



element

PayRange Inc.

BKSelect

FCC 15.247:2021

Report: PAYR0018.1, Issue Date: June 22, 2021



NVLAP LAB CODE: 200630-0



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CERTIFICATE OF TEST



Last Date of Test: May 6, 2021
PayRange Inc.
EUT: BKSelect

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2021	ANSI C63.10:2013, KDB 558074

Results

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

Deviations From Test Standards

None

Approved By:

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

United Kingdom

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

Australia/New Zealand

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

Korea

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

Japan

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

Taiwan

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

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

Singapore

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

Israel

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

Hong Kong

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

Vietnam

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

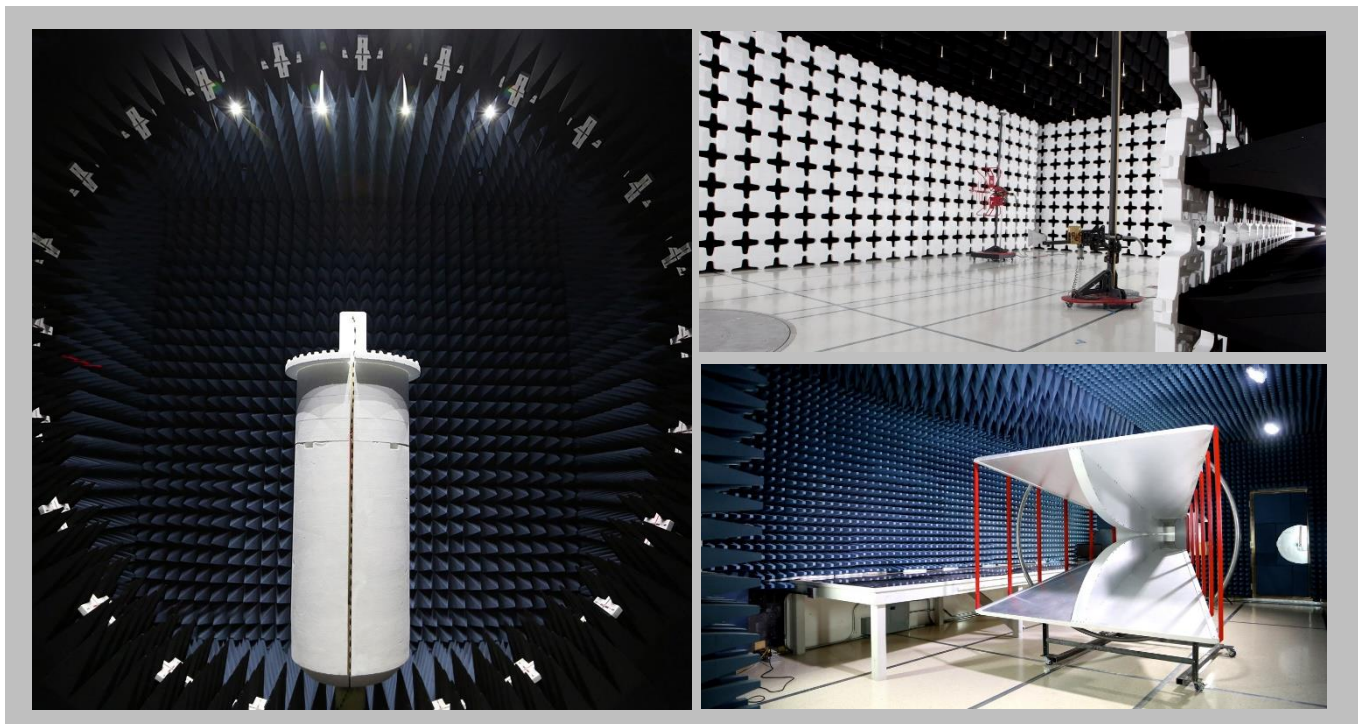
SCOPE

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

FACILITIES



California Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Minnesota Labs MN01-11 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Oregon Labs EV01-12 6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	Texas Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Washington Labs NC01-05 19201 120 th Ave NE Bothell, WA 98011 (425)984-6600
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



Measurement Uncertainty

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

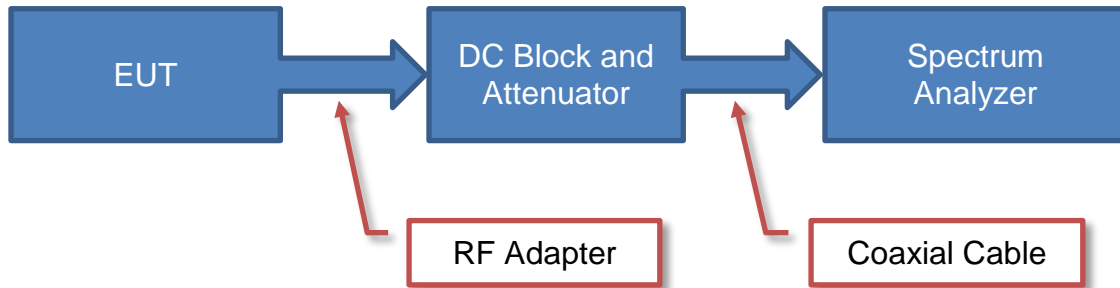
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found in the table below. A lab specific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

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

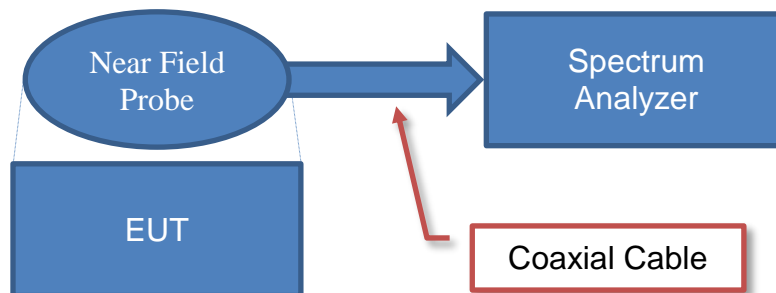
Test	+ MU	- MU
Frequency Accuracy	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	1.2 dB	-1.2 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field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

Test Setup Block Diagrams

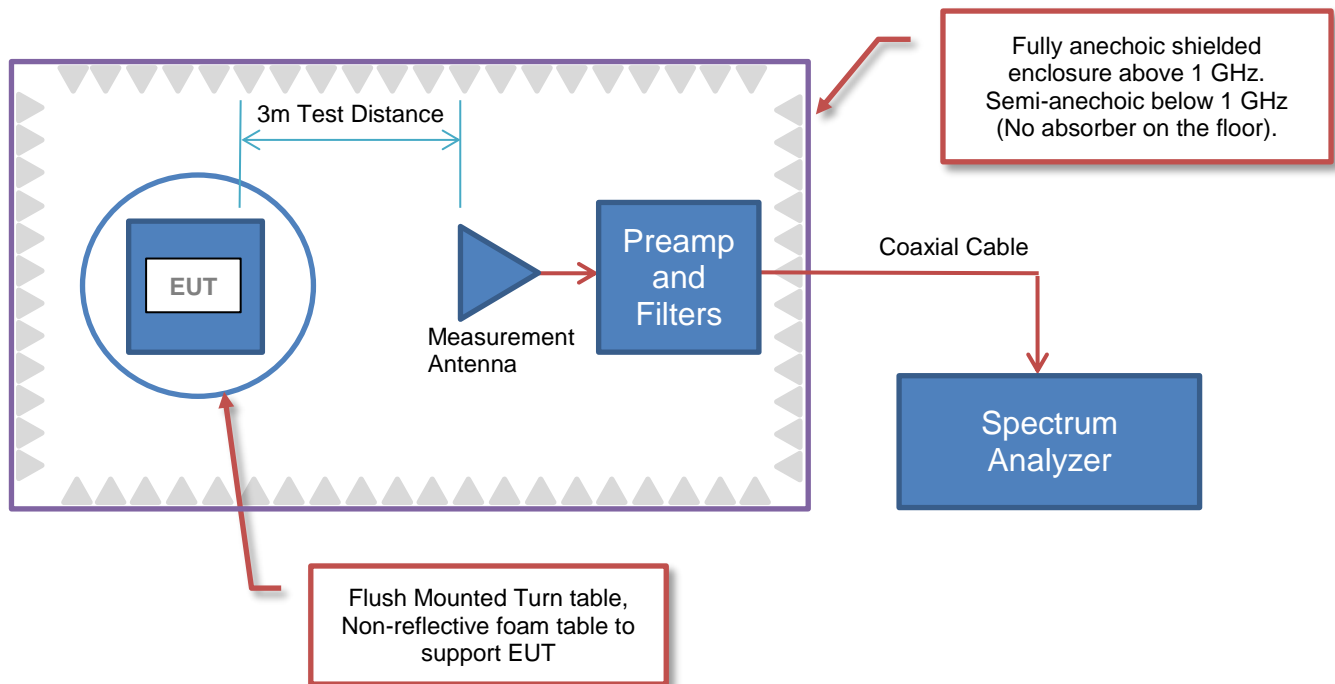
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



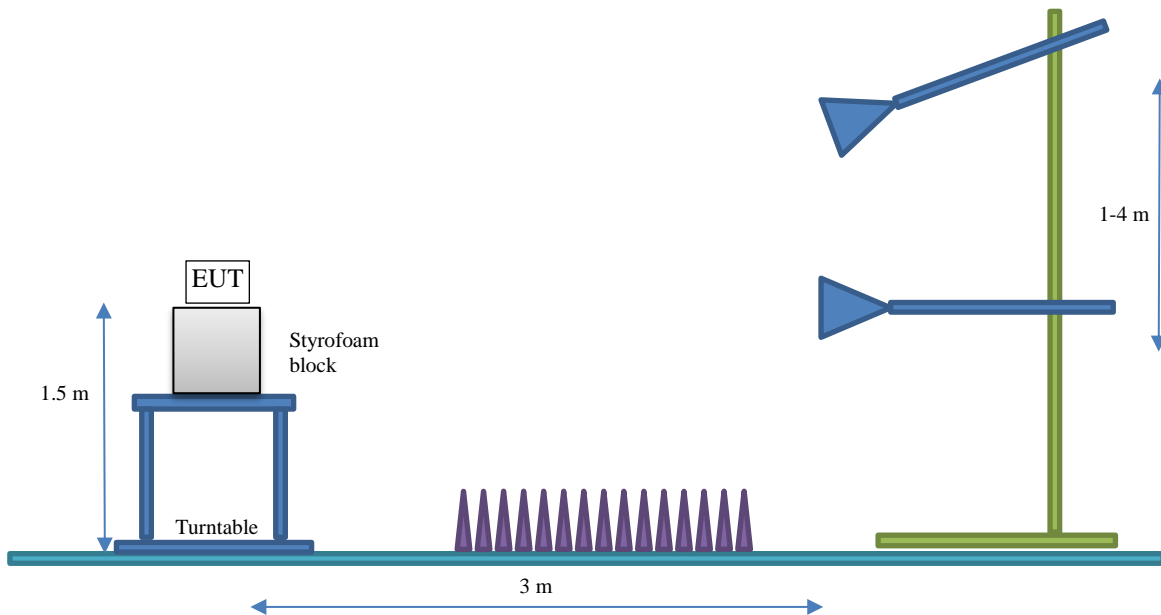
Spurious Radiated Emissions



Test Setup Block Diagrams

Bore Sighting (>1GHz)

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



PRODUCT DESCRIPTION



Client and Equipment Under Test (EUT) Information

Company Name:	PayRange Inc.
Address:	9600 NE Cascades Pkwy, Suite 280
City, State, Zip:	Portland, OR 97220
Test Requested By:	Mike Mitchell
EUT:	BKSelect
First Date of Test:	May 5, 2021
Last Date of Test:	May 6, 2021
Receipt Date of Samples:	May 5, 2021
Equipment Design Stage:	Prototype
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:

Payrange devices allow wireless payment from smartphones to vending and laundry devices with additional interface circuitry for a keypad and a serial interface.

Testing Objective:

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

CONFIGURATIONS



Configuration PAYR0018- 1

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Remote Vending Payment Device	PayRange Inc.	BKSelect	5

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
AC Power Adapter	XP Power	VEL36US120-US-JA	None
Vending Machine Emulator	PayRange Inc.	None	None
Credit Card Reader Emulator	PayRange Inc.	None	None

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Power Cable	No	1.5 m	No	AC Power Adapter	Remote Vending Payment Device
Dex Interface Cable	Yes	1 m	No	Remote Vending Payment Device	Unterminated
Touchless Interface Cable	No	.6 m	No	Remote Vending Payment Device	Vending Machine Emulator
Credit Card Reader Cable	No	.3 m	No	Remote Vending Payment Device	Credit Card Reader Emulator
Keypad Interface Cable	No	1.6 m	No	Remote Vending Payment Device	Unterminated
Configuration Plug	No	10 cm	No	Remote Vending Payment Device	Remote Vending Payment Device
AC Power Cable	No	1.8 m	No	AC Power Adapter	AC Mains

CONFIGURATIONS



Configuration PAYR0018- 2

Software/Firmware Running during test	
Description	Version
CSR uEnergy Test	2.5.0

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Remote Vending Payment Device	PayRange Inc.	BKSelect	4

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Vending Machine Emulator	PayRange Inc.	None	None
CSR programming adapter	Qualcomm	DK-USB-SPI-10225-1A	None

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
AC Power Adapter	XP Power	VEL36US120-US-JA	None
Laptop	HP	15-BS115DX	CND8076QJL

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Power Cable	No	1.5 m	No	AC Power Adapter	Remote Vending Payment Device
Touchless Interface Cable	No	.6 m	No	Remote Vending Payment Device	Vending Machine Emulator
Programming Cable	No	0.1 m	No	Remote Vending Payment Device	CSR Programming Adapter
USB	Yes	1.0 m	No	CSR Programming Adapter	Laptop

MODIFICATIONS



Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2021-05-05	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.
2	2021-05-05	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.
3	2021-05-05	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.
4	2021-05-05	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.
5	2021-05-05	Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
6	2021-05-05	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.
7	2021-05-05	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.
8	2021-05-06	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.
9	2021-05-06	Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

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)
Monopole	Manufacturer	2400 – 2483.5	3.7

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

SETTINGS FOR ALL TESTS IN THIS REPORT

Modulation Types / Data Rates	Type	Channel	Frequency (MHz)	Power Setting (dBm)
BLE	DTS	0	2402	9
		20	2442	9
		39	2480	9

POWERLINE CONDUCTED EMISSIONS



TEST DESCRIPTION

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Receiver	Rohde & Schwarz	ESR7	ARI	2020-07-09	2021-07-09
Cable - Conducted Cable Assembly	Northwest EMC	EVG, HHD, RKT	EVGA	2021-01-05	2022-01-05
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

PAYR0018-1

MODES INVESTIGATED

Transmitting, BLE, GFSK 1Mbps, Mid Ch = 2442 MHz

POWERLINE CONDUCTED EMISSIONS



EUT:	BKSelect	Work Order:	PAYR0018
Serial Number:	5	Date:	2021-05-06
Customer:	PayRange Inc.	Temperature:	23.3°C
Attendees:	Mike Mitchell	Relative Humidity:	41.2%
Customer Project:	None	Bar. Pressure:	1020 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	PAYR0018-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2021	ANSI C63.10:2013

TEST PARAMETERS

Run #:	2	Line:	High Line	Add. Ext. Attenuation (dB):	0
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COMMENTS

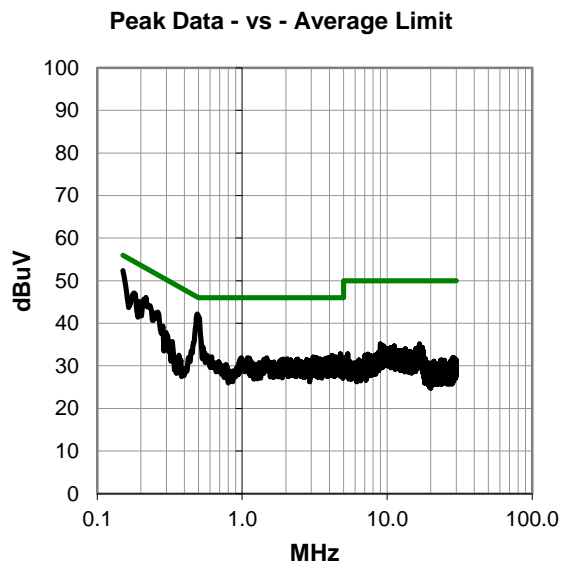
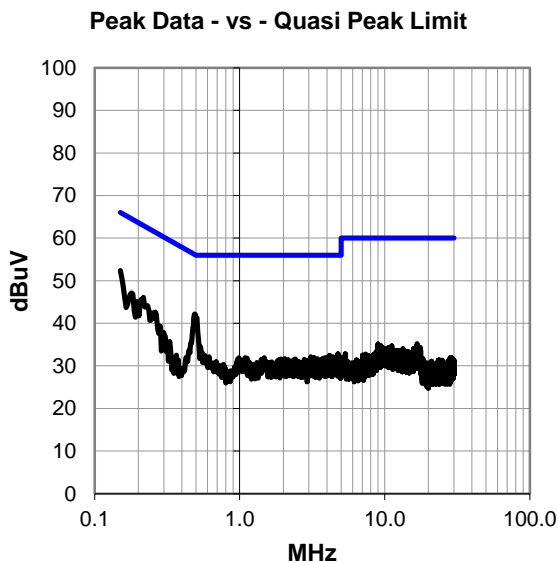
None

EUT OPERATING MODES

Transmitting, BLE, GFSK 1Mbps, Mid Ch = 2442 MHz

DEVIATIONS FROM TEST STANDARD

None



POWERLINE CONDUCTED EMISSIONS



RESULTS - Run #2

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.150	32.4	20.0	52.4	66.0	-13.6
0.490	22.2	20.0	42.2	56.2	-14.0
0.217	26.1	20.0	46.1	62.9	-16.8
0.180	27.1	20.0	47.1	64.5	-17.4
0.195	25.1	20.0	45.1	63.8	-18.7
0.299	17.8	20.0	37.8	60.3	-22.5
4.762	12.7	20.1	32.8	56.0	-23.2
4.169	12.4	20.0	32.4	56.0	-23.6
0.329	15.7	20.0	35.7	59.5	-23.8
3.094	12.1	20.0	32.1	56.0	-23.9
4.415	12.0	20.1	32.1	56.0	-23.9
4.016	12.0	20.0	32.0	56.0	-24.0
4.508	11.9	20.1	32.0	56.0	-24.0
4.904	11.9	20.1	32.0	56.0	-24.0
0.990	11.9	20.0	31.9	56.0	-24.1
1.090	11.9	20.0	31.9	56.0	-24.1
1.475	11.9	20.0	31.9	56.0	-24.1
3.243	11.9	20.0	31.9	56.0	-24.1
3.851	11.9	20.0	31.9	56.0	-24.1
4.814	11.8	20.1	31.9	56.0	-24.1
1.124	11.8	20.0	31.8	56.0	-24.2
2.045	11.7	20.0	31.7	56.0	-24.3
3.426	11.7	20.0	31.7	56.0	-24.3
4.683	11.6	20.1	31.7	56.0	-24.3
4.702	11.6	20.1	31.7	56.0	-24.3

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.150	32.4	20.0	52.4	56.0	-3.6
0.490	22.2	20.0	42.2	46.2	-4.0
0.217	26.1	20.0	46.1	52.9	-6.8
0.180	27.1	20.0	47.1	54.5	-7.4
0.195	25.1	20.0	45.1	53.8	-8.7
0.299	17.8	20.0	37.8	50.3	-12.5
4.762	12.7	20.1	32.8	46.0	-13.2
4.169	12.4	20.0	32.4	46.0	-13.6
0.329	15.7	20.0	35.7	49.5	-13.8
3.094	12.1	20.0	32.1	46.0	-13.9
4.415	12.0	20.1	32.1	46.0	-13.9
4.016	12.0	20.0	32.0	46.0	-14.0
4.508	11.9	20.1	32.0	46.0	-14.0
4.904	11.9	20.1	32.0	46.0	-14.0
0.990	11.9	20.0	31.9	46.0	-14.1
1.090	11.9	20.0	31.9	46.0	-14.1
1.475	11.9	20.0	31.9	46.0	-14.1
3.243	11.9	20.0	31.9	46.0	-14.1
3.851	11.9	20.0	31.9	46.0	-14.1
4.814	11.8	20.1	31.9	46.0	-14.1
1.124	11.8	20.0	31.8	46.0	-14.2
2.045	11.7	20.0	31.7	46.0	-14.3
3.426	11.7	20.0	31.7	46.0	-14.3
4.683	11.6	20.1	31.7	46.0	-14.3
4.702	11.6	20.1	31.7	46.0	-14.3

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS



EUT:	BKSelect	Work Order:	PAYR0018
Serial Number:	5	Date:	2021-05-06
Customer:	PayRange Inc.	Temperature:	23.3°C
Attendees:	Mike Mitchell	Relative Humidity:	41.2%
Customer Project:	None	Bar. Pressure:	1020 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	PAYR0018-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2021	ANSI C63.10:2013

TEST PARAMETERS

Run #:	3	Line:	Neutral	Add. Ext. Attenuation (dB):	0
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COMMENTS

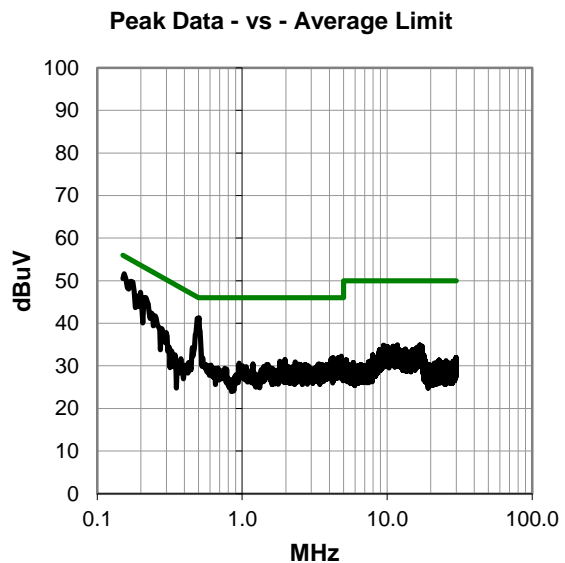
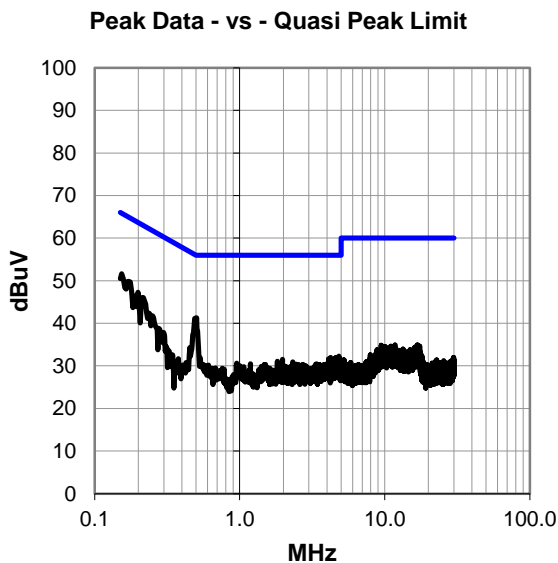
None

EUT OPERATING MODES

Transmitting, BLE, GFSK 1Mbps, Mid Ch = 2442 MHz

DEVIATIONS FROM TEST STANDARD

None



POWERLINE CONDUCTED EMISSIONS



RESULTS - Run #3

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.154	31.6	20.0	51.6	65.8	-14.2
0.504	21.3	20.0	41.3	56.0	-14.7
0.199	27.3	20.0	47.3	63.7	-16.4
0.213	26.1	20.0	46.1	63.1	-17.0
0.277	18.8	20.0	38.8	60.9	-22.1
4.840	12.2	20.1	32.3	56.0	-23.7
4.221	12.0	20.0	32.0	56.0	-24.0
4.609	11.8	20.1	31.9	56.0	-24.1
4.564	11.7	20.1	31.8	56.0	-24.2
4.101	11.6	20.0	31.6	56.0	-24.4
4.795	11.5	20.1	31.6	56.0	-24.4
1.971	11.5	20.0	31.5	56.0	-24.5
4.329	11.4	20.0	31.4	56.0	-24.6
1.814	11.1	20.0	31.1	56.0	-24.9
4.956	10.9	20.1	31.0	56.0	-25.0
2.325	10.9	20.0	30.9	56.0	-25.1
4.721	10.8	20.1	30.9	56.0	-25.1
11.788	14.6	20.3	34.9	60.0	-25.1
16.806	14.4	20.5	34.9	60.0	-25.1
4.922	10.7	20.1	30.8	56.0	-25.2
9.456	14.6	20.2	34.8	60.0	-25.2
17.179	14.2	20.5	34.7	60.0	-25.3
4.467	10.6	20.1	30.7	56.0	-25.3
0.952	10.6	20.0	30.6	56.0	-25.4
11.030	14.3	20.3	34.6	60.0	-25.4

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.154	31.6	20.0	51.6	55.8	-4.2
0.504	21.3	20.0	41.3	46.0	-4.7
0.199	27.3	20.0	47.3	53.7	-6.4
0.213	26.1	20.0	46.1	53.1	-7.0
0.277	18.8	20.0	38.8	50.9	-12.1
4.840	12.2	20.1	32.3	46.0	-13.7
4.221	12.0	20.0	32.0	46.0	-14.0
4.609	11.8	20.1	31.9	46.0	-14.1
4.564	11.7	20.1	31.8	46.0	-14.2
4.101	11.6	20.0	31.6	46.0	-14.4
4.795	11.5	20.1	31.6	46.0	-14.4
1.971	11.5	20.0	31.5	46.0	-14.5
4.329	11.4	20.0	31.4	46.0	-14.6
1.814	11.1	20.0	31.1	46.0	-14.9
4.956	10.9	20.1	31.0	46.0	-15.0
2.325	10.9	20.0	30.9	46.0	-15.1
4.721	10.8	20.1	30.9	46.0	-15.1
11.788	14.6	20.3	34.9	50.0	-15.1
16.806	14.4	20.5	34.9	50.0	-15.1
4.922	10.7	20.1	30.8	46.0	-15.2
9.456	14.6	20.2	34.8	50.0	-15.2
17.179	14.2	20.5	34.7	50.0	-15.3
4.467	10.6	20.1	30.7	46.0	-15.3
0.952	10.6	20.0	30.6	46.0	-15.4
11.030	14.3	20.3	34.6	50.0	-15.4

CONCLUSION

Pass

Tested By

DUTY CYCLE



element

XMIT 2020.12.30.0

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	Agilent	N5181A	TIG	2020-04-16	2023-04-16
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	2021-03-14	2022-03-14
Attenuator	S.M. Electronics	SA26B-20	AUY	2021-03-14	2022-03-14
Block - DC	Fairview Microwave	SD3379	AMW	2021-03-14	2022-03-14
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFE	2021-04-08	2022-04-08

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



TelTx 2019.08.30.0 XMI 2020.12.30.0

EUT: BKSelect		Work Order: PAYR0018	
Serial Number: 4		Date: 5-May-21	
Customer: PayRange Inc.		Temperature: 23.1 °C	
Attendees: Mike Mitchell		Humidity: 40% RH	
Project: None		Barometric Pres.: 1014 mbar	
Tested by: Jeff Alcock	Power: 110VAC/60Hz	Job Site: EV05	
TEST SPECIFICATIONS			
FCC 15.247:2021		ANSI C63.10:2013	
Test Method			
COMMENTS			
Reference level offset includes: DC Block, 20 dB Attenuator, measurement cable, and the manufacturers SMA patch cable.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature	

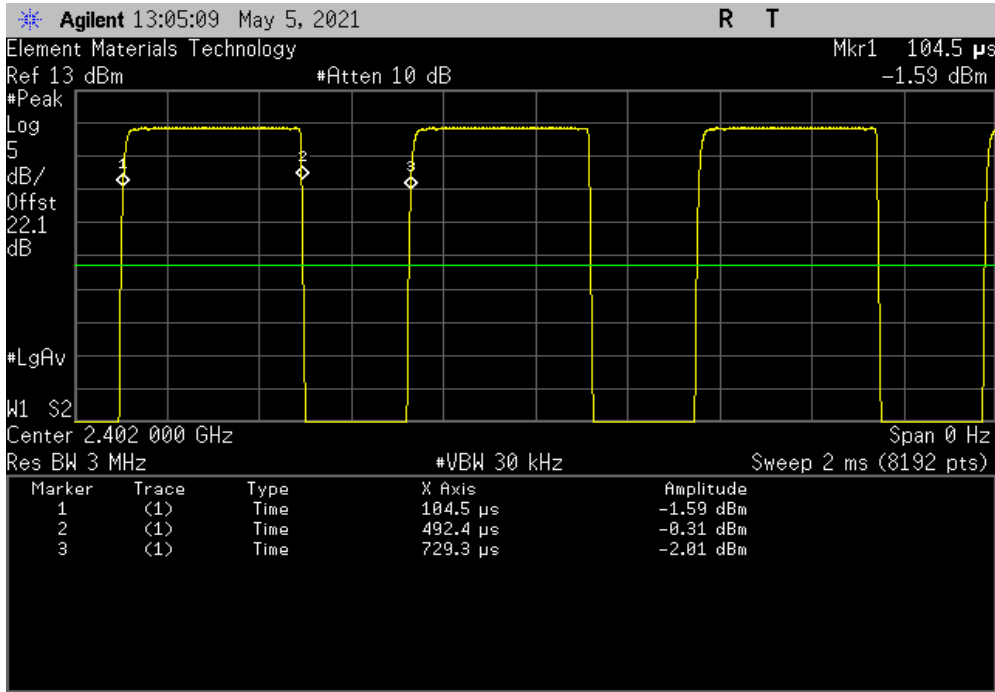
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
BLE/GFSK 1 Mbps Low Channel, 2402 MHz	387.939 us	624.884 us	1	62.1	N/A	N/A
BLE/GFSK 1 Mbps Low Channel, 2402 MHz	N/A	N/A	5	N/A	N/A	N/A
BLE/GFSK 1 Mbps Mid Channel, 2442 MHz	392.81 us	625.022 us	1	62.8	N/A	N/A
BLE/GFSK 1 Mbps Mid Channel, 2442 MHz	N/A	N/A	5	N/A	N/A	N/A
BLE/GFSK 1 Mbps High Channel, 2480 MHz	393.698 us	624.9 us	1	63	N/A	N/A
BLE/GFSK 1 Mbps High Channel, 2480 MHz	N/A	N/A	5	N/A	N/A	N/A

DUTY CYCLE

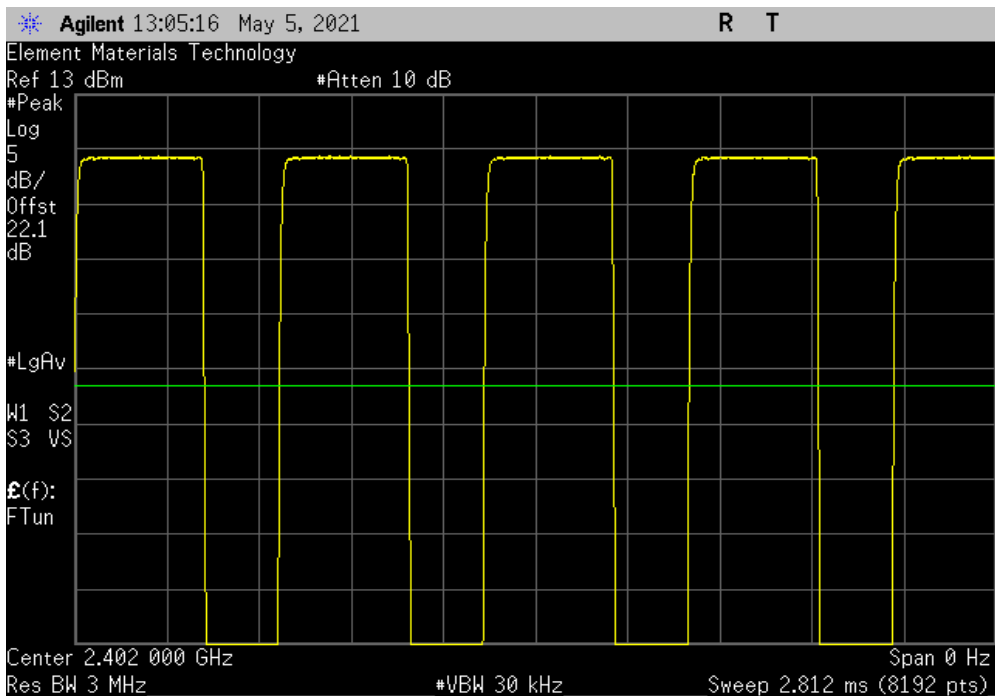


TbTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
387.939 us	624.884 us	1	62.1	N/A	N/A	



BLE/GFSK 1 Mbps Low Channel, 2402 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	

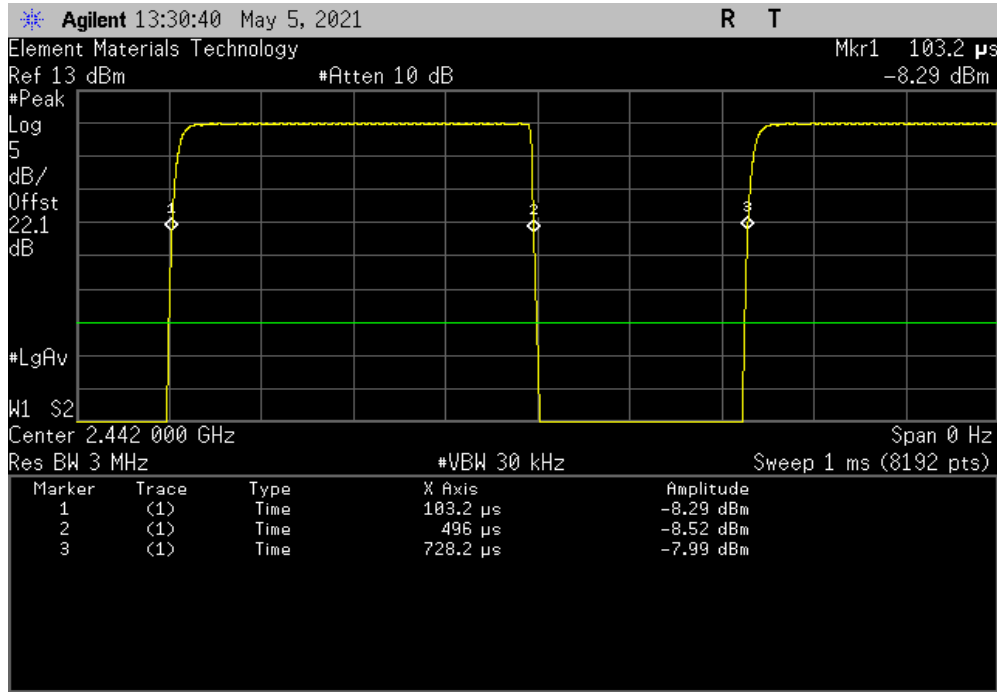


DUTY CYCLE

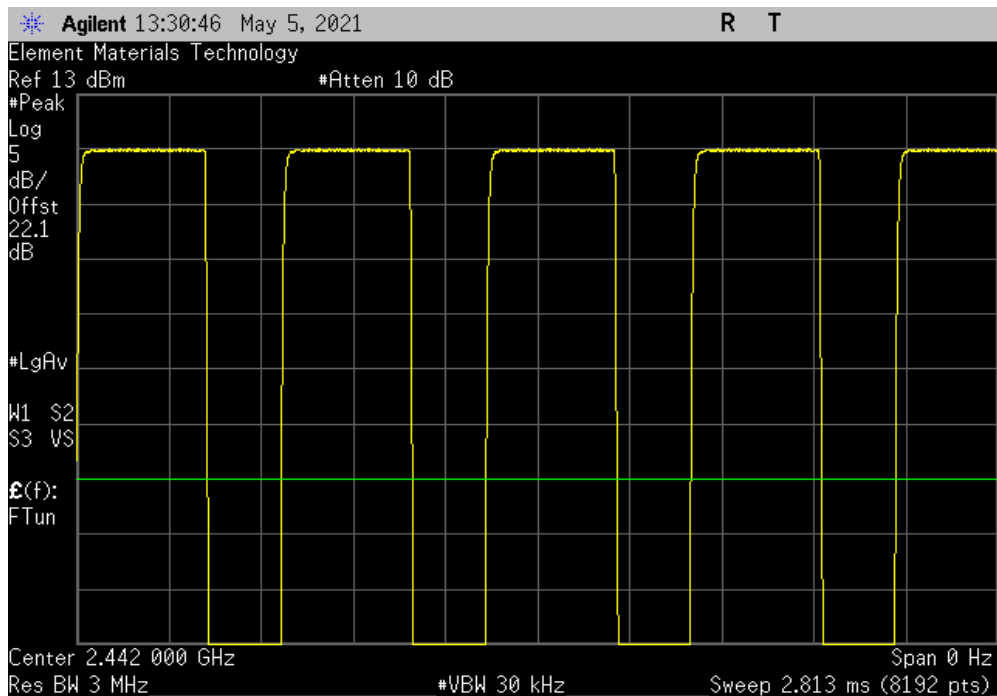


TbTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps Mid Channel, 2442 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
392.81 us	625.022 us	1	62.8	N/A	N/A	



BLE/GFSK 1 Mbps Mid Channel, 2442 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	

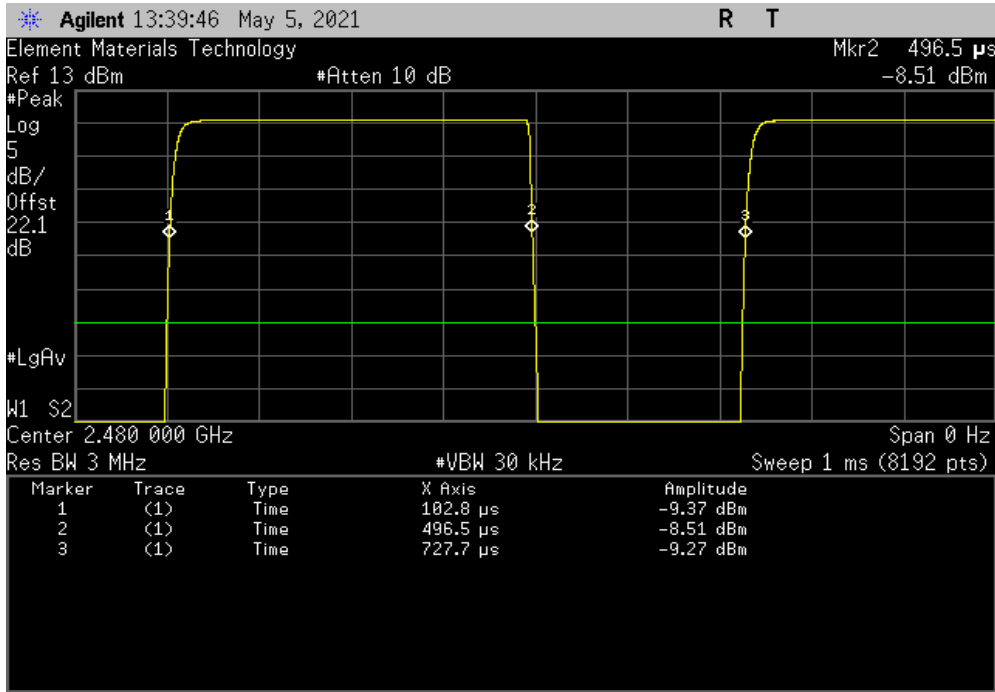


DUTY CYCLE

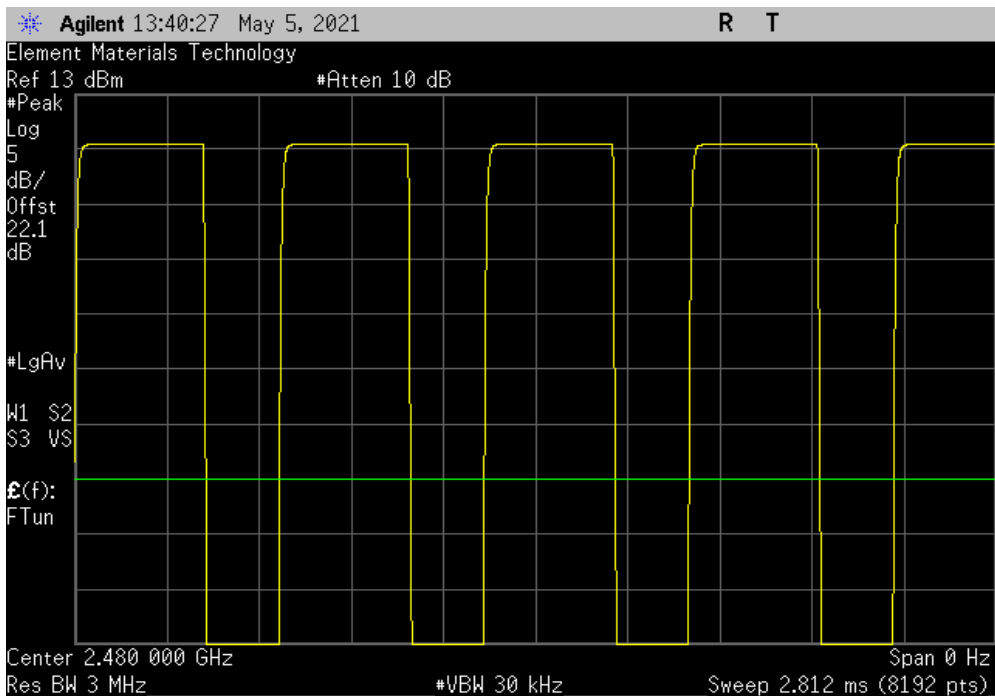


TbTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
393.698 us	624.9 us	1	63	N/A	N/A	



BLE/GFSK 1 Mbps High Channel, 2480 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	



OCCUPIED BANDWIDTH



element

XMIT 2020.12.30.0

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	Agilent	N5181A	TIG	2020-04-16	2023-04-16
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	2021-03-14	2022-03-14
Attenuator	S.M. Electronics	SA26B-20	AUY	2021-03-14	2022-03-14
Block - DC	Fairview Microwave	SD3379	AMW	2021-03-14	2022-03-14
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFE	2021-04-08	2022-04-08

TEST DESCRIPTION


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

The 6dB occupied bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The 99.0% occupied bandwidth was also measured at the same time which can be needed during Output Power depending on the applicable method.

OCCUPIED BANDWIDTH



TelTx 2019.08.30.0 XMI 2020.12.30.0

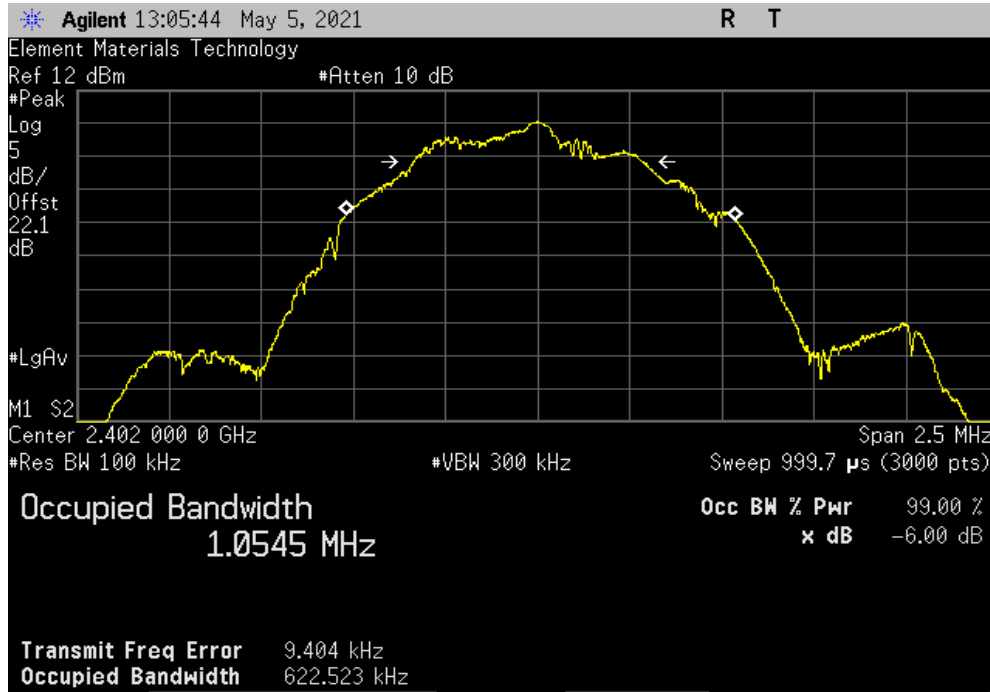
EUT: BKSelect		Work Order: PAYR0018	
Serial Number: 4		Date: 5-May-21	
Customer: PayRange Inc.		Temperature: 23.1 °C	
Attendees: Mike Mitchell		Humidity: 39.8% RH	
Project: None		Barometric Pres.: 1015 mbar	
Tested by: Jeff Alcoke	Power: 110VAC/60Hz	Job Site: EV05	
TEST SPECIFICATIONS			
FCC 15.247:2021		ANSI C63.10:2013	
TEST METHOD			
COMMENTS			
Reference level offset includes: DC Block, 20 dB Attenuator, measurement cable, and the manufacturers SMA patch cable.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature 	
		Value	Limit (±) Result
BLE/GFSK 1 Mbps Low Channel, 2402 MHz		622.523 kHz	500 kHz Pass
BLE/GFSK 1 Mbps Mid Channel, 2442 MHz		624.532 kHz	500 kHz Pass
BLE/GFSK 1 Mbps High Channel, 2480 MHz		624.749 kHz	500 kHz Pass

OCCUPIED BANDWIDTH

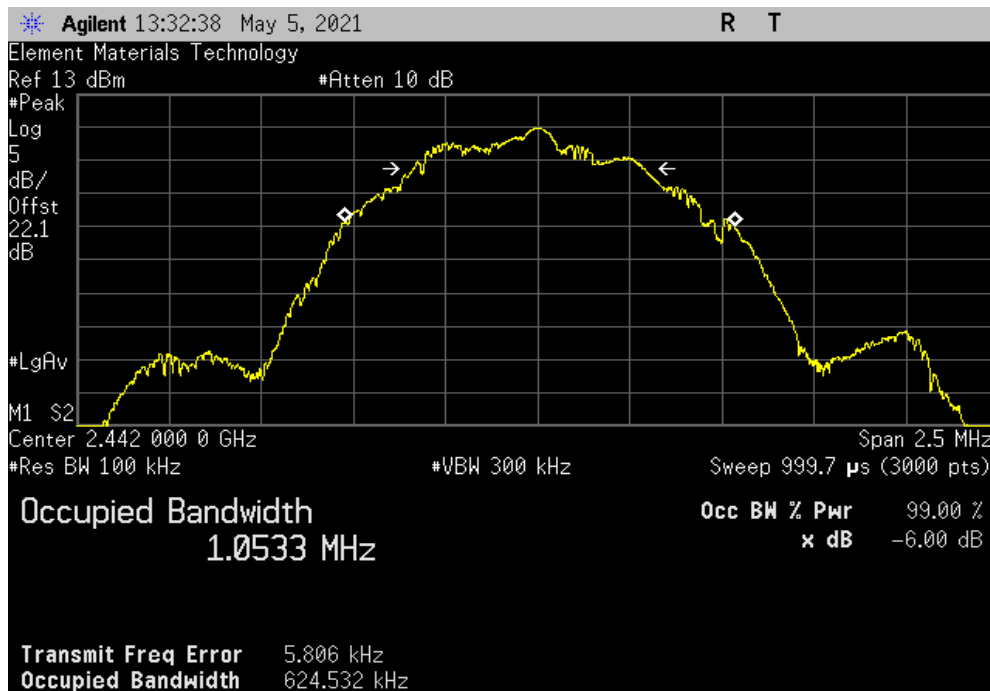


TbTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz			
	Value	Limit (≥)	Result
	622.523 kHz	500 kHz	Pass



BLE/GFSK 1 Mbps Mid Channel, 2442 MHz			
	Value	Limit (≥)	Result
	624.532 kHz	500 kHz	Pass

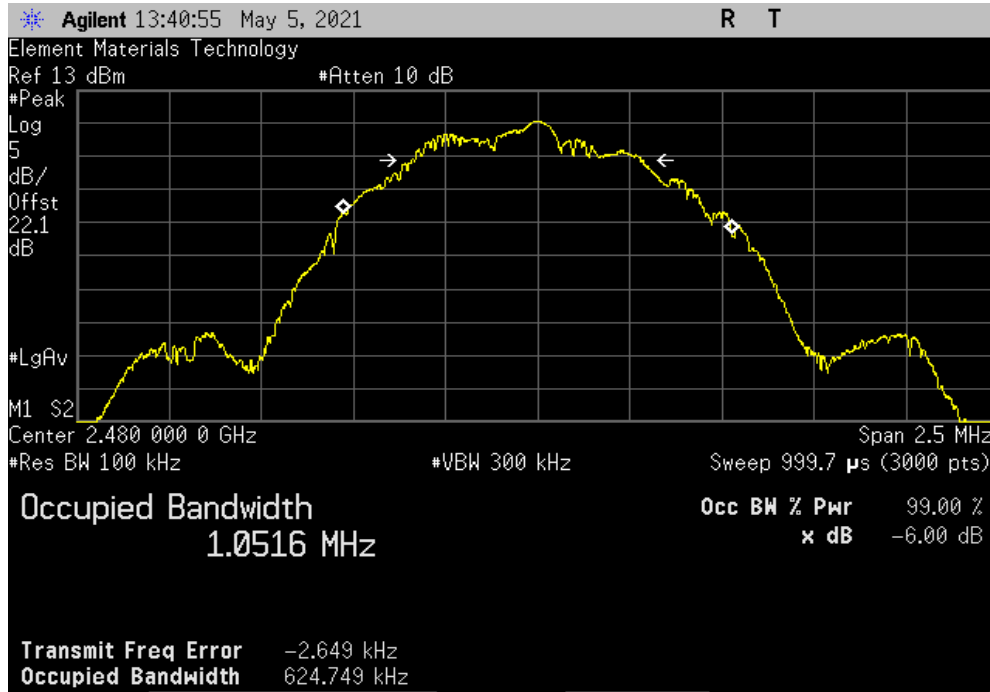


OCCUPIED BANDWIDTH



TbTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz			
	Value	Limit	Result
	624.749 kHz	500 kHz	Pass



OUTPUT POWER



element

XMH 2020.12.30.0

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	Agilent	N5181A	TIG	2020-04-16	2023-04-16
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	2021-03-14	2022-03-14
Attenuator	S.M. Electronics	SA26B-20	AUY	2021-03-14	2022-03-14
Block - DC	Fairview Microwave	SD3379	AMW	2021-03-14	2022-03-14
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFE	2021-04-08	2022-04-08

TEST DESCRIPTION

The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum.


Prior to measuring peak transmit power the DTS bandwidth (B) was measured.

The method found in ANSI C63.10:2013 Section 11.9.1.1 was used because the RBW on the analyzer was greater than the DTS Bandwidth of the radio.

OUTPUT POWER



TelTx 2019.08.30.0 XMI 2020.12.30.0

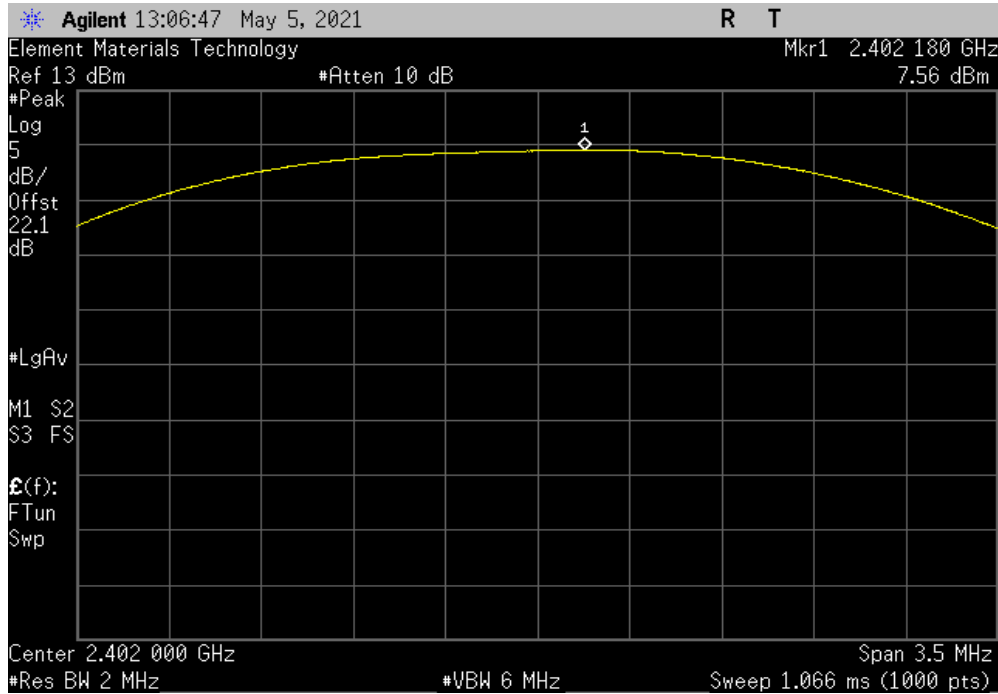
EUT: BKSelect		Work Order: PAYR0018	
Serial Number: 4		Date: 5-May-21	
Customer: PayRange Inc.		Temperature: 23.1 °C	
Attendees: Mike Mitchell		Humidity: 39.9% RH	
Project: None		Barometric Pres.: 1015 mbar	
Tested by: Jeff Alcock	Power: 110VAC/60Hz	Job Site: EV05	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2021		ANSI C63.10:2013	
COMMENTS			
Reference level offset includes: DC Block, 20 dB Attenuator, measurement cable, and the manufacturers SMA patch cable.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature 	
		Out Pwr (dBm)	Limit (dBm) Result
BLE/GFSK 1 Mbps Low Channel, 2402 MHz		7.559	30 Pass
BLE/GFSK 1 Mbps Mid Channel, 2442 MHz		8.185	30 Pass
BLE/GFSK 1 Mbps High Channel, 2480 MHz		8.680	30 Pass

OUTPUT POWER

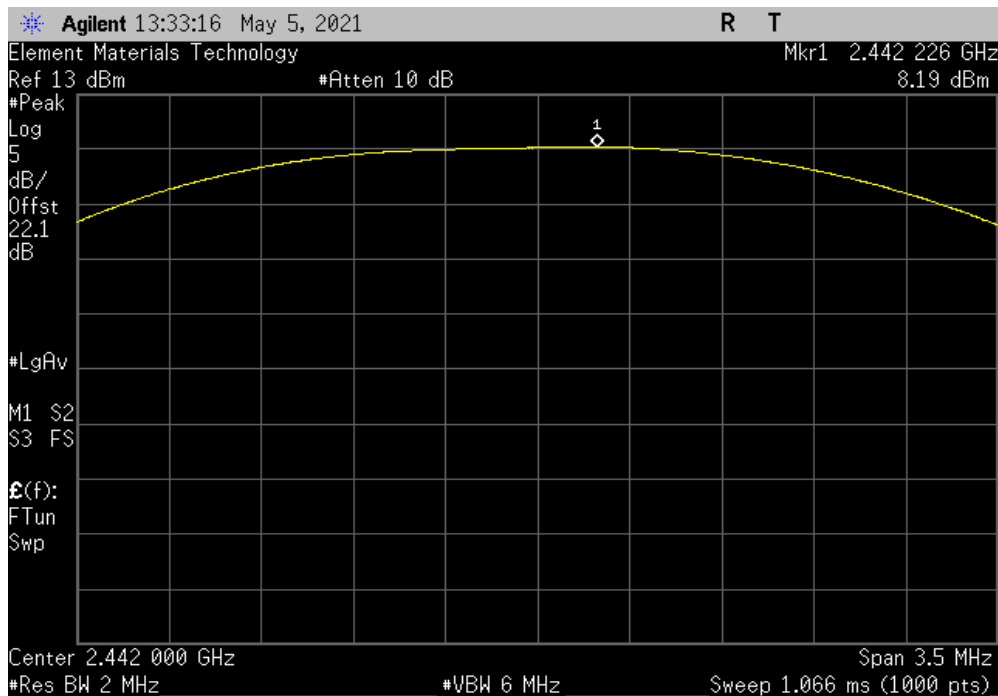


TuTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				7.559	30	Pass



BLE/GFSK 1 Mbps Mid Channel, 2442 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				8.185	30	Pass

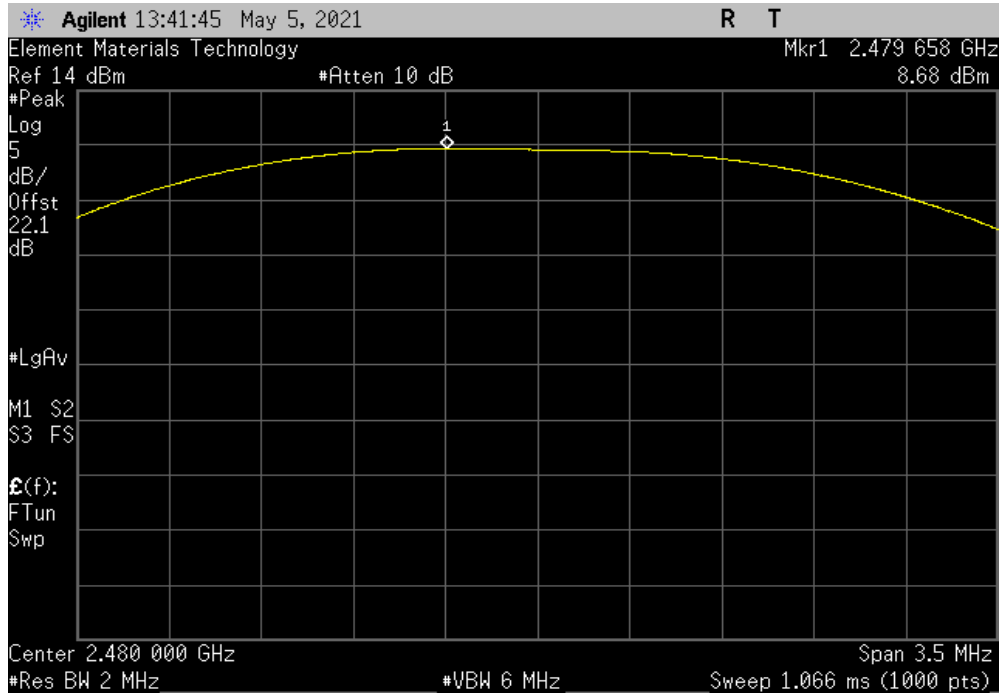


OUTPUT POWER



TbTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				8.68	30	Pass



EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)



element

XMIT 2020.12.30.0

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	Agilent	N5181A	TIG	2020-04-16	2023-04-16
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	2021-03-14	2022-03-14
Attenuator	S.M. Electronics	SA26B-20	AUY	2021-03-14	2022-03-14
Block - DC	Fairview Microwave	SD3379	AMW	2021-03-14	2022-03-14
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFE	2021-04-08	2022-04-08

TEST DESCRIPTION

The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum.

Prior to measuring peak transmit power the DTS bandwidth (B) was measured.

The method found in ANSI C63.10:2013 Section 11.9.1.1 was used because the RBW on the analyzer was greater than the DTS Bandwidth of the radio.

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

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)



TelTx 2019.08.30.0 XMI 2020.12.30.0

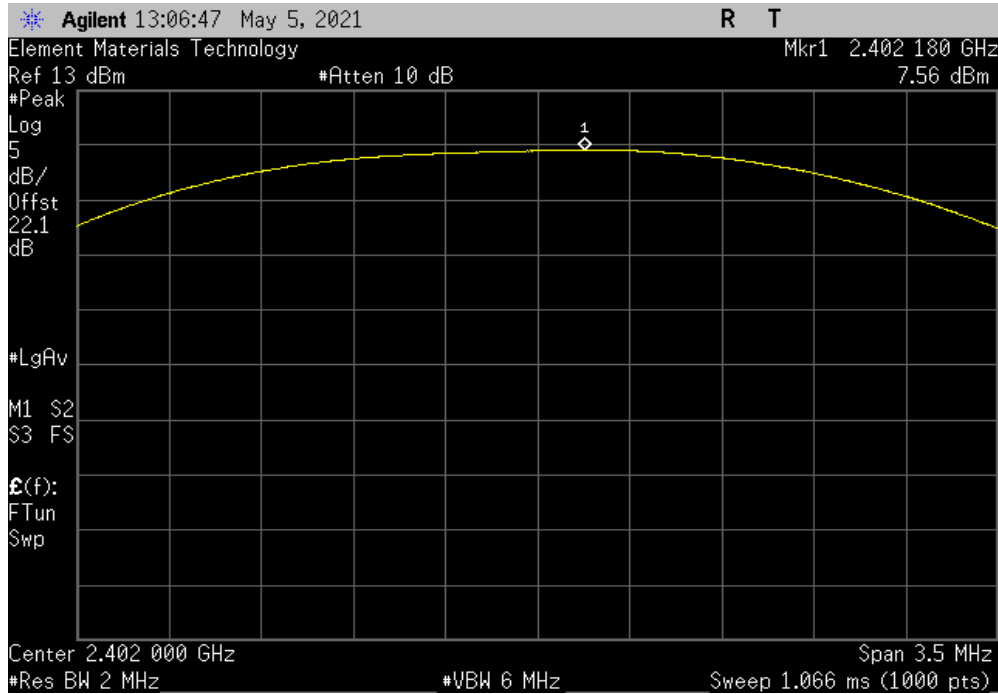
EUT: BKSelect		Work Order: PAYR0018				
Serial Number: 4		Date: 5-May-21				
Customer: PayRange Inc.		Temperature: 23.1 °C				
Attendees: Mike Mitchell		Humidity: 39.8% RH				
Project: None		Barometric Pres.: 1015 mbar				
Tested by: Jeff Alcoke	Power: 110VAC/60Hz	Job Site: EV05				
TEST SPECIFICATIONS						
FCC 15.247:2021			ANSI C63.10:2013			
TEST METHOD						
COMMENTS						
Reference level offset includes: DC Block, 20 dB Attenuator, measurement cable, and the manufacturers SMA patch cable.						
DEVIATIONS FROM TEST STANDARD						
None						
Configuration #	2	Signature				
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
BLE/GFSK 1 Mbps Low Channel, 2402 MHz		7.559	3.7	11.259	36	Pass
BLE/GFSK 1 Mbps Mid Channel, 2442 MHz		8.185	3.7	11.885	36	Pass
BLE/GFSK 1 Mbps High Channel, 2480 MHz		8.680	3.7	12.380	36	Pass

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

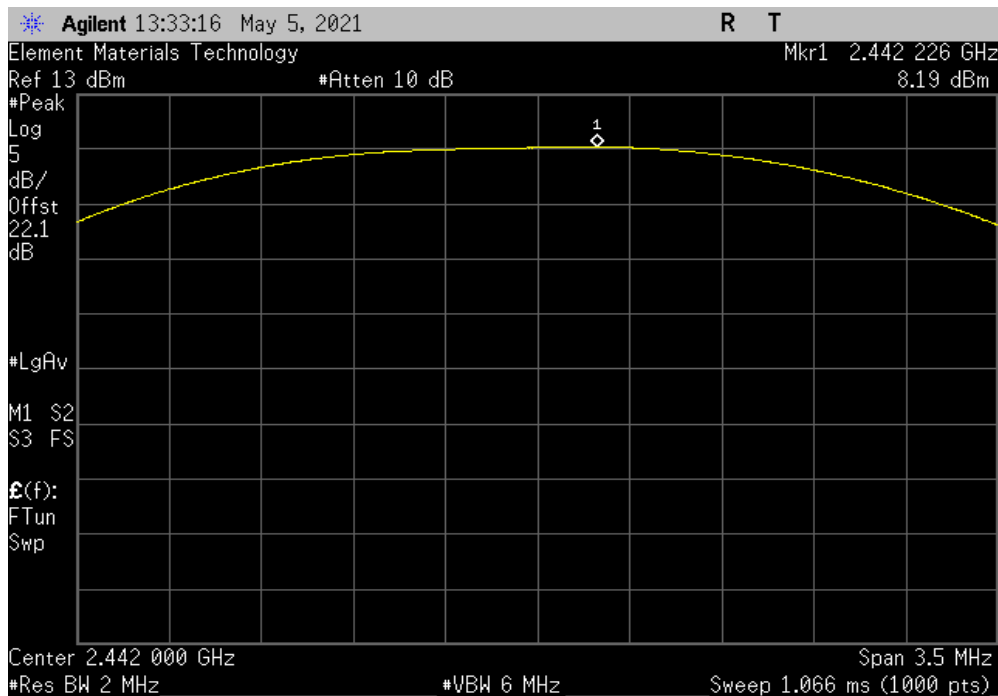


TuTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz						
Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result		
7.559	3.7	11.3	36	Pass		



BLE/GFSK 1 Mbps Mid Channel, 2442 MHz						
Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result		
8.185	3.7	11.9	36	Pass		

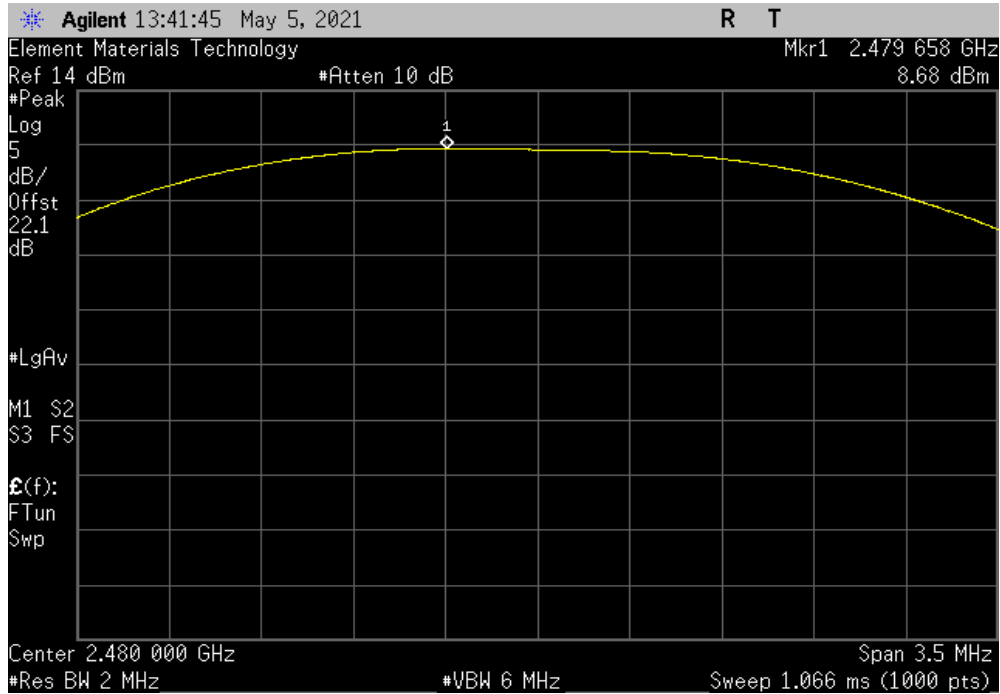


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)



TbTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz					
Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result	
8.68	3.7	12.4	36	Pass	



POWER SPECTRAL DENSITY



XMI 2020.12.30.0

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	Agilent	N5181A	TIG	2020-04-16	2023-04-16
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	2021-03-14	2022-03-14
Attenuator	S.M. Electronics	SA26B-20	AUY	2021-03-14	2022-03-14
Block - DC	Fairview Microwave	SD3379	AMW	2021-03-14	2022-03-14
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFE	2021-04-08	2022-04-08

TEST DESCRIPTION

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

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

POWER SPECTRAL DENSITY



TelTx 2019.08.30.0 XMI 2020.12.30.0

EUT: BKSelect		Work Order: PAYR0018	
Serial Number: 4		Date: 5-May-21	
Customer: PayRange Inc.		Temperature: 23.1 °C	
Attendees: Mike Mitchell		Humidity: 39.9% RH	
Project: None		Barometric Pres.: 1014 mbar	
Tested by: Jeff Alcoke	Power: 110VAC/60Hz	Job Site: EV05	
TEST SPECIFICATIONS			
FCC 15.247:2021		ANSI C63.10:2013	
TEST METHOD			
COMMENTS			
Reference level offset includes: DC Block, 20 dB Attenuator, measurement cable, and the manufacturers SMA patch cable.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature	
		Value	Limit
		dBm/3kHz	< dBm/3kHz
		0.694	8
		1.321	8
		1.724	8
			Results
			Pass
			Pass
			Pass

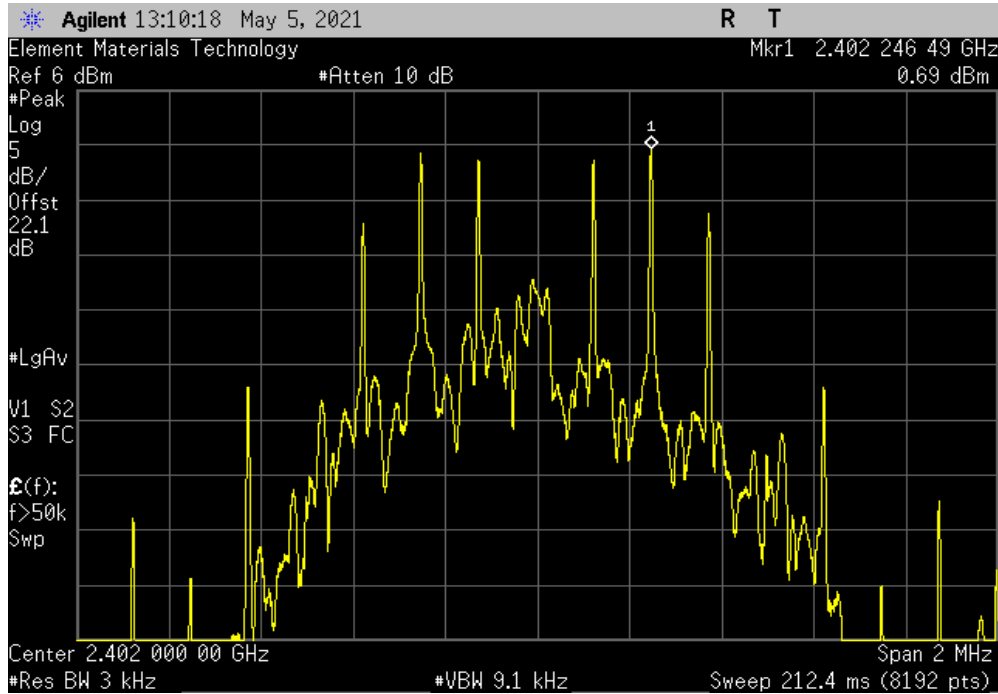
BLE/GFSK 1 Mbps Low Channel, 2402 MHz
 BLE/GFSK 1 Mbps Mid Channel, 2442 MHz
 BLE/GFSK 1 Mbps High Channel, 2480 MHz

POWER SPECTRAL DENSITY

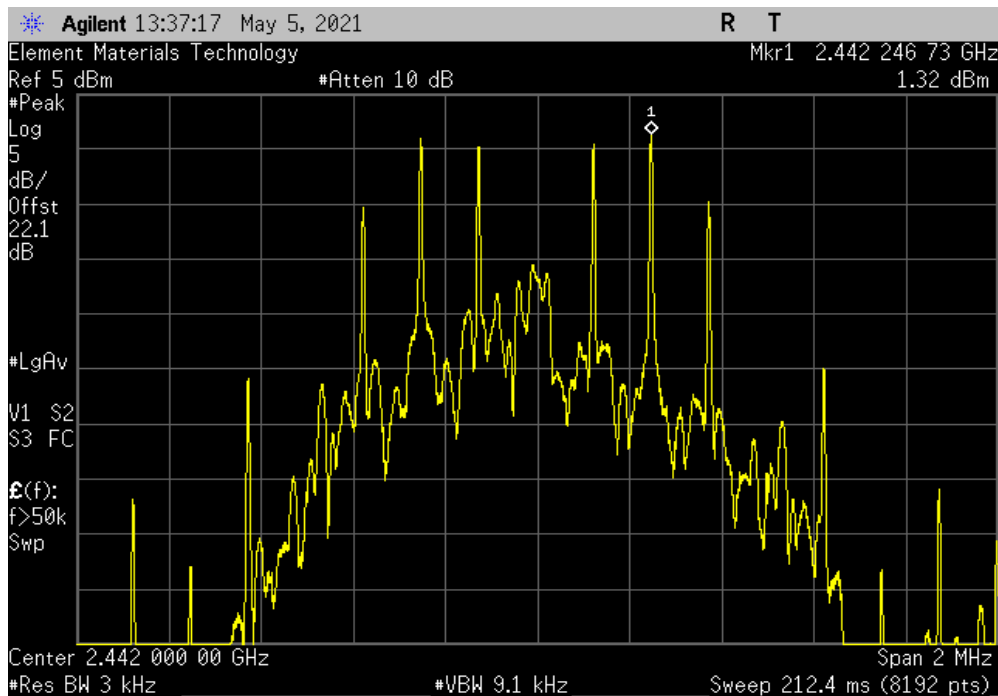


TuTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz			
	Value	Limit	Results
	dBm/3kHz	< dBm/3kHz	
	0.694	8	Pass



BLE/GFSK 1 Mbps Mid Channel, 2442 MHz			
	Value	Limit	Results
	dBm/3kHz	< dBm/3kHz	
	1.321	8	Pass

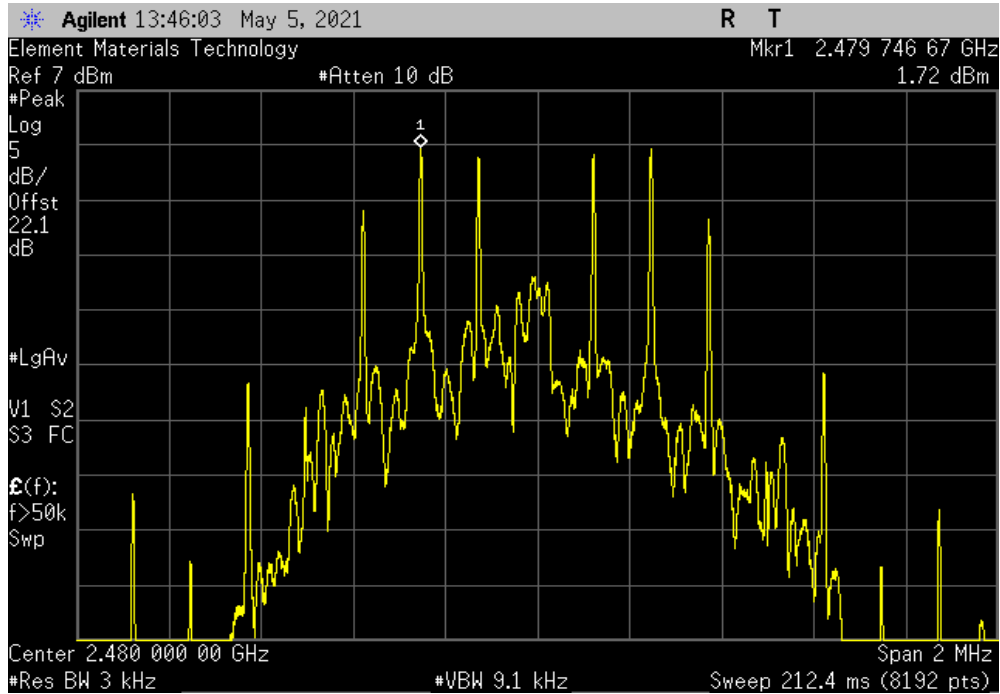


POWER SPECTRAL DENSITY



TbTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz			
	Value	Limit	Results
	dBm/3kHz	< dBm/3kHz	
	1.724	8	Pass



BAND EDGE COMPLIANCE



element

XMIT 2020.12.30.0

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	Agilent	N5181A	TIG	2020-04-16	2023-04-16
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	2021-03-14	2022-03-14
Attenuator	S.M. Electronics	SA26B-20	AUY	2021-03-14	2022-03-14
Block - DC	Fairview Microwave	SD3379	AMW	2021-03-14	2022-03-14
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFE	2021-04-08	2022-04-08

TEST DESCRIPTION

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

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

BAND EDGE COMPLIANCE



TelTx 2019.08.30.0 XMI 2020.12.30.0

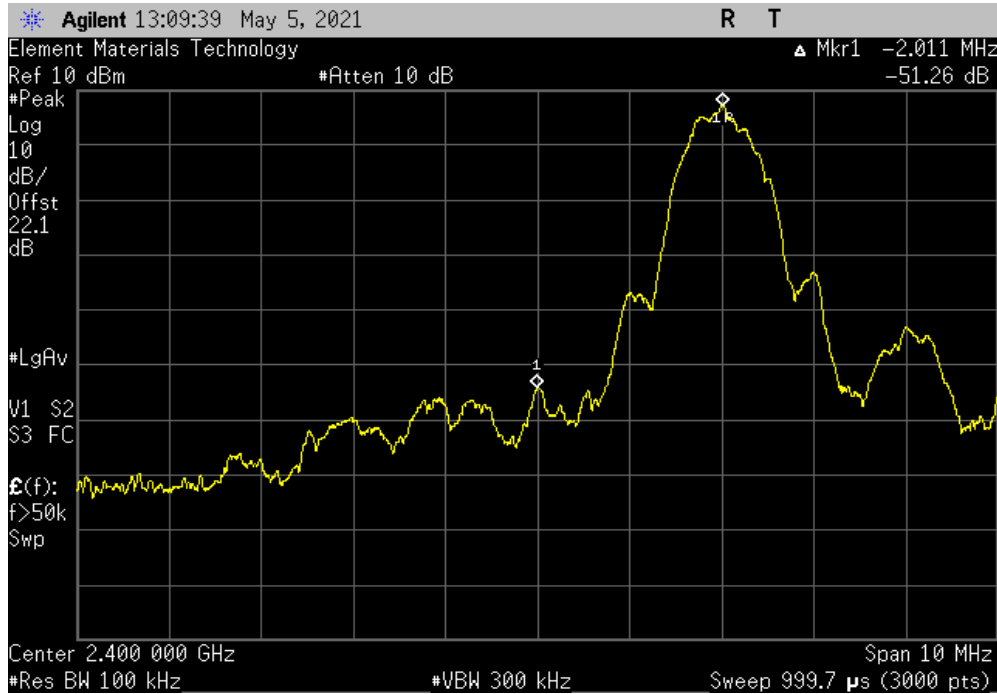
EUT: BKSelect		Work Order: PAYR0018	
Serial Number: 4		Date: 5-May-21	
Customer: PayRange Inc.		Temperature: 23 °C	
Attendees: Mike Mitchell		Humidity: 39.8% RH	
Project: None		Barometric Pres.: 1015 mbar	
Tested by: Jeff Alcoke	Power: 110VAC/60Hz	Job Site: EV05	
TEST SPECIFICATIONS			
FCC 15.247:2021		ANSI C63.10:2013	
TEST METHOD			
COMMENTS			
Reference level offset includes: DC Block, 20 dB Attenuator, measurement cable, and the manufacturers SMA patch cable.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature	
		Value (dBc)	Limit ≤ (dBc) Result
BLE/GFSK 1 Mbps Low Channel, 2402 MHz		-51.26	-20 Pass
BLE/GFSK 1 Mbps High Channel, 2480 MHz		-53.6	-20 Pass

BAND EDGE COMPLIANCE

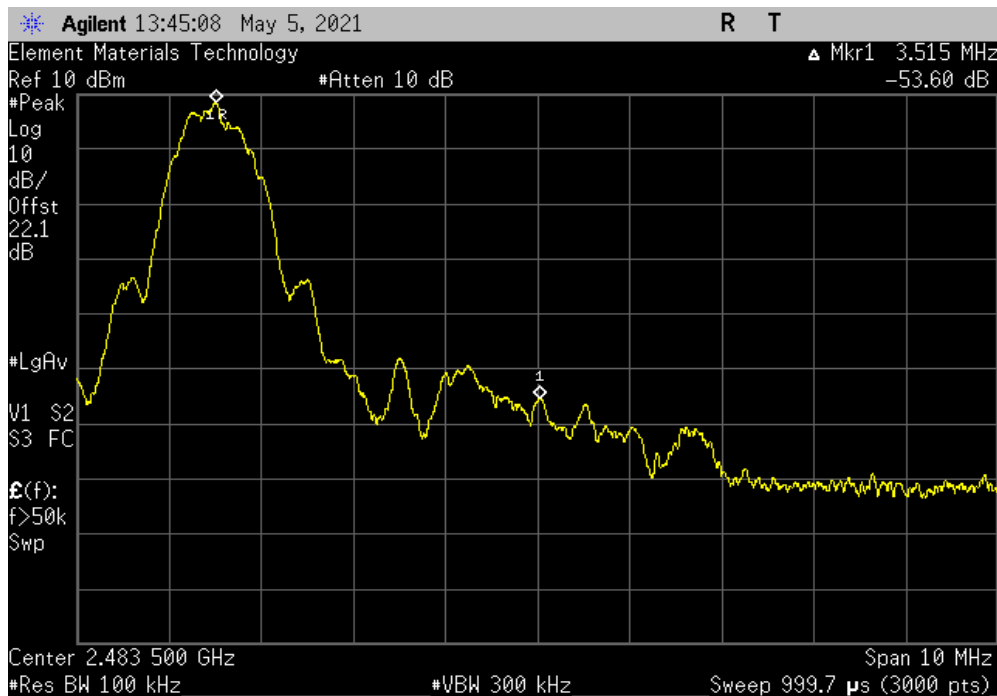


TuTx 2019.08.30.0 XMt 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz				Value	Limit	Result
				(dBc)	≤ (dBc)	
				-51.26	-20	Pass



BLE/GFSK 1 Mbps High Channel, 2480 MHz				Value	Limit	Result
				(dBc)	≤ (dBc)	
				-53.6	-20	Pass



SPURIOUS CONDUCTED EMISSIONS



element

XMit 2020.12.30.0

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	Agilent	N5181A	TIG	2020-04-16	2023-04-16
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	2021-03-14	2022-03-14
Attenuator	S.M. Electronics	SA26B-20	AUY	2021-03-14	2022-03-14
Block - DC	Fairview Microwave	SD3379	AMW	2021-03-14	2022-03-14
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFE	2021-04-08	2022-04-08

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. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.

SPURIOUS CONDUCTED EMISSIONS



Tel: 2019.08.30.0 XM: 2020.12.30.0

EUT: BKSelect		Work Order: PAYR0018	
Serial Number: 4		Date: 5-May-21	
Customer: PayRange Inc.		Temperature: 23.1 °C	
Attendees: Mike Mitchell		Humidity: 40% RH	
Project: None		Barometric Pres.: 1014 mbar	
Tested by: Jeff Alcock	Power: 110VAC/60Hz	Job Site: EV05	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2021		ANSI C63.10:2013	
COMMENTS			
Reference level offset includes: DC Block, 20 dB Attenuator, measurement cable, and the manufacturers SMA patch cable.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature	

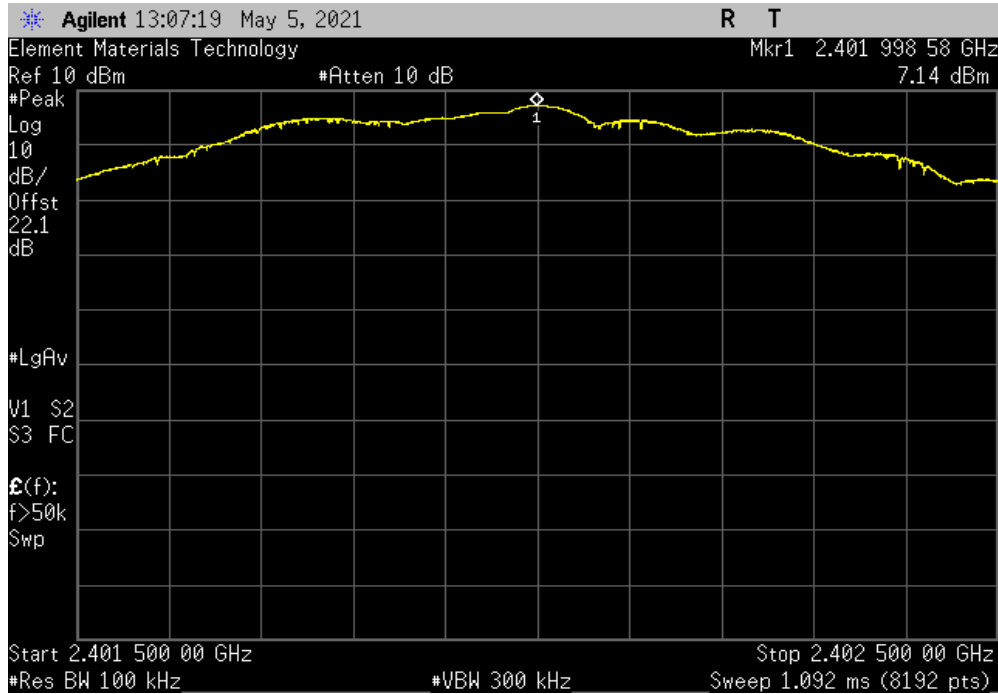
	Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK 1 Mbps Low Channel, 2402 MHz	Fundamental	2402	N/A	N/A	N/A
BLE/GFSK 1 Mbps Low Channel, 2402 MHz	30 MHz - 12.5 GHz	4804.3	-45.46	-20	Pass
BLE/GFSK 1 Mbps Low Channel, 2402 MHz	12.5 GHz - 25 GHz	23480	-59.68	-20	Pass
BLE/GFSK 1 Mbps Mid Channel, 2442 MHz	Fundamental	2442	N/A	N/A	N/A
BLE/GFSK 1 Mbps Mid Channel, 2442 MHz	30 MHz - 12.5 GHz	4883.4	-46.85	-20	Pass
BLE/GFSK 1 Mbps Mid Channel, 2442 MHz	12.5 GHz - 25 GHz	24890.1	-58.27	-20	Pass
BLE/GFSK 1 Mbps High Channel, 2480 MHz	Fundamental	2480	N/A	N/A	N/A
BLE/GFSK 1 Mbps High Channel, 2480 MHz	30 MHz - 12.5 GHz	4959.5	-48.77	-20	Pass
BLE/GFSK 1 Mbps High Channel, 2480 MHz	12.5 GHz - 25 GHz	24000.4	-61.26	-20	Pass

SPURIOUS CONDUCTED EMISSIONS

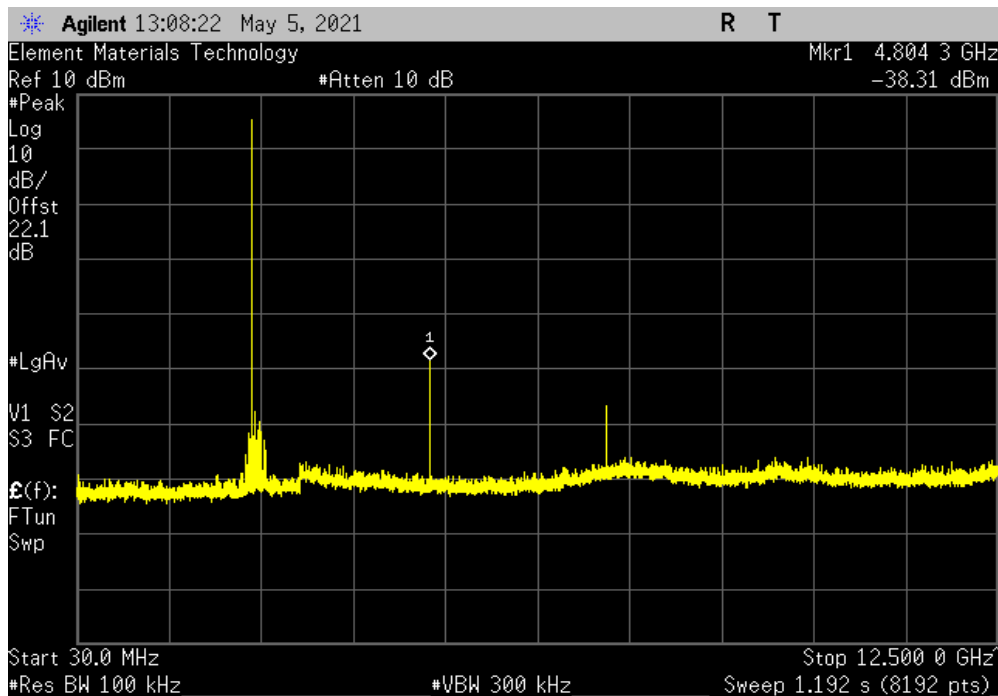


TuTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2402	N/A	N/A	N/A	



BLE/GFSK 1 Mbps Low Channel, 2402 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	4804.3	-45.46	-20	Pass	

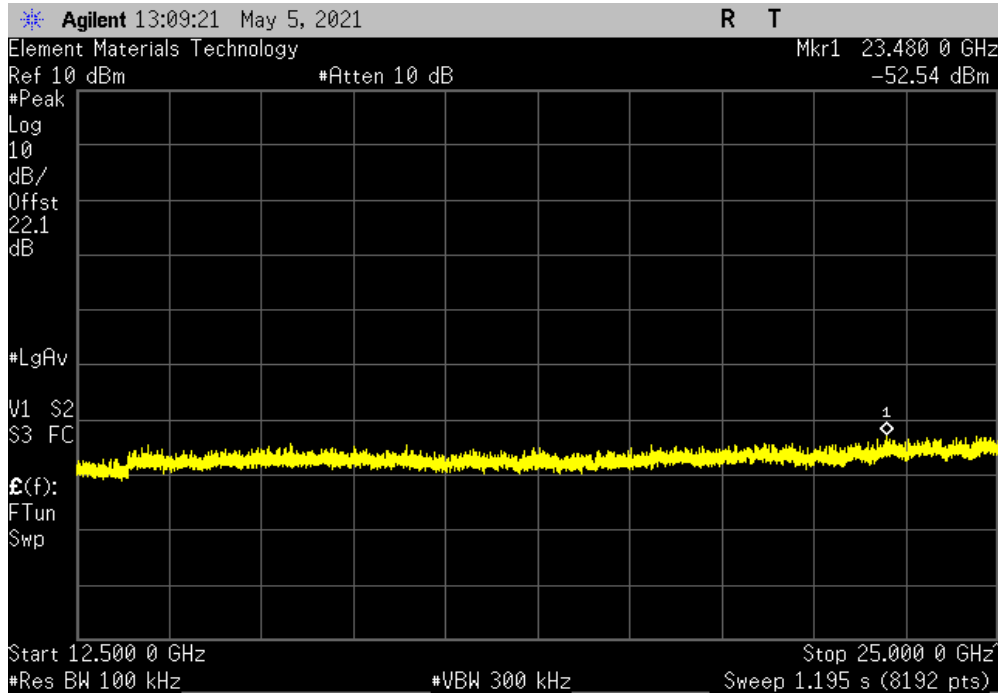


SPURIOUS CONDUCTED EMISSIONS

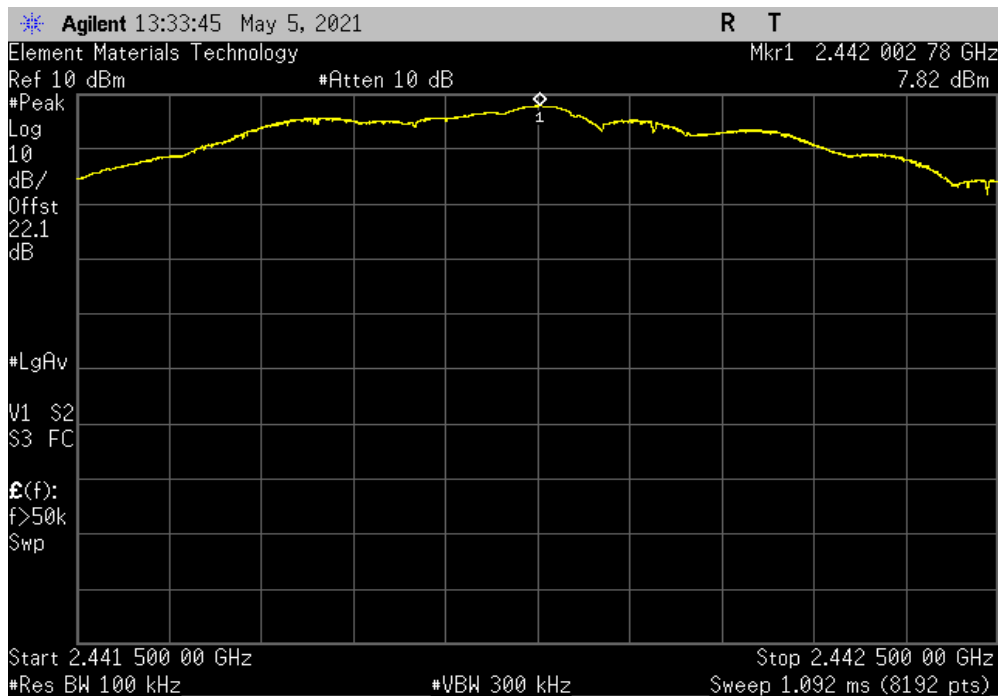


TuTx 2019.08.30.0 XMi 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	23480	-59.68	-20	Pass	



BLE/GFSK 1 Mbps Mid Channel, 2442 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2442	N/A	N/A	N/A	

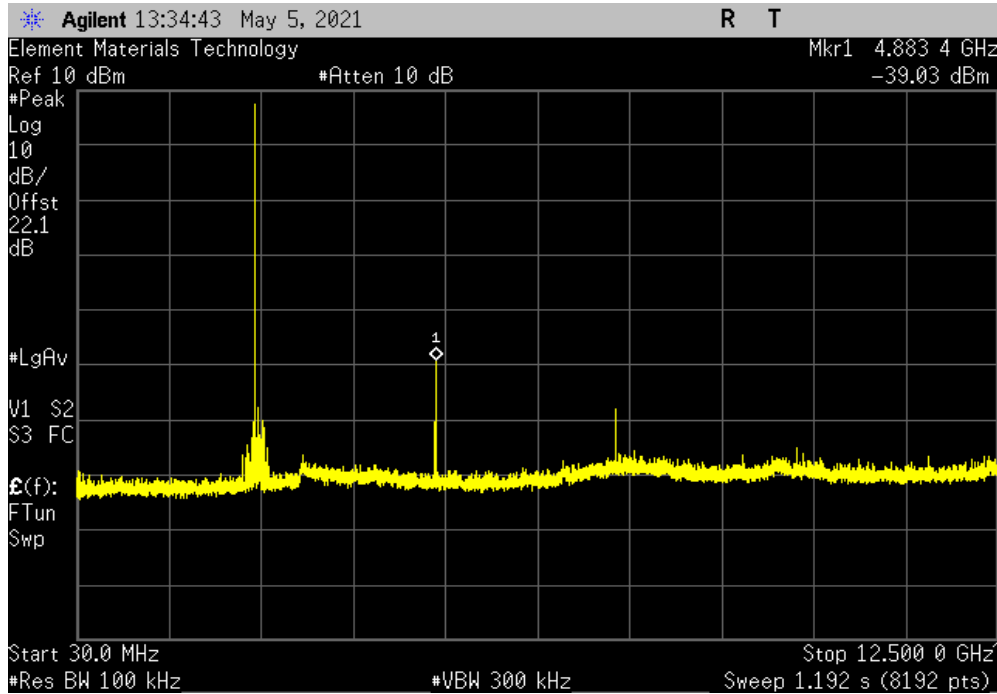


SPURIOUS CONDUCTED EMISSIONS

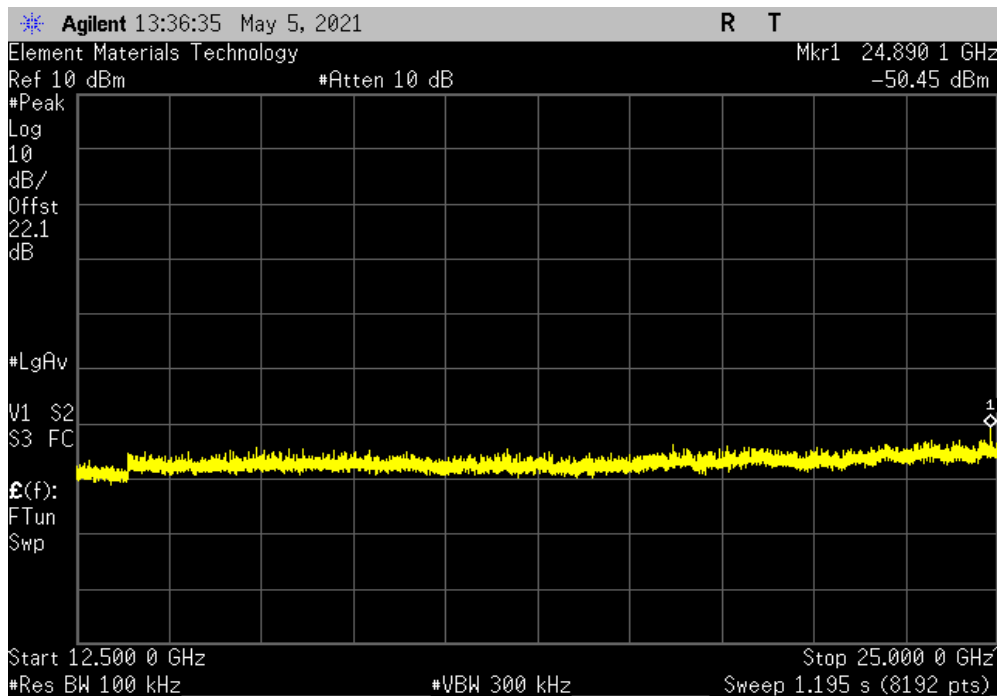


TuTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps Mid Channel, 2442 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	4883.4	-46.85	-20	Pass



BLE/GFSK 1 Mbps Mid Channel, 2442 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz	24890.1	-58.27	-20	Pass

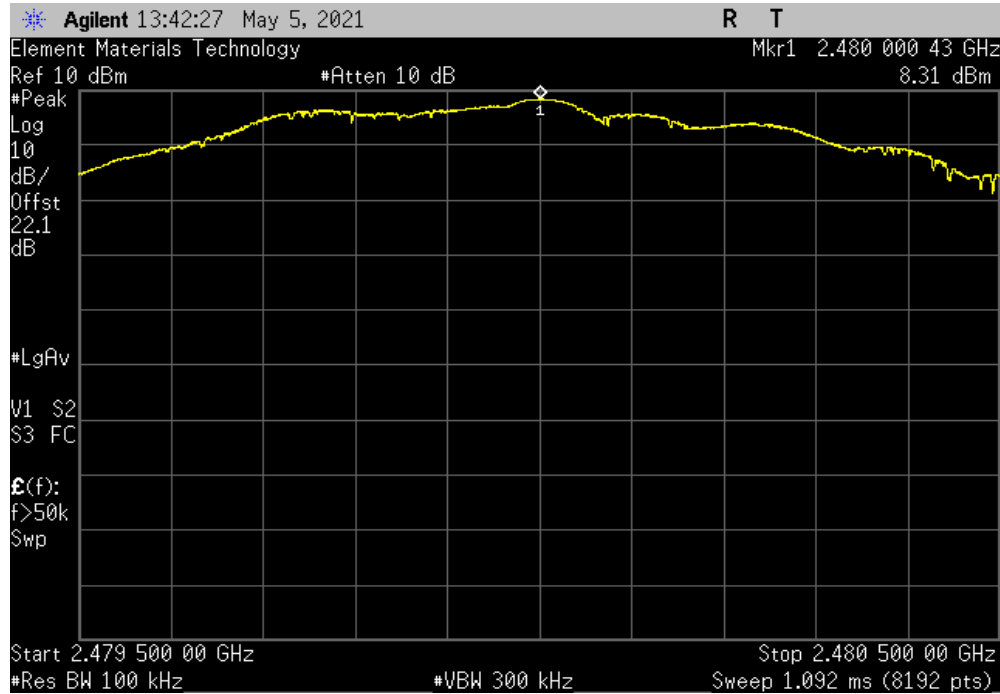


SPURIOUS CONDUCTED EMISSIONS

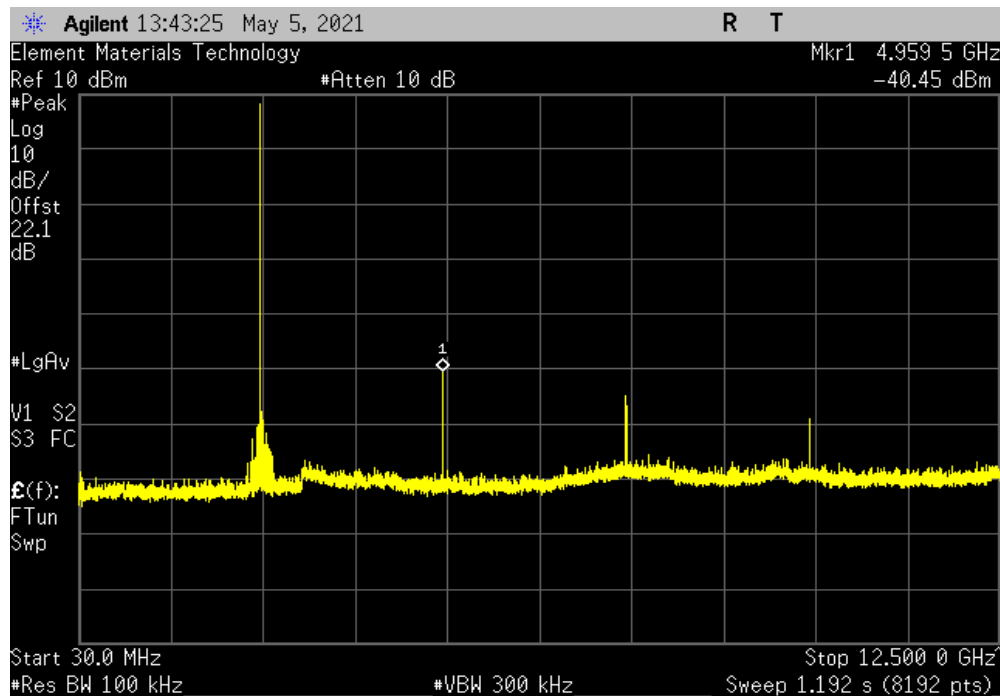


TuTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2480	N/A	N/A	N/A	



BLE/GFSK 1 Mbps High Channel, 2480 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	4959.5	-48.77	-20	Pass	

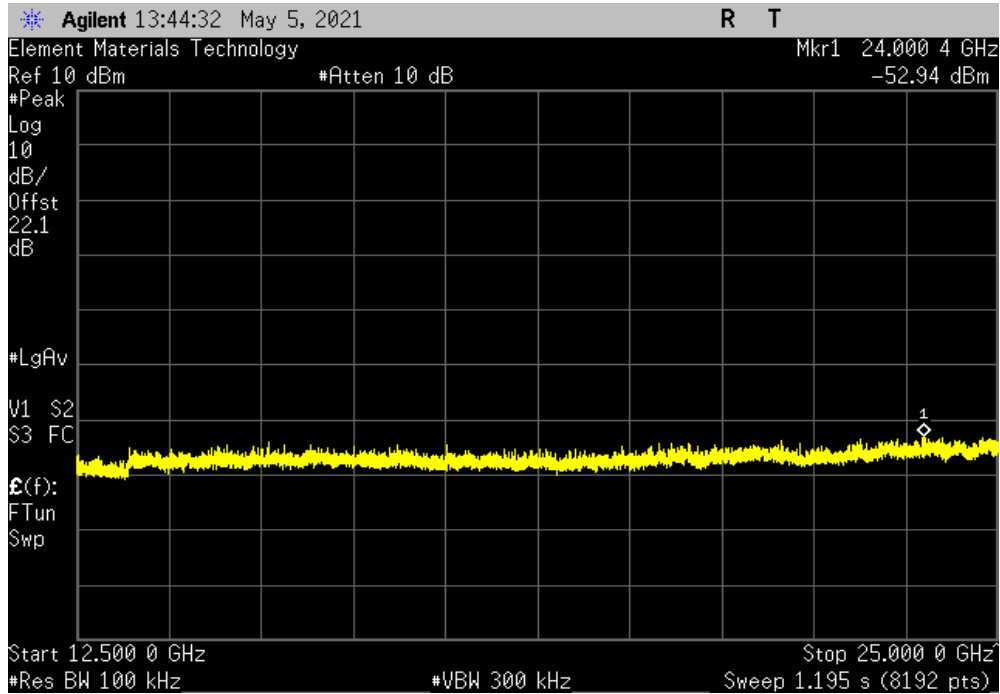


SPURIOUS CONDUCTED EMISSIONS



TbTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz	24000.4	-61.26	-20	Pass



SPURIOUS RADIATED EMISSIONS



TEST DESCRIPTION

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

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

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

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

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

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

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

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

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2020-06-25	2021-06-25
Antenna - Biconilog	EMCO	3141	AXG	2019-07-23	2021-07-23
Antenna - Double Ridge	EMCO	3115	AHC	2020-07-01	2022-07-01
Antenna - Standard Gain	ETS Lindgren	3160-07	AHU	NCR	NCR
Antenna - Standard Gain	ETS Lindgren	3160-08	AHV	NCR	NCR
Antenna - Standard Gain	ETS Lindgren	3160-09	AIV	NCR	NCR
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AOL	2020-11-17	2021-11-17
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAG	2020-11-17	2021-11-17
Amplifier - Pre-Amplifier	L-3 Narda-MITEQ	AMF-6F-08001200-30-10P	PAO	2020-11-18	2021-11-18
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	2020-11-18	2021-11-18
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AVU	2020-07-25	2021-07-25
Cable	N/A	Bilog Cables	EVA	2020-11-17	2021-11-17
Cable	N/A	Double Ridge Horn Cables	EVB	2020-11-17	2021-11-17
Cable	None	Standard Gain Horns Cable	EVF	2020-11-18	2021-11-18

SPURIOUS RADIATED EMISSIONS



Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	EVY	2020-07-25	2021-07-25
Attenuator	Coaxicom	3910-20	AXZ	2021-02-15	2022-02-15
Filter - Low Pass	Micro-Tronics	LPM50004	LFD	2021-02-15	2022-02-15

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	5.2 dB	-5.2 dB

FREQUENCY RANGE INVESTIGATED

30 MHz TO 26.5 GHz

POWER INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

PAYR0018-1

MODES INVESTIGATED

Transmitting, BLE, GFSK 1Mbps, Low Ch = 2402 MHz, Mid Ch = 2442 MHz, High Ch = 2480 MHz

SPURIOUS RADIATED EMISSIONS



EUT:	BKSelect	Work Order:	PAYR0018
Serial Number:	5	Date:	2021-05-06
Customer:	PayRange Inc.	Temperature:	22.6°C
Attendees:	Mike Mitchell	Relative Humidity:	40.9%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Jeff Alcoke	Job Site:	EV01
Power:	110VAC/60Hz	Configuration:	PAYR0018-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2021	ANSI C63.10:2013

TEST PARAMETERS

Run #:	16	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)
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COMMENTS

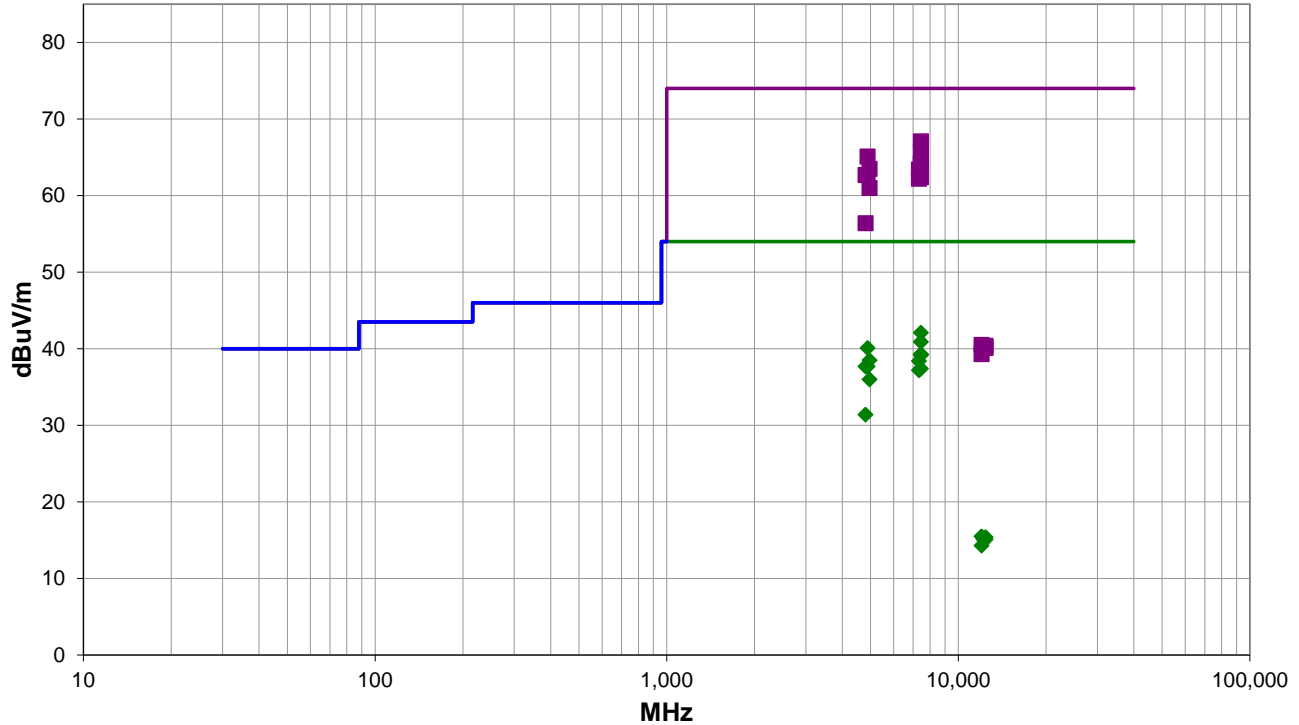
The EUT operates at a protocol limited duty cycle (DC) of 5.64%. As per FCC KDB 558074, FAQ Answer 3a, The average emissions were derived by subtracting $20 \cdot \log(DC) = 20 \cdot \log(0.0564) = -24.8$ dB from the peak measurements.

EUT OPERATING MODES

Transmitting, BLE, GFSK 1Mbps, Low Ch = 2402 MHz, Mid Ch = 2442 MHz, High Ch = 2480 MHz

DEVIATIONS FROM TEST STANDARD

None



Run #: 16

■ PK ◆ AV ● QP

SPURIOUS RADIATED EMISSIONS



RESULTS - Run #16

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7439.283	54.9	12.2	2.1	8.0	0.0	0.0	Horz	PK	0.0	67.1	74.0	-6.9	High Ch, EUT Horz
7439.208	53.7	12.2	1.5	12.0	0.0	0.0	Vert	PK	0.0	65.9	74.0	-8.1	High Ch, EUT Vert
4884.542	59.1	6.0	1.1	333.0	0.0	0.0	Horz	PK	0.0	65.1	74.0	-8.9	Mid Ch, EUT Horz
7439.217	52.1	12.2	1.5	197.0	0.0	0.0	Vert	PK	0.0	64.3	74.0	-9.7	High Ch, EUT on Side
7439.250	52.0	12.2	1.5	63.0	0.0	0.0	Horz	PK	0.0	64.2	74.0	-9.8	High Ch, EUT on Side
7439.300	52.0	12.2	2.0	225.0	0.0	0.0	Horz	PK	0.0	64.2	74.0	-9.8	High Ch, EUT Vert
4959.508	57.6	5.9	2.6	348.0	0.0	0.0	Horz	PK	0.0	63.5	74.0	-10.5	High Ch, EUT Horz
7326.650	51.7	11.7	1.6	183.0	0.0	0.0	Horz	PK	0.0	63.4	74.0	-10.6	Mid Ch, EUT Horz
4804.500	57.5	5.2	1.6	227.0	0.0	0.0	Horz	PK	0.0	62.7	74.0	-11.3	Low Ch, EUT Horz
4884.400	56.7	6.0	1.2	292.0	0.0	0.0	Vert	PK	0.0	62.7	74.0	-11.3	Mid Ch, EUT Vert
7439.183	50.2	12.2	1.5	304.0	0.0	0.0	Vert	PK	0.0	62.4	74.0	-11.6	High Ch, EUT Horz
7326.808	50.5	11.7	1.5	6.0	0.0	0.0	Vert	PK	0.0	62.2	74.0	-11.8	Mid Ch, EUT Vert
7439.283	54.9	12.2	2.1	8.0	-24.8	0.0	Horz	AV	0.0	42.3	54.0	-11.7	High Ch, EUT Horz
4959.475	55.1	5.9	1.3	20.0	0.0	0.0	Vert	PK	0.0	61.0	74.0	-13.0	High Ch, EUT Vert
7439.208	53.7	12.2	1.5	12.0	-24.8	0.0	Vert	AV	0.0	41.1	54.0	-12.9	High Ch, EUT Vert
4884.542	59.1	6.0	1.1	333.0	-24.8	0.0	Horz	AV	0.0	40.3	54.0	-13.7	Mid Ch, EUT Horz
7439.217	52.1	12.2	1.5	197.0	-24.8	0.0	Vert	AV	0.0	39.5	54.0	-14.5	High Ch, EUT on Side
7439.250	52.0	12.2	1.5	63.0	-24.8	0.0	Horz	AV	0.0	39.4	54.0	-14.6	High Ch, EUT on Side
7439.300	52.0	12.2	2.0	225.0	-24.8	0.0	Horz	AV	0.0	39.4	54.0	-14.6	High Ch, EUT Vert
4959.508	57.6	5.9	2.6	348.0	-24.8	0.0	Horz	AV	0.0	38.7	54.0	-15.3	High Ch, EUT Horz
7326.650	51.7	11.7	1.6	183.0	-24.8	0.0	Horz	AV	0.0	38.6	54.0	-15.4	Mid Ch, EUT Horz
4804.500	57.5	5.2	1.6	227.0	-24.8	0.0	Horz	AV	0.0	37.9	54.0	-16.1	Low Ch, EUT Horz
4884.400	56.7	6.0	1.2	292.0	-24.8	0.0	Vert	AV	0.0	37.9	54.0	-16.1	Mid Ch, EUT Vert
7439.183	50.2	12.2	1.5	304.0	-24.8	0.0	Vert	AV	0.0	37.6	54.0	-16.4	High Ch, EUT Horz
7326.808	50.5	11.7	1.5	6.0	-24.8	0.0	Vert	AV	0.0	37.4	54.0	-16.6	Mid Ch, EUT Vert
4804.350	51.2	5.2	1.5	217.0	0.0	0.0	Vert	PK	0.0	56.4	74.0	-17.6	Low Ch, EUT Vert
4959.475	55.1	5.9	1.3	20.0	-24.8	0.0	Vert	AV	0.0	36.2	54.0	-17.8	High Ch, EUT Vert
4804.350	51.2	5.2	1.5	217.0	-24.8	0.0	Vert	AV	0.0	31.6	54.0	-22.4	Low Ch, EUT Vert
12008.080	39.4	1.1	1.0	36.0	0.0	0.0	Vert	PK	0.0	40.5	74.0	-33.5	Low Ch, EUT Vert
12398.650	38.9	1.5	1.5	168.0	0.0	0.0	Vert	PK	0.0	40.4	74.0	-33.6	High Ch, EUT Vert
12210.940	39.3	1.0	1.2	242.0	0.0	0.0	Horz	PK	0.0	40.3	74.0	-33.7	Mid Ch, EUT Horz
12398.380	38.6	1.5	1.5	276.0	0.0	0.0	Horz	PK	0.0	40.1	74.0	-33.9	High Ch, EUT Horz
12209.300	39.2	0.9	1.2	157.0	0.0	0.0	Vert	PK	0.0	40.1	74.0	-33.9	Mid Ch, EUT Vert
12011.730	38.2	1.1	1.5	72.0	0.0	0.0	Horz	PK	0.0	39.3	74.0	-34.7	Low Ch, EUT Horz
12008.080	39.4	1.1	1.0	36.0	-24.8	0.0	Vert	AV	0.0	15.7	54.0	-38.3	Low Ch, EUT Vert
12398.650	38.9	1.5	1.5	168.0	-24.8	0.0	Vert	AV	0.0	15.6	54.0	-38.4	High Ch, EUT Vert
12210.940	39.3	1.0	1.2	242.0	-24.8	0.0	Horz	AV	0.0	15.5	54.0	-38.5	Mid Ch, EUT Horz
12398.380	38.6	1.5	1.5	276.0	-24.8	0.0	Horz	AV	0.0	15.3	54.0	-38.7	High Ch, EUT Horz
12209.300	39.2	0.9	1.2	157.0	-24.8	0.0	Vert	AV	0.0	15.3	54.0	-38.7	Mid Ch, EUT Vert
12011.730	38.2	1.1	1.5	72.0	-24.8	0.0	Horz	AV	0.0	14.5	54.0	-39.5	Low Ch, EUT Horz

SPURIOUS RADIATED EMISSIONS



CONCLUSION

Pass

A handwritten signature in black ink, appearing to be 'J. F. [unclear]', is written over the 'Tested By' text.

Tested By

SPURIOUS RADIATED EMISSIONS



EUT:	BKSelect	Work Order:	PAYR0018
Serial Number:	5	Date:	2021-05-06
Customer:	PayRange Inc.	Temperature:	22.6°C
Attendees:	Mike Mitchell	Relative Humidity:	40.9%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Jeff Alcoke	Job Site:	EV01
Power:	110VAC/60Hz	Configuration:	PAYR0018-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2021	ANSI C63.10:2013

TEST PARAMETERS

Run #:	18	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)
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COMMENTS

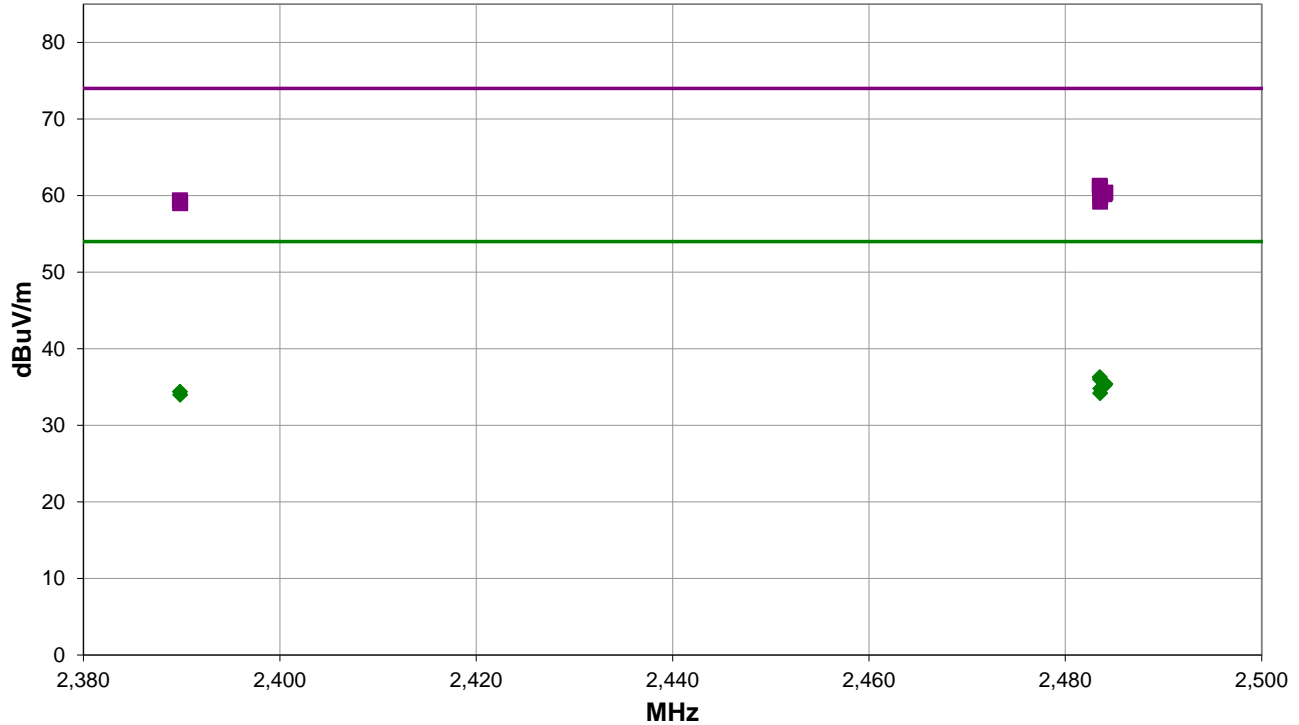
The EUT operates at a protocol limited duty cycle (DC) of 5.64%. As per FCC KDB 558074, FAQ Answer 3a, The average emissions were derived by subtracting $20 \cdot \log(DC) = 20 \cdot \log(0.0564) = -24.8$ dB from the peak measurements.

EUT OPERATING MODES

Transmitting, BLE, GFSK 1Mbps, Low Ch = 2402 MHz, Mid Ch = 2442 MHz, High Ch = 2480 MHz

DEVIATIONS FROM TEST STANDARD

None



Run #: 18

■ PK ◆ AV ● QP

SPURIOUS RADIATED EMISSIONS

RESULTS - Run #18

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2483.510	44.9	-3.6	1.0	334.0	0.0	20.0	Vert	PK	0.0	61.3	74.0	-12.7	High Ch, EUT on Side
2483.533	44.6	-3.6	1.8	32.0	0.0	20.0	Vert	PK	0.0	61.0	74.0	-13.0	High Ch, EUT Vert
2484.080	44.0	-3.6	1.1	40.0	0.0	20.0	Horz	PK	0.0	60.4	74.0	-13.6	High Ch, EUT Vert
2483.983	43.8	-3.6	1.5	324.0	0.0	20.0	Horz	PK	0.0	60.2	74.0	-13.8	High Ch, EUT Horz
2483.560	43.4	-3.6	1.5	152.0	0.0	20.0	Horz	PK	0.0	59.8	74.0	-14.2	High Ch, EUT on Side
2389.823	42.9	-3.5	1.5	139.0	0.0	20.0	Vert	PK	0.0	59.4	74.0	-14.6	Low Ch, EUT on Side
2483.543	42.8	-3.6	1.5	34.0	0.0	20.0	Vert	PK	0.0	59.2	74.0	-14.8	High Ch, EUT Horz
2389.843	42.5	-3.5	1.5	232.0	0.0	20.0	Horz	PK	0.0	59.0	74.0	-15.0	Low Ch, EUT Vert
2483.510	44.9	-3.6	1.0	334.0	-24.8	20.0	Vert	AV	0.0	36.5	54.0	-17.5	High Ch, EUT on Side
2483.533	44.6	-3.6	1.8	32.0	-24.8	20.0	Vert	AV	0.0	36.2	54.0	-17.8	High Ch, EUT Vert
2484.080	44.0	-3.6	1.1	40.0	-24.8	20.0	Horz	AV	0.0	35.6	54.0	-18.4	High Ch, EUT Vert
2483.983	43.8	-3.6	1.5	324.0	-24.8	20.0	Horz	AV	0.0	35.4	54.0	-18.6	High Ch, EUT Horz
2483.560	43.4	-3.6	1.5	152.0	-24.8	20.0	Horz	AV	0.0	35.0	54.0	-19.0	High Ch, EUT on Side
2389.823	42.9	-3.5	1.5	139.0	-24.8	20.0	Vert	AV	0.0	34.6	54.0	-19.4	Low Ch, EUT on Side
2483.543	42.8	-3.6	1.5	34.0	-24.8	20.0	Vert	AV	0.0	34.4	54.0	-19.6	High Ch, EUT Horz
2389.843	42.5	-3.5	1.5	232.0	-24.8	20.0	Horz	AV	0.0	34.2	54.0	-19.8	Low Ch, EUT Vert

CONCLUSION

Pass



Tested By

End of Test Report