



# element

**Medtronic, Inc.**

**MyCareLink Relay Home Communicator 24960**

**FCC 15. 247:2018  
802.11bgn**

**Report # MDTR0649.5**



NVLAP LAB CODE: 200881-0



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# CERTIFICATE OF TEST

**Last Date of Test: August 8, 2018**  
**Medtronic, Inc.**  
**Model: MyCareLink Relay Home Communicator 24960**

## Radio Equipment Testing

### Standards

Specification	Method
FCC 15.247:2018	ANSI C63.10:2013, KDB 558074
FCC 15.207:2018	

### Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	
11.6	Duty Cycle	Yes	Pass	
11.8.2	Occupied Bandwidth	Yes	Pass	
11.9.2.2.4	Output Power	Yes	Pass	
11.10.2	Power Spectral Density	Yes	Pass	
11.11	Band Edge Compliance	Yes	Pass	
11.11	Spurious Conducted Emissions	Yes	Pass	
11.12.1, 11.13.2, 6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	

### Deviations From Test Standards

None

### Approved By:



Matt Nuernberg, Operations 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.*

# REVISION HISTORY



Revision Number	Description	Date (yyyy-mm-dd)	Page Number
00	None		

# ACCREDITATIONS AND AUTHORIZATIONS



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## 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** - Accredited by A2LA to ISO / IEC 17065 as a product certifier. This allows Element to certify transmitters to FCC and IC specifications.

**NVLAP** - Each laboratory is accredited by NVLAP to ISO 17025

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## Canada

**ISED** - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with ISED.

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## European Union

**European Commission** – Within Element, we have a EU Notified Body validated for the EMCD and RED Directives.

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## Australia/New Zealand

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

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## Korea

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

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## Japan

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

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## 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.

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## Singapore

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

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## Israel

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

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## Hong Kong

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

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## Vietnam

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

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## SCOPE

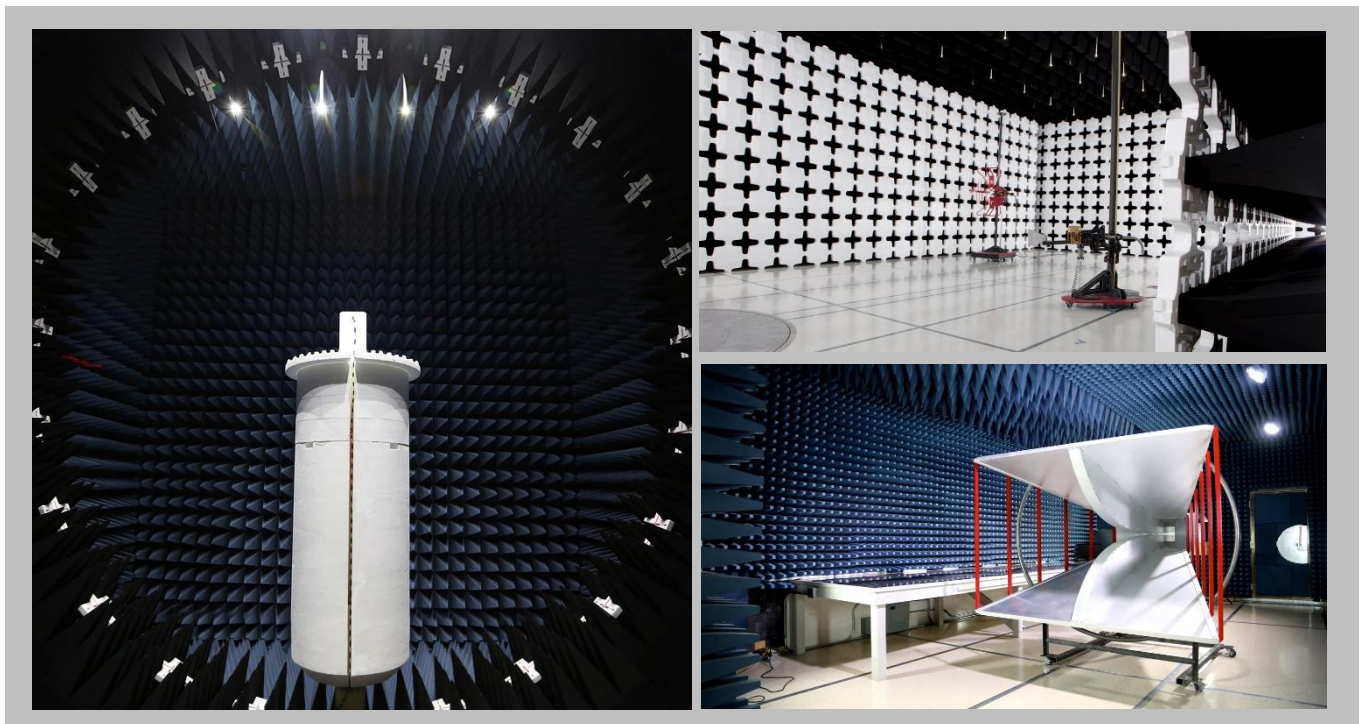
For details on the Scopes of our Accreditations, please visit:

<https://www.nwemc.com/emc-testing-accreditations>

# FACILITIES

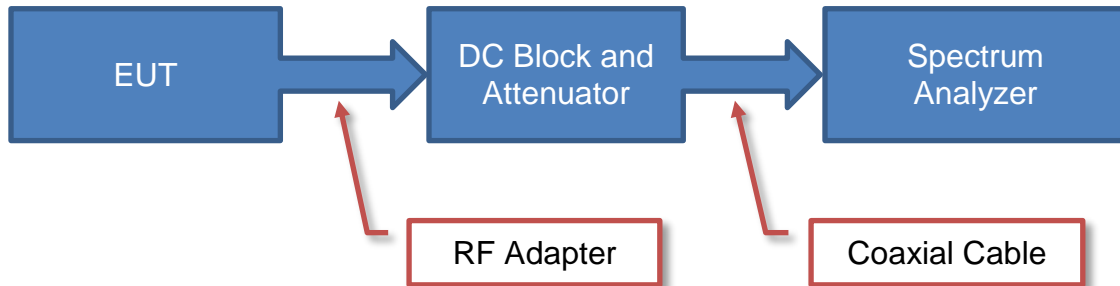


<b>California</b> Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	<b>Minnesota</b> Labs MN01-10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	<b>New York</b> Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	<b>Oregon</b> Labs EV01-12 6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	<b>Texas</b> Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	<b>Washington</b> Labs NC01-05 19201 120 <sup>th</sup> Ave NE Bothell, WA 98011 (425)984-6600
<b>NVLAP</b>					
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0
<b>Innovation, Science and Economic Development Canada</b>					
2834B-1, 2834B-3	2834E-1, 2834E-3	N/A	2834D-1, 2834D-2	2834G-1	2834F-1
<b>BSMI</b>					
SL2-IN-E-1154R	SL2-IN-E-1152R	N/A	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
<b>VCCI</b>					
A-0029	A-0109	N/A	A-0108	A-0201	A-0110
<b>Recognized Phase I CAB for ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA</b>					
US0158	US0175	N/A	US0017	US0191	US0157

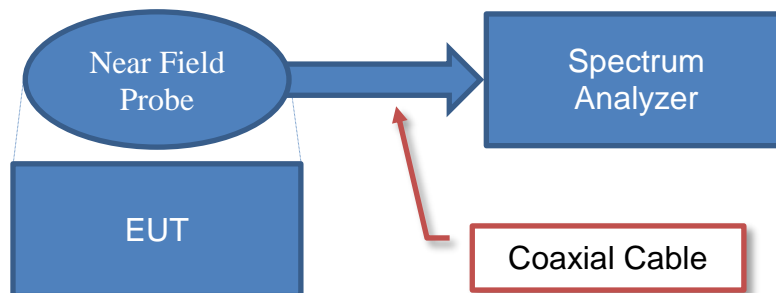


# Test Setup Block Diagrams

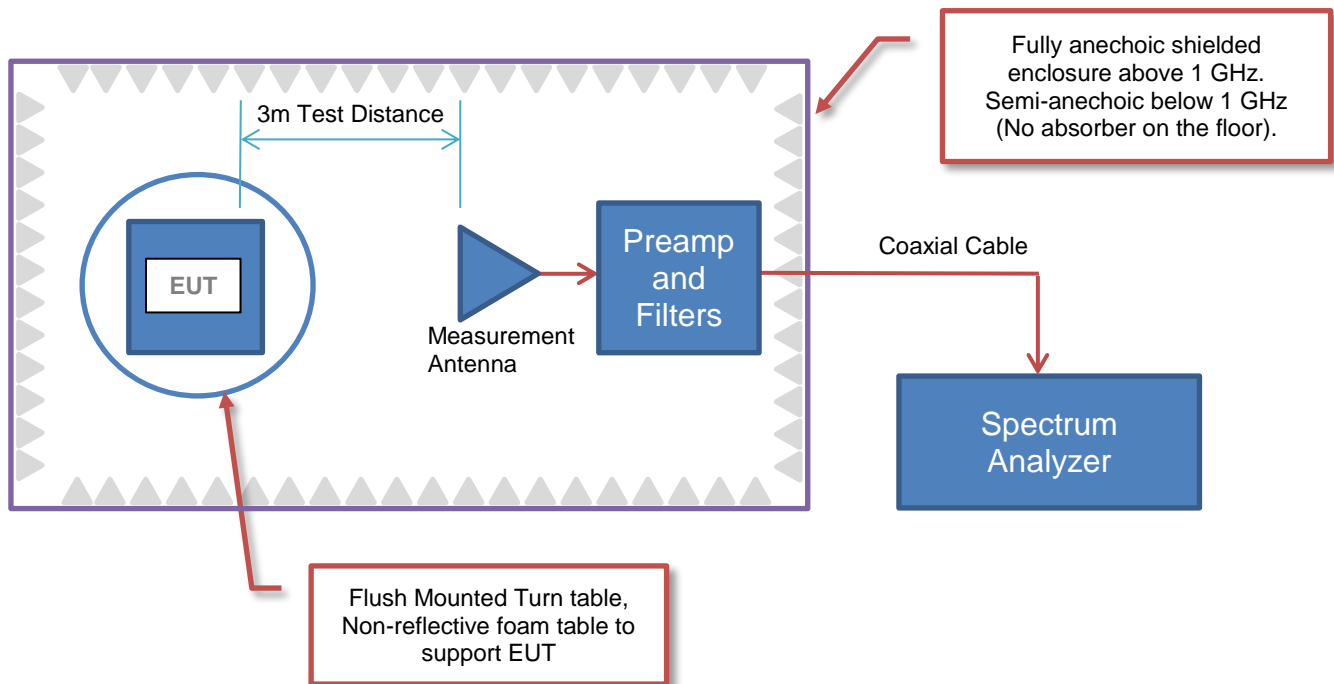
## Antenna Port Conducted Measurements



## Near Field Test Fixture Measurements



## Spurious Radiated Emissions



# PRODUCT DESCRIPTION



## Client and Equipment Under Test (EUT) Information

<b>Company Name:</b>	Medtronic, Inc.
<b>Address:</b>	710 Medtronic Parkway
<b>City, State, Zip:</b>	Minneapolis, MN 55432
<b>Test Requested By:</b>	Taylor Dowden
<b>Model:</b>	MyCareLink Relay Home Communicator 24960
<b>First Date of Test:</b>	June 26, 2018
<b>Last Date of Test:</b>	August 8, 2018
<b>Receipt Date of Samples:</b>	June 25, 2018
<b>Equipment Design Stage:</b>	Production
<b>Equipment Condition:</b>	No Damage
<b>Purchase Authorization:</b>	Verified

## Information Provided by the Party Requesting the Test

### Functional Description of the EUT:

The MyCareLink Relay home communicator wirelessly transfers information between an implanted medical device and the Medtronic CareLink network. The wireless communication between the MyCareLink Relay and the Medtronic CareLink network is accomplished by means of a Wi-Fi radio that supports 802.11b/g/n (2.4 GHz, 20 MHz bandwidth only).

### Testing Objective:

To demonstrate compliance of the 802.11 radio to FCC 15.247 requirements.



# CONFIGURATIONS



## Configuration MDTR0649- 1

Software/Firmware Running during test	
Description	Version
Murata WIFI Test AOSP	N/A

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Atech OEM Power Supply	Atech OEM	ADS012T-W050200	S1811003694
MyCareLink Relay Home Communicator 24960	Medtronic, Inc.	24960	MEA9987DEM

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Atech OEM Power Supply Cable	No	1.9 m	Yes	MyCareLink Relay Home Communicator 24960	Atech OEM Power Supply

## Configuration MDTR0649- 3

Software/Firmware Running during test	
Description	Version
Murata WIFI Test AOSP	N/A

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Atech OEM Power Supply	Atech OEM	ADS012T-W050200	S1811003694
MyCareLink Relay Home Communicator 24960	Medtronic, Inc.	24960	MEA9984DEM

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Atech OEM Power Supply Cable	No	1.9 m	Yes	MyCareLink Relay Home Communicator 24960	Atech OEM Power Supply



# MODIFICATIONS



## Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	6/26/2018	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.
2	7/12/2018	Powerline 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.
3	7/17/2018	Duty Cycle	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	7/17/2018	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.
5	7/17/2018	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.
6	7/17/2018	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.
7	8/8/2018	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.
8	8/8/2018	Power Spectral Density	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	ESR7	ARI	6/26/2018	6/26/2019
Cable - Conducted Cable Assembly	Northwest EMC	MNC	MNCC	1/24/2018	1/24/2019
Filter - High Pass	TTE	H97-100K-50-720B	HGN	NCR	NCR
LISN	Solar Electronics	9252-50-R-24-BNC	LIY	3/15/2018	3/15/2019

## MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

## CONFIGURATIONS INVESTIGATED

MDTR0649-1
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## MODES INVESTIGATED

Tx Mid Ch. 2437 MHz at 1 Mbps modulation, 20 MHz BW
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# POWERLINE CONDUCTED EMISSIONS



EUT:	MyCareLink Relay Home Communicator 24960	Work Order:	MDTR0649
Serial Number:	MEA9987DEM	Date:	07/12/2018
Customer:	Medtronic, Inc.	Temperature:	22.7°C
Attendees:	Taylor Dowden	Relative Humidity:	63.8%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Kyle McMullan, Chris Patterson	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	MDTR0649-1

## TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2018	ANSI C63.10:2013

## TEST PARAMETERS

Run #:	5	Line:	High Line	Add. Ext. Attenuation (dB):	0
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## COMMENTS

802.11b

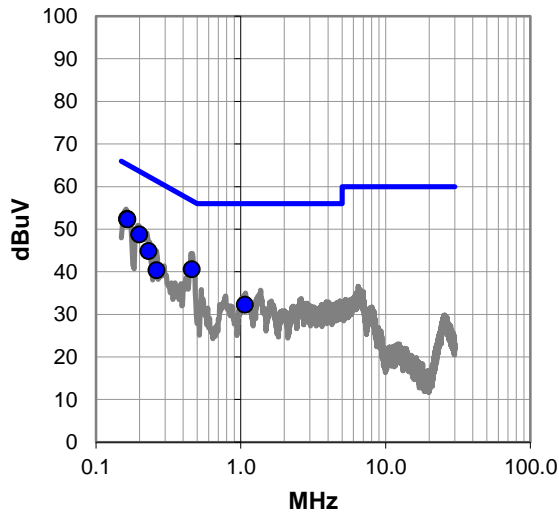
## EUT OPERATING MODES

Tx Mid Ch. 2437 MHz at 1 Mbps modulation, 20 MHz BW

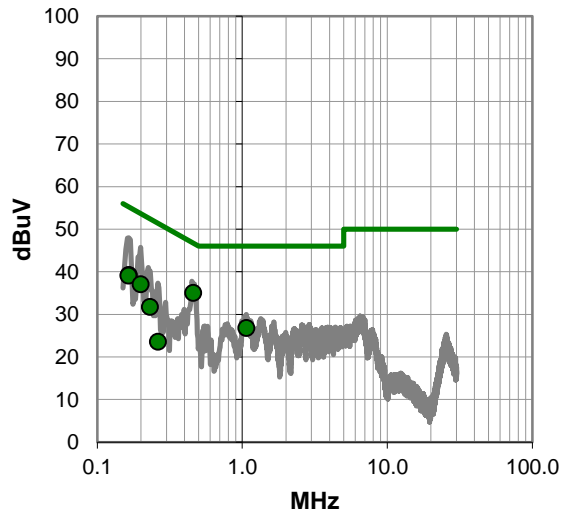
## DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



# POWERLINE CONDUCTED EMISSIONS



## RESULTS - Run #5

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.164	52.2	0.3	52.5	65.2	-12.7
0.165	52.0	0.3	52.3	65.2	-12.9
0.199	48.5	0.3	48.8	63.6	-14.8
0.458	40.4	0.2	40.6	56.7	-16.1
0.231	44.6	0.3	44.9	62.4	-17.5
0.262	40.2	0.2	40.4	61.4	-21.0
1.067	32.0	0.3	32.3	56.0	-23.7

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.458	34.9	0.2	35.1	46.7	-11.6
0.165	39.0	0.3	39.3	55.2	-15.9
0.164	38.8	0.3	39.1	55.2	-16.1
0.199	36.8	0.3	37.1	53.6	-16.5
1.067	26.5	0.3	26.8	46.0	-19.2
0.231	31.5	0.3	31.8	52.4	-20.6
0.262	23.4	0.2	23.6	51.4	-27.8

## CONCLUSION

Pass

Tested By

# POWERLINE CONDUCTED EMISSIONS



EUT:	MyCareLink Relay Home Communicator 24960	Work Order:	MDTR0649
Serial Number:	MEA9987DEM	Date:	07/12/2018
Customer:	Medtronic, Inc.	Temperature:	22.7°C
Attendees:	Taylor Dowden	Relative Humidity:	63.8%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Kyle McMullan, Chris Patterson	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	MDTR0649-1

## TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2018	ANSI C63.10:2013

## TEST PARAMETERS

Run #:	6	Line:	Neutral	Add. Ext. Attenuation (dB):	0
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## COMMENTS

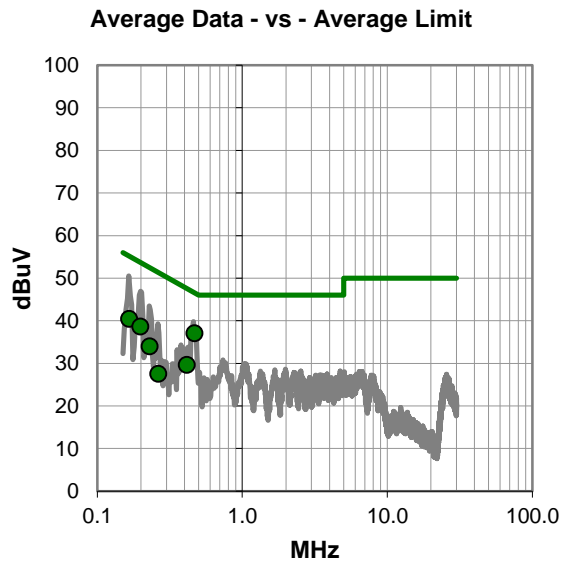
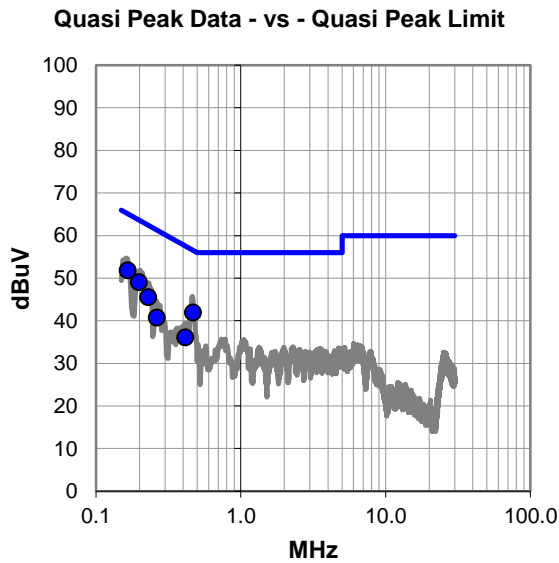
802.11b

## EUT OPERATING MODES

Tx Mid Ch. 2437 MHz at 1 Mbps modulation, 20 MHz BW

## DEVIATIONS FROM TEST STANDARD

None



# POWERLINE CONDUCTED EMISSIONS



## RESULTS - Run #6

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.165	51.6	0.3	51.9	65.2	-13.3
0.198	48.8	0.3	49.1	63.7	-14.6
0.468	41.8	0.2	42.0	56.6	-14.6
0.229	45.3	0.3	45.6	62.5	-16.9
0.263	40.6	0.2	40.8	61.3	-20.5
0.413	35.9	0.2	36.1	57.6	-21.5

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.468	36.9	0.2	37.1	46.6	-9.5
0.165	40.2	0.3	40.5	55.2	-14.7
0.198	38.4	0.3	38.7	53.7	-15.0
0.413	29.5	0.2	29.7	47.6	-17.9
0.229	33.7	0.3	34.0	52.5	-18.5
0.263	27.4	0.2	27.6	51.3	-23.7

## CONCLUSION

Pass

Tested By

# DUTY CYCLE



XMit 2017.12.13

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

## TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	E4422B	TGQ	15-Mar-18	15-Mar-21
Block - DC	Fairview Microwave	SD3379	AMI	12-Sep-17	12-Sep-18
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-18	13-Feb-19
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	15-Mar-18	15-Mar-19
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	27-Apr-18	27-Apr-19

## TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The Duty Cycle (x) of the single channel operation of the radio as controlled by the provided test software was measured for each of the EUT operating modes.

There is no compliance requirement to be met by this test, so therefore no Pass / Fail criteria.

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

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

If the transmit duty cycle < 98 percent, burst gating may have been used during some of the other tests in this report to only take the measurement during the burst duration.



# DUTY CYCLE



TbTx 2017.12.14 XMM 2017.12.13

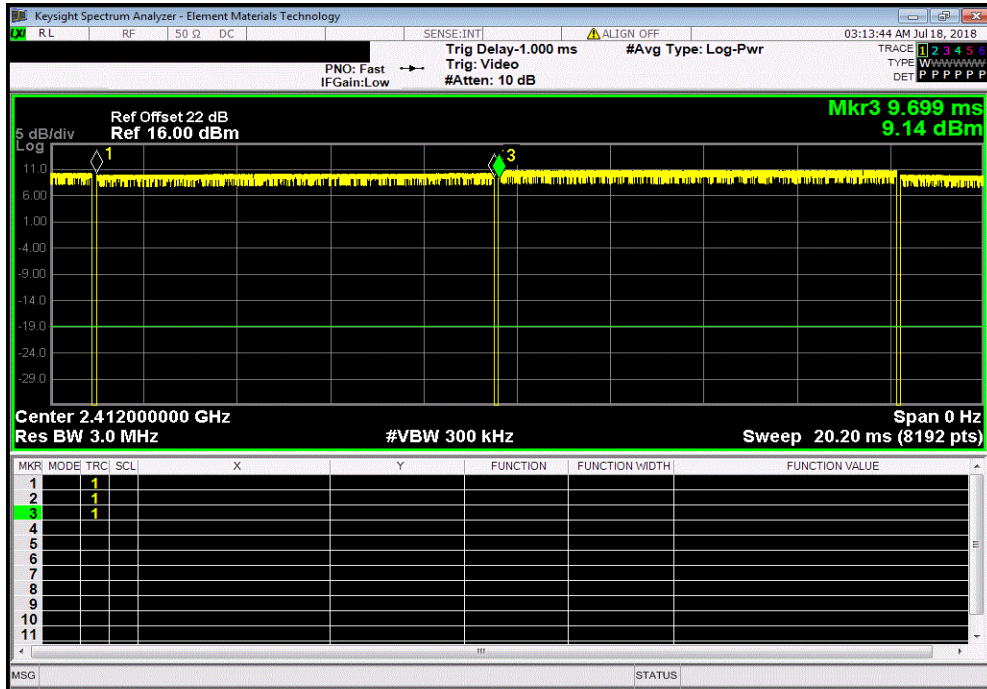
EUT: MyCareLink Relay Home Communicator 24960		Work Order: MDTR0649					
Serial Number: MEA9984DEM		Date: 17-Jul-18					
Customer: Medtronic, Inc.		Temperature: 21.2 °C					
Attendees: Taylor Dowden		Humidity: 47.9% RH					
Project: None		Barometric Pres.: 1024 mbar					
Tested by: Kyle McMullan		Power: 110VAC/60Hz					
		Job Site: MN08					
TEST SPECIFICATIONS							
FCC 15.247:2018		ANSI C63.10:2013					
TEST METHOD							
COMMENTS							
None							
DEVIATIONS FROM TEST STANDARD							
None							
Configuration #	3	Signature <i>Kyle McMullan</i>					
		Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
2400 MHz - 2483.5 MHz Band							
802.11(b) 1 Mbps							
	Low Channel 1, 2412 MHz	8.598 ms	8.702 ms	1	98.8	N/A	N/A
	Low Channel 1, 2412 MHz	N/A	N/A	5	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	8.599 ms	8.702 ms	1	98.8	N/A	N/A
	Mid Channel 6, 2437 MHz	N/A	N/A	5	N/A	N/A	N/A
	High Channel 11, 2462 MHz	8.6 ms	8.702 ms	1	98.8	N/A	N/A
	High Channel 11, 2462 MHz	N/A	N/A	5	N/A	N/A	N/A
802.11(b) 11 Mbps							
	Low Channel 1, 2412 MHz	862.2 us	959.4 us	1	89.9	N/A	N/A
	Low Channel 1, 2412 MHz	N/A	N/A	5	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	862.6 us	959.1 us	1	89.9	N/A	N/A
	Mid Channel 6, 2437 MHz	N/A	N/A	5	N/A	N/A	N/A
	High Channel 11, 2462 MHz	862.9 us	959.1 us	1	90	N/A	N/A
	High Channel 11, 2462 MHz	N/A	N/A	6	N/A	N/A	N/A
802.11(g) 6 Mbps							
	Low Channel 1, 2412 MHz	1.428 ms	1.53 ms	1	93.3	N/A	N/A
	Low Channel 1, 2412 MHz	N/A	N/A	6	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	1.428 ms	1.53 ms	1	93.3	N/A	N/A
	Mid Channel 6, 2437 MHz	N/A	N/A	6	N/A	N/A	N/A
	High Channel 11, 2462 MHz	1.428 ms	1.53 ms	1	93.3	N/A	N/A
	High Channel 11, 2462 MHz	N/A	N/A	5	N/A	N/A	N/A
802.11(g) 36 Mbps							
	Low Channel 1, 2412 MHz	255.7 us	356.8 us	1	71.7	N/A	N/A
	Low Channel 1, 2412 MHz	N/A	N/A	5	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	255.5 us	356.8 us	1	71.6	N/A	N/A
	Mid Channel 6, 2437 MHz	N/A	N/A	5	N/A	N/A	N/A
	High Channel 11, 2462 MHz	255.4 us	356.8 us	1	71.6	N/A	N/A
	High Channel 11, 2462 MHz	N/A	N/A	5	N/A	N/A	N/A
802.11(g) 54 Mbps							
	Low Channel 1, 2412 MHz	179.4 us	281.3 us	1	63.8	N/A	N/A
	Low Channel 1, 2412 MHz	N/A	N/A	5	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	179.5 us	281.3 us	1	63.8	N/A	N/A
	Mid Channel 6, 2437 MHz	N/A	N/A	5	N/A	N/A	N/A
	High Channel 11, 2462 MHz	179.5 us	281.3 us	1	63.8	N/A	N/A
	High Channel 11, 2462 MHz	N/A	N/A	5	N/A	N/A	N/A
802.11(n) MCS0							
	Low Channel 1, 2412 MHz	1.331 ms	1.435 ms	1	92.8	N/A	N/A
	Low Channel 1, 2412 MHz	N/A	N/A	5	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	1.336 ms	1.438 ms	1	92.9	N/A	N/A
	Mid Channel 6, 2437 MHz	N/A	N/A	5	N/A	N/A	N/A
	High Channel 11, 2462 MHz	1.336 ms	1.438 ms	1	92.9	N/A	N/A
	High Channel 11, 2462 MHz	N/A	N/A	5	N/A	N/A	N/A
802.11(n) MCS7							
	Low Channel 1, 2412 MHz	167.5 us	269.4 us	1	62.2	N/A	N/A
	Low Channel 1, 2412 MHz	N/A	N/A	5	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	167.5 us	269.6 us	1	62.1	N/A	N/A
	Mid Channel 6, 2437 MHz	N/A	N/A	5	N/A	N/A	N/A
	High Channel 11, 2462 MHz	167.5 us	269.3 us	1	62.2	N/A	N/A
	High Channel 11, 2462 MHz	N/A	N/A	5	N/A	N/A	N/A

# DUTY CYCLE

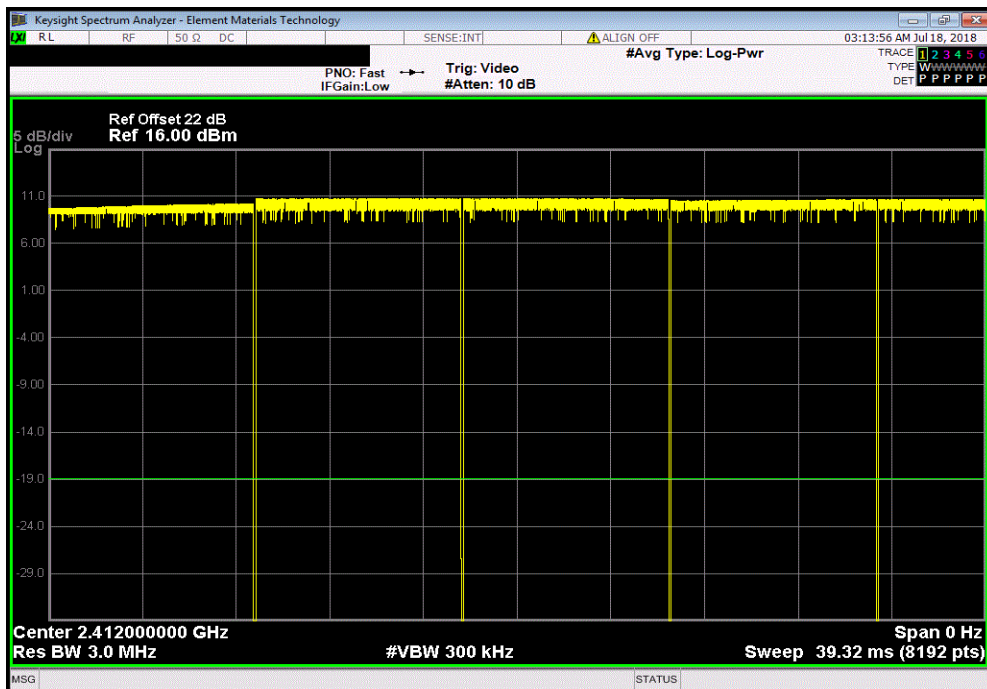


TMTX 2017.12.14 XMI 2017.12.13

2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
8.598 ms	8.702 ms	1	98.8	N/A	N/A	



2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	

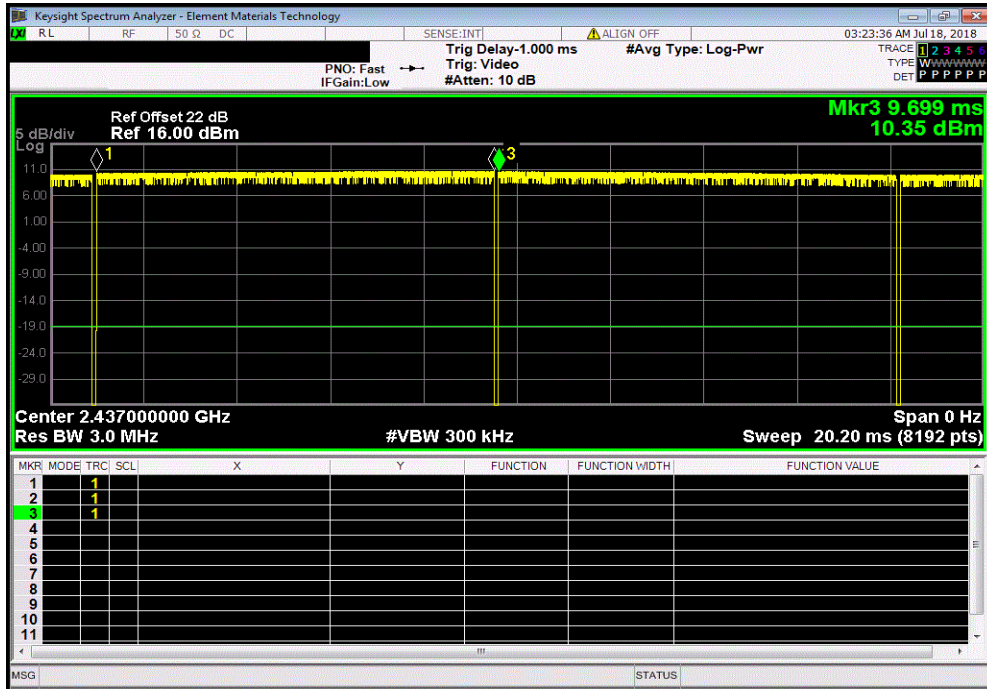


# DUTY CYCLE

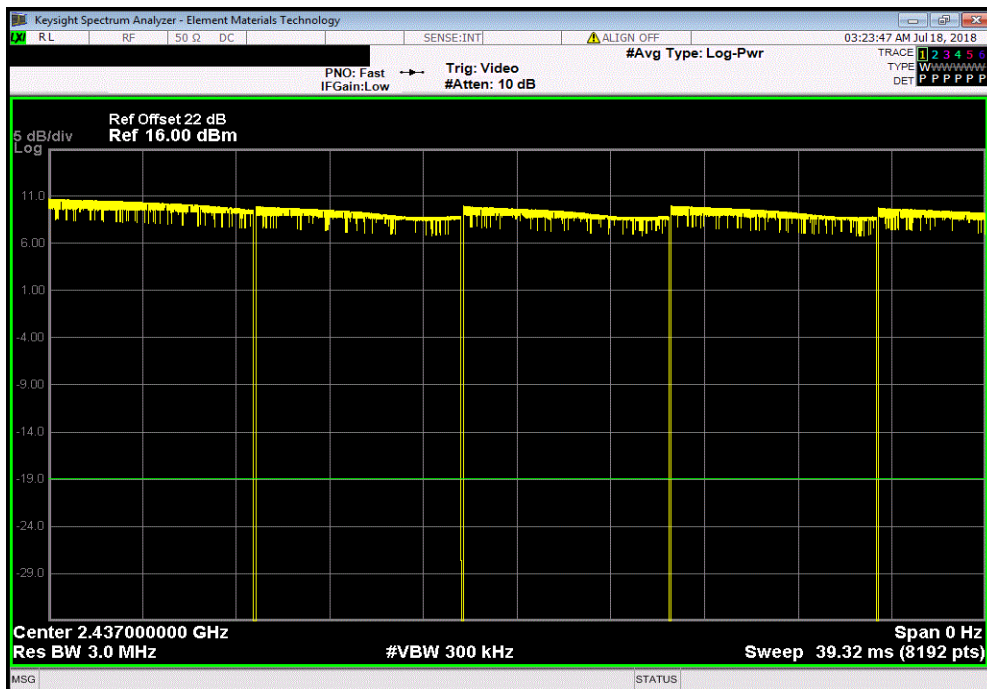


TMTX 2017.12.14 XMI 2017.12.13

2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
8.599 ms	8.702 ms	1	98.8	N/A	N/A	



2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	

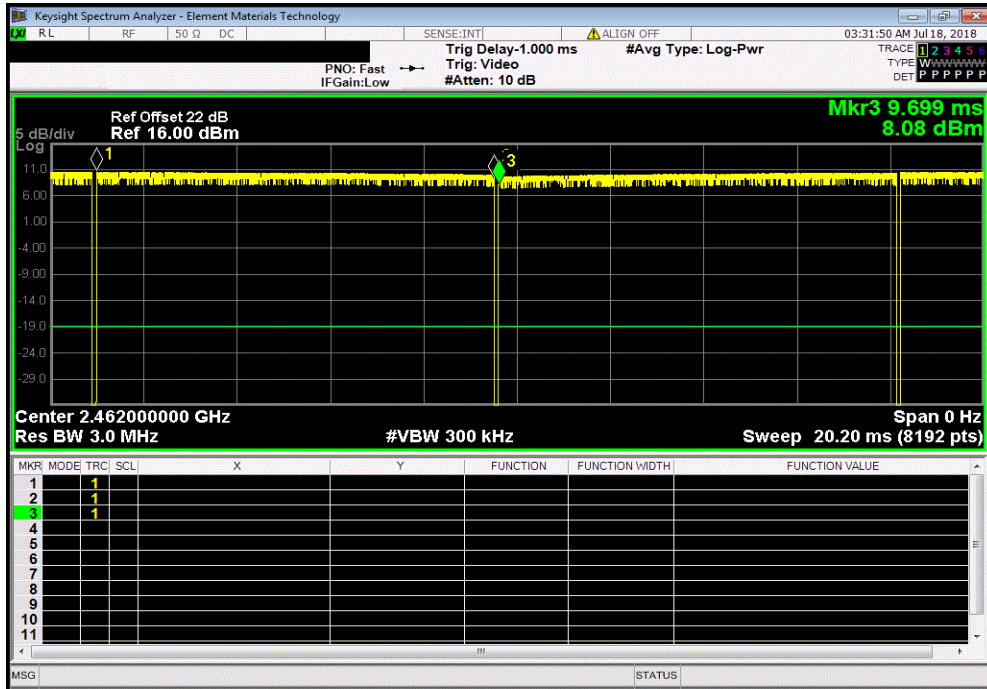


# DUTY CYCLE

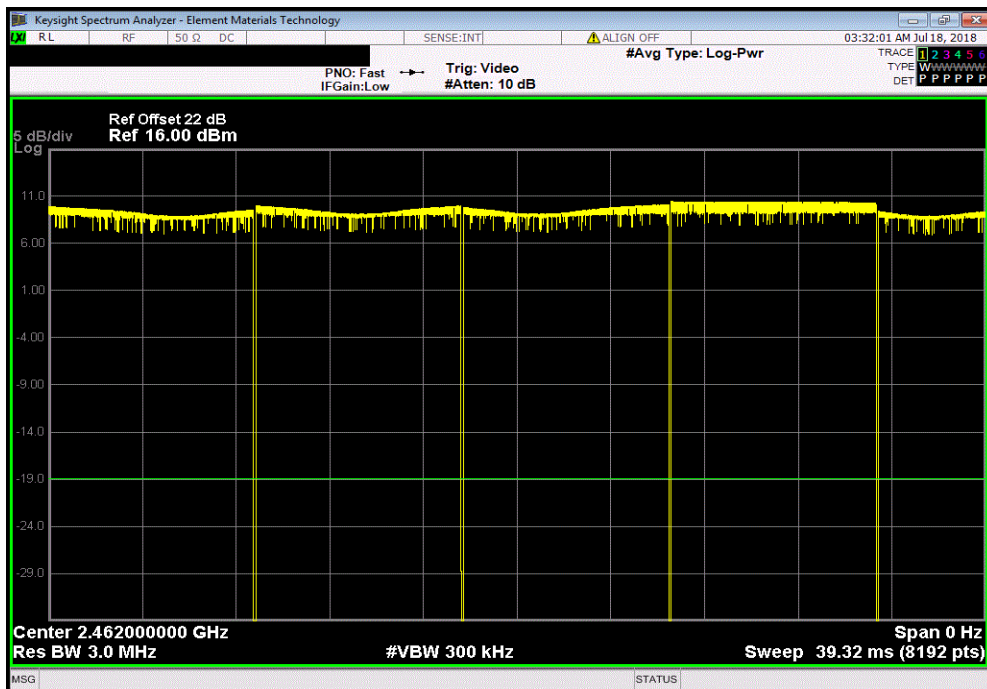


TMTX 2017.12.14 XMI 2017.12.13

2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
8.6 ms	8.702 ms	1	98.8	N/A	N/A	



2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	

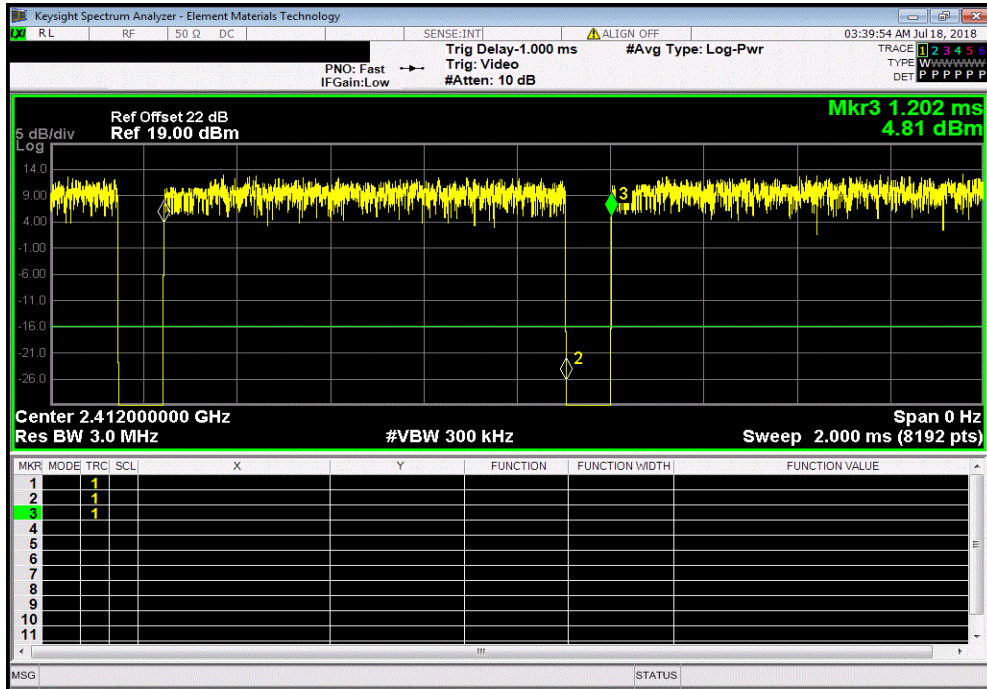


# DUTY CYCLE

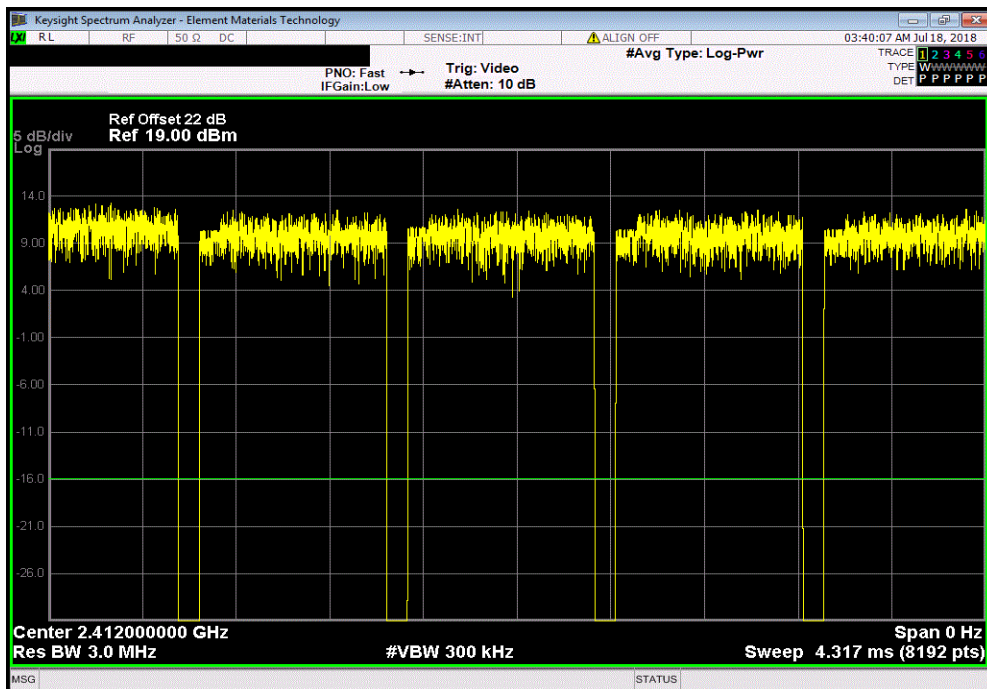


TMTx 2017.12.14 XMI 2017.12.13

2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
862.2 us	959.4 us	1	89.9	N/A	N/A	



2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	



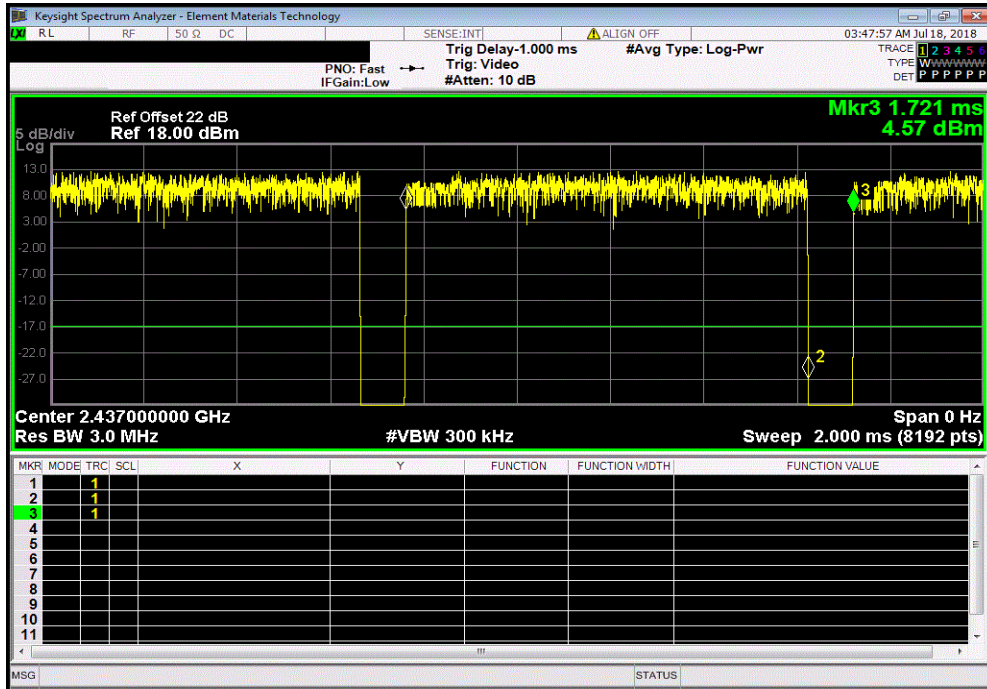


# DUTY CYCLE



TMTX 2017.12.14 XMI 2017.12.13

2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
862.6 us	959.1 us	1	89.9	N/A	N/A	



2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	

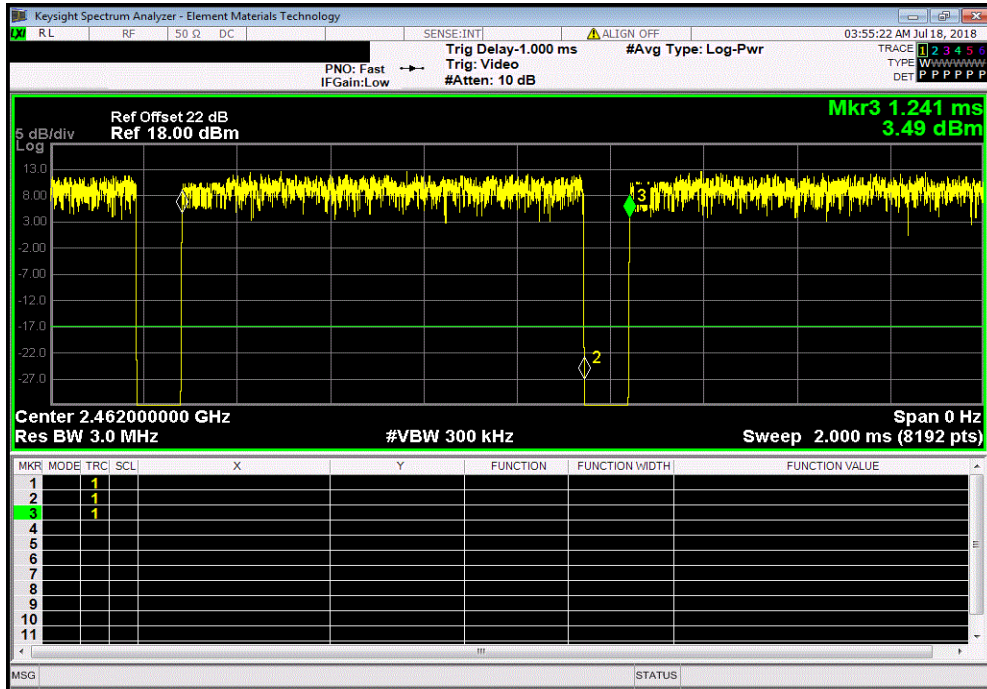


# DUTY CYCLE

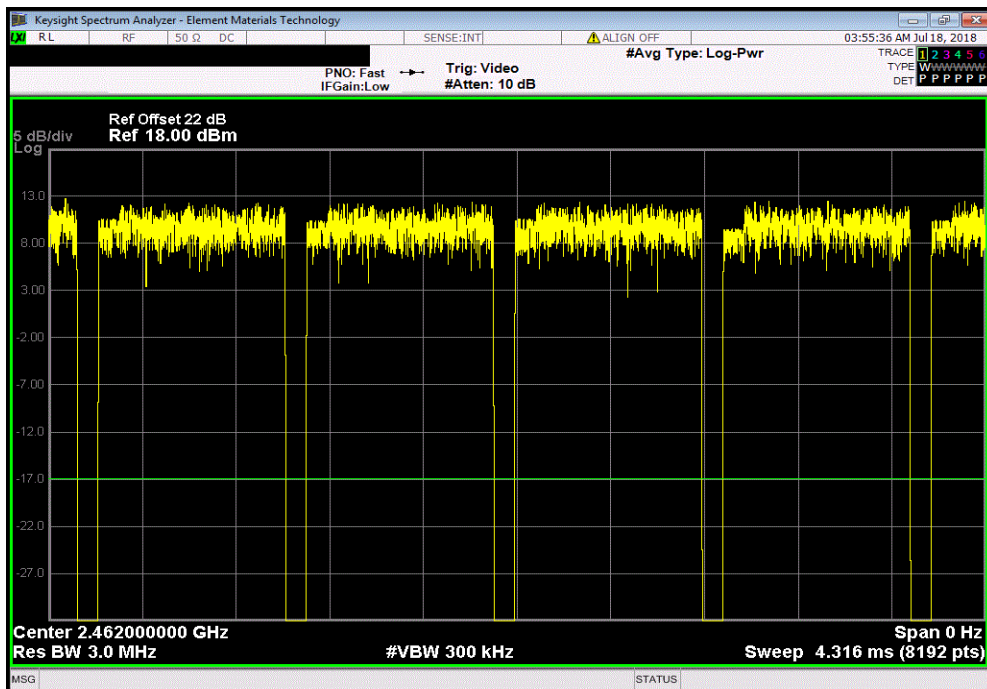


TMTx 2017.12.14 XMI 2017.12.13

2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
862.9 us	959.1 us	1	90	N/A	N/A	



2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	6	N/A	N/A	N/A	



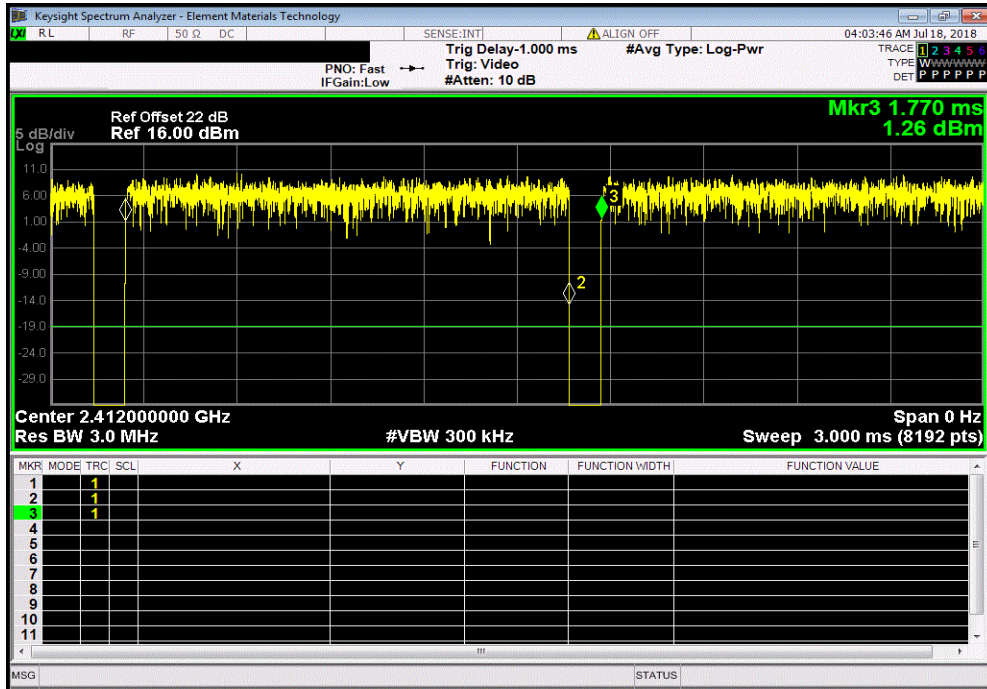


# DUTY CYCLE

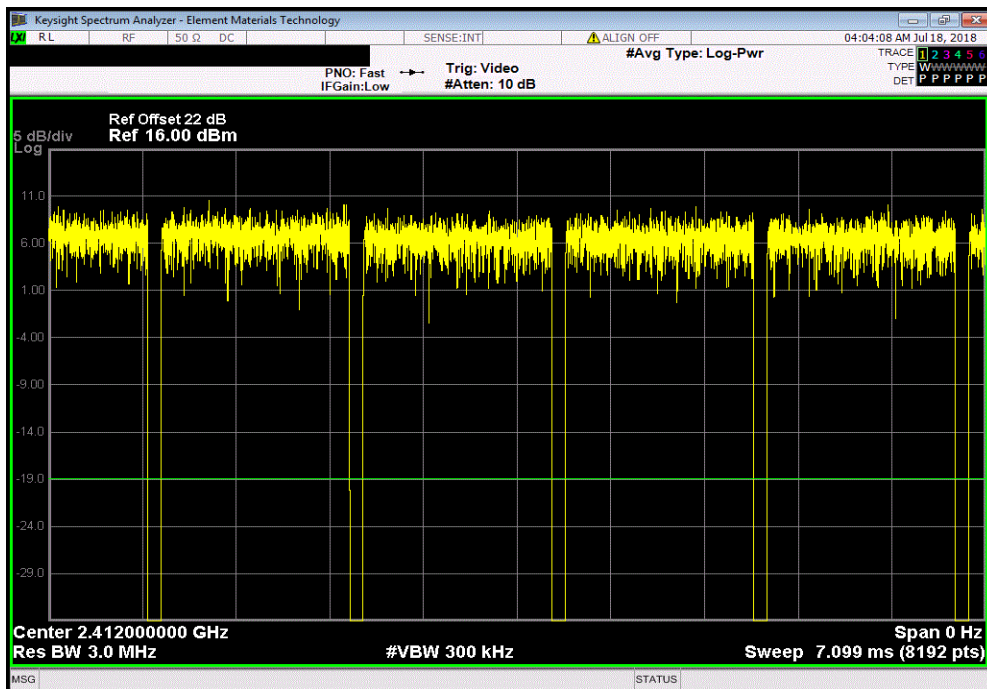


TMTx 2017.12.14 XMI 2017.12.13

2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
1.428 ms	1.53 ms	1	93.3	N/A	N/A	



2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	6	N/A	N/A	N/A	

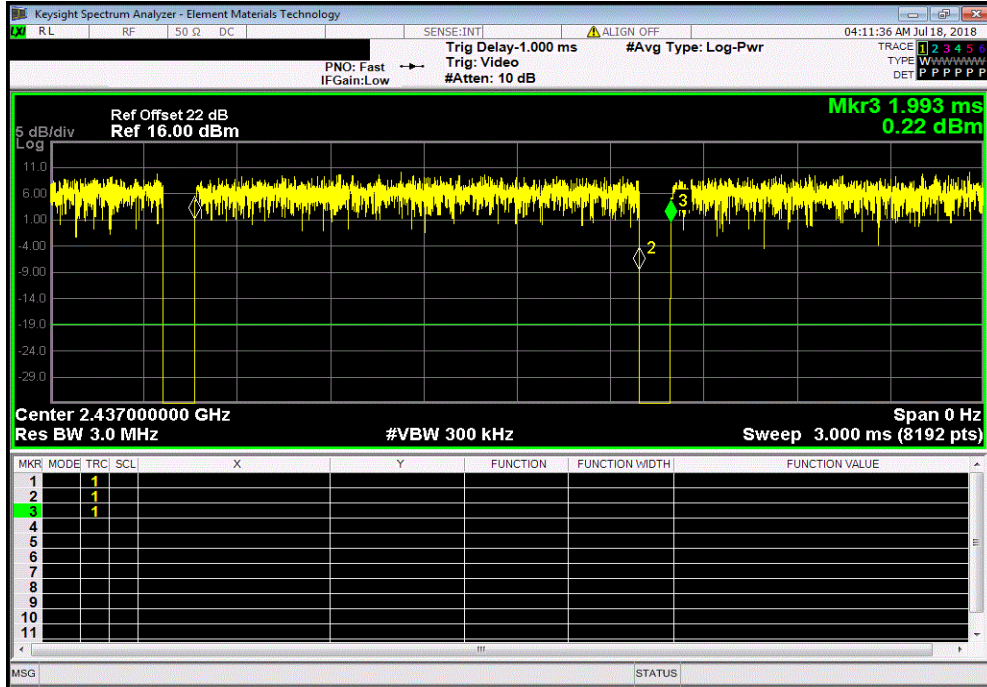


# DUTY CYCLE



TMTX 2017.12.14 XMI 2017.12.13

2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
1.428 ms	1.53 ms	1	93.3	N/A	N/A	



2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	6	N/A	N/A	N/A	

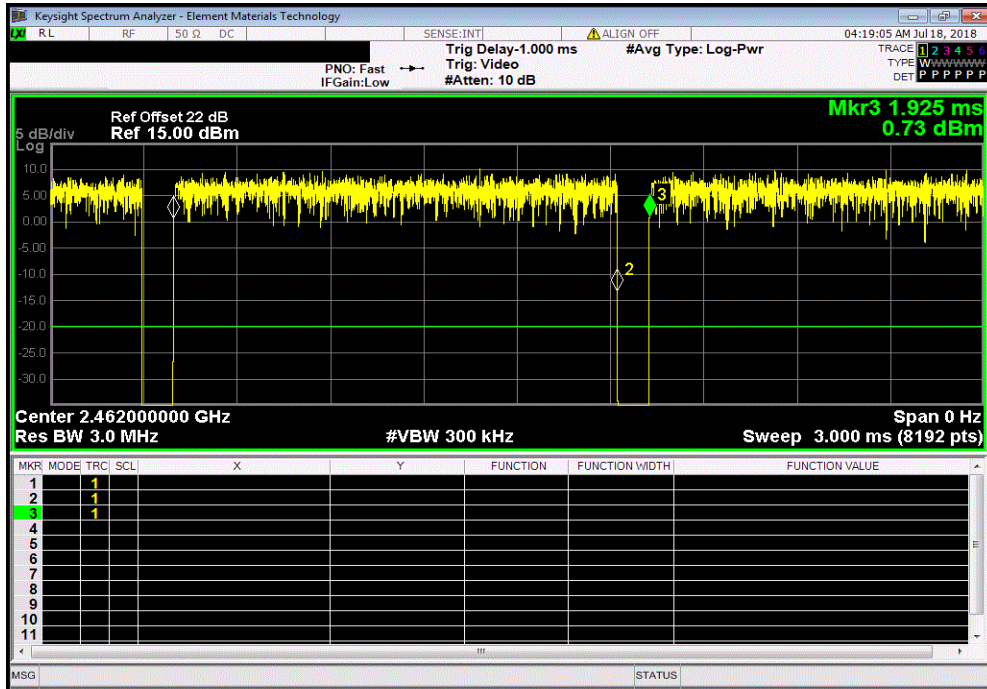


# DUTY CYCLE



TMTX 2017.12.14 XMI 2017.12.13

2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
1.428 ms	1.53 ms	1	93.3	N/A	N/A	



2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	

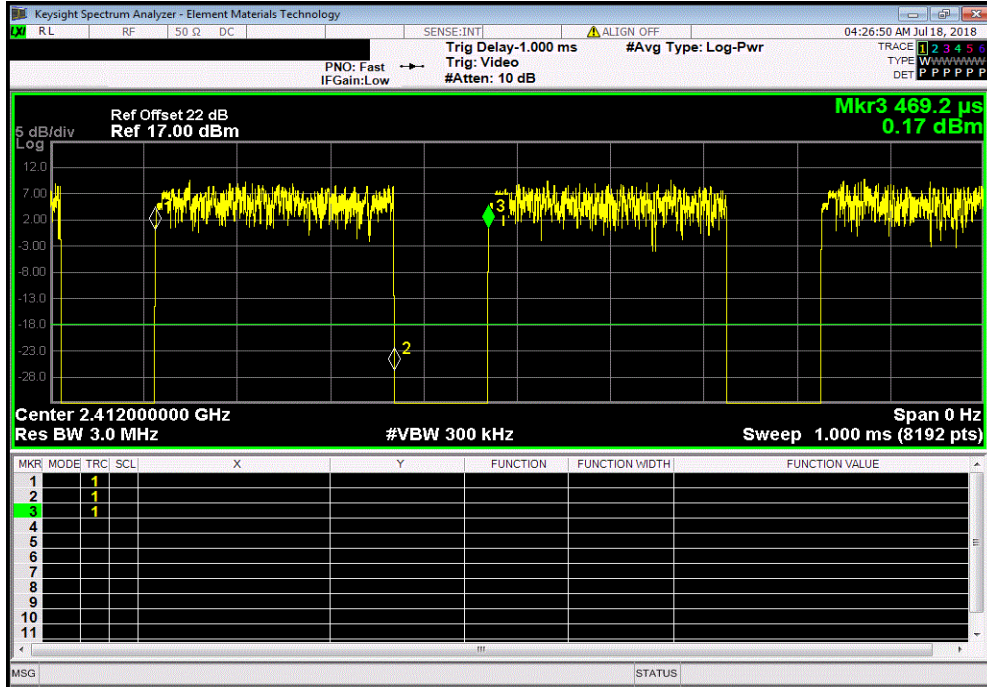


# DUTY CYCLE

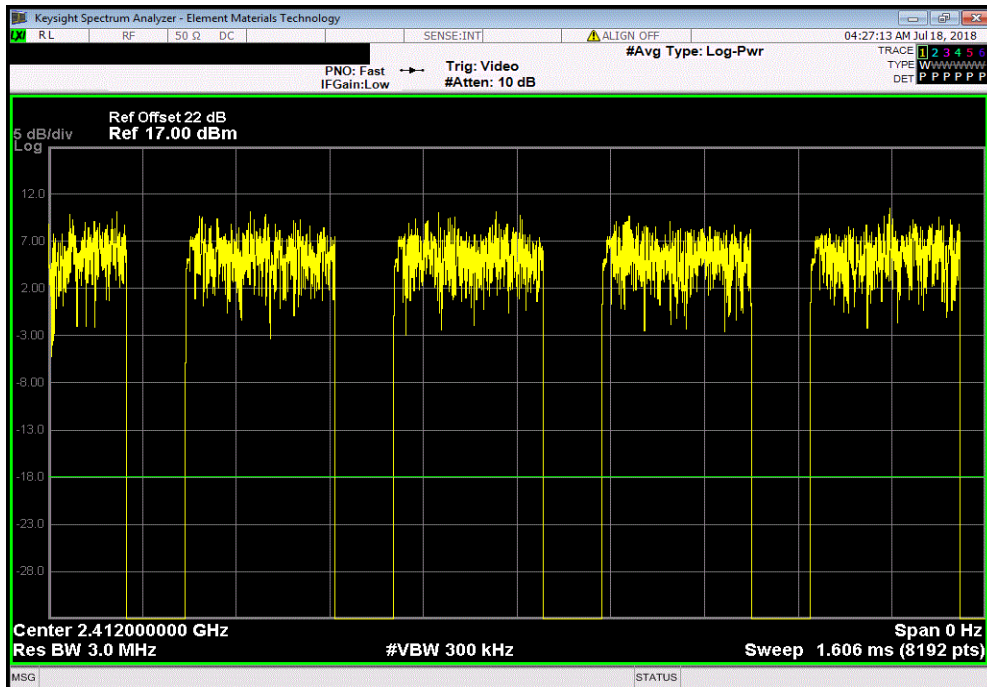


TMTx 2017.12.14 XMI 2017.12.13

2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
255.7 us	356.8 us	1	71.7	N/A	N/A	



2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	

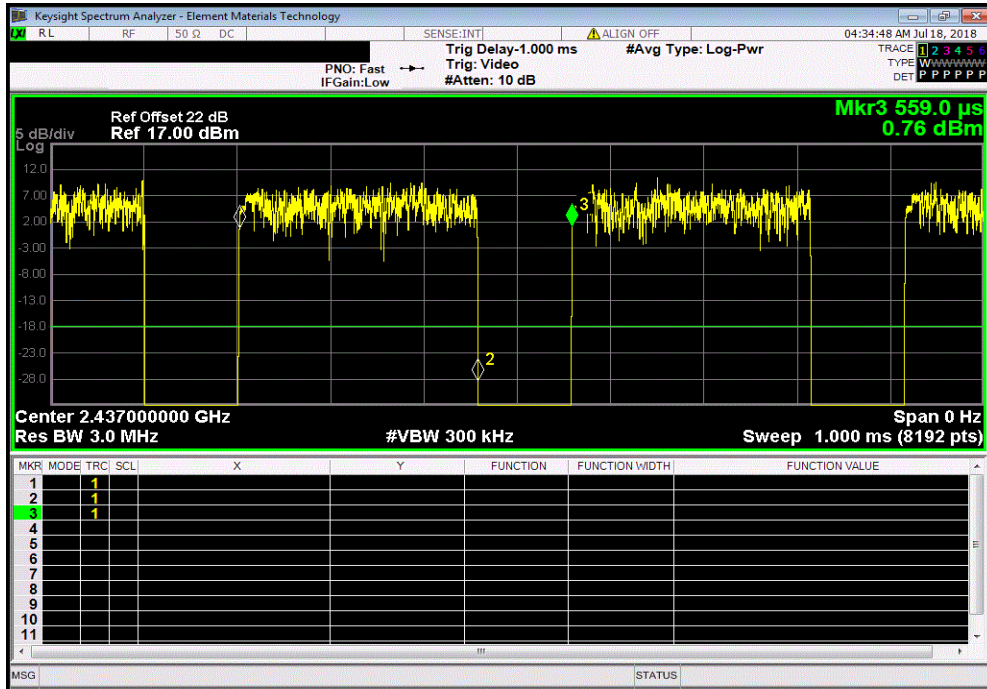


# DUTY CYCLE

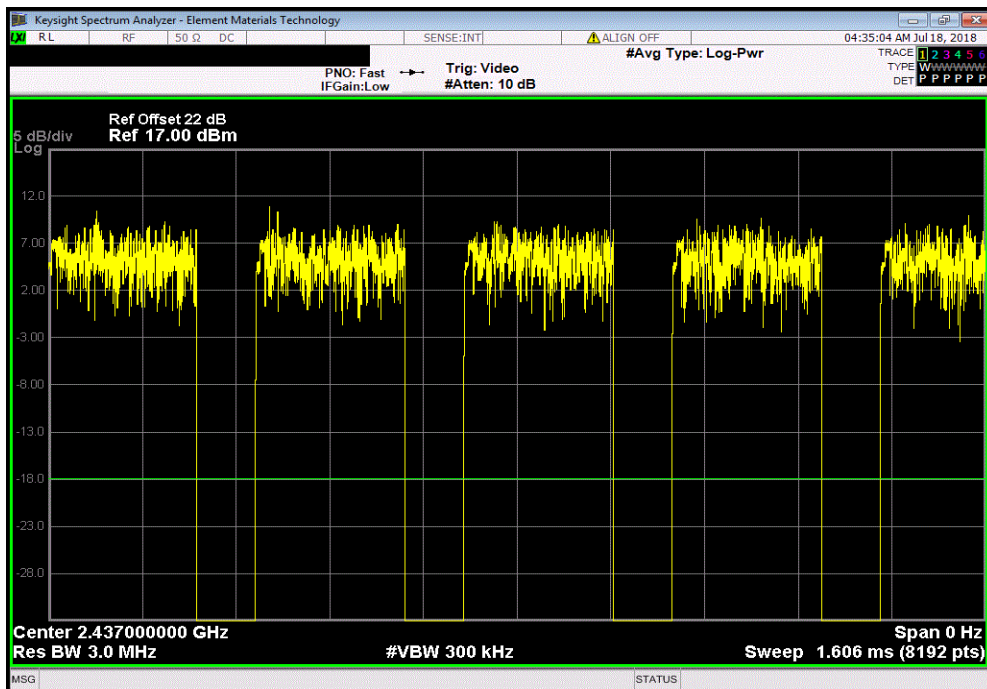


TMTX 2017.12.14 XMI 2017.12.13

2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
255.5 us	356.8 us	1	71.6	N/A	N/A	



2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	



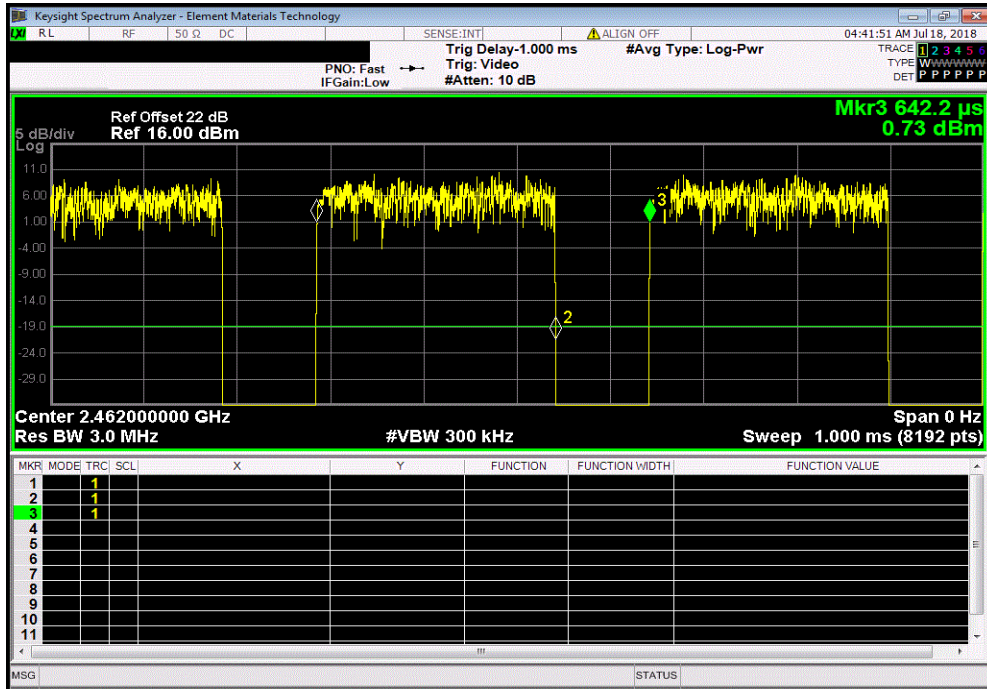


# DUTY CYCLE

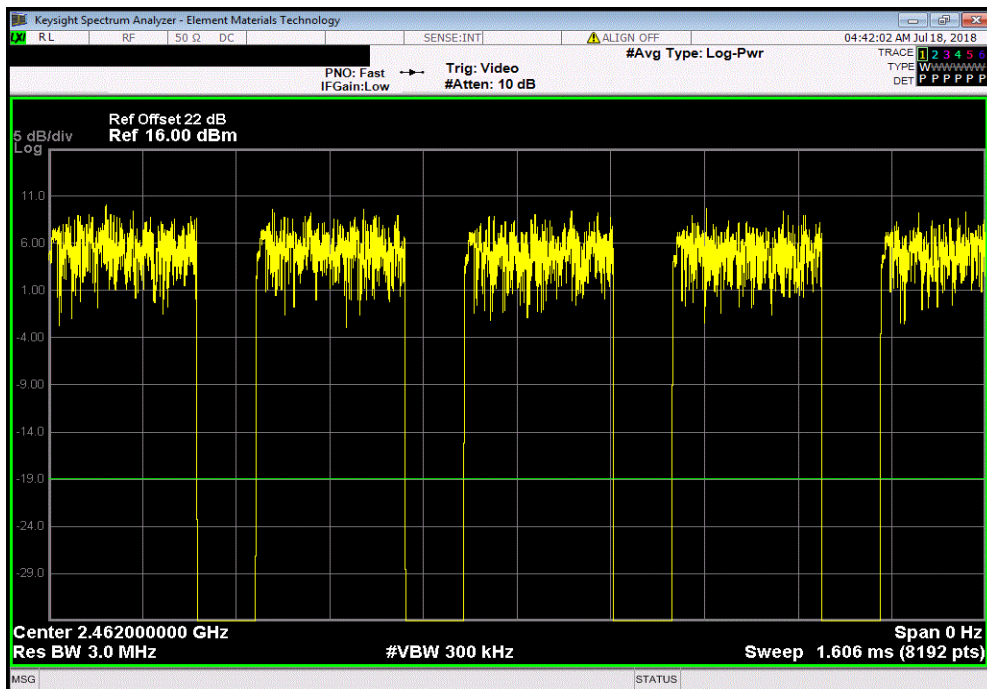


TMTx 2017.12.14 XMI 2017.12.13

2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
255.4 us	356.8 us	1	71.6	N/A	N/A	



2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	

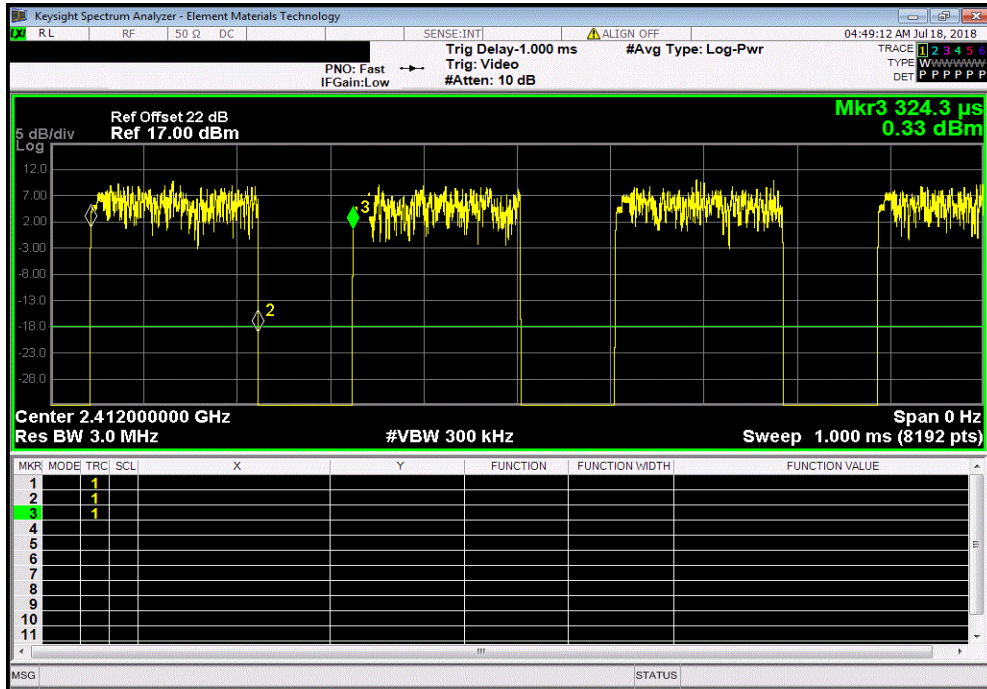


# DUTY CYCLE

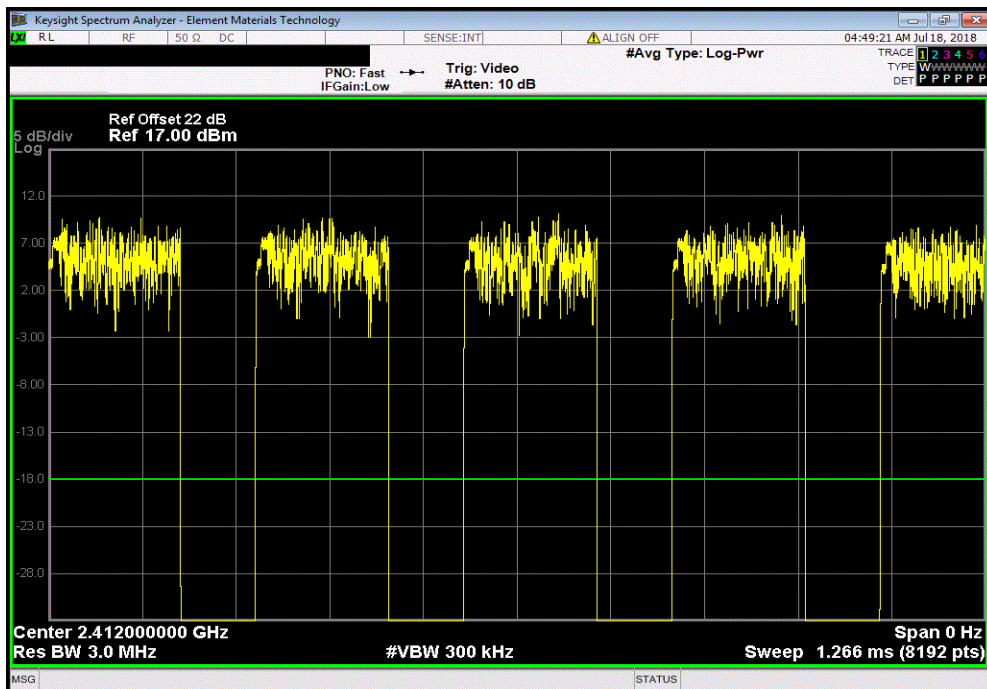


TMTx 2017.12.14 XMI 2017.12.13

2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
179.4 us	281.3 us	1	63.8	N/A	N/A	



2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	



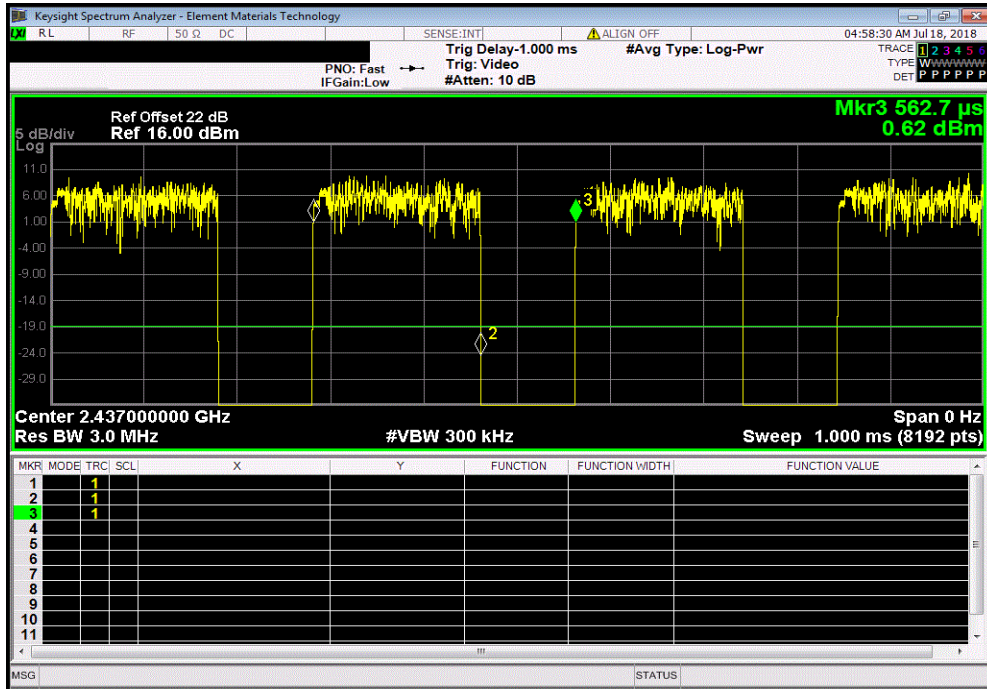


# DUTY CYCLE

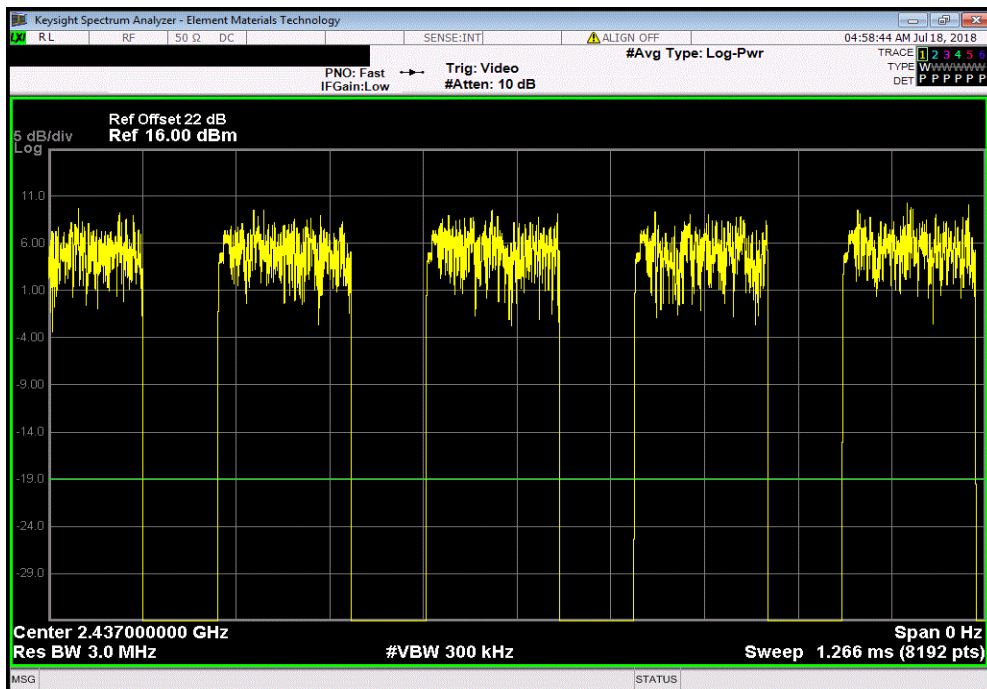


TMTX 2017.12.14 XMI 2017.12.13

2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
179.5 us	281.3 us	1	63.8	N/A	N/A	



2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	

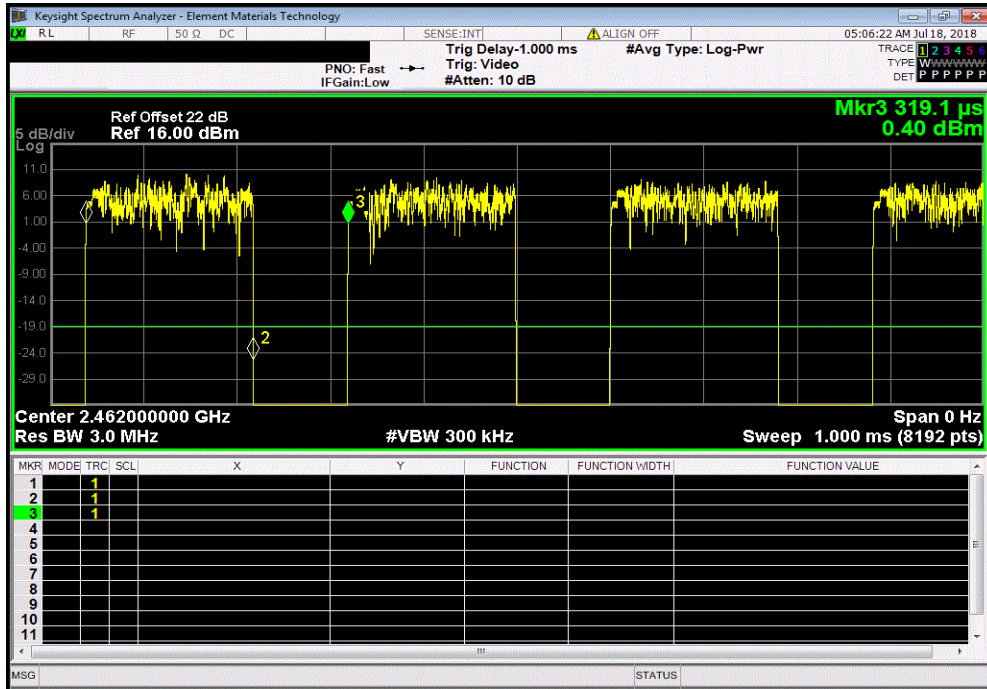


# DUTY CYCLE

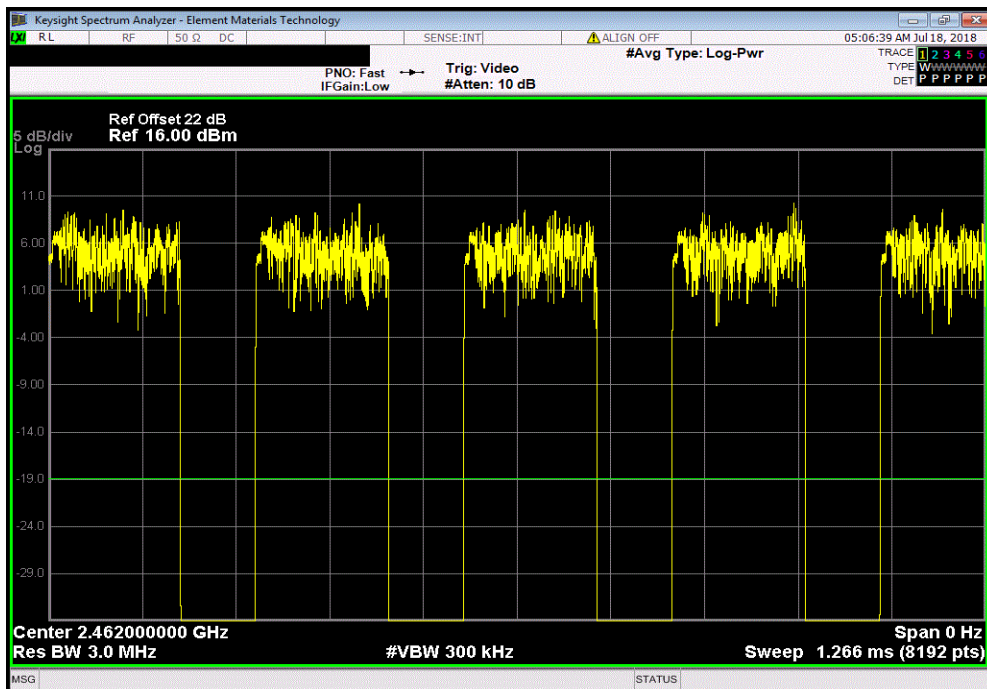


TMTx 2017.12.14 XMI 2017.12.13

2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
179.5 us	281.3 us	1	63.8	N/A	N/A	



2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	

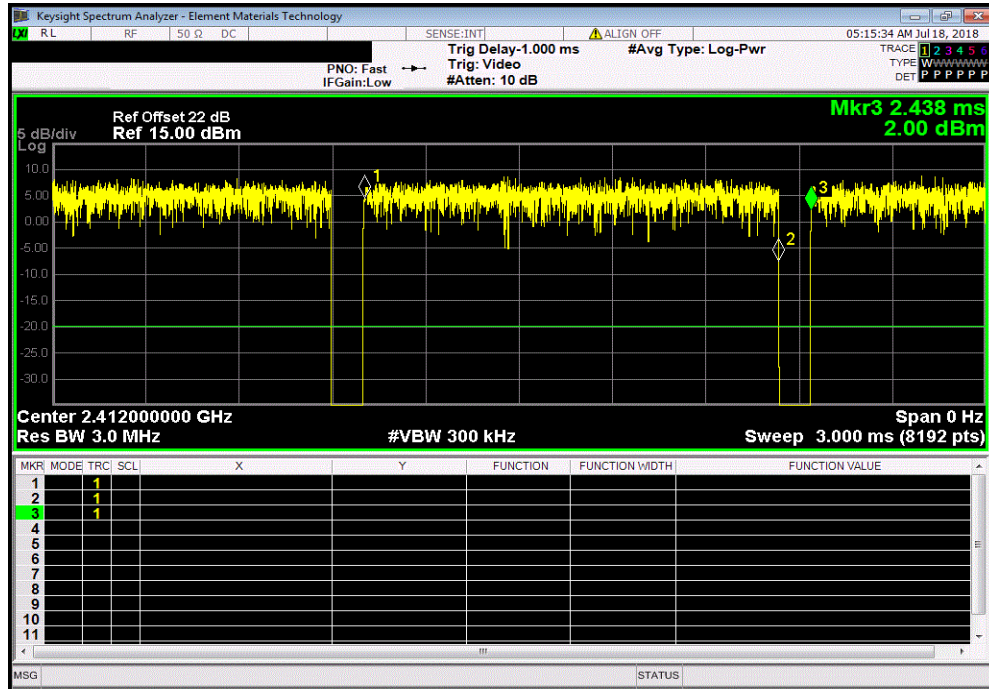


# DUTY CYCLE

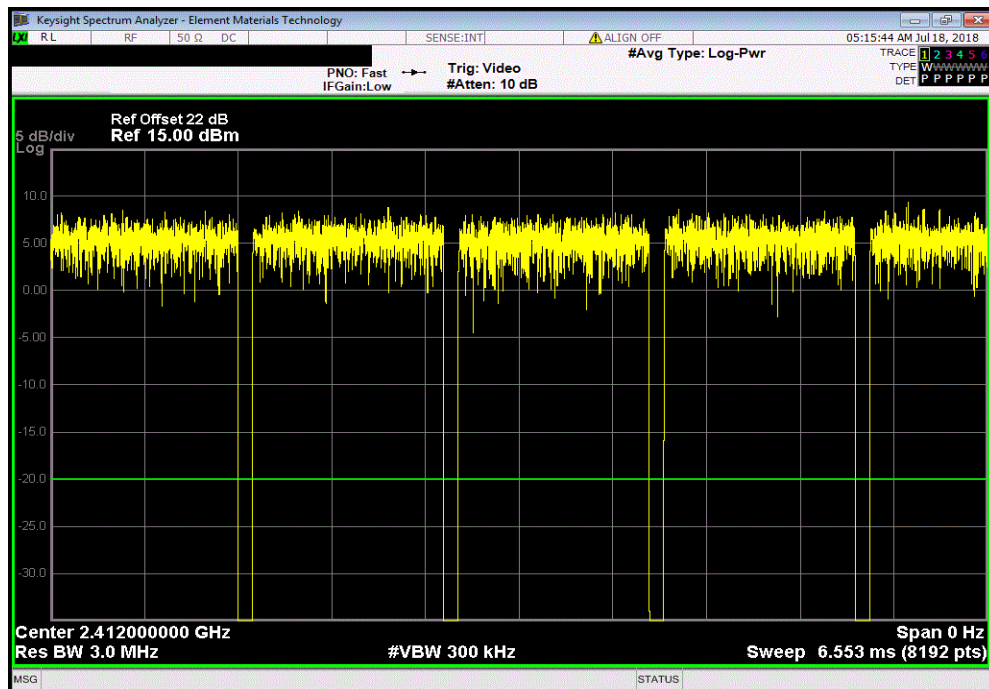


TMTx 2017.12.14 XMI 2017.12.13

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
1.331 ms	1.435 ms	1	92.8	N/A	N/A	



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	

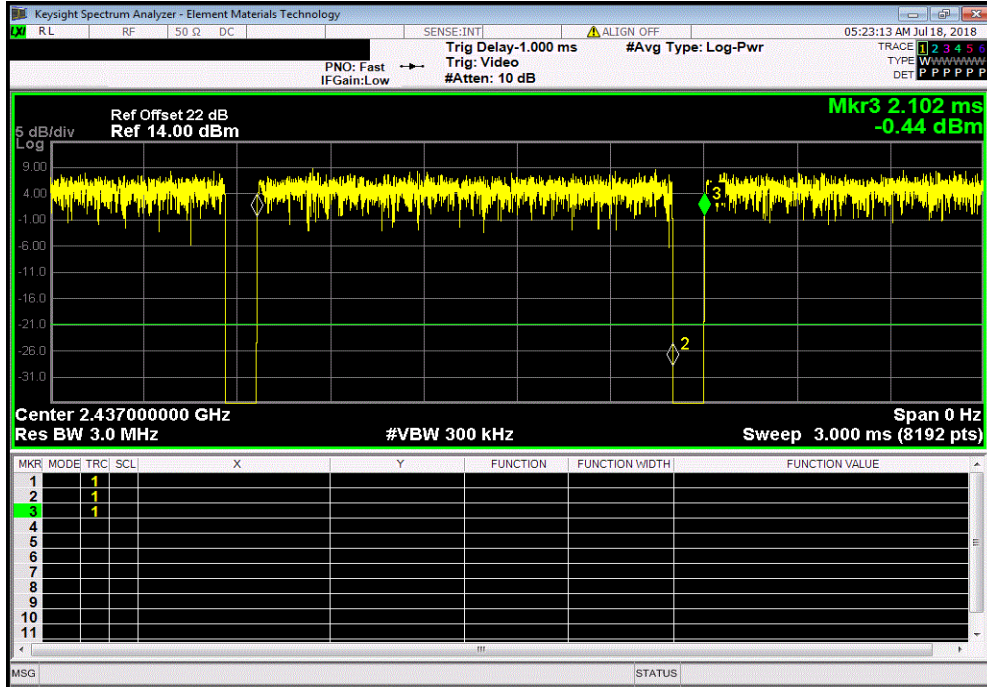


# DUTY CYCLE

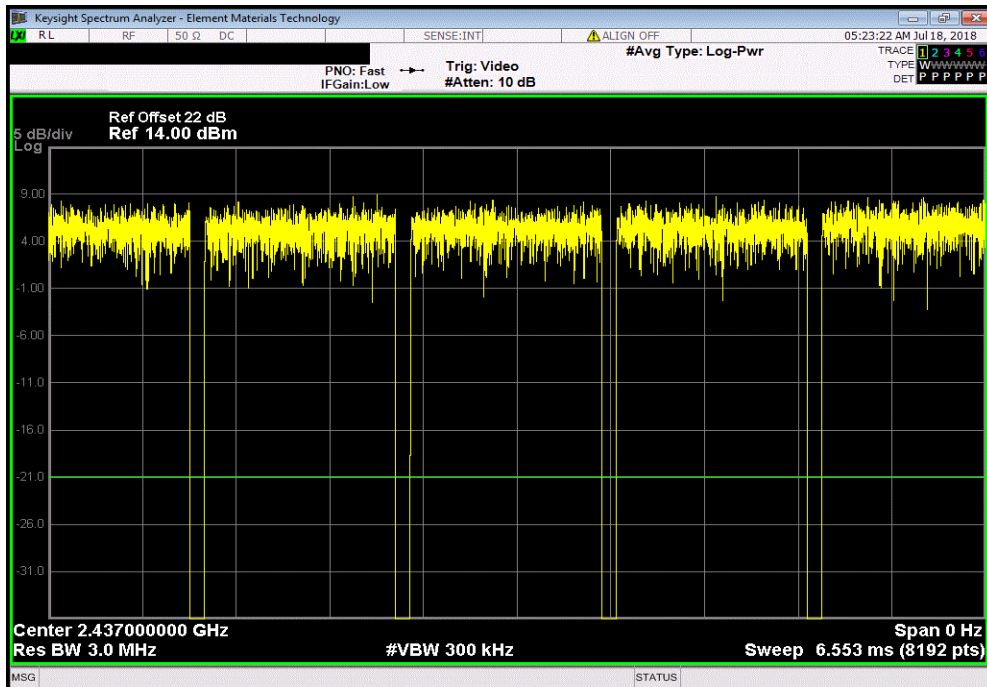


TMTx 2017.12.14 XMI 2017.12.13

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
1.336 ms	1.438 ms	1	92.9	N/A	N/A	



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	

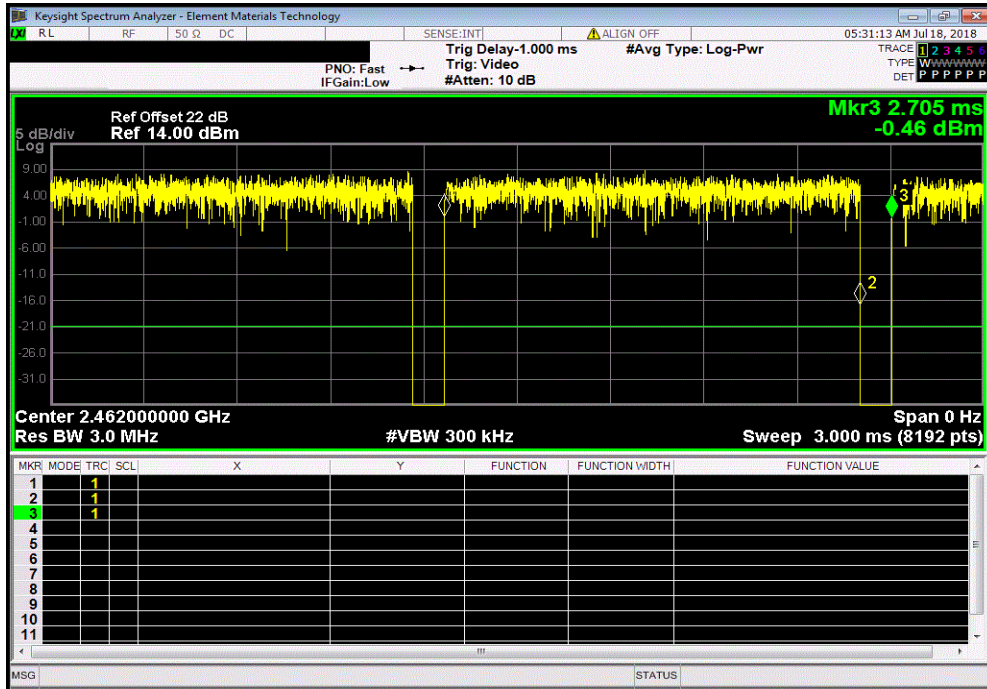


# DUTY CYCLE

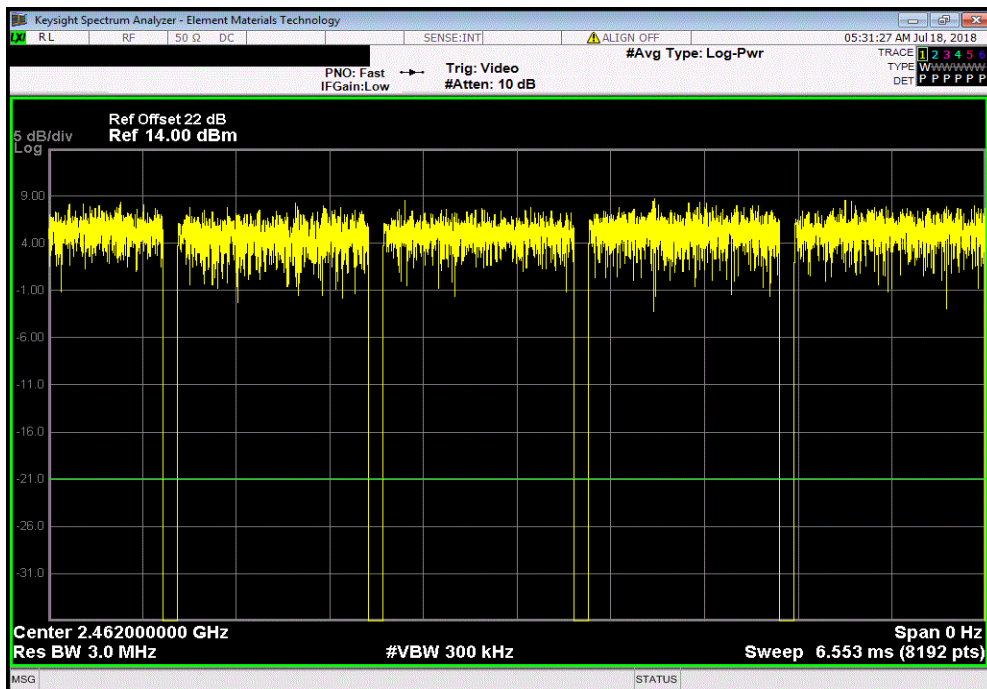


TMTx 2017.12.14 XMI 2017.12.13

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
1.336 ms	1.438 ms	1	92.9	N/A	N/A	



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	



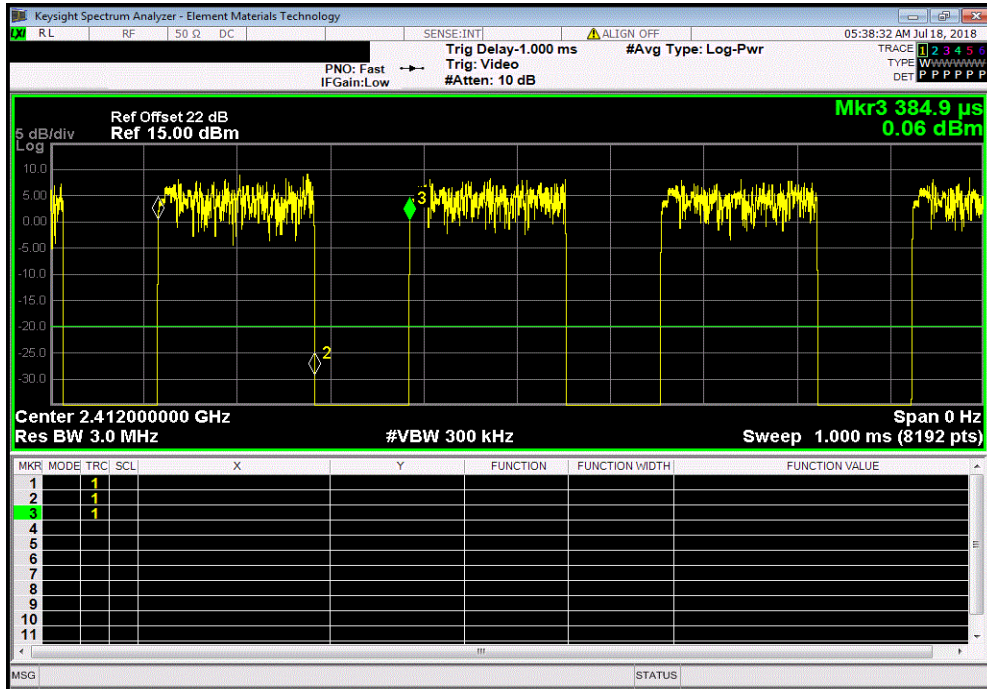


# DUTY CYCLE

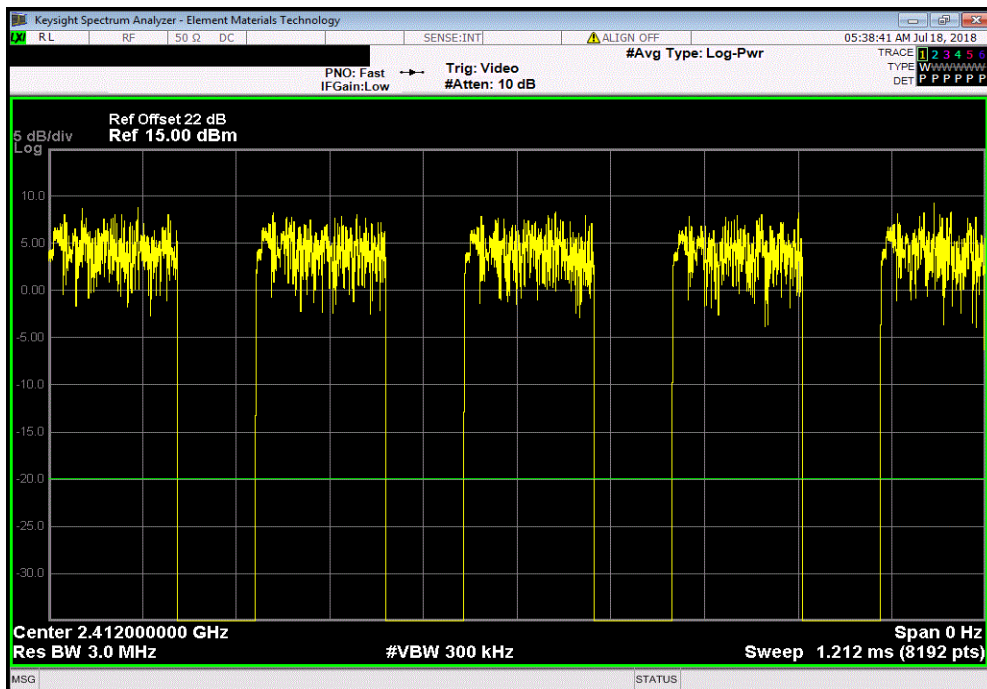


TMTX 2017.12.14 XMI 2017.12.13

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
167.5 us	269.4 us	1	62.2	N/A	N/A	



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	

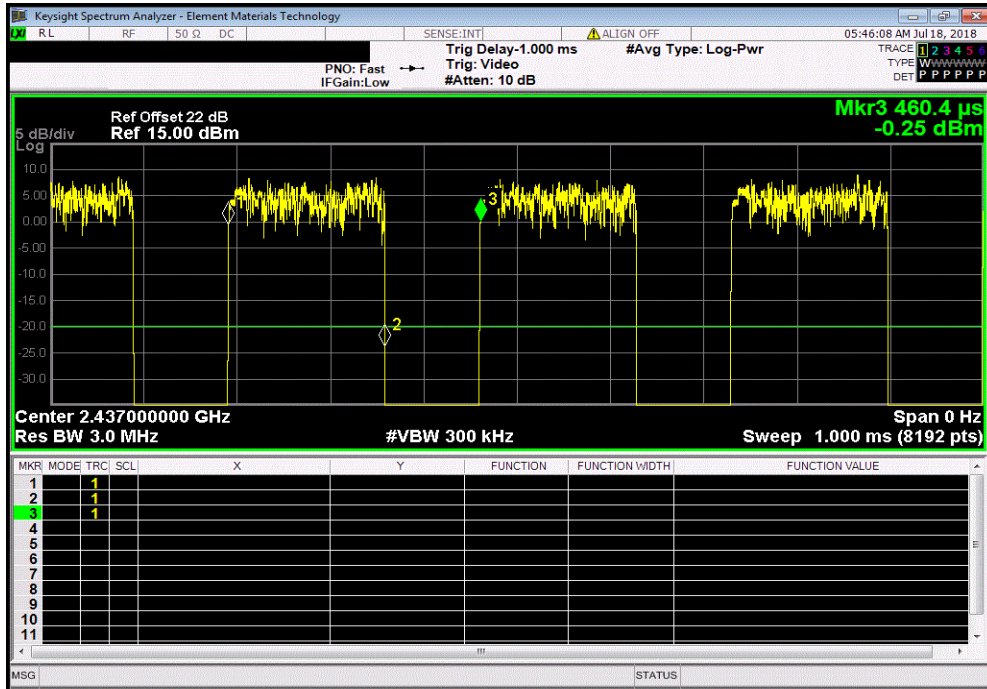


# DUTY CYCLE

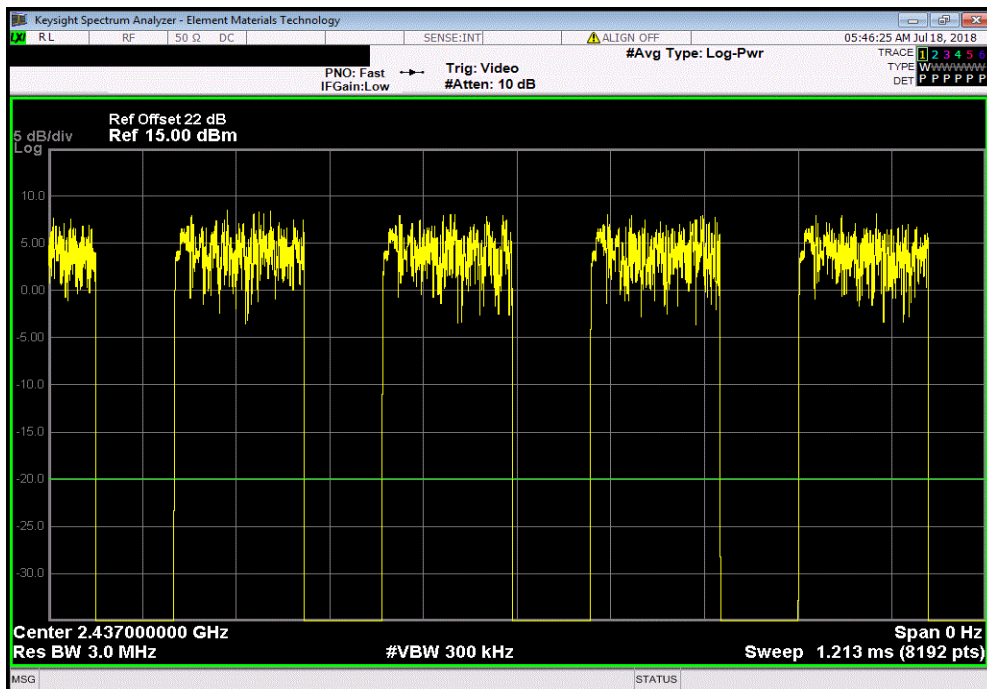


TMTx 2017.12.14 XMI 2017.12.13

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
167.5 us	269.6 us	1	62.1	N/A	N/A	



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	



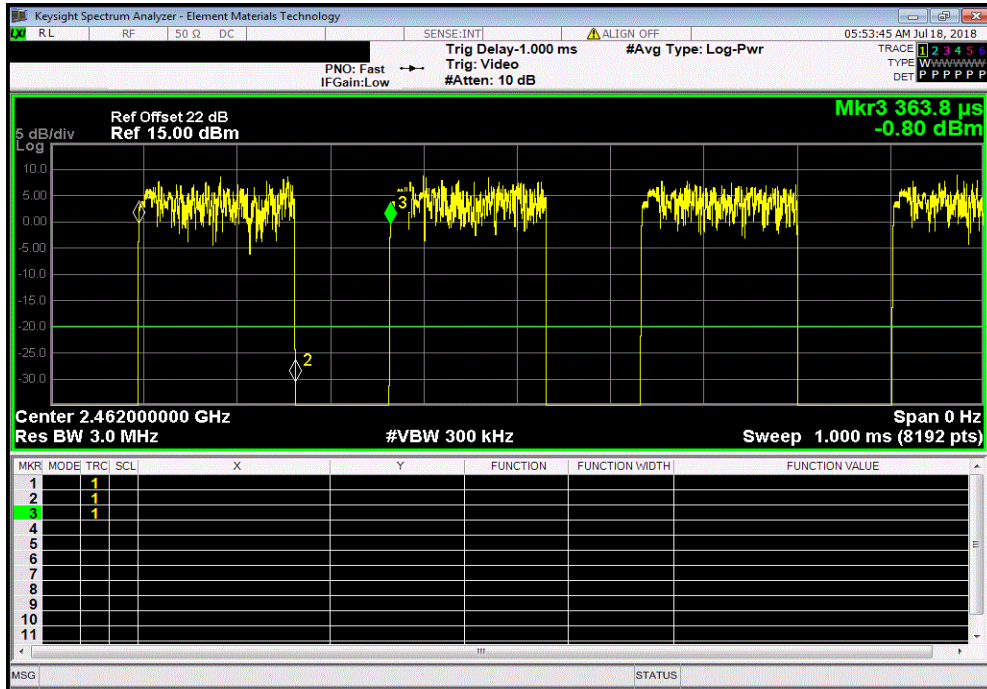


# DUTY CYCLE



TMTX 2017.12.14 XMI 2017.12.13

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
167.5 us	269.3 us	1	62.2	N/A	N/A	



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	

