



Glowforge Incorporated

GFD200

FCC 15.247:2023

RSS-247 Issue 2:2017

RSS-Gen Issue 5:2018+A1:2019+A2:2021

Wi-Fi 802.11 b/g/n SISO radio

Report: GLOW0038.0 Rev. 2, Issue Date: May 2, 2023



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CERTIFICATE OF TEST

Last Date of Test: April 19, 2023

Glowforge Incorporated

EUT: GFD200

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2023	ANSI C63.10:2013, FCC KDB 558074 v05r02:2019
FCC 15.247:2023	ANSI C63.10:2013, FCC KDB 558074 v05r02:2019
RSS-247 Issue 2:2017	ANSI C63.10:2013
RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013

Results

Test Description	Result	Specification Section(s)	Method Section(s)	Comments
Powerline Conducted Emissions	Pass	15.207, RSS-Gen 8.8	6.2	
Duty Cycle	N/A	KDB 558074 -6.0, RSS-Gen 3.2	11.6	Operates at 100%.
DTS Bandwidth	Pass	15.247(a)(2), KDB 558074 - 8.2, RSS-247 5.2(a)	11.8.2	
Occupied Bandwidth	Pass	KDB 558074 -2.1, RSS-Gen 6.7	6.9.3	
Output Power	Pass	15.247(b)(3), KDB 558074 - 8.3.2, RSS-247 5.4(d, f), RSS-Gen 6.12	11.9.2.2.4	
Equivalent Isotropic Radiated Power (EIRP)	Pass	15.247(b)(3), KDB 558074 - 8.3.2, RSS-247 5.4(d, f), RSS-Gen 6.12	11.9.2.2.4	
Power Spectral Density	Pass	15.247(e), KDB 558074 -8.4, RSS-247 5.2(b)	11.10.2	
Band Edge Compliance	Pass	15.247(d), KDB 558074 -8.5, RSS-247 5.5	11.11	
Spurious Conducted Emissions	Pass	15.247(d), KDB 558074 -8.5, RSS-247 5.5	11.11	
Spurious Radiated Emissions	Pass	15.247(d), KDB 558074 - 8.6, 8.7, RSS-247 5.5, RSS-Gen 6.13, 8.10	11.12.1, 11.13.2, 6.5, 6.6	

Deviations From Test Standards

None

Approved By:



Cole Ghizzone, Department Manager

Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information. As indicated in the Statement of Work sent with the quotation, Element's standard process is to always use the latest published version of the test methods even when earlier versions are cited in the test specification. Issuance of a purchase order was de facto acceptance of this approach. Otherwise, the client would have advised Element in writing of the specific version of the test methods they wanted applied to the subject testing.

REVISION HISTORY

Revision Number	Description	Date (yyyy-mm-dd)	Page Number
01	Updated the standard to current year	2023-04-21	Throughout the report
01	Added Cal dates for Cable Assembly and HPF on test description page	2023-04-21	14
01	Resting completed to update testing modes	2023-04-21	29-32, 61-64, 77-80, 93-96, 107-108, 135-144, 156-161
01	Updated test description	2023-04-21	52, 68, 84
01	Updated Modulation types	2023-04-21	11
02	Fixed Calibration dates	2023-05-02	14, 20, 36, 52, 68, 84, 100, 111, 155-162
02	Updated Testing dates to reflect new retesting data	2023-05-02	13
02	Updated the last testing date	2023-05-02	10

ACCREDITATIONS AND AUTHORIZATIONS



United States

FCC - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

A2LA - Each laboratory is accredited by A2LA to ISO / IEC 17025, and as a product certifier to ISO / IEC 17065 which allows Element to certify transmitters to FCC and IC specifications.

Canada

ISED - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB) and as a CAB for the acceptance of test data.

European Union

European Commission – Recognized as an EU Notified Body validated for the EMCD and RED Directives.

United Kingdom

BEIS – Recognized by the UK as an Approved Body under the UK Radio Equipment and UK EMC Regulations.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

MSIT / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

BSMI – Recognized by BSMI as a CAB for the acceptance of test data.

NCC - Recognized by NCC as a CAB for the acceptance of test data.

Singapore

IDA – Recognized by IDA as a CAB for the acceptance of test data.

Israel

MOC – Recognized by MOC as a CAB for the acceptance of test data.

Hong Kong

OFCA – Recognized by OFCA as a CAB for the acceptance of test data.

Vietnam

MIC – Recognized by MIC as a CAB for the acceptance of test data.

SCOPE

For details on the Scopes of our Accreditations, please visit:

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FACILITIES



California Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Minnesota Labs MN01-11 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Oregon Labs EV01-12 6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	Texas Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Washington Labs NC01-05 19201 120 th Ave NE Bothell, WA 98011 (425)984-6600
A2LA				
Lab Code: 3310.04	Lab Code: 3310.05	Lab Code: 3310.02	Lab Code: 3310.03	Lab Code: 3310.06
Innovation, Science and Economic Development Canada				
2834B-1, 2834B-3	2834E-1, 2834E-3	2834D-1	2834G-1	2834F-1
BSMI				
SL2-IN-E-1154R	SL2-IN-E-1152R	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI				
A-0029	A-0109	A-0108	A-0201	A-0110
Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA				
US0158	US0175	US0017	US0191	US0157



MEASUREMENT UNCERTAINTY

Measurement Uncertainty

When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found in the table below. A lab specific value may also be found in the applicable test description section. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-2 as applicable), and are available upon request.

The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

Test	+ MU	- MU
Frequency Accuracy	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	1.2 dB	-1.2 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	3.1 dB	-3.1 dB

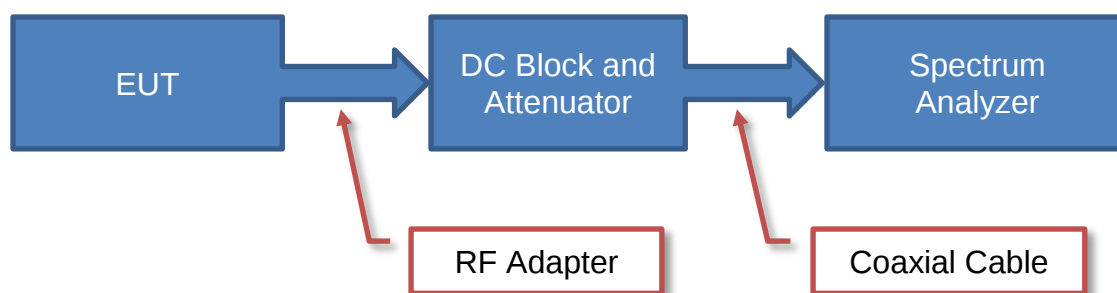
TEST SETUP BLOCK DIAGRAMS

Measurement Bandwidths

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

Unless otherwise stated, measurements were made using the bandwidths and detectors specified. No video filter was used.

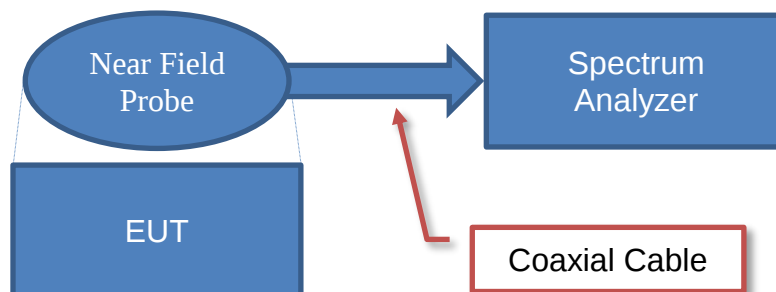
Antenna Port Conducted Measurements



Sample Calculation (logarithmic units)

Measured Value		Measured Level		Reference Level Offset
71.2	=	42.6	+	28.6

Near Field Test Fixture Measurements

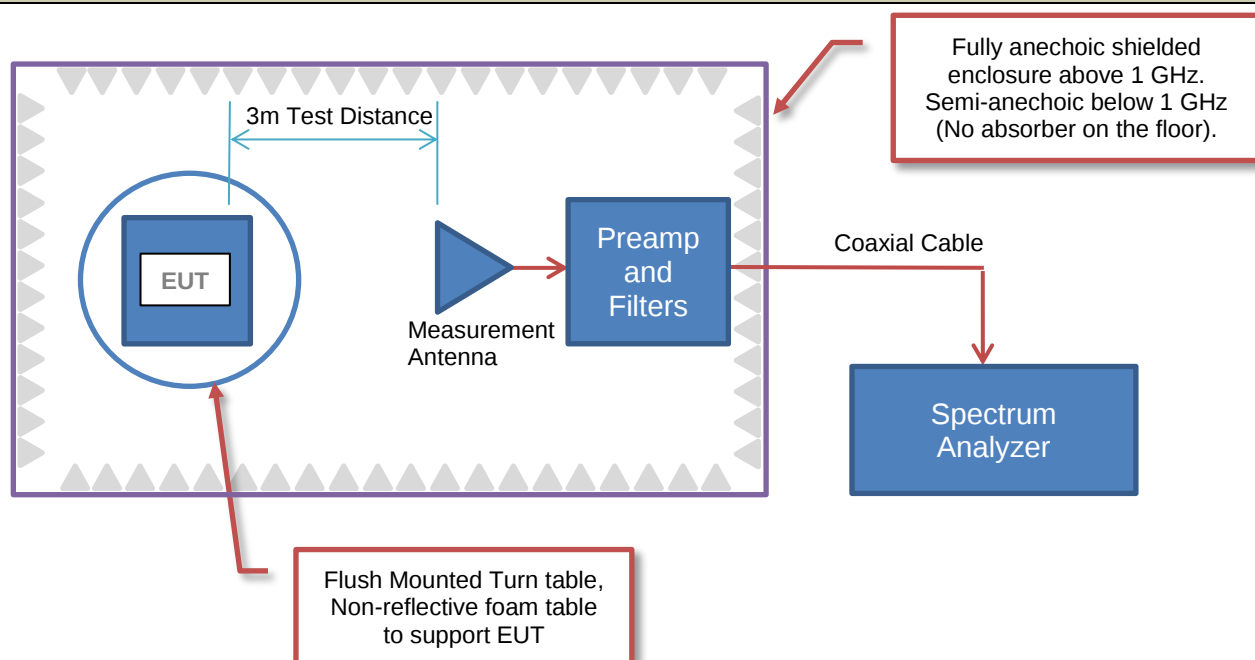


Sample Calculation (logarithmic units)

Measured Value		Measured Level		Reference Level Offset
71.2	=	42.6	+	28.6

TEST SETUP BLOCK DIAGRAMS

Emissions Measurements



Sample Calculation (logarithmic units)

Radiated Emissions:

Measured Level (Amplitude)	Factor			Distance Adjustment Factor	External Attenuation	Field Strength
	Antenna Factor	Cable Factor	Amplifier Gain			
42.6	28.6	3.1	40.8	0.0	0.0	33.5

Conducted Emissions:

Measured Level (Amplitude)	Factor		External Attenuation	Adjusted Level
	Transducer Factor	Cable Factor		
26.7	0.3	0.1	20.0	47.1

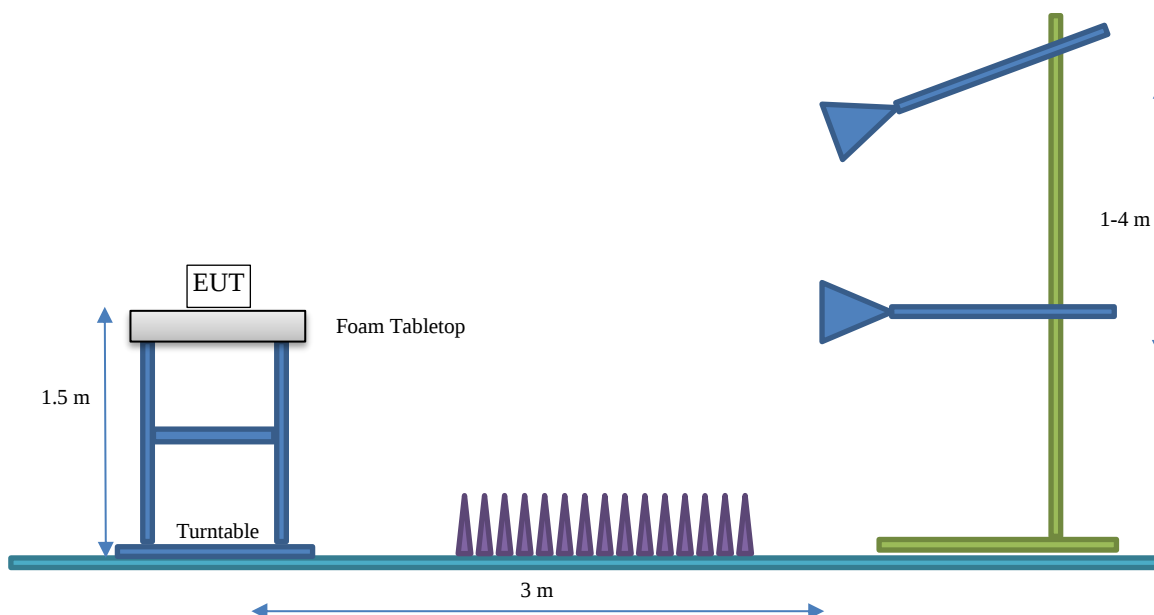
Radiated Power (ERP/EIRP) – Substitution Method:

Measured Level into Substitution Antenna (Amplitude dBm)	Substitution Antenna Factor (dBi)	EIRP to ERP (if applicable)	Measured power (dBm ERP/EIRP)
10.0	6.0	2.15	13.9/16.0

TEST SETUP BLOCK DIAGRAMS

Bore Sighting (>1GHz)

The diameter of the illumination area is the dimension of the line tangent to the EUT formed by 3 dB beamwidth of the measurement antenna at the measurement distance. At a 3 meter test distance, the diameter of the illumination area was 3.8 meters at 1 GHz and greater than 2.1 meters up to 6 GHz. Above 1 GHz, when required by the measurement standard, the antenna is pointed for both azimuth and elevation to maintain the receive antenna within the cone of radiation from the EUT. The specified measurement detectors were used for comparison of the emissions to the peak and average specification limits.



PRODUCT DESCRIPTION



Client and Equipment under Test (EUT) Information

Company Name:	Glowforge Incorporated
Address:	1938 Occidental Avenue S Suite C
City, State, Zip:	Seattle, WA 98134
Test Requested By:	Nick Woolger
EUT:	GFD200
First Date of Test:	January 25, 2023
Last Date of Test:	April 19, 2023
Receipt Date of Samples:	January 25, 2023
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:

3D Laser Printer with Bluetooth and Wi-Fi radios.

Testing Objective:

To demonstrate compliance of the Wi-Fi 802.11 b/g/n SISO radio under FCC 15.247/RSS-247 for operation in the 2.4 GHz band.

POWER SETTINGS AND ANTENNAS



The power settings, antenna gain value(s) and cable loss (if applicable) used for the testing contained in this report were provided by the customer and will affect the validity of the results. Element assumes no responsibility for the accuracy of this information. The power settings below reflect the maximum power that the EUT is allowed to transmit at during normal operation.

ANTENNA GAIN (dBi)

Type	Provided by:	Frequency Range (MHz)	Gain (dBi)
PIFA	ProAnt	2400 – 2500	4.9

The EUT was tested using the power settings provided by the manufacturer which were based upon:

- ☒ Test software settings Test software/firmware installed on EUT: emitest-v0.9.4a
- ☐ Rated power settings

SETTINGS FOR ALL TESTS IN THIS REPORT

Modulation Type	Data rates	Channel Bandwidths (MHz)	20 MHz Channels	Channel Position*	Frequency Range (MHz)	Power Setting
802.11b DSSS/CCK	1 Mbps	20	1, 6, 11	Low, Mid, High	2400-2483.5	38
	11 Mbps	20	1, 6, 11	Low, Mid, High	2400-2483.5	38
802.11g OFDM	6 Mbps	20	1, 6, 11	Low, Mid, High	2400-2483.5	38
	36 Mbps	20	1, 6, 11	Low, Mid, High	2400-2483.5	38
	54 Mbps	20	1, 6, 11	Low, Mid, High	2400-2483.5	38
802.11n OFDM	MCS0	20, 40	1, 6, 11	Low, Mid, High	2400-2483.5	38
	MCS7	20, 40	1, 6, 11	Low, Mid, High	2400-2483.5	38

CONFIGURATIONS

Configuration GLOW0038-1

Software/Firmware Running During Test	
Description	Version
Firmware provided by manufacturer	emitest-v0.9.4a

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Laser Printer	Glowforge	GFD200	MB2-398

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Laptop	Dell	XPS	N/A
Manufactured interface board	Glowforge	GF-ECA-01595	N/A

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC cable	None	3 m	None	EUT	AC power
USB-C-to-USB-C	None	1 m	None	Manufactured interface board	Laptop
White FFC cable	None	1 m	None	EUT	Manufactured interface board

Configuration GLOW0038-2

Software/Firmware Running During Test	
Description	Version
Firmware provided by manufacturer	emitest-v0.9.4a

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Laser Printer	Glowforge	GFD200	XB2-839

Peripherals in Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Laptop	Dell	XPS	N/A
Manufactured interface board	Glowforge	GF-ECA-01595	N/A

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC cable	None	3 m	None	EUT	AC power
USB-C-to-USB-C	None	1 m	None	Manufactured interface board	Laptop
White FFC cable	None	1 m	None	EUT	Manufactured interface board

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2023-04-19	Band Edge Compliance	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
2	2023-01-26	Spurious Radiated Emissions	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
3	2023-04-19	Emission Bandwidth	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
4	2023-04-19	Equivalent Isotropic Radiated Power (EIRP)	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
5	2023-04-19	Occupied Bandwidth	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
6	2023-04-19	Output Power	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
7	2023-04-19	Power Spectral Density	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
8	2023-04-19	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
9	2023-02-03	Powerline Conducted Emissions	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWERLINE CONDUCTED EMISSIONS

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Per the standard, an insulating material was also added to ground plane between the EUT's power and remote I/O cables. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50ohm measuring port is terminated by a 50ohm EMI meter or a 50ohm resistive load. All 50ohm measuring ports of the LISN are terminated by 50ohm. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Receiver	Rohde & Schwarz	ESCI	ARE	2022-11-02	2023-11-02
LISN	Solar Electronics	9252-50-R-24-BNC	LIM	2022-07-05	2023-07-05
Cable - Conducted Cable Assembly	Northwest EMC	NC4, HHF, TYL	NC4A	2022-02-16	2023-02-16

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	3.1 dB	-3.1 dB

CONFIGURATIONS INVESTIGATED

GLOW0038-1

MODES INVESTIGATED

Transmitting 802.11. Channel 6 = 2437 MHz, 1 Mbps, power setting = 38

POWERLINE CONDUCTED EMISSIONS

EUT:	GFD200	Work Order:	GLOW0038
Serial Number:	MB2-398	Date:	2023-02-03
Customer:	Glowforge Incorporated	Temperature:	20.5°C
Attendees:	Jason Bluhm	Relative Humidity:	28.6%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mb
Tested By:	Harry Zhao	Job Site:	NC05
Power:	120VAC/60Hz	Configuration:	GLOW0038-1

TEST SPECIFICATIONS

Specification: Equipment Class B	Method:
FCC 15.207:2023	ANSI C63.10:2013
RSS-247 Issue 2:2017	ANSI C63.10:2013
RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013

TEST PARAMETERS

Run #:	10	Line:	High Line	Add. Ext. Attenuation (dB):	0
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COMMENTS

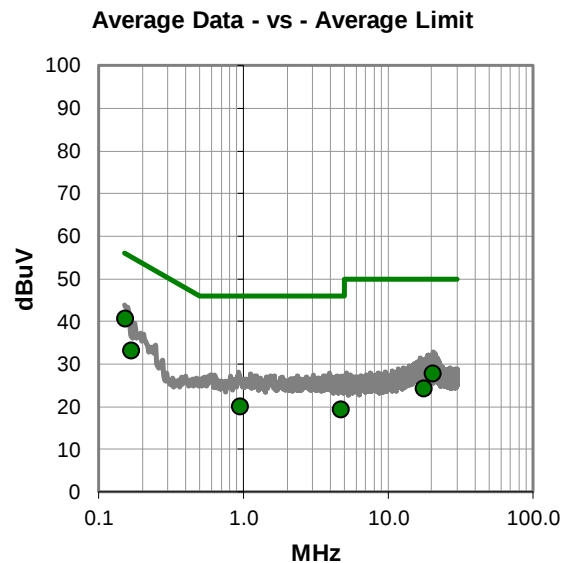
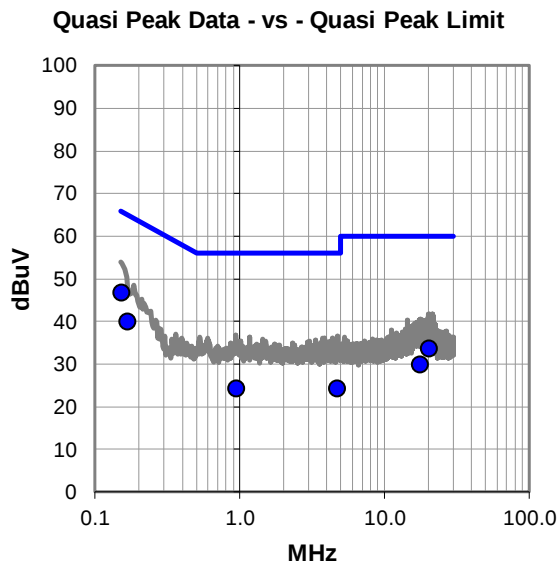
None

EUT OPERATING MODES

Transmitting 802.11b. Channel 6 = 2437 MHz, 1 Mbps, power setting = 38
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DEVIATIONS FROM TEST STANDARD

None



POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #10

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.153	26.1	20.8	46.9	65.9	-19.0
0.168	19.4	20.6	40.0	65.1	-25.1
20.446	12.0	21.6	33.6	60.0	-26.4
17.644	8.6	21.4	30.0	60.0	-30.0
4.737	3.6	20.8	24.4	56.0	-31.6
0.942	3.7	20.5	24.2	56.0	-31.8

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.153	19.9	20.8	40.7	55.9	-15.2
0.168	12.7	20.6	33.3	55.1	-21.8
20.446	6.3	21.6	27.9	50.0	-22.1
17.644	3.0	21.4	24.4	50.0	-25.6
0.942	-0.3	20.5	20.2	46.0	-25.8
4.737	-1.4	20.8	19.4	46.0	-26.6

CONCLUSION

Pass



Tested By

POWERLINE CONDUCTED EMISSIONS

EUT:	GFD200	Work Order:	GLOW0038
Serial Number:	MB2-398	Date:	2023-02-03
Customer:	Glowforge Incorporated	Temperature:	20.5°C
Attendees:	Jason Bluhm	Relative Humidity:	28.6%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mb
Tested By:	Harry Zhao	Job Site:	NC05
Power:	120VAC/60Hz	Configuration:	GLOW0038-1

TEST SPECIFICATIONS

Specification: Equipment Class B	Method:
FCC 15.207:2023	ANSI C63.10:2013
RSS-247 Issue 2:2017	ANSI C63.10:2013
RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013

TEST PARAMETERS

Run #:	11	Line:	Neutral	Add. Ext. Attenuation (dB):	0
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COMMENTS

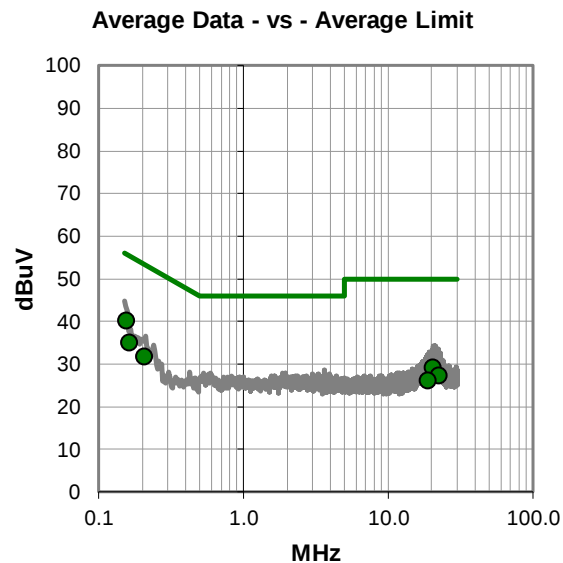
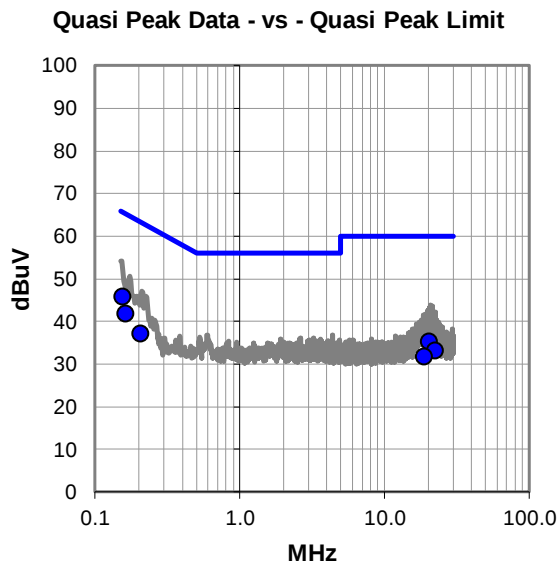
None

EUT OPERATING MODES

Transmitting 802.11b. Channel 6 = 2437 MHz, 1 Mbps, power setting = 38

DEVIATIONS FROM TEST STANDARD

None



POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #11

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.153	25.0	20.8	45.8	65.8	-20.0
0.163	21.2	20.7	41.9	65.3	-23.4
20.435	13.7	21.6	35.3	60.0	-24.7
0.205	16.8	20.5	37.3	63.4	-26.1
22.415	11.4	21.8	33.2	60.0	-26.8
18.667	10.3	21.5	31.8	60.0	-28.2

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.153	19.4	20.8	40.2	55.8	-15.6
0.163	14.3	20.7	35.0	55.3	-20.3
20.435	7.7	21.6	29.3	50.0	-20.7
0.205	11.2	20.5	31.7	53.4	-21.7
22.415	5.6	21.8	27.4	50.0	-22.6
18.667	4.6	21.5	26.1	50.0	-23.9

CONCLUSION

Pass



Tested By

DUTY CYCLE



TEST DESCRIPTION

The Duty Cycle (x) were 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.

The EUT operates at 100% Duty Cycle.

DTS BANDWIDTH



XMIT 2022.02.07.0

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
Block - DC	Weinschel Corp.	7006	AMS	2023-01-18	2024-01-18
Attenuator	S.M. Electronics	SA18H-20	REK	2022-02-15	2023-02-15
Cable	Micro-Coax	UFD150A-1-0720-200200	NCW	2023-01-18	2024-01-18
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	2023-01-19	2024-01-19
Generator - Signal	Agilent	N5183A	TIA	2022-06-25	2024-06-25
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAT	2022-11-03	2023-11-03
Attenuator	S.M. Electronics	SA18H-20	REK	2023-03-08	2024-03-08

TEST DESCRIPTION

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

The EUT was set to the channels and modes listed in the datasheet.

The 6dB DTS bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

DTS BANDWIDTH



TdTx 2022.06.03.0 XMit 2022.02.07.0

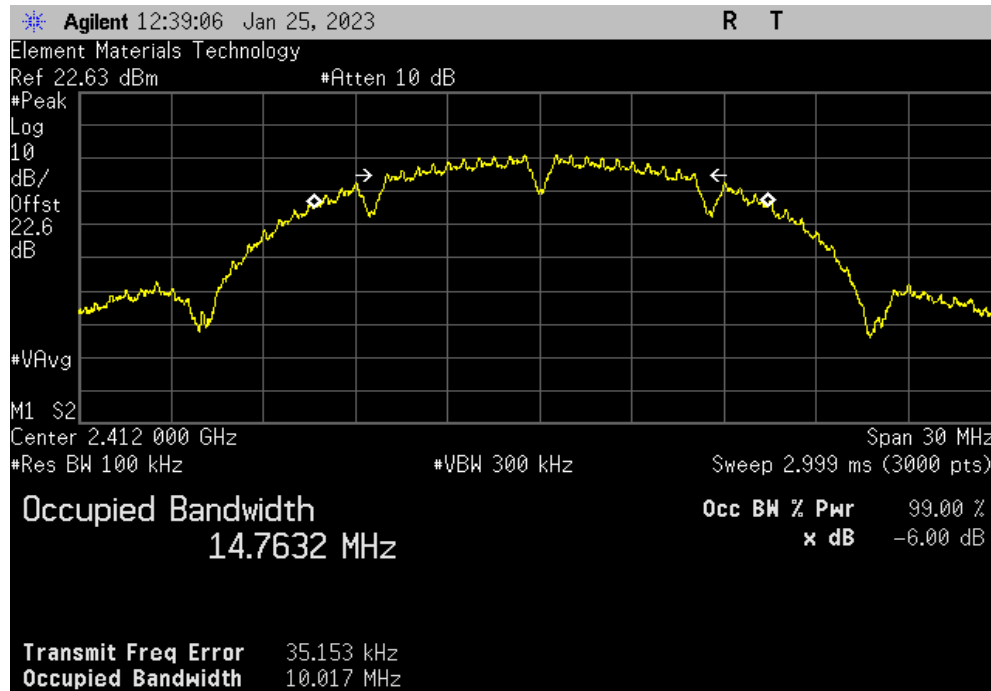
EUT: GFD200		Work Order: GLOW0038	
Serial Number: XB2-839		Date: 19-Apr-23	
Customer: Glowforge Incorporated		Temperature: 20.6 °C	
Attendees: Jason Bluhm		Humidity: 29.4% RH	
Project: None		Barometric Pres.: 1023 mbar	
Tested by: Harry Zhao		Power: 120VAC/60Hz	Job Site: NC06
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2023		ANSI C63.10:2013	
RSS-247 Issue 2:2017		ANSI C63.10:2013	
RSS-Gen Issue 5:2018+A1:2019+A2:2021		ANSI C63.10:2013	
COMMENTS			
Reference offset connection between EUT and Spectrum analyzer: DC Block + 20 dB attenuator + measurement cable + patched coax cable			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature 	
		Value	Limit (>) Result
20 MHz			
2400 MHz - 2483.5 MHz Band			
802.11(b) 1 Mbps			
Low Channel 1, 2412 MHz		10.017 MHz	500 kHz Pass
Mid Channel 6, 2437 MHz		10.031 MHz	500 kHz Pass
High Channel 11, 2462 MHz		10.051 MHz	500 kHz Pass
802.11(b) 11 Mbps			
Low Channel 1, 2412 MHz		10.1 MHz	500 kHz Pass
Mid Channel 6, 2437 MHz		8.623 MHz	500 kHz Pass
High Channel 11, 2462 MHz		8.667 MHz	500 kHz Pass
802.11(g) 6 Mbps			
Low Channel 1, 2412 MHz		16.551 MHz	500 kHz Pass
Mid Channel 6, 2437 MHz		16.522 MHz	500 kHz Pass
High Channel 11, 2462 MHz		16.515 MHz	500 kHz Pass
802.11(g) 36 Mbps			
Low Channel 1, 2412 MHz		16.489 MHz	500 kHz Pass
Mid Channel 6, 2437 MHz		16.504 MHz	500 kHz Pass
High Channel 11, 2462 MHz		16.504 MHz	500 kHz Pass
802.11(g) 54 Mbps			
Low Channel 1, 2412 MHz		16.489 MHz	500 kHz Pass
Mid Channel 6, 2437 MHz		16.506 MHz	500 kHz Pass
High Channel 11, 2462 MHz		16.522 MHz	500 kHz Pass
802.11(n) MCS0			
Low Channel 1, 2412 MHz		17.662 MHz	500 kHz Pass
Mid Channel 6, 2437 MHz		17.675 MHz	500 kHz Pass
High Channel 11, 2462 MHz		17.678 MHz	500 kHz Pass
802.11(n) MCS7			
Low Channel 1, 2412 MHz		17.767 MHz	500 kHz Pass
Mid Channel 6, 2437 MHz		17.763 MHz	500 kHz Pass
High Channel 11, 2462 MHz		17.737 MHz	500 kHz Pass
40 MHz			
2400 MHz - 2483.5 MHz Band			
802.11(n) MCS0			
Low Channel 1/5, 2422 MHz		36.368 MHz	500 kHz Pass
Mid Channel 4/8, 2437 MHz		36.379 MHz	500 kHz Pass
High Channel 7/11, 2452 MHz		36.355 MHz	500 kHz Pass
802.11(n) MCS7			
Low Channel 1/5, 2422 MHz		36.392 MHz	500 kHz Pass
Mid Channel 4/8, 2437 MHz		36.367 MHz	500 kHz Pass
High Channel 7/11, 2452 MHz		36.35 MHz	500 kHz Pass

DTS BANDWIDTH

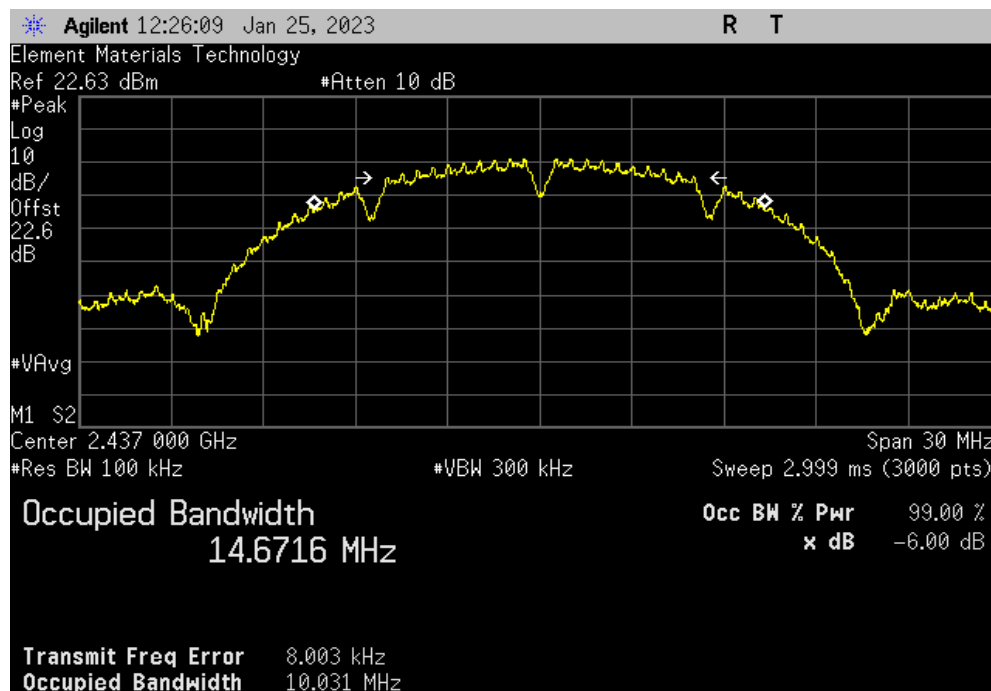


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
				Value	Limit	Result
				10.017 MHz	(>) 500 kHz	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz						
				Value	Limit	Result
				10.031 MHz	(>) 500 kHz	Pass

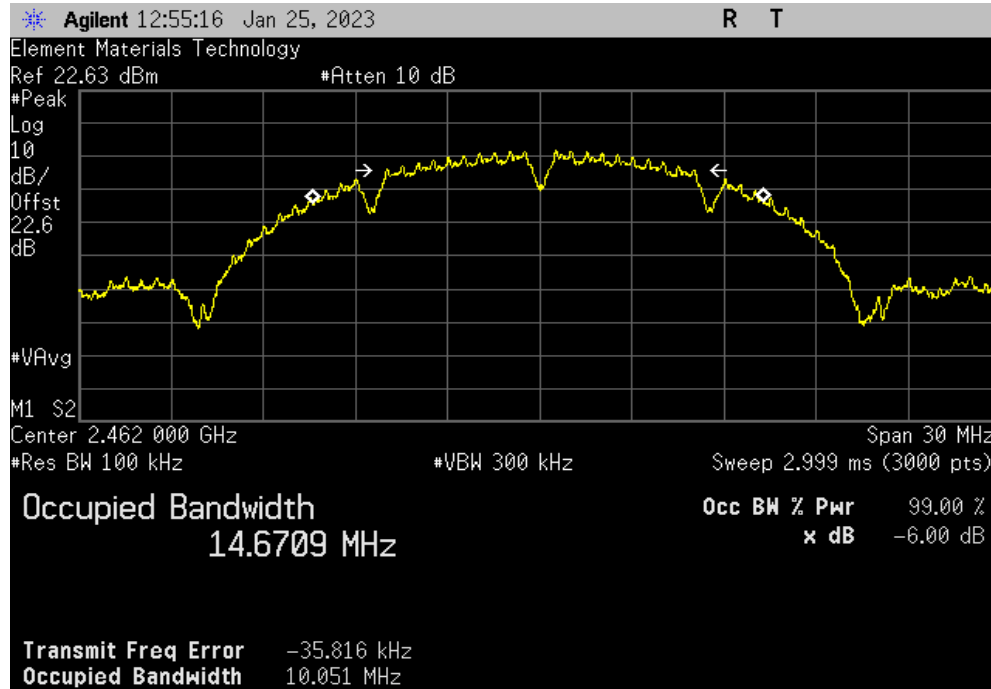


DTS BANDWIDTH

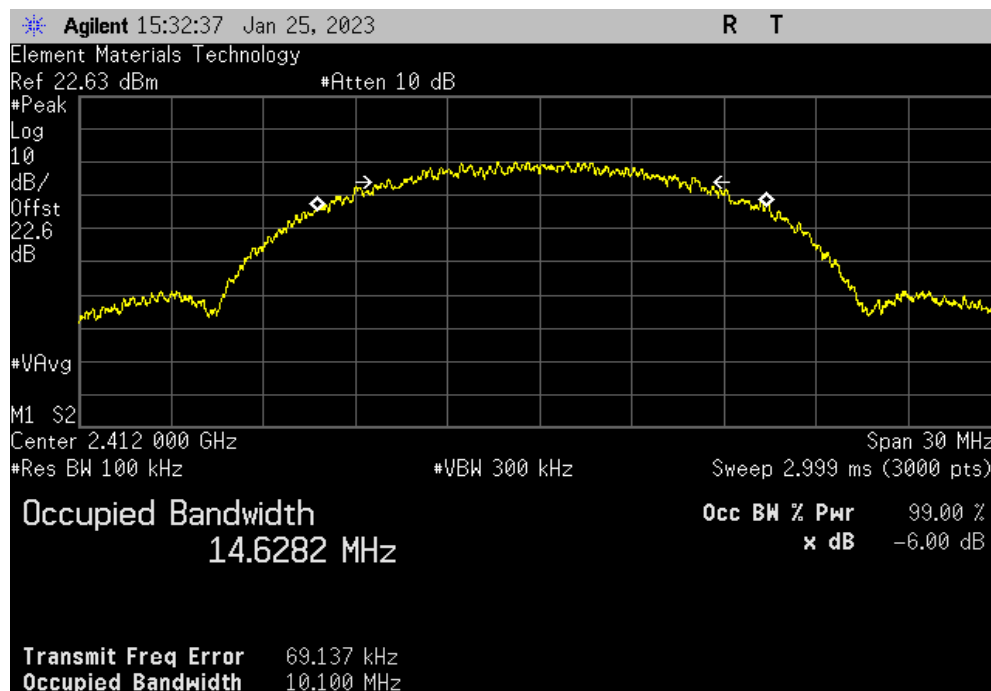


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
				Value	Limit	Result
				10.051 MHz	(>) 500 kHz	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
				Value	Limit	Result
				10.1 MHz	(>) 500 kHz	Pass

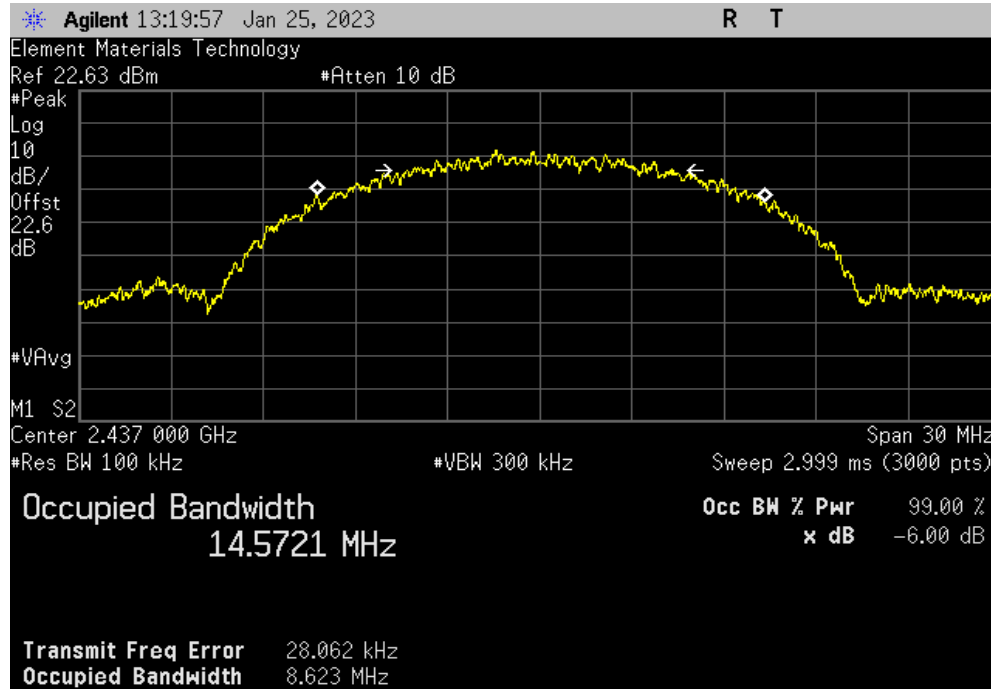


DTS BANDWIDTH

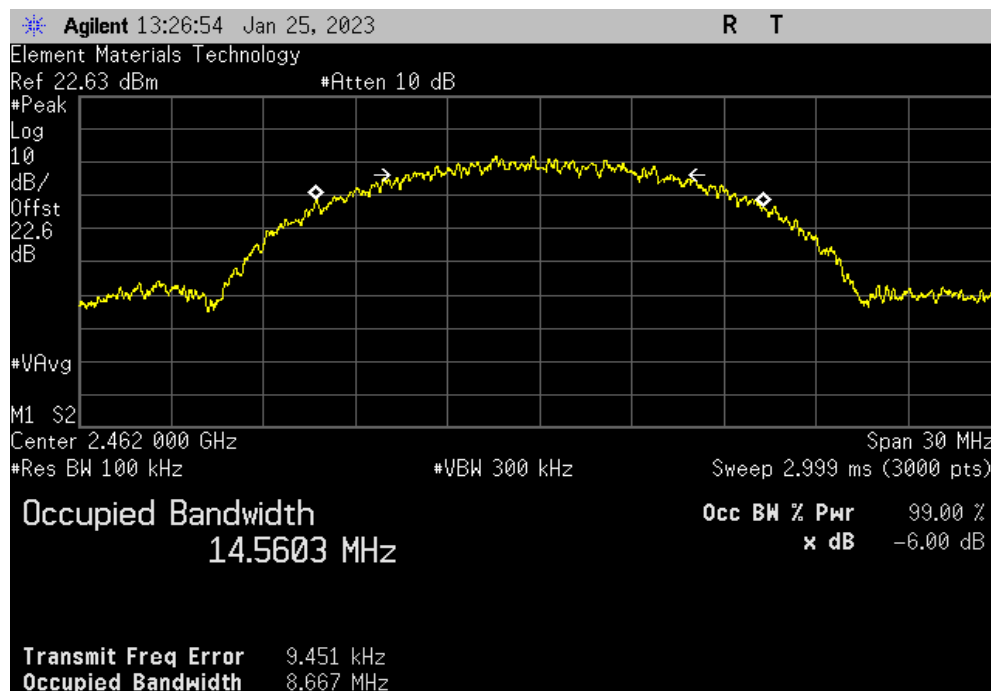


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz						
				Value	Limit	Result
				8.623 MHz	(>) 500 kHz	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
				Value	Limit	Result
				8.667 MHz	(>) 500 kHz	Pass

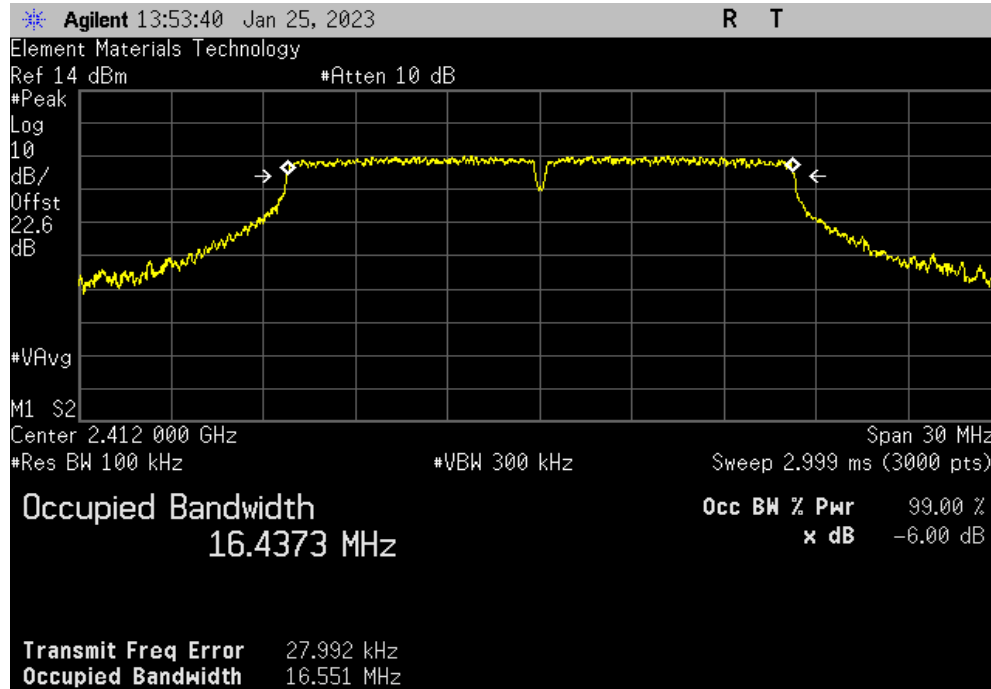


DTS BANDWIDTH

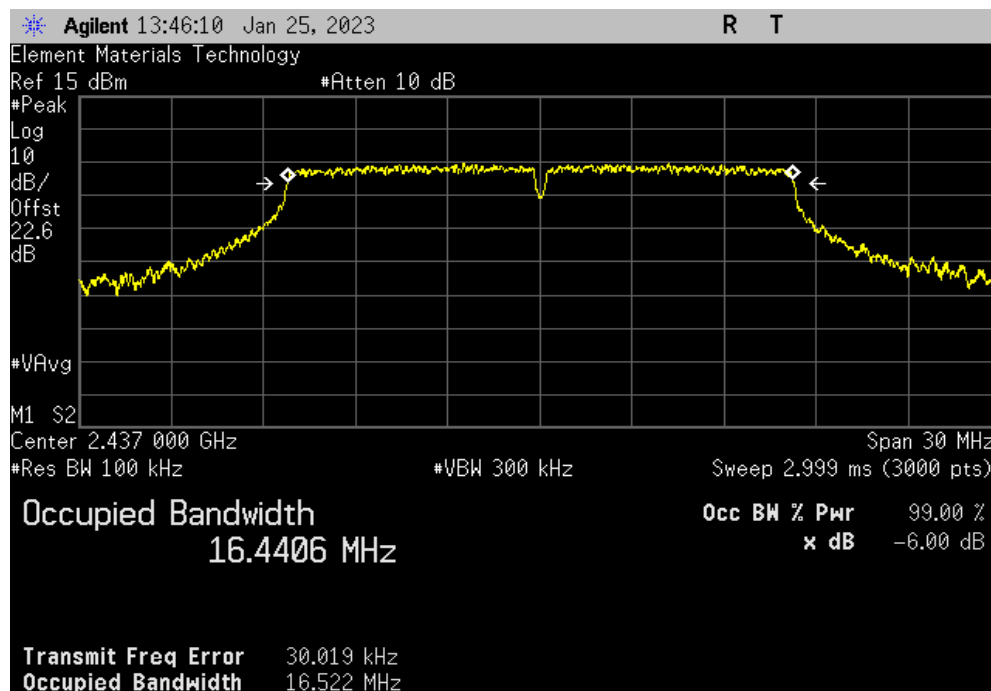


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
				Value	Limit	Result
				16.551 MHz	(>) 500 kHz	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz						
				Value	Limit	Result
				16.522 MHz	(>) 500 kHz	Pass

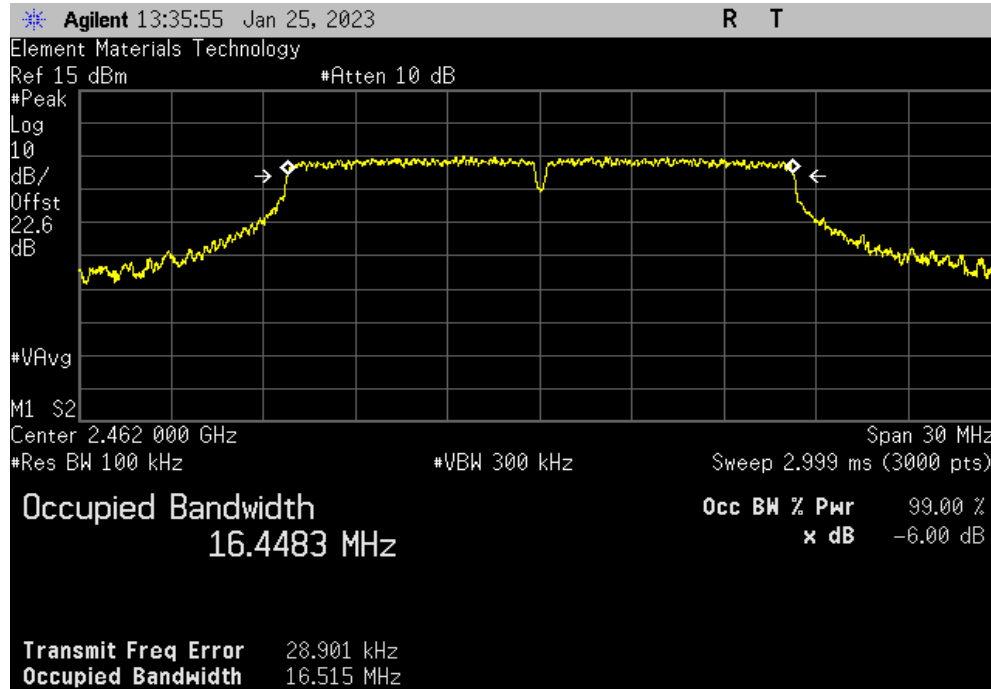


DTS BANDWIDTH

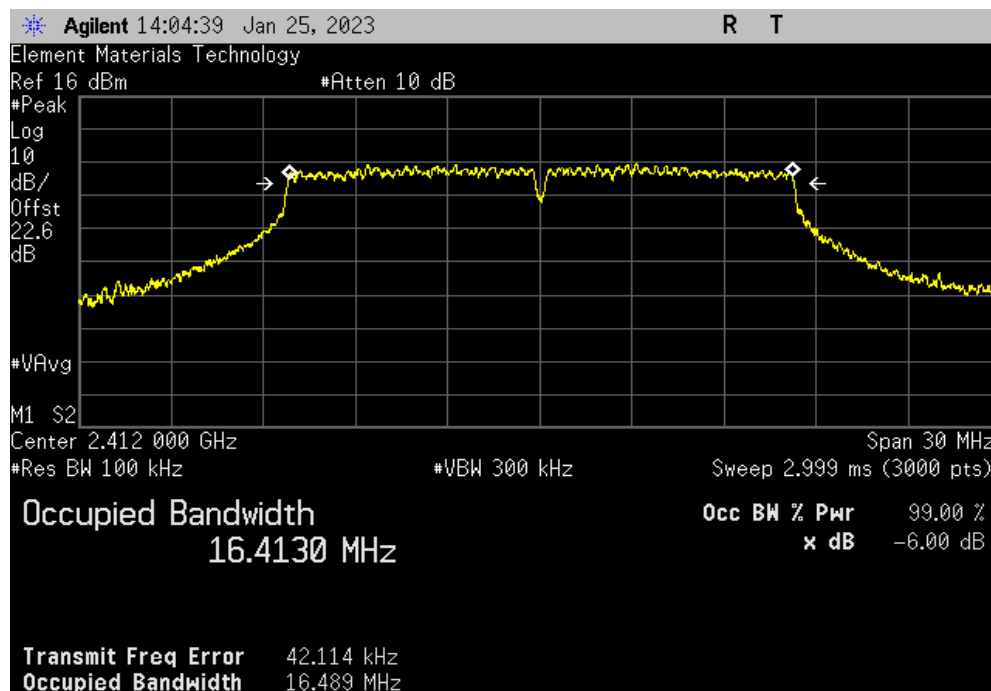


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
				Value	Limit	Result
				16.515 MHz	(>) 500 kHz	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
				Value	Limit	Result
				16.489 MHz	(>) 500 kHz	Pass

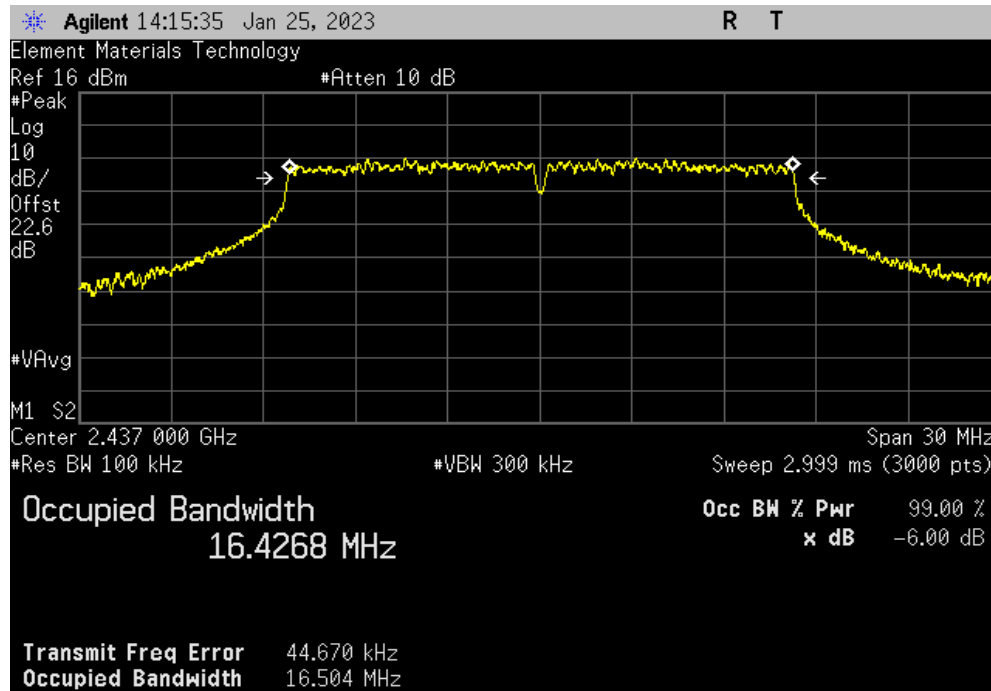


DTS BANDWIDTH

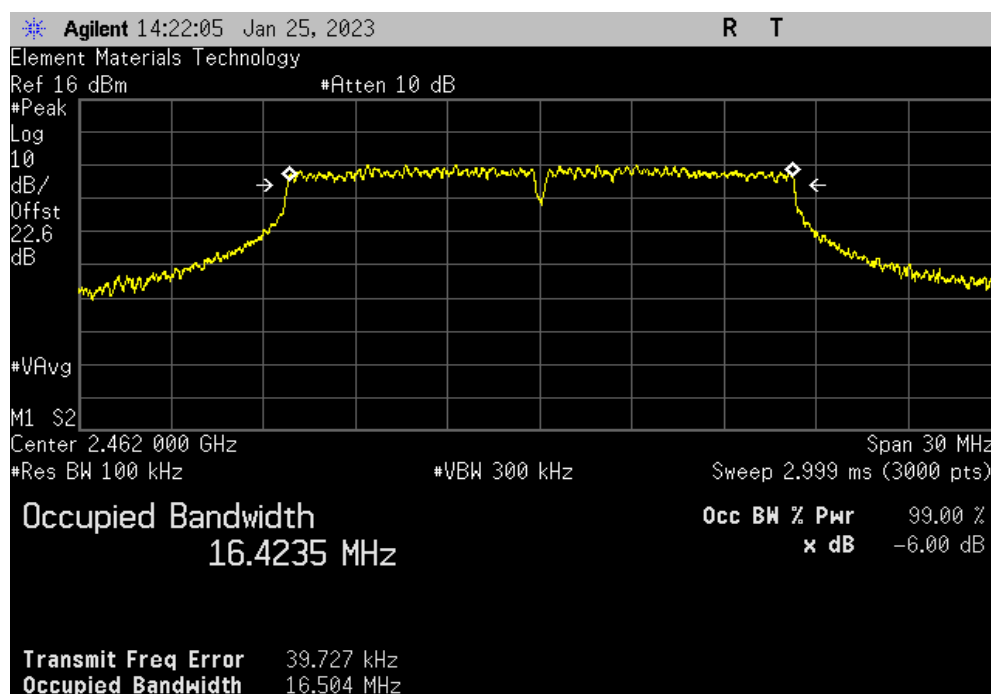


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz						
				Value	Limit	Result
				16.504 MHz	(>) 500 kHz	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
				Value	Limit	Result
				16.504 MHz	(>) 500 kHz	Pass

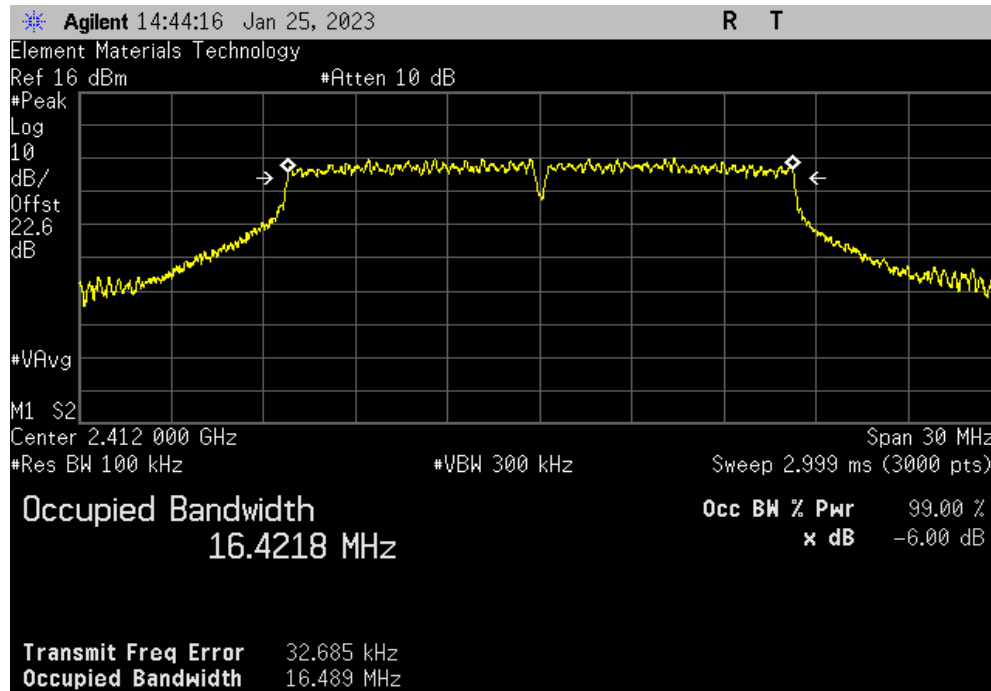


DTS BANDWIDTH

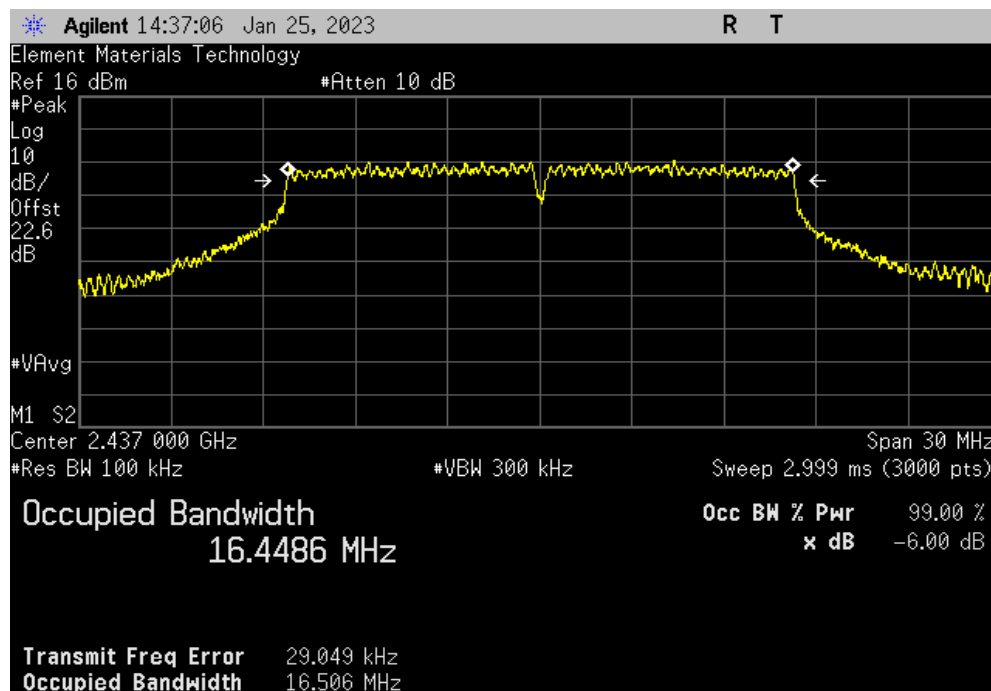


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
				Value	Limit	Result
				16.489 MHz	(>) 500 kHz	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz						
				Value	Limit	Result
				16.506 MHz	(>) 500 kHz	Pass

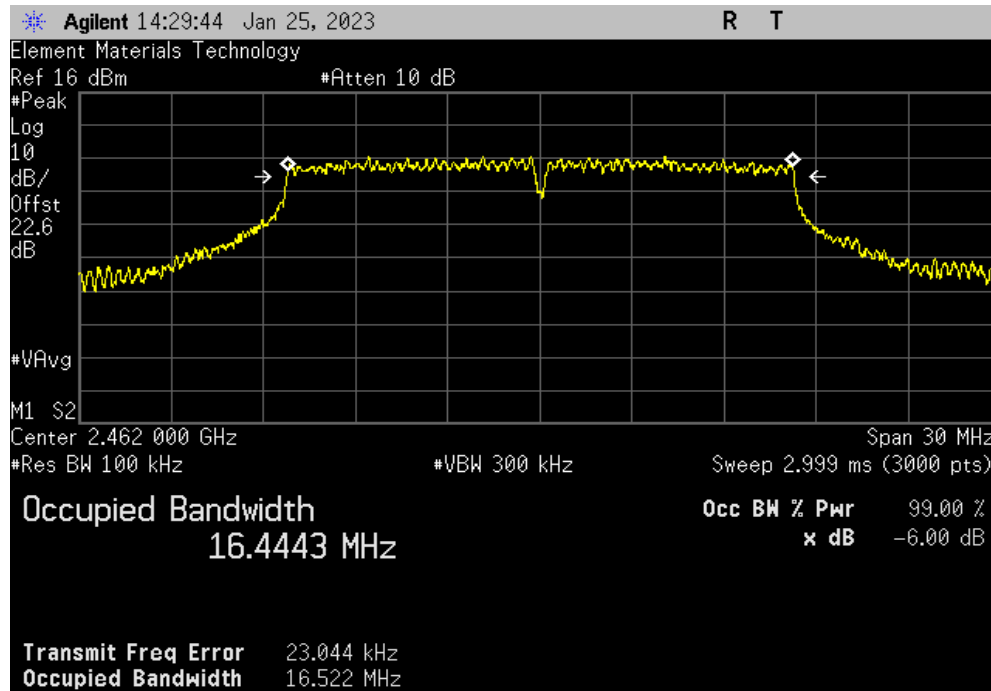


DTS BANDWIDTH

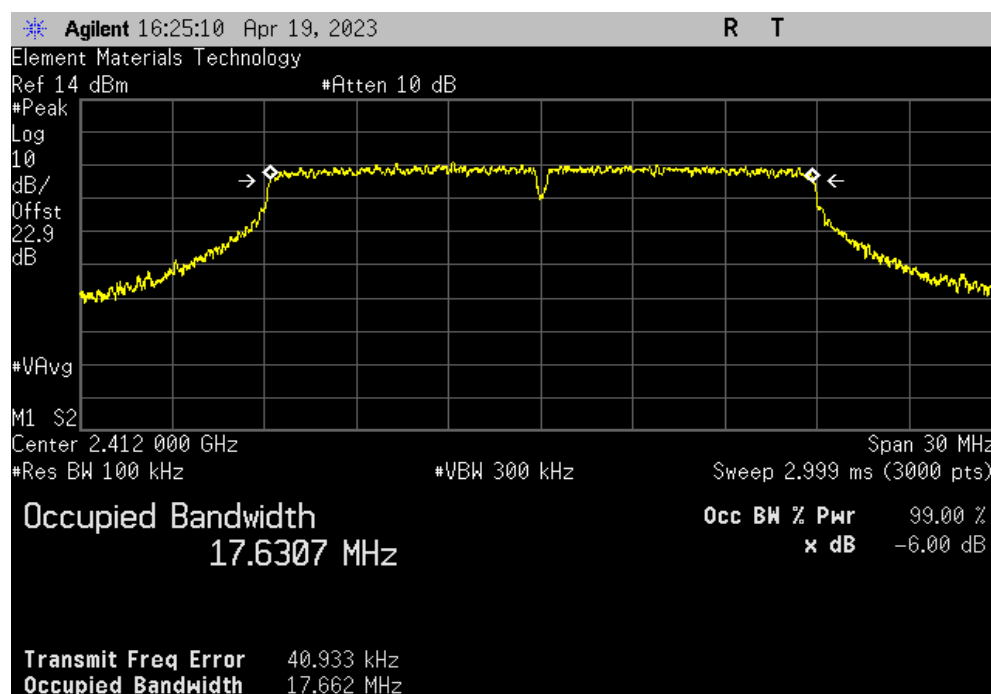


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
				Value	Limit	Result
				16.522 MHz	(>) 500 kHz	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz						
				Value	Limit	Result
				17.662 MHz	(>) 500 kHz	Pass

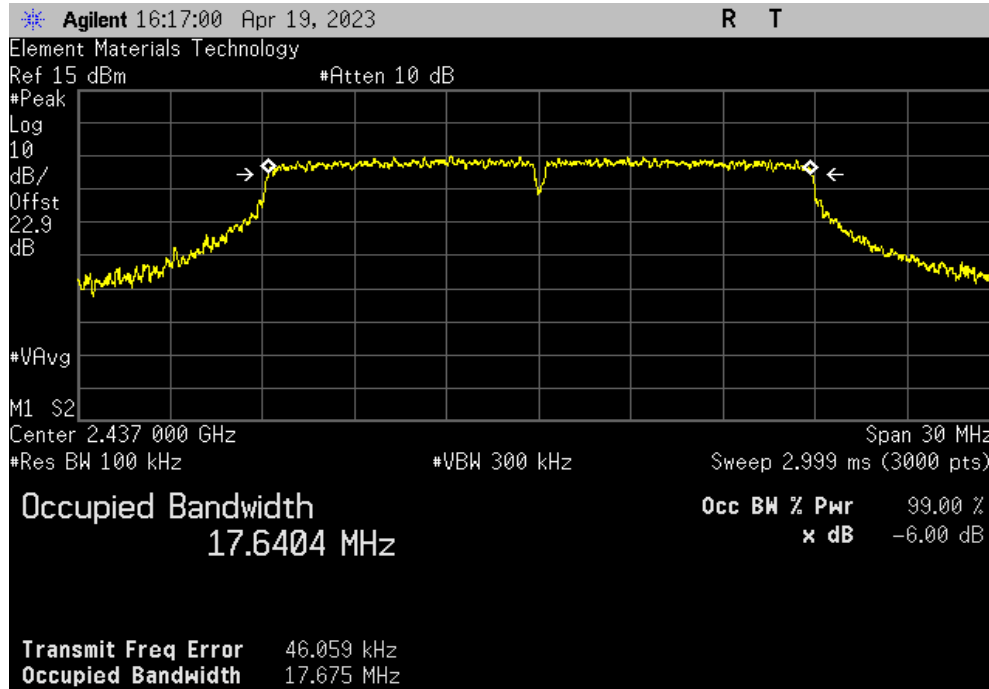


DTS BANDWIDTH

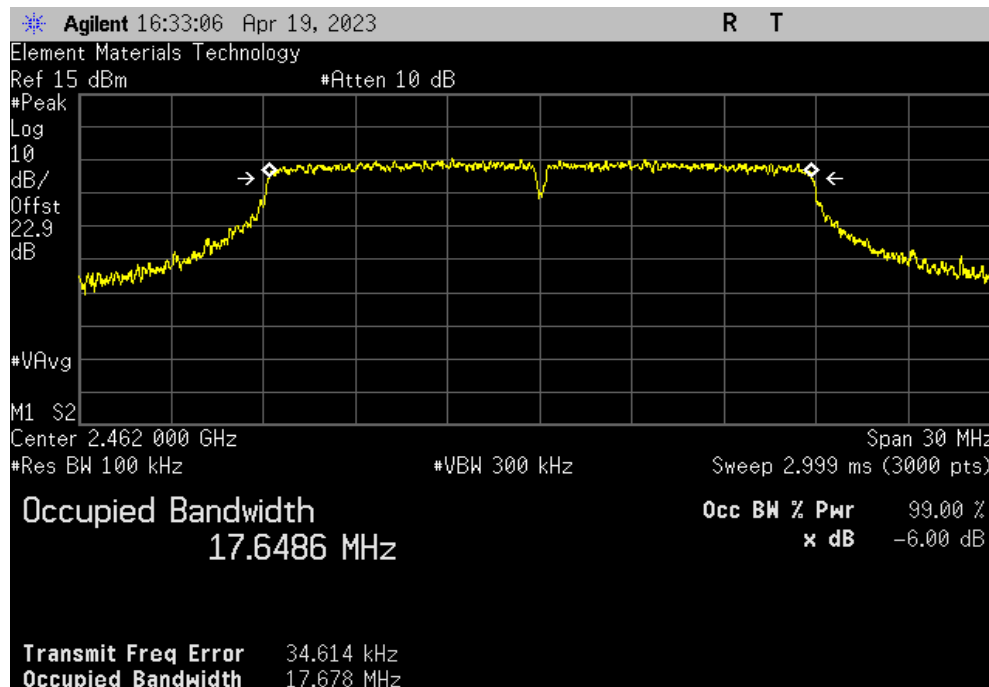


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz						
				Value	Limit	Result
				(>)		
				17.675 MHz	500 kHz	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz						
				Value	Limit	Result
				(>)		
				17.678 MHz	500 kHz	Pass

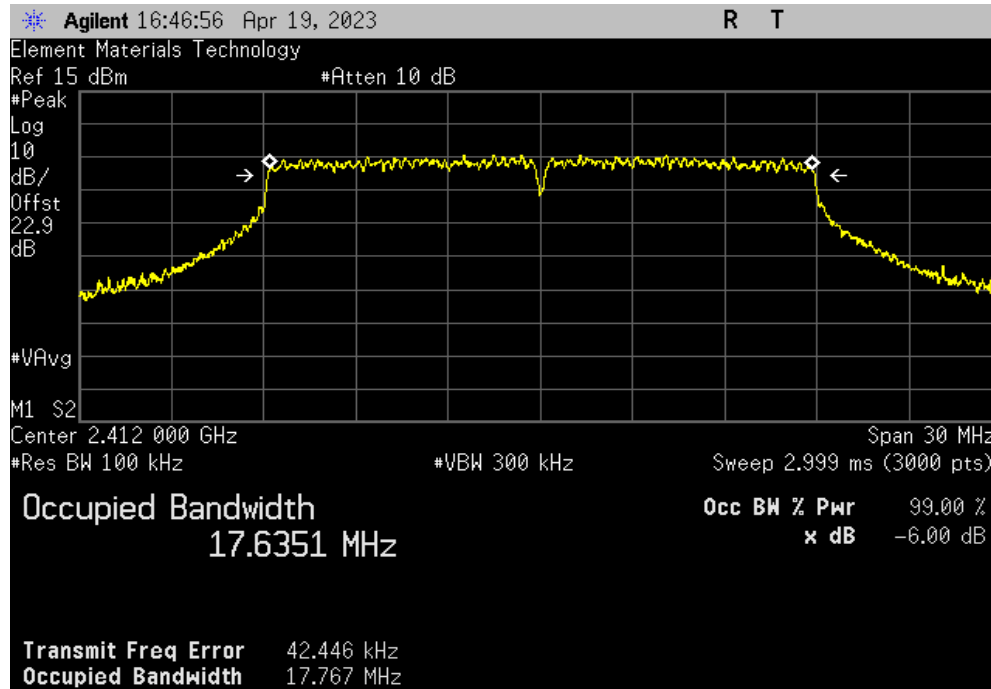


DTS BANDWIDTH

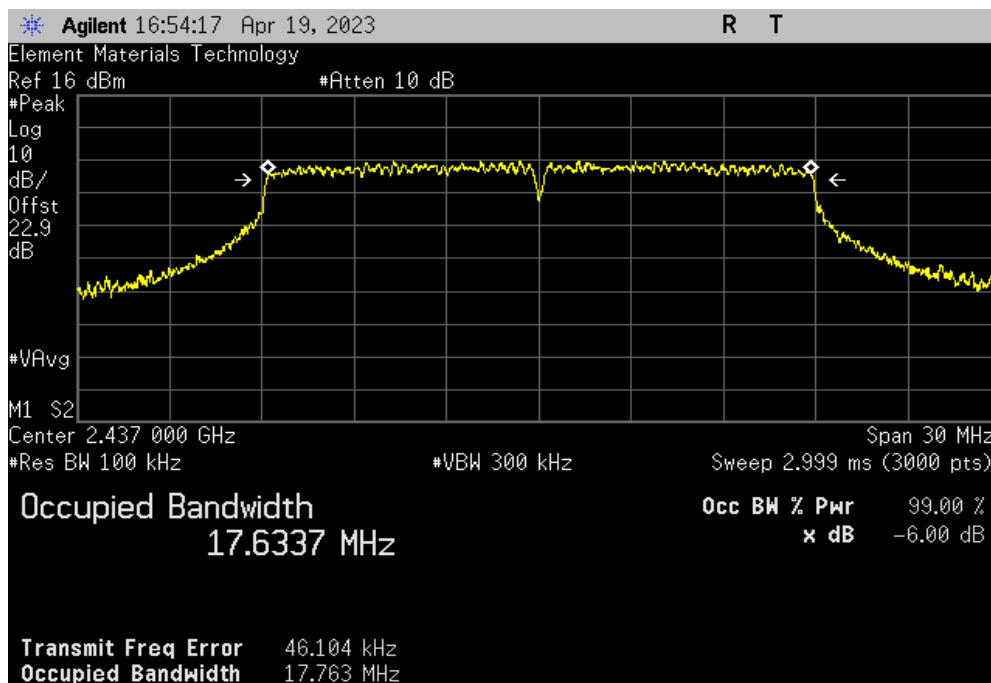


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz						
				Value	Limit	Result
				17.767 MHz	500 kHz	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz						
				Value	Limit	Result
				17.763 MHz	500 kHz	Pass

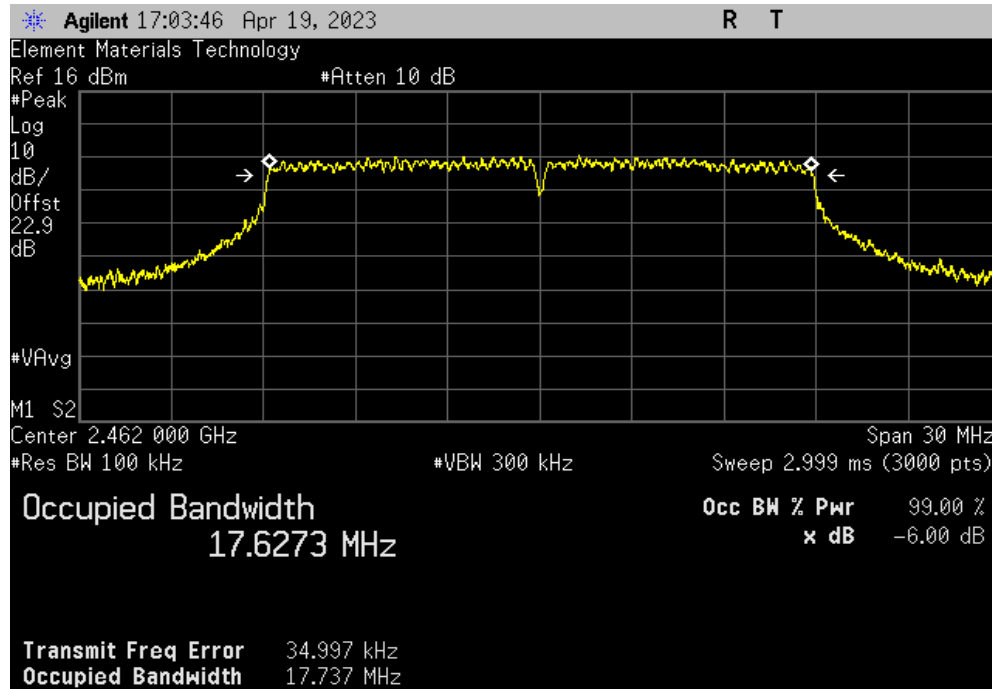


DTS BANDWIDTH

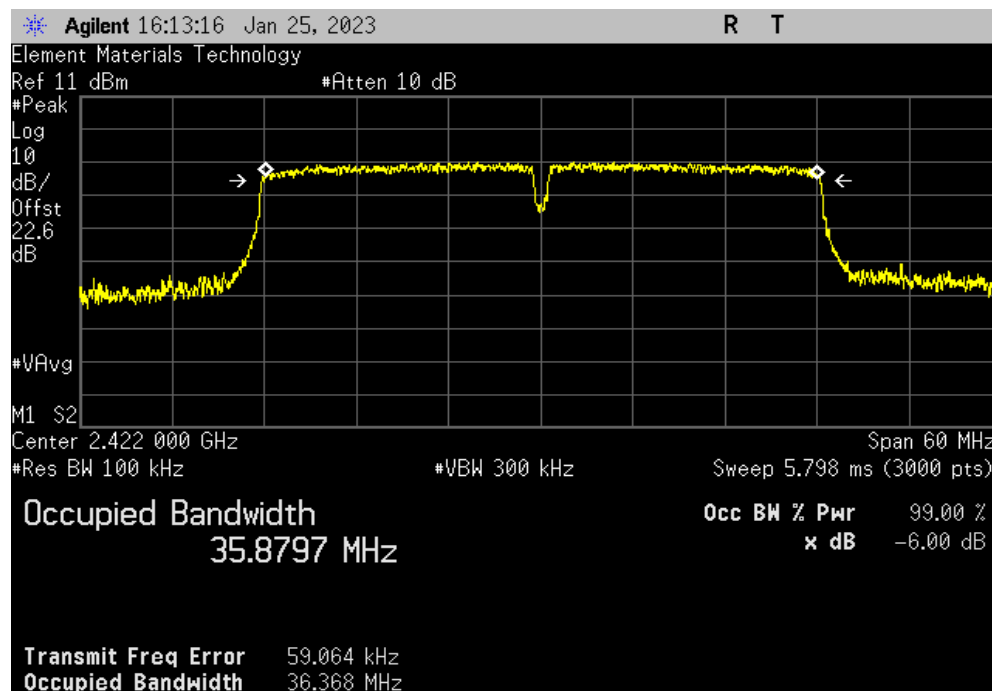


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz						
				Value	Limit	Result
				17.737 MHz	(>) 500 kHz	Pass



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1/5, 2422 MHz						
				Value	Limit	Result
				36.368 MHz	(>) 500 kHz	Pass

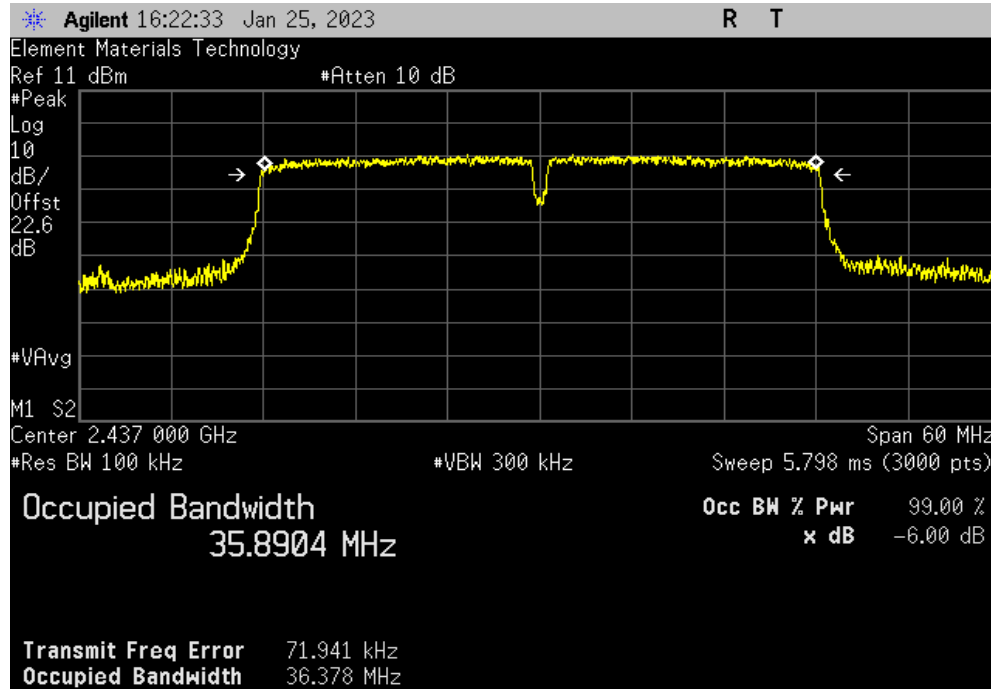


DTS BANDWIDTH

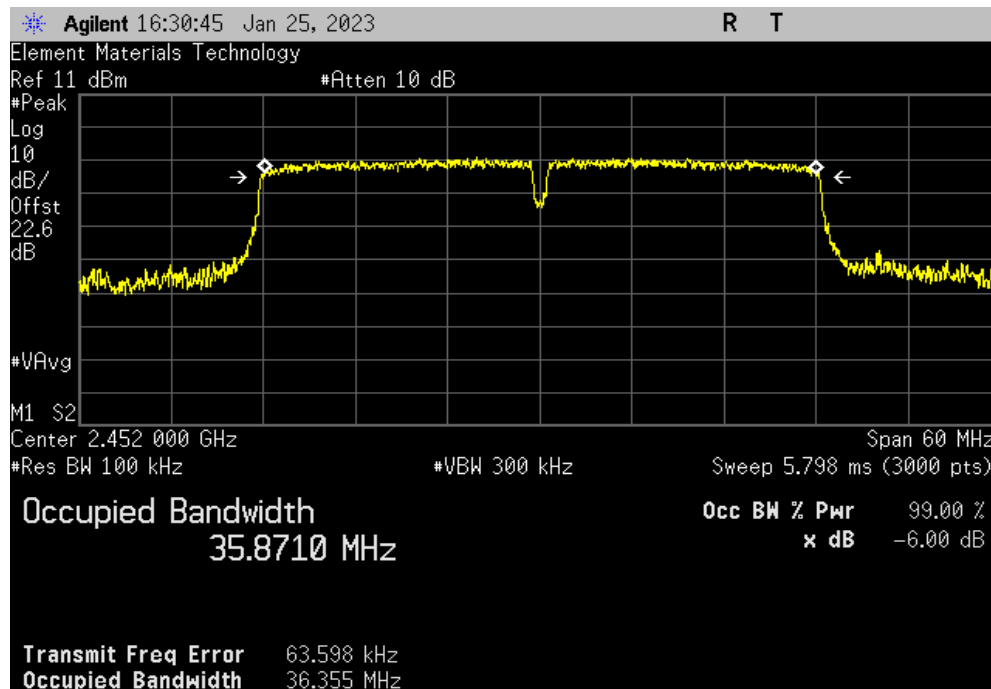


TMTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 4/8, 2437 MHz						
				Value	Limit	Result
				36.379 MHz	(>) 500 kHz	Pass



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 7/11, 2452 MHz						
				Value	Limit	Result
				36.355 MHz	(>) 500 kHz	Pass

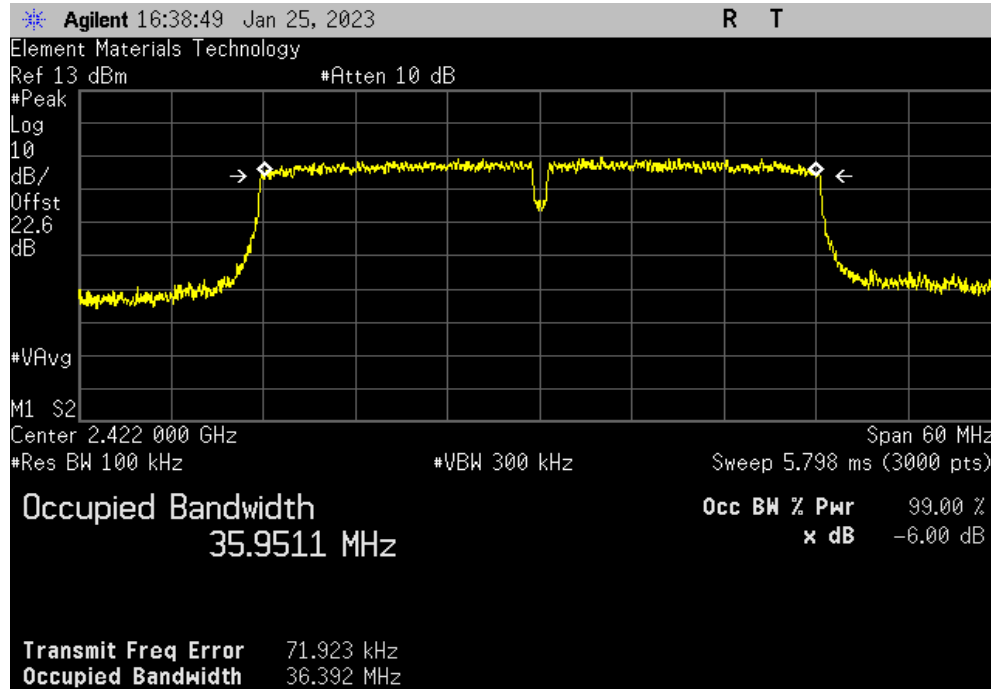


DTS BANDWIDTH

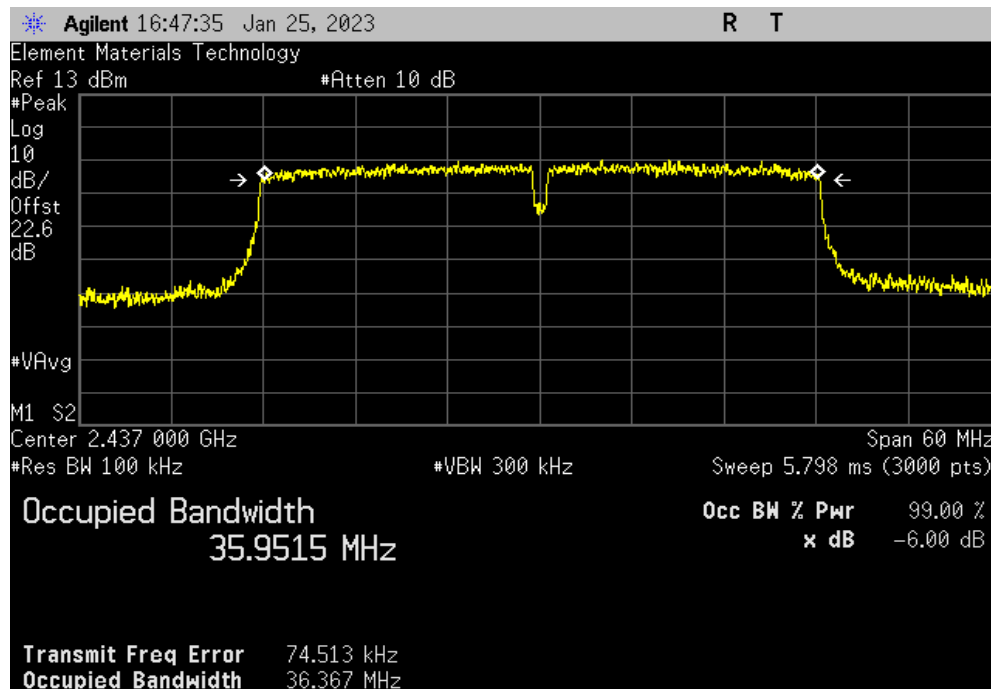


TMTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1/5, 2422 MHz						
				Value	Limit	Result
				36.392 MHz	500 kHz	Pass



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 4/8, 2437 MHz						
				Value	Limit	Result
				36.367 MHz	500 kHz	Pass

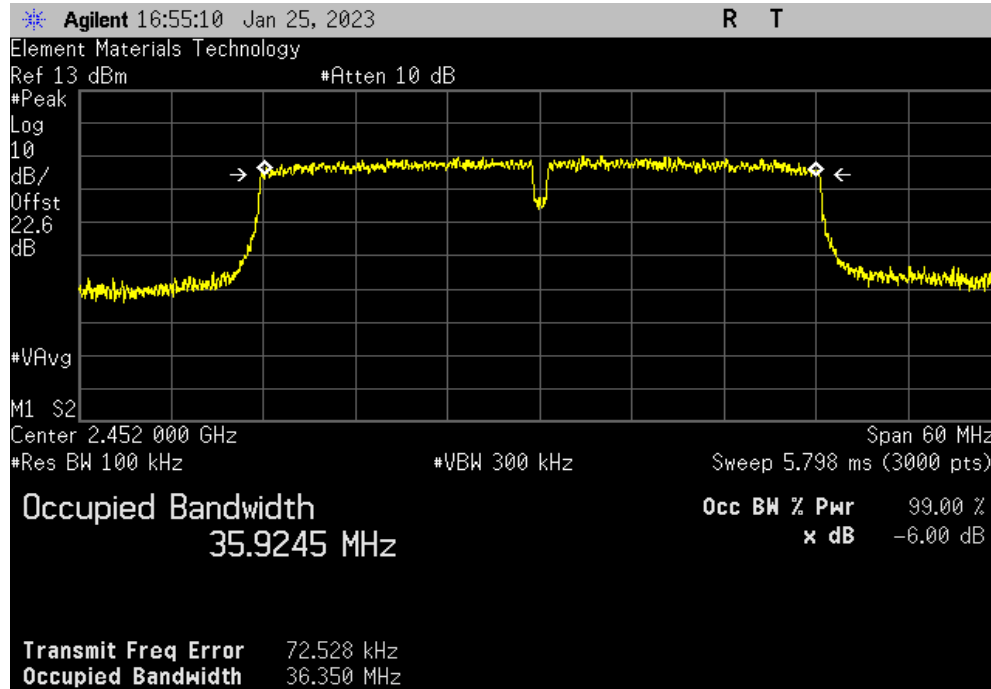


DTS BANDWIDTH



TMTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 7/11, 2452 MHz						
Value				Limit	Result	
				(>)		
36.35 MHz				500 kHz	Pass	



OCCUPIED BANDWIDTH



XMR 2022.02.07.0

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
Cable	Micro-Coax	UFD150A-1-0720-200200	NCW	2023-01-18	2024-01-18
Attenuator	S.M. Electronics	SA18H-20	REK	2022-02-15	2023-02-15
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	2023-01-19	2024-01-19
Block - DC	Weinschel Corp.	7006	AMS	2023-01-18	2024-01-18
Generator - Signal	Agilent	N5183A	TIA	2022-06-25	2024-06-25
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAT	2022-11-03	2023-11-03
Attenuator	S.M. Electronics	SA18H-20	REK	2023-03-08	2024-03-08

TEST DESCRIPTION

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

The 99% occupied bandwidth was measured with the EUT configured for continuous modulated operation.

Per ANSI C63.10:2013, 6.9.3, the spectrum analyzer was configured as follows:

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

The resolution bandwidth (RBW) of the spectrum analyzer was set to the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) bandwidth was set to at least 3 times the resolution bandwidth. The analyzer sweep time was set to auto to prevent video filtering or averaging. A sample detector was used unless the device was not able to be operated in a continuous transmit mode, in which case a peak detector was used.

The spectrum analyzer occupied bandwidth measurement function was used to sum the power of the transmission in linear terms to obtain the 99% bandwidth.

OCCUPIED BANDWIDTH



TbITx 2022.06.03.0 XMit 2022.02.07.0

EUT: GFD200		Work Order: GLOW0038
Serial Number: XB2-839		Date: 19-Apr-23
Customer: Glowforge Incorporated		Temperature: 20.8 °C
Attendees: Jason Bluhm		Humidity: 27% RH
Project: None		Barometric Pres.: 1023 mbar
Tested by: Harry Zhao	Power: 120VAC/60Hz	Job Site: NC06
TEST SPECIFICATIONS		
FCC 15.247:2023		Test Method
RSS-247 Issue 2:2017		ANSI C63.10:2013
RSS-Gen Issue 5:2018+A1:2019+A2:2021		ANSI C63.10:2013
COMMENTS		
Reference offset connection between EUT and Spectrum analyzer: DC Block + 20 dB attenuator + measurement cable + patched coax cable		
DEVIATIONS FROM TEST STANDARD		
None		
Configuration #	2	Signature 

		Value	Limit	Result
20 MHz				
	2400 MHz - 2483.5 MHz Band			
	802.11(b) 1 Mbps			
	Low Channel 1, 2412 MHz	14.828 MHz	N/A	N/A
	Mid Channel 6, 2437 MHz	14.724 MHz	N/A	N/A
	High Channel 11, 2462 MHz	14.716 MHz	N/A	N/A
	802.11(b) 11 Mbps			
	Low Channel 1, 2412 MHz	14.598 MHz	N/A	N/A
	Mid Channel 6, 2437 MHz	14.536 MHz	N/A	N/A
	High Channel 11, 2462 MHz	14.514 MHz	N/A	N/A
	802.11(g) 6 Mbps			
	Low Channel 1, 2412 MHz	16.749 MHz	N/A	N/A
	Mid Channel 6, 2437 MHz	16.765 MHz	N/A	N/A
	High Channel 11, 2462 MHz	16.784 MHz	N/A	N/A
	802.11(g) 36 Mbps			
	Low Channel 1, 2412 MHz	16.69 MHz	N/A	N/A
	Mid Channel 6, 2437 MHz	16.716 MHz	N/A	N/A
	High Channel 11, 2462 MHz	16.705 MHz	N/A	N/A
	802.11(g) 54 Mbps			
	Low Channel 1, 2412 MHz	16.635 MHz	N/A	N/A
	Mid Channel 6, 2437 MHz	16.705 MHz	N/A	N/A
	High Channel 11, 2462 MHz	16.658 MHz	N/A	N/A
	802.11(n) MCS0			
	Low Channel 1, 2412 MHz	17.848 MHz	N/A	N/A
	Mid Channel 6, 2437 MHz	17.861 MHz	N/A	N/A
	High Channel 11, 2462 MHz	17.874 MHz	N/A	N/A
	802.11(n) MCS7			
	Low Channel 1, 2412 MHz	17.776 MHz	N/A	N/A
	Mid Channel 6, 2437 MHz	17.758 MHz	N/A	N/A
	High Channel 11, 2462 MHz	17.735 MHz	N/A	N/A
40 MHz				
	2400 MHz - 2483.5 MHz Band			
	802.11(n) MCS0			
	Low Channel 1/5, 2422 MHz	35.961 MHz	N/A	N/A
	Mid Channel 4/8, 2437 MHz	35.964 MHz	N/A	N/A
	High Channel 7/11, 2452 MHz	35.981 MHz	N/A	N/A
	802.11(n) MCS7			
	Low Channel 1/5, 2422 MHz	36.094 MHz	N/A	N/A
	Mid Channel 4/8, 2437 MHz	36.112 MHz	N/A	N/A
	High Channel 7/11, 2452 MHz	36.103 MHz	N/A	N/A

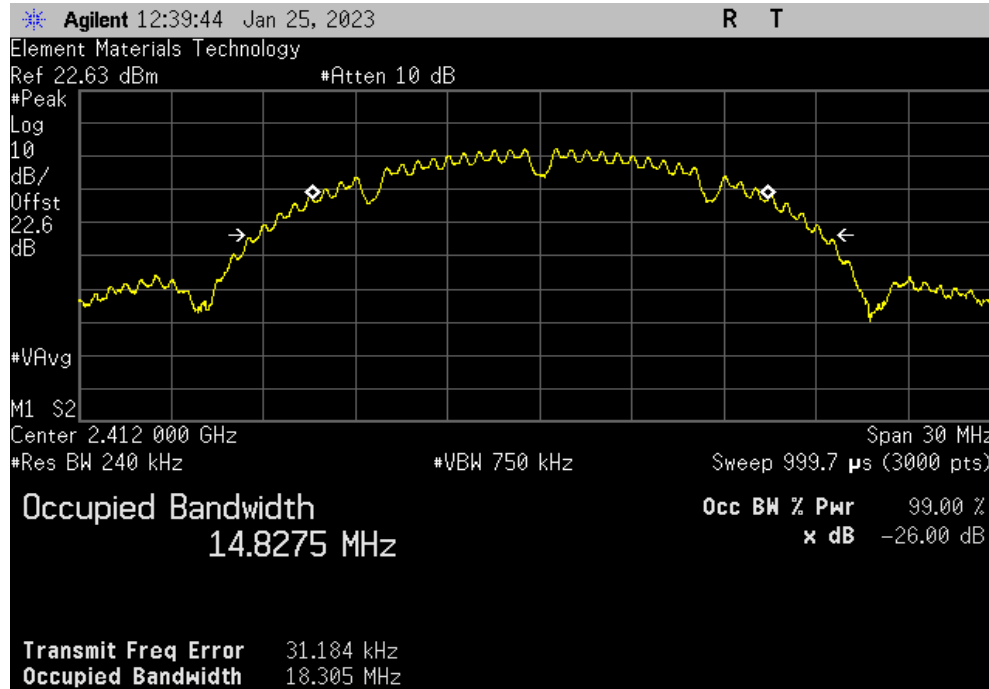
OCCUPIED BANDWIDTH



TMTx 2022.06.03.0 XMR 2022.02.07.0

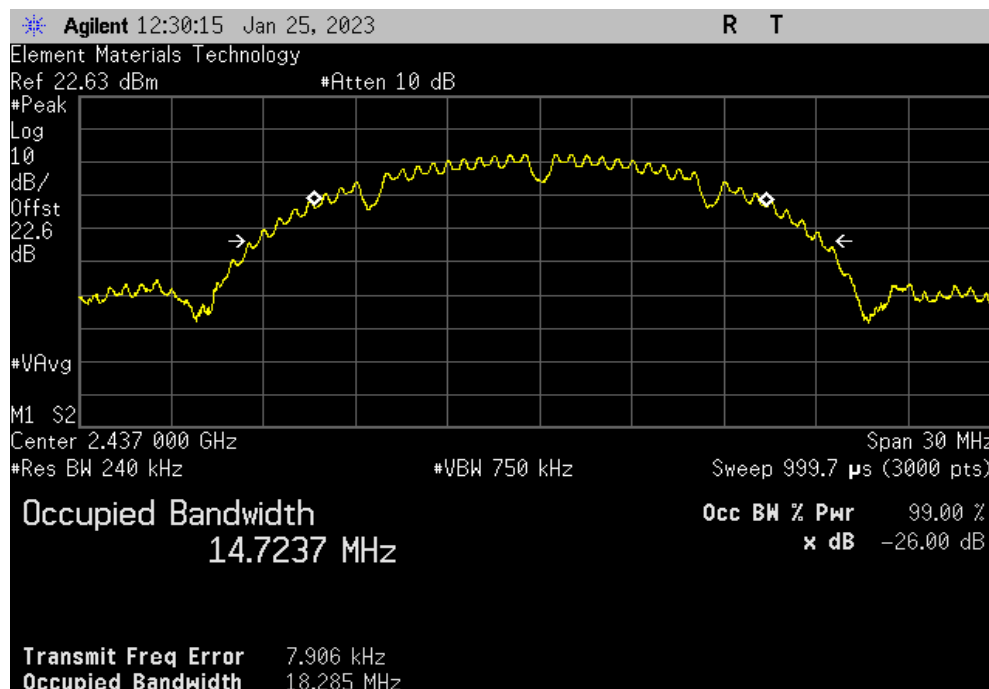
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz

	Value	Limit	Result
	14.828 MHz	N/A	N/A



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz

	Value	Limit	Result
	14.724 MHz	N/A	N/A



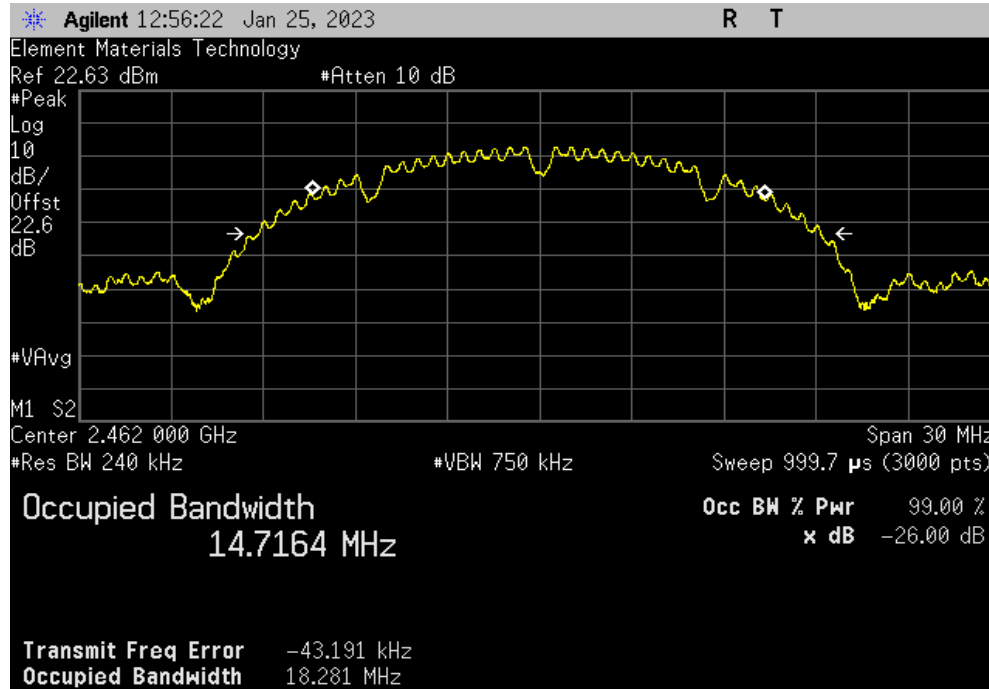
OCCUPIED BANDWIDTH



TMTx 2022.06.03.0 XMR 2022.02.07.0

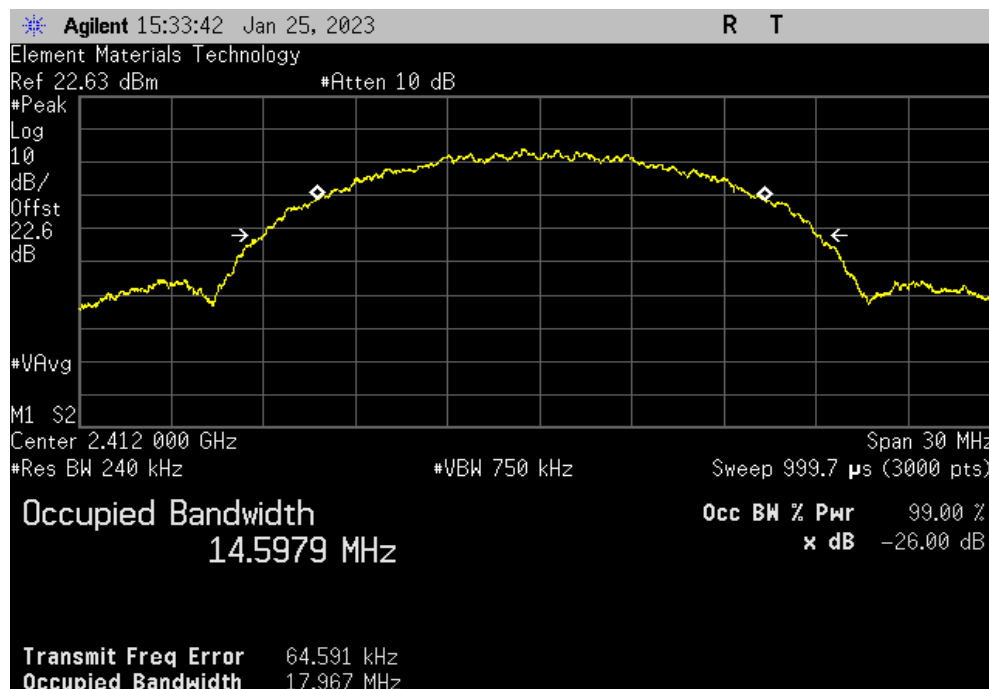
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz

	Value	Limit	Result
	14.716 MHz	N/A	N/A



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz

	Value	Limit	Result
	14.598 MHz	N/A	N/A



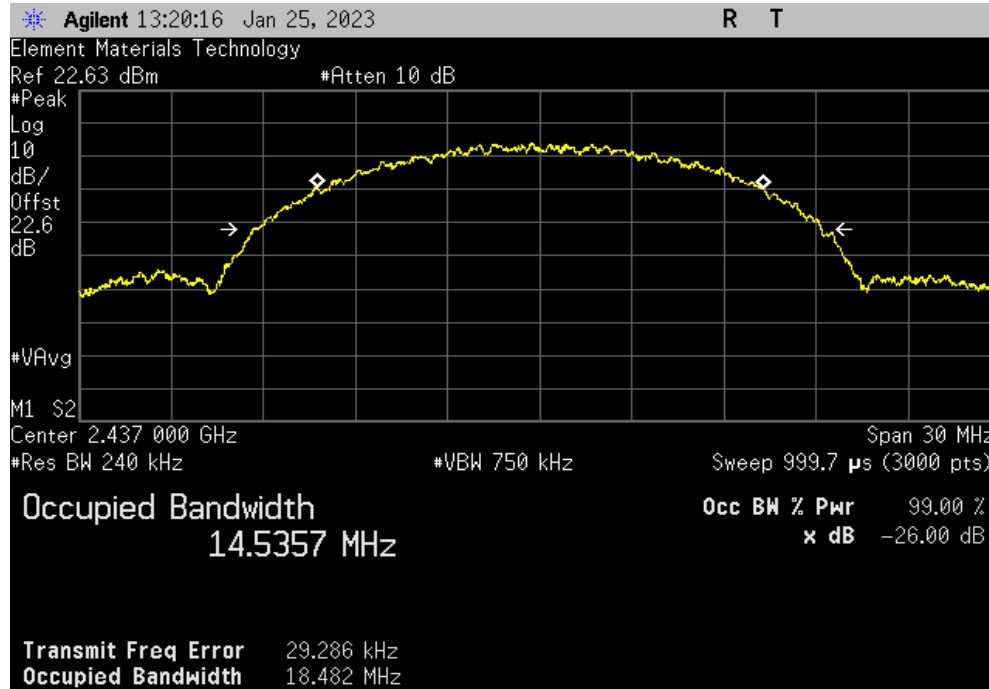
OCCUPIED BANDWIDTH



TUTTx 2022.06.03.0 XMR 2022.02.07.0

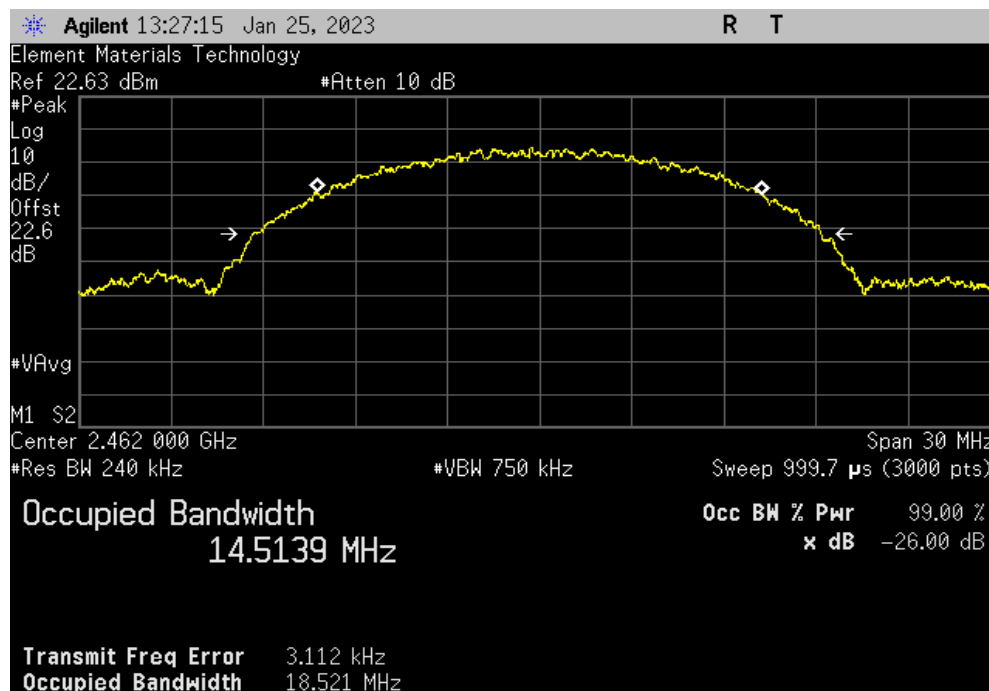
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz

	Value	Limit	Result
	14.536 MHz	N/A	N/A



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz

	Value	Limit	Result
	14.514 MHz	N/A	N/A



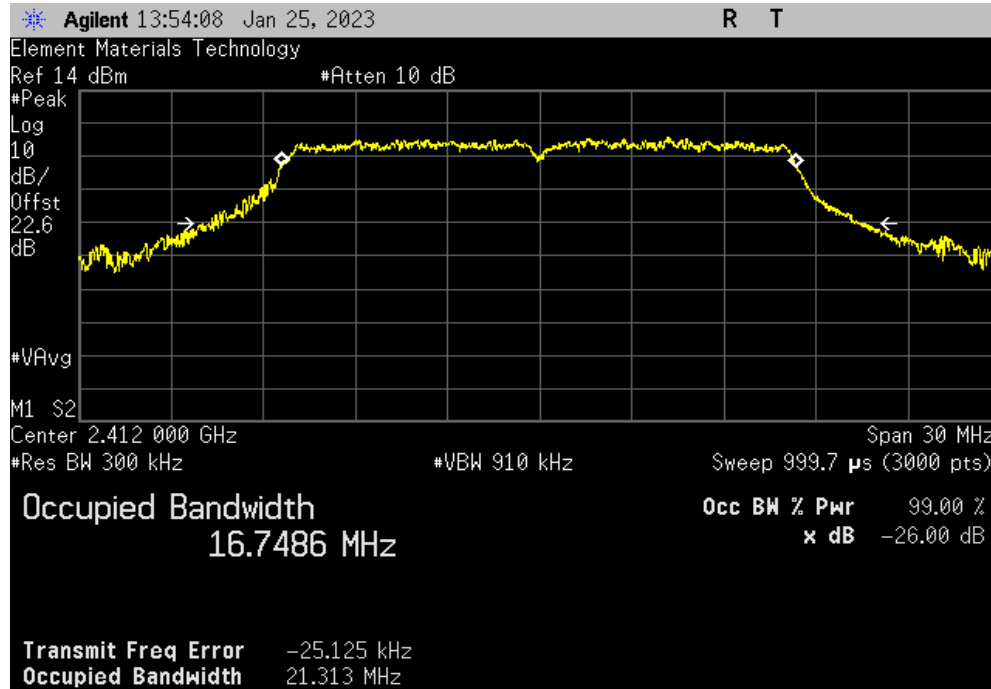
OCCUPIED BANDWIDTH



TMTx 2022.06.03.0 XMR 2022.02.07.0

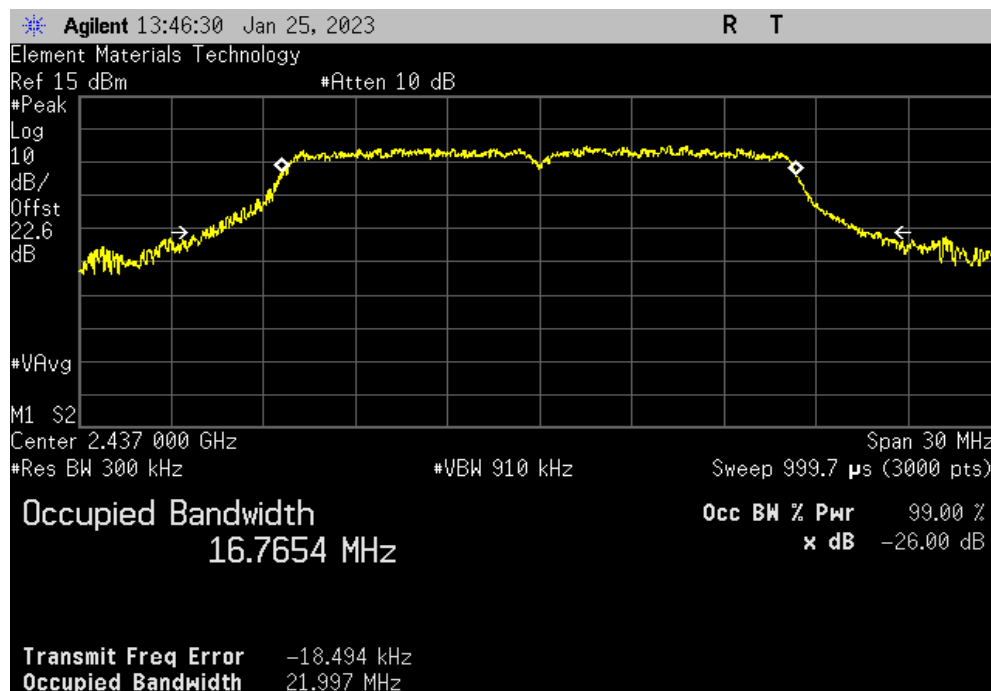
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz

	Value	Limit	Result
	16.749 MHz	N/A	N/A



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz

	Value	Limit	Result
	16.765 MHz	N/A	N/A



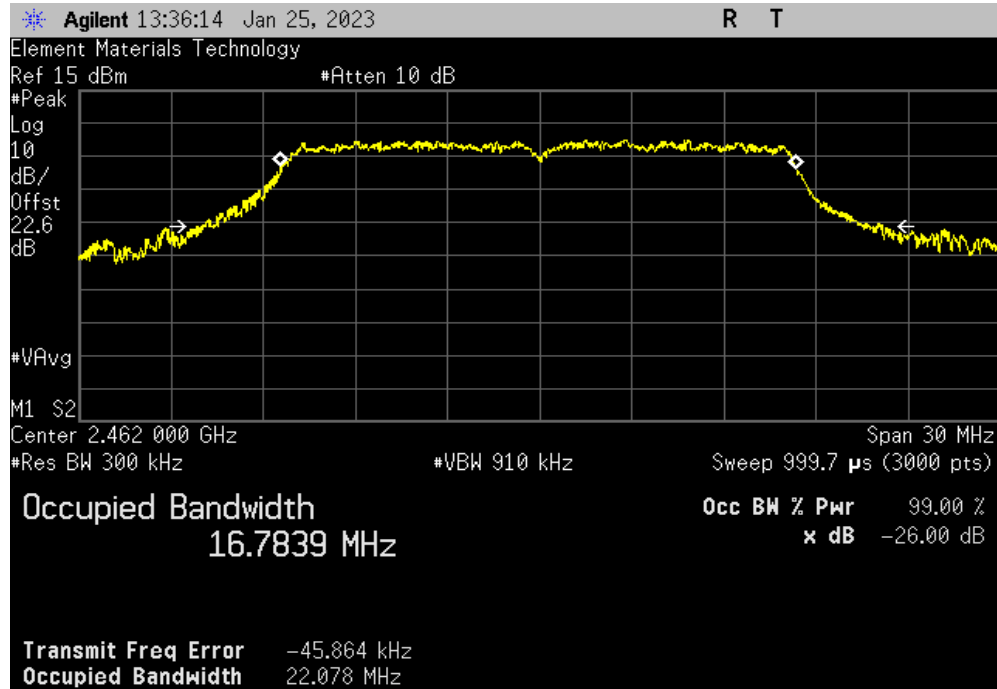
OCCUPIED BANDWIDTH



TMTx 2022.06.03.0 XMR 2022.02.07.0

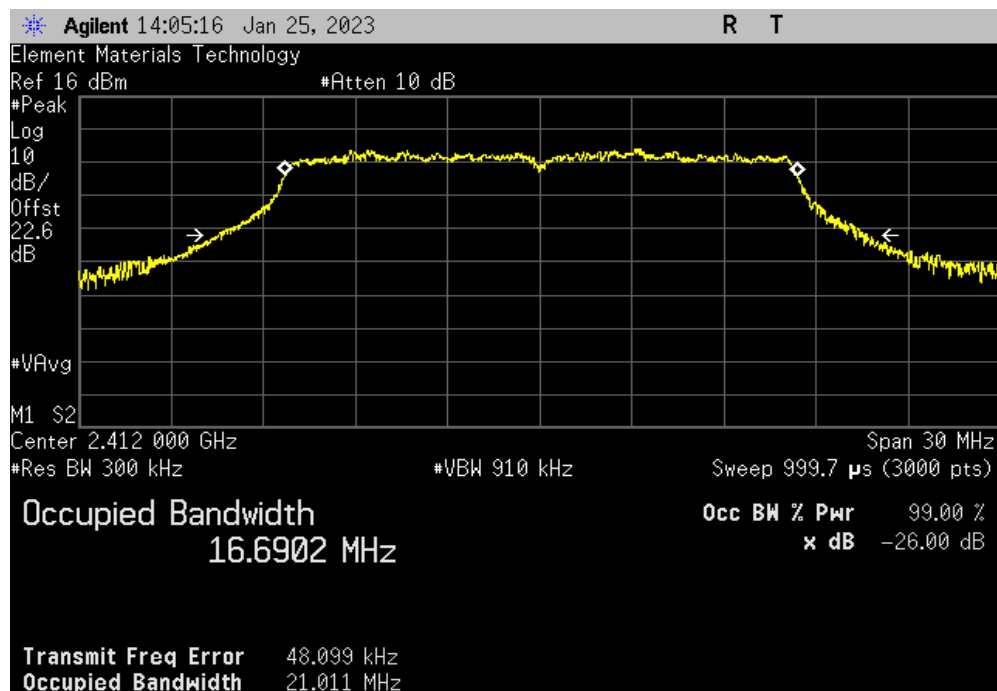
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz

	Value	Limit	Result
	16.784 MHz	N/A	N/A



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz

	Value	Limit	Result
	16.69 MHz	N/A	N/A



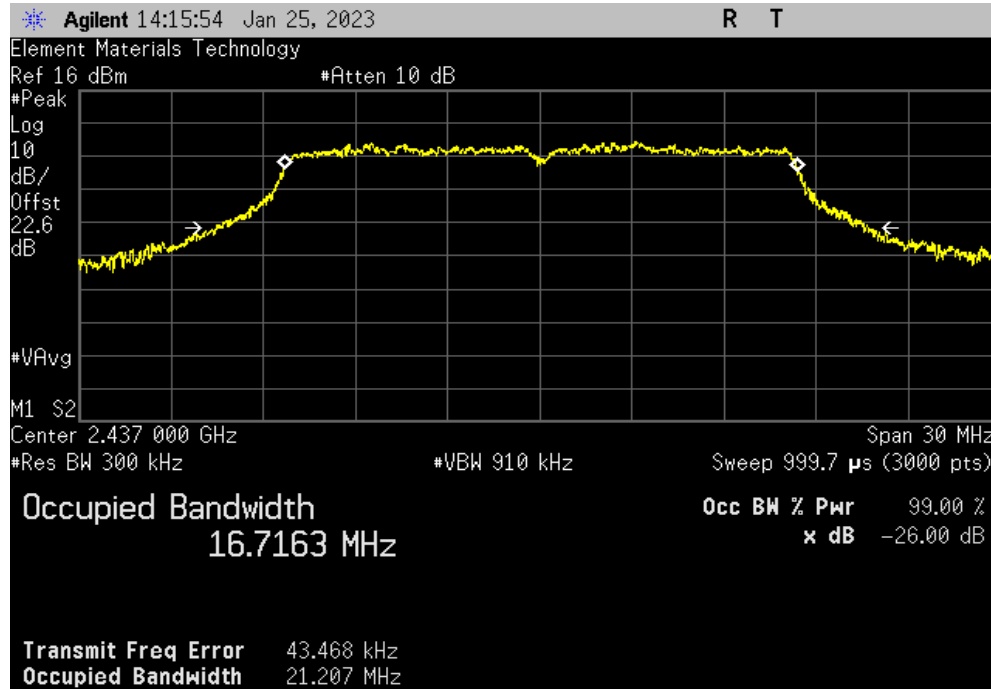
OCCUPIED BANDWIDTH



TMTx 2022.06.03.0 XMR 2022.02.07.0

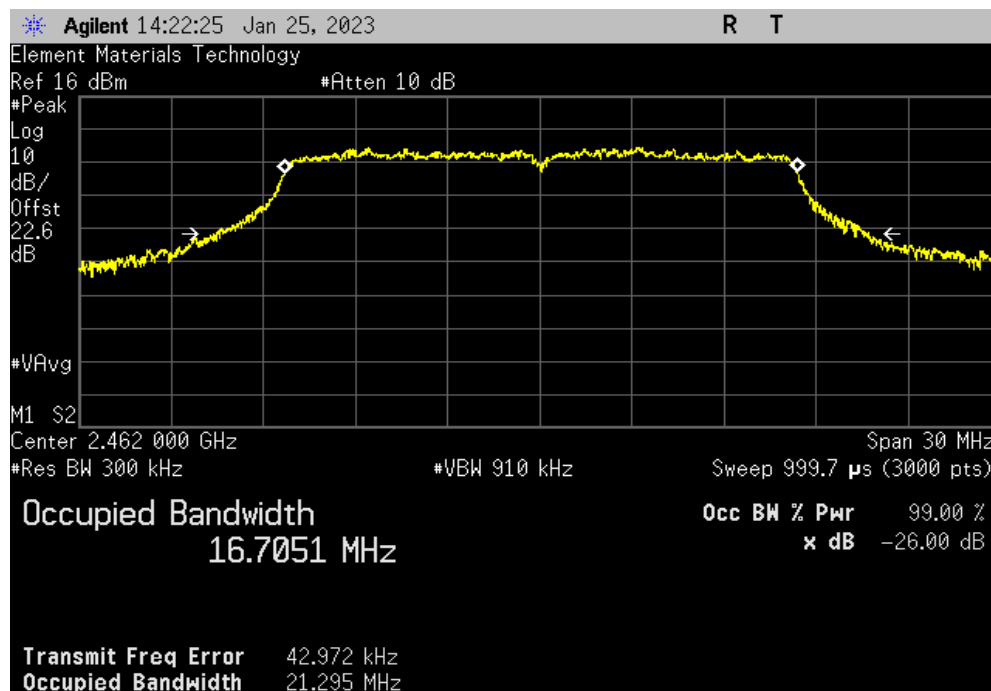
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz

	Value	Limit	Result
	16.716 MHz	N/A	N/A



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz

	Value	Limit	Result
	16.705 MHz	N/A	N/A



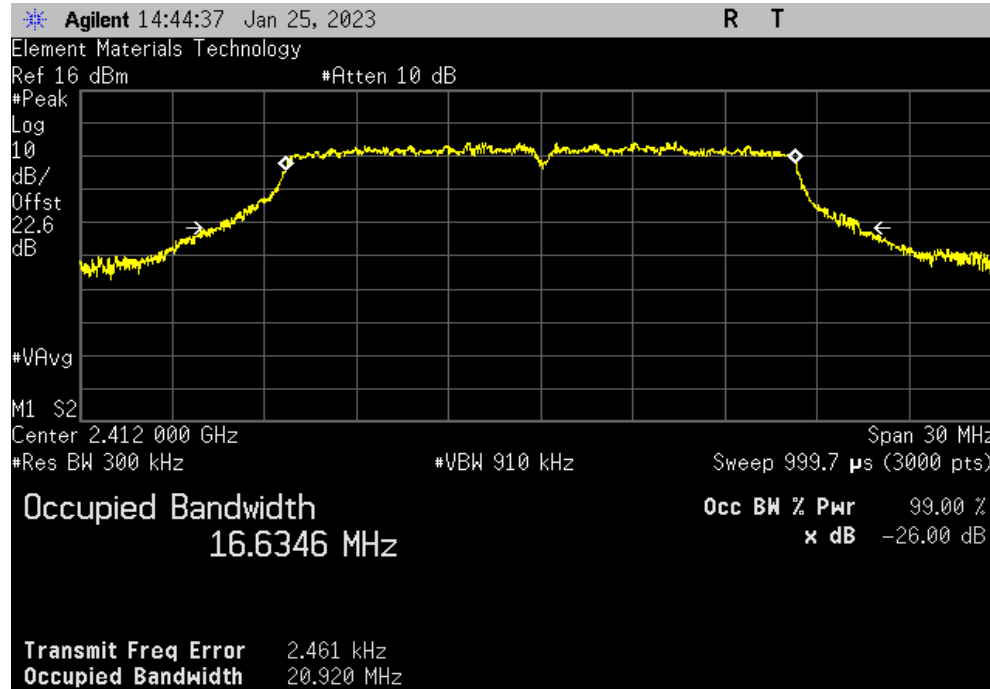
OCCUPIED BANDWIDTH



TMTx 2022.06.03.0 XMR 2022.02.07.0

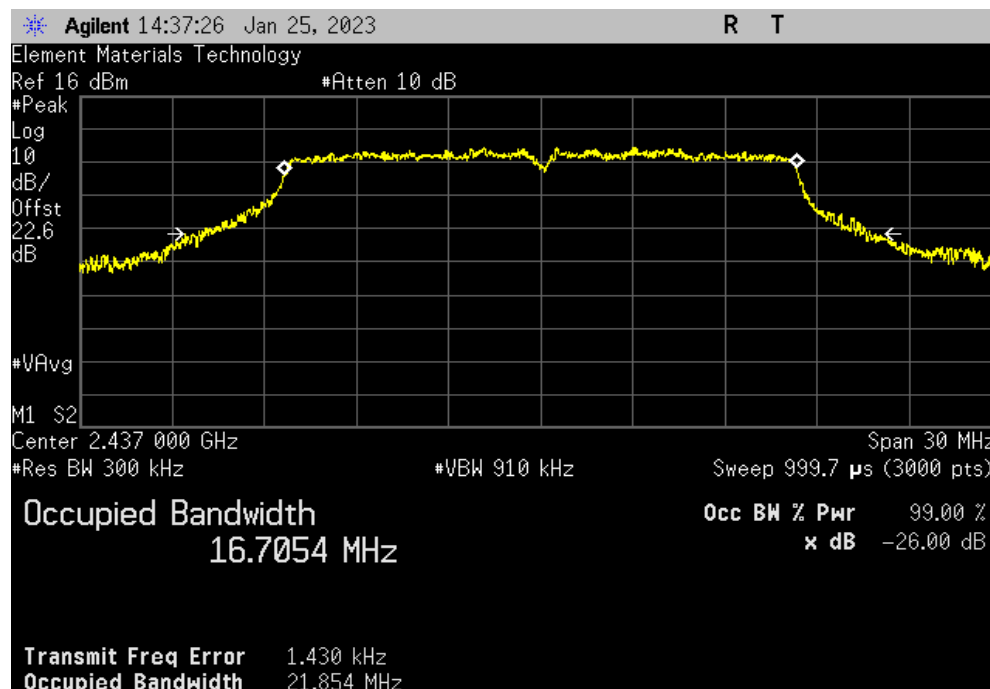
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz

	Value	Limit	Result
	16.635 MHz	N/A	N/A



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz

	Value	Limit	Result
	16.705 MHz	N/A	N/A



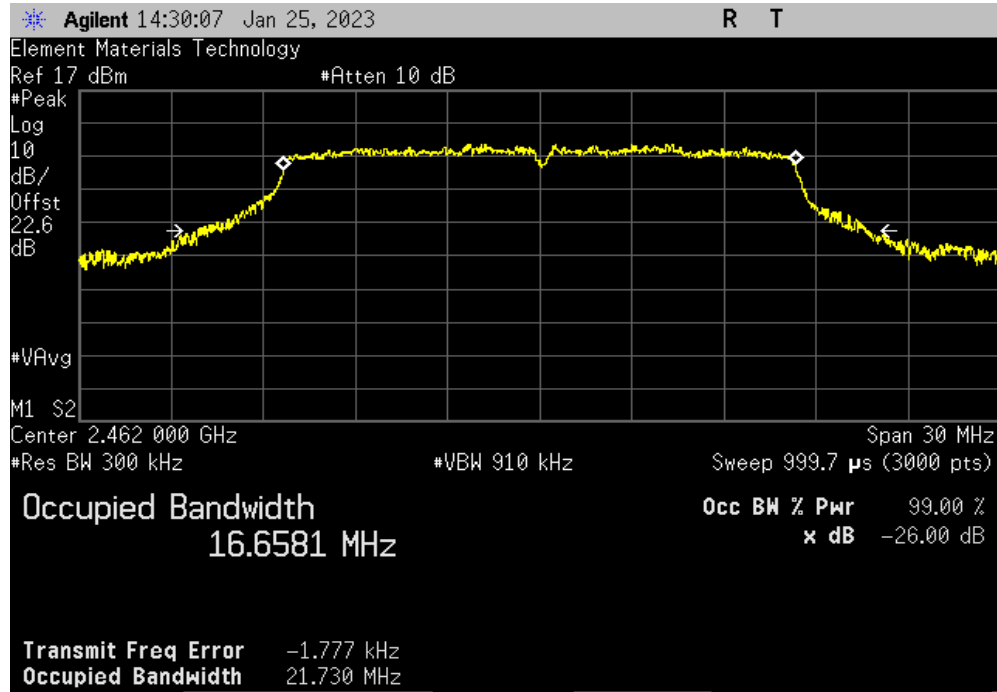
OCCUPIED BANDWIDTH



TMTx 2022.06.03.0 XMR 2022.02.07.0

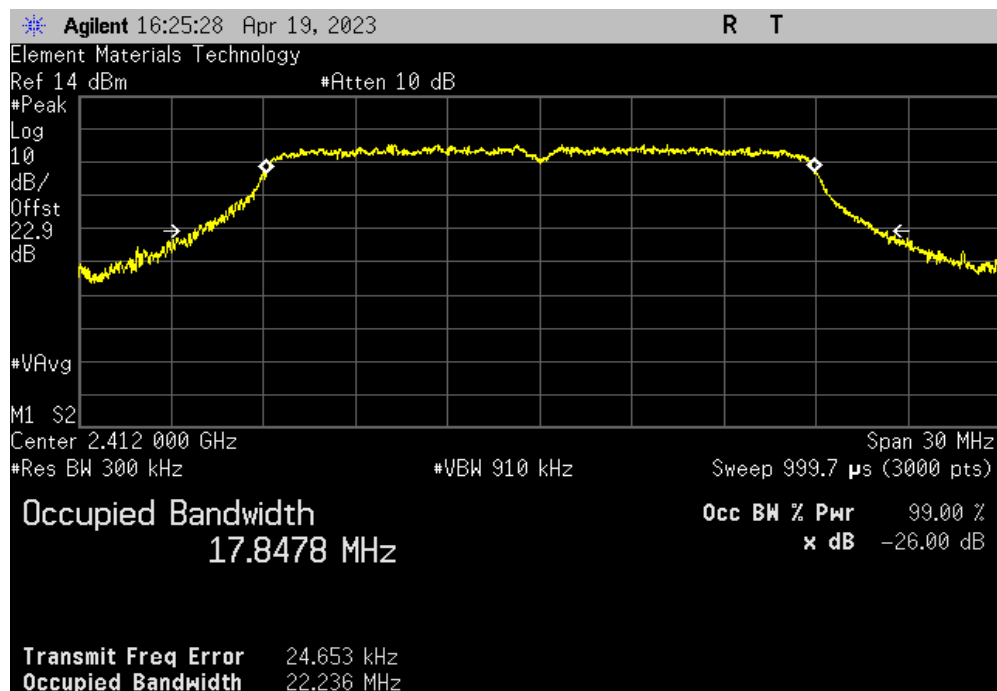
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz

	Value	Limit	Result
	16.658 MHz	N/A	N/A



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz

	Value	Limit	Result
	17.848 MHz	N/A	N/A

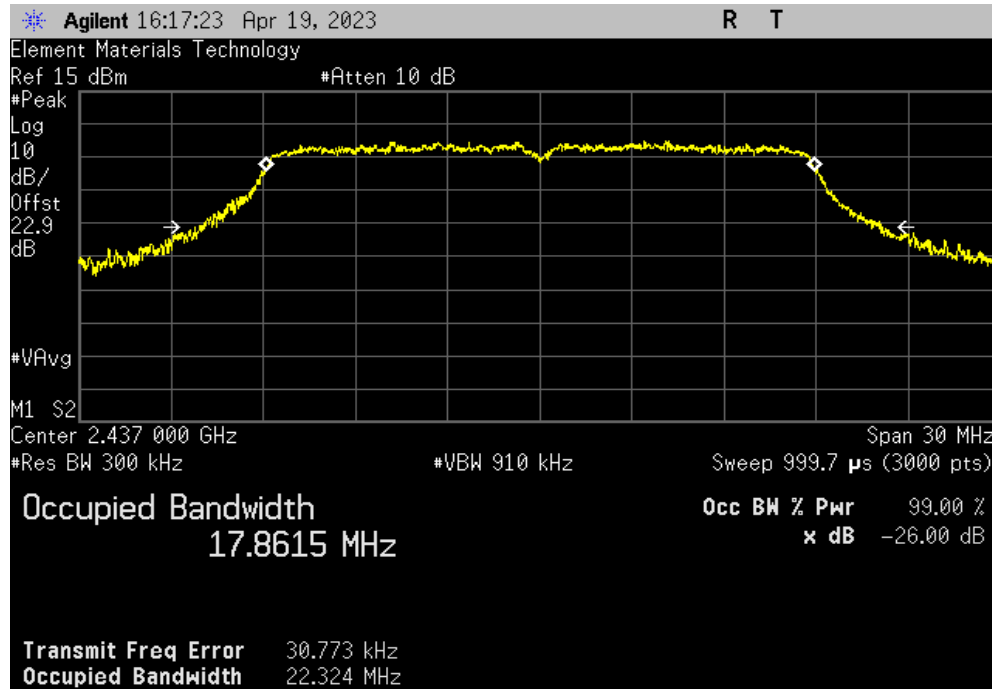


OCCUPIED BANDWIDTH

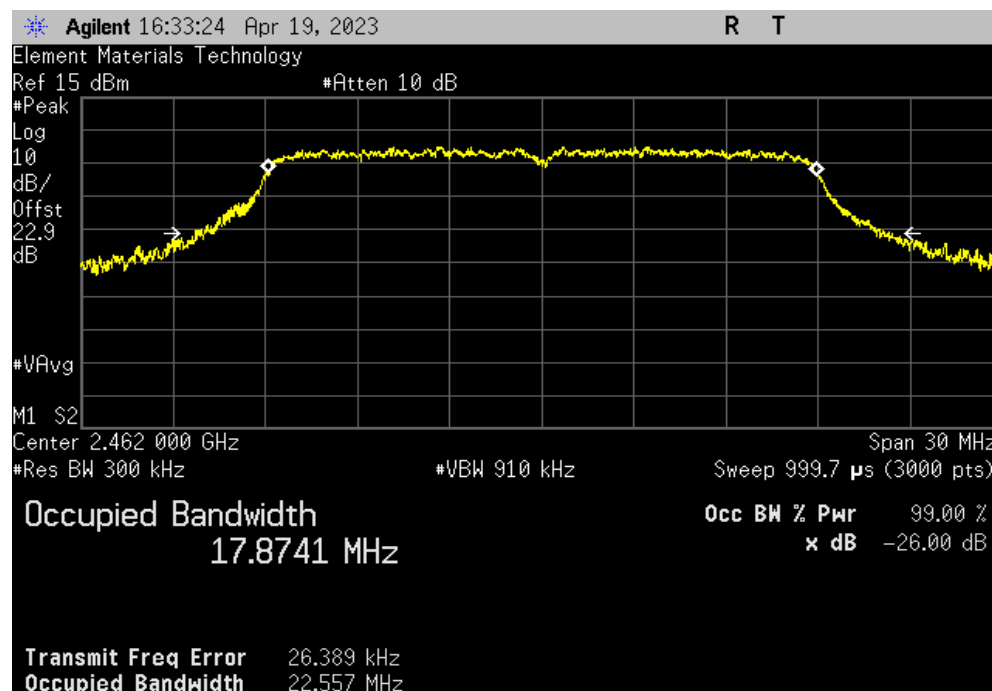


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz						
				Value	Limit	Result
				17.861 MHz	N/A	N/A



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz						
				Value	Limit	Result
				17.874 MHz	N/A	N/A



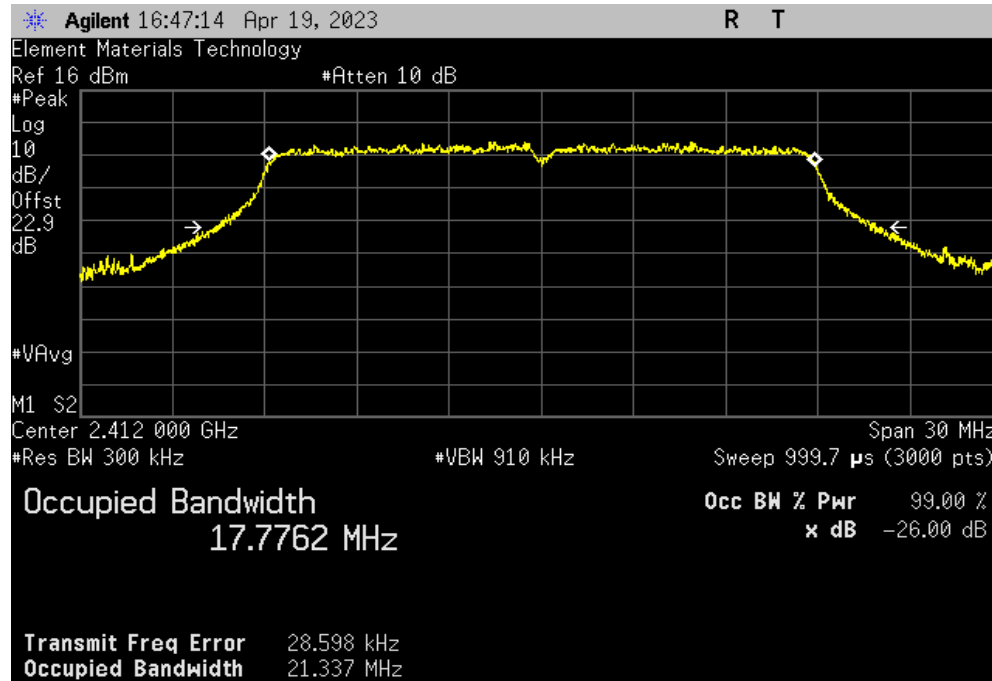
OCCUPIED BANDWIDTH



TMTx 2022.06.03.0 XMR 2022.02.07.0

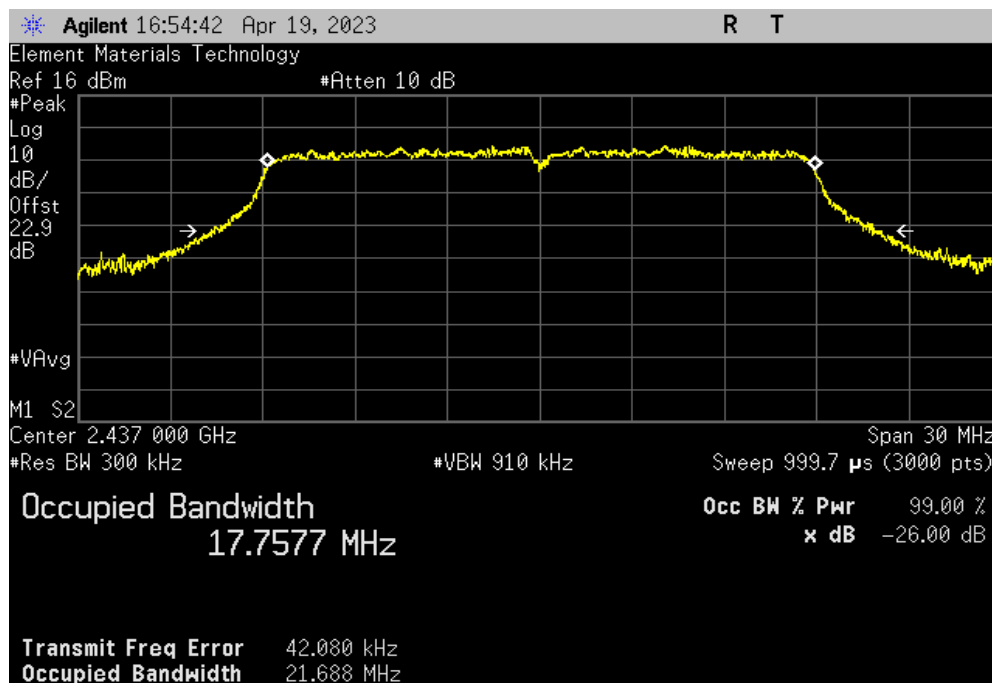
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz

				Value	Limit	Result
				17.776 MHz	N/A	N/A



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz

				Value	Limit	Result
				17.758 MHz	N/A	N/A



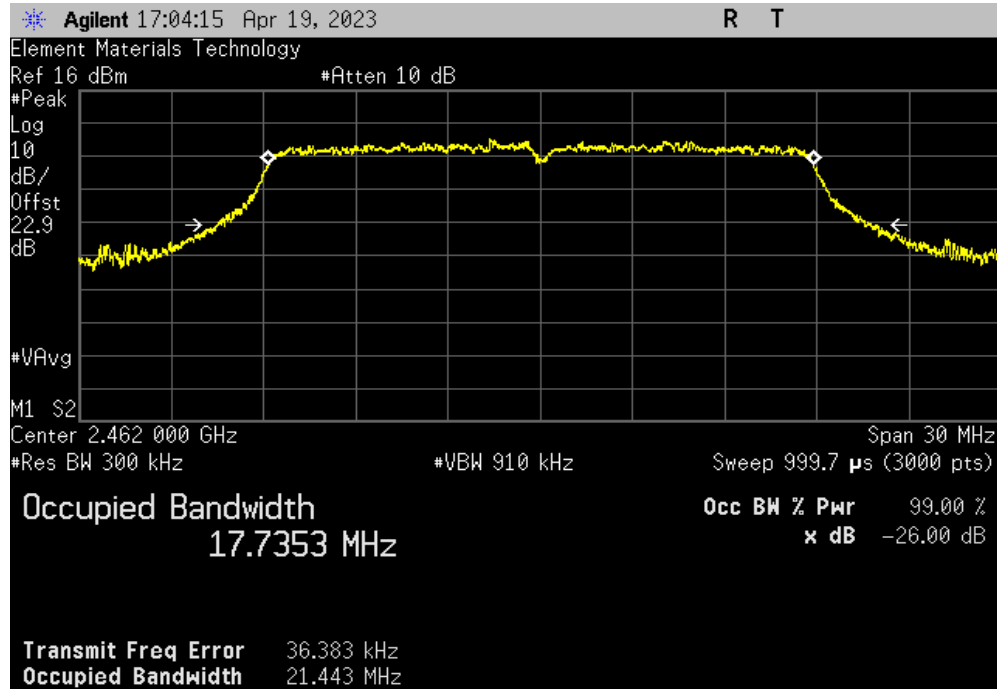
OCCUPIED BANDWIDTH



TMTx 2022.06.03.0 XMR 2022.02.07.0

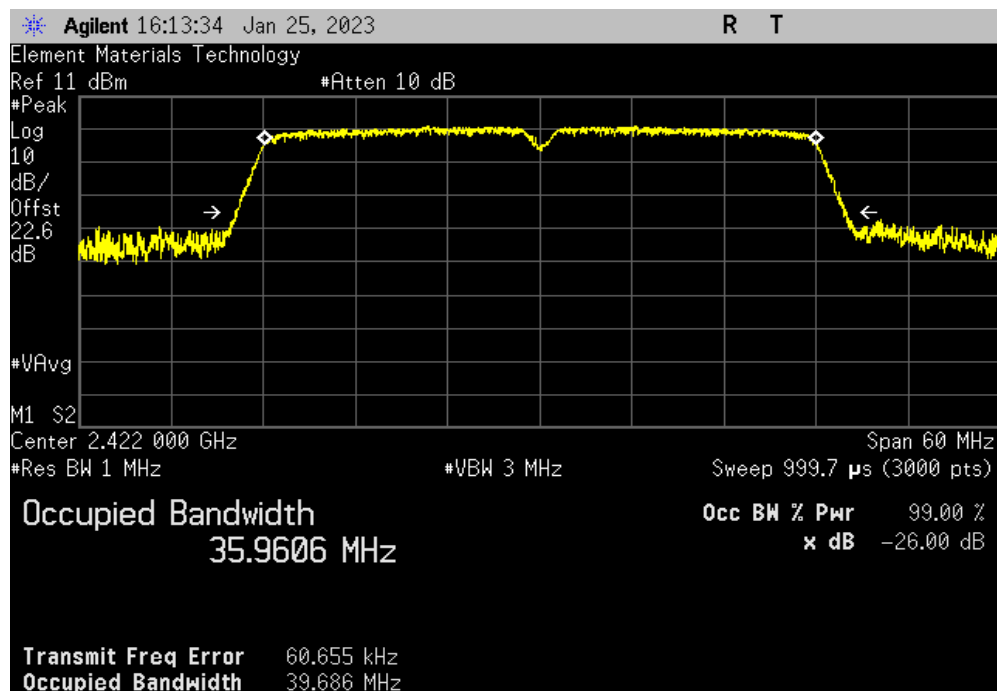
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz

	Value	Limit	Result
	17.735 MHz	N/A	N/A



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1/5, 2422 MHz

	Value	Limit	Result
	35.961 MHz	N/A	N/A

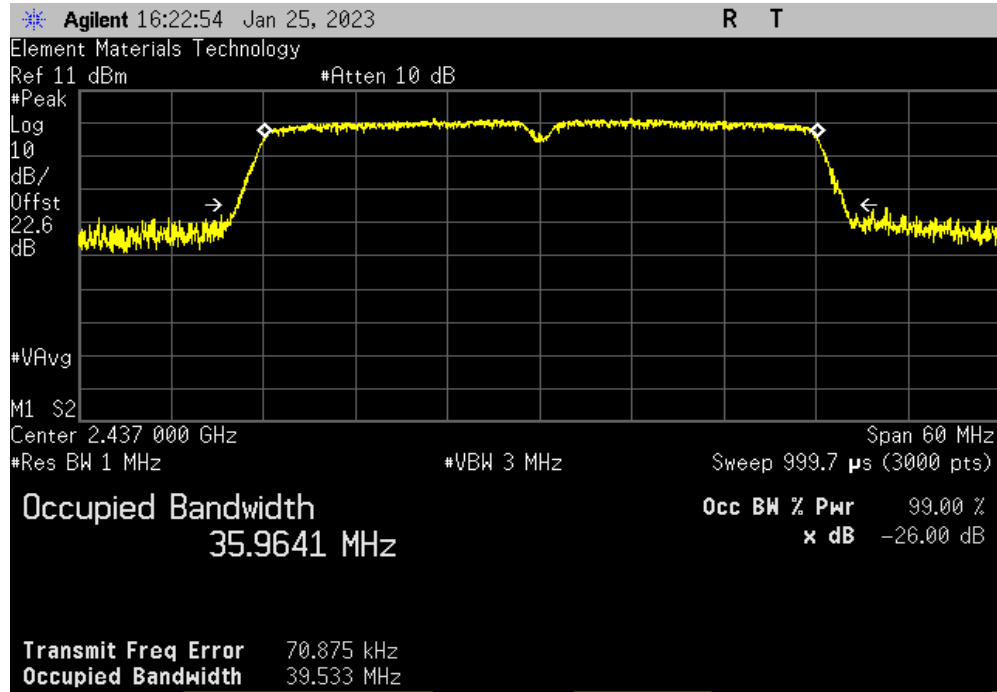


OCCUPIED BANDWIDTH

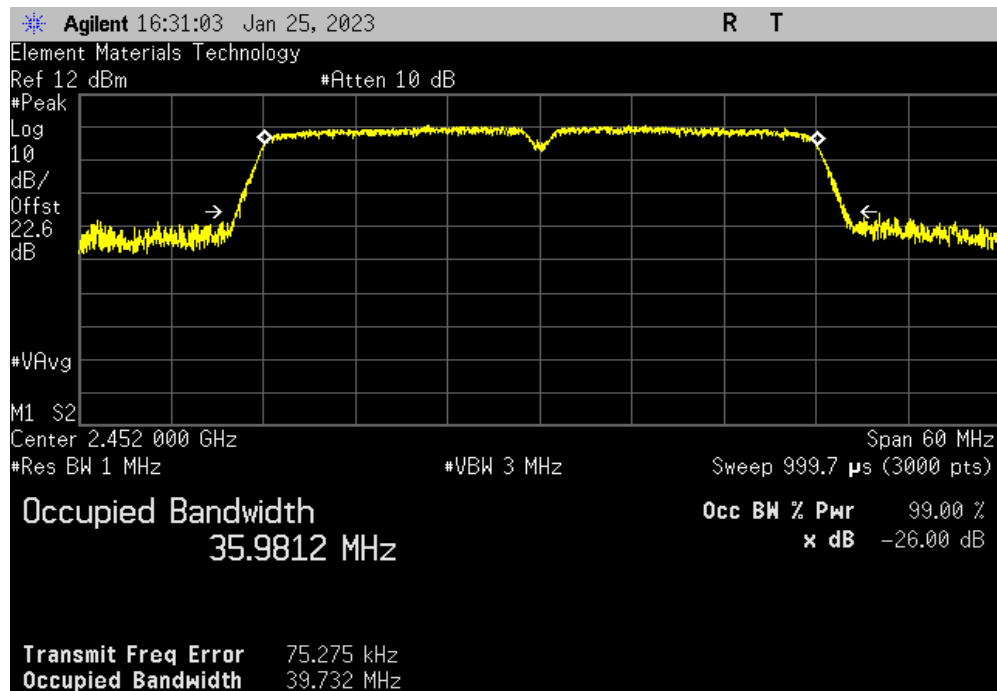


TMTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 4/8, 2437 MHz						
				Value	Limit	Result
				35.964 MHz	N/A	N/A



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 7/11, 2452 MHz						
				Value	Limit	Result
				35.981 MHz	N/A	N/A



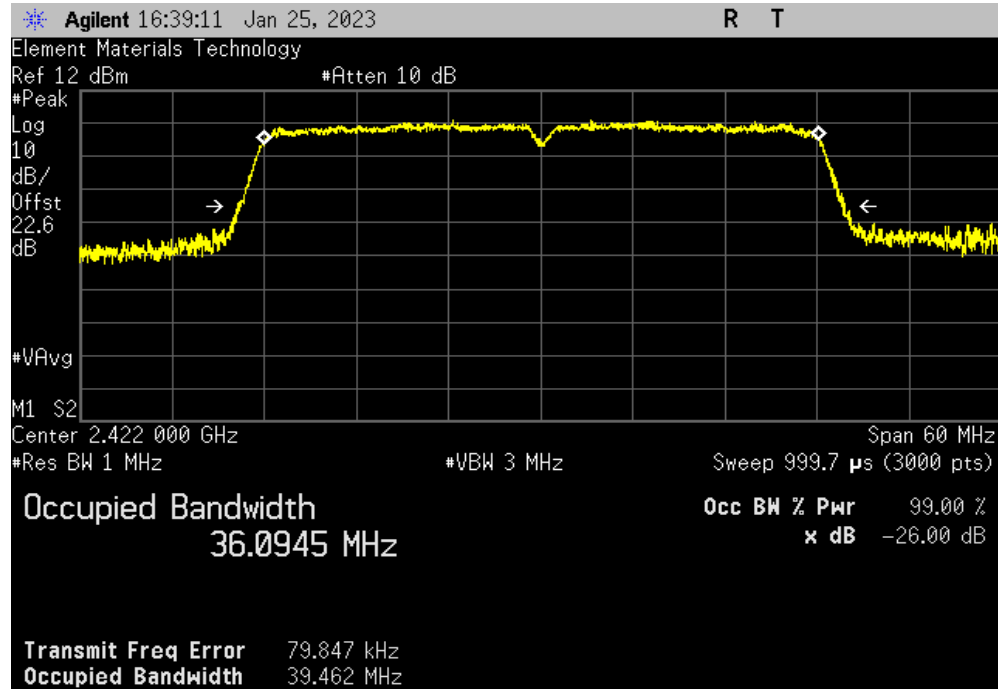
OCCUPIED BANDWIDTH



TMTx 2022.06.03.0 XMR 2022.02.07.0

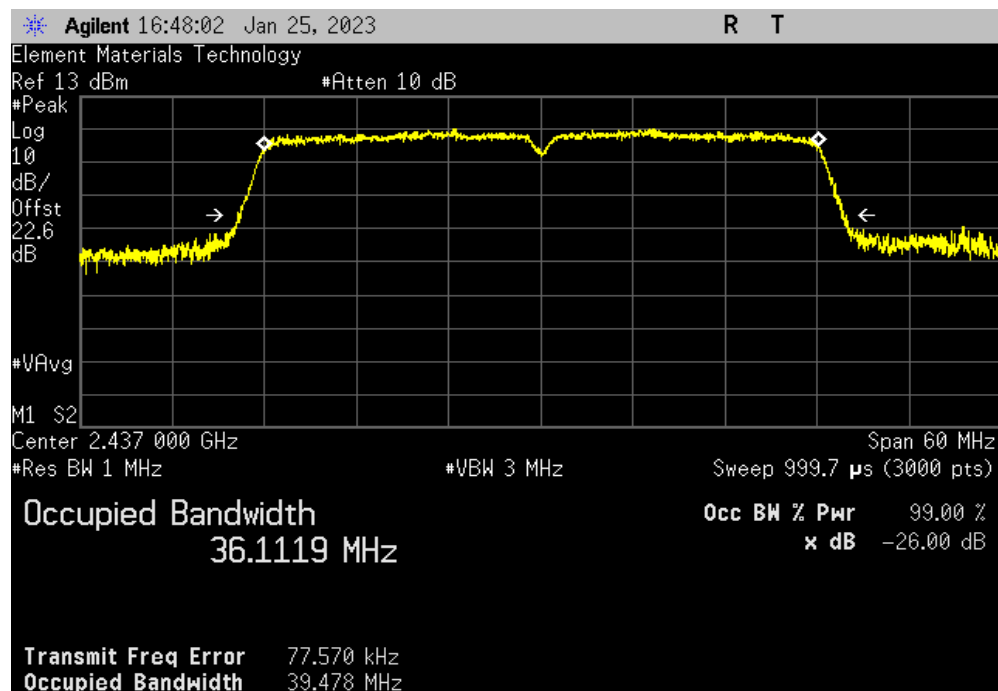
40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1/5, 2422 MHz

	Value	Limit	Result
	36.094 MHz	N/A	N/A



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 4/8, 2437 MHz

	Value	Limit	Result
	36.112 MHz	N/A	N/A

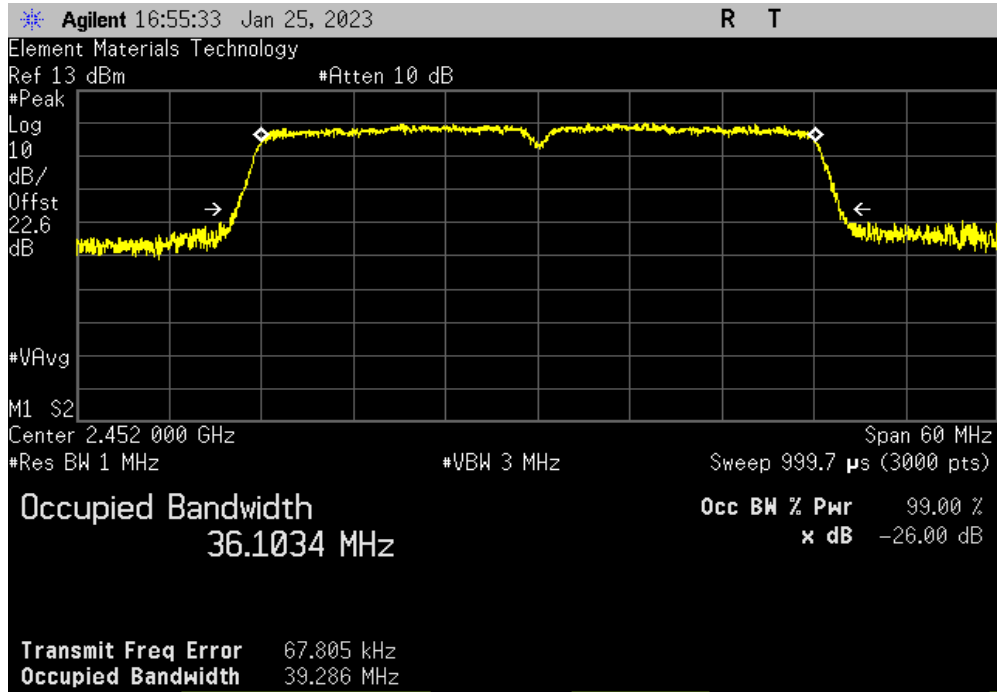


OCCUPIED BANDWIDTH



TMTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 7/11, 2452 MHz						
				Value	Limit	Result
				36.103 MHz	N/A	N/A



OUTPUT POWER



XMIT 2022.02.07.0

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
Block - DC	Weinschel Corp.	7006	AMS	2023-01-18	2024-01-18
Attenuator	S.M. Electronics	SA18H-20	REK	2022-02-15	2023-02-15
Cable	Micro-Coax	UFD150A-1-0720-200200	NCW	2023-01-18	2024-01-18
Generator - Signal	Agilent	N5183A	TIA	2022-06-25	2024-06-25
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	2023-01-19	2024-01-19
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAT	2022-11-03	2023-11-03
Attenuator	S.M. Electronics	SA18H-20	REK	2023-03-08	2024-03-08

TEST DESCRIPTION

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

The fundamental emission output power (maximum average conducted output power) was measured using the channels and modes as called out on the following data sheets. The transmit power was set to its default maximum.

Prior to measuring output power; the emission bandwidth (B) and the transmission pulse duration (T) were measured. Both are required to determine the method of measuring Maximum Conducted Output Power. The transmission pulse duration (T) was measured using a zero span on the spectrum analyzer to see the pulses in the time domain.

The method AVGSA-2 in section 11.9.2.2.4 of ANSI C63.10:2013 was used to make the measurement. This method uses trace averaging across ON and OFF times of the EUT transmissions in the spectrum analyzer channel power function using an RMS detector. Following the measurement a duty cycle correction was applied by adding $[10 \log (1 / D)]$, where D is the duty cycle, to the measured power to compute the average power during the actual transmission times.

OUTPUT POWER



TbTx 2022.06.03.0 XMt 2022.02.07.0

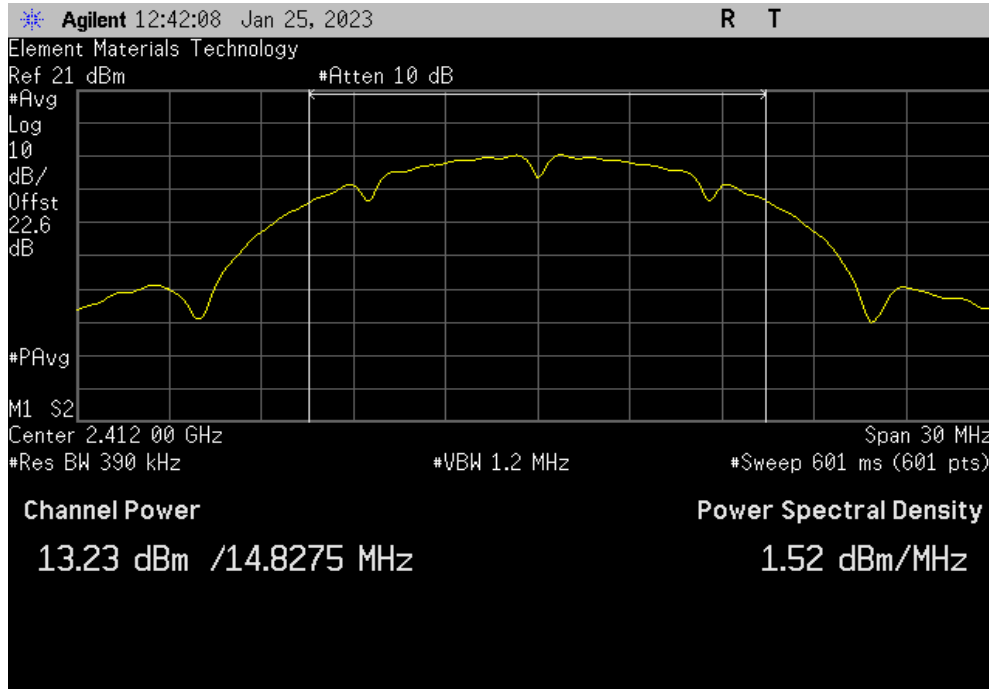
EUT:	GFD200		Work Order:		GLOW0038	
Serial Number:	XB2-839		Date:		19-Apr-23	
Customer:	Glowforge Incorporated		Temperature:		20.6 °C	
Attendees:	Jason Bluhm		Humidity:		27.5% RH	
Project:	None		Barometric Pres.:		1023 mbar	
Tested by:	Harry Zhao	Power:	120VAC/60Hz		Job Site: NC06	
TEST SPECIFICATIONS			Test Method			
FCC 15.247:2023			ANSI C63.10:2013			
RSS-247 Issue 2:2017			ANSI C63.10:2013			
RSS-Gen Issue 5:2018+A1:2019+A2:2021			ANSI C63.10:2013			
COMMENTS						
Reference offset connection between EUT and Spectrum analyzer: DC Block + 20 dB attenuator + measurement cable + patched coax cable						
DEVIATIONS FROM TEST STANDARD						
None						
Configuration #	2					
			Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)
						Result
20 MHz						
2400 MHz - 2483.5 MHz Band						
802.11(b) 1 Mbps						
Low Channel 1, 2412 MHz			13.226	0	13.2	30 Pass
Mid Channel 6, 2437 MHz			13.517	0	13.5	30 Pass
High Channel 11, 2462 MHz			13.86	0	13.9	30 Pass
802.11(b) 11 Mbps						
Low Channel 1, 2412 MHz			13.001	0	13	30 Pass
Mid Channel 6, 2437 MHz			13.434	0	13.4	30 Pass
High Channel 11, 2462 MHz			13.743	0	13.7	30 Pass
802.11(g) 6 Mbps						
Low Channel 1, 2412 MHz			8.427	0	8.4	30 Pass
Mid Channel 6, 2437 MHz			8.747	0	8.7	30 Pass
High Channel 11, 2462 MHz			9.044	0	9	30 Pass
802.11(g) 36 Mbps						
Low Channel 1, 2412 MHz			8.314	0	8.3	30 Pass
Mid Channel 6, 2437 MHz			8.686	0	8.7	30 Pass
High Channel 11, 2462 MHz			8.955	0	9	30 Pass
802.11(g) 54 Mbps						
Low Channel 1, 2412 MHz			8.335	0	8.3	30 Pass
Mid Channel 6, 2437 MHz			8.708	0	8.7	30 Pass
High Channel 11, 2462 MHz			8.963	0	9	30 Pass
802.11(n) MCS0						
Low Channel 1, 2412 MHz			8.66	0	8.7	30 Pass
Mid Channel 6, 2437 MHz			8.988	0	9	30 Pass
High Channel 11, 2462 MHz			9.303	0	9.3	30 Pass
802.11(n) MCS7						
Low Channel 1, 2412 MHz			8.584	0	8.6	30 Pass
Mid Channel 6, 2437 MHz			8.912	0	8.9	30 Pass
High Channel 11, 2462 MHz			9.242	0	9.2	30 Pass
40 MHz						
2400 MHz - 2483.5 MHz Band						
802.11(n) MCS0						
Low Channel 1/5, 2422 MHz			8.384	0	8.4	30 Pass
Mid Channel 4/8, 2437 MHz			8.608	0	8.6	30 Pass
High Channel 7/11, 2452 MHz			8.814	0	8.8	30 Pass
802.11(n) MCS7						
Low Channel 1/5, 2422 MHz			8.335	0	8.3	30 Pass
Mid Channel 4/8, 2437 MHz			8.556	0	8.6	30 Pass
High Channel 7/11, 2452 MHz			8.757	0	8.8	30 Pass

OUTPUT POWER

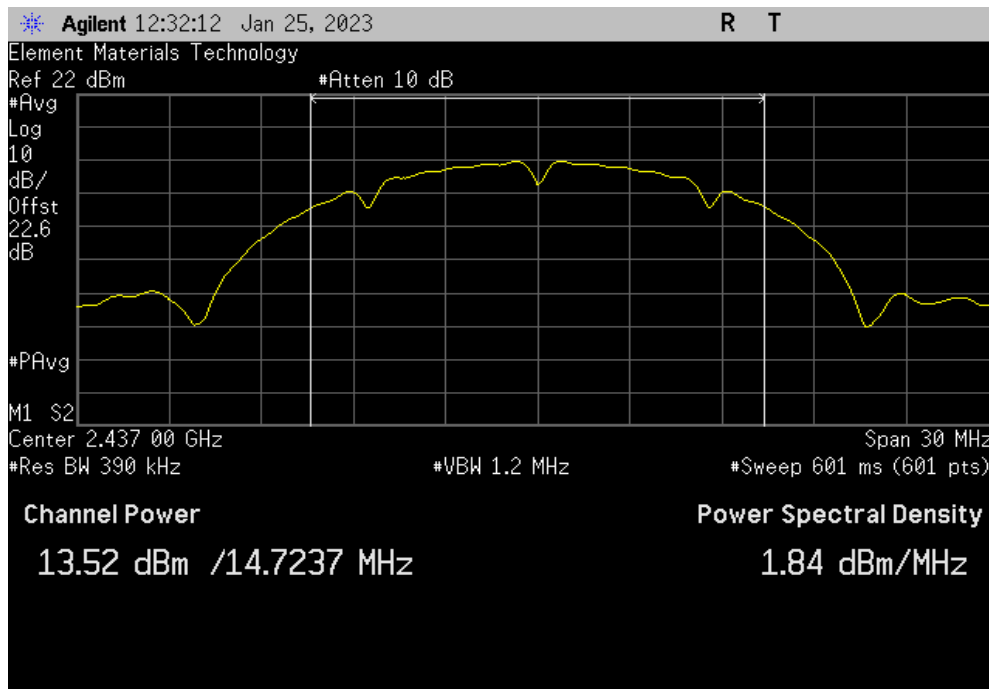


TMTx 2022.06.03.0 XMt 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	13.226	0	13.2	30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	13.517	0	13.5	30	Pass	

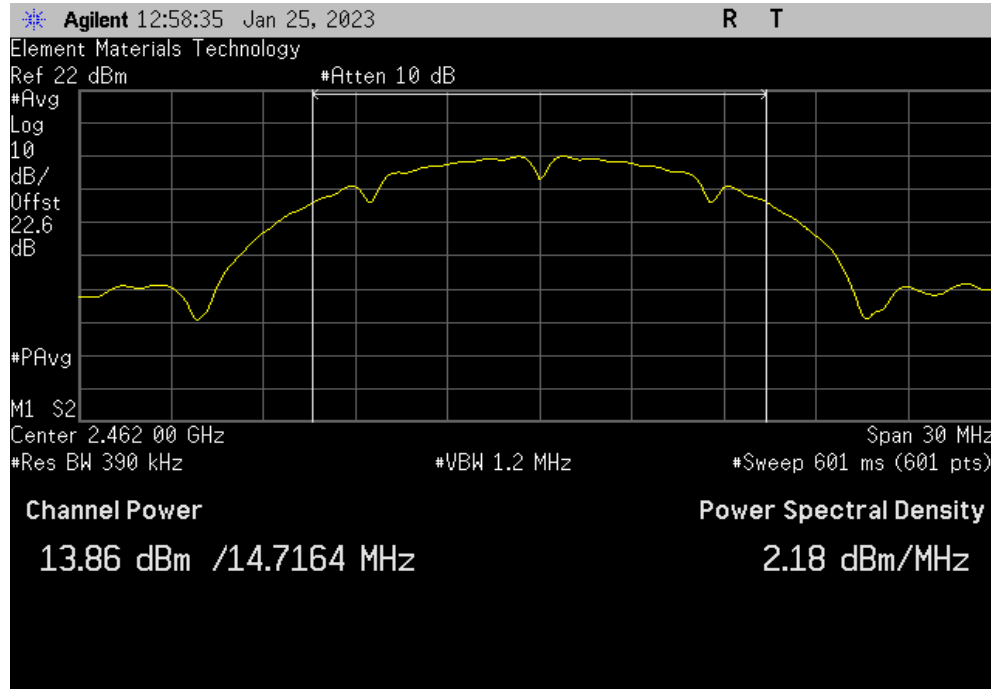


OUTPUT POWER

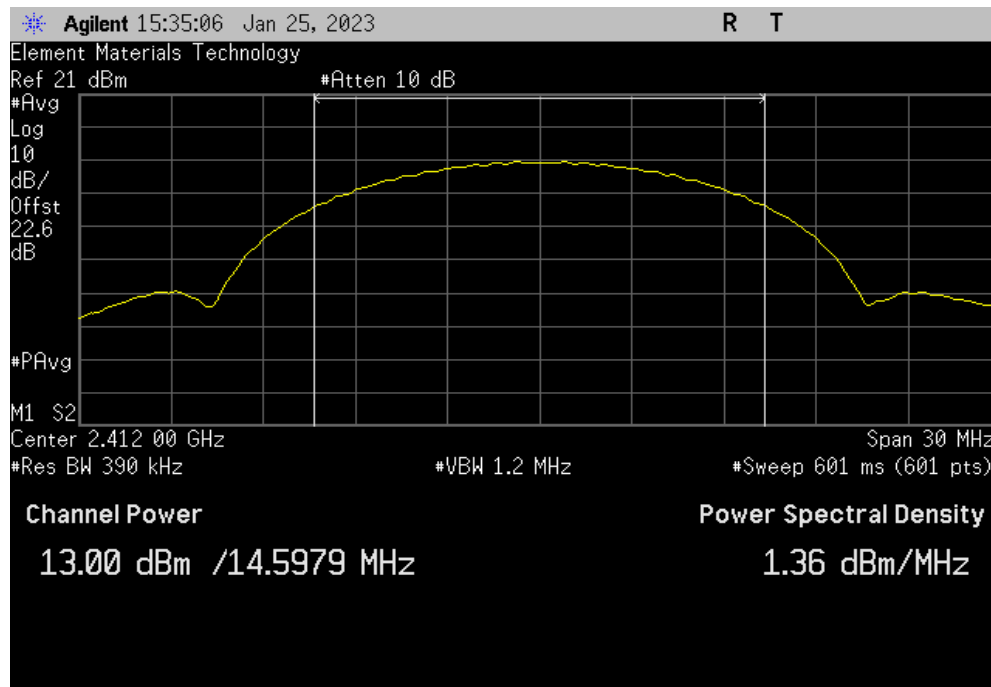


TUTx 2022.06.03.0 XMt 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	13.86	0	13.9	30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	13.001	0	13	30	Pass	

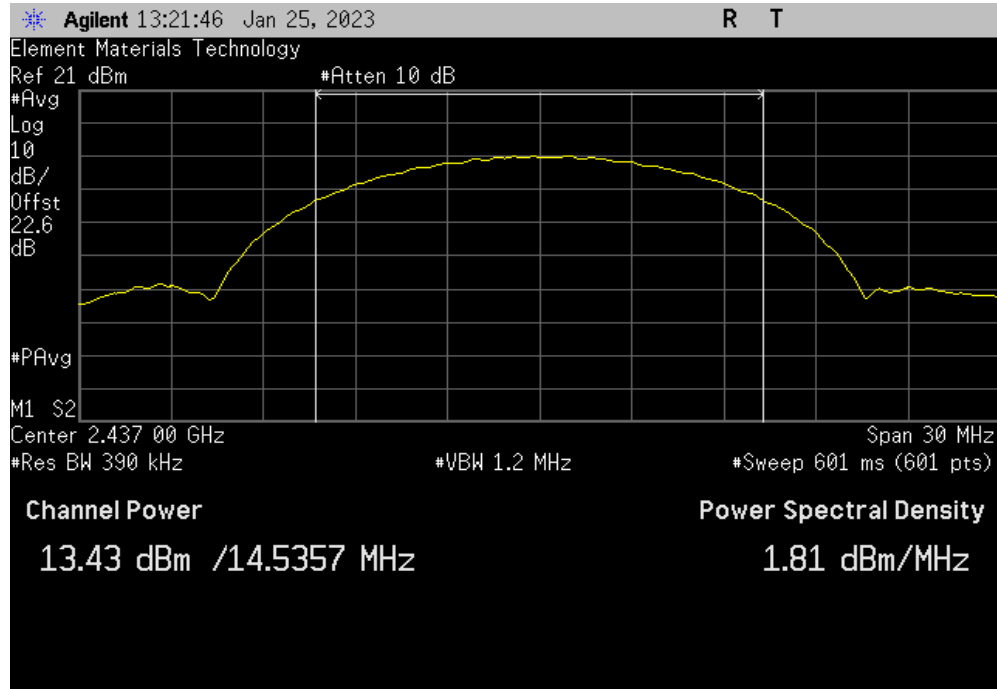


OUTPUT POWER

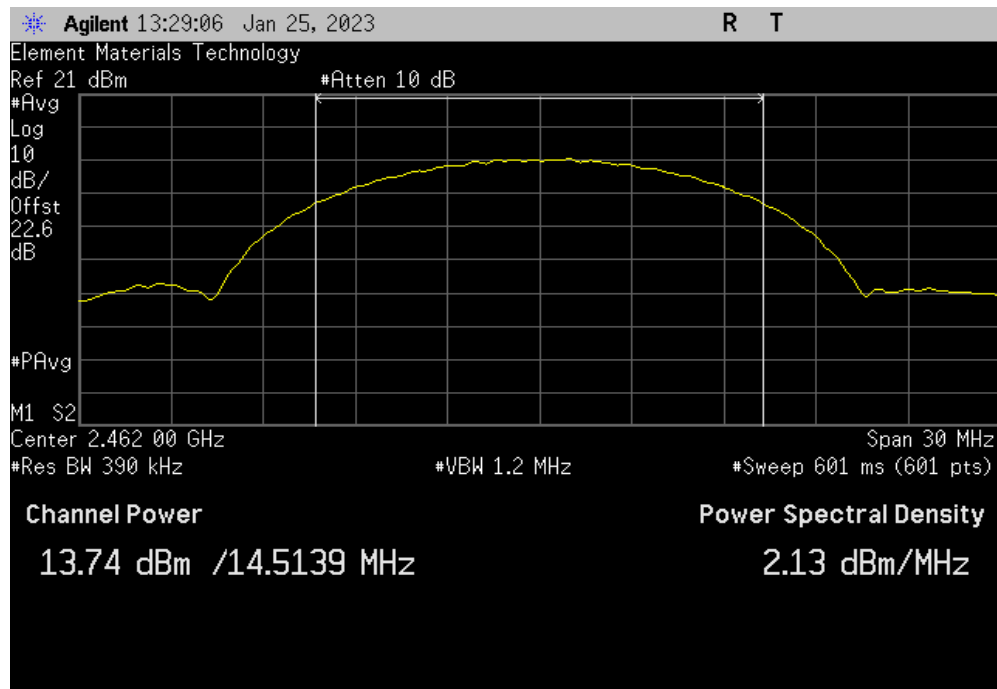


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	13.434	0	13.4	30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	13.743	0	13.7	30	Pass	

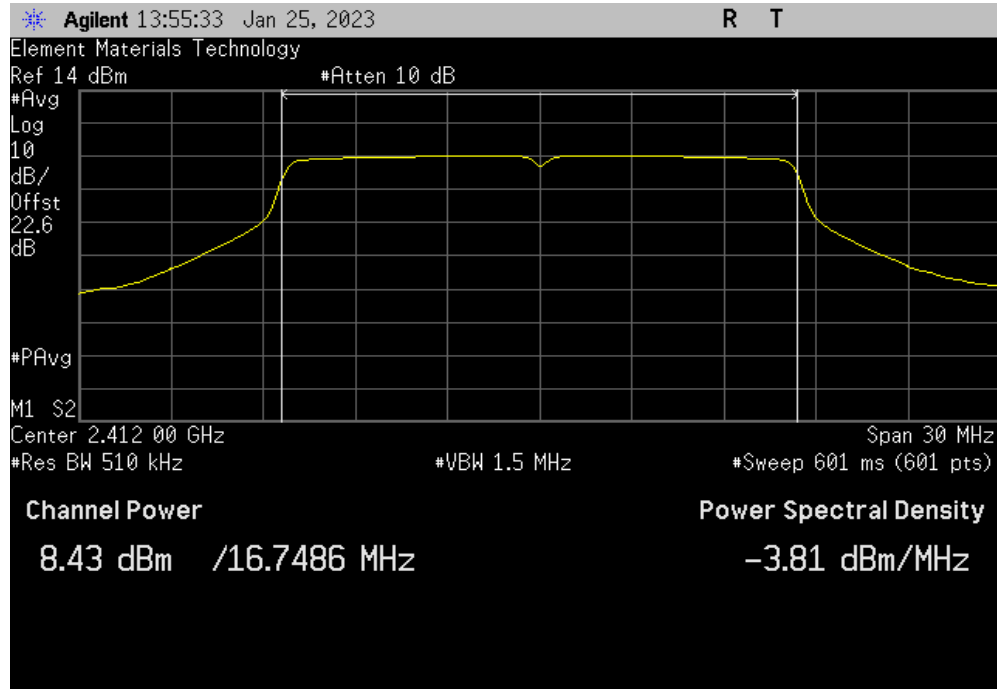


OUTPUT POWER

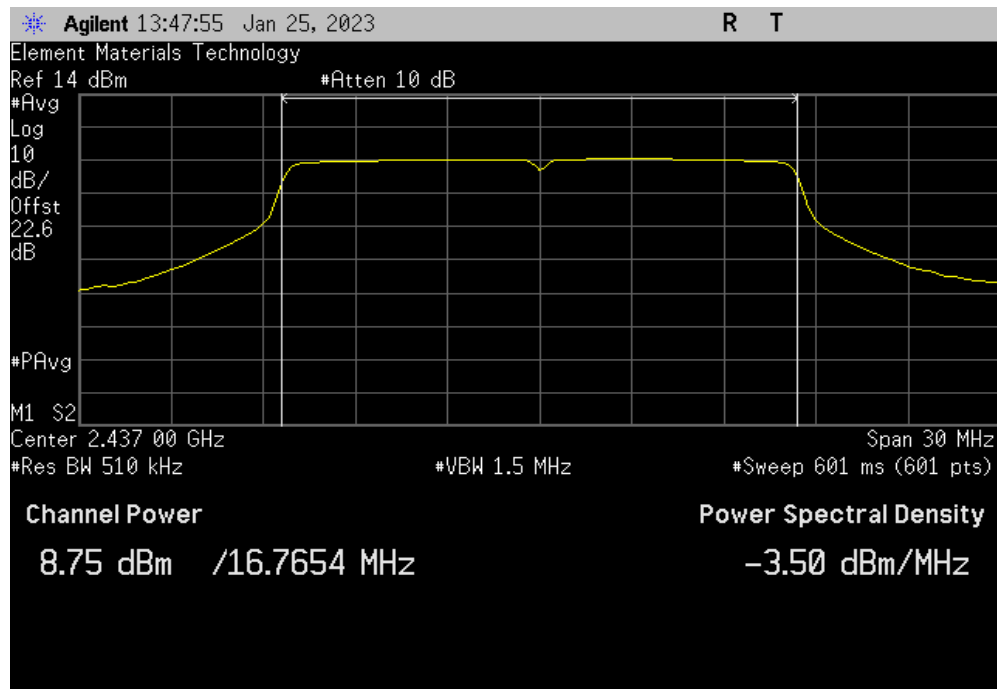


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	8.427	0	8.4	30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	8.747	0	8.7	30	Pass	

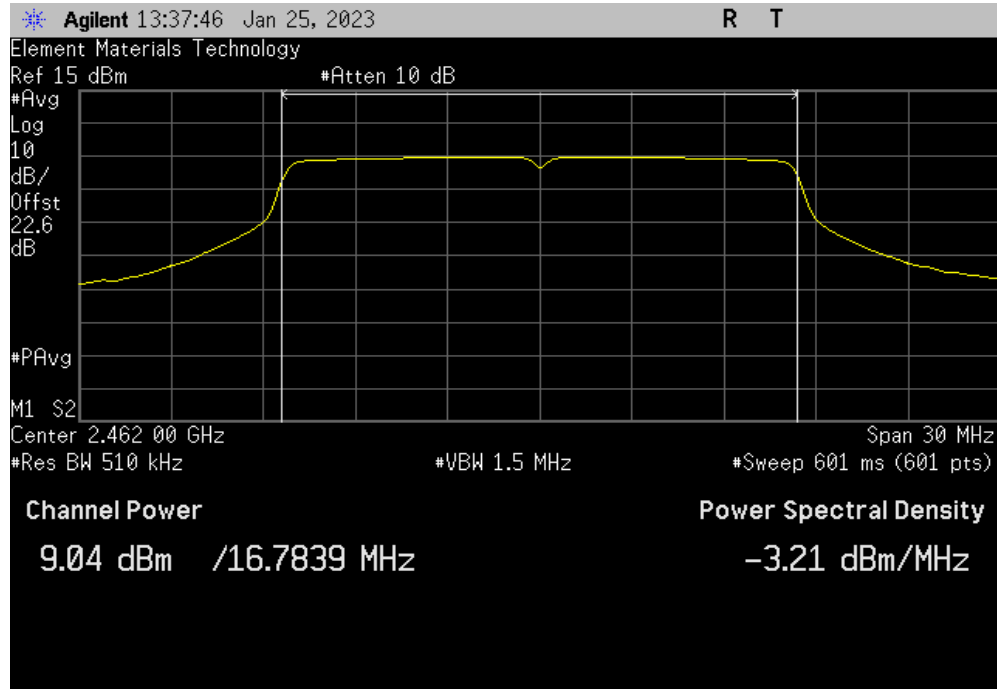


OUTPUT POWER

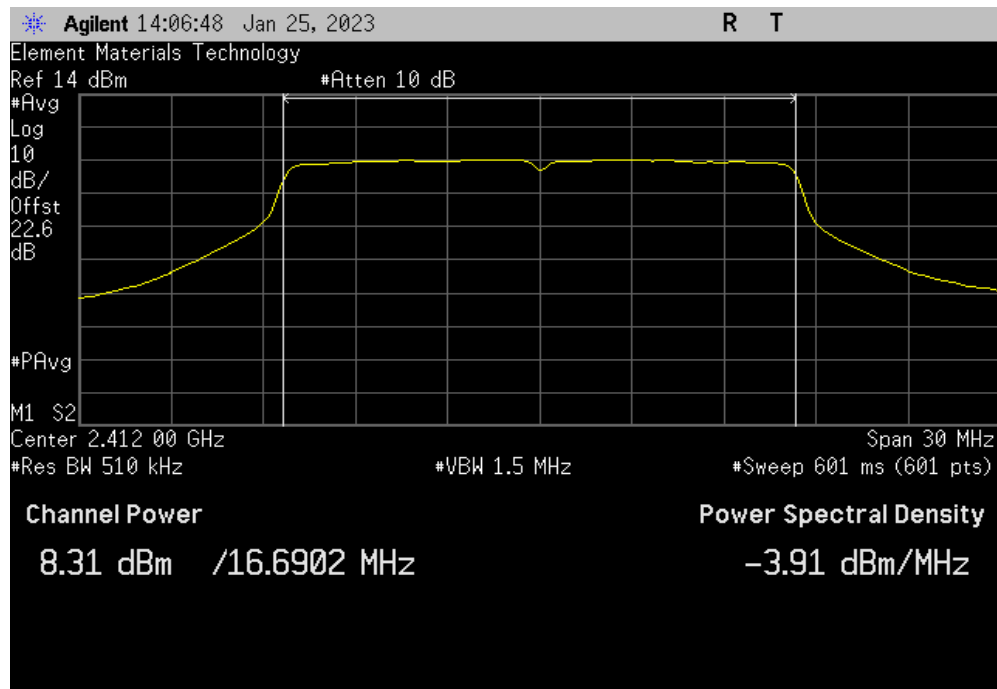


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	9.044	0	9	30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	8.314	0	8.3	30	Pass	

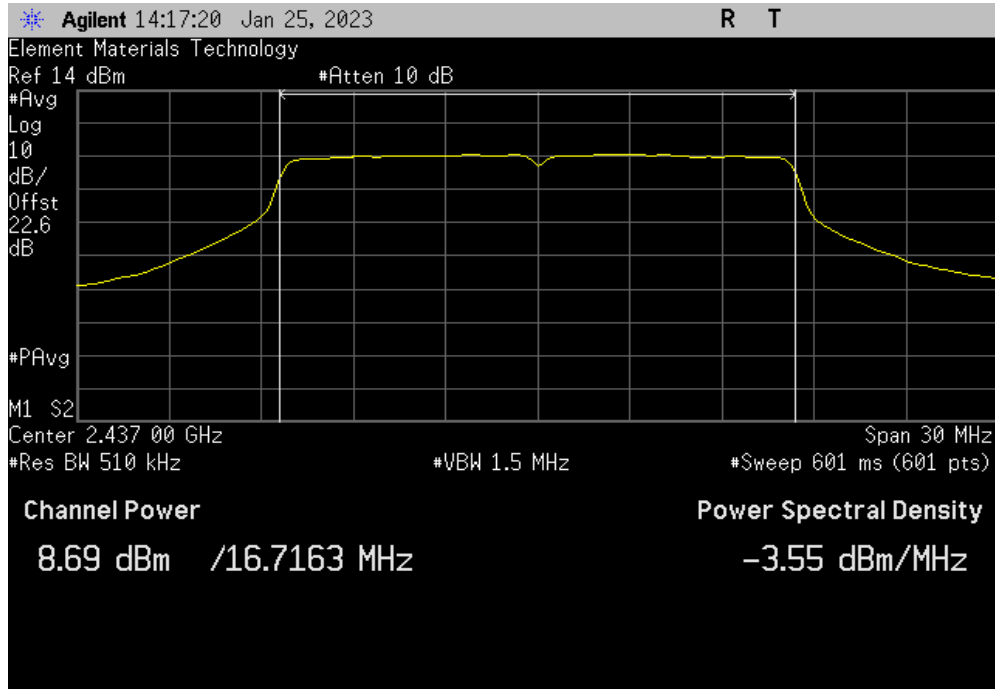


OUTPUT POWER

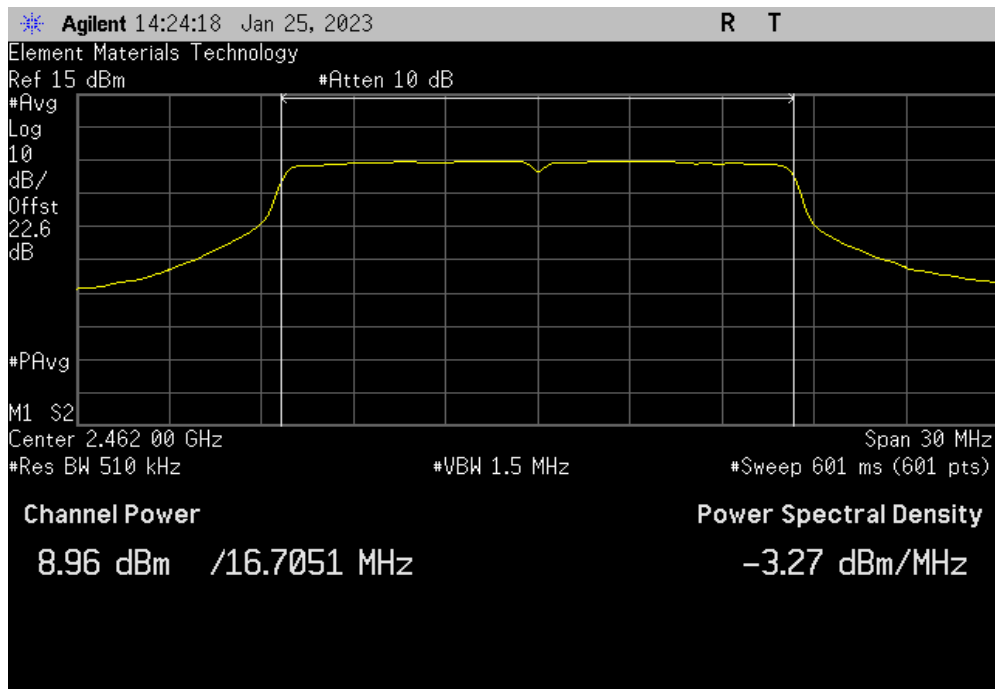


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	8.686	0	8.7	30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	8.955	0	9	30	Pass	

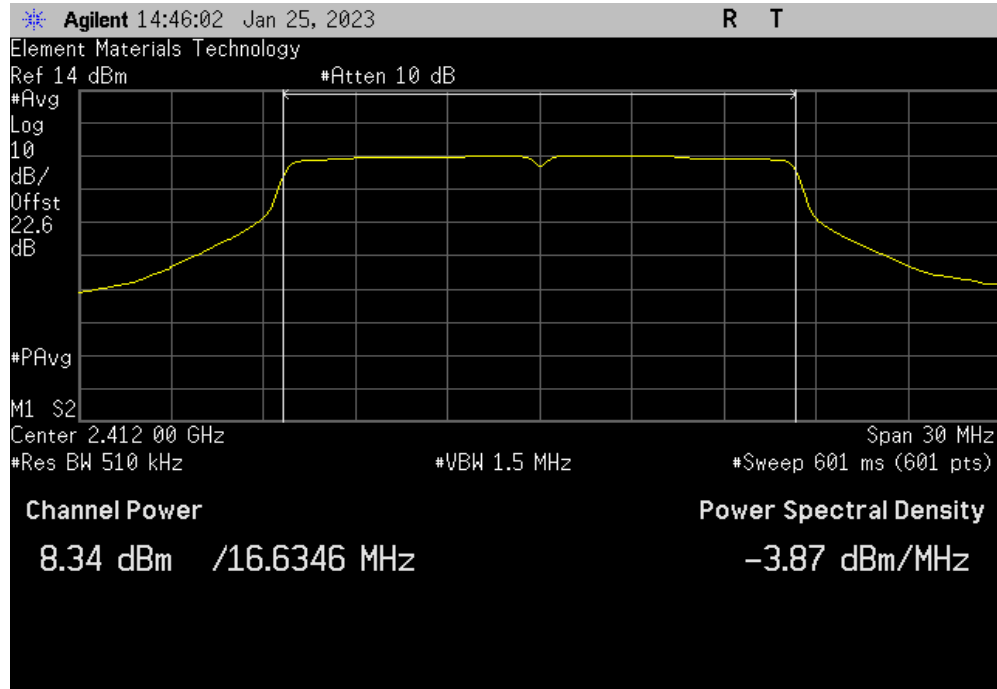


OUTPUT POWER

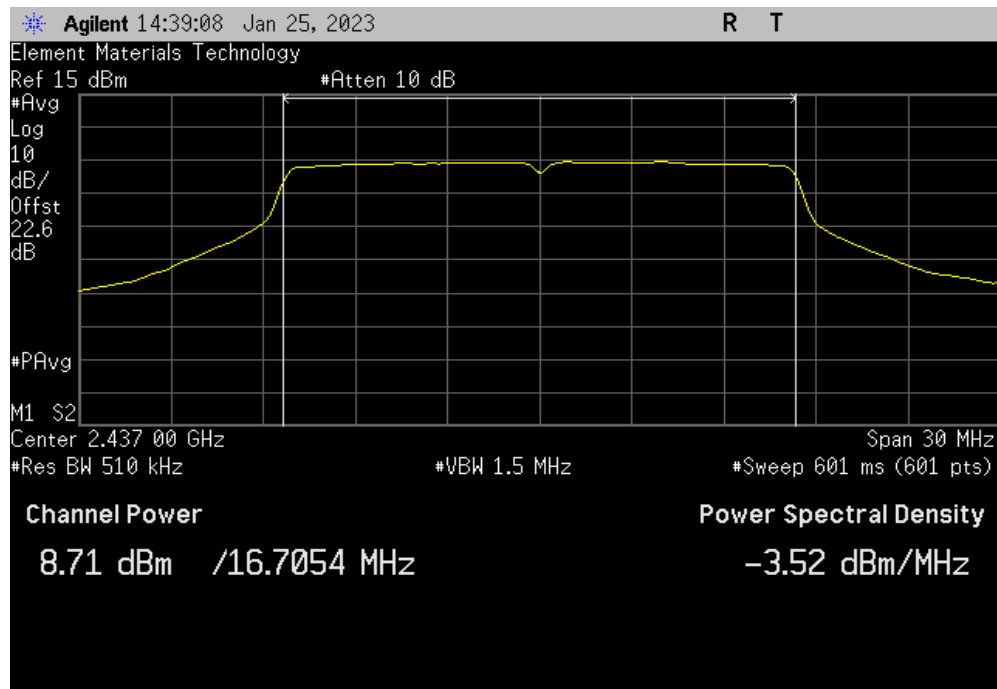


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	8.335	0	8.3	30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	8.708	0	8.7	30	Pass	

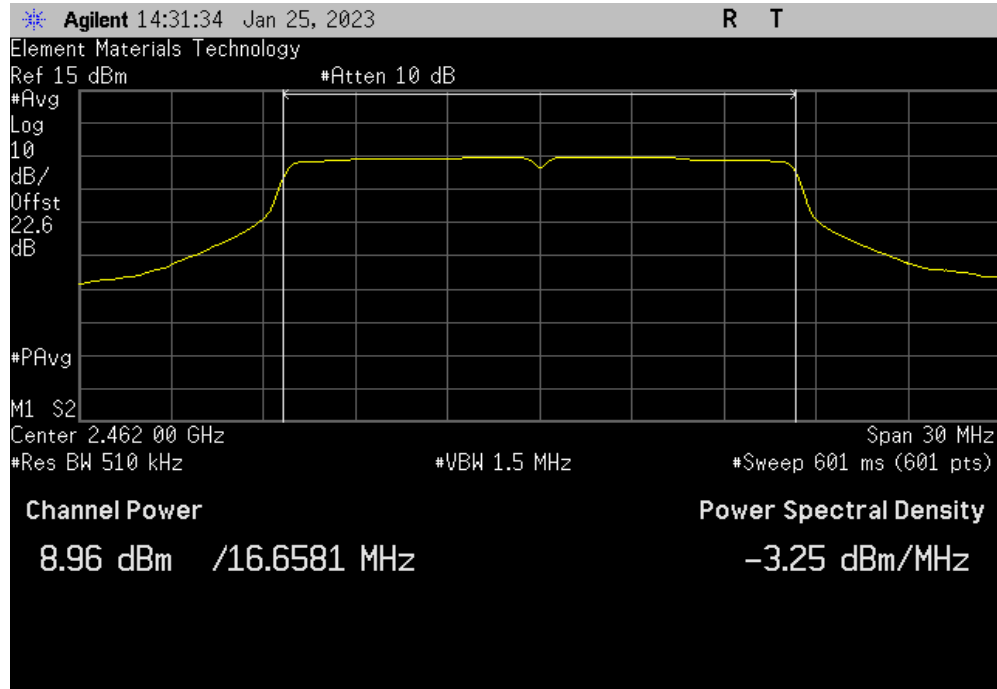


OUTPUT POWER

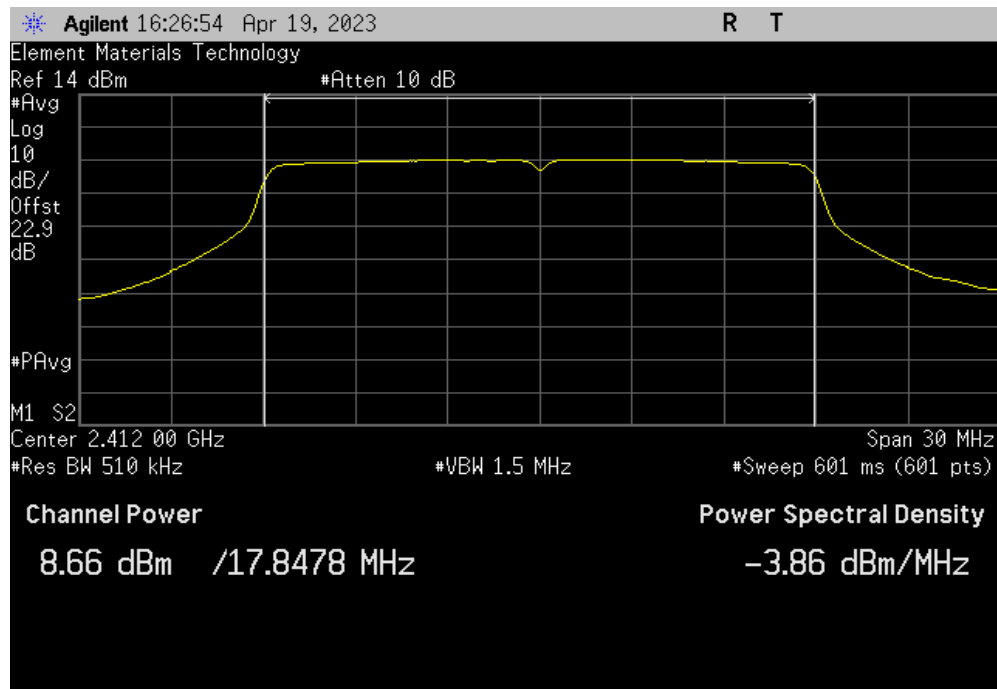


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	8.963	0	9	30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	8.66	0	8.7	30	Pass	

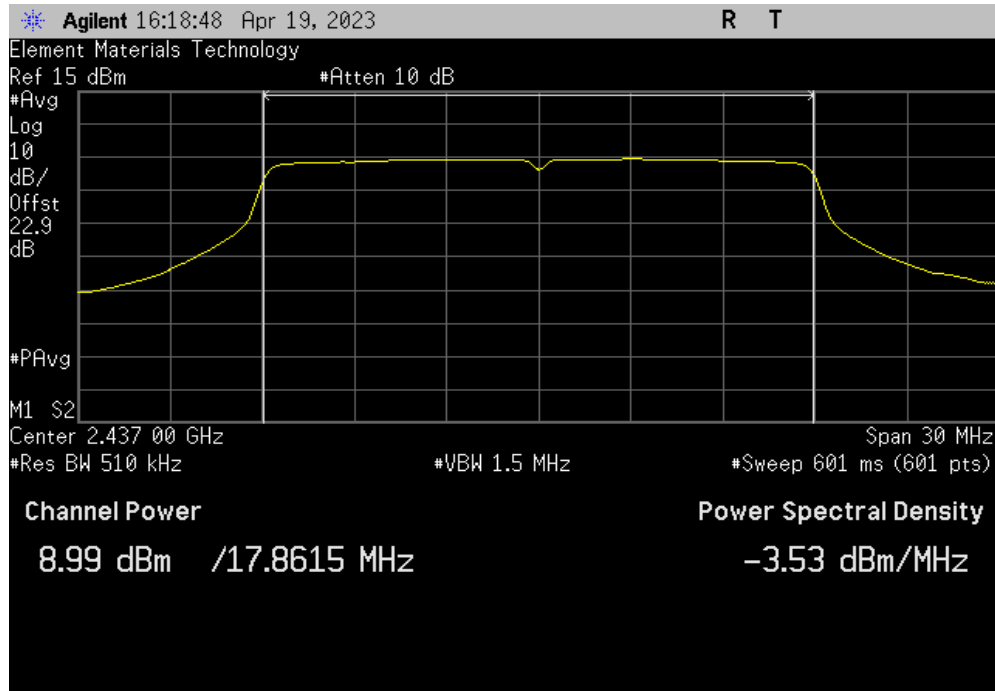


OUTPUT POWER

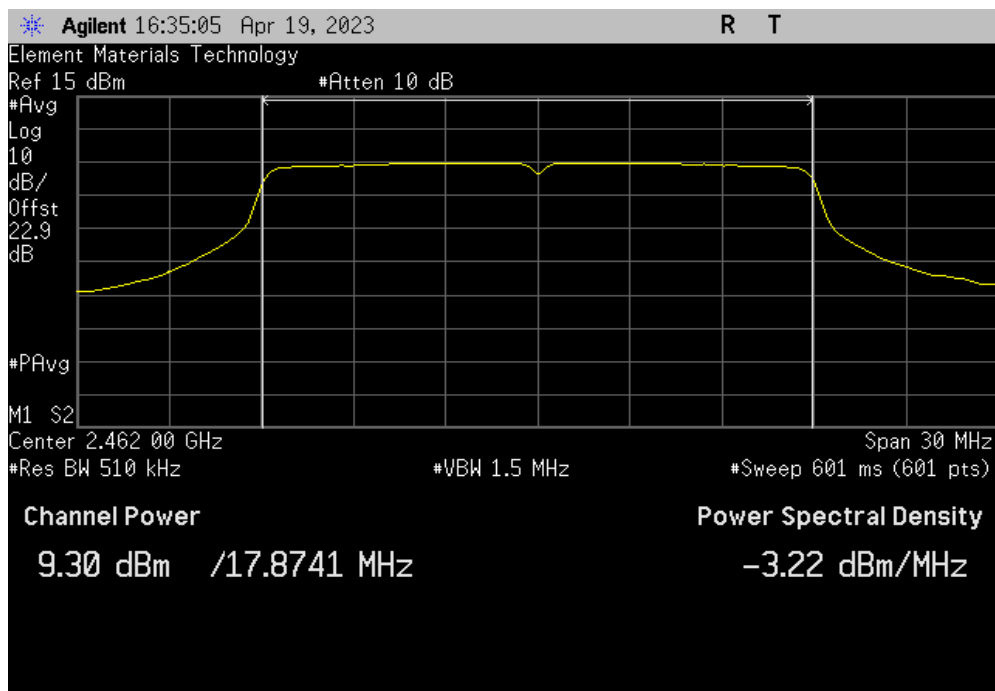


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	8.988	0	9	30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	9.303	0	9.3	30	Pass	

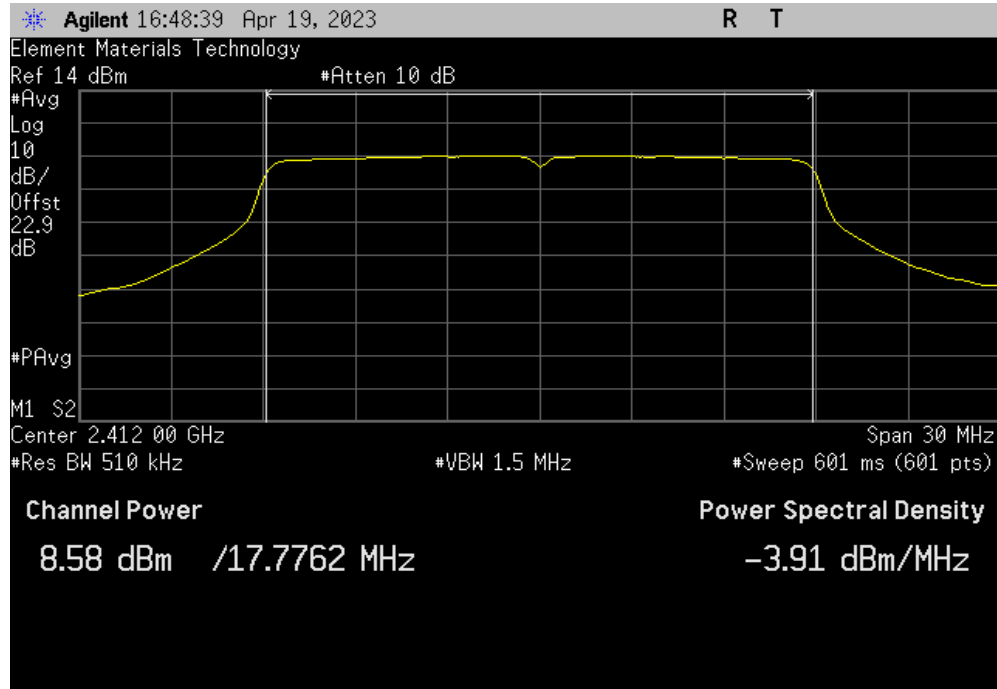


OUTPUT POWER

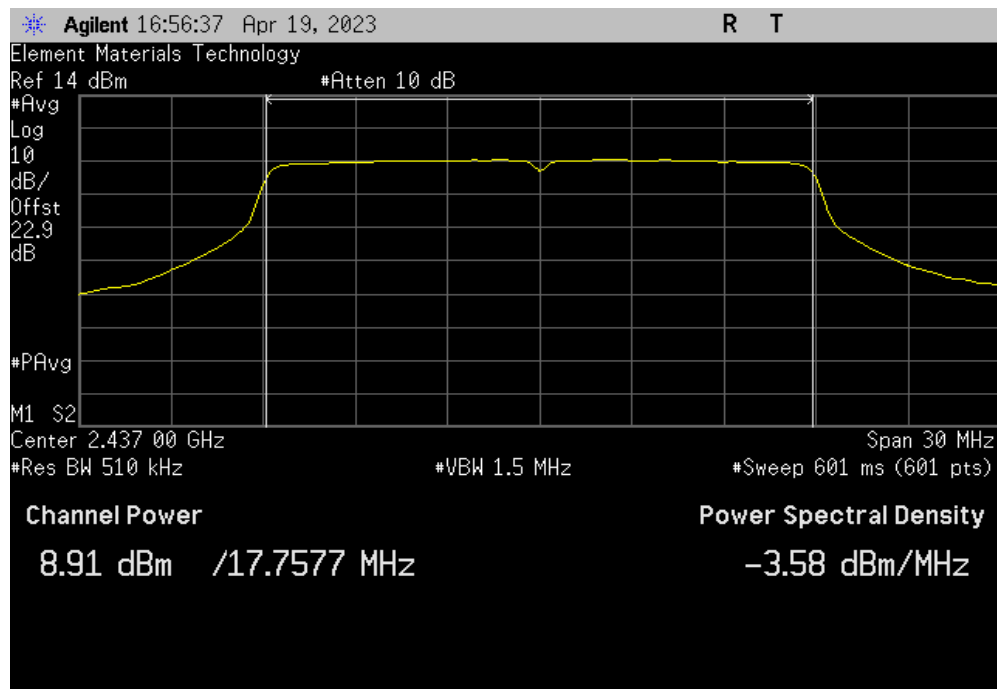


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	8.584	0	8.6	30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	8.912	0	8.9	30	Pass	

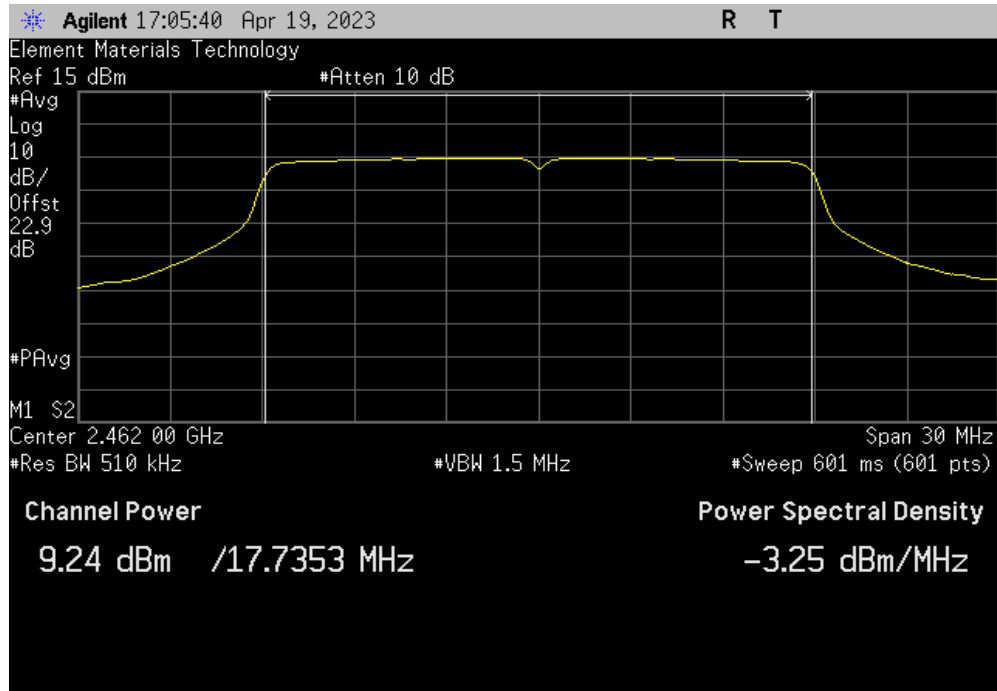


OUTPUT POWER

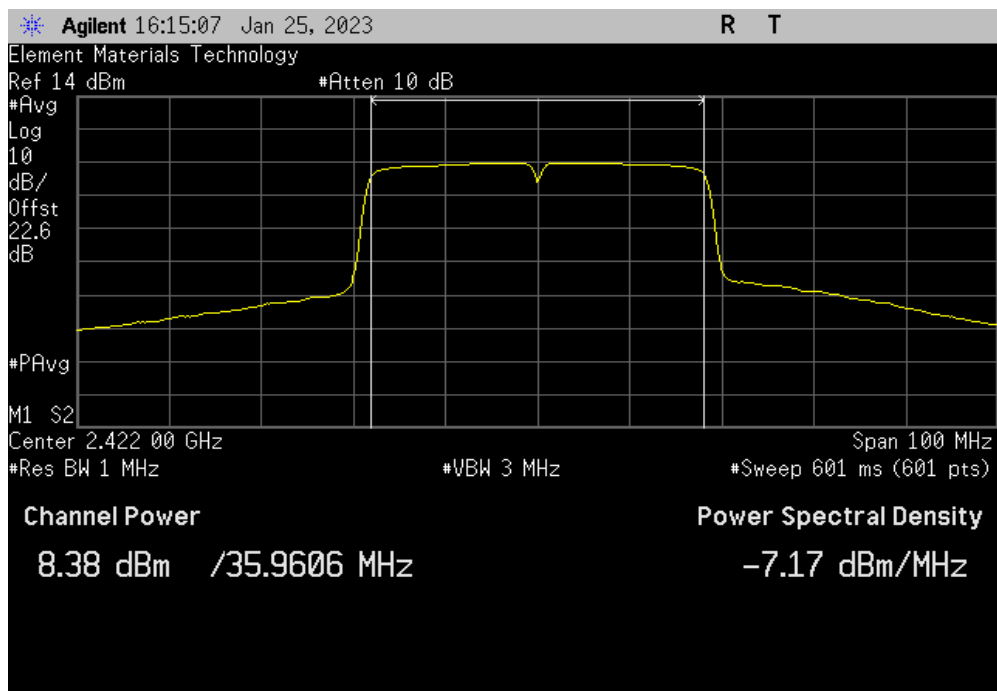


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	9.242	0	9.2	30	Pass	



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1/5, 2422 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	8.384	0	8.4	30	Pass	

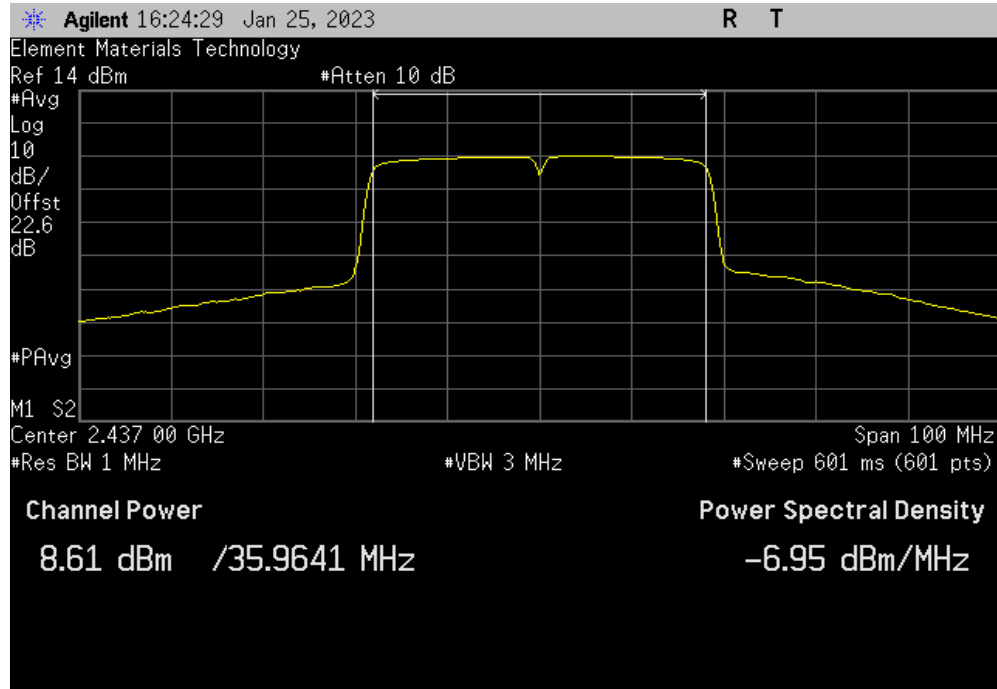


OUTPUT POWER

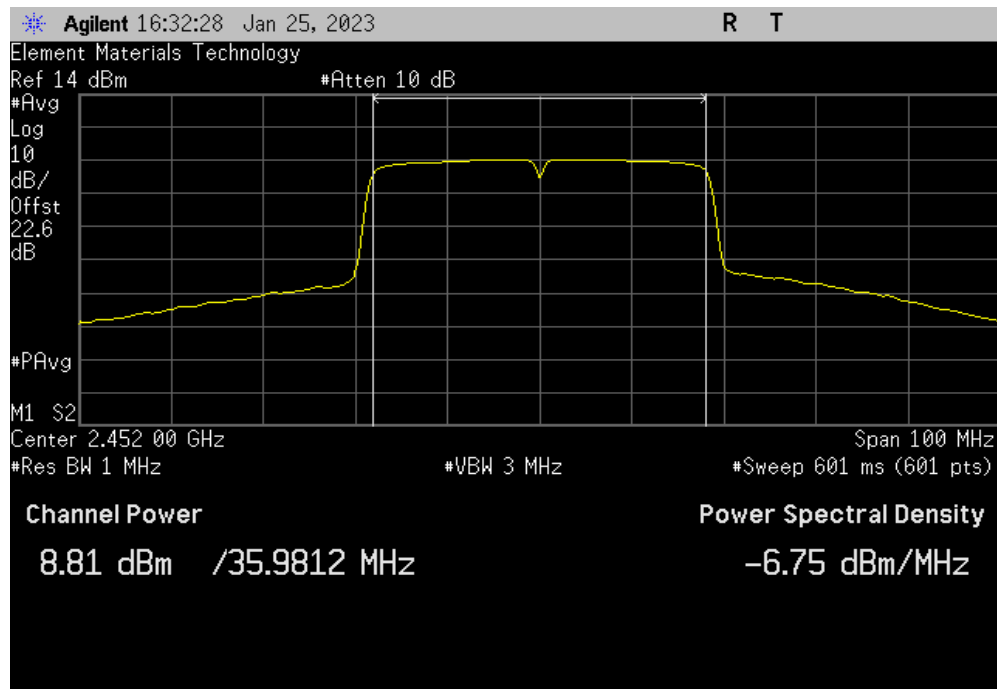


TMTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 4/8, 2437 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	8.608	0	8.6	30	Pass	



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 7/11, 2452 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	8.814	0	8.8	30	Pass	

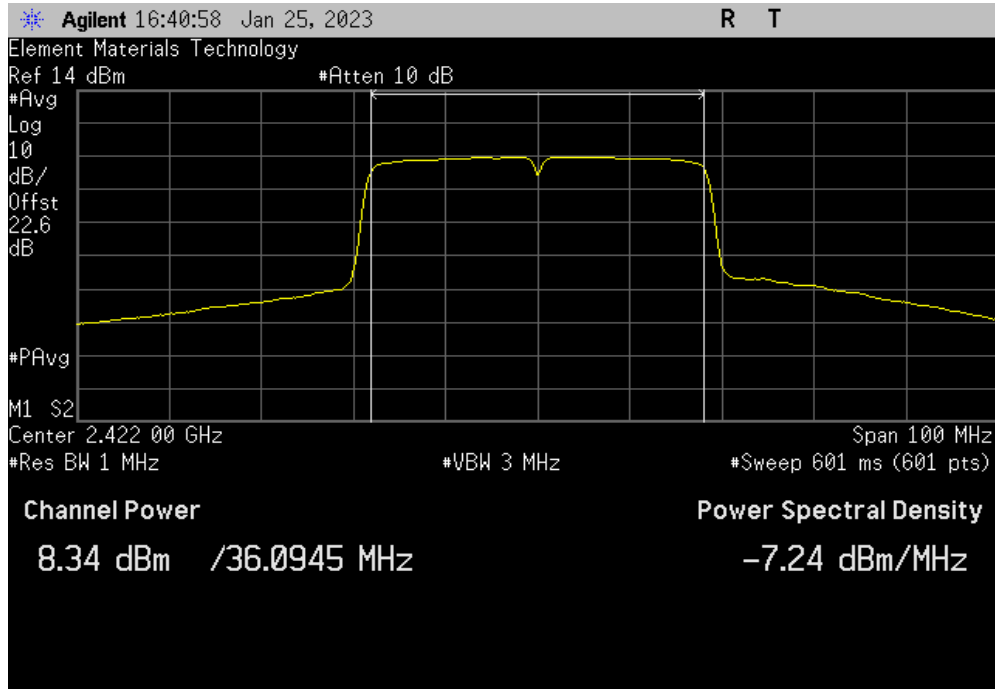


OUTPUT POWER

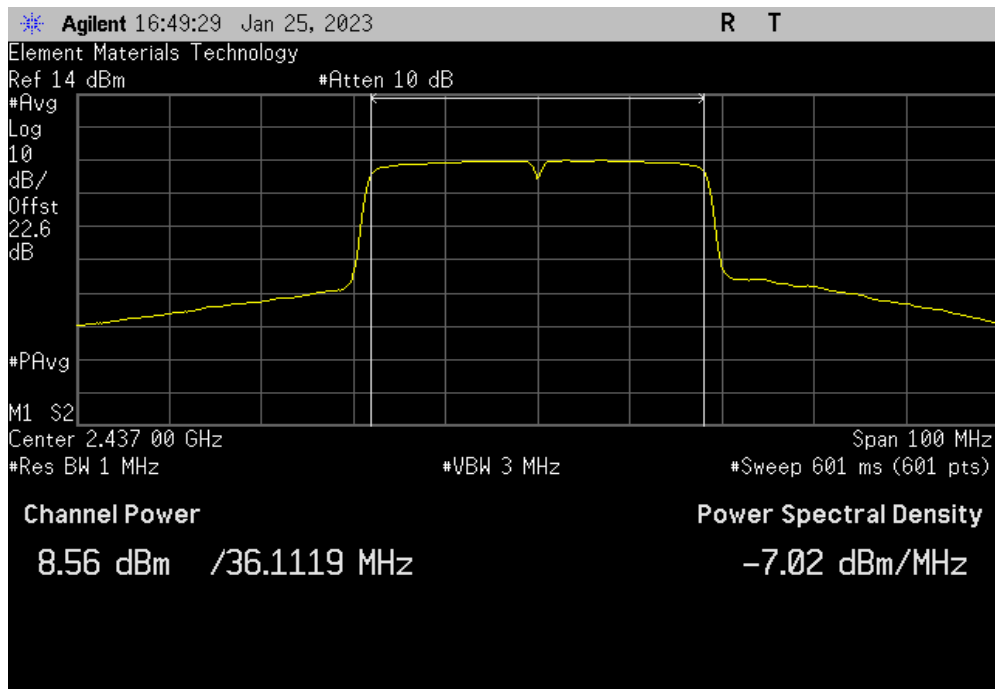


TMTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1/5, 2422 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	8.335	0	8.3	30	Pass	



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 4/8, 2437 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	8.556	0	8.6	30	Pass	

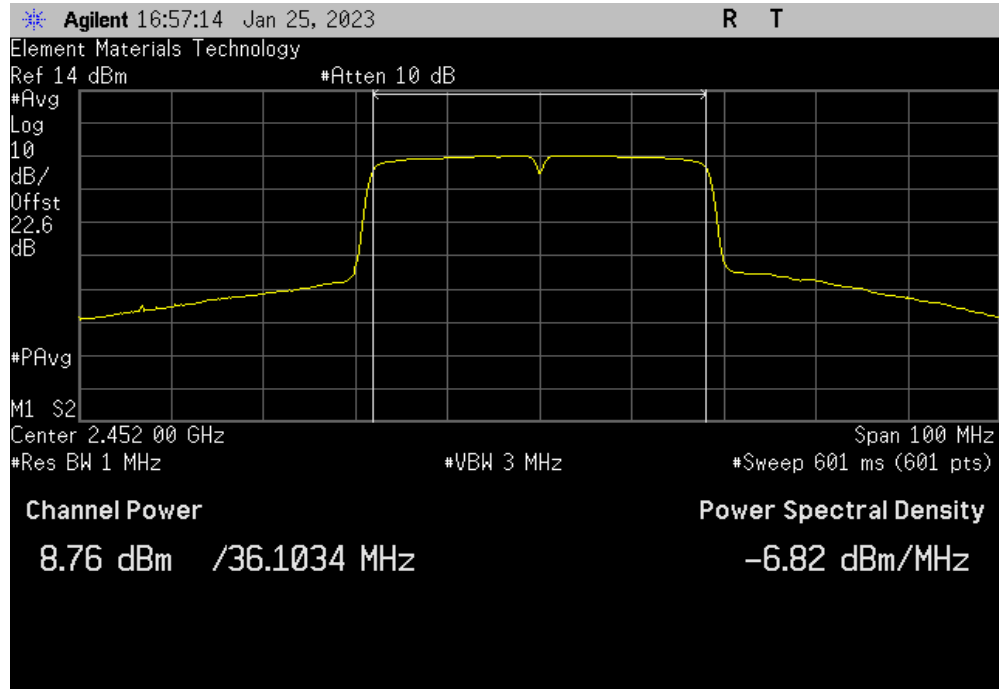


OUTPUT POWER



TbTx 2022.06.03.0 XbTx 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 7/11, 2452 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Limit (dBm)	Result	
	8.757	0	8.8	30	Pass	



EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)



XMIT 2022.02.07.0

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
Attenuator	S.M. Electronics	SA18H-20	REK	2022-02-15	2023-02-15
Cable	Micro-Coax	UFD150A-1-0720-200200	NCW	2023-01-18	2024-01-18
Block - DC	Weinschel Corp.	7006	AMS	2023-01-18	2024-01-18
Generator - Signal	Agilent	N5183A	TIA	2022-06-25	2024-06-25
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	2023-01-19	2024-01-19
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAT	2022-11-03	2023-11-03
Attenuator	S.M. Electronics	SA18H-20	REK	2023-03-08	2024-03-08

TEST DESCRIPTION

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

The fundamental emission output power (maximum average conducted output power) was measured using the channels and modes as called out on the following data sheets. The transmit power was set to its default maximum.

Prior to measuring output power; the emission bandwidth (B) and the transmission pulse duration (T) were measured. Both are required to determine the method of measuring Maximum Conducted Output Power. The transmission pulse duration (T) was measured using a zero span on the spectrum analyzer to see the pulses in the time domain.

The method AVGSA-2 in section 11.9.2.2.4 of ANSI C63.10:2013 was used to make the measurement. This method uses trace averaging across ON and OFF times of the EUT transmissions in the spectrum analyzer channel power function using an RMS detector. Following the measurement a duty cycle correction was applied by adding $[10 \log (1 / D)]$, where D is the duty cycle, to the measured power to compute the average power during the actual transmission times.

Equivalent Isotropic Radiated Power (EIRP) = Max Measured Power + Antenna gain (dBi)

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)



THTx 2022.06.03.0 XMHz 2022.02.07.0

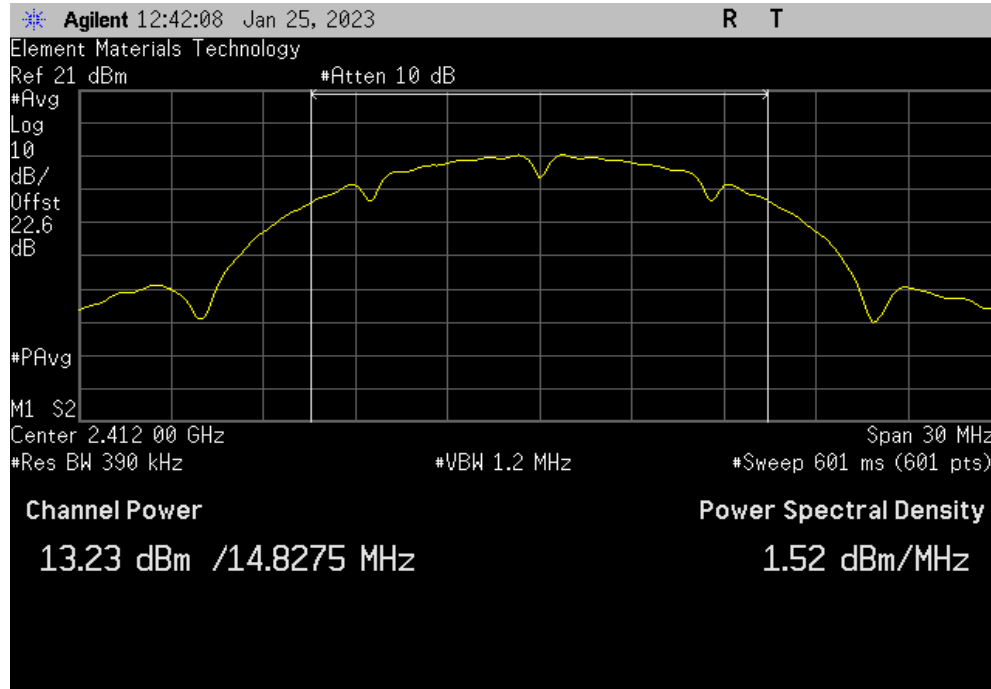
EUT: GFD200				Work Order: GLOW0038				
Serial Number: XB2-839				Date: 19-Apr-23				
Customer: Glowforge Incorporated				Temperature: 20.9 °C				
Attendees: Jason Bluhm				Humidity: 27% RH				
Project: None				Barometric Pres.: 1023 mbar				
Tested by: Harry Zhao		Power: 120VAC/60Hz		Job Site: NC06				
TEST SPECIFICATIONS				Test Method				
FCC 15.247:2023				ANSI C63.10:2013				
RSS-247 Issue 2:2017				ANSI C63.10:2013				
RSS-Gen Issue 5:2018+A1:2019+A2:2021				ANSI C63.10:2013				
COMMENTS								
Reference offset connection between EUT and Spectrum analyzer: DC Block + 20 dB attenuator + measurement cable + patched coax cable								
DEVIATIONS FROM TEST STANDARD								
None								
Configuration #	2							
		Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
20 MHz								
2400 MHz - 2483.5 MHz Band								
802.11(b) 1 Mbps								
Low Channel 1, 2412 MHz		13.226	0	13.2	4.9	18.1	36	Pass
Mid Channel 6, 2437 MHz		13.517	0	13.5	4.9	18.4	36	Pass
High Channel 11, 2462 MHz		13.86	0	13.9	4.9	18.8	36	Pass
802.11(b) 11 Mbps								
Low Channel 1, 2412 MHz		13.001	0	13	4.9	17.9	36	Pass
Mid Channel 6, 2437 MHz		13.434	0	13.4	4.9	18.3	36	Pass
High Channel 11, 2462 MHz		13.743	0	13.7	4.9	18.6	36	Pass
802.11(g) 6 Mbps								
Low Channel 1, 2412 MHz		8.427	0	8.4	4.9	13.3	36	Pass
Mid Channel 6, 2437 MHz		8.747	0	8.7	4.9	13.6	36	Pass
High Channel 11, 2462 MHz		9.044	0	9	4.9	13.9	36	Pass
802.11(g) 36 Mbps								
Low Channel 1, 2412 MHz		8.314	0	8.3	4.9	13.2	36	Pass
Mid Channel 6, 2437 MHz		8.686	0	8.7	4.9	13.6	36	Pass
High Channel 11, 2462 MHz		8.955	0	9	4.9	13.9	36	Pass
802.11(g) 54 Mbps								
Low Channel 1, 2412 MHz		8.335	0	8.3	4.9	13.2	36	Pass
Mid Channel 6, 2437 MHz		8.708	0	8.7	4.9	13.6	36	Pass
High Channel 11, 2462 MHz		8.963	0	9	4.9	13.9	36	Pass
802.11(n) MCS0								
Low Channel 1, 2412 MHz		8.66	0	8.7	4.9	13.6	36	Pass
Mid Channel 6, 2437 MHz		8.988	0	9	4.9	13.9	36	Pass
High Channel 11, 2462 MHz		9.303	0	9.3	4.9	14.2	36	Pass
802.11(n) MCS7								
Low Channel 1, 2412 MHz		8.584	0	8.6	4.9	13.5	36	Pass
Mid Channel 6, 2437 MHz		8.912	0	8.9	4.9	13.8	36	Pass
High Channel 11, 2462 MHz		9.242	0	9.2	4.9	14.1	36	Pass
40 MHz								
2400 MHz - 2483.5 MHz Band								
802.11(n) MCS0								
Low Channel 1/5, 2422 MHz		8.384	0	8.4	4.9	13.3	36	Pass
Mid Channel 4/8, 2437 MHz		8.608	0	8.6	4.9	13.5	36	Pass
High Channel 7/11, 2452 MHz		8.814	0	8.8	4.9	13.7	36	Pass
802.11(n) MCS7								
Low Channel 1/5, 2422 MHz		8.335	0	8.3	4.9	13.2	36	Pass
Mid Channel 4/8, 2437 MHz		8.556	0	8.6	4.9	13.5	36	Pass
High Channel 7/11, 2452 MHz		8.757	0	8.8	4.9	13.7	36	Pass

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

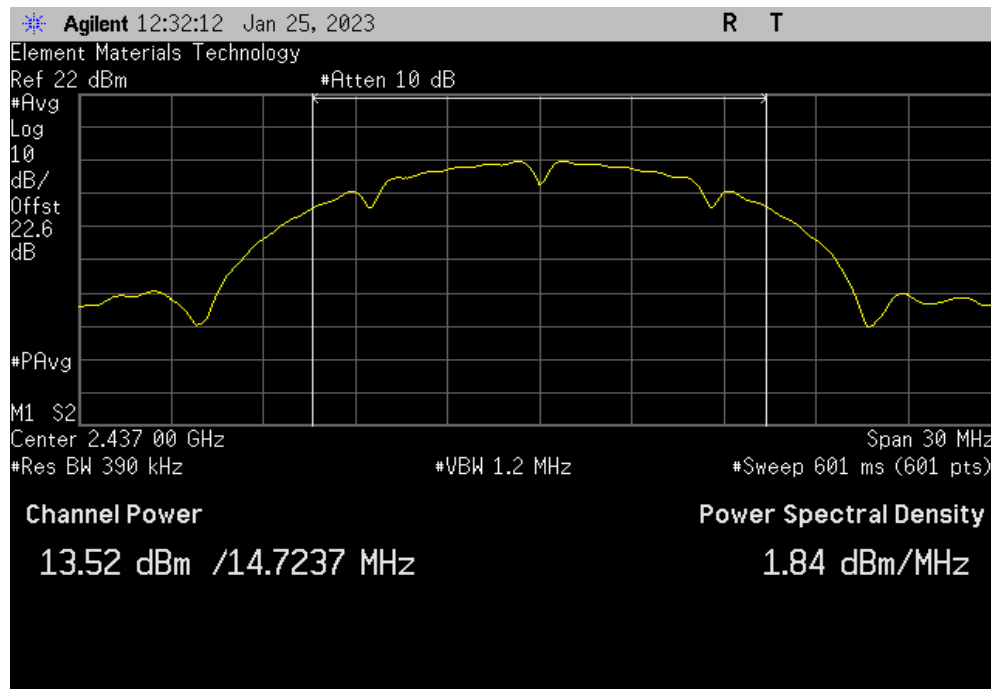


TUTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
13.226	0	13.2	4.9	18.1	36	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
13.517	0	13.5	4.9	18.4	36	Pass

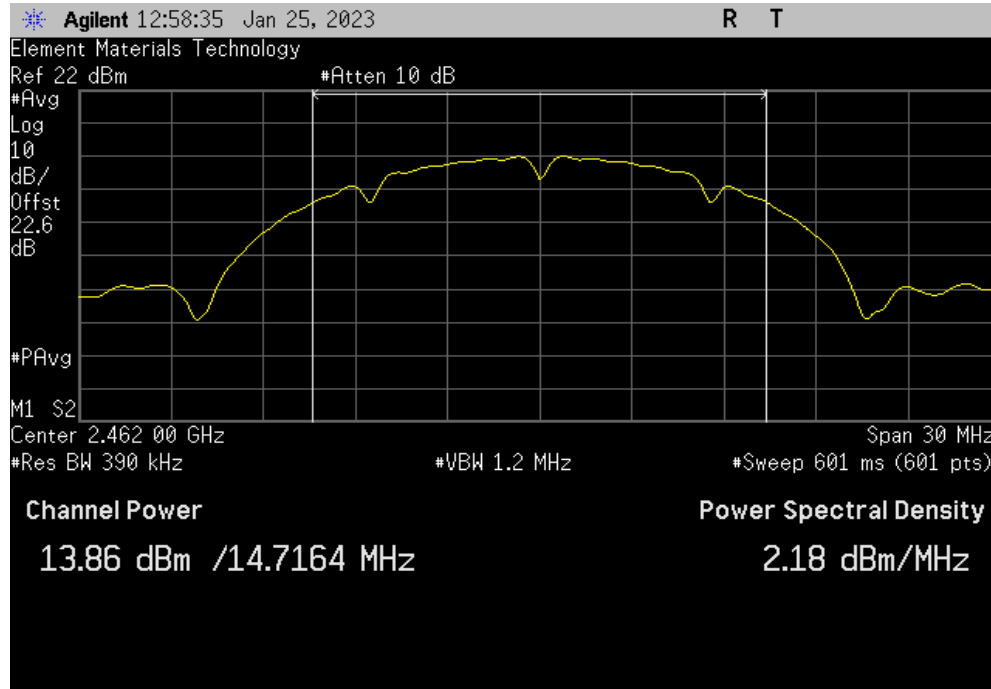


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

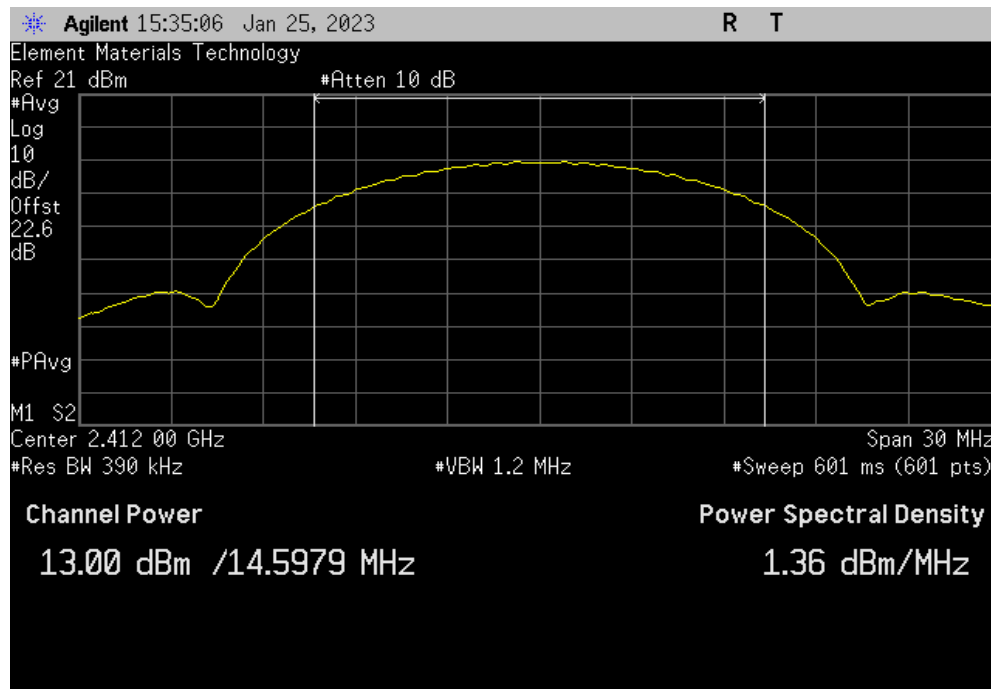


TUTTx 2022.06.03.0 XMt 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
13.86	0	13.9	4.9	18.8	36	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
13.001	0	13	4.9	17.9	36	Pass

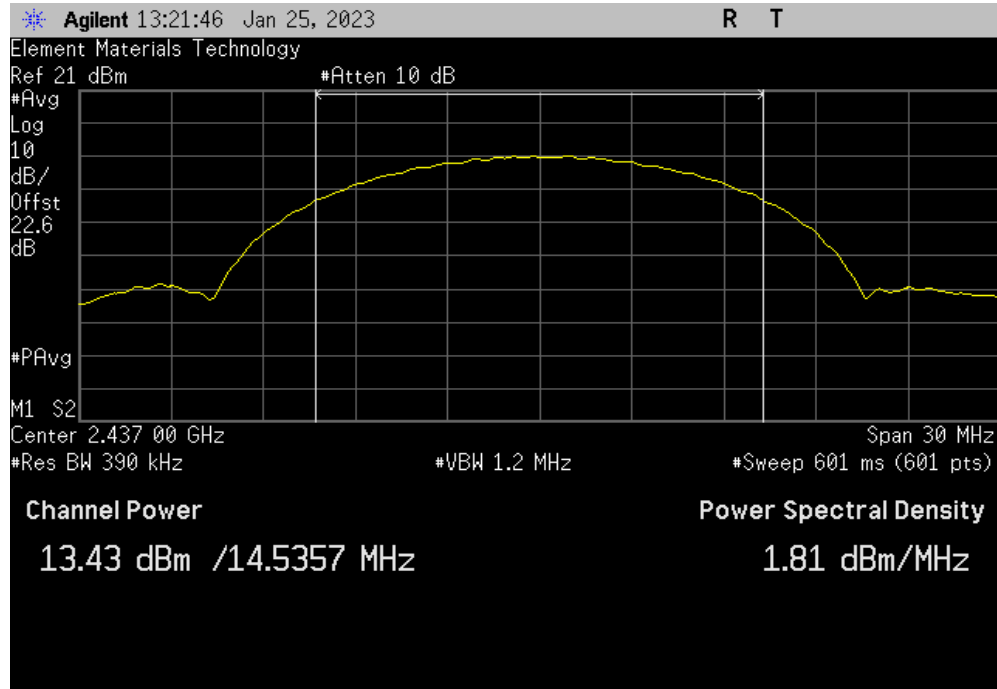


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

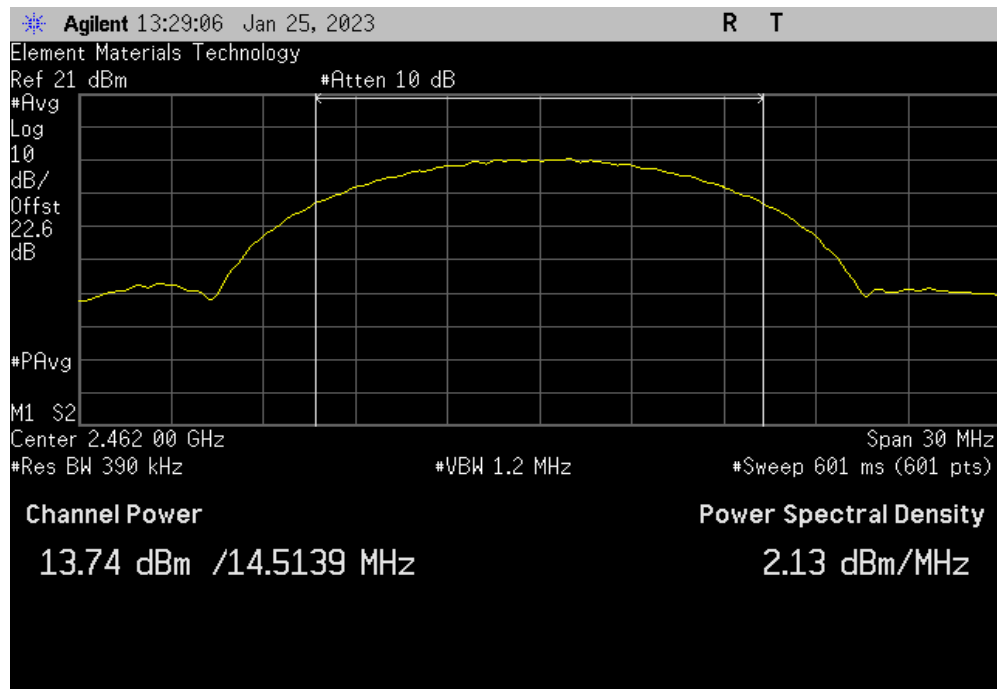


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
13.434	0	13.4	4.9	18.3	36	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
13.743	0	13.7	4.9	18.6	36	Pass

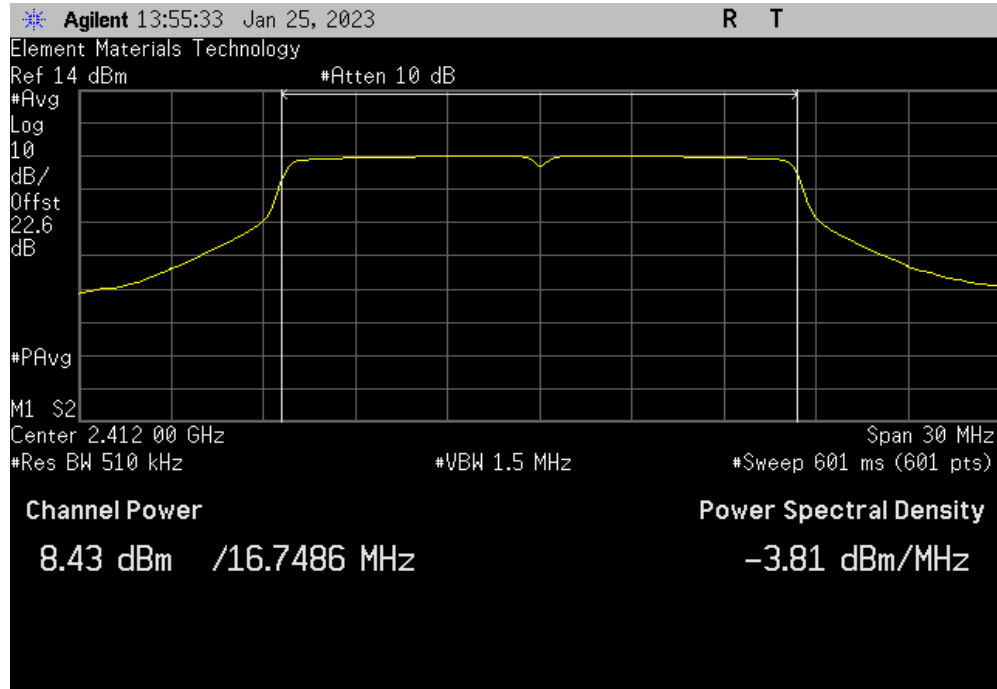


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

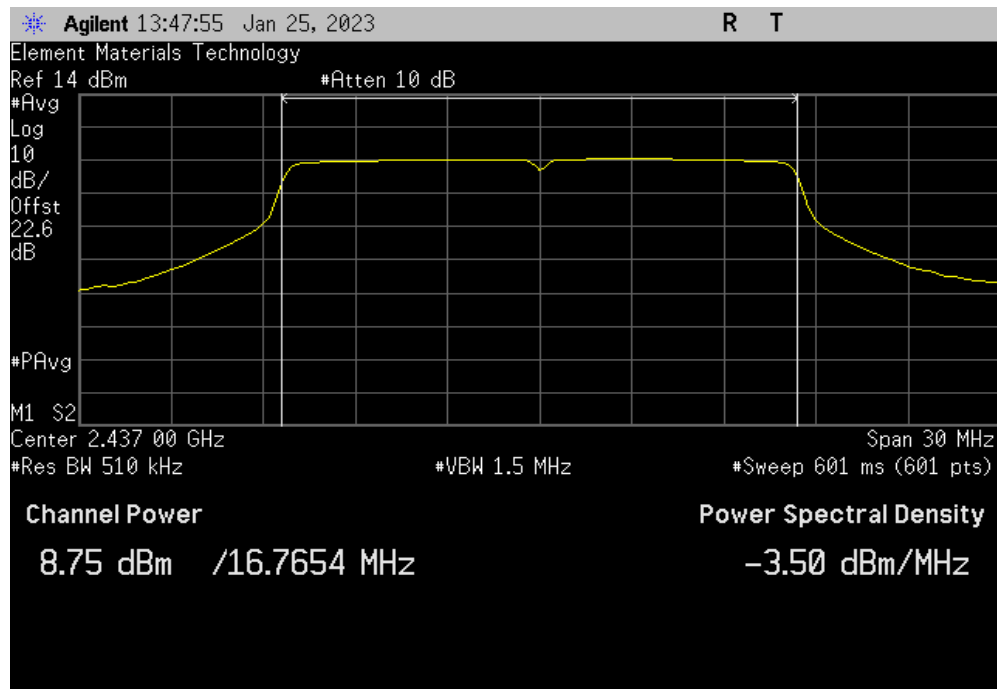


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
8.427	0	8.4	4.9	13.3	36	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
8.747	0	8.7	4.9	13.6	36	Pass

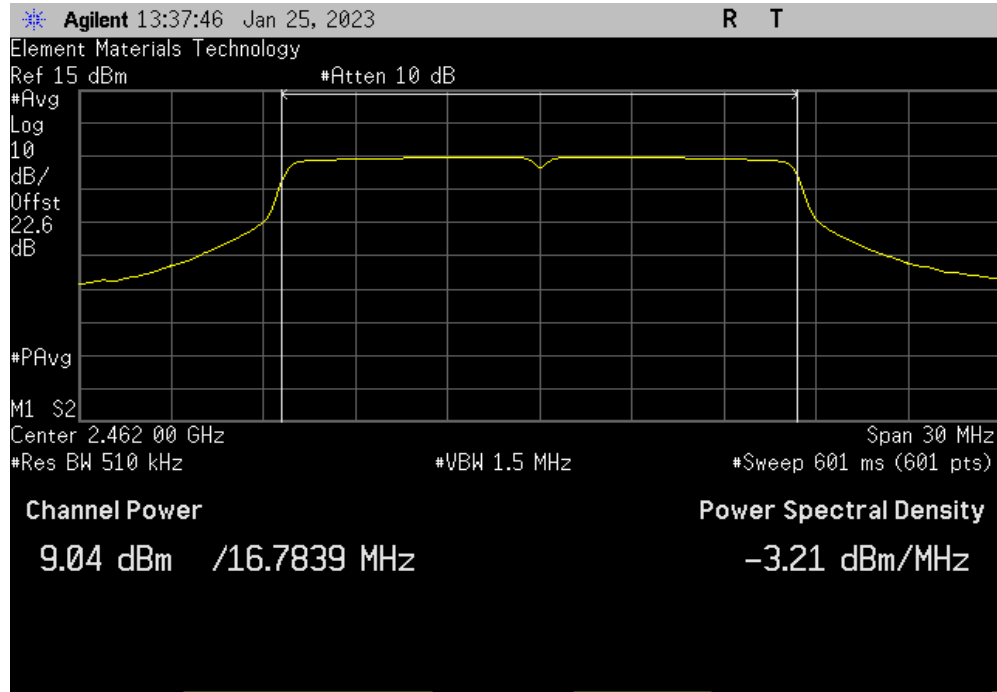


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

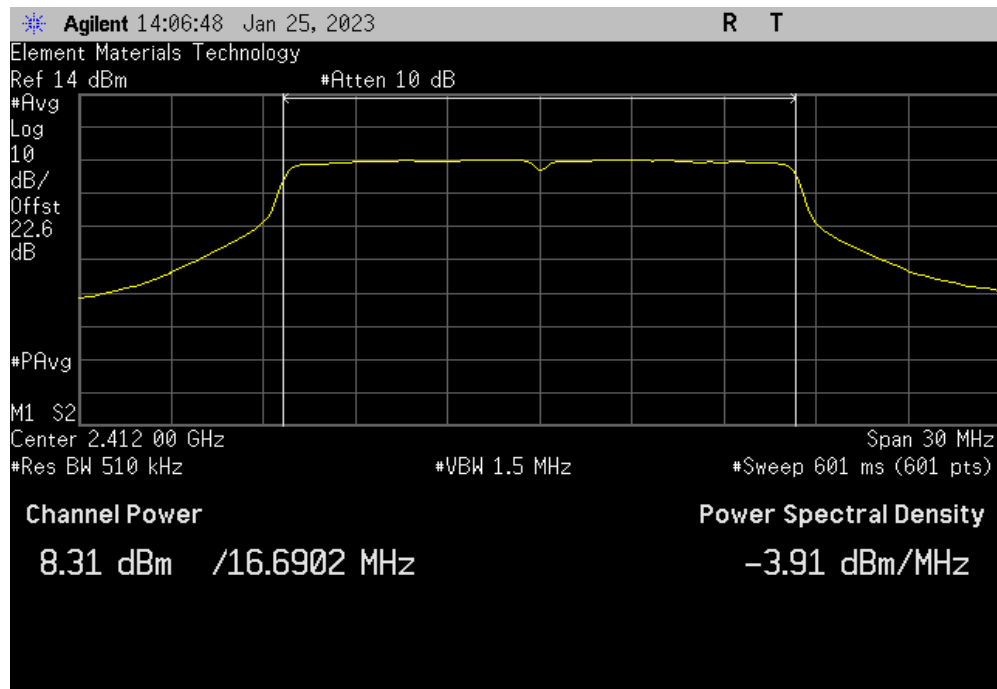


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
9.044	0	9	4.9	13.9	36	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
8.314	0	8.3	4.9	13.2	36	Pass

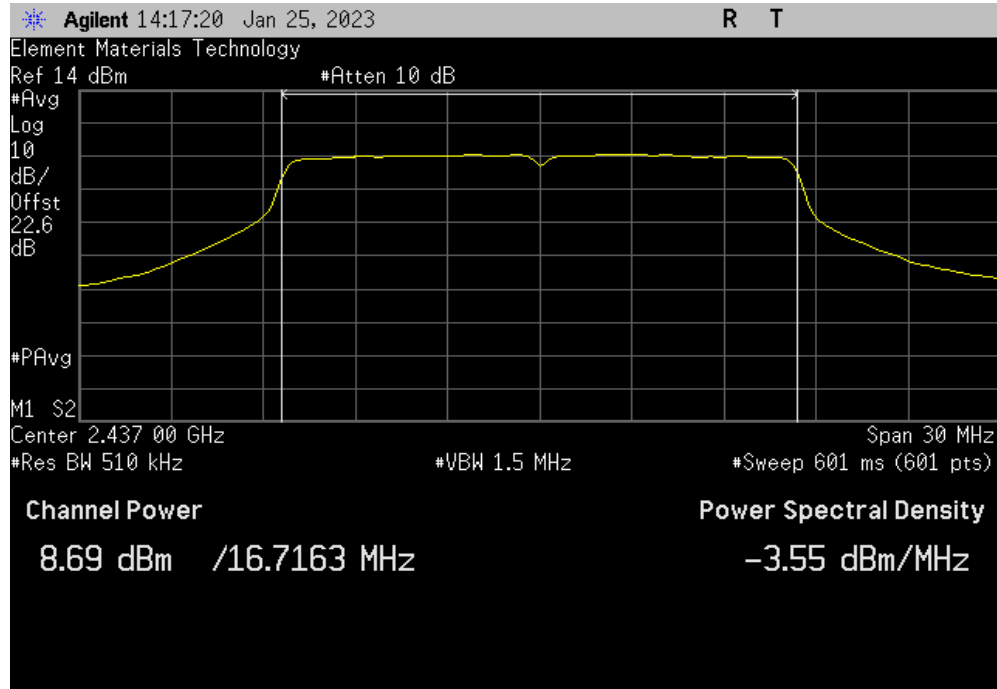


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

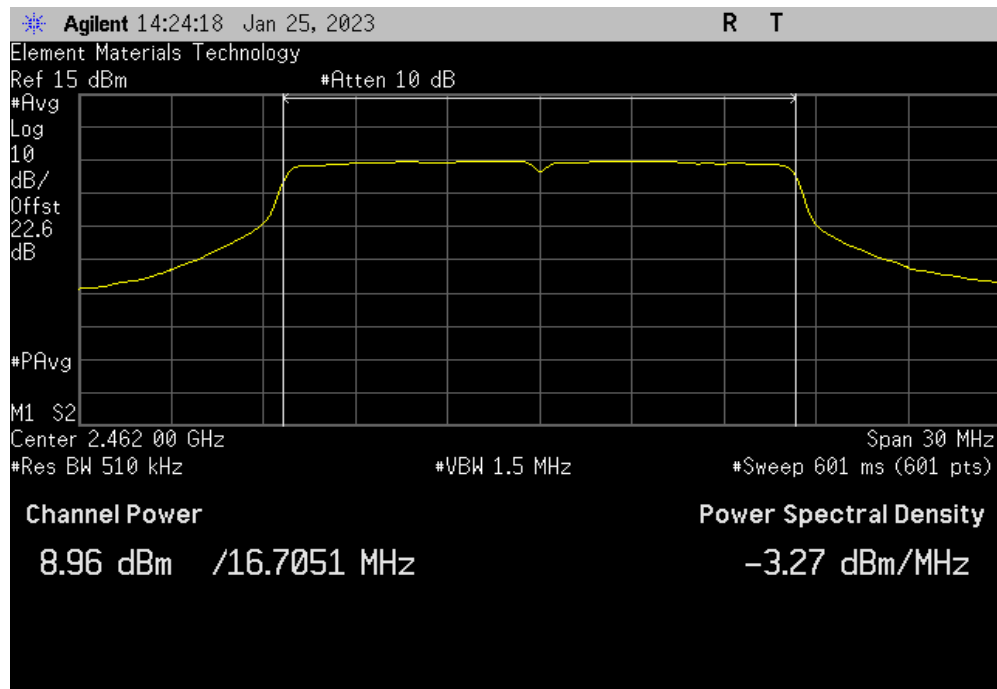


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
8.686	0	8.7	4.9	13.6	36	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
8.955	0	9	4.9	13.9	36	Pass

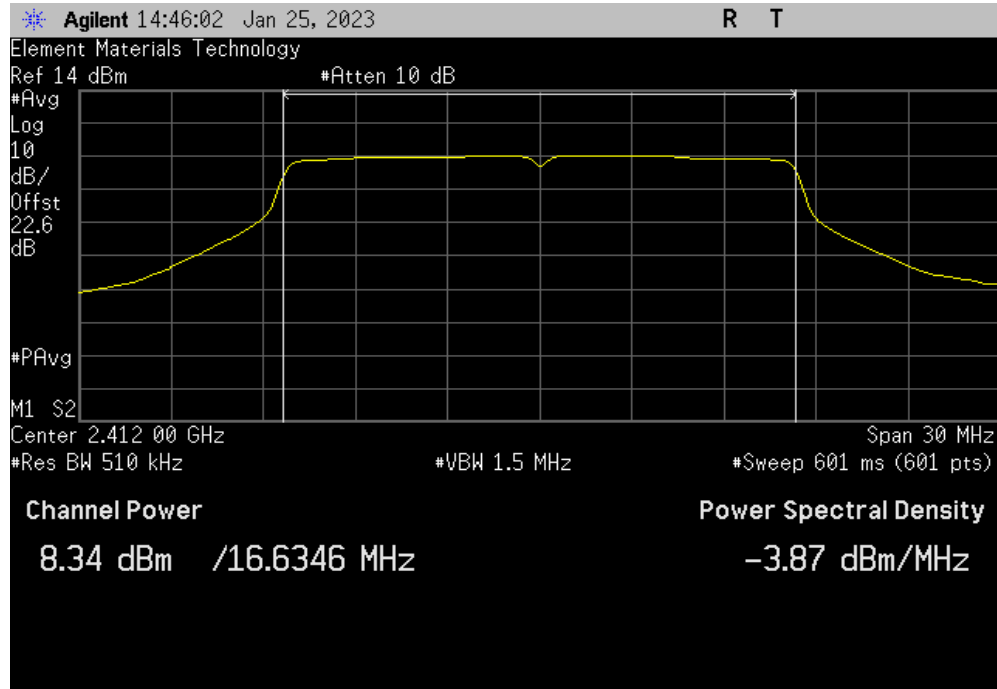


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

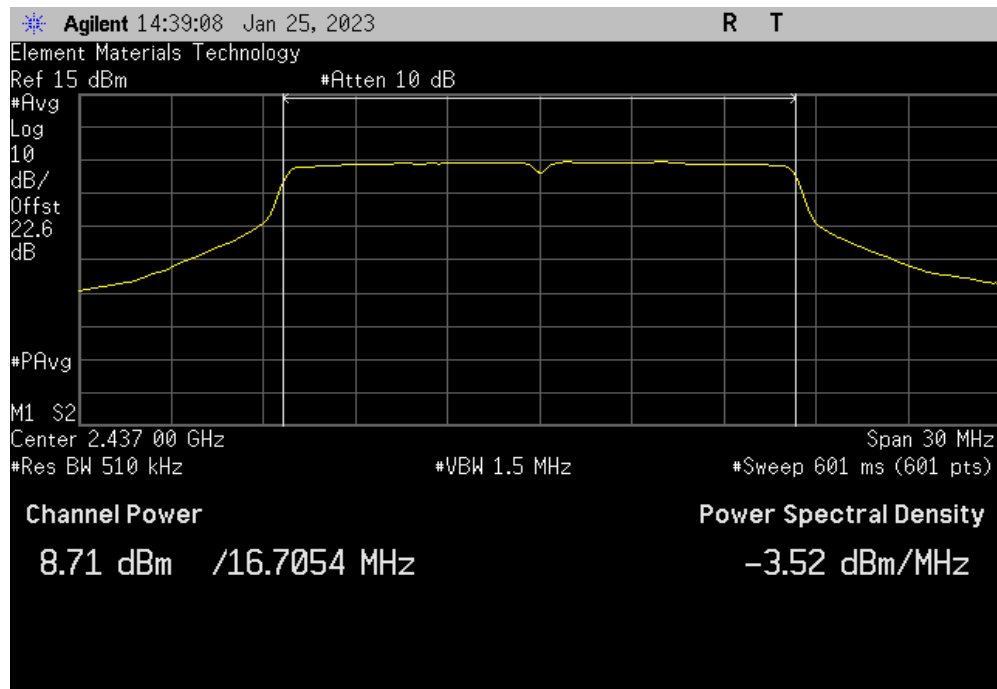


TbTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
8.335	0	8.3	4.9	13.2	36	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
8.708	0	8.7	4.9	13.6	36	Pass

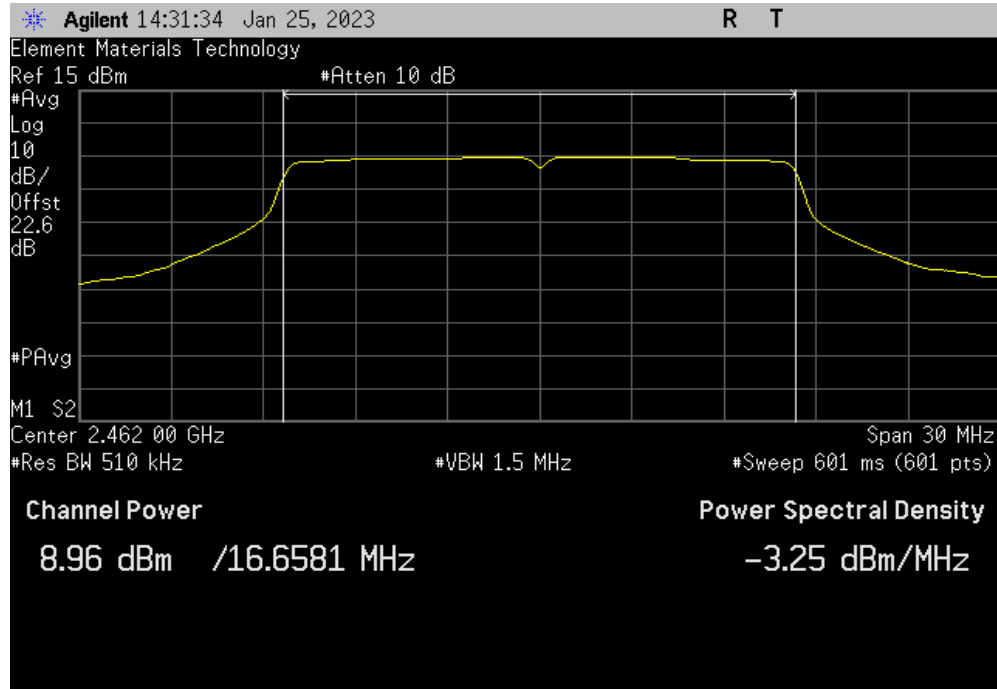


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

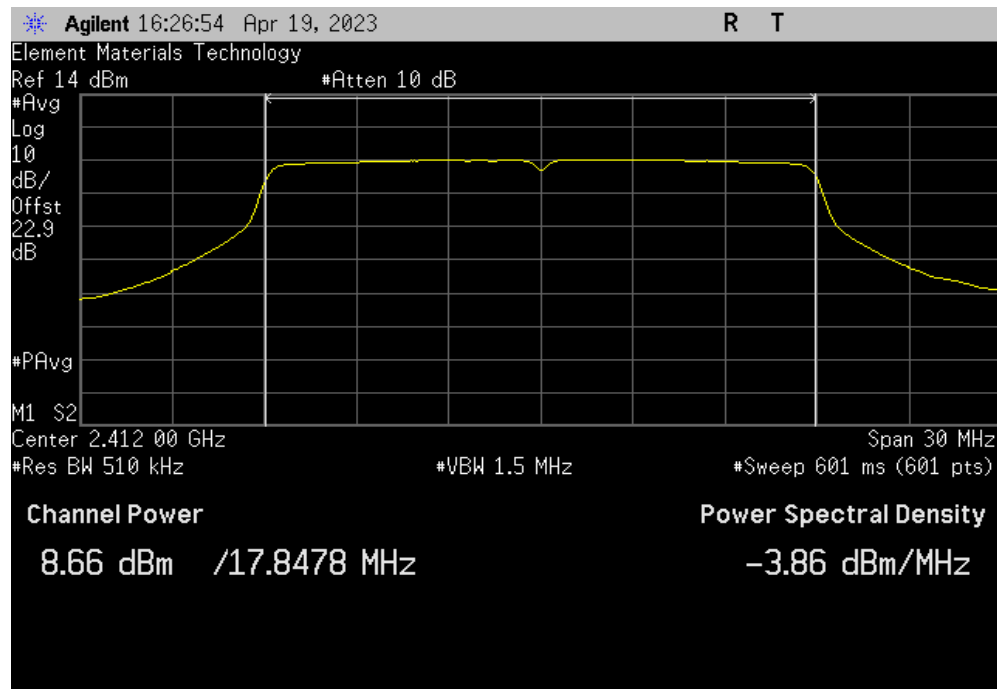


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
8.963	0	9	4.9	13.9	36	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
8.66	0	8.7	4.9	13.6	36	Pass

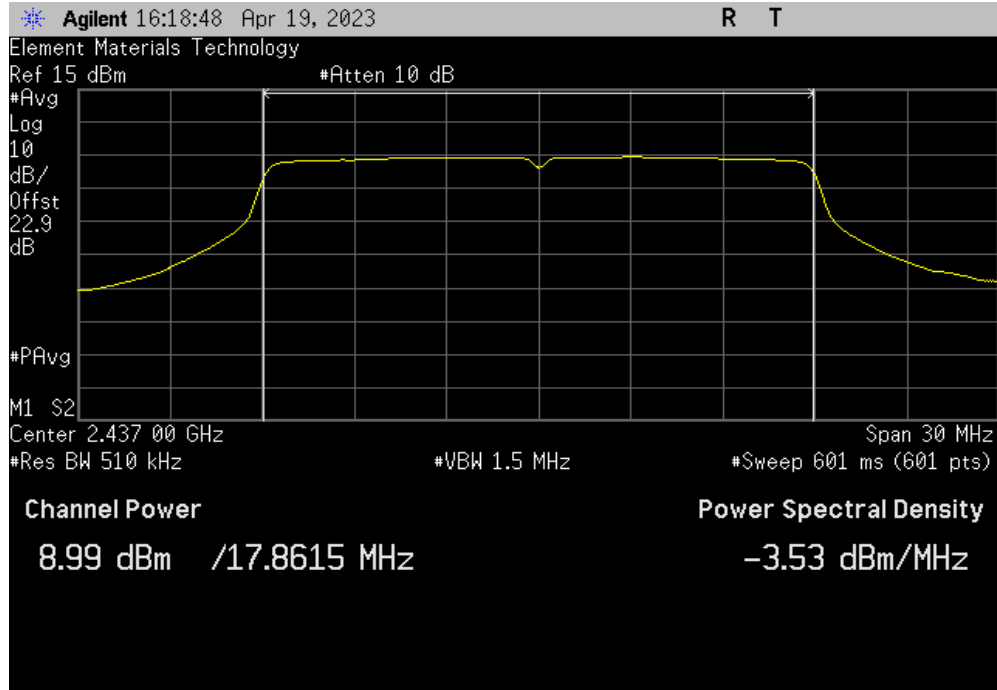


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

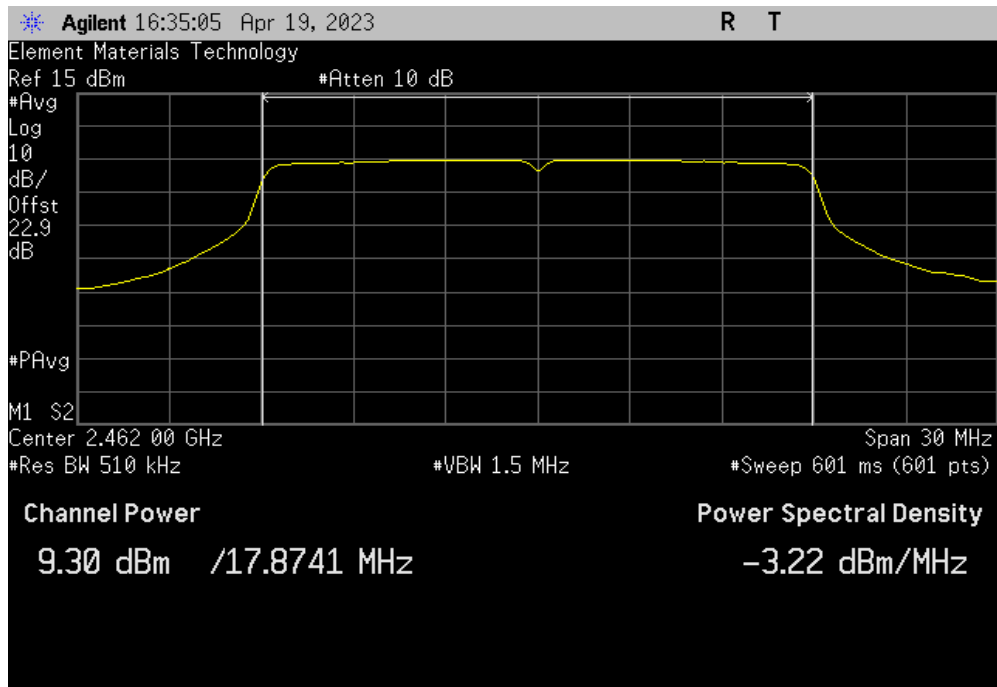


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
8.988	0	9	4.9	13.9	36	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
9.303	0	9.3	4.9	14.2	36	Pass

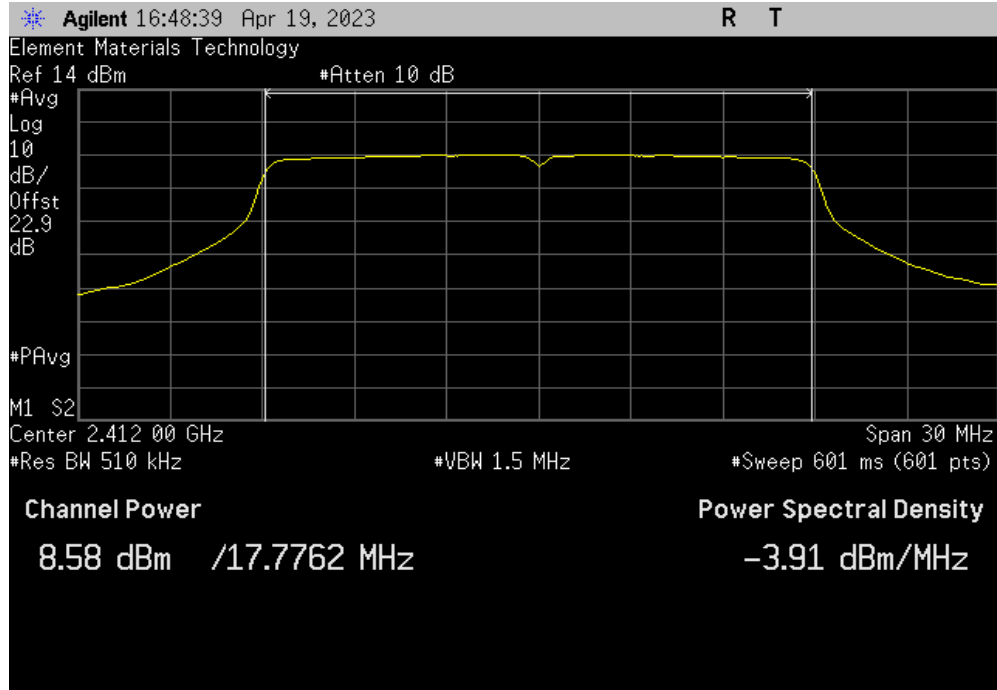


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

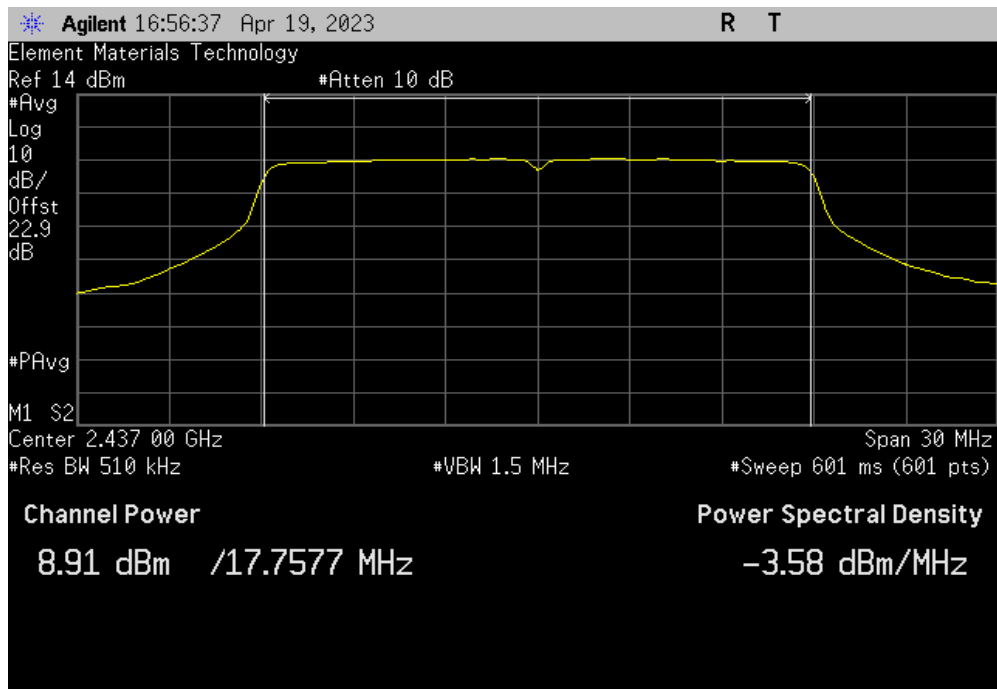


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
8.584	0	8.6	4.9	13.5	36	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
8.912	0	8.9	4.9	13.8	36	Pass

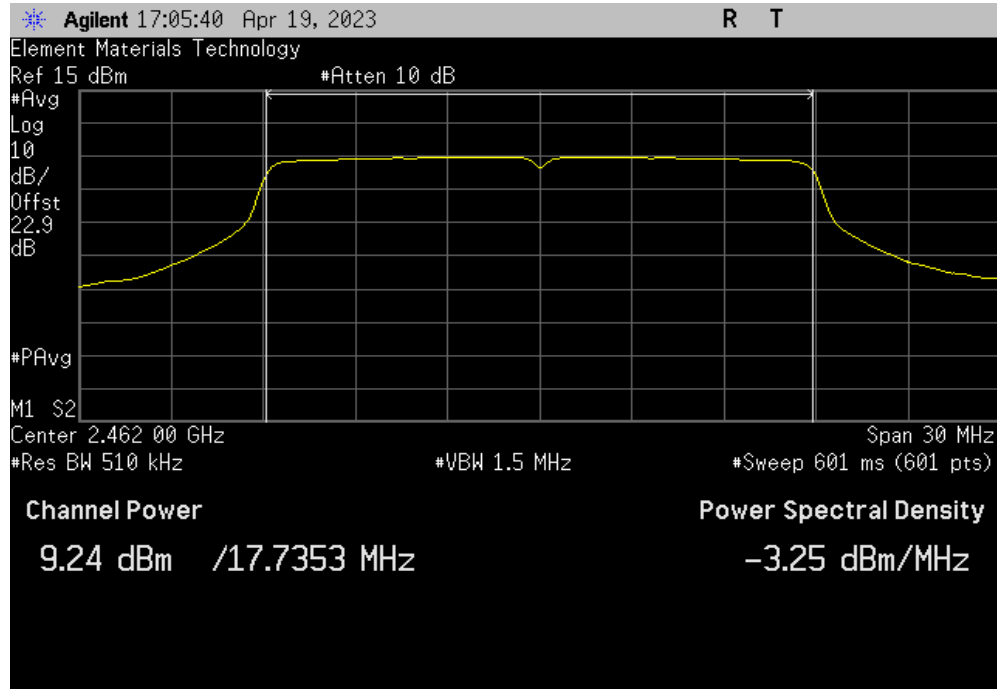


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

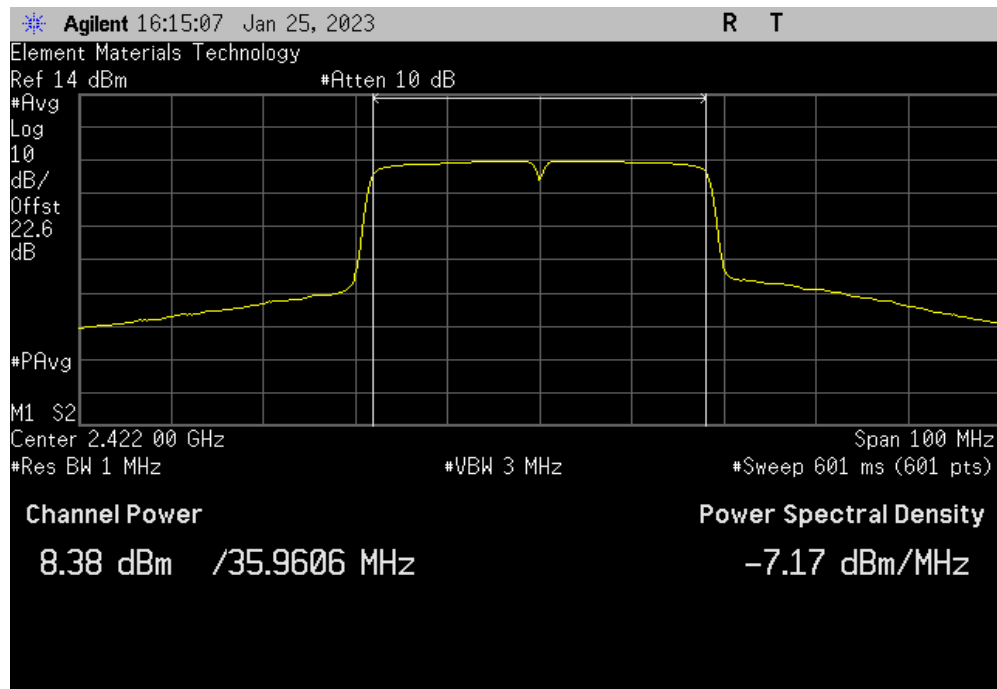


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
9.242	0	9.2	4.9	14.1	36	Pass



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1/5, 2422 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
8.384	0	8.4	4.9	13.3	36	Pass

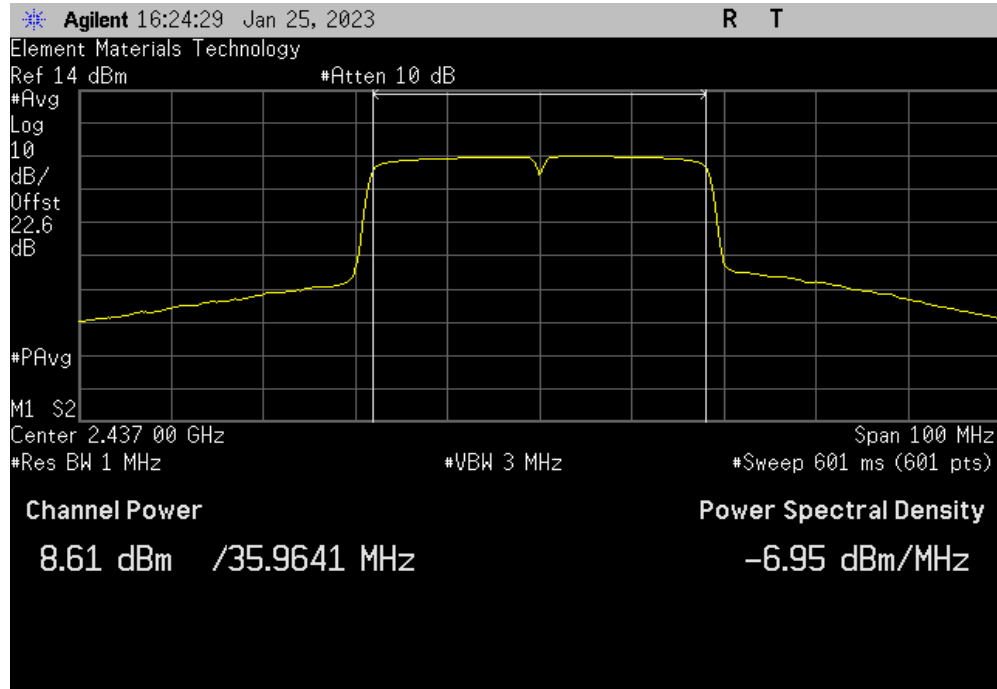


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

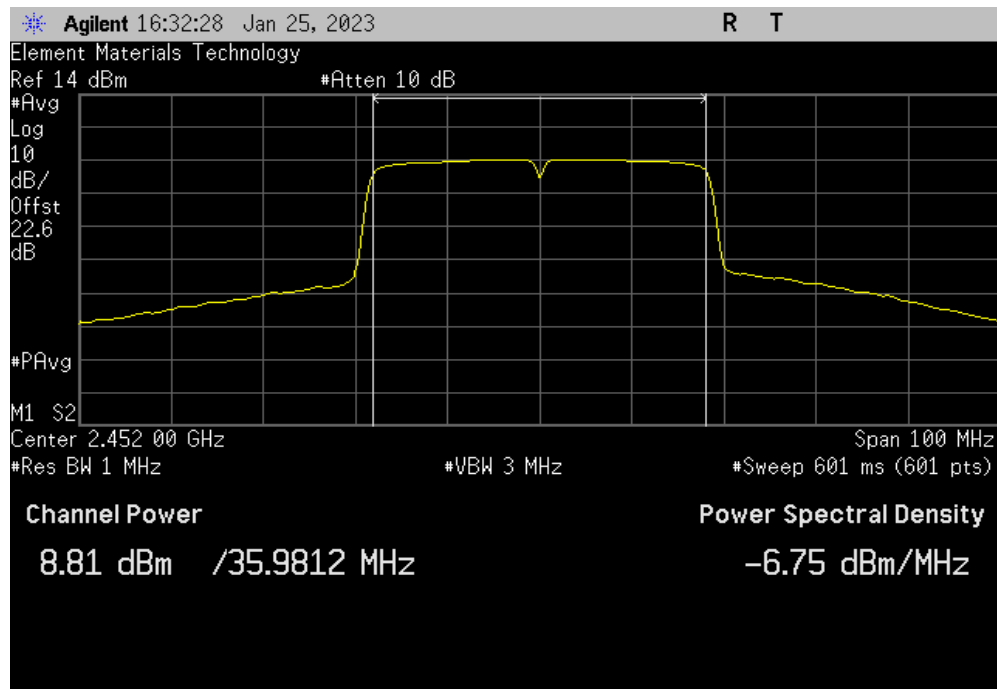


TMTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 4/8, 2437 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
8.608	0	8.6	4.9	13.5	36	Pass



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 7/11, 2452 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
8.814	0	8.8	4.9	13.7	36	Pass

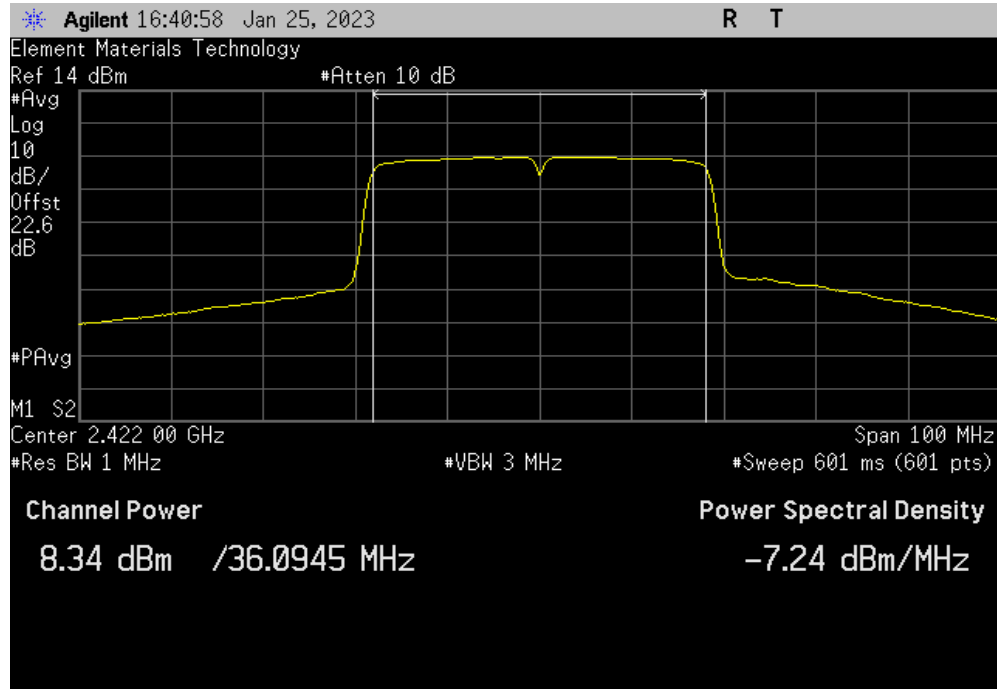


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

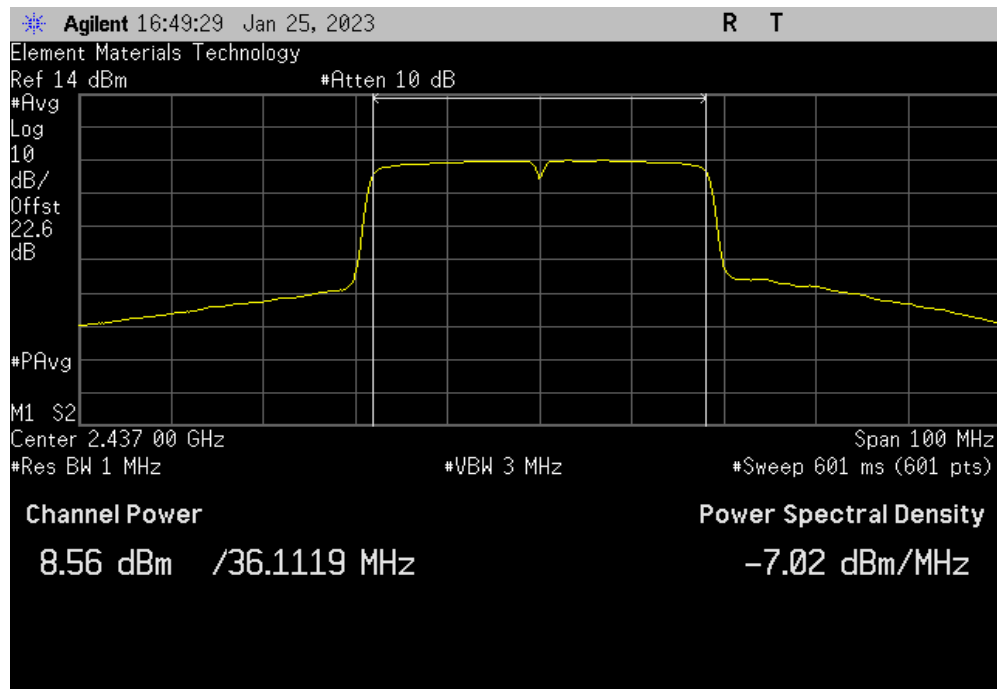


TMTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1/5, 2422 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
8.335	0	8.3	4.9	13.2	36	Pass



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 4/8, 2437 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
8.556	0	8.6	4.9	13.5	36	Pass

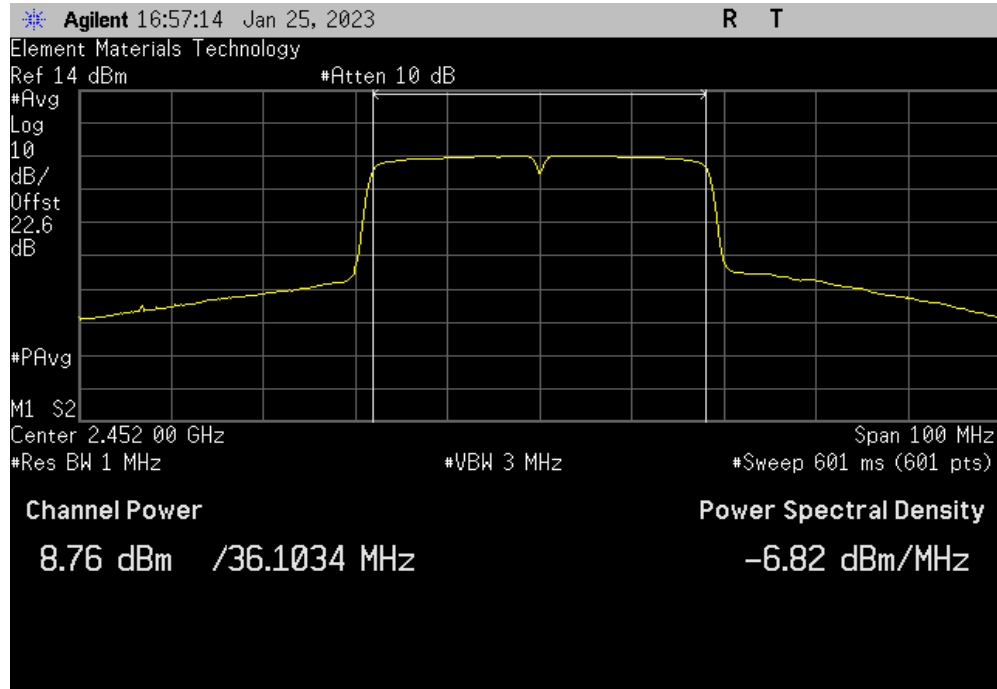


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)



TbTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 7/11, 2452 MHz						
Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
8.757	0	8.8	4.9	13.7	36	Pass



POWER SPECTRAL DENSITY



XMI 2022.02.07.0

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
Block - DC	Weinschel Corp.	7006	AMS	2023-01-18	2024-01-18
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	2023-01-19	2024-01-19
Attenuator	S.M. Electronics	SA18H-20	REK	2022-02-15	2023-02-15
Cable	Micro-Coax	UFD150A-1-0720-200200	NCW	2023-01-18	2024-01-18
Generator - Signal	Agilent	N5183A	TIA	2022-06-25	2024-06-25
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAT	2022-11-03	2023-11-03
Attenuator	S.M. Electronics	SA18H-20	REK	2023-03-08	2024-03-08

TEST DESCRIPTION

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

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

The method AVGPSD-2 in clause 11.10.5 of ANSI C63.10:2013 was used to make the measurement. This method uses trace averaging and RMS detection across the ON and OFF times of the transmission. The analyzer was configured to the following settings:

Span = at least 1.5 * OBW
RBW = 100 kHz
VBW = 300 kHz
Detector = RMS
Sweep = 601 mS
Points = 601

The peak marker function was used to determine the maximum amplitude level. An additional $[10 \cdot \log(1/D)]$, where D is the duty cycle was added to the peak marker to compute the average PSD during the actual transmission time. The resultant value was corrected to the reference bandwidth of 3 kHz using a correction factor of -15.2 dB, and compared to the limit.

$$\text{dBm/100kHz To dBm/3kHz} = 10 \cdot \log(\text{Ref. RBW} / \text{Meas. Bandwidth})$$

POWER SPECTRAL DENSITY



TbTx 2022.06.03.0

XMR 2022.02.07.0

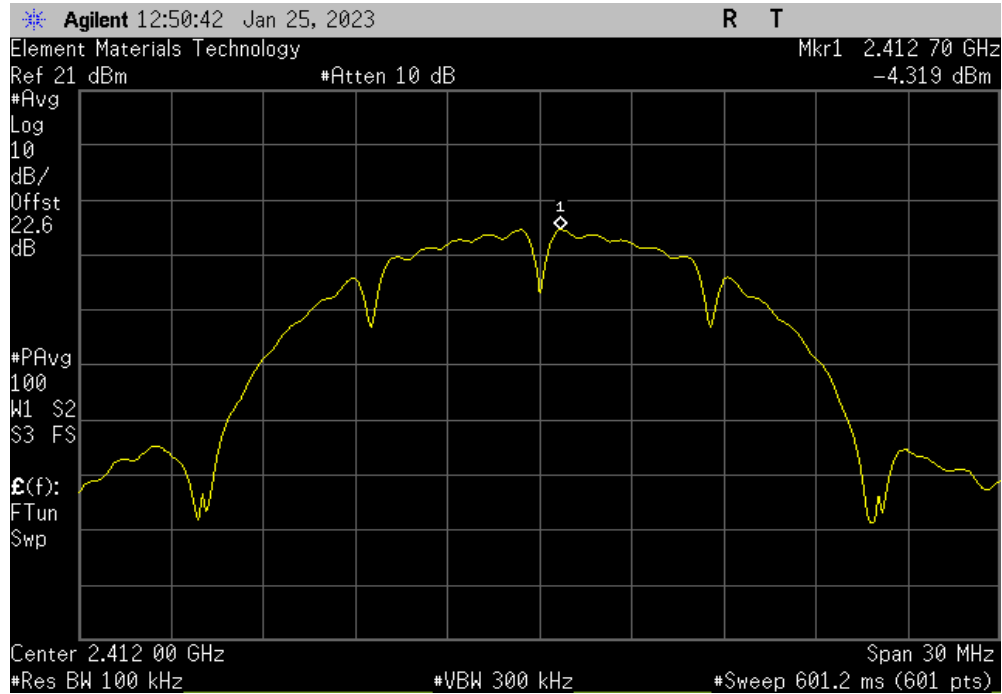
EUT: GFD200			Work Order: GLOW0038				
Serial Number: XB2-839			Date: 19-Apr-23				
Customer: Glowforge Incorporated			Temperature: 20.6 °C				
Attendees: Jason Bluhm			Humidity: 29% RH				
Project: None			Barometric Pres.: 1023 mbar				
Tested by: Harry Zhao		Power: 120VAC/60Hz	Job Site: NC06				
TEST SPECIFICATIONS			Test Method				
FCC 15.247:2023			ANSI C63.10:2013				
RSS-247 Issue 2:2017			ANSI C63.10:2013				
RSS-Gen Issue 5:2018+A1:2019+A2:2021			ANSI C63.10:2013				
COMMENTS							
Reference offset connection between EUT and Spectrum analyzer: DC Block + 20 dB attenuator + measurement cable + patched coax cable							
DEVIATIONS FROM TEST STANDARD							
None							
Configuration #	2						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Duty Cycle Factor (dB)	Value dBm/3kHz	Limit ≤ (dBm/3kHz)	Results
20 MHz							
2400 MHz - 2483.5 MHz Band							
802.11(b) 1 Mbps							
	Low Channel 1, 2412 MHz	-4.319	-15.2	0	-19.5	8	Pass
	Mid Channel 6, 2437 MHz	-4	-15.2	0	-19.2	8	Pass
	High Channel 11, 2462 MHz	-3.716	-15.2	0	-18.9	8	Pass
802.11(b) 11 Mbps							
	Low Channel 1, 2412 MHz	-4.421	-15.2	0	-19.6	8	Pass
	Mid Channel 6, 2437 MHz	-3.61	-15.2	0	-18.8	8	Pass
	High Channel 11, 2462 MHz	-3.304	-15.2	0	-18.5	8	Pass
802.11(g) 6 Mbps							
	Low Channel 1, 2412 MHz	-11.957	-15.2	0	-27.2	8	Pass
	Mid Channel 6, 2437 MHz	-11.613	-15.2	0	-26.8	8	Pass
	High Channel 11, 2462 MHz	-11.35	-15.2	0	-26.6	8	Pass
802.11(g) 36 Mbps							
	Low Channel 1, 2412 MHz	-11.892	-15.2	0	-27.1	8	Pass
	Mid Channel 6, 2437 MHz	-11.543	-15.2	0	-26.7	8	Pass
	High Channel 11, 2462 MHz	-11.253	-15.2	0	-26.5	8	Pass
802.11(g) 54 Mbps							
	Low Channel 1, 2412 MHz	-11.667	-15.2	0	-26.9	8	Pass
	Mid Channel 6, 2437 MHz	-11.353	-15.2	0	-26.6	8	Pass
	High Channel 11, 2462 MHz	-11.041	-15.2	0	-26.2	8	Pass
802.11(n) MCS0							
	Low Channel 1, 2412 MHz	-11.751	-15.2	0	-27	8	Pass
	Mid Channel 6, 2437 MHz	-11.431	-15.2	0	-26.6	8	Pass
	High Channel 11, 2462 MHz	-11.155	-15.2	0	-26.4	8	Pass
802.11(n) MCS7							
	Low Channel 1, 2412 MHz	-11.8	-15.2	0	-27	8	Pass
	Mid Channel 6, 2437 MHz	-11.48	-15.2	0	-26.7	8	Pass
	High Channel 11, 2462 MHz	-11.094	-15.2	0	-26.3	8	Pass
40 MHz							
2400 MHz - 2483.5 MHz Band							
802.11(n) MCS0							
	Low Channel 1/5, 2422 MHz	-15.241	-15.2	0	-30.4	8	Pass
	Mid Channel 4/8, 2437 MHz	-15.001	-15.2	0	-30.2	8	Pass
	High Channel 7/11, 2452 MHz	-14.76	-15.2	0	-30	8	Pass
802.11(n) MCS7							
	Low Channel 1/5, 2422 MHz	-14.663	-15.2	0	-29.9	8	Pass
	Mid Channel 4/8, 2437 MHz	-14.471	-15.2	0	-29.7	8	Pass
	High Channel 7/11, 2452 MHz	-14.216	-15.2	0	-29.4	8	Pass

POWER SPECTRAL DENSITY

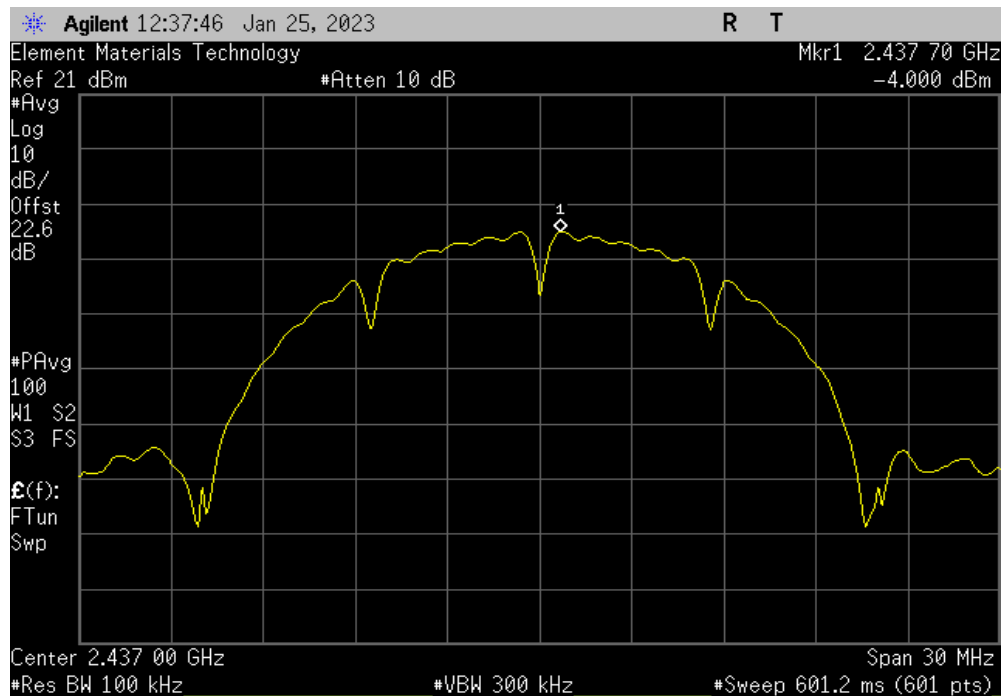


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)		
	-4.319	-15.2	0	-19.5	8	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)		
	-4	-15.2	0	-19.2	8	Pass

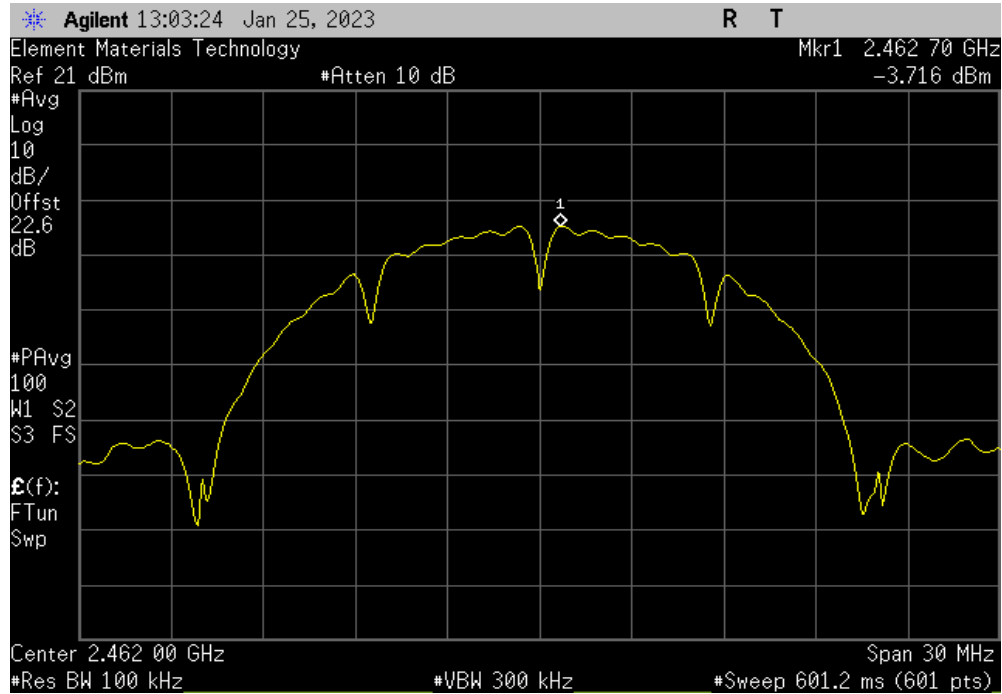


POWER SPECTRAL DENSITY

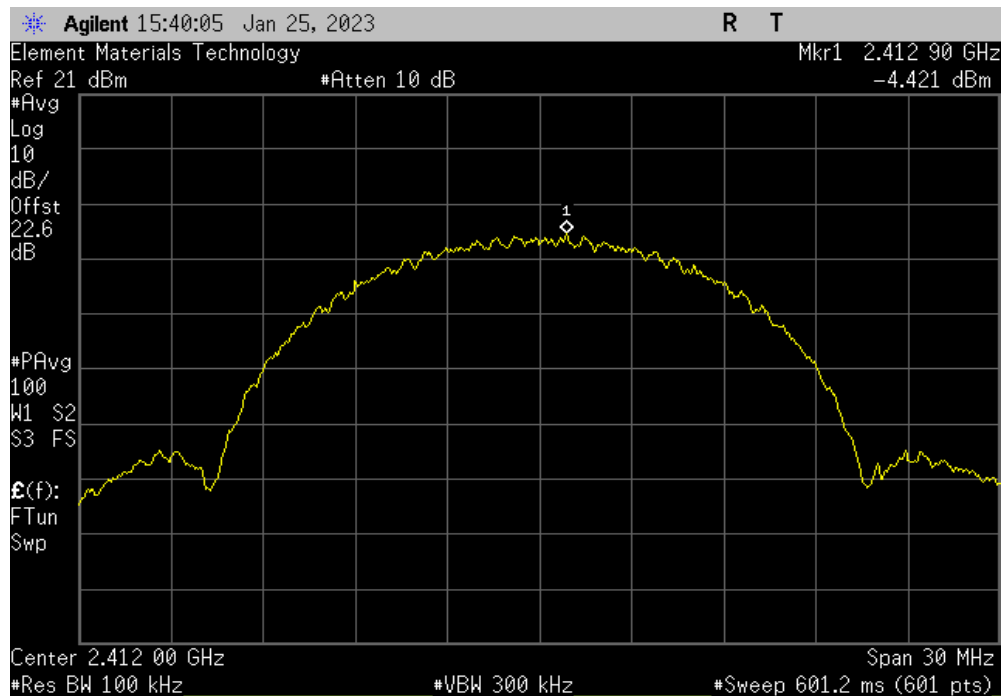


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)		
	-3.716	-15.2	0	-18.9	8	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)		
	-4.421	-15.2	0	-19.6	8	Pass

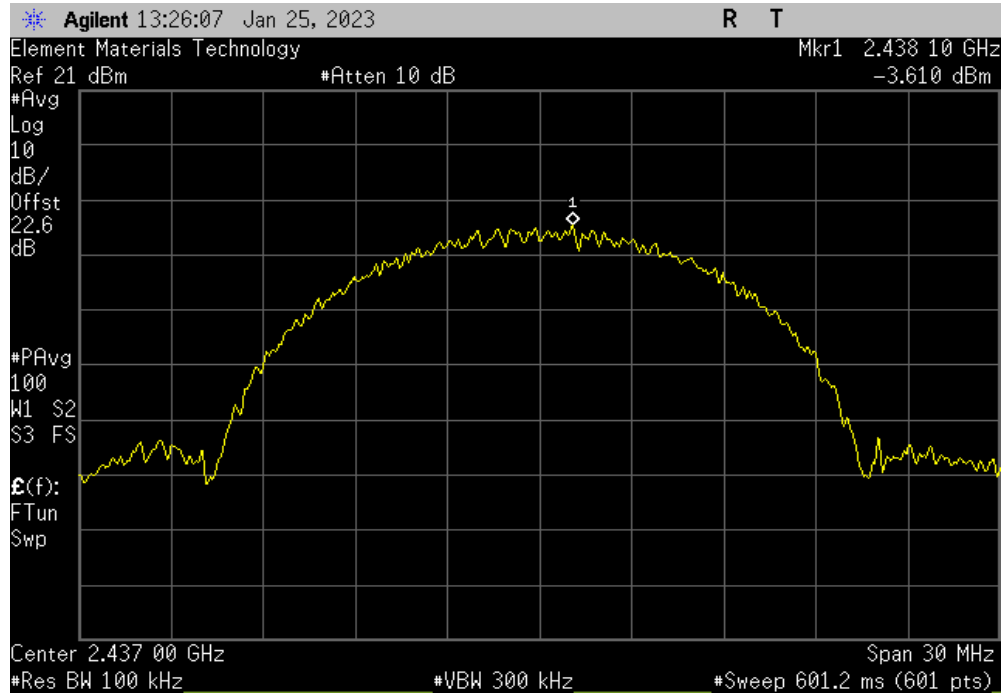


POWER SPECTRAL DENSITY

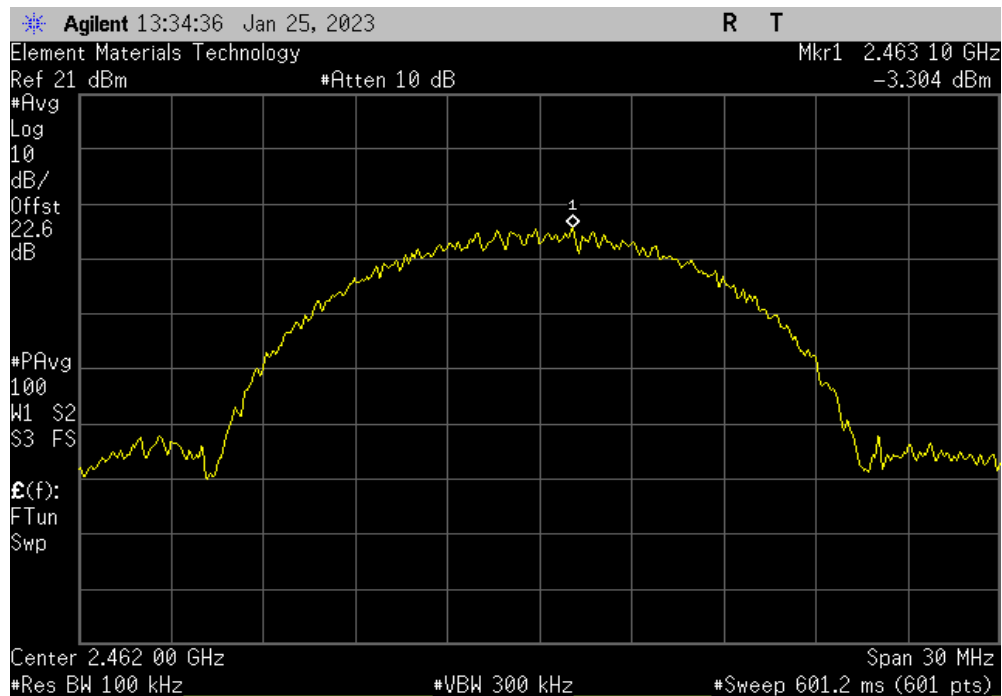


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)		
	-3.61	-15.2	0	-18.8	8	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)		
	-3.304	-15.2	0	-18.5	8	Pass

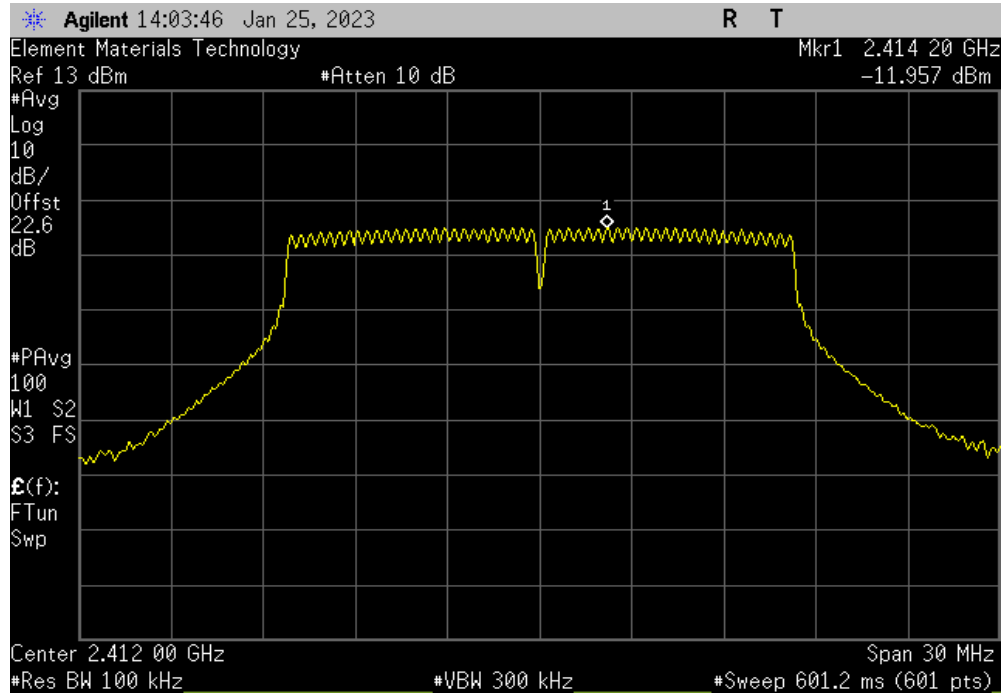


POWER SPECTRAL DENSITY

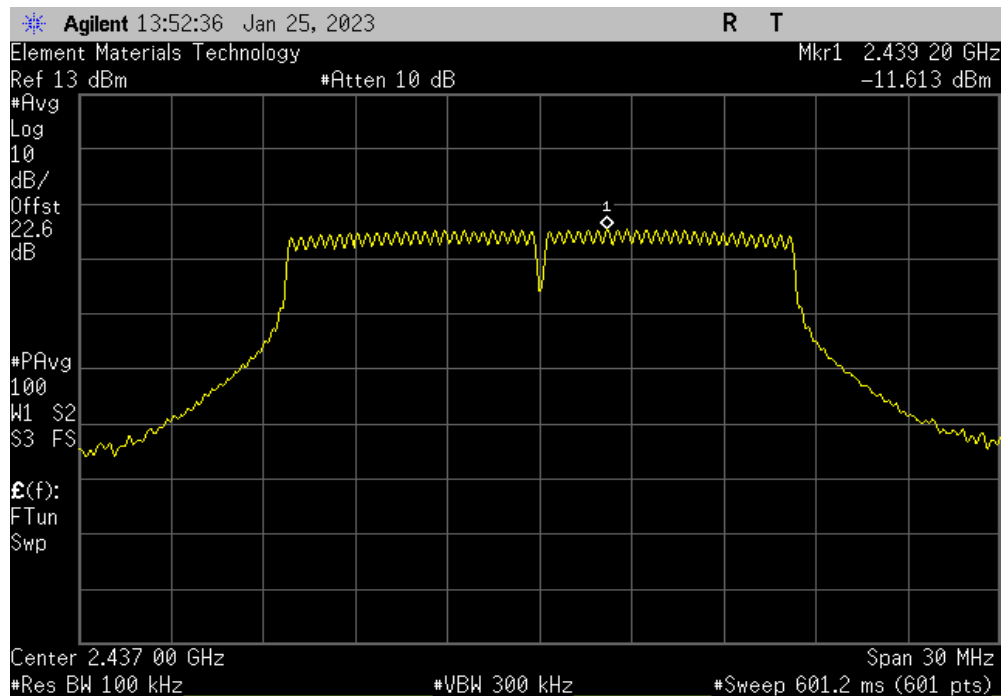


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)		
-11.957	-15.2	0	-27.2	8	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)		
-11.613	-15.2	0	-26.8	8	Pass	

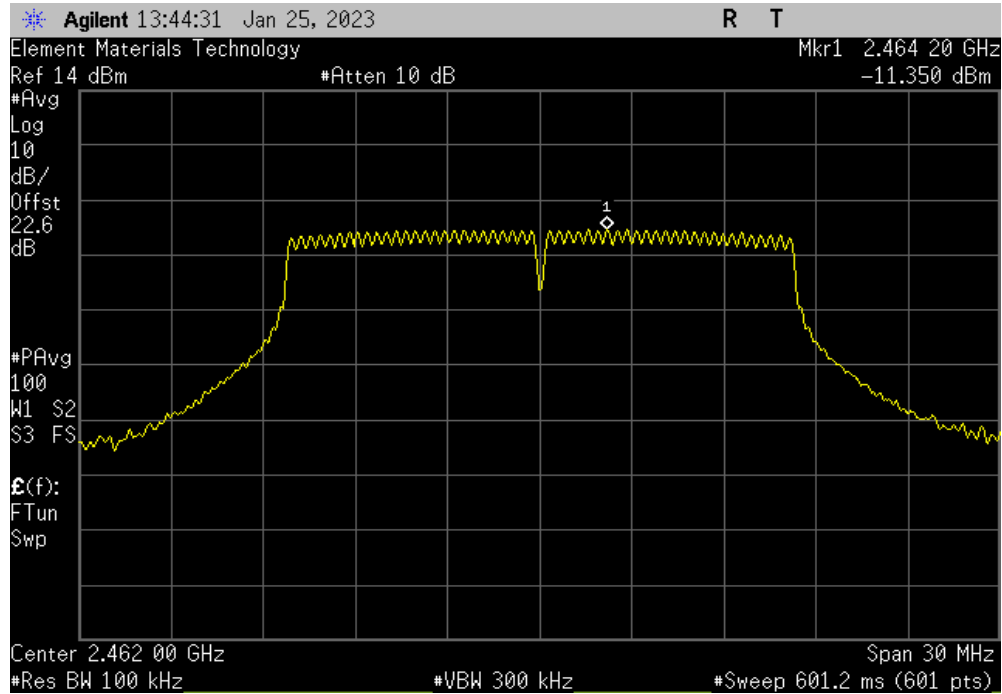


POWER SPECTRAL DENSITY

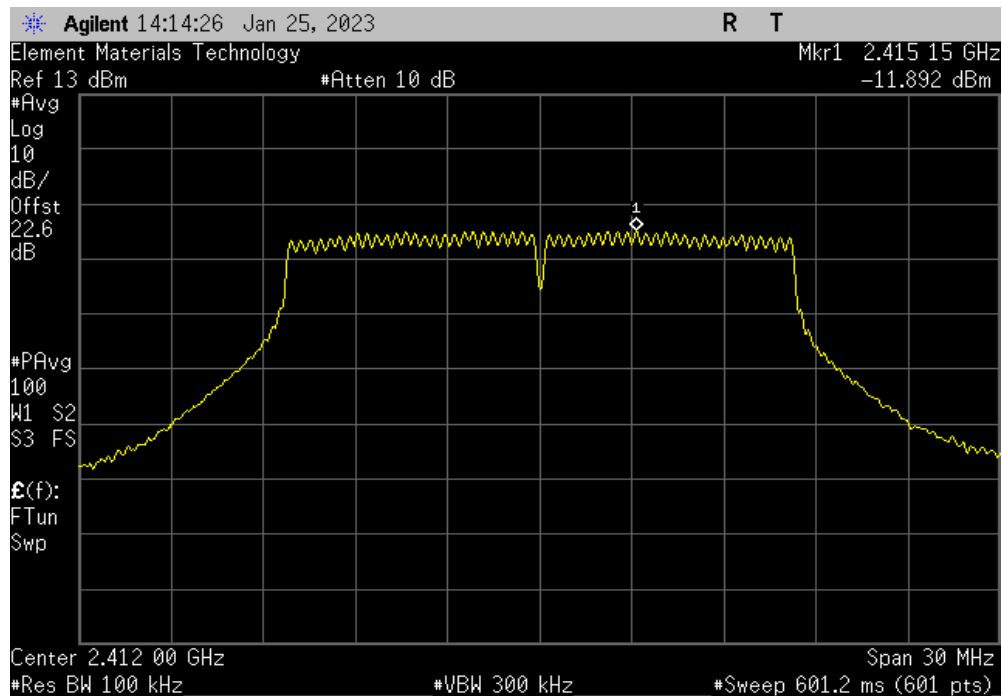


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)		
-11.35	-15.2	0	-26.6	8	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)		
-11.892	-15.2	0	-27.1	8	Pass	

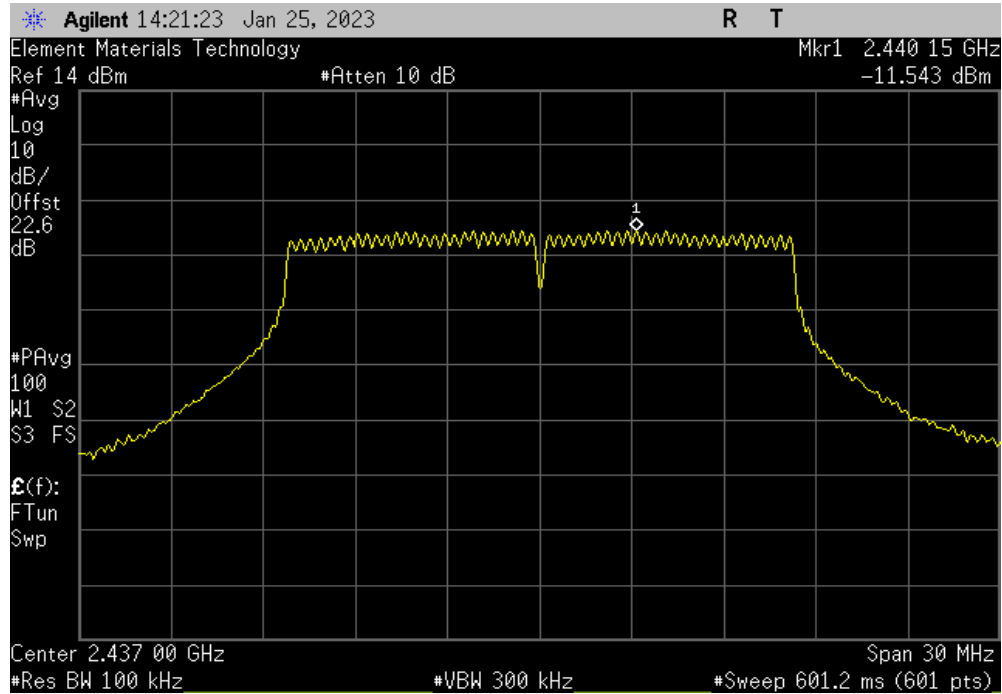


POWER SPECTRAL DENSITY

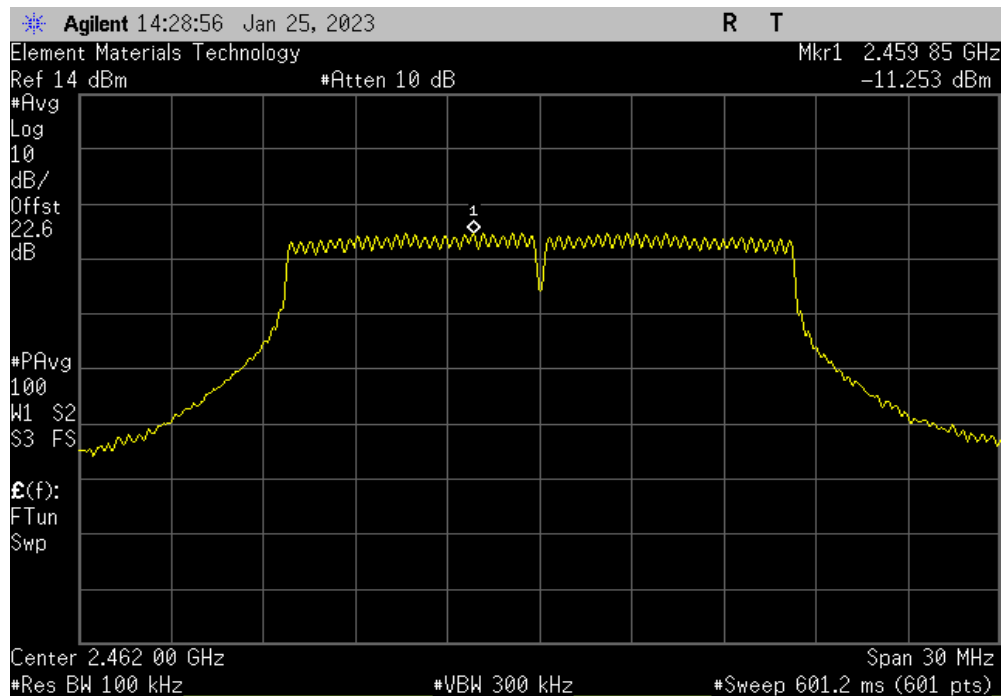


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz						
	Value	dBm/100kHz	Duty Cycle	Value	Limit	
	dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)	Results
	-11.543	-15.2	0	-26.7	8	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit		
dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)	Results	
	-11.253	-15.2	0	-26.5	8	Pass

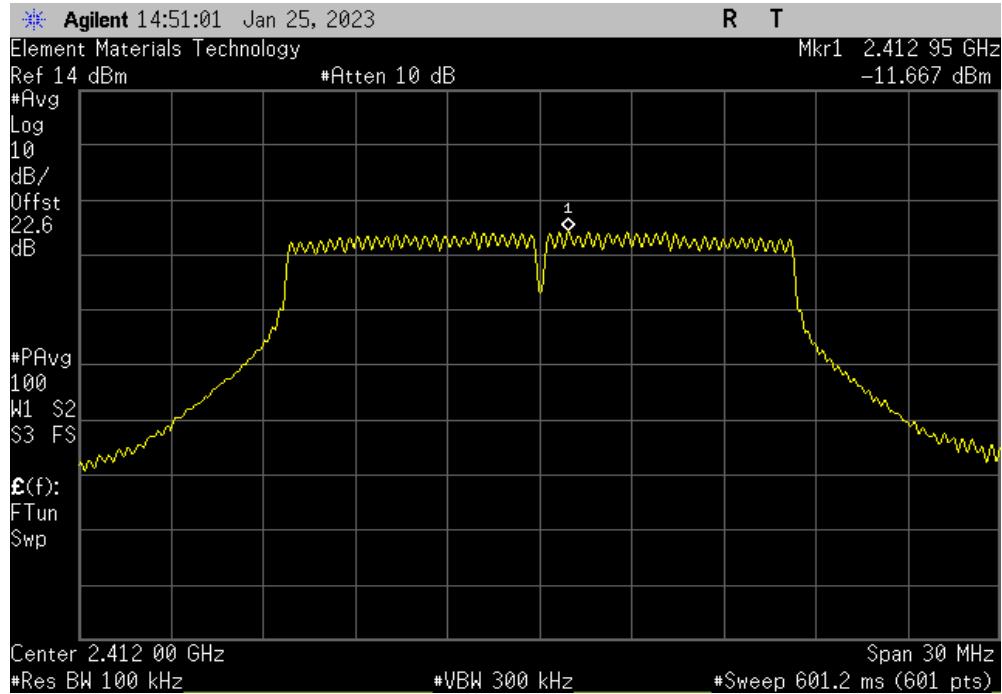


POWER SPECTRAL DENSITY

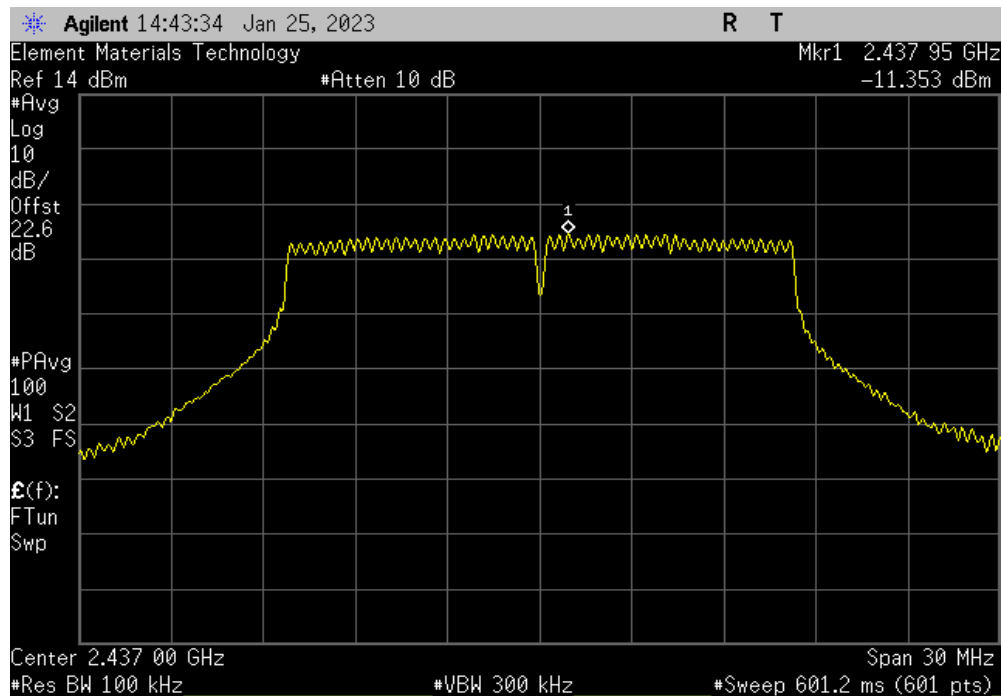


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)		
	-11.667	-15.2	0	-26.9	8	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)		
	-11.353	-15.2	0	-26.6	8	Pass

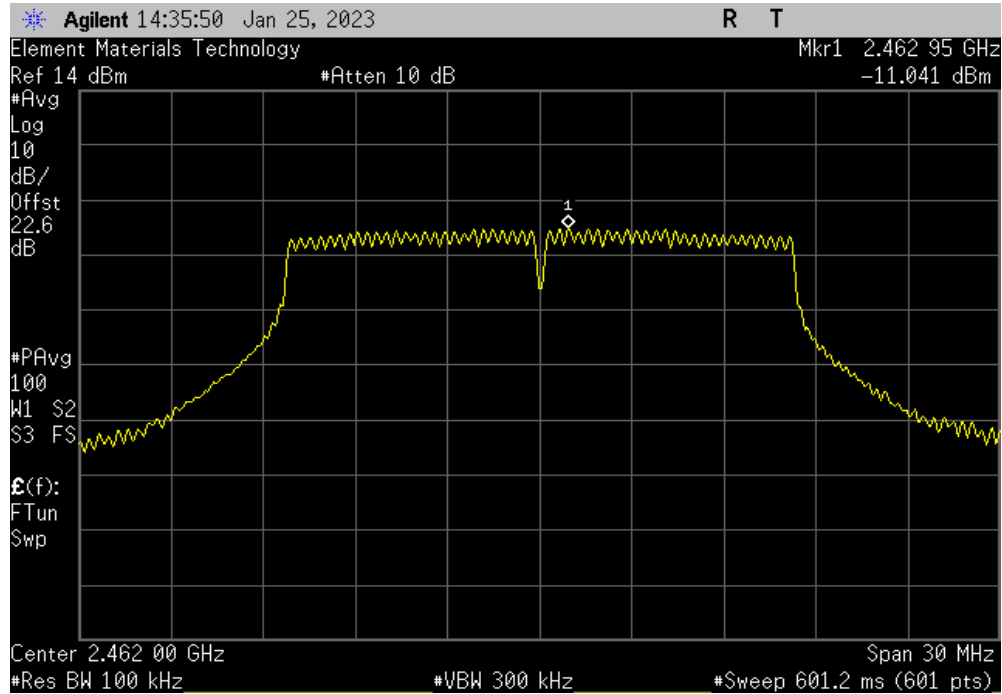


POWER SPECTRAL DENSITY

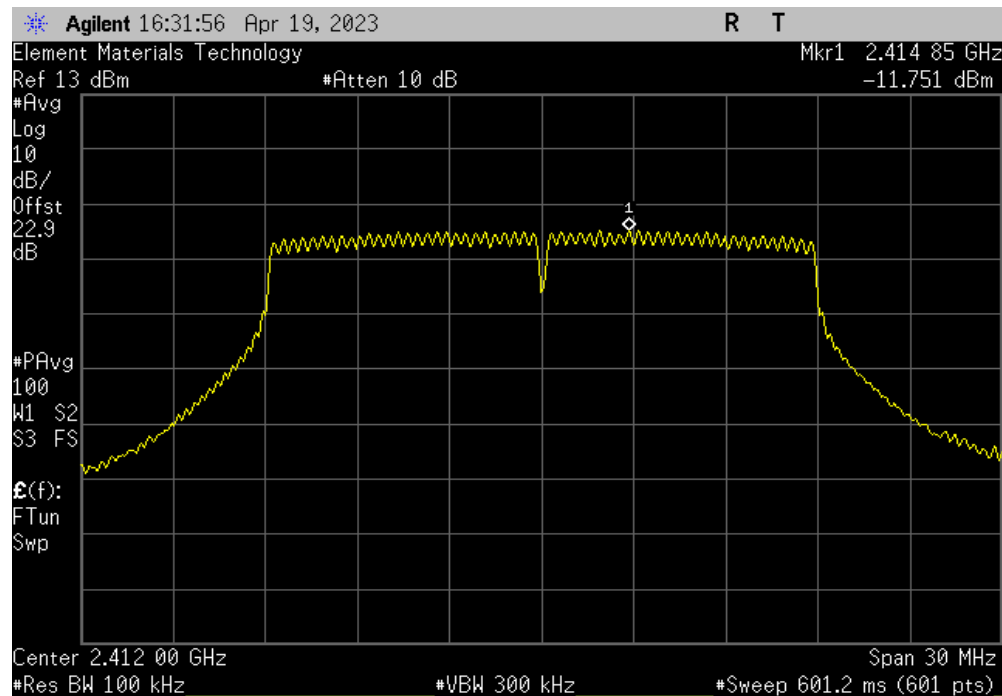


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)		
	-11.041	-15.2	0	-26.2	8	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)		
	-11.751	-15.2	0	-27	8	Pass

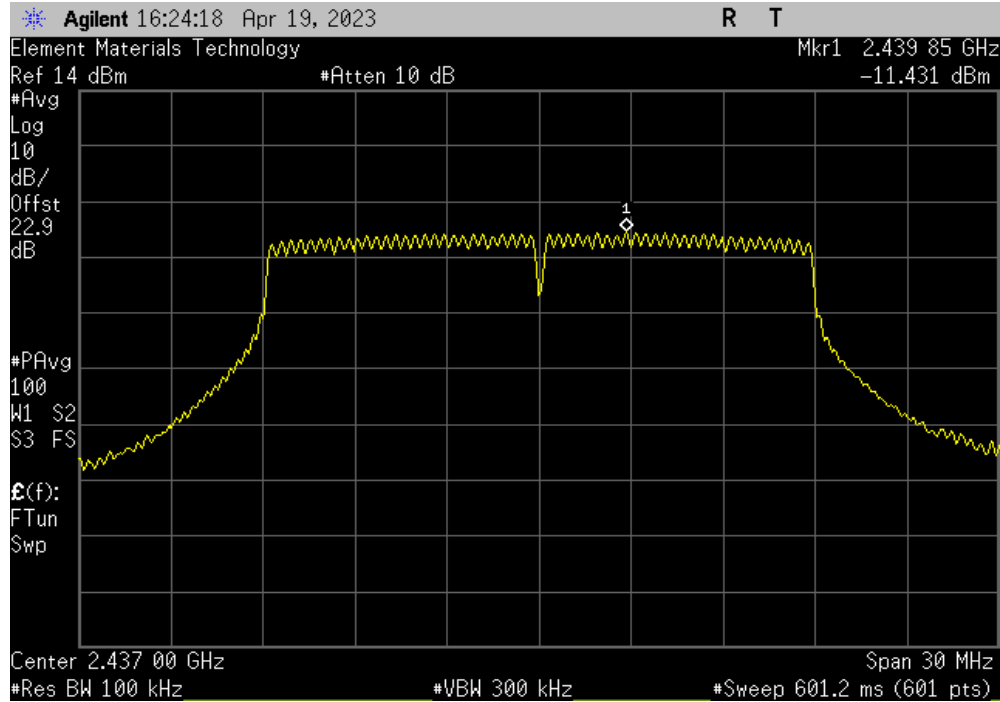


POWER SPECTRAL DENSITY

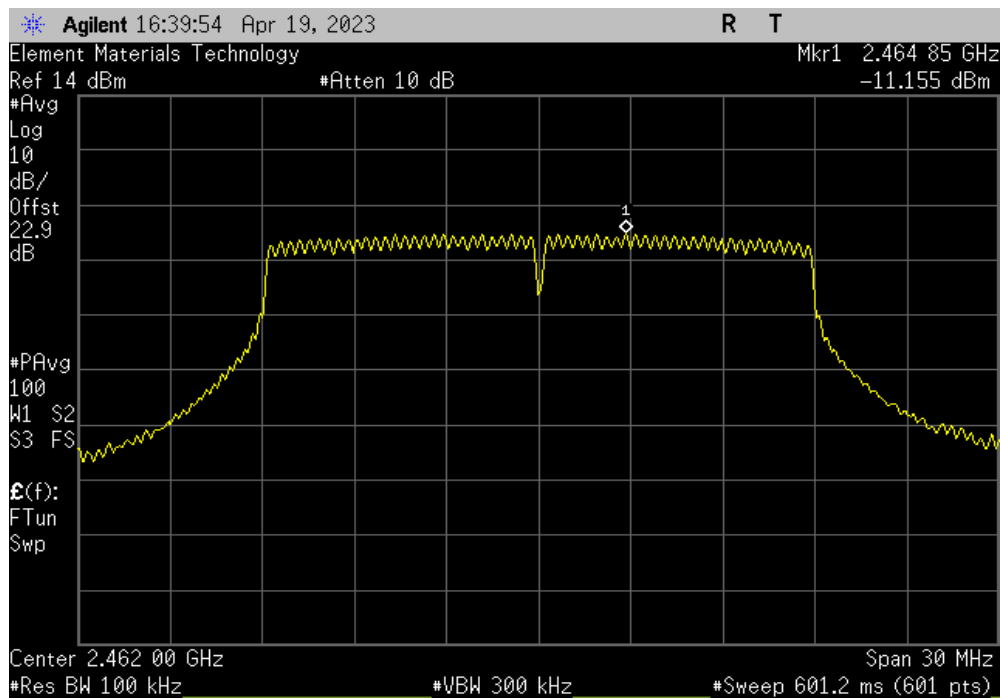


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
	To dBm/3kHz	Factor (dB)		≤ (dBm/3kHz)		
	-11.431	-15.2	0	-26.6	8	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
	To dBm/3kHz	Factor (dB)		≤ (dBm/3kHz)		
	-11.155	-15.2	0	-26.4	8	Pass

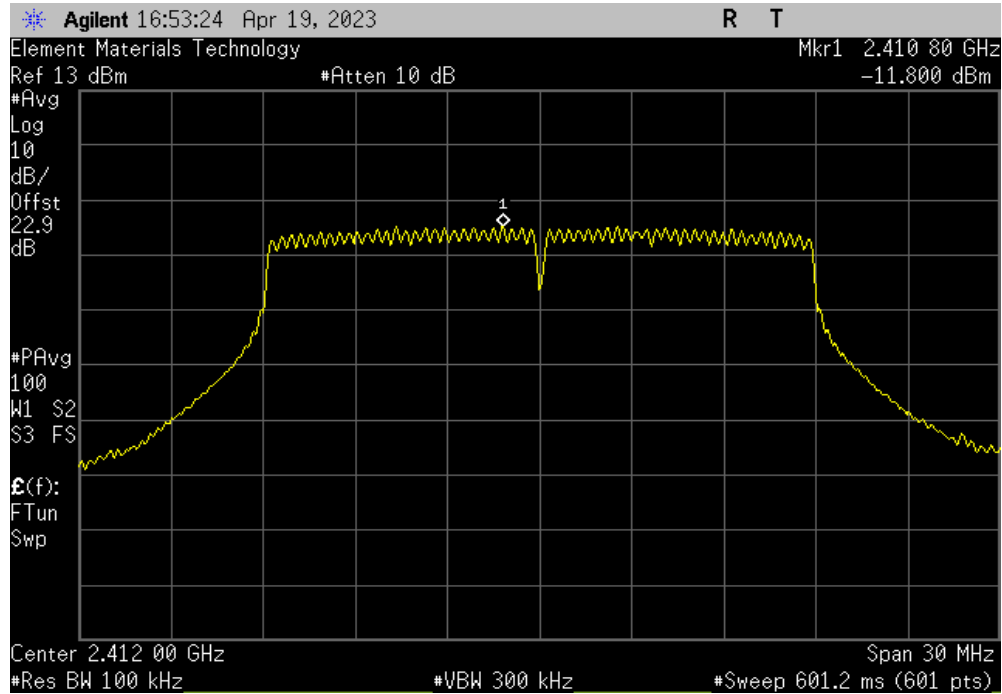


POWER SPECTRAL DENSITY

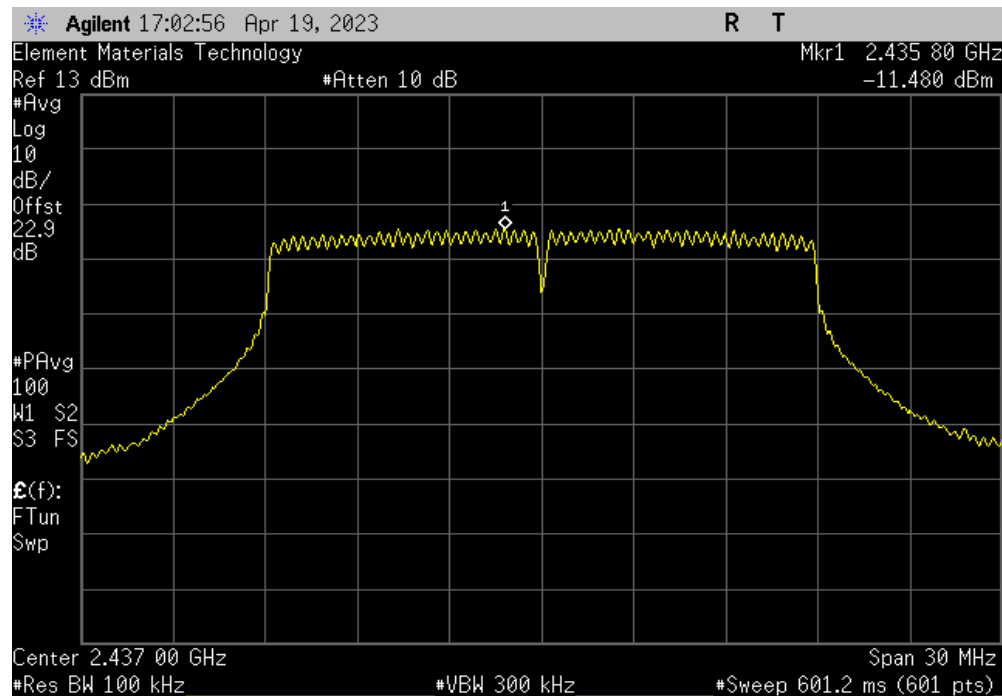


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)		
-11.8	-15.2	0	-27	8	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)		
-11.48	-15.2	0	-26.7	8	Pass	

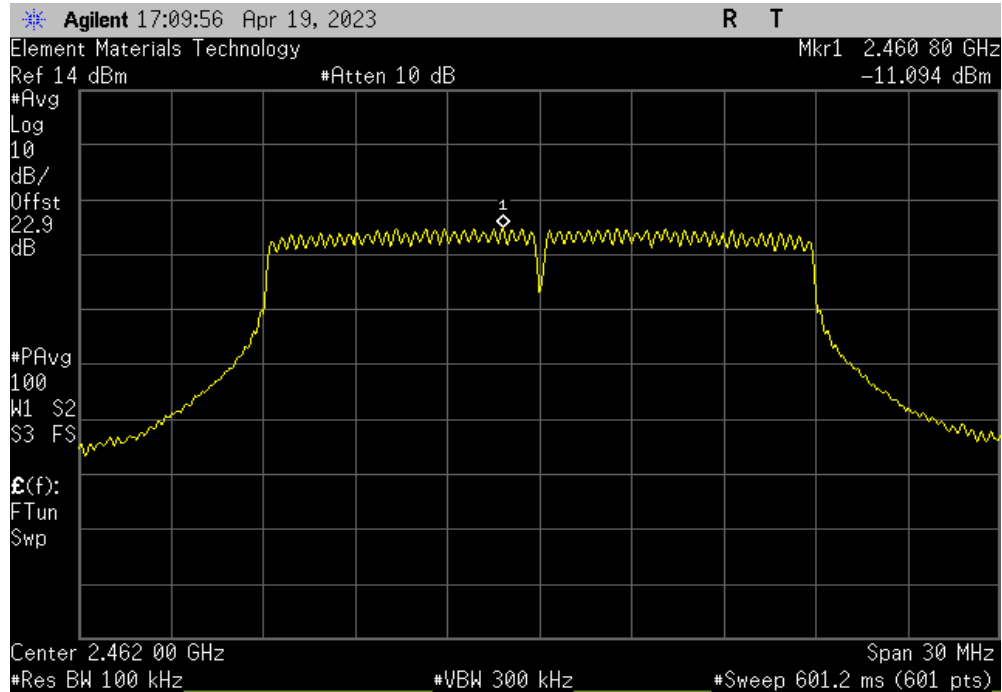


POWER SPECTRAL DENSITY

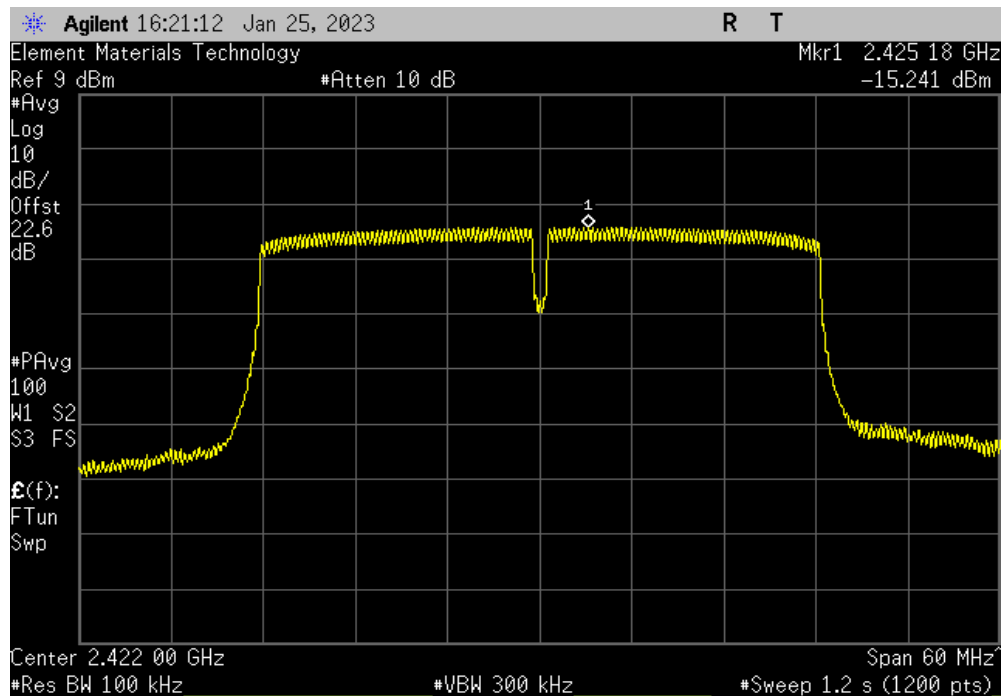


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)		
-11.094	-15.2	0	-26.3	8	Pass	



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1/5, 2422 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)		
-15.241	-15.2	0	-30.4	8	Pass	

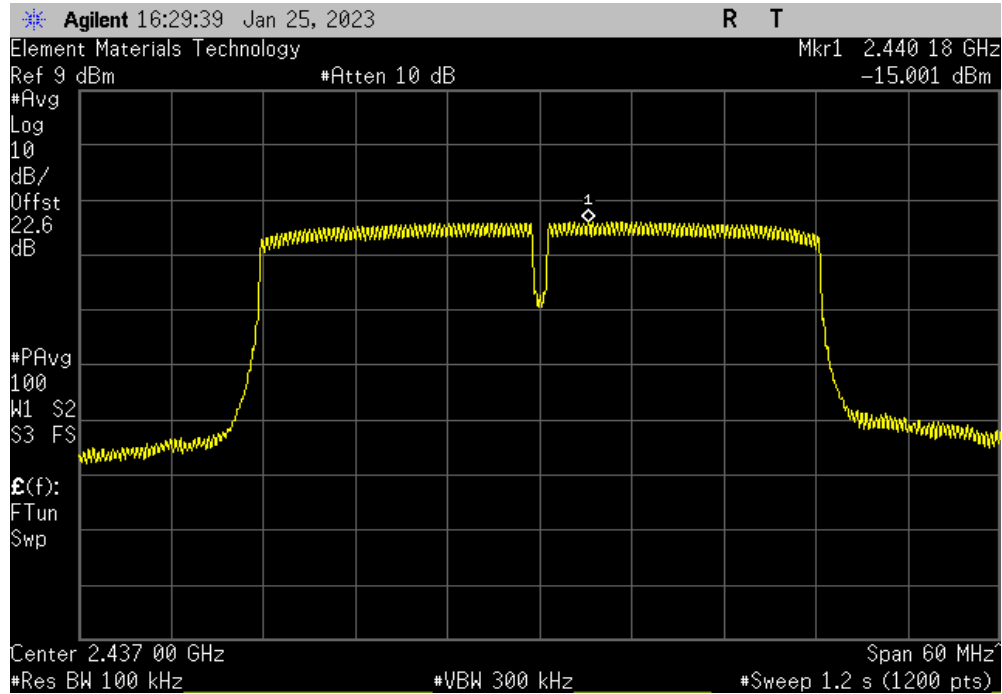


POWER SPECTRAL DENSITY

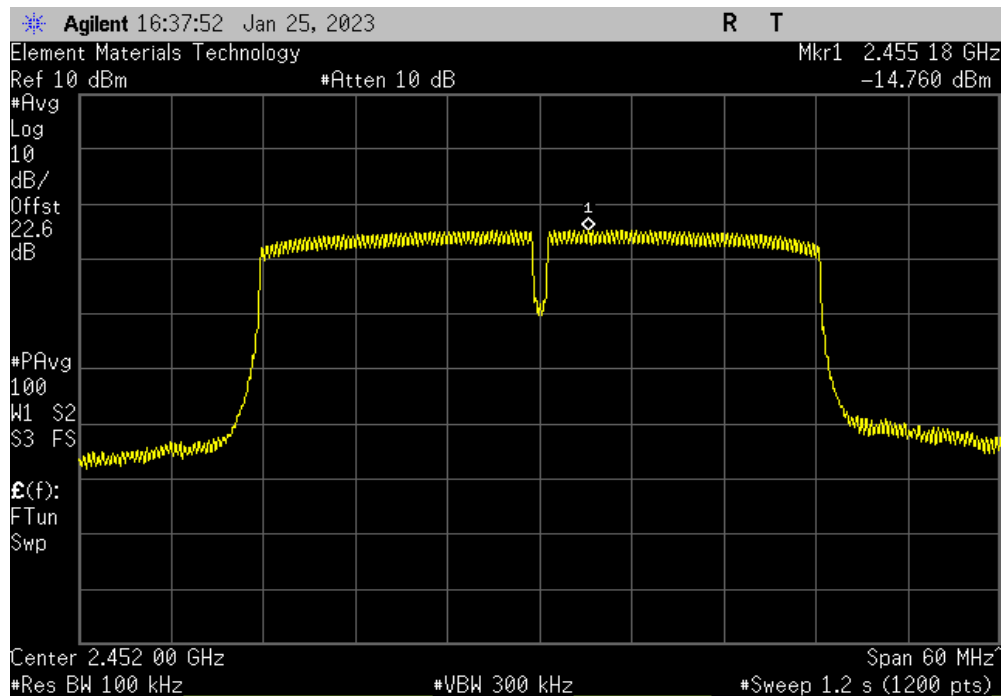


TMTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 4/8, 2437 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)		
	-15.001	-15.2	0	-30.2	8	Pass



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 7/11, 2452 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)		
	-14.76	-15.2	0	-30	8	Pass

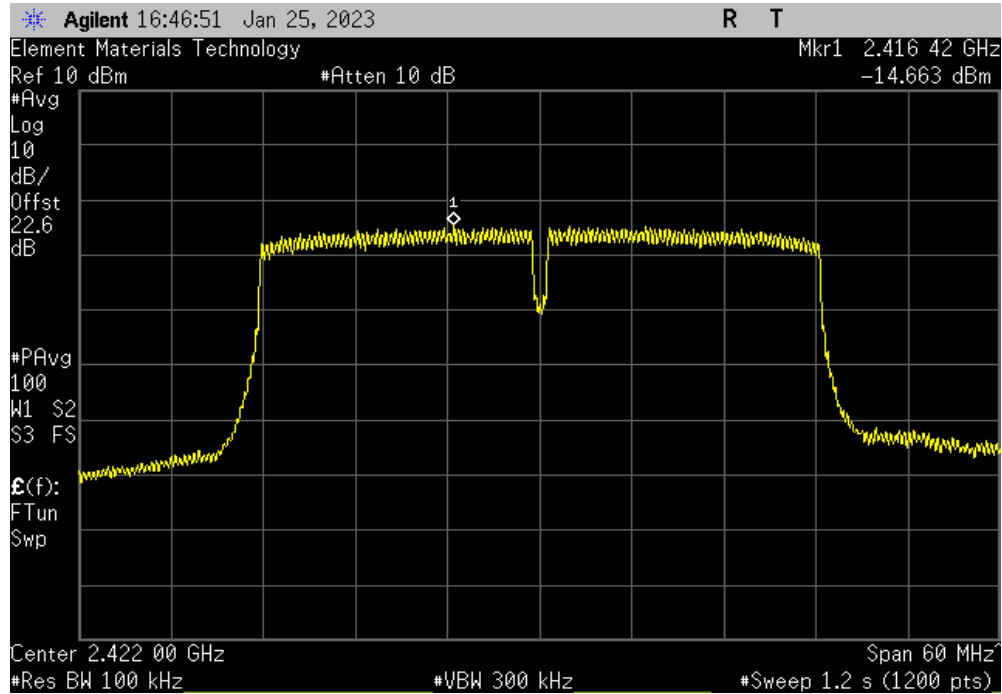


POWER SPECTRAL DENSITY

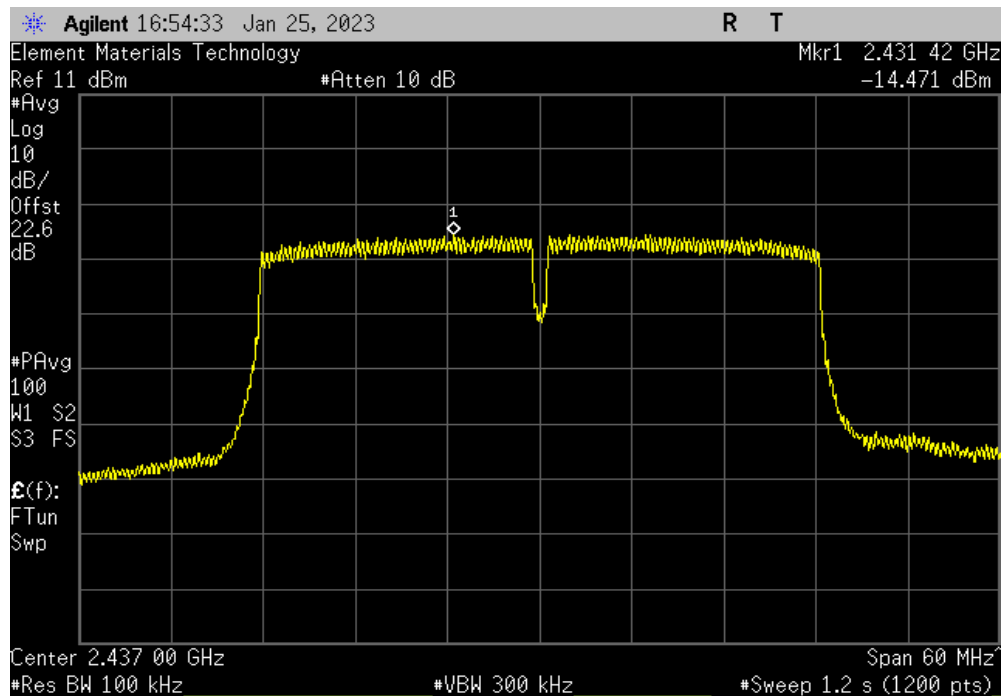


TMTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1/5, 2422 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)		
	-14.663	-15.2	0	-29.9	8	Pass



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 4/8, 2437 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
dBm/100kHz	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)		
	-14.471	-15.2	0	-29.7	8	Pass

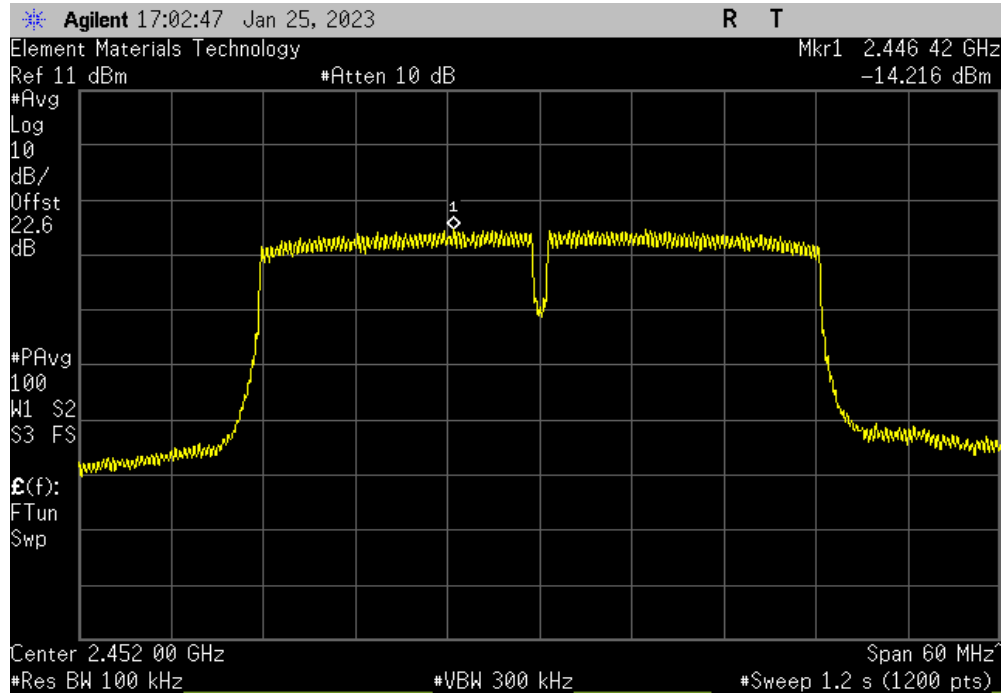


POWER SPECTRAL DENSITY



TMTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 7/11, 2452 MHz						
Value	dBm/100kHz	Duty Cycle	Value	Limit	Results	
	To dBm/3kHz	Factor (dB)	dBm/3kHz	≤ (dBm/3kHz)		
	-14.216	-15.2	0	-29.4	8	Pass



BAND EDGE COMPLIANCE



XMIT 2022.02.07.0

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
Cable	Micro-Coax	UFD150A-1-0720-200200	NCW	2023-01-18	2024-01-18
Block - DC	Weinschel Corp.	7006	AMS	2023-01-18	2024-01-18
Attenuator	S.M. Electronics	SA18H-20	REK	2022-02-15	2023-02-15
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	2023-01-19	2024-01-19
Generator - Signal	Agilent	N5183A	TIA	2022-06-25	2024-06-25
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAT	2022-11-03	2023-11-03
Attenuator	S.M. Electronics	SA18H-20	REK	2023-03-08	2024-03-08

TEST DESCRIPTION

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

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.

An RMS detector was used to match the method called out for Output Power. Because the reference level was taken with an RMS detector, the attenuation requirement is -30 dBc.

BAND EDGE COMPLIANCE



TbTx 2022.06.03.0 XMI 2022.02.07.0

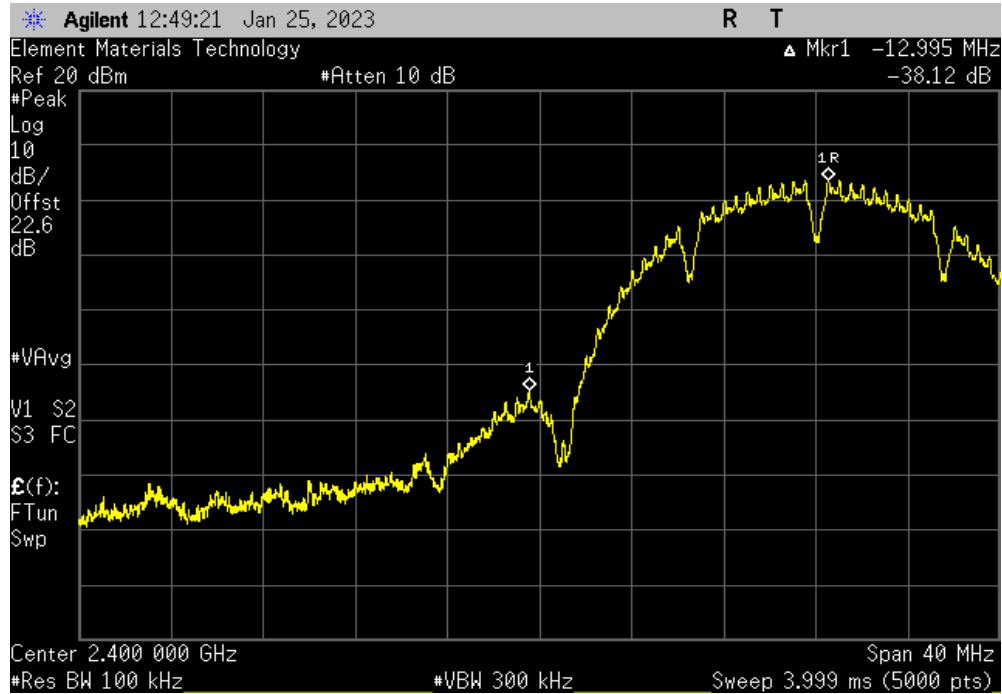
EUT: GFD200		Work Order: GLOW0038	
Serial Number: XB2-839		Date: 19-Apr-23	
Customer: Glowforge Incorporated		Temperature: 20.7 °C	
Attendees: Jason Bluhm		Humidity: 29% RH	
Project: None		Barometric Pres.: 1023 mbar	
Tested by: Harry Zhao		Power: 120VAC/60Hz	Job Site: NC06
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2023		ANSI C63.10:2013	
RSS-247 Issue 2:2017		ANSI C63.10:2013	
RSS-Gen Issue 5:2018+A1:2019+A2:2021		ANSI C63.10:2013	
COMMENTS			
Reference offset connection between EUT and Spectrum analyzer: DC Block + 20 dB attenuator + measurement cable + patched coax cable			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature 	
		Value (dBc)	Limit ≤ (dBc) Result
20 MHz			
2400 MHz - 2483.5 MHz Band			
802.11(b) 1 Mbps			
Low Channel 1, 2412 MHz		-38.12	-30 Pass
High Channel 11, 2462 MHz		-51.48	-30 Pass
802.11(b) 11 Mbps			
Low Channel 1, 2412 MHz		-38.36	-30 Pass
High Channel 11, 2462 MHz		-52.15	-30 Pass
802.11(g) 6 Mbps			
Low Channel 1, 2412 MHz		-30.11	-30 Pass
High Channel 11, 2462 MHz		-39.92	-30 Pass
802.11(g) 36 Mbps			
Low Channel 1, 2412 MHz		-34.46	-30 Pass
High Channel 11, 2462 MHz		-43.73	-30 Pass
802.11(g) 54 Mbps			
Low Channel 1, 2412 MHz		-34.49	-30 Pass
High Channel 11, 2462 MHz		-44.37	-30 Pass
802.11(n) MCS0			
Low Channel 1, 2412 MHz		-32.07	-30 Pass
High Channel 11, 2462 MHz		-40.33	-30 Pass
802.11(n) MCS7			
Low Channel 1, 2412 MHz		-34.52	-30 Pass
High Channel 11, 2462 MHz		-41.16	-30 Pass
40 MHz			
2400 MHz - 2483.5 MHz Band			
802.11(n) MCS0			
Low Channel 1/5, 2422 MHz		-34.89	-30 Pass
High Channel 7/11, 2452 MHz		-34.69	-30 Pass
802.11(n) MCS7			
Low Channel 1/5, 2422 MHz		-37.91	-30 Pass
High Channel 7/11, 2452 MHz		-38.5	-30 Pass

BAND EDGE COMPLIANCE

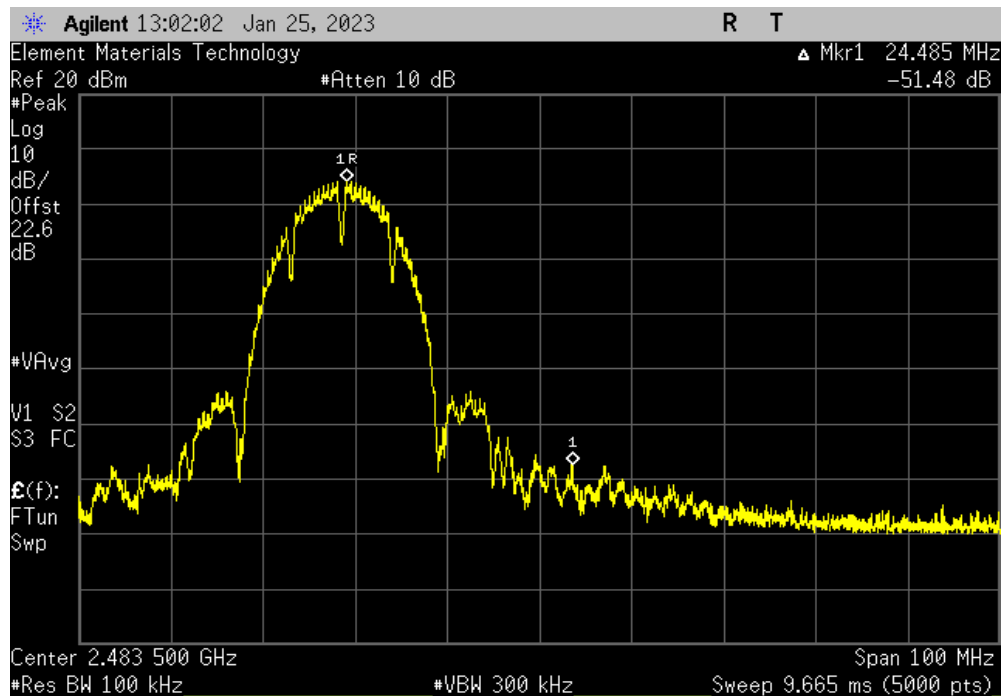


TbTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-38.12	-30	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-51.48	-30	Pass

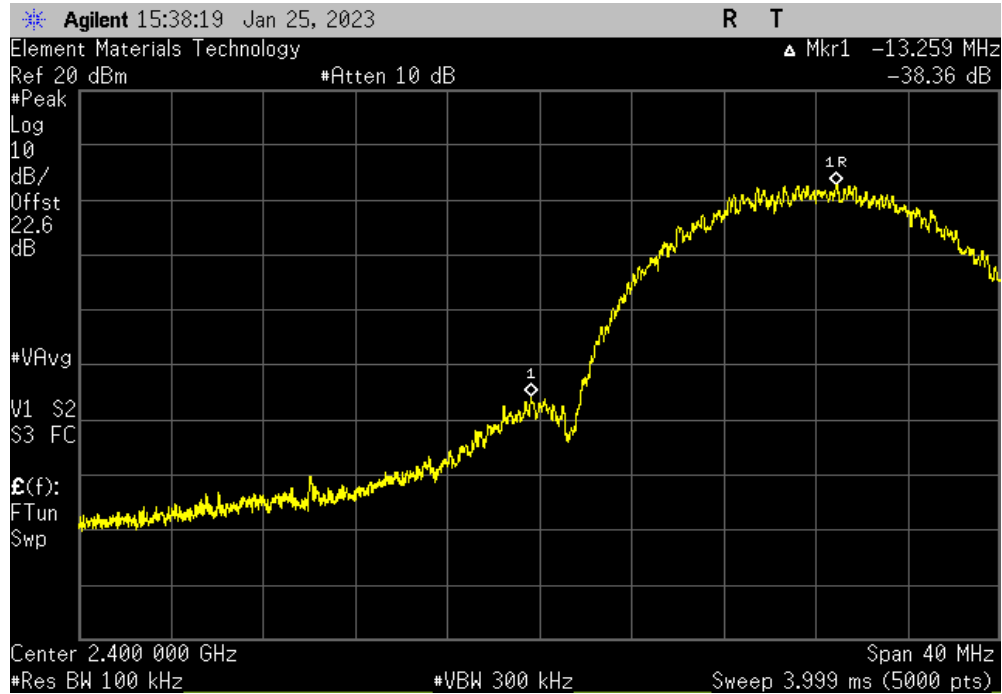


BAND EDGE COMPLIANCE

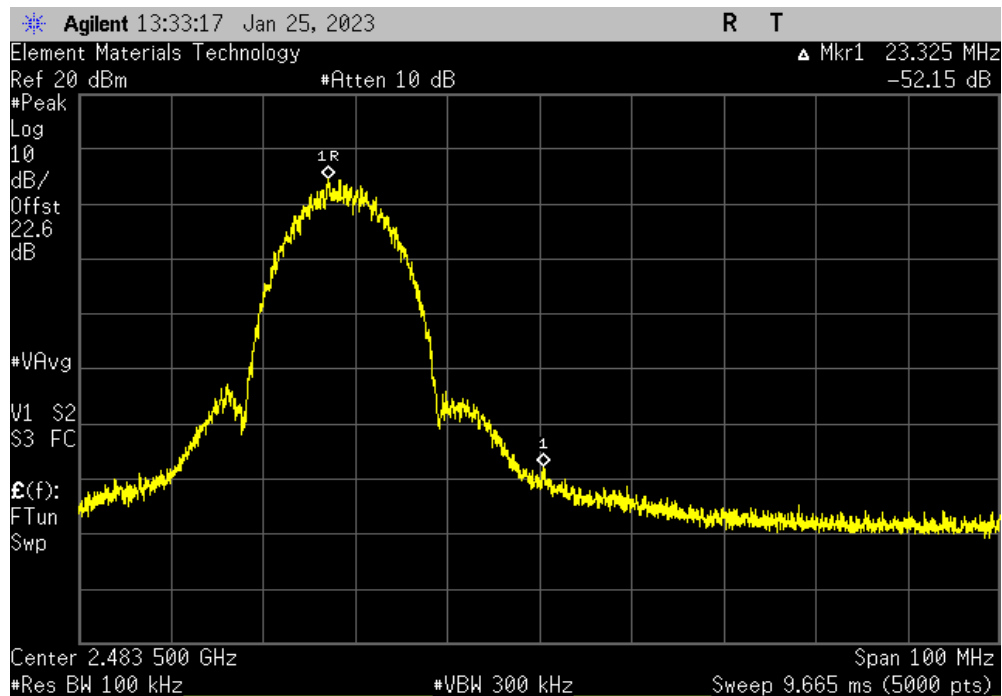


TbTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-38.36	-30	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-52.15	-30	Pass

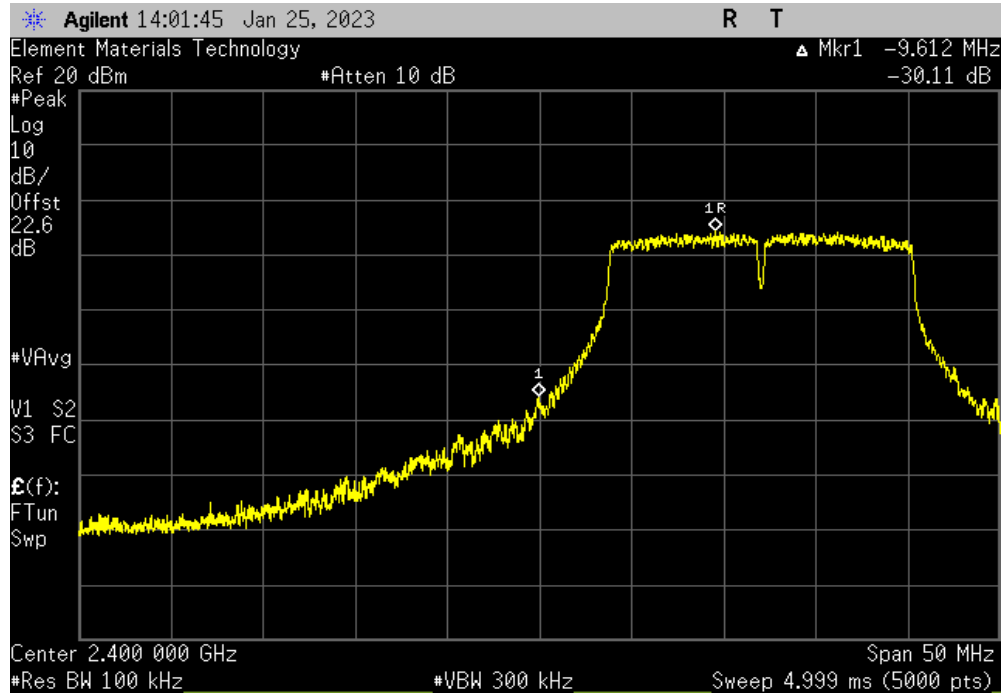


BAND EDGE COMPLIANCE

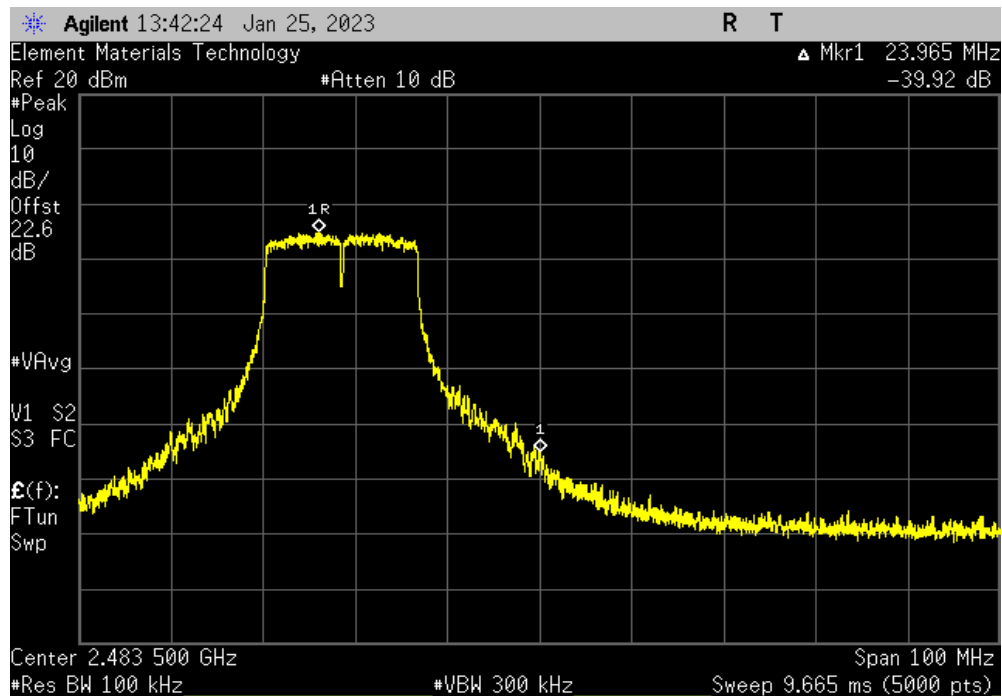


TbTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-30.11	-30	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-39.92	-30	Pass

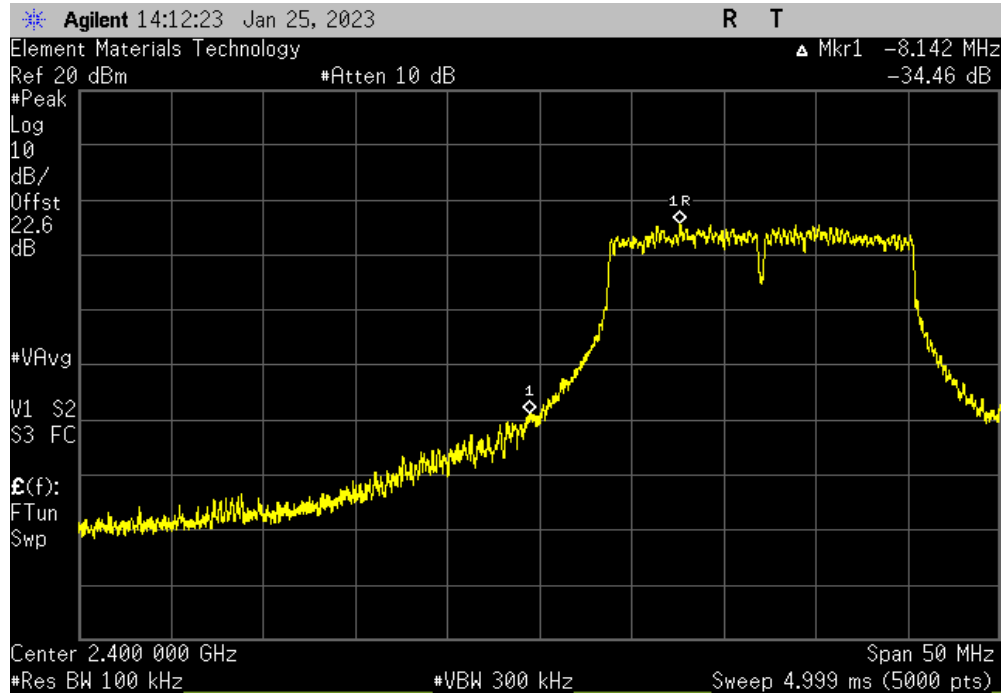


BAND EDGE COMPLIANCE

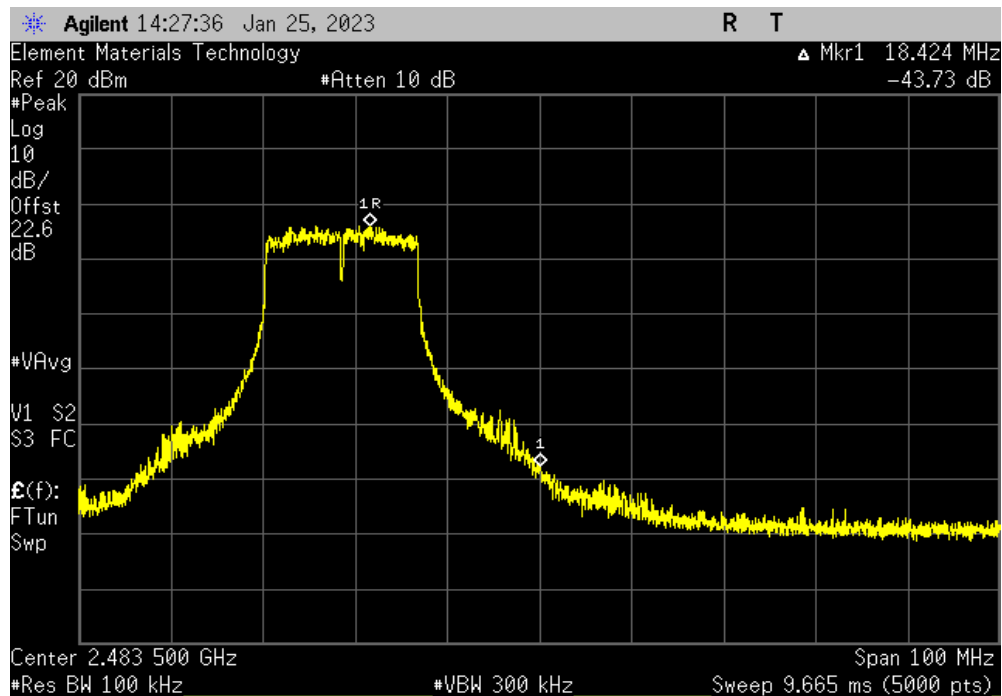


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-34.46	-30	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-43.73	-30	Pass

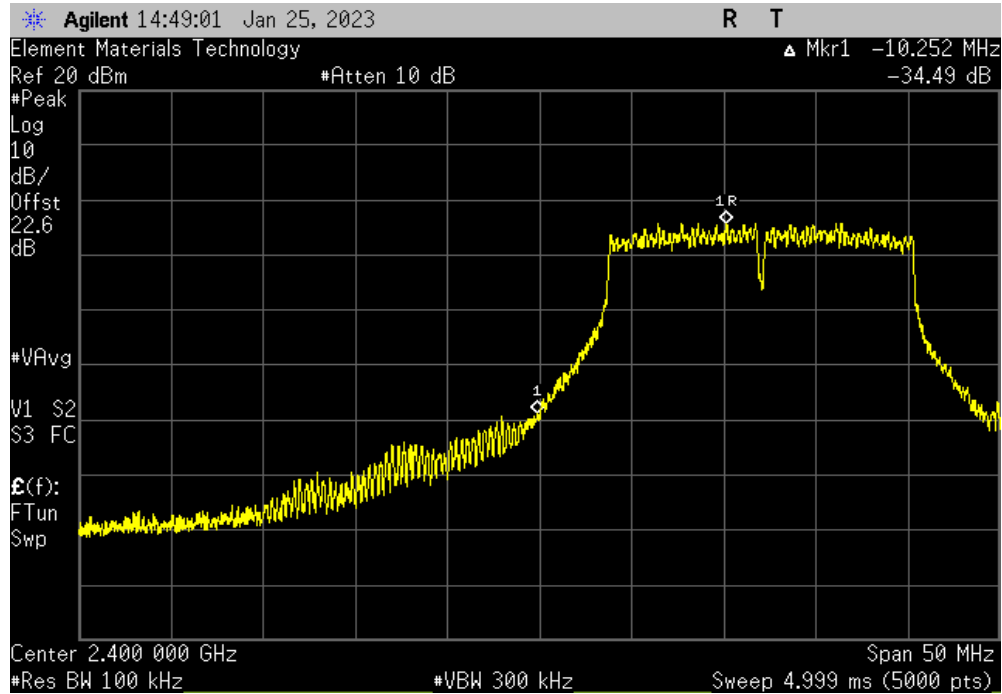


BAND EDGE COMPLIANCE

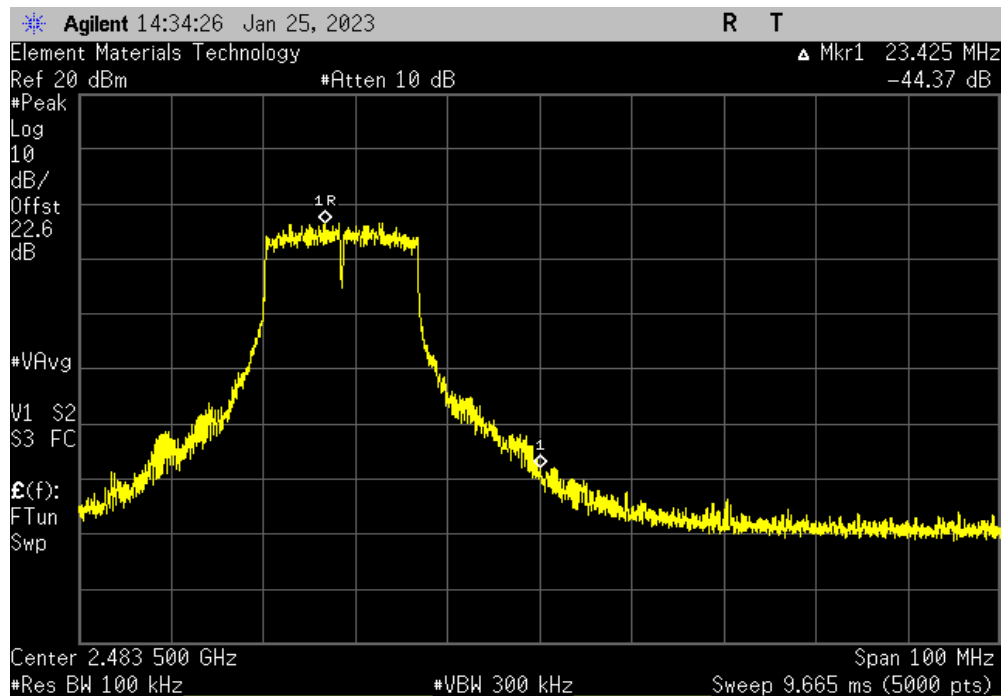


TbTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-34.49	-30	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-44.37	-30	Pass

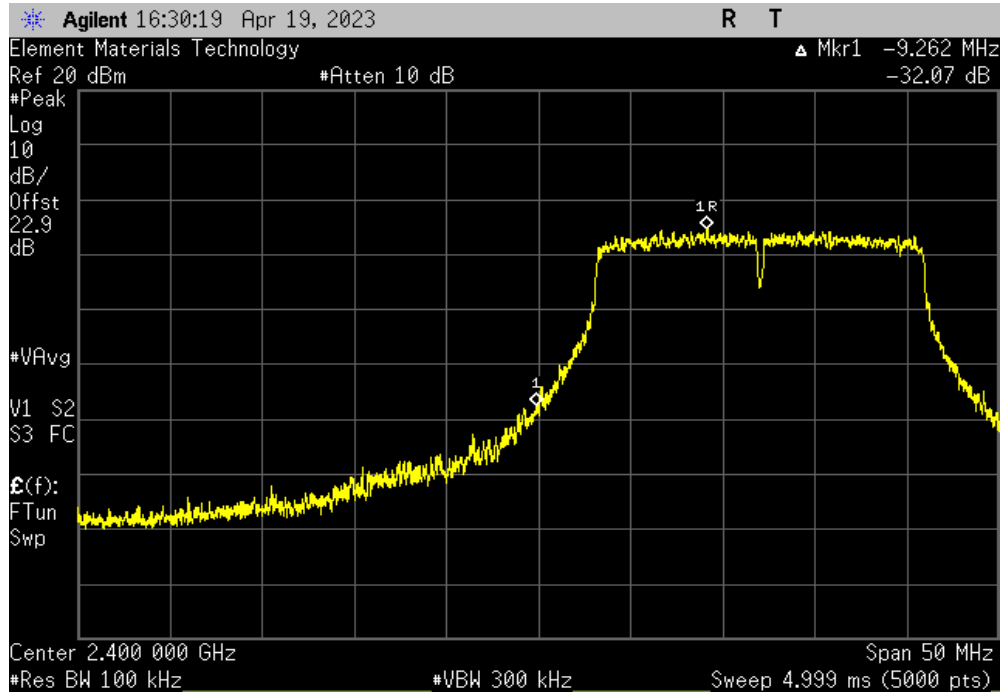


BAND EDGE COMPLIANCE

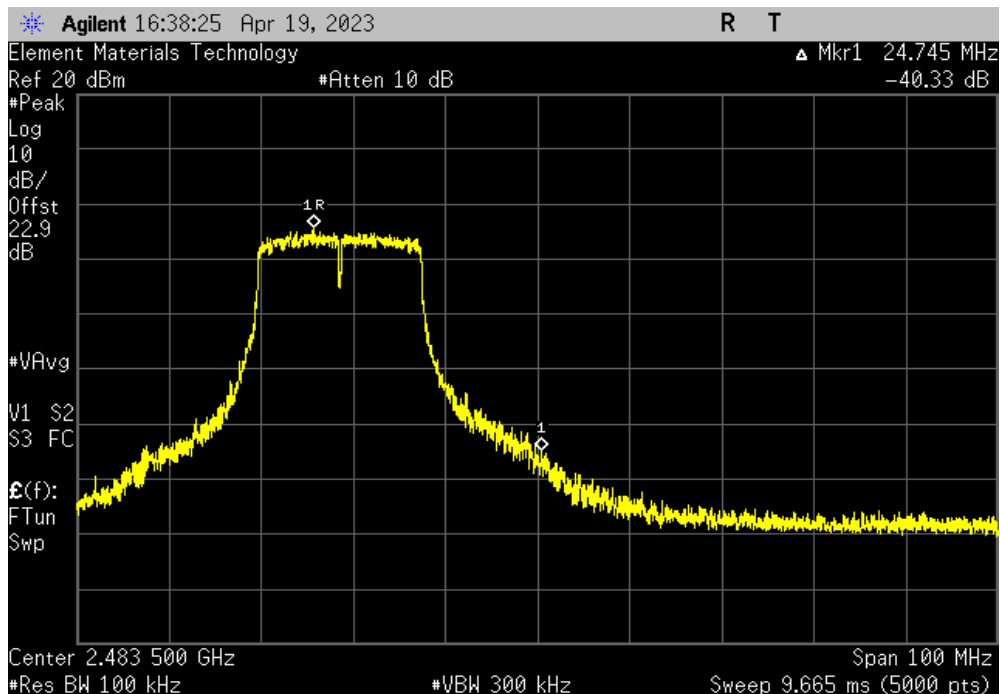


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-32.07	-30	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-40.33	-30	Pass

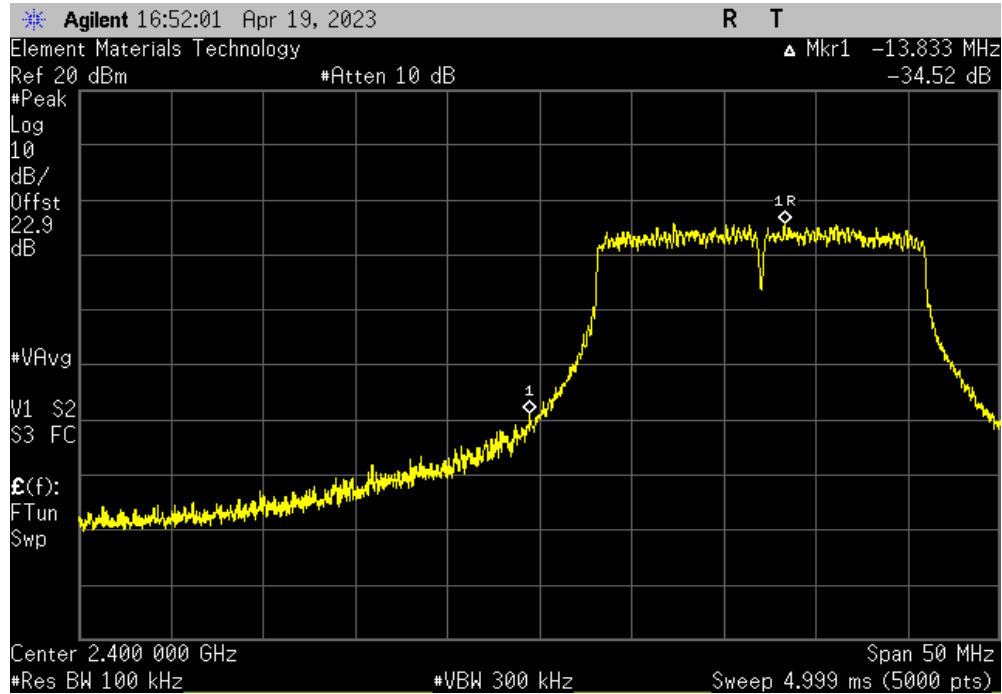


BAND EDGE COMPLIANCE

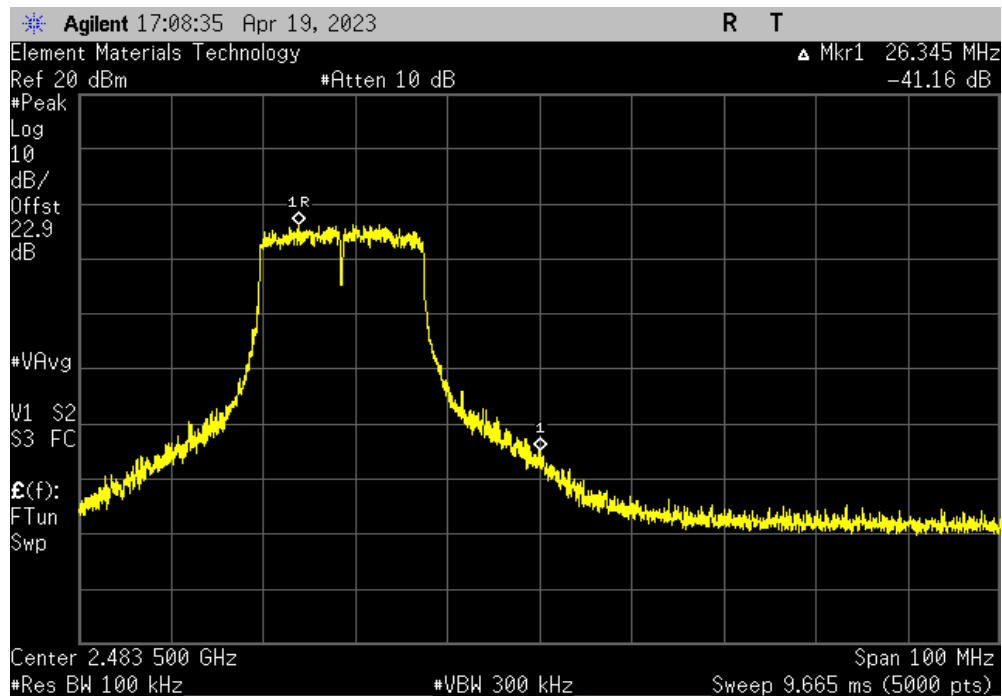


TbTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-34.52	-30	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-41.16	-30	Pass

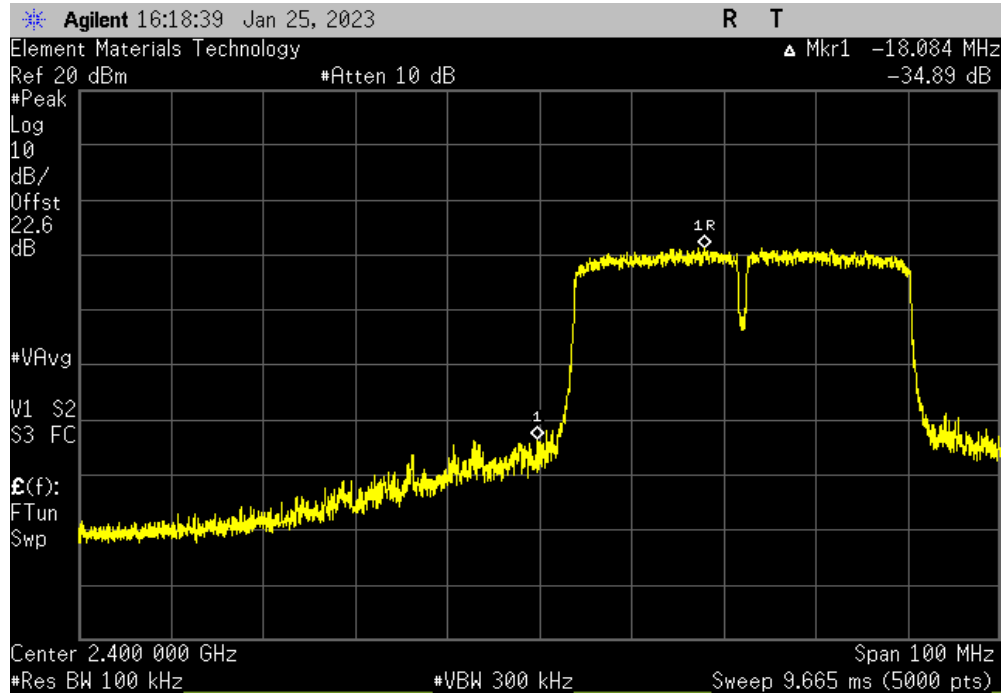


BAND EDGE COMPLIANCE

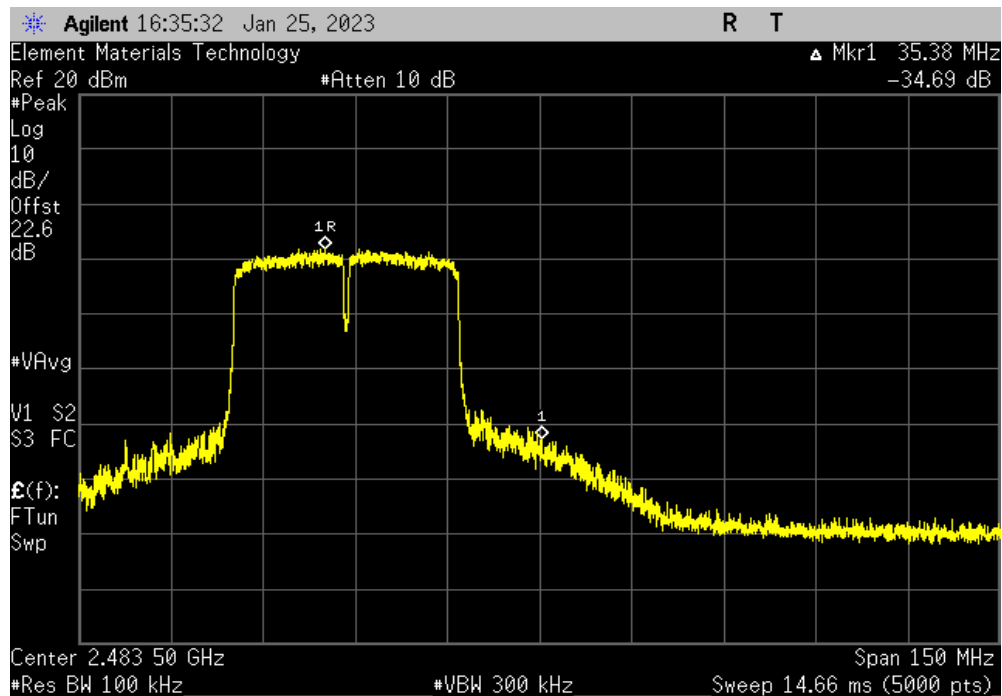


TbTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1/5, 2422 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-34.89	-30	Pass



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 7/11, 2452 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-34.69	-30	Pass

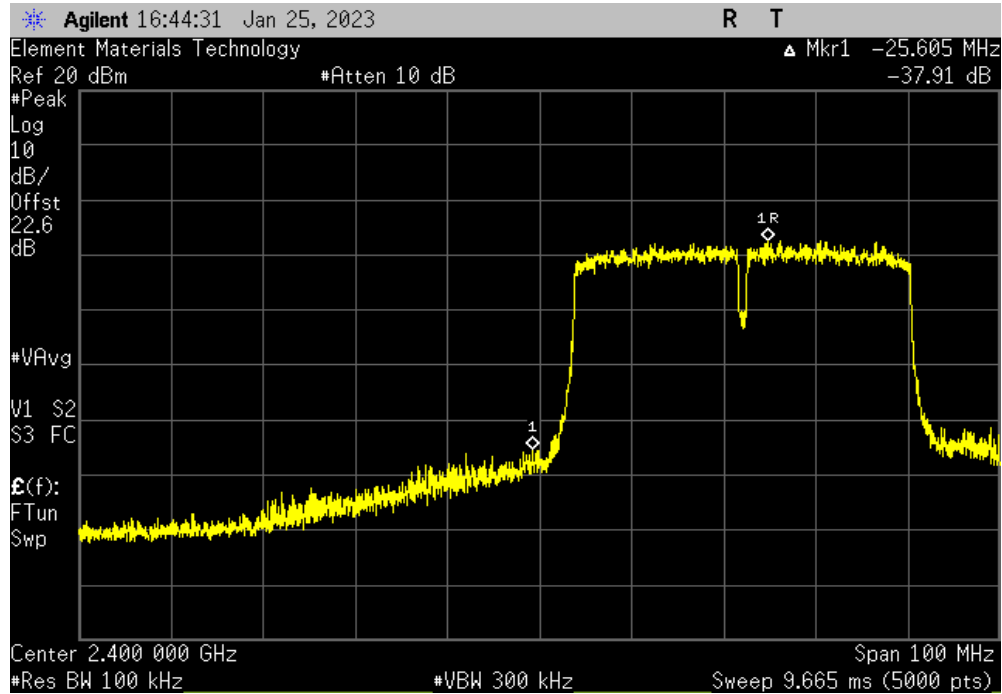


BAND EDGE COMPLIANCE

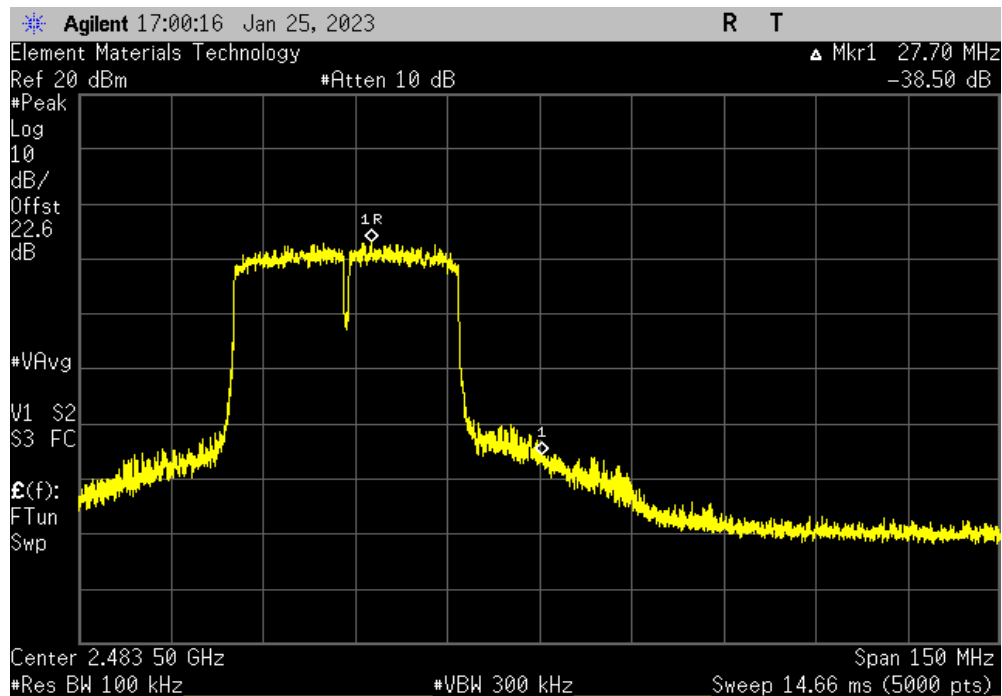


TbTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1/5, 2422 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-37.91	-30	Pass



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 7/11, 2452 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-38.5	-30	Pass



SPURIOUS CONDUCTED EMISSIONS

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
Cable	Micro-Coax	UFD150A-1-0720-200200	NCW	2023-01-18	2024-01-18
Attenuator	S.M. Electronics	SA18H-20	REK	2022-02-15	2023-02-15
Generator - Signal	Agilent	N5183A	TIA	2022-06-25	2024-06-25
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	2023-01-19	2024-01-19
Block - DC	Weinschel Corp.	7006	AMS	2023-01-18	2024-01-18
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAT	2022-11-03	2023-11-03
Attenuator	S.M. Electronics	SA18H-20	REK	2023-03-08	2024-03-08

TEST DESCRIPTION

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

The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet. For each transmit frequency, the fundamental was measured with a 100 kHz resolution bandwidth and the highest value was recorded. The rest of the spectrum was then measured with a 100 kHz resolution bandwidth and the highest value was found. The difference between the value found on the fundamental and the rest of the spectrum was compared against the limit to determine compliance.

The reference level offset for the fundamental screen capture was based on a measured value of the loss between the spectrum analyzer and the EUT which was verified at the time of test. The remaining screen capture(s) use an internal transducer factor on the analyzer to correct the displayed trace based on the cable loss over frequency. The reference level offset for the additional screen capture(s) is then based on the expected attenuator value and any other losses.

Fundamental Offset = Ref Lvl Offset showing measured composite factor of all losses

Remaining Screen capture(s) Offset = "Internal" cable loss factor not shown on screen capture + Ref Lvl Offset showing expected attenuator value and any other losses

SPURIOUS CONDUCTED EMISSIONS



TbTx 2022.06.03.0 XMit 2022.02.07.0

EUT: GFD200		Work Order: GLOW0038				
Serial Number: XB2-839		Date: 19-Apr-23				
Customer: Glowforge Incorporated		Temperature: 20.7 °C				
Attendees: Jason Bluhm		Humidity: 28.3% RH				
Project: None		Barometric Pres.: 1023 mbar				
Tested by: Harry Zhao		Power: 120VAC/60Hz	Job Site: NC06			
TEST SPECIFICATIONS		Test Method				
FCC 15.247:2023		ANSI C63.10:2013				
RSS-247 Issue 2:2017		ANSI C63.10:2013				
RSS-Gen Issue 5:2018+A1:2019+A2:2021		ANSI C63.10:2013				
COMMENTS						
Reference offset connection between EUT and Spectrum analyzer: DC Block + 20 dB attenuator + measurement cable + patched coax cable						
DEVIATIONS FROM TEST STANDARD						
None						
Configuration #	2	Signature 				
		Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
20 MHz						
2400 MHz - 2483.5 MHz Band						
802.11(b) 1 Mbps						
	Low Channel 1, 2412 MHz	Fundamental	2412.54	N/A	N/A	N/A
	Low Channel 1, 2412 MHz	30 MHz - 12.5 GHz	7237.1	-44.91	-30	Pass
	Low Channel 1, 2412 MHz	12.5 GHz - 25 GHz	13694.9	-54.34	-30	Pass
	Mid Channel 6, 2437 MHz	Fundamental	2437.54	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	7311.7	-42.01	-30	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 25 GHz	24862.7	-53.82	-30	Pass
	High Channel 11, 2462 MHz	Fundamental	2461.53	N/A	N/A	N/A
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	7387.8	-39.75	-30	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 25 GHz	24272.1	-54.57	-30	Pass
802.11(b) 11 Mbps						
	Low Channel 1, 2412 MHz	Fundamental	2412.89	N/A	N/A	N/A
	Low Channel 1, 2412 MHz	30 MHz - 12.5 GHz	7227.9	-49.76	-30	Pass
	Low Channel 1, 2412 MHz	12.5 GHz - 25 GHz	24800.1	-52.96	-30	Pass
	Mid Channel 6, 2437 MHz	Fundamental	2435.58	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	7310.1	-45.24	-30	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 25 GHz	24508.6	-54.68	-30	Pass
	High Channel 11, 2462 MHz	Fundamental	2460.59	N/A	N/A	N/A
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	7386.2	-43.11	-30	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 25 GHz	22999.3	-55.5	-30	Pass
802.11(g) 6 Mbps						
	Low Channel 1, 2412 MHz	Fundamental	2409.54	N/A	N/A	N/A
	Low Channel 1, 2412 MHz	30 MHz - 12.5 GHz	7237.1	-44.56	-30	Pass
	Low Channel 1, 2412 MHz	12.5 GHz - 25 GHz	24848.9	-44.88	-30	Pass
	Mid Channel 6, 2437 MHz	Fundamental	2434.53	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	7311.7	-43.1	-30	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 25 GHz	24505.6	-44.7	-30	Pass
	High Channel 11, 2462 MHz	Fundamental	2459.54	N/A	N/A	N/A
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	7387.8	-42.03	-30	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 25 GHz	23991.3	-45.43	-30	Pass
802.11(g) 36 Mbps						
	Low Channel 1, 2412 MHz	Fundamental	2407.65	N/A	N/A	N/A
	Low Channel 1, 2412 MHz	30 MHz - 12.5 GHz	7238.6	-47.26	-30	Pass
	Low Channel 1, 2412 MHz	12.5 GHz - 25 GHz	24768	-44.67	-30	Pass
	Mid Channel 6, 2437 MHz	Fundamental	2432.63	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	7313.2	-44.44	-30	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 25 GHz	24874.9	-46.01	-30	Pass
	High Channel 11, 2462 MHz	Fundamental	2457.65	N/A	N/A	N/A
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	7378.6	-44.49	-30	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 25 GHz	13687.3	-46.66	-30	Pass
802.11(g) 54 Mbps						
	Low Channel 1, 2412 MHz	Fundamental	2410.15	N/A	N/A	N/A
	Low Channel 1, 2412 MHz	30 MHz - 12.5 GHz	7238.6	-47.55	-30	Pass

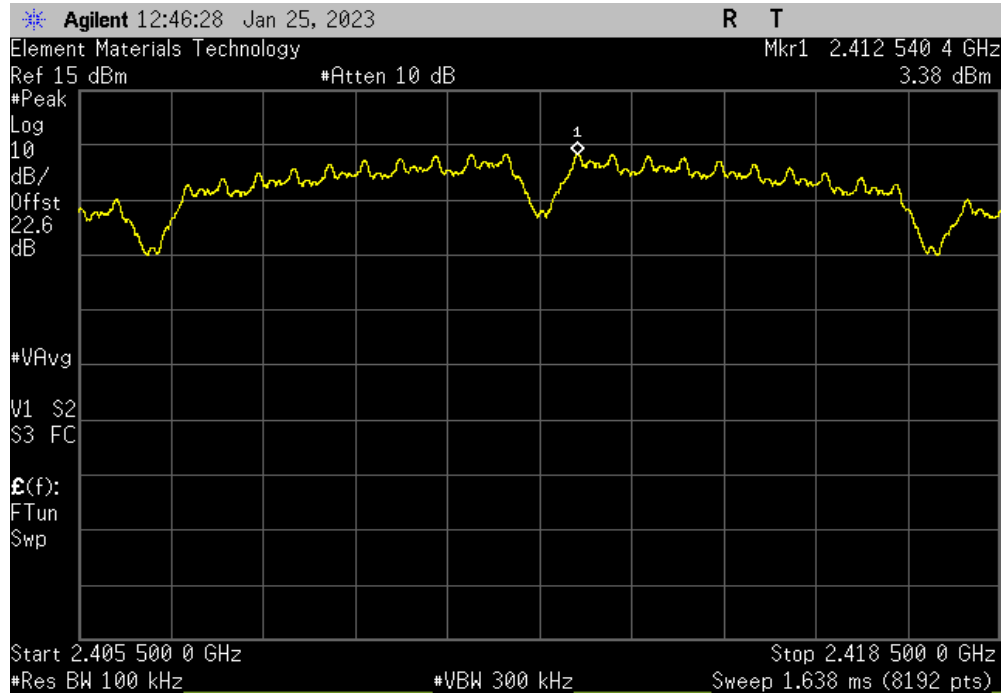
40 MHz						
	Low Channel 1, 2412 MHz	12.5 GHz - 25 GHz	24455.2	-45.89	-30	Pass
	Mid Channel 6, 2437 MHz	Fundamental	2441.39	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	7308.6	-45.58	-30	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 25 GHz	24917.6	-46.56	-30	Pass
	High Channel 11, 2462 MHz	Fundamental	2460.16	N/A	N/A	N/A
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	7383.2	-43.85	-30	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 25 GHz	23882.9	-47.29	-30	Pass
	802.11(n) MCS0					
	Low Channel 1, 2412 MHz	Fundamental	2409.16	N/A	N/A	N/A
	Low Channel 1, 2412 MHz	30 MHz - 12.5 GHz	7235.5	-46.69	-30	Pass
	Low Channel 1, 2412 MHz	12.5 GHz - 25 GHz	13864.3	-43.33	-30	Pass
	Mid Channel 6, 2437 MHz	Fundamental	2434.15	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	7308.6	-46.21	-30	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 25 GHz	23599.1	-43.88	-30	Pass
	High Channel 11, 2462 MHz	Fundamental	2459.16	N/A	N/A	N/A
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	7392.3	-46.04	-30	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 25 GHz	13842.9	-43.63	-30	Pass
	802.11(n) MCS7					
	Low Channel 1, 2412 MHz	Fundamental	2413.29	N/A	N/A	N/A
	Low Channel 1, 2412 MHz	30 MHz - 12.5 GHz	12381.3	-48.09	-30	Pass
	Low Channel 1, 2412 MHz	12.5 GHz - 25 GHz	13966.5	-43.36	-30	Pass
	Mid Channel 6, 2437 MHz	Fundamental	2438.3	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	7314.7	-46.36	-30	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 25 GHz	24919.1	-43.96	-30	Pass
	High Channel 11, 2462 MHz	Fundamental	2463.3	N/A	N/A	N/A
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	7384.7	-45.93	-30	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 25 GHz	13955.9	-44.49	-30	Pass
2400 MHz - 2483.5 MHz Band						
802.11(n) MCS0						
	Low Channel 1/5, 2422 MHz	Fundamental	2414.3	N/A	N/A	N/A
	Low Channel 1/5, 2422 MHz	30 MHz - 12.5 GHz	2240.5	-45.77	-30	Pass
	Low Channel 1/5, 2422 MHz	12.5 GHz - 25 GHz	24238.5	-40.6	-30	Pass
	Mid Channel 4/8, 2437 MHz	Fundamental	2433.55	N/A	N/A	N/A
	Mid Channel 4/8, 2437 MHz	30 MHz - 12.5 GHz	7311.7	-44.43	-30	Pass
	Mid Channel 4/8, 2437 MHz	12.5 GHz - 25 GHz	24232.4	-41.48	-30	Pass
	High Channel 7/11, 2452 MHz	Fundamental	2447.9	N/A	N/A	N/A
	High Channel 7/11, 2452 MHz	30 MHz - 12.5 GHz	7364.9	-42.86	-30	Pass
	High Channel 7/11, 2452 MHz	12.5 GHz - 25 GHz	24826	-41.59	-30	Pass
	802.11(n) MCS7					
	Low Channel 1/5, 2422 MHz	Fundamental	2426.06	N/A	N/A	N/A
	Low Channel 1/5, 2422 MHz	30 MHz - 12.5 GHz	2240.5	-46.2	-30	Pass
	Low Channel 1/5, 2422 MHz	12.5 GHz - 25 GHz	24473.5	-43.58	-30	Pass
	Mid Channel 4/8, 2437 MHz	Fundamental	2441.07	N/A	N/A	N/A
	Mid Channel 4/8, 2437 MHz	30 MHz - 12.5 GHz	7305.6	-45.84	-30	Pass
	Mid Channel 4/8, 2437 MHz	12.5 GHz - 25 GHz	22437.7	-43.02	-30	Pass
	High Channel 7/11, 2452 MHz	Fundamental	2456.07	N/A	N/A	N/A
	High Channel 7/11, 2452 MHz	30 MHz - 12.5 GHz	7368	-45.91	-30	Pass
	High Channel 7/11, 2452 MHz	12.5 GHz - 25 GHz	23835.6	-42.99	-30	Pass

SPURIOUS CONDUCTED EMISSIONS

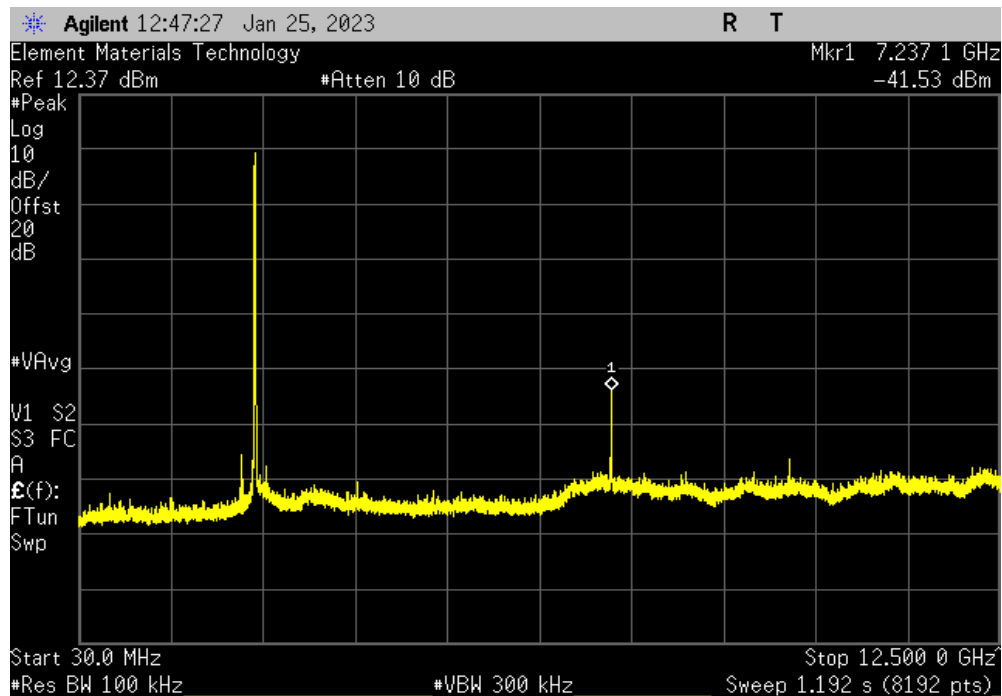


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental		2412.54	N/A	N/A	N/A	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz		7237.1	-44.91	-30	Pass	

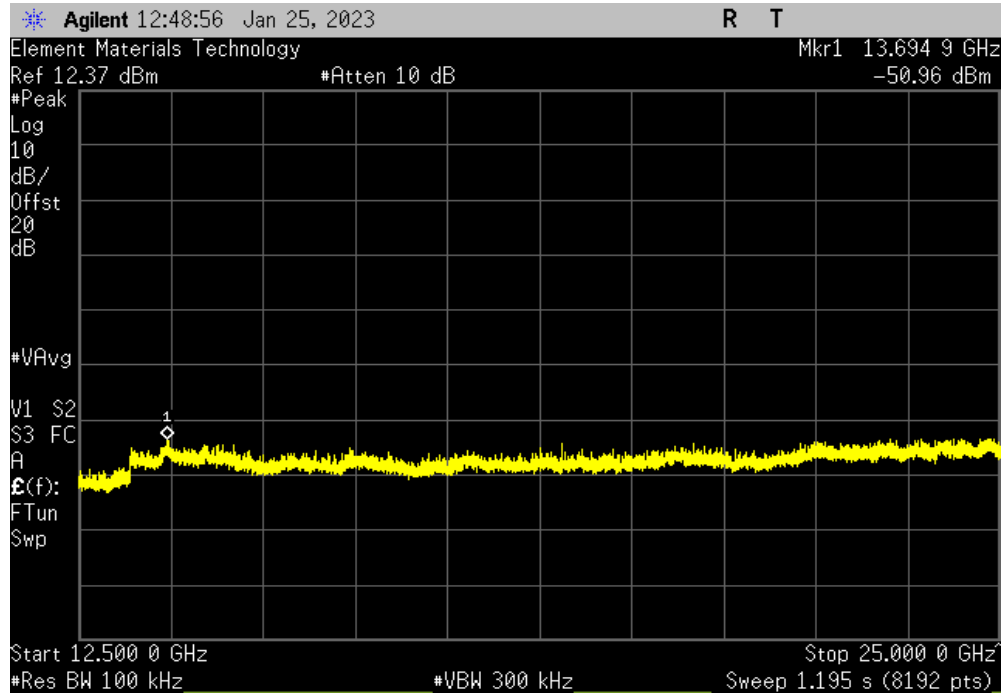


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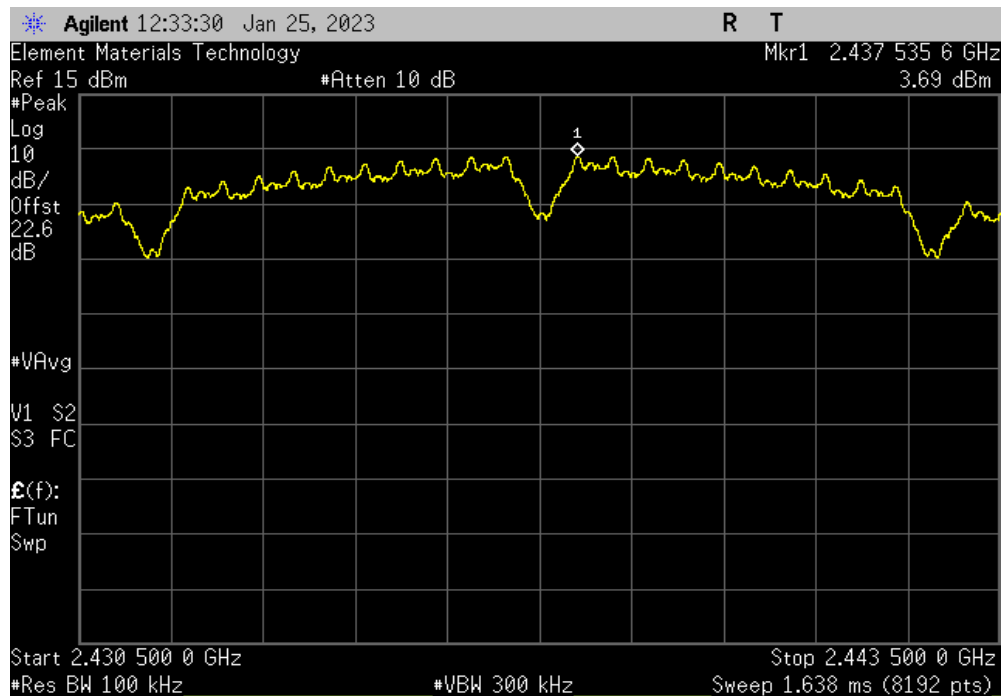


TbTx 2022.06.03.0 XbTx 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	13694.9	-54.34	-30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2437.54	N/A	N/A	N/A	

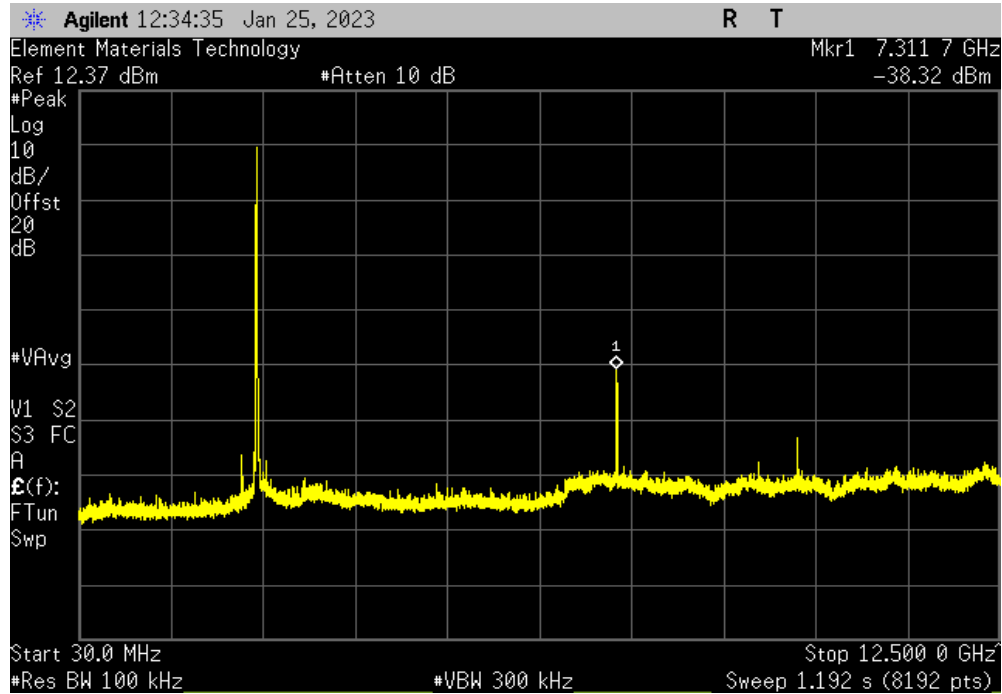


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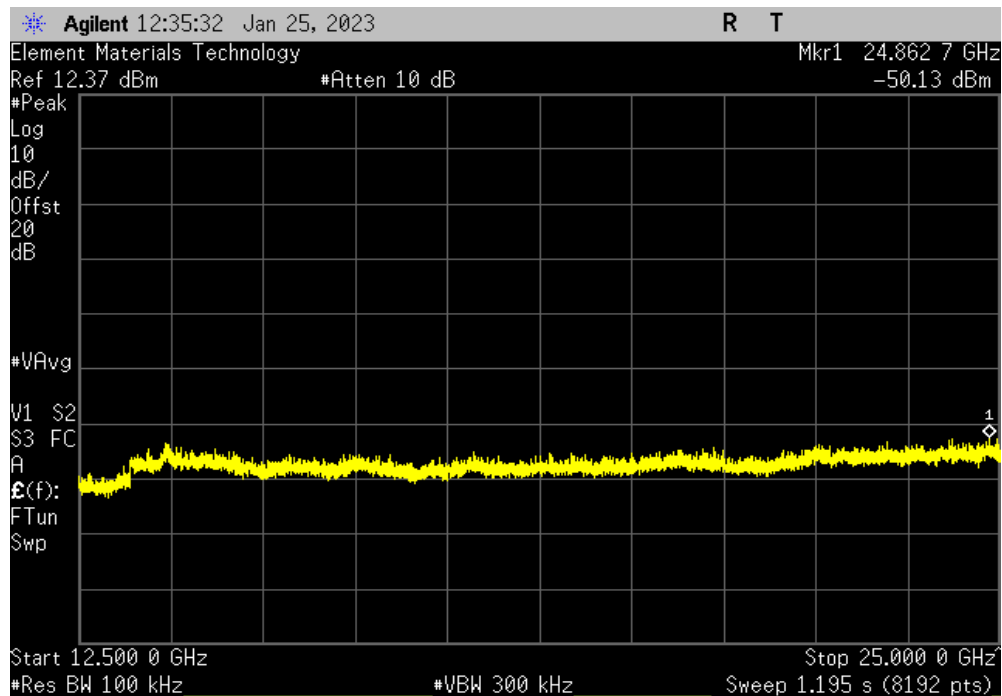


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	7311.7	-42.01	-30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24862.7	-53.82	-30	Pass	

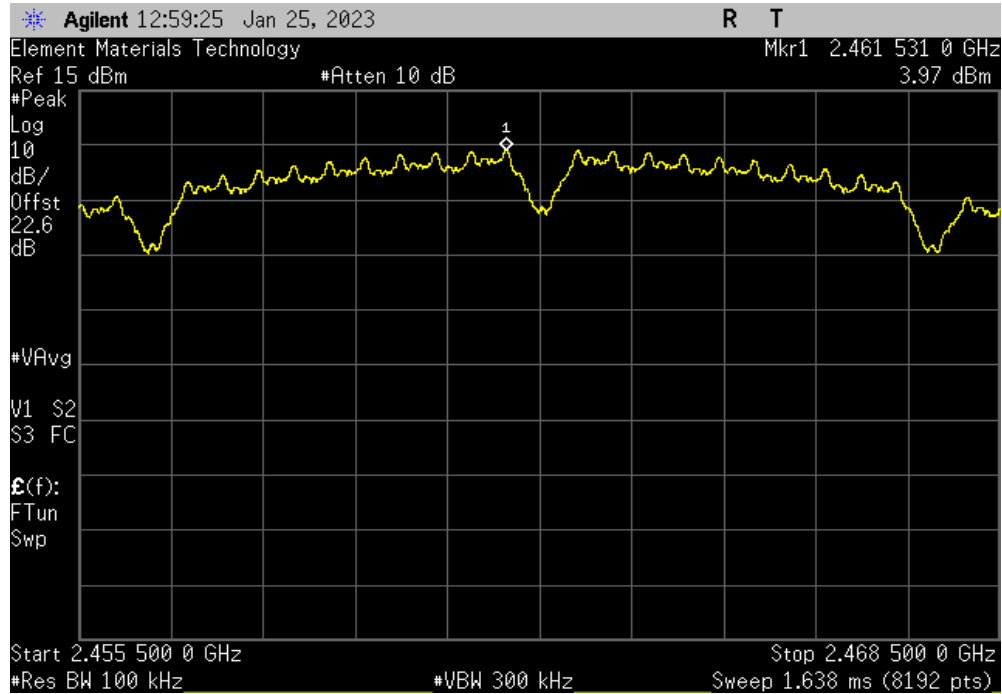


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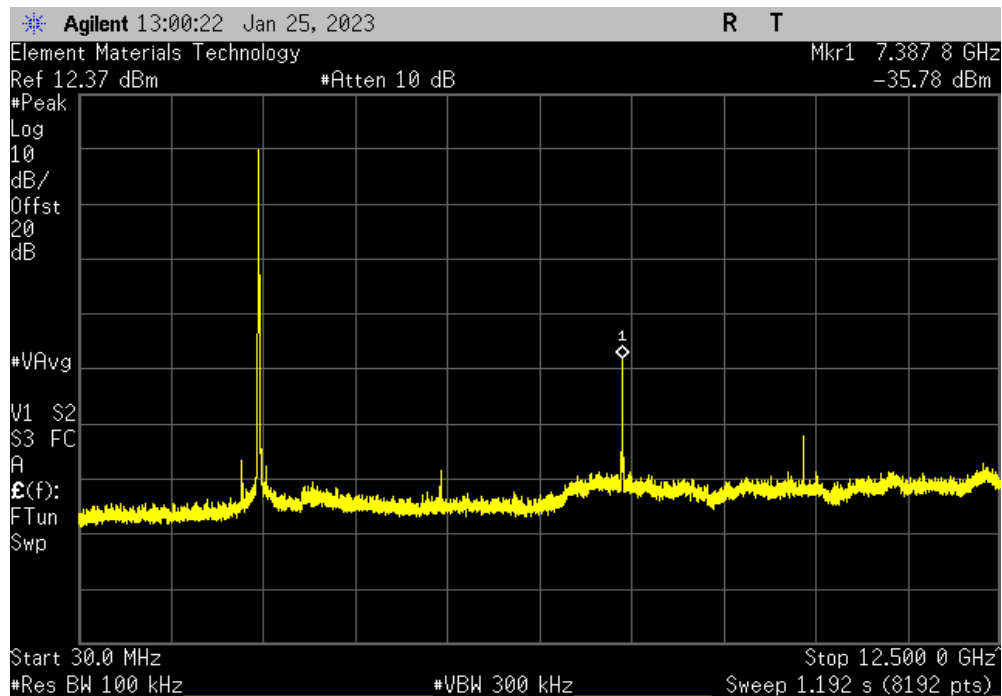


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
Fundamental	2461.53	N/A	N/A	N/A		



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
30 MHz - 12.5 GHz	7387.8	-39.75	-30	Pass		

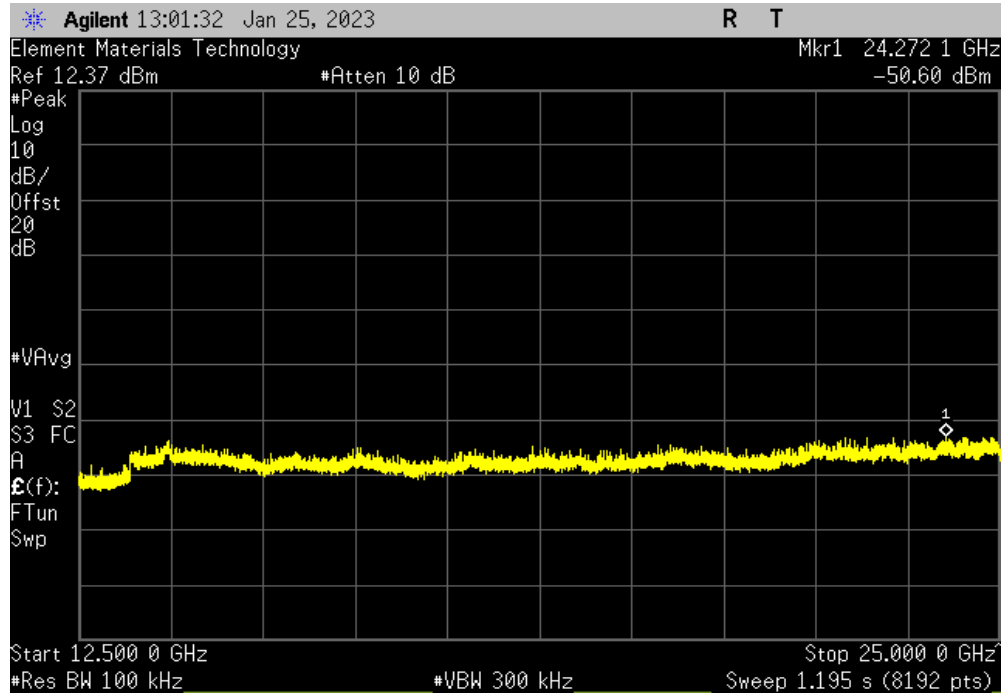


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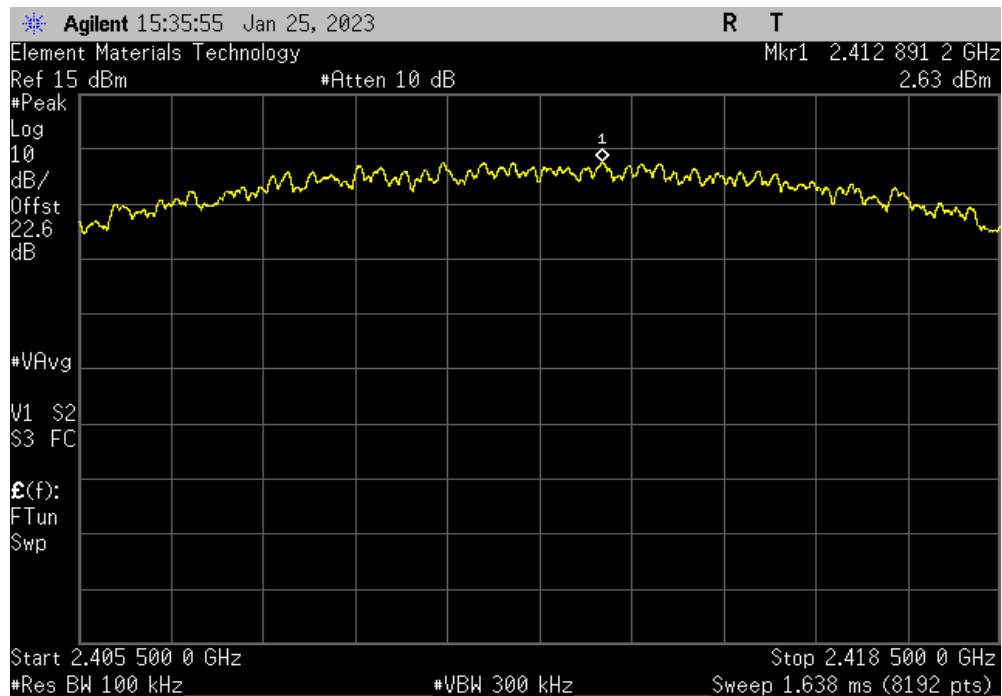


TbTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24272.1	-54.57	-30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2412.89	N/A	N/A	N/A	

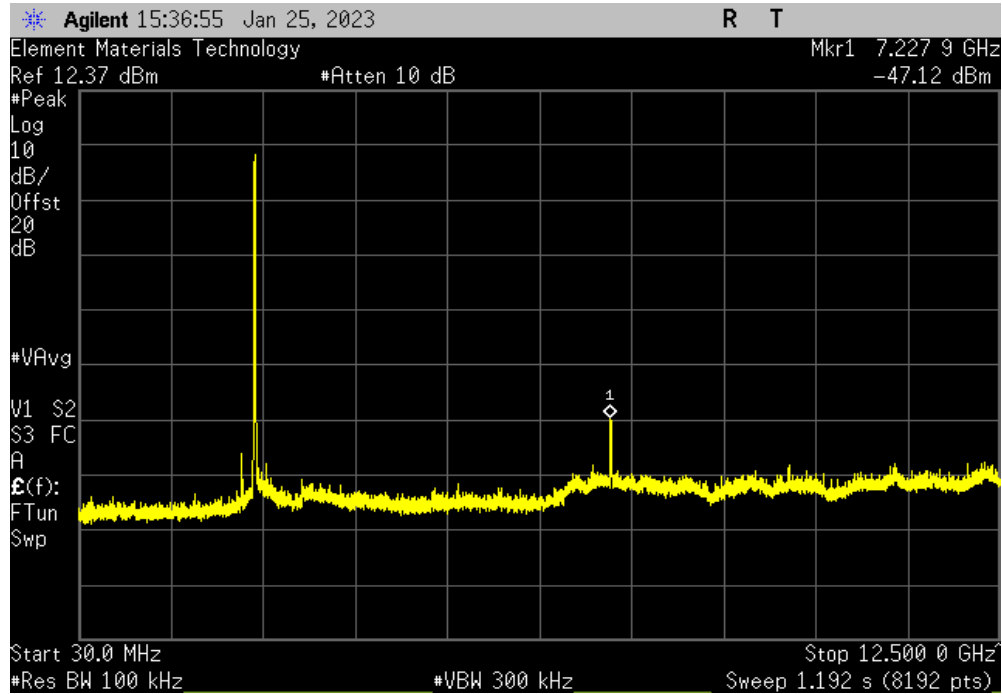


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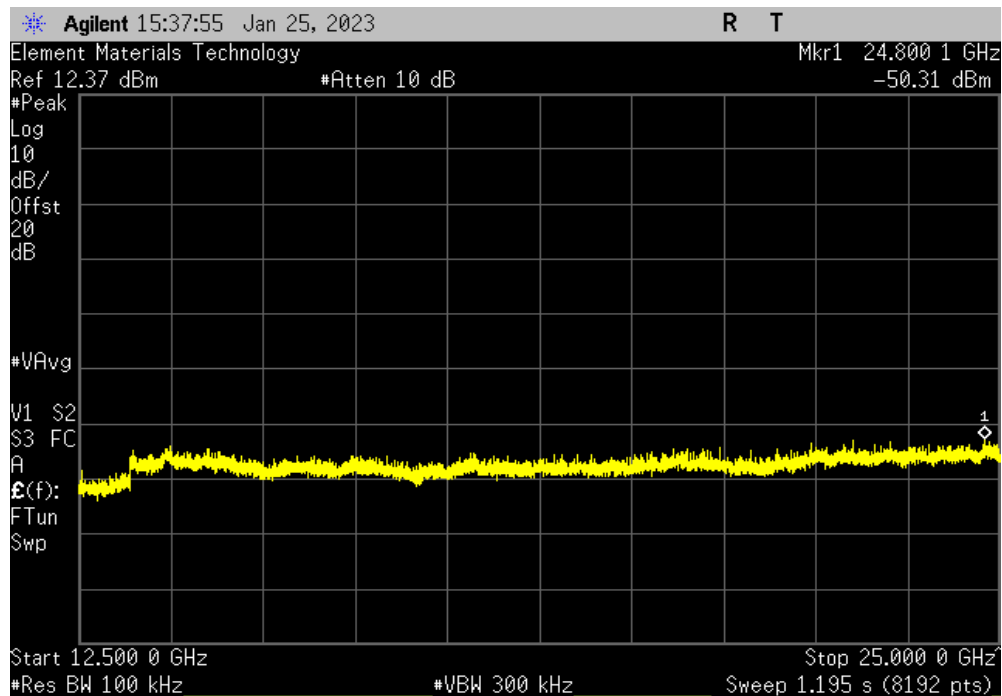


TbTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	7227.9	-49.76	-30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24800.1	-52.96	-30	Pass	

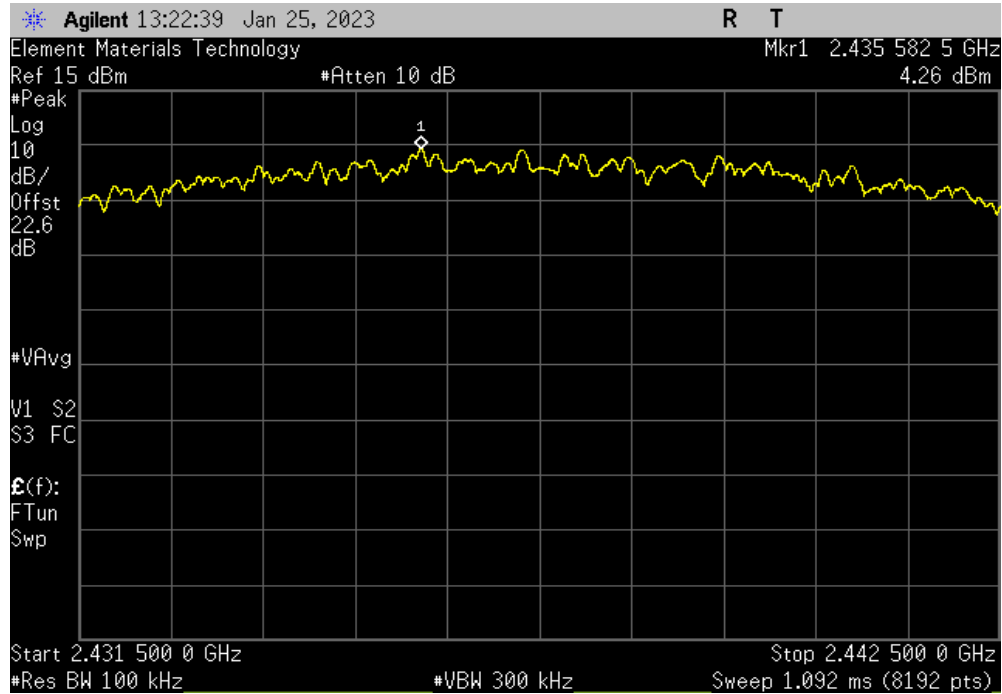


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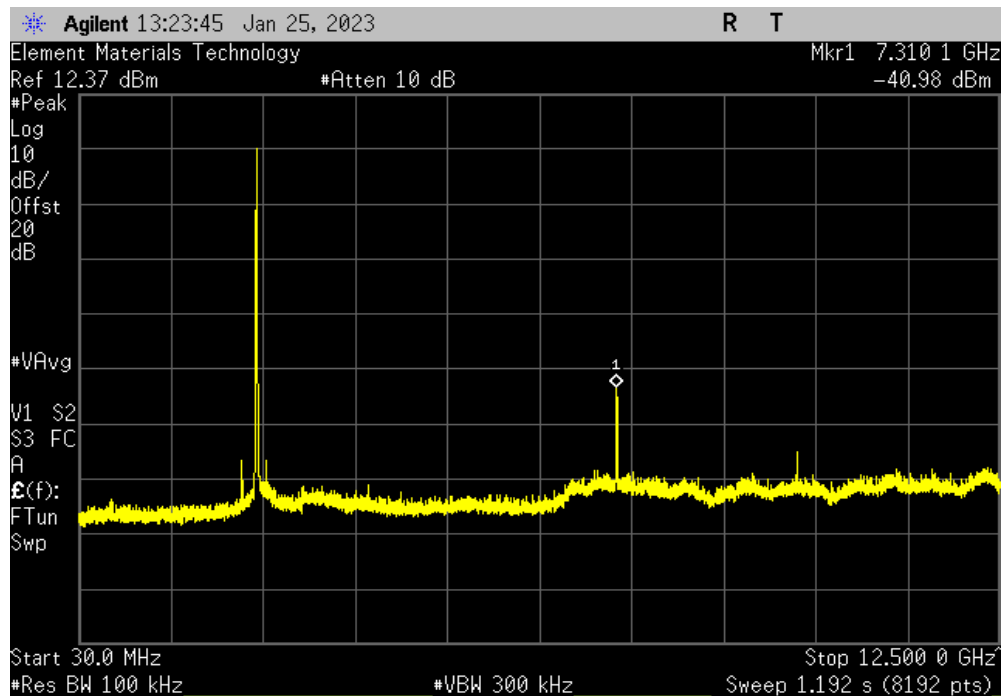


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz						
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental		2435.58	N/A	N/A	N/A	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz						
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz		7310.1	-45.24	-30	Pass	

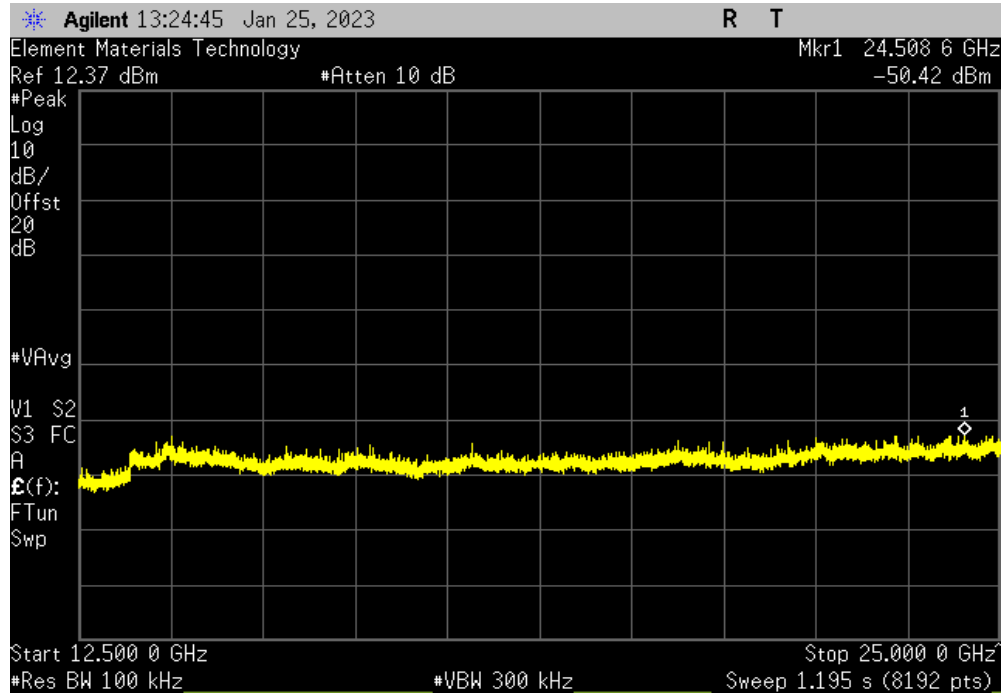


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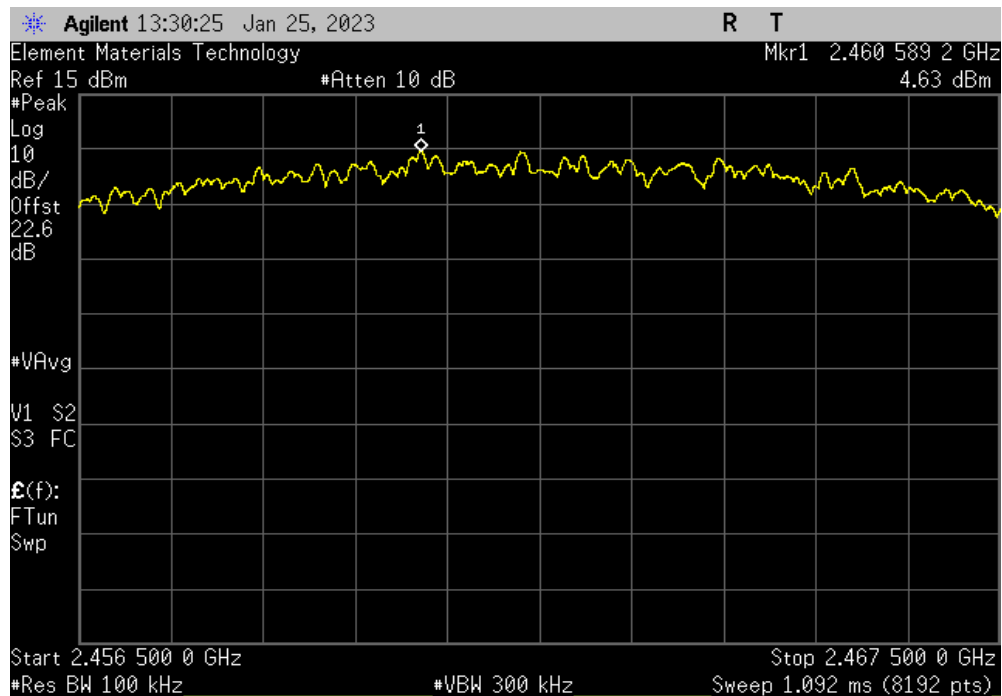


TbTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24508.6	-54.68	-30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2460.59	N/A	N/A	N/A	

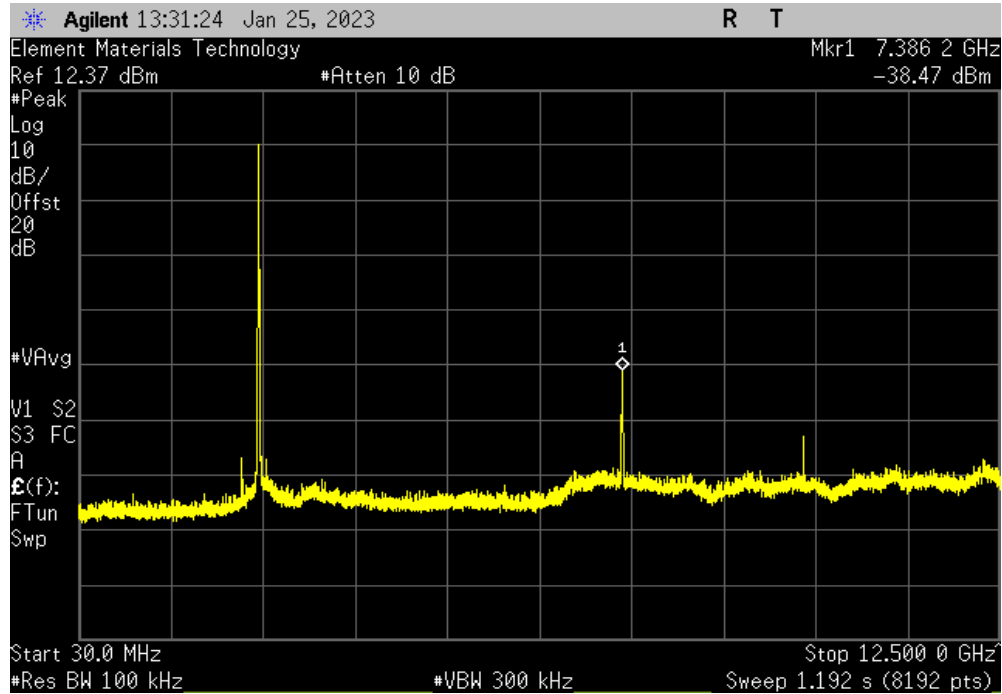


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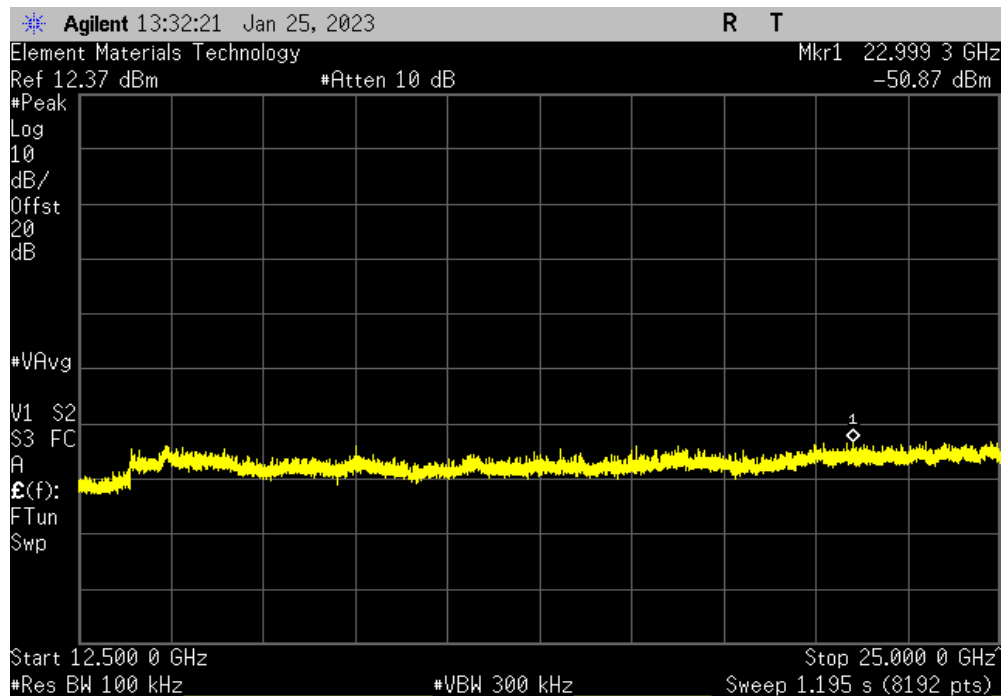


TUTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	7386.2	-43.11	-30	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz	22999.3	-55.5	-30	Pass

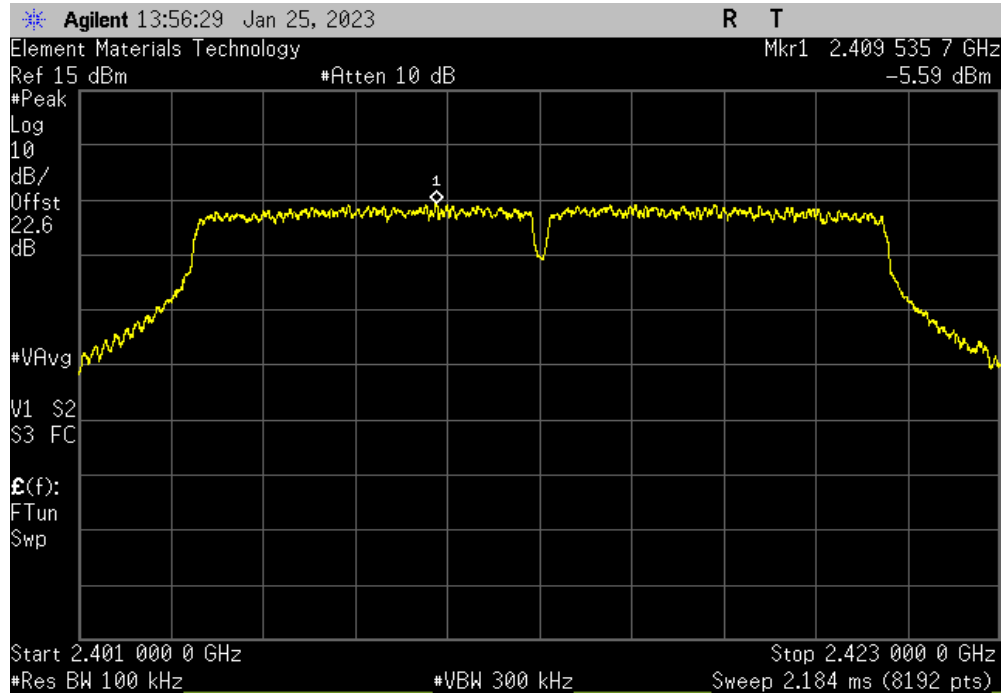


SPURIOUS CONDUCTED EMISSIONS

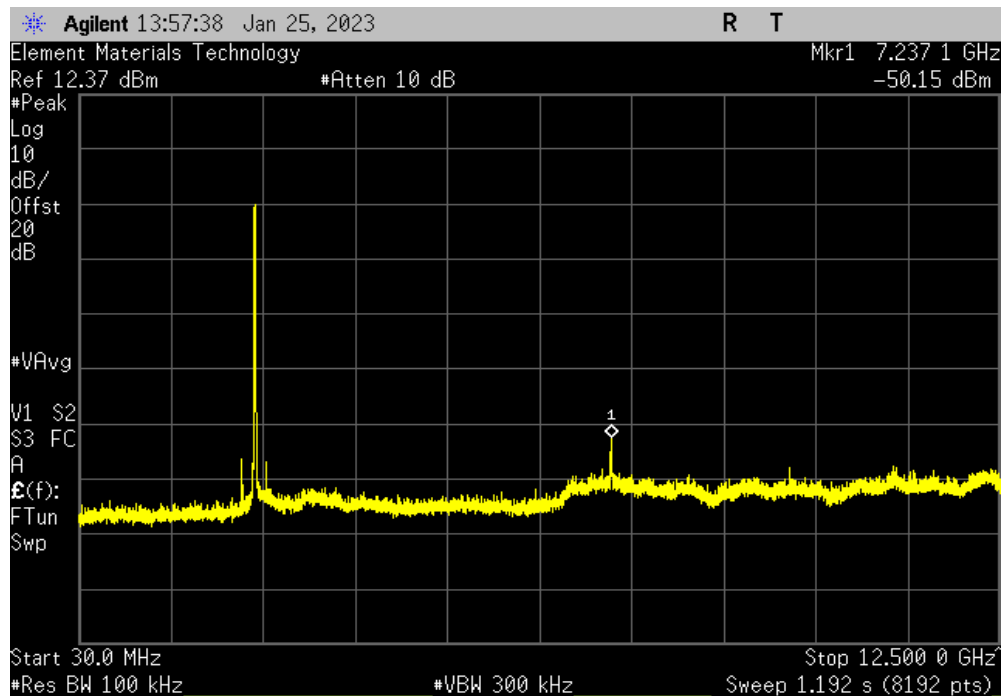


TbTx 2022.06.03.0 XMt 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
Fundamental	2409.54	N/A	N/A	N/A		



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
30 MHz - 12.5 GHz	7237.1	-44.56	-30	Pass		

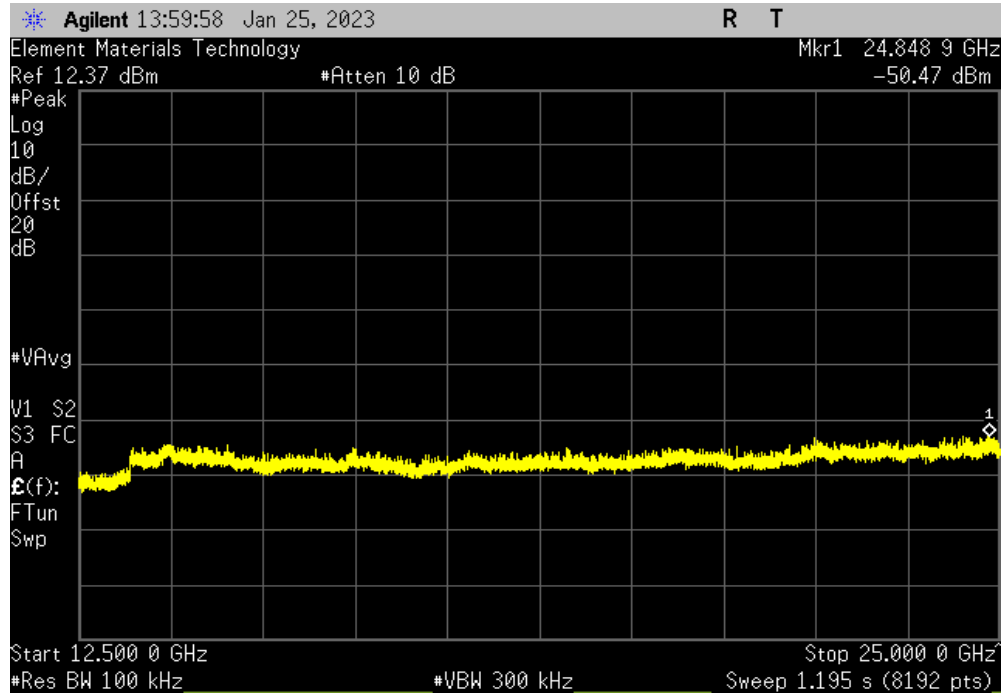


SPURIOUS CONDUCTED EMISSIONS

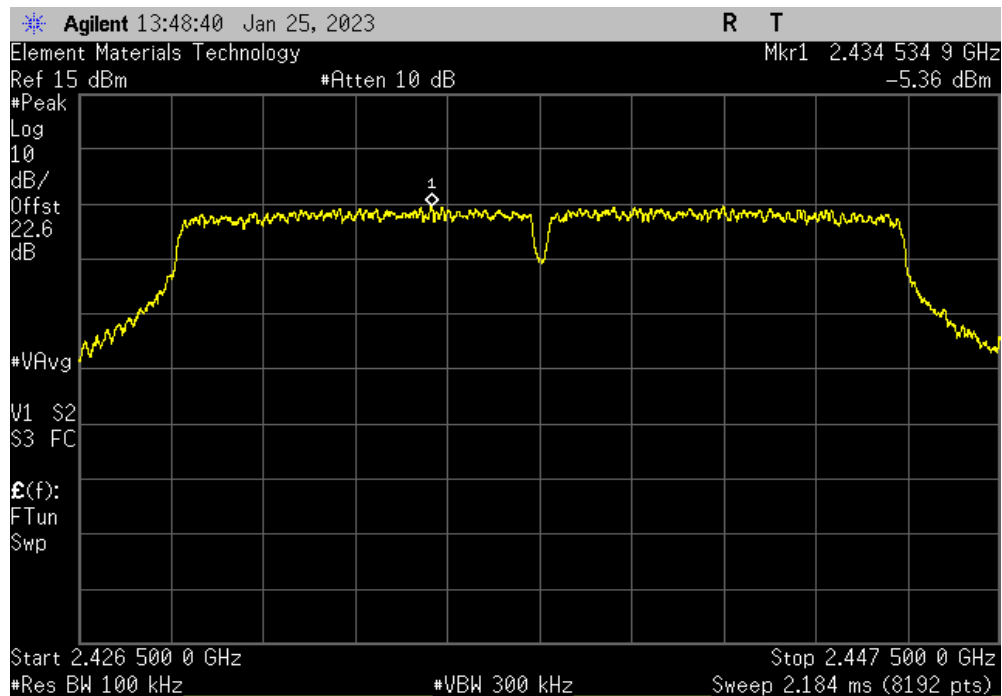


TUTx 2022.06.03.0 XMI 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24848.9	-44.88	-30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2434.53	N/A	N/A	N/A	

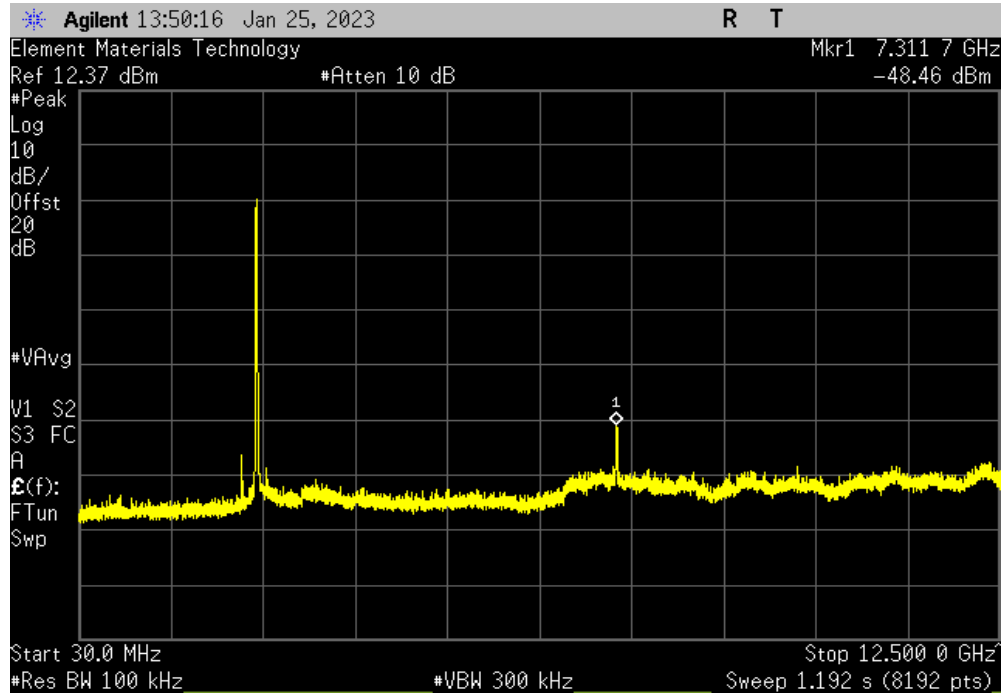


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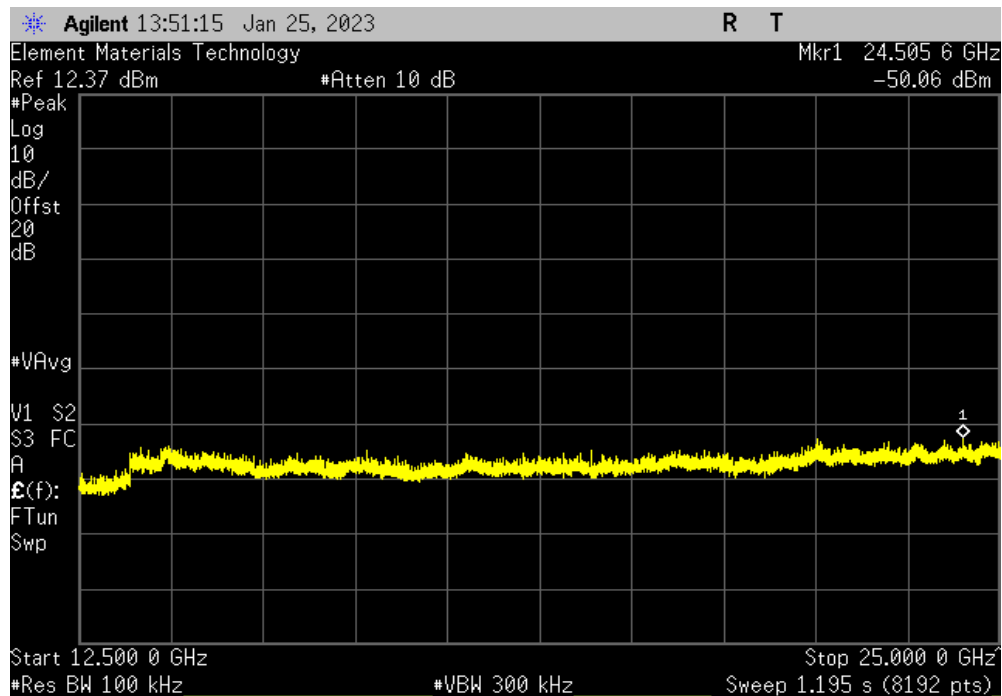


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	7311.7	-43.1	-30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24505.6	-44.7	-30	Pass	

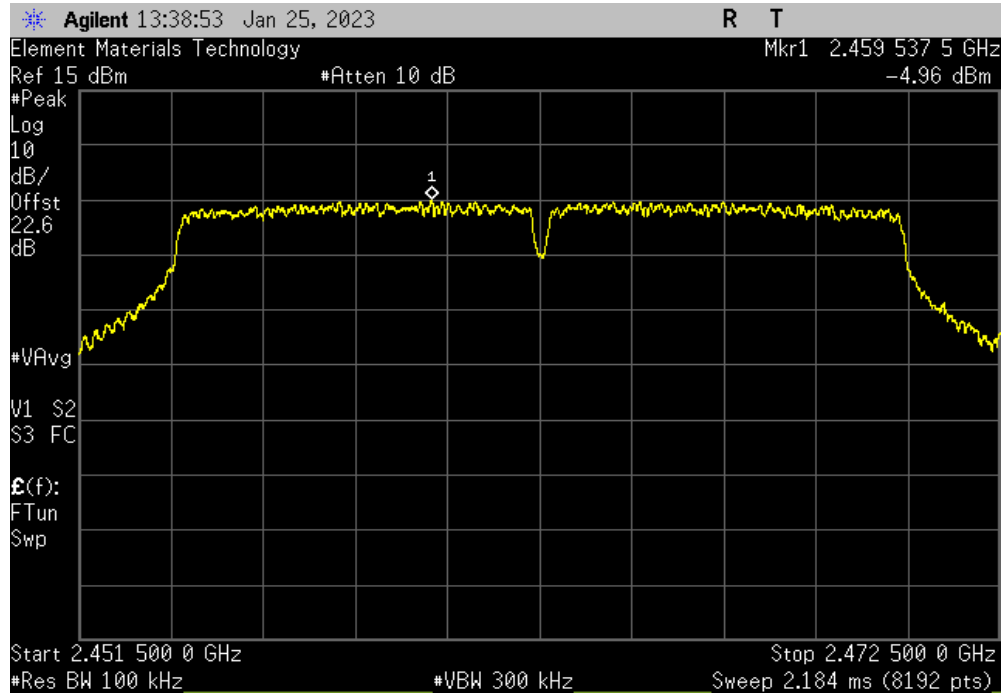


SPURIOUS CONDUCTED EMISSIONS

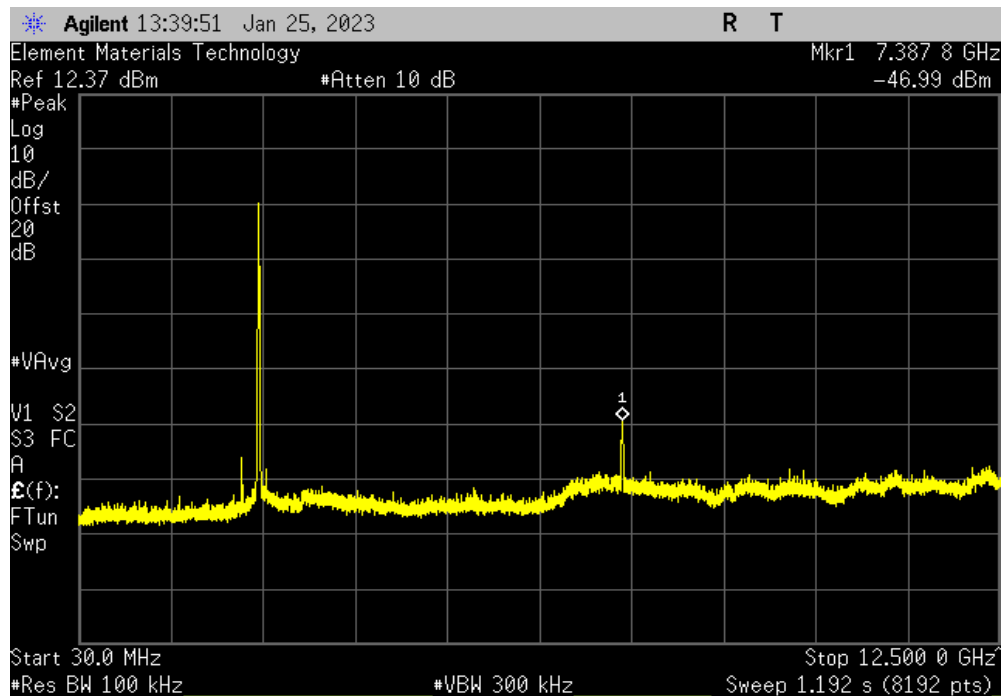


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
Fundamental	2459.54	N/A	N/A	N/A		



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
30 MHz - 12.5 GHz	7387.8	-42.03	-30	Pass		

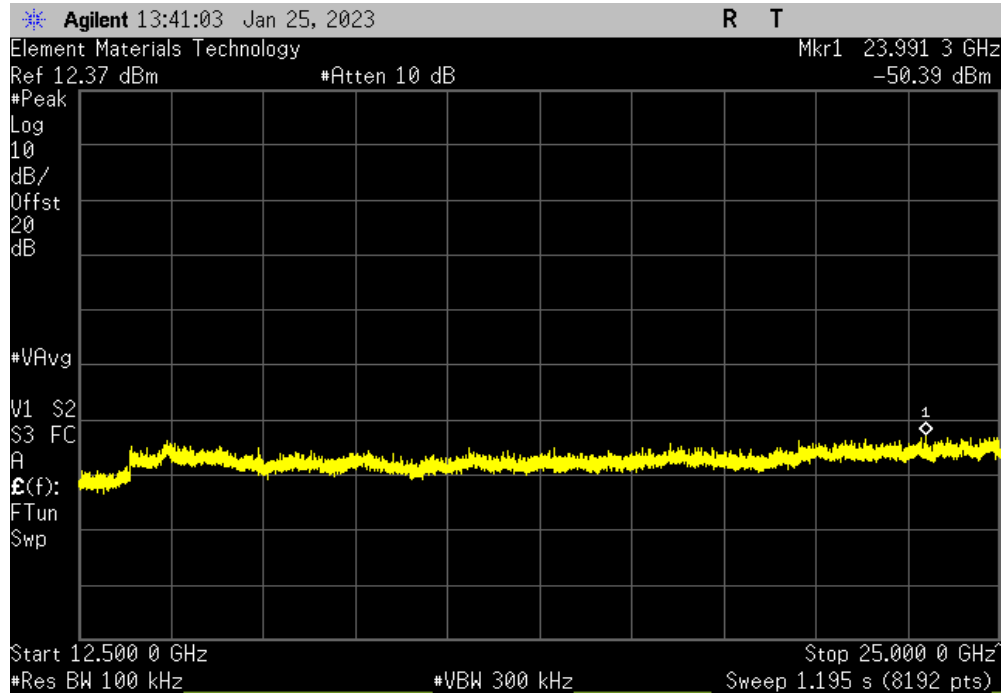


SPURIOUS CONDUCTED EMISSIONS

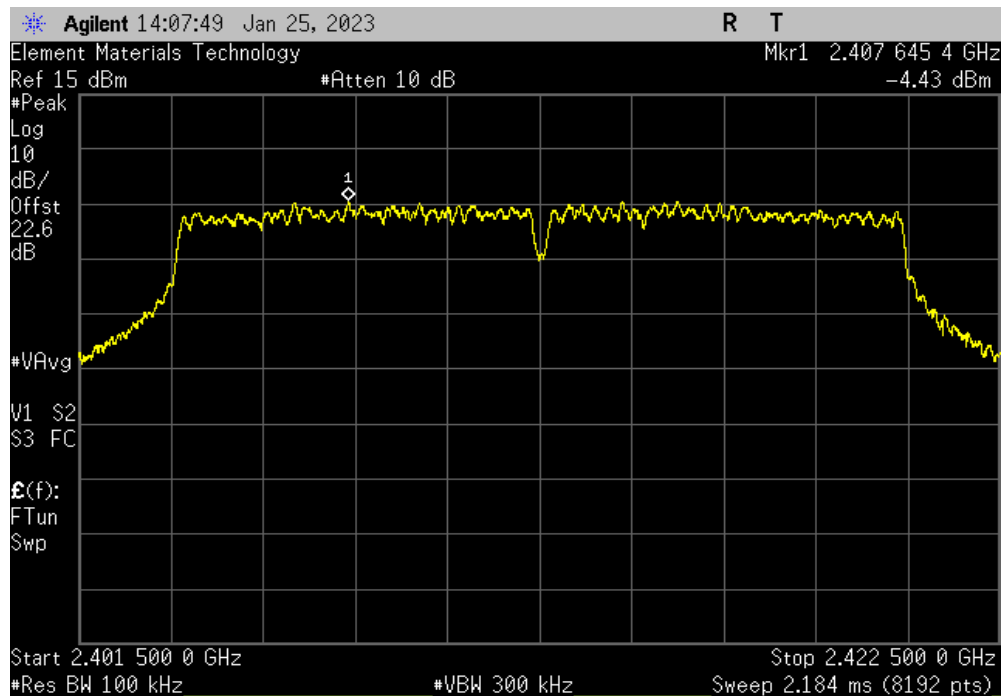


TbTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	23991.3	-45.43	-30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2407.65	N/A	N/A	N/A	

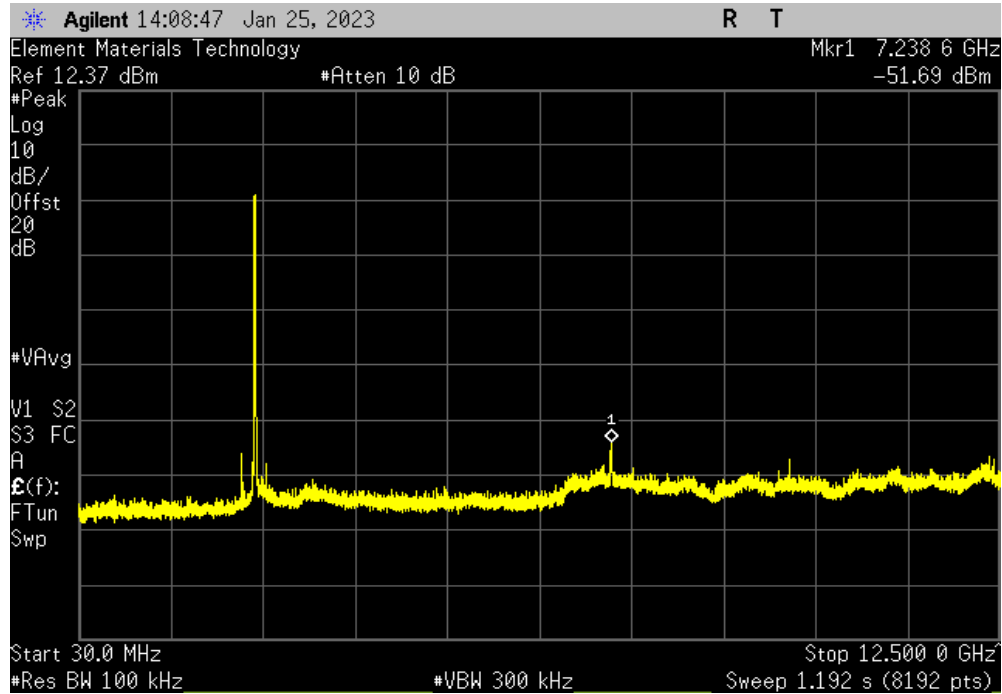


SPURIOUS CONDUCTED EMISSIONS

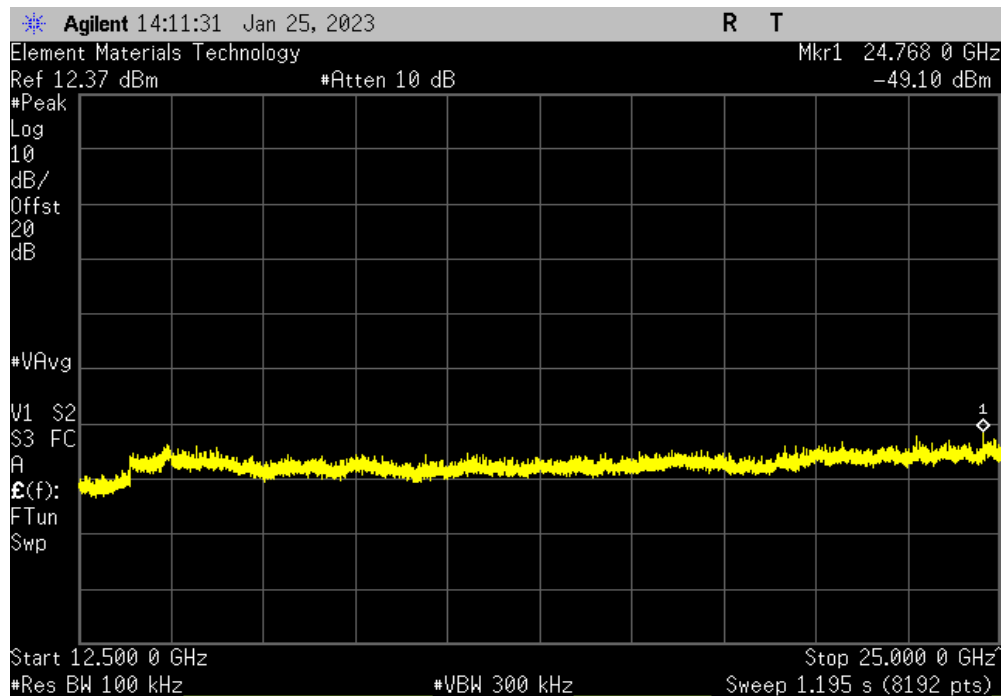


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	7238.6	-47.26	-30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24768	-44.67	-30	Pass	

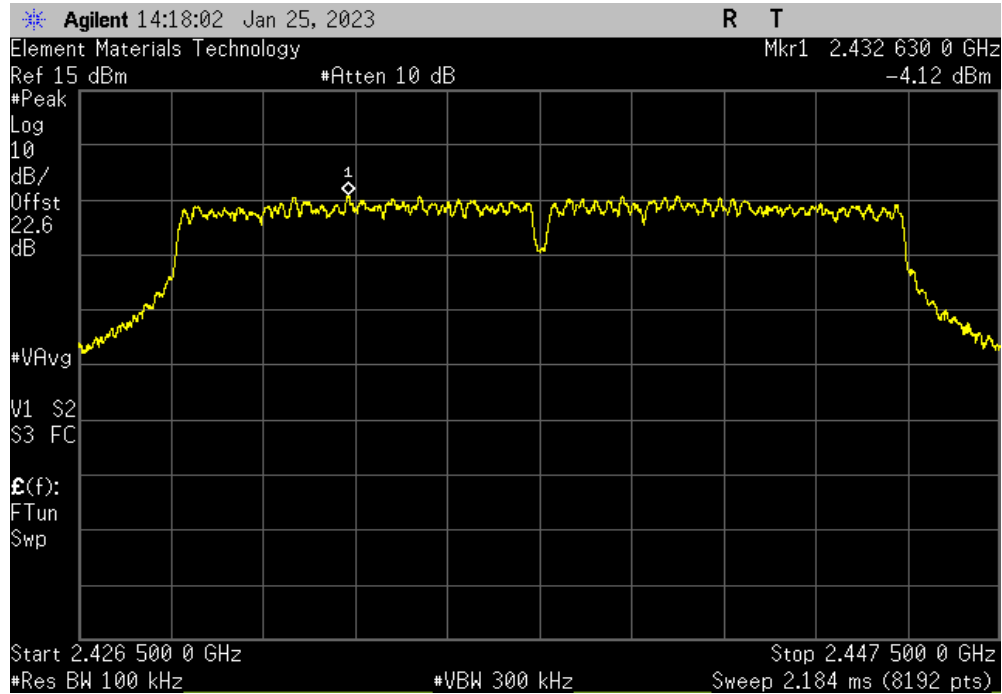


SPURIOUS CONDUCTED EMISSIONS

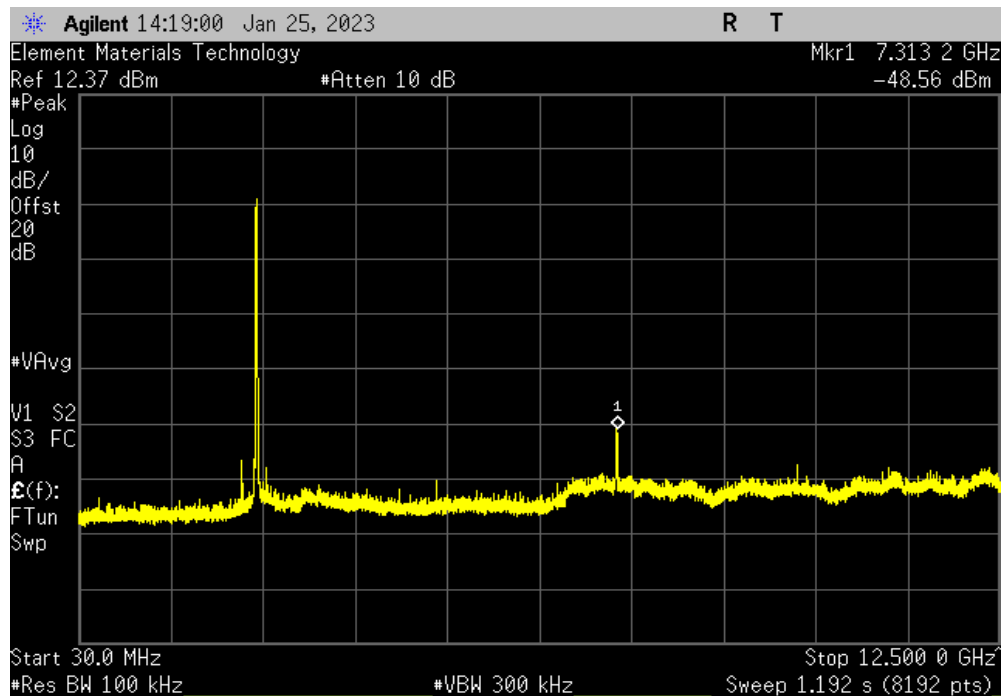


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
Fundamental	2432.63	N/A	N/A	N/A		



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
30 MHz - 12.5 GHz	7313.2	-44.44	-30	Pass		

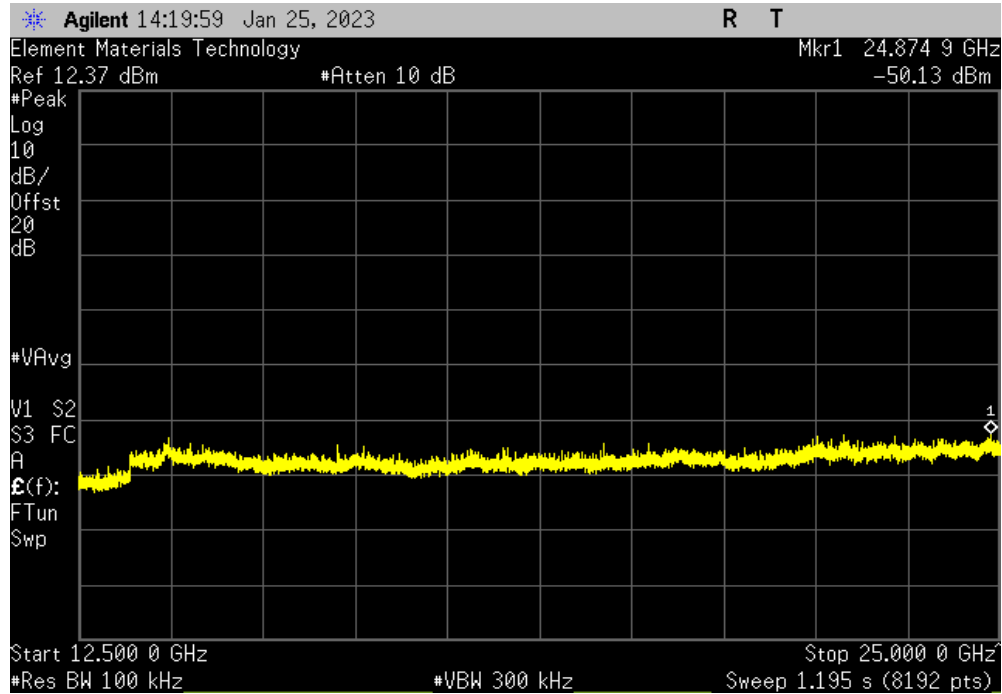


SPURIOUS CONDUCTED EMISSIONS

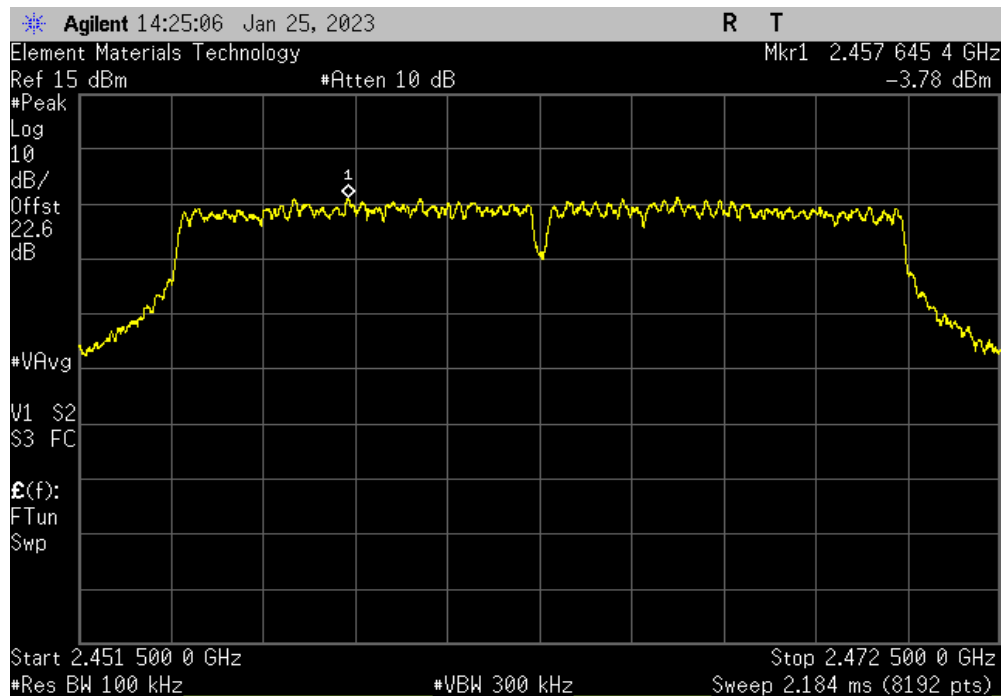


TbTx 2022.06.03.0 XbM 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24874.9	-46.01	-30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2457.65	N/A	N/A	N/A	

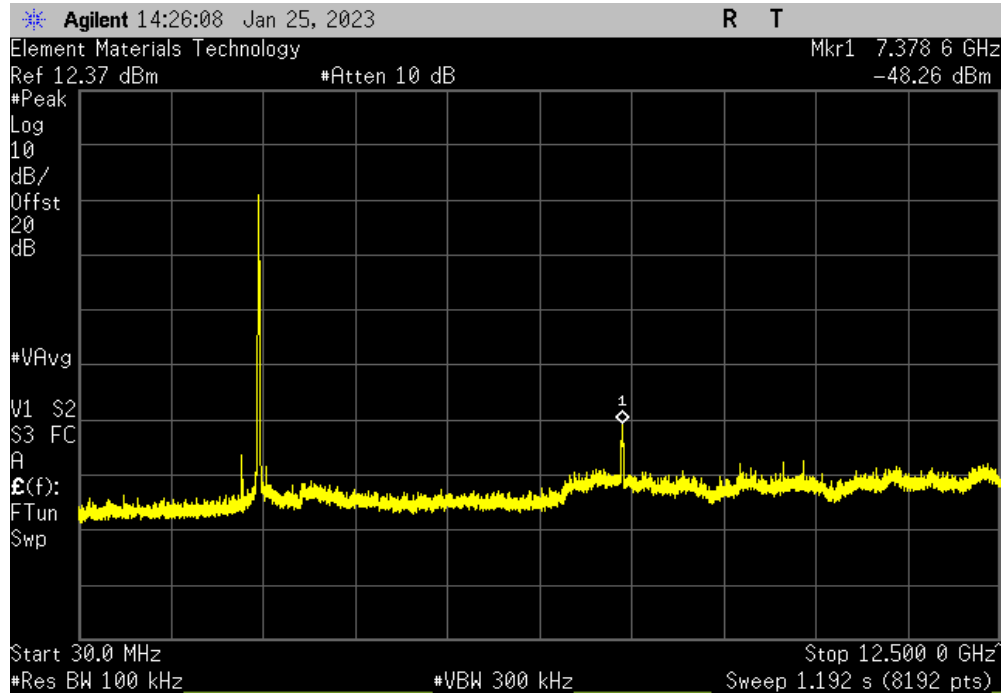


SPURIOUS CONDUCTED EMISSIONS

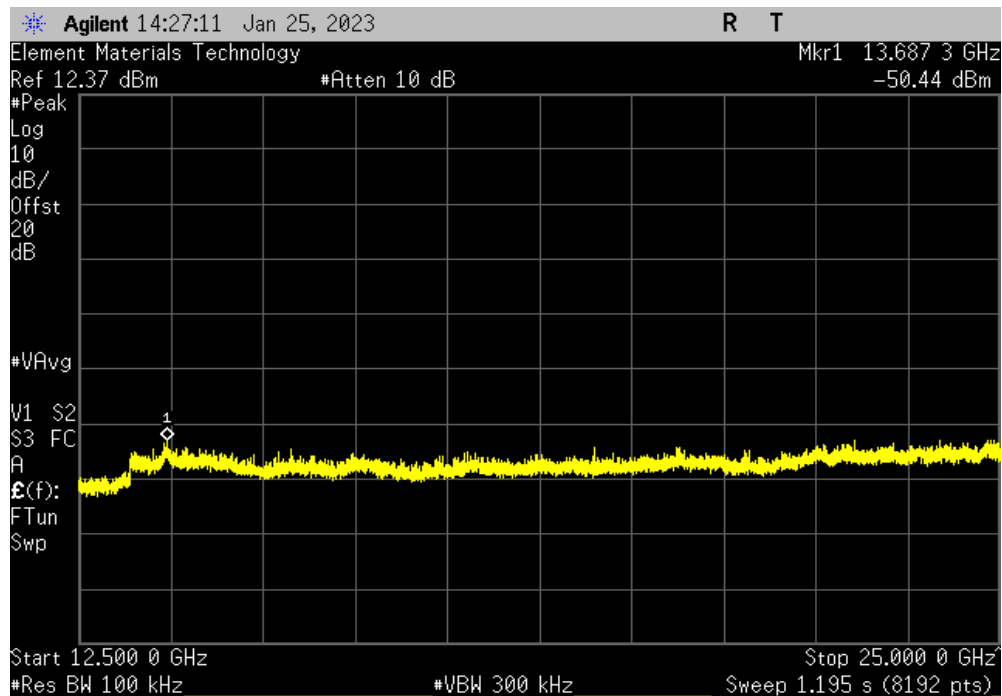


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	7378.6	-44.49	-30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	13687.3	-46.66	-30	Pass	

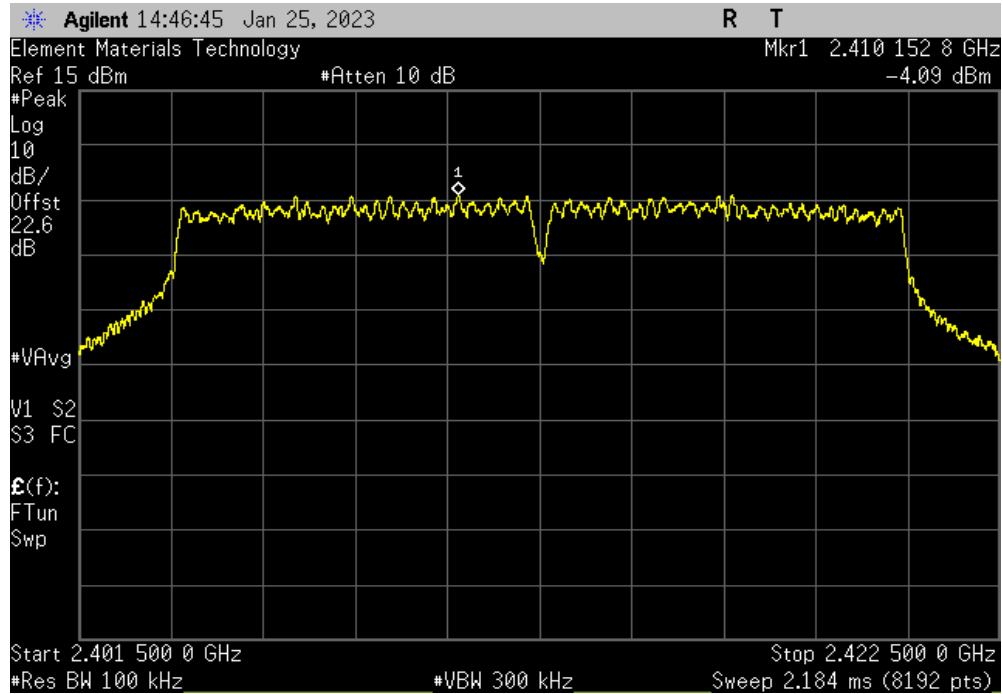


SPURIOUS CONDUCTED EMISSIONS

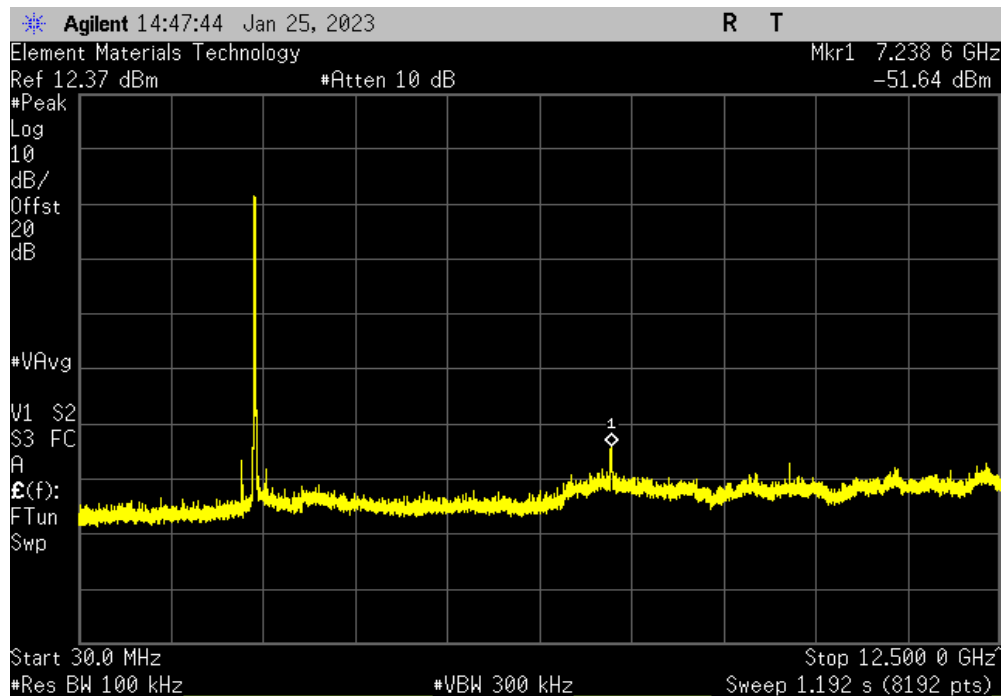


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
Fundamental	2410.15	N/A	N/A	N/A		



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
30 MHz - 12.5 GHz	7238.6	-47.55	-30	Pass		

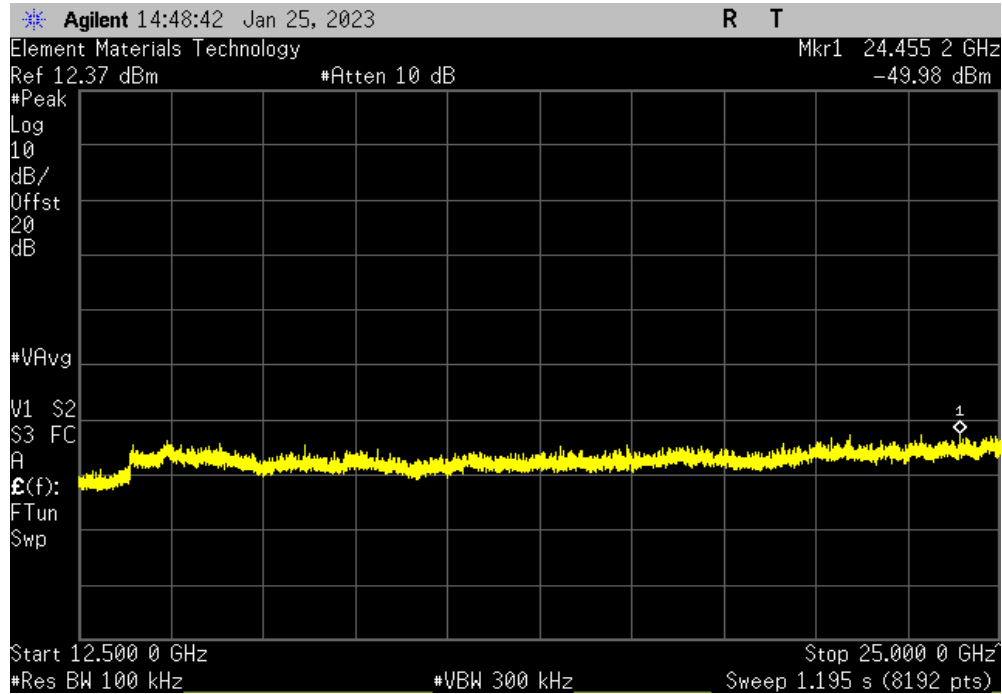


SPURIOUS CONDUCTED EMISSIONS

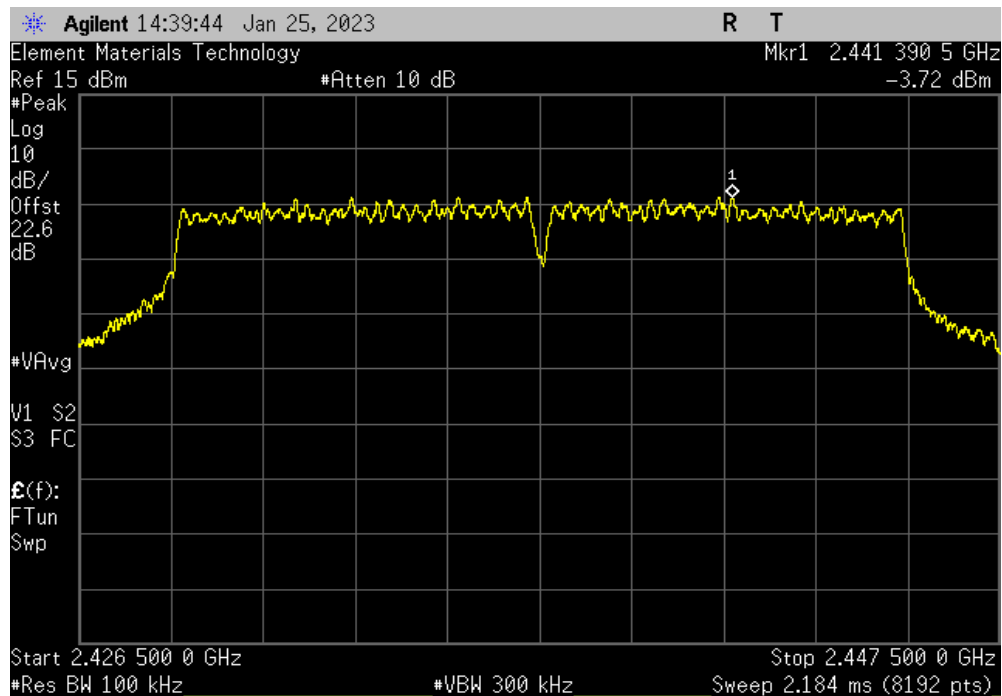


TbTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24455.2	-45.89	-30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2441.39	N/A	N/A	N/A	

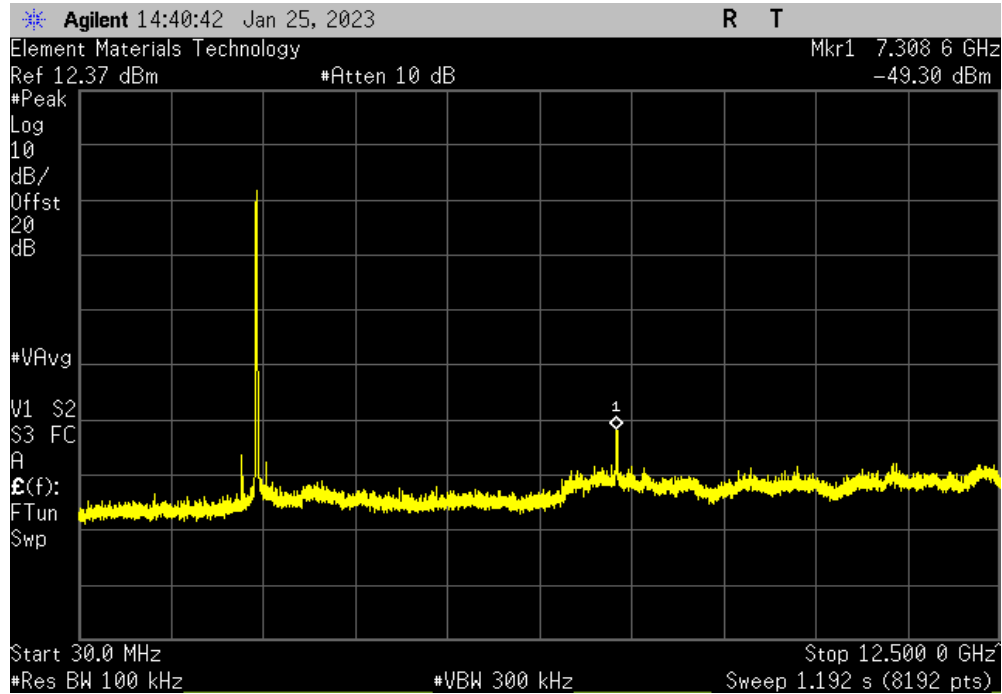


SPURIOUS CONDUCTED EMISSIONS

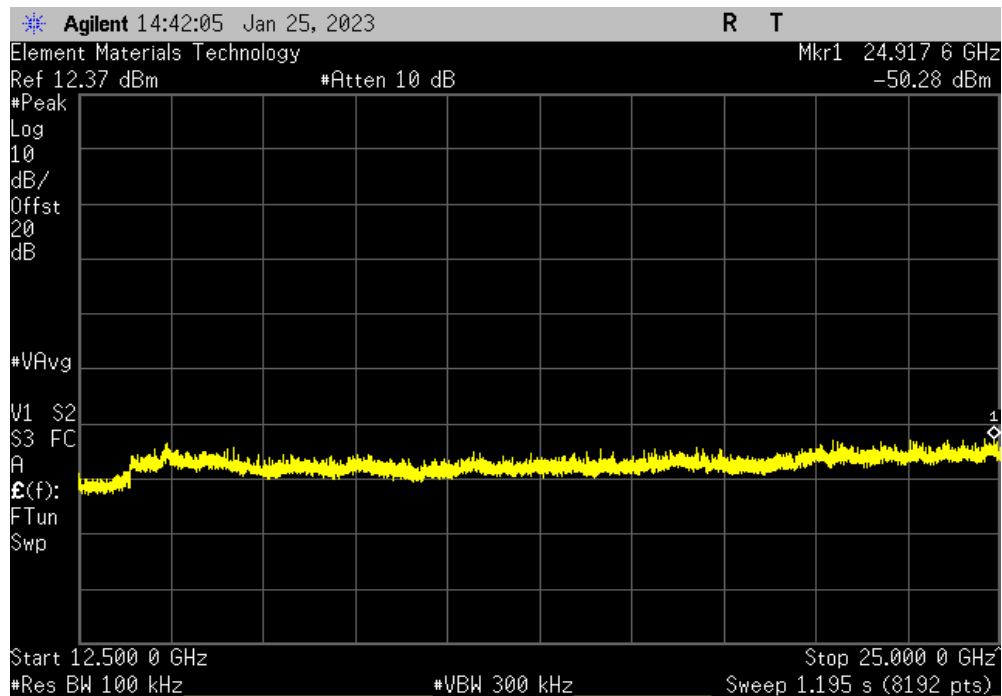


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	7308.6	-45.58	-30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24917.6	-46.56	-30	Pass	

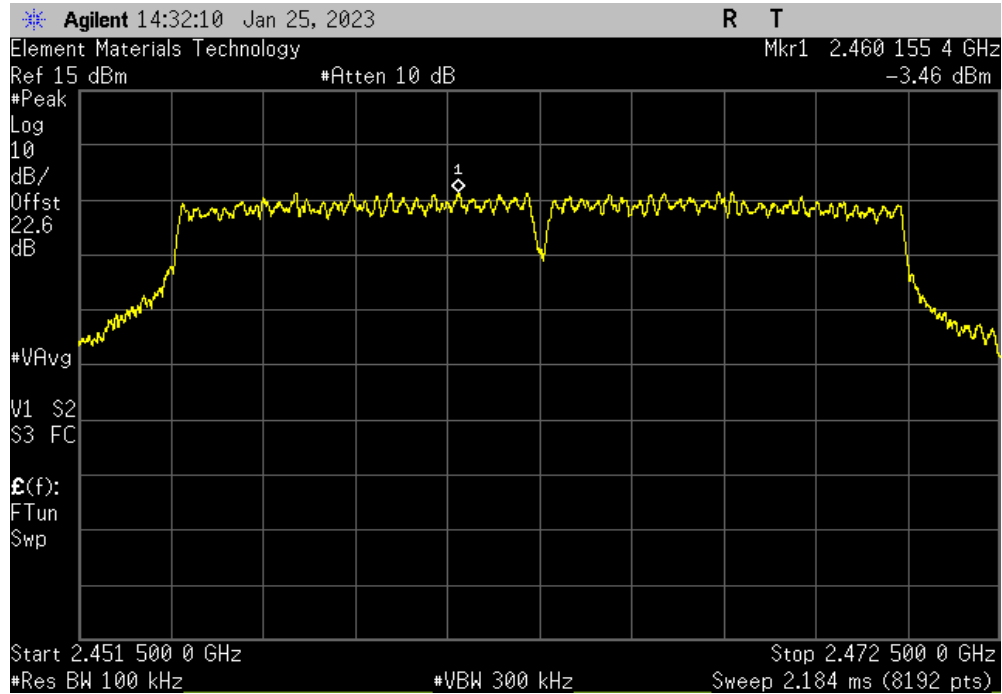


SPURIOUS CONDUCTED EMISSIONS

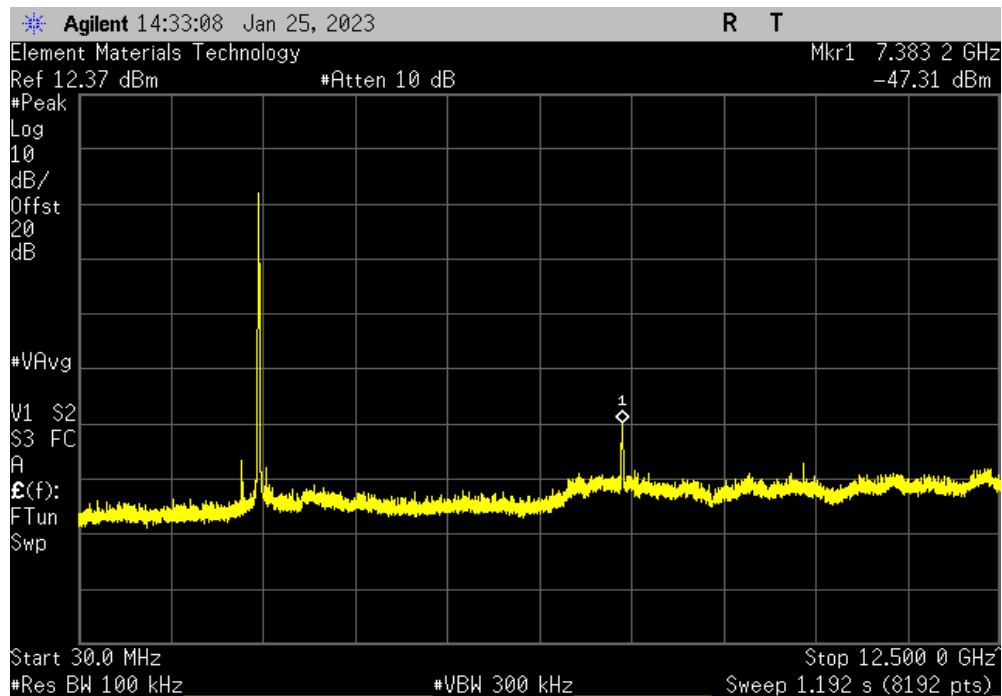


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
Fundamental	2460.16	N/A	N/A	N/A		



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
30 MHz - 12.5 GHz	7383.2	-43.85	-30	Pass		

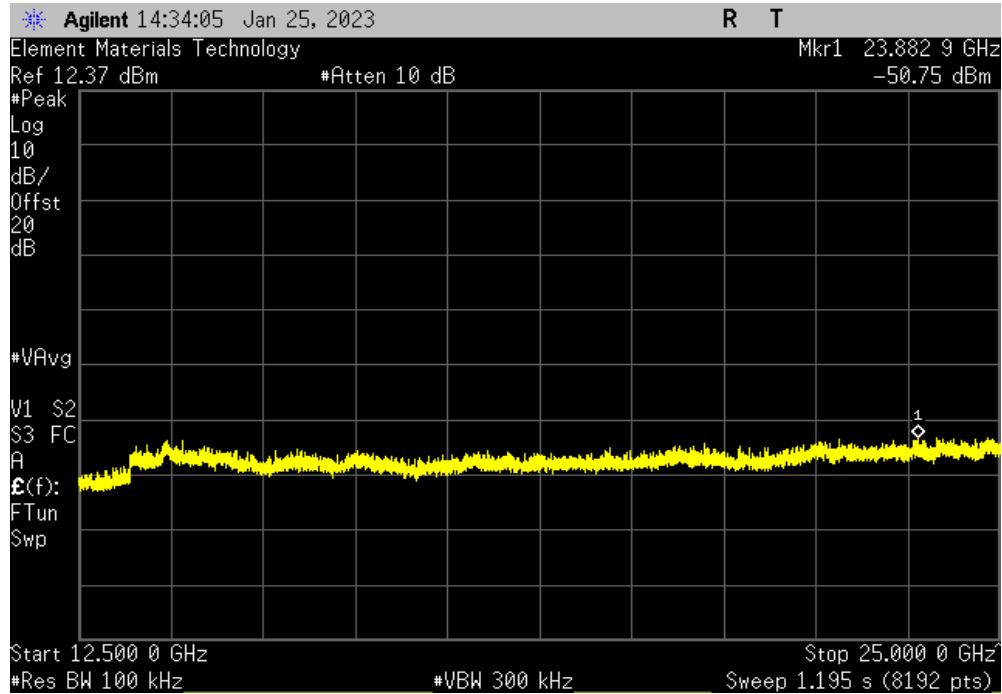


SPURIOUS CONDUCTED EMISSIONS

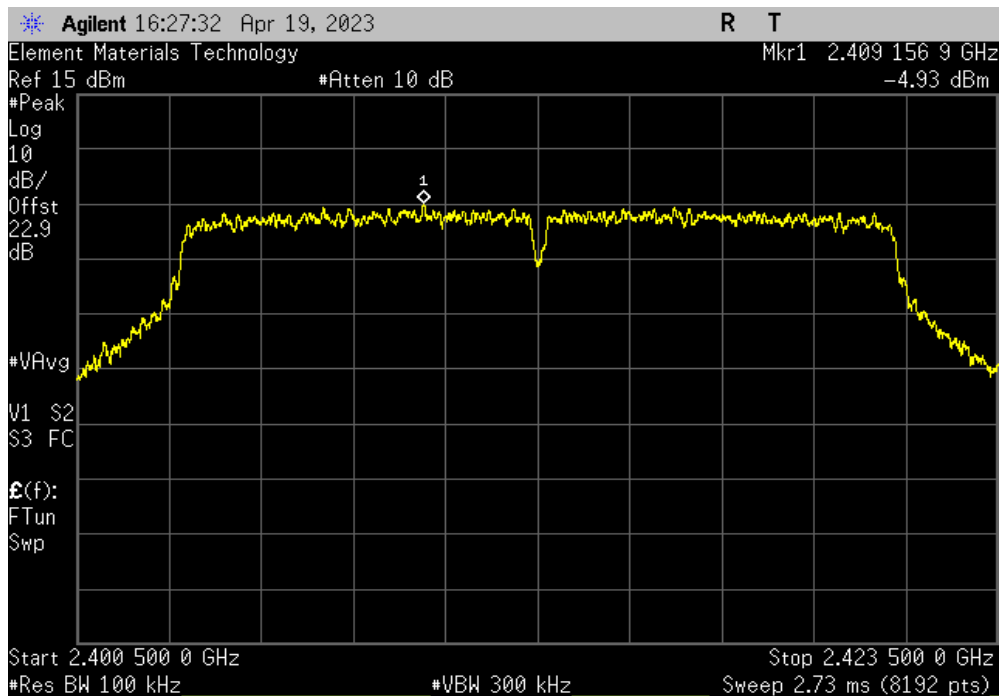


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	23882.9	-47.29	-30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2409.16	N/A	N/A	N/A	

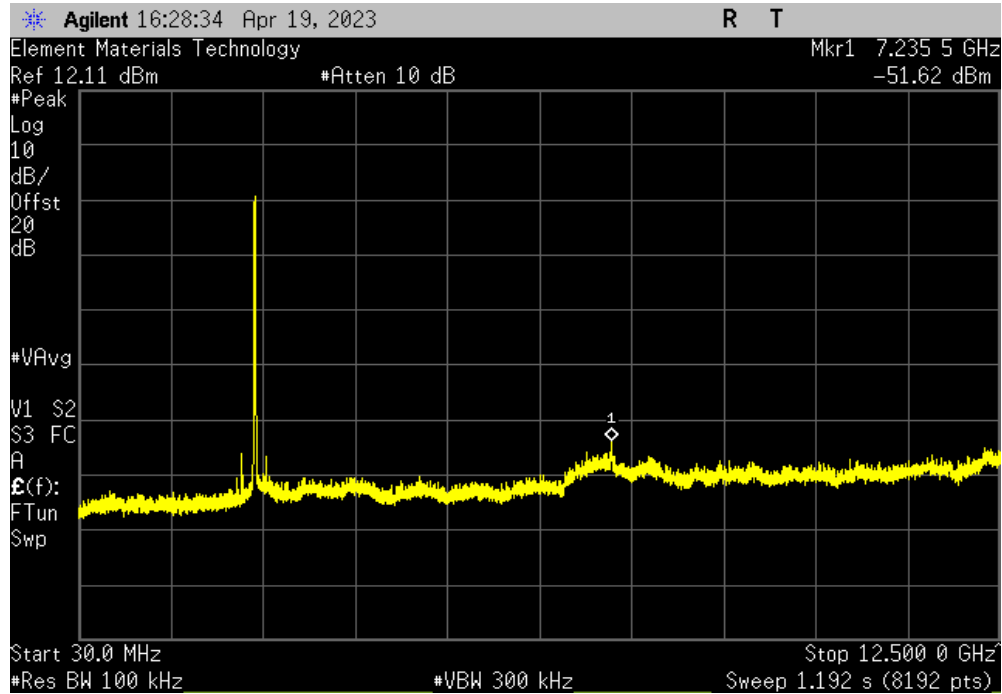


SPURIOUS CONDUCTED EMISSIONS

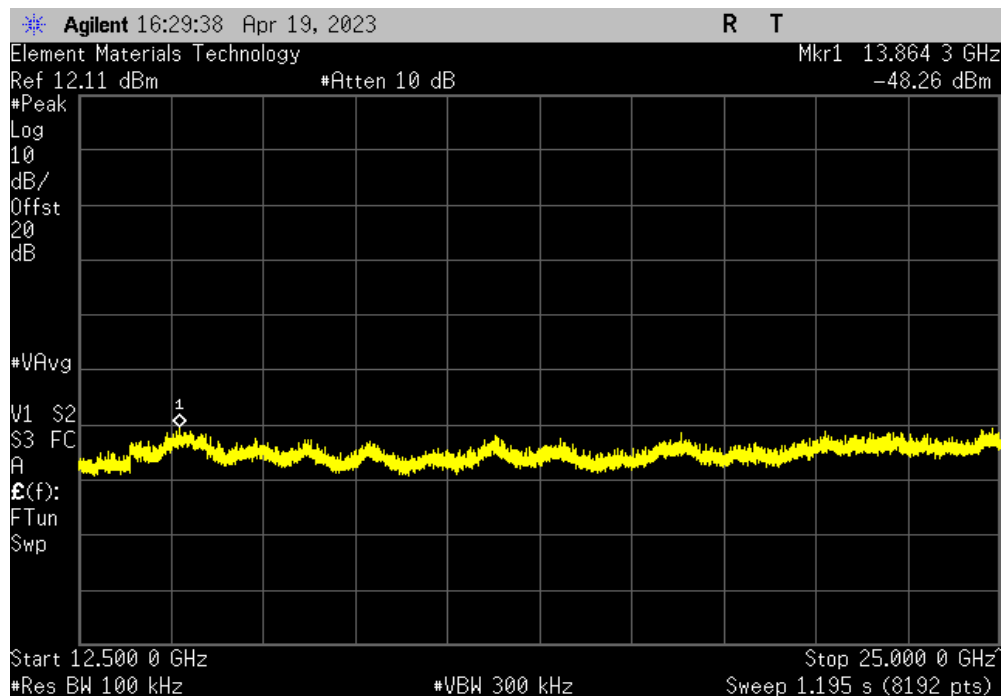


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	7235.5	-46.69	-30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	13864.3	-43.33	-30	Pass	

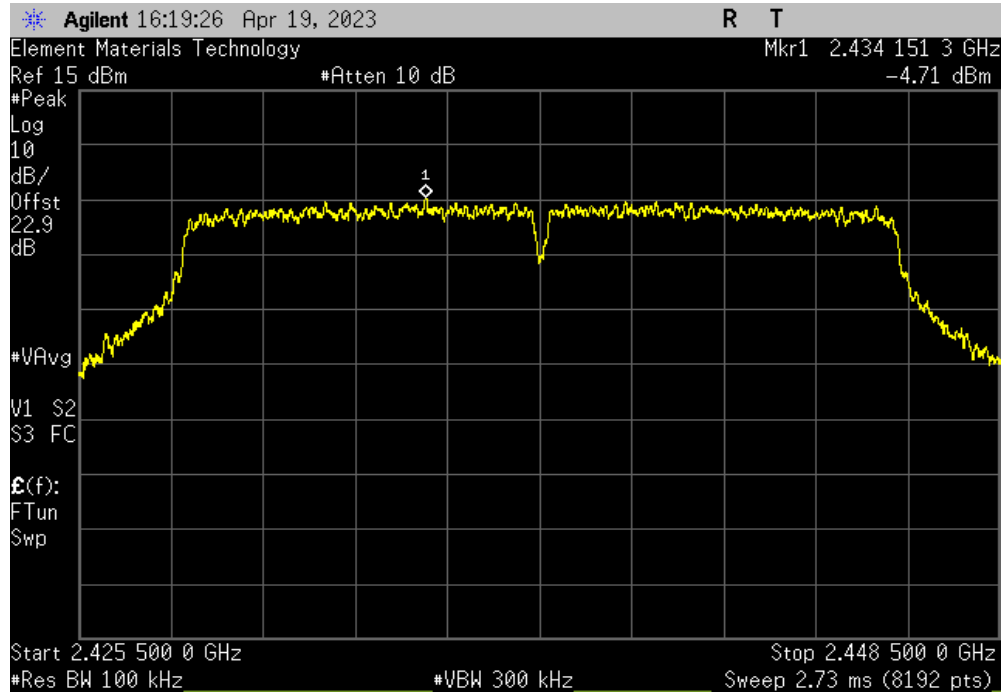


SPURIOUS CONDUCTED EMISSIONS

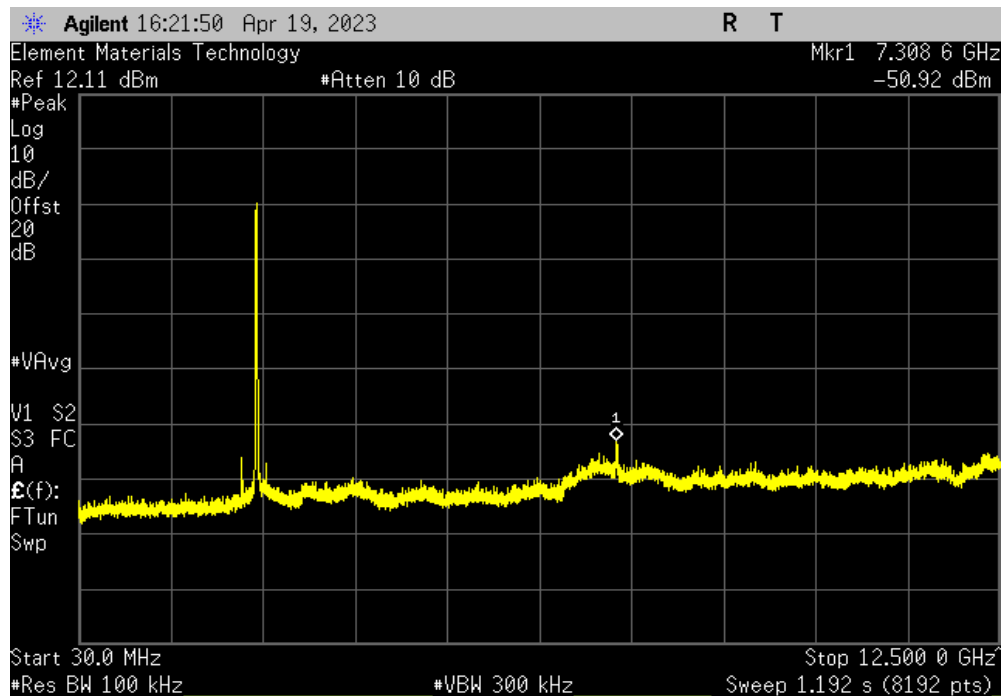


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz						
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental		2434.15	N/A	N/A	N/A	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz						
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz		7308.6	-46.21	-30	Pass	

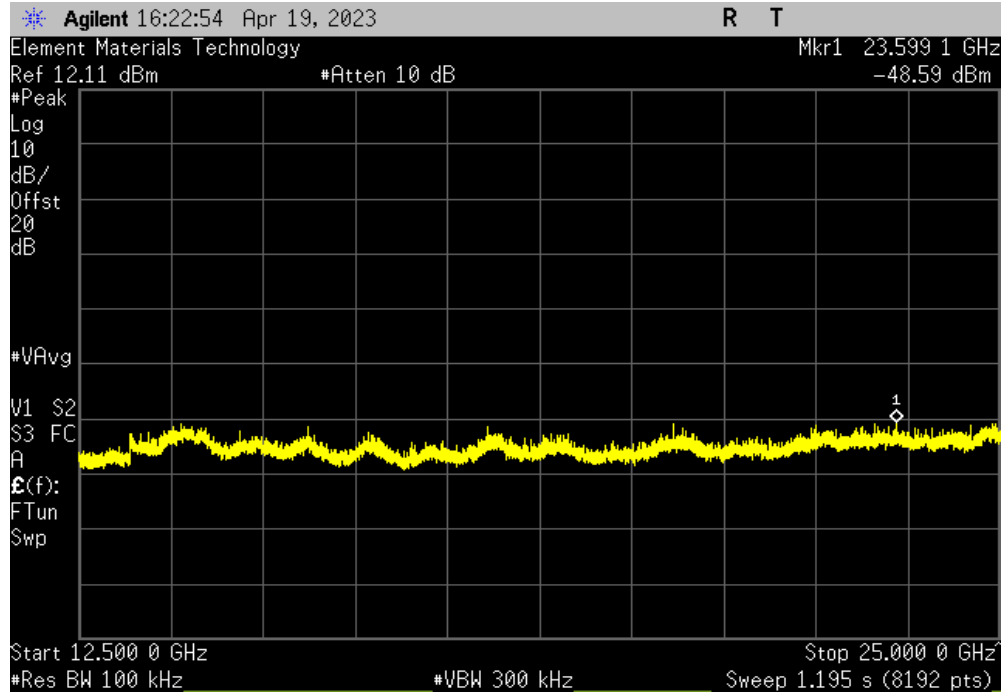


SPURIOUS CONDUCTED EMISSIONS

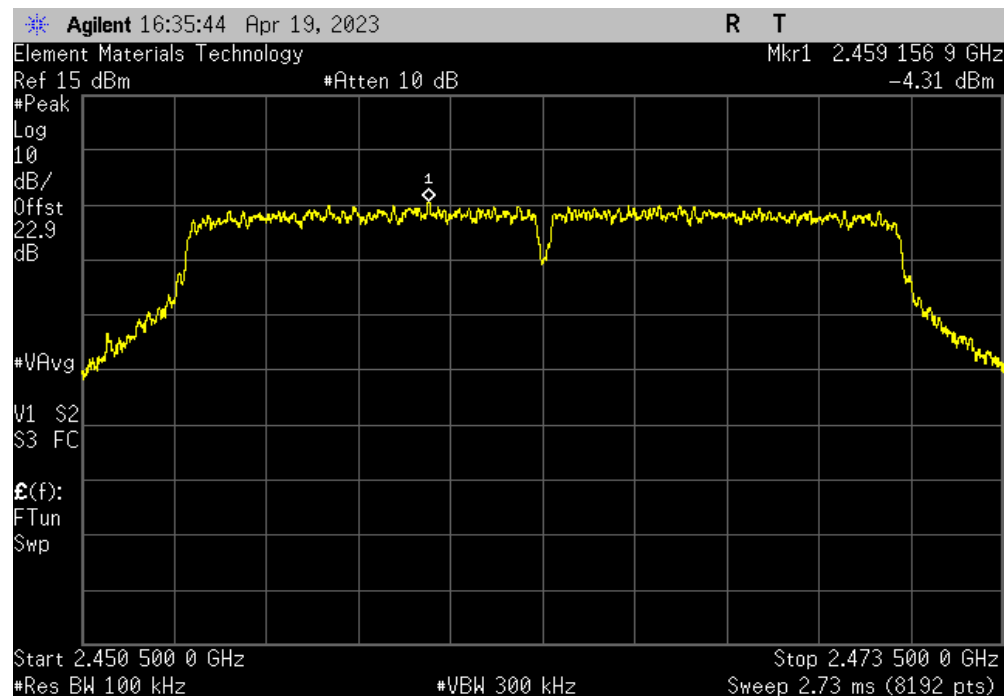


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	23599.1	-43.88	-30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2459.16	N/A	N/A	N/A	

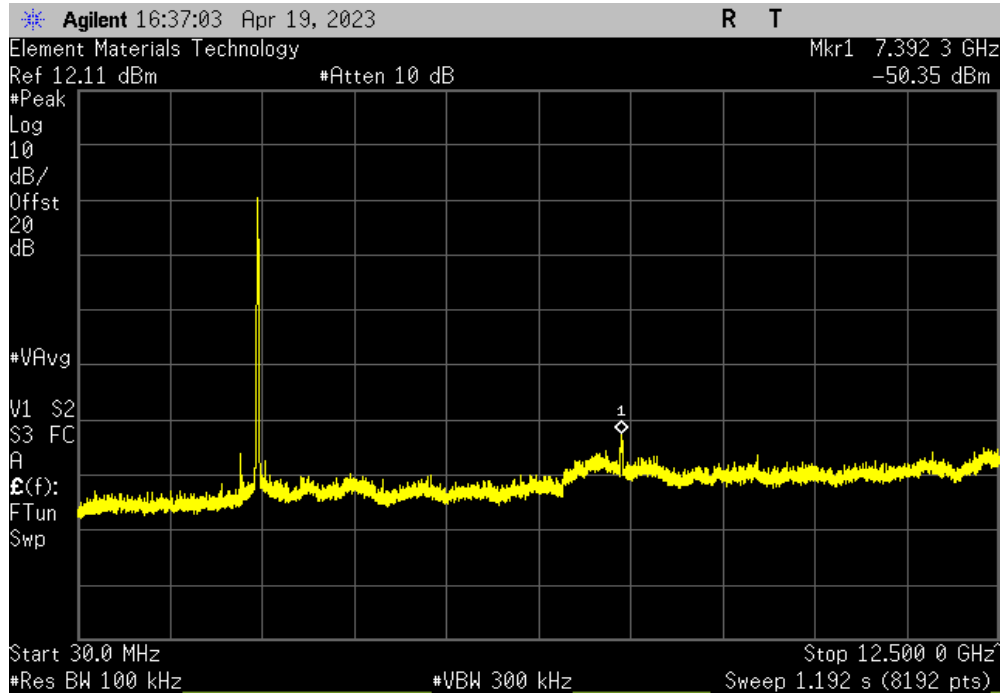


SPURIOUS CONDUCTED EMISSIONS

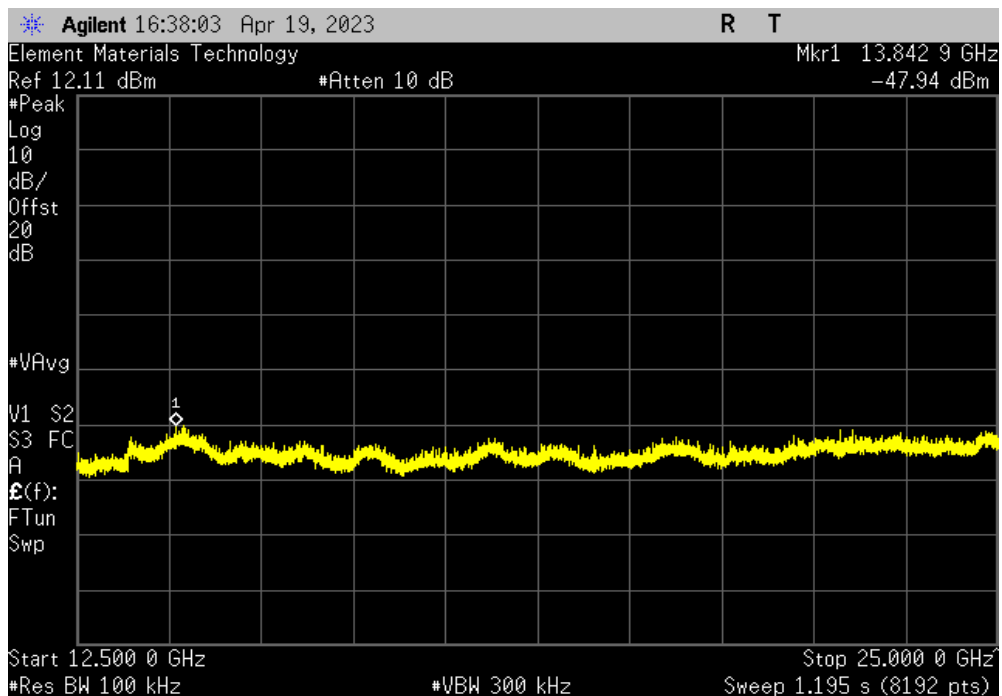


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	7392.3	-46.04	-30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	13842.9	-43.63	-30	Pass	

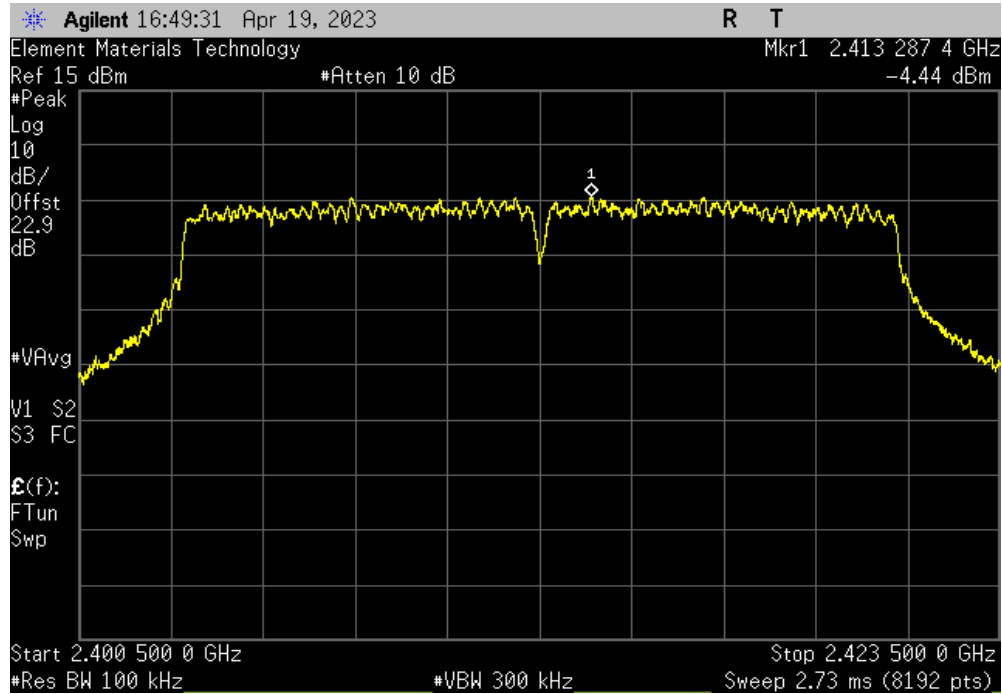


SPURIOUS CONDUCTED EMISSIONS

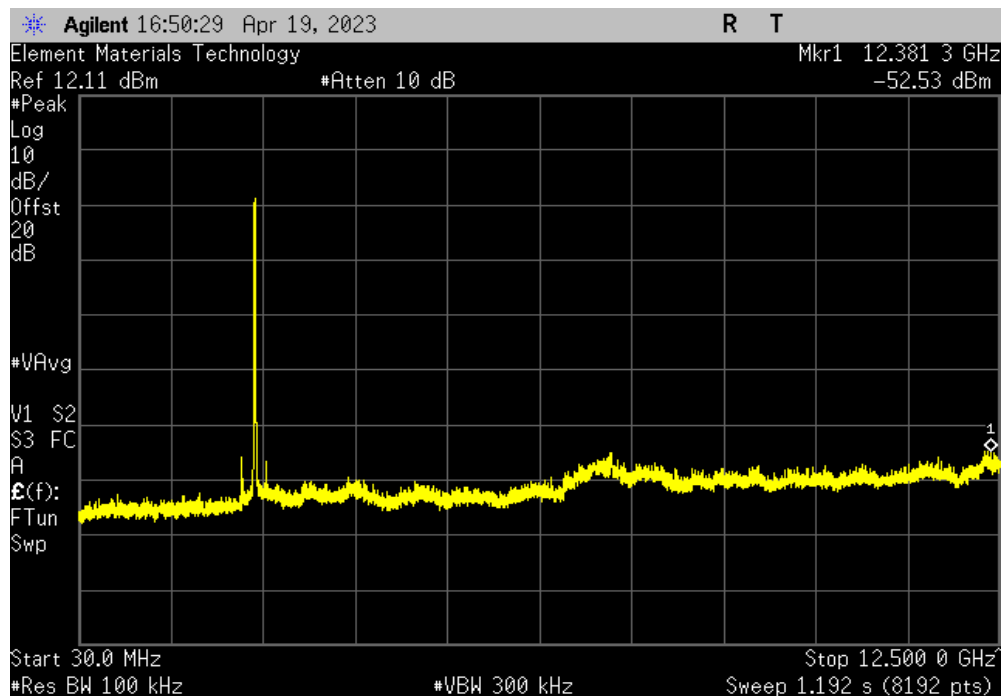


TbTx 2022.06.03.0 XMt 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz						
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental		2413.29	N/A	N/A	N/A	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz						
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz		12381.3	-48.09	-30	Pass	

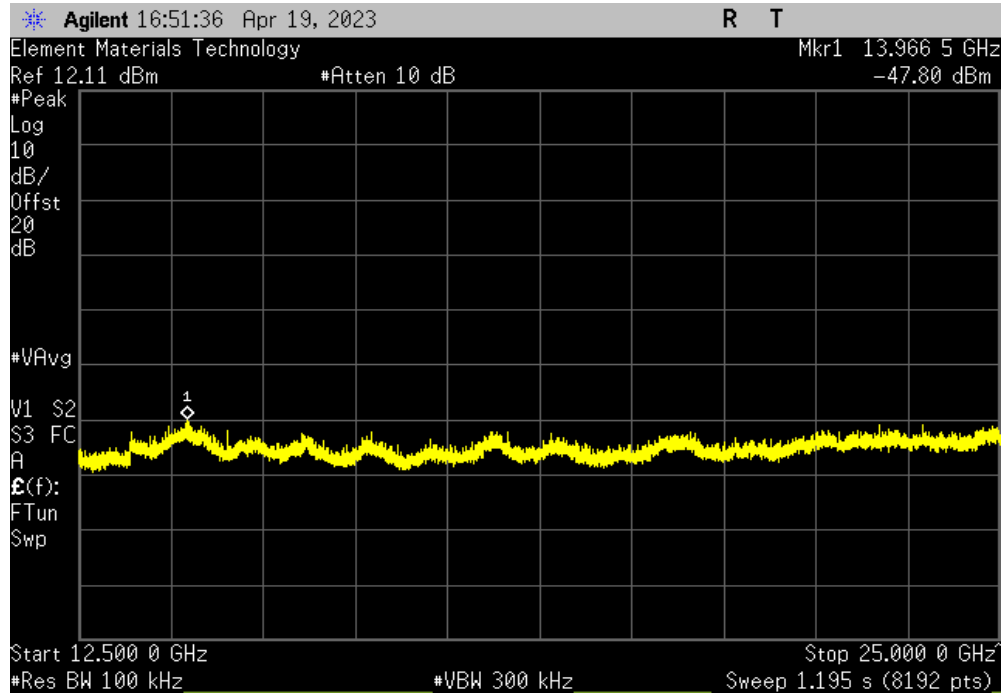


SPURIOUS CONDUCTED EMISSIONS

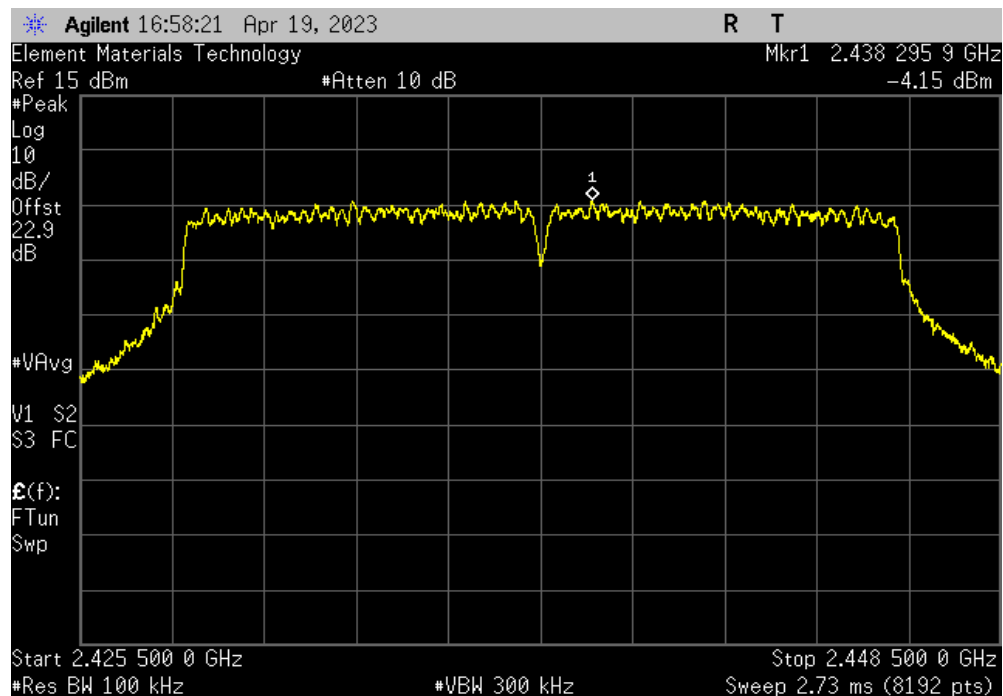


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	13966.5	-43.36	-30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2438.3	N/A	N/A	N/A	

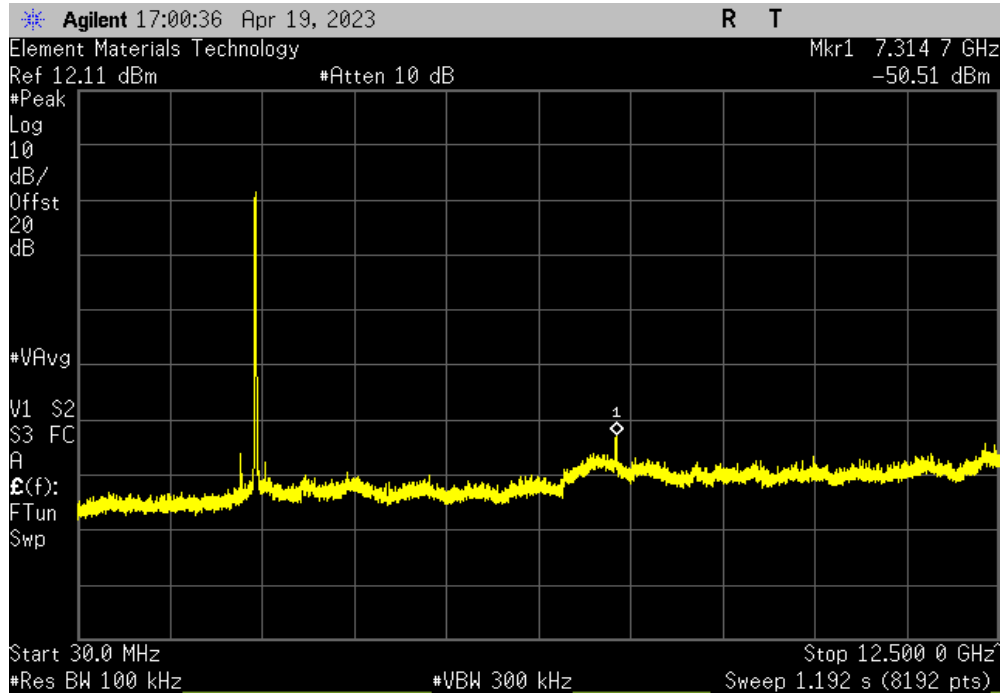


SPURIOUS CONDUCTED EMISSIONS

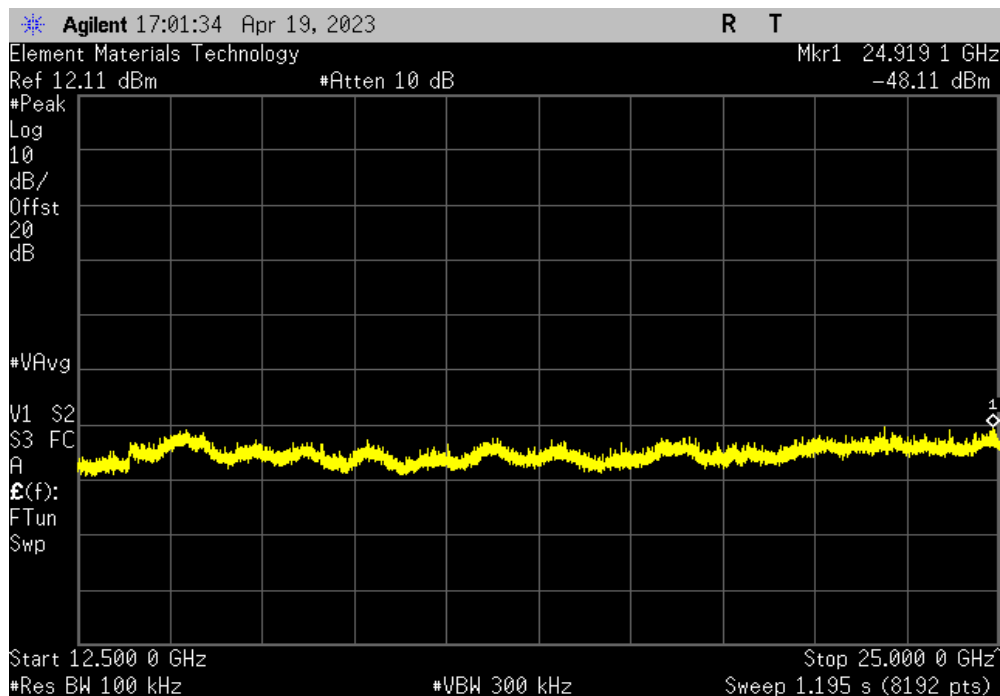


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	7314.7	-46.36	-30	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24919.1	-43.96	-30	Pass	

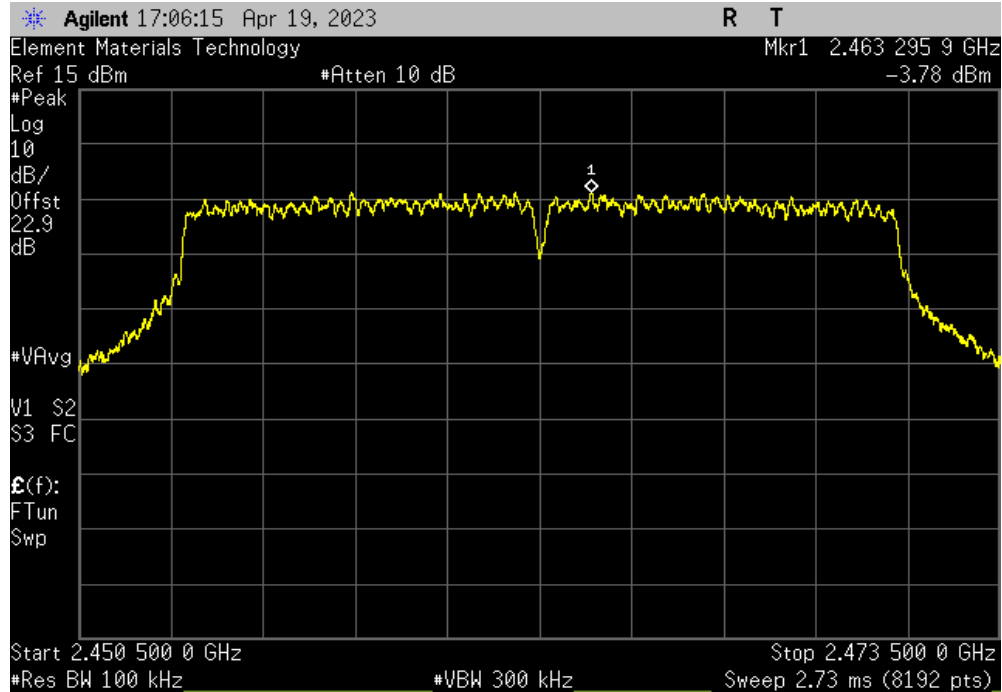


SPURIOUS CONDUCTED EMISSIONS

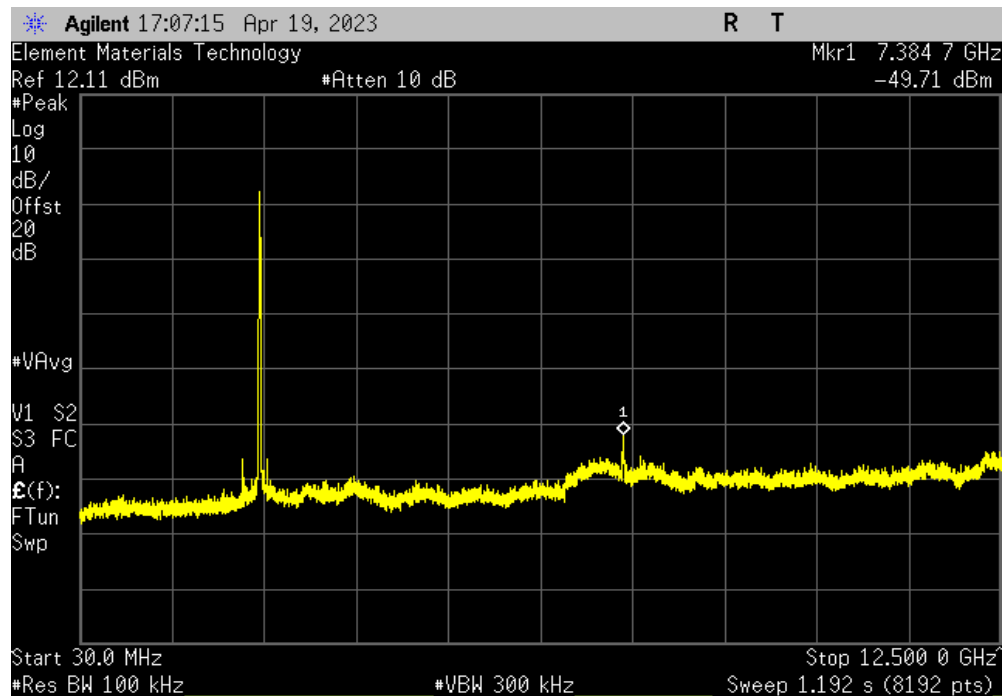


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz						
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental		2463.3	N/A	N/A	N/A	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz						
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz		7384.7	-45.93	-30	Pass	

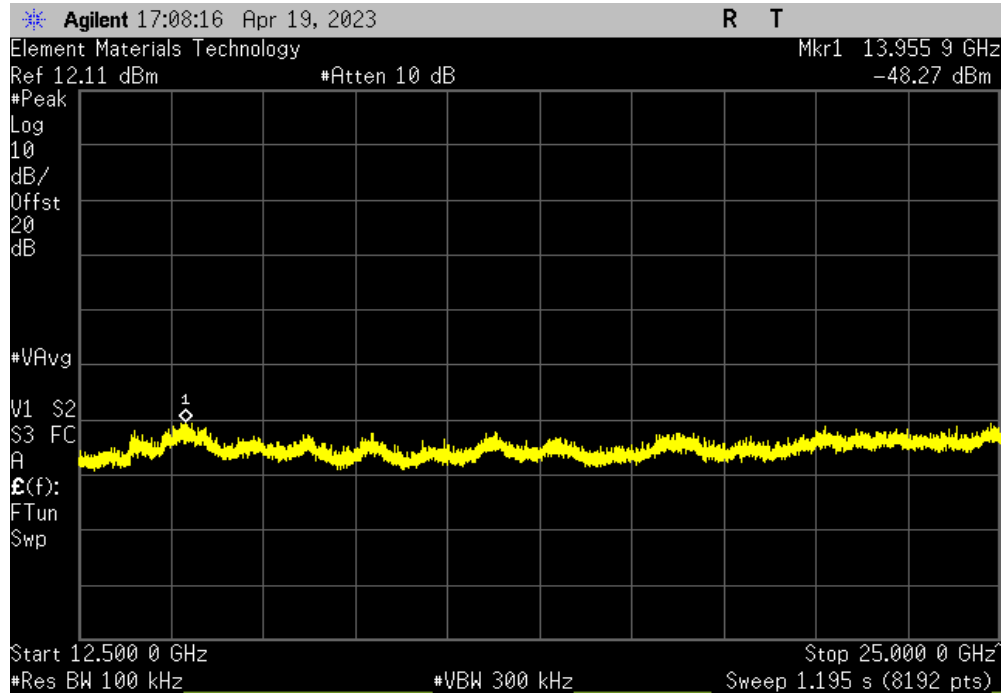


SPURIOUS CONDUCTED EMISSIONS

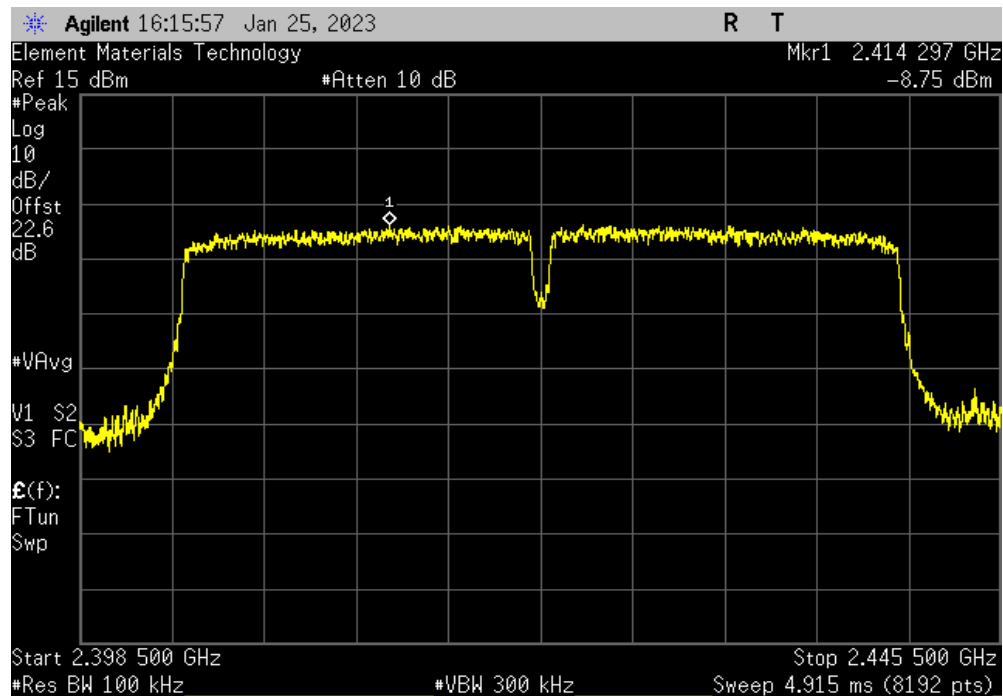


TMTx 2022.06.03.0 XMR 2022.02.07.0

20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	13955.9	-44.49	-30	Pass	



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1/5, 2422 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2414.3	N/A	N/A	N/A	

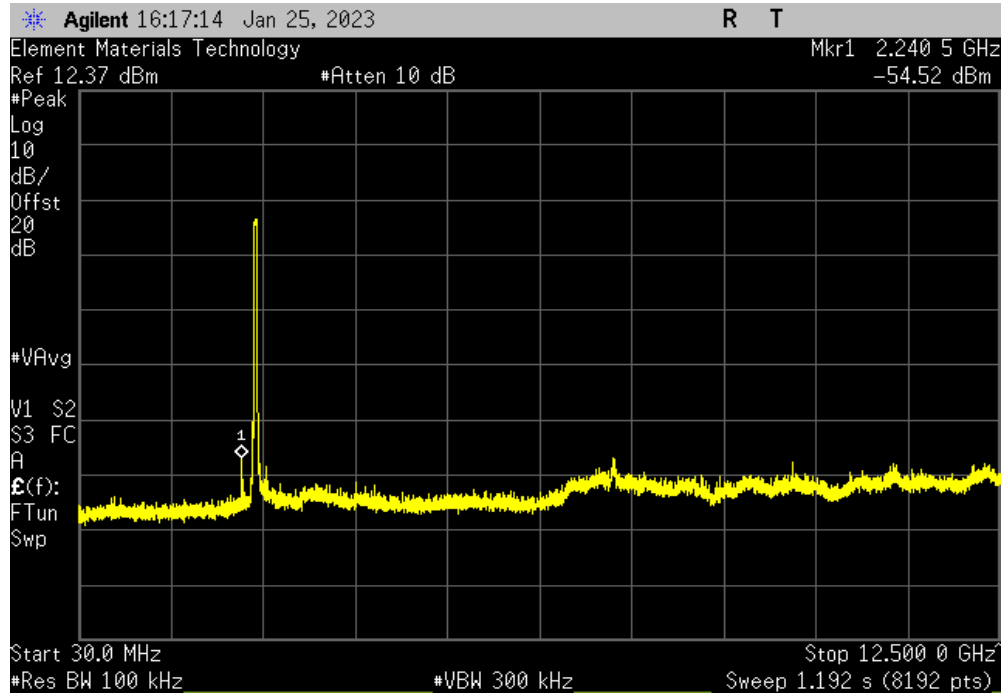


SPURIOUS CONDUCTED EMISSIONS

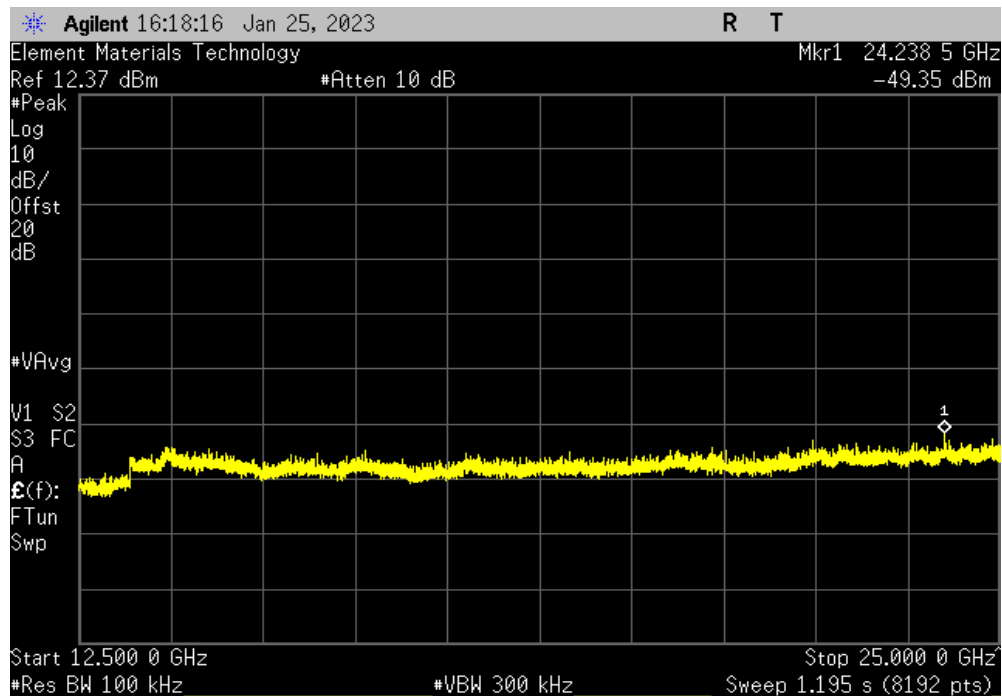


TMTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1/5, 2422 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	2240.5	-45.77	-30	Pass	



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1/5, 2422 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24238.5	-40.6	-30	Pass	

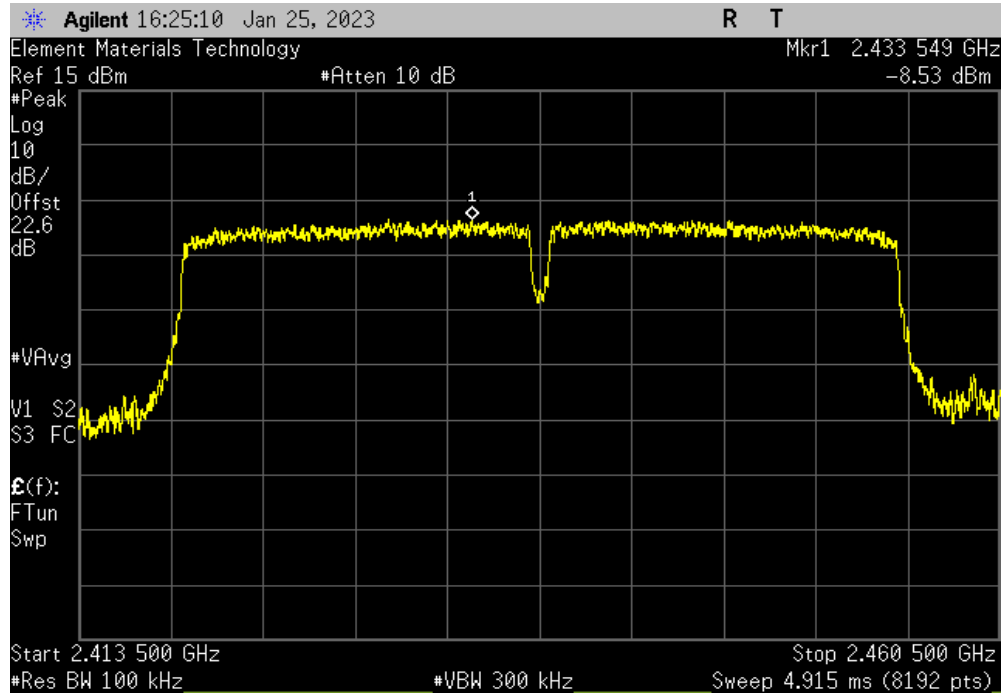


SPURIOUS CONDUCTED EMISSIONS

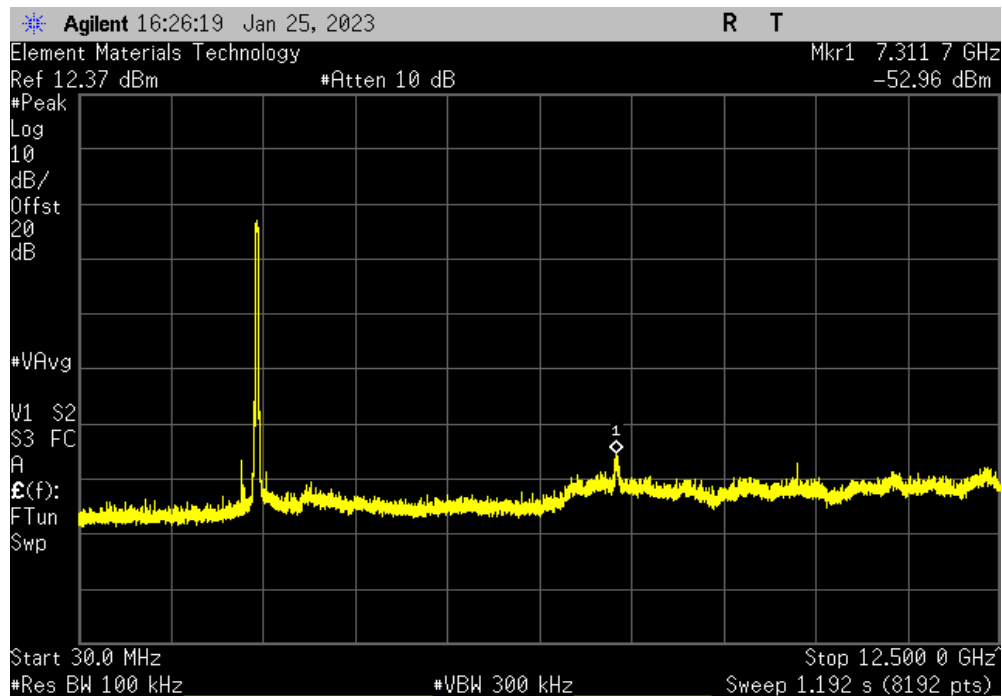


TMTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 4/8, 2437 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
Fundamental	2433.55	N/A	N/A	N/A		



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 4/8, 2437 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
30 MHz - 12.5 GHz	7311.7	-44.43	-30	Pass		

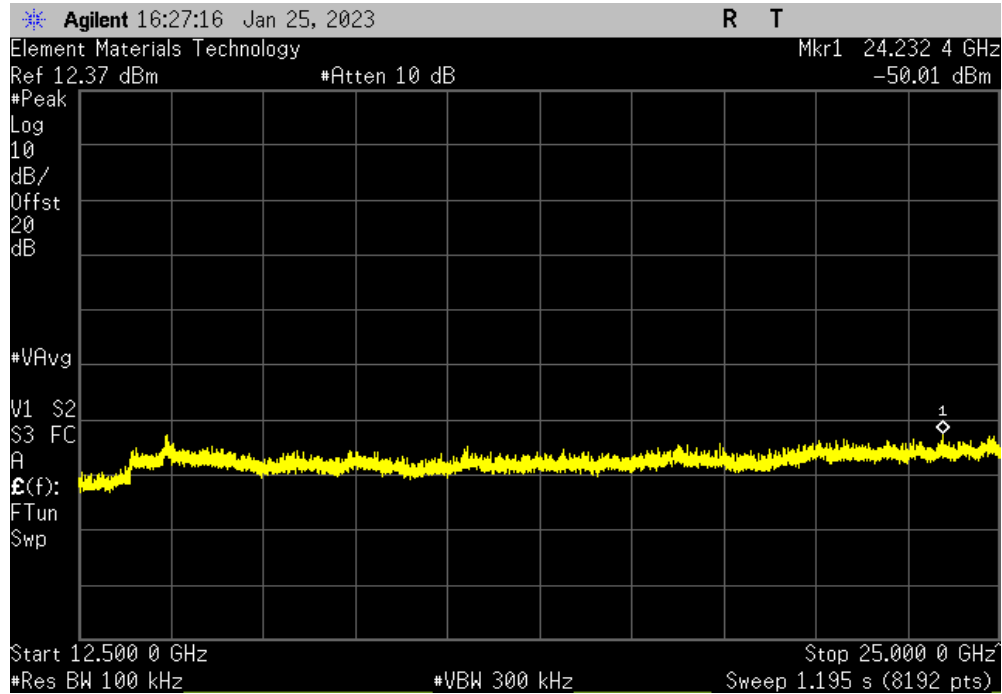


SPURIOUS CONDUCTED EMISSIONS

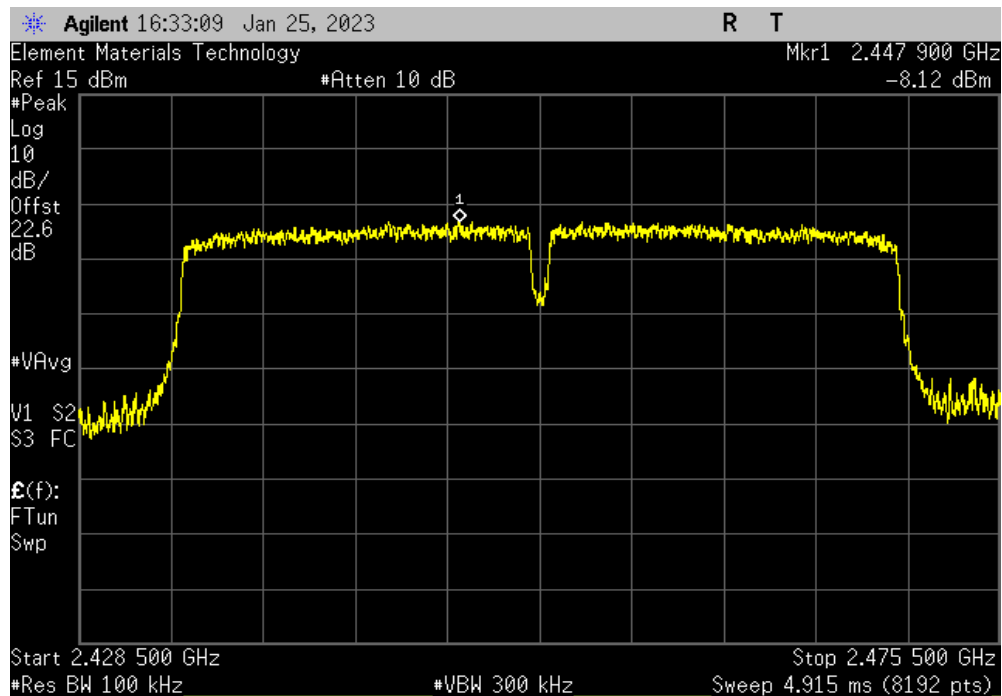


TMTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 4/8, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24232.4	-41.48	-30	Pass	



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 7/11, 2452 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2447.9	N/A	N/A	N/A	

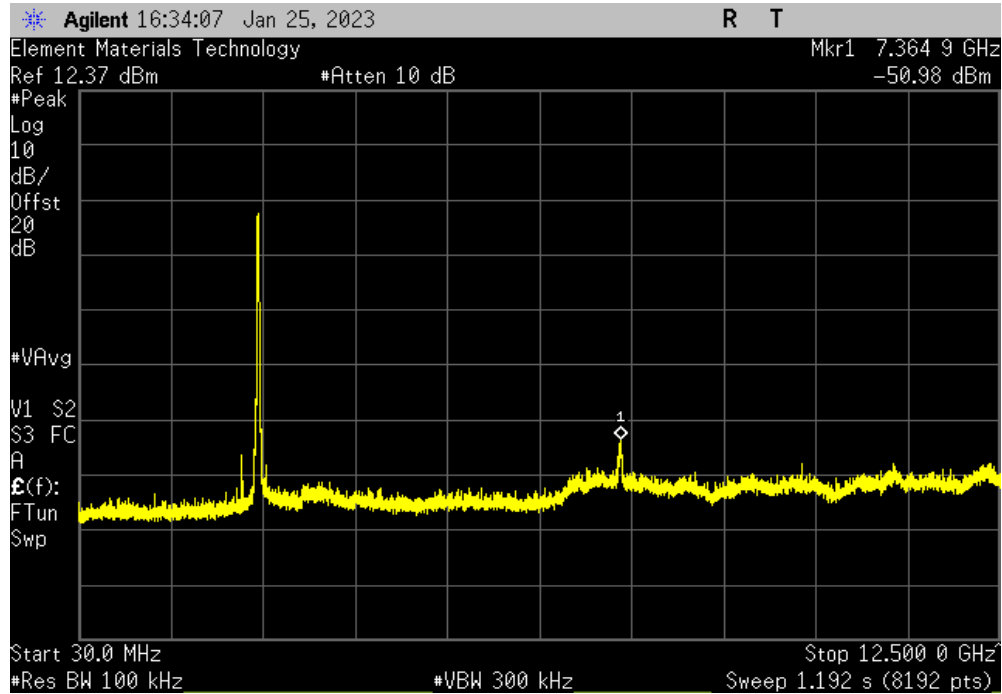


SPURIOUS CONDUCTED EMISSIONS

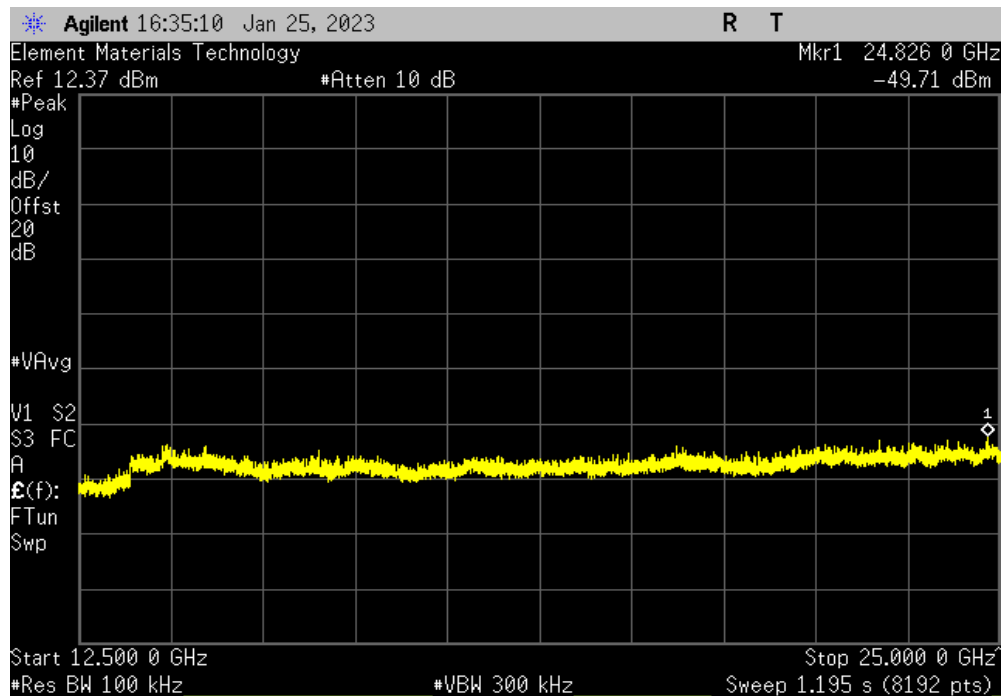


TMTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 7/11, 2452 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	7364.9	-42.86	-30	Pass	



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 7/11, 2452 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24826	-41.59	-30	Pass	

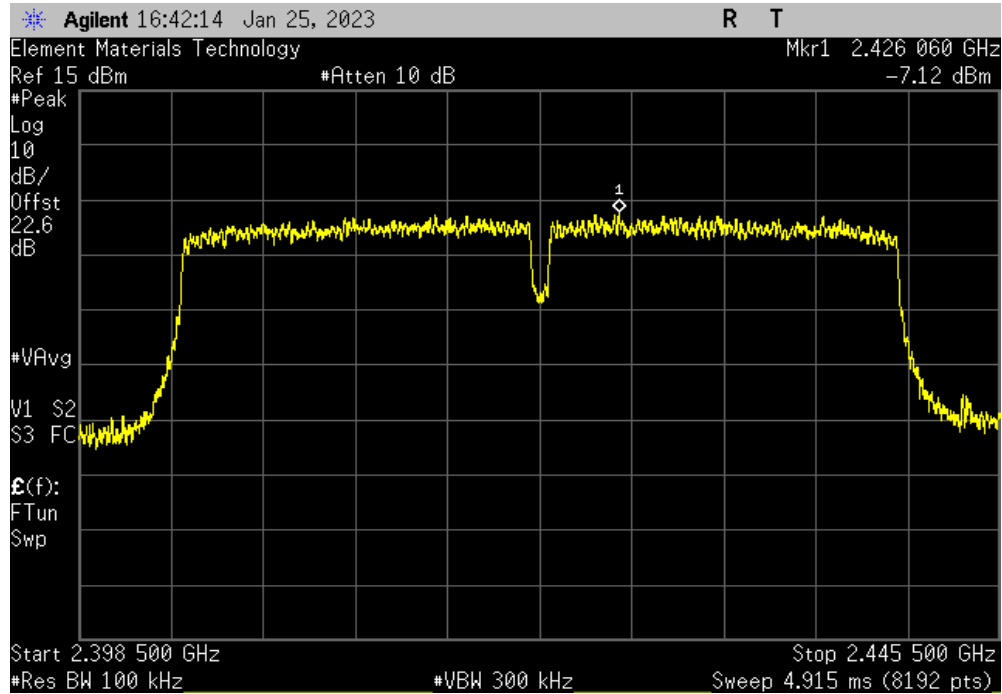


SPURIOUS CONDUCTED EMISSIONS

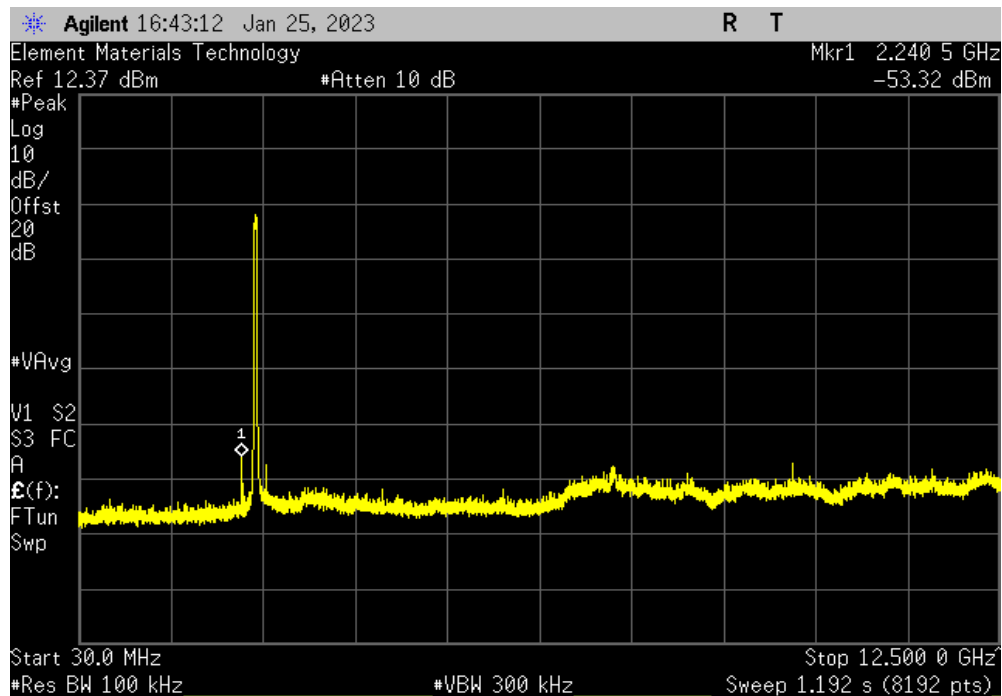


TMTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1/5, 2422 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
Fundamental	2426.06	N/A	N/A	N/A		



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1/5, 2422 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
30 MHz - 12.5 GHz	2240.5	-46.2	-30	Pass		

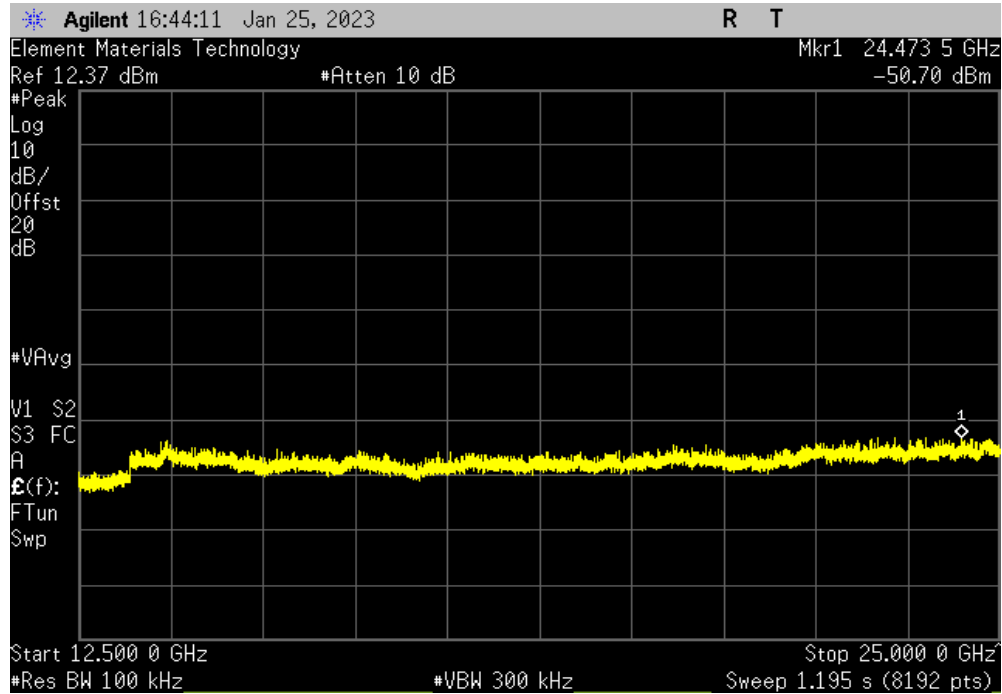


SPURIOUS CONDUCTED EMISSIONS

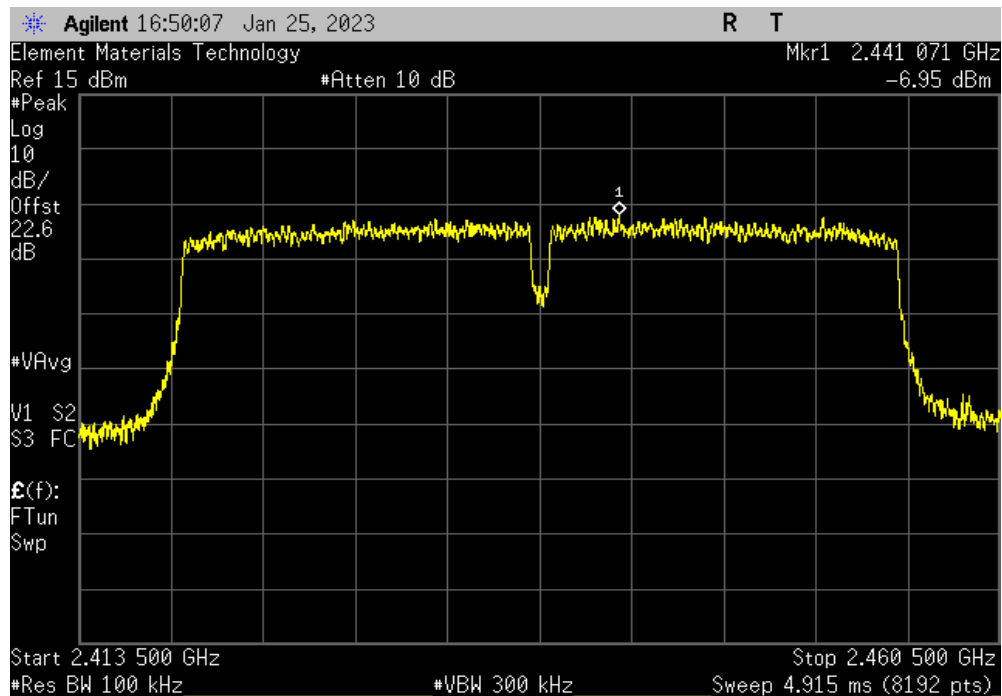


TMTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1/5, 2422 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24473.5	-43.58	-30	Pass	



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 4/8, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2441.07	N/A	N/A	N/A	

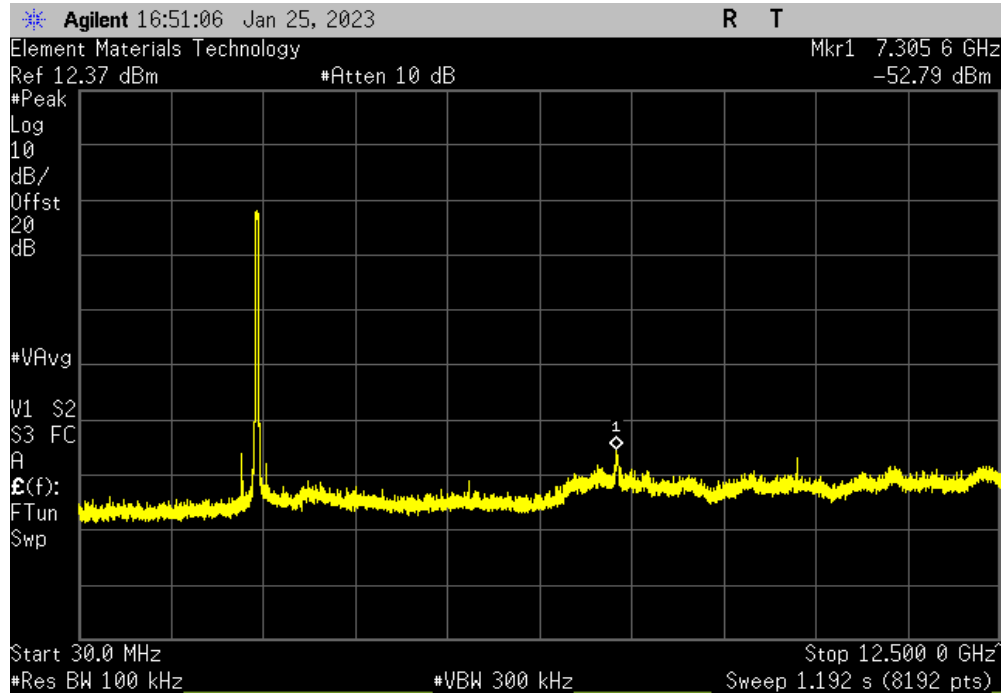


SPURIOUS CONDUCTED EMISSIONS

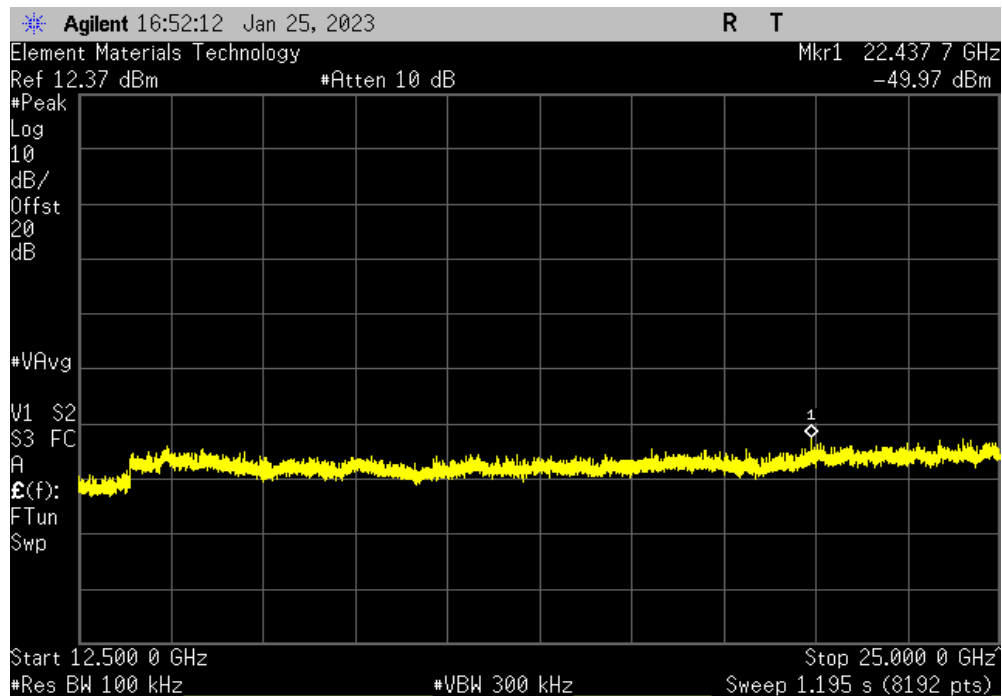


TMTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 4/8, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	7305.6	-45.84	-30	Pass	



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 4/8, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	22437.7	-43.02	-30	Pass	

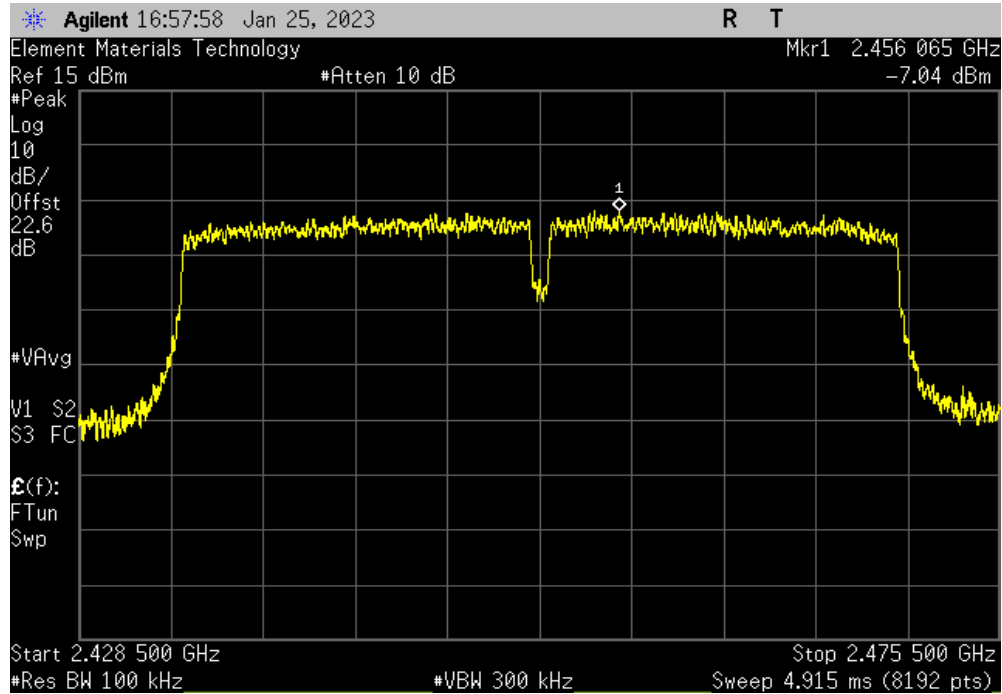


SPURIOUS CONDUCTED EMISSIONS

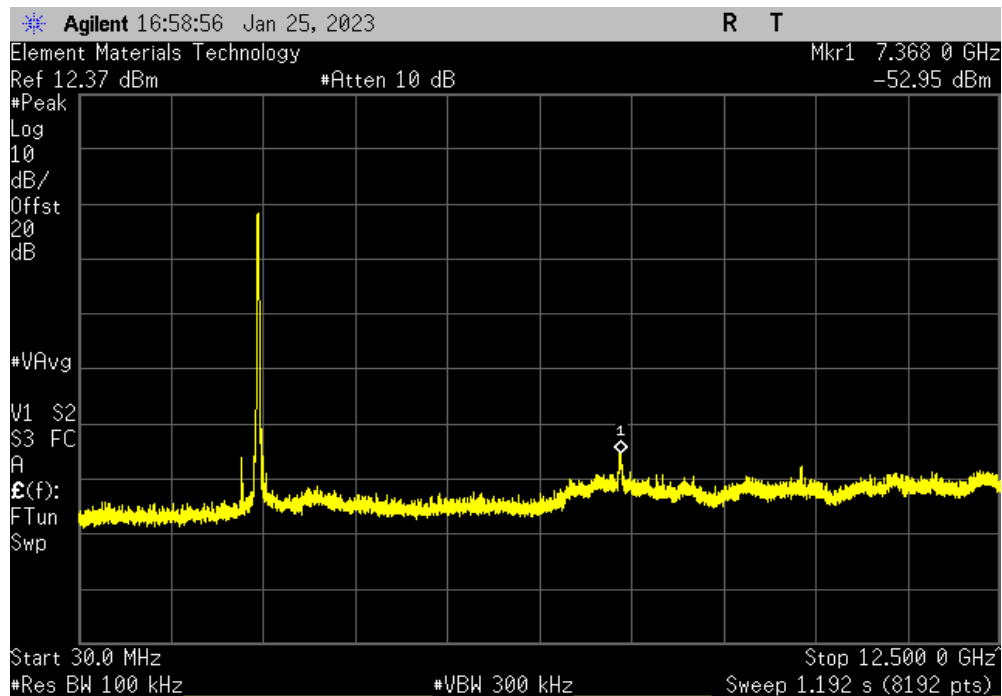


TMTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 7/11, 2452 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
Fundamental	2456.07	N/A	N/A	N/A		



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 7/11, 2452 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
30 MHz - 12.5 GHz	7368	-45.91	-30	Pass		

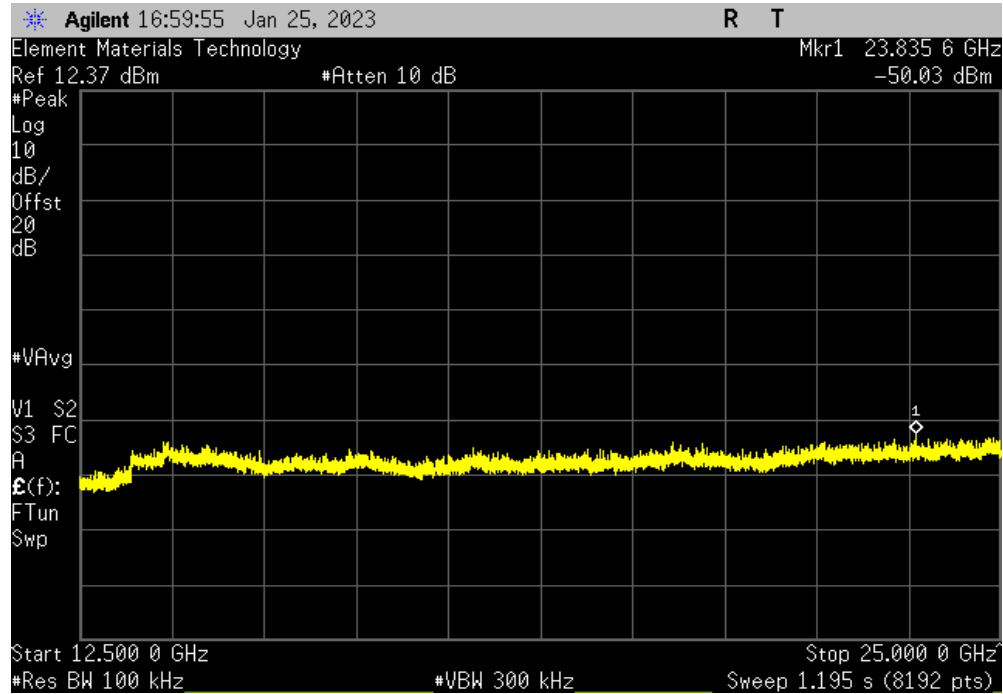


SPURIOUS CONDUCTED EMISSIONS



TMTx 2022.06.03.0 XMR 2022.02.07.0

40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 7/11, 2452 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz	23835.6	-42.99	-30	Pass



SPURIOUS RADIATED EMISSIONS

TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies and the modes as showed in the data sheets.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

Measurements within 2 MHz of the allowable band may have been taken using the integration method from ANSI C63.10 clause 11.13.3. This procedure uses the channel power feature of the spectrum analyzer to integrate the power of the emission within a 1 MHz bandwidth.

Where the radio test software does not provide for a duty cycle at continuous transmit conditions (> 98%) and the RMS (power average) measurements were made across the on and off times of the EUT transmissions, a duty cycle correction is added to the measurements using the formula of $10 \cdot \log(1/dc)$.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Double Ridge	EMCO	3115	AHM	2022-07-13	2024-07-13
Cable	Northwest EMC	3115 Horn Cable	NC2	2022-04-14	2023-04-14
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVZ	2022-04-14	2023-04-14
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAT	2022-11-03	2023-11-03
Antenna - Standard Gain	EMCO	3160-07	AHP	NCR	NCR
Cable	High Speed Interconnects	EW292A-NGNG-300	NC3	2022-08-30	2023-08-30
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOK	2022-08-04	2023-08-04
Antenna - Standard Gain	EMCO	3160-08	AHO	NCR	NCR
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AOJ	2022-08-04	2023-08-04
Antenna - Standard Gain	ETS Lindgren	3160-09	AIY	NCR	NCR
Cable	Northwest EMC	N/A	NC8	2022-03-21	2023-03-21
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AOD	2022-03-21	2023-03-21
Filter - Low Pass	Micro-Tronics	LPM50004	LFF	2022-11-01	2023-11-01
Antenna - Biconilog	Teseq	CBL 6141B	AYL	2021-10-05	2023-10-05
Cable	Northwest EMC	Bilog Cables	NC1	2023-01-29	2024-01-29
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	PAB	2023-01-29	2024-01-29
Filter - High Pass	Micro-Tronics	HPM50111	HHI	2022-10-03	2023-10-03
Attenuator	Fairview Microwave	SA18E-20	AQV	2022-07-28	2023-07-28

SPURIOUS RADIATED EMISSIONS

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	5.2 dB	-5.2 dB

FREQUENCY RANGE INVESTIGATED

30 MHz TO 26.5 GHz

POWER INVESTIGATED

120VAC/60Hz

CONFIGURATIONS INVESTIGATED

GLOW0038-1

MODES INVESTIGATED

Transmitting 802.11b. Channel 1 = 2412 MHz, Channel 6 = 2437 MHz, Channel 11 = 2462, Power setting (38)

SPURIOUS RADIATED EMISSIONS

EUT:	GFD200	Work Order:	GLOW0038
Serial Number:	MB2-398	Date:	2023-01-26
Customer:	Glowforge Incorporated	Temperature:	20.6°C
Attendees:	Jason Bluhm	Relative Humidity:	37.8%
Customer Project:	None	Bar. Pressure (PMSL):	1040 mb
Tested By:	Harry Zhao	Job Site:	NC01
Power:	120VAC/60Hz	Configuration:	GLOW0038-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2023	ANSI C63.10:2013
RSS-247 Issue 2:2017	ANSI C63.10:2013
RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013

TEST PARAMETERS

Run #:	12	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)
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COMMENTS

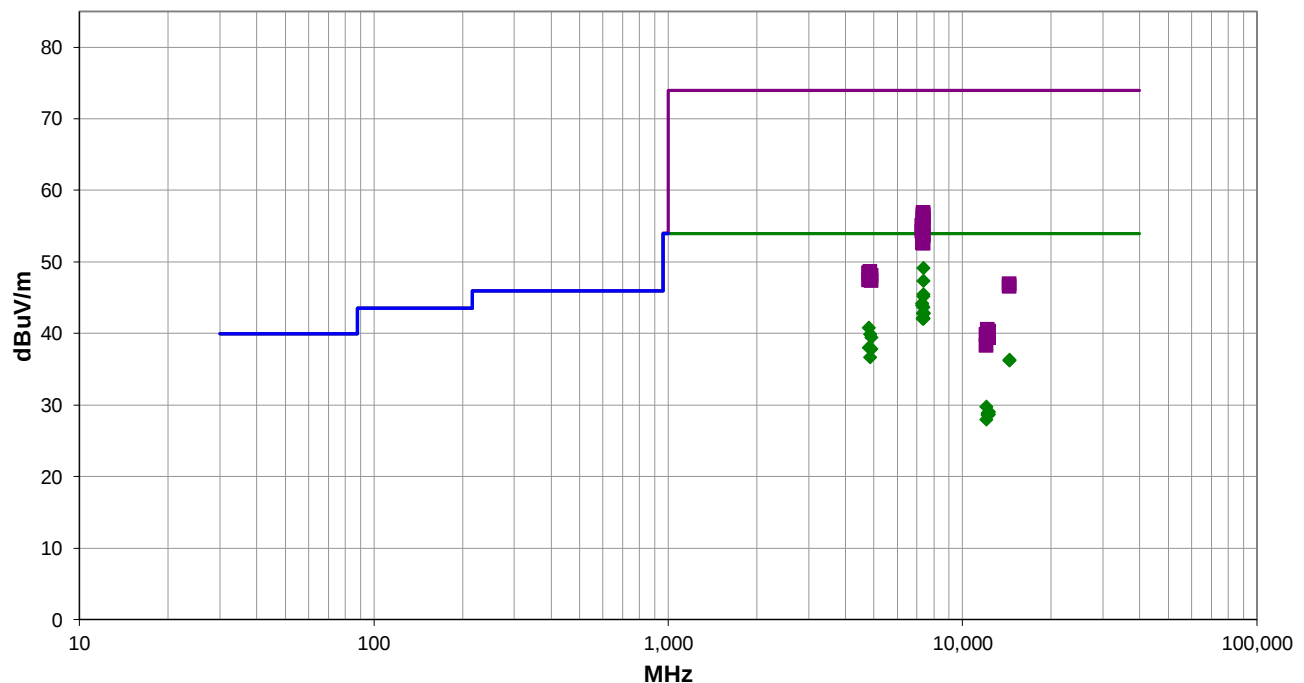
See data comments below for EUT orientation, channel, and data rates

EUT OPERATING MODES

Transmitting 802.11b. Channel 1 = 2412 MHz, Channel 6 = 2437 MHz, Channel 11 = 2462, Power setting (38)

DEVIATIONS FROM TEST STANDARD

None



Run #: 12

■ PK ◆ AV ● QP

SPURIOUS RADIATED EMISSIONS

RESULTS - Run #12

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7387.308	34.3	14.8	4.0	169.0	3.0	0.0	Horz	AV	0.0	49.1	54.0	-4.9	Ch. 11, EUT lying on side, 1 Mbps
7387.033	32.5	14.8	1.36	323.0	3.0	0.0	Vert	AV	0.0	47.3	54.0	-6.7	Ch. 11, EUT front facing down, 1 Mbps
7384.958	30.6	14.8	3.84	95.0	3.0	0.0	Horz	AV	0.0	45.4	54.0	-8.6	Ch. 11, EUT front facing down, 1 Mbps
7385.383	30.4	14.8	4.0	169.0	3.0	0.0	Horz	AV	0.0	45.2	54.0	-8.8	Ch. 11, EUT lying on side, 11 Mbps
7310.117	29.6	14.6	2.79	336.0	3.0	0.0	Vert	AV	0.0	44.2	54.0	-9.8	Ch. 6, EUT front facing down, 1 Mbps
7310.108	29.3	14.6	1.49	5.0	3.0	0.0	Horz	AV	0.0	43.9	54.0	-10.1	Ch. 6, EUT lying on side, 1 Mbps
7385.058	28.8	14.8	1.57	154.0	3.0	0.0	Vert	AV	0.0	43.6	54.0	-10.4	Ch. 11, EUT lying on side, 1 Mbps
7383.608	28.0	14.8	4.0	169.0	3.0	0.0	Horz	AV	0.0	42.8	54.0	-11.2	Ch. 11, EUT lying on side, 54 Mbps
7384.275	28.0	14.8	4.0	169.0	3.0	0.0	Horz	AV	0.0	42.8	54.0	-11.2	Ch. 11, EUT lying on side, 6 Mbps
7384.175	28.0	14.8	4.0	169.0	3.0	0.0	Horz	AV	0.0	42.8	54.0	-11.2	Ch. 11, EUT lying on side, HT20 MSC7
7385.575	27.9	14.8	4.0	169.0	3.0	0.0	Horz	AV	0.0	42.7	54.0	-11.3	Ch. 11, EUT lying on side, 36 Mbps
7383.842	27.9	14.8	4.0	169.0	3.0	0.0	Horz	AV	0.0	42.7	54.0	-11.3	Ch. 11, EUT lying on side, HT20 MSC0
7384.617	27.3	14.8	1.5	210.0	3.0	0.0	Vert	AV	0.0	42.1	54.0	-11.9	Ch. 11, EUT Horizontal, 1 Mbps
7354.942	27.7	14.4	4.0	169.0	3.0	0.0	Horz	AV	0.0	42.1	54.0	-11.9	Ch. 7/11, EUT lying on side, HT40 MCS0
7384.933	27.2	14.8	1.5	189.0	3.0	0.0	Horz	AV	0.0	42.0	54.0	-12.0	Ch. 11, EUT Horizontal, 1 Mbps
7355.983	27.6	14.4	4.0	169.0	3.0	0.0	Horz	AV	0.0	42.0	54.0	-12.0	Ch. 7/11, EUT lying on side, HT40 MCS7
4824.067	31.0	9.8	3.35	147.0	3.0	0.0	Horz	AV	0.0	40.8	54.0	-13.2	Ch. 1, EUT lying on side, 1 Mbps
4874.033	29.9	10.0	4.0	129.0	3.0	0.0	Horz	AV	0.0	39.9	54.0	-14.1	Ch. 6, EUT lying on side, 1 Mbps
4924.142	29.3	10.1	2.24	132.0	3.0	0.0	Horz	AV	0.0	39.4	54.0	-14.6	Ch. 11, EUT lying on side, 1 Mbps
4823.875	28.2	9.8	2.85	150.0	3.0	0.0	Vert	AV	0.0	38.0	54.0	-16.0	Ch. 1, EUT front facing down, 1 Mbps
4924.117	27.7	10.1	2.45	167.0	3.0	0.0	Vert	AV	0.0	37.8	54.0	-16.2	Ch. 11, EUT front facing down, 1 Mbps
7384.925	42.0	14.8	4.0	169.0	3.0	0.0	Horz	PK	0.0	56.8	74.0	-17.2	Ch. 11, EUT lying on side, HT20 MSC0
7386.250	41.8	14.8	4.0	169.0	3.0	0.0	Horz	PK	0.0	56.6	74.0	-17.4	Ch. 11, EUT lying on side, 1 Mbps
4874.108	26.6	10.0	3.39	3.0	3.0	0.0	Vert	AV	0.0	36.6	54.0	-17.4	Ch. 6, EUT front facing down, 1 Mbps
7386.550	41.6	14.8	4.0	169.0	3.0	0.0	Horz	PK	0.0	56.4	74.0	-17.6	Ch. 11, EUT lying on side, 11 Mbps
14474.300	29.2	7.1	2.94	47.0	3.0	0.0	Vert	AV	0.0	36.3	54.0	-17.7	Ch. 1, EUT front facing down, 1 Mbps
14471.830	29.1	7.1	1.5	225.0	3.0	0.0	Horz	AV	0.0	36.2	54.0	-17.8	Ch. 1, EUT lying on side, 1 Mbps
7387.308	41.3	14.8	4.0	169.0	3.0	0.0	Horz	PK	0.0	56.1	74.0	-17.9	Ch. 11, EUT lying on side, 54 Mbps
7384.442	41.1	14.8	1.36	323.0	3.0	0.0	Vert	PK	0.0	55.9	74.0	-18.1	Ch. 11, EUT front facing down, 1 Mbps
7387.758	40.8	14.8	4.0	169.0	3.0	0.0	Horz	PK	0.0	55.6	74.0	-18.4	Ch. 11, EUT lying on side, 36 Mbps
7387.608	40.2	14.8	4.0	169.0	3.0	0.0	Horz	PK	0.0	55.0	74.0	-19.0	Ch. 11, EUT lying on side, 6 Mbps
7309.867	40.4	14.6	1.49	5.0	3.0	0.0	Horz	PK	0.0	55.0	74.0	-19.0	Ch. 6, EUT lying on side, 1 Mbps
7384.350	39.9	14.8	3.84	95.0	3.0	0.0	Horz	PK	0.0	54.7	74.0	-19.3	Ch. 11, EUT front facing down, 1 Mbps
7311.392	39.6	14.6	2.79	336.0	3.0	0.0	Vert	PK	0.0	54.2	74.0	-19.8	Ch. 6, EUT front facing down, 1 Mbps
7386.567	38.9	14.8	1.5	189.0	3.0	0.0	Horz	PK	0.0	53.7	74.0	-20.3	Ch. 11, EUT Horizontal, 1 Mbps
7385.358	38.9	14.8	4.0	169.0	3.0	0.0	Horz	PK	0.0	53.7	74.0	-20.3	Ch. 11, EUT lying on side, HT20 MSC7
7383.667	38.7	14.8	1.57	154.0	3.0	0.0	Vert	PK	0.0	53.5	74.0	-20.5	Ch. 11, EUT lying on side, 1 Mbps
7357.567	38.5	14.4	4.0	169.0	3.0	0.0	Horz	PK	0.0	52.9	74.0	-21.1	Ch. 7/11, EUT lying on side, HT40 MCS0
7356.350	38.2	14.4	4.0	169.0	3.0	0.0	Horz	PK	0.0	52.6	74.0	-21.4	Ch. 7/11, EUT lying on side, HT40 MCS7
7388.150	37.6	14.9	1.5	210.0	3.0	0.0	Vert	PK	0.0	52.5	74.0	-21.5	Ch. 11, EUT Horizontal, 1 Mbps

SPURIOUS RADIATED EMISSIONS

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
12061.150	32.3	-2.6	3.17	131.0	3.0	0.0	Horz	AV	0.0	29.7	54.0	-24.3	Ch. 1, EUT lying on side, 1 Mbps
12311.990	31.1	-2.1	1.5	226.0	3.0	0.0	Vert	AV	0.0	29.0	54.0	-25.0	Ch. 11, EUT front facing down, 1 Mbps
12183.920	31.0	-2.2	1.5	272.0	3.0	0.0	Horz	AV	0.0	28.8	54.0	-25.2	Ch. 6, EUT lying on side, 1 Mbps
12308.560	30.8	-2.1	1.5	156.0	3.0	0.0	Horz	AV	0.0	28.7	54.0	-25.3	Ch. 11, EUT lying on side, 1 Mbps
12183.380	30.8	-2.2	1.5	324.0	3.0	0.0	Vert	AV	0.0	28.6	54.0	-25.4	Ch. 6, EUT front facing down, 1 Mbps
4873.858	38.6	10.0	4.0	129.0	3.0	0.0	Horz	PK	0.0	48.6	74.0	-25.4	Ch. 6, EUT lying on side, 1 Mbps
4824.300	38.6	9.8	3.35	147.0	3.0	0.0	Horz	PK	0.0	48.4	74.0	-25.6	Ch. 1, EUT lying on side, 1 Mbps
4924.183	37.9	10.1	2.24	132.0	3.0	0.0	Horz	PK	0.0	48.0	74.0	-26.0	Ch. 11, EUT lying on side, 1 Mbps
12062.110	30.5	-2.6	1.5	124.0	3.0	0.0	Vert	AV	0.0	27.9	54.0	-26.1	Ch. 1, EUT front facing down, 1 Mbps
4873.850	37.7	10.0	3.39	3.0	3.0	0.0	Vert	PK	0.0	47.7	74.0	-26.3	Ch. 6, EUT front facing down, 1 Mbps
4824.300	37.6	9.8	2.85	150.0	3.0	0.0	Vert	PK	0.0	47.4	74.0	-26.6	Ch. 1, EUT front facing down, 1 Mbps
4925.333	37.2	10.1	2.45	167.0	3.0	0.0	Vert	PK	0.0	47.3	74.0	-26.7	Ch. 11, EUT front facing down, 1 Mbps
14470.880	39.8	7.1	1.5	225.0	3.0	0.0	Horz	PK	0.0	46.9	74.0	-27.1	Ch. 1, EUT lying on side, 1 Mbps
14472.880	39.4	7.1	2.94	47.0	3.0	0.0	Vert	PK	0.0	46.5	74.0	-27.5	Ch. 1, EUT front facing down, 1 Mbps
12187.330	42.6	-2.1	1.5	272.0	3.0	0.0	Horz	PK	0.0	40.5	74.0	-33.5	Ch. 6, EUT lying on side, 1 Mbps
12307.700	42.3	-2.1	1.5	226.0	3.0	0.0	Vert	PK	0.0	40.2	74.0	-33.8	Ch. 11, EUT front facing down, 1 Mbps
12061.310	42.4	-2.6	3.17	131.0	3.0	0.0	Horz	PK	0.0	39.8	74.0	-34.2	Ch. 1, EUT lying on side, 1 Mbps
12182.720	41.6	-2.2	1.5	324.0	3.0	0.0	Vert	PK	0.0	39.4	74.0	-34.6	Ch. 6, EUT front facing down, 1 Mbps
12309.800	41.4	-2.1	1.5	156.0	3.0	0.0	Horz	PK	0.0	39.3	74.0	-34.7	Ch. 11, EUT lying on side, 1 Mbps
12060.720	40.9	-2.6	1.5	124.0	3.0	0.0	Vert	PK	0.0	38.3	74.0	-35.7	Ch. 1, EUT front facing down, 1 Mbps

CONCLUSION

Pass



Tested By

SPURIOUS RADIATED EMISSIONS

EUT:	GFD200	Work Order:	GLOW0038
Serial Number:	MB2-398	Date:	2023-01-26
Customer:	Glowforge Incorporated	Temperature:	21°C
Attendees:	Jason Bluhm	Relative Humidity:	27.1%
Customer Project:	None	Bar. Pressure (PMSL):	1022 mb
Tested By:	Harry Zhao	Job Site:	NC01
Power:	120VAC/60Hz	Configuration:	GLOW0038-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2023	ANSI C63.10:2013
RSS-247 Issue 2:2017	ANSI C63.10:2013
RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013

TEST PARAMETERS

Run #:	94	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)
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COMMENTS

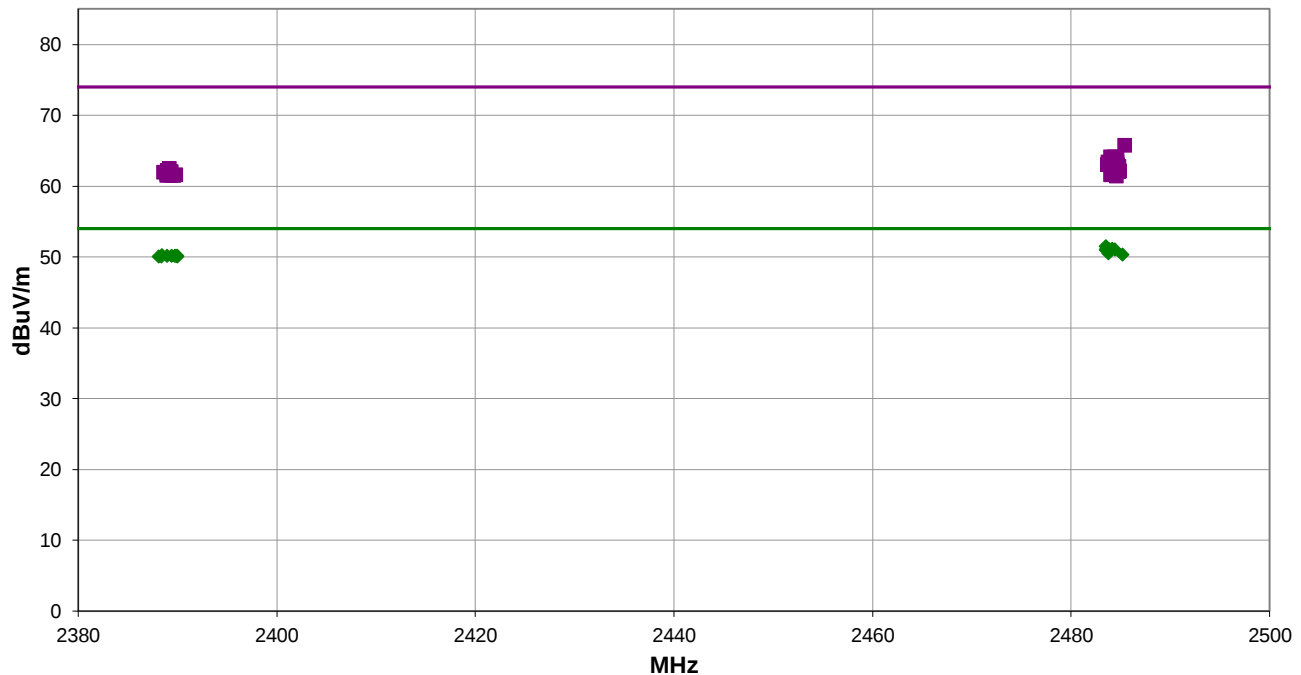
See data comments below for EUT orientation, channel, and data rates

EUT OPERATING MODES

Transmitting 802.11b. Channel 1 = 2412 MHz, Channel 6 = 2437 MHz, Channel 11 = 2462, Power setting (38)

DEVIATIONS FROM TEST STANDARD

None



Run #: 94

■ PK ◆ AV ● QP

SPURIOUS RADIATED EMISSIONS

RESULTS - Run #94

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2483.537	30.3	1.2	1.5	18.0	3.0	20.0	Horz	AV	0.0	51.5	54.0	-2.5	Ch. 7/11, EUT lying on side, HT40 MCS0
2484.170	29.9	1.2	1.69	107.0	3.0	20.0	Horz	AV	0.0	51.1	54.0	-2.9	Ch. 7/11, EUT front facing down, HT40 MCS0
2483.623	29.9	1.2	1.31	302.0	3.0	20.0	Vert	AV	0.0	51.1	54.0	-2.9	Ch. 7/11, EUT Horizontal, HT40 MCS0
2483.883	29.8	1.2	1.5	18.0	3.0	20.0	Horz	AV	0.0	51.0	54.0	-3.0	Ch. 11, EUT lying on side, HT20 MCS0
2483.600	29.8	1.2	1.5	18.0	3.0	20.0	Horz	AV	0.0	51.0	54.0	-3.0	Ch. 11, EUT lying on side, 54 Mbps
2484.460	29.8	1.2	1.5	18.0	3.0	20.0	Horz	AV	0.0	51.0	54.0	-3.0	Ch. 11, EUT lying on side, 11 Mbps
2483.500	29.8	1.2	1.5	18.0	3.0	20.0	Horz	AV	0.0	51.0	54.0	-3.0	Ch. 11, EUT lying on side, 1 Mbps
2483.563	29.7	1.2	2.49	69.0	3.0	20.0	Horz	AV	0.0	50.9	54.0	-3.1	Ch. 7/11, EUT Horizontal, HT40 MCS0
2483.763	29.7	1.2	1.5	18.0	3.0	20.0	Horz	AV	0.0	50.9	54.0	-3.1	Ch. 7/11, EUT lying on side, HT40 MCS7
2483.857	29.7	1.2	1.5	18.0	3.0	20.0	Horz	AV	0.0	50.9	54.0	-3.1	Ch. 11, EUT lying on side, HT20 MCS7
2483.567	29.7	1.2	1.5	18.0	3.0	20.0	Horz	AV	0.0	50.9	54.0	-3.1	Ch. 11, EUT lying on side, 6 Mbps
2483.890	29.6	1.2	1.5	18.0	3.0	20.0	Horz	AV	0.0	50.8	54.0	-3.2	Ch. 11, EUT lying on side, 36 Mbps
2483.787	29.3	1.2	2.58	209.0	3.0	20.0	Vert	AV	0.0	50.5	54.0	-3.5	Ch. 7/11, EUT front facing down, HT40 MCS0
2485.203	29.1	1.2	1.53	48.0	3.0	20.0	Vert	AV	0.0	50.3	54.0	-3.7	Ch. 7/11, EUT lying on side, HT40 MCS0
2388.443	29.2	1.0	1.5	38.0	3.0	20.0	Horz	AV	0.0	50.2	54.0	-3.8	Ch. 1, EUT lying on side, 1 Mbps
2388.943	29.1	1.0	2.24	56.0	3.0	20.0	Horz	AV	0.0	50.1	54.0	-3.9	Ch. 1/5, EUT lying on side, HT40 MCS7
2389.720	29.1	1.0	2.24	56.0	3.0	20.0	Horz	AV	0.0	50.1	54.0	-3.9	Ch. 1, EUT lying on side, HT20 MCS7
2389.400	29.1	1.0	2.24	56.0	3.0	20.0	Horz	AV	0.0	50.1	54.0	-3.9	Ch. 1, EUT lying on side, HT20 MCS0
2389.970	29.1	1.0	2.24	56.0	3.0	20.0	Horz	AV	0.0	50.1	54.0	-3.9	Ch. 1, EUT lying on side, 11 Mbps
2389.857	29.1	1.0	2.24	56.0	3.0	20.0	Horz	AV	0.0	50.1	54.0	-3.9	Ch. 1, EUT lying on side, 54 Mbps
2388.123	29.0	1.0	1.5	243.0	3.0	20.0	Horz	AV	0.0	50.0	54.0	-4.0	Ch. 1, EUT lying on side, 6 Mbps
2389.990	29.0	1.0	2.24	56.0	3.0	20.0	Horz	AV	0.0	50.0	54.0	-4.0	Ch. 1/5, EUT lying on side, HT40 MCS0
2388.393	29.0	1.0	2.24	56.0	3.0	20.0	Horz	AV	0.0	50.0	54.0	-4.0	Ch. 1, EUT lying on side, 36 Mbps
2485.490	44.5	1.2	1.5	18.0	3.0	20.0	Horz	PK	0.0	65.7	74.0	-8.3	Ch. 7/11, EUT lying on side, HT40 MCS0
2484.410	42.9	1.2	1.31	302.0	3.0	20.0	Vert	PK	0.0	64.1	74.0	-9.9	Ch. 7/11, EUT Horizontal, HT40 MCS0
2484.053	42.9	1.2	1.5	18.0	3.0	20.0	Horz	PK	0.0	64.1	74.0	-9.9	Ch. 11, EUT lying on side, HT20 MCS7
2484.717	42.8	1.2	1.69	107.0	3.0	20.0	Horz	PK	0.0	64.0	74.0	-10.0	Ch. 7/11, EUT front facing down, HT40 MCS0
2484.717	42.2	1.2	1.5	18.0	3.0	20.0	Horz	PK	0.0	63.4	74.0	-10.6	Ch. 11, EUT lying on side, HT20 MCS0
2483.780	42.1	1.2	2.49	69.0	3.0	20.0	Horz	PK	0.0	63.3	74.0	-10.7	Ch. 7/11, EUT Horizontal, HT40 MCS0
2483.990	42.0	1.2	1.5	18.0	3.0	20.0	Horz	PK	0.0	63.2	74.0	-10.8	Ch. 7/11, EUT lying on side, HT40 MCS7
2483.743	41.8	1.2	1.5	18.0	3.0	20.0	Horz	PK	0.0	63.0	74.0	-11.0	Ch. 11, EUT lying on side, 36 Mbps
2484.753	41.8	1.2	1.5	18.0	3.0	20.0	Horz	PK	0.0	63.0	74.0	-11.0	Ch. 11, EUT lying on side, 11 Mbps
2484.863	41.5	1.2	1.5	18.0	3.0	20.0	Horz	PK	0.0	62.7	74.0	-11.3	Ch. 11, EUT lying on side, 1 Mbps
2389.237	41.4	1.0	2.24	56.0	3.0	20.0	Horz	PK	0.0	62.4	74.0	-11.6	Ch. 1/5, EUT lying on side, HT40 MCS7
2389.007	41.2	1.0	1.5	38.0	3.0	20.0	Horz	PK	0.0	62.2	74.0	-11.8	Ch. 1, EUT lying on side, 1 Mbps
2484.963	40.9	1.2	1.5	18.0	3.0	20.0	Horz	PK	0.0	62.1	74.0	-11.9	Ch. 11, EUT lying on side, 6 Mbps
2389.420	41.0	1.0	2.24	56.0	3.0	20.0	Horz	PK	0.0	62.0	74.0	-12.0	Ch. 1, EUT lying on side, 54 Mbps
2484.867	40.8	1.2	1.5	18.0	3.0	20.0	Horz	PK	0.0	62.0	74.0	-12.0	Ch. 11, EUT lying on side, 54 Mbps
2388.613	40.9	1.0	2.24	56.0	3.0	20.0	Horz	PK	0.0	61.9	74.0	-12.1	Ch. 1, EUT lying on side, 11 Mbps
2388.960	40.7	1.0	2.24	56.0	3.0	20.0	Horz	PK	0.0	61.7	74.0	-12.3	Ch. 1, EUT lying on side, HT20 MCS7

SPURIOUS RADIATED EMISSIONS

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2389.883	40.5	1.0	2.24	56.0	3.0	20.0	Horz	PK	0.0	61.5	74.0	-12.5	Ch. 1/5, EUT lying on side, HT40 MCS0
2484.027	40.3	1.2	1.53	48.0	3.0	20.0	Vert	PK	0.0	61.5	74.0	-12.5	Ch. 7/11, EUT lying on side, HT40 MCS0
2388.953	40.4	1.0	1.5	243.0	3.0	20.0	Horz	PK	0.0	61.4	74.0	-12.6	Ch. 1, EUT lying on side, 6 Mbps
2389.667	40.4	1.0	2.24	56.0	3.0	20.0	Horz	PK	0.0	61.4	74.0	-12.6	Ch. 1, EUT lying on side, HT20 MCS0
2389.390	40.4	1.0	2.24	56.0	3.0	20.0	Horz	PK	0.0	61.4	74.0	-12.6	Ch. 1, EUT lying on side, 36 Mbps
2484.613	40.1	1.2	2.58	209.0	3.0	20.0	Vert	PK	0.0	61.3	74.0	-12.7	Ch. 7/11, EUT front facing down, HT40 MCS0

CONCLUSION

Pass



Tested By

End of Test Report