Hinge Health

Enso3

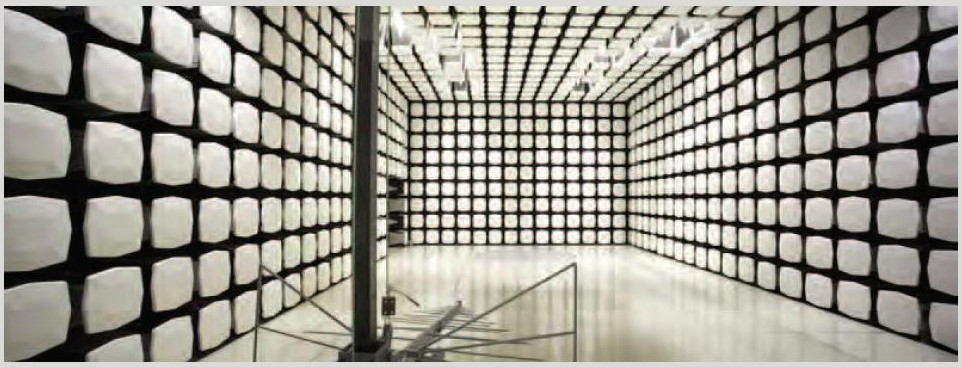
FCC 15.247:2024

RSS-247 Issue 3:2023

RSS-Gen Issue 5:2018+A1:2019+A2:2021

Bluetooth Radio

Report: HING0014.1 Rev. 0, Issue Date: May 13, 2024



ACCREDITED
CERT #3310.02

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element
2023.04.17

Section	Page Number

CERTIFICATE OF TEST

Last Date of Test: April 11, 2024
Hinge Health
EUT: Enso3

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2024	ANSI C63.10:2013
FCC 15.247:2024	
RSS-247 Issue 3:2023	
RSS-Gen 6.12	
RSS-Gen Issue 5:2018+A1:2019+A2:2021	

Guidance

FCC KDB 558074 v05r02:2019
Notice 2021 - CEB0001

Results

Test Description	Result	FCC Section(s)	RSS Section(s)	ANSI C63.10 Section(s)	Comments
Powerline Conducted Emissions	Pass	15.207	RSS-Gen 8.8	6.2	
Duty Cycle	Pass	KDB 558074 -6.0	RSS-Gen 3.2	11.6	
DTS Bandwidth (6 dB)	Pass	15.247(a)(2), KDB 558074 -8.2	RSS-247 5.2(a)	11.8.2	
Occupied Bandwidth (99%)	Pass	KDB 558074 -2.1	RSS-Gen 6.7	6.9.3	
Output Power	Pass	15.247(b)(3), KDB 558074 -8.3.1	RSS-247 5.4(d, f), RSS-Gen 6.12	11.9.1.1	
Equivalent Isotropic Radiated Power	Pass	15.247(b)(3), KDB 558074 -8.3.1	RSS-247 5.4(d, f), RSS-Gen 6.12	11.9.1.1	
Power Spectral Density	Pass	15.247(e), KDB 558074 -8.4	RSS-247 5.2(b)	11.10.2	
Band Edge Compliance	Pass	15.247(d), KDB 558074 -8.5	RSS-247 5.5	11.11	
Spurious Conducted Emissions	Pass	15.247(d), KDB 558074 -8.5	RSS-247 5.5	11.11	
Spurious Radiated Emissions	Pass	15.247(d), KDB 558074 - 8.6, 8.7	RSS-247 5.5, RSS-Gen 6.13, 8.10	11.12.1, 11.13.2, 6.5, 6.6	

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.

CERTIFICATE OF TEST

Deviations From Test Standards

None

Approved By:

Mark Baytan, Department Manager
Signed for and on behalf of Element

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

element
2021.09.01

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

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

California Minnesota Oregon Texas Washington

FACILITIES

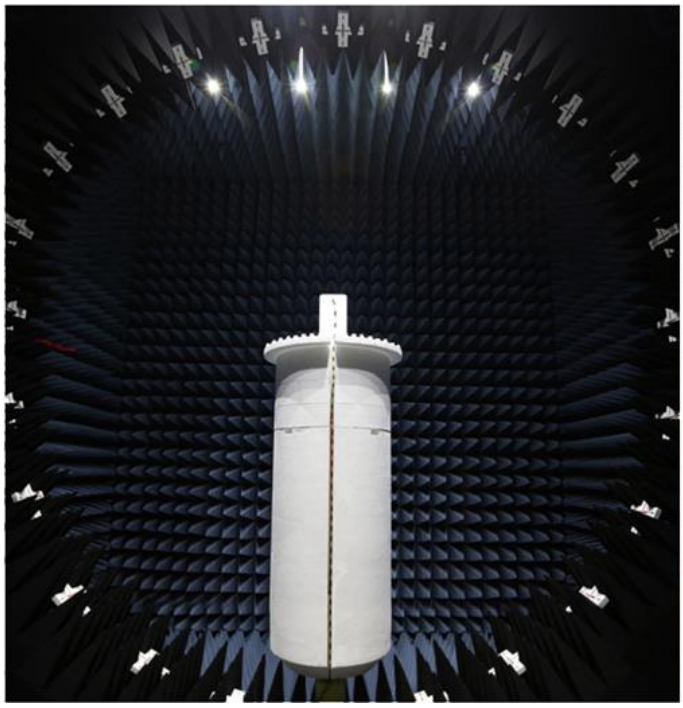
element
2023.09.21

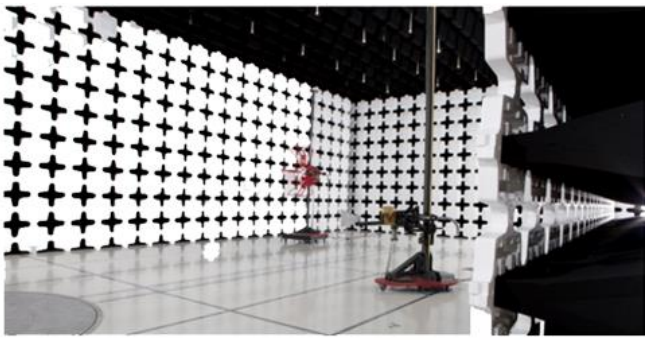
Testing was performed at the following location(s)

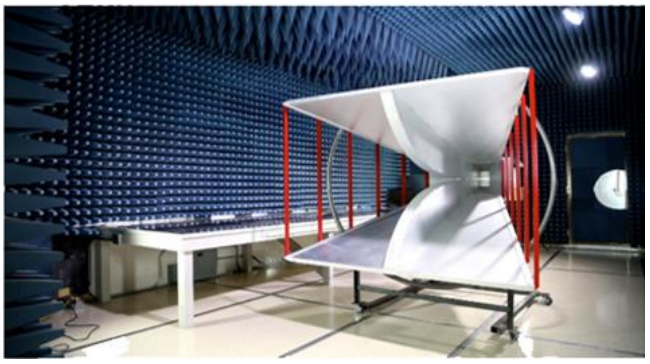
	Location	Labs (1)	Address	A2LA (2)	ISED (3)	BSMI (4)	VCCI (5)	CAB (6)	FDA (7)
☐	California	OC01-17	41 Tesla Irvine, CA 92618 (949) 861-8918	3310.04	2834B	SL2-IN-E-1154R	A-0029	US0158	TL-55
☐	Minnesota	MN01-11	9349 W Broadway Ave. Brooklyn Park, MN 55445 (612) 638-5136	3310.05	2834E	SL2-IN-E-1152R	A-0109	US0175	TL-57
☒	Oregon	EV01-12	6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	3310.02	2834D	SL2-IN-E-1017	A-0108	US0017	TL-56
☐	Texas	TX01-09	3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	3310.03	2834G	SL2-IN-E-1158R	A-0201	US0191	TL-54
☐	Washington	NC01-05	19201 120th Ave NE Bothell, WA 98011 (425) 984-6600	3310.06	2834F	SL2-IN-E-1153R	A-0110	US0157	TL-67
☐	Offsite	N/A	See Product Description	N/A	N/A	N/A	N/A	N/A	N/A

See data sheets for specific labs

(1) The lab designations denote individual rooms within each location. (OC01, OC02, OC03, etc.)
(2) A2LA Certificate No.
(3) ISED Company No.
(4) BSMI No.
(5) VCCI Site Filing No.
(6) CAB Identifier. Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA
(7) FDA ASCA No.







MEASUREMENT UNCERTAINTY

element
TMU.2015.07.10

Measurement Uncertainty

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

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

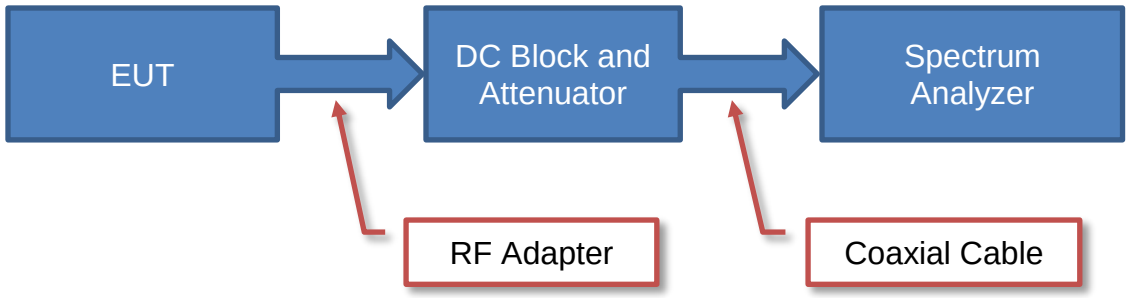
TEST SETUP BLOCK DIAGRAMS

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.

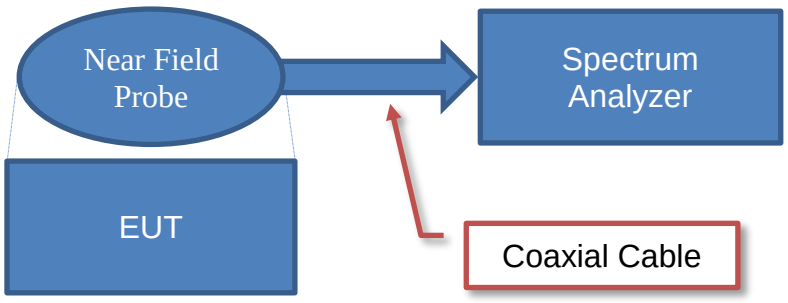
Antenna Port Conducted Measurements



Sample Calculation (logarithmic units)

Measured Value		Measured Level		Reference Level Offset
71.2	=	42.6	+	28.6

Near Field Test Fixture Measurements

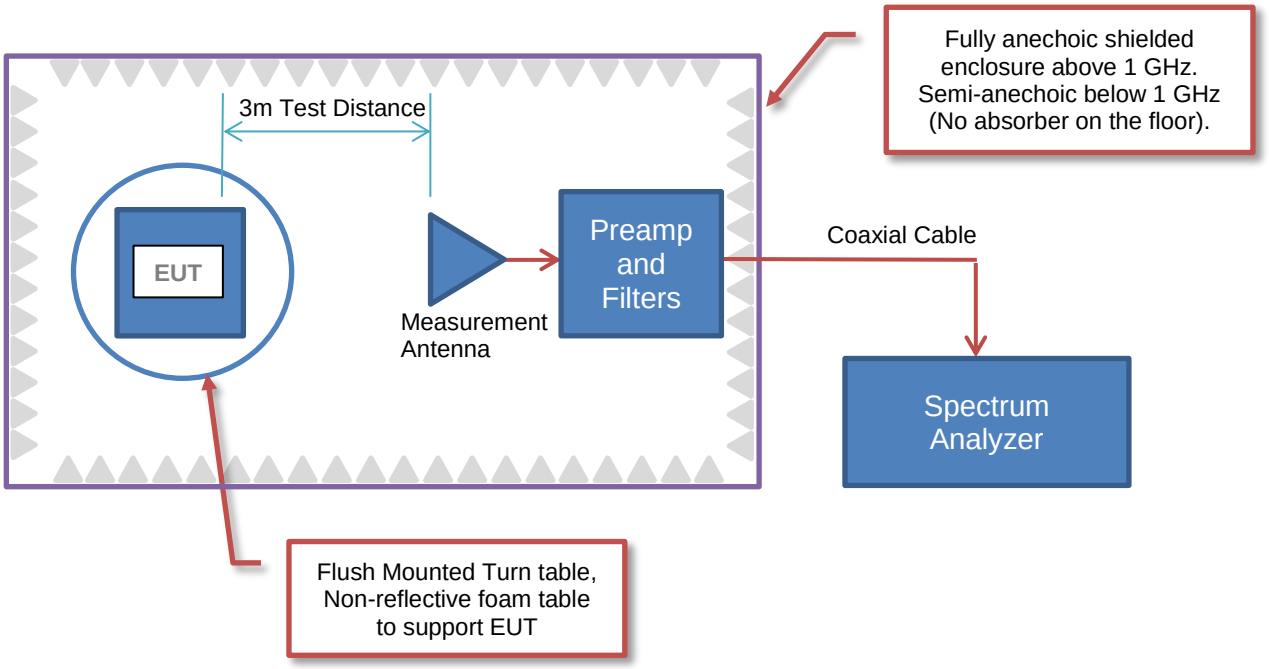


Sample Calculation (logarithmic units)

Measured Value		Measured Level		Reference Level Offset
71.2	=	42.6	+	28.6

TEST SETUP BLOCK DIAGRAMS

Emissions Measurements



Sample Calculation (logarithmic units)

Radiated Emissions:

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

Conducted Emissions:

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

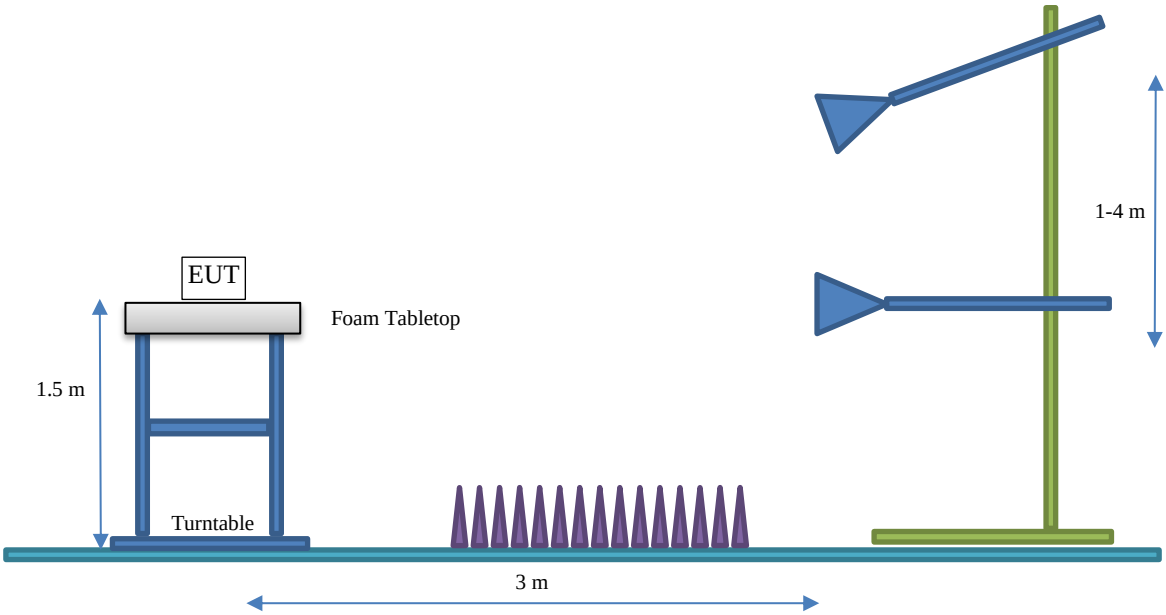
Radiated Power (ERP/EIRP) – Substitution Method:

Measured Level into Substitution Antenna (Amplitude dBm)		Substitution Antenna Factor (dBi)		EIRP to ERP (if applicable)		Measured power (dBm ERP/EIRP)
10.0	+	6.0	-	2.15	=	**13.9/16.0**

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:	465 California St
City, State, Zip:	San Francisco, CA 94104
Test Requested By:	Samuel House
EUT:	Enso3
First Date of Test:	April 8, 2024
Last Date of Test:	April 11, 2024
Receipt Date of Samples:	April 8, 2024
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 radio to FCC 15.247/RSS-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. The power settings below reflect the maximum power that the EUT is allowed to transmit at during normal operation.

ANTENNA GAIN (dBi)

Type	Provided by:	Frequency Range (MHz)	Gain (dBi)
Ultra-Miniature 2.4GHz Chip Antenna	Johanson Technology	2400 - 2500	1.0

The EUT was tested using the power settings provided by the manufacturer which were based upon:

☒ Test software settings Test software/firmware installed on EUT: Nordic Direct Test Mode v2.4.0
☐ Rated power settings

SETTINGS FOR ALL TESTS IN THIS REPORT

Modulation Types / Data Rates	Type	Channel	Frequency (MHz)	Power Setting
BLE GFSK	DTS	0 or 37	2402	+4 dBm
		20 or 18	2442	+4 dBm
		39	2480	+4 dBm

CONFIGURATIONS

Configuration HING0014-1

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
TENs Therapy Device	Hinge Health	IP22	E3D2SP2413000F
Power brick	LlanGang Optoelectric Technology Co.	LA13018	NA
Dock	Hinge Health	Enso 3 Charging Dock	E3C1WB24101446

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Support Tablet	Lenovo	TB-8506F	HA1BR1X3

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB A to USB C cable	No	1.0	No	Power Brick	TENs Therapy Device

Configuration HING0014-2

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Power brick	LlanGang Optoelectric Technology Co.	LA13018	NA
Dock	Hinge Health	Enso 3 Charging Dock	E3C1WB24101446
TENs Therapy Device (Programmable, Conducted)	Hinge Health	IP22	E3D2SP2413000V

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Support Tablet	Lenovo	TB-8506F	HA1BR1X3

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB A to USB C cable	No	1.0	No	Power Brick	TENs Therapy Device

CONFIGURATIONS

Configuration HING0014-4

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
TENs Therapy Device (Programmable)	Hinge Health	IP22	E3D2SP2413000G
Power brick	LlanGang Optoelectric Technology Co.	LA13018	NA
Dock	Hinge Health	Enso 3 Charging Dock	E3C1WB24101446

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB A to USB C cable	No	1.0	No	Power Brick	TENs Therapy Device

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2024-04-08	Powerline Conducted Emissions	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
2	2024-04-10	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.
3	2024-04-11	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.
4	2024-04-11	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.
5	2024-04-11	DTS Bandwidth (6 dB)	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	2024-04-11	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.
7	2024-04-11	Equivalent Isotropic Radiated Power	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
8	2024-04-11	Occupied Bandwidth (99%)	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	2024-04-11	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.
10	2024-04-11	Power Spectral Density	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWERLINE CONDUCTED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

TEST DESCRIPTION

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Cable - Conducted Cable Assembly	Northwest EMC	EVG, HHD, RKT, VAB	EVGA	2023-05-16	2024-05-16
Receiver	Gauss Instruments	TDEMI 30M	ARN	2023-05-08	2024-05-08
LISN	Solar Electronics	9252-50-R-24-BNC	LIR	2023-09-11	2024-09-11

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	3.2 dB	-3.2 dB

CONFIGURATIONS INVESTIGATED

HING0014-4

MODES INVESTIGATED

On, charging, and transmitting BLE, 1Mbps, Mid Ch. = 2440 MHz

POWERLINE CONDUCTED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

EUT:	Enso3	Work Order:	HING0014
Serial Number:	E3D2SP2413000G	Date:	2024-04-08
Customer:	Hinge Health	Temperature:	21.9°C
Attendees:	Samuel House	Relative Humidity:	39.5%
Customer Project:	None	Bar. Pressure (PMSL):	1023 mb
Tested By:	Christopher Ladwig	Job Site:	EV07
Power:	5VDC via 110VAC/60Hz	Configuration:	HING0014-4

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2024	ANSI C63.10:2013
RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013

TEST PARAMETERS

Run #:	1	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

None

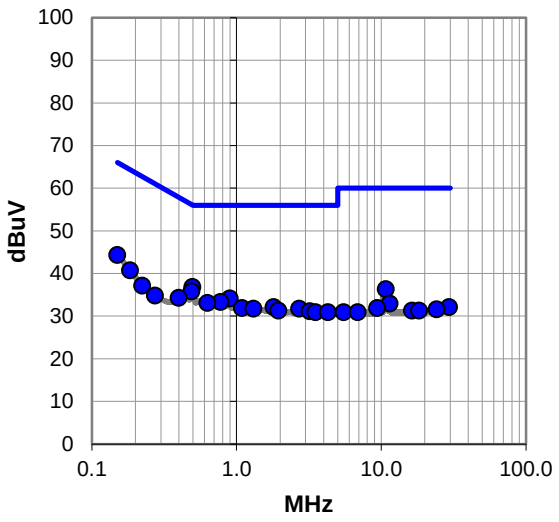
EUT OPERATING MODES

On, charging, and transmitting BLE, 1Mbps, Mid Ch. = 2440 MHz, continuous, power = +4dBm

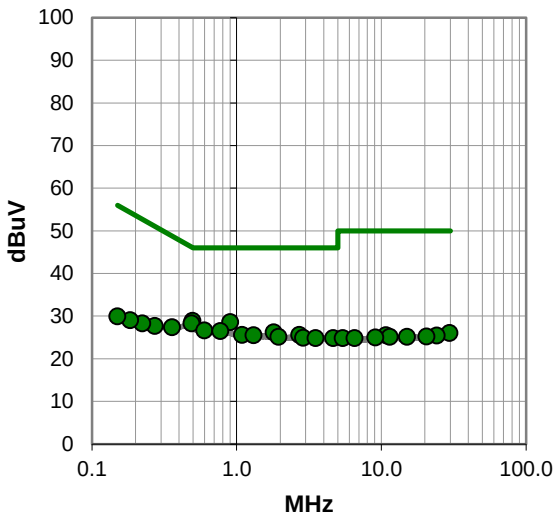
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

RESULTS - Run #1

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.496	16.9	19.9	36.8	56.1	-19.3
0.489	15.9	19.9	35.8	56.2	-20.4
0.150	24.2	20.1	44.3	66.0	-21.7
0.901	14.1	20.0	34.1	56.0	-21.9
0.774	13.3	20.0	33.3	56.0	-22.7
0.631	13.1	20.0	33.1	56.0	-22.9
0.184	20.7	20.0	40.7	64.3	-23.6
0.399	14.4	19.9	34.3	57.9	-23.6
10.791	15.7	20.6	36.3	60.0	-23.7
1.804	12.0	20.1	32.1	56.0	-23.9
1.093	11.9	20.0	31.9	56.0	-24.1
1.313	11.6	20.1	31.7	56.0	-24.3
2.704	11.6	20.1	31.7	56.0	-24.3
1.947	11.2	20.1	31.3	56.0	-24.7
3.212	10.9	20.2	31.1	56.0	-24.9
3.508	10.7	20.2	30.9	56.0	-25.1
4.276	10.7	20.2	30.9	56.0	-25.1
0.223	17.1	20.0	37.1	62.7	-25.6
0.274	14.8	20.0	34.8	61.0	-26.2
11.442	12.2	20.7	32.9	60.0	-27.1
29.467	10.1	22.0	32.1	60.0	-27.9
9.380	11.4	20.5	31.9	60.0	-28.1
24.230	10.1	21.5	31.6	60.0	-28.4
16.304	10.3	21.0	31.3	60.0	-28.7
18.252	10.2	21.1	31.3	60.0	-28.7

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.495	9.0	19.9	28.9	46.1	-17.2
0.902	8.6	20.0	28.6	46.0	-17.4
0.489	8.4	19.9	28.3	46.2	-17.9
0.597	6.6	20.0	26.6	46.0	-19.4
0.771	6.5	20.0	26.5	46.0	-19.5
1.802	6.1	20.1	26.2	46.0	-19.8
1.093	5.6	20.0	25.6	46.0	-20.4
2.704	5.5	20.1	25.6	46.0	-20.4
1.311	5.4	20.1	25.5	46.0	-20.5
1.947	5.0	20.1	25.1	46.0	-20.9
2.887	4.8	20.1	24.9	46.0	-21.1
3.508	4.6	20.2	24.8	46.0	-21.2
4.654	4.6	20.2	24.8	46.0	-21.2
0.358	7.5	19.9	27.4	48.8	-21.4
0.272	7.7	20.0	27.7	51.1	-23.4
29.563	4.0	22.0	26.0	50.0	-24.0
0.223	8.3	20.0	28.3	52.7	-24.4
10.764	4.9	20.6	25.5	50.0	-24.5
24.178	3.9	21.5	25.4	50.0	-24.6
20.538	3.9	21.3	25.2	50.0	-24.8
11.439	4.4	20.7	25.1	50.0	-24.9
15.030	4.2	20.9	25.1	50.0	-24.9
9.096	4.5	20.5	25.0	50.0	-25.0
5.409	4.5	20.3	24.8	50.0	-25.2
6.543	4.4	20.4	24.8	50.0	-25.2

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

EUT:	Enso3	Work Order:	HING0014
Serial Number:	E3D2SP2413000G	Date:	2024-04-08
Customer:	Hinge Health	Temperature:	21.9°C
Attendees:	Samuel House	Relative Humidity:	39.5%
Customer Project:	None	Bar. Pressure (PMSL):	1023 mb
Tested By:	Christopher Ladwig	Job Site:	EV07
Power:	5VDC via 110VAC/60Hz	Configuration:	HING0014-4

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2024	ANSI C63.10:2013
RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013

TEST PARAMETERS

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

COMMENTS

None

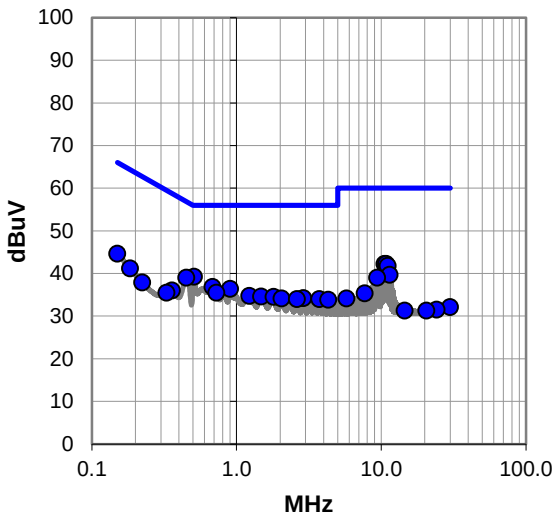
EUT OPERATING MODES

On, charging, and transmitting BLE, 1Mbps, Mid Ch. = 2440 MHz

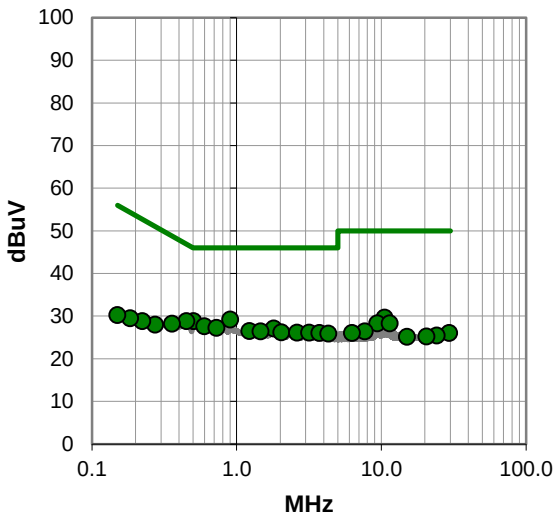
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

RESULTS - Run #2

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.507	19.3	19.9	39.2	56.0	-16.8
10.568	21.6	20.6	42.2	60.0	-17.8
10.800	21.6	20.6	42.2	60.0	-17.8
0.449	19.1	19.9	39.0	56.9	-17.9
11.089	21.2	20.6	41.8	60.0	-18.2
0.684	16.8	20.0	36.8	56.0	-19.2
0.904	16.4	20.0	36.4	56.0	-19.6
11.442	19.0	20.7	39.7	60.0	-20.3
0.727	15.5	20.0	35.5	56.0	-20.5
9.390	18.5	20.5	39.0	60.0	-21.0
1.229	14.7	20.0	34.7	56.0	-21.3
0.150	24.5	20.1	44.6	66.0	-21.4
1.482	14.5	20.1	34.6	56.0	-21.4
1.802	14.4	20.1	34.5	56.0	-21.5
2.900	14.1	20.1	34.2	56.0	-21.8
2.045	14.0	20.1	34.1	56.0	-21.9
2.616	13.9	20.1	34.0	56.0	-22.0
3.734	13.8	20.2	34.0	56.0	-22.0
4.314	13.6	20.2	33.8	56.0	-22.2
0.358	16.1	19.9	36.0	58.8	-22.8
0.184	21.2	20.0	41.2	64.3	-23.1
0.329	15.6	19.9	35.5	59.5	-24.0
7.701	14.9	20.4	35.3	60.0	-24.7
0.223	17.9	20.0	37.9	62.7	-24.8
5.748	13.8	20.3	34.1	60.0	-25.9

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.902	9.2	20.0	29.2	46.0	-16.8
0.504	8.9	19.9	28.8	46.0	-17.2
0.451	8.9	19.9	28.8	46.9	-18.1
0.597	7.6	20.0	27.6	46.0	-18.4
0.727	7.2	20.0	27.2	46.0	-18.8
1.802	7.0	20.1	27.1	46.0	-18.9
1.226	6.5	20.0	26.5	46.0	-19.5
1.465	6.3	20.1	26.4	46.0	-19.6
2.044	6.1	20.1	26.2	46.0	-19.8
2.620	6.0	20.1	26.1	46.0	-19.9
3.180	5.9	20.2	26.1	46.0	-19.9
3.736	5.8	20.2	26.0	46.0	-20.0
4.317	5.7	20.2	25.9	46.0	-20.1
10.545	9.0	20.6	29.6	50.0	-20.4
0.358	8.3	19.9	28.2	48.8	-20.6
9.389	7.8	20.5	28.3	50.0	-21.7
11.442	7.6	20.7	28.3	50.0	-21.7
0.274	8.0	20.0	28.0	51.0	-23.0
7.703	6.0	20.4	26.4	50.0	-23.6
0.223	8.8	20.0	28.8	52.7	-23.9
6.285	5.6	20.4	26.0	50.0	-24.0
29.476	4.0	22.0	26.0	50.0	-24.0
24.177	3.9	21.5	25.4	50.0	-24.6
0.184	9.5	20.0	29.5	54.3	-24.8
20.536	3.9	21.3	25.2	50.0	-24.8

CONCLUSION

Pass

Tested By

DUTY CYCLE

element
TbtTx 2023.12.06.3
WTD.2023.11.13.0

TEST DESCRIPTION

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

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The Duty Cycle (x) of the single channel operation of the radio as controlled by the provided test software was measured for each of the EUT operating modes.

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

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

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

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAW	2024-02-14	2025-02-14
Block - DC	Fairview Microwave	SD3473	AMY	2023-07-10	2024-07-10
Attenuator	Weinschel Corp.	54A-20	RBL	2023-11-17	2024-11-17
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2023-11-22	2024-11-22
Generator - Signal	Keysight	N5182B	TFU	2022-12-02	2024-12-02

DUTY CYCLE

element
TbtTx 2023.12.06.3
WTD.2023.11.13.0

EUT:	Enso3	Work Order:	HING0014
Serial Number:	E3D2SP2413000V	Date:	2024-04-11
Customer:	Hinge Health	Temperature:	22.6°C
Attendees:	None	Relative Humidity:	33.5%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mbar
Tested By:	Christopher Ladwig and Jeff Alcoke	Job Site:	EV06
Power:	5VDC via 110VAC/60Hz	Configuration:	HING0014-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013
RSS-247 Issue 3:2023	ANSI C63.10:2013

COMMENTS

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

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

N/A

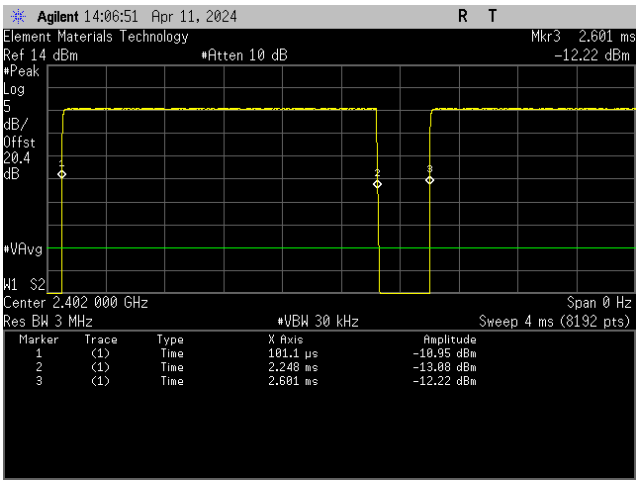
Tested By

TEST RESULTS

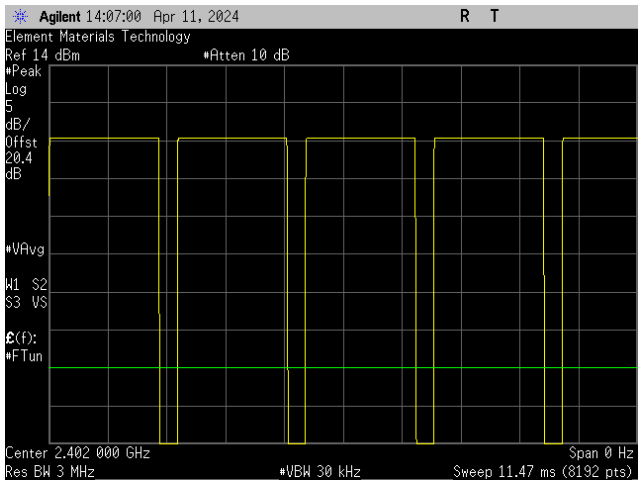
	Pulse Width	Period	Number of Pulses	Value (%)	Limit N/A ()	Results
BLE/GFSK 1 Mbps						
Low Channel, 2402 MHz	2.147 ms	2.5 ms	1	85.9	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
Mid Channel, 2440 MHz	2.147 ms	2.5 ms	1	85.9	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
High Channel, 2480 MHz	2.147 ms	2.5 ms	1	85.9	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A

DUTY CYCLE

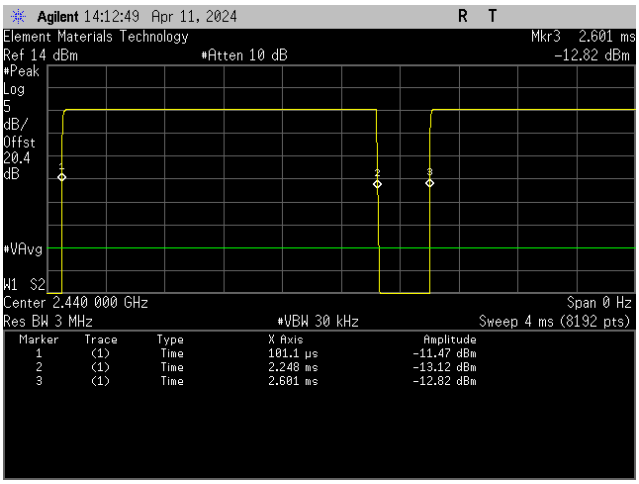
element
TbtTx 2023.12.06.3
WTD.2023.11.13.0



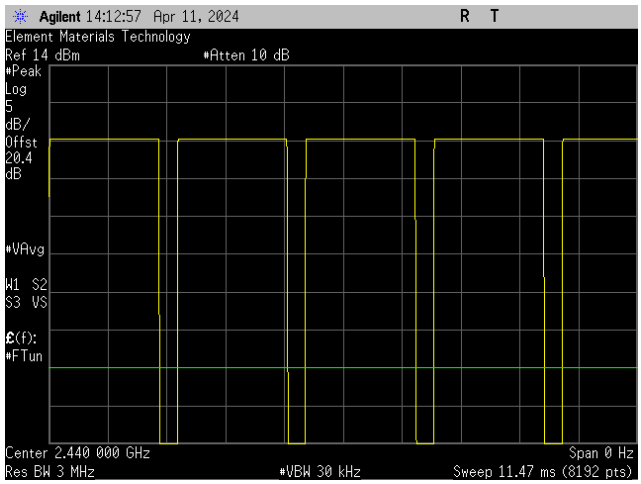
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



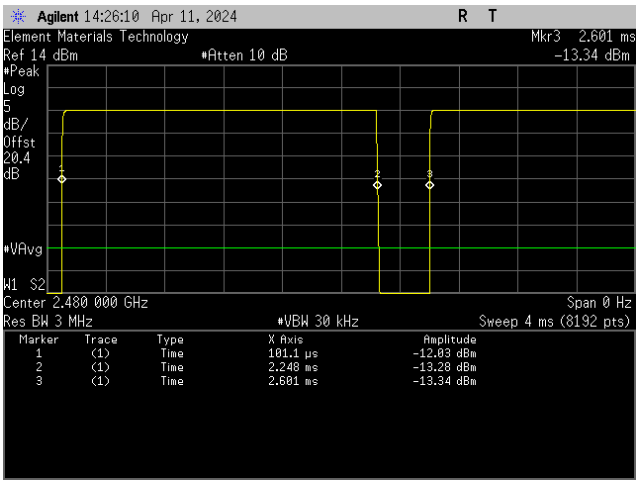
BLE/GFSK 1 Mbps
Mid Channel, 2440 MHz



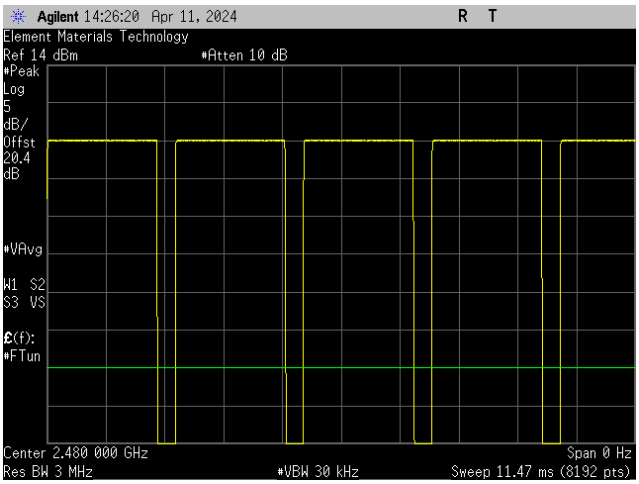
BLE/GFSK 1 Mbps
Mid Channel, 2440 MHz

DUTY CYCLE

element
TbtTx 2023.12.06.3
WTD.2023.11.13.0



BLE/GFSK 1 Mbps
High Channel, 2480 MHz



BLE/GFSK 1 Mbps
High Channel, 2480 MHz

DTS BANDWIDTH (6 dB)

element
TbtTx 2023.12.06.3
WTD.2023.11.13.0

TEST DESCRIPTION

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

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAW	2024-02-14	2025-02-14
Block - DC	Fairview Microwave	SD3473	AMY	2023-07-10	2024-07-10
Attenuator	Weinschel Corp.	54A-20	RBL	2023-11-17	2024-11-17
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2023-11-22	2024-11-22
Generator - Signal	Keysight	N5182B	TFU	2022-12-02	2024-12-02

DTS BANDWIDTH (6 dB)

element
TbtTx 2023.12.06.3
WTD.2023.11.13.0

EUT:	Enso3	Work Order:	HING0014
Serial Number:	E3D2SP2413000V	Date:	2024-04-11
Customer:	Hinge Health	Temperature:	22.5°C
Attendees:	None	Relative Humidity:	33.6%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mbar
Tested By:	Christopher Ladwig and Jeff Alcoke	Job Site:	EV06
Power:	5VDC via 110VAC/60Hz	Configuration:	HING0014-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013
RSS-247 Issue 3:2023	ANSI C63.10:2013

COMMENTS

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

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

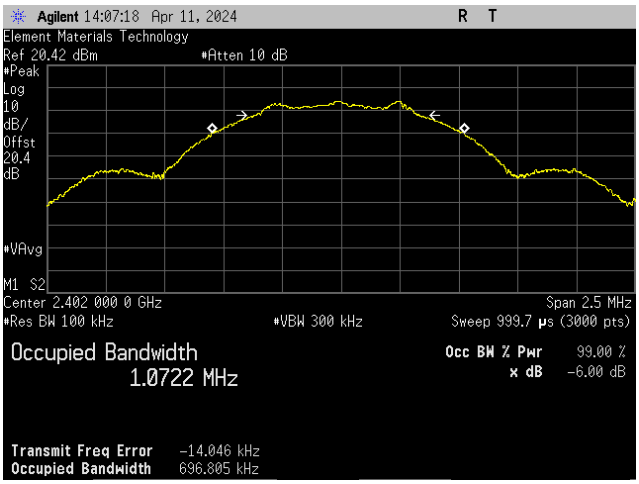
Pass

Tested By

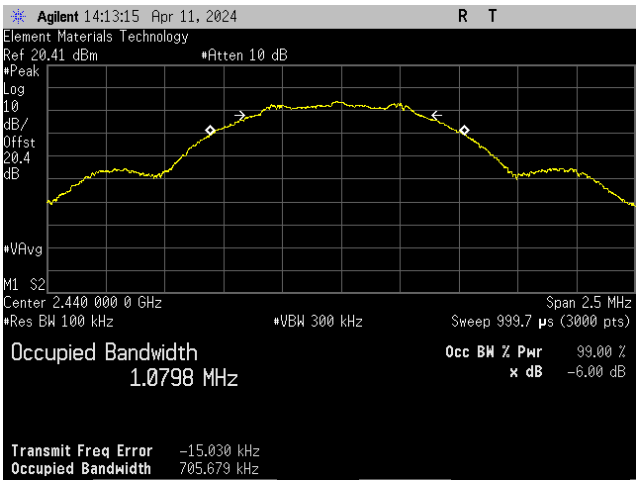
TEST RESULTS

	Value	Limit (≥)	Result
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	696.805 kHz	500 kHz	Pass
Mid Channel, 2440 MHz	705.679 kHz	500 kHz	Pass
High Channel, 2480 MHz	716.658 kHz	500 kHz	Pass

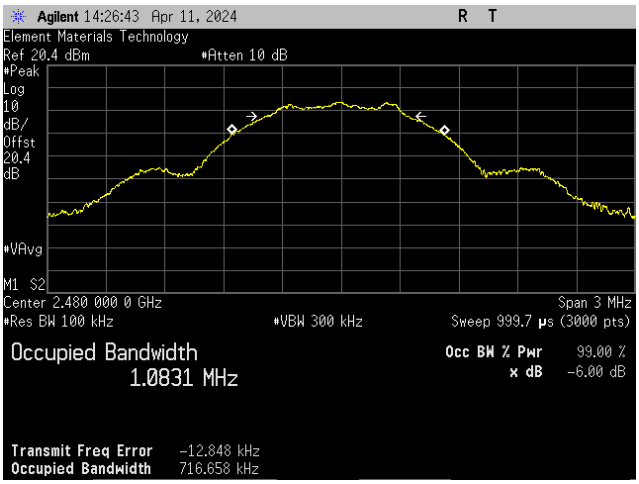
DTS BANDWIDTH (6 dB)



BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2440 MHz



BLE/GFSK 1 Mbps
High Channel, 2480 MHz

OCCUPIED BANDWIDTH (99%)

element
TbtTx 2023.12.06.3
WTD.2023.11.13.0

TEST DESCRIPTION

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

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The 99% occupied bandwidth was measured with the EUT configured for continuous modulated operation.

Per ANSI C63.10:2013, 6.9.3, the spectrum analyzer was configured as follows:

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

The resolution bandwidth (RBW) of the spectrum analyzer was set to the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) bandwidth was set to at least 3 times the resolution bandwidth. The analyzer sweep time was set to auto to prevent video filtering or averaging. A sample detector was used unless the device was not able to be operated in a continuous transmit mode, in which case a peak detector was used.

The spectrum analyzer occupied bandwidth measurement function was used to sum the power of the transmission in linear terms to obtain the 99% bandwidth.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAW	2024-02-14	2025-02-14
Block - DC	Fairview Microwave	SD3473	AMY	2023-07-10	2024-07-10
Attenuator	Weinschel Corp.	54A-20	RBL	2023-11-17	2024-11-17
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2023-11-22	2024-11-22
Generator - Signal	Keysight	N5182B	TFU	2022-12-02	2024-12-02

OCCUPIED BANDWIDTH (99%)

element
TbtTx 2023.12.06.3
WTD.2023.11.13.0

EUT:	Enso3	Work Order:	HING0014
Serial Number:	E3D2SP2413000V	Date:	2024-04-11
Customer:	Hinge Health	Temperature:	22.4°C
Attendees:	None	Relative Humidity:	33.4%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mbar
Tested By:	Christopher Ladwig and Jeff Alcoke	Job Site:	EV06
Power:	5VDC via 110VAC/60Hz	Configuration:	HING0014-2

TEST SPECIFICATIONS

Specification:	Method:
RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013

COMMENTS

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

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

N/A

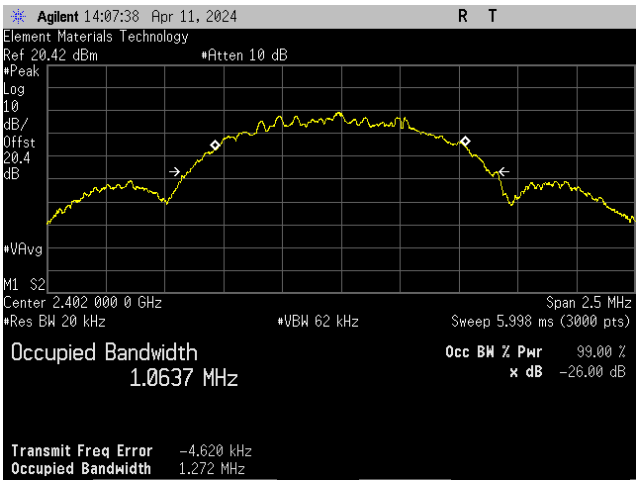
Tested By

TEST RESULTS

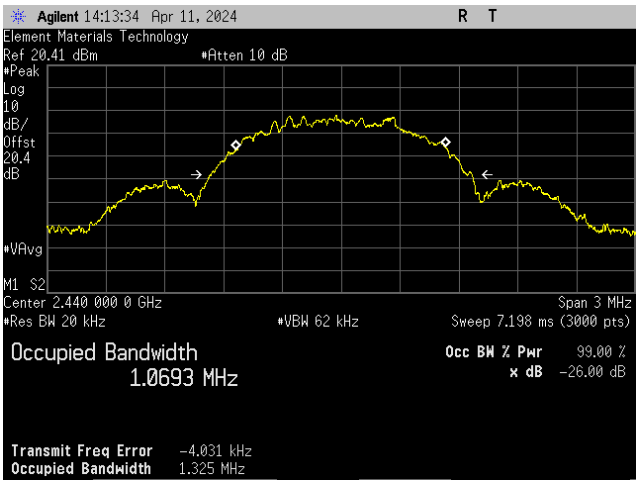
	Value	Limit	Result
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	1.064 MHz	N/A	N/A
Mid Channel, 2440 MHz	1.069 MHz	N/A	N/A
High Channel, 2480 MHz	1.073 MHz	N/A	N/A

OCCUPIED BANDWIDTH (99%)

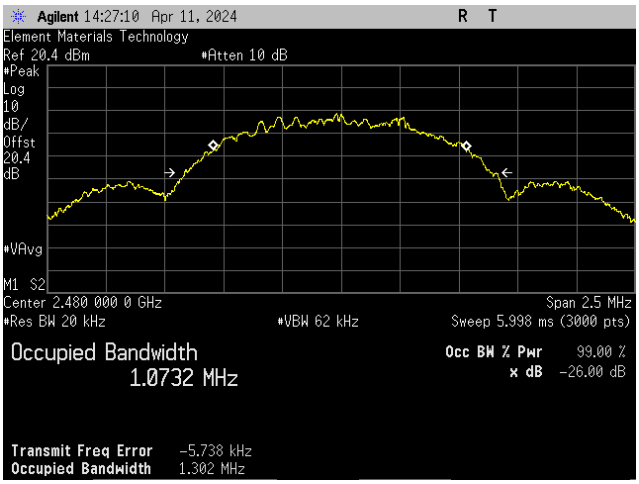
element
TbtTx 2023.12.06.3
WTD.2023.11.13.0



BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2440 MHz



BLE/GFSK 1 Mbps
High Channel, 2480 MHz

OUTPUT POWER

element
TbtTx 2023.12.06.3
WTD.2023.11.13.0

TEST DESCRIPTION

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

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAW	2024-02-14	2025-02-14
Block - DC	Fairview Microwave	SD3473	AMY	2023-07-10	2024-07-10
Attenuator	Weinschel Corp.	54A-20	RBL	2023-11-17	2024-11-17
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2023-11-22	2024-11-22
Generator - Signal	Keysight	N5182B	TFU	2022-12-02	2024-12-02

OUTPUT POWER

element
TbtTx 2023.12.06.3
WTD.2023.11.13.0

EUT:	Enso3	Work Order:	HING0014
Serial Number:	E3D2SP2413000V	Date:	2024-04-11
Customer:	Hinge Health	Temperature:	22.6°C
Attendees:	None	Relative Humidity:	32%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mbar
Tested By:	Christopher Ladwig and Jeff Alcoke	Job Site:	EV06
Power:	5VDC via 110VAC/60Hz	Configuration:	HING0014-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013
RSS-247 Issue 3:2023	ANSI C63.10:2013
RSS-Gen 6.12	ANSI C63.10:2013

COMMENTS

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

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

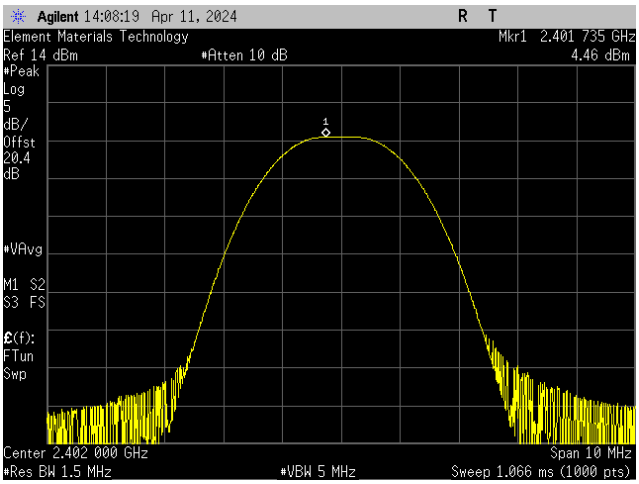
Pass

Tested By

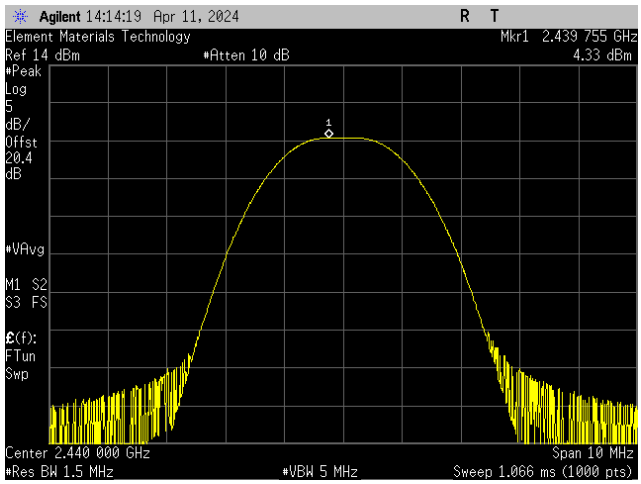
TEST RESULTS

	Out Pwr (dBm)	Limit (dBm)	Result
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	4.457	30	Pass
Mid Channel, 2440 MHz	4.327	30	Pass
High Channel, 2480 MHz	4.119	30	Pass

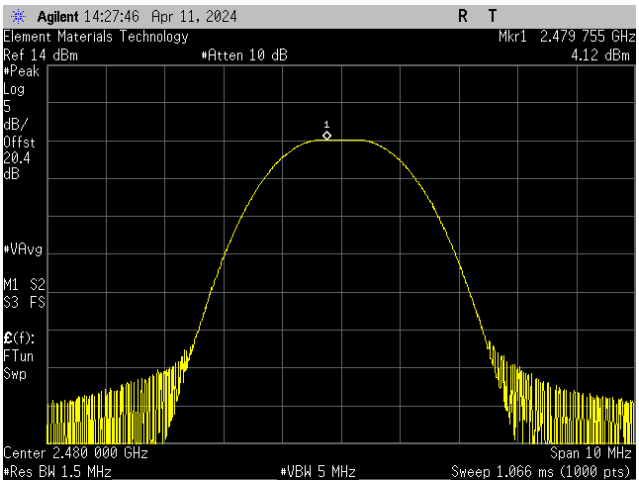
OUTPUT POWER



BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2440 MHz



BLE/GFSK 1 Mbps
High Channel, 2480 MHz

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

element
TbtTx 2023.12.06.3
WTD.2023.11.13.0

TEST DESCRIPTION

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

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

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)

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAW	2024-02-14	2025-02-14
Block - DC	Fairview Microwave	SD3473	AMY	2023-07-10	2024-07-10
Attenuator	Weinschel Corp.	54A-20	RBL	2023-11-17	2024-11-17
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2023-11-22	2024-11-22
Generator - Signal	Keysight	N5182B	TFU	2022-12-02	2024-12-02

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

element
TbtTx 2023.12.06.3
WTD.2023.11.13.0

EUT:	Enso3	Work Order:	HING0014
Serial Number:	E3D2SP2413000V	Date:	2024-04-11
Customer:	Hinge Health	Temperature:	22.3°C
Attendees:	None	Relative Humidity:	32.6%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mbar
Tested By:	Christopher Ladwig and Jeff Alcoke	Job Site:	EV06
Power:	5VDC via 110VAC/60Hz	Configuration:	HING0014-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013
RSS-247 Issue 3:2023	ANSI C63.10:2013
RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013

COMMENTS

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

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

Tested By

TEST RESULTS

	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
BLE/GFSK 1 Mbps					
Low Channel, 2402 MHz	4.457	1	5.5	36	Pass
Mid Channel, 2440 MHz	4.327	1	5.3	36	Pass
High Channel, 2480 MHz	4.119	1	5.1	36	Pass

POWER SPECTRAL DENSITY

element
TbtTx 2023.12.06.3
WTD.2023.11.13.0

TEST DESCRIPTION

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

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAW	2024-02-14	2025-02-14
Block - DC	Fairview Microwave	SD3473	AMY	2023-07-10	2024-07-10
Attenuator	Weinschel Corp.	54A-20	RBL	2023-11-17	2024-11-17
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2023-11-22	2024-11-22
Generator - Signal	Keysight	N5182B	TFU	2022-12-02	2024-12-02

POWER SPECTRAL DENSITY

element
TbtTx 2023.12.06.3
WTD.2023.11.13.0

EUT:	Enso3	Work Order:	HING0014
Serial Number:	E3D2SP2413000V	Date:	2024-04-11
Customer:	Hinge Health	Temperature:	22.3°C
Attendees:	None	Relative Humidity:	32%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mbar
Tested By:	Christopher Ladwig and Jeff Alcoke	Job Site:	EV06
Power:	5VDC via 110VAC/60Hz	Configuration:	HING0014-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013
RSS-247 Issue 3:2023	ANSI C63.10:2013

COMMENTS

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

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

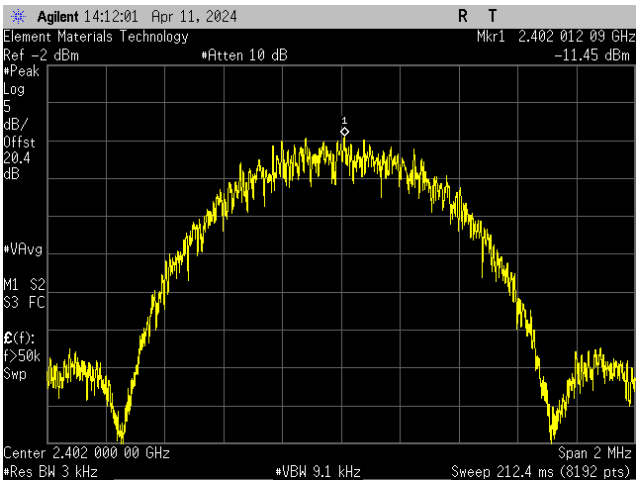
Tested By

TEST RESULTS

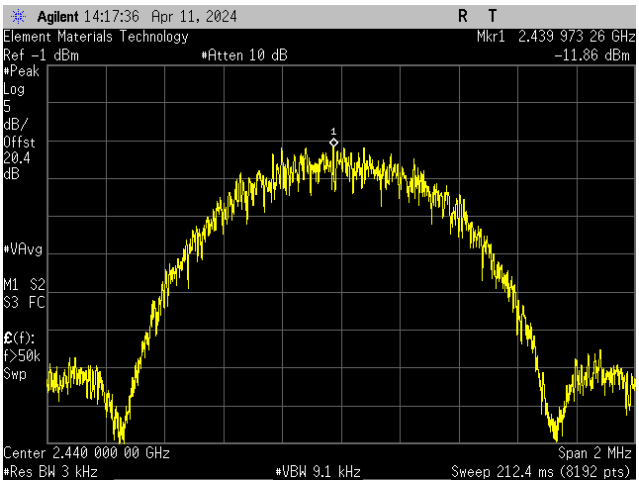
	Value dBm/3kHz	Limit ≤ (dBm/3kHz)	Results
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	-11.452	8	Pass
Mid Channel, 2440 MHz	-11.859	8	Pass
High Channel, 2480 MHz	-11.551	8	Pass

POWER SPECTRAL DENSITY

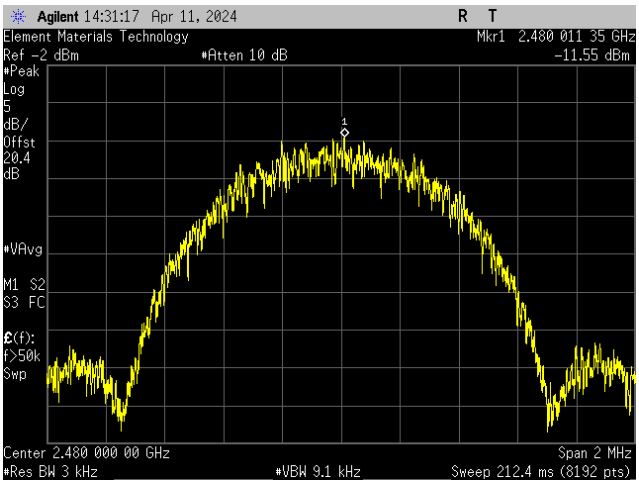
element
TbtTx 2023.12.06.3
WTD.2023.11.13.0



BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2440 MHz



BLE/GFSK 1 Mbps
High Channel, 2480 MHz

BAND EDGE COMPLIANCE

element
TbtTx 2023.12.06.3
WTD.2023.11.13.0

TEST DESCRIPTION

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

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

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. The analyzer screen captures for this test show an example of the emission mask for the test mode also used during the radiated spurious emissions at the restricted band edges test.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAW	2024-02-14	2025-02-14
Block - DC	Fairview Microwave	SD3473	AMY	2023-07-10	2024-07-10
Attenuator	Weinschel Corp.	54A-20	RBL	2023-11-17	2024-11-17
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2023-11-22	2024-11-22
Generator - Signal	Keysight	N5182B	TFU	2022-12-02	2024-12-02

BAND EDGE COMPLIANCE

element
TbtTx 2023.12.06.3
WTD.2023.11.13.0

EUT:	Enso3	Work Order:	HING0014
Serial Number:	E3D2SP2413000V	Date:	2024-04-11
Customer:	Hinge Health	Temperature:	22.4°C
Attendees:	None	Relative Humidity:	32.4%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mbar
Tested By:	Christopher Ladwig and Jeff Alcoke	Job Site:	EV06
Power:	5VDC via 110VAC/60Hz	Configuration:	HING0014-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013
RSS-247 Issue 3:2023	ANSI C63.10:2013

COMMENTS

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

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

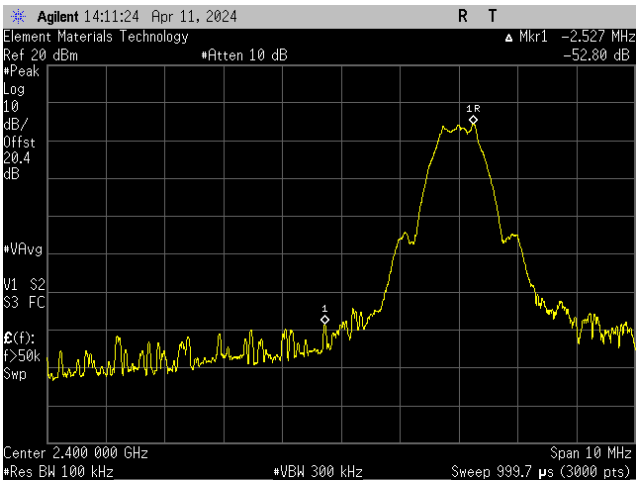
Tested By

TEST RESULTS

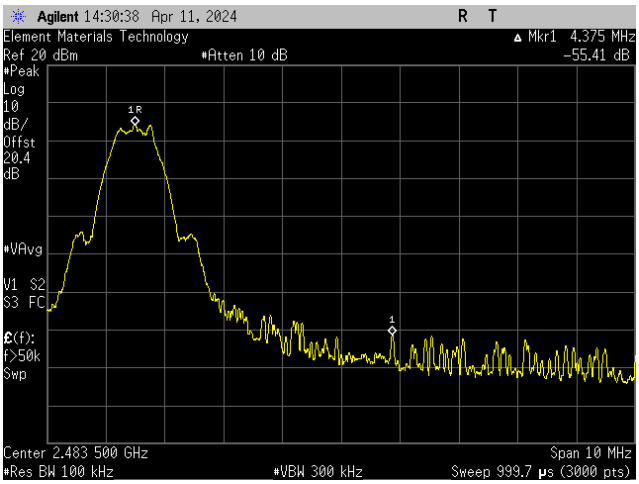
	Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	-52.8	-20	Pass
High Channel, 2480 MHz	-55.41	-20	Pass

BAND EDGE COMPLIANCE

element
TbtTx 2023.12.06.3
WTD.2023.11.13.0



BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
High Channel, 2480 MHz

SPURIOUS CONDUCTED EMISSIONS

element
TbtTx 2023.12.06.3
WTD.2023.11.13.0

TEST DESCRIPTION

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

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

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.

The reference level offset for the fundamental screen capture was based on a measured value of the loss between the spectrum analyzer and the EUT which was verified at the time of test. The remaining screen capture(s) use an internal transducer factor on the analyzer to correct the displayed trace based on the cable loss over frequency. The reference level offset for the additional screen capture(s) is then based on the expected attenuator value and any other losses.

Fundamental Offset = Ref Lvl Offset showing measured composite factor of all losses

Remaining Screen capture(s) Offset = “Internal” cable loss factor not shown on screen capture + Ref Lvl Offset showing expected attenuator value and any other losses

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAW	2024-02-14	2025-02-14
Block - DC	Fairview Microwave	SD3473	AMY	2023-07-10	2024-07-10
Attenuator	Weinschel Corp.	54A-20	RBL	2023-11-17	2024-11-17
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2023-11-22	2024-11-22
Generator - Signal	Keysight	N5182B	TFU	2022-12-02	2024-12-02

SPURIOUS CONDUCTED EMISSIONS

element
TbtTx 2023.12.06.3
WTD.2023.11.13.0

EUT:	Enso3	Work Order:	HING0014
Serial Number:	E3D2SP2413000V	Date:	2024-04-11
Customer:	Hinge Health	Temperature:	22.5°C
Attendees:	None	Relative Humidity:	32.6%
Customer Project:	None	Bar. Pressure (PMSL):	1012 mbar
Tested By:	Christopher Ladwig and Jeff Alcoke	Job Site:	EV06
Power:	5VDC via 110VAC/60Hz	Configuration:	HING0014-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013
RSS-247 Issue 3:2023	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

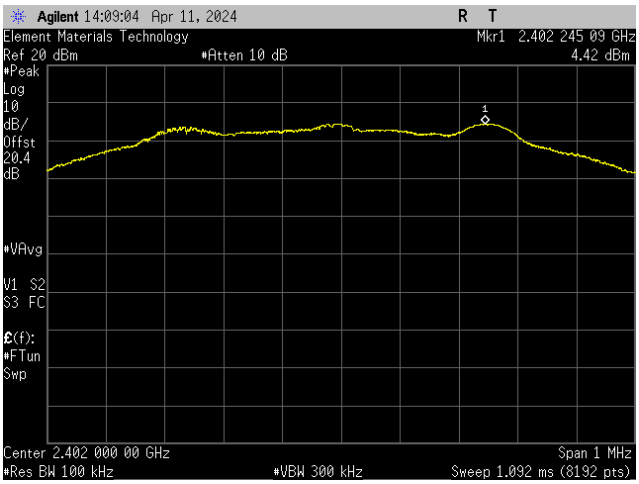
Tested By

TEST RESULTS

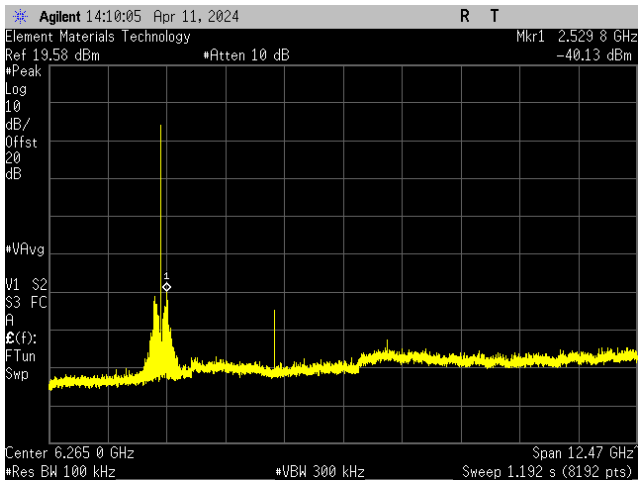
	Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK 1 Mbps					
Low Channel, 2402 MHz	Fundamental	2402.25	N/A	N/A	N/A
	30 MHz - 12.5 GHz	2529.8	-44.55	-20	Pass
	12.5 GHz - 25 GHz	24343.8	-52.02	-20	Pass
Mid Channel, 2440 MHz	Fundamental	2440.25	N/A	N/A	N/A
	30 MHz - 12.5 GHz	2567.8	-45.07	-20	Pass
	12.5 GHz - 25 GHz	24441.5	-52.43	-20	Pass
High Channel, 2480 MHz	Fundamental	2480.24	N/A	N/A	N/A
	30 MHz - 12.5 GHz	2609	-43.88	-20	Pass
	12.5 GHz - 25 GHz	24339.2	-52.35	-20	Pass

SPURIOUS CONDUCTED EMISSIONS

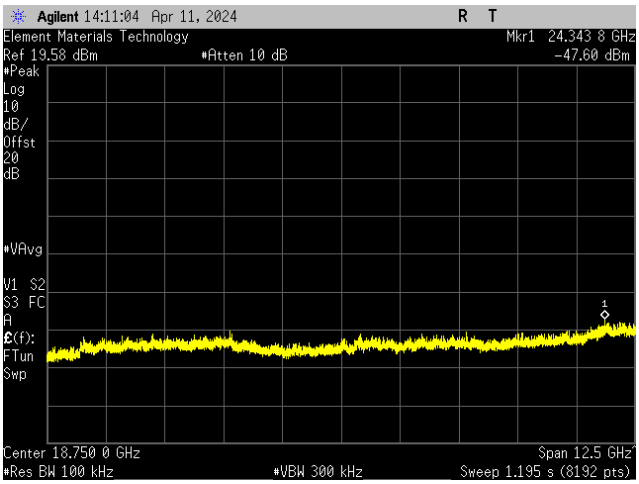
element
TbtTx 2023.12.06.3
WTD.2023.11.13.0



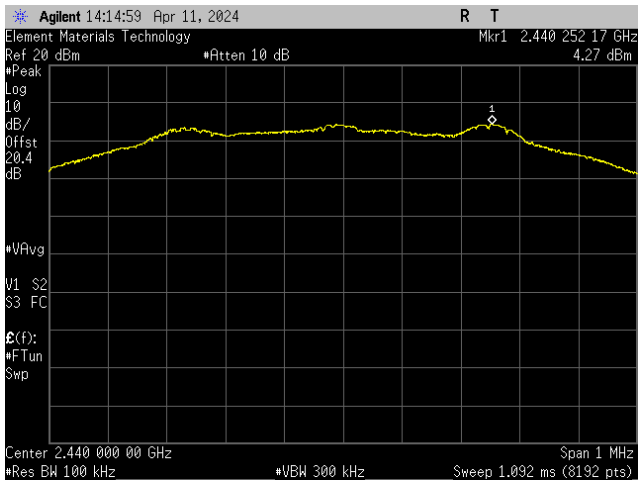
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



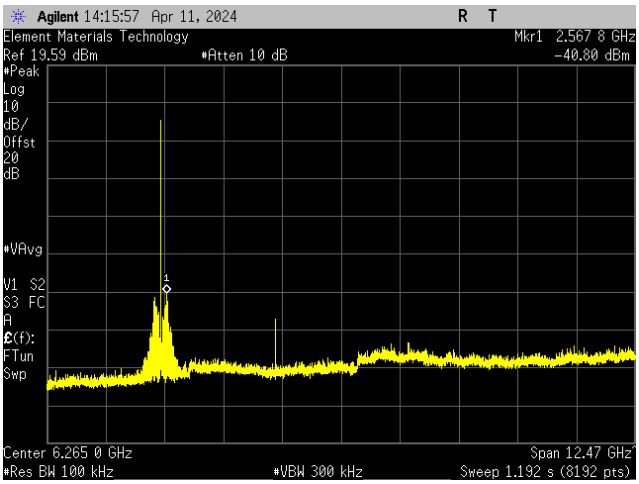
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



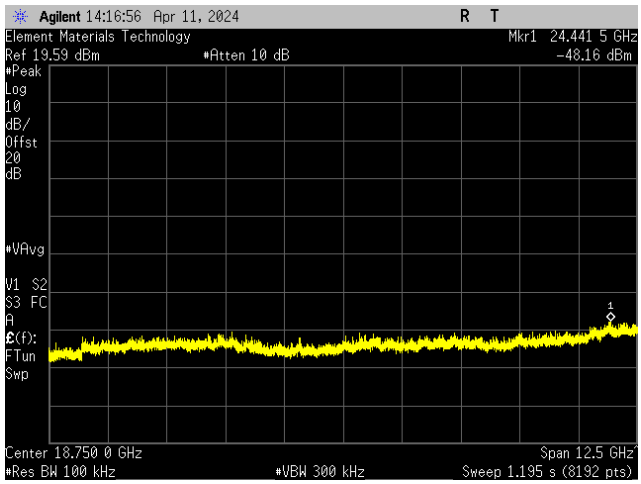
BLE/GFSK 1 Mbps
Mid Channel, 2440 MHz

SPURIOUS CONDUCTED EMISSIONS

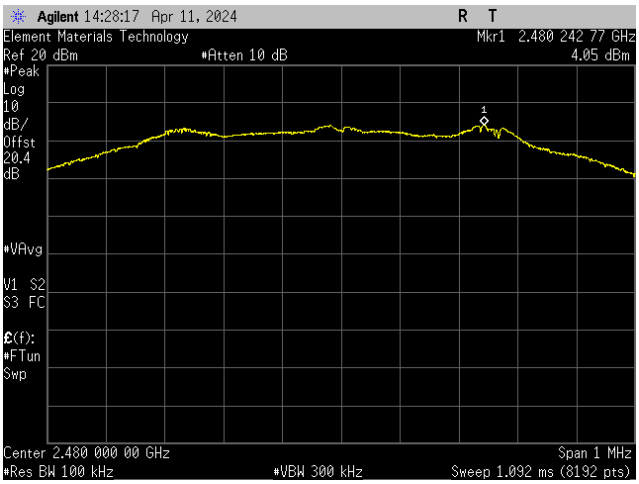
element
TbtTx 2023.12.06.3
WTD.2023.11.13.0



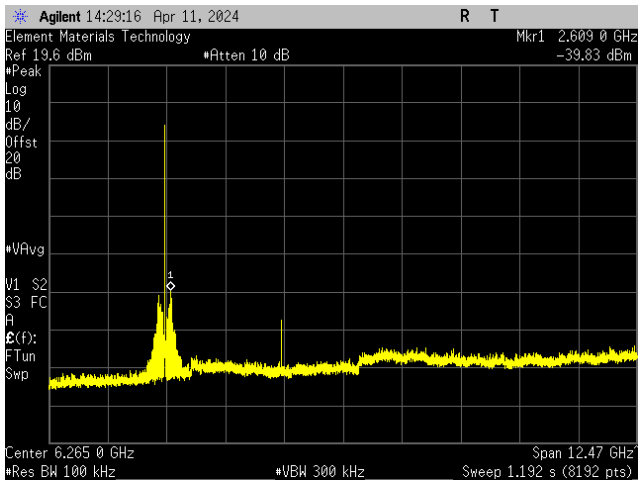
BLE/GFSK 1 Mbps
Mid Channel, 2440 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2440 MHz

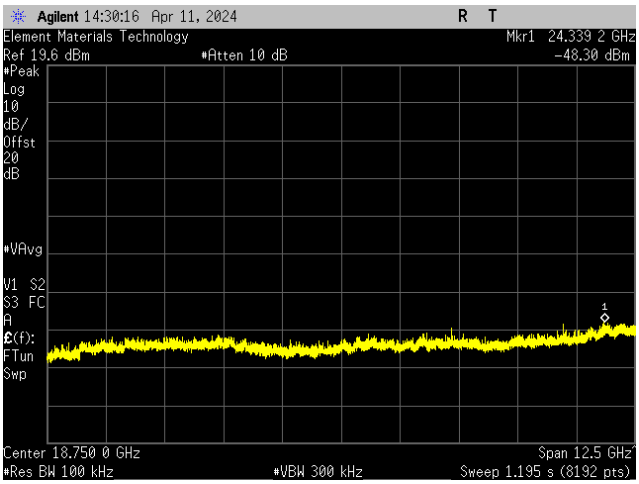


BLE/GFSK 1 Mbps
High Channel, 2480 MHz



BLE/GFSK 1 Mbps
High Channel, 2480 MHz

SPURIOUS CONDUCTED EMISSIONS



BLE/GFSK 1 Mbps
High Channel, 2480 MHz

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

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 shown in the data sheets.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. 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 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 = CISPR AVG 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 CISPR AVG 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 20*log(1/dc).

Test mode operates at 85.9% duty cycle, upward DCCF correction applied based on:

20*log(1/Duty cycle) = 20*log(1/0.859) = 1.3 dB

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Biconilog	EMCO	3142B	AXJ	2023-04-17	2025-04-17
Cable	N/A	Bilog Cables	EVA	2023-11-05	2024-11-05
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AOL	2023-11-05	2024-11-05
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2023-10-04	2024-10-04
Antenna - Double Ridge	EMCO	3115	AHC	2022-07-08	2024-07-08
Cable	N/A	Double Ridge Horn Cables	EVB	2024-03-14	2025-03-14
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAG	2024-03-14	2025-03-14
Filter - High Pass	Micro-Tronics	HPM50111	HFO	2023-11-06	2024-11-06
Antenna - Standard Gain	ETS Lindgren	3160-08	AHV	NCR	NCR
Cable	None	Standard Gain Horn Cables	EVF	2023-10-31	2024-10-31
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	2023-10-31	2024-10-31
Antenna - Standard Gain	ETS Lindgren	3160-07	AHU	NCR	NCR
Amplifier - Pre-Amplifier	L-3 Narda-MITEQ	AMF-6F-08001200-30-10P	PAO	2023-10-31	2024-10-31
Antenna - Standard Gain	ETS Lindgren	3160-09	AIV	NCR	NCR
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	EVY	2023-07-10	2024-07-10
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AVU	2023-07-10	2024-07-10
Antenna - Loop	EMCO	6502	AOA	2022-07-13	2024-07-13
Attenuator	Coaxicom	3910-10	AWX	2024-02-12	2025-02-12

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	5.2 dB	-5.2 dB

FREQUENCY RANGE INVESTIGATED

9 kHz TO 26 GHz

POWER INVESTIGATED

230VAC/50Hz

CONFIGURATIONS INVESTIGATED

HING0014-1

MODES INVESTIGATED

Powered on, broadcasting BLE, 1Mbps, PRBS9 with maximum packet size.
Low Ch. = 2402 MHz, Mid Ch. = 2440 MHz, High Ch. = 2480 MHz

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

EUT:	Enso3	Work Order:	HING0014
Serial Number:	E3D2SP2413000F	Date:	2024-04-10
Customer:	Hinge Health	Temperature:	21.2°C
Attendees:	Samuel House	Relative Humidity:	39.3%
Customer Project:	None	Bar. Pressure (PMSL):	1026 mb
Tested By:	Christopher Ladwig	Job Site:	EV01
Power:	5VDC via 110VAC/60Hz	Configuration:	HING0014-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013
RSS-247 Issue 3:2023	ANSI C63.10:2013
RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013

TEST PARAMETERS

Run #:	15	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

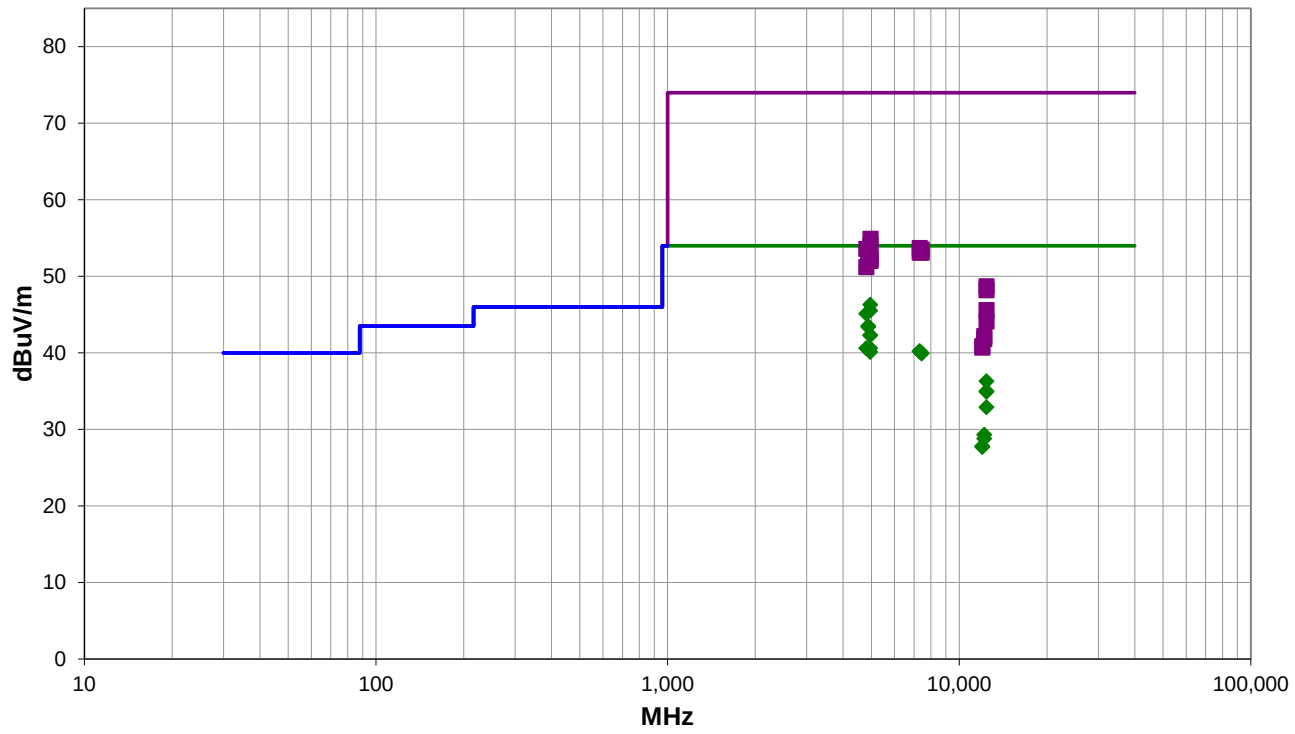
None

EUT OPERATING MODES

Powered on, broadcasting BLE, 1Mbps, PRBS9 with maximum packet size.
Low Ch. = 2402 MHz, Mid Ch. = 2440 MHz, High Ch. = 2480 MHz

DEVIATIONS FROM TEST STANDARD

None



Run #: 15 PK AV QP

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

RESULTS - Run #15

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
4959.975	34.9	10.1	3.2	24.0	1.3	0.0	Horz	AV	0.0	46.3	54.0	-7.7	EUT On Side, High Ch.
4959.967	34.1	10.1	1.5	213.0	1.3	0.0	Vert	AV	0.0	45.5	54.0	-8.5	EUT On Side, High Ch.
4803.950	34.1	9.7	1.0	191.0	1.3	0.0	Vert	AV	0.0	45.1	54.0	-8.9	EUT On Side, Low Ch.
4879.975	32.4	9.8	1.0	196.0	1.3	0.0	Vert	AV	0.0	43.5	54.0	-10.5	EUT On Side, Mid Ch.
4879.950	32.3	9.8	2.3	105.0	1.3	0.0	Horz	AV	0.0	43.4	54.0	-10.6	EUT On Side, Mid Ch.
4959.967	30.9	10.1	1.5	177.0	1.3	0.0	Horz	AV	0.0	42.3	54.0	-11.7	EUT Horz, High Ch.
4959.958	30.9	10.1	1.6	221.0	1.3	0.0	Vert	AV	0.0	42.3	54.0	-11.7	EUT Vert, High Ch.
4960.142	29.2	10.1	1.5	175.0	1.3	0.0	Horz	AV	0.0	40.6	54.0	-13.4	EUT Vert, High Ch.
4803.933	29.6	9.7	1.5	210.0	1.3	0.0	Horz	AV	0.0	40.6	54.0	-13.4	EUT On Side, Low Ch.
7319.108	24.2	14.7	2.3	176.0	1.3	0.0	Horz	AV	0.0	40.2	54.0	-13.8	EUT On Side, Mid Ch.
7317.517	24.2	14.7	3.1	37.0	1.3	0.0	Vert	AV	0.0	40.2	54.0	-13.8	EUT On Side, Mid Ch.
4960.067	28.7	10.1	1.0	181.0	1.3	0.0	Vert	AV	0.0	40.1	54.0	-13.9	EUT Horz, High Ch.
7439.367	24.0	14.7	1.5	223.0	1.3	0.0	Vert	AV	0.0	40.0	54.0	-14.0	EUT On Side, High Ch.
7439.425	23.9	14.7	1.5	72.0	1.3	0.0	Horz	AV	0.0	39.9	54.0	-14.1	EUT On Side, High Ch.
12401.100	24.1	10.9	1.0	262.0	1.3	0.0	Horz	AV	0.0	36.3	54.0	-17.7	EUT On Side, High Ch.
12398.750	32.4	1.3	1.0	255.0	1.3	0.0	Vert	AV	0.0	35.0	54.0	-19.0	EUT On Side, High Ch.
12401.000	22.7	10.9	1.5	16.0	1.3	0.0	Vert	AV	0.0	34.9	54.0	-19.1	EUT On Side, High Ch.
4960.483	44.8	10.1	3.2	24.0	0.0	0.0	Horz	PK	0.0	54.9	74.0	-19.1	EUT On Side, High Ch.
4960.392	44.0	10.1	1.5	213.0	0.0	0.0	Vert	PK	0.0	54.1	74.0	-19.9	EUT On Side, High Ch.
7320.600	39.0	14.7	2.3	176.0	0.0	0.0	Horz	PK	0.0	53.7	74.0	-20.3	EUT On Side, Mid Ch.
4804.200	43.9	9.7	1.0	191.0	0.0	0.0	Vert	PK	0.0	53.6	74.0	-20.4	EUT On Side, Low Ch.
7438.417	38.8	14.7	1.5	223.0	0.0	0.0	Vert	PK	0.0	53.5	74.0	-20.5	EUT On Side, High Ch.
7439.017	38.4	14.7	1.5	72.0	0.0	0.0	Horz	PK	0.0	53.1	74.0	-20.9	EUT On Side, High Ch.
4880.500	43.3	9.8	2.3	105.0	0.0	0.0	Horz	PK	0.0	53.1	74.0	-20.9	EUT On Side, Mid Ch.
7318.883	38.4	14.7	3.1	37.0	0.0	0.0	Vert	PK	0.0	53.1	74.0	-20.9	EUT On Side, Mid Ch.
12398.730	30.3	1.3	2.6	260.0	1.3	0.0	Horz	AV	0.0	32.9	54.0	-21.1	EUT On Side, High Ch.
4959.517	42.5	10.1	1.5	177.0	0.0	0.0	Horz	PK	0.0	52.6	74.0	-21.4	EUT Horz, High Ch.
4879.142	42.5	9.8	1.0	196.0	0.0	0.0	Vert	PK	0.0	52.3	74.0	-21.7	EUT On Side, Mid Ch.
4960.467	42.1	10.1	1.5	175.0	0.0	0.0	Horz	PK	0.0	52.2	74.0	-21.8	EUT Vert, High Ch.
4960.167	42.1	10.1	1.6	221.0	0.0	0.0	Vert	PK	0.0	52.2	74.0	-21.8	EUT Vert, High Ch.
4959.967	41.9	10.1	1.0	181.0	0.0	0.0	Vert	PK	0.0	52.0	74.0	-22.0	EUT Horz, High Ch.
4803.842	41.5	9.7	1.5	210.0	0.0	0.0	Horz	PK	0.0	51.2	74.0	-22.8	EUT On Side, Low Ch.
12201.070	27.2	0.8	1.8	317.0	1.3	0.0	Horz	AV	0.0	29.3	54.0	-24.7	EUT On Side, Mid Ch.
12198.740	26.7	0.8	1.0	53.0	1.3	0.0	Vert	AV	0.0	28.8	54.0	-25.2	EUT On Side, Mid Ch.
12400.700	37.8	10.9	1.0	262.0	0.0	0.0	Horz	PK	0.0	48.7	74.0	-25.3	EUT On Side, High Ch.
12402.030	37.3	10.9	1.5	16.0	0.0	0.0	Vert	PK	0.0	48.2	74.0	-25.8	EUT On Side, High Ch.
12007.580	25.9	0.6	1.5	98.0	1.3	0.0	Horz	AV	0.0	27.8	54.0	-26.2	EUT On Side, Low Ch.
12007.500	25.8	0.6	1.2	88.0	1.3	0.0	Vert	AV	0.0	27.7	54.0	-26.3	EUT On Side, Low Ch.
12398.430	44.3	1.3	1.0	255.0	0.0	0.0	Vert	PK	0.0	45.6	74.0	-28.4	EUT On Side, High Ch.
12398.380	42.8	1.3	2.6	260.0	0.0	0.0	Horz	PK	0.0	44.1	74.0	-29.9	EUT On Side, High Ch.

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

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
12201.140	41.4	0.8	1.8	317.0	0.0	0.0	Horz	PK	0.0	42.2	74.0	-31.8	EUT On Side, Mid Ch.
12201.330	41.0	0.8	1.0	53.0	0.0	0.0	Vert	PK	0.0	41.8	74.0	-32.2	EUT On Side, Mid Ch.
12008.580	40.3	0.6	1.2	88.0	0.0	0.0	Vert	PK	0.0	40.9	74.0	-33.1	EUT On Side, Low Ch.
12008.930	40.1	0.6	1.5	98.0	0.0	0.0	Horz	PK	0.0	40.7	74.0	-33.3	EUT On Side, Low Ch.

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

EUT:	Enso3	Work Order:	HING0014
Serial Number:	E3D2SP2413000F	Date:	2024-04-10
Customer:	Hinge Health	Temperature:	21.2°C
Attendees:	Samuel House	Relative Humidity:	39.3%
Customer Project:	None	Bar. Pressure (PMSL):	1026 mb
Tested By:	Christopher Ladwig and Jeff Alcoke	Job Site:	EV01
Power:	5VDC via 110VAC/60Hz	Configuration:	HING0014-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013
RSS-247 Issue 3:2023	ANSI C63.10:2013
RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013

TEST PARAMETERS

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

COMMENTS

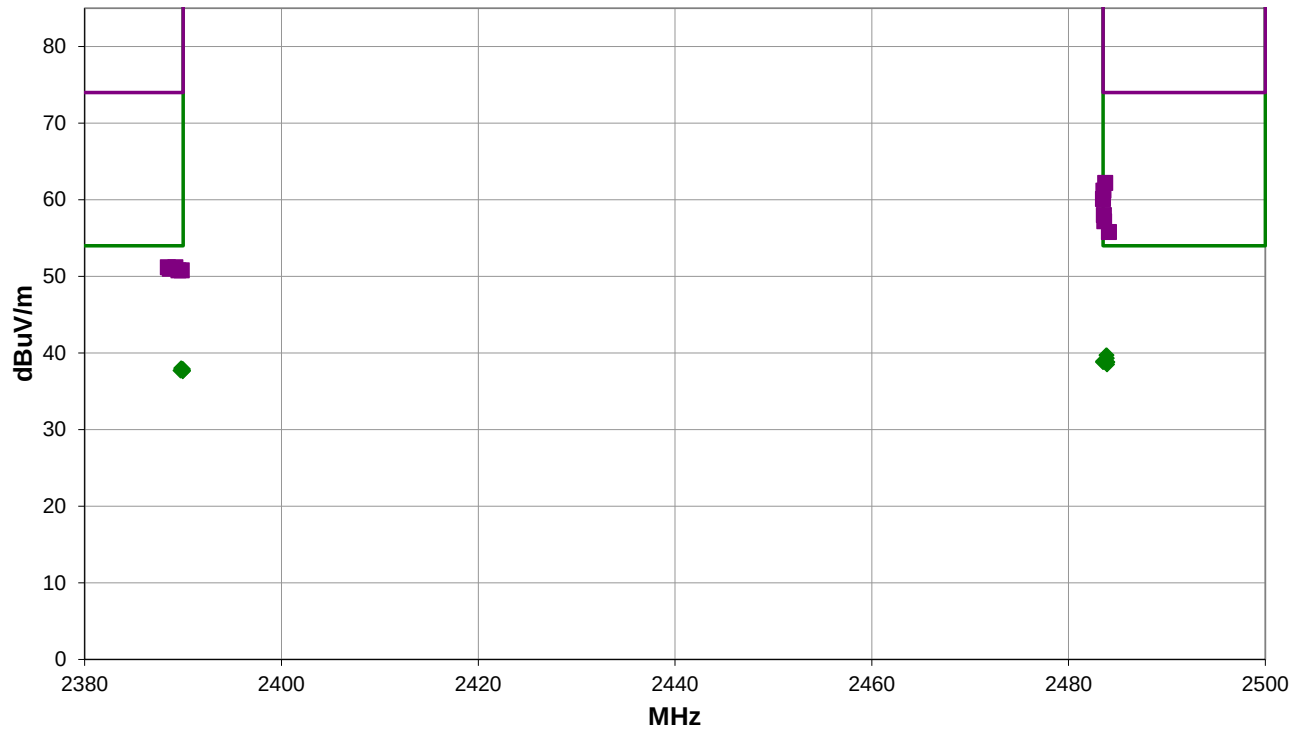
None

EUT OPERATING MODES

Powered on, broadcasting BLE, 1Mbps, PRBS9 with maximum packet size.
Low Ch. = 2402 MHz, Mid Ch. = 2440 MHz, High Ch. = 2480 MHz

DEVIATIONS FROM TEST STANDARD

None



Run #: 18 ■ PK ◆ AV ● QP

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

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
2483.723	53.4	-1.2	1.0	125.0	0.0	10.0	Horz	PK	0.0	62.2	74.0	-11.8	EUT Horz, High Ch.
2483.550	52.4	-1.2	1.0	214.0	0.0	10.0	Horz	PK	0.0	61.2	74.0	-12.8	EUT Vert, High Ch.
2483.500	51.3	-1.2	1.0	207.0	0.0	10.0	Vert	PK	0.0	60.1	74.0	-13.9	EUT On Side, High Ch.
2483.853	29.6	-1.2	1.0	214.0	1.3	10.0	Horz	AV	0.0	39.7	54.0	-14.3	EUT Vert, High Ch.
2483.883	29.2	-1.2	1.0	125.0	1.3	10.0	Horz	AV	0.0	39.3	54.0	-14.7	EUT Horz, High Ch.
2483.513	28.8	-1.2	1.5	175.0	1.3	10.0	Vert	AV	0.0	38.9	54.0	-15.1	EUT Horz, High Ch.
2483.940	28.7	-1.2	1.0	207.0	1.3	10.0	Vert	AV	0.0	38.8	54.0	-15.2	EUT On Side, High Ch.
2483.503	28.7	-1.2	1.5	175.0	1.3	10.0	Vert	AV	0.0	38.8	54.0	-15.2	EUT Vert, High Ch.
2483.907	28.4	-1.2	1.5	35.0	1.3	10.0	Horz	AV	0.0	38.5	54.0	-15.5	EUT On Side, High Ch.
2389.813	28.2	-1.5	1.2	33.0	1.3	10.0	Horz	AV	0.0	38.0	54.0	-16.0	EUT Horz, Low Ch.
2483.590	49.2	-1.2	1.5	175.0	0.0	10.0	Vert	PK	0.0	58.0	74.0	-16.0	EUT Horz, High Ch.
2389.967	28.1	-1.5	1.5	124.0	1.3	10.0	Vert	AV	0.0	37.9	54.0	-16.1	EUT Horz, Low Ch.
2389.737	27.9	-1.5	1.5	209.0	1.3	10.0	Horz	AV	0.0	37.7	54.0	-16.3	EUT On Side, Low Ch.
2389.957	27.9	-1.5	1.7	305.0	1.3	10.0	Vert	AV	0.0	37.7	54.0	-16.3	EUT On Side, Low Ch.
2389.987	27.9	-1.5	3.2	197.0	1.3	10.0	Vert	AV	0.0	37.7	54.0	-16.3	EUT Vert, Low Ch.
2389.960	27.8	-1.5	1.5	21.0	1.3	10.0	Horz	AV	0.0	37.6	54.0	-16.4	EUT Vert, Low Ch.
2483.623	48.4	-1.2	1.5	175.0	0.0	10.0	Vert	PK	0.0	57.2	74.0	-16.8	EUT Vert, High Ch.
2484.100	47.0	-1.2	1.5	35.0	0.0	10.0	Horz	PK	0.0	55.8	74.0	-18.2	EUT On Side, High Ch.
2389.213	42.7	-1.5	1.2	33.0	0.0	10.0	Horz	PK	0.0	51.2	74.0	-22.8	EUT Horz, Low Ch.
2388.447	42.7	-1.5	3.2	197.0	0.0	10.0	Vert	PK	0.0	51.2	74.0	-22.8	EUT Vert, Low Ch.
2388.910	42.6	-1.5	1.5	209.0	0.0	10.0	Horz	PK	0.0	51.1	74.0	-22.9	EUT On Side, Low Ch.
2388.650	42.5	-1.5	1.7	305.0	0.0	10.0	Vert	PK	0.0	51.0	74.0	-23.0	EUT On Side, Low Ch.
2389.520	42.3	-1.5	1.5	124.0	0.0	10.0	Vert	PK	0.0	50.8	74.0	-23.2	EUT Horz, Low Ch.
2389.857	42.3	-1.5	1.5	21.0	0.0	10.0	Horz	PK	0.0	50.8	74.0	-23.2	EUT Vert, Low Ch.

CONCLUSION

Pass

Tested By

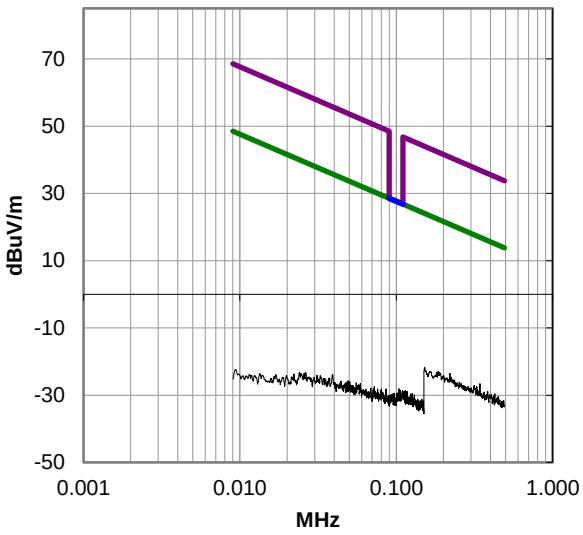
SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

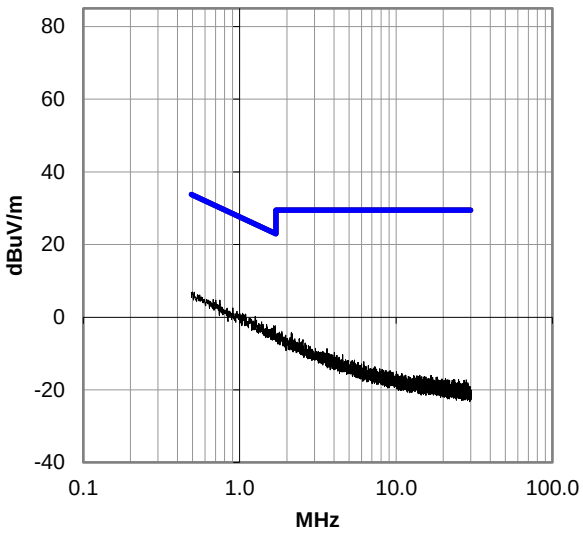
PRESCAN DATA

Radiated spurious emissions from the EUT are initially reviewed with Pre-scans (Preview scans). Pre-scans are performed, with the EUT transmitting on the lowest applicable data rate, for both vertical and horizontal polarizations. The Pre-scan plots below are shown with a peak detector and RBW for the following frequency ranges: 9 kHz RBW (< 30 MHz); 120 kHz RBW (30 - 1000 MHz); 1 MHz RBW (> 1 GHz). In the case where unintentional emissions are observed, an ambient or idle pre-scan with the radio off, will be shown for comparison.

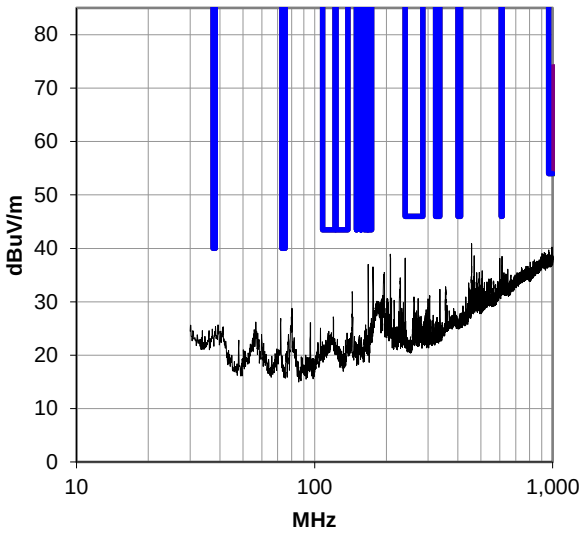
0.009-0.49 MHz, Run 28



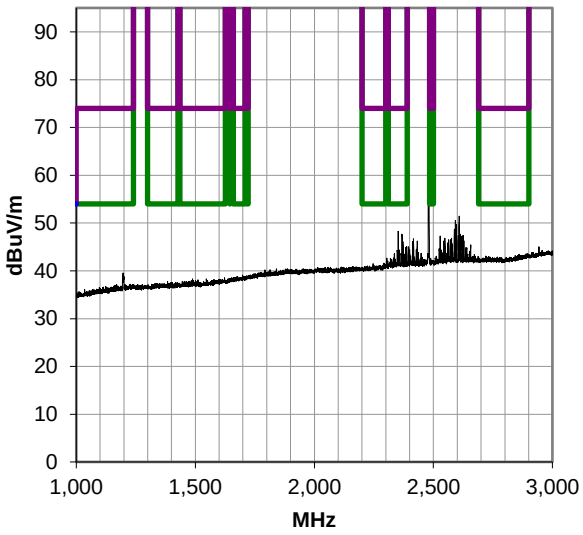
0.49-30 MHz, Run 29



30-1000 MHz, Run 24



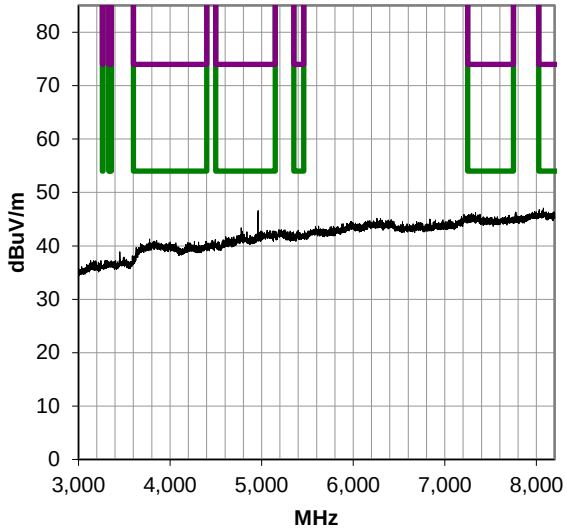
1000-3000 MHz, Run 11



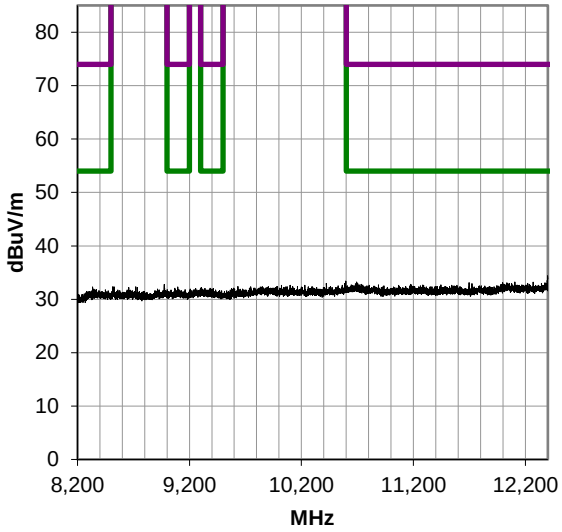
SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

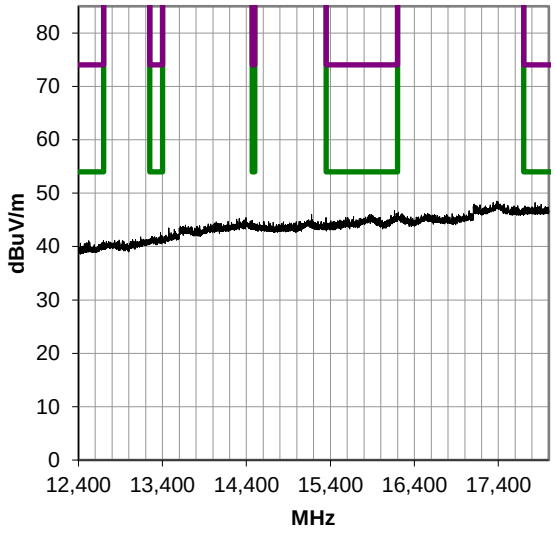
3000-8200 MHz, Run 12



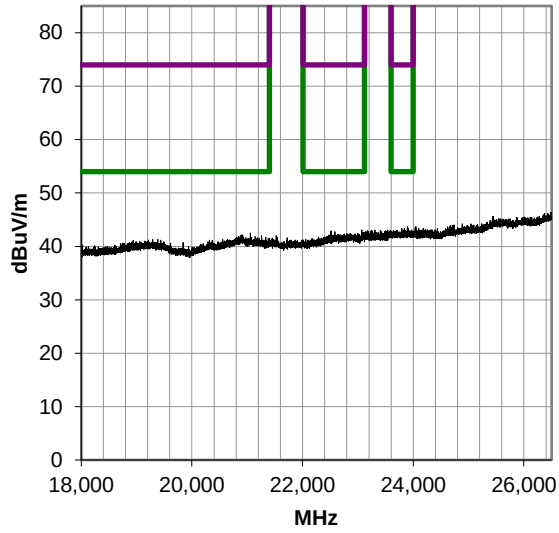
8200-12400 MHz, Run 13



12400-18000 MHz, Run 14



18000-26500 MHz, Run 21



End of Test Report