

Starkey Laboratories, Inc.

Livio RIC 312

FCC 15.247:2019
Bluetooth Low Energy (DTS) Radio

Report # STAK0183







NVLAP LAB CODE: 200881-0

CERTIFICATE OF TEST



Last Date of Test: October 11, 2019 Starkey Laboratories, Inc. EUT: Livio RIC 312

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2019	ANSI C63.10:2013, KDB 558074

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	No	N/A	Not required for a battery powered EUT.
11.12.1, 11.13.2, 6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	
11.6	Duty Cycle	Yes	N/A	
11.8.2	Occupied Bandwidth	Yes	Pass	
11.9.1.1	Output Power	Yes	Pass	
11.9.1.1	Equivalent Isotropic Radiated Power	Yes	Pass	
11.10.2	Power Spectral Density	Yes	Pass	
11.11	Band Edge Compliance	Yes	Pass	
11.11	Spurious Conducted Emissions	Yes	Pass	

Deviations From Test Standards

None

Approved By:

Matt Nuernberg, Operations Manager

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

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REVISION HISTORY



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

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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 - Accredited by A2LA to ISO / IEC 17065 as a product certifier. This allows Element to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

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 - Within Element, we have a EU Notified Body validated for the EMCD and RED Directives.

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: https://www.nwemc.com/emc-testing-accreditations

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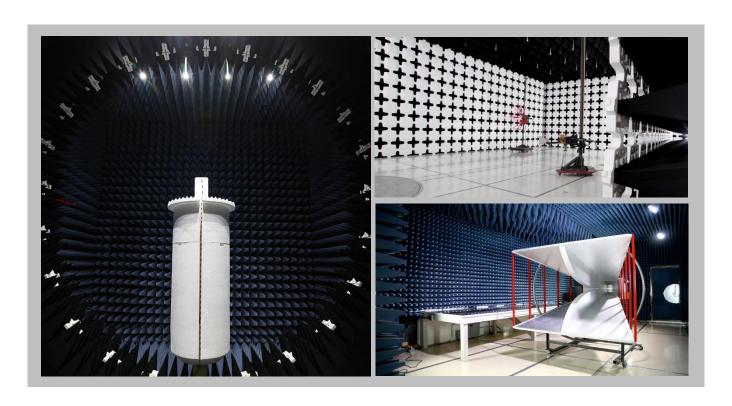
FACILITIES







California	Minnesota	Oregon	Texas	Washington			
Labs OC01-17	Labs MN01-10	Labs EV01-12	Labs TX01-09	Labs NC01-05			
41 Tesla	9349 W Broadway Ave.	6775 NE Evergreen Pkwy #400	3801 E Plano Pkwy	19201 120 th Ave NE			
Irvine, CA 92618	Brooklyn Park, MN 55445	Hillsboro, OR 97124	Plano, TX 75074	Bothell, WA 98011			
(949) 861-8918	(612)-638-5136	(503) 844-4066	(469) 304-5255	(425)984-6600			
		NVLAP					
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0			
	Innovation, Science and Economic Development Canada						
2834B-1, 2834B-3	2834E-1, 2834E-3	2834D-1	2834G-1	2834F-1			
	BSMI						
SL2-IN-E-1154R	SL2-IN-E-1152R	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R			
	VCCI						
A-0029	A-0109	A-0108	A-0201	A-0110			
Re	Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA						
US0158	US0175	US0017	US0191	US0157			



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MEASUREMENT UNCERTAINTY



Measurement Uncertainty

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

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

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

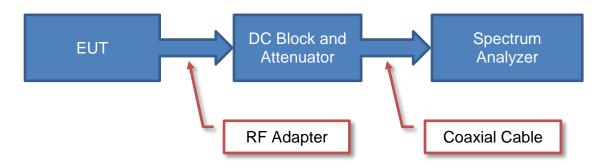
Test	+ MU	- MU
Frequency Accuracy	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	1.2 dB	-1.2 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	2.4 dB	-2.4 dB

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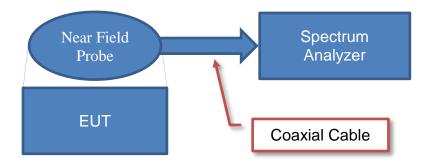
Test Setup Block Diagrams



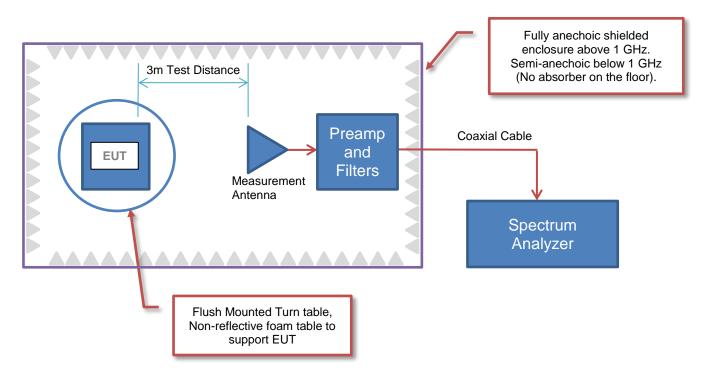
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



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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:	Livio RIC 312
First Date of Test:	September 27, 2019
Last Date of Test:	October 11, 2019
Receipt Date of Samples:	September 27, 2019
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Descrip	ption of the EUT:
Hearing aid with 2.4	4 GHz and NFMI

Testing Objective:

To demonstrate compliance of the Bluetooth Low Energy (DTS) radio to FCC 15.247 requirements.

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CONFIGURATIONS



Configuration STAK0183-1

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Hearing Aid	Starkey Laboratories, Inc.	Livio RIC 312	190645257

Configuration STAK0183- 2

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Hearing Aid	Starkey Laboratories, Inc.	Livio RIC 312	190645258

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MODIFICATIONS



Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
		Spurious	Tested as	No EMI suppression	EUT remained at
1	2019-09-27	Radiated	delivered to	devices were added or	Element following the
		Emissions	Test Station.	modified during this test.	test.
		Occupied	Tested as	No EMI suppression	EUT remained at
2	2019-09-30	Bandwidth	delivered to	devices were added or	Element following the
		Danaman	Test Station.	modified during this test.	test.
			Tested as	No EMI suppression	EUT remained at
3	2019-09-30	Output Power	delivered to	devices were added or	Element following the
			Test Station.	modified during this test.	test.
		Equivalent	Tested as	No EMI suppression	EUT remained at
4	2019-09-30	Isotropic	delivered to	devices were added or	Element following the
7	2010 00 00	Radiated	Test Station.	modified during this test.	test.
		Power	rest otation.	modified during this test.	1031.
		Power Spectral	Tested as	No EMI suppression	EUT remained at
5	2019-09-30	Density	delivered to	devices were added or	Element following the
		Density	Test Station.	modified during this test.	test.
		Band Edge	Tested as	No EMI suppression	EUT remained at
6	2019-09-30	Compliance	delivered to	devices were added or	Element following the
		Compliance	Test Station.	modified during this test.	test.
		Spurious	Tested as	No EMI suppression	EUT remained at
7	2019-09-30	Conducted	delivered to	devices were added or	Element following the
		Emissions	Test Station.	modified during this test.	test.
			Tested as	No EMI suppression	Cobodulad taating
8	2019-10-11	Duty Cycle	delivered to	devices were added or	Scheduled testing
			Test Station.	modified during this test.	was completed.

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SPURIOUS RADIATED EMISSIONS



PSA-ESCI 2019.05.10

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 test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Tx on Low channel (2402 MHz), Mid channel (2442 MHz), and High channel (2480 MHz); 2 Mbps BLE

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

STAK0183 - 1

FREQUENCY RANGE INVESTIGATED

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Antenna - Double Ridge	ETS-Lindgren	3115	AJQ	16-Jan-2019	24 mo
Cable	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	17-Sep-2019	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVT	8-Feb-2019	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AXP	NCR	0 mo
Cable	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	8-Mar-2019	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	8-Feb-2019	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AIQ	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVW	8-Feb-2019	12 mo
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFD	28-Jul-2019	12 mo
Attenuator	Fairview Microwave	SA18E-20	TWZ	17-Sep-2019	12 mo
Attenuator	Fairview Microwave	SA18E-10	TYA	17-Sep-2019	12 mo
Filter - High Pass	Micro-Tronics	HPM50111	LFN	12-Sep-2019	12 mo

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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 at the edges of the allowable band may be presented in an alternative method as provided for in the ANSI C63.10 Marker-Delta method. This method involves performing an in-band fundamental measurement followed by a screen capture of the fundamental and out-of-band emission using reduced measurement instrumentation bandwidths. The amplitude delta measured on this screen capture is applied to the fundamental emission value to show the out-of-band emission level as applied to the limit.

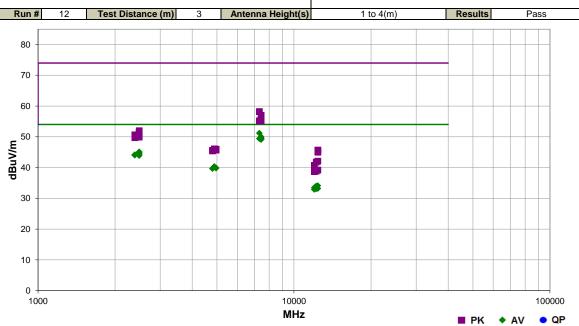
Where the radio test software does not provide for a duty cycle at continuous transmit conditions (> 98%) and the RMS (power average) measurements were made across the on and off times of the EUT transmissions, a duty cycle correction is added to the measurements using the formula of 10*LOG(dc).

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SPURIOUS RADIATED EMISSIONS



					EmiR5 2019.08.01	PSA-ESCI 2019.05.10
Work Order:	STAK0183	Date:	27-Sep-2019			, /
Project:	None	Temperature:	21.7 °C	1	PY	-2
Job Site:	MN05	Humidity:	50% RH		1 - Service	27
Serial Number:	190645257	Barometric Pres.:	1005 mbar	Tested by:	Andrew Rogstad	
EUT:	Livio RIC 312	•				
Configuration:	1					
Customer:	Starkey Laboratories,	Inc.				
Attendees:	Charlie Esch					
EUT Power:	Battery					
Operating Mode:	Tx on Low channel (2	402 MHz), Mid channel	(2442 MHz), and H	ligh channel (2480 MHz);	2 Mbps BLE	
Deviations:	None					
Comments:	measurements (DCC		ng at frequencies b	n Factor of 5.1 dB was ad below 1 GHz and above 1 l, and modulation		
Test Specifications			Test Met	thod		
FCC 15.247:2019			ANSI C6	3.10:2013		



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7326.980	32.6	13.5	2.6	267.0	5.1	0.0	Horz	AV	0.0	51.2	54.0	-2.8	EUT on side, Mid ch., 2 Mbps
7440.977	31.7	13.2	2.2	275.0	5.1	0.0	Horz	AV	0.0	50.0	54.0	-4.0	EUT on side, High ch., 2 Mbps
7439.093	31.3	13.2	1.9	121.9	5.1	0.0	Vert	AV	0.0	49.6	54.0	-4.4	EUT vert, High ch., 2 Mbps
7325.243	30.8	13.5	1.5	207.0	5.1	0.0	Vert	AV	0.0	49.4	54.0	-4.6	EUT on side, Mid ch., 2 Mbps
7439.020	31.1	13.2	2.2	268.0	5.1	0.0	Horz	AV	0.0	49.4	54.0	-4.6	EUT horz, High ch., 2 Mbps
7439.400	31.1	13.2	1.5	312.9	5.1	0.0	Vert	AV	0.0	49.4	54.0	-4.6	EUT on side, High ch., 2 Mbps
7440.863	30.9	13.2	1.5	102.9	5.1	0.0	Vert	AV	0.0	49.2	54.0	-4.8	EUT horz, High ch., 2 Mbps
7439.257	30.8	13.2	1.5	258.9	5.1	0.0	Horz	AV	0.0	49.1	54.0	-4.9	EUT vert, High ch., 2 Mbps
2483.570	33.8	-3.8	1.5	24.9	5.1	10.0	Vert	AV	0.0	45.1	54.0	-8.9	EUT on side, High ch., 2 Mbps
2483.540	33.6	-3.8	1.5	166.0	5.1	10.0	Horz	AV	0.0	44.9	54.0	-9.1	EUT horz, High ch., 2 Mbps
2483.520	33.5	-3.8	1.5	214.0	5.1	10.0	Horz	AV	0.0	44.8	54.0	-9.2	EUT vert, High ch., 2 Mbps
2483.553	33.2	-3.8	1.5	181.9	5.1	10.0	Vert	AV	0.0	44.5	54.0	-9.5	EUT vert, High ch., 2 Mbps
2389.373	32.7	-3.6	1.1	16.0	5.1	10.0	Vert	AV	0.0	44.2	54.0	-9.8	EUT on side, Low ch., 2 Mbps
2483.567	32.8	-3.8	1.5	272.9	5.1	10.0	Horz	AV	0.0	44.1	54.0	-9.9	EUT on side, High ch., 2 Mbps
2389.187	32.5	-3.6	1.5	157.9	5.1	10.0	Horz	AV	0.0	44.0	54.0	-10.0	EUT horz, Low ch., 2 Mbps
2484.477	32.6	-3.8	1.5	0.0	5.1	10.0	Vert	AV	0.0	43.9	54.0	-10.1	EUT horz, High ch., 2 Mbps
4883.057	30.5	4.7	1.9	322.9	5.1	0.0	Horz	AV	0.0	40.3	54.0	-13.7	EUT on side, Mid ch., 2 Mbps
4884.503	30.5	4.7	1.5	200.9	5.1	0.0	Vert	AV	0.0	40.3	54.0	-13.7	EUT on side, Mid ch., 2 Mbps
4959.640	30.0	4.8	1.5	339.0	5.1	0.0	Horz	AV	0.0	39.9	54.0	-14.1	EUT on side, High ch., 2 Mbps
4959.403	29.9	4.8	1.5	217.0	5.1	0.0	Vert	AV	0.0	39.8	54.0	-14.2	EUT on side, High ch., 2 Mbps
4803.167	30.0	4.6	2.8	303.0	5.1	0.0	Horz	AV	0.0	39.7	54.0	-14.3	EUT on side, Low ch., 2 Mbps
4803.287	30.0	4.6	1.5	54.0	5.1	0.0	Vert	AV	0.0	39.7	54.0	-14.3	EUT on side, Low ch., 2 Mbps
12400.760	28.7	5.4	1.9	239.9	5.1	0.0	Horz	AV	0.0	39.2	54.0	-14.8	EUT on side, High ch., 2 Mbps

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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
12400.260	28.6	5.4	1.5	300.9	5.1	0.0	Vert	AV	0.0	39.1	54.0	-14.9	EUT on side, High ch., 2 Mbps
7326.773	44.7	13.5	2.6	267.0	0.0	0.0	Horz	PK	0.0	58.2	74.0	-15.8	EUT on side, Mid ch., 2 Mbps
7440.450	43.8	13.2	2.2	275.0	0.0	0.0	Horz	PK	0.0	57.0	74.0	-17.0	EUT on side, High ch., 2 Mbps
7439.460	43.0	13.2	1.9	121.9	0.0	0.0	Vert	PK	0.0	56.2	74.0	-17.8	EUT vert, High ch., 2 Mbps
7439.993	42.3	13.2	1.5	258.9	0.0	0.0	Horz	PK	0.0	55.5	74.0	-18.5	EUT vert, High ch., 2 Mbps
7326.153	41.7	13.5	1.5	207.0	0.0	0.0	Vert	PK	0.0	55.2	74.0	-18.8	EUT on side, Mid ch., 2 Mbps
7440.570	42.0	13.2	1.5	102.9	0.0	0.0	Vert	PK	0.0	55.2	74.0	-18.8	EUT horz, High ch., 2 Mbps
7440.097	41.9	13.2	2.2	268.0	0.0	0.0	Horz	PK	0.0	55.1	74.0	-18.9	EUT horz, High ch., 2 Mbps
7440.700	41.9	13.2	1.5	312.9	0.0	0.0	Vert	PK	0.0	55.1	74.0	-18.9	EUT on side, High ch., 2 Mbps
12399.090	29.6	-0.6	2.0	346.0	5.1	0.0	Horz	AV	0.0	34.1	54.0	-19.9	EUT on side, High ch., 2 Mbps
12210.890	30.6	-1.7	1.9	15.0	5.1	0.0	Horz	AV	0.0	34.0	54.0	-20.0	EUT on side, Mid ch., 2 Mbps
12010.920	30.6	-2.2	2.2	1.9	5.1	0.0	Horz	AV	0.0	33.5	54.0	-20.5	EUT on side, Low ch., 2 Mbps
12399.620	28.7	-0.6	1.5	207.9	5.1	0.0	Vert	AV	0.0	33.2	54.0	-20.8	EUT on side, High ch., 2 Mbps
12210.920	29.7	-1.7	1.5	198.0	5.1	0.0	Vert	AV	0.0	33.1	54.0	-20.9	EUT on side, Mid ch., 2 Mbps
12009.110	30.0	-2.2	1.5	272.9	5.1	0.0	Vert	AV	0.0	32.9	54.0	-21.1	EUT on side, Low ch., 2 Mbps
2483.553	45.8	-3.8	1.5	166.0	0.0	10.0	Horz	PK	0.0	52.0	74.0	-22.0	EUT horz, High ch., 2 Mbps
2483.510	45.2	-3.8	1.5	24.9	0.0	10.0	Vert	PK	0.0	51.4	74.0	-22.6	EUT on side, High ch., 2 Mbps
2483.613	45.0	-3.8	1.5	214.0	0.0	10.0	Horz	PK	0.0	51.2	74.0	-22.8	EUT vert, High ch., 2 Mbps
2388.537	44.2	-3.6	1.1	16.0	0.0	10.0	Vert	PK	0.0	50.6	74.0	-23.4	EUT on side, Low ch., 2 Mbps
2484.830	44.1	-3.8	1.5	0.0	0.0	10.0	Vert	PK	0.0	50.3	74.0	-23.7	EUT horz, High ch., 2 Mbps
2484.097	44.1	-3.8	1.5	181.9	0.0	10.0	Vert	PK	0.0	50.3	74.0	-23.7	EUT vert, High ch., 2 Mbps
2483.777	43.7	-3.8	1.5	272.9	0.0	10.0	Horz	PK	0.0	49.9	74.0	-24.1	EUT on side, High ch., 2 Mbps
2389.480	43.3	-3.6	1.5	157.9	0.0	10.0	Horz	PK	0.0	49.7	74.0	-24.3	EUT horz, Low ch., 2 Mbps
4883.367	41.4	4.7	1.9	322.9	0.0	0.0	Horz	PK	0.0	46.1	74.0	-27.9	EUT on side, Mid ch., 2 Mbps
4960.270	41.2	4.8	1.5	339.0	0.0	0.0	Horz	PK	0.0	46.0	74.0	-28.0	EUT on side, High ch., 2 Mbps
4884.573	41.2	4.7	1.5	200.9	0.0	0.0	Vert	PK	0.0	45.9	74.0	-28.1	EUT on side, Mid ch., 2 Mbps
4960.360	40.9	4.8	1.5	217.0	0.0	0.0	Vert	PK	0.0	45.7	74.0	-28.3	EUT on side, High ch., 2 Mbps
12400.160	40.3	5.4	1.9	239.9	0.0	0.0	Horz	PK	0.0	45.7	74.0	-28.3	EUT on side, High ch., 2 Mbps
4804.793	41.0	4.6	2.8	303.0	0.0	0.0	Horz	PK	0.0	45.6	74.0	-28.4	EUT on side, Low ch., 2 Mbps
4804.390	40.8	4.6	1.5	54.0	0.0	0.0	Vert	PK	0.0	45.4	74.0	-28.6	EUT on side, Low ch., 2 Mbps
12400.780	39.6	5.4	1.5	300.9	0.0	0.0	Vert	PK	0.0	45.0	74.0	-29.0	EUT on side, High ch., 2 Mbps
12399.840	42.7	-0.6	2.0	346.0	0.0	0.0	Horz	PK	0.0	42.1	74.0	-31.9	EUT on side, High ch., 2 Mbps
12209.950	43.5	-1.7	1.9	15.0	0.0	0.0	Horz	PK	0.0	41.8	74.0	-32.2	EUT on side, Mid ch., 2 Mbps
12009.840	42.9	-2.2	2.2	1.9	0.0	0.0	Horz	PK	0.0	40.7	74.0	-33.3	EUT on side, Low ch., 2 Mbps
12399.650	39.8	-0.6	1.5	207.9	0.0	0.0	Vert	PK	0.0	39.2	74.0	-34.8	EUT on side, High ch., 2 Mbps
12209.770	40.6	-1.7	1.5	198.0	0.0	0.0	Vert	PK	0.0	38.9	74.0	-35.1	EUT on side, Mid ch., 2 Mbps
12010.780	40.9	-2.2	1.5	272.9	0.0	0.0	Vert	PK	0.0	38.7	74.0	-35.3	EUT on side, Low ch., 2 Mbps

Report No. STAK0183 14/45



XMit 2019.09.05

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	30-Apr-19	30-Apr-22
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFD	28-Jul-19	28-Jul-20
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	MNU	11-Apr-19	11-Apr-20
Block - DC	Fairview Microwave	SD3379	AMI	6-Aug-19	6-Aug-20
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-19	13-Feb-20

TEST DESCRIPTION

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.

Report No. STAK0183 15/45

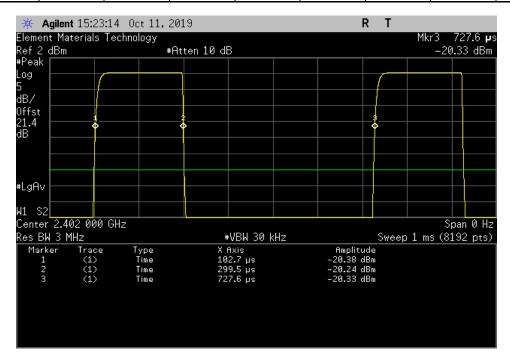


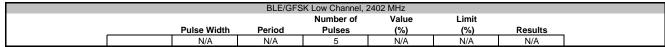
					TbtTx 2019.08.30.0	XMit 2019.09.05
EUT: RIC 312				Work Order:	STAK0183	
Serial Number: 190645258					11-Oct-19	
Customer: Starkey Laboratories, Inc.				Temperature:	21.7 °C	
Attendees: Charlie Esch				Humidity:	38.9% RH	
Project: None				Barometric Pres.:	1010 mbar	
Tested by: Andrew Rogstad	Power: 1.4 VDC			Job Site:	MN09	
TEST SPECIFICATIONS	Test Method					
FCC 15.247:2019	ANSI C63.10:2013					
COMMENTS						
Reference level offset includes measurment cable, DC block, and 20 dB atte	enuator.					
DEVIATIONS FROM TEST STANDARD						
None						
Configuration # 2 Signature	Chy Ropton					
			Number of	Value	Limit	
	Pulse Width	Period	Pulses	(%)	(%)	Results
BLE/GFSK Low Channel, 2402 MHz	196.8 us	624.9 us	1	31.5	N/A	N/A
BLE/GFSK Low Channel, 2402 MHz	N/A	N/A	5	N/A	N/A	N/A
BLE/GFSK Mid Channel, 2442 MHz	197.2 us	625 us	1	31.6	N/A	N/A
BLE/GFSK Mid Channel, 2442 MHz	N/A	N/A	5	N/A	N/A	N/A
						IN/A
BLE/GFSK High Channel, 2480 MHz	196.9 us	624.9 us	1	31.5	N/A	N/A

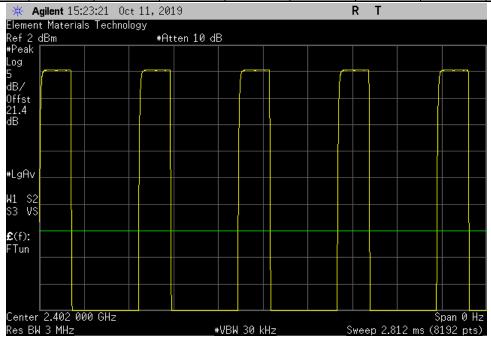
Report No. STAK0183



		BLE/GFS	K Low Channel, 2	2402 MHz		
			Number of	Value	Limit	
	Pulse Width	Period	Pulses	(%)	(%)	Results
	196.8 us	624.9 us	1	31.5	N/A	N/A



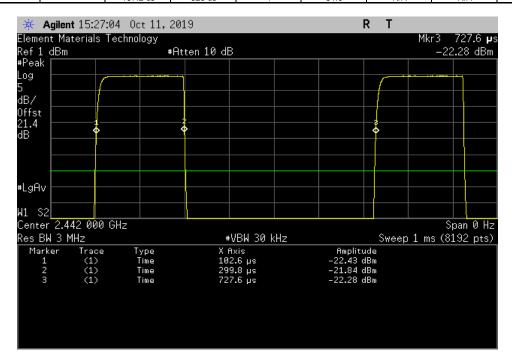


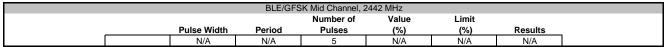


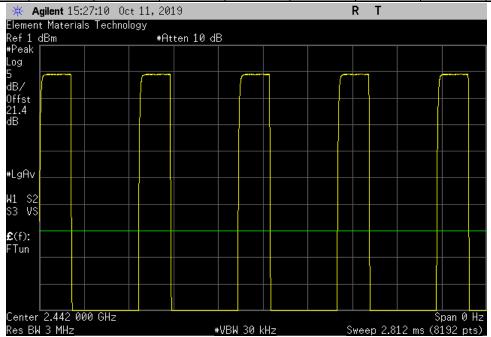
Report No. STAK0183 17/45



		BLE/GFS	SK Mid Channel, 2	2442 MHz		
			Number of	Value	Limit	
	Pulse Width	Period	Pulses	(%)	(%)	Results
	197.2 us	625 us	1	31.6	N/A	N/A



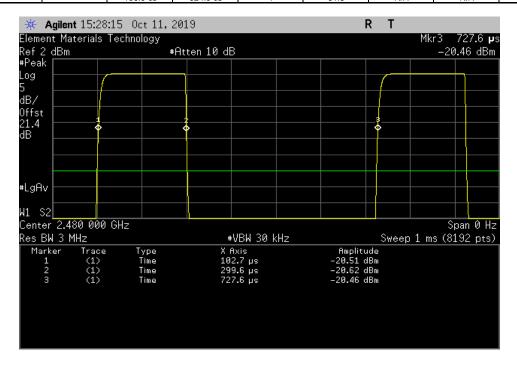


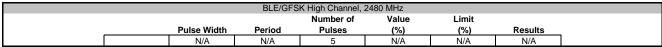


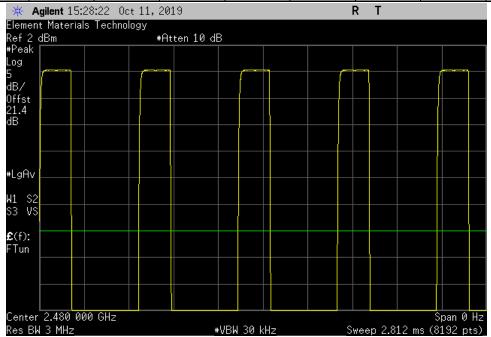
Report No. STAK0183 18/45



		BLE/GFS	K High Channel,	2480 MHz		
			Number of	Value	Limit	
	Pulse Width	Period	Pulses	(%)	(%)	Results
	196.9 us	624.9 us	1	31.5	N/A	N/A







Report No. STAK0183 19/45



XMit 2019.09.05

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5173B	TIW	5-Jul-17	5-Jul-20
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	MNU	11-Apr-19	11-Apr-20
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-19	13-Feb-20
Block - DC	Fairview Microwave	SD3379	AMI	6-Aug-19	6-Aug-20
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	1-May-19	1-May-20

TEST DESCRIPTION

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 occupied bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The 99.0% occupied bandwidth was also measured at the same time which can be needed during Output Power depending on the applicable method.

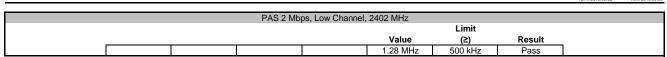
Report No. STAK0183 20/45



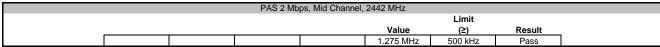
						TbtTx 2019.08.02	XMit 2019.09.05
EUT: L	Livio RIC 312				Work Order:	STAK0183	
Serial Number: 1	190645258				Date:	30-Sep-19	
Customer: S	Starkey Laboratories, Inc.				Temperature:	21.1 °C	
Attendees: 0	Charlie Esch				Humidity:	66.1% RH	
Project:	None				Barometric Pres.:	1010 mbar	
Tested by: [Dustin Sparks			Power: Battery	Job Site:	MN08	
TEST SPECIFICATION	DNS			Test Method			
FCC 15.247:2019				ANSI C63.10:2013			
				Ì			
COMMENTS							
None							
DEVIATIONS FROM	TEST STANDARD						
None							
			1				
Configuration #	2		X J	stingpards			
		Signature	- 500	pares			
	•					Limit	
					Value	(≥)	Result
PAS 2 Mbps, Low Cha	annel, 2402 MHz				1.28 MHz	500 kHz	Pass
PAS 2 Mbps, Mid Cha					1.275 MHz	500 kHz	Pass
PAS 2 Mbps, High Ch					1.281 MHz	500 kHz	Pass

Report No. STAK0183 21/45











Report No. STAK0183 22/45

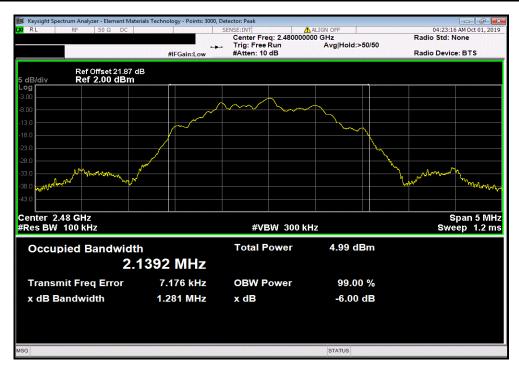


PAS 2 Mbps, High Channel, 2480 MHz

Limit

Value (2) Result

1.281 MHz 500 kHz Pass



Report No. STAK0183 23/45



XMit 2019.09.05

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5173B	TIW	5-Jul-17	5-Jul-20
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	MNU	11-Apr-19	11-Apr-20
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-19	13-Feb-20
Block - DC	Fairview Microwave	SD3379	AMI	6-Aug-19	6-Aug-20
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	1-May-19	1-May-20

TEST DESCRIPTION

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.

Report No. STAK0183 24/45



						TbtTx 2019.08.02	XMit 2019.09.05
EUT: Livi	io RIC 312				Work Order:	STAK0183	
Serial Number: 190	645258				Date:	30-Sep-19	
Customer: Sta	rkey Laboratories, Inc.				Temperature:	21.1 °C	
Attendees: Cha					Humidity:	67.3% RH	
Project: Nor					Barometric Pres.:		
Tested by: Dus			Power:	Battery	Job Site:		
TEST SPECIFICATIONS				Test Method			
FCC 15.247:2019				ANSI C63.10:2013			
COMMENTS							
None							
DEVIATIONS FROM TE	CT CTANDADD						
	SISIANDARD						
None							
	_		9010) 2			
Configuration #	2		Justine	Spares			
		Signature					
					Out Pwr	Limit	
					(dBm)	(dBm)	Result
PAS 2 Mbps, Low Chann	nel, 2402 MHz				-1.943	30	Pass
PAS 2 Mbps, Mid Chann	el. 2442 MHz				-3.541	30	Pass
PAS 2 Mbps, High Chan					-1.92	30	Pass
zpo, riigii Onaii	, 22				1.52	50	. 400

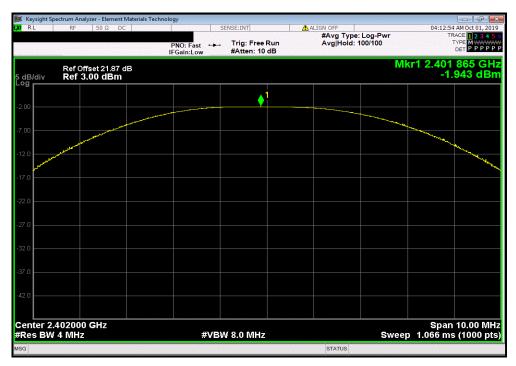
Report No. STAK0183 25/45



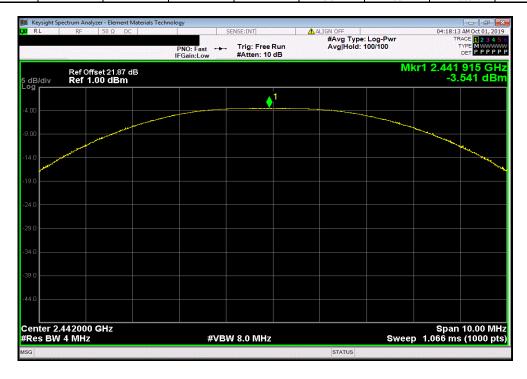
PAS 2 Mbps, Low Channel, 2402 MHz

Out Pwr Limit
(dBm) (dBm) Result

-1.943 30 Pass



	PAS 2 Mb	ps, Mid Channel,	2442 MHz		
			Out Pwr	Limit	
			(dBm)	(dBm)	Result
			-3.541	30	Pass



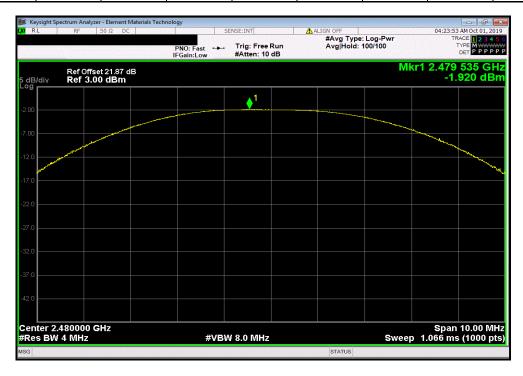
Report No. STAK0183 26/45



PAS 2 Mbps, High Channel, 2480 MHz

Out Pwr Limit
(dBm) (dBm) Result

-1.92 30 Pass



Report No. STAK0183 27/45



XMit 2019.09.05

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5173B	TIW	5-Jul-17	5-Jul-20
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	MNU	11-Apr-19	11-Apr-20
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-19	13-Feb-20
Block - DC	Fairview Microwave	SD3379	AMI	6-Aug-19	6-Aug-20
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	1-May-19	1-May-20

TEST DESCRIPTION

The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum.

Prior to measuring peak transmit power the DTS bandwidth (B) was measured.

The method found in ANSI C63.10:2013 Section 11.9.1.1 was used because the RBW on the analyzer was greater than the DTS Bandwidth of the radio.

The antenna gain was added to out the conducted output power value to calculate the EIRP.

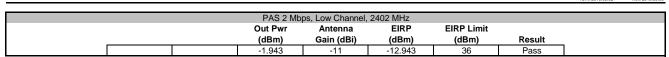
Report No. STAK0183 28/45

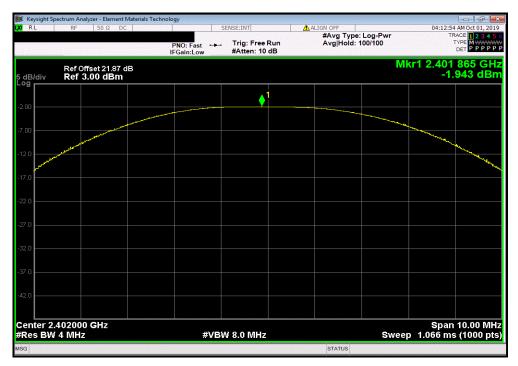


								TbtTx 2019.08.02	XMit 2019.09.05
EUT:	Livio RIC 312						Work Order:	STAK0183	
Serial Number:	190645258						Date:	30-Sep-19	
Customer:	Starkey Laboratories, Inc).					Temperature:	21.2 °C	
Attendees:	Charlie Esch						Humidity:	68.3% RH	
Project:	None						Barometric Pres.:	1010 mbar	
Tested by:	Dustin Sparks		Powe	r: Battery			Job Site:	MN08	
TEST SPECIFICAT	IONS			Test Method					
FCC 15.247:2019				ANSI C63.10:2013					
COMMENTS									
None									
DEVIATIONS FROM	M TEST STANDARD								
None									
			A .						
Configuration #	2		of the trans	Spares					
J		Signature	- Jus John	Sparco					
					Out Pwr	Antenna	EIRP	EIRP Limit	
					(dBm)	Gain (dBi)	(dBm)	(dBm)	Result
PAS 2 Mbps, Low C	channel, 2402 MHz				-1.943	-11	-12.943	36	Pass
PAS 2 Mbps, Mid C					-3.541	-11	-14.541	36	Pass
PAS 2 Mbps, High C					-1.92	-11	-12.92	36	Pass
i / to z iviopa, i ligii c	7110111101, 2700 WII IZ				1.02	11	12.02	55	1 433

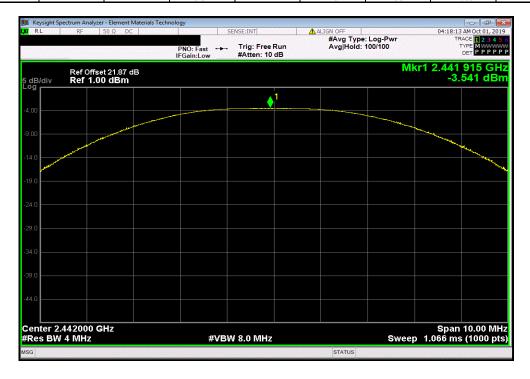
Report No. STAK0183 29/45







PAS 2 Mbps, Mid Channel, 2442 MHz								
		Out Pwr	Antenna	EIRP	EIRP Limit			
		(dBm)	Gain (dBi)	(dBm)	(dBm)	Result		
		-3.541	-11	-14.541	36	Pass		



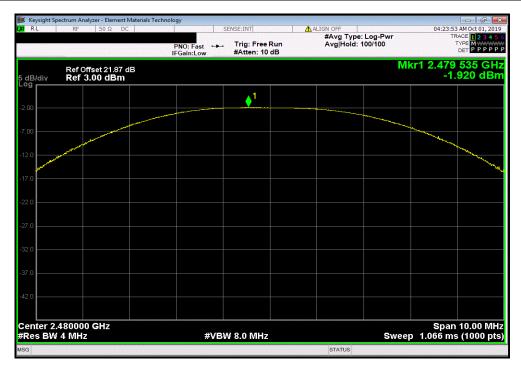
Report No. STAK0183 30/45



PAS 2 Mbps, High Channel, 2480 MHz

Out Pwr Antenna EIRP EIRP Limit
(dBm) Gain (dBi) (dBm) (dBm) Result

-1.92 -11 -12.92 36 Pass



Report No. STAK0183 31/45



XMit 2019.09.05

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5173B	TIW	5-Jul-17	5-Jul-20
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	MNU	11-Apr-19	11-Apr-20
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-19	13-Feb-20
Block - DC	Fairview Microwave	SD3379	AMI	6-Aug-19	6-Aug-20
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	1-May-19	1-May-20

TEST DESCRIPTION

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.

Report No. STAK0183 32/45



						TbtTx 2019.08.02	XMit 2019.09.05
EUT:	Livio RIC 312				Work Order:	STAK0183	
Serial Number:	190645258				Date:	30-Sep-19	
Customer:	Starkey Laboratories, Inc				Temperature:	21.1 °C	
Attendees:	Charlie Esch				Humidity:	68.2% RH	
Project:	None				Barometric Pres.:	1010 mbar	
	Dustin Sparks			Power: Battery	Job Site:	MN08	
TEST SPECIFICATI	IONS			Test Method			
FCC 15.247:2019				ANSI C63.10:2013			
COMMENTS							
None							
DEVIATIONS FROM	I TEST STANDARD						
None							
Configuration #	2	Signature	29	tustinSparls			
		_			Value dBm/3kHz	Limit < dBm/3kHz	Results
PAS 2 Mbps, Low C	hannel, 2402 MHz				-19.997	8	Pass
PAS 2 Mbps, Mid Ch	nannel, 2442 MHz				-21.536	8	Pass
PAS 2 Mbps, High C	Channel, 2480 MHz				-19.963	8	Pass

Report No. STAK0183 33/45

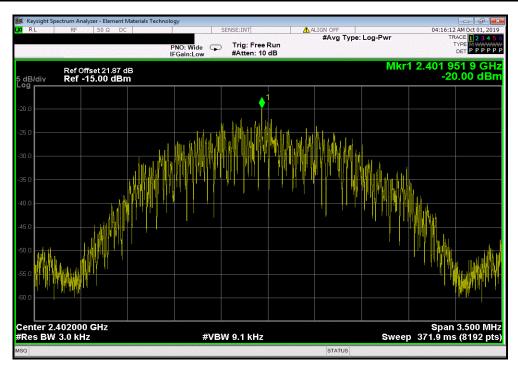


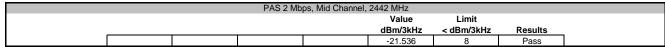
PAS 2 Mbps, Low Channel, 2402 MHz

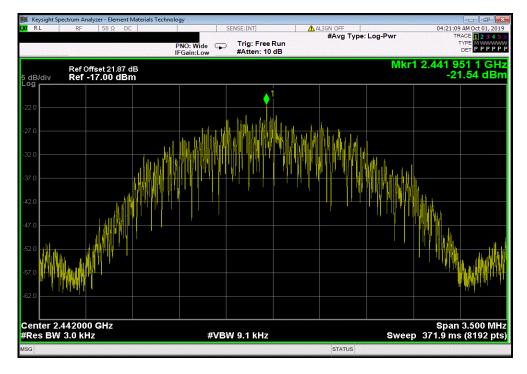
Value Limit

dBm/3kHz < dBm/3kHz Results

-19.997 8 Pass







Report No. STAK0183 34/45

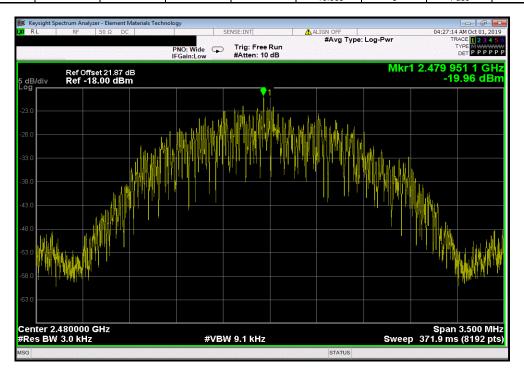


PAS 2 Mbps, High Channel, 2480 MHz

Value Limit

dBm/3kHz < dBm/3kHz Results

-19.963 8 Pass



Report No. STAK0183 35/45

BAND EDGE COMPLIANCE



XMit 2019.09.05

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5173B	TIW	5-Jul-17	5-Jul-20
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	MNU	11-Apr-19	11-Apr-20
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-19	13-Feb-20
Block - DC	Fairview Microwave	SD3379	AMI	6-Aug-19	6-Aug-20
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	1-May-19	1-May-20

TEST DESCRIPTION

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.

Report No. STAK0183 36/45

BAND EDGE COMPLIANCE



						TbtTx 2019.08.02	XMit 2019.09.06
EUT:	Livio RIC 312				Work Order:	STAK0183	
Serial Number:	190645258				Date:	30-Sep-19	
Customer:	Starkey Laboratories, Inc.				Temperature:	21.2 °C	
Attendees:	Charlie Esch				Humidity:	69.8% RH	
Project:	None				Barometric Pres.:	1010 mbar	
Tested by:	Dustin Sparks		Power:	Battery	Job Site:	MN08	
TEST SPECIFICATI	IONS			Test Method			
FCC 15.247:2019				ANSI C63.10:2013			
COMMENTS							
None							
DEVIATIONS FROM	/I TEST STANDARD						
None							
Configuration #	2	Signature	Tusting	Spards			
					Value	Limit	
					(dBc)	≤ (dBc)	Result
PAS 2 Mbps, Low C	hannel, 2402 MHz				-26.07	-20	Pass
PAS 2 Mbps, High C	Channel, 2480 MHz				-38.19	-20	Pass

Report No. STAK0183 37/45

BAND EDGE COMPLIANCE



PAS 2 Mbps, Low Channel, 2402 MHz

Value Limit
(dBc) ≤ (dBc) Result

-26.07 -20 Pass



		PAS 2 Mbr	os, High Channel,	2480 MHz		
Value					Limit	
				(dBc)	≤ (dBc)	Result
				-38.19	-20	Pass



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XMit 2019.09.05

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5173B	TIW	5-Jul-17	5-Jul-20
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	MNU	11-Apr-19	11-Apr-20
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-19	13-Feb-20
Block - DC	Fairview Microwave	SD3379	AMI	6-Aug-19	6-Aug-20
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	1-May-19	1-May-20

TEST DESCRIPTION

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 spectrum was scanned throughout the specified frequency range.

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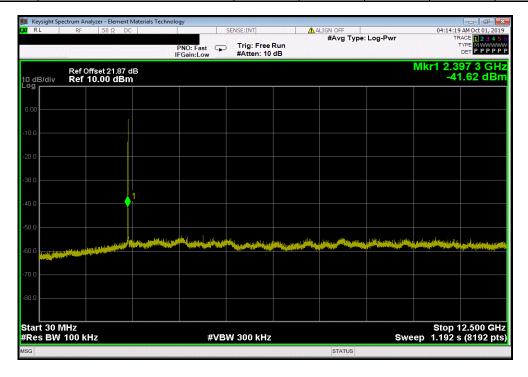
COMMENTS None DEVIATIONS FROM TEST STANDARD					TbtTx 2019.08.02	XMit 2019.09.05
Customer: Starkey Laboratories, Inc.						
Attendees: Charlie Esch						
Project None Barometric Pres. 1010 mbar		ratories, Inc.		Temperature:	21.1 °C	
Tested by: Dustin Sparks Power: Battery Job Site: MN08						
TEST SPECIFICATIONS FCC 15.247:2019 ANSI C63.10:2013 COMMENTS None DEVIATIONS FROM TEST STANDARD						
ANSI C63.10:2013		Power: Battery		Job Site:	MN08	
COMMENTS	TEST SPECIFICATIONS	Test Method				
DEVIATIONS FROM TEST STANDARD	FCC 15.247:2019	ANSI C63.10:201	3			
DEVIATIONS FROM TEST STANDARD			<u> </u>			
DEVIATIONS FROM TEST STANDARD	COMMENTS	_				
PAS 2 Mbps, Low Channel, 2402 MHz Signature Frequency Measured Max Value Limit Range Freq (MHz) Max Value Limit Range Freq (MHz) Max Value Limit Range Freq (MHz) Max Value Limit L	None					
PAS 2 Mbps, Low Channel, 2402 MHz Signature Frequency Measured Max Value Limit Range Freq (MHz) Max Value Limit Range Freq (MHz) Max Value Limit Range Freq (MHz) Max Value Limit L						
PAS 2 Mbps, Low Channel, 2402 MHz Signature Frequency Measured Max Value Limit Range Freq (MHz) Max Value Limit Range Freq (MHz) Max Value Limit Range Freq (MHz) Max Value Limit L						
PAS 2 Mbps, Low Channel, 2402 MHz Signature Signature Frequency Range Freq (MHz) Max Value (dBc) Result	DEVIATIONS FROM TEST STAN	ARD				
Signature Frequency Measured Max Value Limit (dBc) Result	None					
Signature Frequency Measured Max Value Limit (dBc) Result		A 11 0 1				
Frequency Range	Configuration #	Vistraxondo	_			
Range Freq (MHz) (dBc) ≤ (dBc) Result PAS 2 Mbps, Low Channel, 2402 MHz Fundamental 2402.02 N/A N/A N/A PAS 2 Mbps, Low Channel, 2402 MHz 30 MHz - 12.5 GHz 2397.34 38.22 -20 Pass PAS 2 Mbps, Low Channel, 2402 MHz 12.5 GHz - 25 GHz 24290.38 -47.62 -20 Pass PAS 2 Mbps, Mid Channel, 2442 MHz Fundamental 2442.02 N/A N/A N/A PAS 2 Mbps, Mid Channel, 2442 MHz 30 Mtz - 12.5 GHz 3816.22 -48.21 -20 Pass PAS 2 Mbps, Migh Channel, 2442 MHz 12.5 GHz - 25 GHz 23719.63 -44.56 -20 Pass PAS 2 Mbps, High Channel, 2480 MHz Fundamental 2480.01 N/A N/A N/A PAS 2 Mbps, High Channel, 2480 MHz 30 Mtz - 12.5 GHz 2487.16 -48.13 -20 Pass						
PAS 2 Mbps, Low Channel, 2402 MHz 30 MHz - 12.5 GHz 2397.34 38.22 -20 Pass PAS 2 Mbps, Low Channel, 2402 MHz 12.5 GHz - 25 GHz 24290.38 -47.62 -20 Pass PAS 2 Mbps, Mid Channel, 2442 MHz Fundamental 2442.02 N/A N/A N/A PAS 2 Mbps, Mid Channel, 2442 MHz 30 MHz - 12.5 GHz 3816.22 -48.21 -20 Pass PAS 2 Mbps, Mid Channel, 2442 MHz 12.5 GHz - 25 GHz 23719.63 -44.56 -20 Pass PAS 2 Mbps, High Channel, 2480 MHz 480.01 N/A N/A N/A PAS 2 Mbps, High Channel, 2480 MHz 30 MHz - 12.5 GHz 2487.16 -48.13 -20 Pass						
PAS 2 Mbps, Low Channel, 2402 MHz 30 MHz - 12.5 GHz 2397.34 -38.22 -20 Pass PAS 2 Mbps, Low Channel, 2402 MHz 12.5 GHz 24290.38 -47.62 -20 Pass PAS 2 Mbps, Mid Channel, 2442 MHz Fundamental 2442.02 N/A N/A N/A N/A PAS 2 Mbps, Mid Channel, 2442 MHz 30 MHz - 12.5 GHz 3816.22 -48.21 -20 Pass PAS 2 Mbps, Mid Channel, 2442 MHz 12.5 GHz 23719.63 -44.56 -20 Pass PAS 2 Mbps, Migh Channel, 2449 MHz 12.5 GHz 23719.63 -44.56 -20 Pass PAS 2 Mbps, High Channel, 2440 MHz 2480 MHz 30 MHz - 12.5 GHz 2487.16 -48.13 -20 Pass					` '	
PAS 2 Mbps, Low Channel, 2402 MHz PAS 2 Mbps, Mid Channel, 2402 MHz PAS 2 Mbps, Mid Channel, 2442 MHz PAS 2 Mbps, Mid Channel, 2448 MHz PAS 2 Mbps, High Channel, 2480 MHz						
PAS 2 Mbps, Mid Channel, 2442 MHz Fundamental 2442.02 N/A N/A N/A PAS 2 Mbps, Mid Channel, 2442 MHz 30 MHz - 12.5 GHz 3816.22 -48.21 -20 Pass PAS 2 Mbps, Mid Channel, 2442 MHz 12.5 GHz 25 GHz 23719.63 -44.56 -20 Pass PAS 2 Mbps, High Channel, 2480 MHz 12.5 GHz 2480.11 N/A N/A N/A PAS 2 Mbps, High Channel, 2480 MHz 30 MHz - 12.5 GHz 2487.16 -48.13 -20 Pass						
PAS 2 Mbps, Mid Channel, 2442 MHz 30 MHz - 12.5 GHz 3816.22 -48.21 -20 Pass PAS 2 Mbps, Mid Channel, 2442 MHz 12.5 GHz 23719.63 -44.56 -20 Pass PAS 2 Mbps, High Channel, 2480 MHz 12.5 GHz 2480.01 N/A N/A N/A PAS 2 Mbps, High Channel, 2480 MHz 30 MHz - 12.5 GHz 2487.16 -48.13 -20 Pass						
PAS 2 Mbps, High Channel, 2442 MHz 12.5 GHz 23719.63 -44.56 -20 Pass PAS 2 Mbps, High Channel, 2480 MHz 12.5 GHz 2480.01 N/A N/A N/A PAS 2 Mbps, High Channel, 2480 MHz 2480.01 S 30 MHz - 12.5 GHz 2487.16 -48.13 -20 Pass				N/A		N/A
PAS 2 Mbps, High Channel, 2480 MHz Fundamental 2480.01 N/A N/A N/A PAS 2 Mbps, High Channel, 2480 MHz 30 MHz - 12.5 GHz 2487.16 -48.13 -20 Pass						
PAS 2 Mbps, High Channel, 2480 MHz 30 MHz - 12.5 GHz 2487.16 -48.13 -20 Pass	PAS 2 Mbps, Mid Channel, 2442 M	dz 12.5 GHz - 25 GH	z 23719.63	-44.56	-20	Pass
	PAS 2 Mbps, High Channel, 2480	1Hz Fundamental	2480.01	N/A	N/A	N/A
PAS 2 Mbps, High Channel, 2480 MHz 12.5 GHz 24001.95 -46.88 -20 Pass	PAS 2 Mbps, High Channel, 2480	1Hz 30 MHz - 12.5 GF	z 2487.16	-48.13	-20	Pass
	DAG 0 Miles - 18-6 Observed 0400					

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PAS 2 Mbps, Low Channel, 2402 MHz						
Frequency	Measured	Max Value	Limit			
Range	Freq (MHz)	(dBc)	≤ (dBc)	Result		
30 MHz - 12.5 GHz	2397.34	-38.22	-20	Pass		



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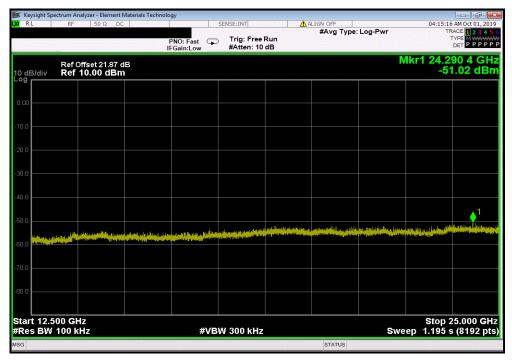


PAS 2 Mbps, Low Channel, 2402 MHz

Frequency Measured Max Value Limit

Range Freq (MHz) (dBc) ≤ (dBc) Result

12.5 GHz - 25 GHz 24290.38 -47.62 -20 Pass



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



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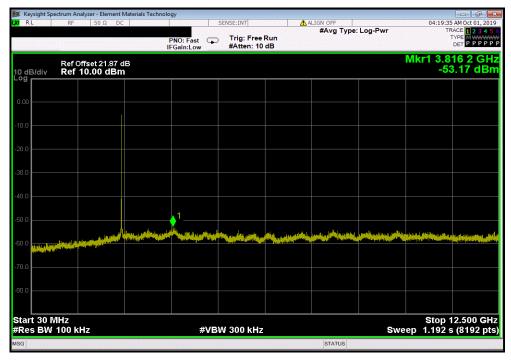


PAS 2 Mbps, Mid Channel, 2442 MHz

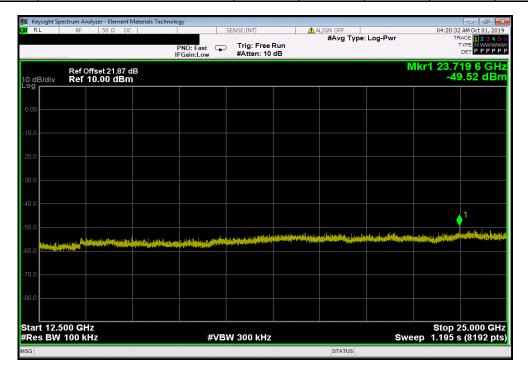
Frequency Measured Max Value Limit

Range Freq (MHz) (dBc) ≤ (dBc) Result

30 MHz - 12.5 GHz 3816.22 -48.21 -20 Pass

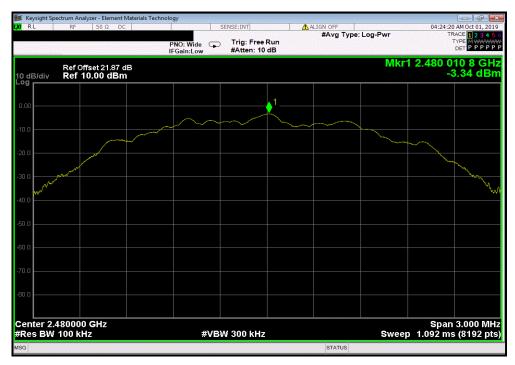


	PAS 2 Mbps, Mid Channel, 2442 MHz				
	Frequency	Measured	Max Value	Limit	
	Range	Freq (MHz)	(dBc)	≤ (dBc)	Result
I	12.5 GHz - 25 GHz	23719.63	-44.56	-20	Pass

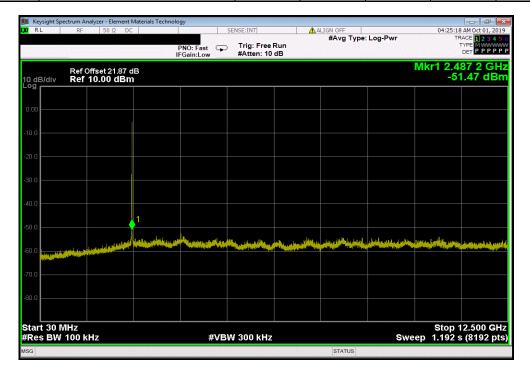


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	PAS 2 Mbps, High Channel, 2480 MHz				
	Frequency	Measured	Max Value	Limit	
_	Range	Freq (MHz)	(dBc)	≤ (dBc)	Result
ı	30 MHz - 12.5 GHz	2487.16	-48.13	-20	Pass



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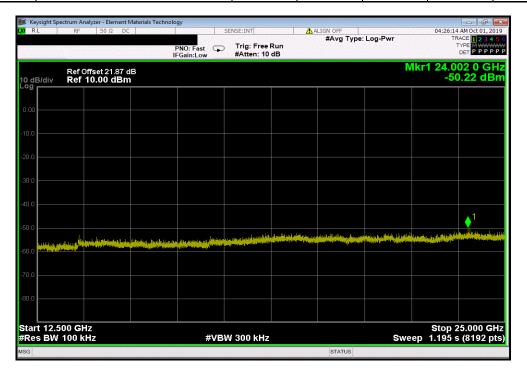


PAS 2 Mbps, High Channel, 2480 MHz

Frequency Measured Max Value Limit

Range Freq (MHz) (dBc) ≤ (dBc) Result

12.5 GHz - 25 GHz 24001.95 -46.88 -20 Pass



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