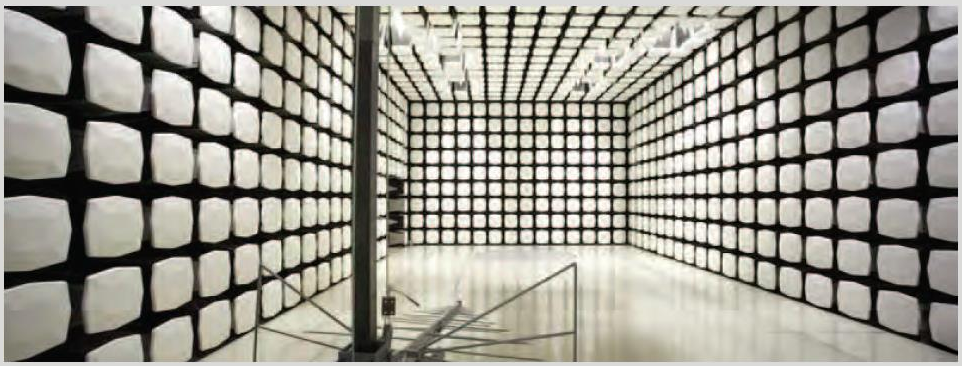
Masimo Corporation

MWMII

FCC 15.247:2019

Bluetooth Radio

Report # MASI0553.2 Rev. 1



NVLAP LAB CODE: 200676-0

CERTIFICATE OF TEST

Last Date of Test: September 30, 2019
Masimo Corporation
Model: MWMII

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2019	ANSI C63.10:2013
FCC 15.247:2019	

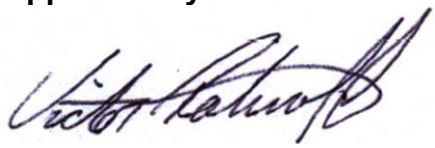
Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	
6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	
7.5	Duty Cycle	Yes	N/A	
7.8.2	Carrier Frequency Separation	Yes	Pass	
7.8.3	Number of Hopping Frequencies	Yes	Pass	
7.8.4	Dwell Time	Yes	Pass	
7.8.5	Output Power	Yes	Pass	
7.8.5	Equivalent Isotropic Radiated Power	Yes	Pass	
7.8.6	Band Edge Compliance	Yes	Pass	
7.8.6	Band Edge Compliance - Hopping Mode	Yes	Pass	
7.8.7	Occupied Channel Bandwidth	Yes	Pass	
7.8.8	Spurious Conducted Emissions	Yes	Pass	

Deviations From Test Standards

None

Approved By:



Victor Ratinoff, 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. 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
00	None		
01	Removed 26-40GHz equipment from data	2019-11-29	18-23
	Added DCCF to Spurious AVG emissions data	2019-11-29	18-23

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 - 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

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

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

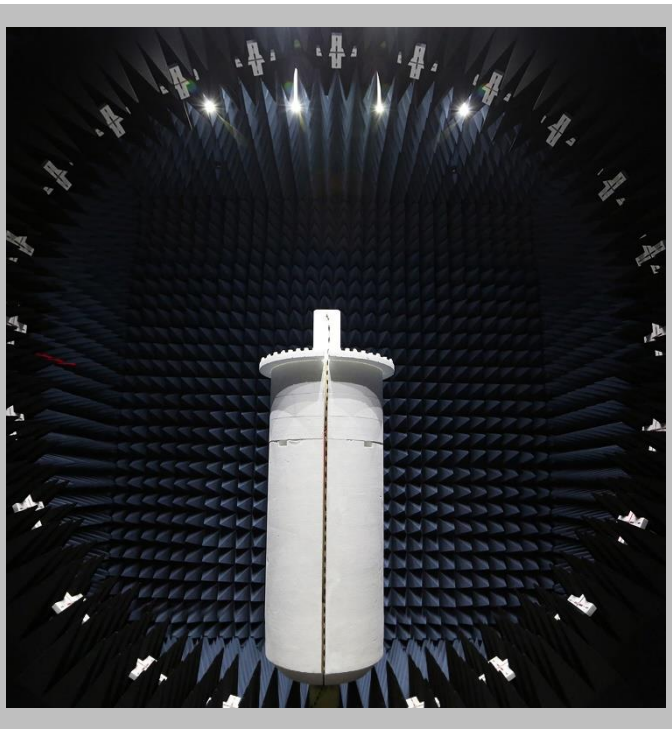
MIC – Recognized by MIC as a CAB for the acceptance of test data.

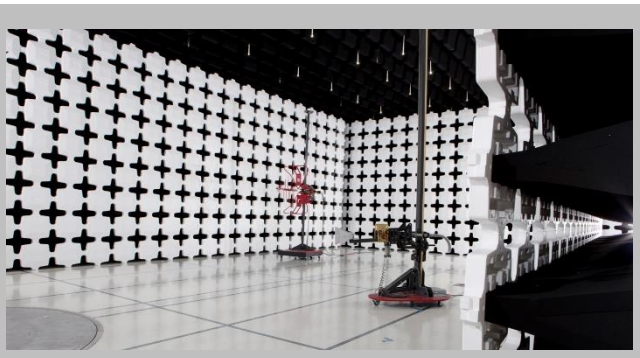
SCOPE

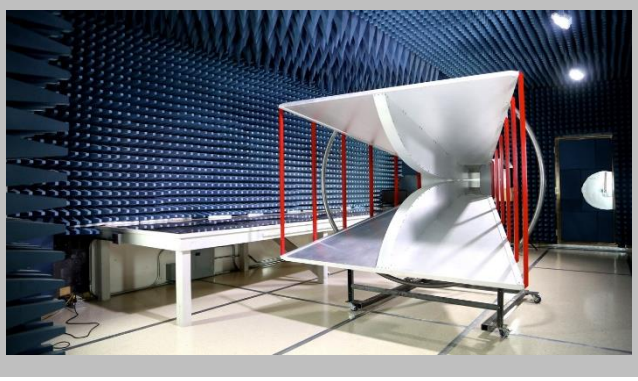
For details on the Scopes of our Accreditations, please visit:
https://www.nwemc.com/emc-testing-accreditations

FACILITIES

California	Minnesota	Oregon	Texas	Washington
Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Labs EV01-12 6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Labs NC01-05 19201 120th Ave NE Bothell, WA 98011 (425)984-6600
NVLAP				
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0
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

element
TMU.2015.07.10

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.

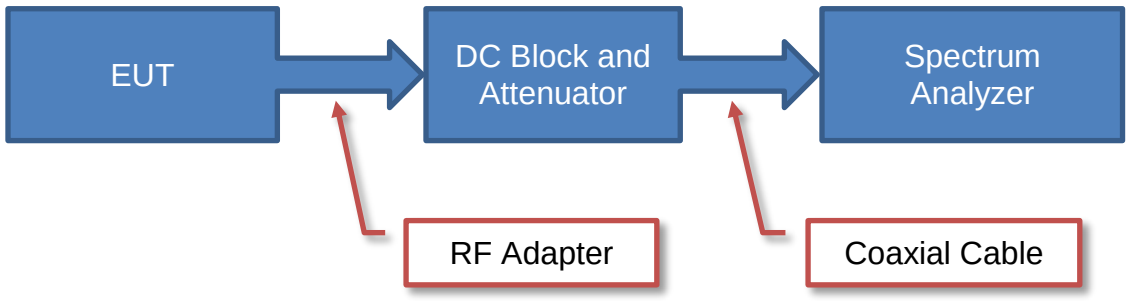
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found included as part of the applicable test description page. 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.

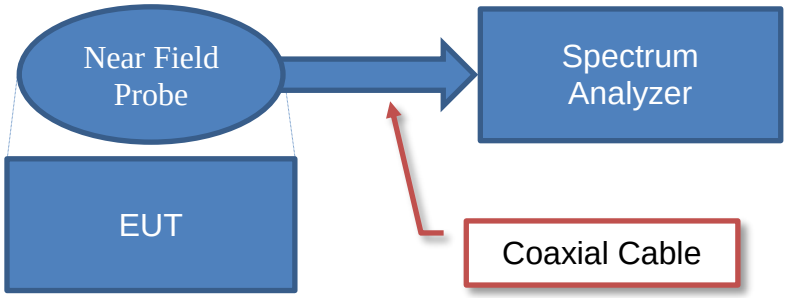
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	1.2 dB	-1.2 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.1 dB	-5.1 dB
AC Powerline Conducted Emissions (dB)	2.4 dB	-2.4 dB

Test Setup Block Diagrams

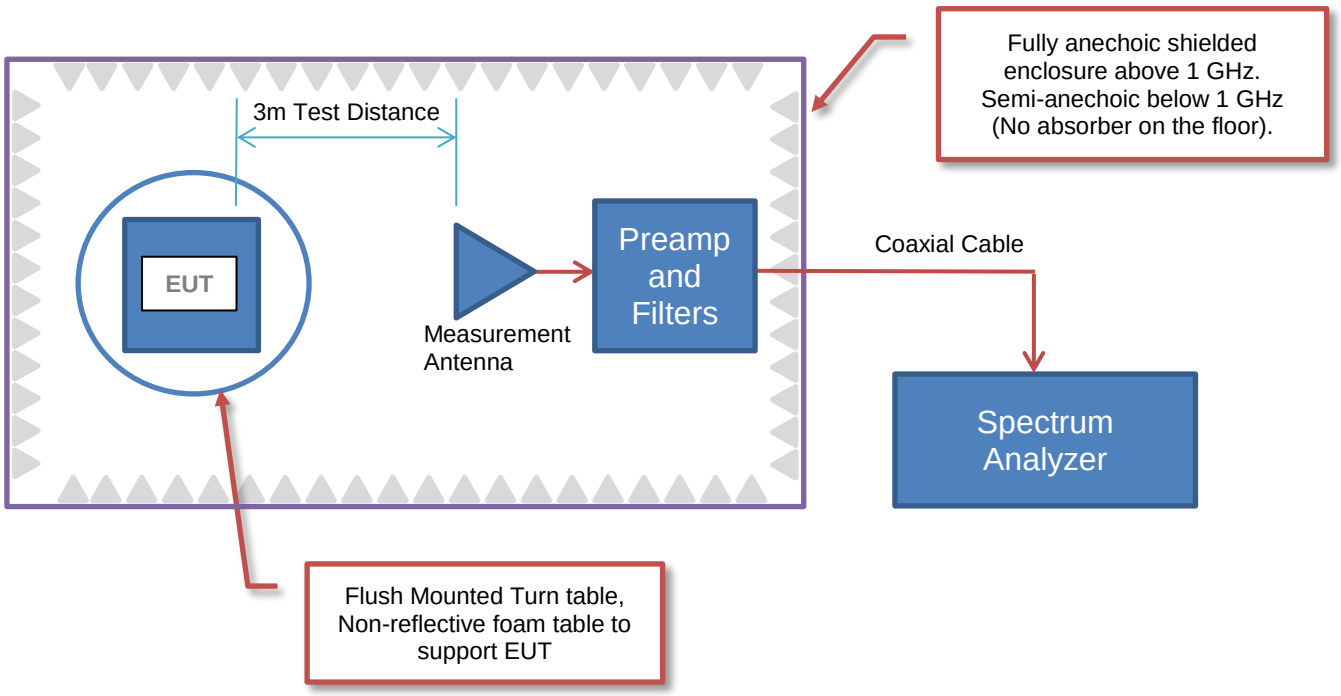
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	Masimo Corporation
Address:	52 Discovery
City, State, Zip:	Irvine, CA 92618
Test Requested By:	Anami Joshi
Model:	MWMII
First Date of Test:	July 3, 2019
Last Date of Test:	September 30, 2019
Receipt Date of Samples:	July 1, 2019
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
The MWMII module (P/N 26269) uses an AzureWave AW-CM256SM radio chipset, which incorporates the Broadcom BCM43455 single chip.

Testing Objective:
To demonstrate compliance of the Bluetooth radio to FCC 15.247 requirements.

CONFIGURATIONS

Configuration MASI0553- 1

Software/Firmware Running during test	
Description	**Version**
Firmware	7.45.100.7-mfgtest

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Masimo Wireless Module II	Masimo	MWMII (P/N: 26269)	ENG-1
Antenna (2.4GHz-5.35GHz)	Ethertronics	1000672	N/A

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Carrier Board	Masimo	26634 Rev.B	1847700024
Hawk Radio Board Debug Tool	Masimo	82403	None

Configuration MASI0553- 2

Software/Firmware Running during test	
Description	**Version**
Firmware	7.45.100.7-mfgtest

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Masimo Wireless Module II	Masimo	MWMII (P/N: 26269)	ENG-1

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Carrier Board	Masimo	26634 Rev.B	1847700024
Host Laptop	Hewlett-Packard	ProBook	CND638CWSR
Laptop Power Supply	Hewlett-Packard	PPP009H	WBGSU0BL91FXO9
Dual Output DC Power Supply	Agilent	E3648A	MY51120045
Hawk Radio Board Debug Tool	Masimo	82403	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
U.FL Cable	Yes	0.1m	No	SMA Cable	Wireless Module
AC Cable	No	1.8m	No	AC Mains	DC Power Supply
USB Cable	Yes	3.0m	No	Host Laptop	USB Hub
AC Cable	No	1.2m	No	AC Mains	Laptop Power Supply
DC Cable	Yes	1.4m	Yes	Laptop Power Supply	Host Laptop
USB Cable	Yes	2.6m	No	Host Laptop	Hawk Radio Board Debug Tool
DC Cable	Yes	1.6m	No	iMx-53 Programmer	AC Adapter (AC Mains)

CONFIGURATIONS

Configuration MASI0553- 7

Software/Firmware Running during test	
Description	**Version**
Firmware	7.45.100.7-mfgtest

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Masimo Wireless Module II	Masimo	MWMII (P/N: 26269)	ENG-1
Antenna (2.4GHz-5.35GHz)	Ethertronics	1000672	N/A

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Carrier Board	Masimo	26634 Rev.B	1847700024
Hawk Radio Board Debug Tool	Masimo	82403	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Cable	Yes	1.0m	No	LISN (DC Source)	Hawk Radio Board Debug Tool

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2019-07-03	Carrier Frequency Separation	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	2019-07-03	Number of Hopping Frequencies	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	2019-07-03	Dwell Time	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	2019-07-08	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.
5	2019-09-23	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.
6	2019-09-23	Equivalent Isotropic Radiated 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	2019-09-23	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.
8	2019-09-23	Band Edge Compliance - Hopping Mode	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	2019-09-23	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.
10	2019-09-26	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.
11	2019-09-30	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.
12	2019-09-30	Occupied Channel Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWER SETTINGS

The EUT was tested using the power settings provided by the manufacturer:

SETTINGS FOR ALL TESTS IN THIS REPORT

Modulation Types	Type	Channel	Position	Frequency (MHz)	Power Setting
DH5, 2DH5, 3DH5	FHSS	0	Low Channel	2402	Max
		39	Mid Channel	2441	Max
		79	High Channel	2480	Max

*Client states power is set to the default setting.

POWERLINE CONDUCTED EMISSIONS

element
WTD.2019.1.24

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
LISN	Solar Electronics	9252-50-24-BNC	LIA	2019-01-08	2020-01-08
LISN	Solar Electronics	9252-50-24-BNC	LIB	2019-01-08	2020-01-08
Cable - Conducted Cable Assembly	Northwest EMC	OCP, HFP, AWC	OCPA	2018-10-05	2019-10-05
Power Supply	Pacific Power	AFX 12KVA	SMT	NCR	NCR
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFP	2019-07-02	2020-07-02

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

CONFIGURATIONS INVESTIGATED

MASI0553-7

MODES INVESTIGATED

Transmitting Bluetooth Classic Mid Ch 39 (2441 MHz), DH5

POWERLINE CONDUCTED EMISSIONS

EUT:	MWMII	Work Order:	MASI0553
Serial Number:	ENG-1	Date:	2019-07-08
Customer:	Masimo Corporation	Temperature:	21.3°C
Attendees:	Anami Joshi, Nghi Nguyen	Relative Humidity:	50%
Customer Project:	None	Bar. Pressure:	1019 mb
Tested By:	Nolan De Ramos	Job Site:	OC06
Power:	3.6 VDC	Configuration:	MASI0553-7

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2019	ANSI C63.10:2013

TEST PARAMETERS

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

COMMENTS

None

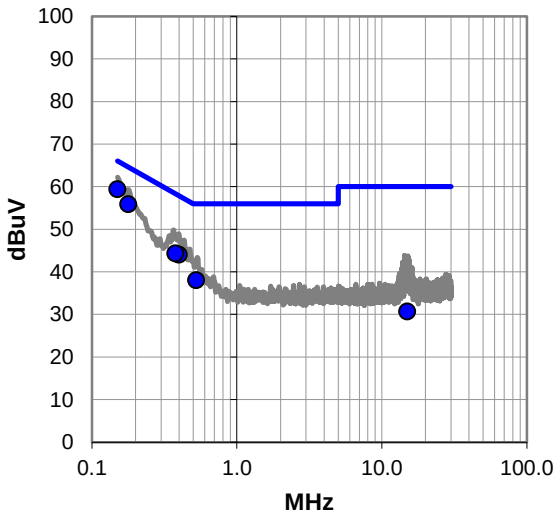
EUT OPERATING MODES

Transmitting Bluetooth Classic Mid Ch 39 (2441 MHz), DH5

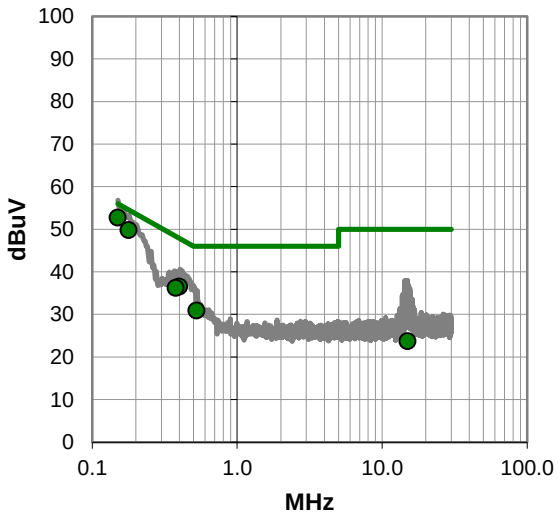
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2019.1.24

RESULTS - Run #5

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.150	39.1	20.3	59.4	66.0	-6.6
0.178	35.7	20.2	55.9	64.6	-8.7
0.399	24.0	20.0	44.0	57.9	-13.9
0.376	24.3	20.0	44.3	58.4	-14.1
0.525	18.0	20.0	38.0	56.0	-18.0
14.946	9.8	20.9	30.7	60.0	-29.3

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.150	32.4	20.3	52.7	56.0	-3.3
0.178	29.6	20.2	49.8	54.6	-4.8
0.399	16.5	20.0	36.5	47.9	-11.4
0.376	16.2	20.0	36.2	48.4	-12.2
0.525	10.9	20.0	30.9	46.0	-15.1
14.946	2.8	20.9	23.7	50.0	-26.3

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2019.1.24

EUT:	MWMII	Work Order:	MASI0553
Serial Number:	ENG-1	Date:	2019-07-08
Customer:	Masimo Corporation	Temperature:	21.3°C
Attendees:	Anami Joshi, Nghi Nguyen	Relative Humidity:	50%
Customer Project:	None	Bar. Pressure:	1019 mb
Tested By:	Nolan De Ramos	Job Site:	OC06
Power:	3.6 VDC	Configuration:	MASI0553-7

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2019	ANSI C63.10:2013

TEST PARAMETERS

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

COMMENTS

None

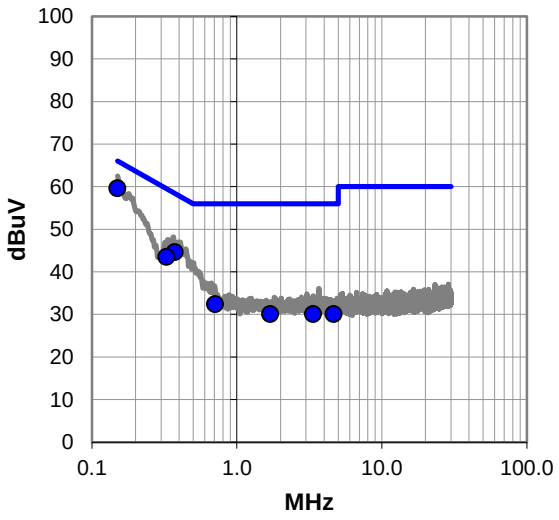
EUT OPERATING MODES

Transmitting Bluetooth Classic Mid Ch 39 (2441 MHz), DH5

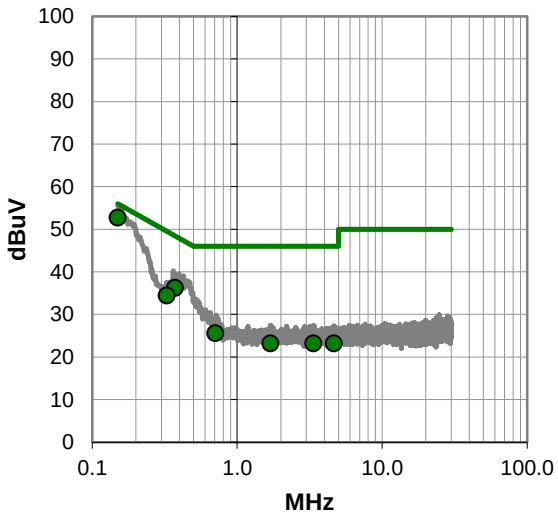
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2019.1.24

RESULTS - Run #6

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.150	39.3	20.3	59.6	66.0	-6.4
0.372	24.5	20.1	44.6	58.4	-13.8
0.327	23.4	20.1	43.5	59.5	-16.0
0.708	12.4	20.0	32.4	56.0	-23.6
3.356	9.8	20.3	30.1	56.0	-25.9
1.701	10.0	20.1	30.1	56.0	-25.9
4.651	9.8	20.3	30.1	56.0	-25.9

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.150	32.4	20.3	52.7	56.0	-3.3
0.372	16.1	20.1	36.2	48.4	-12.2
0.327	14.3	20.1	34.4	49.5	-15.1
0.708	5.6	20.0	25.6	46.0	-20.4
1.701	3.1	20.1	23.2	46.0	-22.8
3.356	2.9	20.3	23.2	46.0	-22.8
4.651	2.9	20.3	23.2	46.0	-22.8

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2019.05.10

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. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Transmitting BT BR EDR: Low Ch 2402 MHz, Mid Ch 2441 MHz, High Ch 2480 MHz
Transmitting BT BR EDR: Low Ch 2402 MHz, High Ch 2480 MHz

POWER SETTINGS INVESTIGATED

3.6 VDC

CONFIGURATIONS INVESTIGATED

MASI0553 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26500 MHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFJ	18-Dec-2018	12 mo
Antenna - Double Ridge	EMCO	3115	AHB	28-Mar-2018	24 mo
Antenna - Standard Gain	ETS Lindgren	3160-09	AHN	NCR	0 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AHR	NCR	0 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AHT	NCR	0 mo
Antenna - Standard Gain	ETS Lindgren	3160-10	AIX	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOE	10-Jan-2019	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AOF	10-Jan-2019	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AOI	19-Dec-2018	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-4D-010120-30-10P-1	AOP	10-Jan-2019	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1402	AOZ	2-Jul-2019	12 mo
Antenna - Biconilog	Teseq	CBL 6141A	AYE	7-Nov-2017	24 mo
Filter - High Pass	Micro-Tronics	HPM50111	HHX	2-Jul-2019	12 mo
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	OC1	19-Dec-2018	12 mo
Cable	Northwest EMC	10kHz-1GHz RE Cables	OCH	9-Sep-2019	12 mo
Cable	Northwest EMC	1-8GHz RE Cables	OCJ	10-Jan-2019	12 mo
Cable	Northwest EMC	18-26GHz RE Cables	OCK	19-Dec-2018	12 mo
Cable	Northwest EMC	8-18GHz RE Cables	OCO	10-Jan-2019	12 mo
Attenuator	Fairview Microwave	SA18H-20	TKQ	2-Jul-2019	12 mo

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 at the edges of the allowable band may be presented in an alternative method as provided for in the ANSI C63.10 Marker-Delta method. This method involves performing an in-band fundamental measurement followed by a screen capture of the fundamental and out-of-band emission using reduced measurement instrumentation bandwidths. The amplitude delta measured on this screen capture is applied to the fundamental emission value to show the out-of-band emission level as applied to the limit.

SPURIOUS RADIATED EMISSIONS

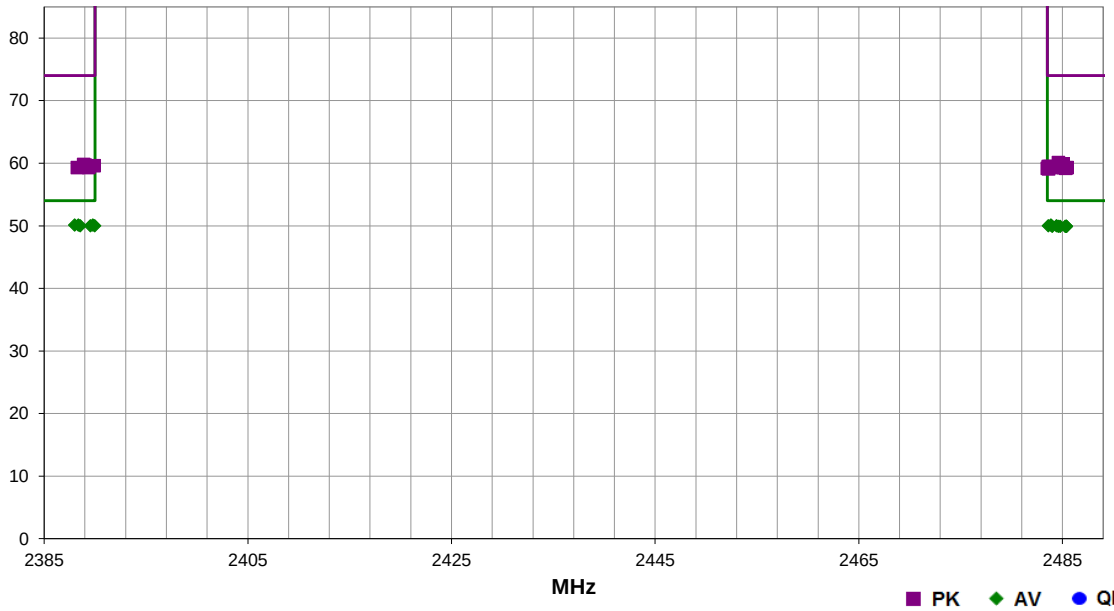
element

EmiR5 2019.08.01 PSA-ESCI 2019.05.10

Work Order:	MASI0553	**Date:**	26-Sep-2019		
Project:	None	**Temperature:**	22.5 °C		
Job Site:	OC07	**Humidity:**	54.4% RH		
Serial Number:	ENG-1	**Barometric Pres.:**	1017 mbar	**Tested by:**	Mark Baytan
EUT:	MWMII				
Configuration:	1				
Customer:	Masimo Corporation				
Attendees:	Anami Joshi				
EUT Power:	3.6 VDC				
Operating Mode:	Transmitting BT BR EDR: Low Ch 2402 MHz, High Ch 2480 MHz				
Deviations:	None				
Comments:	Band Edge. DCCF of 1.6 dB added to AVG values. [DCCF = 10*log(duty cycle .77)]				

Test Specifications	**Test Method**
FCC 15.247:2019	ANSI C63.10:2013

Run #	30	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2483.877	32.6	-4.1	1.5	120.0	1.6	20.0	Horz	AV	0.0	50.1	54.0	-3.9	High Ch, DH5, EUT Horz
2389.777	32.9	-4.4	2.5	188.0	1.6	20.0	Horz	AV	0.0	50.1	54.0	-3.9	Low Ch, DH5, EUT on Side
2388.000	32.9	-4.4	1.5	248.0	1.6	20.0	Vert	AV	0.0	50.1	54.0	-3.9	Low Ch, DH5, EUT on Side
2388.357	32.9	-4.4	1.5	342.0	1.6	20.0	Horz	AV	0.0	50.1	54.0	-3.9	Low Ch, DH5, EUT Vert
2484.413	32.5	-4.1	1.5	238.0	1.6	20.0	Horz	AV	0.0	50.0	54.0	-4.0	High Ch, DH5, EUT Vert
2483.607	32.5	-4.1	1.5	235.0	1.6	20.0	Horz	AV	0.0	50.0	54.0	-4.0	High Ch, 2DH5, EUT Horz
2389.973	32.8	-4.4	1.5	293.0	1.6	20.0	Horz	AV	0.0	50.0	54.0	-4.0	Low Ch, DH5, EUT Horz
2389.540	32.8	-4.4	1.5	197.0	1.6	20.0	Vert	AV	0.0	50.0	54.0	-4.0	Low Ch, DH5, EUT Horz
2388.550	32.8	-4.4	3.7	281.0	1.6	20.0	Vert	AV	0.0	50.0	54.0	-4.0	Low Ch, DH5, EUT Vert
2484.593	32.4	-4.1	2.4	0.0	1.6	20.0	Vert	AV	0.0	49.9	54.0	-4.1	High Ch, DH5, EUT Horz
2485.397	32.4	-4.1	1.5	67.0	1.6	20.0	Vert	AV	0.0	49.9	54.0	-4.1	High Ch, DH5, EUT Vert
2485.390	32.4	-4.1	1.5	261.0	1.6	20.0	Horz	AV	0.0	49.9	54.0	-4.1	High Ch, DH5, EUT on Side
2485.357	32.4	-4.1	1.5	270.0	1.6	20.0	Vert	AV	0.0	49.9	54.0	-4.1	High Ch, DH5, EUT on Side
2484.000	32.4	-4.1	1.2	237.0	1.6	20.0	Horz	AV	0.0	49.9	54.0	-4.1	High Ch, 3DH5, EUT Horz
2484.773	32.4	-4.1	1.5	231.0	1.6	20.0	Vert	AV	0.0	49.9	54.0	-4.1	High Ch, 3DH5, EUT Horz
2485.270	32.4	-4.1	1.5	182.0	1.6	20.0	Vert	AV	0.0	49.9	54.0	-4.1	High Ch, 2DH5, EUT Horz
2484.607	44.2	-4.1	1.5	238.0	0.0	20.0	Horz	PK	0.0	60.1	74.0	-13.9	High Ch, DH5, EUT Vert
2485.047	44.0	-4.1	1.2	237.0	0.0	20.0	Horz	PK	0.0	59.9	74.0	-14.1	High Ch, 3DH5, EUT Horz
2388.877	44.2	-4.4	1.5	293.0	0.0	20.0	Horz	PK	0.0	59.8	74.0	-14.2	Low Ch, DH5, EUT Horz
2389.020	44.1	-4.4	1.5	342.0	0.0	20.0	Horz	PK	0.0	59.7	74.0	-14.3	Low Ch, DH5, EUT Vert
2389.890	44.0	-4.4	1.5	197.0	0.0	20.0	Vert	PK	0.0	59.6	74.0	-14.4	Low Ch, DH5, EUT Horz
2389.013	44.0	-4.4	3.7	281.0	0.0	20.0	Vert	PK	0.0	59.6	74.0	-14.4	Low Ch, DH5, EUT Vert

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2483.593	43.6	-4.1	1.5	67.0	0.0	20.0	Vert	PK	0.0	59.5	74.0	-14.5	High Ch, DH5, EUT Vert
2483.757	43.6	-4.1	1.5	231.0	0.0	20.0	Vert	PK	0.0	59.5	74.0	-14.5	High Ch, 3DH5, EUT Horz
2485.110	43.4	-4.1	2.4	0.0	0.0	20.0	Vert	PK	0.0	59.3	74.0	-14.7	High Ch, DH5, EUT Horz
2484.483	43.4	-4.1	1.5	270.0	0.0	20.0	Vert	PK	0.0	59.3	74.0	-14.7	High Ch, DH5, EUT on Side
2485.457	43.4	-4.1	1.5	235.0	0.0	20.0	Horz	PK	0.0	59.3	74.0	-14.7	High Ch, 2DH5, EUT Horz
2389.390	43.7	-4.4	2.5	188.0	0.0	20.0	Horz	PK	0.0	59.3	74.0	-14.7	Low Ch, DH5, EUT on Side
2388.257	43.7	-4.4	1.5	248.0	0.0	20.0	Vert	PK	0.0	59.3	74.0	-14.7	Low Ch, DH5, EUT on Side
2483.513	43.3	-4.1	1.5	120.0	0.0	20.0	Horz	PK	0.0	59.2	74.0	-14.8	High Ch, DH5, EUT Horz
2485.320	43.3	-4.1	1.5	182.0	0.0	20.0	Vert	PK	0.0	59.2	74.0	-14.8	High Ch, 2DH5, EUT Horz
2483.637	43.2	-4.1	1.5	261.0	0.0	20.0	Horz	PK	0.0	59.1	74.0	-14.9	High Ch, DH5, EUT on Side

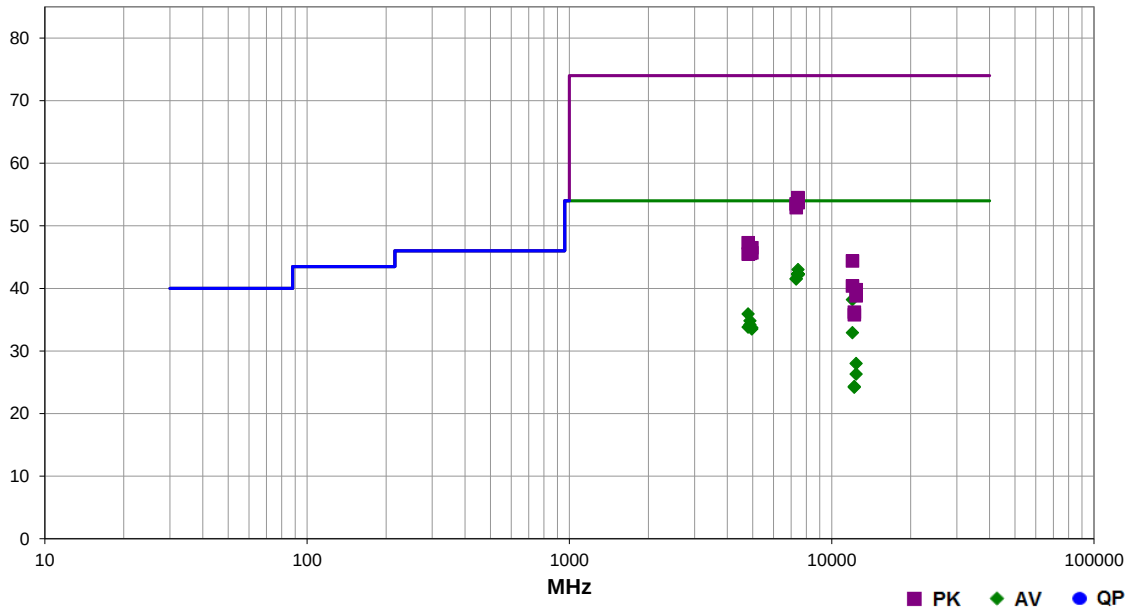
SPURIOUS RADIATED EMISSIONS

EmiR5 2019.08.01 PSA-ESCI 2019.05.10

Work Order:	MASI0553	**Date:**	26-Sep-2019		
Project:	None	**Temperature:**	22.5 °C		
Job Site:	OC07	**Humidity:**	54.4% RH		
Serial Number:	ENG-1	**Barometric Pres.:**	1017 mbar	**Tested by:**	Mark Baytan
EUT:	MWMII				
Configuration:	1				
Customer:	Masimo Corporation				
Attendees:	Anami Joshi				
EUT Power:	3.6 VDC				
Operating Mode:	Transmitting BT BR EDR: Low Ch 2402 MHz, Mid Ch 2441 MHz, High Ch 2480 MHz				
Deviations:	None				
Comments:	DCCF of 1.6 dB added to AVG values. [DCCF = 10*log(duty cycle .77)]				

Test Specifications	**Test Method**
FCC 15.247:2019	ANSI C63.10:2013

Run #	31	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7440.158	29.3	12.1	1.2	284.0	1.6	0.0	Horz	AV	0.0	43.0	54.0	-11.0	High Ch, DH5, EUT on Side
7440.275	28.6	12.1	2.5	354.0	1.6	0.0	Horz	AV	0.0	42.3	54.0	-11.7	High Ch, DH5, EUT Horz
7439.900	28.6	12.1	1.5	175.0	1.6	0.0	Vert	AV	0.0	42.3	54.0	-11.7	High Ch, DH5, EUT on Side
7440.050	28.6	12.1	1.5	263.0	1.6	0.0	Horz	AV	0.0	42.3	54.0	-11.7	High Ch, DH5, EUT Vert
7440.442	28.6	12.1	1.5	281.0	1.6	0.0	Vert	AV	0.0	42.3	54.0	-11.7	High Ch, DH5, EUT Vert
7440.350	28.6	12.1	1.5	106.0	1.6	0.0	Vert	AV	0.0	42.3	54.0	-11.7	High Ch, 2DH5, EUT on Side
7439.900	28.5	12.1	2.1	189.0	1.6	0.0	Vert	AV	0.0	42.2	54.0	-11.8	High Ch, DH5, EUT Horz
7442.250	28.5	12.1	1.5	204.0	1.6	0.0	Horz	AV	0.0	42.2	54.0	-11.8	High Ch, 2DH5, EUT on Side
7442.175	28.5	12.1	1.5	149.0	1.6	0.0	Horz	AV	0.0	42.2	54.0	-11.8	High Ch, 3DH5, EUT on Side
7442.217	28.5	12.1	1.5	162.0	1.6	0.0	Vert	AV	0.0	42.2	54.0	-11.8	High Ch, 3DH5, EUT on Side
7322.400	28.8	11.1	1.5	251.0	1.6	0.0	Horz	AV	0.0	41.5	54.0	-12.5	Mid Ch, DH5, EUT on Side
7322.492	28.8	11.1	1.5	328.0	1.6	0.0	Vert	AV	0.0	41.5	54.0	-12.5	Mid Ch, DH5, EUT on Side
12010.790	42.3	-5.7	1.2	153.0	1.6	0.0	Horz	AV	0.0	38.2	54.0	-15.8	Low Ch, DH5, EUT on Side
4804.083	30.6	3.7	1.5	225.0	1.6	0.0	Vert	AV	0.0	35.9	54.0	-18.1	Low Ch, DH5, EUT on Side
4882.042	29.2	4.0	3.7	320.0	1.6	0.0	Vert	AV	0.0	34.8	54.0	-19.2	Mid Ch, DH5, EUT on Side
7439.083	42.4	12.1	1.5	204.0	0.0	0.0	Horz	PK	0.0	54.5	74.0	-19.5	High Ch, 2DH5, EUT on Side
7440.908	42.3	12.1	1.2	284.0	0.0	0.0	Horz	PK	0.0	54.4	74.0	-19.6	High Ch, DH5, EUT on Side
7441.233	42.3	12.1	1.5	162.0	0.0	0.0	Vert	PK	0.0	54.4	74.0	-19.6	High Ch, 3DH5, EUT on Side
7439.342	42.2	12.1	1.5	263.0	0.0	0.0	Horz	PK	0.0	54.3	74.0	-19.7	High Ch, DH5, EUT Vert
7439.292	42.2	12.1	1.5	281.0	0.0	0.0	Vert	PK	0.0	54.3	74.0	-19.7	High Ch, DH5, EUT Vert
7438.175	42.1	12.1	1.5	106.0	0.0	0.0	Vert	PK	0.0	54.2	74.0	-19.8	High Ch, 2DH5, EUT on Side
4881.975	28.6	4.0	3.7	94.0	1.6	0.0	Horz	AV	0.0	34.2	54.0	-19.8	Mid Ch, DH5, EUT on Side

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7437.592	42.0	12.1	2.5	354.0	0.0	0.0	Horz	PK	0.0	54.1	74.0	-19.9	High Ch, DH5, EUT Horz
7439.800	42.0	12.1	2.1	189.0	0.0	0.0	Vert	PK	0.0	54.1	74.0	-19.9	High Ch, DH5, EUT Horz
7437.517	41.9	12.1	1.5	175.0	0.0	0.0	Vert	PK	0.0	54.0	74.0	-20.0	High Ch, DH5, EUT on Side
4804.100	28.5	3.7	3.7	231.0	1.6	0.0	Horz	AV	0.0	33.8	54.0	-20.2	Low Ch, DH5, EUT on Side
7441.475	41.6	12.1	1.5	149.0	0.0	0.0	Horz	PK	0.0	53.7	74.0	-20.3	High Ch, 3DH5, EUT on Side
4960.158	28.0	4.1	1.7	0.0	1.6	0.0	Vert	AV	0.0	33.7	54.0	-20.3	High Ch, DH5, EUT on Side
7318.025	42.5	11.0	1.5	251.0	0.0	0.0	Horz	PK	0.0	53.5	74.0	-20.5	Mid Ch, DH5, EUT on Side
4960.342	27.8	4.1	1.5	129.0	1.6	0.0	Horz	AV	0.0	33.5	54.0	-20.5	High Ch, DH5, EUT on Side
12010.910	37.0	-5.7	2.1	173.0	1.6	0.0	Vert	AV	0.0	32.9	54.0	-21.1	Low Ch, DH5, EUT on Side
7320.683	41.9	11.0	1.5	328.0	0.0	0.0	Vert	PK	0.0	52.9	74.0	-21.1	Mid Ch, DH5, EUT on Side
12399.530	27.7	-1.3	2.1	341.0	1.6	0.0	Horz	AV	0.0	28.0	54.0	-26.0	High Ch, DH5, EUT on Side
4804.483	43.6	3.7	1.5	225.0	0.0	0.0	Vert	PK	0.0	47.3	74.0	-26.7	Low Ch, DH5, EUT on Side
4959.400	42.4	4.1	1.5	129.0	0.0	0.0	Horz	PK	0.0	46.5	74.0	-27.5	High Ch, DH5, EUT on Side
12397.590	26.0	-1.3	1.5	177.0	1.6	0.0	Vert	AV	0.0	26.3	54.0	-27.7	High Ch, DH5, EUT on Side
4959.025	41.6	4.1	1.7	0.0	0.0	0.0	Vert	PK	0.0	45.7	74.0	-28.3	High Ch, DH5, EUT on Side
4880.100	41.7	3.9	3.7	94.0	0.0	0.0	Horz	PK	0.0	45.6	74.0	-28.4	Mid Ch, DH5, EUT on Side
4879.758	41.7	3.9	3.7	320.0	0.0	0.0	Vert	PK	0.0	45.6	74.0	-28.4	Mid Ch, DH5, EUT on Side
4804.508	41.8	3.7	3.7	231.0	0.0	0.0	Horz	PK	0.0	45.5	74.0	-28.5	Low Ch, DH5, EUT on Side
12010.890	50.1	-5.7	1.2	153.0	0.0	0.0	Horz	PK	0.0	44.4	74.0	-29.6	Low Ch, DH5, EUT on Side
12199.770	26.2	-3.5	2.5	192.0	1.6	0.0	Horz	AV	0.0	24.3	54.0	-29.7	Mid Ch, DH5, EUT on Side
12200.440	26.1	-3.5	1.5	360.0	1.6	0.0	Vert	AV	0.0	24.2	54.0	-29.8	Mid Ch, DH5, EUT on Side
12011.150	46.1	-5.7	2.1	173.0	0.0	0.0	Vert	PK	0.0	40.4	74.0	-33.6	Low Ch, DH5, EUT on Side
12399.670	41.1	-1.3	2.1	341.0	0.0	0.0	Horz	PK	0.0	39.8	74.0	-34.2	High Ch, DH5, EUT on Side
12397.510	40.1	-1.3	1.5	177.0	0.0	0.0	Vert	PK	0.0	38.8	74.0	-35.2	High Ch, DH5, EUT on Side
12200.680	39.7	-3.5	2.5	192.0	0.0	0.0	Horz	PK	0.0	36.2	74.0	-37.8	Mid Ch, DH5, EUT on Side
12199.980	39.3	-3.5	1.5	360.0	0.0	0.0	Vert	PK	0.0	35.8	74.0	-38.2	Mid Ch, DH5, EUT on Side

DUTY CYCLE CHARACTERIZATION

XMit 2019.09.05

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
Power Supply - DC	Agilent	E3648A	TPE	NCR	NCR
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	NCR
Block - DC	Fairview Microwave	SD3379	AMV	3-Jan-19	3-Jan-20
Attenuator	Fairview Microwave	SA18H-20	TKR	20-Dec-18	20-Dec-19
Generator - Signal	Agilent	E8257D	TGU	15-Feb-18	15-Feb-21
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFP	2-Jul-19	2-Jul-20

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 CHARACTERIZATION

element

TbtTx 2019.08.02 XMit 2019.09.05

EUT:	**MWMII**			**Work Order:**	**MASI0553**
Serial Number:	**ENG-1**			**Date:**	**23-Sep-19**
Customer:	**Masimo Corporation**			**Temperature:**	**22.2 °C**
Attendees:	**Anami Joshi**			**Humidity:**	**47.5% RH**
Project:	**None**			**Barometric Pres.:**	**1013 mbar**
Tested by:	**Mark Baytan**	**Power:**	**3.6 VDC**	**Job Site:**	**OC13**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2019	ANSI C63.10:2013

COMMENTS

Reference Level Offset: DC Block + 20 dB Attenuator + RF Test Cable + Patch Cable = 23.2 dB

DEVIATIONS FROM TEST STANDARD

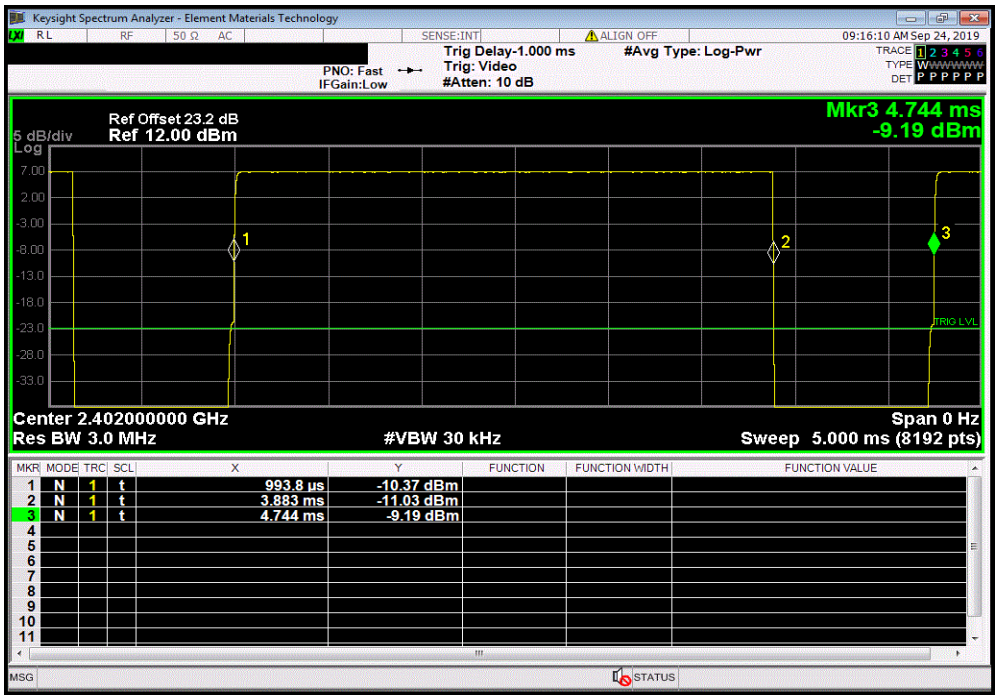
None

Configuration #	**2**	*Signature*

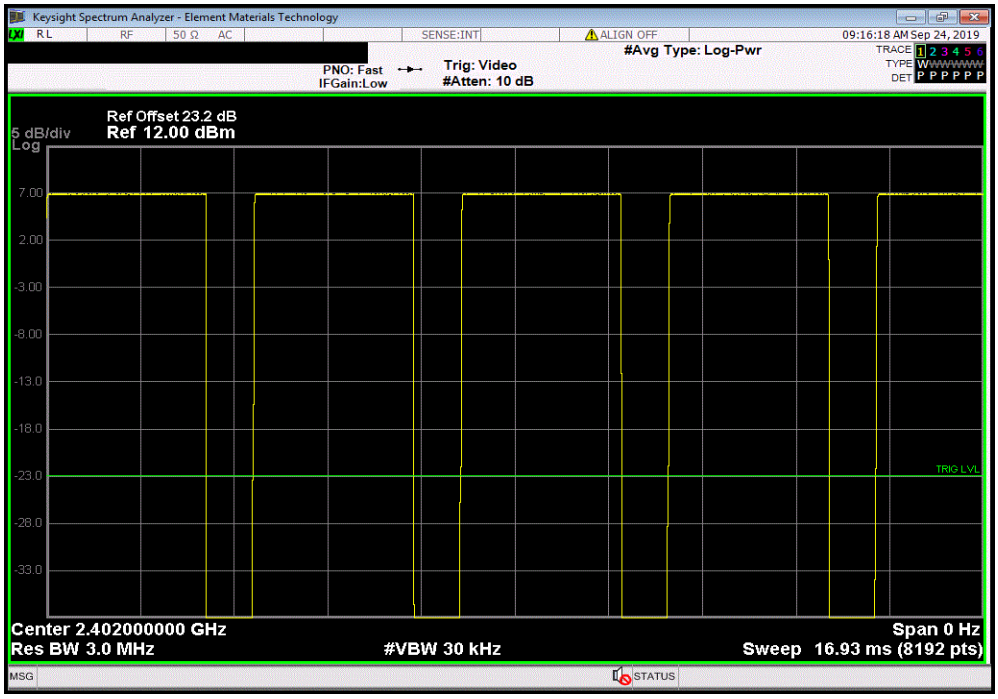
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
GFSK, DH5						
Low Channel, 2402 MHz	2.889 ms	3.75 ms	1	77	N/A	N/A
Low Channel, 2402 MHz	N/A	N/A	5	N/A	N/A	N/A
Mid Channel, 2441 MHz	2.89 ms	3.75 ms	1	77.1	N/A	N/A
Mid Channel, 2441 MHz	N/A	N/A	5	N/A	N/A	N/A
High Channel, 2480 MHz	2.889 ms	3.75 ms	1	77	N/A	N/A
High Channel, 2480 MHz	N/A	N/A	5	N/A	N/A	N/A
pi/4-DQPSK, 2DH5						
Low Channel, 2402 MHz	2.892 ms	3.75 ms	1	77.1	N/A	N/A
Low Channel, 2402 MHz	N/A	N/A	5	N/A	N/A	N/A
Mid Channel, 2441 MHz	2.892 ms	3.75 ms	1	77.1	N/A	N/A
Mid Channel, 2441 MHz	N/A	N/A	5	N/A	N/A	N/A
High Channel, 2480 MHz	2.892 ms	3.75 ms	1	77.1	N/A	N/A
High Channel, 2480 MHz	N/A	N/A	5	N/A	N/A	N/A
8DPSK, 3DH5						
Low Channel, 2402 MHz	2.894 ms	3.75 ms	1	77.2	N/A	N/A
Low Channel, 2402 MHz	N/A	N/A	5	N/A	N/A	N/A
Mid Channel, 2441 MHz	2.893 ms	3.75 ms	1	77.2	N/A	N/A
Mid Channel, 2441 MHz	N/A	N/A	5	N/A	N/A	N/A
High Channel, 2480 MHz	2.894 ms	3.75 ms	1	77.2	N/A	N/A
High Channel, 2480 MHz	N/A	N/A	5	N/A	N/A	N/A

DUTY CYCLE CHARACTERIZATION

GFSK, DH5, Low Channel, 2402 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	2.889 ms	3.75 ms	1	77	N/A	N/A

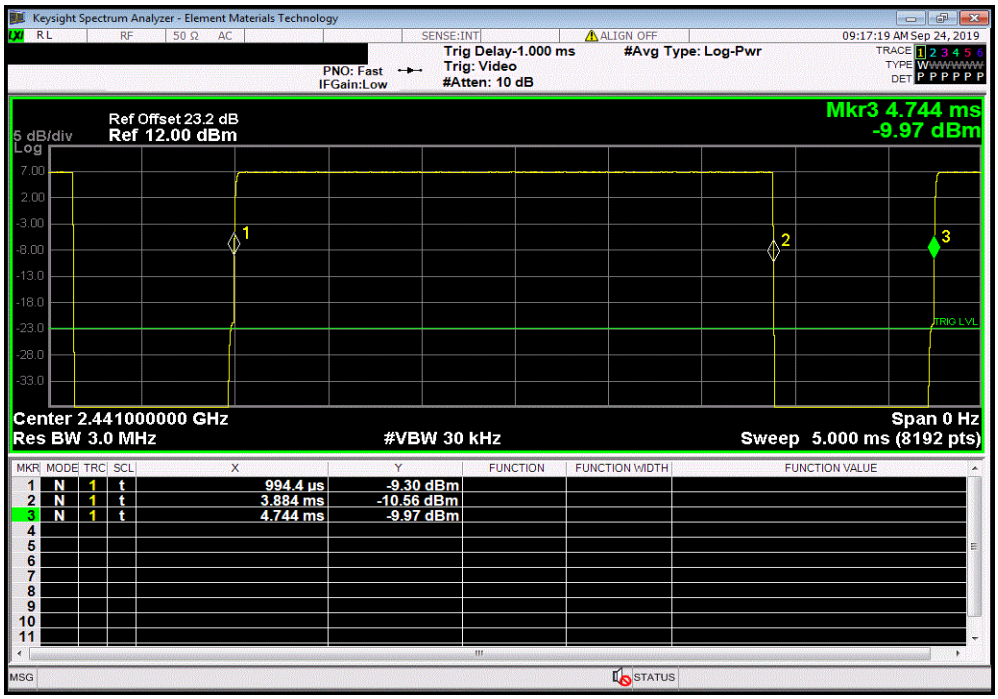


GFSK, DH5, Low Channel, 2402 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

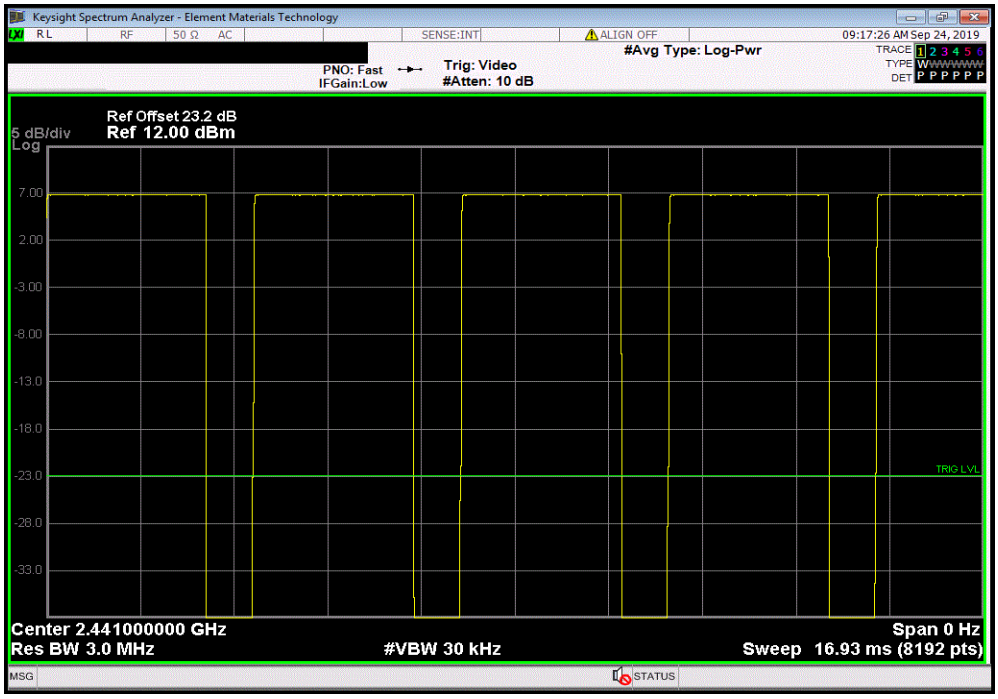


DUTY CYCLE CHARACTERIZATION

GFSK, DH5, Mid Channel, 2441 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	2.89 ms	3.75 ms	1	77.1	N/A	N/A

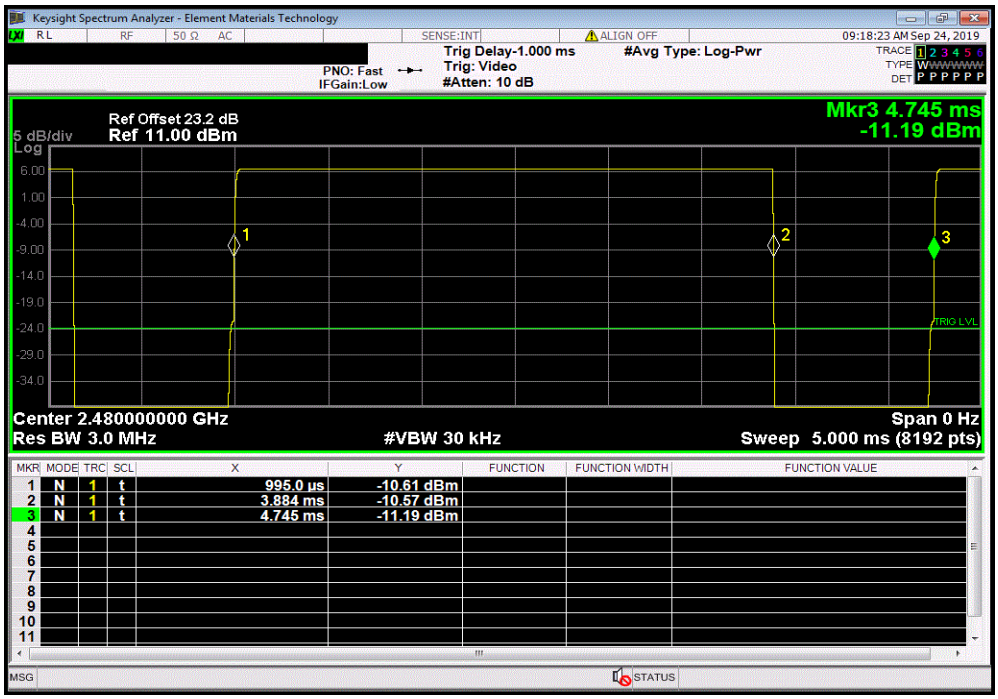


GFSK, DH5, Mid Channel, 2441 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

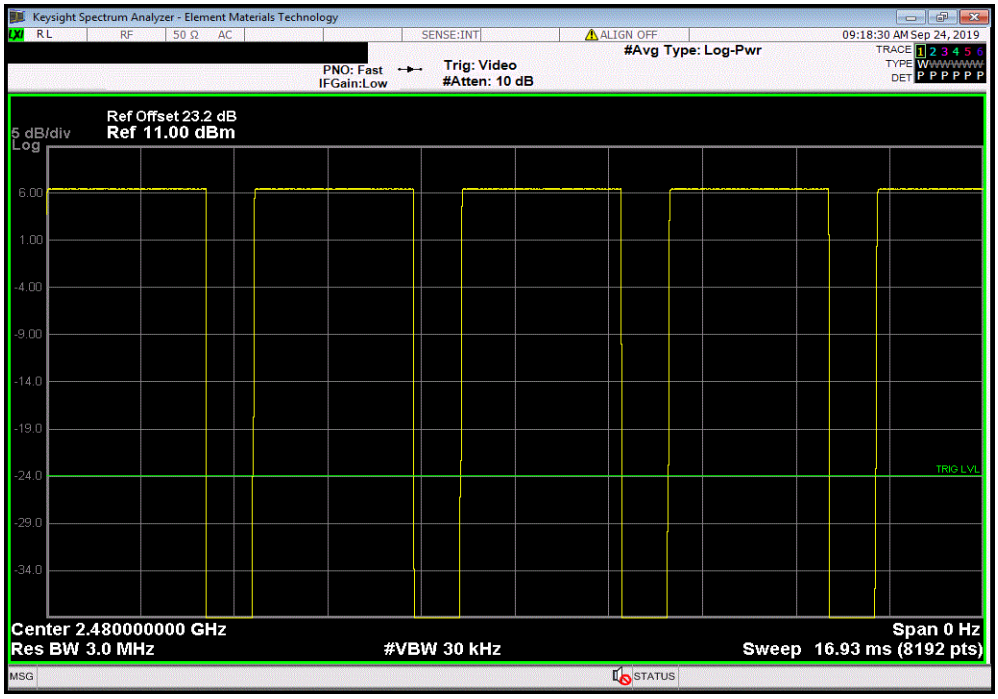


DUTY CYCLE CHARACTERIZATION

GFSK, DH5, High Channel, 2480 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	2.889 ms	3.75 ms	1	77	N/A	N/A

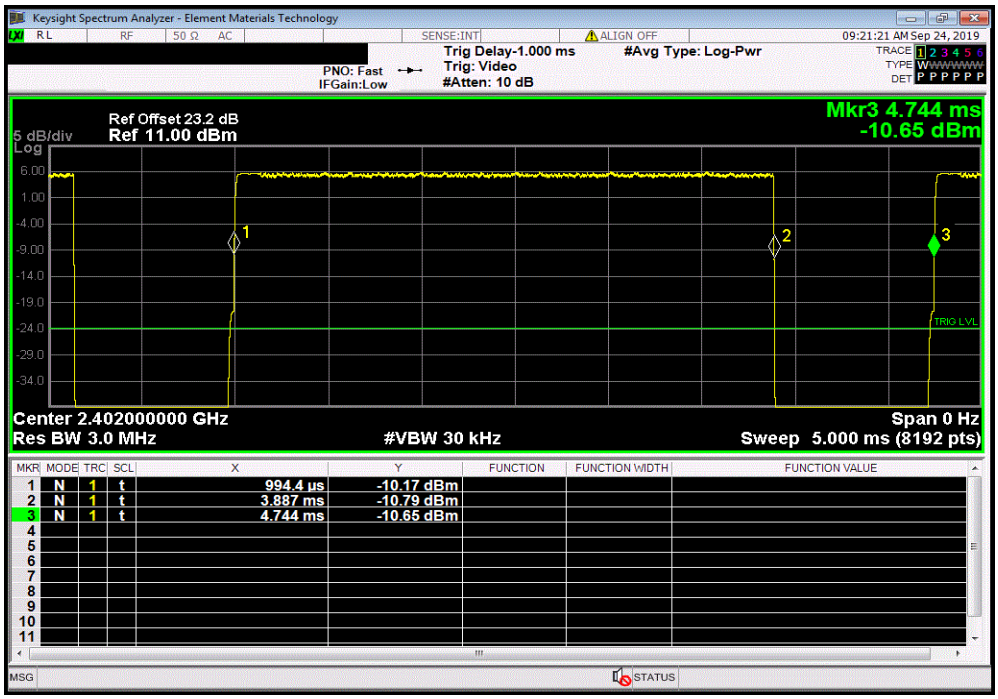


GFSK, DH5, High Channel, 2480 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

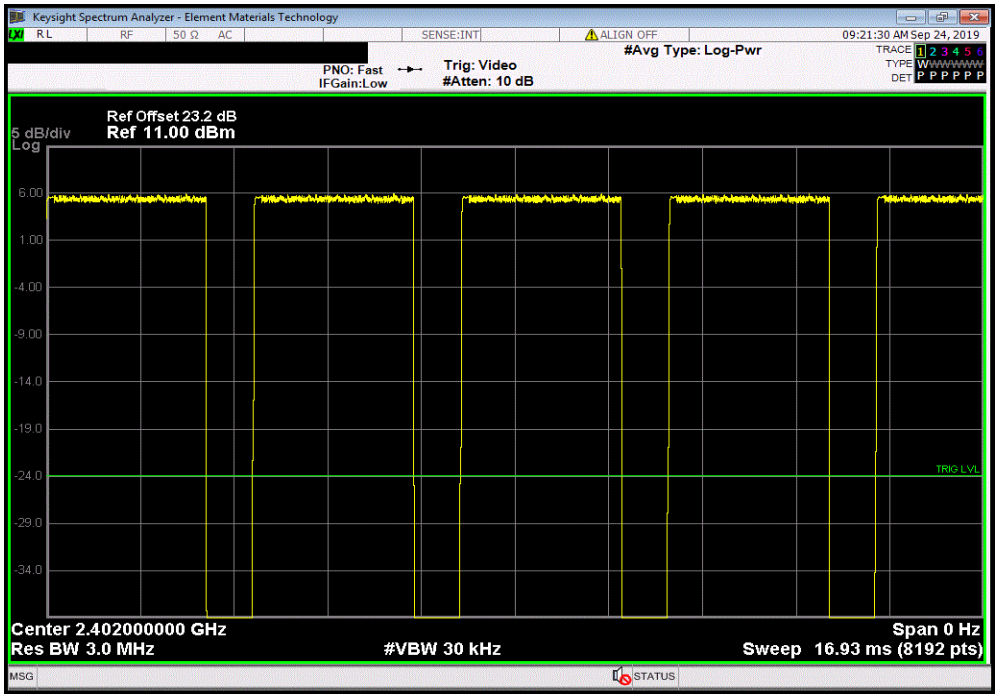


DUTY CYCLE CHARACTERIZATION

pi/4-DQPSK, 2DH5, Low Channel, 2402 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	2.892 ms	3.75 ms	1	77.1	N/A	N/A

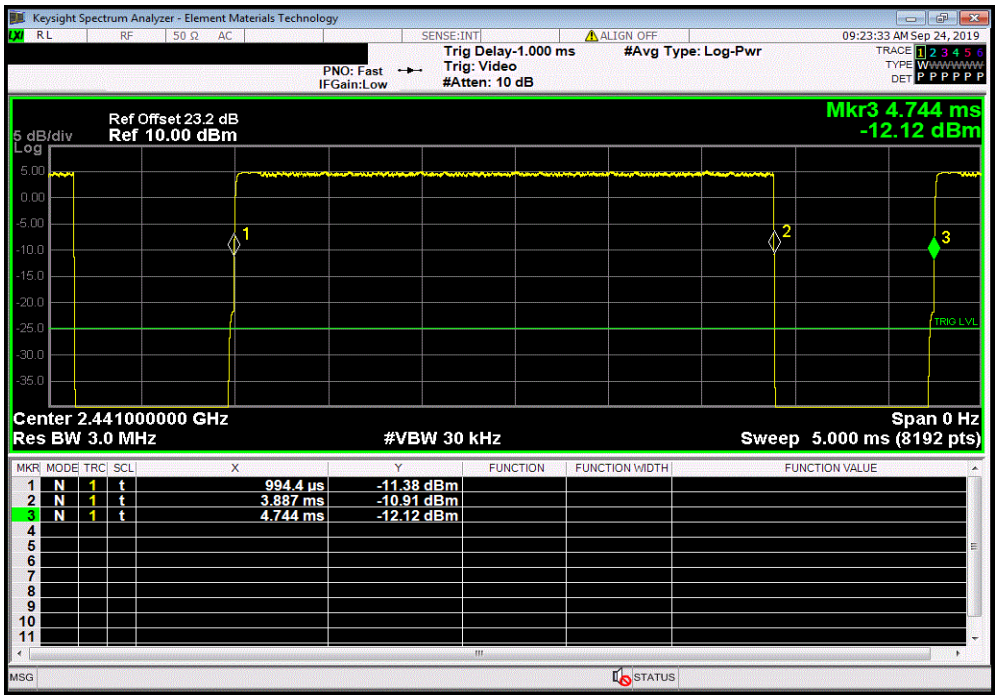


pi/4-DQPSK, 2DH5, Low Channel, 2402 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

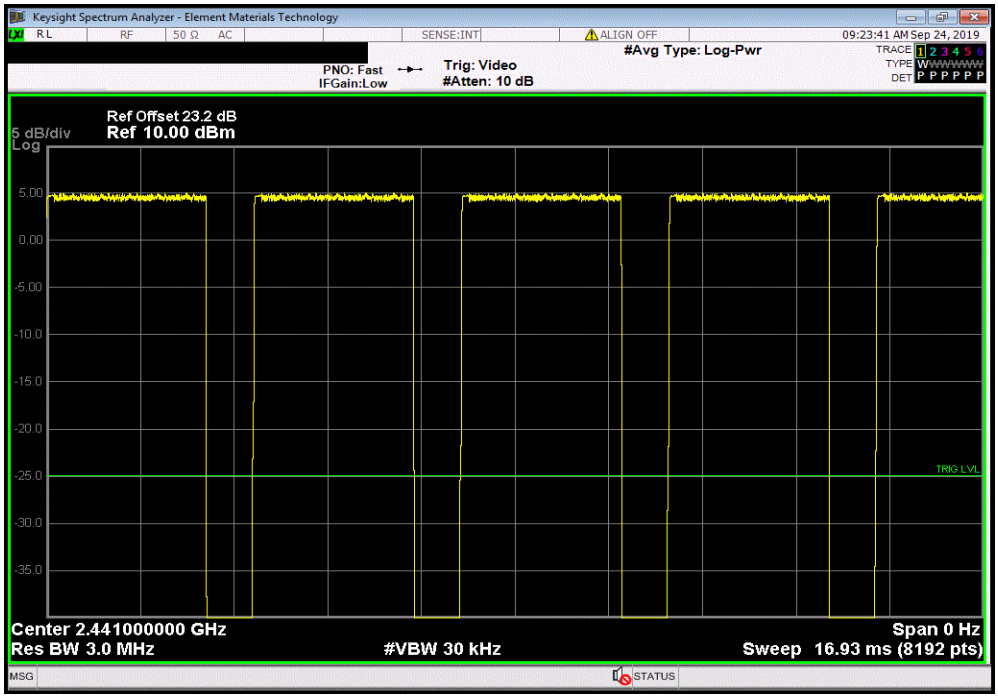


DUTY CYCLE CHARACTERIZATION

pi/4-DQPSK, 2DH5, Mid Channel, 2441 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	2.892 ms	3.75 ms	1	77.1	N/A	N/A



pi/4-DQPSK, 2DH5, Mid Channel, 2441 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

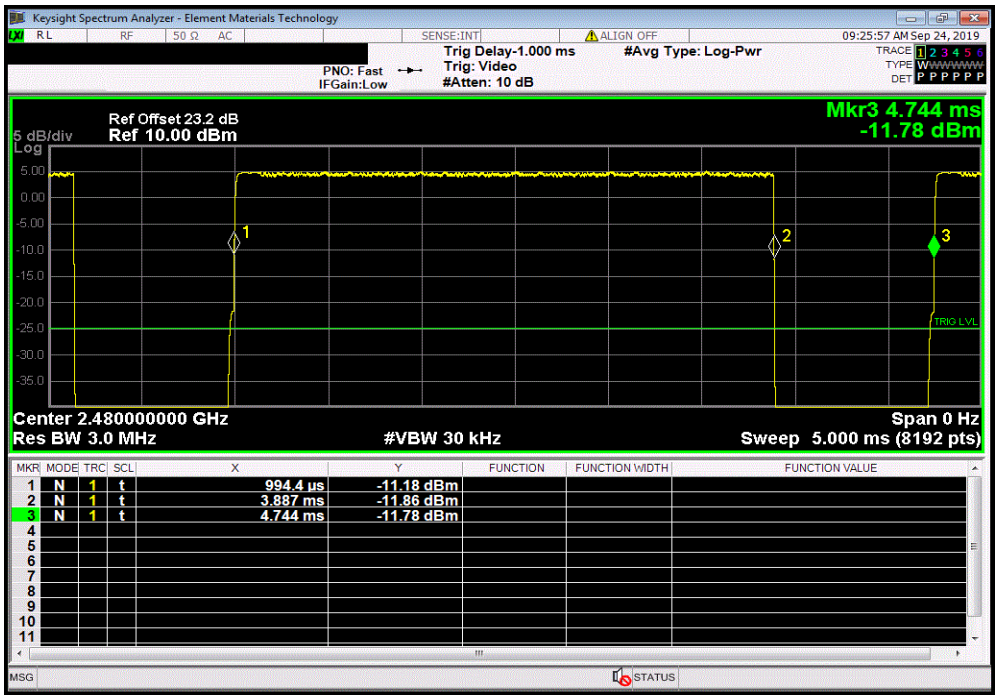


DUTY CYCLE CHARACTERIZATION

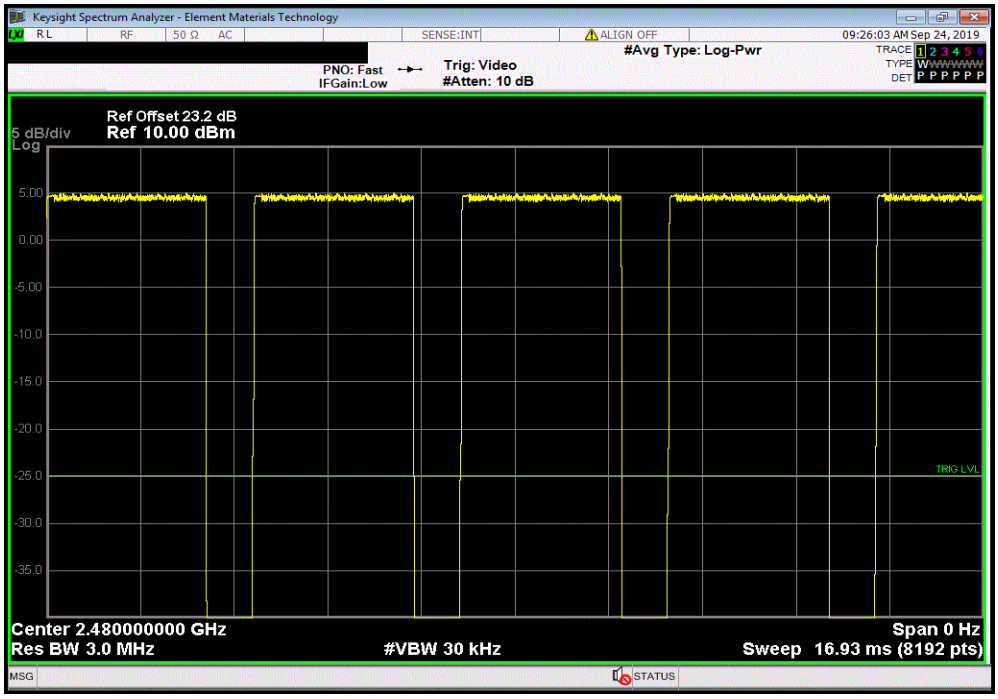
element

TbtTx 2019.08.02 XMit 2019.09.05

pi/4-DQPSK, 2DH5, High Channel, 2480 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	2.892 ms	3.75 ms	1	77.1	N/A	N/A

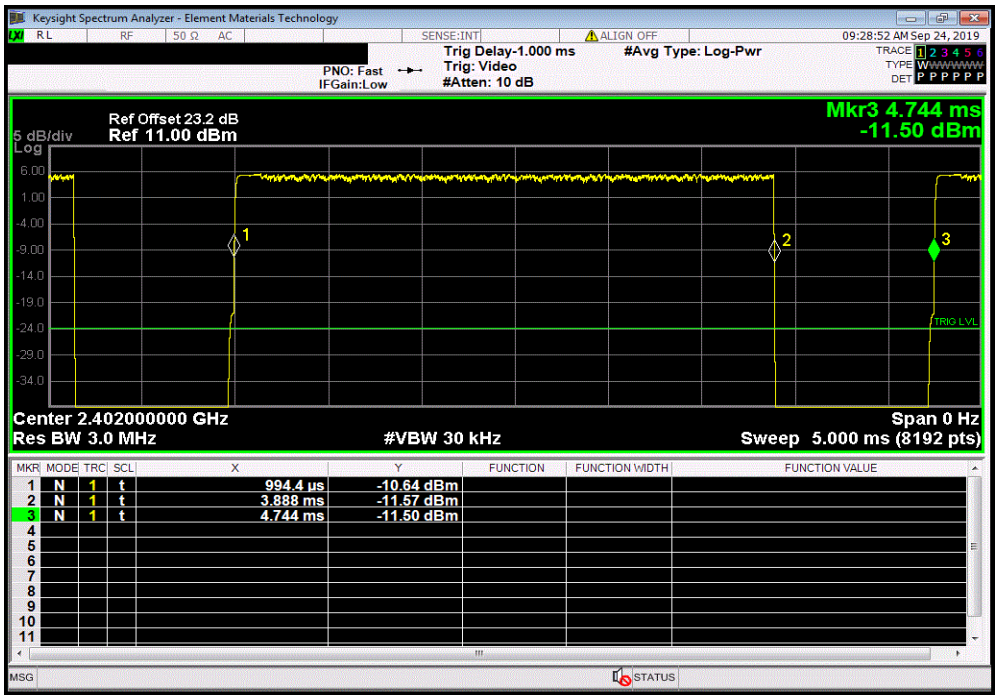


pi/4-DQPSK, 2DH5, High Channel, 2480 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

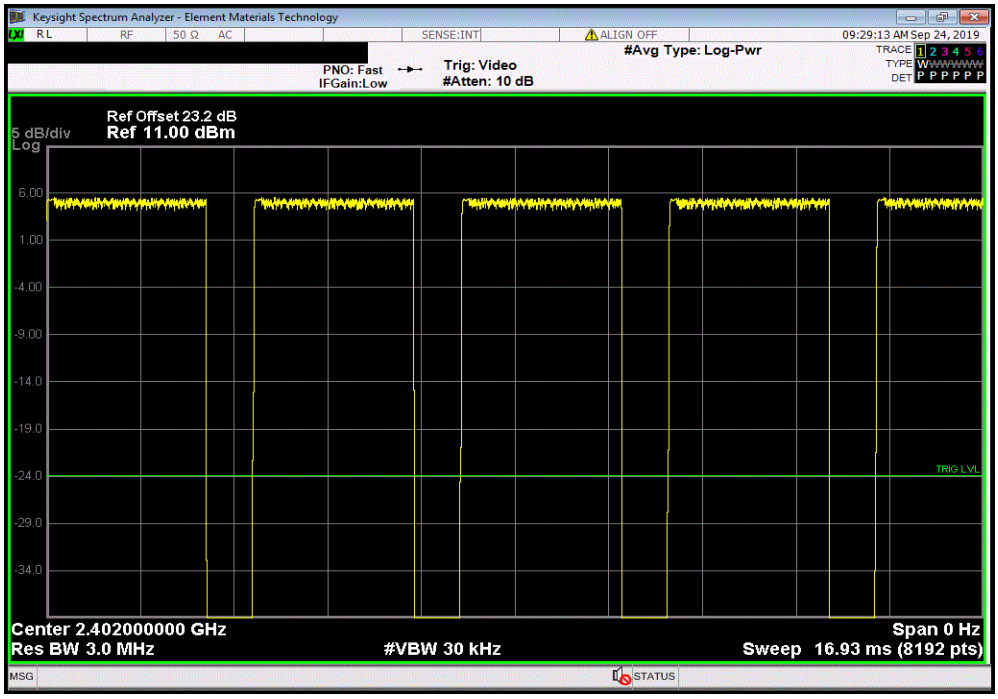


DUTY CYCLE CHARACTERIZATION

8DPSK, 3DH5, Low Channel, 2402 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	2.894 ms	3.75 ms	1	77.2	N/A	N/A

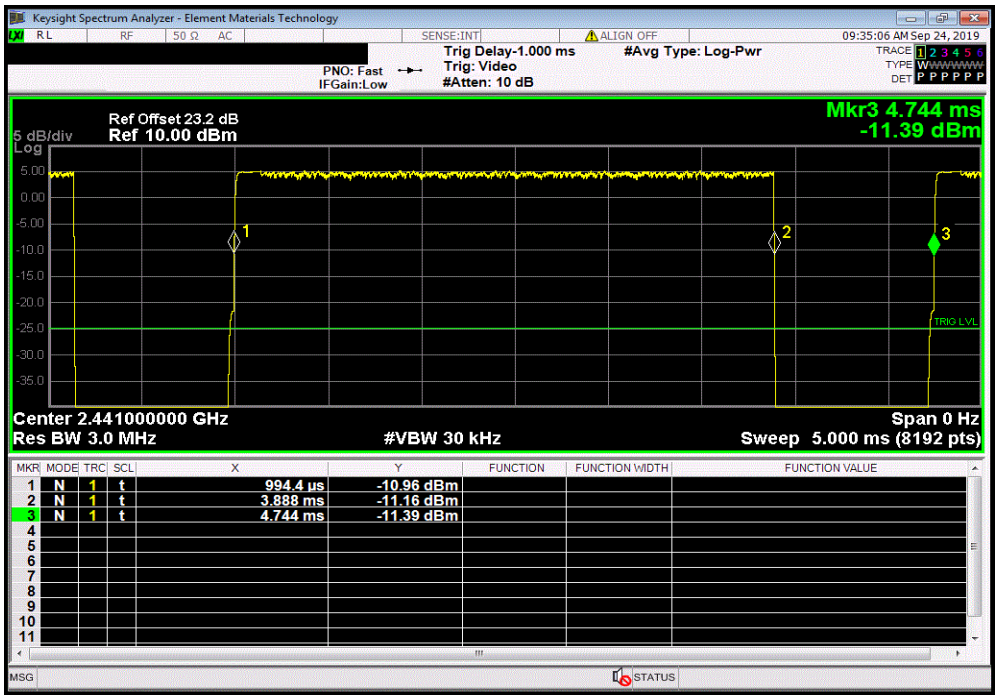


8DPSK, 3DH5, Low Channel, 2402 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

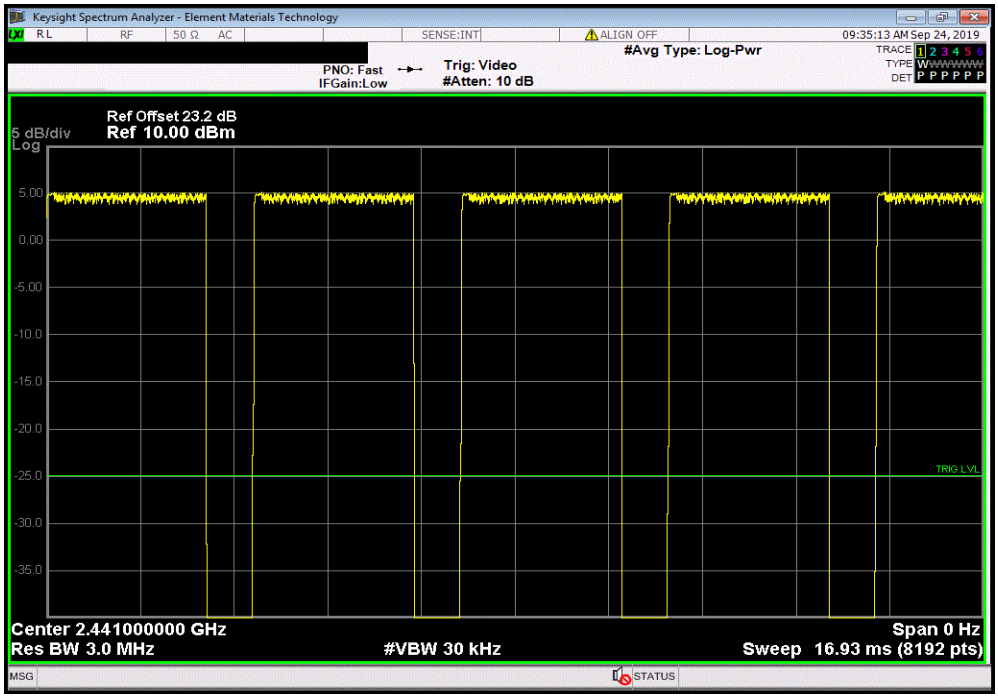


DUTY CYCLE CHARACTERIZATION

8DPSK, 3DH5, Mid Channel, 2441 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	2.893 ms	3.75 ms	1	77.2	N/A	N/A

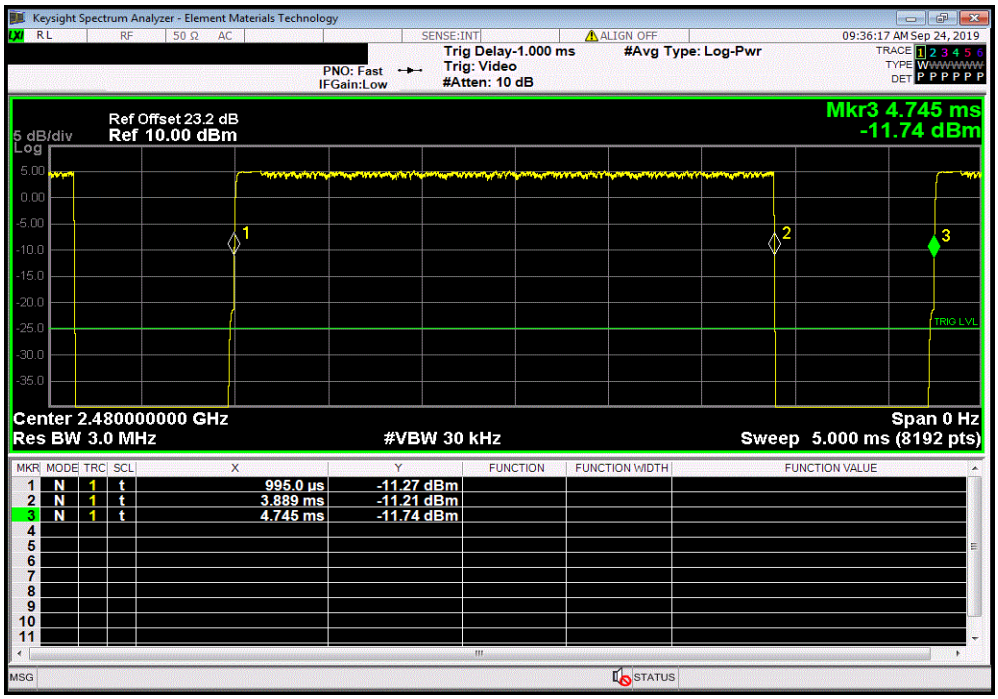


8DPSK, 3DH5, Mid Channel, 2441 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

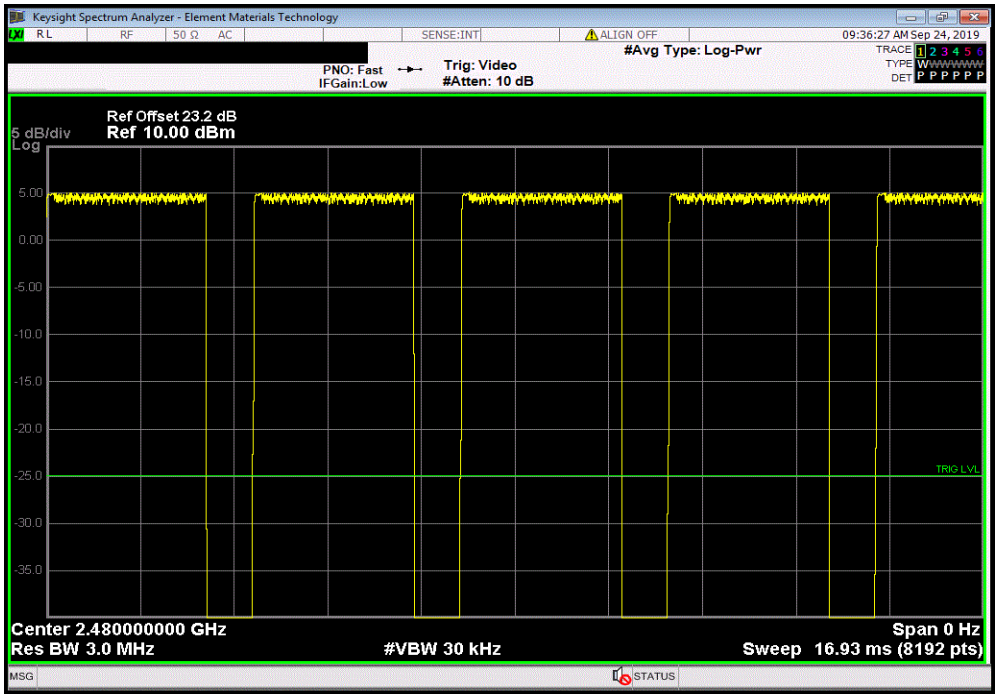


DUTY CYCLE CHARACTERIZATION

8DPSK, 3DH5, High Channel, 2480 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	2.894 ms	3.75 ms	1	77.2	N/A	N/A



8DPSK, 3DH5, High Channel, 2480 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



CARRIER FREQUENCY SEPARATION

XMit 2019.06.11

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	E8257D	TGU	15-Feb-18	15-Feb-21
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	NCR
Attenuator	Fairview Microwave	SA18H-20	TKR	20-Dec-18	20-Dec-19
Block - DC	Fairview Microwave	SD3379	AMV	3-Jan-19	3-Jan-20
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFP	2-Jul-19	2-Jul-20

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The channel carrier frequencies in the 2400-2483.5MHz band must be separated by 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Or, if the output power is less than 125 mW, the channel separation can be 25 kHz or 2/3 of the 20dB bandwidth. The EUT was operated in pseudorandom hopping mode. The spectrum was scanned across two adjacent peaks. The separation between the peaks of these channels was measured.

CARRIER FREQUENCY SEPARATION

TbtTx 2018.09.13 XMit 2019.06.11

EUT:	MWMII			**Work Order:**	MASI0553
Serial Number:	ENG-1			**Date:**	3-Jul-19
Customer:	Masimo Corporation			**Temperature:**	26.4 °C
Attendees:	Anami Joshi			**Humidity:**	41.6% RH
Project:	None			**Barometric Pres.:**	1012 mbar
Tested by:	Luis Flores and Mark Baytan	**Power:**	3.6VDC	**Job Site:**	OC13

TEST SPECIFICATIONS	Test Method
FCC 15.247:2019	ANSI C63.10:2013

COMMENTS

Reference level offset: DC block + 20dB attenuator + coax cable + client provided patch cable = 23.7dB Total Offset

DEVIATIONS FROM TEST STANDARD

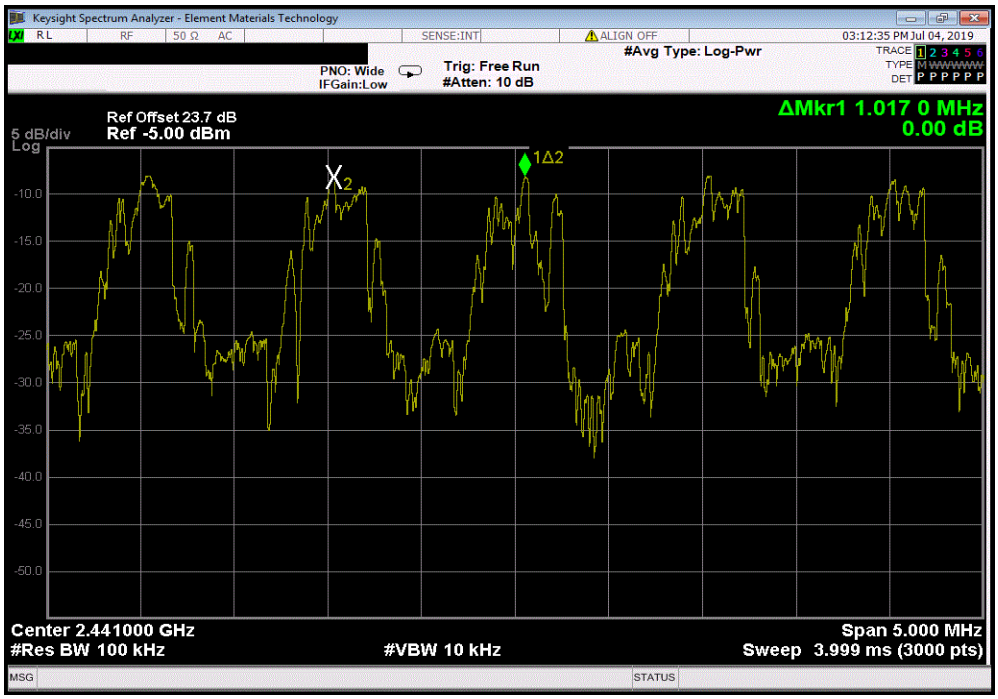
None

Configuration #	2	Signature

		Value	Limit (≥)	Results
Hopping Mode (All Channels)				
	DH5, GFSK			
	Mid Channel, 2441 MHz	1.0 MHz	1 MHz	Pass

CARRIER FREQUENCY SEPARATION

Hopping Mode (All Channels), DH5, GFSK, Mid Channel, 2441 MHz						
				Value	Limit (≥)	Results
				1.0 MHz	1 MHz	Pass



NUMBER OF HOPPING FREQUENCIES

XMit 2019.06.11

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	E8257D	TGU	15-Feb-18	15-Feb-21
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	NCR
Attenuator	Fairview Microwave	SA18H-20	TKR	20-Dec-18	20-Dec-19
Block - DC	Fairview Microwave	SD3379	AMV	3-Jan-19	3-Jan-20
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFP	2-Jul-19	2-Jul-20

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The number of hopping frequencies was measured across the authorized band. The hopping function of the EUT was enabled.

NUMBER OF HOPPING FREQUENCIES

element

TbtTx 2018.09.13 XMit 2019.06.11

EUT:	**MWMII**			**Work Order:**	**MASI0553**
Serial Number:	**ENG-1**			**Date:**	**3-Jul-19**
Customer:	**Masimo Corporation**			**Temperature:**	**26.4 °C**
Attendees:	**Anami Joshi**			**Humidity:**	**41.6% RH**
Project:	**None**			**Barometric Pres.:**	**1012 mbar**
Tested by:	**Luis Flores and Mark Baytan**	**Power:**	**3.6VDC**	**Job Site:**	**OC13**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2019	ANSI C63.10:2013

COMMENTS

Reference level offset: DC block + 20dB attenuator + coax cable + client provided patch cable = 23.7dB Total Offset

DEVIATIONS FROM TEST STANDARD

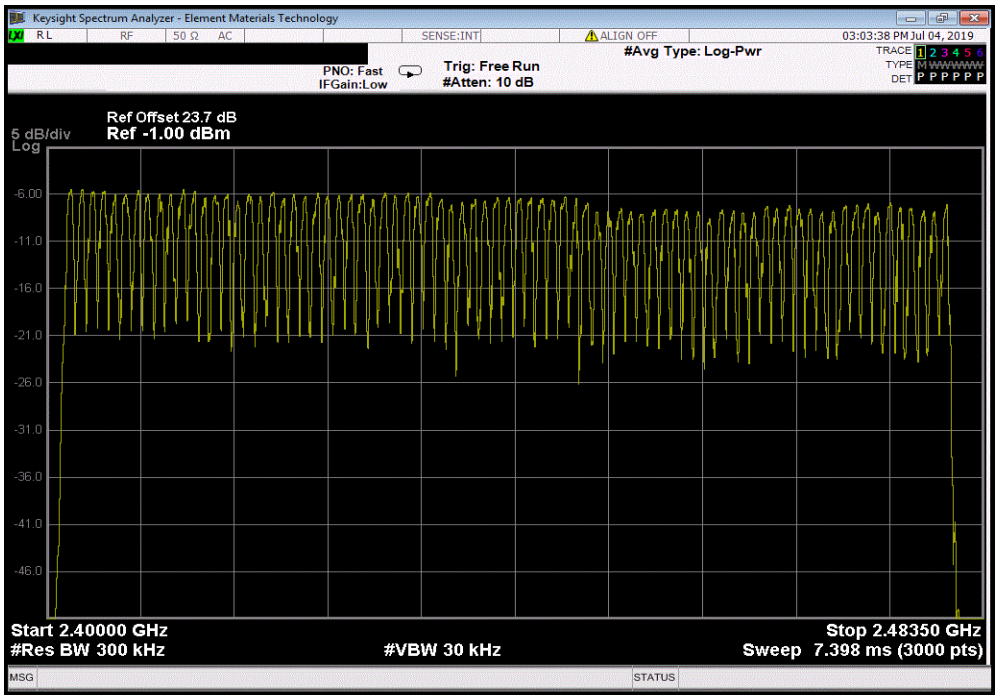
None

Configuration #	**2**	*Signature*

	Number of Channels	**Limit (≥)**	**Results**
Hopping Mode (All Channels)			
DH5, GFSK			
Mid Channel, 2441 MHz	79	15	Pass

NUMBER OF HOPPING FREQUENCIES

Hopping Mode (All Channels), DH5, GFSK, Mid Channel, 2441 MHz						
				Number of Channels	Limit (≥)	Results
				79	15	Pass



DWELL TIME

XMit 2019.06.11

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	E8257D	TGU	15-Feb-18	15-Feb-21
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	NCR
Attenuator	Fairview Microwave	SA18H-20	TKR	20-Dec-18	20-Dec-19
Block - DC	Fairview Microwave	SD3379	AMV	3-Jan-19	3-Jan-20
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	12-Feb-19	12-Feb-20

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The average dwell time per hopping channel was measured at one hopping channel in the middle of the authorized band. The hopping function of the EUT was enabled.

The dwell time limit is based on the Number of Hopping Channels * 400 mS. For Bluetooth this would be 79 Channels * 400mS = 31.6 Sec.

On Time During 31.6 Sec = Pulse Width * Average Number of Pulses * Scale Factor

➢Average Number of Pulses is based on 4 samples.

DWELL TIME

element

TbtTx 2019.08.02 XMit 2019.06.11

EUT:	MWMII			Work Order:	MASI0553
Serial Number:	ENG-1			Date:	3-Jul-19
Customer:	Masimo Corporation			Temperature:	26.4 °C
Attendees:	Anami Joshi			Humidity:	41.6% RH
Project:	None			Barometric Pres.:	1012 mbar
Tested by:	Luis Flores and Mark Baytan	Power:	3.6VDC	Job Site:	OC13

TEST SPECIFICATIONS	Test Method
FCC 15.247:2019	ANSI C63.10:2013

COMMENTS

Reference level offset: DC block + 20dB attenuator + coax cable + client provided patch cable = 23.7dB Total Offset

DEVIATIONS FROM TEST STANDARD

None

Configuration #	2	Signature

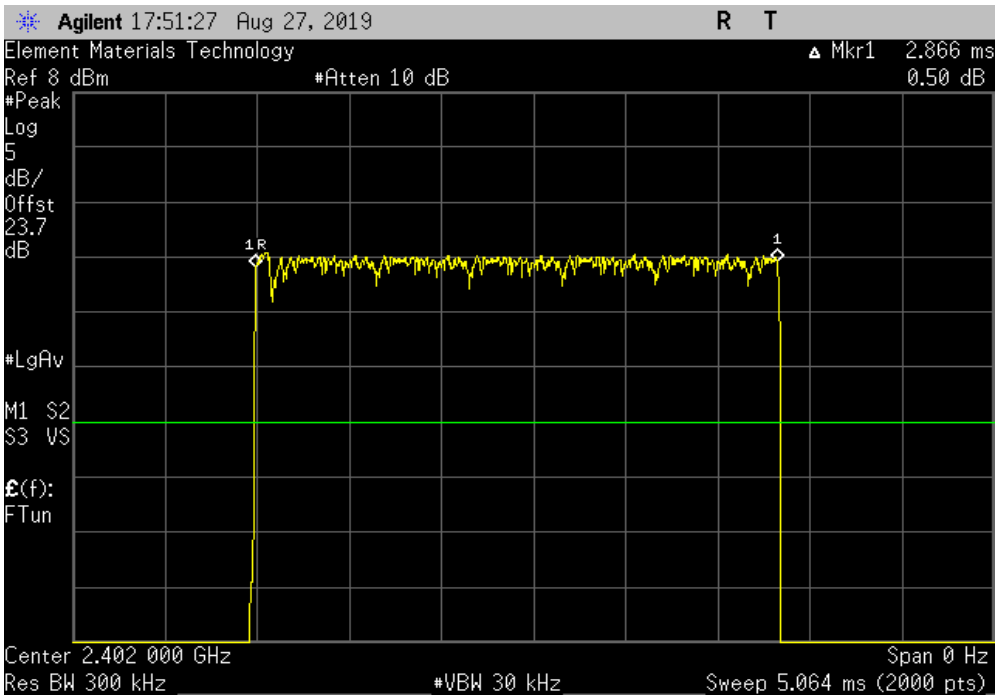
	Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
Hopping Mode (All Channels)							
GFSK, DH5							
Low Channel, 2402 MHz	2.866	N/A	N/A	N/A	N/A	N/A	N/A
Low Channel, 2402 MHz	N/A	28	N/A	N/A	N/A	N/A	N/A
Low Channel, 2402 MHz	N/A	17	N/A	N/A	N/A	N/A	N/A
Low Channel, 2402 MHz	N/A	28	N/A	N/A	N/A	N/A	N/A
Low Channel, 2402 MHz	N/A	16	N/A	N/A	N/A	N/A	N/A
Low Channel, 2402 MHz	2.866	N/A	22.25	5	318.84	400	Pass
High Channel, 2480 MHz	2.886	N/A	N/A	N/A	N/A	N/A	N/A
High Channel, 2480 MHz	N/A	17	N/A	N/A	N/A	N/A	N/A
High Channel, 2480 MHz	N/A	19	N/A	N/A	N/A	N/A	N/A
High Channel, 2480 MHz	N/A	16	N/A	N/A	N/A	N/A	N/A
High Channel, 2480 MHz	N/A	32	N/A	N/A	N/A	N/A	N/A
High Channel, 2480 MHz	2.886	N/A	21	5	303.03	400	Pass
pi/4-DQPSK, 2DH5							
Low Channel, 2402 MHz	2.889	N/A	N/A	N/A	N/A	N/A	N/A
Low Channel, 2402 MHz	N/A	18	N/A	N/A	N/A	N/A	N/A
Low Channel, 2402 MHz	N/A	27	N/A	N/A	N/A	N/A	N/A
Low Channel, 2402 MHz	N/A	27	N/A	N/A	N/A	N/A	N/A
Low Channel, 2402 MHz	N/A	24	N/A	N/A	N/A	N/A	N/A
Low Channel, 2402 MHz	2.889	N/A	24	5	346.68	400	Pass
High Channel, 2480 MHz	2.889	N/A	N/A	N/A	N/A	N/A	N/A
High Channel, 2480 MHz	N/A	19	N/A	N/A	N/A	N/A	N/A
High Channel, 2480 MHz	N/A	24	N/A	N/A	N/A	N/A	N/A
High Channel, 2480 MHz	N/A	17	N/A	N/A	N/A	N/A	N/A
High Channel, 2480 MHz	N/A	20	N/A	N/A	N/A	N/A	N/A
High Channel, 2480 MHz	2.889	N/A	20	5	288.9	400	Pass
8DPSK, 3DH5							
Low Channel, 2402 MHz	2.892	N/A	N/A	N/A	N/A	N/A	N/A
Low Channel, 2402 MHz	N/A	24	N/A	N/A	N/A	N/A	N/A
Low Channel, 2402 MHz	N/A	22	N/A	N/A	N/A	N/A	N/A
Low Channel, 2402 MHz	N/A	23	N/A	N/A	N/A	N/A	N/A
Low Channel, 2402 MHz	N/A	26	N/A	N/A	N/A	N/A	N/A
Low Channel, 2402 MHz	2.892	N/A	23.75	5	343.43	400	Pass
High Channel, 2480 MHz	2.892	N/A	N/A	N/A	N/A	N/A	N/A
High Channel, 2480 MHz	N/A	21	N/A	N/A	N/A	N/A	N/A
High Channel, 2480 MHz	N/A	24	N/A	N/A	N/A	N/A	N/A
High Channel, 2480 MHz	N/A	20	N/A	N/A	N/A	N/A	N/A
High Channel, 2480 MHz	N/A	21	N/A	N/A	N/A	N/A	N/A
High Channel, 2480 MHz	2.892	N/A	21.5	5	310.89	400	Pass

DWELL TIME

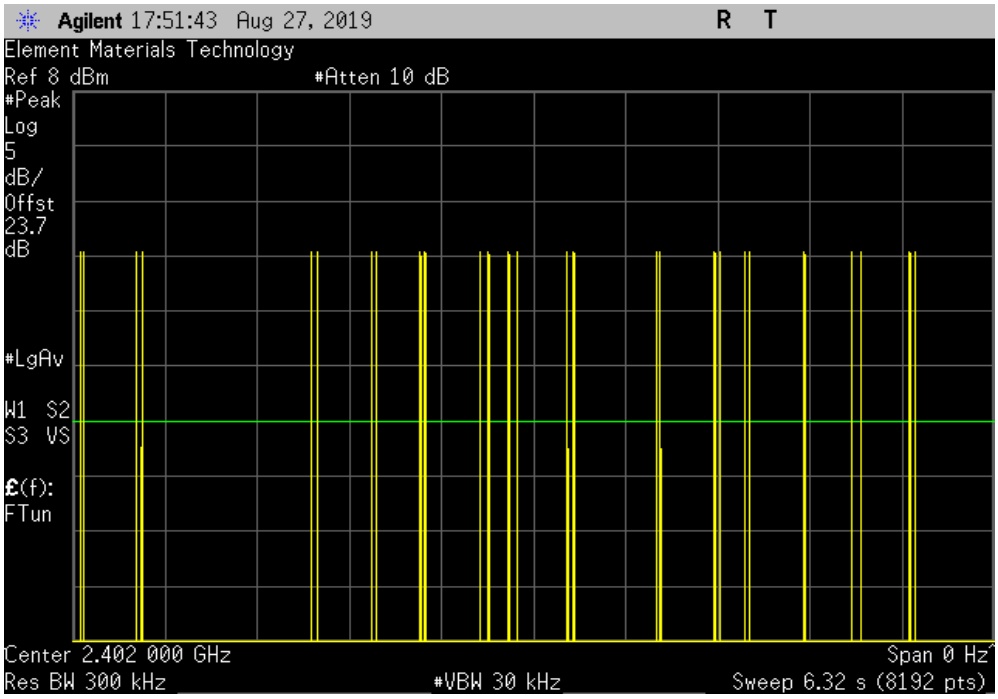
element

TbtTx 2019.08.02 XMit 2019.06.11

Hopping Mode (All Channels), GFSK, DH5, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.866	N/A	N/A	N/A	N/A	N/A	N/A

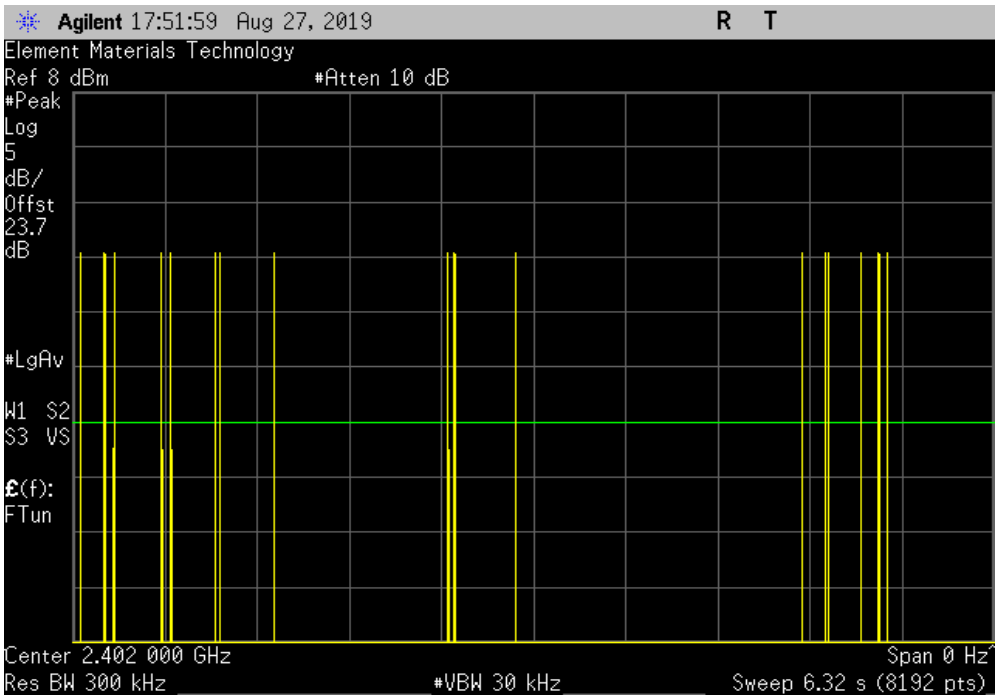


Hopping Mode (All Channels), GFSK, DH5, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	28	N/A	N/A	N/A	N/A	N/A

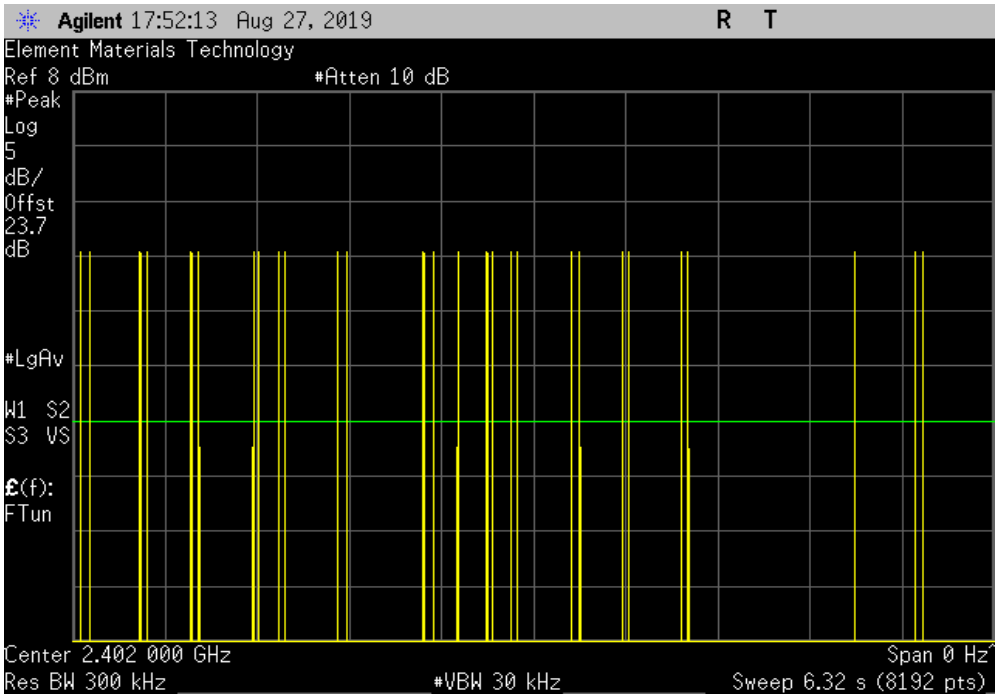


DWELL TIME

Hopping Mode (All Channels), GFSK, DH5, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	17	N/A	N/A	N/A	N/A	N/A

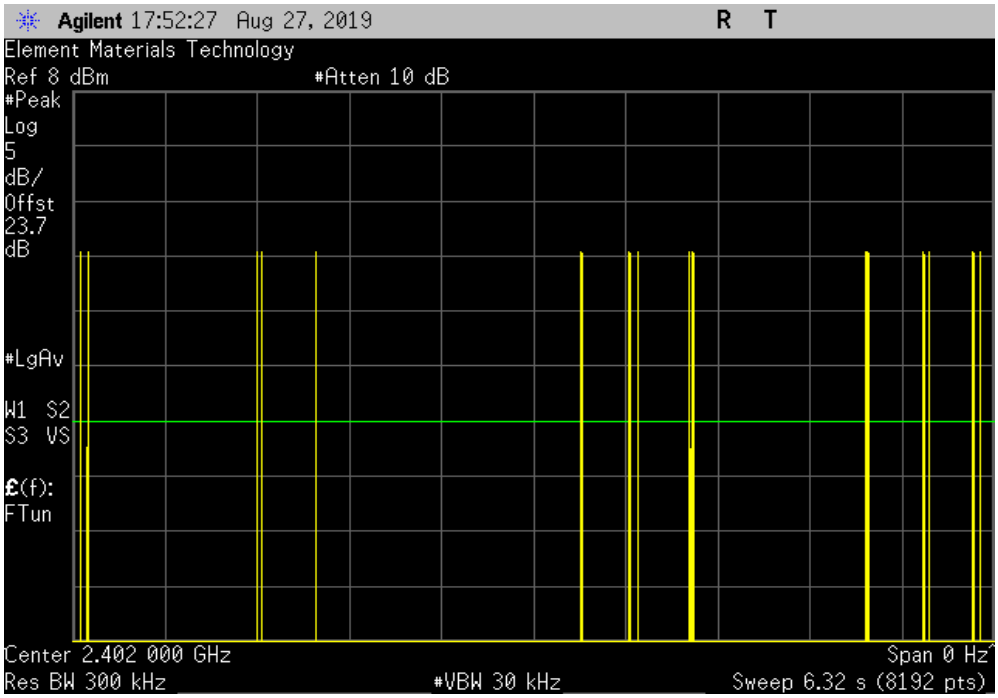


Hopping Mode (All Channels), GFSK, DH5, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	28	N/A	N/A	N/A	N/A	N/A



DWELL TIME

Hopping Mode (All Channels), GFSK, DH5, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	16	N/A	N/A	N/A	N/A	N/A



Hopping Mode (All Channels), GFSK, DH5, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.866	N/A	22.25	5	318.84	400	Pass

Calculation Only

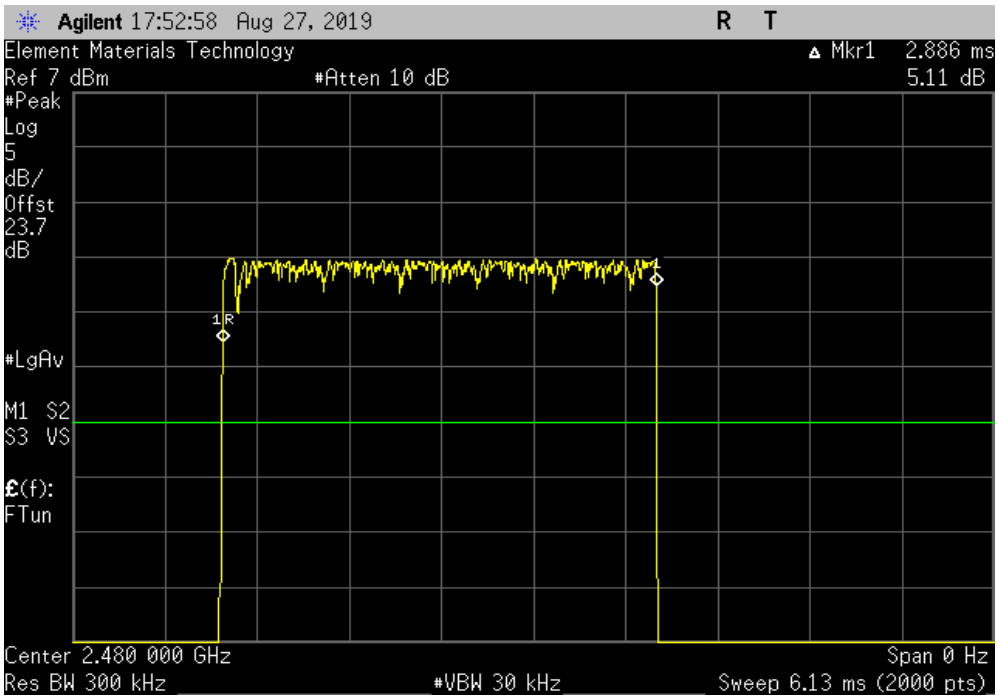
No Screen Capture Required

DWELL TIME

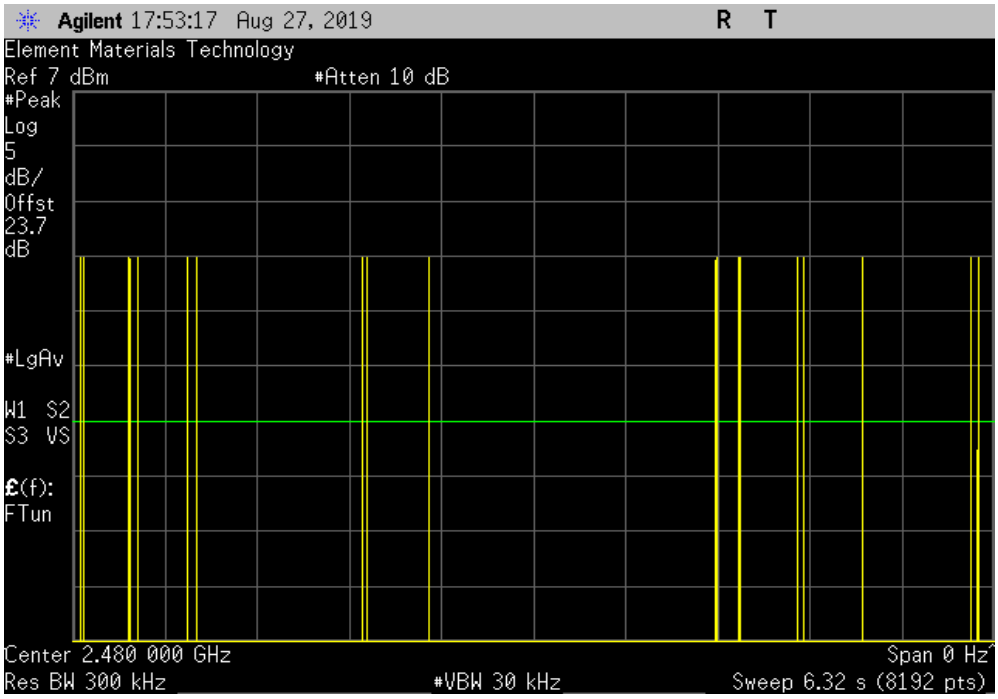
element

TbtTx 2019.08.02 XMit 2019.06.11

Hopping Mode (All Channels), GFSK, DH5, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.886	N/A	N/A	N/A	N/A	N/A	N/A

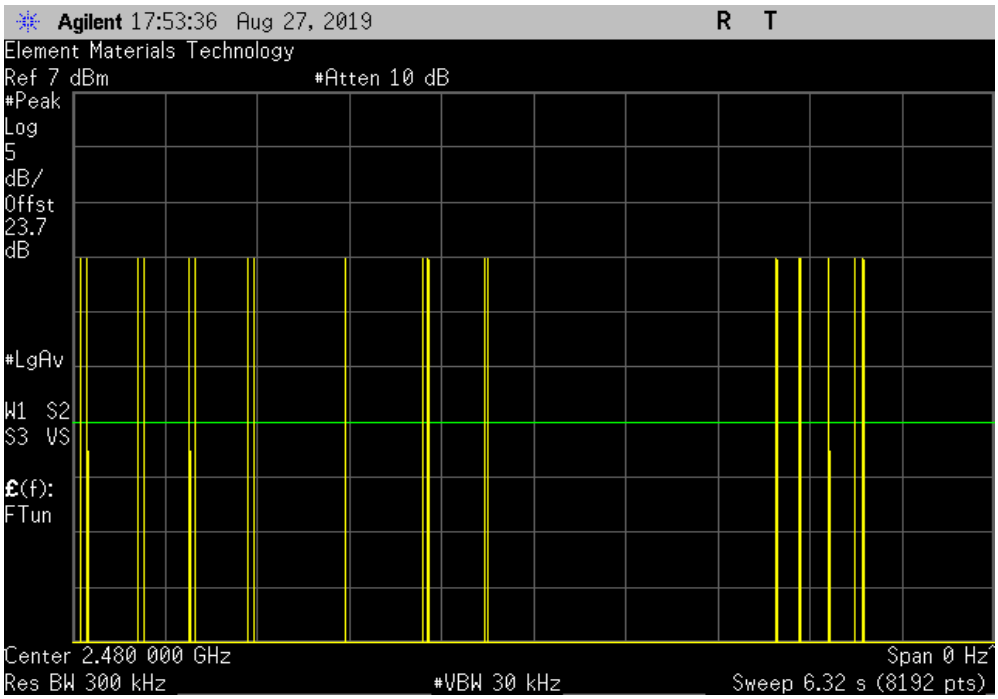


Hopping Mode (All Channels), GFSK, DH5, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	17	N/A	N/A	N/A	N/A	N/A

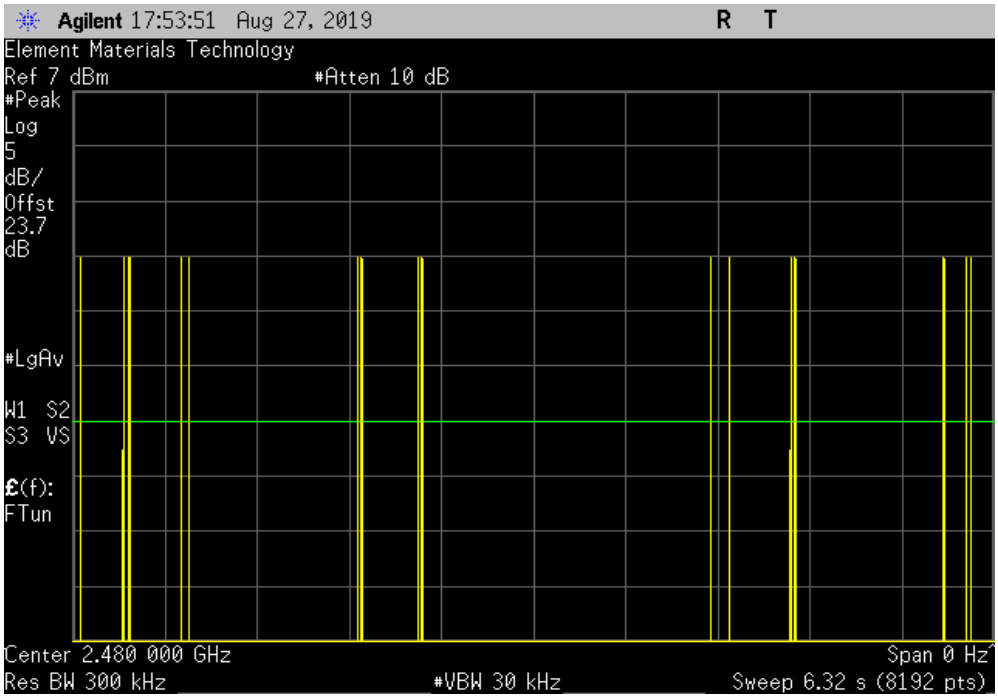


DWELL TIME

Hopping Mode (All Channels), GFSK, DH5, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	19	N/A	N/A	N/A	N/A	N/A

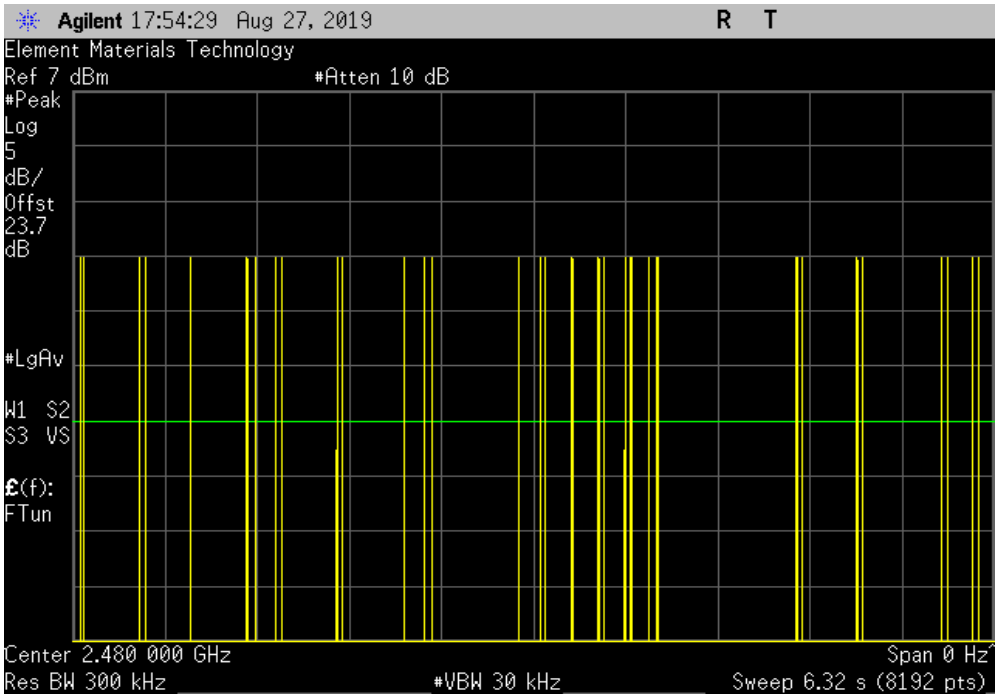


Hopping Mode (All Channels), GFSK, DH5, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	16	N/A	N/A	N/A	N/A	N/A



DWELL TIME

Hopping Mode (All Channels), GFSK, DH5, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	32	N/A	N/A	N/A	N/A	N/A



Hopping Mode (All Channels), GFSK, DH5, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.886	N/A	21	5	303.03	400	Pass

Calculation Only

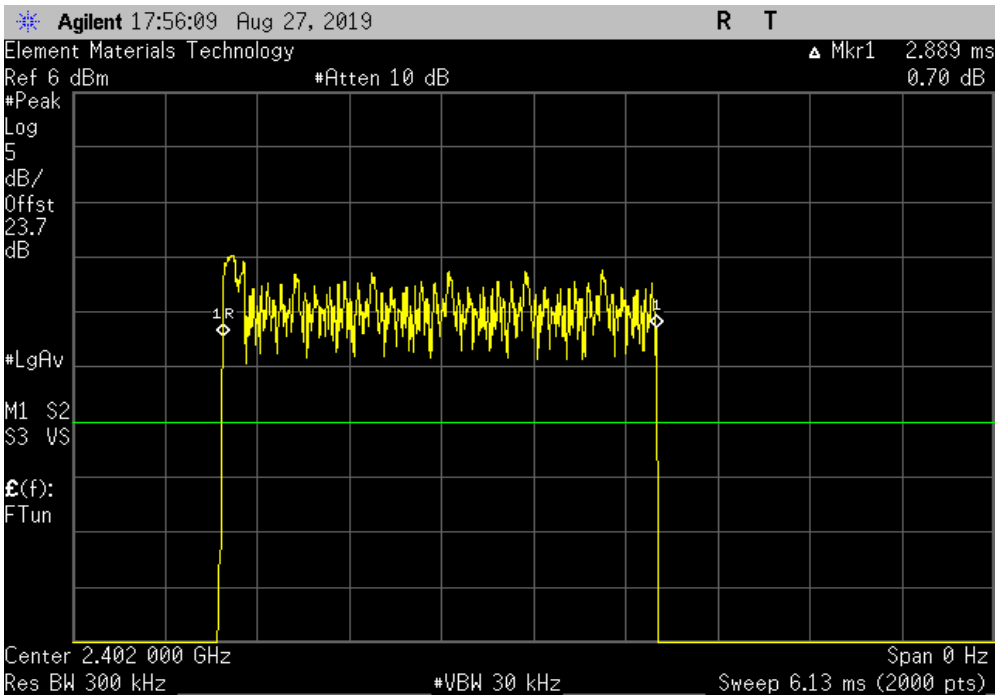
No Screen Capture Required

DWELL TIME

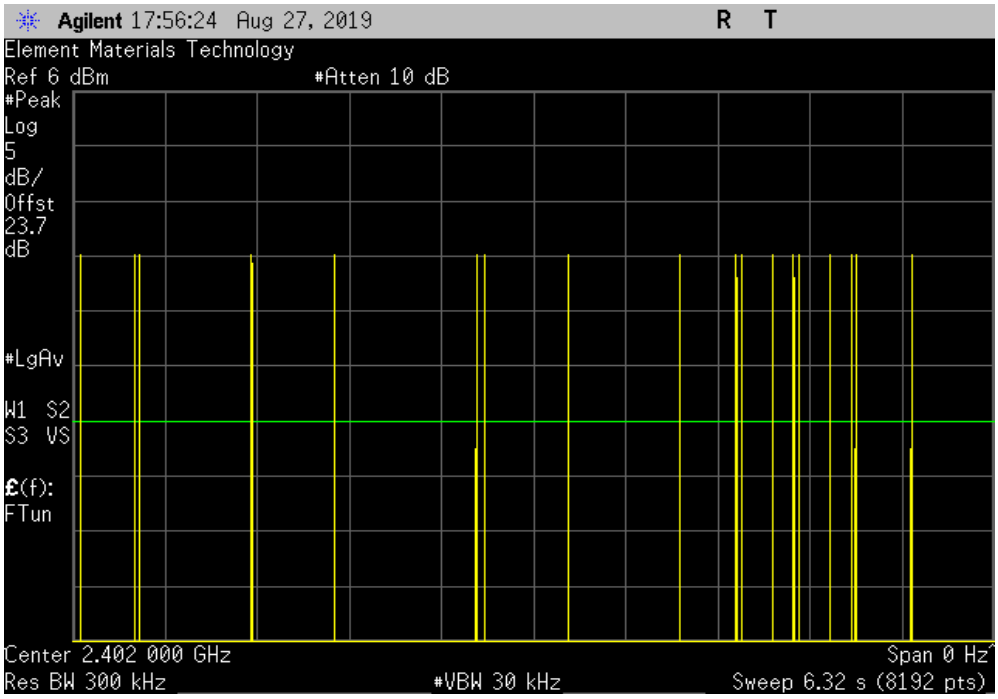
element

TbtTx 2019.08.02 XMit 2019.06.11

Hopping Mode (All Channels), pi/4-DQPSK, 2DH5, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.889	N/A	N/A	N/A	N/A	N/A	N/A

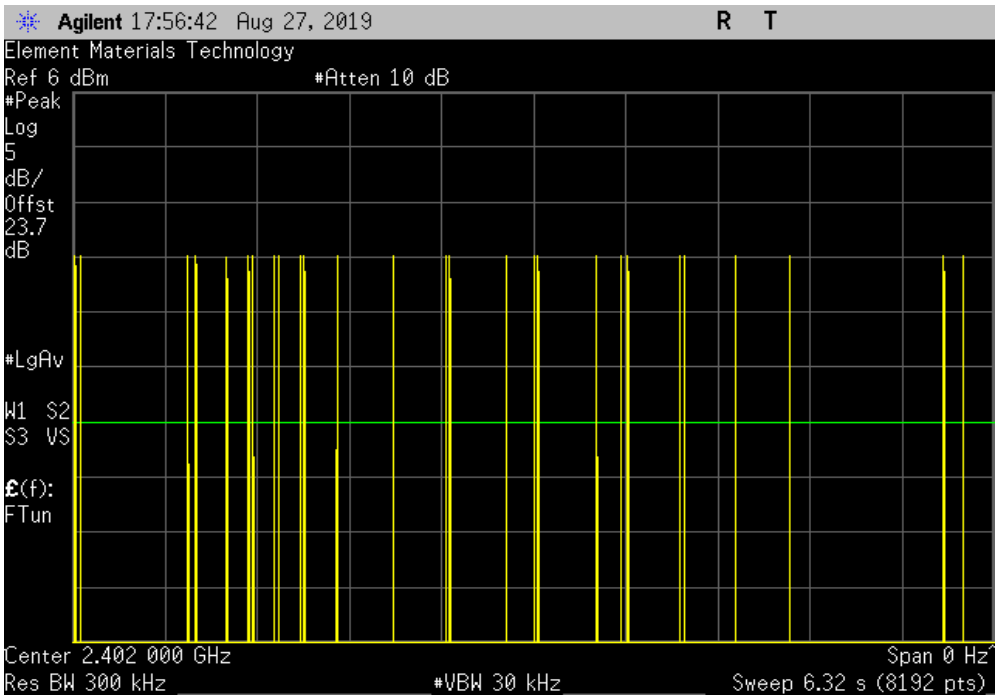


Hopping Mode (All Channels), pi/4-DQPSK, 2DH5, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	18	N/A	N/A	N/A	N/A	N/A

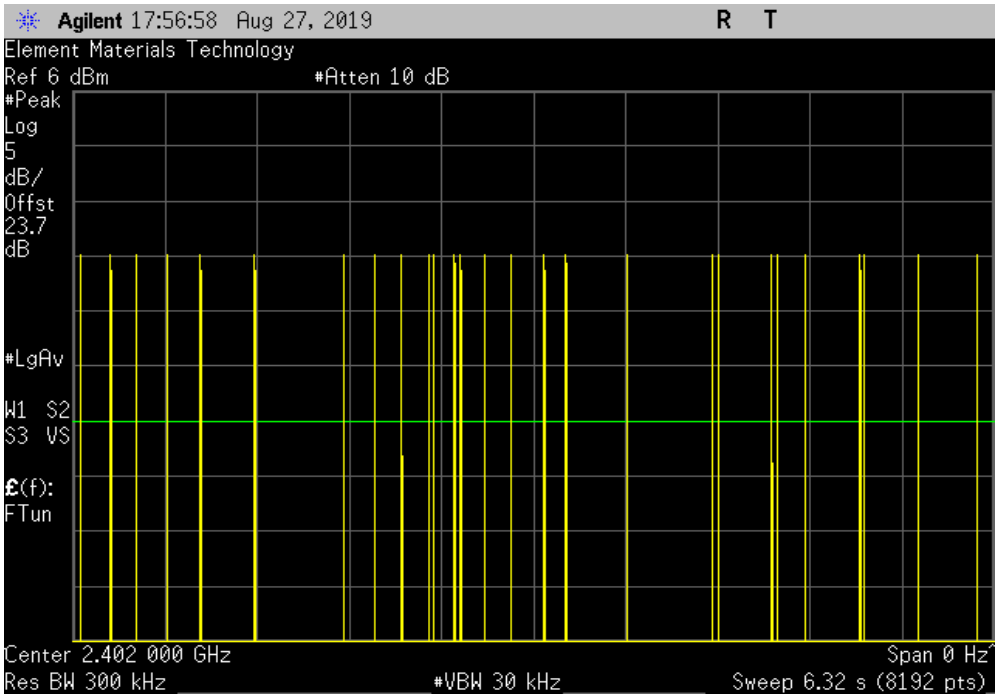


DWELL TIME

Hopping Mode (All Channels), pi/4-DQPSK, 2DH5, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	27	N/A	N/A	N/A	N/A	N/A

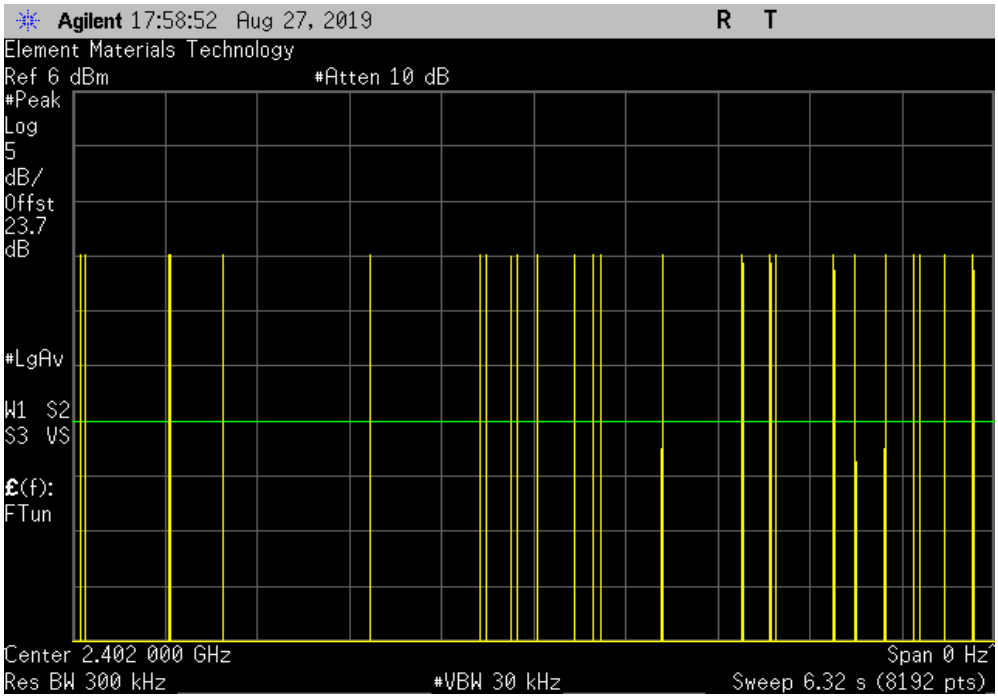


Hopping Mode (All Channels), pi/4-DQPSK, 2DH5, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	27	N/A	N/A	N/A	N/A	N/A



DWELL TIME

Hopping Mode (All Channels), pi/4-DQPSK, 2DH5, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	24	N/A	N/A	N/A	N/A	N/A



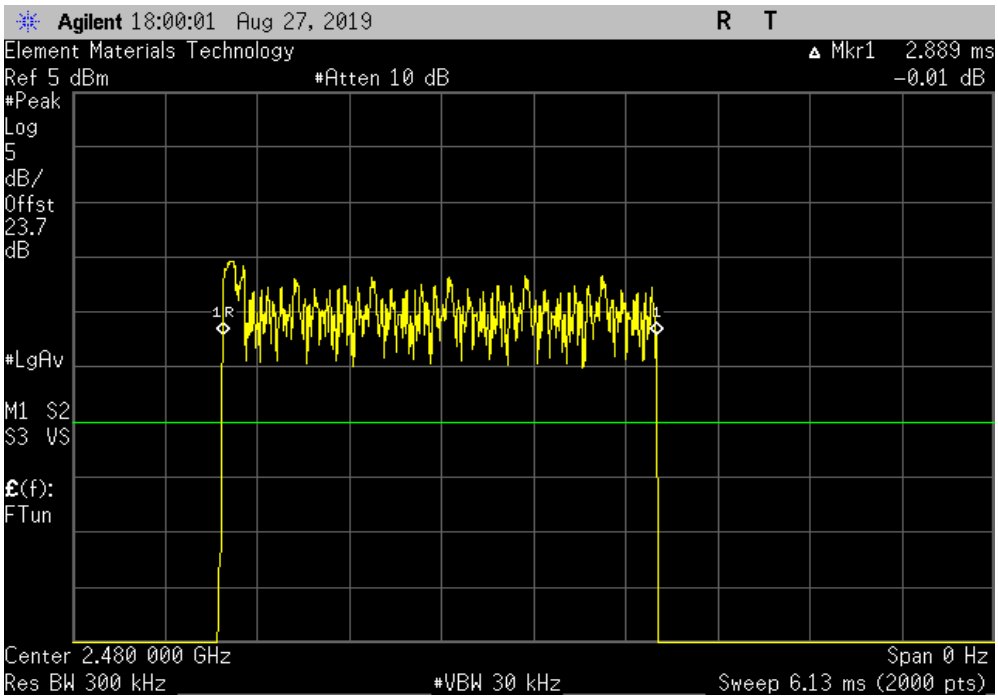
Hopping Mode (All Channels), pi/4-DQPSK, 2DH5, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.889	N/A	24	5	346.68	400	Pass

Calculation Only

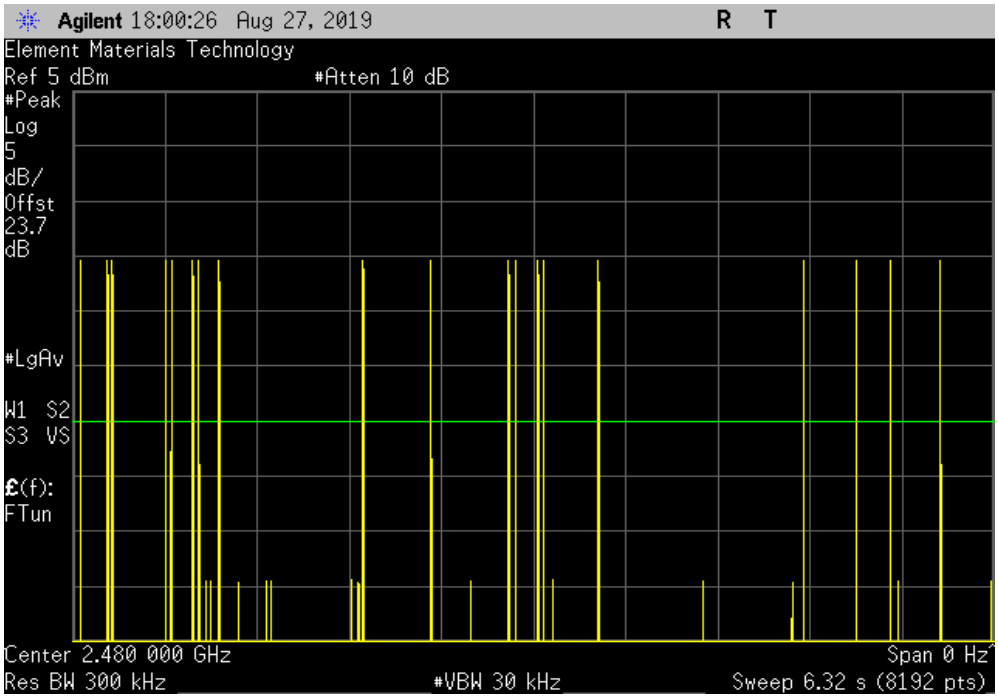
No Screen Capture Required

DWELL TIME

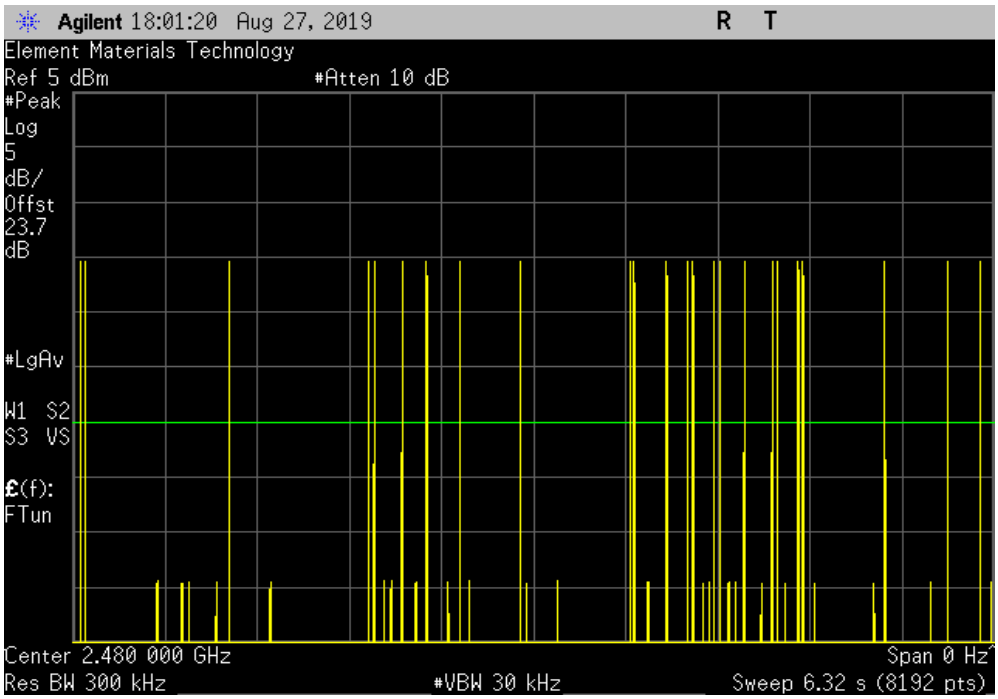
Hopping Mode (All Channels), pi/4-DQPSK, 2DH5, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.889	N/A	N/A	N/A	N/A	N/A	N/A



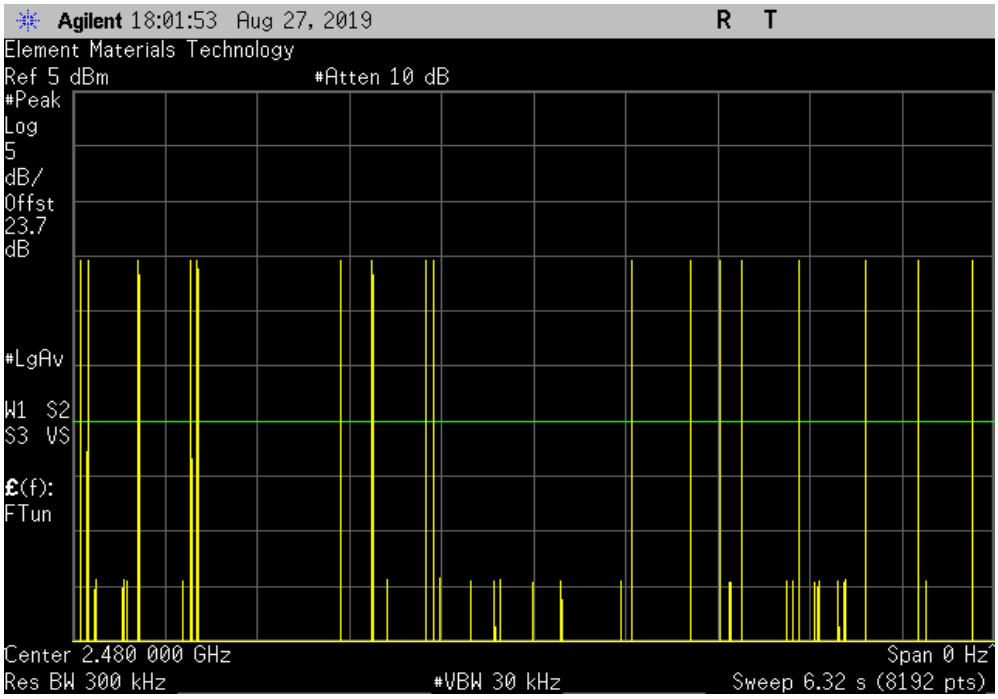
Hopping Mode (All Channels), pi/4-DQPSK, 2DH5, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	19	N/A	N/A	N/A	N/A	N/A



Hopping Mode (All Channels), pi/4-DQPSK, 2DH5, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	24	N/A	N/A	N/A	N/A	N/A

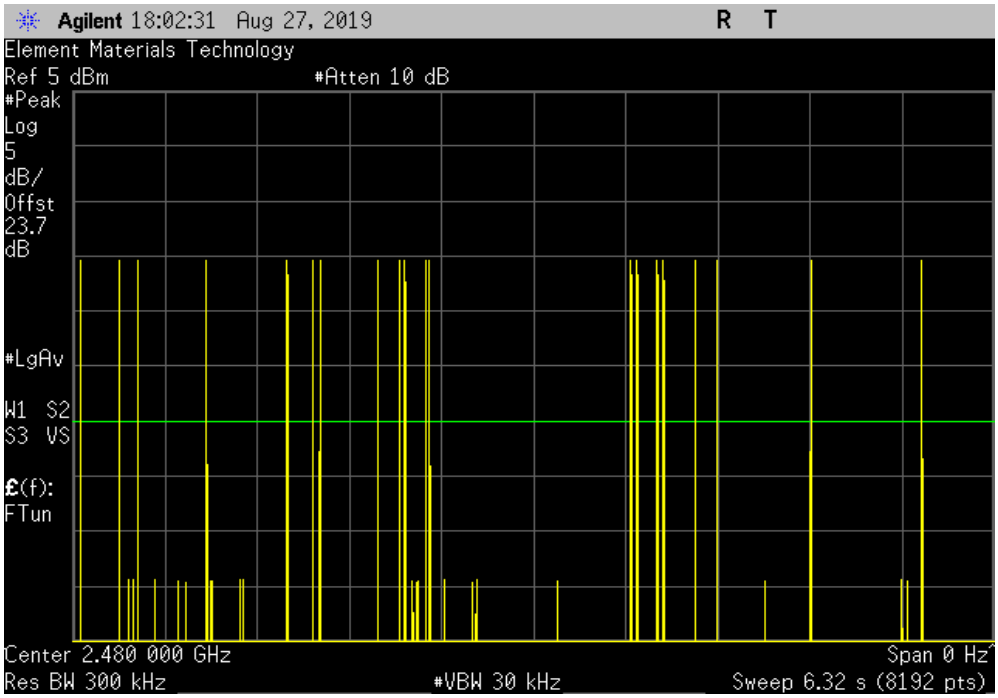


Hopping Mode (All Channels), pi/4-DQPSK, 2DH5, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	17	N/A	N/A	N/A	N/A	N/A



DWELL TIME

Hopping Mode (All Channels), pi/4-DQPSK, 2DH5, High Channel, 2480 MHz						
Pulse Width (ms)	**Number of Pulses**	**Average No. of Pulses**	**Scale Factor**	**On Time (ms) During 31.6 s**	**Limit (ms)**	**Results**
N/A	20	N/A	N/A	N/A	N/A	N/A



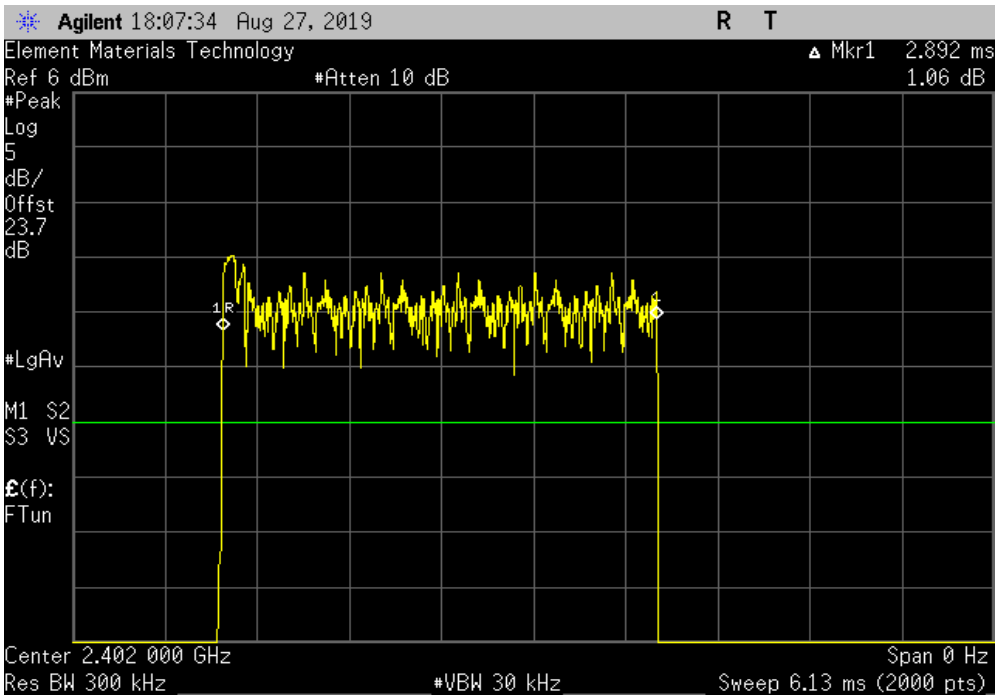
Hopping Mode (All Channels), pi/4-DQPSK, 2DH5, High Channel, 2480 MHz						
Pulse Width (ms)	**Number of Pulses**	**Average No. of Pulses**	**Scale Factor**	**On Time (ms) During 31.6 s**	**Limit (ms)**	**Results**
2.889	N/A	20	5	288.9	400	Pass

Calculation Only

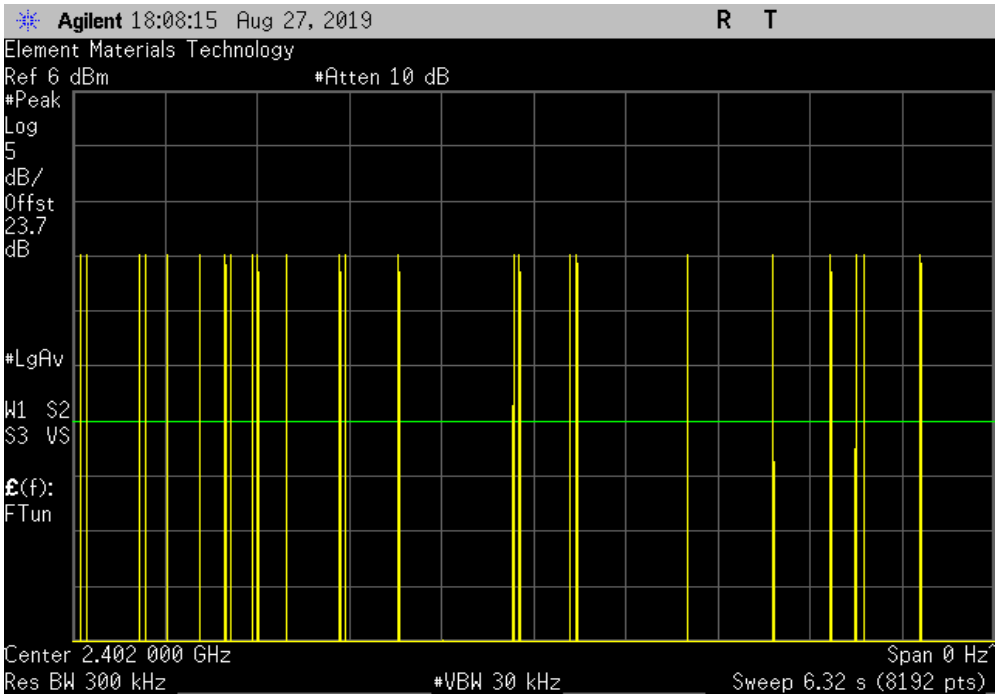
No Screen Capture Required

DWELL TIME

Hopping Mode (All Channels), 8DPSK, 3DH5, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.892	N/A	N/A	N/A	N/A	N/A	N/A

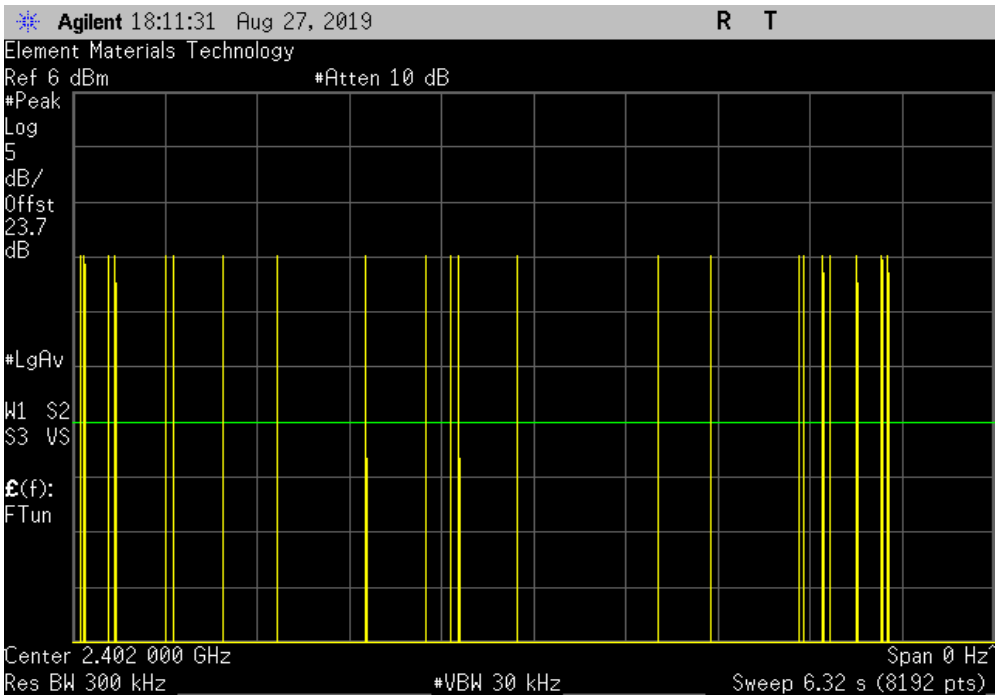


Hopping Mode (All Channels), 8DPSK, 3DH5, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	24	N/A	N/A	N/A	N/A	N/A

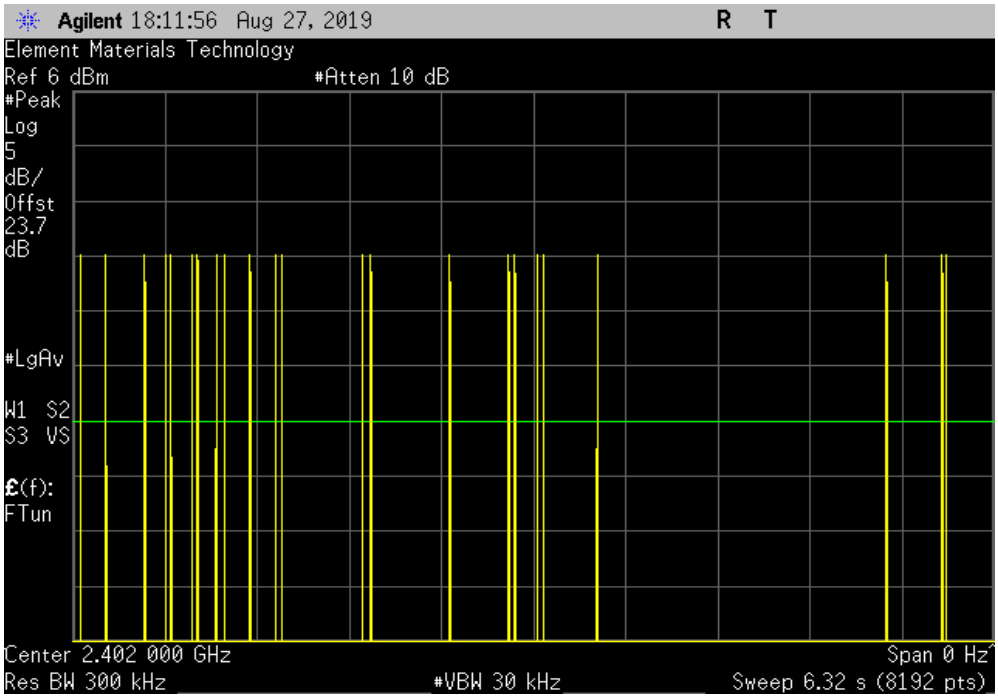


DWELL TIME

Hopping Mode (All Channels), 8DPSK, 3DH5, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	22	N/A	N/A	N/A	N/A	N/A



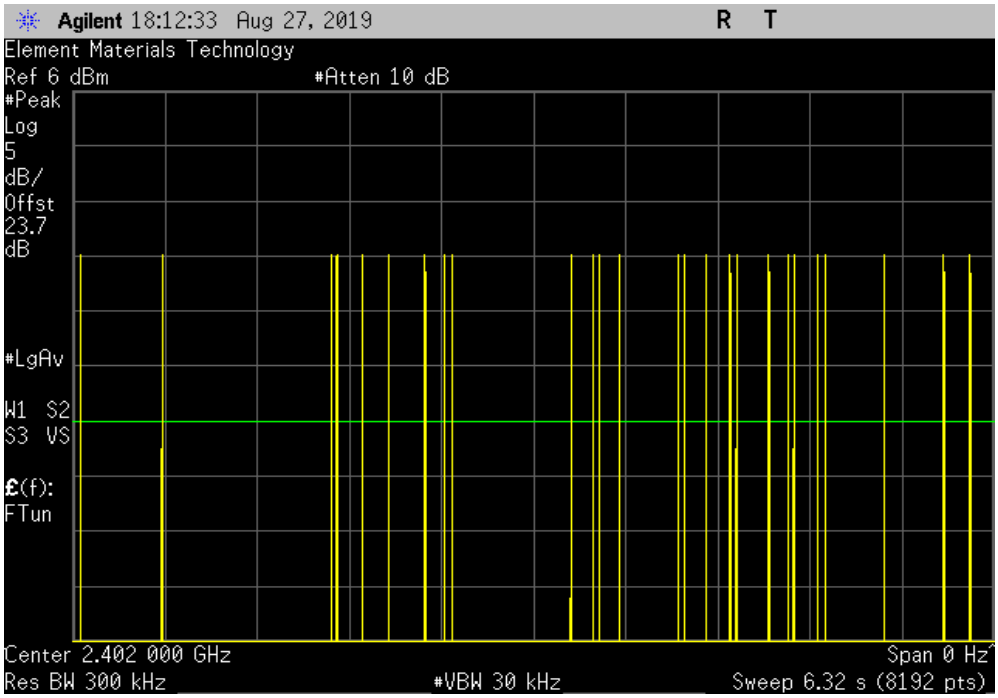
Hopping Mode (All Channels), 8DPSK, 3DH5, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	23	N/A	N/A	N/A	N/A	N/A



DWELL TIME

TbtTx 2019.08.02 XMit 2019.06.11

Hopping Mode (All Channels), 8DPSK, 3DH5, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	26	N/A	N/A	N/A	N/A	N/A



Hopping Mode (All Channels), 8DPSK, 3DH5, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.892	N/A	23.75	5	343.43	400	Pass

Calculation Only

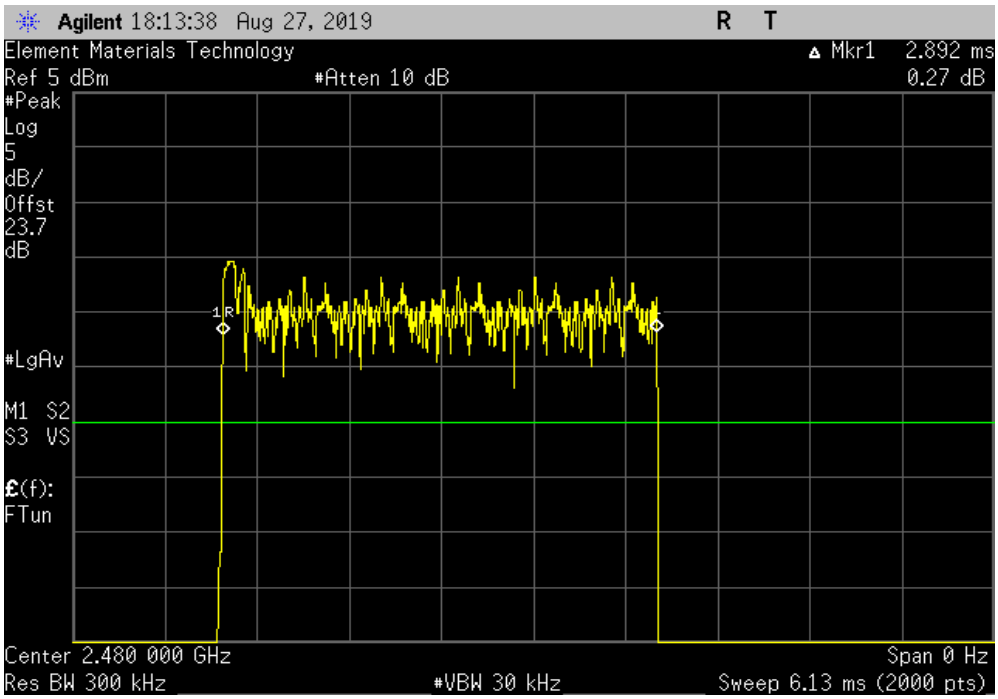
No Screen Capture Required

DWELL TIME

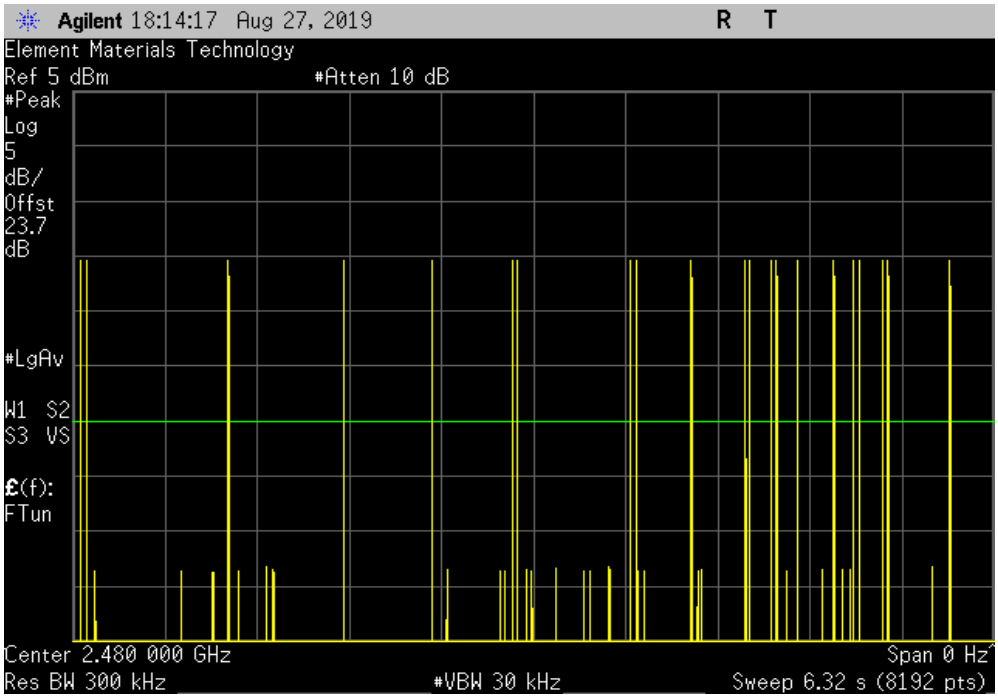
element

TbtTx 2019.08.02 XMit 2019.06.11

Hopping Mode (All Channels), 8DPSK, 3DH5, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.892	N/A	N/A	N/A	N/A	N/A	N/A

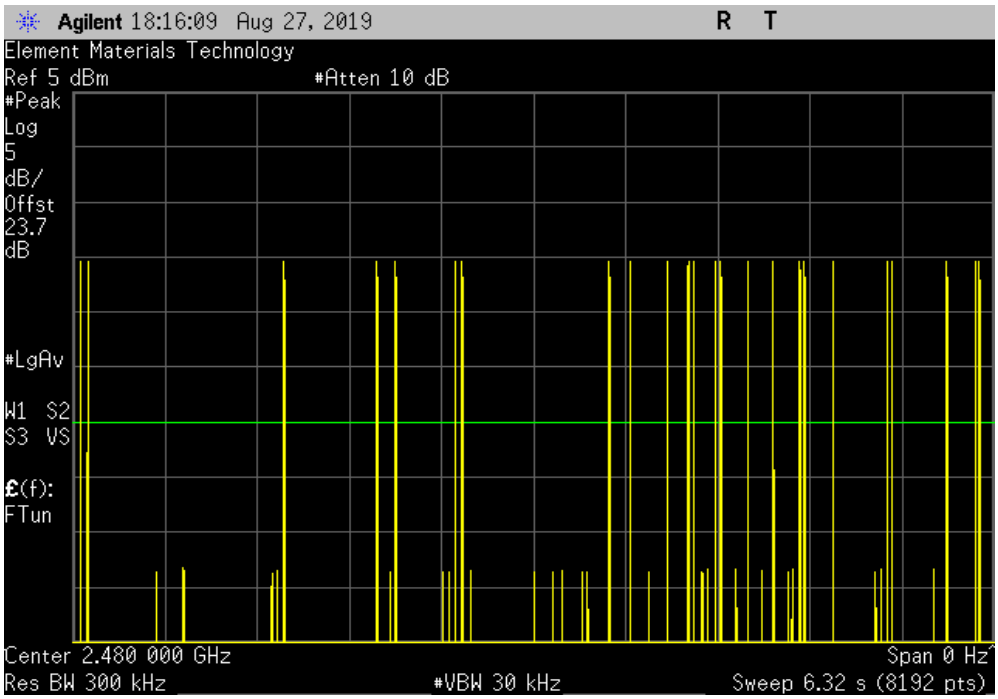


Hopping Mode (All Channels), 8DPSK, 3DH5, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	21	N/A	N/A	N/A	N/A	N/A

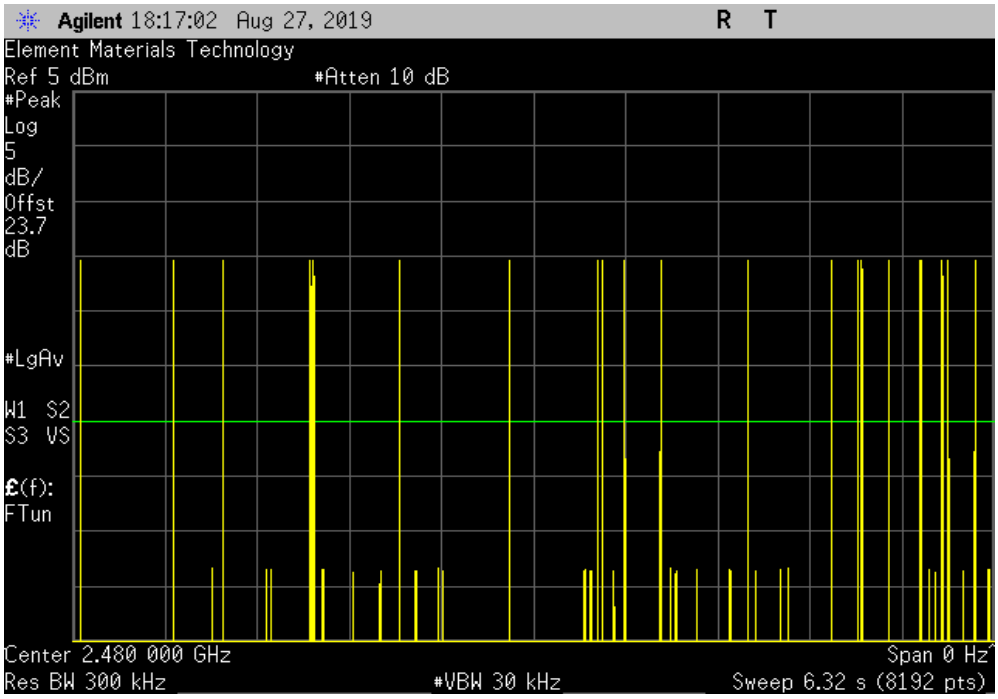


DWELL TIME

Hopping Mode (All Channels), 8DPSK, 3DH5, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	24	N/A	N/A	N/A	N/A	N/A



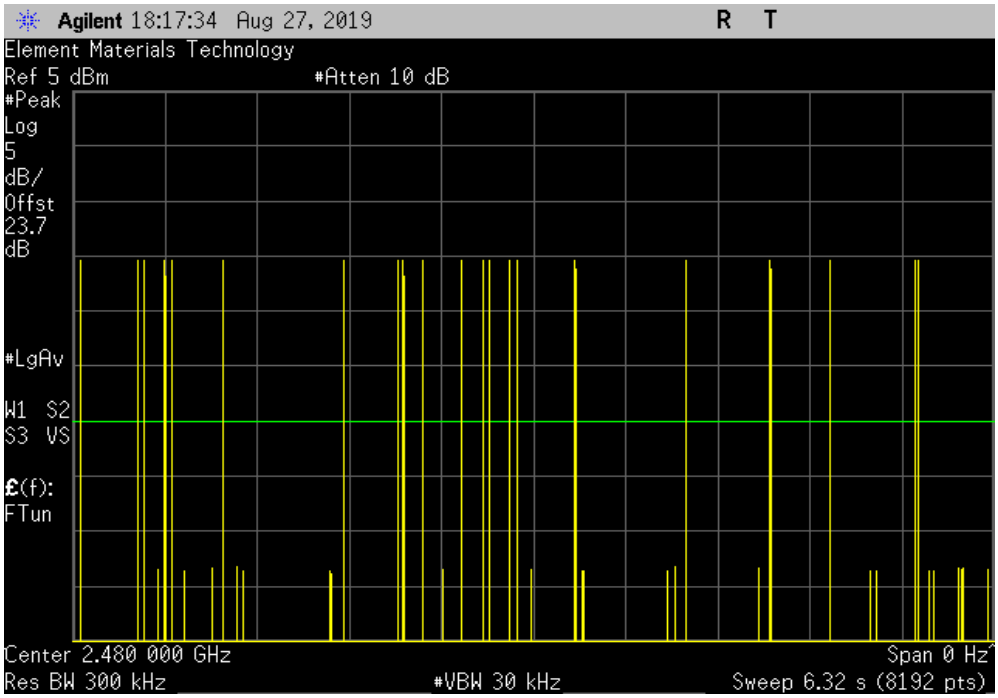
Hopping Mode (All Channels), 8DPSK, 3DH5, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	20	N/A	N/A	N/A	N/A	N/A



DWELL TIME

TbtTx 2019.08.02 XMit 2019.06.11

Hopping Mode (All Channels), 8DPSK, 3DH5, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	21	N/A	N/A	N/A	N/A	N/A



Hopping Mode (All Channels), 8DPSK, 3DH5, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.892	N/A	21.5	5	310.89	400	Pass

Calculation Only

No Screen Capture Required

OUTPUT POWER

XMit 2019.09.05

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
Power Supply - DC	Agilent	E3648A	TPE	NCR	NCR
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	NCR
Block - DC	Fairview Microwave	SD3379	AMV	3-Jan-19	3-Jan-20
Attenuator	Fairview Microwave	SA18H-20	TKR	20-Dec-18	20-Dec-19
Generator - Signal	Agilent	E8257D	TGU	15-Feb-18	15-Feb-21
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFP	2-Jul-19	2-Jul-20

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The peak output power was measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting in a no hop mode at the data rate(s) listed in the datasheet.

The method found in ANSI C63.10:2013 Section 7.8.5 was used for a FHSS radio.

OUTPUT POWER

TbtTx 2019.08.02 XMit 2019.09.05

EUT:	**MWMII**			**Work Order:**	**MASI0553**
Serial Number:	**ENG-1**			**Date:**	**30-Sep-19**
Customer:	**Masimo Corporation**			**Temperature:**	**22.3 °C**
Attendees:	**Anami Joshi**			**Humidity:**	**47.2% RH**
Project:	**None**			**Barometric Pres.:**	**1013 mbar**
Tested by:	**Mark Baytan**	**Power:**	**3.6 VDC**	**Job Site:**	**OC13**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2019	ANSI C63.10:2013

COMMENTS

Reference Level Offset: DC Block + 20 dB Attenuator + RF Test Cable + Patch Cable = 23.2 dB

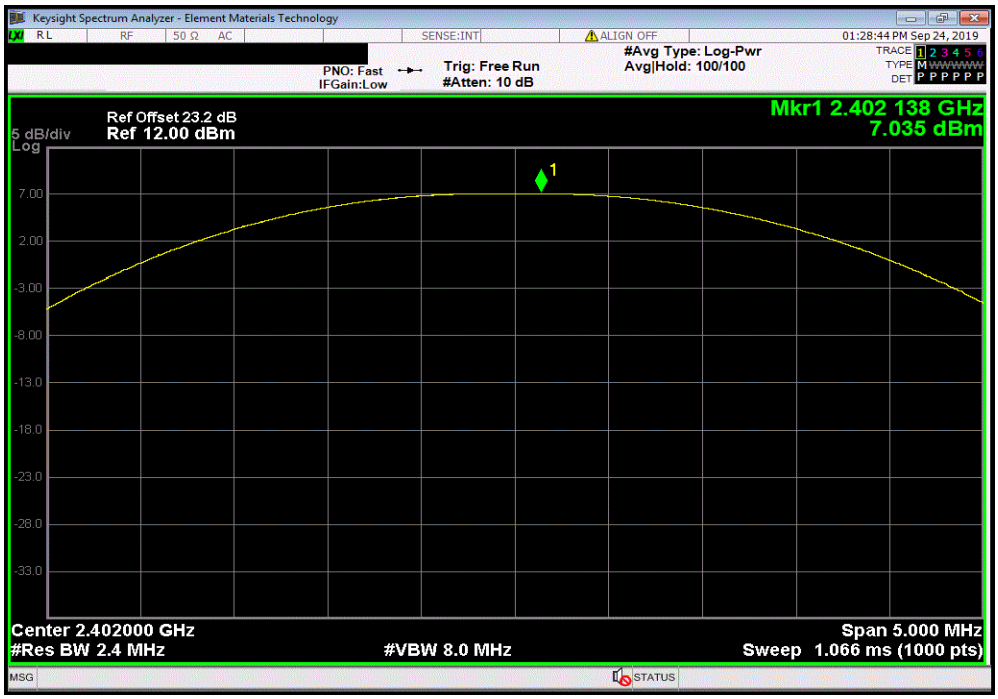
DEVIATIONS FROM TEST STANDARD

None

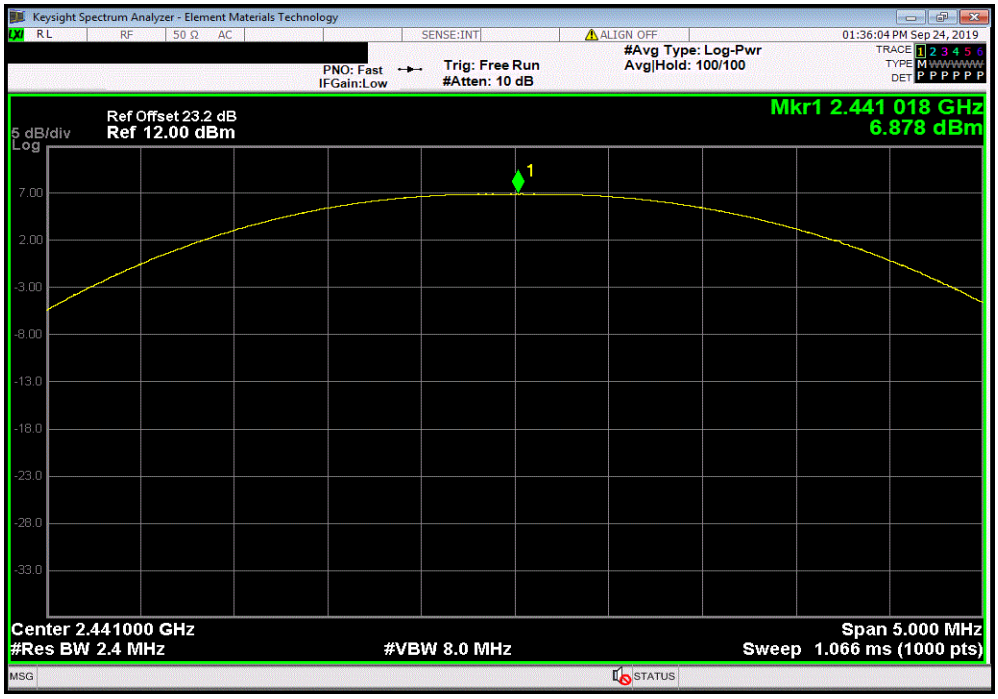
Configuration #	**2**	*Signature*

		Out Pwr (dBm)	**Limit (dBm)**	**Result**
DH5, GFSK				
	Low Channel	7.035	21	Pass
	Mid Channel	6.878	21	Pass
	High Channel	6.524	21	Pass
2DH5, pi/4-DQPSK				
	Low Channel	7.804	21	Pass
	Mid Channel	7.067	21	Pass
	High Channel	6.943	21	Pass
3DH5, 8-DPSK				
	Low Channel	8.249	21	Pass
	Mid Channel	7.536	21	Pass
	High Channel	7.393	21	Pass

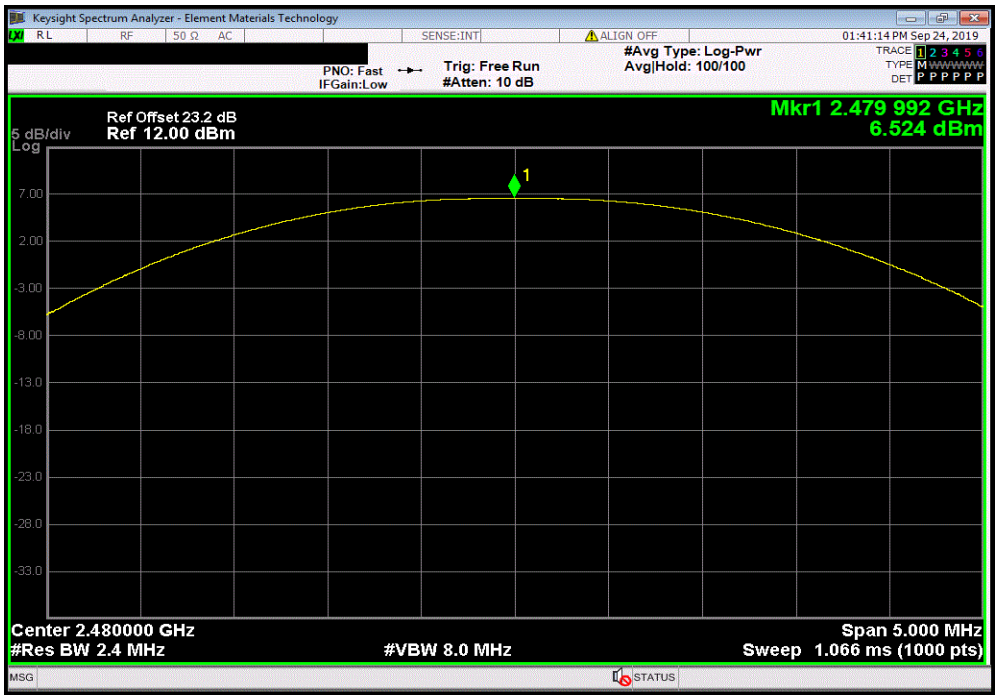
DH5, GFSK, Low Channel						
				Out Pwr (dBm)	Limit (dBm)	Result
				7.035	21	Pass



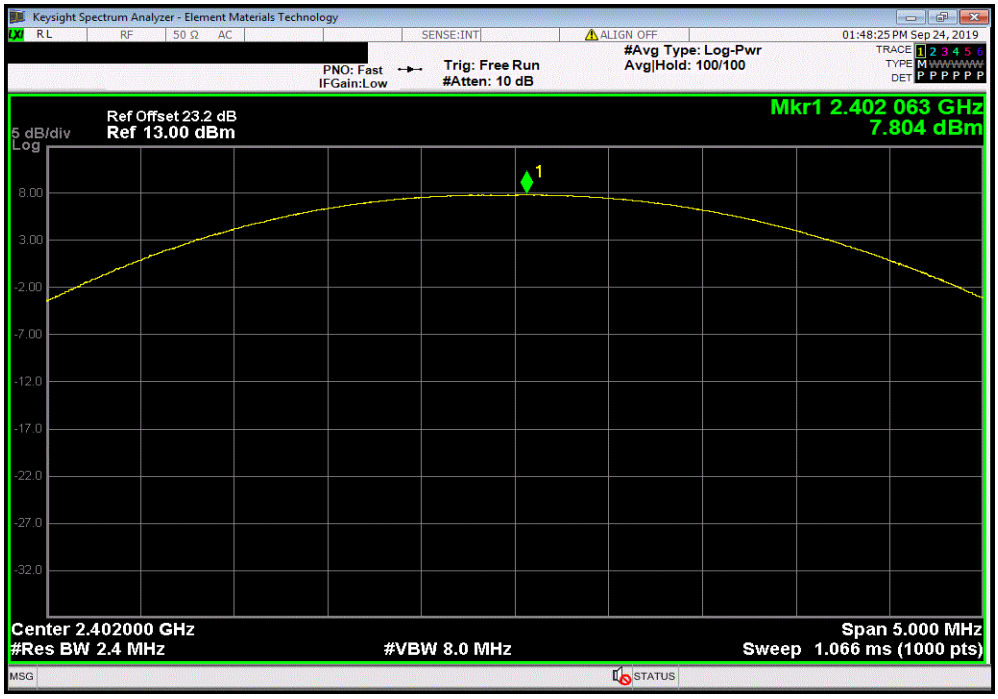
DH5, GFSK, Mid Channel						
				Out Pwr (dBm)	Limit (dBm)	Result
				6.878	21	Pass



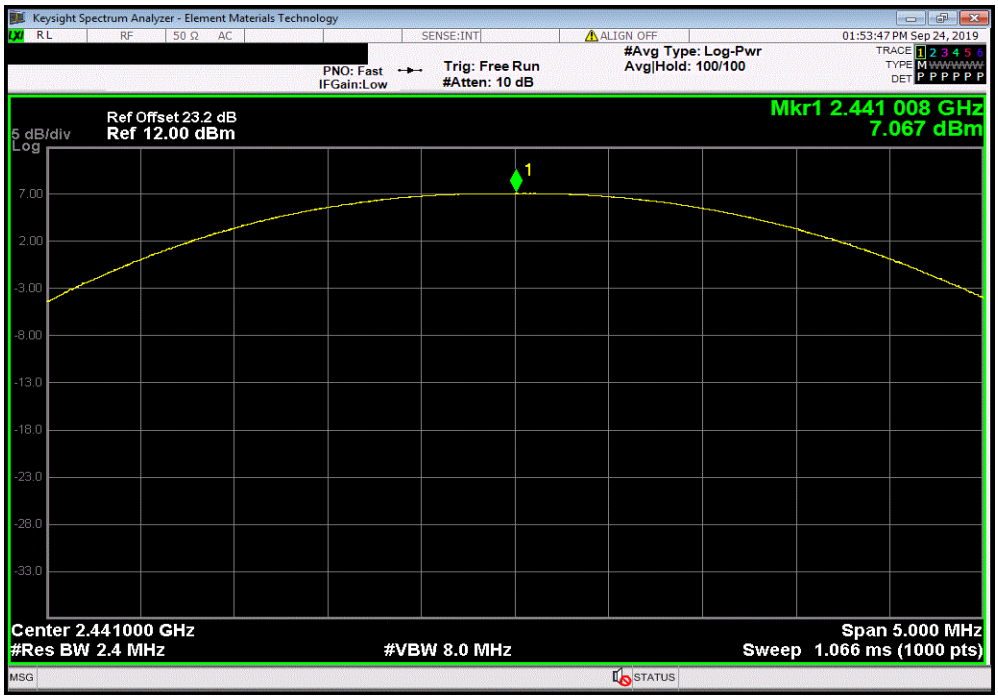
DH5, GFSK, High Channel						
				Out Pwr (dBm)	Limit (dBm)	Result
				6.524	21	Pass



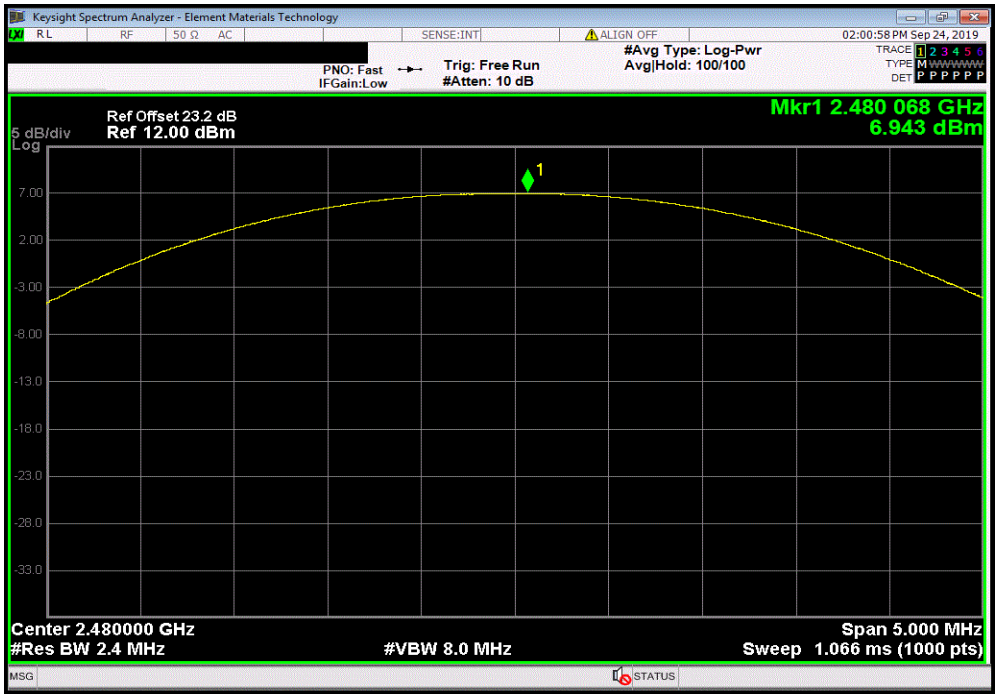
2DH5, pi/4-DQPSK, Low Channel						
				Out Pwr (dBm)	Limit (dBm)	Result
				7.804	21	Pass



2DH5, pi/4-DQPSK, Mid Channel						
				Out Pwr (dBm)	Limit (dBm)	Result
				7.067	21	Pass

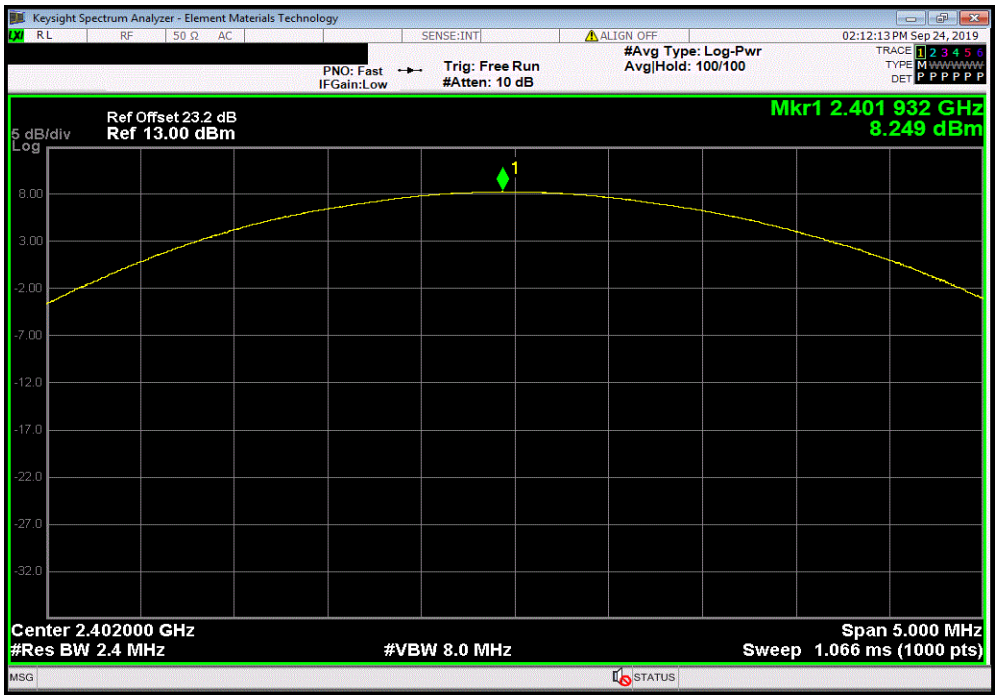


2DH5, pi/4-DQPSK, High Channel						
				Out Pwr (dBm)	Limit (dBm)	Result
				6.943	21	Pass

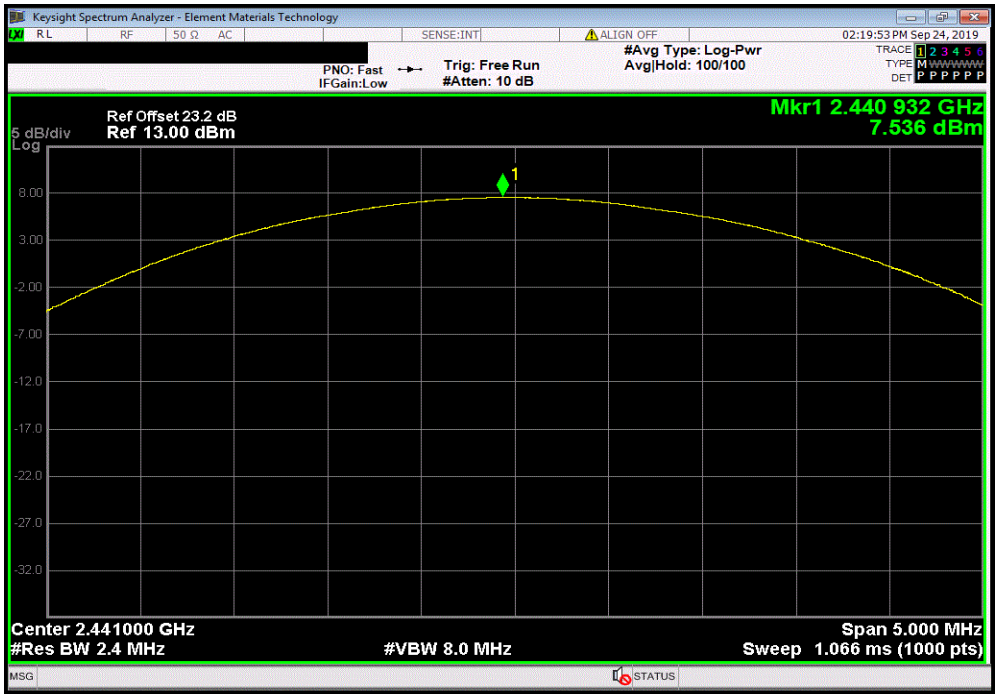


OUTPUT POWER

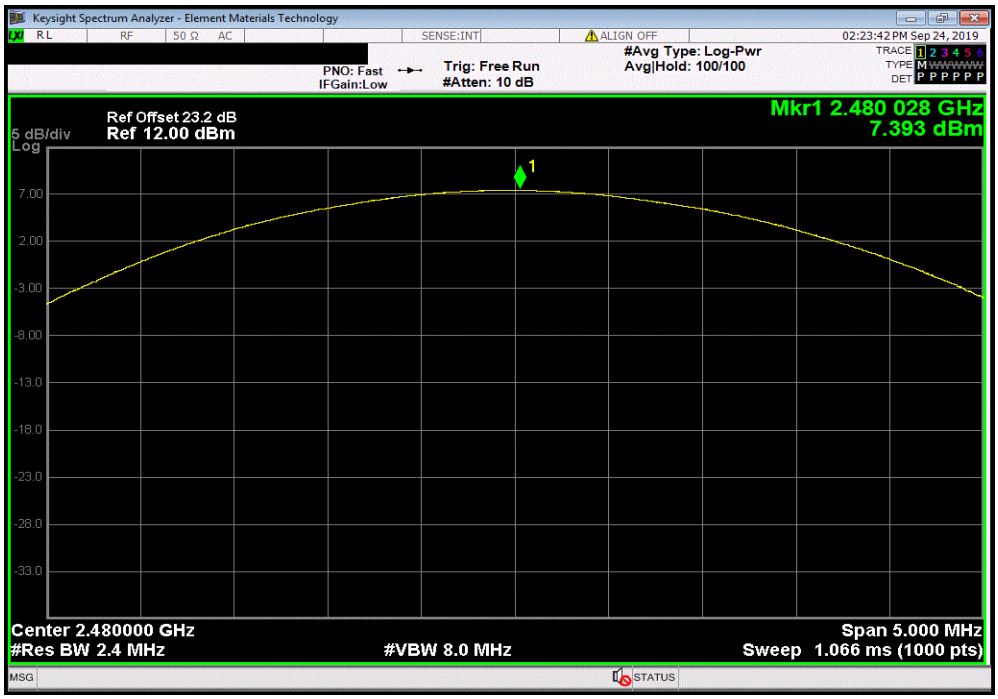
3DH5, 8-DPSK, Low Channel						
				Out Pwr (dBm)	Limit (dBm)	Result
				8.249	21	Pass



3DH5, 8-DPSK, Mid Channel						
				Out Pwr (dBm)	Limit (dBm)	Result
				7.536	21	Pass



3DH5, 8-DPSK, High Channel						
				Out Pwr (dBm)	Limit (dBm)	Result
				7.393	21	Pass



EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

XMit 2019.09.05

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
Power Supply - DC	Agilent	E3648A	TPE	NCR	NCR
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	NCR
Block - DC	Fairview Microwave	SD3379	AMV	3-Jan-19	3-Jan-20
Attenuator	Fairview Microwave	SA18H-20	TKR	20-Dec-18	20-Dec-19
Generator - Signal	Agilent	E8257D	TGU	15-Feb-18	15-Feb-21
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFP	2-Jul-19	2-Jul-20

TEST DESCRIPTION

The peak output power was measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting in a no hop mode at the data rate(s) listed in the datasheet.

The method found in ANSI C63.10:2013 Section 7.8.5 was used for a FHSS radio.

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

element

TbtTx 2019.08.02 XMit 2019.09.05

EUT:	MWMII			**Work Order:**	MASI0553
Serial Number:	ENG-1			**Date:**	23-Sep-19
Customer:	Masimo Corporation			**Temperature:**	23.3 °C
Attendees:	Anami Joshi			**Humidity:**	51.4% RH
Project:	None			**Barometric Pres.:**	1015 mbar
Tested by:	Mark Baytan	**Power:**	3.6 VDC	**Job Site:**	OC13

TEST SPECIFICATIONS	Test Method
FCC 15.247:2019	ANSI C63.10:2013

COMMENTS

Reference Level Offset: DC Block + 20dB Attenuator + RF Test Cable + Patch Cable = 23.2 dB

DEVIATIONS FROM TEST STANDARD

None

Configuration #	2	Signature

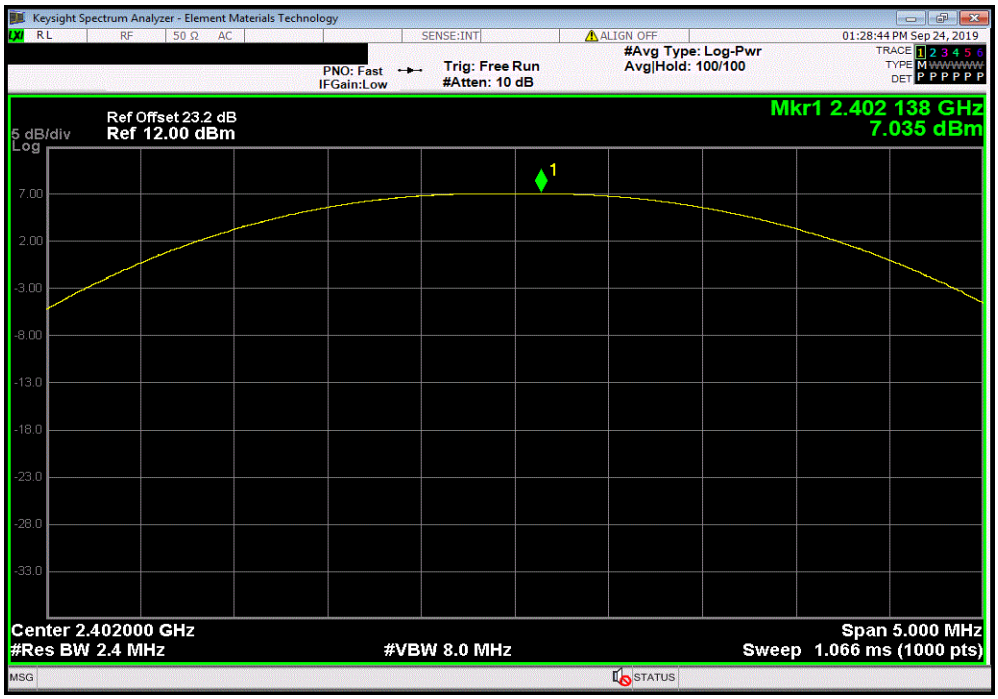
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
DH5, GFSK						
	Low Channel	7.035	2.5	9.535	27	Pass
	Mid Channel	6.878	2.5	9.378	27	Pass
	High Channel	6.524	2.5	9.024	27	Pass
2DH5, pi/4-DQPSK						
	Low Channel	7.804	2.5	10.304	27	Pass
	Mid Channel	7.067	2.5	9.567	27	Pass
	High Channel	6.943	2.5	9.443	27	Pass
3DH5, 8-DPSK						
	Low Channel	8.249	2.5	10.749	27	Pass
	Mid Channel	7.536	2.5	10.036	27	Pass
	High Channel	7.393	2.5	9.893	27	Pass

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

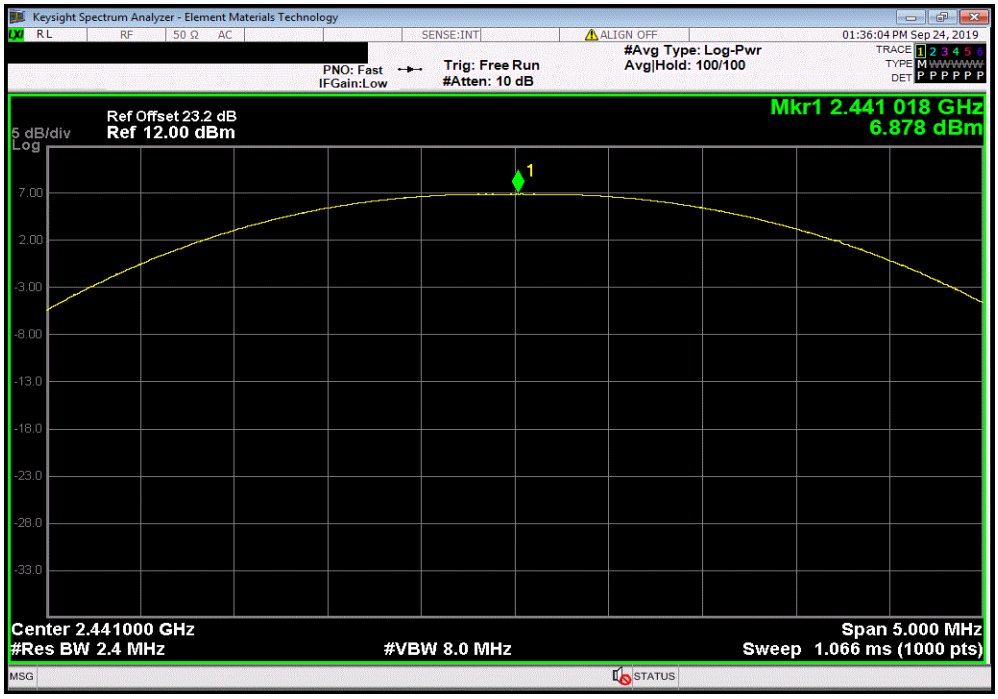
element

TbtTx 2019.08.02 XMit 2019.09.05

DH5, GFSK, Low Channel						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		7.035	2.5	9.535	27	Pass

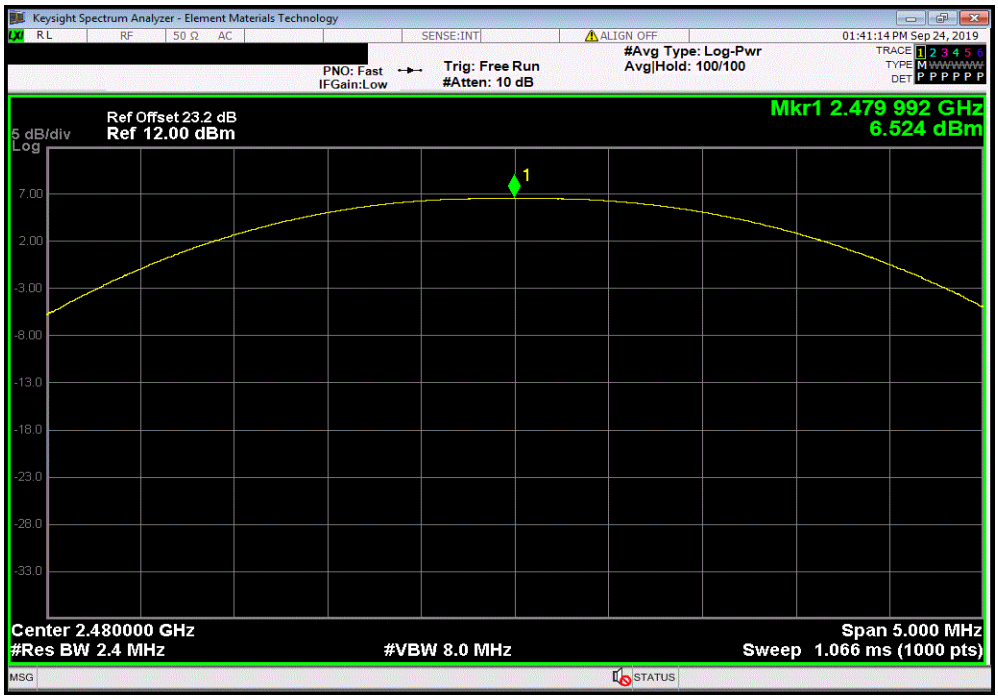


DH5, GFSK, Mid Channel						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		6.878	2.5	9.378	27	Pass

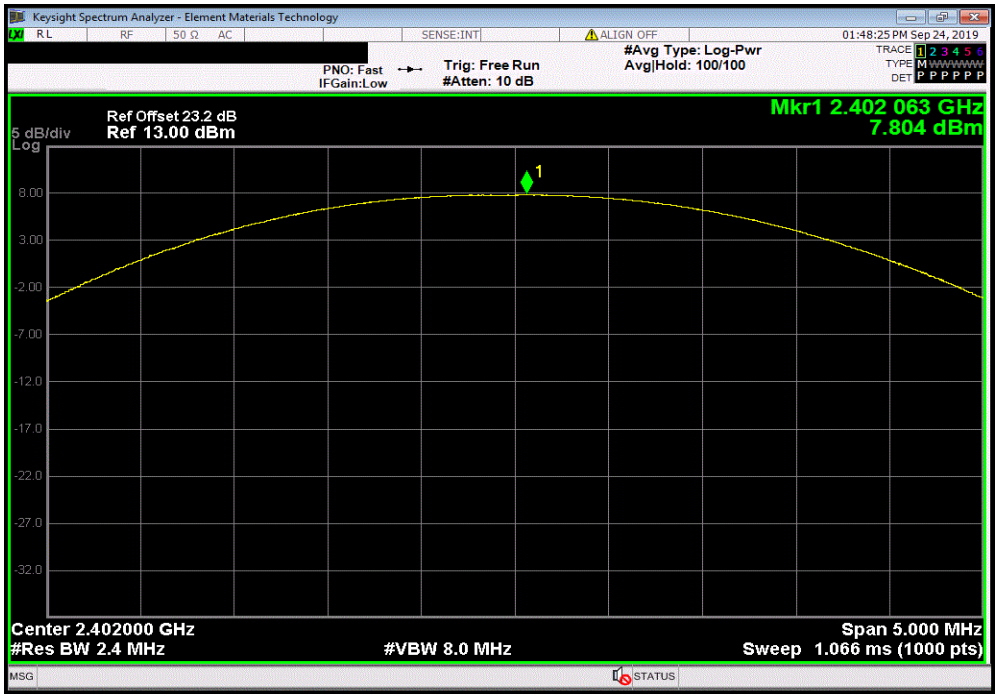


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

DH5, GFSK, High Channel						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		6.524	2.5	9.024	27	Pass

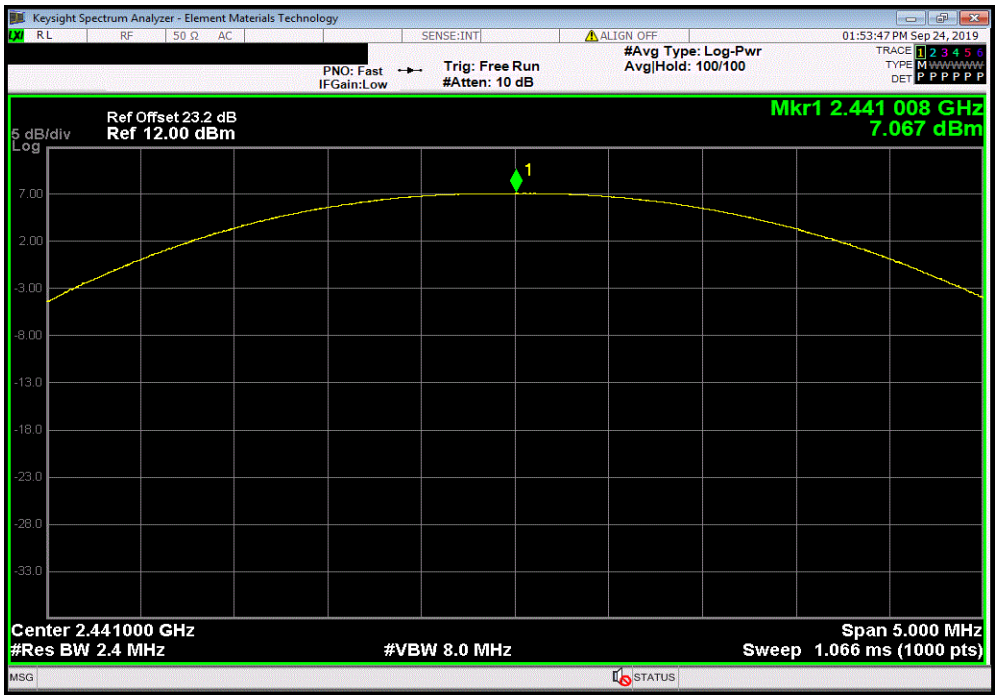


2DH5, pi/4-DQPSK, Low Channel						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		7.804	2.5	10.304	27	Pass

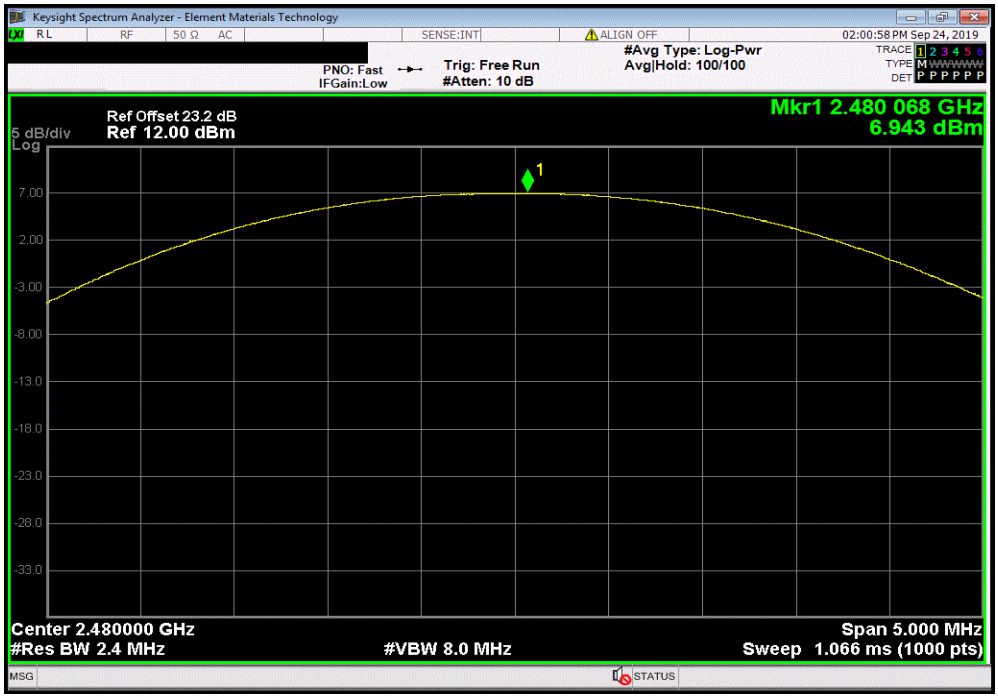


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

2DH5, pi/4-DQPSK, Mid Channel						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		7.067	2.5	9.567	27	Pass



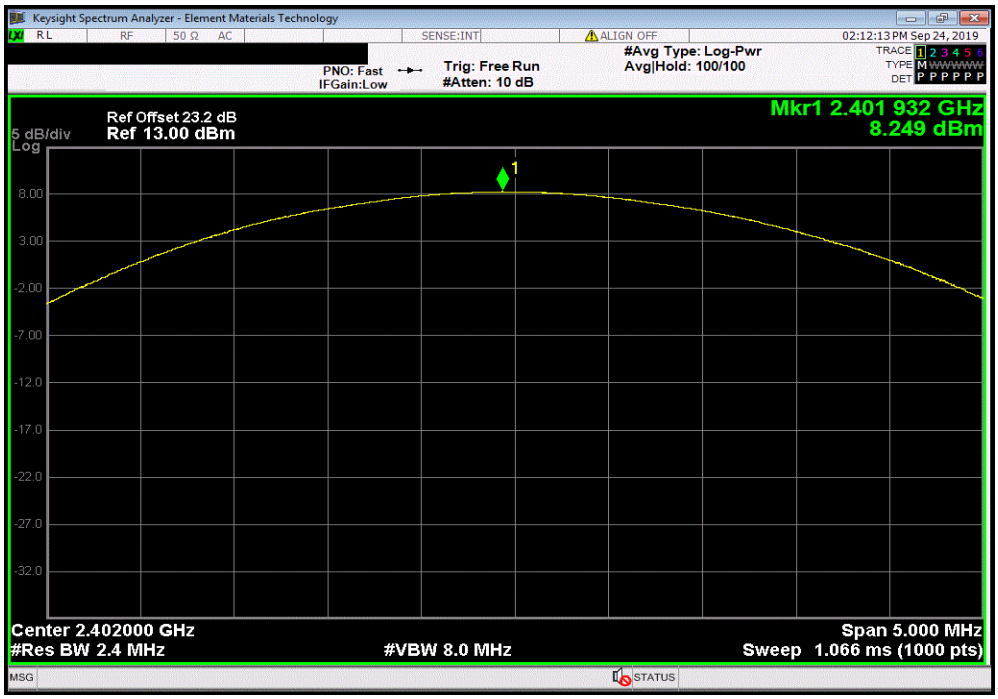
2DH5, pi/4-DQPSK, High Channel						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		6.943	2.5	9.443	27	Pass



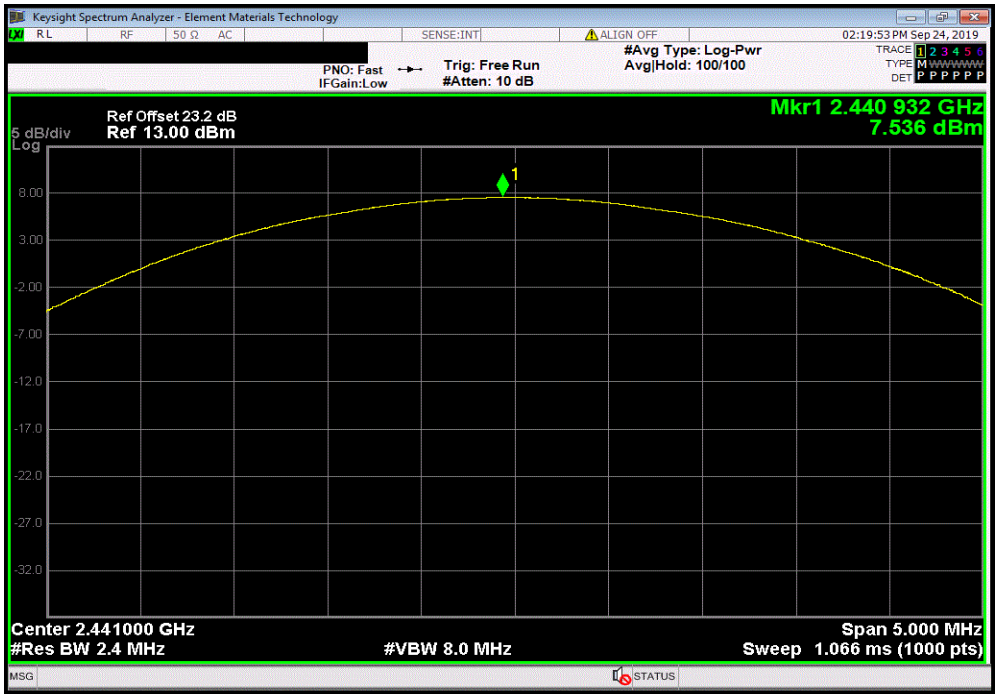
EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

TbtTx 2019.08.02 XMit 2019.09.05

3DH5, 8-DPSK, Low Channel						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		8.249	2.5	10.749	27	Pass



3DH5, 8-DPSK, Mid Channel						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		7.536	2.5	10.036	27	Pass



EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

TbtTx 2019.08.02 XMit 2019.09.05

3DH5, 8-DPSK, High Channel						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		7.393	2.5	9.893	27	Pass