Starkey Laboratories, Inc.

TV Streamer

FCC 15.247:2024

RSS-247 Issue 3:2023

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

Bluetooth Low Energy (DTS) Radio

Proprietary Audio Streaming (PAS)

Report: STAK0342.0 Rev. 2, Issue Date: November 4, 2024

ACCREDITED
CERT #3310.05

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TABLE OF CONTENTS

element
2023.04.17

Section	Page Number

CERTIFICATE OF TEST

Last Date of Test: November 1, 2024
Starkey Laboratories, Inc.
EUT: TV Streamer

Radio Equipment Testing

Standards

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

Guidance

FCC KDB 558074 v05r02:2019
Notice 2021 - CEB0001

Results

Test Description	Result	FCC Section(s)	RSS Section(s)	ANSI C63.10 Section(s)	Comments
Powerline Conducted Emissions	Pass	15.207	RSS-Gen 8.8	6.2	
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	

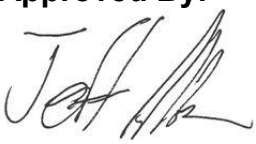
Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual 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

Occupied Bandwidth High channel 1 Mbps measurement used an RBW greater than 5% which slightly overstates the 99% OBW

Approved By:



Jeff Alcoke, Senior EMC Test Engineer
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	Added data from STAK0356	2024-09-19	44-46, 53-55, 73-79
	Added configuration from STAK0356	2024-09-19	16
	Updated test dates	2024-09-19	3, 12, 17
02	Updated test dates	2024-11-01	3, 12, 17
	Changed antenna gain from 5 dBi to 4.89 dBi	2024-11-01	13, 48
	Added additional Spurious Radiated Emissions data with Model 800.	2024-11-01	73
	Added deviation on occupied bandwidth measurement	2024-11-01	4, 28

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

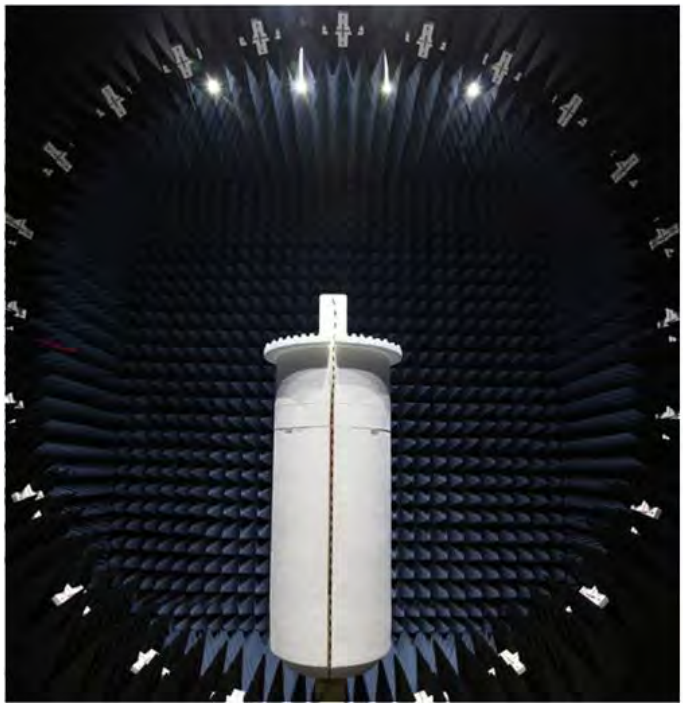
element
2023.09.21

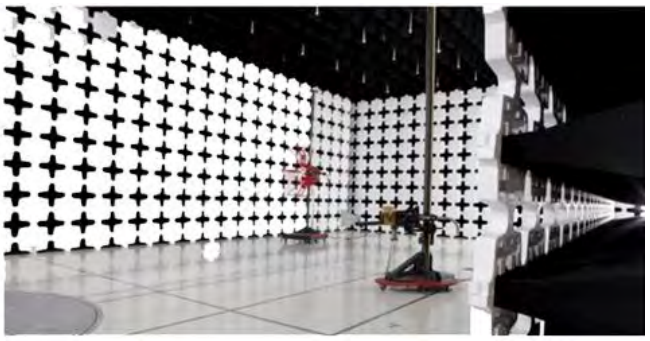
Testing was performed at the following location(s)

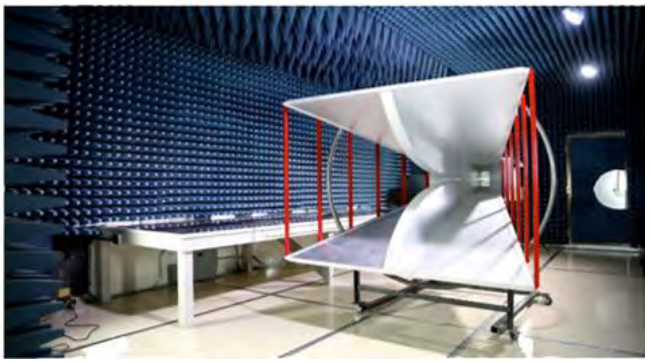
	Location	Labs (1)	Address	A2LA (2)	ISED (3)	BSMI (4)	VCCI (5)	CAB (6)	FDA (7)
☐	California	OC01-17	41 Tesla Irvine, CA 92618 (949) 861-8918	3310.04	2834B	SL2-IN-E-1154R	A-0029	US0158	TL-55
☒	Minnesota	MN01-11	9349 W Broadway Ave. Brooklyn Park, MN 55445 (612) 638-5136	3310.05	2834E	SL2-IN-E-1152R	A-0109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

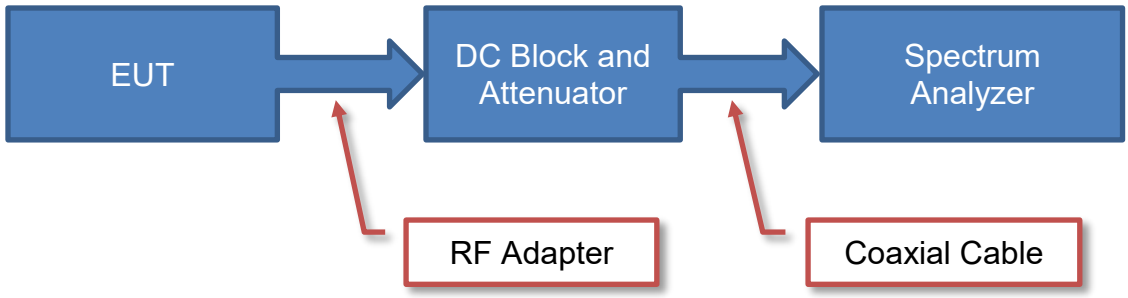
TEST SETUP BLOCK DIAGRAMS

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.

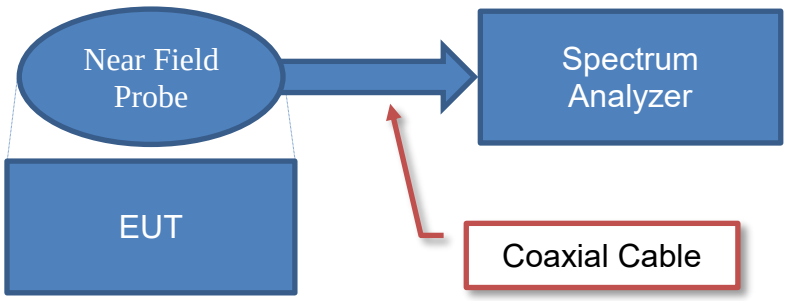
Antenna Port Conducted Measurements



Sample Calculation (logarithmic units)

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

Near Field Test Fixture Measurements

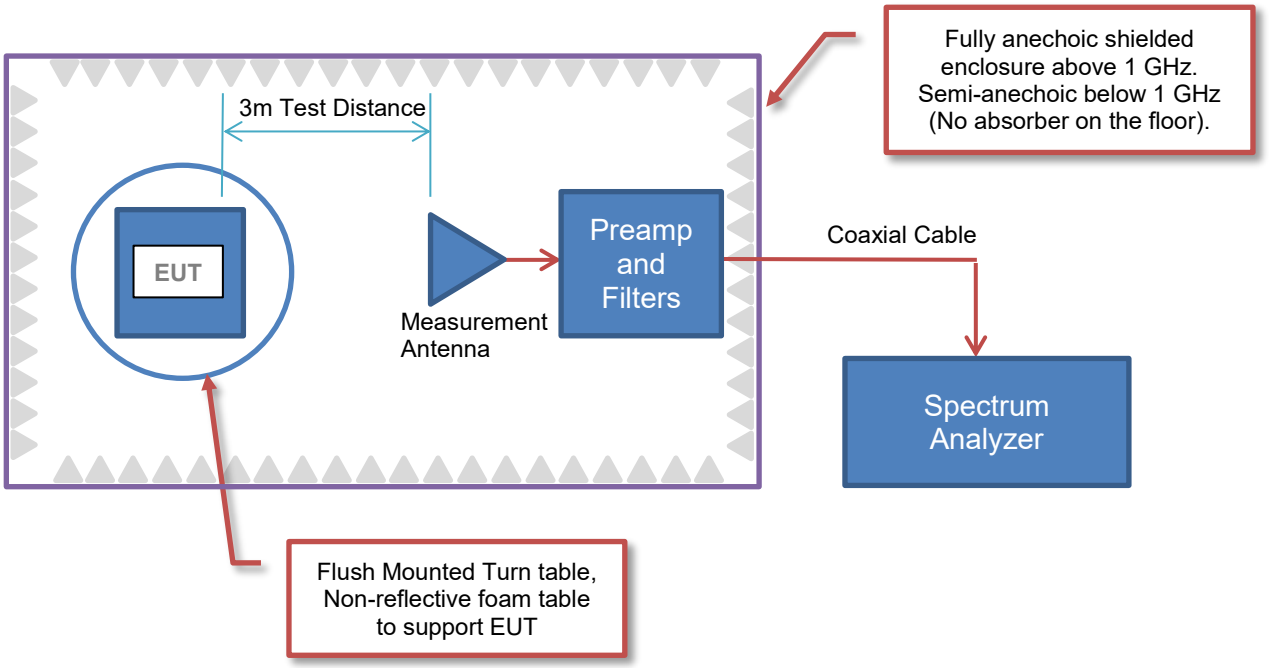


Sample Calculation (logarithmic units)

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**

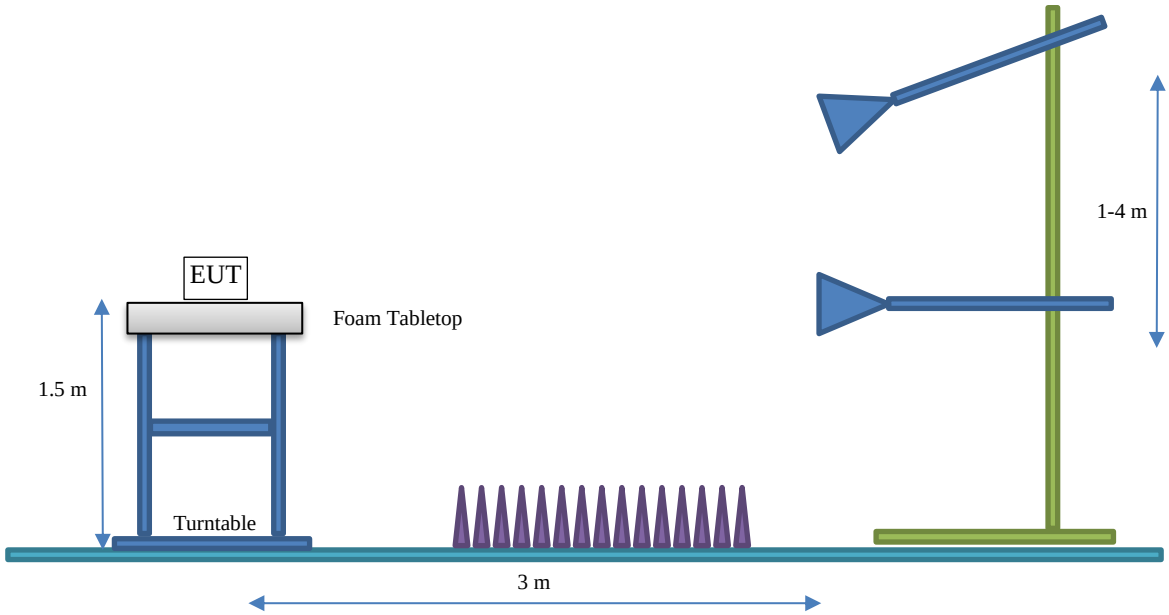
Radiated Power (ERP/EIRP) – Substitution Method:

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:	TV Streamer
First Date of Test:	March 20, 2024
Last Date of Test:	November 1, 2024
Receipt Date of Samples:	March 20, 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:
TV streamer used with hearing aids containing a Bluetooth Low Energy (BLE) and Proprietary Audio Streaming (PAS) radios. Models 800 and 801 are identical devices except in the power settings of the devices. Model 801 is a lower power model.

Testing Objective:
To demonstrate compliance of the BLE and PAS radios to FCC 15.247/RSS-247 requirements.

POWER SETTINGS AND ANTENNAS

The power settings, antenna gain value(s) and cable loss (if applicable) used for the testing contained in this report were provided by the customer and will affect the validity of the results. Element assumes no responsibility for the accuracy of this information. The power settings below reflect the maximum power that the EUT is allowed to transmit at during normal operation.

ANTENNA GAIN (dBi)

Type	Provided by:	Frequency Range (MHz)	Gain (dBi)
Inverted F antenna, PCB Trace	Starkey	2400-2483.5	4.89

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: 5.5.0
☐ Rated power settings

SETTINGS FOR ALL TESTS IN THIS REPORT – MODEL 800

Modulation Types / Data Rates	Type	Channel	Frequency (MHz)	Power Setting
BLE GFSK 1 Mbps	DTS	0	2402	-2, no preamp
		19	2440	-2, no preamp
		39	2480	-2, no preamp
Proprietary Audio Streaming (PAS) GFSK 2 Mbps	DTS	1	2404	-2, with preamp
		19	2440	-2, with preamp
		37	2476	-2, with preamp

SETTINGS FOR ALL TESTS IN THIS REPORT – MODEL 801

Modulation Types / Data Rates	Type	Channel	Frequency (MHz)	Power Setting
BLE GFSK 1 Mbps	DTS	0	2402	-10, no preamp
		19	2440	-10, no preamp
		39	2480	-10, no preamp
Proprietary Audio Streaming (PAS) GFSK 2 Mbps	DTS	1	2404	-10, no preamp
		19	2440	-10, no preamp
		37	2476	-10, no preamp

POWER SETTING COMMENTS

A preamp with approximately 24dB gain is used on the 2 Mbps data rate but not the 1 Mbps data rate. Additionally, the client states that there is 5 dB of insertion loss, and a saw filter which is inside the band and affects the high channel by approximately 10-15dB.

CONFIGURATIONS

Configuration STAK0332-1

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
TV Streamer	Starkey	800	10000105

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Dell	Precision 5560	5W9ZZH3
Power Supply (Laptop)	None	DA130PM170	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB Cable	YEs	1.2 m	Yes	USB Hub	TV Streamer
AC Cable (Laptop)	No	0.9 m	None	AC Mains	Laptop Power Supply
DC Cable (Laptop)	No	1.7m	None	Laptop	Laptop Power Supply

Configuration STAK0332-3

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
TV Streamer	Starkey	800	242420709B

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Dell	Precision 5560	5W9ZZH3
Power Supply (Laptop)	None	DA130PM170	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB Cable	Yes	1.2 m	Yes	USB Hub	TV Streamer
AC Cable (Laptop)	No	0.9 m	None	AC Mains	Laptop Power Supply
DC Cable (Laptop)	No	1.7m	None	Laptop	Laptop Power Supply
Mic Cable	No	3.0 m	No	TV Streamer	Unpopulated

CONFIGURATIONS

Configuration STAK0342-3

Software/Firmware Running During Test	
Description	**Version**
KALAM TVS Controller (PC Software)	None
Firmware	5.5.0

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
TV Streamer	Starkey	800	100000105

Peripherals in Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Dell	Precision 5530	CB1RMV2

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB Cable	Yes	1.4 m	Yes	Laptop	TV Streamer

Configuration STAK0342-6

Software/Firmware Running During Test	
Description	**Version**
KALAM TVS Controller (PC Software)	None
Firmware	5.5.0

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
TV Streamer	Starkey	800	100000105

Peripherals in Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Dell	Latitude 5420	JM32303
Laptop Power supply	Dell	LA65NM170	CN-02YK0F-LOC00-017-2096-A04

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power cable (Laptop)	No	1.8 m	No	Laptop	Laptop Power supply
AC Power cable (Laptop)	No	1.1 m	No	Laptop Power supply	AC Mains
USB Cable	Yes	0.8 m	Yes	Laptop	TV Streamer

CONFIGURATIONS

Configuration STAK0356-1

Software/Firmware Running During Test	
Description	**Version**
Firmware	5.5.0
Test Software KALAM TVS CONTROLLER	None

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
TV Streamer	Starkey	801	242420709B

Peripherals in Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Dell	Precision 5530	CB1RMV2
Laptop Power Supply	Dell	HA65NM130	None
USB Hub	Anker	A8305	ACDPLG0B25401321
Microphone	Audio Teknica	ATR4600	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB Cable	Yes	1.4 m	No	TV Streamer	USB Hub
Microphone Cable	No	1.8 m	No	TV Streamer	Microphone (Integrated)
USB Cable (Hub, Integrated)	Yes	0.4 m	No	Laptop	USB Hub
DC Cable (Laptop Power Supply)	No	1 m	No	Laptop	Laptop DC Supply
AC Cable (Laptop Power Supply)	No	0.8 m	No	Laptop DC Supply	AC Mains

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2024-03-20	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	2024-05-24	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.
3	2024-05-24	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.
4	2024-05-24	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.
5	2024-05-24	Equivalent Isotropic Radiated Power	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
6	2024-05-24	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.
7	2024-05-24	Spurious Conducted Emissions	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
8	2024-06-19	Powerline Conducted Emissions	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
9	2024-09-18	Output Power	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
10	2024-09-18	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.
11	2024-10-23	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.
12	2024-11-01	Spurious Radiated Emissions – Spot Checks	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

TEST DESCRIPTION

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
LISN	Solar Electronics	9252-50-R-24-BNC	LIY	2024-03-27	2025-03-27
Cable - Conducted Cable Assembly	Northwest EMC	MNC, HGN, TYK, VAE	MNCA	2024-03-11	2025-03-11
Receiver	Gauss Instruments	TDEMI 30M	ARS	2024-05-07	2025-05-07

CONFIGURATIONS INVESTIGATED

STAK0342-6

MODES INVESTIGATED

Transmitting BLE mid channel 1 Mbps
Transmitting Proprietary Audio Streamer (PAS) mid channel 2 Mbps

POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	TV Streamer (Model 800)	Work Order:	STAK0342
Serial Number:	100000105	Date:	2024-06-19
Customer:	Starkey Laboratories, Inc.	Temperature:	22.1°C
Attendees:	John Quach	Relative Humidity:	55.5%
Customer Project:	None	Bar. Pressure (PMSL):	1024 mb
Tested By:	William Hoffa	Job Site:	MN03
Power:	5VDC via USB from laptop	Configuration:	STAK0342-6

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	16	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

None

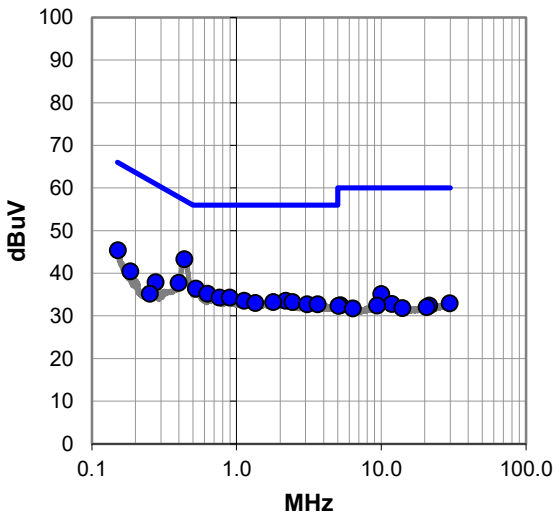
EUT OPERATING MODES

Transmitting Proprietary Audio Streamer (PAS) mid channel 2 Mbps

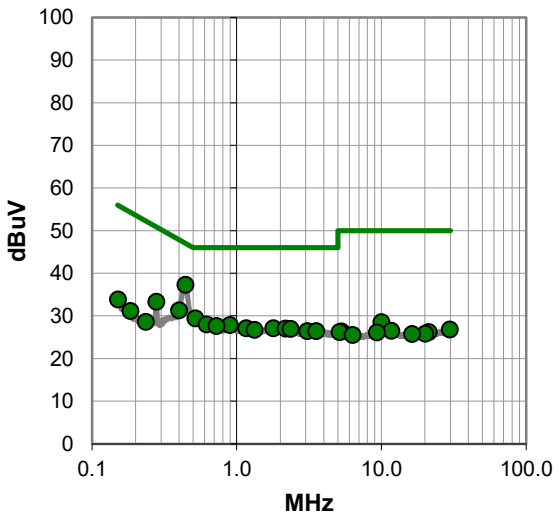
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #16

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.437	23.2	20.1	43.3	57.1	-13.8
0.524	16.3	20.1	36.4	56.0	-19.6
0.399	17.6	20.1	37.7	57.9	-20.2
0.152	24.8	20.6	45.4	65.9	-20.5
0.629	15.1	20.1	35.2	56.0	-20.8
0.762	14.2	20.1	34.3	56.0	-21.7
0.899	14.2	20.1	34.3	56.0	-21.7
1.133	13.3	20.2	33.5	56.0	-22.5
2.190	13.2	20.3	33.5	56.0	-22.5
1.796	13.0	20.2	33.2	56.0	-22.8
2.442	12.9	20.3	33.2	56.0	-22.8
0.277	17.7	20.2	37.9	60.9	-23.0
1.352	12.8	20.2	33.0	56.0	-23.0
3.083	12.3	20.4	32.7	56.0	-23.3
3.650	12.3	20.4	32.7	56.0	-23.3
0.185	20.0	20.4	40.4	64.3	-23.9
10.013	14.1	21.0	35.1	60.0	-24.9
0.252	15.0	20.2	35.2	61.7	-26.5
29.760	9.9	23.0	32.9	60.0	-27.1
11.844	11.7	21.1	32.8	60.0	-27.2
5.239	11.9	20.6	32.5	60.0	-27.5
9.381	11.6	20.8	32.4	60.0	-27.6
21.469	10.4	22.0	32.4	60.0	-27.6
5.060	11.7	20.6	32.3	60.0	-27.7
20.608	10.2	21.8	32.0	60.0	-28.0

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.443	17.2	20.1	37.3	47.0	-9.7
0.400	11.2	20.1	31.3	47.8	-16.5
0.519	9.3	20.1	29.4	46.0	-16.6
0.278	13.1	20.2	33.3	50.9	-17.6
0.620	7.9	20.1	28.0	46.0	-18.0
0.899	7.7	20.1	27.8	46.0	-18.2
0.727	7.5	20.1	27.6	46.0	-18.4
1.165	6.9	20.2	27.1	46.0	-18.9
1.796	6.9	20.2	27.1	46.0	-18.9
2.176	6.7	20.3	27.0	46.0	-19.0
2.369	6.6	20.3	26.9	46.0	-19.1
1.329	6.5	20.2	26.7	46.0	-19.3
3.078	6.0	20.4	26.4	46.0	-19.6
3.554	6.0	20.4	26.4	46.0	-19.6
10.036	7.5	21.0	28.5	50.0	-21.5
0.152	13.2	20.6	33.8	55.9	-22.1
0.185	10.7	20.4	31.1	54.3	-23.2
29.735	3.8	23.0	26.8	50.0	-23.2
11.748	5.5	21.0	26.5	50.0	-23.5
0.235	8.4	20.2	28.6	52.3	-23.7
5.312	5.7	20.6	26.3	50.0	-23.7
5.138	5.6	20.6	26.2	50.0	-23.8
21.301	4.2	22.0	26.2	50.0	-23.8
9.340	5.3	20.8	26.1	50.0	-23.9
20.175	4.0	21.8	25.8	50.0	-24.2

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	TV Streamer (Model 800)	Work Order:	STAK0342
Serial Number:	100000105	Date:	2024-06-19
Customer:	Starkey Laboratories, Inc.	Temperature:	22.1°C
Attendees:	John Quach	Relative Humidity:	55.5%
Customer Project:	None	Bar. Pressure (PMSL):	1024 mb
Tested By:	William Hoffa	Job Site:	MN03
Power:	5VDC via USB from laptop	Configuration:	STAK0342-6

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	17	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

None

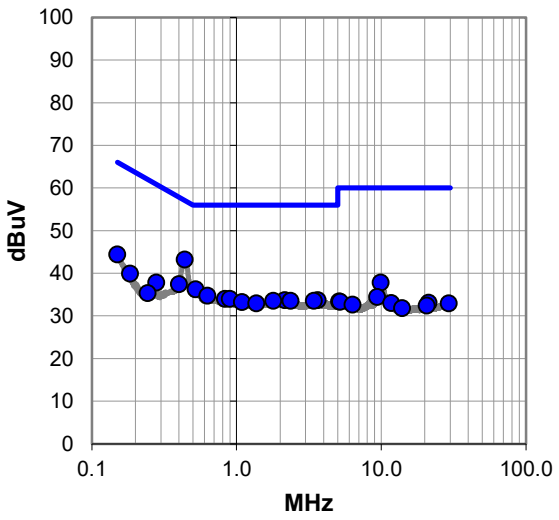
EUT OPERATING MODES

Transmitting Proprietary Audio Streamer (PAS) mid channel 2 Mbps

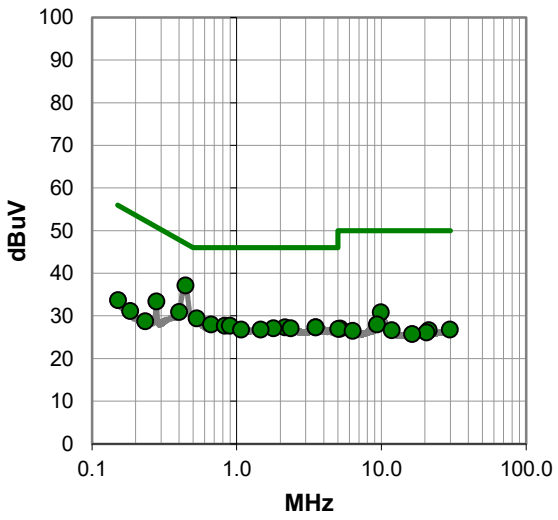
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #17

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.438	23.1	20.1	43.2	57.1	-13.9
0.521	16.1	20.1	36.2	56.0	-19.8
0.400	17.3	20.1	37.4	57.8	-20.4
0.631	14.6	20.1	34.7	56.0	-21.3
0.150	23.8	20.6	44.4	66.0	-21.6
0.834	13.9	20.1	34.0	56.0	-22.0
0.898	13.9	20.1	34.0	56.0	-22.0
9.927	16.8	21.0	37.8	60.0	-22.2
2.159	13.4	20.3	33.7	56.0	-22.3
3.644	13.3	20.4	33.7	56.0	-22.3
1.798	13.3	20.2	33.5	56.0	-22.5
2.367	13.2	20.3	33.5	56.0	-22.5
3.427	13.1	20.4	33.5	56.0	-22.5
1.090	13.0	20.2	33.2	56.0	-22.8
0.278	17.6	20.2	37.8	60.9	-23.1
1.372	12.7	20.2	32.9	56.0	-23.1
0.184	19.5	20.4	39.9	64.3	-24.4
9.378	13.6	20.8	34.4	60.0	-25.6
5.123	12.8	20.6	33.4	60.0	-26.6
0.243	15.1	20.2	35.3	62.0	-26.7
5.210	12.7	20.6	33.3	60.0	-26.7
21.267	11.1	22.0	33.1	60.0	-26.9
11.723	12.0	21.0	33.0	60.0	-27.0
29.352	10.0	22.9	32.9	60.0	-27.1
6.336	12.0	20.6	32.6	60.0	-27.4

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.443	17.0	20.1	37.1	47.0	-9.9
0.530	9.3	20.1	29.4	46.0	-16.6
0.400	10.8	20.1	30.9	47.8	-16.9
0.278	13.2	20.2	33.4	50.9	-17.5
0.667	7.9	20.1	28.0	46.0	-18.0
0.829	7.6	20.1	27.7	46.0	-18.3
0.898	7.6	20.1	27.7	46.0	-18.3
2.159	7.0	20.3	27.3	46.0	-18.7
3.505	6.9	20.4	27.3	46.0	-18.7
3.510	6.9	20.4	27.3	46.0	-18.7
1.793	6.9	20.2	27.1	46.0	-18.9
2.367	6.8	20.3	27.1	46.0	-18.9
1.076	6.6	20.2	26.8	46.0	-19.2
1.468	6.6	20.2	26.8	46.0	-19.2
9.918	9.8	21.0	30.8	50.0	-19.2
9.355	7.2	20.8	28.0	50.0	-22.0
0.152	13.1	20.6	33.7	55.9	-22.2
5.208	6.4	20.6	27.0	50.0	-23.0
5.054	6.3	20.6	26.9	50.0	-23.1
0.184	10.7	20.4	31.1	54.3	-23.2
29.737	3.8	23.0	26.8	50.0	-23.2
11.804	5.5	21.1	26.6	50.0	-23.4
21.290	4.6	22.0	26.6	50.0	-23.4
6.336	5.9	20.6	26.5	50.0	-23.5
0.234	8.5	20.2	28.7	52.3	-23.6

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	TV Streamer (Model 800)	Work Order:	STAK0342
Serial Number:	100000105	Date:	2024-06-19
Customer:	Starkey Laboratories, Inc.	Temperature:	22.1°C
Attendees:	John Quach	Relative Humidity:	55.5%
Customer Project:	None	Bar. Pressure (PMSL):	1024 mb
Tested By:	William Hoffa	Job Site:	MN03
Power:	5VDC via USB from laptop	Configuration:	STAK0342-6

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	18	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

None

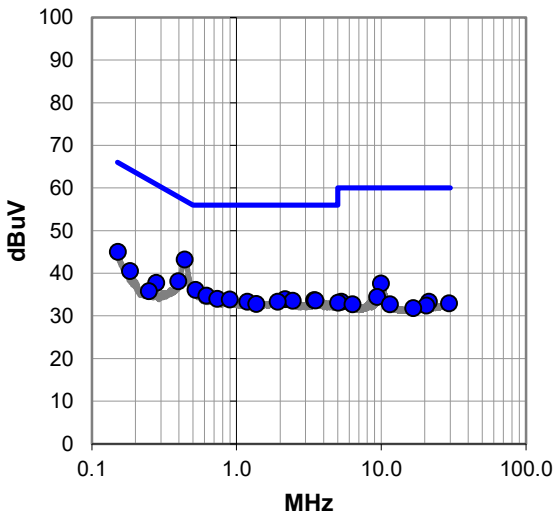
EUT OPERATING MODES

Transmitting BLE mid channel 1 Mbps

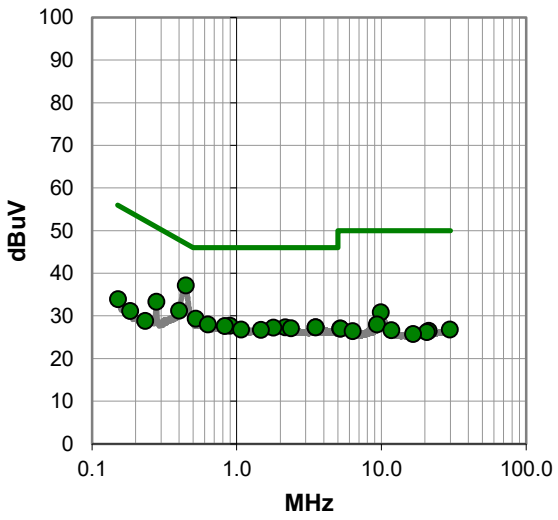
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #18

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.438	23.1	20.1	43.2	57.1	-13.9
0.396	18.0	20.1	38.1	57.9	-19.8
0.522	16.0	20.1	36.1	56.0	-19.9
0.152	24.4	20.6	45.0	65.9	-20.9
0.618	14.6	20.1	34.7	56.0	-21.3
0.737	13.9	20.1	34.0	56.0	-22.0
2.170	13.6	20.3	33.9	56.0	-22.1
0.898	13.7	20.1	33.8	56.0	-22.2
3.447	13.3	20.4	33.7	56.0	-22.3
9.961	16.6	21.0	37.6	60.0	-22.4
3.516	13.2	20.4	33.6	56.0	-22.4
2.454	13.2	20.3	33.5	56.0	-22.5
1.191	13.1	20.2	33.3	56.0	-22.7
1.932	13.1	20.2	33.3	56.0	-22.7
0.278	17.5	20.2	37.7	60.9	-23.2
1.368	12.6	20.2	32.8	56.0	-23.2
0.184	20.1	20.4	40.5	64.3	-23.8
9.389	13.6	20.8	34.4	60.0	-25.6
0.248	15.6	20.2	35.8	61.8	-26.0
21.359	11.3	22.0	33.3	60.0	-26.7
5.306	12.7	20.6	33.3	60.0	-26.7
5.045	12.5	20.6	33.1	60.0	-26.9
29.406	10.0	22.9	32.9	60.0	-27.1
6.340	12.1	20.6	32.7	60.0	-27.3
11.522	11.7	21.0	32.7	60.0	-27.3

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.444	17.0	20.1	37.1	47.0	-9.9
0.400	11.1	20.1	31.2	47.8	-16.6
0.522	9.2	20.1	29.3	46.0	-16.7
0.278	13.1	20.2	33.3	50.9	-17.6
0.632	7.9	20.1	28.0	46.0	-18.0
0.898	7.6	20.1	27.7	46.0	-18.3
0.829	7.5	20.1	27.6	46.0	-18.4
2.166	7.0	20.3	27.3	46.0	-18.7
3.507	6.9	20.4	27.3	46.0	-18.7
3.511	6.9	20.4	27.3	46.0	-18.7
1.795	7.0	20.2	27.2	46.0	-18.8
2.376	6.8	20.3	27.1	46.0	-18.9
1.076	6.6	20.2	26.8	46.0	-19.2
9.943	9.8	21.0	30.8	50.0	-19.2
1.470	6.5	20.2	26.7	46.0	-19.3
0.152	13.3	20.6	33.9	55.9	-22.0
9.325	7.2	20.8	28.0	50.0	-22.0
5.191	6.4	20.6	27.0	50.0	-23.0
5.214	6.4	20.6	27.0	50.0	-23.0
0.184	10.7	20.4	31.1	54.3	-23.2
29.740	3.8	23.0	26.8	50.0	-23.2
11.755	5.6	21.0	26.6	50.0	-23.4
0.234	8.6	20.2	28.8	52.3	-23.5
21.267	4.5	22.0	26.5	50.0	-23.5
6.336	5.8	20.6	26.4	50.0	-23.6

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	TV Streamer (Model 800)	Work Order:	STAK0342
Serial Number:	100000105	Date:	2024-06-19
Customer:	Starkey Laboratories, Inc.	Temperature:	22.1°C
Attendees:	John Quach	Relative Humidity:	55.5%
Customer Project:	None	Bar. Pressure (PMSL):	1024 mb
Tested By:	William Hoffa	Job Site:	MN03
Power:	5VDC via USB from laptop	Configuration:	STAK0342-6

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	19	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

None

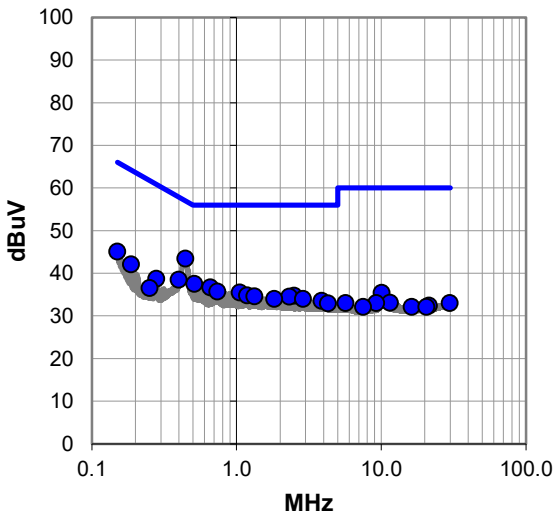
EUT OPERATING MODES

Transmitting BLE mid channel 1 Mbps

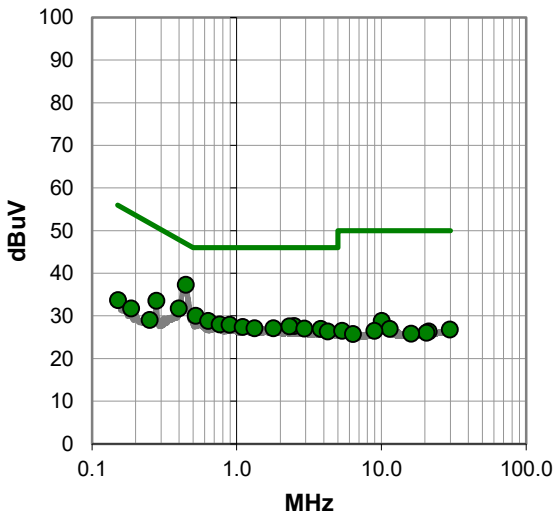
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #19

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.443	23.3	20.1	43.4	57.0	-13.6
0.512	17.4	20.1	37.5	56.0	-18.5
0.658	16.6	20.1	36.7	56.0	-19.3
0.397	18.4	20.1	38.5	57.9	-19.4
0.736	15.6	20.1	35.7	56.0	-20.3
1.052	15.3	20.2	35.5	56.0	-20.5
0.150	24.5	20.6	45.1	66.0	-20.9
1.180	14.6	20.2	34.8	56.0	-21.2
2.498	14.4	20.3	34.7	56.0	-21.3
1.331	14.4	20.2	34.6	56.0	-21.4
2.311	14.2	20.3	34.5	56.0	-21.5
1.821	13.8	20.2	34.0	56.0	-22.0
2.887	13.6	20.4	34.0	56.0	-22.0
0.187	21.7	20.4	42.1	64.2	-22.1
0.278	18.5	20.2	38.7	60.9	-22.2
3.881	13.1	20.4	33.5	56.0	-22.5
4.279	12.5	20.4	32.9	56.0	-23.1
10.097	14.4	21.0	35.4	60.0	-24.6
0.251	16.3	20.2	36.5	61.7	-25.2
11.497	12.1	21.0	33.1	60.0	-26.9
5.675	12.4	20.6	33.0	60.0	-27.0
9.236	12.2	20.8	33.0	60.0	-27.0
29.815	10.0	23.0	33.0	60.0	-27.0
21.343	10.4	22.0	32.4	60.0	-27.6
7.488	11.3	20.8	32.1	60.0	-27.9

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.444	17.2	20.1	37.3	47.0	-9.7
0.521	9.9	20.1	30.0	46.0	-16.0
0.397	11.6	20.1	31.7	47.9	-16.2
0.635	8.7	20.1	28.8	46.0	-17.2
0.278	13.3	20.2	33.5	50.9	-17.4
0.763	7.9	20.1	28.0	46.0	-18.0
0.896	7.8	20.1	27.9	46.0	-18.1
2.498	7.3	20.3	27.6	46.0	-18.4
2.311	7.2	20.3	27.5	46.0	-18.5
1.102	7.2	20.2	27.4	46.0	-18.6
1.331	6.9	20.2	27.1	46.0	-18.9
1.795	6.9	20.2	27.1	46.0	-18.9
2.938	6.6	20.4	27.0	46.0	-19.0
3.817	6.5	20.4	26.9	46.0	-19.1
4.274	5.9	20.4	26.3	46.0	-19.7
10.097	7.8	21.0	28.8	50.0	-21.2
0.152	13.1	20.6	33.7	55.9	-22.2
0.187	11.3	20.4	31.7	54.2	-22.5
0.251	8.8	20.2	29.0	51.7	-22.7
11.447	5.9	21.0	26.9	50.0	-23.1
29.735	3.8	23.0	26.8	50.0	-23.2
5.355	5.9	20.6	26.5	50.0	-23.5
8.971	5.7	20.8	26.5	50.0	-23.5
21.316	4.3	22.0	26.3	50.0	-23.7
20.515	4.2	21.8	26.0	50.0	-24.0

CONCLUSION

Pass

Tested By

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
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2024-02-29	2025-02-28
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31
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
Generator - Signal	Agilent	N5182A	TIF	2023-07-27	2026-07-27

OCCUPIED BANDWIDTH (99%)

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

EUT:	TV Streamer (Model 800)	Work Order:	STAK0342
Serial Number:	100000105	Date:	2024-05-24
Customer:	Starkey Laboratories, Inc.	Temperature:	22.1°C
Attendees:	Charles Esch	Relative Humidity:	48%
Customer Project:	None	Bar. Pressure (PMSL):	997.8 mbar
Tested By:	Christopher Heintzelman, Arnauld Dedry	Job Site:	MN11
Power:	5VDC Via USB Cable	Configuration:	STAK0342-3

TEST SPECIFICATIONS

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

COMMENTS

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

DEVIATIONS FROM TEST STANDARD

High channel 1 Mbps used an RBW greater than 5% which slightly overstates the 99% OBW

CONCLUSION

N/A

Tested By

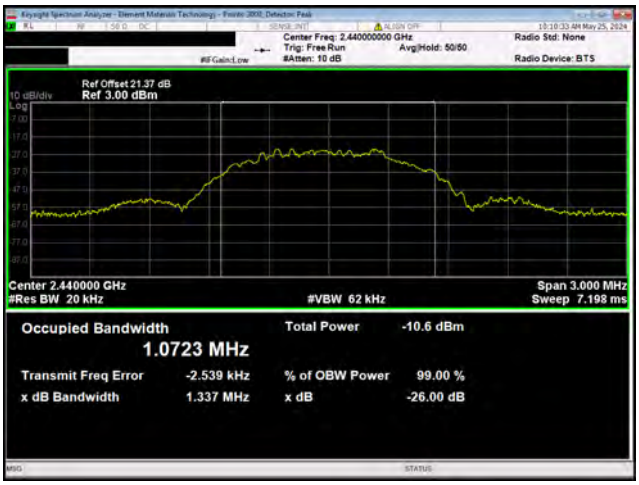
TEST RESULTS

	Value	Limit	Result
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	1.073 MHz	N/A	N/A
Mid Channel, 2440 MHz	1.072 MHz	N/A	N/A
High Channel, 2480 MHz	1.169 MHz	N/A	N/A
PAS/GFSK 2 Mbps			
Low Channel, 2404 MHz	2.154 MHz	N/A	N/A
Mid Channel, 2440 MHz	2.158 MHz	N/A	N/A
High Channel, 2476 MHz	2.109 MHz	N/A	N/A

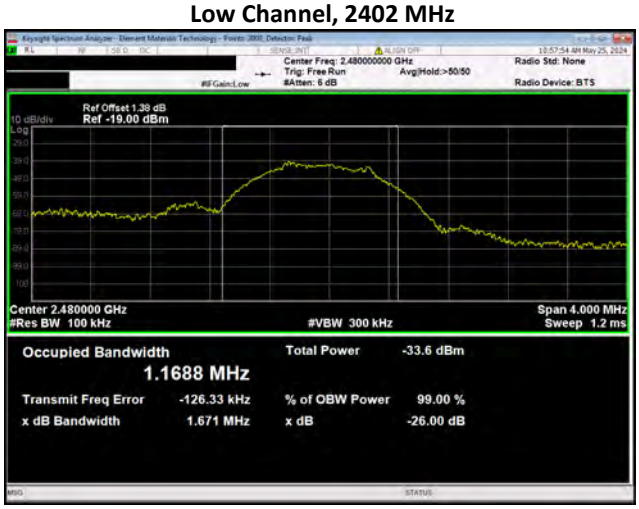
OCCUPIED BANDWIDTH (99%)

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

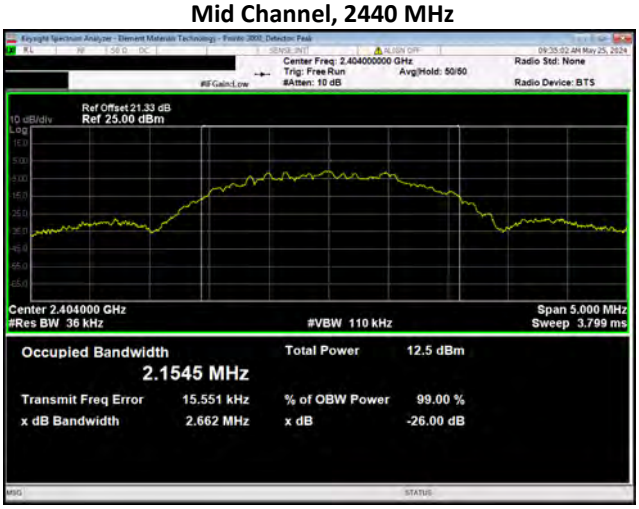
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2440 MHz



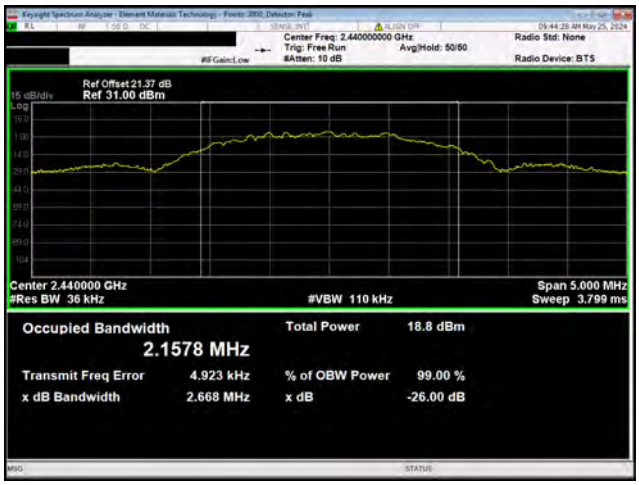
BLE/GFSK 1 Mbps
High Channel, 2480 MHz



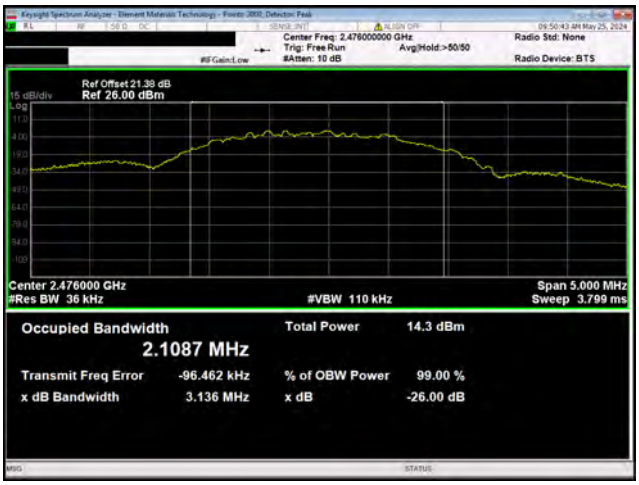
PAS/GFSK 2 Mbps
Low Channel, 2404 MHz

OCCUPIED BANDWIDTH (99%)

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



PAS/GFSK 2 Mbps
Mid Channel, 2440 MHz



PAS/GFSK 2 Mbps
High Channel, 2476 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 spectrum analyzer.

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

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

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

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

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2024-02-29	2025-02-28
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31
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
Generator - Signal	Agilent	N5182A	TIF	2023-07-27	2026-07-27

DUTY CYCLE

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

EUT:	TV Streamer (Model 800)	Work Order:	STAK0342
Serial Number:	100000105	Date:	2024-05-24
Customer:	Starkey Laboratories, Inc.	Temperature:	22.1°C
Attendees:	Charles Esch	Relative Humidity:	48%
Customer Project:	None	Bar. Pressure (PMSL):	997.8 mbar
Tested By:	Christopher Heintzelman, Arnauld Dedry	Job Site:	MN11
Power:	5VDC Via USB Cable	Configuration:	STAK0342-3

TEST SPECIFICATIONS

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

COMMENTS

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

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

N/A

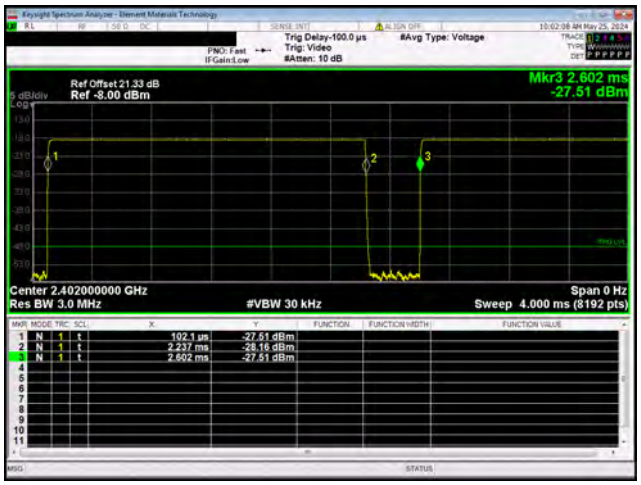
Tested By

TEST RESULTS

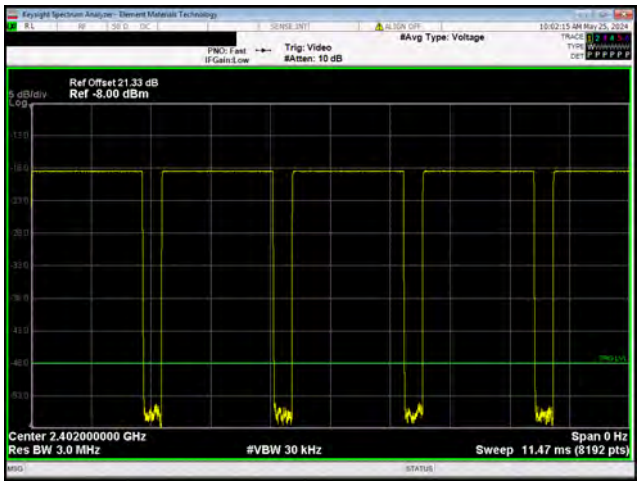
	Pulse Width	Period	Number of Pulses	Value (%)	Limit N/A ()	Results
BLE/GFSK 1 Mbps						
Low Channel, 2402 MHz	2.135 ms	2.5 ms	1	85.4	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
Mid Channel, 2440 MHz	2.135 ms	2.5 ms	1	85.4	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
High Channel, 2480 MHz	2.134 ms	2.5 ms	1	85.3	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
PAS/GFSK 2 Mbps						
Low Channel, 2404 MHz	1.101 ms	1.875 ms	1	58.7	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
Mid Channel, 2440 MHz	1.101 ms	1.875 ms	1	58.7	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
High Channel, 2476 MHz	1.098 ms	1.875 ms	1	58.6	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A

DUTY CYCLE

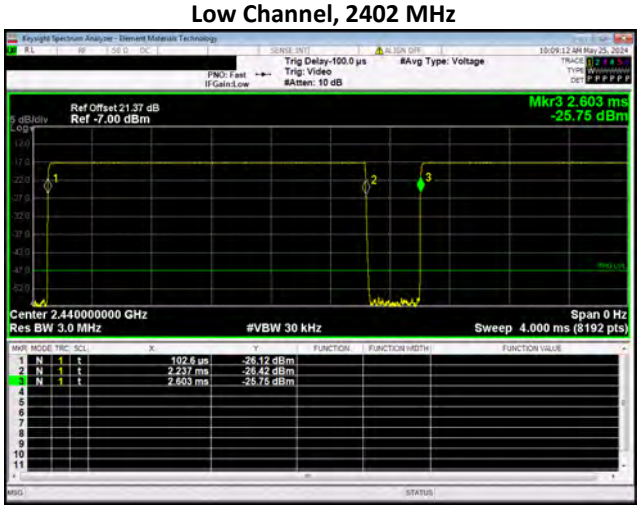
element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



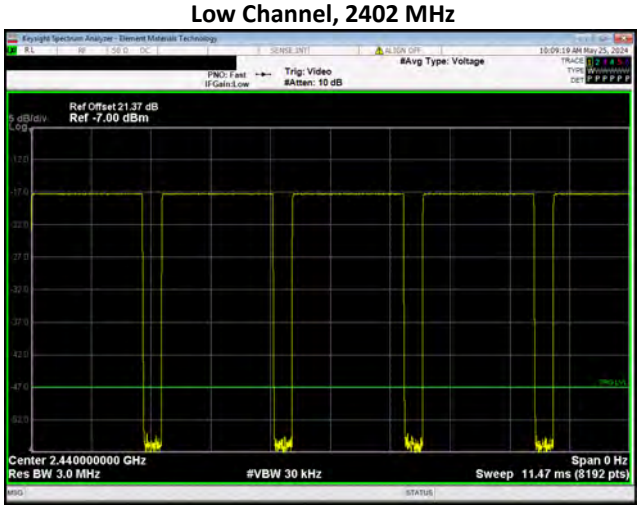
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



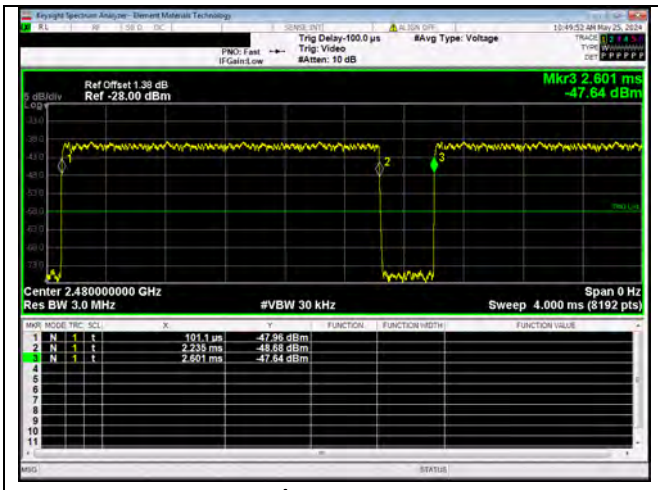
BLE/GFSK 1 Mbps
Mid Channel, 2440 MHz



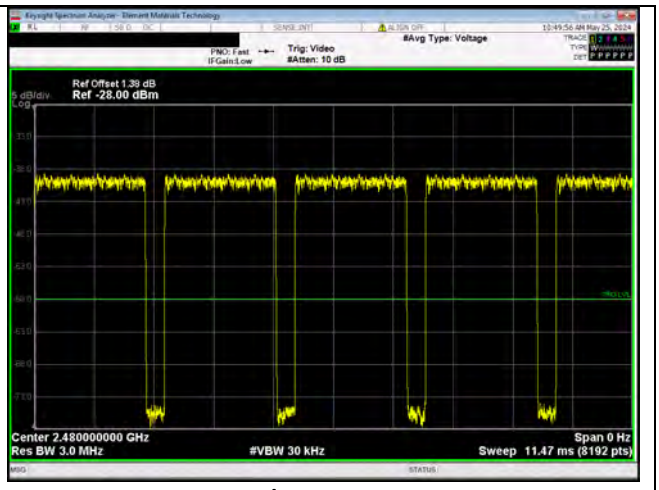
BLE/GFSK 1 Mbps
Mid Channel, 2440 MHz

DUTY CYCLE

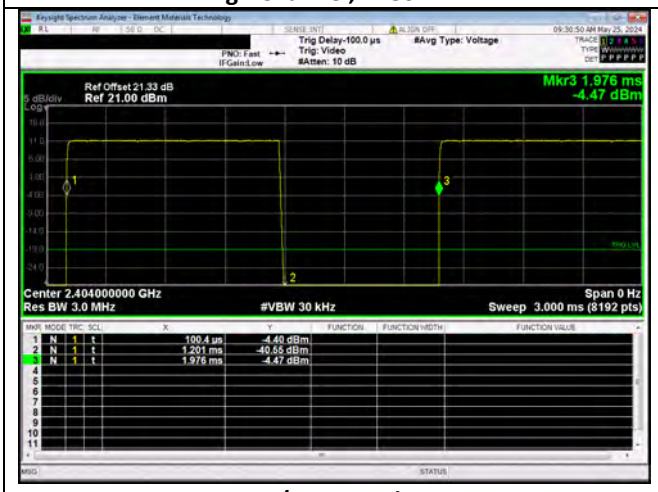
element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



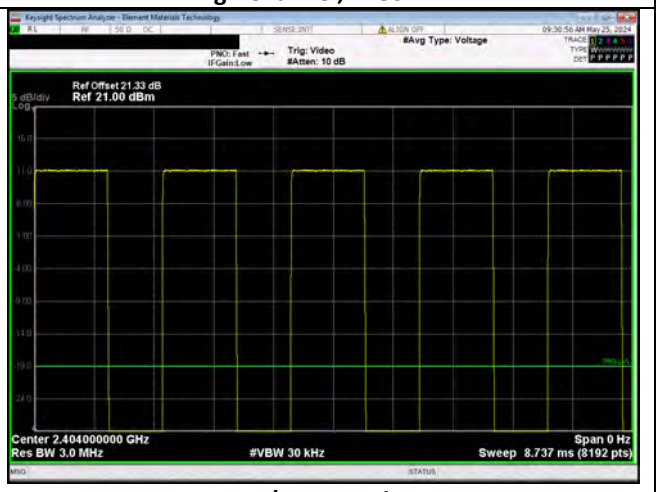
BLE/GFSK 1 Mbps
High Channel, 2480 MHz



BLE/GFSK 1 Mbps
High Channel, 2480 MHz



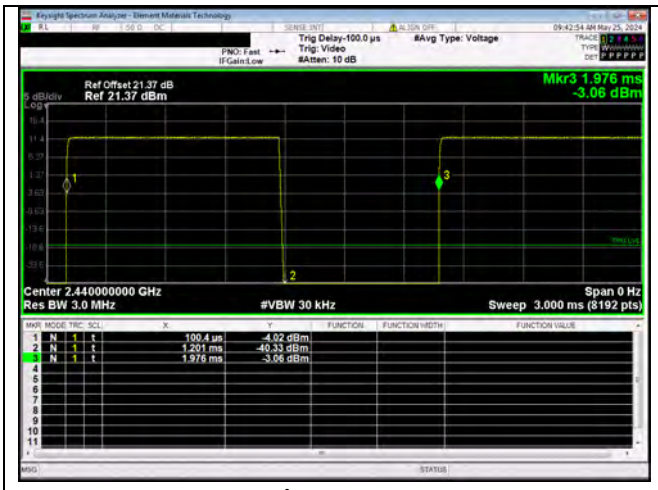
PAS/GFSK 2 Mbps
Low Channel, 2404 MHz



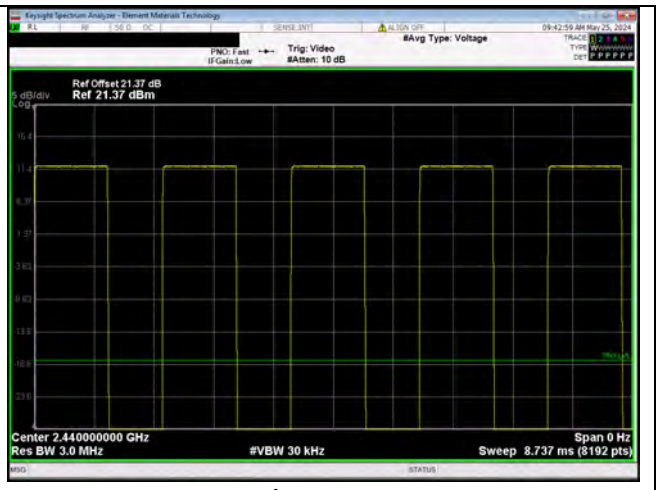
PAS/GFSK 2 Mbps
Low Channel, 2404 MHz

DUTY CYCLE

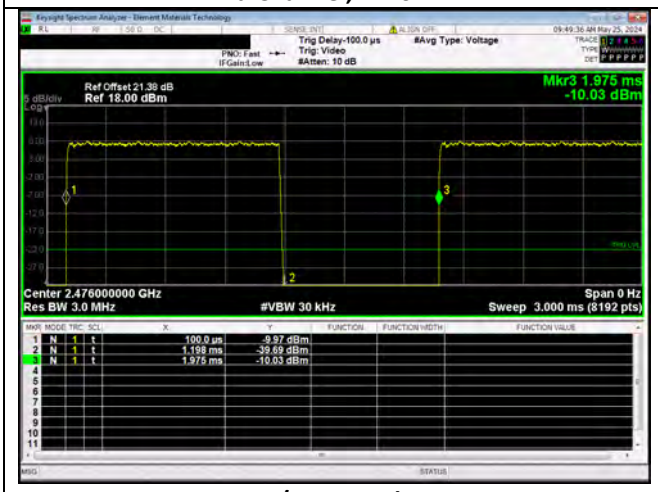
element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



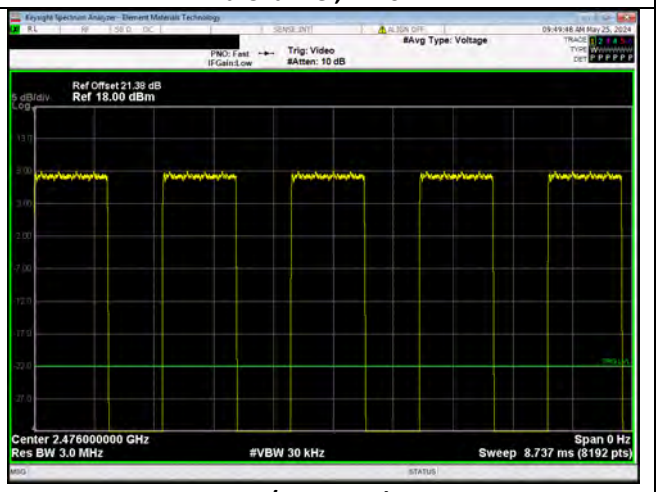
PAS/GFSK 2 Mbps
Mid Channel, 2440 MHz



PAS/GFSK 2 Mbps
Mid Channel, 2440 MHz



PAS/GFSK 2 Mbps
High Channel, 2476 MHz



PAS/GFSK 2 Mbps
High Channel, 2476 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
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2024-02-29	2025-02-28
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31
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
Generator - Signal	Agilent	N5182A	TIF	2023-07-27	2026-07-27

DTS BANDWIDTH (6 dB)

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

EUT:	TV Streamer (Model 800)	Work Order:	STAK0342
Serial Number:	100000105	Date:	2024-05-24
Customer:	Starkey Laboratories, Inc.	Temperature:	22.1°C
Attendees:	Charles Esch	Relative Humidity:	48%
Customer Project:	None	Bar. Pressure (PMSL):	997.8 mbar
Tested By:	Christopher Heintzelman, Arnauld Dedry	Job Site:	MN11
Power:	5VDC Via USB Cable	Configuration:	STAK0342-3

TEST SPECIFICATIONS

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

COMMENTS

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

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

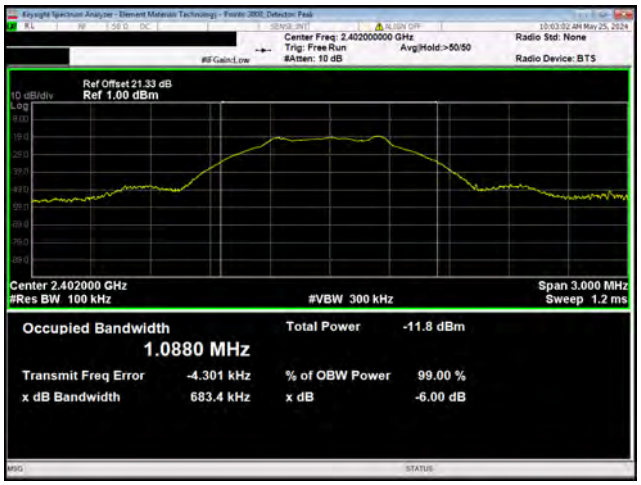
Tested By

TEST RESULTS

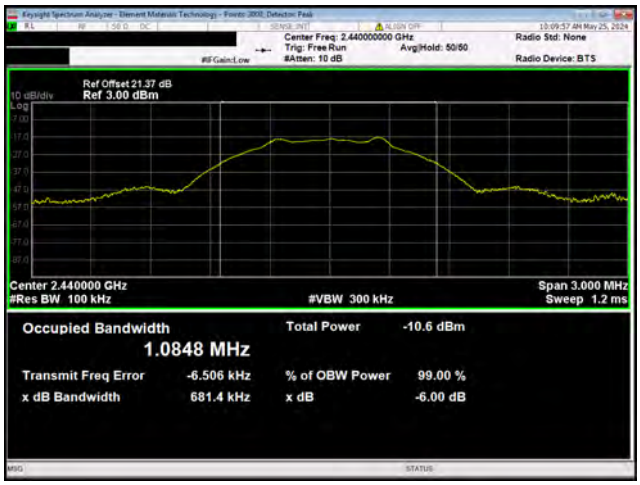
	Value	Limit (≥)	Result
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	683.377 kHz	500 kHz	Pass
Mid Channel, 2440 MHz	681.392 kHz	500 kHz	Pass
High Channel, 2480 MHz	721.258 kHz	500 kHz	Pass
PAS/GFSK 2 Mbps			
Low Channel, 2404 MHz	1.253 MHz	500 kHz	Pass
Mid Channel, 2440 MHz	1.264 MHz	500 kHz	Pass
High Channel, 2476 MHz	1.268 MHz	500 kHz	Pass

DTS BANDWIDTH (6 dB)

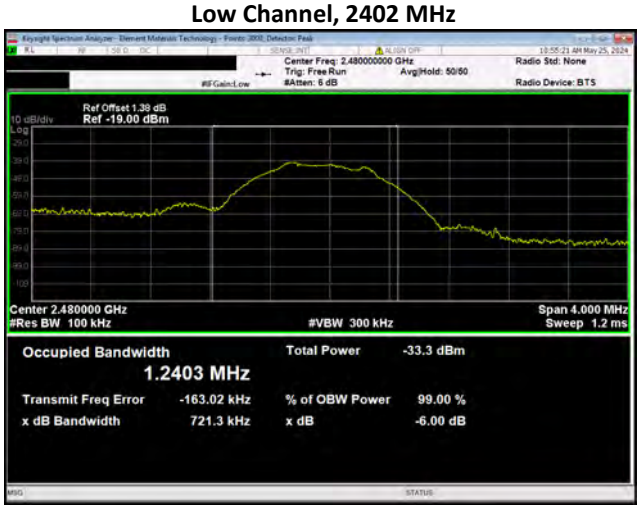
element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



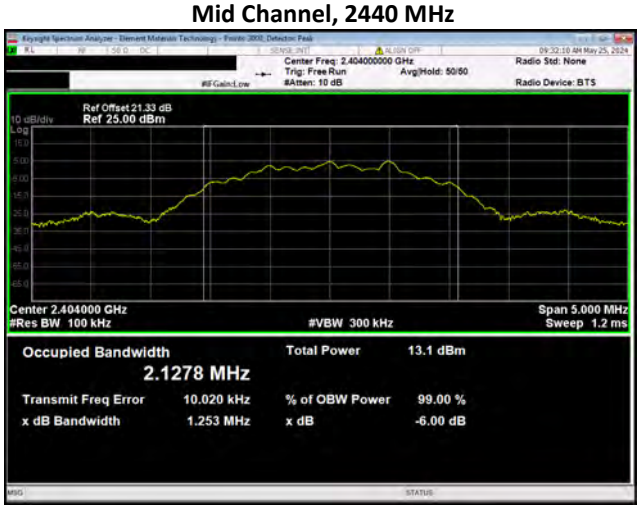
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2440 MHz



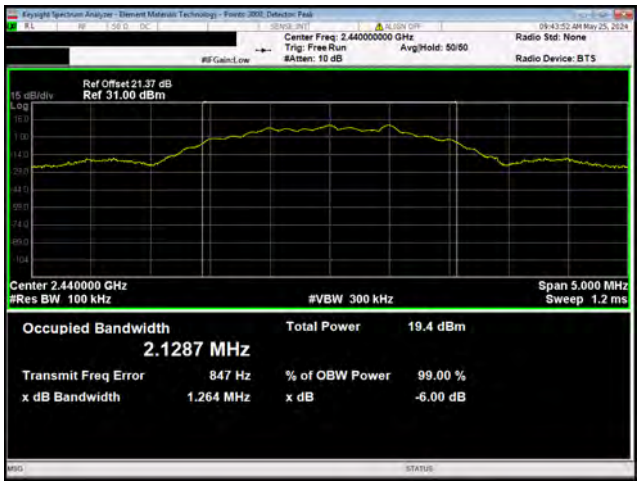
BLE/GFSK 1 Mbps
High Channel, 2480 MHz



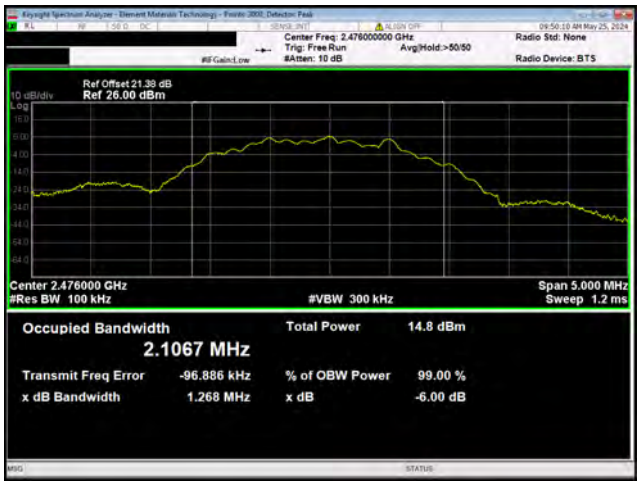
PAS/GFSK 2 Mbps
Low Channel, 2404 MHz

DTS BANDWIDTH (6 dB)

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



PAS/GFSK 2 Mbps
Mid Channel, 2440 MHz



PAS/GFSK 2 Mbps
High Channel, 2476 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
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2024-02-29	2025-02-28
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31
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
Generator - Signal	Agilent	N5182A	TIF	2023-07-27	2026-07-27

OUTPUT POWER

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

EUT:	TV Streamer (Model 800)	Work Order:	STAK0342
Serial Number:	100000105	Date:	2024-05-24
Customer:	Starkey Laboratories, Inc.	Temperature:	22.1°C
Attendees:	Charles Esch	Relative Humidity:	48%
Customer Project:	None	Bar. Pressure (PMSL):	997.8 mbar
Tested By:	Christopher Heintzelman, Arnauld Dedry	Job Site:	MN11
Power:	5VDC Via USB Cable	Configuration:	STAK0342-3

TEST SPECIFICATIONS

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

COMMENTS

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

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

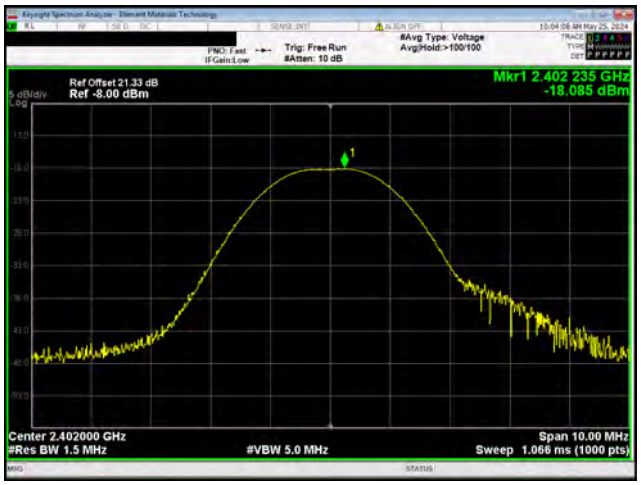
Tested By

TEST RESULTS

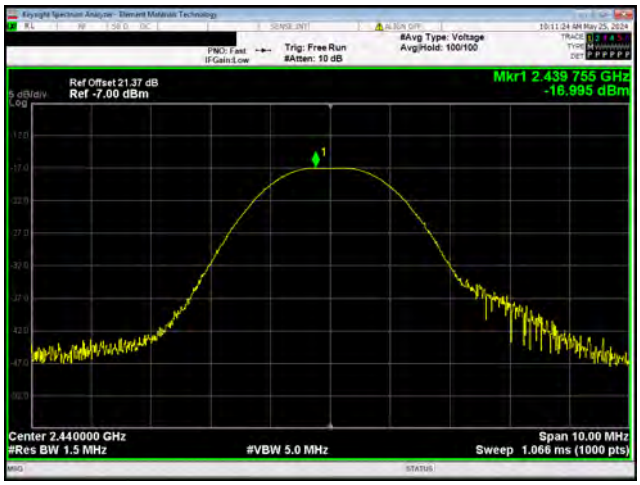
	Out Pwr (dBm)	Limit (dBm)	Result
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	-18.085	30	Pass
Mid Channel, 2440 MHz	-16.995	30	Pass
High Channel, 2480 MHz	-37.48	30	Pass
PAS/GFSK 2 Mbps			
Low Channel, 2404 MHz	11.528	30	Pass
Mid Channel, 2440 MHz	12.111	30	Pass
High Channel, 2476 MHz	8.945	30	Pass

OUTPUT POWER

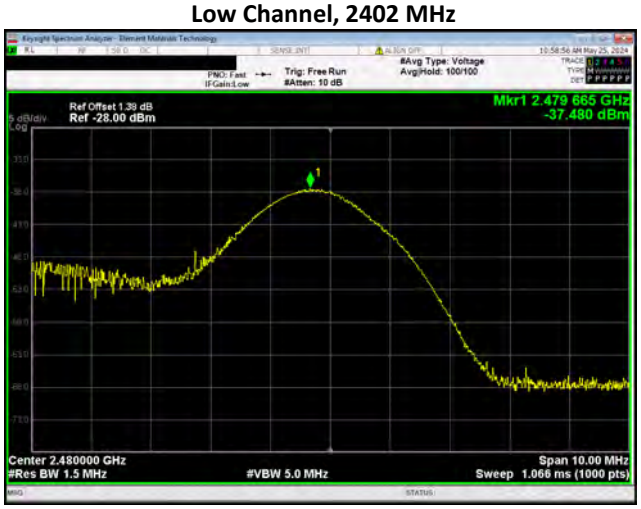
element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



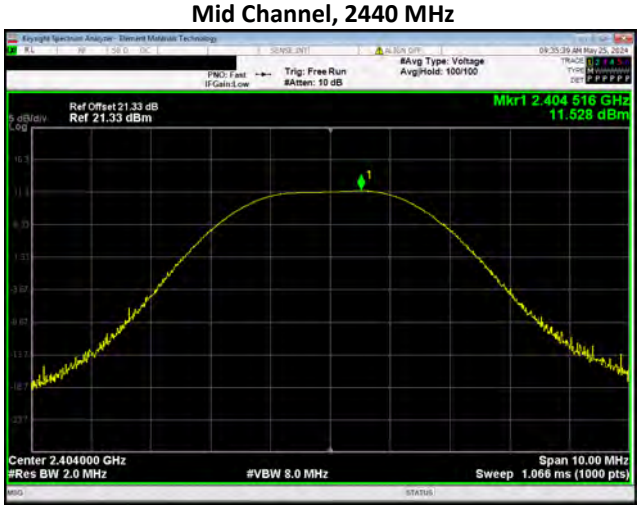
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2440 MHz



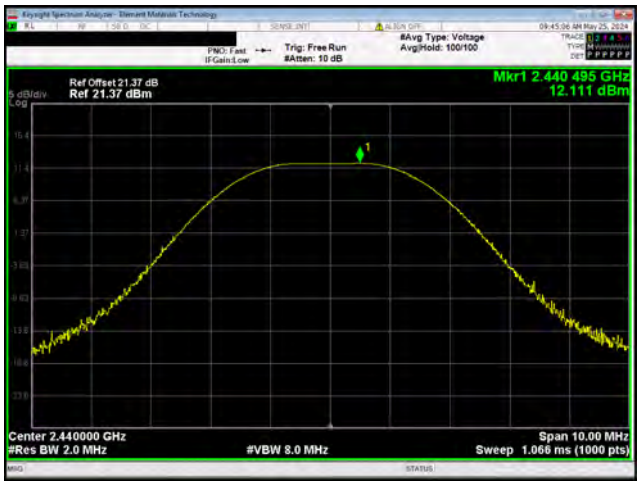
BLE/GFSK 1 Mbps
High Channel, 2480 MHz



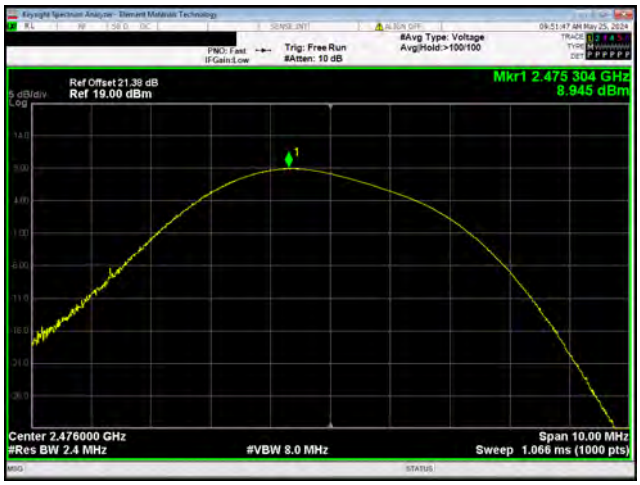
PAS/GFSK 2 Mbps
Low Channel, 2404 MHz

OUTPUT POWER

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



PAS/GFSK 2 Mbps
Mid Channel, 2440 MHz



PAS/GFSK 2 Mbps
High Channel, 2476 MHz

OUTPUT POWER

element
TbtTx 2024.05.24.1
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
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	2024-03-13	2025-03-13
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2024-08-28	2025-08-28
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Block - DC	Fairview Microwave	SD3379	ANH	2024-08-28	2025-08-28

OUTPUT POWER

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	TV Streamer (Model 801)	Work Order:	STAK0356
Serial Number:	242420709B	Date:	2024-09-18
Customer:	Starkey Laboratories, Inc.	Temperature:	21.8°C
Attendees:	Charlie Esch	Relative Humidity:	56.8%
Customer Project:	None	Bar. Pressure (PMSL):	1009 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN05
Power:	110VAC/60Hz	Configuration:	STAK0356-1

TEST SPECIFICATIONS

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

COMMENTS

Power setting is -10. Reference level offset includes measurement cable and DC block.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

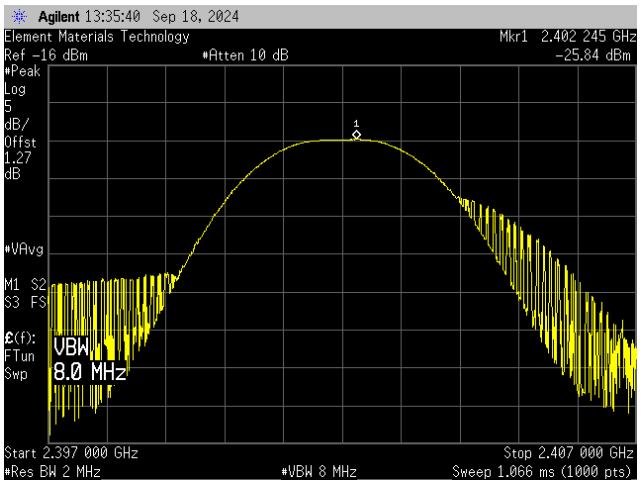
Pass

Tested By

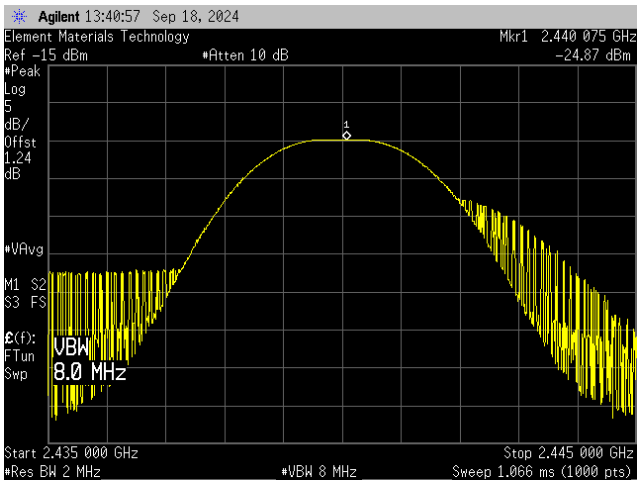
TEST RESULTS

	Out Pwr (dBm)	Limit (dBm)	Result
BLE/GFSK 1 Mbps			
BLE/GFSK 1 Mbps, Low Channel 2402 MHz	-25.837	30	Pass
BLE/GFSK 1 Mbps, Mid Channel 2440 MHz	-24.866	30	Pass
BLE/GFSK 1 Mbps, High Channel 2480 MHz	-47.682	30	Pass
PAS/GFSK 2 Mbps			
BLE/GFSK 2 Mbps, Low Channel 2404 MHz	-25.304	30	Pass
BLE/GFSK 2 Mbps, Mid Channel 2440 MHz	-24.858	30	Pass
BLE/GFSK 2 Mbps, High Channel 2476 MHz	-28.212	30	Pass

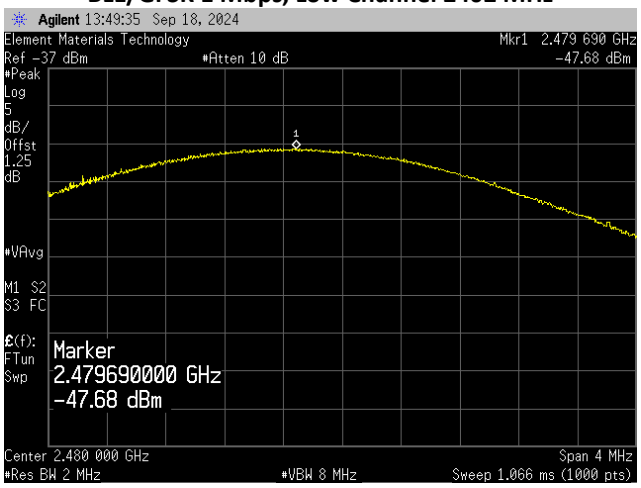
OUTPUT POWER



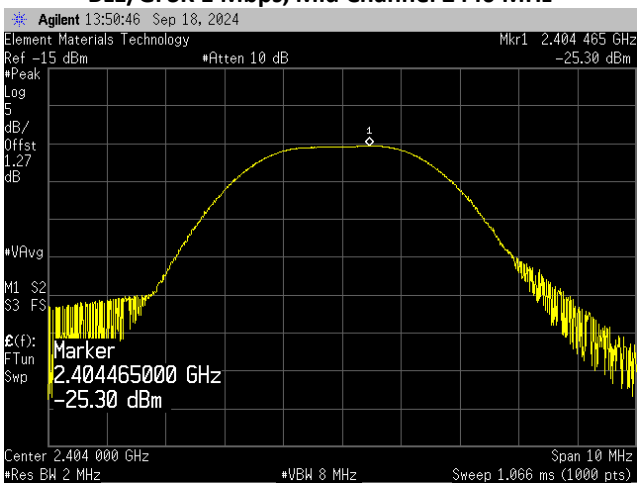
BLE/GFSK 1 Mbps, Low Channel 2402 MHz



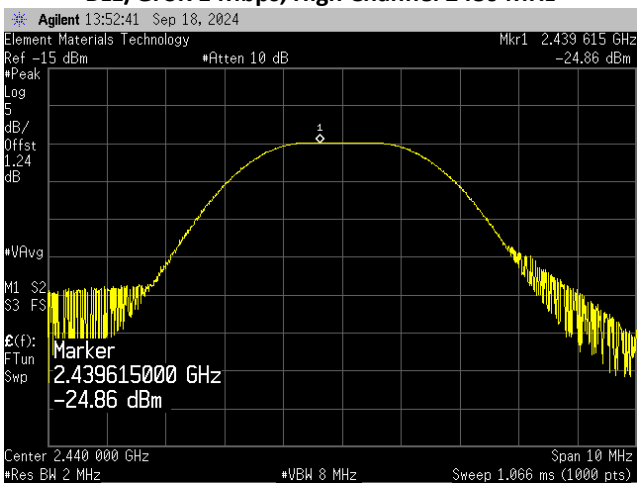
BLE/GFSK 1 Mbps, Mid Channel 2440 MHz



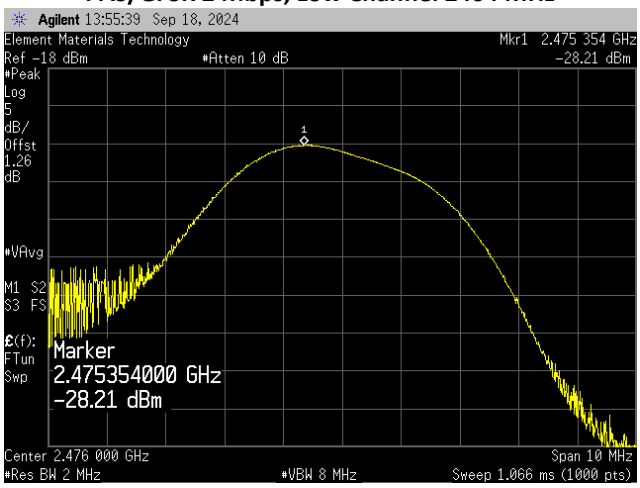
BLE/GFSK 1 Mbps, High Channel 2480 MHz



PAS/GFSK 2 Mbps, Low Channel 2404 MHz



PAS/GFSK 2 Mbps, Mid Channel 2440 MHz



PAS/GFSK 2 Mbps, High Channel 2476 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
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2024-02-29	2025-02-28
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31
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
Generator - Signal	Agilent	N5182A	TIF	2023-07-27	2026-07-27

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

EUT:	TV Streamer (Model 800)	Work Order:	STAK0342
Serial Number:	100000105	Date:	2024-05-24
Customer:	Starkey Laboratories, Inc.	Temperature:	22.1°C
Attendees:	Charles Esch	Relative Humidity:	48%
Customer Project:	None	Bar. Pressure (PMSL):	997.8 mbar
Tested By:	Christopher Heintzelman, Arnauld Dedry	Job Site:	MN11
Power:	5VDC Via USB Cable	Configuration:	STAK0342-3

TEST SPECIFICATIONS

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

COMMENTS

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

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	-18.085	4.89	-13.195	36	Pass
Mid Channel, 2440 MHz	-16.995	4.89	-12.105	36	Pass
High Channel, 2480 MHz	-37.48	4.89	-32.59	36	Pass
PAS/GFSK 2 Mbps					
Low Channel, 2404 MHz	11.528	4.89	16.418	36	Pass
Mid Channel, 2440 MHz	12.111	4.89	17.001	36	Pass
High Channel, 2476 MHz	8.945	4.89	13.835	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
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2024-02-29	2025-02-28
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31
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
Generator - Signal	Agilent	N5182A	TIF	2023-07-27	2026-07-27

POWER SPECTRAL DENSITY

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

EUT:	TV Streamer (Model 800)	Work Order:	STAK0342
Serial Number:	100000105	Date:	2024-05-24
Customer:	Starkey Laboratories, Inc.	Temperature:	21.1°C
Attendees:	Charles Esch	Relative Humidity:	48%
Customer Project:	None	Bar. Pressure (PMSL):	997.8 mbar
Tested By:	Christopher Heintzelman, Arnauld Dedry	Job Site:	MN11
Power:	5VDC Via USB Cable	Configuration:	STAK0342-3

TEST SPECIFICATIONS

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

COMMENTS

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

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

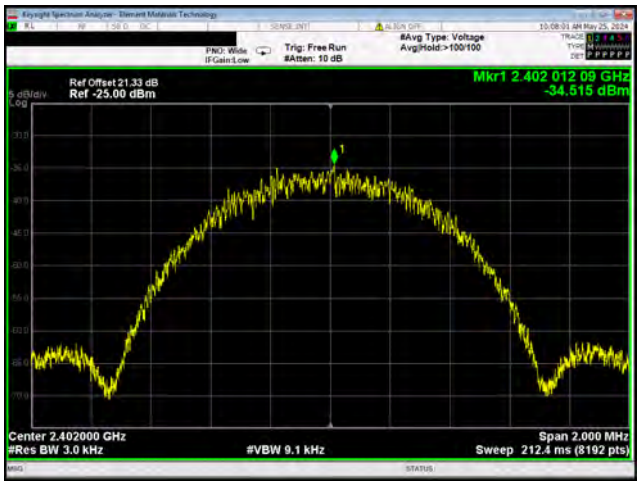
Tested By

TEST RESULTS

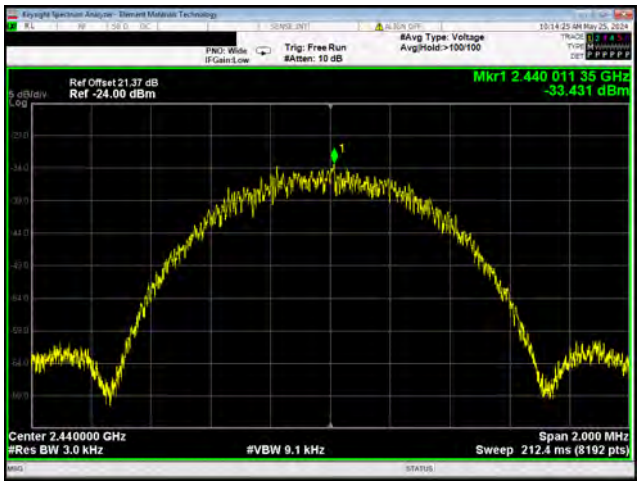
	Value dBm/3kHz	Limit ≤ (dBm/3kHz)	Results
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	-34.515	8	Pass
Mid Channel, 2440 MHz	-33.431	8	Pass
High Channel, 2480 MHz	-55.282	8	Pass
PAS/GFSK 2 Mbps			
Low Channel, 2404 MHz	-8.247	8	Pass
Mid Channel, 2440 MHz	-7.425	8	Pass
High Channel, 2476 MHz	-11.832	8	Pass

POWER SPECTRAL DENSITY

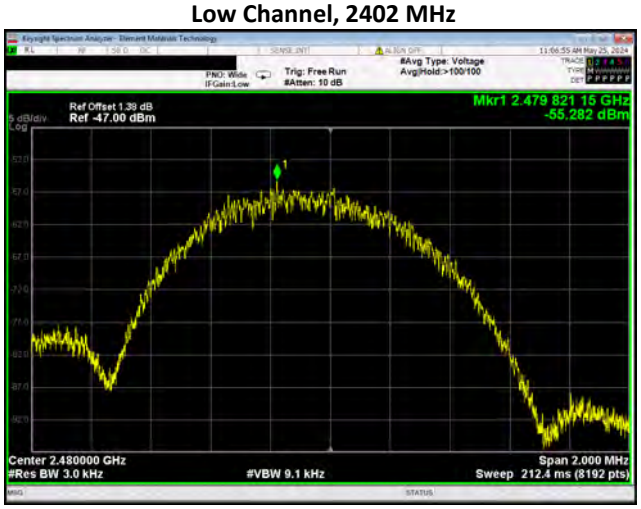
element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



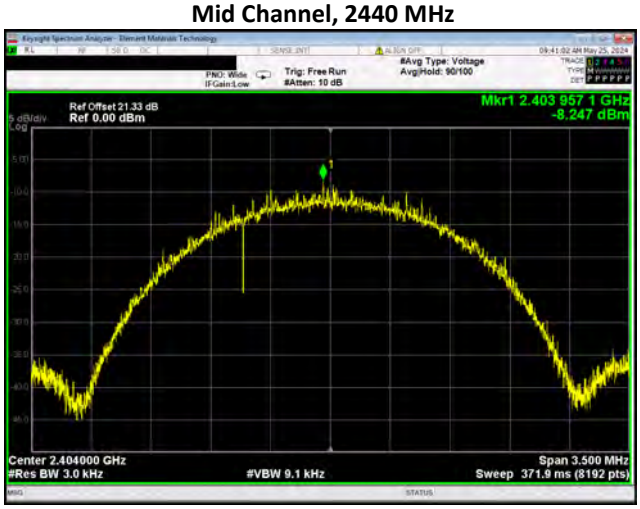
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2440 MHz



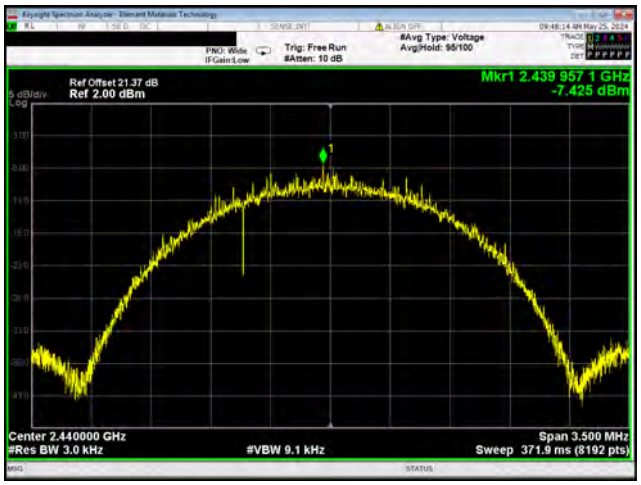
BLE/GFSK 1 Mbps
High Channel, 2480 MHz



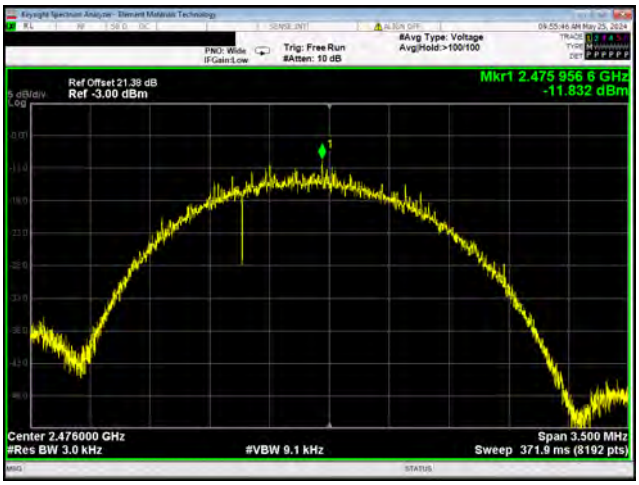
PAS/GFSK 2 Mbps
Low Channel, 2404 MHz

POWER SPECTRAL DENSITY

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



PAS/GFSK 2 Mbps
Mid Channel, 2440 MHz



PAS/GFSK 2 Mbps
High Channel, 2476 MHz

POWER SPECTRAL DENSITY

element
TbtTx 2024.05.24.1
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
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	2024-03-13	2025-03-13
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2024-08-28	2025-08-28
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Block - DC	Fairview Microwave	SD3379	ANH	2024-08-28	2025-08-28

POWER SPECTRAL DENSITY

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	TV Streamer (Model 801)	Work Order:	STAK0356
Serial Number:	242420709B	Date:	2024-09-18
Customer:	Starkey Laboratories, Inc.	Temperature:	21.7°C
Attendees:	Charlie Esch	Relative Humidity:	56.5%
Customer Project:	None	Bar. Pressure (PMSL):	1009 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN05
Power:	110VAC/60Hz	Configuration:	STAK0356-1

TEST SPECIFICATIONS

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

COMMENTS

Power setting is -10. Reference level offset includes measurement cable and DC block.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

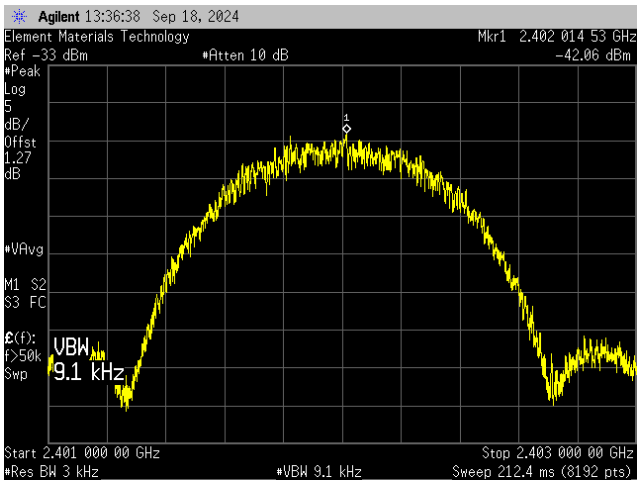
Tested By

TEST RESULTS

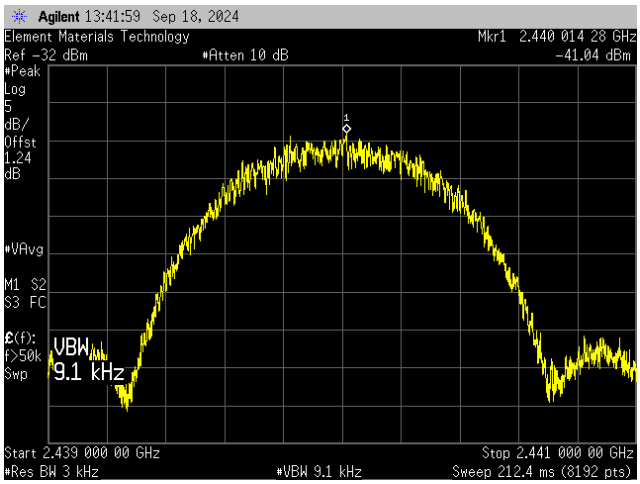
	Value dBm/3kHz	Limit ≤ (dBm/3kHz)	Results
BLE/GFSK 1 Mbps			
BLE/GFSK 1 Mbps, Low Channel 2402 MHz	-42.061	8	Pass
BLE/GFSK 1 Mbps, Mid Channel 2440 MHz	-41.041	8	Pass
BLE/GFSK 1 Mbps, High Channel 2480 MHz	-66.046	8	Pass
PAS/GFSK 2 Mbps			
BLE/GFSK 2 Mbps, Low Channel 2404 MHz	-45.22	8	Pass
BLE/GFSK 2 Mbps, Mid Channel 2440 MHz	-44.595	8	Pass
BLE/GFSK 2 Mbps, High Channel 2476 MHz	-49.166	8	Pass

POWER SPECTRAL DENSITY

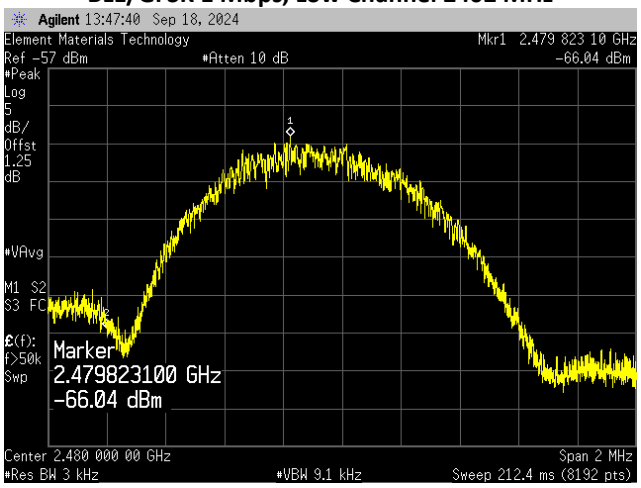
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



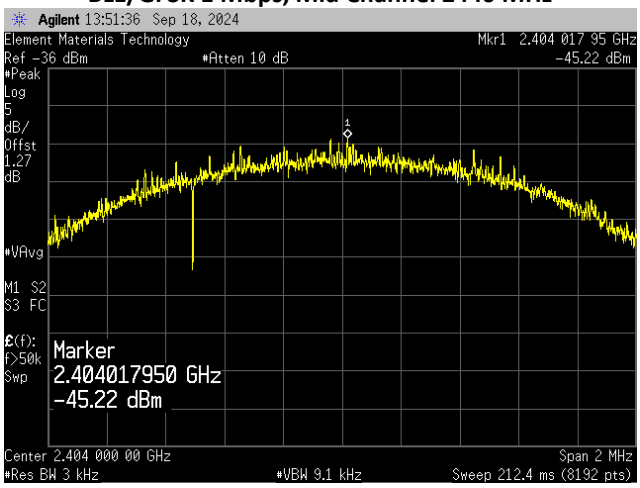
BLE/GFSK 1 Mbps, Low Channel 2402 MHz



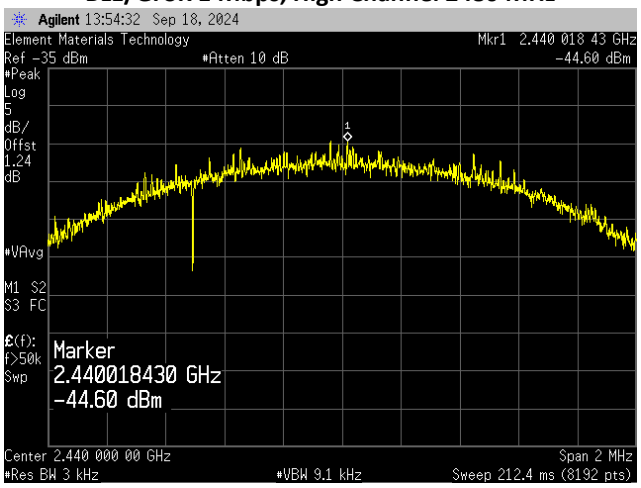
BLE/GFSK 1 Mbps, Mid Channel 2440 MHz



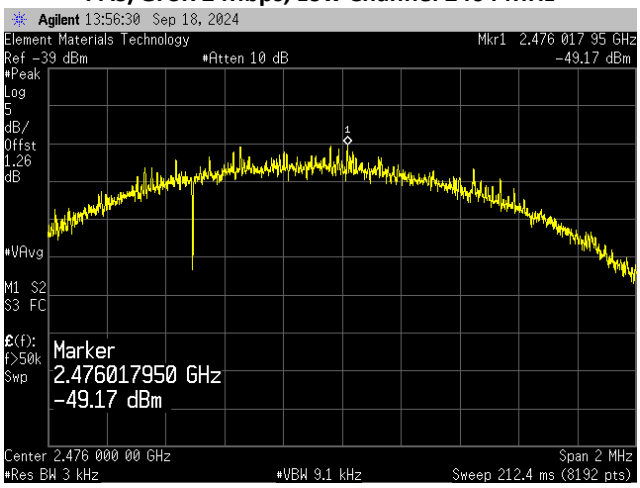
BLE/GFSK 1 Mbps, High Channel 2480 MHz



PAS/GFSK 2 Mbps, Low Channel 2404 MHz



PAS/GFSK 2 Mbps, Mid Channel 2440 MHz



PAS/GFSK 2 Mbps, High Channel 2476 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
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2024-02-29	2025-02-28
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31
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
Generator - Signal	Agilent	N5182A	TIF	2023-07-27	2026-07-27

BAND EDGE COMPLIANCE

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

EUT:	TV Streamer (Model 800)	Work Order:	STAK0342
Serial Number:	100000105	Date:	2024-05-24
Customer:	Starkey Laboratories, Inc.	Temperature:	22.1°C
Attendees:	Charles Esch	Relative Humidity:	48%
Customer Project:	None	Bar. Pressure (PMSL):	997.8 mbar
Tested By:	Christopher Heintzelman, Arnauld Dedry	Job Site:	MN11
Power:	5VDC Via USB Cable	Configuration:	STAK0342-3

TEST SPECIFICATIONS

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

COMMENTS

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

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

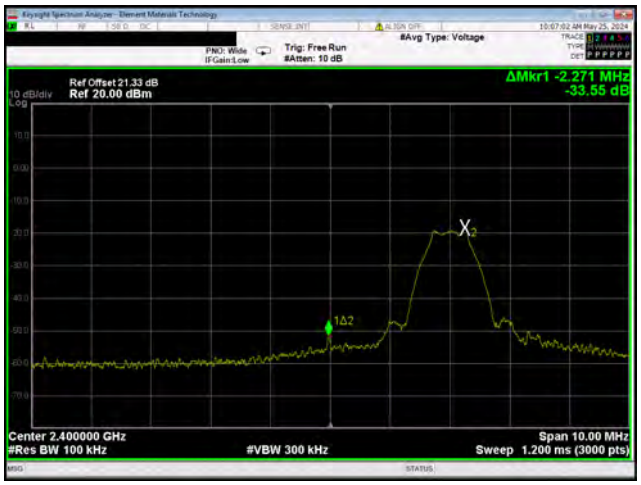
Tested By

TEST RESULTS

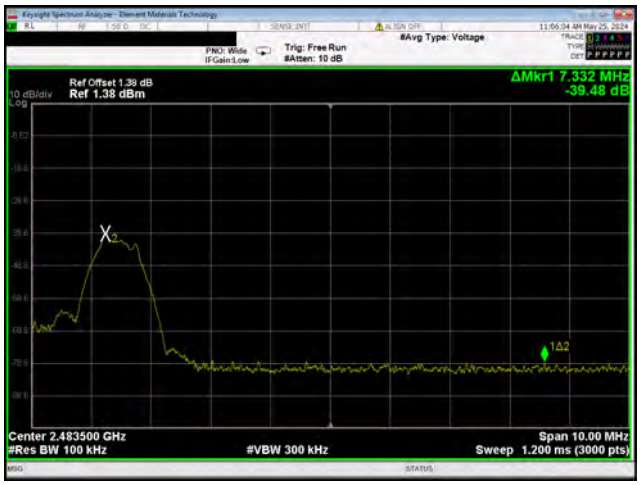
	Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	-33.55	-20	Pass
High Channel, 2480 MHz	-39.48	-20	Pass
PAS/GFSK 2 Mbps			
Low Channel, 2404 MHz	-39.49	-20	Pass
High Channel, 2476 MHz	-64.29	-20	Pass

BAND EDGE COMPLIANCE

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

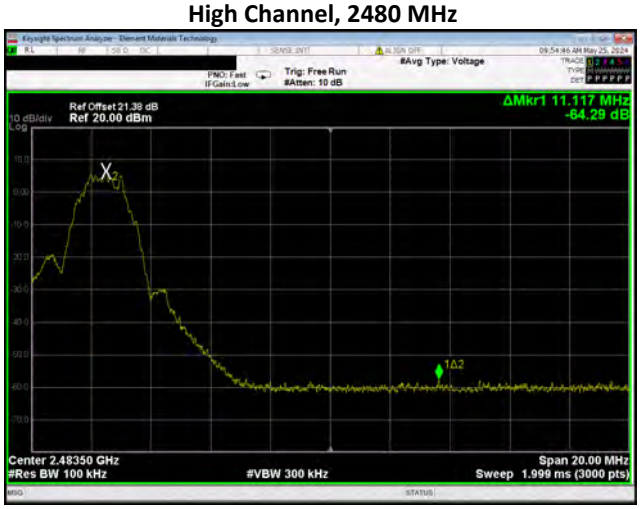


BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
High Channel, 2480 MHz

PAS/GFSK 2 Mbps
Low Channel, 2404 MHz



PAS/GFSK 2 Mbps
High Channel, 2476 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
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2024-02-29	2025-02-28
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31
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
Generator - Signal	Agilent	N5182A	TIF	2023-07-27	2026-07-27

SPURIOUS CONDUCTED EMISSIONS

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0

EUT:	TV Streamer (Model 800)	Work Order:	STAK0342
Serial Number:	100000105	Date:	2024-05-24
Customer:	Starkey Laboratories, Inc.	Temperature:	22.1°C
Attendees:	Charles Esch	Relative Humidity:	48%
Customer Project:	None	Bar. Pressure (PMSL):	997.8 mbar
Tested By:	Christopher Heintzelman, Arnauld Dedry	Job Site:	MN11
Power:	5VDC Via USB Cable	Configuration:	STAK0342-3

TEST SPECIFICATIONS

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

COMMENTS

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

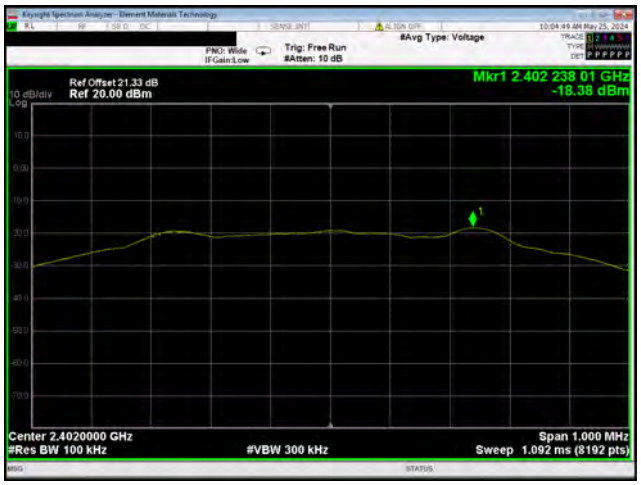
Tested By

TEST RESULTS

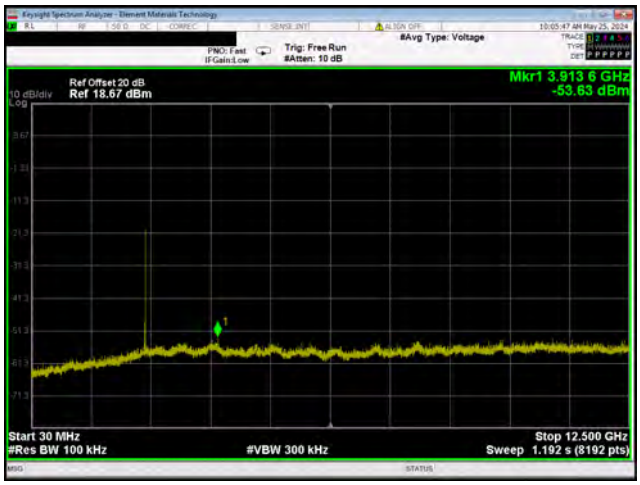
	Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK 1 Mbps					
Low Channel, 2402 MHz	Fundamental	2402.24	N/A	N/A	N/A
	30 MHz - 12.5 GHz	3913.65	-35.25	-20	Pass
	12.5 GHz - 25 GHz	24836.71	-30.88	-20	Pass
Mid Channel, 2440 MHz	Fundamental	2440.24	N/A	N/A	N/A
	30 MHz - 12.5 GHz	3820.78	-36.27	-20	Pass
	12.5 GHz - 25 GHz	23734.89	-31.62	-20	Pass
High Channel, 2480 MHz	Fundamental	2479.75	N/A	N/A	N/A
	30 MHz - 12.5 GHz	3198.12	-34.83	-20	Pass
	12.5 GHz - 25 GHz	24273.59	-30.54	-20	Pass
PAS/GFSK 2 Mbps					
Low Channel, 2404 MHz	Fundamental	2404.49	N/A	N/A	N/A
	30 MHz - 12.5 GHz	2395.81	-52.9	-20	Pass
	12.5 GHz - 25 GHz	24942.01	-59.77	-20	Pass
Mid Channel, 2440 MHz	Fundamental	2440	N/A	N/A	N/A
	30 MHz - 12.5 GHz	1901.03	-50.98	-20	Pass
	12.5 GHz - 25 GHz	24117.93	-59.94	-20	Pass
High Channel, 2476 MHz	Fundamental	2475.99	N/A	N/A	N/A
	30 MHz - 12.5 GHz	11530.23	-60.54	-20	Pass
	12.5 GHz - 25 GHz	24163.72	-55.77	-20	Pass

SPURIOUS CONDUCTED EMISSIONS

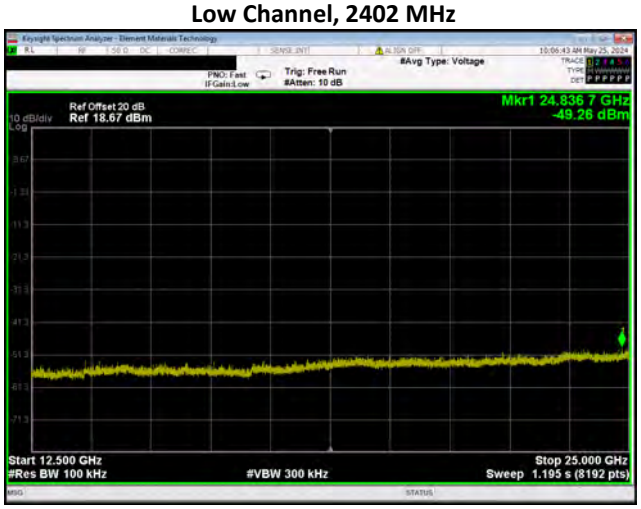
element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



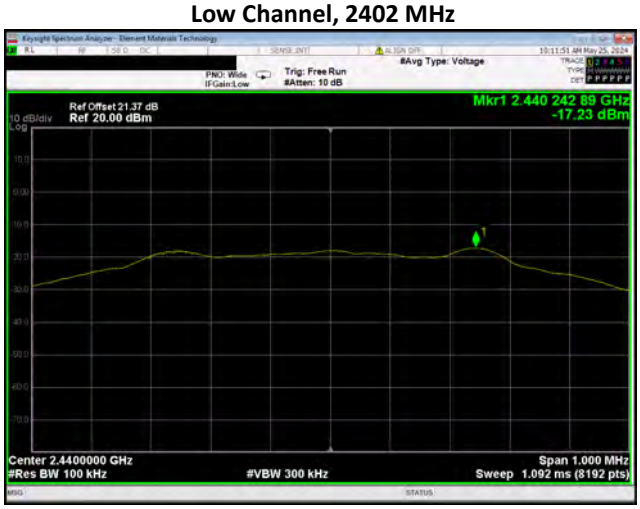
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Low Channel, 2402 MHz

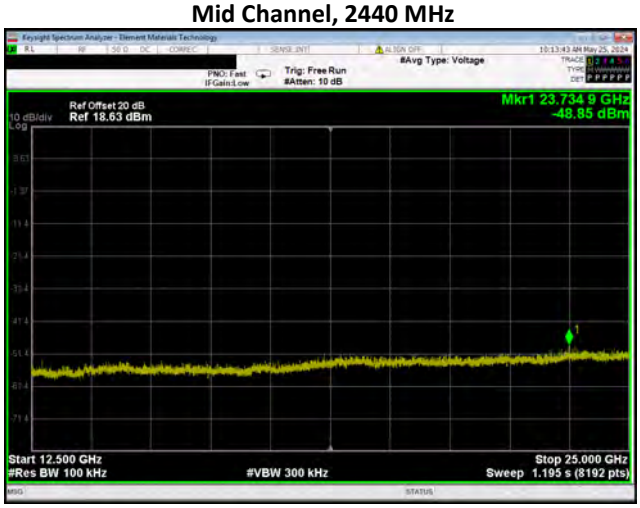


BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2440 MHz

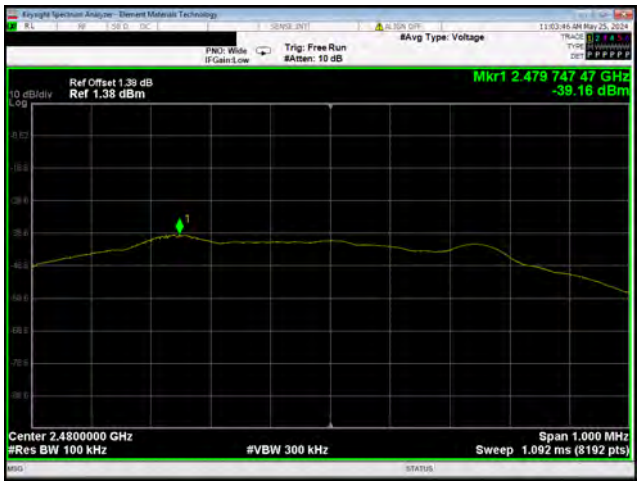
BLE/GFSK 1 Mbps
Mid Channel, 2440 MHz



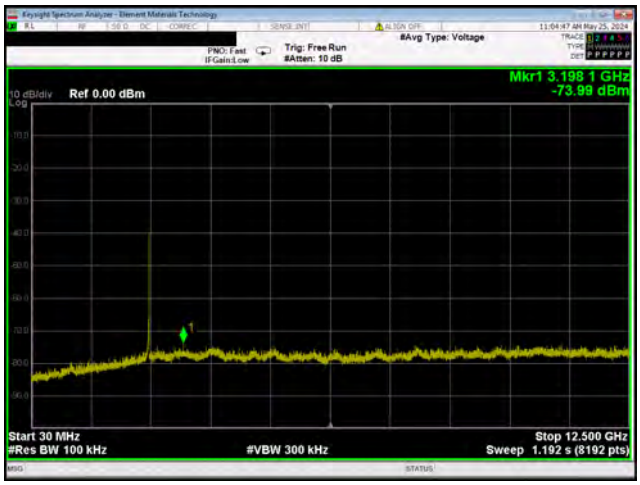
BLE/GFSK 1 Mbps
Mid Channel, 2440 MHz

SPURIOUS CONDUCTED EMISSIONS

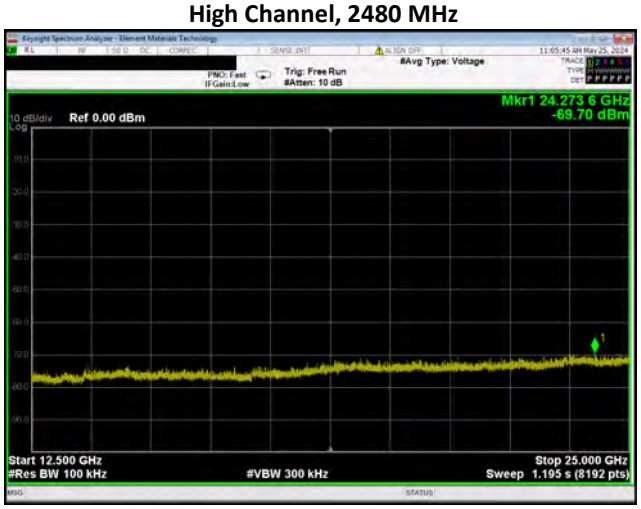
element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



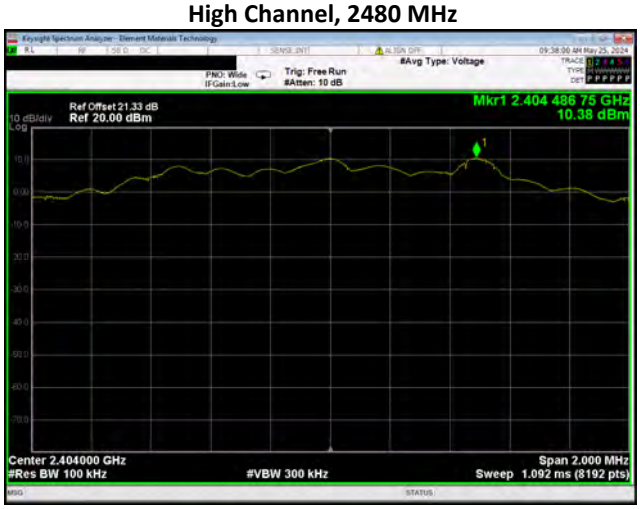
BLE/GFSK 1 Mbps
High Channel, 2480 MHz



BLE/GFSK 1 Mbps
High Channel, 2480 MHz



BLE/GFSK 1 Mbps
High Channel, 2480 MHz



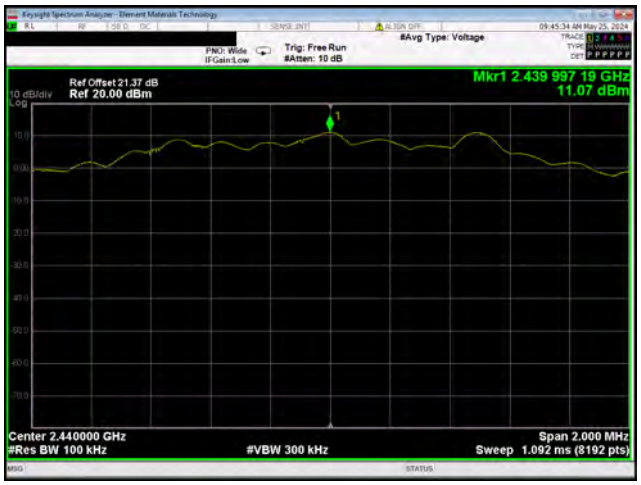
PAS/GFSK 2 Mbps
Low Channel, 2404 MHz

PAS/GFSK 2 Mbps
Low Channel, 2404 MHz

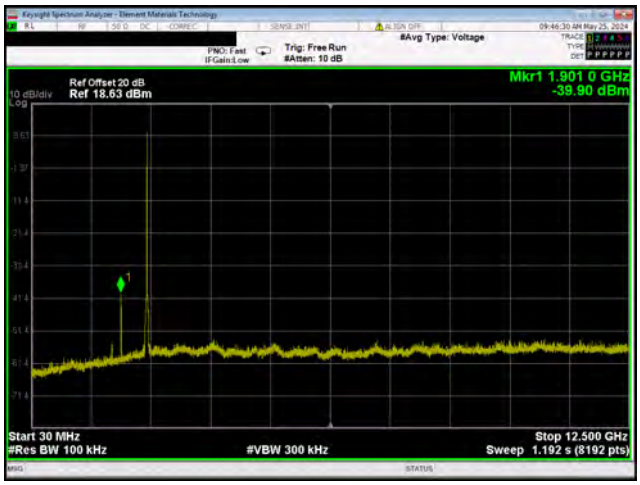
PAS/GFSK 2 Mbps
Low Channel, 2404 MHz

SPURIOUS CONDUCTED EMISSIONS

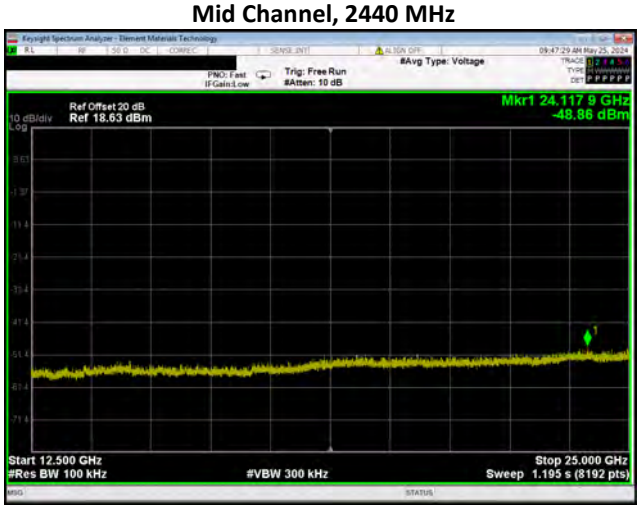
element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



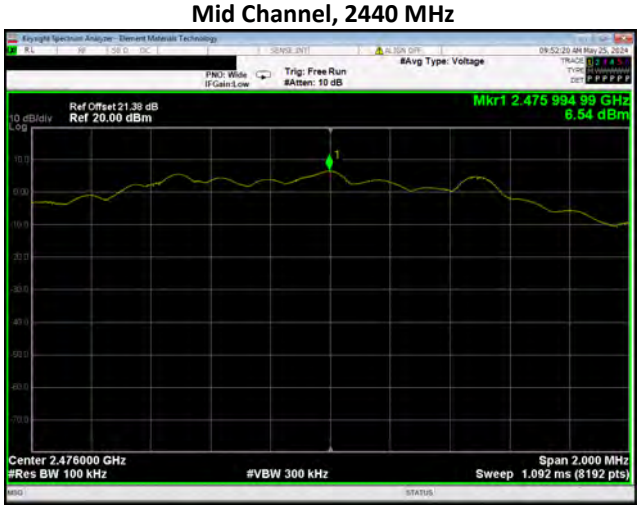
PAS/GFSK 2 Mbps
Mid Channel, 2440 MHz



PAS/GFSK 2 Mbps
Mid Channel, 2440 MHz



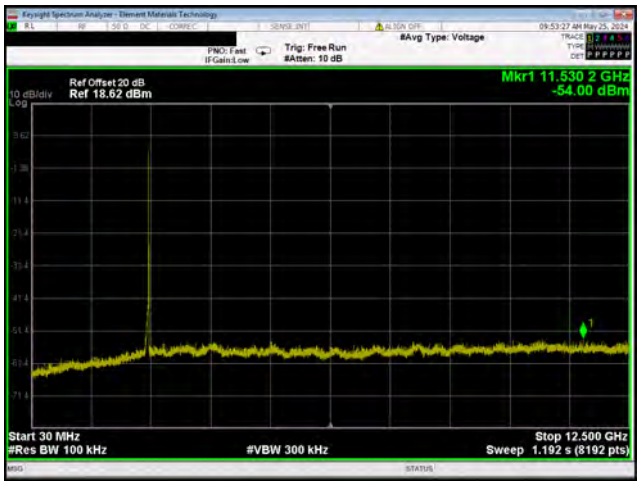
PAS/GFSK 2 Mbps
Mid Channel, 2440 MHz



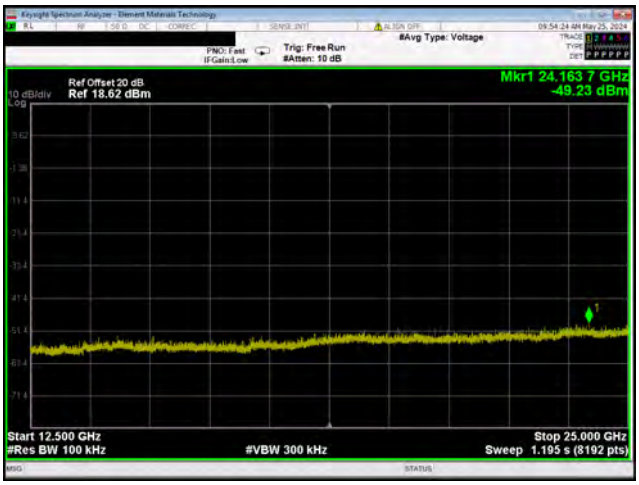
PAS/GFSK 2 Mbps
High Channel, 2476 MHz

SPURIOUS CONDUCTED EMISSIONS

element
TbtTx 2023.12.06.3
WTD.2024.01.16.0



PAS/GFSK 2 Mbps
High Channel, 2476 MHz



PAS/GFSK 2 Mbps
High Channel, 2476 MHz

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies and the modes as 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 - Double Ridge	ETS Lindgren	3115	AIB	2022-09-01	2024-09-01
Cable	Element	Double Ridge Guide Horn Cables	MNV	2024-01-30	2025-01-30
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVX	2024-01-30	2025-01-30
Attenuator	Coaxicom	3910-20	AXY	2023-09-10	2024-09-10
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2023-05-01	2024-05-01
Filter - High Pass	Micro-Tronics	HPM50111	HFM	2023-09-10	2024-09-10
Antenna - Standard Gain	ETS-Lindgren	3160-07	AJJ	NCR	NCR
Cable	Element	Standard Gain Cable	MNW	2024-01-30	2025-01-30
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	2024-01-30	2025-01-30
Antenna - Standard Gain	ETS-Lindgren	3160-08	AJP	NCR	NCR
Amplifier - Pre-Amplifier	L-3 Narda-Miteq	AMF-6F-12001800-30-10P	PAP	2024-01-30	2025-01-30
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
Antenna - Loop	ETS Lindgren	6502	AOB	2023-06-12	2025-06-12
Cable	Element	Biconilog Cable	MNX	2024-01-30	2025-01-30
Antenna - Biconilog	Ametek	CBL 6141B	AYS	2023-03-28	2025-03-28
Amplifier - Pre-Amplifier	Miteq	AM-1064-9079 and SA18E-10	AOO	2024-01-30	2025-01-30
Filter - Low Pass	Micro-Tronics	LPM50004	HGG	2023-09-10	2024-09-10

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	5.2 dB	-5.2 dB

FREQUENCY RANGE INVESTIGATED

9 kHz TO 26500 MHz

POWER INVESTIGATED

5VDC via USB

CONFIGURATIONS INVESTIGATED

STAK0332-1

MODES INVESTIGATED

Transmitting BLE Low, Mid, and High Channels, 1 and 2 Mbps. (2402, 2440, and 2480 MHz. 2 Mbps rate low/high channels are 2404 and 2476 MHz). 2 Mbps PA -2 front end amp on, 1 Mbps PA0 front end amp off.

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

EUT:	TV Streamer (Model 800)	Work Order:	STAK0332
Serial Number:	10000105	Date:	2024-03-20
Customer:	Starkey Laboratories, Inc.	Temperature:	21.4°C
Attendees:	Aaron Anderson	Relative Humidity:	20.7%
Customer Project:	None	Bar. Pressure (PMSL):	1023 mb
Tested By:	Christopher Heintzelman	Job Site:	MN09
Power:	5VDC via USB	Configuration:	STAK0332-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013

TEST PARAMETERS

Run #:	23	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

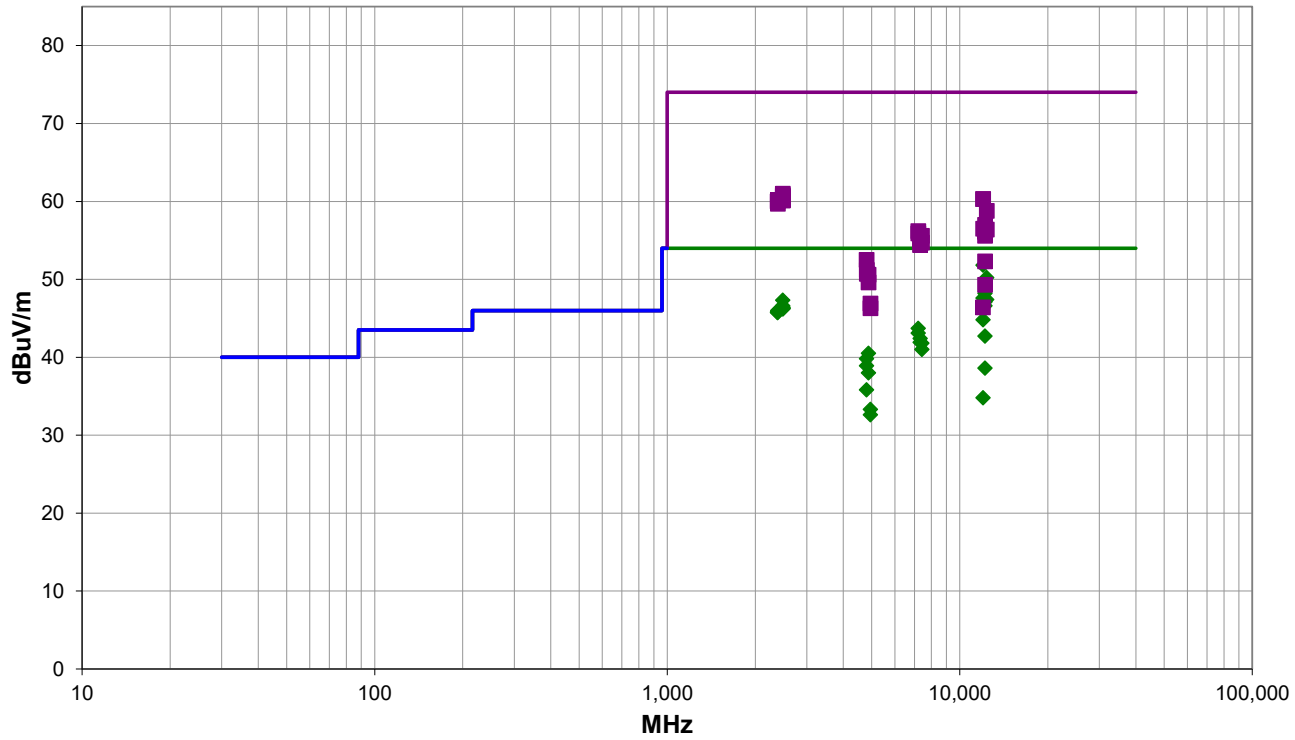
2 Mbps data rate has PA enabled, and 1 Mbps does not, therefore 2Mbps is the higher risk. Operational duty cycle is 30%, Test mode is 56% for 2 Mbps, DCCF using 10*log(duty cycle)=+2.5-5.2=-2.7 net correction (downwards)

EUT OPERATING MODES

Transmitting BLE Low, Mid, and High Channels, 1 and 2 Mbps. (2402, 2440, and 2480 MHz. 2 Mbps rate low/high channels are 2404 and 2476 MHz). 2 Mbps PA -2 front end amp on, 1 Mbps PA0 front end amp off.

DEVIATIONS FROM TEST STANDARD

None



Run #: 23 PK AV QP

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

RESULTS - Run #23

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity/ Transducer	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
12022.340	54.9	-0.4	1.9	242.0	-2.7	0.0	Horz	AV	0.0	51.8	54.0	-2.2	EUT On Side, Low Ch, 2 Mbps
12382.320	52.0	0.9	2.0	244.0	-2.7	0.0	Horz	AV	0.0	50.2	54.0	-3.8	EUT On Side, High Ch, 2 Mbps
12202.340	50.3	0.6	1.9	274.0	-2.7	0.0	Horz	AV	0.0	48.2	54.0	-5.8	power level -2, Mid Ch, 2 Mbps, EUT On Side
12022.340	50.7	-0.4	1.0	252.0	-2.7	0.0	Vert	AV	0.0	47.6	54.0	-6.4	EUT Vert, Low Ch, 2 Mbps
12382.300	49.2	0.9	2.1	260.0	-2.7	0.0	Vert	AV	0.0	47.4	54.0	-6.6	EUT Vert, High Ch, 2 Mbps
12202.330	49.4	0.6	2.7	280.0	-2.7	0.0	Vert	AV	0.0	47.3	54.0	-6.7	power level -2, Mid Ch, 2 mbps, EUT Vert
2486.133	33.0	-3.0	1.5	88.0	-2.7	20.0	Horz	AV	0.0	47.3	54.0	-6.7	EUT Vert, High Ch, 2 Mbps
12202.410	49.2	0.6	1.2	309.0	-2.7	0.0	Vert	AV	0.0	47.1	54.0	-6.9	power level -2, Mid Ch, 2 Mbps, EUT Horz
12202.380	48.7	0.6	2.7	266.0	-2.7	0.0	Horz	AV	0.0	46.6	54.0	-7.4	power level -2, Mid Ch, 2 mbps, EUT Vert
2484.125	32.3	-3.0	1.5	199.0	-2.7	20.0	Vert	AV	0.0	46.6	54.0	-7.4	EUT Horz, High Ch,2 Mbps
2486.975	32.1	-3.0	1.5	128.0	-2.7	20.0	Horz	AV	0.0	46.4	54.0	-7.6	EUT Vert, High Ch, 1 Mbps
2485.150	32.0	-3.0	1.2	287.0	-2.7	20.0	Vert	AV	0.0	46.3	54.0	-7.7	EUT Vert, High Ch, 2 Mbps
2484.042	32.0	-3.0	1.5	126.0	-2.7	20.0	Horz	AV	0.0	46.3	54.0	-7.7	EUT On Side, High Ch, 2 Mbps
2486.175	32.0	-3.0	1.5	163.0	-2.7	20.0	Vert	AV	0.0	46.3	54.0	-7.7	EUT Vert, High Ch, 1 Mbps
2484.592	31.9	-3.0	1.5	100.0	-2.7	20.0	Vert	AV	0.0	46.2	54.0	-7.8	EUT On Side, High Ch, 2 Mbps
2487.033	31.9	-3.0	1.5	273.0	-2.7	20.0	Horz	AV	0.0	46.2	54.0	-7.8	EUT Horz, High Ch,2 Mbps
2389.575	32.0	-3.3	1.5	186.0	-2.7	20.0	Vert	AV	0.0	46.0	54.0	-8.0	EUT Vert, Low Ch, 1 Mbps
2386.700	31.9	-3.4	1.5	128.0	-2.7	20.0	Horz	AV	0.0	45.8	54.0	-8.2	EUT Vert, Low Ch, 2 Mbps
2386.700	31.9	-3.4	1.2	300.0	-2.7	20.0	Horz	AV	0.0	45.8	54.0	-8.2	EUT Vert, Low Ch, 1 Mbps
2386.025	31.8	-3.4	1.5	169.0	-2.7	20.0	Vert	AV	0.0	45.7	54.0	-8.3	EUT Vert, Low Ch, 2 Mbps
12022.240	47.9	-0.4	1.9	242.0	-2.7	0.0	Horz	AV	0.0	44.8	54.0	-9.2	EUT On Side, Low Ch, 2 Mbps
7213.283	33.7	12.7	4.0	294.0	-2.7	0.0	Horz	AV	0.0	43.7	54.0	-10.3	EUT On Side, Low Ch, 2 Mbps
7213.325	33.1	12.7	3.0	200.0	-2.7	0.0	Vert	AV	0.0	43.1	54.0	-10.9	EUT Vert, Low Ch, 2 Mbps
12202.350	44.8	0.6	2.3	276.0	-2.7	0.0	Vert	AV	0.0	42.7	54.0	-11.3	power level -2, Mid Ch, 2 Mbps, EUT On Side
7321.240	31.8	13.3	1.5	273.0	-2.7	0.0	Vert	AV	0.0	42.4	54.0	-11.6	EUT Vert, Mid Ch, 2 Mbps
7321.310	31.3	13.3	1.5	41.0	-2.7	0.0	Horz	AV	0.0	41.9	54.0	-12.1	EUT On Side, Mid Ch, 2 Mbps
7429.410	30.4	14.1	1.5	97.0	-2.7	0.0	Vert	AV	0.0	41.8	54.0	-12.2	EUT Vert. High Ch, 2 Mbps
7426.450	29.7	14.0	1.5	354.0	-2.7	0.0	Horz	AV	0.0	41.0	54.0	-13.0	EUT On Side, High Ch, 2 Mbps
2484.430	44.0	-3.0	1.2	287.0	0.0	20.0	Vert	PK	0.0	61.0	74.0	-13.0	EUT Vert, High Ch, 2 Mbps
2486.092	43.8	-3.0	1.5	163.0	0.0	20.0	Vert	PK	0.0	60.8	74.0	-13.2	EUT Vert, High Ch, 1 Mbps
2485.867	43.6	-3.0	1.5	88.0	0.0	20.0	Horz	PK	0.0	60.6	74.0	-13.4	EUT Vert, High Ch, 2 Mbps
2486.675	43.6	-3.0	1.5	199.0	0.0	20.0	Vert	PK	0.0	60.6	74.0	-13.4	EUT Horz, High Ch,2 Mbps
2486.683	43.6	-3.0	1.5	128.0	0.0	20.0	Horz	PK	0.0	60.6	74.0	-13.4	EUT Vert, High Ch, 1 Mbps
4879.110	37.5	5.7	3.4	332.0	-2.7	0.0	Horz	AV	0.0	40.5	54.0	-13.5	EUT On Side, Mid Ch, 2 Mbps
12022.530	60.7	-0.4	1.9	242.0	0.0	0.0	Horz	PK	0.0	60.3	74.0	-13.7	EUT On Side, Low Ch, 2 Mbps
12022.410	60.7	-0.4	1.9	242.0	0.0	0.0	Horz	PK	0.0	60.3	74.0	-13.7	EUT On Side, Low Ch, 2 Mbps
2484.133	43.3	-3.0	1.5	273.0	0.0	20.0	Horz	PK	0.0	60.3	74.0	-13.7	EUT Horz, High Ch,2 Mbps
2488.540	43.3	-3.1	1.5	88.0	0.0	20.0	Horz	PK	0.0	60.2	74.0	-13.8	EUT Vert, High Ch, 2 Mbps
2488.100	43.3	-3.1	1.5	100.0	0.0	20.0	Vert	PK	0.0	60.2	74.0	-13.8	EUT On Side, High Ch, 2 Mbps
2389.808	43.5	-3.3	1.5	128.0	0.0	20.0	Horz	PK	0.0	60.2	74.0	-13.8	EUT Vert, Low Ch, 2 Mbps

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity/ Transducer	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2389.342	43.5	-3.3	1.5	186.0	0.0	20.0	Vert	PK	0.0	60.2	74.0	-13.8	EUT Vert, Low Ch, 1 Mbps
2483.933	43.1	-3.0	1.5	126.0	0.0	20.0	Horz	PK	0.0	60.1	74.0	-13.9	EUT On Side, High Ch, 2 Mbps
2386.083	43.4	-3.4	1.5	169.0	0.0	20.0	Vert	PK	0.0	60.0	74.0	-14.0	EUT Vert, Low Ch, 2 Mbps
4807.083	36.5	6.0	1.0	275.0	-2.7	0.0	Vert	AV	0.0	39.8	54.0	-14.2	EUT Vert, Low Ch, 2 Mbps
2387.400	43.1	-3.4	1.2	300.0	0.0	20.0	Horz	PK	0.0	59.7	74.0	-14.3	EUT Vert, Low Ch, 1 Mbps
4807.217	35.6	6.0	2.6	313.0	-2.7	0.0	Horz	AV	0.0	38.9	54.0	-15.1	EUT On Side, Low Ch, 2 Mbps
12382.400	57.9	0.9	2.0	244.0	0.0	0.0	Horz	PK	0.0	58.8	74.0	-15.2	EUT On Side, High Ch, 2 Mbps
12202.320	40.7	0.6	2.7	80.0	-2.7	0.0	Horz	AV	0.0	38.6	54.0	-15.4	power level -2, Mid Ch, 2 Mbps, EUT Horz
4879.250	35.0	5.7	1.9	335.0	-2.7	0.0	Vert	AV	0.0	38.0	54.0	-16.0	EUT Vert, Mid Ch, 2 Mbps
12202.610	56.4	0.6	1.9	274.0	0.0	0.0	Horz	PK	0.0	57.0	74.0	-17.0	power level -2, Mid Ch, 2 Mbps, EUT On Side
12022.440	56.9	-0.4	1.0	252.0	0.0	0.0	Vert	PK	0.0	56.5	74.0	-17.5	EUT Vert, Low Ch, 2 Mbps
12382.390	55.5	0.9	2.1	260.0	0.0	0.0	Vert	PK	0.0	56.4	74.0	-17.6	EUT Vert, High Ch, 2 Mbps
7213.608	43.5	12.7	4.0	294.0	0.0	0.0	Horz	PK	0.0	56.2	74.0	-17.8	EUT On Side, Low Ch, 2 Mbps
12202.480	55.5	0.6	2.7	280.0	0.0	0.0	Vert	PK	0.0	56.1	74.0	-17.9	power level -2, Mid Ch, 2 mbps, EUT Vert
12202.570	55.5	0.6	1.2	309.0	0.0	0.0	Vert	PK	0.0	56.1	74.0	-17.9	power level -2, Mid Ch, 2 Mbps, EUT Horz
7213.708	43.2	12.7	3.0	200.0	0.0	0.0	Vert	PK	0.0	55.9	74.0	-18.1	EUT Vert, Low Ch, 2 Mbps
4807.025	32.5	6.0	1.0	275.0	-2.7	0.0	Vert	AV	0.0	35.8	54.0	-18.2	EUT Vert, Low Ch, 2 Mbps
12202.510	55.0	0.6	2.7	266.0	0.0	0.0	Horz	PK	0.0	55.6	74.0	-18.4	power level -2, Mid Ch, 2 mbps, EUT Vert
7429.400	41.5	14.1	1.5	97.0	0.0	0.0	Vert	PK	0.0	55.6	74.0	-18.4	EUT Vert. High Ch, 2 Mbps
7318.370	41.7	13.3	1.5	273.0	0.0	0.0	Vert	PK	0.0	55.0	74.0	-19.0	EUT Vert, Mid Ch, 2 Mbps
12011.040	38.0	-0.5	1.9	245.0	-2.7	0.0	Horz	AV	0.0	34.8	54.0	-19.2	EUT On Side, Low Ch, 1 Mbps
7429.710	40.6	14.1	1.5	354.0	0.0	0.0	Horz	PK	0.0	54.7	74.0	-19.3	EUT On Side, High Ch, 2 Mbps
7319.180	41.1	13.3	1.5	41.0	0.0	0.0	Horz	PK	0.0	54.4	74.0	-19.6	EUT On Side, Mid Ch, 2 Mbps
4951.320	30.6	5.4	1.5	160.0	-2.7	0.0	Horz	AV	0.0	33.3	54.0	-20.7	EUT On Side, High Ch, 2 Mbps
4953.880	29.9	5.4	3.5	155.0	-2.7	0.0	Vert	AV	0.0	32.6	54.0	-21.4	EUT Vert. High Ch, 2 Mbps
4807.750	46.5	6.0	1.0	275.0	0.0	0.0	Vert	PK	0.0	52.5	74.0	-21.5	EUT Vert, Low Ch, 2 Mbps
12202.590	51.7	0.6	2.3	276.0	0.0	0.0	Vert	PK	0.0	52.3	74.0	-21.7	power level -2, Mid Ch, 2 Mbps, EUT On Side
4808.467	45.3	5.9	1.0	275.0	0.0	0.0	Vert	PK	0.0	51.2	74.0	-22.8	EUT Vert, Low Ch, 2 Mbps
4809.033	44.8	5.9	2.6	313.0	0.0	0.0	Horz	PK	0.0	50.7	74.0	-23.3	EUT On Side, Low Ch, 2 Mbps
4878.870	44.9	5.7	3.4	332.0	0.0	0.0	Horz	PK	0.0	50.6	74.0	-23.4	EUT On Side, Mid Ch, 2 Mbps
4879.000	43.9	5.7	1.9	335.0	0.0	0.0	Vert	PK	0.0	49.6	74.0	-24.4	EUT Vert, Mid Ch, 2 Mbps
12202.360	48.7	0.6	2.7	80.0	0.0	0.0	Horz	PK	0.0	49.3	74.0	-24.7	power level -2, Mid Ch, 2 Mbps, EUT Horz
4950.590	41.5	5.4	1.5	160.0	0.0	0.0	Horz	PK	0.0	46.9	74.0	-27.1	EUT On Side, High Ch, 2 Mbps
12008.730	46.9	-0.5	1.9	245.0	0.0	0.0	Horz	PK	0.0	46.4	74.0	-27.6	EUT On Side, Low Ch, 1 Mbps
4949.570	40.9	5.4	3.5	155.0	0.0	0.0	Vert	PK	0.0	46.3	74.0	-27.7	EUT Vert. High Ch, 2 Mbps

CONCLUSION

Pass

Tested By

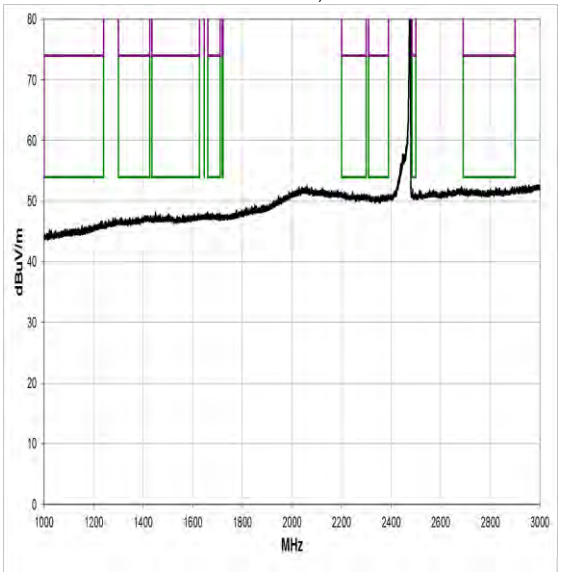
SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

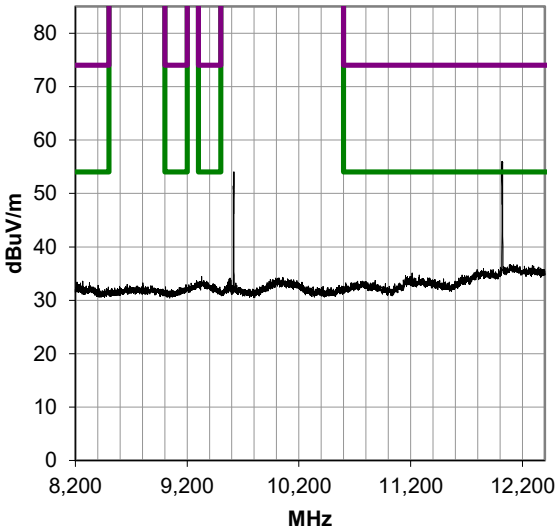
PRESCAN DATA

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

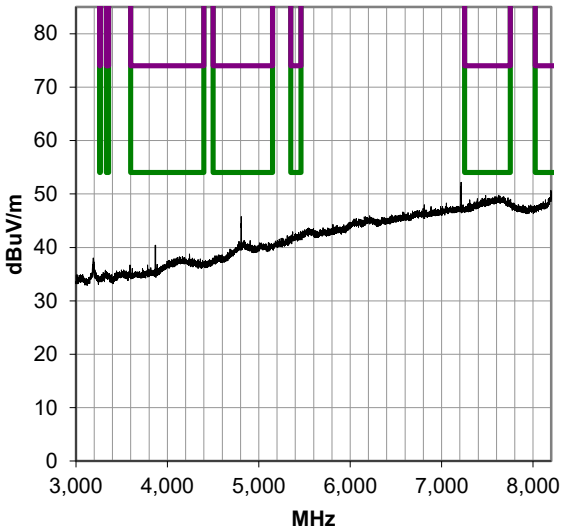
1000-3000 MHz, Run 13



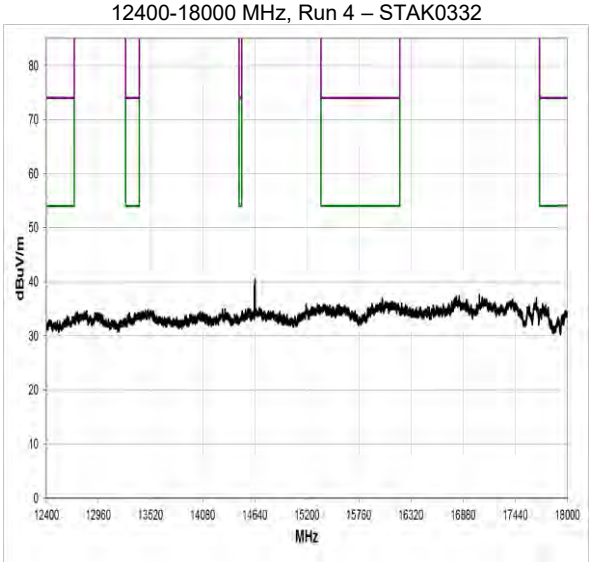
8200-12400 MHz, Run 19



3000-8200 MHz, Run 20



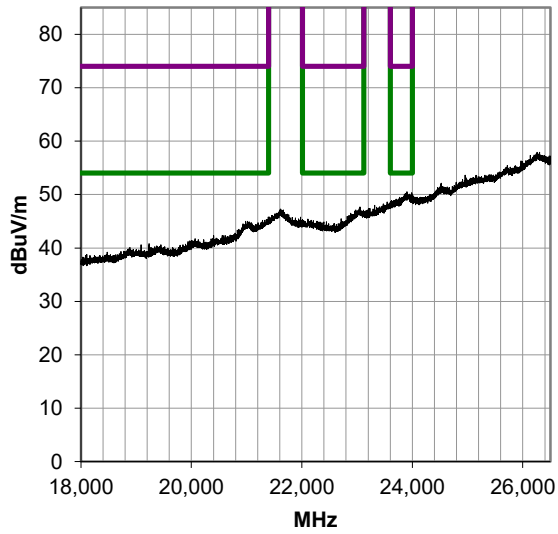
12400-18000 MHz, Run 4 – STAK0332



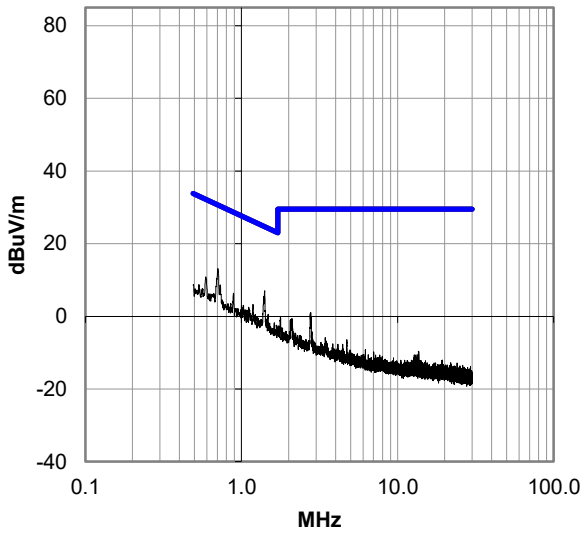
SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

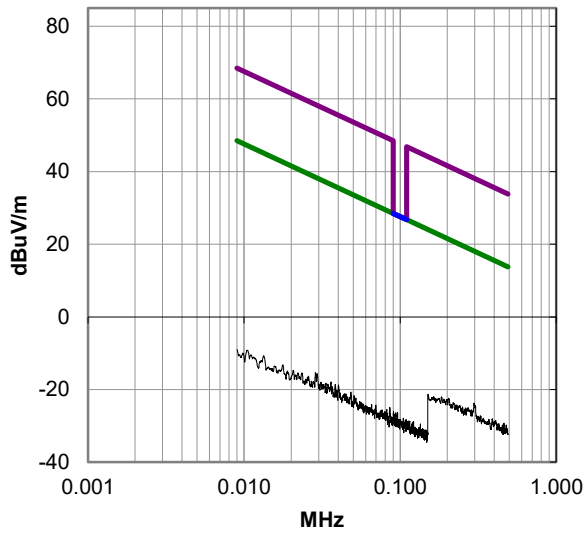
18000-26500 MHz, Run 41



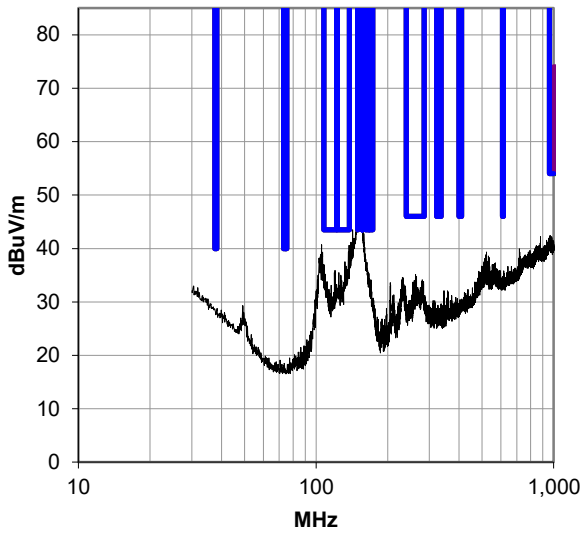
0.49-30 MHz, Run 47



0.009-0.49 MHz, Run 48

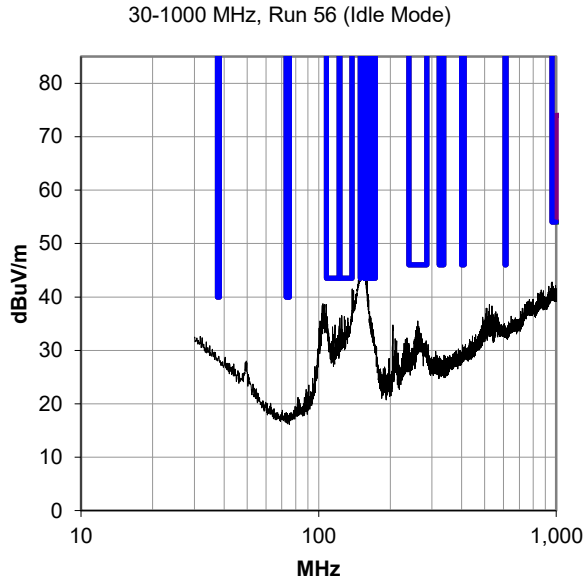


30-1000 MHz, Run 52 (Transmit Mode)



SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0



SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2024.06.27.0

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. A reference preview scan (pre-scan) is 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 - Double Ridge	ETS Lindgren	3115	AIP	2024-08-02	2026-08-02
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	2024-08-25	2025-08-25
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	2024-03-13	2025-03-13
Filter - High Pass	Micro-Tronics	HPM50111	LFN	2024-08-25	2025-08-25
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

FREQUENCY RANGE INVESTIGATED

1 GHz TO 18 GHz

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2024.06.27.0

POWER INVESTIGATED

5VDC via USB

CONFIGURATIONS INVESTIGATED

STAK0332-3

MODES INVESTIGATED

Transmitting BLE Low, Mid, and High Channels, 1 and 2 Mbps. (2402, 2440, and 2480 MHz. 2 Mbps rate low/high channels are 2404 and 2476 MHz). 2 Mbps PA -2, 1 Mbps PA0
Transmitting BLE Low and High Channels, 1 and 2 Mbps. (2402 and 2480 MHz) 2 Mbps rate low/high channels are 2404 and 2476 MHz). 2 Mbps PA -2, 1 Mbps PA0

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2024.06.27.0

EUT:	TV Streamer (Model 800)	Work Order:	STAK0332
Serial Number:	242420709B	Date:	2024-10-23
Customer:	Starkey Laboratories, Inc.	Temperature:	21.8°C
Attendees:	John Quach	Relative Humidity:	37.4%
Customer Project:	None	Bar. Pressure (PMSL):	1023 mb
Tested By:	Marcelo Aguayo	Job Site:	MN05
Power:	5VDC via USB	Configuration:	STAK0332-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013

TEST PARAMETERS

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

COMMENTS

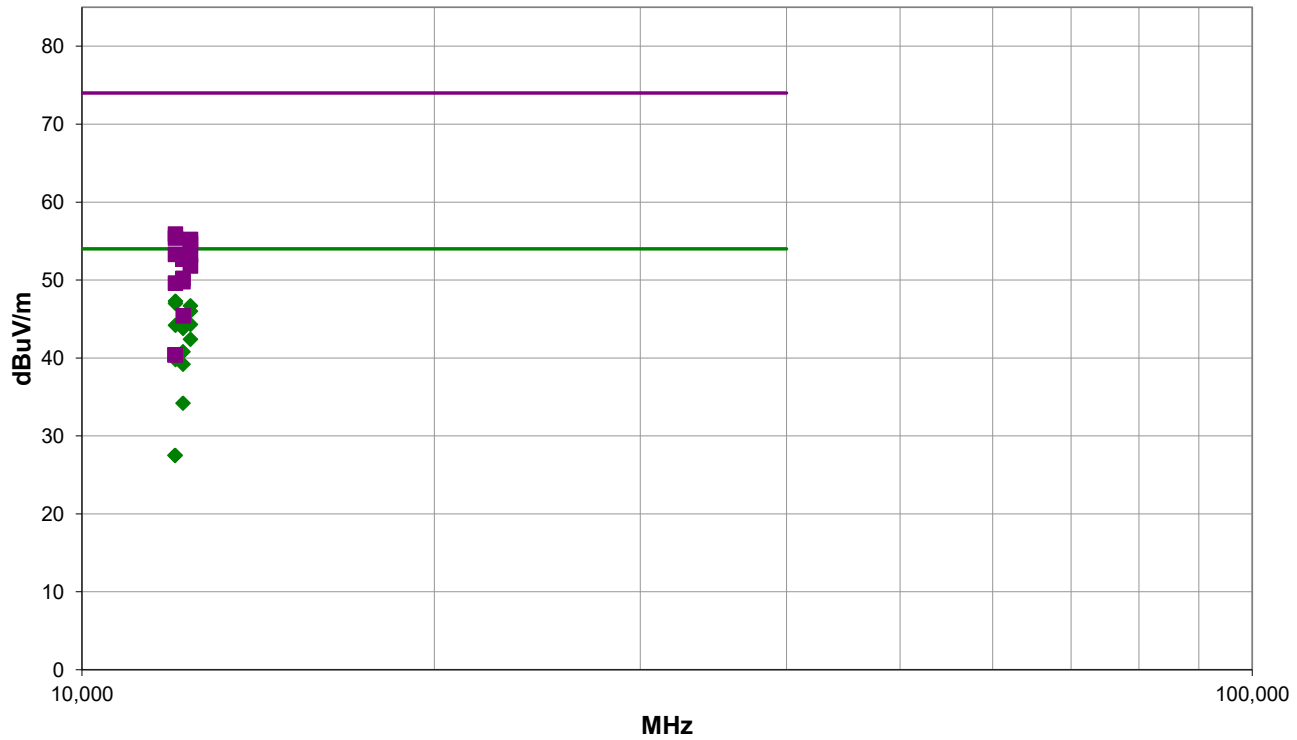
Spot-checking worst-case emissions with data cable connected to EUT.
2 Mbps data rate has PA enabled, and 1 Mbps does not, therefore 2Mbps is the higher risk. Operational duty cycle is 30%, Test mode is 56% for 2 Mbps, DCCF using 10*log(duty cycle)=+2.5-5.2=-2.7 net correction (downwards)

EUT OPERATING MODES

Transmitting BLE Low, Mid, and High Channels, 1 and 2 Mbps. (2402, 2440, and 2480 MHz. 2 Mbps rate low/high channels are 2404 and 2476 MHz). 2 Mbps PA -2 front end amp on, 1 Mbps PA0 front end amp off.

DEVIATIONS FROM TEST STANDARD

None



Run #: 18 ■ PK ◆ AV ● QP

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2024.06.27.0

RESULTS - Run #18

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
12017.520	51.8	-1.8	1.9	206.0	-2.7	0.0	Horz	AV	0.0	47.3	54.0	-6.7	EUT On Side, Low Ch 2Mbps
12017.500	51.5	-1.8	2.1	45.9	-2.7	0.0	Horz	AV	0.0	47.0	54.0	-7.0	EUT Vert, Low Ch 2Mbps
12377.540	50.2	-0.8	2.2	204.9	-2.7	0.0	Horz	AV	0.0	46.7	54.0	-7.3	EUT Vert, High Ch 2Mbps
12377.560	49.5	-0.8	1.3	74.9	-2.7	0.0	Horz	AV	0.0	46.0	54.0	-8.0	EUT On Side, High Ch 2Mbps
12377.630	47.8	-0.8	2.0	268.0	-2.7	0.0	Vert	AV	0.0	44.3	54.0	-9.7	EUT Vert, High Ch 2Mbps
12017.540	48.7	-1.8	2.0	264.9	-2.7	0.0	Vert	AV	0.0	44.2	54.0	-9.8	EUT On Side, Low Ch 2Mbps
12197.530	47.3	-0.8	1.3	74.9	-2.7	0.0	Horz	AV	0.0	43.8	54.0	-10.2	EUT Vert, Mid Ch 2Mbps
12377.580	45.9	-0.8	2.5	8.0	-2.7	0.0	Vert	AV	0.0	42.4	54.0	-11.6	EUT On Side, High Ch 2Mbps
12197.500	44.3	-0.8	1.5	77.0	-2.7	0.0	Horz	AV	0.0	40.8	54.0	-13.2	EUT On Side, Mid Ch 2Mbps
12017.530	44.3	-1.8	1.4	26.0	-2.7	0.0	Vert	AV	0.0	39.8	54.0	-14.2	EUT Vert, Low Ch 2Mbps
12197.500	42.7	-0.8	1.0	20.9	-2.7	0.0	Vert	AV	0.0	39.2	54.0	-14.8	EUT Vert, Mid Ch 2Mbps
12017.600	57.7	-1.8	1.9	206.0	0.0	0.0	Horz	PK	0.0	55.9	74.0	-18.1	EUT On Side, Low Ch 2Mbps
12017.500	57.2	-1.8	2.1	45.9	0.0	0.0	Horz	PK	0.0	55.4	74.0	-18.6	EUT Vert, Low Ch 2Mbps
12377.570	56.0	-0.8	2.2	204.9	0.0	0.0	Horz	PK	0.0	55.2	74.0	-18.8	EUT Vert, High Ch 2Mbps
12377.500	55.5	-0.8	1.3	74.9	0.0	0.0	Horz	PK	0.0	54.7	74.0	-19.3	EUT On Side, High Ch 2Mbps
12197.510	37.7	-0.8	1.5	23.9	-2.7	0.0	Vert	AV	0.0	34.2	54.0	-19.8	EUT On Side, Mid Ch 2Mbps
12017.550	55.1	-1.8	2.0	264.9	0.0	0.0	Vert	PK	0.0	53.3	74.0	-20.7	EUT On Side, Low Ch 2Mbps
12377.580	54.0	-0.8	2.0	268.0	0.0	0.0	Vert	PK	0.0	53.2	74.0	-20.8	EUT Vert, High Ch 2Mbps
12197.520	53.5	-0.8	1.3	74.9	0.0	0.0	Horz	PK	0.0	52.7	74.0	-21.3	EUT Vert, Mid Ch 2Mbps
12377.530	52.6	-0.8	2.5	8.0	0.0	0.0	Vert	PK	0.0	51.8	74.0	-22.2	EUT On Side, High Ch 2Mbps
12197.620	51.0	-0.8	1.5	77.0	0.0	0.0	Horz	PK	0.0	50.2	74.0	-23.8	EUT On Side, Mid Ch 2Mbps
12197.530	50.6	-0.8	1.0	20.9	0.0	0.0	Vert	PK	0.0	49.8	74.0	-24.2	EUT Vert, Mid Ch 2Mbps
12017.580	51.4	-1.8	1.4	26.0	0.0	0.0	Vert	PK	0.0	49.6	74.0	-24.4	EUT Vert, Low Ch 2Mbps
12008.900	32.1	-1.9	1.5	9.0	-2.7	0.0	Horz	AV	0.0	27.5	54.0	-26.5	EUT On Side, Low Ch 1Mbps
12008.940	32.1	-1.9	1.5	324.0	-2.7	0.0	Vert	AV	0.0	27.5	54.0	-26.5	EUT On Side, Low Ch 1Mbps
12202.350	46.2	-0.8	1.5	23.9	0.0	0.0	Vert	PK	0.0	45.4	74.0	-28.6	EUT On Side, Mid Ch 2Mbps
12008.620	42.3	-1.9	1.5	9.0	0.0	0.0	Horz	PK	0.0	40.4	74.0	-33.6	EUT On Side, Low Ch 1Mbps
12011.060	42.3	-1.9	1.5	324.0	0.0	0.0	Vert	PK	0.0	40.4	74.0	-33.6	EUT On Side, Low Ch 1Mbps

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2024.06.27.0

EUT:	TV Streamer (Model 800)	Work Order:	STAK0332
Serial Number:	242420709B	Date:	2024-10-23
Customer:	Starkey Laboratories, Inc.	Temperature:	21.8°C
Attendees:	John Quach	Relative Humidity:	37.4%
Customer Project:	None	Bar. Pressure (PMSL):	1023 mb
Tested By:	Marcelo Aguayo	Job Site:	MN05
Power:	5VDC via USB	Configuration:	STAK0332-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013

TEST PARAMETERS

Run #:	7	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

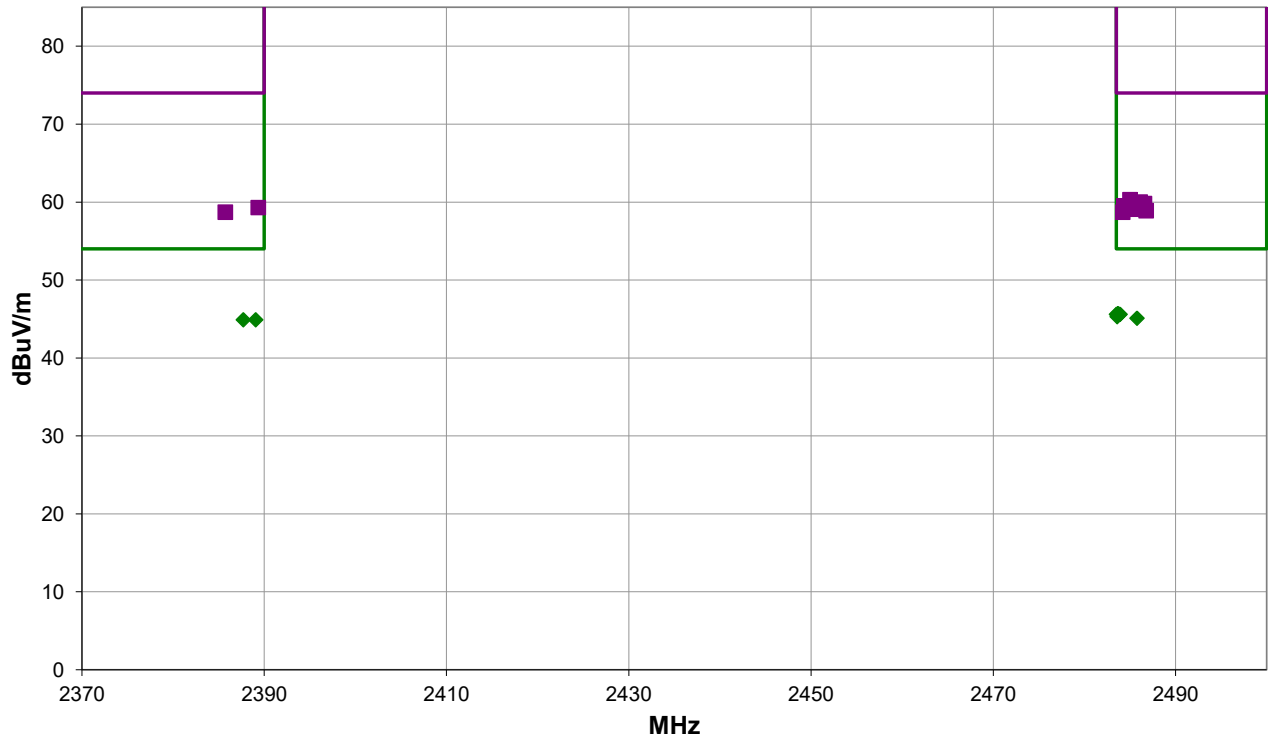
Spot-checking worst-case emissions with data cable connected to EUT.
2 Mbps data rate has PA enabled, and 1 Mbps does not, therefore 2Mbps is the higher risk. Operational duty cycle is 30%, Test mode is 56% for 2 Mbps, DCCF using 10*log(duty cycle)=+2.5-5.2=-2.7 net correction (downwards)

EUT OPERATING MODES

Transmitting BLE Low, Mid, and High Channels, 1 and 2 Mbps. (2402, 2440, and 2480 MHz. 2 Mbps rate low/high channels are 2404 and 2476 MHz). 2 Mbps PA -2 front end amp on, 1 Mbps PA0 front end amp off.

DEVIATIONS FROM TEST STANDARD

None



Run #: 7 ■ PK ◆ AV ● QP

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2024.06.27.0

RESULTS - Run #7

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2483.675	31.7	-3.3	1.5	304.9	-2.7	20.0	Vert	AV	0.0	45.7	54.0	-8.3	EUT Horz, High Ch 2Mbps
2483.850	31.6	-3.3	1.5	348.9	-2.7	20.0	Horz	AV	0.0	45.6	54.0	-8.4	EUT Horz, High Ch 2Mbps
2483.833	31.6	-3.3	1.5	148.0	-2.7	20.0	Horz	AV	0.0	45.6	54.0	-8.4	EUT Vert, High Ch 2Mbps
2483.700	31.6	-3.3	1.5	360.0	-2.7	20.0	Vert	AV	0.0	45.6	54.0	-8.4	EUT Vert, High Ch 2Mbps
2483.917	31.6	-3.3	2.8	123.0	-2.7	20.0	Horz	AV	0.0	45.6	54.0	-8.4	EUT On Side, High Ch 2Mbps
2483.517	31.6	-3.3	1.5	282.9	-2.7	20.0	Vert	AV	0.0	45.6	54.0	-8.4	EUT On Side, High Ch 2Mbps
2483.600	31.3	-3.3	2.6	311.0	-2.7	20.0	Vert	AV	0.0	45.3	54.0	-8.7	EUT Horz, High Ch 1Mbps
2485.775	31.1	-3.3	1.5	166.0	-2.7	20.0	Horz	AV	0.0	45.1	54.0	-8.9	EUT Horz, High Ch 1Mbps
2387.700	31.7	-4.1	1.5	55.0	-2.7	20.0	Horz	AV	0.0	44.9	54.0	-9.1	EUT Horz, Low Ch 2Mbps
2389.058	31.7	-4.1	1.5	163.9	-2.7	20.0	Vert	AV	0.0	44.9	54.0	-9.1	EUT Horz, Low Ch 2Mbps
2485.000	43.6	-3.3	1.5	148.0	0.0	20.0	Horz	PK	0.0	60.3	74.0	-13.7	EUT Vert, High Ch 2Mbps
2486.125	43.3	-3.3	1.5	282.9	0.0	20.0	Vert	PK	0.0	60.0	74.0	-14.0	EUT On Side, High Ch 2Mbps
2486.600	43.1	-3.3	2.6	311.0	0.0	20.0	Vert	PK	0.0	59.8	74.0	-14.2	EUT Horz, High Ch 1Mbps
2485.208	42.9	-3.3	2.8	123.0	0.0	20.0	Horz	PK	0.0	59.6	74.0	-14.4	EUT On Side, High Ch 2Mbps
2484.342	42.8	-3.3	1.5	348.9	0.0	20.0	Horz	PK	0.0	59.5	74.0	-14.5	EUT Horz, High Ch 2Mbps
2389.333	43.4	-4.1	1.5	163.9	0.0	20.0	Vert	PK	0.0	59.3	74.0	-14.7	EUT Horz, Low Ch 2Mbps
2485.567	42.4	-3.3	1.5	360.0	0.0	20.0	Vert	PK	0.0	59.1	74.0	-14.9	EUT Vert, High Ch 2Mbps
2486.775	42.2	-3.3	1.5	304.9	0.0	20.0	Vert	PK	0.0	58.9	74.0	-15.1	EUT Horz, High Ch 2Mbps
2385.717	42.8	-4.1	1.5	55.0	0.0	20.0	Horz	PK	0.0	58.7	74.0	-15.3	EUT Horz, Low Ch 2Mbps
2484.217	42.0	-3.3	1.5	166.0	0.0	20.0	Horz	PK	0.0	58.7	74.0	-15.3	EUT Horz, High Ch 1Mbps

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS – SPOT CHECKS

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. A reference preview scan (pre-scan) is 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 - Double Ridge	ETS Lindgren	3115	AIP	2024-08-02	2026-08-02
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
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	2024-03-13	2025-03-13
Filter - High Pass	Micro-Tronics	HPM50111	LFN	2024-08-25	2025-08-25
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

FREQUENCY RANGE INVESTIGATED

1 GHz TO 18 GHz

POWER INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

SPURIOUS RADIATED EMISSIONS – SPOT CHECKS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

STAK0356-1

MODES INVESTIGATED

Transmitting BLE Low and High Chs, 1 and 2 Mbps. Low Channel is 2402 MHz (1 Mbps) and 2404 MHz (2 MHz), High Channel is 2480 MHz (1 Mbps) and 2476 MHz (2 Mbps).
Transmitting BLE Low, Mid, and High Chs, 1 and 2 Mbps. Mid Channel is 2440 MHz. Low Channel is 2402 MHz (1 Mbps) and 2404 MHz (2 MHz), High Channel is 2480 MHz (1 Mbps) and 2476 MHz (2 Mbps).

SPURIOUS RADIATED EMISSIONS – SPOT CHECKS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	TV Streamer Model 801	Work Order:	STAK0356
Serial Number:	242420709B	Date:	2024-09-18
Customer:	Starkey Laboratories, Inc.	Temperature:	22°C
Attendees:	Charlie Esch	Relative Humidity:	54%
Customer Project:	None	Bar. Pressure (PMSL):	1011 mb
Tested By:	Christopher Heintzelman	Job Site:	MN05
Power:	110VAC/60Hz	Configuration:	STAK0356-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013

TEST PARAMETERS

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

COMMENTS

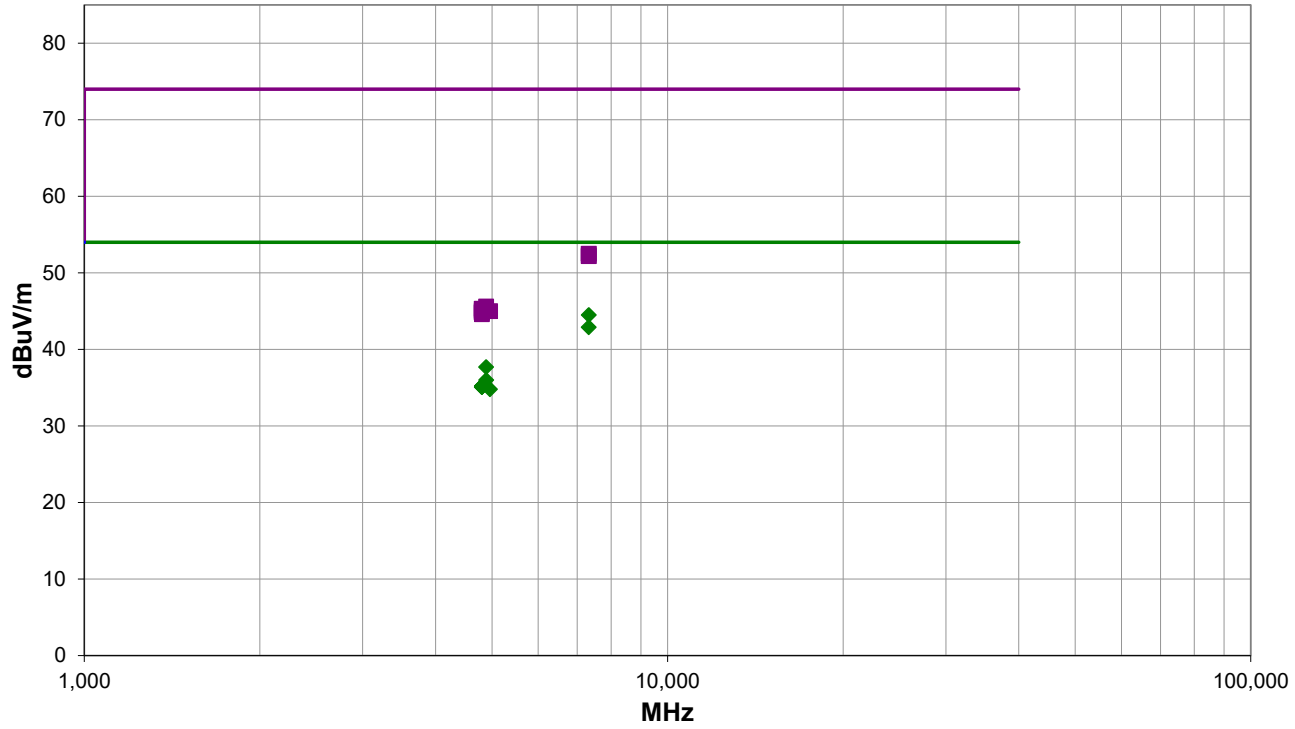
Power setting is -10. The test mode is 85.3% (1 Mbps) and 58.6% (2 Mbps). A duty cycle correction factor (DCCF) was applied using 10*log(1/duty cycle) for a 0.7dB and 2.3dB correction (1 and 2 Mbps, respectively)

EUT OPERATING MODES

Transmitting BLE Low, Mid, and High Chs, 1 and 2 Mbps. Mid Channel is 2440 MHz. Low Channel is 2402 MHz (1 Mbps) and 2404 MHz (2 MHz), High Channel is 2480 MHz (1 Mbps) and 2476 MHz (2 Mbps).

DEVIATIONS FROM TEST STANDARD

None



Run #: 15 ■ PK ◆ AV ● QP

SPURIOUS RADIATED EMISSIONS – SPOT CHECKS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #15

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7325.975	29.6	12.6	1.3	74.9	2.3	0.0	Horz	AV	0.0	44.5	54.0	-9.5	EUT On Side, Mid Ch, 2 Mbps
7323.817	29.6	12.6	1.5	227.0	0.7	0.0	Horz	AV	0.0	42.9	54.0	-11.1	EUT On Side, Mid Ch, 1 Mbps
4884.458	30.1	5.3	1.5	274.0	2.3	0.0	Horz	AV	0.0	37.7	54.0	-16.3	EUT On Side, Mid Ch, 2 Mbps
4886.025	30.0	5.3	1.5	18.0	0.7	0.0	Horz	AV	0.0	36.0	54.0	-18.0	EUT On Side, Mid Ch, 1 Mbps
4805.583	29.2	5.3	1.5	263.0	0.7	0.0	Horz	AV	0.0	35.2	54.0	-18.8	EUT On Side, Low Ch, 1 Mbps
4804.717	29.3	5.2	1.5	156.9	0.7	0.0	Horz	AV	0.0	35.2	54.0	-18.8	EUT Vert, Low Ch, 1 Mbps
4805.192	29.2	5.3	1.5	225.0	0.7	0.0	Vert	AV	0.0	35.2	54.0	-18.8	EUT Vert, Low Ch, 1 Mbps
4803.958	29.2	5.2	1.5	281.0	0.7	0.0	Horz	AV	0.0	35.1	54.0	-18.9	EUT Horz, Low Ch, 1 Mbps
4804.767	29.2	5.2	1.5	229.9	0.7	0.0	Vert	AV	0.0	35.1	54.0	-18.9	EUT Horz, Low Ch, 1 Mbps
4802.983	29.2	5.2	1.5	296.0	0.7	0.0	Vert	AV	0.0	35.1	54.0	-18.9	EUT On Side, Low Ch, 1 Mbps
4959.075	28.8	5.3	1.5	98.0	0.7	0.0	Horz	AV	0.0	34.8	54.0	-19.2	EUT On Side, High Ch, 1 Mbps
7324.058	39.9	12.6	1.3	74.9	0.0	0.0	Horz	PK	0.0	52.5	74.0	-21.5	EUT On Side, Mid Ch, 2 Mbps
7325.525	39.6	12.6	1.5	227.0	0.0	0.0	Horz	PK	0.0	52.2	74.0	-21.8	EUT On Side, Mid Ch, 1 Mbps
4884.733	40.3	5.3	1.5	18.0	0.0	0.0	Horz	PK	0.0	45.6	74.0	-28.4	EUT On Side, Mid Ch, 1 Mbps
4801.942	40.1	5.2	1.5	225.0	0.0	0.0	Vert	PK	0.0	45.3	74.0	-28.7	EUT Vert, Low Ch, 1 Mbps
4805.533	39.8	5.3	1.5	229.9	0.0	0.0	Vert	PK	0.0	45.1	74.0	-28.9	EUT Horz, Low Ch, 1 Mbps
4805.533	39.8	5.3	1.5	263.0	0.0	0.0	Horz	PK	0.0	45.1	74.0	-28.9	EUT On Side, Low Ch, 1 Mbps
4884.708	39.8	5.3	1.5	274.0	0.0	0.0	Horz	PK	0.0	45.1	74.0	-28.9	EUT On Side, Mid Ch, 2 Mbps
4801.667	39.8	5.2	1.5	296.0	0.0	0.0	Vert	PK	0.0	45.0	74.0	-29.0	EUT On Side, Low Ch, 1 Mbps
4961.517	39.7	5.3	1.5	98.0	0.0	0.0	Horz	PK	0.0	45.0	74.0	-29.0	EUT On Side, High Ch, 1 Mbps
4801.950	39.6	5.2	1.5	156.9	0.0	0.0	Horz	PK	0.0	44.8	74.0	-29.2	EUT Vert, Low Ch, 1 Mbps
4803.983	39.4	5.2	1.5	281.0	0.0	0.0	Horz	PK	0.0	44.6	74.0	-29.4	EUT Horz, Low Ch, 1 Mbps

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS – SPOT CHECKS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	TV Streamer Model 801	Work Order:	STAK0356
Serial Number:	242420709B	Date:	2024-09-18
Customer:	Starkey Laboratories, Inc.	Temperature:	22°C
Attendees:	Charlie Esch	Relative Humidity:	54%
Customer Project:	None	Bar. Pressure (PMSL):	1011 mb
Tested By:	Christopher Heintzelman	Job Site:	MN05
Power:	110VAC/60Hz	Configuration:	STAK0356-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013

TEST PARAMETERS

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

COMMENTS

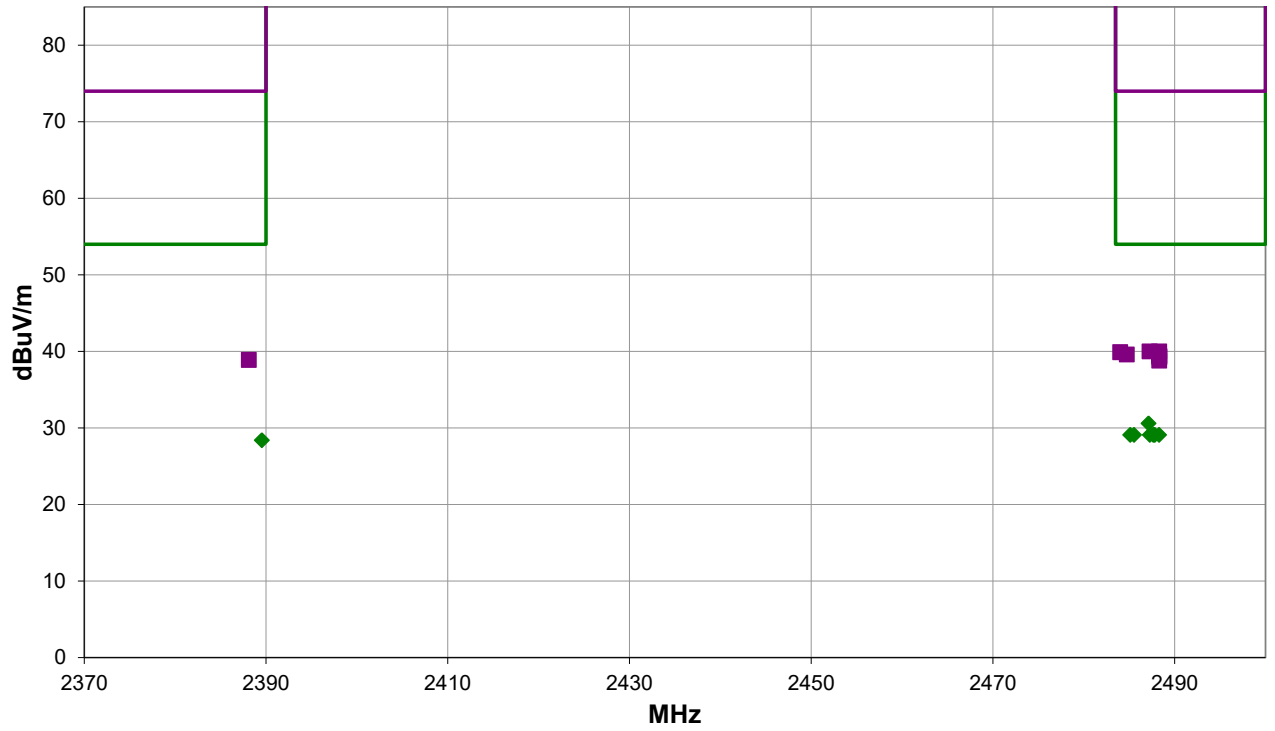
Power setting is -10. The test mode is 85.3% (1 Mbps) and 58.6% (2 Mbps). A duty cycle correction factor (DCCF) was applied using 10*log(1/duty cycle) for a 0.7dB and 2.3dB correction (1 and 2 Mbps, respectively)

EUT OPERATING MODES

Transmitting BLE Low and High Chs, 1 and 2 Mbps. Low Channel is 2402 MHz (1 Mbps) and 2404 MHz (2 MHz), High Channel is 2480 MHz (1 Mbps) and 2476 MHz (2 Mbps).

DEVIATIONS FROM TEST STANDARD

None



Run #: 16 ■ PK ◆ AV ● QP

SPURIOUS RADIATED EMISSIONS – SPOT CHECKS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #16

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2485.525	31.7	-3.3	3.9	78.9	0.7	0.0	Horz	AV	0.0	29.1	54.0	-24.9	EUT On Side, High Ch, 1 Mbps
2487.267	31.7	-3.3	1.5	132.9	0.7	0.0	Vert	AV	0.0	29.1	54.0	-24.9	EUT On Side, High Ch, 1 Mbps
2487.808	31.7	-3.3	1.5	260.0	0.7	0.0	Horz	AV	0.0	29.1	54.0	-24.9	EUT Vert, High Ch, 1 Mbps
2485.108	31.7	-3.3	2.1	319.9	0.7	0.0	Vert	AV	0.0	29.1	54.0	-24.9	EUT Vert, High Ch, 1 Mbps
2488.283	31.7	-3.3	1.5	221.0	0.7	0.0	Horz	AV	0.0	29.1	54.0	-24.9	EUT Horz, High Ch, 1 Mbps
2487.650	31.7	-3.3	1.5	289.9	0.7	0.0	Vert	AV	0.0	29.1	54.0	-24.9	EUT Horz, High Ch, 1 Mbps
2487.125	31.6	-3.3	1.5	243.9	2.3	0.0	Horz	AV	0.0	30.6	54.0	-23.4	EUT On Side, High Ch, 2 Mbps
2389.533	31.8	-4.1	1.5	88.9	0.7	0.0	Horz	AV	0.0	28.4	54.0	-25.6	EUT On Side, Low Ch, 1 Mbps
2488.283	43.3	-3.3	2.1	319.9	0.0	0.0	Vert	PK	0.0	40.0	74.0	-34.0	EUT Vert, High Ch, 1 Mbps
2487.242	43.3	-3.3	1.5	221.0	0.0	0.0	Horz	PK	0.0	40.0	74.0	-34.0	EUT Horz, High Ch, 1 Mbps
2484.000	43.2	-3.3	1.5	243.9	0.0	0.0	Horz	PK	0.0	39.9	74.0	-34.1	EUT On Side, High Ch, 2 Mbps
2484.733	42.9	-3.3	1.5	260.0	0.0	0.0	Horz	PK	0.0	39.6	74.0	-34.4	EUT Vert, High Ch, 1 Mbps
2488.283	42.8	-3.3	3.9	78.9	0.0	0.0	Horz	PK	0.0	39.5	74.0	-34.5	EUT On Side, High Ch, 1 Mbps
2488.308	42.6	-3.3	1.5	289.9	0.0	0.0	Vert	PK	0.0	39.3	74.0	-34.7	EUT Horz, High Ch, 1 Mbps
2388.100	43.0	-4.1	1.5	88.9	0.0	0.0	Horz	PK	0.0	38.9	74.0	-35.1	EUT On Side, Low Ch, 1 Mbps
2488.300	42.1	-3.3	1.5	132.9	0.0	0.0	Vert	PK	0.0	38.8	74.0	-35.2	EUT On Side, High Ch, 1 Mbps

CONCLUSION

Pass

Tested By

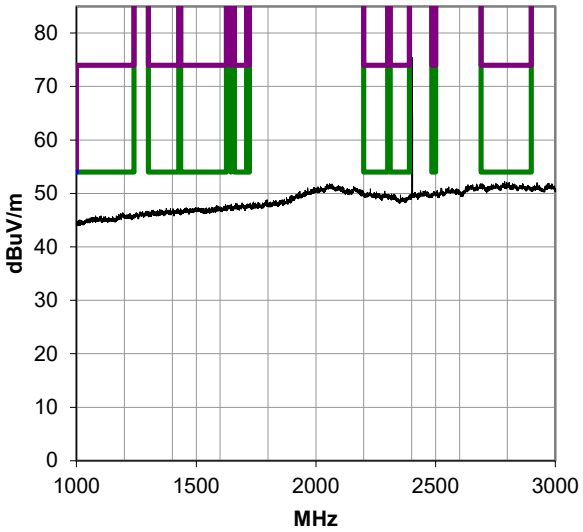
SPURIOUS RADIATED EMISSIONS – SPOT CHECKS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

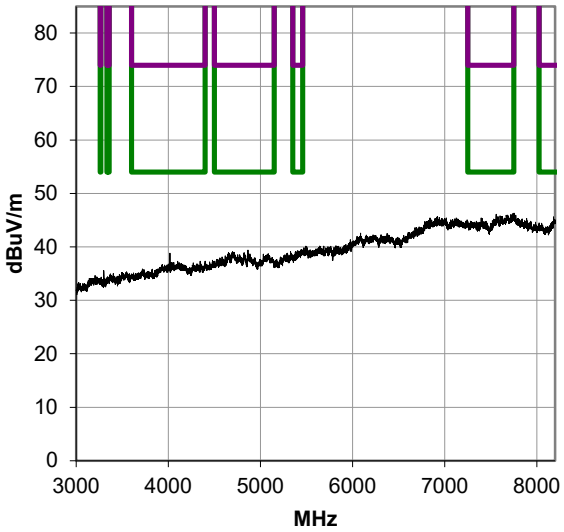
PRESCAN DATA

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.

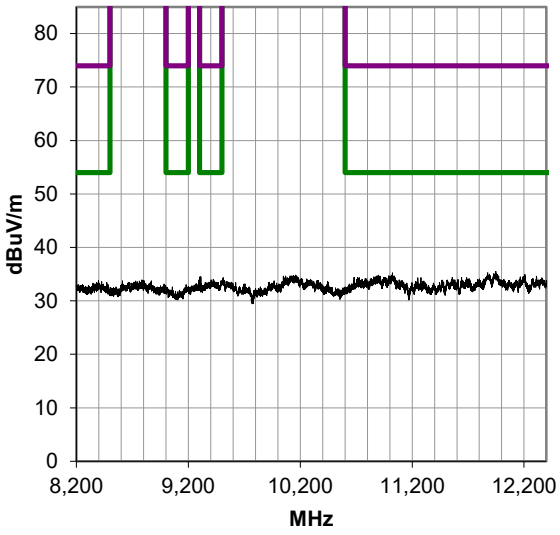
1000-3000 MHz, Run 2



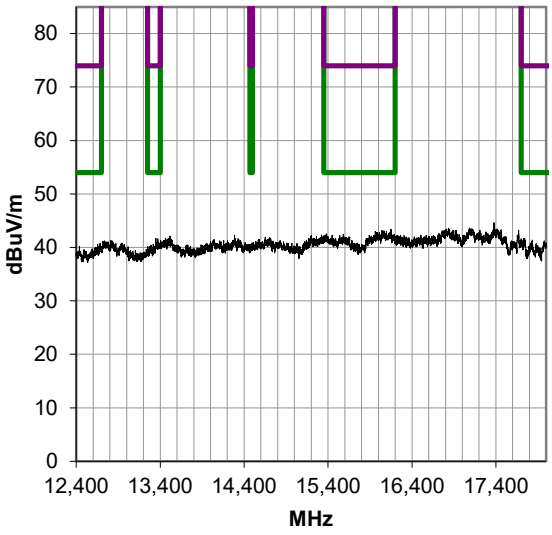
3000-8200 MHz, Run 3



8200-12400 MHz, Run 4



12400-18000 MHz, Run 5



End of Test Report