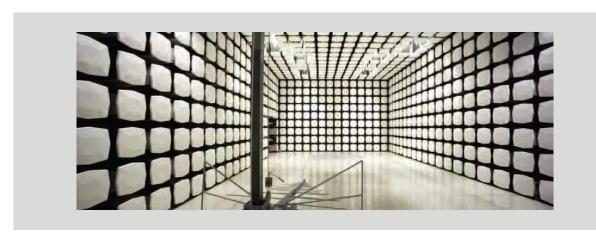


Starkey Laboratories, Inc.

Livio BTE 13

FCC 15.247:2019 Bluetooth

Report # STAK0184







NVLAP LAB CODE: 200881-0

CERTIFICATE OF TEST



Last Date of Test: October 25, 2019 Starkey Laboratories, Inc. EUT: Livio BTE 13

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2019	ANSI C63.10:2013

Results

Results				
Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	No	N/A	Not required for a battery powered EUT.
11.6	Duty Cycle	Yes	Pass	
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	
11.12.1, 11.13.2, 6.5, 6.6	Spurious Radiated 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.

Report No. STAK0184 2/62

REVISION HISTORY



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

Report No. STAK0184 3/62

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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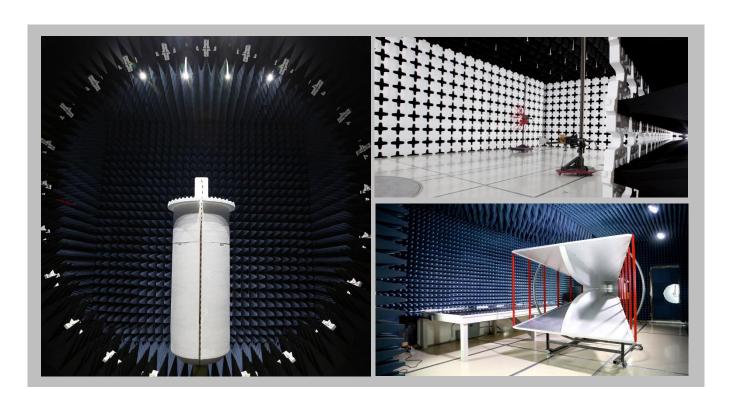
FACILITIES







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 (949) 861-8918	Brooklyn Park, MN 55445 (612)-638-5136	Hillsboro, OR 97124 (503) 844-4066	Plano, TX 75074 (469) 304-5255	Bothell, WA 98011 (425)984-6600
(848) 881 8818	(812) 888 8188	(000) 044 4000	(400) 004 0200	(420)004 0000
		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, Sci	ence and Economic Develop	ment 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	ecognized Phase I CAB for IS	SED, ACMA, BSMI, IDA, KCC/	RRA, MIC, MOC, NCC, OI	-CA
US0158	US0175	US0017	US0191	US0157



Report No. STAK0184 5/62

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 WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) for each test is on each data sheet. 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.

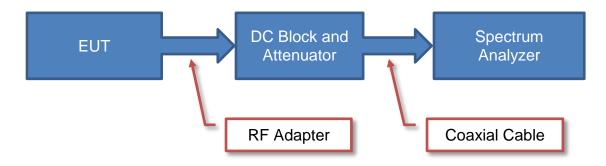
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	2.4 dB	-2.4 dB

Report No. STAK0184 6/62

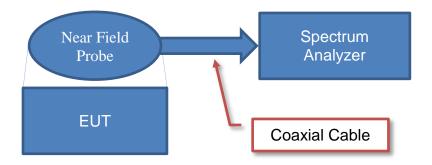
Test Setup Block Diagrams



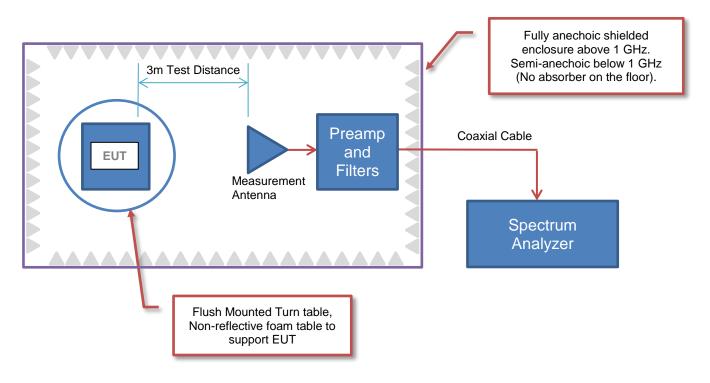
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



Report No. STAK0184 7/62

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 BTE 13
First Date of Test:	October 23, 2019
Last Date of Test:	October 25, 2019
Receipt Date of Samples:	October 23, 2019
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:	
Hearing aid with 2.4 GHz and NFMI	

Testing Objective:

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

Report No. STAK0184 8/62

CONFIGURATIONS



Configuration STAK0184- 1

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Hearing Aid	Starkey Laboratories, Inc.	Livio BTE 13	190592167

Configuration STAK0184-3

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Hearing Aid	Starkey Laboratories, Inc.	Livio BTE 13	190592168

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MODIFICATIONS



Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2019-10-23	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.
2	2019-10-23	Occupied Bandwidth	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	2019-10-23	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT was taken home by the client before the next scheduled test.
4	2019-10-23	Equivalent Isotropic Radiated Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
5	2019-10-23	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.
6	2019-10-23	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.
7	2019-10-23	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	2019-10-25	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

Report No. STAK0184 10/62



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
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	1-May-19	1-May-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. STAK0184 11/62



EUT: Livio BTE 13

Serial Number: 190592167

Customer: Starkey Laboratories, Inc.
Attendees: Charlie Esch Work Order: STAK0184
Date: 23-Oct-19
Temperature: 23 °C Humidity: 34.8% RH
Barometric Pres.: 1015 mbar Project: None
Tested by: Andrew Rogstad
TEST SPECIFICATIONS Power: 1.25 VDC Test Method Job Site: MN08 FCC 15.247:2019 ANSI C63.10:2013 COMMENTS Reference level offset includes measurement cable, DC block, and 20 dB attenuator. Data for 2 Mbps modulation was taken on 10/23/2019 and data taken for 1 Mbps modulation was taken on 10/28/2019. DEVIATIONS FROM TEST STANDARD Rogertan Configuration # a Signature Value (%) Period 625.3 us Pulse Width Results Pulses (%) BLE/GFSK (2 Mbps) Low Channel, 2402 MHz BLE/GFSK (2 Mbps) Low Channel, 2402 MHz BLE/GFSK (2 Mbps) Mid Channel, 2442 MHz N/A 197.7 us N/A 625 us N/A N/A N/A N/A N/A N/A 31.6 BLE/GFSK (2 Mbps) Mid Channel, 2442 MHz BLE/GFSK (2 Mbps) High Channel, 2480 MHz N/A N/A 5 N/A N/A N/A N/A 197.1 us 624.9 us 31.5 BLE/GFSK (2 Mbps) High Channel, 2480 MHz N/A N/A 5 N/A N/A N/A BLE/GFSK (1 Mbps) Low Channel, 2402 MHz BLE/GFSK (1 Mbps) Low Channel, 2402 MHz 385.4 us N/A 624.9 us N/A 61.7 N/A N/A N/A N/A N/A BLE/GFSK (1 Mbps) Mid Channel, 2442 MHz BLE/GFSK (1 Mbps) Mid Channel, 2442 MHz 385.9 us 625.2 us N/A 61.7 N/A N/A N/A N/A N/A N/A 624.8 us BLE/GFSK (1 Mbps) High Channel, 2480 MHz BLE/GFSK (1 Mbps) High Channel, 2480 MHz 385.4 us N/A 61.7 N/A N/A N/A N/A N/A N/A

Report No. STAK0184

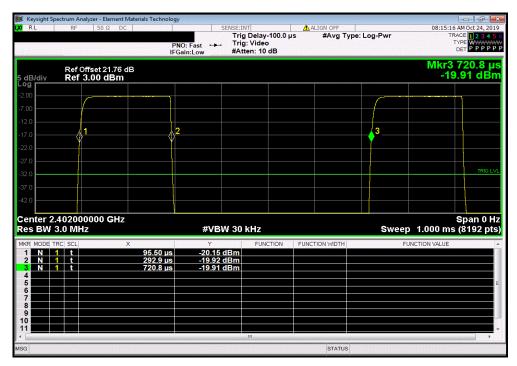


BLE/GFSK (2 Mbps) Low Channel, 2402 MHz

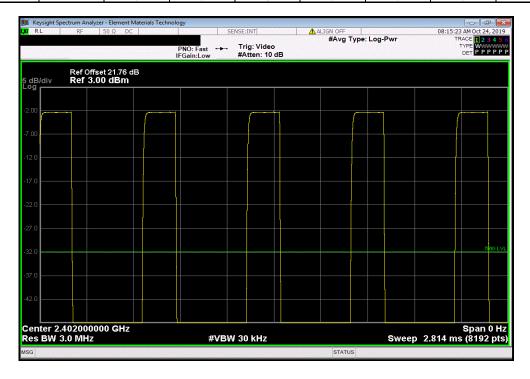
Number of Value Limit

Pulse Width Period Pulses (%) (%) Results

197.4 us 625.3 us 1 31.6 N/A N/A



	BLE/GFSK (2 Mbps) Low Channel, 2402 MHz						
				Number of	Value	Limit	
		Pulse Width	Period	Pulses	(%)	(%)	Results
i		N/A	N/A	5	N/A	N/A	N/A



Report No. STAK0184 13/62

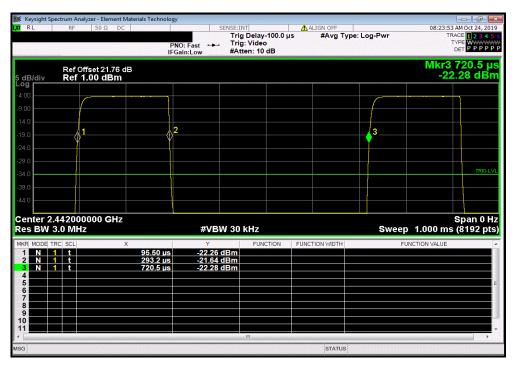


BLE/GFSK (2 Mbps) Mid Channel, 2442 MHz

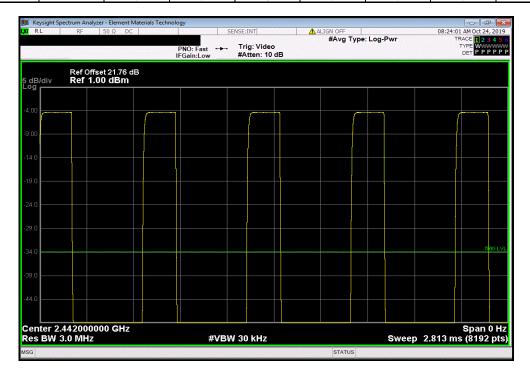
Number of Value Limit

Pulse Width Period Pulses (%) (%) Results

197.7 us 625 us 1 31.6 N/A N/A

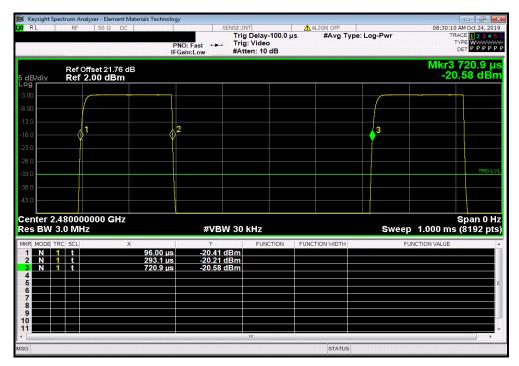


	BLE/GFSK (2 Mbps) Mid Channel, 2442 MHz									
	Number of Value Limit									
		Pulse Width	Period	Pulses	(%)	(%)	Results			
i		N/A	N/A	5	N/A	N/A	N/A			

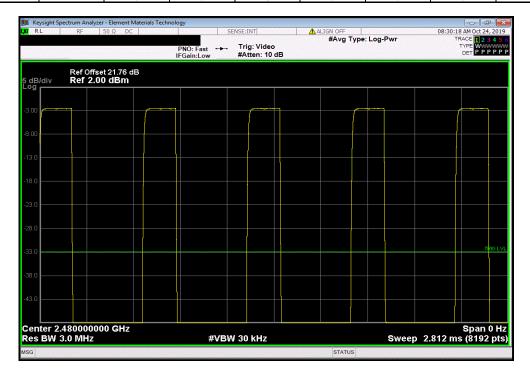


Report No. STAK0184 14/62





	BLE/GFSK (2 Mbps) High Channel, 2480 MHz									
	Number of Value Limit									
		Pulse Width	Period	Pulses	(%)	(%)	Results			
i		N/A	N/A	5	N/A	N/A	N/A			



Report No. STAK0184 15/62

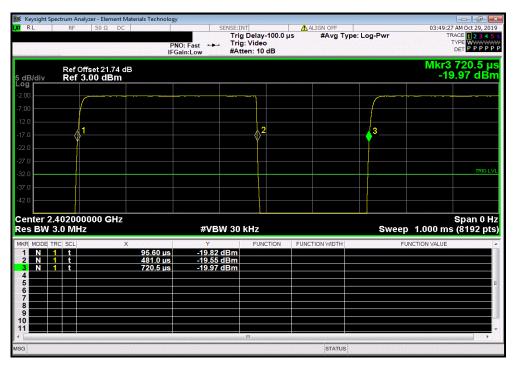


BLE/GFSK (1 Mbps) Low Channel, 2402 MHz

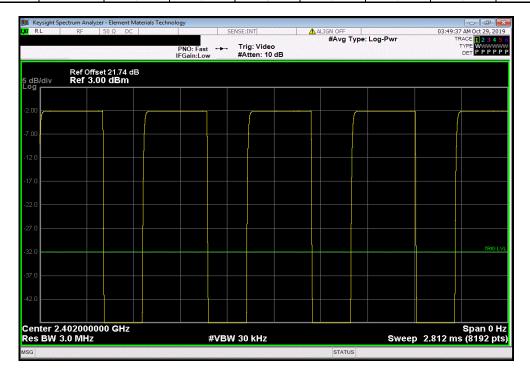
Number of Value Limit

Pulse Width Period Pulses (%) (%) Results

385.4 us 624.9 us 1 61.7 N/A N/A



	BLE/GFSK (1 Mbps) Low Channel, 2402 MHz									
				Number of	Value	Limit				
		Pulse Width	Period	Pulses	(%)	(%)	Results			
i		N/A	N/A	5	N/A	N/A	N/A			



Report No. STAK0184 16/62

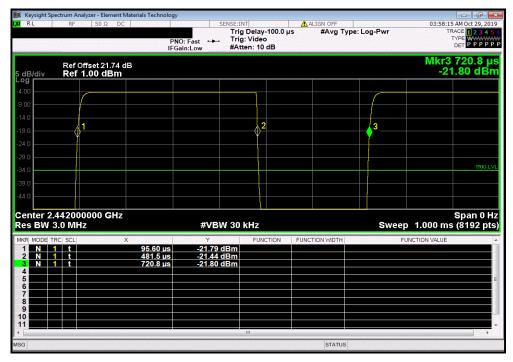


BLE/GFSK (1 Mbps) Mid Channel, 2442 MHz

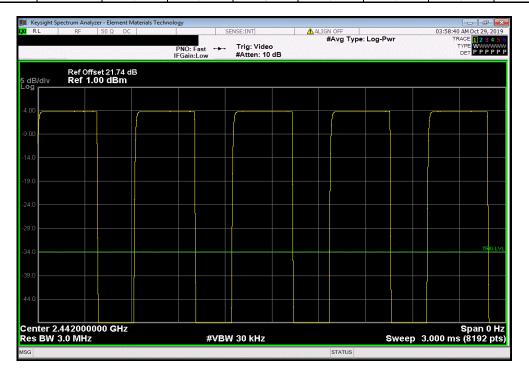
Number of Value Limit

Pulse Width Period Pulses (%) (%) Results

385.9 us 625.2 us 1 61.7 N/A N/A



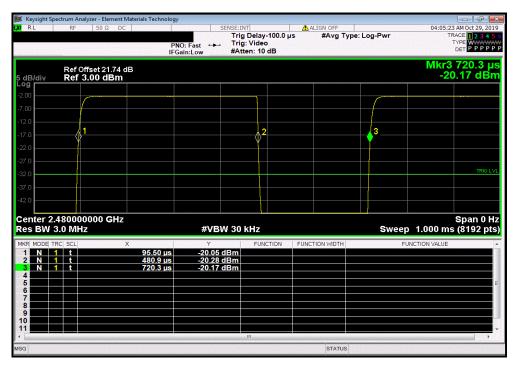
	BLE/GFSK (1 Mbps) Mid Channel, 2442 MHz									
	Number of Value Limit									
		Pulse Width	Period	Pulses	(%)	(%)	Results			
i		N/A	N/A	5	N/A	N/A	N/A			



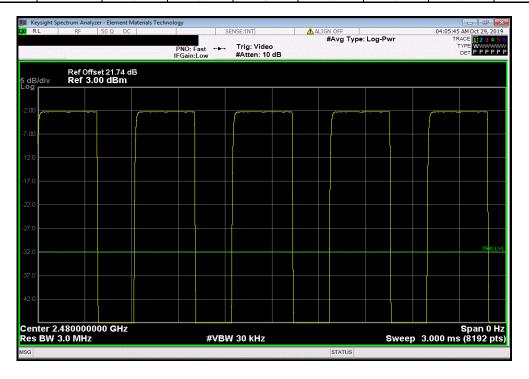
Report No. STAK0184 17/62



| BLE/GFSK (1 Mbps) High Channel, 2480 MHz
| Number of Value Limit
| Pulse Width | Period | Pulses (%) (%) | Results |
| 385.4 us | 624.8 us | 1 | 61.7 | N/A | N/A |



	BLE/GFSK (2 Mbps) High Channel, 2480 MHz									
	Number of Value Limit									
		Pulse Width	Period	Pulses	(%)	(%)	Results			
i		N/A	N/A	5	N/A	N/A	N/A			



Report No. STAK0184 18/62



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
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	1-May-19	1-May-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 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. STAK0184 19/62



						TbtTx 2019.08.30.0	XMit 2019.09.05
	Livio BTE 13				Work Order:		
Serial Number:	190592167				Date	23-Oct-19	
Customer:	Starkey Laboratories, Inc				Temperature	23.1 °C	
Attendees:	Charlie Esch				Humidity:	35% RH	
Project:	None				Barometric Pres.	1015 mbar	
Tested by:	Andrew Rogstad		Power	1.25 VDC	Job Site	MN08	
TEST SPECIFICATI	ONS			Test Method			
FCC 15.247:2019				ANSI C63.10:2013			
COMMENTS							
DEVIATIONS FROM		t casic, 50 block, and 20 ab attend	ator. Data for 2 msp	3 III Oddidio II Was taken on 19/29/20	19 and data taken for 1 Mbps modulatio	on was taken on 10/2	G/2013.
None							
Configuration #	1	Signature	an k	and the			
						Limit	
					Value	(≥)	Result
BLE/GFSK (2 Mbps)	Low Channel, 2402 MHz				1.282 MHz	500 kHz	Pass
BLE/GFSK (2 Mbps)	Mid Channel, 2442 MHz				1.281 MHz	500 kHz	Pass
BLE/GFSK (2 Mbps)	High Channel, 2480 MHz				1,279 MHz	500 kHz	Pass
BLE/GFSK (1 Mbps)	Low Channel, 2402 MHz				765.283 kHz	500 kHz	Pass
	Mid Channel, 2442 MHz				747.803 kHz	500 kHz	Pass
BLE/GFSK (1 Mbps)	High Channel, 2480 MHz				741.943 kHz	500 kHz	Pass

Report No. STAK0184 20/62



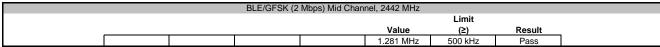
BLE/GFSK (2 Mbps) Low Channel, 2402 MHz

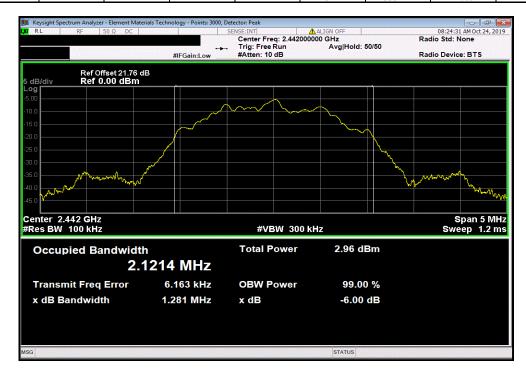
Limit

Value (≥) Result

1.282 MHz 500 kHz Pass







Report No. STAK0184 21/62



| BLE/GFSK (2 Mbps) High Channel, 2480 MHz | Limit | Value (2) | Result | 1.279 MHz | 500 kHz | Pass |



Report No. STAK0184 22/62

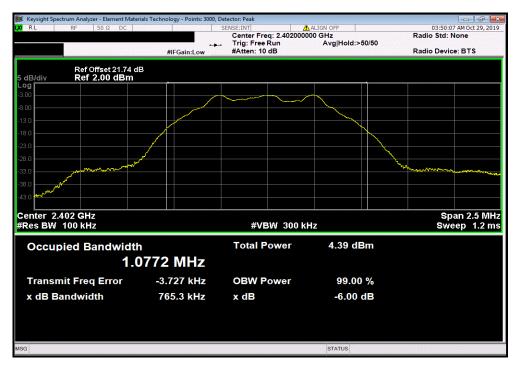


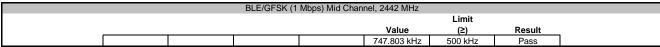
BLE/GFSK (1 Mbps) Low Channel, 2402 MHz

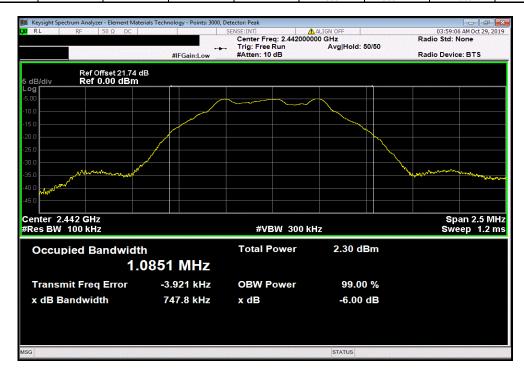
Limit

Value (2) Result

765.283 kHz 500 kHz Pass







Report No. STAK0184 23/62

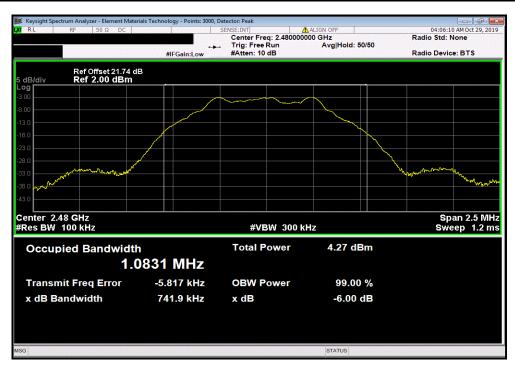


BLE/GFSK (1 Mbps) High Channel, 2480 MHz

Limit

Value (≥) Result

741.943 kHz 500 kHz Pass



Report No. STAK0184 24/62



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
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	1-May-19	1-May-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 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. STAK0184 25/62



EUT: Livio BTE 13
Serial Number: 190592167
Customer: Starkey Laboratories, Inc.
Attendees: Charlie Esch
Project: None
Tested by: Andrew Rogstad
TEST SPECIFICATIONS Work Order: STAK0184
Date: 23-Oct-19
Temperature: 23.1 °C Humidity: 34.8% RH
Barometric Pres.: 1015 mbar Power: 1.25 VDC Test Method Job Site: MN08 FCC 15.247:2019 ANSI C63.10:2013 COMMENTS Reference level offset includes measurement cable, DC block, and 20 dB attenuator. Data for 2 Mbps modulation was taken on 10/23/2019 and data taken for 1 Mbps modulation was taken on 10/28/2019. DEVIATIONS FROM TEST STANDARD Chy Rogertal Configuration # Signature Out Pw (dBm) Limit (dBm) Result BLE/GFSK (2 Mbps) Low Channel, 2402 MHz Pass BLE/GFSK (2 Mbps) Mid Channel, 2442 MHz BLE/GFSK (2 Mbps) High Channel, 2480 MHz -4.069 30 Pass -2.245 30 Pass BLE/GFSK (1 Mbps) Low Channel, 2402 MHz -1.996 30 Pass BLE/GFSK (1 Mbps) Mid Channel, 2442 MHz BLE/GFSK (1 Mbps) High Channel, 2480 MHz -4.101 -2.142 30 30 Pass Pass

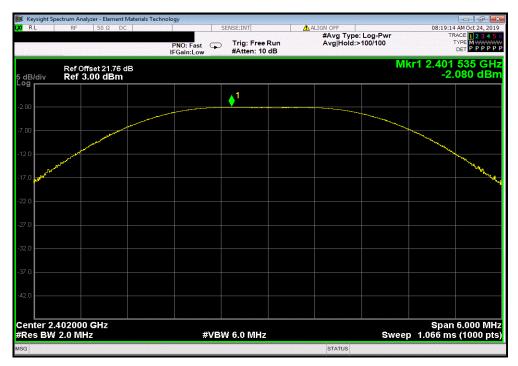
Report No. STAK0184 26/62



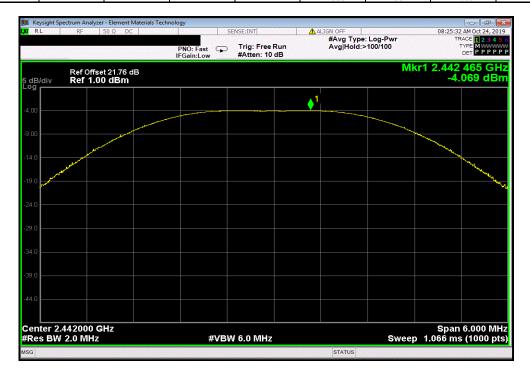
BLE/GFSK (2 Mbps) Low Channel, 2402 MHz

Out Pwr Limit
(dBm) (dBm) Result

-2.08 30 Pass



BLE/GFSK (2 Mbps) Mid Channel, 2442 MHz								
				Out Pwr	Limit			
				(dBm)	(dBm)	Result		
				-4.069	30	Pass		



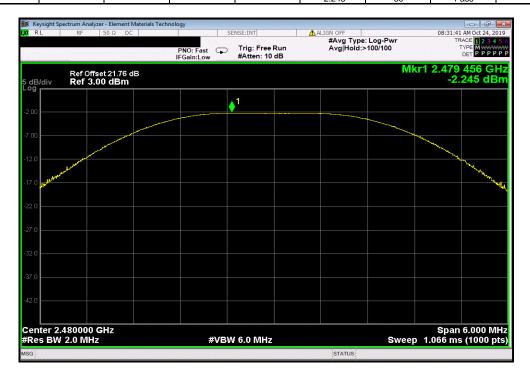
Report No. STAK0184 27/62



BLE/GFSK (2 Mbps) High Channel, 2480 MHz

Out Pwr Limit
(dBm) (dBm) Result

-2.245 30 Pass



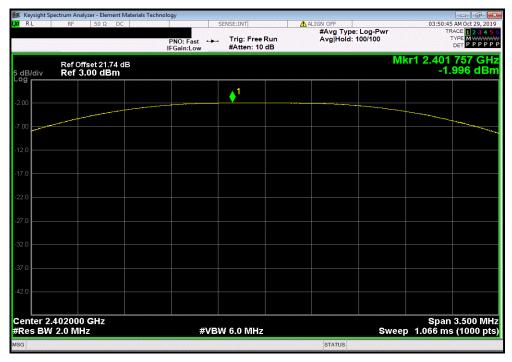
Report No. STAK0184 28/62

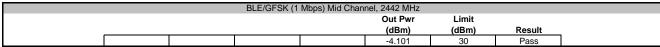


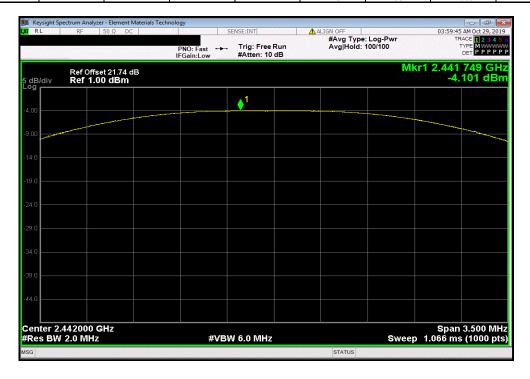
BLE/GFSK (1 Mbps) Low Channel, 2402 MHz

Out Pwr Limit
(dBm) (dBm) Result

-1.996 30 Pass







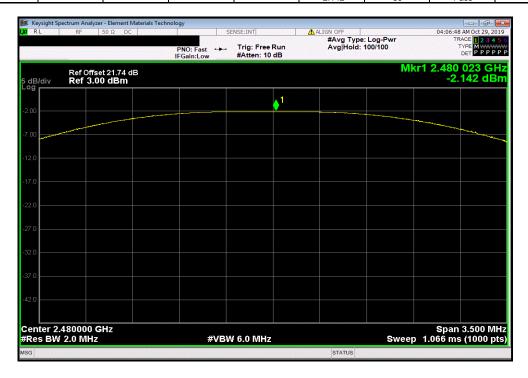
Report No. STAK0184 29/62



BLE/GFSK (1 Mbps) High Channel, 2480 MHz

Out Pwr Limit
(dBm) (dBm) Result

-2.142 30 Pass



Report No. STAK0184 30/62



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
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	1-May-19	1-May-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 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 the conducted output power value to calculate the EIRP.

Report No. STAK0184 31/62

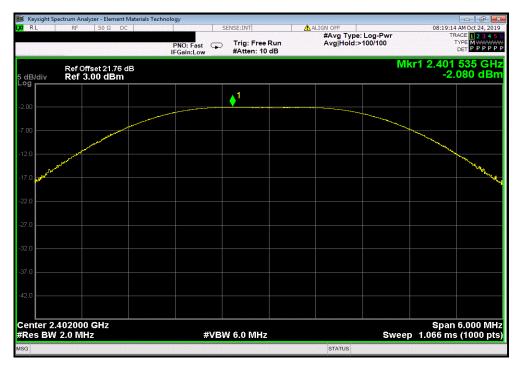


	rio BTE 13					Work Order:				
Serial Number: 190	0592167						23-Oct-19			
Customer: Sta	arkey Laboratories, Inc.					Temperature:	23.2 °C			
Attendees: Ch	arlie Esch					Humidity:	36% RH			
Project: No	ne					Barometric Pres.:	1015 mbar			
Tested by: An	drew Rogstad		Power	r: 1.25 VDC	Job Site: MN08					
TEST SPECIFICATION:	S			Test Method						
FCC 15.247:2019				ANSI C63.10:2013						
COMMENTS				•						
Reference level offset	includes measurement of	cable DC block and 20 dB att	tenuator. Data for 2 Mbr	os modulation was taken on 10/23/2019	and data taken for	Mbps modulatio	n was taken on 10/2	8/2019		
Reference level on set	morades measurement	subic, DO block, and 20 ab at	icination. Data for 2 mop	os modulation was taken on 10/20/2015	una data taken ioi	i ilibpo illoudiatio	ii was taken on 10/2	0/2010.		
DEVIATIONS FROM TE	ST STANDARD									
None	OT OTANDARD									
None	.or orangans									
	1		3./1	p 48						
None Configuration #	1	Signature	ank	o stark						
	1	Signature	and k		Antenna	EIRP	EIRP Limit			
	1	Signature	ar 1	Out Pwr	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result		
Configuration #	1	Signature	and 1	Out Pwr (dBm)	Gain (dBi)	(dBm)	(dBm)	Result Pass		
Configuration # BLE/GFSK (2 Mbps) Lov	u Channel, 2402 MHz	Signature	and k	Out Pwr (dBm) -2.08	Gain (dBi) -5.5	(dBm) -7.58	(dBm) 36	Pass		
Configuration # BLE/GFSK (2 Mbps) Lot BLE/GFSK (2 Mbps) Mic	1 w Channel, 2402 MHz d Channel, 2442 MHz	Signature	and k	Out Pwr (dBm) -2.08 -4.069	Gain (dBi) -5.5 -5.5	(dBm) -7.58 -9.569	(dBm) 36 36	Pass Pass		
Configuration # BLE/GFSK (2 Mbps) Lov	1 w Channel, 2402 MHz d Channel, 2442 MHz	Signature	Char K	Out Pwr (dBm) -2.08	Gain (dBi) -5.5	(dBm) -7.58	(dBm) 36	Pass		
Configuration # BLE/GFSK (2 Mbps) Lo BLE/GFSK (2 Mbps) Mic BLE/GFSK (2 Mbps) Hig	u Channel, 2402 MHz d Channel, 2442 MHz gh Channel, 2480 MHz	Signature	Char K	Out Pwr (dBm) -2.08 -4.069 -2.245	Gain (dBi) -5.5 -5.5 -5.5	(dBm) -7.58 -9.569 -7.745	(dBm) 36 36 36	Pass Pass Pass		
BLE/GFSK (2 Mbps) Lor BLE/GFSK (2 Mbps) Mic BLE/GFSK (2 Mbps) Hig BLE/GFSK (1 Mbps) Lor	w Channel, 2402 MHz d Channel, 2442 MHz gh Channel, 2480 MHz w Channel, 2402 MHz	Signature	and 10	Out Pwr (dBm) -2.08 -4.069 -2.245 -1.996	Gain (dBi) -5.5 -5.5 -5.5 -5.5	(dBm) -7.58 -9.569 -7.745 -7.496	(dBm) 36 36 36 36	Pass Pass Pass		
Configuration # BLE/GFSK (2 Mbps) Lo BLE/GFSK (2 Mbps) Mic BLE/GFSK (2 Mbps) Hig	w Channel, 2402 MHz d Channel, 2442 MHz gh Channel, 2480 MHz w Channel, 2402 MHz d Channel, 2442 MHz	Signature	Char K	Out Pwr (dBm) -2.08 -4.069 -2.245	Gain (dBi) -5.5 -5.5 -5.5	(dBm) -7.58 -9.569 -7.745	(dBm) 36 36 36	Pass Pass Pass		

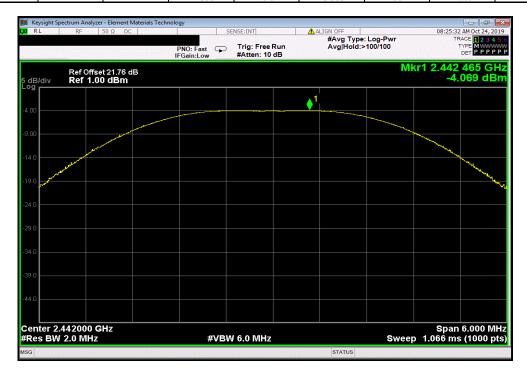
Report No. STAK0184 32/62



	BLE/GFSK (2	Mbps) Low Chan	nel, 2402 MHz			
	Out Pwr	Antenna	EIRP	EIRP Limit		
	(dBm)	Gain (dBi)	(dBm)	(dBm)	Result	
	-2.08	-5.5	-7.58	36	Pass	



BLE/GFSK (2 Mbps) Mid Channel, 2442 MHz								
			Out Pwr	Antenna	EIRP	EIRP Limit		
			(dBm)	Gain (dBi)	(dBm)	(dBm)	Result	
1			-4.069	-5.5	-9.569	36	Pass	



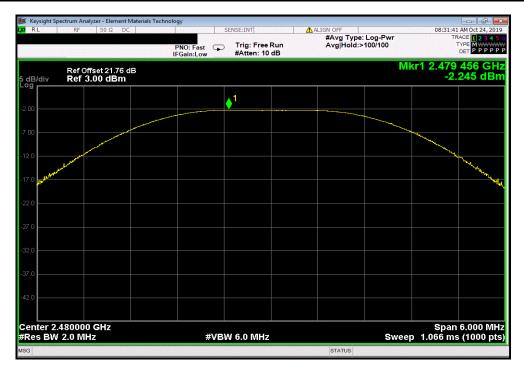
Report No. STAK0184 33/62



BLE/GFSK (2 Mbps) High Channel, 2480 MHz

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

-2.245 -5.5 -7.745 36 Pass



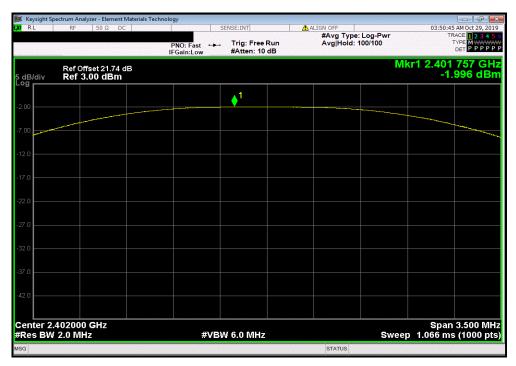
Report No. STAK0184 34/62



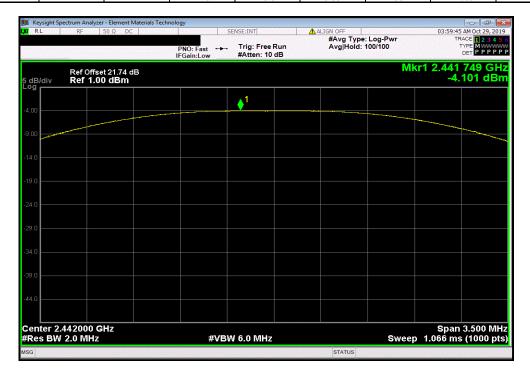
BLE/GFSK (1 Mbps) Low Channel, 2402 MHz

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

-1.996 -5.5 -7.496 36 Pass



BLE/GFSK (1 Mbps) Mid Channel, 2442 MHz								
			Out Pwr	Antenna	EIRP	EIRP Limit		
			(dBm)	Gain (dBi)	(dBm)	(dBm)	Result	
			-4.101	-5.5	-9.601	36	Pass	



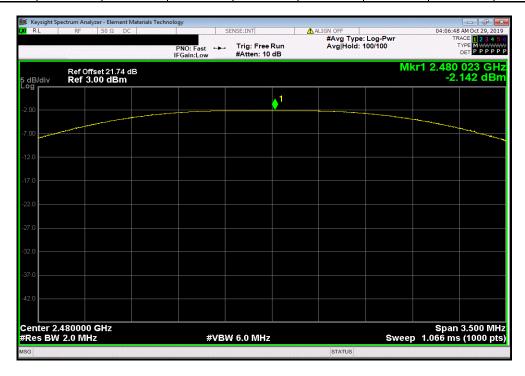
Report No. STAK0184 35/62



BLE/GFSK (1 Mbps) High Channel, 2480 MHz

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

-2.142 -5.5 -7.642 36 Pass



Report No. STAK0184 36/62



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
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	1-May-19	1-May-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 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. STAK0184 37/62



EUT: Livio BTE 13
Serial Number: 190592167
Customer: Starkey Laboratories, Inc.
Attendees: Charlie Esch
Project: None
Tested by: Andrew Rogstad
TEST SPECIFICATIONS Work Order: STAK0184
Date: 23-Oct-19
Temperature: 23.1 °C Humidity: 34.8% RH
Barometric Pres.: 1015 mbar Power: 1.25 VDC Test Method Job Site: MN08 FCC 15.247:2019 ANSI C63.10:2013 COMMENTS Reference level offset includes measurement cable, DC block, and 20 dB attenuator. Data for 2 Mbps modulation was taken on 10/23/2019 and data taken for 1 Mbps modulation was taken on 10/28/2019. DEVIATIONS FROM TEST STANDARD Chy Rogertal Configuration # Signature Value dBm/3kHz Results < dBm/3kHz BLE/GFSK (2 Mbps) Low Channel, 2402 MHz Pass BLE/GFSK (2 Mbps) Mid Channel, 2442 MHz -22.25 Pass BLE/GFSK (2 Mbps) High Channel, 2480 MHz -20.246 Pass 8 BLE/GFSK (1 Mbps) Low Channel, 2402 MHz -17.616 Pass BLE/GFSK (1 Mbps) Mid Channel, 2442 MHz BLE/GFSK (1 Mbps) High Channel, 2480 MHz -19.731 -17.758 Pass Pass

Report No. STAK0184 38/62

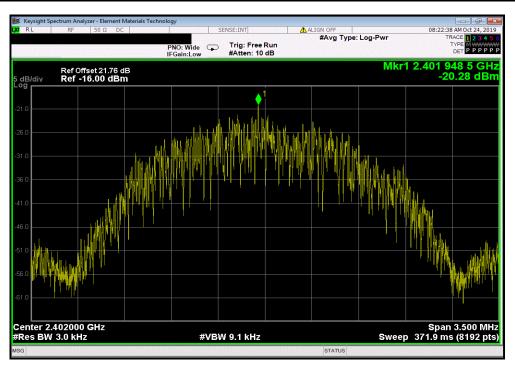


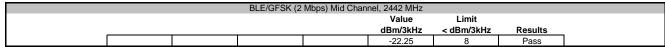
BLE/GFSK (2 Mbps) Low Channel, 2402 MHz

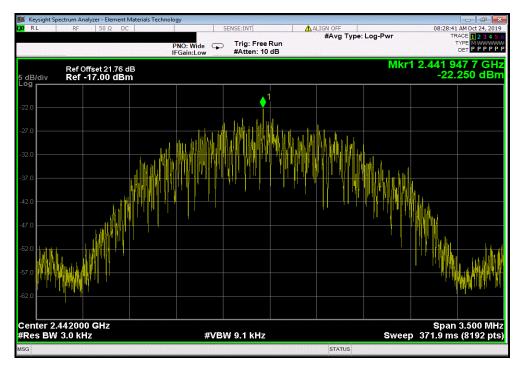
Value Limit

dBm/3kHz < dBm/3kHz Results

-20.28 8 Pass







Report No. STAK0184 39/62

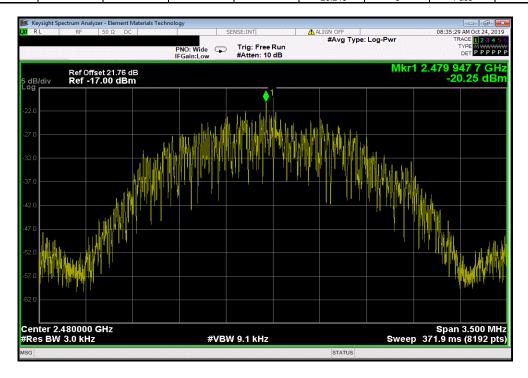


BLE/GFSK (2 Mbps) High Channel, 2480 MHz

Value Limit

dBm/3kHz < dBm/3kHz Results

-20.246 8 Pass



Report No. STAK0184 40/62

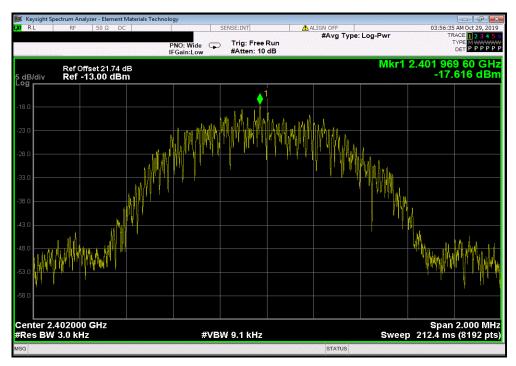


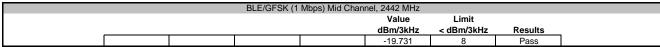
BLE/GFSK (1 Mbps) Low Channel, 2402 MHz

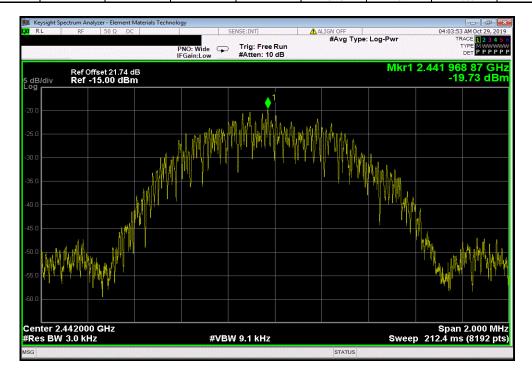
Value Limit

dBm/3kHz < dBm/3kHz Results

-17.616 8 Pass







Report No. STAK0184 41/62

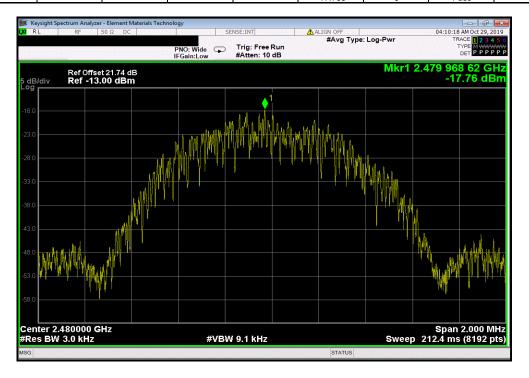


BLE/GFSK (1 Mbps) High Channel, 2480 MHz

Value Limit

dBm/3kHz < dBm/3kHz Results

-17.758 8 Pass



Report No. STAK0184 42/62



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
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	1-May-19	1-May-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 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. STAK0184 43/62



		TbtTx 2019.08.30.0	XMit 2019.09.05
EUT: Livio BTE 13	Work Order:	STAK0184	
Serial Number: 190592167	Date:	23-Oct-19	
Customer: Starkey Laboratories, Inc.	Temperature:	23.2 °C	
Attendees: Charlie Esch	Humidity:	36% RH	
Project: None	Barometric Pres.:	1015 mbar	
Tested by: Andrew Rogstad Power: 1.25 VDC	Job Site:	MN08	
TEST SPECIFICATIONS Test Method			
FCC 15.247:2019 ANSI C63.10:2013			
COMMENTS			
DEVIATIONS FROM TEST STANDARD None Configuration # 1 Signature Regulation			
Signature Conf. Conf. Signature	Value	Limit	
	(dBc)	≤ (dBc)	Result
BLE/GFSK (2 Mbps) Low Channel, 2402 MHz	-27.84	-20	Pass
BLE/GFSK (2 Mbps) High Channel, 2480 MHz	-38.14	-20	Pass
BLE/GFSK (1 Mbps) Low Channel, 2402 MHz	-41.79	-20	Pass
BLE/GFSK (1 Mbps) High Channel, 2480 MHz	-41.53	-20	Pass

Report No. STAK0184 44/62



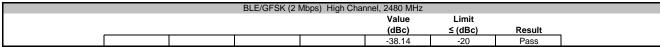
BLE/GFSK (2 Mbps) Low Channel, 2402 MHz

Value

(dBc) ≤ (dBc) Result

-27.84 -20 Pass







Report No. STAK0184 45/62



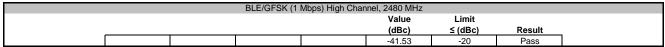
BLE/GFSK (1 Mbps) Low Channel, 2402 MHz

Value

(dBc) ≤ (dBc) Result

-41.79 -20 Pass







Report No. STAK0184 46/62



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
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	1-May-19	1-May-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 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.

Report No. STAK0184 47/62



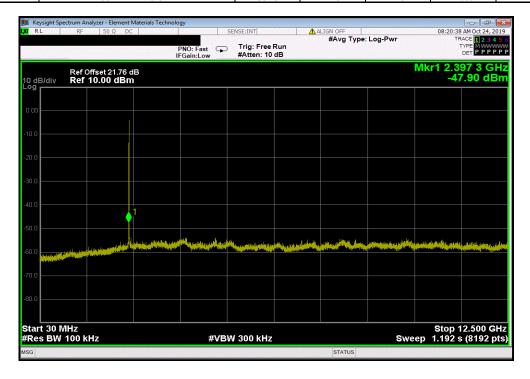
				TbtTx 2019.08.30.0	XMit 2019.0
EUT: Livio BTE 13			Work Order:		
Serial Number: 190592167			Date:	23-Oct-19	
Customer: Starkey Laboratories, Inc.			Temperature:	23 °C	
Attendees: Charlie Esch			Humidity:	34.8% RH	
Project: None			Barometric Pres.:	1015 mbar	
Tested by: Andrew Rogstad	Power: 1.25 VDC		Job Site:	MN08	
TEST SPECIFICATIONS	Test Method				
FCC 15.247:2019	ANSI C63.10:2013				
COMMENTS					
erence level offset includes measurement capie, DC block	and 20 dB attenuator. Data for 2 Mbps modulation was taken on 10/2	3/2019 and data taken for	i wibps illodulation	i was taken on no.	20/2019.
DEVIATIONS FROM TEST STANDARD					
None					
	1. 1.5				
Configuration # 1 Sig	nature Chy Rogadall				
	Frequency	Measured	Max Value	Limit	
	Range	Freq (MHz)	(dBc)	≤ (dBc)	Result
LE/GFSK (2 Mbps) Low Channel, 2402 MHz	Fundamental	2402.02	N/A	N/A	N/A
LE/GFSK (2 Mbps) Low Channel, 2402 MHz	30 MHz - 12.5 GHz	2397.34	-44.37	-20	Pass
LE/GFSK (2 Mbps) Low Channel, 2402 MHz	12.5 GHz - 25 GHz	24272.07	-47.97	-20	
LE/GFSK (2 Mbps) Mid Channel, 2442 MHz					Pass
	Fundamental	2442.02	N/A	N/A	Pass N/A
	30 MHz - 12.5 GHz	2442.02 3810.13	N/A -48.12	N/A -20	N/A Pass
LE/GFSK (2 Mbps) Mid Channel, 2442 MHz		2442.02	N/A -48.12 -45.54	N/A	N/A Pass Pass
LE/GFSK (2 Mbps) Mid Channel, 2442 MHz LE/GFSK (2 Mbps) High Channel, 2480 MHz	30 MHz - 12.5 GHz	2442.02 3810.13 24030.95 2480.02	N/A -48.12 -45.54 N/A	N/A -20 -20 N/A	N/A Pass Pass N/A
LE/GFSK (2 Mbps) Mid Channel, 2442 MHz LE/GFSK (2 Mbps) High Channel, 2480 MHz	30 MHz - 12.5 GHz 12.5 GHz - 25 GHz	2442.02 3810.13 24030.95	N/A -48.12 -45.54	N/A -20 -20	N/A Pass Pass
LE/GFSK (2 Mbps) Mid Channel, 2442 MHz LE/GFSK (2 Mbps) High Channel, 2480 MHz LE/GFSK (2 Mbps) High Channel, 2480 MHz	30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental	2442.02 3810.13 24030.95 2480.02	N/A -48.12 -45.54 N/A	N/A -20 -20 N/A	N/A Pass Pass N/A
LE/GFSK (2 Mbps) Mid Channel, 2442 MHz LE/GFSK (2 Mbps) High Channel, 2480 MHz LE/GFSK (2 Mbps) High Channel, 2480 MHz LE/GFSK (2 Mbps) High Channel, 2480 MHz	30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz	2442.02 3810.13 24030.95 2480.02 2487.16	N/A -48.12 -45.54 N/A -49.21	N/A -20 -20 N/A -20	N/A Pass Pass N/A Pass
.E/GFSK (2 Mbps) Mid Channel, 2442 MHz .E/GFSK (2 Mbps) High Channel, 2480 MHz .E/GFSK (2 Mbps) High Channel, 2480 MHz .E/GFSK (2 Mbps) High Channel, 2480 MHz .E/GFSK (1 Mbps) Low Channel, 2402 MHz	30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz	2442.02 3810.13 24030.95 2480.02 2487.16 24957.27	N/A -48.12 -45.54 N/A -49.21 -47.04	N/A -20 -20 N/A -20 -20	N/A Pass Pass N/A Pass Pass
.E/GFSK (2 Mbps) Mid Channel, 2442 MHz .E/GFSK (2 Mbps) High Channel, 2480 MHz .E/GFSK (2 Mbps) High Channel, 2480 MHz .E/GFSK (2 Mbps) High Channel, 2480 MHz .E/GFSK (1 Mbps) Low Channel, 2402 MHz .E/GFSK (1 Mbps) Low Channel, 2402 MHz	30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental	2442.02 3810.13 24030.95 2480.02 2487.16 24957.27	N/A -48.12 -45.54 N/A -49.21 -47.04 N/A	N/A -20 -20 N/A -20 -20	N/A Pass Pass N/A Pass Pass
LE/GFSK (2 Mbps) Mid Channel, 2442 MHz LE/GFSK (2 Mbps) High Channel, 2480 MHz LE/GFSK (2 Mbps) High Channel, 2480 MHz LE/GFSK (2 Mbps) High Channel, 2480 MHz LE/GFSK (1 Mbps) Low Channel, 2402 MHz LE/GFSK (1 Mbps) Low Channel, 2402 MHz LE/GFSK (1 Mbps) Low Channel, 2402 MHz	30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz	2442.02 3810.13 24030.95 2480.02 2487.16 24957.27 2402.24 2397.34	N/A -48.12 -45.54 N/A -49.21 -47.04 N/A -47.52	N/A -20 -20 N/A -20 -20 N/A -20	N/A Pass Pass N/A Pass Pass N/A Pass
LE/GFSK (2 Mbps) Mid Channel, 2442 MHz LE/GFSK (2 Mbps) High Channel, 2480 MHz LE/GFSK (2 Mbps) High Channel, 2480 MHz LE/GFSK (2 Mbps) High Channel, 2480 MHz LE/GFSK (1 Mbps) Low Channel, 2402 MHz LE/GFSK (1 Mbps) Low Channel, 2402 MHz LE/GFSK (1 Mbps) Low Channel, 2402 MHz LE/GFSK (1 Mbps) Mid Channel, 2402 MHz LE/GFSK (1 Mbps) Mid Channel, 2402 MHz	30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz	2442.02 3810.13 24030.95 2480.02 2487.16 24957.27 2402.24 2397.34 24113.36	N/A -48.12 -45.54 N/A -49.21 -47.04 N/A -47.52 -47.99	N/A -20 -20 N/A -20 -20 N/A -20 -20 N/A	N/A Pass Pass N/A Pass Pass N/A Pass Pass
LE/GFSK (2 Mbps) Mid Channel, 2442 MHz LE/GFSK (2 Mbps) High Channel, 2480 MHz LE/GFSK (2 Mbps) High Channel, 2480 MHz LE/GFSK (2 Mbps) High Channel, 2480 MHz LE/GFSK (1 Mbps) Low Channel, 2402 MHz LE/GFSK (1 Mbps) Low Channel, 2402 MHz LE/GFSK (1 Mbps) Low Channel, 2402 MHz LE/GFSK (1 Mbps) Mid Channel, 2442 MHz LE/GFSK (1 Mbps) Mid Channel, 2442 MHz	30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 5 GHz - 25 GHz Fundamental	2442.02 3810.13 24030.95 2480.02 2487.16 24957.27 2402.24 2397.34 24113.36 2442.24	N/A -48.12 -45.54 N/A -49.21 -47.04 N/A -47.52 -47.99 N/A	N/A -20 -20 N/A -20 -20 N/A -20 -20	N/A Pass Pass N/A Pass Pass N/A Pass N/A Pass Pass N/A
LE/GFSK (2 Mbps) Mid Channel, 2442 MHz LE/GFSK (2 Mbps) High Channel, 2480 MHz LE/GFSK (2 Mbps) High Channel, 2480 MHz LE/GFSK (2 Mbps) High Channel, 2480 MHz LE/GFSK (1 Mbps) Hugh Channel, 2480 MHz LE/GFSK (1 Mbps) Low Channel, 2402 MHz LE/GFSK (1 Mbps) Low Channel, 2402 MHz LE/GFSK (1 Mbps) Mid Channel, 2402 MHz LE/GFSK (1 Mbps) Mid Channel, 2442 MHz	30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz	2442.02 3810.13 24030.95 2480.02 2487.16 24957.27 2402.24 2397.34 24113.36 2442.24 3747.71 24090.47	N/A -48.12 -45.54 N/A -49.21 -47.04 N/A -47.52 -47.99 N/A -48.77 -45.7	N/A -20 -20 N/A -20 -20 N/A -20 -20 N/A -20 -20	N/A Pass Pass N/A Pass Pass N/A Pass N/A Pass Pass Pass Pass N/A Pass Pass
LE/GFSK (2 Mbps) Mid Channel, 2442 MHz LE/GFSK (2 Mbps) Mid Channel, 2442 MHz LE/GFSK (2 Mbps) High Channel, 2480 MHz LE/GFSK (2 Mbps) High Channel, 2480 MHz LE/GFSK (2 Mbps) High Channel, 2480 MHz LE/GFSK (1 Mbps) Low Channel, 2480 MHz LE/GFSK (1 Mbps) Low Channel, 2402 MHz LE/GFSK (1 Mbps) Low Channel, 2402 MHz LE/GFSK (1 Mbps) Low Channel, 2402 MHz LE/GFSK (1 Mbps) Mid Channel, 2442 MHz LE/GFSK (1 Mbps) High Channel, 2480 MHz	30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 12.5 GHz - 25 GHz 12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz	2442.02 3810.13 24030.95 2480.02 2487.16 24957.27 2402.24 2397.34 2411.3.36 2442.24 3747.71	N/A -48.12 -45.54 N/A -49.21 -47.04 N/A -47.52 -47.99 N/A -48.77	N/A -20 -20 N/A -20 -20 N/A -20 -20 N/A -20	N/A Pass Pass N/A Pass Pass N/A Pass N/A Pass Pass N/A Pass

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BLE/GFSK (2 Mbps) Low Channel, 2402 MHz						
Frequency Measured Max Value						
 Range	Freq (MHz)	(dBc)	≤ (dBc)	Result		
30 MHz - 12.5 GHz	2397.34	-44.37	-20	Pass		



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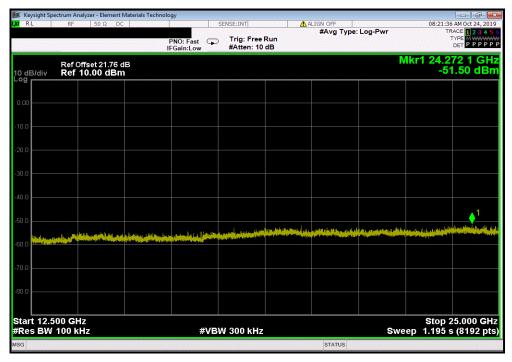


BLE/GFSK (2 Mbps) Low Channel, 2402 MHz

Frequency Measured Max Value Limit

Range Freq (MHz) (dBc) ≤ (dBc) Result

12.5 GHz - 25 GHz 24272.07 -47.97 -20 Pass



BLE/GFSK (2 Mbps) Mid Channel, 2442 MHz					
Frequency Measured Max Value					
 Range	Freq (MHz)	(dBc)	≤ (dBc)	Result	
Fundamental	2442.02	N/A	N/A	N/A	



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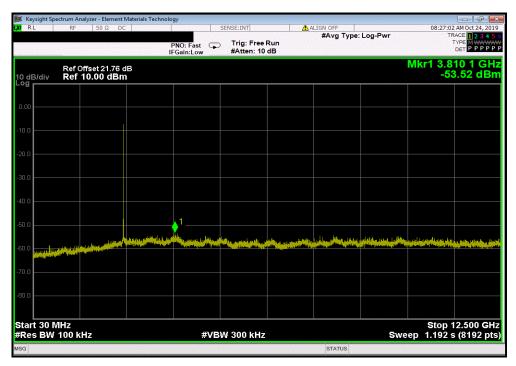


BLE/GFSK (2 Mbps) Mid Channel, 2442 MHz

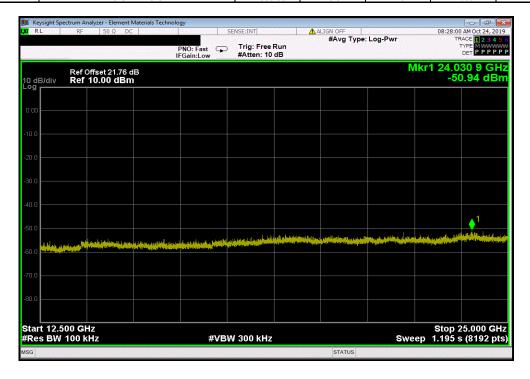
Frequency Measured Max Value Limit

Range Freq (MHz) (dBc) ≤ (dBc) Result

30 MHz - 12.5 GHz 3810.13 -48.12 -20 Pass



	BLE/GFSK (2 Mbps) Mid Channel, 2442 MHz						
	Frequency	Limit					
	Range	Freq (MHz)	(dBc)	≤ (dBc)	Result		
1	12.5 GHz - 25 GHz	24030.95	-45.54	-20	Pass		



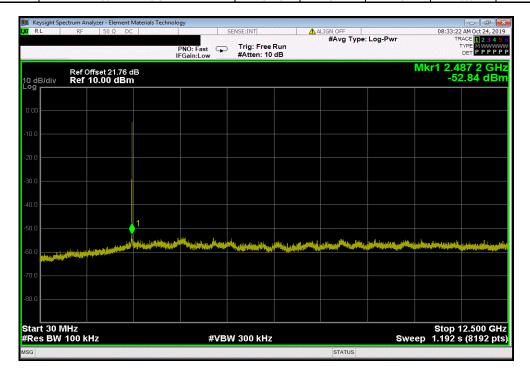
Report No. STAK0184 51/62



| BLE/GFSK (2 Mbps) High Channel, 2480 MHz
Frequency	Measured	Max Value	Limit	
Range	Freq (MHz)	(dBc)	≤ (dBc)	Result
Fundamental	2480.02	N/A	N/A	N/A



BLE/GFSK (2 Mbps) High Channel, 2480 MHz						
	Frequency	Max Value	Limit			
	Range	Freq (MHz)	(dBc)	≤ (dBc)	Result	
,	30 MHz - 12.5 GHz	2487.16	-49.21	-20	Pass	



Report No. STAK0184 52/62

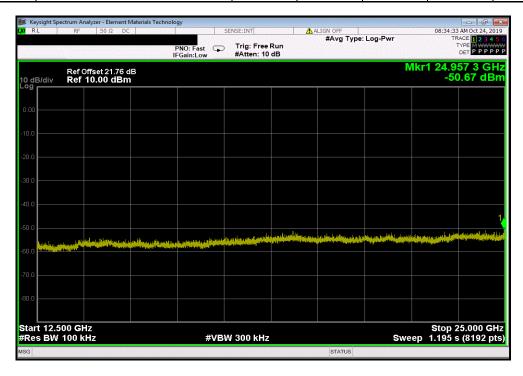


BLE/GFSK (2 Mbps) High Channel, 2480 MHz

Frequency Measured Max Value Limit

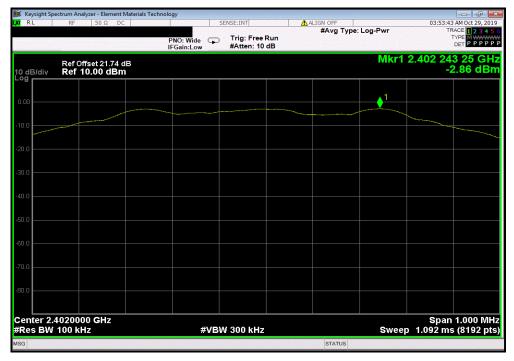
Range Freq (MHz) (dBc) ≤ (dBc) Result

12.5 GHz - 25 GHz 24957.27 -47.04 -20 Pass

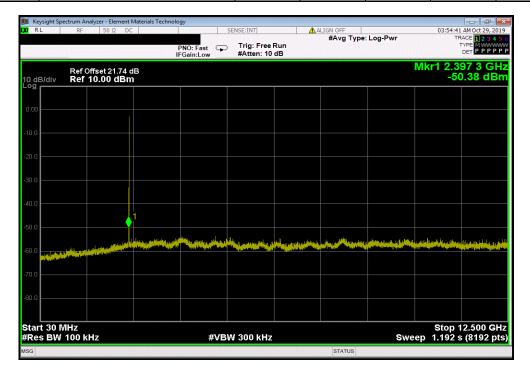


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BLE/GFSK (1 Mbps) Low Channel, 2402 MHz					
Frequency	Limit				
Range	Freq (MHz)	(dBc)	≤ (dBc)	Result	
30 MHz - 12.5 GHz	2397.34	-47.52	-20	Pass	



Report No. STAK0184 54/62

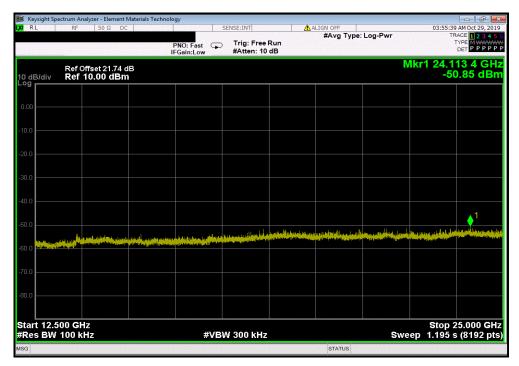


 BLE/GFSK (1 Mbps) Low Channel, 2402 MHz

 Frequency
 Measured
 Max Value
 Limit

 Range
 Freq (MHz)
 (dBc)
 ≤ (dBc)
 Result

 12.5 GHz - 25 GHz
 24113.36
 -47.99
 -20
 Pass



	BLE/GFSK (1 Mbps) Mid Channel, 2442 MHz					
Fre	equency	Measured	Max Value	Limit		
R	Range	Freq (MHz)	(dBc)	≤ (dBc)	Result	
Fund	damental	2442.24	N/A	N/A	N/A	



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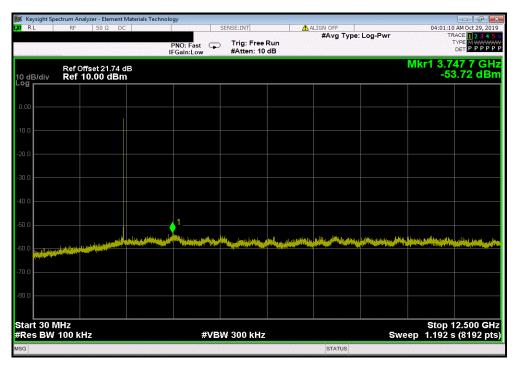


 BLE/GFSK (1 Mbps) Mid Channel, 2442 MHz

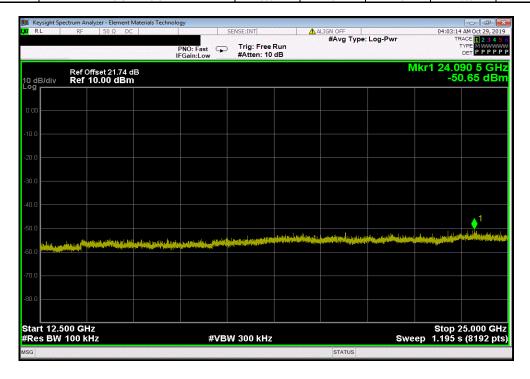
 Frequency
 Measured Max Value Limit

 Range
 Freq (MHz)
 (dBc)
 ≤ (dBc)
 Result

 30 MHz - 12.5 GHz
 3747.71
 -48.77
 -20
 Pass



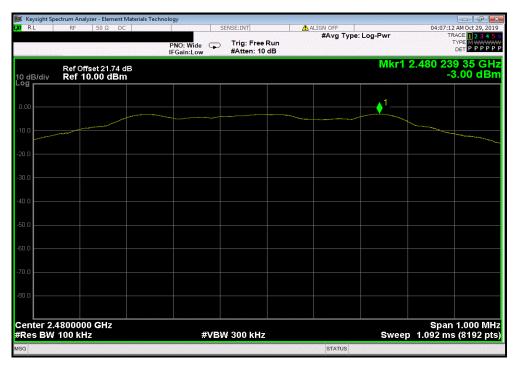
	BLE/GFSK (1 Mbps) Mid Channel, 2442 MHz						
	Frequency	Max Value	Limit				
	Range	Freq (MHz)	(dBc)	≤ (dBc)	Result		
i	12.5 GHz - 25 GHz	24090.47	-45.7	-20	Pass		



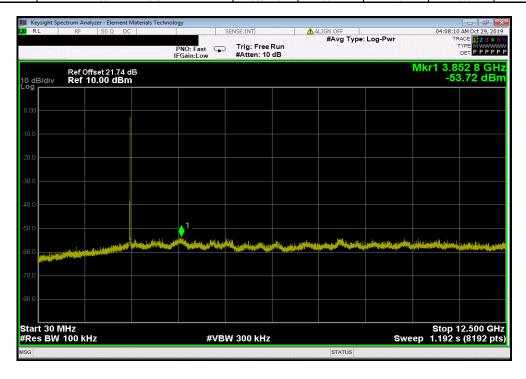
Report No. STAK0184 56/62



| BLE/GFSK (1 Mbps) High Channel, 2480 MHz
Frequency	Measured	Max Value	Limit	
Range	Freq (MHz)	(dBc)	≤ (dBc)	Result
Fundamental	2480.24	N/A	N/A	N/A



BLE/GFSK (1 Mbps) High Channel, 2480 MHz										
Freque	ency Measured	Max Value	Limit							
Rang	ge Freq (MHz) (dBc)	≤ (dBc)	Result						
30 MHz - 1	2.5 GHz 3852.75	-50.72	-20	Pass						



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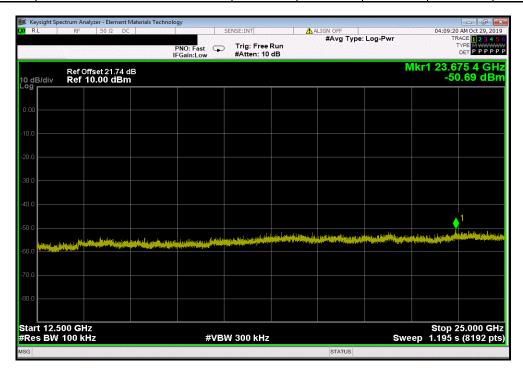


 BLE/GFSK (1 Mbps) High Channel, 2480 MHz

 Frequency
 Measured
 Max Value
 Limit

 Range
 Freq (MHz)
 (dBc)
 ≤ (dBc)
 Result

 12.5 GHz - 25 GHz
 23675.38
 -47.69
 -20
 Pass



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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); BLE 1 Mbps and 2 Mbps

POWER SETTINGS INVESTIGATED

1.25 VDC

CONFIGURATIONS INVESTIGATED

STAK0184 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency 30 MHz Stop Frequency 25000 MHz

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AVO	18-Oct-2019	12 mo
Cable	ESM Cable Corp.	Bilog Cables	MNH	18-Oct-2019	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AYD	25-Jan-2018	24 mo
Amplifier - Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	11-Sep-2019	12 mo
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNP	11-Sep-2019	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-09	AHG	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVW	8-Feb-2019	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AIQ	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	8-Feb-2019	12 mo
Cable	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	8-Mar-2019	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AXP	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVT	8-Feb-2019	12 mo
Cable	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	17-Sep-2019	12 mo
Antenna - Double Ridge	ETS-Lindgren	3115	AJQ	16-Jan-2019	24 mo
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	13-Dec-2018	12 mo

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SPURIOUS RADIATED EMISSIONS



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(1/dc).

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SPURIOUS RADIATED EMISSIONS

Date:

25-Oct-2019

STAK0184

Work Order:

2389.667

32.6

1.6 1.4

-3.6

354.9

5.0

10.0



-10.0

EUT horz, Low ch., BLE 2 Mbps

Wo	rk Order:	SIA	K0184		Date:		t-2019						
	Project:		one	Ter	nperature:		4 °C		1	P	Jalan	Z	
	Job Site:	M	N05		Humidity:	32.5	% RH		-				
Serial	Number:	1905	92168	Barome	etric Pres.:		mbar		Tested by:	Andrew Ro	ogstad		_
	EUT:	Livio BTE	13						-				=
Confi	guration:	3											=
			aboratories,	Inc.									=
	ttendees:												_
EU	T Power:	1.25 VDC											_
				2402 MHz)	Mid channe	el (2442 ME	lz) and Hic	nh channel	(2480 MHz))· BI F 1 Mb	ons and 2 M	Mbps	_
Operati	ng Mode:	201		, ,		» (<u> </u>	,, a	g o a o.	(2 .002)	,,	, po aa <u>-</u> .		
De	eviations:	None											_
Co	omments:	dB was ca	alculated fro	m a meası		cle of 32.69	% for 2 Mbp		cle of 61.7% ion(10*log(1				-
		I	7101 201 01	iontation, i	x onamo,	ana modan							≣
CC 15.247							Test Meth ANSI C63.						=
- "													_
Run#	12	Test Di	stance (m)	3	Antenna	Height(s)		1 to 4(m)		Results	l P	ass	_
80													
00													
											_		
70												Ш	
60													
00													
											_		
50												Ш	
E ~													
>							•						
ਜ਼ੂ 40 ⊢													
w//ngp													
									3				
30 🗕													
20													
10 +												++	
0 +						400-			40000			400000	
10			100			1000			10000			100000	
						MHz				■ PK	◆ AV	• QP	
											· ^ ^		
					Duty Cycle	Futorno'	Polarity/		Dietones			Compared	
Freq	Amplitude	Factor	Antenna Height	Azimuth	Correction Factor	External Attenuation	Transducer Type	Detector	Distance Adjustment	Adjusted	Spec. Limit	Compared to Spec.	
(MHz)	(dBuV)	(dB)	(meters)	(degrees)	(dB)	(dB)			(dB)	(dBuV/m)	(dBuV/m)	(dB)	
													Comments
7440.237	30.9	13.2	1.5	357.0	5.0	0.0	Vert	AV	0.0	49.1	54.0	-4.9	EUT vert, High ch., BLE 2 Mbps
7440.403	30.8	13.2	1.5	54.0	5.0	0.0	Horz	AV	0.0	49.0	54.0	-5.0	EUT on side, High ch., BLE 2 Mbp
2483.553	35.5	-3.8	1.5	282.9	5.0	10.0	Vert	AV	0.0	46.7	54.0	-7.3 7.6	EUT on side, High ch., BLE 2 Mbp EUT horz, High ch., BLE 2 Mbps
2483.510 7325.433	35.2 30.6	-3.8 13.5	1.5 2.3	360.0 264.9	5.0 2.1	10.0 0.0	Horz Vert	AV AV	0.0 0.0	46.4 46.2	54.0 54.0	-7.6 -7.8	EUT vert, Mid ch., BLE 1 Mbps
7440.160	30.9	13.3	2.3	48.0	2.1	0.0	Vert	AV	0.0	46.2	54.0	-7.8 -7.8	EUT vert, High ch., BLE 1 Mbps
7440.160	30.9	13.2	3.8	288.0	2.1	0.0	Horz	AV	0.0	46.2	54.0	-7.8	EUT on side, High ch., BLE 1 Mbp
7326.757	30.4	13.5	1.6	48.0	2.1	0.0	Horz	AV	0.0	46.0	54.0	-8.0	EUT on side, Mid ch., BLE 1 Mbps
2389 667	32.6	-3.6	1 4	354.9	5.0	10.0	Horz	Δ\/	0.0	44.0	54.0	-10.0	FUT horz Lowich BLF 2 Mbps

EUT on side, Low ch., BLE 2 Mbps EUT on side, Low ch., BLE 1 Mbps 2388.753 32.6 -3.6 2.9 227.0 10.0 Vert AV 44.0 54.0 -10.0 1.5 1.5 1.5 AV AV 41.0 32.5 32.5 -3.6 -3.7 0.0 54.0 2389.573 355.9 2.1 2.1 2.1 2.1 2.1 2.1 10.0 Vert -13.0 2485.190 -13.1 EUT horz, High ch., BLE 1 Mbps 182.9 40.9 54.0 10.0 Horz 54.0 54.0 EUT horz, Low ch., BLE 1 Mbps EUT on side, High ch., BLE 1 Mbps 2388.847 32.4 -3.6 321.0 10.0 Horz AV 0.0 40.9 -13.1 2483 737 -3.8 1.5 1.5 ΑV 0.0 40.8 32.5 134 0 10.0 Horz -13.2 2483.910 32.5 -3.8 296.0 Vert ΑV 0.0 40.8 54.0 -13.2 EUT on side, High ch., BLE 1 Mbps 10.0 2483.863 32.5 -3.8 1.8 29.0 ΑV 0.0 40.8 54.0 -13.2 EUT vert, High ch., BLE 1 Mbps EUT vert, High ch., BLE 1 Mbps 2484.107 2484.900 32.5 32.5 -3.8 -3.8 2.9 1.5 0.0 2.1 2.1 10.0 Vert AV AV 0.0 40.8 54.0 -13.2 -13.2 40.8 EUT horz, High ch., BLE 1 Mbps 221.9 54.0 10.0 Vert EUT on side, High ch., BLE 1 Mbps EUT vert, Mid ch., BLE 1 Mbps 12401.080 31.9 5.4 2.4 63.9 2.1 0.0 0.0 39.4 54.0 -14.6 Horz 31.1 31.1 4.7 4.7 1.5 1.5 2.1 2.1 0.0 AV AV 0.0 37.9 37.9 -16.1 -16.1 4884.493 249.0 Vert 54.0 4884.440 196.0 54.0 EUT on side, Mid ch., BLE 1 Mbps Horz 4803.260 30.8 360.0 Horz 0.0 37.5 EUT on side, Low ch., BLE 1 Mbps 4960.707 30.6 4.8 348.9 0.0 Horz ΑV 0.0 37.5 54.0 -16.5 EUT on side, High ch., BLE 1 Mbps

ΑV

0.0

44.0

54.0

Horz

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					Duty Cycle Correction	External	Polarity/ Transducer		Distance			Compared to	
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Factor (dB)	Attenuation (dB)	Туре	Detector	Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Spec. (dB)	
(IVITIZ)	(dbdv)	(ub)	(IIIcicis)	(degrees)	(db)	(db)			(GD)	(dbd v/iii)	(dbdv/iii)	(GD)	Comments
12398.860	35.9	-0.6	2.5	138.0	2.1	0.0	Horz	AV	0.0	37.4	54.0	-16.6	EUT on side, High ch., BLE 1 Mbps
4959.937	30.5	4.8	1.5	31.9	2.1	0.0	Vert	AV	0.0	37.4	54.0	-16.6	EUT vert, High ch., BLE 1 Mbps
12208.810	37.0	-1.7	1.9	297.0	2.1	0.0	Horz	AV	0.0	37.4	54.0	-16.6	EUT on side, Mid ch., BLE 1 Mbps
12008.780	37.4	-2.2	1.7	279.9	2.1	0.0	Horz	AV	0.0	37.3	54.0	-16.7	EUT on side, Low ch., BLE 1 Mbps
4803.043	30.5	4.6	1.5	351.9	2.1	0.0	Vert	AV	0.0	37.2	54.0	-16.8	EUT vert, Low ch., BLE 1 Mbps
12400.630	29.0	5.4	1.5	321.0	2.1	0.0	Vert	AV	0.0	36.5	54.0	-17.5	EUT vert, High ch., BLE 1 Mbps
7440.160	43.1	13.2	1.5	54.0	0.0	0.0	Horz	PK	0.0	56.3	74.0	-17.7	EUT on side, High ch., BLE 2 Mbps
12008.690	36.4	-2.2	1.7	77.0	2.1	0.0	Vert	AV	0.0	36.3	54.0	-17.7	EUT vert, Low ch., BLE 1 Mbps
7325.827	42.5	13.5	1.6	48.0	0.0	0.0	Horz	PK	0.0	56.0	74.0	-18.0	EUT on side, Mid ch., BLE 1 Mbps
7439.923	42.6	13.2	2.2	48.0	0.0	0.0	Vert	PK	0.0	55.8	74.0	-18.2	EUT vert, High ch., BLE 1 Mbps
7440.153	42.5	13.2	3.8	288.0	0.0	0.0	Horz	PK	0.0	55.7	74.0	-18.3	EUT on side, High ch., BLE 1 Mbps
7325.910	42.1	13.5	2.3	264.9	0.0	0.0	Vert	PK	0.0	55.6	74.0	-18.4	EUT vert, Mid ch., BLE 1 Mbps
7439.697	42.1	13.2	1.5	357.0	0.0	0.0	Vert	PK	0.0	55.3	74.0	-18.7	EUT vert, High ch., BLE 2 Mbps
2483.560	48.6	-3.8	1.5	282.9	0.0	10.0	Vert	PK	0.0	54.8	74.0	-19.2	EUT on side, High ch., BLE 2 Mbps
12208.920	34.4	-1.7	3.2	303.0	2.1	0.0	Vert	AV	0.0	34.8	54.0	-19.2	EUT vert, Mid ch., BLE 1 Mbps
2483.533	48.2	-3.8	1.5	360.0	0.0	10.0	Horz	PK	0.0	54.4	74.0	-19.6	EUT horz, High ch., BLE 2 Mbps
12398.810	32.6	-0.6	3.1	131.9	2.1	0.0	Vert	AV	0.0	34.1	54.0	-19.9	EUT vert, High ch., BLE 1 Mbps
12008.730	33.0	-2.2	2.0	178.9	2.1	0.0	Vert	AV	0.0	32.9	54.0	-21.1	EUT horz, Low ch., BLE 1 Mbps
12008.790	32.4	-2.2	1.8	225.9	2.1	0.0	Horz	AV	0.0	32.3	54.0	-21.7	EUT horz, Low ch., BLE 1 Mbps
12008.730	31.6	-2.2	1.5	271.0	2.1	0.0	Vert	AV	0.0	31.5	54.0	-22.5	EUT on side, Low ch., BLE 1 Mbps
2389.427	44.8	-3.6	2.9	227.0	0.0	10.0	Vert	PK	0.0	51.2	74.0	-22.8	EUT on side, Low ch., BLE 2 Mbps
2484.353	44.7	-3.8	1.5	296.0	0.0	10.0	Vert	PK	0.0	50.9	74.0	-23.1	EUT on side, High ch., BLE 1 Mbps
2484.260	44.6	-3.8	1.5	182.9	0.0	10.0	Horz	PK	0.0	50.8	74.0	-23.2	EUT horz, High ch., BLE 1 Mbps
2388.003	44.4	-3.6	1.4	354.9	0.0	10.0	Horz	PK	0.0	50.8	74.0	-23.2	EUT horz, Low ch., BLE 2 Mbps
12008.780	30.8	-2.2	1.5	227.0	2.1	0.0	Horz	AV	0.0	30.7	54.0	-23.3	EUT vert, Low ch., BLE 1 Mbps
2388.480	44.2	-3.6	1.5	321.0	0.0	10.0	Horz	PK	0.0	50.6	74.0	-23.4	EUT horz, Low ch., BLE 1 Mbps
2389.793	44.2	-3.6	1.5	355.9	0.0	10.0	Vert	PK	0.0	50.6	74.0	-23.4	EUT on side, Low ch., BLE 1 Mbps
2485.223	44.2	-3.7	2.9	0.0	0.0	10.0	Vert	PK	0.0	50.5	74.0	-23.5	EUT vert, High ch., BLE 1 Mbps
2484.787	44.0	-3.8	1.8	29.0	0.0	10.0	Horz	PK	0.0	50.2	74.0	-23.8	EUT vert, High ch., BLE 1 Mbps
2484.437	44.0	-3.8	1.5	221.9	0.0	10.0	Vert	PK	0.0	50.2	74.0	-23.8	EUT horz, High ch., BLE 1 Mbps
2484.087	43.8	-3.8	1.5	134.0	0.0	10.0	Horz	PK	0.0	50.0	74.0	-24.0	EUT on side, High ch., BLE 1 Mbps
12401.040	42.8	5.4	2.4	63.9	0.0	0.0	Horz	PK	0.0	48.2	74.0	-25.8	EUT on side, High ch., BLE 1 Mbps
4884.200	43.1	4.7	1.5	196.0	0.0	0.0	Horz	PK	0.0	47.8	74.0	-26.2	EUT on side, Mid ch., BLE 1 Mbps
4884.747	42.7	4.7	1.5	249.0	0.0	0.0	Vert	PK	0.0	47.4	74.0	-26.6	EUT vert, Mid ch., BLE 1 Mbps
4803.547	42.0	4.6	1.5	351.9	0.0	0.0	Vert	PK	0.0	46.6	74.0	-27.4	EUT vert, Low ch., BLE 1 Mbps
4960.757	41.8	4.8	1.5	31.9	0.0	0.0	Vert	PK	0.0	46.6	74.0	-27.4	EUT vert, High ch., BLE 1 Mbps
4960.257	41.8	4.8	1.5	348.9	0.0	0.0	Horz	PK	0.0	46.6	74.0	-27.4	EUT on side, High ch., BLE 1 Mbps
4803.540	41.6	4.6	1.5	360.0	0.0	0.0	Horz	PK	0.0	46.2	74.0	-27.8	EUT on side, Low ch., BLE 1 Mbps
12400.930	40.4	5.4	1.5	321.0	0.0	0.0	Vert	PK	0.0	45.8	74.0	-28.2	EUT vert, High ch., BLE 1 Mbps
12398.810	45.0	-0.6	2.5	138.0	0.0	0.0	Horz	PK	0.0	44.4	74.0	-29.6	EUT on side, High ch., BLE 1 Mbps
12211.240	46.1	-1.7	1.9	297.0	0.0	0.0	Horz	PK	0.0	44.4	74.0	-29.6	EUT on side, Mid ch., BLE 1 Mbps
12008.800	46.4	-2.2	1.7	279.9	0.0	0.0	Horz	PK	0.0	44.2	74.0	-29.8	EUT on side, Low ch., BLE 1 Mbps
12008.370	45.9	-2.2	1.7	77.0	0.0	0.0	Vert	PK	0.0	43.7	74.0	-30.3	EUT vert, Low ch., BLE 1 Mbps
12398.440	43.4	-0.6	3.1	131.9	0.0	0.0	Vert	PK	0.0	42.8	74.0	-31.2	EUT vert, High ch., BLE 1 Mbps
12208.460	44.1	-1.7	3.2	303.0	0.0	0.0	Vert	PK	0.0	42.4	74.0	-31.6	EUT vert, Mid ch., BLE 1 Mbps
12008.930	43.3	-2.2	2.0	178.9	0.0	0.0	Vert	PK	0.0	41.1	74.0	-32.9	EUT horz, Low ch., BLE 1 Mbps
12011.100	43.0	-2.2	1.8	225.9	0.0	0.0	Horz	PK	0.0	40.8	74.0	-33.2	EUT horz, Low ch., BLE 1 Mbps
12011.030	42.9	-2.2	1.5	227.0	0.0	0.0	Horz	PK	0.0	40.7	74.0	-33.3	EUT vert, Low ch., BLE 1 Mbps
12008.390	42.5	-2.2	1.5	271.0	0.0	0.0	Vert	PK	0.0	40.3	74.0	-33.7	EUT on side, Low ch., BLE 1 Mbps

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