



# POWER SPECTRAL DENSITY

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
Generator - Signal	Keysight	N5182B	TFX	28-Apr-20	28-Apr-23
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	15-Sep-19	15-Sep-20
Attenuator	S.M. Electronics	SA26B-20	RFW	10-Feb-20	10-Feb-21
Block - DC	Fairview Microwave	SD3379	AMI	5-Aug-20	5-Aug-21
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	21-Dec-19	21-Dec-20

## TEST DESCRIPTION

The maximum power spectral density measurements was measured using the channels and modes as called out on the following data sheets.

Per the procedure outlined in ANSI C63.10 the peak power spectral density was measured in a 3 kHz RBW.

# POWER SPECTRAL DENSITY



TelTx 2019.08.30.0 XMI 2020.03.25.0

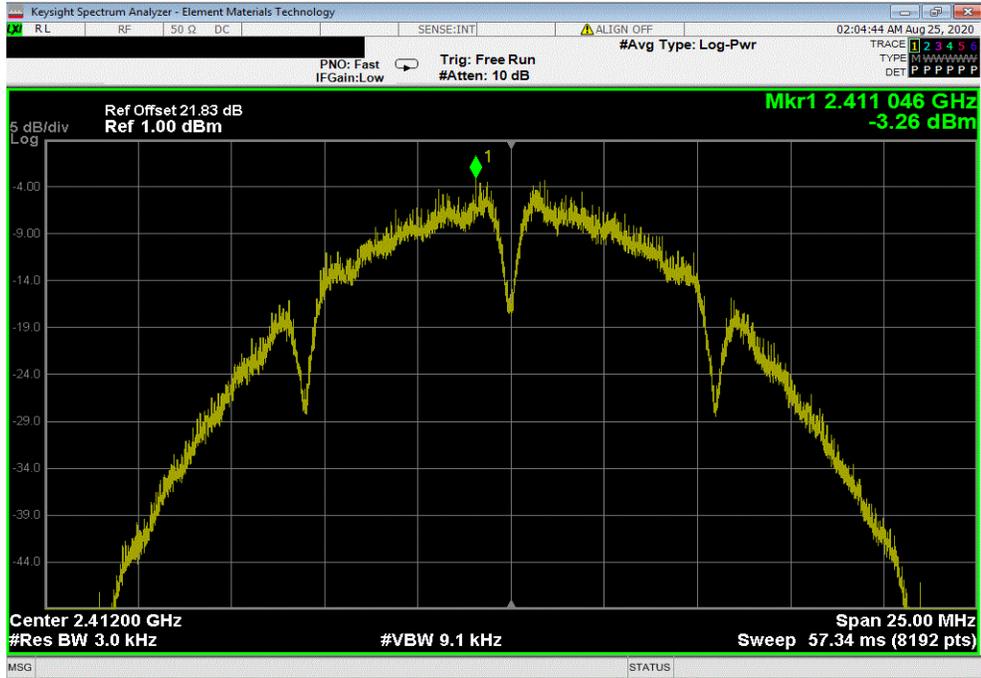
EUT: USB to WiFi Adapter		Work Order: TRNE0022		
Serial Number: 0022A301FF5D		Date: 24-Aug-20		
Customer: Trane		Temperature: 21.9 °C		
Attendees: Chris Vanderkoy		Humidity: 57.4% RH		
Project: None		Barometric Pres.: 1017 mbar		
Tested by: Dustin Sparks		Power: 5VDC via USB		
		Job Site: MN08		
TEST SPECIFICATIONS				
FCC 15.247:2020		ANSI C63.10:2013		
TEST METHOD				
COMMENTS				
Measurement cable, DC block, and 20 dB attenuator included in reference level offset.				
DEVIATIONS FROM TEST STANDARD				
None				
Configuration #	3	Signature <i>Dustin Sparks</i>		
		Value dBm/3kHz	Limit < dBm/3kHz	Results
2400 MHz - 2483.5 MHz Band				
802.11(b) 1 Mbps				
	Low Channel 1, 2412 MHz	-3.257	8	Pass
	Mid Channel 6, 2437 MHz	-3.77	8	Pass
	High Channel 11, 2462 MHz	-4.201	8	Pass
802.11(b) 11 Mbps				
	Low Channel 1, 2412 MHz	2.097	8	Pass
	Mid Channel 6, 2437 MHz	1.854	8	Pass
	High Channel 11, 2462 MHz	-2.641	8	Pass
802.11(g) 6 Mbps				
	Low Channel 1, 2412 MHz	-7.312	8	Pass
	Mid Channel 6, 2437 MHz	-7.214	8	Pass
	High Channel 11, 2462 MHz	-11.9	8	Pass
802.11(g) 36 Mbps				
	Low Channel 1, 2412 MHz	-9.786	8	Pass
	Mid Channel 6, 2437 MHz	-9.745	8	Pass
	High Channel 11, 2462 MHz	-13.82	8	Pass
802.11(g) 54 Mbps				
	Low Channel 1, 2412 MHz	-12.737	8	Pass
	Mid Channel 6, 2437 MHz	-10.89	8	Pass
	High Channel 11, 2462 MHz	-13.943	8	Pass
802.11(n) MCS0				
	Low Channel 1, 2412 MHz	-7.964	8	Pass
	Mid Channel 6, 2437 MHz	-8.028	8	Pass
	High Channel 11, 2462 MHz	-13.901	8	Pass
802.11(n) MCS7				
	Low Channel 1, 2412 MHz	-10.721	8	Pass
	Mid Channel 6, 2437 MHz	-11.003	8	Pass
	High Channel 11, 2462 MHz	-15.506	8	Pass

# POWER SPECTRAL DENSITY

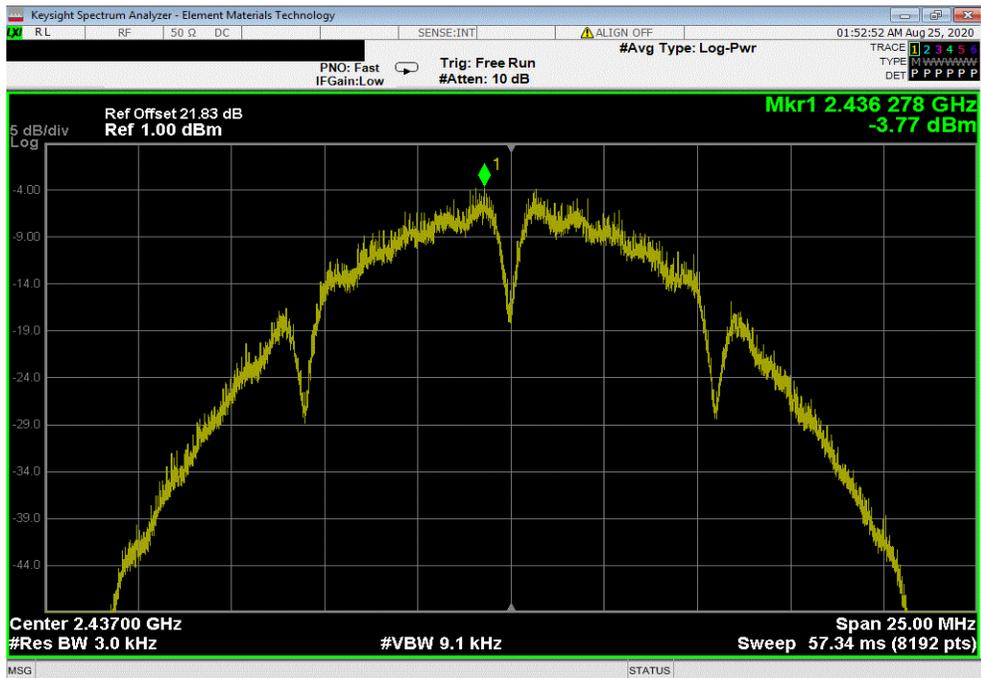


TbTx 2019.08.30.0 XMI 2020.03.25.0

2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	-3.257	8	Pass			



2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	-3.77	8	Pass			

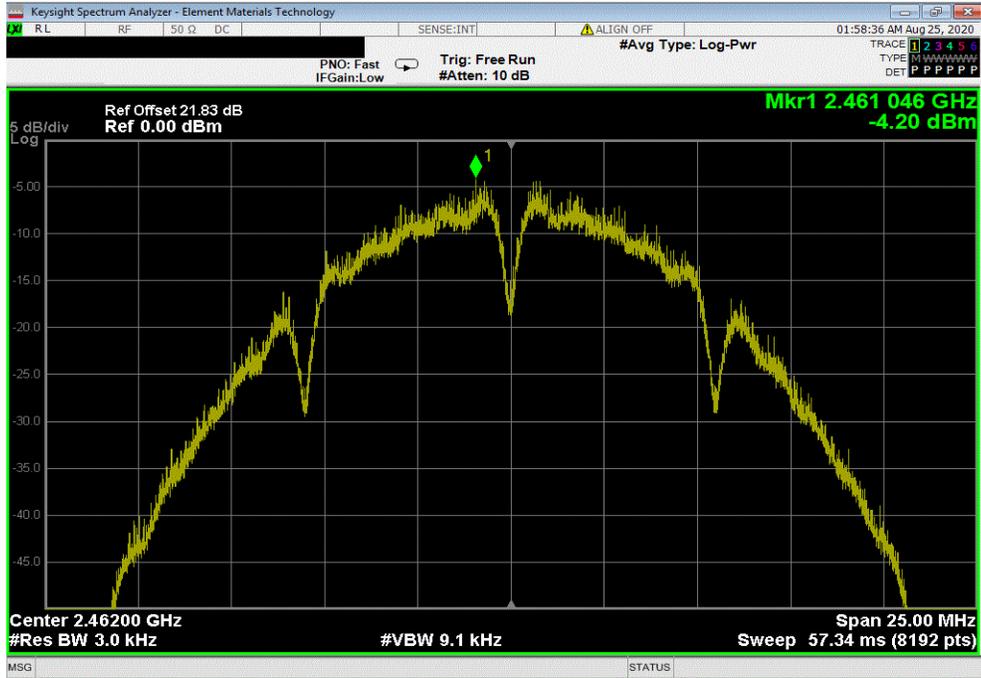


# POWER SPECTRAL DENSITY

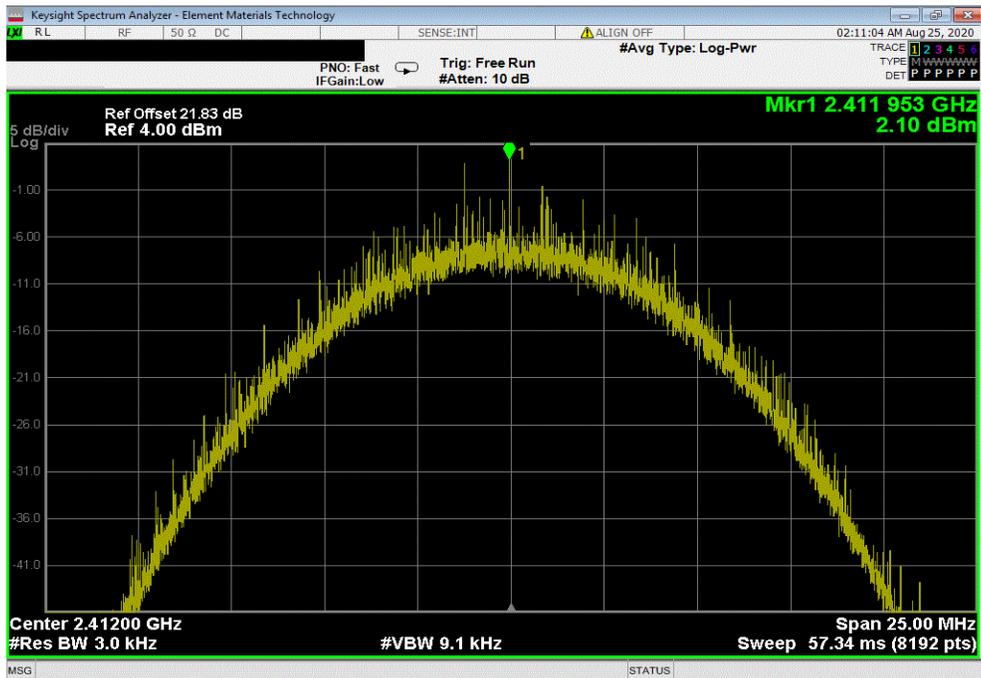


TbTx 2019.08.30.0 XMI 2020.03.25.0

2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	-4.201	8	Pass			



2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	2.097	8	Pass			

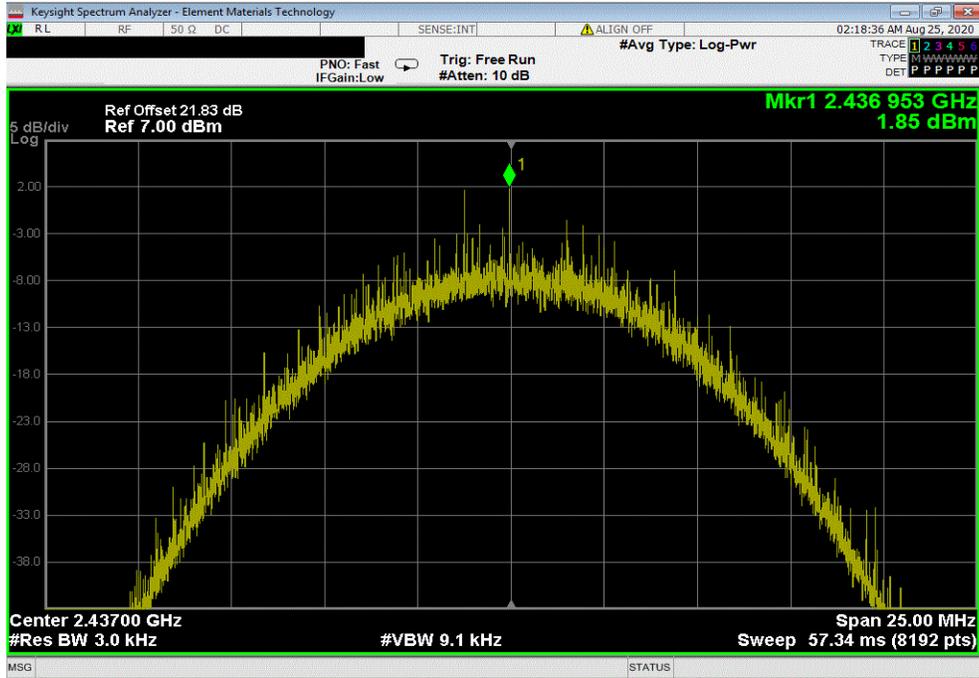


# POWER SPECTRAL DENSITY

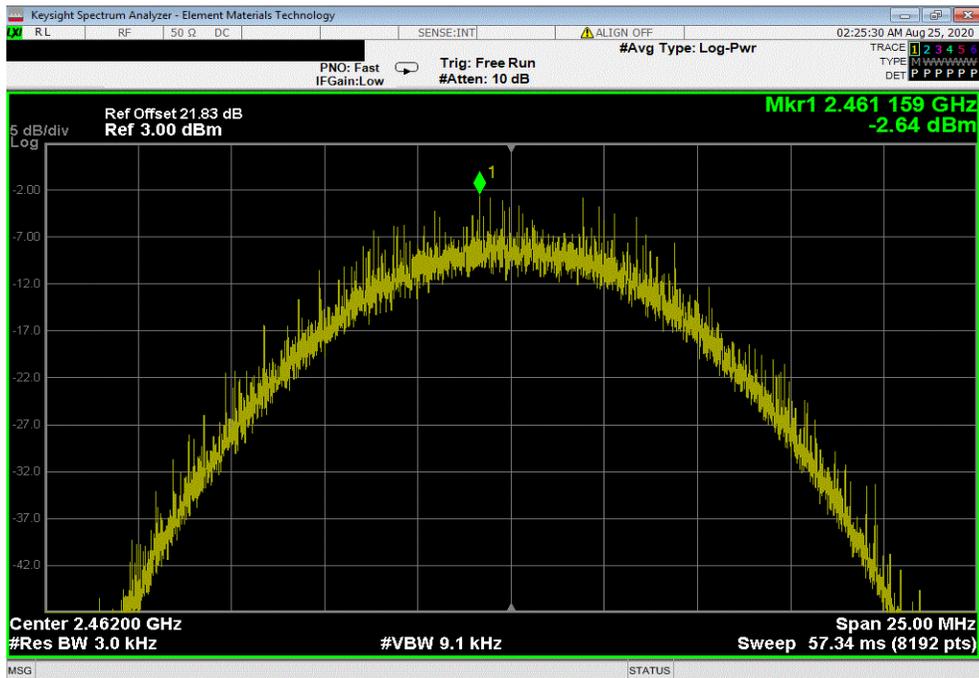


TbTx 2019.08.30.0 XMI 2020.03.25.0

2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	1.854	8	Pass			



2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	-2.641	8	Pass			

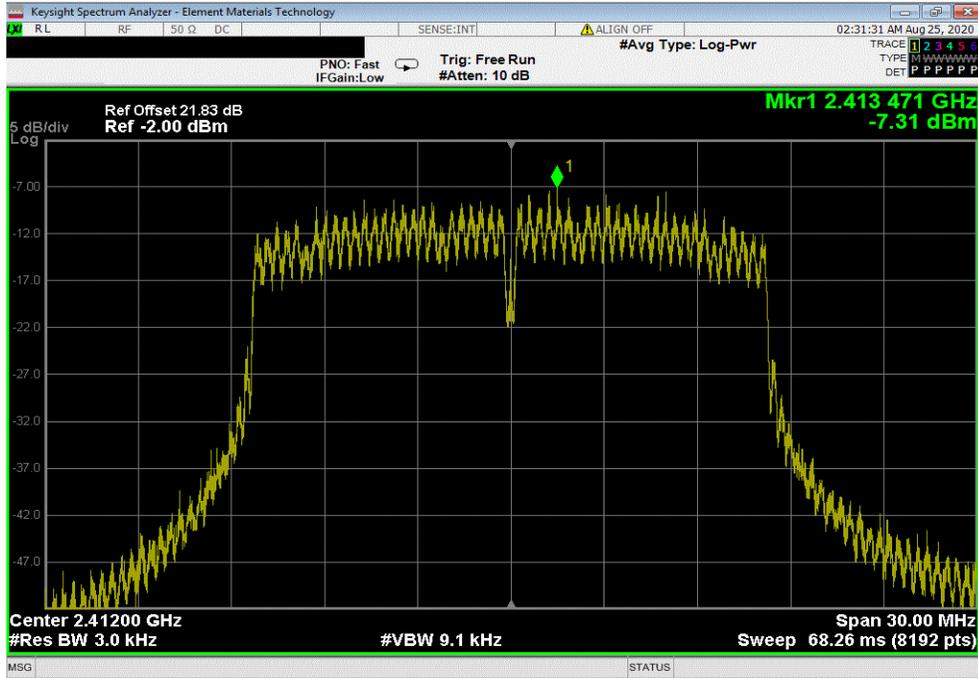


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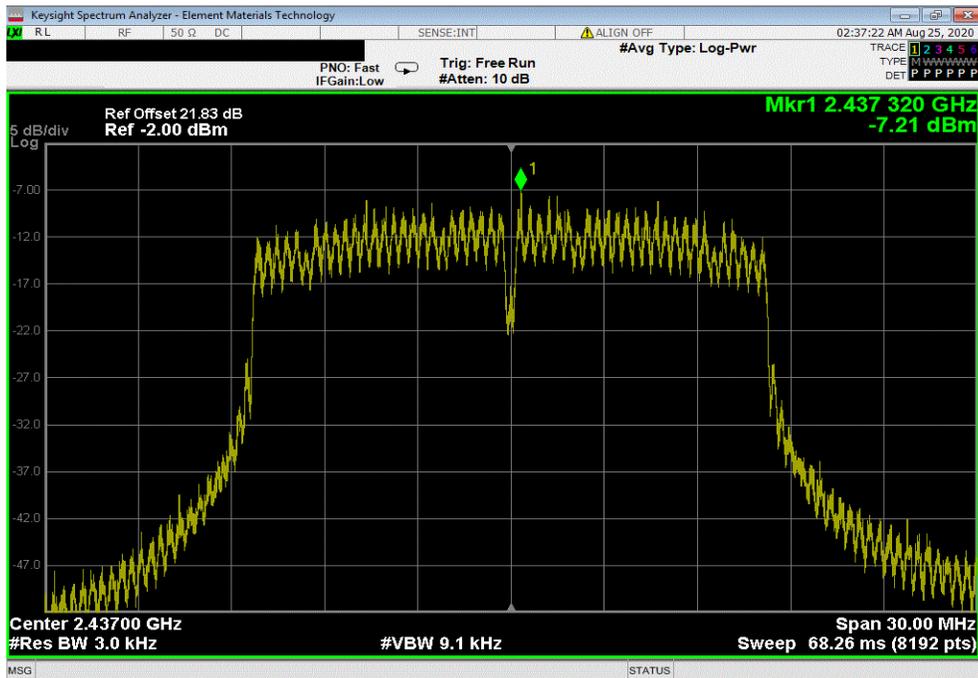


TbTx 2019.08.30.0 XMI 2020.03.25.0

2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	-7.312	8	Pass			



2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	-7.214	8	Pass			

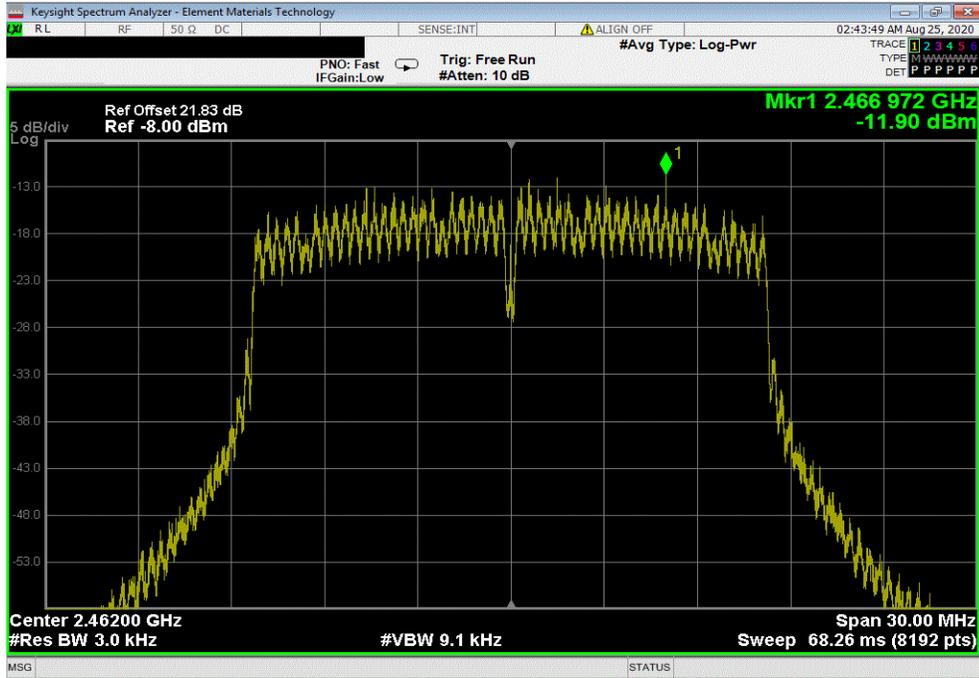


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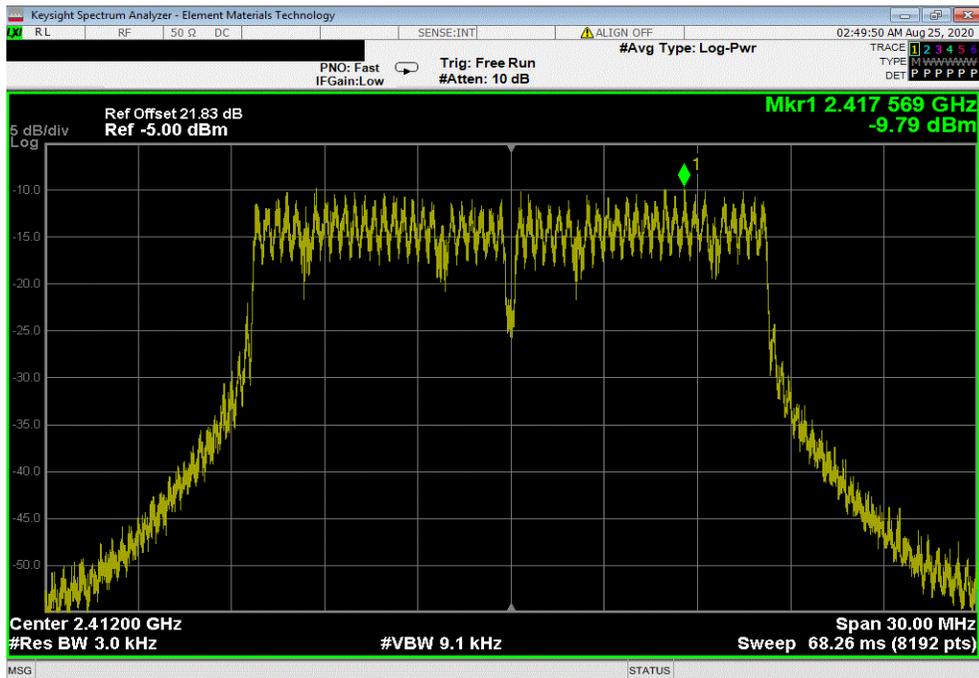


TbTx 2019.08.30.0 XMI 2020.03.25.0

2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	-11.9	8	Pass			



2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	-9.786	8	Pass			

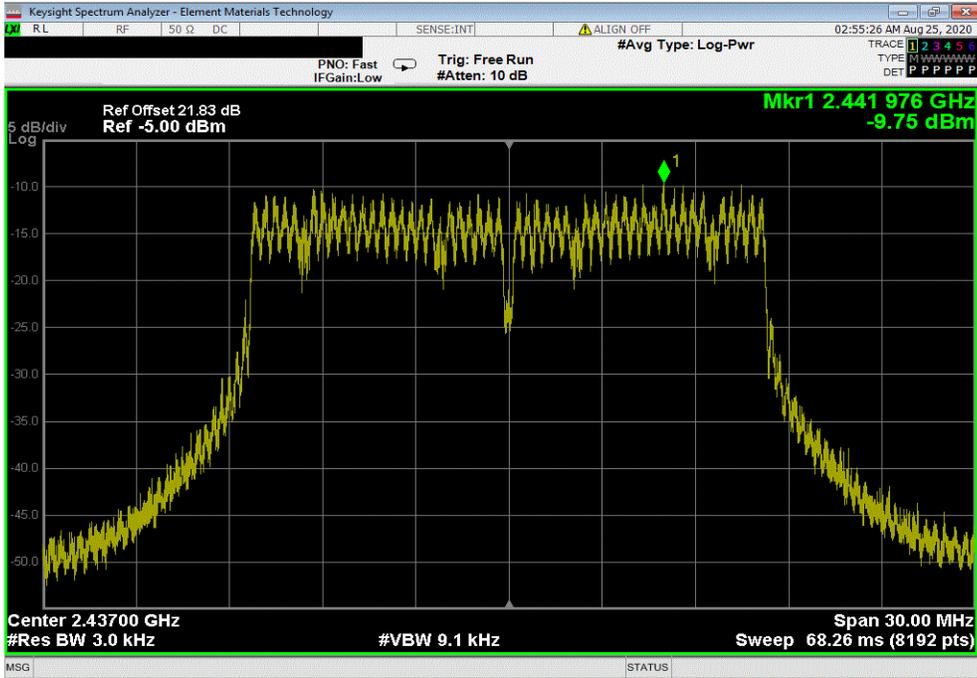


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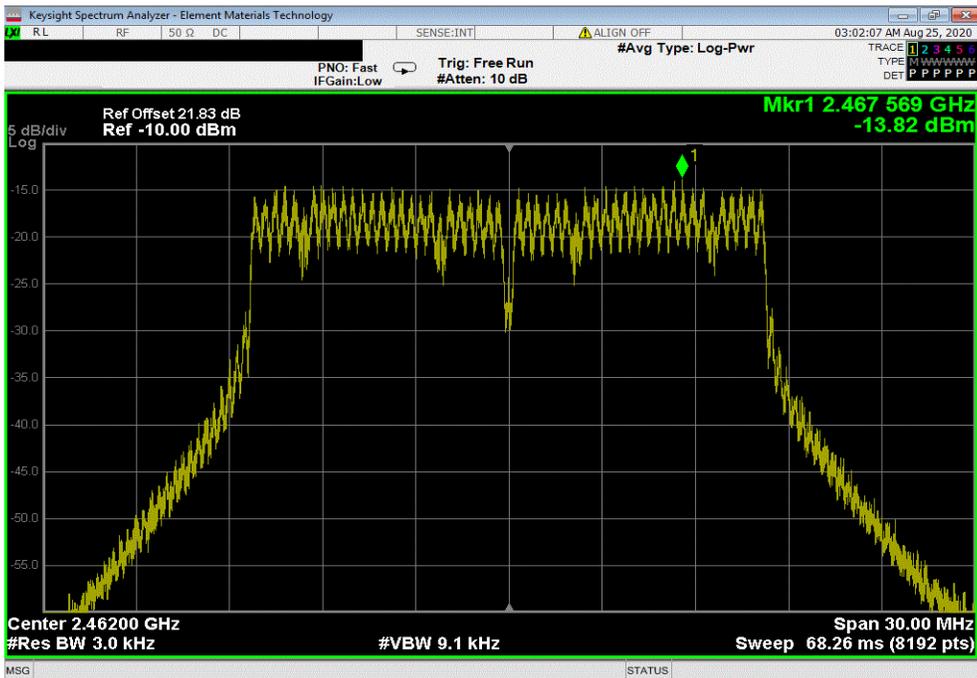


TbTx 2019.08.30.0 XMI 2020.03.25.0

2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	-9.745	8	Pass			



2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	-13.82	8	Pass			

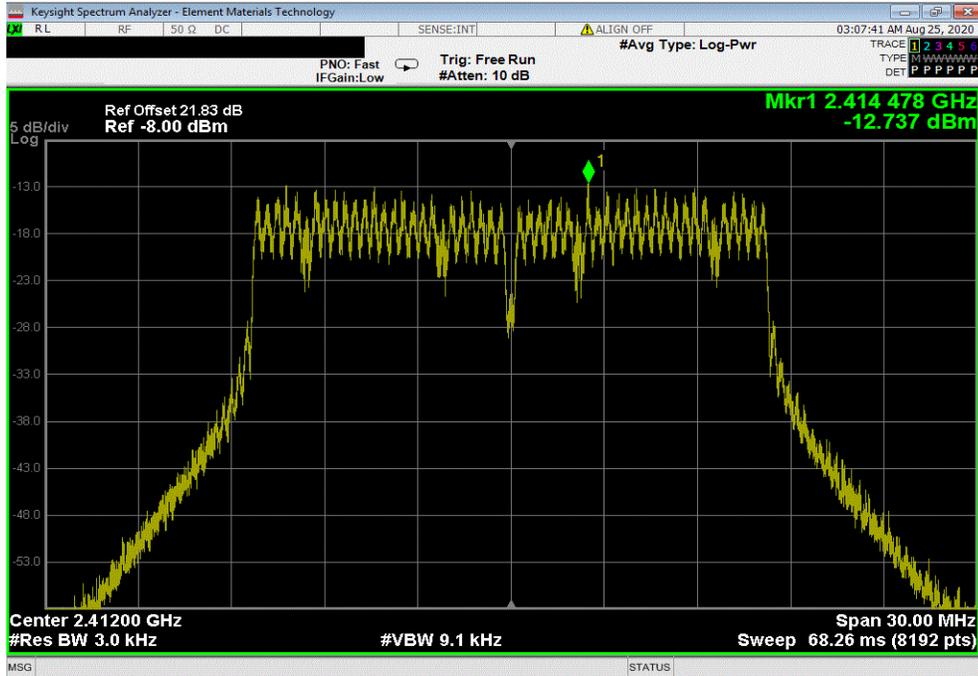


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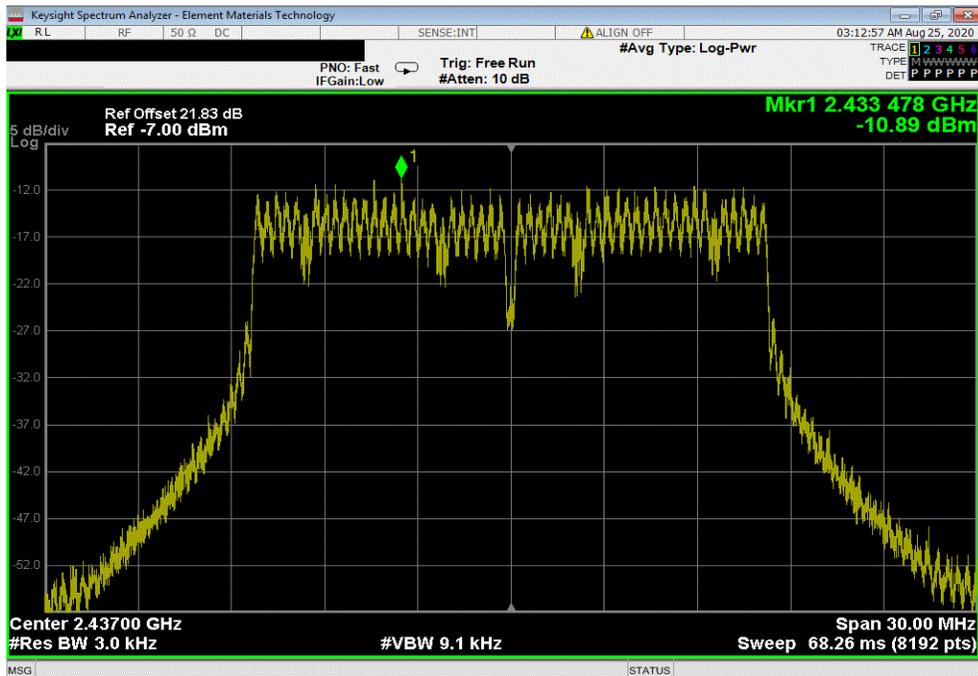


TbTx 2019.08.30.0 XMI 2020.03.25.0

2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	-12.737	8	Pass			



2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	-10.89	8	Pass			

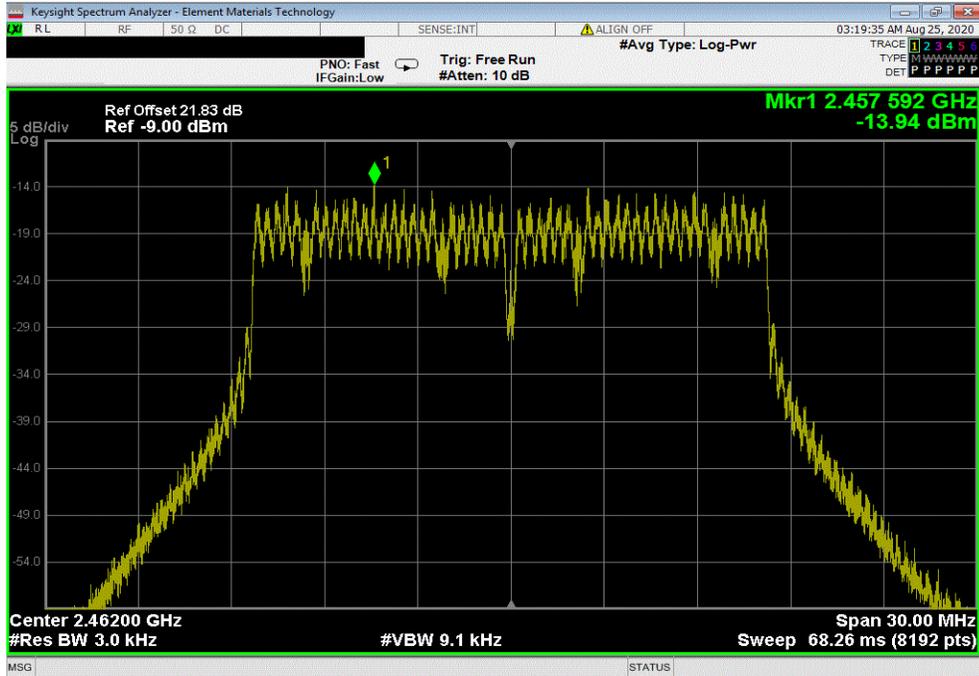


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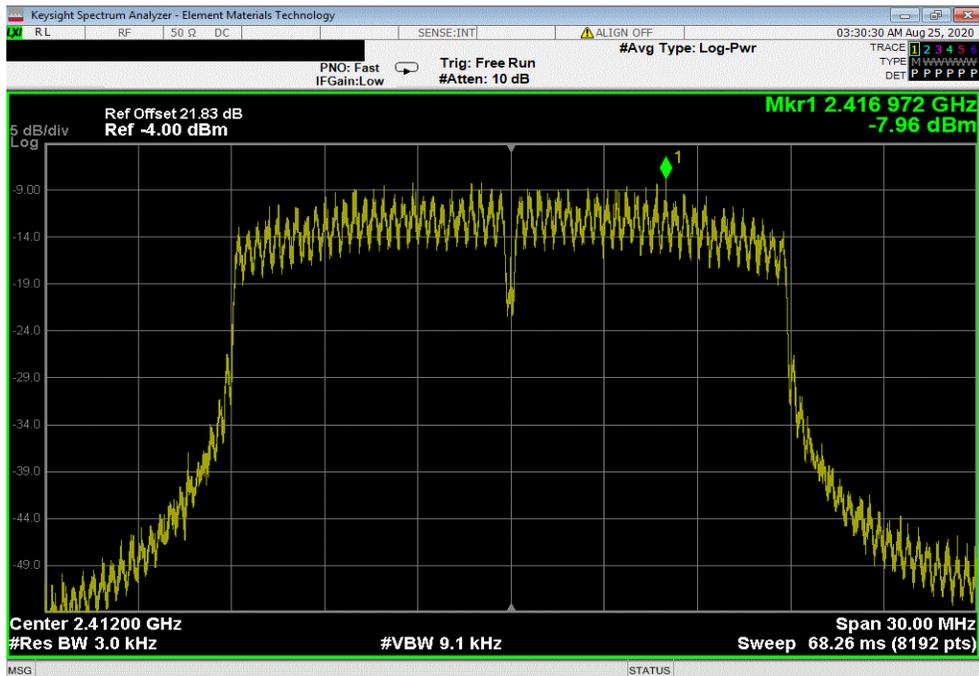


TbTx 2019.08.30.0 XMI 2020.03.25.0

2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	-13.943	8	Pass			



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	-7.964	8	Pass			

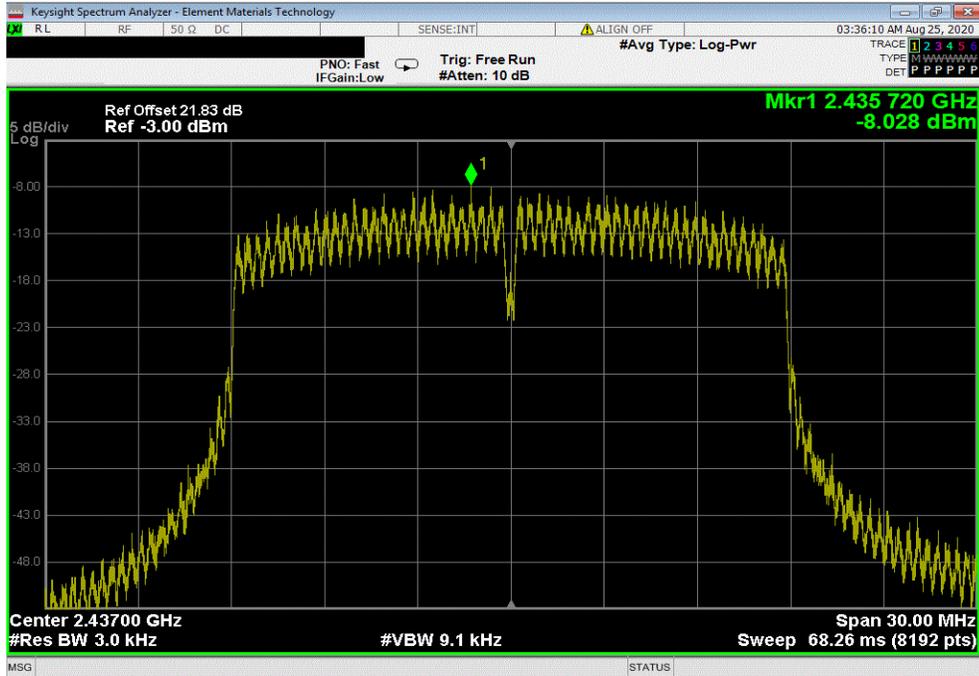


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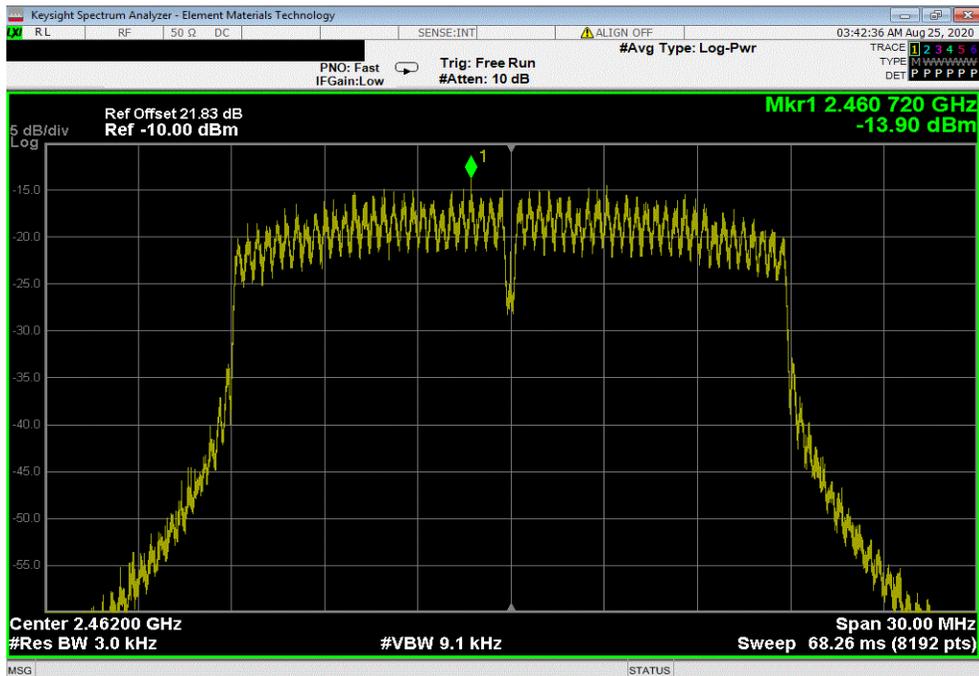


TbTx 2019.08.30.0 XMI 2020.03.25.0

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz			
	Value	Limit	Results
	dBm/3kHz	< dBm/3kHz	
	-8.028	8	Pass



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz			
	Value	Limit	Results
	dBm/3kHz	< dBm/3kHz	
	-13.901	8	Pass

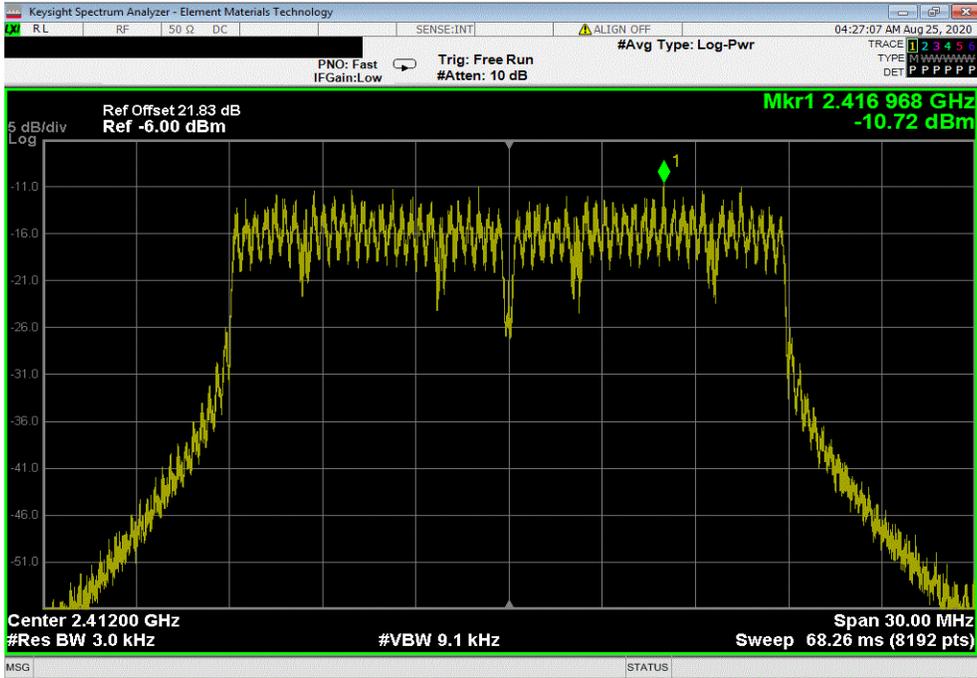


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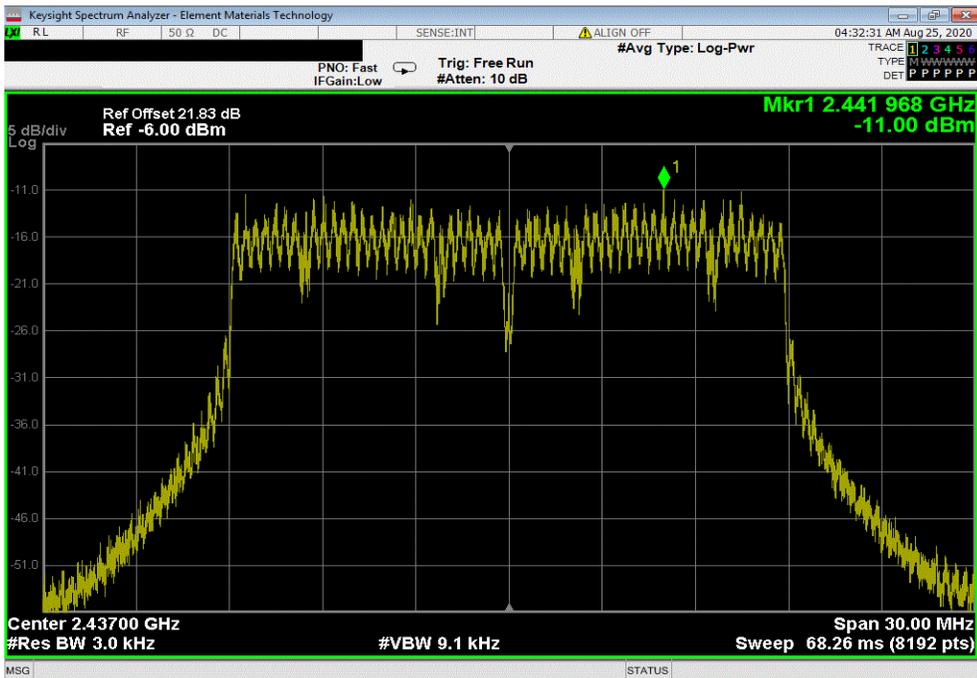


TbTx 2019.08.30.0 XMI 2020.03.25.0

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	-10.721	8	Pass			



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	-11.003	8	Pass			

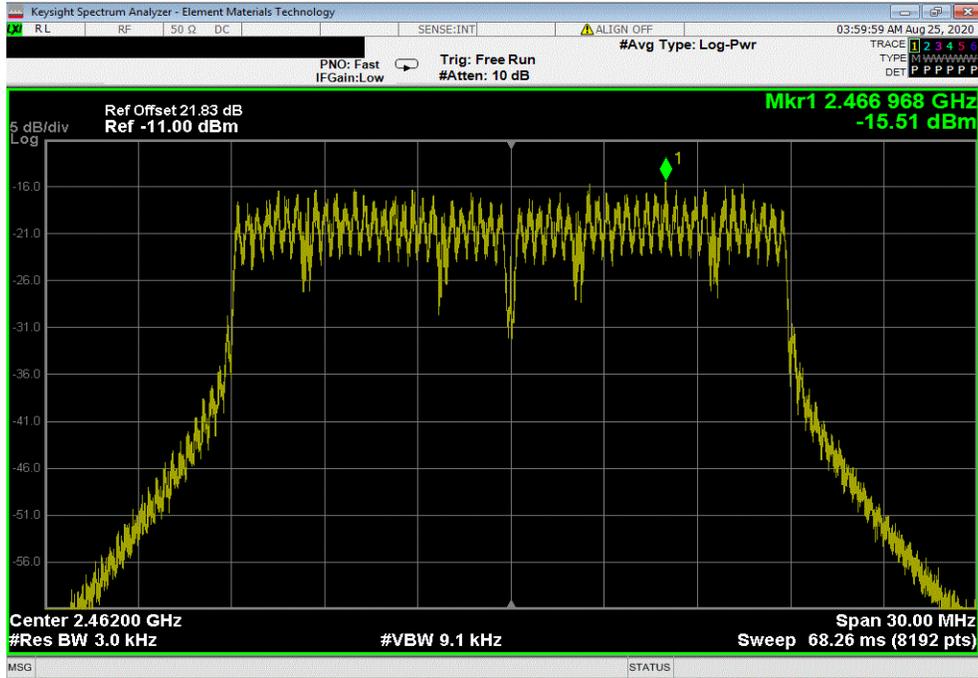


# POWER SPECTRAL DENSITY



TbTx 2019.08.30.0 XMI 2020.03.25.0

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz						
		Value	Limit			
		dBm/3kHz	< dBm/3kHz	Results		
		-15.506	8	Pass		



# BAND EDGE COMPLIANCE



XMI 2020.03.25.0

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
Generator - Signal	Keysight	N5182B	TFX	28-Apr-20	28-Apr-23
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	15-Sep-19	15-Sep-20
Attenuator	S.M. Electronics	SA26B-20	RFW	10-Feb-20	10-Feb-21
Block - DC	Fairview Microwave	SD3379	AMI	5-Aug-20	5-Aug-21
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	21-Dec-19	21-Dec-20

## TEST DESCRIPTION

The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in each available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet.

The spectrum was scanned below the lower band edge and above the higher band edge.

# BAND EDGE COMPLIANCE



TelTx 2019.08.30.0 XMt 2020.03.25.0

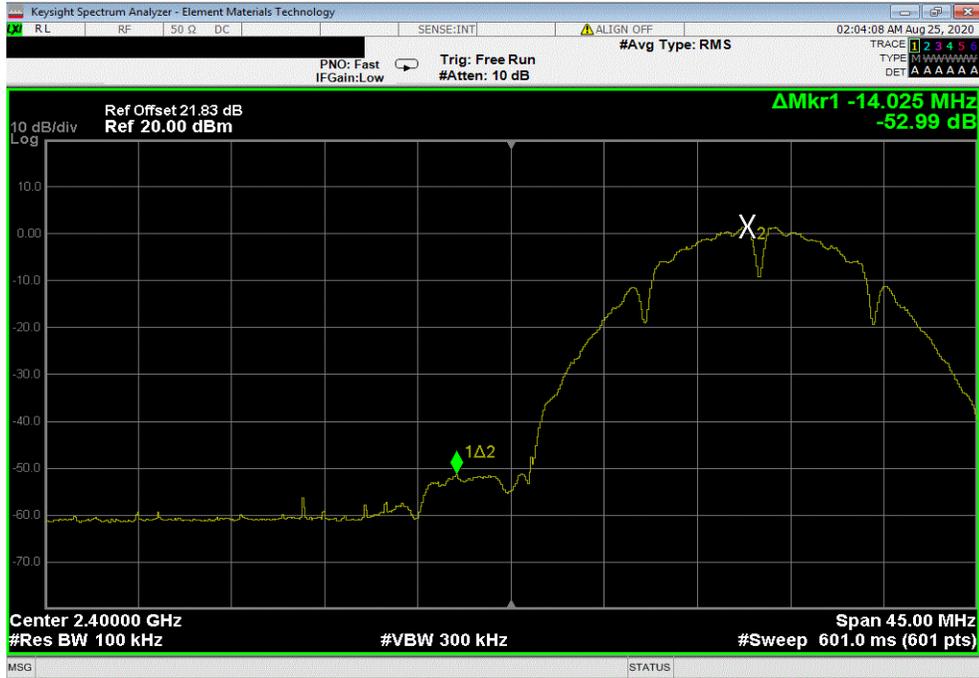
EUT: USB to WiFi Adapter		Work Order: TRNE0022	
Serial Number: 0022A301FF5D		Date: 24-Aug-20	
Customer: Trane		Temperature: 21.9 °C	
Attendees: Chris Vanderkoy		Humidity: 57.2% RH	
Project: None		Barometric Pres.: 1017 mbar	
Tested by: Dustin Sparks		Power: 5VDC via USB	
		Job Site: MN08	
TEST SPECIFICATIONS			
FCC 15.247:2020		ANSI C63.10:2013	
TEST METHOD			
COMMENTS			
Measurement cable, DC block, and 20 dB attenuator included in reference level offset.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	3	Signature <i>Dustin Sparks</i>	
		Value (dBc)	Limit ≤ (dBc) Result
2400 MHz - 2483.5 MHz Band			
802.11(b) 1 Mbps			
	Low Channel 1, 2412 MHz	-52.99	-30 Pass
	High Channel 11, 2462 MHz	-59.14	-30 Pass
802.11(b) 11 Mbps			
	Low Channel 1, 2412 MHz	-54.17	-30 Pass
	High Channel 11, 2462 MHz	-60.92	-30 Pass
802.11(g) 6 Mbps			
	Low Channel 1, 2412 MHz	-37.28	-30 Pass
	High Channel 11, 2462 MHz	-50.74	-30 Pass
802.11(g) 36 Mbps			
	Low Channel 1, 2412 MHz	-35.26	-30 Pass
	High Channel 11, 2462 MHz	-48.84	-30 Pass
802.11(g) 54 Mbps			
	Low Channel 1, 2412 MHz	-36.51	-30 Pass
	High Channel 11, 2462 MHz	-48.28	-30 Pass
802.11(n) MCS0			
	Low Channel 1, 2412 MHz	-37.29	-30 Pass
	High Channel 11, 2462 MHz	-49.33	-30 Pass
802.11(n) MCS7			
	Low Channel 1, 2412 MHz	-34.9	-30 Pass
	High Channel 11, 2462 MHz	-47.93	-30 Pass

# BAND EDGE COMPLIANCE

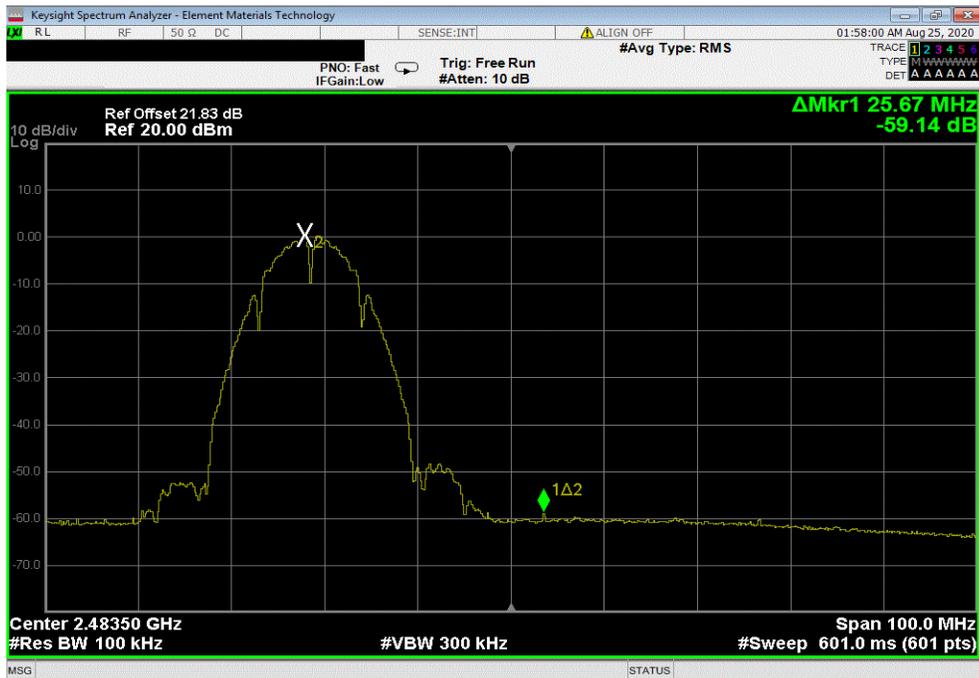


TbTx 2019.08.30.0 XMI 2020.03.25.0

2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
	Value (dBc)	Limit ≤ (dBc)	Result			
	-52.99	-30	Pass			



2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
	Value (dBc)	Limit ≤ (dBc)	Result			
	-59.14	-30	Pass			

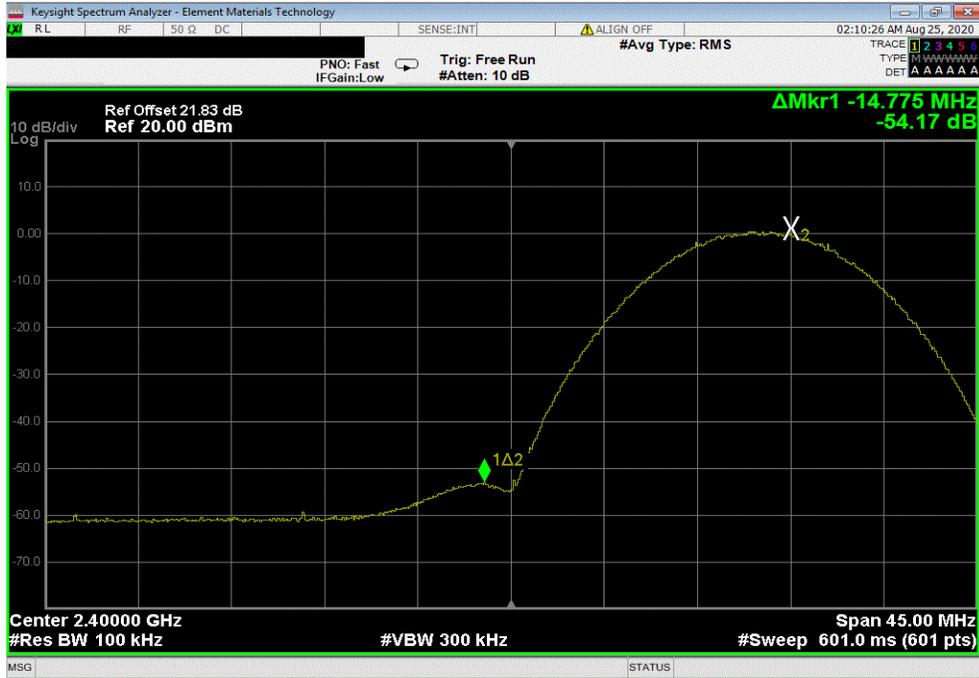


# BAND EDGE COMPLIANCE

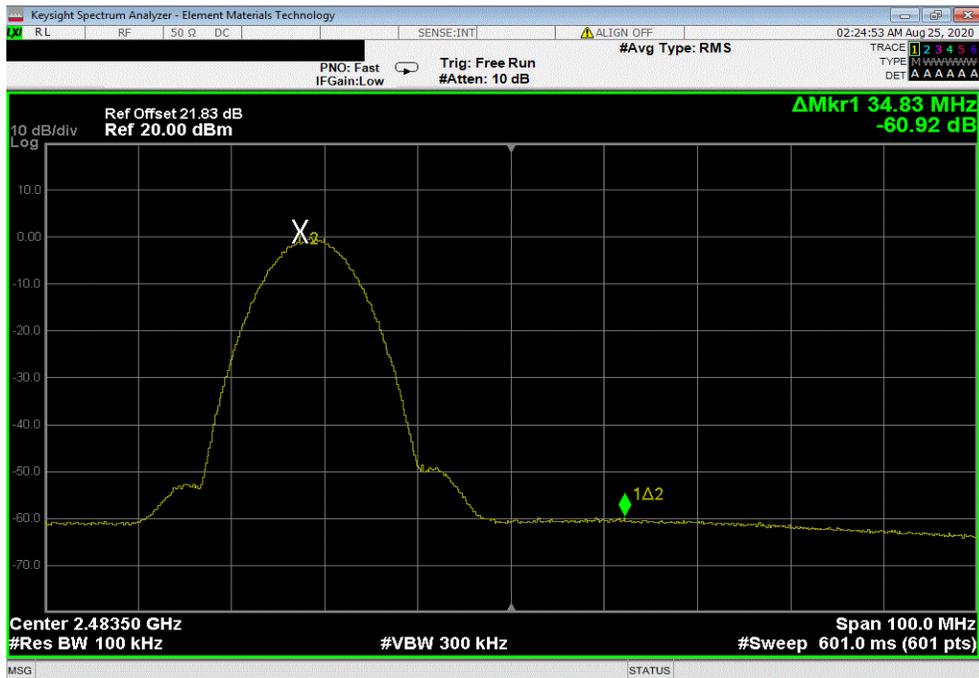


TbTx 2019.08.30.0 XMI 2020.03.25.0

2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
	Value (dBc)	Limit ≤ (dBc)	Result			
	-54.17	-30	Pass			



2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
	Value (dBc)	Limit ≤ (dBc)	Result			
	-60.92	-30	Pass			

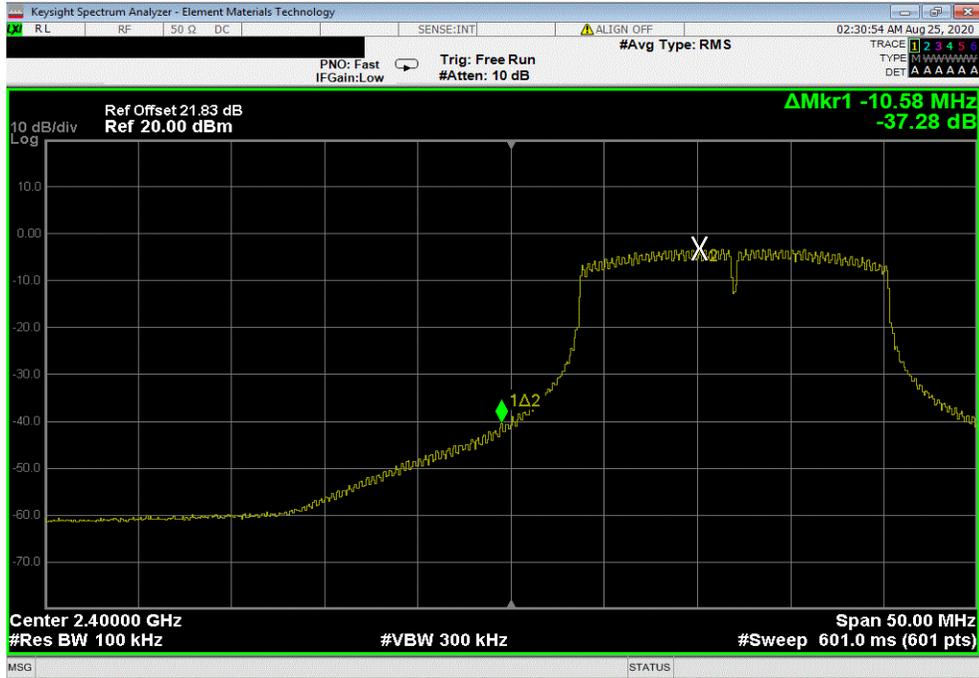


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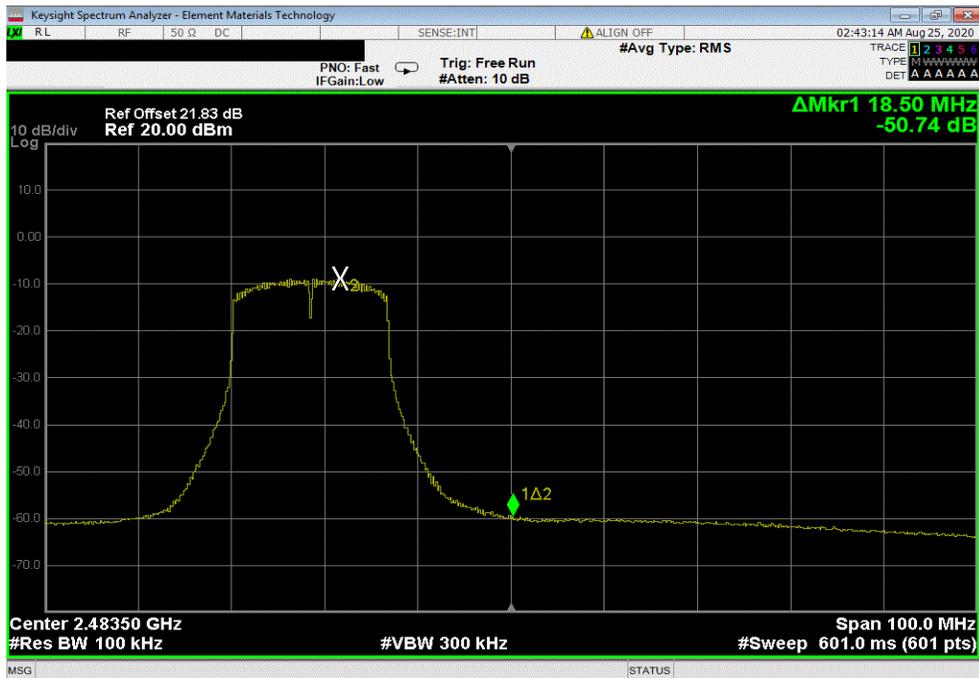


TbTx 2019.08.30.0 XMI 2020.03.25.0

2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
	Value (dBc)	Limit ≤ (dBc)	Result			
	-37.28	-30	Pass			



2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
	Value (dBc)	Limit ≤ (dBc)	Result			
	-50.74	-30	Pass			

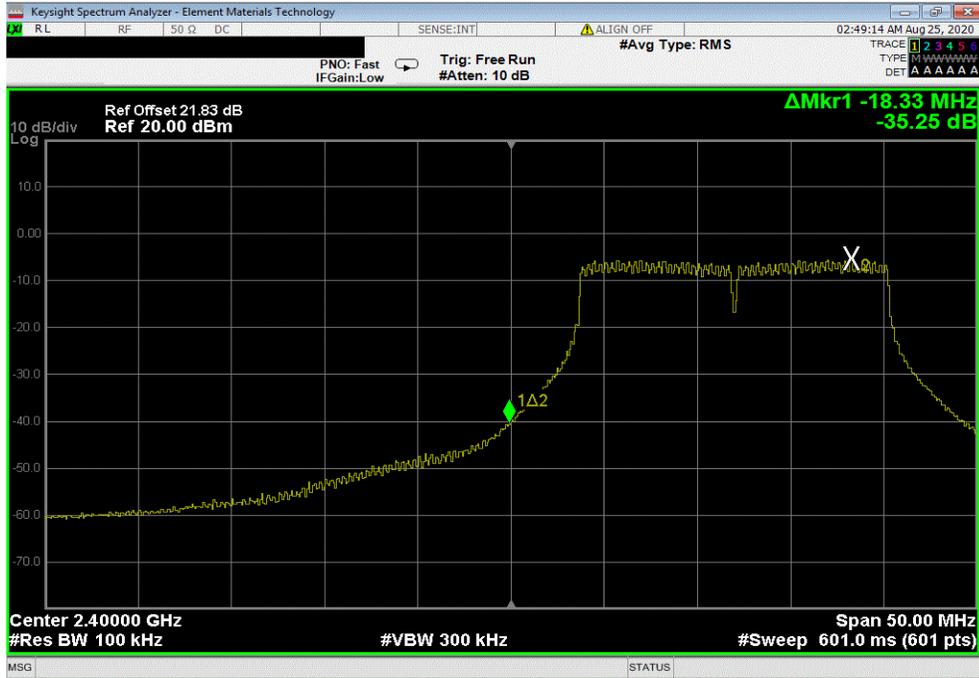


# BAND EDGE COMPLIANCE

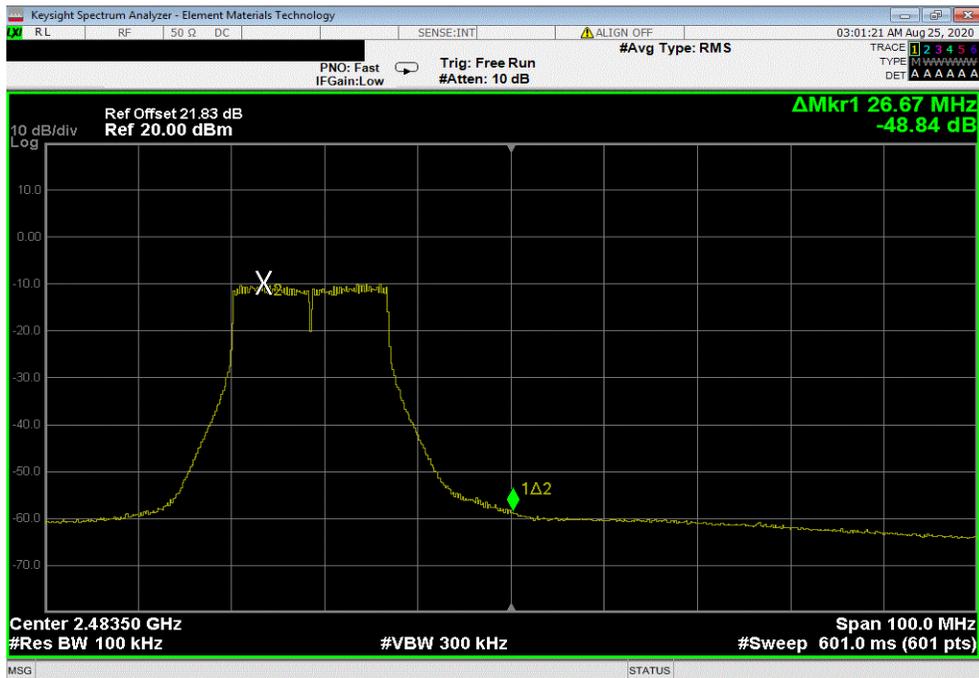


TbTx 2019.08.30.0 XMI 2020.03.25.0

2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
	Value (dBc)	Limit ≤ (dBc)	Result			
	-35.26	-30	Pass			



2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
	Value (dBc)	Limit ≤ (dBc)	Result			
	-48.84	-30	Pass			

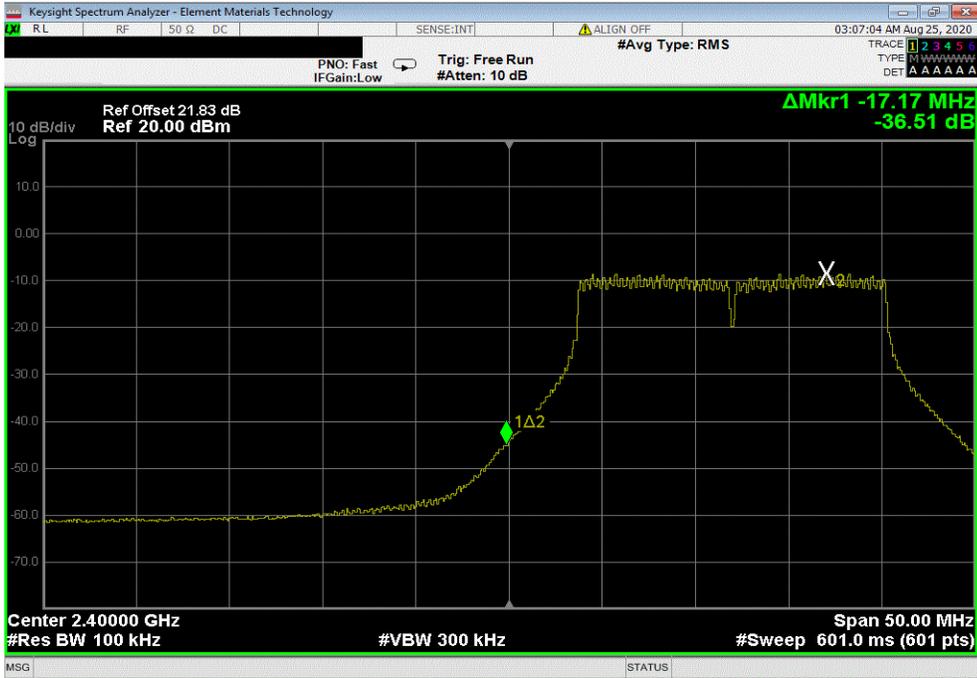


# BAND EDGE COMPLIANCE



TbTx 2019.08.30.0 XMi 2020.03.25.0

2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
	Value (dBc)	Limit ≤ (dBc)	Result			
	-36.51	-30	Pass			



2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
	Value (dBc)	Limit ≤ (dBc)	Result			
	-48.28	-30	Pass			



# BAND EDGE COMPLIANCE

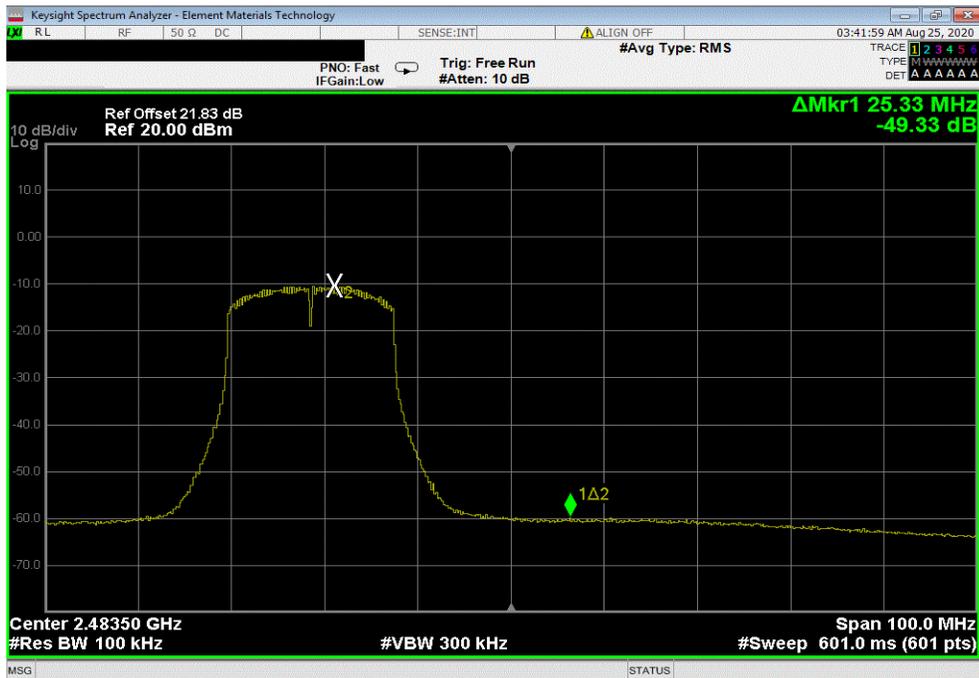


TbTx 2019.08.30.0 XMI 2020.03.25.0

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz						
	Value	Limit	Result			
	(dBc)	≤ (dBc)				
	-37.29	-30	Pass			



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz						
	Value	Limit	Result			
	(dBc)	≤ (dBc)				
	-49.33	-30	Pass			

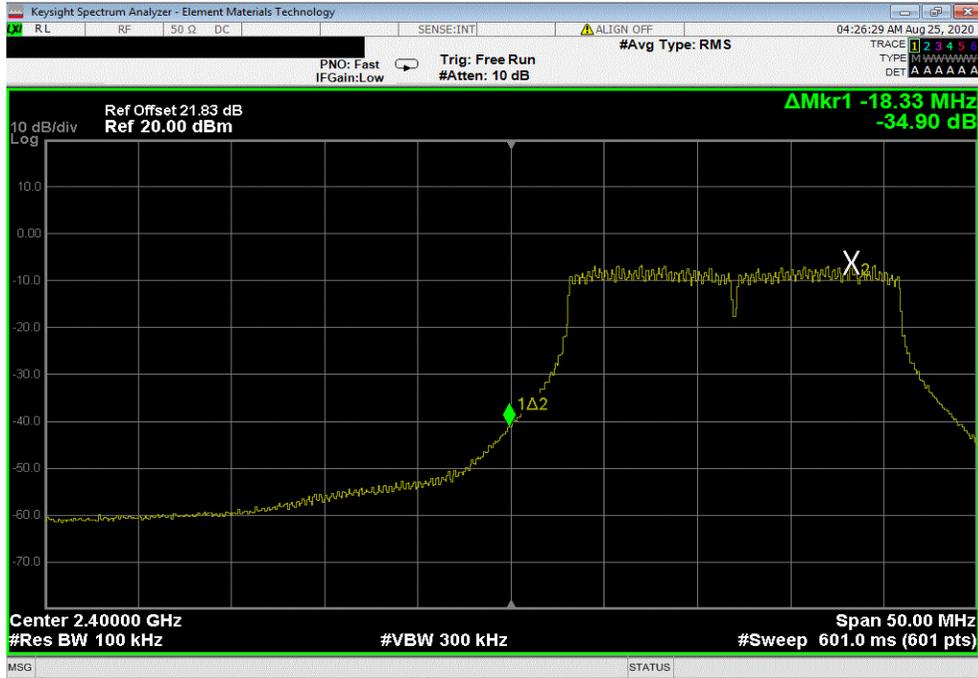


# BAND EDGE COMPLIANCE



TbTx 2019.08.30.0 XMI 2020.03.25.0

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz						
	Value (dBc)	Limit ≤ (dBc)	Result			
	-34.9	-30	Pass			



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz						
	Value (dBc)	Limit ≤ (dBc)	Result			
	-47.93	-30	Pass			

