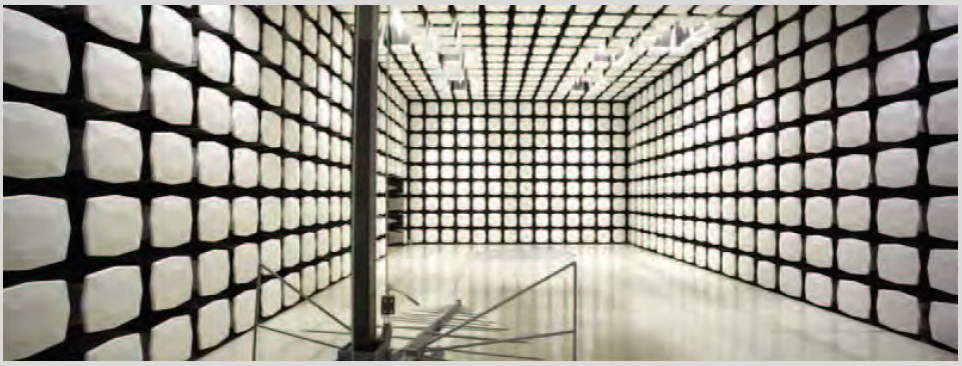
Starkey Laboratories, Inc.

BTE 13 Hearing Aid

Models: Halo B13; A3i B13; Start 10i B13; Start 9i B13

FCC 15.247:2014

Report # STAK0041



NVLAP Lab Code: 200881-0

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NORTHWEST EMC

WTD 13.9.30

CERTIFICATE OF TEST

Last Date of Test: October 14, 2014
Starkey Laboratories, Inc.
BTE 13 Hearing Aid
Models: Halo B13; A3i B13; Start 10i B13; Start 9i B13

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2014	ANSI C63.10:2009

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	AC Powerline Conducted Emissions	No	N/A	Not required for a battery powered EUT.
6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	
6.7	Band Edge Compliance	No	Pass	
6.7	Spurious Conducted Emissions	No	Pass	
6.9.1	Occupied Bandwidth	Yes	Pass	
6.10.2	Output Power	Yes	Pass	
6.11.2	Power Spectral Density	Yes	Pass	
7.5	Duty Cycle	Yes	Pass	

Deviations From Test Standards

None

Approved By:

Tim O'Shea, 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.

NORTHWEST EMC
REV 2012.08.02

REVISION HISTORY

Revision Number	Description	Date	Page Number
00	None		

Barometric Pressure

The recorded barometric pressure has been normalized to sea level.

REV 2014.08.11

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 Guide 65 as a product certifier. This allows Northwest EMC to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

IC - Recognized by Industry Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with IC.

European Union

European Commission – Validated by the European Commission as a Conformity Assessment Body (CAB) under the EMC directive and as a Notified Body under the R&TTE Directive.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

MSIP / 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

OFTA – Recognized by OFTA 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:
http://www.nwemc.com/accreditations/

MEASUREMENT UNCERTAINTY

Measurement Uncertainty

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

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) for each test is on each data sheet. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-1 as applicable), and are available upon request.

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

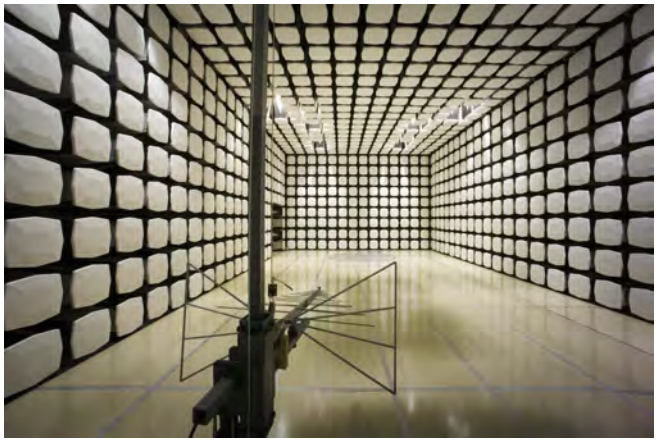
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.12	-0.01
Amplitude Accuracy (dB)	0.49	-0.49
Conducted Power (dB)	0.41	-0.41
Radiated Power via Substitution (dB)	0.69	-0.68
Temperature (degrees C)	0.81	-0.81
Humidity (% RH)	2.89	-2.89
Field Strength (dB)	4.00	-4.00
AC Powerline Conducted Emissions (dB)	2.70	-2.70

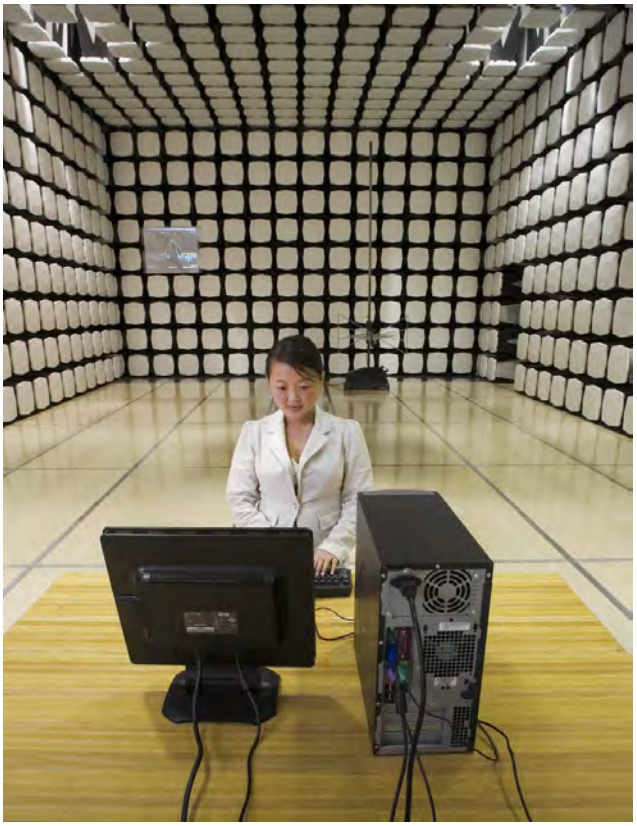
NORTHWEST EMC

REV 2013.06.28

FACILITIES

Oregon	California	New York	Minnesota	Washington
Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 685-0796	Labs MN01-08 9349 W Broadway Ave. Brooklyn Park, MN 55445 (763) 425-2281	Labs NC01-05,SU02,SU07 19201 120th Ave. NE Bothell, WA 98011 (425) 984-6600
VCCI				
A-0108	A-0029		A-0109	A-0110
Industry Canada				
2834D-1, 2834D-2	2834B-1, 2834B-2, 2834B-3		2834E-1	2834F-1
NVLAP				
NVLAP Lab Code: 200630-0	NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200629-0





PRODUCT DESCRIPTION

WTD 13.9.30

Client and Equipment Under Test (EUT) Information

Company Name:	Starkey Laboratories, Inc.
Address:	6600 Washington Ave S.
City, State, Zip:	Eden Prairie, MN 55344
Test Requested By:	Bill Mitchell
Model:	Halo B13; A3i B13; Start 10i B13; Start 9i B13
First Date of Test:	September 25, 2014
Last Date of Test:	October 14, 2014
Receipt Date of Samples:	September 25, 2014
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Hearing Aid with Bluetooth Low Energy radio.

Client Provided Information:
These hearing aid models are electrically and physically identical; the only difference is that they are sold under different model names.

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

CONFIGURATIONS

Configuration STAK0041- 2

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Hearing Aid	Starkey Laboratories, Inc.	BTE 13 Hearing Aid	14889332

Configuration STAK0041- 4

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Hearing Aid	Starkey Laboratories, Inc.	BTE 13 Hearing Aid	14673920

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	9/25/2014	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	9/29/2014	Duty Cycle	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
3	9/29/2014	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
4	9/29/2014	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
5	9/29/2014	Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.
6	10/14/2014	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
7	10/14/2014	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

SPURIOUS RADIATED EMISSIONS

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 ADV at 2402, 2426, and 2480 MHz; BLE DATA at 2404, 2442, and 2478 MHz.

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

STAK0041 - 2

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

Description	Manufacturer	Model	ID	Last Cal.	Interval
High Pass Filter	Micro-Tronics	HPM50111	HGQ	5/15/2014	24 mo
Attenuator, 20 dB, 'SMA'	SM Electronics	SA6-20	REO	5/15/2014	12 mo
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	9/26/2013	14 mo
MN05 Cables	N/A	18-26GHz Standard Gain Horn Cable	MNP	9/26/2013	14 mo
Antenna, Horn	ETS	3160-09	AHG	NCR	0 mo
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVW	3/14/2014	12 mo
Antenna, Horn	ETS Lindgren	3160-08	AIQ	NCR	0 mo
MN05 Cables	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	3/14/2014	12 mo
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	3/14/2014	12 mo
Antenna, Horn	ETS	3160-07	AXP	NCR	0 mo
Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVX	3/14/2014	12 mo
MN05 Cables	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	3/14/2014	12 mo
Antenna, Horn	ETS	3115	AJA	6/3/2014	24 mo
Pre-Amplifier	Miteq	AM-1616-1000	PAD	3/14/2014	12 mo
MN05 Cables	ESM Cable Corp.	Bilog Cables	MNH	3/14/2014	12 mo
Antenna, Biconilog	Teseq	CBL 6141B	AYD	12/17/2013	24 mo
Spectrum Analyzer	Agilent	N9010A	AFI	1/27/2013	24 mo

MEASUREMENT BANDWIDTHS

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

TEST DESCRIPTION

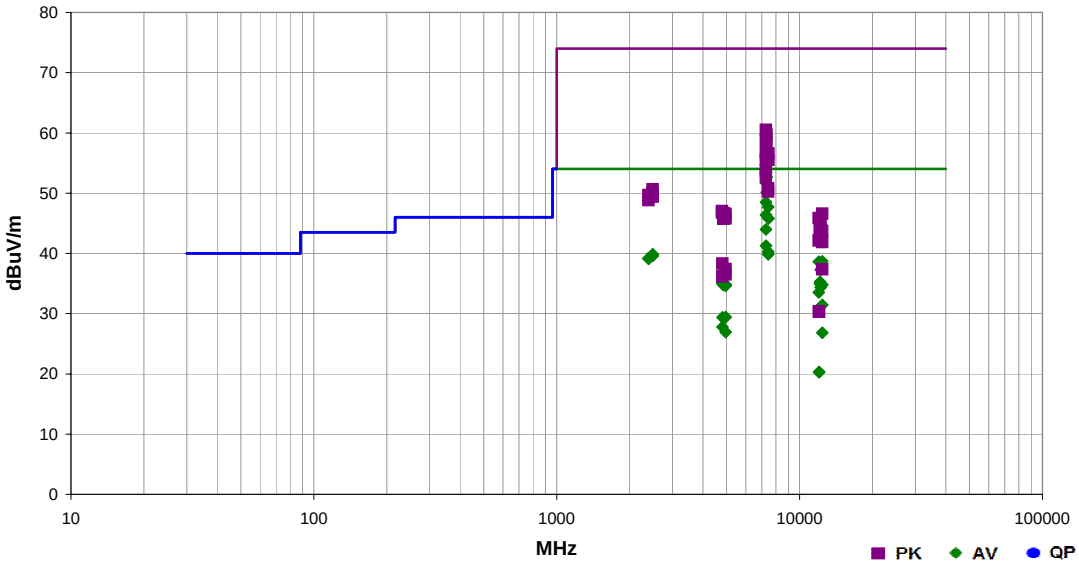
The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization. A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

SPURIOUS RADIATED EMISSIONS

Work Order:	STAK0041	**Date:**	09/25/14		
Project:	None	**Temperature:**	22.5 °C		
Job Site:	MN05	**Humidity:**	48.7% RH		
Serial Number:	14889332	**Barometric Pres.:**	1024.7 mbar	**Tested by:**	Dustin Sparks, Trevor Buls
EUT:	BTE 13 Hearing Aid				
Configuration:	2				
Customer:	Starkey Laboratories, Inc.				
Attendees:	Bob France				
EUT Power:	Battery				
Operating Mode:	Transmitting BLE ADV at 2402, 2426, and 2480 MHz; BLE DATA at 2404, 2442, and 2478 MHz.				
Deviations:	None				
Comments:	None				

Test Specifications	**Test Method**
FCC 15.247:2014	ANSI C63.10:2009

Run #	13	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7277.350	41.4	12.1	1.0	231.0	3.0	0.0	Horz	AV	0.0	53.5	54.0	-0.5	BLE ADV, mid channel, EUT on side
7325.475	40.3	12.4	1.0	42.0	3.0	0.0	Horz	AV	0.0	52.7	54.0	-1.3	BLE DATA, mid channel, EUT on side
7277.417	39.6	12.1	1.0	219.0	3.0	0.0	Horz	AV	0.0	51.7	54.0	-2.3	BLE ADV, mid channel, EUT horz
7325.517	37.7	12.4	1.0	125.0	3.0	0.0	Vert	AV	0.0	50.1	54.0	-3.9	BLE DATA, mid channel, EUT vert
7277.575	36.4	12.1	1.0	343.0	3.0	0.0	Vert	AV	0.0	48.5	54.0	-5.5	BLE ADV, mid channel, EUT vert
7439.325	34.7	13.0	1.0	57.0	3.0	0.0	Horz	AV	0.0	47.7	54.0	-6.3	BLE ADV, high channel, EUT on side
7277.375	34.3	12.1	2.3	268.0	3.0	0.0	Vert	AV	0.0	46.4	54.0	-7.6	BLE ADV, mid channel, EUT on side
7439.533	32.8	13.0	1.8	108.0	3.0	0.0	Vert	AV	0.0	45.8	54.0	-8.2	BLE ADV, high channel, EUT vert
7277.650	31.9	12.1	1.0	271.0	3.0	0.0	Vert	AV	0.0	44.0	54.0	-10.0	BLE ADV, mid channel, EUT horz
7277.133	29.2	12.1	1.0	168.0	3.0	0.0	Horz	AV	0.0	41.3	54.0	-12.7	BLE ADV, mid channel, EUT vert
7278.458	48.4	12.1	1.0	231.0	3.0	0.0	Horz	PK	0.0	60.5	74.0	-13.5	BLE ADV, mid channel, EUT on side
7433.300	27.3	13.0	1.7	311.0	3.0	0.0	Vert	AV	0.0	40.3	54.0	-13.7	BLE DATA, high channel, EUT vert
7433.340	26.9	13.0	1.0	311.9	3.0	0.0	Horz	AV	0.0	39.9	54.0	-14.1	BLE DATA, high channel, EUT on side
2488.325	22.8	-3.0	1.0	123.1	3.0	20.0	Horz	AV	0.0	39.8	54.0	-14.2	BLE ADV, high channel, EUT horz
2488.067	22.7	-3.0	1.0	330.9	3.0	20.0	Vert	AV	0.0	39.7	54.0	-14.3	BLE ADV, high channel, EUT horz
2484.658	22.7	-3.0	1.0	161.0	3.0	20.0	Horz	AV	0.0	39.7	54.0	-14.3	BLE ADV, high channel, EUT on side
2484.425	22.7	-3.0	2.3	195.1	3.0	20.0	Horz	AV	0.0	39.7	54.0	-14.3	BLE DATA, high channel, EUT horz
2484.067	22.7	-3.0	1.0	249.0	3.0	20.0	Vert	AV	0.0	39.7	54.0	-14.3	BLE ADV, high channel, EUT vert
7326.817	47.3	12.4	1.0	42.0	3.0	0.0	Horz	PK	0.0	59.7	74.0	-14.3	BLE DATA, mid channel, EUT on side
2484.650	22.6	-3.0	1.0	72.0	3.0	20.0	Vert	AV	0.0	39.6	54.0	-14.4	BLE ADV, high channel, EUT on side
2484.633	22.6	-3.0	1.0	183.0	3.0	20.0	Horz	AV	0.0	39.6	54.0	-14.4	BLE ADV, high channel, EUT vert
2388.992	22.5	-3.3	2.8	315.8	3.0	20.0	Horz	AV	0.0	39.2	54.0	-14.8	BLE DATA, low channel, EUT horz
2387.483	22.4	-3.3	2.8	315.9	3.0	20.0	Horz	AV	0.0	39.1	54.0	-14.9	BLE ADV, low channel, EUT horz
7278.917	46.7	12.1	1.0	219.0	3.0	0.0	Horz	PK	0.0	58.8	74.0	-15.2	BLE ADV, mid channel, EUT horz
12399.090	43.1	-4.4	1.3	339.0	3.0	0.0	Horz	AV	0.0	38.7	54.0	-15.3	BLE ADV, high channel, EUT on side
12008.970	44.1	-5.5	1.2	236.9	3.0	0.0	Horz	AV	0.0	38.6	54.0	-15.4	BLE ADV, low channel, EUT on side
7325.433	46.0	12.4	1.0	125.0	3.0	0.0	Vert	PK	0.0	58.4	74.0	-15.6	BLE DATA, mid channel, EUT vert
12208.990	42.3	-5.0	1.0	128.0	3.0	0.0	Vert	AV	0.0	37.3	54.0	-16.7	BLE DATA, mid channel, EUT vert
7279.267	44.6	12.1	1.0	343.0	3.0	0.0	Vert	PK	0.0	56.7	74.0	-17.3	BLE ADV, mid channel, EUT vert
7440.092	43.6	13.0	1.0	57.0	3.0	0.0	Horz	PK	0.0	56.6	74.0	-17.4	BLE ADV, high channel, EUT on side
4884.075	31.5	5.0	1.3	138.1	3.0	0.0	Horz	AV	0.0	36.5	54.0	-17.5	BLE DATA, mid channel, EUT on side
4803.867	30.9	5.5	1.0	103.0	3.0	0.0	Horz	AV	0.0	36.4	54.0	-17.6	BLE ADV, low channel, EUT on side
7278.167	43.4	12.1	2.3	268.0	3.0	0.0	Vert	PK	0.0	55.5	74.0	-18.5	BLE ADV, mid channel, EUT on side
7440.017	42.5	13.0	1.8	108.0	3.0	0.0	Vert	PK	0.0	55.5	74.0	-18.5	BLE ADV, high channel, EUT vert

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
12128.900	40.2	-4.9	1.0	311.0	3.0	0.0	Vert	AV	0.0	35.3	54.0	-18.7	BLE ADV, mid channel, EUT vert
4801.800	29.5	5.5	2.4	243.9	3.0	0.0	Vert	AV	0.0	35.0	54.0	-19.0	BLE ADV, low channel, EUT vert
4884.192	30.0	5.0	2.2	355.9	3.0	0.0	Vert	AV	0.0	35.0	54.0	-19.0	BLE DATA, mid channel, EUT vert
12129.100	39.9	-4.9	1.0	137.1	3.0	0.0	Horz	AV	0.0	35.0	54.0	-19.0	BLE ADV, mid channel, EUT on side
4851.650	29.7	5.2	1.4	97.0	3.0	0.0	Horz	AV	0.0	34.9	54.0	-19.1	BLE ADV, mid channel, EUT on side
4959.758	29.9	4.9	2.5	285.0	3.0	0.0	Vert	AV	0.0	34.8	54.0	-19.2	BLE ADV, high channel, EUT vert
12398.850	39.2	-4.4	1.0	98.1	3.0	0.0	Vert	AV	0.0	34.8	54.0	-19.2	BLE ADV, high channel, EUT vert
4851.792	29.5	5.2	1.0	229.0	3.0	0.0	Vert	AV	0.0	34.7	54.0	-19.3	BLE ADV, mid channel, EUT vert
4962.050	29.7	4.9	1.8	329.0	3.0	0.0	Horz	AV	0.0	34.6	54.0	-19.4	BLE ADV, high channel, EUT on side
12208.900	39.4	-5.0	1.4	76.1	3.0	0.0	Horz	AV	0.0	34.4	54.0	-19.6	BLE DATA, mid channel, EUT vert
7277.142	41.7	12.1	1.0	271.0	3.0	0.0	Vert	PK	0.0	53.8	74.0	-20.2	BLE ADV, mid channel, EUT horz
12008.830	39.0	-5.5	1.0	103.0	3.0	0.0	Vert	AV	0.0	33.5	54.0	-20.5	BLE ADV, low channel, EUT vert
7276.300	40.6	12.1	1.0	168.0	3.0	0.0	Horz	PK	0.0	52.7	74.0	-21.3	BLE ADV, mid channel, EUT vert
12388.830	35.9	-4.5	1.1	153.0	3.0	0.0	Horz	AV	0.0	31.4	54.0	-22.6	BLE DATA, high channel, EUT on side
7433.370	37.8	13.0	1.0	311.9	3.0	0.0	Horz	PK	0.0	50.8	74.0	-23.2	BLE DATA, high channel, EUT on side
2486.042	33.6	-3.0	1.0	330.9	3.0	20.0	Vert	PK	0.0	50.6	74.0	-23.4	BLE ADV, high channel, EUT horz
7433.385	37.3	13.0	1.7	311.0	3.0	0.0	Vert	PK	0.0	50.3	74.0	-23.7	BLE DATA, high channel, EUT vert
2485.475	33.0	-3.0	2.3	195.1	3.0	20.0	Horz	PK	0.0	50.0	74.0	-24.0	BLE DATA, high channel, EUT horz
2485.467	32.9	-3.0	1.0	183.0	3.0	20.0	Horz	PK	0.0	49.9	74.0	-24.1	BLE ADV, high channel, EUT vert
2486.525	32.7	-3.0	1.0	72.0	3.0	20.0	Vert	PK	0.0	49.7	74.0	-24.3	BLE ADV, high channel, EUT on side
2485.808	32.7	-3.0	1.0	123.1	3.0	20.0	Horz	PK	0.0	49.7	74.0	-24.3	BLE ADV, high channel, EUT horz
2389.408	33.0	-3.3	2.8	315.8	3.0	20.0	Horz	PK	0.0	49.7	74.0	-24.3	BLE DATA, low channel, EUT horz
2484.767	32.5	-3.0	1.0	249.0	3.0	20.0	Vert	PK	0.0	49.5	74.0	-24.5	BLE ADV, high channel, EUT vert
2486.850	32.4	-3.0	1.0	161.0	3.0	20.0	Horz	PK	0.0	49.4	74.0	-24.6	BLE ADV, high channel, EUT on side
4955.610	24.5	4.9	1.0	135.0	3.0	0.0	Vert	AV	0.0	29.4	54.0	-24.6	BLE DATA, high channel, EUT vert
4807.545	23.9	5.5	1.0	326.9	3.0	0.0	Horz	AV	0.0	29.4	54.0	-24.6	BLE DATA, low channel, EUT on side
2387.658	32.1	-3.3	2.8	315.9	3.0	20.0	Horz	PK	0.0	48.8	74.0	-25.2	BLE ADV, low channel, EUT horz
4807.575	22.3	5.5	1.0	346.0	3.0	0.0	Vert	AV	0.0	27.8	54.0	-26.2	BLE DATA, low channel, EUT vert
4803.650	41.5	5.5	1.0	103.0	3.0	0.0	Horz	PK	0.0	47.0	74.0	-27.0	BLE ADV, low channel, EUT on side
4955.560	22.0	4.9	1.0	152.1	3.0	0.0	Horz	AV	0.0	26.9	54.0	-27.1	BLE DATA, high channel, EUT on side
12388.870	31.3	-4.5	1.0	264.0	3.0	0.0	Vert	AV	0.0	26.8	54.0	-27.2	BLE DATA, high channel, EUT vert
4802.825	41.2	5.5	2.4	243.9	3.0	0.0	Vert	PK	0.0	46.7	74.0	-27.3	BLE ADV, low channel, EUT vert
4884.017	41.6	5.0	1.3	138.1	3.0	0.0	Horz	PK	0.0	46.6	74.0	-27.4	BLE DATA, mid channel, EUT on side
4854.050	41.4	5.2	1.4	97.0	3.0	0.0	Horz	PK	0.0	46.6	74.0	-27.4	BLE ADV, mid channel, EUT on side
12398.680	51.0	-4.4	1.3	339.0	3.0	0.0	Horz	PK	0.0	46.6	74.0	-27.4	BLE ADV, high channel, EUT on side
4959.258	41.6	4.9	1.8	329.0	3.0	0.0	Horz	PK	0.0	46.5	74.0	-27.5	BLE ADV, high channel, EUT on side
12008.780	51.3	-5.5	1.2	236.9	3.0	0.0	Horz	PK	0.0	45.8	74.0	-28.2	BLE ADV, low channel, EUT on side
4883.242	40.8	5.0	2.2	355.9	3.0	0.0	Vert	PK	0.0	45.8	74.0	-28.2	BLE DATA, mid channel, EUT vert
4958.958	40.9	4.9	2.5	285.0	3.0	0.0	Vert	PK	0.0	45.8	74.0	-28.2	BLE ADV, high channel, EUT vert
4853.042	40.5	5.2	1.0	229.0	3.0	0.0	Vert	PK	0.0	45.7	74.0	-28.3	BLE ADV, mid channel, EUT vert
12208.780	50.7	-5.0	1.0	128.0	3.0	0.0	Vert	PK	0.0	45.7	74.0	-28.3	BLE DATA, mid channel, EUT vert
12130.080	48.9	-4.9	1.0	311.0	3.0	0.0	Vert	PK	0.0	44.0	74.0	-30.0	BLE ADV, mid channel, EUT vert
12208.900	48.9	-5.0	1.4	76.1	3.0	0.0	Horz	PK	0.0	43.9	74.0	-30.1	BLE DATA, mid channel, EUT vert
12129.080	48.8	-4.9	1.0	137.1	3.0	0.0	Horz	PK	0.0	43.9	74.0	-30.1	BLE ADV, mid channel, EUT on side
12398.690	48.1	-4.4	1.0	98.1	3.0	0.0	Vert	PK	0.0	43.7	74.0	-30.3	BLE ADV, high channel, EUT vert
12011.900	47.6	-5.5	1.0	103.0	3.0	0.0	Vert	PK	0.0	42.1	74.0	-31.9	BLE ADV, low channel, EUT vert
12390.200	46.3	-4.5	1.1	153.0	3.0	0.0	Horz	PK	0.0	41.8	74.0	-32.2	BLE DATA, high channel, EUT on side
12021.170	25.7	-5.4	3.3	340.9	3.0	0.0	Vert	AV	0.0	20.3	54.0	-33.7	BLE DATA, low channel, EUT vert
12019.370	25.7	-5.4	1.0	137.1	3.0	0.0	Horz	AV	0.0	20.3	54.0	-33.7	BLE DATA, low channel, EUT on side
4807.580	32.8	5.5	1.0	326.9	3.0	0.0	Horz	PK	0.0	38.3	74.0	-35.7	BLE DATA, low channel, EUT on side
4956.155	32.5	4.9	1.0	135.0	3.0	0.0	Vert	PK	0.0	37.4	74.0	-36.6	BLE DATA, high channel, EUT vert
12390.200	41.8	-4.5	1.0	264.0	3.0	0.0	Vert	PK	0.0	37.3	74.0	-36.7	BLE DATA, high channel, EUT vert
4956.160	31.6	4.9	1.0	152.1	3.0	0.0	Horz	PK	0.0	36.5	74.0	-37.5	BLE DATA, high channel, EUT on side
4807.830	30.7	5.5	1.0	346.0	3.0	0.0	Vert	PK	0.0	36.2	74.0	-37.8	BLE DATA, low channel, EUT vert
12020.480	35.8	-5.4	1.0	137.1	3.0	0.0	Horz	PK	0.0	30.4	74.0	-43.6	BLE DATA, low channel, EUT on side
12019.680	35.7	-5.4	3.3	340.9	3.0	0.0	Vert	PK	0.0	30.3	74.0	-43.7	BLE DATA, low channel, EUT vert

BAND EDGE COMPLIANCE

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.	Interval
Power Sensor	Agilent	N8481A	SQN	8/22/2014	12
Power Meter	Agilent	N1913A	SQL	8/22/2014	12
Attenuator - 20db, 'SMA'	SM Electronics	SA26B-20	RFW	4/3/2014	12
40 GHz DC Block	Fairview Microwave	SD3379	AMI	10/2/2014	12
G MW Analog Signal Generator 40 (	Agilent	N5183A	TID	9/26/2014	36
Spectrum Analyzer	Agilent	E4440A	AAX	4/28/2014	12

TEST DESCRIPTION

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 measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. 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.

BAND EDGE COMPLIANCE

EUT:	BTE 13 Hearing Aid			**Work Order:**	STAK0041
Serial Number:	14673920			**Date:**	10/14/14
Customer:	Starkey Laboratories, Inc.			**Temperature:**	22.7°C
Attendees:	Bob France			**Humidity:**	39%
Project:	None			**Barometric Pres.:**	1013.5
Tested by:	Trevor Buls	**Power:**	Battery	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2014	ANSI C63.10:2009

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

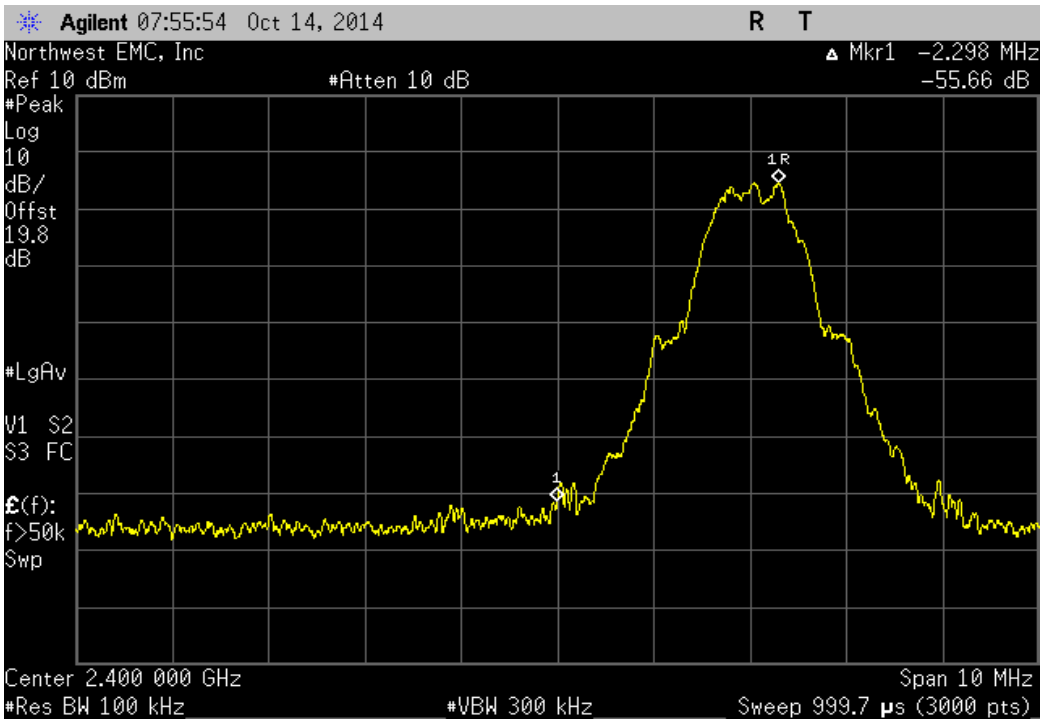
None

Configuration #	4	Signature Trevor Buls

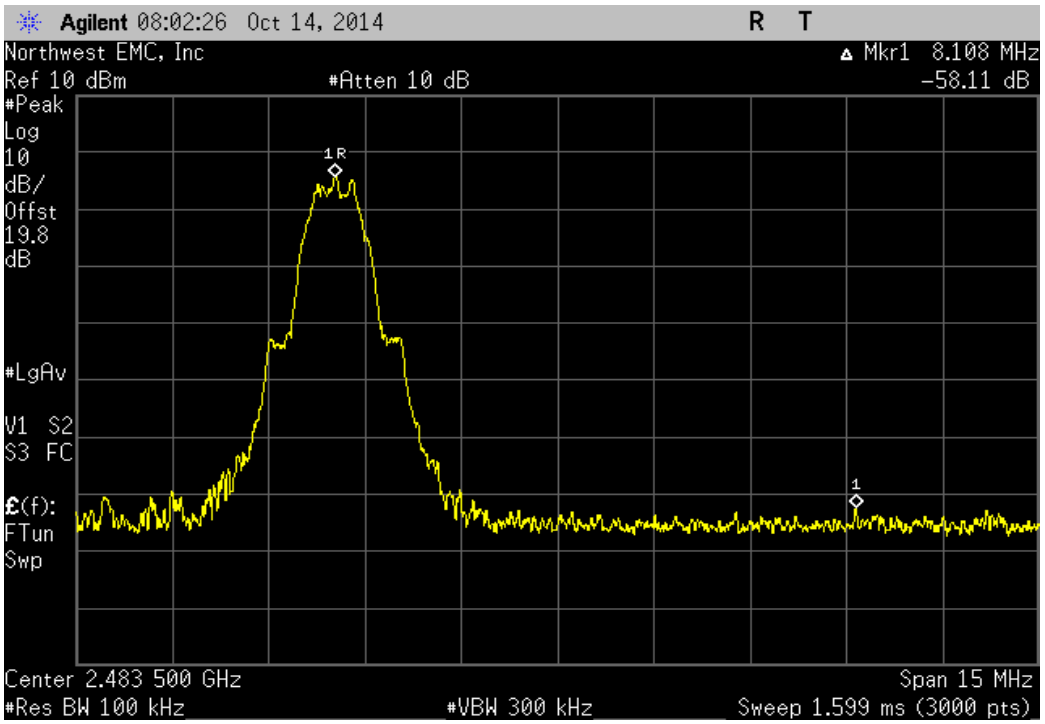
		Value (dBc)	Limit ≤ (dBc)	Result
BLE - Advertising				
	Low Channel, 2402 MHz	-55.66	-20	Pass
	High Channel, 2480 MHz	-58.11	-20	Pass
BLE - Data				
	Low Channel, 2404 MHz	-58.25	-20	Pass
	High Channel, 2478 MHz	-56.32	-20	Pass

BAND EDGE COMPLIANCE

BLE - Advertising, Low Channel, 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-55.66	-20	Pass

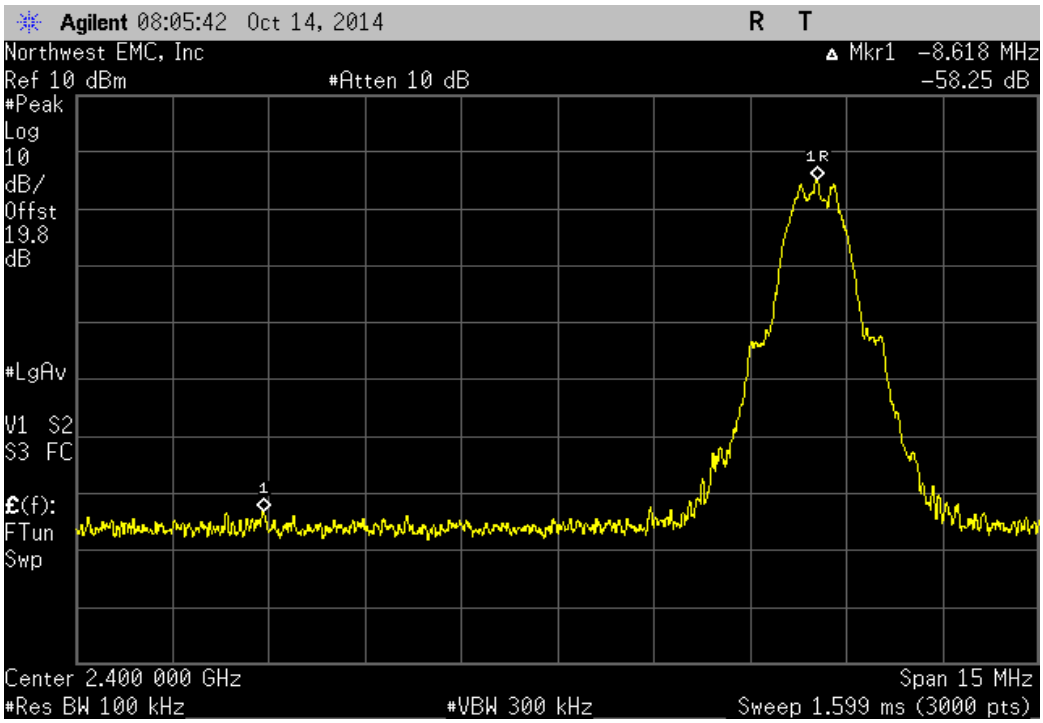


BLE - Advertising, High Channel, 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-58.11	-20	Pass

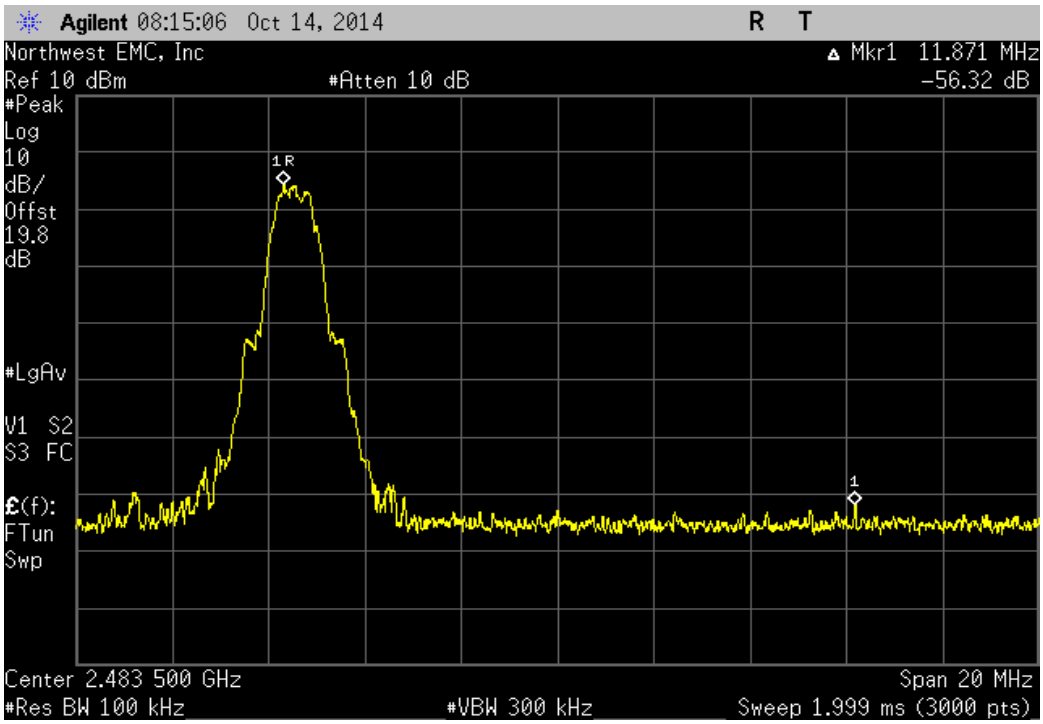


BAND EDGE COMPLIANCE

BLE - Data, Low Channel, 2404 MHz							
					Value (dBc)	Limit ≤ (dBc)	Result
					-58.25	-20	Pass



BLE - Data, High Channel, 2478 MHz							
					Value (dBc)	Limit ≤ (dBc)	Result
					-56.32	-20	Pass



SPURIOUS CONDUCTED EMISSIONS

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.	Interval
Attenuator - 20db, 'SMA'	SM Electronics	SA26B-20	RFW	4/3/2014	12
40 GHz DC Block	Fairview Microwave	SD3379	AMI	10/2/2014	12
Power Sensor	Agilent	N8481A	SQN	8/22/2014	12
Power Meter	Agilent	N1913A	SQL	8/22/2014	12
G MW Analog Signal Generator 40	Agilent	N5183A	TID	9/26/2014	36
Spectrum Analyzer	Agilent	E4440A	AAX	4/28/2014	12

TEST DESCRIPTION

The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. 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.

SPURIOUS CONDUCTED EMISSIONS

EUT:	BTE 13 Hearing Aid			**Work Order:**	STAK0041
Serial Number:	14673920			**Date:**	10/14/14
Customer:	Starkey Laboratories, Inc.			**Temperature:**	22.7°C
Attendees:	Bob France			**Humidity:**	39%
Project:	None			**Barometric Pres.:**	1013.5
Tested by:	Trevor Buls	**Power:**	Battery	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2014	ANSI C63.10:2009

COMMENTS

None

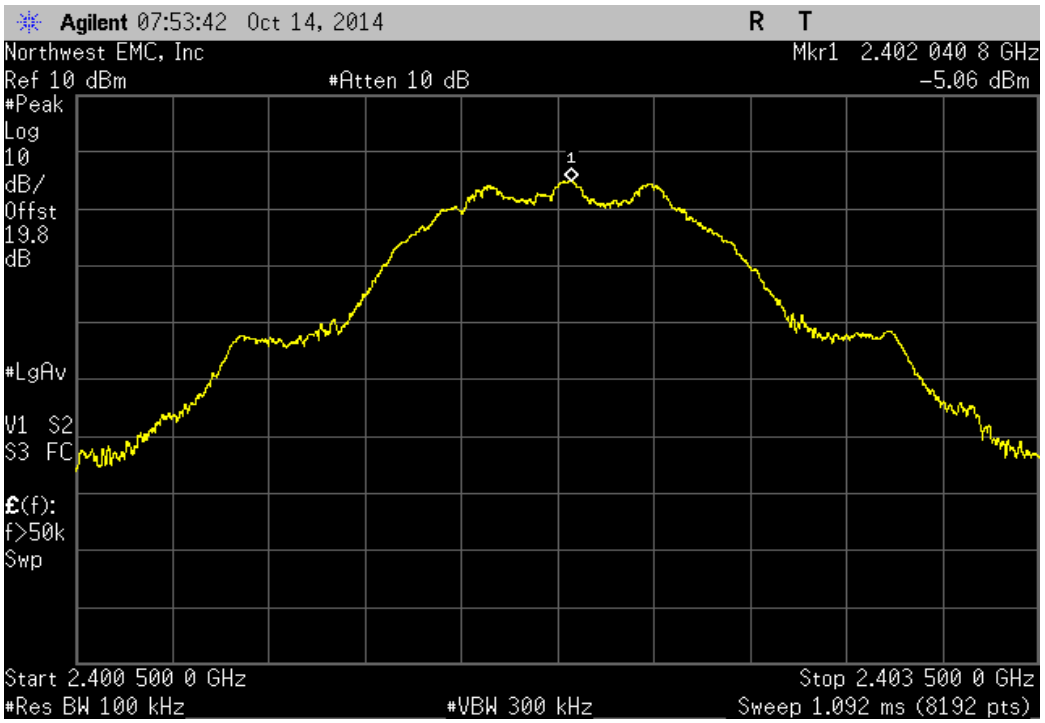
DEVIATIONS FROM TEST STANDARD

None

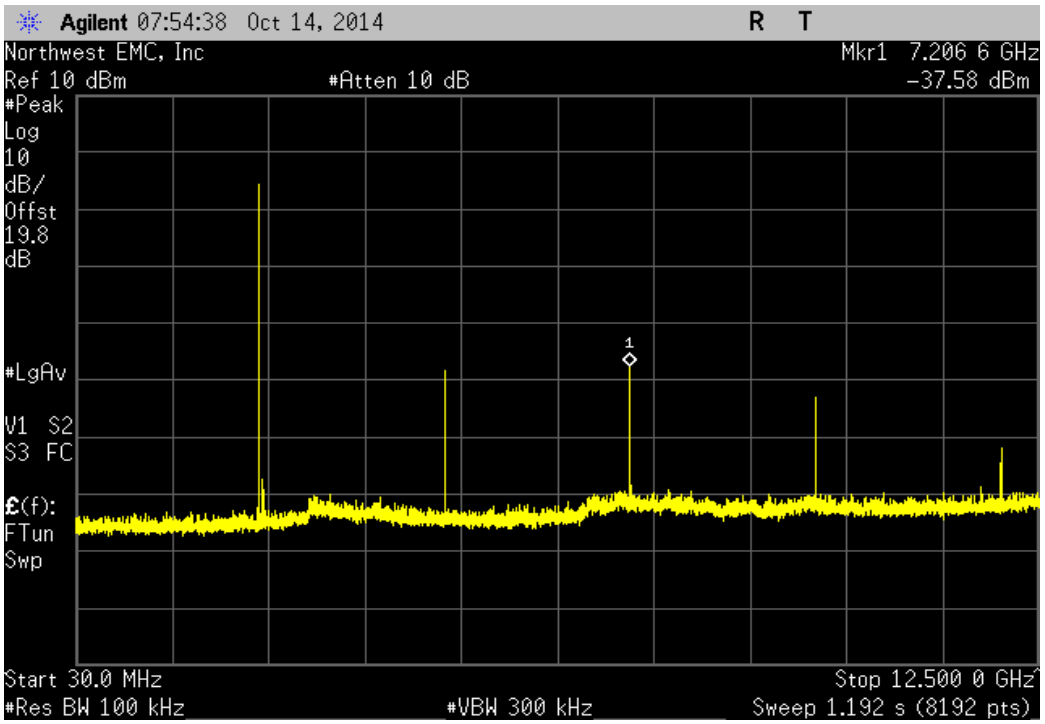
Configuration #	4	Signature	Trevor Buls

		Frequency Range	Value (dBc)	Limit ≤ (dBc)	Result
BLE - Advertising					
	Low Channel, 2402 MHz	Fundamental	N/A	N/A	N/A
	Low Channel, 2402 MHz	30 MHz - 12.5 GHz	-32.52	-20	Pass
	Low Channel, 2402 MHz	12.5 GHz - 25 GHz	-49.59	-20	Pass
	Mid Channel, 2426 MHz	Fundamental	N/A	N/A	N/A
	Mid Channel, 2426 MHz	30 MHz - 12.5 GHz	-32.25	-20	Pass
	Mid Channel, 2426 MHz	12.5 GHz - 25 GHz	-50	-20	Pass
	High Channel, 2480 MHz	Fundamental	N/A	N/A	N/A
	High Channel, 2480 MHz	30 MHz - 12.5 GHz	-28.77	-20	Pass
	High Channel, 2480 MHz	12.5 GHz - 25 GHz	-50.37	-20	Pass
BLE - Data					
	Low Channel, 2404 MHz	Fundamental	N/A	N/A	N/A
	Low Channel, 2404 MHz	30 MHz - 12.5 GHz	-29.5	-20	Pass
	Low Channel, 2404 MHz	12.5 GHz - 25 GHz	-48.98	-20	Pass
	Mid Channel, 2442 MHz	Fundamental	N/A	N/A	N/A
	Mid Channel, 2442 MHz	30 MHz - 12.5 GHz	-31.41	-20	Pass
	Mid Channel, 2442 MHz	12.5 GHz - 25 GHz	-49.21	-20	Pass
	High Channel, 2478 MHz	Fundamental	N/A	N/A	N/A
	High Channel, 2478 MHz	30 MHz - 12.5 GHz	-31.13	-20	Pass
	High Channel, 2478 MHz	12.5 GHz - 25 GHz	-50.34	-20	Pass

BLE - Advertising, Low Channel, 2402 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A

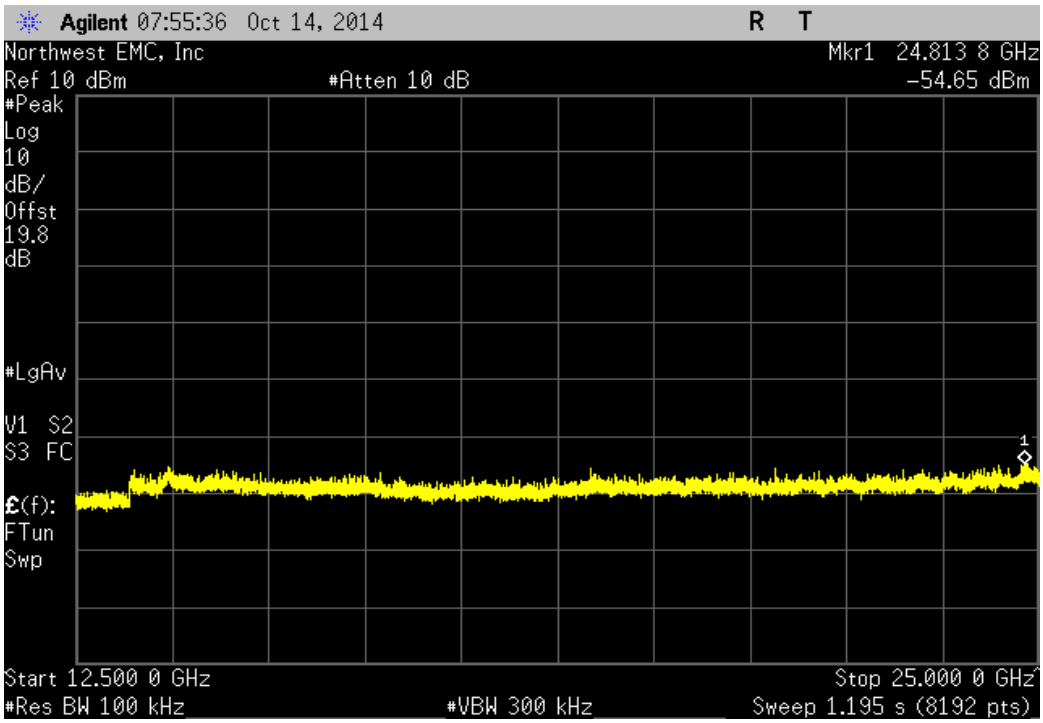


BLE - Advertising, Low Channel, 2402 MHz					
Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-32.52	-20	Pass

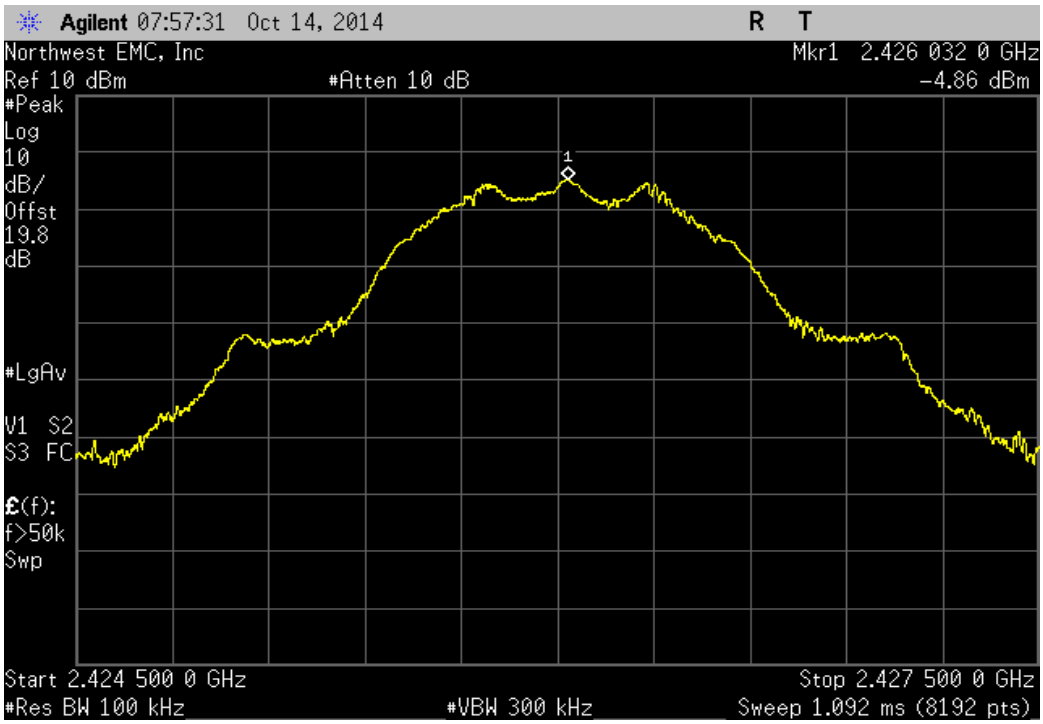


SPURIOUS CONDUCTED EMISSIONS

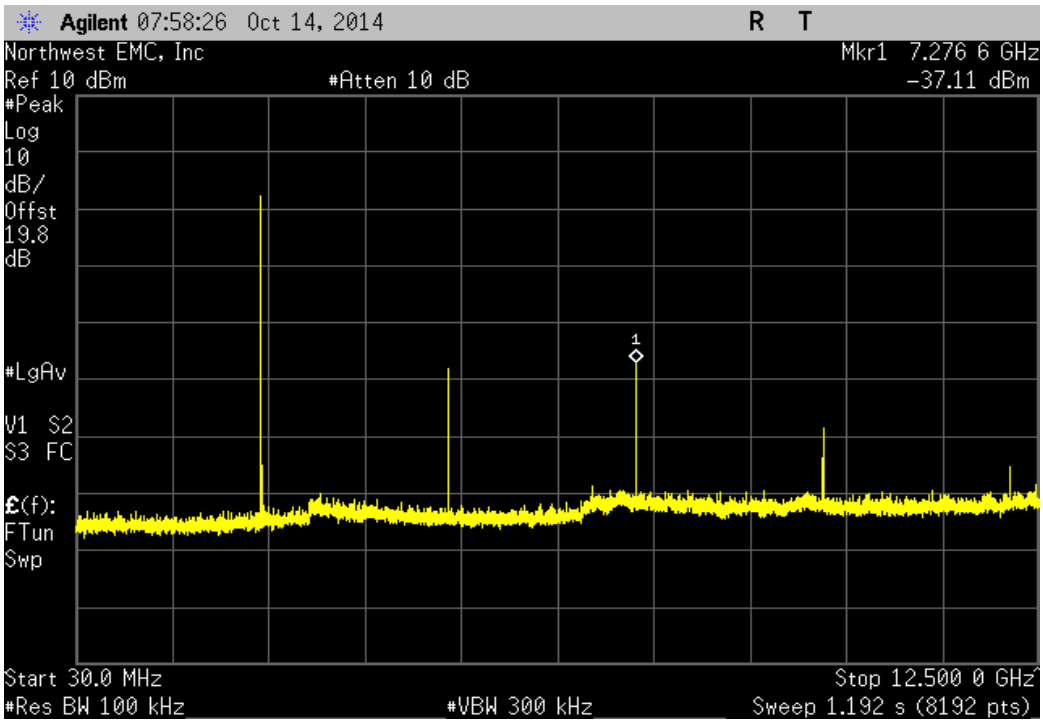
BLE - Advertising, Low Channel, 2402 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-49.59	-20	Pass



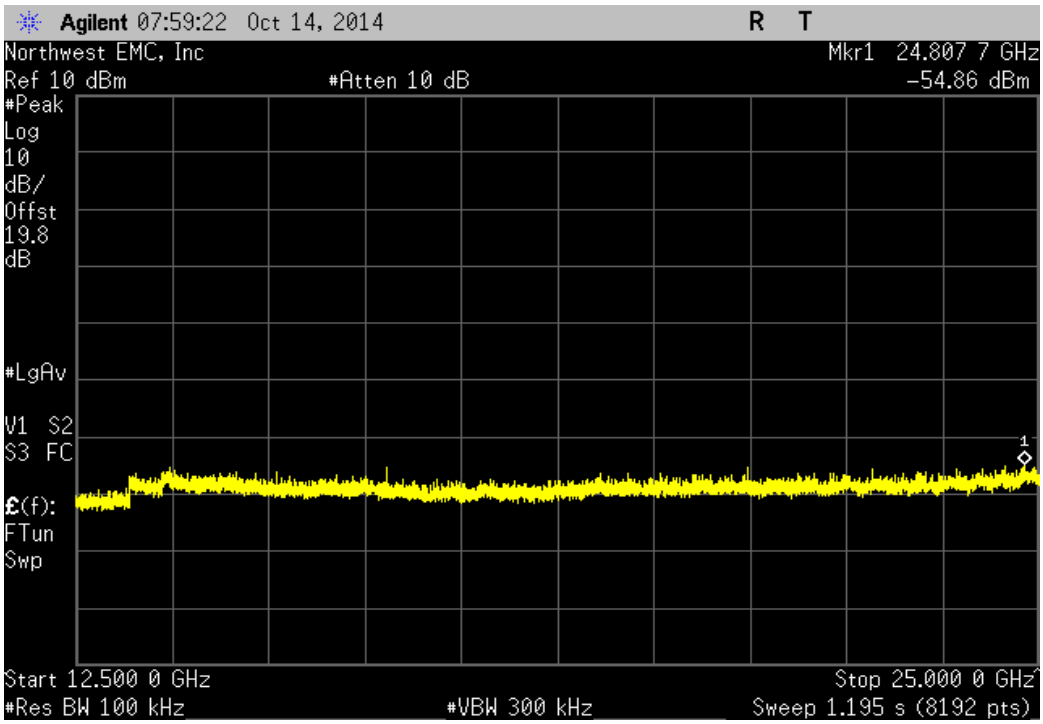
BLE - Advertising, Mid Channel, 2426 MHz						
	Frequency Range			**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
	Fundamental			N/A	N/A	N/A



BLE - Advertising, Mid Channel, 2426 MHz				
Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz		-32.25	-20	Pass

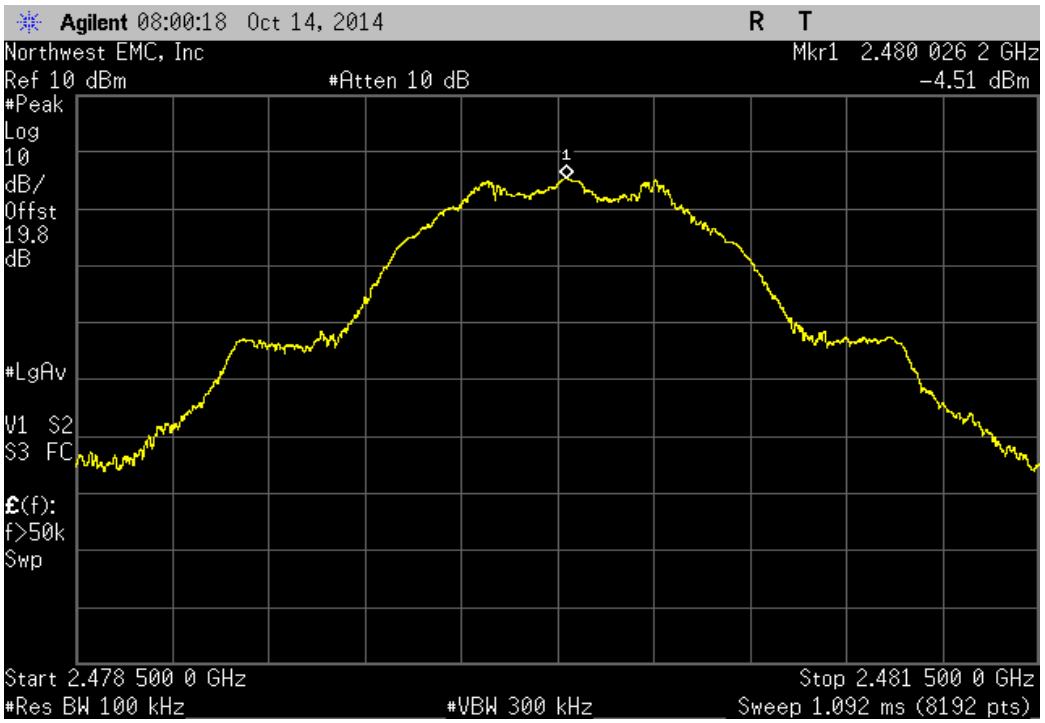


BLE - Advertising, Mid Channel, 2426 MHz				
Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz		-50	-20	Pass

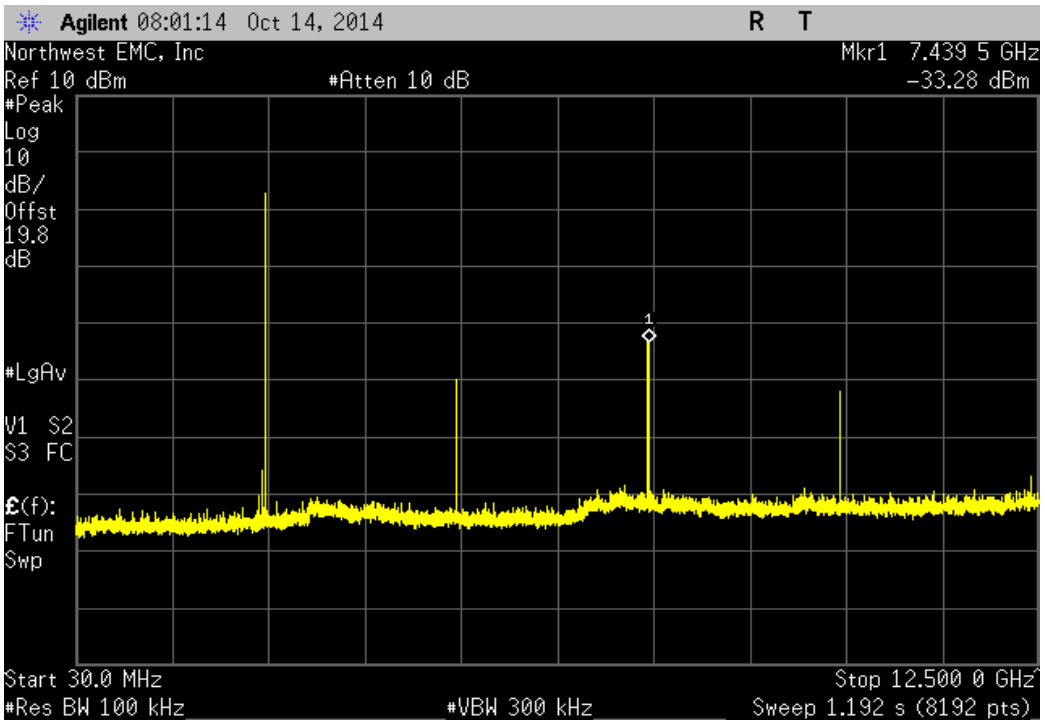


SPURIOUS CONDUCTED EMISSIONS

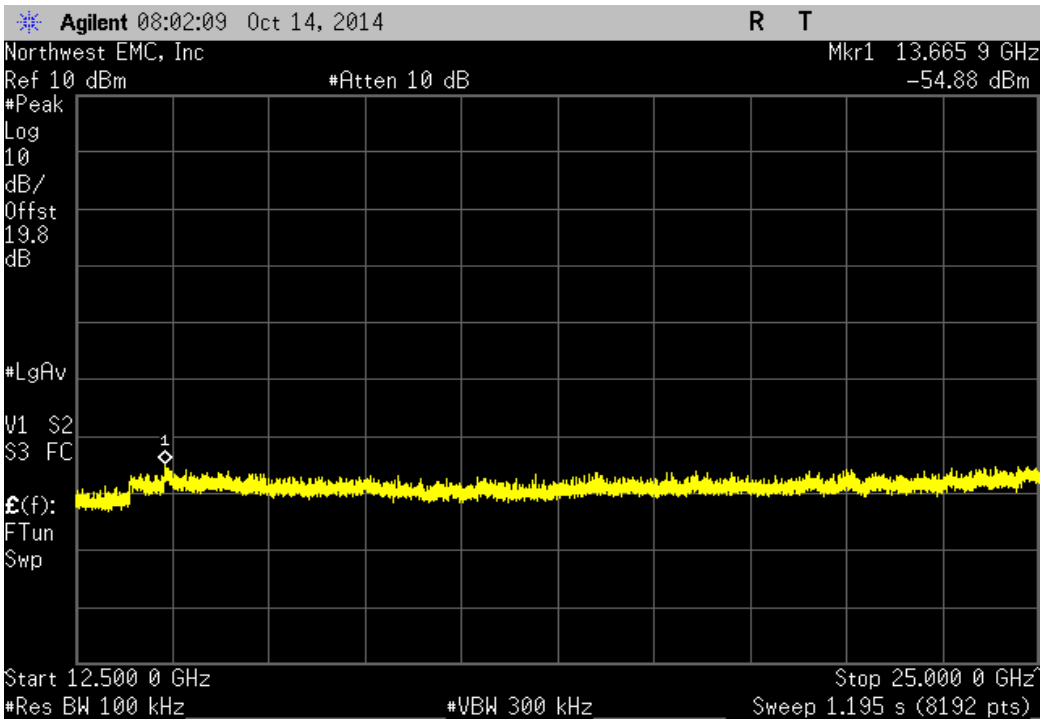
BLE - Advertising, High Channel, 2480 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



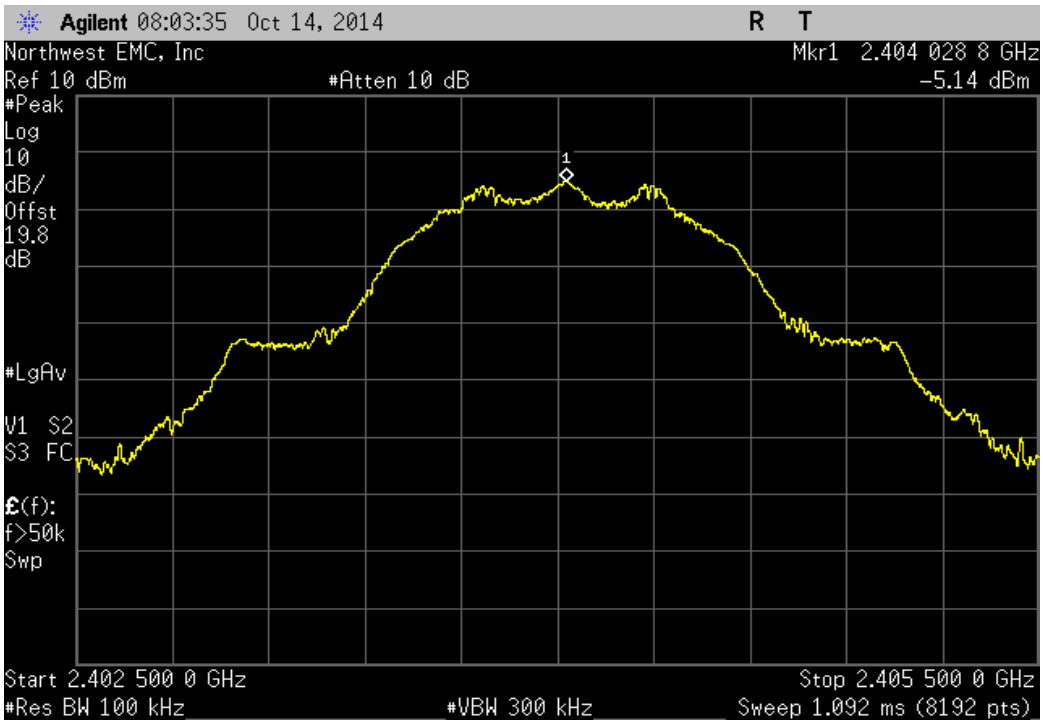
BLE - Advertising, High Channel, 2480 MHz					
Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz		-28.77	-20	Pass	



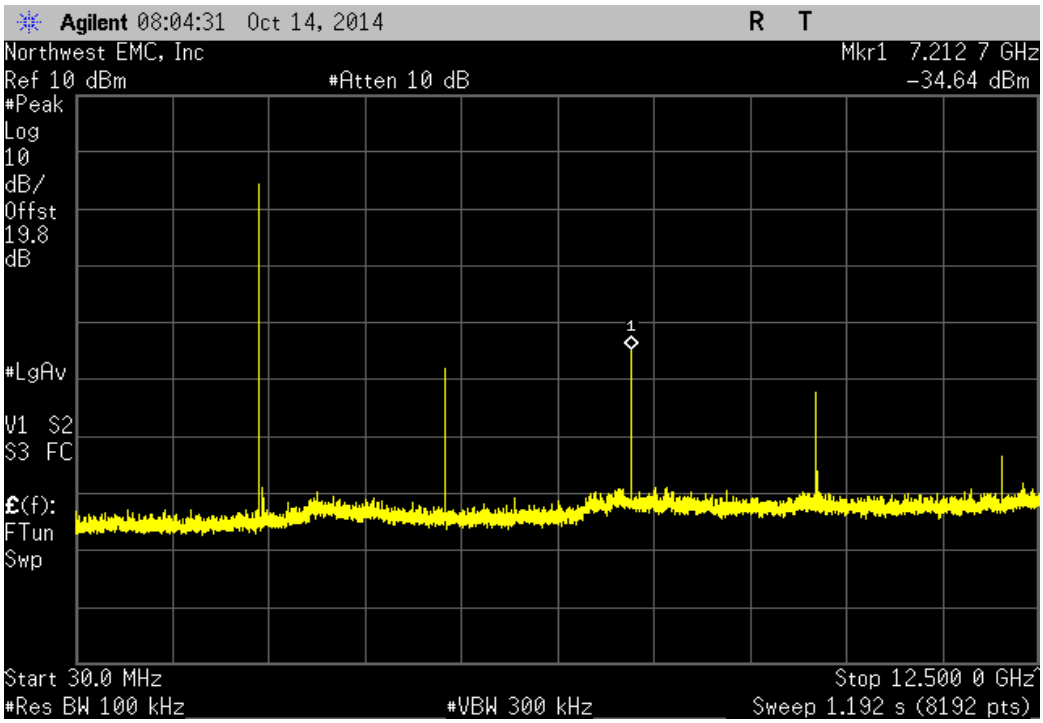
BLE - Advertising, High Channel, 2480 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-50.37	-20	Pass



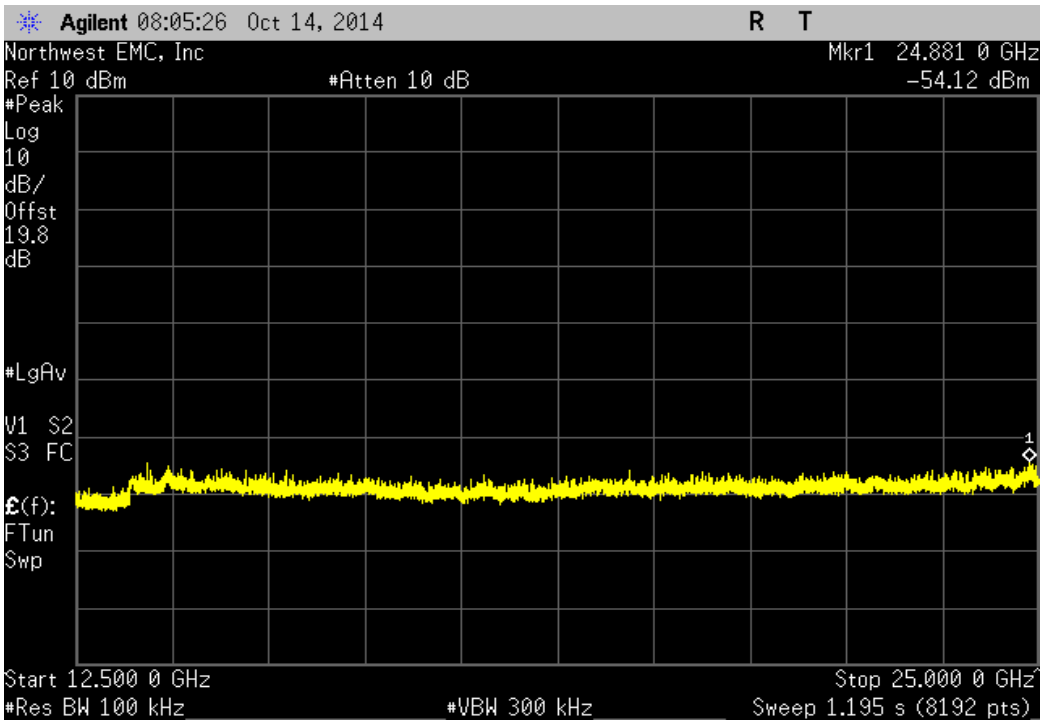
BLE - Data, Low Channel, 2404 MHz						
	Frequency Range			**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
	Fundamental			N/A	N/A	N/A



BLE - Data, Low Channel, 2404 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz		-29.5	-20	Pass

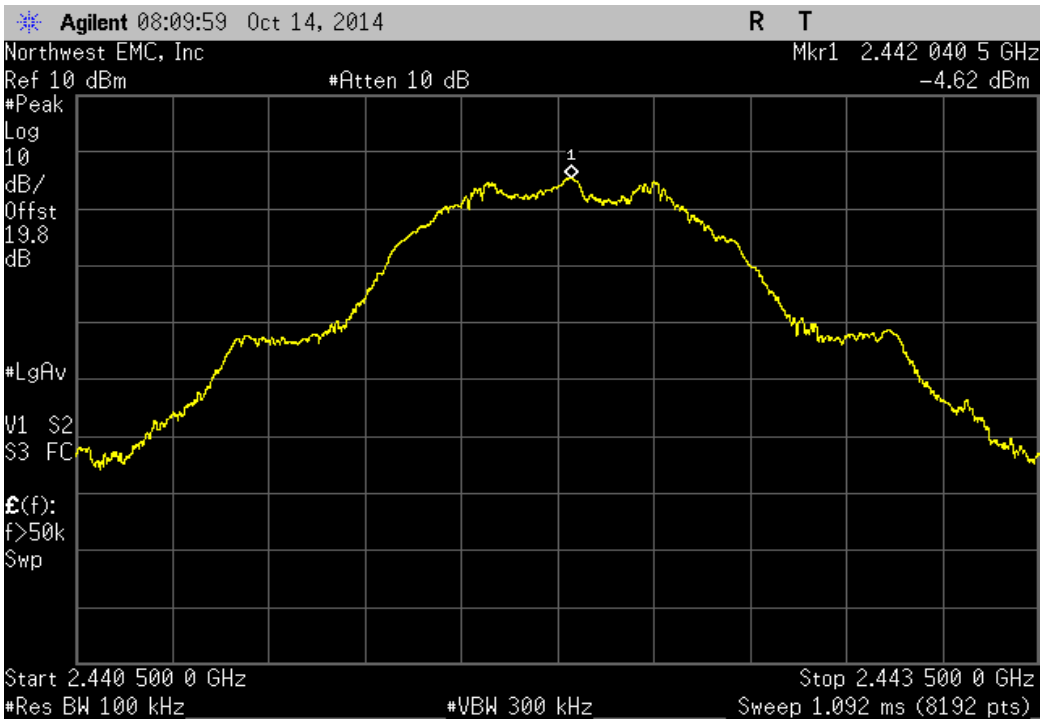


BLE - Data, Low Channel, 2404 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-48.98	-20	Pass



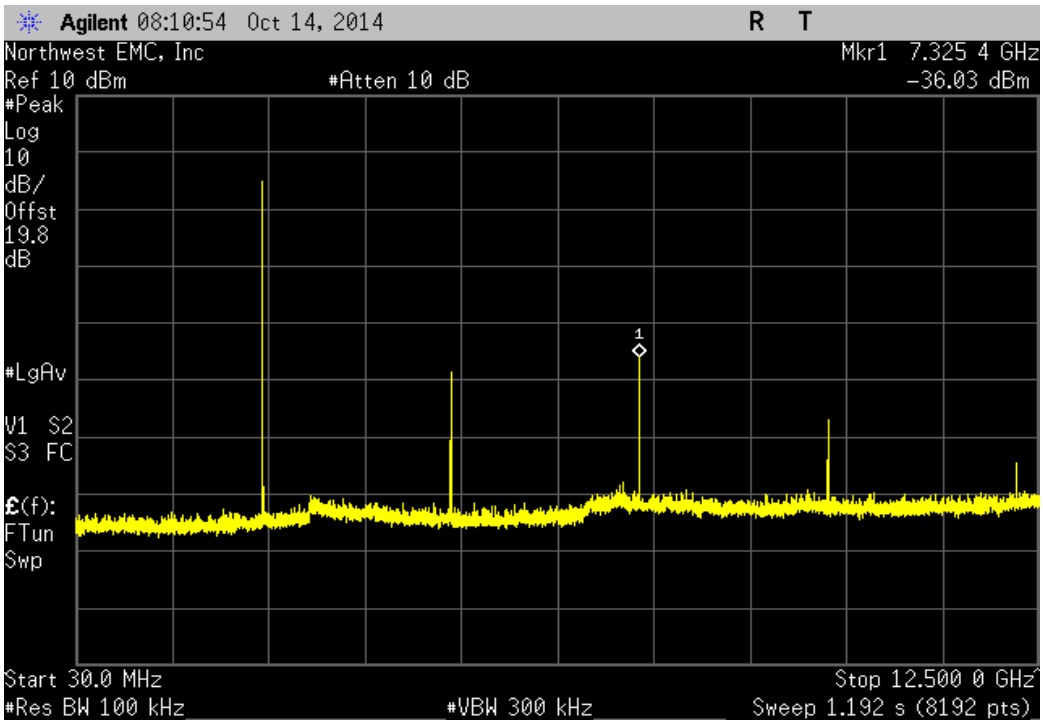
BLE - Data, Mid Channel, 2442 MHz

Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
Fundamental			N/A	N/A	N/A

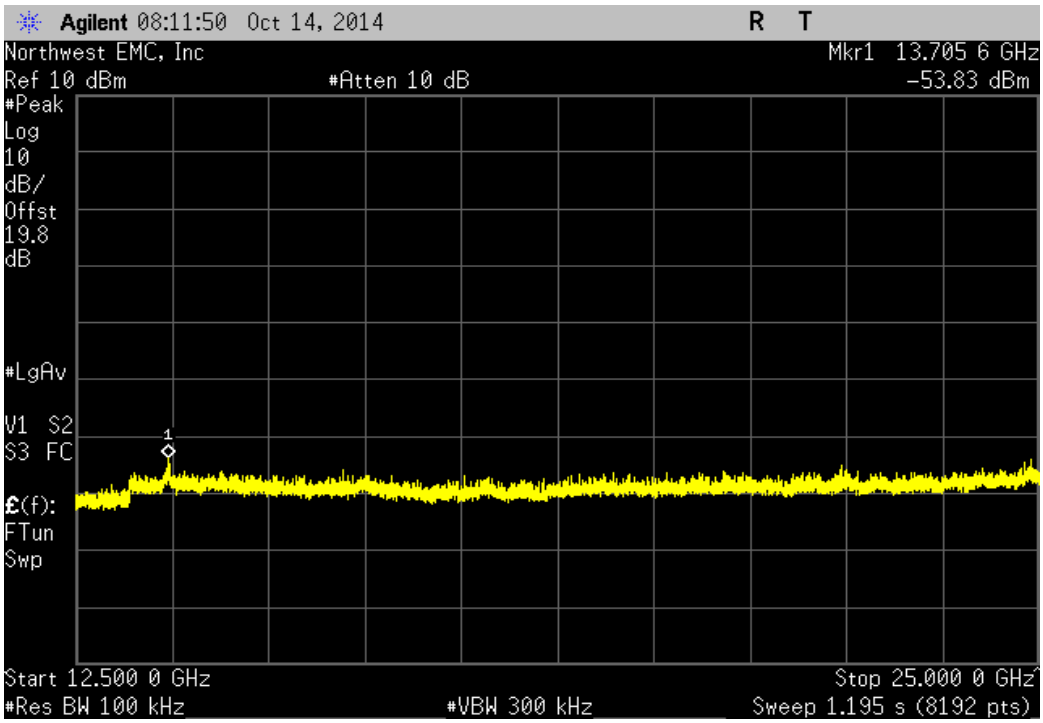


BLE - Data, Mid Channel, 2442 MHz

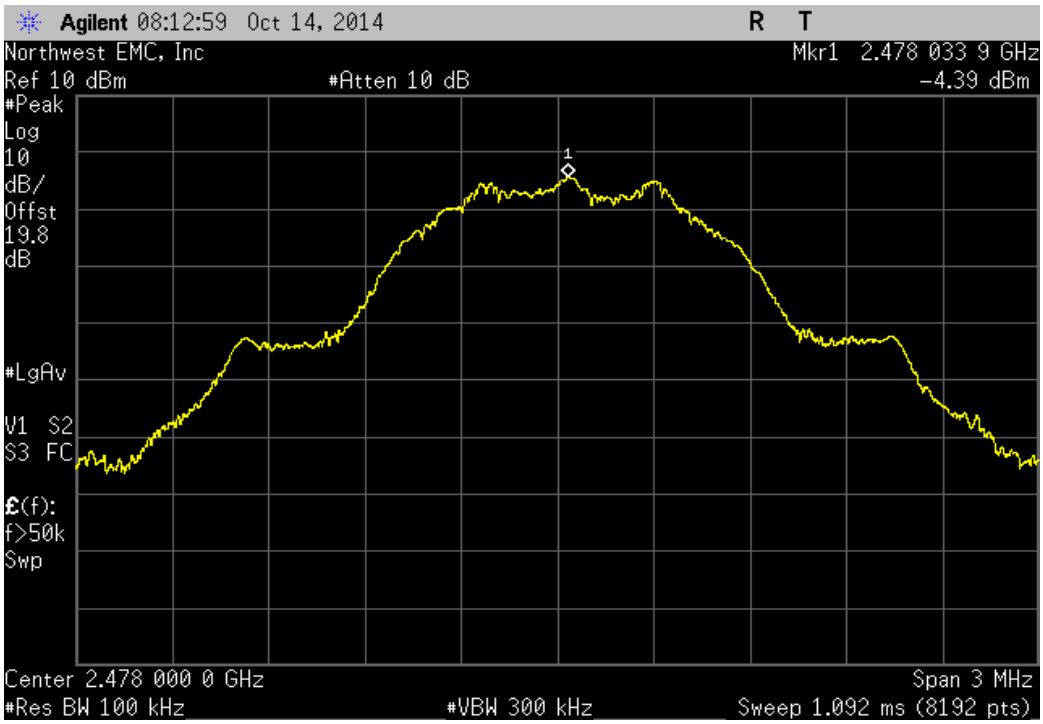
Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz		-31.41	-20	Pass



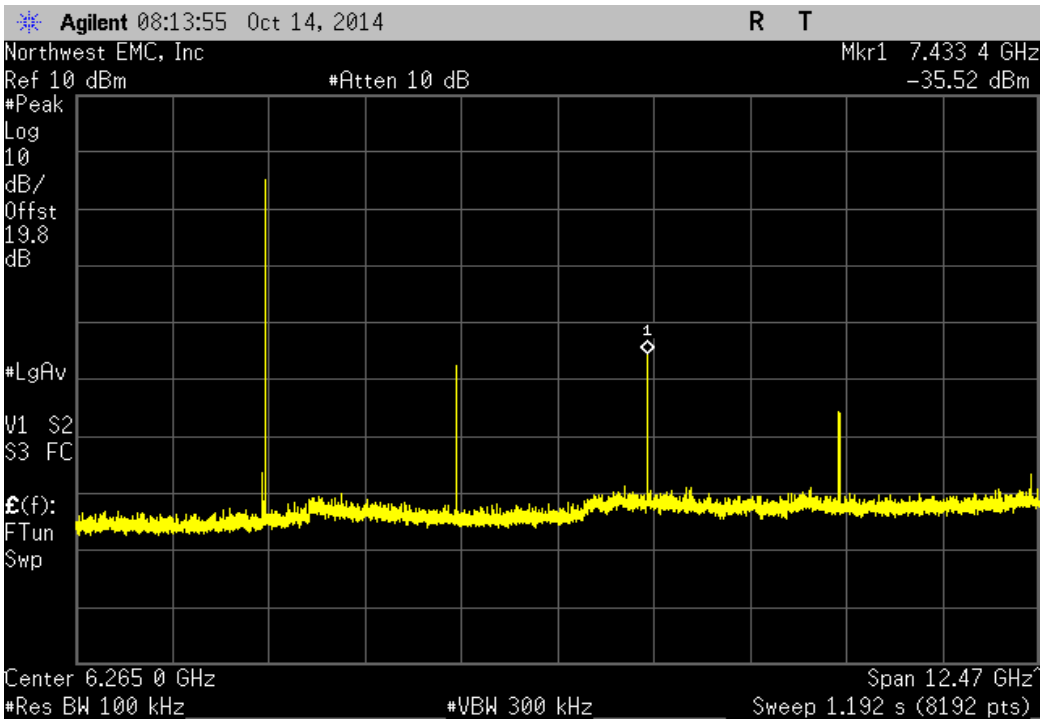
BLE - Data, Mid Channel, 2442 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-49.21	-20	Pass



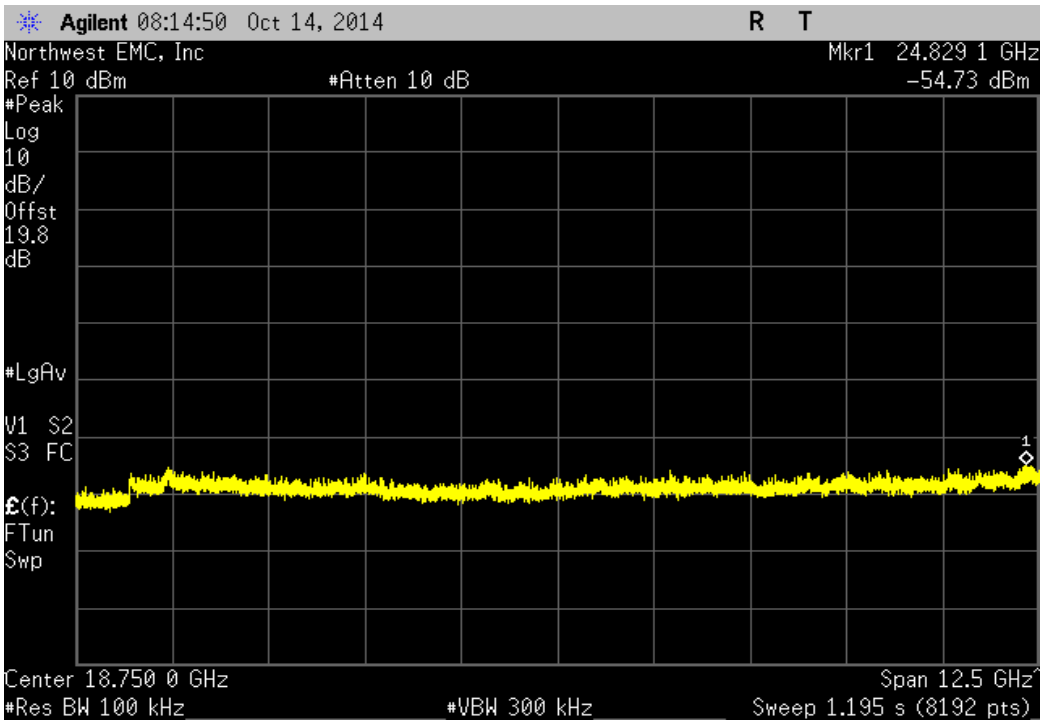
BLE - Data, High Channel, 2478 MHz						
	Frequency Range			**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
	Fundamental			N/A	N/A	N/A



BLE - Data, High Channel, 2478 MHz				
Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz		-31.13	-20	Pass



BLE - Data, High Channel, 2478 MHz				
Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz		-50.34	-20	Pass



OCCUPIED BANDWIDTH

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.	Interval
Signal Generator MXG	Agilent	N5183A	TIK	6/7/2012	36
40 GHz DC block	Fairview Microwave	SD3379	AMI	9/26/2013	14
Attenuator - 20db, 'SMA'	SM Electronics	SA26B-20	RFW	4/3/2014	12
Spectrum Analyzer	Agilent	E4440A	AAX	4/28/2014	12

TEST DESCRIPTION

The 6dB occupied bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The 99.9% (approximate 26 dB) emission bandwidth (EBW) was also measured at the same time.

The EUT was set to low, medium and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the data rate(s) listed in the datasheet.

OCCUPIED BANDWIDTH

EUT:	BTE 13 Hearing Aid			**Work Order:**	STAK0041
Serial Number:	14673920			**Date:**	09/29/14
Customer:	Starkey Laboratories, Inc.			**Temperature:**	22.4°C
Attendees:	Bob France			**Humidity:**	50%
Project:	None			**Barometric Pres.:**	1022
Tested by:	Trevor Buls	**Power:**	Battery	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2014	ANSI C63.10:2009

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

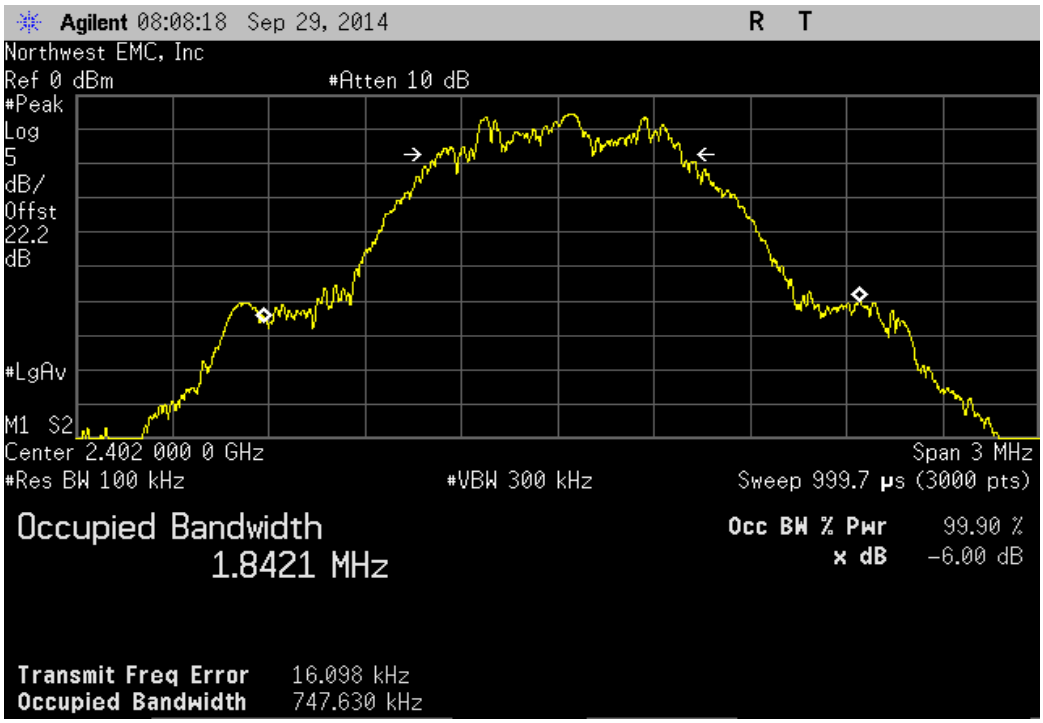
None

Configuration #	4	Signature	Trevor Buls

		Value	Limit (≥)	Result
BLE - Advertising				
	Low Channel, 2402 MHz	747.63 kHz	500 kHz	Pass
	Mid Channel, 2426 MHz	778.619 kHz	500 kHz	Pass
	High Channel, 2480 MHz	745.623 kHz	500 kHz	Pass
BLE - Data				
	Low Channel, 2404 MHz	758.75 kHz	500 kHz	Pass
	Mid Channel, 2442 MHz	785.45 kHz	500 kHz	Pass
	High Channel, 2478 MHz	765.936 kHz	500 kHz	Pass

OCCUPIED BANDWIDTH

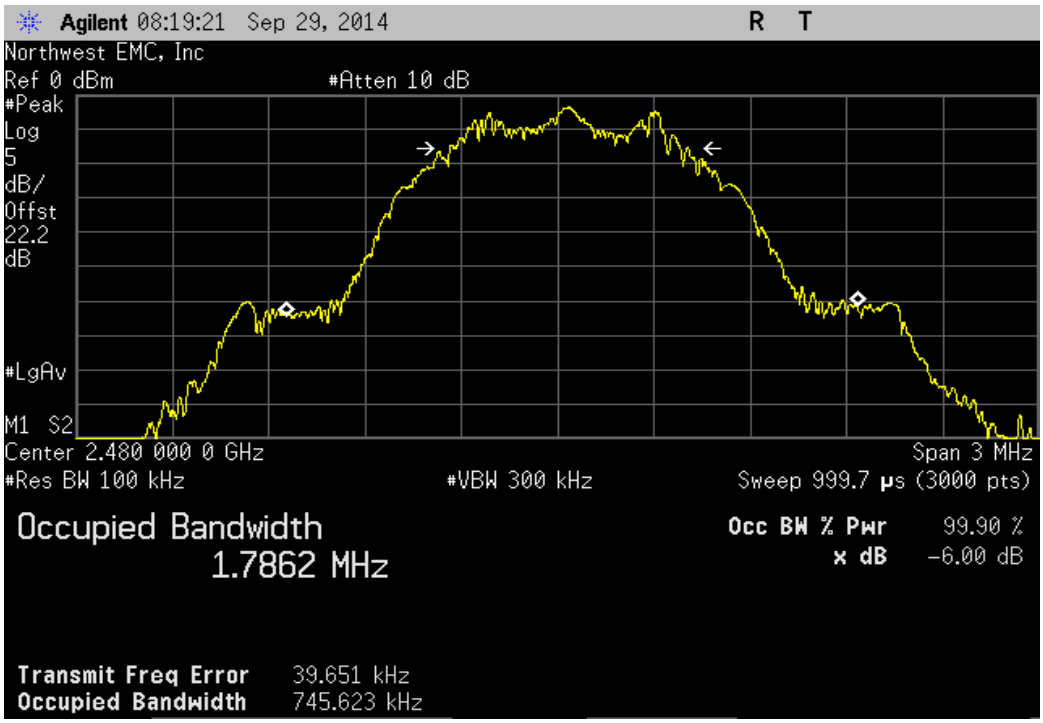
BLE - Advertising, Low Channel, 2402 MHz							
					Value	Limit (≥)	Result
					747.63 kHz	500 kHz	Pass



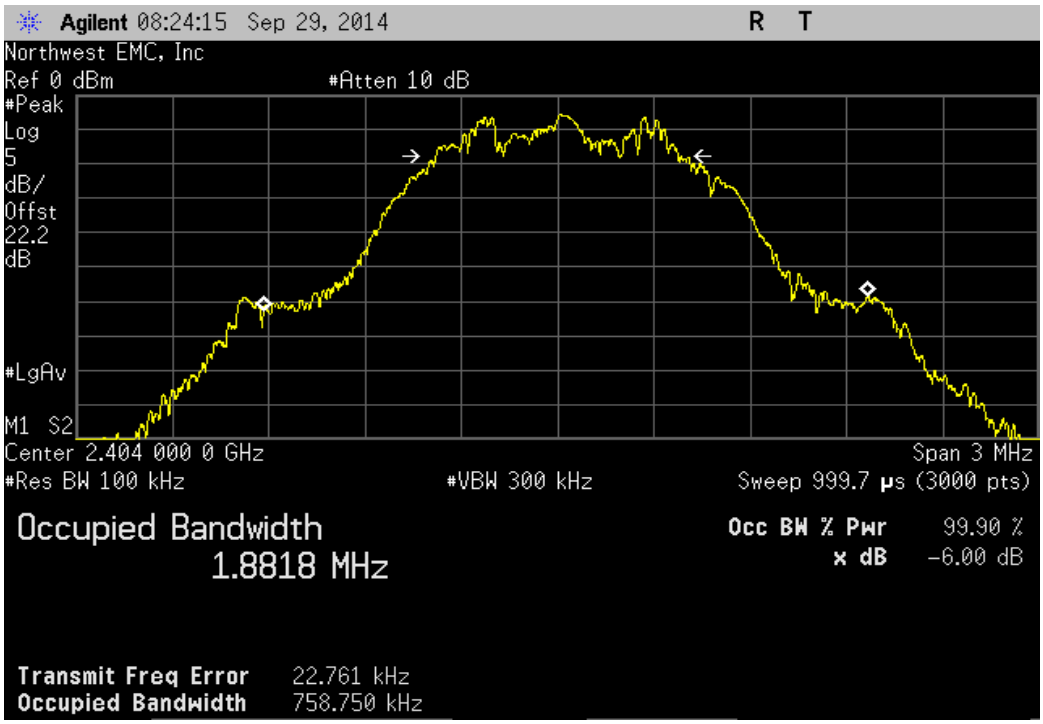
BLE - Advertising, Mid Channel, 2426 MHz							
					Value	Limit (≥)	Result
					778.619 kHz	500 kHz	Pass

OCCUPIED BANDWIDTH

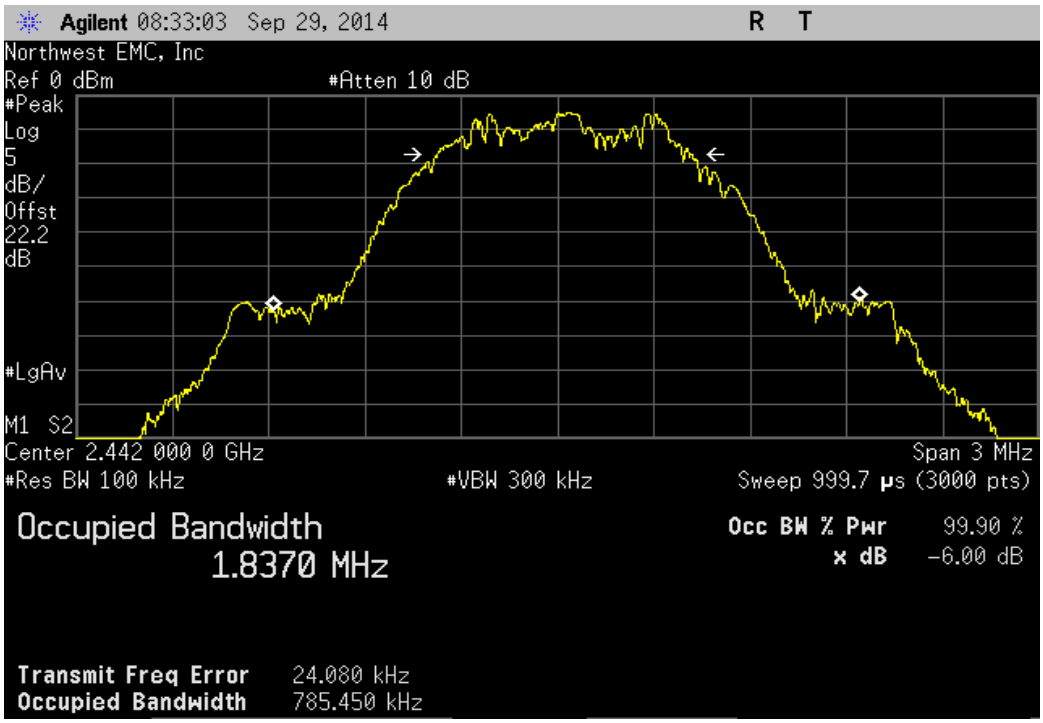
BLE - Advertising, High Channel, 2480 MHz						
				Value	Limit (≥)	Result
				745.623 kHz	500 kHz	Pass



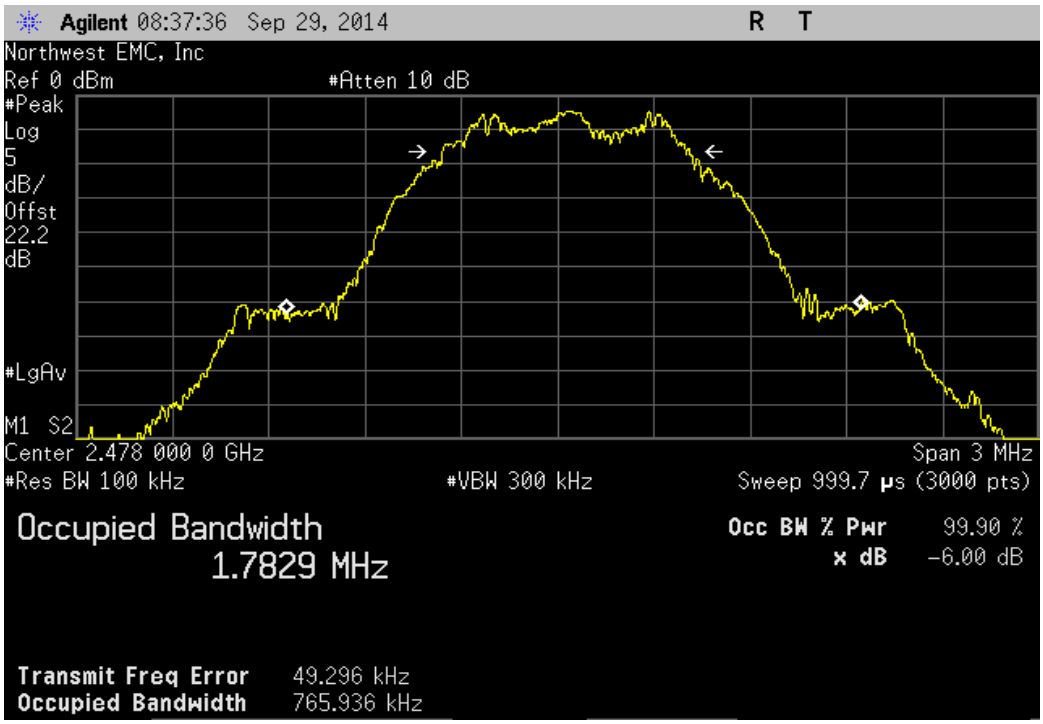
BLE - Data, Low Channel, 2404 MHz						
				Value	Limit (≥)	Result
				758.75 kHz	500 kHz	Pass



BLE - Data, Mid Channel, 2442 MHz							
					Value	Limit (≥)	Result
					785.45 kHz	500 kHz	Pass



BLE - Data, High Channel, 2478 MHz							
					Value	Limit (≥)	Result
					765.936 kHz	500 kHz	Pass



OUTPUT POWER

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.	Interval
Signal Generator MXG	Agilent	N5183A	TIK	6/7/2012	36
Attenuator - 20db, 'SMA'	SM Electronics	SA26B-20	RFW	4/3/2014	12
40 GHz DC block	Fairview Microwave	SD3379	AMI	9/26/2013	14
Spectrum Analyzer	Agilent	E4440A	AAX	4/28/2014	12

TEST DESCRIPTION

The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input.

Prior to measuring peak transmit power the DTS bandwidth (B) and the transmission pulse duration (T) were measured. Both are required to determine the method of measuring Maximum Conducted Output Power. The transmission pulse duration (T) was measured using a zero span on the spectrum analyzer to see the pulses in the time domain.

The method found in KDB 558074 DTS D01 Measurement Section 9.1.1 was used because the RBW on the analyzer was greater than the DTS Bandwidth of the radio.

De Facto EIRP Limit: Per 47 CFR 15.247 (b)(1-3), the EUT meets the de facto EIRP limit of +36 dBm.

OUTPUT POWER

EUT:	BTE 13 Hearing Aid			**Work Order:**	STAK0041
Serial Number:	14673920			**Date:**	09/29/14
Customer:	Starkey Laboratories, Inc.			**Temperature:**	22.4°C
Attendees:	Bob France			**Humidity:**	50%
Project:	None			**Barometric Pres.:**	1022
Tested by:	Trevor Buls	**Power:**	Battery	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2014	ANSI C63.10:2009

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

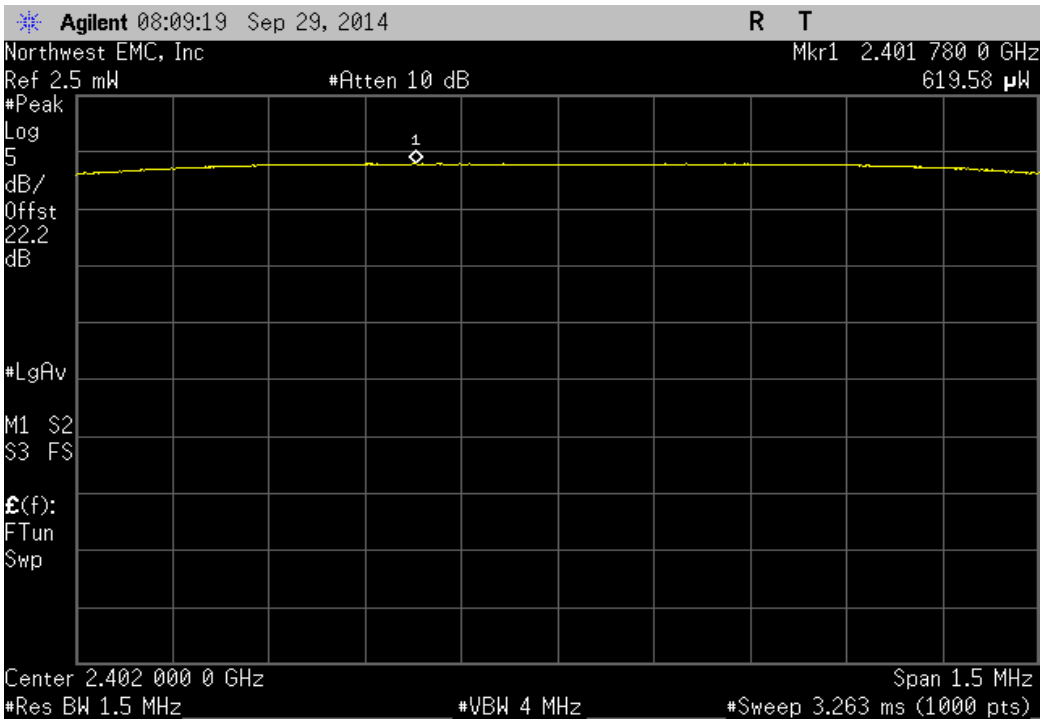
None

Configuration #	4	Signature	Trevor Buls

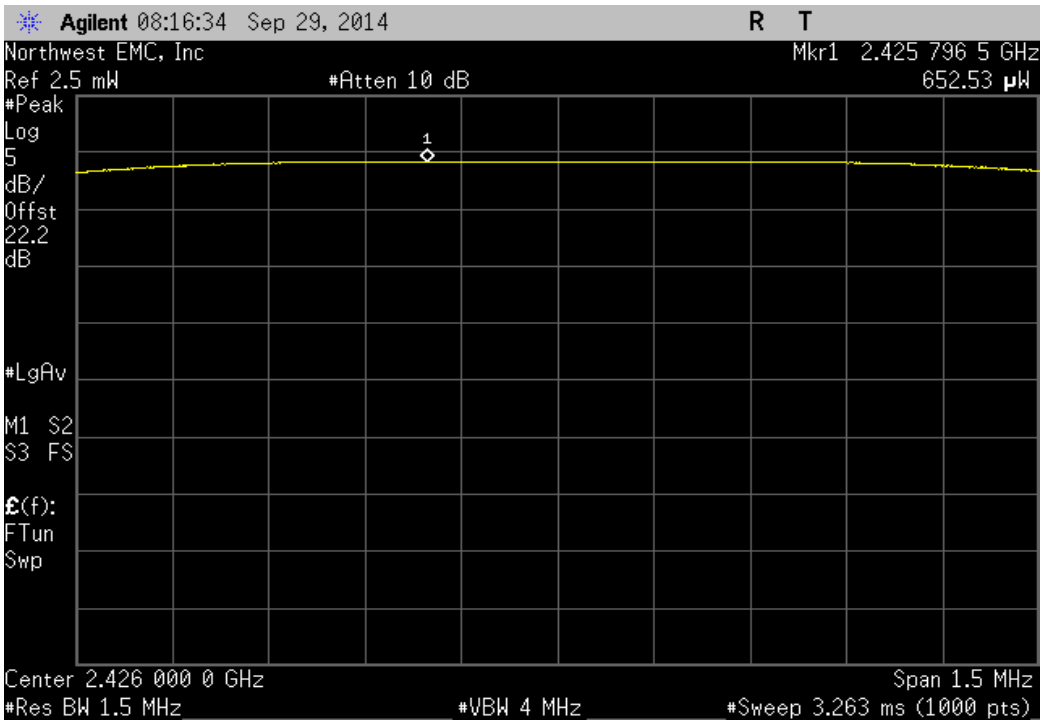
		Value	Limit (<)	Result
BLE - Advertising				
	Low Channel, 2402 MHz	619.584 uW	1 W	Pass
	Mid Channel, 2426 MHz	652.529 uW	1 W	Pass
	High Channel, 2480 MHz	722.437 uW	1 W	Pass
BLE - Data				
	Low Channel, 2404 MHz	619.298 uW	1 W	Pass
	Mid Channel, 2442 MHz	686.594 uW	1 W	Pass
	High Channel, 2478 MHz	716.968 uW	1 W	Pass

OUTPUT POWER

BLE - Advertising, Low Channel, 2402 MHz						
				Value	Limit (<)	Result
				619.584 uW	1 W	Pass

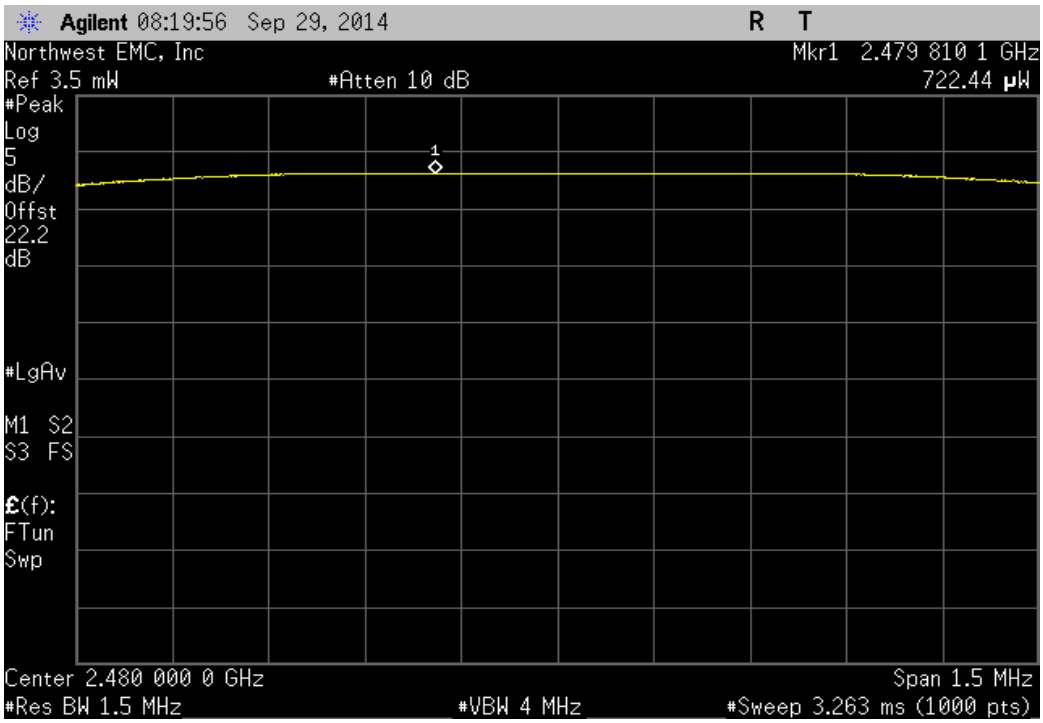


BLE - Advertising, Mid Channel, 2426 MHz						
				Value	Limit (<)	Result
				652.529 uW	1 W	Pass

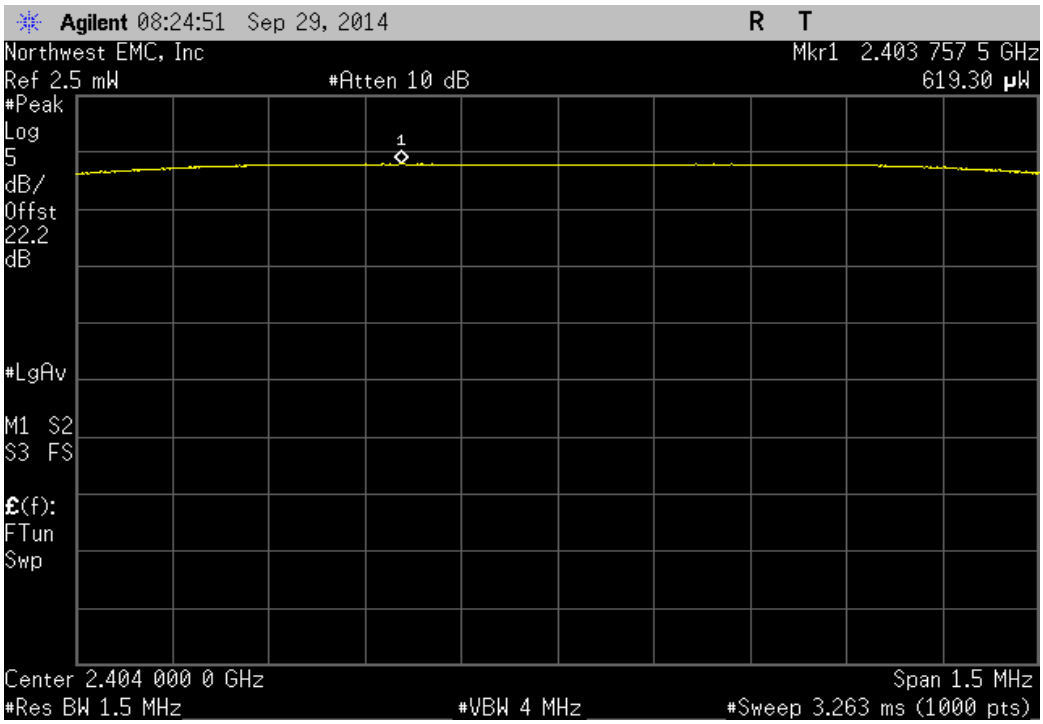


OUTPUT POWER

BLE - Advertising, High Channel, 2480 MHz							
					Value	Limit (<)	Result
					722.437 uW	1 W	Pass

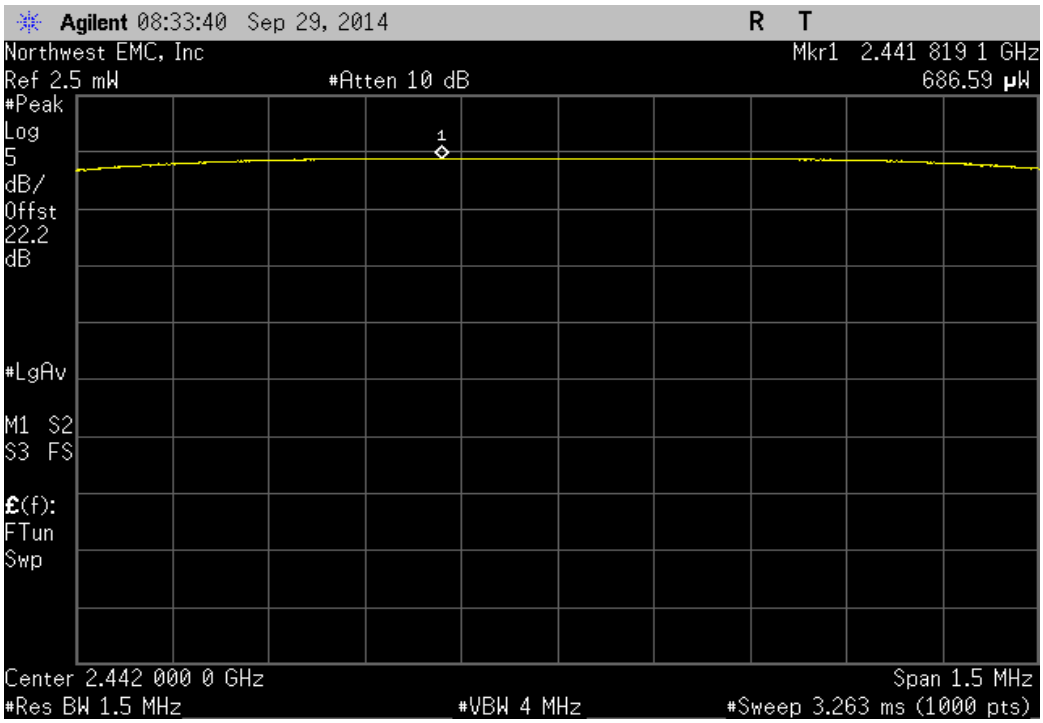


BLE - Data, Low Channel, 2404 MHz							
					Value	Limit (<)	Result
					619.298 uW	1 W	Pass

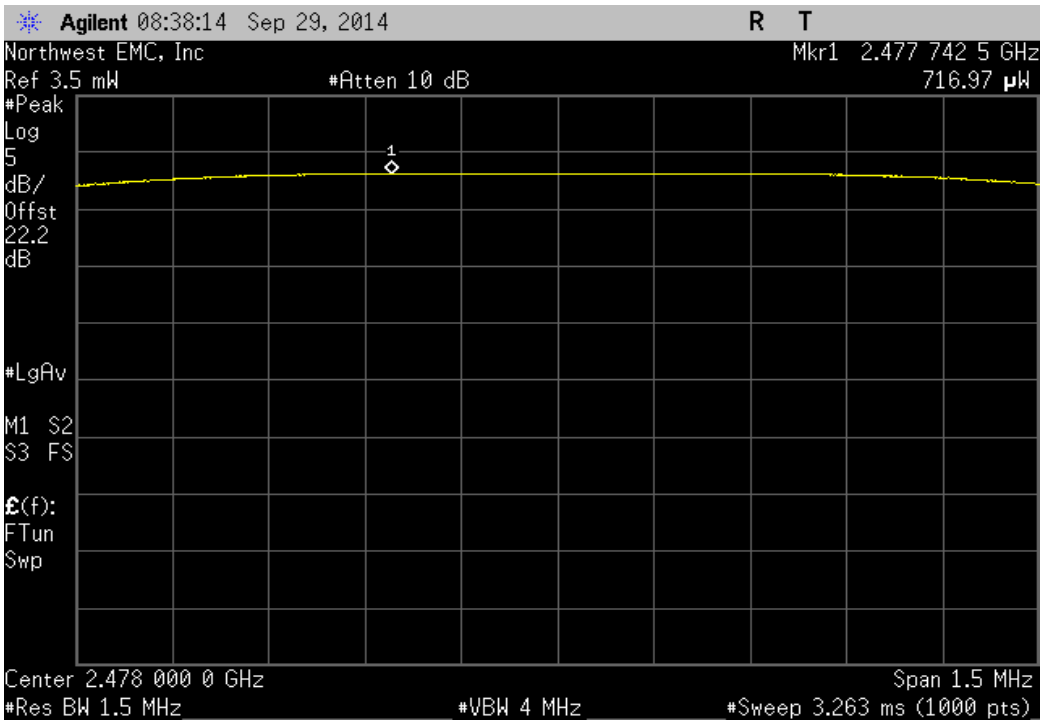


OUTPUT POWER

BLE - Data, Mid Channel, 2442 MHz							
					Value	Limit (<)	Result
					686.594 uW	1 W	Pass



BLE - Data, High Channel, 2478 MHz							
					Value	Limit (<)	Result
					716.968 uW	1 W	Pass



POWER SPECTRAL DENSITY

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.	Interval
40 GHz DC block	Fairview Microwave	SD3379	AMI	9/26/2013	14
Attenuator - 20db, 'SMA'	SM Electronics	SA26B-20	RFW	4/3/2014	12
Signal Generator MXG	Agilent	N5183A	TIK	6/7/2012	36
Spectrum Analyzer	Agilent	E4440A	AAX	4/28/2014	12

TEST DESCRIPTION

The maximum power spectral density measurements were measured with the EUT set to the required transmit frequencies in each band. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the lowest, middle, and maximum data rate for each modulation type available.

Per the procedure outlined in FCC KDB 558074 D01 DTS Measurement Section 5.3.1, the spectrum analyzer was used as follows:

- RBW = 100 kHz
- VBW = 300 kHz
- Detector = Peak (to match method used for power measurement)
- Trace = Max hold

The observed power level is then scaled to an equivalent value in 3 kHz by adding a Bandwidth Correction Factor (BWCF) where:

BWCF = 10*LOG (3 kHz / 100 kHz) = -15.2 dB

POWER SPECTRAL DENSITY

EUT:	BTE 13 Hearing Aid			**Work Order:**	STAK0041
Serial Number:	14673920			**Date:**	09/29/14
Customer:	Starkey Laboratories, Inc.			**Temperature:**	22.4°C
Attendees:	Bob France			**Humidity:**	50%
Project:	None			**Barometric Pres.:**	1022
Tested by:	Trevor Buls	**Power:**	Battery	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2014	ANSI C63.10:2009

COMMENTS

None

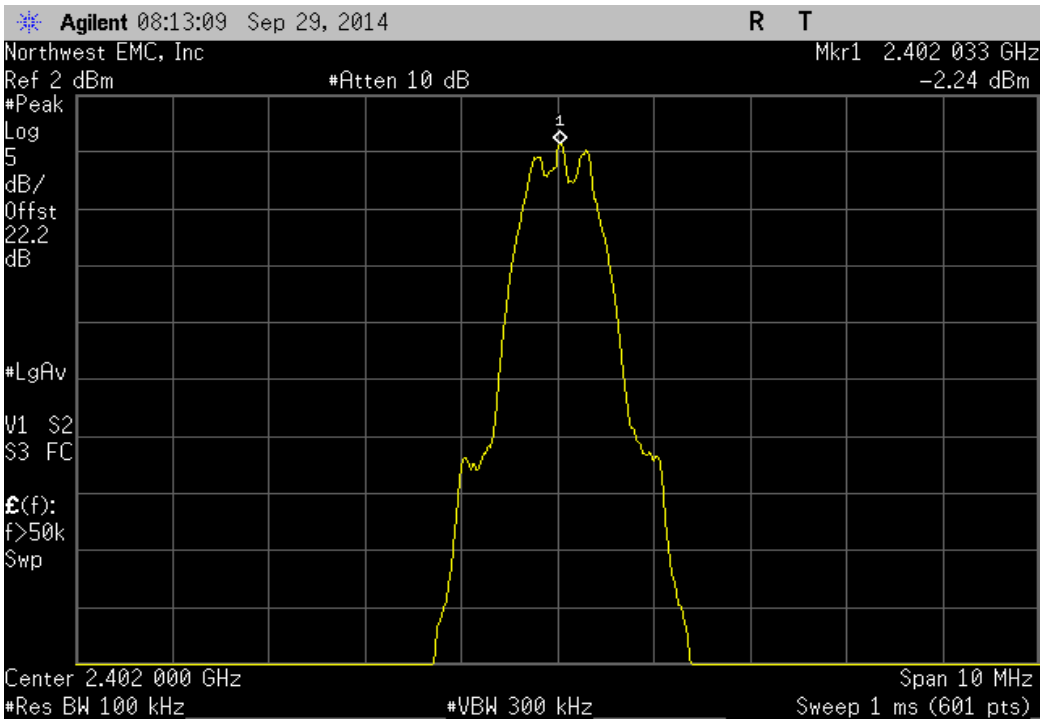
DEVIATIONS FROM TEST STANDARD

None

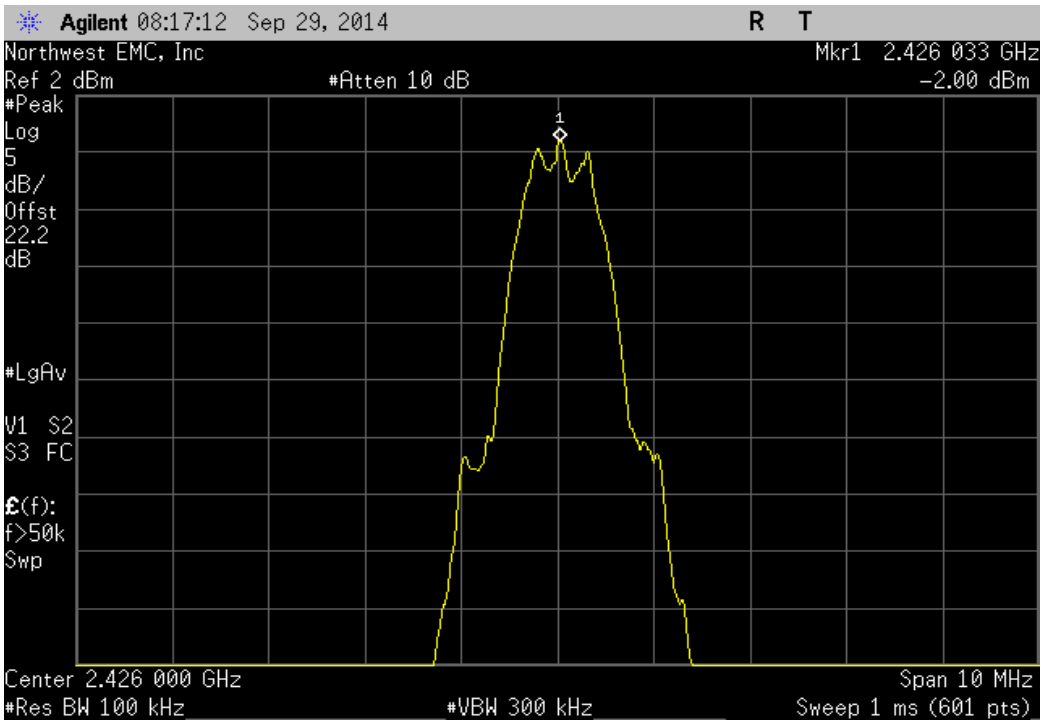
Configuration #	4	Signature	Trevor Buls

		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
BLE - Advertising						
	Low Channel, 2402 MHz	-2.242	-15.2	-17.442	8	Pass
	Mid Channel, 2426 MHz	-1.997	-15.2	-17.197	8	Pass
	High Channel, 2480 MHz	-2.111	-15.2	-17.311	8	Pass
BLE - Data						
	Low Channel, 2404 MHz	-2.273	-15.2	-17.473	8	Pass
	Mid Channel, 2442 MHz	-1.76	-15.2	-16.96	8	Pass
	High Channel, 2478 MHz	-1.567	-15.2	-16.767	8	Pass

BLE - Advertising, Low Channel, 2402 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		-2.242	-15.2	-17.442	8	Pass

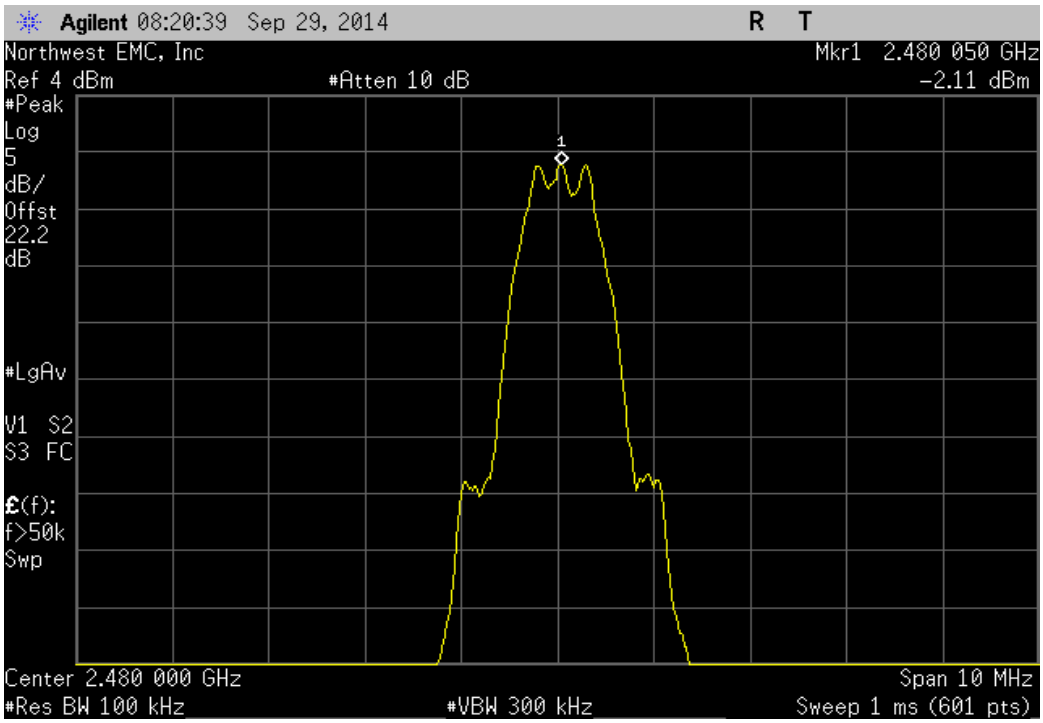


BLE - Advertising, Mid Channel, 2426 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		-1.997	-15.2	-17.197	8	Pass

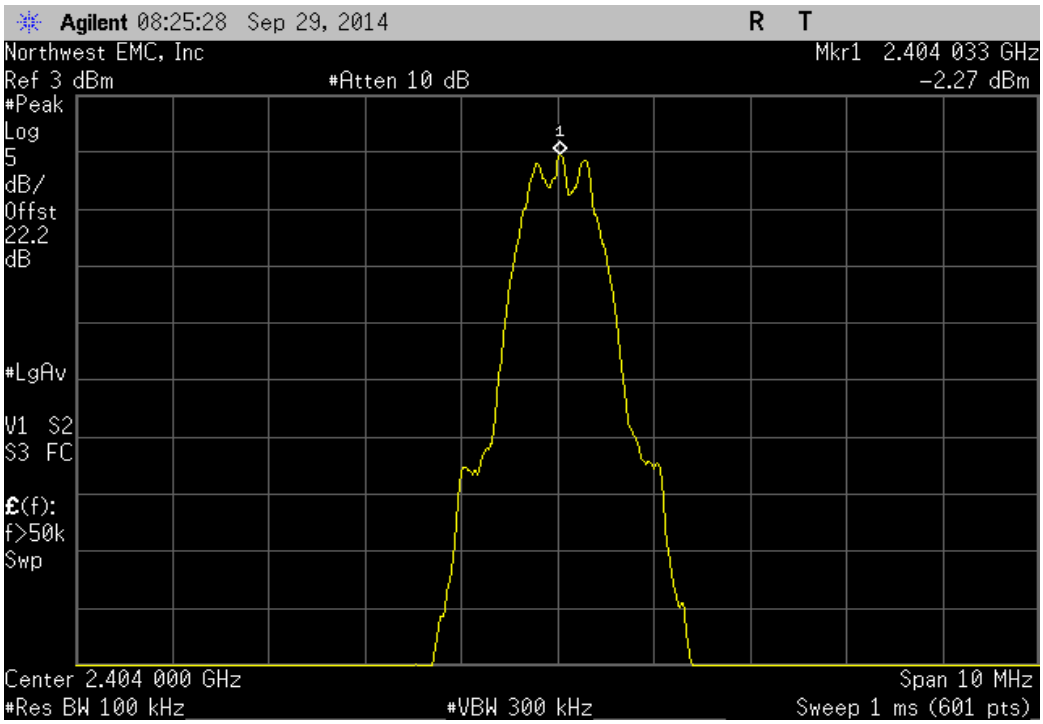


POWER SPECTRAL DENSITY

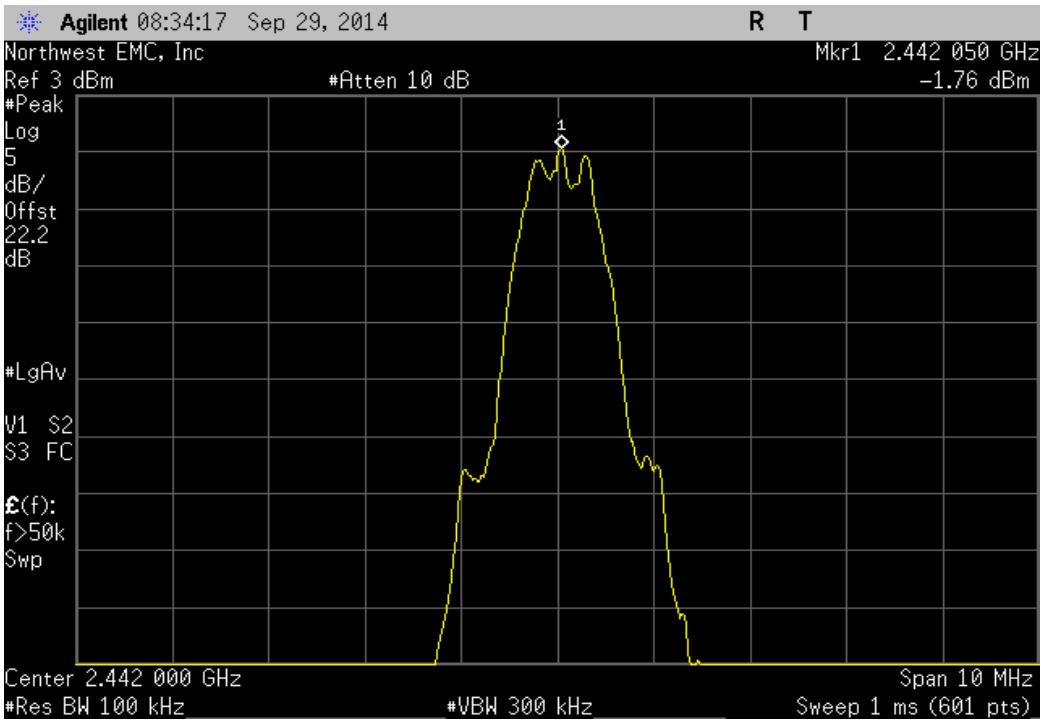
BLE - Advertising, High Channel, 2480 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		-2.111	-15.2	-17.311	8	Pass



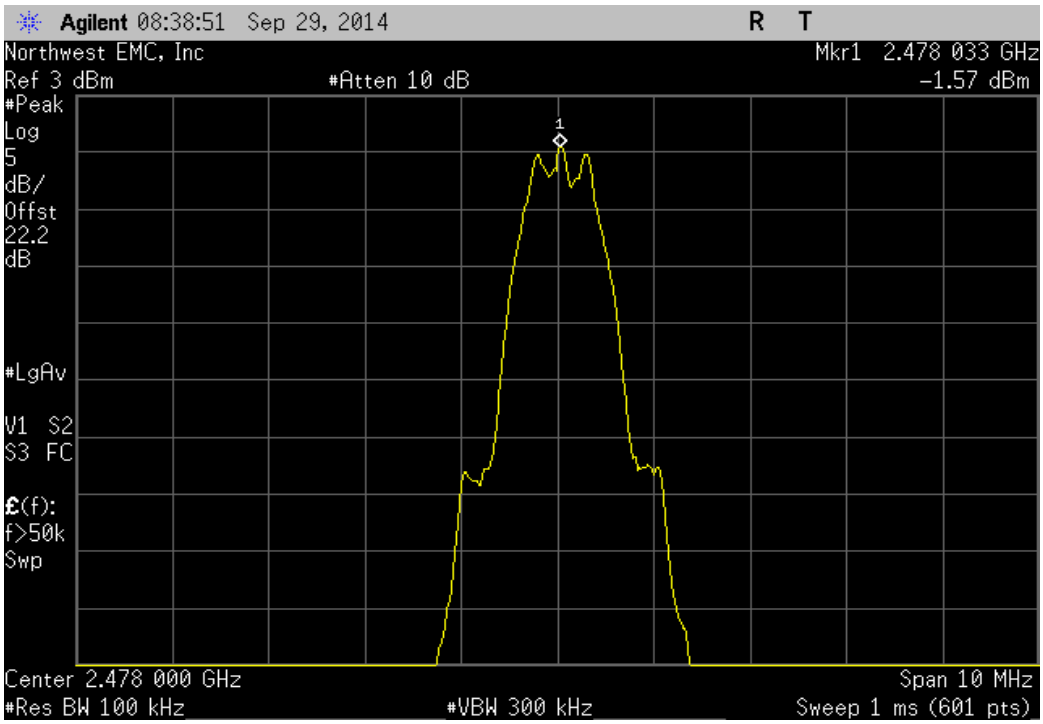
BLE - Data, Low Channel, 2404 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		-2.273	-15.2	-17.473	8	Pass



BLE - Data, Mid Channel, 2442 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		-1.76	-15.2	-16.96	8	Pass



BLE - Data, High Channel, 2478 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		-1.567	-15.2	-16.767	8	Pass



DUTY CYCLE

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.	Interval
Signal Generator MXG	Agilent	N5183A	TIK	6/7/2012	36
Attenuator - 20db, 'SMA'	SM Electronics	SA26B-20	RFW	4/3/2014	12
40 GHz DC block	Fairview Microwave	SD3379	AMI	9/26/2013	14
Spectrum Analyzer	Agilent	E4440A	AAX	4/28/2014	12

TEST DESCRIPTION

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.

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. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used.

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 was used during some of the other tests in this report to only measure during the burst duration.

DUTY CYCLE

EUT:	BTE 13 Hearing Aid			**Work Order:**	STAK0041
Serial Number:	14673920			**Date:**	09/29/14
Customer:	Starkey Laboratories, Inc.			**Temperature:**	22.4°C
Attendees:	Bob France			**Humidity:**	50%
Project:	None			**Barometric Pres.:**	1022
Tested by:	Trevor Buls	**Power:**	Battery	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2014	ANSI C63.10:2009

COMMENTS

None

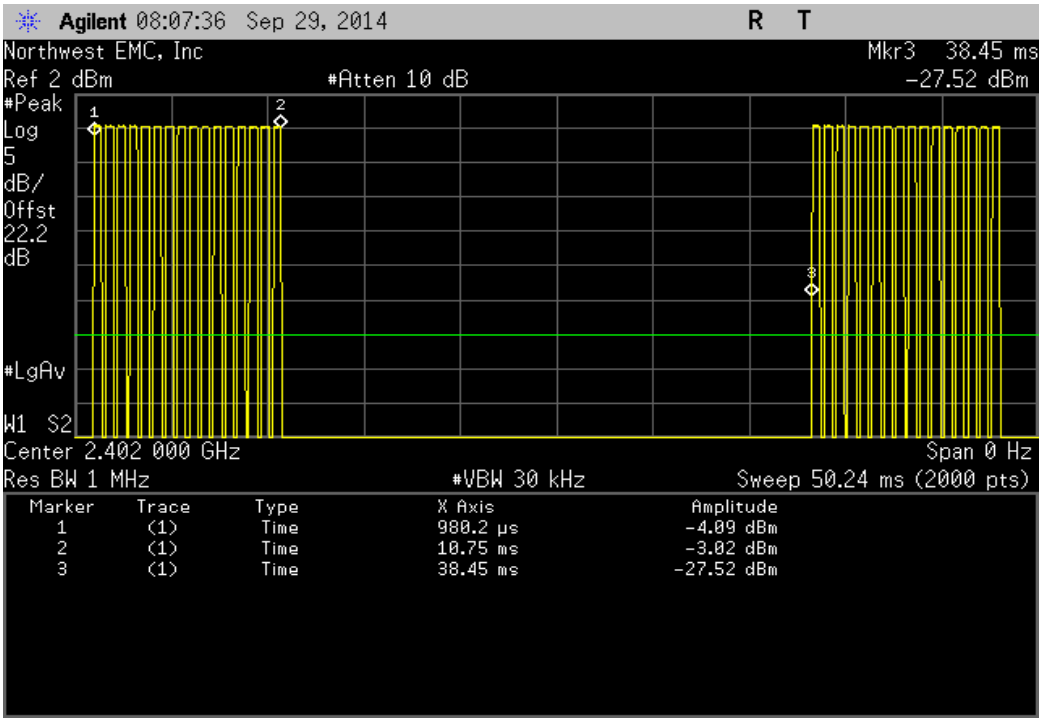
DEVIATIONS FROM TEST STANDARD

None

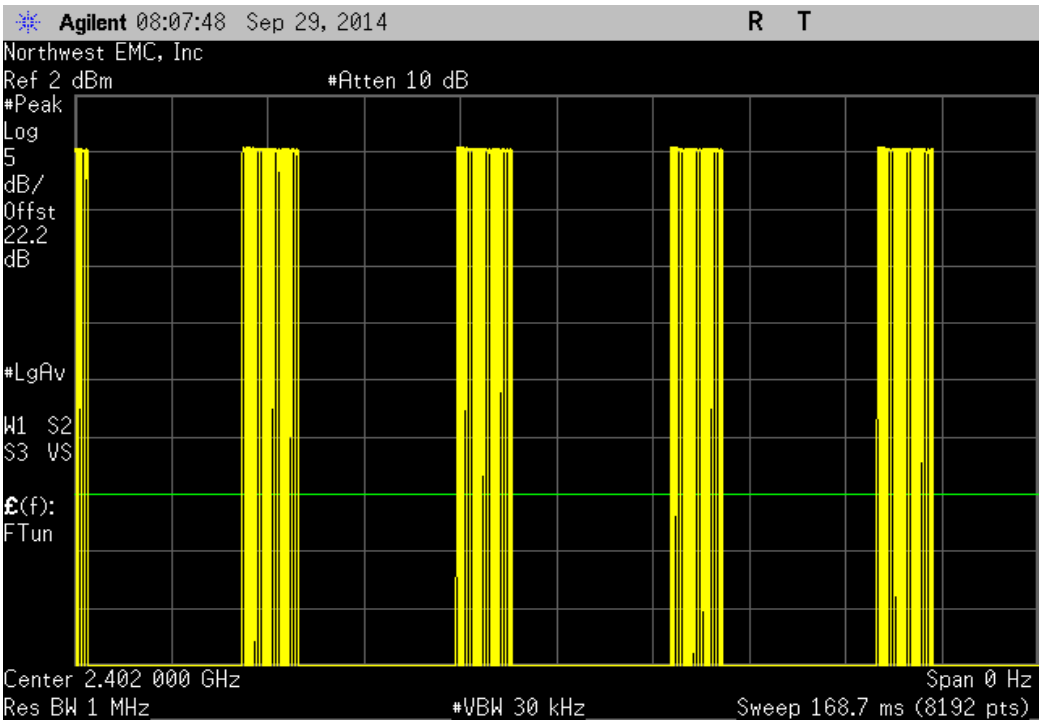
Configuration #	4	Signature	Trevor Buls

		Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
BLE - Advertising							
	Low Channel, 2402 MHz	9.768 mS	37.471 mS	1	26.1	N/A	N/A
	Low Channel, 2402 MHz	N/A	N/A	67	N/A	N/A	N/A
	Mid Channel, 2426 MHz	9.139 mS	36.243 mS	1	25.2	N/A	N/A
	Mid Channel, 2426 MHz	N/A	N/A	81	N/A	N/A	N/A
	High Channel, 2480 MHz	9.773 mS	37.495 mS	1	26.1	N/A	N/A
	High Channel, 2480 MHz	N/A	N/A	80	N/A	N/A	N/A
BLE - Data							
	Low Channel, 2404 MHz	9.792 mS	37.499 mS	1	26.1	N/A	N/A
	Low Channel, 2404 MHz	N/A	N/A	79	N/A	N/A	N/A
	Mid Channel, 2442 MHz	9.143 mS	36.206 mS	1	25.3	N/A	N/A
	Mid Channel, 2442 MHz	N/A	N/A	80	N/A	N/A	N/A
	High Channel, 2478 MHz	9.175 mS	36.254 mS	1	25.3	N/A	N/A
	High Channel, 2478 MHz	N/A	N/A	68	N/A	N/A	N/A

BLE - Advertising, Low Channel, 2402 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	9.768 mS	37.471 mS	1	26.1	N/A	N/A

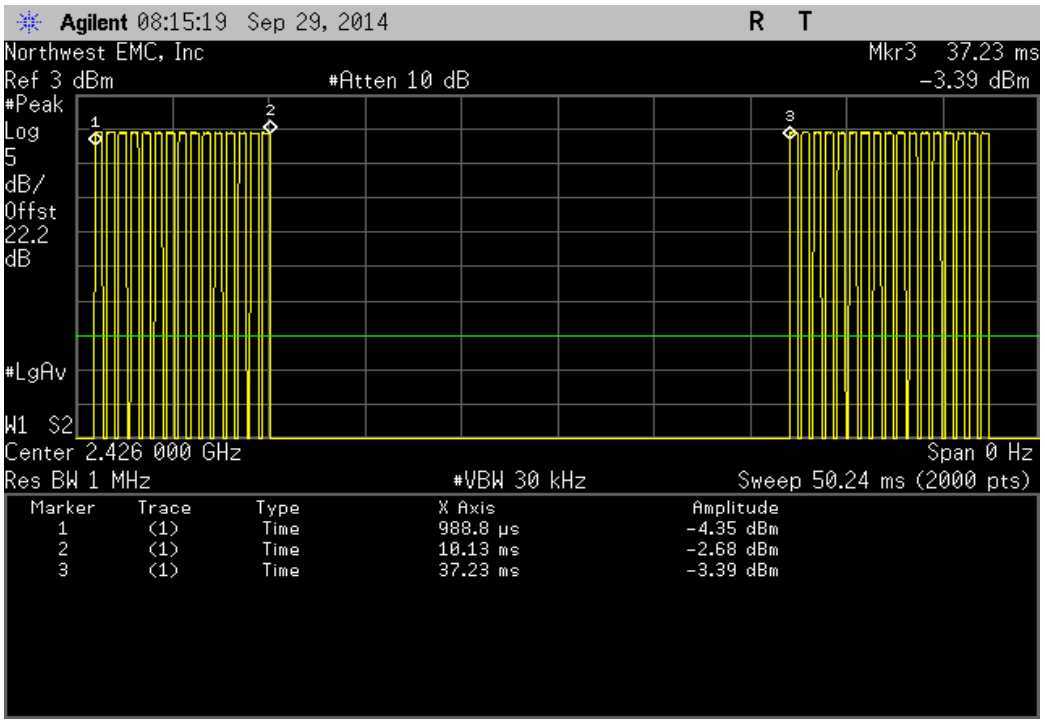


BLE - Advertising, Low Channel, 2402 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	67	N/A	N/A	N/A

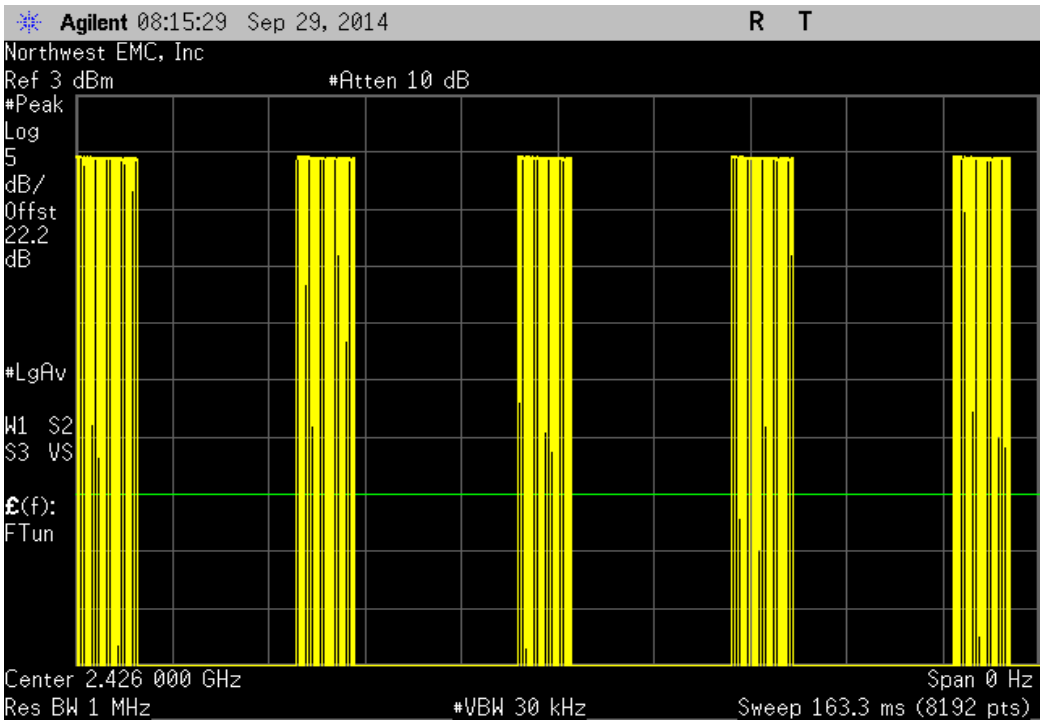


DUTY CYCLE

BLE - Advertising, Mid Channel, 2426 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	9.139 mS	36.243 mS	1	25.2	N/A	N/A



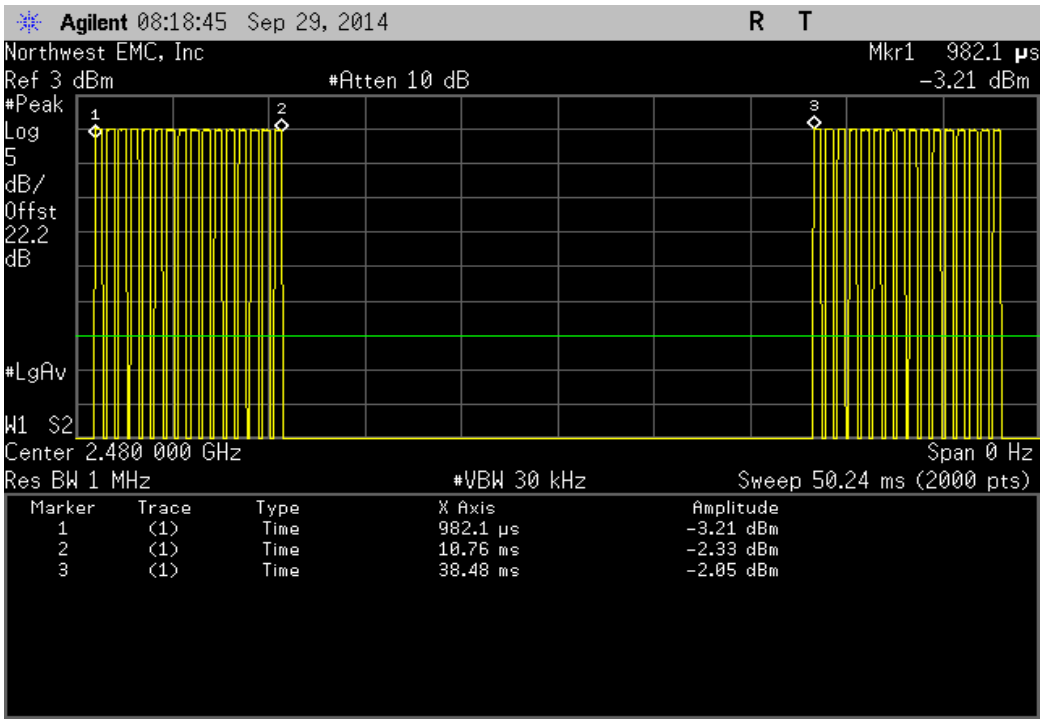
BLE - Advertising, Mid Channel, 2426 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	81	N/A	N/A	N/A



DUTY CYCLE

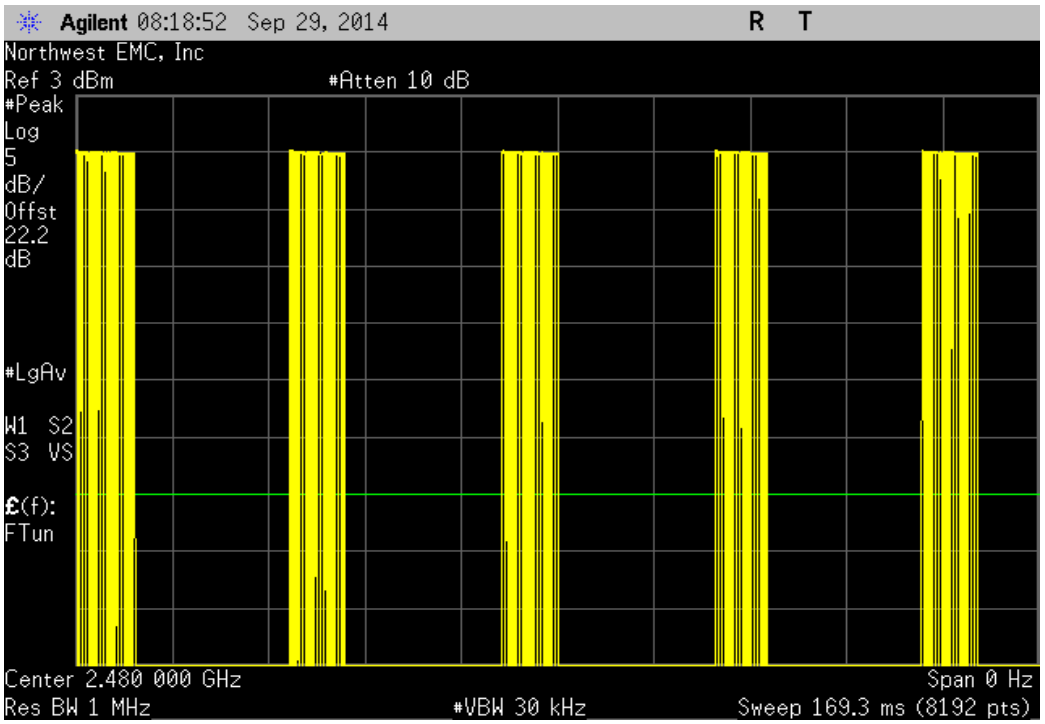
BLE - Advertising, High Channel, 2480 MHz

Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
9.773 mS	37.495 mS	1	26.1	N/A	N/A



BLE - Advertising, High Channel, 2480 MHz

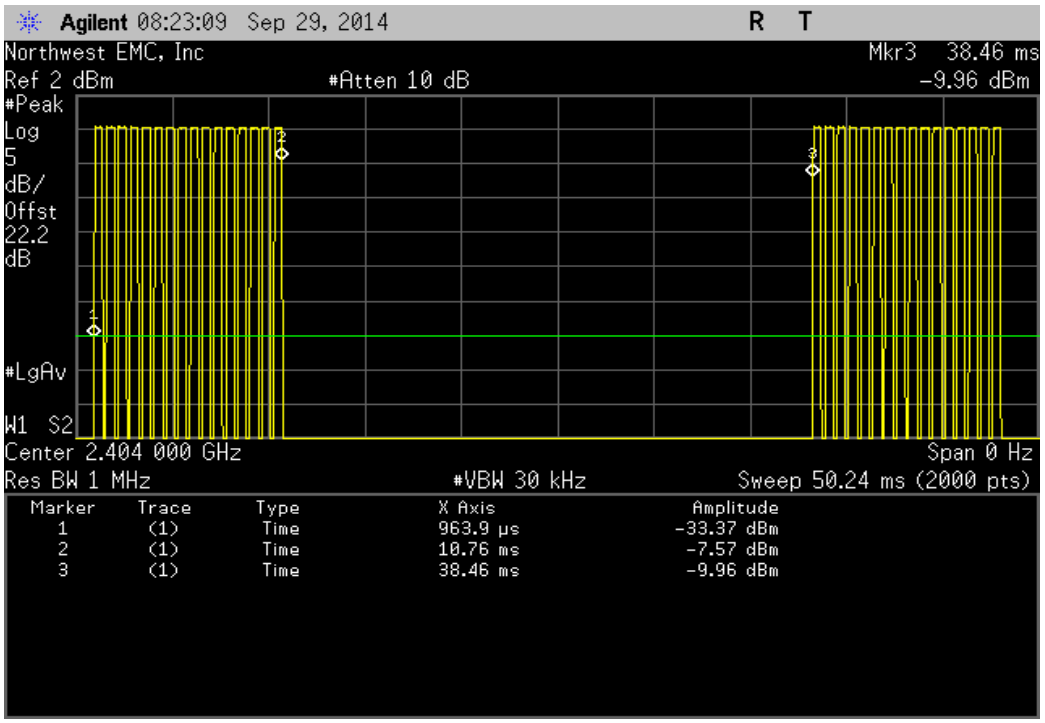
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
N/A	N/A	80	N/A	N/A	N/A



DUTY CYCLE

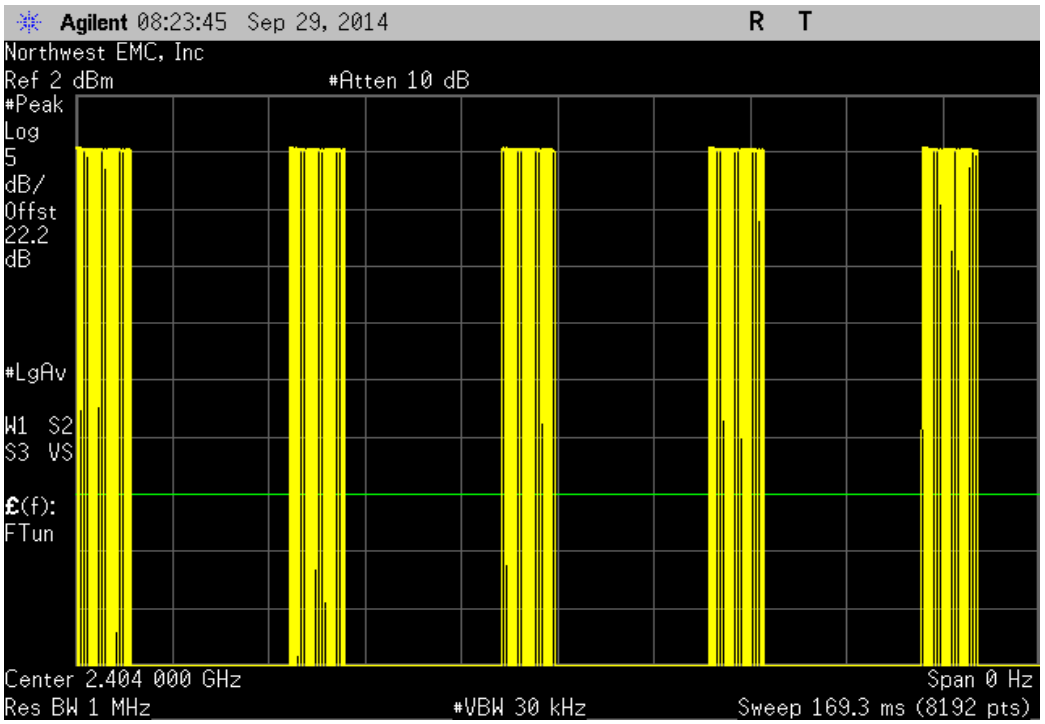
BLE - Data, Low Channel, 2404 MHz

Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
9.792 mS	37.499 mS	1	26.1	N/A	N/A



BLE - Data, Low Channel, 2404 MHz

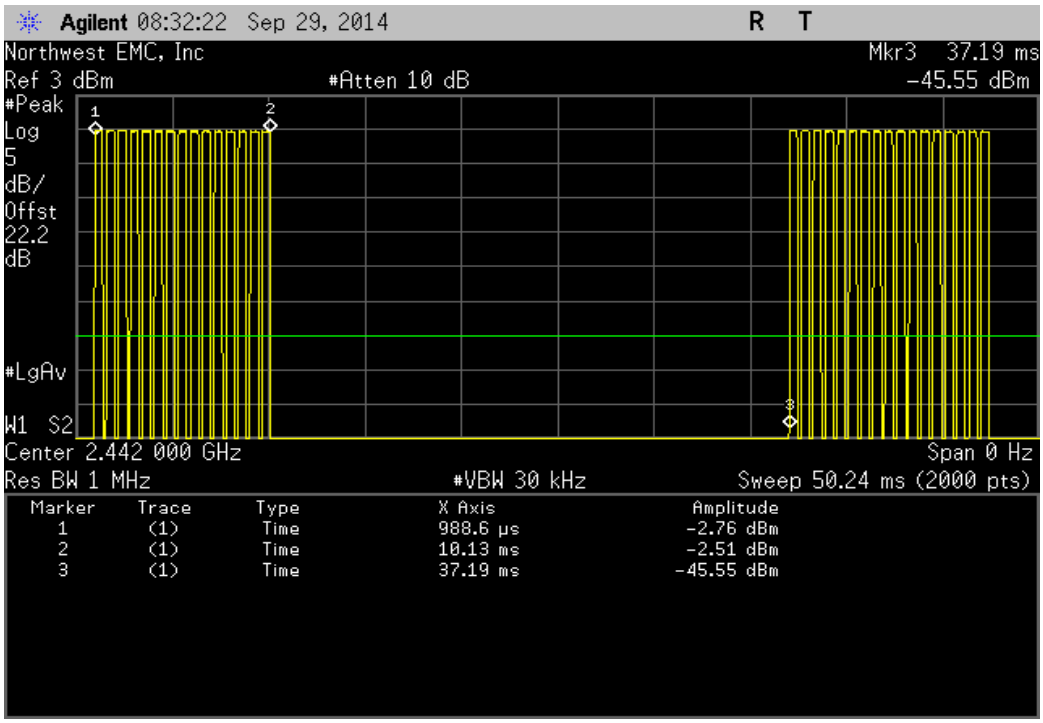
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
N/A	N/A	79	N/A	N/A	N/A



DUTY CYCLE

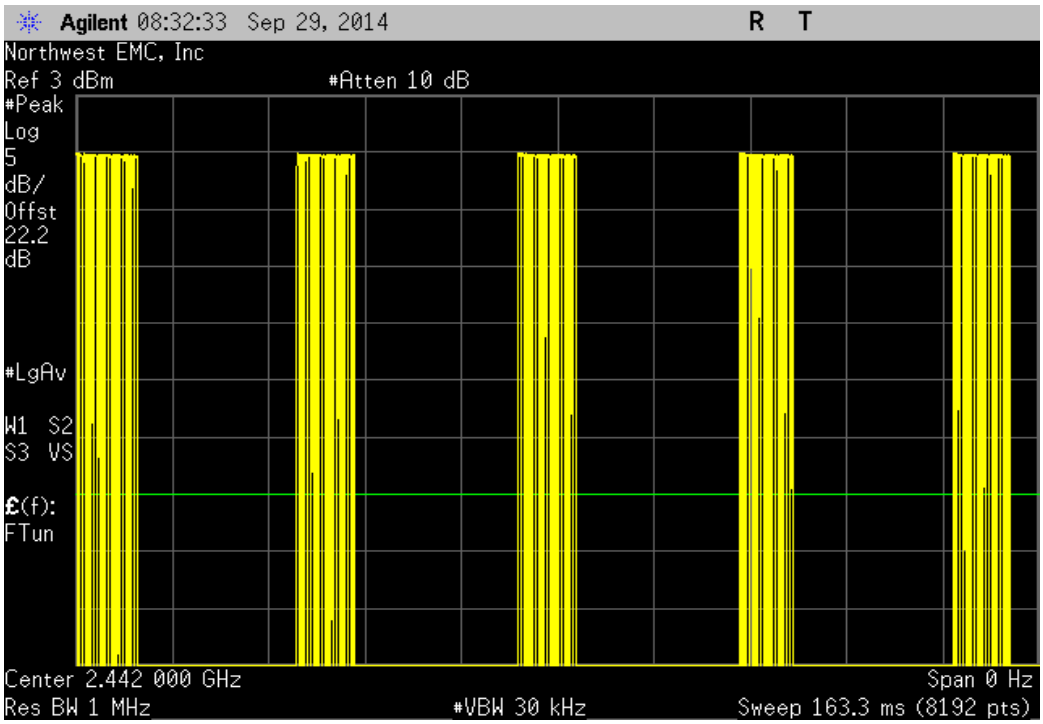
BLE - Data, Mid Channel, 2442 MHz

Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
9.143 mS	36.206 mS	1	25.3	N/A	N/A



BLE - Data, Mid Channel, 2442 MHz

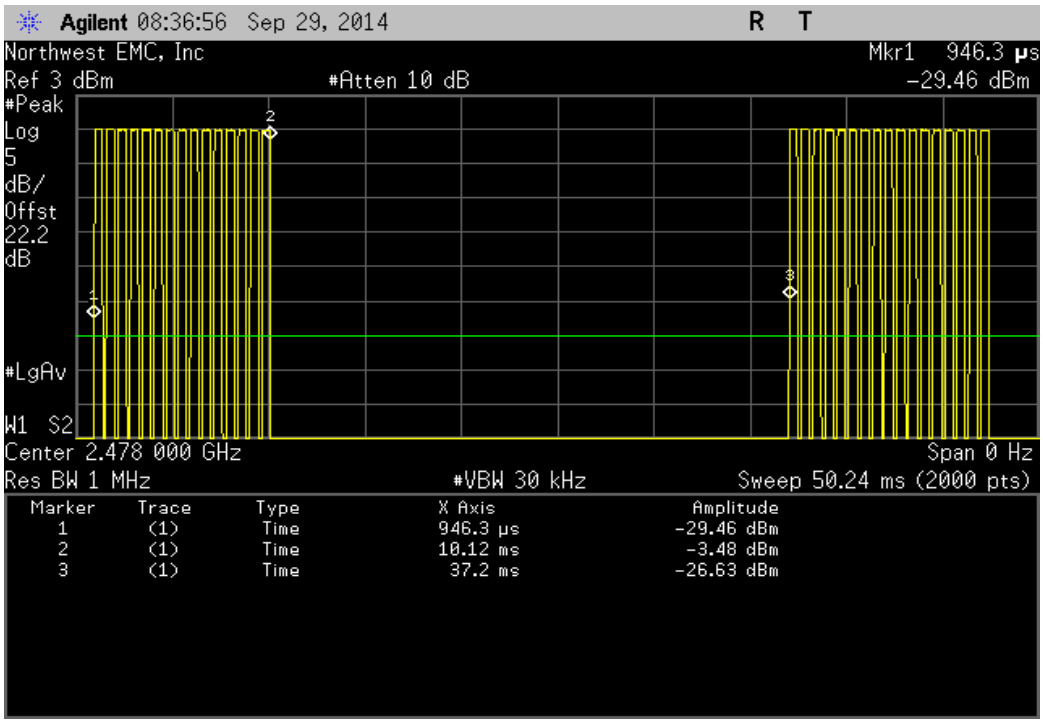
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
N/A	N/A	80	N/A	N/A	N/A

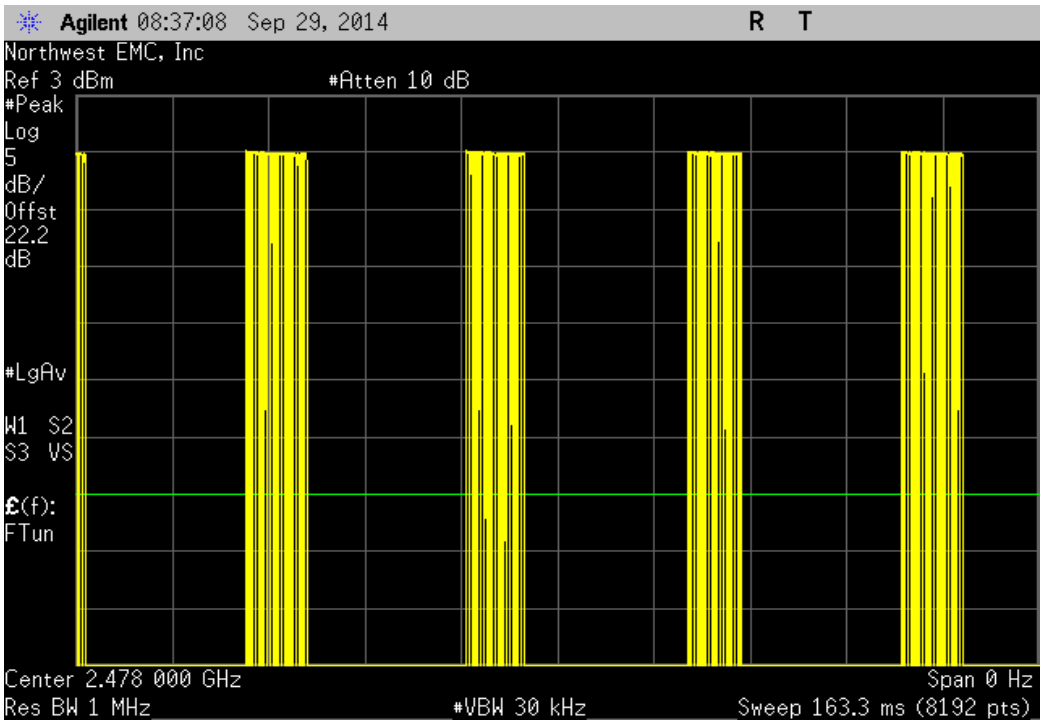


DUTY CYCLE

BLE - Data, High Channel, 2478 MHz

Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
9.175 mS	36.254 mS	1	25.3	N/A	N/A



BLE - Data, High Channel, 2478 MHz

Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
N/A	N/A	68	N/A	N/A	N/A