DUTY CYCLE

XMit 2016.05.06

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.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	6/8/2016	6/8/2017
Cable	Micro-Coax	UFD150A-1-0720-200200	NCS	6/7/2016	6/7/2017
Attenuator	Fairview Microwave	SA4014-20	TKV	3/4/2016	3/4/2017
Block - DC	Fairview Microwave	SD3379	AMU	5/6/2016	5/6/2017
Generator - Signal	Agilent	N5183A	TIA	4/6/2016	4/6/2018

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. Per ANSI C63.10, all measurements are to be performed with the EUT operating at 100% duty cycle at its maximum power level. In the event the EUT cannot be operated at 100% duty cycle, the transmission pulse duration (T) and Duty Cycle (x) are required to be measured for each of the EUT operating modes.

The measurements were made using a zero span on the spectrum analyzer to see the pulses in the time domain. The transmit power was set to its default maximum.

The duty cycle was calculated by dividing the transmission pulse duration (T) by the total period of a single on and total off time.

If the transmit duty cycle < 98 percent, a duty cycle correction factor in dB can be calculated to add to power measurements if required in the test method guidance using the following formula

10 * LOG (1/D) = dB

Where D is duty cycle of the radio transmissions

DUTY CYCLE

NORTHWEST EMC

XMit 2016.05.06

EUT:	1790			**Work Order:**	MCSO1761
Serial Number:	DV-1-0546			**Date:**	11/02/16
Customer:	Microsoft Corporation			**Temperature:**	22 °C
Attendees:	None			**Humidity:**	48% RH
Project:	None			**Barometric Pres.:**	1019 mbar
Tested by:	Richard Mellroth	**Power:**	USB	**Job Site:**	NC02

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

COMMENTS

Power Setting at Default. Client provided adapter cable loss of 1.2dB included in reference level offset.

DEVIATIONS FROM TEST STANDARD

None

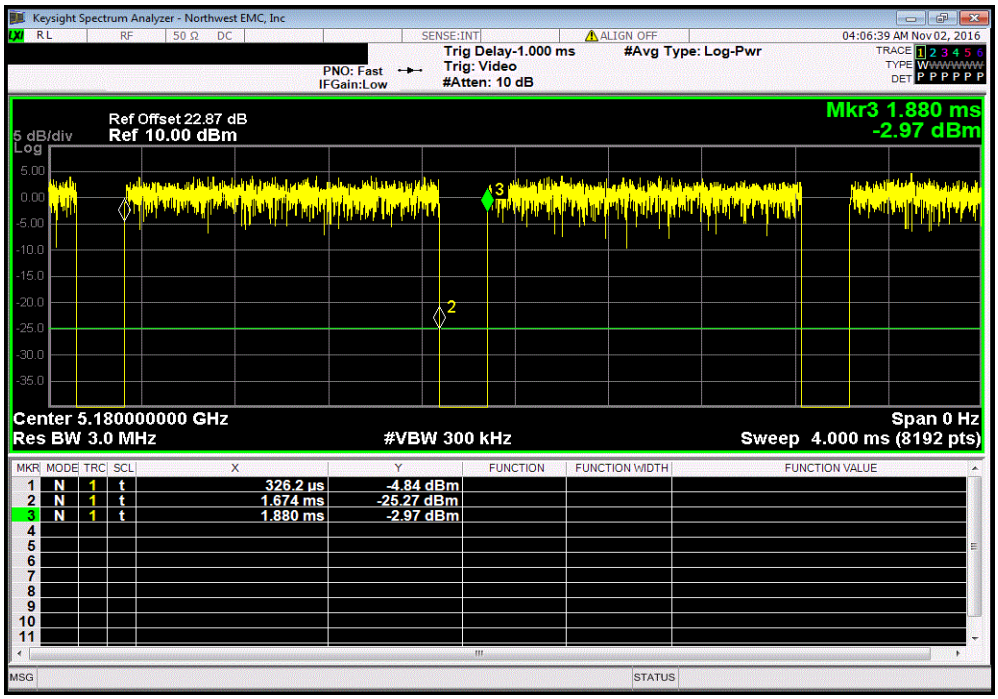
Configuration #	1	Signature

		Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
5150 - 5250 MHz Band							
	Low Channel 36 - 5180 MHz						
	802.11(n) MCS0	1.348 ms	1.554 ms	1	86.7	N/A	N/A
	802.11(n) MCS0	N/A	N/A	5	N/A	N/A	N/A
	802.11(n) MCS7	167.8 us	373.6 us	1	44.9	N/A	N/A
	802.11(n) MCS7	N/A	N/A	5	N/A	N/A	N/A
	High Channel 48 - 5240 MHz						
	802.11(n) MCS0	1.347 ms	1.554 ms	1	86.7	N/A	N/A
	802.11(n) MCS0	N/A	N/A	6	N/A	N/A	N/A
	802.11(n) MCS7	168 us	373.6 us	1	45	N/A	N/A
	802.11(n) MCS7	N/A	N/A	5	N/A	N/A	N/A
5725 - 5785 MHz Band							
	Low Channel 149 - 5745 MHz						
	802.11(n) MCS0	1.348 ms	1.554 ms	1	86.7	N/A	N/A
	802.11(n) MCS0	N/A	N/A	5	N/A	N/A	N/A
	802.11(n) MCS7	167.8 us	373.6 us	1	44.9	N/A	N/A
	802.11(n) MCS7	N/A	N/A	5	N/A	N/A	N/A
	Mid Channel 157 - 5785 MHz						
	802.11(n) MCS0	1.348 ms	1.554 ms	1	86.7	N/A	N/A
	802.11(n) MCS0	N/A	N/A	6	N/A	N/A	N/A
	802.11(n) MCS7	167.7 us	373.5 us	1	44.9	N/A	N/A
	802.11(n) MCS7	N/A	N/A	5	N/A	N/A	N/A
	High Channel 161 - 5805 MHz						
	802.11(n) MCS0	1.348 ms	1.554 ms	1	86.7	N/A	N/A
	802.11(n) MCS0	N/A	N/A	5	N/A	N/A	N/A
	802.11(n) MCS7	167.8 us	373.6 us	1	44.9	N/A	N/A
	802.11(n) MCS7	N/A	N/A	5	N/A	N/A	N/A

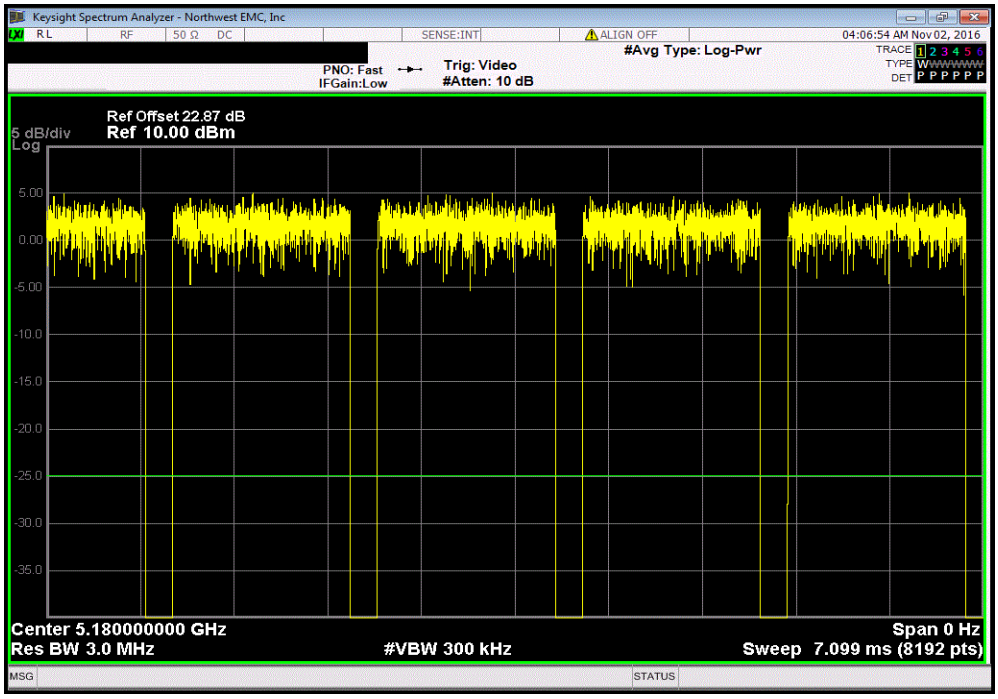
DUTY CYCLE

XMit 2016.05.06

5150 - 5250 MHz Band, Low Channel 36 - 5180 MHz, 802.11(n) MCS0						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	1.348 ms	1.554 ms	1	86.7	N/A	N/A



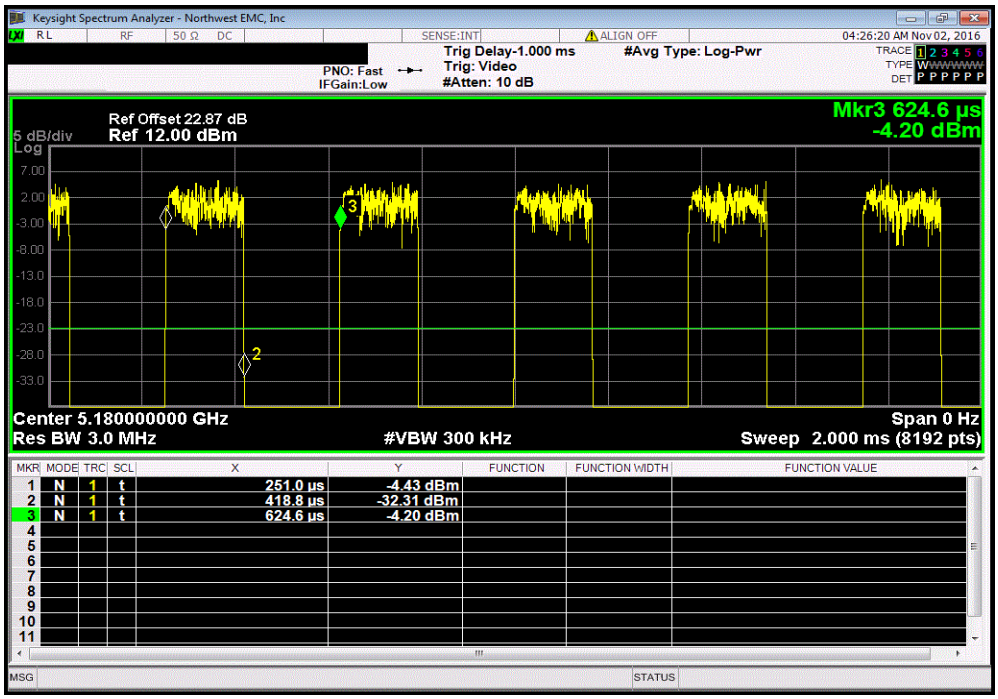
5150 - 5250 MHz Band, Low Channel 36 - 5180 MHz, 802.11(n) MCS0						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



DUTY CYCLE

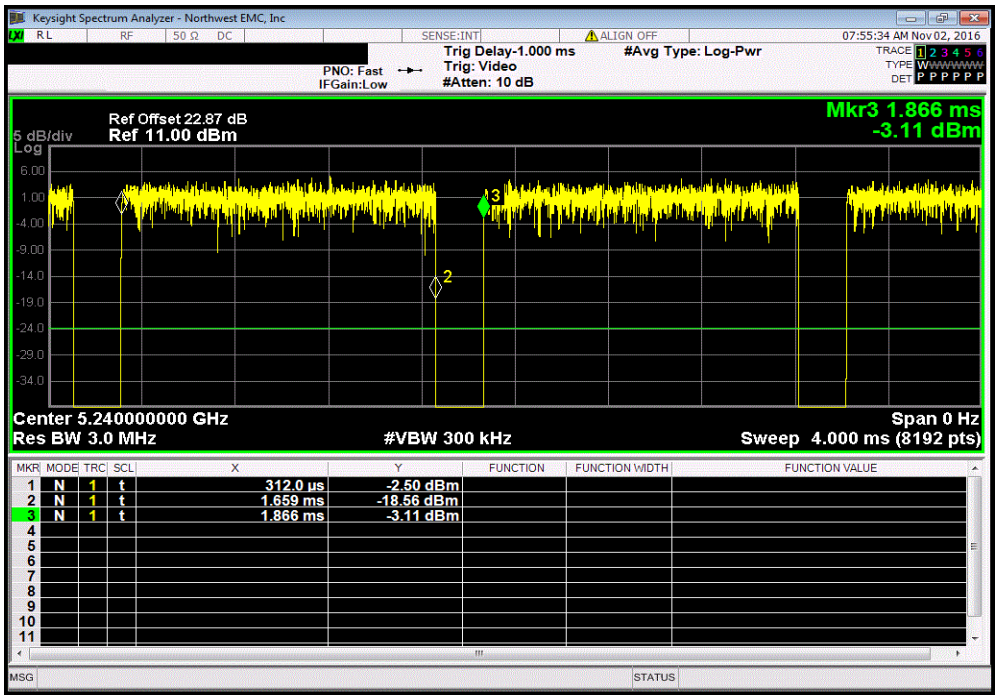
XMit 2016.05.06

5150 - 5250 MHz Band, Low Channel 36 - 5180 MHz, 802.11(n) MCS7						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	167.8 us	373.6 us	1	44.9	N/A	N/A

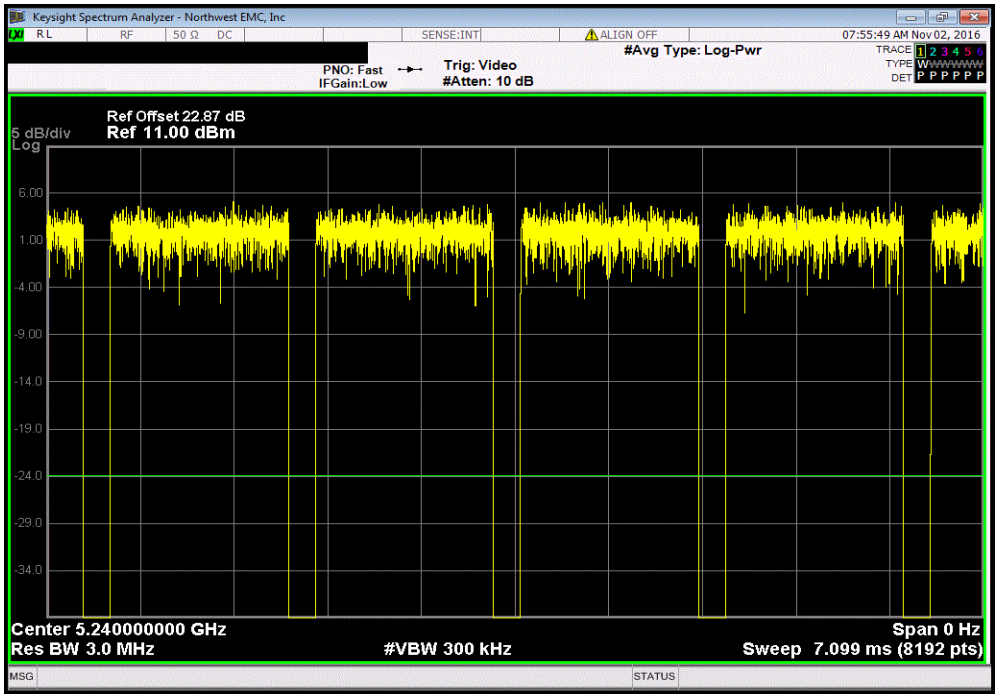


5150 - 5250 MHz Band, Low Channel 36 - 5180 MHz, 802.11(n) MCS7						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

5150 - 5250 MHz Band, High Channel 48 - 5240 MHz, 802.11(n) MCS0						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	1.347 ms	1.554 ms	1	86.7	N/A	N/A



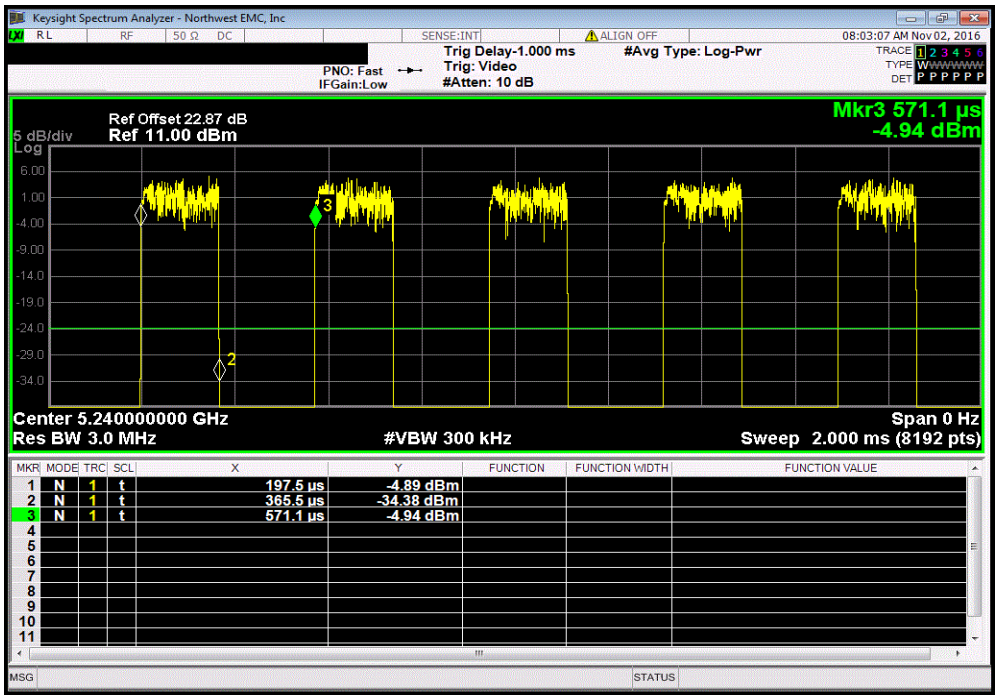
5150 - 5250 MHz Band, High Channel 48 - 5240 MHz, 802.11(n) MCS0						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	6	N/A	N/A	N/A



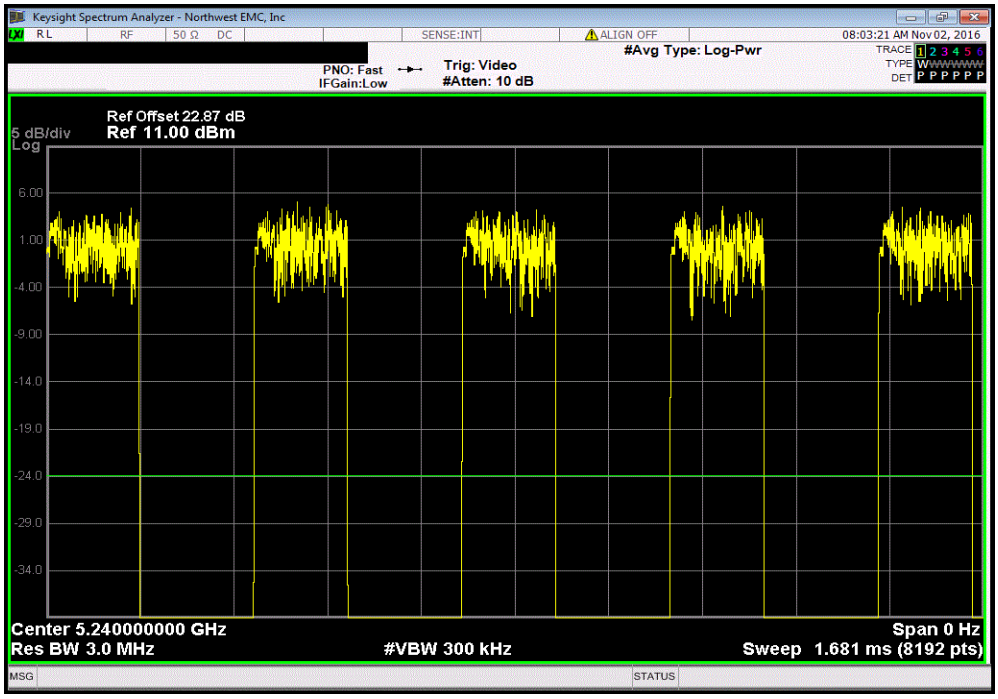
DUTY CYCLE

XMit 2016.05.06

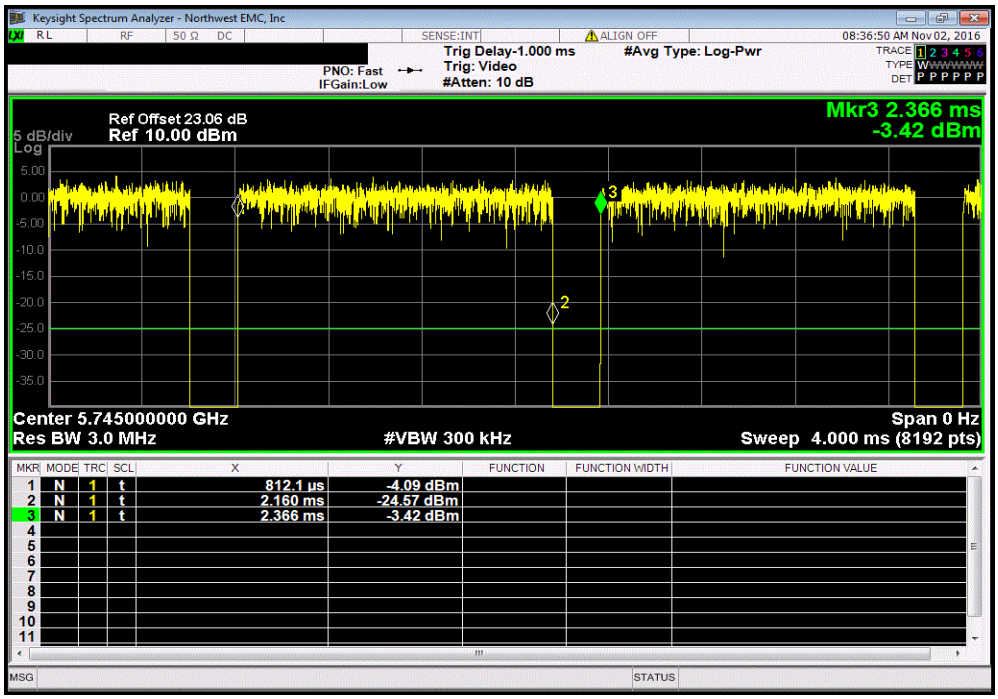
5150 - 5250 MHz Band, High Channel 48 - 5240 MHz, 802.11(n) MCS7						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	168 us	373.6 us	1	45	N/A	N/A



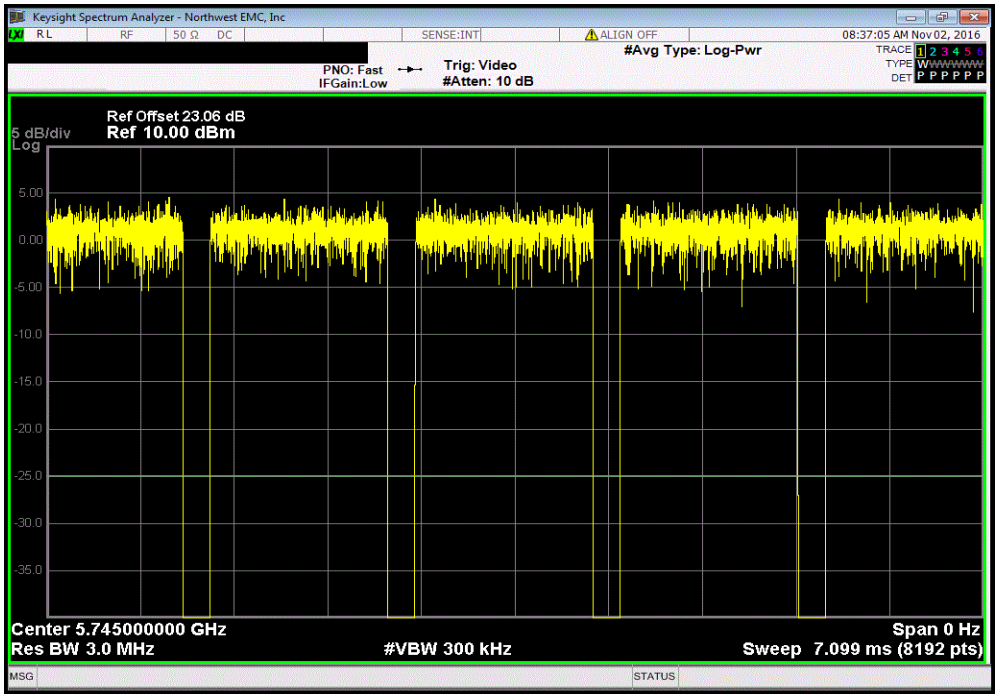
5150 - 5250 MHz Band, High Channel 48 - 5240 MHz, 802.11(n) MCS7						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



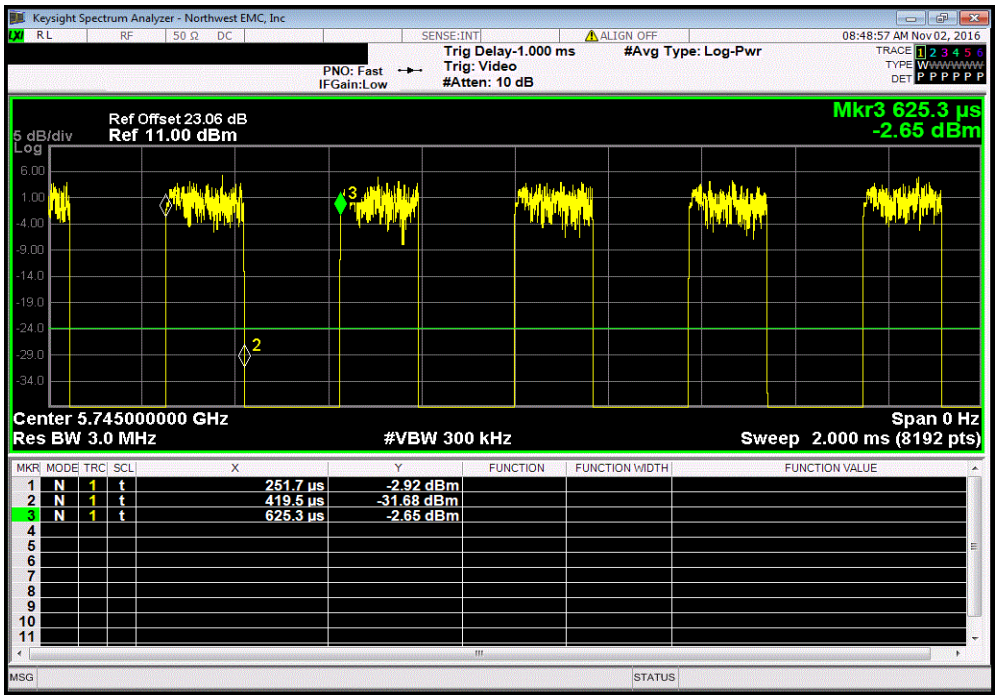
5725 - 5785 MHz Band, Low Channel 149 - 5745 MHz, 802.11(n) MCS0						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	1.348 ms	1.554 ms	1	86.7	N/A	N/A



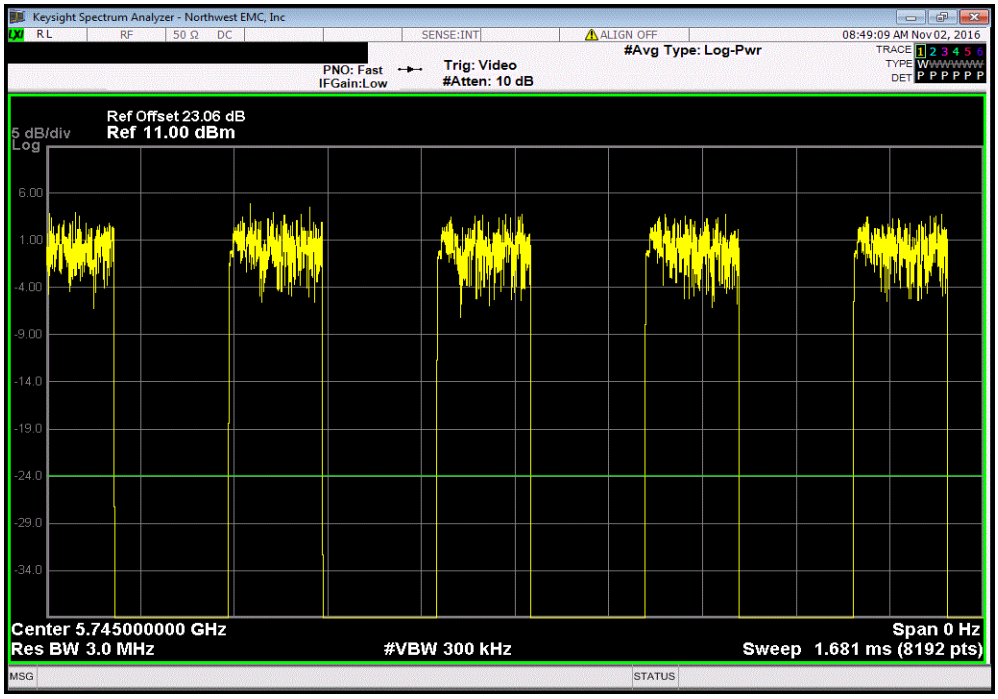
5725 - 5785 MHz Band, Low Channel 149 - 5745 MHz, 802.11(n) MCS0						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



5725 - 5785 MHz Band, Low Channel 149 - 5745 MHz, 802.11(n) MCS7						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	167.8 us	373.6 us	1	44.9	N/A	N/A



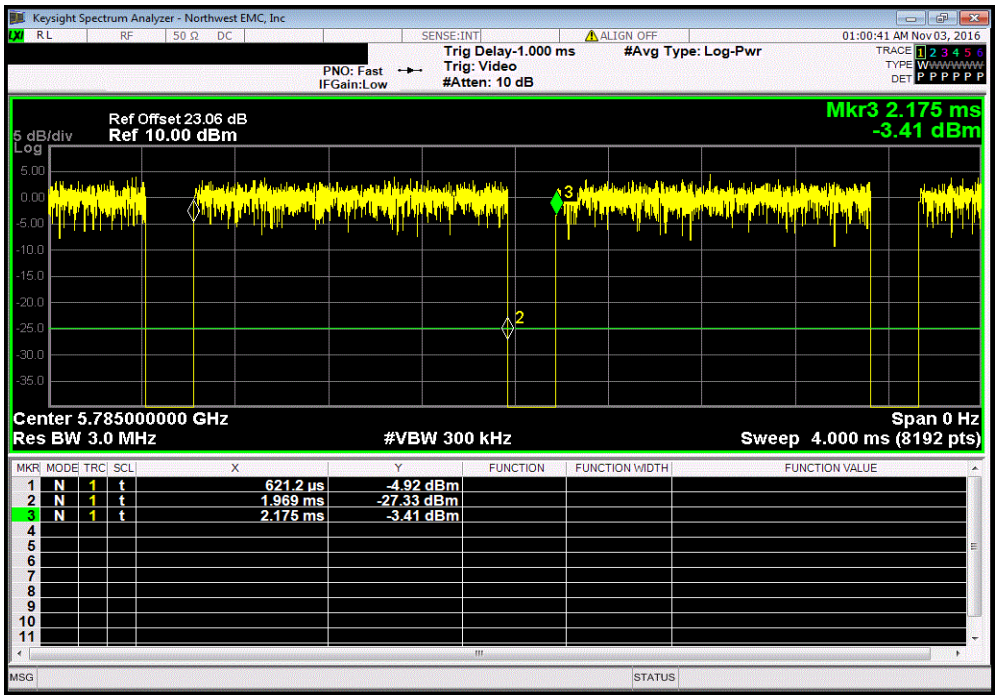
5725 - 5785 MHz Band, Low Channel 149 - 5745 MHz, 802.11(n) MCS7						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



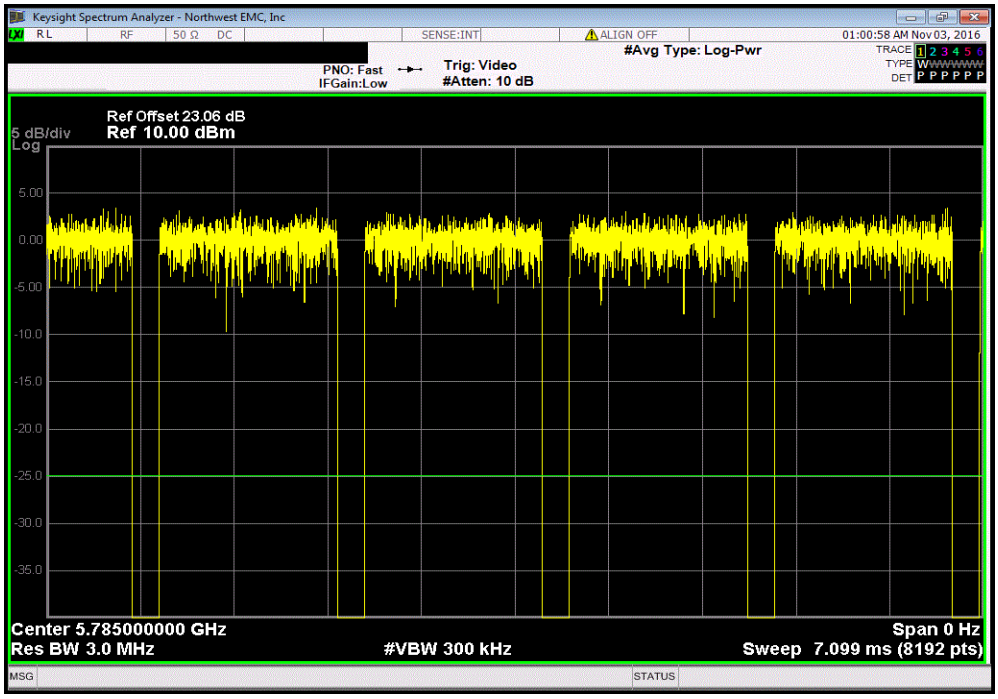
DUTY CYCLE

XMit 2016.05.06

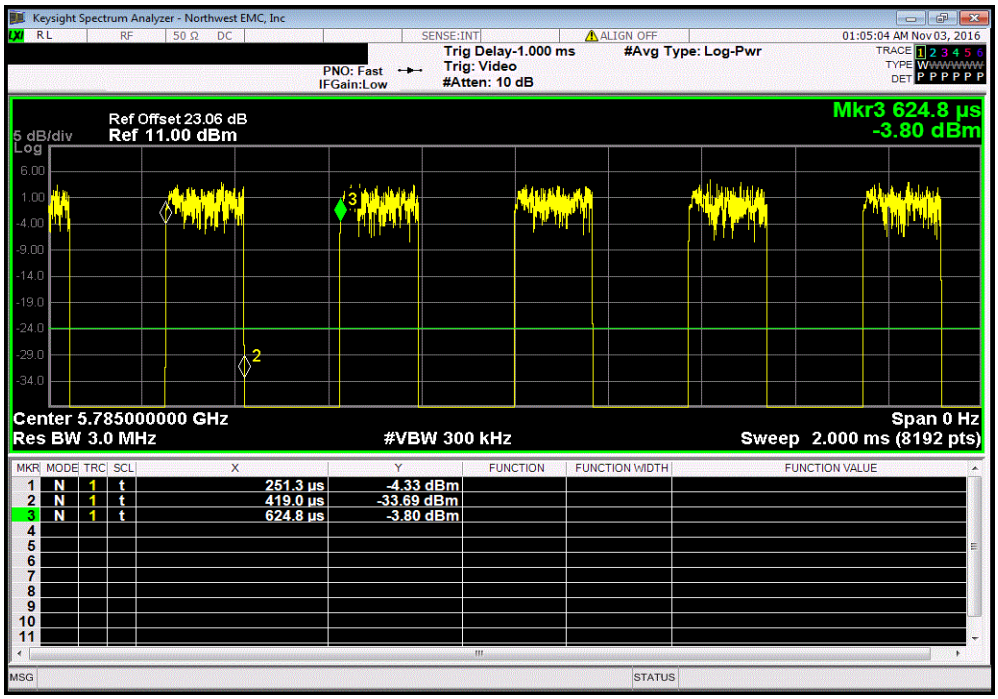
5725 - 5785 MHz Band, Mid Channel 157 - 5785 MHz, 802.11(n) MCS0						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	1.348 ms	1.554 ms	1	86.7	N/A	N/A



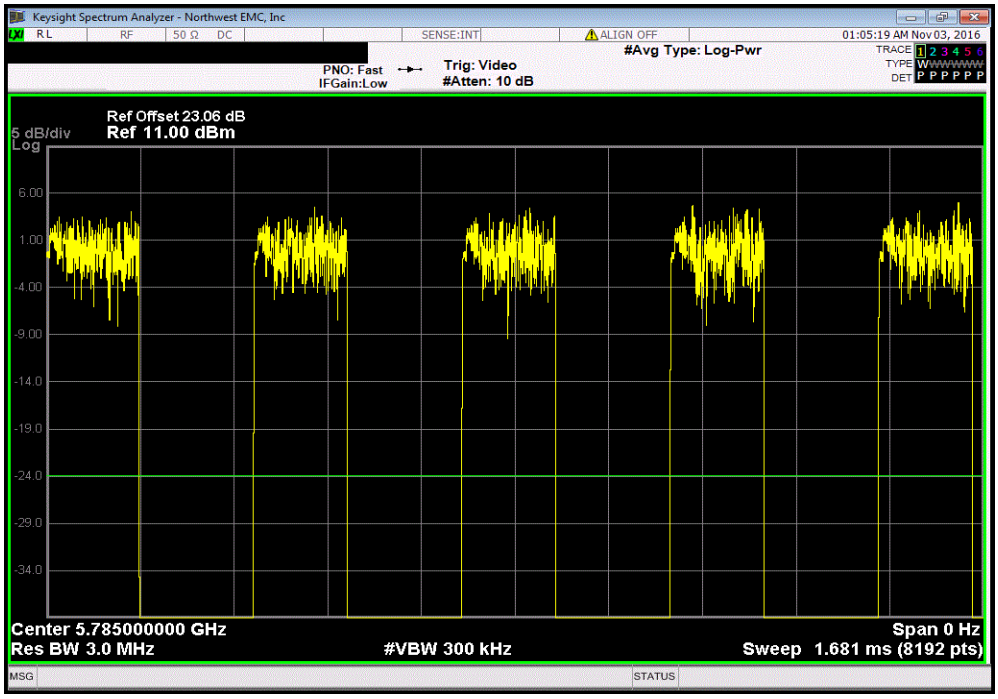
5725 - 5785 MHz Band, Mid Channel 157 - 5785 MHz, 802.11(n) MCS0						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	6	N/A	N/A	N/A



5725 - 5785 MHz Band, Mid Channel 157 - 5785 MHz, 802.11(n) MCS7						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	167.7 us	373.5 us	1	44.9	N/A	N/A



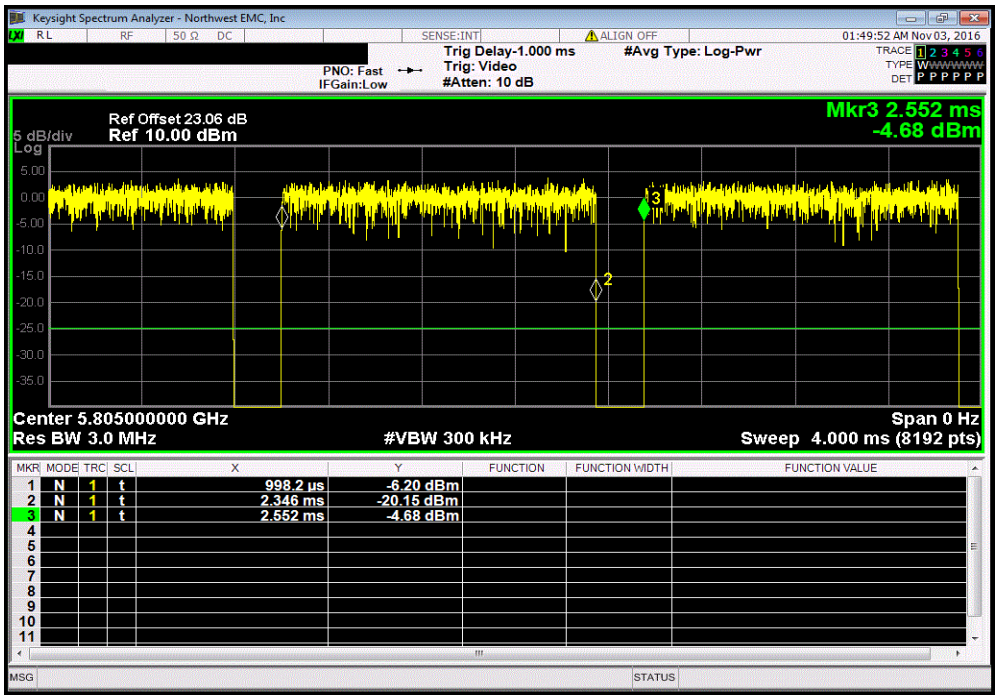
5725 - 5785 MHz Band, Mid Channel 157 - 5785 MHz, 802.11(n) MCS7						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



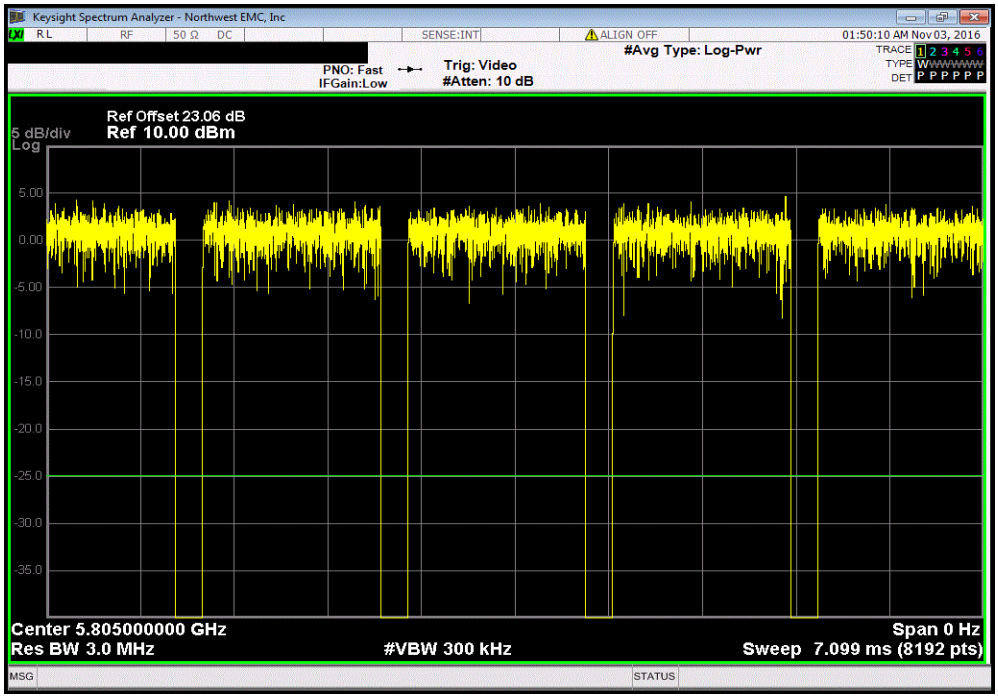
DUTY CYCLE

XMit 2016.05.06

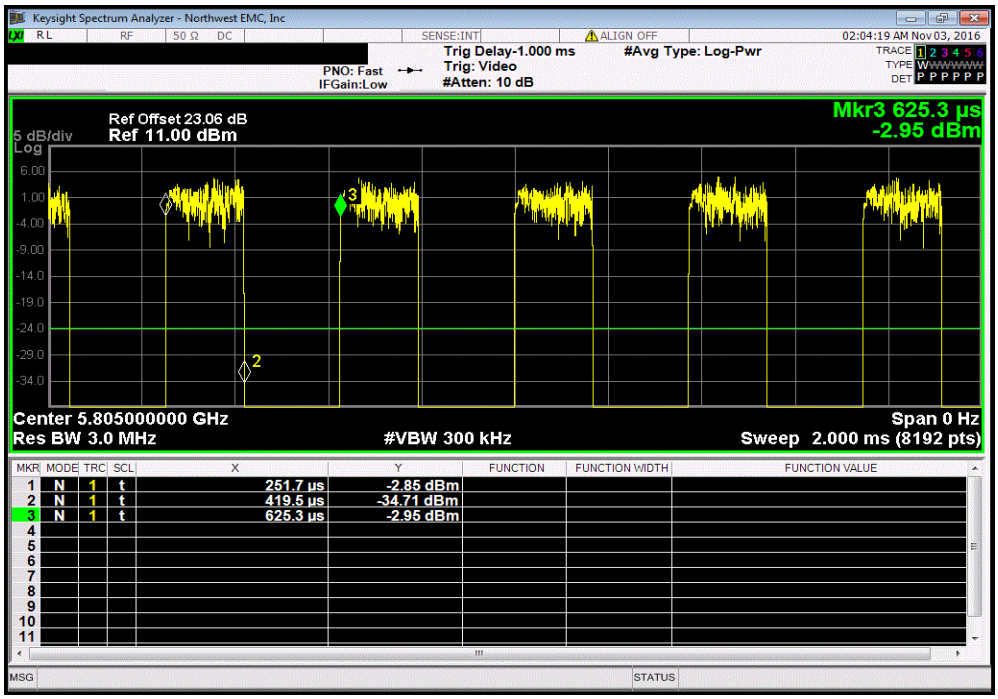
5725 - 5785 MHz Band, High Channel 161 - 5805 MHz, 802.11(n) MCS0						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	1.348 ms	1.554 ms	1	86.7	N/A	N/A



5725 - 5785 MHz Band, High Channel 161 - 5805 MHz, 802.11(n) MCS0						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



5725 - 5785 MHz Band, High Channel 161 - 5805 MHz, 802.11(n) MCS7						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	167.8 us	373.6 us	1	44.9	N/A	N/A



5725 - 5785 MHz Band, High Channel 161 - 5805 MHz, 802.11(n) MCS7						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

MAXIMUM CONDUCTED OUTPUT POWER

XMit 2016.05.06

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.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	6/8/2016	6/8/2017
Cable	Micro-Coax	UFD150A-1-0720-200200	NCS	6/7/2016	6/7/2017
Attenuator	Fairview Microwave	SA4014-20	TKV	3/4/2016	3/4/2017
Block - DC	Fairview Microwave	SD3379	AMU	5/6/2016	5/6/2017
Generator - Signal	Agilent	N5183A	TIA	4/6/2016	4/6/2018

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. 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.

Prior to measuring maximum transmit power; the emission bandwidth (B) and the transmission pulse duration (T) were measured. The method of measuring the emission bandwidth and the associated data are found elsewhere in this test report. The transmission pulse duration (T) was measured using a zero span on the spectrum analyzer to see the pulses in the time domain.

The maximum conducted output power 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).

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

-RMS Detector

-Trace average 100 traces in power averaging mode.

-Power was integrated across “B”, by using the channel power function of the analyzer.

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 CONDUCTED OUTPUT POWER

NORTHWEST EMC

XMit 2016.05.06

EUT:	1790			**Work Order:**	MCSO1761
Serial Number:	DV-1-0546			**Date:**	11/08/16
Customer:	Microsoft Corporation			**Temperature:**	22 °C
Attendees:	None			**Humidity:**	47.3% RH
Project:	None			**Barometric Pres.:**	1021 mbar
Tested by:	Richard Mellroth	**Power:**	USB	**Job Site:**	NC02

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

COMMENTS

Power Setting at Default. Client provided adapter cable loss of 1.2dB included in reference level offset.

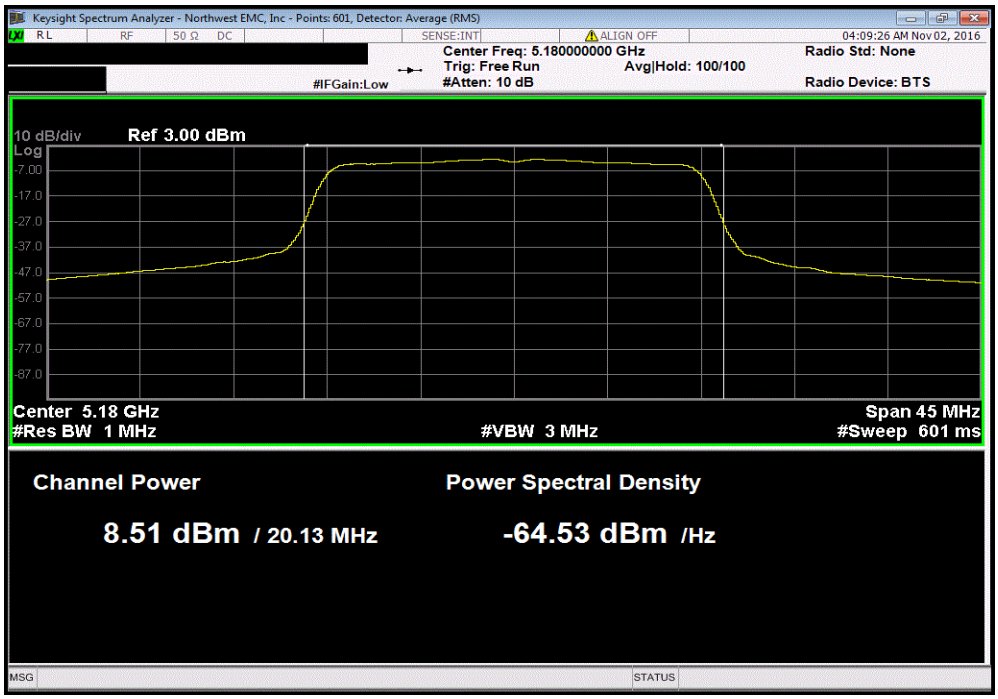
DEVIATIONS FROM TEST STANDARD

None

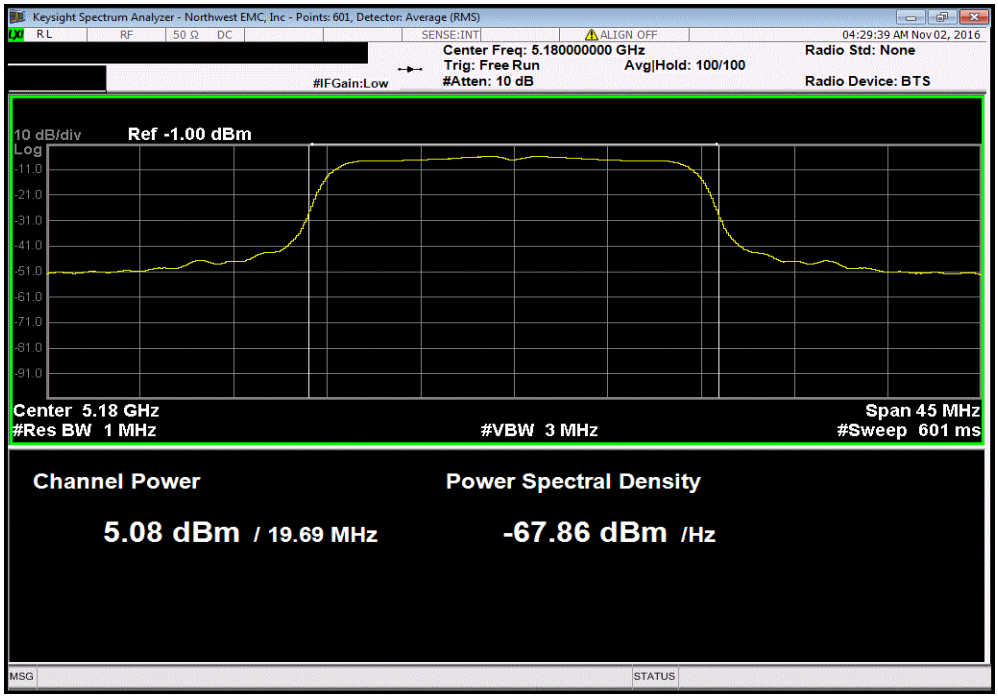
Configuration #	1	Signature

	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result
5150 - 5250 MHz Band					
Low Channel 36 - 5180 MHz					
802.11(n) MCS0	8.509	0.6	9.1	24	Pass
802.11(n) MCS7	5.081	3.5	8.6	24	Pass
High Channel 48 - 5240 MHz					
802.11(n) MCS0	8.705	0.6	9.3	24	Pass
802.11(n) MCS7	5.111	3.5	8.6	24	Pass
5725 - 5785 MHz Band					
Low Channel 149 - 5745 MHz					
802.11(n) MCS0	6.987	0.6	7.6	30	Pass
802.11(n) MCS7	4.481	3.5	8	30	Pass
Mid Channel 157 - 5785 MHz					
802.11(n) MCS0	7.088	0.6	7.7	30	Pass
802.11(n) MCS7	3.976	3.5	7.5	30	Pass
High Channel 161 - 5805 MHz					
802.11(n) MCS0	6.82	0.6	7.4	30	Pass
802.11(n) MCS7	4.306	3.5	7.8	30	Pass

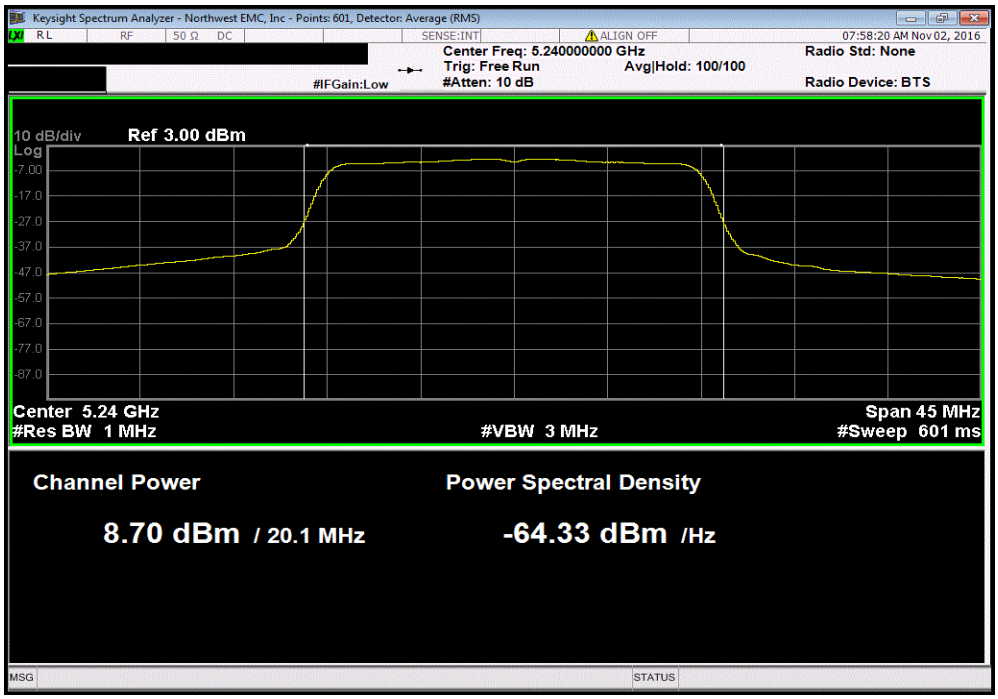
5150 - 5250 MHz Band, Low Channel 36 - 5180 MHz, 802.11(n) MCS0						
		Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result
		8.509	0.6	9.1	24	Pass



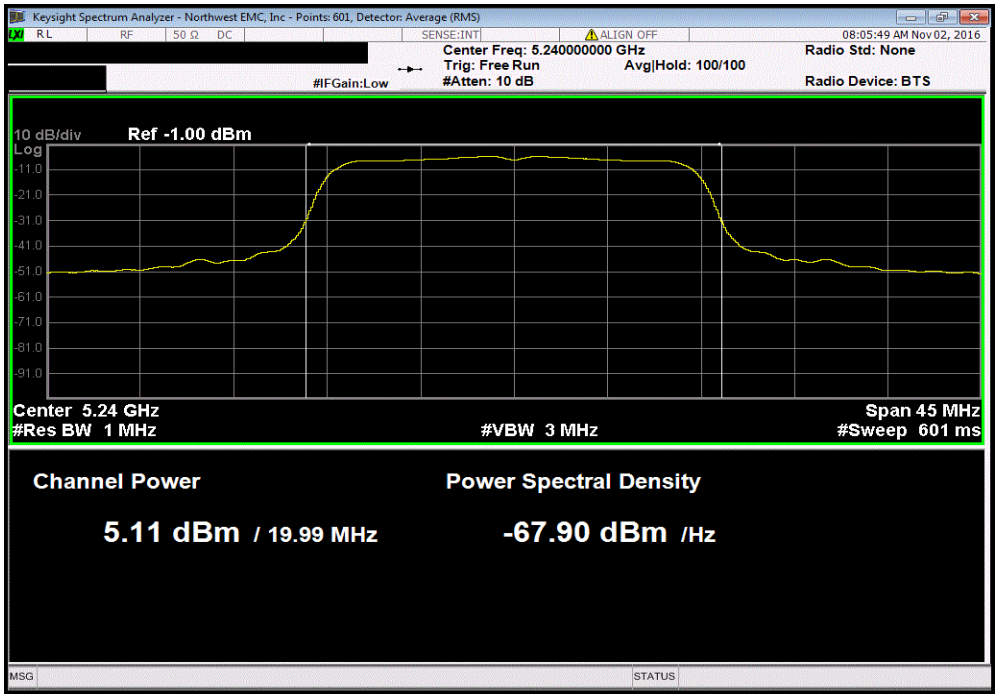
5150 - 5250 MHz Band, Low Channel 36 - 5180 MHz, 802.11(n) MCS7						
		Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result
		5.081	3.5	8.6	24	Pass



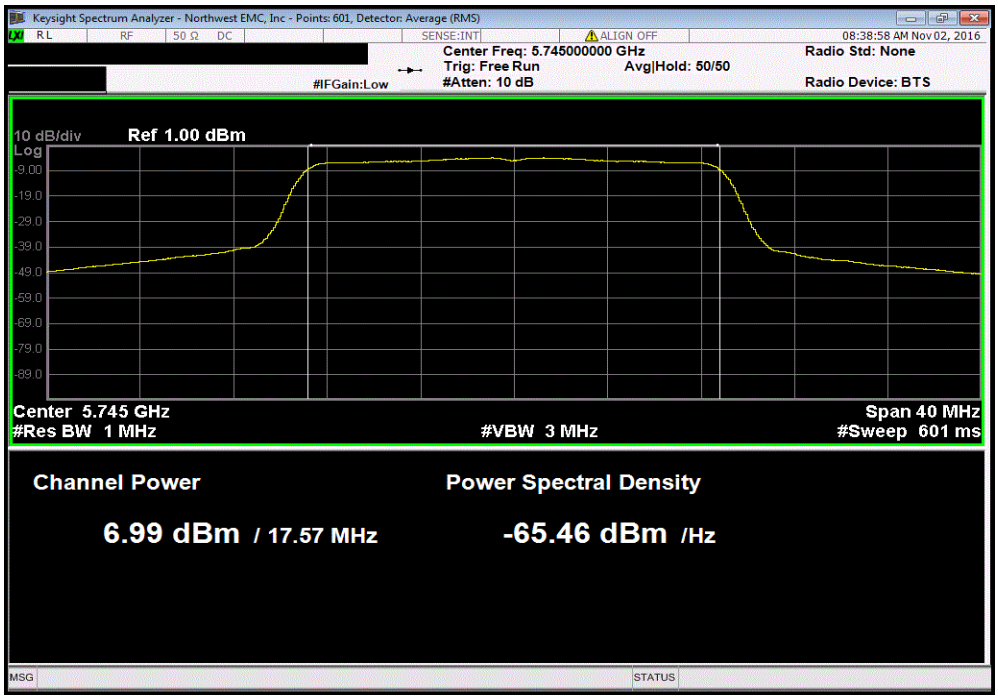
5150 - 5250 MHz Band, High Channel 48 - 5240 MHz, 802.11(n) MCS0						
		Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result
		8.705	0.6	9.3	24	Pass



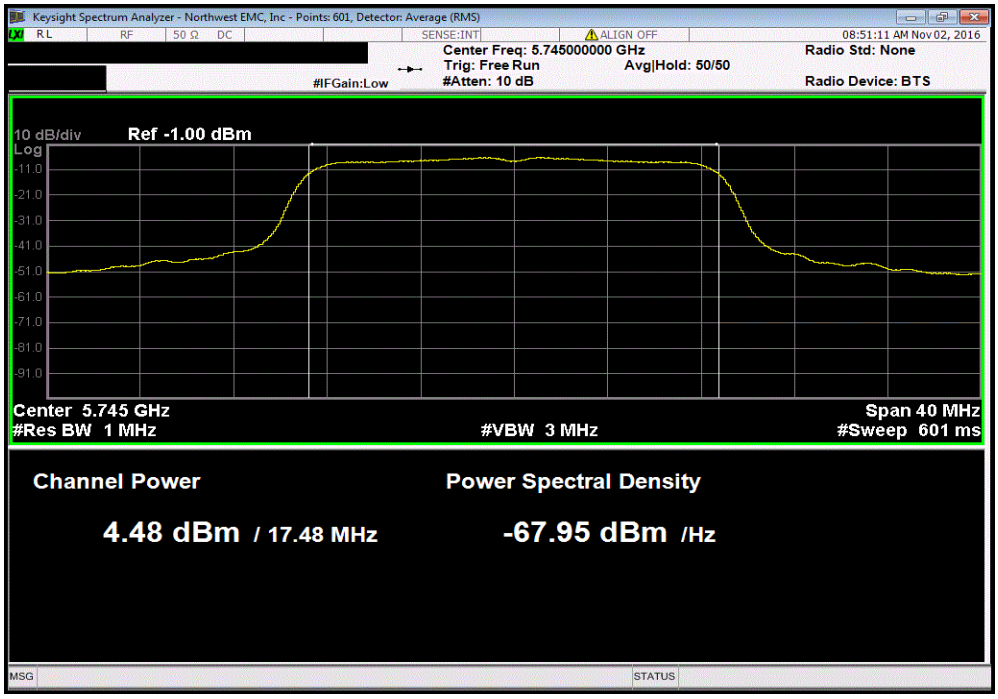
5150 - 5250 MHz Band, High Channel 48 - 5240 MHz, 802.11(n) MCS7						
		Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result
		5.111	3.5	8.6	24	Pass



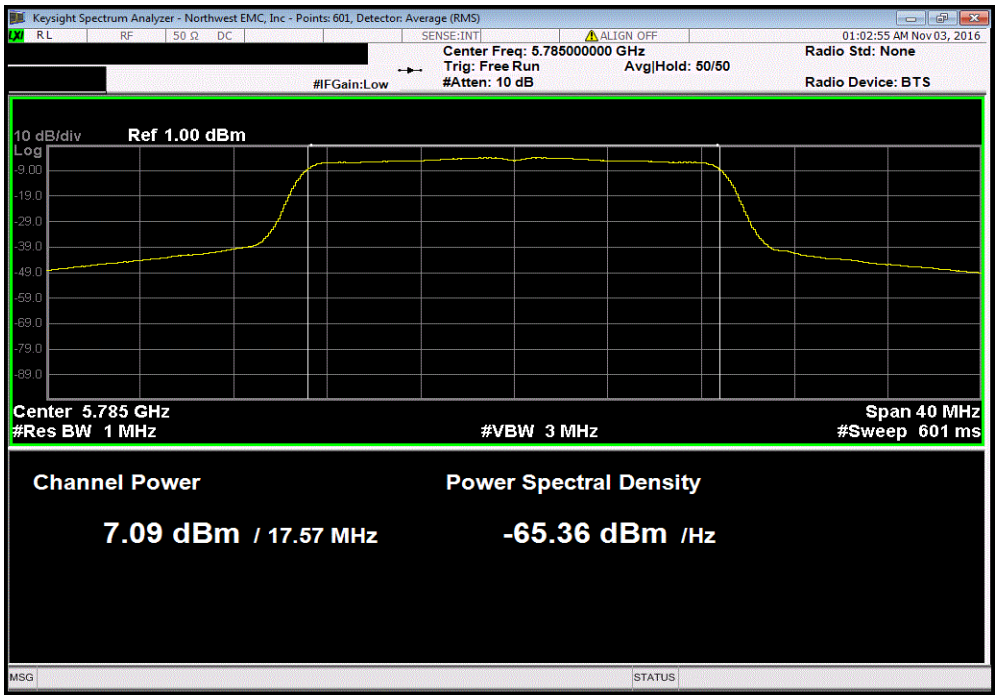
5725 - 5785 MHz Band, Low Channel 149 - 5745 MHz, 802.11(n) MCS0						
		Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result
		6.987	0.6	7.6	30	Pass



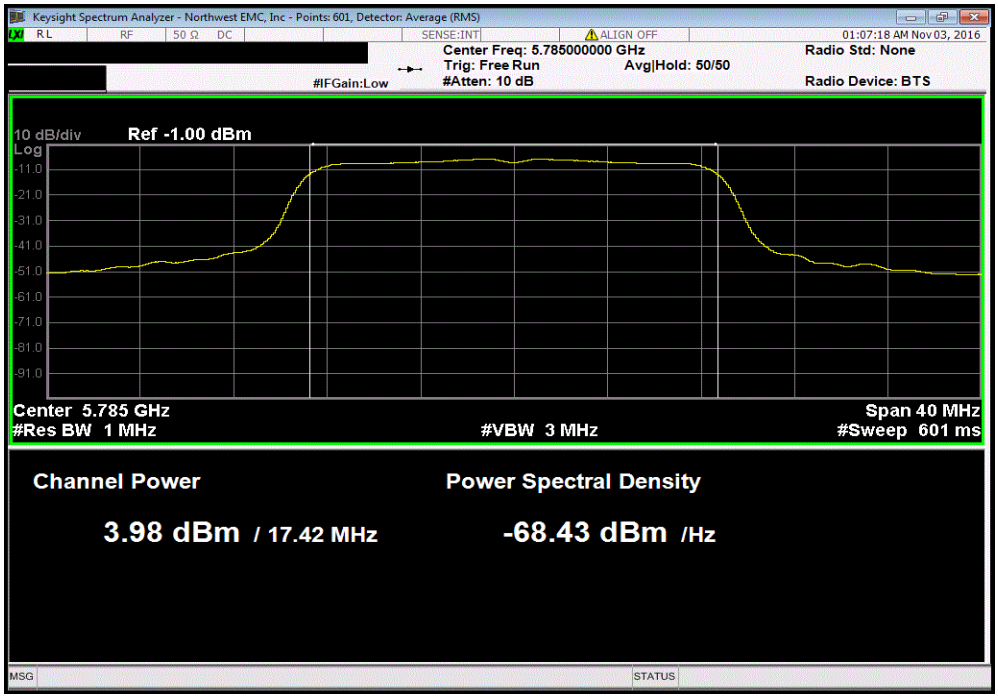
5725 - 5785 MHz Band, Low Channel 149 - 5745 MHz, 802.11(n) MCS7						
		Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result
		4.481	3.5	8	30	Pass



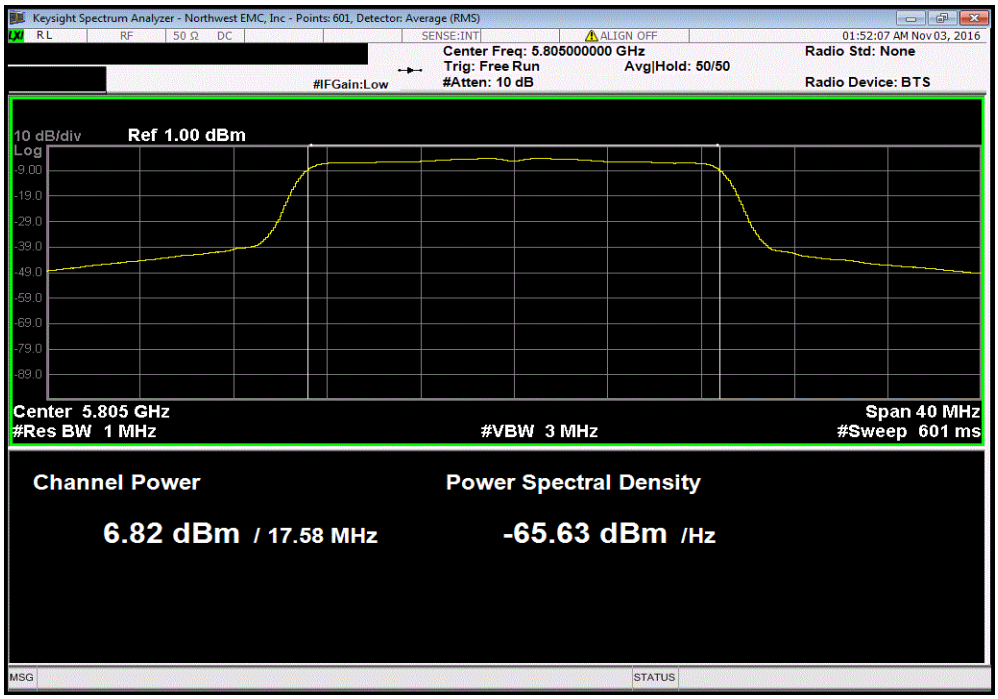
5725 - 5785 MHz Band, Mid Channel 157 - 5785 MHz, 802.11(n) MCS0						
		Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result
		7.088	0.6	7.7	30	Pass



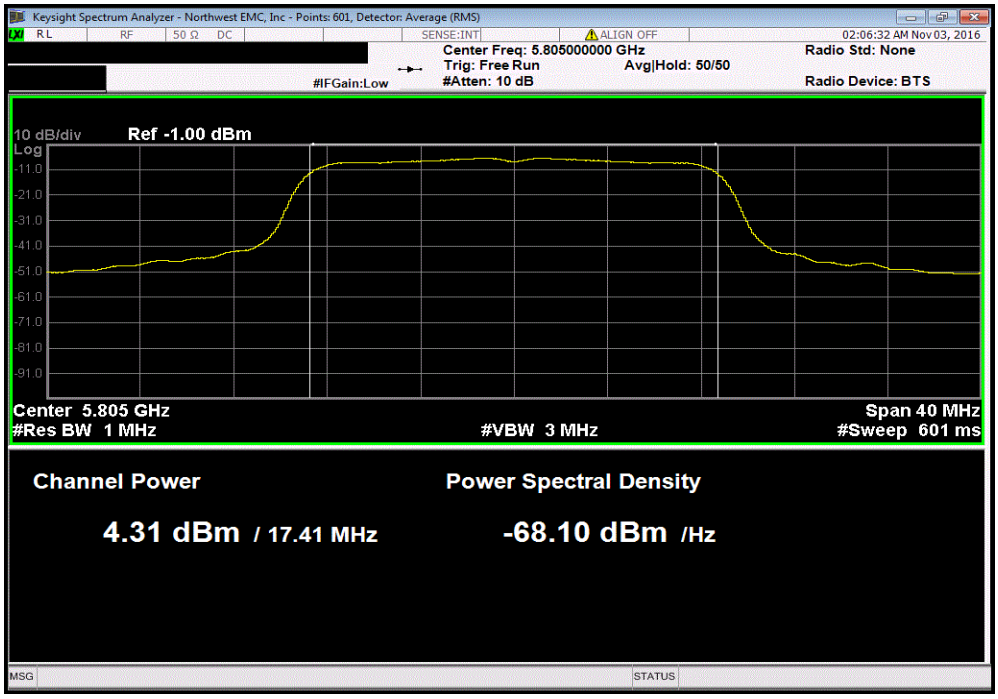
5725 - 5785 MHz Band, Mid Channel 157 - 5785 MHz, 802.11(n) MCS7						
		Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result
		3.976	3.5	7.5	30	Pass



5725 - 5785 MHz Band, High Channel 161 - 5805 MHz, 802.11(n) MCS0						
		Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result
		6.82	0.6	7.4	30	Pass



5725 - 5785 MHz Band, High Channel 161 - 5805 MHz, 802.11(n) MCS7						
		Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result
		4.306	3.5	7.8	30	Pass



EMISSION BANDWIDTH

XMit 2016.05.06

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.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	6/8/2016	6/8/2017
Cable	Micro-Coax	UFD150A-1-0720-200200	NCS	6/7/2016	6/7/2017
Attenuator	Fairview Microwave	SA4014-20	TKV	3/4/2016	3/4/2017
Block - DC	Fairview Microwave	SD3379	AMU	5/6/2016	5/6/2017
Generator - Signal	Agilent	N5183A	TIA	4/6/2016	4/6/2018

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The transmit frequencies and data rates listed in the datasheet were measured in each band utilized by the radio. The transmit power was set to its default maximum.

Per ANSI C63.10, the spectrum analyzer settings were as follows:

-RBW = Approx. 1% of the emission bandwidth (B).

-VBW = > RBW

-Detector = Peak
-
-Trace mode = max hold

The spectrum analyzer occupied bandwidth measurement function was then used to measure 26 dB emission bandwidth.

There is no required limit to be met in the rule part for this test. The purpose of the test is to both report the results as required and to utilize the emission bandwidth for setting the channel power integration bandwidth during conducted output power testing.

EMISSION BANDWIDTH

NORTHWEST EMC

XMit 2016.05.06

EUT:	1790			**Work Order:**	MCSO1761
Serial Number:	DV-1-0546			**Date:**	11/08/16
Customer:	Microsoft Corporation			**Temperature:**	22 °C
Attendees:	None			**Humidity:**	47% RH
Project:	None			**Barometric Pres.:**	1021 mbar
Tested by:	Richard Mellroth	**Power:**	USB	**Job Site:**	NC02

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

COMMENTS

Power Setting at Default. Client provided adapter cable loss of 1.2dB included in reference level offset.

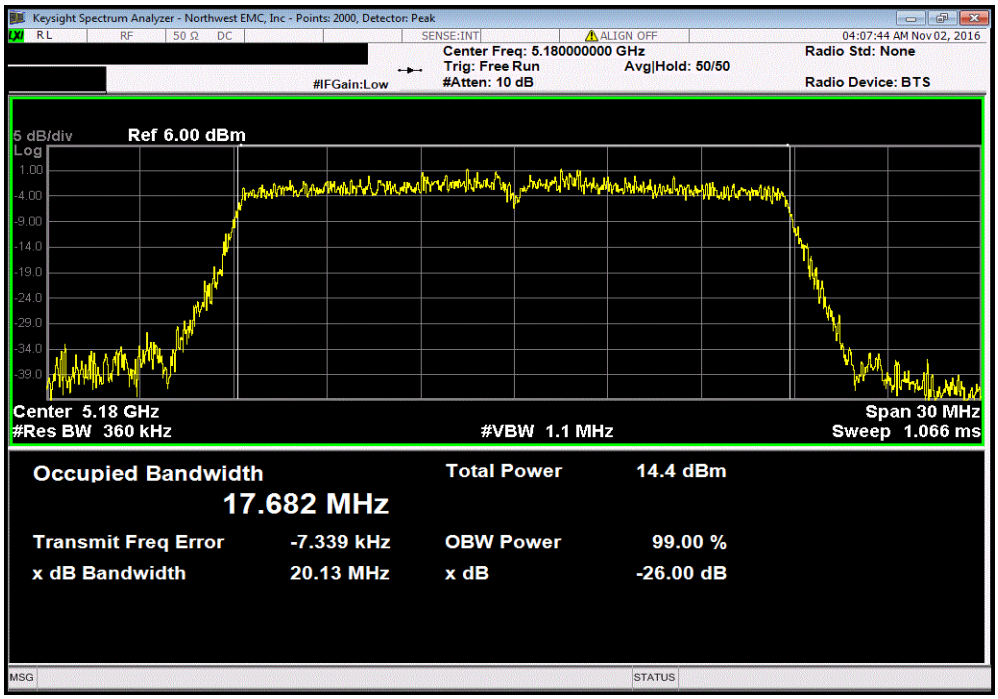
DEVIATIONS FROM TEST STANDARD

None

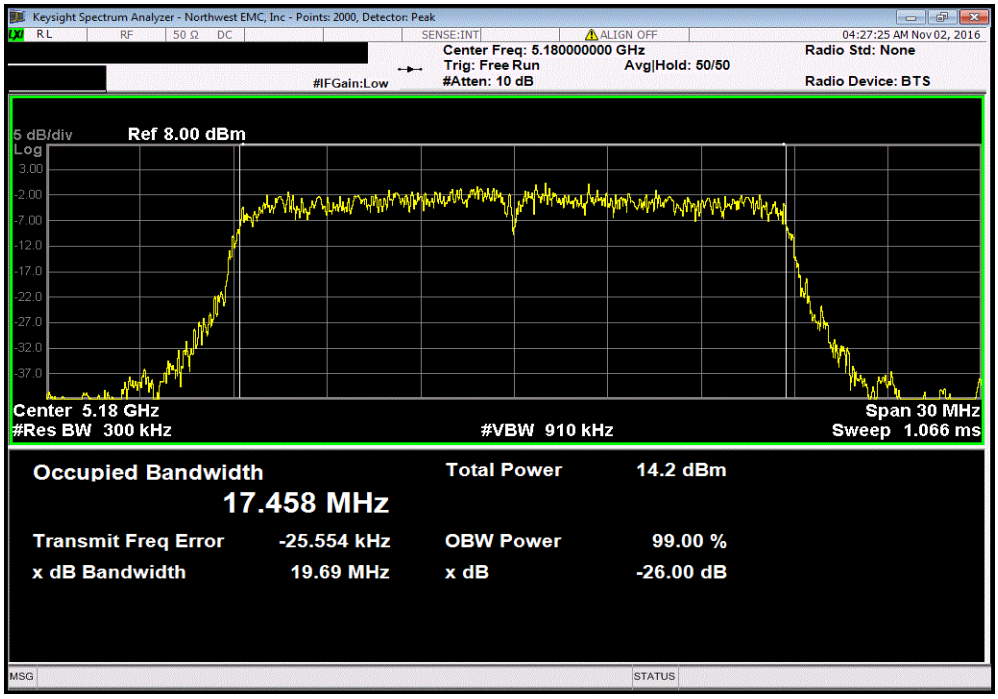
Configuration #	1	Signature

	Value (%)	Value (dB)	Limit	Result
5150 - 5250 MHz Band				
Low Channel 36 - 5180 MHz				
802.11(n) MCS0	17.682 MHz	20.134 MHz	N/A	N/A
802.11(n) MCS7	17.458 MHz	19.685 MHz	N/A	N/A
High Channel 48 - 5240 MHz				
802.11(n) MCS0	17.677 MHz	20.103 MHz	N/A	N/A
802.11(n) MCS7	17.511 MHz	19.988 MHz	N/A	N/A

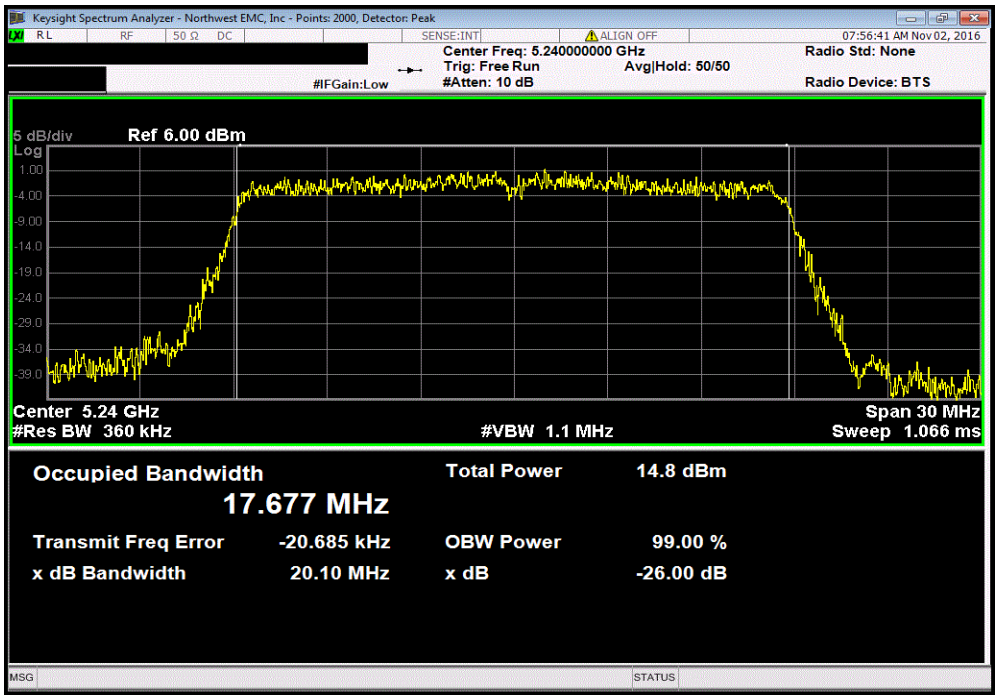
5150 - 5250 MHz Band, Low Channel 36 - 5180 MHz, 802.11(n) MCS0						
			Value (%)	Value (dB)	Limit	Result
			17.682 MHz	20.134 MHz	N/A	N/A



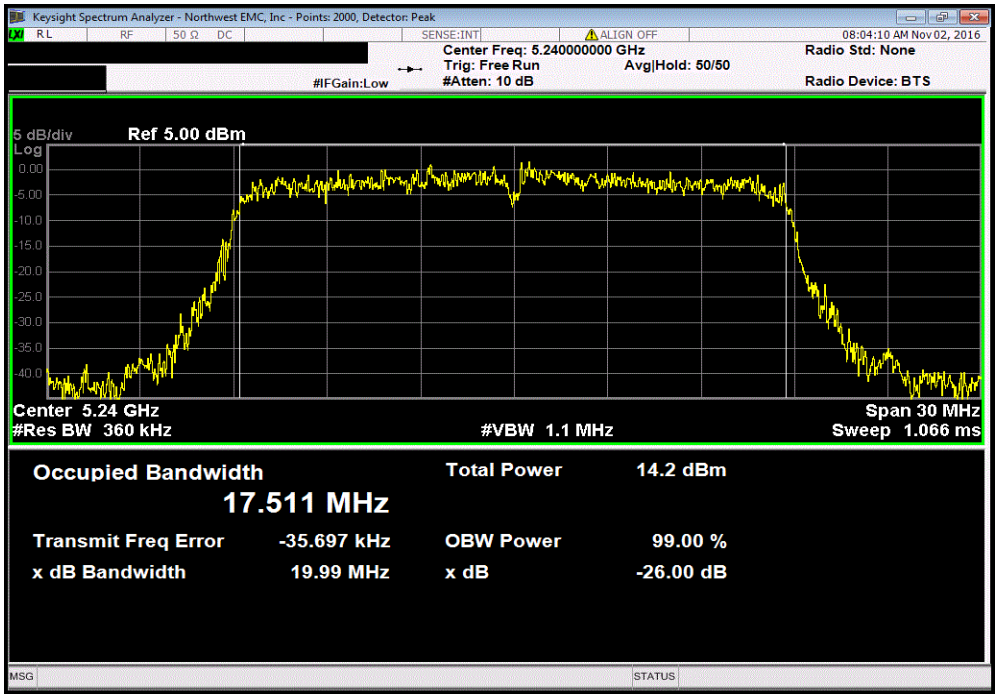
5150 - 5250 MHz Band, Low Channel 36 - 5180 MHz, 802.11(n) MCS7						
			Value (%)	Value (dB)	Limit	Result
			17.458 MHz	19.685 MHz	N/A	N/A



5150 - 5250 MHz Band, High Channel 48 - 5240 MHz, 802.11(n) MCS0						
			Value (%)	Value (dB)	Limit	Result
			17.677 MHz	20.103 MHz	N/A	N/A



5150 - 5250 MHz Band, High Channel 48 - 5240 MHz, 802.11(n) MCS7						
			Value (%)	Value (dB)	Limit	Result
			17.511 MHz	19.988 MHz	N/A	N/A



OCCUPIED BANDWIDTH

XMit 2016.05.06

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.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	6/8/2016	6/8/2017
Cable	Micro-Coax	UFD150A-1-0720-200200	NCS	6/7/2016	6/7/2017
Attenuator	Fairview Microwave	SA4014-20	TKV	3/4/2016	3/4/2017
Block - DC	Fairview Microwave	SD3379	AMU	5/6/2016	5/6/2017
Generator - Signal	Agilent	N5183A	TIA	4/6/2016	4/6/2018

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The transmit frequencies and data rates listed in the datasheet were measured in each band utilized by the radio. The transmit power was set to its default maximum.

Per ANSI C63.10, the spectrum analyzer settings were as follows:

-RBW = 100 kHz

-VBW = ≥ 3x RBW

-Detector = Peak

-Trace mode = max hold

The spectrum analyzer occupied bandwidth measurement function was then used to measure the 6 dB emission bandwidth.

OCCUPIED BANDWIDTH

XMit 2016.05.06

EUT:	1790			**Work Order:**	MCSO1761
Serial Number:	DV-1-0546			**Date:**	11/08/16
Customer:	Microsoft Corporation			**Temperature:**	22 °C
Attendees:	None			**Humidity:**	46.9% RH
Project:	None			**Barometric Pres.:**	1021 mbar
Tested by:	Richard Mellroth	**Power:**	USB	**Job Site:**	NC02

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

COMMENTS

Power Setting at Default. Client provided adapter cable loss of 1.2dB included in reference level offset.

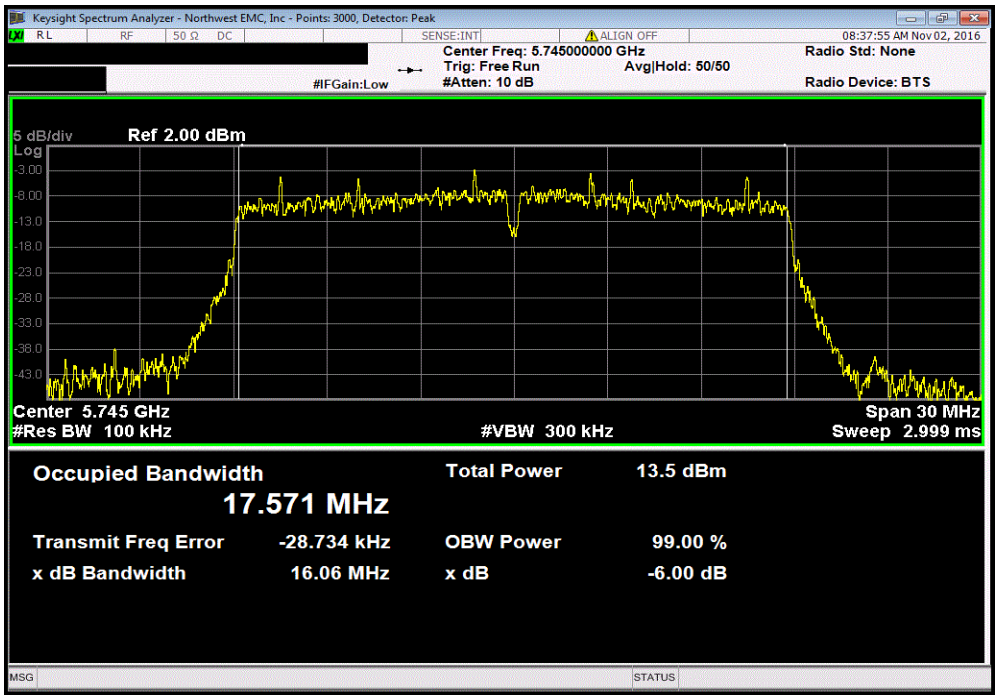
DEVIATIONS FROM TEST STANDARD

None

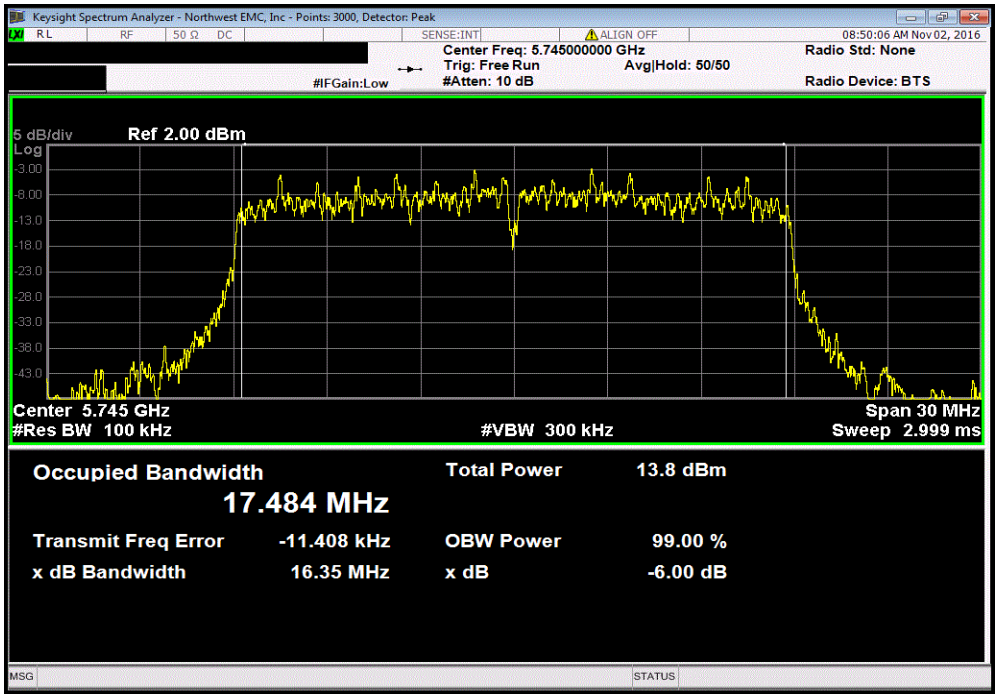
Configuration #	1	Signature

	Value (%)	Value (dB)	Limit (>)	Result
5725 - 5785 MHz Band				
Low Channel 149 - 5745 MHz				
802.11(n) MCS0	17.571 MHz	16.064 MHz	500 kHz	Pass
802.11(n) MCS7	17.484 MHz	16.353 MHz	500 kHz	Pass
Mid Channel 157 - 5785 MHz				
802.11(n) MCS0	17.573 MHz	17.059 MHz	500 kHz	Pass
802.11(n) MCS7	17.419 MHz	16.235 MHz	500 kHz	Pass
High Channel 161 - 5805 MHz				
802.11(n) MCS0	17.58 MHz	17.594 MHz	500 kHz	Pass
802.11(n) MCS7	17.409 MHz	17.093 MHz	500 kHz	Pass

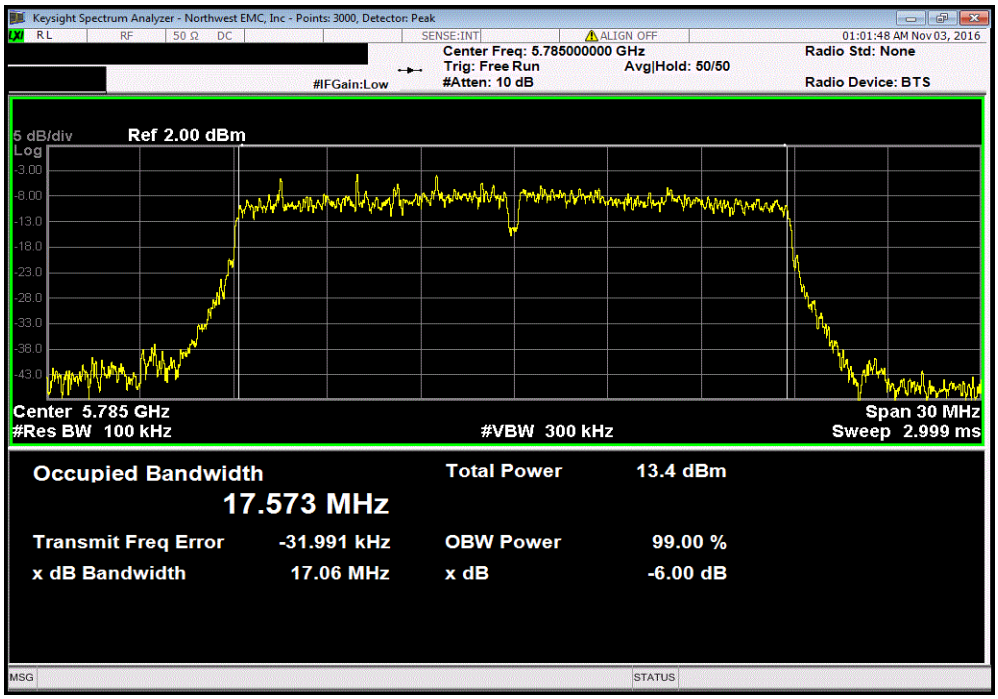
5725 - 5785 MHz Band, Low Channel 149 - 5745 MHz, 802.11(n) MCS0						
			Value (%)	Value (dB)	Limit (>)	Result
			17.571 MHz	16.064 MHz	500 kHz	Pass



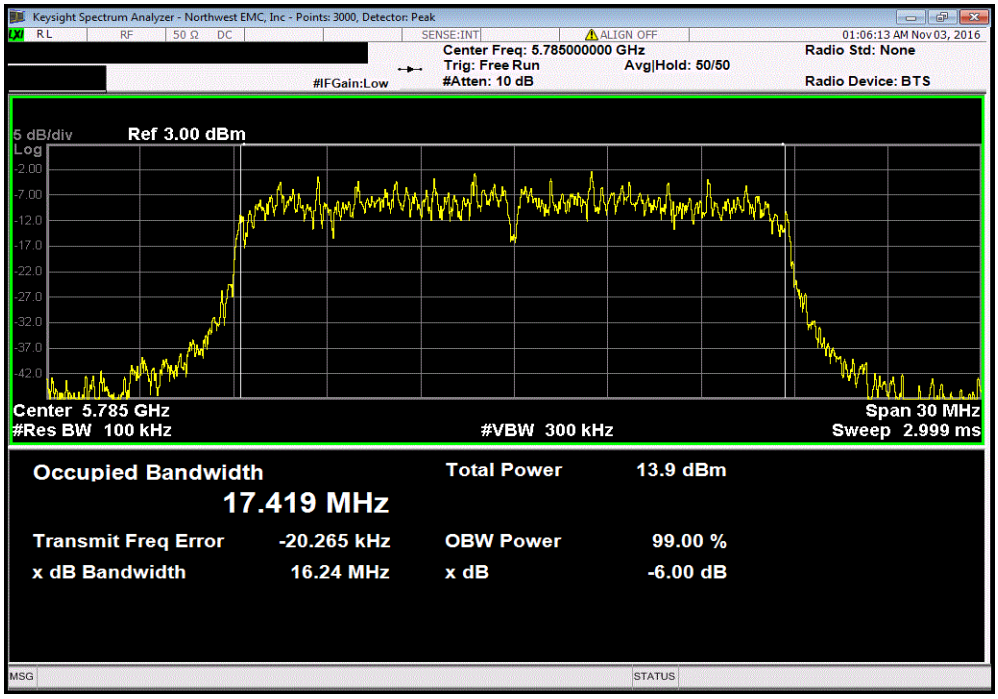
5725 - 5785 MHz Band, Low Channel 149 - 5745 MHz, 802.11(n) MCS7						
			Value (%)	Value (dB)	Limit (>)	Result
			17.484 MHz	16.353 MHz	500 kHz	Pass



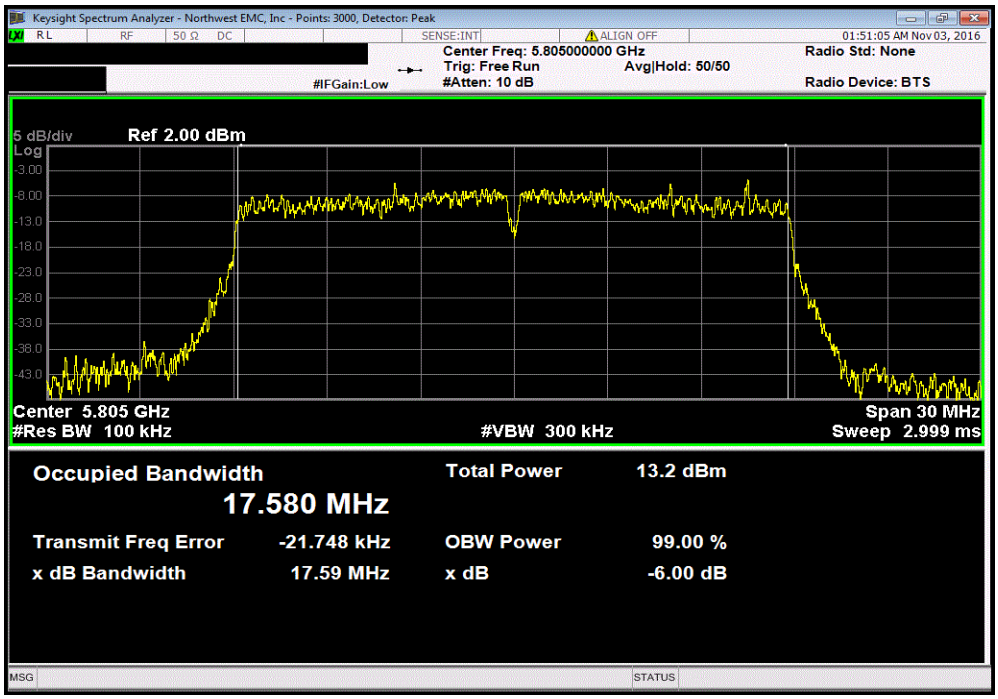
5725 - 5785 MHz Band, Mid Channel 157 - 5785 MHz, 802.11(n) MCS0						
			Value (%)	Value (dB)	Limit (>)	Result
			17.573 MHz	17.059 MHz	500 kHz	Pass



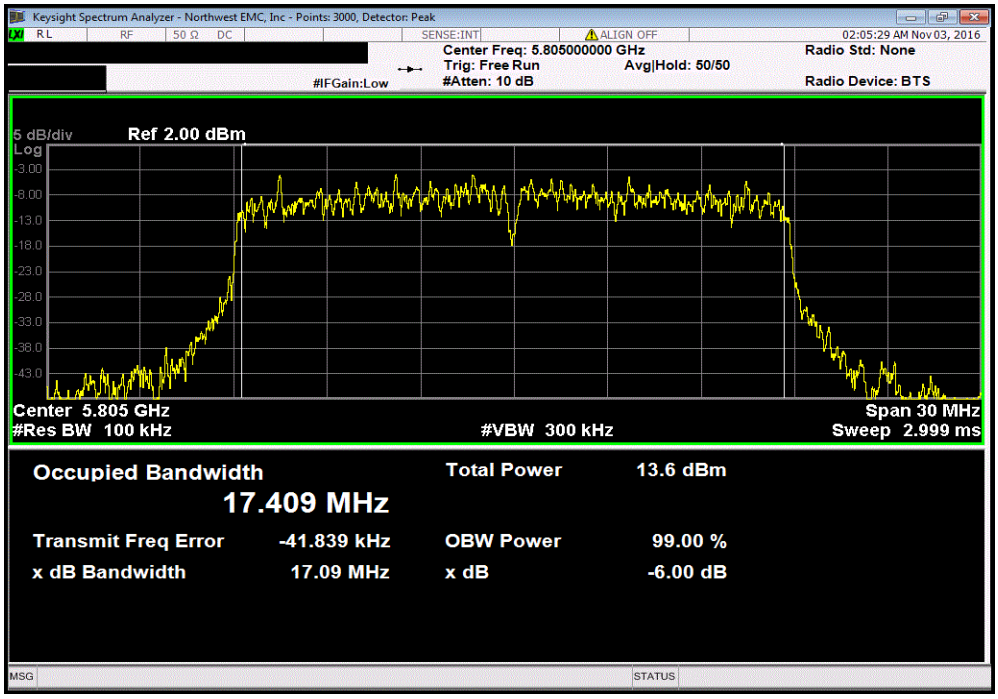
5725 - 5785 MHz Band, Mid Channel 157 - 5785 MHz, 802.11(n) MCS7						
			Value (%)	Value (dB)	Limit (>)	Result
			17.419 MHz	16.235 MHz	500 kHz	Pass



5725 - 5785 MHz Band, High Channel 161 - 5805 MHz, 802.11(n) MCS0						
			Value (%)	Value (dB)	Limit (>)	Result
			17.58 MHz	17.594 MHz	500 kHz	Pass



5725 - 5785 MHz Band, High Channel 161 - 5805 MHz, 802.11(n) MCS7						
			Value (%)	Value (dB)	Limit (>)	Result
			17.409 MHz	17.093 MHz	500 kHz	Pass



BAND EDGE

XMit 2016.05.06

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.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	6/8/2016	6/8/2017
Cable	Micro-Coax	UFD150A-1-0720-200200	NCS	6/7/2016	6/7/2017
Attenuator	Fairview Microwave	SA4014-20	TKV	3/4/2016	3/4/2017
Block - DC	Fairview Microwave	SD3379	AMU	5/6/2016	5/6/2017
Generator - Signal	Agilent	N5183A	TIA	4/6/2016	4/6/2018

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. 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.

BAND EDGE

NORTHWEST EMC

XMit 2016.05.06

EUT:	1790			**Work Order:**	MCSO1761
Serial Number:	DV-1-0546			**Date:**	11/08/16
Customer:	Microsoft Corporation			**Temperature:**	21.9 °C
Attendees:	None			**Humidity:**	46.8% RH
Project:	None			**Barometric Pres.:**	1021 mbar
Tested by:	Richard Mellroth	**Power:**	USB	**Job Site:**	NC02

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

COMMENTS

Power Setting at Default. Client provided adapter cable loss of 1.2dB included in reference level offset.

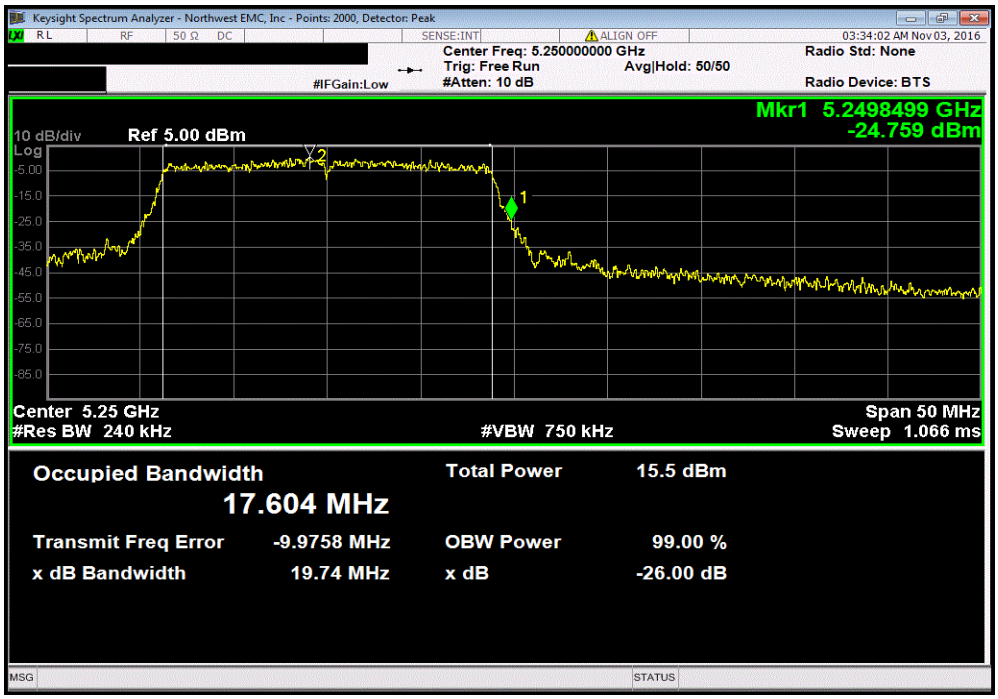
DEVIATIONS FROM TEST STANDARD

None

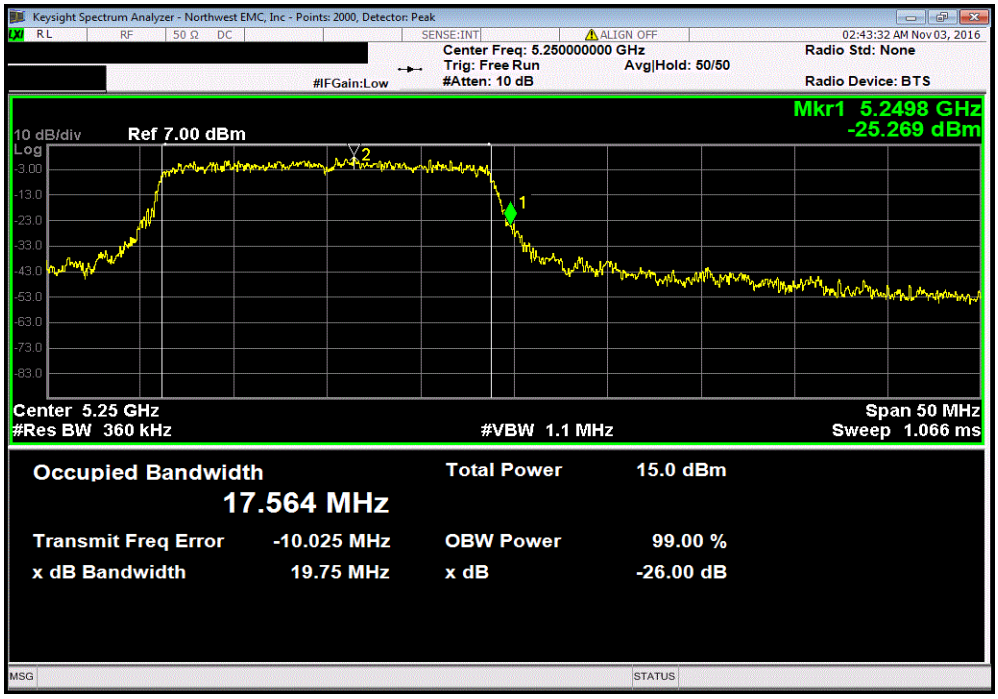
Configuration #	1	Signature

		Value (MHz)	Limit (MHz)	Result
5150 - 5250 MHz Band				
	High Channel, Ch 48 - 5240 MHz			
	802.11(n) MCS0	5249.8	< 5250	Pass
	802.11(n) MCS7	5249.8	< 5250	Pass
5725 - 5825 MHz Band				
	Low Channel, Ch 149 - 5745 MHz			
	802.11(n) MCS0	5734.7	> 5725	Pass
	802.11(n) MCS7	5734.9	> 5725	Pass

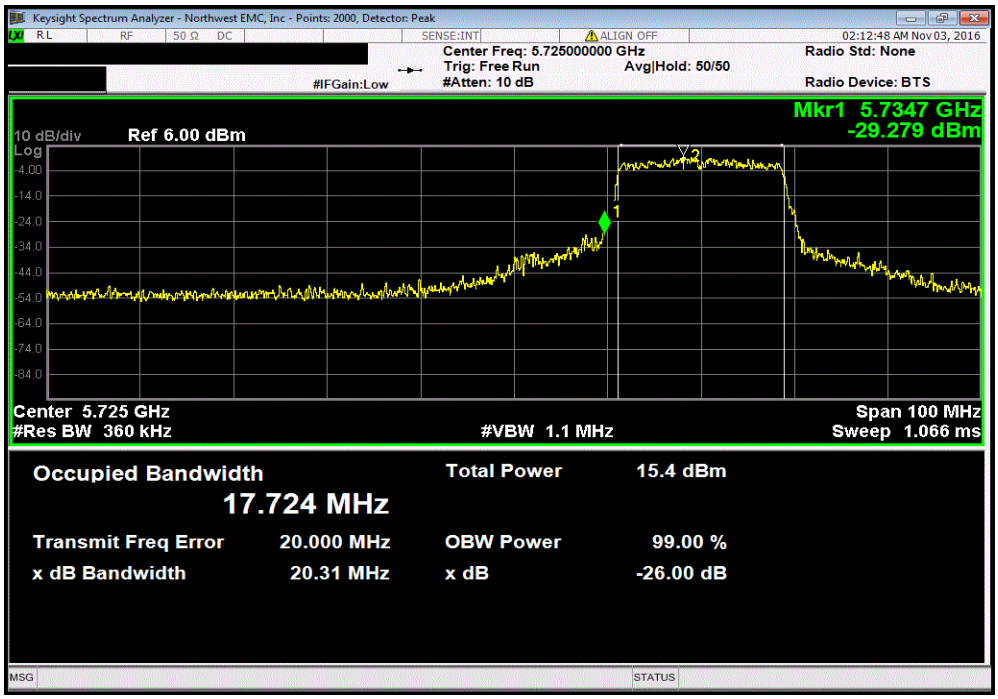
5150 - 5250 MHz Band, High Channel, Ch 48 - 5240 MHz, 802.11(n) MCS0						
				Value (MHz)	Limit (MHz)	Result
				5249.8	< 5250	Pass



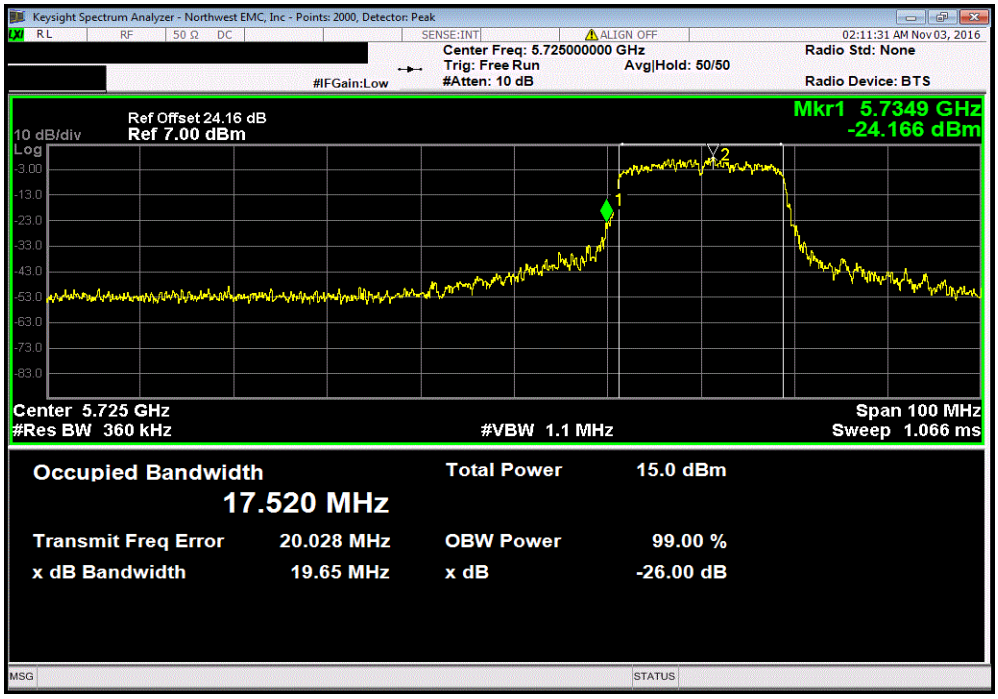
5150 - 5250 MHz Band, High Channel, Ch 48 - 5240 MHz, 802.11(n) MCS7						
				Value (MHz)	Limit (MHz)	Result
				5249.8	< 5250	Pass



5725 - 5825 MHz Band, Low Channel, Ch 149 - 5745 MHz, 802.11(n) MCS0						
				Value (MHz)	Limit (MHz)	Result
				5734.7	> 5725	Pass



5725 - 5825 MHz Band, Low Channel, Ch 149 - 5745 MHz, 802.11(n) MCS7						
				Value (MHz)	Limit (MHz)	Result
				5734.9	> 5725	Pass



MAXIMUM POWER SPECTRAL DENSITY - 5.2 BAND

XMit 2016.05.06

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.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	6/8/2016	6/8/2017
Cable	Micro-Coax	UFD150A-1-0720-200200	NCS	6/7/2016	6/7/2017
Attenuator	Fairview Microwave	SA4014-20	TKV	3/4/2016	3/4/2017
Block - DC	Fairview Microwave	SD3379	AMU	5/6/2016	5/6/2017
Generator - Signal	Agilent	N5183A	TIA	4/6/2016	4/6/2018

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. 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.

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 1 MHz

-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 any 1 MHz band 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 - 5.2 BAND

NORTHWEST EMC

XMit 2016.05.06

EUT:	1790			**Work Order:**	MCSO1761
Serial Number:	DV-1-0546			**Date:**	11/08/16
Customer:	Microsoft Corporation			**Temperature:**	22.1 °C
Attendees:	None			**Humidity:**	47.3% RH
Project:	None			**Barometric Pres.:**	1022 mbar
Tested by:	Richard Mellroth	**Power:**	USB	**Job Site:**	NC02

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

COMMENTS

Power Setting at Default. Client provided adapter cable loss of 1.2dB included in reference level offset.

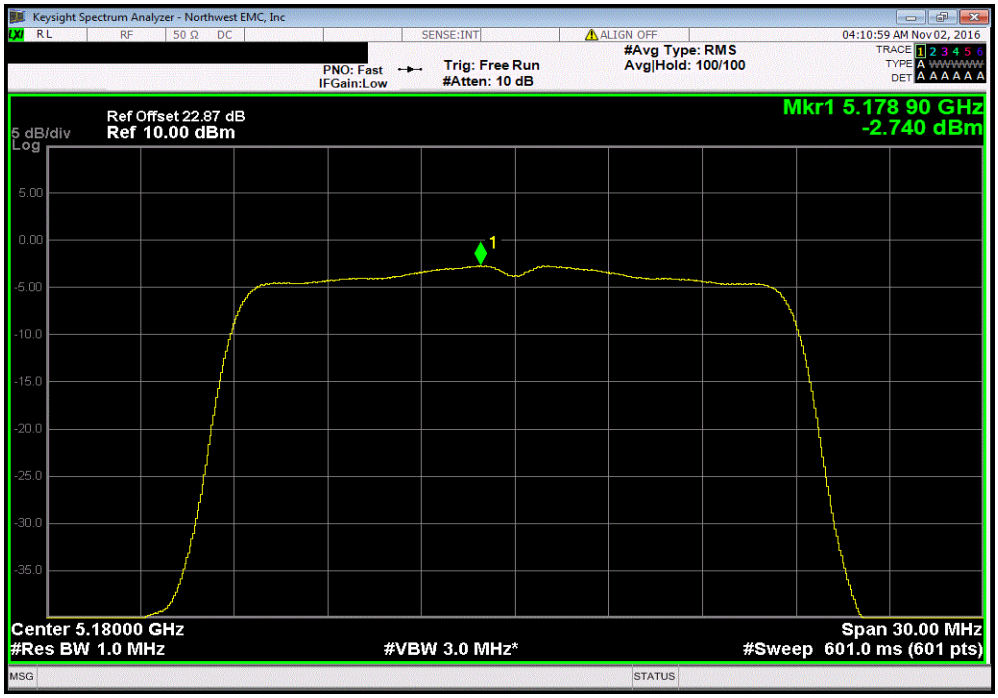
DEVIATIONS FROM TEST STANDARD

None

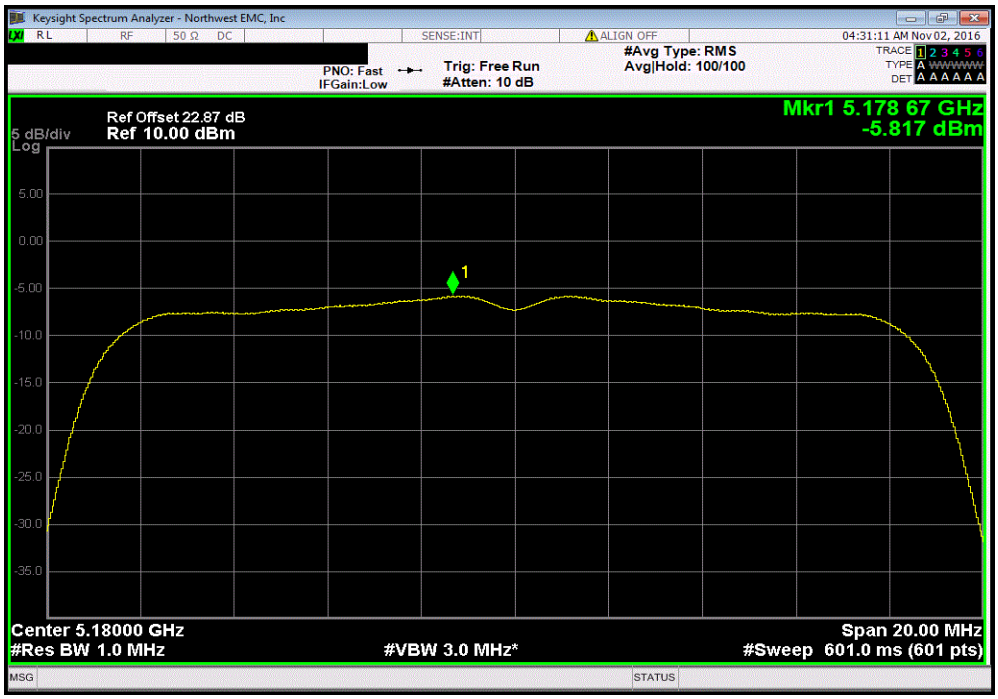
Configuration #	1	Signature

	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Density (dBm/Ref BW)	Limit ≤ (dBm/Ref BW)	Results
5150 - 5250 MHz Band					
Low Channel 36 - 5180 MHz					
802.11(n) MCS0	-2.74	0.6	-2.1	11	Pass
802.11(n) MCS7	-5.817	3.5	-2.3	11	Pass
High Channel 48 - 5240 MHz					
802.11(n) MCS0	-2.537	0.6	-1.9	11	Pass
802.11(n) MCS7	-5.027	3.5	-1.6	11	Pass

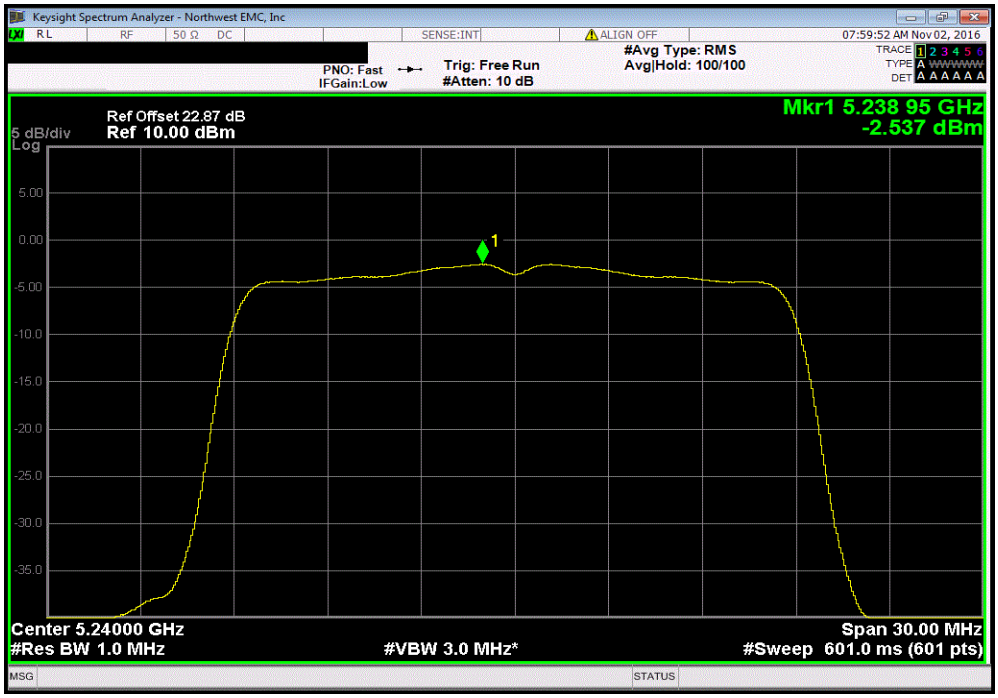
5150 - 5250 MHz Band, Low Channel 36 - 5180 MHz, 802.11(n) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit ≤ (dBm/Ref BW)	Results
	-2.74	0.6		-2.1	11	Pass



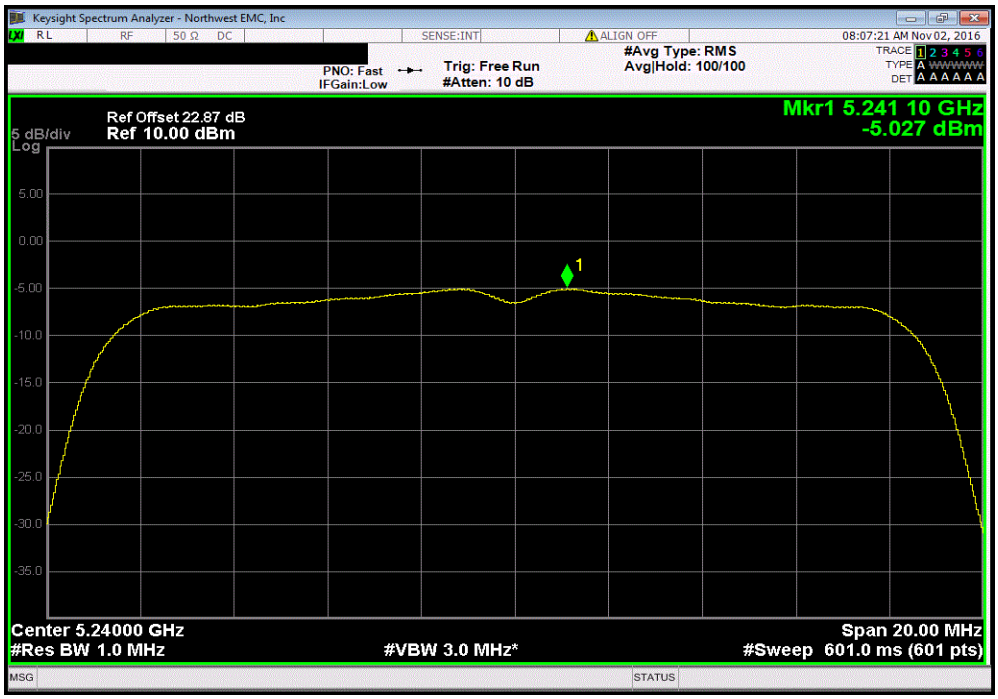
5150 - 5250 MHz Band, Low Channel 36 - 5180 MHz, 802.11(n) MCS7						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit ≤ (dBm/Ref BW)	Results
	-5.817	3.5		-2.3	11	Pass



5150 - 5250 MHz Band, High Channel 48 - 5240 MHz, 802.11(n) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit ≤ (dBm/Ref BW)	Results
	-2.537	0.6		-1.9	11	Pass



5150 - 5250 MHz Band, High Channel 48 - 5240 MHz, 802.11(n) MCS7						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit ≤ (dBm/Ref BW)	Results
	-5.027	3.5		-1.6	11	Pass



MAXIMUM POWER SPECTRAL DENSITY - 5.8 BAND

XMit 2016.05.06

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.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	6/8/2016	6/8/2017
Cable	Micro-Coax	UFD150A-1-0720-200200	NCS	6/7/2016	6/7/2017
Attenuator	Fairview Microwave	SA4014-20	TKV	3/4/2016	3/4/2017
Block - DC	Fairview Microwave	SD3379	AMU	5/6/2016	5/6/2017
Generator - Signal	Agilent	N5183A	TIA	4/6/2016	4/6/2018

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. 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.

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 - 5.8 BAND

NORTHWEST EMC

XMit 2016.05.06

EUT:	1790			**Work Order:**	MCSO1761
Serial Number:	DV-1-0546			**Date:**	11/08/16
Customer:	Microsoft Corporation			**Temperature:**	22.2 °C
Attendees:	None			**Humidity:**	47.2% RH
Project:	None			**Barometric Pres.:**	1022 mbar
Tested by:	Richard Mellroth	**Power:**	USB	**Job Site:**	NC02

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

COMMENTS

Power Setting at Default. Client provided adapter cable loss of 1.2dB included in reference level offset.

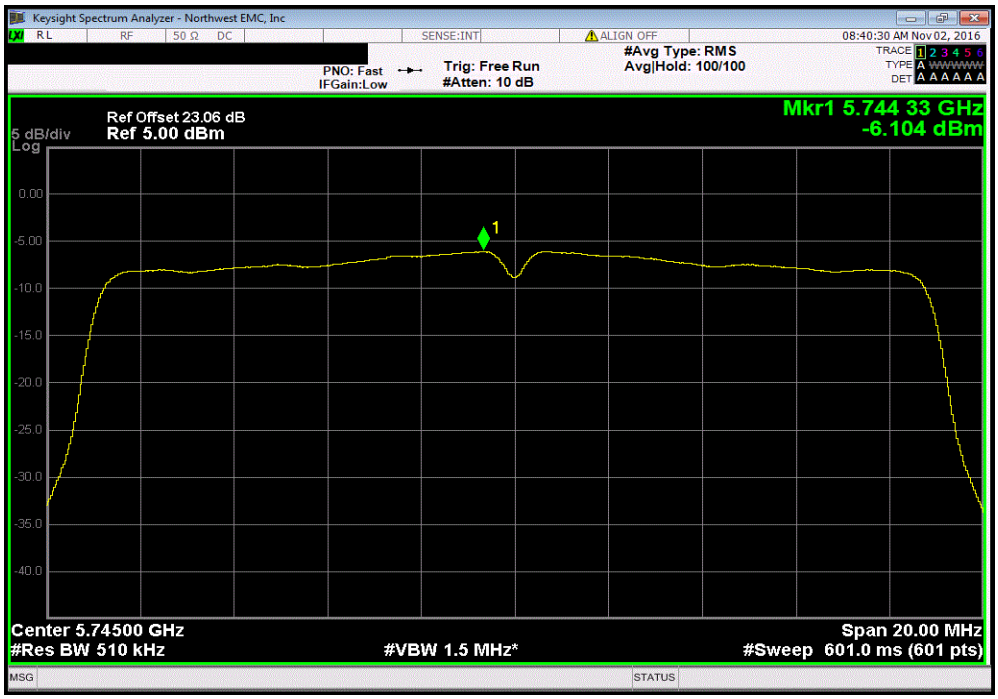
DEVIATIONS FROM TEST STANDARD

None

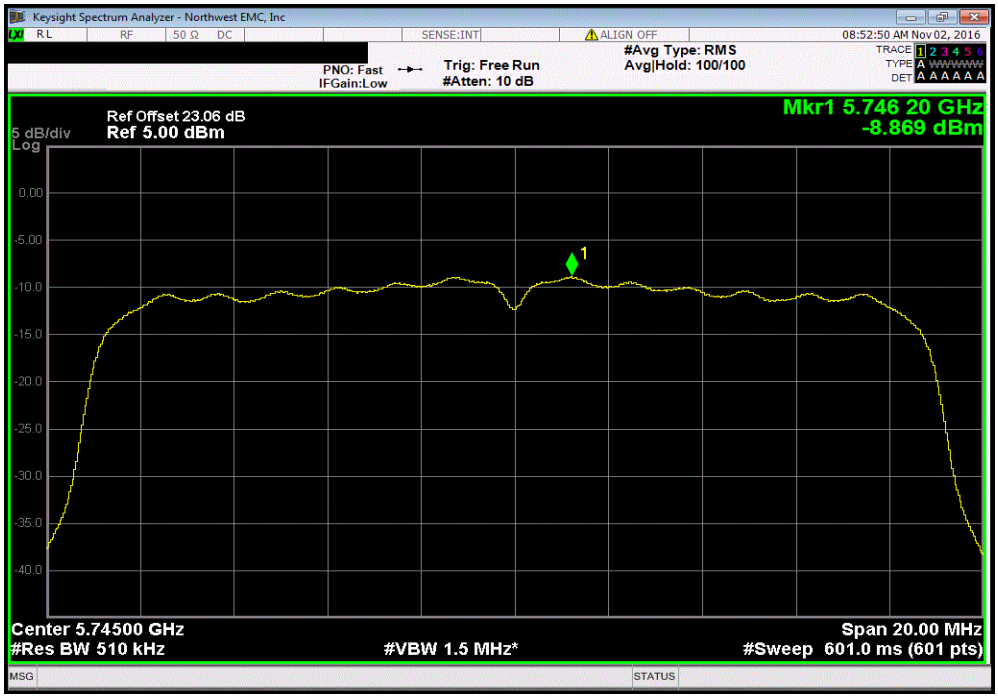
Configuration #	1	Signature

	Power (dBm/Ref BW)	Duty Cycle Factor (dB)	Density (dBm/Ref BW)	Limit ≤ (dBm/Ref BW)	Results
5725 - 5785 MHz Band					
Low Channel 149 - 5745 MHz					
802.11(n) MCS0	-6.104	0.6	-5.5	30	Pass
802.11(n) MCS7	-8.869	3.5	-5.4	30	Pass
Mid Channel 157 - 5785 MHz					
802.11(n) MCS0	-6.864	0.6	-6.2	30	Pass
802.11(n) MCS7	-9.278	3.5	-5.8	30	Pass
High Channel 161 - 5805 MHz					
802.11(n) MCS0	-6.296	0.6	-5.7	30	Pass
802.11(n) MCS7	-9.029	3.5	-5.6	30	Pass

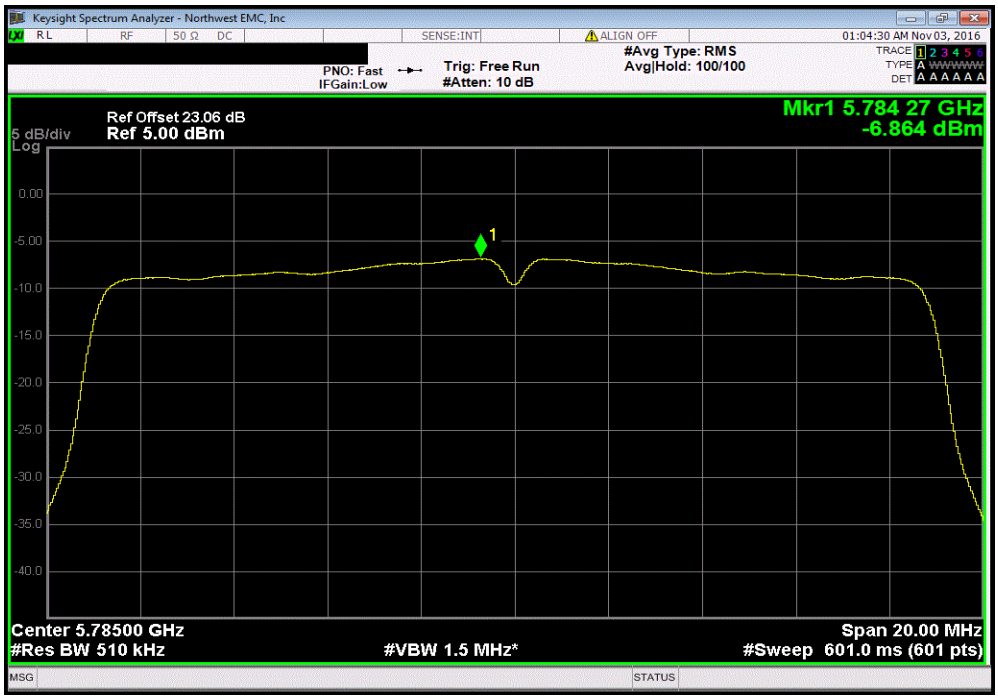
5725 - 5785 MHz Band, Low Channel 149 - 5745 MHz, 802.11(n) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit ≤ (dBm/Ref BW)	Results
	-6.104	0.6		-5.5	30	Pass



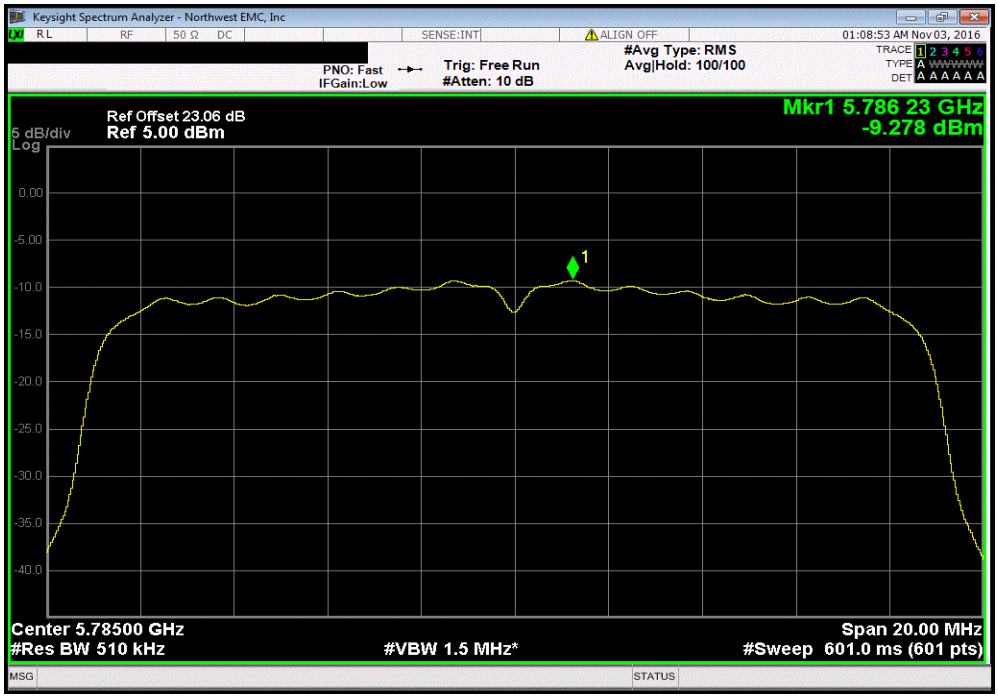
5725 - 5785 MHz Band, Low Channel 149 - 5745 MHz, 802.11(n) MCS7						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit ≤ (dBm/Ref BW)	Results
	-8.869	3.5		-5.4	30	Pass



5725 - 5785 MHz Band, Mid Channel 157 - 5785 MHz, 802.11(n) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit ≤ (dBm/Ref BW)	Results
	-6.864	0.6		-6.2	30	Pass



5725 - 5785 MHz Band, Mid Channel 157 - 5785 MHz, 802.11(n) MCS7						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit ≤ (dBm/Ref BW)	Results
	-9.278	3.5		-5.8	30	Pass

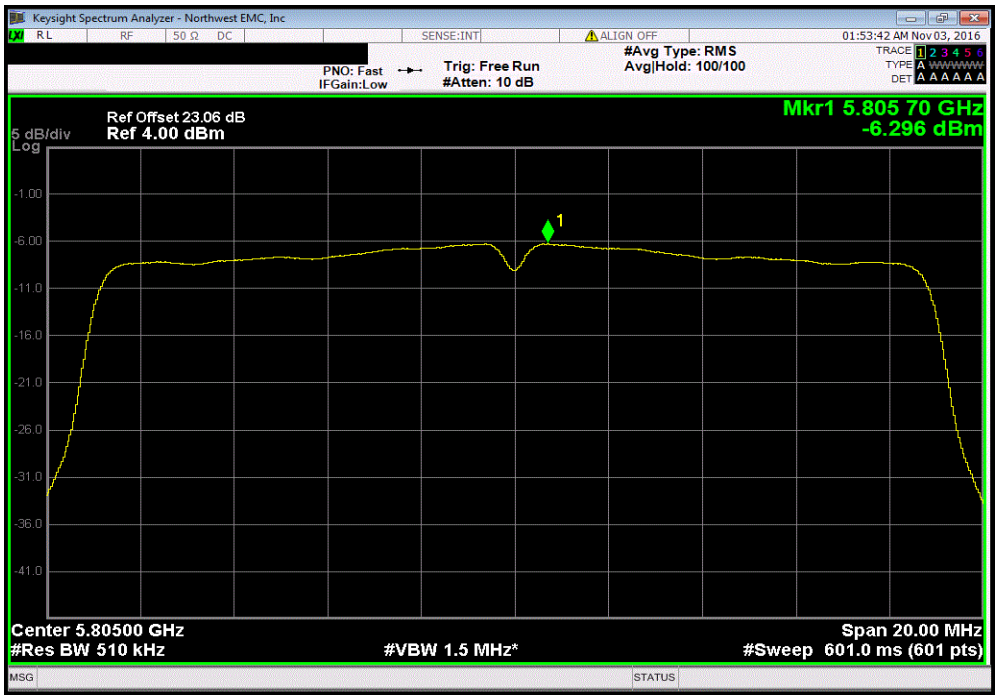


MAXIMUM POWER SPECTRAL DENSITY - 5.8 BAND

NORTHWEST EMC

XMit 2016.05.06

5725 - 5785 MHz Band, High Channel 161 - 5805 MHz, 802.11(n) MCS0						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit ≤ (dBm/Ref BW)	Results
	-6.296	0.6		-5.7	30	Pass



5725 - 5785 MHz Band, High Channel 161 - 5805 MHz, 802.11(n) MCS7						
	Power (dBm/Ref BW)	Duty Cycle Factor (dB)		Density (dBm/Ref BW)	Limit ≤ (dBm/Ref BW)	Results
	-9.029	3.5		-5.6	30	Pass