

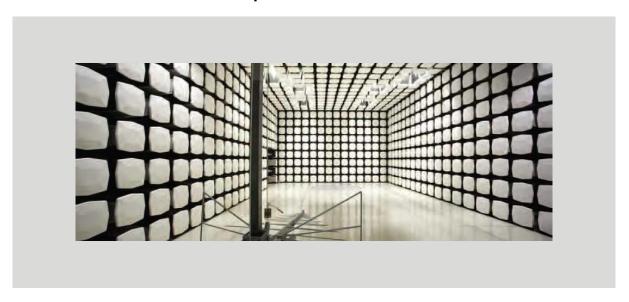
Starkey Laboratories, Inc.

Mini Remote Microphone

FCC 15.207 2018 FCC 15.247:2018

Bluetooth Low Energy (DTS) Radio

Report # STAK0144.1







NVLAP LAB CODE: 200881-0

CERTIFICATE OF TEST



Last Date of Test: January 8, 2019 Starkey Laboratories, Inc. Model: Mini Remote Microphone

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2018	ANSI C63.10:2013
FCC 15.247:2018	ANSI C03.10.2013

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	
11.6	Duty Cycle	Yes	Pass	
11.8.2	Occupied Bandwidth	Yes	Pass	
11.9.1.1	Output Power	Yes	Pass	
11.9.1.1	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.

REVISION HISTORY



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

Report No. STAK0144.1 3/67

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

Report No. STAK0144.1 4/67

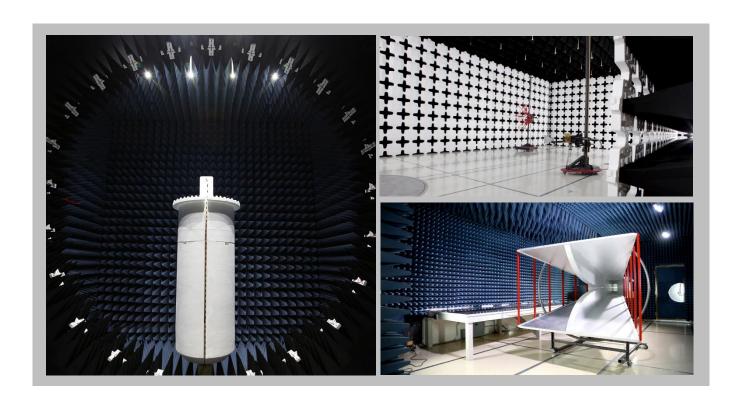
FACILITIES







			_	_		
California	Minnesota	New York	Oregon	Texas	Washington	
Labs OC01-17	Labs MN01-10	Labs NY01-04	Labs EV01-12	Labs TX01-09	Labs NC01-05	
41 Tesla	9349 W Broadway Ave.	4939 Jordan Rd.	6775 NE Evergreen Pkwy #400	3801 E Plano Pkwy	19201 120 th Ave NE	
Irvine, CA 92618	Brooklyn Park, MN 55445	Elbridge, NY 13060	Hillsboro, OR 97124	Plano, TX 75074	Bothell, WA 98011	
(949) 861-8918	(612)-638-5136	(315) 554-8214	(503) 844-4066	(469) 304-5255	(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	MI			
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	



Report No. STAK0144.1 5/67

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.

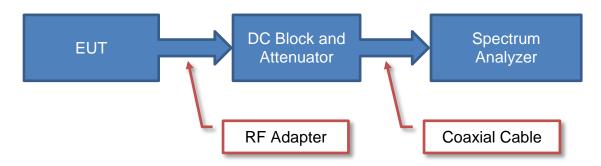
<u>Test</u>	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%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

Report No. STAK0144.1

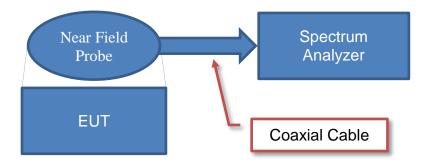
Test Setup Block Diagrams



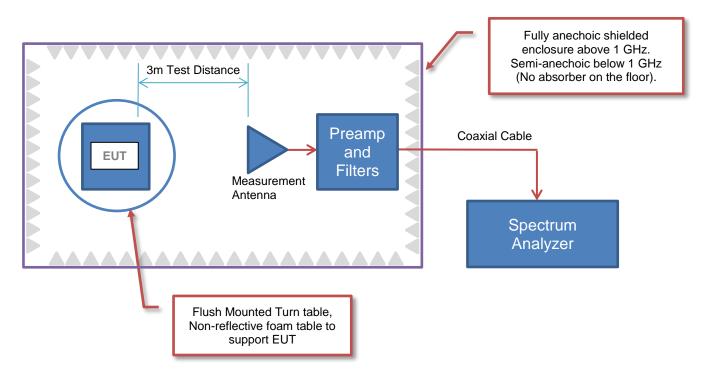
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



Report No. STAK0144.1 7/67

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:	Mini Remote Microphone
First Date of Test:	October 18, 2018
Last Date of Test:	January 8, 2019
Receipt Date of Samples:	October 16, 2018
Equipment Design Stage:	Prototype
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the El	JI:
----------------------------------	-----

This is a remote microphone device for 2.4 GHz hearing aids using BLE.

Testing Objective:

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

Report No. STAK0144.1 8/67

CONFIGURATIONS



Configuration STAK0144-1

EUT					
Description	Manufacturer	Model/Part Number	Serial Number		
Remote Microphone	Starkey Laboratories, Inc.	N/A	182000364		

Peripherals in test setup boundary				
Description	Manufacturer	Model/Part Number	Serial Number	
AC Adapter	DVE	DSA-5PPFU1-05	N/A	

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Micro-USB Cable	No	2 m	No	Remote Microphone	AC Adapter

Configuration STAK0144-5

EUT					
Description	Manufacturer	Model/Part Number	Serial Number		
Remote Microphone	Starkey Laboratories, Inc.	N/A	182000364		

Configuration STAK0144-7

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Remote Microphone	Starkey Laboratories, Inc.	N/A	182000364

Peripherals in test setu	p boundary		
Description	Manufacturer	Model/Part Number	Serial Number
Laptop	Lenovo	ThinkPad T430	11306
AC Adapter (Laptop)	Lenovo	ADLX90NCT2A	11S45N0311Z1ZLZ633M0T4

Cables						
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2	
USB Cable	Yes			Laptop	Remote Microphone	
DC Cable (Laptop)	No			AC Adapter (Laptop)	Laptop	
AC Cable (Laptop)	No	1.0m	No	AC Adapter (Laptop)	AC Mains	

Report No. STAK0144.1 9/67

CONFIGURATIONS



Configuration STAK0144-8

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Remote Microphone	Starkey Laboratories, Inc.	N/A	182000364

Peripherals in test set	up boundary				
Description	Manufacturer	Model/Part Number	Serial Number		
Laptop	Dell	Latitude E6420	F6WC5R1		
AC Adapter (Laptop)	Dell	DA90PE1-00	CN-0WK890-73245-96F-0270-A01		

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
USB Cable	Yes	1.8m	No	Laptop	Remote Microphone
DC Cable (Laptop)	No	1.8m	Yes	AC Adapter (Laptop)	Laptop
AC Cable (Laptop)	No	1.0m	No	AC Adapter (Laptop)	AC Mains

Configuration STAK0144-11

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Mini Remote Microphone	Starkey Laboratories, Inc.	43023-000	182010339

Report No. STAK0144.1 10/67

MODIFICATIONS



Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2018-10-18	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.
2	2018-10-18	Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
3	2018-10-18	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.
4	2018-10-18	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.
5	2018-10-18	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
6	2018-10-18	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.
7	2018-10-18	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.
8	2018-10-22	Powerline Conducted Emissions	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.
9	2019-01-08	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. STAK0144.1 11/67



TEST DESCRIPTION

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Receiver	Rohde & Schwarz	ESR7	ARI	6/26/2018	6/26/2019
Cable - Conducted Cable Assembly	Northwest EMC	MNC, HGN, TYK	MNCA	3/14/2018	3/14/2019
LISN	Solar Electronics	9252-50-R-24-BNC	LIY	3/15/2018	3/15/2019

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

CONFIGURATIONS INVESTIGATED

STAK0144-1 STAK0144-8

MODES INVESTIGATED

Transmitting mid channel (2440 MHz) at 2 Mbps

Report No. STAK0144.1



EUT:	Mini Remote Microphone	Work Order:	STAK0144
Serial Number:	182000364	Date:	10/22/2018
Customer:	Starkey Laboratories, Inc.	Temperature:	22°C
Attendees:	Charlie Esch, John Quach	Relative Humidity:	30.2%
Customer Project:	None	Bar. Pressure:	1020 mb
Tested By:	Dustin Sparks	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	STAK0144-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2018	ANSI C63.10:2013

TEST PARAMETERS

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

COMMENTS

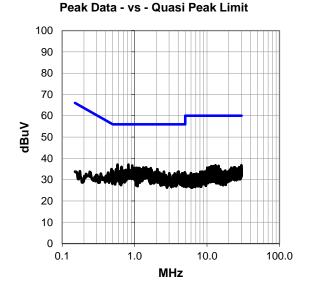
None

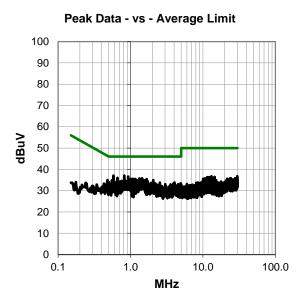
EUT OPERATING MODES

Transmitting mid channel (2440 MHz) at 2 Mbps

DEVIATIONS FROM TEST STANDARD

None





Report No. STAK0144.1 13/67



RESULTS - Run #18

Peak Data - vs - Quasi Peak Limit						
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)	
0.583	16.7	20.4	37.1	56.0	-18.9	
0.822	16.6	20.5	37.1	56.0	-18.9	
0.930	16.1	20.5	36.6	56.0	-19.4	
0.661	15.5	20.5	36.0	56.0	-20.0	
1.445	15.3	20.5	35.8	56.0	-20.2	
1.321	15.2	20.5	35.7	56.0	-20.3	
1.068	15.1	20.5	35.6	56.0	-20.4	
1.012	15.0	20.5	35.5	56.0	-20.5	
1.165	15.0	20.5	35.5	56.0	-20.5	
1.363	15.0	20.5	35.5	56.0	-20.5	
1.113	14.9	20.5	35.4	56.0	-20.6	
1.672	14.9	20.5	35.4	56.0	-20.6	
0.986	14.8	20.5	35.3	56.0	-20.7	
1.038	14.8	20.5	35.3	56.0	-20.7	
1.195	14.6	20.5	35.1	56.0	-20.9	
1.512	14.5	20.5	35.0	56.0	-21.0	
1.594	14.5	20.5	35.0	56.0	-21.0	
0.557	14.5	20.4	34.9	56.0	-21.1	
2.064	14.4	20.5	34.9	56.0	-21.1	
0.963	14.3	20.5	34.8	56.0	-21.2	
1.239	14.3	20.5	34.8	56.0	-21.2	
1.642	14.3	20.5	34.8	56.0	-21.2	
1.564	14.2	20.5	34.7	56.0	-21.3	
0.478	14.6	20.4	35.0	56.4	-21.4	
0.758	14.1	20.5	34.6	56.0	-21.4	
0.848	14.1	20.5	34.6	56.0	-21.4	

Peak Data - vs - Average Limit						
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)	
0.583	16.7	20.4	37.1	46.0	-8.9	
0.822	16.6	20.5	37.1	46.0	-8.9	
0.930	16.1	20.5	36.6	46.0	-9.4	
0.661	15.5	20.5	36.0	46.0	-10.0	
1.445	15.3	20.5	35.8	46.0	-10.2	
1.321	15.2	20.5	35.7	46.0	-10.3	
1.068	15.1	20.5	35.6	46.0	-10.4	
1.012	15.0	20.5	35.5	46.0	-10.5	
1.165	15.0	20.5	35.5	46.0	-10.5	
1.363	15.0	20.5	35.5	46.0	-10.5	
1.113	14.9	20.5	35.4	46.0	-10.6	
1.672	14.9	20.5	35.4	46.0	-10.6	
0.986	14.8	20.5	35.3	46.0	-10.7	
1.038	14.8	20.5	35.3	46.0	-10.7	
1.195	14.6	20.5	35.1	46.0	-10.9	
1.512	14.5	20.5	35.0	46.0	-11.0	
1.594	14.5	20.5	35.0	46.0	-11.0	
0.557	14.5	20.4	34.9	46.0	-11.1	
2.064	14.4	20.5	34.9	46.0	-11.1	
0.963	14.3	20.5	34.8	46.0	-11.2	
1.239	14.3	20.5	34.8	46.0	-11.2	
1.642	14.3	20.5	34.8	46.0	-11.2	
1.564	14.2	20.5	34.7	46.0	-11.3	
0.478	14.6	20.4	35.0	46.4	-11.4	
0.758	14.1	20.5	34.6	46.0	-11.4	
0.848	14.1	20.5	34.6	46.0	-11.4	

CONCLUSION

Pass

Tested By



EUT:	Mini Remote Microphone	Work Order:	STAK0144
Serial Number:	182000364	Date:	10/22/2018
Customer:	Starkey Laboratories, Inc.	Temperature:	22°C
Attendees:	Charlie Esch, John Quach	Relative Humidity:	30.2%
Customer Project:	None	Bar. Pressure:	1020 mb
Tested By:	Dustin Sparks	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	STAK0144-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2018	ANSI C63.10:2013

TEST PARAMETERS

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

COMMENTS

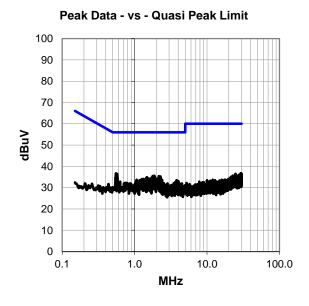
None

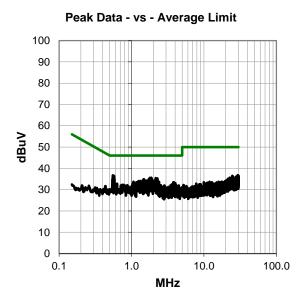
EUT OPERATING MODES

Transmitting mid channel (2440 MHz) at 2 Mbps

DEVIATIONS FROM TEST STANDARD

None





Report No. STAK0144.1 15/67



RESULTS - Run #19

Peak Data - vs - Quasi Peak Limit						
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)	
0.553	16.3	20.4	36.7	56.0	-19.3	
0.572	16.0	20.4	36.4	56.0	-19.6	
1.784	15.0	20.5	35.5	56.0	-20.5	
1.874	15.0	20.5	35.5	56.0	-20.5	
1.855	14.9	20.5	35.4	56.0	-20.6	
1.889	14.9	20.5	35.4	56.0	-20.6	
2.157	14.9	20.5	35.4	56.0	-20.6	
2.280	14.8	20.5	35.3	56.0	-20.7	
2.183	14.4	20.5	34.9	56.0	-21.1	
1.471	14.3	20.5	34.8	56.0	-21.2	
1.493	14.3	20.5	34.8	56.0	-21.2	
1.724	14.3	20.5	34.8	56.0	-21.2	
1.430	13.9	20.5	34.4	56.0	-21.6	
1.698	13.9	20.5	34.4	56.0	-21.6	
1.598	13.7	20.5	34.2	56.0	-21.8	
1.993	13.7	20.5	34.2	56.0	-21.8	
2.086	13.7	20.5	34.2	56.0	-21.8	
2.124	13.7	20.5	34.2	56.0	-21.8	
1.318	13.6	20.5	34.1	56.0	-21.9	
1.642	13.6	20.5	34.1	56.0	-21.9	
1.251	13.5	20.5	34.0	56.0	-22.0	
2.228	13.5	20.5	34.0	56.0	-22.0	
2.306	13.3	20.5	33.8	56.0	-22.2	
1.064	13.2	20.5	33.7	56.0	-22.3	
1.668	13.2	20.5	33.7	56.0	-22.3	
1.948	13.2	20.5	33.7	56.0	-22.3	

Peak Data - vs - Average Limit						
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)	
0.553	16.3	20.4	36.7	46.0	-9.3	
0.572	16.0	20.4	36.4	46.0	-9.6	
1.784	15.0	20.5	35.5	46.0	-10.5	
1.874	15.0	20.5	35.5	46.0	-10.5	
1.855	14.9	20.5	35.4	46.0	-10.6	
1.889	14.9	20.5	35.4	46.0	-10.6	
2.157	14.9	20.5	35.4	46.0	-10.6	
2.280	14.8	20.5	35.3	46.0	-10.7	
2.183	14.4	20.5	34.9	46.0	-11.1	
1.471	14.3	20.5	34.8	46.0	-11.2	
1.493	14.3	20.5	34.8	46.0	-11.2	
1.724	14.3	20.5	34.8	46.0	-11.2	
1.430	13.9	20.5	34.4	46.0	-11.6	
1.698	13.9	20.5	34.4	46.0	-11.6	
1.598	13.7	20.5	34.2	46.0	-11.8	
1.993	13.7	20.5	34.2	46.0	-11.8	
2.086	13.7	20.5	34.2	46.0	-11.8	
2.124	13.7	20.5	34.2	46.0	-11.8	
1.318	13.6	20.5	34.1	46.0	-11.9	
1.642	13.6	20.5	34.1	46.0	-11.9	
1.251	13.5	20.5	34.0	46.0	-12.0	
2.228	13.5	20.5	34.0	46.0	-12.0	
2.306	13.3	20.5	33.8	46.0	-12.2	
1.064	13.2	20.5	33.7	46.0	-12.3	
1.668	13.2	20.5	33.7	46.0	-12.3	
1.948	13.2	20.5	33.7	46.0	-12.3	

CONCLUSION

Pass

Tested By



EUT:	Mini Remote Microphone	Work Order:	STAK0144
Serial Number:	182000364	Date:	10/22/2018
Customer:	Starkey Laboratories, Inc.	Temperature:	22°C
Attendees:	Charlie Esch, John Quach	Relative Humidity:	30.2%
Customer Project:	None	Bar. Pressure:	1020 mb
Tested By:	Dustin Sparks	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	STAK0144-8

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2018	ANSI C63.10:2013

TEST PARAMETERS

Run #:	21	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

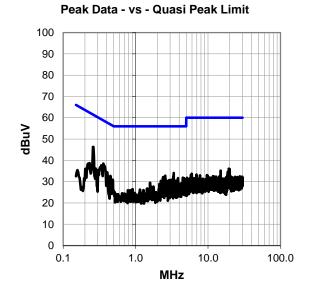
None

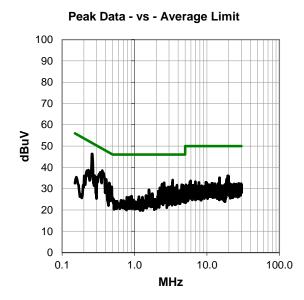
EUT OPERATING MODES

Transmitting mid channel (2440 MHz) at 2 Mbps

DEVIATIONS FROM TEST STANDARD

None





Report No. STAK0144.1 17/67



RESULTS - Run #21

Peak Data - vs - Quasi Peak Limit							
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)		
0.258	25.8	20.5	46.3	61.5	-15.2		
0.359	18.1	20.4	38.5	58.8	-20.3		
0.337	17.3	20.4	37.7	59.3	-21.6		
3.358	13.4	20.7	34.1	56.0	-21.9		
2.564	12.3	20.5	32.8	56.0	-23.2		
0.407	14.0	20.4	34.4	57.7	-23.3		
0.232	18.1	20.6	38.7	62.4	-23.7		
2.403	11.6	20.5	32.1	56.0	-23.9		
3.332	11.3	20.7	32.0	56.0	-24.0		
19.382	13.6	22.4	36.0	60.0	-24.0		
2.430	11.4	20.5	31.9	56.0	-24.1		
19.845	13.5	22.4	35.9	60.0	-24.1		
0.448	12.3	20.4	32.7	56.9	-24.2		
4.500	11.1	20.7	31.8	56.0	-24.2		
3.855	11.0	20.7	31.7	56.0	-24.3		
4.657	10.9	20.7	31.6	56.0	-24.4		
0.281	15.7	20.5	36.2	60.8	-24.6		
19.487	12.9	22.4	35.3	60.0	-24.7		
14.954	13.4	21.7	35.1	60.0	-24.9		
19.621	12.6	22.4	35.0	60.0	-25.0		
3.135	10.3	20.6	30.9	56.0	-25.1		
3.250	10.2	20.7	30.9	56.0	-25.1		
4.840	10.2	20.7	30.9	56.0	-25.1		
2.915	10.3	20.5	30.8	56.0	-25.2		
18.901	12.4	22.3	34.7	60.0	-25.3		
0.482	10.5	20.4	30.9	56.3	-25.4		

Peak Data - vs - Average Limit						
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)	
0.258	25.8	20.5	46.3	51.5	-5.2	
0.359	18.1	20.4	38.5	48.8	-10.3	
0.337	17.3	20.4	37.7	49.3	-11.6	
3.358	13.4	20.7	34.1	46.0	-11.9	
2.564	12.3	20.5	32.8	46.0	-13.2	
0.407	14.0	20.4	34.4	47.7	-13.3	
0.232	18.1	20.6	38.7	52.4	-13.7	
2.403	11.6	20.5	32.1	46.0	-13.9	
3.332	11.3	20.7	32.0	46.0	-14.0	
19.382	13.6	22.4	36.0	50.0	-14.0	
2.430	11.4	20.5	31.9	46.0	-14.1	
19.845	13.5	22.4	35.9	50.0	-14.1	
0.448	12.3	20.4	32.7	46.9	-14.2	
4.500	11.1	20.7	31.8	46.0	-14.2	
3.855	11.0	20.7	31.7	46.0	-14.3	
4.657	10.9	20.7	31.6	46.0	-14.4	
0.281	15.7	20.5	36.2	50.8	-14.6	
19.487	12.9	22.4	35.3	50.0	-14.7	
14.954	13.4	21.7	35.1	50.0	-14.9	
19.621	12.6	22.4	35.0	50.0	-15.0	
3.135	10.3	20.6	30.9	46.0	-15.1	
3.250	10.2	20.7	30.9	46.0	-15.1	
4.840	10.2	20.7	30.9	46.0	-15.1	
2.915	10.3	20.5	30.8	46.0	-15.2	
18.901	12.4	22.3	34.7	50.0	-15.3	
0.482	10.5	20.4	30.9	46.3	-15.4	

CONCLUSION

Pass

Tested By



EUT:	Mini Remote Microphone	Work Order:	STAK0144
Serial Number:	182000364	Date:	10/22/2018
Customer:	Starkey Laboratories, Inc.	Temperature:	22°C
Attendees:	Charlie Esch, John Quach	Relative Humidity:	30.2%
Customer Project:	None	Bar. Pressure:	1020 mb
Tested By:	Dustin Sparks	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	STAK0144-8

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2018	ANSI C63.10:2013

TEST PARAMETERS

Run #:	22	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

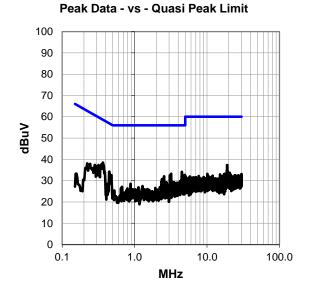
None

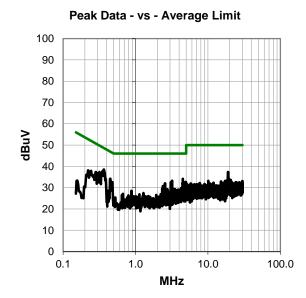
EUT OPERATING MODES

Transmitting mid channel (2440 MHz) at 2 Mbps

DEVIATIONS FROM TEST STANDARD

None





Report No. STAK0144.1 19/67



RESULTS - Run #22

Peak Data - vs - Quasi Peak Limit

	Peak Da	<u>ta - vs - C</u>	<u>luasi Peal</u>	k Limit	
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.366	18.1	20.4	38.5	58.6	-20.1
4.496	13.4	20.7	34.1	56.0	-21.9
0.318	17.0	20.4	37.4	59.8	-22.4
0.448	13.8	20.4	34.2	56.9	-22.7
18.998	15.0	22.3	37.3	60.0	-22.7
3.202	12.6	20.6	33.2	56.0	-22.8
4.944	12.0	20.7	32.7	56.0	-23.3
0.284	17.0	20.4	37.4	60.7	-23.3
3.064	12.0	20.6	32.6	56.0	-23.4
0.303	16.4	20.4	36.8	60.2	-23.4
4.653	11.8	20.7	32.5	56.0	-23.5
0.478	12.2	20.4	32.6	56.4	-23.8
2.556	11.5	20.5	32.0	56.0	-24.0
0.243	17.3	20.6	37.9	62.0	-24.1
4.597	10.7	20.7	31.4	56.0	-24.6
0.221	17.5	20.6	38.1	62.8	-24.7
18.935	12.7	22.3	35.0	60.0	-25.0
2.459	10.4	20.5	30.9	56.0	-25.1
2.385	10.1	20.5	30.6	56.0	-25.4
19.151	12.2	22.4	34.6	60.0	-25.4
4.918	9.5	20.7	30.2	56.0	-25.8
19.423	11.5	22.4	33.9	60.0	-26.1
4.295	9.1	20.7	29.8	56.0	-26.2
19.211	11.2	22.4	33.6	60.0	-26.4
19.766	11.2	22.4	33.6	60.0	-26.4
20.580	11.1	22.5	33.6	60.0	-26.4

Peak Data - vs - Average Limit									
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)				
0.366	18.1	20.4	38.5	48.6	-10.1				
4.496	13.4	20.7	34.1	46.0	-11.9				
0.318	17.0	20.4	37.4	49.8	-12.4				
0.448	13.8	20.4	34.2	46.9	-12.7				
18.998	15.0	22.3	37.3	50.0	-12.7				
3.202	12.6	20.6	33.2	46.0	-12.8				
4.944	12.0	20.7	32.7	46.0	-13.3				
0.284	17.0	20.4	37.4	50.7	-13.3				
3.064	12.0	20.6	32.6	46.0	-13.4				
0.303	16.4	20.4	36.8	50.2	-13.4				
4.653	11.8	20.7	32.5	46.0	-13.5				
0.478	12.2	20.4	32.6	46.4	-13.8				
2.556	11.5	20.5	32.0	46.0	-14.0				
0.243	17.3	20.6	37.9	52.0	-14.1				
4.597	10.7	20.7	31.4	46.0	-14.6				
0.221	17.5	20.6	38.1	52.8	-14.7				
18.935	12.7	22.3	35.0	50.0	-15.0				
2.459	10.4	20.5	30.9	46.0	-15.1				
2.385	10.1	20.5	30.6	46.0	-15.4				
19.151	12.2	22.4	34.6	50.0	-15.4				
4.918	9.5	20.7	30.2	46.0	-15.8				
19.423	11.5	22.4	33.9	50.0	-16.1				
4.295	9.1	20.7	29.8	46.0	-16.2				
19.211	11.2	22.4	33.6	50.0	-16.4				
19.766	11.2	22.4	33.6	50.0	-16.4				
20.580	11.1	22.5	33.6	50.0	-16.4				

CONCLUSION

Pass

Tested By



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	E4422B	TGQ	15-Mar-18	15-Mar-21
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	7-Sep-18	7-Sep-19
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	19-Dec-17	19-Dec-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.

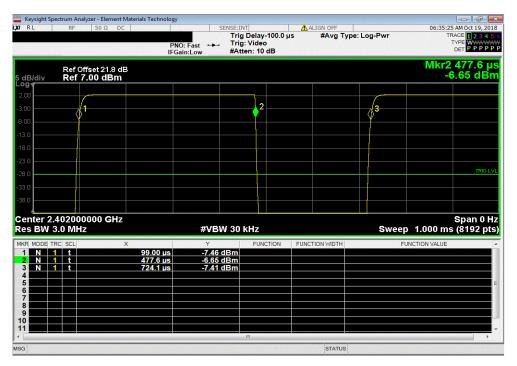
Report No. STAK0144.1



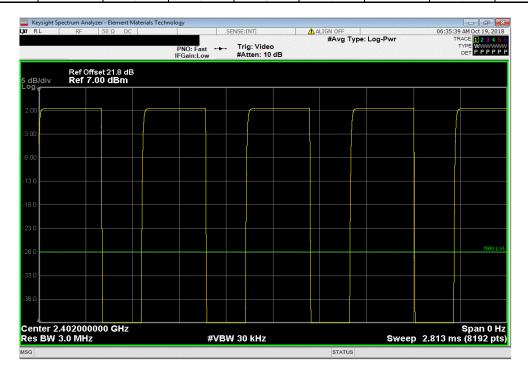
				TbtTx 2018.09.13	
EUT: Mini Remote Microphone			Work Order		
Serial Number: 182000364				: 18-Oct-18	
Customer: Starkey Laboratories, Inc.			Temperature		
Attendees: Charlie Esch				: 33.1% RH	
Project: None			Barometric Pres.		
Tested by: Dustin Sparks	Power: Battery		Job Site	: MN08	
TEST SPECIFICATIONS	Test Method				
FCC 15.247:2018	ANSI C63.10:2013				
COMMENTS					
None					
1					
DEVIATIONS FROM TEST STANDARD					
None					
	A 11 0				
None Configuration # 7	Dustin Loads				
	Signature				
	Signature	Number of	Value	Limit	
Configuration # 7	Signature (Pulse Width Period	Number of Pulses	(%)	(%)	Results
Configuration # 7 BLE, Low Channel (2402 MHz), 1 Mbps	Signature Pulse Width Period 378.633 us 625.1 us		(%) 60.6		Results N/A
Configuration # 7 BLE, Low Channel (2402 MHz), 1 Mbps BLE, Low Channel (2402 MHz), 1 Mbps	Signature (Pulse Width Period		(%)	(%) N/A N/A	
Configuration # 7 BLE, Low Channel (2402 MHz), 1 Mbps BLE, Low Channel (2402 MHz), 1 Mbps BLE, Mid Channel (2440 MHz), 1 Mbps	Pulse Width Period 378.633 us 625.1 us N/A 378.544 us 625.1 us	Pulses 1	(%) 60.6 N/A 60.6	(%) N/A N/A N/A	N/A N/A N/A
Configuration # 7 BLE, Low Channel (2402 MHz), 1 Mbps BLE, Low Channel (2402 MHz), 1 Mbps BLE, Mid Channel (2440 MHz), 1 Mbps BLE, Mid Channel (2440 MHz), 1 Mbps	Pulse Width Period 378,633 us 625.1 us N/A N/A S78,544 us 625.1 us N/A	Pulses 1	(%) 60.6 N/A	(%) N/A N/A	N/A N/A
Configuration # 7 BLE, Low Channel (2402 MHz), 1 Mbps BLE, Low Channel (2402 MHz), 1 Mbps BLE, Mid Channel (2440 MHz), 1 Mbps BLE, Mid Channel (2440 MHz), 1 Mbps BLE, High Channel (2480 MHz), 1 Mbps	Pulse Width Period 378.633 us 625.1 us N/A N/A 378.544 us 625.1 us N/A N/A N/A 378.567 us 625.1	Pulses 1 5	60.6 N/A 60.6 N/A 60.6	(%) N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A
Configuration # 7 BLE, Low Channel (2402 MHz), 1 Mbps BLE, Low Channel (2402 MHz), 1 Mbps BLE, Mid Channel (2440 MHz), 1 Mbps BLE, Mid Channel (2440 MHz), 1 Mbps BLE, High Channel (2480 MHz), 1 Mbps BLE, High Channel (2480 MHz), 1 Mbps	Pulse Width Period 378.633 us 625.1 us N/A N/A 378.544 us 625.1 us N/A	Pulses 1 5	60.6 N/A 60.6 N/A 60.6 N/A	(%) N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A N/A
Configuration # 7 BLE, Low Channel (2402 MHz), 1 Mbps BLE, Low Channel (2402 MHz), 1 Mbps BLE, Mid Channel (2440 MHz), 1 Mbps BLE, Mid Channel (2440 MHz), 1 Mbps BLE, High Channel (2480 MHz), 1 Mbps	Pulse Width Period 378.633 us 625.1 us N/A N/A 378.544 us 625.1 us N/A N/A N/A 378.567 us 625.1	Pulses 1 5	60.6 N/A 60.6 N/A 60.6	(%) N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A
Configuration # 7 BLE, Low Channel (2402 MHz), 1 Mbps BLE, Low Channel (2402 MHz), 1 Mbps BLE, Mid Channel (2440 MHz), 1 Mbps BLE, Mid Channel (2440 MHz), 1 Mbps BLE, High Channel (2480 MHz), 1 Mbps BLE, High Channel (2480 MHz), 1 Mbps BLE, Migh Channel (2490 MHz), 2 Mbps Low Channel (2402 MHz), 2 Mbps Low Channel (2402 MHz), 2 Mbps	Pulse Width Period 378.633 us 625.1 us N/A N/A 378.544 us 625.1 us N/A	Pulses 1 5	60.6 N/A 60.6 N/A 60.6 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
Configuration # 7 BLE, Low Channel (2402 MHz), 1 Mbps BLE, Low Channel (2402 MHz), 1 Mbps BLE, Mid Channel (2440 MHz), 1 Mbps BLE, Mid Channel (2440 MHz), 1 Mbps BLE, High Channel (2480 MHz), 1 Mbps BLE, High Channel (2480 MHz), 1 Mbps LE, High Channel (2480 MHz), 2 Mbps Low Channel (2402 MHz), 2 Mbps	Pulse Width Period 378.633 us 625.1 us N/A N/A 378.544 us 625.1 us N/A N/A 378.567 us 625.1 us N/A N/A 378.567 us 625.1 us N/A N/A 306.922 us 625.1	Pulses 1 5	(%) 60.6 N/A 60.6 N/A 60.6 N/A 49.1	(%) N/A N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A N/A
Configuration # 7 BLE, Low Channel (2402 MHz), 1 Mbps BLE, Low Channel (2402 MHz), 1 Mbps BLE, Mid Channel (2440 MHz), 1 Mbps BLE, Mid Channel (2440 MHz), 1 Mbps BLE, High Channel (2480 MHz), 1 Mbps BLE, High Channel (2480 MHz), 1 Mbps BLE, Migh Channel (2490 MHz), 2 Mbps Low Channel (2402 MHz), 2 Mbps Low Channel (2402 MHz), 2 Mbps	Pulse Width Period 378.633 us 625.1 us N/A N/A 378.544 us 625.1 us N/A	Pulses 1 5	(%) 60.6 N/A 60.6 N/A 60.6 N/A 49.1 N/A	(%) N/A	N/A N/A N/A N/A N/A N/A N/A
Configuration # 7 BLE, Low Channel (2402 MHz), 1 Mbps BLE, Low Channel (2402 MHz), 1 Mbps BLE, Mid Channel (2440 MHz), 1 Mbps BLE, Mid Channel (2440 MHz), 1 Mbps BLE, High Channel (2440 MHz), 1 Mbps BLE, High Channel (2440 MHz), 1 Mbps Low Channel (2402 MHz), 2 Mbps Low Channel (2402 MHz), 2 Mbps Mid Channel (2404 MHz), 2 Mbps Mid Channel (2404 MHz), 2 Mbps	Pulse Width Period 378.633 us 625.1 us N/A N/A 378.544 us 625.1 us N/A 306.355 us 625.1 us N/A	Pulses 1 5	(%) 60.6 N/A 60.6 N/A 60.6 N/A 49.1 N/A 49	(%) N/A	N/A N/A N/A N/A N/A N/A N/A N/A

Report No. STAK0144.1 22/67





		BLE, Low (Channel (2402 MI	Hz), 1 Mbps		
			Number of	Value	Limit	
	Pulse Width	Period	Pulses	(%)	(%)	Results
I	N/A	N/A	5	N/A	N/A	N/A



Report No. STAK0144.1 23/67

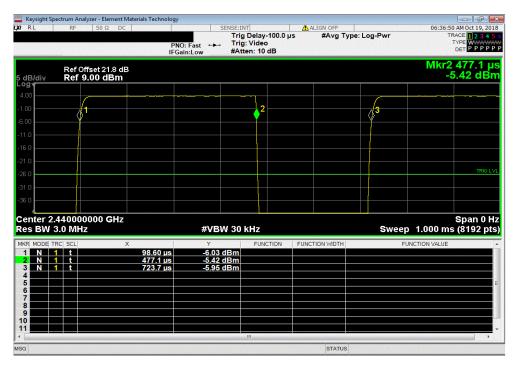


BLE, Mid Channel (2440 MHz), 1 Mbps

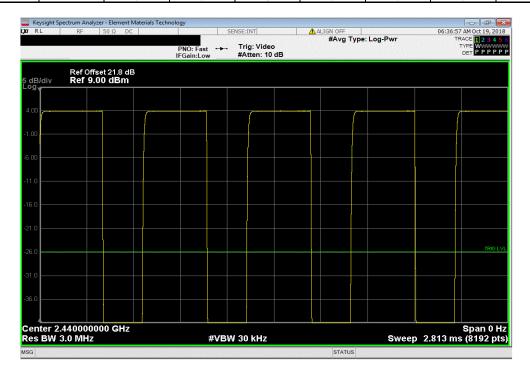
Number of Value Limit

Pulse Width Period Pulses (%) (%) Results

378.544 us 625.1 us 1 60.6 N/A N/A

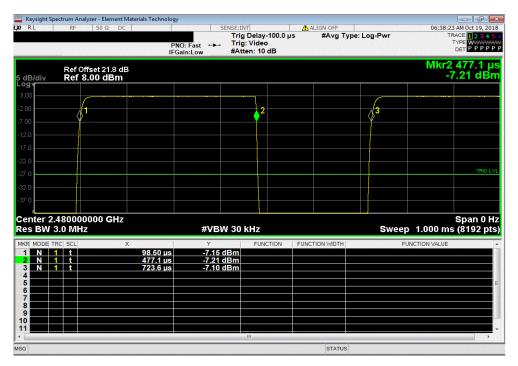


		BLE, Mid C	Channel (2440 MF	Hz), 1 Mbps		
			Number of	Value	Limit	
	Pulse Width	Period	Pulses	(%)	(%)	Results
	N/A	N/A	5	N/A	N/A	N/A

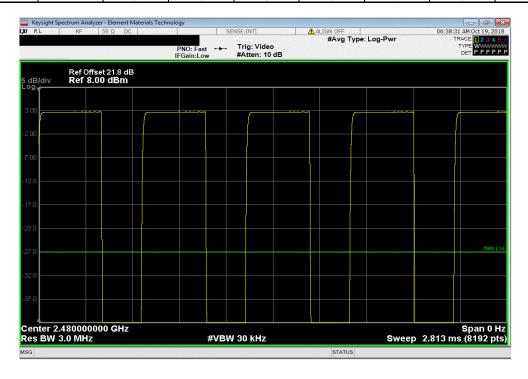


Report No. STAK0144.1 24/67





		BLE, High (Channel (2480 MI	Hz), 1 Mbps		
			Number of	Value	Limit	
	 Pulse Width	Period	Pulses	(%)	(%)	Results
i	N/A	N/A	5	N/A	N/A	N/A

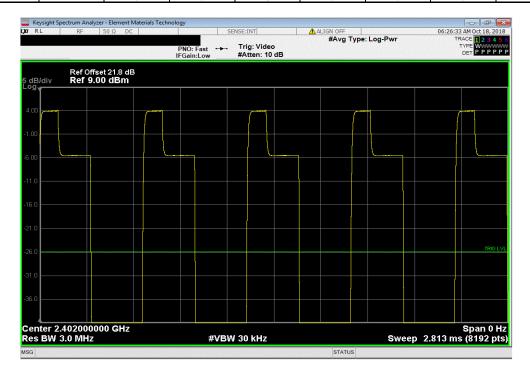


Report No. STAK0144.1 25/67





		Low Cha	annel (2402 MHz)), 2 Mbps		
			Number of	Value	Limit	
	Pulse Width	Period	Pulses	(%)	(%)	Results
. [N/A	N/A	5	N/A	N/A	N/A



Report No. STAK0144.1 26/67

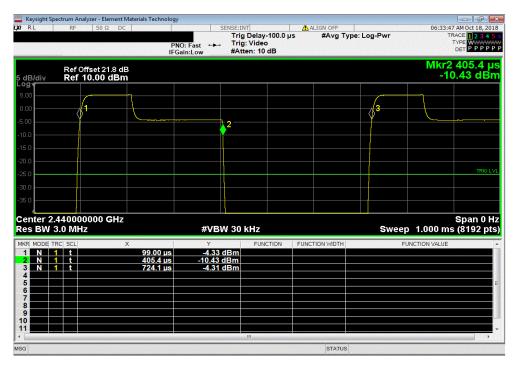


 Mid Channel (2440 MHz), 2 Mbps

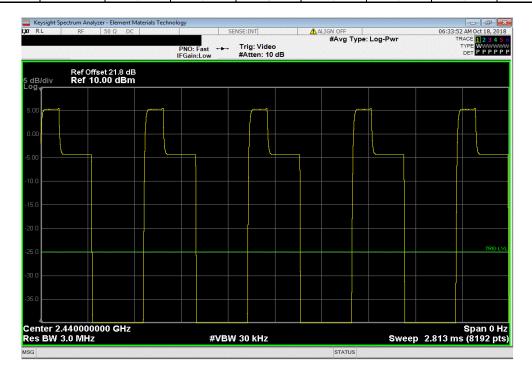
 Number of Value Limit

 Pulse Width
 Period
 Pulses
 (%)
 Results

 306.355 us
 625.1 us
 1
 49
 N/A
 N/A



		Mid Cha	nnel (2440 MHz)	, 2 Mbps		
			Number of	Value	Limit	
	Pulse Width	Period	Pulses	(%)	(%)	Results
	N/A	N/A	5	N/A	N/A	N/A



Report No. STAK0144.1 27/67

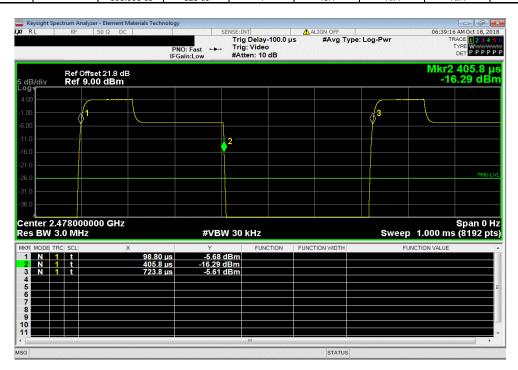


High Channel (2478 MHz), 2 Mbps

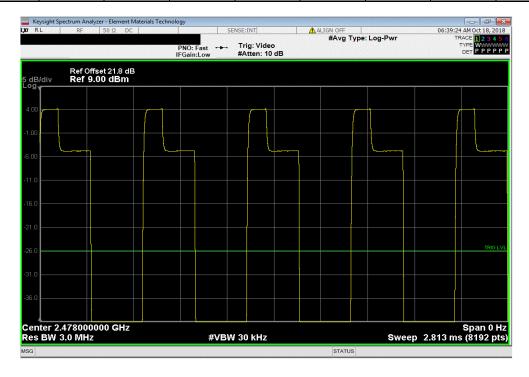
Number of Value Limit

Pulse Width Period Pulses (%) (%) Results

306.998 us 625 us 1 49.1 N/A N/A



High Channel (2478 MHz), 2 Mbps						
		Number of Value Limit				
	Pulse Width	Period	Pulses	(%)	(%)	Results
	N/A	N/A	5	N/A	N/A	N/A



Report No. STAK0144.1 28/67



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	E4422B	TGQ 15-Mar-18		15-Mar-21	
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	7-Sep-18	7-Sep-19	
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	19-Dec-17	19-Dec-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.

Report No. STAK0144.1



					TbtTx 2018.09.13	XMit 2017.12.13
	Mini Remote Microphone	9			er: STAK0144	
Serial Number:	182000364				te: 18-Oct-18	
	Starkey Laboratories, Inc).		Temperatu		
	Charlie Esch				ty: 32.8% RH	
Project:	None			Barometric Pre	s.: 1024 mbar	
	Dustin Sparks		Power: Battery	Job S	te: MN08	
TEST SPECIFICATI	IONS		Test Method			
FCC 15.247:2018			ANSI C63.10:2013			
COMMENTS						
None						
DEVIATIONS FROM	// TEST STANDARD					
None						
			2 . 0			
Configuration #	7	\propto	Tustin Spards			
		Signature	3/300			
					Limit	
				Value	(≥)	Result
BLE, Low Channel (2402 MHz), 1 Mbps			686.497 kHz	500 kHz	Pass
BLE, Mid Channel (2	2440 MHz), 1 Mbps		686.922 kHz	500 kHz	Pass	
BLE, High Channel	(2480 MHz), 1 Mbps		697.823 kHz	500 kHz	Pass	
Low Channel (2402			968.619 kHz	500 kHz	Pass	
Mid Channal (2440 I	MHz), 2 Mbps		979.96 kHz	500 kHz	Pass	
Wild Charifier (2440 I						

Report No. STAK0144.1 30/67

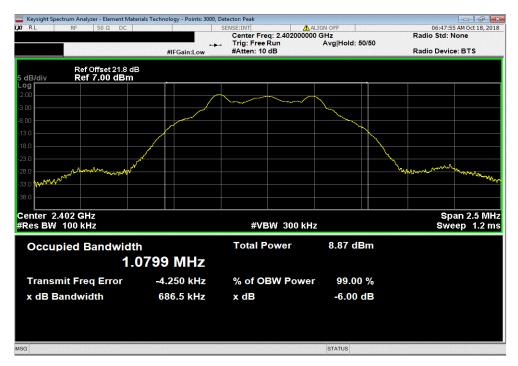


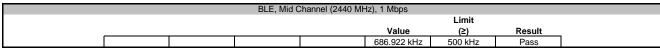
BLE, Low Channel (2402 MHz), 1 Mbps

Limit

Value (2) Result

686.497 kHz 500 kHz Pass

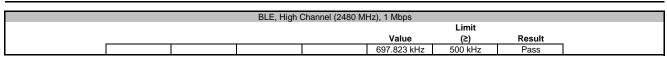


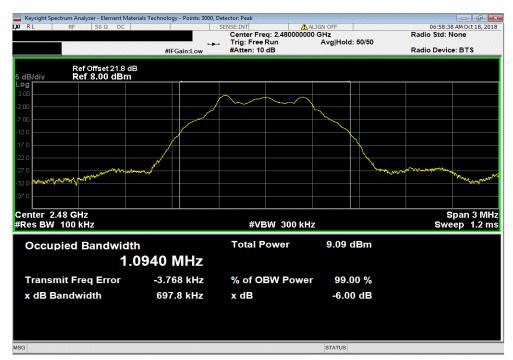


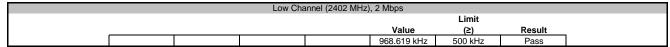


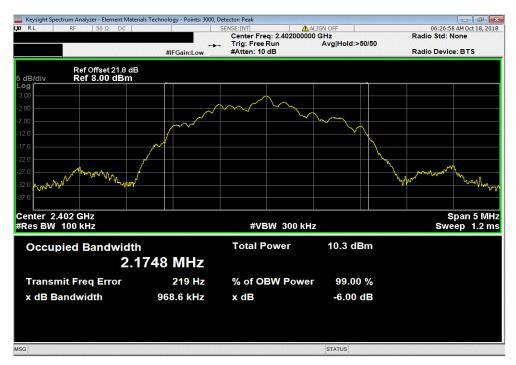
Report No. STAK0144.1 31/67











Report No. STAK0144.1 32/67

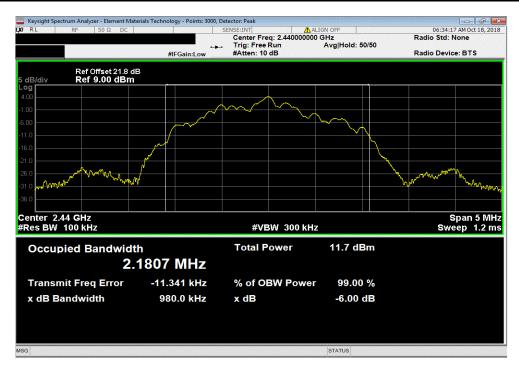


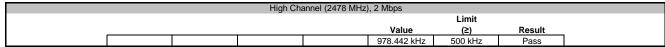
Mid Channel (2440 MHz), 2 Mbps

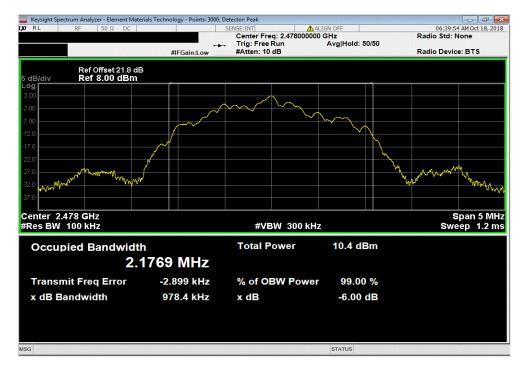
Limit

Value (2) Result

979.96 kHz 500 kHz Pass







Report No. STAK0144.1 33/67

OUTPUT POWER



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	E4422B	TGQ	15-Mar-18	15-Mar-21	
	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	7-Sep-18	7-Sep-19	
,	Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	19-Dec-17	19-Dec-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.

OUTPUT POWER



						TbtTx 2018.09.13	XMit 2017.12.13
EUT:	Mini Remote Microphone				Work Order:		
Serial Number:	182000364				Date:	18-Oct-18	
Customer:	Starkey Laboratories, Inc.				Temperature:	22 °C	
Attendees:	Charlie Esch				Humidity:	32.9% RH	
Project:	None				Barometric Pres.:	1024 mbar	
Tested by:	Dustin Sparks		Power:	Battery	Job Site:	MN08	
TEST SPECIFICAT	IONS			Test Method			
FCC 15.247:2018				ANSI C63.10:2013			
COMMENTS							
None							
DEVIATIONS FROM	// TEST STANDARD						
None							
			10				
Configuration # 7							
		Signature		3/			
						Limit	
					Value	(<)	Result
BLE, Low Channel (2402 MHz), 1 Mbps				1.837 mW	1 W	Pass
BLE, Mid Channel (2	2440 MHz), 1 Mbps				2.532 mW	1 W	Pass
BLE, High Channel (2480 MHz), 1 Mbps					1.917 mW	1 W	Pass
Low Channel (2402 MHz), 2 Mbps					2.668 mW	1 W	Pass
Mid Channel (2440 MHz), 2 Mbps					3.641 mW	1 W	Pass
High Channel (2478 MHz), 2 Mbps				2.73 mW	1 W	Pass	

Report No. STAK0144.1 35/67

OUTPUT POWER

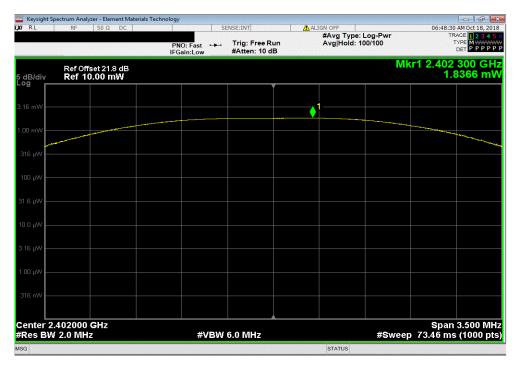


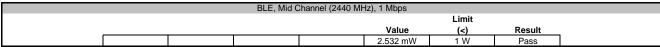
BLE, Low Channel (2402 MHz), 1 Mbps

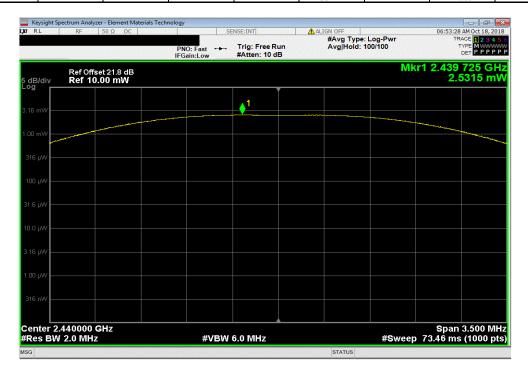
Limit

Value (<) Result

1.837 mW 1 W Pass







Report No. STAK0144.1 36/67

OUTPUT POWER

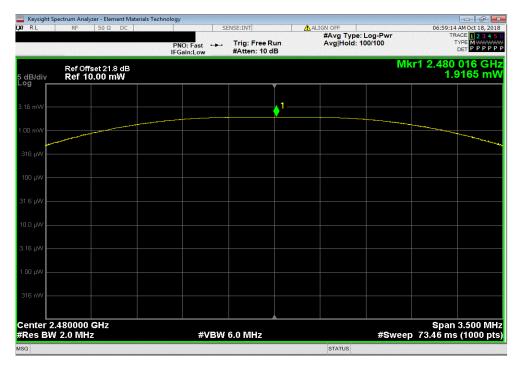


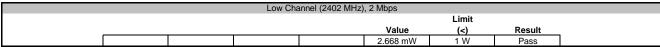
BLE, High Channel (2480 MHz), 1 Mbps

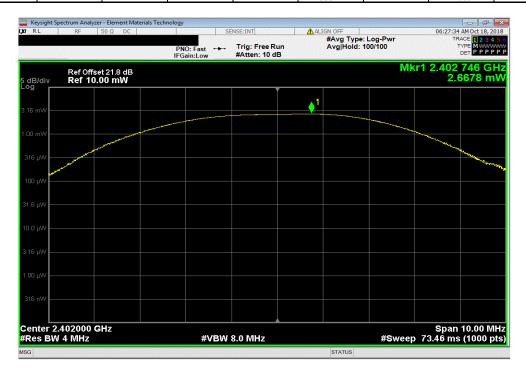
Limit

Value (<) Result

1.917 mW 1 W Pass







Report No. STAK0144.1 37/67

OUTPUT POWER

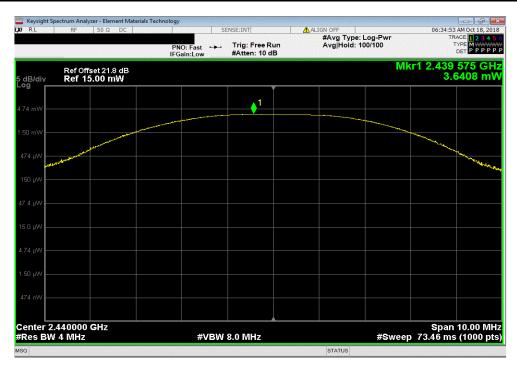


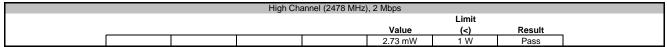
Mid Channel (2440 MHz), 2 Mbps

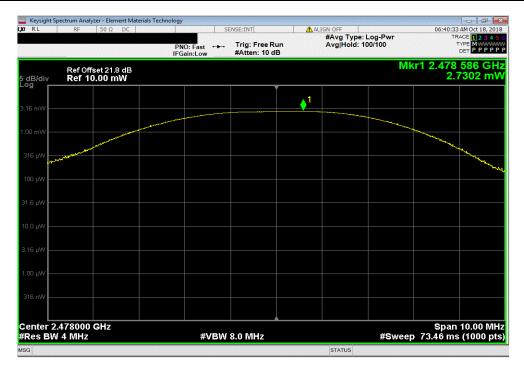
Limit

Value (<) Result

3.641 mW 1 W Pass







Report No. STAK0144.1 38/67



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	E4422B	TGQ	15-Mar-18	15-Mar-21
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	7-Sep-18	7-Sep-19
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	19-Dec-17	19-Dec-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. The actual antenna gain of the EUT was added to the conducted output power to derive the EIRP values.

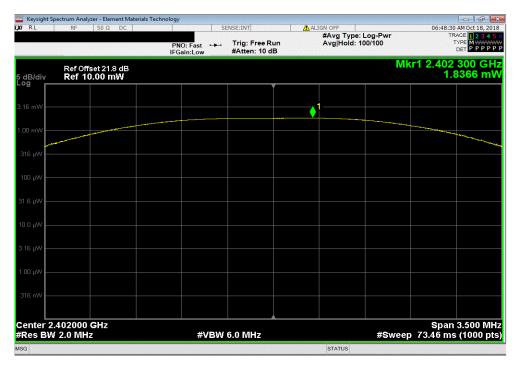


		TbtTx 2018.09.13	XMit 2017.12.13
EUT: Mini Remote Microphone	Work Order:		
Serial Number: 182000364		18-Oct-18	
Customer: Starkey Laboratories, Inc.	Temperature:		
Attendees: Charlie Esch		32.9% RH	
Project: None	Barometric Pres.:		
Tested by: Dustin Sparks Power: Battery	Job Site:	MN08	
ST SPECIFICATIONS Test Method			
C 15.247:2018 ANSI C63.10:2013			
	·		
MMENTS			
ne			
VIATIONS FROM TEST STANDARD			
ne			
2			
nfiguration# 7			
Signature			
Value	Antenna EIRP	Limit	
Value (dBm)	Gain (dBi) (dBm)	(< dBm)	Result
E, Low Channel (2402 MHz), 1 Mbps 1.837 mW 2.72	2.5 5.22	36	Pass
E, Mid Channel (2440 MHz), 1 Mbps 2.532 mW 4.03	2.5 6.53	36	Pass
E, High Channel (2480 MHz), 1 Mbps 1.917 mW 2.83	2.5 5.33	36	Pass
v Channel (2402 MHz), 2 Mpps 2.668 mW 4.26	2.5 6.76	36	Pass
			Pass
I Channel (2440 MHz), 2 Mbps 3.641 mW 5.61	2.5 8.11	36	Pass

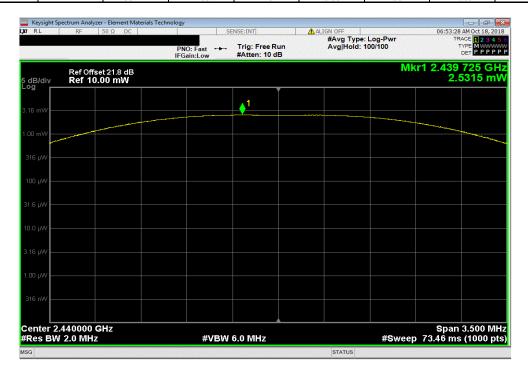
Report No. STAK0144.1 40/67



BLE, Low Channel (2402 MHz), 1 Mbps Value Antenna EIRP Limit Value (dBm) Gain (dBi) (dBm) (< dBm) Result 1.837 mW 2.72 5.22 36 Pass



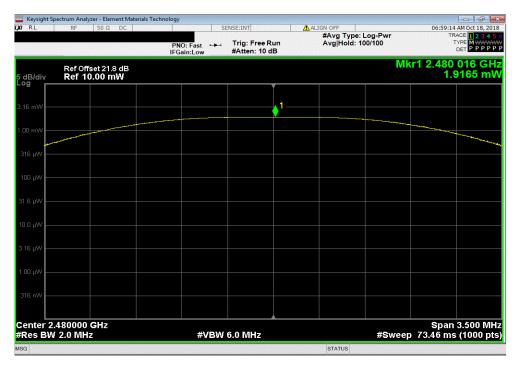
	BLE, Mid Channel (2440 MHz), 1 Mbps						
			Value	Antenna	EIRP	Limit	
		Value	(dBm)	Gain (dBi)	(dBm)	(< dBm)	Result
1		2.532 mW	4.03	2.5	6.53	36	Pass



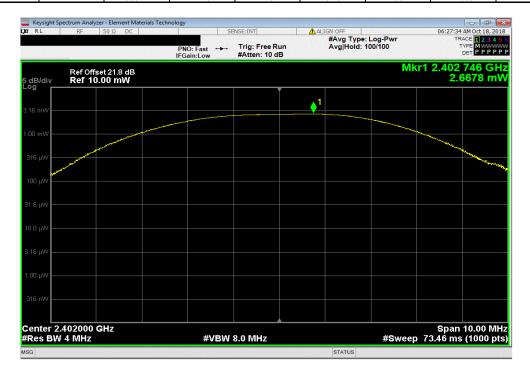
Report No. STAK0144.1 41/67



BLE, High Channel (2480 MHz), 1 Mbps Value Antenna EIRP Limit Value (dBm) Gain (dBi) (dBm) (< dBm) Result 1.917 mW 2.83 5.33 36 Pass



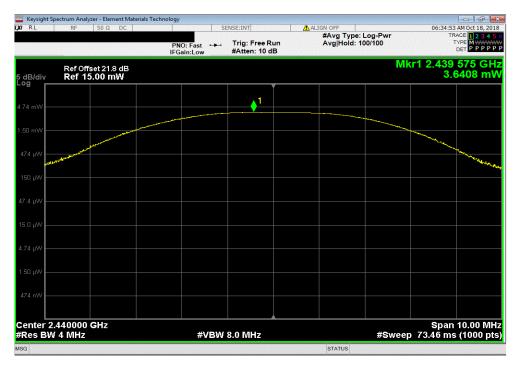
	Low Channel (2402 MHz), 2 Mbps						
		Value Antenna EIRP Limit					
		Value	(dBm)	Gain (dBi)	(dBm)	(< dBm)	Result
İ		2.668 mW	4.26	2.5	6.76	36	Pass



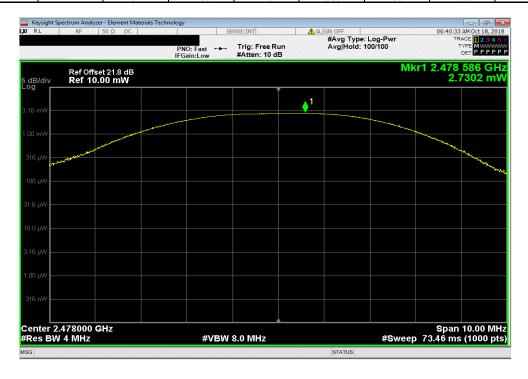
Report No. STAK0144.1 42/67



Mid Channel (2440 MHz), 2 Mbps Value Antenna EIRP Limit Value (dBm) Gain (dBi) (dBm) (< dBm) Result 3.641 mW 5.61 8.11 36 Pass



	High Channel (2478 MHz), 2 Mbps						
			Value	Antenna	EIRP	Limit	
		Value	(dBm)	Gain (dBi)	(dBm)	(< dBm)	Result
l		2.73 mW	4.36	2.5	6.86	36	Pass



Report No. STAK0144.1 43/67



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	E4422B	TGQ	15-Mar-18	15-Mar-21
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	7-Sep-18	7-Sep-19
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	19-Dec-17	19-Dec-18

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.



FCC 15.247:2018 COMMENTS None DEVIATIONS FROM TEST STANDARD None						TbtTx 2018.09.13	XMit 2017.12.13
Customer: Starkey Laboratories, Inc. Temperature: 22 °C Attendees: Charlie Esch Humidity: 32.9% RH Project: None Barometric Press: 1024 mbar Tested by: Dustin Sparks Power: Battery Job Site: MN08 Test Method FCC 15.247:2018 ANSI C63.10:2013 COMMENTS			e				
Attendees: Charlie Esch Humidity: 32.9% RH							
Project: None Barometric Pres. 1024 mbar Tested by: Dustin Sparks Power: Battery Job Site: MNO8 Test Method	Customer: Starl	key Laboratories, Inc	c.		Temperature:	22 °C	
Tested by: Dustin Sparks Power: Battery Job Site: MN08 Test Method	Attendees: Char	rlie Esch			Humidity:	32.9% RH	
Test Method FCC 15.247:2018	Project: None	e			Barometric Pres.:	1024 mbar	
ANSI C63.10:2013 COMMENTS	Tested by: Dust	tin Sparks		Power: Battery	Job Site:	MN08	
COMMENTS	TEST SPECIFICATIONS			Test Method			
DEVIATIONS FROM TEST STANDARD	FCC 15.247:2018			ANSI C63.10:2013			
DEVIATIONS FROM TEST STANDARD							
DEVIATIONS FROM TEST STANDARD	COMMENTS			•			
DEVIATIONS FROM TEST STANDARD	None						
Value Limit Results 111111							
Value Limit Results							
Table Tabl	DEVIATIONS FROM TES	T STANDARD					
Signature Value Limit Results MBm/3kHz < dBm/3kHz Results	None						
Signature Value Limit Results MBm/3kHz < dBm/3kHz Results				A . O			
Signature Value Limit Results MBm/3kHz < dBm/3kHz Results	Configuration #	7		Tunting Some			
Value Limit Results Adm/3kHz cdm/3kHz Results			Signature	7000			
BLE, Low Channel (2402 MHz), 1 Mbps -13.375 8 Pass BLE, Mid Channel (2440 MHz), 1 Mbps -11.958 8 Pass BLE, High Channel (2480 MHz), 1 Mbps -13.25 8 Pass Low Channel (2402 MHz), 2 Mbps -7.486 8 Pass Mid Channel (2404 MHz), 2 Mbps -6.328 8 Pass			•		Value	Limit	
BLE, Mid Channel (2440 MHz), 1 Mbps -11.958 8 Pass BLE, High Channel (2480 MHz), 1 Mbps -13.25 8 Pass Low Channel (2402 MHz), 2 Mbps -7.486 8 Pass Mid Channel (2404 MHz), 2 Mbps -6.328 8 Pass					dBm/3kHz	< dBm/3kHz	Results
BLE, High Channel (2480 MHz), 1 Mbps -13.25 8 Pass Low Channel (2402 MHz), 2 Mbps -7.486 8 Pass Mid Channel (2440 MHz), 2 Mbps 6.328 8 Pass	BLE, Low Channel (2402 I	MHz), 1 Mbps			-13.375	8	Pass
BLE, High Channel (2480 MHz), 1 Mbps -13.25 8 Pass Low Channel (2402 MHz), 2 Mbps -7.486 8 Pass Mid Channel (2440 MHz), 2 Mbps 6.328 8 Pass						8	Pass
Low Channel (2402 MHz), 2 Mbps -7.486 8 Pass Mid Channel (2440 MHz), 2 Mbps -6.328 8 Pass						8	Pass
Mid Channel (2440 MHz), 2 Mbps -6.328 8 Pass						8	
					-6.328	8	Pass
						8	

Report No. STAK0144.1 45/67

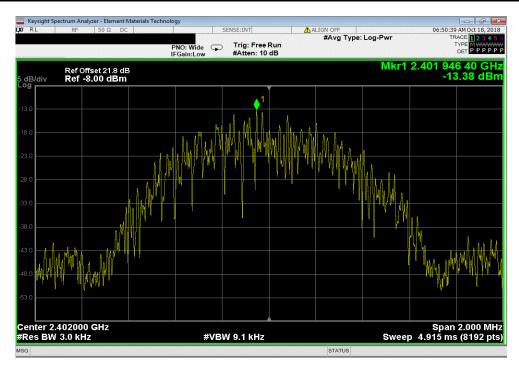


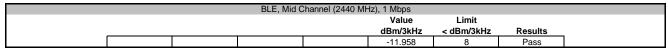
BLE, Low Channel (2402 MHz), 1 Mbps

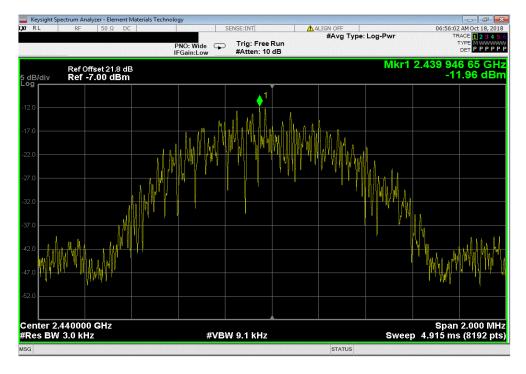
Value Limit

dBm/3kHz < dBm/3kHz Results

-13.375 8 Pass







Report No. STAK0144.1 46/67

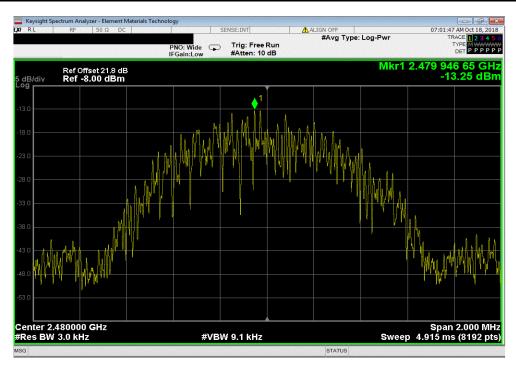


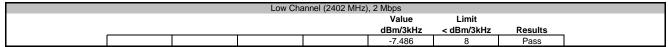
BLE, High Channel (2480 MHz), 1 Mbps

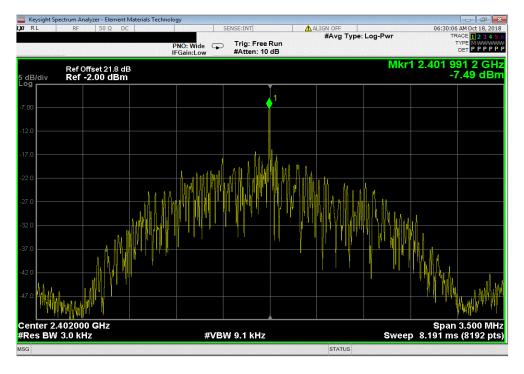
Value Limit

dBm/3kHz < dBm/3kHz Results

-13.25 8 Pass







Report No. STAK0144.1 47/67

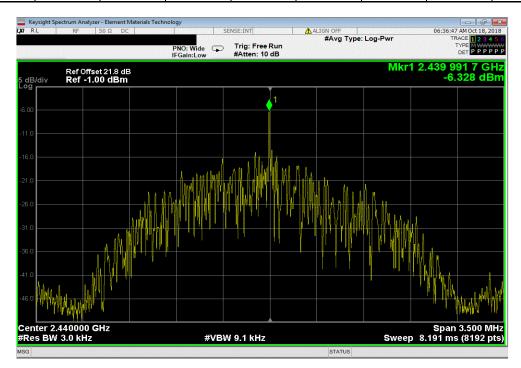


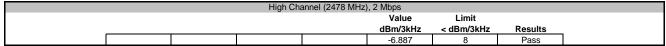
Mid Channel (2440 MHz), 2 Mbps

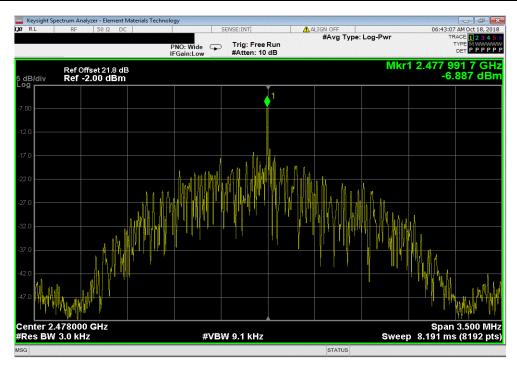
Value Limit

dBm/3kHz < dBm/3kHz Results

-6.328 8 Pass







Report No. STAK0144.1 48/67



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	E4422B	TGQ	15-Mar-18	15-Mar-21
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	7-Sep-18	7-Sep-19
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	19-Dec-17	19-Dec-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 2018.09.13	XMit 2017.12.13
	i Remote Microphone	9			Work Order		
Serial Number: 182	000364				Date	18-Oct-18	
Customer: Star	rkey Laboratories, Inc).			Temperature	22 °C	
Attendees: Cha	rlie Esch				Humidity	32.9% RH	
Project: Non	ne				Barometric Pres.	1024 mbar	
Tested by: Dus	stin Sparks		Power: B	atterv	Job Site	MN08	
TEST SPECIFICATIONS				est Method			
FCC 15.247:2018				NSI C63.10:2013			
			i i	10, 000, 10,2010			
COMMENTS							
None							
DEVIATIONS FROM TES	ST STANDARD						
None							
			100				
Configuration #	7		Justin	Dares			Į.
		Signature	- 0				
					Value	Limit	
					(dBc)	≤ (dBc)	Result
BLE, Low Channel (2402	MHz), 1 Mbps				-36.5	-20	Pass
BLE, High Channel (2480					-44.21	-20	Pass
Low Channel (2402 MHz)					-28.63	-20	Pass
High Channel (2478 MHz					-46.56	-20	Pass
riigii Chaillel (2476 MHZ	. j, z wibpa				-40.30	-20	1 455

Report No. STAK0144.1 50/67

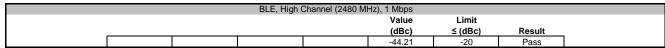


BLE, Low Channel (2402 MHz), 1 Mbps

Value Limit
(dBc) ≤ (dBc) Result

-36.5 -20 Pass







Report No. STAK0144.1 51/67

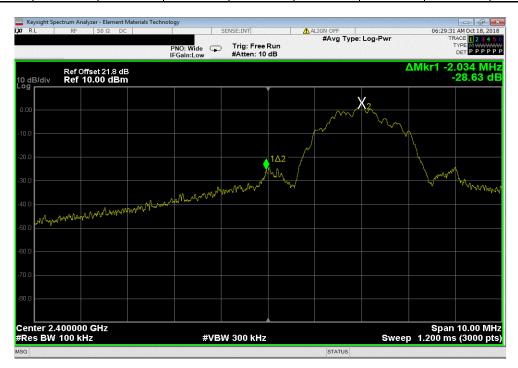


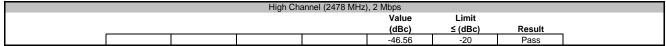
 Low Channel (2402 MHz), 2 Mbps

 Value
 Limit

 (dBc)
 ≤ (dBc)
 Result

 -28.63
 -20
 Pass







Report No. STAK0144.1 52/67



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	E4422B	TGQ	15-Mar-18	15-Mar-21
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	7-Sep-18	7-Sep-19
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	19-Dec-17	19-Dec-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.

Report No. STAK0144.1



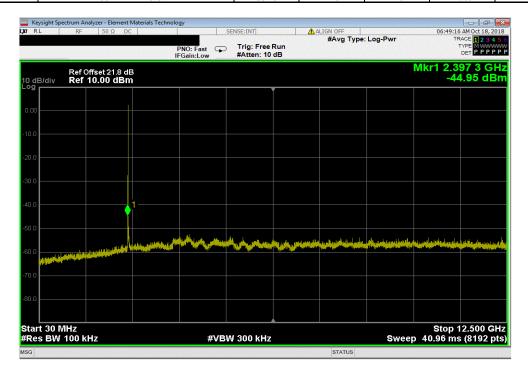
						TbtTx 2018.09.13	XMit 2017.12
	i Remote Microphone	e			Work Order:		
Serial Number: 182						18-Oct-18	
	rkey Laboratories, Inc	c.			Temperature:		
Attendees: Cha					Humidity:		
Project: Non					Barometric Pres.:		
Tested by: Dus			Power: Battery		Job Site:	MN08	
TEST SPECIFICATIONS	5		Test Method				
FCC 15.247:2018			ANSI C63.10:2013				
COMMENTS							
None							
DEVIATIONS FROM TES	ST STANDARD						
None							
Configuration #	7	Signature	Dustingowals				
			Frequency	Measured	Max Value	Limit	
			Range	Freq (MHz)	(dBc)	≤ (dBc)	Result
BLE, Low Channel (2402			Fundamental	2401.74	N/A	N/A	N/A
BLE, Low Channel (2402			30 MHz - 12.5 GHz	2397.34	-47.32	-20	Pass
BLE, Low Channel (2402			12.5 GHz - 25 GHz	23769.99	-52.85	-20	Pass
LE, Mid Channel (2440			Fundamental	2439.74	N/A	N/A	N/A
SLE, Mid Channel (2440			30 MHz - 12.5 GHz	4035.44	-55.92	-20	Pass
BLE, Mid Channel (2440			12.5 GHz - 25 GHz	23863.08	-54.24	-20	Pass
LE, High Channel (2480			Fundamental	2479.74	N/A	N/A	N/A
LE, High Channel (2480			30 MHz - 12.5 GHz 12.5 GHz - 25 GHz	2487.16 24087.41	-52.97 -53.11	-20	Pass
LE, High Channel (2480						-20	Pass
ow Channel (2402 MHz)			Fundamental	2402 2397.34	N/A	N/A	N/A
ow Channel (2402 MHz)			30 MHz - 12.5 GHz 12.5 GHz - 25 GHz	2397.34	-41.37 -53.02	-20	Pass
ow Channel (2402 MHz)						-20	Pass
lid Channel (2440 MHz)			Fundamental 30 MHz - 12.5 GHz	2440 3764.45	N/A -57.37	N/A	N/A Pass
Mid Channel (2440 MHz)			30 MHz - 12.5 GHz 12.5 GHz - 25 GHz	3764.45 24755.83		-20 -20	Pass
lid Channel (2440 MHz)			12.5 GHz - 25 GHz Fundamental	24755.83 2478	-54.45 N/A	-20 N/A	Pass N/A
ligh Channel (2478 MHz							
ligh Channel (2478 MHz	z), ∠ ivibps		30 MHz - 12.5 GHz	2490.2	-54.29	-20	Pass
ligh Channel (2478 MHz	·		12.5 GHz - 25 GHz	23708.95	-52.95	-20	Pass

Report No. STAK0144.1 54/67





	BLE, Low Channel (2402 MHz), 1 Mbps							
	Frequency	Measured	Max Value	Limit				
	Range	Freq (MHz)	(dBc)	≤ (dBc)	Result			
1	30 MHz - 12.5 GHz	2397.34	-47.32	-20	Pass			



Report No. STAK0144.1 55/67

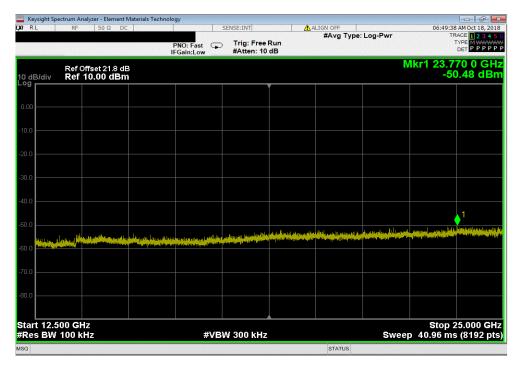


BLE, Low Channel (2402 MHz), 1 Mbps

Frequency Measured Max Value Limit

Range Freq (MHz) (dBc) ≤ (dBc) Result

12.5 GHz - 25 GHz 23769.99 -52.85 -20 Pass



	BLE, Mid Channel (2440 MHz), 1 Mbps									
	Frequency Measured Max Value Limit									
	Range	Freq (MHz)	(dBc)	≤ (dBc)	Result					
1	Fundamental	2439.74	N/A	N/A	N/A					



Report No. STAK0144.1 56/67

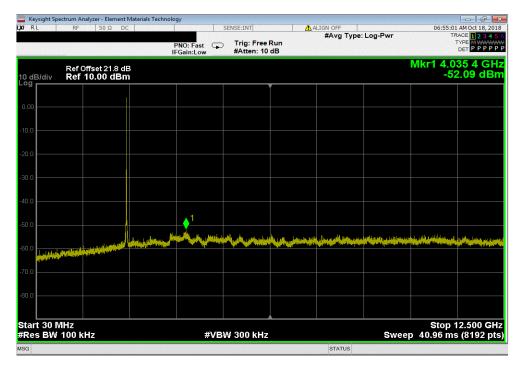


BLE, Mid Channel (2440 MHz), 1 Mbps

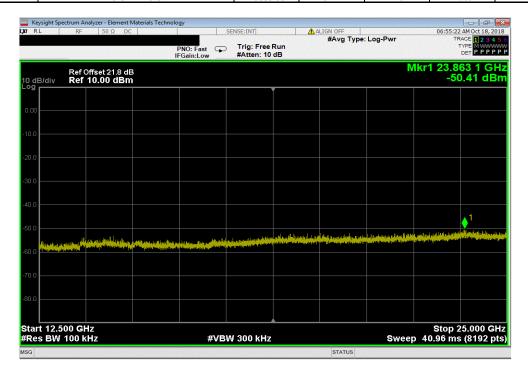
Frequency Measured Max Value Limit

Range Freq (MHz) (dBc) ≤ (dBc) Result

30 MHz - 12.5 GHz 4035.44 -55.92 -20 Pass



	BLE, Mid Channel (2440 MHz), 1 Mbps									
	Frequency	Limit								
_	Range	Freq (MHz)	(dBc)	≤ (dBc)	Result					
. [12.5 GHz - 25 GHz	23863.08	-54.24	-20	Pass					



Report No. STAK0144.1 57/67



BLE, High Channel (2480 MHz), 1 Mbps

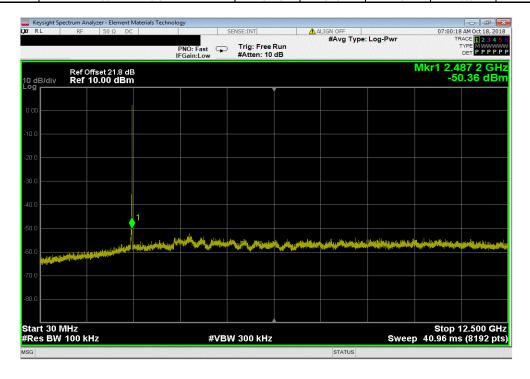
Frequency Measured Max Value Limit

Range Freq (MHz) (dBc) ≤ (dBc) Result

Fundamental 2479.74 N/A N/A N/A



BLE, High Channel (2480 MHz), 1 Mbps									
Frequency Measured Max Value Limit									
 Range	Freq (MHz)	(dBc)	≤ (dBc)	Result					
30 MHz - 12.5 GHz	2487.16	-52.97	-20	Pass					



Report No. STAK0144.1 58/67

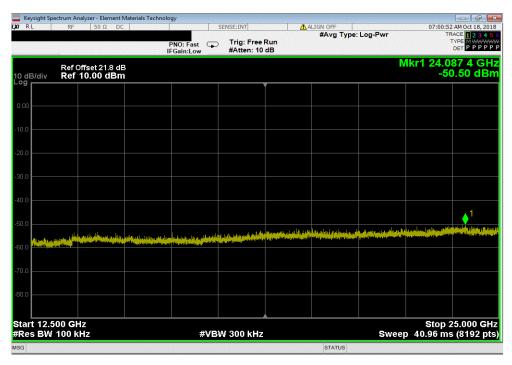


BLE, High Channel (2480 MHz), 1 Mbps

Frequency Measured Max Value Limit

Range Freq (MHz) (dBc) ≤ (dBc) Result

12.5 GHz - 25 GHz 24087.41 -53.11 -20 Pass



Low Channel (2402 MHz), 2 Mbps									
Frequency Measured Max Value Limit									
Range	Freq (MHz)	(dBc)	≤ (dBc)	Result					
Fundamental	2402	N/A	N/A	N/A					



Report No. STAK0144.1 59/67

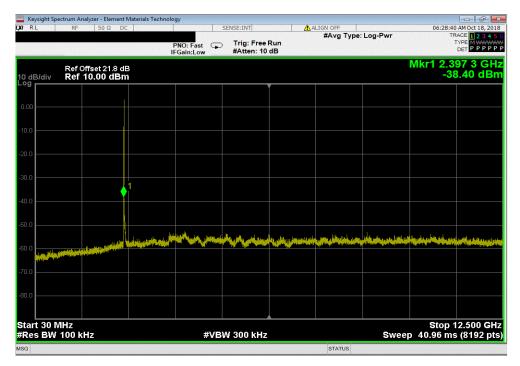


 Low Channel (2402 MHz), 2 Mbps

 Frequency
 Measured
 Max Value
 Limit

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

 30 MHz - 12.5 GHz
 2397.34
 -41.37
 -20
 Pass



	Low Channel (2402 MHz), 2 Mbps									
	Frequency Measured Max Value Limit									
	Range	Freq (MHz)	(dBc)	≤ (dBc)	Result					
1	12.5 GHz - 25 GHz	23936.33	-53.02	-20	Pass					



Report No. STAK0144.1 60/67



 Mid Channel (2440 MHz), 2 Mbps

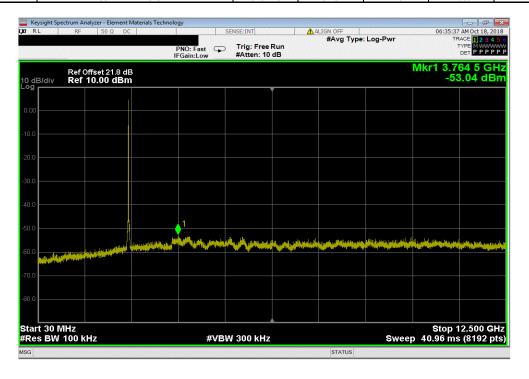
 Frequency
 Measured
 Max Value
 Limit

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

 Fundamental
 2440
 N/A
 N/A
 N/A



Mid Channel (2440 MHz), 2 Mbps									
Frequency Measured Max Value Limit									
 Range	Freq (MHz)	(dBc)	≤ (dBc)	Result					
30 MHz - 12.5 GHz	3764.45	-57.37	-20	Pass					



Report No. STAK0144.1 61/67

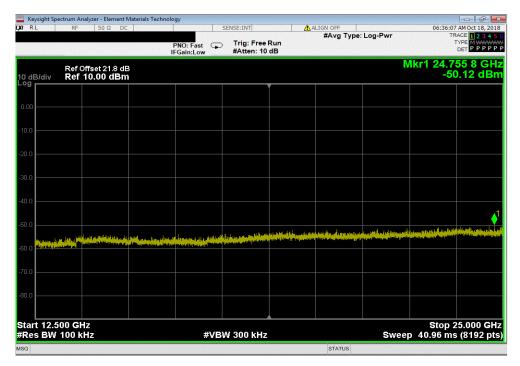


 Mid Channel (2440 MHz), 2 Mbps

 Frequency
 Measured
 Max Value
 Limit

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

 12.5 GHz - 25 GHz
 24755.83
 -54.45
 -20
 Pass



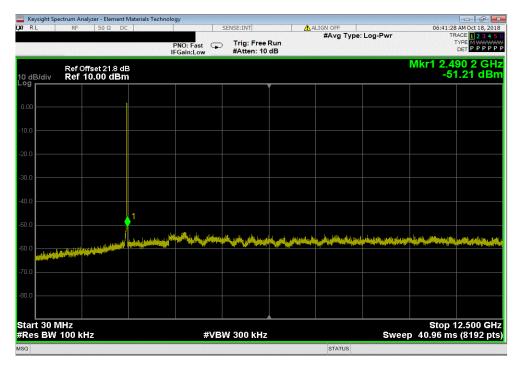
High Channel (2478 MHz), 2 Mbps									
Frequency Measured Max Value Limit									
Range	Freq (MHz)	(dBc)	≤ (dBc)	Result					
Fundamental	2478	N/A	N/A	N/A					



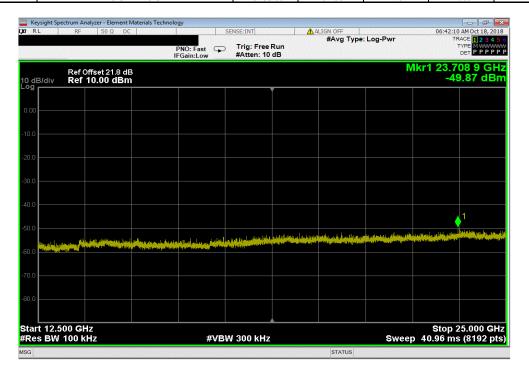
Report No. STAK0144.1 62/67



| High Channel (2478 MHz), 2 Mbps | Frequency | Measured | Max Value | Limit | Fange | Freq (MHz) | (dBc) | ≤ (dBc) | Result | 30 MHz - 12.5 GHz | 2490.2 | -54.29 | -20 | Pass |



	High Channel (2478 MHz), 2 Mbps									
	Frequency									
	Range	Freq (MHz)	(dBc)	≤ (dBc)	Result					
1	12.5 GHz - 25 GHz	23708.95	-52.95	-20	Pass					



Report No. STAK0144.1 63/67

SPURIOUS RADIATED EMISSIONS



PSA-ESCI 2018.07.27

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

Transmitting BLE - low channel (2402 MHz), mid channel (2440 MHz) and high channel (2480 MHz) at 1 Mbps; low channel (2402 MHz), mid channel (2440 MHz), and high channel (2476 MHz) at 2 Mbps. High Channel for 2 Mbps taken at 2478 MHz for harmonics.

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

STAK0144 - 5, STAK0144 -11

FREQUENCY RANGE INVESTIGATED

Start Frequency 30 MHz Stop Frequency 26500 MHz

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

231 EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
Attenuator	Coaxicom	3910-20	AXY	26-Sep-2018	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	HGG	26-Sep-2018	12 mo
Filter - High Pass	Micro-Tronics	HPM50111	HFM	26-Sep-2018	12 mo
Cable	ESM Cable Corp	TTBJ141 KMKM-72	MNP	12-Sep-2018	12 mo
Amplifier - Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	13-Sep-2018	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-09	AHG	NCR	0 mo
Amplifier - Pre-Amplifier	L-3 Narda-MITEQ	AMF-6F-12001800-30-10P	PAP	24-Feb-2018	12 mo
Cable	Element	Biconilog Cable	MNX	24-Feb-2018	12 mo
Cable	Element	Standard Gain Cable	MNW	24-Feb-2018	12 mo
Cable	Element	Double Ridge Guide Horn Cables	MNV	24-Feb-2018	12 mo
Antenna - Biconilog	ETS Lindgren	3142D	AXO	15-Dec-2017	24 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVX	24-Feb-2018	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	24-Feb-2018	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1064-9079 and SA18E-10	AOO	24-Feb-2018	12 mo
Antenna - Double Ridge	ETS-Lindgren	3115	AJQ	14-Nov-2016	24 mo
Antenna	ETS-Lindgren	3160-08	AJP	NCR	0 mo
Antenna	ETS-Lindgren	3160-07	AJJ	NCR	0 mo
Attenuator	Fairview Microwave	SA18E-20	TWZ	24-Sep-2018	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVT	13-Feb-2018	12 mo
Cable	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	24-Sep-2018	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AJA	27-Jun-2018	24 mo
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	27-Apr-2018	12 mo
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	26-Mar-2018	12 mo

MEASUREMENT BANDWIDTHS

Frequency Range	Peak Data	Quasi-Peak Data	Average Data
(MHz)	(kHz)	(kHz)	(kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

Report No. STAK0144.1 64/67

SPURIOUS RADIATED EMISSIONS



PSA-ESCI 2018.07.27

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).

Report No. STAK0144.1

SPURIOUS RADIATED EMISSIONS



Work Order: STAK0144 8-Jan-2019 Tusti Project: Job Site: Temperature: None MN09 and MN05 Humidity: 29.4% RH Tested by: Dustin Sparks Serial Number 182000364 and 182010339 Barometric Pres.: 1017 mbar ini Remote Microphone Configuration: and 11 (see comments) Customer: starkey Laboratories, Inc EUT Power: Battery Transmitting BLE - low channel (2402 MHz), mid channel (2440 MHz) and high channel (2480 MHz) at 1 Mbps; low channel (2402 MHz), mid Operating Mode channel (2440 MHz), and high channel (2476 MHz) at 2 Mbps. High Channel for 2 Mbps taken at 2478 MHz for harmonics. DCCF of 3.0 dB added to all 2 Mbps average points (based on 50% duty cycle.) DCCF of 2.2 added to all 1 Mbps average points (based on 60.6% duty cycle.) Worst case operating duty cycle is < 1% for 1 Mbps and 8% for 2 Mbps, so DCCF of -40 and -21.9 were added to the 1 and 2 Mbps points (respectively.) 1 Mbps mode set to tx power = -3. Configuration 11 only used for testing at the 2483.5 MHz band edge for Comments 2 Mbps, configuration 5 used for all other testing. The AJQ double ridge horn was used only for the harmonics measurements performed on 10/15/2018 and 10/16/2018 before the calibration expiration date. Test Method Test Specifications Run # 44 Test Distance (m) Antenna Height(s) 1 to 4(m) Results Pass 80 70 60 **dBuV/m** [₹] 30 20 ٠ 10 0 10 100 1000 10000 100000 MHz ■ PK ♦ AV Duty Cycle ction Fact Freq (MHz) Comments High ch, EUT vert, 1 Mbps 2483.533 238.0 20.0 0.0 73.1 -0.9 Horz Vert Vert Horz Vert 2484.237 45.1 1.0 1.6 1.7 1.0 1.0 1.1 2.4 1.0 3.8 1.1 2.6 116.0 20.0 0.0 0.0 0.0 0.0 61.0 -13.0 High Ch, EUT Horz PK PK PK PK PK PK PK PK PK AV PK AV High Ch, EUT Horz High Ch, EUT Vert Low ch, EUT Vert, 1 Mbps High Ch, EUT Vert High Ch, EUT Horz High Ch, EUT On Side 44.6 44.3 44.2 44.1 20.0 20.0 20.0 20.0 20.0 60.5 60.4 60.1 60.0 -13.5 -13.6 -13.9 -14.0 2484.140 329.0 2389.308 2485.360 2483.590 104.0 307.0 95.0 43.8 43.7 42.9 40.1 39.8 39.4 Horz Vert Horz Vert Horz Vert 59.7 59.6 54.5 52.2 51.9 51.5 2483.703 -4.1 -4.1 275.0 20.0 0.0 0.0 0.0 0.0 0.0 0.0 -14.3 -14.4 High Ch, EUT On Side High Ch, EUT On Side High ch, EUT on side, 2 Mbps Mid ch, EUT on side, 1 Mbps Mid ch, EUT on side, 2 Mbps Mid ch, EUT on side, 2 Mbps 2483 673 7434.167 7318.842 7321.225 11.6 12.1 12.1 12.1 12.1 317.0 153.0 201.0 96.0 -14.4 -19.5 -21.8 -22.1 -22.5 7320.408 0.0 20.0 0.0 0.0 20.0 Vert Vert Horz 0.0 0.0 0.0 0.0 54.0 74.0 74.0 54.0 Low ch, EUT vert, 2 Mbps High ch, EUT on side, 2 Mbps High ch, EUT on side, 2 Mbps High ch, EUT on side, 2 Mbps Low ch, EUT vert, 1 Mbps 2389.758 4954.817 32.5 45.2 -3.9 4.3 304.0 357.0 -18.9 29.7 49.5 -24.3 -24.5

Report No. STAK0144.1 66/67

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
4802.983	45.1	4.3	3.7	157.0		0.0	Vert	PK	0.0	49.4	74.0	-24.6	Low ch, EUT on side, 2 Mbps
2483.610	32.4	-4.1	1.0	275.0	-18.9	20.0	Horz	AV	0.0	29.4	54.0	-24.6	High ch, EUT on side, 2 Mbps
2485.143	32.4	-4.1	1.0	329.0	-18.9	20.0	Vert	AV	0.0	29.4	54.0	-24.6	High ch, EUT vert, 2 Mbps
2483.543	32.4	-4.1	1.0	116.0	-18.9	20.0	Horz	AV	0.0	29.4	54.0	-24.6	High ch, EUT horz, 2 Mbps
2483.813	32.3	-4.1	1.0	95.0	-18.9	20.0	Vert	AV	0.0	29.3	54.0	-24.7	High ch, EUT horz, 2 Mbps
2484.810	32.3	-4.1	1.0	268.9	-18.9	20.0	Vert	AV	0.0	29.3	54.0	-24.7	High ch, EUT on side, 2 Mbps
2485.147	32.3	-4.1	1.7	307.0	-18.9	20.0	Horz	AV	0.0	29.3	54.0	-24.7	High ch, EUT vert, 2 Mbps
4803.967	44.9	4.3	2.8	268.0		0.0	Horz	PK	0.0	49.2	74.0	-24.8	Low ch, EUT horz, 2 Mbps
4879.042	44.8	4.0	1.0	178.0		0.0	Vert	PK	0.0	48.8	74.0	-25.2	Mid ch, EUT on side, 2 Mbps
4957.600	44.0	4.3	1.9	308.9		0.0	Horz	PK	0.0	48.3	74.0	-25.7	High ch, EUT on side, 2 Mbps
4803.192	43.9	4.3	3.2	210.0		0.0	Horz	PK	0.0	48.2	74.0	-25.8	Low ch, EUT on side, 2 Mbps
12007.510	49.9	-1.8	2.3	164.0		0.0	Horz	PK	0.0	48.1	74.0	-25.9	Low ch, EUT on side, 2 Mbps
4802.808	43.6	4.3	2.0	194.0		0.0	Horz	PK	0.0	47.9	74.0	-26.1	Low ch, EUT vert, 2 Mbps
4802.783	42.7	4.3	1.0	132.0		0.0	Vert	PK	0.0	47.0	74.0	-27.0	Low ch, EUT vert, 2 Mbps
4880.042	42.2	4.0	1.1	353.0		0.0	Horz	PK	0.0	46.2	74.0	-27.8	Mid ch, EUT on side, 2 Mbps
4803.150	41.8	4.3	1.0	282.0		0.0	Vert	PK	0.0	46.1	74.0	-27.9	Low ch, EUT horz, 2 Mbps
12200.030	46.2	-0.2	1.3	285.0		0.0	Horz	PK	0.0	46.0	74.0	-28.0	Mid ch, EUT on side
12387.630	44.7	0.9	1.0	139.0		0.0	Vert	PK	0.0	45.6	74.0	-28.4	High ch, EUT on side, 2 Mbps
12202.480	44.2	-0.2	1.0	150.0		0.0	Vert	PK	0.0	44.0	74.0	-30.0	Mid ch, EUT on side
7434.058	31.1	11.6	1.1	317.0	-18.9	0.0	Horz	AV	0.0	23.8	54.0	-30.2	High ch, EUT on side, 2 Mbps
12009.870	44.4	-1.8	1.0	77.0		0.0	Vert	PK	0.0	42.6	74.0	-31.4	Low ch, EUT on side, 2 Mbps
7319.858	29.2	12.1	3.8	96.0	-18.9	0.0	Vert	AV	0.0	22.4	54.0	-31.6	Mid ch, EUT on side, 2 Mbps
7318.883	28.9	12.1	1.0	201.0	-18.9	0.0	Horz	AV	0.0	22.1	54.0	-31.9	Mid ch, EUT on side, 2 Mbps
4803.900	34.6	4.3	3.7	157.0	-18.9	0.0	Vert	AV	0.0	20.0	54.0	-34.0	Low ch, EUT on side, 2 Mbps
4804.000	34.6	4.3	1.0	132.0	-18.9	0.0	Vert	AV	0.0	20.0	54.0	-34.0	Low ch, EUT vert, 2 Mbps
4803.967	34.5	4.3	3.2	210.0	-18.9	0.0	Horz	AV	0.0	19.9	54.0	-34.1	Low ch, EUT on side, 2 Mbps
4803.958	34.2	4.3	2.8	268.0	-18.9	0.0	Horz	AV	0.0	19.6	54.0	-34.4	Low ch, EUT horz, 2 Mbps
4955.167	32.7	4.3	2.6	357.0	-18.9	0.0	Vert	AV	0.0	18.1	54.0	-35.9	High ch, EUT on side, 2 Mbps
12387.510	35.8	0.9	2.6	307.0	-18.9	0.0	Horz	AV	0.0	17.8	54.0	-36.2	High ch, EUT on side, 2 Mbps
4953.708	31.8	4.3	1.9	308.9	-18.9	0.0	Horz	AV	0.0	17.2	54.0	-36.8	High ch, EUT on side, 2 Mbps
4880.017	31.8	4.0	1.1	353.0	-18.9	0.0	Horz	AV	0.0	16.9	54.0	-37.1	Mid ch, EUT on side, 2 Mbps
4879.867	31.8	4.0	1.0	178.0	-18.9	0.0	Vert	AV	0.0	16.9	54.0	-37.1	Mid ch, EUT on side, 2 Mbps
12010.070	37.4	-1.7	2.3	164.0	-18.9	0.0	Horz	AV	0.0	16.8	54.0	-37.2	Low ch, EUT on side, 2 Mbps
4803.817	31.3	4.3	2.0	194.0	-18.9	0.0	Horz	AV	0.0	16.7	54.0	-37.3	Low ch, EUT vert, 2 Mbps
4804.017	30.7	4.3	1.0	282.0	-18.9	0.0	Vert	AV	0.0	16.1	54.0		Low ch, EUT horz, 2 Mbps
12197.610	34.2	-0.2	1.3	285.0	-18.9	0.0	Horz	AV	0.0	15.1	54.0		Mid ch, EUT on side
12197.540	32.7	-0.2	1.0	150.0	-18.9	0.0	Vert	AV	0.0	13.6	54.0		Mid ch, EUT on side
12387.620	31.1	0.9	1.0	139.0	-18.9	0.0	Vert	AV	0.0	13.1	54.0	-40.9	High ch, EUT on side, 2 Mbps
2484.000	34.5	-4.2	1.0	238.0	-37.8	20.0	Vert	AV	0.0	12.5	54.0	-41.5	High ch, EUT vert, 1 Mbps
12007.510	32.8	-1.8	1.0	77.0	-18.9	0.0	Vert	AV	0.0	12.1	54.0		Low ch, EUT on side, 2 Mbps
7319.067	29.4	12.1	2.4	153.0	-37.8	0.0	Vert	AV	0.0	3.7	54.0	-50.3	High ch, EUT on side, 1 Mbps
1013.001	25.7	12.1	2.7	100.0	-07.0	0.0	VOIL	A. v	0.0	5.7	54.0	-30.0	riigii sii, 23 f off side, f Mops

Report No. STAK0144.1 67/67