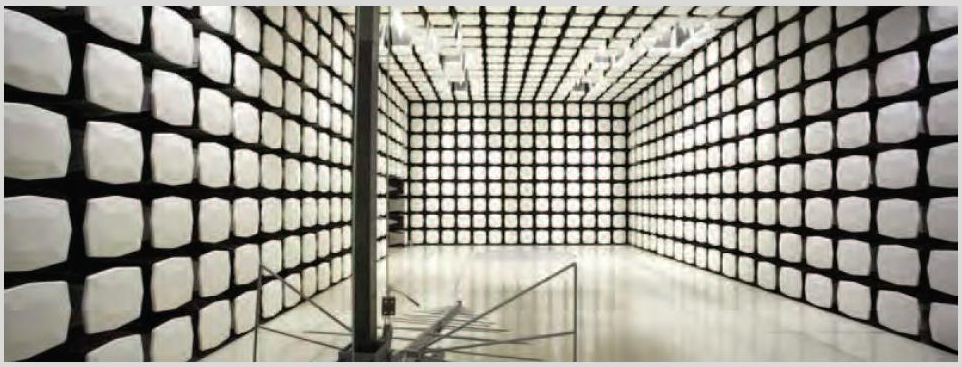
A-dec, Inc.

A-dec Gateway

Bluetooth FHSS
FCC 15.247:2020

Report: A-DE0149.1, Issue Date: April 8, 2021



NVLAP LAB CODE: 200630-0

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CERTIFICATE OF TEST

Last Date of Test: December 7, 2020
A-dec, Inc.
EUT: A-dec Gateway

Radio Equipment Testing

Standards

Specification	Method
FCC 15.209:2020	ANSI C63.10:2013
FCC 15.247:2020	

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	Pass	
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 Bandwidth	Yes	Pass	
7.8.8	Spurious Conducted Emissions	Yes	Pass	

Deviations From Test Standards

None

Approved By:

Kyle Holgate, 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		

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

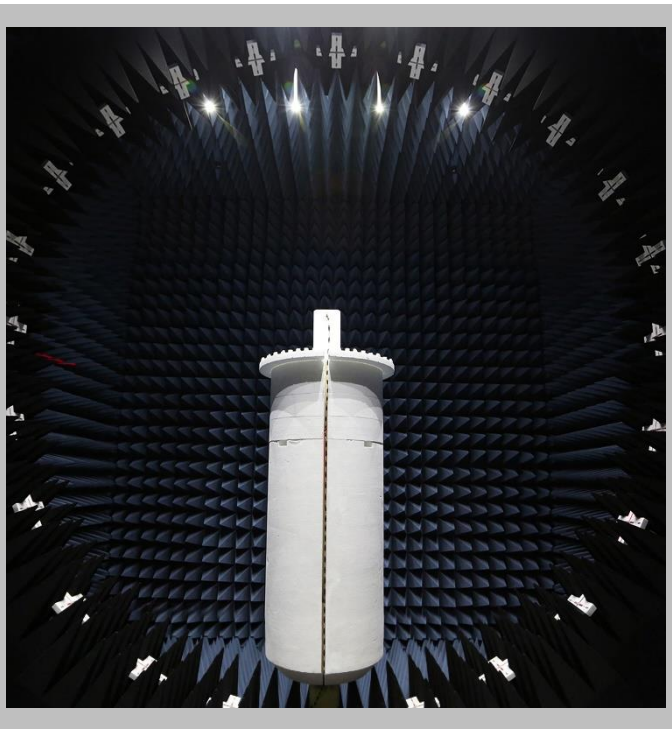
MIC – Recognized by MIC as a CAB for the acceptance of test data.

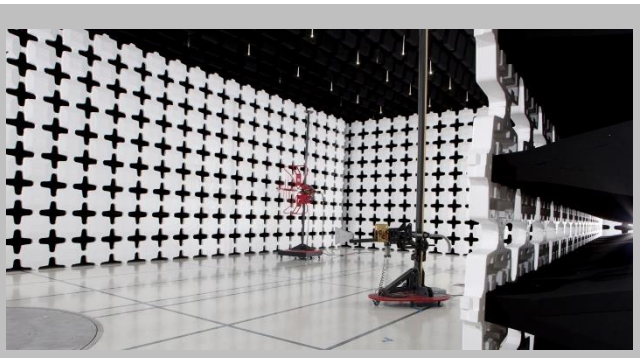
SCOPE

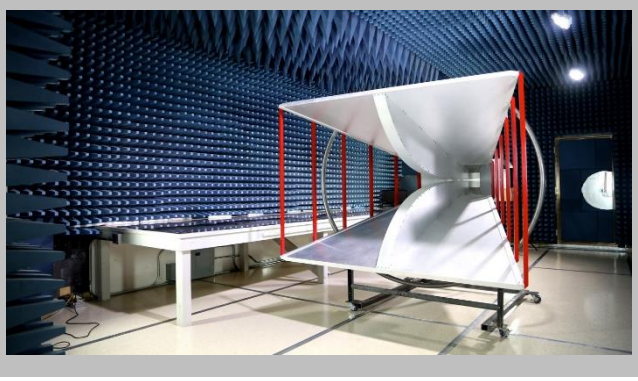
For details on the Scopes of our Accreditations, please visit:
https://www.nwemc.com/emc-testing-accreditations

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.

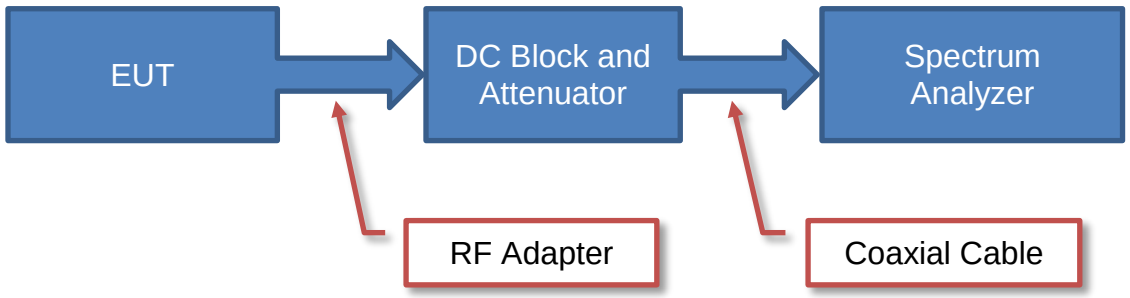
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found included as part of the applicable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

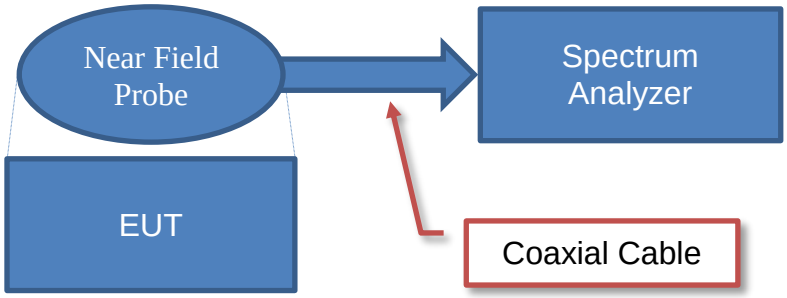
Test	+ MU	- MU
Frequency Accuracy	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	1.2 dB	-1.2 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	2.6 dB	-2.6 dB

Test Setup Block Diagrams

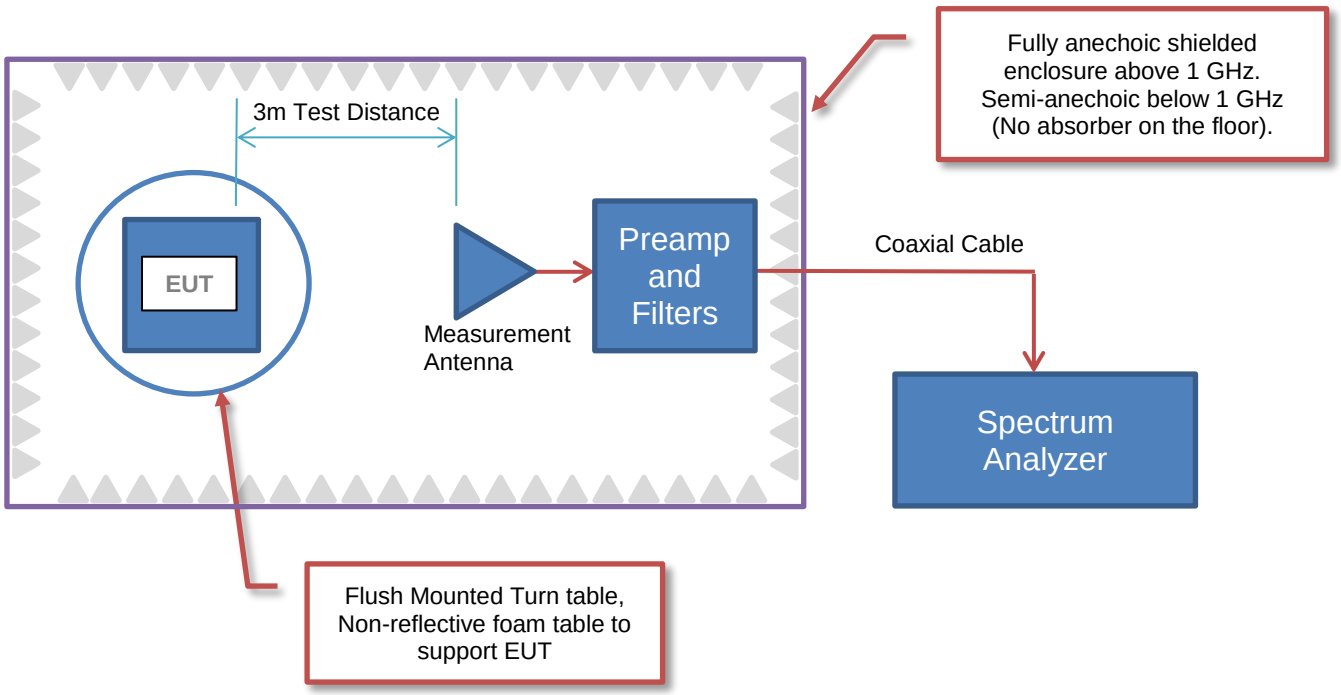
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	A-dec, Inc.
Address:	2601 Crestview Drive, Building 4
City, State, Zip:	Newberg, OR 97132-9528
Test Requested By:	Michael Yurkoski
EUT:	A-dec Gateway
First Date of Test:	November 30, 2020
Last Date of Test:	December 7, 2020
Receipt Date of Samples:	November 17, 2020
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Network Gateway

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

POWER SETTINGS AND ANTENNAS

The power settings, antenna gain value(s) and cable loss (if applicable) used for the testing contained in this report were provided by the customer and will affect the validity of the results. Element assumes no responsibility for the accuracy of this information.

ANTENNA GAIN (dBi)

Type	Provided by:	Frequency Range (MHz)	Gain (dBi)
Ceramic chip	Manufacturer	2400 - 2500	2.2

No adjustable power settings were provided. The EUT was tested using power settings pre-defined by the manufacturer.

CONFIGURATIONS

Configuration A-DE0149- 1

Software/Firmware Running during test	
Description	**Version**
Murata Test Firmware	None

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Wireless Access Point / IoT Device	A-dec, Inc.	43.0531.00	521O041984

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Dell	Lattitude E7470	BRXX1G2

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Serial to USB	Yes	2.0 m	No	Laptop	Wireless Access Point / IoT Device
DC Power	Yes	1.5 m	No	ITE Power Supply	Wireless Access Point / IoT Device

CONFIGURATIONS

Configuration A-DE0149- 2

Software/Firmware Running during test	
Description	**Version**
Murata Test Firmware	None

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Wireless Access Point / IoT Device	A-dec, Inc.	43.0531.00	521O041985

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Dell	Lattitude E7470	BRXX1G2

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Serial to USB	Yes	2.0 m	No	Laptop	Wireless Access Point / IoT Device
DC Power	Yes	1.5 m	No	ITE Power Supply	Wireless Access Point / IoT Device
Ethernet	No	5.5 m	No	Laptop	Wireless Access Point / IoT Device
CAN	No	7.6 m	No	Unterminated	Wireless Access Point / IoT Device
CAN FD	No	7.6 m	No	Unterminated	Wireless Access Point / IoT Device

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2020-11-30	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	2020-12-02	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.
3	2020-12-02	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.
4	2020-12-02	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.
5	2020-12-02	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.
6	2020-12-02	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
7	2020-12-02	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.
8	2020-12-02	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.
9	2020-12-02	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.
10	2020-12-02	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.
11	2020-12-02	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.
12	2020-12-07	Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWERLINE CONDUCTED EMISSIONS

element
WTD.2020.03.25.0

TEST DESCRIPTION

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Receiver	Rohde & Schwarz	ESCI	ARH	2020-05-13	2021-05-13
Cable - Conducted Cable Assembly	Northwest EMC	EVG, HHD, RKT	EVGA	2020-01-06	2021-01-06
LISN	Solar Electronics	9252-50-R-24-BNC	LIP	2020-08-31	2021-08-31

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.6 dB	-2.6 dB

CONFIGURATIONS INVESTIGATED

A-DE0149-2

MODES INVESTIGATED

Continuous Tx, Bluetooth, Mid Channel = 2440 MHz, DH5

POWERLINE CONDUCTED EMISSIONS

EUT:	A-dec Gateway	Work Order:	A-DE0149
Serial Number:	521O041985	Date:	2020-12-07
Customer:	A-dec, Inc.	Temperature:	23.5°C
Attendees:	Spencer Warneke	Relative Humidity:	32.5%
Customer Project:	None	Bar. Pressure:	1032 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	A-DE0149-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2020	ANSI C63.10:2013

TEST PARAMETERS

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

COMMENTS

None

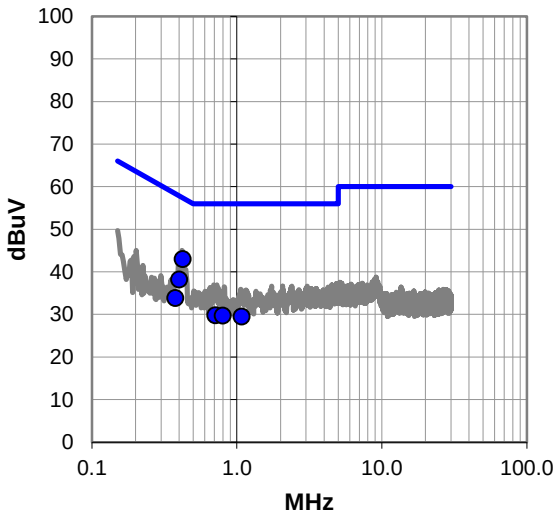
EUT OPERATING MODES

Continuous Tx, Bluetooth, Mid Channel = 2440 MHz, DH5

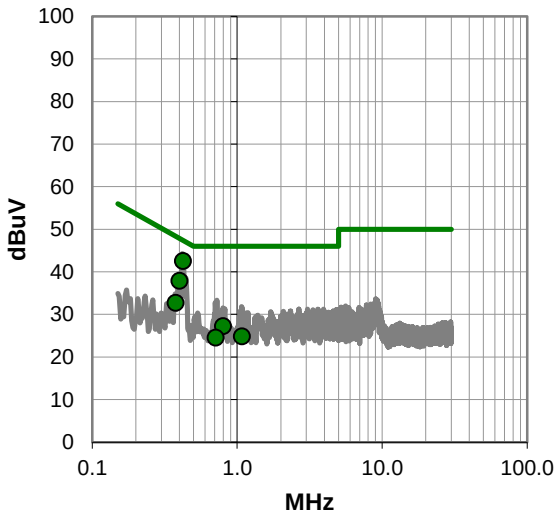
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2020.03.25.0

RESULTS - Run #6

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.423	23.1	19.9	43.0	57.4	-14.4
0.400	18.3	19.9	38.2	57.9	-19.7
0.377	13.9	19.9	33.8	58.3	-24.5
0.711	9.9	19.9	29.8	56.0	-26.2
0.800	9.8	19.9	29.7	56.0	-26.3
1.077	9.6	19.9	29.5	56.0	-26.5

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.423	22.6	19.9	42.5	47.4	-4.9
0.400	18.0	19.9	37.9	47.9	-10.0
0.377	12.8	19.9	32.7	48.3	-15.6
0.800	7.3	19.9	27.2	46.0	-18.8
1.077	4.9	19.9	24.8	46.0	-21.2
0.711	4.6	19.9	24.5	46.0	-21.5

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2020.03.25.0

EUT:	A-dec Gateway	Work Order:	A-DE0149
Serial Number:	521O041985	Date:	2020-12-07
Customer:	A-dec, Inc.	Temperature:	23.5°C
Attendees:	Spencer Warneke	Relative Humidity:	32.5%
Customer Project:	None	Bar. Pressure:	1032 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	A-DE0149-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2020	ANSI C63.10:2013

TEST PARAMETERS

Run #:	7	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

None

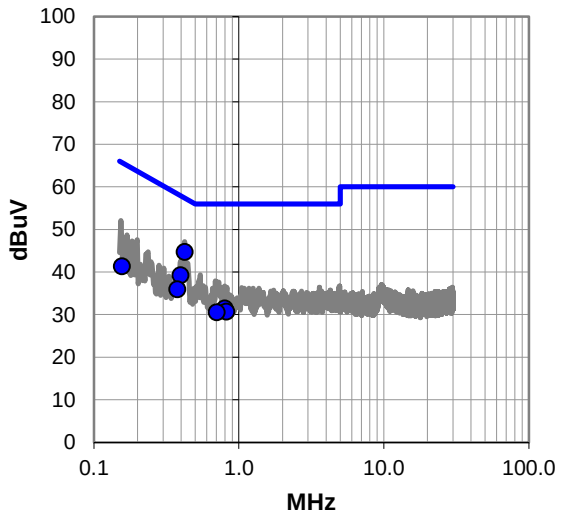
EUT OPERATING MODES

Continuous Tx, Bluetooth, Mid Channel = 2440 MHz, DH5

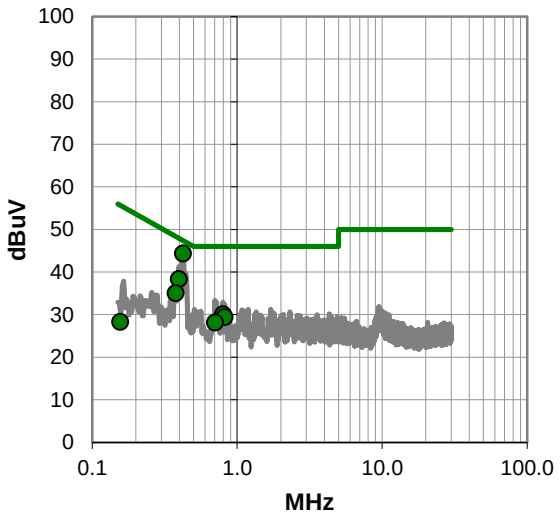
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2020.03.25.0

RESULTS - Run #7

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.423	24.8	19.9	44.7	57.4	-12.7
0.396	19.3	19.9	39.2	57.9	-18.7
0.377	16.0	19.9	35.9	58.3	-22.4
0.156	21.3	20.0	41.3	65.7	-24.4
0.798	11.5	19.9	31.4	56.0	-24.6
0.820	10.8	19.9	30.7	56.0	-25.3
0.705	10.6	19.9	30.5	56.0	-25.5

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.423	24.4	19.9	44.3	47.4	-3.1
0.396	18.4	19.9	38.3	47.9	-9.6
0.377	15.1	19.9	35.0	48.3	-13.3
0.798	10.2	19.9	30.1	46.0	-15.9
0.820	9.5	19.9	29.4	46.0	-16.6
0.705	8.2	19.9	28.1	46.0	-17.9
0.156	8.3	20.0	28.3	55.7	-27.4

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2020.06.24.2

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 - Bluetooth, Low Channel = 2402 MHz, Mid Channel = 2440 MHz, High Channel = 2480 MHz

POWER SETTINGS INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

A-DE0149 - 2

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26.4 GHz

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	AFI	2019-12-13	12 mo
Filter - High Pass	Micro-Tronics	HPM50111	HFO	2020-11-17	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	LFD	2020-02-15	12 mo
Attenuator	Coaxicom	3910-20	AXZ	2020-02-15	12 mo
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	EVY	2020-07-25	12 mo
Cable	None	Standard Gain Horns Cable	EVF	2020-11-18	12 mo
Cable	N/A	Double Ridge Horn Cables	EVB	2020-11-17	12 mo
Cable	N/A	Bilog Cables	EVA	2020-11-17	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AVU	2020-07-25	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	2020-11-18	12 mo
Amplifier - Pre-Amplifier	L-3 Narda-MITEQ	AMF-6F-08001200-30-10P	PAO	2020-11-18	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAG	2020-11-17	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AOL	2020-11-17	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-09	AIV	NCR	0 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AHV	NCR	0 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AHU	NCR	0 mo
Antenna - Double Ridge	EMCO	3115	AHC	2020-07-01	24 mo
Antenna - Biconilog	Teseq	CBL 6141B	AXR	2020-10-13	24 mo

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2020.06.24.2

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 (in no-hop, single channel mode) and the modes as showed in the data sheets.

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

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

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

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

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

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

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

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

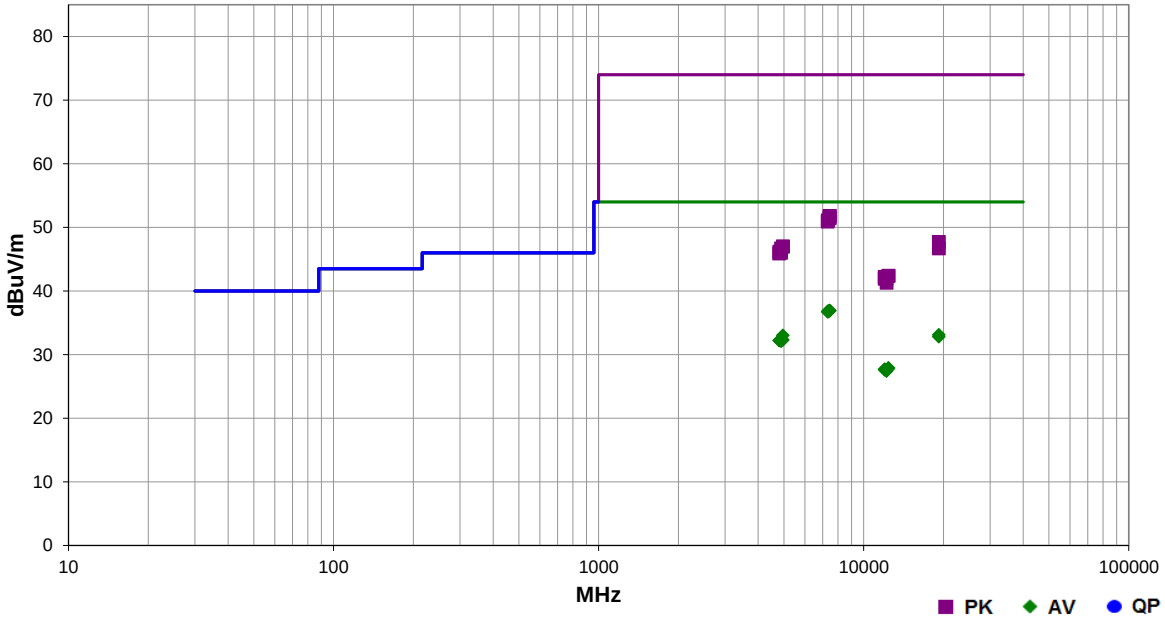
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.4 PSA-ESCI 2020.06.24.2

Work Order:	A-DE0149	**Date:**	2020-11-30		
Project:	None	**Temperature:**	22.5 °C		
Job Site:	EV01	**Humidity:**	36.6% RH		
Serial Number:	521O041985	**Barometric Pres.:**	1024 mbar	**Tested by:**	Jeff Alcoke
EUT:	A-dec Gateway				
Configuration:	2				
Customer:	A-dec, Inc.				
Attendees:	Spencer Warneke				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting - Bluetooth, Low Channel = 2402 MHz, Mid Channel = 2440 MHz, High Channel = 2480 MHz				
Deviations:	None				
Comments:	Measurements performed using worst case EUT orientations determined from pre-compliance testing. See comments below for Channel, Data Rate, and EUT orientation. All measurements were noise floor, no duty cycle correction factor was applied to the average measurements.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	108	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7442.142	24.7	12.2	1.50	360.0	3.0	0.0	Vert	AV	0.0	36.9	54.0	-17.1	High Ch, DH5, EUT Horz
7438.908	24.7	12.2	1.50	209.0	3.0	0.0	Horz	AV	0.0	36.9	54.0	-17.1	High Ch, DH5, EUT on Side
7439.742	24.7	12.2	1.50	283.0	3.0	0.0	Vert	AV	0.0	36.9	54.0	-17.1	High Ch, 2DH5, EUT Horz
7438.400	24.7	12.2	1.50	147.0	3.0	0.0	Vert	AV	0.0	36.9	54.0	-17.1	High Ch, 3DH5, EUT Horz
7322.483	25.1	11.7	1.50	145.0	3.0	0.0	Vert	AV	0.0	36.8	54.0	-17.2	Mid Ch, DH5, EUT Horz
7322.500	25.0	11.7	1.50	185.0	3.0	0.0	Horz	AV	0.0	36.7	54.0	-17.3	Mid Ch, DH5, EUT on Side
19217.020	29.7	3.4	1.25	0.0	3.0	0.0	Horz	AV	0.0	33.1	54.0	-20.9	Low Ch, DH5, EUT on Side
4960.017	27.1	5.9	2.05	303.0	3.0	0.0	Horz	AV	0.0	33.0	54.0	-21.0	High Ch, DH5, EUT on Side
19213.600	29.4	3.4	1.25	360.0	3.0	0.0	Vert	AV	0.0	32.8	54.0	-21.2	Low Ch, DH5, EUT Horz
4960.025	26.4	5.9	1.50	251.0	3.0	0.0	Vert	AV	0.0	32.3	54.0	-21.7	High Ch, DH5, EUT Horz
4803.800	27.1	5.1	1.50	15.0	3.0	0.0	Vert	AV	0.0	32.2	54.0	-21.8	Low Ch, DH5, EUT Horz
4804.500	27.0	5.2	1.50	119.0	3.0	0.0	Horz	AV	0.0	32.2	54.0	-21.8	Low Ch, DH5, EUT on Side
4879.950	26.2	6.0	2.24	104.0	3.0	0.0	Horz	AV	0.0	32.2	54.0	-21.8	Mid Ch, DH5, EUT on Side
4882.192	26.1	6.0	1.50	267.0	3.0	0.0	Vert	AV	0.0	32.1	54.0	-21.9	Mid Ch, DH5, EUT Horz
7441.767	39.6	12.2	1.50	209.0	3.0	0.0	Horz	PK	0.0	51.8	74.0	-22.2	High Ch, DH5, EUT on Side
7439.667	39.6	12.2	1.50	283.0	3.0	0.0	Vert	PK	0.0	51.8	74.0	-22.2	High Ch, 2DH5, EUT Horz
7438.408	39.4	12.2	1.50	360.0	3.0	0.0	Vert	PK	0.0	51.6	74.0	-22.4	High Ch, DH5, EUT Horz
7441.392	39.2	12.2	1.50	147.0	3.0	0.0	Vert	PK	0.0	51.4	74.0	-22.6	High Ch, 3DH5, EUT Horz
7321.717	39.4	11.7	1.50	185.0	3.0	0.0	Horz	PK	0.0	51.1	74.0	-22.9	Mid Ch, DH5, EUT on Side
7317.642	39.3	11.6	1.50	145.0	3.0	0.0	Vert	PK	0.0	50.9	74.0	-23.1	Mid Ch, DH5, EUT Horz

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
12399.530	26.4	1.5	1.50	166.0	3.0	0.0	Horz	AV	0.0	27.9	54.0	-26.1	High Ch, DH5, EUT on Side
12399.650	26.3	1.5	1.50	202.0	3.0	0.0	Vert	AV	0.0	27.8	54.0	-26.2	High Ch, DH5, EUT Horz
19218.230	44.3	3.4	1.25	0.0	3.0	0.0	Horz	PK	0.0	47.7	74.0	-26.3	Low Ch, DH5, EUT on Side
12007.530	26.6	1.1	1.50	7.0	3.0	0.0	Horz	AV	0.0	27.7	54.0	-26.3	Low Ch, DH5, EUT on Side
12007.540	26.5	1.1	1.50	38.0	3.0	0.0	Vert	AV	0.0	27.6	54.0	-26.4	Low Ch, DH5, EUT Horz
12202.470	26.6	0.9	1.43	244.0	3.0	0.0	Horz	AV	0.0	27.5	54.0	-26.5	Mid Ch, DH5, EUT on Side
12202.310	26.5	0.9	1.50	309.0	3.0	0.0	Vert	AV	0.0	27.4	54.0	-26.6	Mid Ch, DH5, EUT Horz
4958.842	41.1	5.9	1.50	251.0	3.0	0.0	Vert	PK	0.0	47.0	74.0	-27.0	High Ch, DH5, EUT Horz
4962.333	41.1	5.9	2.05	303.0	3.0	0.0	Horz	PK	0.0	47.0	74.0	-27.0	High Ch, DH5, EUT on Side
4880.542	40.7	6.0	1.50	267.0	3.0	0.0	Vert	PK	0.0	46.7	74.0	-27.3	Mid Ch, DH5, EUT Horz
19216.320	43.3	3.4	1.25	360.0	3.0	0.0	Vert	PK	0.0	46.7	74.0	-27.3	Low Ch, DH5, EUT Horz
4805.600	41.0	5.2	1.50	15.0	3.0	0.0	Vert	PK	0.0	46.2	74.0	-27.8	Low Ch, DH5, EUT Horz
4881.558	40.0	6.0	2.24	104.0	3.0	0.0	Horz	PK	0.0	46.0	74.0	-28.0	Mid Ch, DH5, EUT on Side
4802.467	40.8	5.1	1.50	119.0	3.0	0.0	Horz	PK	0.0	45.9	74.0	-28.1	Low Ch, DH5, EUT on Side
12398.810	40.9	1.5	1.50	166.0	3.0	0.0	Horz	PK	0.0	42.4	74.0	-31.6	High Ch, DH5, EUT on Side
12399.420	40.9	1.5	1.50	202.0	3.0	0.0	Vert	PK	0.0	42.4	74.0	-31.6	High Ch, DH5, EUT Horz
12008.290	41.1	1.1	1.50	7.0	3.0	0.0	Horz	PK	0.0	42.2	74.0	-31.8	Low Ch, DH5, EUT on Side
12200.630	41.1	0.9	1.43	244.0	3.0	0.0	Horz	PK	0.0	42.0	74.0	-32.0	Mid Ch, DH5, EUT on Side
12010.980	40.8	1.1	1.50	38.0	3.0	0.0	Vert	PK	0.0	41.9	74.0	-32.1	Low Ch, DH5, EUT Horz
12199.330	40.4	0.9	1.50	309.0	3.0	0.0	Vert	PK	0.0	41.3	74.0	-32.7	Mid Ch, DH5, EUT Horz

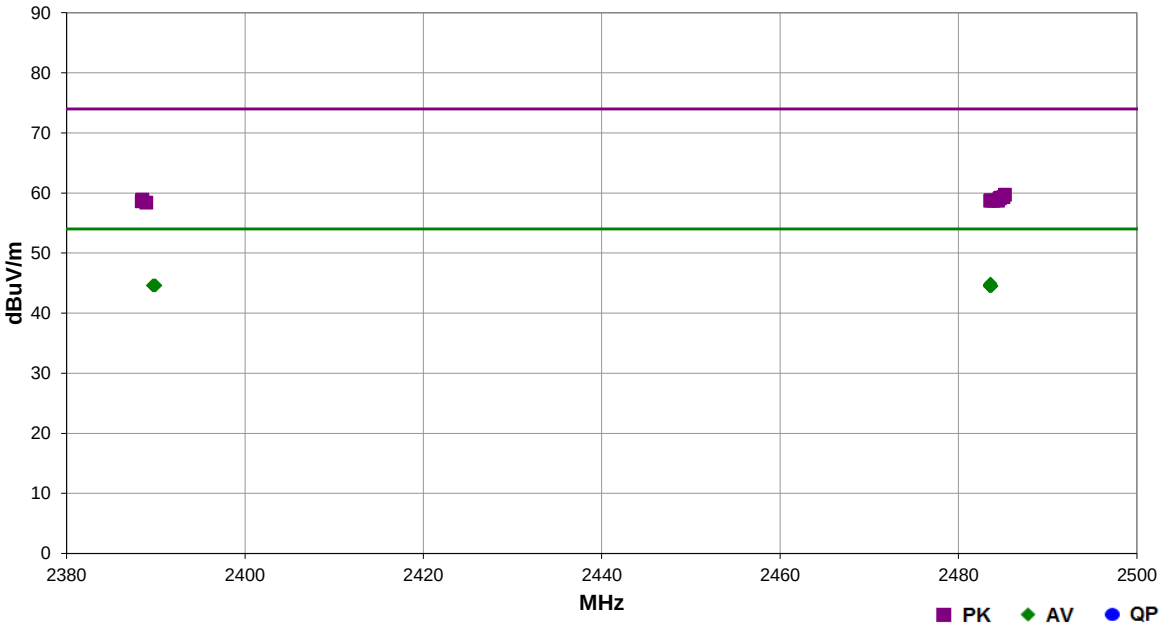
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.4 PSA-ESCI 2020.06.24.2

Work Order:	A-DE0149	**Date:**	2020-11-30		
Project:	None	**Temperature:**	22.5 °C		
Job Site:	EV01	**Humidity:**	36.6% RH		
Serial Number:	521O041985	**Barometric Pres.:**	1024 mbar	**Tested by:**	Jeff Alcoke
EUT:	A-dec Gateway				
Configuration:	2				
Customer:	A-dec, Inc.				
Attendees:	Spencer Warneke				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting - Bluetooth, Low channel = 2402 MHz, Mid Channel = 2440 MHz, High Channel = 2480 MHz				
Deviations:	None				
Comments:	See comments below for Channel, Data Rate, and EUT orientation. All measurements were noise floor, no duty cycle correction factor was applied to the average measurements.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	110	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2483.590	28.5	-3.6	1.50	166.0	3.0	20.0	Horz	AV	0.0	44.9	54.0	-9.1	High Ch, DH5, EUT Horz
2483.503	28.3	-3.6	1.80	10.0	3.0	20.0	Vert	AV	0.0	44.7	54.0	-9.3	High Ch, DH5, EUT Horz
2483.577	28.2	-3.6	3.31	265.0	3.0	20.0	Horz	AV	0.0	44.6	54.0	-9.4	High Ch, DH5, EUT on Side
2389.980	28.1	-3.5	1.50	195.0	3.0	20.0	Horz	AV	0.0	44.6	54.0	-9.4	Low Ch, DH5, EUT Horz
2389.833	28.1	-3.5	1.50	22.0	3.0	20.0	Vert	AV	0.0	44.6	54.0	-9.4	Low Ch, DH5, EUT Horz
2389.683	28.1	-3.5	2.09	127.0	3.0	20.0	Horz	AV	0.0	44.6	54.0	-9.4	Low Ch, 2DH5, EUT Horz
2389.897	28.1	-3.5	1.50	61.0	3.0	20.0	Horz	AV	0.0	44.6	54.0	-9.4	Low Ch, 3DH5, EUT Horz
2483.717	28.1	-3.6	2.17	315.0	3.0	20.0	Vert	AV	0.0	44.5	54.0	-9.5	High Ch, DH5, EUT on Side
2483.503	28.1	-3.6	3.53	198.0	3.0	20.0	Horz	AV	0.0	44.5	54.0	-9.5	High Ch, DH5, EUT Vert
2483.507	28.1	-3.6	1.50	94.0	3.0	20.0	Vert	AV	0.0	44.5	54.0	-9.5	High Ch, DH5, EUT Vert
2483.503	28.1	-3.6	3.36	40.0	3.0	20.0	Horz	AV	0.0	44.5	54.0	-9.5	High Ch, 2DH5, EUT Horz
2483.620	28.1	-3.6	1.50	360.0	3.0	20.0	Horz	AV	0.0	44.5	54.0	-9.5	High Ch, 3DH5, EUT Horz
2485.203	43.2	-3.5	3.31	265.0	3.0	20.0	Horz	PK	0.0	59.7	74.0	-14.3	High Ch, DH5, EUT on Side
2485.043	42.8	-3.5	1.50	166.0	3.0	20.0	Horz	PK	0.0	59.3	74.0	-14.7	High Ch, DH5, EUT Horz
2484.693	42.8	-3.6	1.80	10.0	3.0	20.0	Vert	PK	0.0	59.2	74.0	-14.8	High Ch, DH5, EUT Horz
2484.597	42.7	-3.6	3.53	198.0	3.0	20.0	Horz	PK	0.0	59.1	74.0	-14.9	High Ch, DH5, EUT Vert
2388.483	42.4	-3.5	2.09	127.0	3.0	20.0	Horz	PK	0.0	58.9	74.0	-15.1	Low Ch, 2DH5, EUT Horz
2483.610	42.4	-3.6	1.50	94.0	3.0	20.0	Vert	PK	0.0	58.8	74.0	-15.2	High Ch, DH5, EUT Vert
2388.460	42.3	-3.5	1.50	22.0	3.0	20.0	Vert	PK	0.0	58.8	74.0	-15.2	Low Ch, DH5, EUT Horz
2483.890	42.3	-3.6	2.17	315.0	3.0	20.0	Vert	PK	0.0	58.7	74.0	-15.3	High Ch, DH5, EUT on Side

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2483.563	42.3	-3.6	3.36	40.0	3.0	20.0	Horz	PK	0.0	58.7	74.0	-15.3	High Ch, 2DH5, EUT Horz
2484.427	42.3	-3.6	1.50	360.0	3.0	20.0	Horz	PK	0.0	58.7	74.0	-15.3	High Ch, 3DH5, EUT Horz
2388.437	42.1	-3.5	1.50	61.0	3.0	20.0	Horz	PK	0.0	58.6	74.0	-15.4	Low Ch, 3DH5, EUT Horz
2388.930	41.9	-3.5	1.50	195.0	3.0	20.0	Horz	PK	0.0	58.4	74.0	-15.6	Low Ch, DH5, EUT Horz

DUTY CYCLE

XMit 2020.03.25.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Keysight	N5182B	TFU	20-Nov-20	20-Nov-22
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	13-Mar-20	13-Mar-21
Attenuator	S.M. Electronics	SA26B-20	AUY	13-Mar-20	13-Mar-21
Block - DC	Fairview Microwave	SD3379	AMW	13-Mar-20	13-Mar-21
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAT	28-Oct-20	28-Oct-21

TEST DESCRIPTION

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

element

TbtTx 2019.08.30.0 XMit 2020.03.25.0

EUT:	**A-dec Gateway**			**Work Order:**	**A-DE0149**
Serial Number:	**521O041984**			**Date:**	**2-Dec-20**
Customer:	**A-dec, Inc.**			**Temperature:**	**23.1 °C**
Attendees:	**Spencer Warneke**			**Humidity:**	**31.2% RH**
Project:	**None**			**Barometric Pres.:**	**1024 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**110VAC/60Hz**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2020	**ANSI C63.10:2013**

COMMENTS

Reference level offset includes: DC Block, 20 dB attenuator, and measurement cable.

DEVIATIONS FROM TEST STANDARD

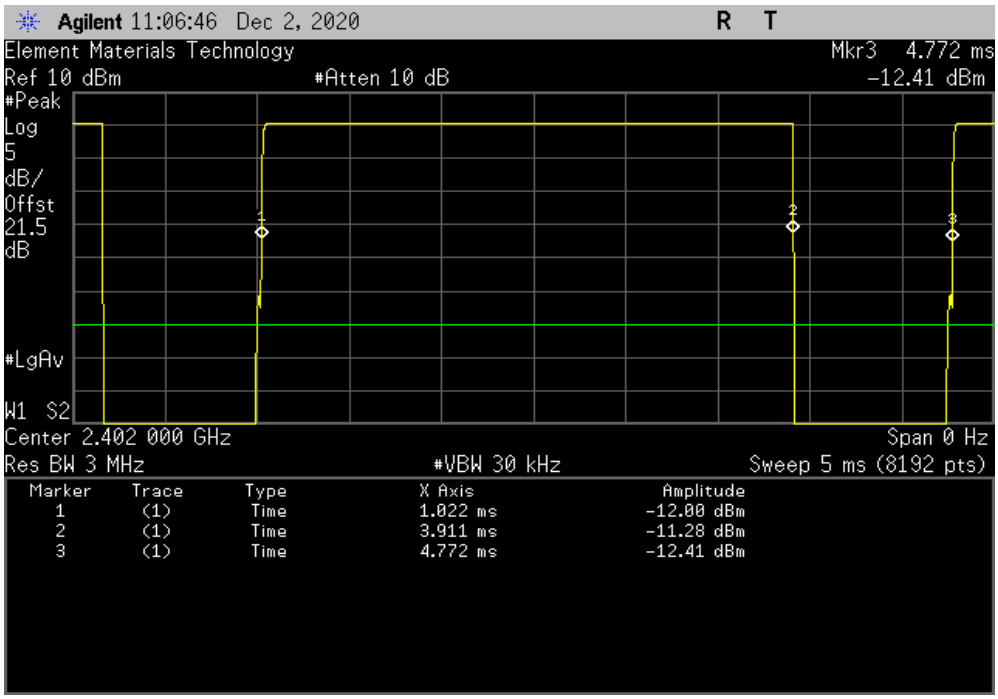
None

Configuration #	**1**	*Signature*

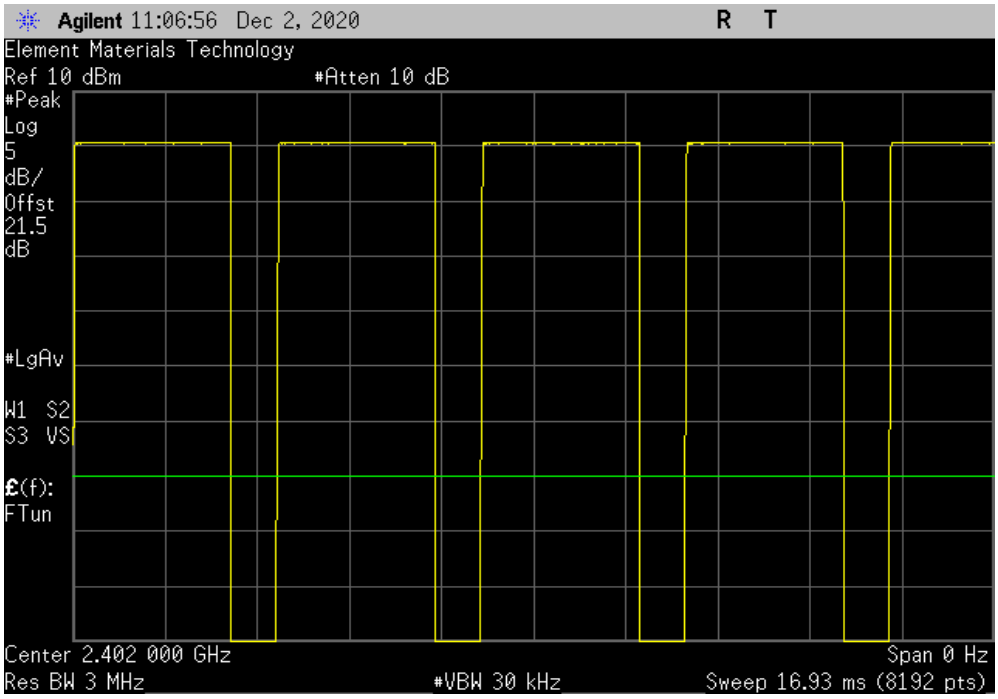
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
Bluetooth, single channel mode						
DH5, GFSK						
Low Channel, 2402 MHz	2.889 ms	3.75 ms	1	77	N/A	N/A
Low Channel, 2402 MHz	N/A	N/A	5	N/A	N/A	N/A
Mid Channel, 2440 MHz	2.89 ms	3.75 ms	1	77.1	N/A	N/A
Mid Channel, 2440 MHz	N/A	N/A	5	N/A	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
2DH5, pi/4-DQPSK						
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, 2440 MHz	2.892 ms	3.75 ms	1	77.1	N/A	N/A
Mid Channel, 2440 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
3DH5, 8-DPSK						
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, 2440 MHz	2.893 ms	3.75 ms	1	77.2	N/A	N/A
Mid Channel, 2440 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

Bluetooth, single channel mode, DH5, GFSK, 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

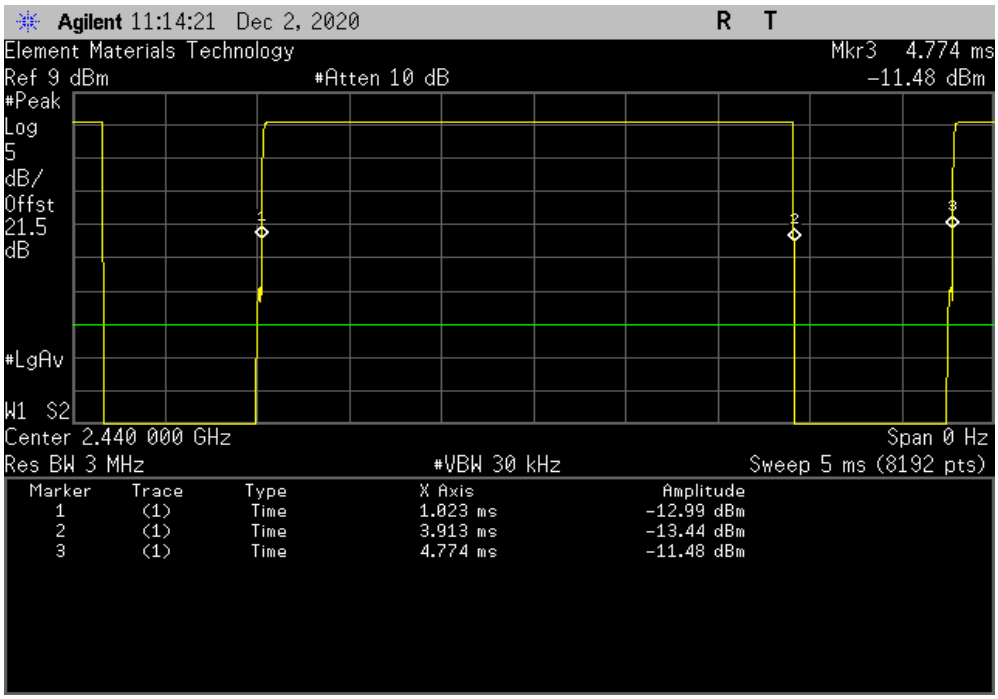


Bluetooth, single channel mode, DH5, GFSK, Low Channel, 2402 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

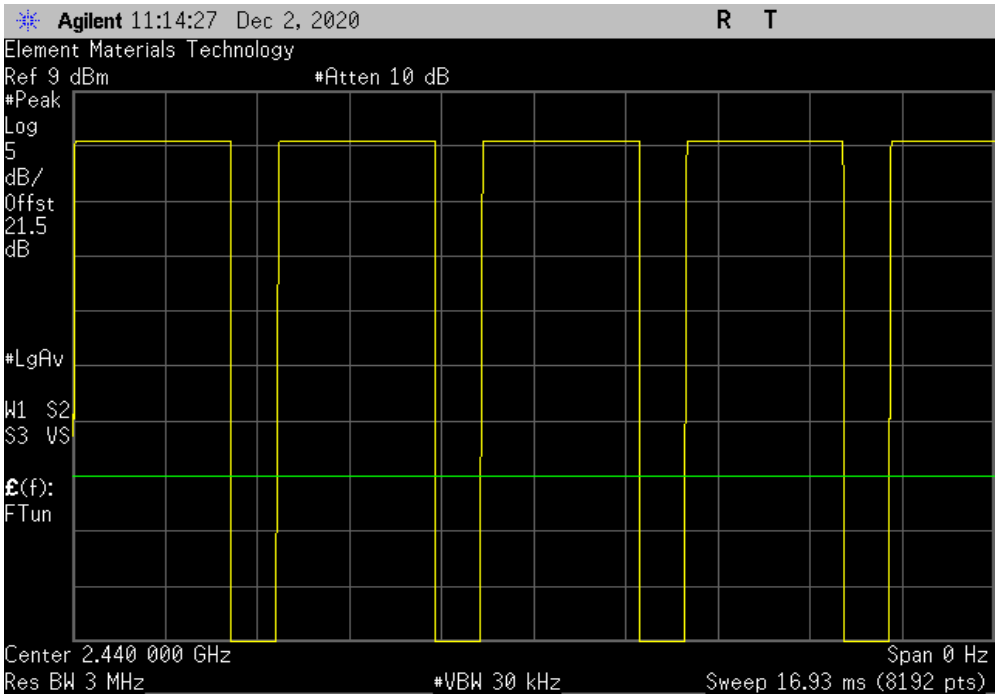


DUTY CYCLE

Bluetooth, single channel mode, DH5, GFSK, Mid Channel, 2440 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	2.89 ms	3.75 ms	1	77.1	N/A	N/A

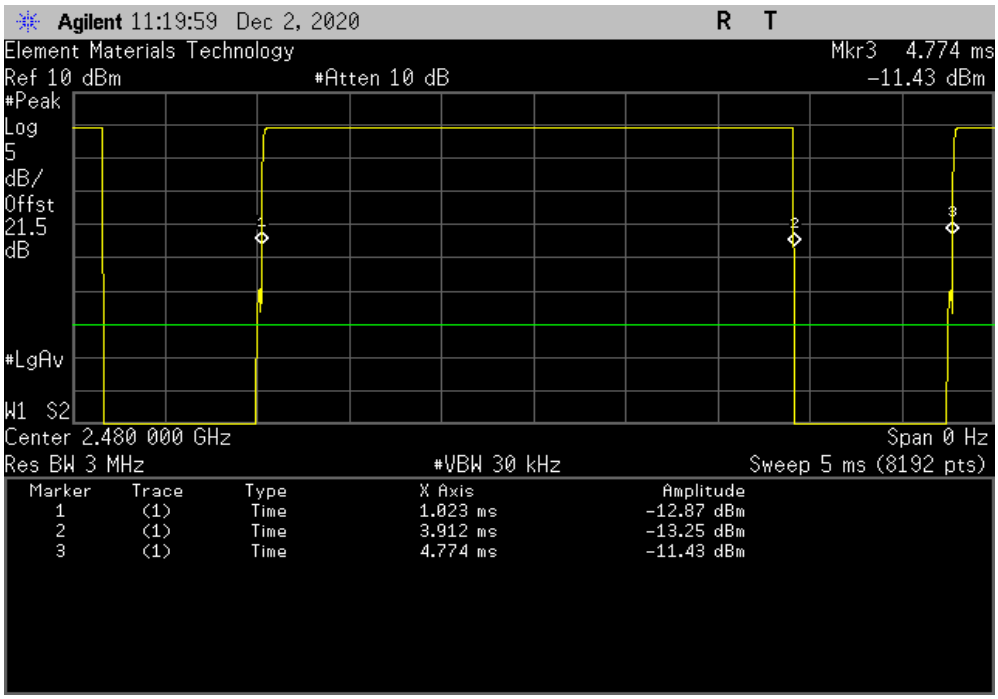


Bluetooth, single channel mode, DH5, GFSK, Mid Channel, 2440 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

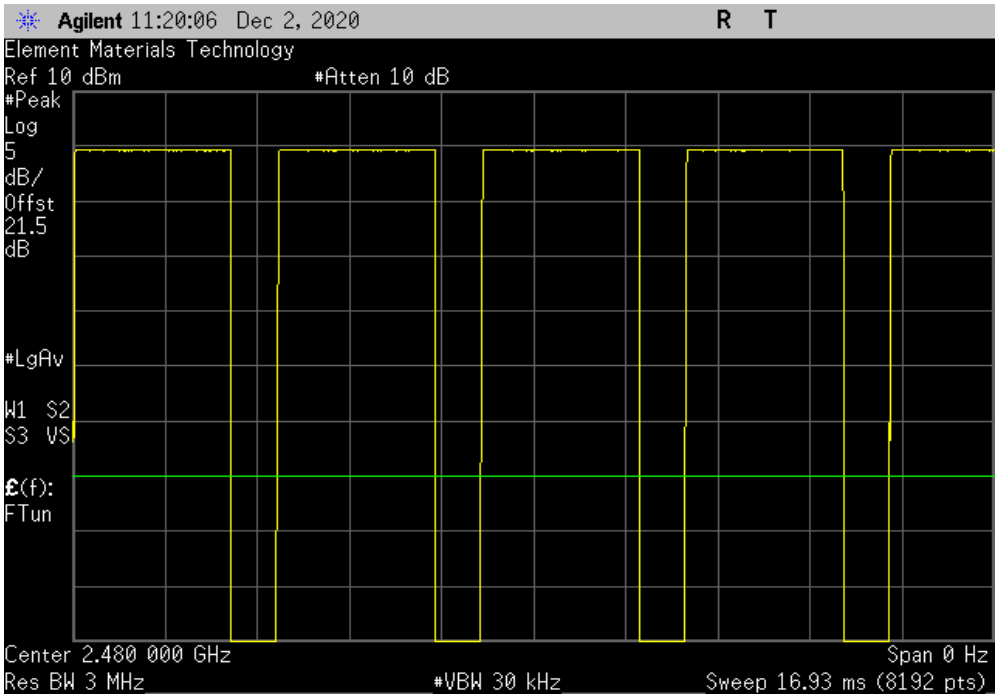


DUTY CYCLE

Bluetooth, single channel mode, DH5, GFSK, 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

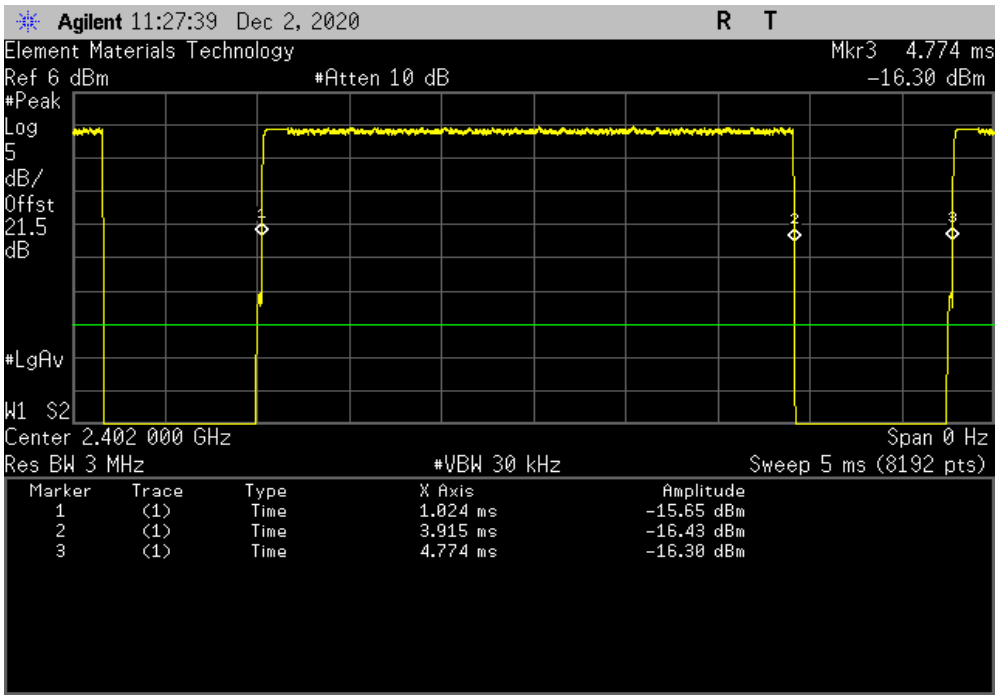


Bluetooth, single channel mode, DH5, GFSK, High Channel, 2480 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

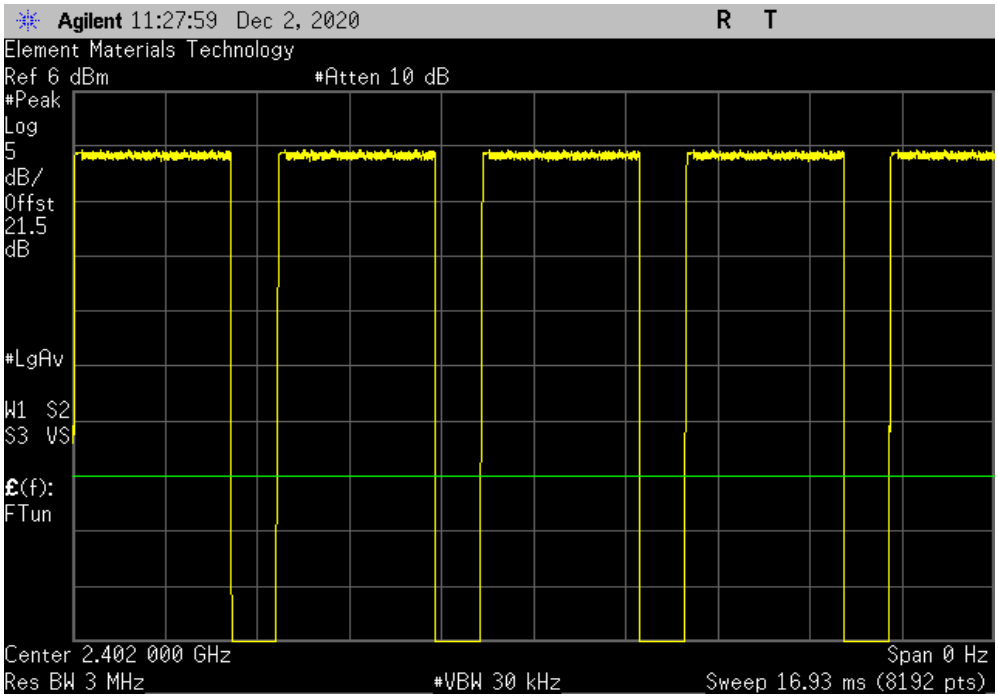


DUTY CYCLE

Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, 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

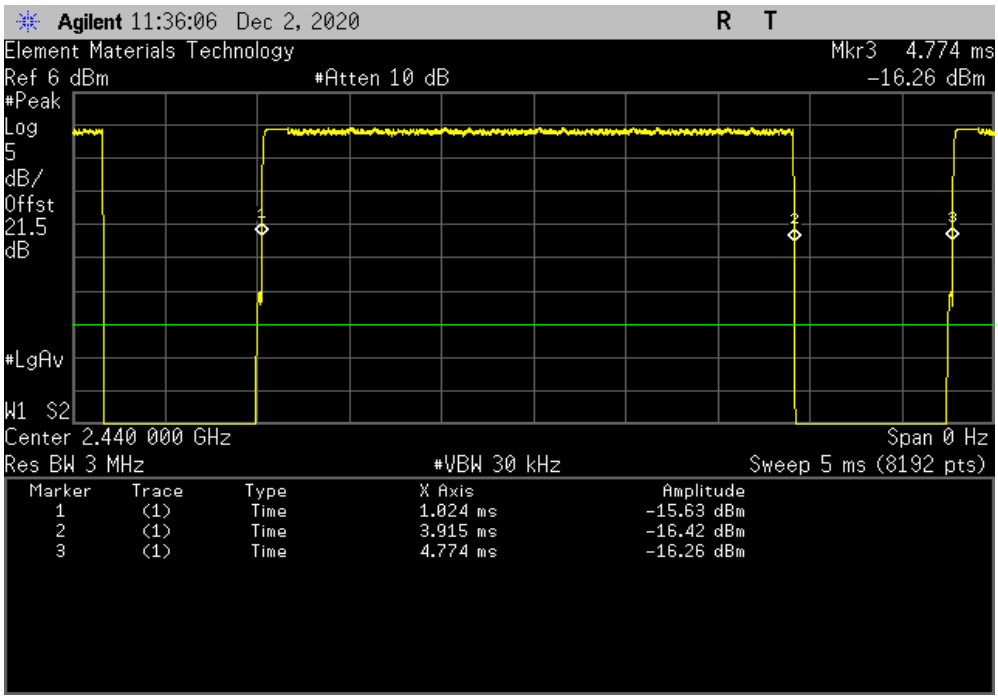


Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

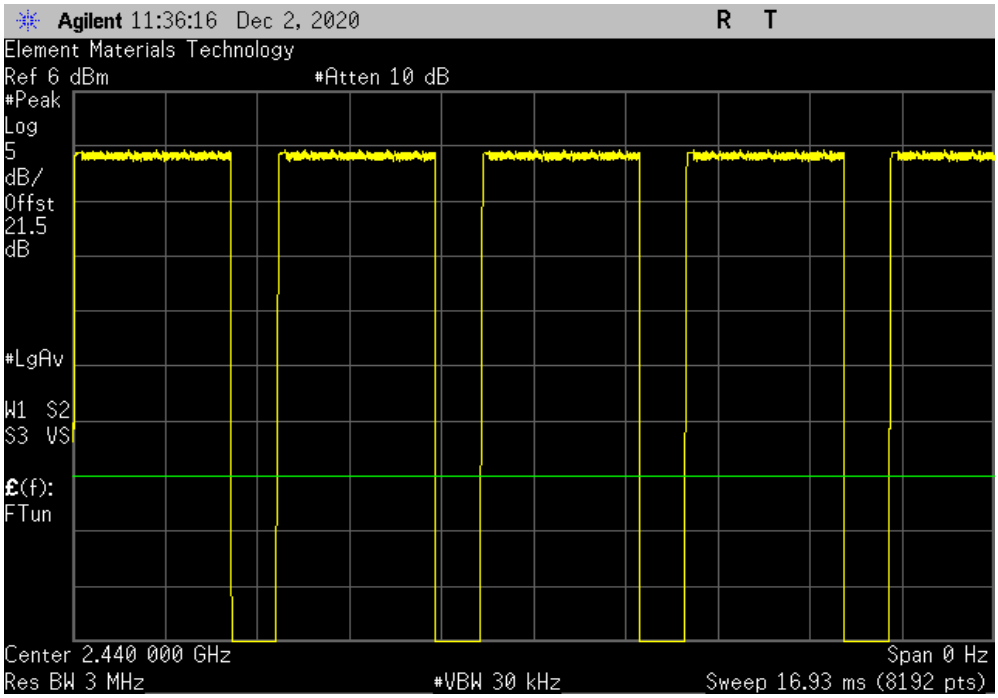


DUTY CYCLE

Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	2.892 ms	3.75 ms	1	77.1	N/A	N/A



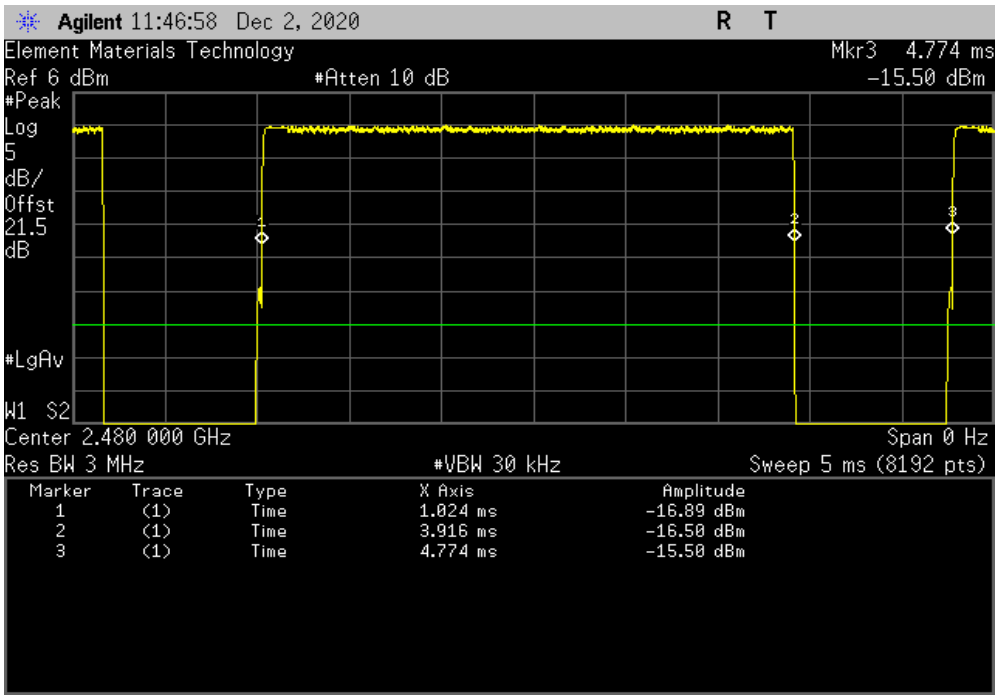
Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



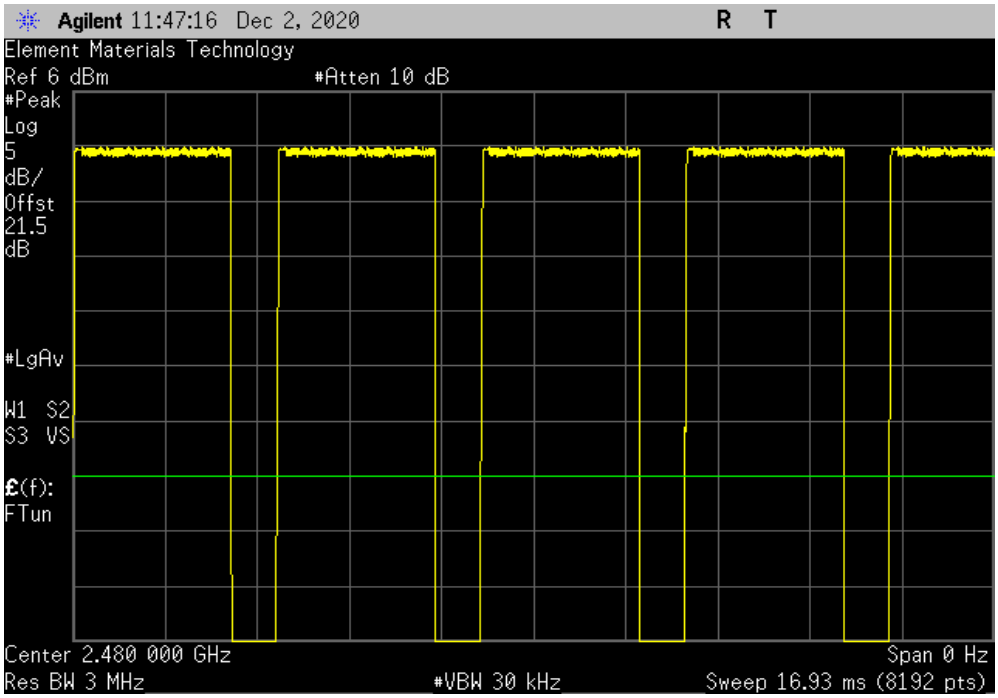
DUTY CYCLE

TbtTx 2019.08.30.0 XMit 2020.03.25.0

Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, 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

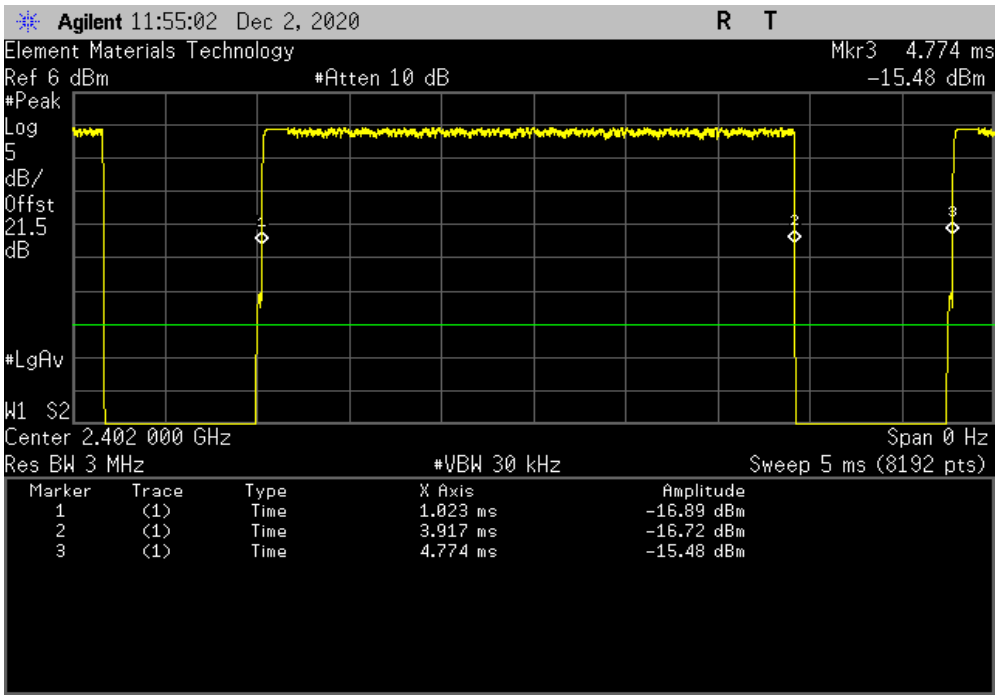


Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

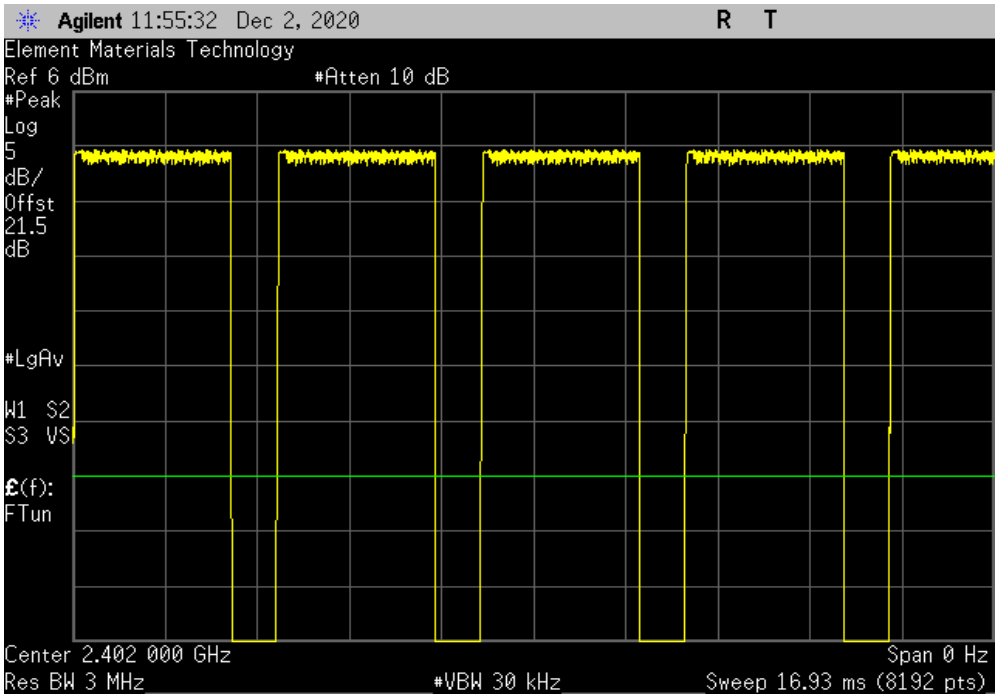


DUTY CYCLE

Bluetooth, single channel mode, 3DH5, 8-DPSK, 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

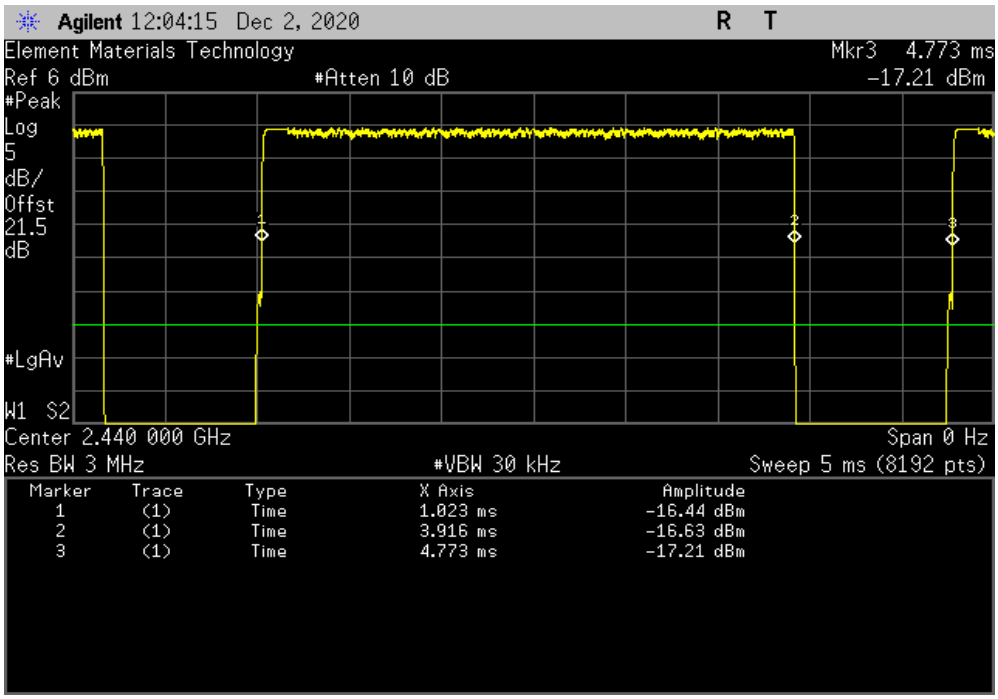


Bluetooth, single channel mode, 3DH5, 8-DPSK, Low Channel, 2402 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

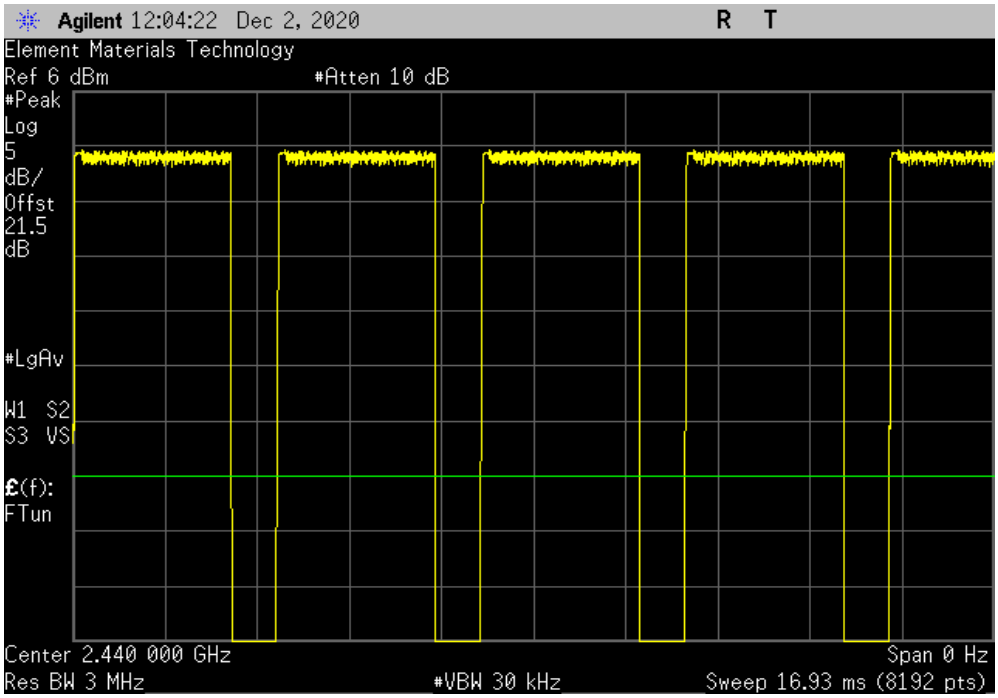


DUTY CYCLE

Bluetooth, single channel mode, 3DH5, 8-DPSK, Mid Channel, 2440 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	2.893 ms	3.75 ms	1	77.2	N/A	N/A

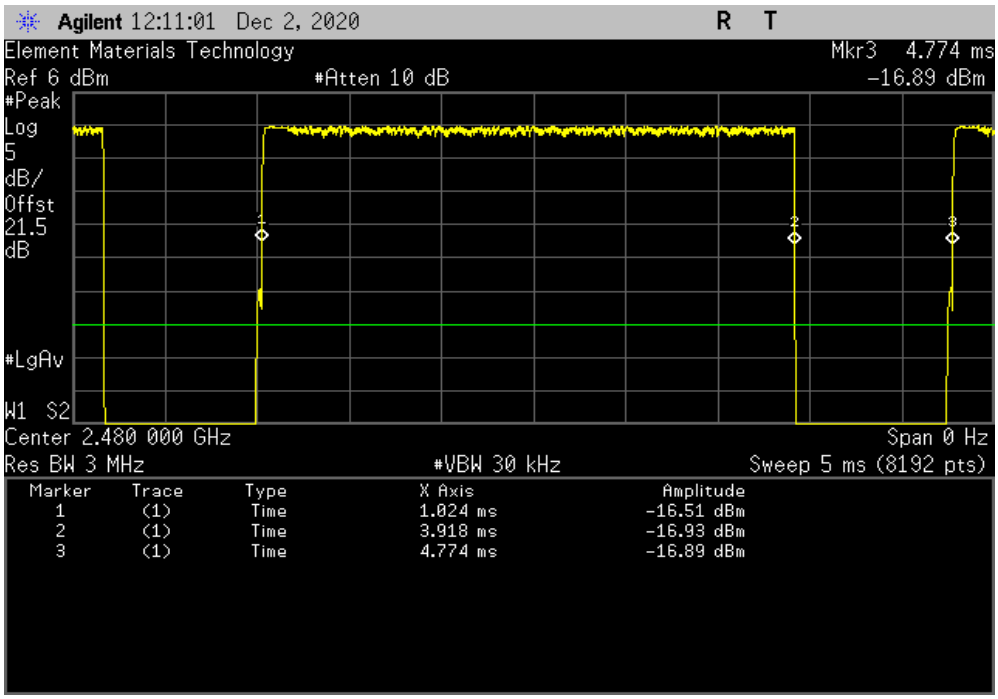


Bluetooth, single channel mode, 3DH5, 8-DPSK, Mid Channel, 2440 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

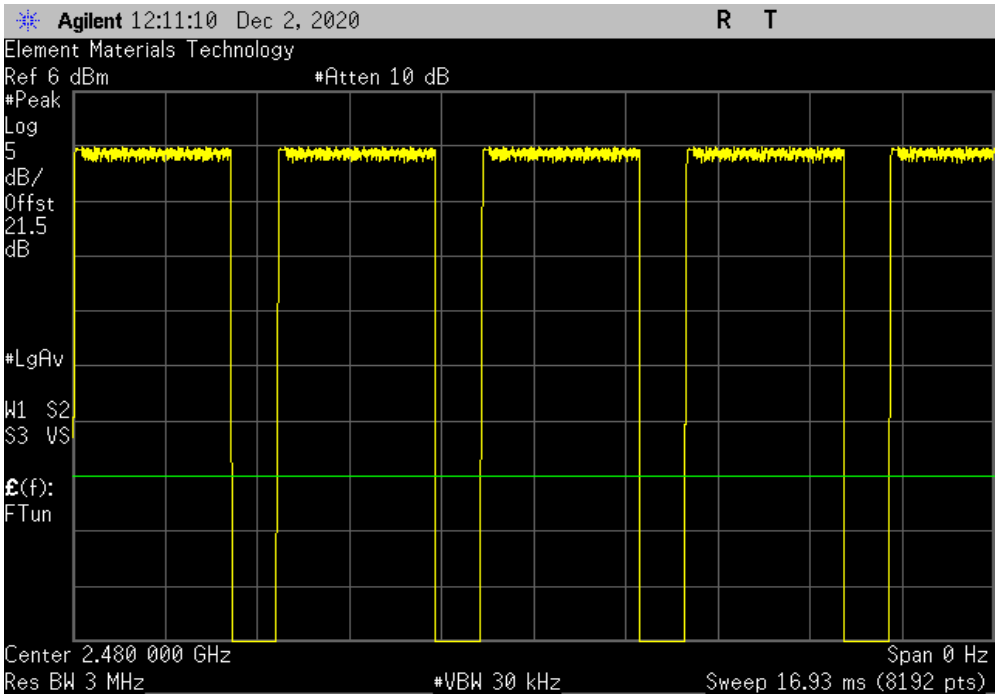


DUTY CYCLE

Bluetooth, single channel mode, 3DH5, 8-DPSK, 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



Bluetooth, single channel mode, 3DH5, 8-DPSK, 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 2020.03.25.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Keysight	N5182B	TFU	20-Nov-20	20-Nov-22
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	13-Mar-20	13-Mar-21
Attenuator	S.M. Electronics	SA26B-20	AUY	13-Mar-20	13-Mar-21
Block - DC	Fairview Microwave	SD3379	AMW	13-Mar-20	13-Mar-21
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAT	28-Oct-20	28-Oct-21

TEST DESCRIPTION

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

element

TbtTx 2019.08.30.0 XMit 2020.03.25.0

EUT:	A-dec Gateway			**Work Order:**	A-DE0149
Serial Number:	521O041984			**Date:**	2-Dec-20
Customer:	A-dec, Inc.			**Temperature:**	23.3 °C
Attendees:	Spencer Warneke			**Humidity:**	30.7% RH
Project:	None			**Barometric Pres.:**	1024 mbar
Tested by:	Jeff Alcoke	**Power:**	110VAC/60Hz	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247:2020	ANSI C63.10:2013

COMMENTS

Reference level offset includes: DC Block, 20 dB attenuator, and measurement cable. From this report, the worst case (largest) occupied bandwidth is 1.338 MHz. The limit is 2/3 * 1.344 MHz = 0.893 MHz

DEVIATIONS FROM TEST STANDARD

None

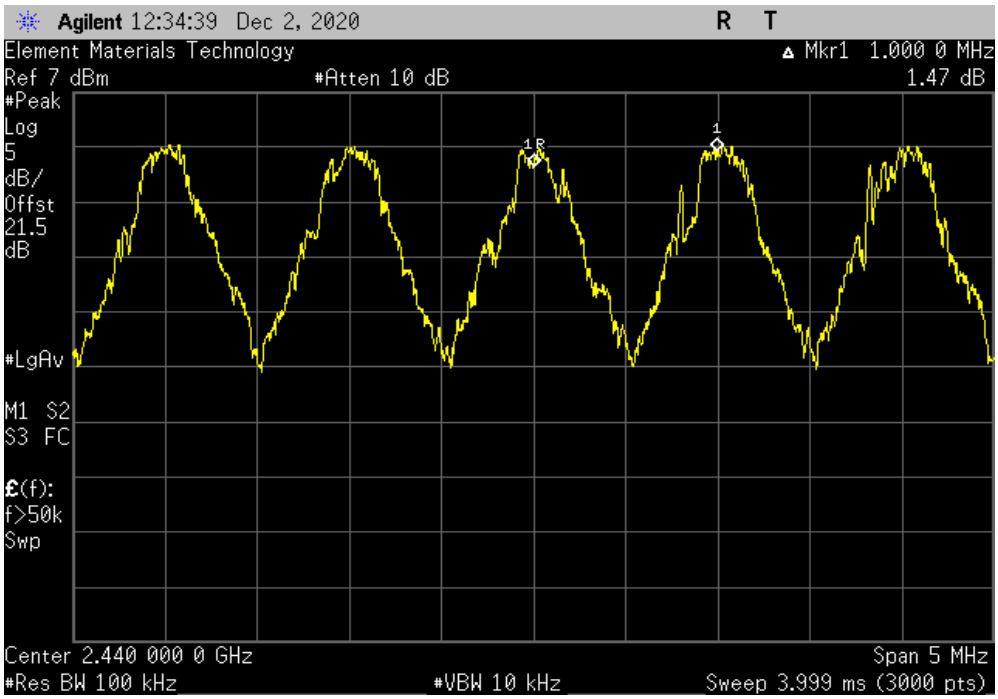
Configuration #	1	Signature

	Value	Limit (≥)	Results
Hopping Mode (All Channels)			
DH5, GFSK			
Mid Channel, 2440 MHz	1.0 MHz	0.893 MHz	Pass

CARRIER FREQUENCY SEPARATION

TbtTx 2019.08.30.0 XMit 2020.03.25.0

Hopping Mode (All Channels), DH5, GFSK, Mid Channel, 2440 MHz						
				Value	Limit (≥)	Results
				1.0 MHz	0.893 MHz	Pass



NUMBER OF HOPPING FREQUENCIES

XMit 2020.03.25.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Keysight	N5182B	TFU	20-Nov-20	20-Nov-22
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	13-Mar-20	13-Mar-21
Attenuator	S.M. Electronics	SA26B-20	AUY	13-Mar-20	13-Mar-21
Block - DC	Fairview Microwave	SD3379	AMW	13-Mar-20	13-Mar-21
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAT	28-Oct-20	28-Oct-21

TEST DESCRIPTION

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 2019.08.30.0 XMit 2020.03.25.0

EUT:	A-dec Gateway			Work Order:	A-DE0149
Serial Number:	521O041984			Date:	2-Dec-20
Customer:	A-dec, Inc.			Temperature:	23.1 °C
Attendees:	Spencer Warneke			Humidity:	31.1% RH
Project:	None			Barometric Pres.:	1024 mbar
Tested by:	Jeff Alcoke	Power:	110VAC/60Hz	Job Site:	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247:2020	ANSI C63.10:2013

COMMENTS

Reference level offset includes: DC Block, 20 dB attenuator, and measurement cable.

DEVIATIONS FROM TEST STANDARD

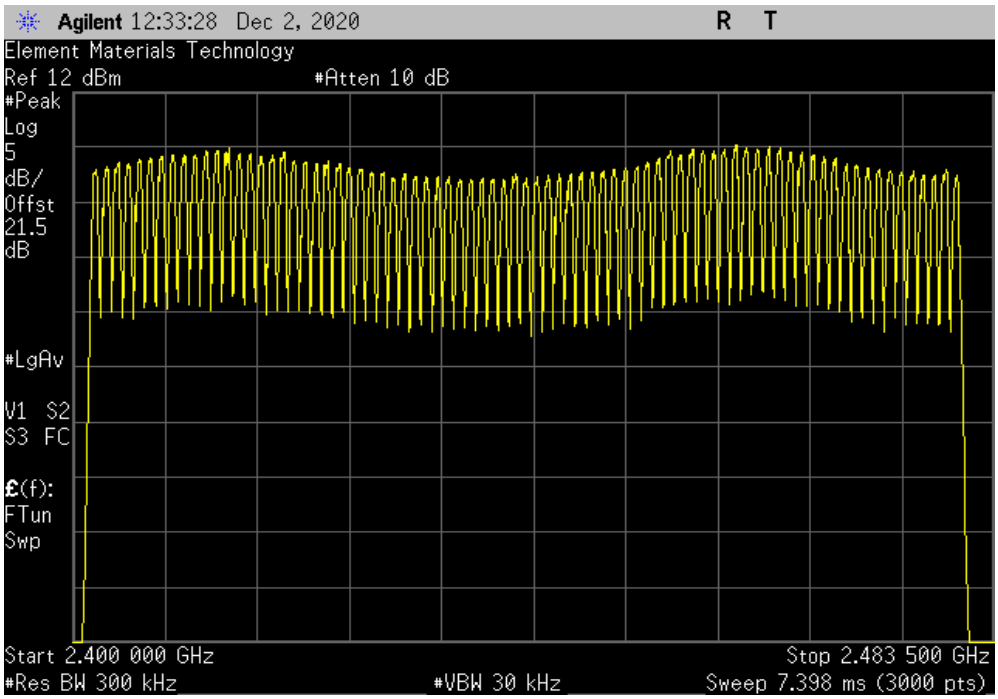
None

Configuration #	1	Signature

	Number of Channels	Limit (≥)	Results
Hopping Mode (All Channels)			
DH5, GFSK			
Mid Channel, 2440 MHz	79	15	Pass

NUMBER OF HOPPING FREQUENCIES

Hopping Mode (All Channels), DH5, GFSK, Mid Channel, 2440 MHz						
				Number of Channels	Limit (≥)	Results
				79	15	Pass



DWELL TIME

XMit 2020.03.25.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Keysight	N5182B	TFU	20-Nov-20	20-Nov-22
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	13-Mar-20	13-Mar-21
Attenuator	S.M. Electronics	SA26B-20	AUY	13-Mar-20	13-Mar-21
Block - DC	Fairview Microwave	SD3379	AMW	13-Mar-20	13-Mar-21
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAT	28-Oct-20	28-Oct-21

TEST DESCRIPTION

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.
- Scale Factor = 31.6 Sec / Screen Capture Sweep Time = 31.6 Sec / 6.32 Sec = 5

DWELL TIME

TbtTx 2019.08.30.0 XMit 2020.03.25.0

EUT:	A-dec Gateway			Work Order:	A-DE0149
Serial Number:	521O041984			Date:	2-Dec-20
Customer:	A-dec, Inc.			Temperature:	23.1 °C
Attendees:	Spencer Warneke			Humidity:	31.1% RH
Project:	None			Barometric Pres.:	1024 mbar
Tested by:	Jeff Alcoke	Power:	110VAC/60Hz	Job Site:	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247:2020	ANSI C63.10:2013

COMMENTS

Reference level offset includes: DC Block, 20 dB attenuator, and measurement cable. For DH5 modulation, the sweep time used to determine average number of pulses was 6 seconds. The scale factor for a 6 second sweep is: Scale Factor = 31.6 Sec / Screen Capture Sweep Time = 31.6 Sec / 6 Sec = 5.267

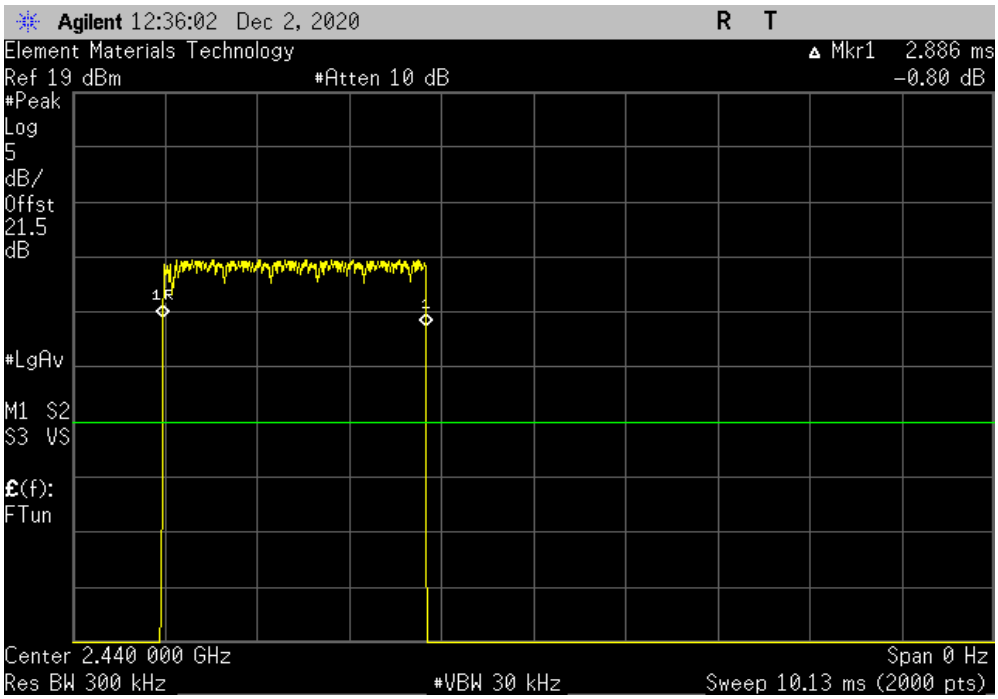
DEVIATIONS FROM TEST STANDARD

None

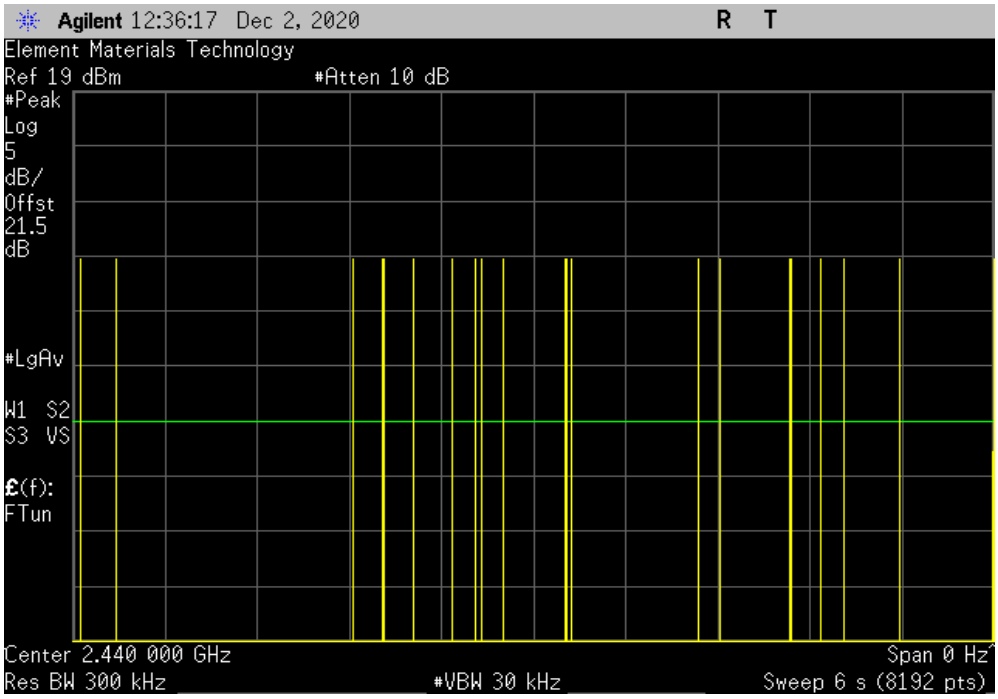
Configuration #	1	Signature

	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)							
DH5, GFSK							
Mid Channel, 2440 MHz	2.886	N/A	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2440 MHz	N/A	18	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2440 MHz	N/A	14	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2440 MHz	N/A	20	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2440 MHz	N/A	21	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2440 MHz	2.886	N/A	18.25	5.267	277.4	400	Pass
2DH5, pi/4-DQPSK							
Mid Channel, 2440 MHz	2.889	N/A	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2440 MHz	N/A	20	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2440 MHz	N/A	29	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2440 MHz	N/A	30	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2440 MHz	N/A	19	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2440 MHz	2.889	N/A	24.5	5	353.9	400	Pass
3DH5, 8-DPSK							
Mid Channel, 2440 MHz	2.892	N/A	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2440 MHz	N/A	25	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2440 MHz	N/A	15	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2440 MHz	N/A	27	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2440 MHz	N/A	19	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2440 MHz	2.892	N/A	21.5	5	310.89	400	Pass

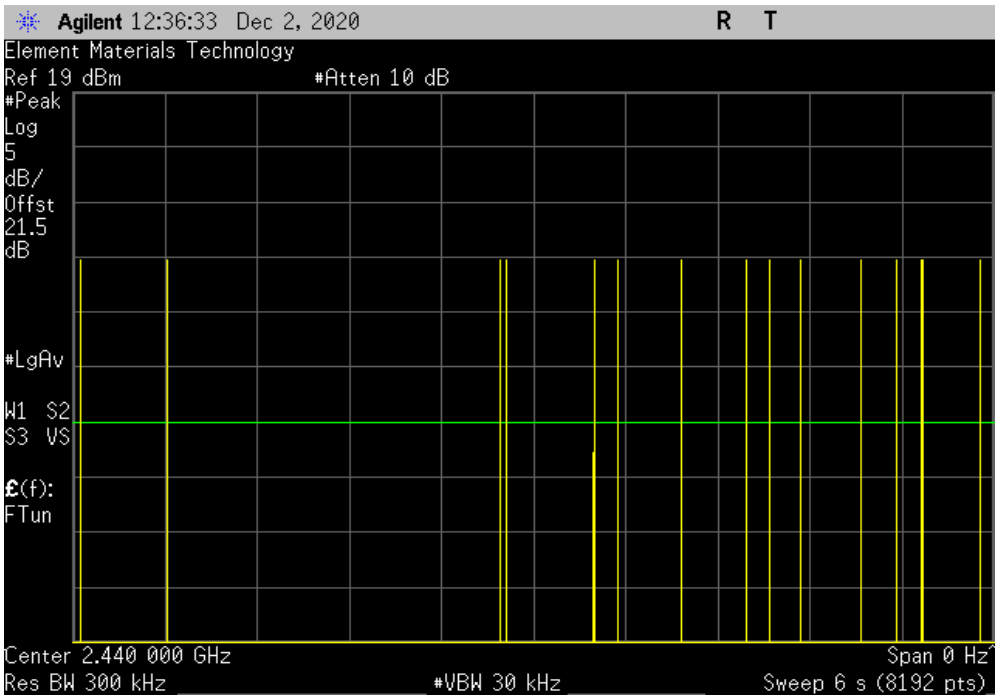
Hopping Mode (All Channels), DH5, GFSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.886	N/A	N/A	N/A	N/A	N/A	N/A



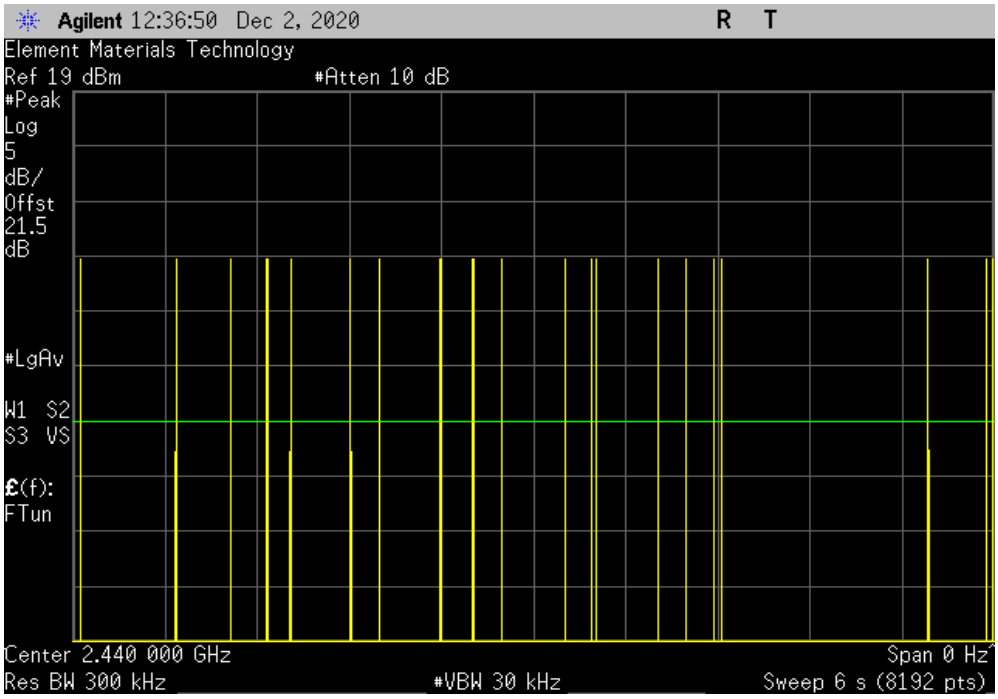
Hopping Mode (All Channels), DH5, GFSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	18	N/A	N/A	N/A	N/A	N/A



Hopping Mode (All Channels), DH5, GFSK, Mid Channel, 2440 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	14	N/A	N/A	N/A	N/A	N/A



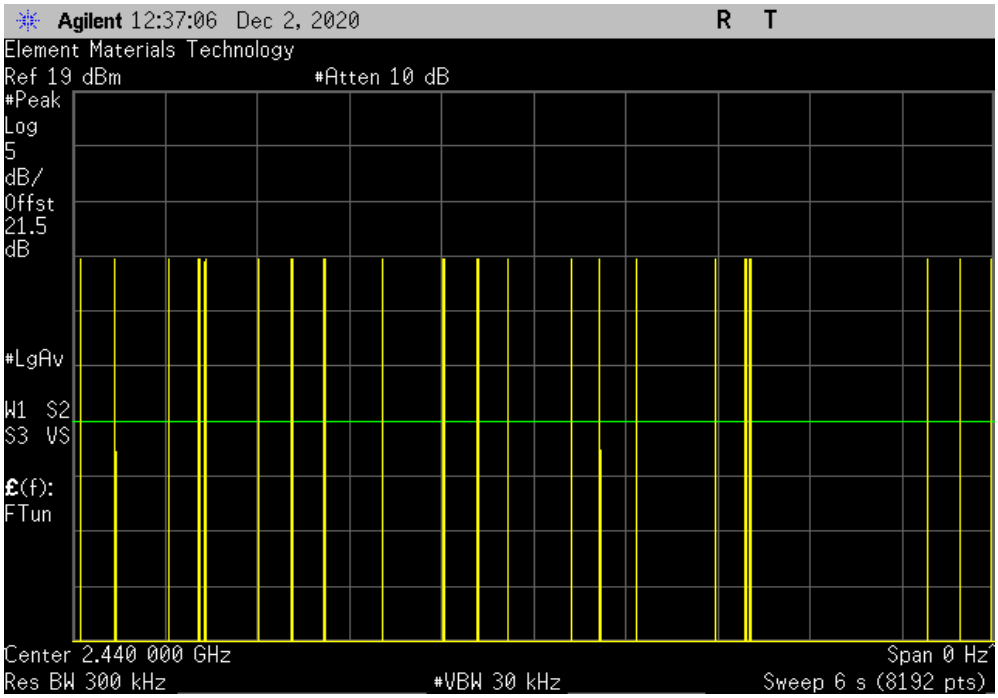
Hopping Mode (All Channels), DH5, GFSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	20	N/A	N/A	N/A	N/A	N/A



DWELL TIME

TbtTx 2019.08.30.0 XMit 2020.03.25.0

Hopping Mode (All Channels), DH5, GFSK, Mid Channel, 2440 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



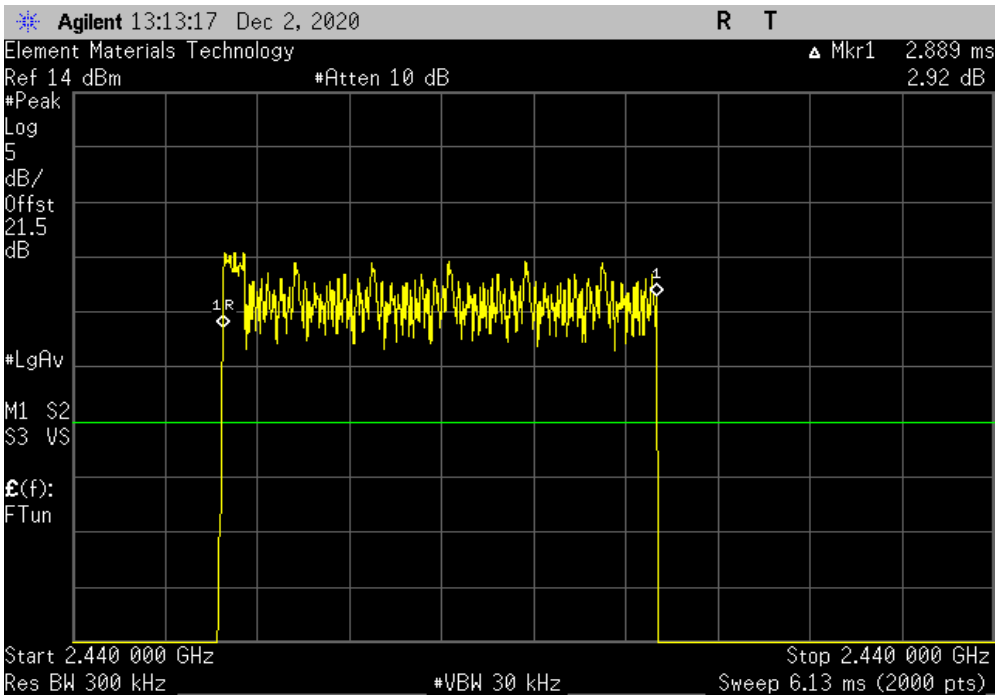
Hopping Mode (All Channels), DH5, GFSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.886	N/A	18.25	5.267	277.4	400	Pass

Calculation Only

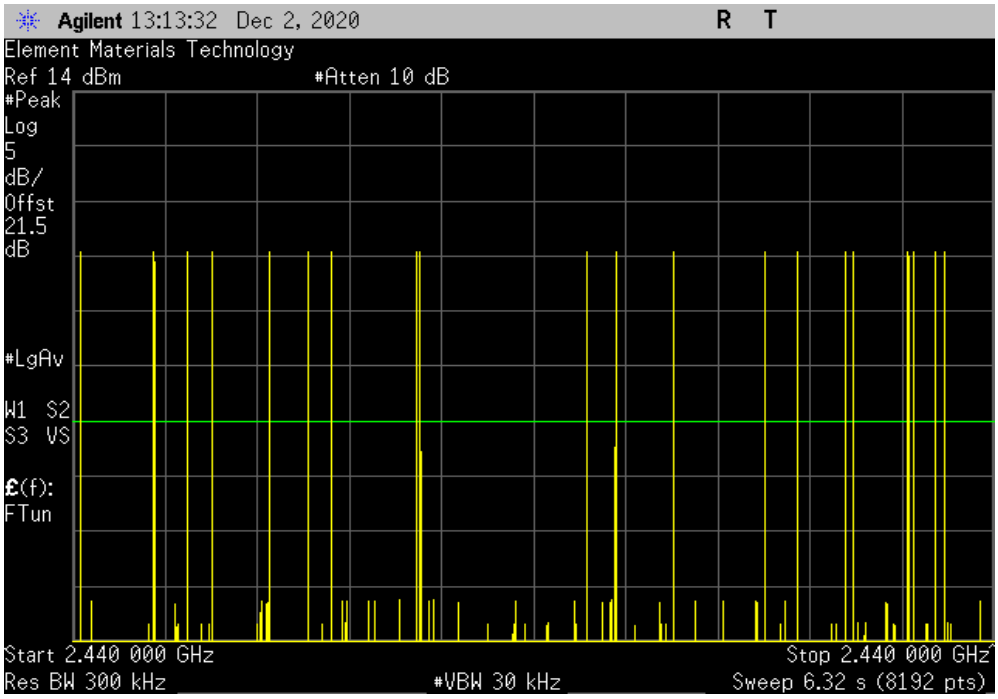
No Screen Capture Required

DWELL TIME

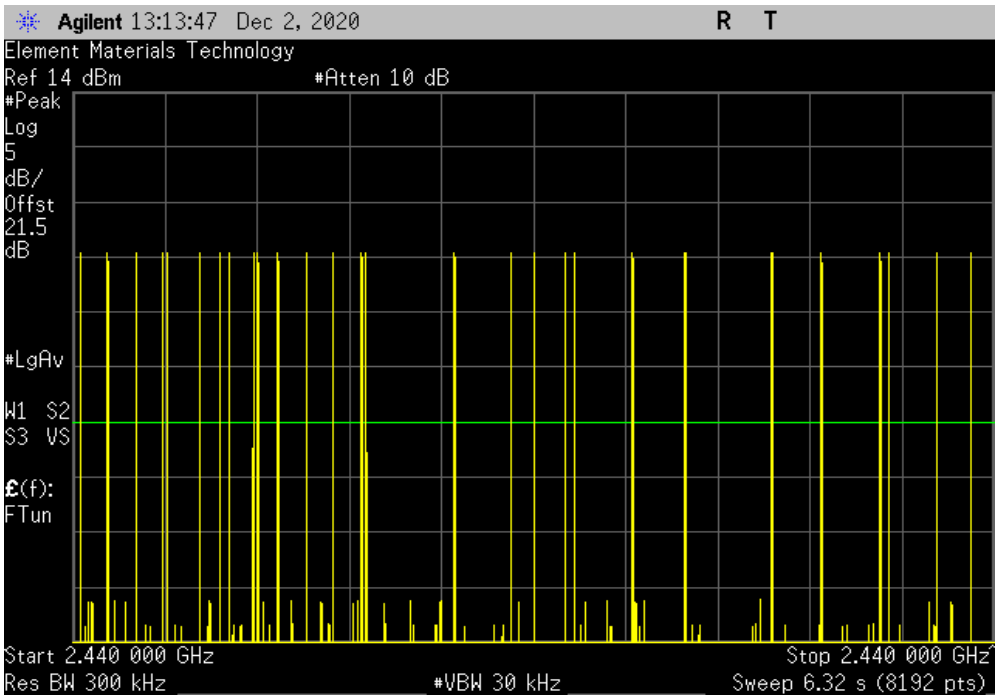
Hopping Mode (All Channels), 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.889	N/A	N/A	N/A	N/A	N/A	N/A



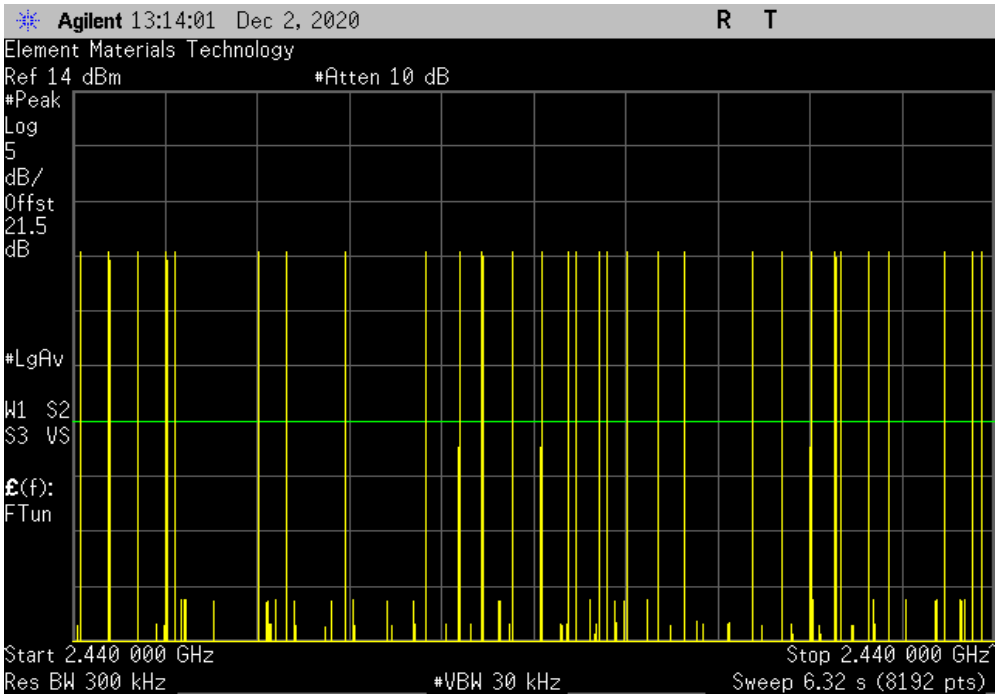
Hopping Mode (All Channels), 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	20	N/A	N/A	N/A	N/A	N/A



Hopping Mode (All Channels), 2DH5, pi/4-DQPSK, Mid Channel, 2440 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	29	N/A	N/A	N/A	N/A	N/A



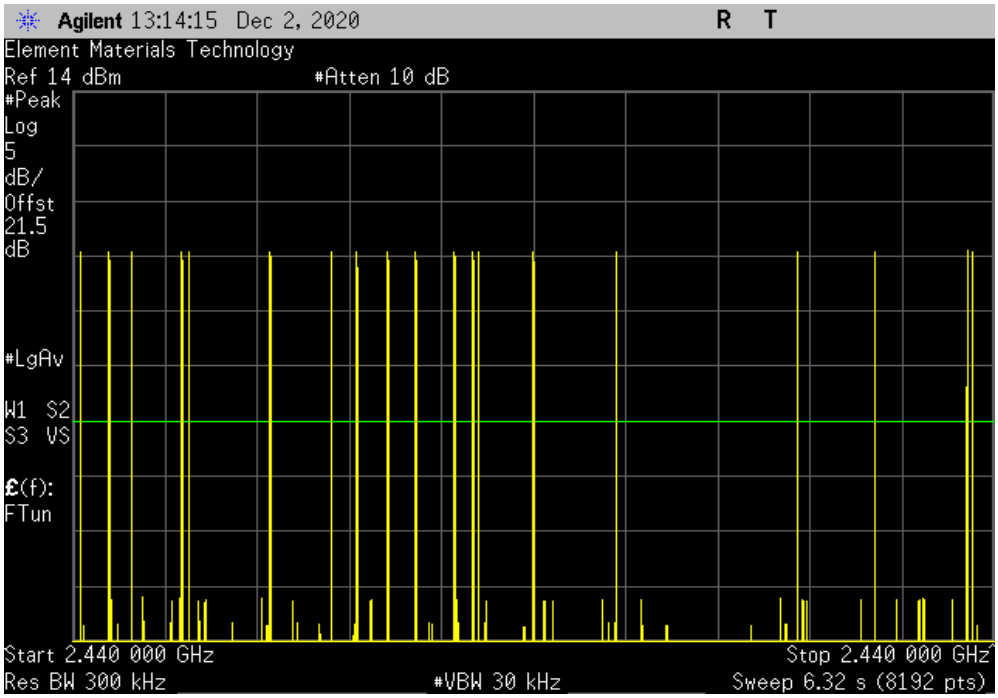
Hopping Mode (All Channels), 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	30	N/A	N/A	N/A	N/A	N/A



DWELL TIME

TbtTx 2019.08.30.0 XMit 2020.03.25.0

Hopping Mode (All Channels), 2DH5, pi/4-DQPSK, Mid Channel, 2440 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

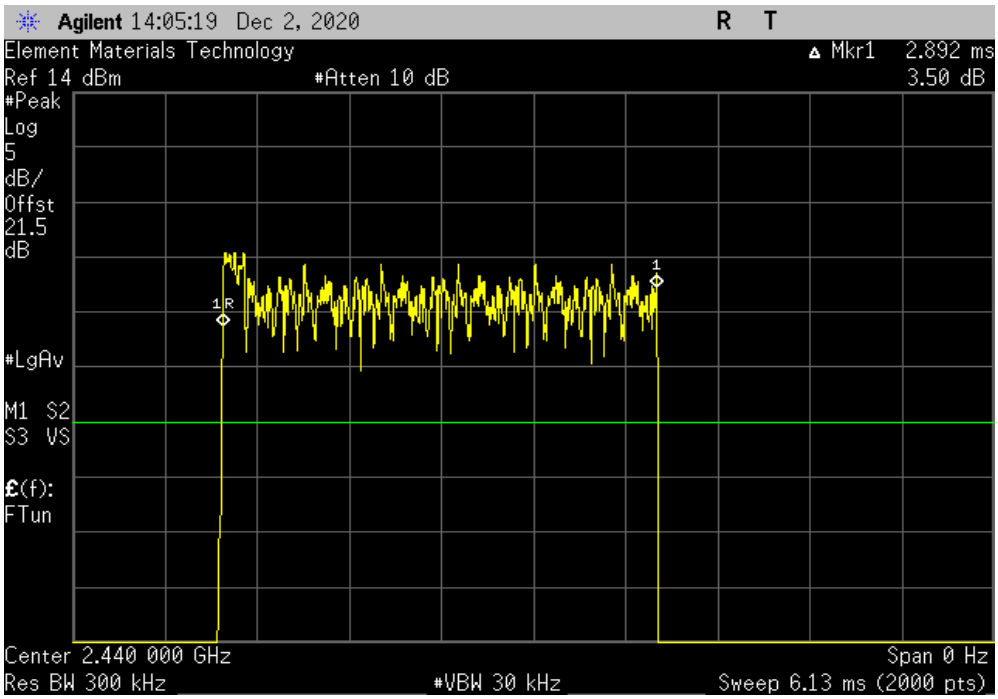


Hopping Mode (All Channels), 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.889	N/A	24.5	5	353.9	400	Pass

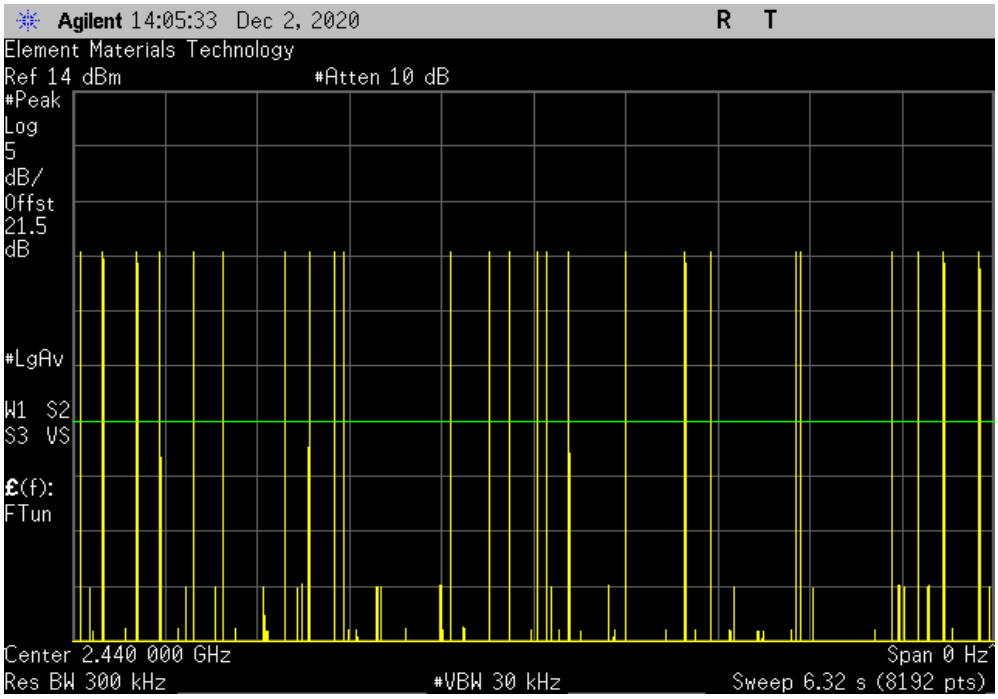
Calculation Only

No Screen Capture Required

Hopping Mode (All Channels), 3DH5, 8-DPSK, Mid Channel, 2440 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

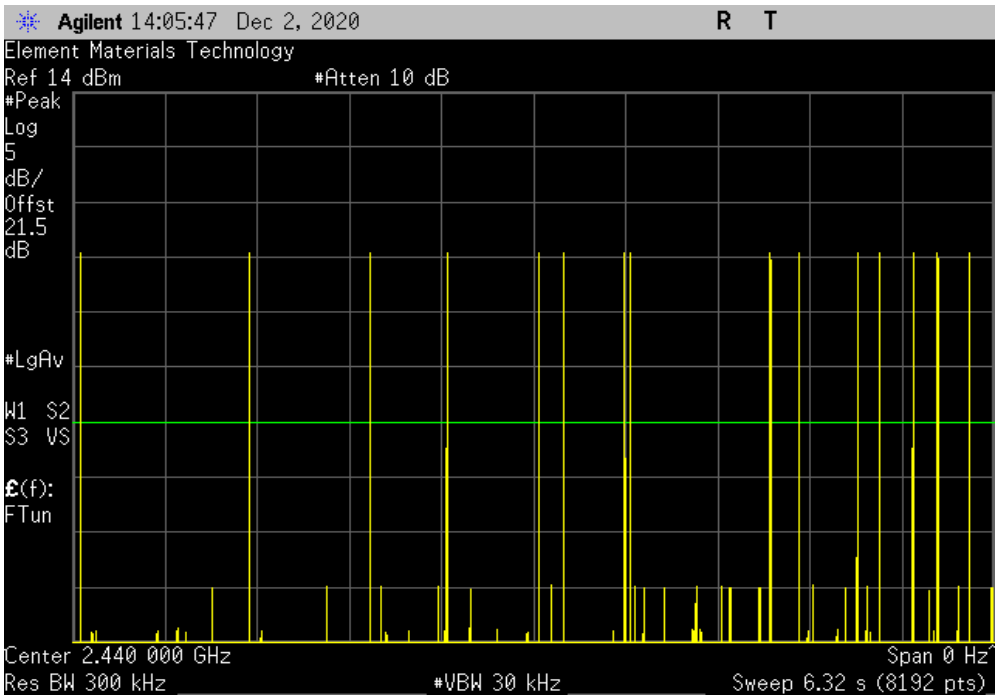


Hopping Mode (All Channels), 3DH5, 8-DPSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	25	N/A	N/A	N/A	N/A	N/A

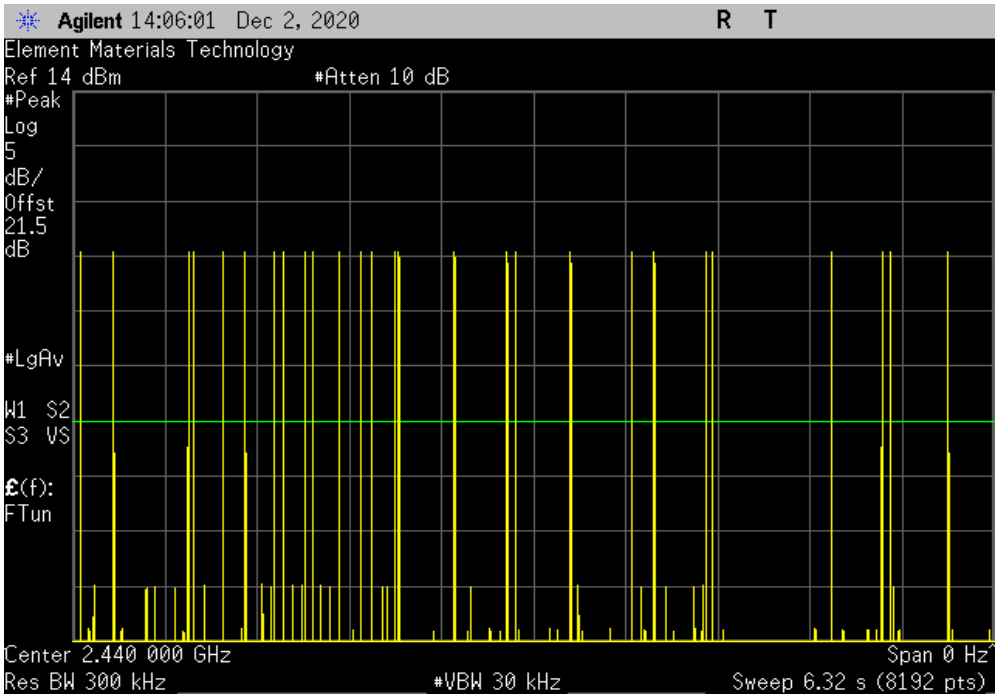


DWELL TIME

Hopping Mode (All Channels), 3DH5, 8-DPSK, Mid Channel, 2440 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	15	N/A	N/A	N/A	N/A	N/A

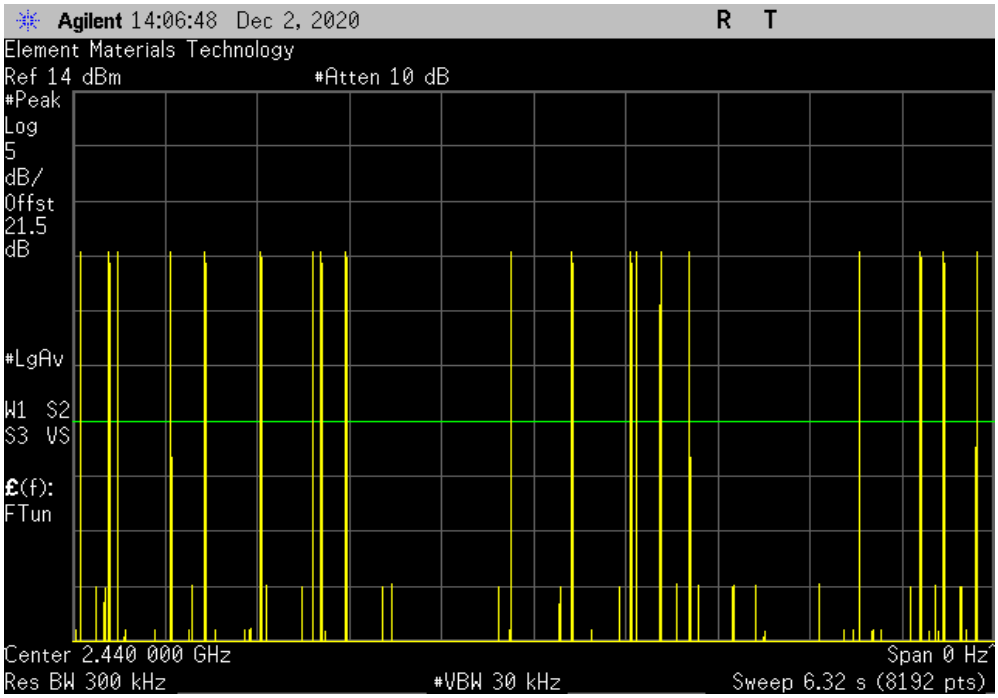


Hopping Mode (All Channels), 3DH5, 8-DPSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	27	N/A	N/A	N/A	N/A	N/A



DWELL TIME

Hopping Mode (All Channels), 3DH5, 8-DPSK, Mid Channel, 2440 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), 3DH5, 8-DPSK, Mid Channel, 2440 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 2020.03.25.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Keysight	N5182B	TFU	20-Nov-20	20-Nov-22
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	13-Mar-20	13-Mar-21
Attenuator	S.M. Electronics	SA26B-20	AUY	13-Mar-20	13-Mar-21
Block - DC	Fairview Microwave	SD3379	AMW	13-Mar-20	13-Mar-21
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAT	28-Oct-20	28-Oct-21

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.

OUTPUT POWER

element

TbtTx 2019.08.30.0 XMit 2020.03.25.0

EUT:	A-dec Gateway			**Work Order:**	A-DE0149
Serial Number:	521O041984			**Date:**	2-Dec-20
Customer:	A-dec, Inc.			**Temperature:**	23.9 °C
Attendees:	Spencer Warneke			**Humidity:**	27.8% RH
Project:	None			**Barometric Pres.:**	1026 mbar
Tested by:	Jeff Alcoke	**Power:**	110VAC/60Hz	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247:2020	ANSI C63.10:2013

COMMENTS

Reference level offset includes: DC Block, 20 dB attenuator, and measurement cable.

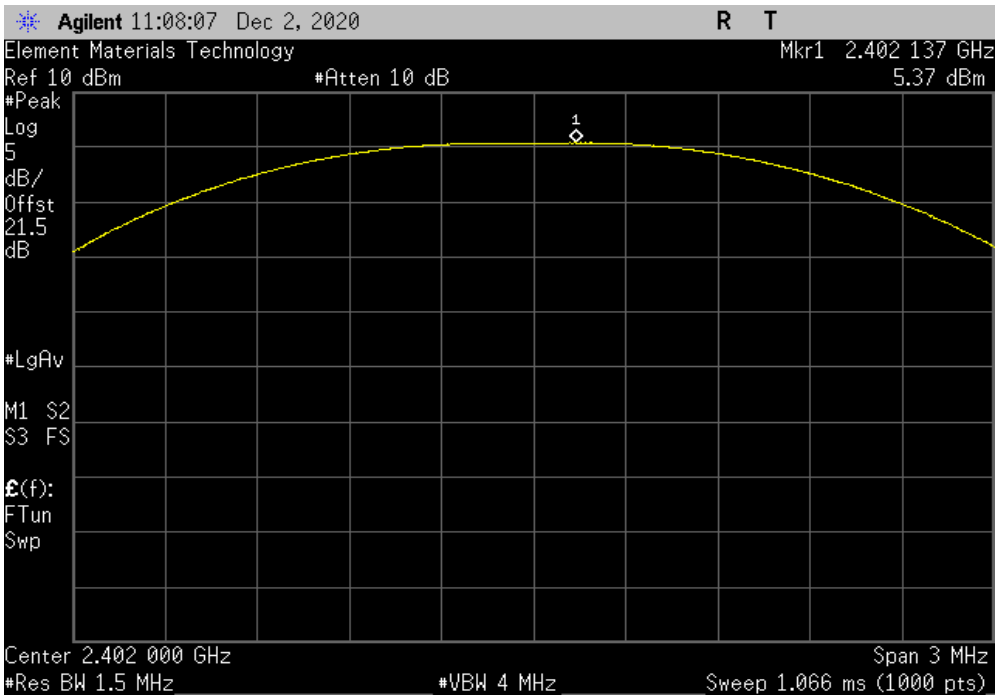
DEVIATIONS FROM TEST STANDARD

None

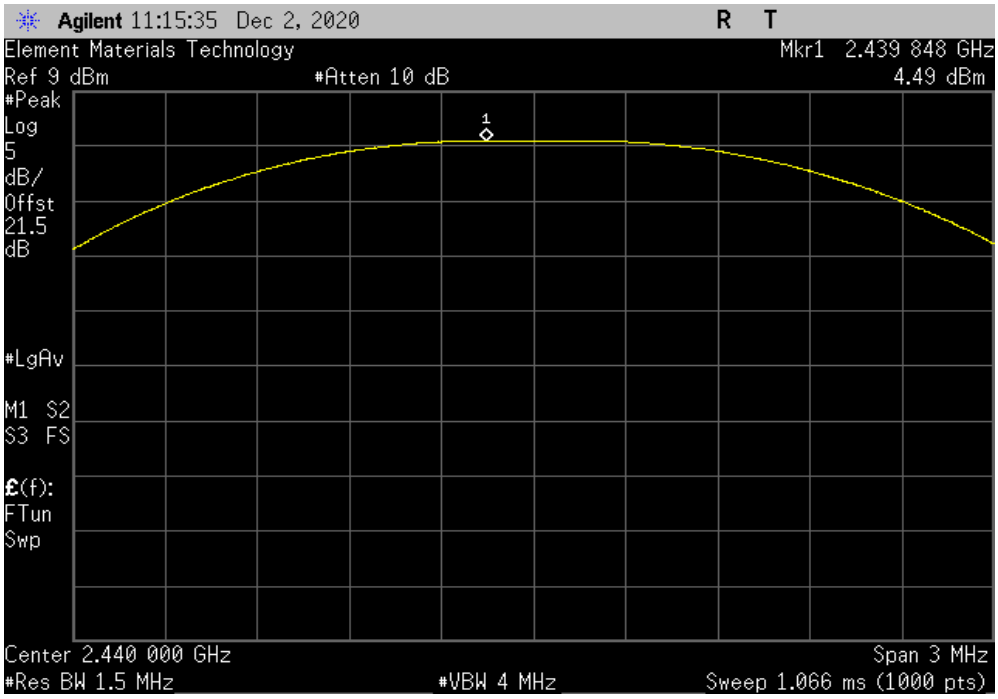
Configuration #	1	Signature

	Out Pwr (dBm)	Limit (dBm)	Result
Bluetooth, single channel mode			
DH5, GFSK			
Low Channel, 2402 MHz	5.371	21	Pass
Mid Channel, 2440 MHz	4.486	21	Pass
High Channel, 2480 MHz	4.69	21	Pass
2DH5, pi/4-DQPSK			
Low Channel, 2402 MHz	2.807	21	Pass
Mid Channel, 2440 MHz	2.702	21	Pass
High Channel, 2480 MHz	2.927	21	Pass
3DH5, 8-DPSK			
Low Channel, 2402 MHz	3.242	21	Pass
Mid Channel, 2440 MHz	3.113	21	Pass
High Channel, 2480 MHz	3.337	21	Pass

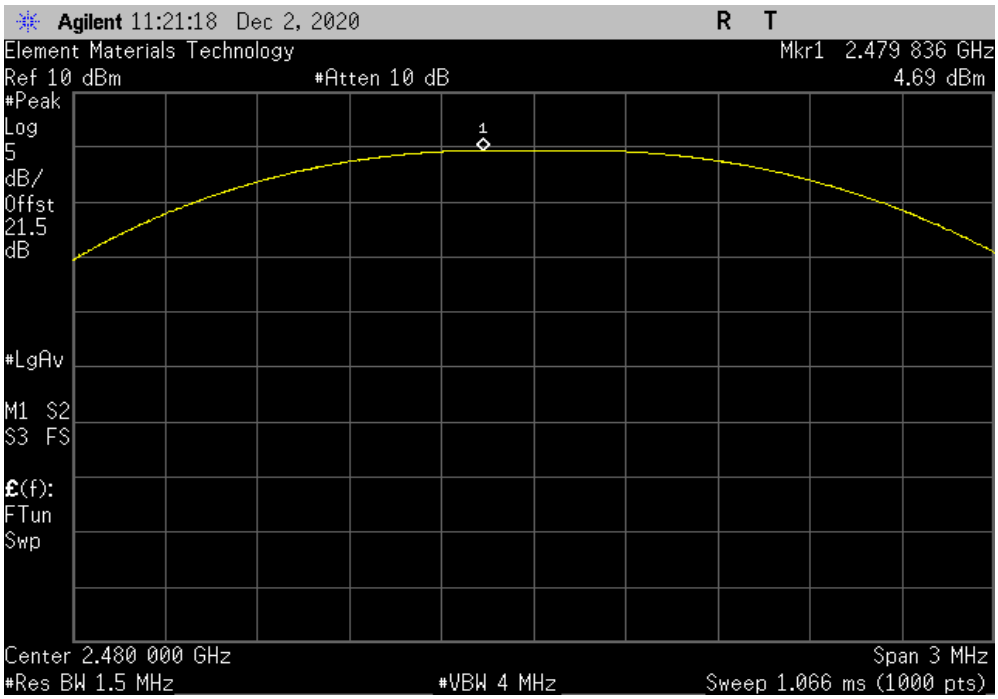
Bluetooth, single channel mode, DH5, GFSK, Low Channel, 2402 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				5.371	21	Pass



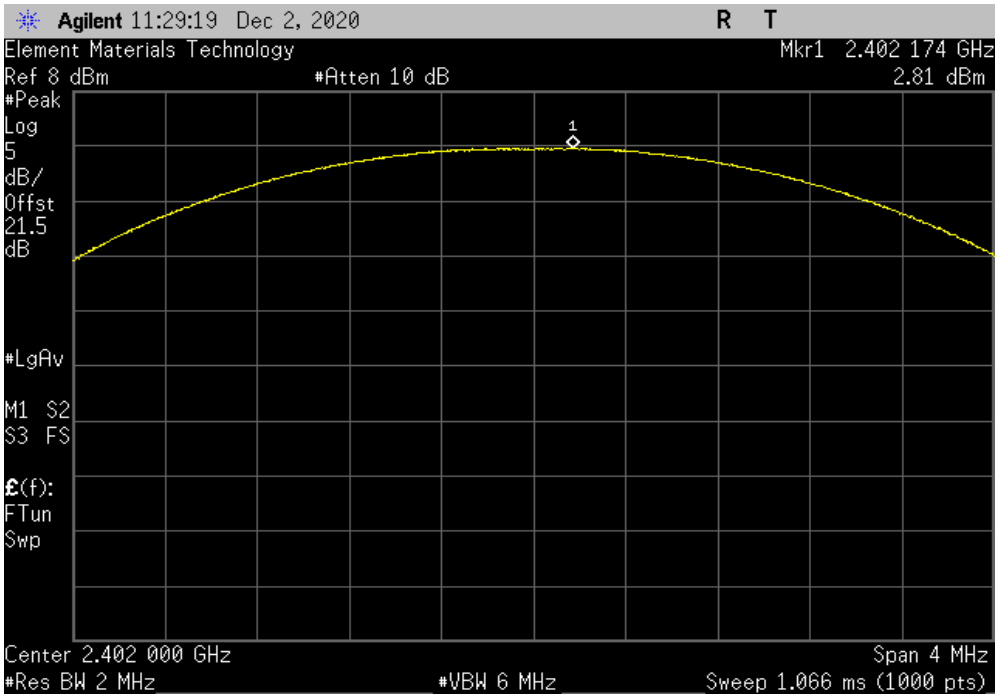
Bluetooth, single channel mode, DH5, GFSK, Mid Channel, 2440 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				4.486	21	Pass



Bluetooth, single channel mode, DH5, GFSK, High Channel, 2480 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				4.69	21	Pass

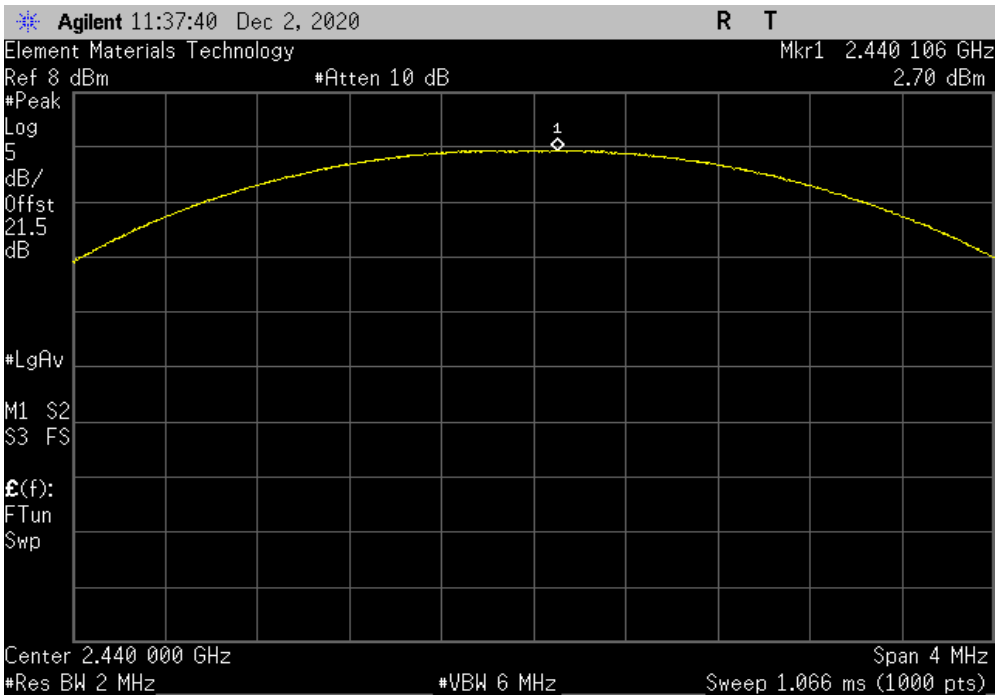


Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				2.807	21	Pass

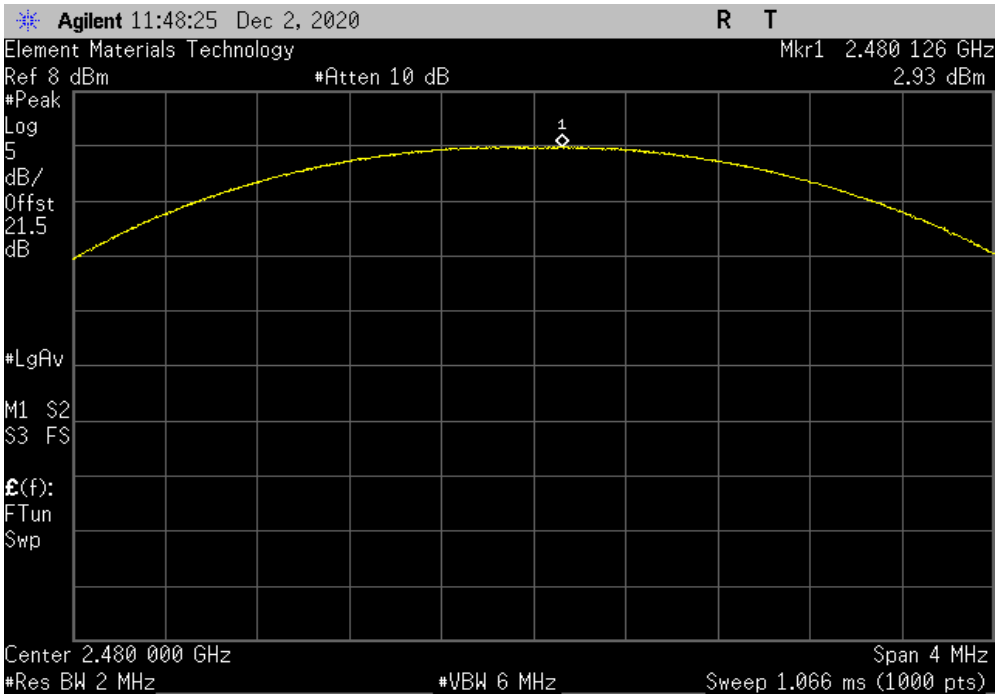


OUTPUT POWER

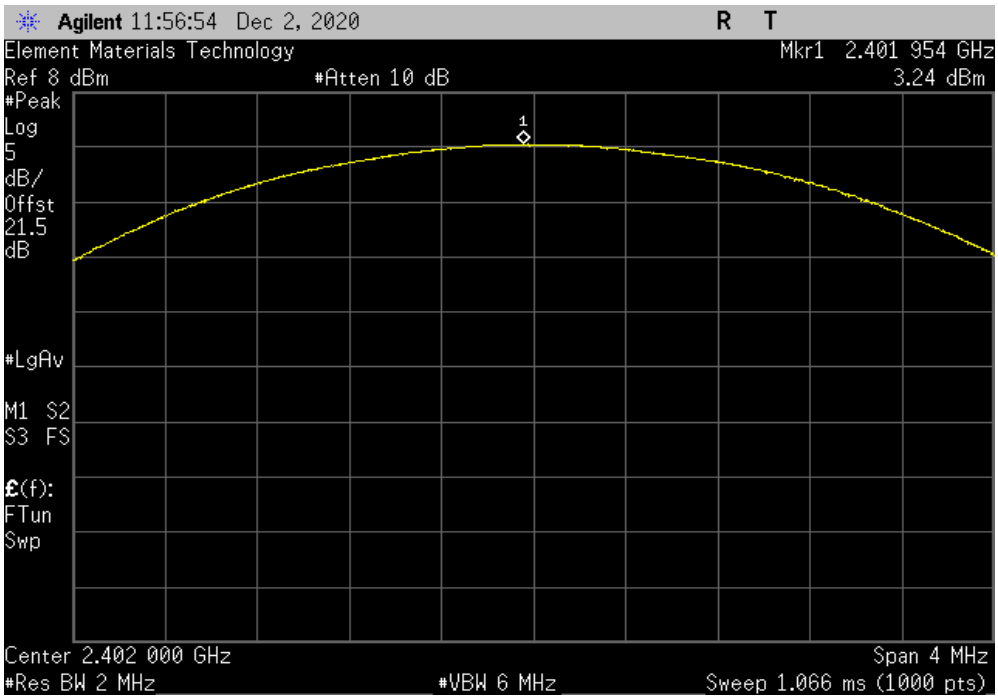
Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				2.702	21	Pass



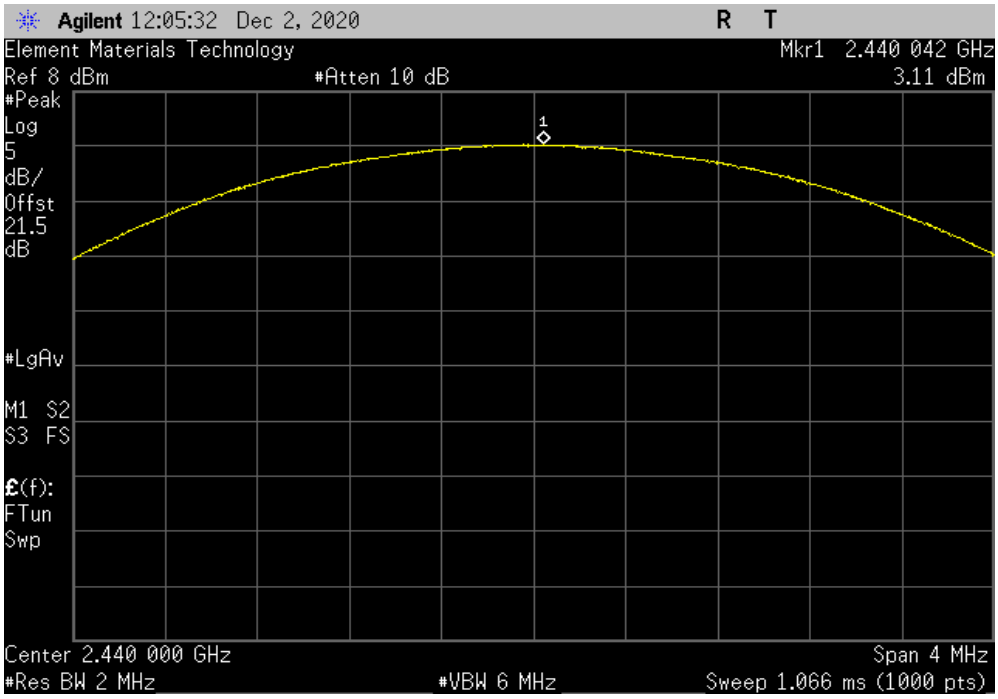
Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				2.927	21	Pass



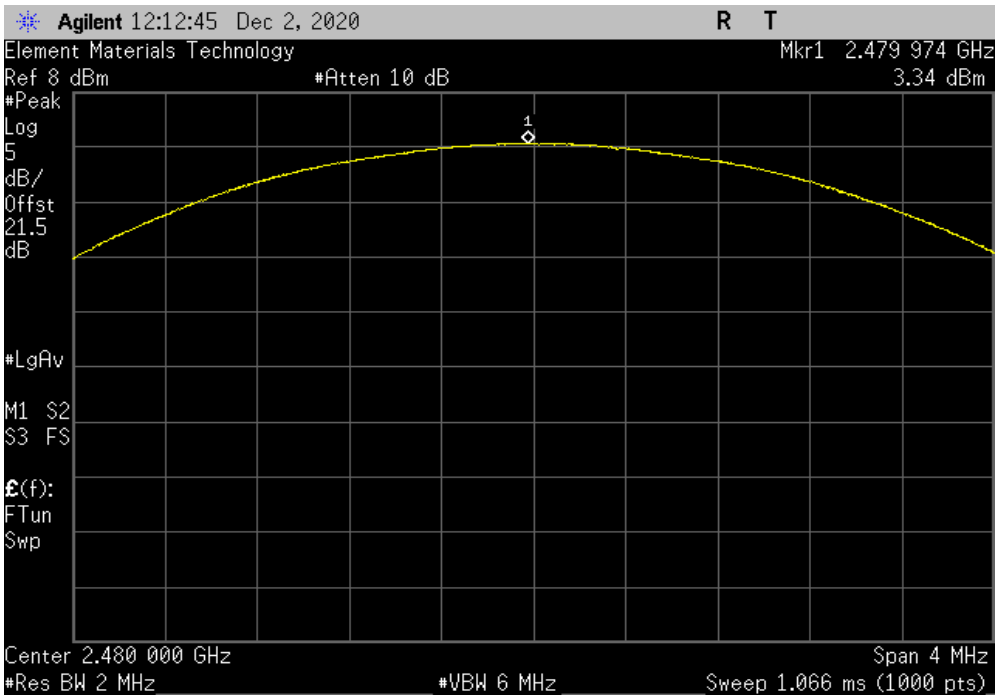
Bluetooth, single channel mode, 3DH5, 8-DPSK, Low Channel, 2402 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				3.242	21	Pass



Bluetooth, single channel mode, 3DH5, 8-DPSK, Mid Channel, 2440 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				3.113	21	Pass



Bluetooth, single channel mode, 3DH5, 8-DPSK, High Channel, 2480 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				3.337	21	Pass



EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

XMit 2020.03.25.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	13-Mar-20	13-Mar-21
Attenuator	S.M. Electronics	SA26B-20	AUY	13-Mar-20	13-Mar-21
Block - DC	Fairview Microwave	SD3379	AMW	13-Mar-20	13-Mar-21
Generator - Signal	Keysight	N5182B	TFU	20-Nov-20	20-Nov-22
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAT	28-Oct-20	28-Oct-21

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) = Max Measured Power + Antenna gain (dBi)

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

element

TbtTx 2019.08.30.0 XMit 2020.03.25.0

EUT:	A-dec Gateway			**Work Order:**	A-DE0149
Serial Number:	521O041984			**Date:**	2-Dec-20
Customer:	A-dec, Inc.			**Temperature:**	23.9 °C
Attendees:	Spencer Warneke			**Humidity:**	27.8% RH
Project:	None			**Barometric Pres.:**	1026 mbar
Tested by:	Jeff Alcoke	**Power:**	110VAC/60Hz	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247:2020	ANSI C63.10:2013

COMMENTS

Reference level offset includes: DC Block, 20 dB attenuator, and measurement cable.

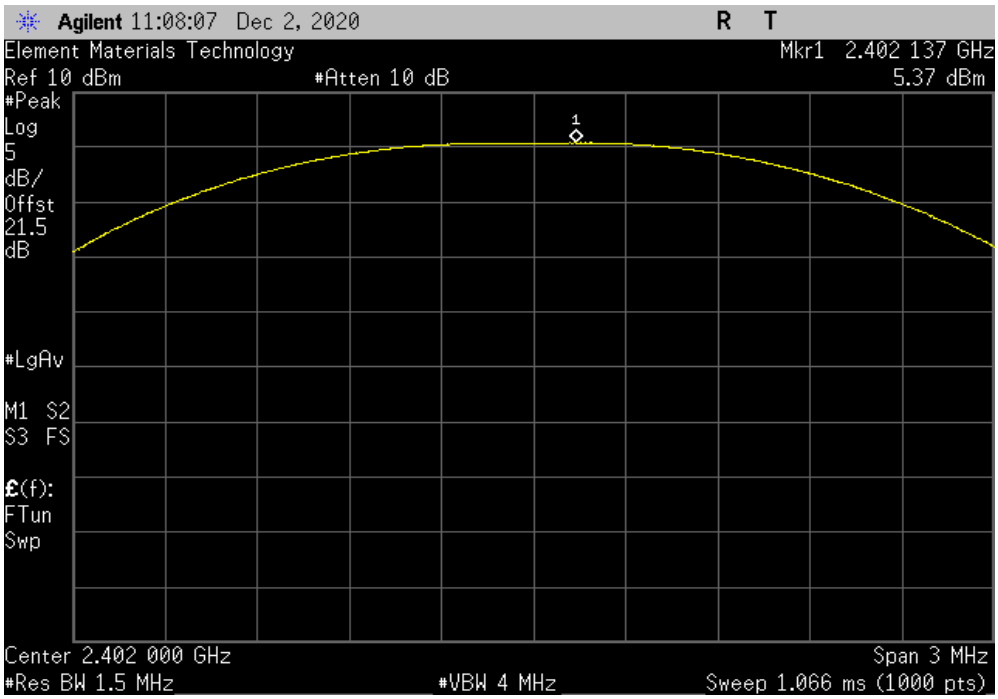
DEVIATIONS FROM TEST STANDARD

None

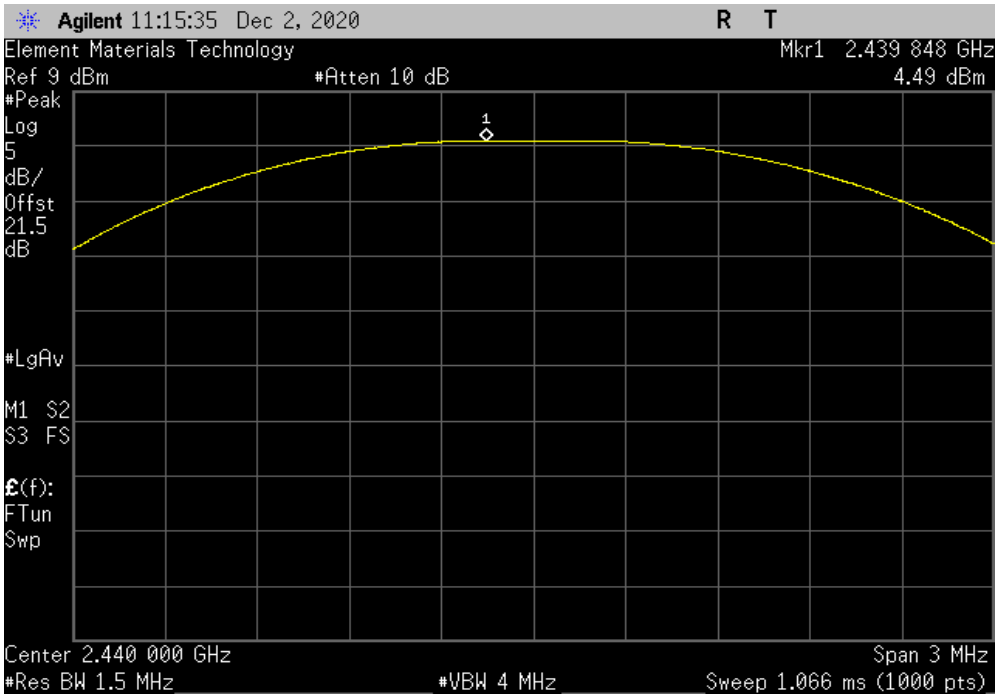
Configuration #	1	Signature

	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
Bluetooth, single channel mode					
DH5, GFSK					
Low Channel, 2402 MHz	5.371	2.2	7.571	27	Pass
Mid Channel, 2440 MHz	4.486	2.2	6.686	27	Pass
High Channel, 2480 MHz	4.69	2.2	6.89	27	Pass
2DH5, pi/4-DQPSK					
Low Channel, 2402 MHz	2.807	2.2	5.007	27	Pass
Mid Channel, 2440 MHz	2.702	2.2	4.902	27	Pass
High Channel, 2480 MHz	2.927	2.2	5.127	27	Pass
3DH5, 8-DPSK					
Low Channel, 2402 MHz	3.242	2.2	5.442	27	Pass
Mid Channel, 2440 MHz	3.113	2.2	5.313	27	Pass
High Channel, 2480 MHz	3.337	2.2	5.537	27	Pass

Bluetooth, single channel mode, DH5, GFSK, Low Channel, 2402 MHz						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		5.371	2.2	7.571	27	Pass

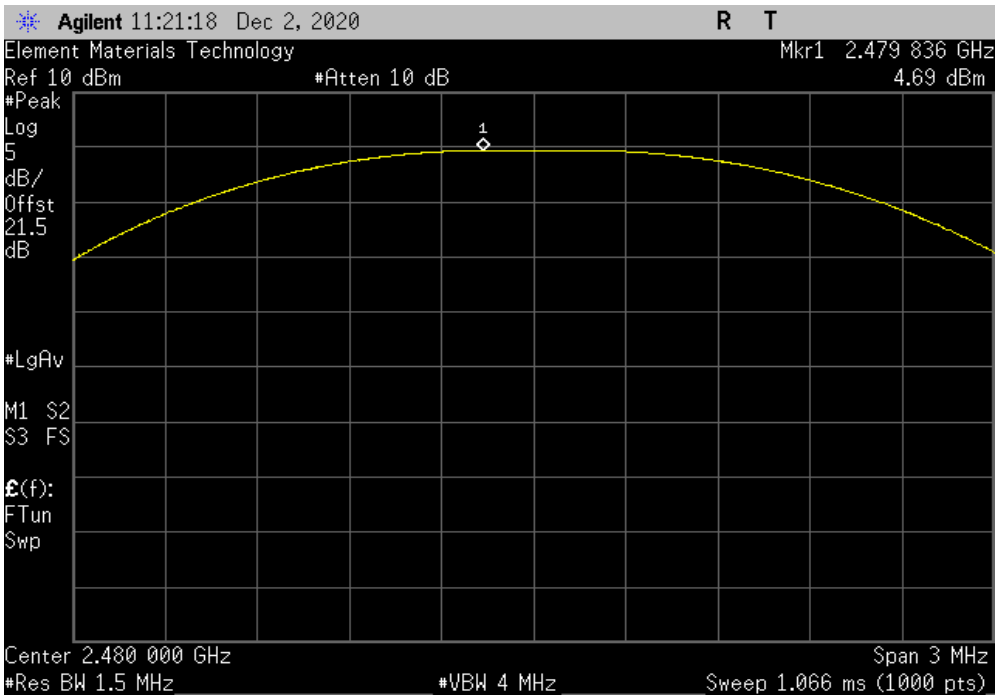


Bluetooth, single channel mode, DH5, GFSK, Mid Channel, 2440 MHz						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		4.486	2.2	6.686	27	Pass

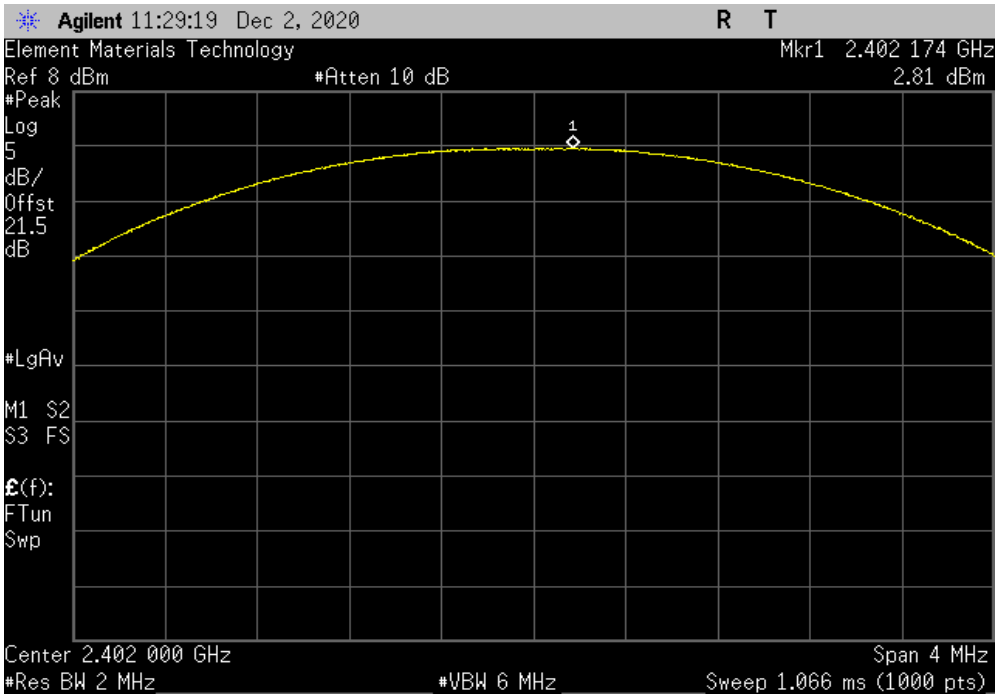


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

Bluetooth, single channel mode, DH5, GFSK, High Channel, 2480 MHz						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		4.69	2.2	6.89	27	Pass

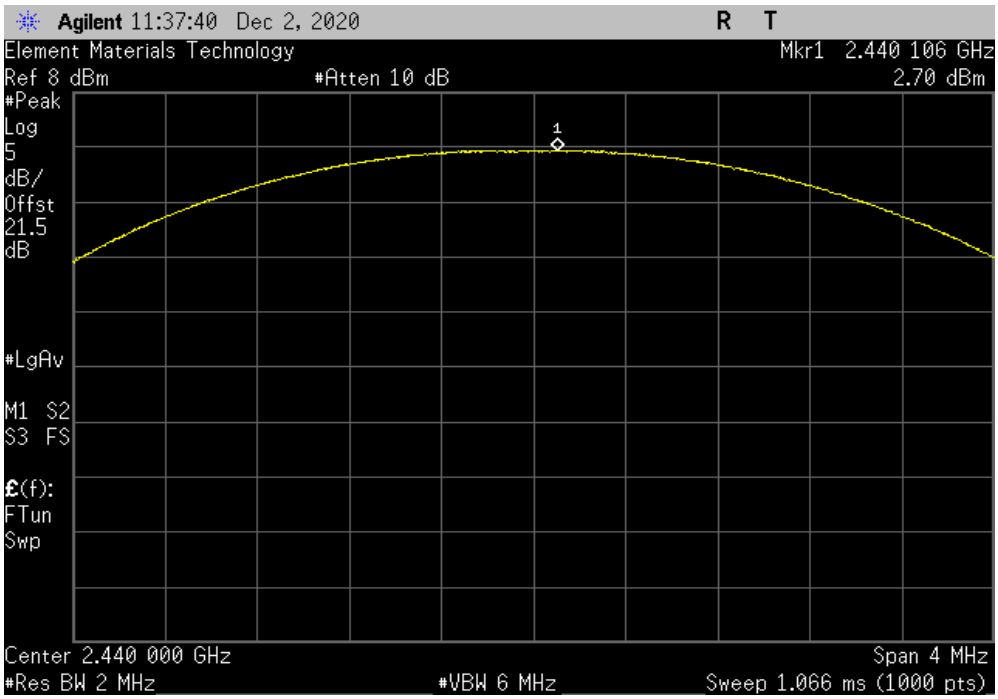


Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		2.807	2.2	5.007	27	Pass

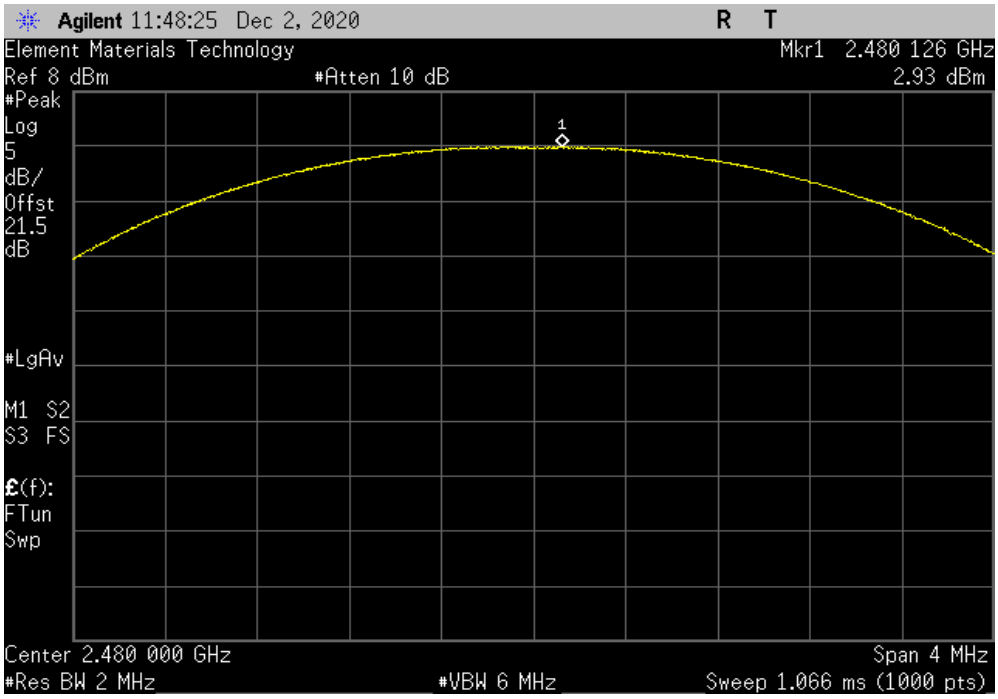


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

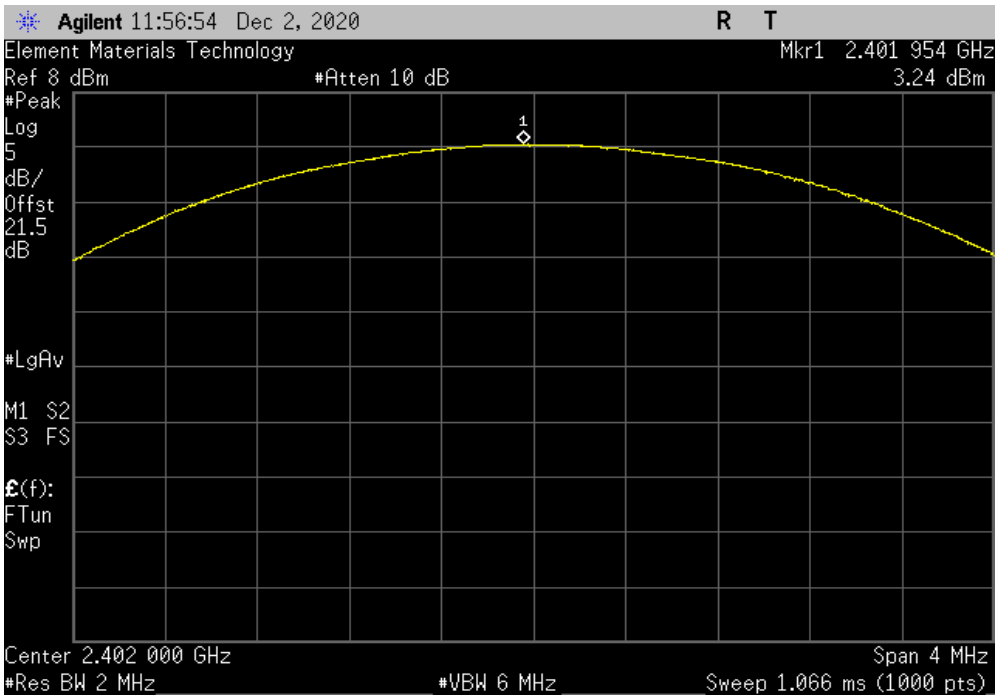
Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		2.702	2.2	4.902	27	Pass



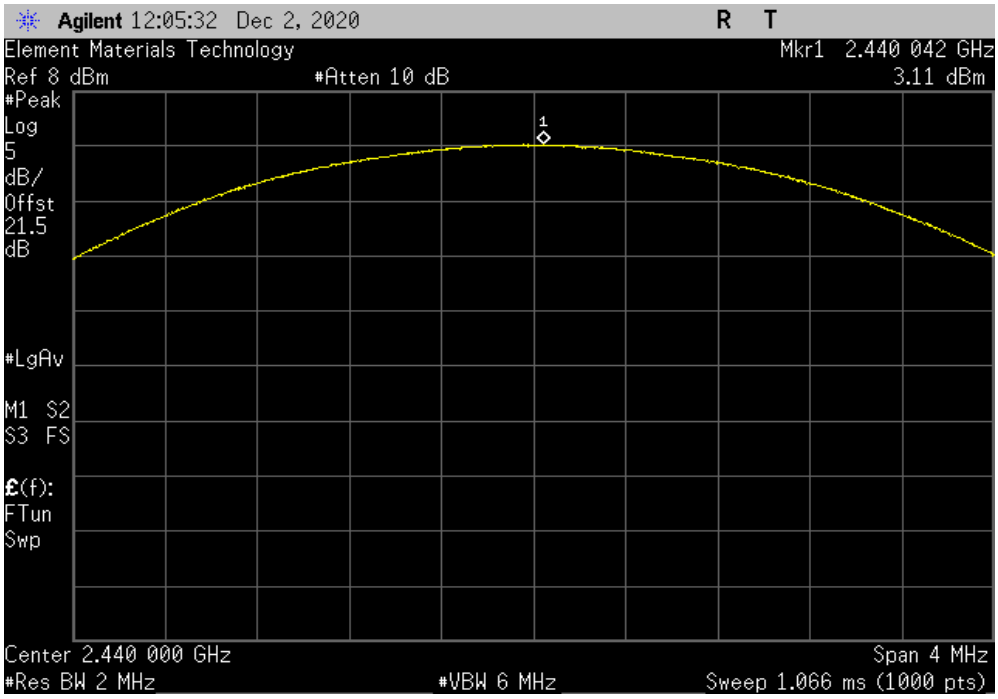
Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		2.927	2.2	5.127	27	Pass



Bluetooth, single channel mode, 3DH5, 8-DPSK, Low Channel, 2402 MHz						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		3.242	2.2	5.442	27	Pass

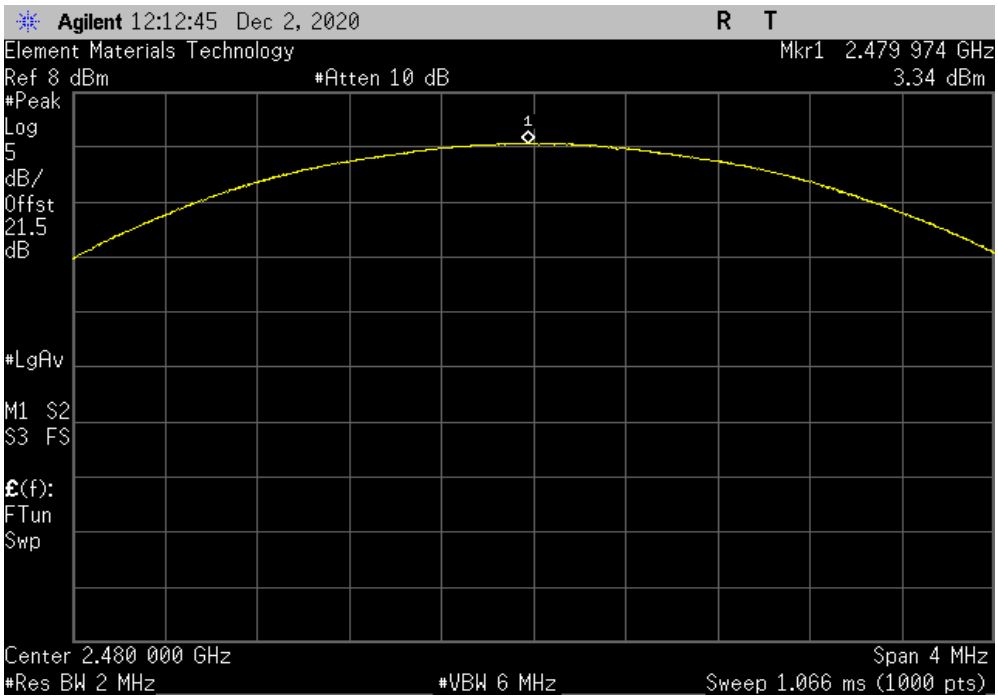


Bluetooth, single channel mode, 3DH5, 8-DPSK, Mid Channel, 2440 MHz						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		3.113	2.2	5.313	27	Pass



EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

Bluetooth, single channel mode, 3DH5, 8-DPSK, High Channel, 2480 MHz						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		3.337	2.2	5.537	27	Pass



BAND EDGE COMPLIANCE -HOPPING MODE

XMit 2020.03.25.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Keysight	N5182B	TFU	20-Nov-20	20-Nov-22
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	13-Mar-20	13-Mar-21
Attenuator	S.M. Electronics	SA26B-20	AUY	13-Mar-20	13-Mar-21
Block - DC	Fairview Microwave	SD3379	AMW	13-Mar-20	13-Mar-21
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAT	28-Oct-20	28-Oct-21

TEST DESCRIPTION

The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to its normal pseudo-random hopping sequence. The EUT was transmitting at the data rate(s) listed in the datasheet.

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

BAND EDGE COMPLIANCE -HOPPING MODE

element

TbtTx 2019.08.30.0 XMit 2020.03.25.0

EUT:	A-dec Gateway			**Work Order:**	A-DE0149
Serial Number:	521O041984			**Date:**	2-Dec-20
Customer:	A-dec, Inc.			**Temperature:**	24.3 °C
Attendees:	Spencer Warneke			**Humidity:**	28.2% RH
Project:	None			**Barometric Pres.:**	1025 mbar
Tested by:	Jeff Alcoke	**Power:**	110VAC/60Hz	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247:2020	ANSI C63.10:2013

COMMENTS

Reference level offset includes: DC Block, 20 dB attenuator, and measurement cable.

DEVIATIONS FROM TEST STANDARD

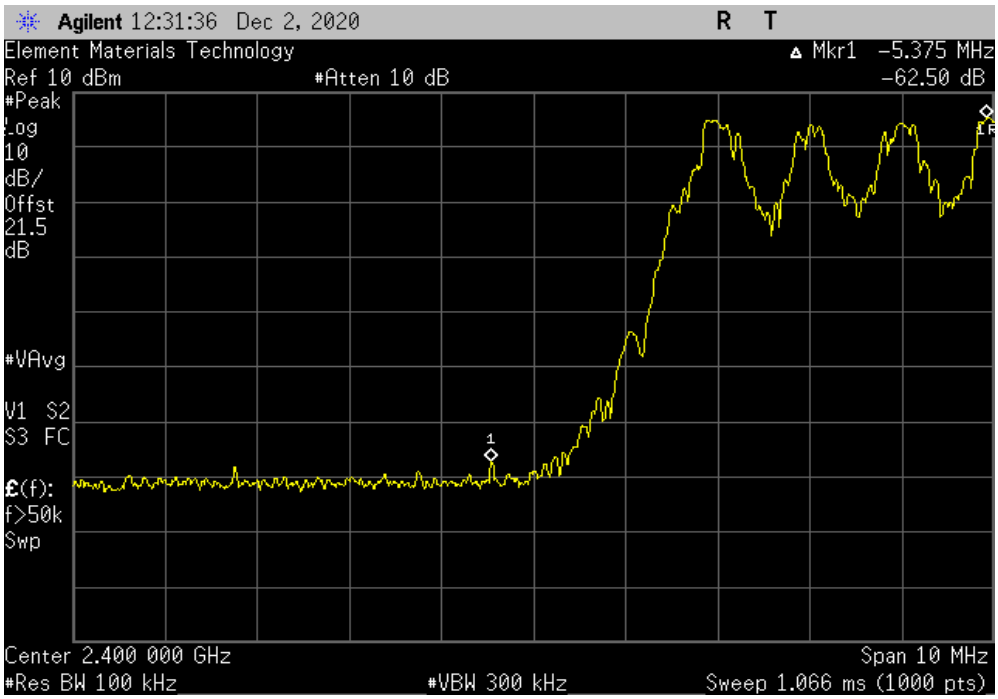
None

Configuration #	1	Signature

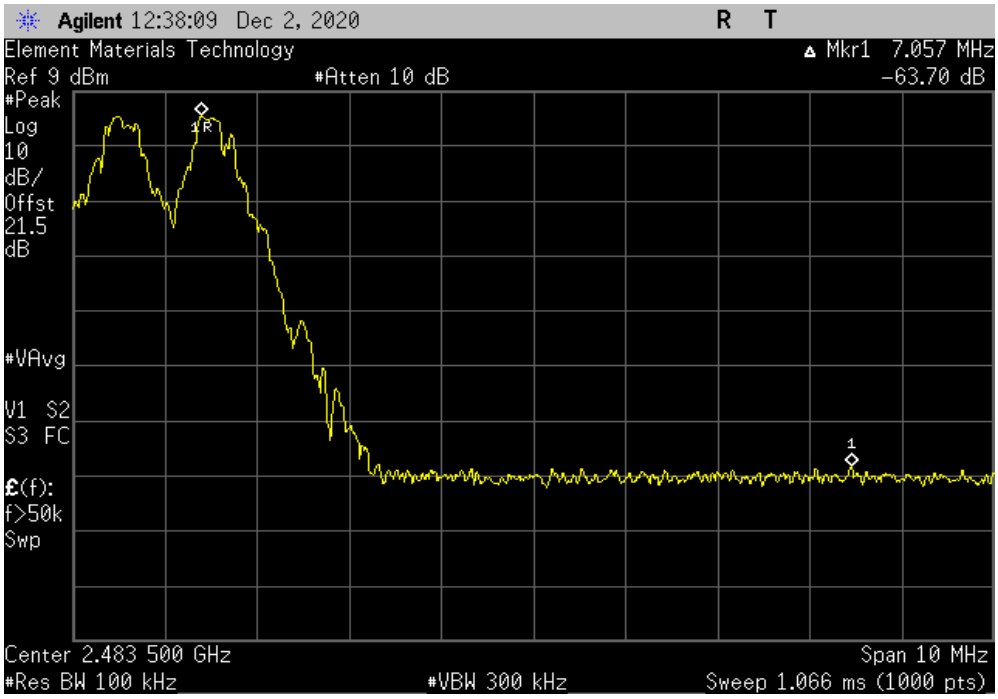
	Value (dBc)	Limit ≤ (dBc)	Result
Hopping Mode (All Channels)			
DH5, GFSK			
Low Channel, 2402 MHz	-62.5	-20	Pass
High Channel, 2480 MHz	-63.7	-20	Pass
2DH5, pi/4-DQPSK			
Low Channel, 2402 MHz	-59.64	-20	Pass
High Channel, 2480 MHz	-60	-20	Pass
3DH5, 8-DPSK			
Low Channel, 2402 MHz	-58.1	-20	Pass
High Channel, 2480 MHz	-58.33	-20	Pass

BAND EDGE COMPLIANCE -HOPPING MODE

Hopping Mode (All Channels), DH5, GFSK, Low Channel, 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-62.5	-20	Pass

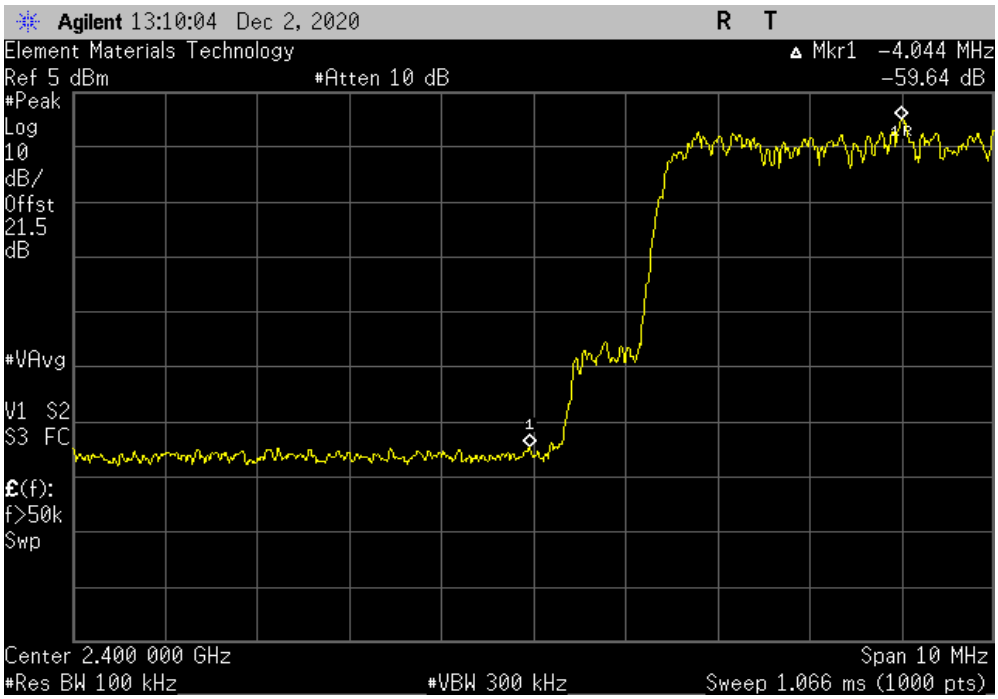


Hopping Mode (All Channels), DH5, GFSK, High Channel, 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-63.7	-20	Pass

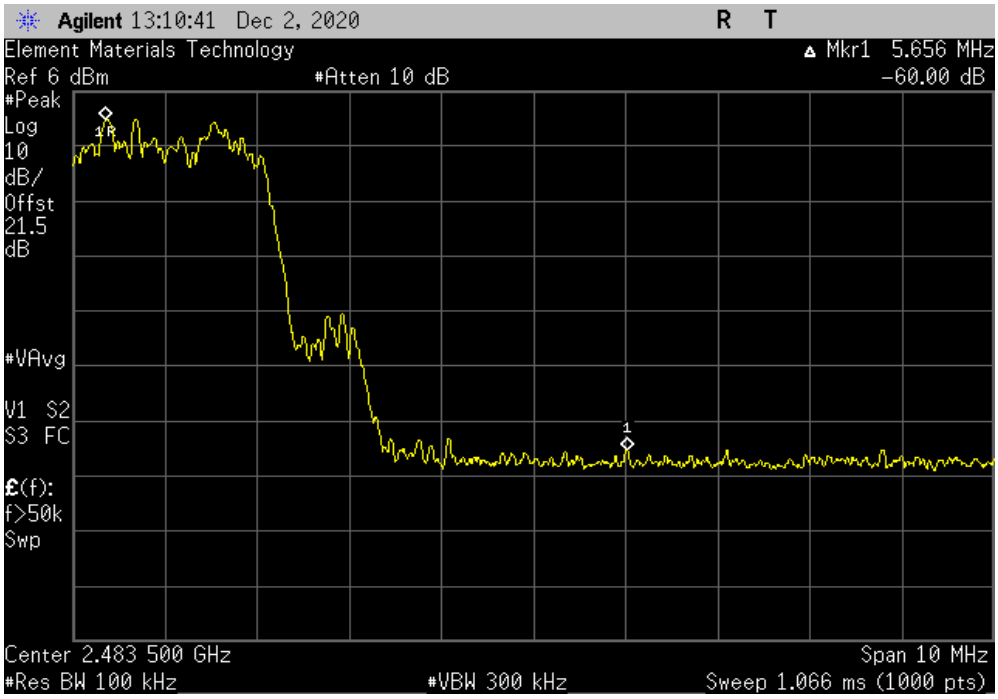


BAND EDGE COMPLIANCE -HOPPING MODE

Hopping Mode (All Channels), 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-59.64	-20	Pass

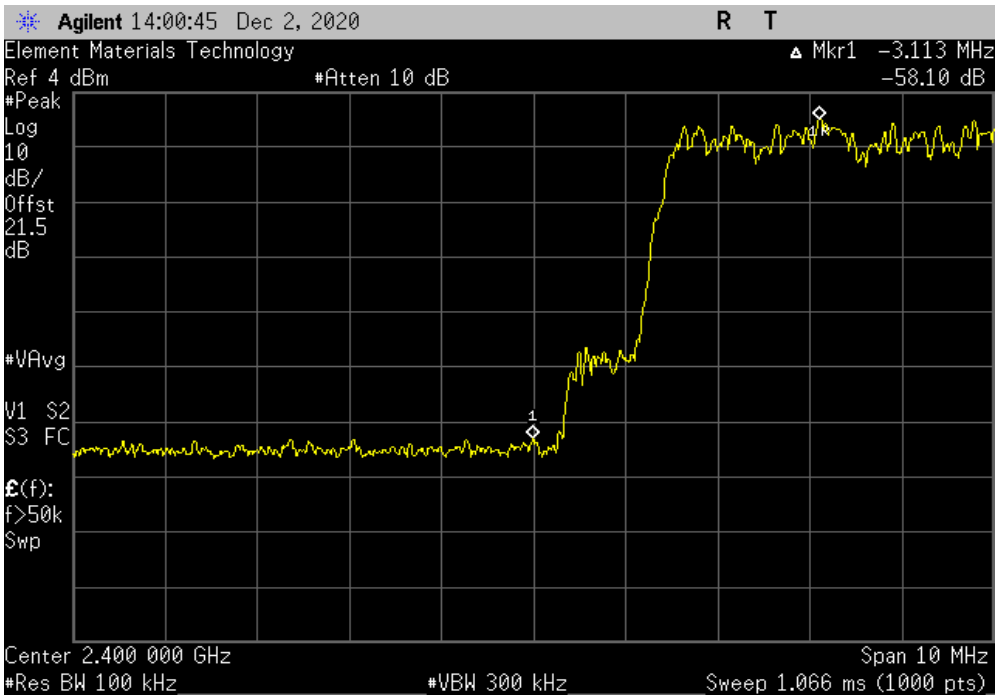


Hopping Mode (All Channels), 2DH5, pi/4-DQPSK, High Channel, 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-60	-20	Pass

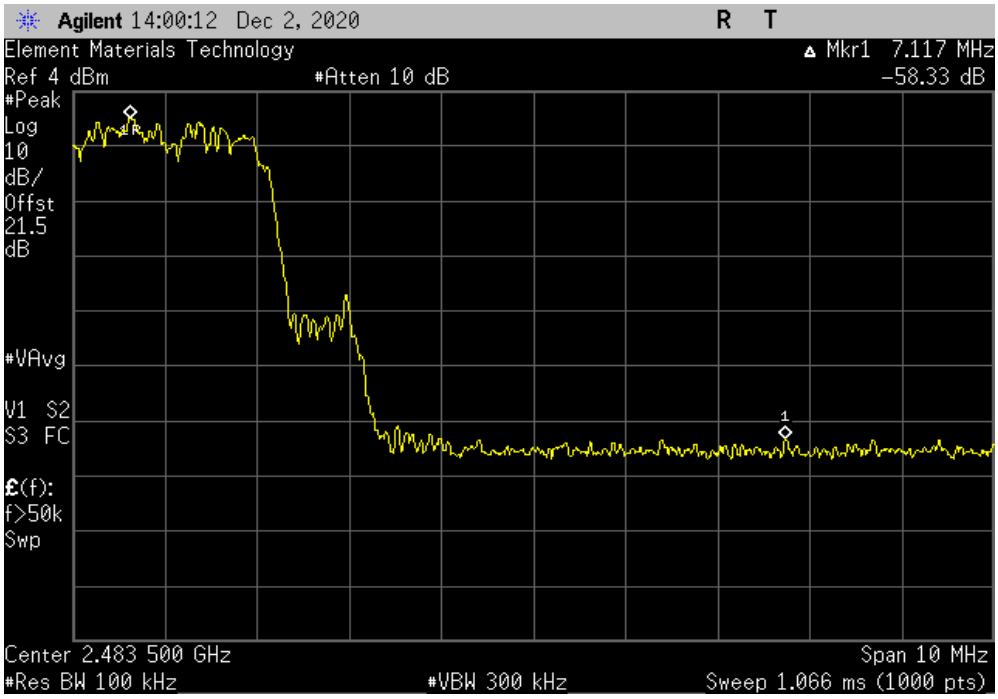


BAND EDGE COMPLIANCE -HOPPING MODE

Hopping Mode (All Channels), 3DH5, 8-DPSK, Low Channel, 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-58.1	-20	Pass



Hopping Mode (All Channels), 3DH5, 8-DPSK, High Channel, 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-58.33	-20	Pass



BAND EDGE COMPLIANCE

XMit 2020.03.25.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	13-Mar-20	13-Mar-21
Attenuator	S.M. Electronics	SA26B-20	AUY	13-Mar-20	13-Mar-21
Block - DC	Fairview Microwave	SD3379	AMW	13-Mar-20	13-Mar-21
Generator - Signal	Keysight	N5182B	TFU	20-Nov-20	20-Nov-22
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAT	28-Oct-20	28-Oct-21

TEST DESCRIPTION

The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to low and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet in a no hop mode. The channels closest to the band edges were selected.

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

BAND EDGE COMPLIANCE

element

TbtTx 2019.08.30.0 XMit 2020.03.25.0

EUT:	**A-dec Gateway**			**Work Order:**	**A-DE0149**
Serial Number:	**521O041984**			**Date:**	**2-Dec-20**
Customer:	**A-dec, Inc.**			**Temperature:**	**23.9 °C**
Attendees:	**Spencer Warneke**			**Humidity:**	**28% RH**
Project:	**None**			**Barometric Pres.:**	**1026 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**110VAC/60Hz**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2020	**ANSI C63.10:2013**

COMMENTS

Reference level offset includes: DC Block, 20 dB attenuator, and measurement cable.

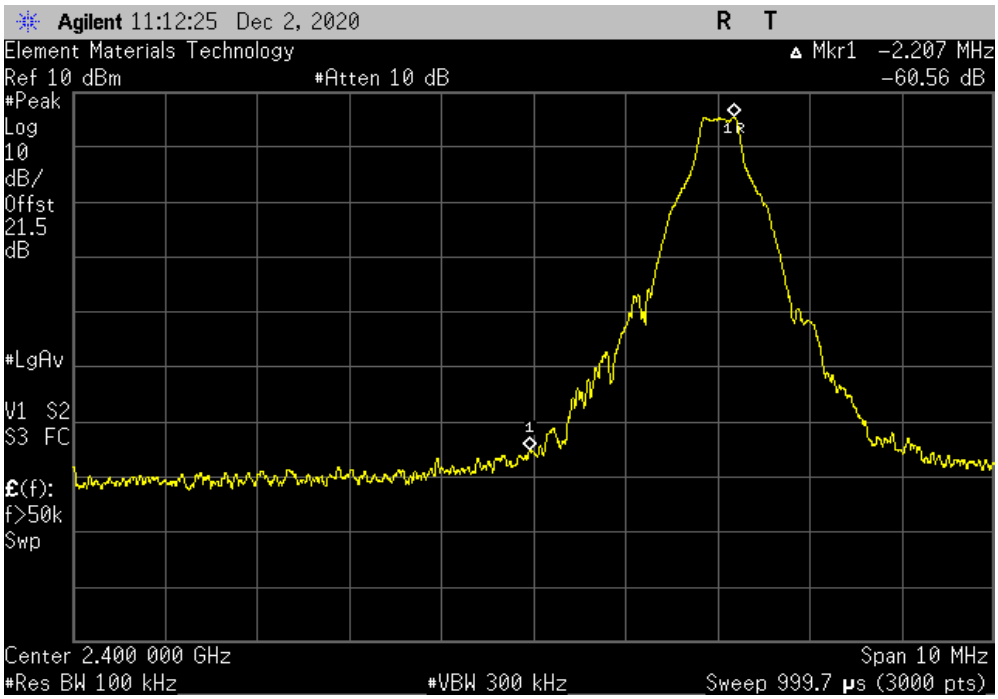
DEVIATIONS FROM TEST STANDARD

None

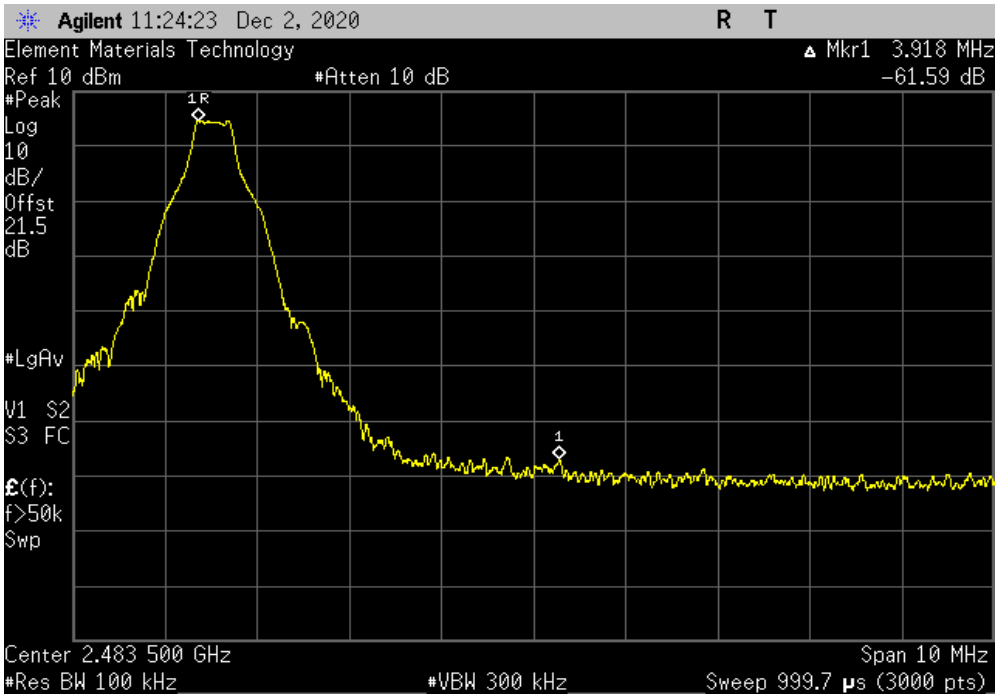
Configuration #	**1**	*Signature*

	Value (dBc)	**Limit ≤ (dBc)**	**Result**
Bluetooth, single channel mode			
DH5, GFSK			
Low Channel, 2402 MHz	-60.56	-20	Pass
High Channel, 2480 MHz	-61.59	-20	Pass
2DH5, pi/4-DQPSK			
Low Channel, 2402 MHz	-57.64	-20	Pass
High Channel, 2480 MHz	-59.26	-20	Pass
3DH5, 8-DPSK			
Low Channel, 2402 MHz	-57.07	-20	Pass
High Channel, 2480 MHz	-58.97	-20	Pass

Bluetooth, single channel mode, DH5, GFSK, Low Channel, 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-60.56	-20	Pass

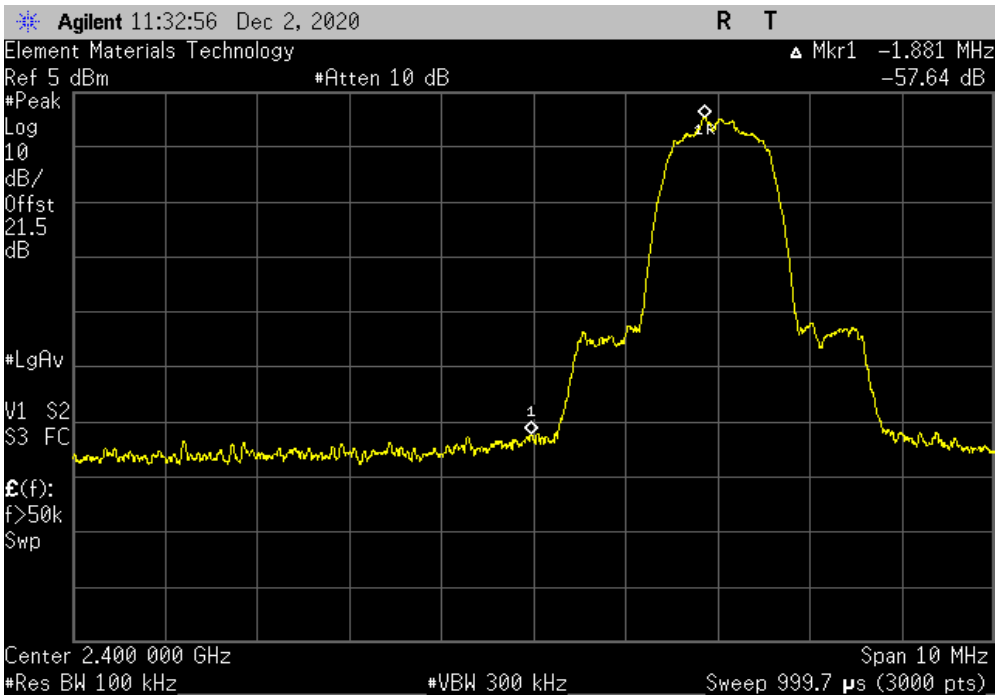


Bluetooth, single channel mode, DH5, GFSK, High Channel, 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-61.59	-20	Pass

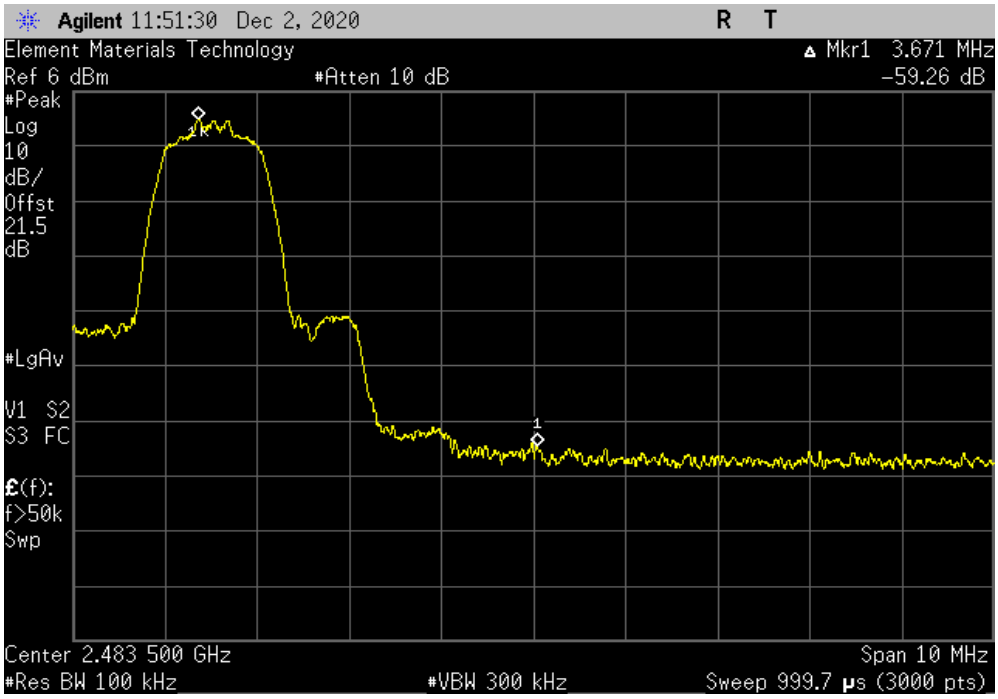


BAND EDGE COMPLIANCE

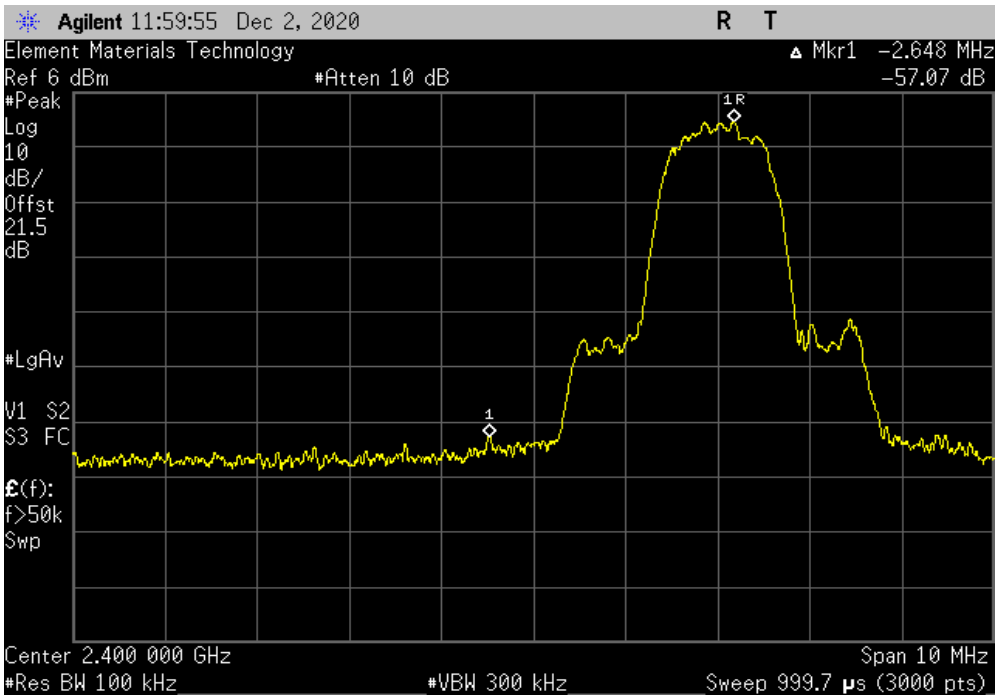
Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-57.64	-20	Pass



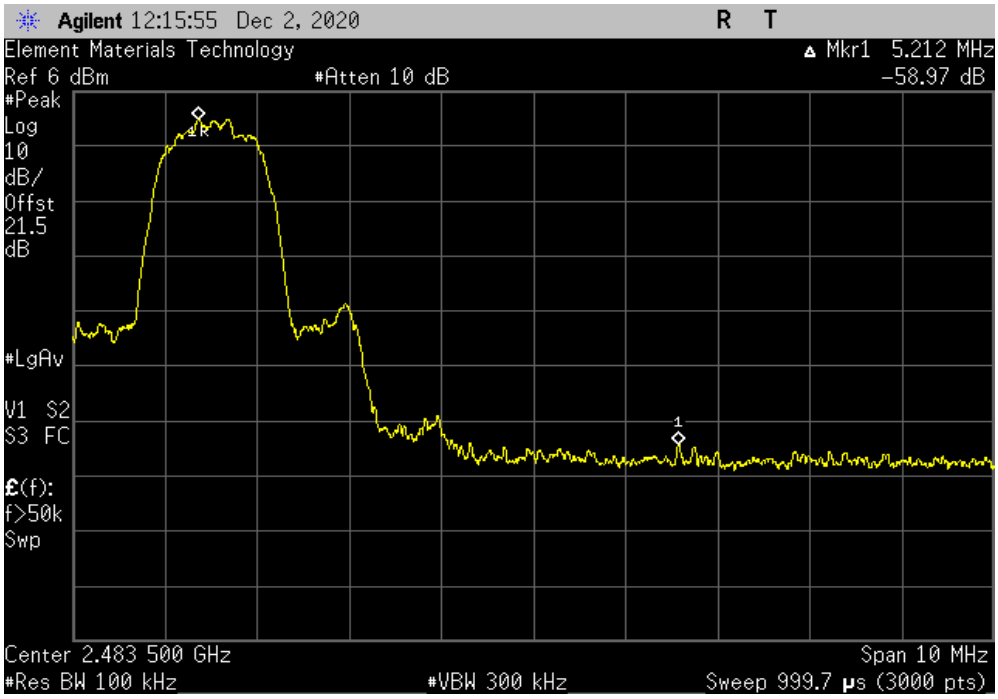
Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-59.26	-20	Pass



Bluetooth, single channel mode, 3DH5, 8-DPSK, Low Channel, 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-57.07	-20	Pass



Bluetooth, single channel mode, 3DH5, 8-DPSK, High Channel, 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-58.97	-20	Pass



OCCUPIED BANDWIDTH

XMit 2020.03.25.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	13-Mar-20	13-Mar-21
Attenuator	S.M. Electronics	SA26B-20	AUY	13-Mar-20	13-Mar-21
Block - DC	Fairview Microwave	SD3379	AMW	13-Mar-20	13-Mar-21
Generator - Signal	Keysight	N5182B	TFU	20-Nov-20	20-Nov-22
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAT	28-Oct-20	28-Oct-21

TEST DESCRIPTION

The 20 dB occupied bandwidth was measured with the EUT set to low, medium and high transmit frequencies in the band. The EUT was transmitting at the data rate(s) listed in the datasheet in a no-hop mode.

OCCUPIED BANDWIDTH

element

TbtTx 2019.08.30.0 XMit 2020.03.25.0

EUT:	A-dec Gateway			**Work Order:**	A-DE0149
Serial Number:	521O041984			**Date:**	2-Dec-20
Customer:	A-dec, Inc.			**Temperature:**	23.8 °C
Attendees:	Spencer Warneke			**Humidity:**	27.8% RH
Project:	None			**Barometric Pres.:**	1026 mbar
Tested by:	Jeff Alcoke	**Power:**	110VAC/60Hz	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247:2020	ANSI C63.10:2013

COMMENTS

Reference level offset includes: DC Block, 20 dB attenuator, and measurement cable.

DEVIATIONS FROM TEST STANDARD

None

Configuration #	1	Signature

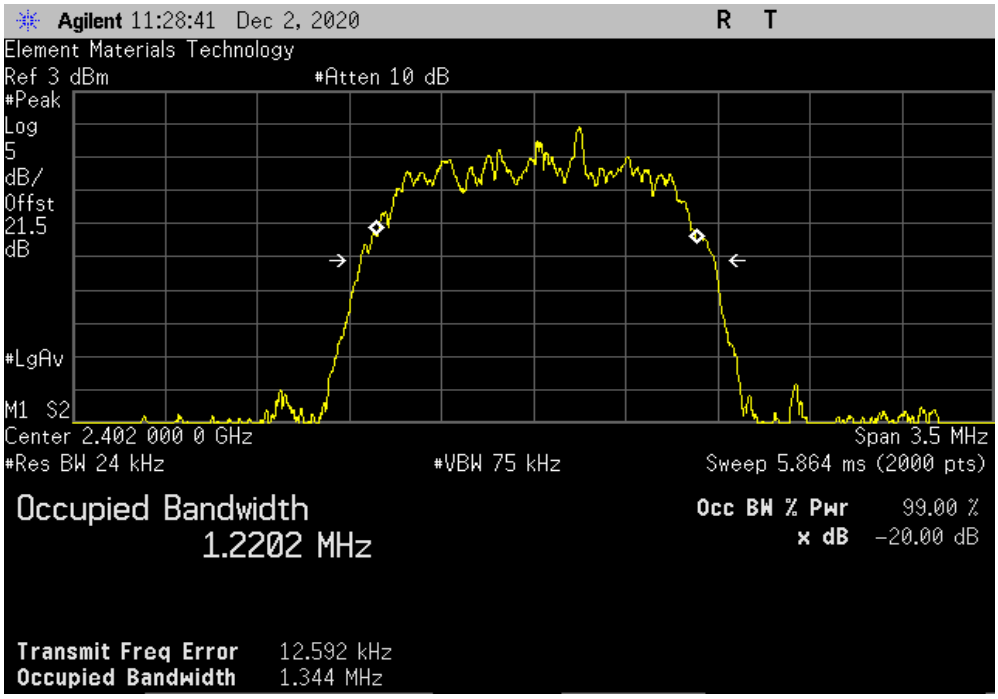
	Value	Limit (<)	Result
Bluetooth, single channel mode			
DH5, GFSK			
Low Channel, 2402 MHz	930.123 kHz	1.5 MHz	Pass
Mid Channel, 2440 MHz	927.954 kHz	1.5 MHz	Pass
High Channel, 2480 MHz	929.461 kHz	1.5 MHz	Pass
2DH5, pi/4-DQPSK			
Low Channel, 2402 MHz	1.344 MHz	1.5 MHz	Pass
Mid Channel, 2440 MHz	1.338 MHz	1.5 MHz	Pass
High Channel, 2480 MHz	1.332 MHz	1.5 MHz	Pass
3DH5, 8-DPSK			
Low Channel, 2402 MHz	1.316 MHz	1.5 MHz	Pass
Mid Channel, 2440 MHz	1.328 MHz	1.5 MHz	Pass
High Channel, 2480 MHz	1.329 MHz	1.5 MHz	Pass

Bluetooth, single channel mode, DH5, GFSK, Low Channel, 2402 MHz						
				Value	Limit (<)	Result
				930.123 kHz	1.5 MHz	Pass

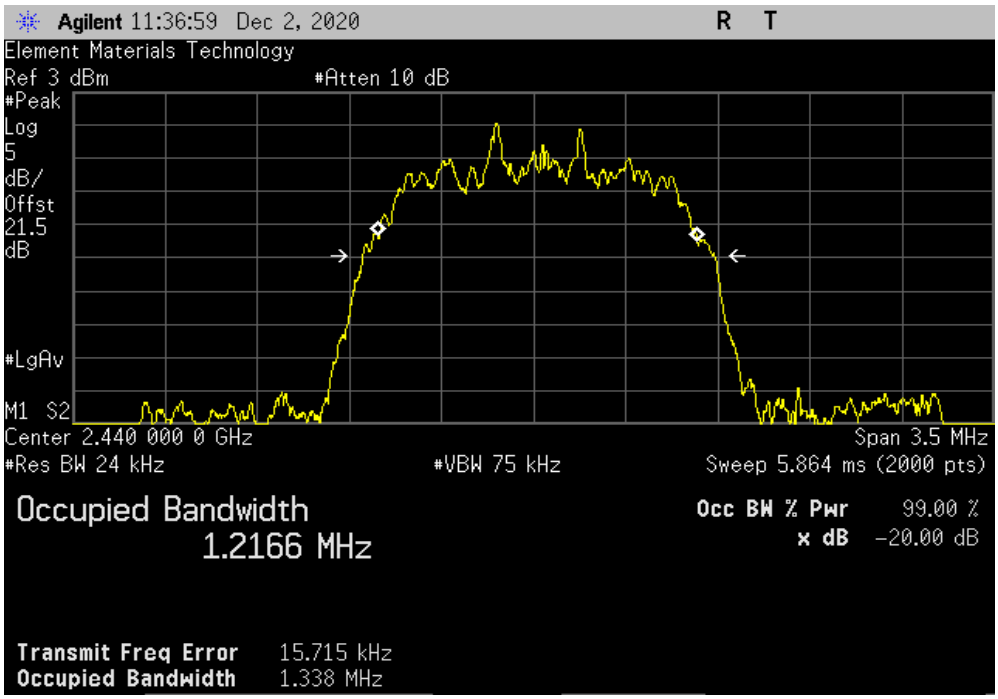
Bluetooth, single channel mode, DH5, GFSK, Mid Channel, 2440 MHz						
				Value	Limit (<)	Result
				927.954 kHz	1.5 MHz	Pass

Bluetooth, single channel mode, DH5, GFSK, High Channel, 2480 MHz						
				Value	Limit (<)	Result
				929.461 kHz	1.5 MHz	Pass

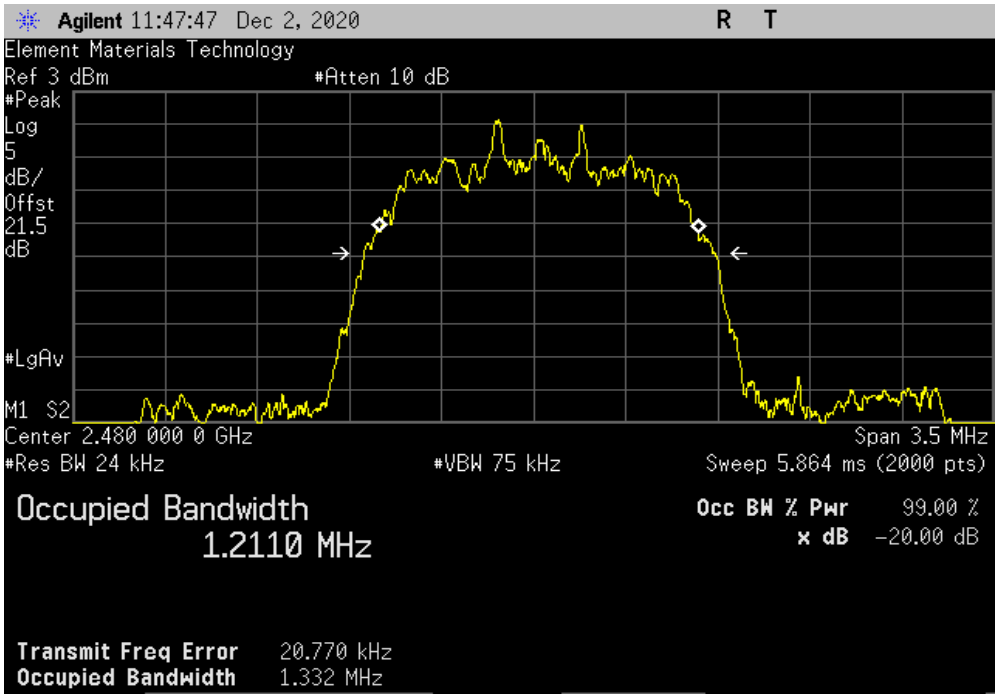
Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz						
				Value	Limit (<)	Result
				1.344 MHz	1.5 MHz	Pass



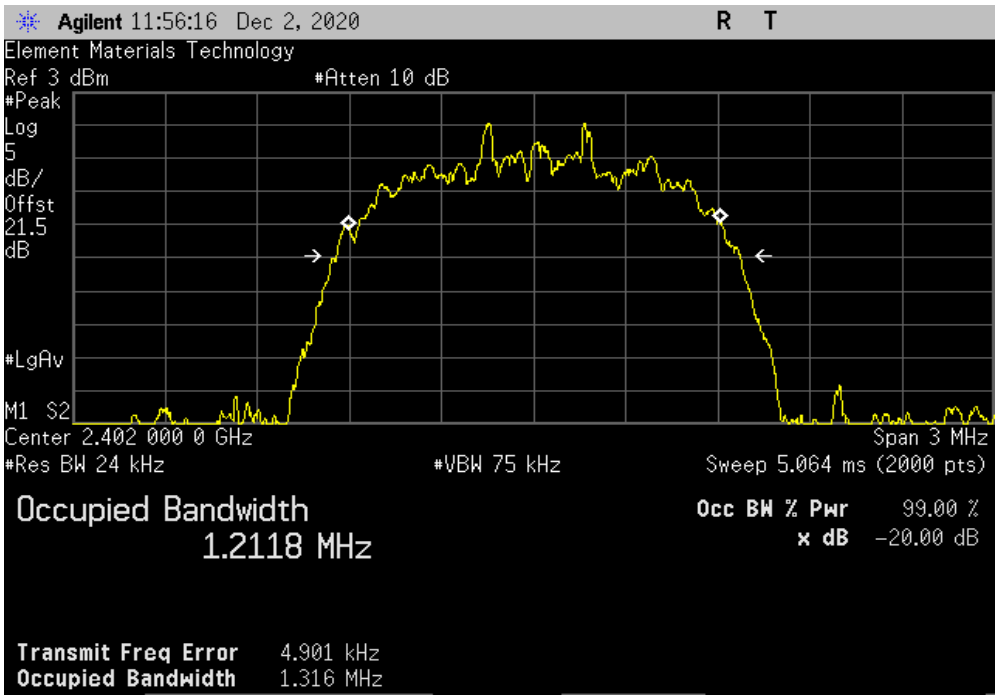
Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz						
				Value	Limit (<)	Result
				1.338 MHz	1.5 MHz	Pass



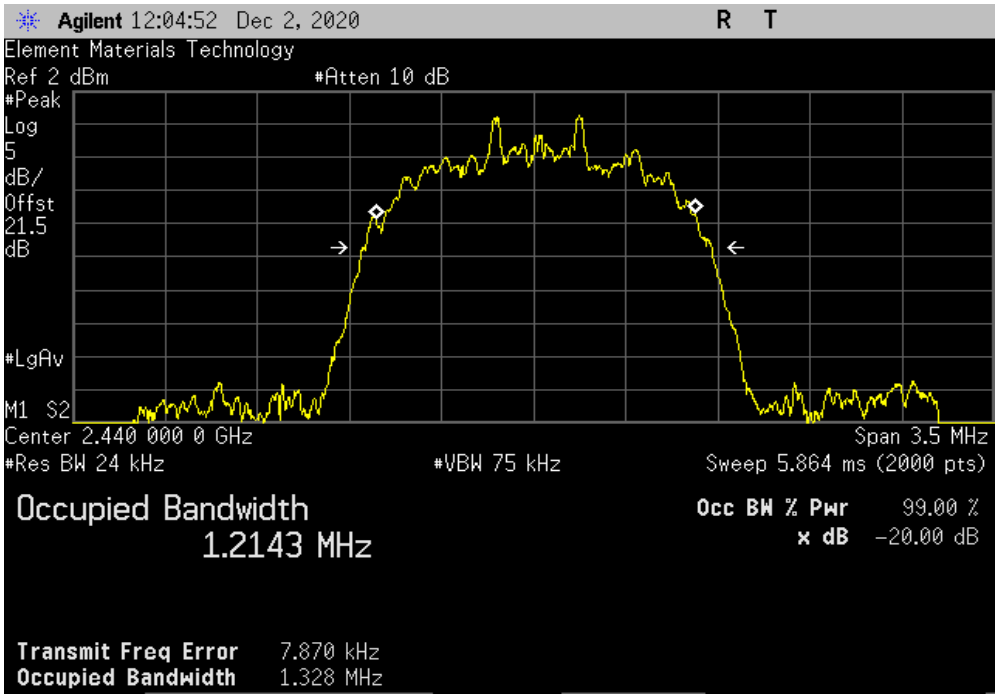
Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz						
				Value	Limit (<)	Result
				1.332 MHz	1.5 MHz	Pass



Bluetooth, single channel mode, 3DH5, 8-DPSK, Low Channel, 2402 MHz						
				Value	Limit (<)	Result
				1.316 MHz	1.5 MHz	Pass



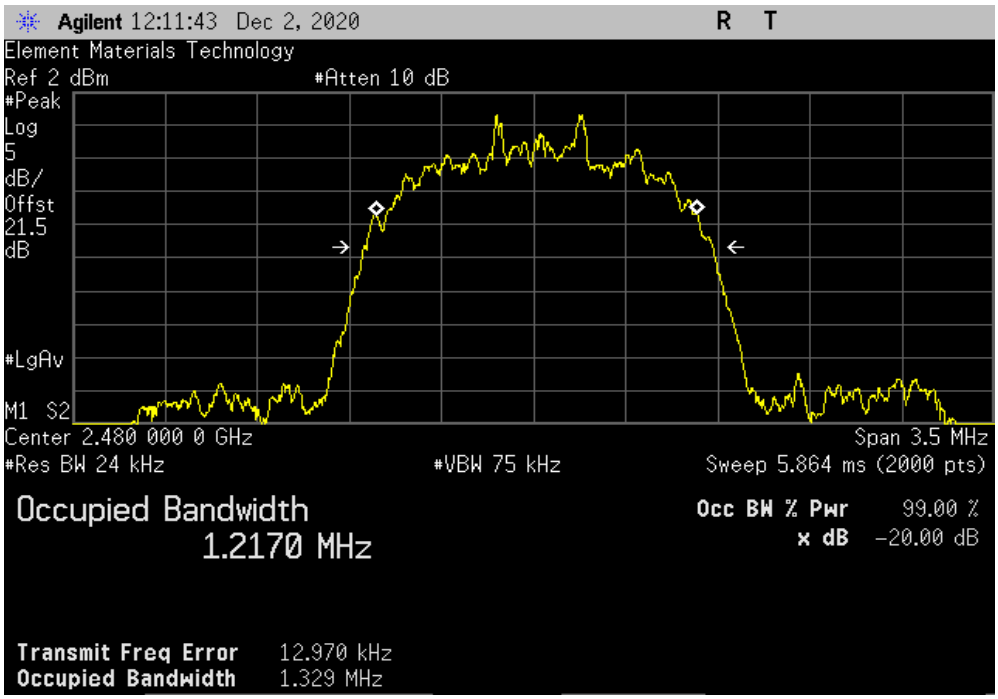
Bluetooth, single channel mode, 3DH5, 8-DPSK, Mid Channel, 2440 MHz						
				Value	Limit (<)	Result
				1.328 MHz	1.5 MHz	Pass



OCCUPIED BANDWIDTH

TbtTx 2019.08.30.0 XMit 2020.03.25.0

Bluetooth, single channel mode, 3DH5, 8-DPSK, High Channel, 2480 MHz						
				Value	Limit (<)	Result
				1.329 MHz	1.5 MHz	Pass



SPURIOUS CONDUCTED EMISSIONS

XMit 2020.03.25.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Keysight	N5182B	TFU	20-Nov-20	20-Nov-22
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	13-Mar-20	13-Mar-21
Attenuator	S.M. Electronics	SA26B-20	AUY	13-Mar-20	13-Mar-21
Block - DC	Fairview Microwave	SD3379	AMW	13-Mar-20	13-Mar-21
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAT	28-Oct-20	28-Oct-21

TEST DESCRIPTION

The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet in a no-hop mode. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.

SPURIOUS CONDUCTED EMISSIONS

element

TbtTx 2019.08.30.0 XMit 2020.03.25.0

EUT:	**A-dec Gateway**			**Work Order:**	**A-DE0149**
Serial Number:	**521O041984**			**Date:**	**2-Dec-20**
Customer:	**A-dec, Inc.**			**Temperature:**	**23 °C**
Attendees:	**Spencer Warneke**			**Humidity:**	**31.2% RH**
Project:	**None**			**Barometric Pres.:**	**1024 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**110VAC/60Hz**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2020	**ANSI C63.10:2013**

COMMENTS

Reference level offset includes: DC Block, 20 dB attenuator, and measurement cable.

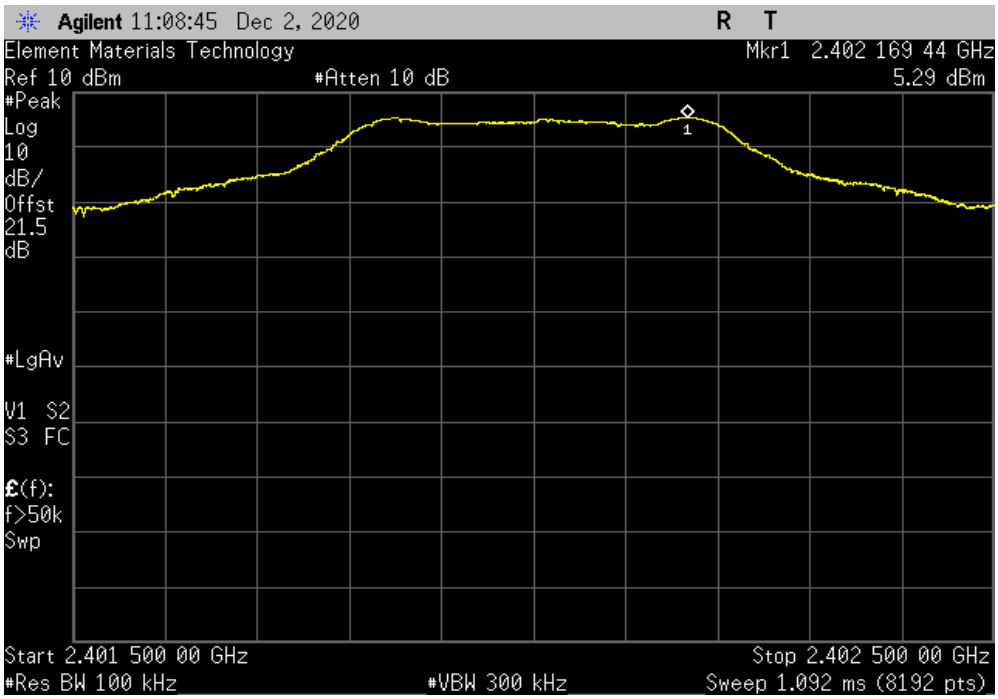
DEVIATIONS FROM TEST STANDARD

None

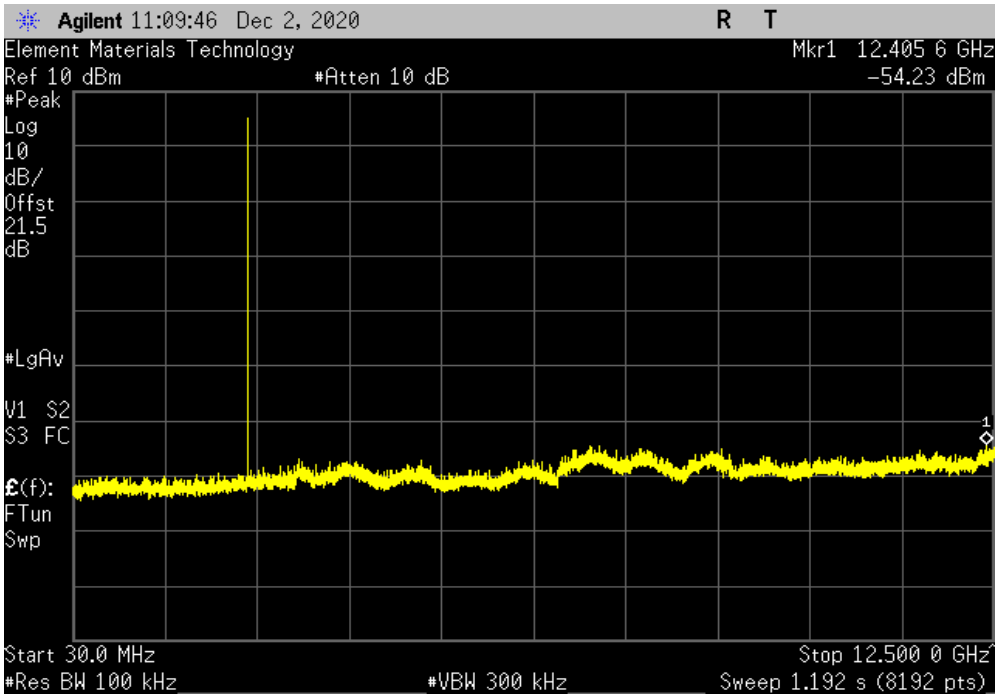
Configuration #	**1**	*Signature*

	Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
Bluetooth, single channel mode					
DH5, GFSK					
Low Channel, 2402 MHz	Fundamental	2402.17	N/A	N/A	N/A
Low Channel, 2402 MHz	30 MHz - 12.5 GHz	12405.6	-59.52	-20	Pass
Low Channel, 2402 MHz	12.5 GHz - 25 GHz	13933	-55.85	-20	Pass
Mid Channel, 2440 MHz	Fundamental	2439.85	N/A	N/A	N/A
Mid Channel, 2440 MHz	30 MHz - 12.5 GHz	7127.4	-58.24	-20	Pass
Mid Channel, 2440 MHz	12.5 GHz - 25 GHz	13875	-55.1	-20	Pass
High Channel, 2480 MHz	Fundamental	2479.86	N/A	N/A	N/A
High Channel, 2480 MHz	30 MHz - 12.5 GHz	7014.8	-59.45	-20	Pass
High Channel, 2480 MHz	12.5 GHz - 25 GHz	13931.4	-55.41	-20	Pass
2DH5, pi/4-DQPSK					
Low Channel, 2402 MHz	Fundamental	2401.84	N/A	N/A	N/A
Low Channel, 2402 MHz	30 MHz - 12.5 GHz	12500	-54.64	-20	Pass
Low Channel, 2402 MHz	12.5 GHz - 25 GHz	13968.1	-51.39	-20	Pass
Mid Channel, 2440 MHz	Fundamental	2439.85	N/A	N/A	N/A
Mid Channel, 2440 MHz	30 MHz - 12.5 GHz	12480.2	-54.35	-20	Pass
Mid Channel, 2440 MHz	12.5 GHz - 25 GHz	14039.8	-51.52	-20	Pass
High Channel, 2480 MHz	Fundamental	2479.86	N/A	N/A	N/A
High Channel, 2480 MHz	30 MHz - 12.5 GHz	12378.2	-54.97	-20	Pass
High Channel, 2480 MHz	12.5 GHz - 25 GHz	14067.3	-50.6	-20	Pass
3DH5, 8-DPSK					
Low Channel, 2402 MHz	Fundamental	2401.85	N/A	N/A	N/A
Low Channel, 2402 MHz	30 MHz - 12.5 GHz	6935.6	-54.87	-20	Pass
Low Channel, 2402 MHz	12.5 GHz - 25 GHz	13931.4	-50.63	-20	Pass
Mid Channel, 2440 MHz	Fundamental	2439.85	N/A	N/A	N/A
Mid Channel, 2440 MHz	30 MHz - 12.5 GHz	8692.5	-54.58	-20	Pass
Mid Channel, 2440 MHz	12.5 GHz - 25 GHz	13875	-51.08	-20	Pass
High Channel, 2480 MHz	Fundamental	2479.86	N/A	N/A	N/A
High Channel, 2480 MHz	30 MHz - 12.5 GHz	7060.5	-54.84	-20	Pass
High Channel, 2480 MHz	12.5 GHz - 25 GHz	14094.7	-50.7	-20	Pass

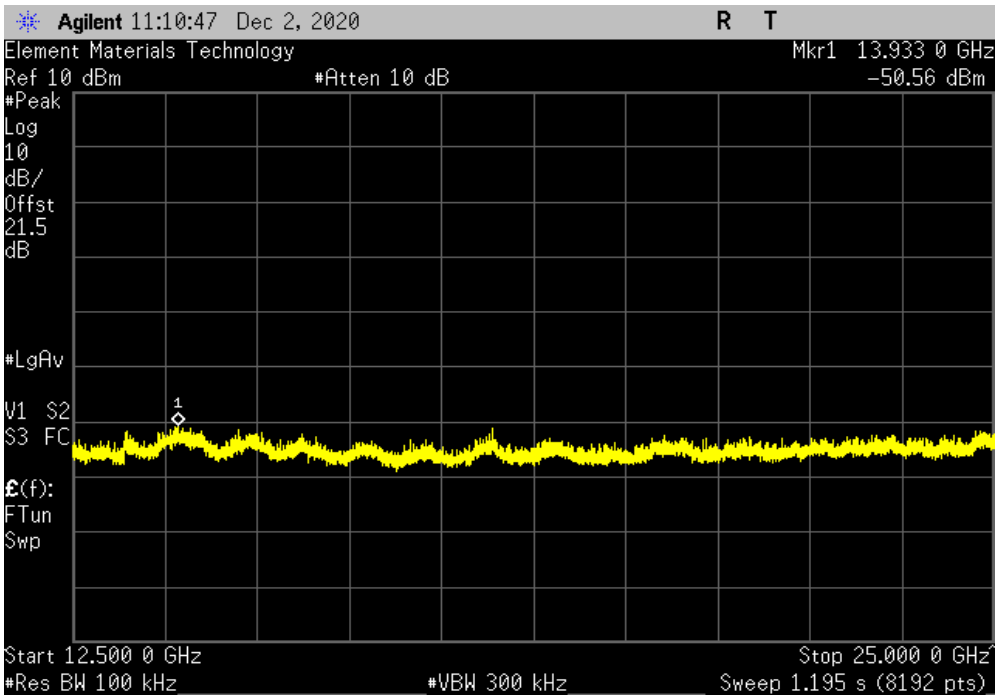
Bluetooth, single channel mode, DH5, GFSK, Low Channel, 2402 MHz					
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
Fundamental		2402.17	N/A	N/A	N/A



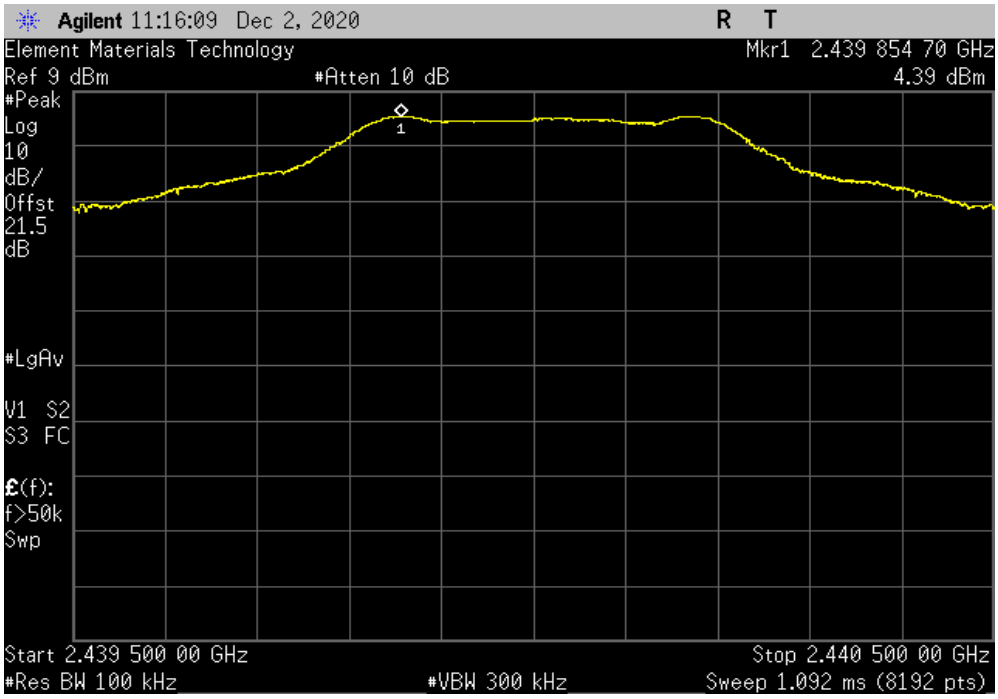
Bluetooth, single channel mode, DH5, GFSK, Low Channel, 2402 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	12405.6	-59.52	-20	Pass



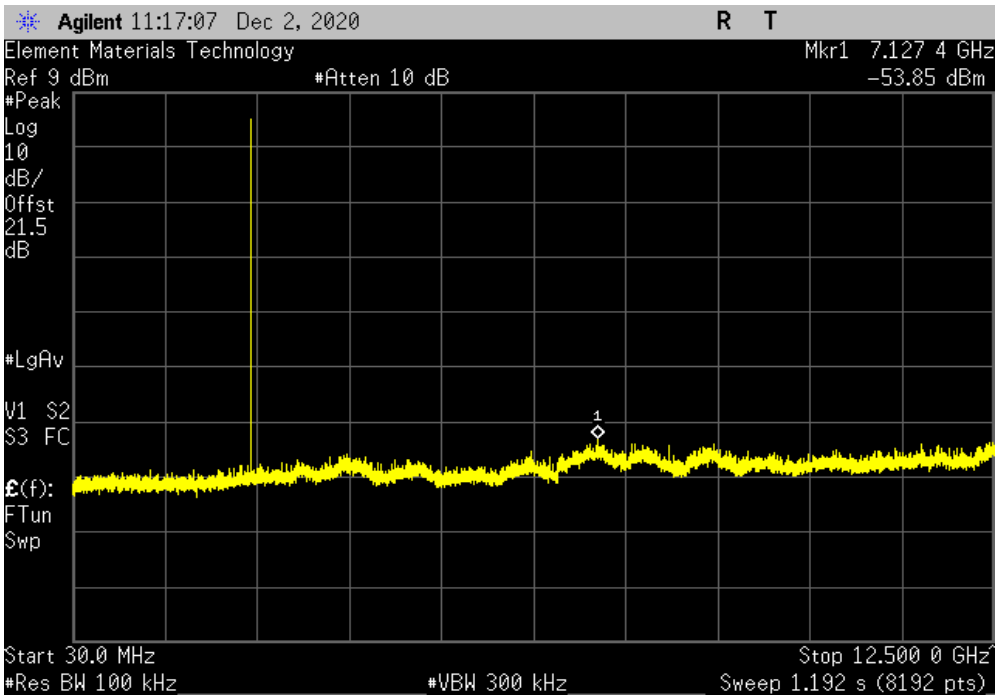
Bluetooth, single channel mode, DH5, GFSK, Low Channel, 2402 MHz				
Frequency Range	**Measured Freq (MHz)**	**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz	13933	-55.85	-20	Pass



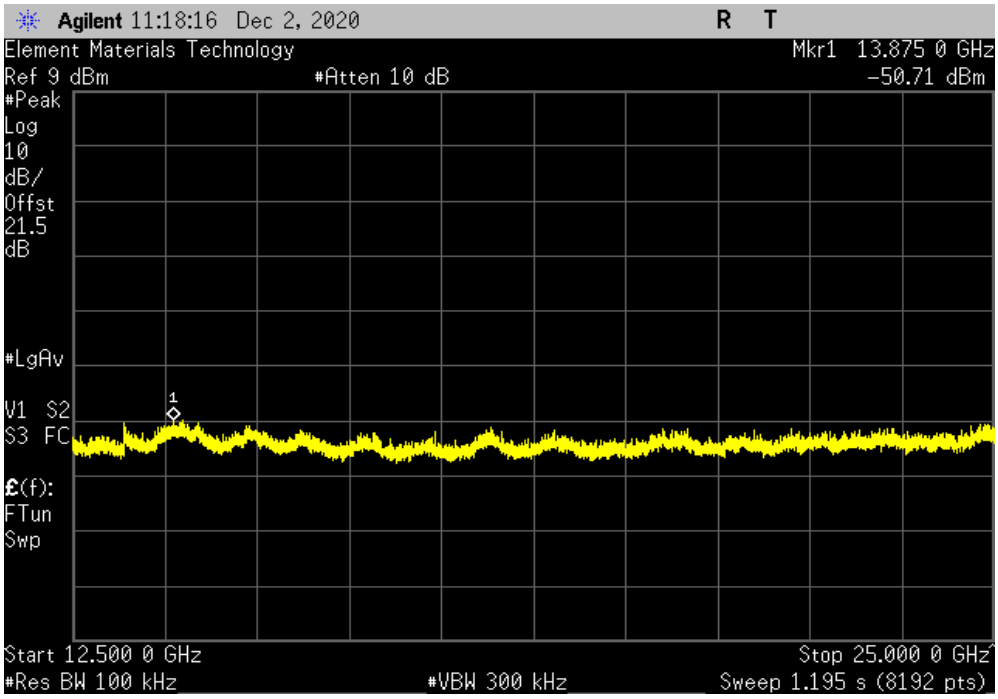
Bluetooth, single channel mode, DH5, GFSK, Mid Channel, 2440 MHz					
Frequency Range		**Measured Freq (MHz)**	**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
	Fundamental	2439.85	N/A	N/A	N/A



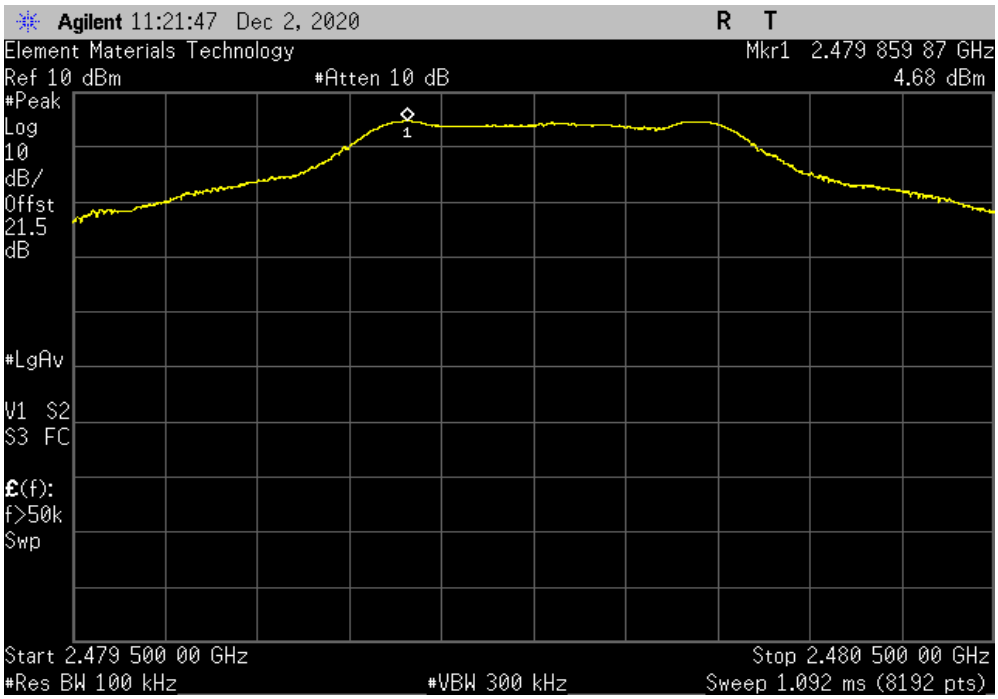
Bluetooth, single channel mode, DH5, GFSK, Mid Channel, 2440 MHz				
Frequency Range	**Measured Freq (MHz)**	**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz	7127.4	-58.24	-20	Pass



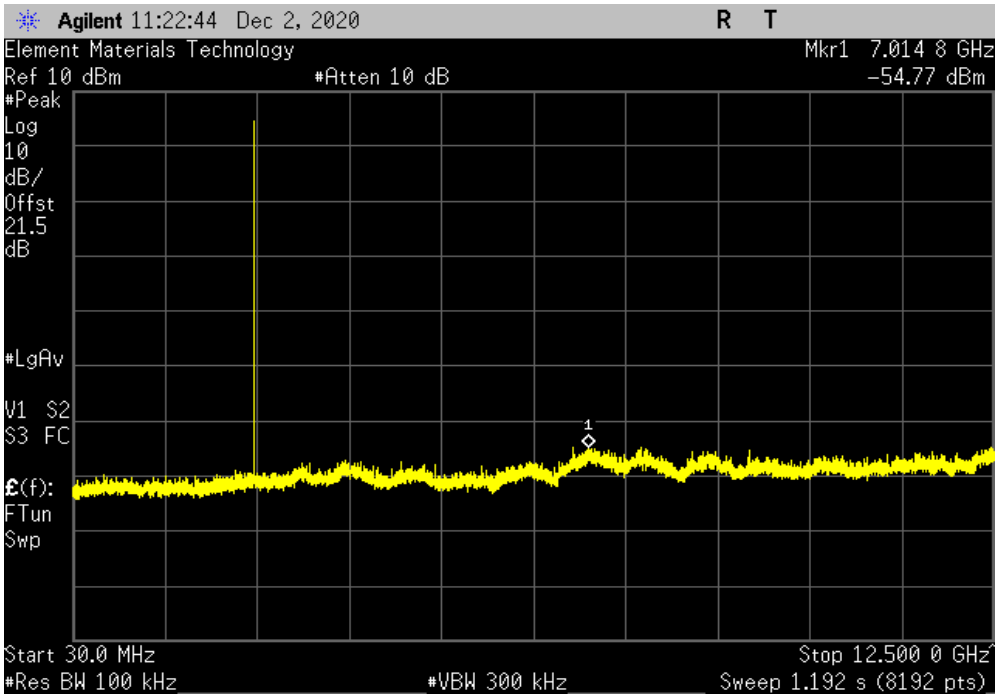
Bluetooth, single channel mode, DH5, GFSK, Mid Channel, 2440 MHz				
Frequency Range	**Measured Freq (MHz)**	**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz	13875	-55.1	-20	Pass



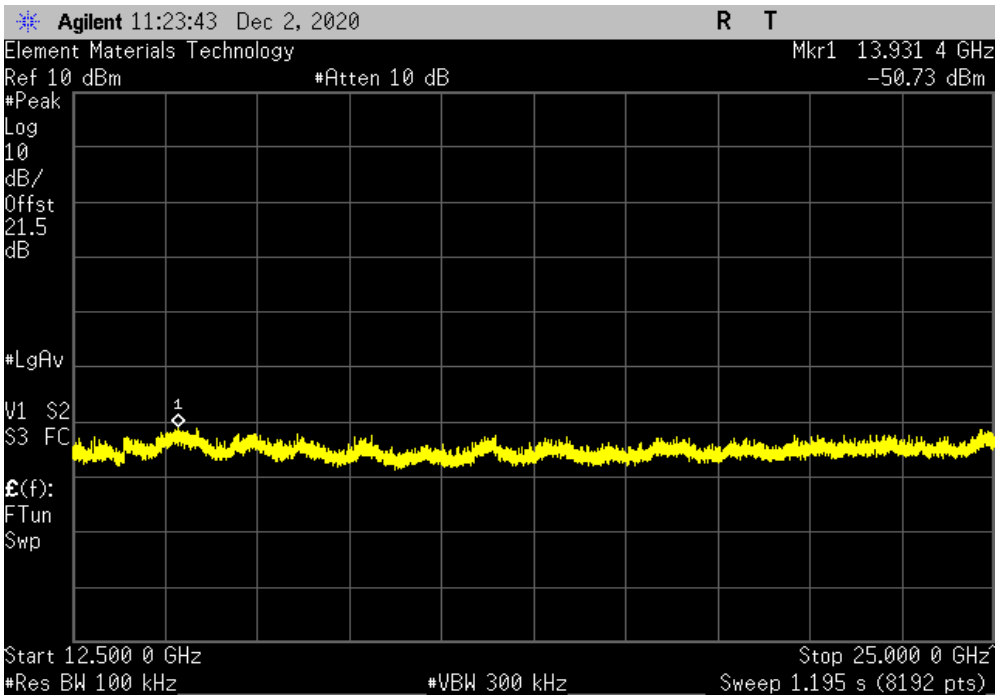
Bluetooth, single channel mode, DH5, GFSK, High Channel, 2480 MHz					
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
Fundamental		2479.86	N/A	N/A	N/A



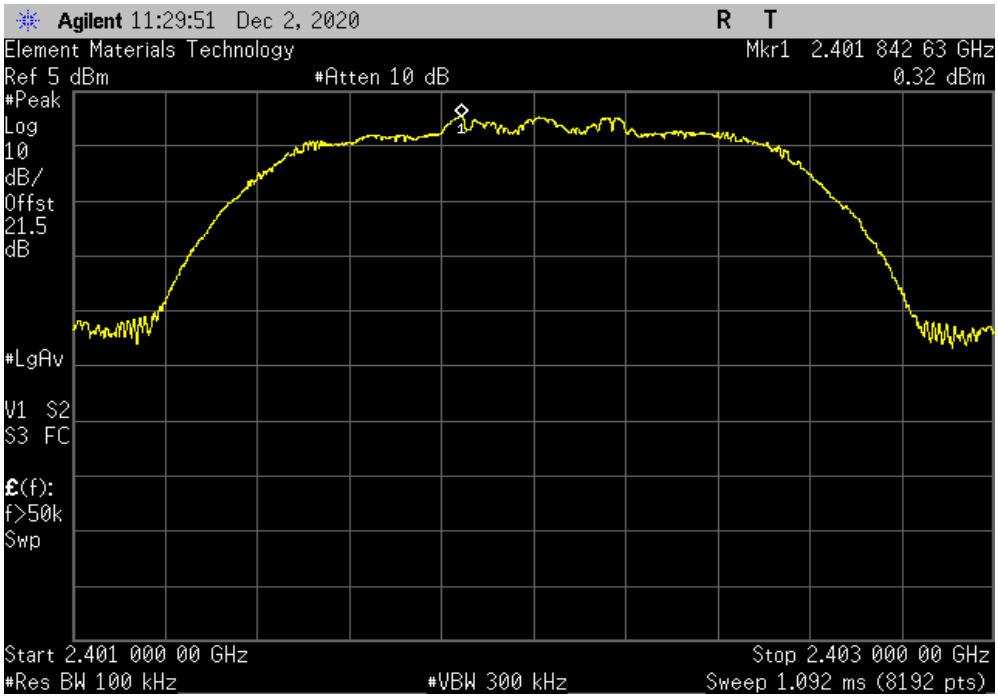
Bluetooth, single channel mode, DH5, GFSK, High Channel, 2480 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	7014.8	-59.45	-20	Pass



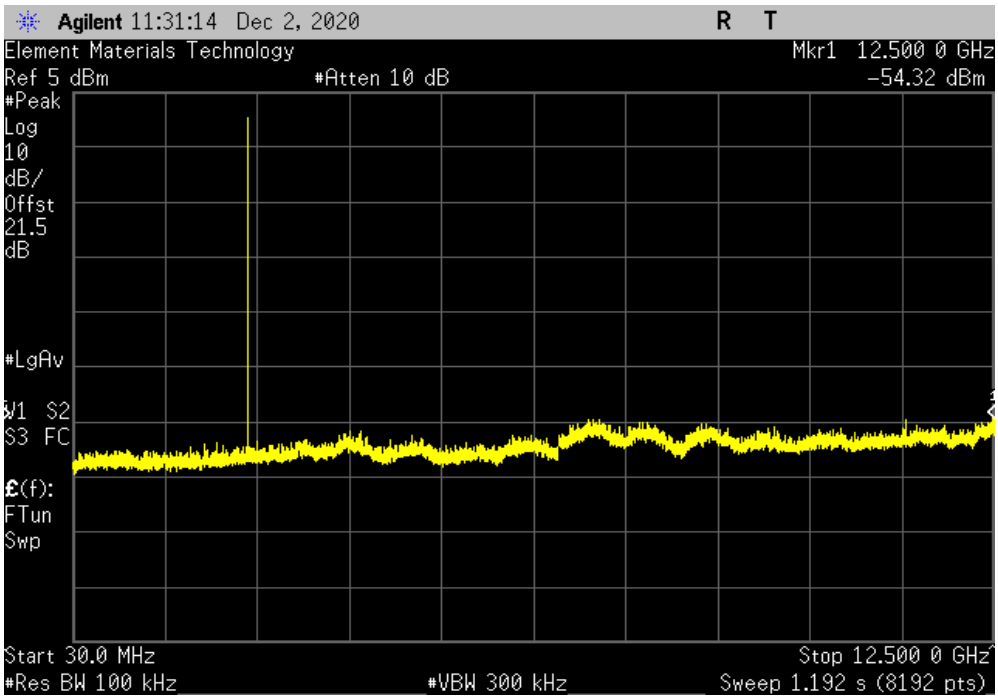
Bluetooth, single channel mode, DH5, GFSK, High Channel, 2480 MHz				
Frequency Range	**Measured Freq (MHz)**	**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz	13931.4	-55.41	-20	Pass



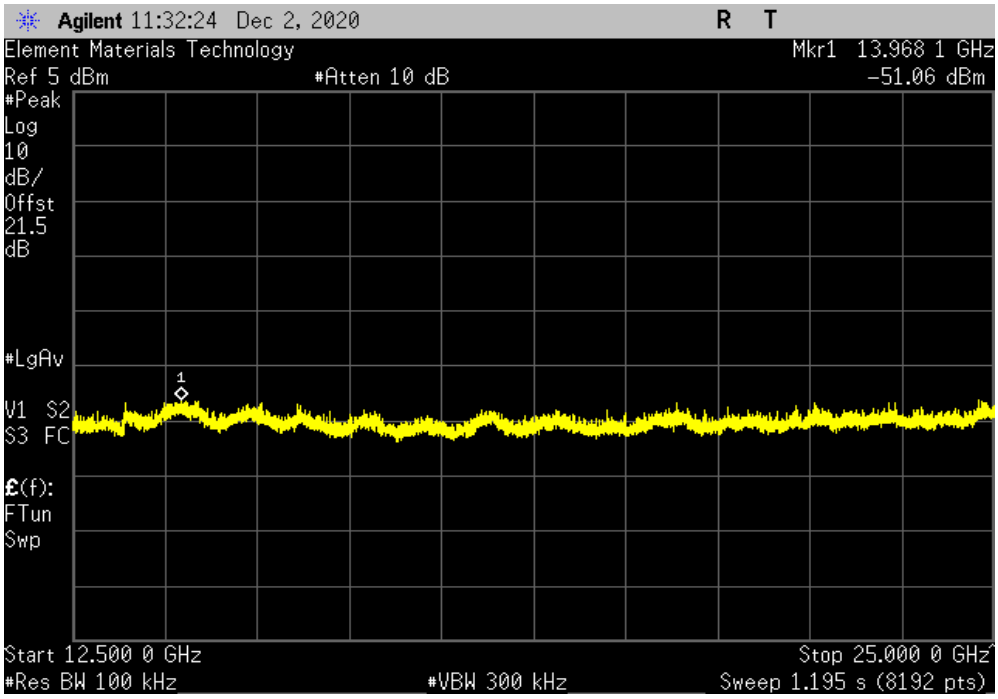
Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz					
Frequency Range		**Measured Freq (MHz)**	**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
Fundamental		2401.84	N/A	N/A	N/A



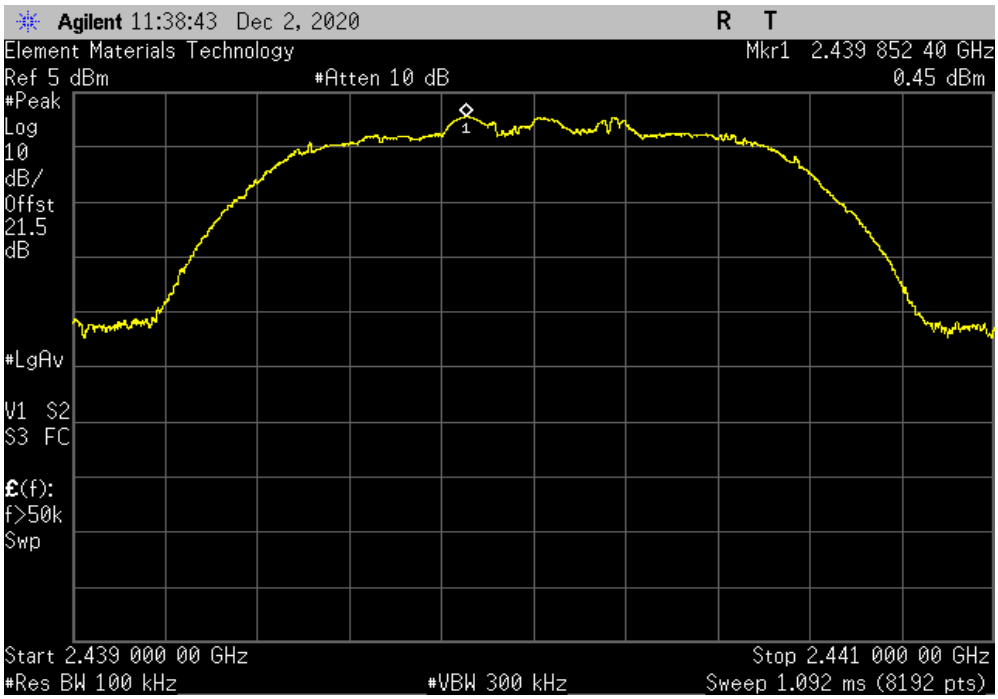
Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz				
Frequency Range	**Measured Freq (MHz)**	**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz	12500	-54.64	-20	Pass



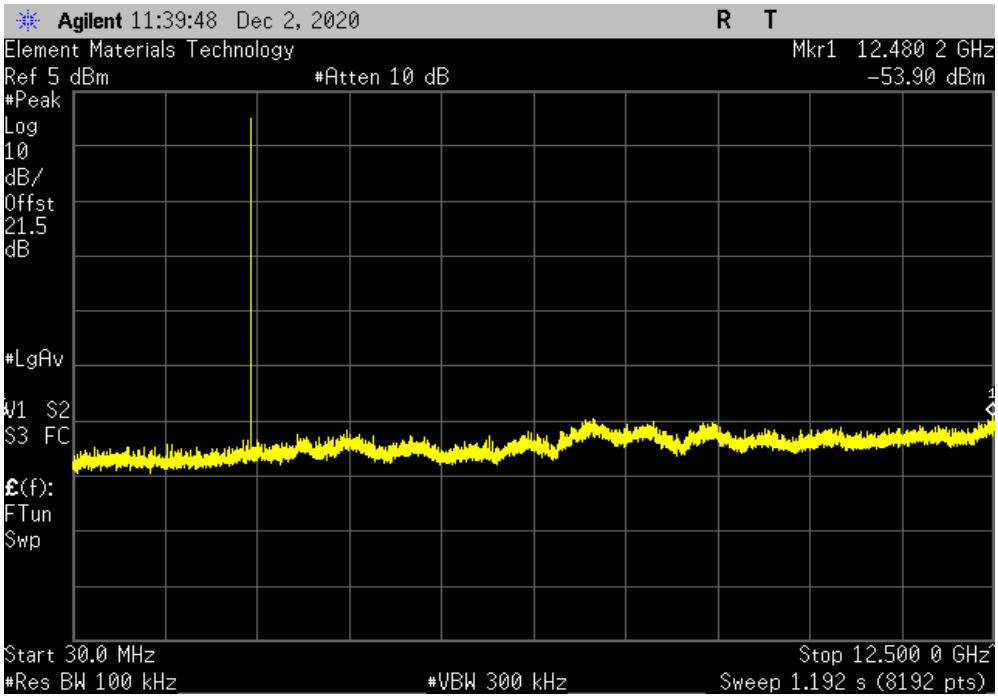
Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz				
Frequency Range	**Measured Freq (MHz)**	**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz	13968.1	-51.39	-20	Pass



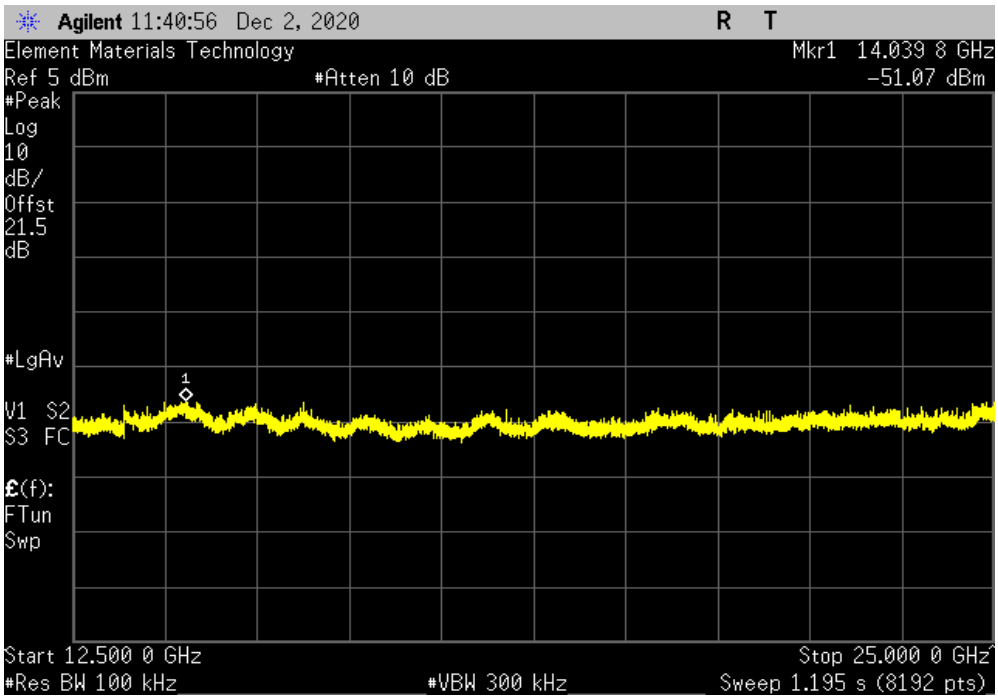
Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz						
	Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental		2439.85	N/A	N/A	N/A



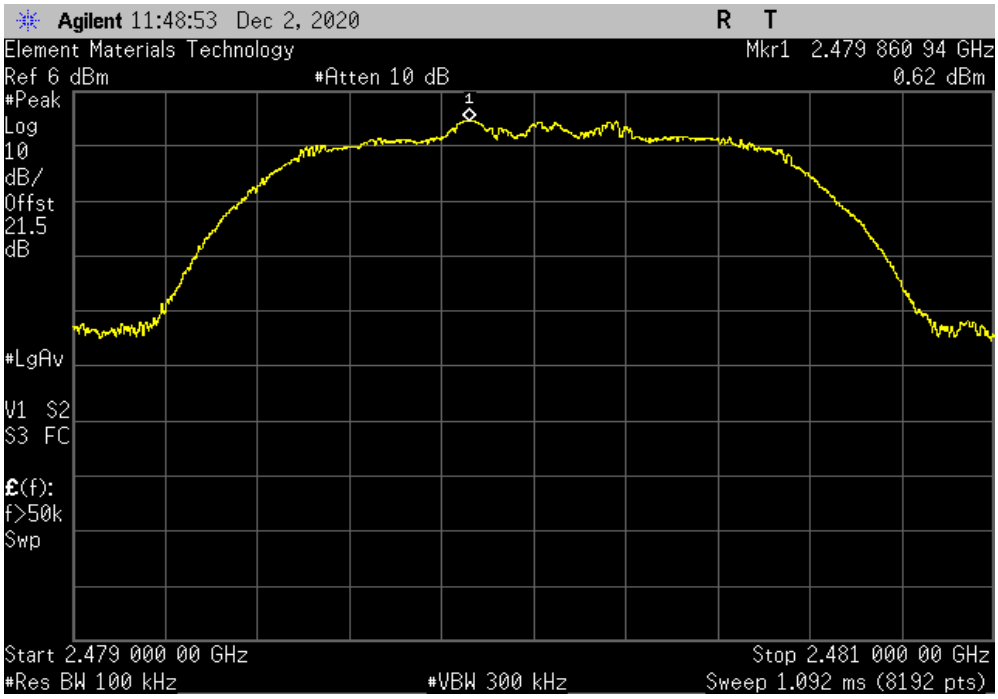
Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	12480.2	-54.35	-20	Pass



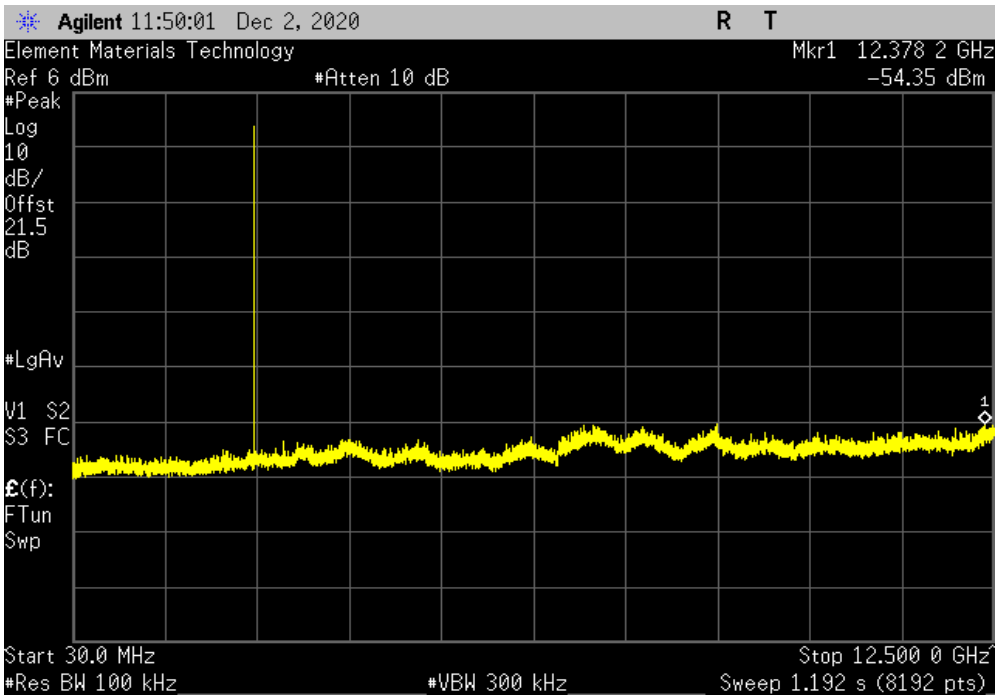
Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz				
Frequency Range	**Measured Freq (MHz)**	**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz	14039.8	-51.52	-20	Pass



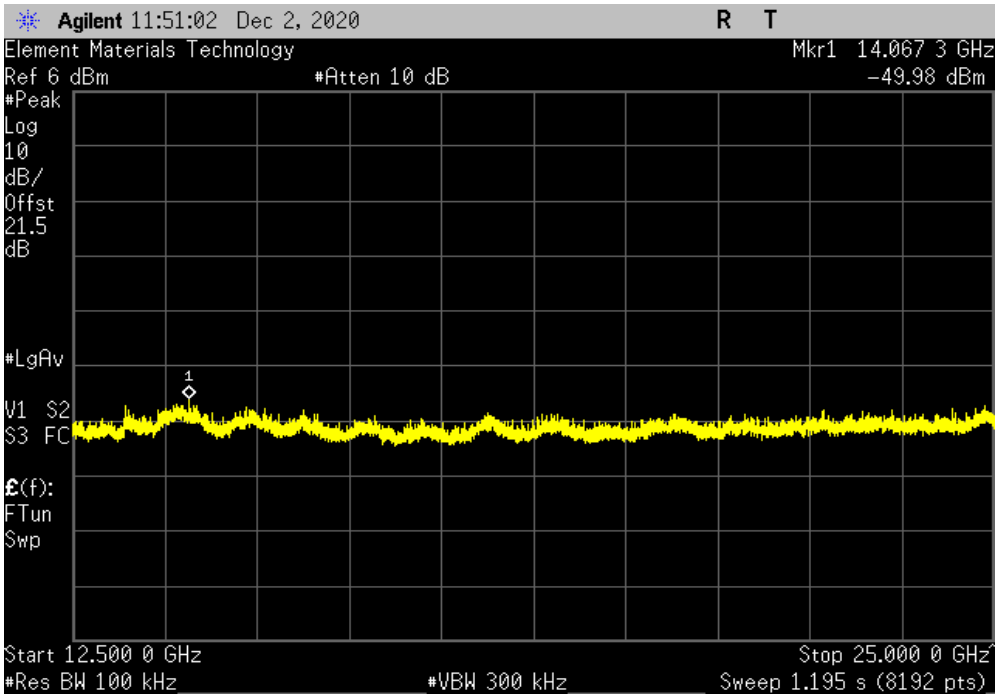
Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz					
Frequency Range		**Measured Freq (MHz)**	**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
Fundamental		2479.86	N/A	N/A	N/A



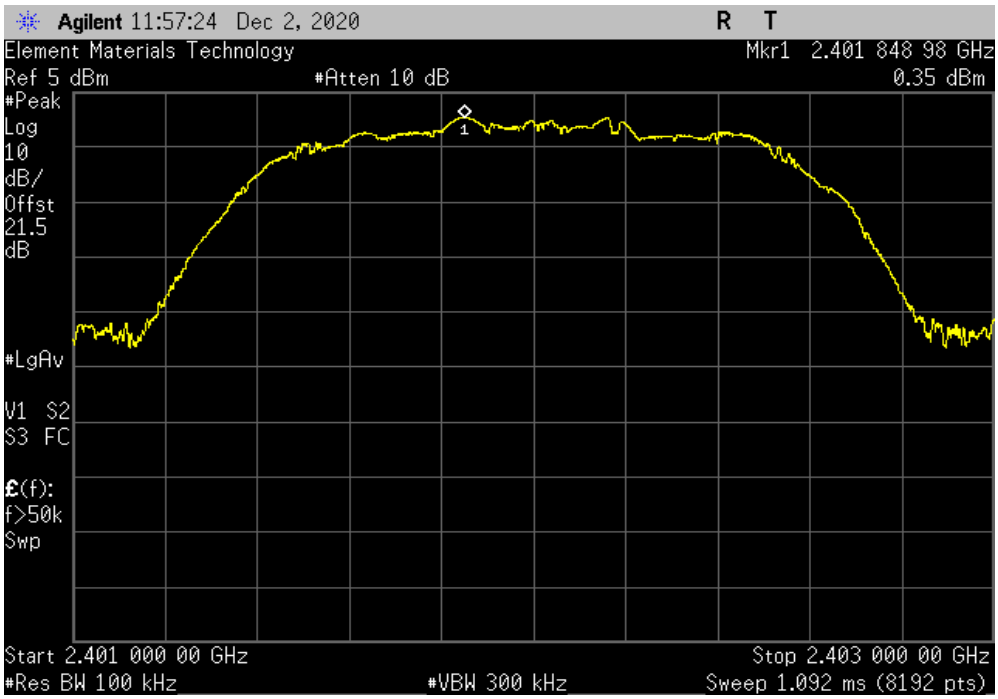
Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz				
Frequency Range	**Measured Freq (MHz)**	**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz	12378.2	-54.97	-20	Pass



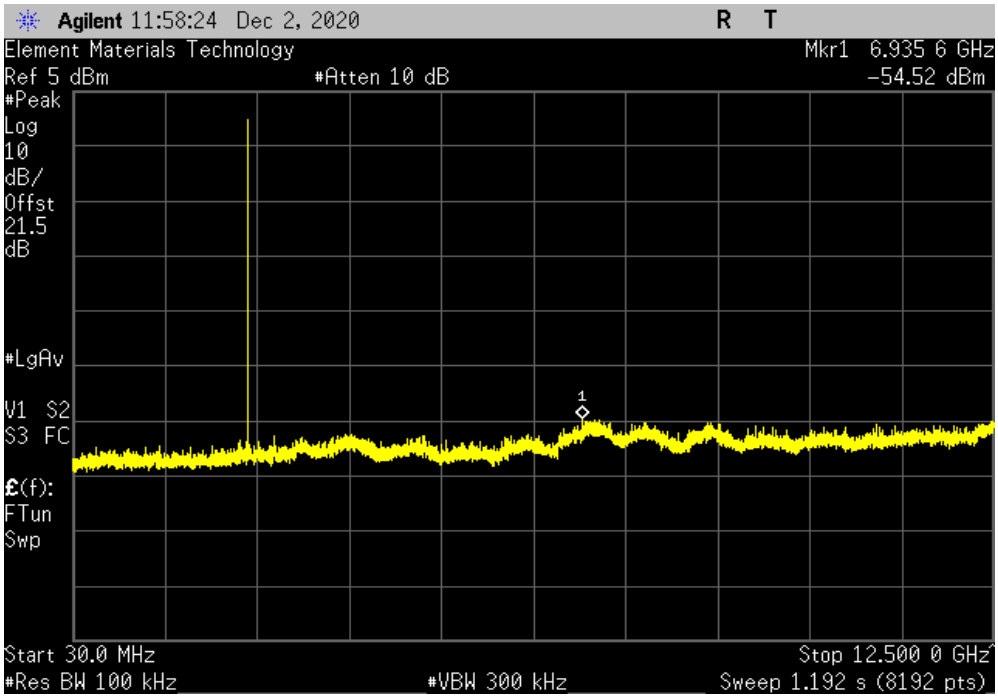
Bluetooth, single channel mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz				
Frequency Range	**Measured Freq (MHz)**	**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz	14067.3	-50.6	-20	Pass



Bluetooth, single channel mode, 3DH5, 8-DPSK, Low Channel, 2402 MHz						
	Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental		2401.85	N/A	N/A	N/A

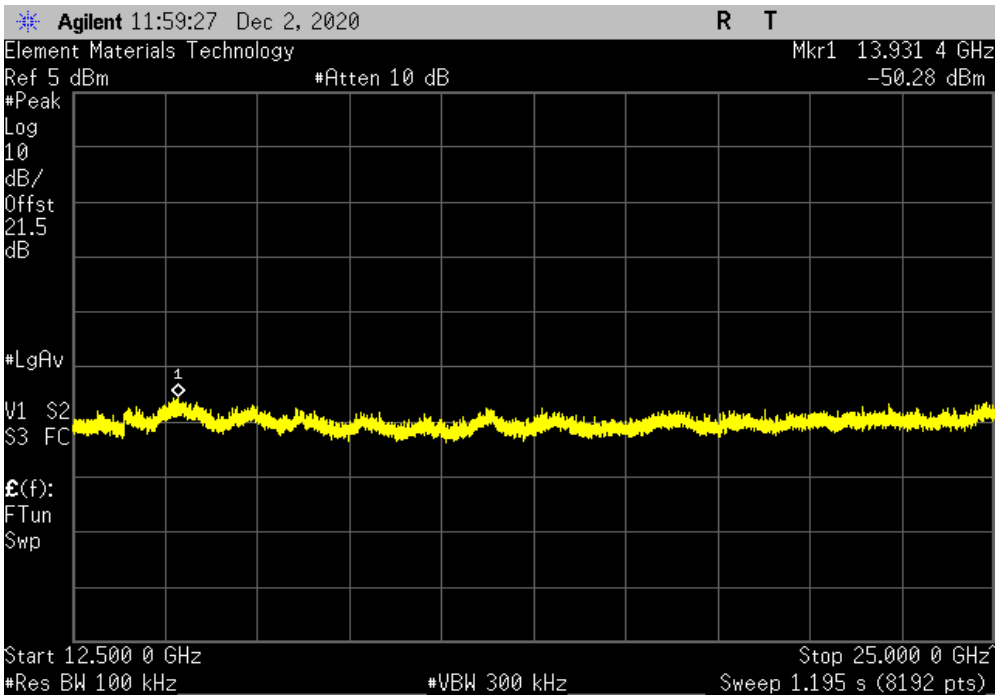


Bluetooth, single channel mode, 3DH5, 8-DPSK, Low Channel, 2402 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	6935.6	-54.87	-20	Pass



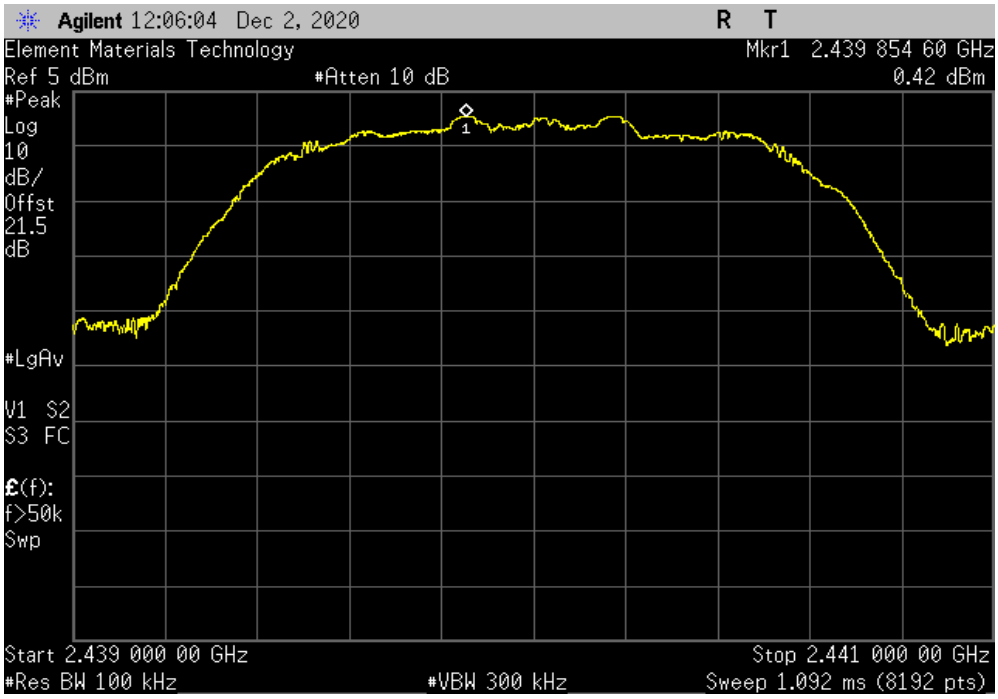
Bluetooth, single channel mode, 3DH5, 8-DPSK, Low Channel, 2402 MHz

Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz	13931.4	-50.63	-20	Pass

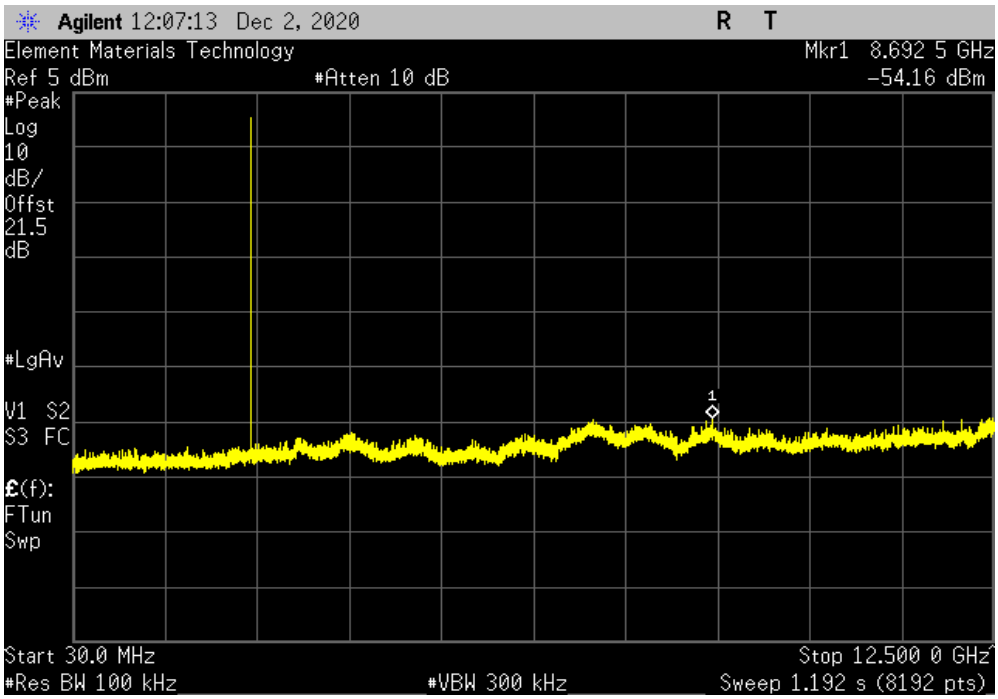


Bluetooth, single channel mode, 3DH5, 8-DPSK, Mid Channel, 2440 MHz

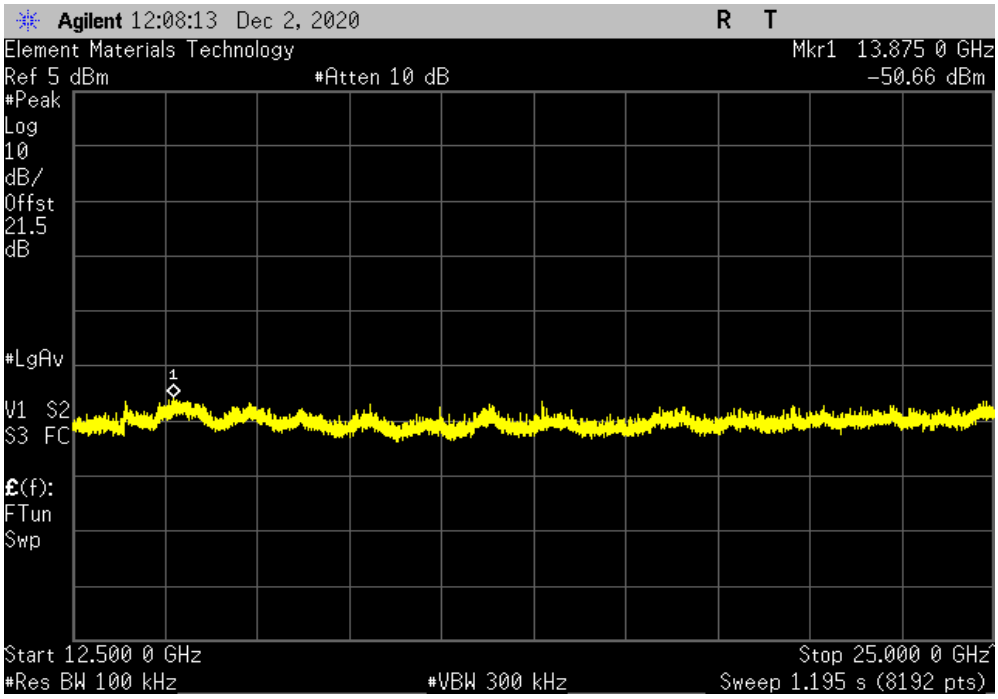
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
Fundamental	2439.85	N/A	N/A	N/A



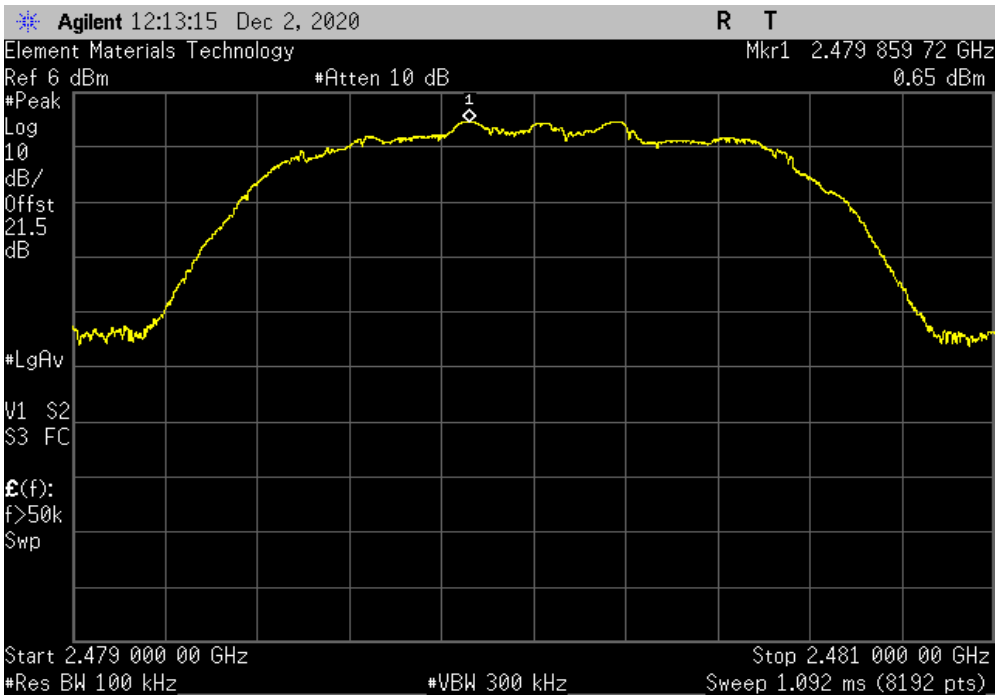
Bluetooth, single channel mode, 3DH5, 8-DPSK, Mid Channel, 2440 MHz				
Frequency Range	**Measured Freq (MHz)**	**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz	8692.5	-54.58	-20	Pass



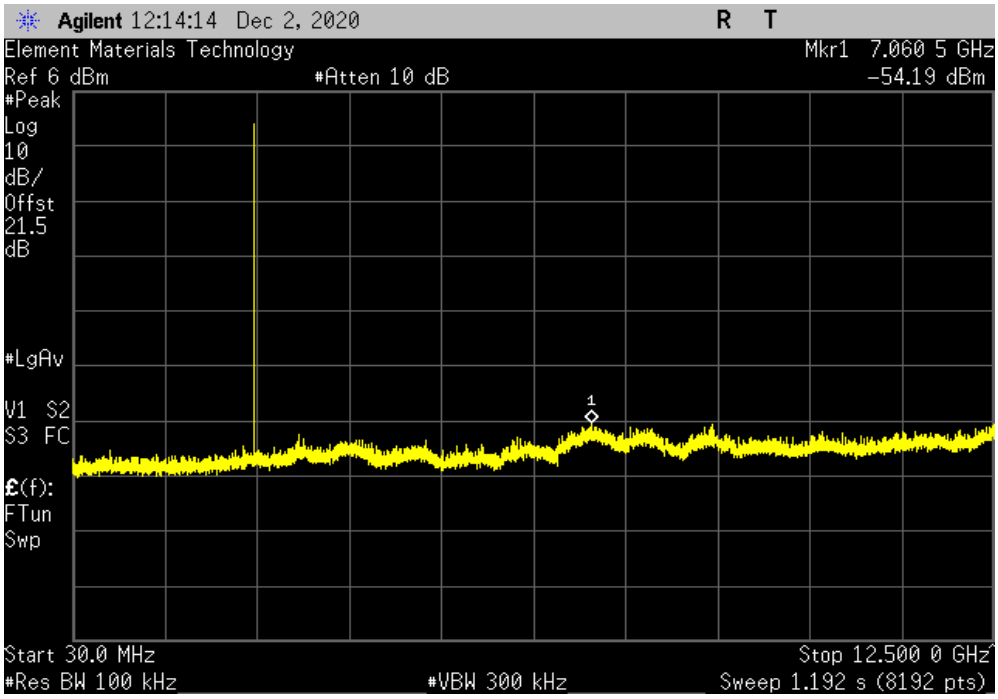
Bluetooth, single channel mode, 3DH5, 8-DPSK, Mid Channel, 2440 MHz				
Frequency Range	**Measured Freq (MHz)**	**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz	13875	-51.08	-20	Pass



Bluetooth, single channel mode, 3DH5, 8-DPSK, High Channel, 2480 MHz					
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
Fundamental		2479.86	N/A	N/A	N/A



Bluetooth, single channel mode, 3DH5, 8-DPSK, High Channel, 2480 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	7060.5	-54.84	-20	Pass



Bluetooth, single channel mode, 3DH5, 8-DPSK, High Channel, 2480 MHz				
Frequency Range	**Measured Freq (MHz)**	**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz	14094.7	-50.7	-20	Pass