



element

Hinge Health

Enso 2

FCC 15.247:2021

Bluetooth Low Energy (DTS) Radio

Report: HING0001 Rev. 1, Issue Date: March 22, 2022



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CERTIFICATE OF TEST

Last Date of Test: September 30, 2021
Hinge Health
EUT: Enso 2

Radio Equipment Testing

Standards

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

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	
11.6	Duty Cycle	Yes	N/A	
11.8.2	DTS 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
01	Updated block diagrams have been added to the report.	2022-03-22	7-9, 17-19, 57-66
	Updated the test description for the DTS Bandwidth, and updated the title to DTS Bandwidth. Changed Occupied Bandwidth to DTS Bandwidth in the Modifications, and Certificate of Test.	2022-03-22	2, 10, 15, 22-26

ACCREDITATIONS AND AUTHORIZATIONS



United States

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

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

Canada

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

European Union

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

United Kingdom

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

Australia/New Zealand

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

Korea

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

Japan

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

Taiwan

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

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

Singapore

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

Israel

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

Hong Kong

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

Vietnam

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

SCOPE

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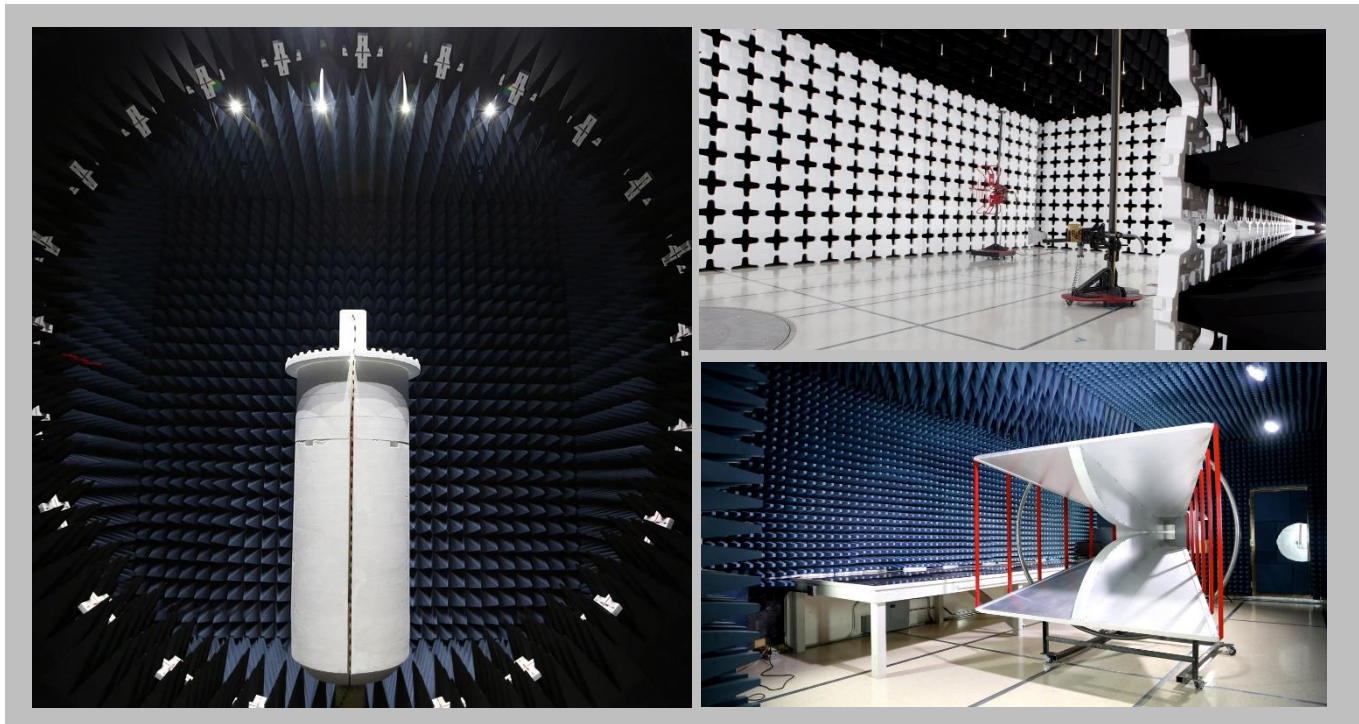
[Texas](#)

[Washington](#)

FACILITIES



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



MEASUREMENT UNCERTAINTY



Measurement Uncertainty

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

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

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

Test	+ MU	- MU
Frequency Accuracy	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	1.2 dB	-1.2 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	3.2 dB	-3.2 dB

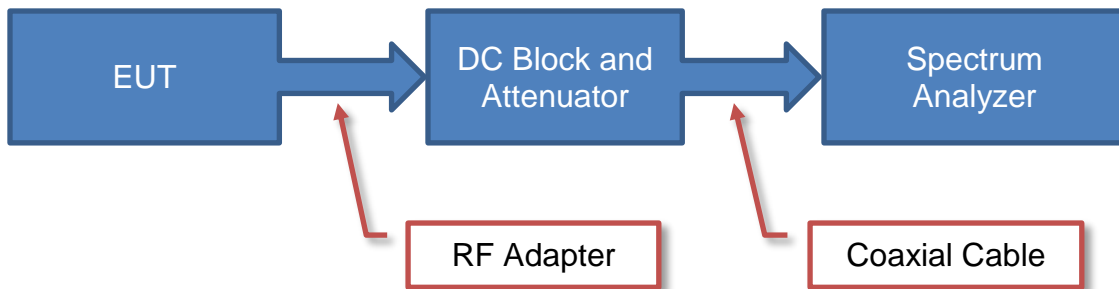
TEST SETUP BLOCK DIAGRAMS

Measurement Bandwidths

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

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

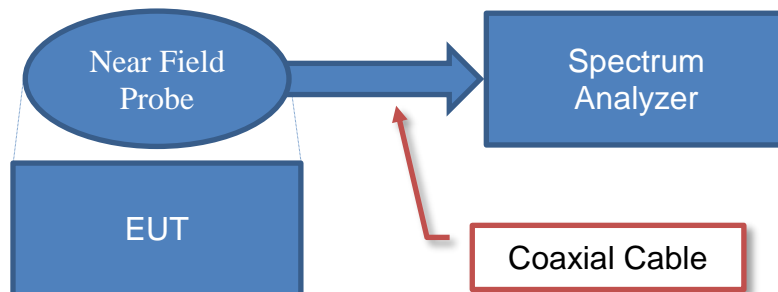
Antenna Port Conducted Measurements



Sample Calculation (logarithmic units)

$$\begin{array}{r}
 \text{Measured Value} \\
 71.2
 \end{array}
 =
 \begin{array}{r}
 \text{Measured Level} \\
 42.6
 \end{array}
 +
 \begin{array}{r}
 \text{Reference Level Offset} \\
 28.6
 \end{array}$$

Near Field Test Fixture Measurements

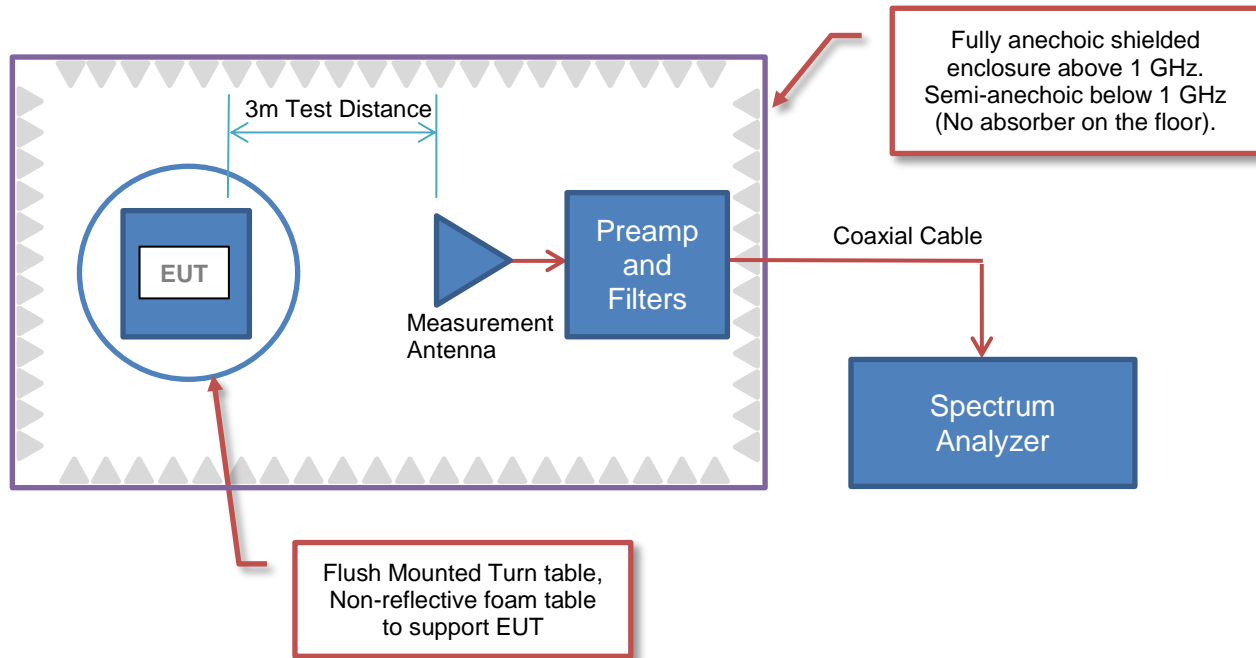


Sample Calculation (logarithmic units)

$$\begin{array}{r}
 \text{Measured Value} \\
 71.2
 \end{array}
 =
 \begin{array}{r}
 \text{Measured Level} \\
 42.6
 \end{array}
 +
 \begin{array}{r}
 \text{Reference Level Offset} \\
 28.6
 \end{array}$$

TEST SETUP BLOCK DIAGRAMS

Emissions Measurements



Sample Calculation (logarithmic units)

Radiated Emissions:

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

42.6 + 28.6 + 3.1 - 40.8 + 0.0 + 0.0 = 33.5

Conducted Emissions:

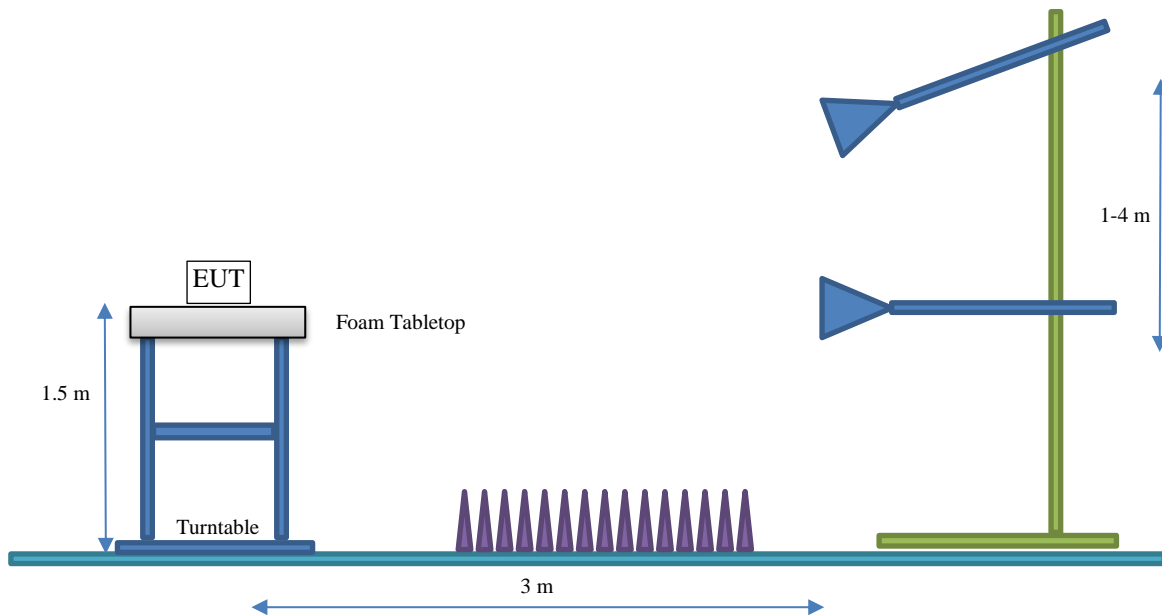
Measured Level (Amplitude)	Factor		External Attenuation	Adjusted Level
	Transducer Factor	Cable Factor		
26.7	0.3	0.1	20.0	47.1

26.7 + 0.3 + 0.1 + 20.0 = 47.1

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:	Hinge Health
Address:	455 Market St Ste 700
City, State, Zip:	San Francisco, CA 94105
Test Requested By:	Samuel House
EUT:	Enso 2
First Date of Test:	September 29, 2021
Last Date of Test:	September 30, 2021
Receipt Date of Samples:	September 29, 2021
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:

Wearable pain management device containing Bluetooth Low Energy

Testing Objective:

To demonstrate compliance of the Bluetooth Low Energy (DTS) 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	1.0

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
BLE 1 Mbps, 2 Mbps	DTS	0	2402	0 dBm
		20	2442	0 dBm
		39	2480	0 dBm

CONFIGURATIONS



Configuration HING0001- 1

Software/Firmware Running during test	
Description	Version
NRF Direct Test Mode (DTM)	1.1.7
PuTTY	0.70

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Wearable pain management device containing Bluetooth Low Energy	Hinge Health	Enso 2	202640563

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Laptop	Lenovo	7510	CB17045993

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
FTDI	No	1.0 m	No	Laptop	Wearable pain management device containing Bluetooth Low Energy

CONFIGURATIONS



Configuration HING0001- 2

Software/Firmware Running during test	
Description	Version
NRF Direct Test Mode (DTM)	1.1.7
PuTTY	0.70

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Wearable pain management device containing Bluetooth Low Energy	Hinge Health	Enso 2	202688456

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Laptop	Lenovo	7510	CB17045993

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
FTDI	No	1.0 m	No	Wearable pain management device containing Bluetooth Low Energy	USB Extension Cable
USB Extension Cable	Yes	3.0 m	No	FTDI	Laptop

Configuration HING0001- 3

Software/Firmware Running during test	
Description	Version
NRF Direct Test Mode (DTM)	1.1.7
PuTTY	0.70

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Wearable pain management device containing Bluetooth Low Energy	Hinge Health	Enso 2	202604202
ITE Power Supply	China	LX050100	None
Charging Base	Hinge Health	Enso 2 charger	None

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Laptop	Lenovo	7510	CB17045993

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
USB	Yes	1.0 m	No	ITE Power Supply	Charging Base

CONFIGURATIONS



Configuration HING0001- 4

Software/Firmware Running during test	
Description	Version
NRF Direct Test Mode (DTM)	1.1.7
PutTy	0.70

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Wearable pain management device containing Bluetooth Low Energy	Hinge Health	Enso 2	202688456
ITE Power Supply	China	LX050100	None
Charging Base	Hinge Health	Enso 2 charger	None

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Laptop	Lenovo	7510	CB17045993

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
FTDI	No	1.0 m	No	Wearable pain management device containing Bluetooth Low Energy	USB Extension Cable
USB Extension Cable	Yes	3.0 m	No	FTDI	Laptop
USB	Yes	1.0 m	No	ITE Power Supply	Charging Base

MODIFICATIONS



Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2021-09-29	Powerline 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.
2	2021-09-29	DTS 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	2021-09-29	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.
4	2021-09-29	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.
5	2021-09-29	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.
6	2021-09-29	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	2021-09-30	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.
8	2021-09-30	Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWERLINE CONDUCTED EMISSIONS



TEST DESCRIPTION

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
LISN	Solar Electronics	9252-50-R-24-BNC	LIN	2021-01-08	2022-01-08
Cable - Conducted Cable Assembly	Northwest EMC	EVG, HHD, RKT	EVGA	2021-01-05	2022-01-05
Receiver	Gauss Instruments	TDEMI 30M	ARN	2021-04-06	2022-04-06

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	3.2 dB	-3.2 dB

CONFIGURATIONS INVESTIGATED

HING0001-3

MODES INVESTIGATED

Battery charging, Continuous Tx, BLE, Mid Ch. 2442 MHz, 1 Mbps

POWERLINE CONDUCTED EMISSIONS



EUT:	Enso 2	Work Order:	HING0001
Serial Number:	202604202	Date:	2021-09-30
Customer:	Hinge Health	Temperature:	23°C
Attendees:	Samuel House	Relative Humidity:	47.7%
Customer Project:	None	Bar. Pressure:	1024 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	HING0001-3

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

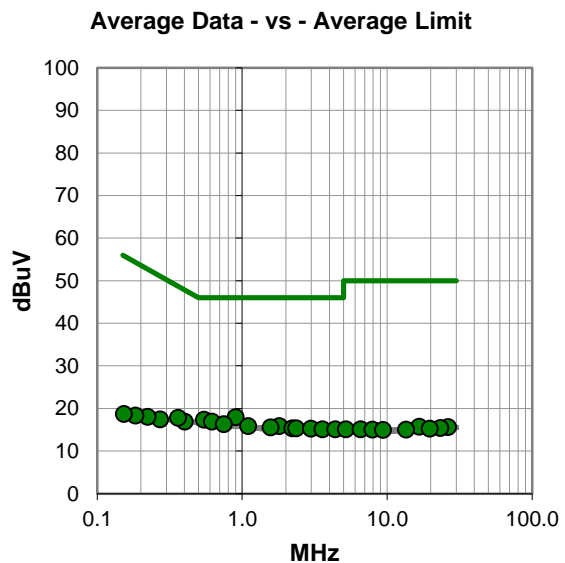
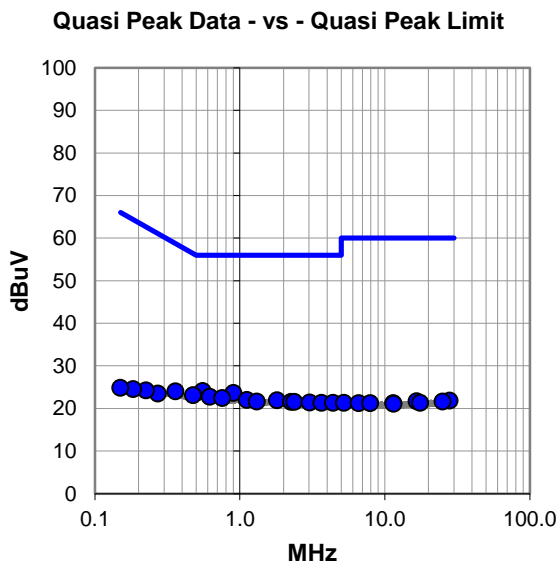
None

EUT OPERATING MODES

Battery charging. Continuous Tx, BLE, Mid Ch. 2442 MHz, 1 Mbps

DEVIATIONS FROM TEST STANDARD

None



POWERLINE CONDUCTED EMISSIONS



RESULTS - Run #2

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.553	4.1	20.0	24.1	56.0	-31.9
0.902	3.6	20.0	23.6	56.0	-32.4
0.477	3.1	20.0	23.1	56.4	-33.3
0.620	2.7	20.0	22.7	56.0	-33.3
0.756	2.4	20.0	22.4	56.0	-33.6
1.120	2.0	20.0	22.0	56.0	-34.0
1.804	1.9	20.0	21.9	56.0	-34.1
1.313	1.6	20.0	21.6	56.0	-34.4
2.257	1.5	20.0	21.5	56.0	-34.5
2.372	1.5	20.0	21.5	56.0	-34.5
3.032	1.4	20.0	21.4	56.0	-34.6
3.664	1.3	20.0	21.3	56.0	-34.7
4.390	1.3	20.0	21.3	56.0	-34.7
0.359	4.0	20.0	24.0	58.8	-34.8
0.272	3.5	20.0	23.5	61.1	-37.6
27.961	0.7	21.1	21.8	60.0	-38.2
16.630	1.1	20.6	21.7	60.0	-38.3
25.031	0.7	20.9	21.6	60.0	-38.4
0.225	4.1	20.1	24.2	62.6	-38.4
5.239	1.1	20.2	21.3	60.0	-38.7
17.543	0.7	20.6	21.3	60.0	-38.7
6.595	1.0	20.2	21.2	60.0	-38.8
7.947	1.0	20.2	21.2	60.0	-38.8
11.438	0.8	20.4	21.2	60.0	-38.8
11.505	0.7	20.4	21.1	60.0	-38.9

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.902	-2.1	20.0	17.9	46.0	-28.1
0.547	-2.7	20.0	17.3	46.0	-28.7
0.620	-3.1	20.0	16.9	46.0	-29.1
0.750	-3.7	20.0	16.3	46.0	-29.7
1.102	-4.2	20.0	15.8	46.0	-30.2
1.802	-4.2	20.0	15.8	46.0	-30.2
1.569	-4.5	20.0	15.5	46.0	-30.5
2.217	-4.7	20.0	15.3	46.0	-30.7
2.365	-4.7	20.0	15.3	46.0	-30.7
2.990	-4.8	20.0	15.2	46.0	-30.8
0.402	-3.1	20.0	16.9	47.8	-30.9
3.582	-4.9	20.0	15.1	46.0	-30.9
4.401	-5.0	20.1	15.1	46.0	-30.9
0.361	-2.2	20.0	17.8	48.7	-30.9
0.272	-2.6	20.0	17.4	51.1	-33.7
16.633	-4.9	20.6	15.7	50.0	-34.3
26.316	-5.5	21.1	15.6	50.0	-34.4
23.377	-5.5	20.9	15.4	50.0	-34.6
0.223	-2.1	20.1	18.0	52.7	-34.7
19.725	-5.5	20.7	15.2	50.0	-34.8
5.202	-5.1	20.2	15.1	50.0	-34.9
6.563	-5.1	20.2	15.1	50.0	-34.9
7.930	-5.2	20.2	15.0	50.0	-35.0
13.562	-5.5	20.5	15.0	50.0	-35.0
9.398	-5.3	20.2	14.9	50.0	-35.1

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS



EUT:	Enso 2	Work Order:	HING0001
Serial Number:	202604202	Date:	2021-09-30
Customer:	Hinge Health	Temperature:	23°C
Attendees:	Samuel House	Relative Humidity:	47.7%
Customer Project:	None	Bar. Pressure:	1024 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	HING0001-3

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

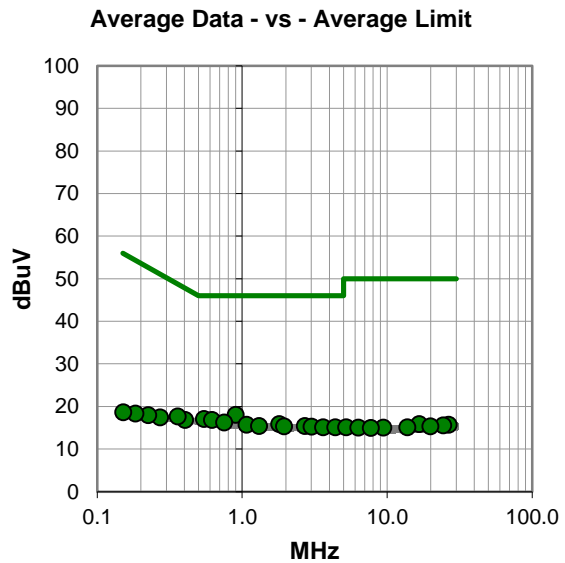
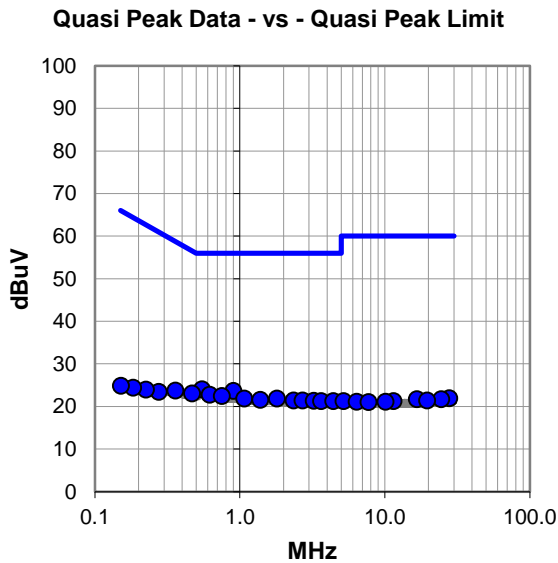
None

EUT OPERATING MODES

Battery charging. Continuous Tx, BLE, Mid Ch. 2442 MHz, 1 Mbps

DEVIATIONS FROM TEST STANDARD

None



POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #3

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.550	4.0	20.0	24.0	56.0	-32.0
0.902	3.6	20.0	23.6	56.0	-32.4
0.620	2.7	20.0	22.7	56.0	-33.3
0.467	3.0	20.0	23.0	56.6	-33.6
0.751	2.4	20.0	22.4	56.0	-33.6
1.076	1.8	20.0	21.8	56.0	-34.2
1.804	1.8	20.0	21.8	56.0	-34.2
1.384	1.5	20.0	21.5	56.0	-34.5
2.346	1.4	20.0	21.4	56.0	-34.6
2.706	1.4	20.0	21.4	56.0	-34.6
3.238	1.3	20.0	21.3	56.0	-34.7
3.636	1.2	20.0	21.2	56.0	-34.8
4.424	1.1	20.1	21.2	56.0	-34.8
0.359	3.7	20.0	23.7	58.8	-35.1
0.277	3.4	20.0	23.4	60.9	-37.5
27.929	0.8	21.1	21.9	60.0	-38.1
16.632	1.1	20.6	21.7	60.0	-38.3
24.491	0.8	20.9	21.7	60.0	-38.3
19.635	0.7	20.7	21.4	60.0	-38.6
0.225	3.8	20.1	23.9	62.6	-38.7
5.205	1.0	20.2	21.2	60.0	-38.8
11.500	0.8	20.4	21.2	60.0	-38.8
6.413	0.9	20.2	21.1	60.0	-38.9
10.109	0.9	20.2	21.1	60.0	-38.9
7.715	0.8	20.2	21.0	60.0	-39.0

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.902	-2.0	20.0	18.0	46.0	-28.0
0.547	-3.0	20.0	17.0	46.0	-29.0
0.620	-3.2	20.0	16.8	46.0	-29.2
0.751	-3.8	20.0	16.2	46.0	-29.8
1.804	-4.2	20.0	15.8	46.0	-30.2
1.076	-4.3	20.0	15.7	46.0	-30.3
1.311	-4.6	20.0	15.4	46.0	-30.6
2.706	-4.6	20.0	15.4	46.0	-30.6
1.943	-4.7	20.0	15.3	46.0	-30.7
3.014	-4.8	20.0	15.2	46.0	-30.8
3.630	-4.9	20.0	15.1	46.0	-30.9
4.405	-5.0	20.1	15.1	46.0	-30.9
0.403	-3.2	20.0	16.8	47.8	-31.0
0.359	-2.4	20.0	17.6	48.8	-31.2
0.272	-2.6	20.0	17.4	51.1	-33.7
16.632	-4.8	20.6	15.8	50.0	-34.2
26.688	-5.4	21.1	15.7	50.0	-34.3
24.464	-5.4	20.9	15.5	50.0	-34.5
0.225	-2.2	20.1	17.9	52.6	-34.7
19.923	-5.4	20.7	15.3	50.0	-34.7
5.216	-5.1	20.2	15.1	50.0	-34.9
13.807	-5.4	20.5	15.1	50.0	-34.9
6.346	-5.2	20.2	15.0	50.0	-35.0
9.431	-5.2	20.2	15.0	50.0	-35.0
7.715	-5.3	20.2	14.9	50.0	-35.1

CONCLUSION

Pass



Tested By

DUTY CYCLE



TEST DESCRIPTION

The Duty Cycle (x) were measured for each of the EUT operating modes. The measurements were made using a zero span on the spectrum analyzer to see the pulses in the time domain. The transmit power was set to its default maximum.

The duty cycle was calculated by dividing the transmission pulse duration (T) by the total period of a single on and total off time. The EUT operates at 100% Duty Cycle.

DTS BANDWIDTH



XMit 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	Keysight	N9010A	AFO	2021-07-06	2022-07-06

TEST DESCRIPTION

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

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

DTS BANDWIDTH



TelTx 2021.03.19.1 XMI 2020.12.30.0

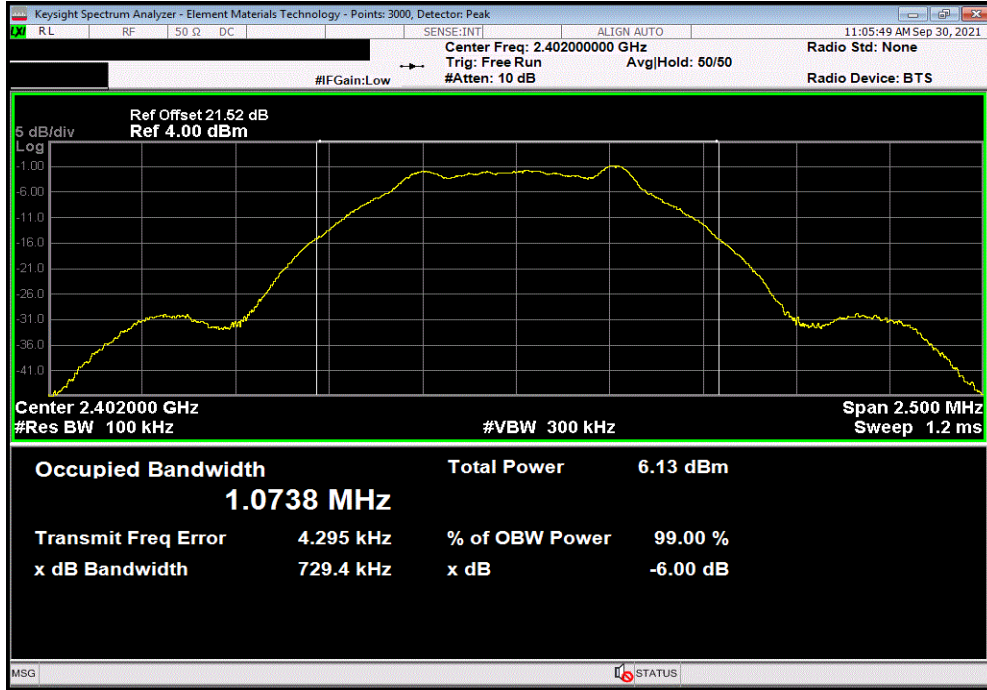
EUT: Enso 2		Work Order: HING0001	
Serial Number: 202640563		Date: 29-Sep-21	
Customer: Hinge Health		Temperature: 22.7 °C	
Attendees: Samuel House		Humidity: 44.8% RH	
Project: None		Barometric Pres.: 1024 mbar	
Tested by: Jeff Alcoke	Power: Battery	Job Site: EV06	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2021		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
BLE/GFSK 1 Mbps Low Channel, 2402 MHz		729.355 kHz	500 kHz Pass
BLE/GFSK 1 Mbps Mid Channel, 2442 MHz		730.377 kHz	500 kHz Pass
BLE/GFSK 1 Mbps High Channel, 2480 MHz		712.629 kHz	500 kHz Pass
BLE/GFSK 2 Mbps Low Channel, 2402 MHz		1.265 MHz	500 kHz Pass
BLE/GFSK 2 Mbps Mid Channel, 2442 MHz		1.299 MHz	500 kHz Pass
BLE/GFSK 2 Mbps High Channel, 2480 MHz		1.245 MHz	500 kHz Pass

DTS BANDWIDTH

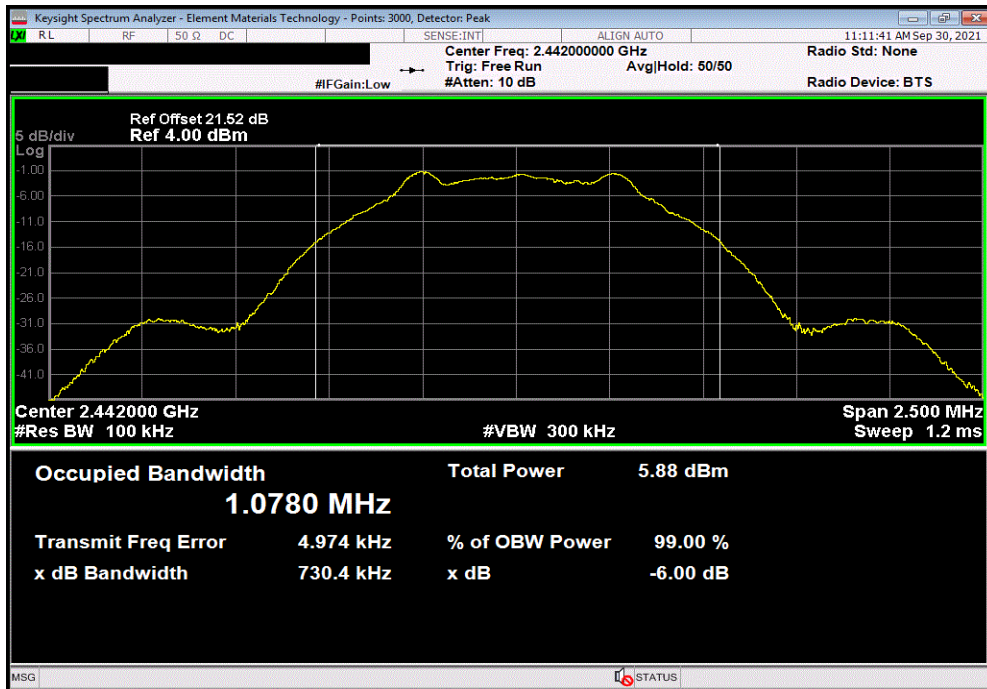


TbTx 2021.03.19.1 XMt 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz			
	Value	Limit	Result
	729.355 kHz	500 kHz	Pass



BLE/GFSK 1 Mbps Mid Channel, 2442 MHz			
	Value	Limit	Result
	730.377 kHz	500 kHz	Pass

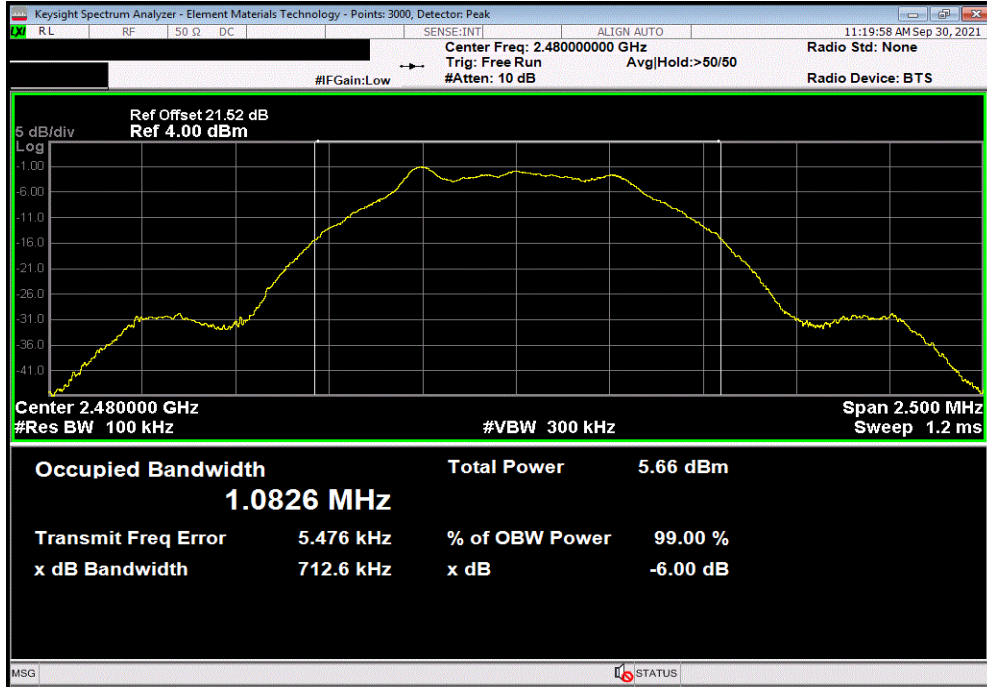


DTS BANDWIDTH

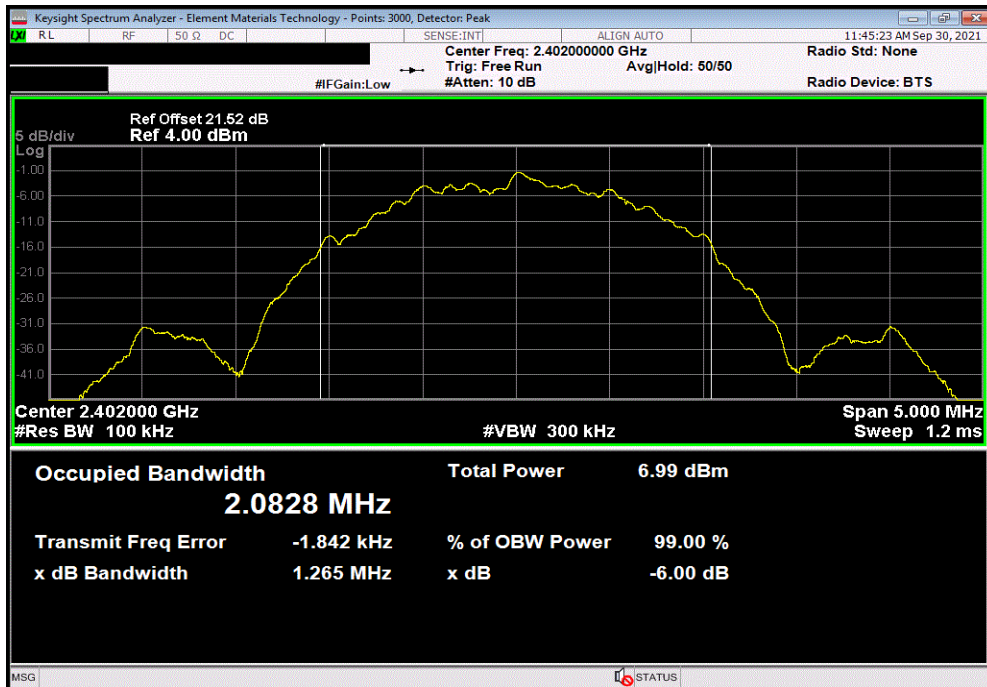


TuTx 2021.03.19.1 XMt 2020.12.30.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz						
	Value	Limit	Result			
		(≥)				
	712.629 kHz	500 kHz	Pass			



BLE/GFSK 2 Mbps Low Channel, 2402 MHz						
	Value	Limit	Result			
		(≥)				
	1.265 MHz	500 kHz	Pass			

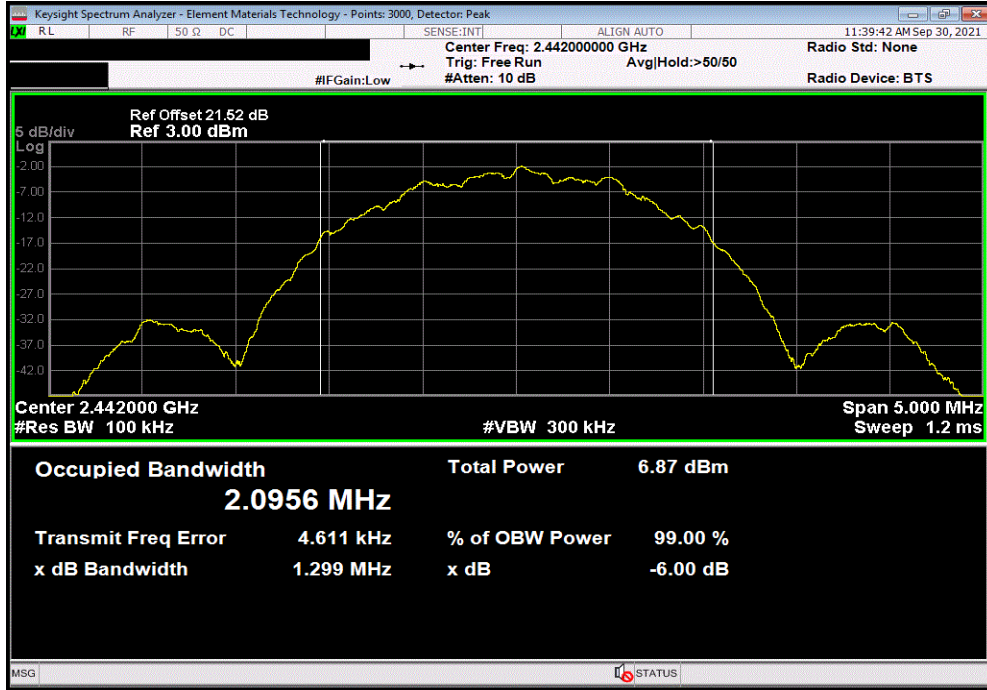


DTS BANDWIDTH

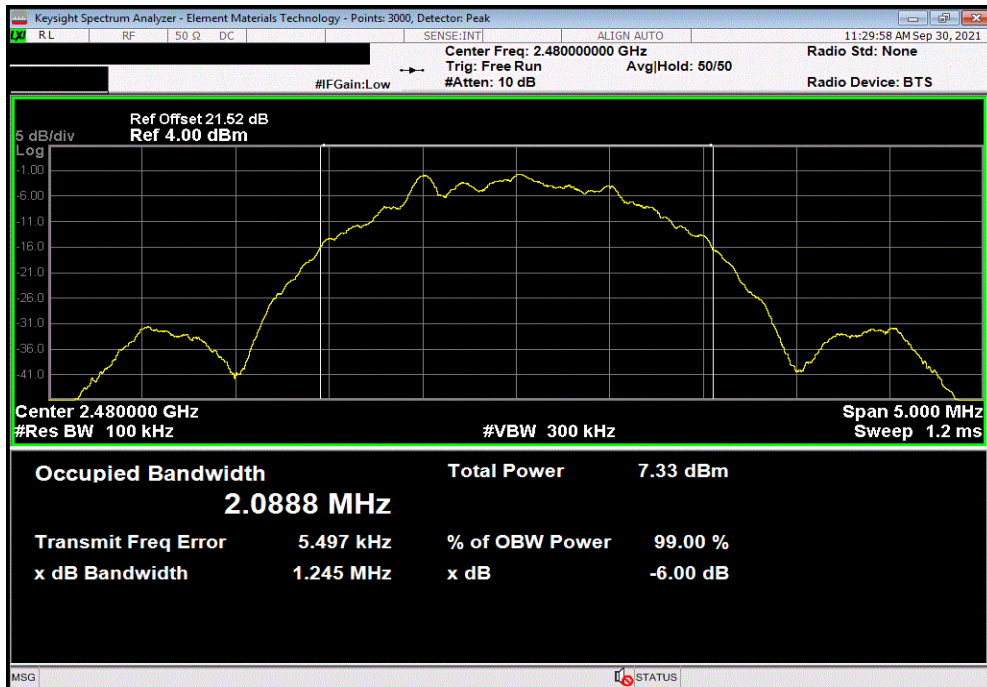


TuTx 2021.03.19.1 XMt 2020.12.30.0

BLE/GFSK 2 Mbps Mid Channel, 2442 MHz						
				Value	Limit	Result
					(≥)	
				1.299 MHz	500 kHz	Pass



BLE/GFSK 2 Mbps High Channel, 2480 MHz						
				Value	Limit	Result
					(≥)	
				1.245 MHz	500 kHz	Pass





OUTPUT POWER

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	Keysight	N9010A	AFO	2021-07-06	2022-07-06

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 2021.03.19.1 XMI 2020.12.30.0

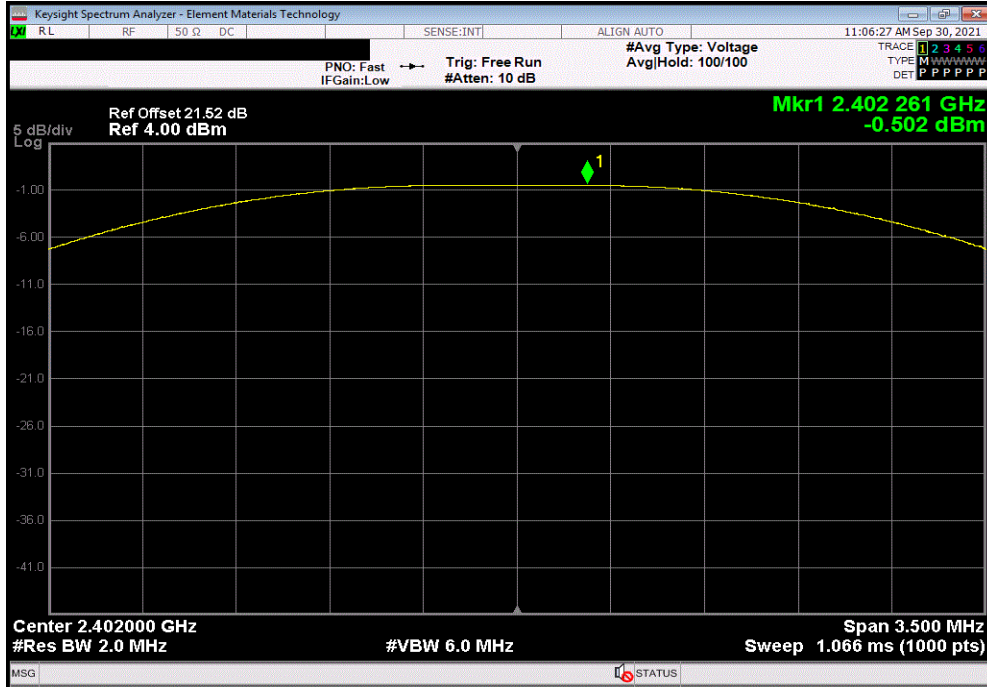
EUT: Enso 2		Work Order: HING0001	
Serial Number: 202640563		Date: 29-Sep-21	
Customer: Hinge Health		Temperature: 22.7 °C	
Attendees: Samuel House		Humidity: 44.8% RH	
Project: None		Barometric Pres.: 1024 mbar	
Tested by: Jeff Alcock	Power: Battery	Job Site: EV06	
TEST SPECIFICATIONS			
FCC 15.247:2021		Test Method: 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
BLE/GFSK 1 Mbps Low Channel, 2402 MHz		-0.502	30 Pass
BLE/GFSK 1 Mbps Mid Channel, 2442 MHz		-0.819	30 Pass
BLE/GFSK 1 Mbps High Channel, 2480 MHz		-0.968	30 Pass
BLE/GFSK 2 Mbps Low Channel, 2402 MHz		-0.497	30 Pass
BLE/GFSK 2 Mbps Mid Channel, 2442 MHz		-0.788	30 Pass
BLE/GFSK 2 Mbps High Channel, 2480 MHz		-0.591	30 Pass

OUTPUT POWER

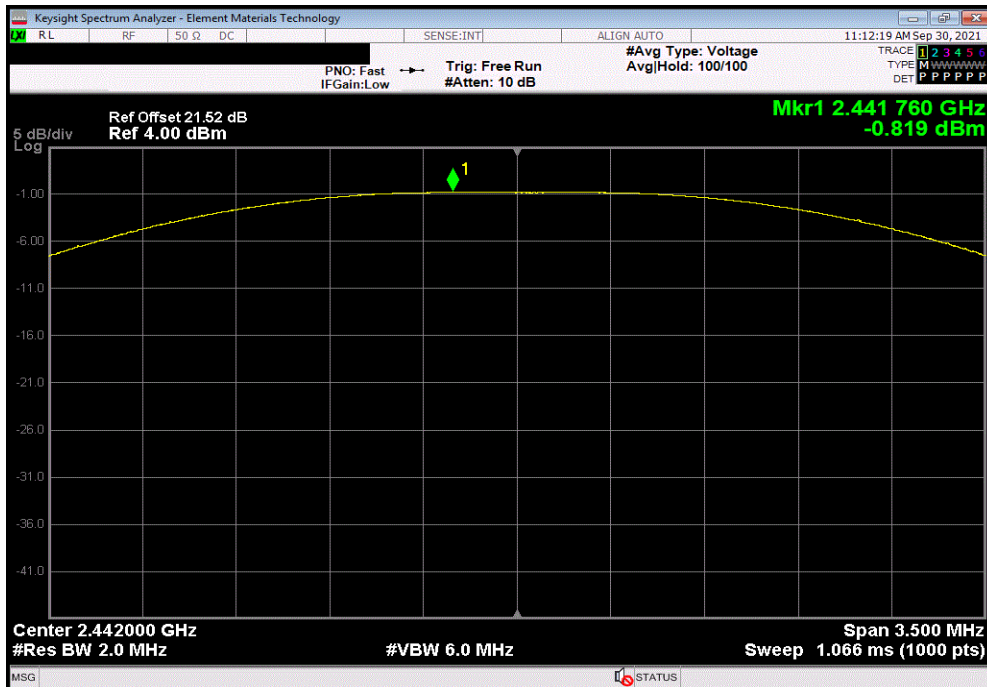


TbTx 2021.03.19.1 XMI 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				-0.502	30	Pass



BLE/GFSK 1 Mbps Mid Channel, 2442 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				-0.819	30	Pass

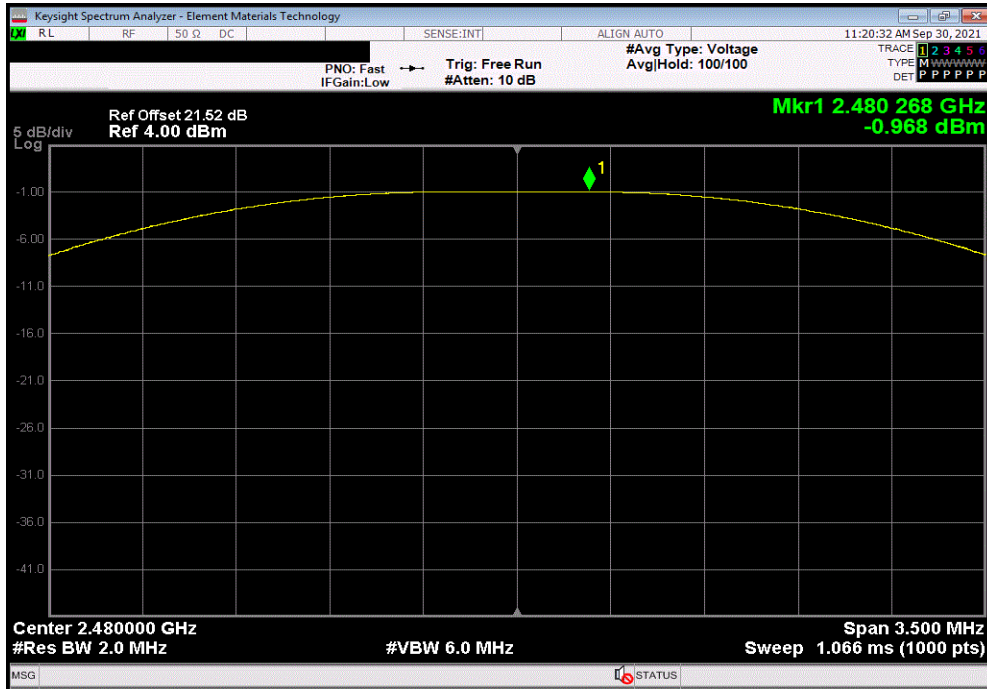


OUTPUT POWER

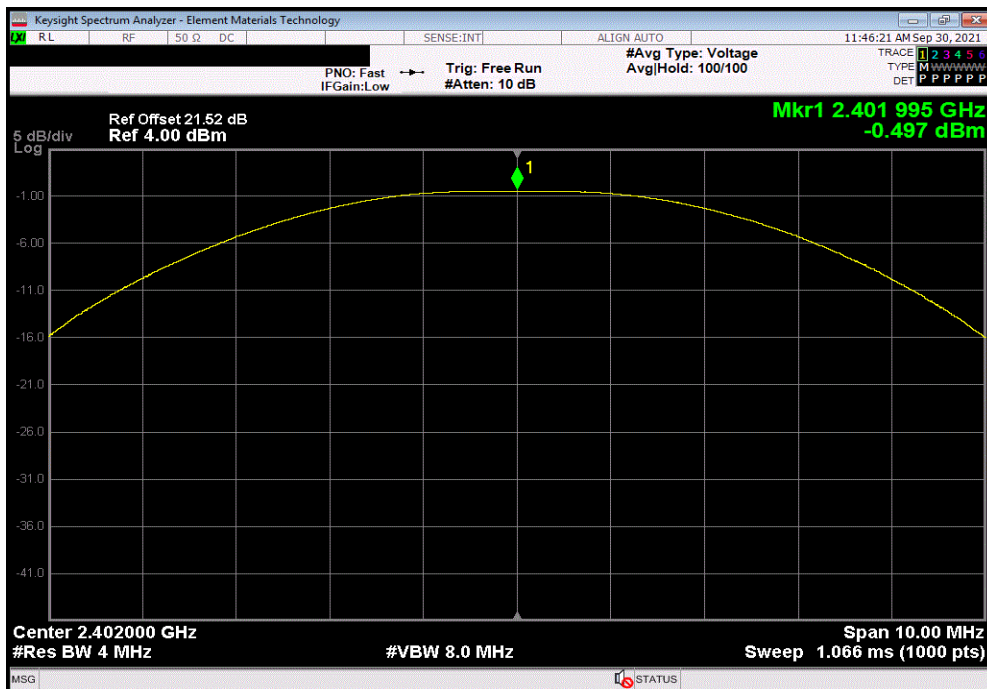


TbTx 2021.03.19.1 XMI 2020.12.30.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				-0.968	30	Pass



BLE/GFSK 2 Mbps Low Channel, 2402 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				-0.497	30	Pass

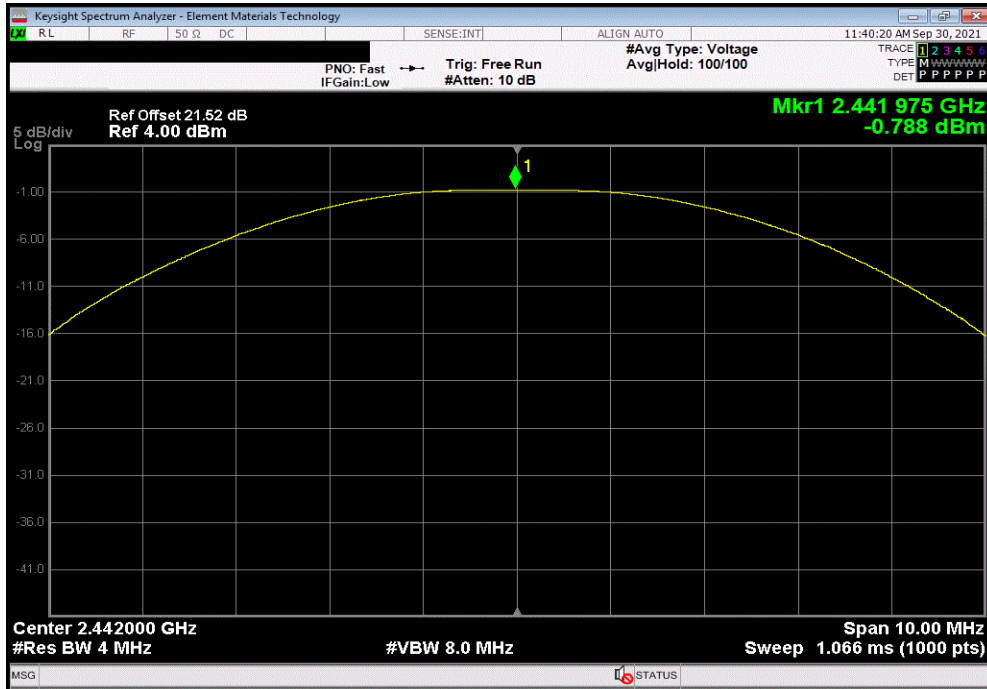


OUTPUT POWER

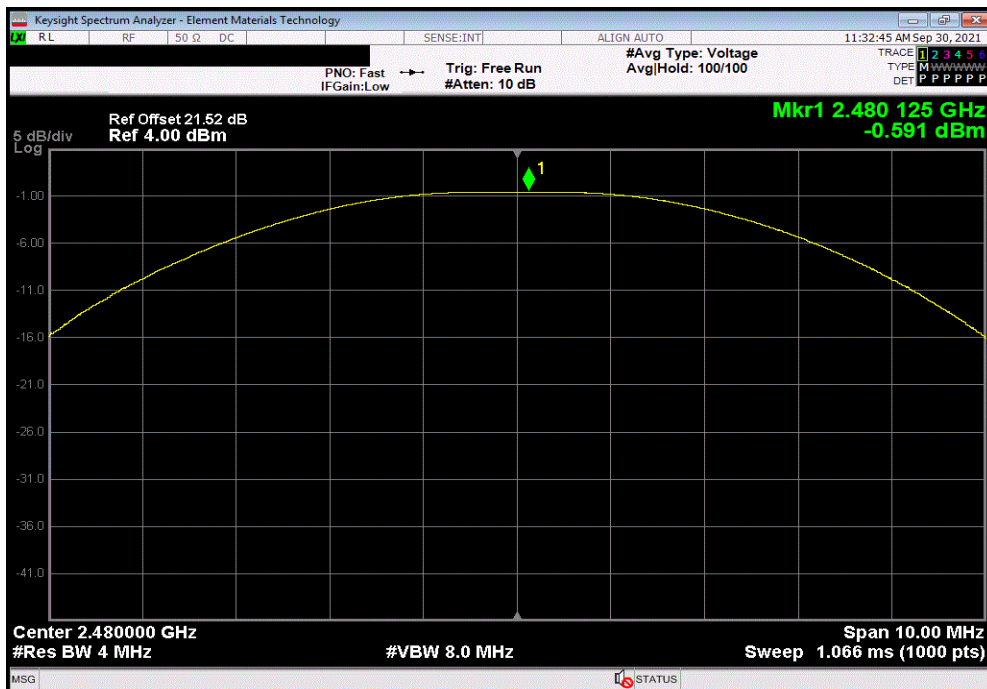


TbTx 2021.03.19.1 XMI 2020.12.30.0

BLE/GFSK 2 Mbps Mid Channel, 2442 MHz						
	Out Pwr (dBm)	Limit (dBm)	Result			
	-0.788	30	Pass			



BLE/GFSK 2 Mbps High Channel, 2480 MHz						
	Out Pwr (dBm)	Limit (dBm)	Result			
	-0.591	30	Pass			



EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)



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	Keysight	N9010A	AFO	2021-07-06	2022-07-06

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 2021.03.19.1 XMI 2020.12.30.0

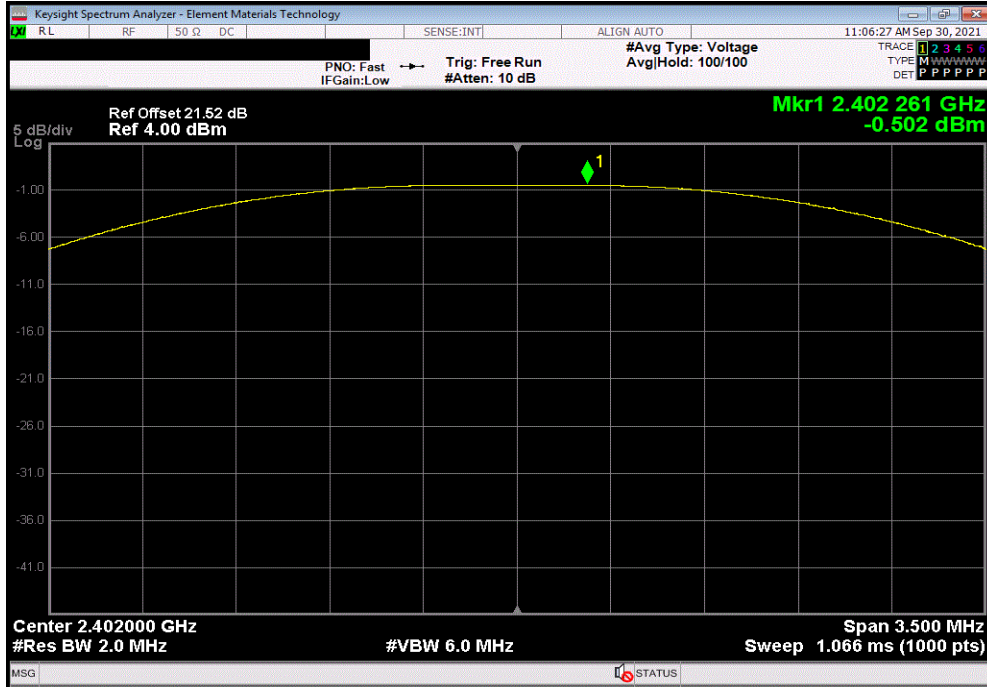
EUT: Enso 2		Work Order: HING0001				
Serial Number: 202640563		Date: 29-Sep-21				
Customer: Hinge Health		Temperature: 22.6 °C				
Attendees: Samuel House		Humidity: 44.8% RH				
Project: None		Barometric Pres.: 1023 mbar				
Tested by: Jeff Alcock	Power: Battery	Job Site: EV06				
TEST SPECIFICATIONS		Test Method				
FCC 15.247:2021		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
BLE/GFSK 1 Mbps Low Channel, 2402 MHz		-0.502	1	0.498	36	Pass
BLE/GFSK 1 Mbps Mid Channel, 2442 MHz		-0.819	1	0.181	36	Pass
BLE/GFSK 1 Mbps High Channel, 2480 MHz		-0.968	1	0.032	36	Pass
BLE/GFSK 2 Mbps Low Channel, 2402 MHz		-0.497	1	0.503	36	Pass
BLE/GFSK 2 Mbps Mid Channel, 2442 MHz		-0.788	1	0.212	36	Pass
BLE/GFSK 2 Mbps High Channel, 2480 MHz		-0.591	1	0.409	36	Pass

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

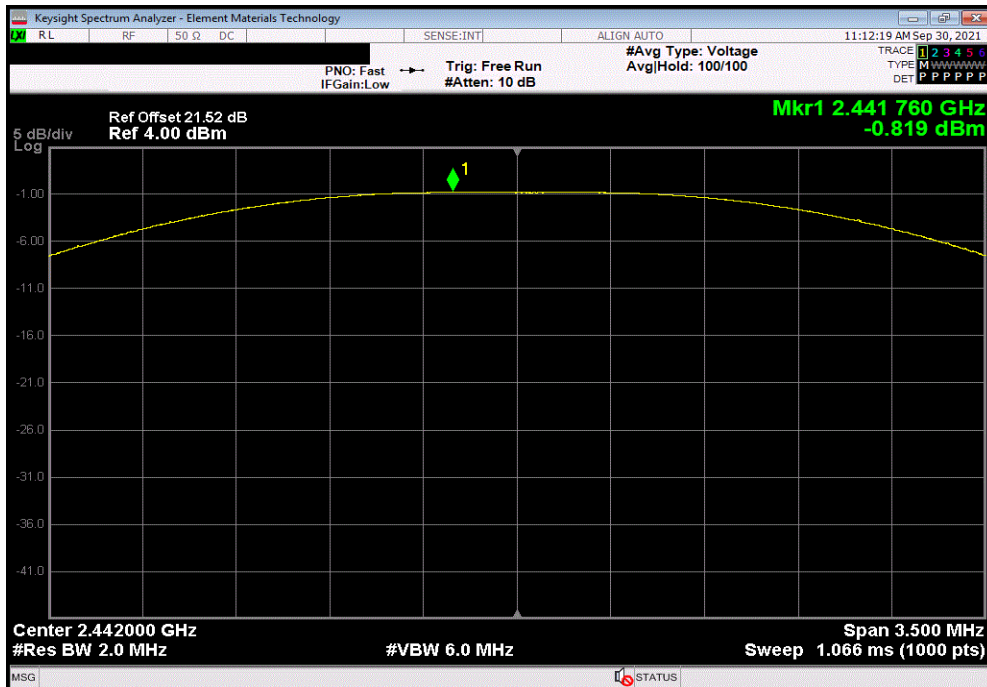


TbTx 2021.03.19.1 XMI 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz						
Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result		
-0.502	1	0.498	36	Pass		



BLE/GFSK 1 Mbps Mid Channel, 2442 MHz						
Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result		
-0.819	1	0.181	36	Pass		

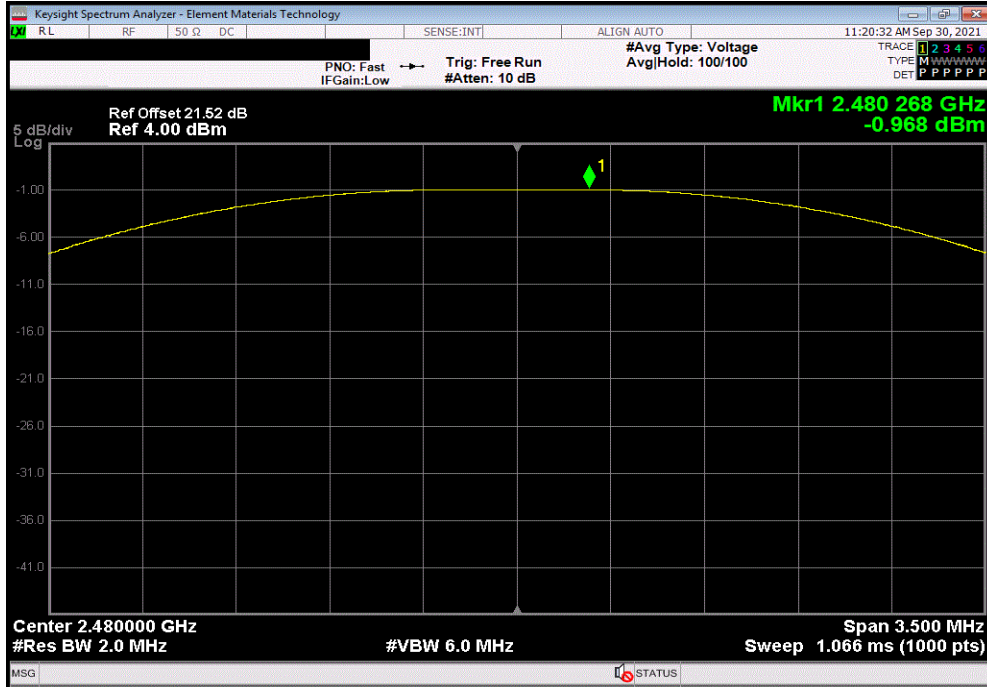


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

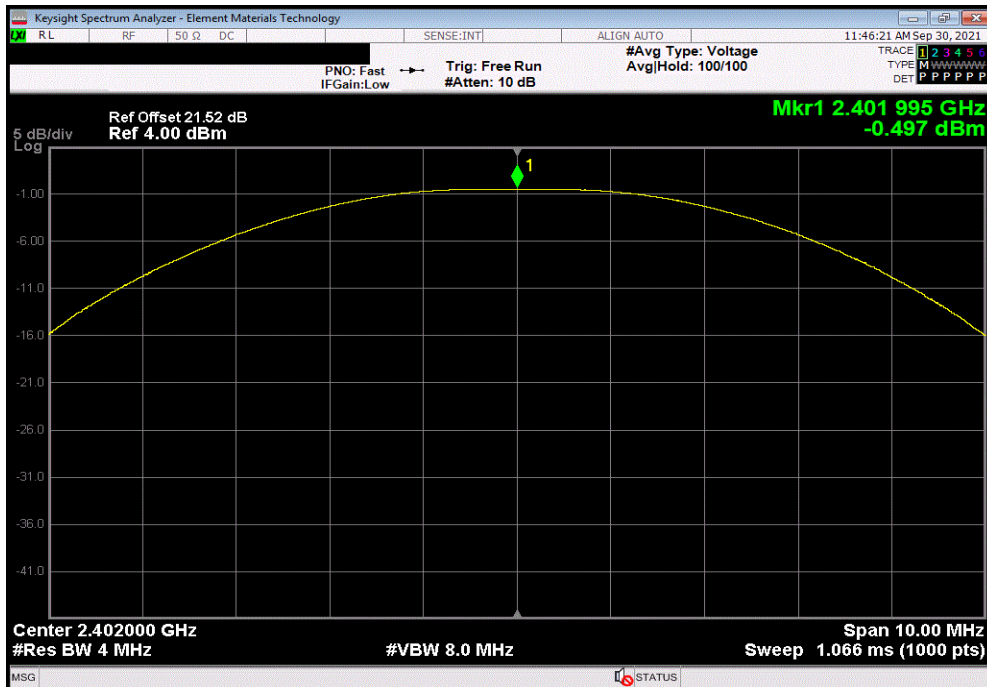


TbTx 2021.03.19.1 XMI 2020.12.30.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz						
Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result		
-0.968	1	0.032	36	Pass		



BLE/GFSK 2 Mbps Low Channel, 2402 MHz						
Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result		
-0.497	1	0.503	36	Pass		

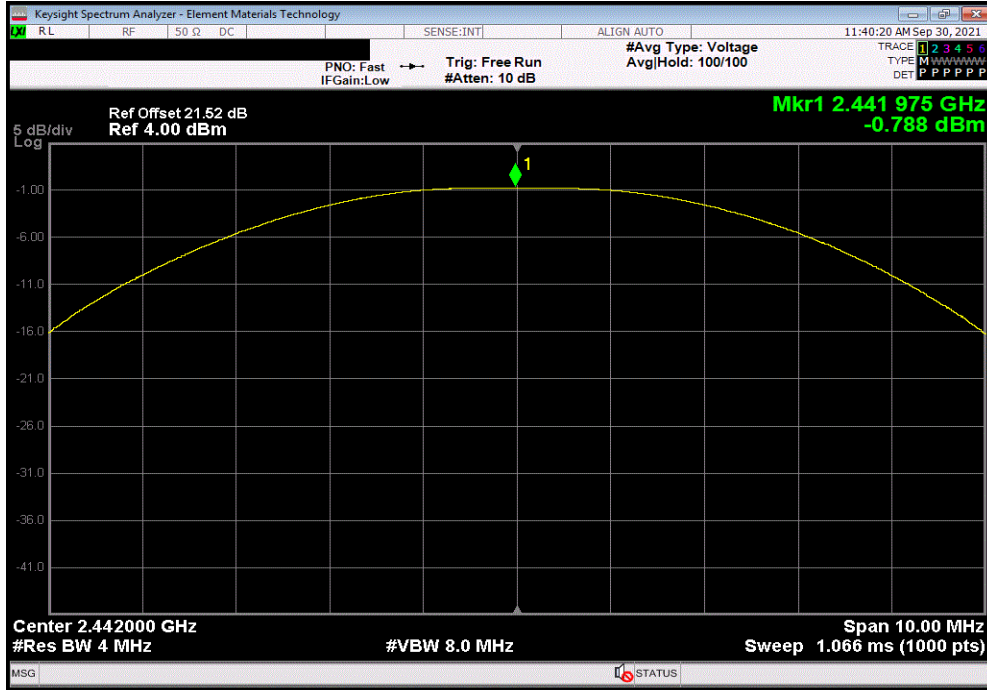


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

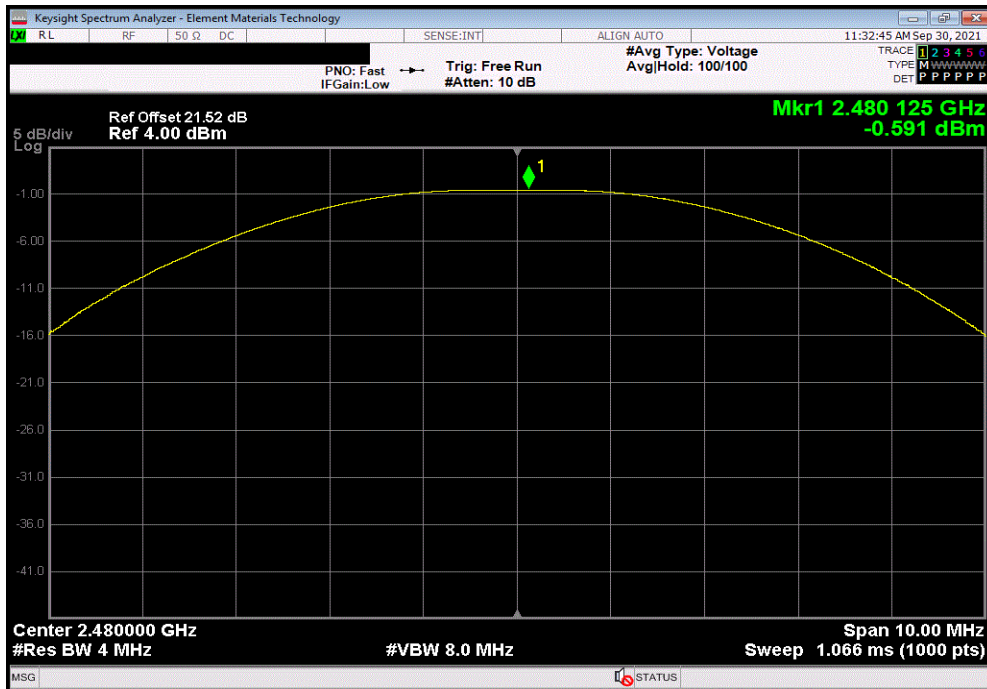


TbTx 2021.03.19.1 XMi 2020.12.30.0

BLE/GFSK 2 Mbps Mid Channel, 2442 MHz						
Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result		
-0.788	1	0.212	36	Pass		



BLE/GFSK 2 Mbps High Channel, 2480 MHz						
Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result		
-0.591	1	0.409	36	Pass		



POWER SPECTRAL DENSITY



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	Keysight	N9010A	AFO	2021-07-06	2022-07-06

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 2021.03.19.1 XMI 2020.12.30.0

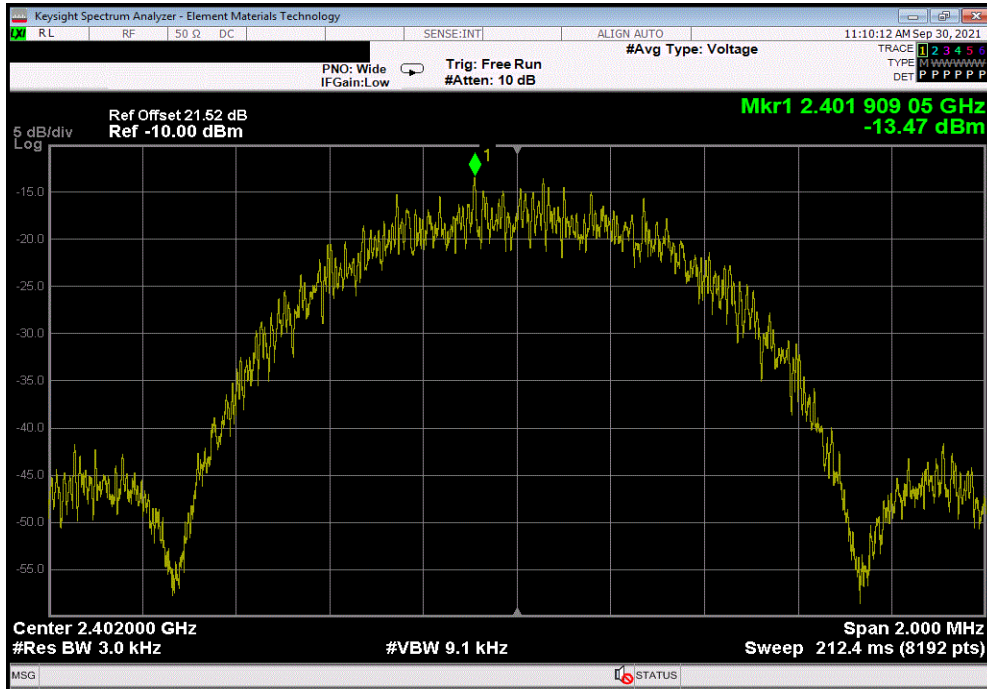
EUT: Enso 2		Work Order: HING0001	
Serial Number: 202640563		Date: 29-Sep-21	
Customer: Hinge Health		Temperature: 22.7 °C	
Attendees: Samuel House		Humidity: 44.8% RH	
Project: None		Barometric Pres.: 1024 mbar	
Tested by: Jeff Alcoko	Power: Battery	Job Site: EV06	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2021		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 dBm/3kHz	Limit < dBm/3kHz
BLE/GFSK 1 Mbps Low Channel, 2402 MHz		-13.466	8
BLE/GFSK 1 Mbps Mid Channel, 2442 MHz		-15.155	8
BLE/GFSK 1 Mbps High Channel, 2480 MHz		-14.213	8
BLE/GFSK 2 Mbps Low Channel, 2402 MHz		-16.454	8
BLE/GFSK 2 Mbps Mid Channel, 2442 MHz		-16.262	8
BLE/GFSK 2 Mbps High Channel, 2480 MHz		-17.576	8
			Results
			Pass
			Pass
			Pass
			Pass
			Pass
			Pass

POWER SPECTRAL DENSITY

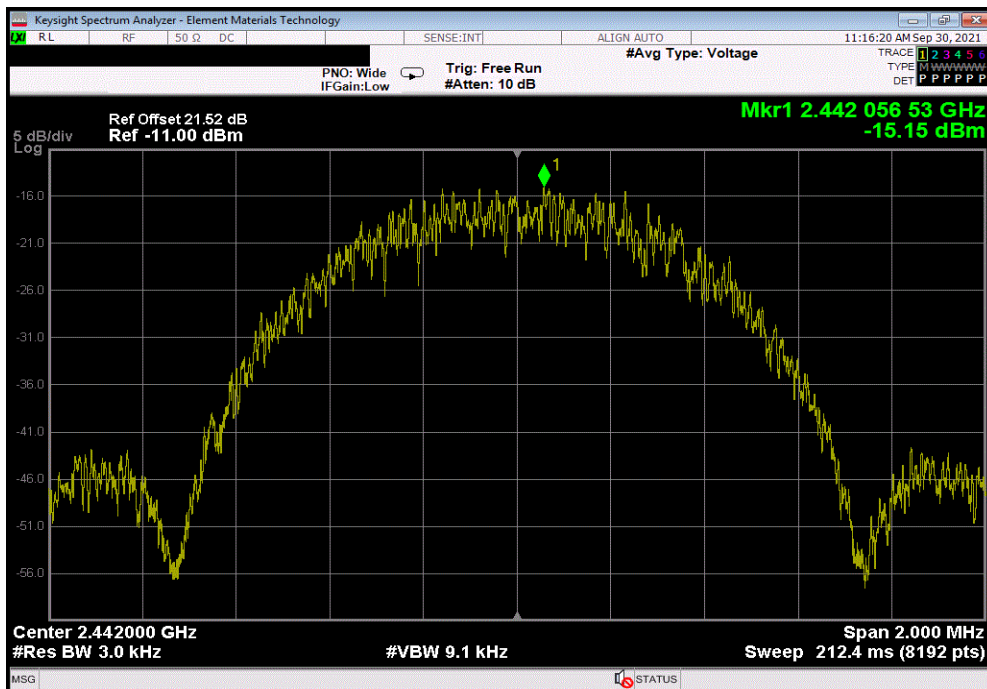


TbTx 2021.03.19.1 XMI 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz			
	Value	Limit	Results
	dBm/3kHz	< dBm/3kHz	
	-13.466	8	Pass



BLE/GFSK 1 Mbps Mid Channel, 2442 MHz			
	Value	Limit	Results
	dBm/3kHz	< dBm/3kHz	
	-15.155	8	Pass

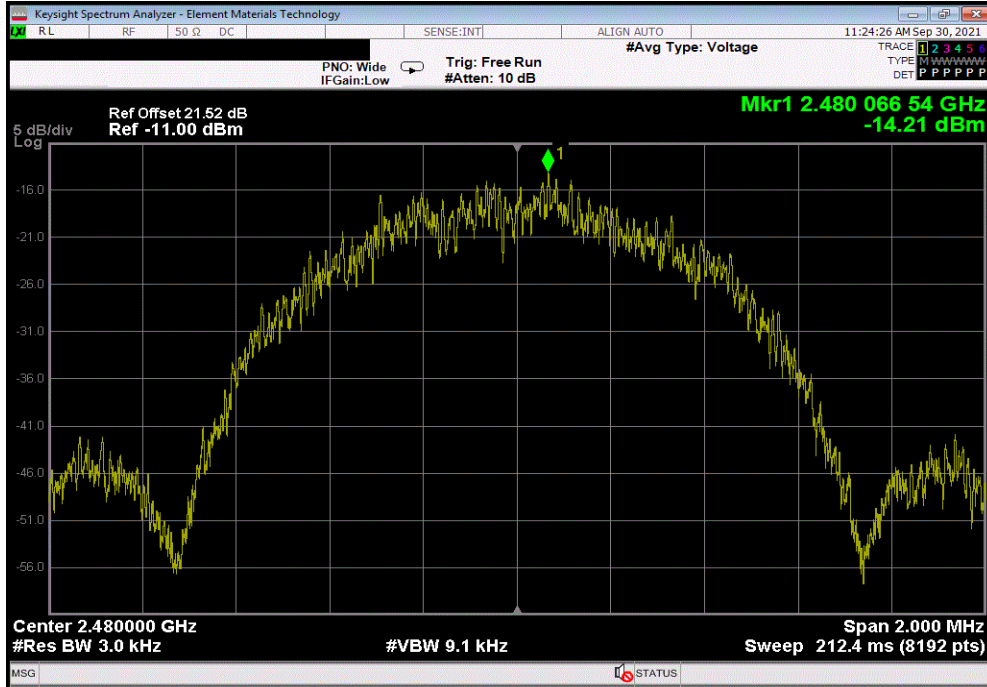


POWER SPECTRAL DENSITY

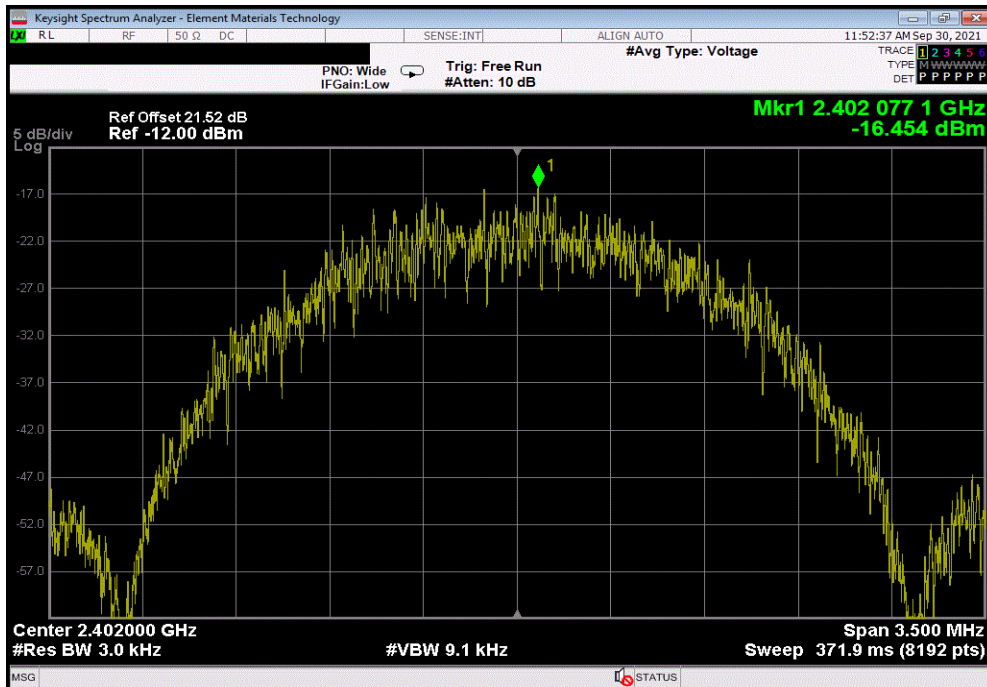


TbTx 2021.03.19.1 XMI 2020.12.30.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz			
	Value	Limit	Results
	dBm/3kHz	< dBm/3kHz	
	-14.213	8	Pass



BLE/GFSK 2 Mbps Low Channel, 2402 MHz			
	Value	Limit	Results
	dBm/3kHz	< dBm/3kHz	
	-16.454	8	Pass

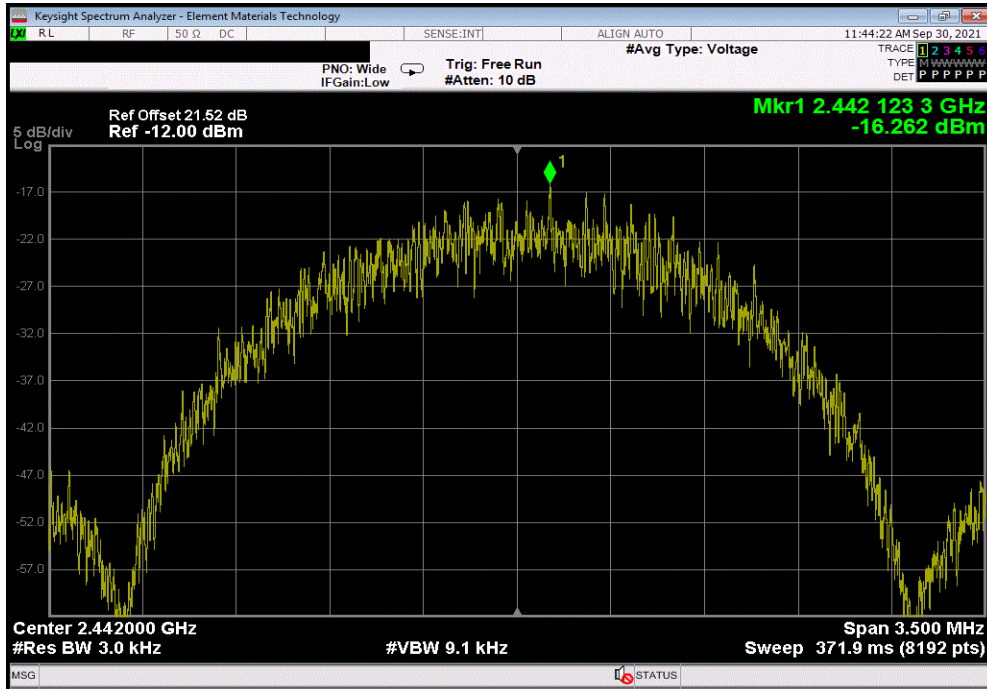


POWER SPECTRAL DENSITY

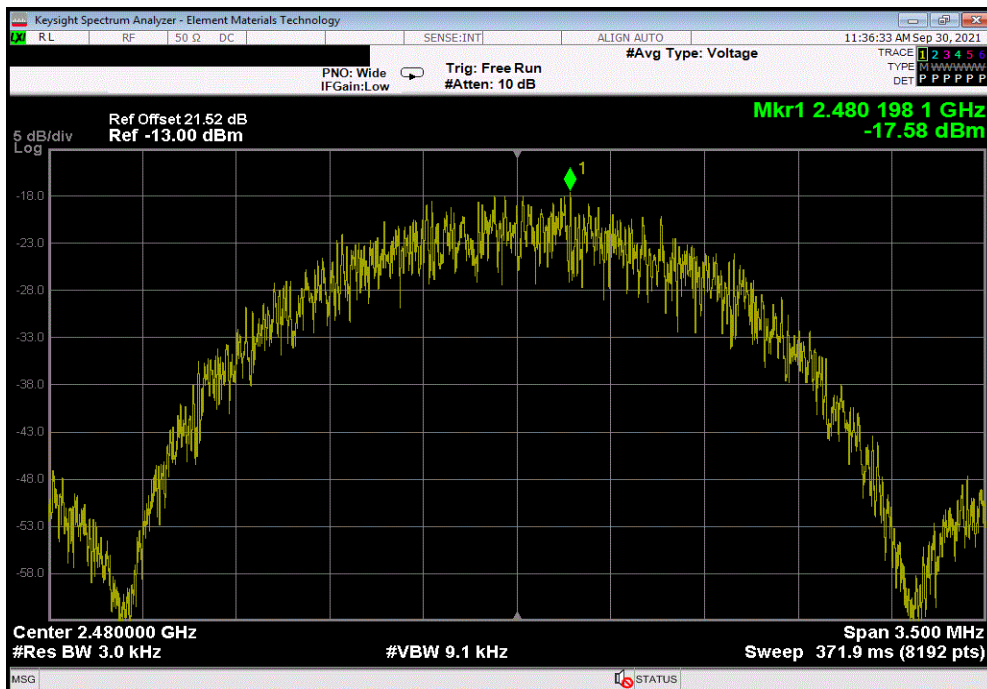


TbTx 2021.03.19.1 XMI 2020.12.30.0

BLE/GFSK 2 Mbps Mid Channel, 2442 MHz			
Value	Limit	Results	
dBm/3kHz	< dBm/3kHz		
-16.262	8	Pass	



BLE/GFSK 2 Mbps High Channel, 2480 MHz			
Value	Limit	Results	
dBm/3kHz	< dBm/3kHz		
-17.576	8	Pass	





element

XMit 2020.12.30.0

BAND EDGE COMPLIANCE

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	Keysight	N9010A	AFO	2021-07-06	2022-07-06

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 2021.03.19.1 XMI 2020.12.30.0

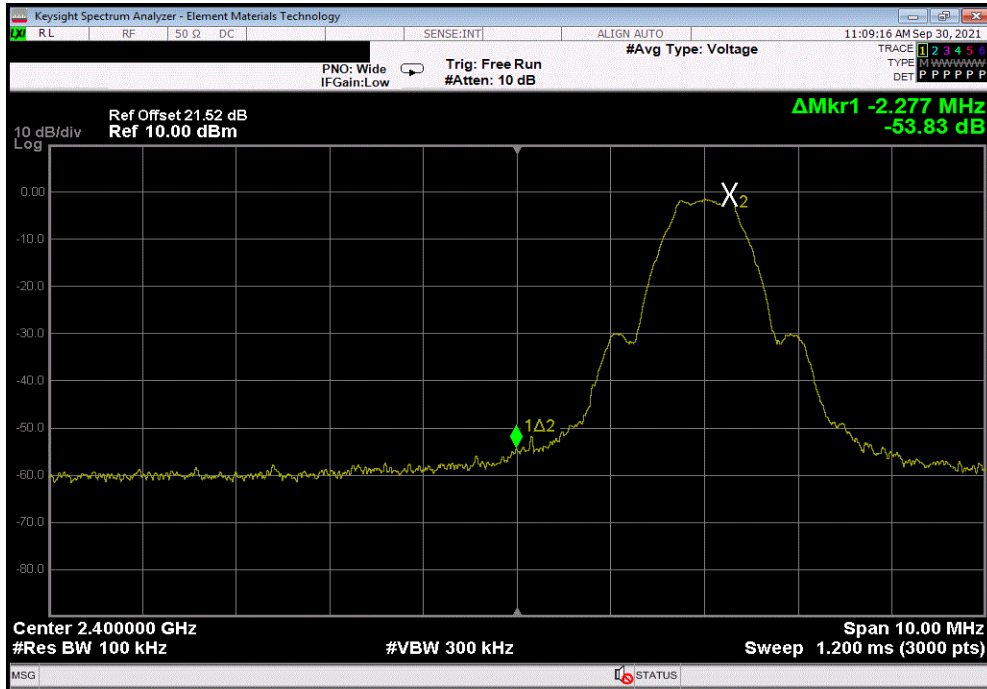
EUT: Enso 2		Work Order: HING0001	
Serial Number: 202640563		Date: 29-Sep-21	
Customer: Hinge Health		Temperature: 22.6 °C	
Attendees: Samuel House		Humidity: 44.7% RH	
Project: None		Barometric Pres.: 1024 mbar	
Tested by: Jeff Alcock	Power: Battery	Job Site: EV06	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2021		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
BLE/GFSK 1 Mbps Low Channel, 2402 MHz		-53.83	-20 Pass
BLE/GFSK 1 Mbps High Channel, 2480 MHz		-55.86	-20 Pass
BLE/GFSK 2 Mbps Low Channel, 2402 MHz		-30.61	-20 Pass
BLE/GFSK 2 Mbps High Channel, 2480 MHz		-53.77	-20 Pass

BAND EDGE COMPLIANCE

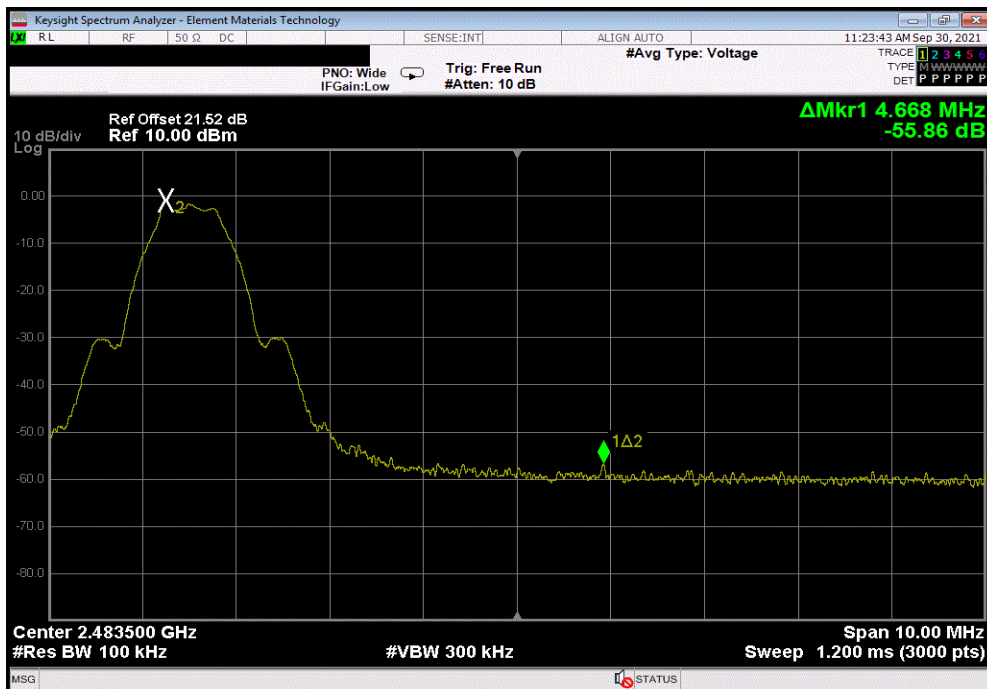


TbTx 2021.03.19.1 XMI 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz						
	Value	Limit	Result			
	(dBc)	≤ (dBc)				
	-53.83	-20	Pass			



BLE/GFSK 1 Mbps High Channel, 2480 MHz						
	Value	Limit	Result			
	(dBc)	≤ (dBc)				
	-55.86	-20	Pass			

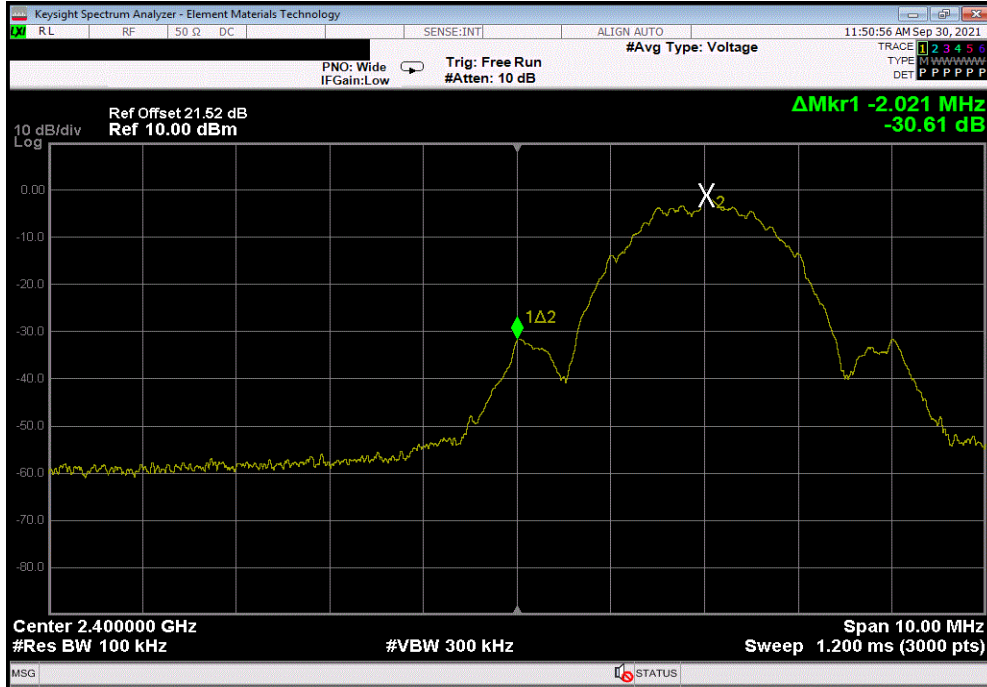


BAND EDGE COMPLIANCE

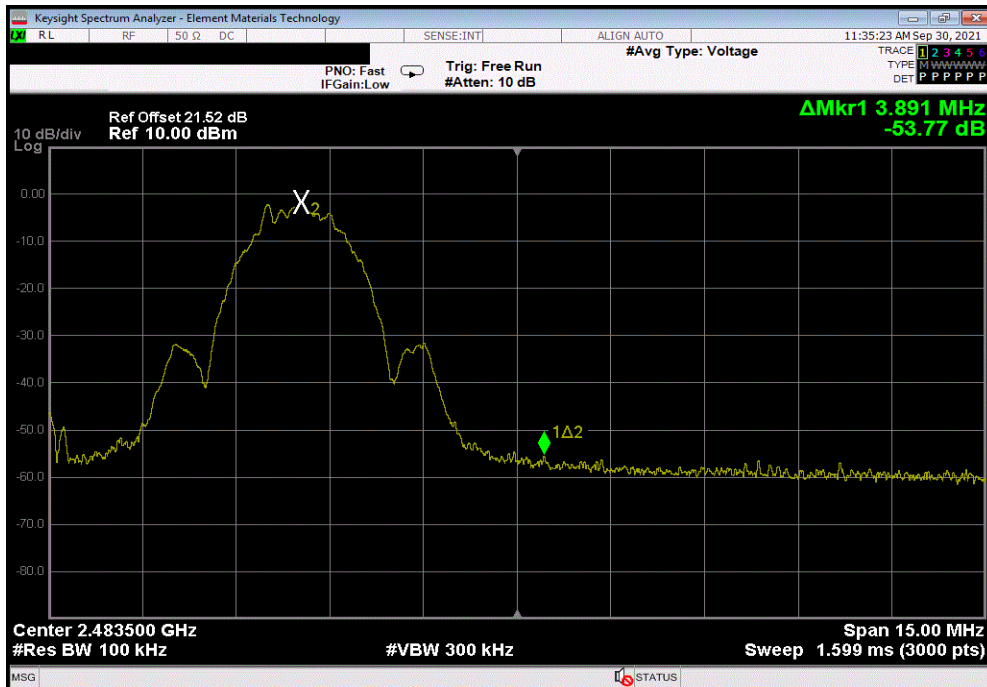


TbTx 2021.03.19.1 XMI 2020.12.30.0

BLE/GFSK 2 Mbps Low Channel, 2402 MHz						
	Value	Limit	Result			
	(dBc)	≤ (dBc)				
	-30.61	-20	Pass			



BLE/GFSK 2 Mbps High Channel, 2480 MHz						
	Value	Limit	Result			
	(dBc)	≤ (dBc)				
	-53.77	-20	Pass			





SPURIOUS CONDUCTED EMISSIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
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	Keysight	N9010A	AFO	2021-07-06	2022-07-06

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 fundamental was measured with a 100 kHz resolution bandwidth and the highest value was recorded. The rest of the spectrum was then measured with a 100 kHz resolution bandwidth and the highest value was found. The difference between the value found on the fundamental and the rest of the spectrum was compared against the limit to determine compliance.

SPURIOUS CONDUCTED EMISSIONS



TelTx 2021.03.19.1 XMit 2020.12.30.0

EUT: Enso 2		Work Order: HING0001	
Serial Number: 202640563		Date: 29-Sep-21	
Customer: Hinge Health		Temperature: 22.7 °C	
Attendees: Samuel House		Humidity: 44.9% RH	
Project: None		Barometric Pres.: 1024 mbar	
Tested by: Jeff Alcock	Power: Battery	Job Site: EV06	
TEST SPECIFICATIONS			
FCC 15.247:2021		Test Method: 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	

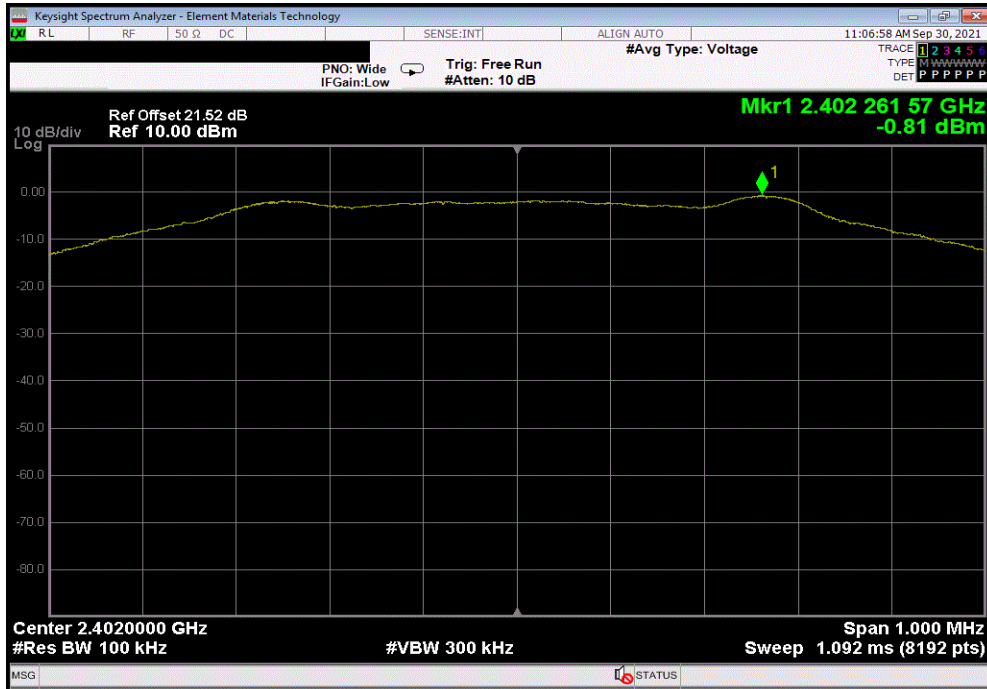
	Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK 1 Mbps Low Channel, 2402 MHz	Fundamental	2402.26	N/A	N/A	N/A
BLE/GFSK 1 Mbps Low Channel, 2402 MHz	30 MHz - 12.5 GHz	4804.25	-48.84	-20	Pass
BLE/GFSK 1 Mbps Low Channel, 2402 MHz	12.5 GHz - 25 GHz	23798.99	-50.79	-20	Pass
BLE/GFSK 1 Mbps Mid Channel, 2442 MHz	Fundamental	2441.75	N/A	N/A	N/A
BLE/GFSK 1 Mbps Mid Channel, 2442 MHz	30 MHz - 12.5 GHz	4883.42	-50.42	-20	Pass
BLE/GFSK 1 Mbps Mid Channel, 2442 MHz	12.5 GHz - 25 GHz	24598.64	-50.57	-20	Pass
BLE/GFSK 1 Mbps High Channel, 2480 MHz	Fundamental	2479.75	N/A	N/A	N/A
BLE/GFSK 1 Mbps High Channel, 2480 MHz	30 MHz - 12.5 GHz	4959.54	-47.67	-20	Pass
BLE/GFSK 1 Mbps High Channel, 2480 MHz	12.5 GHz - 25 GHz	23759.31	-50.88	-20	Pass
BLE/GFSK 2 Mbps Low Channel, 2402 MHz	Fundamental	2402.01	N/A	N/A	N/A
BLE/GFSK 2 Mbps Low Channel, 2402 MHz	30 MHz - 12.5 GHz	4802.73	-49.94	-20	Pass
BLE/GFSK 2 Mbps Low Channel, 2402 MHz	12.5 GHz - 25 GHz	24964.9	-50.47	-20	Pass
BLE/GFSK 2 Mbps Mid Channel, 2442 MHz	Fundamental	2442.02	N/A	N/A	N/A
BLE/GFSK 2 Mbps Mid Channel, 2442 MHz	30 MHz - 12.5 GHz	2569.37	-50.8	-20	Pass
BLE/GFSK 2 Mbps Mid Channel, 2442 MHz	12.5 GHz - 25 GHz	23922.6	-50.05	-20	Pass
BLE/GFSK 2 Mbps High Channel, 2480 MHz	Fundamental	2480.02	N/A	N/A	N/A
BLE/GFSK 2 Mbps High Channel, 2480 MHz	30 MHz - 12.5 GHz	4959.54	-48.22	-20	Pass
BLE/GFSK 2 Mbps High Channel, 2480 MHz	12.5 GHz - 25 GHz	23771.52	-50.03	-20	Pass

SPURIOUS CONDUCTED EMISSIONS

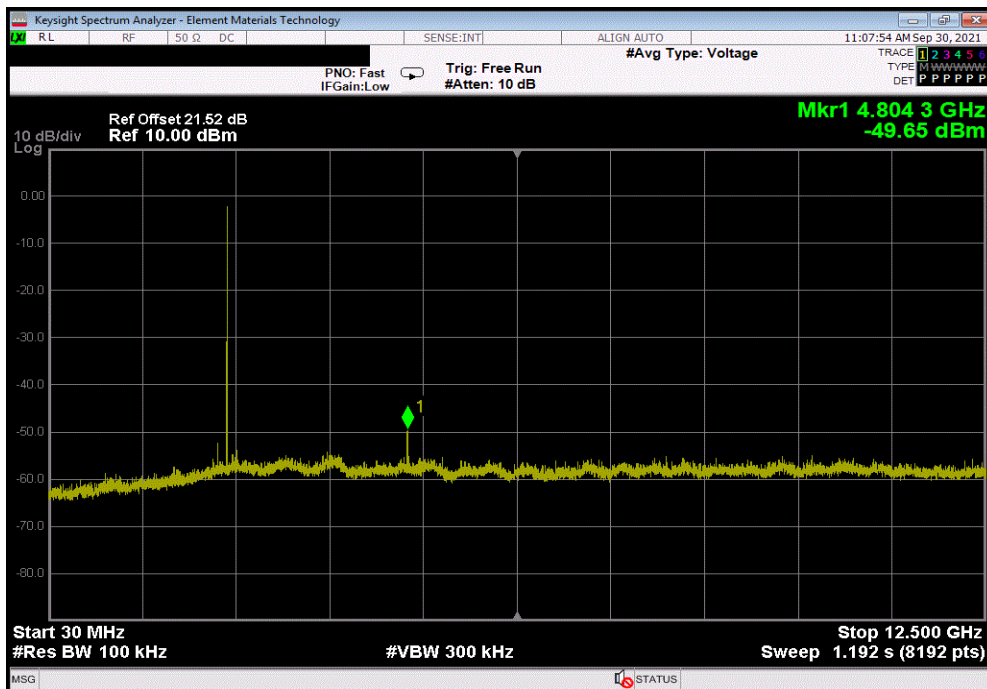


TbTx 2021.03.19.1 XMI 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
Fundamental	2402.26	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	4804.25	-48.84	-20	Pass		

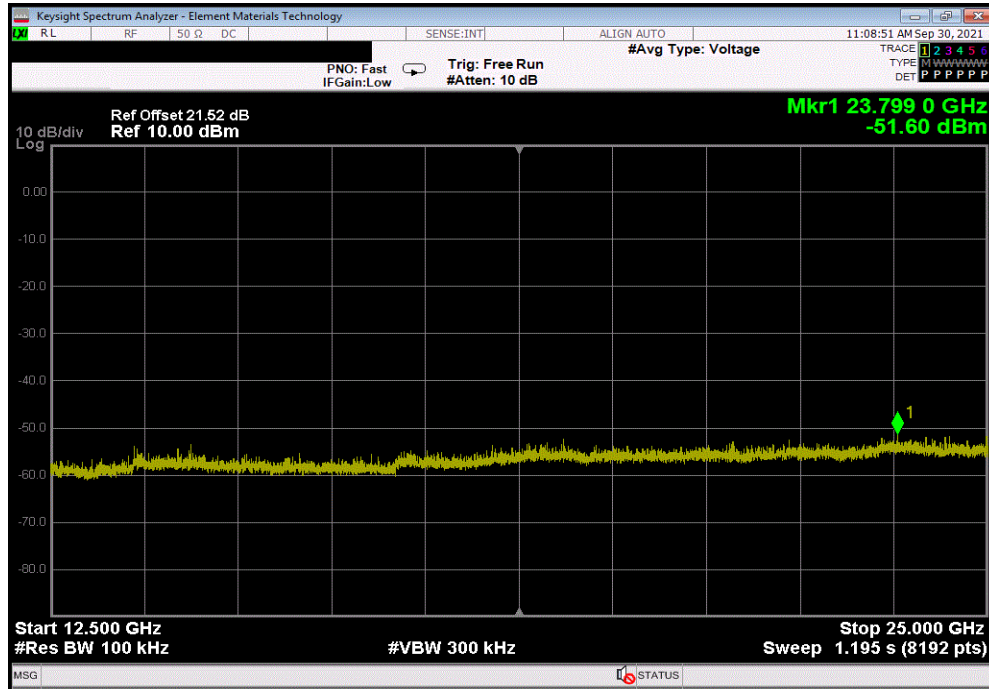


SPURIOUS CONDUCTED EMISSIONS

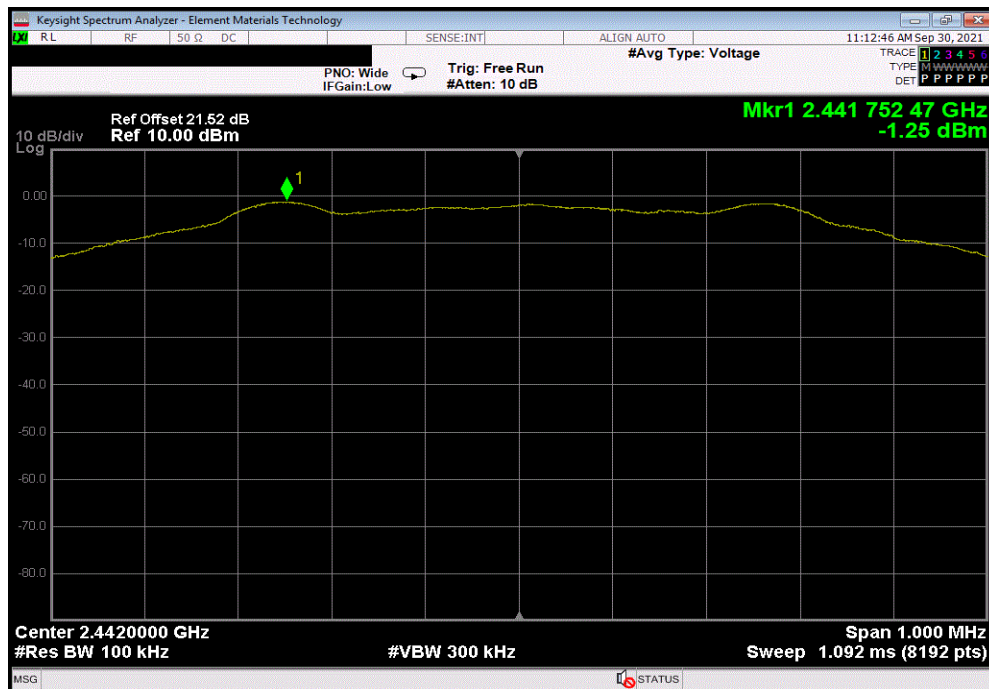


TbTx 2021.03.19.1 XMI 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	23798.99	-50.79	-20	Pass	



BLE/GFSK 1 Mbps Mid Channel, 2442 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2441.75	N/A	N/A	N/A	

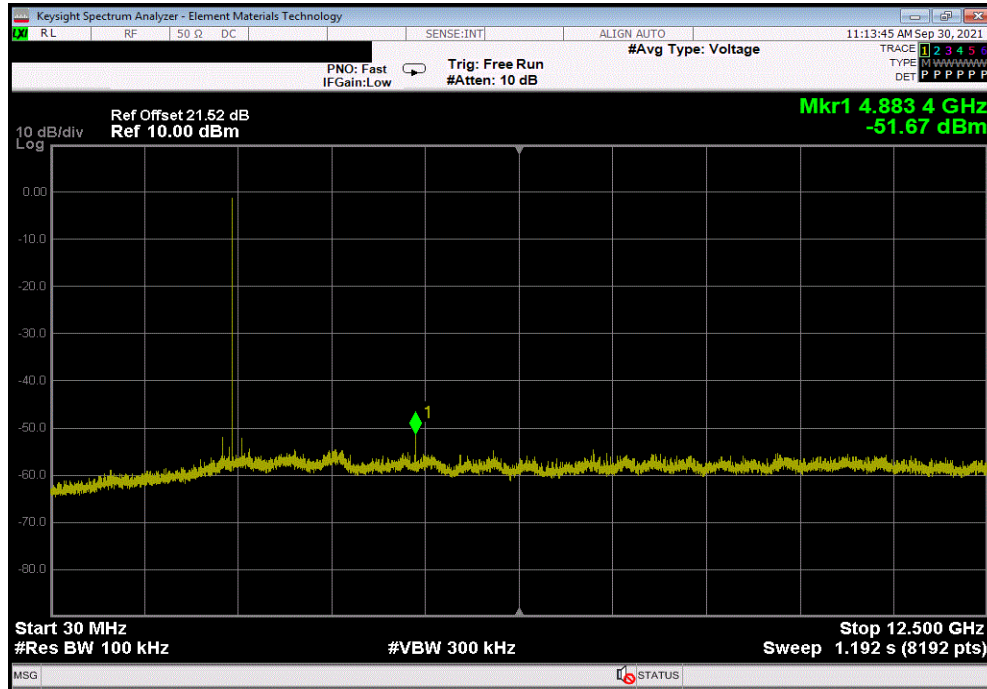


SPURIOUS CONDUCTED EMISSIONS

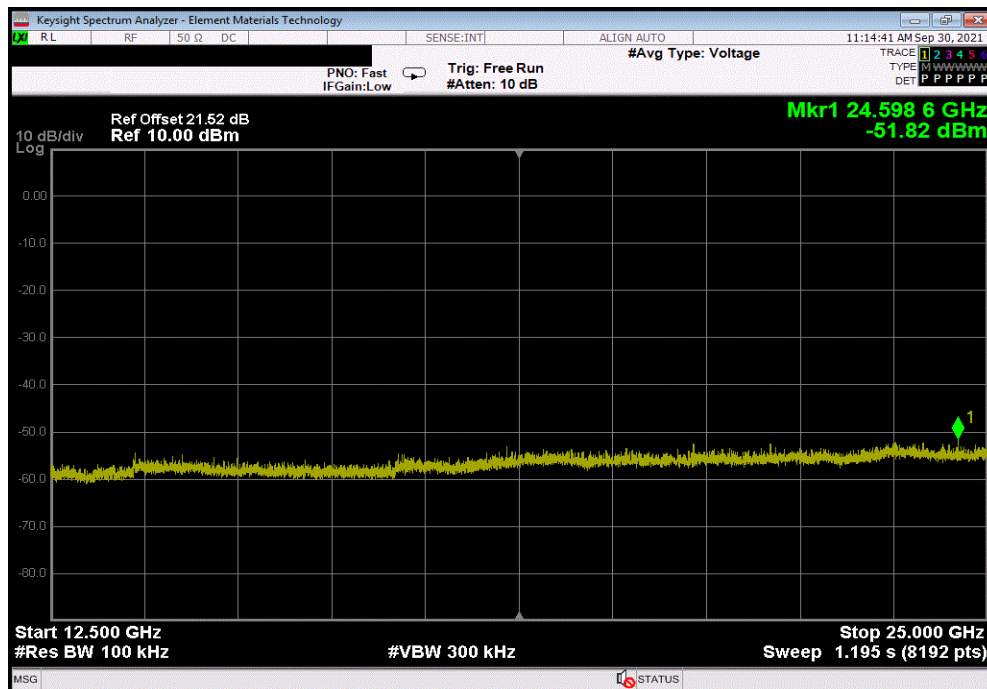


TbTx 2021.03.19.1 XMI 2020.12.30.0

BLE/GFSK 1 Mbps Mid Channel, 2442 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	4883.42	-50.42	-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	24598.64	-50.57	-20	Pass

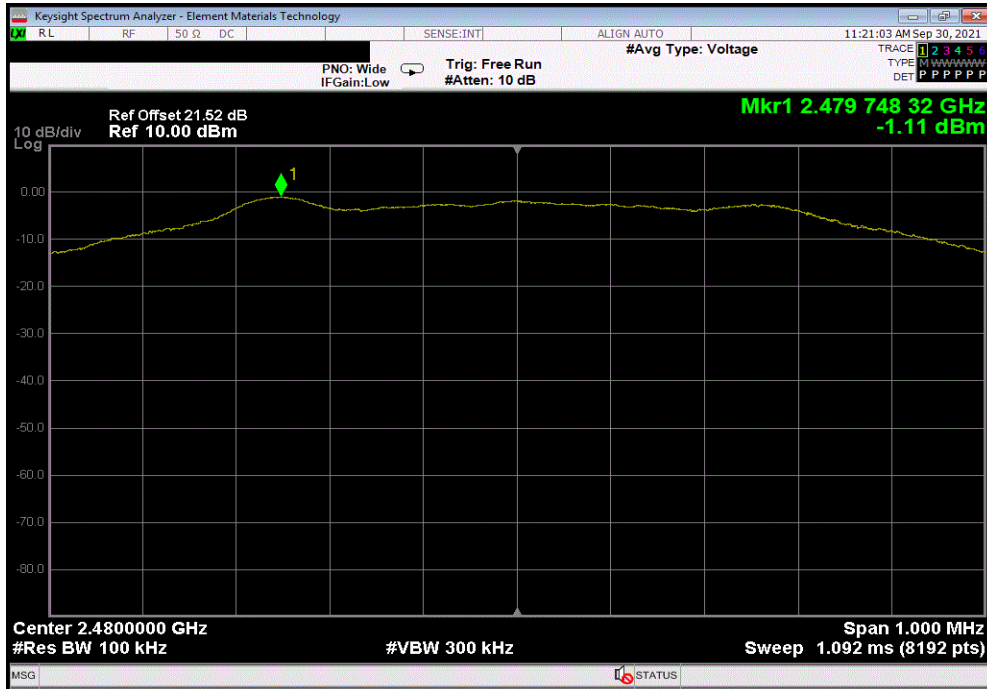


SPURIOUS CONDUCTED EMISSIONS

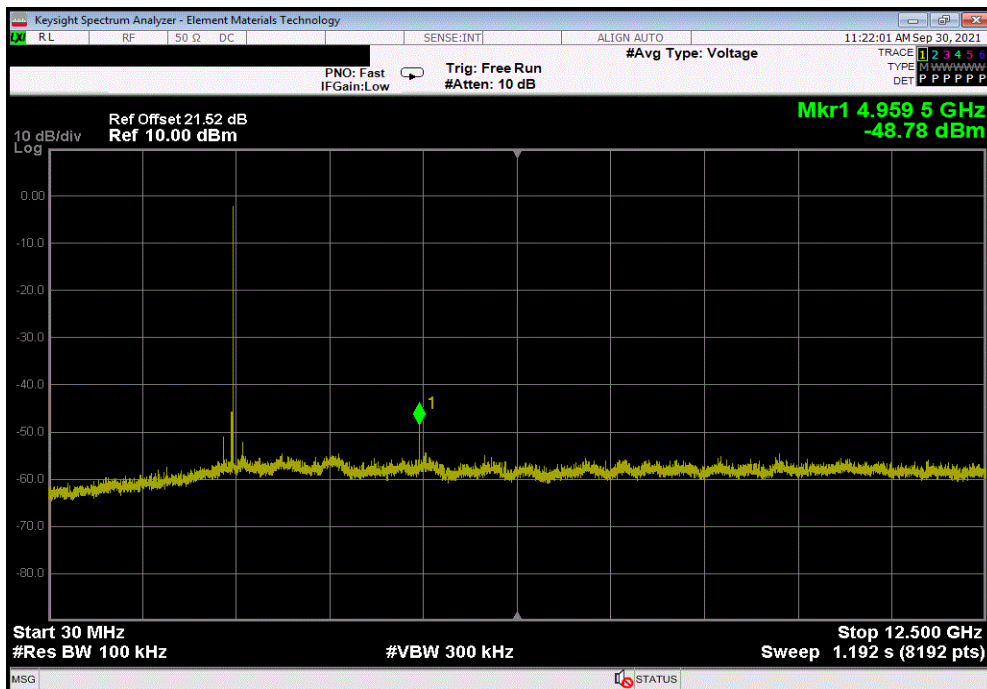


TbTx 2021.03.19.1 XMI 2020.12.30.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2479.75	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	4959.54	-47.67	-20	Pass	

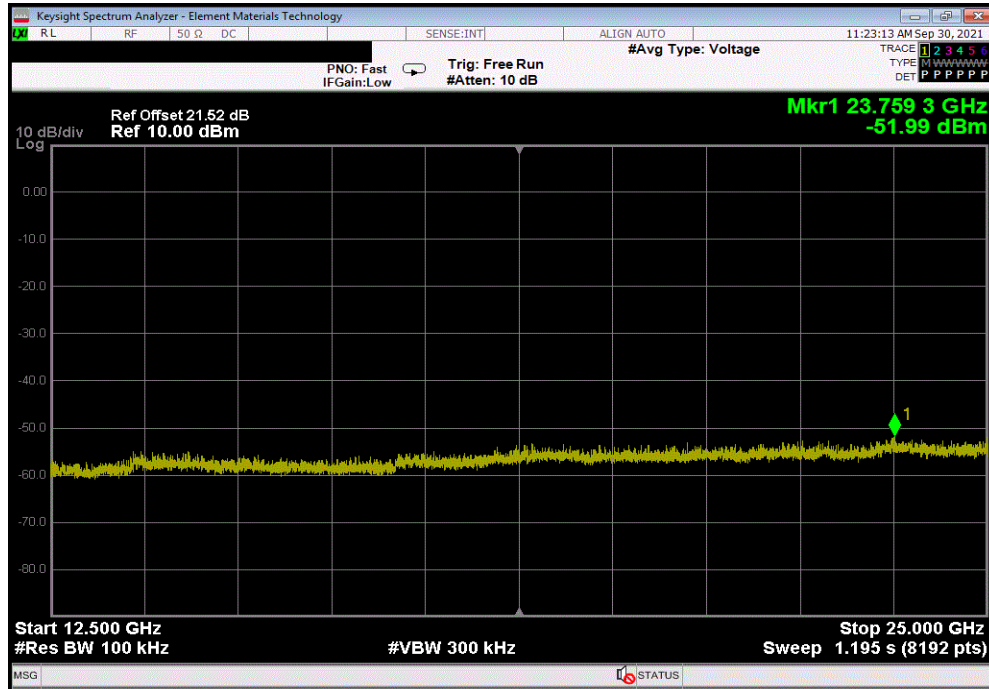


SPURIOUS CONDUCTED EMISSIONS

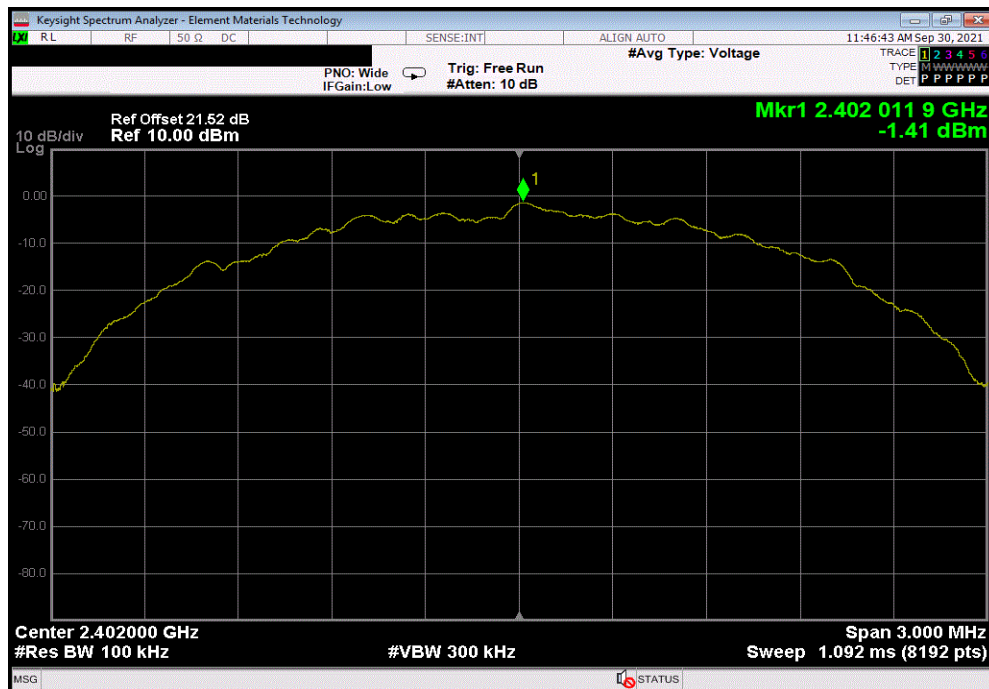


TbTx 2021.03.19.1 XMI 2020.12.30.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	23759.31	-50.88	-20	Pass	



BLE/GFSK 2 Mbps Low Channel, 2402 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2402.01	N/A	N/A	N/A	

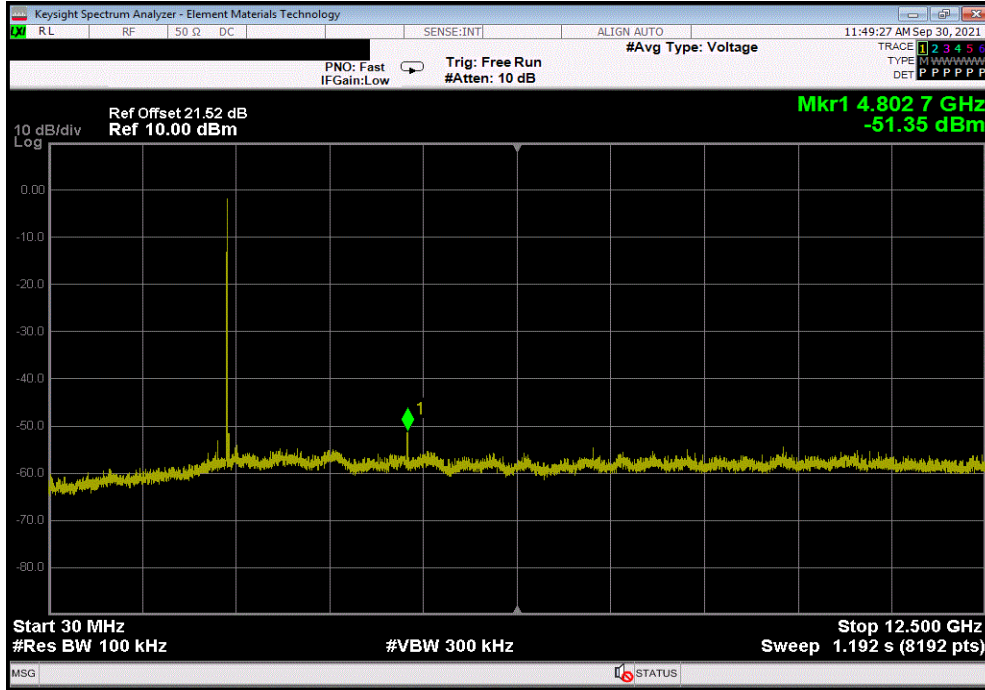


SPURIOUS CONDUCTED EMISSIONS

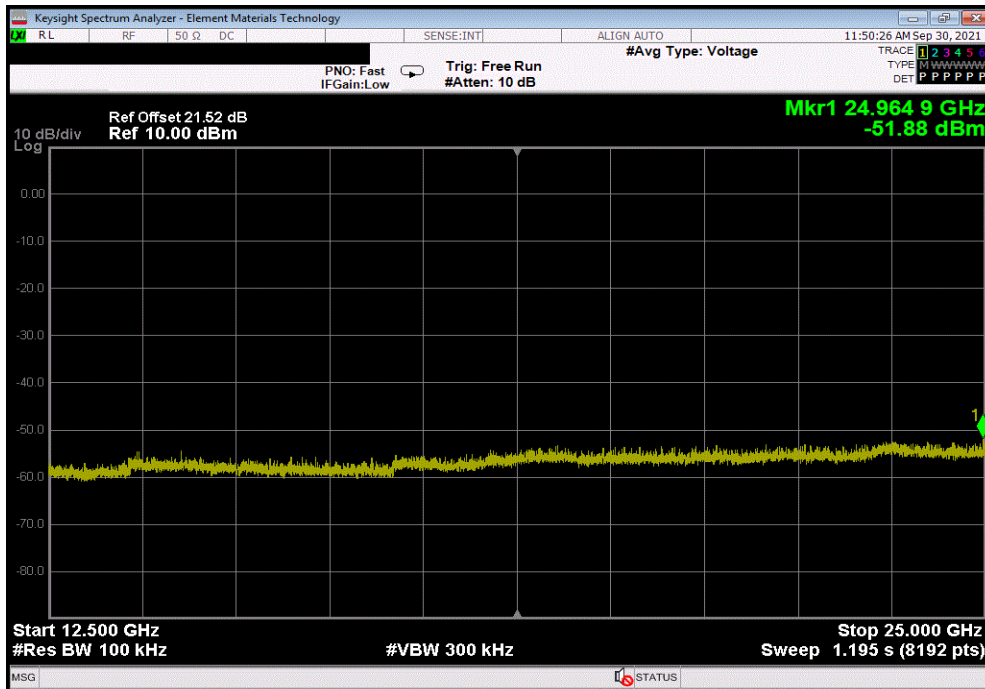


TbTx 2021.03.19.1 XMI 2020.12.30.0

BLE/GFSK 2 Mbps Low Channel, 2402 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	4802.73	-49.94	-20	Pass



BLE/GFSK 2 Mbps Low Channel, 2402 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz	24964.9	-50.47	-20	Pass

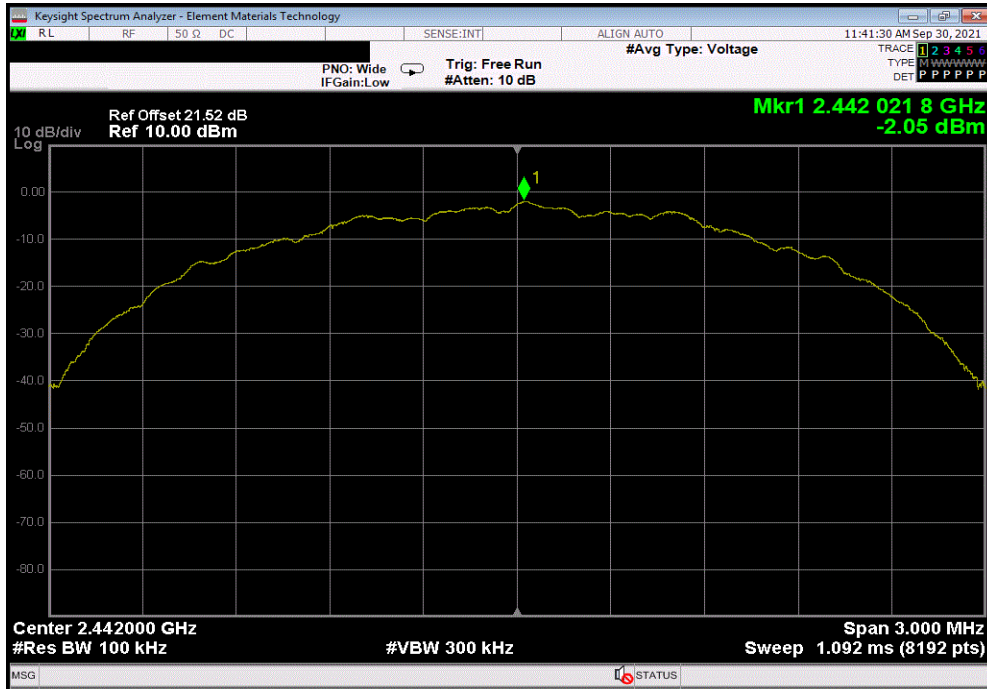


SPURIOUS CONDUCTED EMISSIONS

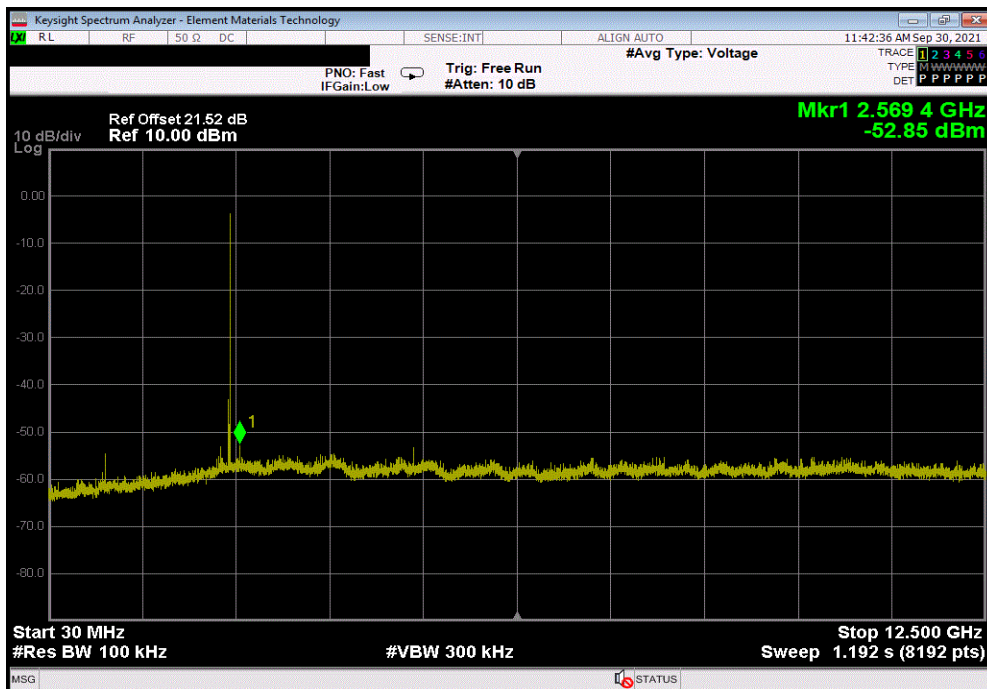


TbTx 2021.03.19.1 XMI 2020.12.30.0

BLE/GFSK 2 Mbps Mid Channel, 2442 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
Fundamental	2442.02	N/A	N/A	N/A		



BLE/GFSK 2 Mbps Mid Channel, 2442 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
30 MHz - 12.5 GHz	2569.37	-50.8	-20	Pass		

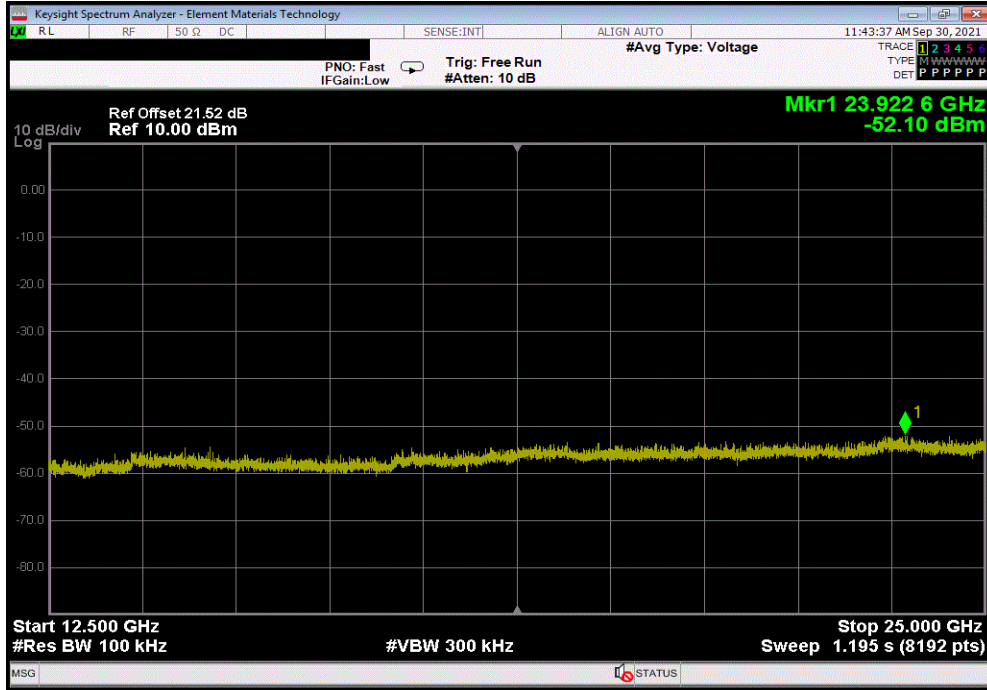


SPURIOUS CONDUCTED EMISSIONS

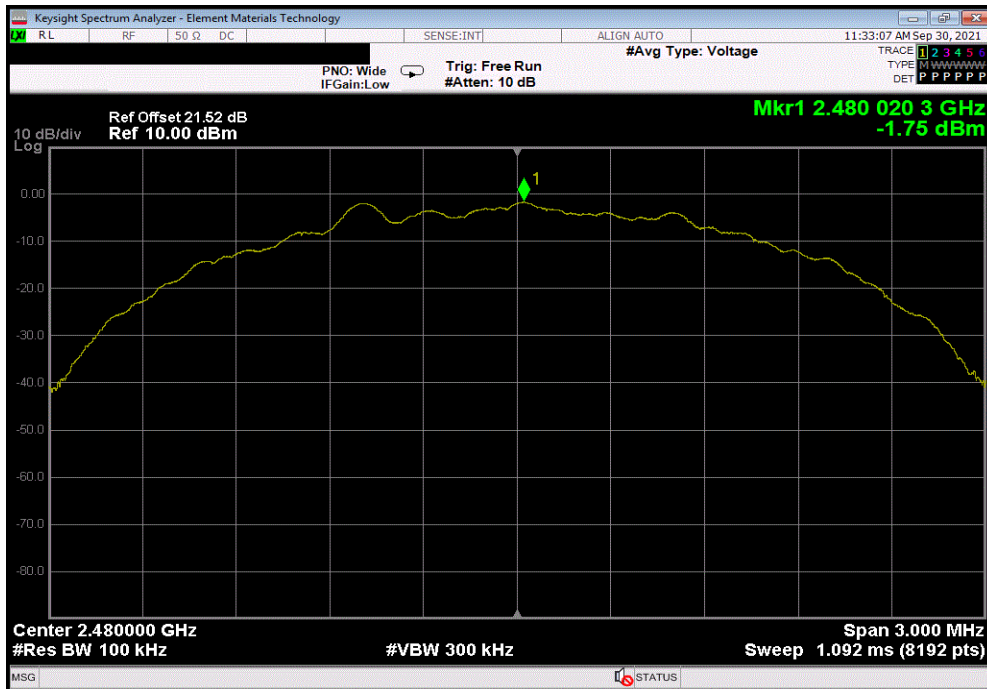


TbTx 2021.03.19.1 XMI 2020.12.30.0

BLE/GFSK 2 Mbps Mid Channel, 2442 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	23922.6	-50.05	-20	Pass	



BLE/GFSK 2 Mbps High Channel, 2480 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2480.02	N/A	N/A	N/A	

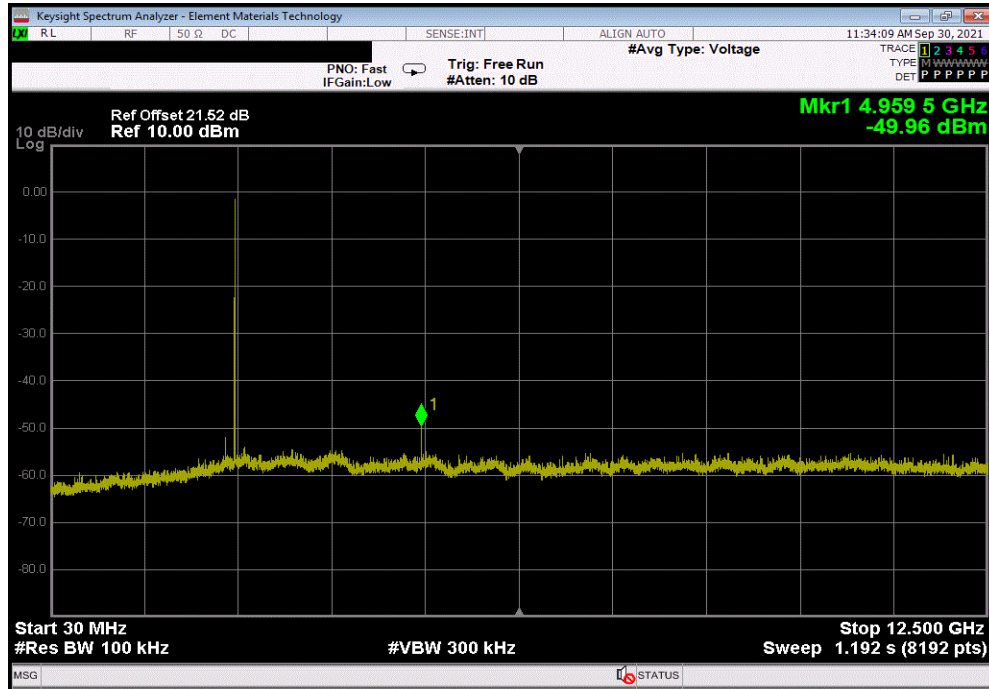


SPURIOUS CONDUCTED EMISSIONS

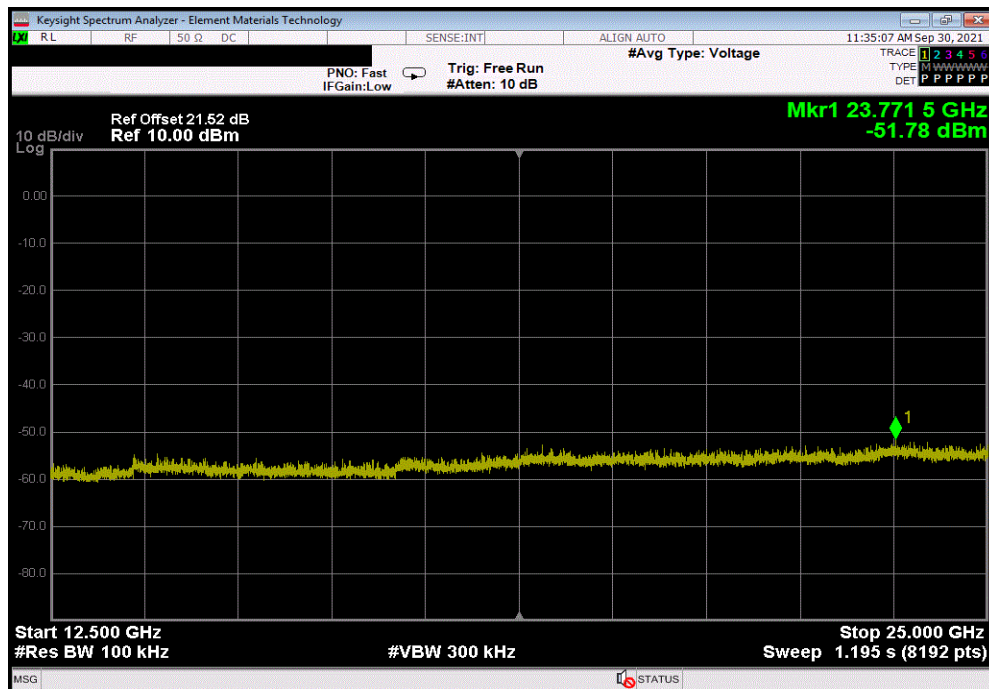


TbTx 2021.03.19.1 XMI 2020.12.30.0

BLE/GFSK 2 Mbps High Channel, 2480 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	4959.54	-48.22	-20	Pass



BLE/GFSK 2 Mbps High Channel, 2480 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz	23771.52	-50.03	-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	Agilent	N9010A	AFI	2020-12-08	2021-12-08
Antenna - Biconilog	Teseq	CBL 6141B	AXR	2020-10-13	2022-10-13
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	2021-07-16	2022-07-16
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
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	EVY	2021-07-16	2022-07-16
Attenuator	Coaxicom	3910-20	AXZ	2021-02-15	2022-02-15
Filter - Low Pass	Micro-Tronics	LPM50004	LFD	2021-02-15	2022-02-15
Filter - High Pass	Micro-Tronics	HPM50111	HFO	2020-11-17	2021-11-17

SPURIOUS RADIATED EMISSIONS



MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	5.2 dB	-5.2 dB

FREQUENCY RANGE INVESTIGATED

30 MHz TO 26400 MHz

POWER INVESTIGATED

Battery
Charging via 110VAC/60Hz

CONFIGURATIONS INVESTIGATED

HING0001-2
HING0001-4

MODES INVESTIGATED

Continuous Tx, BLE, Low Ch = 2402 MHz, Mid Ch = 2442 MHz, High Ch = 2480 MHz

SPURIOUS RADIATED EMISSIONS



EUT:	Enso 2	Work Order:	HING0001
Serial Number:	202688456	Date:	2021-09-30
Customer:	Hinge Health	Temperature:	22.9°C
Attendees:	Samuel House	Relative Humidity:	46.2%
Customer Project:	None	Bar. Pressure:	1024 mb
Tested By:	Jeff Alcoke	Job Site:	EV01
Power:	Battery	Configuration:	HING0001-2

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	14	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)
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COMMENTS

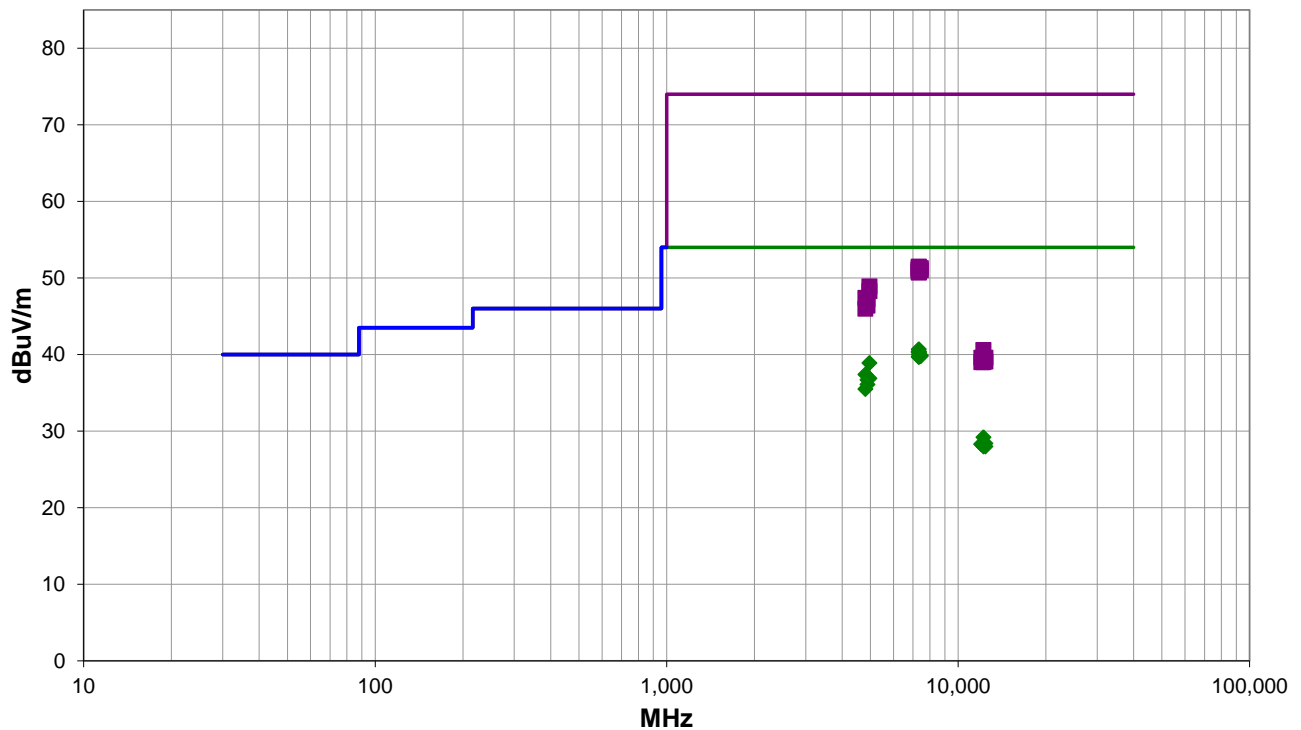
Please reference data comments below for channel, data rate, and EUT orientation.

EUT OPERATING MODES

Continuous Tx, BLE, Low Ch = 2402 MHz, Mid Ch = 2442 MHz, High Ch = 2480 MHz

DEVIATIONS FROM TEST STANDARD

None



Run #: 14

■ PK ◆ AV ● QP

SPURIOUS RADIATED EMISSIONS

RESULTS - Run #14

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	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
7326.492	29.0	11.7	1.5	63.0	3.0	0.0	Horz	AV	0.0	40.7	54.0	-13.3	Mid Ch, 1 Mbps, EUT Vert (button up)
7325.450	28.7	11.7	1.5	46.0	3.0	0.0	Vert	AV	0.0	40.4	54.0	-13.6	Mid Ch, 1 Mbps, EUT Vert (button up)
7324.342	28.7	11.7	2.1	96.0	3.0	0.0	Vert	AV	0.0	40.4	54.0	-13.6	Mid Ch, 2 Mbps, EUT Vert (button up)
7325.475	28.6	11.7	2.1	306.0	3.0	0.0	Vert	AV	0.0	40.3	54.0	-13.7	Mid Ch, 1 Mbps, EUT Horz
7324.483	28.6	11.7	1.5	9.0	3.0	0.0	Horz	AV	0.0	40.3	54.0	-13.7	Mid Ch, 2 Mbps, EUT Vert (button up)
7326.592	28.3	11.7	1.5	168.0	3.0	0.0	Horz	AV	0.0	40.0	54.0	-14.0	Mid Ch, 1 Mbps, EUT Horz
7437.692	27.7	12.2	2.9	218.0	3.0	0.0	Horz	AV	0.0	39.9	54.0	-14.1	High Ch, 1 Mbps, EUT Vert (button up)
7439.825	27.6	12.2	1.5	290.0	3.0	0.0	Vert	AV	0.0	39.8	54.0	-14.2	High Ch, 1 Mbps, EUT Vert (button up)
7325.483	28.0	11.7	2.3	151.0	3.0	0.0	Horz	AV	0.0	39.7	54.0	-14.3	Mid Ch, 1 Mbps, EUT on Side
7326.708	28.0	11.7	2.5	335.0	3.0	0.0	Vert	AV	0.0	39.7	54.0	-14.3	Mid Ch, 1 Mbps, EUT on Side
4960.042	33.0	5.9	1.5	33.0	3.0	0.0	Vert	AV	0.0	38.9	54.0	-15.1	High Ch, 1 Mbps, EUT Vert (button up)
4804.050	32.3	5.1	1.0	76.0	3.0	0.0	Vert	AV	0.0	37.4	54.0	-16.6	Low Ch, 1 Mbps, EUT Vert (button up)
4960.092	31.0	5.9	1.7	23.0	3.0	0.0	Horz	AV	0.0	36.9	54.0	-17.1	High Ch, 1 Mbps, EUT Vert (button up)
4884.025	30.7	6.0	2.8	90.0	3.0	0.0	Vert	AV	0.0	36.7	54.0	-17.3	Mid Ch, 1 Mbps, EUT Vert (button up)
4884.092	30.1	6.0	1.5	356.0	3.0	0.0	Horz	AV	0.0	36.1	54.0	-17.9	Mid Ch, 1 Mbps, EUT Vert (button up)
4804.167	30.3	5.2	1.5	37.0	3.0	0.0	Horz	AV	0.0	35.5	54.0	-18.5	Low Ch, 1 Mbps, EUT Vert (button up)
7327.258	39.8	11.7	1.5	63.0	3.0	0.0	Horz	PK	0.0	51.5	74.0	-22.5	Mid Ch, 1 Mbps, EUT Vert (button up)
7327.658	39.7	11.7	1.5	9.0	3.0	0.0	Horz	PK	0.0	51.4	74.0	-22.6	Mid Ch, 2 Mbps, EUT Vert (button up)
7440.800	39.1	12.2	1.5	290.0	3.0	0.0	Vert	PK	0.0	51.3	74.0	-22.7	High Ch, 1 Mbps, EUT Vert (button up)
7327.508	39.5	11.7	2.1	96.0	3.0	0.0	Vert	PK	0.0	51.2	74.0	-22.8	Mid Ch, 2 Mbps, EUT Vert (button up)
7325.858	39.4	11.7	2.1	306.0	3.0	0.0	Vert	PK	0.0	51.1	74.0	-22.9	Mid Ch, 1 Mbps, EUT Horz
7326.850	39.4	11.7	2.5	335.0	3.0	0.0	Vert	PK	0.0	51.1	74.0	-22.9	Mid Ch, 1 Mbps, EUT on Side
7440.383	38.8	12.2	2.9	218.0	3.0	0.0	Horz	PK	0.0	51.0	74.0	-23.0	High Ch, 1 Mbps, EUT Vert (button up)
7323.825	39.2	11.7	1.5	168.0	3.0	0.0	Horz	PK	0.0	50.9	74.0	-23.1	Mid Ch, 1 Mbps, EUT Horz
7324.142	39.1	11.7	2.3	151.0	3.0	0.0	Horz	PK	0.0	50.8	74.0	-23.2	Mid Ch, 1 Mbps, EUT on Side
7326.892	39.0	11.7	1.5	46.0	3.0	0.0	Vert	PK	0.0	50.7	74.0	-23.3	Mid Ch, 1 Mbps, EUT Vert (button up)
12208.820	28.3	0.9	1.0	244.0	3.0	0.0	Vert	AV	0.0	29.2	54.0	-24.8	Mid Ch, 1 Mbps, EUT Vert (button up)
4960.583	43.0	5.9	1.5	33.0	3.0	0.0	Vert	PK	0.0	48.9	74.0	-25.1	High Ch, 1 Mbps, EUT Vert (button up)
12398.130	26.9	1.5	3.7	46.0	3.0	0.0	Horz	AV	0.0	28.4	54.0	-25.6	High Ch, 1 Mbps, EUT Vert (button up)
12008.380	27.2	1.1	1.5	127.0	3.0	0.0	Horz	AV	0.0	28.3	54.0	-25.7	Low Ch, 1 Mbps, EUT Vert (button up)
12007.880	27.2	1.1	1.5	329.0	3.0	0.0	Vert	AV	0.0	28.3	54.0	-25.7	Low Ch, 1 Mbps, EUT Vert (button up)
4960.442	42.4	5.9	1.7	23.0	3.0	0.0	Horz	PK	0.0	48.3	74.0	-25.7	High Ch, 1 Mbps, EUT Vert (button up)
12399.460	26.5	1.5	2.8	216.0	3.0	0.0	Vert	AV	0.0	28.0	54.0	-26.0	High Ch, 1 Mbps, EUT Vert (button up)
12208.820	27.1	0.9	3.2	0.0	3.0	0.0	Horz	AV	0.0	28.0	54.0	-26.0	Mid Ch, 1 Mbps, EUT Vert (button up)
4805.142	42.2	5.2	1.0	76.0	3.0	0.0	Vert	PK	0.0	47.4	74.0	-26.6	Low Ch, 1 Mbps, EUT Vert (button up)
4884.050	41.2	6.0	2.8	90.0	3.0	0.0	Vert	PK	0.0	47.2	74.0	-26.8	Mid Ch, 1 Mbps, EUT Vert (button up)
4883.125	40.4	6.0	1.5	356.0	3.0	0.0	Horz	PK	0.0	46.4	74.0	-27.6	Mid Ch, 1 Mbps, EUT Vert (button up)
4802.633	40.9	5.1	1.5	37.0	3.0	0.0	Horz	PK	0.0	46.0	74.0	-28.0	Low Ch, 1 Mbps, EUT Vert (button up)
12208.880	39.7	0.9	1.0	244.0	3.0	0.0	Vert	PK	0.0	40.6	74.0	-33.4	Mid Ch, 1 Mbps, EUT Vert (button up)
12399.550	38.1	1.5	3.7	46.0	3.0	0.0	Horz	PK	0.0	39.6	74.0	-34.4	High Ch, 1 Mbps, EUT Vert (button up)

SPURIOUS RADIATED EMISSIONS

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	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
12007.540	38.5	1.1	1.5	127.0	3.0	0.0	Horz	PK	0.0	39.6	74.0	-34.4	Low Ch, 1 Mbps, EUT Vert (button up)
12397.860	37.6	1.5	2.8	216.0	3.0	0.0	Vert	PK	0.0	39.1	74.0	-34.9	High Ch, 1 Mbps, EUT Vert (button up)
12211.660	38.0	1.0	3.2	0.0	3.0	0.0	Horz	PK	0.0	39.0	74.0	-35.0	Mid Ch, 1 Mbps, EUT Vert (button up)
12009.330	37.9	1.1	1.5	329.0	3.0	0.0	Vert	PK	0.0	39.0	74.0	-35.0	Low Ch, 1 Mbps, EUT Vert (button up)

CONCLUSION

Pass



Tested By

SPURIOUS RADIATED EMISSIONS



EUT:	Enso 2	Work Order:	HING0001
Serial Number:	202688456	Date:	2021-09-30
Customer:	Hinge Health	Temperature:	22.9°C
Attendees:	Samuel House	Relative Humidity:	46.2%
Customer Project:	None	Bar. Pressure:	1024 mb
Tested By:	Jeff Alcoke	Job Site:	EV01
Power:	Battery	Configuration:	HING0001-2

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

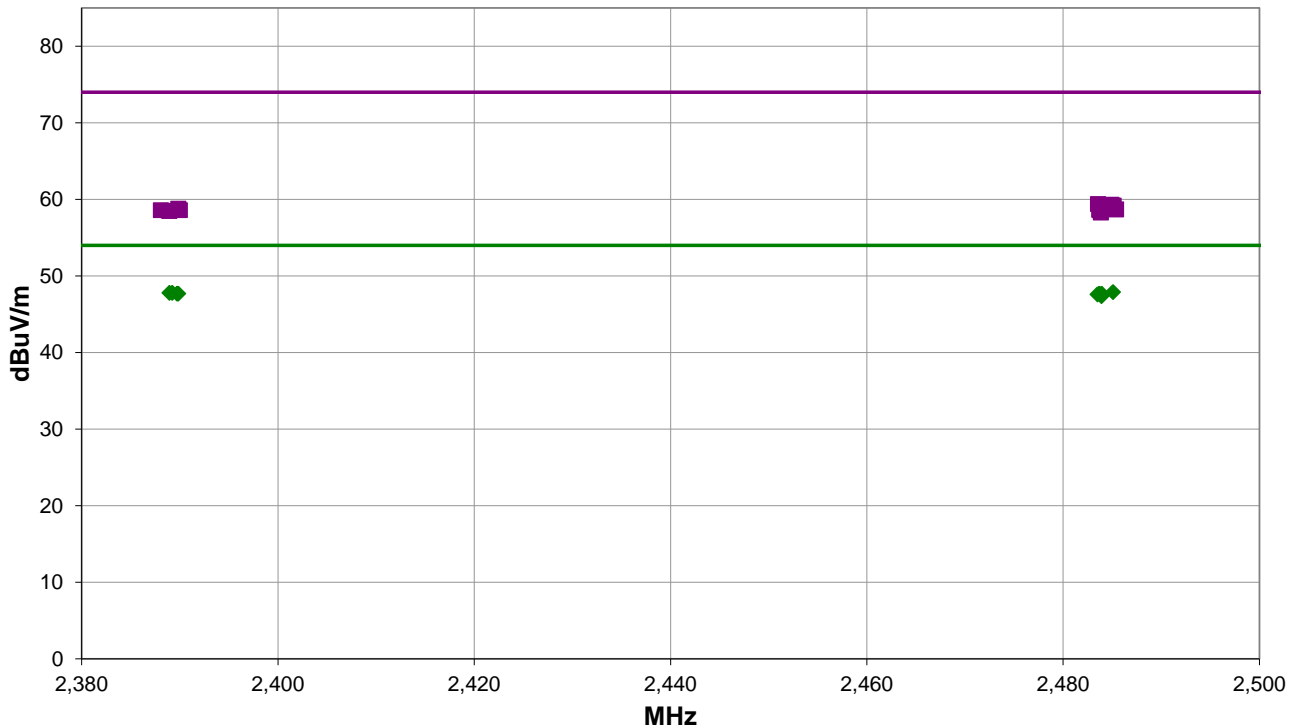
Please reference data comments below for channel, data rate, and EUT orientation.

EUT OPERATING MODES

Continuous Tx, BLE, 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)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2485.083	31.4	-3.5	2.86	14.0	3.0	20.0	Horz	AV	0.0	47.9	54.0	-6.1	High Ch, 1 Mbps, EUT Vert (button up)
2388.937	31.3	-3.5	1.37	137.0	3.0	20.0	Horz	AV	0.0	47.8	54.0	-6.2	Low Ch, 1 Mbps, EUT Vert (button up)
2389.223	31.3	-3.5	1.5	7.0	3.0	20.0	Vert	AV	0.0	47.8	54.0	-6.2	Low Ch, 1 Mbps, EUT Vert (button up)
2483.923	31.3	-3.6	1.5	283.0	3.0	20.0	Vert	AV	0.0	47.7	54.0	-6.3	High Ch, 1 Mbps, EUT Vert (button up)
2483.677	31.3	-3.6	1.87	177.0	3.0	20.0	Horz	AV	0.0	47.7	54.0	-6.3	High Ch, 1 Mbps, EUT Horz
2389.833	31.2	-3.5	1.5	304.0	3.0	20.0	Horz	AV	0.0	47.7	54.0	-6.3	Low Ch, 2 Mbps, EUT Vert (button up)
2389.717	31.2	-3.5	1.5	199.0	3.0	20.0	Vert	AV	0.0	47.7	54.0	-6.3	Low Ch, 2 Mbps, EUT Vert (button up)
2483.503	31.2	-3.6	1.5	24.0	3.0	20.0	Vert	AV	0.0	47.6	54.0	-6.4	High Ch, 2 Mbps, EUT Vert (button up)
2483.953	31.1	-3.6	1.5	47.0	3.0	20.0	Horz	AV	0.0	47.5	54.0	-6.5	High Ch, 1 Mbps, EUT on Side
2483.927	31.1	-3.6	1.5	168.0	3.0	20.0	Vert	AV	0.0	47.5	54.0	-6.5	High Ch, 1 Mbps, EUT on Side
2483.903	31.0	-3.6	1.01	167.0	3.0	20.0	Vert	AV	0.0	47.4	54.0	-6.6	High Ch, 1 Mbps, EUT Horz
2483.913	31.0	-3.6	2.72	79.0	3.0	20.0	Horz	AV	0.0	47.4	54.0	-6.6	High Ch, 2 Mbps, EUT Vert (button up)
2483.553	43.0	-3.6	1.5	24.0	3.0	20.0	Vert	PK	0.0	59.4	74.0	-14.6	High Ch, 2 Mbps, EUT Vert (button up)
2484.937	42.9	-3.6	1.5	47.0	3.0	20.0	Horz	PK	0.0	59.3	74.0	-14.7	High Ch, 1 Mbps, EUT on Side
2485.147	42.7	-3.5	1.87	177.0	3.0	20.0	Horz	PK	0.0	59.2	74.0	-14.8	High Ch, 1 Mbps, EUT Horz
2483.973	42.4	-3.6	1.5	168.0	3.0	20.0	Vert	PK	0.0	58.8	74.0	-15.2	High Ch, 1 Mbps, EUT on Side
2389.843	42.3	-3.5	1.5	304.0	3.0	20.0	Horz	PK	0.0	58.8	74.0	-15.2	Low Ch, 2 Mbps, EUT Vert (button up)
2483.690	42.3	-3.6	2.86	14.0	3.0	20.0	Horz	PK	0.0	58.7	74.0	-15.3	High CH, 1 Mbps, EUT Vert (button up)
2485.393	42.2	-3.5	1.5	283.0	3.0	20.0	Vert	PK	0.0	58.7	74.0	-15.3	High CH, 1 Mbps, EUT Vert (button up)
2483.707	42.2	-3.6	2.72	79.0	3.0	20.0	Horz	PK	0.0	58.6	74.0	-15.4	High Ch, 2 Mbps, EUT Vert (button up)
2389.997	42.1	-3.5	1.5	199.0	3.0	20.0	Vert	PK	0.0	58.6	74.0	-15.4	Low Ch, 2 Mbps, EUT Vert (button up)
2388.070	42.1	-3.5	1.5	7.0	3.0	20.0	Vert	PK	0.0	58.6	74.0	-15.4	Low Ch, 1 Mbps, EUT Vert (button up)
2388.917	42.0	-3.5	1.37	137.0	3.0	20.0	Horz	PK	0.0	58.5	74.0	-15.5	Low Ch, 1 Mbps, EUT Vert (button up)
2483.843	41.9	-3.6	1.01	167.0	3.0	20.0	Vert	PK	0.0	58.3	74.0	-15.7	High Ch, 1 Mbps, EUT Horz

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS



EUT:	Enso 2	Work Order:	HING0001
Serial Number:	202688456	Date:	2021-09-30
Customer:	Hinge Health	Temperature:	22.9°C
Attendees:	Samuel House	Relative Humidity:	46.2%
Customer Project:	None	Bar. Pressure:	1024 mb
Tested By:	Jeff Alcoke	Job Site:	EV01
Power:	Charging via 110VAC/60Hz	Configuration:	HING0001-4

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	19	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)
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COMMENTS

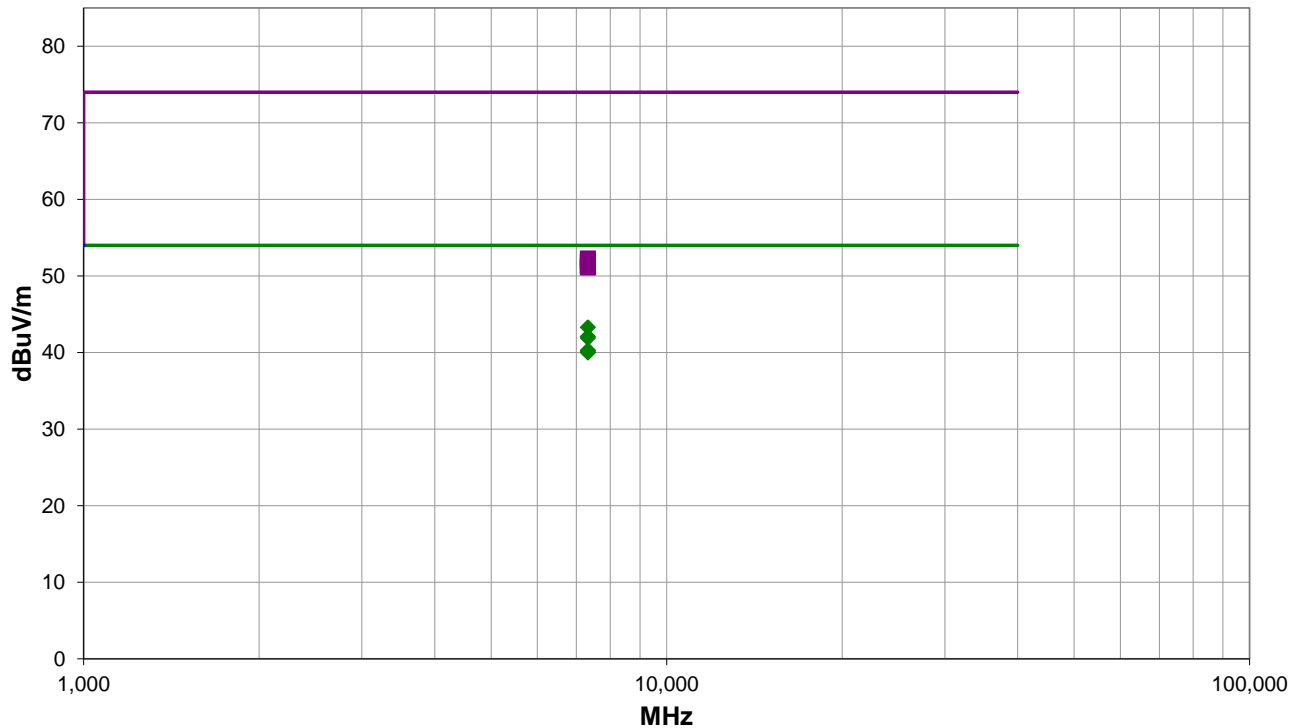
Please reference data comments below for channel, data rate, and EUT orientation.

EUT OPERATING MODES

Continuous Tx, BLE, Low Ch = 2402 MHz, Mid Ch = 2442 MHz, High Ch = 2480 MHz

DEVIATIONS FROM TEST STANDARD

None



Run #: 19

■ PK ◆ AV ● QP

SPURIOUS RADIATED EMISSIONS

RESULTS - Run #19

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	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
7325.392	31.6	11.7	2.65	44.0	3.0	0.0	Horz	AV	0.0	43.3	54.0	-10.7	Mid Ch, 1 Mbps, EUT Vert (button up)
7325.558	30.4	11.7	2.72	261.0	3.0	0.0	Vert	AV	0.0	42.1	54.0	-11.9	Mid Ch, 1 Mbps, EUT Horz
7325.300	30.2	11.7	2.5	67.0	3.0	0.0	Horz	AV	0.0	41.9	54.0	-12.1	Mid Ch, 1 Mbps, EUT on Side
7326.542	28.6	11.7	1.33	122.0	3.0	0.0	Vert	AV	0.0	40.3	54.0	-13.7	Mid Ch, 1 Mbps, EUT on Side
7325.525	28.5	11.7	1.33	49.0	3.0	0.0	Vert	AV	0.0	40.2	54.0	-13.8	Mid Ch, 1 Mbps, EUT Vert (button up)
7325.125	28.3	11.7	1.5	236.0	3.0	0.0	Horz	AV	0.0	40.0	54.0	-14.0	Mid Ch, 1 Mbps, EUT Horz
7326.992	40.6	11.7	2.65	44.0	3.0	0.0	Horz	PK	0.0	52.3	74.0	-21.7	Mid Ch, 1 Mbps, EUT Vert (button up)
7325.308	40.2	11.7	2.72	261.0	3.0	0.0	Vert	PK	0.0	51.9	74.0	-22.1	Mid Ch, 1 Mbps, EUT Horz
7325.425	40.2	11.7	2.5	67.0	3.0	0.0	Horz	PK	0.0	51.9	74.0	-22.1	Mid Ch, 1 Mbps, EUT on Side
7324.000	39.6	11.7	1.5	236.0	3.0	0.0	Horz	PK	0.0	51.3	74.0	-22.7	Mid Ch, 1 Mbps, EUT Horz
7325.342	39.6	11.7	1.33	122.0	3.0	0.0	Vert	PK	0.0	51.3	74.0	-22.7	Mid Ch, 1 Mbps, EUT on Side
7325.625	39.4	11.7	1.33	49.0	3.0	0.0	Vert	PK	0.0	51.1	74.0	-22.9	Mid Ch, 1 Mbps, EUT Vert (button up)

CONCLUSION

Pass



Tested By

SPURIOUS RADIATED EMISSIONS



EUT:	Enso 2	Work Order:	HING0001
Serial Number:	202688456	Date:	2021-09-30
Customer:	Hinge Health	Temperature:	22.9°C
Attendees:	Samuel House	Relative Humidity:	46.2%
Customer Project:	None	Bar. Pressure:	1024 mb
Tested By:	Jeff Alcoke	Job Site:	EV01
Power:	Charging via 110VAC/60Hz	Configuration:	HING0001-4

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	20	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)
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COMMENTS

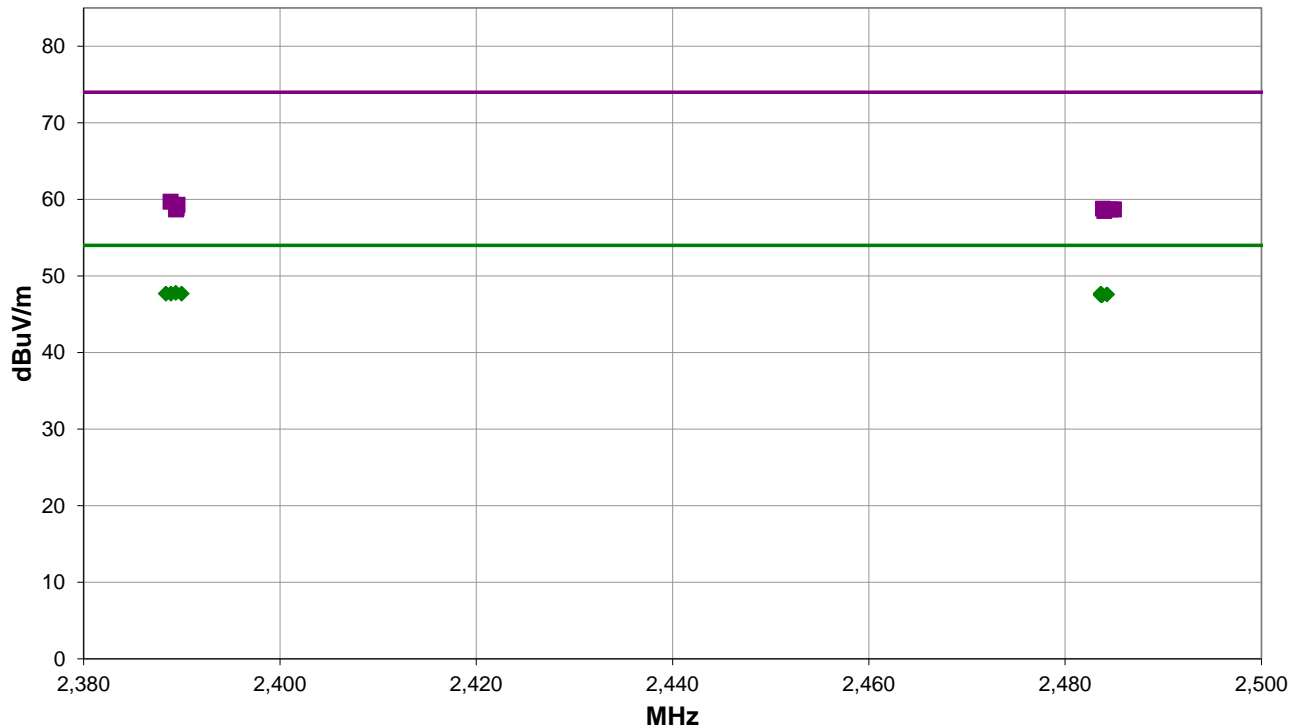
Please reference data comments below for channel, data rate, and EUT orientation.

EUT OPERATING MODES

Continuous Tx, BLE, Low Ch = 2402 MHz, Mid Ch = 2442 MHz, High Ch = 2480 MHz

DEVIATIONS FROM TEST STANDARD

None



Run #: 20

■ PK ◆ AV ● QP

SPURIOUS RADIATED EMISSIONS

RESULTS - Run #20

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	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
2389.377	31.3	-3.5	1.17	107.0	3.0	20.0	Vert	AV	0.0	47.8	54.0	-6.2	Low Ch, 1 Mbps, EUT Vert (button up)
2388.887	31.2	-3.5	1.5	336.0	3.0	20.0	Horz	AV	0.0	47.7	54.0	-6.3	Low Ch, 1 Mbps, EUT Vert (button up)
2389.973	31.2	-3.5	1.5	141.0	3.0	20.0	Horz	AV	0.0	47.7	54.0	-6.3	Low Ch, 2 Mbps, EUT Vert (button up)
2388.373	31.2	-3.5	1.47	203.0	3.0	20.0	Vert	AV	0.0	47.7	54.0	-6.3	Low Ch, 2 Mbps, EUT Vert (button up)
2483.633	31.3	-3.6	3.02	82.0	3.0	20.0	Vert	AV	0.0	47.7	54.0	-6.3	High Ch, 2 Mbps, EUT Vert (button up)
2484.263	31.2	-3.6	3.19	246.0	3.0	20.0	Horz	AV	0.0	47.6	54.0	-6.4	High Ch, 1 Mbps, EUT Vert (button up)
2483.643	31.1	-3.6	1.5	0.0	3.0	20.0	Vert	AV	0.0	47.5	54.0	-6.5	High Ch, 1 Mbps, EUT Vert (button up)
2483.773	31.1	-3.6	1.5	356.0	3.0	20.0	Horz	AV	0.0	47.5	54.0	-6.5	High Ch, 2 Mbps, EUT Vert (button up)
2388.857	43.2	-3.5	1.5	336.0	3.0	20.0	Horz	PK	0.0	59.7	74.0	-14.3	Low Ch, 1 Mbps, EUT Vert (button up)
2389.563	42.8	-3.5	1.47	203.0	3.0	20.0	Vert	PK	0.0	59.3	74.0	-14.7	Low Ch, 2 Mbps, EUT Vert (button up)
2389.470	42.4	-3.5	1.5	141.0	3.0	20.0	Horz	PK	0.0	58.9	74.0	-15.1	Low Ch, 2 Mbps, EUT Vert (button up)
2483.857	42.4	-3.6	3.19	246.0	3.0	20.0	Horz	PK	0.0	58.8	74.0	-15.2	High Ch, 1 Mbps, EUT Vert (button up)
2389.410	42.2	-3.5	1.17	107.0	3.0	20.0	Vert	PK	0.0	58.7	74.0	-15.3	Low Ch, 1 Mbps, EUT Vert (button up)
2484.633	42.3	-3.6	1.5	356.0	3.0	20.0	Horz	PK	0.0	58.7	74.0	-15.3	High Ch, 2 Mbps, EUT Vert (button up)
2484.970	42.3	-3.6	3.02	82.0	3.0	20.0	Vert	PK	0.0	58.7	74.0	-15.3	High Ch, 2 Mbps, EUT Vert (button up)
2483.990	42.1	-3.6	1.5	0.0	3.0	20.0	Vert	PK	0.0	58.5	74.0	-15.5	High Ch, 1 Mbps, EUT Vert (button up)

CONCLUSION

Pass



Tested By

End of Test Report