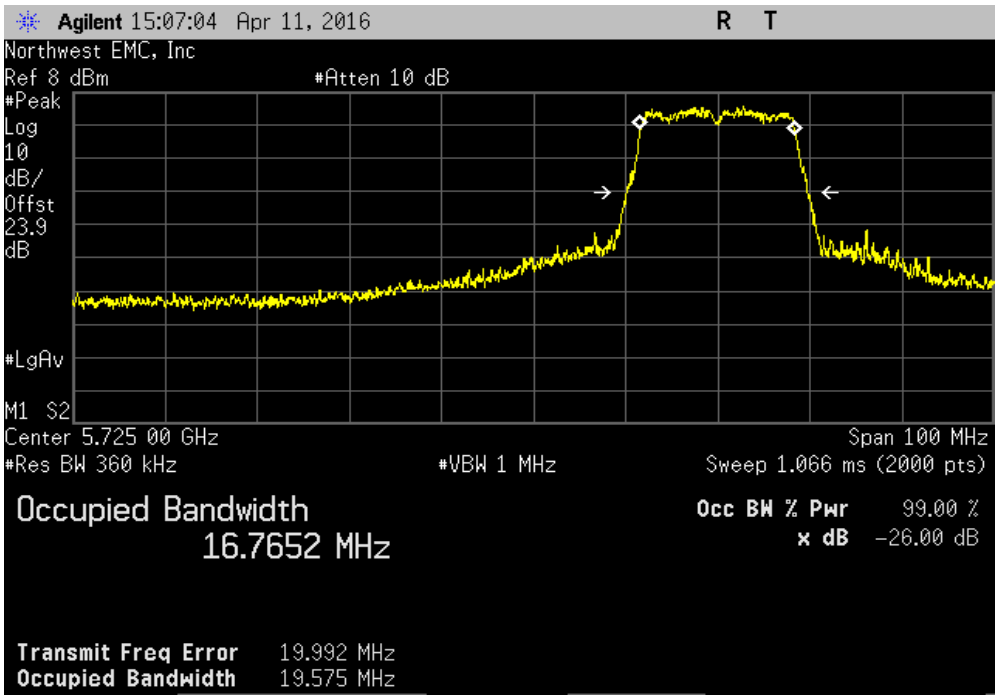
DEVIATIONS FROM TEST STANDARD

None

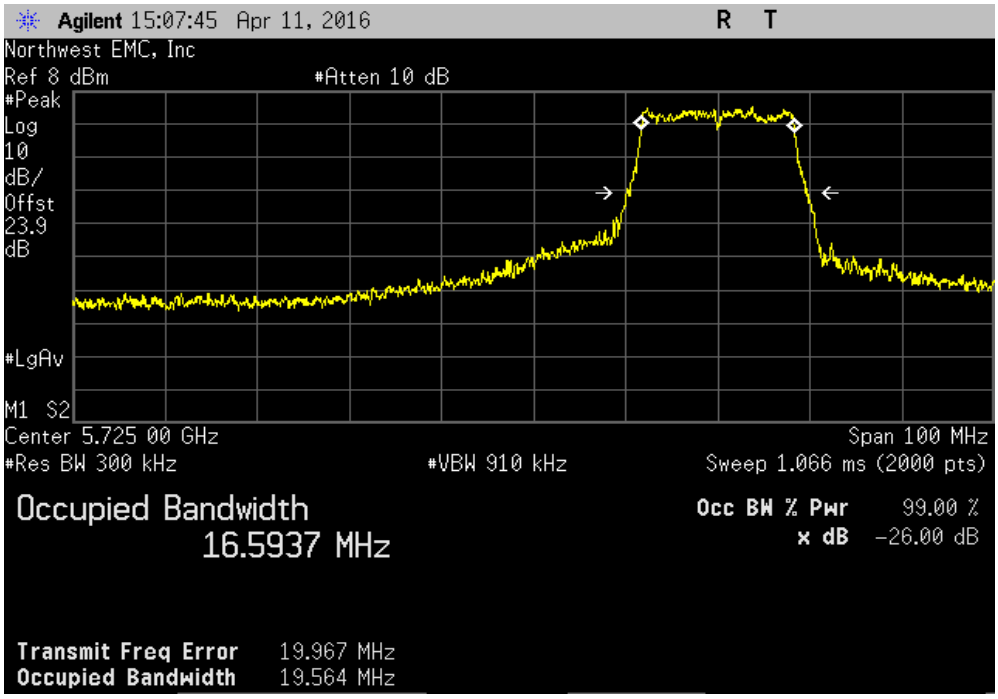
Configuration #	1	Signature

			OBW Within Band	Band Edge (MHz)	Result
SISO, Chain A					
	20MHz BW				
		Low Channel, Ch 149 - 5745 MHz			
		802.11(a) 6 Mbps	Yes	5725	Pass
		802.11(a) 36 Mbps	Yes	5725	Pass
		802.11(a) 54 Mbps	Yes	5725	Pass
		802.11(n) MCS0	Yes	5725	Pass
		802.11(n) MCS7	Yes	5725	Pass
		802.11(ac) MCS0	Yes	5725	Pass
		802.11(ac) MCS8	Yes	5725	Pass
	40MHz BW				
		Low Channel, Ch 149/153 - 5755 MHz			
		802.11(n) MCS0	Yes	5725	Pass
		802.11(n) MCS7	Yes	5725	Pass
		802.11(ac) MCS0	Yes	5725	Pass
		802.11(ac) MCS9	Yes	5725	Pass
	80MHz BW				
		Mid Channel, Ch 149/161 - 5775 MHz			
		802.11(ac) MCS0	Yes	5725	Pass
		802.11(ac) MCS9	Yes	5725	Pass
SISO, Chain B					
	20MHz BW				
		Low Channel, Ch 149 - 5745 MHz			
		802.11(a) 6 Mbps	Yes	5725	Pass
		802.11(a) 36 Mbps	Yes	5725	Pass
		802.11(a) 54 Mbps	Yes	5725	Pass
		802.11(n) MCS0	Yes	5725	Pass
		802.11(n) MCS7	Yes	5725	Pass
		802.11(ac) MCS0	Yes	5725	Pass
		802.11(ac) MCS8	Yes	5725	Pass
	40MHz BW				
		Low Channel, Ch 149/153 - 5755 MHz			
		802.11(n) MCS0	Yes	5725	Pass
		802.11(n) MCS7	Yes	5725	Pass
		802.11(ac) MCS0	Yes	5725	Pass
		802.11(ac) MCS9	Yes	5725	Pass
	80MHz BW				
		Mid Channel, Ch 149/161 - 5775 MHz			
		802.11(ac) MCS0	Yes	5725	Pass
		802.11(ac) MCS9	Yes	5725	Pass

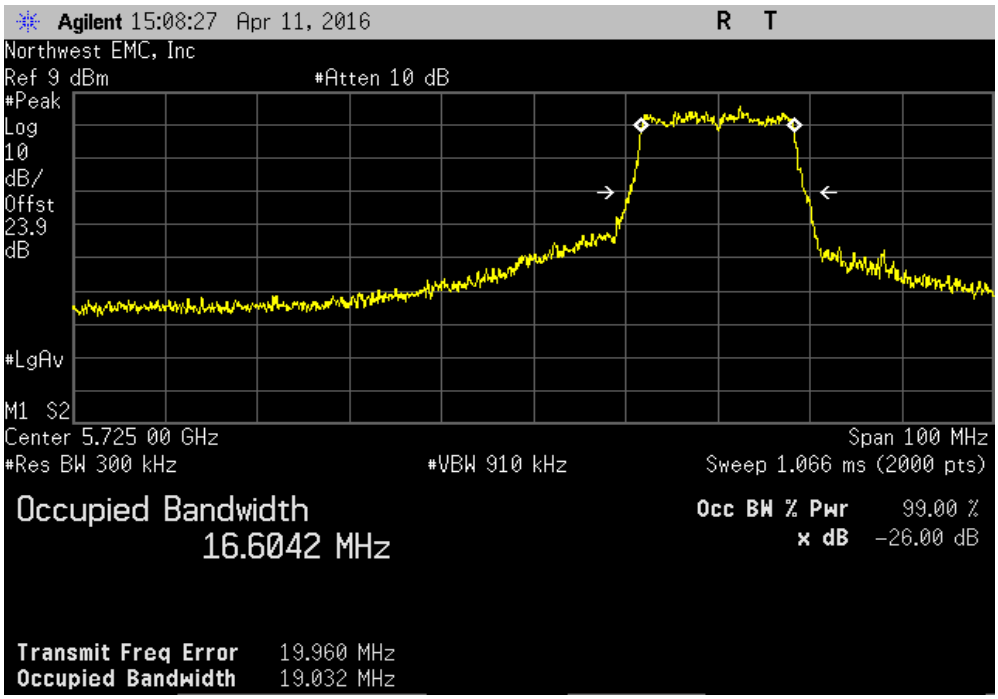
SISO, Chain A, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(a) 6 Mbps						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



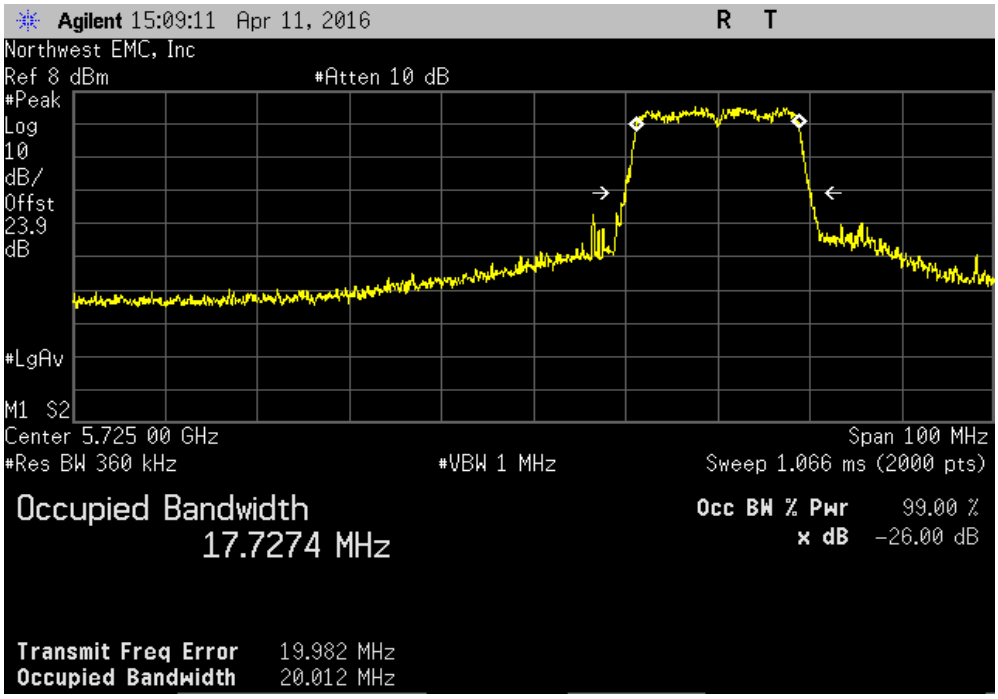
SISO, Chain A, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(a) 36 Mbps						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



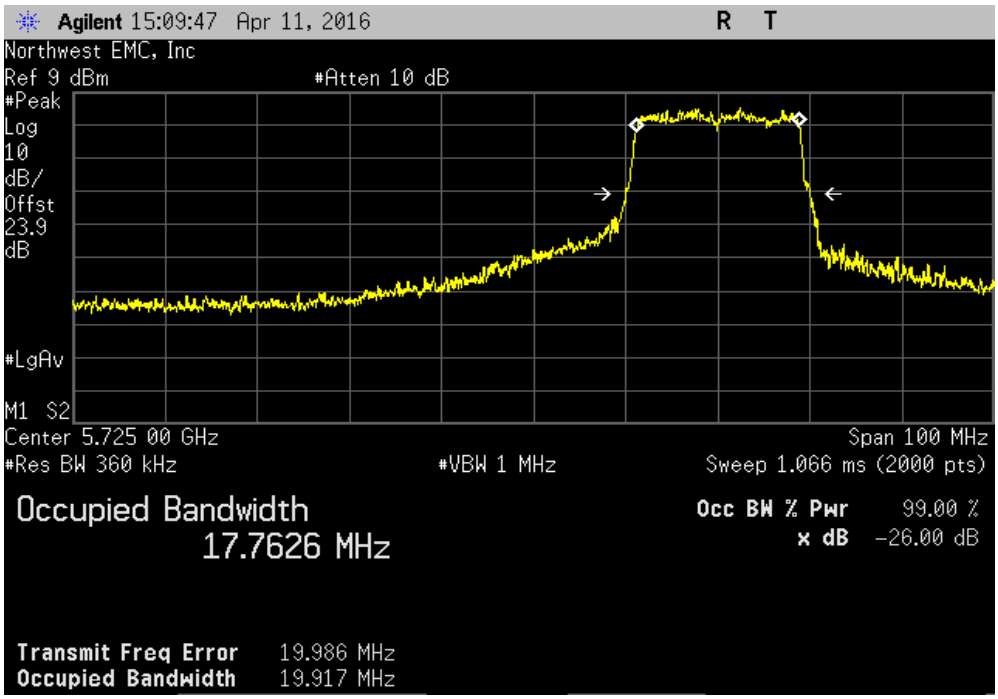
SISO, Chain A, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(a) 54 Mbps						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



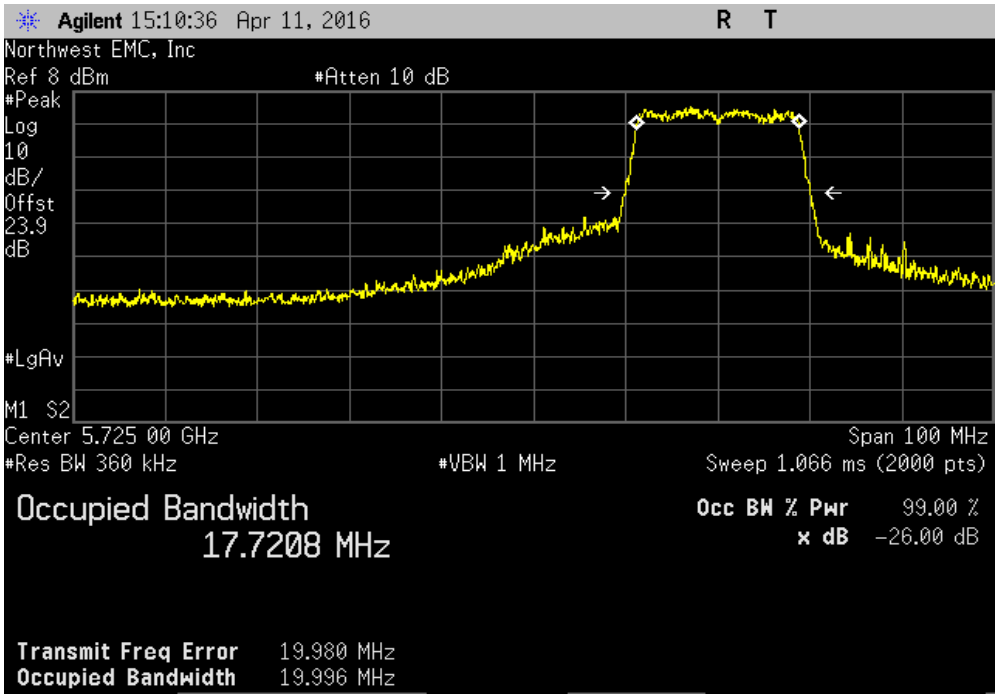
SISO, Chain A, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(n) MCS0						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



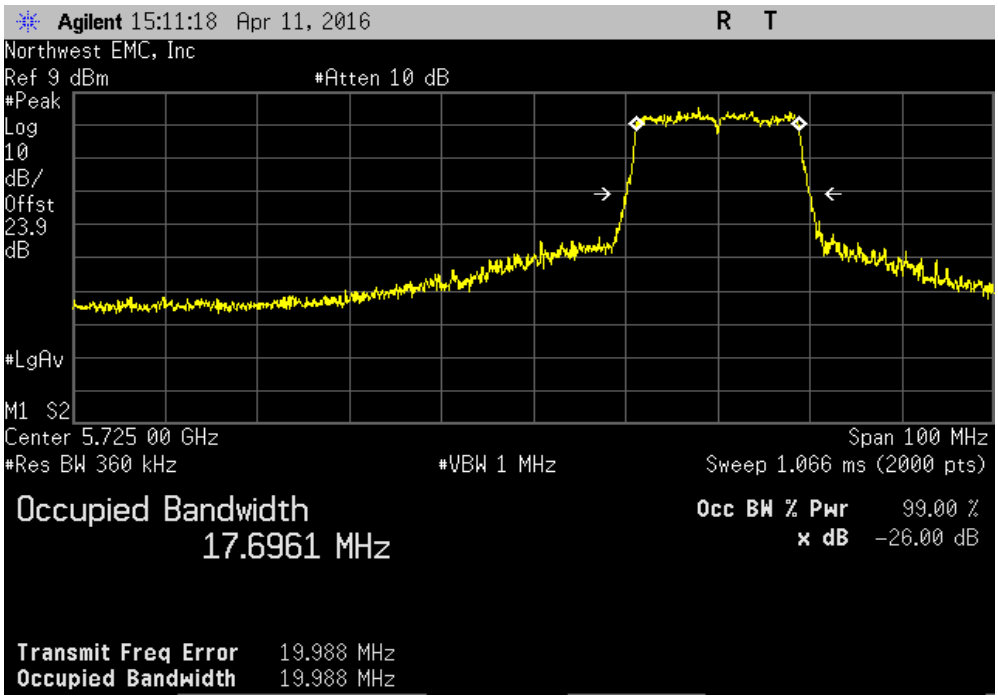
SISO, Chain A, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(n) MCS7						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



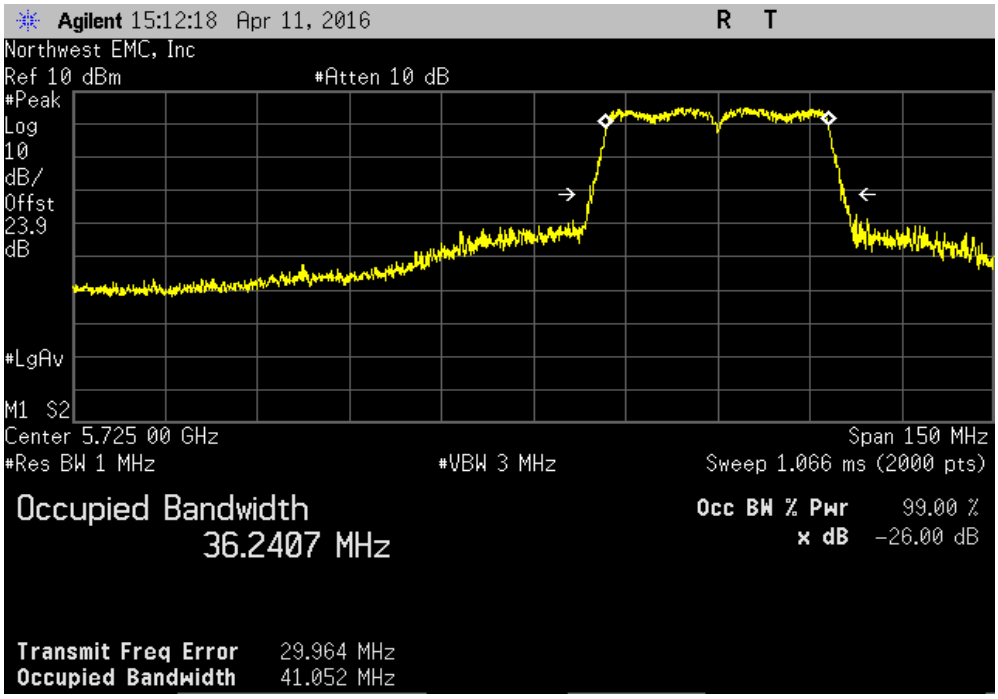
SISO, Chain A, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(ac) MCS0						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



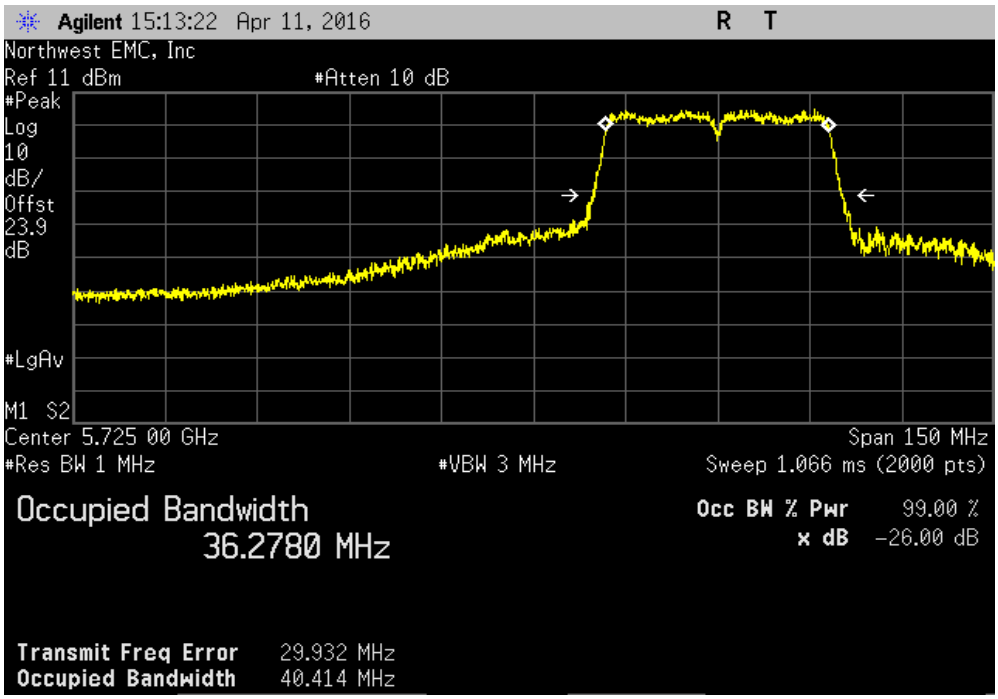
SISO, Chain A, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(ac) MCS8						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



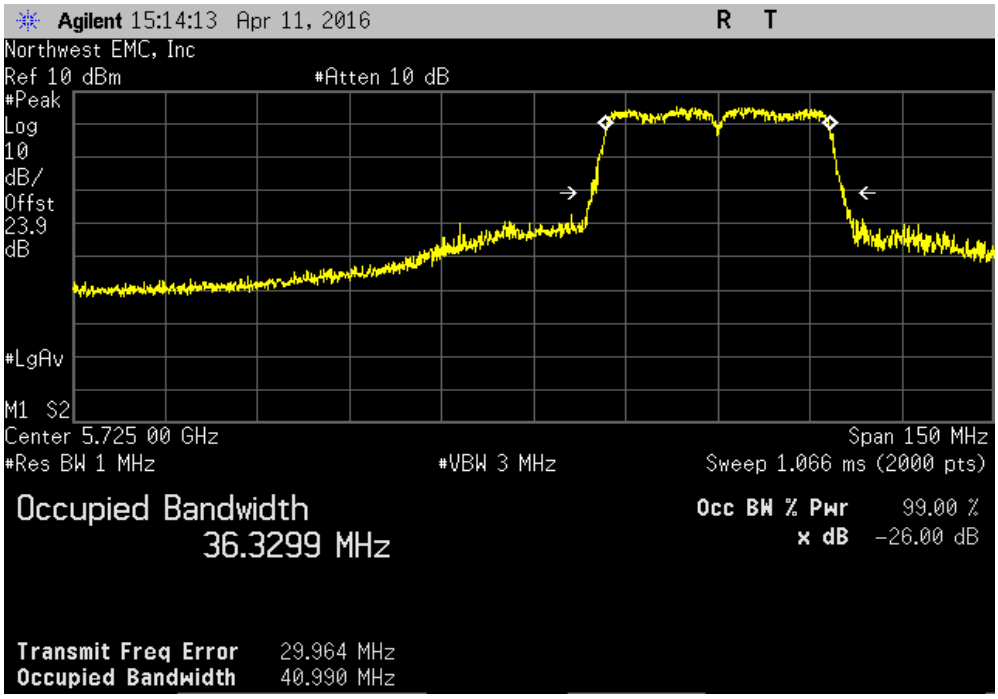
SISO, Chain A, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(n) MCS0						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



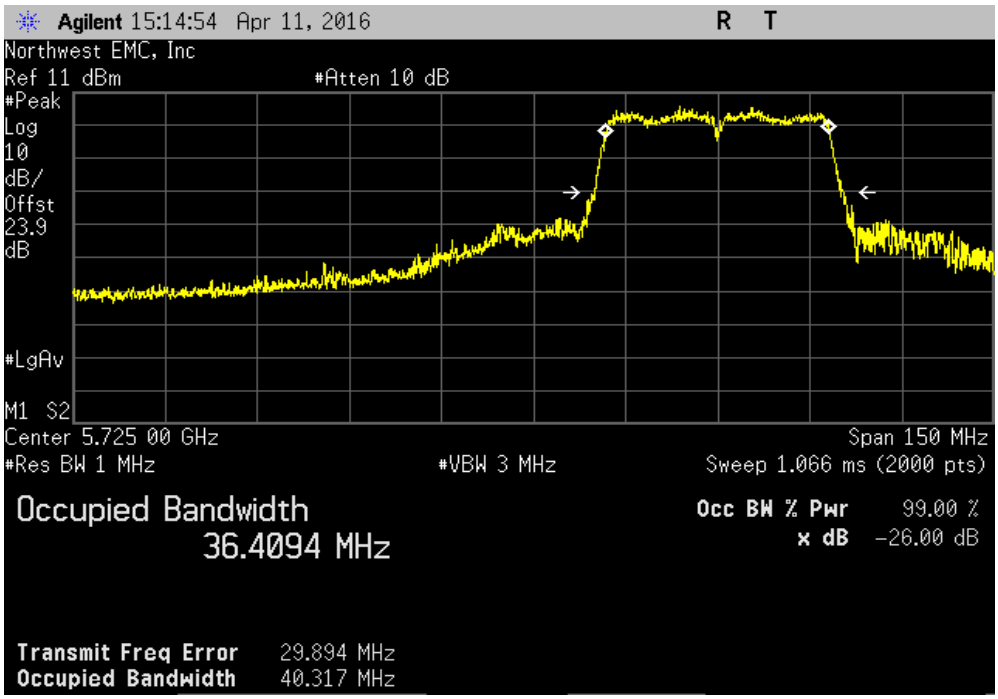
SISO, Chain A, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(n) MCS7						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



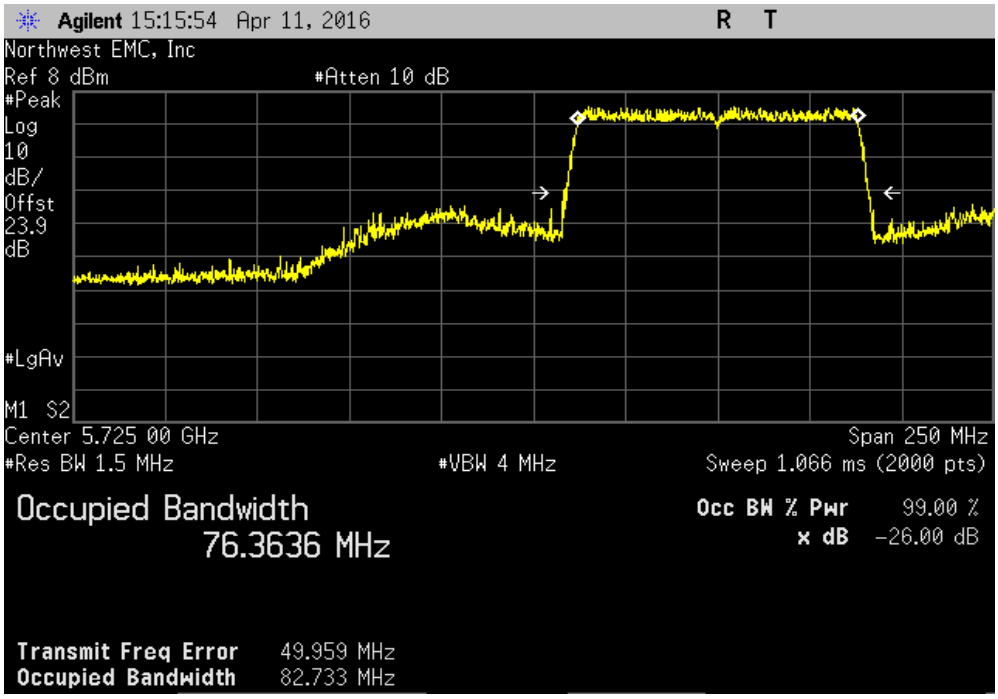
SISO, Chain A, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(ac) MCS0						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



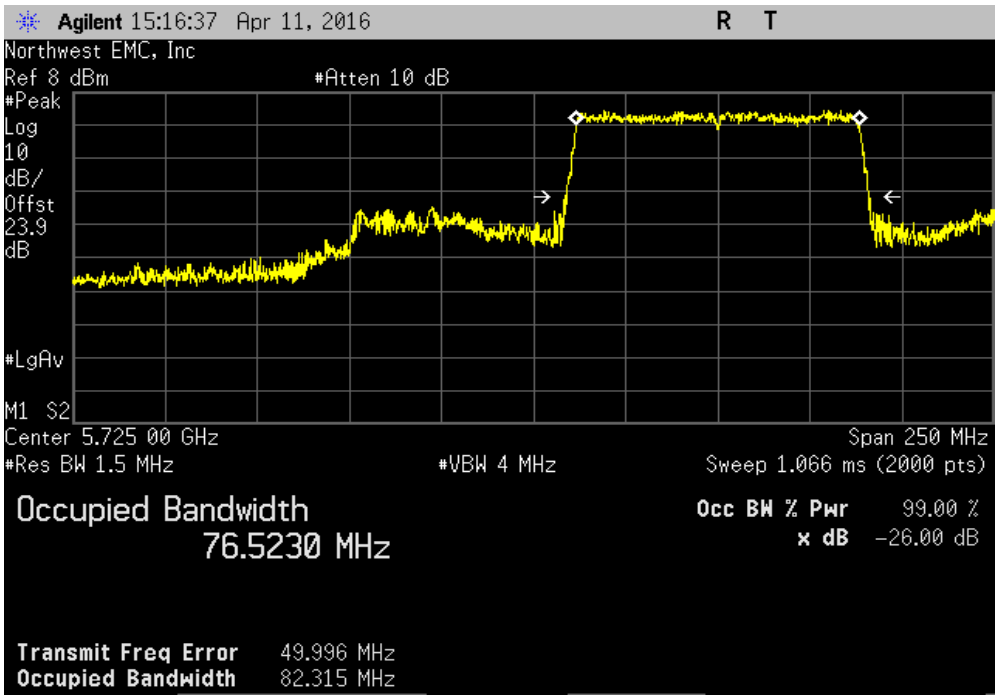
SISO, Chain A, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(ac) MCS9						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



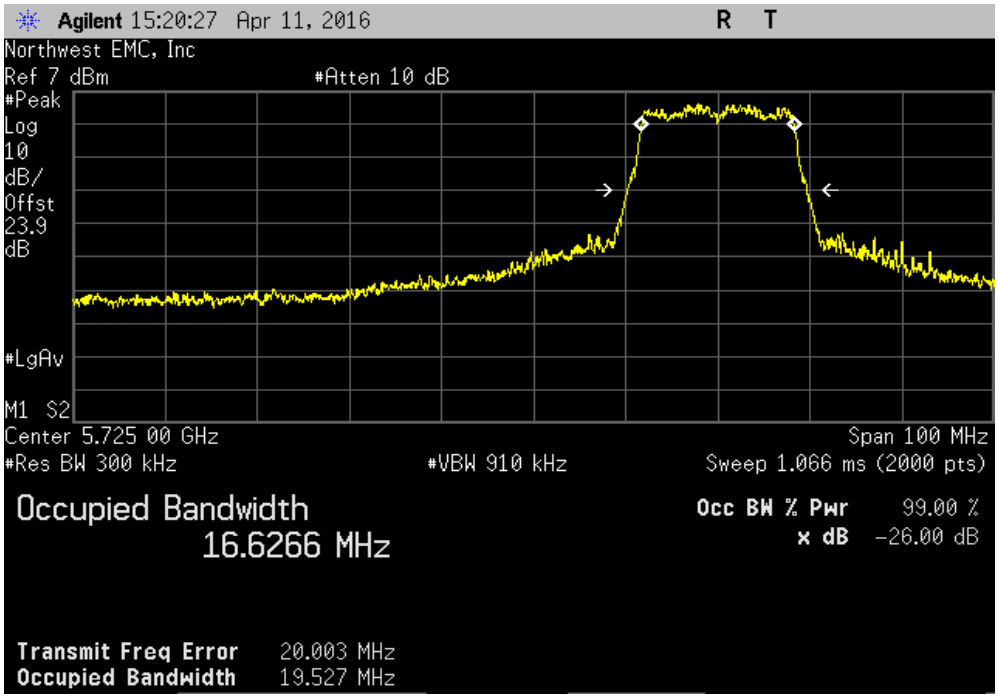
SISO, Chain A, 80MHz BW, Mid Channel, Ch 149/161 - 5775 MHz, 802.11(ac) MCS0						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



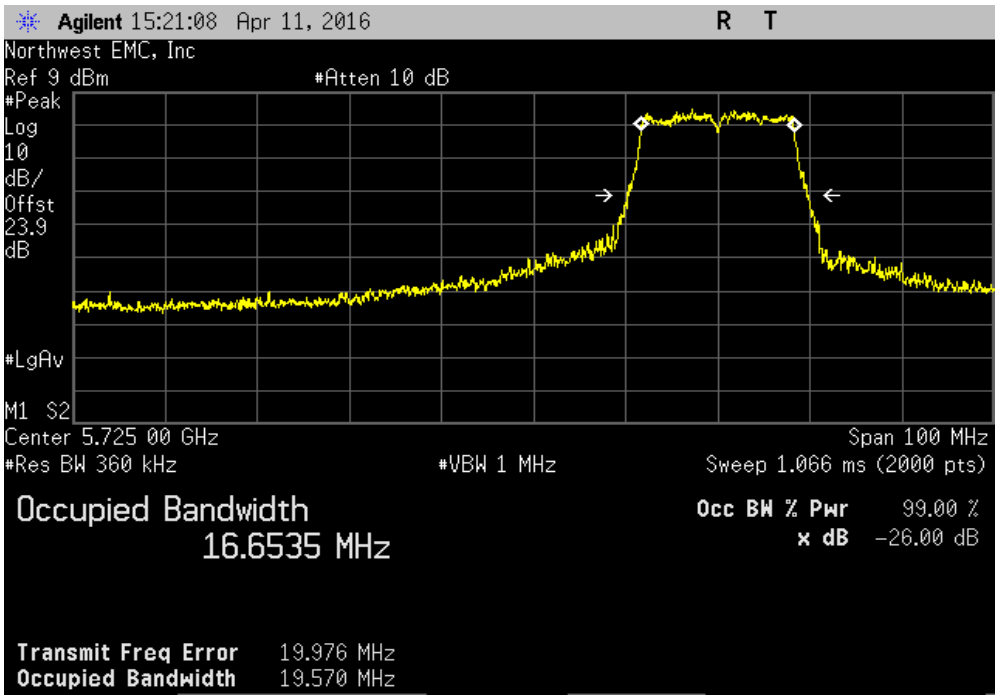
SISO, Chain A, 80MHz BW, Mid Channel, Ch 149/161 - 5775 MHz, 802.11(ac) MCS9						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



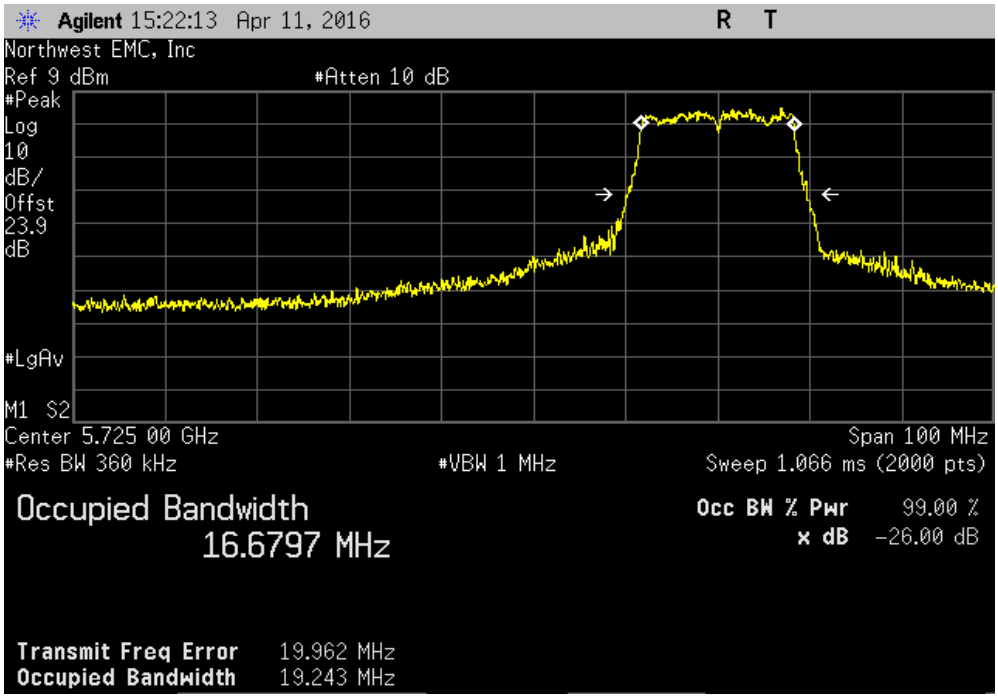
SISO, Chain B, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(a) 6 Mbps						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



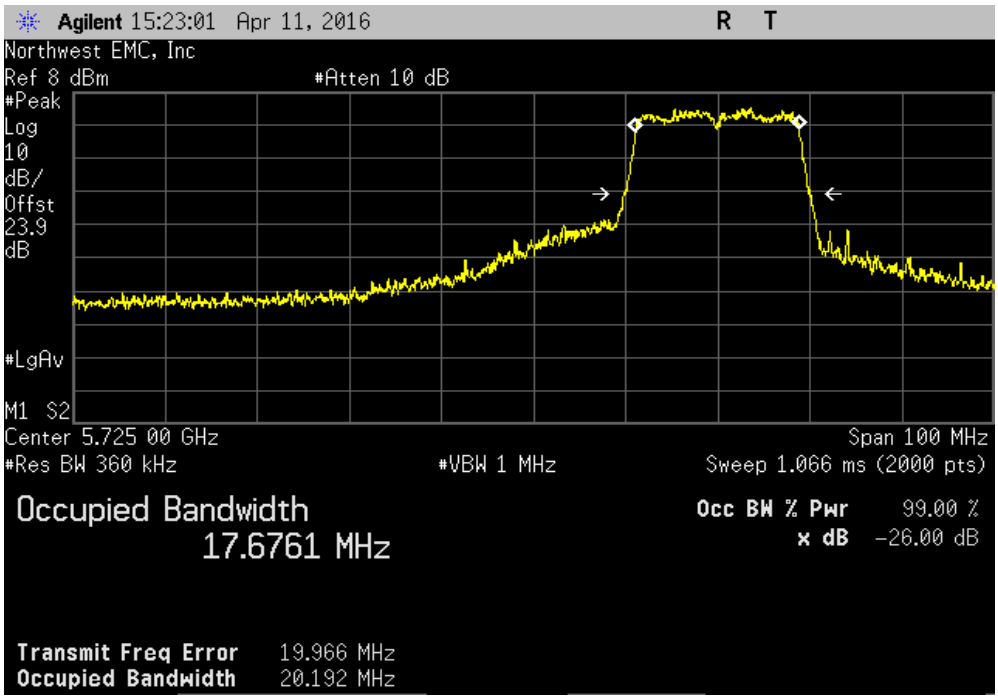
SISO, Chain B, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(a) 36 Mbps						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



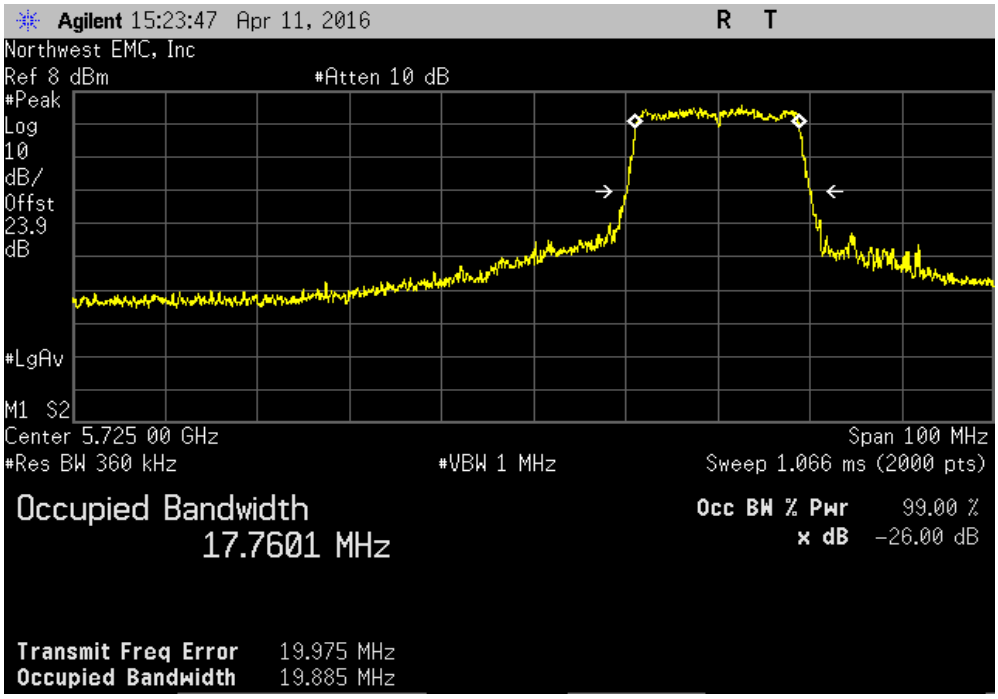
SISO, Chain B, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(a) 54 Mbps						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



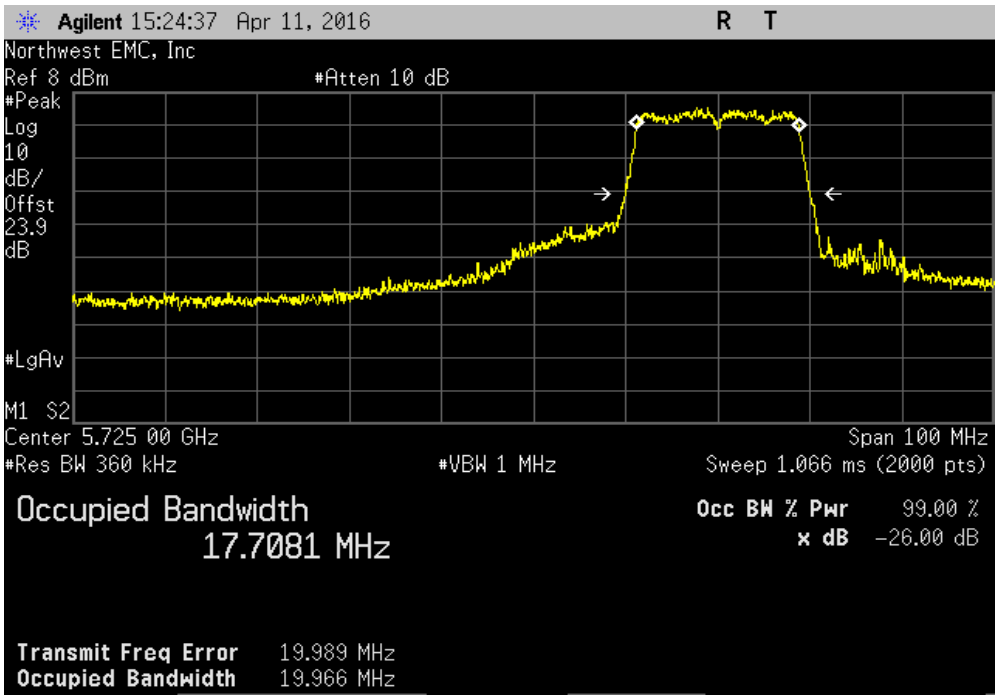
SISO, Chain B, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(n) MCS0						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



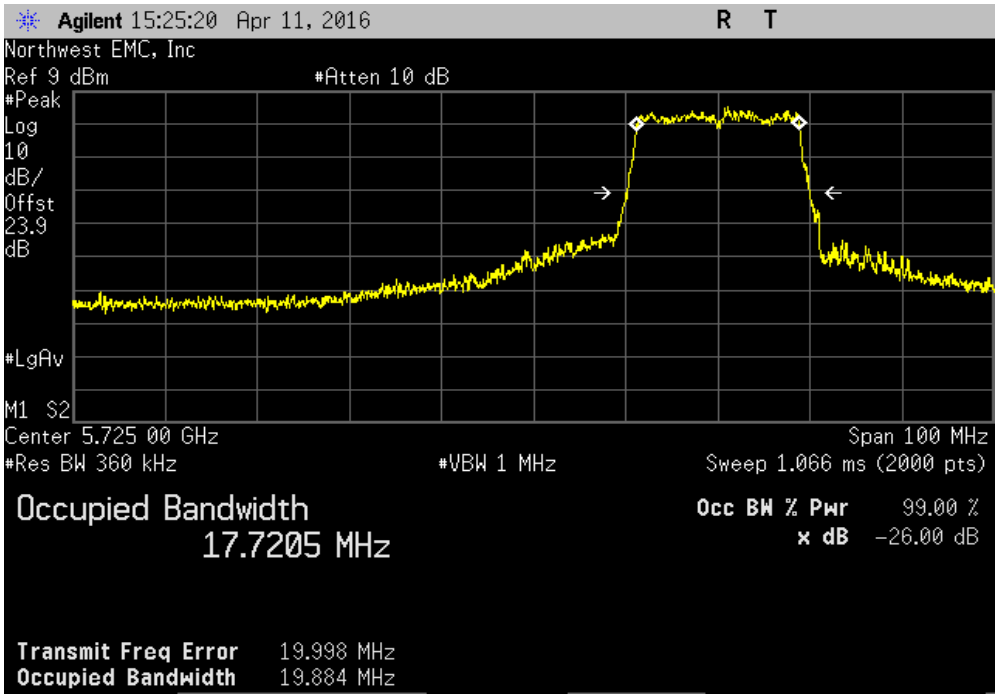
SISO, Chain B, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(n) MCS7						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



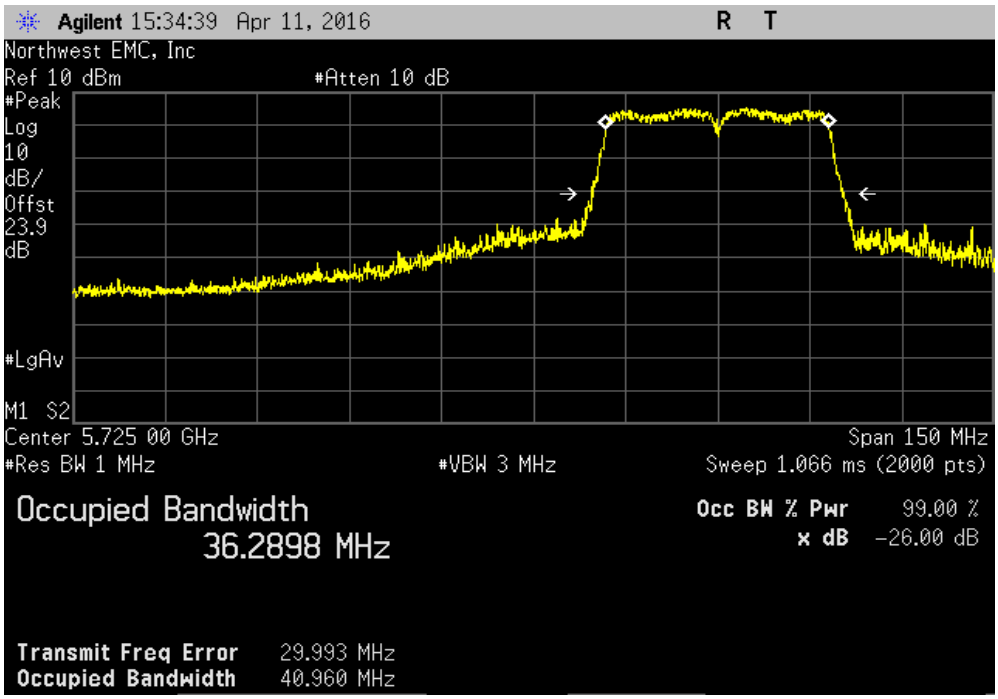
SISO, Chain B, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(ac) MCS0						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



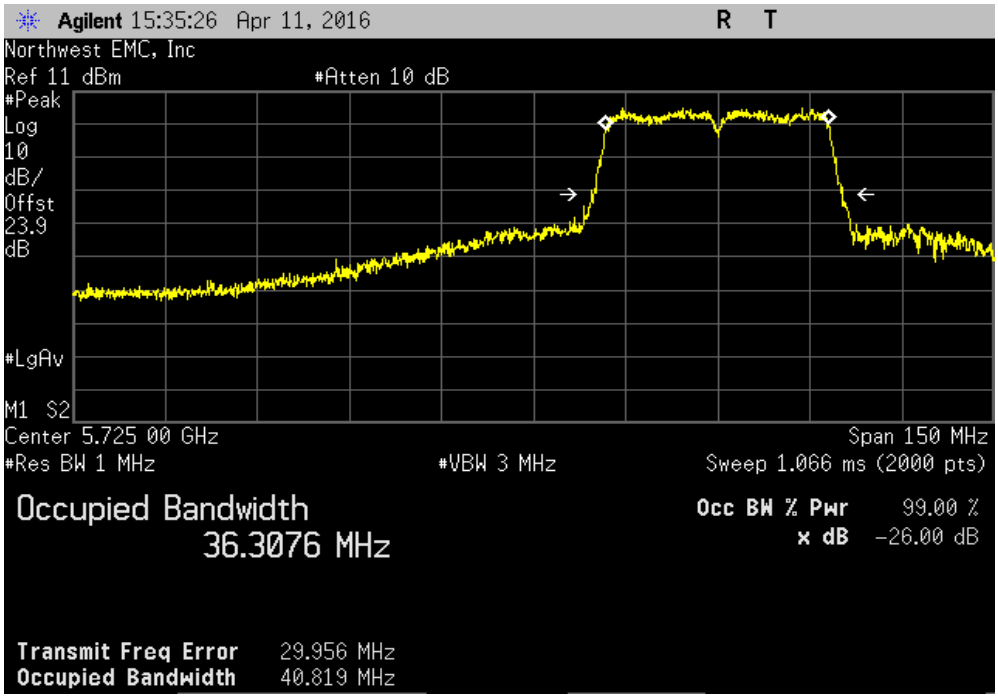
SISO, Chain B, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(ac) MCS8						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



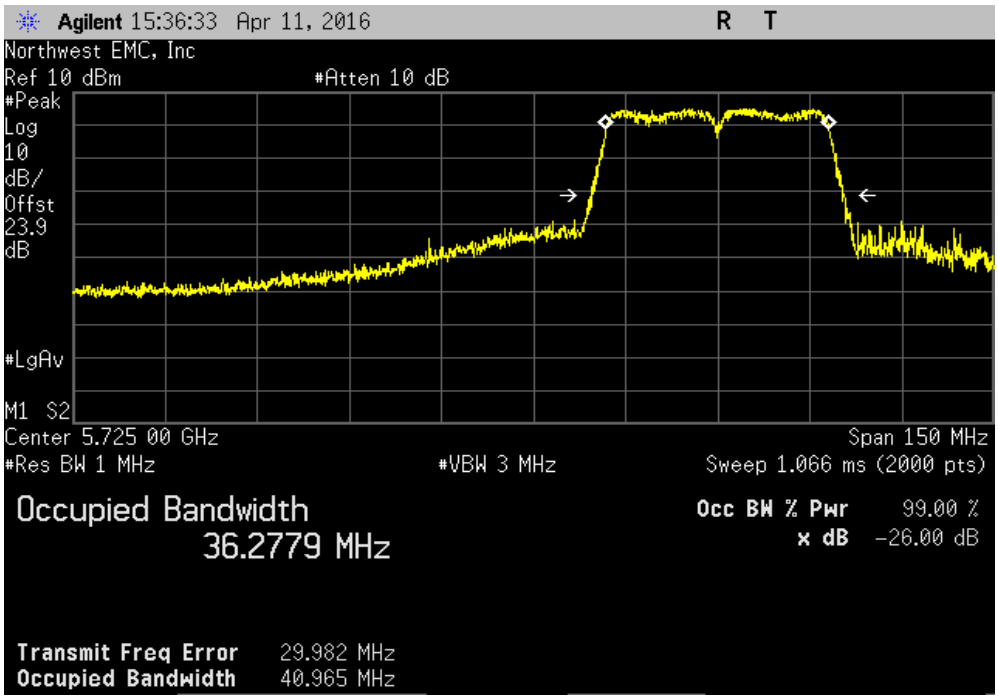
SISO, Chain B, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(n) MCS0						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



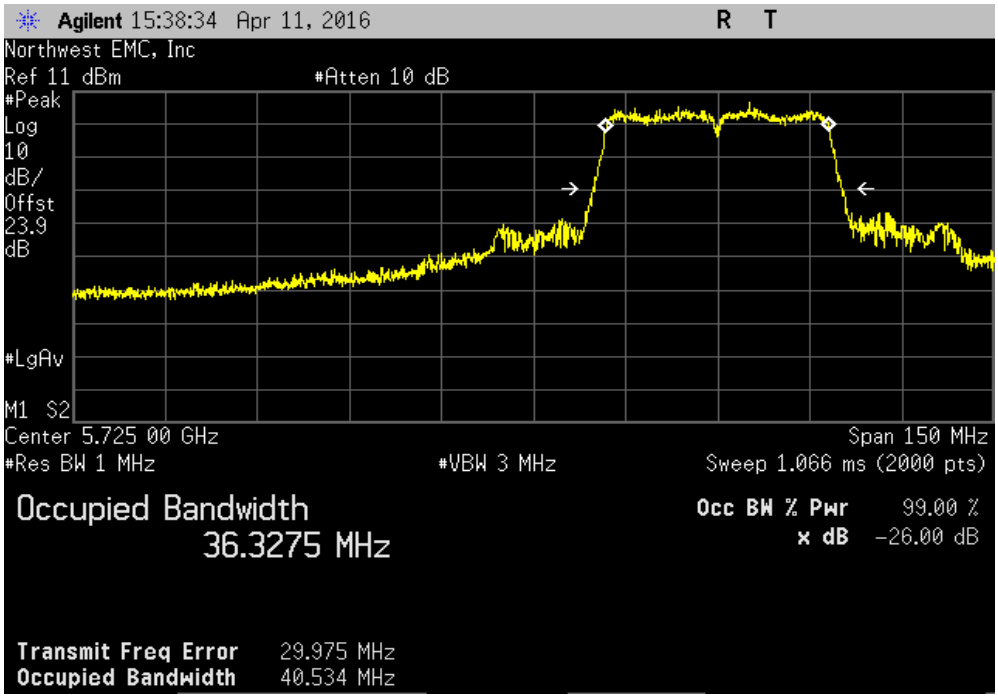
SISO, Chain B, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(n) MCS7						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



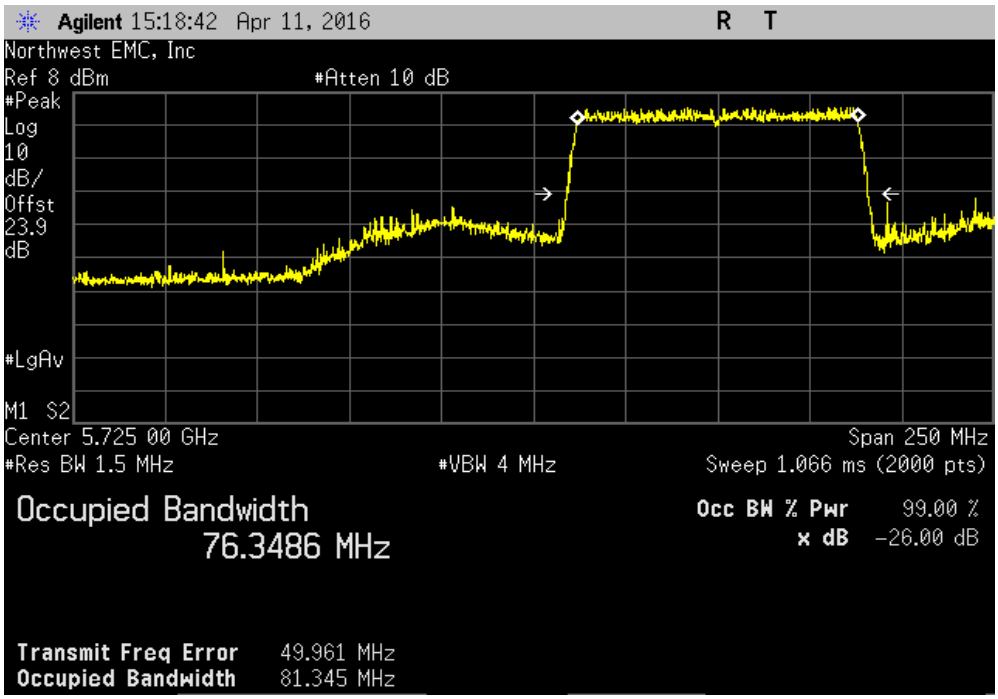
SISO, Chain B, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(ac) MCS0						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



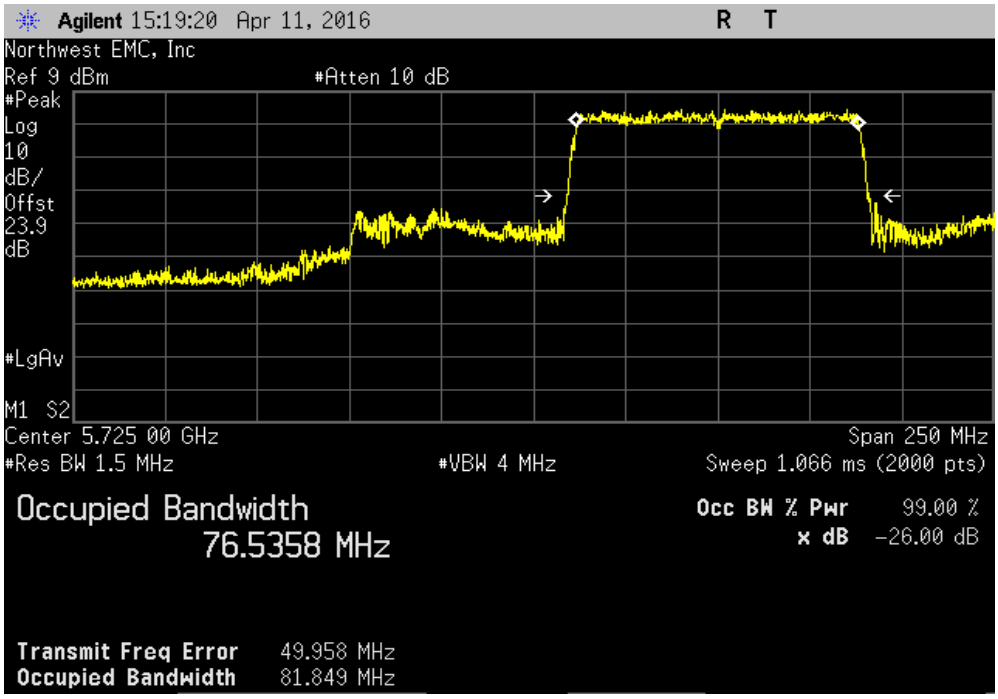
SISO, Chain B, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(ac) MCS9						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



SISO, Chain B, 80MHz BW, Mid Channel, Ch 149/161 - 5775 MHz, 802.11(ac) MCS0						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



SISO, Chain B, 80MHz BW, Mid Channel, Ch 149/161 - 5775 MHz, 802.11(ac) MCS9						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



BAND EDGE

XMit 2015.01.14

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval (mo)
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFE	6/22/2015	12
Attenuator	Fairview Microwave	SA4014-20	TKV	3/4/2016	12
Block - DC	Fairview Microwave	SD3379	AMJ	6/6/2015	12
Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	NC5	6/6/2015	12
Generator - Signal	Agilent	N5183A	TID	11/26/2014	36

TEST DESCRIPTION

The -26 dB emission bandwidth of the carrier was measured to ensure that no part of the emission of the carrier operating in a non-DFS band was operating in a band where DFS testing is required. This test is done with the U-NII-1 band (5.2 GHz band) to ensure no portion of the carrier is contained within the U-NII-2A band and with the U-NII-3 band (5.8 GHz band) to ensure no portion of the carrier is contained in the U-NII-2C band.

The transmit frequencies and data rates listed in the datasheet were measured. The transmit power was set to its default maximum.

A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input.

BAND EDGE

NORTHWEST EMC

XMit 2015.01.14

EUT:	Model 1631			**Work Order:**	MCSO1748
Serial Number:	041152140753			**Date:**	04/12/16
Customer:	Microsoft Corporation			**Temperature:**	23°C
Attendees:	None			**Humidity:**	33%
Project:	None			**Barometric Pres.:**	1019 mbar
Tested by:	Richard Mellroth	**Power:**	110VAC/60Hz	**Job Site:**	NC02

TEST SPECIFICATIONS	Test Method
FCC 15.407:2016	ANSI C63.10:2013

COMMENTS

Power setting at 11dBm for 20MHz and 40MHz channels. Power Setting at 10dBm for 80MHz channels. Client supplied adapter cable loss of 1.3dB included in reference level offset. Signal setting at > 95% Duty Cycle.

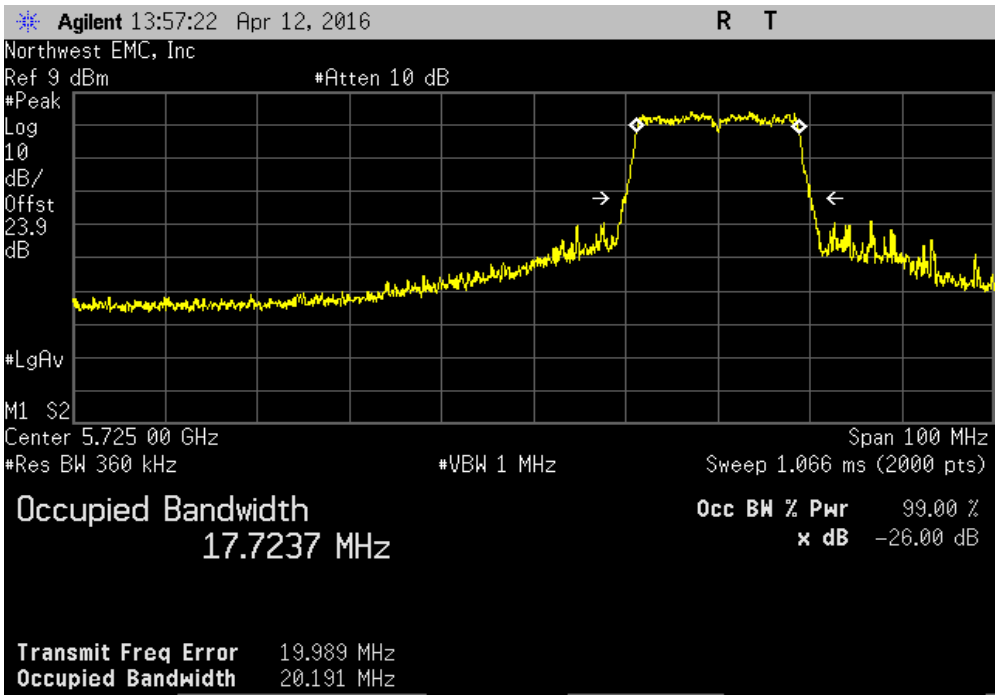
DEVIATIONS FROM TEST STANDARD

None

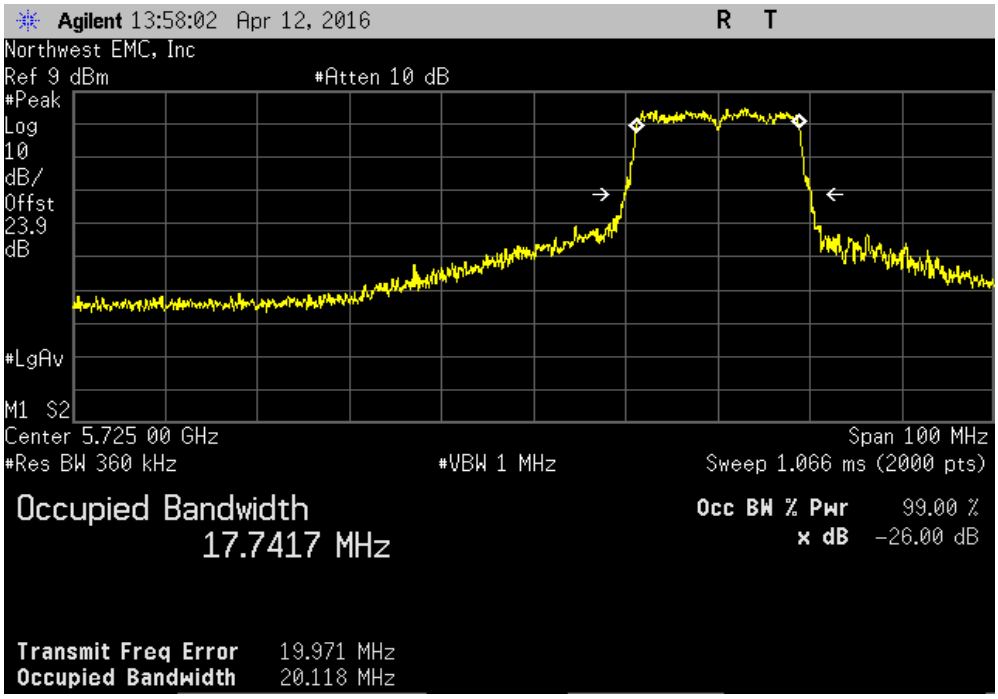
Configuration #	1	Signature

			OBW Within Band	Band Edge (MHz)	Result
2x2 MIMO, Chain A					
	20MHz BW				
		Low Channel, Ch 149 - 5745 MHz			
		802.11(n) MCS8	Yes	5725	Pass
		802.11(n) MCS15	Yes	5725	Pass
		802.11(ac) MCS0	Yes	5725	Pass
		802.11(ac) MCS8	Yes	5725	Pass
	40MHz BW				
		Low Channel, Ch 149/153 - 5755 MHz			
		802.11(n) MCS8	Yes	5725	Pass
		802.11(n) MCS15	Yes	5725	Pass
		802.11(ac) MCS0	Yes	5725	Pass
		802.11(ac) MCS9	Yes	5725	Pass
	80MHz BW				
		Mid Channel, Ch 149/161 - 5775 MHz			
		802.11(ac) MCS0	Yes	5725	Pass
		802.11(ac) MCS9	Yes	5725	Pass
2x2 MIMO, Chain B					
	20MHz BW				
		Low Channel, Ch 149 - 5745 MHz			
		802.11(n) MCS8	Yes	5725	Pass
		802.11(n) MCS15	Yes	5725	Pass
		802.11(ac) MCS0	Yes	5725	Pass
		802.11(ac) MCS8	Yes	5725	Pass
	40MHz BW				
		Low Channel, Ch 149/153 - 5755 MHz			
		802.11(n) MCS8	Yes	5725	Pass
		802.11(n) MCS15	Yes	5725	Pass
		802.11(ac) MCS0	Yes	5725	Pass
		802.11(ac) MCS9	Yes	5725	Pass
	80MHz BW				
		Mid Channel, Ch 149/161 - 5775 MHz			
		802.11(ac) MCS0	Yes	5725	Pass
		802.11(ac) MCS9	Yes	5725	Pass

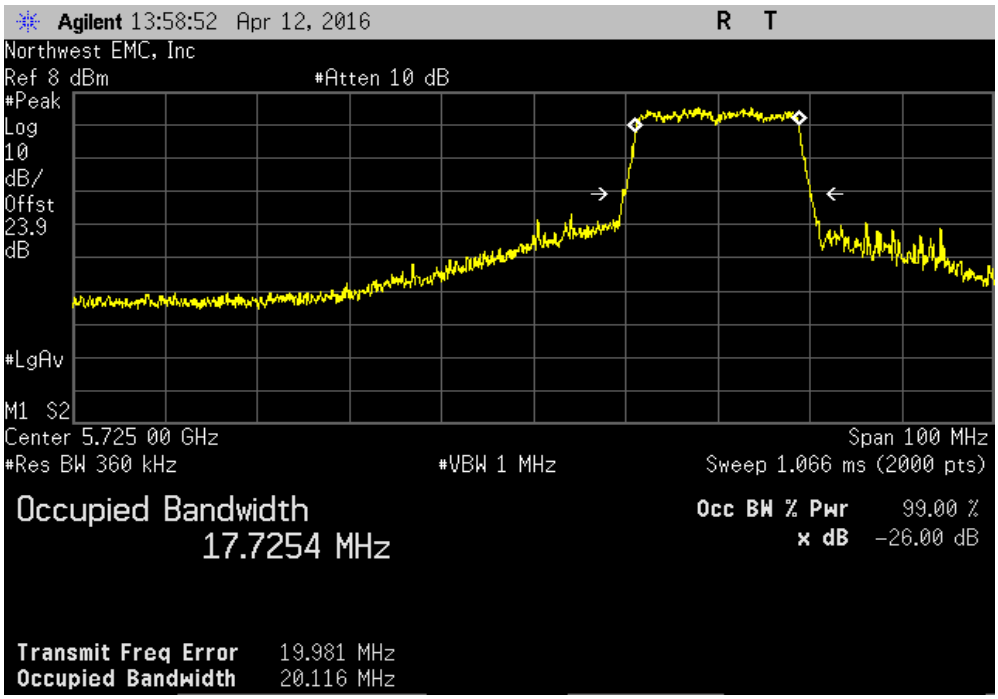
2x2 MIMO, Chain A, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(n) MCS8						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



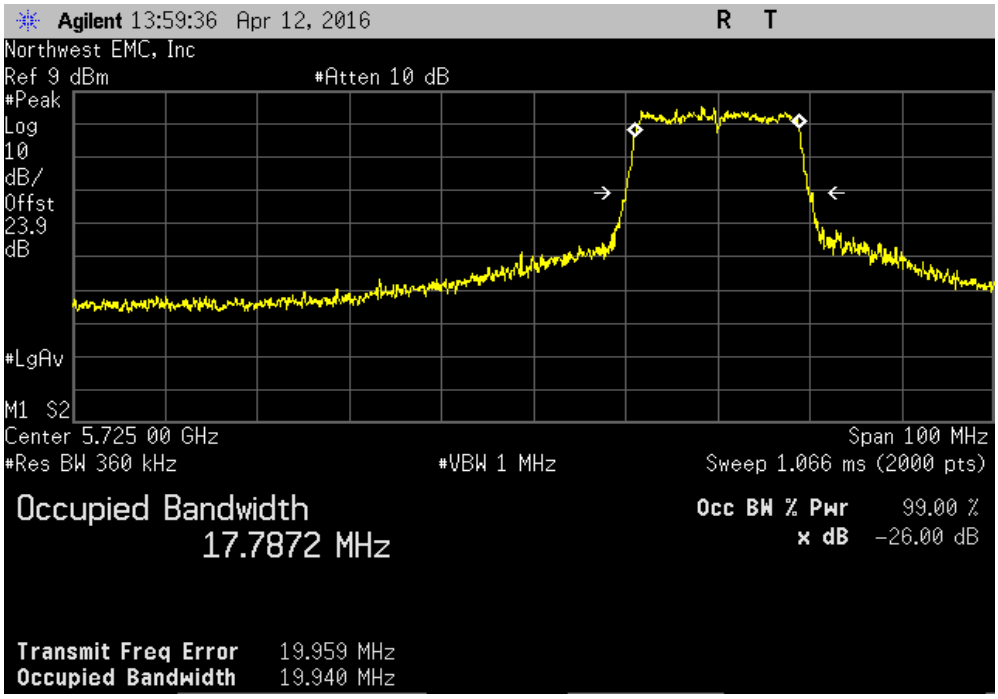
2x2 MIMO, Chain A, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(n) MCS15						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



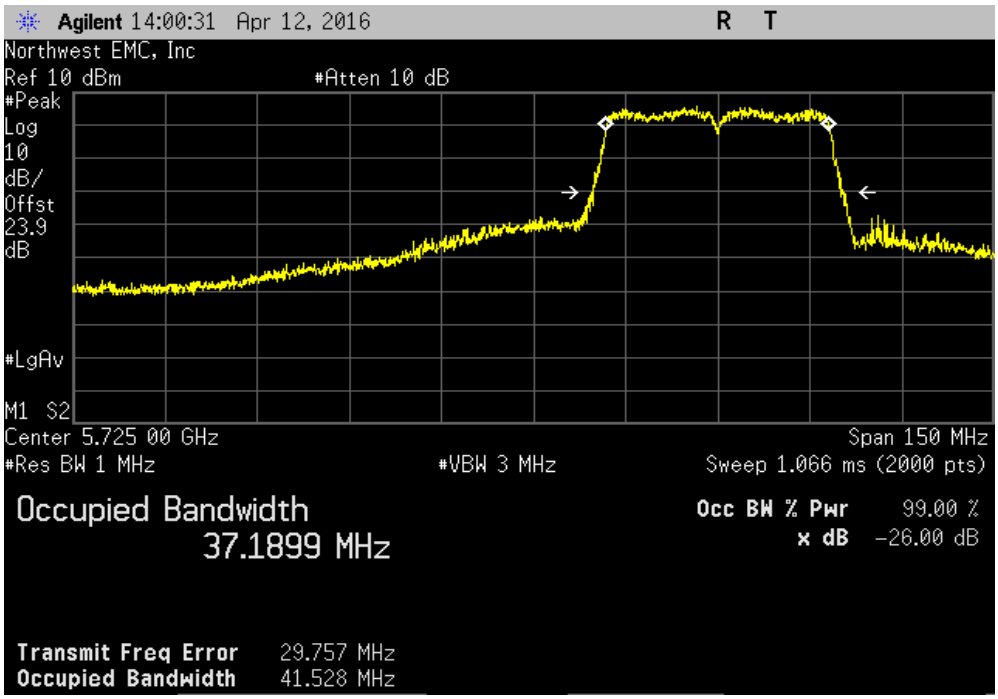
2x2 MIMO, Chain A, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(ac) MCS0						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



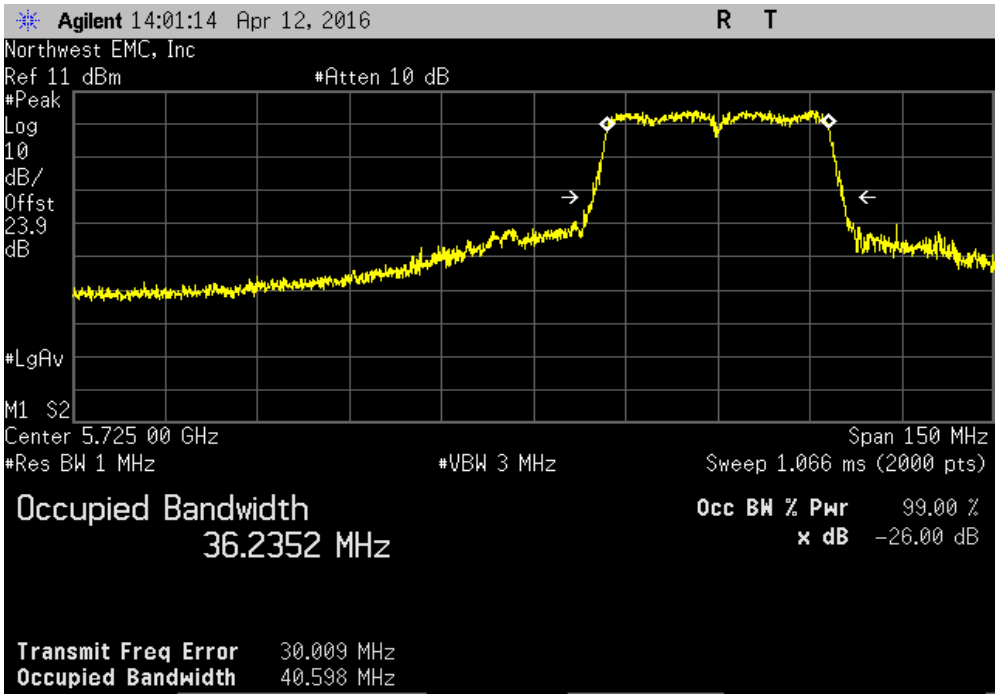
2x2 MIMO, Chain A, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(ac) MCS8						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



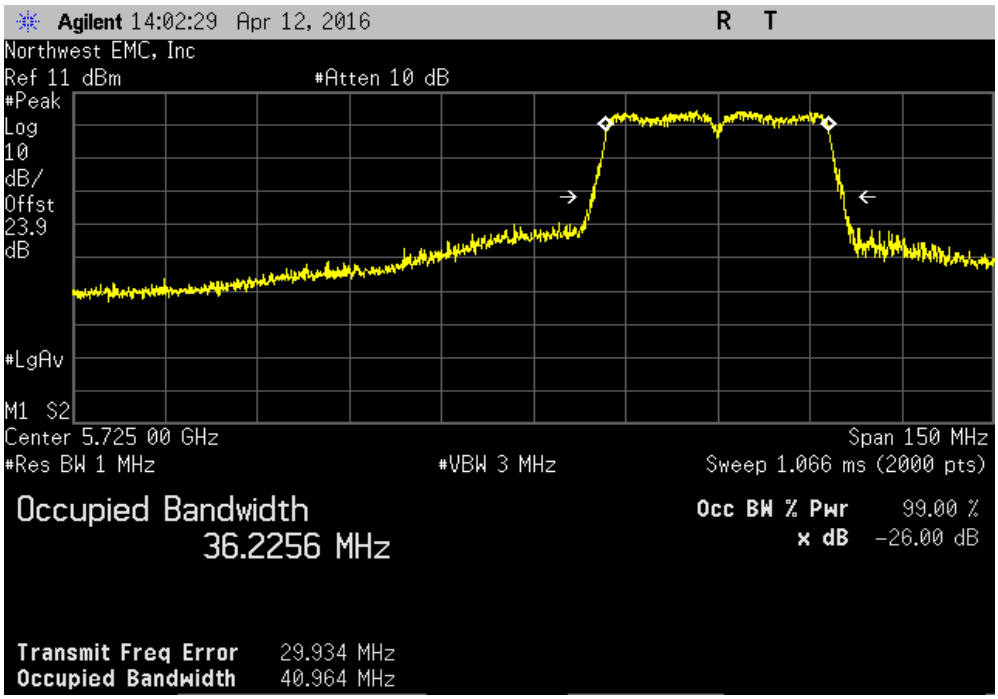
2x2 MIMO, Chain A, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(n) MCS8						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



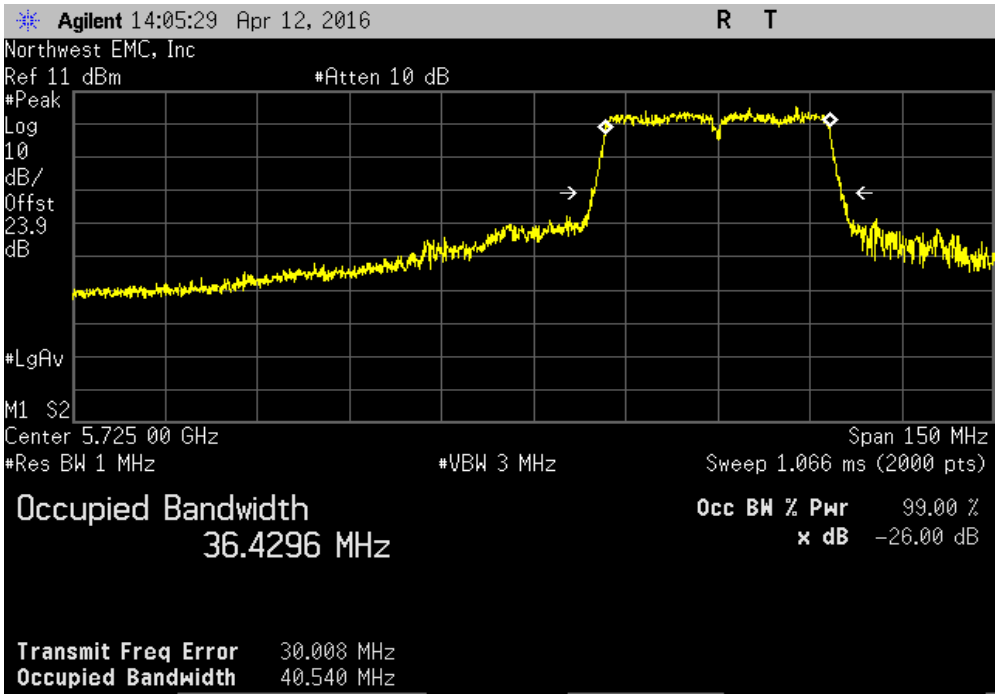
2x2 MIMO, Chain A, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(n) MCS15						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



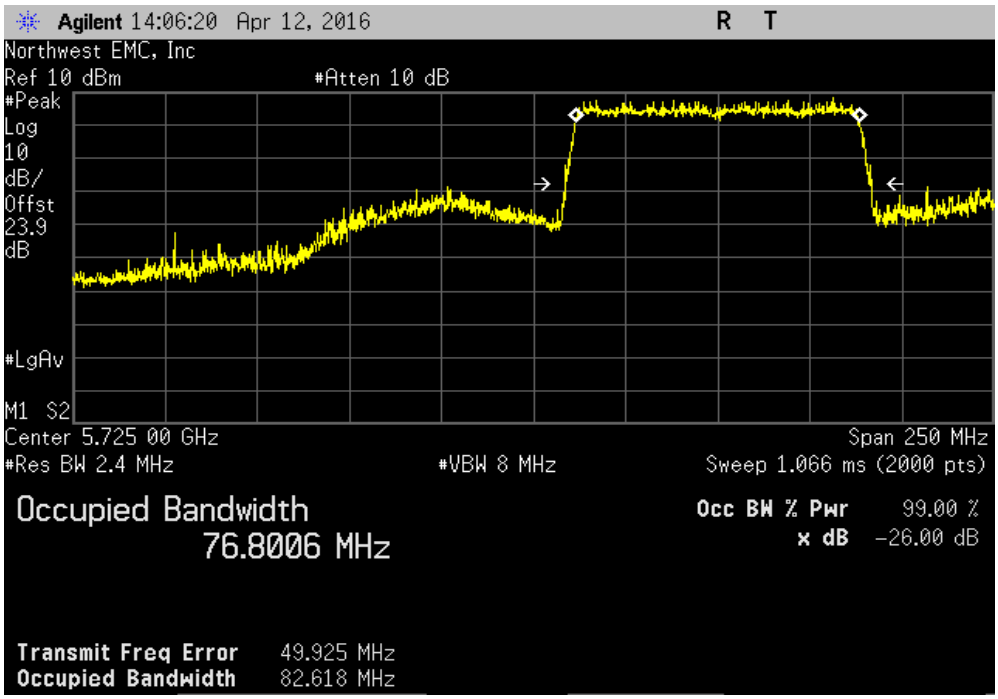
2x2 MIMO, Chain A, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(ac) MCS0						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



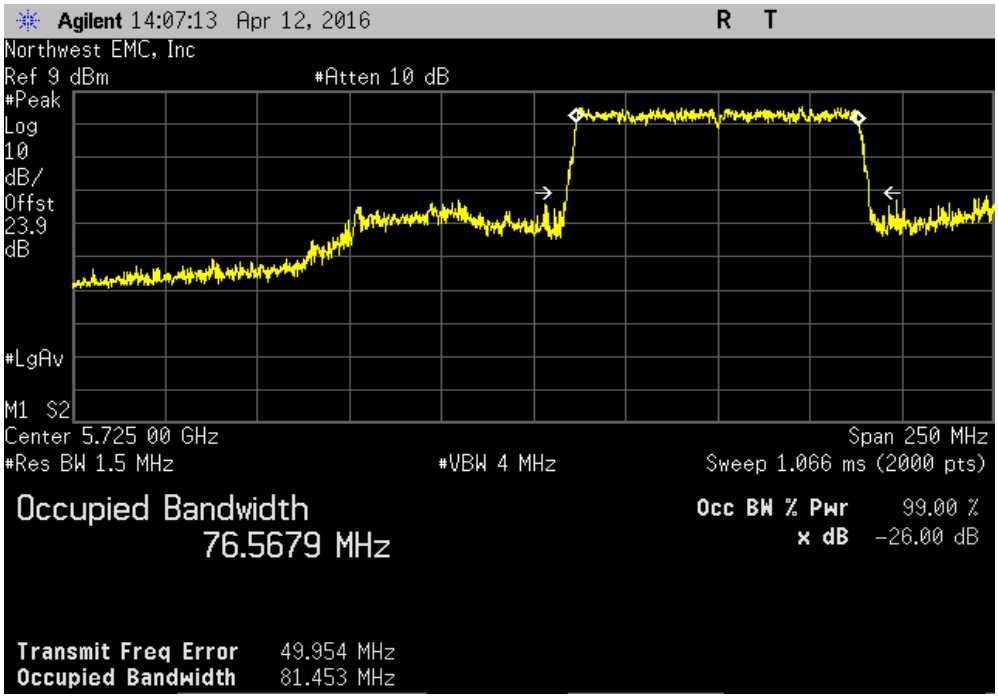
2x2 MIMO, Chain A, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(ac) MCS9						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



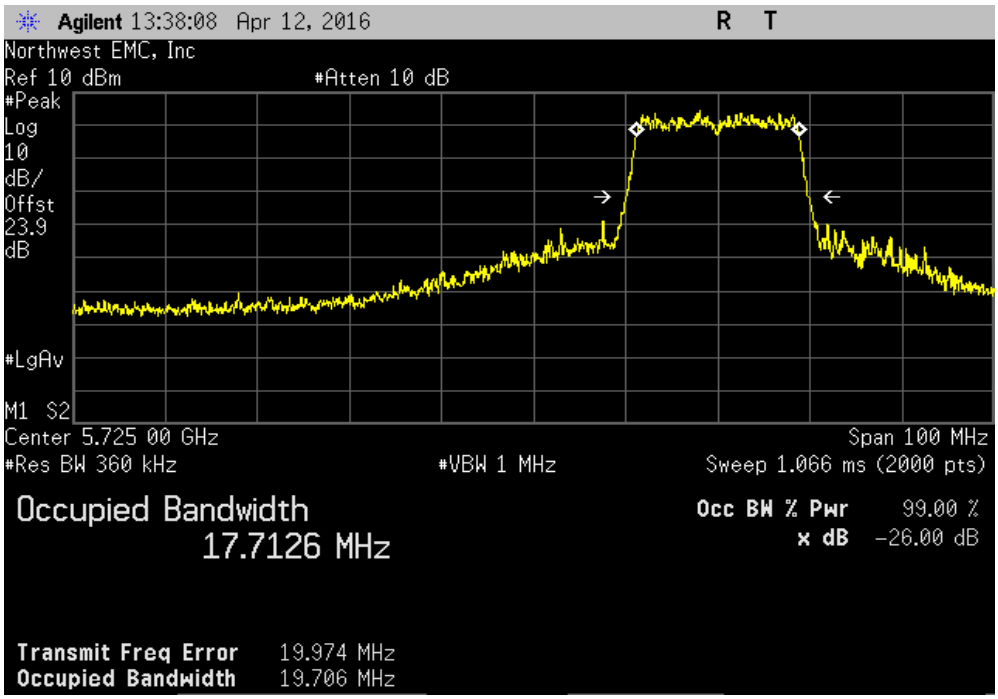
2x2 MIMO, Chain A, 80MHz BW, Mid Channel, Ch 149/161 - 5775 MHz, 802.11(ac) MCS0						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



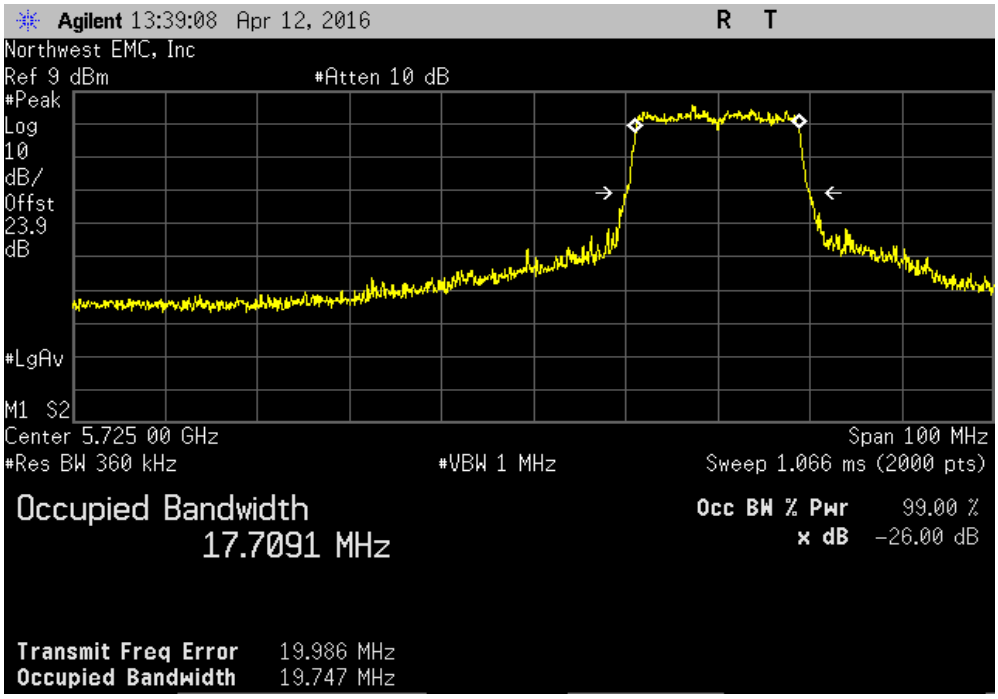
2x2 MIMO, Chain A, 80MHz BW, Mid Channel, Ch 149/161 - 5775 MHz, 802.11(ac) MCS9						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



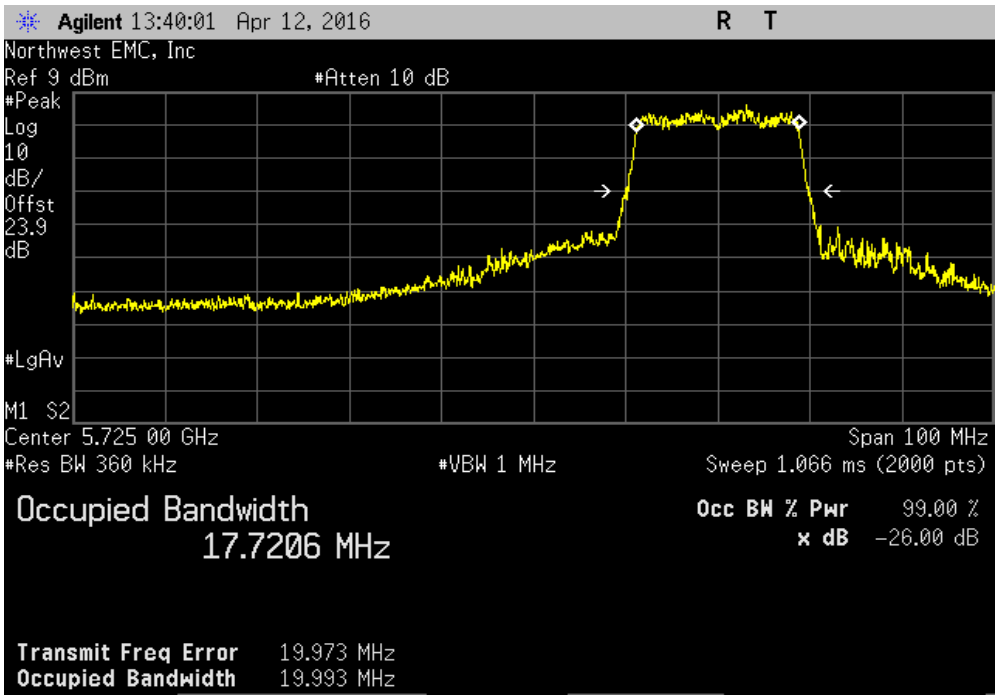
2x2 MIMO, Chain B, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(n) MCS8						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



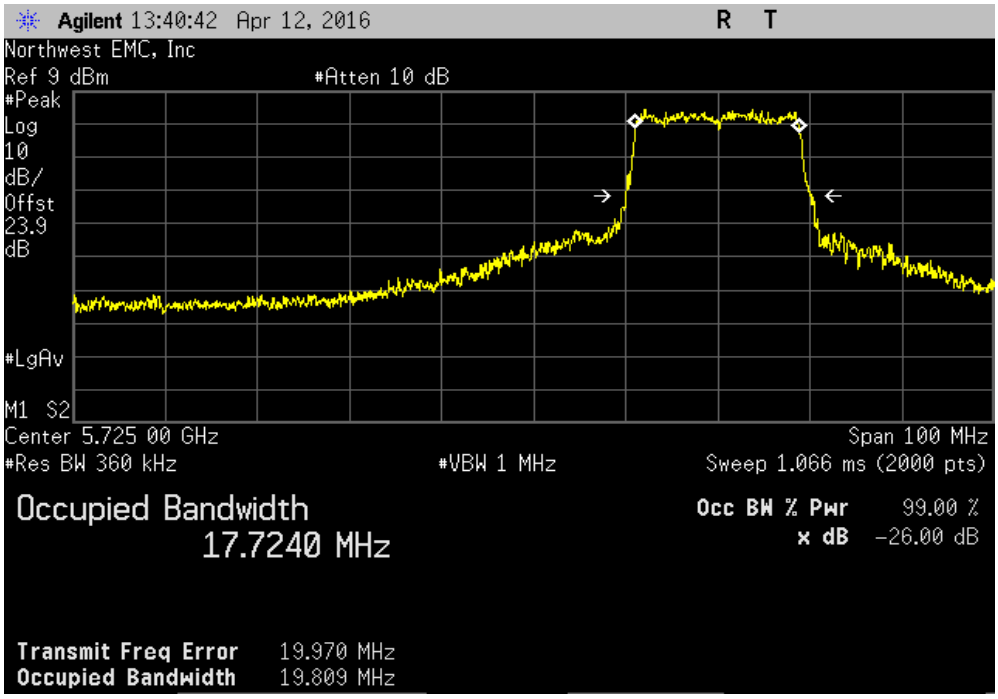
2x2 MIMO, Chain B, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(n) MCS15						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



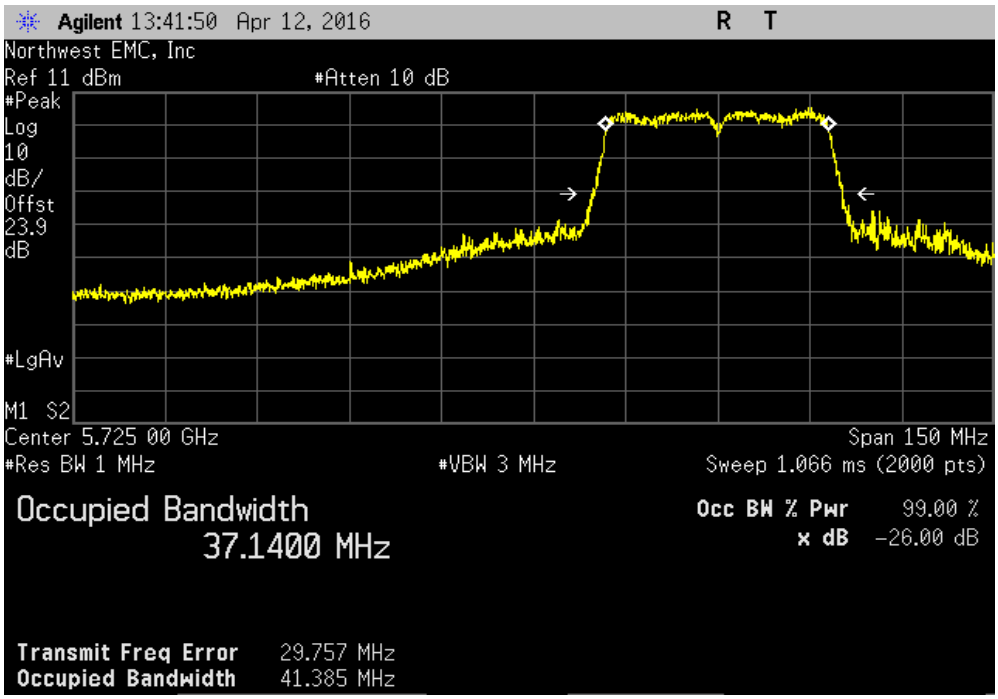
2x2 MIMO, Chain B, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(ac) MCS0						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



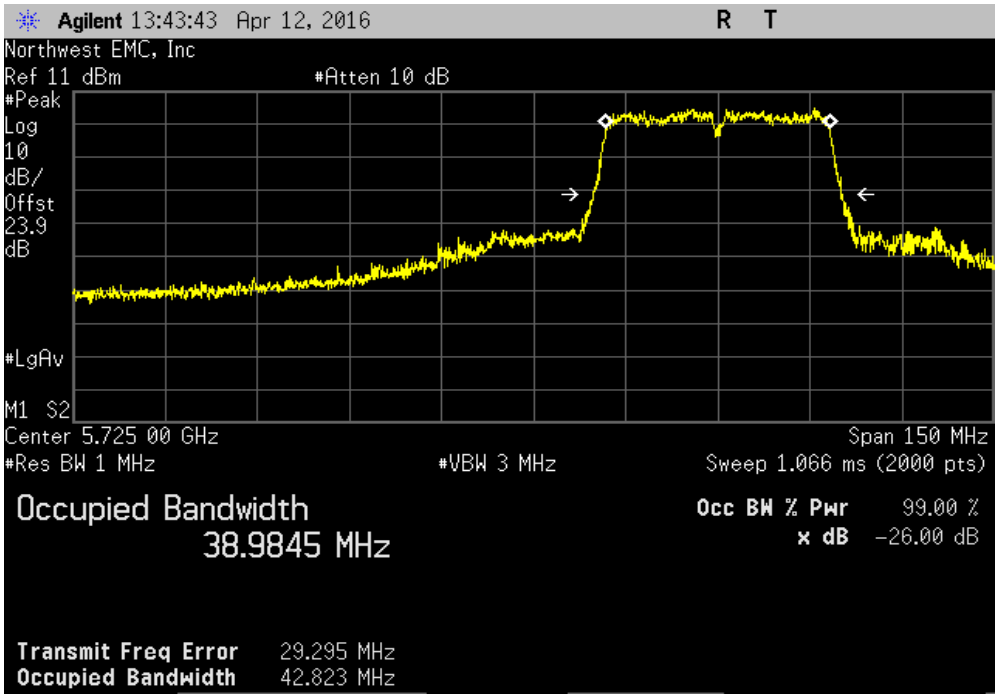
2x2 MIMO, Chain B, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(ac) MCS8						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



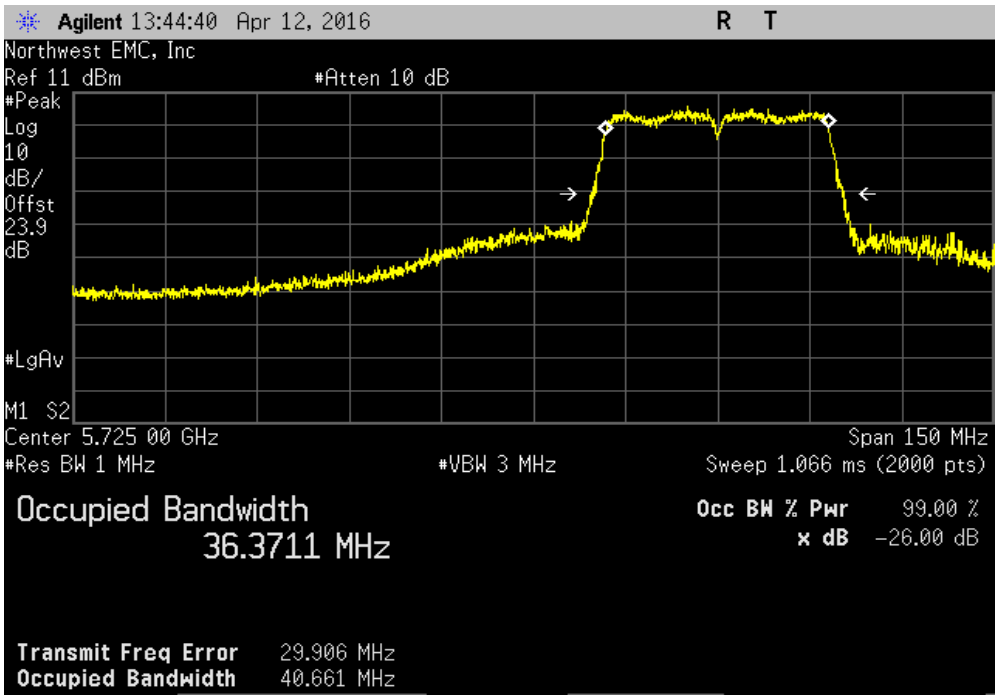
2x2 MIMO, Chain B, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(n) MCS8						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



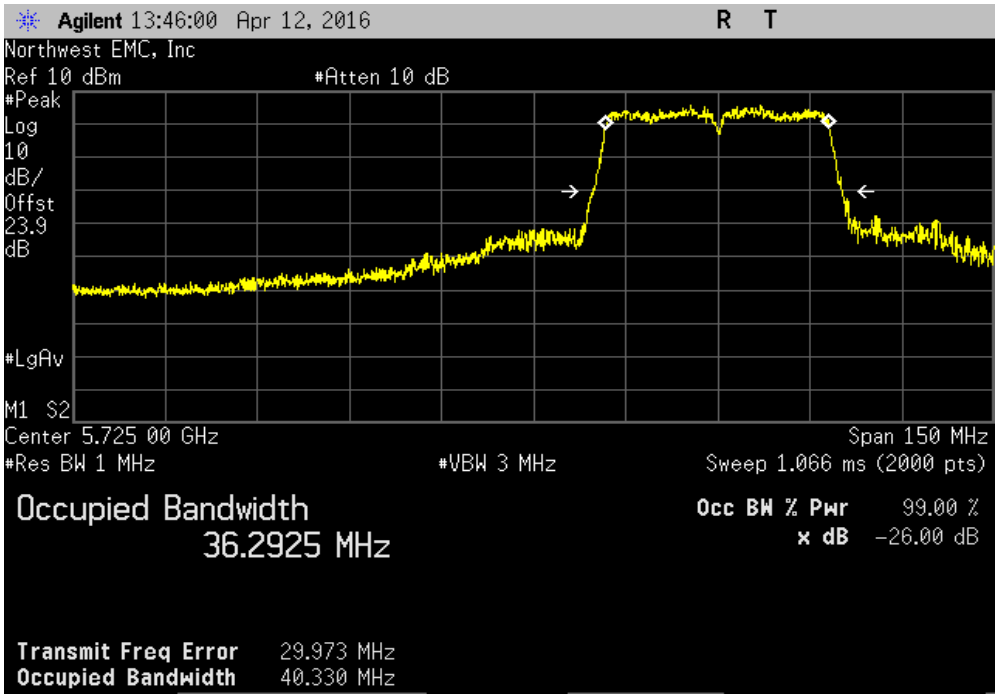
2x2 MIMO, Chain B, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(n) MCS15						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



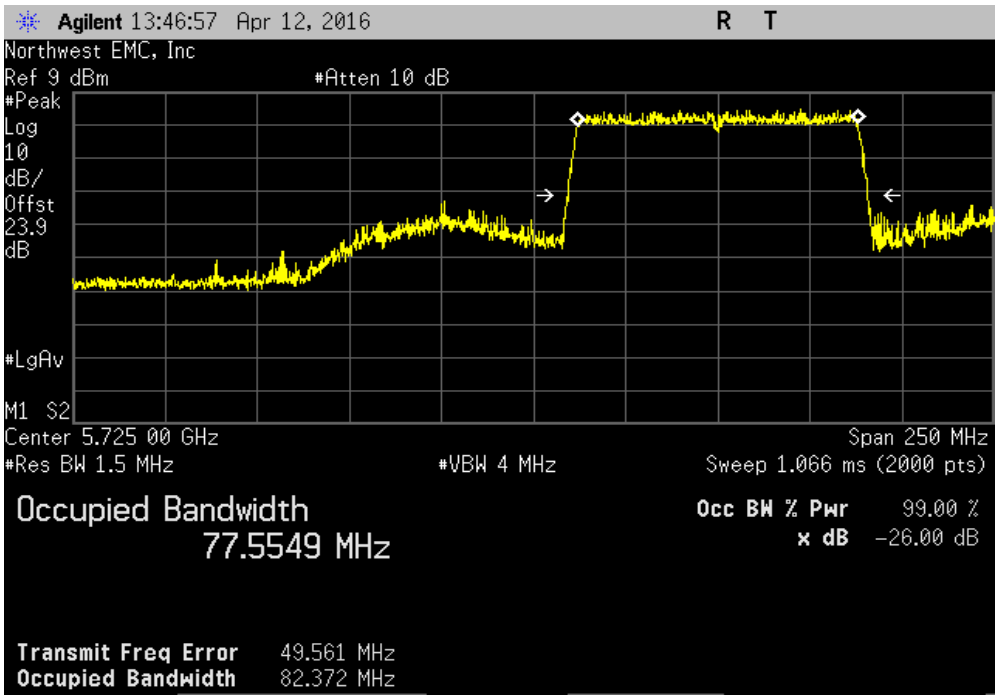
2x2 MIMO, Chain B, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(ac) MCS0						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



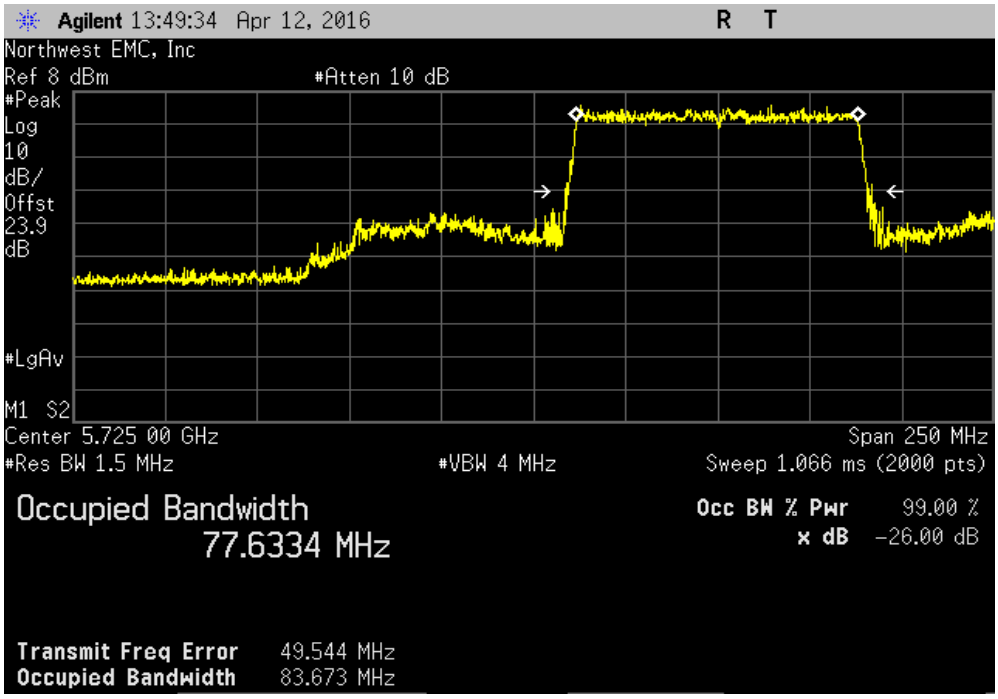
2x2 MIMO, Chain B, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(ac) MCS9						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



2x2 MIMO, Chain B, 80MHz BW, Mid Channel, Ch 149/161 - 5775 MHz, 802.11(ac) MCS0						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



2x2 MIMO, Chain B, 80MHz BW, Mid Channel, Ch 149/161 - 5775 MHz, 802.11(ac) MCS9						
				OBW Within Band	Band Edge (MHz)	Result
				Yes	5725	Pass



MAXIMUM POWER SPECTRAL DENSITY

NORTHWEST EMC

XMit 2015.01.14

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval (mo)
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFE	6/22/2015	12
Attenuator	Fairview Microwave	SA4014-20	TKV	3/4/2016	12
Block - DC	Fairview Microwave	SD3379	AMJ	6/6/2015	12
Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	NC5	6/6/2015	12
Generator - Signal	Agilent	N5183A	TID	11/26/2014	36

TEST DESCRIPTION

The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum. The radio was operated in the modes as shown in the following data sheets.

A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input.

Prior to measuring maximum power spectral density, the emission bandwidth (B) was measured. The method of measuring the emission bandwidth and the associated data are found elsewhere in this test report

The maximum power spectral density was measured using ANSI C63.10, Method SA-2 (RMS detection and trace averaging across the on and off times of the EUT transmission and use of a duty cycle correction factor), consistent with the method used for maximum conducted output power.

The spectrum analyzer settings were set per the guidance as well as the following specifics:

-Resolution Bandwidth of 510 kHz

-RMS Detector

-Trace average 100 traces in power averaging mode

The peak power spectral density (PPSD) was determined to be the highest level found across the emission in the reference bandwidth after 100 sweeps of power averaging (not video averaging).

A duty cycle correction factor was added to the measurement using the results of the formula of 10*LOG(1/D) where D is the

MAXIMUM POWER SPECTRAL DENSITY

NORTHWEST EMC

XMit 2015.01.14

EUT:	Model 1631			**Work Order:**	MCSO1748
Serial Number:	041152140753			**Date:**	04/12/16
Customer:	Microsoft Corporation			**Temperature:**	23°C
Attendees:	None			**Humidity:**	33%
Project:	None			**Barometric Pres.:**	1019 mbar
Tested by:	Richard Mellroth	**Power:**	110VAC/60Hz	**Job Site:**	NC02

TEST SPECIFICATIONS	Test Method
FCC 15.407:2016	ANSI C63.10:2013

COMMENTS

Power setting at 11dBm for 20MHz and 40MHz channels. Power Setting at 10dBm for 80MHz channels. Client supplied adapter cable loss of 1.3dB included in reference level offset. Signal setting at > 95% Duty Cycle.

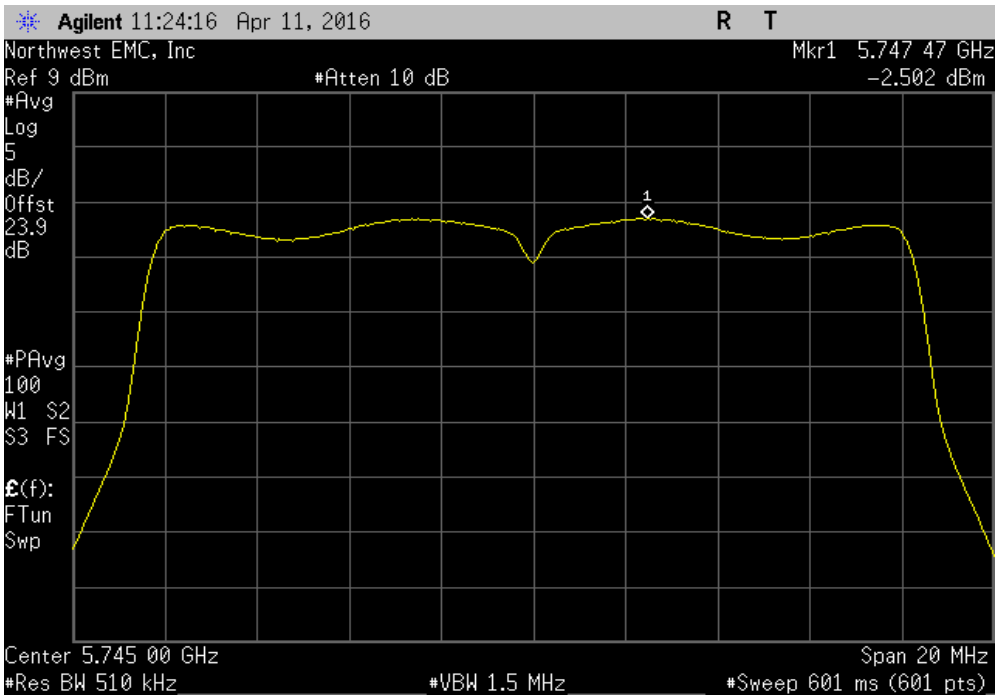
DEVIATIONS FROM TEST STANDARD

None

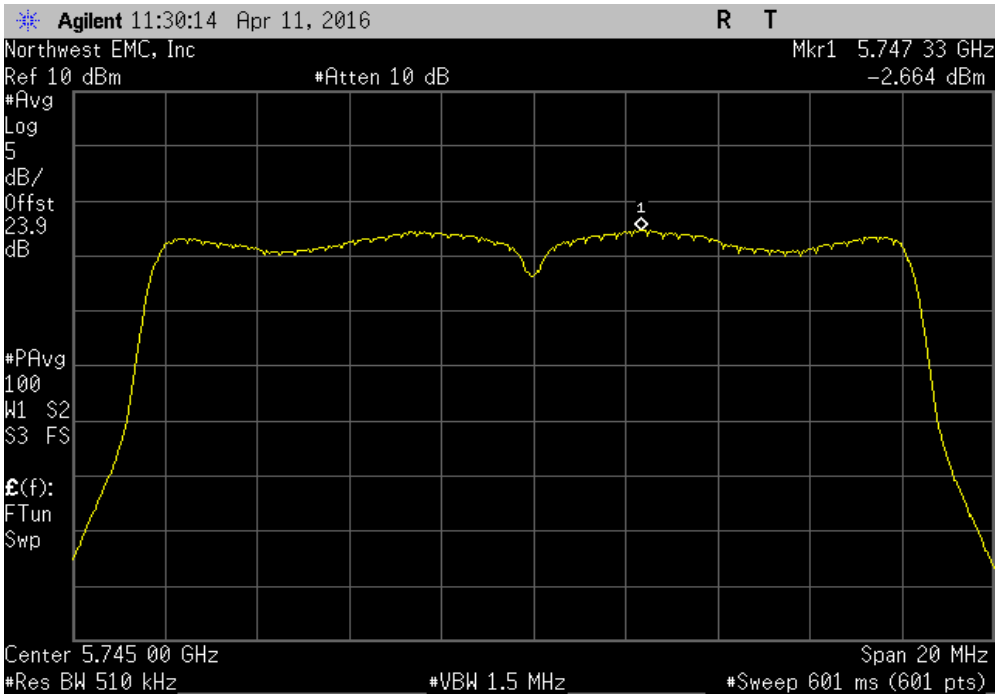
Configuration #	1	Signature

			Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Density (dBm/Ref BW)	Limit ≤ (dBm / Ref BW)	Results
SISO, Chain A							
	20MHz BW						
		Low Channel, Ch 149 - 5745 MHz					
		802.11(a) 6 Mbps	-2.502	0	-2.5	30	Pass
		802.11(a) 36 Mbps	-2.664	0.3	-2.4	30	Pass
		802.11(a) 54 Mbps	-2.77	0.4	-2.3	30	Pass
		802.11(n) MCS0	-2.671	0	-2.6	30	Pass
		802.11(n) MCS7	-3.084	0.4	-2.7	30	Pass
		802.11(ac) MCS0	-2.737	0	-2.7	30	Pass
		802.11(ac) MCS8	-2.88	0.4	-2.5	30	Pass
		Mid Channel, Ch 157 - 5785 MHz					
		802.11(a) 6 Mbps	-2.455	0	-2.4	30	Pass
		802.11(a) 36 Mbps	-2.545	0.3	-2.3	30	Pass
		802.11(a) 54 Mbps	-2.632	0.4	-2.2	30	Pass
		802.11(n) MCS0	-2.632	0	-2.6	30	Pass
		802.11(n) MCS7	-2.914	0.4	-2.5	30	Pass
		802.11(ac) MCS0	-2.587	0	-2.5	30	Pass
		802.11(ac) MCS8	-2.703	0.4	-2.3	30	Pass
		High Channel, Ch 165 - 5825 MHz					
		802.11(a) 6 Mbps	-2.338	0	-2.3	30	Pass
		802.11(a) 36 Mbps	-2.618	0.3	-2.4	30	Pass
		802.11(a) 54 Mbps	-2.606	0.4	-2.2	30	Pass
		802.11(n) MCS0	-2.661	0	-2.6	30	Pass
		802.11(n) MCS7	-2.718	0.4	-2.3	30	Pass
		802.11(ac) MCS0	-2.633	0	-2.6	30	Pass
		802.11(ac) MCS8	-2.672	0.4	-2.3	30	Pass
	40MHz BW						
		Low Channel, Ch 149/153 - 5755 MHz					
		802.11(n) MCS0	-6.021	0.2	-5.8	30	Pass
		802.11(n) MCS7	-5.997	1.5	-4.5	30	Pass
		802.11(ac) MCS0	-5.947	0.2	-5.8	30	Pass
		802.11(ac) MCS9	-5.88	1.6	-4.2	30	Pass
		High Channel, Ch 157/161 - 5795 MHz					
		802.11(n) MCS0	-5.898	0.2	-5.7	30	Pass
		802.11(n) MCS7	-6.111	1.5	-4.6	30	Pass
		802.11(ac) MCS0	-5.913	0.2	-5.8	30	Pass
		802.11(ac) MCS9	-5.972	1.6	-4.3	30	Pass
	80MHz BW						
		Mid Channel, Ch 149/161 - 5775 MHz					
		802.11(ac) MCS0	-11.041	0.3	-10.7	30	Pass
		802.11(ac) MCS9	-10.952	1.8	-9.1	30	Pass
SISO, Chain B							
	20MHz BW						
		Low Channel, Ch 149 - 5745 MHz					
		802.11(a) 6 Mbps	-2.858	0	-2.8	30	Pass
		802.11(a) 36 Mbps	-2.547	0.3	-2.3	30	Pass
		802.11(a) 54 Mbps	-2.9	0.4	-2.5	30	Pass
		802.11(n) MCS0	-3.032	0	-3	30	Pass
		802.11(n) MCS7	-3.097	0.4	-2.7	30	Pass
		802.11(ac) MCS0	-2.956	0	-2.9	30	Pass
		802.11(ac) MCS8	-3.018	0.4	-2.6	30	Pass
		Mid Channel, Ch 157 - 5785 MHz					
		802.11(a) 6 Mbps	-2.417	0	-2.4	30	Pass
		802.11(a) 36 Mbps	-2.785	0.3	-2.5	30	Pass
		802.11(a) 54 Mbps	-2.773	0.4	-2.4	30	Pass
		802.11(n) MCS0	-2.794	0	-2.8	30	Pass
		802.11(n) MCS7	-2.912	0.4	-2.5	30	Pass
		802.11(ac) MCS0	-2.79	0	-2.8	30	Pass
		802.11(ac) MCS8	-2.927	0.4	-2.5	30	Pass
		High Channel, Ch 165 - 5825 MHz					
		802.11(a) 6 Mbps	-2.57	0	-2.5	30	Pass
		802.11(a) 36 Mbps	-2.716	0.3	-2.5	30	Pass
		802.11(a) 54 Mbps	-2.794	0.4	-2.4	30	Pass
		802.11(n) MCS0	-2.858	0	-2.8	30	Pass
		802.11(n) MCS7	-2.945	0.4	-2.5	30	Pass
		802.11(ac) MCS0	-2.743	0	-2.7	30	Pass
		802.11(ac) MCS8	-2.766	0.4	-2.4	30	Pass
	40MHz BW						
		Low Channel, Ch 149/153 - 5755 MHz					
		802.11(n) MCS0	-5.84	0.2	-5.7	30	Pass
		802.11(n) MCS7	-6.31	1.5	-4.8	30	Pass
		802.11(ac) MCS0	-5.888	0.2	-5.7	30	Pass
		802.11(ac) MCS9	-5.786	1.6	-4.2	30	Pass
		High Channel, Ch 157/161 - 5795 MHz					
		802.11(n) MCS0	-5.836	0.2	-5.7	30	Pass
		802.11(n) MCS7	-6.224	1.5	-4.7	30	Pass
		802.11(ac) MCS0	-5.785	0.2	-5.6	30	Pass
		802.11(ac) MCS9	-6.023	1.7	-4.4	30	Pass
	80MHz BW						
		Mid Channel, Ch 149/161 - 5775 MHz					
		802.11(ac) MCS0	-10.331	0.2	-10.1	30	Pass
		802.11(ac) MCS9	-10.294	1.9	-8.4	30	Pass

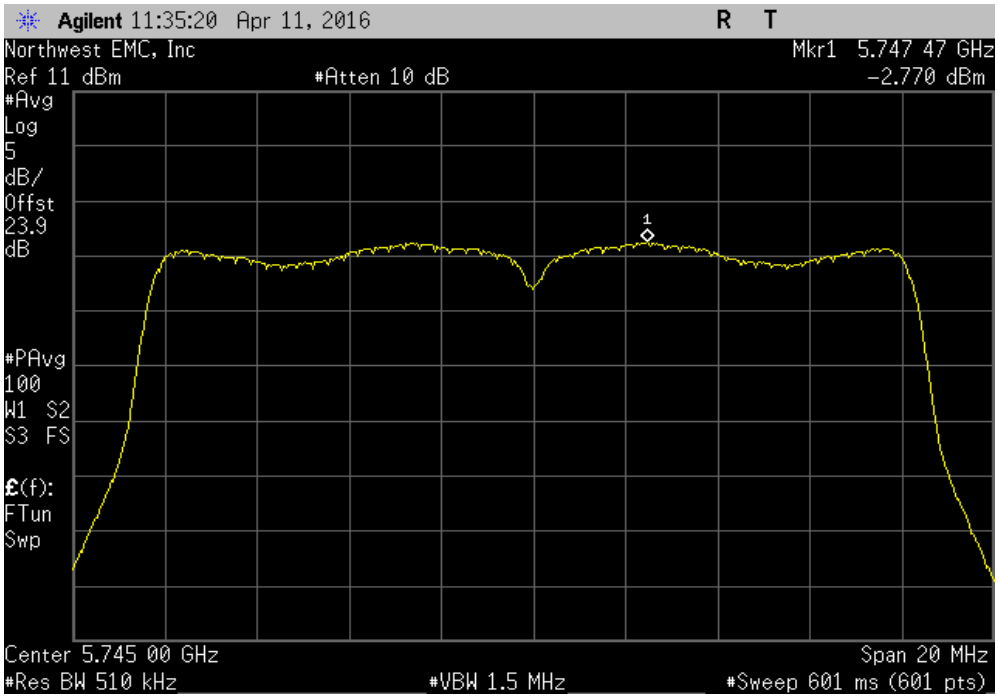
SISO, Chain A, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(a) 6 Mbps						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.502	0		-2.5	30	Pass



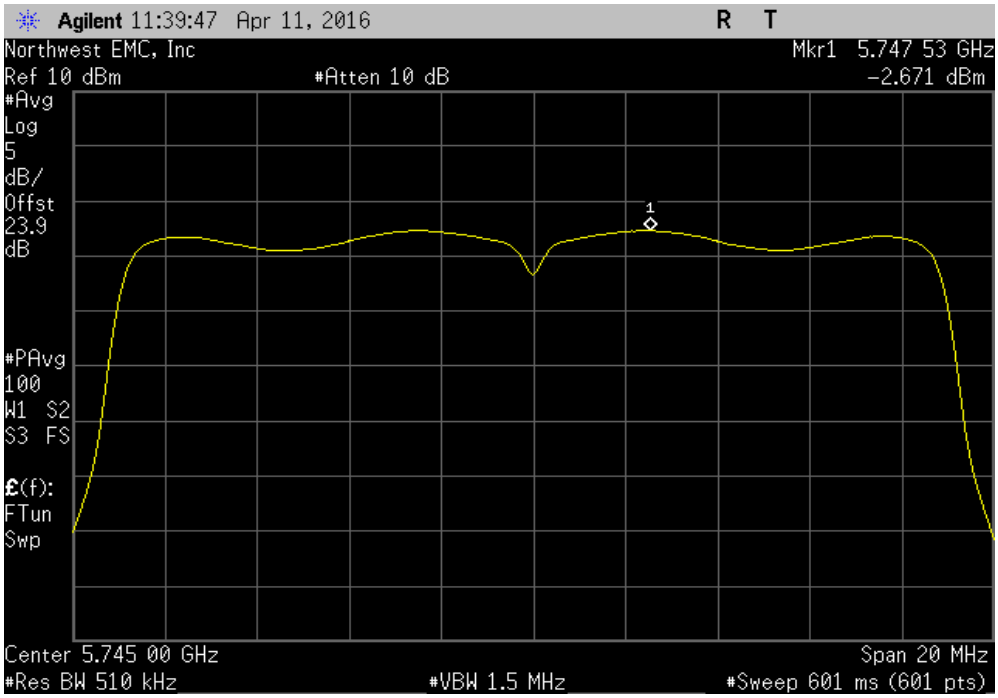
SISO, Chain A, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(a) 36 Mbps						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.664	0.3		-2.4	30	Pass



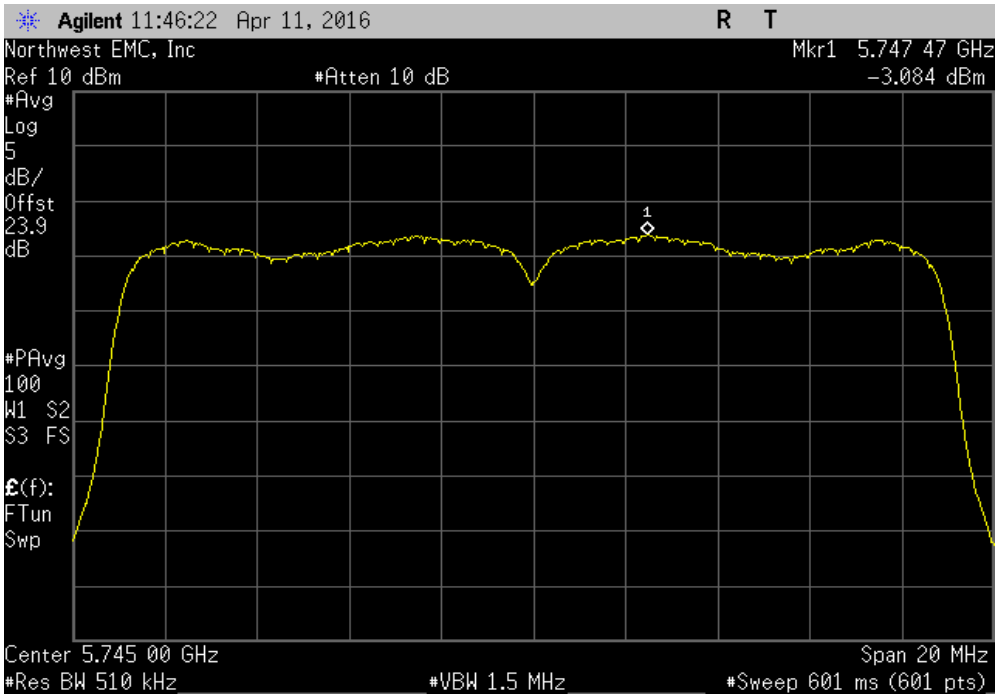
SISO, Chain A, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(a) 54 Mbps						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.77	0.4		-2.3	30	Pass



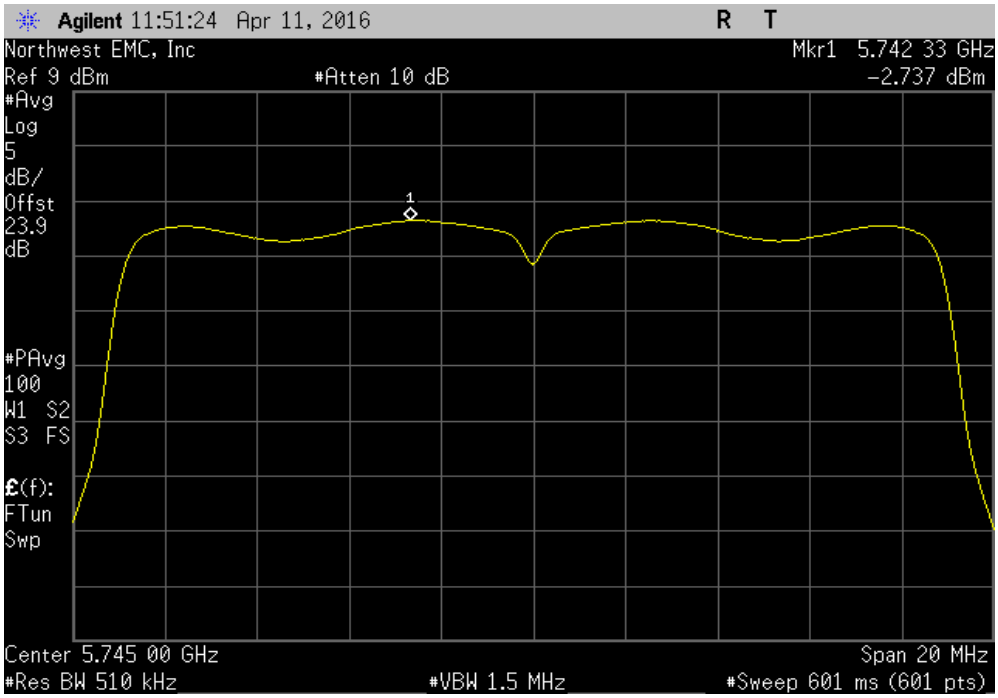
SISO, Chain A, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(n) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.671	0		-2.6	30	Pass



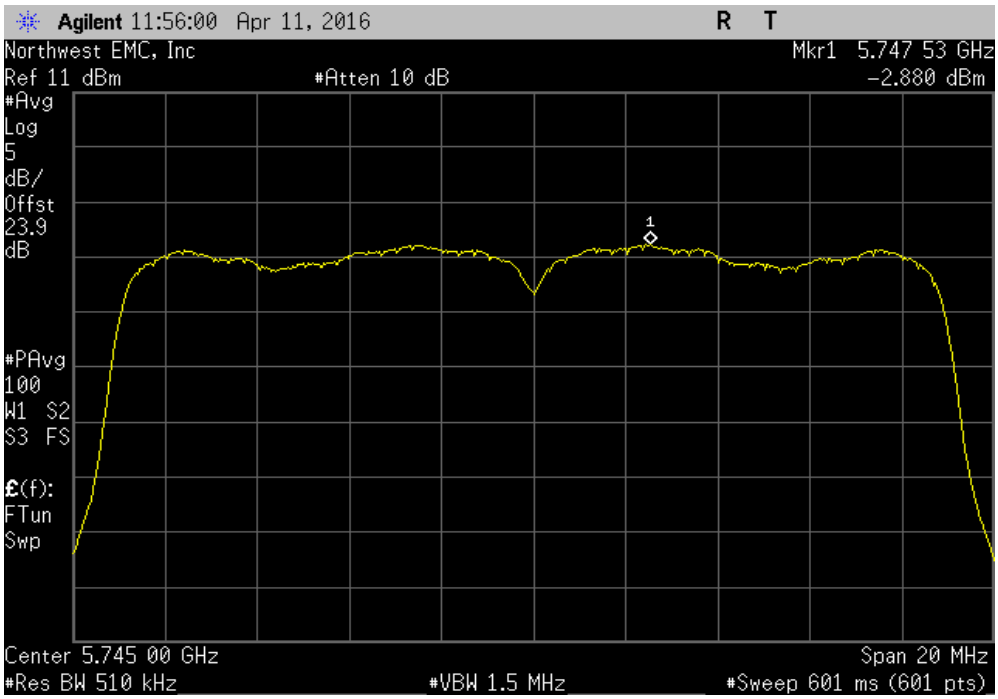
SISO, Chain A, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(n) MCS7						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-3.084	0.4		-2.7	30	Pass



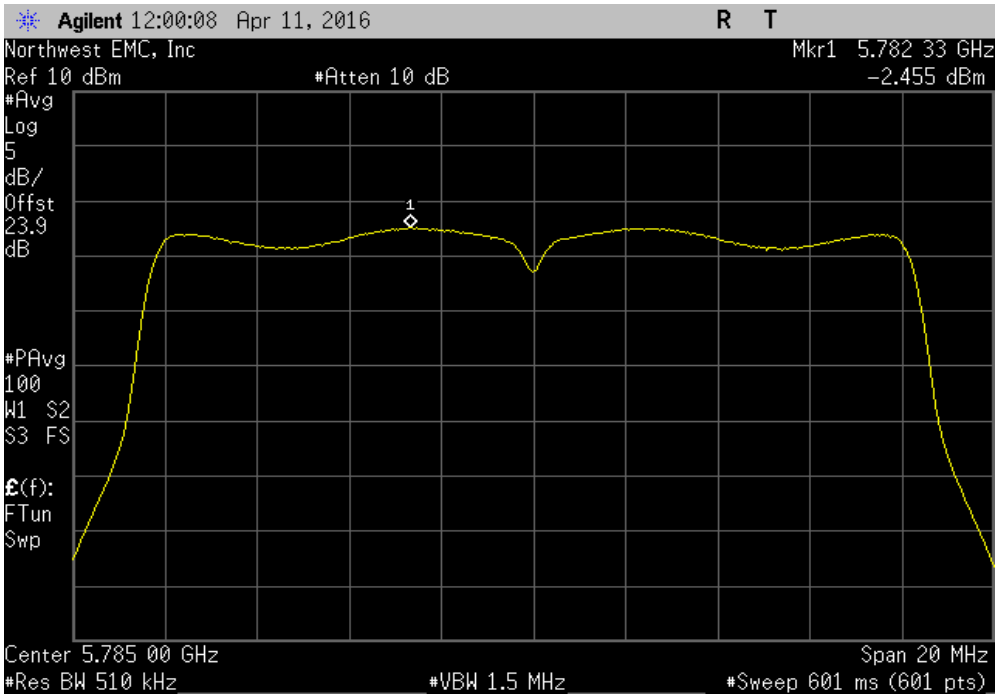
SISO, Chain A, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.737	0		-2.7	30	Pass



SISO, Chain A, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(ac) MCS8						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.88	0.4		-2.5	30	Pass

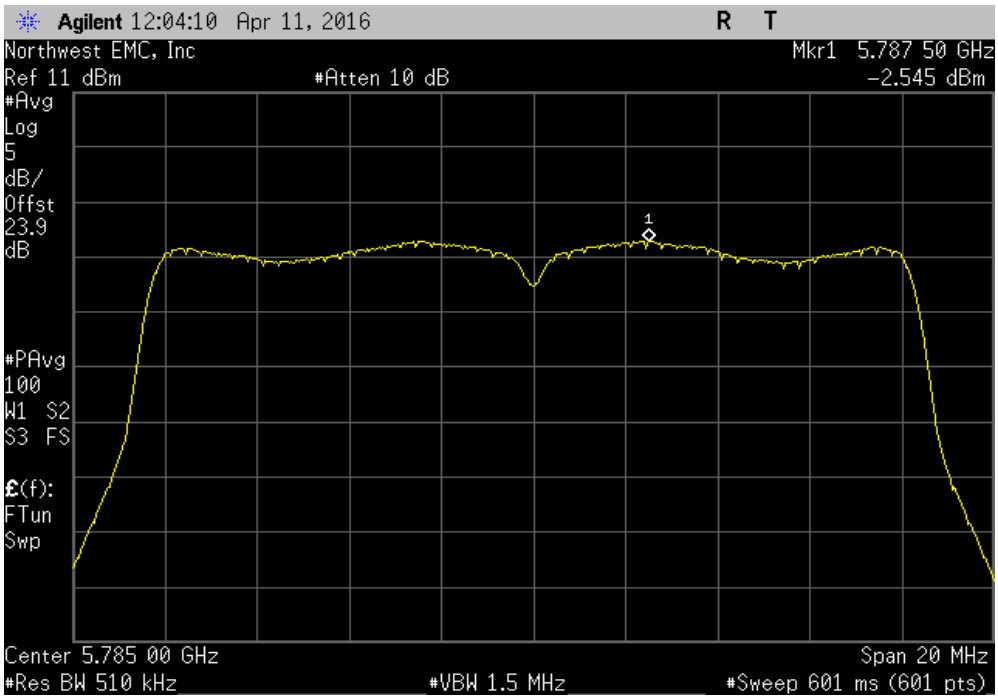


SISO, Chain A, 20MHz BW, Mid Channel, Ch 157 - 5785 MHz, 802.11(a) 6 Mbps						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.455	0		-2.4	30	Pass



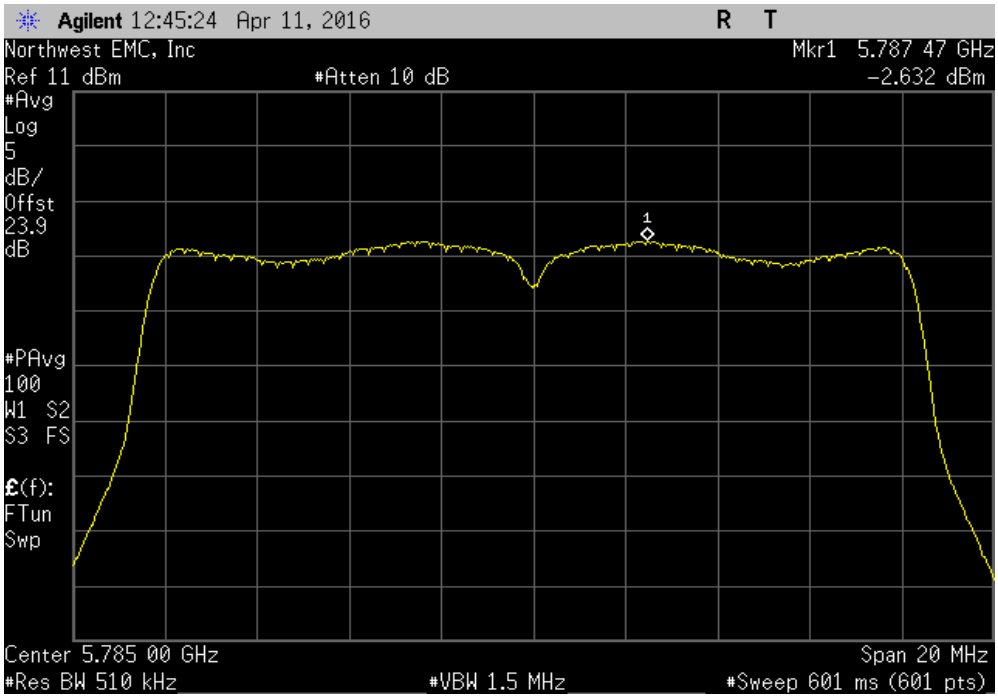
SISO, Chain A, 20MHz BW, Mid Channel, Ch 157 - 5785 MHz, 802.11(a) 36 Mbps

	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.545	0.3		-2.3	30	Pass

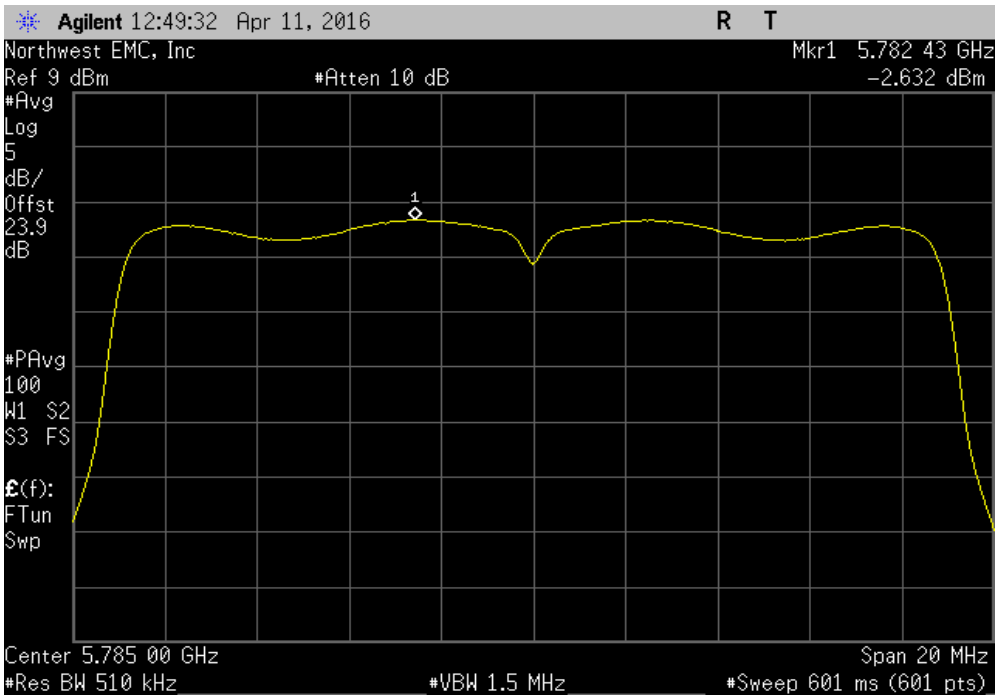


SISO, Chain A, 20MHz BW, Mid Channel, Ch 157 - 5785 MHz, 802.11(a) 54 Mbps

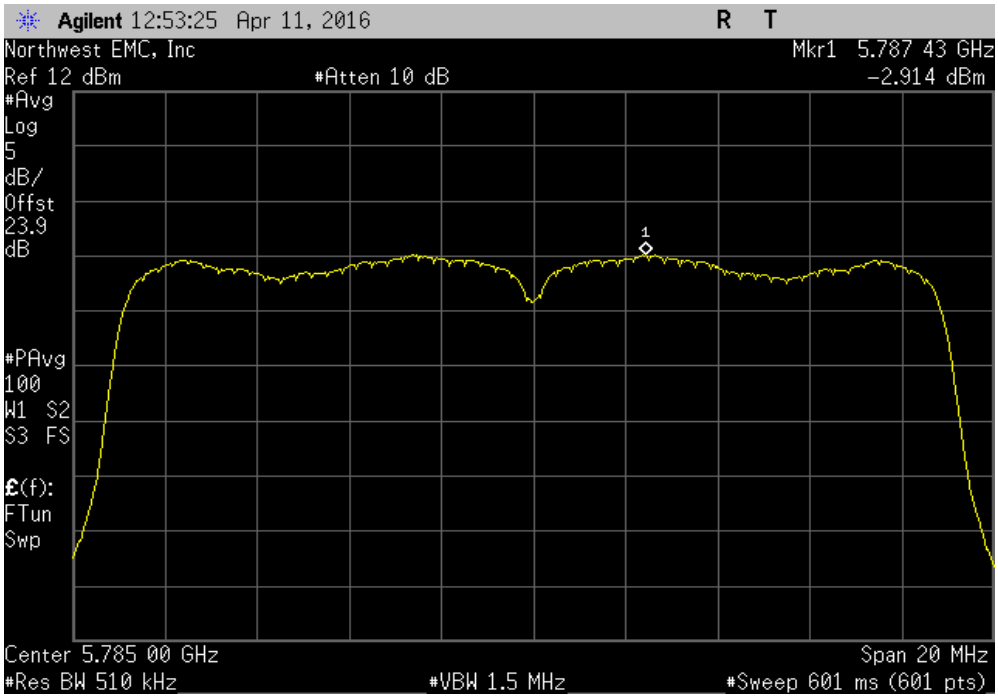
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.632	0.4		-2.2	30	Pass



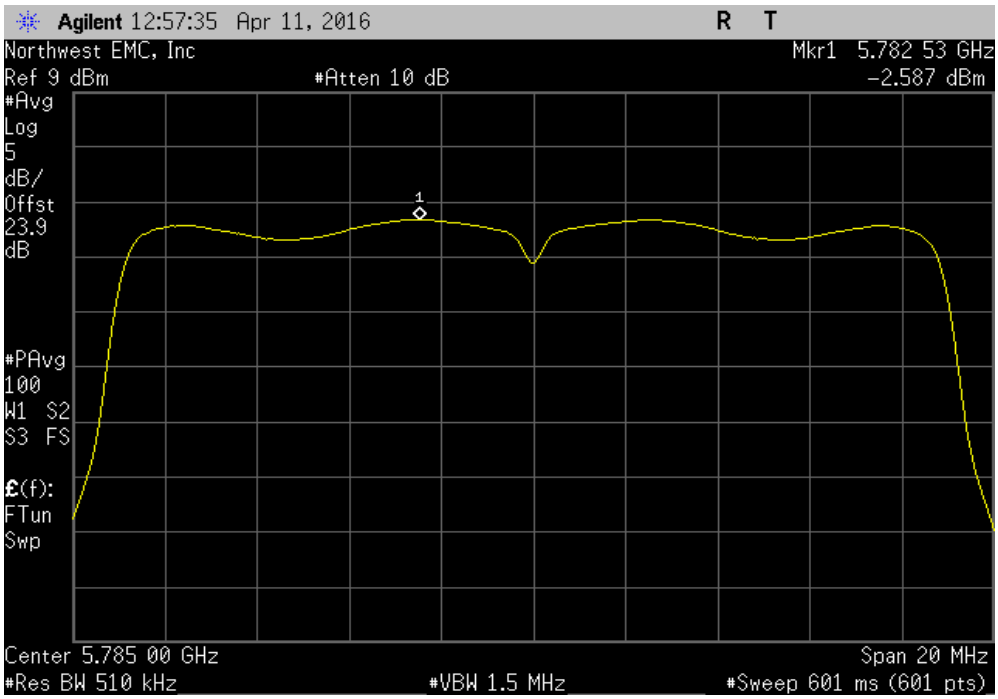
SISO, Chain A, 20MHz BW, Mid Channel, Ch 157 - 5785 MHz, 802.11(n) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.632	0		-2.6	30	Pass



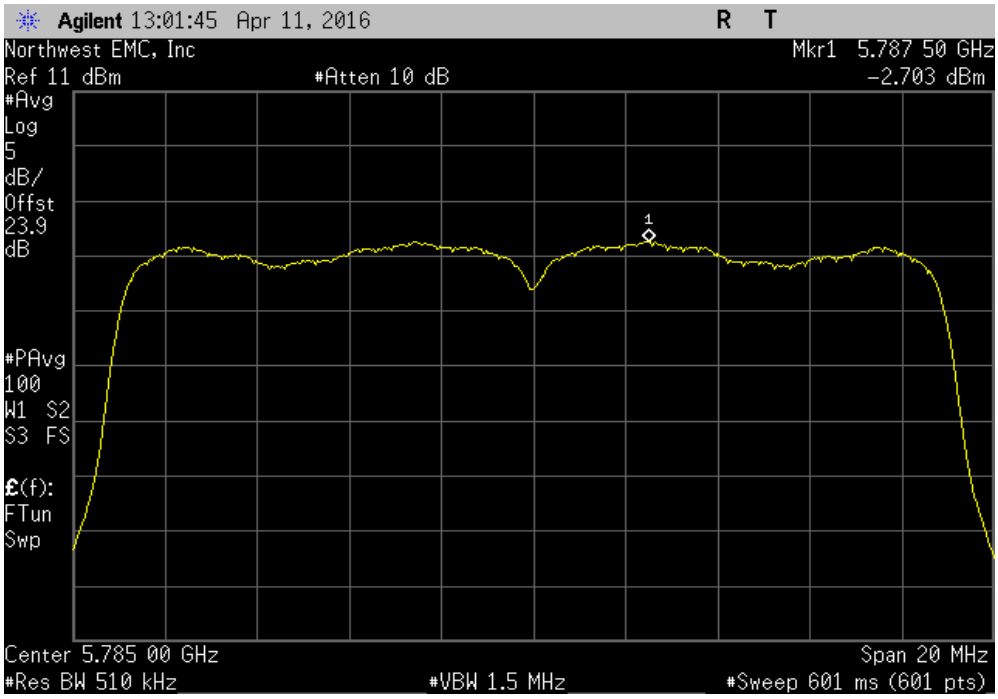
SISO, Chain A, 20MHz BW, Mid Channel, Ch 157 - 5785 MHz, 802.11(n) MCS7						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.914	0.4		-2.5	30	Pass



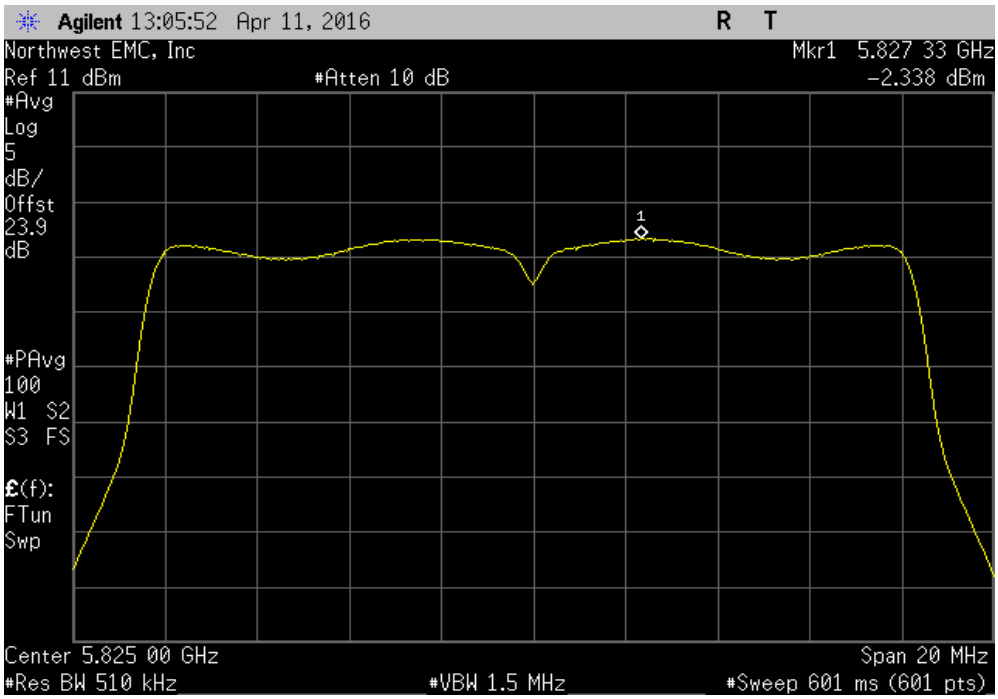
SISO, Chain A, 20MHz BW, Mid Channel, Ch 157 - 5785 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.587	0		-2.5	30	Pass



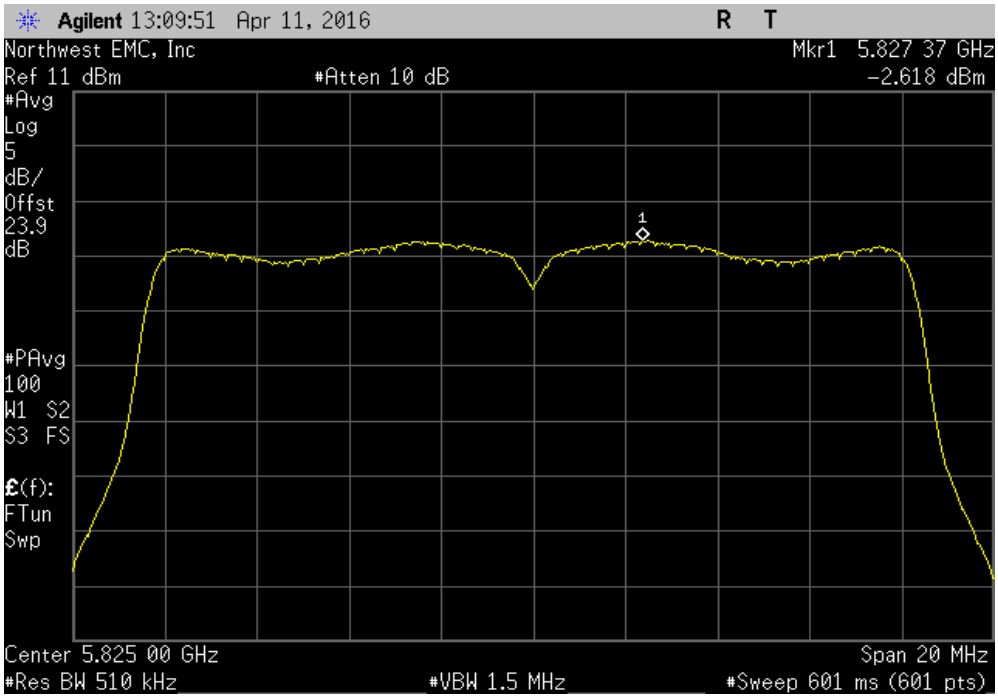
SISO, Chain A, 20MHz BW, Mid Channel, Ch 157 - 5785 MHz, 802.11(ac) MCS8						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.703	0.4		-2.3	30	Pass



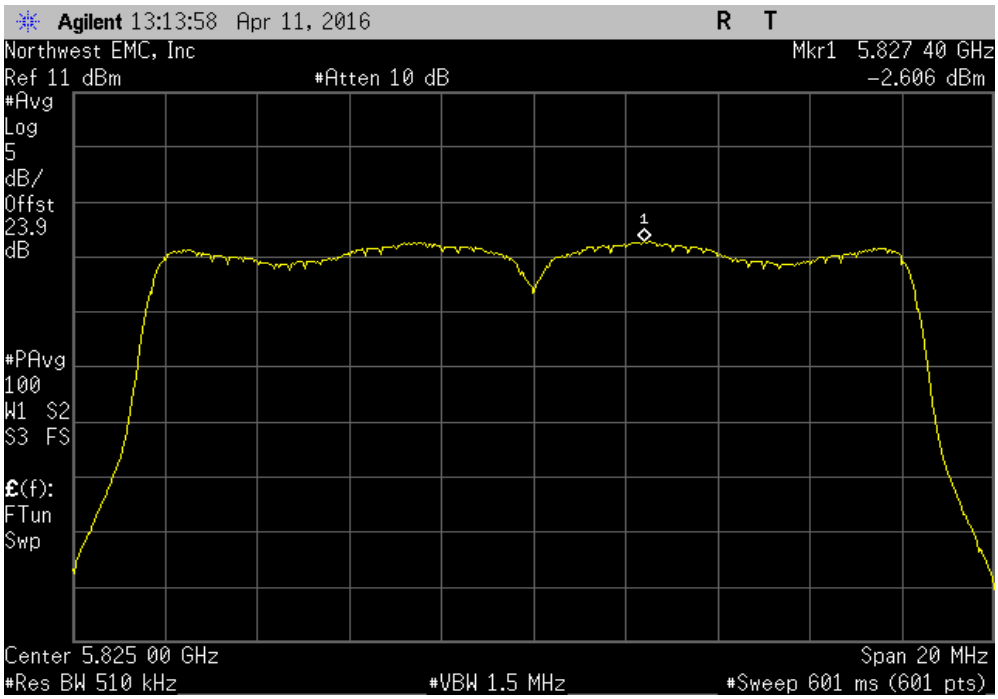
SISO, Chain A, 20MHz BW, High Channel, Ch 165 - 5825 MHz, 802.11(a) 6 Mbps						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.338	0		-2.3	30	Pass



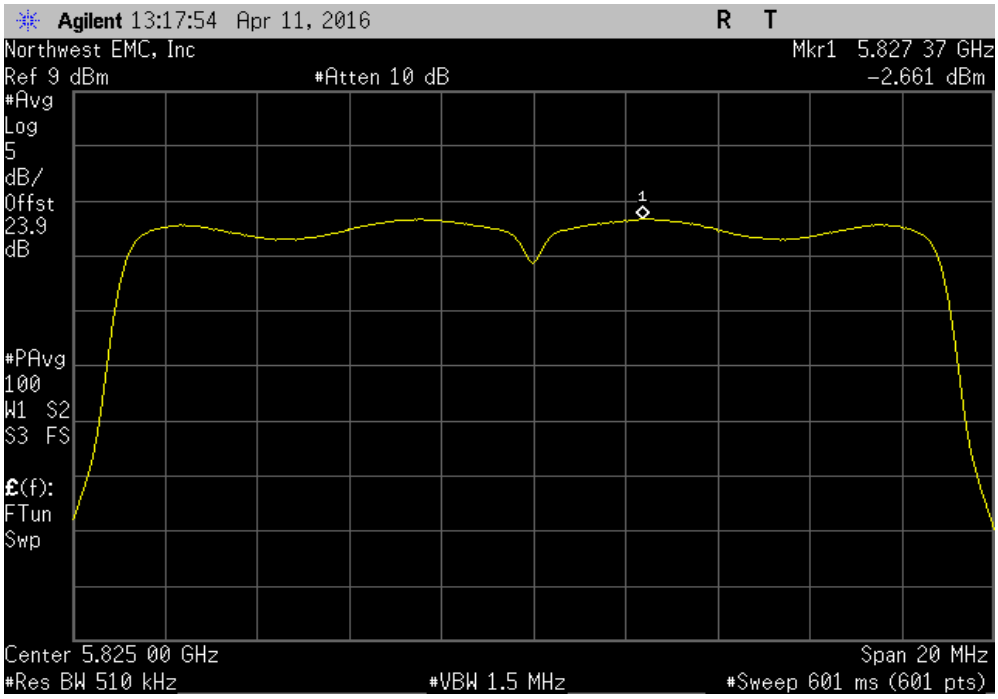
SISO, Chain A, 20MHz BW, High Channel, Ch 165 - 5825 MHz, 802.11(a) 36 Mbps						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.618	0.3		-2.4	30	Pass



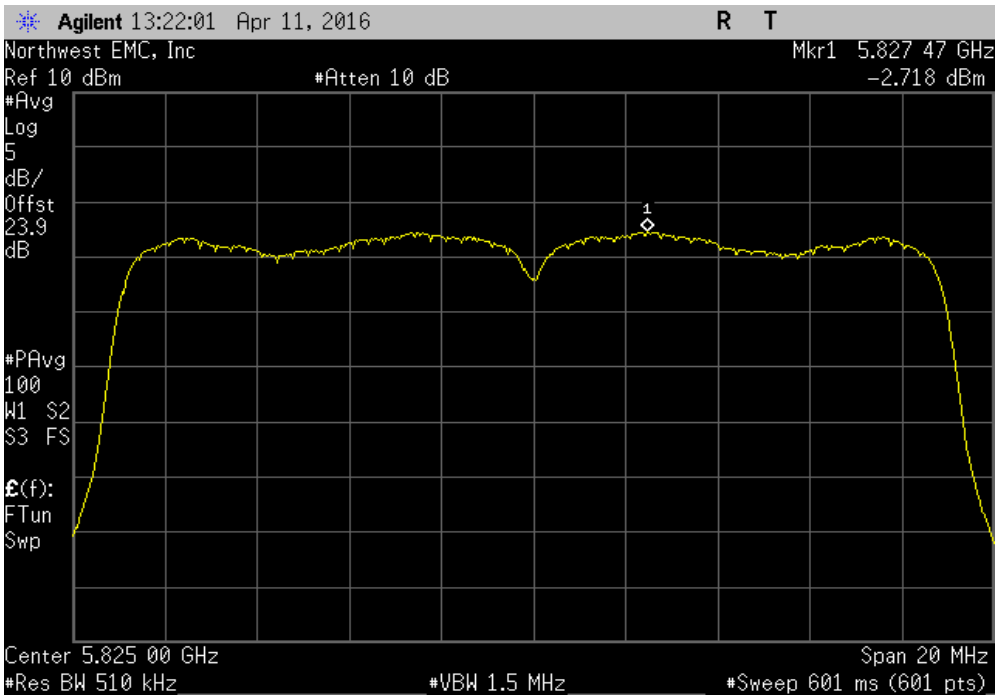
SISO, Chain A, 20MHz BW, High Channel, Ch 165 - 5825 MHz, 802.11(a) 54 Mbps						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.606	0.4		-2.2	30	Pass



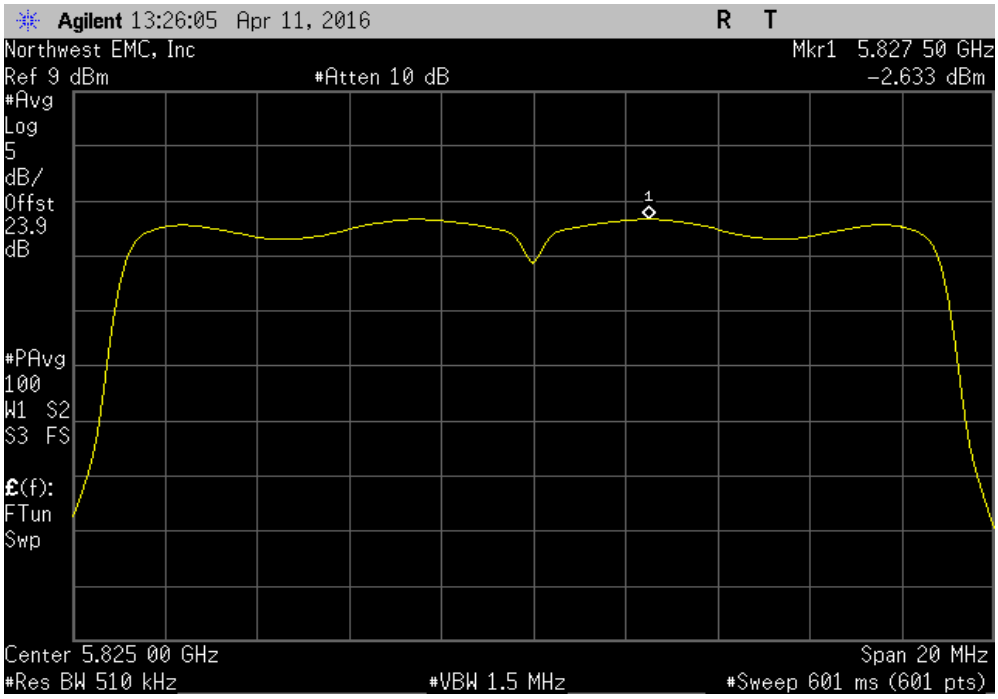
SISO, Chain A, 20MHz BW, High Channel, Ch 165 - 5825 MHz, 802.11(n) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.661	0		-2.6	30	Pass



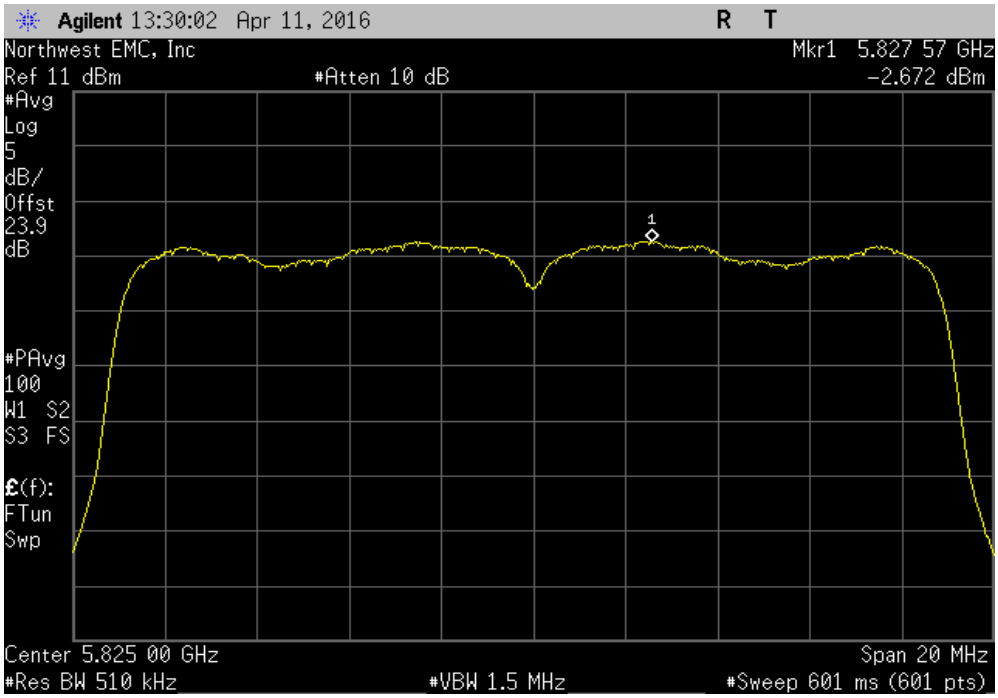
SISO, Chain A, 20MHz BW, High Channel, Ch 165 - 5825 MHz, 802.11(n) MCS7						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.718	0.4		-2.3	30	Pass



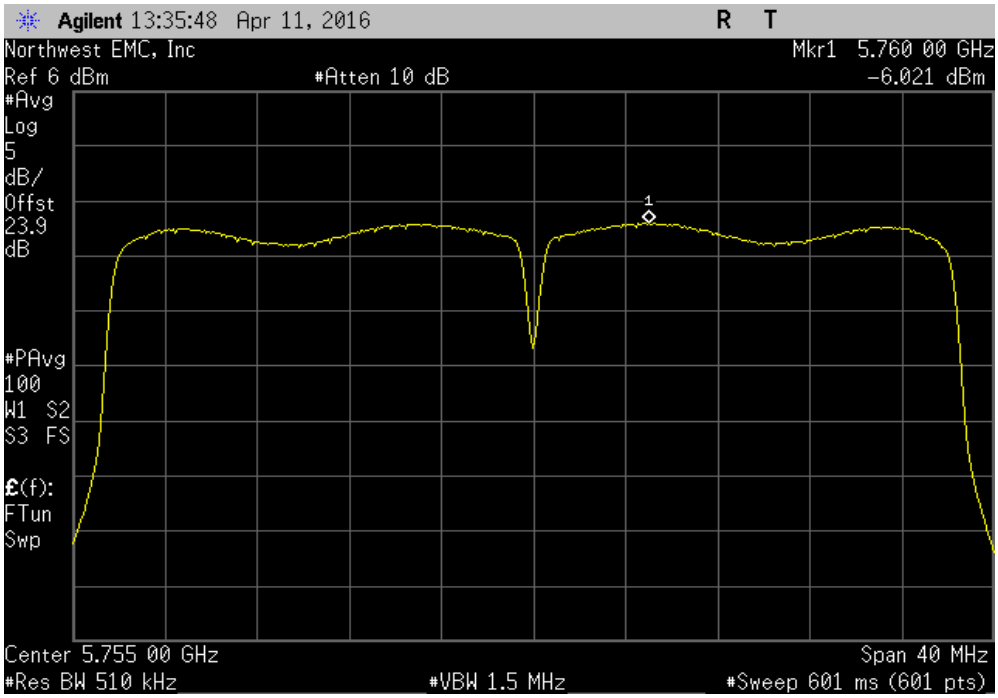
SISO, Chain A, 20MHz BW, High Channel, Ch 165 - 5825 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.633	0		-2.6	30	Pass



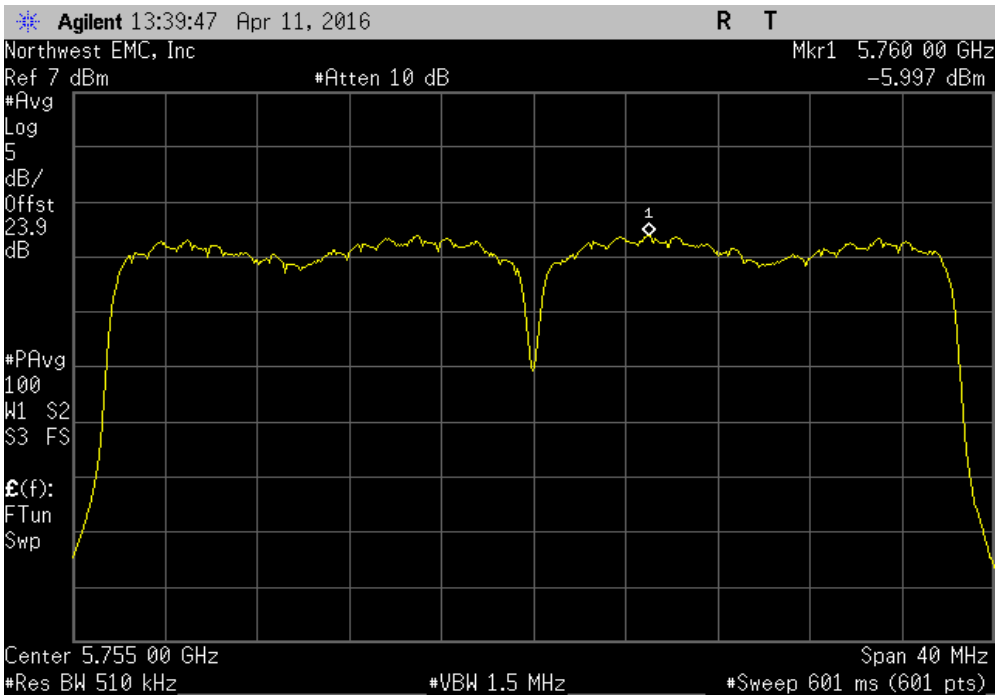
SISO, Chain A, 20MHz BW, High Channel, Ch 165 - 5825 MHz, 802.11(ac) MCS8						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.672	0.4		-2.3	30	Pass



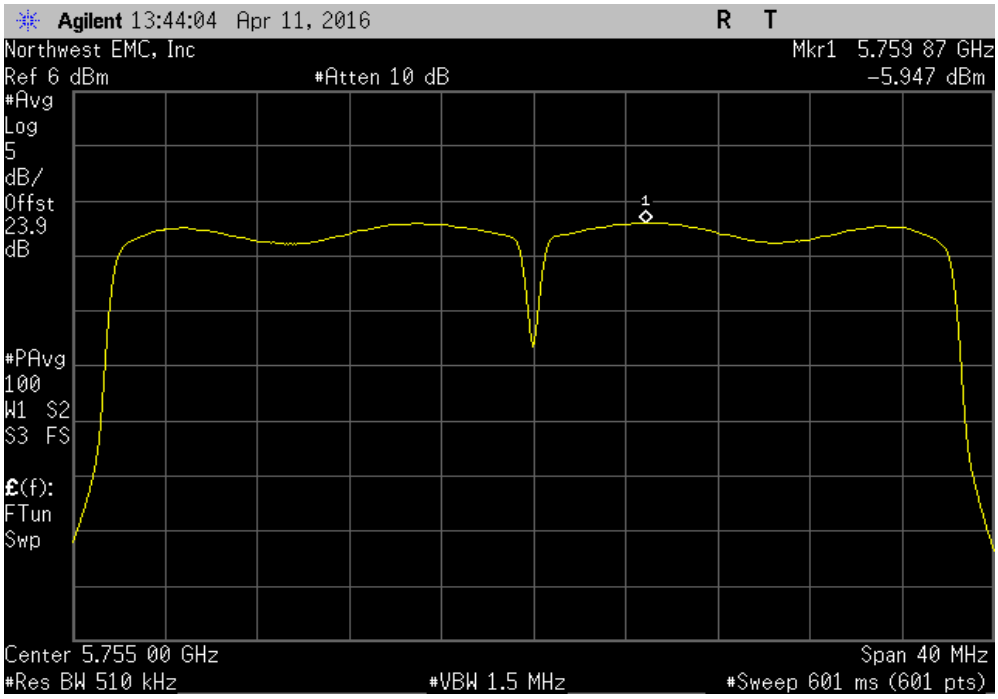
SISO, Chain A, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(n) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-6.021	0.2		-5.8	30	Pass



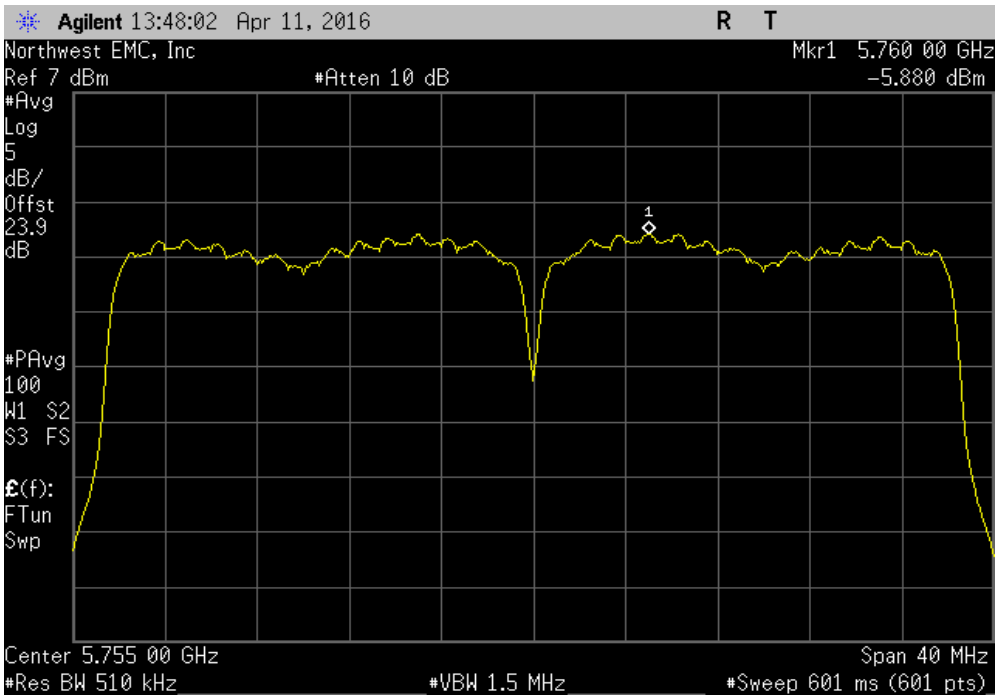
SISO, Chain A, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(n) MCS7						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-5.997	1.5		-4.5	30	Pass



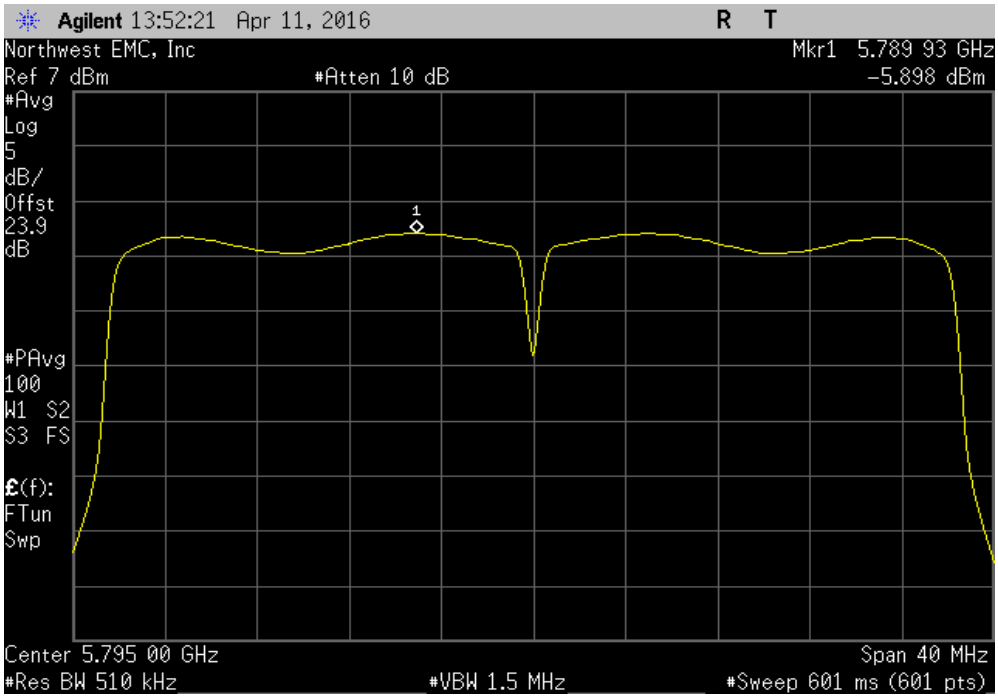
SISO, Chain A, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-5.947	0.2		-5.8	30	Pass



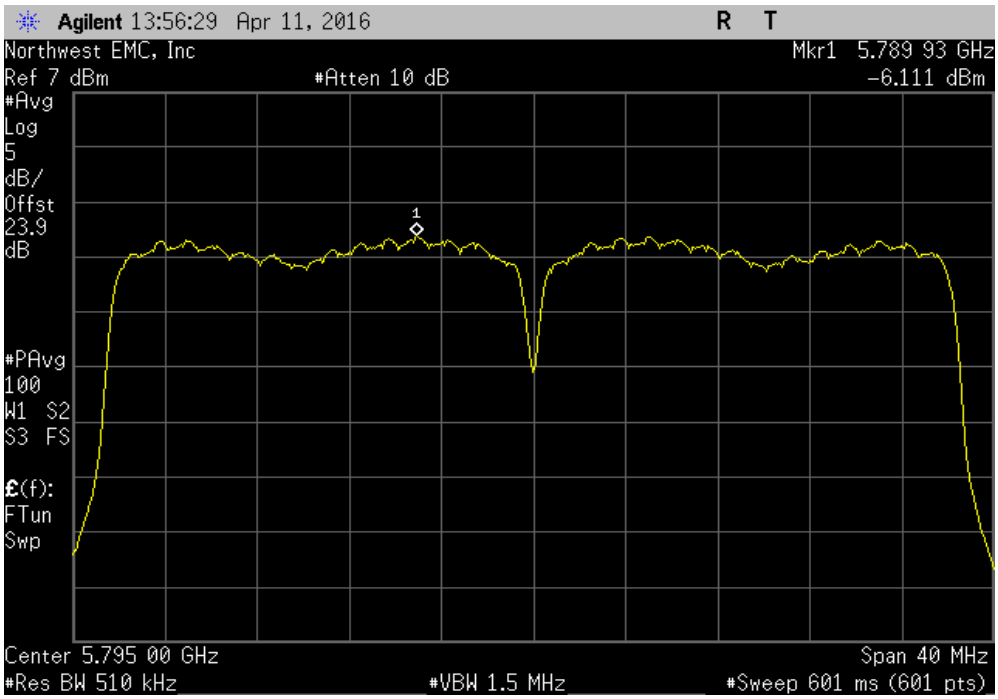
SISO, Chain A, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(ac) MCS9						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-5.88	1.6		-4.2	30	Pass



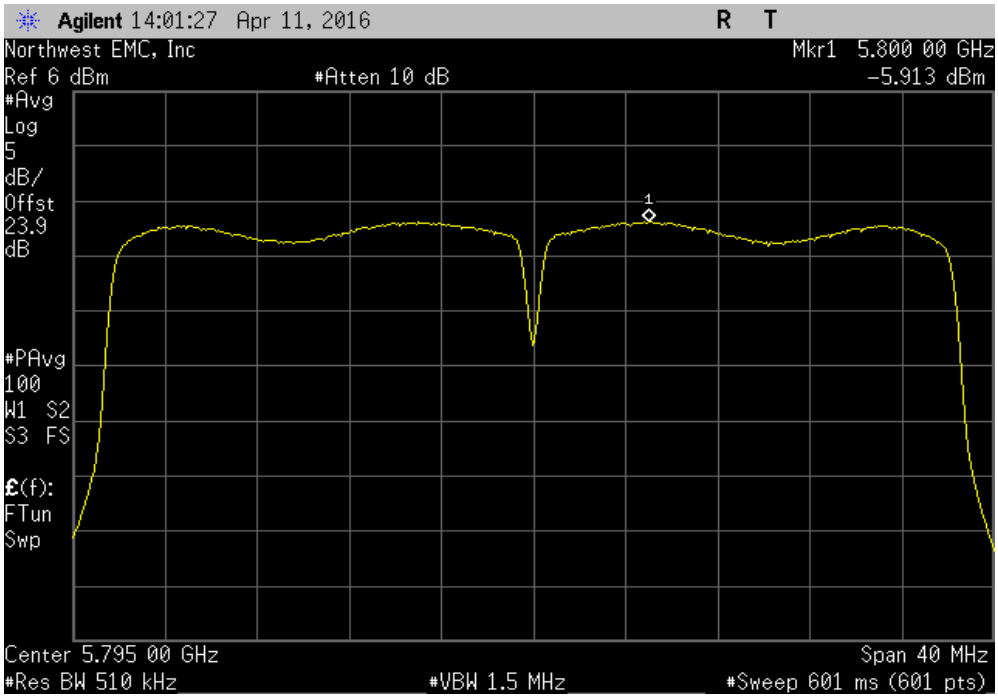
SISO, Chain A, 40MHz BW, High Channel, Ch 157/161 - 5795 MHz, 802.11(n) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-5.898	0.2		-5.7	30	Pass



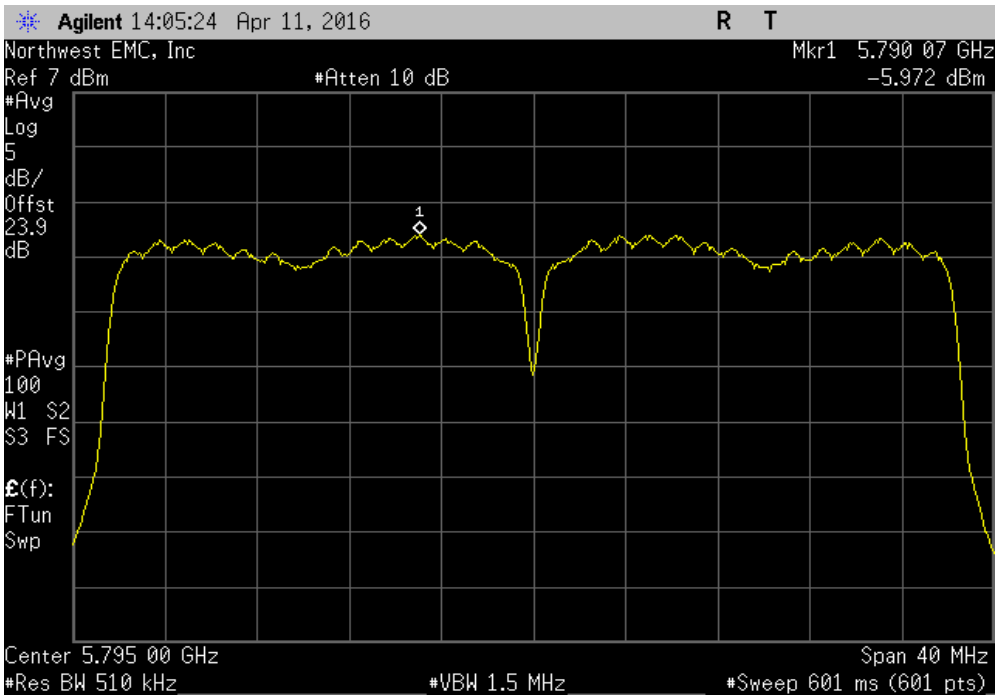
SISO, Chain A, 40MHz BW, High Channel, Ch 157/161 - 5795 MHz, 802.11(n) MCS7						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-6.111	1.5		-4.6	30	Pass



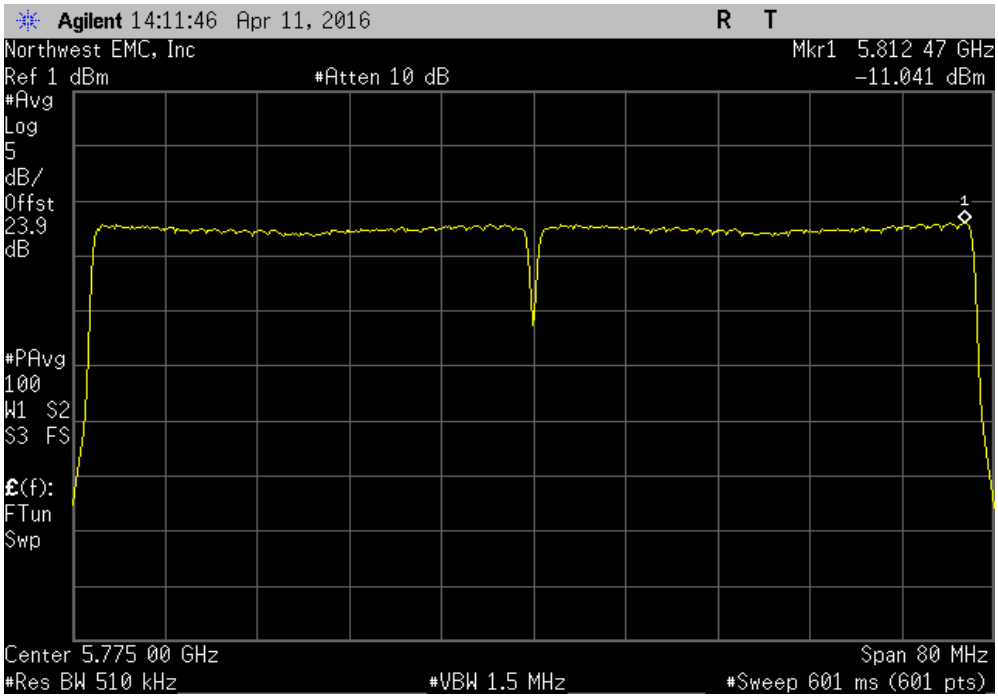
SISO, Chain A, 40MHz BW, High Channel, Ch 157/161 - 5795 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-5.913	0.2		-5.8	30	Pass



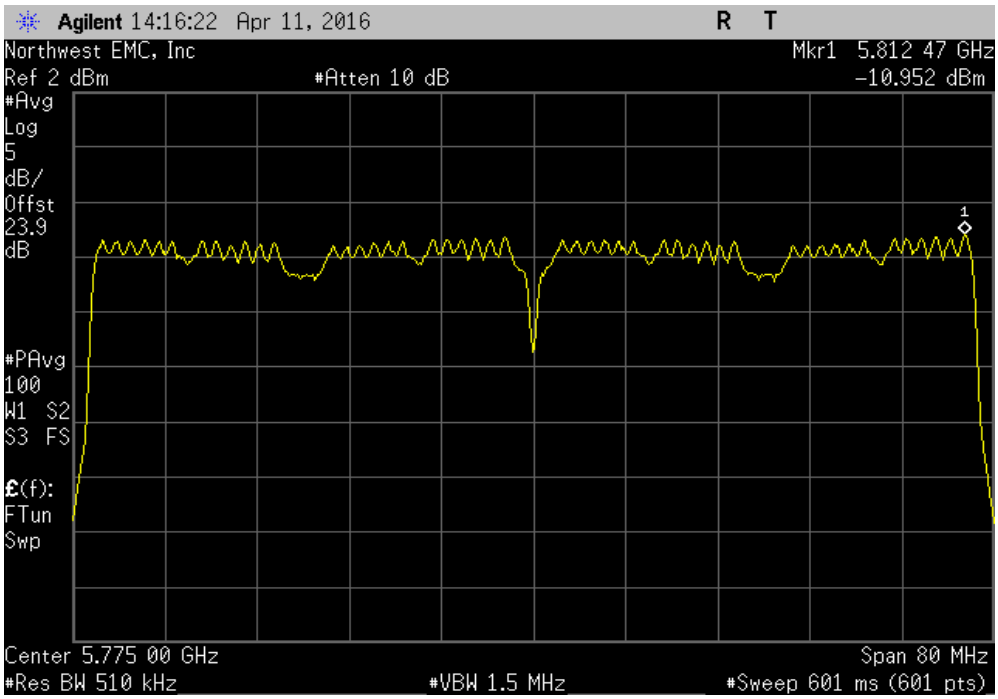
SISO, Chain A, 40MHz BW, High Channel, Ch 157/161 - 5795 MHz, 802.11(ac) MCS9						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-5.972	1.6		-4.3	30	Pass



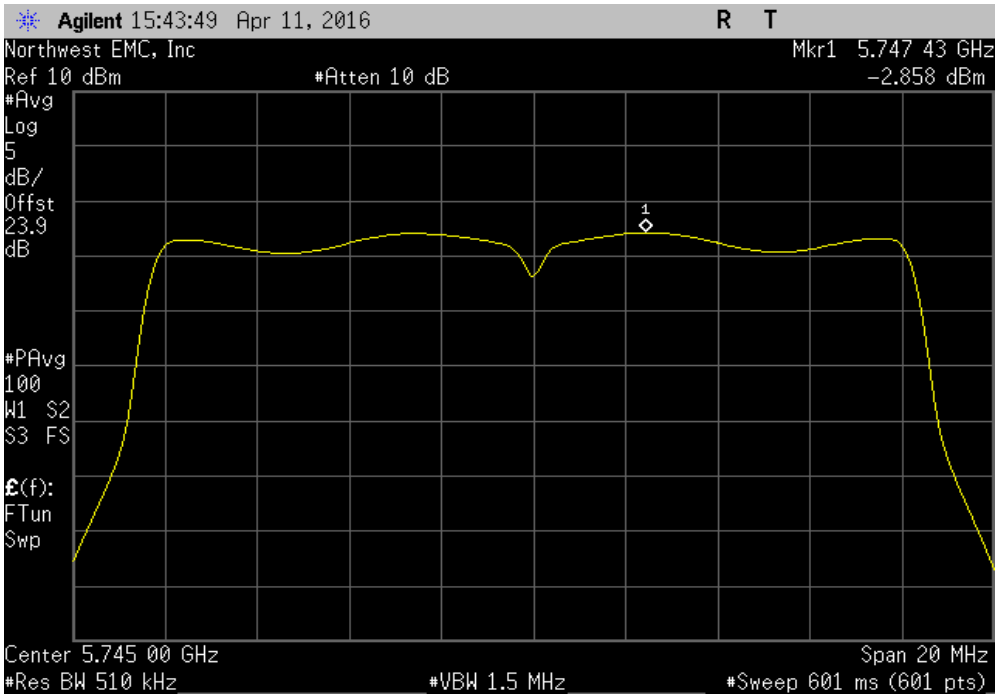
SISO, Chain A, 80MHz BW, Mid Channel, Ch 149/161 - 5775 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-11.041	0.3		-10.7	30	Pass



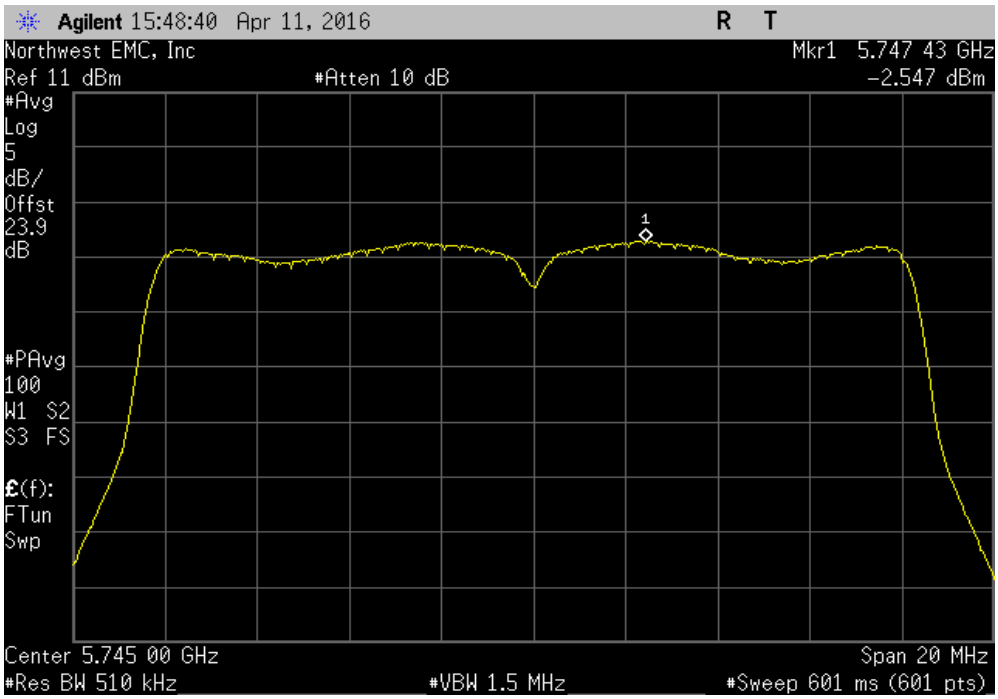
SISO, Chain A, 80MHz BW, Mid Channel, Ch 149/161 - 5775 MHz, 802.11(ac) MCS9						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-10.952	1.8		-9.1	30	Pass



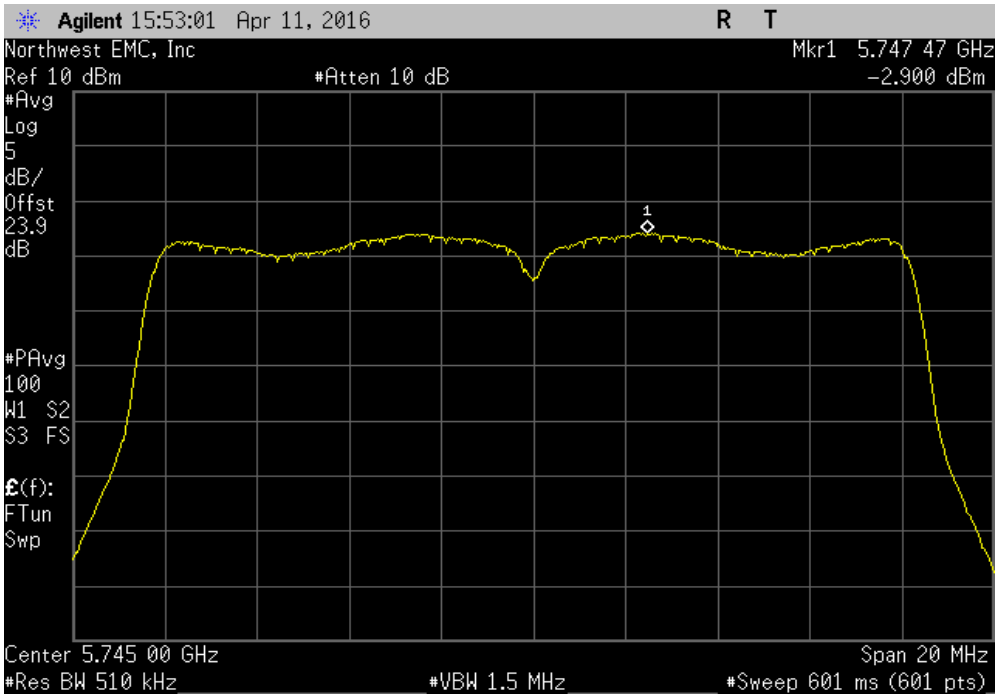
SISO, Chain B, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(a) 6 Mbps						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.858	0		-2.8	30	Pass



SISO, Chain B, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(a) 36 Mbps						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.547	0.3		-2.3	30	Pass



SISO, Chain B, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(a) 54 Mbps						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.9	0.4		-2.5	30	Pass

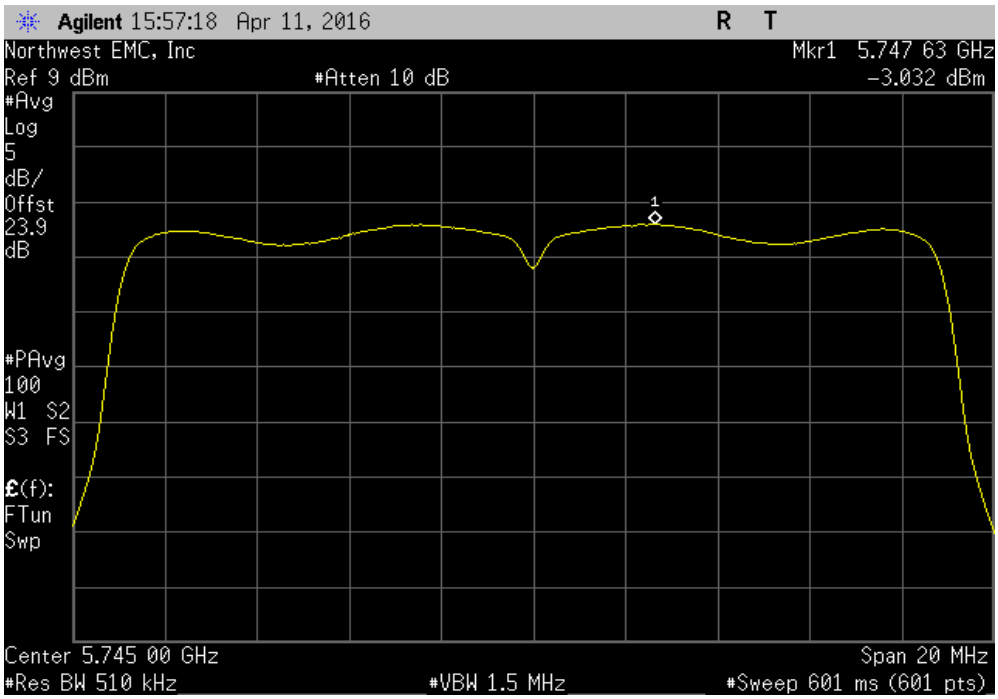


MAXIMUM POWER SPECTRAL DENSITY

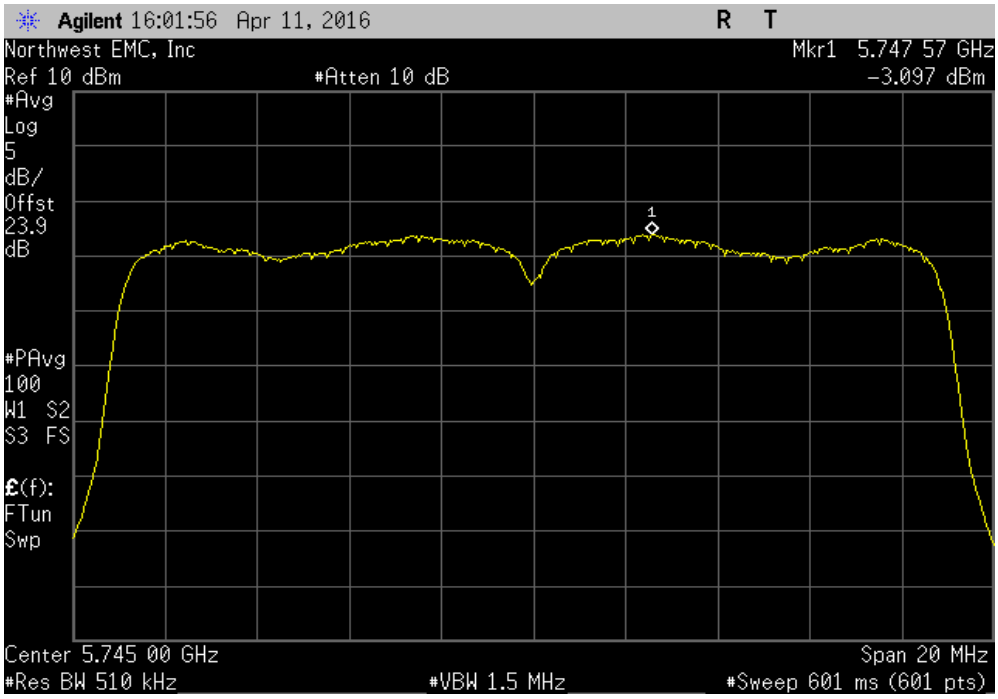
NORTHWEST EMC

XMit 2015.01.14

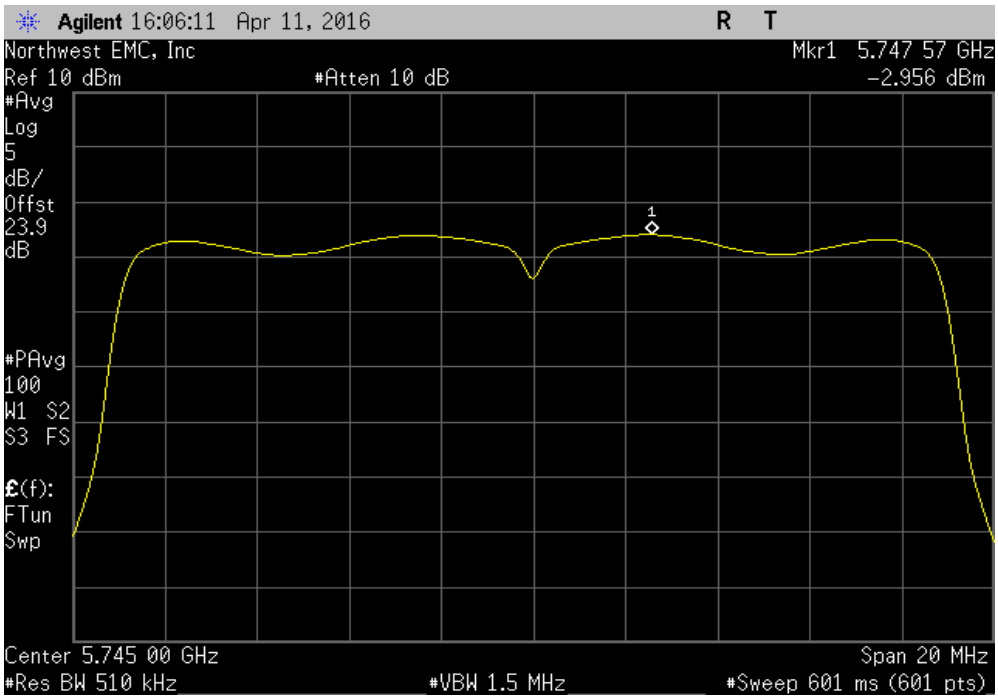
SISO, Chain B, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(n) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-3.032	0		-3	30	Pass



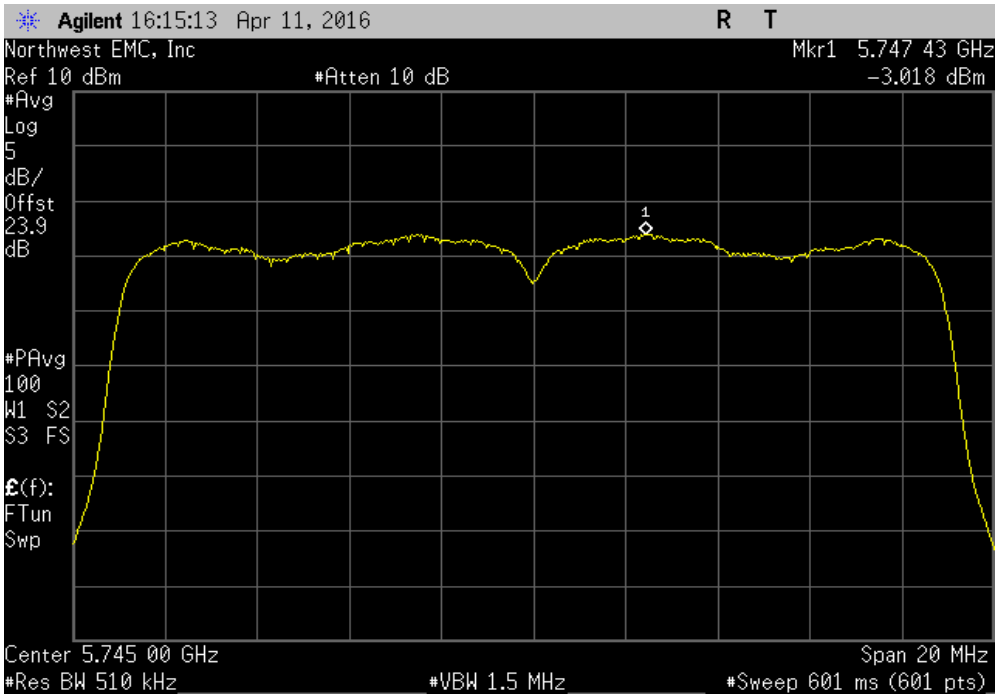
SISO, Chain B, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(n) MCS7						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-3.097	0.4		-2.7	30	Pass



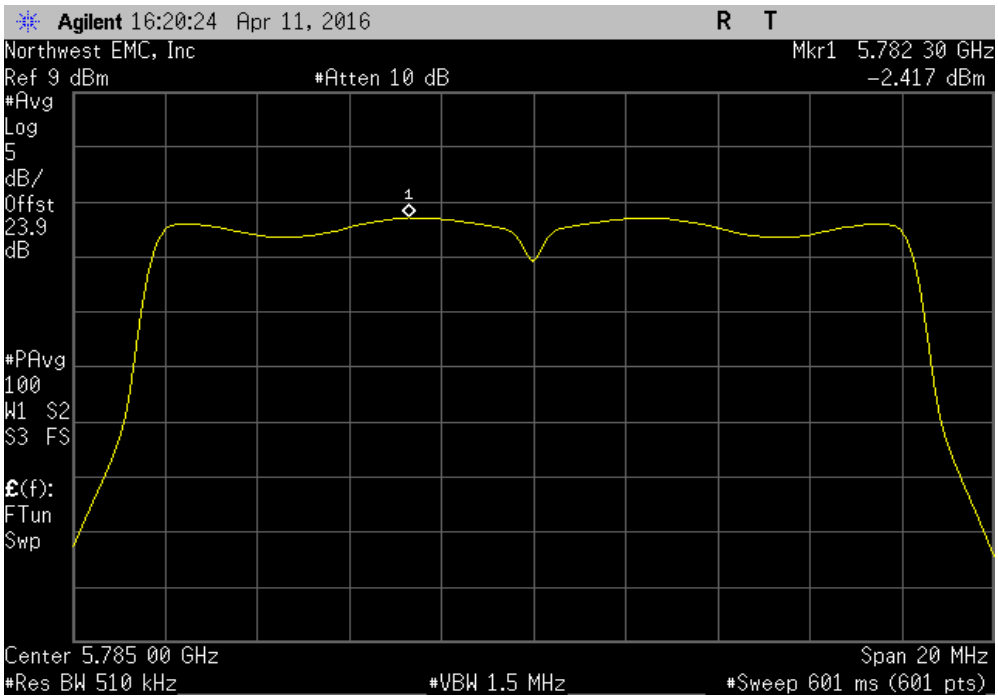
SISO, Chain B, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.956	0		-2.9	30	Pass



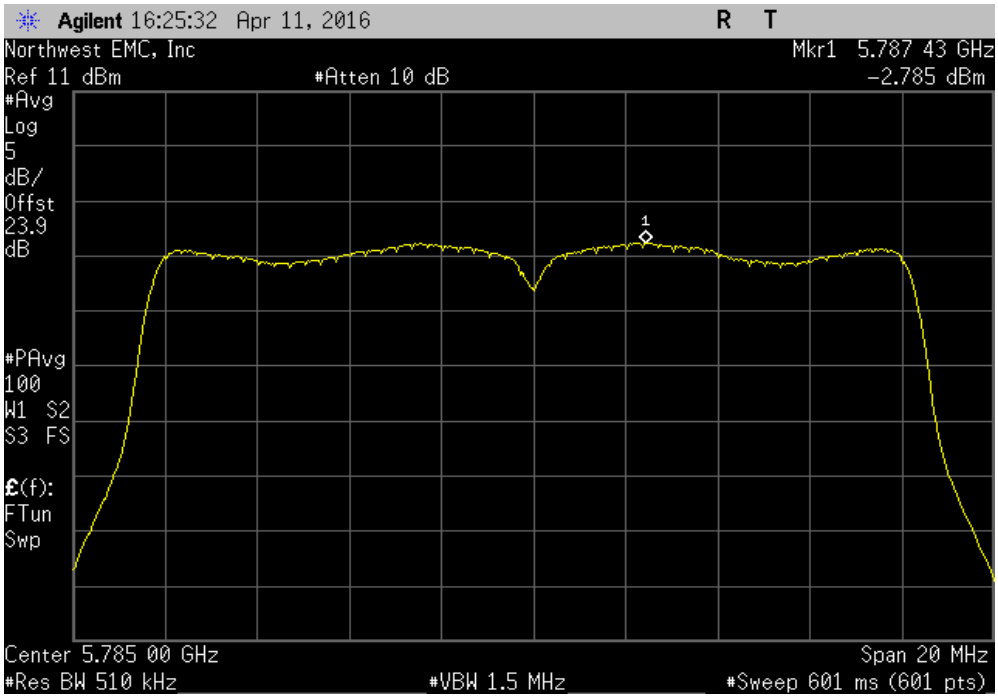
SISO, Chain B, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(ac) MCS8						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-3.018	0.4		-2.6	30	Pass



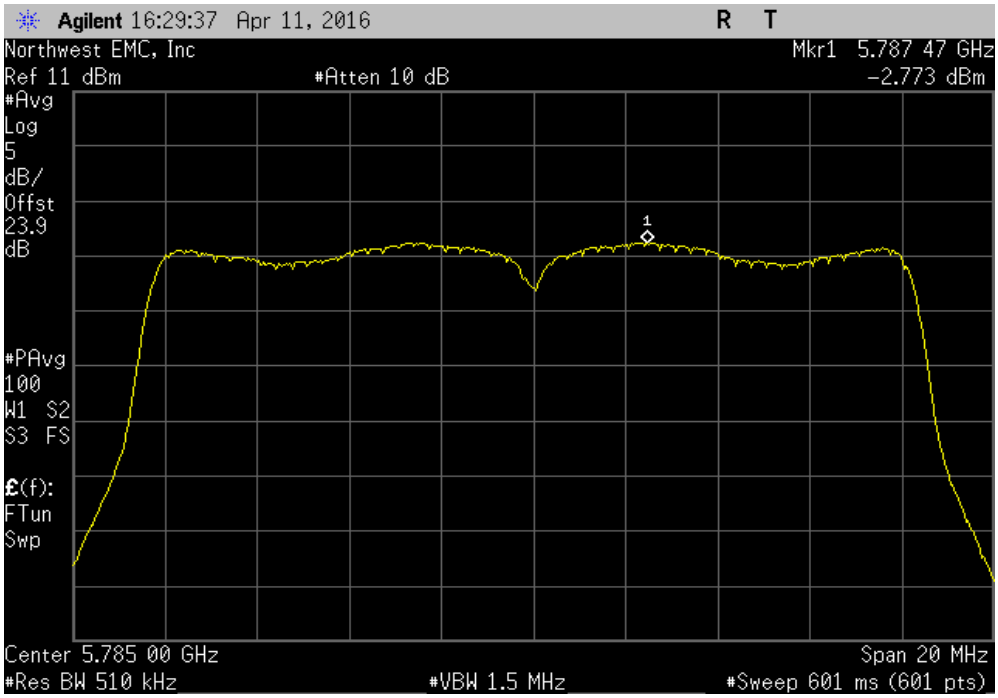
SISO, Chain B, 20MHz BW, Mid Channel, Ch 157 - 5785 MHz, 802.11(a) 6 Mbps						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.417	0		-2.4	30	Pass



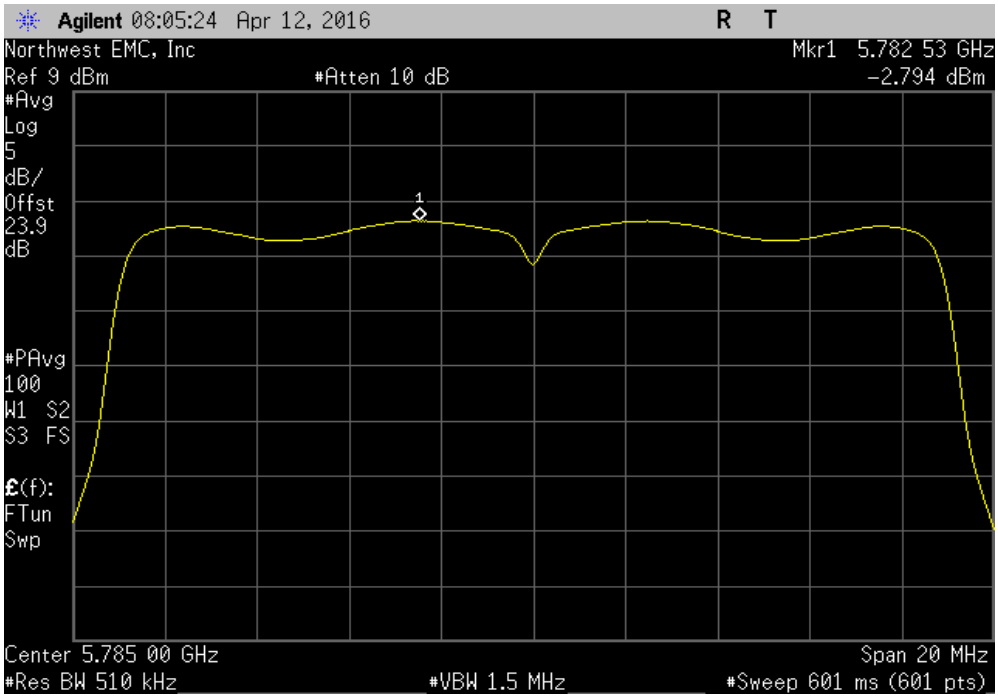
SISO, Chain B, 20MHz BW, Mid Channel, Ch 157 - 5785 MHz, 802.11(a) 36 Mbps						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.785	0.3		-2.5	30	Pass



SISO, Chain B, 20MHz BW, Mid Channel, Ch 157 - 5785 MHz, 802.11(a) 54 Mbps						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.773	0.4		-2.4	30	Pass



SISO, Chain B, 20MHz BW, Mid Channel, Ch 157 - 5785 MHz, 802.11(n) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.794	0		-2.8	30	Pass

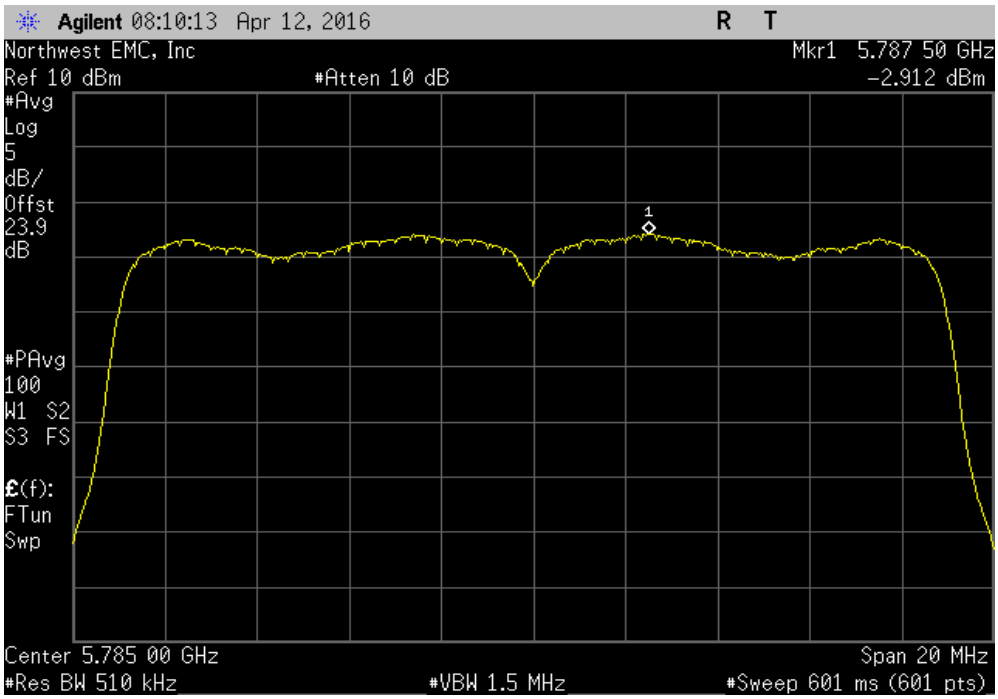


MAXIMUM POWER SPECTRAL DENSITY

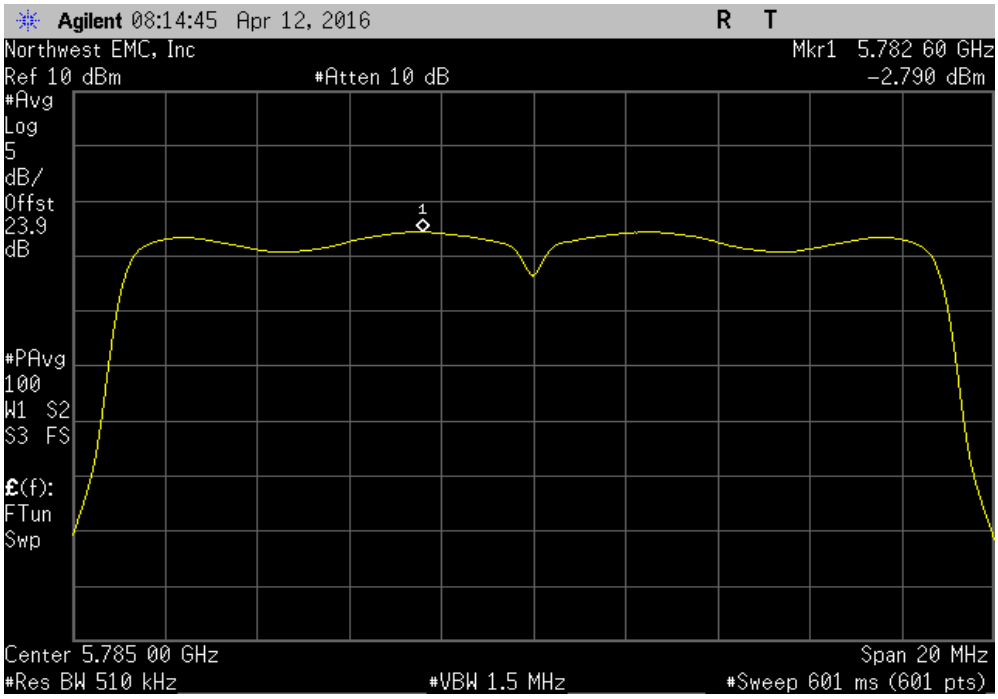
NORTHWEST EMC

XMit 2015.01.14

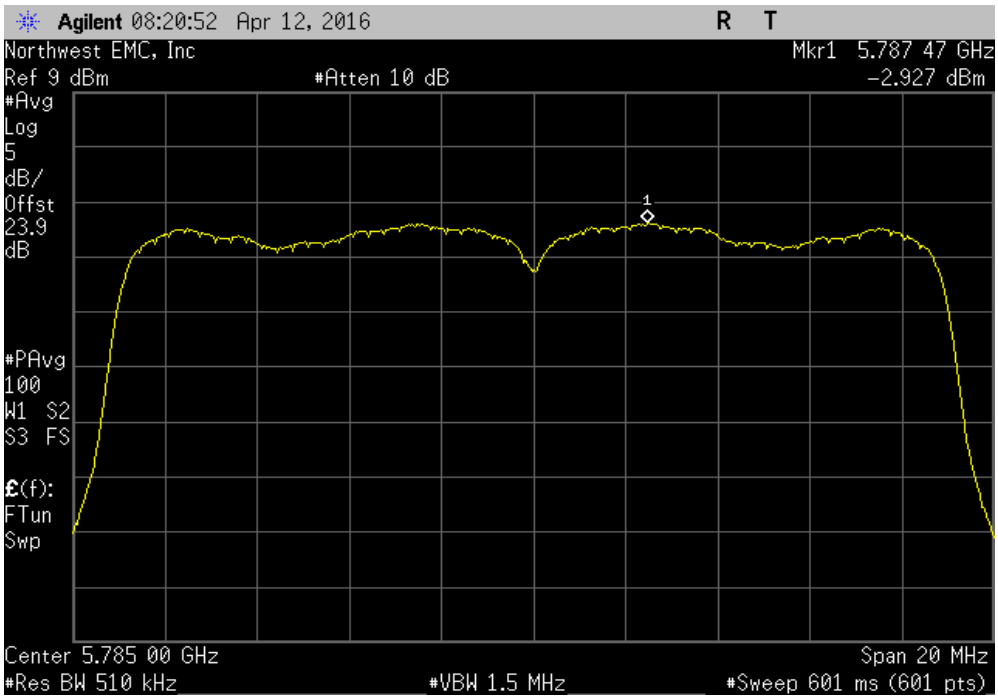
SISO, Chain B, 20MHz BW, Mid Channel, Ch 157 - 5785 MHz, 802.11(n) MCS7						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.912	0.4		-2.5	30	Pass



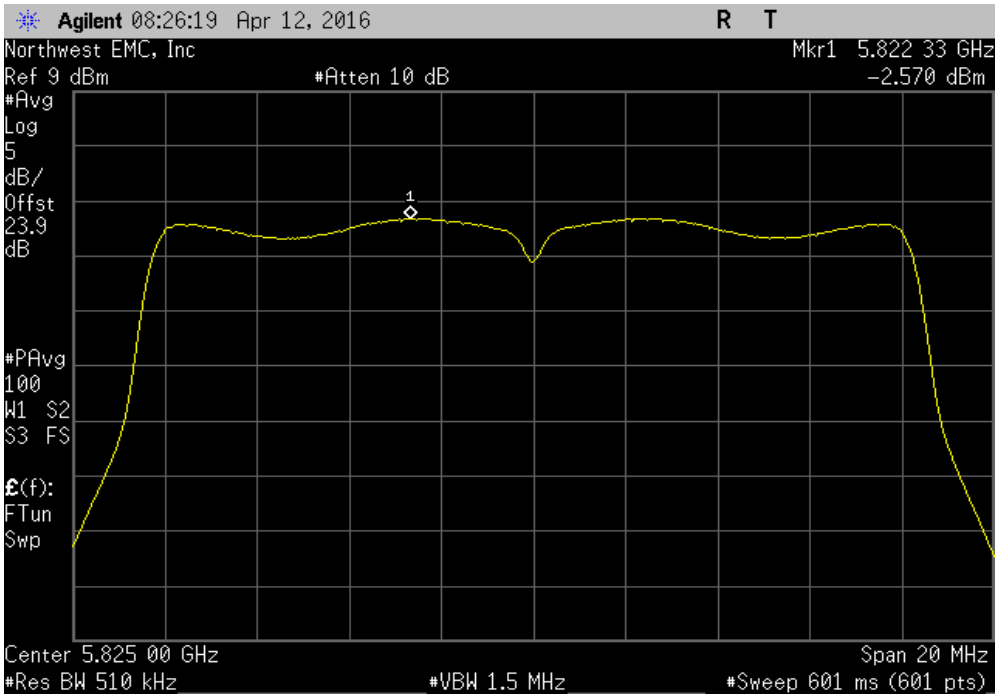
SISO, Chain B, 20MHz BW, Mid Channel, Ch 157 - 5785 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.79	0		-2.8	30	Pass



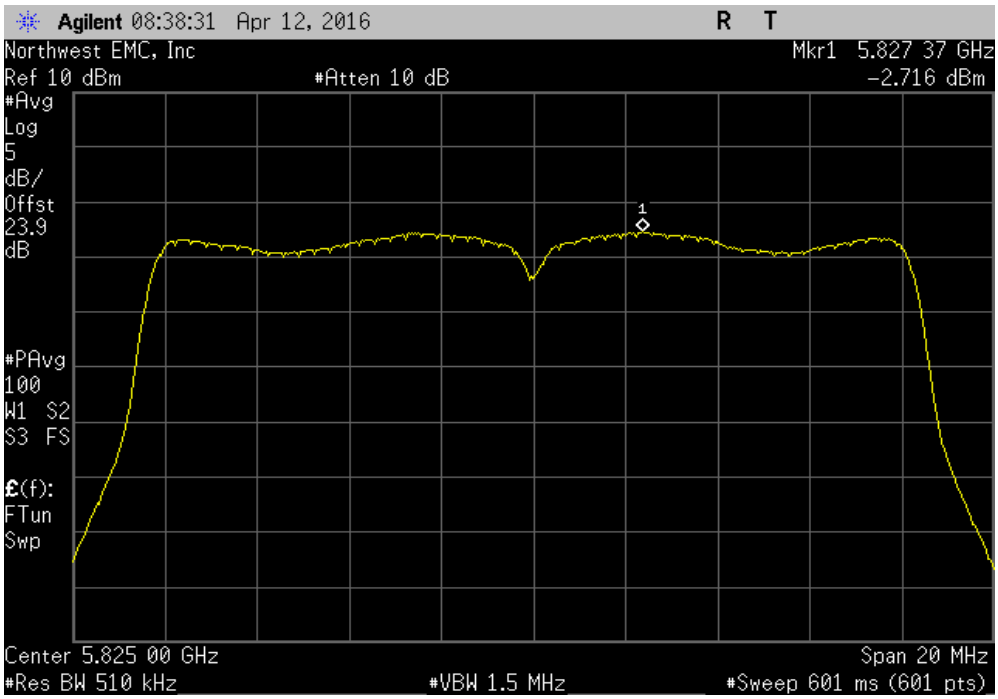
SISO, Chain B, 20MHz BW, Mid Channel, Ch 157 - 5785 MHz, 802.11(ac) MCS8						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.927	0.4		-2.5	30	Pass



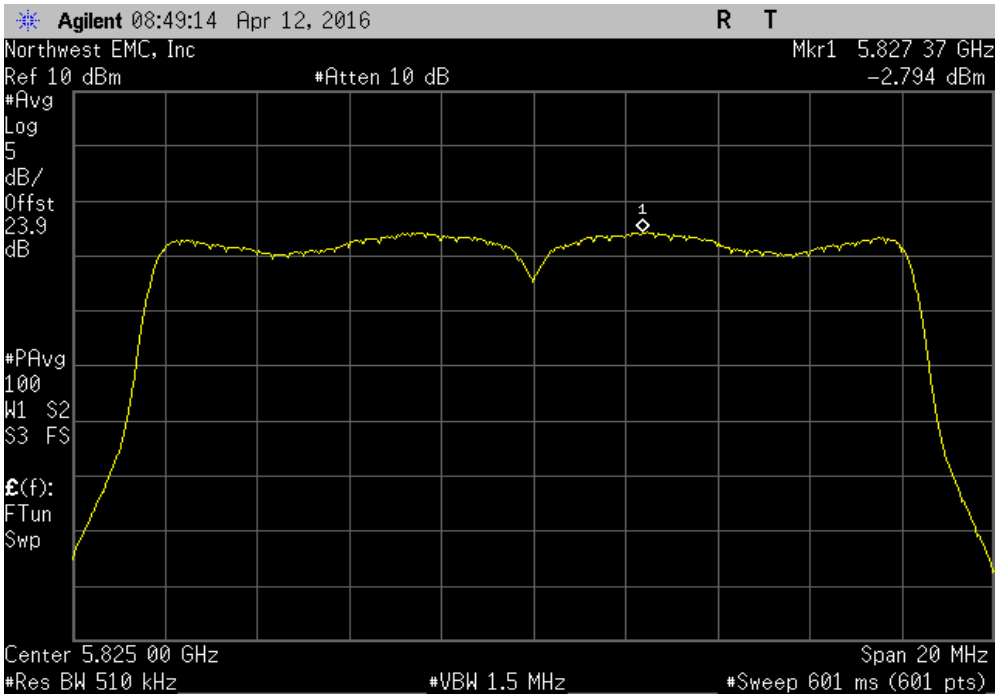
SISO, Chain B, 20MHz BW, High Channel, Ch 165 - 5825 MHz, 802.11(a) 6 Mbps						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.57	0		-2.5	30	Pass



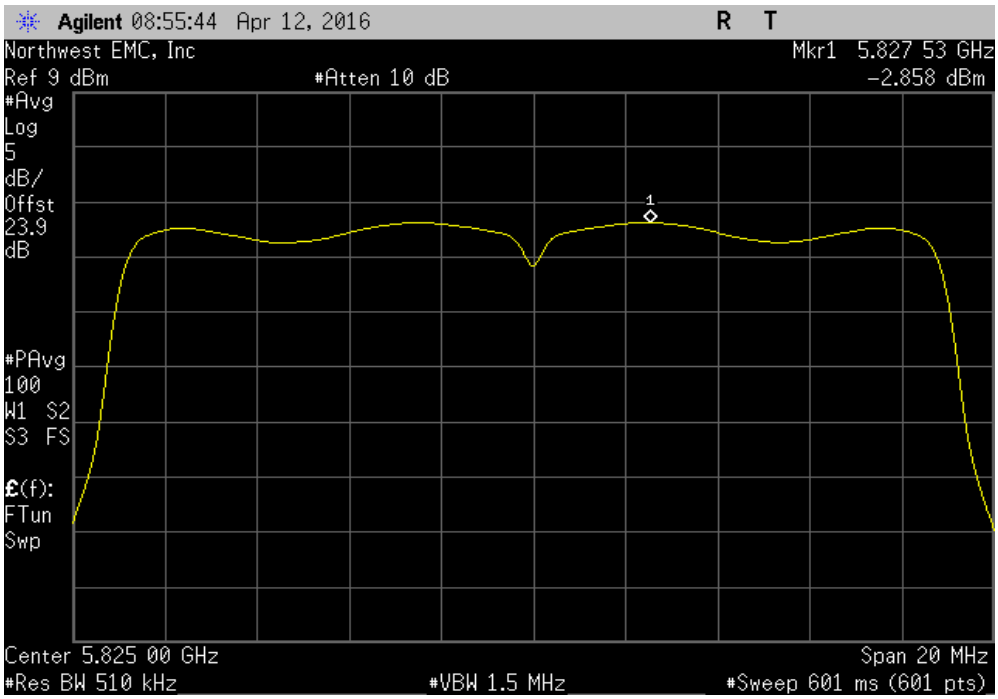
SISO, Chain B, 20MHz BW, High Channel, Ch 165 - 5825 MHz, 802.11(a) 36 Mbps						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.716	0.3		-2.5	30	Pass



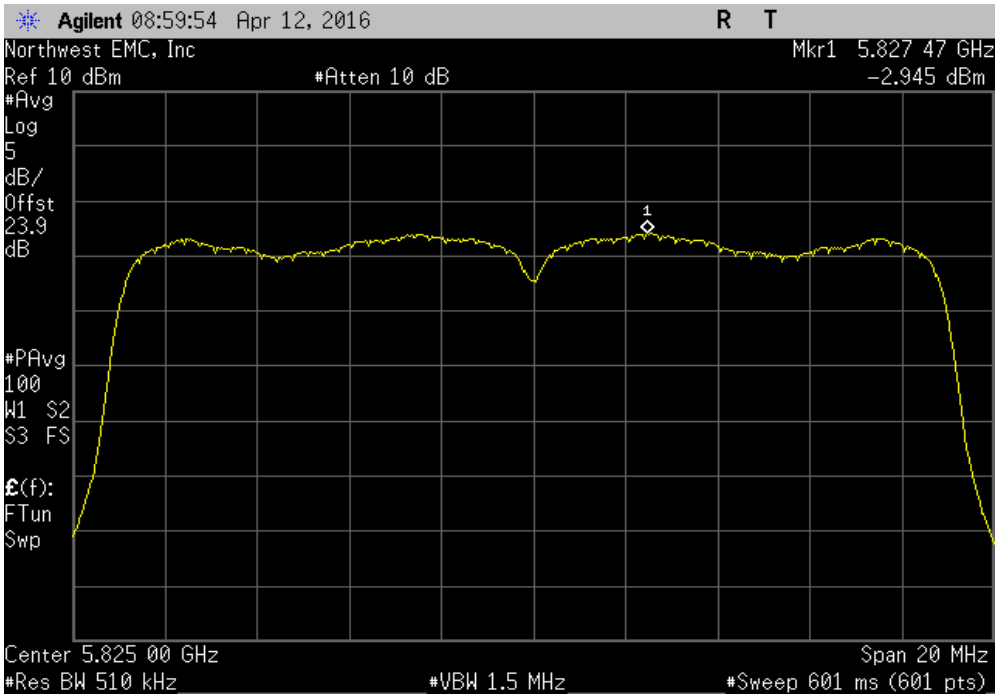
SISO, Chain B, 20MHz BW, High Channel, Ch 165 - 5825 MHz, 802.11(a) 54 Mbps						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.794	0.4		-2.4	30	Pass



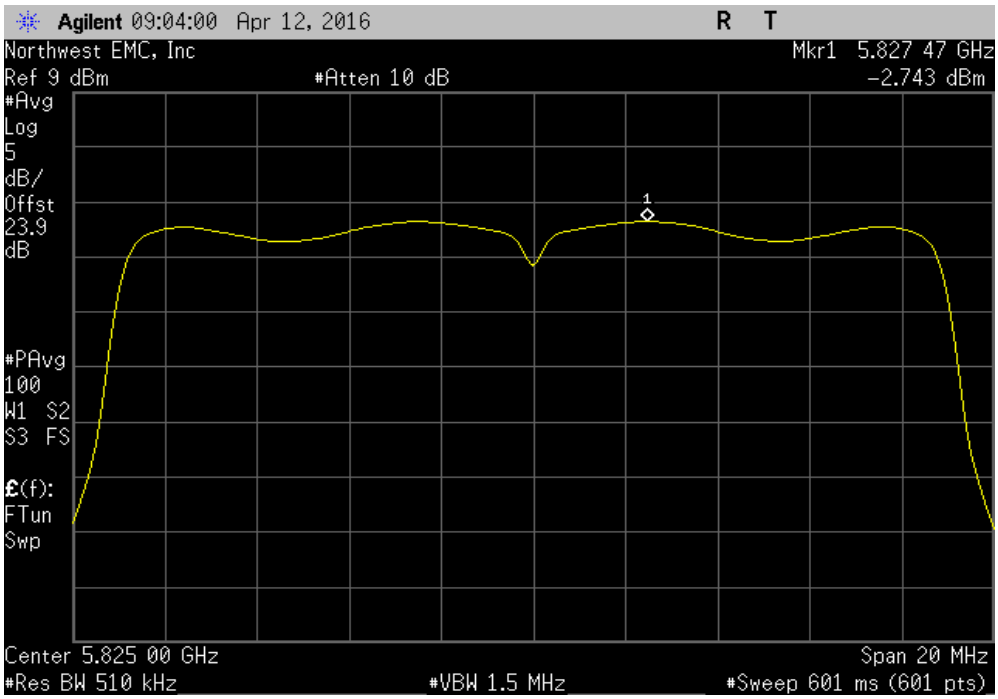
SISO, Chain B, 20MHz BW, High Channel, Ch 165 - 5825 MHz, 802.11(n) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.858	0		-2.8	30	Pass



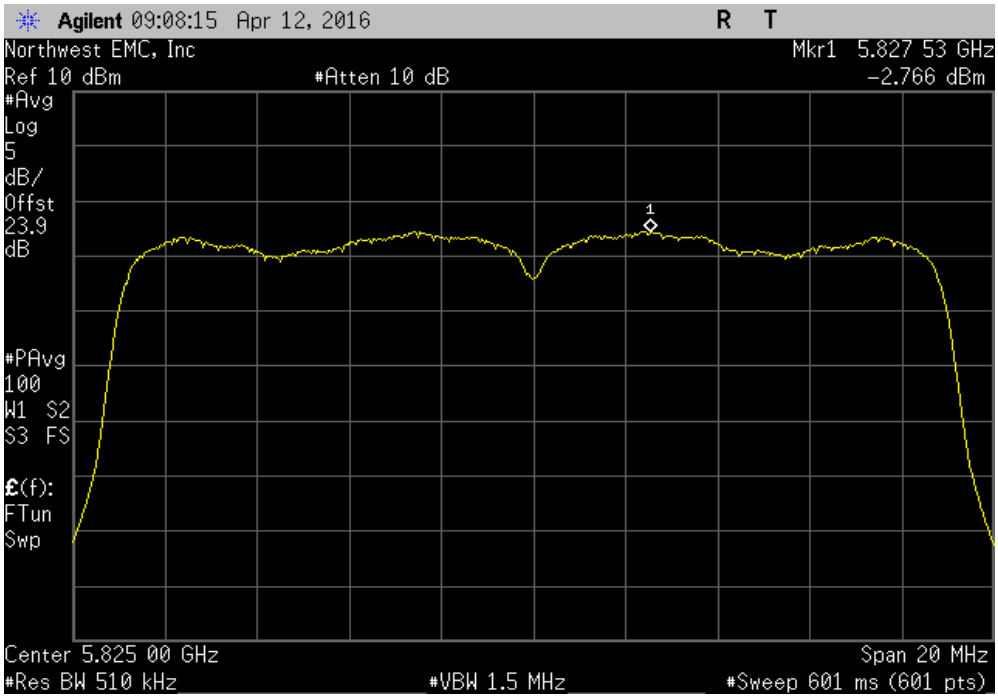
SISO, Chain B, 20MHz BW, High Channel, Ch 165 - 5825 MHz, 802.11(n) MCS7						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.945	0.4		-2.5	30	Pass



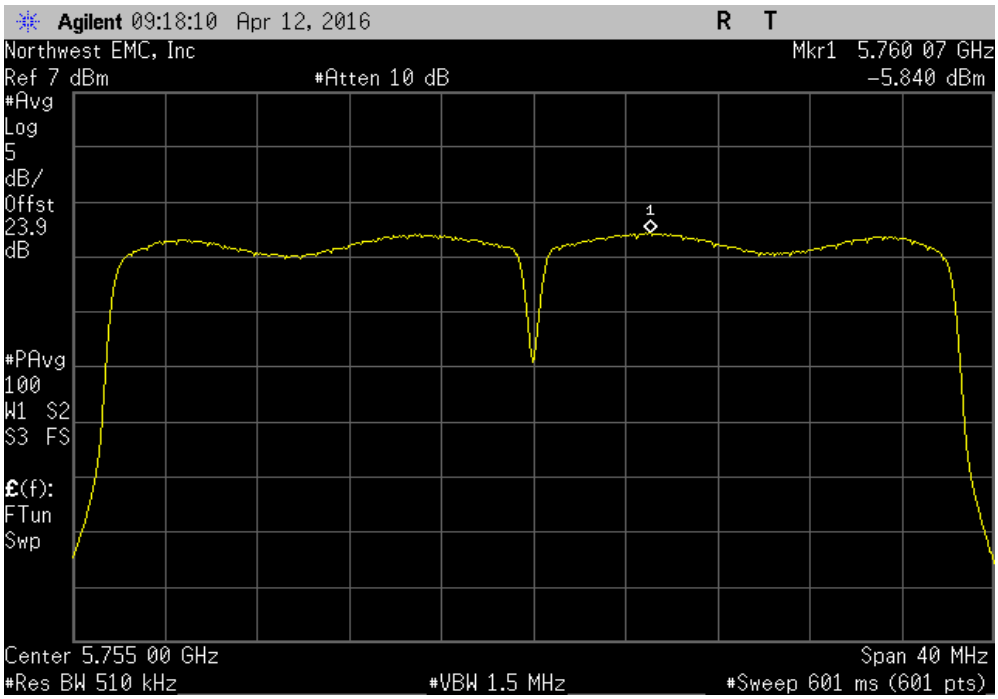
SISO, Chain B, 20MHz BW, High Channel, Ch 165 - 5825 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.743	0		-2.7	30	Pass



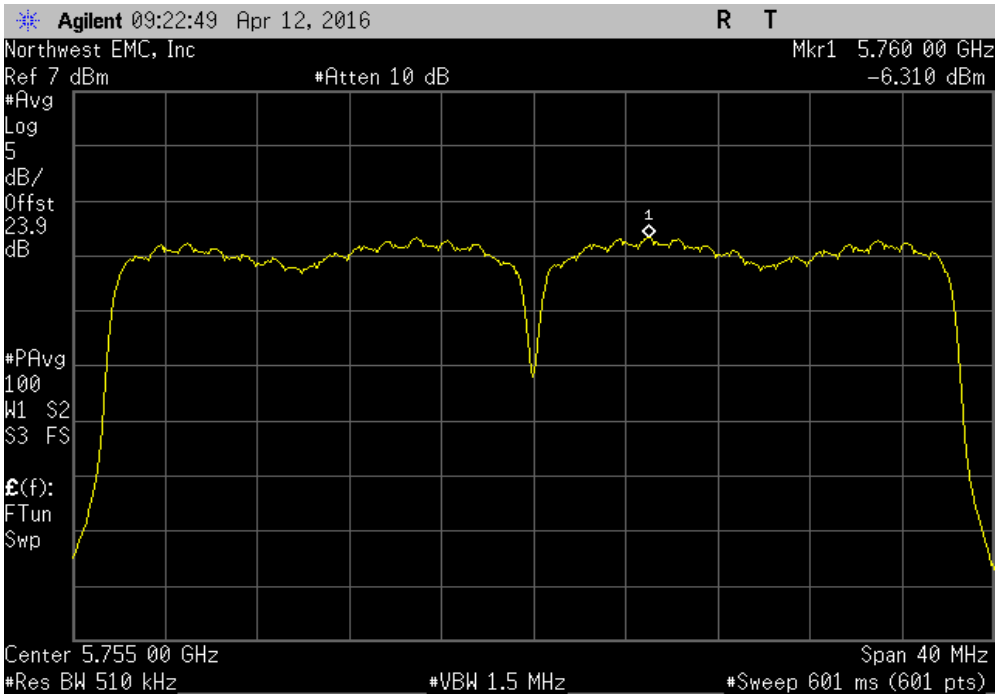
SISO, Chain B, 20MHz BW, High Channel, Ch 165 - 5825 MHz, 802.11(ac) MCS8						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.766	0.4		-2.4	30	Pass



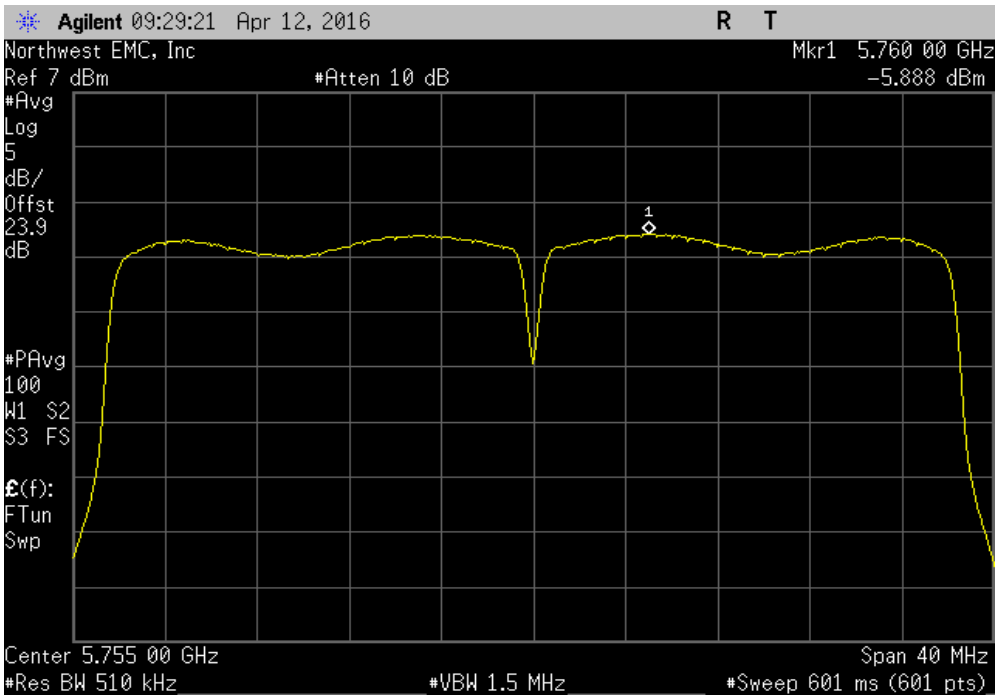
SISO, Chain B, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(n) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-5.84	0.2		-5.7	30	Pass



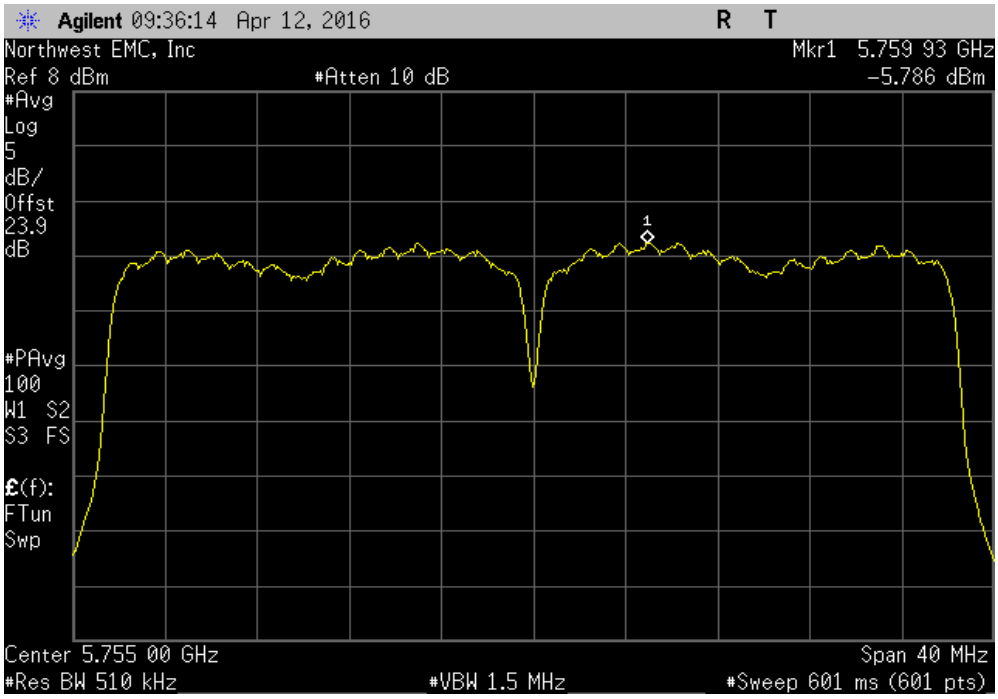
SISO, Chain B, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(n) MCS7						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-6.31	1.5		-4.8	30	Pass



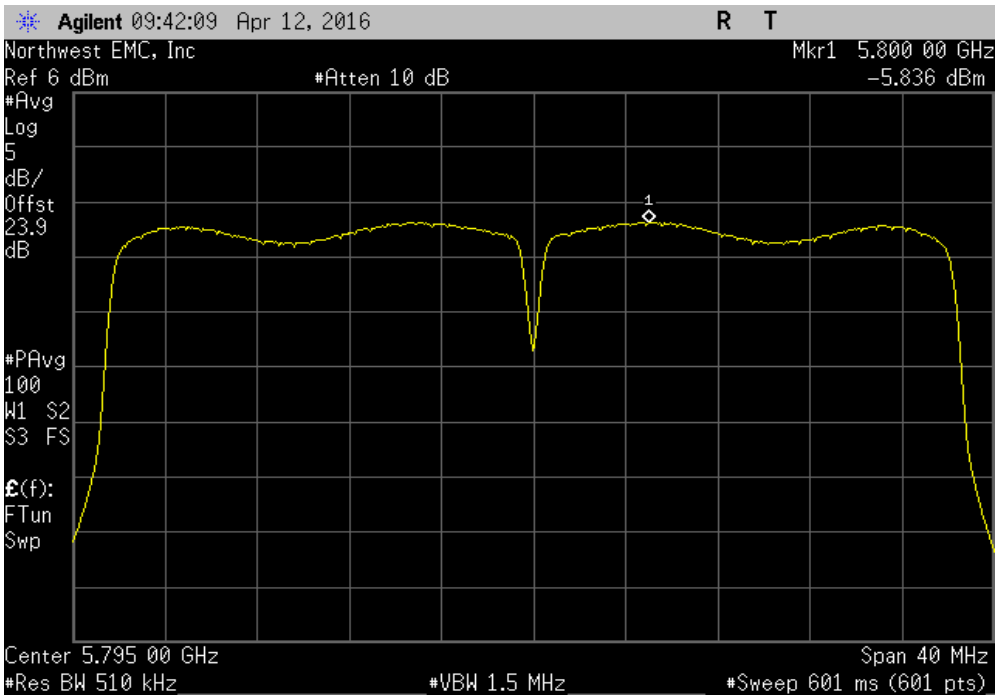
SISO, Chain B, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-5.888	0.2		-5.7	30	Pass



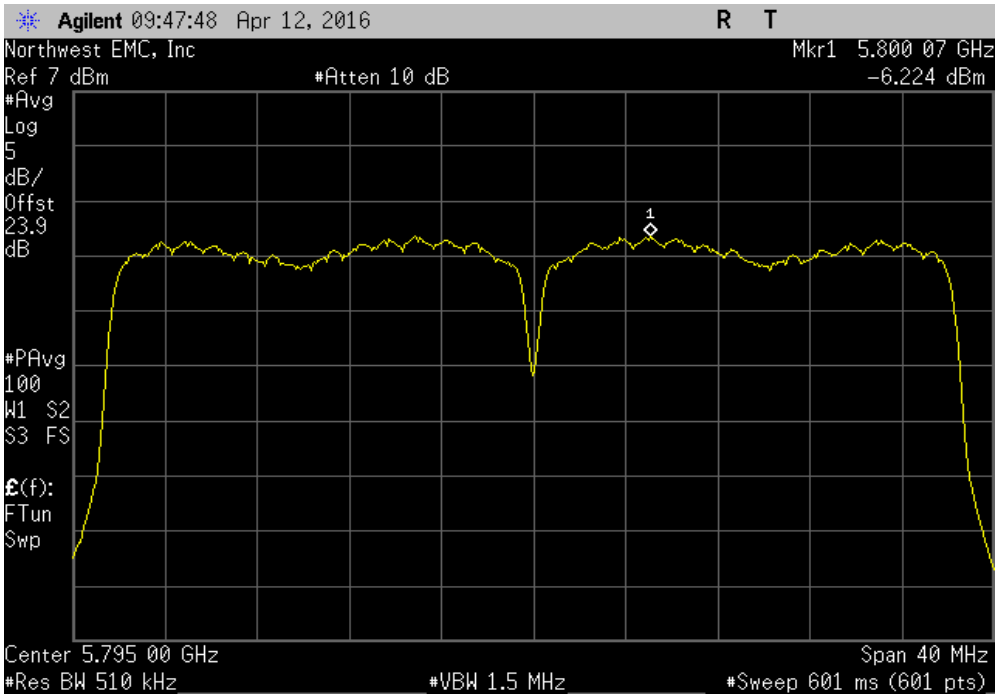
SISO, Chain B, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(ac) MCS9						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-5.786	1.6		-4.2	30	Pass



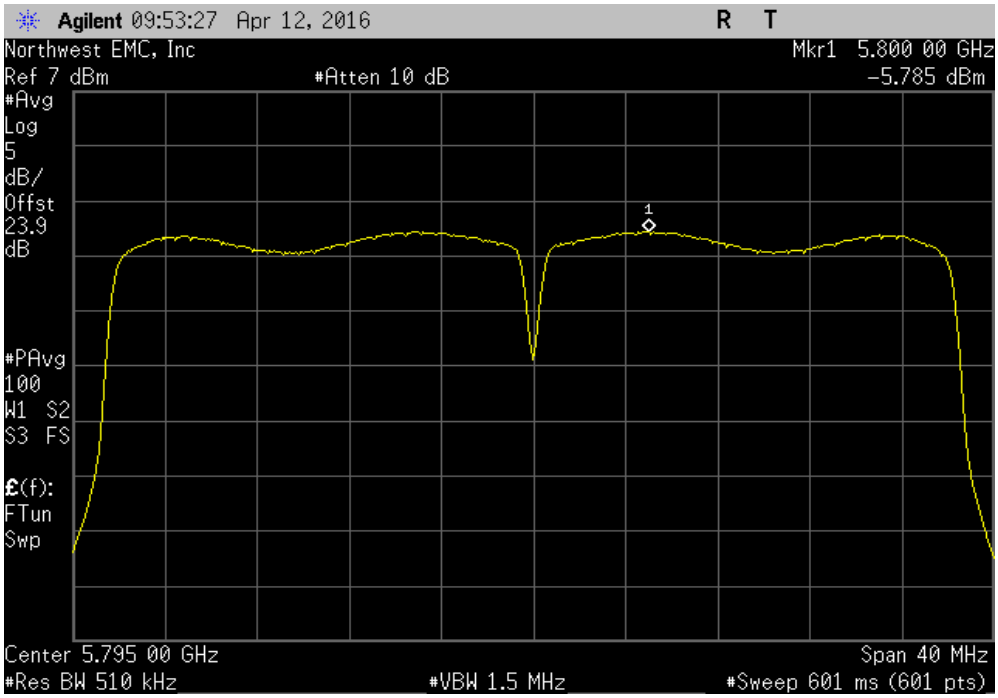
SISO, Chain B, 40MHz BW, High Channel, Ch 157/161 - 5795 MHz, 802.11(n) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-5.836	0.2		-5.7	30	Pass



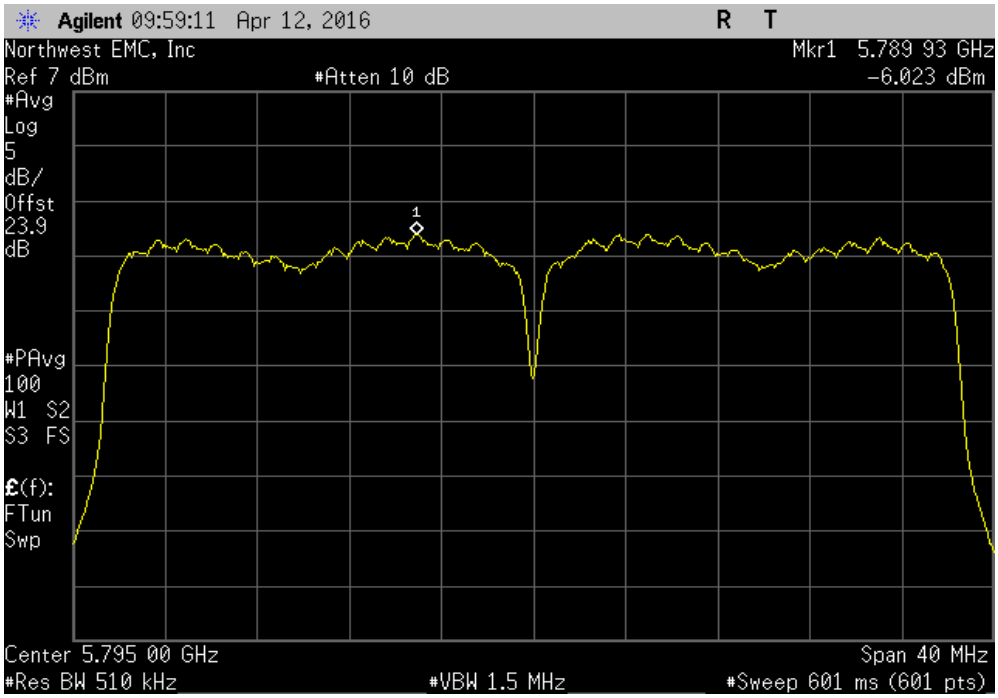
SISO, Chain B, 40MHz BW, High Channel, Ch 157/161 - 5795 MHz, 802.11(n) MCS7						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-6.224	1.5		-4.7	30	Pass



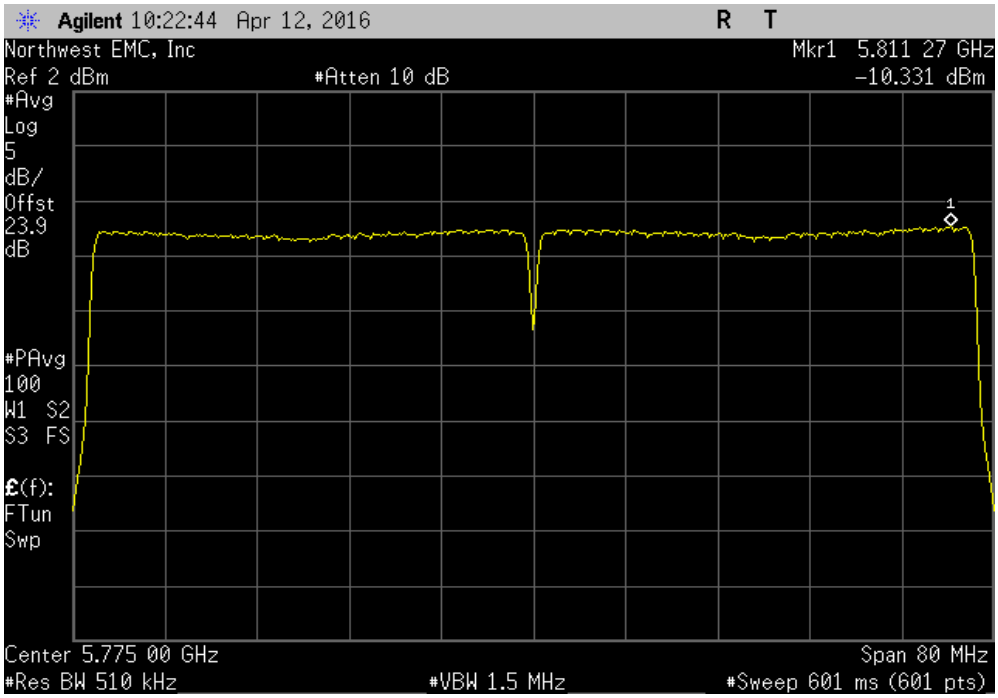
SISO, Chain B, 40MHz BW, High Channel, Ch 157/161 - 5795 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-5.785	0.2		-5.6	30	Pass



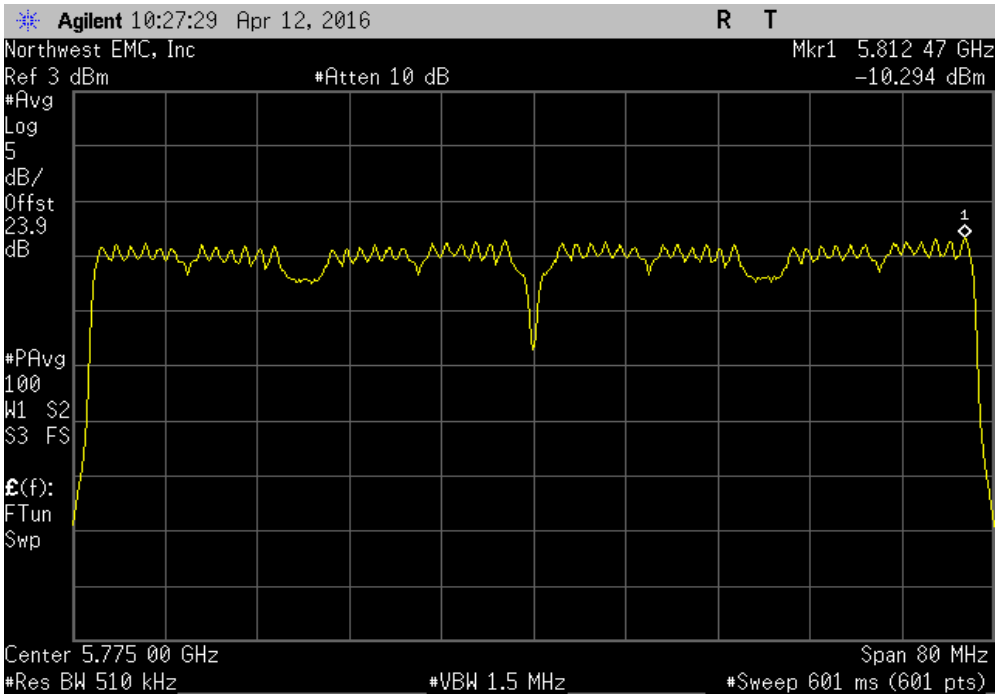
SISO, Chain B, 40MHz BW, High Channel, Ch 157/161 - 5795 MHz, 802.11(ac) MCS9						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-6.023	1.7		-4.4	30	Pass



SISO, Chain B, 80MHz BW, Mid Channel, Ch 149/161 - 5775 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-10.331	0.2		-10.1	30	Pass



SISO, Chain B, 80MHz BW, Mid Channel, Ch 149/161 - 5775 MHz, 802.11(ac) MCS9						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-10.294	1.9		-8.4	30	Pass



MAXIMUM POWER SPECTRAL DENSITY

NORTHWEST EMC

XMit 2015.01.14

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval (mo)
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFE	6/22/2015	12
Attenuator	Fairview Microwave	SA4014-20	TKV	3/4/2016	12
Block - DC	Fairview Microwave	SD3379	AMJ	6/6/2015	12
Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	NC5	6/6/2015	12
Generator - Signal	Agilent	N5183A	TIA	4/6/2016	24

TEST DESCRIPTION

The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum. The radio was operated in the modes as shown in the following data sheets.

A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input.

Prior to measuring maximum power spectral density, the emission bandwidth (B) was measured. The method of measuring the emission bandwidth and the associated data are found elsewhere in this test report

The maximum power spectral density was measured using ANSI C63.10, Method SA-2 (RMS detection and trace averaging across the on and off times of the EUT transmission and use of a duty cycle correction factor), consistent with the method used for maximum conducted output power.

The spectrum analyzer settings were set per the guidance as well as the following specifics:

-Resolution Bandwidth of 510 kHz

-RMS Detector

-Trace average 100 traces in power averaging mode

The peak power spectral density (PPSD) was determined to be the highest level found across the emission in the reference bandwidth after 100 sweeps of power averaging (not video averaging).

A duty cycle correction factor was added to the measurement using the results of the formula of 10*LOG(1/D) where D is the duty cycle.

MAXIMUM POWER SPECTRAL DENSITY

NORTHWEST EMC

XMit 2015.01.14

EUT:	Model 1631			**Work Order:**	MCSO1748
Serial Number:	041152140753			**Date:**	04/13/16
Customer:	Microsoft Corporation			**Temperature:**	23°C
Attendees:	None			**Humidity:**	33%
Project:	None			**Barometric Pres.:**	1019 mbar
Tested by:	Richard Mellroth	**Power:**	110VAC/60Hz	**Job Site:**	NC02

TEST SPECIFICATIONS	Test Method
FCC 15.407:2016	ANSI C63.10:2013

COMMENTS

Power setting at 11dBm for 20MHz and 40MHz channels. Power Setting at 10dBm for 80MHz channels. Client supplied adapter cable loss of 1.3dB included in reference level offset. Signal setting at > 95% Duty Cycle.

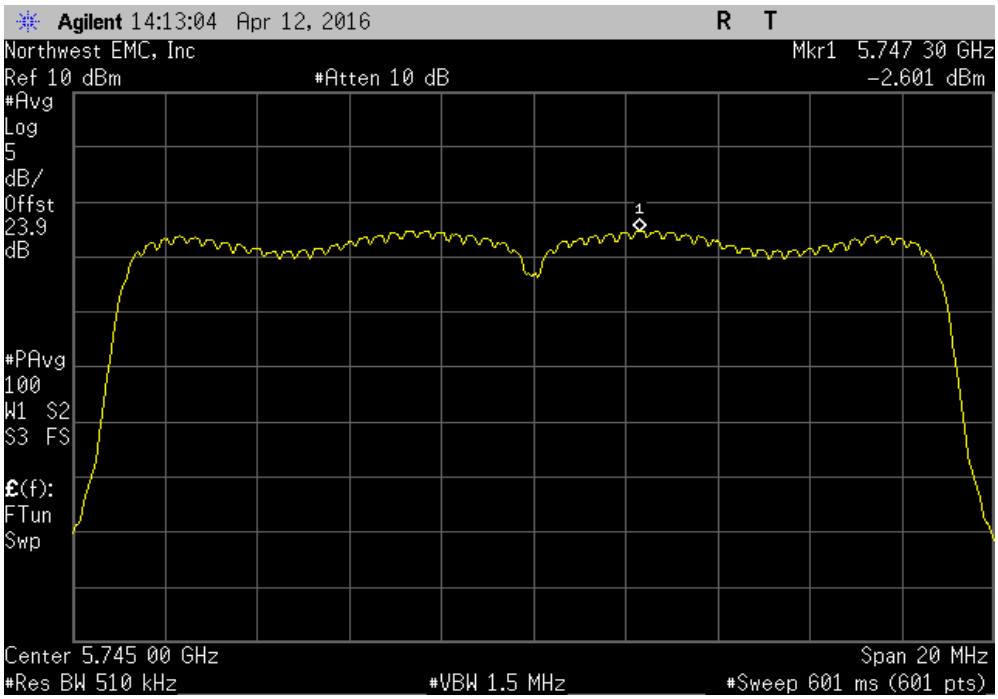
DEVIATIONS FROM TEST STANDARD

None

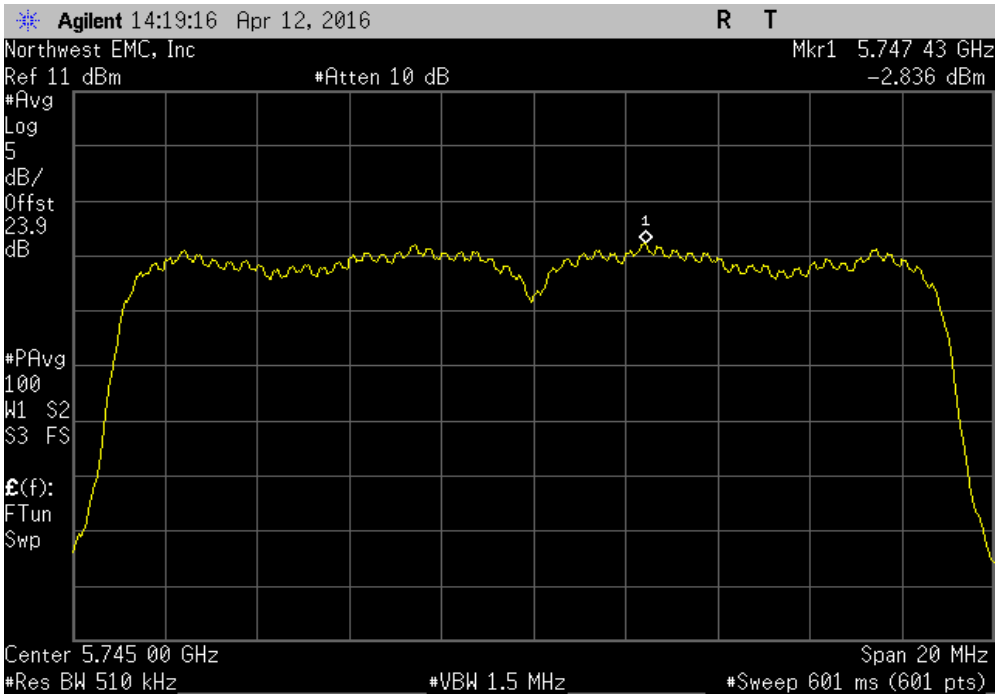
Configuration #	1	Signature

		Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit ≤ (dBm / Ref BW)	Results
2x2 MIMO, Chain A							
	20MHz BW						
	Low Channel, Ch 149 - 5745 MHz						
	802.11(n) MCS8	-2.601	0.1	3.0	0.5	30	Pass
	802.11(n) MCS15	-2.836	0.7	3.0	0.9	30	Pass
	802.11(ac) MCS0	-2.582	0.1	3.0	0.5	30	Pass
	802.11(ac) MCS8	-2.983	0.7	3.0	0.7	30	Pass
	Mid Channel, Ch 157 - 5785 MHz						
	802.11(n) MCS8	-2.534	0.1	3.0	0.6	30	Pass
	802.11(n) MCS15	-2.877	0.7	3.0	0.8	30	Pass
	802.11(ac) MCS0	-2.465	0.1	3.0	0.6	30	Pass
	802.11(ac) MCS8	-2.882	0.7	3.0	0.8	30	Pass
	High Channel, Ch 165 - 5825 MHz						
	802.11(n) MCS8	-2.424	0.1	3.0	0.7	30	Pass
	802.11(n) MCS15	-2.518	0.7	3.0	1.2	30	Pass
	802.11(ac) MCS0	-2.606	0.1	3.0	0.5	30	Pass
	802.11(ac) MCS8	-2.475	0.7	3.0	1.2	30	Pass
	40MHz BW						
	Low Channel, Ch 149/153 - 5755 MHz						
	802.11(n) MCS8	-5.908	0.2	3.0	-2.7	30	Pass
	802.11(n) MCS15	-7.051	1.5	3.0	-2.5	30	Pass
	802.11(ac) MCS0	-5.941	0.3	3.0	-2.6	30	Pass
	802.11(ac) MCS9	-6.72	1.2	3.0	-2.5	30	Pass
	High Channel, Ch 157/161 - 5795 MHz						
	802.11(n) MCS8	-5.985	0.3	3.0	-2.7	30	Pass
	802.11(n) MCS15	-6.876	1.5	3.0	-2.4	30	Pass
	802.11(ac) MCS0	-5.913	0.3	3.0	-2.6	30	Pass
	802.11(ac) MCS9	-6.32	2.5	3.0	-0.8	30	Pass
	80MHz BW						
	Mid Channel, Ch 149/161 - 5775 MHz						
	802.11(ac) MCS0	-11.77	0.6	3.0	-8.2	30	Pass
	802.11(ac) MCS9	-11.482	2.8	3.0	-5.7	30	Pass
2x2 MIMO, Chain B							
	20MHz BW						
	Low Channel, Ch 149 - 5745 MHz						
	802.11(n) MCS8	-2.768	0.1	3.0	0.3	30	Pass
	802.11(n) MCS15	-3.04	0.8	3.0	0.8	30	Pass
	802.11(ac) MCS0	-3.162	0.1	3.0	-0.1	30	Pass
	802.11(ac) MCS8	-2.99	0.7	3.0	0.7	30	Pass
	Mid Channel, Ch 157 - 5785 MHz						
	802.11(n) MCS8	-2.739	0.1	3.0	0.4	30	Pass
	802.11(n) MCS15	-3.011	0.8	3.0	0.8	30	Pass
	802.11(ac) MCS0	-2.648	0.1	3.0	0.5	30	Pass
	802.11(ac) MCS8	-2.846	0.7	3.0	0.9	30	Pass
	High Channel, Ch 165 - 5825 MHz						
	802.11(n) MCS8	-2.692	0.1	3.0	0.4	30	Pass
	802.11(n) MCS15	-2.883	0.8	3.0	0.9	30	Pass
	802.11(ac) MCS0	-2.563	0.1	3.0	0.5	30	Pass
	802.11(ac) MCS8	-2.84	0.7	3.0	0.9	30	Pass
	40MHz BW						
	Low Channel, Ch 149/153 - 5755 MHz						
	802.11(n) MCS8	-6.46	0.3	3.0	-3.1	30	Pass
	802.11(n) MCS15	-6.806	2.4	3.0	-1.4	30	Pass
	802.11(ac) MCS0	-5.985	0.3	3.0	-2.7	30	Pass
	802.11(ac) MCS9	-6.235	1.1	3.0	-2.1	30	Pass
	High Channel, Ch 157/161 - 5795 MHz						
	802.11(n) MCS8	-6.337	0.3	3.0	-3.0	30	Pass
	802.11(n) MCS15	-6.723	2.4	3.0	-1.3	30	Pass
	802.11(ac) MCS0	-6.009	0.3	3.0	-2.7	30	Pass
	802.11(ac) MCS9	-6.416	2.5	3.0	-0.9	30	Pass
	80MHz BW						
	Mid Channel, Ch 149/161 - 5775 MHz						
	802.11(ac) MCS0	-11.495	0.6	3.0	-7.9	30	Pass
	802.11(ac) MCS9	-11.092	1.5	3.0	-6.6	30	Pass

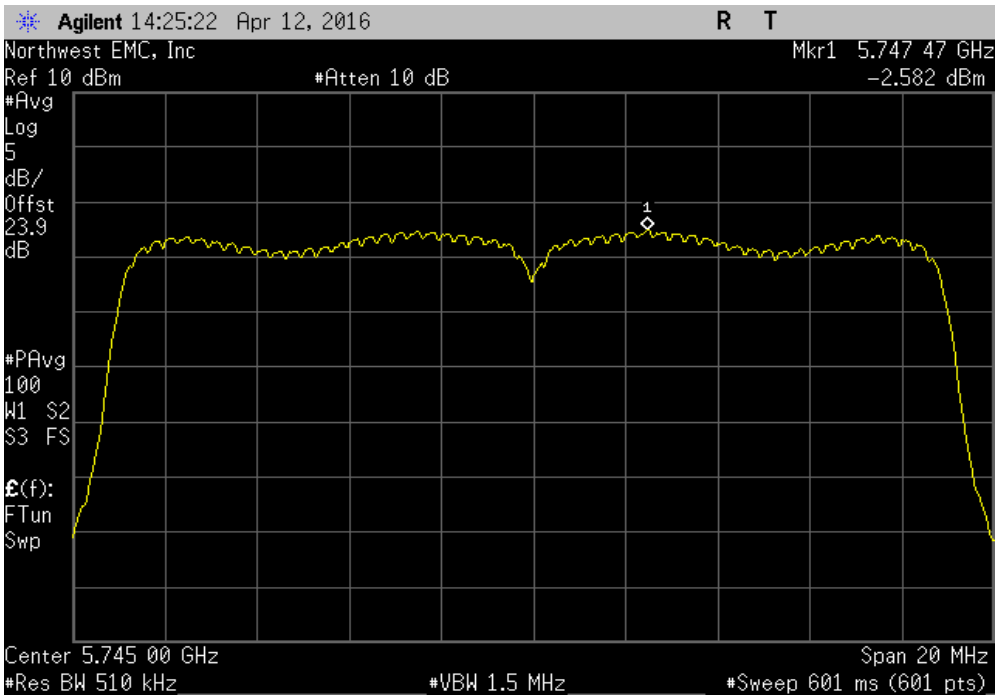
2x2 MIMO, Chain A, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(n) MCS8						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.601	0.1	3.0	0.5	30	Pass



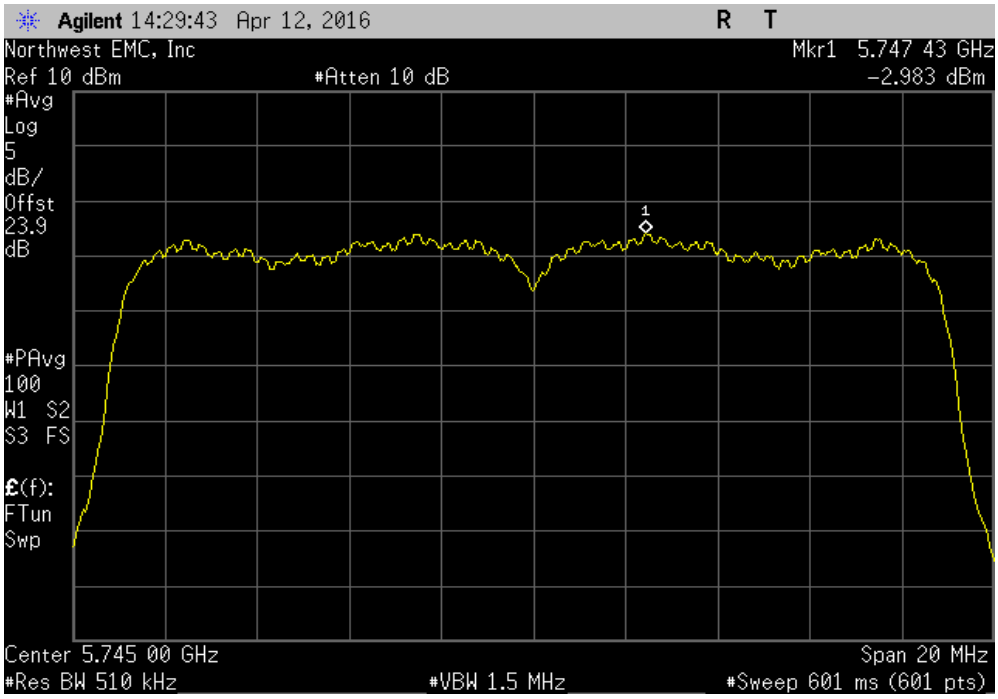
2x2 MIMO, Chain A, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(n) MCS15						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.836	0.7	3.0	0.9	30	Pass



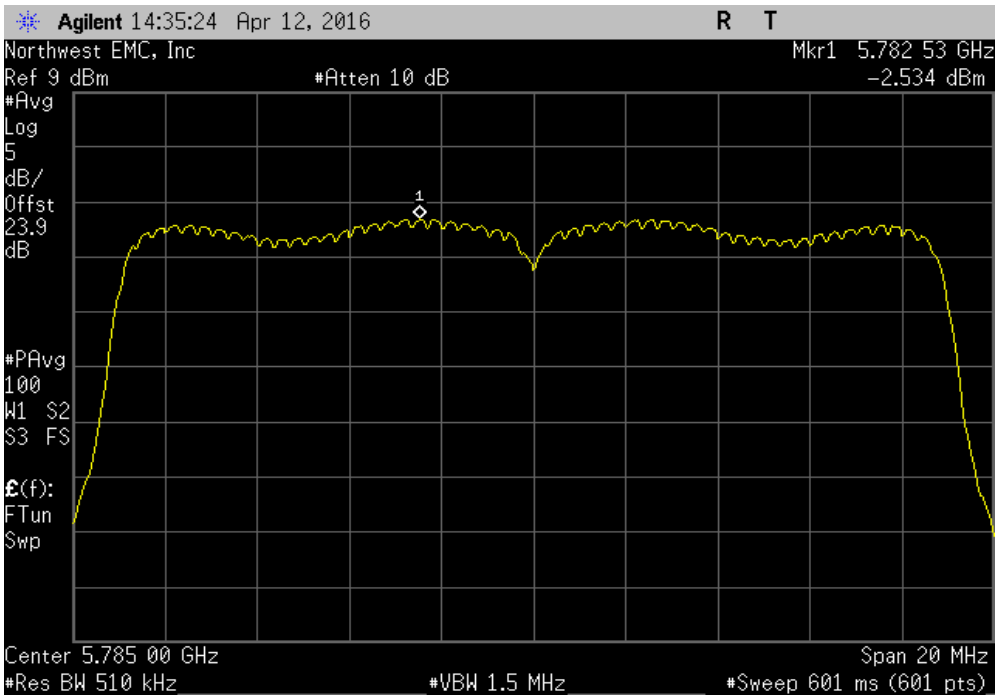
2x2 MIMO, Chain A, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.582	0.1	3.0	0.5	30	Pass



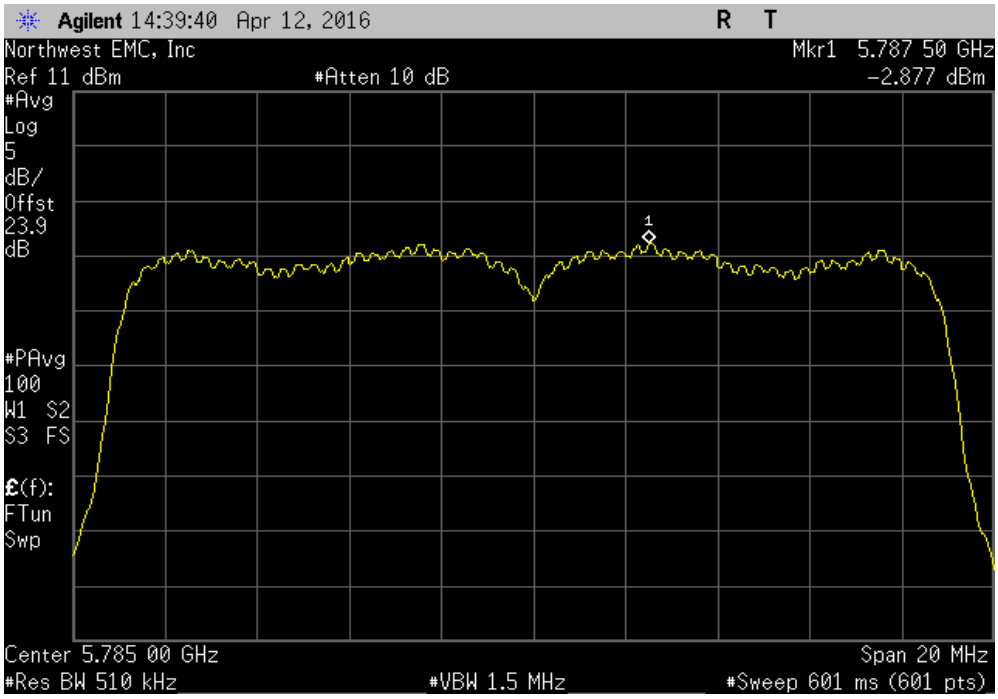
2x2 MIMO, Chain A, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(ac) MCS8						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.983	0.7	3.0	0.7	30	Pass



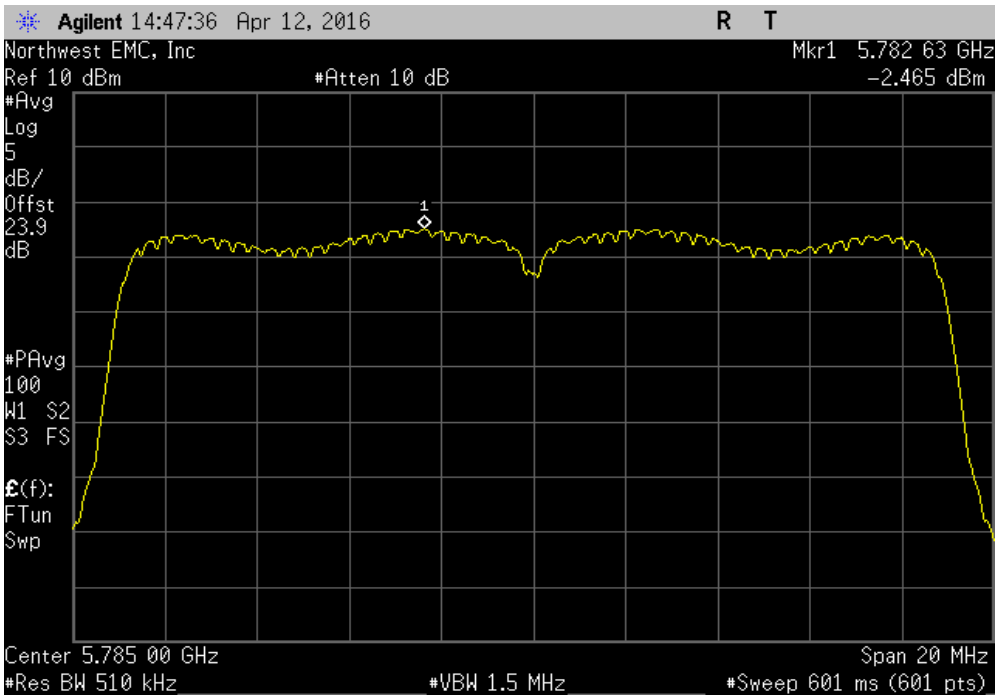
2x2 MIMO, Chain A, 20MHz BW, Mid Channel, Ch 157 - 5785 MHz, 802.11(n) MCS8						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.534	0.1	3.0	0.6	30	Pass



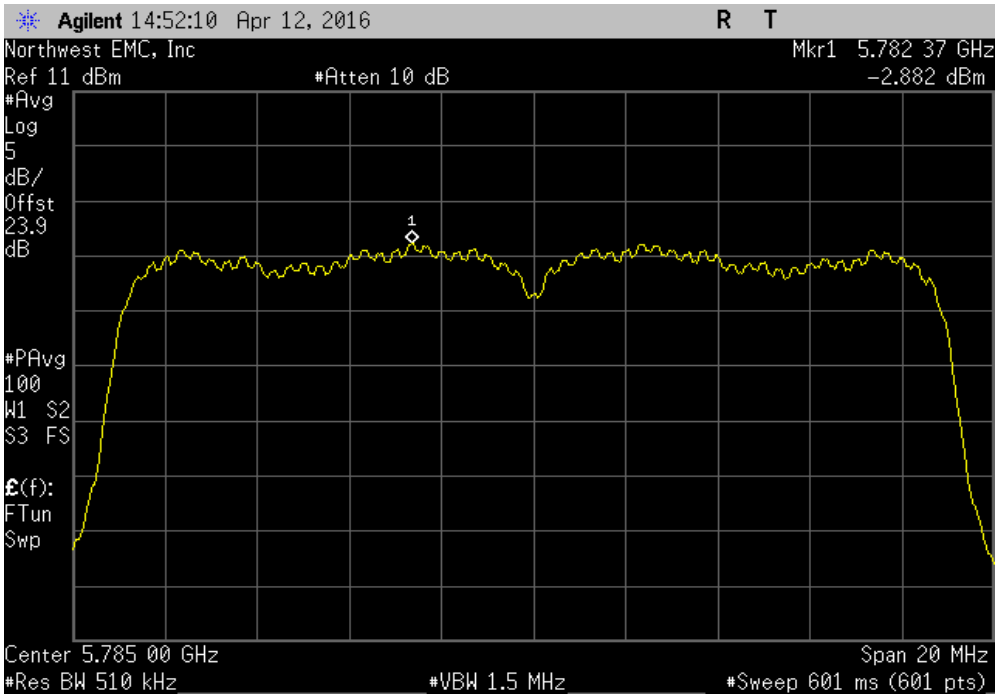
2x2 MIMO, Chain A, 20MHz BW, Mid Channel, Ch 157 - 5785 MHz, 802.11(n) MCS15						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.877	0.7	3.0	0.8	30	Pass



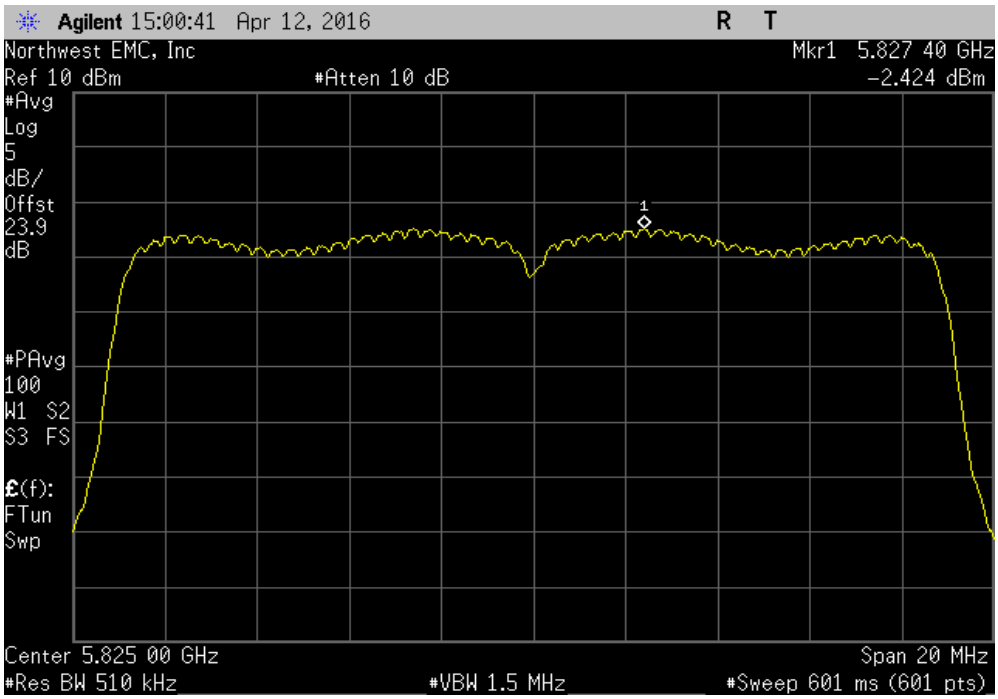
2x2 MIMO, Chain A, 20MHz BW, Mid Channel, Ch 157 - 5785 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.465	0.1	3.0	0.6	30	Pass



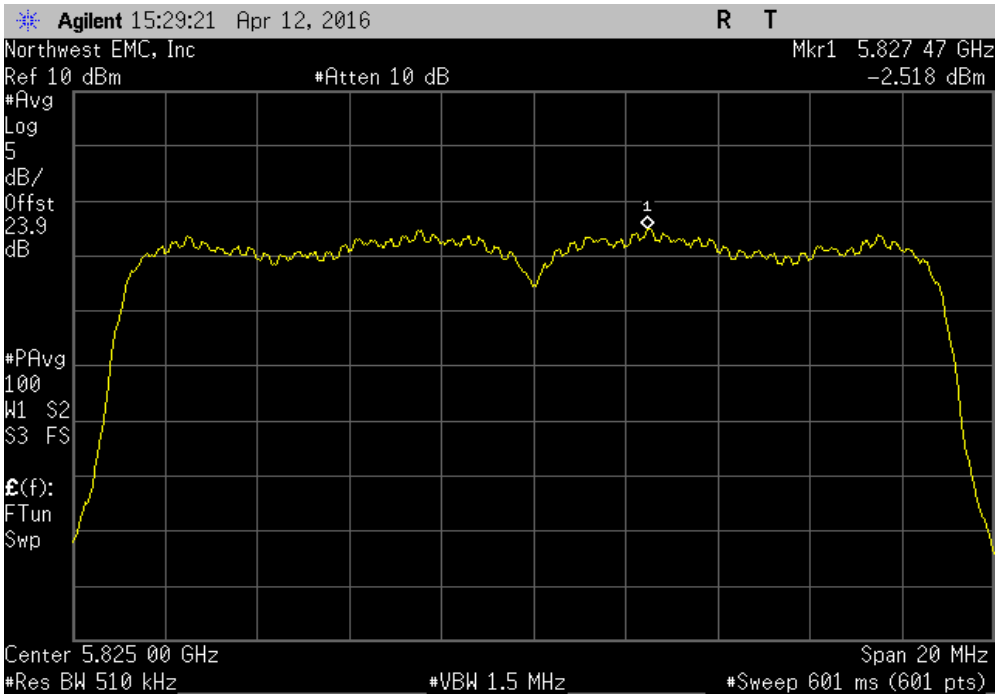
2x2 MIMO, Chain A, 20MHz BW, Mid Channel, Ch 157 - 5785 MHz, 802.11(ac) MCS8						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.882	0.7	3.0	0.8	30	Pass



2x2 MIMO, Chain A, 20MHz BW, High Channel, Ch 165 - 5825 MHz, 802.11(n) MCS8						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.424	0.1	3.0	0.7	30	Pass



2x2 MIMO, Chain A, 20MHz BW, High Channel, Ch 165 - 5825 MHz, 802.11(n) MCS15						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.518	0.7	3.0	1.2	30	Pass

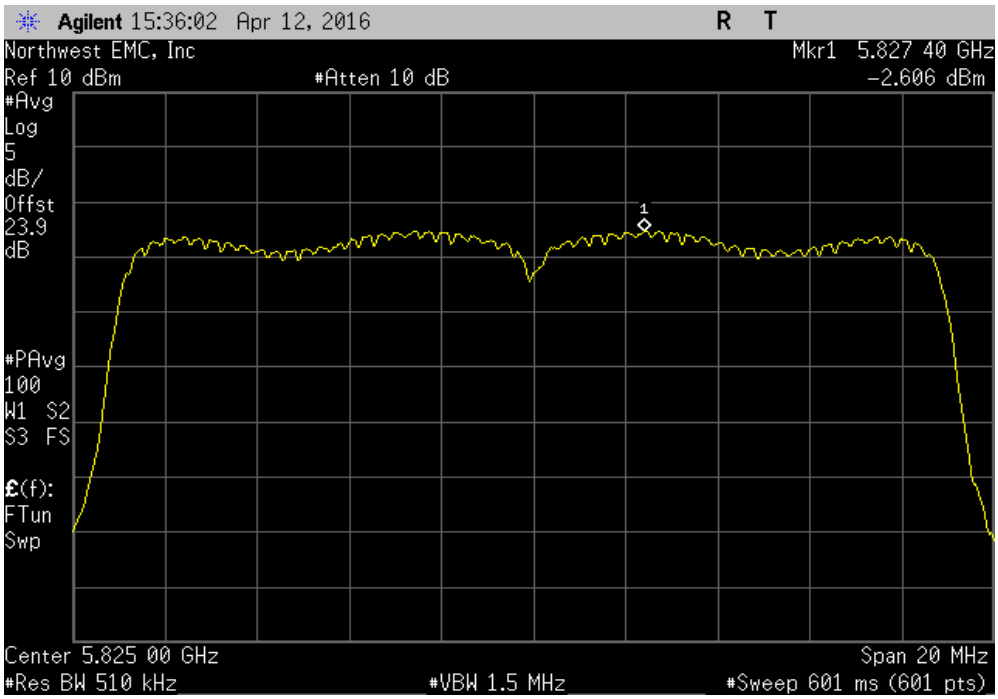


MAXIMUM POWER SPECTRAL DENSITY

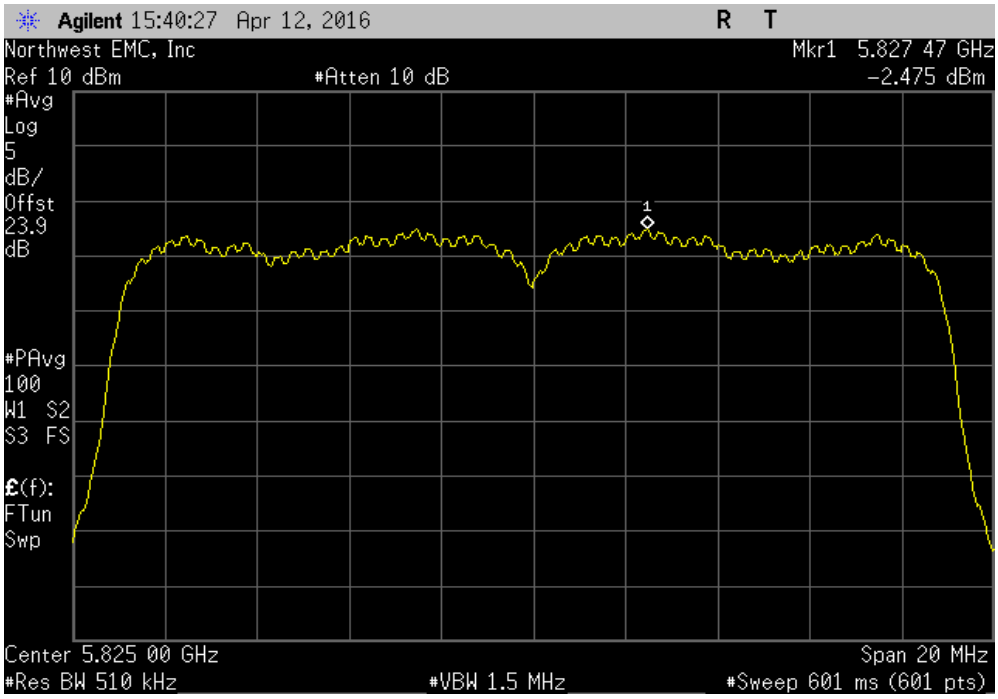
NORTHWEST EMC

XMit 2015.01.14

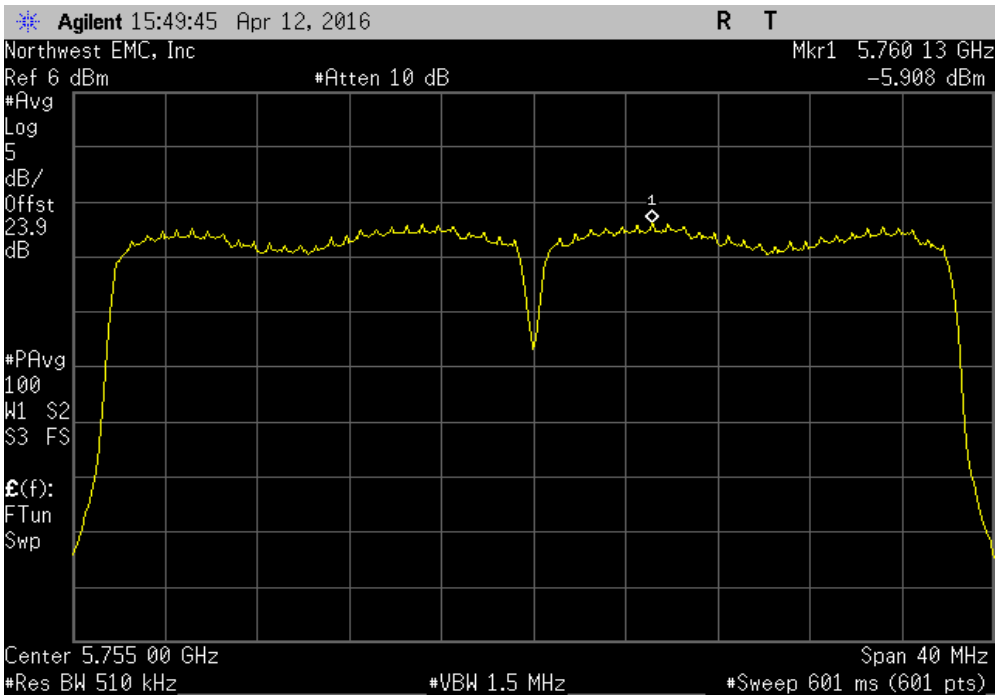
2x2 MIMO, Chain A, 20MHz BW, High Channel, Ch 165 - 5825 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.606	0.1	3.0	0.5	30	Pass



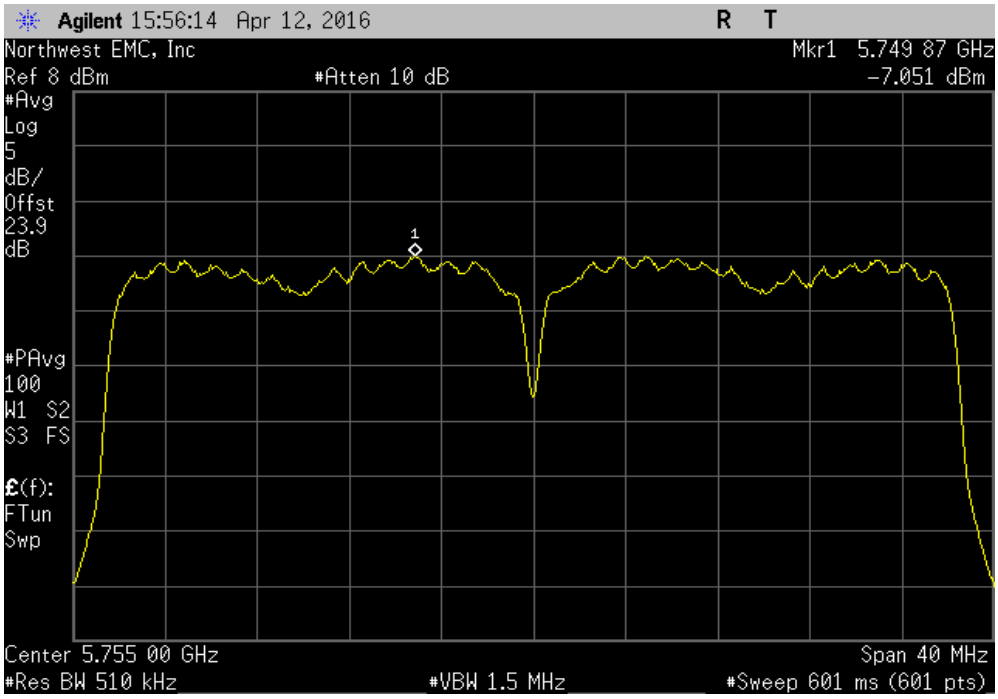
2x2 MIMO, Chain A, 20MHz BW, High Channel, Ch 165 - 5825 MHz, 802.11(ac) MCS8						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.475	0.7	3.0	1.2	30	Pass



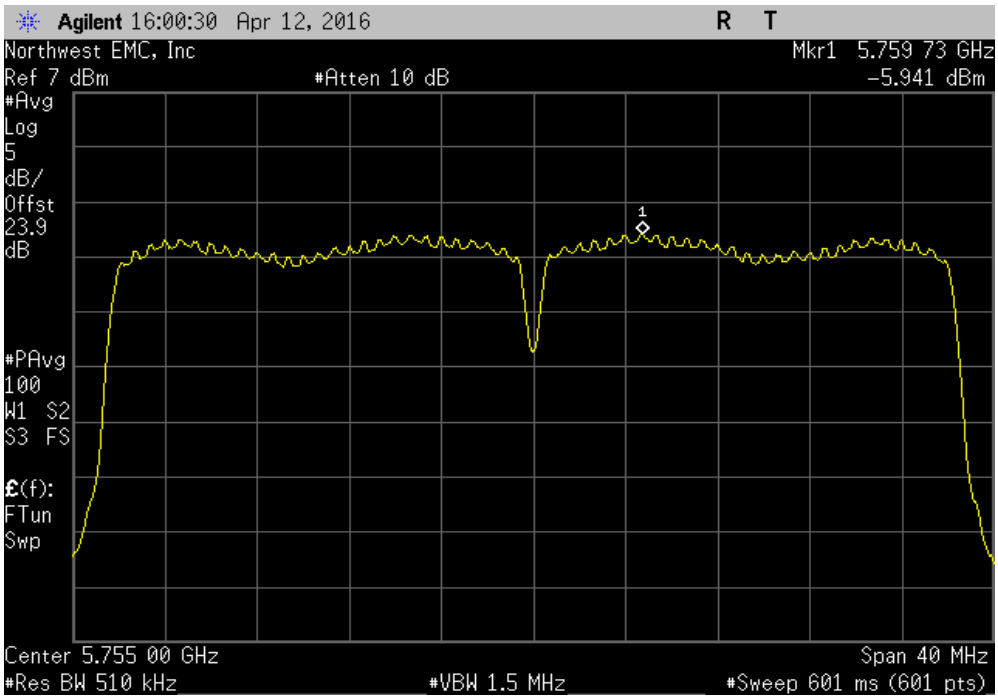
2x2 MIMO, Chain A, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(n) MCS8						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-5.908	0.2	3.0	-2.7	30	Pass



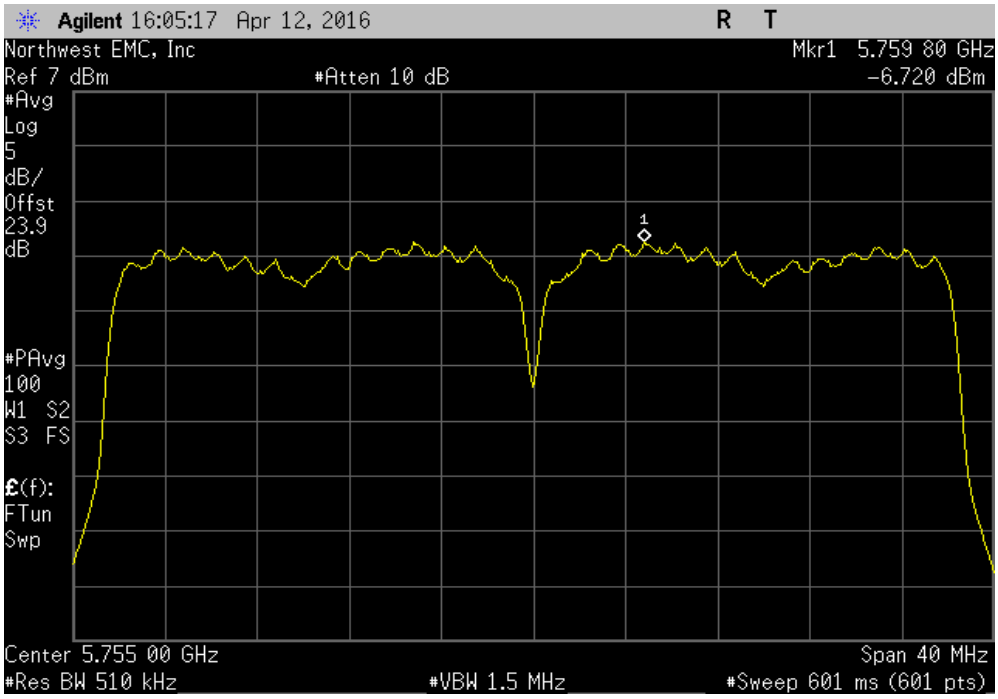
2x2 MIMO, Chain A, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(n) MCS15						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-7.051	1.5	3.0	-2.5	30	Pass



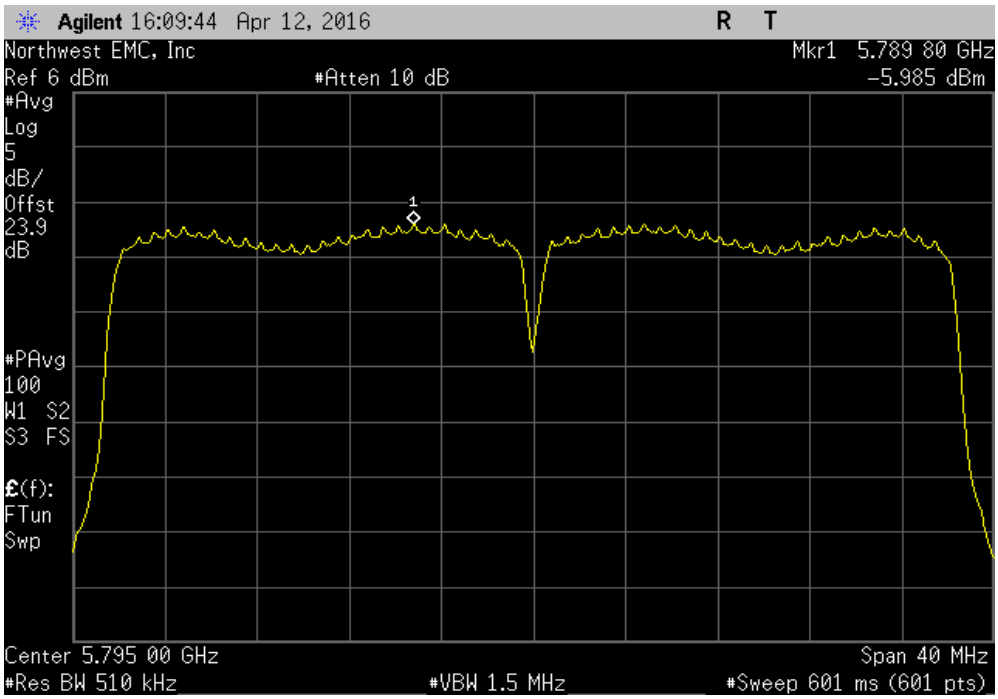
2x2 MIMO, Chain A, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-5.941	0.3	3.0	-2.6	30	Pass



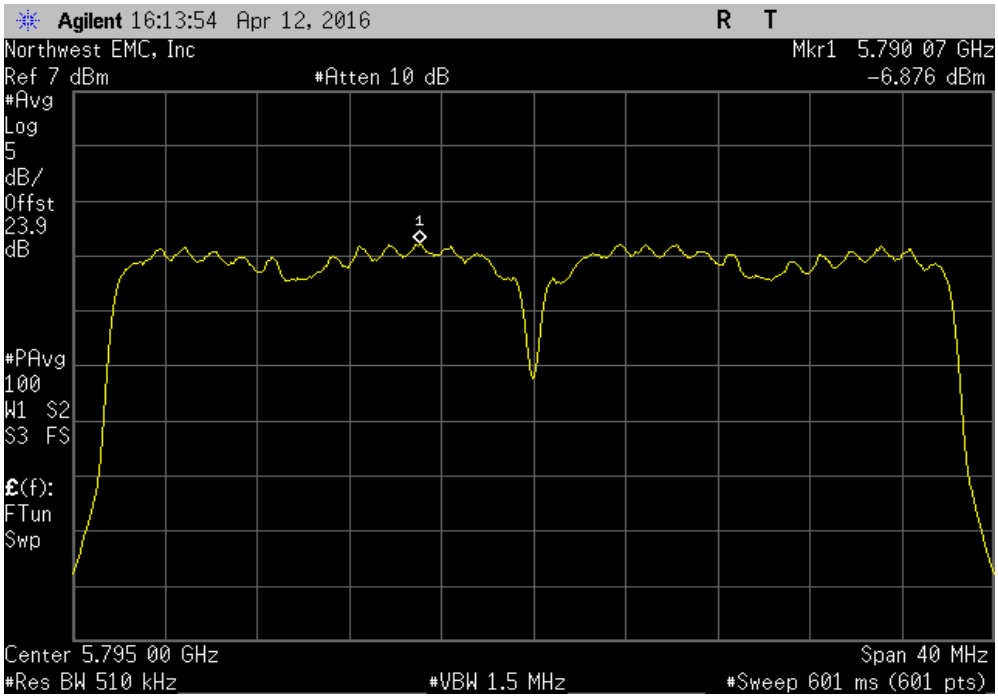
2x2 MIMO, Chain A, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(ac) MCS9						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-6.72	1.2	3.0	-2.5	30	Pass



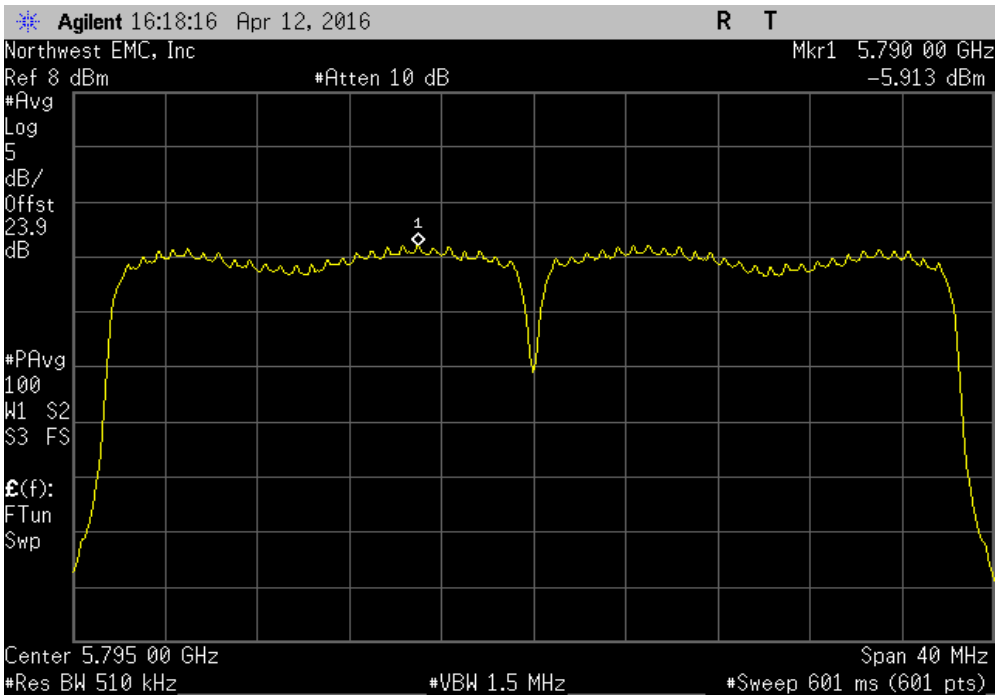
2x2 MIMO, Chain A, 40MHz BW, High Channel, Ch 157/161 - 5795 MHz, 802.11(n) MCS8						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-5.985	0.3	3.0	-2.7	30	Pass



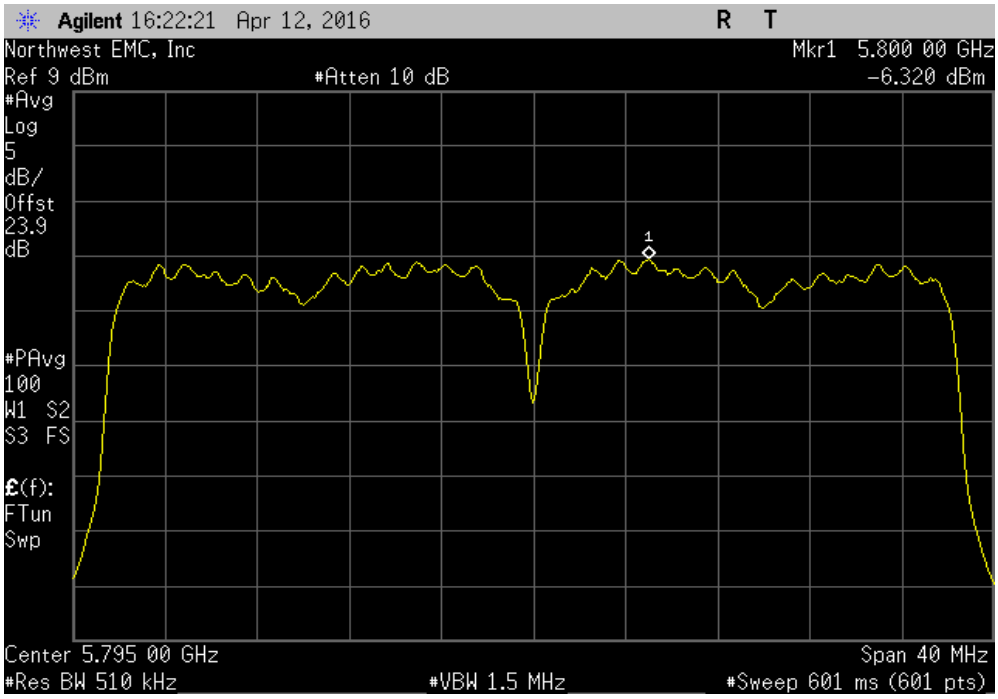
2x2 MIMO, Chain A, 40MHz BW, High Channel, Ch 157/161 - 5795 MHz, 802.11(n) MCS15						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-6.876	1.5	3.0	-2.4	30	Pass



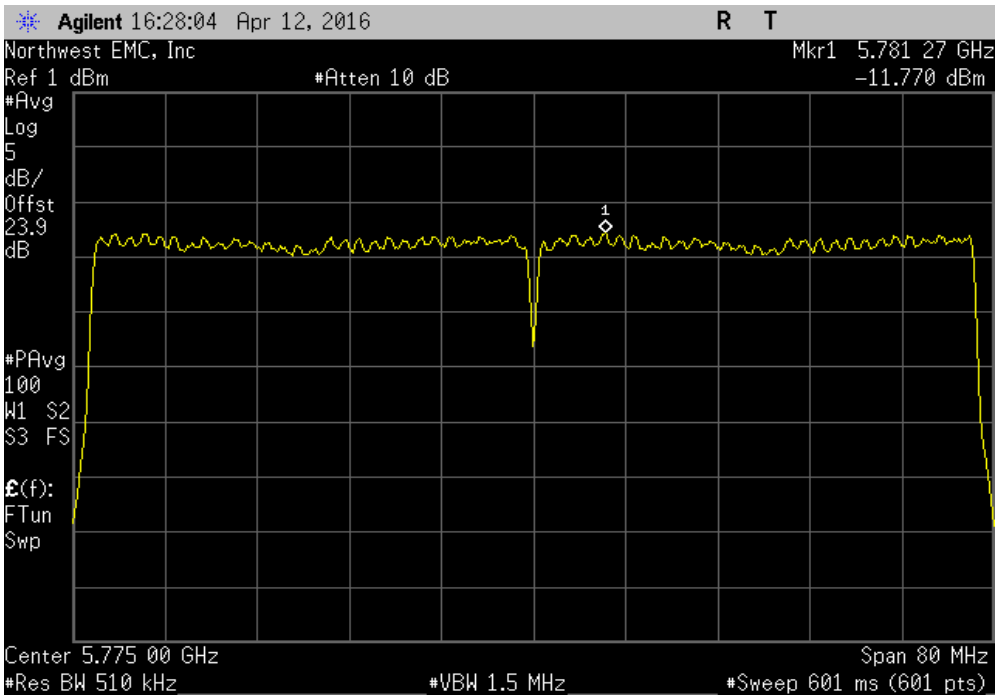
2x2 MIMO, Chain A, 40MHz BW, High Channel, Ch 157/161 - 5795 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-5.913	0.3	3.0	-2.6	30	Pass



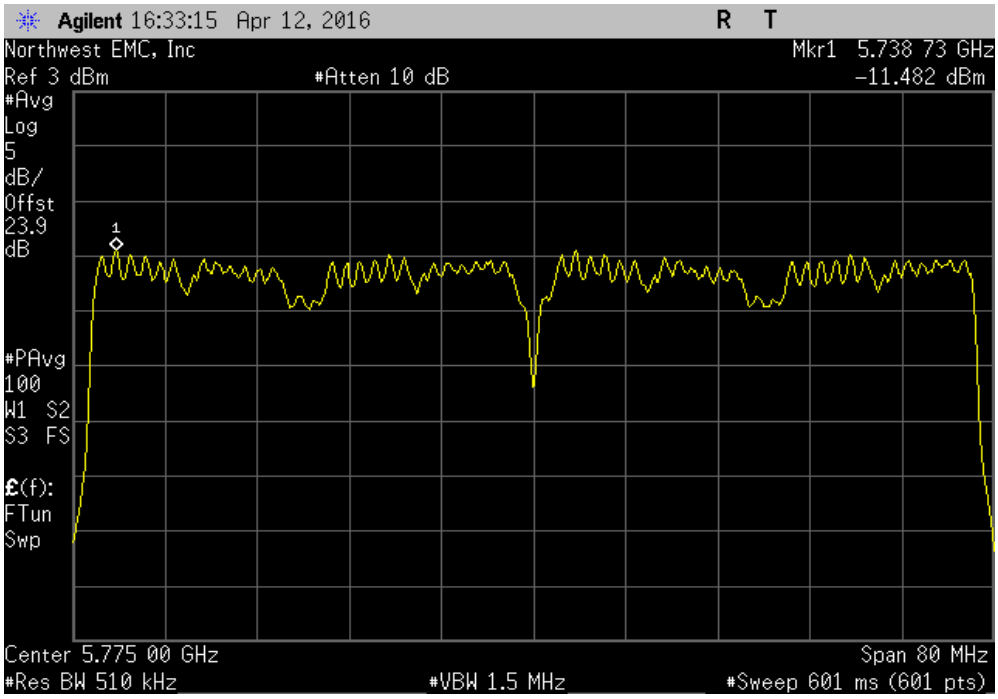
2x2 MIMO, Chain A, 40MHz BW, High Channel, Ch 157/161 - 5795 MHz, 802.11(ac) MCS9						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-6.32	2.5	3.0	-0.8	30	Pass



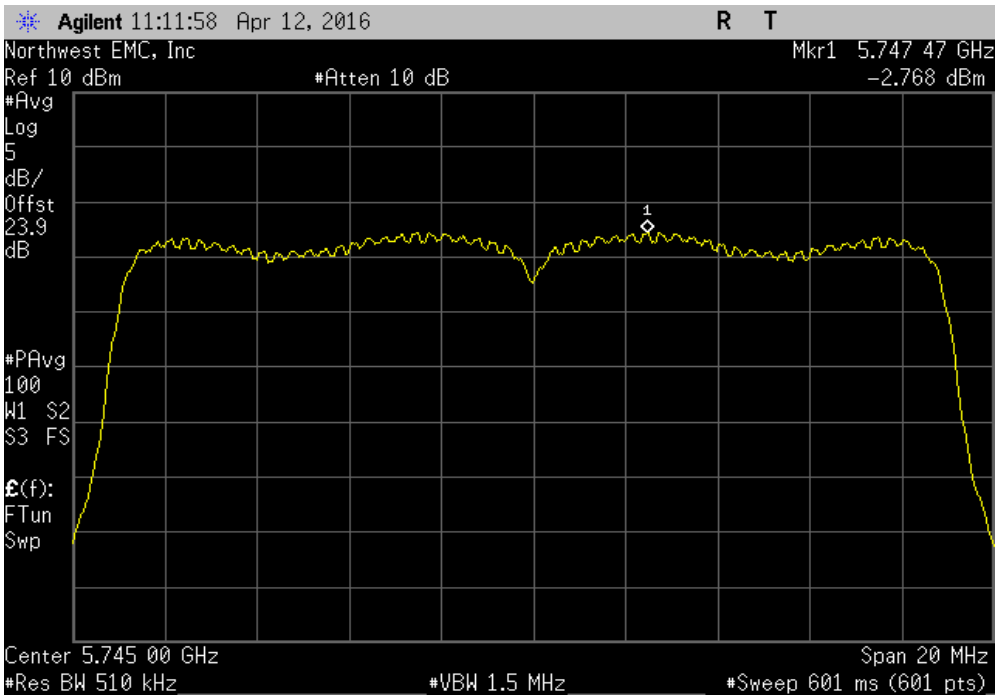
2x2 MIMO, Chain A, 80MHz BW, Mid Channel, Ch 149/161 - 5775 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-11.77	0.6	3.0	-8.2	30	Pass



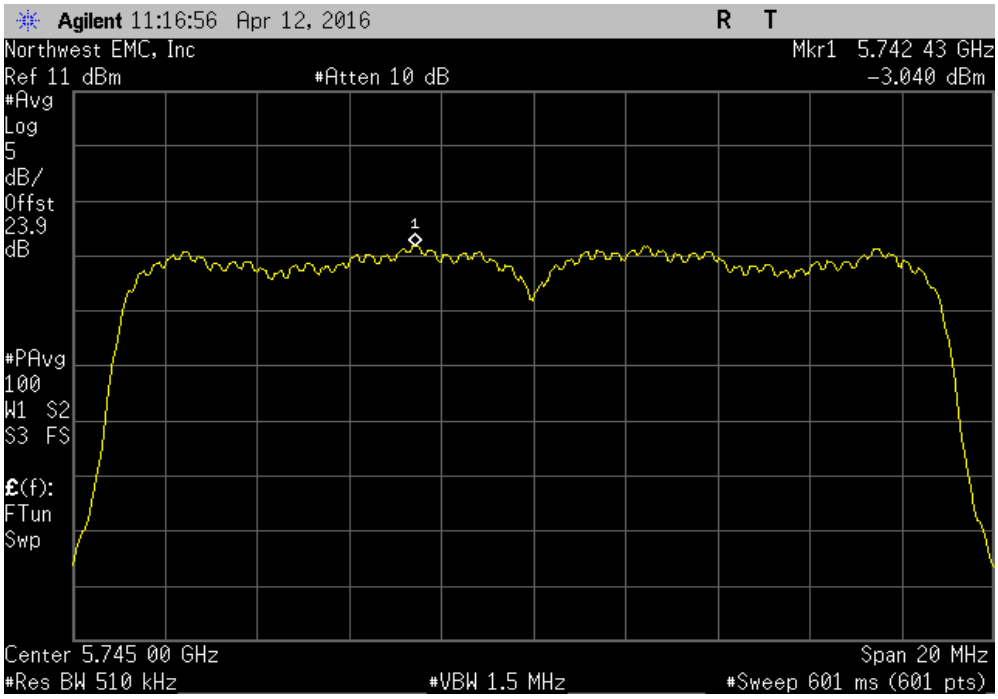
2x2 MIMO, Chain A, 80MHz BW, Mid Channel, Ch 149/161 - 5775 MHz, 802.11(ac) MCS9						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-11.482	2.8	3.0	-5.7	30	Pass



2x2 MIMO, Chain B, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(n) MCS8						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.768	0.1	3.0	0.3	30	Pass



2x2 MIMO, Chain B, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(n) MCS15						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-3.04	0.8	3.0	0.8	30	Pass

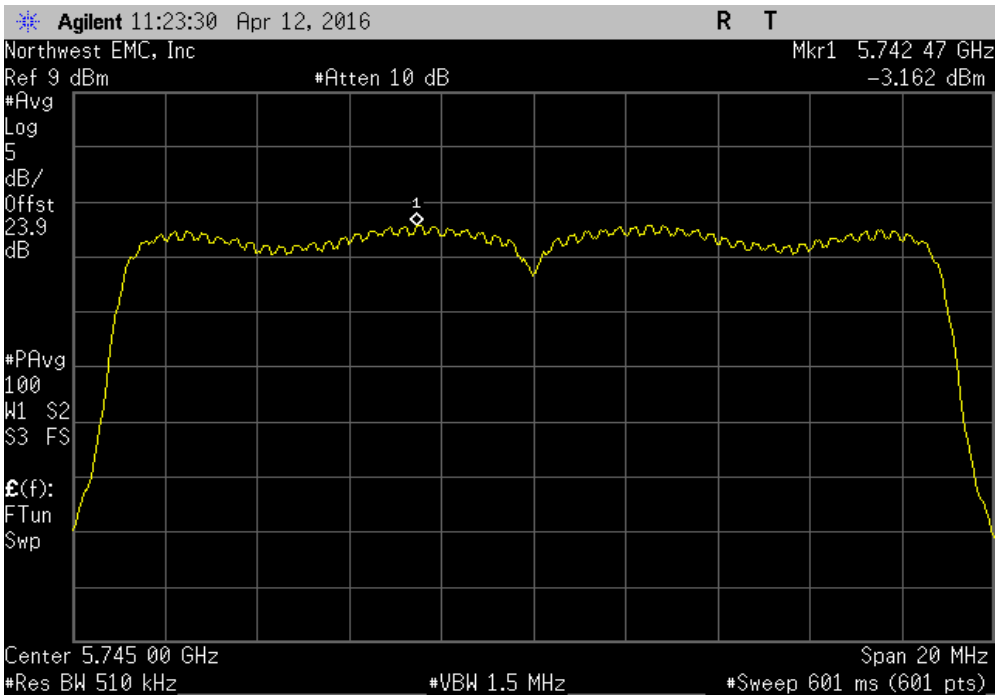


MAXIMUM POWER SPECTRAL DENSITY

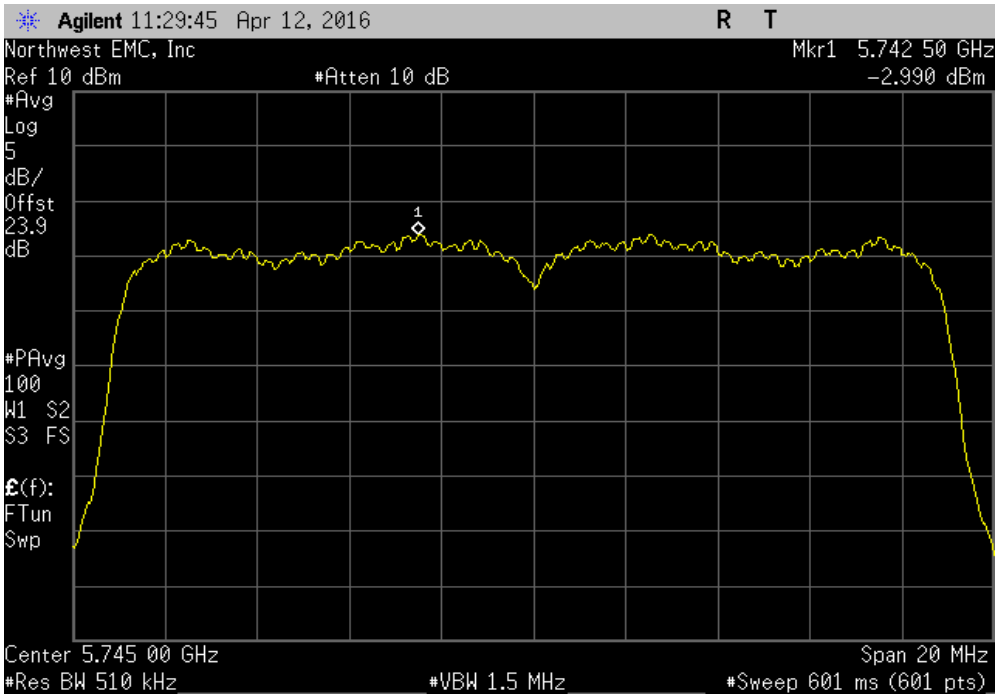
NORTHWEST EMC

XMit 2015.01.14

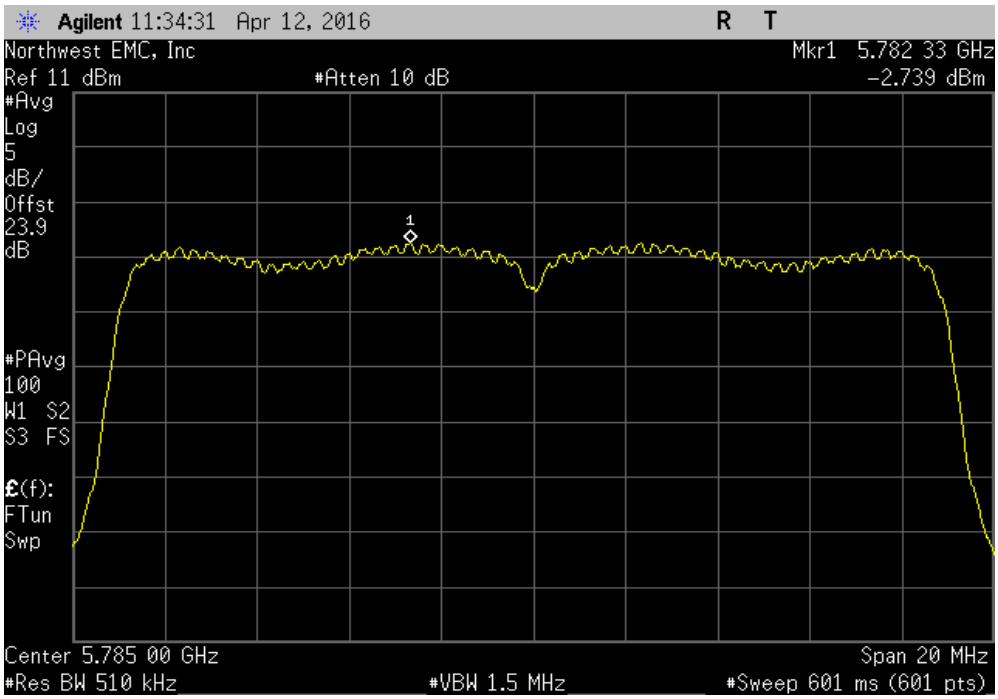
2x2 MIMO, Chain B, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-3.162	0.1	3.0	-0.1	30	Pass



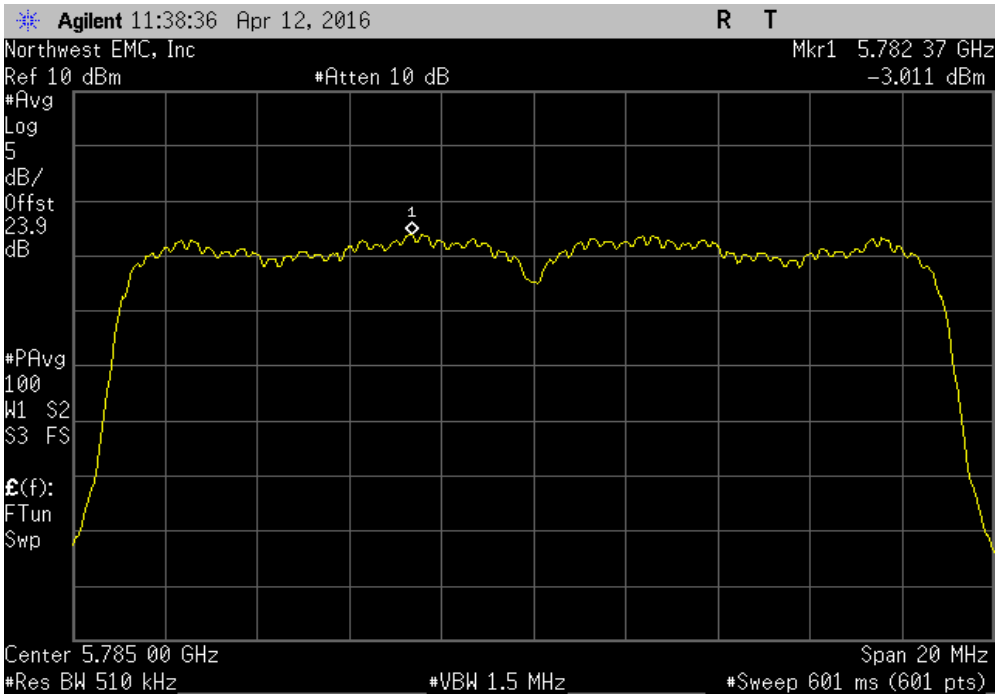
2x2 MIMO, Chain B, 20MHz BW, Low Channel, Ch 149 - 5745 MHz, 802.11(ac) MCS8						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.99	0.7	3.0	0.7	30	Pass



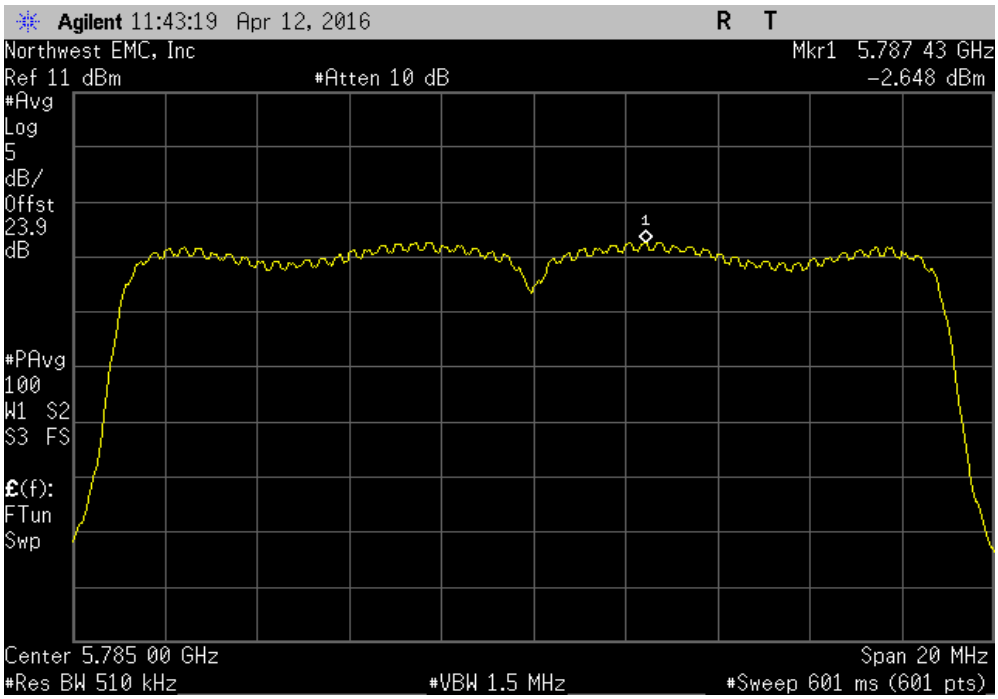
2x2 MIMO, Chain B, 20MHz BW, Mid Channel, Ch 157 - 5785 MHz, 802.11(n) MCS8						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.739	0.1	3.0	0.4	30	Pass



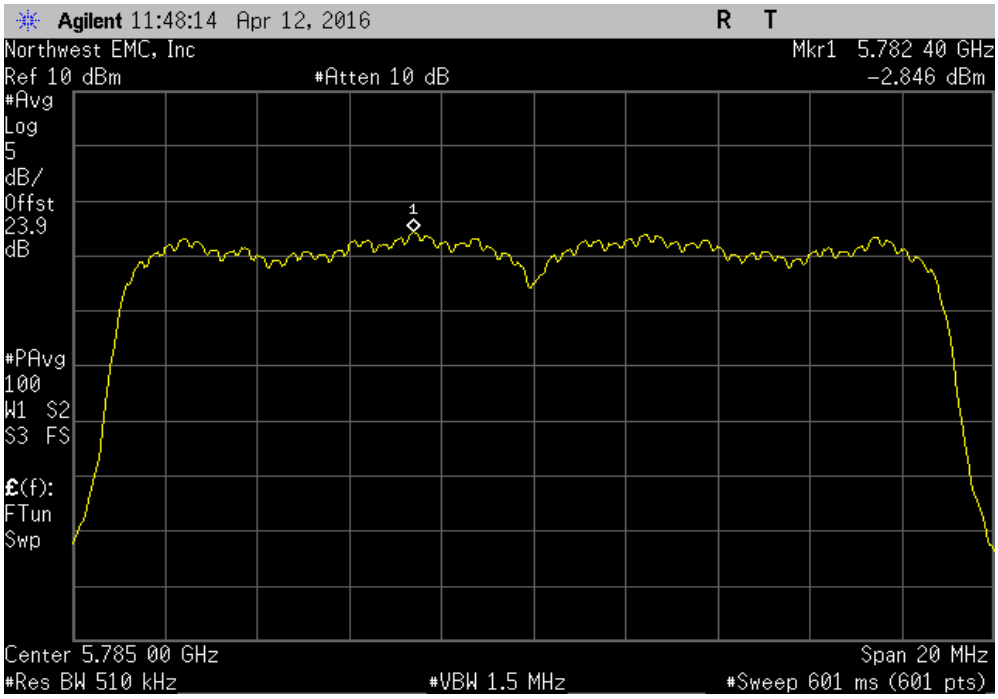
2x2 MIMO, Chain B, 20MHz BW, Mid Channel, Ch 157 - 5785 MHz, 802.11(n) MCS15						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-3.011	0.8	3.0	0.8	30	Pass



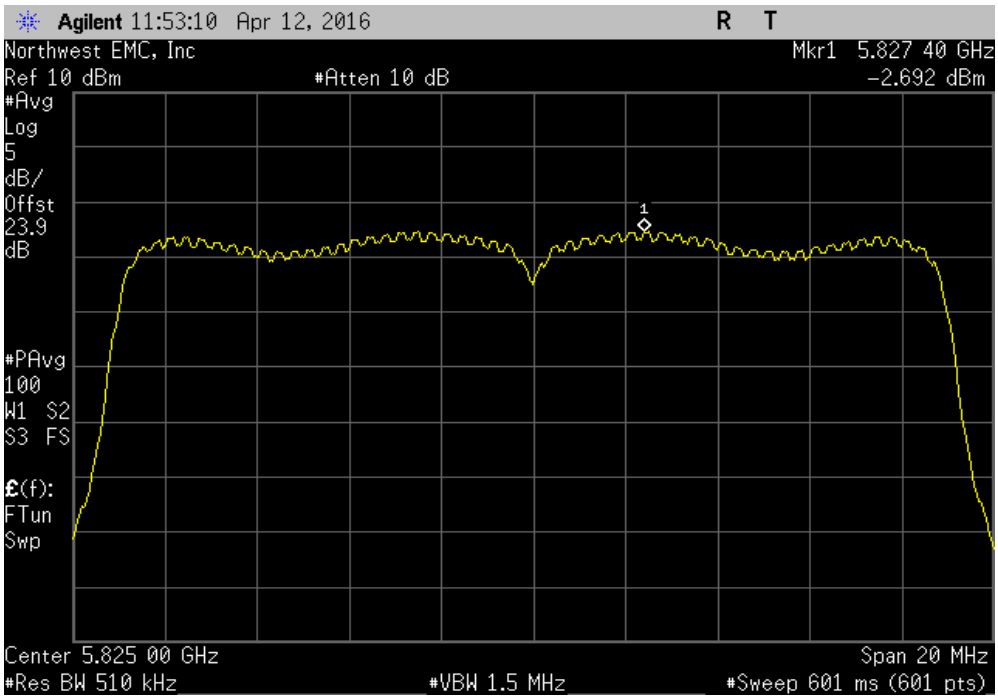
2x2 MIMO, Chain B, 20MHz BW, Mid Channel, Ch 157 - 5785 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.648	0.1	3.0	0.5	30	Pass



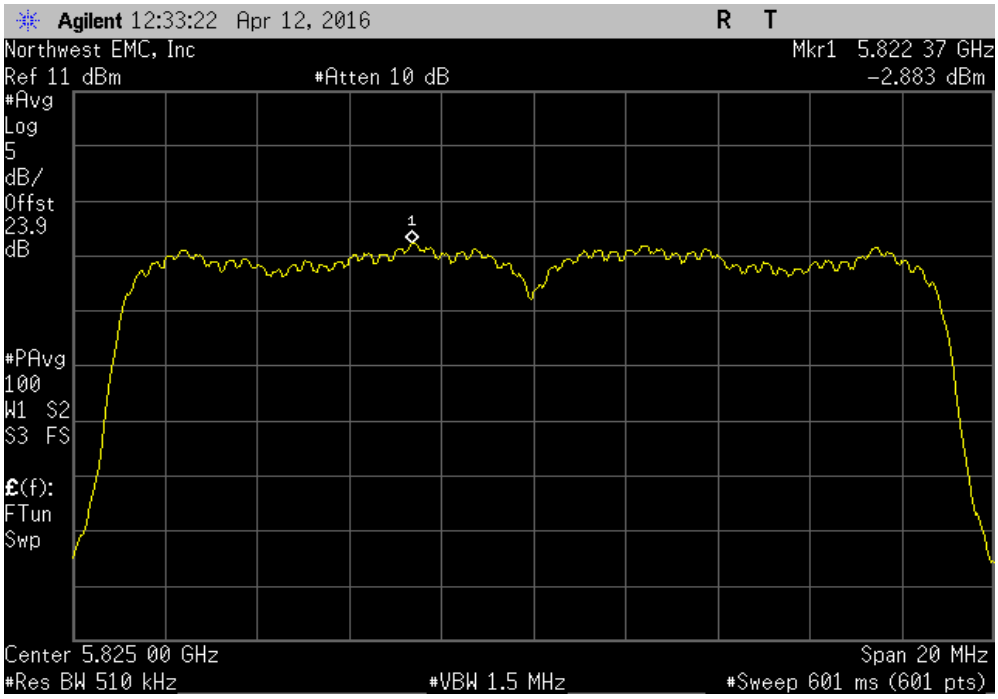
2x2 MIMO, Chain B, 20MHz BW, Mid Channel, Ch 157 - 5785 MHz, 802.11(ac) MCS8						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.846	0.7	3.0	0.9	30	Pass



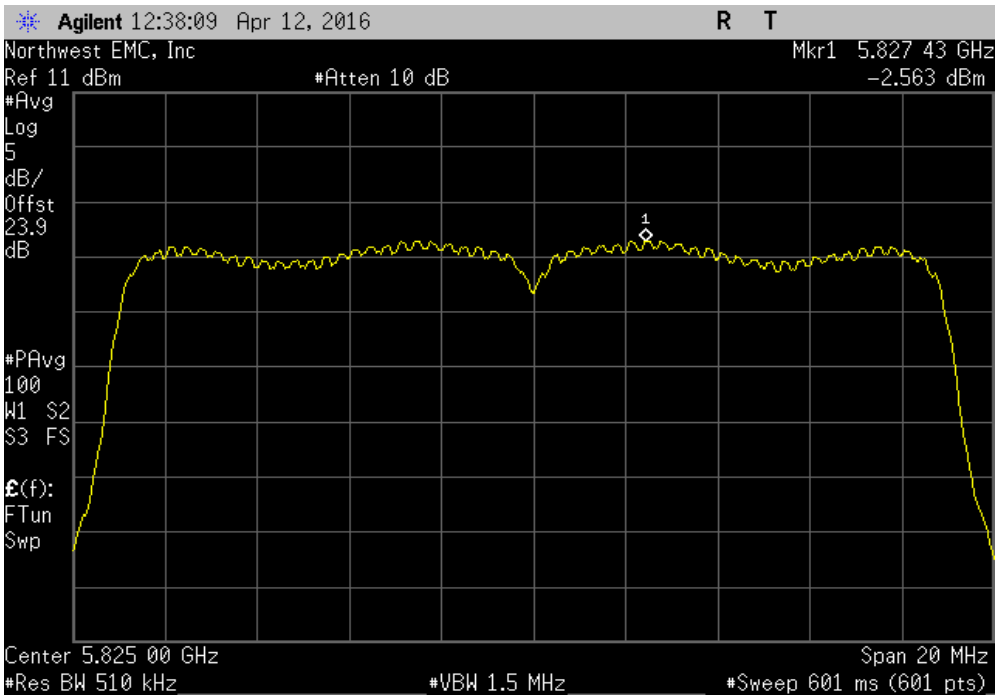
2x2 MIMO, Chain B, 20MHz BW, High Channel, Ch 165 - 5825 MHz, 802.11(n) MCS8						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.692	0.1	3.0	0.4	30	Pass



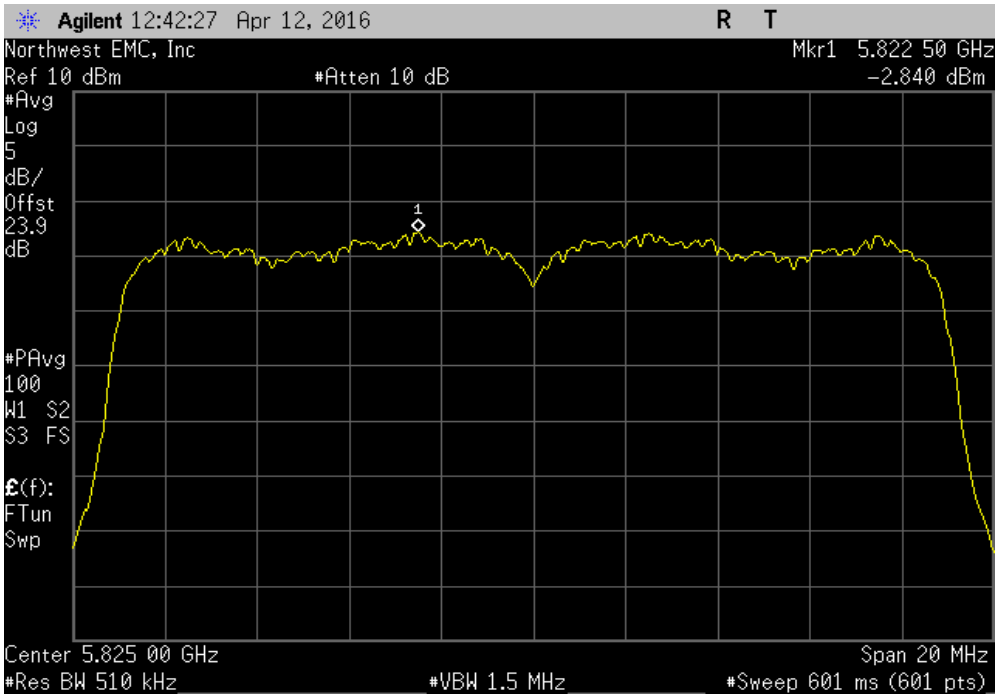
2x2 MIMO, Chain B, 20MHz BW, High Channel, Ch 165 - 5825 MHz, 802.11(n) MCS15						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.883	0.8	3.0	0.9	30	Pass



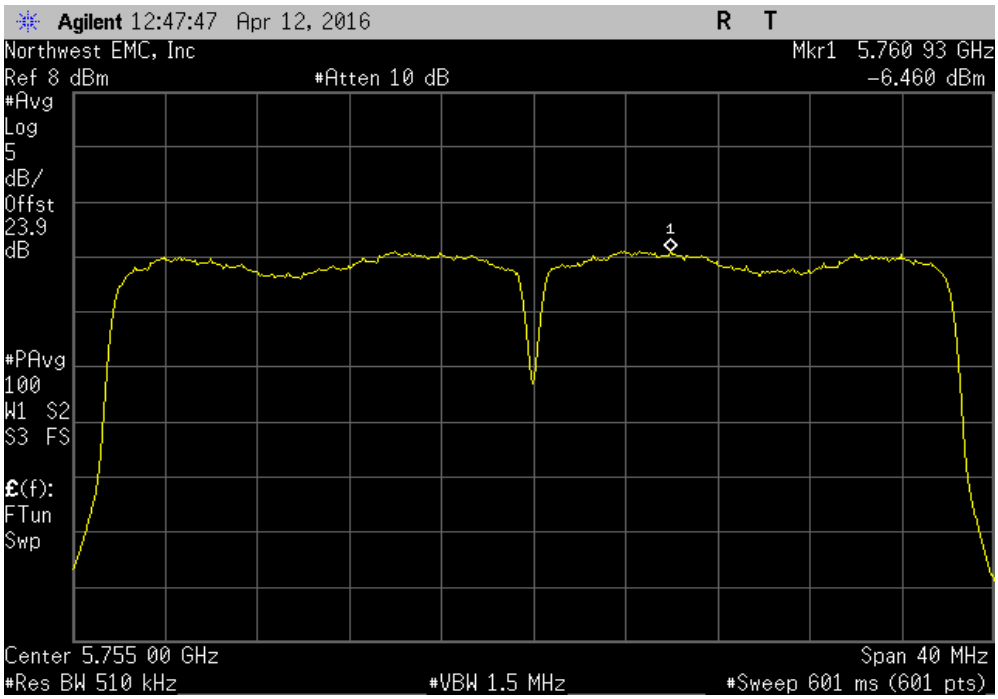
2x2 MIMO, Chain B, 20MHz BW, High Channel, Ch 165 - 5825 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.563	0.1	3.0	0.5	30	Pass



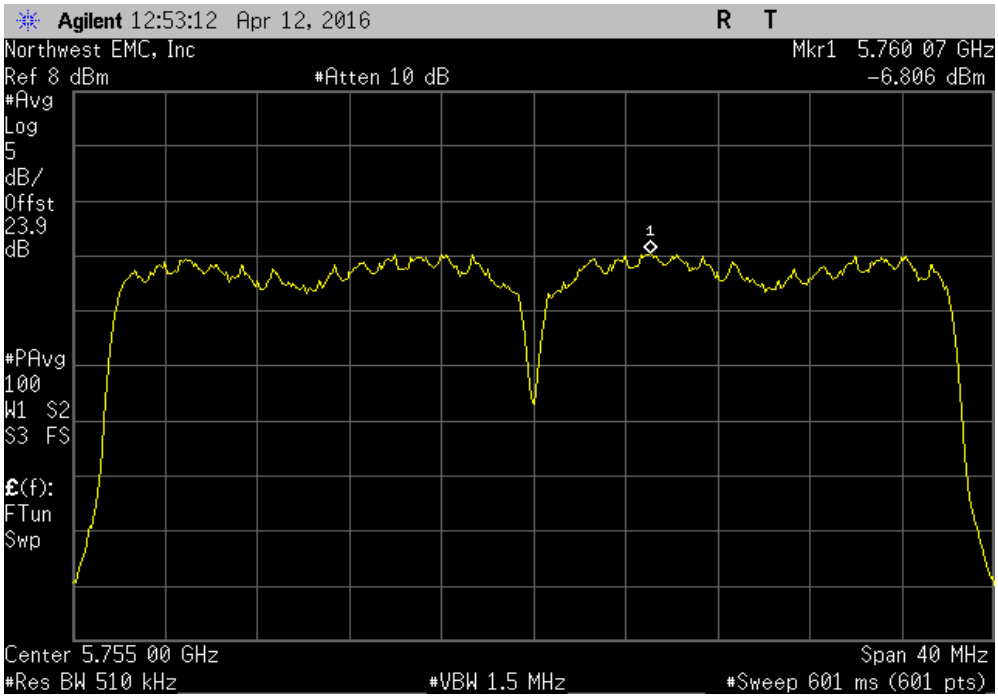
2x2 MIMO, Chain B, 20MHz BW, High Channel, Ch 165 - 5825 MHz, 802.11(ac) MCS8						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-2.84	0.7	3.0	0.9	30	Pass



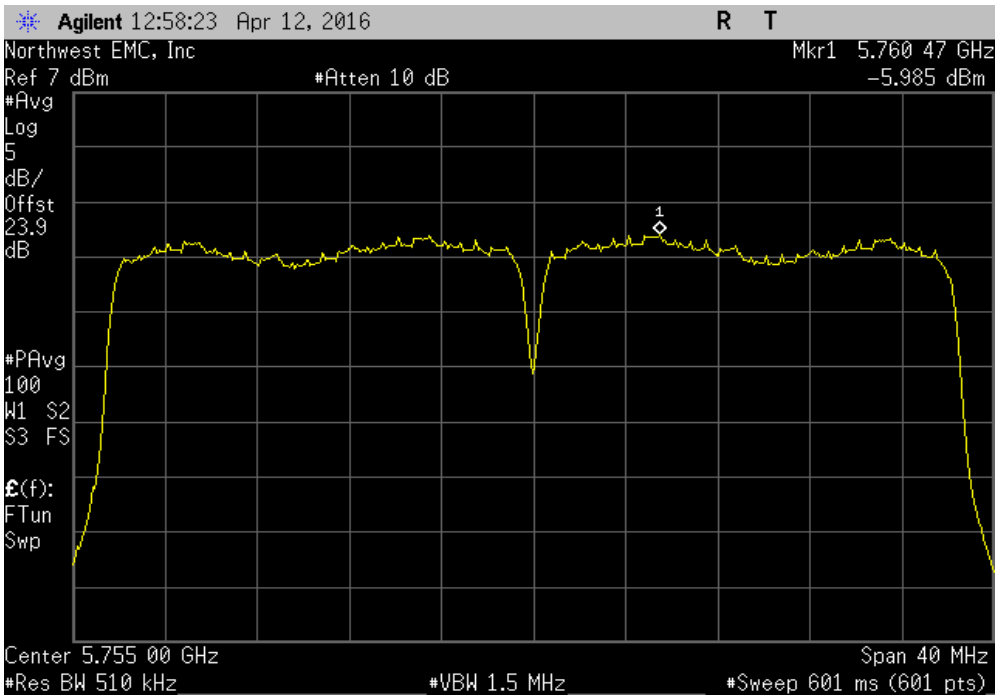
2x2 MIMO, Chain B, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(n) MCS8						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-6.46	0.3	3.0	-3.1	30	Pass



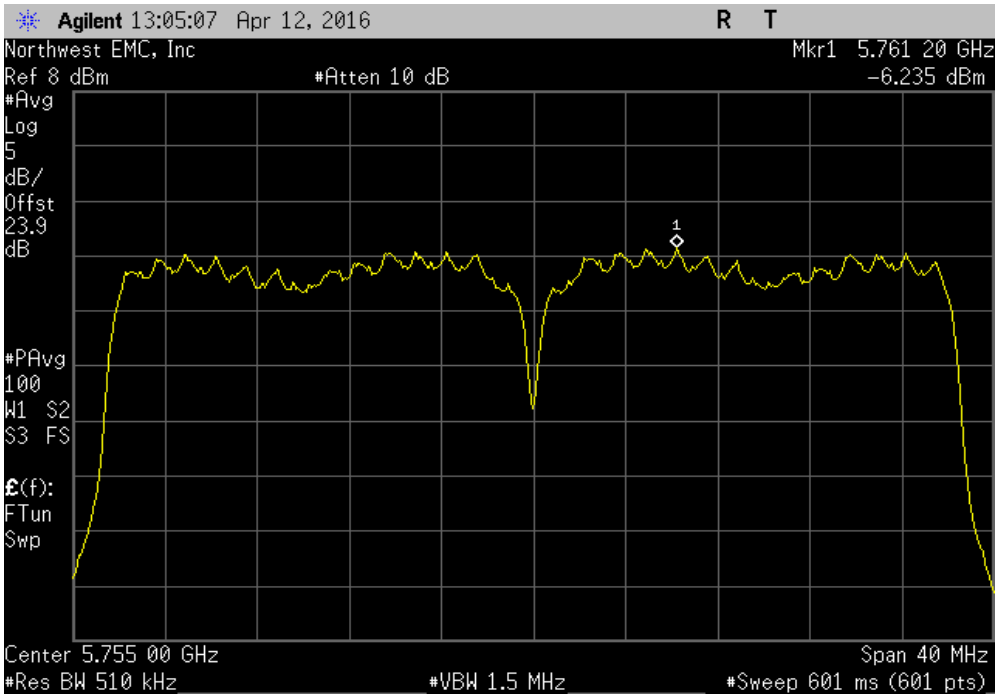
2x2 MIMO, Chain B, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(n) MCS15						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-6.806	2.4	3.0	-1.4	30	Pass



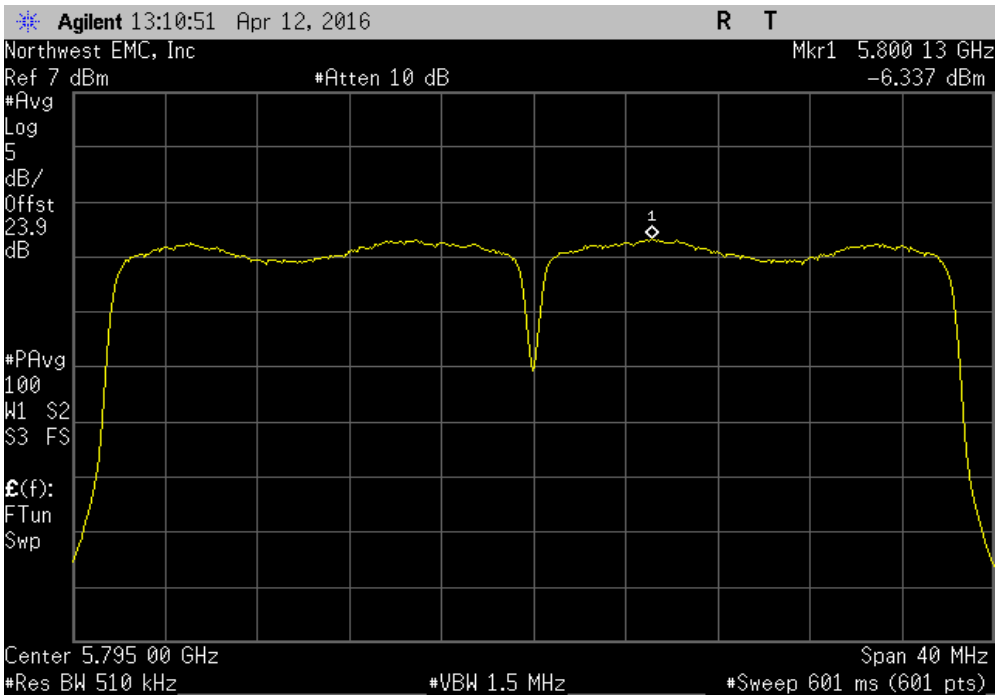
2x2 MIMO, Chain B, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-5.985	0.3	3.0	-2.7	30	Pass



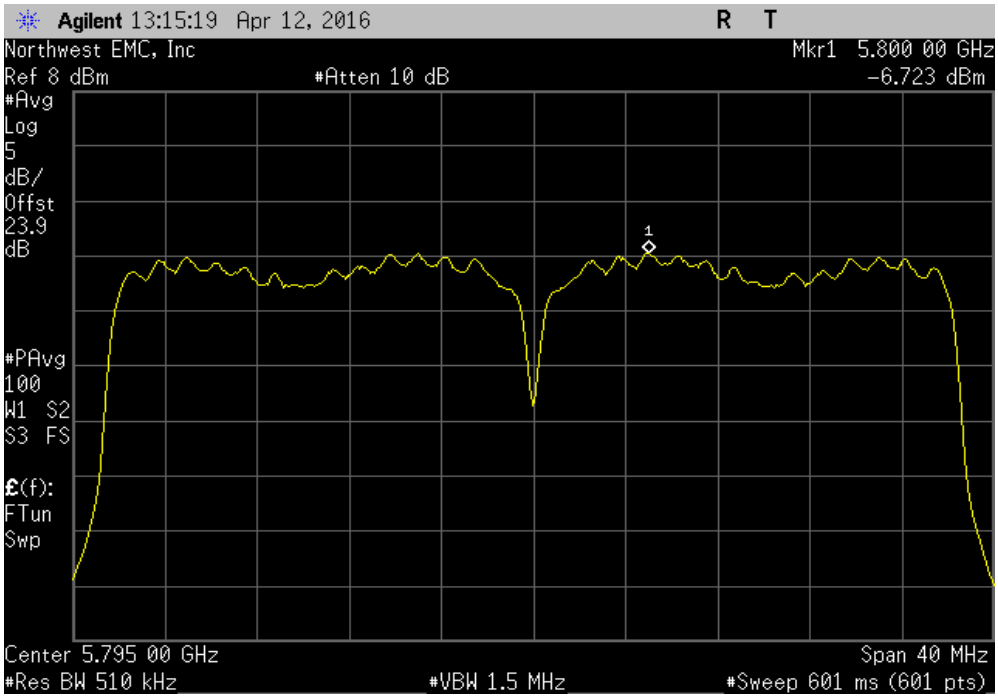
2x2 MIMO, Chain B, 40MHz BW, Low Channel, Ch 149/153 - 5755 MHz, 802.11(ac) MCS9						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-6.235	1.1	3.0	-2.1	30	Pass



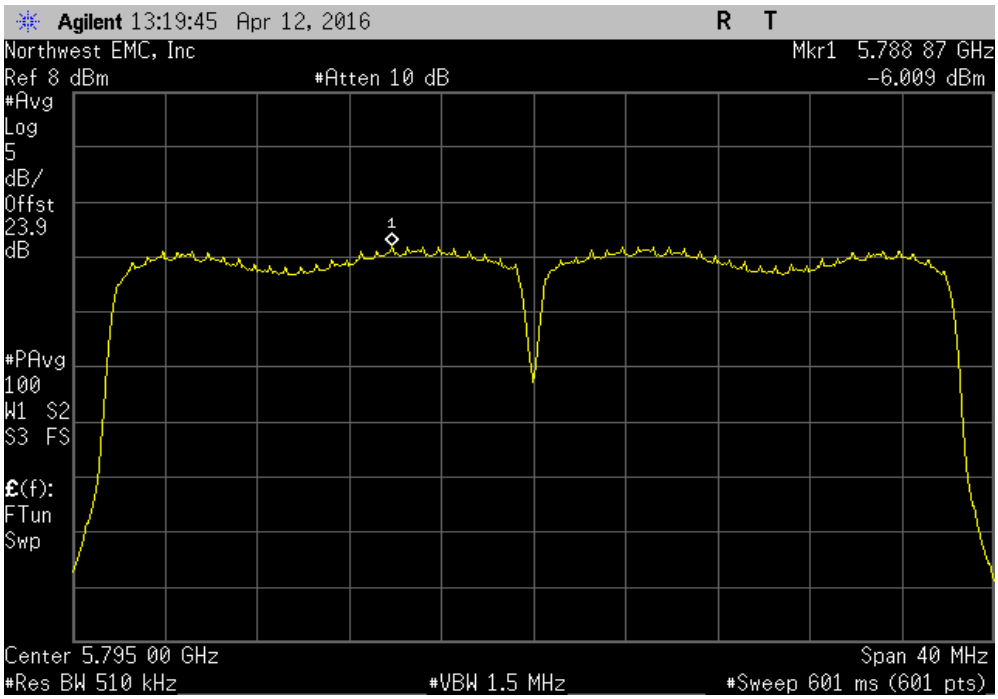
2x2 MIMO, Chain B, 40MHz BW, High Channel, Ch 157/161 - 5795 MHz, 802.11(n) MCS8						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-6.337	0.3	3.0	-3.0	30	Pass



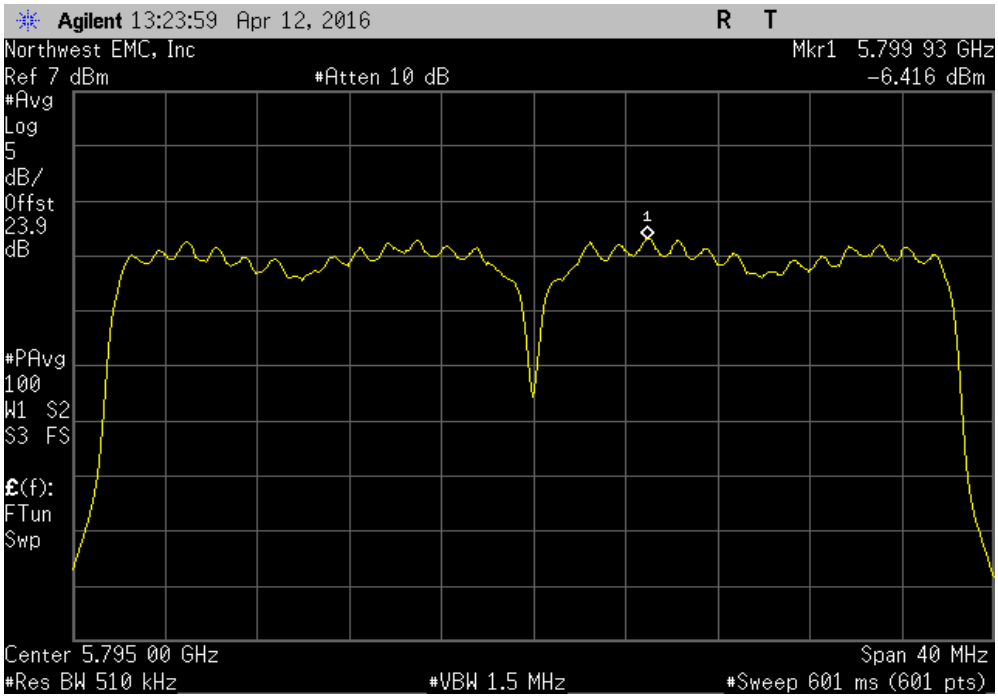
2x2 MIMO, Chain B, 40MHz BW, High Channel, Ch 157/161 - 5795 MHz, 802.11(n) MCS15						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-6.723	2.4	3.0	-1.3	30	Pass



2x2 MIMO, Chain B, 40MHz BW, High Channel, Ch 157/161 - 5795 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-6.009	0.3	3.0	-2.7	30	Pass



2x2 MIMO, Chain B, 40MHz BW, High Channel, Ch 157/161 - 5795 MHz, 802.11(ac) MCS9						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-6.416	2.5	3.0	-0.9	30	Pass

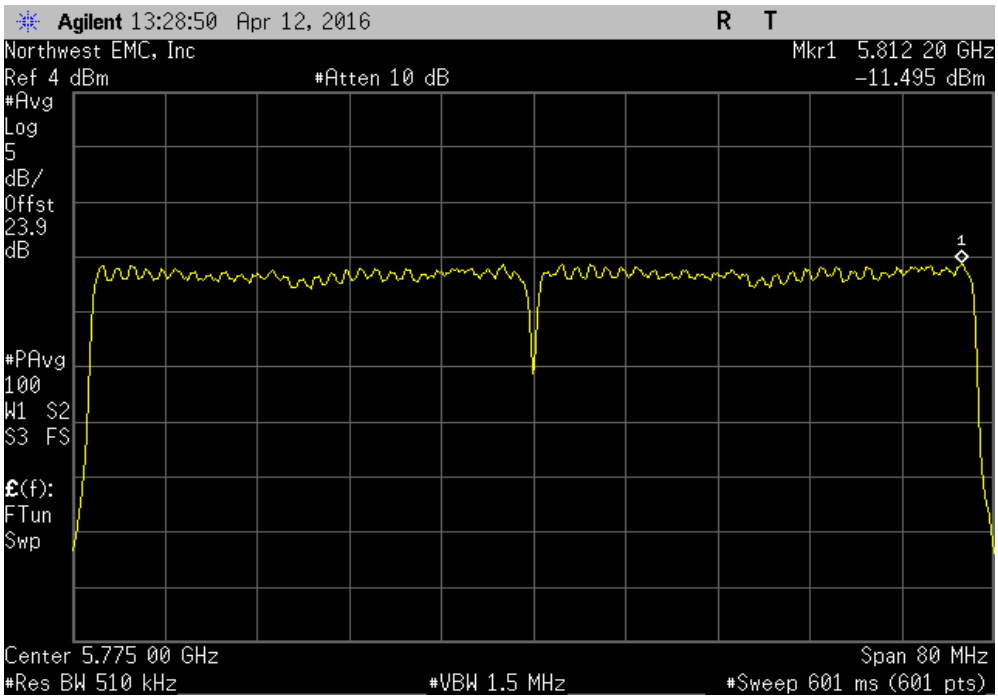


MAXIMUM POWER SPECTRAL DENSITY

NORTHWEST EMC

XMit 2015.01.14

2x2 MIMO, Chain B, 80MHz BW, Mid Channel, Ch 149/161 - 5775 MHz, 802.11(ac) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-11.495	0.6	3.0	-7.9	30	Pass



2x2 MIMO, Chain B, 80MHz BW, Mid Channel, Ch 149/161 - 5775 MHz, 802.11(ac) MCS9						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Summing Factor (dB)	Density (dBm/Ref BW)	Limit (dBm / Ref BW	Results
	-11.092	1.5	3.0	-6.6	30	Pass