Starkey Laboratories, Inc.

Edge AI ITE (Left)

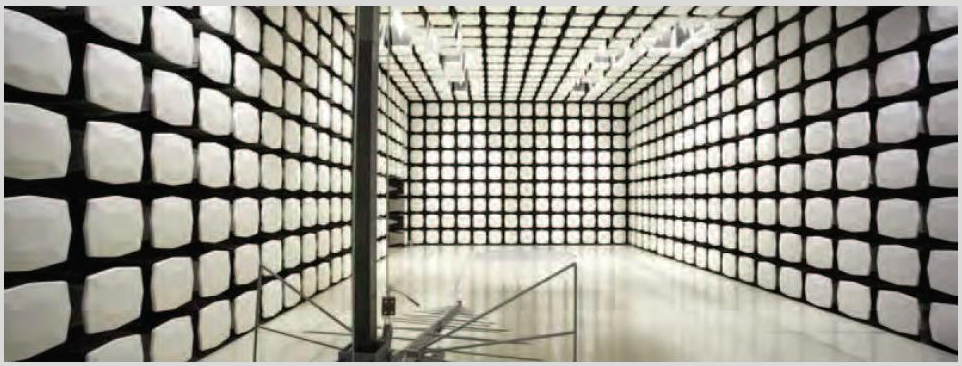
FCC 15.247:2024

RSS-247 Issue 3:2023

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

Bluetooth (Left Ear) Radio

Report: STAK0330.1 Rev. 1, Issue Date: July 10, 2024



CERT #3310.05

TABLE OF CONTENTS

Section	Page Number

CERTIFICATE OF TEST

Last Date of Test: June 10, 2024
Starkey Laboratories, Inc.
EUT: Edge AI ITE (Left)

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2024	ANSI C63.10:2013
RSS-247 Issue 3:2023	
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	N/A	15.207	RSS-Gen 8.8	6.2	Not required for a battery powered EUT.
Occupied Bandwidth (99%)	Pass	KDB 558074 -2.1	RSS-Gen 6.7	6.9.3	
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	
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:

Chuck Heller, Operations 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
01	Updated to align with the DC module and 16.8% for 1 Mbps.	2024-07-10	49-53

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

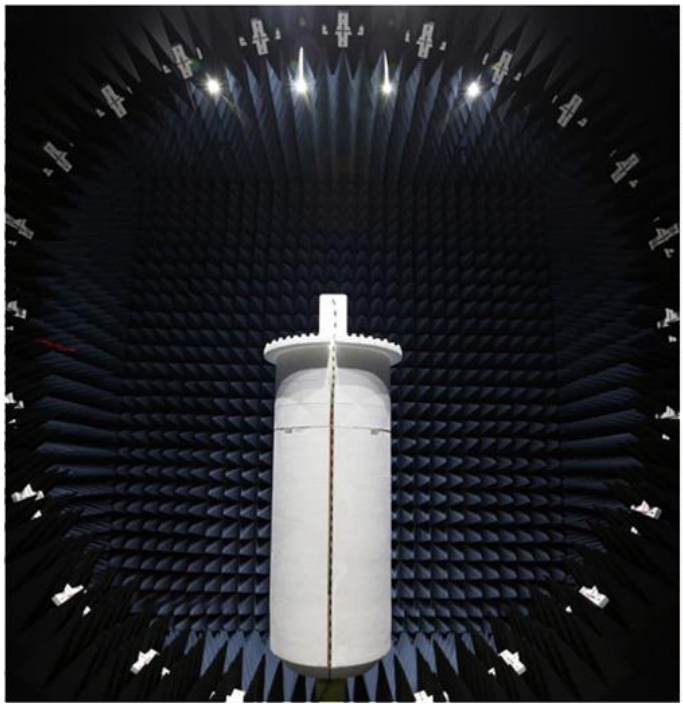
element
2023.09.21

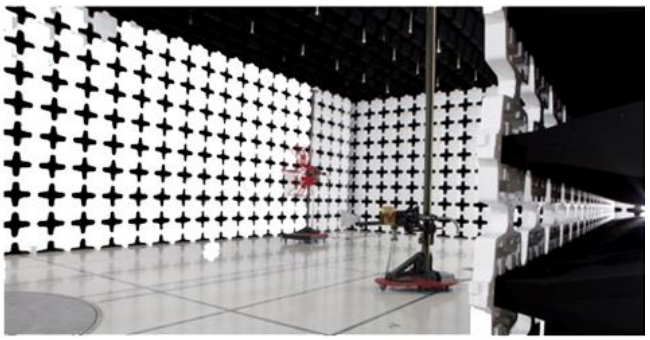
Testing was performed at the following location(s)

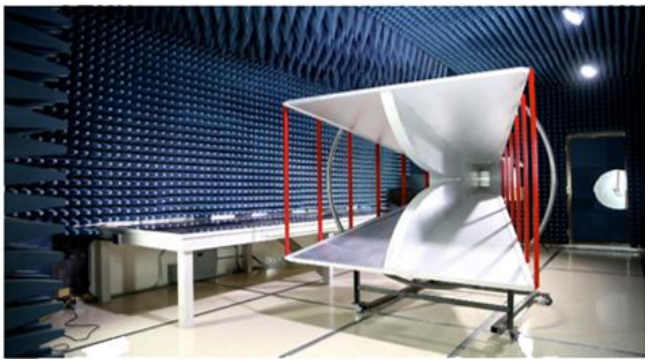
	Location	Labs (1)	Address	A2LA (2)	ISED (3)	BSMI (4)	VCCI (5)	CAB (6)	FDA (7)
☐	California	OC01-17	41 Tesla Irvine, CA 92618 (949) 861-8918	3310.04	2834B	SL2-IN-E-1154R	A-0029	US0158	TL-55
☒	Minnesota	MN01-11	9349 W Broadway Ave. Brooklyn Park, MN 55445 (612) 638-5136	3310.05	2834E	SL2-IN-E-1152R	A-0109	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
MU 2023-09-21

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.

Various Measurements

Test	All Labs (+/-)
Frequency Accuracy (%)	0.0007
Amplitude Accuracy (dB)	1.2
Conducted Power (dB)	1.2
Radiated Power via Substitution (dB)	0.7
Temperature (degrees C)	0.7
Humidity (% RH)	2.5
Voltage (AC) (%)	1
Voltage (DC) (%)	0.7
Field Strength (dB)	5.2

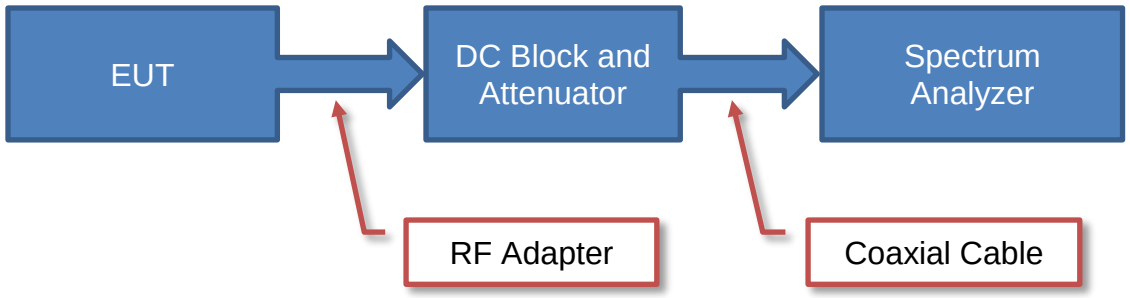
TEST SETUP BLOCK DIAGRAMS

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.

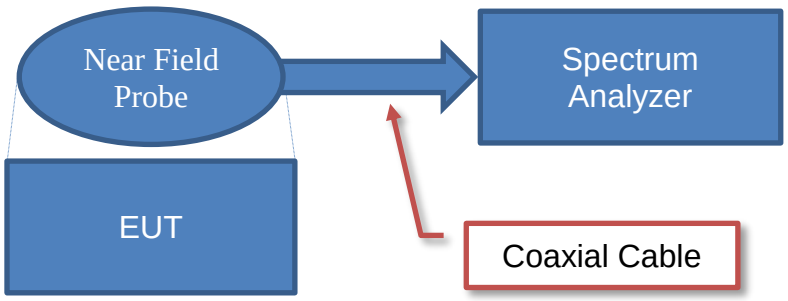
Antenna Port Conducted Measurements



Sample Calculation (logarithmic units)

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

Near Field Test Fixture Measurements

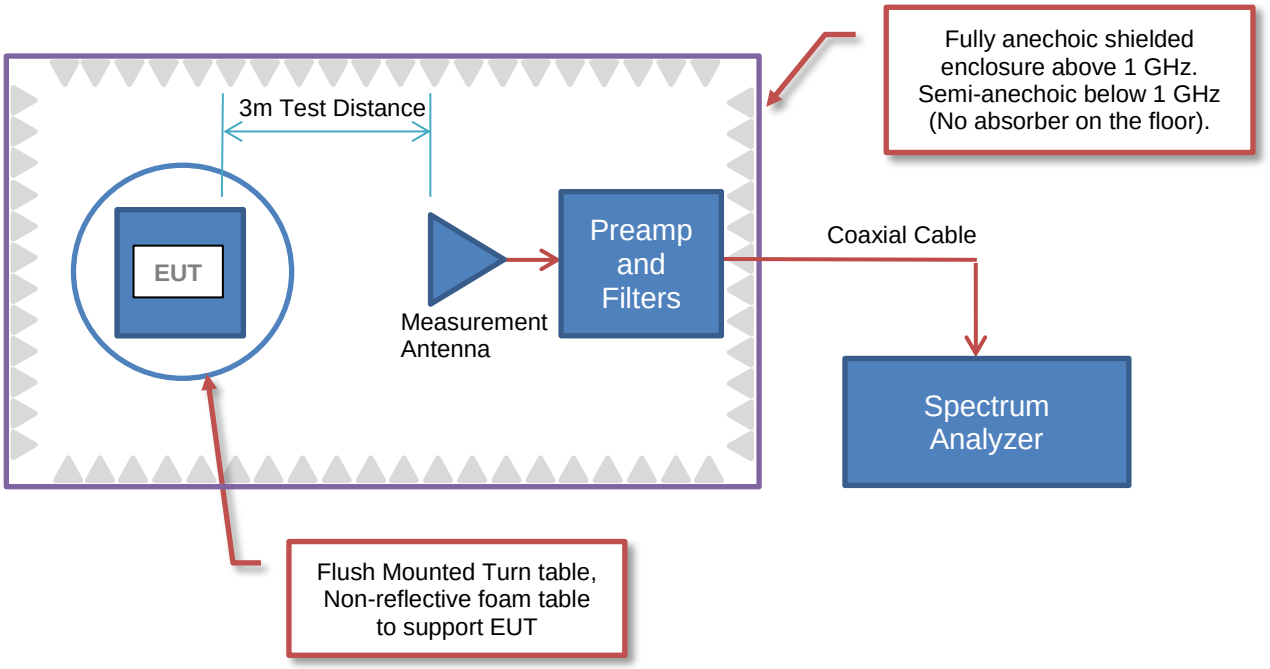


Sample Calculation (logarithmic units)

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**

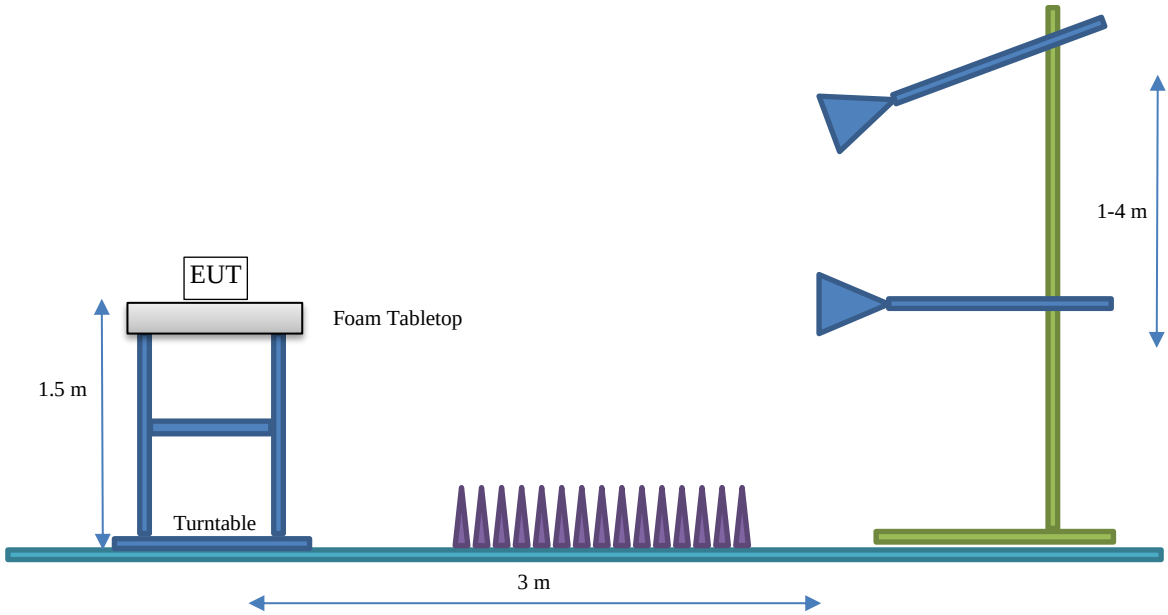
Radiated Power (ERP/EIRP) – Substitution Method:

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:	Starkey Laboratories, Inc.
Address:	6600 Washington Ave S
City, State, Zip:	Eden Prairie, MN 55344-3404
Test Requested By:	Bill Mitchell
EUT:	Edge AI ITE (Left)
First Date of Test:	May 23, 2024
Last Date of Test:	June 10, 2024
Receipt Date of Samples:	May 23, 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:
Bluetooth hearing aid

Testing Objective:
To demonstrate compliance of the Bluetooth (Left Ear) 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 transmits during normal operation.

ANTENNA GAIN (dBi)

Type	Provided by:	Frequency Range (MHz)	Gain (dBi)
PIFA	Starkey Laboratories, Inc	2400-2483.5	-4.9

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

☐ Test software settings
☒ Rated power settings

FW Version 10.0.0.14.342
SW Version Monaco 7.0.2.0

SETTINGS FOR ALL TESTS IN THIS REPORT

Modulation Types / Data Rates	Type	Channel	Frequency (MHz)	Power Setting (dBm)
BLE GFSK 1 Mbps	DTS	0 or 37	2402	4
		20 or 18	2440	4
		39	2480	4
BLE GFSK 2 Mbps	DTS	0 or 37	2402	4
		20 or 18	2440	4
		39	2480	4

CONFIGURATIONS

Configuration STAK0345-2

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Edge AI ITE (Left)	Starkey	P00003871	2911339424

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Dell	Precision 5560	5W9ZZH3
Bluetooth Hub	NoahLink Wireless	CPD-1	1881381559

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB Cable	Yes	2.9 m	No	Laptop	Bluetooth Hub

Configuration STAK0345-3

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Edge AI ITE (Left-Conducted RF)	Starkey	P00003871	2911339398

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Dell	Precision 5560	5W9ZZH3
Bluetooth Hub	NoahLink Wireless	CPD-1	1881381559

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Leads	No	1.2 m	No	Custom ITE R	DC Mains
USB Cable	Yes	2.9 m	No	Laptop	Bluetooth Hub

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2024-05-23	Spurious Radiated Emissions	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
2	2024-06-10	Duty Cycle	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
3	2024-06-10	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.
4	2024-06-10	Equivalent Isotropic Radiated Power	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
5	2024-06-10	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.
6	2024-06-10	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	2024-06-10	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.
8	2024-06-10	Spurious Conducted Emissions	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 2023.12.06.3
WTD.2024.01.16.0

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	Agilent	N5182A	TIF	2023-07-27	2026-07-27
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2023-09-05	2024-09-05
Block - DC	Fairview Microwave	SD3379	ANH	2023-09-05	2024-09-05
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31

OCCUPIED BANDWIDTH (99%)

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

EUT:	Edge AI ITE (Left)	Work Order:	STAK0345
Serial Number:	2911339398	Date:	2024-06-10
Customer:	Starkey Laboratories, Inc.	Temperature:	22.1°C
Attendees:	John Quach	Relative Humidity:	46.8%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	Lithium Battery	Configuration:	STAK0345-3

TEST SPECIFICATIONS

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

COMMENTS

+4dBm Power Setting.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

N/A

Tested By

TEST RESULTS

	Value	Limit	Result
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	1.011 MHz	N/A	N/A
Mid Channel, 2442 MHz	1.008 MHz	N/A	N/A
High Channel, 2480 MHz	1.009 MHz	N/A	N/A
BLE/GFSK 2 Mbps			
Low Channel, 2402 MHz	2.008 MHz	N/A	N/A
Mid Channel, 2442 MHz	2.003 MHz	N/A	N/A
High Channel, 2480 MHz	2 MHz	N/A	N/A

OCCUPIED BANDWIDTH (99%)

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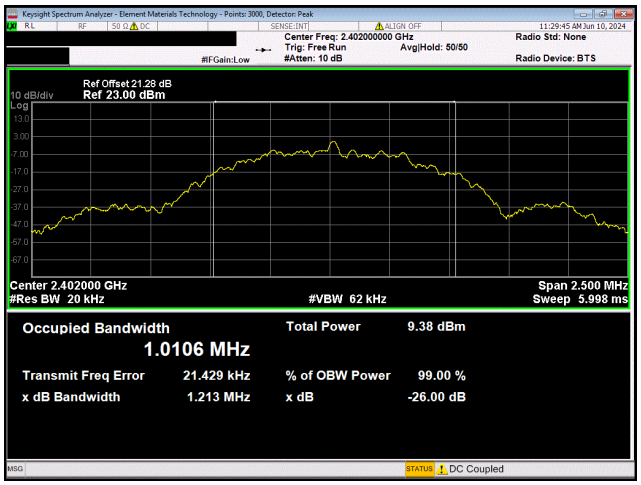
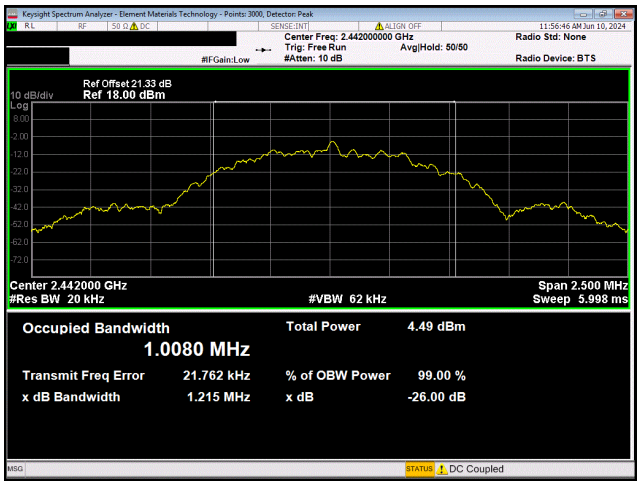
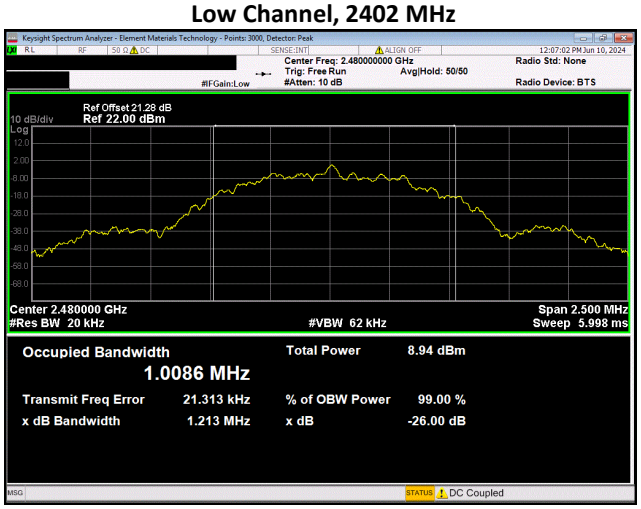
WTD.2024.01.16.0



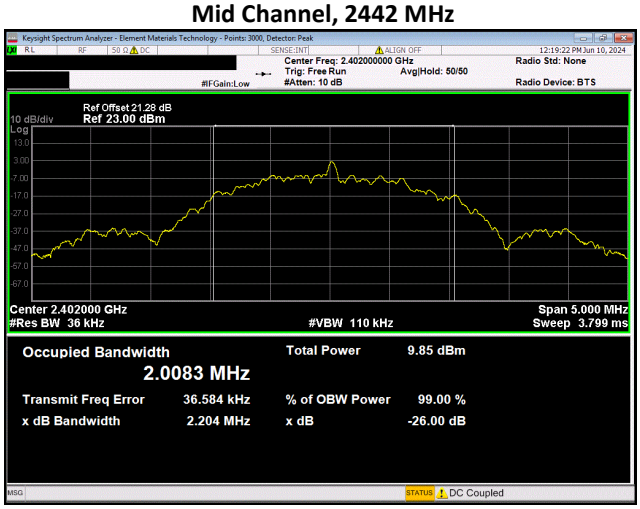
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz



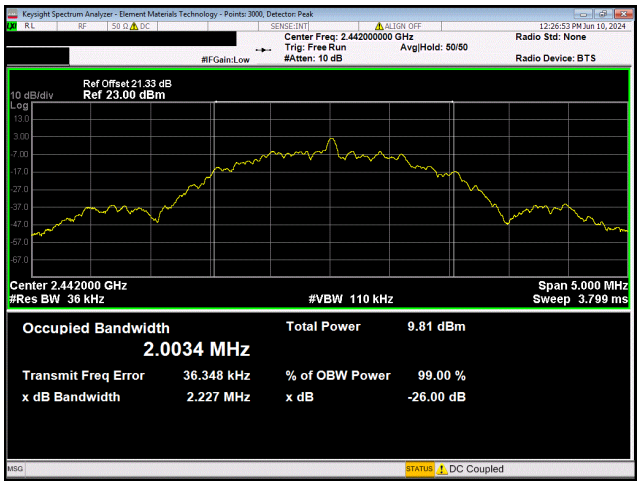
BLE/GFSK 1 Mbps
High Channel, 2480 MHz



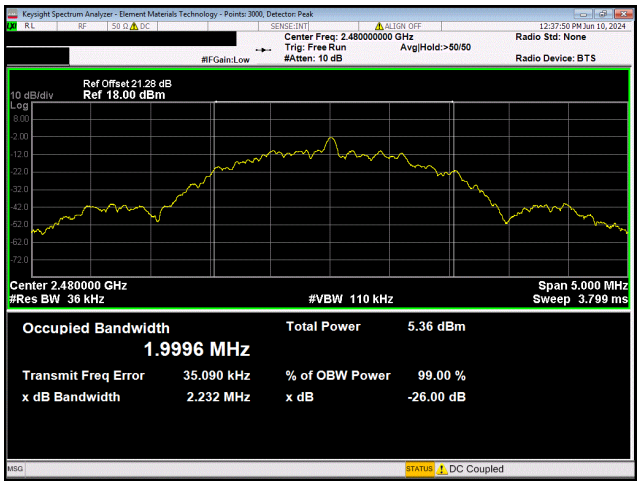
BLE/GFSK 2 Mbps
Low Channel, 2402 MHz

OCCUPIED BANDWIDTH (99%)

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



BLE/GFSK 2 Mbps
Mid Channel, 2442 MHz



BLE/GFSK 2 Mbps
High Channel, 2480 MHz

DUTY CYCLE

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

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 RF Power Sensor capable of 1 million samples per second, which only measures across the high time of the burst of the carrier. The measured level was offset by the cable loss, attenuator, and DC block that was used between the power sensor and EUT. This offset was determined prior to testing using a signal generator and spectrum analyzer.

The RF duty cycle was measured with the EUT set to the channels and modes called out in the data sheets.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Generator - Signal	Agilent	N5182A	TIF	2023-07-27	2026-07-27
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2023-09-05	2024-09-05
Block - DC	Fairview Microwave	SD3379	ANH	2023-09-05	2024-09-05
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31
Meter - Power	ETS Lindgren	7002-008	SRA	2024-02-19	2025-02-19

DUTY CYCLE

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

EUT:	Edge AI ITE (Left)	Work Order:	STAK0345
Serial Number:	2911339398	Date:	2024-06-10
Customer:	Starkey Laboratories, Inc.	Temperature:	22.1°C
Attendees:	John Quach	Relative Humidity:	46.6%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	Lithium Battery	Configuration:	STAK0345-3

TEST SPECIFICATIONS

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

COMMENTS

+4dBm Power Setting.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

N/A

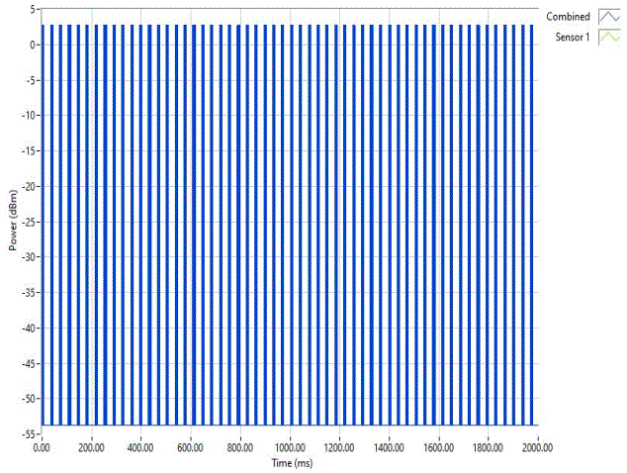
Tested By

TEST RESULTS

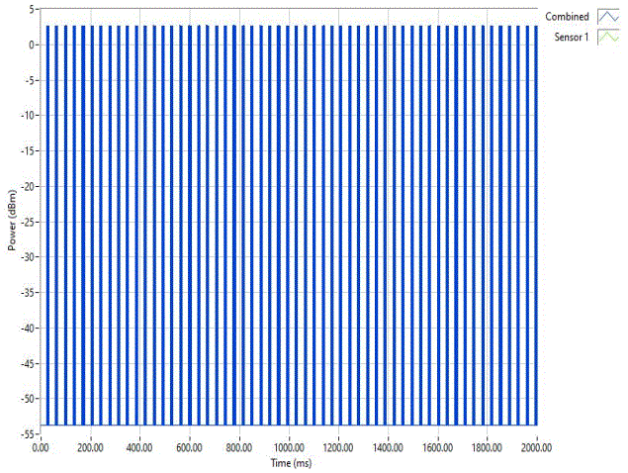
	Duty Cycle (%)	Results
BLE/GFSK 1 Mbps		
Low Channel, 2402 MHz	18.25	N/A
Mid Channel, 2442 MHz	18.268	N/A
High Channel, 2480 MHz	17.95	N/A
BLE/GFSK 2 Mbps		
Low Channel, 2402 MHz	16.246	N/A
Mid Channel, 2442 MHz	16.363	N/A
High Channel, 2480 MHz	16.265	N/A

DUTY CYCLE

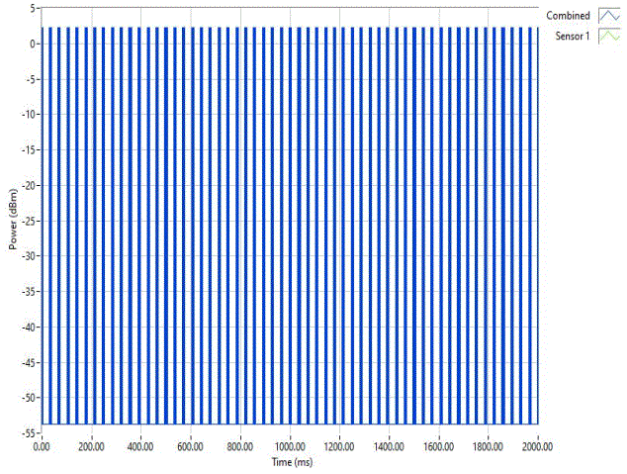
element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



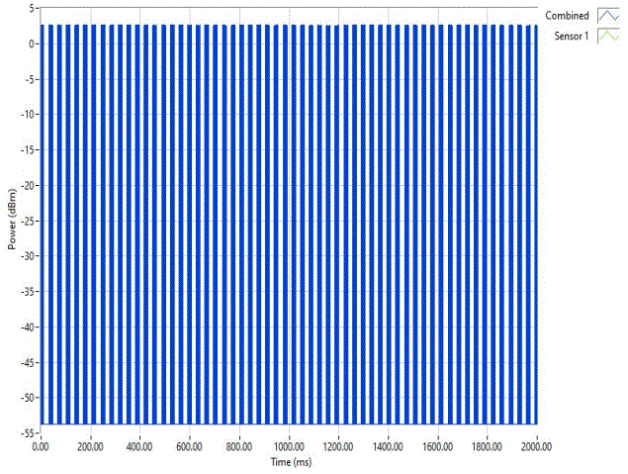
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz



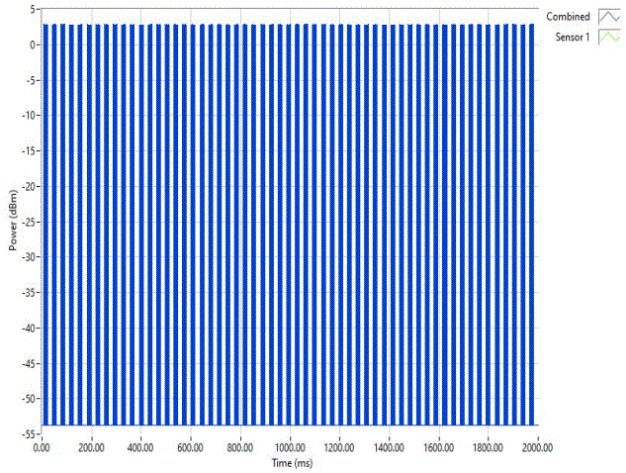
BLE/GFSK 1 Mbps
High Channel, 2480 MHz



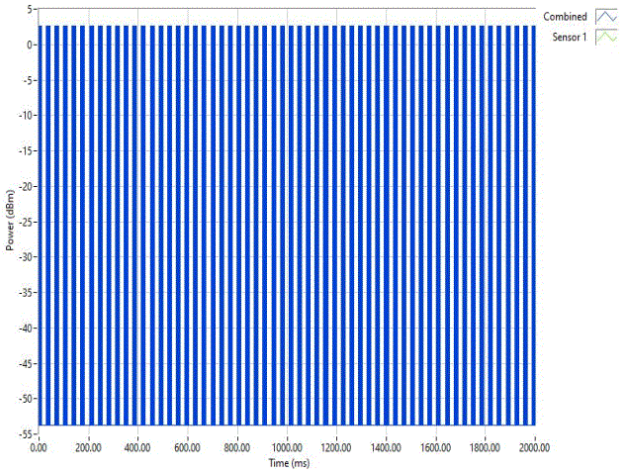
BLE/GFSK 2 Mbps
Low Channel, 2402 MHz

DUTY CYCLE

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



BLE/GFSK 2 Mbps
Mid Channel, 2442 MHz



BLE/GFSK 2 Mbps
High Channel, 2480 MHz

DTS BANDWIDTH (6 dB)

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

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
Generator - Signal	Agilent	N5182A	TIF	2023-07-27	2026-07-27
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2023-09-05	2024-09-05
Block - DC	Fairview Microwave	SD3379	ANH	2023-09-05	2024-09-05
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31

DTS BANDWIDTH (6 dB)

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

EUT:	Edge AI ITE (Left)	Work Order:	STAK0345
Serial Number:	2911339398	Date:	2024-06-10
Customer:	Starkey Laboratories, Inc.	Temperature:	22.1°C
Attendees:	John Quach	Relative Humidity:	47.1%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	Lithium Battery	Configuration:	STAK0345-3

TEST SPECIFICATIONS

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

COMMENTS

+4dBm Power Setting.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

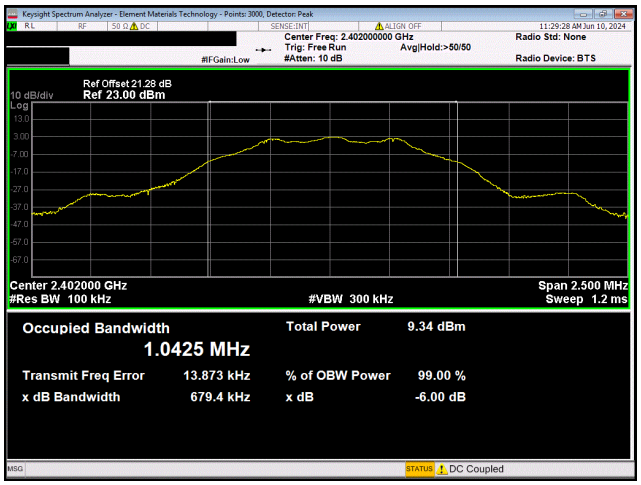
Tested By

TEST RESULTS

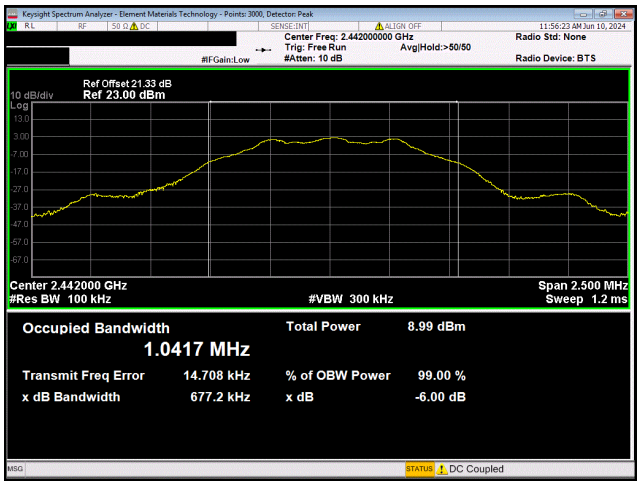
	Value	Limit (≥)	Result
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	679.362 kHz	500 kHz	Pass
Mid Channel, 2442 MHz	677.247 kHz	500 kHz	Pass
High Channel, 2480 MHz	678.471 kHz	500 kHz	Pass
BLE/GFSK 2 Mbps			
Low Channel, 2402 MHz	1.157 MHz	500 kHz	Pass
Mid Channel, 2442 MHz	1.152 MHz	500 kHz	Pass
High Channel, 2480 MHz	1.159 MHz	500 kHz	Pass

DTS BANDWIDTH (6 dB)

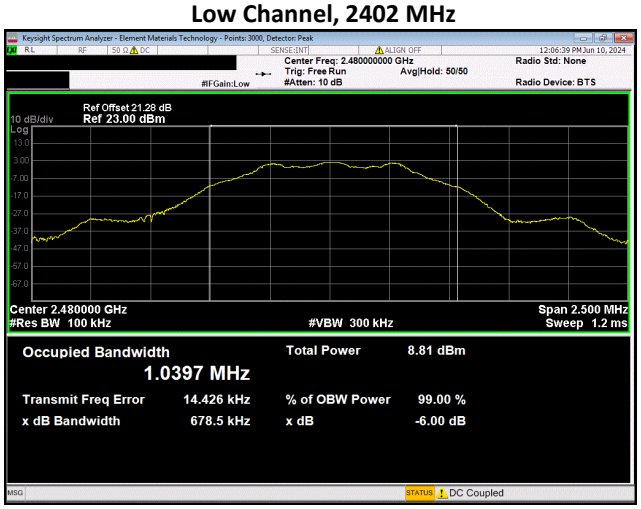
element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



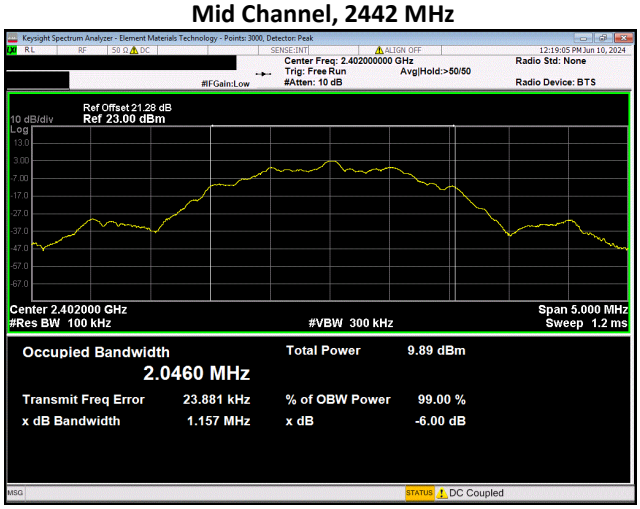
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz



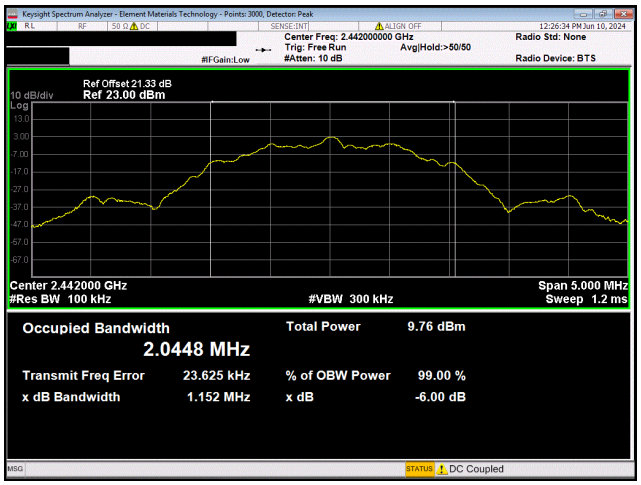
BLE/GFSK 1 Mbps
High Channel, 2480 MHz



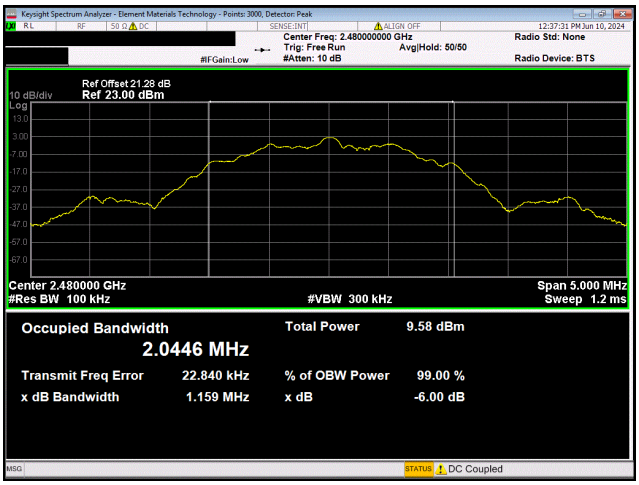
BLE/GFSK 2 Mbps
Low Channel, 2402 MHz

DTS BANDWIDTH (6 dB)

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



BLE/GFSK 2 Mbps
Mid Channel, 2442 MHz



BLE/GFSK 2 Mbps
High Channel, 2480 MHz

OUTPUT POWER

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

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	Agilent	N5182A	TIF	2023-07-27	2026-07-27
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2023-09-05	2024-09-05
Block - DC	Fairview Microwave	SD3379	ANH	2023-09-05	2024-09-05
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31

OUTPUT POWER

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

EUT:	Edge AI ITE (Left)	Work Order:	STAK0345
Serial Number:	2911339398	Date:	2024-06-10
Customer:	Starkey Laboratories, Inc.	Temperature:	22.1°C
Attendees:	John Quach	Relative Humidity:	46.4%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	Lithium Battery	Configuration:	STAK0345-3

TEST SPECIFICATIONS

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

COMMENTS

+4dBm Power Setting.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

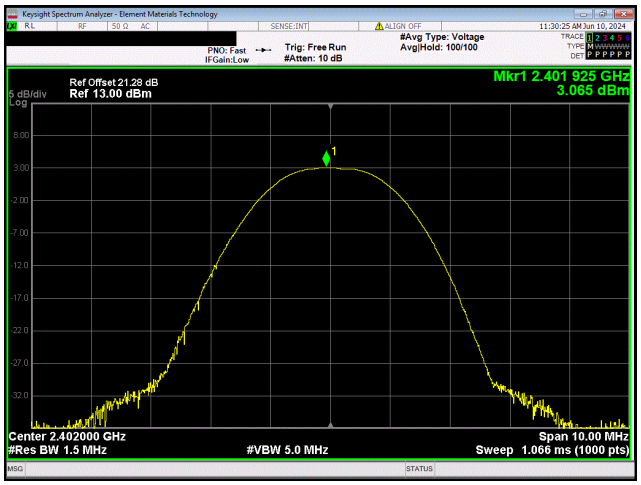
Tested By

TEST RESULTS

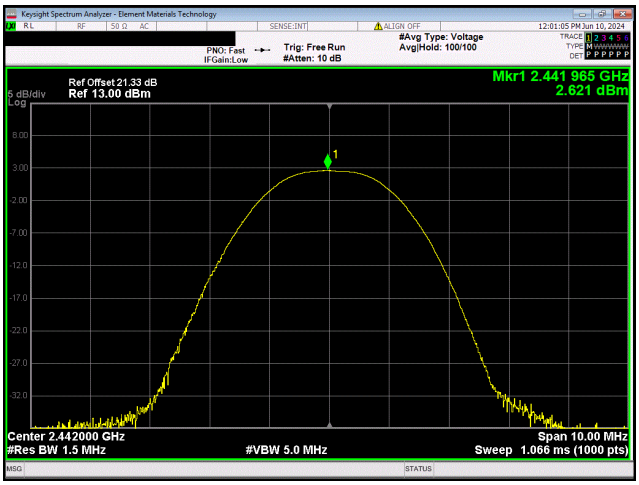
	Out Pwr (dBm)	Limit (dBm)	Result
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	3.065	30	Pass
Mid Channel, 2442 MHz	2.621	30	Pass
High Channel, 2480 MHz	2.594	30	Pass
BLE/GFSK 2 Mbps			
Low Channel, 2402 MHz	3.214	30	Pass
Mid Channel, 2442 MHz	3.09	30	Pass
High Channel, 2480 MHz	2.888	30	Pass

OUTPUT POWER

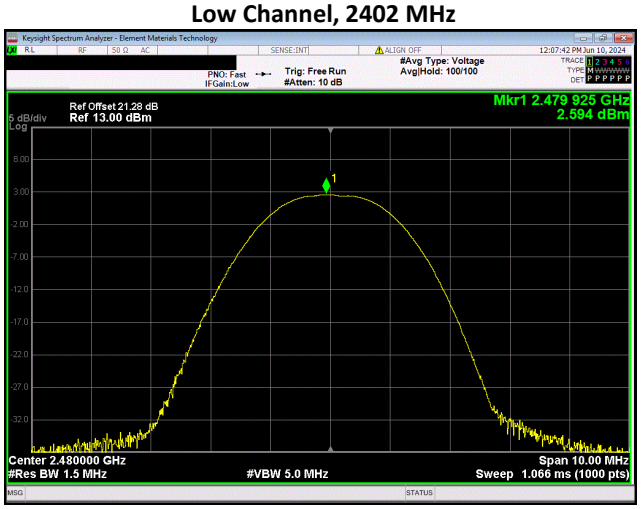
element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



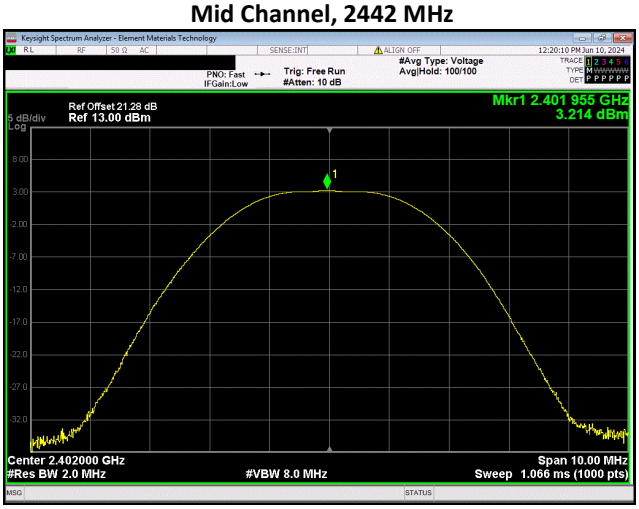
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz



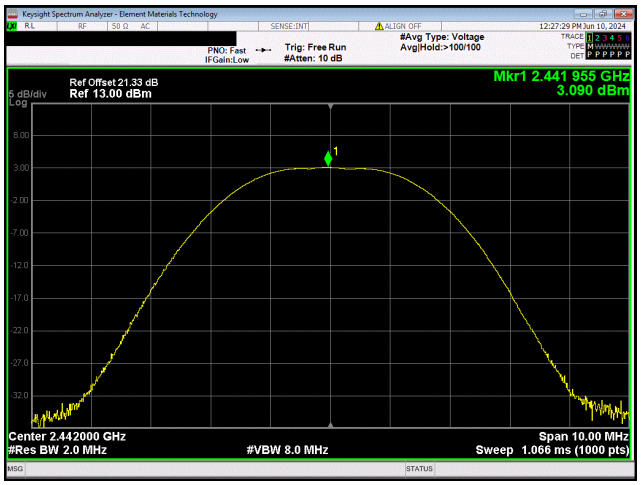
BLE/GFSK 1 Mbps
High Channel, 2480 MHz



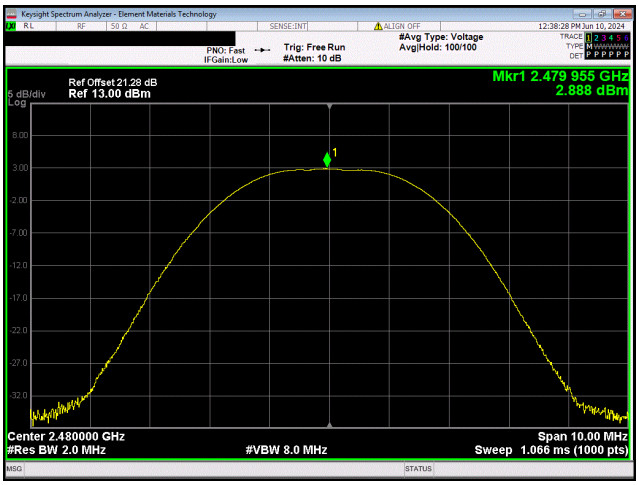
BLE/GFSK 2 Mbps
Low Channel, 2402 MHz

OUTPUT POWER

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



BLE/GFSK 2 Mbps
Mid Channel, 2442 MHz



BLE/GFSK 2 Mbps
High Channel, 2480 MHz

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

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	Agilent	N5182A	TIF	2023-07-27	2026-07-27
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2023-09-05	2024-09-05
Block - DC	Fairview Microwave	SD3379	ANH	2023-09-05	2024-09-05
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

EUT:	Edge AI ITE (Left)	Work Order:	STAK0345
Serial Number:	2911339398	Date:	2024-06-10
Customer:	Starkey Laboratories, Inc.	Temperature:	22.1°C
Attendees:	John Quach	Relative Humidity:	46.7%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	Lithium Battery	Configuration:	STAK0345-3

TEST SPECIFICATIONS

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

COMMENTS

+4dBm Power Setting.

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	3.065	-4.9	-1.835	36	Pass
Mid Channel, 2442 MHz	2.621	-4.9	-2.279	36	Pass
High Channel, 2480 MHz	2.594	-4.9	-2.306	36	Pass
BLE/GFSK 2 Mbps					
Low Channel, 2402 MHz	3.214	-4.9	-1.686	36	Pass
Mid Channel, 2442 MHz	3.09	-4.9	-1.81	36	Pass
High Channel, 2480 MHz	2.888	-4.9	-2.012	36	Pass

POWER SPECTRAL DENSITY

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

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	Agilent	N5182A	TIF	2023-07-27	2026-07-27
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2023-09-05	2024-09-05
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Block - DC	Fairview Microwave	SD3379	ANH	2023-09-05	2024-09-05
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31

POWER SPECTRAL DENSITY

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

EUT:	Edge AI ITE (Left)	Work Order:	STAK0345
Serial Number:	2911339398	Date:	2024-06-10
Customer:	Starkey Laboratories, Inc.	Temperature:	22.3°C
Attendees:	John Quach	Relative Humidity:	46.2%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	Lithium Battery	Configuration:	STAK0345-3

TEST SPECIFICATIONS

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

COMMENTS

+4dBm Power Setting.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

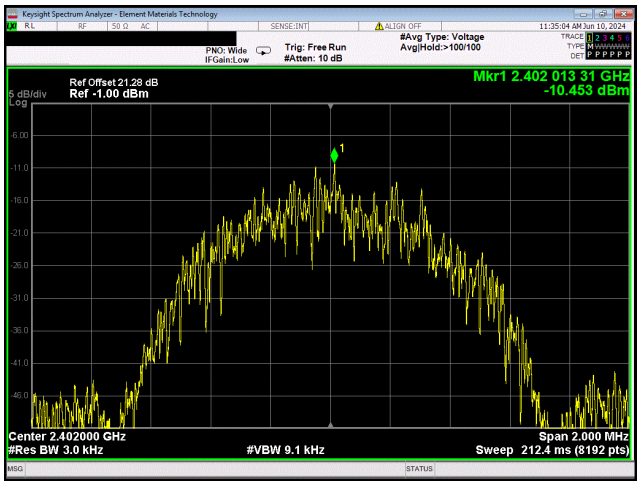
Tested By

TEST RESULTS

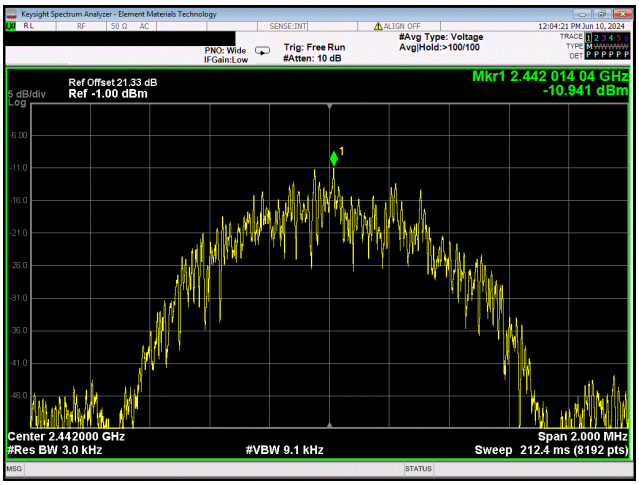
	Value dBm/3kHz	Limit ≤ (dBm/3kHz)	Results
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	-10.453	8	Pass
Mid Channel, 2442 MHz	-10.941	8	Pass
High Channel, 2480 MHz	-11.512	8	Pass
BLE/GFSK 2 Mbps			
Low Channel, 2402 MHz	-11.259	8	Pass
Mid Channel, 2442 MHz	-11.877	8	Pass
High Channel, 2480 MHz	-12.767	8	Pass

POWER SPECTRAL DENSITY

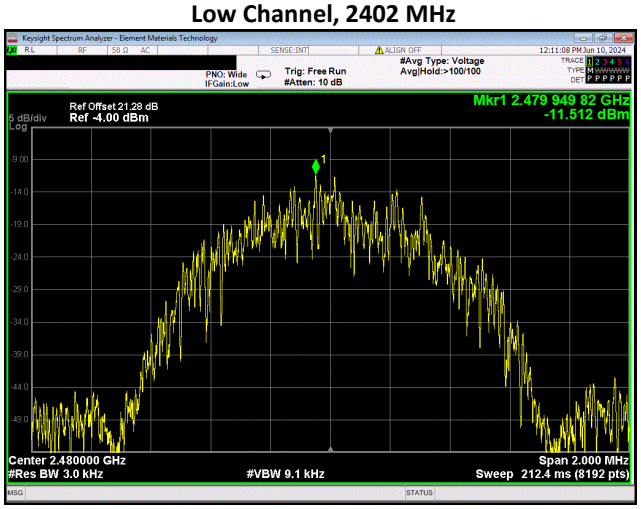
element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



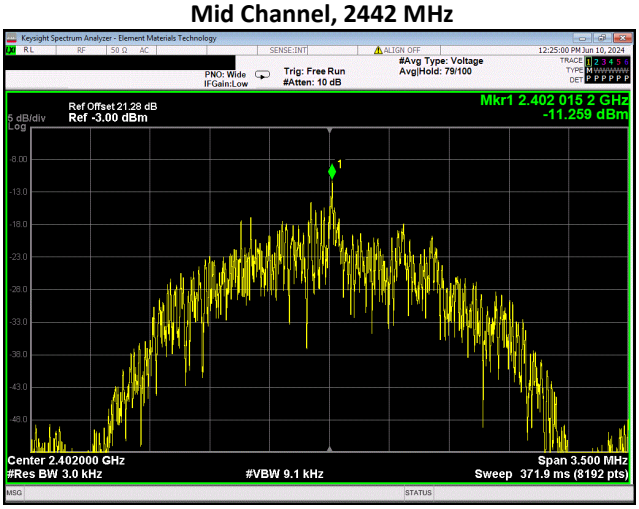
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz



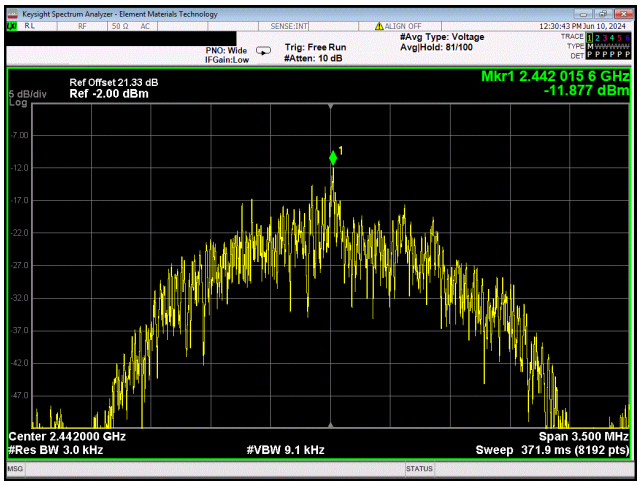
BLE/GFSK 1 Mbps
High Channel, 2480 MHz



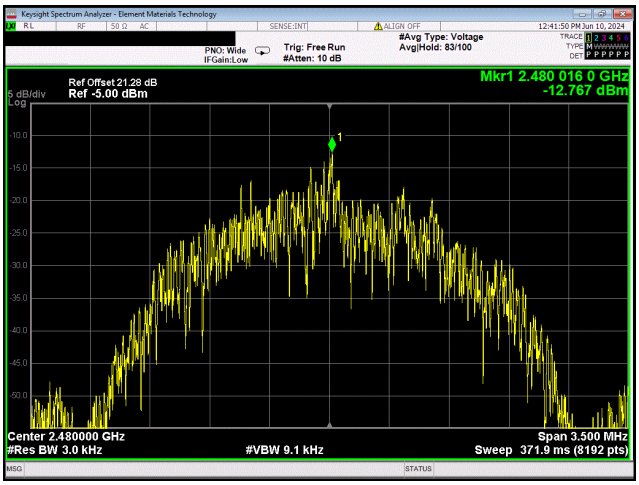
BLE/GFSK 2 Mbps
Low Channel, 2402 MHz

POWER SPECTRAL DENSITY

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



BLE/GFSK 2 Mbps
Mid Channel, 2442 MHz



BLE/GFSK 2 Mbps
High Channel, 2480 MHz

BAND EDGE COMPLIANCE

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

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	Agilent	N5182A	TIF	2023-07-27	2026-07-27
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2023-09-05	2024-09-05
Block - DC	Fairview Microwave	SD3379	ANH	2023-09-05	2024-09-05
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31

BAND EDGE COMPLIANCE

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

EUT:	Edge AI ITE (Left)	Work Order:	STAK0345
Serial Number:	2911339398	Date:	2024-06-10
Customer:	Starkey Laboratories, Inc.	Temperature:	22.2°C
Attendees:	John Quach	Relative Humidity:	45.6%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	Lithium Battery	Configuration:	STAK0345-3

TEST SPECIFICATIONS

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

COMMENTS

+4dBm Power Setting.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

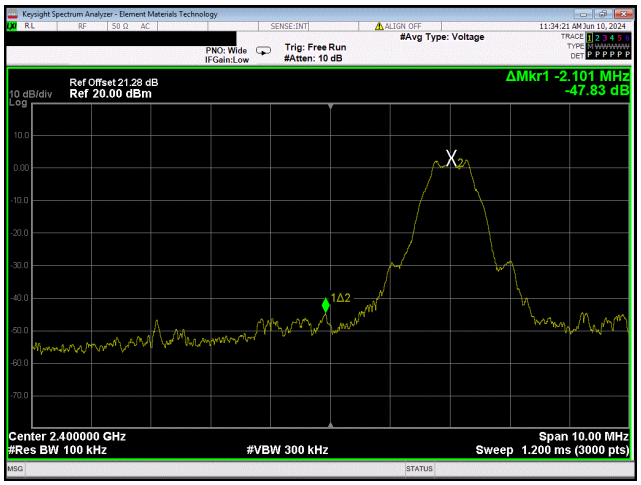
Tested By

TEST RESULTS

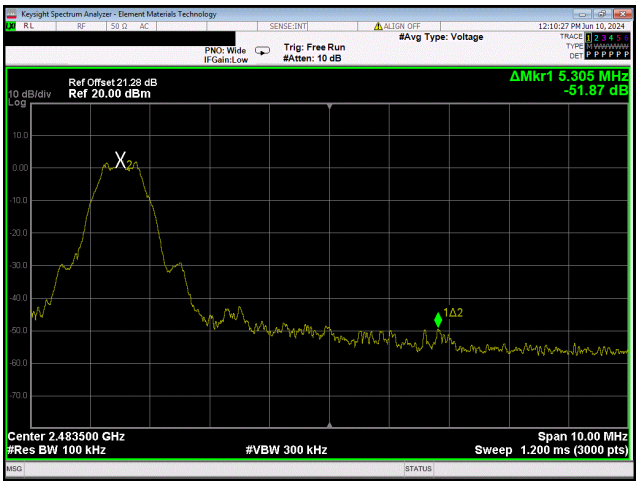
	Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	-47.84	-20	Pass
High Channel, 2480 MHz	-51.87	-20	Pass
BLE/GFSK 2 Mbps			
Low Channel, 2402 MHz	-34.01	-20	Pass
High Channel, 2480 MHz	-51.97	-20	Pass

BAND EDGE COMPLIANCE

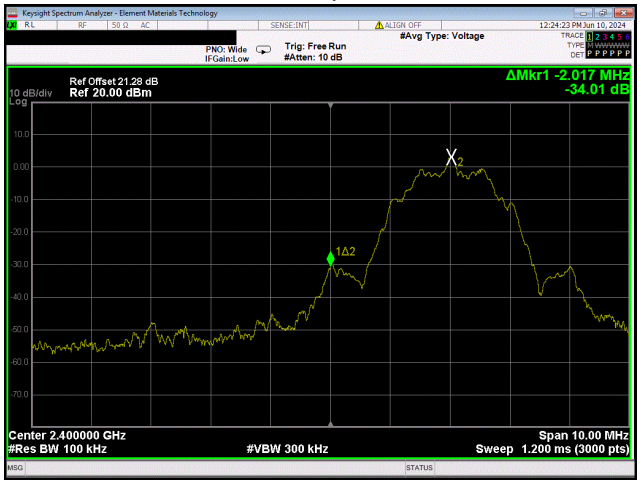
element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



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 2023.12.06.3
WTD.2024.01.16.0

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	Agilent	N5182A	TIF	2023-07-27	2026-07-27
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2023-09-05	2024-09-05
Block - DC	Fairview Microwave	SD3379	ANH	2023-09-05	2024-09-05
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31

SPURIOUS CONDUCTED EMISSIONS

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

EUT:	Edge AI ITE (Left)	Work Order:	STAK0345
Serial Number:	2911339398	Date:	2024-06-10
Customer:	Starkey Laboratories, Inc.	Temperature:	22.1°C
Attendees:	John Quach	Relative Humidity:	45.8%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	Lithium Battery	Configuration:	STAK0345-3

TEST SPECIFICATIONS

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

COMMENTS

+4dBm Power Setting.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

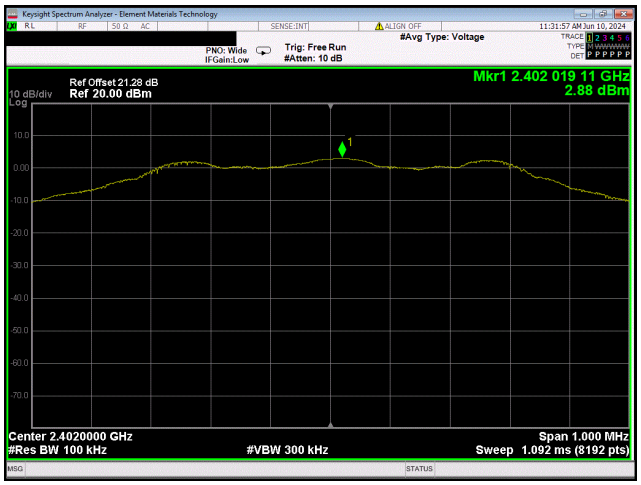
Tested By

TEST RESULTS

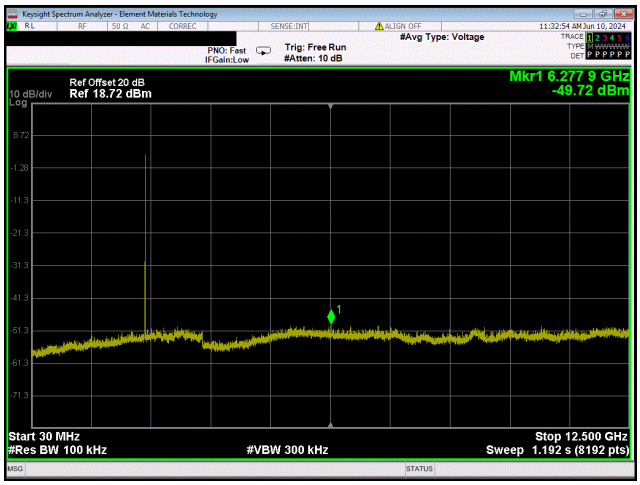
	Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK 1 Mbps					
Low Channel, 2402 MHz	Fundamental	2402.02	N/A	N/A	N/A
	30 MHz - 12.5 GHz	6277.94	-52.6	-20	Pass
	12.5 GHz - 25 GHz	24954.22	-39.68	-20	Pass
Mid Channel, 2442 MHz	Fundamental	2442.02	N/A	N/A	N/A
	30 MHz - 12.5 GHz	5629.4	-51.78	-20	Pass
	12.5 GHz - 25 GHz	24790.93	-39.68	-20	Pass
High Channel, 2480 MHz	Fundamental	2480.01	N/A	N/A	N/A
	30 MHz - 12.5 GHz	11848.41	-51.83	-20	Pass
	12.5 GHz - 25 GHz	24989.32	-38.73	-20	Pass
BLE/GFSK 2 Mbps					
Low Channel, 2402 MHz	Fundamental	2402.02	N/A	N/A	N/A
	30 MHz - 12.5 GHz	2397.34	-51.62	-20	Pass
	12.5 GHz - 25 GHz	24974.06	-39.99	-20	Pass
Mid Channel, 2442 MHz	Fundamental	2442.02	N/A	N/A	N/A
	30 MHz - 12.5 GHz	9319.7	-52.19	-20	Pass
	12.5 GHz - 25 GHz	24488.77	-40.49	-20	Pass
High Channel, 2480 MHz	Fundamental	2480.02	N/A	N/A	N/A
	30 MHz - 12.5 GHz	5638.53	-52.21	-20	Pass
	12.5 GHz - 25 GHz	24952.69	-39.17	-20	Pass

SPURIOUS CONDUCTED EMISSIONS

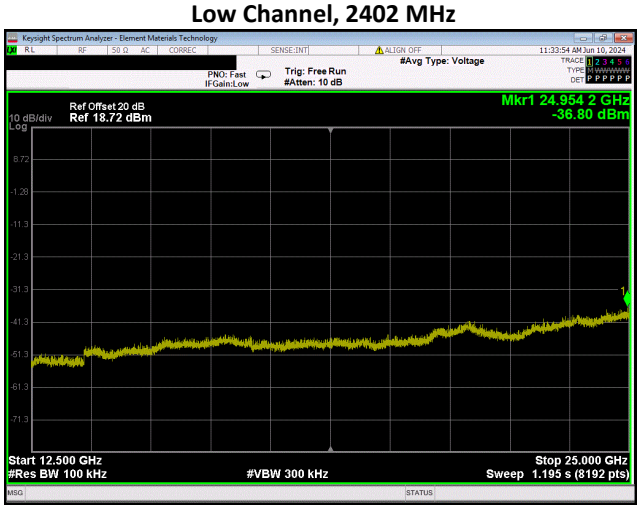
element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



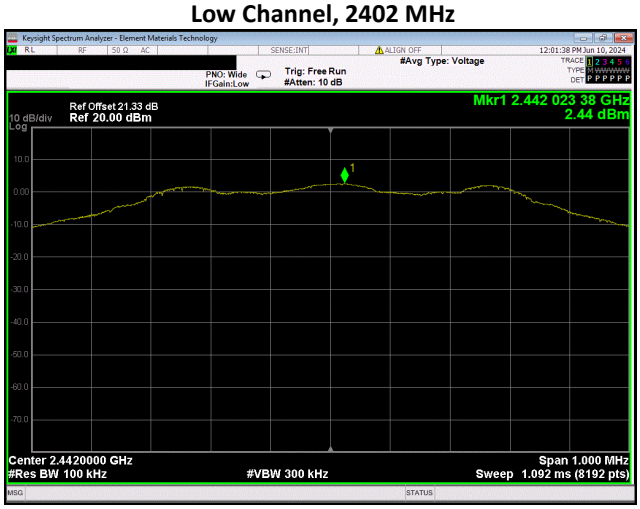
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



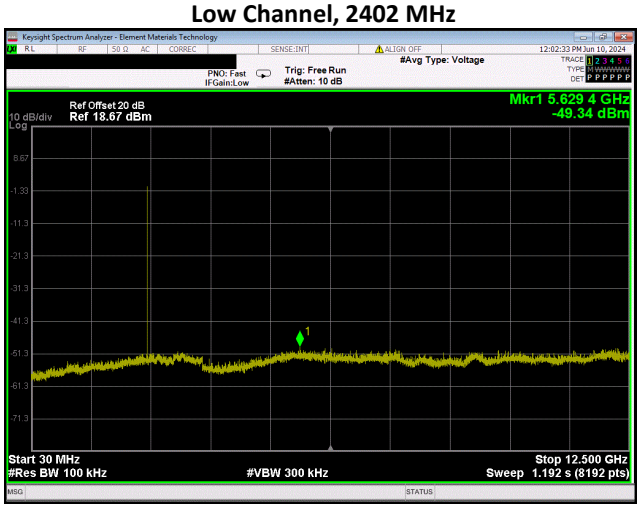
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



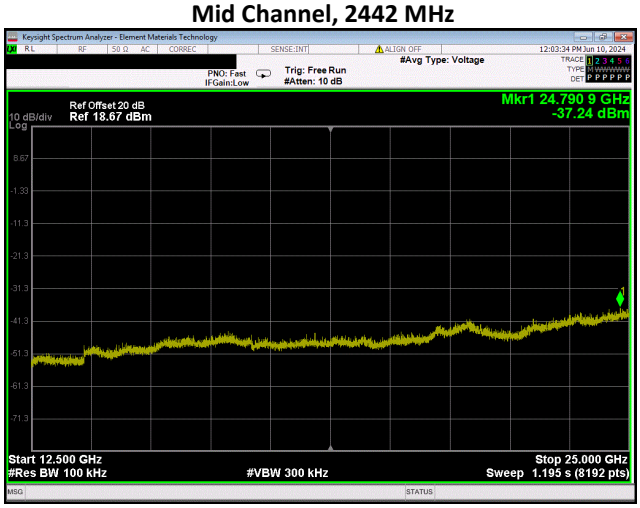
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz



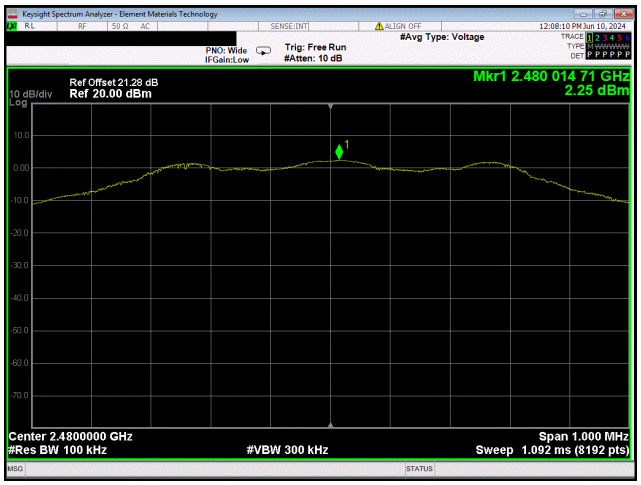
BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz



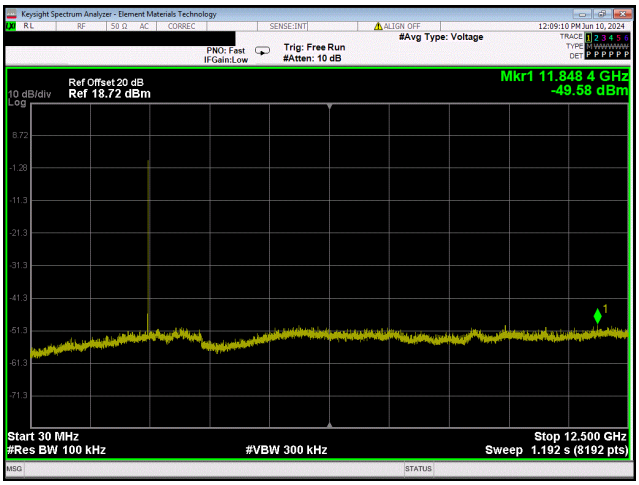
BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz

SPURIOUS CONDUCTED EMISSIONS

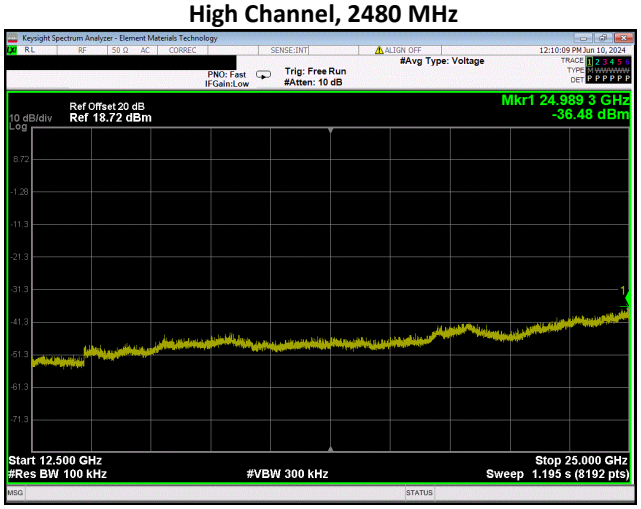
element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



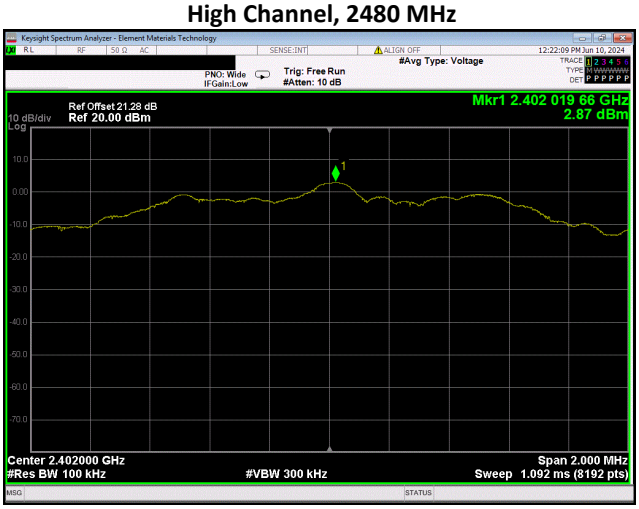
BLE/GFSK 1 Mbps
High Channel, 2480 MHz



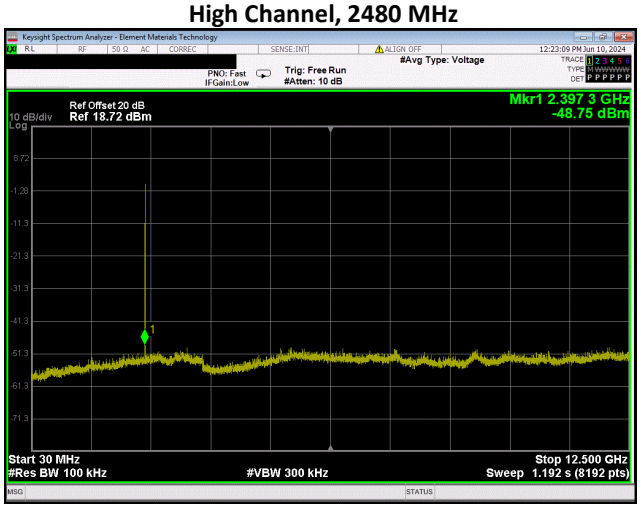
BLE/GFSK 1 Mbps
High Channel, 2480 MHz



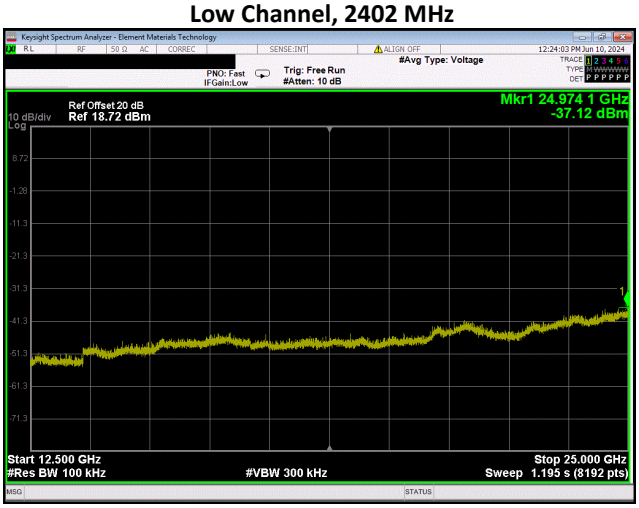
BLE/GFSK 1 Mbps
High Channel, 2480 MHz



BLE/GFSK 2 Mbps
Low Channel, 2402 MHz



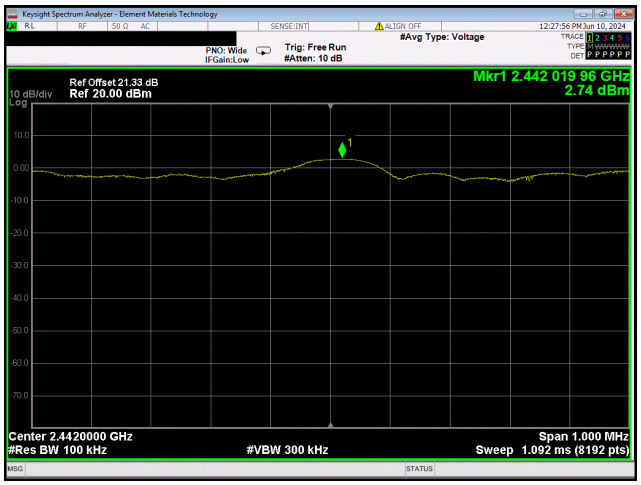
BLE/GFSK 2 Mbps
Low Channel, 2402 MHz



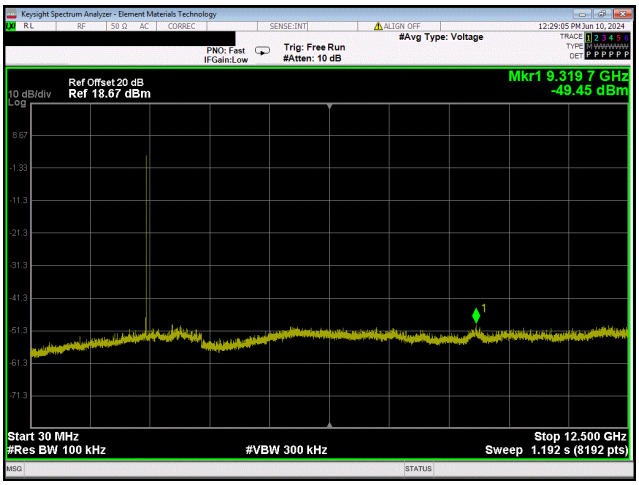
BLE/GFSK 2 Mbps
Low Channel, 2402 MHz

SPURIOUS CONDUCTED EMISSIONS

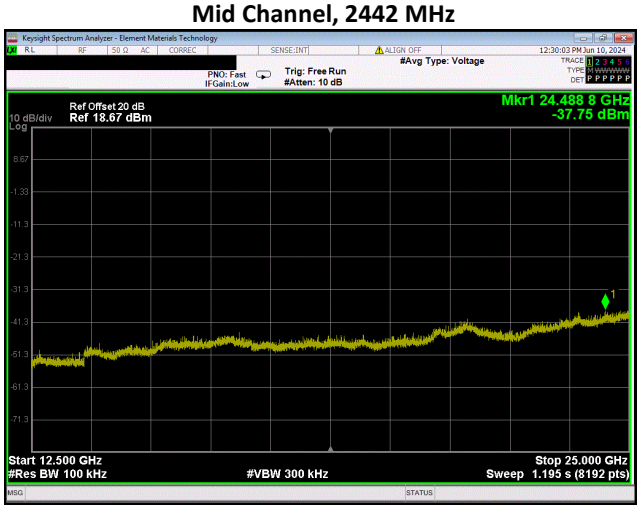
element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



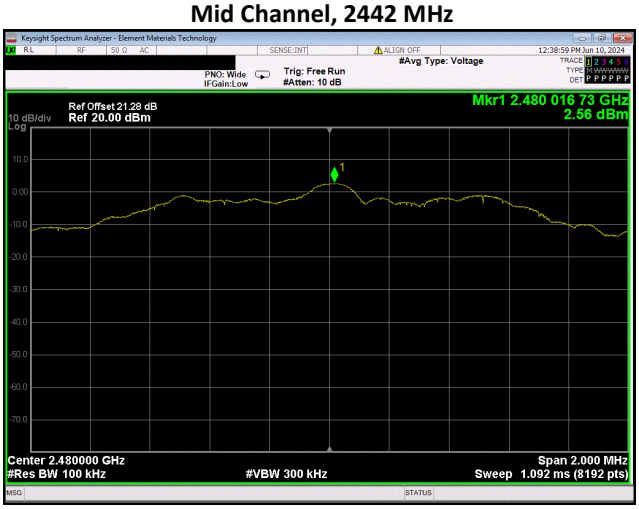
BLE/GFSK 2 Mbps
Mid Channel, 2442 MHz



BLE/GFSK 2 Mbps
Mid Channel, 2442 MHz



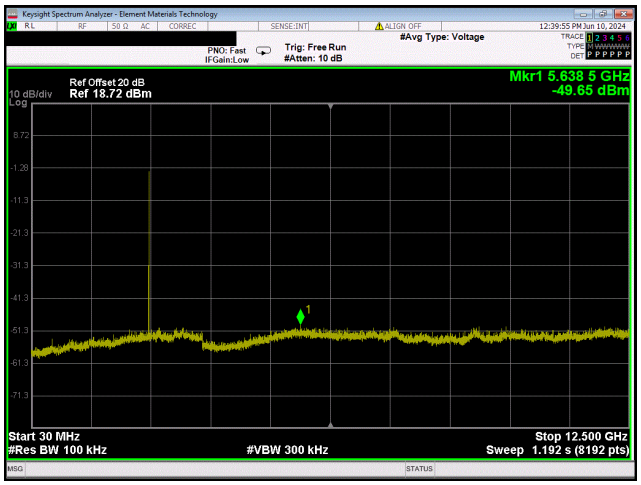
BLE/GFSK 2 Mbps
Mid Channel, 2442 MHz



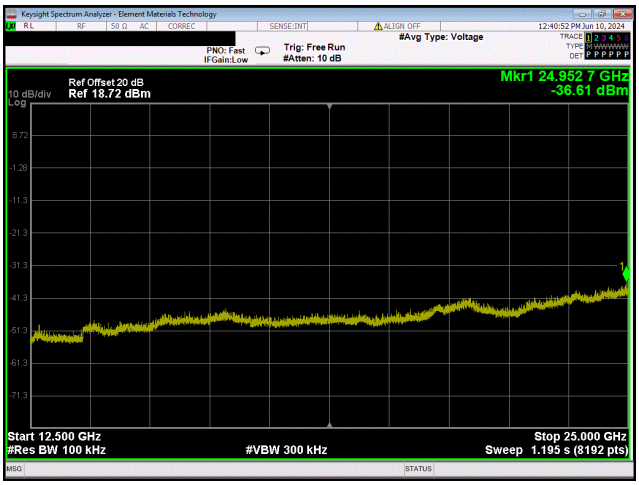
BLE/GFSK 2 Mbps
High Channel, 2480 MHz

SPURIOUS CONDUCTED EMISSIONS

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



BLE/GFSK 2 Mbps
High Channel, 2480 MHz



BLE/GFSK 2 Mbps
High Channel, 2480 MHz

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

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 showed in the data sheets.

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

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

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

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

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

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

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

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Loop	ETS Lindgren	6502	AOB	2023-06-12	2025-06-12
Cable	ESM Cable Corp.	Bilog Cables	MNH	2023-10-08	2024-10-08
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	2024-03-13	2025-03-13
Antenna - Biconilog	ETS Lindgren	3142D	AXO	2023-10-02	2025-10-02
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AVO	2023-10-08	2024-10-08
Filter - Low Pass	Micro-Tronics	LPM50004	LFK	2023-08-23	2024-08-23
Antenna - Double Ridge	ETS Lindgren	3115	AIP	2022-07-20	2024-07-20
Cable	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	2024-01-08	2025-01-08
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVT	2024-01-08	2025-01-08
Attenuator	Fairview Microwave	SA18H-20	VAF	2023-09-11	2024-09-11
Filter - High Pass	Micro-Tronics	HPM50111	LFN	2023-08-23	2024-08-23
Antenna - Standard Gain	ETS Lindgren	3160-07	AXP	NCR	NCR
Cable	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	2024-01-28	2025-01-28
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	2024-01-08	2025-01-08
Antenna - Standard Gain	ETS Lindgren	3160-08	AIQ	NCR	NCR
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVW	2024-01-08	2025-01-08
Antenna - Standard Gain	ETS Lindgren	3160-09	AHG	NCR	NCR
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNP	2023-09-05	2024-09-05
Amplifier - Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	2023-09-05	2024-09-05

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

FREQUENCY RANGE INVESTIGATED

9 kHz TO 26500 MHz

POWER INVESTIGATED

Lithium Battery

CONFIGURATIONS INVESTIGATED

STAK0345-2

MODES INVESTIGATED

Transmitting BLE Low and High Ch (2402 and 2480 MHz) 1 Mbps and 2 Mbps
Transmitting BLE Low, Mid and High Ch (2402, 2442 and 2480 MHz) 1 Mbps and 2 Mbps

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Edge AI ITE (Left)	Work Order:	STAK0345
Serial Number:	2911339424	Date:	2024-05-23
Customer:	Starkey Laboratories, Inc.	Temperature:	22.1°C
Attendees:	John Quach	Relative Humidity:	46.6%
Customer Project:	None	Bar. Pressure (PMSL):	1010 mb
Tested By:	Marcelo Aguayo	Job Site:	MN05
Power:	Lithium Battery	Configuration:	STAK0345-2

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	50	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

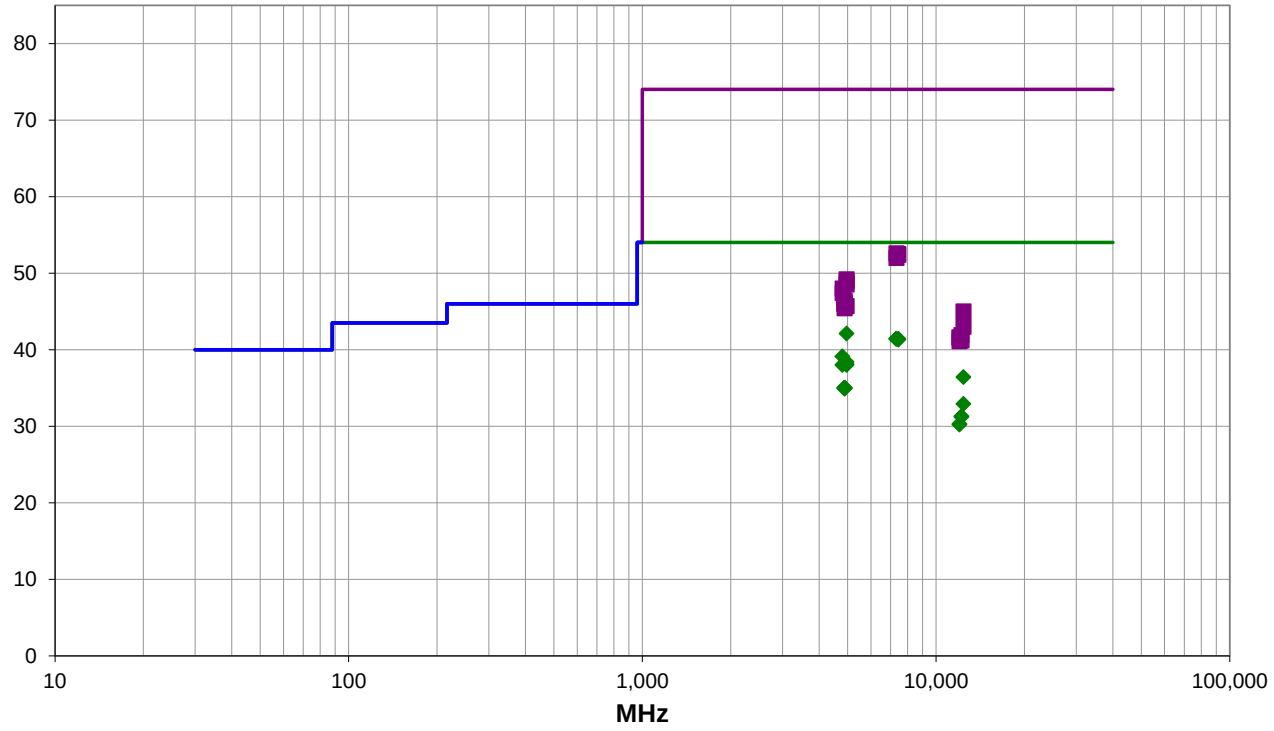
See comments for EUT orientation and data rate. Power +4dBm. Test mode duty cycle is 17.95% (1 Mbps) and 16.24% (2 Mbps), operational duty cycle is 16.8% for 1 mbps and 17% for 2 Mbps. Duty cycle correction factor (DCCF) applied using DCCF=[10*log(1/test mode DC)]+[10*log(operational DC)]=-0.2 dB (1 Mbps) or +0.2 dB (2 Mbps)

EUT OPERATING MODES

Transmitting BLE Low, Mid and High Ch (2402, 2442 and 2480 MHz) 1 Mbps and 2 Mbps

DEVIATIONS FROM TEST STANDARD

None



Run #: 50 PK AV QP

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #50

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
4959.975	37.1	5.2	3.2	235.0	-0.2	0.0	Horz	AV	0.0	42.1	54.0	-11.9	EUT Horz, High Ch 1 Mbps
7325.692	29.2	12.4	3.2	70.9	-0.2	0.0	Horz	AV	0.0	41.4	54.0	-12.6	EUT Horz, Mid Ch 1 Mbps
7324.000	29.2	12.4	1.5	153.9	-0.2	0.0	Vert	AV	0.0	41.4	54.0	-12.6	EUT Horz, Mid Ch 1 Mbps
7442.433	29.1	12.5	1.5	199.9	-0.2	0.0	Horz	AV	0.0	41.4	54.0	-12.6	EUT Horz, High Ch 1 Mbps
7440.467	29.0	12.5	1.5	220.0	-0.2	0.0	Vert	AV	0.0	41.3	54.0	-12.7	EUT Horz, High Ch 1 Mbps
4804.013	34.2	5.1	3.5	307.0	-0.2	0.0	Horz	AV	0.0	39.1	54.0	-14.9	EUT Horz, Low Ch 1 Mbps
4959.908	33.0	5.2	1.5	19.0	-0.2	0.0	Vert	AV	0.0	38.0	54.0	-16.0	EUT Horz, High Ch 1 Mbps
4803.923	33.1	5.1	2.1	85.9	-0.2	0.0	Vert	AV	0.0	38.0	54.0	-16.0	EUT Horz, Low Ch 1 Mbps
4959.127	33.0	5.2	1.0	109.9	0.2	0.0	Horz	AV	0.0	38.4	54.0	-15.6	EUT Horz, High Ch 2 Mbps
4959.950	32.7	5.2	1.0	109.0	0.2	0.0	Vert	AV	0.0	38.1	54.0	-15.9	EUT Horz, High Ch 2 Mbps
12398.970	37.4	-0.8	1.0	30.9	-0.2	0.0	Horz	AV	0.0	36.4	54.0	-17.6	EUT Horz, High Ch 1 Mbps
4886.175	30.1	5.1	3.0	16.9	-0.2	0.0	Horz	AV	0.0	35.0	54.0	-19.0	EUT Horz, Mid Ch 1 Mbps
4883.775	30.1	5.1	1.5	178.9	-0.2	0.0	Vert	AV	0.0	35.0	54.0	-19.0	EUT Horz, Mid Ch 1 Mbps
4885.883	30.1	5.1	1.5	206.0	-0.2	0.0	Horz	AV	0.0	35.0	54.0	-19.0	EUT On Side, Mid Ch 1 Mbps
4886.258	30.1	5.1	1.5	311.0	-0.2	0.0	Vert	AV	0.0	35.0	54.0	-19.0	EUT On Side, Mid Ch 1 Mbps
4885.150	30.1	5.1	2.9	131.0	-0.2	0.0	Horz	AV	0.0	35.0	54.0	-19.0	EUT Vert, Mid Ch 1 Mbps
4886.367	30.0	5.1	1.5	77.9	-0.2	0.0	Vert	AV	0.0	34.9	54.0	-19.1	EUT Vert, Mid Ch 1 Mbps
12398.820	33.9	-0.8	1.4	285.0	-0.2	0.0	Vert	AV	0.0	32.9	54.0	-21.1	EUT Horz, High Ch 1 Mbps
7325.133	40.2	12.4	1.5	153.9	0.0	0.0	Vert	PK	0.0	52.6	74.0	-21.4	EUT Horz, Mid Ch 1 Mbps
7439.058	40.0	12.5	1.5	220.0	0.0	0.0	Vert	PK	0.0	52.5	74.0	-21.5	EUT Horz, High Ch 1 Mbps
7437.525	39.9	12.5	1.5	199.9	0.0	0.0	Horz	PK	0.0	52.4	74.0	-21.6	EUT Horz, High Ch 1 Mbps
7328.450	39.6	12.4	3.2	70.9	0.0	0.0	Horz	PK	0.0	52.0	74.0	-22.0	EUT Horz, Mid Ch 1 Mbps
12207.970	32.3	-0.8	1.5	54.0	-0.2	0.0	Horz	AV	0.0	31.3	54.0	-22.7	EUT Horz, Mid Ch 1 Mbps
12207.620	32.2	-0.8	1.5	213.0	-0.2	0.0	Vert	AV	0.0	31.2	54.0	-22.8	EUT Horz, Mid Ch 1 Mbps
12010.400	32.4	-1.9	1.7	49.9	-0.2	0.0	Horz	AV	0.0	30.3	54.0	-23.7	EUT Horz, Low Ch 1 Mbps
12010.900	32.3	-1.9	1.5	340.9	-0.2	0.0	Vert	AV	0.0	30.2	54.0	-23.8	EUT Horz, Low Ch 1 Mbps
4959.283	44.0	5.2	3.2	235.0	0.0	0.0	Horz	PK	0.0	49.2	74.0	-24.8	EUT Horz, High Ch 1 Mbps
4960.863	43.7	5.2	1.0	109.9	0.0	0.0	Horz	PK	0.0	48.9	74.0	-25.1	EUT Horz, High Ch 2 Mbps
4959.507	43.3	5.2	1.0	109.0	0.0	0.0	Vert	PK	0.0	48.5	74.0	-25.5	EUT Horz, High Ch 2 Mbps
4804.293	42.9	5.1	3.5	307.0	0.0	0.0	Horz	PK	0.0	48.0	74.0	-26.0	EUT Horz, Low Ch 1 Mbps
4804.300	42.3	5.1	2.1	85.9	0.0	0.0	Vert	PK	0.0	47.4	74.0	-26.6	EUT Horz, Low Ch 1 Mbps
4885.517	41.3	5.1	1.5	77.9	0.0	0.0	Vert	PK	0.0	46.4	74.0	-27.6	EUT Vert, Mid Ch 1 Mbps
4886.408	41.0	5.1	1.5	178.9	0.0	0.0	Vert	PK	0.0	46.1	74.0	-27.9	EUT Horz, Mid Ch 1 Mbps
4884.117	40.9	5.1	3.0	16.9	0.0	0.0	Horz	PK	0.0	46.0	74.0	-28.0	EUT Horz, Mid Ch 1 Mbps
4883.083	40.9	5.1	1.5	311.0	0.0	0.0	Vert	PK	0.0	46.0	74.0	-28.0	EUT On Side, Mid Ch 1 Mbps
4881.550	40.8	5.1	1.5	206.0	0.0	0.0	Horz	PK	0.0	45.9	74.0	-28.1	EUT On Side, Mid Ch 1 Mbps
4959.742	40.5	5.2	1.5	19.0	0.0	0.0	Vert	PK	0.0	45.7	74.0	-28.3	EUT Horz, High Ch 1 Mbps
4882.867	40.3	5.1	2.9	131.0	0.0	0.0	Horz	PK	0.0	45.4	74.0	-28.6	EUT Vert, Mid Ch 1 Mbps
12398.760	45.8	-0.8	1.0	30.9	0.0	0.0	Horz	PK	0.0	45.0	74.0	-29.0	EUT Horz, High Ch 1 Mbps
12399.010	43.8	-0.8	1.4	285.0	0.0	0.0	Vert	PK	0.0	43.0	74.0	-31.0	EUT Horz, High Ch 1 Mbps

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
12208.410	42.7	-0.8	1.5	54.0	0.0	0.0	Horz	PK	0.0	41.9	74.0	-32.1	EUT Horz, Mid Ch 1 Mbps
12009.520	43.5	-1.9	1.7	49.9	0.0	0.0	Horz	PK	0.0	41.6	74.0	-32.4	EUT Horz, Low Ch 1 Mbps
12209.100	42.0	-0.8	1.5	213.0	0.0	0.0	Vert	PK	0.0	41.2	74.0	-32.8	EUT Horz, Mid Ch 1 Mbps
12010.330	43.0	-1.9	1.5	340.9	0.0	0.0	Vert	PK	0.0	41.1	74.0	-32.9	EUT Horz, Low Ch 1 Mbps

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Edge AI ITE (Left)	Work Order:	STAK0345
Serial Number:	2911339424	Date:	2024-05-23
Customer:	Starkey Laboratories, Inc.	Temperature:	22.1°C
Attendees:	John Quach	Relative Humidity:	46.6%
Customer Project:	None	Bar. Pressure (PMSL):	1010 mb
Tested By:	Marcelo Aguayo	Job Site:	MN05
Power:	Lithium Battery	Configuration:	STAK0345-2

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	53	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

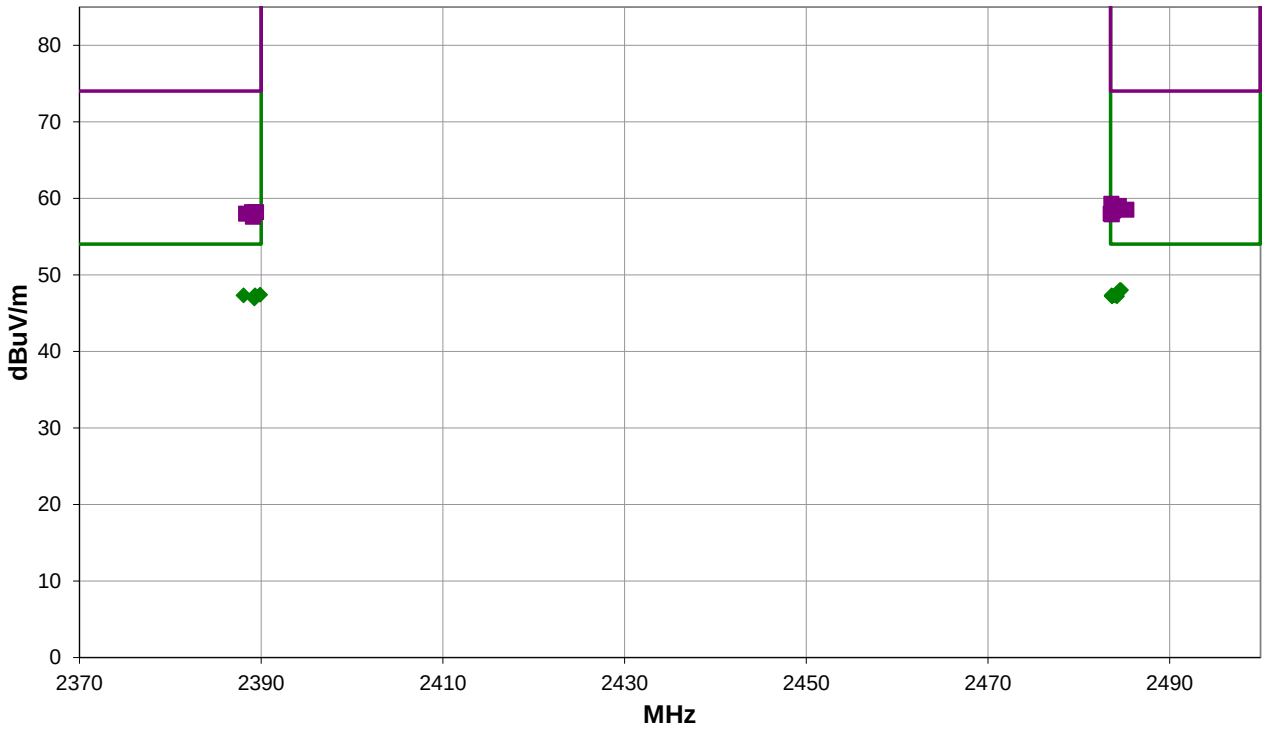
See comments for EUT orientation and data rate. Power +4dBm. Test mode duty cycle is 17.95% (1 Mbps) and 16.24% (2 Mbps), operational duty cycle is 16.8% for 1 mbps and 17% for 2 Mbps. Duty cycle correction factor (DCCF) applied using DCCF=[10*log(1/test mode DC)]+[10*log(operational DC)]=-0.2 dB (1 Mbps) or +0.2 dB (2 Mbps)

EUT OPERATING MODES

Transmitting BLE Low and High Ch (2402 and 2480 MHz) 1 Mbps and 2 Mbps

DEVIATIONS FROM TEST STANDARD

None



Run #: 53 PK AV QP

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #53

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
2484.013	31.0	-3.5	1.5	130.0	-0.2	20.0	Horz	AV	0.0	47.3	54.0	-6.7	EUT On Side, High Ch 1 Mbps
2484.083	31.0	-3.5	1.5	181.9	-0.2	20.0	Horz	AV	0.0	47.3	54.0	-6.7	EUT Horz, High Ch 1 Mbps
2483.640	31.0	-3.5	1.6	217.0	-0.2	20.0	Vert	AV	0.0	47.3	54.0	-6.7	EUT On Side, High Ch 1 Mbps
2483.680	30.9	-3.5	3.9	224.0	-0.2	20.0	Vert	AV	0.0	47.2	54.0	-6.8	EUT Vert, High Ch 1 Mbps
2483.663	30.9	-3.5	1.5	52.9	-0.2	20.0	Horz	AV	0.0	47.2	54.0	-6.8	EUT Horz, High Ch 1 Mbps
2484.230	30.9	-3.5	1.2	135.0	-0.2	20.0	Vert	AV	0.0	47.2	54.0	-6.8	EUT Vert, High Ch 1 Mbps
2484.670	31.3	-3.5	3.2	59.9	0.2	20.0	Horz	AV	0.0	48.0	54.0	-6.0	EUT On Side, High Ch 2 Mbps
2484.530	31.3	-3.5	1.5	54.0	0.2	20.0	Vert	AV	0.0	48.0	54.0	-6.0	EUT On Side, High Ch 2 Mbps
2389.273	31.2	-4.1	1.7	322.9	-0.2	20.0	Vert	AV	0.0	46.9	54.0	-7.1	EUT On Side, Low Ch 1 Mbps
2389.893	31.3	-4.1	1.5	109.0	0.2	20.0	Horz	AV	0.0	47.4	54.0	-6.6	EUT On Side, Low Ch 2 Mbps
2389.347	31.2	-4.1	1.5	221.9	0.2	20.0	Vert	AV	0.0	47.3	54.0	-6.7	EUT On Side, Low Ch 2 Mbps
2388.067	31.2	-4.1	1.5	138.9	0.2	20.0	Horz	AV	0.0	47.3	54.0	-6.7	EUT On Side, Low Ch 2 Mbps
2483.590	42.8	-3.5	1.5	54.0	0.0	20.0	Vert	PK	0.0	59.3	74.0	-14.7	EUT On Side, High Ch 2 Mbps
2484.423	42.5	-3.5	1.6	217.0	0.0	20.0	Vert	PK	0.0	59.0	74.0	-15.0	EUT On Side, High Ch 1 Mbps
2484.303	42.4	-3.5	3.9	224.0	0.0	20.0	Vert	PK	0.0	58.9	74.0	-15.1	EUT Horz, High Ch 1 Mbps
2483.937	42.1	-3.5	1.5	181.9	0.0	20.0	Horz	PK	0.0	58.6	74.0	-15.4	EUT On Side, High Ch 1 Mbps
2485.230	42.0	-3.5	3.2	59.9	0.0	20.0	Horz	PK	0.0	58.5	74.0	-15.5	EUT On Side, High Ch 2 Mbps
2483.793	41.9	-3.5	1.5	130.0	0.0	20.0	Horz	PK	0.0	58.4	74.0	-15.6	EUT Vert, High Ch 1 Mbps
2389.007	42.3	-4.1	1.5	138.9	0.0	20.0	Horz	PK	0.0	58.2	74.0	-15.8	EUT On Side, Low Ch 2 Mbps
2389.430	42.3	-4.1	1.5	109.0	0.0	20.0	Horz	PK	0.0	58.2	74.0	-15.8	EUT On Side, Low Ch 1 Mbps
2483.513	41.5	-3.5	1.5	52.9	0.0	20.0	Horz	PK	0.0	58.0	74.0	-16.0	EUT Horz, High Ch 1 Mbps
2388.337	42.1	-4.1	1.7	322.9	0.0	20.0	Vert	PK	0.0	58.0	74.0	-16.0	EUT On Side, Low Ch 1 Mbps
2483.640	41.4	-3.5	1.2	135.0	0.0	20.0	Vert	PK	0.0	57.9	74.0	-16.1	EUT Vert, High Ch 1 Mbps
2389.103	41.7	-4.1	1.5	221.9	0.0	20.0	Vert	PK	0.0	57.6	74.0	-16.4	EUT On Side, Low Ch 2 Mbps

CONCLUSION

Pass

Tested By

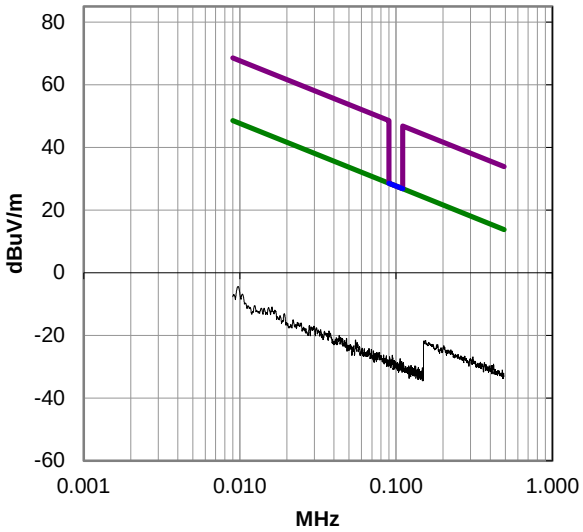
SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

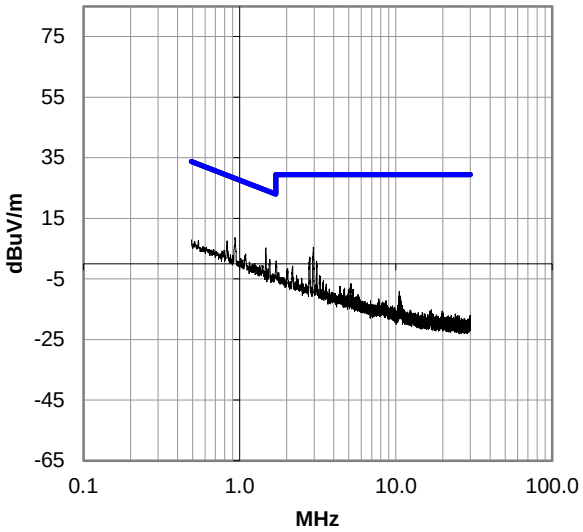
PRESCAN DATA

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.

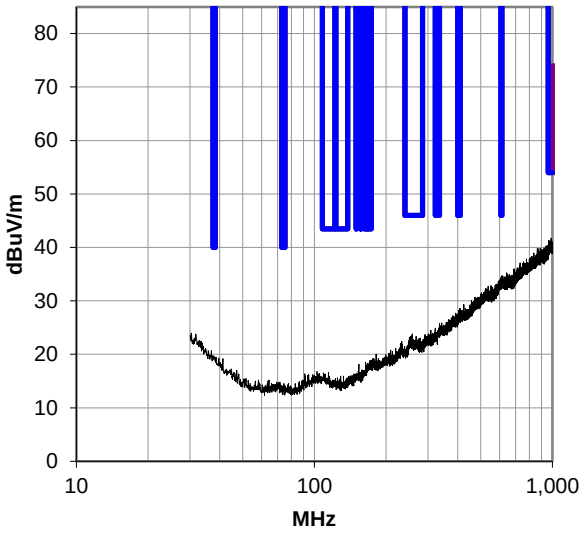
0.009-0.49 MHz, Run 65



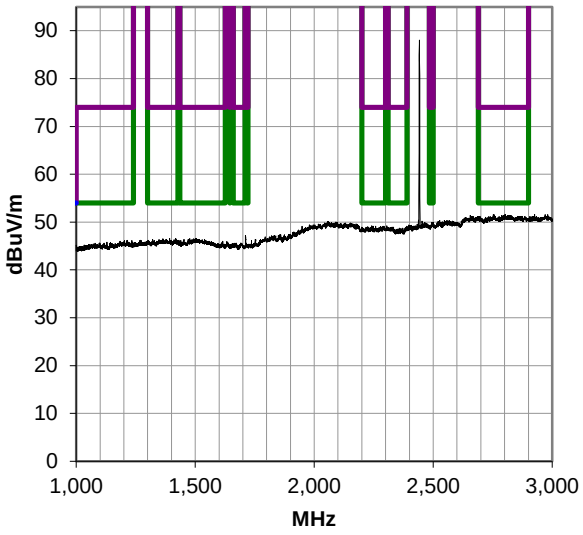
0.49-30 MHz, Run 64



30-1000 MHz, Run 60



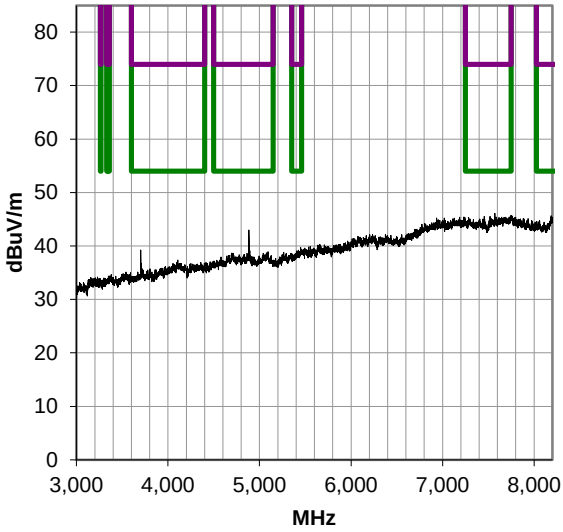
1000-3000 MHz, Run 43



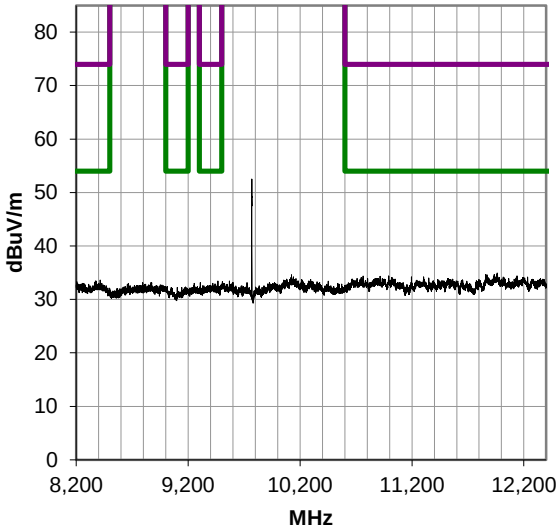
SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

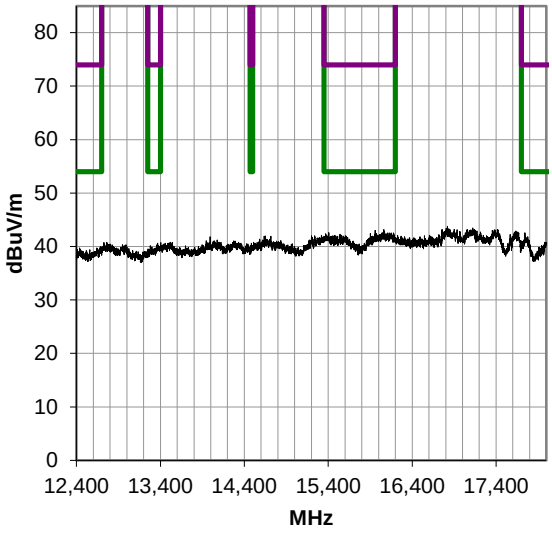
3000-8200 MHz, Run 44



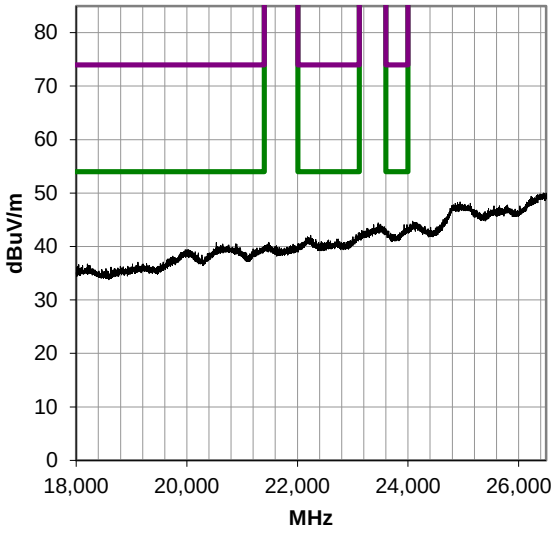
8200-12400 MHz, Run 45



12400-18000 MHz, Run 46



18000-26500 MHz, Run 37



End of Test Report