

Starkey Laboratories, Inc.

TV Streamer

FCC 15.247:2018 Bluetooth Low Energy (DTS) Radio

Report # STAK0135



TESTING NVLAP LAB CODE: 200881-0



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CERTIFICATE OF TEST



Last Date of Test: August 2, 2018 Starkey Laboratories, Inc. Model: TV Streamer

Radio Equipment Testing

Standards	
Specification	Method
FCC 15.247:2018	ANSI C63.10:2013, KDB 558074

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	
11.12.1, 11.13.2, 6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	
11.6	Duty Cycle	Yes	Pass	
11.8.2	Occupied Bandwidth	Yes	Pass	
11.9.1.1	Output 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.

REVISION HISTORY



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

ACCREDITATIONS AND AUTHORIZATIONS



United States

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

A2LA - 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). Certification chambers and Open Area Test Sites are filed with ISED.

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

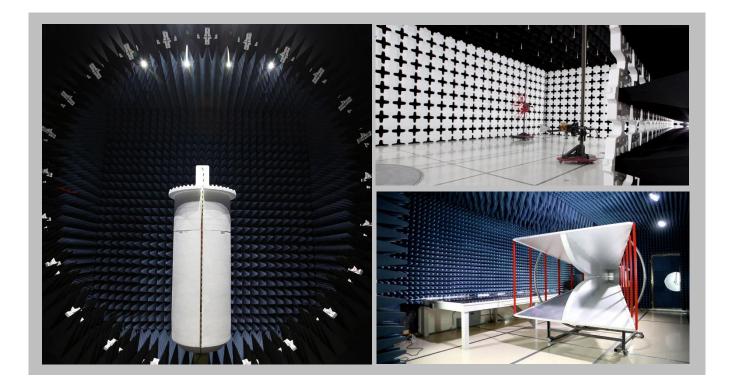
For details on the Scopes of our Accreditations, please visit: <u>http://portlandcustomer.element.com/ts/scope/scope.htm</u> <u>http://gsi.nist.gov/global/docs/cabs/designations.html</u>

FACILITIES





California Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Minnesota Labs MN01-10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	New York Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	Oregon Labs EV01-12 6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	Texas Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Washington Labs NC01-05 19201 120 th Ave NE Bothell, WA 98011 (425)984-6600	
		NV	LAP			
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200761-0	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	N/A	2834D-1, 2834D-2	2834G-1	2834F-1	
		BS	МІ			
SL2-IN-E-1154R	SL2-IN-E-1152R	N/A	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R	
	VCCI					
A-0029	A-0109	N/A	A-0108	A-0201	A-0110	
	Recognized Phase I CAB for ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA					
US0158	US0175	N/A	US0017	US0191	US0157	



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.

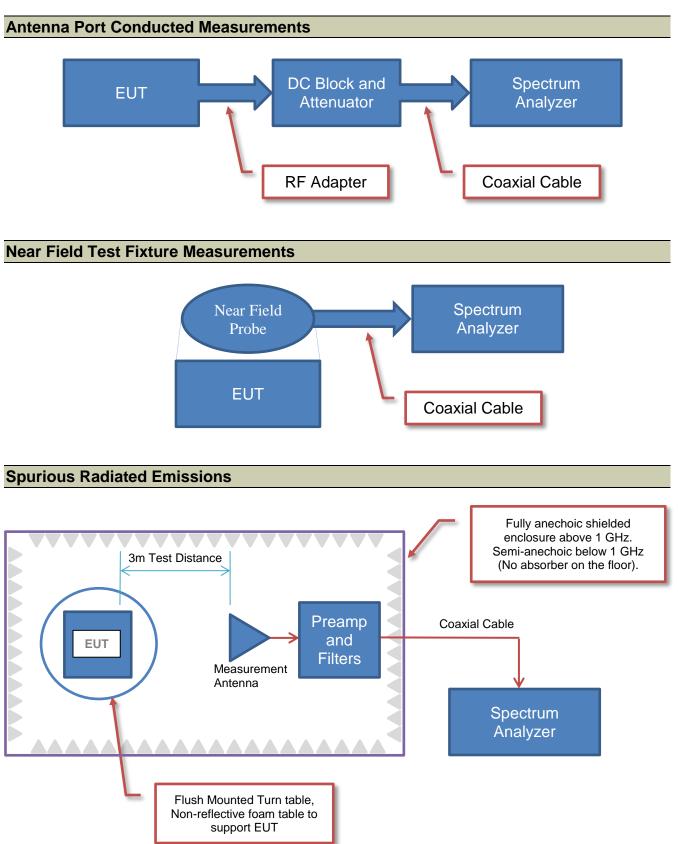
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found included as part of the applicable 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	<u>- MU</u>
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

Test Setup Block Diagrams





PRODUCT DESCRIPTION



Client and Equipment Under Test (EUT) Information

Company Name:	Starkey Laboratories, Inc.
Address:	6600 Washington Ave. SO.
City, State, Zip:	Eden Prairie, MN 55344
Test Requested By:	Bill Mitchell
Model:	TV Streamer
First Date of Test:	August 1, 2018
Last Date of Test:	August 2, 2018
Receipt Date of Samples:	August 1, 2018
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:

TV streaming device for the 2.4 GHz hearing aids using BLE

Testing Objective:

To demonstrate compliance of the Bluetooth low energy (DTS) radio to FCC 15.247 requirements.





Configuration STAK0135-1

EUT					
Description	Manufacturer	Model/Part Number	Serial Number		
TV Streaming Device	Starkey Laboratories, Inc.	800	182220800B		

Remote Equipment Outside of Test Setup Boundary					
Description Manufacturer Model/Part Number Serial Number					
Laptop	Dell	Latitude E6420	2GK1DS1		
Power Supply (Laptop)	Dell	DA130PE1-00	CN-0JU012-48661-08A-1HHP-A04		

Cables						
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2	
USB Cable	No	1.5 m	Yes	TV Streaming Device	USB Extender	
USB Extender	No	1.5 m	No	USB Cable	Laptop	
AC Cable (Laptop)	No	0.9 m	No	AC Mains	Power Supply (Laptop)	
DC Cable (Laptop)	No	1.5 m	Yes	Power Supply (Laptop)	Laptop	

MODIFICATIONS



Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2018-08-01	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	2018-08-01	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	2018-08-01	Output Power	Modified from delivered configuration.	Output power was lowered by 2 dB by the customer for FCC for the 2 Mbps modulation. Modification authorized by Aaron Anderson.	EUT remained at Element following the test.
4	2018-08-01	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.
5	2018-08-01	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.
6	2018-08-01	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.
7	2018-08-02	Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
8	2018-08-02	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.



TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Per the standard, an insulating material was also added to ground plane between the EUT's power and remote I/O cables. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 500hm measuring port is terminated by a 500hm EMI meter or a 500hm resistive load. All 500hm measuring ports of the LISN are terminated by 500hm. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
LISN	Solar Electronics	9252-50-R-24-BNC	LIY	3/15/2018	3/15/2019
Cable - Conducted Cable Assembly	Northwest EMC	MNC	MNCC	1/24/2018	1/24/2019
Receiver	Rohde & Schwarz	ESR7	ARI	6/26/2018	6/26/2019
Meter - Multimeter	Fluke	117	MLS	1/23/2017	1/23/2020
Power Supply - DC	Agilent	U8002A	TPZ	NCR	NCR

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

CONFIGURATIONS INVESTIGATED

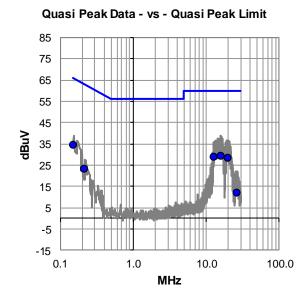
STAK0135-1

MODES INVESTIGATED

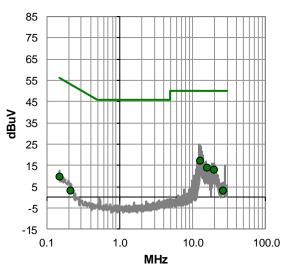
Tx at 1 Mbps, Mid channel (2442 MHz) Tx at 2 Mbps, Mid channel (2442 MHz)



						0
EUT:	TV Streamer	•		Work Order:	STAK0135	
Serial Number:	182220800E	182220800B				08/02/2018
Customer:	Starkey Lab	Starkey Laboratories, Inc.				21.4°C
Attendees:	Charlie Esch				Relative Humidity:	46.3%
Customer Proje	t: None				Bar. Pressure:	1018 mb
Tested By:	Andrew Rog	stad, Trevo	or Buls		Job Site:	MN03
Power:	5VDC via 11	0VAC/60H	Z		Configuration:	STAK0135-1
TEST SPECI	FICATIONS					
Specification:				Method:		
FCC 15.207:201	8			ANSI C63.10:	2013	
TEST PARA	METERS					
Run #: 4). 0
		Line.	Treation	710		
COMMENTS		LINC.		7.0		
		Line.		110	<u></u>	
COMMENTS None	TING MODES					
COMMENTS None EUT OPERA	TING MODES d channel (2442					
COMMENTS None EUT OPERA Tx at 2 Mbps, M		MHz)				
COMMENTS None EUT OPERA Tx at 2 Mbps, M	d channel (2442	MHz)				



Average Data - vs - Average Limit





RESULTS - Run #4

Quasi Peak Data - vs - Quasi Peak Limit						
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)	
16.017	27.7	1.5	29.2	60.0	-30.8	
0.154	34.2	0.3	34.5	65.8	-31.3	
13.025	27.5	1.2	28.7	60.0	-31.3	
20.164	25.9	2.2	28.1	60.0	-31.9	
0.213	22.8	0.3	23.1	63.1	-40.0	
26.372	9.1	3.0	12.1	60.0	-47.9	

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.025	15.9	1.2	17.1	50.0	-32.9
16.017	12.1	1.5	13.6	50.0	-36.4
20.164	10.4	2.2	12.6	50.0	-37.4
0.154	9.1	0.3	9.4	55.8	-46.4
26.372	-0.2	3.0	2.8	50.0	-47.2
0.213	2.8	0.3	3.1	53.1	-50.0

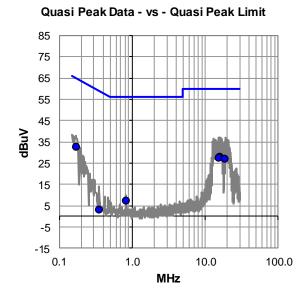
CONCLUSION

Pass

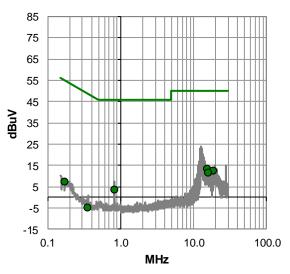
Trevor Buls Tested By



EUT.		-			Work Order:	CTAK0425
EUT:	TV Streamer					STAK0135
Serial Number:	182220800E	182220800B				08/02/2018
Customer:	Starkey Lab	oratories, Ir	IC.		Temperature:	21.4°C
Attendees:	Charlie Esch	1			Relative Humidity:	46.3%
Customer Project	None				Bar. Pressure:	1018 mb
Tested By:	Andrew Rog	stad, Trevo	r Buls		Job Site:	MN03
Power:	5VDC via 11	0VAC/60H	Z		Configuration:	STAK0135-1
TEST SPECIF						
	ICATION3					
Specification:				Method:		
FCC 15.207:2018				ANSI C63.10):2013	
TEST PARAM	ETERS					
Run #: 5		Line:	High Line	A	dd. Ext. Attenuation (dB): 0
COMMENTS						
None						
EUT OPERATING MODES						
Tx at 2 Mbps, Mid channel (2442 MHz)						
Tx at 2 Mbps, Mic	i channel (2442	ivii 1 <i>2</i> /				
Tx at 2 Mbps, Mic			ARD			
•			ARD			



Average Data - vs - Average Limit





RESULTS - Run #5

Quasi Peak Data - vs - Quasi Peak Limit						
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)	
16.242	26.0	1.6	27.6	60.0	-32.4	
15.340	26.1	1.4	27.5	60.0	-32.5	
0.172	32.0	0.3	32.3	64.9	-32.6	
19.005	24.9	2.0	26.9	60.0	-33.1	
0.830	6.8	0.2	7.0	56.0	-49.0	
0.357	3.0	0.2	3.2	58.8	-55.6	

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
15.340	11.9	1.4	13.3	50.0	-36.7
19.005	10.2	2.0	12.2	50.0	-37.8
16.242	10.0	1.6	11.6	50.0	-38.4
0.830	3.4	0.2	3.6	46.0	-42.4
0.172	6.9	0.3	7.2	54.9	-47.7
0.357	-5.1	0.2	-4.9	48.8	-53.7

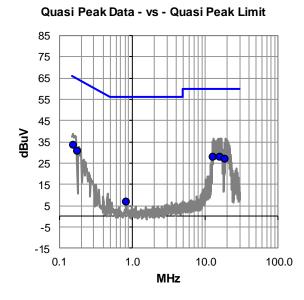
CONCLUSION

Pass

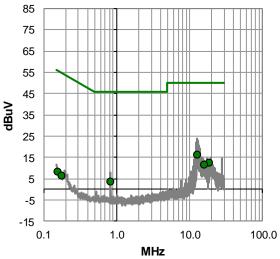
Trevor Buls Tested By



EUT:	TV Streamer				Work Order:	STAK0135	
Serial Number:		182220800B				08/02/2018	
Customer:		Starkey Laboratories, Inc.				21.4°C	
Attendees:	Charlie Esch				Temperature: Relative Humidity:	46.3%	
Customer Project:	None				Bar. Pressure:	1018 mb	
Tested By:	Andrew Rogs	stad, Trevo	r Buls		Job Site:	MN03	
Power:	5VDC via 11	OVAC/60Hz	7		Configuration:	STAK0135-1	
TEST SPECIFIC	ATIONS						
Specification:				Method:			
FCC 15.207:2018				ANSI C63.1	0:2013		
TEST PARAME	TERS						
Run #: 6		Line:	High Line	A	Add. Ext. Attenuation (dB)): 0	
COMMENTS							
None							
	EUT OPERATING MODES						
Tx at 1 Mbps, Mid c	hannel (2442 I	MHz)					
DEVIATIONS F	ROM TEST	STANDA	ARD				
None							



Average Data - vs - Average Limit





RESULTS - Run #6

Quasi Peak Data - vs - Quasi Peak Limit						
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)	
0.158	33.1	0.3	33.4	65.5	-32.1	
13.064	26.5	1.3	27.8	60.0	-32.2	
16.278	26.1	1.6	27.7	60.0	-32.3	
19.004	24.9	2.0	26.9	60.0	-33.1	
0.178	30.5	0.3	30.8	64.6	-33.8	
0.829	6.7	0.2	6.9	56.0	-49.1	

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.064	14.9	1.3	16.2	50.0	-33.8
19.004	10.2	2.0	12.2	50.0	-37.8
16.278	9.9	1.6	11.5	50.0	-38.5
0.829	3.2	0.2	3.4	46.0	-42.6
0.158	7.6	0.3	7.9	55.5	-47.6
0.178	5.9	0.3	6.2	54.6	-48.4

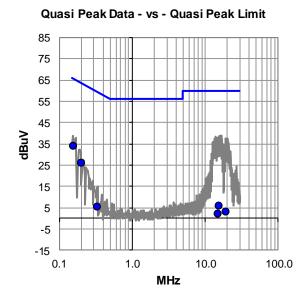
CONCLUSION

Pass

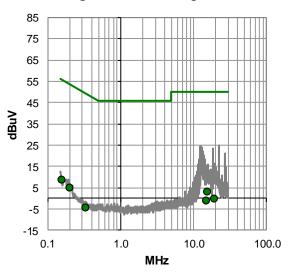
Trevor Buls Tested By



EUT:	TV Streamer				Work Order:	STAK0135
Serial Number:	182220800B	182220800B				08/02/2018
Customer:	Starkey Labo	Starkey Laboratories, Inc.				21.4°C
Attendees:	Charlie Esch				Relative Humidity:	46.3%
Customer Project:	None				Bar. Pressure:	1018 mb
Tested By:	Andrew Rogs	tad, Trevo	r Buls		Job Site:	MN03
Power:	5VDC via 110	VAC/60H	Z		Configuration:	STAK0135-1
TEST SPECIFIC	CATIONS					
Specification:				Method:		
FCC 15.207:2018				ANSI C63.10:	2013	
TEST PARAME	TERS					
Run #: 7		Line:	Neutral	Ad	d. Ext. Attenuation (dB)): 0
COMMENTS						
COMMENTS None						
None EUT OPERATII						
None		1Hz)				
None EUT OPERATII	channel (2442 N	,	ARD			
None EUT OPERATII Tx at 1 Mbps, Mid o	channel (2442 N	,	ARD			



Average Data - vs - Average Limit





RESULTS - Run #7

Quasi Peak Data - vs - Quasi Peak Limit						
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)	
0.156	33.7	0.3	34.0	65.7	-31.7	
0.202	25.6	0.3	25.9	63.5	-37.6	
0.335	5.0	0.2	5.2	59.3	-54.1	
15.556	4.1	1.5	5.6	60.0	-54.4	
19.678	0.8	2.1	2.9	60.0	-57.1	
15.069	0.5	1.4	1.9	60.0	-58.1	

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.156	8.4	0.3	8.7	55.7	-47.0
15.556	1.4	1.5	2.9	50.0	-47.1
0.202	4.7	0.3	5.0	53.5	-48.5
19.678	-2.2	2.1	-0.1	50.0	-50.1
15.069	-2.5	1.4	-1.1	50.0	-51.1
0.335	-4.9	0.2	-4.7	49.3	-54.0

CONCLUSION

Pass

Trevor Buls Tested By

SPURIOUS RADIATED EMISSIONS



PSA-ESCI 2018.05.04

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 at 2 Mbps (GFSK), Low channel (2402 MHz), Mid channel (2442 MHz), High channel (2476 MHz); Tx at 1 Mbps (BLE/GFSK), Low channel (2402 MHz), Mid channel (2442 MHz), High channel (2480 MHz)

POWER SETTINGS INVESTIGATED

5 VDC

CONFIGURATIONS INVESTIGATED

STAK0135 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency 30 MHz

Stop Frequency 26.5 GHz

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
Cable	ESM Cable Corp	TTBJ141 KMKM-72	MNP	12-Sep-2017	12 mo
Amplifier - Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	12-Sep-2017	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-09	AHG	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVW	13-Feb-2018	12 mo
Cable	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	12-Jul-2018	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVT	13-Feb-2018	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AIB	25-Aug-2016	24 mo
Cable	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	21-Nov-2017	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AXP	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	13-Feb-2018	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AIQ	NCR	0 mo
Cable	ESM Cable Corp.	Bilog Cables	MNH	9-Nov-2017	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AYD	25-Jan-2018	24 mo
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	26-Mar-2018	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AVO	9-Nov-2017	12 mo
Filter - High Pass	Micro-Tronics	HPM50111	LFN	20-Sep-2017	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	LFK	20-Sep-2017	12 mo
Attenuator	Fairview Microwave	SA18E-20	TWZ	20-Sep-2017	12 mo

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).

SPURIOUS RADIATED EMISSIONS



PK + AV • QP

					-	EmiR5 2018.05.07 PSA-ESCI 2018.05.04
W	ork Order:	STAK0135	Date:	2-Aug-2018	1	00
	Project:	None	Temperature:	19.2 °C)MON	or Buls
	Job Site:	MN05	Humidity:	47.1% RH		
Seria	al Number:	182220800B	Barometric Pres.:	1020 mbar	Tested by:	Andrew Rogstad, Trevor Buls
		TV Streamer				
	figuration:	1				
	Customer:	Starkey Laboratories,	Inc.			
	Attendees:	Charlie Esch				
E	UT Power:		Law shares I (0400 M	I-) Mistakaraal (0	440 MUL-) Librita alterna al	(0.470 MILE) To at 4 Miles
Operat	ting Mode:				442 MHZ), High channei), High channel (2480 M	(2476 MHz); Tx at 1 Mbps Hz)
г	Deviations:	None		- -		e e e e e e e e e e e e e e e e e e e
	Jeviations.					
						uty cycle correction factor
_						of pulsed operation. The DCCF
C	comments:					()) to add to the measured
						ed duty cylce using the formula
		(20"Log(x)) (2 Mbps (GFSK duty cycle is 30%	and T wops BLE d	uty cycle is 1%).	
	cifications			Test Me		
FCC 15.24	47:2018			ANSI C6	3.10:2013	
Run #	13	Test Distance (m)	3 Antenna	Height(s)	1 to 4(m)	Results Pass
1						
80 -						
70 -						
60 -						
_ 50 -						
εŰ						
W/Nngp						
n 40 -				· · · · · · · · · · · · · · · · · · ·		
- F						
30 -						
20 -						
10 -						
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				🖊		
0 +		1				1
0 +	0	100		1000	10000	100000

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
2483.925	55.2	-4.5	1.0	289.0		20.0	Vert	PK	0.0	70.7	74.0	-3.3	EUT on side; High Ch., 2 Mbps
2483.550	38.1	-4.5	1.2	13.0	-3.0	20.0	Horz	AV	0.0	50.6	54.0	-3.4	EUT horz; High Ch., 2 Mbps
4951.008	47.1	5.6	2.7	308.9	-2.6	0.0	Horz	AV	0.0	50.1	54.0	-3.9	EUT on side; High Ch., 2 Mbps
4951.058	46.7	5.6	1.0	289.9	-2.6	0.0	Vert	AV	0.0	49.7	54.0	-4.3	EUT vert; High Ch., 2 Mbps
2483.792	54.0	-4.5	1.0	268.9		20.0	Horz	PK	0.0	69.5	74.0	-4.5	EUT vert; High Ch., 2 Mbps
2483.533	36.7	-4.5	1.0	289.0	-3.0	20.0	Vert	AV	0.0	49.2	54.0	-4.8	EUT on side; High Ch., 2 Mbps
2483.500	36.7	-4.5	1.0	268.9	-3.0	20.0	Horz	AV	0.0	49.2	54.0	-4.8	EUT vert; High Ch., 2 Mbps
2483.583	53.2	-4.5	1.0	28.0		20.0	Horz	PK	0.0	68.7	74.0	-5.3	EUT horz; High Ch., 2 Mbps
4883.042	46.0	5.4	1.0	306.0	-3.0	0.0	Vert	AV	0.0	48.4	54.0	-5.6	EUT vert, Mid Ch., 2 Mbps
2483.525	35.2	-4.5	1.0	218.0	-2.6	20.0	Vert	AV	0.0	48.1	54.0	-5.9	EUT vert; High Ch., 2 Mbps
2483.508	52.3	-4.5	1.0	218.0		20.0	Vert	PK	0.0	67.8	74.0	-6.2	EUT vert; High Ch., 2 Mbps
4882.950	44.8	5.4	1.0	61.0	-2.6	0.0	Vert	AV	0.0	47.6	54.0	-6.4	EUT horz; Mid Ch., 2 Mbps
4802.975	45.1	5.0	2.0	236.9	-3.0	0.0	Horz	AV	0.0	47.1	54.0	-6.9	EUT on side; Low Ch., 2 Mbps
12207.520	49.8	-0.3	2.3	286.0	-2.6	0.0	Horz	AV	0.0	46.9	54.0	-7.1	EUT on side; Mid Ch., 2 Mbps
4882.992	44.0	5.4	1.2	215.0	-2.6	0.0	Horz	AV	0.0	46.8	54.0	-7.2	EUT on side; Mid Ch., 2 Mbps
4803.083	44.5	5.0	1.1	304.9	-3.0	0.0	Vert	AV	0.0	46.5	54.0	-7.5	EUT vert; Low Ch.; 2 Mbps
12377.520	48.3	0.8	1.0	260.0	-2.9	0.0	Vert	AV	0.0	46.2	54.0	-7.8	EUT vert; High Ch., 2 Mbps
2257.855	32.8	-3.6	1.0	160.1	-3.0	20.0	Vert	AV	0.0	46.2	54.0	-7.8	EUT vert; Low Ch., 2 Mbps
2389.908	33.4	-4.4	1.0	10.0	-3.0	20.0	Horz	AV	0.0	46.0	54.0	-8.0	EUT horz; Low Ch., 2 Mbps
2483.517	32.8	-4.5	3.0	147.0	-3.0	20.0	Horz	AV	0.0	45.3	54.0	-8.7	EUT on side; High Ch., 2 Mbps
2389.067	49.6	-4.4	1.0	10.0		20.0	Horz	PK	0.0	65.2	74.0	-8.8	EUT horz; Low Ch., 2 Mbps

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)	C
40007.500	40.0	0.0	1.0	275.0	-2.6	0.0	Mart	AV	0.0	45.4	54.0	-8.9	Comments EUT vert; Mid Ch., 2 Mbps
12207.500 2331.930	48.0 32.1	-0.3 -4.1	1.0 1.0	275.0 196.1	-2.6	20.0	Vert Vert	AV	0.0	45.1 45.0	54.0 54.0	-8.9 -9.0	EUT vert; High Ch., 2 Mbps
12012.170	48.2	-4.1	1.0	292.0	-3.0	20.0	Vert	AV	0.0	45.0	54.0 54.0	-9.0	EUT vert; Low Ch., 2 Mbps
4950.908	40.2 59.1	-0.9	2.7	308.9	-2.0	0.0	Horz	PK	0.0	64.7	74.0	-9.3	EUT on side; High Ch., 2 Mbps
2483.500	32.1	-4.5	1.0	90.0	-3.0	20.0	Vert	AV	0.0	44.6	74.0 54.0	-9.3	EUT horz; High Ch., 2 Mbps
2297.982	31.4	-4.1	1.0	191.1	-3.0	20.0	Vert	AV	0.0	44.0	54.0	-9.4	EUT vert; Mid Ch., 2 Mbps
4950.858	58.6	5.6	1.0	289.9	-3.0	0.0	Vert	PK	0.0	64.2	74.0	-9.8	EUT vert; High Ch., 2 Mbps
2259.272	30.6	-3.6	2.5	97.0	-3.0	20.0	Horz	AV	0.0	44.0	54.0	-10.0	EUT on side; Low Ch., 2 Mbps
4883.017	41.3	-5.0	1.0	286.9	-2.9	0.0	Horz	AV	0.0	43.8	54.0	-10.2	EUT horz; Mid Ch., 2 Mbps
2333.913	30.9	-4.1	1.0	151.0	-3.0	20.0	Horz	AV	0.0	43.8	54.0	-10.2	EUT on side; High Ch., 2 Mbps
4882.842	58.1	5.4	1.0	306.0	-0.0	0.0	Vert	PK	0.0	63.5	74.0	-10.2	EUT vert, Mid Ch., 2 Mbps
2295.915	30.5	-4.0	1.0	183.0	-3.0	20.0	Horz	AV	0.0	43.5	54.0	-10.5	EUT on side; Mid Ch., 2 Mbps
2483.500	47.4	-4.5	3.0	147.0	-0.0	20.0	Horz	PK	0.0	62.9	74.0	-11.1	EUT on side; High Ch., 2 Mbps
4882.967	39.6	5.4	3.3	220.1	-2.6	0.0	Horz	AV	0.0	42.4	54.0	-11.6	EUT vert, Mid Ch., 2 Mbps
4882.800	57.0	5.4	1.0	61.0	2.0	0.0	Vert	PK	0.0	62.4	74.0	-11.6	EUT horz; Mid Ch., 2 Mbps
4804.967	57.1	5.0	2.0	236.9		0.0	Horz	PK	0.0	62.1	74.0	-11.9	EUT on side; Low Ch., 2 Mbps
4804.983	57.1	5.0	1.1	304.9		0.0	Vert	PK	0.0	62.1	74.0	-11.9	EUT vert; Low Ch.; 2 Mbps
12379.780	61.1	0.8	1.0	260.0		0.0	Vert	PK	0.0	61.9	74.0	-12.1	EUT vert; High Ch., 2 Mbps
12209.760	62.1	-0.2	2.3	286.0		0.0	Horz	PK	0.0	61.9	74.0	-12.1	EUT on side; Mid Ch., 2 Mbps
4882.925	56.3	5.4	1.2	215.0		0.0	Horz	PK	0.0	61.7	74.0	-12.3	EUT on side; Mid Ch., 2 Mbps
2258.555	44.9	-3.6	1.0	160.1		20.0	Vert	PK	0.0	61.3	74.0	-12.7	EUT vert; Low Ch., 2 Mbps
12012.410	61.7	-0.9	1.0	292.0		0.0	Vert	PK	0.0	60.8	74.0	-13.2	EUT vert; Low Ch., 2 Mbps
2483.967	45.2	-4.5	1.0	90.0		20.0	Vert	PK	0.0	60.7	74.0	-13.3	EUT horz; High Ch., 2 Mbps
7324.433	32.7	10.6	1.1	308.9	-2.6	0.0	Horz	AV	0.0	40.7	54.0	-13.3	EUT on side; Mid Ch., 2 Mbps
12209.830	60.4	-0.2	1.0	275.0		0.0	Vert	PK	0.0	60.2	74.0	-13.8	EUT vert; Mid Ch., 2 Mbps
4883.008	37.0	5.4	1.0	202.1	-2.6	0.0	Vert	AV	0.0	39.8	54.0	-14.2	EUT on side; Mid Ch., 2 Mbps
12007.530	43.3	-0.9	1.0	264.0	-2.6	0.0	Horz	AV	0.0	39.8	54.0	-14.2	EUT on side; Low Ch., 2 Mbps
12377.500	41.5	0.8	1.0	335.0	-2.6	0.0	Horz	AV	0.0	39.7	54.0	-14.3	EUT on side; High Ch., 2 Mbps
2331.097	43.8	-4.1	1.0	196.1		20.0	Vert	PK	0.0	59.7	74.0	-14.3	EUT vert; High Ch., 2 Mbps
2298.173	43.7	-4.1	1.0	191.1		20.0	Vert	PK	0.0	59.6	74.0	-14.4	EUT vert; Mid Ch., 2 Mbps
7426.433	31.6	10.6	2.1	257.9	-2.6	0.0	Vert	AV	0.0	39.6	54.0	-14.4	EUT vert; High Ch., 2 Mbps
4882.858	53.9	5.4	1.0	286.9		0.0	Horz	PK	0.0	59.3	74.0	-14.7	EUT horz; Mid Ch., 2 Mbps
7426.492	31.3	10.6	1.4	27.0	-2.6	0.0	Horz	AV	0.0	39.3	54.0	-14.7	EUT on side; High Ch., 2 Mbps
2255.430	42.6	-3.5	2.5	97.0		20.0	Horz	PK	0.0	59.1	74.0	-14.9	EUT on side; Low Ch., 2 Mbps
7324.492	31.1	10.6	1.0	243.9	-2.9	0.0	Vert	AV	0.0	38.8	54.0	-15.2	EUT vert; Mid Ch., 2 Mbps
2333.322	42.7	-4.1	1.0	151.0		20.0	Horz	PK	0.0	58.6	74.0	-15.4	EUT on side; High Ch., 2 Mbps
2298.998	42.2	-4.1	1.0	183.0		20.0	Horz	PK	0.0	58.1	74.0	-15.9	EUT on side; Mid Ch., 2 Mbps
4882.800	52.6	5.4	3.3	220.1		0.0	Horz	PK	0.0	58.0	74.0	-16.0	EUT vert, Mid Ch., 2 Mbps
7327.150	46.0	10.6	1.1	308.9		0.0	Horz	PK	0.0	56.6	74.0	-17.4	EUT on side; Mid Ch., 2 Mbps
4884.708	50.6	5.4	1.0	202.1		0.0	Vert	PK	0.0	56.0	74.0	-18.0	EUT on side; Mid Ch., 2 Mbps
12379.760	55.0	0.8	1.0	335.0		0.0	Horz	PK	0.0	55.8	74.0	-18.2	EUT on side; High Ch., 2 Mbps
12012.250	56.7	-0.9	1.0	264.0		0.0	Horz	PK	0.0	55.8	74.0	-18.2	EUT on side; Low Ch., 2 Mbps
7426.417	44.5	10.6	2.1	257.9		0.0	Vert	PK	0.0	55.1	74.0	-18.9	EUT vert; High Ch., 2 Mbps
7429.200	44.3	10.7	1.4	27.0		0.0	Horz	PK	0.0	55.0	74.0	-19.0	EUT on side; High Ch., 2 Mbps
7324.542	43.5	10.6	1.0	243.9		0.0	Vert	PK	0.0	54.1	74.0	-19.9	EUT vert; Mid Ch., 2 Mbps
2483.733	43.9	-4.5	1.0	164.0		10.0	Horz	PK	0.0	49.4	74.0	-24.6	EUT horz; High Ch., 1 Mbps
2385.733	43.5	-4.4	1.0	312.9		10.0	Horz	PK	0.0	49.1	74.0	-24.9	EUT horz; Low Ch., 1 Mbps
4962.050	43.4	5.7	1.4	286.0		0.0	Horz	PK	0.0	49.1	74.0	-24.9	EUT on side; High Ch., 1 Mbps
2483.525	31.9	-4.5	1.0	164.0	-35.5	10.0	Horz	AV	0.0	1.9	54.0	-52.1	EUT horz; High Ch., 1 Mbps
4959.800	31.5	5.7	1.4	286.0	-35.5	0.0	Horz	AV	0.0	1.7	54.0	-52.3	EUT on side; High Ch., 1 Mbps
2389.967	31.4	-4.4	1.0	312.9	-35.5	10.0	Horz	AV	0.0	1.5	54.0	-52.5	EUT horz; Low Ch., 1 Mbps



XMit 2017.12.13

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	29-Sep-17	29-Sep-20
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	26-Mar-18	26-Mar-19
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	15-Mar-18	15-Mar-19
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-18	13-Feb-19
Block - DC	Fairview Microwave	SD3379	AMI	12-Sep-17	12-Sep-18

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.

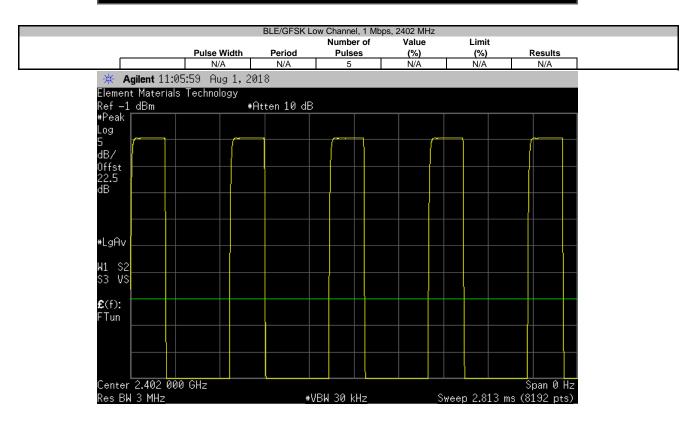
If the transmit duty cycle < 98 percent, burst gating may have been used during some of the other tests in this report to only take the measurement during the burst duration.



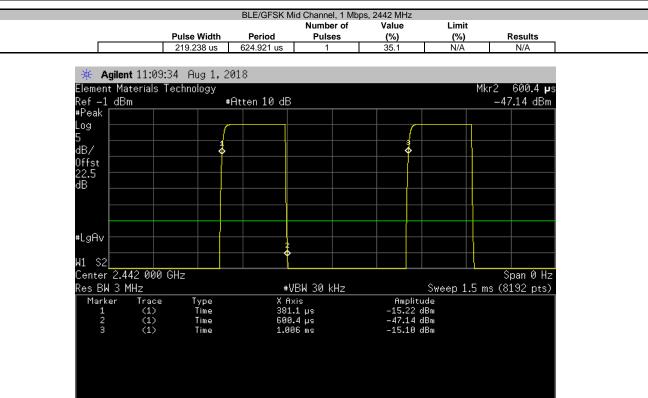
								TbtTx 2017.12.14	XMit 2
EUT:	TV Streamer						Work Order:	STAK0135	
Serial Number:								1-Aug-18	
Customer:	Starkey Laboratories, Inc.						Temperature:	23 °C	
Attendees:	Charlie Esch						Humidity:	54.2% RH	
Project:							Barometric Pres.:	1018 mbar	
	Andrew Rogstad, Trevor Buls		Pow	er: 5 VDC			Job Site:	MN09	
ST SPECIFICATI	IONS			Test Method					
C 15.247:2018				ANSI C63.10:2013					
MMENTS									
	ter cable included in measurement	cable offset.							
- to only tudapt									
VIATIONS FROM	M TEST STANDARD								
one									
one	1	Signature	Trevor	Buls					
	1	Signature	Trevor	Buls Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Result
nfiguration #	1 annel, 1 Mbps, 2402 MHz	Signature	Trevor		Period 625.119 us				Result N/A
nfiguration # E/GFSK Low Cha E/GFSK Low Cha	annel, 1 Mbps, 2402 MHz	Signature	Trevor	Pulse Width			(%) 35.3 N/A	(%)	N/A N/A
nfiguration # E/GFSK Low Cha E/GFSK Low Cha E/GFSK Mid Cha	annel, 1 Mbps, 2402 MHz Innel, 1 Mbps, 2442 MHz	Signature	Trevor	Pulse Width 220.655 us N/A 219.238 us	625.119 us N/A 624.921 us	Pulses 1	(%) 35.3 N/A 35.1	(%) N/A N/A N/A	N/A N/A N/A
nfiguration # E/GFSK Low Cha E/GFSK Low Cha E/GFSK Mid Cha E/GFSK Mid Cha	annel, 1 Mbps, 2402 MHz innel, 1 Mbps, 2442 MHz innel, 1 Mbps, 2442 MHz	Signature	Trevor	Pulse Width 220.655 us N/A 219.238 us N/A	625.119 us N/A 624.921 us N/A	Pulses 1	(%) 35.3 N/A 35.1 N/A	(%) N/A N/A N/A N/A	N/A N/A N/A N/A
nfiguration # E/GFSK Low Cha E/GFSK Low Cha E/GFSK Mid Cha E/GFSK Mid Cha E/GFSK High Cha	annel, 1 Mbps, 2402 MHz Innel, 1 Mbps, 2442 MHz Innel, 1 Mbps, 2442 MHz annel, 1 Mbps, 2480 MHz	Signature	Trevor	Pulse Width 220.655 us N/A 219.238 us N/A 220.105 us	625.119 us N/A 624.921 us N/A 624.954 us	Pulses 1 5 1	(%) 35.3 N/A 35.1 N/A 35.2	(%) N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A
E/GFSK Low Cha E/GFSK Low Cha E/GFSK Mid Chau E/GFSK Mid Chau E/GFSK Migh Cha E/GFSK High Cha	annel, 1 Mbps, 2402 MHz Innel, 1 Mbps, 2442 MHz Innel, 1 Mbps, 2442 MHz annel, 1 Mbps, 2480 MHz annel, 1 Mbps, 2480 MHz	Signature	Trevor	Pulse Width 220.655 us N/A 219.238 us N/A 220.105 us N/A	625.119 us N/A 624.921 us N/A 624.954 us N/A	Pulses 1 5 1	(%) 35.3 N/A 35.1 N/A 35.2 N/A	(%) N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A
figuration # //GFSK Low Cha //GFSK Low Cha //GFSK Mid Chau //GFSK Mid Chau //GFSK High Cha //GFSK High Cha SK Low Channel,	annel, 1 Mbps, 2402 MHz Innel, 1 Mbps, 2442 MHz Innel, 1 Mbps, 2442 MHz annel, 1 Mbps, 2480 MHz annel, 1 Mbps, 2480 MHz I, 2 Mbps, 2402 MHz	Signature	Trevor	Pulse Width 220.655 us N/A 219.238 us N/A 220.105 us N/A 107.995 us	625.119 us N/A 624.921 us N/A 624.954 us N/A 624.958 us	Pulses 1 5 1	(%) 35.3 N/A 35.1 N/A 35.2 N/A 17.3	(%) N/A N/A N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A N/A
figuration # //GFSK Low Cha //GFSK Mid Chai //GFSK Mid Chai //GFSK Mid Chai //GFSK High Chi //GFSK High Chi //GFSK High Chi //GFSK High Chi //GFSK Low Channel, SK Low Channel,	annel, 1 Mbps, 2402 MHz Innel, 1 Mbps, 2442 MHz Innel, 1 Mbps, 2442 MHz annel, 1 Mbps, 2480 MHz annel, 1 Mbps, 2480 MHz I, 2 Mbps, 2402 MHz J, 2 Mbps, 2402 MHz	Signature	Trevor	Pulse Width 220.655 us N/A 219.238 us N/A 220.105 us N/A 107.995 us N/A	625.119 us N/A 624.921 us N/A 624.954 us N/A 624.958 us N/A	Pulses 1 5 1	(%) 35.3 N/A 35.1 N/A 35.2 N/A 17.3 N/A	(%) N/A N/A N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A N/A
Figuration # E/GFSK Low Cha E/GFSK Low Cha E/GFSK Mid Chai E/GFSK Mid Chai C/GFSK Migh Chi E/GFSK High Chi SK Low Channel, SK Low Channel, SK Mid Channel,	annel, 1 Mbps, 2402 MHz innel, 1 Mbps, 2442 MHz innel, 1 Mbps, 2442 MHz annel, 1 Mbps, 2448 MHz annel, 1 Mbps, 2480 MHz , 2 Mbps, 2402 MHz , 2 Mbps, 2402 MHz . 2 Mbps, 2442 MHz	Signature	Trevor	Pulse Width 220.655 us N/A 219.238 us N/A 220.105 us N/A 107.995 us N/A 107.929 us	625.119 us N/A 624.921 us N/A 624.954 us N/A 624.958 us N/A 625.001 us	Pulses 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1	(%) 35.3 N/A 35.1 N/A 35.2 N/A 17.3 N/A 17.3	(%) N/A N/A N/A N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A N/A N/A
Infiguration # E/GFSK Low Cha E/GFSK Low Cha E/GFSK Mid Cha E/GFSK High Cha SK Low Channel, SK Low Channel, SK Mid Channel,	annel, 1 Mbps, 2402 MHz Innel, 1 Mbps, 2442 MHz annel, 1 Mbps, 2442 MHz annel, 1 Mbps, 24480 MHz annel, 1 Mbps, 2480 MHz , 2 Mbps, 2402 MHz , 2 Mbps, 2402 MHz , 2 Mbps, 2402 MHz , 2 Mbps, 2442 MHz , 2 Mbps, 2442 MHz	Signature	Trevor	Pulse Width 220.655 us N/A 219.238 us N/A 220.105 us N/A 107.995 us N/A	625.119 us N/A 624.921 us N/A 624.954 us N/A 624.958 us N/A 625.001 us N/A	Pulses 1 5 1	(%) 35.3 N/A 35.1 N/A 35.2 N/A 17.3 N/A 17.3 N/A	(%) N/A N/A N/A N/A N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A N/A N/A
E/GFSK Low Cha E/GFSK Low Cha E/GFSK Low Cha E/GFSK Mid Cha E/GFSK Migh Cha E/GFSK High Cha E/GFSK High Cha FSK Low Channel, SSK Mid Channel, SSK Mid Channel,	annel, 1 Mbps, 2402 MHz innel, 1 Mbps, 2442 MHz innel, 1 Mbps, 2442 MHz annel, 1 Mbps, 2448 MHz annel, 1 Mbps, 2480 MHz , 2 Mbps, 2402 MHz , 2 Mbps, 2402 MHz . 2 Mbps, 2442 MHz	Signature	Trevor	Pulse Width 220.655 us N/A 219.238 us N/A 220.105 us N/A 107.995 us N/A 107.929 us	625.119 us N/A 624.921 us N/A 624.954 us N/A 624.958 us N/A 625.001 us	Pulses 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1	(%) 35.3 N/A 35.1 N/A 35.2 N/A 17.3 N/A 17.3	(%) N/A N/A N/A N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A N/A N/A

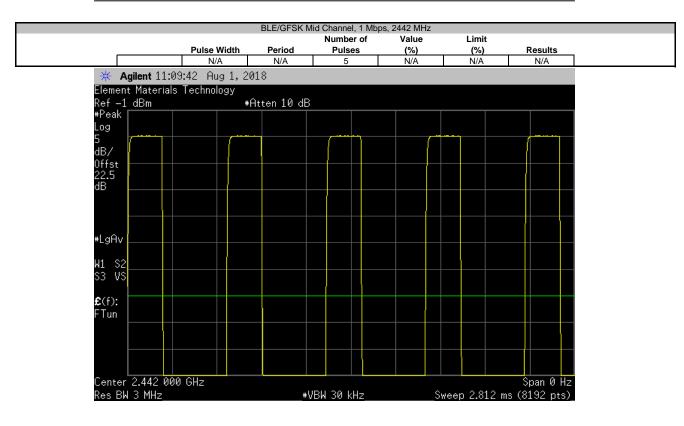


Pulse Width Period Pulses (%) (%) Results 220.655 us 625.119 us 1 35.3 N/A N/A Agilent 11:05:52 Aug 1, 2018 Mkr2 601.6 ps -47.13 dBm Element Materials Technology #Atten 10 dB -47.13 dBm -47.13 dBm #Deak -47.13 dBm -47.13 dBm -47.13 dBm #Log -47.13 dBm -47.13 dBm -47.13 dBm #LgAv -47.13 dBm -47.13 dBm -47.13 dBm Mit S2 -47.43 dBm -47.43 dBm -47.13 dBm Marker Trace Type X Axis Sweep 1.5 ms (8192 pts) Marker Trace Type X Axis -47.13 dBm 3 (1) Time 388.9 µs -15.			BLE/GFSK L	ow Channel, 1 Mb	ps, 2402 MHz		
220.655 us 625.119 us 1 35.3 N/A N/A # Agilent 11:05:52 Aug 1, 2018 Element Materials Technology Mkr2 601.6 µs Ref -1 dBm #Atten 10 dB -47.13 dBm #Peak -47.13 dBm Log State State GB/ Offst State State Uter and the state State State State HLgAv Image: State State State State WI S2 State State State State State Marker Trace Type X Axis Amplitude Amplitude 1 Call Time State Amplitude -47.13 dBm							
* Agilent 11:05:52 Aug 1, 2018 Element Materials Technology Mkr2 601.6 µs Ref -1 dBm *Atten 10 dB -47.13 dBm *Peak -47.13 dBm Log -47.13 dBm 5 dB/ dB/ -47.13 dBm 0ffst -47.13 dBm 22.5 -47.13 dBm dB -47.13 dBm *LgAv -47.13 dBm wl1 S2 -47.13 dBm Center 2.402 000 GHz Span 0 Hz Res BW 3 MHz *VBW 30 kHz Sweep 1.5 ms (8192 pts) Marker Trace Type X Axis Amplitude 1 10 Time 681.6 µs -47.13 dBm							
Element Materials Technology Mkr2 601.6 µs Ref -1 dBm #Atten 10 dB -47.13 dBm *Peak -47.13 dBm -47.13 dBm Log		220.655 us	625.119 us	1	35.3	N/A	N/A
Element Materials Technology Mkr2 601.6 µs Ref 1 dB -47.13 dBm *Peak	siz	11.05.50 0	001.0				
Ref -1 dBm #Atten 10 dB -47.13 dBm #Peak			2018				0.001.0
*Peak Log 5 dB/ 0ffst 22.5 dB 4 *LgAv 4 *LgAv 4 *LgAv 4 *LgAv 5 Marker Trace 1 1 1 1 2 1 1 1 2 1 1 1 2 1 2 1 1 1 1 1 1 1 2 1 2 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 2 1						MI	
Log 5 dB/ Offst 22.5 dB #LgAv #VBW 30 kHz #VBW 30 kHz Sweep 1.5 ms (8192 pts) Marker Trace Type X Axis 1 (1) Time 3880.9 µs -47.7.13 dBm	Ref -1_dBm		#Atten 10 dB				-47.13 dBm
5 dB/ 0ffst 22.5 dB +LgAv H1 S2 Center 2.402 000 GHz Res BW 3 MHz 1 (1) Time 3880.9 µs -15.27 dBm 2 (1) Time 691.6 µs -47.13 dBm							
dB/ 0ffst 22.5 dB 3 3 3 #LgAv 4 4 4 #LgAv 5 5 5 #U S2 5 5 5 Genter 2.402 000 GHz 5 Res BW 3 MHz #VBW 30 kHz 5 Marker Trace Type 1 (1) Time 388.9 µs 2 (1) Time 601.6 µs 2 (1) Time 601.6 µs							
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22.5 dB #LgAv #LgAv W1 S2 Center 2.402 000 GHz Res BW 3 MHz 1 (1) Time 388.9 µs -15.27 dBm 2 (1) Time 681.6 µs -47.13 dBm		¢			•		
dB +LgAv H1 S2 Center 2.402 000 GHz Res BW 3 MHz Marker Trace Type X Axis 1 (1) Time 3880.9 µs -15.27 dBm 2 (1) Time 601.6 µs -47.13 dBm	Offst						
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H1 S2 Center 2.402 000 GHz Res BW 3 MHz Marker Trace Type X Axis 1 (1) Time 3880.9 µs 2 (1) Time 601.6 µs -47.13 dBm	dB				<u> </u>		
H1 S2 Center 2.402 000 GHz Res BW 3 MHz Marker Trace Type X Axis 1 (1) Time 388.9 µs 2 (1) Time 601.6 µs -47.13 dBm							
H1 S2 Center 2.402 000 GHz Res BW 3 MHz Marker Trace Type X Axis 1 (1) Time 380.9 µs 2 (1) Time 601.6 µs -47.13 dBm							
H1 S2 Center 2.402 000 GHz Res BW 3 MHz Marker Trace Type X Axis 1 (1) Time 380.9 µs 2 (1) Time 601.6 µs -47.13 dBm							
Center 2.402 000 GHz Span 0 Hz Res BW 3 MHz #VBW 30 kHz Sweep 1.5 ms (8192 pts) Marker Trace Type X Axis Amplitude 1 (1) Time 380.9 µs -15.27 dBm 2 (1) Time 601.6 µs -47.13 dBm	#LgAv						
Center 2.402 000 GHz Span 0 Hz Res BW 3 MHz #VBW 30 kHz Sweep 1.5 ms (8192 pts) Marker Trace Type X Axis Amplitude 1 (1) Time 380.9 µs -15.27 dBm 2 (1) Time 601.6 µs -47.13 dBm							
Res BW 3 MHz #VBW 30 kHz Sweep 1.5 ms (8192 pts) Marker Trace Type X Axis Amplitude 1 (1) Time 380.9 μs -15.27 dBm 2 (1) Time 601.6 μs -47.13 dBm	W1 S2						
MarkerTraceTypeX AxisAmplitude1(1)Time380.9 μs-15.27 dBm2(1)Time601.6 μs-47.13 dBm	Center 2.402	2 000 GHz					Span 0 Hz
1 (1) Time 380.9 μs -15.27 dBm 2 (1) Time 601.6 μs -47.13 dBm	Res BW 3 MH	lz	#\	/BW 30 kHz		Sweep 1.5 m	ns (8192 pts)
2 (1) Time 601.6 µs -47.13 dBm	Marker						
2 (1) lime 581.5 µs -47.13 dBm 3 (1) Time 1.006 ms -15.02 dBm	1						
3 (1) Time 1.866 ms -13.82 dbm	2						
		(1) 11116	1.00	50 MS	-15.02 dE		

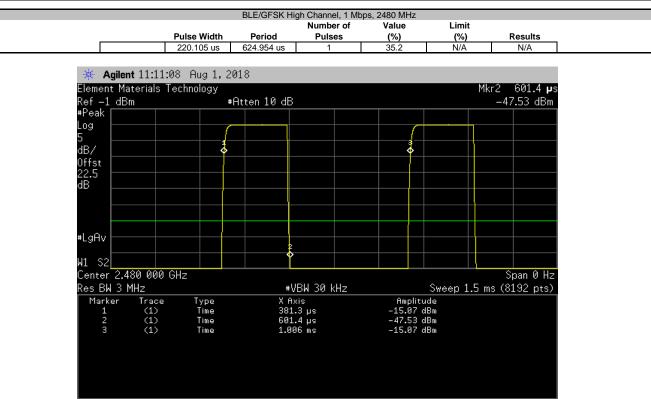


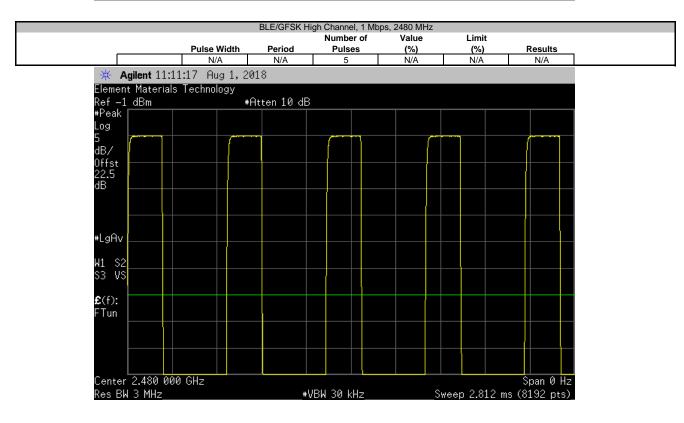




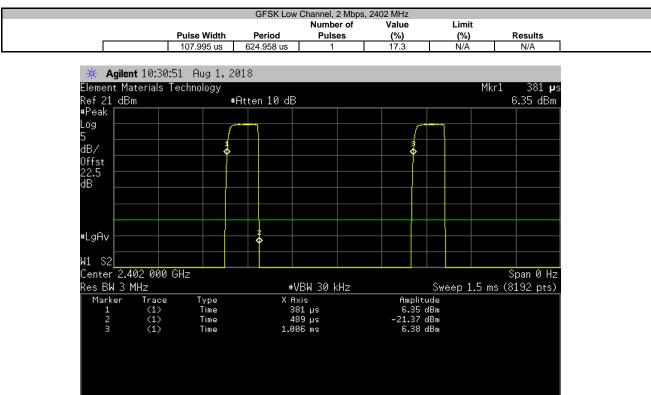


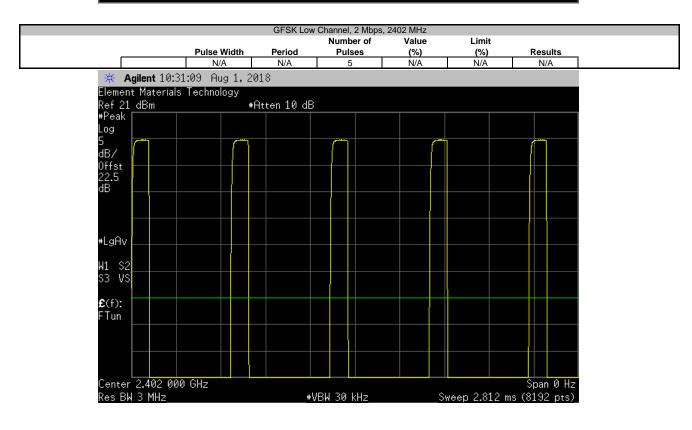






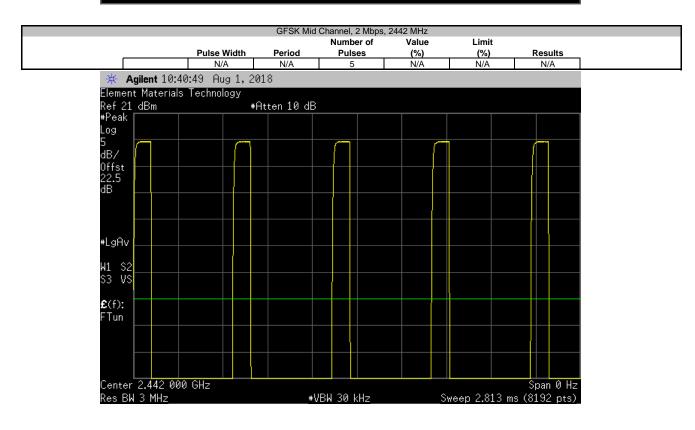




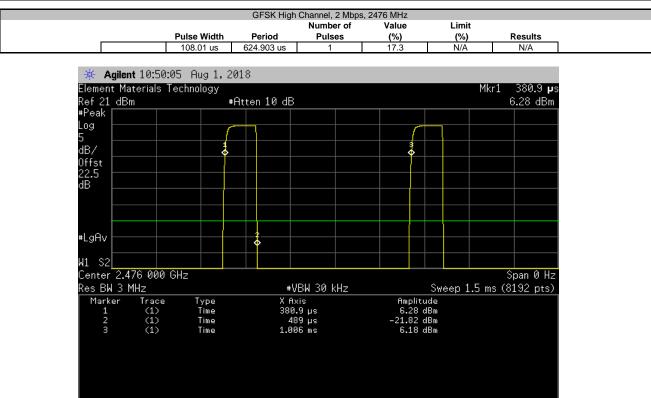


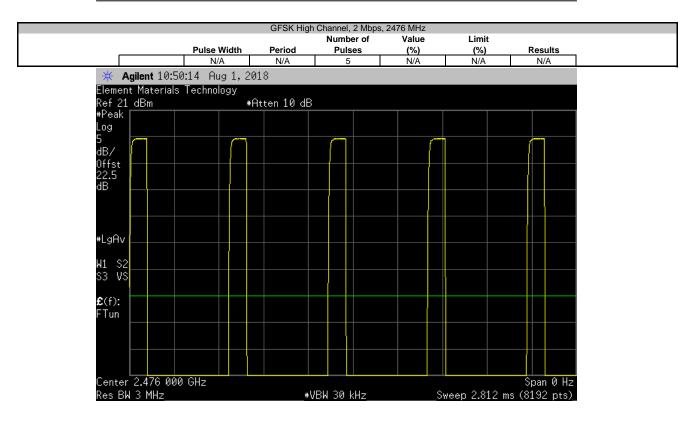


Number of Pulse Width Period Period Value Pulses Limit (%) Results 107.929 us 625.001 us 1 17.3 N/A N/A Agilent 10:40:39 Aug 1, 2018 Kr1 380.8 µs Kr1 380.8 µs Control of the second se			GFSK Mid	Channel, 2 Mbps,			
107.929 us 625.001 us 1 17.3 N/A N/A # Agilent 10:40:39 Aug 1, 2018 Element Materials Technology Mkr1 380.8 µs Ref 21 dBm #Atten 10 dB 6.42 dBm #Peak							
Image: Second							
Element Materials Technology Mkr1 380.8 µs Ref 21 dBm *Atten 10 dB 6.42 dBm *Peak 6.42 dBm Log 5 dB/ 0 Offst 22.5 dB 0 *LgAv 0 *LgAv 0 *LgAv 0 M1 \$2 0 Center 2.442 000 GHz Span 0 Hz Res BW 3 MHz *VBW 30 kHz Marker Trace Type 1 (1) Time 2 (1) Time		107.929 us	625.001 us	1	17.3	N/A	N/A
Element Materials Technology Mkr1 380.8 µs Ref 21 dBm *Atten 10 dB 6.42 dBm *Peak Log 5 dB/ Offst 22.5 dB *LgAv W1 \$2 Center 2.442 000 GHz Res BW 3 MHz *VBW 30 kHz Sweep 1.5 ms (8192 pts) Marker Trace Type X Axis Amplitude 1 (1) Time 380.8 µs 6.42 dBm *LgAv Marker Trace Type X Axis Amplitude 1 (1) Time 488.8 µs -21.81 dBm							
Ref 21 dBm #Atten 10 dB 6.42 dBm *Peak	- 🔆 🕺 🔆 🔆 🔆	:39 Aug 1, 20	018				
Ref 21 dBm #Atten 10 dB 6.42 dBm *Peak	Element Materials	Technology					Mkr1 380.8 µ
Peak Log 5 dB/ Offst 22.5 dB *LgAv *LgA			Atten 10 dB				
5 dB/							
dB/ Offst 22.5 dB i i i i #LgAv i i i i Marker Center 2.442 000 GHz Span 0 Hz Res BW 3 MHz #VBW 30 kHz Sweep 1.5 ms (8192 pts) Marker Trace Type X Axis 1 (1) Time 380.8 µs -21.81 dBm	Log	(\rightarrow		
dB/ Offst 22.5 dB Image: Constraint of the system of the							
22.5 dB #LgAv W1 S2 Center 2.442 000 GHz Res BW 3 MHz Marker Trace Type X Axis 1 (1) Time 380.8 µs 6.42 dBm 2 (1) Time 488.8 µs -21.81 dBm	dB/						
dB #LgAv W1 \$2 Center 2.442 000 GHz Res BW 3 MHz Marker Trace Type X Axis 1 (1) Time X80.8 µs 2 (1) Time 488.8 µs -21.81 dBm	Offst 🛛 🚽						
#LgAv #LgAv W1 S2 Center 2.442 000 GHz Res BW 3 MHz #VBW 30 kHz Sweep 1.5 ms (8192 pts) Marker Trace Type X Axis 1 (1) Time 380.8 µs 2 (1) Time 488.8 µs -2 (1)	22.5						
W1 S2 Center 2.442 000 GHz Res BW 3 MHz Marker Trace Type X Axis 1 (1) Time X80.8 µs 2 (1) Time 488.8 µs -21.81 dBm	dB					_	
W1 S2 Center 2.442 000 GHz Res BW 3 MHz Marker Trace Type X Axis 1 (1) Time X80.8 µs 2 (1) Time 488.8 µs -21.81 dBm							
W1 S2 Center 2.442 000 GHz Res BW 3 MHz Marker Trace Type X Axis 1 (1) Time X80.8 µs 2 (1) Time 488.8 µs -21.81 dBm							
W1 S2 Center 2.442 000 GHz Res BW 3 MHz Marker Trace Type X Axis 1 (1) Time X80.8 µs 2 (1) Time 488.8 µs -21.81 dBm							
W1 S2 S2 Span 0 Hz Center 2.442 000 GHz Span 0 Hz Res BW 3 MHz #VBW 30 kHz Sweep 1.5 ms (8192 pts) Marker Trace Type X Axis Amplitude 1 (1) Time 380.8 µs -21.81 dBm 2 (1) Time 488.8 µs -21.81 dBm	#LgAv						
Center 2.442 000 GHz Span 0 Hz Res BW 3 MHz #VBW 30 kHz Sweep 1.5 ms (8192 pts) Marker Trace Type X Axis Amplitude 1 (1) Time 380.8 µs 6.42 48m 2 (1) Time 488.8 µs -21.81 dBm							
Res BW 3 MHz #VBW 30 kHz Sweep 1.5 ms (8192 pts) Marker Trace Type X Axis Amplitude 1 (1) Time 380.8 µs 6.42 dBm 2 (1) Time 488.8 µs -21.81 dBm							
Marker Trace Type X Axis Amplitude 1 (1) Time 380.8 μs 6.42 dBm 2 (1) Time 488.8 μs -21.81 dBm		GHz					
1 (1) Time 380.8 µs 6.42 dBm 2 (1) Time 488.8 µs –21.81 dBm	Res BW 3 MHz		#V	/BW 30 kHz		Sweep 1.5	ms (8192 pts)
2 (1) Time 488.8 µs -21.81 dBm							
2 (1) Time 1,006 ms 6,32 dBm	1 (1) 2 (1)						
	3 (1)						











XMit 2017.12.13

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	29-Sep-17	29-Sep-20
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	26-Mar-18	26-Mar-19
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	15-Mar-18	15-Mar-19
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-18	13-Feb-19
Block - DC	Fairview Microwave	SD3379	AMI	12-Sep-17	12-Sep-18

TEST DESCRIPTION

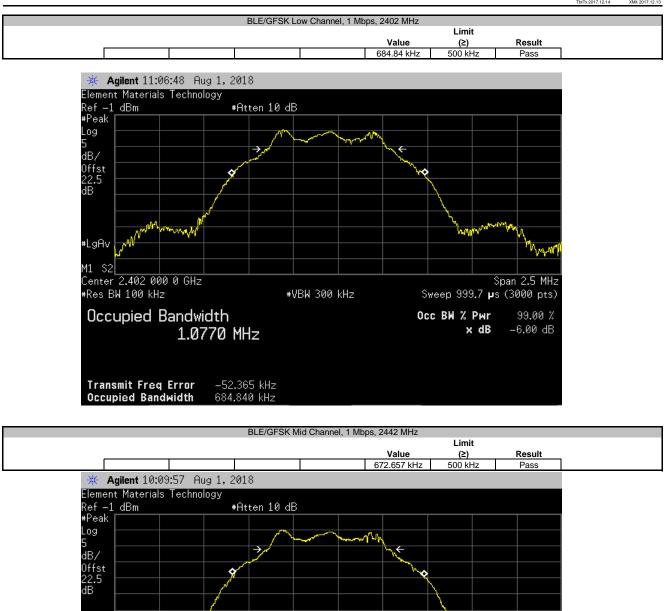
The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The EUT was set to the channels and modes listed in the datasheet.

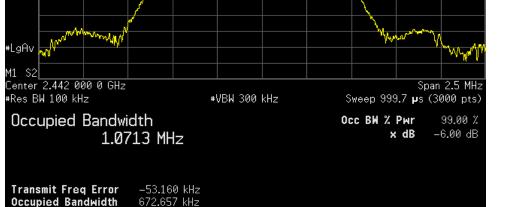
The 6dB occupied bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The 99.0% occupied bandwidth was also measured at the same time which can be needed during Output Power depending on the applicable method.



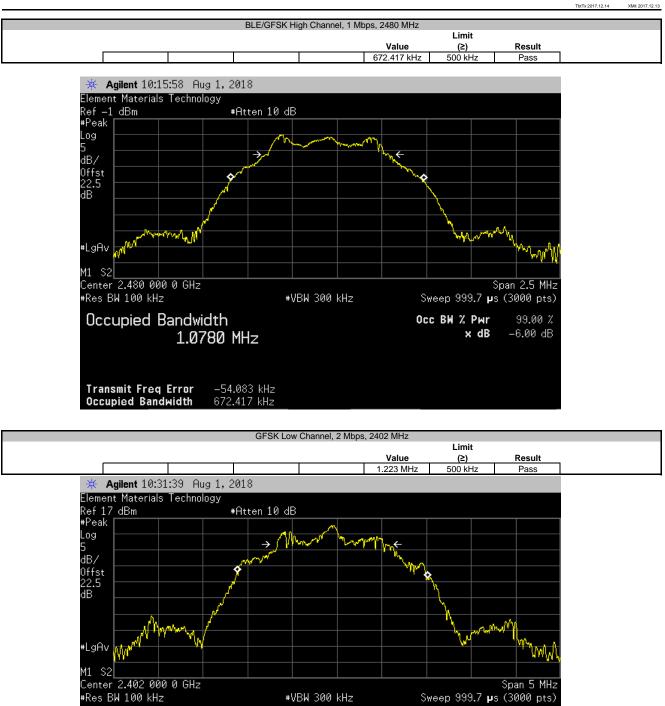
						TbtTx 2017.12.14	XMit 2017.12.13
EUT:	TV Streamer				Work Order:	STAK0135	
Serial Number:	182220800B				Date:	1-Aug-18	
Customer:	Starkey Laboratories, Inc.				Temperature:	23 °C	
Attendees:	Charlie Esch				Humidity:	54.2% RH	
Project:	None				Barometric Pres.:	1018 mbar	
Tested by:	Andrew Rogstad, Trevor	Buls		Power: 5 VDC	Job Site:	MN09	
TEST SPECIFICATI	IONS			Test Method			
FCC 15.247:2018				ANSI C63.10:2013			
COMMENTS							
U.FL to SMA adapt	er cable included in measu	rement cable offset.					
DEVIATIONS FROM	I TEST STANDARD						
None							
Configuration #	1	Signature	Tre	vor Buls			
						Limit	
					Value	(≥)	Result
BLE/GFSK Low Cha	nnel, 1 Mbps, 2402 MHz				684.84 kHz	500 kHz	Pass
BLE/GFSK Mid Cha	nnel, 1 Mbps, 2442 MHz				672.657 kHz	500 kHz	Pass
BLE/GFSK High Cha	annel, 1 Mbps, 2480 MHz				672.417 kHz	500 kHz	Pass
GFSK Low Channel,	, 2 Mbps, 2402 MHz				1.223 MHz	500 kHz	Pass
GFSK Mid Channel,	2 Mbps, 2442 MHz				1.184 MHz	500 kHz	Pass
GFSK High Channel	, 2 Mbps, 2476 MHz				1.211 MHz	500 kHz	Pass











#VBW 300 kHz

Occupied Bandwidth

Transmit Freq Error **Occupied Bandwidth**

2.1256 MHz

-48.440 kHz

1.223 MHz

Span 5 MHz

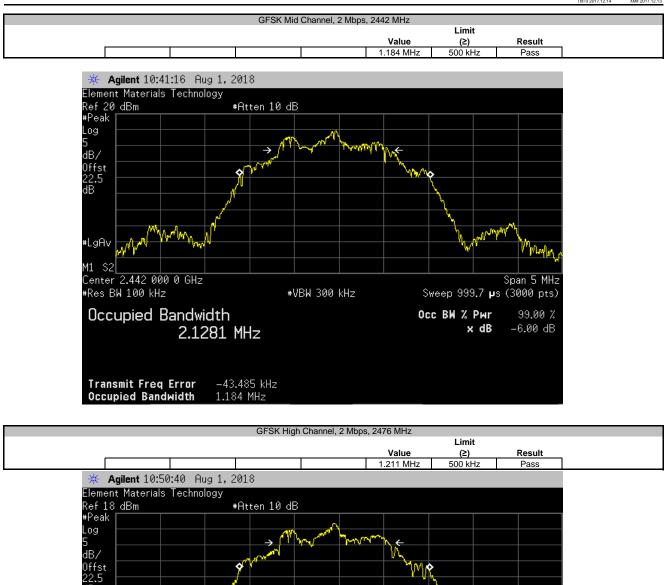
99.00 % -6.00 dB

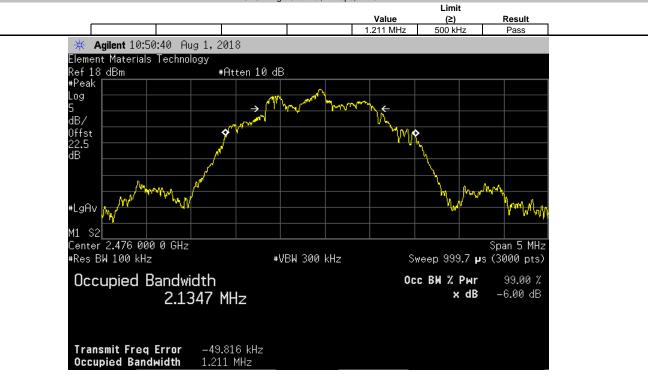
Sweep 999.7 µs (3000 pts)

x dB

Occ BW % Pwr









XMit 2017.12.13

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	29-Sep-17	29-Sep-20
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	26-Mar-18	26-Mar-19
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	15-Mar-18	15-Mar-19
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-18	13-Feb-19
Block - DC	Fairview Microwave	SD3379	AMI	12-Sep-17	12-Sep-18

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.

De Facto EIRP Limit: The EUT meets the de facto EIRP limit of +36 dBm.

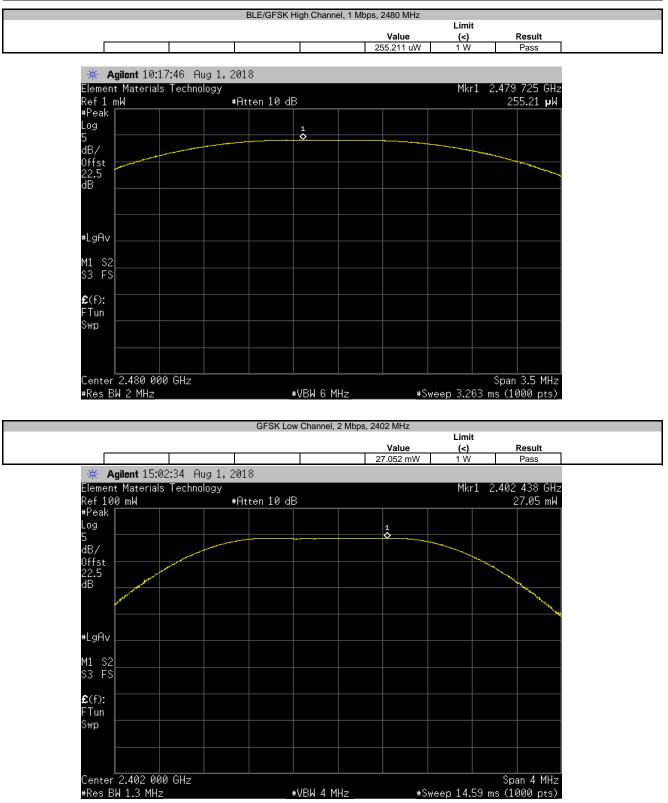


		TbtTx 2017.12.14	XMit 2017.12.13
EUT: TV Streamer	Work Order:	STAK0135	
Serial Number: 182220800B		1-Aug-18	
Customer: Starkey Laboratories, Inc.	Temperature:	23 °C	
Attendees: Charlie Esch	Humidity:		
Project: None	Barometric Pres.:		
Tested by: Andrew Rogstad, Trevor Buls Power: 5 VDC	Job Site:	MN09	
TEST SPECIFICATIONS Test Method			
FCC 15.247:2018 ANSI C63.10:2013			
COMMENTS			
U.FL to SMA adapter cable included in measurement cable offset. Output power was lowered by 2 dB by the customer for FCC for the 2 I	Mbps modulation. Modification author	ized by Aaron And	lerson.
DEVIATIONS FROM TEST STANDARD			
None			
Configuration # 1 Signature Trevor Buls			
Configuration # 1 Signature Trevor Buls		Limit	
Configuration # 1 Signature Trevor Buls	Value	Limit (<)	Result
Configuration # 1 Signature Jrevor Bulls BLE/GFSK Low Channel, 1 Mbps, 2402 MHz	Value 281.903 uW		Result Pass
		(<)	
BLE/GFSK Low Channel, 1 Mbps, 2402 MHz	281.903 uW	(<) 1 W	Pass
BLE/GFSK Low Channel, 1 Mbps, 2402 MHz BLE/GFSK Mid Channel, 1 Mbps, 2442 MHz BLE/GFSK High Channel, 1 Mbps, 2480 MHz GFSK Low Channel, 2 Mbps, 2402 MHz	281.903 uW 266.809 uW	(<) 1 W 1 W	Pass Pass
BLE/GFSK Low Channel, 1 Mbps, 2402 MHz BLE/GFSK Mid Channel, 1 Mbps, 2442 MHz BLE/GFSK High Channel, 1 Mbps, 2480 MHz	281.903 uW 266.809 uW 255.211 uW	(<) 1 W 1 W 1 W	Pass Pass Pass

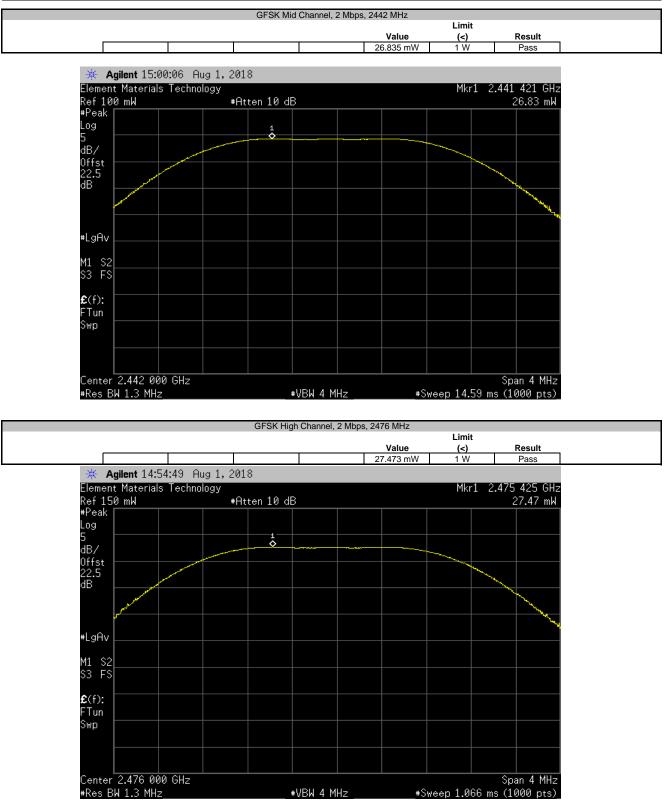


BLE/GFSK Low Cha	annel, 1 Mbps, 2402 MHz	Limit	
	Value 281.903 uW	(<) 1 W	Result Pass
Agilent 11:07:25 Aug 1, 2018			0 400 4E0 OU
Element Materials Technology Ref 1 mW #Atten 10 dB		Mkrl	2.402 156 GHz 281.90 µW
#Peak			
dB/			
0Ffst 22.5 dB			
dB			
#LgAv			
M1 S2 S3 FS			
S3 FS			
£(f):			
FTun Swp			
5mh			
Center 2.402 000 GHz			Span 3.5 MHz
#Res BW 2 MHz#VBW 6	6 MHz#	Sweep 3.263	ms (1000 pts)
BLE/GFSK Mid Cha	annel, 1 Mbps, 2442 MHz	Limit	
r	Value	(<)	Result
	266.809 uW	1 VV	Pass
* Agilent 10:10:50 Aug 1, 2018	266.809 uW	1 W	Pass
Element Materials Technology	266.809 uW		2.441 725 GHz
	266.809 uW		
Element Materials Technology Ref 1 mW #Atten 10 dB #Peak Log 1	266.809 uW		2.441 725 GHz
Element Materials Technology Ref 1 mW #Atten 10 dB #Peak Log 5 dB/	266.809 uW		2.441 725 GHz
Element Materials Technology Ref 1 mW #Atten 10 dB #Peak Log 5 dB/			2.441 725 GHz
Element Materials Technology Ref 1 mW #Atten 10 dB #Peak Log 5 1			2.441 725 GHz
Element Materials Technology Ref 1 mW #Atten 10 dB #Peak Log 5 dB/			2.441 725 GHz
Element Materials Technology Ref 1 mW #Atten 10 dB #Peak Log 5 dB/ Offst 22.5 dB			2.441 725 GHz
Element Materials Technology Ref 1 mW #Atten 10 dB #Peak Log 5 dB/			2.441 725 GHz
Element Materials Technology Ref 1 mW #Atten 10 dB *Peak Log 5 dB/ Offst 22.5 dB *LgAv			2.441 725 GHz
Element Materials Technology Ref 1 mW #Atten 10 dB #Peak Log 5 dB/ Offst 22.5 dB			2.441 725 GHz
Element Materials Technology Ref 1 mW #Atten 10 dB *Peak Log 5 dB/ Offst 22.5 dB *LgAv M1 \$2 \$3 F\$ £(f):			2.441 725 GHz
Element Materials Technology Ref 1 mW #Atten 10 dB *Peak Log 5 dB/ Offst 22.5 dB *LgAv M1 \$2 \$3 F\$ £(f): FTun			2.441 725 GHz
Element Materials Technology Ref 1 mW #Atten 10 dB *Peak Log 5 dB/ Offst 22.5 dB *LgAv M1 \$2 \$3 F\$ £(f):			2.441 725 GHz
Element Materials Technology Ref 1 mW #Atten 10 dB *Peak Log 5 dB/ Offst 22.5 dB *LgAv M1 \$2 \$3 F\$ £(f): FTun			2.441 725 GHz
Element Materials Technology Ref 1 mW #Atten 10 dB *Peak Log 5 dB/ Offst 22.5 dB *LgAv M1 \$2 \$3 F\$ £(f): FTun			2.441 725 GHz











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	29-Sep-17	29-Sep-20
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	26-Mar-18	26-Mar-19
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	15-Mar-18	15-Mar-19
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-18	13-Feb-19
Block - DC	Fairview Microwave	SD3379	AMI	12-Sep-17	12-Sep-18

TEST DESCRIPTION

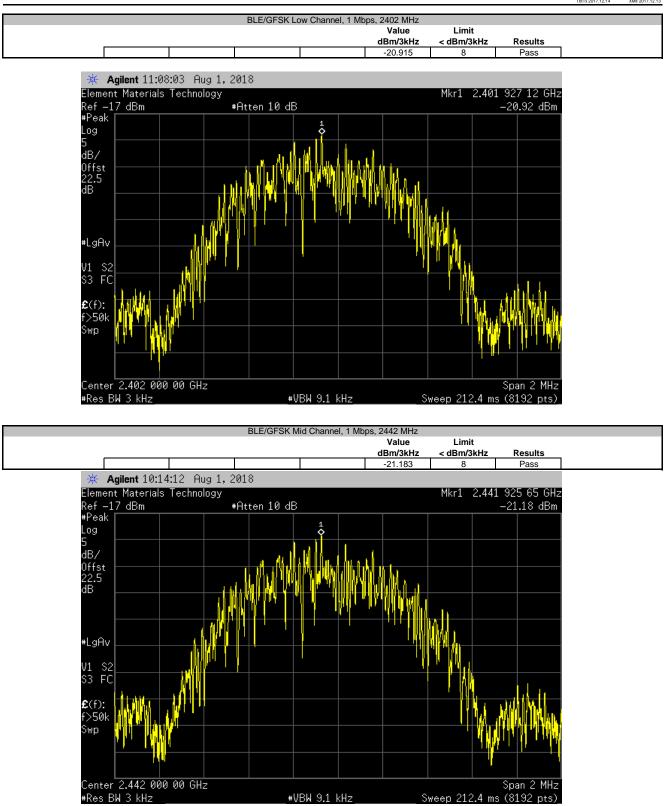
The maximum power spectral density measurements was measured using the channels and modes as called out on the following data sheets.

Per the procedure outlined in ANSI C63.10 the peak power spectral density was measured in a 3 kHz RBW.

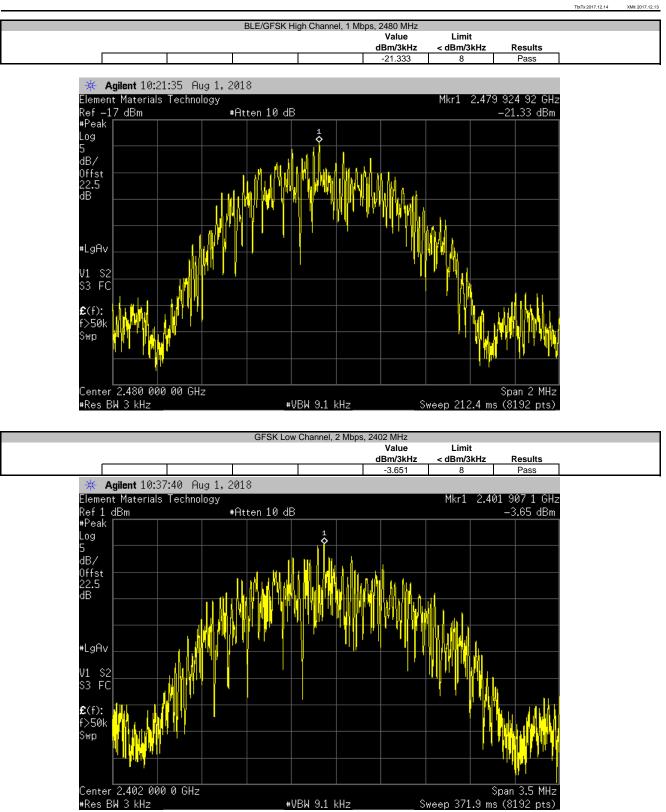


EUT:	TV Streamer					Work Order:	STAK0135	
Serial Number:	182220800B						1-Aug-18	
Customer:	Starkey Laboratories, Inc					Temperature:	23 °C	
Attendees:	Charlie Esch					Humidity:	54.2% RH	
Project:	None					Barometric Pres.:	1018 mbar	
Tested by:	Andrew Rogstad, Trevor	Buls		Powe	er: 5 VDC	Job Site:	MN09	
TEST SPECIFICATI	IONS				Test Method			
FCC 15.247:2018					ANSI C63.10:2013			
COMMENTS								
	er cable included in meas	urement cable offset.						
•	M TEST STANDARD	irement cable offset.						
DEVIATIONS FROM		Signature	In	evor	Buls			
DEVIATIONS FROM None Configuration #	M TEST STANDARD		Jr	wor	Buls	Value dBm/3kHz	Limit < dBm/3kHz	Results
DEVIATIONS FROM None Configuration #			Tr	evor	Buls			Results Pass
DEVIATIONS FROM None Configuration # BLE/GFSK Low Cha	M TEST STANDARD		Tr	wor	Buls	 dBm/3kHz	< dBm/3kHz	
DEVIATIONS FROM lone Configuration # BLE/GFSK Low Cha BLE/GFSK Mid Char	M TEST STANDARD		Tr	evor	Buls	 dBm/3kHz -20.915	< dBm/3kHz 8	Pass
DEVIATIONS FROM lone Configuration # BLE/GFSK Low Cha BLE/GFSK Mid Char BLE/GFSK High Char	M TEST STANDARD		Jr	evor	Buls	 dBm/3kHz -20.915 -21.183	< dBm/3kHz 8	Pass Pass
DEVIATIONS FROM None Configuration # BLE/GFSK Low Cha BLE/GFSK Mid Char BLE/GFSK High Cha JFSK Low Channel, JFSK Low Channel,	I TEST STANDARD		Jn	evor	Buls	 dBm/3kHz -20.915 -21.183 -21.333	< dBm/3kHz 8 8 8 8	Pass Pass Pass

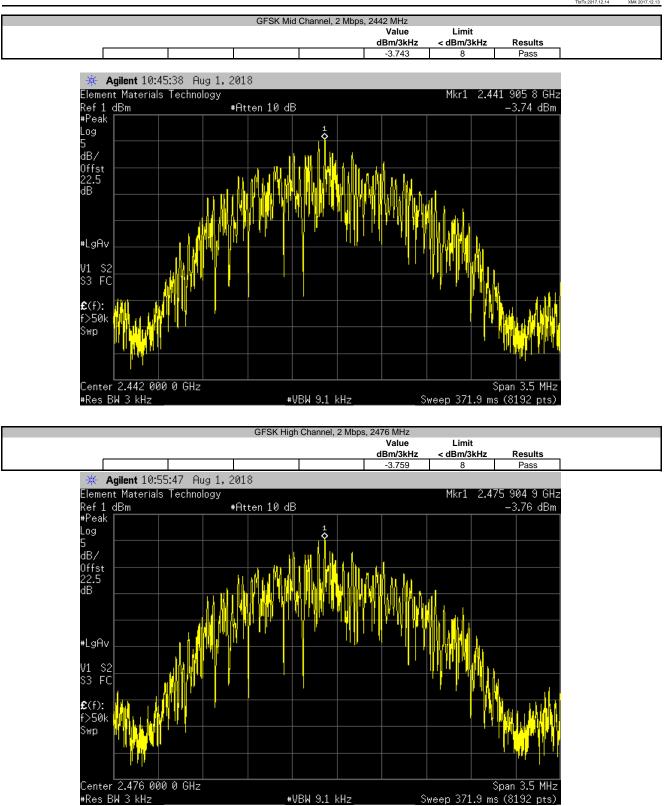














XMit 2017.12.13

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	29-Sep-17	29-Sep-20
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	26-Mar-18	26-Mar-19
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	15-Mar-18	15-Mar-19
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-18	13-Feb-19
Block - DC	Fairview Microwave	SD3379	AMI	12-Sep-17	12-Sep-18

TEST DESCRIPTION

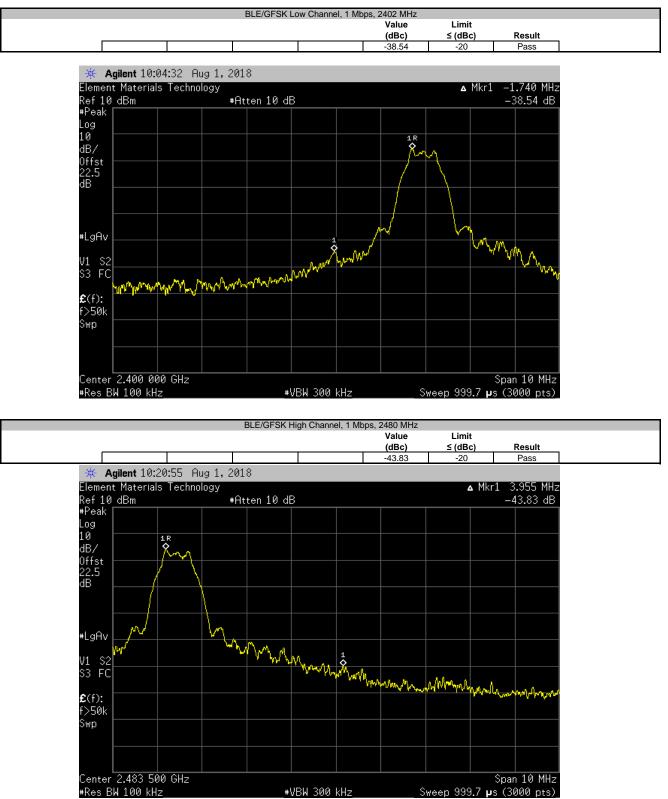
The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in each available band. The channels closest to the 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.

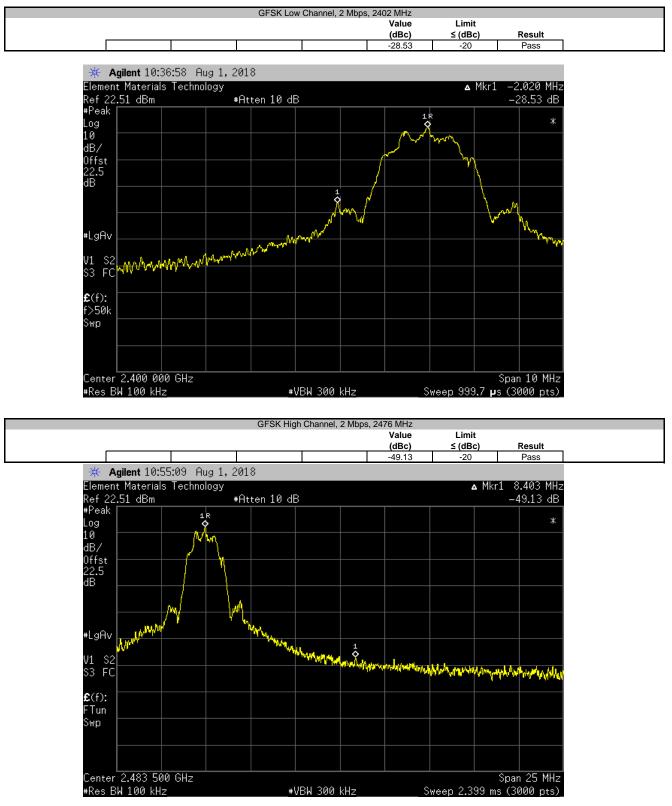


					TbtTx 2017.12.14	XMit 2017.12
EUT: TV	Streamer			Work Order:	STAK0135	
Serial Number: 182	220800B			Date:	1-Aug-18	
Customer: Star	rkey Laboratories, Inc.			Temperature:	22.9 °C	
Attendees: Cha				Humidity:		
Project: Nor				Barometric Pres.:		
	drew Rogstad, Trevor Buls		Power: 5 VDC	Job Site:	MN09	
TEST SPECIFICATIONS	8		Test Method			
FCC 15.247:2018			ANSI C63.10:2013			
COMMENTS						
DEVIATIONS FROM TE	ST STANDARD					
DEVIATIONS FROM TE	ST STANDARD					
	1	ignature True	vor Buls			
lone	1	ignature True	vor Buls	Value	Limit	
lone	1	ignature Jrce	vor Buls	Value (dBc)	Limit ≤ (dBc)	Result
lone Configuration #	1 S	ignature Jrca	vor Buls			Result Pass
Configuration #	1 S	ignature Joce	vor Buls	(dBc)	≤ (dBc)	
None	1 S 1, 1 Mbps, 2402 MHz 1, 1 Mbps, 2480 MHz	ignature True	vor Buls	 (dBc) -38.54	≤ (dBc) -20	Pass











XMit 2017.12.13

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

					<u> </u>
Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	29-Sep-17	29-Sep-20
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	26-Mar-18	26-Mar-19
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	15-Mar-18	15-Mar-19
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-18	13-Feb-19
Block - DC	Fairview Microwave	SD3379	AMI	12-Sep-17	12-Sep-18

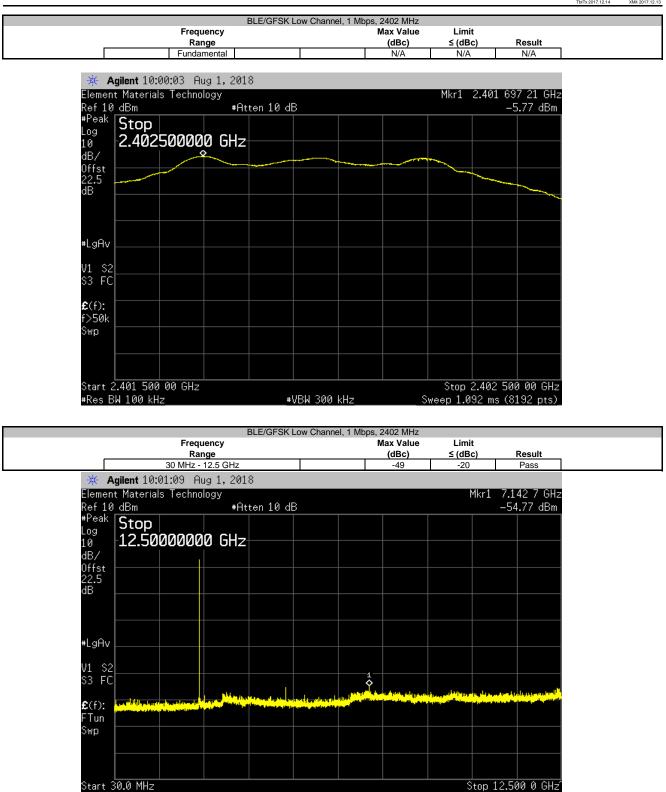
TEST DESCRIPTION

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.



				TbtTx 2017.12.14	XMit 2
	V Streamer		Work Order:		
Serial Number: 1				1-Aug-18	
	tarkey Laboratories, Inc.		Temperature:		
Attendees: C			Humidity:		
Project: N			Barometric Pres.:		
	ndrew Rogstad, Trevor Buls	Power: 5 VDC	Job Site:	MN09	
EST SPECIFICATIO	NS	Test Method			
CC 15.247:2018		ANSI C63.10:2013			
OMMENTS					
.FL to SMA adapter	cable included in measurement cable offset.				
EVIATIONS FROM	TEST STANDARD				
One	EST STANDARD				
one					
onfiguration #	1	Jonevor Buls			
Singulation #	Signatu	stave comus			
	Signati	Frequency	Max Value	Limit	
		Range	(dBc)	≤ (dBc)	Resu
E/GFSK Low Chan	nel, 1 Mbps, 2402 MHz	Fundamental	N/A	N/A	N/A
	nel, 1 Mbps, 2402 MHz	30 MHz - 12.5 GHz			Pass
			-49		
E/GESK Low Chan		12.5 GHz - 25 GHz	-49 -46.46	-20 -20	
	nel, 1 Mbps, 2402 MHz		-49 -46.46 N/A		
LE/GFSK Mid Chann	nel, 1 Mbps, 2402 MHz el, 1 Mbps, 2442 MHz	12.5 GHz - 25 GHz	-46.46 N/A	-20 N/A	Pass N/A
LE/GFSK Mid Chann LE/GFSK Mid Chann	nel, 1 Mbps, 2402 MHz nel, 1 Mbps, 2442 MHz nel, 1 Mbps, 2442 MHz	12.5 GHz - 25 GHz Fundamental	-46.46	-20	Pass N/A Pass
_E/GFSK Mid Chann _E/GFSK Mid Chann _E/GFSK Mid Chann	nel, 1 Mbps, 2402 MHz lel, 1 Mbps, 2442 MHz lel, 1 Mbps, 2442 MHz lel, 1 Mbps, 2442 MHz	12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz	-46.46 N/A -49.95	-20 N/A -20	Pass N/A Pass Pass
LE/GFSK Mid Chann LE/GFSK Mid Chann LE/GFSK Mid Chann LE/GFSK High Chan	nel, 1 Mbps, 2402 MHz el, 1 Mbps, 2442 MHz el, 1 Mbps, 2442 MHz el, 1 Mbps, 2442 MHz nel, 1 Mbps, 2442 MHz	12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental	-46.46 N/A -49.95 -44.94 N/A	-20 N/A -20 -20 N/A	Pass N/A Pass Pass N/A
_E/GFSK Mid Chann _E/GFSK Mid Chann _E/GFSK Mid Chann _E/GFSK High Chan _E/GFSK High Chan	rel, 1 Mbps, 2402 MHz el, 1 Mbps, 2442 MHz el, 1 Mbps, 2442 MHz el, 1 Mbps, 2442 MHz nel, 1 Mbps, 2448 MHz nel, 1 Mbps, 2480 MHz	12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz	-46.46 N/A -49.95 -44.94	-20 N/A -20 -20	Pass N/A Pass Pass N/A Pass
LE/GFSK Mid Chann LE/GFSK Mid Chann LE/GFSK Mid Chann LE/GFSK High Chan LE/GFSK High Chan LE/GFSK High Chan	nel, 1 Mbps, 2402 MHz el, 1 Mbps, 2442 MHz el, 1 Mbps, 2442 MHz el, 1 Mbps, 2442 MHz nel, 1 Mbps, 2480 MHz nel, 1 Mbps, 2480 MHz nel, 1 Mbps, 2480 MHz	12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz	-46.46 N/A -49.95 -44.94 N/A -49.83	-20 N/A -20 -20 N/A -20	Pass N/A Pass Pass N/A Pass Pass
LE/GFSK Mid Chann LE/GFSK Mid Chann LE/GFSK Mid Chann LE/GFSK High Chan LE/GFSK High Chan LE/GFSK High Chan FSK Low Channel, 2	nel, 1 Mbps, 2402 MHz el, 1 Mbps, 2442 MHz el, 1 Mbps, 2442 MHz el, 1 Mbps, 2442 MHz nel, 1 Mbps, 2442 MHz nel, 1 Mbps, 2480 MHz nel, 1 Mbps, 2480 MHz Mbps, 2402 MHz	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	-46.46 N/A -49.95 -44.94 N/A -49.83 -45.54	-20 N/A -20 -20 N/A -20 -20	Pass N/A Pass Pass N/A Pass Pass N/A
LE/GFSK Mid Chann LE/GFSK Mid Chann LE/GFSK Mid Chann LE/GFSK High Chan LE/GFSK High Chan LE/GFSK High Chan FSK Low Channel, 2 FSK Low Channel, 2	rel, 1 Mbps, 2402 MHz el, 1 Mbps, 2442 MHz el, 1 Mbps, 2442 MHz el, 1 Mbps, 2442 MHz rel, 1 Mbps, 2442 MHz nel, 1 Mbps, 2480 MHz nel, 1 Mbps, 2480 MHz Mbps, 2400 MHz Mbps, 2402 MHz	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	-46.46 N/A -49.95 -44.94 N/A -49.83 -45.54 N/A	-20 N/A -20 -20 N/A -20 -20 N/A	Pass N/A Pass Pass N/A Pass N/A Pass
E/GFSK Mid Chann E/GFSK Mid Chann E/GFSK Mid Chann E/GFSK High Chan E/GFSK High Chan E/GFSK High Chan SK Low Channel, 2 SK Low Channel, 2 SK Low Channel, 2	nel, 1 Mbps, 2402 MHz el, 1 Mbps, 2442 MHz el, 1 Mbps, 2442 MHz el, 1 Mbps, 2442 MHz nel, 1 Mbps, 2480 MHz nel, 1 Mbps, 2480 MHz nel, 1 Mbps, 2400 MHz Mbps, 2402 MHz Mbps, 2402 MHz	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	-46.46 N/A -49.95 -44.94 N/A -49.83 -45.54 N/A -47.32	-20 N/A -20 -20 N/A -20 -20 N/A -20	Pass N/A Pass Pass N/A Pass N/A Pass Pass
E/GFSK Mid Chann E/GFSK Mid Chann E/GFSK Mid Chann E/GFSK High Chan E/GFSK High Chan E/GFSK High Chan SK Low Channel, 2 SK Low Channel, 2 SK Low Channel, 2	nel, 1 Mbps, 2402 MHz el, 1 Mbps, 2442 MHz el, 1 Mbps, 2442 MHz el, 1 Mbps, 2442 MHz nel, 1 Mbps, 2440 MHz nel, 1 Mbps, 2480 MHz mbps, 2402 MHz Mbps, 2402 MHz Mbps, 2402 MHz Mbps, 2402 MHz	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 12.5 GHz - 25 GHz	-46.46 N/A -49.95 -44.94 N/A -49.83 -45.54 N/A -47.32 -66.79	-20 N/A -20 -20 N/A -20 -20 N/A -20 -20	Pass N/A Pass N/A Pass N/A Pass N/A Pass N/A
LE/GFSK Mid Chann LE/GFSK Mid Chann LE/GFSK Mid Chann LE/GFSK High Chan LE/GFSK High Chann LE/GFSK High Channel, 2 FSK Low Channel, 2 FSK Low Channel, 2 FSK Mid Channel, 2 FSK Mid Channel, 2	rel, 1 Mbps, 2402 MHz el, 1 Mbps, 2442 MHz el, 1 Mbps, 2442 MHz el, 1 Mbps, 2442 MHz nel, 1 Mbps, 2448 MHz nel, 1 Mbps, 2480 MHz Mbps, 2480 MHz Mbps, 2402 MHz Mbps, 2402 MHz Mbps, 2402 MHz Mbps, 2442 MHz	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 12.5 GHz - 25 GHz Fundamental	-46.46 N/A -49.95 -44.94 N/A -49.83 -45.54 N/A -47.32 -66.79 N/A	-20 N/A -20 -20 N/A -20 N/A -20 N/A -20 N/A	Pass N/A Pass N/A Pass N/A Pass N/A Pass N/A
E/GFSK Mid Chann E/GFSK Mid Chann E/GFSK Mid Chann E/GFSK High Chan E/GFSK High Chan E/GFSK High Chan E/GFSK High Channel, 2 FSK Low Channel, 2 FSK Mid Channel, 2 FSK Mid Channel, 2	nel, 1 Mbps, 2402 MHz el, 1 Mbps, 2442 MHz el, 1 Mbps, 2442 MHz el, 1 Mbps, 2442 MHz nel, 1 Mbps, 2480 MHz nel, 1 Mbps, 2480 MHz nel, 1 Mbps, 2480 MHz Mbps, 2402 MHz Mbps, 2402 MHz Mbps, 2442 MHz Mbps, 2442 MHz	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 12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz	-46.46 N/A -49.95 -44.94 N/A -49.83 -45.54 N/A -47.32 -66.79 N/A -51.61	-20 N/A -20 -20 N/A -20 -20 N/A -20 -20 N/A -20	Pass N/A Pass N/A Pass N/A Pass N/A Pass N/A Pass Pass
LE/GFSK Mid Chann LE/GFSK Mid Chann LE/GFSK Mid Chann LE/GFSK High Chan LE/GFSK High Chan	el, 1 Mbps, 2402 MHz el, 1 Mbps, 2442 MHz el, 1 Mbps, 2442 MHz el, 1 Mbps, 2442 MHz nel, 1 Mbps, 2440 MHz nel, 1 Mbps, 2480 MHz mbps, 2480 MHz Mbps, 2402 MHz Mbps, 2402 MHz Mbps, 2402 MHz Mbps, 2402 MHz Mbps, 2442 MHz Mbps, 2447 MHz Mbps, 2447 MHz	12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz 12.5 GHz - 25 GHz	-46.46 N/A -49.95 -44.94 N/A -49.83 -45.54 N/A -47.32 -66.79 N/A -51.61 -66.28	-20 N/A -20 -20 N/A -20 -20 N/A -20 N/A -20 N/A -20 -20	Pass



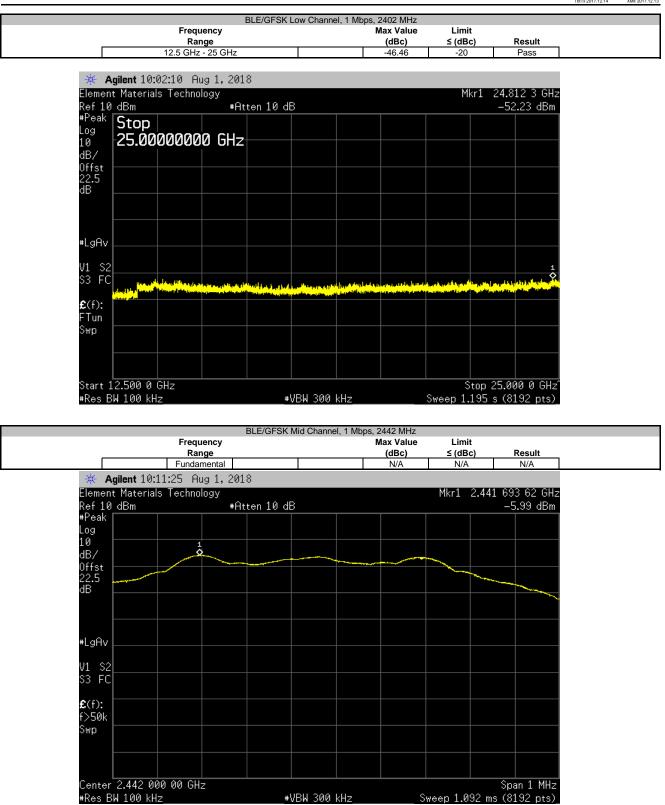


#VBW 300 kHz

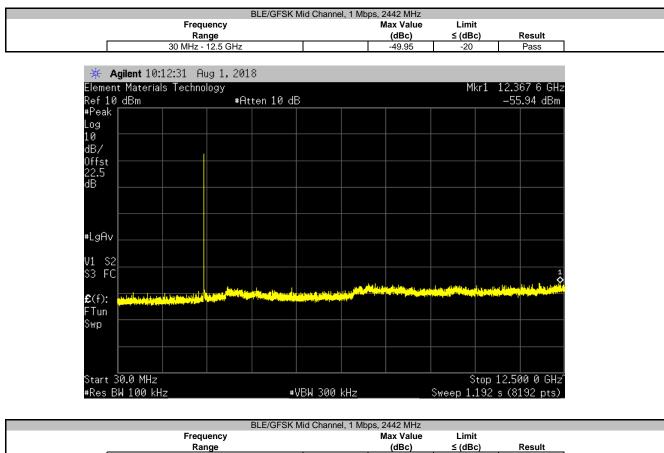
Sweep 1.192 s (8192 pts)

#Res BW 100 kHz



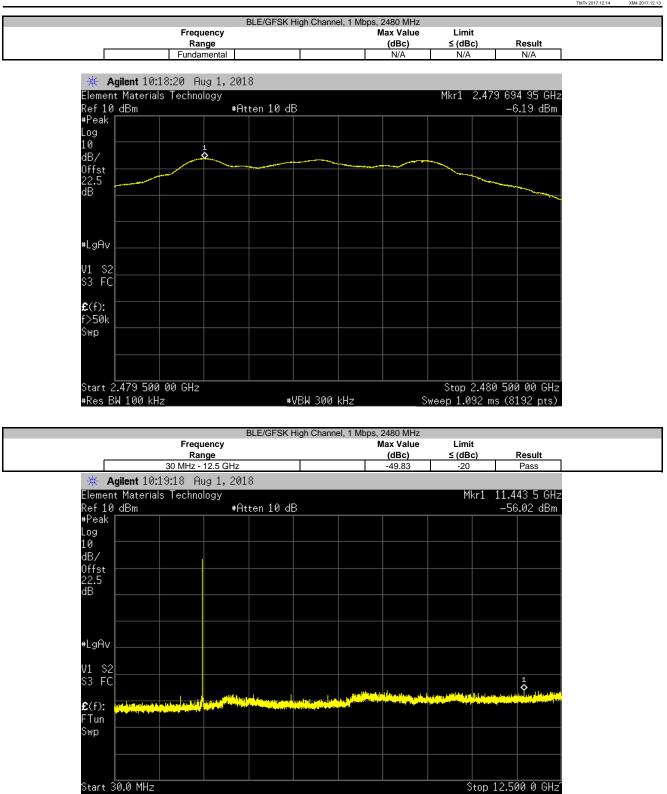






Element Materials		4.0 15				M		29 8 GHz
Ref 10 dBm ⊧Peak	#H	tten 10 dE	3		1		-54	0.92 dBm
.0g								
10								
4B/								
)ffst								
22.5 #B								
IgAv								
J1 S2								1
		the second	as to collabere	داللالىرىلەر بەرس	والاعتداد والمحادث	مليرة المراجرين	المحطية مراقع	and the second state
	State of the local division of the local div	والتعريب أخفت الم		and a little different little die	Note that the second second	and the state of the state	Provide a statistica o	كند فقاعدت
€(f): Tun								
Swp								



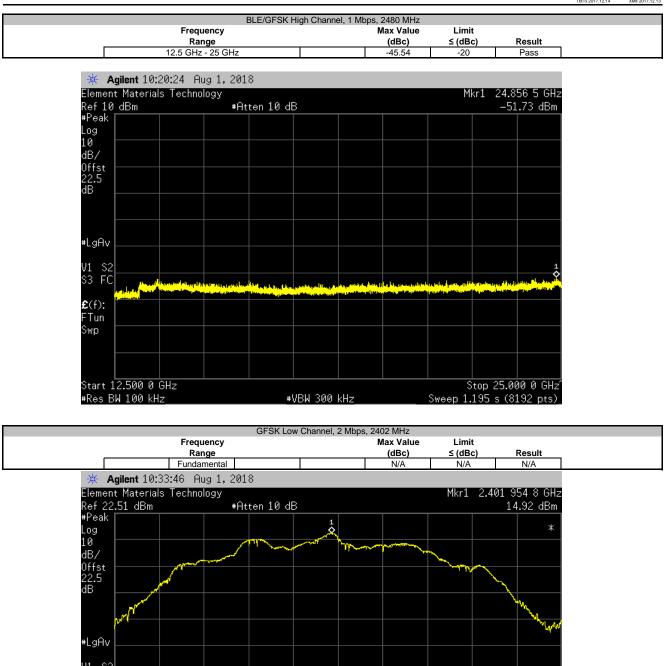


#VBW 300 kHz

#Res BW 100 kHz

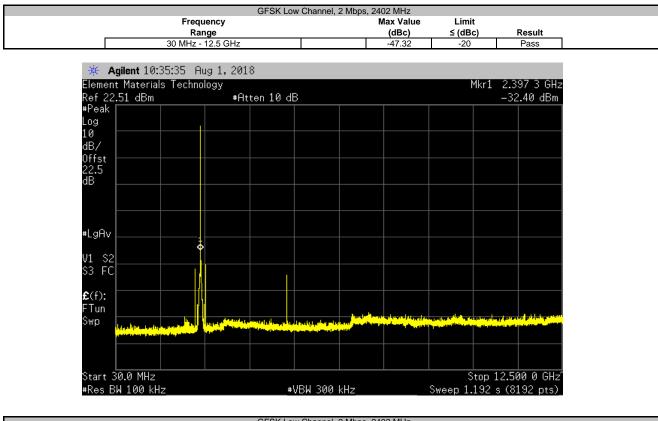
Sweep 1.192 s (8192 pts)





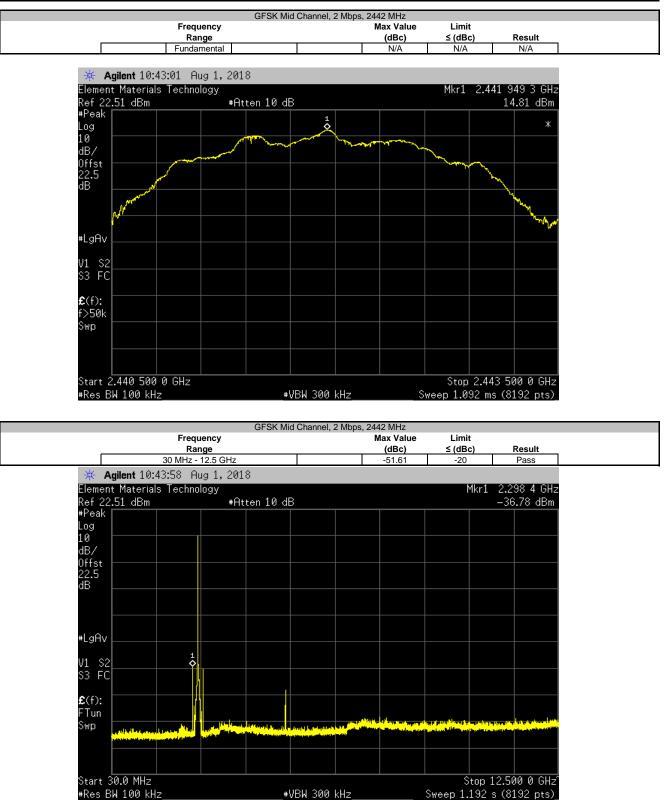
V1 S2								
S3 FC								
£ (f): f>50k								
Swp								
	2.400 500 W 100 kH		#	VBW 300	kHz	s	2.403 50 92 ms (81	



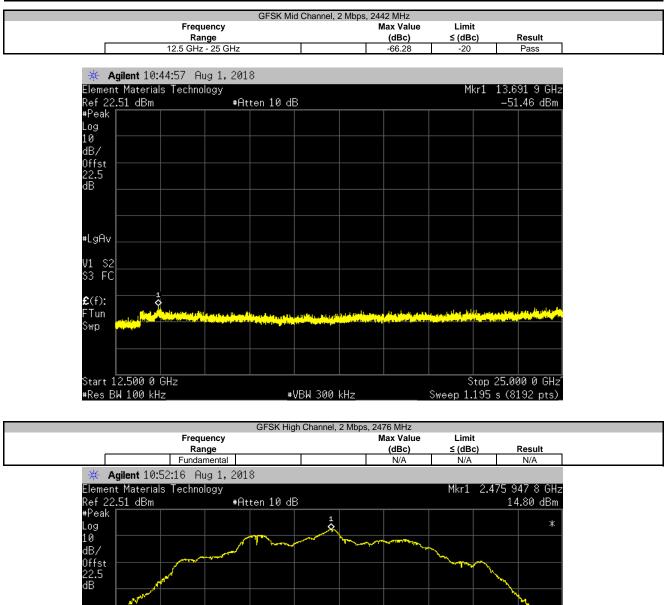


				GFSK Lo	w Channel,	2 Mbps, 24	402 MHz			
		Frequ					Max Value	Limi		
		Rar			1		(dBc)	≤ (dB		Result
		12.5 GHz					-66.79	-20		Pass
		36:33 Au		8						
		ls Technol						М	kr1 13.	705 6 GHz
Ref 22.	51 dBm		#Ĥt	ten 10 d	В	-51.87 dBm				
#Peak [
Log										
10										
dB/										
Offst 22.5 dB										
22.5 dB										
uD -										
#LgAv										
*LGHV										
V1 S2										
V1 S2 S3 FC										
£ (f):	1									
FTun	- here	And the state	والمر والمراجع والعريقان	and and the subscripts	الشار المراجعات			والمرود والمراجع والمراجع	and the later of	and the state of the state of the
Swp 🕺	lan h	يبتل والمتلاطق بتقليما	Construction of the local division of the lo	And Address of the			امرينيون ۽ انجابي ۽ ييناني ۽ <mark>ي</mark> ريند <mark>ا</mark>	and the second secon	ه هاد با بر دادان _و مه ه	a and a share been the
Start 11	2.500 0	GH-Z						<	L Stop 25 0) 00 0 GHz
	∠.J00 0 V100 kH			+	VBW 300	↓Ц- <u>,</u>		Sween 1	195 e_4	3192 pts)
#NG2 DM	I TAA KH			#	ODK 200	<u>кп</u> 2		oweeh T	.103 5 (0)102 pts)









V1 S2 S3 FC S3 FC S3 FC Swp Swp Start 2.474 500 0 GHz *Res BW 100 kHz *Res BW 100 kHz *Res BW 100 kHz *Res BW 100 kHz *VBW 300 kHz Sweep 1.092 ms (8192 pts)

#LgAv

WYNW



