Global Experience Innovators, Inc.

Ocean Medallion

FCC 15.247:2017

Bluetooth Low Energy Radio

Report # NYTE0005

NVLAP Lab Code: 200676-0

CERTIFICATE OF TEST

Last Date of Test: August 10, 2017
Global Experience Innovators, Inc.
Model: Ocean Medallion

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2017	ANSI C63.10:2013, KDB 558074

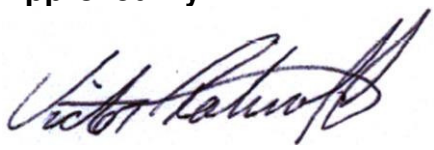
Results

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

Deviations From Test Standards

None

Approved By:



Victor Ratinoff, Operations Manager

Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information.

REVISION HISTORY

Revision Number	Description	Date	Page Number
00	None		

ACCREDITATIONS AND AUTHORIZATIONS

2017.6.12

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

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

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:
http://portlandcustomer.element.com/ts/scope/scope.htm
http://gsi.nist.gov/global/docs/cabs/designations.html

MEASUREMENT UNCERTAINTY

TMU.2015.07.10

Measurement Uncertainty

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

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

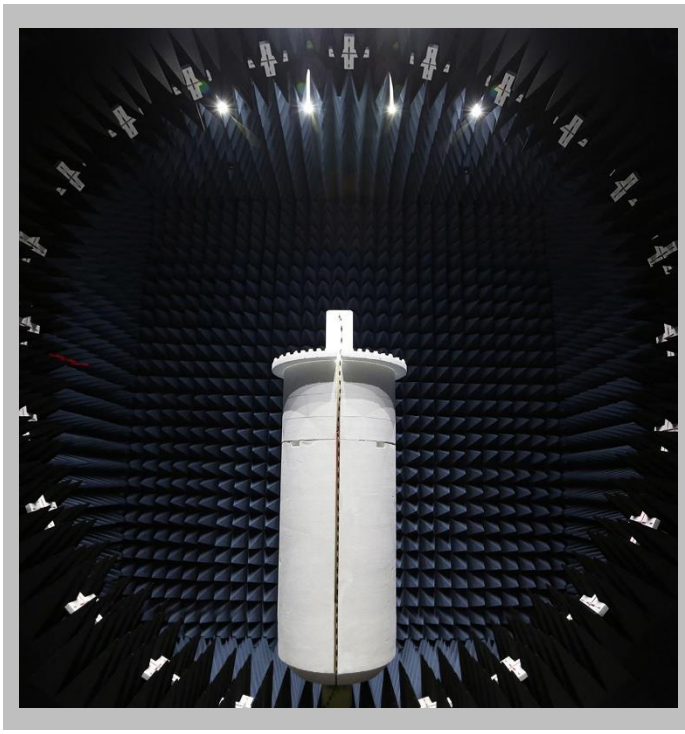
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

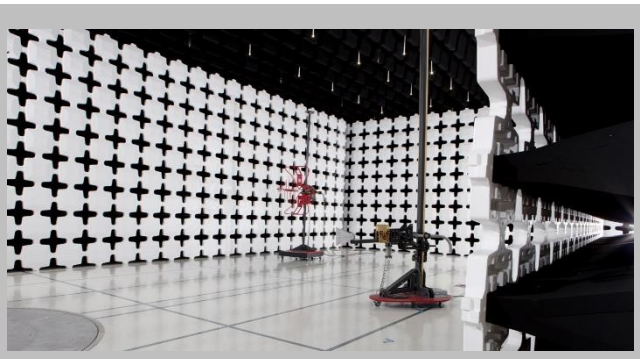
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%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

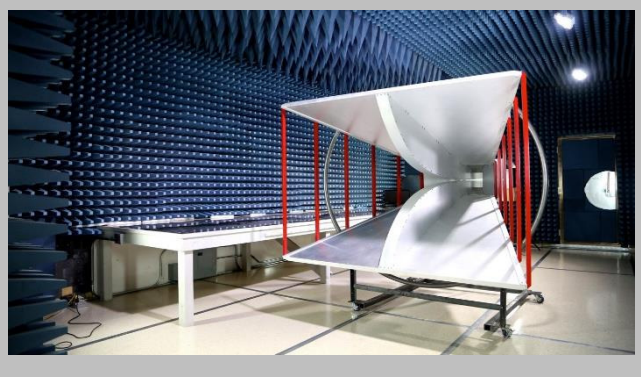
FACILITIES

2017.7.25

California	Minnesota	New York	Oregon	Texas	Washington
Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-08, MN10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Labs NC01-05 19201 120th Ave NE Bothell, WA 98011 (425)984-6600
NVLAP					
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
BSMI					
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

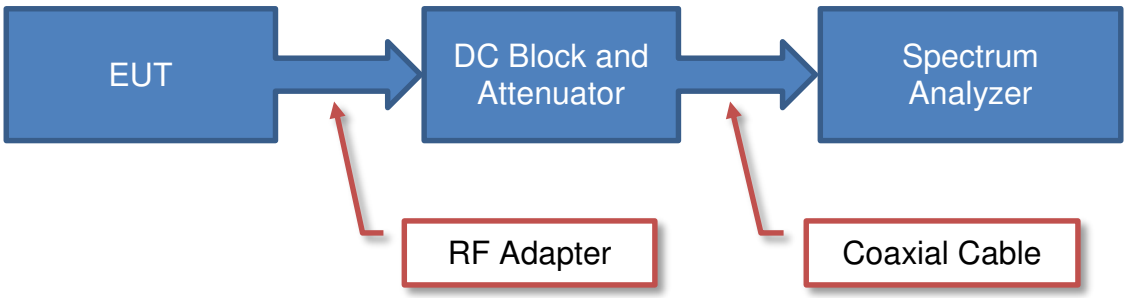




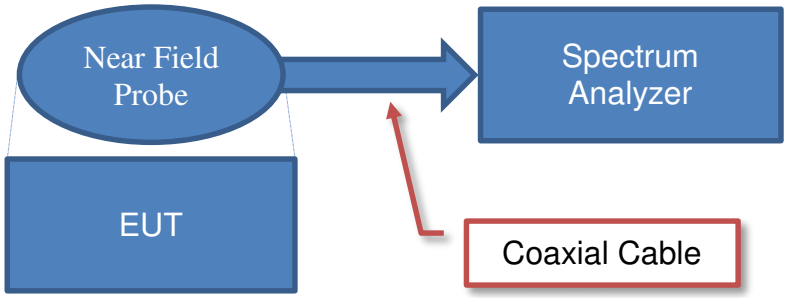


Test Setup Block Diagrams

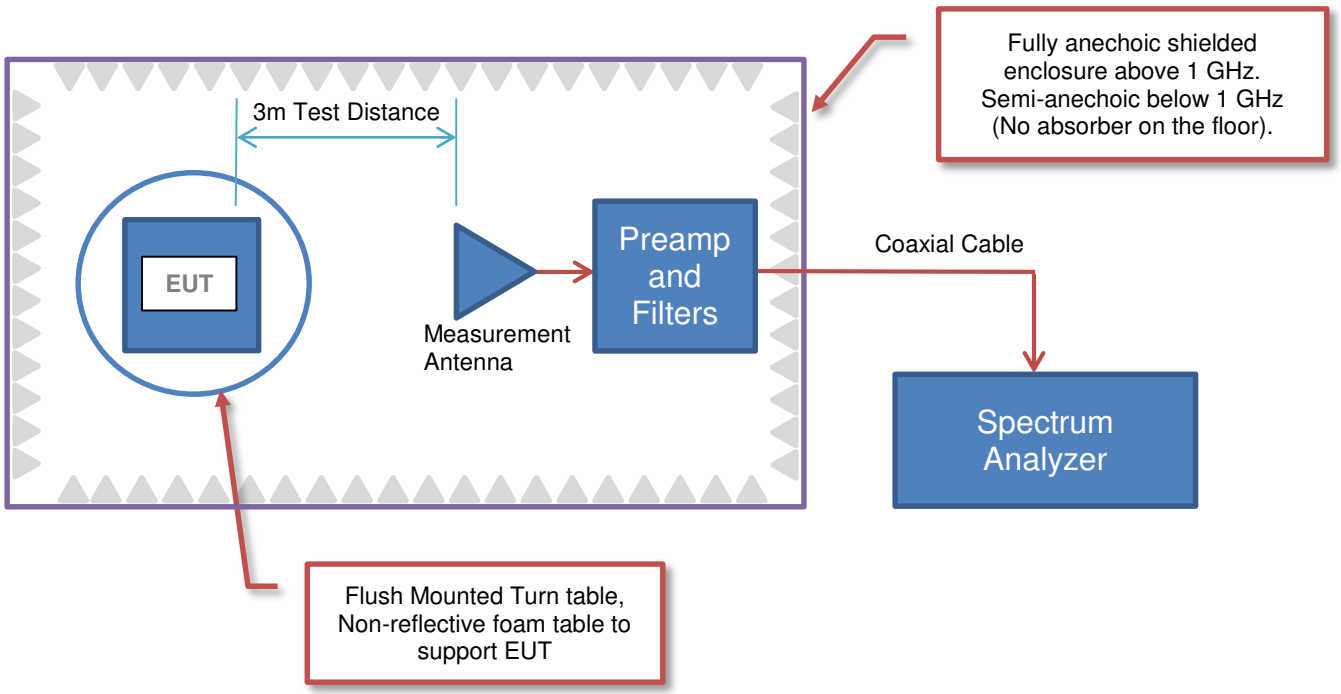
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	Global Experience Innovators, Inc.
Address:	3655 NW 87th Avenue, MLGL-815
City, State, Zip:	Miami, FL 33178
Test Requested By:	Robert Lawrence of Nytec Inc.
Model:	Ocean Medallion
First Date of Test:	August 9, 2017
Last Date of Test:	August 10, 2017
Receipt Date of Samples:	August 7, 2017
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
The Medallion is a wearable device for Identification of passengers on a cruise ship for the purpose of door access, payment for goods and services on-board the cruise ship, passenger experience thru detection of their presence. It communicates with Sensors fitted on-board the cruise ship thru Bluetooth Low Energy. It contains a Lithium cell battery (to be referred to as Lithium Cell in the document) that provides energy necessary for the wireless communication between the Medallion and the Sensors on the cruise ship. It contains 4 permanent magnets for attachment to Wrist Bands, Pendants and other accessories, each with matching magnets to keep the Medallion in place. The Medallion's housing is hermetically sealed to allow passengers to wear it while swimming. This seal will prevent water ingress up to a water pressure of 5 ATM (this is approximately a depth of 50 meters).

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

CONFIGURATIONS

Configuration NYTE0005- 1

Software/Firmware Running during test	
Description	**Version**
nRFgo Studio	1.21.2.10

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Wearable BT Device	Global Experience Innovators, Inc.	Ocean Medallion	EV1

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Development Board	Nordic Semiconductor	PCA10040 V1.1.0	682471276
Host Laptop	Toshiba	Satellite C55D-B5102	ZE315927P
Host Laptop Power Supply	Toshiba	PA3822U-1ACA	T0214490011014A

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB Cable	Yes	2.5m	No	Host Laptop	Development Board
USB Cable (Serial COM)	Yes	2.0m	No	Host Laptop	Development Board
Ribbon Cable	No	0.15m	No	Wearable BT Device	Development Board
AC Cable	No	1.8m	No	AC Mains	Host Laptop Power Supply
DC Cable	No	2.0m	No	Host Laptop	Host Laptop Power Supply

CONFIGURATIONS

Configuration NYTE0005- 2

Software/Firmware Running during test	
Description	**Version**
nRFgo Studio	1.21.2.10

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Wearable BT Device	Global Experience Innovators, Inc.	Ocean Medallion	EV1-1

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Development Board	Nordic Semiconductor	PCA10040 V1.1.0	682471276
Host Laptop	Toshiba	Satellite C55D-B5102	ZE315927P
Host Laptop Power Supply	Toshiba	PA3822U-1ACA	T0214490011014A
DC Power Source	HQ Power	PS3003U	DK10103872

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB Cable	Yes	2.5m	No	Host Laptop	Development Board
USB Cable (Serial COM)	Yes	2.0m	No	Host Laptop	Development Board
Ribbon Cable	No	0.15m	No	Wearable BT Device	Development Board
AC Cable	No	1.8m	No	AC Mains	Host Laptop Power Supply
DC Cable	No	2.0m	No	Host Laptop	Host Laptop Power Supply
AC Cable	No	1.8m	No	AC Mains	DC Power Source
DC Leads	No	1.0m	No	Wearable BT Device	DC Power Source

MODIFICATIONS

2017-1-25

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	8/9/2017	Spurious Radiated 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.
2	8/10/2017	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.
3	8/10/2017	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.
4	8/10/2017	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.
5	8/10/2017	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	8/10/2017	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.
7	8/10/2017	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

PSA-ESCI 2017.06.01

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 0 - 2402 MHz, Mid Ch 19 - 2440 MHz, and High Channel 39 - 2480 MHz

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

NYTE0005 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26000 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
Attenuator	S.M. Electronics	SA6-20	REO	2/20/2017	12 mo
Filter - High Pass	Micro-Tronics	HPM50111	HGQ	2/20/2017	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	HGK	2/20/2017	12 mo
Amplifier - Pre-Amplifier	Miteq	JSDWK42-18004000-60-5P	PAN	1/4/2017	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	PAD	8/2/2017	12 mo
Cable	ESM Cable Corp.	8-18GHz cables	OCY	5/15/2017	12 mo
Cable	ESM Cable Corp.	1-8GHz cables	OCX	5/15/2017	12 mo
Cable	ESM Cable Corp.	30-1GHz cables	OCW	5/15/2017	12 mo
Cable	D-Coax	None	OC4	1/4/2017	12 mo
Antenna - Double Ridge	A.H. Systems, Inc.	SAS-574	AXV	5/3/2016	24 mo
Antenna - Biconilog	EMCO	3142	AXA	10/24/2016	24 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVP	8/3/2017	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVL	10/17/2016	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVJ	8/3/2017	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AIR	6/23/2016	24 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AHX	NCR	0 mo
Antenna - Standard Gain	EMCO	3160-08	AHK	NCR	0 mo
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAY	10/25/2016	12 mo

TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies and the modes as showed in the data sheets.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

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

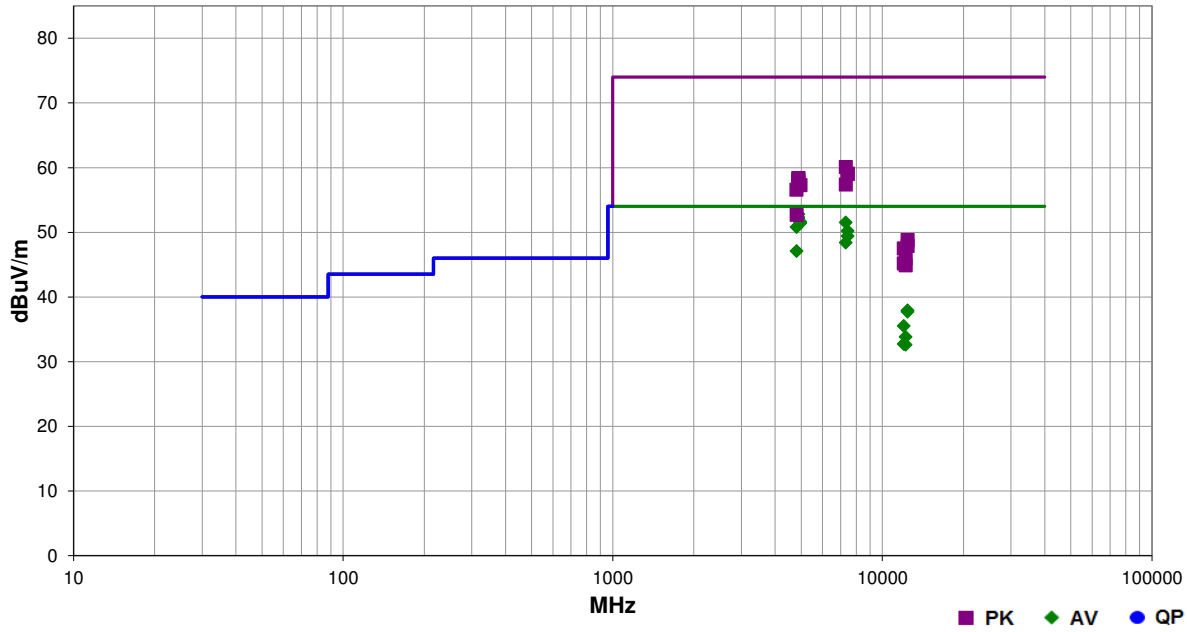
SPURIOUS RADIATED EMISSIONS

EmiR5 2017.07.11 PSA-ESCI 2017.06.01

Work Order:	NYTE0005	**Date:**	08/09/17		
Project:	None	**Temperature:**	22.9 °C		
Job Site:	OC07	**Humidity:**	45% RH		
Serial Number:	EV1	**Barometric Pres.:**	1015 mbar	**Tested by:**	Johnny Candelas
EUT:	Ocean Medallion				
Configuration:	1				
Customer:	Global Experience Innovators, Inc.				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	Transmitting BLE: Low Channel 0 - 2402 MHz, Mid Ch 19 - 2440 MHz, and High Channel 39 - 2480 MHz				
Deviations:	None				
Comments:	Only performed testing at 2-Axis since EUT is small and round				

Test Specifications	**Test Method**
FCC 15.247:2017	ANSI C63.10:2013

Run #	38	**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
4879.850	48.9	3.9	1.0	184.0	3.0	0.0	Vert	AV	0.0	52.8	54.0	-1.2	Mid Ch 19, EUT Vert
4879.792	48.4	3.9	2.7	205.0	3.0	0.0	Vert	AV	0.0	52.3	54.0	-1.7	Mid Ch 19, EUT Horiz
4879.892	48.3	3.9	2.5	164.0	3.0	0.0	Horz	AV	0.0	52.2	54.0	-1.8	Mid Ch 19, EUT Vert
4879.800	48.1	3.9	2.7	163.0	3.0	0.0	Horz	AV	0.0	52.0	54.0	-2.0	Mid Ch 19, EUT Horiz
4959.925	47.3	4.3	1.5	176.0	3.0	0.0	Vert	AV	0.0	51.6	54.0	-2.4	High Ch 39, EUT Vert
7319.117	40.9	10.6	1.0	203.0	3.0	0.0	Vert	AV	0.0	51.5	54.0	-2.5	Mid Ch 19, EUT Vert
4959.883	47.1	4.3	1.6	207.0	3.0	0.0	Horz	AV	0.0	51.4	54.0	-2.6	High Ch 39, EUT Vert
4803.725	47.1	3.7	2.4	199.0	3.0	0.0	Horz	AV	0.0	50.8	54.0	-3.2	Low Ch 0, EUT Vert
7439.133	38.5	11.7	1.2	168.0	3.0	0.0	Horz	AV	0.0	50.2	54.0	-3.8	High Ch 39, EUT Vert
7439.317	37.7	11.7	3.5	194.0	3.0	0.0	Vert	AV	0.0	49.4	54.0	-4.6	High Ch 39, EUT Vert
7319.242	37.8	10.6	1.4	161.0	3.0	0.0	Horz	AV	0.0	48.4	54.0	-5.6	Mid Ch 19, EUT Vert
4803.833	43.4	3.7	1.5	219.0	3.0	0.0	Vert	AV	0.0	47.1	54.0	-6.9	Low Ch 0, EUT Vert
7318.917	49.5	10.6	1.0	203.0	3.0	0.0	Vert	PK	0.0	60.1	74.0	-13.9	Mid Ch 19, EUT Vert
7439.308	47.4	11.7	1.2	168.0	3.0	0.0	Horz	PK	0.0	59.1	74.0	-14.9	High Ch 39, EUT Vert
7440.458	47.3	11.7	3.5	194.0	3.0	0.0	Vert	PK	0.0	59.0	74.0	-15.0	High Ch 39, EUT Vert
4879.450	54.5	3.9	1.0	184.0	3.0	0.0	Vert	PK	0.0	58.4	74.0	-15.6	Mid Ch 19, EUT Vert
4879.500	54.4	3.9	2.7	205.0	3.0	0.0	Vert	PK	0.0	58.3	74.0	-15.7	Mid Ch 19, EUT Horiz
4879.258	54.0	3.9	2.5	164.0	3.0	0.0	Horz	PK	0.0	57.9	74.0	-16.1	Mid Ch 19, 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
12400.860	32.4	5.5	1.9	117.0	3.0	0.0	Horz	AV	0.0	37.9	54.0	-16.1	High Ch 39, EUT Vert
4880.450	53.9	3.9	2.7	163.0	3.0	0.0	Horz	PK	0.0	57.8	74.0	-16.2	Mid Ch 19, EUT Horiz
12400.750	32.2	5.5	1.1	67.0	3.0	0.0	Vert	AV	0.0	37.7	54.0	-16.3	High Ch 39, EUT Vert
7320.517	46.8	10.6	1.4	161.0	3.0	0.0	Horz	PK	0.0	57.4	74.0	-16.6	Mid Ch 19, EUT Vert
4959.417	53.0	4.3	1.6	207.0	3.0	0.0	Horz	PK	0.0	57.3	74.0	-16.7	High Ch 39, EUT Vert
4960.442	53.0	4.3	1.5	176.0	3.0	0.0	Vert	PK	0.0	57.3	74.0	-16.7	High Ch 39, EUT Vert
4803.358	52.9	3.7	2.4	199.0	3.0	0.0	Horz	PK	0.0	56.6	74.0	-17.4	Low Ch 0, EUT Vert
12008.530	40.7	-5.2	2.1	198.0	3.0	0.0	Horz	AV	0.0	35.5	54.0	-18.5	Low Ch 0, EUT Vert
12198.510	37.7	-3.9	1.3	345.0	3.0	0.0	Horz	AV	0.0	33.8	54.0	-20.2	Mid Ch 19, EUT Vert
4803.758	49.0	3.7	1.5	219.0	3.0	0.0	Vert	PK	0.0	52.7	74.0	-21.3	Low Ch 0, EUT Vert
12008.520	37.9	-5.2	1.5	320.0	3.0	0.0	Vert	AV	0.0	32.7	54.0	-21.3	Low Ch 0, EUT Vert
12198.520	36.5	-3.9	1.9	88.0	3.0	0.0	Vert	AV	0.0	32.6	54.0	-21.4	Mid Ch 19, EUT Vert
12400.970	43.3	5.5	1.9	117.0	3.0	0.0	Horz	PK	0.0	48.8	74.0	-25.2	High Ch 39, EUT Vert
12400.990	42.4	5.5	1.1	67.0	3.0	0.0	Vert	PK	0.0	47.9	74.0	-26.1	High Ch 39, EUT Vert
12010.940	52.7	-5.2	2.1	198.0	3.0	0.0	Horz	PK	0.0	47.5	74.0	-26.5	Low Ch 0, EUT Vert
12200.870	49.9	-3.9	1.3	345.0	3.0	0.0	Horz	PK	0.0	46.0	74.0	-28.0	Mid Ch 19, EUT Vert
12008.490	50.4	-5.2	1.5	320.0	3.0	0.0	Vert	PK	0.0	45.2	74.0	-28.8	Low Ch 0, EUT Vert
12198.270	48.8	-3.9	1.9	88.0	3.0	0.0	Vert	PK	0.0	44.9	74.0	-29.1	Mid Ch 19, EUT Vert

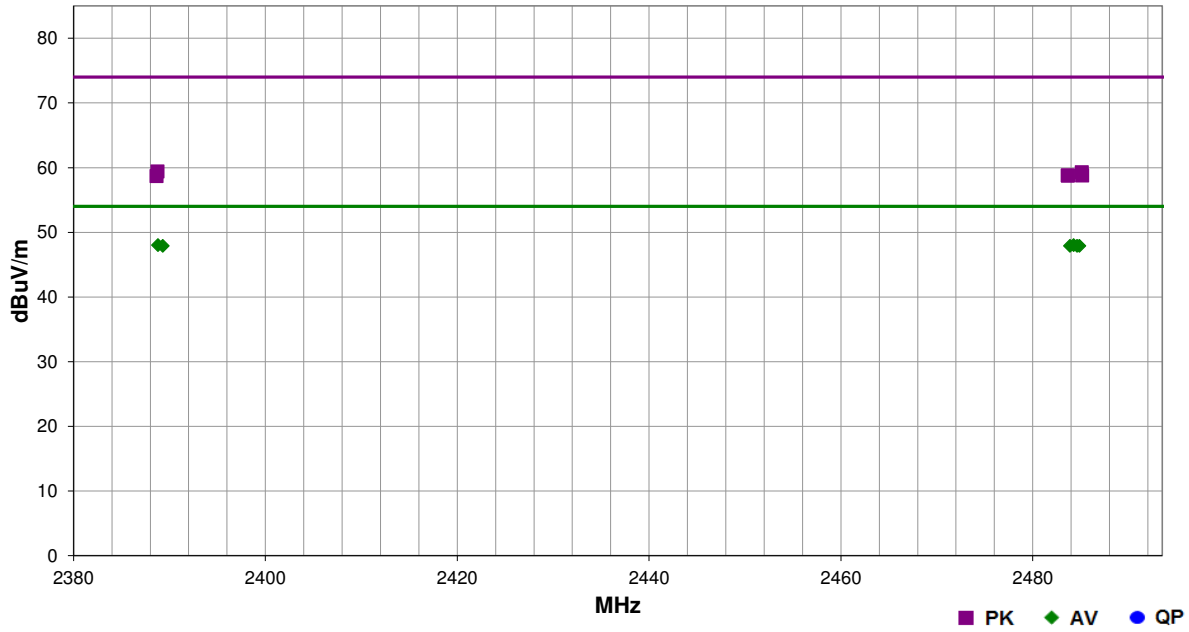
SPURIOUS RADIATED EMISSIONS

EmiR5 2017.07.11 PSA-ESCI 2017.06.01

Work Order:	NYTE0005	**Date:**	08/09/17		
Project:	None	**Temperature:**	22.9 °C		
Job Site:	OC07	**Humidity:**	45% RH		
Serial Number:	EV1	**Barometric Pres.:**	1015 mbar	**Tested by:**	Johnny Candelas
EUT:	Ocean Medallion				
Configuration:	1				
Customer:	Global Experience Innovators, Inc.				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	Transmitting BLE: Low Channel 0 - 2402 MHz and High Channel 39 - 2480 MHz				
Deviations:	None				
Comments:	Only performed testing at 2-Axis since EUT is small and round Band Edge				

Test Specifications	**Test Method**
FCC 15.247:2017	ANSI C63.10:2013

Run #	41	**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
2484.277	32.5	-4.5	1.5	359.0	3.0	20.0	Horz	AV	0.0	48.0	54.0	-6.0	High Ch 39, EUT Vert
2388.803	32.9	-4.9	1.1	129.0	3.0	20.0	Horz	AV	0.0	48.0	54.0	-6.0	Low Ch 0, EUT Vert
2483.883	32.4	-4.5	1.5	170.0	3.0	20.0	Vert	AV	0.0	47.9	54.0	-6.1	High Ch 39, EUT Vert
2484.863	32.4	-4.5	1.5	328.0	3.0	20.0	Horz	AV	0.0	47.9	54.0	-6.1	High Ch 39, EUT Horiz
2484.627	32.4	-4.5	3.5	324.0	3.0	20.0	Vert	AV	0.0	47.9	54.0	-6.1	High Ch 39, EUT Horiz
2389.313	32.8	-4.9	1.5	96.0	3.0	20.0	Vert	AV	0.0	47.9	54.0	-6.1	Low Ch 0, EUT Vert
2388.747	44.3	-4.9	1.5	96.0	3.0	20.0	Vert	PK	0.0	59.4	74.0	-14.6	Low Ch 0, EUT Vert
2485.100	43.8	-4.5	1.5	359.0	3.0	20.0	Horz	PK	0.0	59.3	74.0	-14.7	High Ch 39, EUT Vert
2483.667	43.3	-4.5	1.5	170.0	3.0	20.0	Vert	PK	0.0	58.8	74.0	-15.2	High Ch 39, EUT Vert
2485.150	43.3	-4.5	1.5	328.0	3.0	20.0	Horz	PK	0.0	58.8	74.0	-15.2	High Ch 39, EUT Horiz
2483.653	43.3	-4.5	3.5	324.0	3.0	20.0	Vert	PK	0.0	58.8	74.0	-15.2	High Ch 39, EUT Horiz
2388.647	43.6	-4.9	1.1	129.0	3.0	20.0	Horz	PK	0.0	58.7	74.0	-15.3	Low Ch 0, EUT Vert

DUTY CYCLE

XMit 2017.02.08

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	E8257D	TGU	2/5/2015	2/5/2018
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	NCR
Attenuator	Fairview Microwave	SA18H-20	TKR	1/5/2017	1/5/2018
Block - DC	Fairview Microwave	SD3379	AMV	1/11/2017	1/11/2018
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	11/2/2016	11/2/2017

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.

DUTY CYCLE

TbtTx 2017.07.11 XMit 2017.02.08

EUT:	Ocean Medallion			Work Order:	NYTE0005
Serial Number:	EV1-1			Date:	08/10/17
Customer:	Global Experience Innovators, Inc.			Temperature:	23.3 °C
Attendees:	None			Humidity:	45.4% RH
Project:	None			Barometric Pres.:	1016 mbar
Tested by:	Johnny Candelas, Salvador Solorzano	Power:	3 VDC	Job Site:	OC13

TEST SPECIFICATIONS	Test Method
FCC 15.247:2017	ANSI C63.10:2013

COMMENTS

DC Block/20dB Attenuator + Coax Cable + Patch Cable = 23.97dB total offset

DEVIATIONS FROM TEST STANDARD

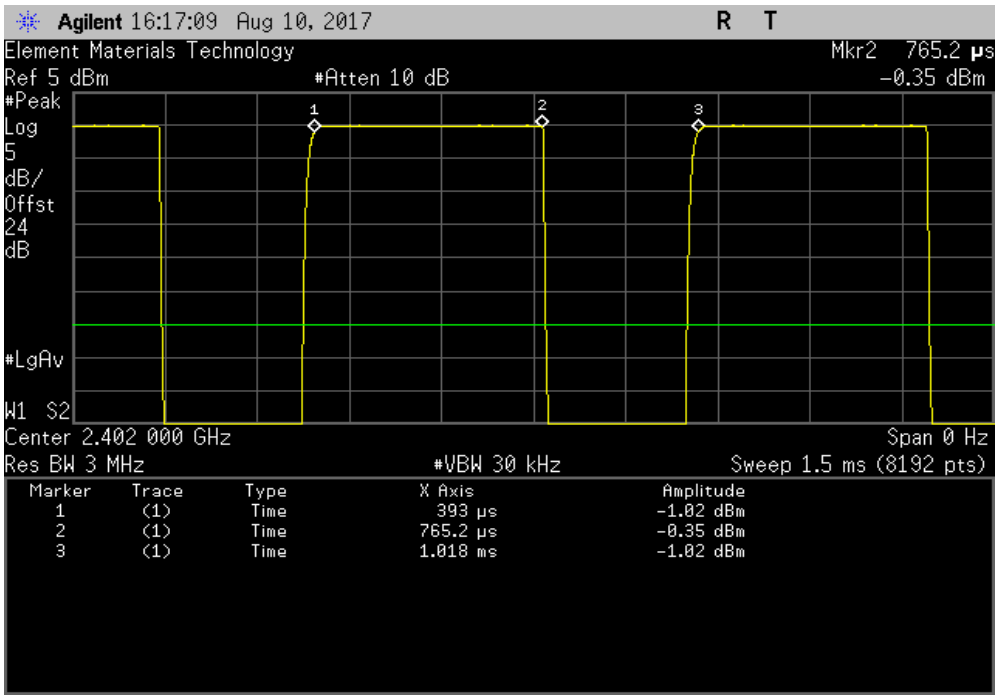
None

Configuration #	2	Signature

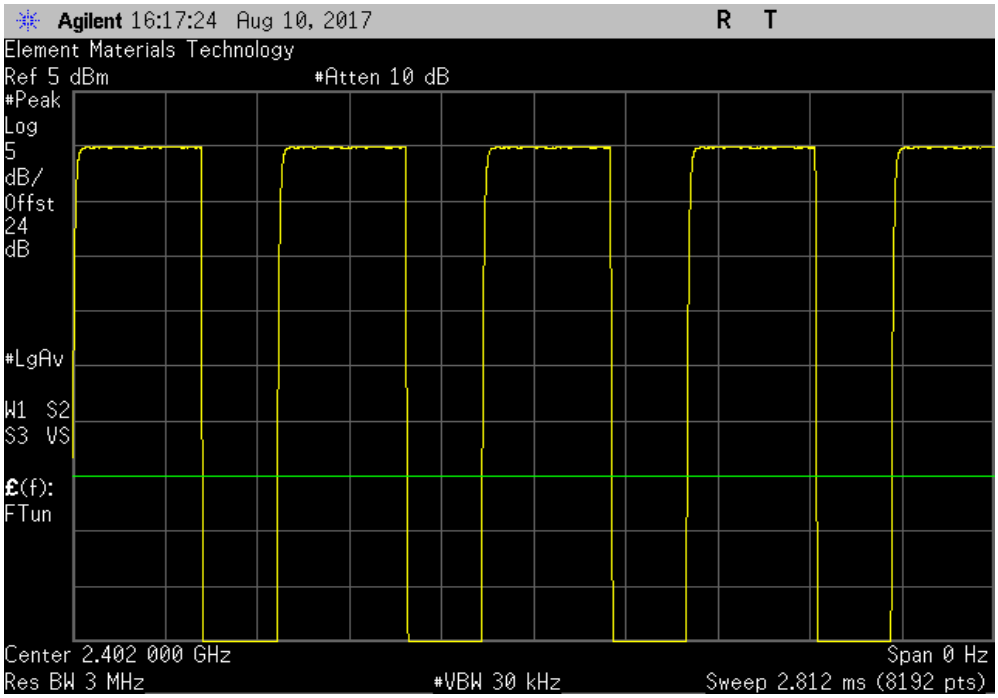
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
BLE/GFSK Low Channel, 2402 MHz	372.15 us	624.897 us	1	59.6	N/A	N/A
BLE/GFSK Low Channel, 2402 MHz	N/A	N/A	5	N/A	N/A	N/A
BLE/GFSK Mid Channel, 2440 MHz	371.967 us	625.08 us	1	59.5	N/A	N/A
BLE/GFSK Mid Channel, 2440 MHz	N/A	N/A	5	N/A	N/A	N/A
BLE/GFSK High Channel, 2480 MHz	370.319 us	624.897 us	1	59.3	N/A	N/A
BLE/GFSK High Channel, 2480 MHz	N/A	N/A	5	N/A	N/A	N/A

DUTY CYCLE

BLE/GFSK Low Channel, 2402 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	372.15 us	624.897 us	1	59.6	N/A	N/A

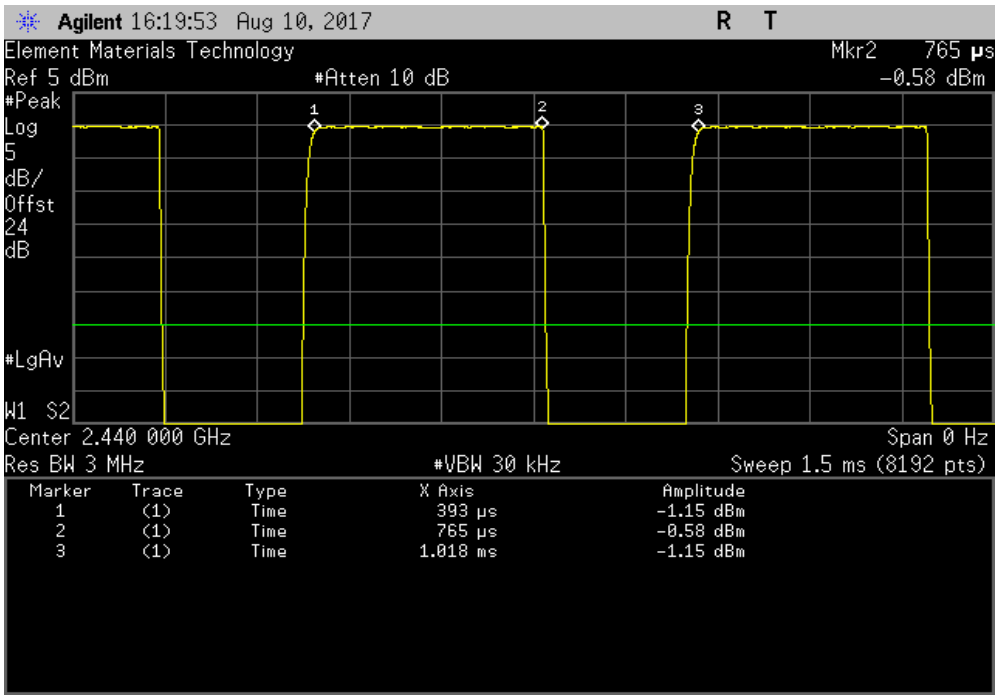


BLE/GFSK Low Channel, 2402 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

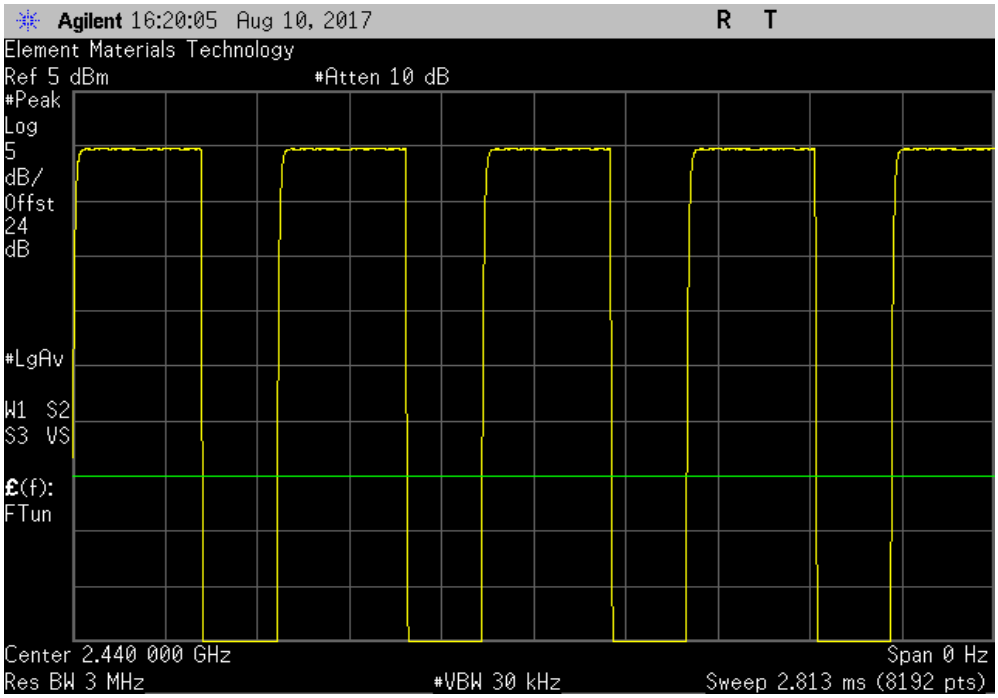


DUTY CYCLE

BLE/GFSK Mid Channel, 2440 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	371.967 us	625.08 us	1	59.5	N/A	N/A

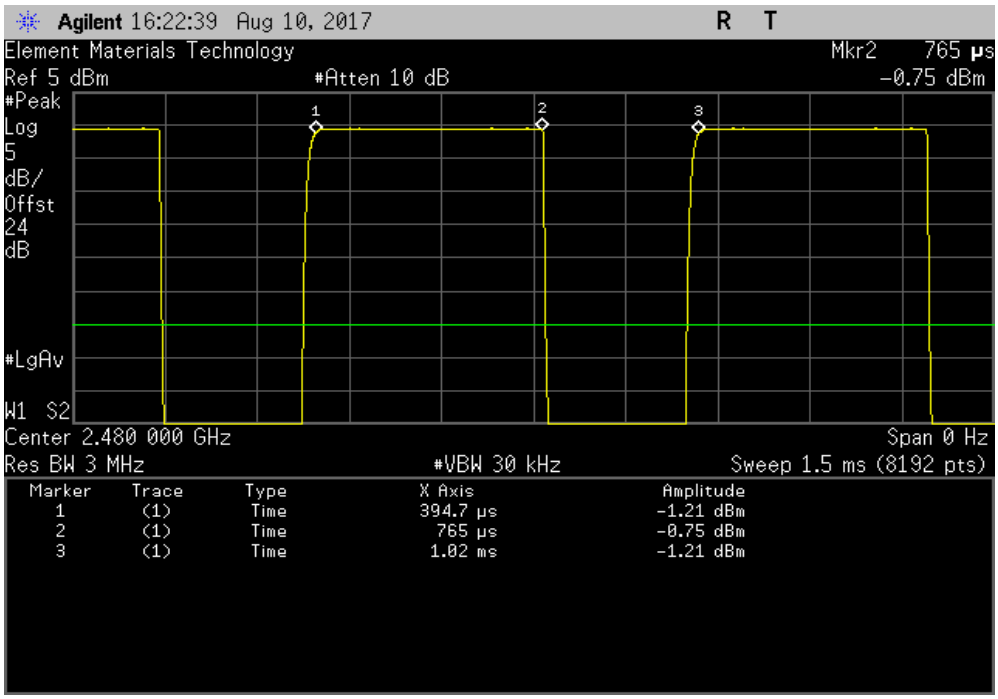


BLE/GFSK Mid Channel, 2440 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

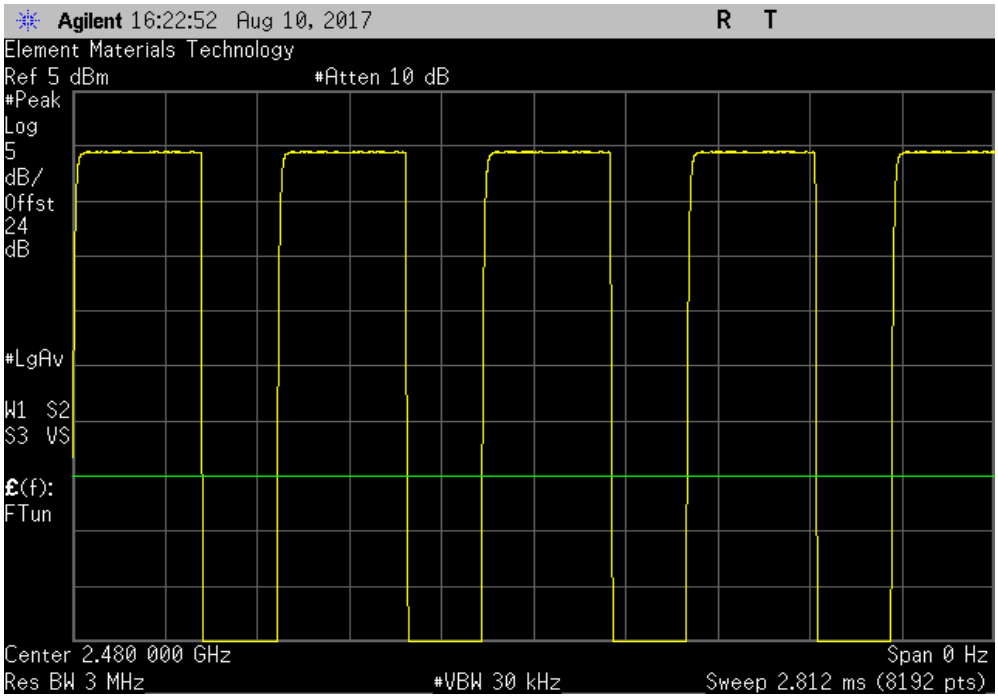


DUTY CYCLE

BLE/GFSK High Channel, 2480 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	370.319 us	624.897 us	1	59.3	N/A	N/A



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



OCCUPIED BANDWIDTH

XMit 2017.02.08

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	E8257D	TGU	2/5/2015	2/5/2018
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	NCR
Attenuator	Fairview Microwave	SA18H-20	TKR	1/5/2017	1/5/2018
Block - DC	Fairview Microwave	SD3379	AMV	1/11/2017	1/11/2018
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	11/2/2016	11/2/2017

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

OCCUPIED BANDWIDTH

TbtTx 2017.07.11 XMit 2017.02.08

EUT:	Ocean Medallion			**Work Order:**	NYTE0005
Serial Number:	EV1-1			**Date:**	08/10/17
Customer:	Global Experience Innovators, Inc.			**Temperature:**	23.3 °C
Attendees:	None			**Humidity:**	45.4% RH
Project:	None			**Barometric Pres.:**	1016 mbar
Tested by:	Johnny Candelas, Salvador Solorzano	**Power:**	3 VDC	**Job Site:**	OC13

TEST SPECIFICATIONS	Test Method
FCC 15.247:2017	ANSI C63.10:2013

COMMENTS

DC Block/20dB Attenuator + Coax Cable + Patch Cable = 23.97dB total offset

DEVIATIONS FROM TEST STANDARD

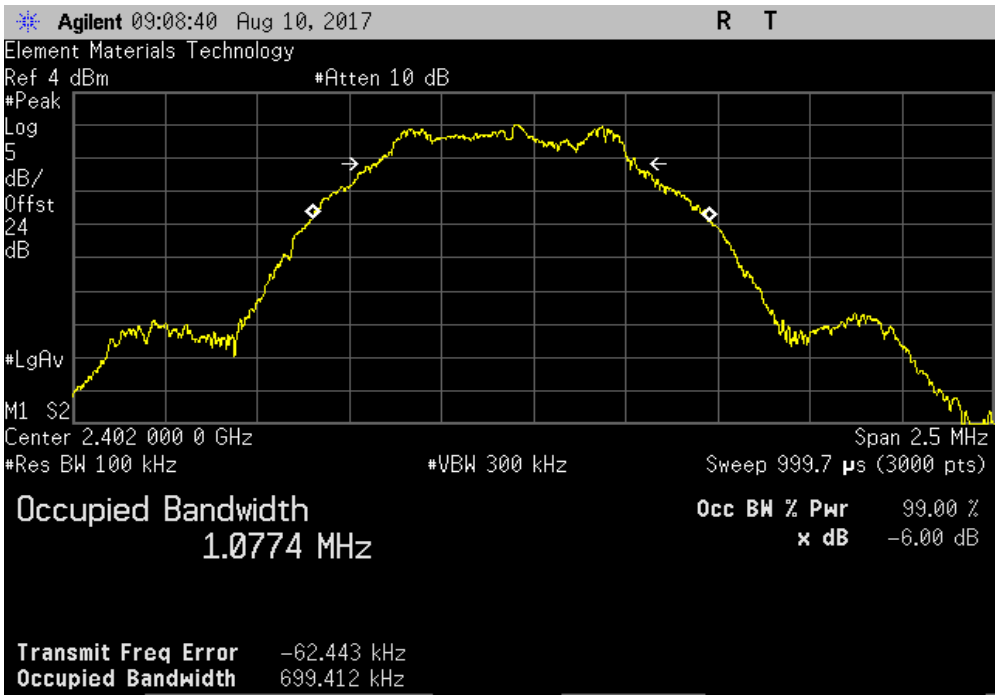
None

Configuration #	2	Signature

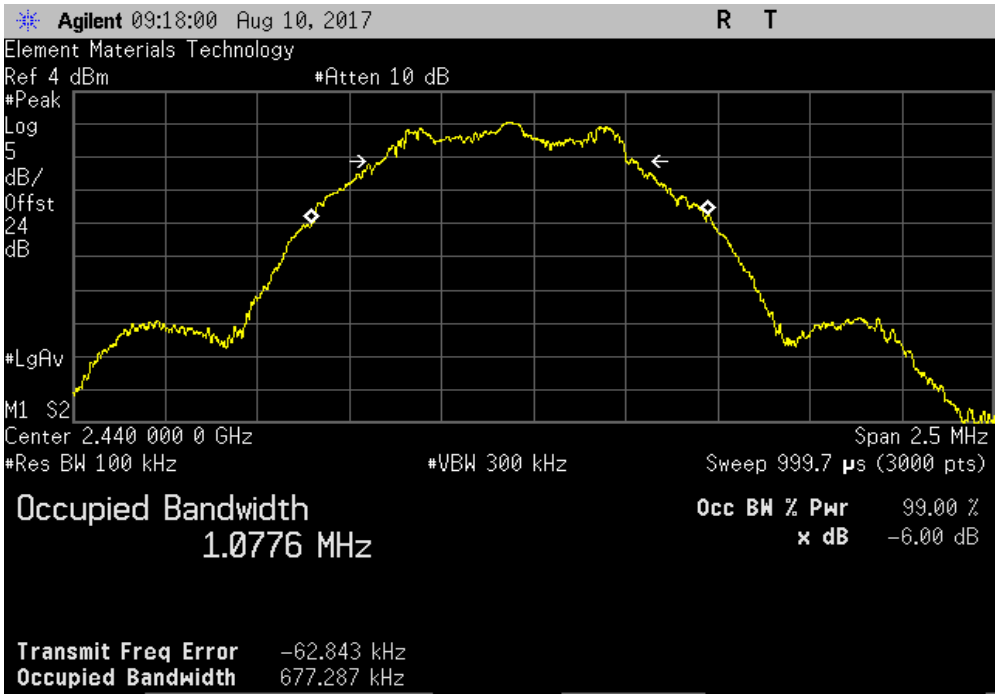
	Value	Limit (≥)	Result
BLE/GFSK Low Channel, 2402 MHz	699.412 kHz	500 kHz	Pass
BLE/GFSK Mid Channel, 2440 MHz	677.287 kHz	500 kHz	Pass
BLE/GFSK High Channel, 2480 MHz	682.049 kHz	500 kHz	Pass

OCCUPIED BANDWIDTH

BLE/GFSK Low Channel, 2402 MHz						
				Value	Limit (≥)	Result
				699.412 kHz	500 kHz	Pass

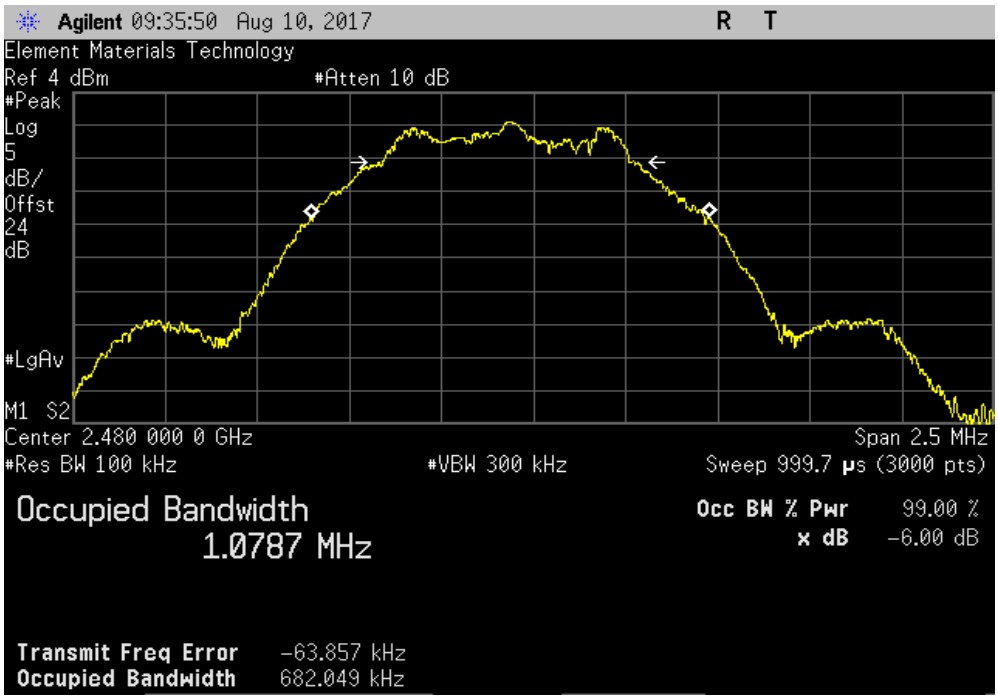


BLE/GFSK Mid Channel, 2440 MHz						
				Value	Limit (≥)	Result
				677.287 kHz	500 kHz	Pass



OCCUPIED BANDWIDTH

BLE/GFSK High Channel, 2480 MHz						
				Value	Limit (≥)	Result
				682.049 kHz	500 kHz	Pass



OUTPUT POWER

XMit 2017.02.08

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	E8257D	TGU	2/5/2015	2/5/2018
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	NCR
Attenuator	Fairview Microwave	SA18H-20	TKR	1/5/2017	1/5/2018
Block - DC	Fairview Microwave	SD3379	AMV	1/11/2017	1/11/2018
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	11/2/2016	11/2/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum.

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

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

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

OUTPUT POWER

TbtTx 2017.07.11 XMit 2017.02.08

EUT:	Ocean Medallion			**Work Order:**	NYTE0005
Serial Number:	EV1-1			**Date:**	08/10/17
Customer:	Global Experience Innovators, Inc.			**Temperature:**	23.3 °C
Attendees:	None			**Humidity:**	45.4% RH
Project:	None			**Barometric Pres.:**	1016 mbar
Tested by:	Johnny Candelas, Salvador Solorzano	**Power:**	3 VDC	**Job Site:**	OC13

TEST SPECIFICATIONS	Test Method
FCC 15.247:2017	ANSI C63.10:2013

COMMENTS

DC Block/20dB Attenuator + Coax Cable + Patch Cable = 23.97dB total offset

DEVIATIONS FROM TEST STANDARD

None

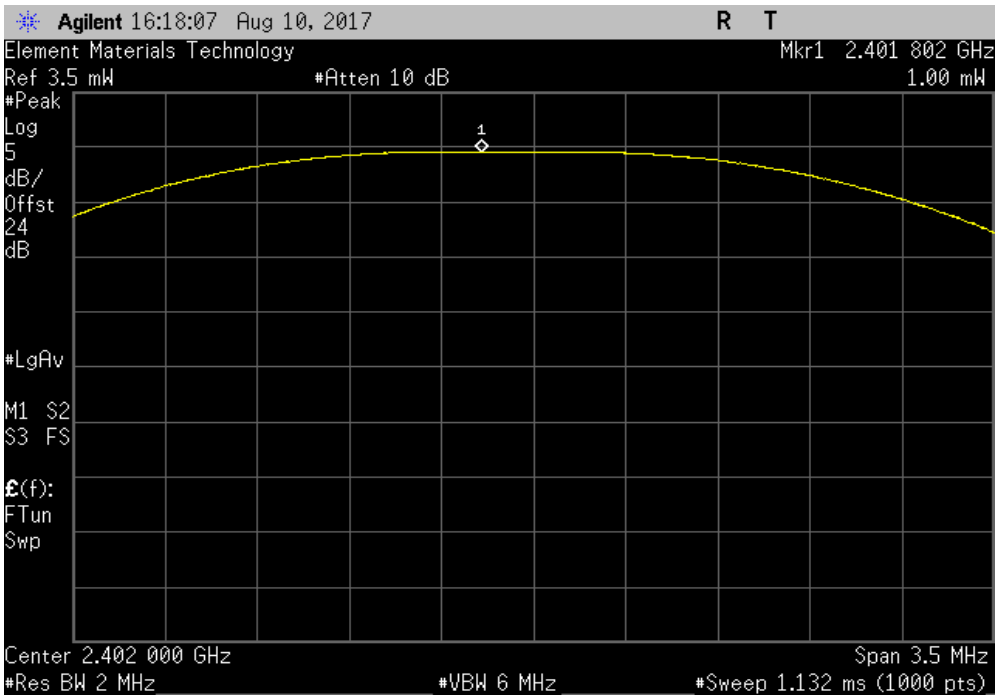
Configuration #	2	Signature

	Value	Limit (<)	Result
BLE/GFSK Low Channel, 2402 MHz	1.002 mW	1 W	Pass
BLE/GFSK Mid Channel, 2440 MHz	0.975 mW	1 W	Pass
BLE/GFSK High Channel, 2480 MHz	0.905 mW	1 W	Pass

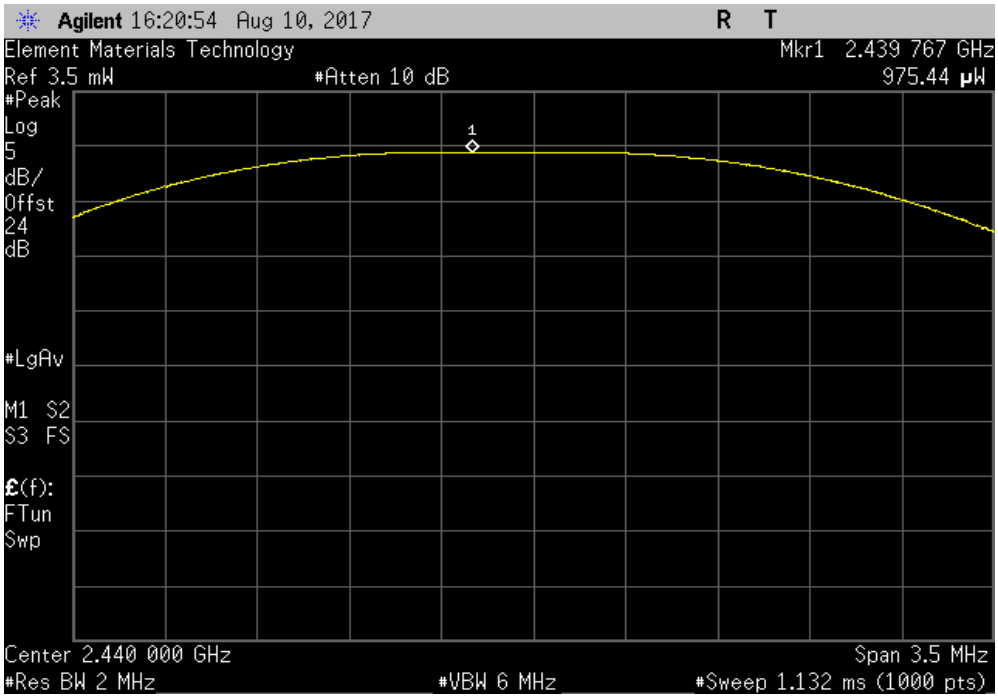
OUTPUT POWER

TbtTx 2017.07.11 XMit 2017.02.08

BLE/GFSK Low Channel, 2402 MHz							
					Value	Limit (<)	Result
					1.002 mW	1 W	Pass



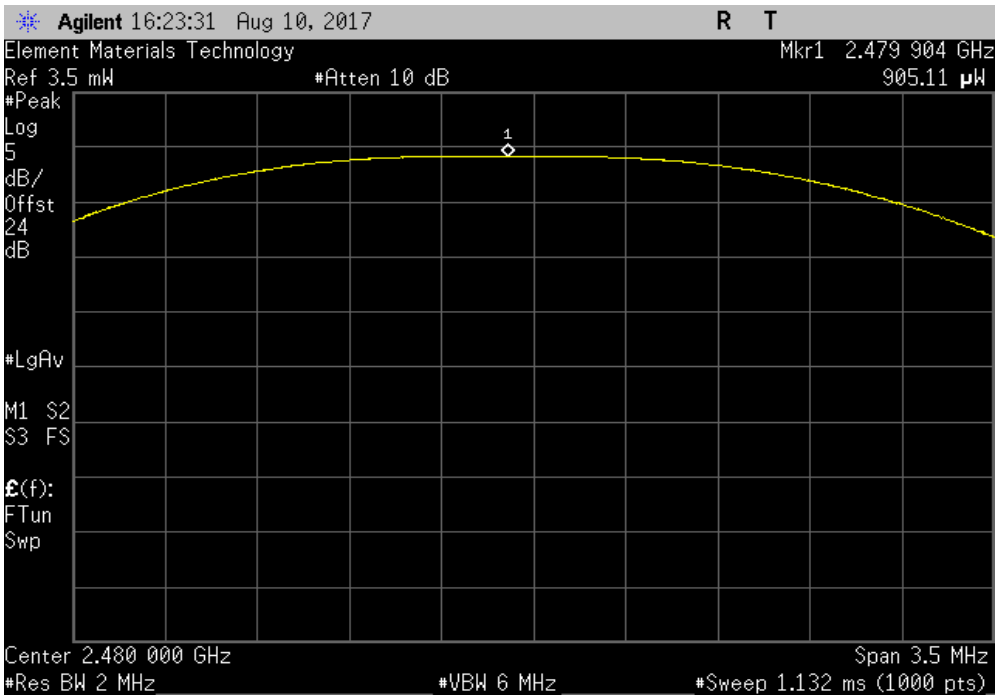
BLE/GFSK Mid Channel, 2440 MHz							
					Value	Limit (<)	Result
					0.975 mW	1 W	Pass



OUTPUT POWER

TbtTx 2017.07.11 XMit 2017.02.08

BLE/GFSK High Channel, 2480 MHz							
					Value	Limit (<)	Result
					0.905 mW	1 W	Pass



POWER SPECTRAL DENSITY

XMit 2017.02.08

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	E8257D	TGU	2/5/2015	2/5/2018
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	NCR
Attenuator	Fairview Microwave	SA18H-20	TKR	1/5/2017	1/5/2018
Block - DC	Fairview Microwave	SD3379	AMV	1/11/2017	1/11/2018
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	11/2/2016	11/2/2017

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.

POWER SPECTRAL DENSITY

TbtTx 2017.07.11 XMit 2017.02.08

EUT:	Ocean Medallion			**Work Order:**	NYTE0005
Serial Number:	EV1-1			**Date:**	08/10/17
Customer:	Global Experience Innovators, Inc.			**Temperature:**	23.3 °C
Attendees:	None			**Humidity:**	45.4% RH
Project:	None			**Barometric Pres.:**	1016 mbar
Tested by:	Johnny Candelas, Salvador Solorzano	**Power:**	3 VDC	**Job Site:**	OC13

TEST SPECIFICATIONS	Test Method
FCC 15.247:2017	ANSI C63.10:2013

COMMENTS

DC Block/20dB Attenuator + Coax Cable + Patch Cable = 23.97dB total offset

DEVIATIONS FROM TEST STANDARD

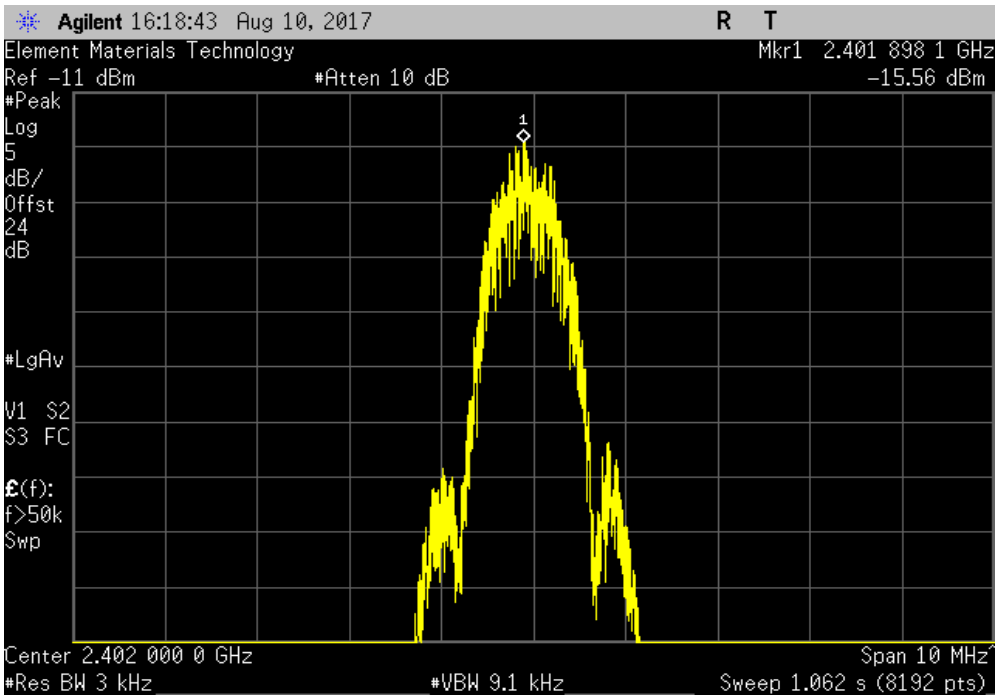
None

Configuration #	2	Signature

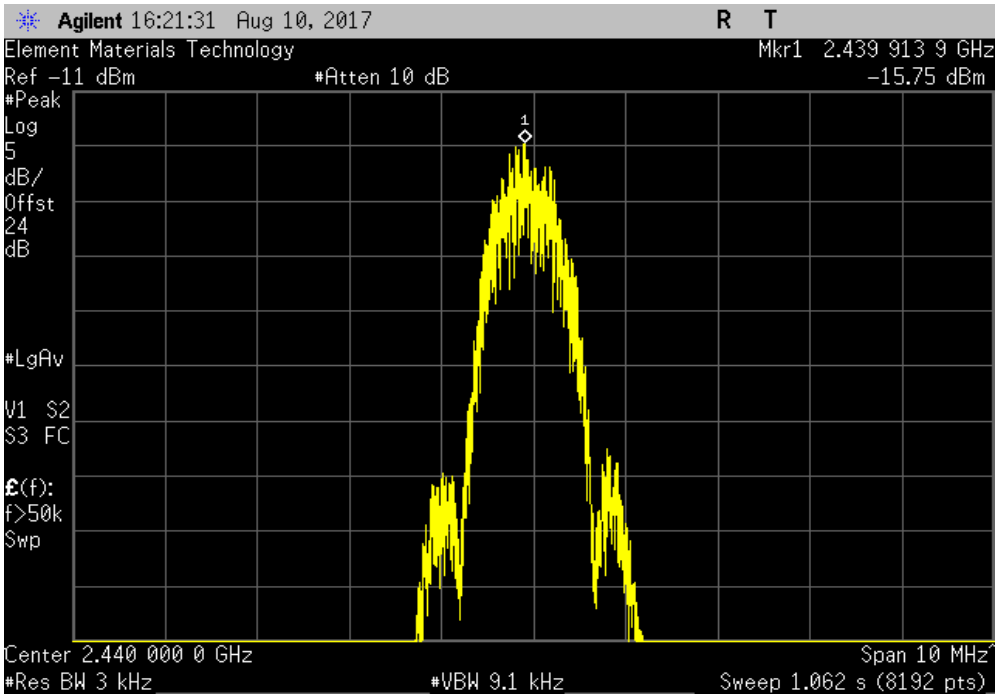
	Value dBm/3kHz	Limit < dBm/3kHz	Results
BLE/GFSK Low Channel, 2402 MHz	-15.557	8	Pass
BLE/GFSK Mid Channel, 2440 MHz	-15.747	8	Pass
BLE/GFSK High Channel, 2480 MHz	-16.022	8	Pass

POWER SPECTRAL DENSITY

BLE/GFSK Low Channel, 2402 MHz							
					Value dBm/3kHz	Limit < dBm/3kHz	Results
					-15.557	8	Pass

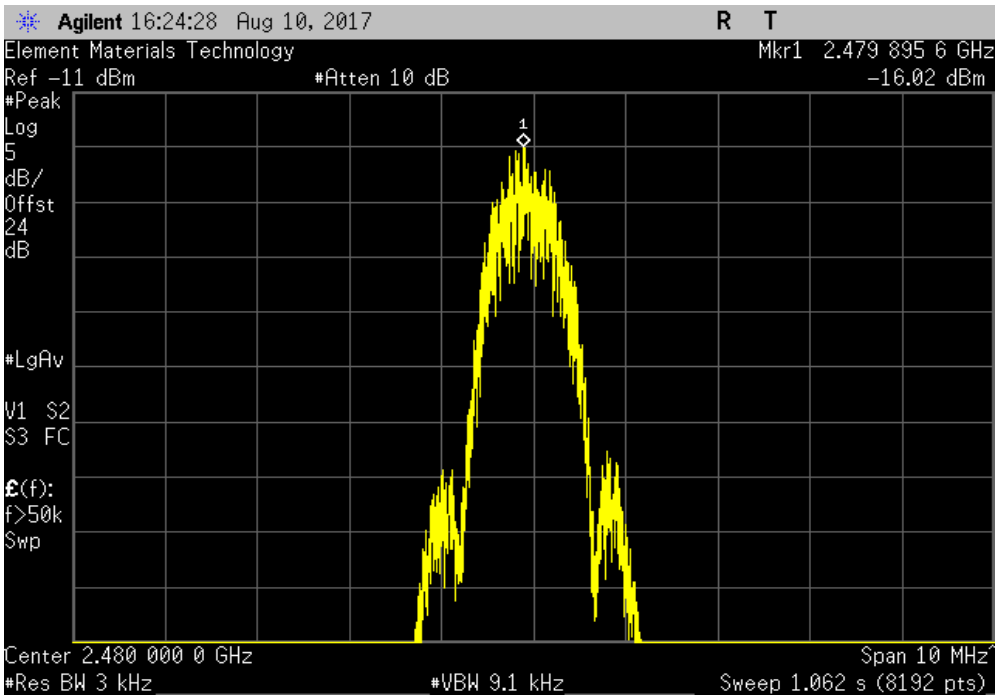


BLE/GFSK Mid Channel, 2440 MHz							
					Value dBm/3kHz	Limit < dBm/3kHz	Results
					-15.747	8	Pass



POWER SPECTRAL DENSITY

BLE/GFSK High Channel, 2480 MHz							
					Value dBm/3kHz	Limit < dBm/3kHz	Results
					-16.022	8	Pass



BAND EDGE COMPLIANCE

XMit 2017.02.08

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	E8257D	TGU	2/5/2015	2/5/2018
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	NCR
Attenuator	Fairview Microwave	SA18H-20	TKR	1/5/2017	1/5/2018
Block - DC	Fairview Microwave	SD3379	AMV	1/11/2017	1/11/2018
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	11/2/2016	11/2/2017

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.

BAND EDGE COMPLIANCE

TbtTx 2017.07.11 XMit 2017.02.08

EUT:	Ocean Medallion			**Work Order:**	NYTE0005
Serial Number:	EV1-1			**Date:**	08/10/17
Customer:	Global Experience Innovators, Inc.			**Temperature:**	23.3 °C
Attendees:	None			**Humidity:**	45.4% RH
Project:	None			**Barometric Pres.:**	1016 mbar
Tested by:	Johnny Candelas, Salvador Solorzano	**Power:**	3 VDC	**Job Site:**	OC13

TEST SPECIFICATIONS	**Test Method**
FCC 15.245:2017	ANSI C63.10:2013

COMMENTS

DC Block/20dB Attenuator + Coax Cable + Patch Cable = 23.97dB total offset

DEVIATIONS FROM TEST STANDARD

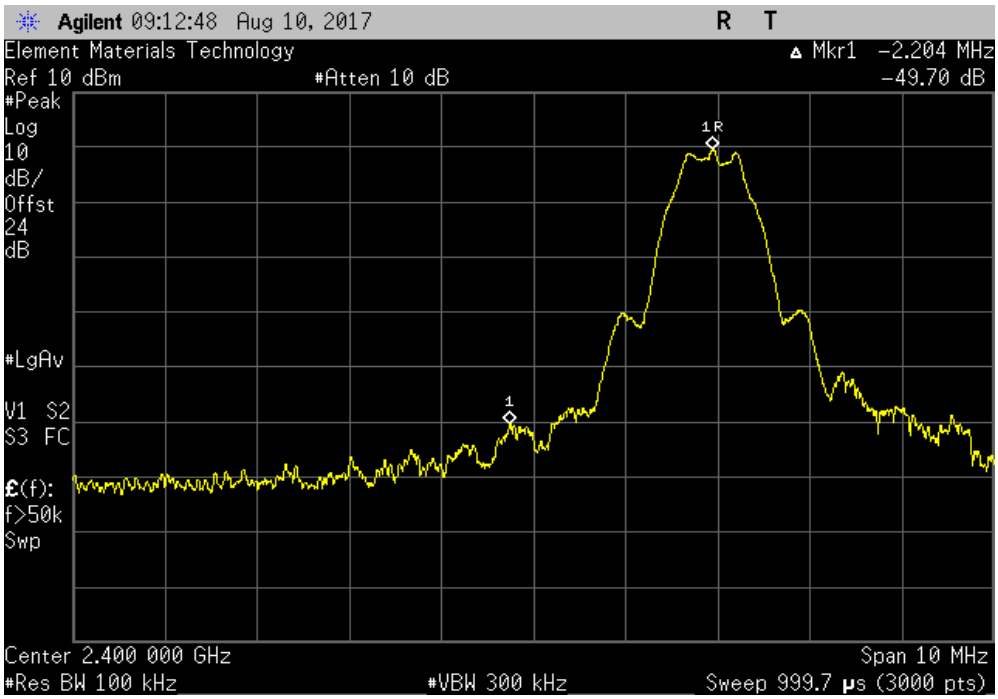
None

Configuration #	2	*Signature*

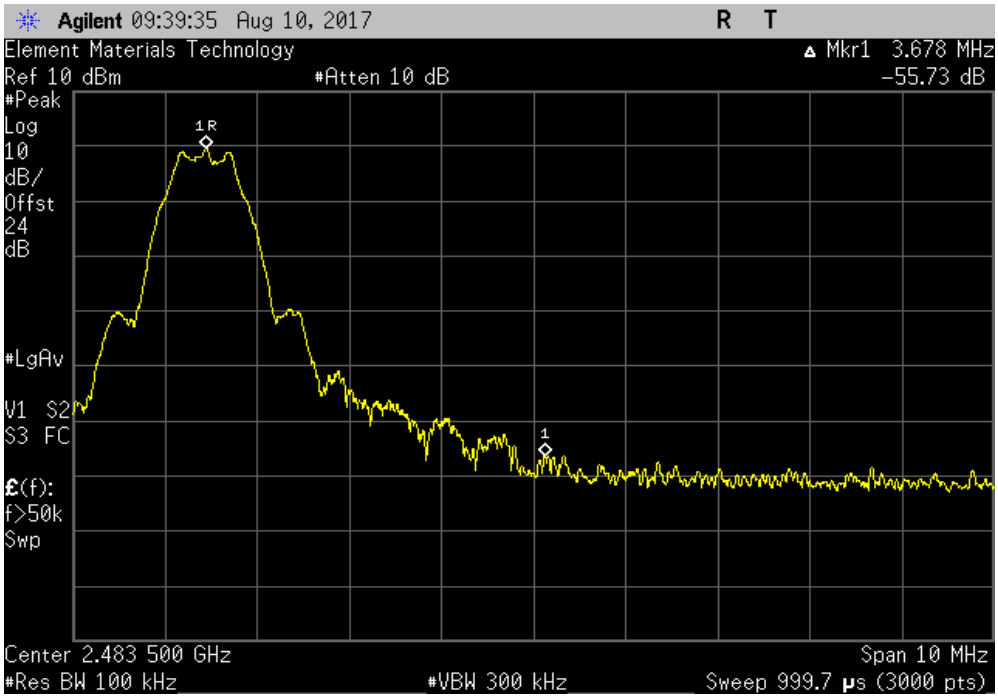
	Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK Low Channel, 2402 MHz	-49.70	-20	Pass
BLE/GFSK High Channel, 2480 MHz	-55.73	-20	Pass

BAND EDGE COMPLIANCE

BLE/GFSK Low Channel, 2402 MHz							
					Value (dBc)	Limit ≤ (dBc)	Result
					-49.70	-20	Pass



BLE/GFSK High Channel, 2480 MHz							
					Value (dBc)	Limit ≤ (dBc)	Result
					-55.73	-20	Pass



SPURIOUS CONDUCTED EMISSIONS

XMit 2017.02.08

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	E8257D	TGU	2/5/2015	2/5/2018
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	NCR
Attenuator	Fairview Microwave	SA18H-20	TKR	1/5/2017	1/5/2018
Block - DC	Fairview Microwave	SD3379	AMV	1/11/2017	1/11/2018
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	11/2/2016	11/2/2017

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.

SPURIOUS CONDUCTED EMISSIONS

TbtTx 2017.07.11 XMit 2017.02.08

EUT:	Ocean Medallion			**Work Order:**	NYTE0005
Serial Number:	EV1-1			**Date:**	08/10/17
Customer:	Global Experience Innovators, Inc.			**Temperature:**	23.3 °C
Attendees:	None			**Humidity:**	45.4% RH
Project:	None			**Barometric Pres.:**	1016 mbar
Tested by:	Johnny Candelas, Salvador Solorzano	**Power:**	3 VDC	**Job Site:**	OC13

TEST SPECIFICATIONS	Test Method
FCC 15.247:2017	ANSI C63.10:2013

COMMENTS

DC Block/20dB Attenuator + Coax Cable + Patch Cable = 23.97dB total offset

DEVIATIONS FROM TEST STANDARD

None

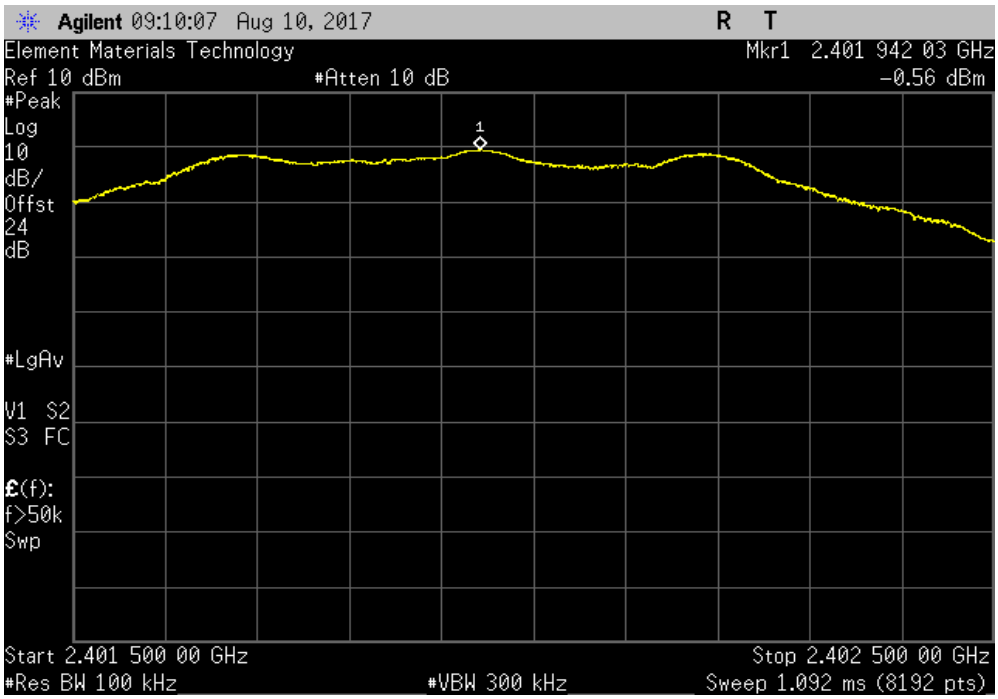
Configuration #	2	*Signature*

	Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK Low Channel, 2402 MHz	Fundamental	N/A	N/A	N/A
BLE/GFSK Low Channel, 2402 MHz	30 MHz - 12.5 GHz	-48.83	-20	Pass
BLE/GFSK Low Channel, 2402 MHz	12.5 GHz - 25 GHz	-50.43	-20	Pass
BLE/GFSK Mid Channel, 2440 MHz	Fundamental	N/A	N/A	N/A
BLE/GFSK Mid Channel, 2440 MHz	30 MHz - 12.5 GHz	-49.95	-20	Pass
BLE/GFSK Mid Channel, 2440 MHz	12.5 GHz - 25 GHz	-49.97	-20	Pass
BLE/GFSK High Channel, 2480 MHz	Fundamental	N/A	N/A	N/A
BLE/GFSK High Channel, 2480 MHz	30 MHz - 12.5 GHz	-49.82	-20	Pass
BLE/GFSK High Channel, 2480 MHz	12.5 GHz - 25 GHz	-50.13	-20	Pass

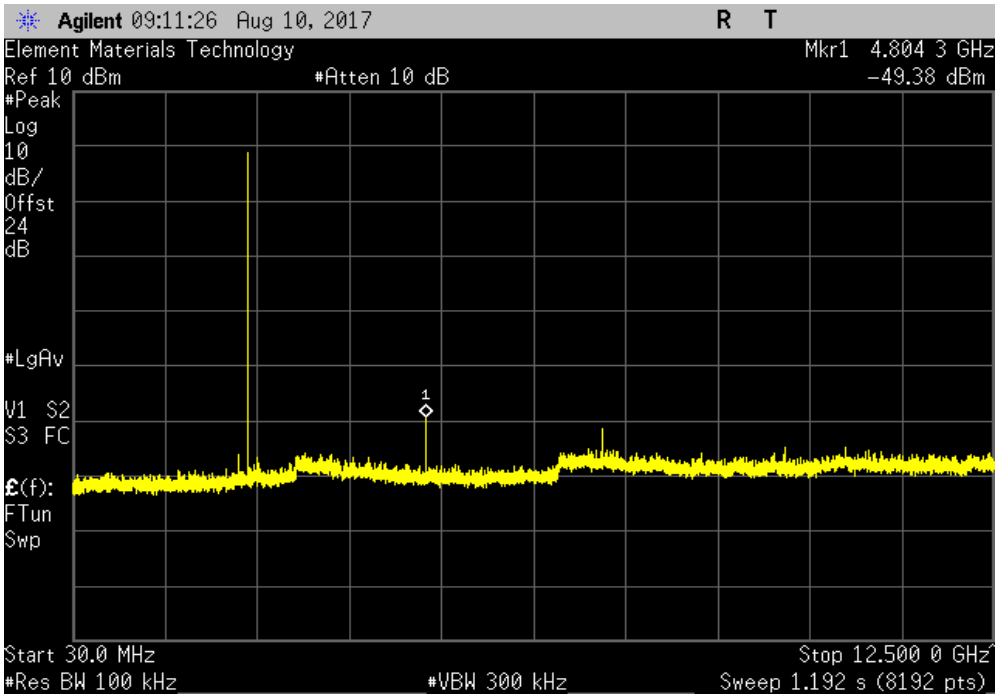
SPURIOUS CONDUCTED EMISSIONS

TbtTx 2017.07.11 XMit 2017.02.08

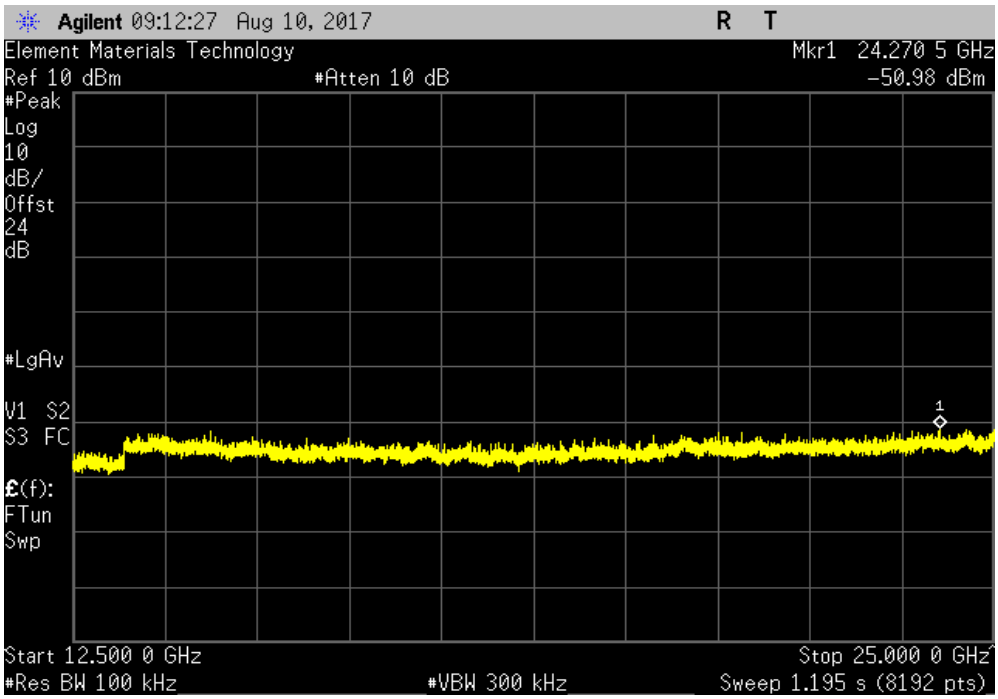
BLE/GFSK Low Channel, 2402 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



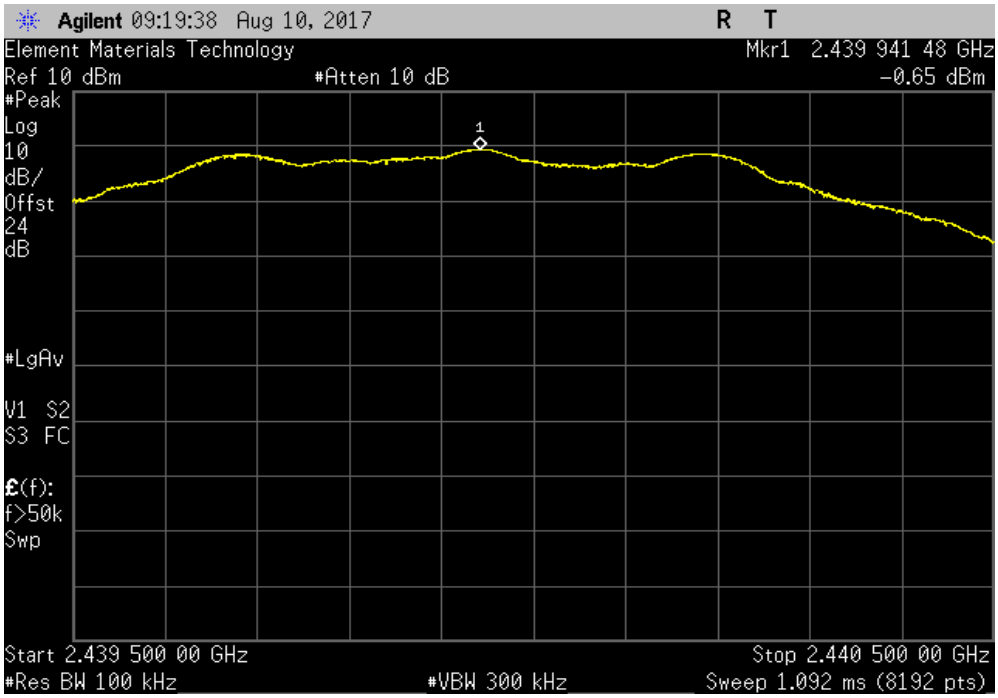
BLE/GFSK Low Channel, 2402 MHz					
Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-48.83	-20	Pass



BLE/GFSK Low Channel, 2402 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-50.43	-20	Pass

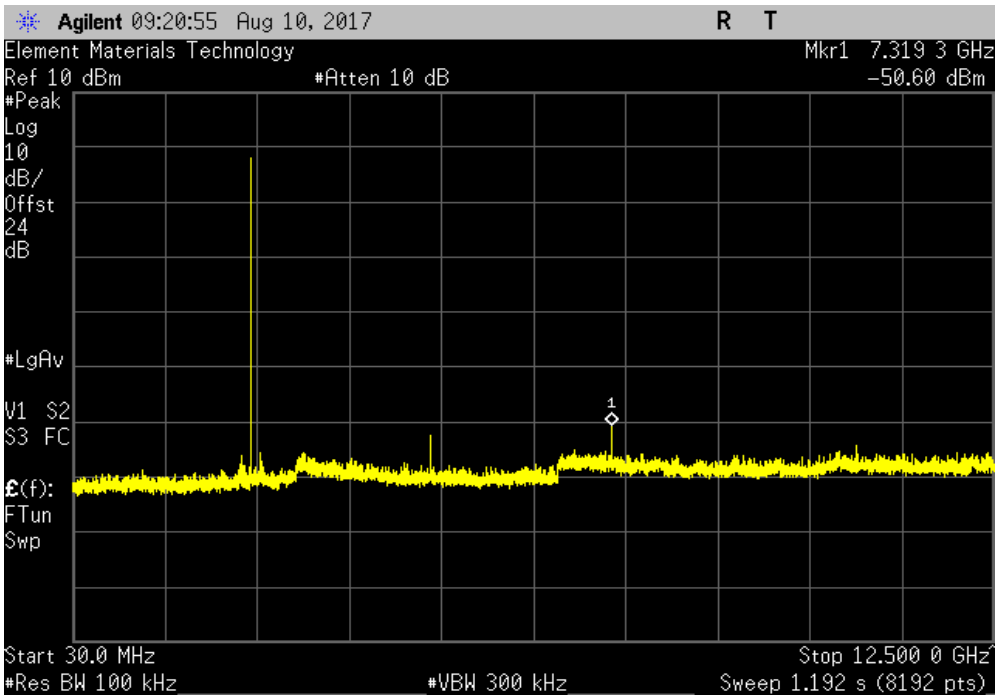


BLE/GFSK Mid Channel, 2440 MHz					
	Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
	Fundamental		N/A	N/A	N/A

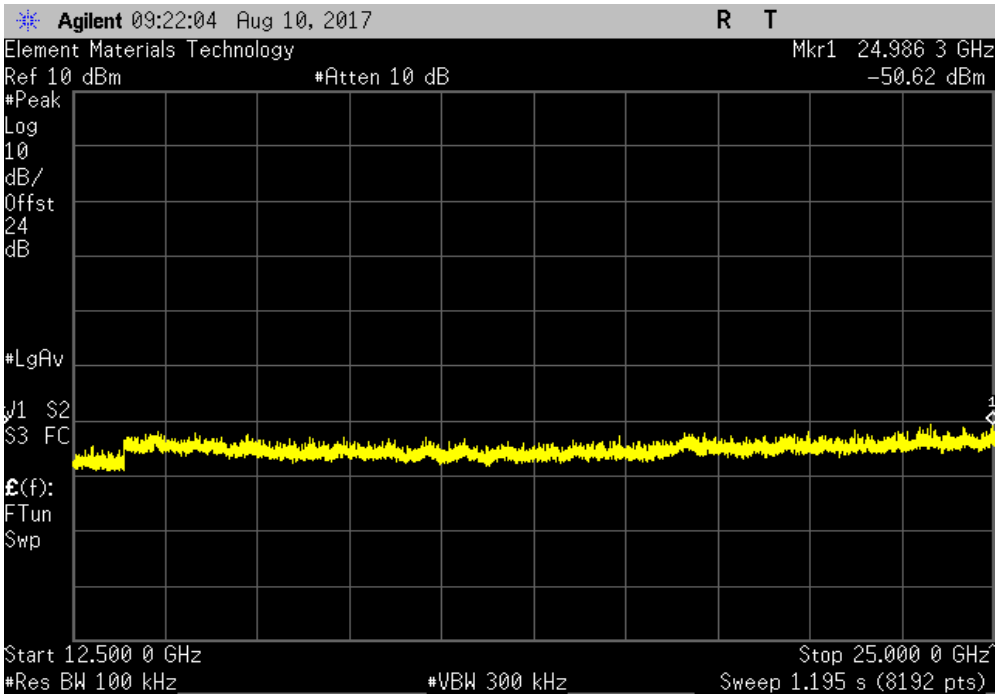


SPURIOUS CONDUCTED EMISSIONS

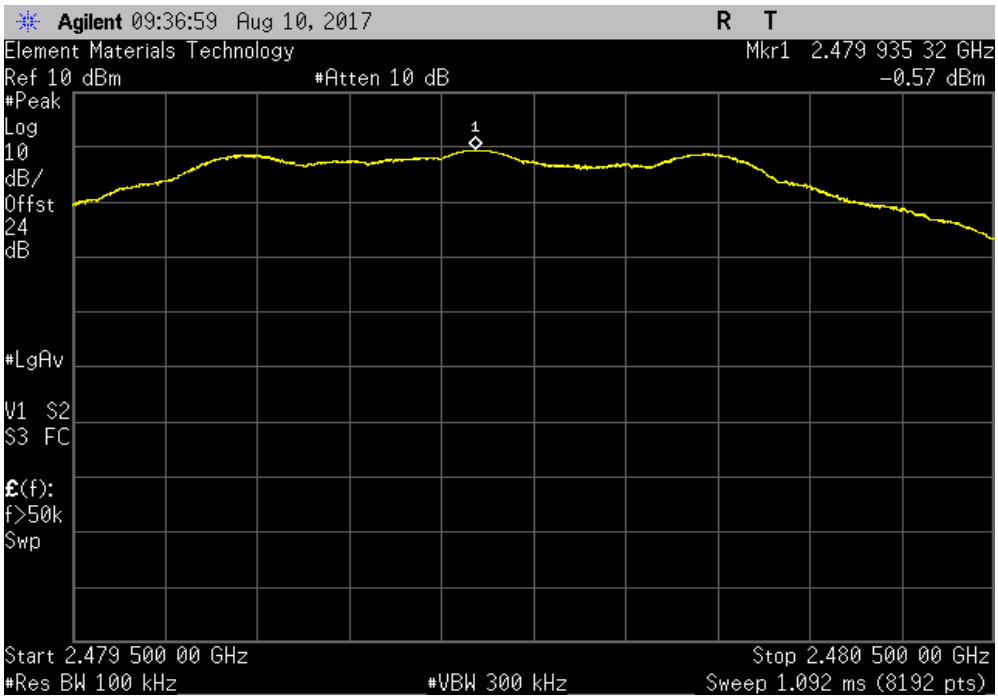
BLE/GFSK Mid Channel, 2440 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz		-49.95	-20	Pass



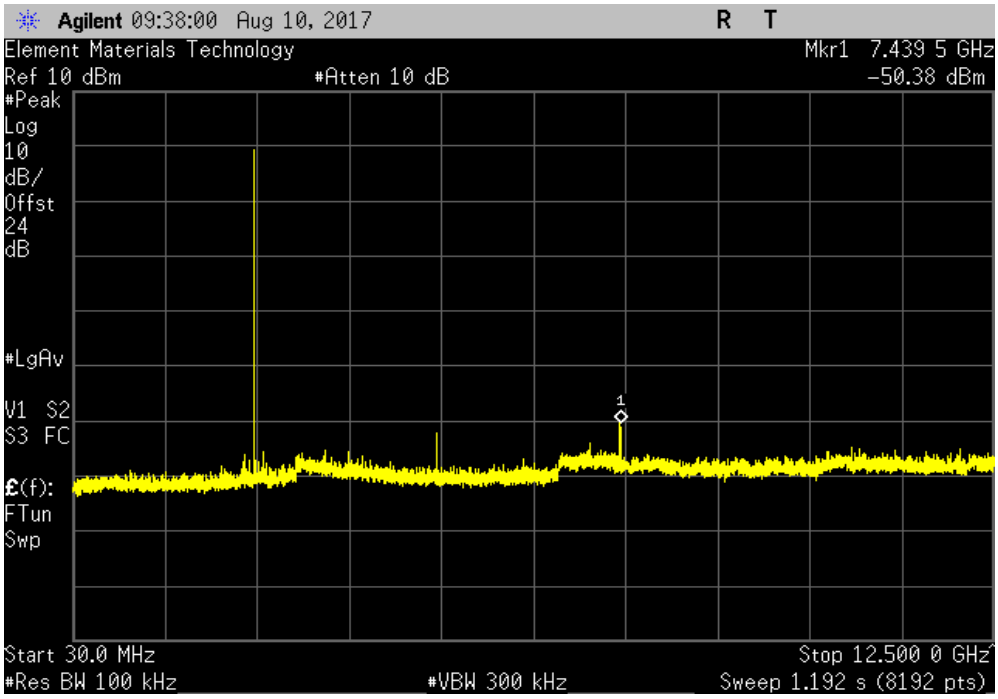
BLE/GFSK Mid Channel, 2440 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-49.97	-20	Pass



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



BLE/GFSK High Channel, 2480 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	30 MHz - 12.5 GHz			-49.82	-20	Pass



SPURIOUS CONDUCTED EMISSIONS

BLE/GFSK High Channel, 2480 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-50.13	-20	Pass