Cardiac Insight, Inc

M400

FCC 15.247:2023

Bluetooth Low Energy (DTS) Radio

Report: CAIN0005.0 Rev. 0, Issue Date: January 27, 2024

ACCREDITED
CERT #3310.02

TABLE OF CONTENTS

element
2023.04.17

CERTIFICATE OF TEST

Last Date of Test: December 28, 2023
Cardiac Insight, Inc
EUT: M400

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2023	ANSI C63.10:2013

Guidance

FCC KDB 558074 v05r02:2019

Results

Test Description	Result	Specification Section(s)	Method Section(s)	Comments
Powerline Conducted Emissions	N/A	15.207	6.2	Not required for a battery powered EUT.
Occupied Bandwidth (99%)	Pass	KDB 558074 - 2.1	6.9.3	
Duty Cycle	N/A	KDB 558074 - 6.0	11.6	Characterization of radio operation.
DTS Bandwidth (6 dB)	Pass	15.247(a)(2), KDB 558074 - 8.2	11.8.2	
Output Power	Pass	15.247(b)(3), KDB 558074 - 8.3.1	11.9.1.1	
Equivalent Isotropic Radiated Power	Pass	15.247(b)(3), KDB 558074 - 8.3.1	11.9.1.1	
Power Spectral Density	Pass	15.247(e), KDB 558074 -8.4	11.10.2	
Band Edge Compliance	Pass	15.247(d), KDB 558074 -8.5	11.11	
Spurious Conducted Emissions	Pass	15.247(d), KDB 558074 -8.5	11.11	
Spurious Radiated Emissions	Pass	15.247(d), KDB 558074 - 8.6, 8.7	11.12.1, 11.13.2, 6.5, 6.6	

Deviations From Test Standards

None

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

Approved By:

Cole Ghizzone, Operations Manager

Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information. As indicated in the Statement of Work sent with the quotation, Element's standard process is to always use the latest published version of the test methods even when earlier versions are cited in the test specification. Issuance of a purchase order was de facto acceptance of this approach. Otherwise, the client would have advised Element in writing of the specific version of the test methods they wanted applied to the subject testing.

REVISION HISTORY

Revision Number	Description	Date (yyyy-mm-dd)	Page Number
00	None		

ACCREDITATIONS AND AUTHORIZATIONS

United States

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

A2LA - 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

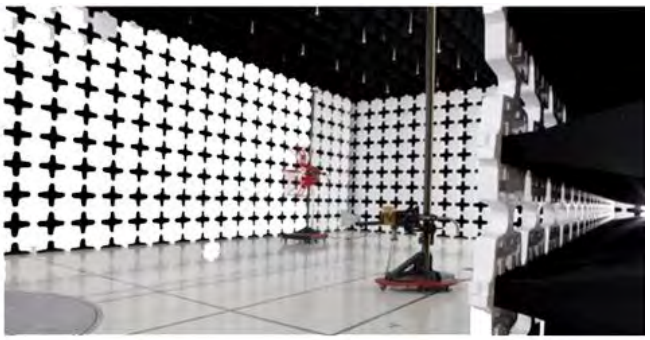
element
2023.09.21

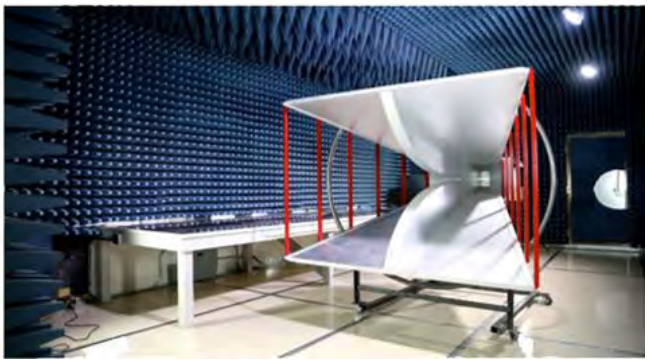
Testing was performed at the following location(s)

	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

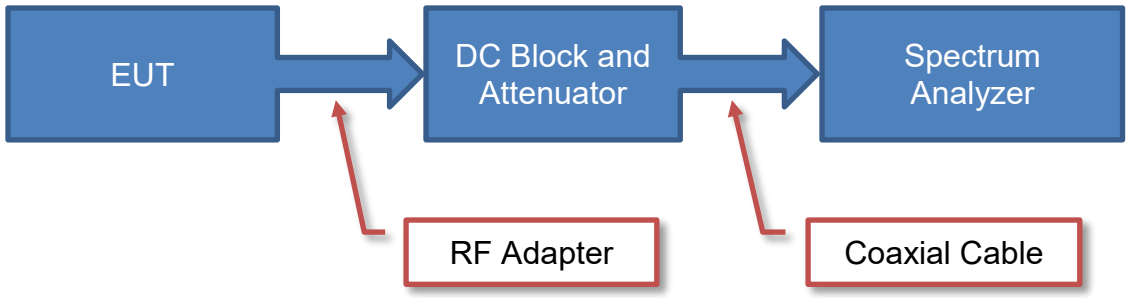
TEST SETUP BLOCK DIAGRAMS

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.

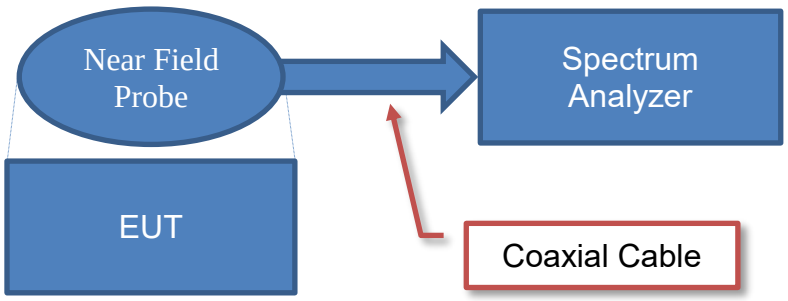
Antenna Port Conducted Measurements



Sample Calculation (logarithmic units)

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

Near Field Test Fixture Measurements

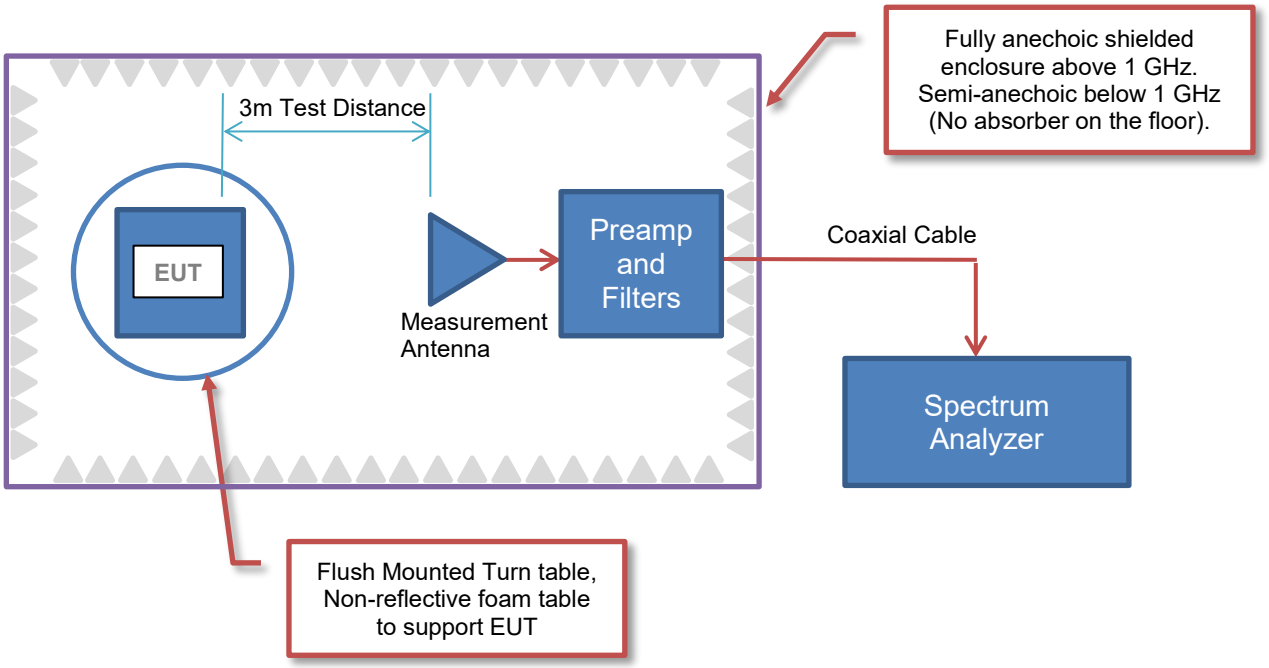


Sample Calculation (logarithmic units)

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						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**

Conducted Emissions:

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

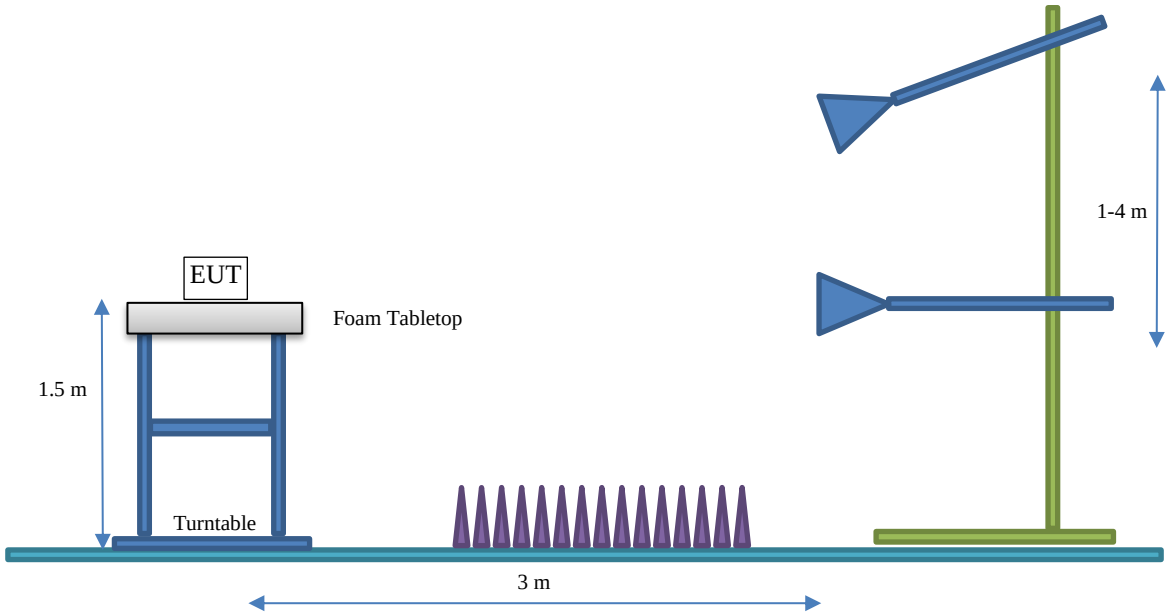
Radiated Power (ERP/EIRP) – Substitution Method:

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:	Cardiac Insight, Inc
Address:	2375 130th Ave NE Suite 101
City, State, Zip:	Bellevue, WA 98005
Test Requested By:	Rick Myers
EUT:	M400
First Date of Test:	December 28, 2023
Last Date of Test:	December 28, 2023
Receipt Date of Samples:	December 28, 2023
Equipment Design Stage:	Prototype
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Disposable battery powered wearable ECG sensor with Bluetooth LE. The ECG sensor does not have the ability to be recharge.

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

POWER SETTINGS AND ANTENNAS

The power settings, antenna gain value(s) and cable loss (if applicable) used for the testing contained in this report were provided by the customer and will affect the validity of the results. Element assumes no responsibility for the accuracy of this information. 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 (MHz)	Gain (dBi)
Trace	Element	2402	-5.54
		2442	-6.75
		2480	-6.54

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: 1.0.19
X Rated power settings

SETTINGS FOR ALL TESTS IN THIS REPORT

Modulation Types / Data Rates	Type	Channel	Frequency (MHz)	Power Setting (dBm)
BLE GFSK 1 Mbps, 2 Mbps	DTS	0	2402	0
		20	2442	
		39	2480	

CONFIGURATIONS

Configuration CAIN0005-2

Software/Firmware Running During Test	
Description	**Version**
Radio Firmware	1.0.19

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Wearable ECG sensor (2402 MHz, 1 Mbps)	Cardiac Insight, Inc	M400	1000004A
Wearable ECG sensor (2442 MHz, 1 Mbps)	Cardiac Insight, Inc	M400	1000008Y
Wearable ECG sensor (2480 MHz, 1 Mbps)	Cardiac Insight, Inc	M400	1000009M
Wearable ECG sensor (2402 MHz, 2 Mbps)	Cardiac Insight, Inc	M400	1000009N
Wearable ECG sensor (2480 MHz, 2 Mbps)	Cardiac Insight, Inc	M400	1000009X

Configuration CAIN0005-3

Software/Firmware Running During Test	
Description	**Version**
Radio Firmware	1.0.19

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Wearable ECG sensor (2402 MHz, 1 Mbps)	Cardiac Insight, Inc	M400	10000096
Wearable ECG sensor (2442 MHz, 1 Mbps)	Cardiac Insight, Inc	M400	10000097
Wearable ECG sensor (2480 MHz, 1 Mbps)	Cardiac Insight, Inc	M400	10000050
Wearable ECG sensor (2402 MHz, 2 Mbps)	Cardiac Insight, Inc	M400	10000095
Wearable ECG sensor (2442 MHz, 2 Mbps)	Cardiac Insight, Inc	M400	10000094
Wearable ECG sensor (2480 MHz, 2 Mbps)	Cardiac Insight, Inc	M400	10000093

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2023-12-28	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.
2	2023-12-28	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	2023-12-28	Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
4	2023-12-28	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	2023-12-28	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.
6	2023-12-28	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	2023-12-28	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	2023-12-28	Occupied Bandwidth (99%)	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

OCCUPIED BANDWIDTH (99%)

element
TbtTx 2023.08.15.2
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
Generator - Signal	Keysight	N5182B	TFU	2022-12-02	2024-12-02
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2023-10-04	2024-10-04
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2023-11-22	2024-11-22
Attenuator	Fairview Microwave	SA26B-20	TWJ	2023-03-13	2024-03-13
Block - DC	Fairview Microwave	SD3379	AMX	2023-03-13	2024-03-13

OCCUPIED BANDWIDTH (99%)

element
TbtTx 2023.08.15.2
WTD.2023.11.13.0

EUT:	M400	Work Order:	CAIN0005
Serial Number:	See configuration	Date:	2023-12-28
Customer:	Cardiac Insight, Inc	Temperature:	21.3°C
Attendees:	Rick Myers	Relative Humidity:	39.6%
Customer Project:	None	Bar. Pressure (PMSL):	1014 mbar
Tested By:	Jeff Alcoke	Job Site:	EV01
Power:	Battery	Configuration:	CAIN0005-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2023	ANSI C63.10:2013

COMMENTS

Reference level offset includes: DC Block, 20 dB attenuator, measurement cable, manufacturers supplied patch cable, and insertion loss of SMC connector at antenna feed.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

Tested By

TEST RESULTS

	Value	Limit	Result
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	1.048 MHz	N/A	N/A
Mid Channel, 2442 MHz	1.054 MHz	N/A	N/A
High Channel, 2480 MHz	1.064 MHz	N/A	N/A
BLE/GFSK 2 Mbps			
Low Channel, 2402 MHz	2.076 MHz	N/A	N/A
Mid Channel, 2442 MHz	2.072 MHz	N/A	N/A
High Channel, 2480 MHz	2.09 MHz	N/A	N/A

OCCUPIED BANDWIDTH (99%)

element
TbtTx 2023.08.15.2
WTD.2023.11.13.0

BLE/GFSK 1 Mbps
Low Channel, 2402 MHz

BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz

BLE/GFSK 1 Mbps
High Channel, 2480 MHz

BLE/GFSK 2 Mbps
Low Channel, 2402 MHz

OCCUPIED BANDWIDTH (99%)

element
TbtTx 2023.08.15.2
WTD.2023.11.13.0

BLE/GFSK 2 Mbps
Mid Channel, 2442 MHz

BLE/GFSK 2 Mbps
High Channel, 2480 MHz

DUTY CYCLE

element
2023/09/26

TEST DESCRIPTION

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

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

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

The test software provided for operation in a fixed, single channel mode allows the EUT to operate continuously at 100% Duty Cycle.

DTS BANDWIDTH (6 dB)

element
TbtTx 2023.08.15.2
WTD.2023.11.13.0

TEST DESCRIPTION

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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
Generator - Signal	Keysight	N5182B	TFU	2022-12-02	2024-12-02
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2023-10-04	2024-10-04
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2023-11-22	2024-11-22
Attenuator	Fairview Microwave	SA26B-20	TWJ	2023-03-13	2024-03-13
Block - DC	Fairview Microwave	SD3379	AMX	2023-03-13	2024-03-13

DTS BANDWIDTH (6 dB)

element
TbtTx 2023.08.15.2
WTD.2023.11.13.0

EUT:	M400	Work Order:	CAIN0005
Serial Number:	See configuration	Date:	2023-12-28
Customer:	Cardiac Insight, Inc	Temperature:	21.3°C
Attendees:	Rick Myers	Relative Humidity:	39.6%
Customer Project:	None	Bar. Pressure (PMSL):	1014 mbar
Tested By:	Jeff Alcoke	Job Site:	EV01
Power:	Battery	Configuration:	CAIN0005-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2023	ANSI C63.10:2013

COMMENTS

Reference level offset includes: DC Block, 20 dB attenuator, measurement cable, manufacturers supplied patch cable, and insertion loss of SMC connector at antenna feed.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

Tested By

TEST RESULTS

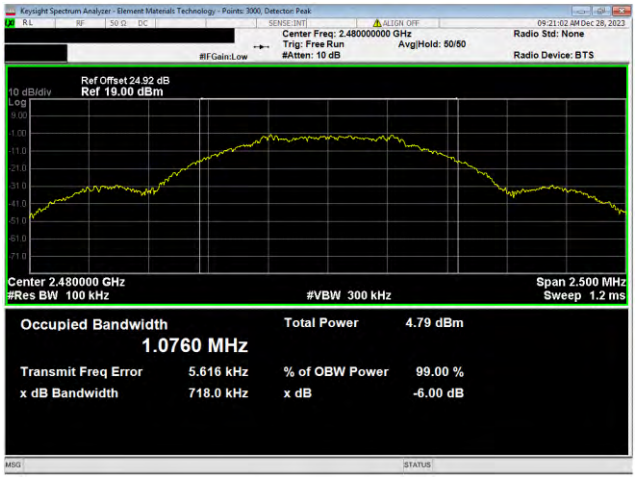
	Value	Limit (≥)	Result
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	691.192 kHz	500 kHz	Pass
Mid Channel, 2442 MHz	701.118 kHz	500 kHz	Pass
High Channel, 2480 MHz	717.965 kHz	500 kHz	Pass
BLE/GFSK 2 Mbps			
Low Channel, 2402 MHz	1.392 MHz	500 kHz	Pass
Mid Channel, 2442 MHz	1.404 MHz	500 kHz	Pass
High Channel, 2480 MHz	1.417 MHz	500 kHz	Pass

DTS BANDWIDTH (6 dB)

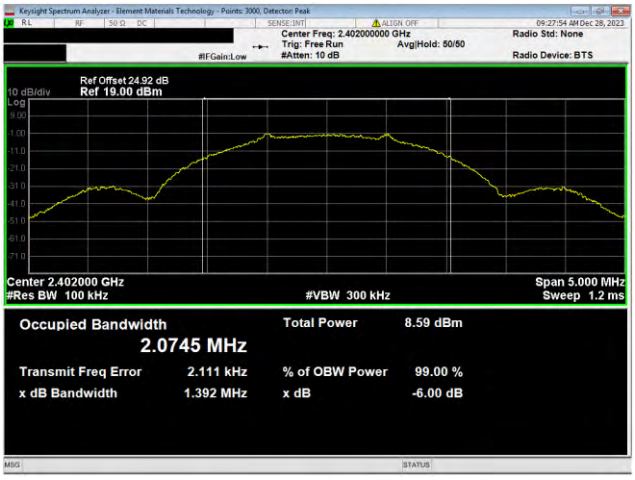
element
TbtTx 2023.08.15.2
WTD.2023.11.13.0

BLE/GFSK 1 Mbps
Low Channel, 2402 MHz

BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz



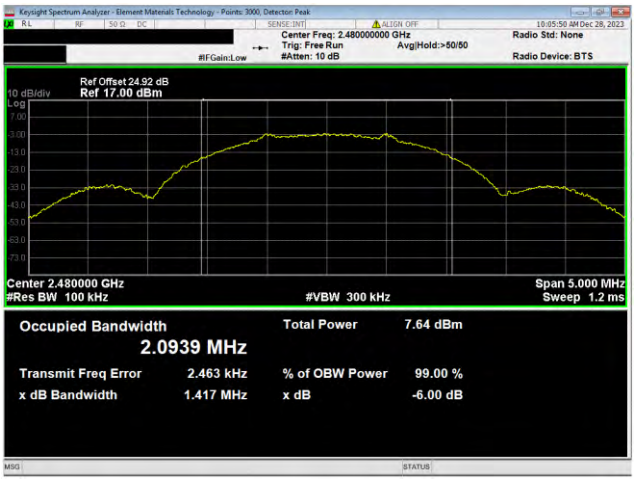
BLE/GFSK 1 Mbps
High Channel, 2480 MHz



BLE/GFSK 2 Mbps
Low Channel, 2402 MHz

DTS BANDWIDTH (6 dB)

BLE/GFSK 2 Mbps
Mid Channel, 2442 MHz



BLE/GFSK 2 Mbps
High Channel, 2480 MHz

OUTPUT POWER

element
TbtTx 2023.08.15.2
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
Generator - Signal	Keysight	N5182B	TFU	2022-12-02	2024-12-02
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2023-10-04	2024-10-04
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2023-11-22	2024-11-22
Attenuator	Fairview Microwave	SA26B-20	TWJ	2023-03-13	2024-03-13
Block - DC	Fairview Microwave	SD3379	AMX	2023-03-13	2024-03-13

OUTPUT POWER

element
TbtTx 2023.08.15.2
WTD.2023.11.13.0

EUT:	M400	Work Order:	CAIN0005
Serial Number:	See configuration	Date:	2023-12-28
Customer:	Cardiac Insight, Inc	Temperature:	21.3°C
Attendees:	Rick Myers	Relative Humidity:	39.6%
Customer Project:	None	Bar. Pressure (PMSL):	1014 mbar
Tested By:	Jeff Alcoke	Job Site:	EV01
Power:	Battery	Configuration:	CAIN0005-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2023	ANSI C63.10:2013

COMMENTS

Reference level offset includes: DC Block, 20 dB attenuator, measurement cable, manufacturers supplied patch cable, and insertion loss of SMC connector at antenna feed.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

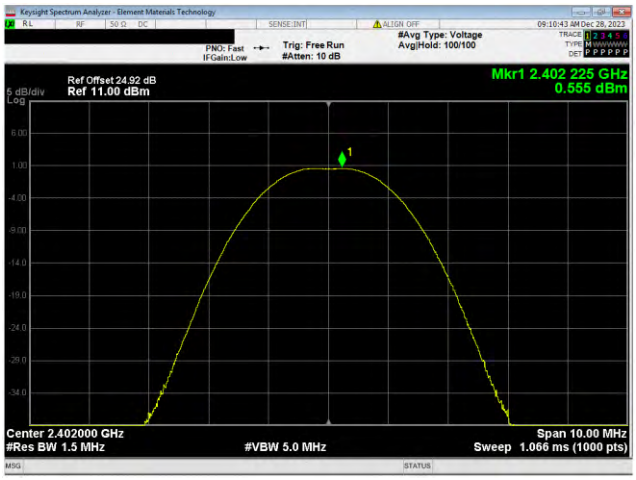
Pass

Tested By

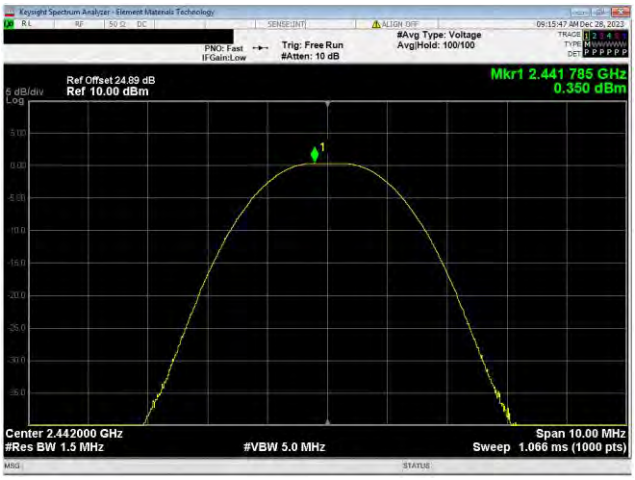
TEST RESULTS

	Out Pwr (dBm)	Limit (dBm)	Result
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	0.555	30	Pass
Mid Channel, 2442 MHz	0.35	30	Pass
High Channel, 2480 MHz	-0.869	30	Pass
BLE/GFSK 2 Mbps			
Low Channel, 2402 MHz	0.571	30	Pass
Mid Channel, 2442 MHz	-0.204	30	Pass
High Channel, 2480 MHz	-0.35	30	Pass

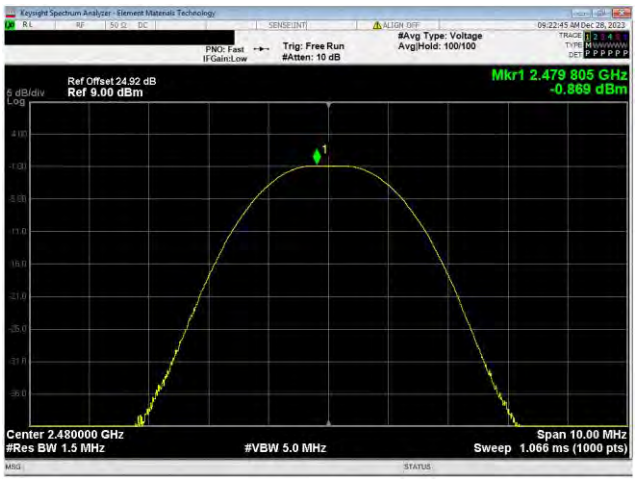
OUTPUT POWER



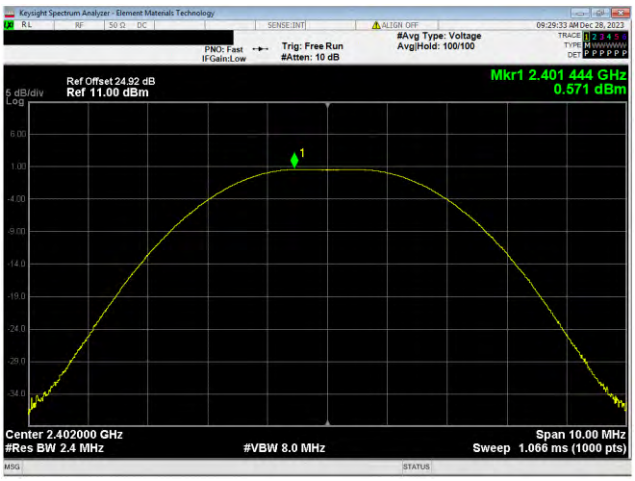
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz

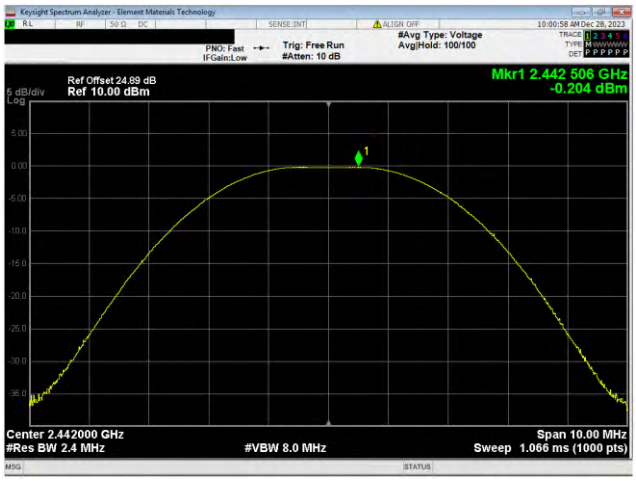


BLE/GFSK 1 Mbps
High Channel, 2480 MHz

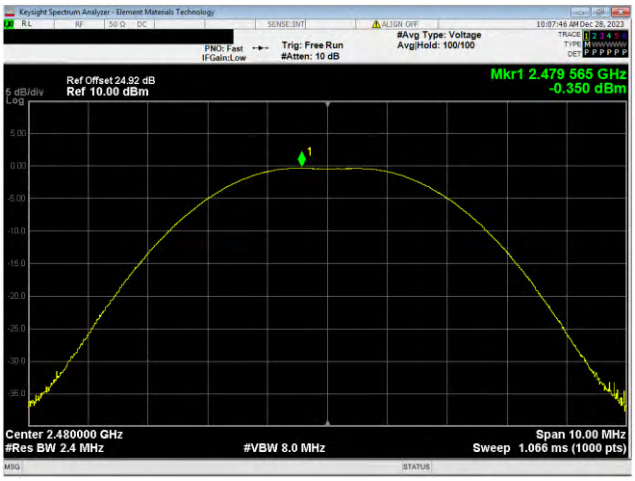


BLE/GFSK 2 Mbps
Low Channel, 2402 MHz

OUTPUT POWER



BLE/GFSK 2 Mbps
Mid Channel, 2442 MHz



BLE/GFSK 2 Mbps
High Channel, 2480 MHz

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

element
TbtTx 2023.08.15.2
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
Generator - Signal	Keysight	N5182B	TFU	2022-12-02	2024-12-02
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2023-10-04	2024-10-04
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2023-11-22	2024-11-22
Attenuator	Fairview Microwave	SA26B-20	TWJ	2023-03-13	2024-03-13
Block - DC	Fairview Microwave	SD3379	AMX	2023-03-13	2024-03-13

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

element
TbtTx 2023.08.15.2
WTD.2023.11.13.0

EUT:	M400	Work Order:	CAIN0005
Serial Number:	See configuration	Date:	2023-12-28
Customer:	Cardiac Insight, Inc	Temperature:	21.3°C
Attendees:	Rick Myers	Relative Humidity:	39.6%
Customer Project:	None	Bar. Pressure (PMSL):	1014 mbar
Tested By:	Jeff Alcoke	Job Site:	EV01
Power:	Battery	Configuration:	CAIN0005-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2023	ANSI C63.10:2013

COMMENTS

Reference level offset includes: DC Block, 20 dB attenuator, measurement cable, manufacturers supplied patch cable, and insertion loss of SMC connector at antenna feed.

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	0.555	-5.54	-5.0	36	Pass
Mid Channel, 2442 MHz	0.350	-6.75	-6.4	36	Pass
High Channel, 2480 MHz	-0.869	-6.54	-7.4	36	Pass
BLE/GFSK 2 Mbps					
Low Channel, 2402 MHz	0.571	-5.54	-5.0	36	Pass
Mid Channel, 2442 MHz	-0.204	-6.75	-7.0	36	Pass
High Channel, 2480 MHz	-0.350	-6.54	-6.9	36	Pass

POWER SPECTRAL DENSITY

element
TbtTx 2023.08.15.2
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
Generator - Signal	Keysight	N5182B	TFU	2022-12-02	2024-12-02
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2023-10-04	2024-10-04
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2023-11-22	2024-11-22
Attenuator	Fairview Microwave	SA26B-20	TWJ	2023-03-13	2024-03-13
Block - DC	Fairview Microwave	SD3379	AMX	2023-03-13	2024-03-13

POWER SPECTRAL DENSITY

element
TbtTx 2023.08.15.2
WTD.2023.11.13.0

EUT:	M400	Work Order:	CAIN0005
Serial Number:	See configuration	Date:	2023-12-28
Customer:	Cardiac Insight, Inc	Temperature:	21.3°C
Attendees:	Rick Myers	Relative Humidity:	39.6%
Customer Project:	None	Bar. Pressure (PMSL):	1014 mbar
Tested By:	Jeff Alcoke	Job Site:	EV01
Power:	Battery	Configuration:	CAIN0005-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2023	ANSI C63.10:2013

COMMENTS

Reference level offset includes: DC Block, 20 dB attenuator, measurement cable, manufacturers supplied patch cable, and insertion loss of SMC connector at antenna feed.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

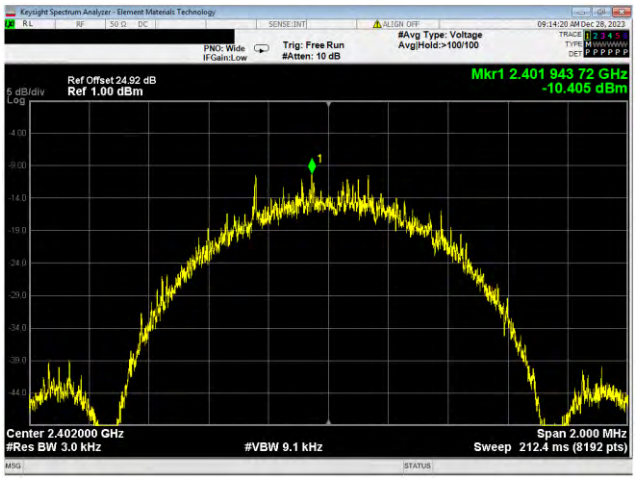
Tested By

TEST RESULTS

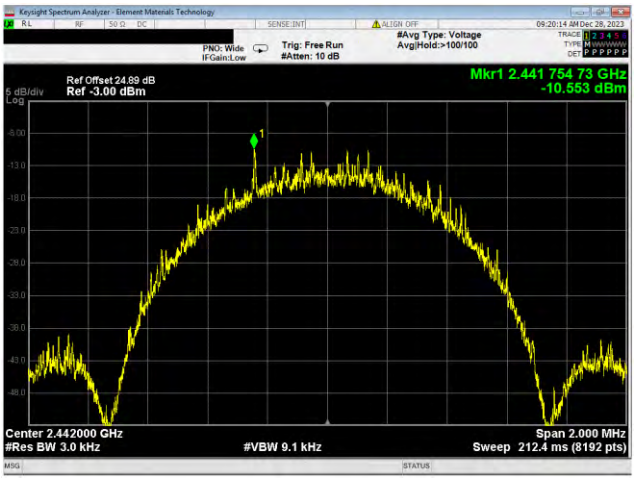
	Value dBm/3kHz	Limit ≤ (dBm/3kHz)	Results
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	-10.405	8	Pass
Mid Channel, 2442 MHz	-10.553	8	Pass
High Channel, 2480 MHz	-10.429	8	Pass
BLE/GFSK 2 Mbps			
Low Channel, 2402 MHz	-12.454	8	Pass
Mid Channel, 2442 MHz	-13.746	8	Pass
High Channel, 2480 MHz	-14.338	8	Pass

POWER SPECTRAL DENSITY

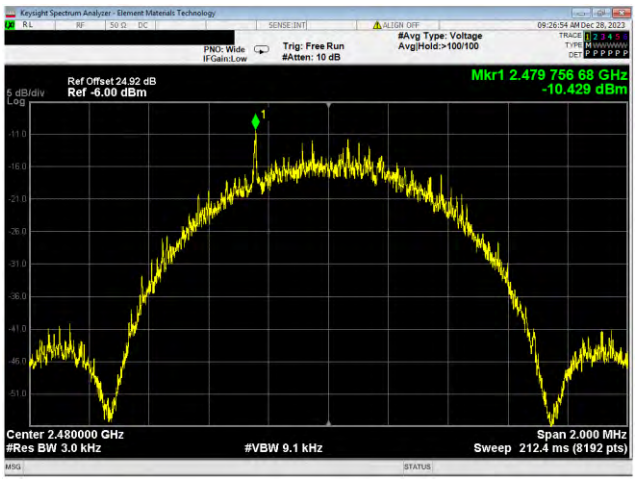
element
TbtTx 2023.08.15.2
WTD.2023.11.13.0



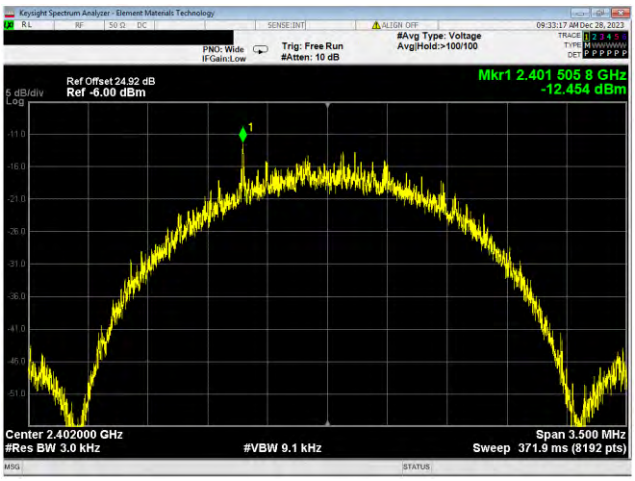
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz

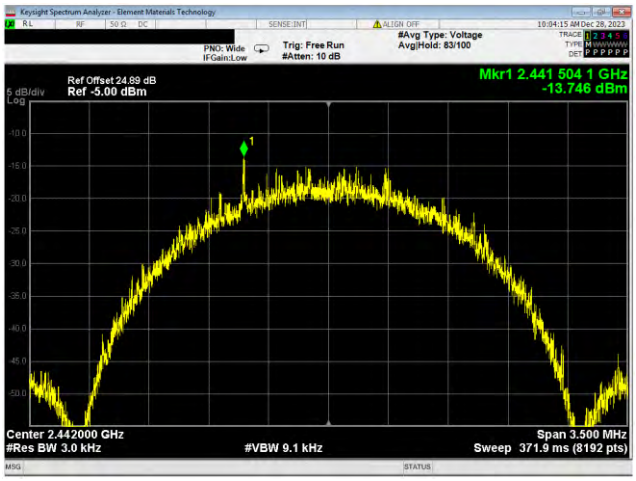


BLE/GFSK 1 Mbps
High Channel, 2480 MHz

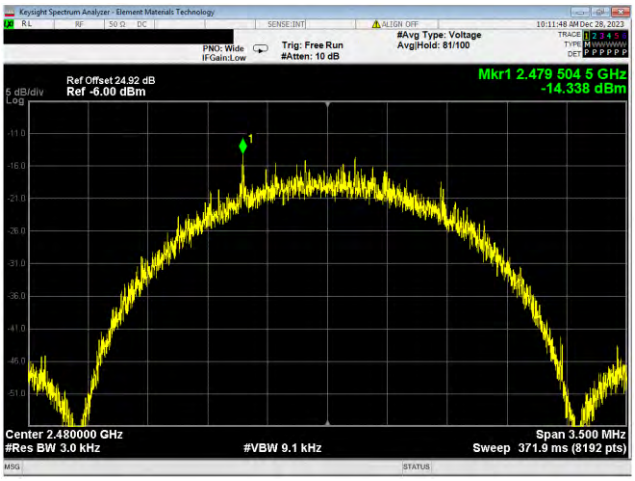


BLE/GFSK 2 Mbps
Low Channel, 2402 MHz

POWER SPECTRAL DENSITY



BLE/GFSK 2 Mbps
Mid Channel, 2442 MHz



BLE/GFSK 2 Mbps
High Channel, 2480 MHz

BAND EDGE COMPLIANCE

element
TbtTx 2023.08.15.2
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
Generator - Signal	Keysight	N5182B	TFU	2022-12-02	2024-12-02
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2023-10-04	2024-10-04
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2023-11-22	2024-11-22
Attenuator	Fairview Microwave	SA26B-20	TWJ	2023-03-13	2024-03-13
Block - DC	Fairview Microwave	SD3379	AMX	2023-03-13	2024-03-13

BAND EDGE COMPLIANCE

element
TbtTx 2023.08.15.2
WTD.2023.11.13.0

EUT:	M400	Work Order:	CAIN0005
Serial Number:	See configuration	Date:	2023-12-28
Customer:	Cardiac Insight, Inc	Temperature:	21.3°C
Attendees:	Rick Myers	Relative Humidity:	39.6%
Customer Project:	None	Bar. Pressure (PMSL):	1014 mbar
Tested By:	Jeff Alcoke	Job Site:	EV01
Power:	Battery	Configuration:	CAIN0005-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2023	ANSI C63.10:2013

COMMENTS

Reference level offset includes: DC Block, 20 dB attenuator, measurement cable, manufacturers supplied patch cable, and insertion loss of SMC connector at antenna feed.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

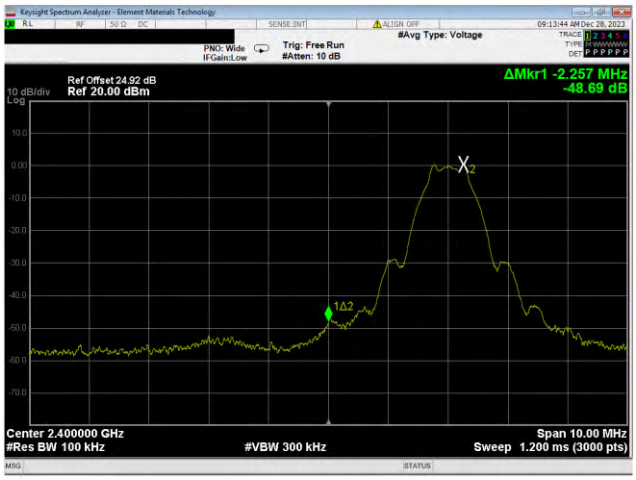
Pass

Tested By

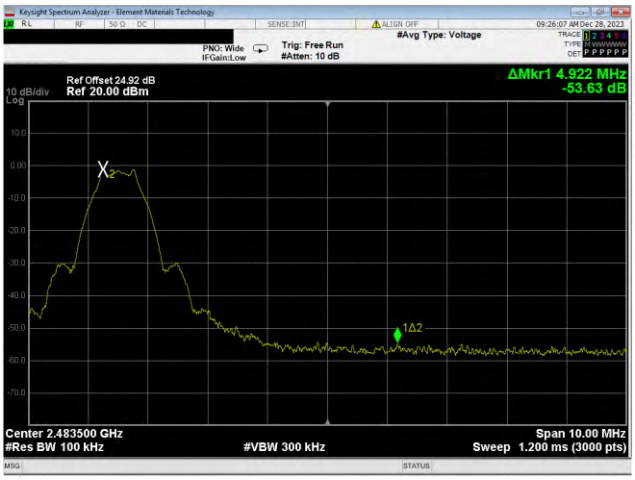
TEST RESULTS

	Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	-48.69	-20	Pass
High Channel, 2480 MHz	-53.63	-20	Pass
BLE/GFSK 2 Mbps			
Low Channel, 2402 MHz	-31.17	-20	Pass
High Channel, 2480 MHz	-51.51	-20	Pass

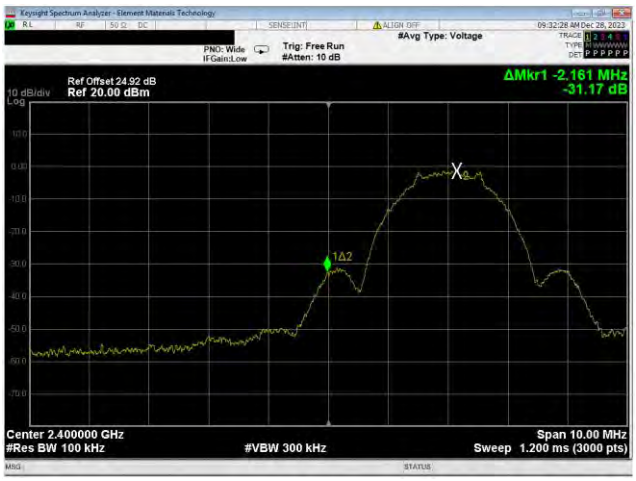
BAND EDGE COMPLIANCE



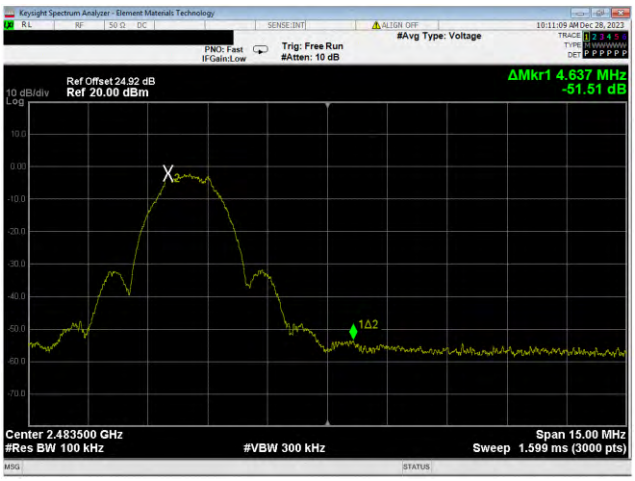
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
High Channel, 2480 MHz



BLE/GFSK 2 Mbps
Low Channel, 2402 MHz



BLE/GFSK 2 Mbps
High Channel, 2480 MHz

SPURIOUS CONDUCTED EMISSIONS

element
TbtTx 2023.08.15.2
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
Generator - Signal	Keysight	N5182B	TFU	2022-12-02	2024-12-02
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2023-10-04	2024-10-04
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2023-11-22	2024-11-22
Attenuator	Fairview Microwave	SA26B-20	TWJ	2023-03-13	2024-03-13
Block - DC	Fairview Microwave	SD3379	AMX	2023-03-13	2024-03-13

SPURIOUS CONDUCTED EMISSIONS

element
TbtTx 2023.08.15.2
WTD.2023.11.13.0

EUT:	M400	Work Order:	CAIN0005
Serial Number:	See configuration	Date:	2023-12-28
Customer:	Cardiac Insight, Inc	Temperature:	21.3°C
Attendees:	Rick Myers	Relative Humidity:	39.6%
Customer Project:	None	Bar. Pressure (PMSL):	1014 mbar
Tested By:	Jeff Alcoke	Job Site:	EV01
Power:	Battery	Configuration:	CAIN0005-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2023	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

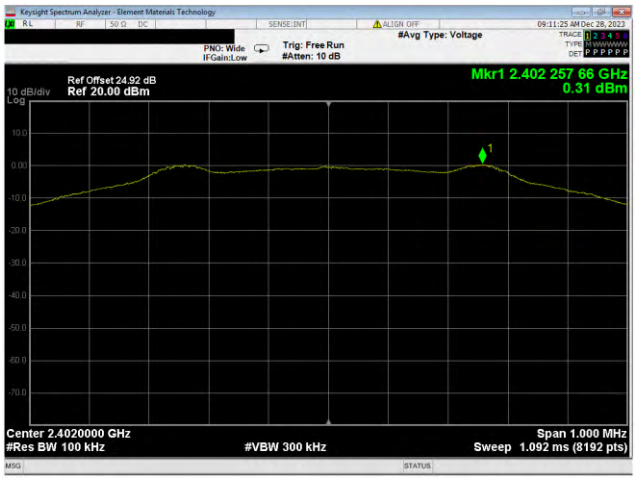
Tested By

TEST RESULTS

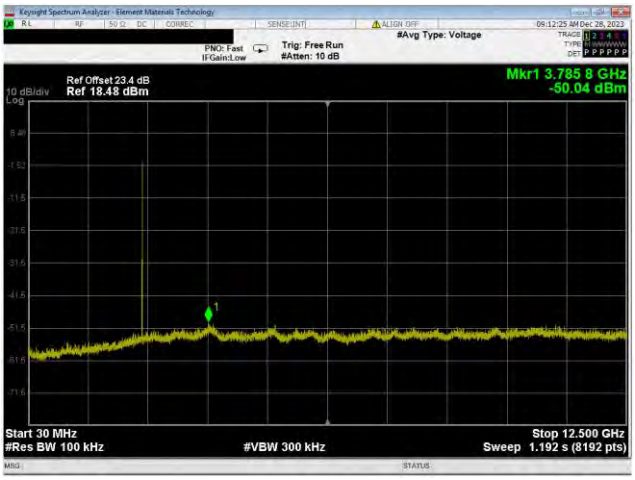
	Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK 1 Mbps					
Low Channel, 2402 MHz	Fundamental	2402.26	N/A	N/A	N/A
	30 MHz - 12.5 GHz	3785.77	-50.35	-20	Pass
	12.5 GHz - 25 GHz	23875.29	-46.31	-20	Pass
Mid Channel, 2442 MHz	Fundamental	2441.76	N/A	N/A	N/A
	30 MHz - 12.5 GHz	3799.47	-49.65	-20	Pass
	12.5 GHz - 25 GHz	23766.94	-46.27	-20	Pass
High Channel, 2480 MHz	Fundamental	2479.75	N/A	N/A	N/A
	30 MHz - 12.5 GHz	10706.61	-49.05	-20	Pass
	12.5 GHz - 25 GHz	24667.32	-44.76	-20	Pass
BLE/GFSK 2 Mbps					
Low Channel, 2402 MHz	Fundamental	2402	N/A	N/A	N/A
	30 MHz - 12.5 GHz	3829.92	-48.89	-20	Pass
	12.5 GHz - 25 GHz	24385	-45.42	-20	Pass
Mid Channel, 2442 MHz	Fundamental	2442	N/A	N/A	N/A
	30 MHz - 12.5 GHz	3887.77	-48.37	-20	Pass
	12.5 GHz - 25 GHz	23687.58	-44.7	-20	Pass
High Channel, 2480 MHz	Fundamental	2479.51	N/A	N/A	N/A
	30 MHz - 12.5 GHz	9680.51	-47.54	-20	Pass
	12.5 GHz - 25 GHz	24711.57	-44.14	-20	Pass

SPURIOUS CONDUCTED EMISSIONS

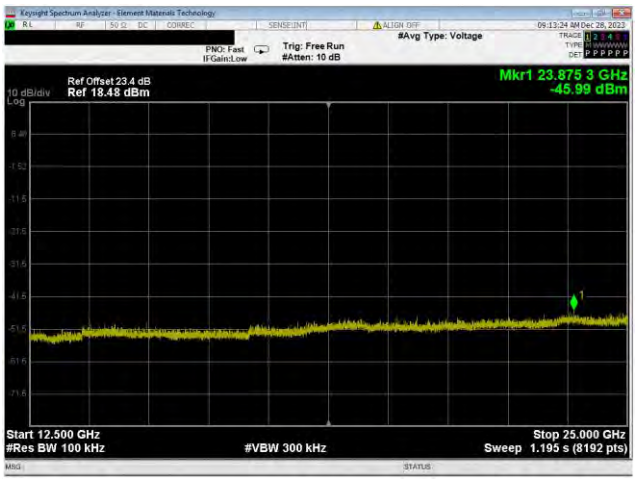
element
TbtTx 2023.08.15.2
WTD.2023.11.13.0



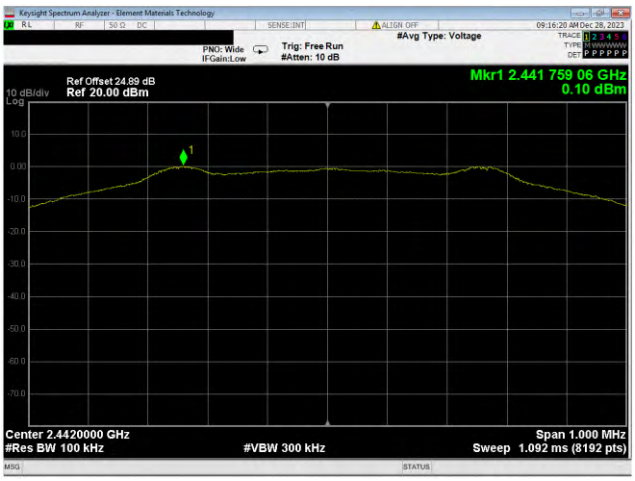
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Low Channel, 2402 MHz

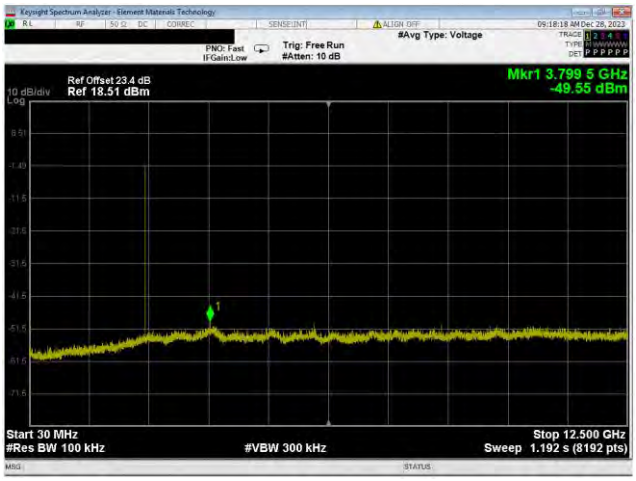


BLE/GFSK 1 Mbps
Low Channel, 2402 MHz

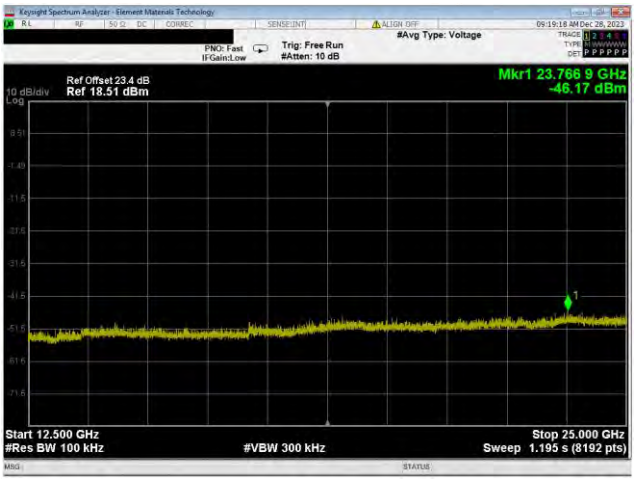


BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz

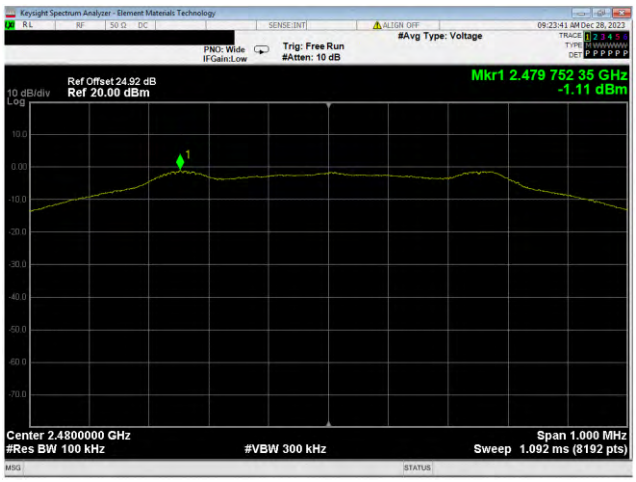
SPURIOUS CONDUCTED EMISSIONS



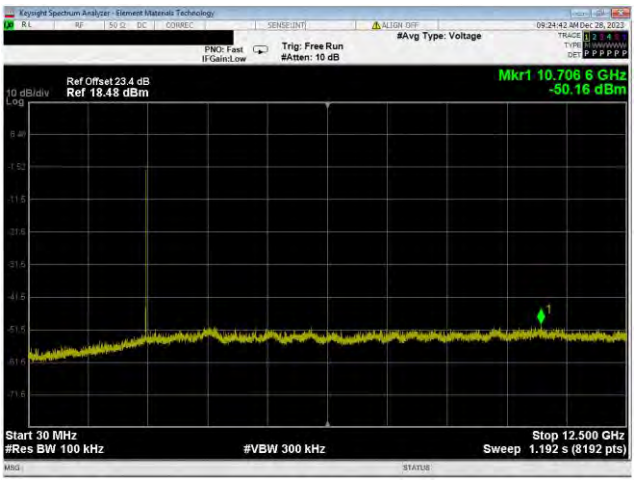
BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz



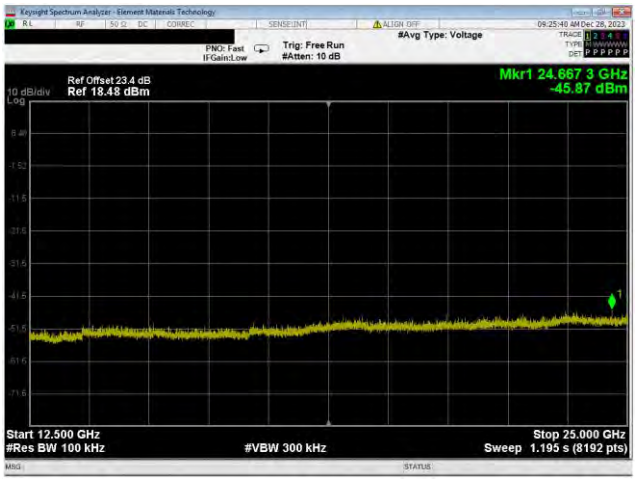
BLE/GFSK 1 Mbps
High Channel, 2480 MHz



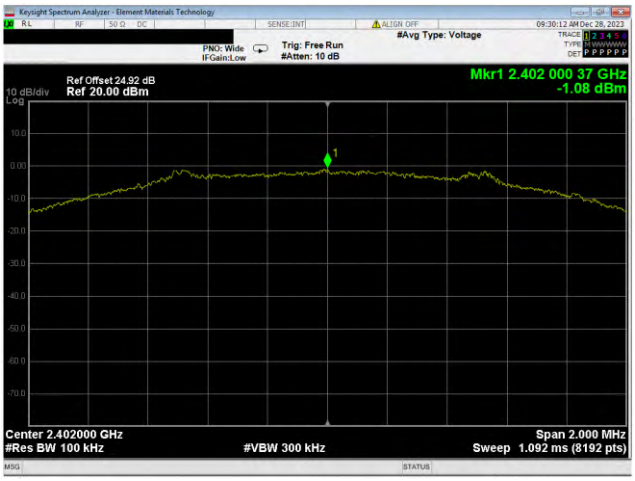
BLE/GFSK 1 Mbps
High Channel, 2480 MHz

SPURIOUS CONDUCTED EMISSIONS

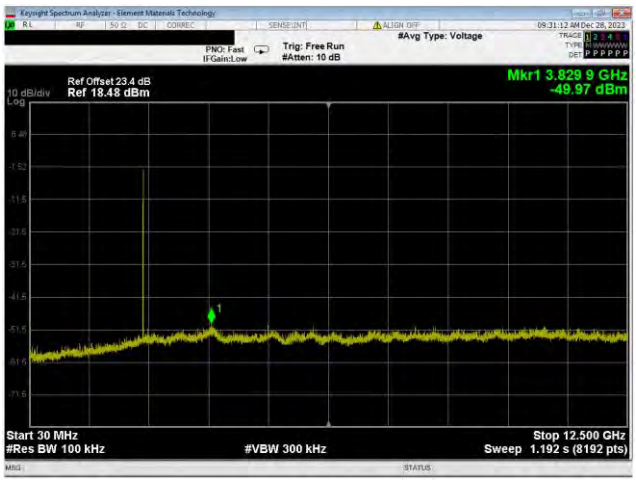
element
TbtTx 2023.08.15.2
WTD.2023.11.13.0



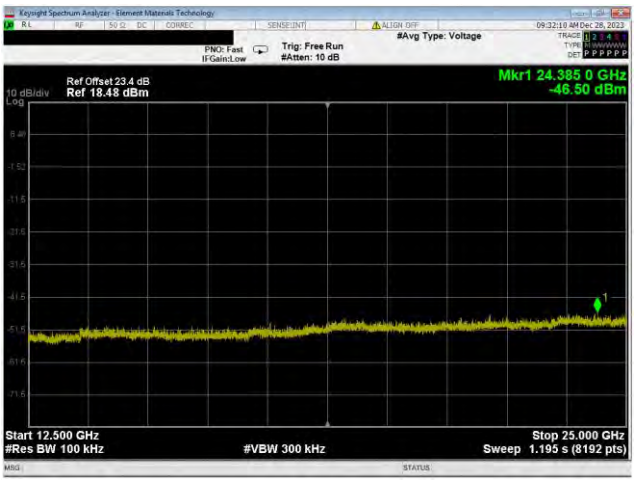
BLE/GFSK 1 Mbps
High Channel, 2480 MHz



BLE/GFSK 2 Mbps
Low Channel, 2402 MHz



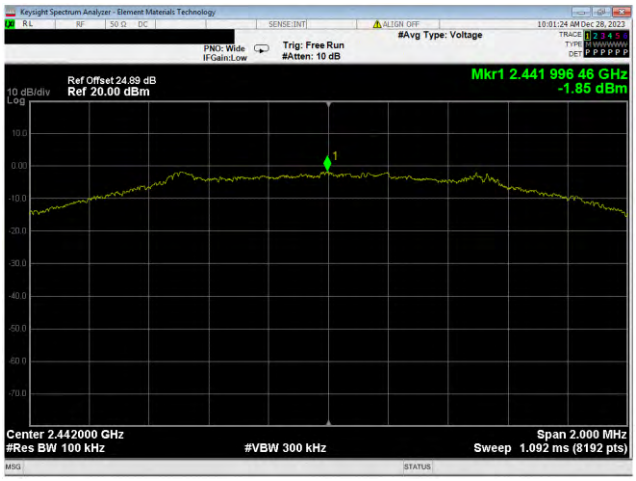
BLE/GFSK 2 Mbps
Low Channel, 2402 MHz



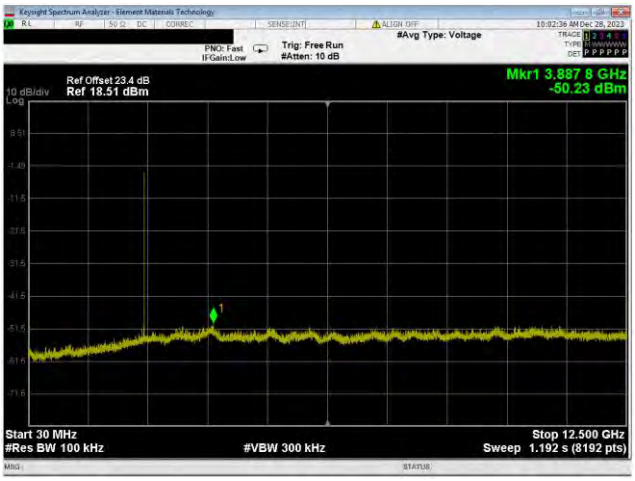
BLE/GFSK 2 Mbps
Low Channel, 2402 MHz

SPURIOUS CONDUCTED EMISSIONS

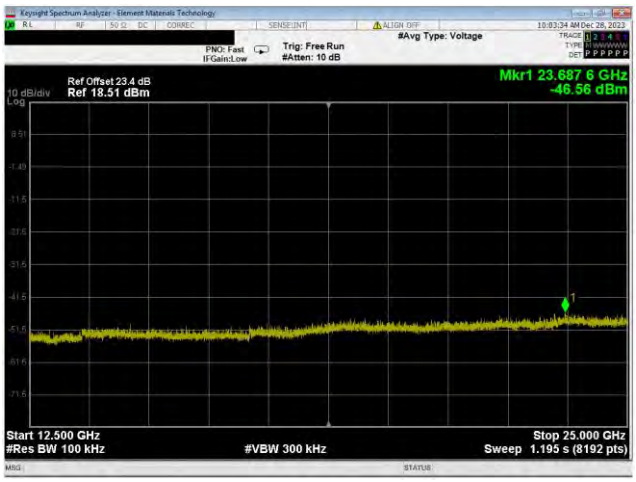
element
TbtTx 2023.08.15.2
WTD.2023.11.13.0



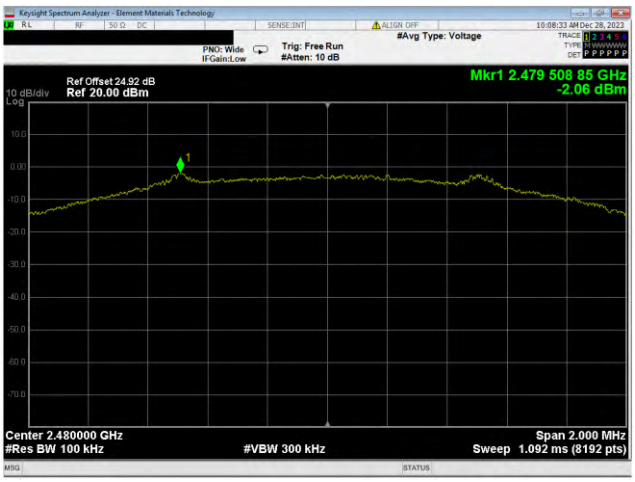
BLE/GFSK 2 Mbps
Mid Channel, 2442 MHz



BLE/GFSK 2 Mbps
Mid Channel, 2442 MHz

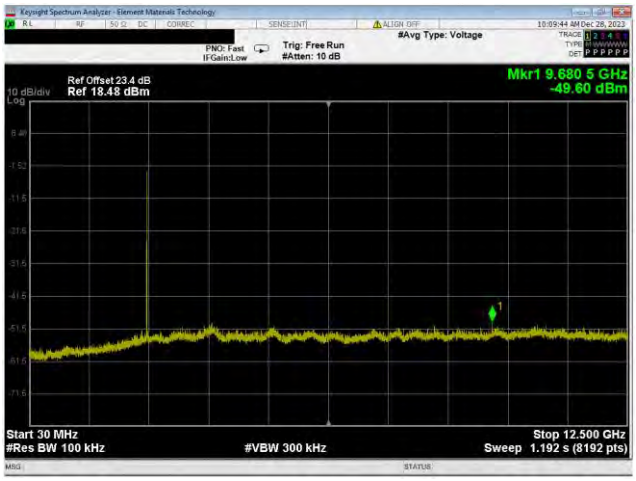


BLE/GFSK 2 Mbps
Mid Channel, 2442 MHz

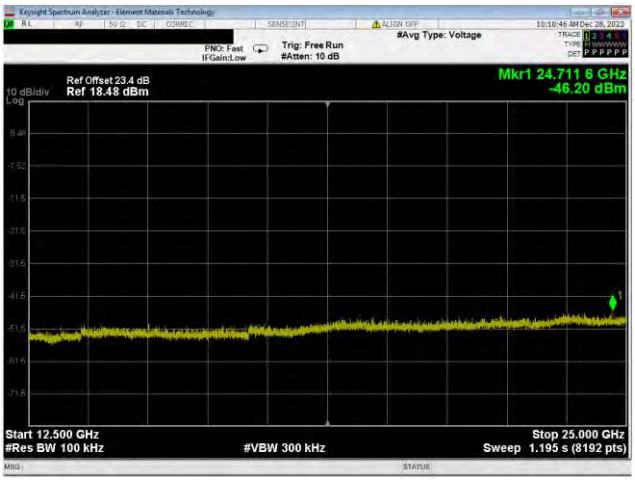


BLE/GFSK 2 Mbps
High Channel, 2480 MHz

SPURIOUS CONDUCTED EMISSIONS



BLE/GFSK 2 Mbps
High Channel, 2480 MHz



BLE/GFSK 2 Mbps
High Channel, 2480 MHz

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.10.23.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, a final radiated emissions test was performed. The frequency range investigated (scanned), is also noted in this report. Radiated emissions measurements were made at the EUT azimuth and antenna height such that the maximum radiated emissions level was detected. This required the use of a turntable and an antenna positioner. The preferred method of a continuous azimuth search was utilized for frequency scans of the EUT field strength with both polarities of the measuring antenna. A calibrated, linearly polarized antenna was positioned at the specified distance from the periphery of the EUT. Tests were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna was varied in height above the conducting ground plane to obtain the maximum signal strength. Though specified in the report, the measurement distance was 3 meters or 10 meters (from antenna to boundary of EUT). At any measurement distance, the antenna height was varied from 1 meter to 4 meters. These height scans apply for both horizontal and vertical polarization, except that for vertical polarization the minimum height of the center of the antenna was increased so that the lowest point of the bottom of the antenna cleared the ground surface by at least 25 cm.

The EUT arrangement is configured as equivalent to that occurring in normal use. Tabletop equipment is placed on a 0.8 meter high non-conductive table & for Floor-standing equipment, it is placed on, but insulated from a ground reference plane by the use of its own rollers or stand-off supports. If measurements above 1 GHz were required, the test setup was modified to meet the regulatory requirements for higher frequency measurements. If required, RF absorber was placed on the floor between the measurement antenna and EUT. If required, per the standard, an insulating material was also added to ground plane between the EUT's power and remote I/O cables.

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.

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
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	2023-10-04	2024-10-04
Antenna - Biconilog	Teseq	CBL 6141B	AXR	2022-11-01	2024-11-01
Antenna - Double Ridge	ETS Lindgren	3115	AIZ	2022-03-02	2024-03-02
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	2023-11-05	2024-11-05
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAG	2023-03-26	2024-03-26
Amplifier - Pre-Amplifier	L-3 Narda-MITEQ	AMF-6F-08001200-30-10P	PAO	2023-10-31	2024-10-31
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	2023-10-31	2024-10-31
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AVU	2023-07-10	2024-07-10
Cable	N/A	Bilog Cables	EVA	2023-11-05	2024-11-05
Cable	N/A	Double Ridge Horn Cables	EVB	2023-03-26	2024-03-26
Cable	None	Standard Gain Horn Cables	EVF	2023-10-31	2024-10-31
Attenuator	Coaxicom	3910-10	AWX	2023-02-10	2024-02-10
Filter - Low Pass	Micro-Tronics	LPM50004	LFD	2023-02-10	2024-02-10
Filter - High Pass	Micro-Tronics	HPM50111	HFO	2023-11-06	2024-11-06

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	5.2 dB	-5.2 dB

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.10.23.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

FREQUENCY RANGE INVESTIGATED

30 MHz TO 26500 MHz

POWER INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

CAIN0005-2

MODES INVESTIGATED

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

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.10.23.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

EUT:	M400	Work Order:	CAIN0005
Serial Number:	See configurations	Date:	2023-12-28
Customer:	Cardiac Insight, Inc	Temperature:	21.3°C
Attendees:	Rick Myers	Relative Humidity:	39.6%
Customer Project:	None	Bar. Pressure (PMSL):	1014 mb
Tested By:	Jeff Alcoke	Job Site:	EV01
Power:	Battery	Configuration:	CAIN0005-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2023	ANSI C63.10:2013

TEST PARAMETERS

Run #:	11	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

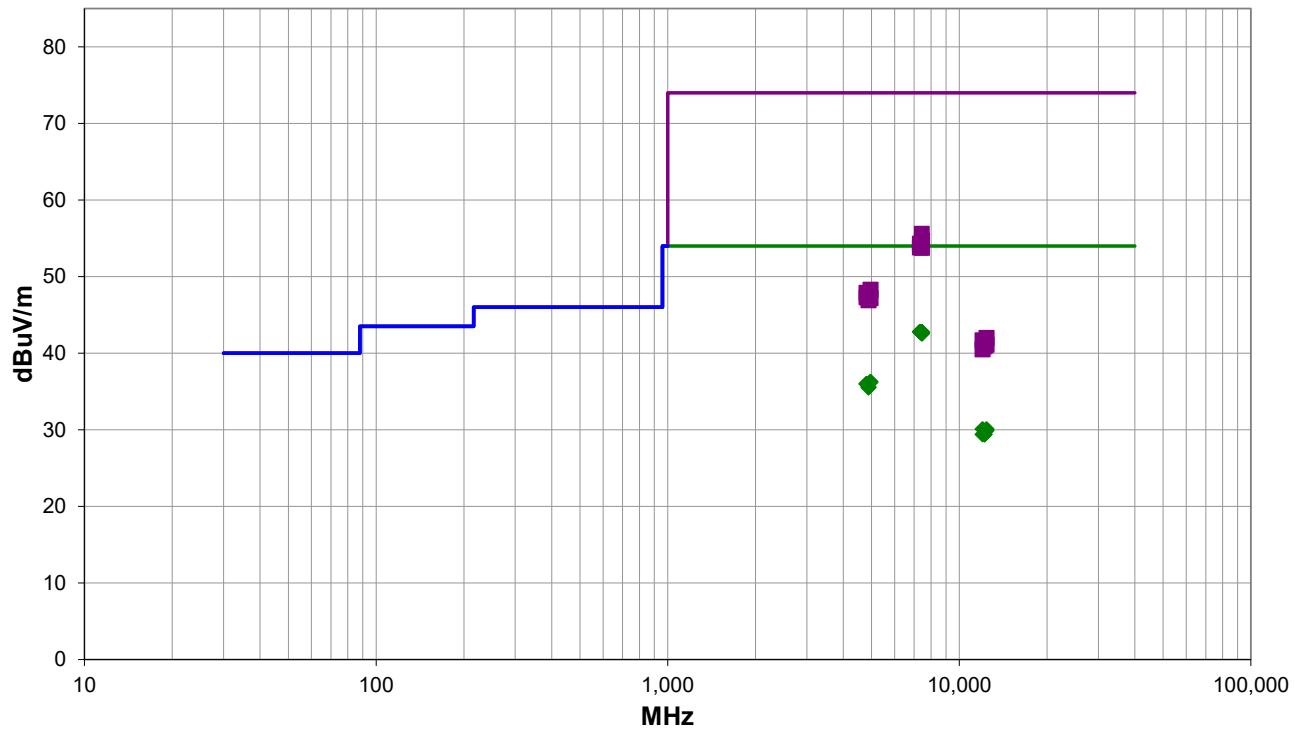
Please reference data comments below for channel, data rate, and EUT orientation.

EUT OPERATING MODES

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

DEVIATIONS FROM TEST STANDARD

None



Run #: 11 ■ PK ◆ AV ● QP

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.10.23.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

RESULTS - Run #11

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
7439.642	27.2	15.6	1.5	18.0	3.0	0.0	Horz	AV	0.0	42.8	54.0	-11.2	High Ch, 1 Mbps, EUT Horz
7439.375	27.2	15.6	1.5	322.0	3.0	0.0	Vert	AV	0.0	42.8	54.0	-11.2	High Ch, 1 Mbps, EUT Horz
7323.983	27.4	15.4	1.5	337.0	3.0	0.0	Horz	AV	0.0	42.8	54.0	-11.2	Mid Ch, 1 Mbps, EUT Horz
7324.000	27.4	15.4	1.5	55.0	3.0	0.0	Vert	AV	0.0	42.8	54.0	-11.2	Mid Ch, 1 Mbps, EUT Horz
7440.483	27.0	15.6	1.5	183.0	3.0	0.0	Horz	AV	0.0	42.6	54.0	-11.4	High Ch, 1 Mbps, EUT on Side
7437.508	27.0	15.6	1.5	222.0	3.0	0.0	Vert	AV	0.0	42.6	54.0	-11.4	High Ch, 1 Mbps, EUT on Side
7440.117	27.0	15.6	4.0	96.0	3.0	0.0	Horz	AV	0.0	42.6	54.0	-11.4	High Ch, 1 Mbps, EUT Vert
7440.708	27.0	15.6	1.5	225.0	3.0	0.0	Vert	AV	0.0	42.6	54.0	-11.4	High Ch, 1 Mbps, EUT Vert
7439.740	27.0	15.6	1.5	2.0	3.0	0.0	Horz	AV	0.0	42.6	54.0	-11.4	High Ch, 2 Mbps, EUT Horz
7439.017	27.0	15.6	1.5	159.0	3.0	0.0	Vert	AV	0.0	42.6	54.0	-11.4	High Ch, 2 Mbps, EUT Horz
4957.517	28.6	7.7	1.5	306.0	3.0	0.0	Horz	AV	0.0	36.3	54.0	-17.7	High Ch, 1 Mbps, EUT Horz
4959.058	28.5	7.7	1.5	318.0	3.0	0.0	Vert	AV	0.0	36.2	54.0	-17.8	High Ch, 1 Mbps, EUT Horz
4801.608	28.3	7.7	1.5	4.0	3.0	0.0	Horz	AV	0.0	36.0	54.0	-18.0	Low Ch, 1 Mbps, EUT Horz
4801.625	28.3	7.7	1.5	180.0	3.0	0.0	Vert	AV	0.0	36.0	54.0	-18.0	Low Ch, 1 Mbps, EUT Horz
7437.583	40.0	15.6	1.5	18.0	3.0	0.0	Horz	PK	0.0	55.6	74.0	-18.4	High Ch, 1 Mbps, EUT Horz
4884.483	27.9	7.7	1.5	146.0	3.0	0.0	Horz	AV	0.0	35.6	54.0	-18.4	Mid Ch, 1 Mbps, EUT Horz
4881.850	27.8	7.7	1.5	0.0	3.0	0.0	Vert	AV	0.0	35.5	54.0	-18.5	Mid Ch, 1 Mbps, EUT Horz
7438.233	39.1	15.6	1.5	183.0	3.0	0.0	Horz	PK	0.0	54.7	74.0	-19.3	High Ch, 1 Mbps, EUT on Side
7440.363	38.9	15.6	1.5	159.0	3.0	0.0	Vert	PK	0.0	54.5	74.0	-19.5	High Ch, 2 Mbps, EUT Horz
7324.750	38.9	15.4	1.5	55.0	3.0	0.0	Vert	PK	0.0	54.3	74.0	-19.7	Mid Ch, 1 Mbps, EUT Horz
7440.280	38.5	15.6	1.5	2.0	3.0	0.0	Horz	PK	0.0	54.1	74.0	-19.9	High Ch, 2 Mbps, EUT Horz
7438.683	38.4	15.6	4.0	96.0	3.0	0.0	Horz	PK	0.0	54.0	74.0	-20.0	High Ch, 1 Mbps, EUT Vert
7439.975	38.2	15.6	1.5	322.0	3.0	0.0	Vert	PK	0.0	53.8	74.0	-20.2	High Ch, 1 Mbps, EUT Horz
7438.858	38.2	15.6	1.5	222.0	3.0	0.0	Vert	PK	0.0	53.8	74.0	-20.2	High Ch, 1 Mbps, EUT on Side
7441.833	38.2	15.6	1.5	225.0	3.0	0.0	Vert	PK	0.0	53.8	74.0	-20.2	High Ch, 1 Mbps, EUT Vert
7327.017	38.4	15.4	1.5	337.0	3.0	0.0	Horz	PK	0.0	53.8	74.0	-20.2	Mid Ch, 1 Mbps, EUT Horz
12011.080	29.5	0.6	2.6	360.0	3.0	0.0	Vert	AV	0.0	30.1	54.0	-23.9	Low Ch, 1 Mbps, EUT Horz
12399.000	28.8	1.3	1.5	300.0	3.0	0.0	Horz	AV	0.0	30.1	54.0	-23.9	High Ch, 1 Mbps, EUT Horz
12398.180	28.6	1.3	1.5	310.0	3.0	0.0	Vert	AV	0.0	29.9	54.0	-24.1	High Ch, 1 Mbps, EUT Horz
12007.580	28.8	0.6	1.5	143.0	3.0	0.0	Horz	AV	0.0	29.4	54.0	-24.6	Low Ch, 1 Mbps, EUT Horz
12210.820	28.8	0.6	1.5	89.0	3.0	0.0	Horz	AV	0.0	29.4	54.0	-24.6	Mid Ch, 1 Mbps, EUT Horz
12208.840	28.8	0.6	1.5	91.0	3.0	0.0	Vert	AV	0.0	29.4	54.0	-24.6	Mid Ch, 1 Mbps, EUT Horz
4960.625	40.6	7.7	1.5	306.0	3.0	0.0	Horz	PK	0.0	48.3	74.0	-25.7	High Ch, 1 Mbps, EUT Horz
4801.892	40.2	7.7	1.5	180.0	3.0	0.0	Vert	PK	0.0	47.9	74.0	-26.1	Low Ch, 1 Mbps, EUT Horz
4802.667	39.6	7.7	1.5	4.0	3.0	0.0	Horz	PK	0.0	47.3	74.0	-26.7	Low Ch, 1 Mbps, EUT Horz
4961.725	39.5	7.7	1.5	318.0	3.0	0.0	Vert	PK	0.0	47.2	74.0	-26.8	High Ch, 1 Mbps, EUT Horz
4883.358	39.5	7.7	1.5	146.0	3.0	0.0	Horz	PK	0.0	47.2	74.0	-26.8	Mid Ch, 1 Mbps, EUT Horz
4883.192	39.2	7.7	1.5	0.0	3.0	0.0	Vert	PK	0.0	46.9	74.0	-27.1	Mid Ch, 1 Mbps, EUT Horz
12399.820	40.7	1.3	1.5	310.0	3.0	0.0	Vert	PK	0.0	42.0	74.0	-32.0	High Ch, 1 Mbps, EUT Horz
12011.080	41.1	0.6	2.6	360.0	3.0	0.0	Vert	PK	0.0	41.7	74.0	-32.3	Low Ch, 1 Mbps, EUT Horz

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.10.23.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

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
12212.060	40.8	0.6	1.5	89.0	3.0	0.0	Horz	PK	0.0	41.4	74.0	-32.6	Mid Ch, 1 Mbps, EUT Horz
12398.680	39.8	1.3	1.5	300.0	3.0	0.0	Horz	PK	0.0	41.1	74.0	-32.9	High Ch, 1 Mbps, EUT Horz
12211.650	40.3	0.6	1.5	91.0	3.0	0.0	Vert	PK	0.0	40.9	74.0	-33.1	Mid Ch, 1 Mbps, EUT Horz
12008.310	39.9	0.6	1.5	143.0	3.0	0.0	Horz	PK	0.0	40.5	74.0	-33.5	Low Ch, 1 Mbps, EUT Horz

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.10.23.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

EUT:	M400	Work Order:	CAIN0005
Serial Number:	See configurations	Date:	2023-12-28
Customer:	Cardiac Insight, Inc	Temperature:	21.3°C
Attendees:	Rick Myers	Relative Humidity:	39.6%
Customer Project:	None	Bar. Pressure (PMSL):	1014 mb
Tested By:	Jeff Alcoke	Job Site:	EV01
Power:	Battery	Configuration:	CAIN0005-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2023	ANSI C63.10:2013

TEST PARAMETERS

Run #:	13	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

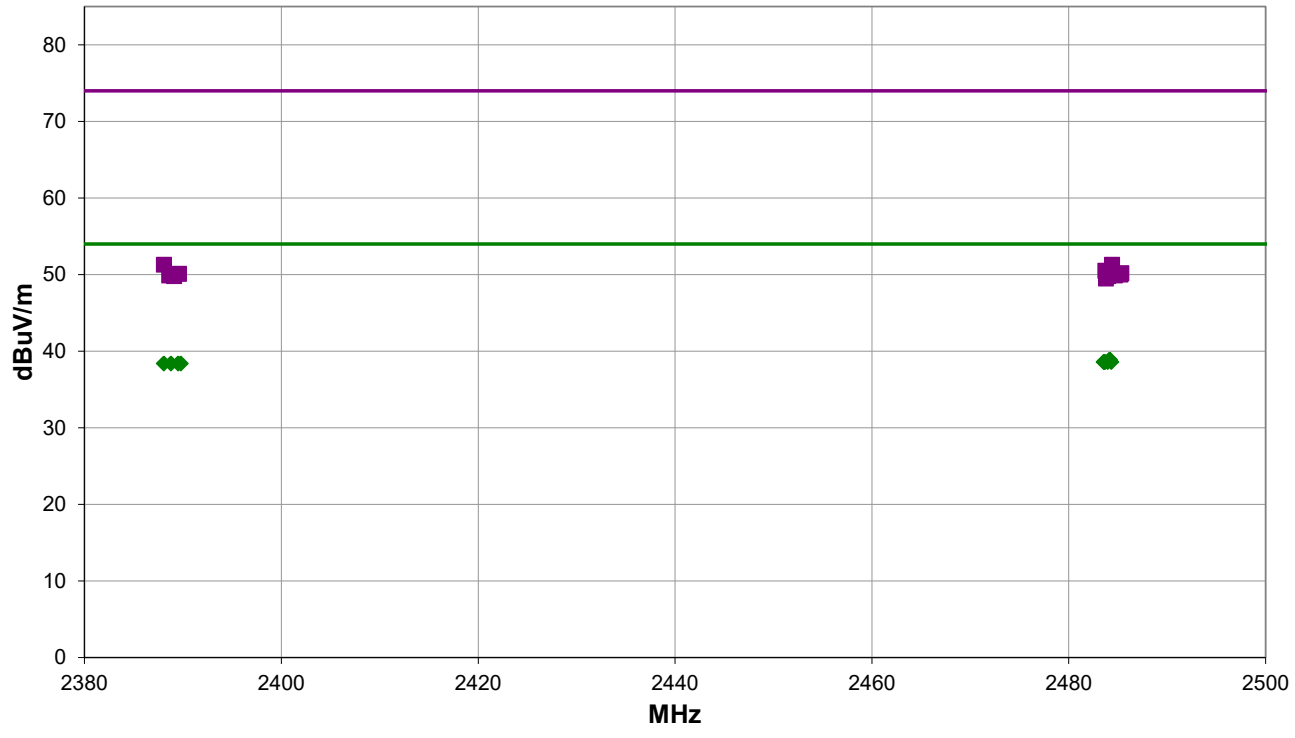
Please reference data comments below for channel, data rate, and EUT orientation.

EUT OPERATING MODES

Continuous Tx, BLE: Low Ch = 2402 MHz, High Ch = 2480 MHz

DEVIATIONS FROM TEST STANDARD

None



Run #: 13 ■ PK ◆ AV ● QP

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.10.23.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

RESULTS - Run #13

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
2484.177	31.2	-2.3	1.6	238.0	3.0	10.0	Horz	AV	0.0	38.9	54.0	-15.1	High Ch, 2 Mbps, EUT Horz
2484.137	31.2	-2.3	1.5	231.0	3.0	10.0	Vert	AV	0.0	38.9	54.0	-15.1	High Ch, 2 Mbps, EUT Horz
2483.610	30.9	-2.3	1.79	27.0	3.0	10.0	Horz	AV	0.0	38.6	54.0	-15.4	High Ch, 2 Mbps, EUT on side
2483.953	30.9	-2.3	3.06	0.0	3.0	10.0	Vert	AV	0.0	38.6	54.0	-15.4	High Ch, 2 Mbps, EUT on side
2483.597	30.9	-2.3	3.84	14.0	3.0	10.0	Horz	AV	0.0	38.6	54.0	-15.4	High Ch, 2 Mbps, EUT Vert
2484.320	30.9	-2.3	1.5	217.0	3.0	10.0	Vert	AV	0.0	38.6	54.0	-15.4	High Ch, 2 Mbps, EUT Vert
2483.540	30.9	-2.3	1.5	254.0	3.0	10.0	Horz	AV	0.0	38.6	54.0	-15.4	High Ch, 2 Mbps, EUT Vert
2483.670	30.9	-2.3	1.5	354.0	3.0	10.0	Vert	AV	0.0	38.6	54.0	-15.4	High Ch, 1 Mbps, EUT Horz
2388.777	31.0	-2.6	1.5	5.0	3.0	10.0	Horz	AV	0.0	38.4	54.0	-15.6	Low Ch, 1 Mbps, EUT Horz
2389.510	31.0	-2.6	1.5	12.0	3.0	10.0	Vert	AV	0.0	38.4	54.0	-15.6	Low Ch, 1 Mbps, EUT Horz
2389.780	31.0	-2.6	1.5	130.0	3.0	10.0	Horz	AV	0.0	38.4	54.0	-15.6	Low Ch, 2 Mbps, EUT Horz
2388.053	31.0	-2.6	1.5	146.0	3.0	10.0	Vert	AV	0.0	38.4	54.0	-15.6	Low Ch, 2 Mbps, EUT Horz
2484.400	43.6	-2.3	1.6	238.0	3.0	10.0	Horz	PK	0.0	51.3	74.0	-22.7	High Ch, 2 Mbps, EUT Horz
2388.063	43.9	-2.6	1.5	146.0	3.0	10.0	Vert	PK	0.0	51.3	74.0	-22.7	Low Ch, 2 Mbps, EUT Horz
2483.717	42.8	-2.3	1.5	231.0	3.0	10.0	Vert	PK	0.0	50.5	74.0	-23.5	High Ch, 2 Mbps, EUT Horz
2485.347	42.5	-2.3	3.84	14.0	3.0	10.0	Horz	PK	0.0	50.2	74.0	-23.8	High Ch, 2 Mbps, EUT Vert
2389.590	42.7	-2.6	1.5	12.0	3.0	10.0	Vert	PK	0.0	50.1	74.0	-23.9	Low Ch, 1 Mbps, EUT Horz
2485.260	42.3	-2.3	3.06	0.0	3.0	10.0	Vert	PK	0.0	50.0	74.0	-24.0	High Ch, 2 Mbps, EUT on side
2484.693	42.2	-2.3	1.79	27.0	3.0	10.0	Horz	PK	0.0	49.9	74.0	-24.1	High Ch, 2 Mbps, EUT on side
2483.927	42.2	-2.3	1.5	217.0	3.0	10.0	Vert	PK	0.0	49.9	74.0	-24.1	High Ch, 2 Mbps, EUT Vert
2388.610	42.5	-2.6	1.5	5.0	3.0	10.0	Horz	PK	0.0	49.9	74.0	-24.1	Low Ch, 1 Mbps, EUT Horz
2483.990	42.1	-2.3	1.5	254.0	3.0	10.0	Horz	PK	0.0	49.8	74.0	-24.2	High Ch, 1 Mbps, EUT Horz
2389.100	42.4	-2.6	1.5	130.0	3.0	10.0	Horz	PK	0.0	49.8	74.0	-24.2	Low Ch, 2 Mbps, EUT Horz
2483.777	41.8	-2.3	1.5	354.0	3.0	10.0	Vert	PK	0.0	49.5	74.0	-24.5	High Ch, 1 Mbps, EUT Horz

CONCLUSION

Pass

Tested By

End of Test Report