NORTHWEST EMC

Awarepoint Corporation

BLEB

FCC 15.247:2016

Bluetooth Radio Module

Report # AWAR0023.6

NVLAP TESTING

NVLAP Lab Code: 200676-0

CERTIFICATE OF TEST

NORTHWEST EMC
2014-12-10

Last Date of Test: August 8, 2016
Awarepoint Corporation
Model: BLEB

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2016	ANSI C63.10:2013, KDB 558074

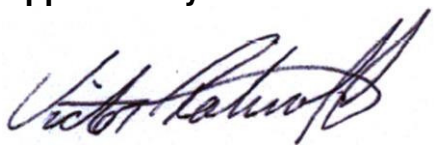
Results

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

NORTHWEST EMC
REV 2014.10.14

Revision Number	Description	Date	Page Number
00	None		

ACCREDITATIONS AND AUTHORIZATIONS

NORTHWEST EMC
REV 2016.7.25

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 Northwest EMC 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 – Validated by the European Commission 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

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://www.nwemc.com/accreditations/
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.

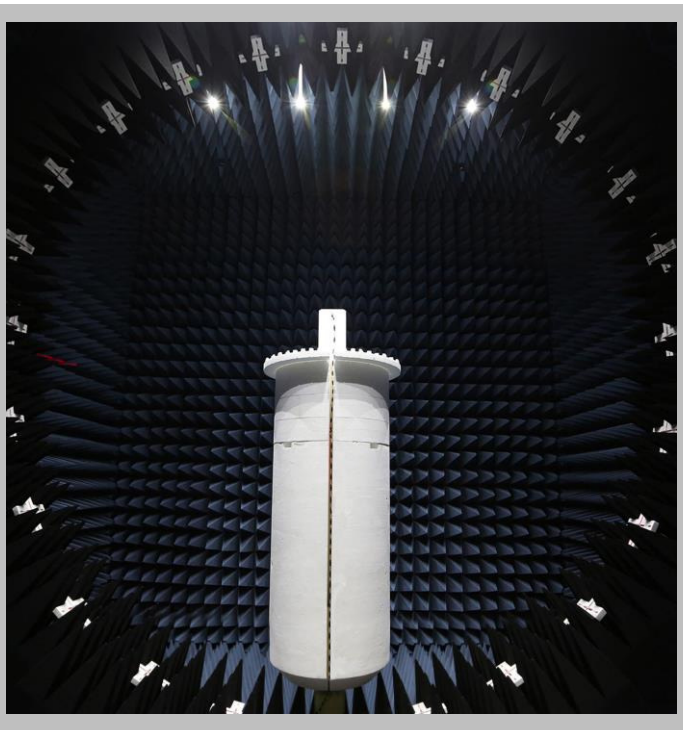
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

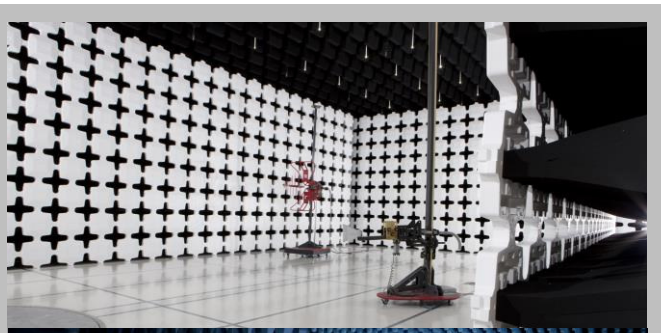
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%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

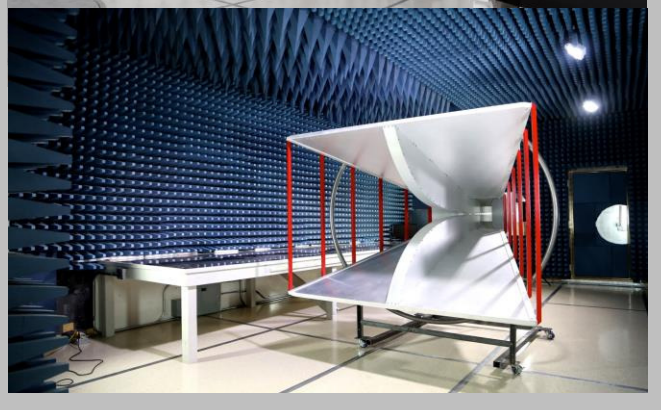
FACILITIES

NORTHWEST EMC
REV 2016.7.25

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	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

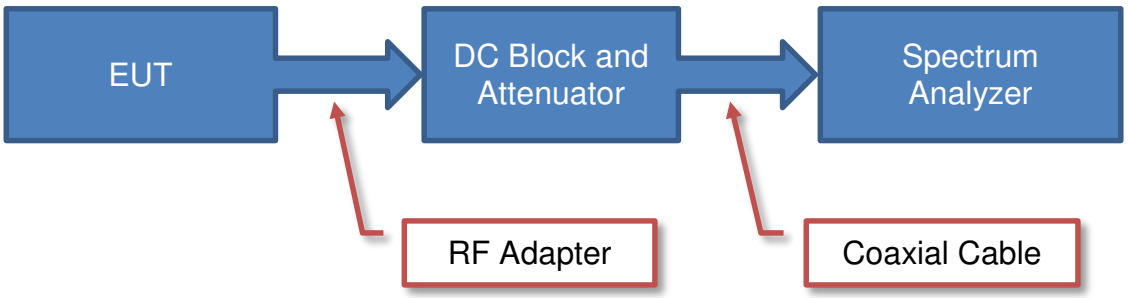




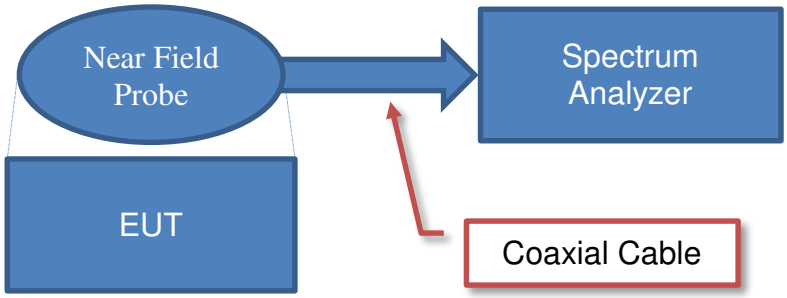


Test Setup Block Diagrams

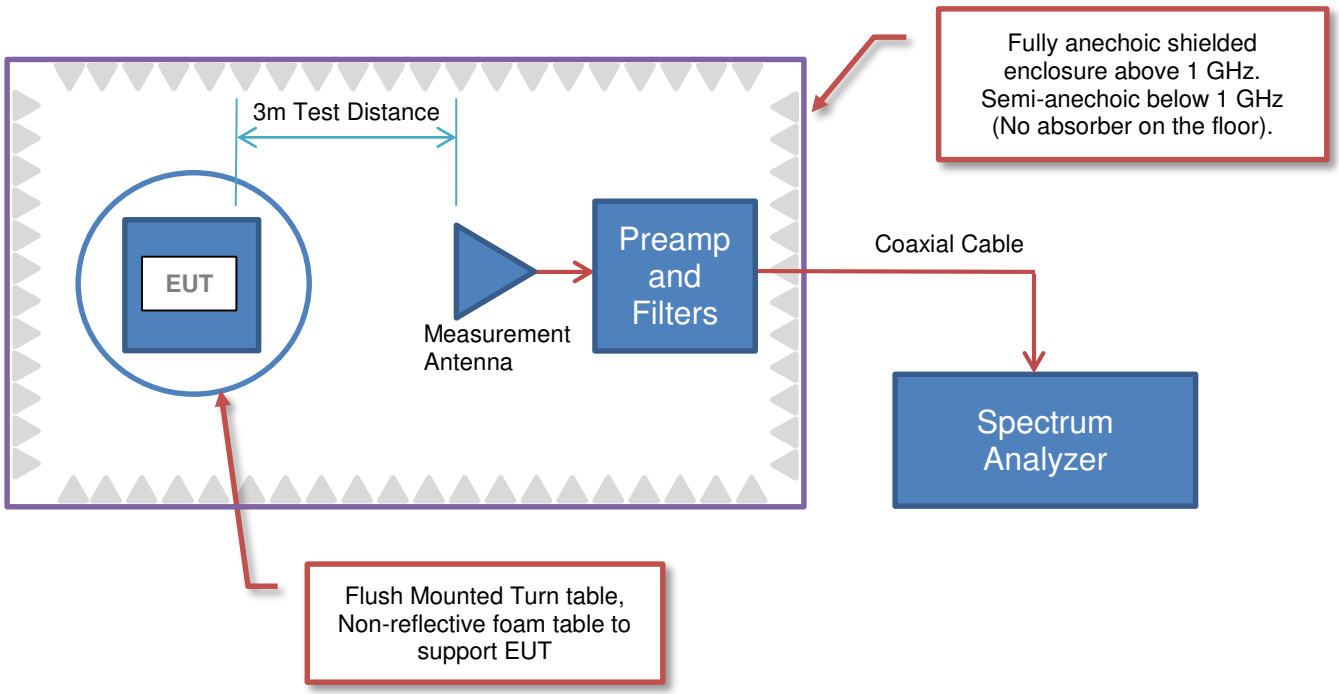
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	Awarepoint Corporation
Address:	600 W. Broadway Suite 250
City, State, Zip:	San Diego, CA 92101
Test Requested By:	John Taylor
Model:	BLEB
First Date of Test:	August 3, 2016
Last Date of Test:	August 8, 2016
Receipt Date of Samples:	July 26, 2016
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
BLE Beacon: Primarily a Bluetooth low energy broadcaster (transmitter) that sends out beacon messages at a typical 5 per second rate. Periodically (about once per day) this device will connect to a WiFi access point for configuration and firmware updates. Two antenna variations were tested for spurious radiated emissions.

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

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration AWAR0023- 4

Software/Firmware Running during test	
Description	**Version**
SmartRF Studio 7	2.3.1

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
WiFi and Bluetooth Radio	Awarepoint Corporation	BLEB	QS15260346

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Dell	VOSTRO 3550	FJRVLR1
AC/DC Power Supply	Dell	LA90PS0-00	CN-0DF266-71615-73O-0B34
BLE Interface Board	Texas Instruments	SmartRF06EB	0x00321

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Cable	No	0.75m	No	AC mains	AC/DC Power Supply
DC Cable	No	1.5m	Yes	AC/DC Power Supply	Laptop
Ribbon Cable	No	0.1m	No	BLE Interface Board	WiFi and Bluetooth Radio
Micro USB Cable	No	1.0m	No	BLE Interface Board	Laptop

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration AWAR0023- 5

Software/Firmware Running during test	
Description	**Version**
SmartRF Studio 7	2.3.1

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Bluetooth Radio	Awarepoint Corporation	BLEB	QS15360077

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Dell	VOSTRO 3550	FJRVLR1
AC/DC Power Supply	Dell	LA90PS0-00	CN-0DF266-71615-73O-0B34
BLE Interface Board	Texas Instruments	SmartRF06EB	0x00321

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
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Micro USB Cable	No	1.0m	No	BLE Interface Board	Laptop

MODIFICATIONS

NORTHWEST EMC
2014-12-10

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	8/3/2016	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	8/8/2016	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	8/8/2016	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	8/8/2016	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	8/8/2016	Power Spectral Density	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.
6	8/8/2016	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	8/8/2016	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 2016.04.26.1

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 at Low Channel 0(2402MHz), Mid Channel 20(2442MHz), and High Channel 39(2480MHz)

POWER SETTINGS INVESTIGATED

USB Powered

CONFIGURATIONS INVESTIGATED

AWAR0023 - 4

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
Filter - Low Pass	Micro-Tronics	LPM50004	LFC	11/3/2015	12 mo
Attenuator	Coaxicom	66702 3910AF-20	TKI	3/3/2016	12 mo
Cable	Northwest EMC	8-18GHz RE Cables	OCO	8/26/2015	12 mo
Cable	Northwest EMC	18-26GHz RE Cables	OCK	1/6/2016	12 mo
Cable	Northwest EMC	1-8GHz RE Cables	OCJ	8/26/2015	12 mo
Cable	Northwest EMC	10kHz-1GHz RE Cables	OCH	3/3/2016	12 mo
Filter - High Pass	Micro-Tronics	HPM50111	HFM	2/9/2016	12 mo
Antenna - Biconilog	EMCO	3142B	AXK	10/6/2014	24 mo
Amplifier - Pre-Amplifier	Miteq	AMF-4D-010120-30-10P-1	AOP	8/26/2015	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1064-9079	AOO	3/3/2016	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AOI	1/6/2016	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AOF	8/31/2015	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOE	8/31/2015	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AHT	NCR	0 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AHR	NCR	0 mo
Antenna - Standard Gain	ETS Lindgren	3160-09	AHN	NCR	0 mo
Antenna - Double Ridge	EMCO	3115	AHB	3/21/2016	24 mo
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFJ	2/9/2016	12 mo

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

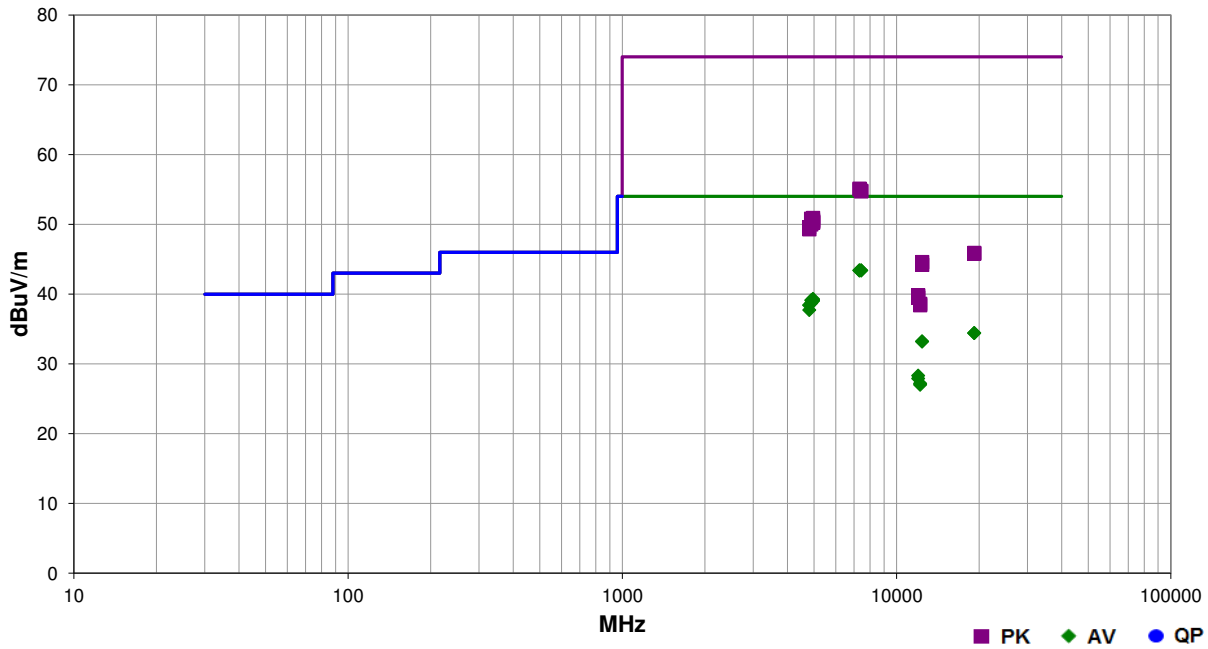
NORTHWEST EMC

PSA-ESCI 2016.04.26.1
EmiR5 2016.04.26.1

Work Order:	AWAR0023	**Date:**	08/03/16		
Project:	None	**Temperature:**	22.6 °C		
Job Site:	OC10	**Humidity:**	51.8% RH		
Serial Number:	QS15260346	**Barometric Pres.:**	1017 mbar	**Tested by:**	Mike Tran
EUT:	BLEB				
Configuration:	4				
Customer:	Awarepoint Corporation				
Attendees:	None				
EUT Power:	USB Powered				
Operating Mode:	Transmitting BLE at Low Channel 0(2402MHz), Mid Channel 20(2442MHz), and High Channel 39(2480MHz)				
Deviations:	None				
Comments:	None				

Test Specifications	**Test Method**
FCC 15.247:2016	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
7438.125	27.0	16.4	2.9	50.0	3.0	0.0	Horz	AV	0.0	43.4	54.0	-10.6	High Ch, EUT Vert
7437.867	27.0	16.4	1.0	11.0	3.0	0.0	Vert	AV	0.0	43.4	54.0	-10.6	High Ch, EUT Vert
7325.017	27.2	16.2	1.0	15.0	3.0	0.0	Horz	AV	0.0	43.4	54.0	-10.6	Mid Ch, EUT Vert
7326.667	27.2	16.2	1.0	100.0	3.0	0.0	Vert	AV	0.0	43.4	54.0	-10.6	Mid Ch, EUT Vert
4959.592	28.5	10.8	3.1	335.0	3.0	0.0	Horz	AV	0.0	39.3	54.0	-14.7	High Ch, EUT Vert
4959.000	28.4	10.8	1.0	29.0	3.0	0.0	Horz	AV	0.0	39.2	54.0	-14.8	High Ch, EUT on Side
4958.733	28.3	10.8	2.2	108.0	3.0	0.0	Vert	AV	0.0	39.1	54.0	-14.9	High Ch, EUT Vert
4960.450	28.3	10.8	4.0	92.0	3.0	0.0	Vert	AV	0.0	39.1	54.0	-14.9	High Ch, EUT on Side
4960.117	28.3	10.8	1.0	76.0	3.0	0.0	Horz	AV	0.0	39.1	54.0	-14.9	High Ch, EUT Horz
4884.417	28.5	10.6	1.0	313.0	3.0	0.0	Horz	AV	0.0	39.1	54.0	-14.9	Mid Ch, EUT Vert
4958.267	28.2	10.8	2.6	296.0	3.0	0.0	Vert	AV	0.0	39.0	54.0	-15.0	High Ch, EUT Horz
4886.425	28.1	10.6	1.2	45.0	3.0	0.0	Vert	AV	0.0	38.7	54.0	-15.3	Mid Ch, EUT Vert
4804.117	28.0	10.4	1.0	332.0	3.0	0.0	Vert	AV	0.0	38.4	54.0	-15.6	Low Ch, EUT Vert
4806.492	27.3	10.4	1.0	59.0	3.0	0.0	Horz	AV	0.0	37.7	54.0	-16.3	Low Ch, EUT Vert
7325.867	38.9	16.2	1.0	15.0	3.0	0.0	Horz	PK	0.0	55.1	74.0	-18.9	Mid Ch, EUT Vert
7327.600	38.8	16.2	1.0	100.0	3.0	0.0	Vert	PK	0.0	55.0	74.0	-19.0	Mid Ch, EUT Vert
7439.542	38.4	16.4	1.0	11.0	3.0	0.0	Vert	PK	0.0	54.8	74.0	-19.2	High Ch, 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
7439.742	38.3	16.4	2.9	50.0	3.0	0.0	Horz	PK	0.0	54.7	74.0	-19.3	High Ch, EUT Vert
19213.580	40.0	-5.6	1.5	266.0	3.0	0.0	Horz	AV	0.0	34.4	54.0	-19.6	Low Ch, EUT Vert
19214.030	40.0	-5.6	1.5	75.0	3.0	0.0	Vert	AV	0.0	34.4	54.0	-19.6	Low Ch, EUT Vert
12400.460	29.0	4.2	1.0	25.0	3.0	0.0	Horz	AV	0.0	33.2	54.0	-20.8	High Ch, EUT Vert
12400.470	29.0	4.2	1.0	78.0	3.0	0.0	Vert	AV	0.0	33.2	54.0	-20.8	High Ch, EUT Vert
4959.000	40.1	10.8	3.1	335.0	3.0	0.0	Horz	PK	0.0	50.9	74.0	-23.1	High Ch, EUT Vert
4883.342	40.2	10.6	1.0	313.0	3.0	0.0	Horz	PK	0.0	50.8	74.0	-23.2	Mid Ch, EUT Vert
4958.375	39.8	10.8	1.0	76.0	3.0	0.0	Horz	PK	0.0	50.6	74.0	-23.4	High Ch, EUT Horz
4957.950	39.6	10.8	1.0	29.0	3.0	0.0	Horz	PK	0.0	50.4	74.0	-23.6	High Ch, EUT on Side
4957.642	39.6	10.8	2.6	296.0	3.0	0.0	Vert	PK	0.0	50.4	74.0	-23.6	High Ch, EUT Horz
4960.033	39.5	10.8	2.2	108.0	3.0	0.0	Vert	PK	0.0	50.3	74.0	-23.7	High Ch, EUT Vert
4961.400	39.4	10.8	4.0	92.0	3.0	0.0	Vert	PK	0.0	50.2	74.0	-23.8	High Ch, EUT on Side
4884.225	39.4	10.6	1.2	45.0	3.0	0.0	Vert	PK	0.0	50.0	74.0	-24.0	Mid Ch, EUT Vert
4802.892	39.2	10.4	1.0	332.0	3.0	0.0	Vert	PK	0.0	49.6	74.0	-24.4	Low Ch, EUT Vert
4804.558	38.9	10.4	1.0	59.0	3.0	0.0	Horz	PK	0.0	49.3	74.0	-24.7	Low Ch, EUT Vert
12008.980	36.6	-8.3	3.3	30.0	3.0	0.0	Horz	AV	0.0	28.3	54.0	-25.7	Low Ch, EUT Vert
12009.130	36.2	-8.3	1.0	25.0	3.0	0.0	Vert	AV	0.0	27.9	54.0	-26.1	Low Ch, EUT Vert
12208.880	35.2	-8.0	1.0	360.0	3.0	0.0	Horz	AV	0.0	27.2	54.0	-26.8	Mid Ch, EUT Vert
12207.840	35.0	-8.0	1.0	219.0	3.0	0.0	Vert	AV	0.0	27.0	54.0	-27.0	Mid Ch, EUT Vert
19218.160	51.5	-5.6	1.5	266.0	3.0	0.0	Horz	PK	0.0	45.9	74.0	-28.1	Low Ch, EUT Vert
19215.950	51.4	-5.6	1.5	75.0	3.0	0.0	Vert	PK	0.0	45.8	74.0	-28.2	Low Ch, EUT Vert
12401.350	40.4	4.2	1.0	25.0	3.0	0.0	Horz	PK	0.0	44.6	74.0	-29.4	High Ch, EUT Vert
12402.140	40.0	4.2	1.0	78.0	3.0	0.0	Vert	PK	0.0	44.2	74.0	-29.8	High Ch, EUT Vert
12009.310	48.1	-8.3	3.3	30.0	3.0	0.0	Horz	PK	0.0	39.8	74.0	-34.2	Low Ch, EUT Vert
12008.730	47.8	-8.3	1.0	25.0	3.0	0.0	Vert	PK	0.0	39.5	74.0	-34.5	Low Ch, EUT Vert
12209.400	46.6	-8.0	1.0	219.0	3.0	0.0	Vert	PK	0.0	38.6	74.0	-35.4	Mid Ch, EUT Vert
12209.290	46.4	-8.0	1.0	360.0	3.0	0.0	Horz	PK	0.0	38.4	74.0	-35.6	Mid Ch, EUT Vert

SPURIOUS RADIATED EMISSIONS

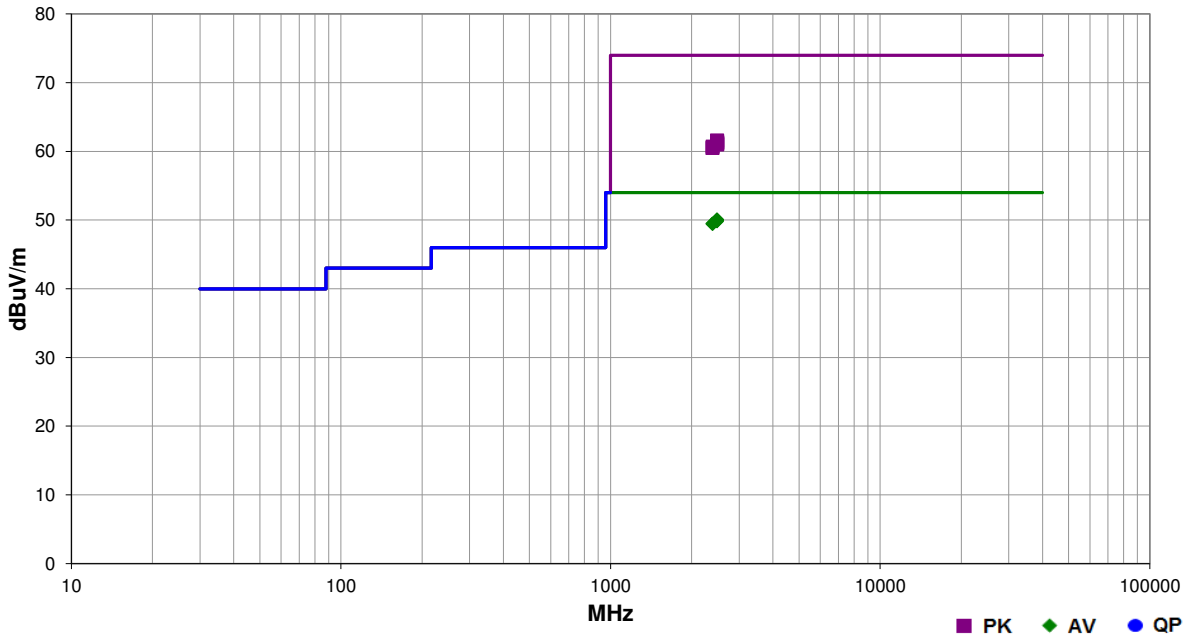
NORTHWEST EMC

PSA-ESCI 2016.04.26.1
EmiR5 2016.04.26.1

Work Order:	AWAR0023	**Date:**	08/03/16		
Project:	None	**Temperature:**	22.6 °C		
Job Site:	OC10	**Humidity:**	51.8% RH		
Serial Number:	QS15260346	**Barometric Pres.:**	1017 mbar	**Tested by:**	Mike Tran
EUT:	BLEB				
Configuration:	4				
Customer:	Awarepoint Corporation				
Attendees:	None				
EUT Power:	USB Powered				
Operating Mode:	Transmitting BLE at Low Channel 0(2402MHz) and High Channel 39(2480MHz)				
Deviations:	None				
Comments:	None				

Test Specifications	**Test Method**
FCC 15.247:2016	ANSI C63.10:2013

Run #	44	**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
2484.670	28.3	1.8	1.0	11.0	3.0	20.0	Vert	AV	0.0	50.1	54.0	-3.9	High Ch, EUT Horz
2483.923	28.2	1.8	1.0	305.0	3.0	20.0	Horz	AV	0.0	50.0	54.0	-4.0	High Ch, EUT on Side
2484.100	28.2	1.8	1.0	194.0	3.0	20.0	Vert	AV	0.0	50.0	54.0	-4.0	High Ch, EUT on Side
2483.717	28.2	1.8	1.0	119.0	3.0	20.0	Horz	AV	0.0	50.0	54.0	-4.0	High Ch, EUT Horz
2485.497	28.1	1.8	1.0	218.0	3.0	20.0	Horz	AV	0.0	49.9	54.0	-4.1	High Ch, EUT Vert
2484.177	28.0	1.8	2.8	186.0	3.0	20.0	Vert	AV	0.0	49.8	54.0	-4.2	High Ch, EUT Vert
2388.653	28.2	1.3	1.1	226.0	3.0	20.0	Vert	AV	0.0	49.5	54.0	-4.5	Low Ch, EUT Horz
2389.773	28.1	1.3	1.0	119.0	3.0	20.0	Horz	AV	0.0	49.4	54.0	-4.6	Low Ch, EUT on Side
2483.583	39.8	1.8	1.0	218.0	3.0	20.0	Horz	PK	0.0	61.6	74.0	-12.4	High Ch, EUT Vert
2483.933	39.7	1.8	2.8	186.0	3.0	20.0	Vert	PK	0.0	61.5	74.0	-12.5	High Ch, EUT Vert
2485.080	39.5	1.8	1.0	11.0	3.0	20.0	Vert	PK	0.0	61.3	74.0	-12.7	High Ch, EUT Horz
2484.420	39.4	1.8	1.0	194.0	3.0	20.0	Vert	PK	0.0	61.2	74.0	-12.8	High Ch, EUT on Side
2485.390	39.3	1.8	1.0	305.0	3.0	20.0	Horz	PK	0.0	61.1	74.0	-12.9	High Ch, EUT on Side
2484.410	39.2	1.8	1.0	119.0	3.0	20.0	Horz	PK	0.0	61.0	74.0	-13.0	High Ch, EUT Horz
2388.980	39.4	1.3	1.1	226.0	3.0	20.0	Vert	PK	0.0	60.7	74.0	-13.3	Low Ch, EUT Horz
2388.517	39.2	1.3	1.0	119.0	3.0	20.0	Horz	PK	0.0	60.5	74.0	-13.5	Low Ch, EUT on Side

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2016.04.26.1

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 at Low Channel 0(2402MHz), Mid Channel 20(2442MHz), and High Channel 39(2480MHz)

POWER SETTINGS INVESTIGATED

USB Powered

CONFIGURATIONS INVESTIGATED

AWAR0023 - 5

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
Cable	D-Coax	None	OC4	1/4/2017	12 mo
Amplifier - Pre-Amplifier	Miteq	JSDWK42-18004000-60-5P	PAN	1/4/2017	12 mo
Antenna - Double Ridge	A.H. Systems, Inc.	SAS-574	AXV	5/3/2016	24 mo
Attenuator	S.M. Electronics	SA6-20	REO	3/28/2016	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	PAD	3/28/2016	12 mo
Cable	ESM Cable Corp.	8-18GHz cables	OCY	3/28/2016	12 mo
Cable	ESM Cable Corp.	1-8GHz cables	OCX	3/28/2016	12 mo
Cable	ESM Cable Corp.	30-1GHz cables	OCW	3/28/2016	12 mo
Filter - High Pass	Micro-Tronics	HPM50111	HGQ	3/28/2016	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	HGK	3/28/2016	12 mo
Antenna - Biconilog	EMCO	3142	AXB	11/6/2015	24 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVP	11/2/2015	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVL	11/2/2015	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVJ	3/28/2016	12 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	11/5/2015	12 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

NORTHWEST EMC

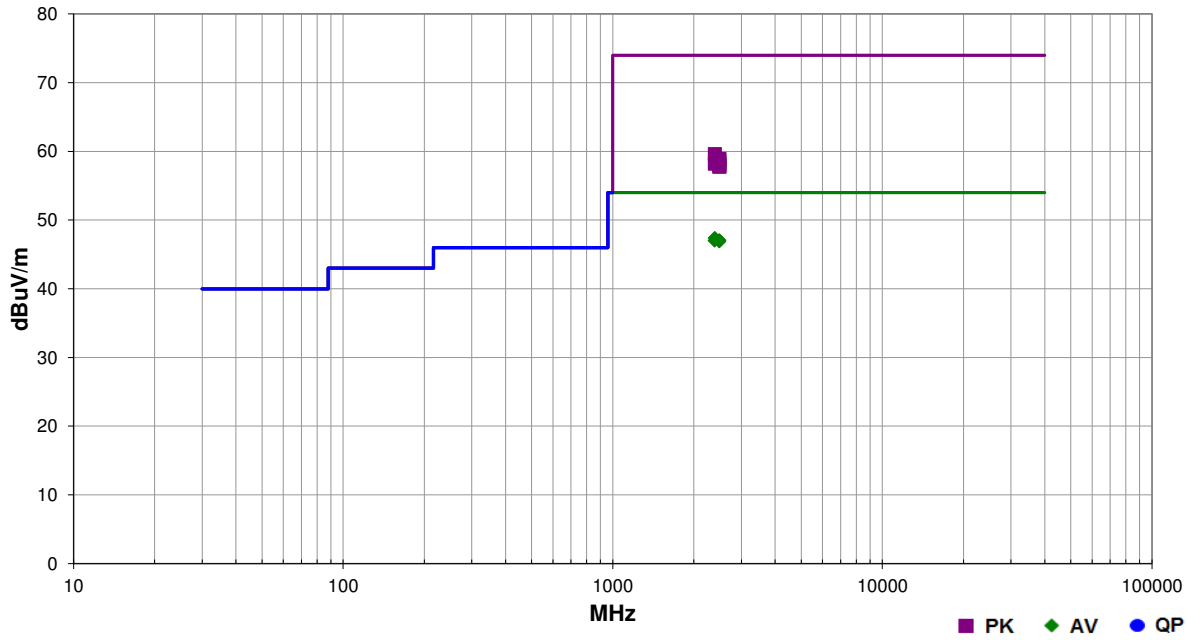
PSA-ESCI 2016.04.26.1

EmiR5 2016.04.26.1

Work Order:	AWAR0023	**Date:**	08/04/16		
Project:	None	**Temperature:**	23.1 °C		
Job Site:	OC07	**Humidity:**	49.3% RH		
Serial Number:	QS15360077	**Barometric Pres.:**	1013 mbar	**Tested by:**	Mark Baytan
EUT:	BLEB				
Configuration:	5				
Customer:	Awarepoint Corporation				
Attendees:	None				
EUT Power:	USB Powered				
Operating Mode:	Transmitting BLE at Low Channel 0(2402MHz) and High Channel 39(2480MHz)				
Deviations:	None				
Comments:	None				

Test Specifications	**Test Method**
FCC 15.247:2016	ANSI C63.10:2013

Run #	6	**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
2388.990	30.6	-3.2	2.7	217.0	3.0	20.0	Horz	AV	0.0	47.4	54.0	-6.6	Low Ch 0, EUT Horz
2483.613	29.9	-2.9	3.7	89.0	3.0	20.0	Horz	AV	0.0	47.0	54.0	-7.0	High Ch 39, EUT Horz
2483.793	29.9	-2.9	1.0	356.0	3.0	20.0	Horz	AV	0.0	47.0	54.0	-7.0	High Ch 39, EUT Vert
2483.990	29.9	-2.9	1.0	81.0	3.0	20.0	Vert	AV	0.0	47.0	54.0	-7.0	High Ch 39, EUT Vert
2484.960	29.9	-2.9	1.0	160.0	3.0	20.0	Horz	AV	0.0	47.0	54.0	-7.0	High Ch 39, EUT on Side
2484.150	29.9	-2.9	1.0	305.0	3.0	20.0	Vert	AV	0.0	47.0	54.0	-7.0	High Ch 39, EUT on Side
2388.120	30.2	-3.2	1.0	130.0	3.0	20.0	Vert	AV	0.0	47.0	54.0	-7.0	Low Ch 0, EUT Vert
2485.297	29.8	-2.9	1.0	123.0	3.0	20.0	Vert	AV	0.0	46.9	54.0	-7.1	High Ch 39, EUT Horz
2389.297	42.8	-3.2	1.0	130.0	3.0	20.0	Vert	PK	0.0	59.6	74.0	-14.4	Low Ch 0, EUT Vert
2484.827	41.8	-2.9	1.0	305.0	3.0	20.0	Vert	PK	0.0	58.9	74.0	-15.1	High Ch 39, EUT on Side
2484.297	41.6	-2.9	1.0	123.0	3.0	20.0	Vert	PK	0.0	58.7	74.0	-15.3	High Ch 39, EUT Horz
2484.590	41.2	-2.9	1.0	356.0	3.0	20.0	Horz	PK	0.0	58.3	74.0	-15.7	High Ch 39, EUT Vert
2389.673	41.4	-3.2	2.7	217.0	3.0	20.0	Horz	PK	0.0	58.2	74.0	-15.8	Low Ch 0, EUT Horz
2484.923	40.9	-2.9	1.0	81.0	3.0	20.0	Vert	PK	0.0	58.0	74.0	-16.0	High Ch 39, EUT Vert
2485.257	40.7	-2.9	3.7	89.0	3.0	20.0	Horz	PK	0.0	57.8	74.0	-16.2	High Ch 39, EUT Horz
2483.710	40.7	-2.9	1.0	160.0	3.0	20.0	Horz	PK	0.0	57.8	74.0	-16.2	High Ch 39, EUT on Side

SPURIOUS RADIATED EMISSIONS

NORTHWEST EMC

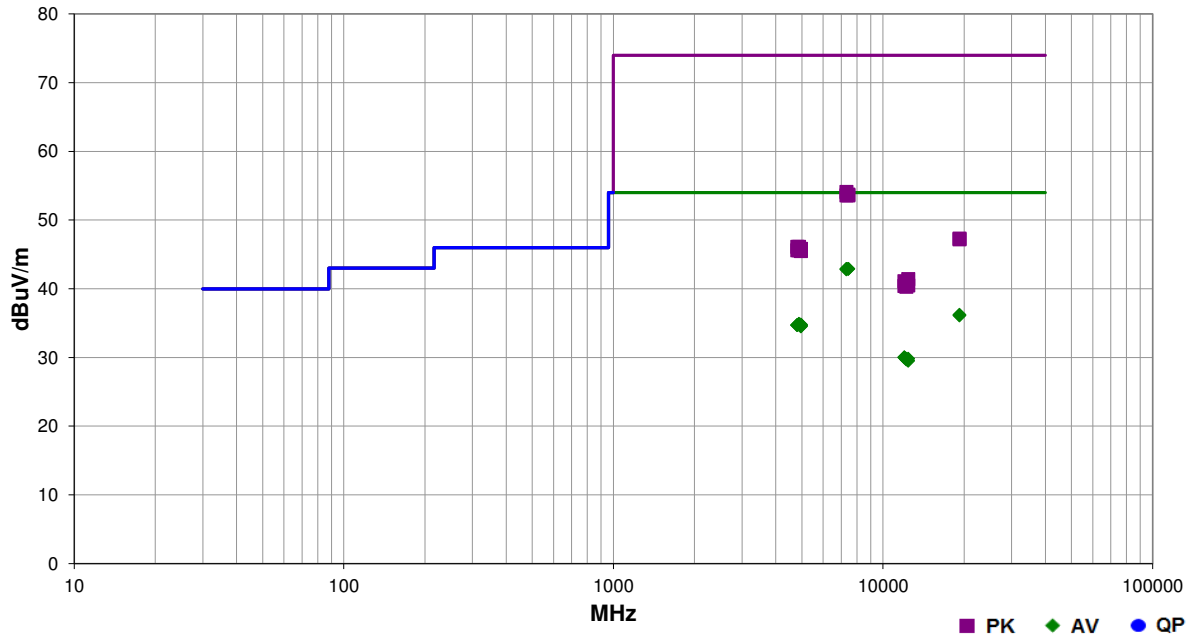
PSA-ESCI 2016.04.26.1

EmiR5 2016.04.26.1

Work Order:	AWAR0023	**Date:**	08/04/16		
Project:	None	**Temperature:**	23.1 °C		
Job Site:	OC07	**Humidity:**	49.3% RH		
Serial Number:	QS15360077	**Barometric Pres.:**	1013 mbar	**Tested by:**	Mark Baytan
EUT:	BLEB				
Configuration:	5				
Customer:	Awarepoint Corporation				
Attendees:	None				
EUT Power:	USB Powered				
Operating Mode:	Transmitting BLE at Low Channel 0(2402MHz), Mid Channel 20(2442MHz), and High Channel 39(2480MHz)				
Deviations:	None				
Comments:	None				

Test Specifications	**Test Method**
FCC 15.247:2016	ANSI C63.10:2013

Run #	9	**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
7439.290	29.7	13.2	1.1	225.0	3.0	0.0	Horz	AV	0.0	42.9	54.0	-11.1	High Ch 39, EUT on Side
7439.103	29.7	13.2	1.0	315.0	3.0	0.0	Vert	AV	0.0	42.9	54.0	-11.1	High Ch 39, EUT on Side
7319.003	30.0	12.9	1.0	235.0	3.0	0.0	Vert	AV	0.0	42.9	54.0	-11.1	Mid Ch 20, EUT on Side
7319.420	29.9	12.9	1.0	137.0	3.0	0.0	Horz	AV	0.0	42.8	54.0	-11.2	Mid Ch 20, EUT on Side
19216.920	47.8	-11.6	0.0	358.0	3.0	0.0	Horz	AV	0.0	36.2	54.0	-17.8	Low Ch 0, EUT on Side
19214.650	47.7	-11.6	1.0	165.0	3.0	0.0	Vert	AV	0.0	36.1	54.0	-17.9	Low Ch 0, EUT on Side
4879.363	28.4	6.5	1.0	355.0	3.0	0.0	Horz	AV	0.0	34.9	54.0	-19.1	Mid Ch 20, EUT on Side
4959.300	28.1	6.7	3.6	306.0	3.0	0.0	Vert	AV	0.0	34.8	54.0	-19.2	High Ch 39, EUT on Side
4879.160	28.3	6.5	1.0	287.0	3.0	0.0	Vert	AV	0.0	34.8	54.0	-19.2	Mid Ch 20, EUT on Side
4959.017	28.0	6.7	1.0	3.0	3.0	0.0	Vert	AV	0.0	34.7	54.0	-19.3	High Ch 39, EUT Vert
4959.387	28.0	6.7	1.9	39.0	3.0	0.0	Horz	AV	0.0	34.7	54.0	-19.3	High Ch 39, EUT on Side
4803.283	28.5	6.2	1.0	360.0	3.0	0.0	Horz	AV	0.0	34.7	54.0	-19.3	Low Ch 0, EUT on Side
4803.767	28.5	6.2	3.5	180.0	3.0	0.0	Vert	AV	0.0	34.7	54.0	-19.3	Low Ch 0, EUT on Side
4959.397	27.9	6.7	1.7	127.0	3.0	0.0	Vert	AV	0.0	34.6	54.0	-19.4	High Ch 39, EUT Horz
4959.050	27.9	6.7	1.0	268.0	3.0	0.0	Horz	AV	0.0	34.6	54.0	-19.4	High Ch 39, EUT Horz
4959.140	27.8	6.7	2.1	122.0	3.0	0.0	Horz	AV	0.0	34.5	54.0	-19.5	High Ch 39, EUT Vert
7320.083	41.2	12.9	1.0	235.0	3.0	0.0	Vert	PK	0.0	54.1	74.0	-19.9	Mid Ch 20, EUT on Side
7439.343	40.5	13.2	1.0	315.0	3.0	0.0	Vert	PK	0.0	53.7	74.0	-20.3	High Ch 39, EUT on Side

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
7440.130	40.4	13.2	1.1	225.0	3.0	0.0	Horz	PK	0.0	53.6	74.0	-20.4	High Ch 39, EUT on Side
7319.007	40.7	12.9	1.0	137.0	3.0	0.0	Horz	PK	0.0	53.6	74.0	-20.4	Mid Ch 20, EUT on Side
12010.790	32.5	-2.5	1.0	23.0	3.0	0.0	Horz	AV	0.0	30.0	54.0	-24.0	Low Ch 0, EUT on Side
12010.790	32.5	-2.5	1.0	80.0	3.0	0.0	Vert	AV	0.0	30.0	54.0	-24.0	Low Ch 0, EUT on Side
12200.130	31.5	-1.7	1.9	172.0	3.0	0.0	Horz	AV	0.0	29.8	54.0	-24.2	Mid Ch 20, EUT on Side
12399.060	30.5	-0.7	3.9	317.0	3.0	0.0	Vert	AV	0.0	29.8	54.0	-24.2	High Ch 39, EUT on Side
12199.000	31.4	-1.7	2.4	119.0	3.0	0.0	Vert	AV	0.0	29.7	54.0	-24.3	Mid Ch 20, EUT on Side
12399.080	30.2	-0.7	1.0	299.0	3.0	0.0	Horz	AV	0.0	29.5	54.0	-24.5	High Ch 39, EUT on Side
19217.500	58.9	-11.6	0.0	358.0	3.0	0.0	Horz	PK	0.0	47.3	74.0	-26.7	Low Ch 0, EUT on Side
19215.270	58.8	-11.6	1.0	165.0	3.0	0.0	Vert	PK	0.0	47.2	74.0	-26.8	Low Ch 0, EUT on Side
4879.437	39.6	6.5	1.0	287.0	3.0	0.0	Vert	PK	0.0	46.1	74.0	-27.9	Mid Ch 20, EUT on Side
4803.677	39.9	6.2	3.5	180.0	3.0	0.0	Vert	PK	0.0	46.1	74.0	-27.9	Low Ch 0, EUT on Side
4959.490	39.1	6.7	2.1	122.0	3.0	0.0	Horz	PK	0.0	45.8	74.0	-28.2	High Ch 39, EUT Vert
4959.560	39.1	6.7	1.7	127.0	3.0	0.0	Vert	PK	0.0	45.8	74.0	-28.2	High Ch 39, EUT Horz
4959.247	39.0	6.7	1.9	39.0	3.0	0.0	Horz	PK	0.0	45.7	74.0	-28.3	High Ch 39, EUT on Side
4959.670	39.0	6.7	3.6	306.0	3.0	0.0	Vert	PK	0.0	45.7	74.0	-28.3	High Ch 39, EUT on Side
4959.517	38.9	6.7	1.0	268.0	3.0	0.0	Horz	PK	0.0	45.6	74.0	-28.4	High Ch 39, EUT Horz
4880.253	39.1	6.5	1.0	355.0	3.0	0.0	Horz	PK	0.0	45.6	74.0	-28.4	Mid Ch 20, EUT on Side
4804.037	39.4	6.2	1.0	360.0	3.0	0.0	Horz	PK	0.0	45.6	74.0	-28.4	Low Ch 0, EUT on Side
4960.457	38.8	6.7	1.0	3.0	3.0	0.0	Vert	PK	0.0	45.5	74.0	-28.5	High Ch 39, EUT Vert
12399.500	42.1	-0.7	1.0	299.0	3.0	0.0	Horz	PK	0.0	41.4	74.0	-32.6	High Ch 39, EUT on Side
12009.460	43.7	-2.6	1.0	23.0	3.0	0.0	Horz	PK	0.0	41.1	74.0	-32.9	Low Ch 0, EUT on Side
12200.560	42.5	-1.7	2.4	119.0	3.0	0.0	Vert	PK	0.0	40.8	74.0	-33.2	Mid Ch 20, EUT on Side
12399.620	41.2	-0.7	3.9	317.0	3.0	0.0	Vert	PK	0.0	40.5	74.0	-33.5	High Ch 39, EUT on Side
12010.860	42.9	-2.5	1.0	80.0	3.0	0.0	Vert	PK	0.0	40.4	74.0	-33.6	Low Ch 0, EUT on Side
12200.560	42.0	-1.7	1.9	172.0	3.0	0.0	Horz	PK	0.0	40.3	74.0	-33.7	Mid Ch 20, EUT on Side

DUTY CYCLE

NORTHWEST EMC

XMit 2016.05.06

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 test software provided for operation in a fixed, single channel mode allows the EUT to operate continuously at 100% Duty Cycle.

OCCUPIED BANDWIDTH

XMit 2016.05.06

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
Attenuator	Fairview Microwave	SA18E-20	TKS	4/4/2016	4/4/2017
Block - DC	Aeroflex	INMET 8535	AMO	4/4/2016	4/4/2017
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	NCR
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	11/19/2015	11/19/2016
Generator - Signal	Keysight	N5182B	TFX	4/16/2015	4/16/2018

TEST DESCRIPTION

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

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

OCCUPIED BANDWIDTH

NORTHWEST EMC

XMit 2016.05.06

EUT:	**BLEB**			**Work Order:**	**AWAR0023**
Serial Number:	**QS15260346**			**Date:**	**08/08/16**
Customer:	**Awarepoint Corporation**			**Temperature:**	**22.4 °C**
Attendees:	**None**			**Humidity:**	**50% RH**
Project:	**None**			**Barometric Pres.:**	**1013 mbar**
Tested by:	**Mike Tran**	**Power:**	**USB Powered**	**Job Site:**	**OC13**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2016	ANSI C63.10:2013

COMMENTS

Total reference level offset: DC Block + 20dB attenuator + RF Cable + Patch Cable = 22.75 dB. Power setting = -9.

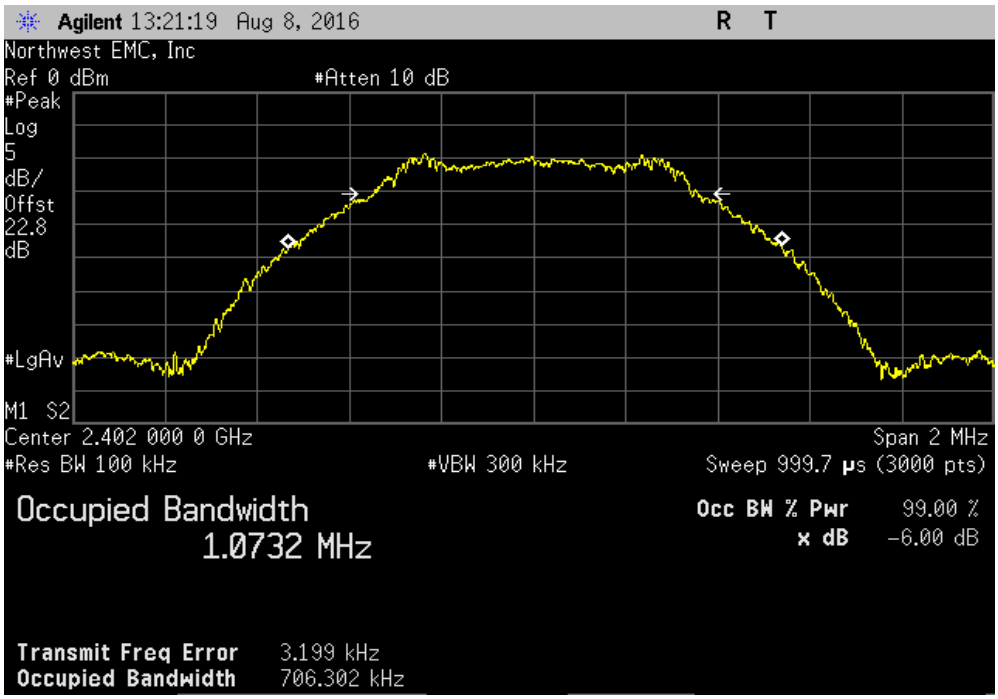
DEVIATIONS FROM TEST STANDARD

None

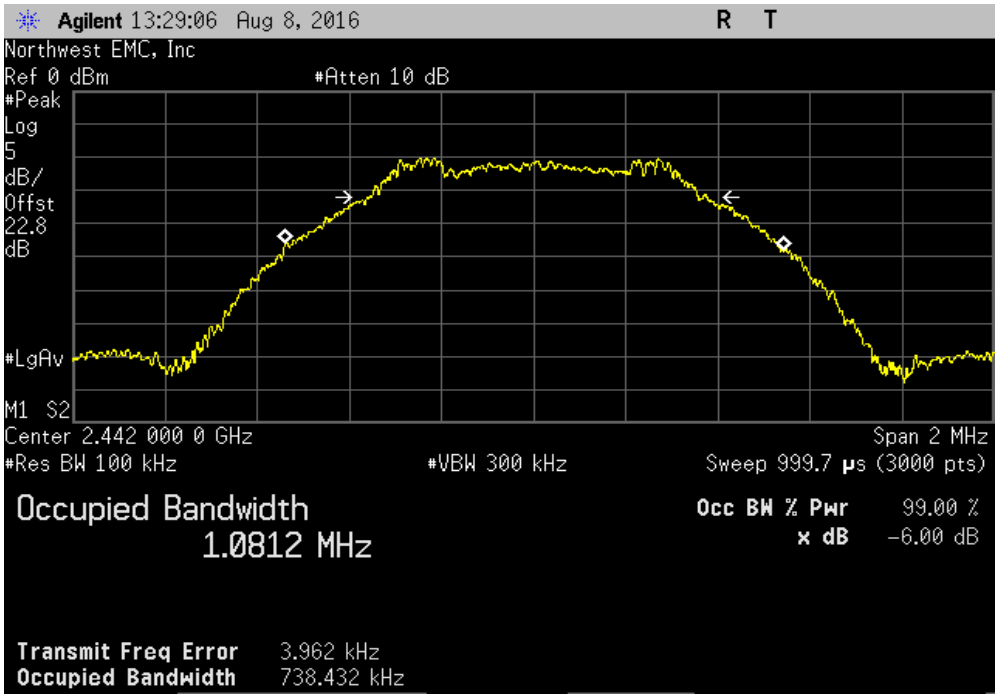
Configuration #	**4**	*Signature*

	Value	**Limit (≥)**	**Result**
BLE/GFSK Low Channel, 2402 MHz	706.302 kHz	500 kHz	Pass
BLE/GFSK Mid Channel, 2442 MHz	738.432 kHz	500 kHz	Pass
BLE/GFSK High Channel, 2480 MHz	754.632 kHz	500 kHz	Pass

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



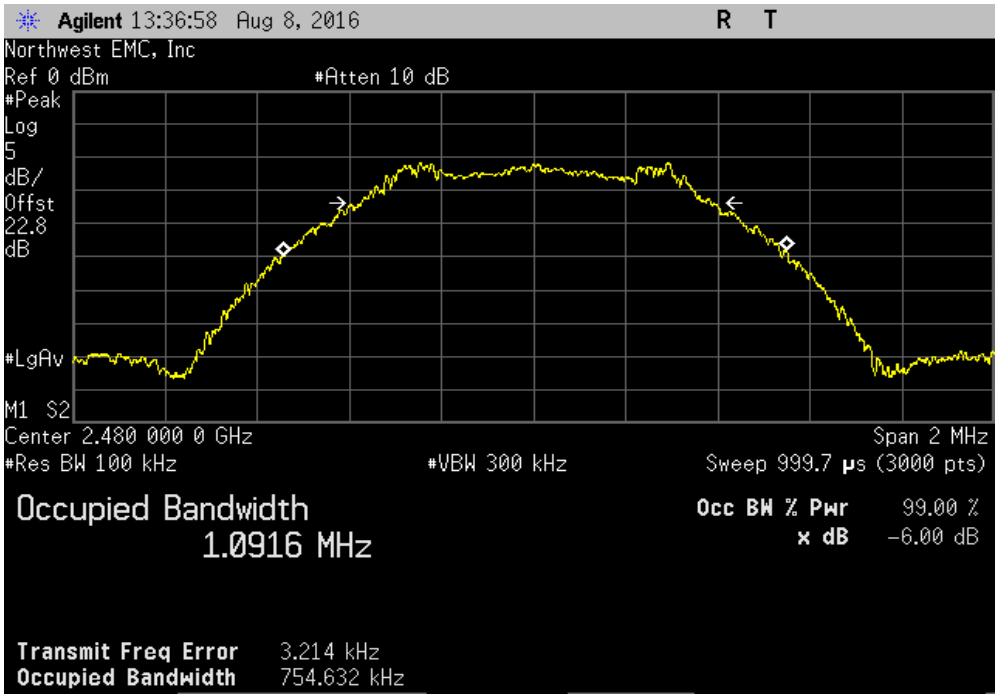
BLE/GFSK Mid Channel, 2442 MHz						
				Value	Limit (≥)	Result
				738.432 kHz	500 kHz	Pass



OCCUPIED BANDWIDTH

XMit 2016.05.06

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



OUTPUT POWER

XMit 2016.05.06

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
Attenuator	Fairview Microwave	SA18E-20	TKS	4/4/2016	4/4/2017
Block - DC	Aeroflex	INMET 8535	AMO	4/4/2016	4/4/2017
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	NCR
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	11/19/2015	11/19/2016
Generator - Signal	Keysight	N5182B	TFX	4/16/2015	4/16/2018

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) 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 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

NORTHWEST EMC

XMit 2016.05.06

EUT:	**BLEB**			**Work Order:**	**AWAR0023**
Serial Number:	**QS15260346**			**Date:**	**08/08/16**
Customer:	**Awarepoint Corporation**			**Temperature:**	**22.4 °C**
Attendees:	**None**			**Humidity:**	**50% RH**
Project:	**None**			**Barometric Pres.:**	**1013 mbar**
Tested by:	**Mike Tran**	**Power:**	**USB Powered**	**Job Site:**	**OC13**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2016	ANSI C63.10:2013

COMMENTS

Total reference level offset: DC Block + 20dB attenuator + RF Cable + Patch Cable = 22.75 dB. Power setting = -9.

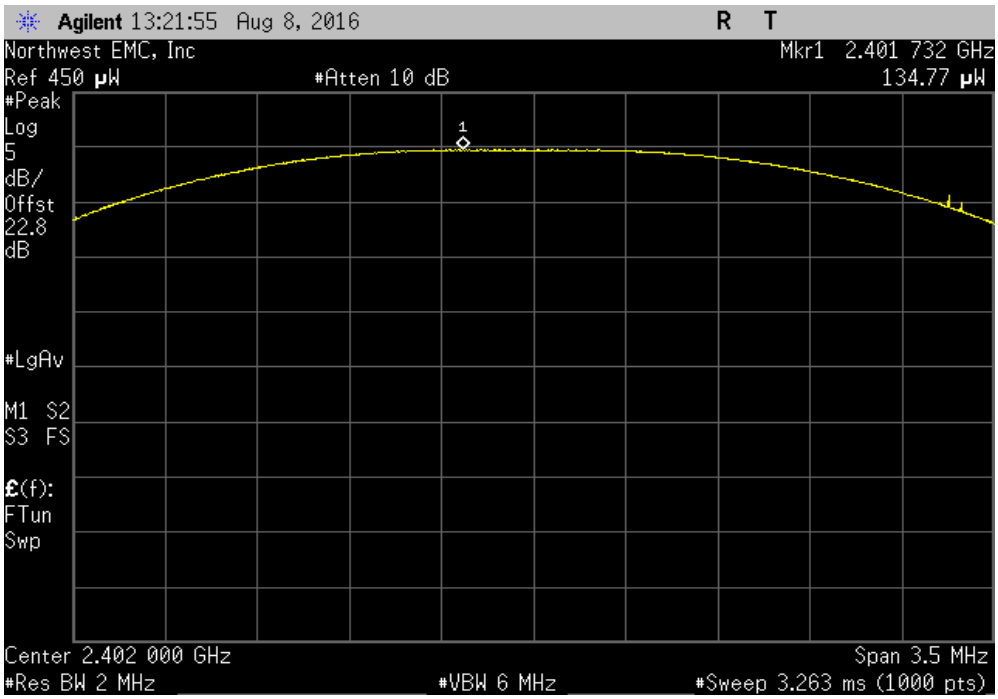
DEVIATIONS FROM TEST STANDARD

None

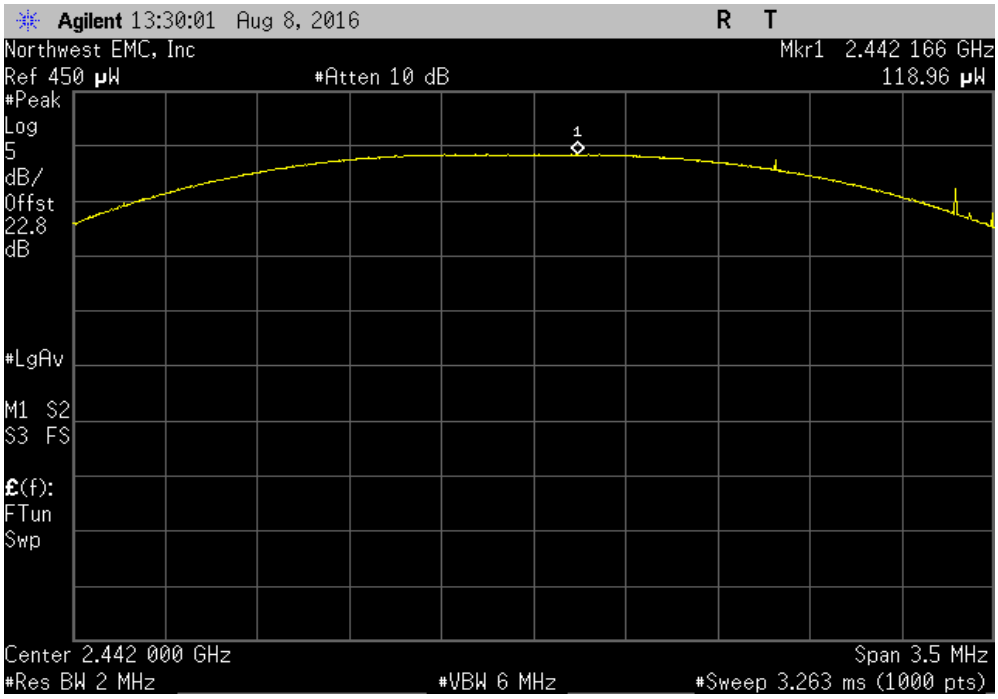
Configuration #	**4**	*Signature*

	Value	**Limit (<)**	**Result**
BLE/GFSK Low Channel, 2402 MHz	134.772 uW	1 W	Pass
BLE/GFSK High Channel, 2480 MHz	118.96 uW	1 W	Pass
BLE/GFSK Mid Channel, 2442 MHz	98.946 uW	1 W	Pass

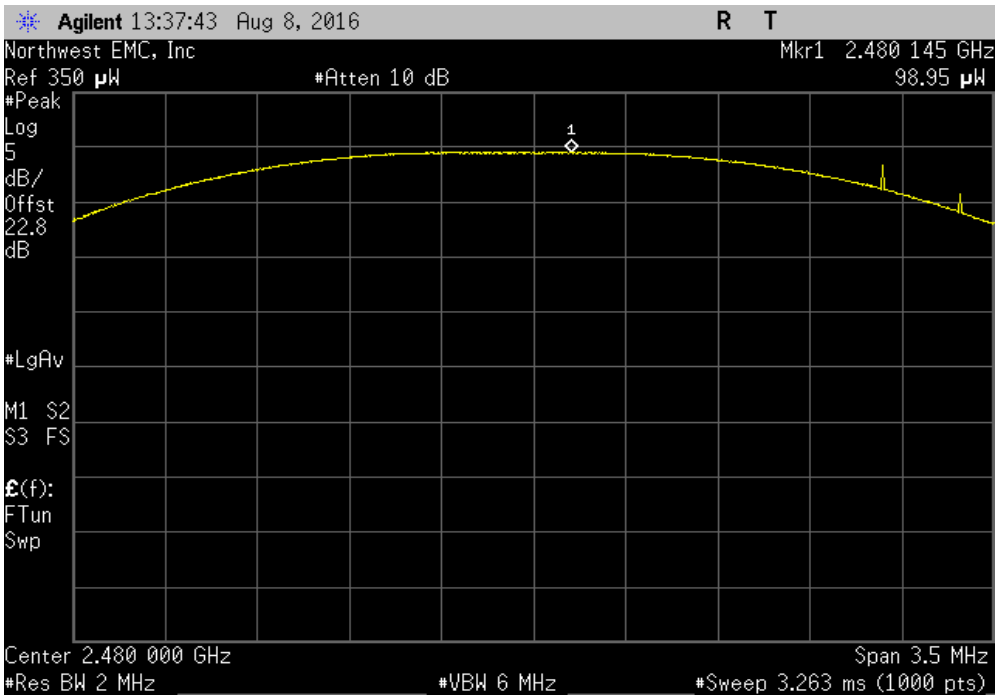
BLE/GFSK Low Channel, 2402 MHz						
				Value	Limit (<)	Result
				134.772 uW	1 W	Pass



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



BLE/GFSK Mid Channel, 2442 MHz						
				Value	Limit (<)	Result
				98.946 uW	1 W	Pass



POWER SPECTRAL DENSITY

XMit 2016.05.06

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
Attenuator	Fairview Microwave	SA18E-20	TKS	4/4/2016	4/4/2017
Block - DC	Aeroflex	INMET 8535	AMO	4/4/2016	4/4/2017
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	NCR
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	11/19/2015	11/19/2016
Generator - Signal	Keysight	N5182B	TFX	4/16/2015	4/16/2018

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

NORTHWEST EMC

XMit 2016.05.06

EUT:	BLEB			**Work Order:**	AWAR0023
Serial Number:	QS15260346			**Date:**	08/08/16
Customer:	Awarepoint Corporation			**Temperature:**	22.4 °C
Attendees:	None			**Humidity:**	50% RH
Project:	None			**Barometric Pres.:**	1013 mbar
Tested by:	Mike Tran	**Power:**	USB Powered	**Job Site:**	OC13

TEST SPECIFICATIONS	Test Method
FCC 15.247:2016	ANSI C63.10:2013

COMMENTS

Total reference level offset: DC Block + 20dB attenuator + RF Cable + Patch Cable = 22.75 dB. Power setting = -9.

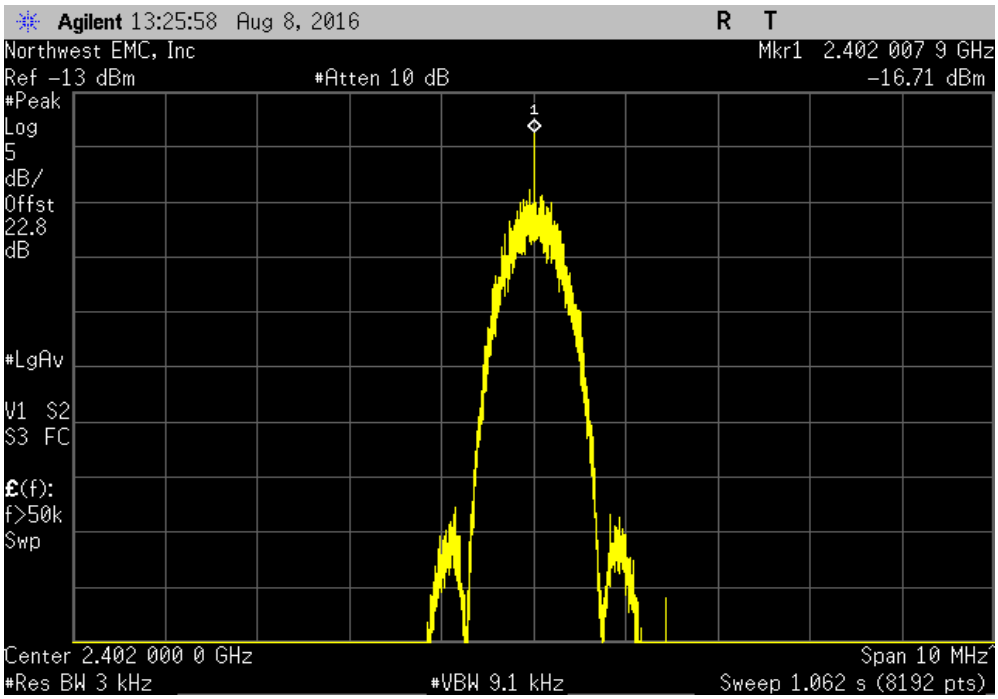
DEVIATIONS FROM TEST STANDARD

None

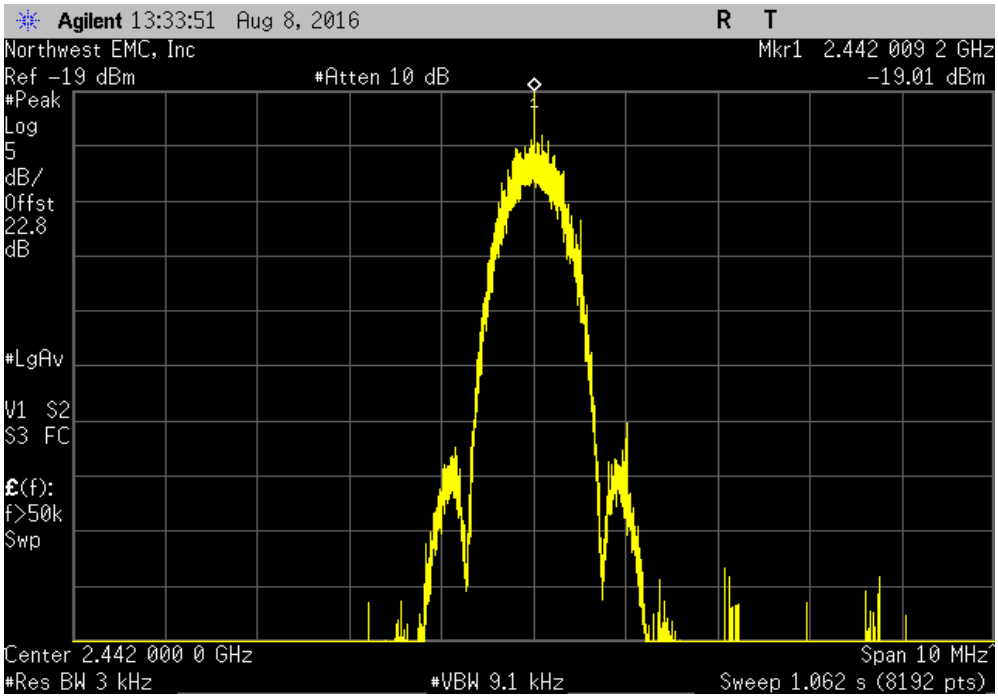
Configuration #	4	Signature

	Value dBm/3kHz	Limit < dBm/3kHz	Results
BLE/GFSK Low Channel, 2402 MHz	-16.712	8	Pass
BLE/GFSK High Channel, 2480 MHz	-19.006	8	Pass
BLE/GFSK Mid Channel, 2442 MHz	-22.544	8	Pass

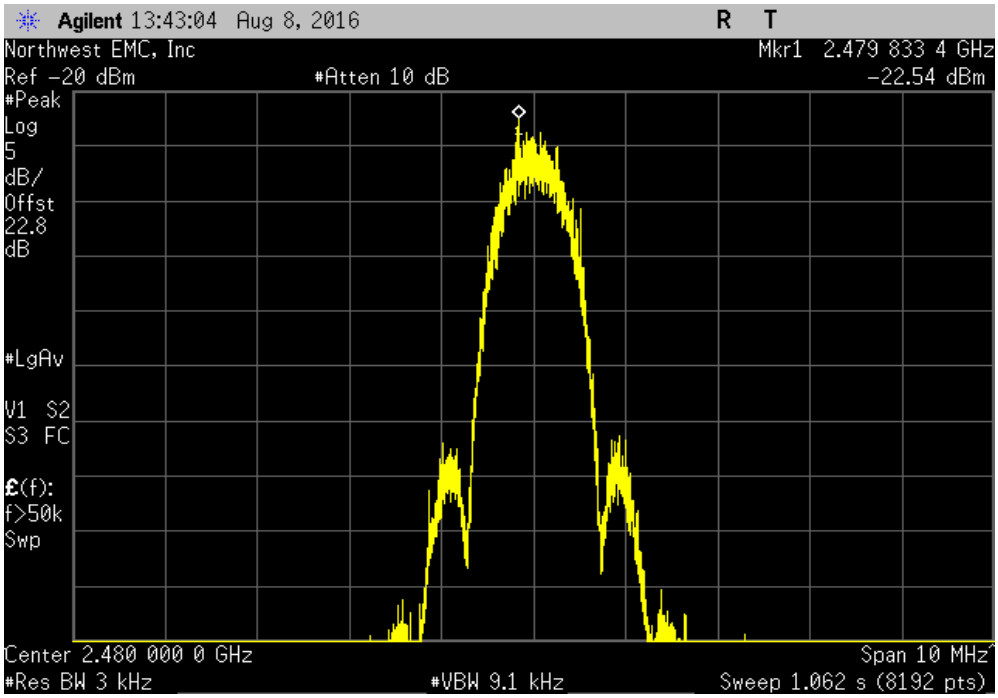
BLE/GFSK Low Channel, 2402 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-16.712	8	Pass



BLE/GFSK High Channel, 2480 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-19.006	8	Pass



BLE/GFSK Mid Channel, 2442 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-22.544	8	Pass



BAND EDGE COMPLIANCE

NORTHWEST EMC

XMit 2016.05.06

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	Keysight	N5182B	TFX	4/16/2015	4/16/2018
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	11/19/2015	11/19/2016
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	NCR
Block - DC	Aeroflex	INMET 8535	AMO	4/4/2016	4/4/2017
Attenuator	Fairview Microwave	SA18E-20	TKS	4/4/2016	4/4/2017

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

NORTHWEST EMC

XMit 2016.05.06

EUT:	BLEB			**Work Order:**	AWAR0023
Serial Number:	QS15260346			**Date:**	08/08/16
Customer:	Awarepoint Corporation			**Temperature:**	22.4 °C
Attendees:	None			**Humidity:**	50% RH
Project:	None			**Barometric Pres.:**	1013 mbar
Tested by:	Mike Tran	**Power:**	USB Powered	**Job Site:**	OC13

TEST SPECIFICATIONS	Test Method
FCC 15.247:2016	ANSI C63.10:2013

COMMENTS

Total reference level offset: DC Block + 20dB attenuator + RF Cable + Patch Cable = 22.75 dB. Power setting = -9.

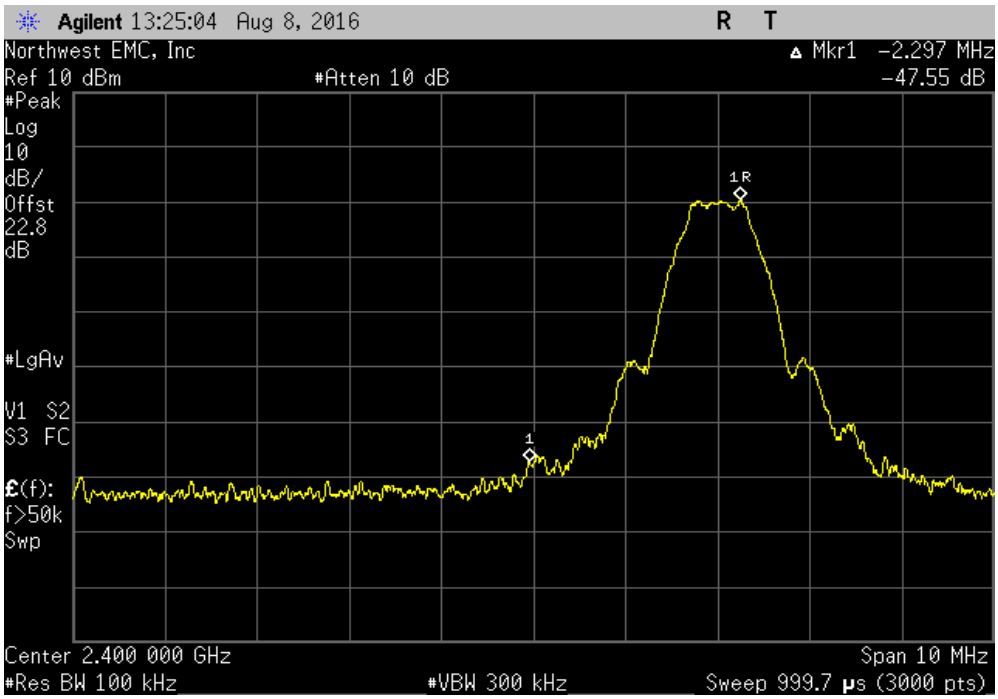
DEVIATIONS FROM TEST STANDARD

None

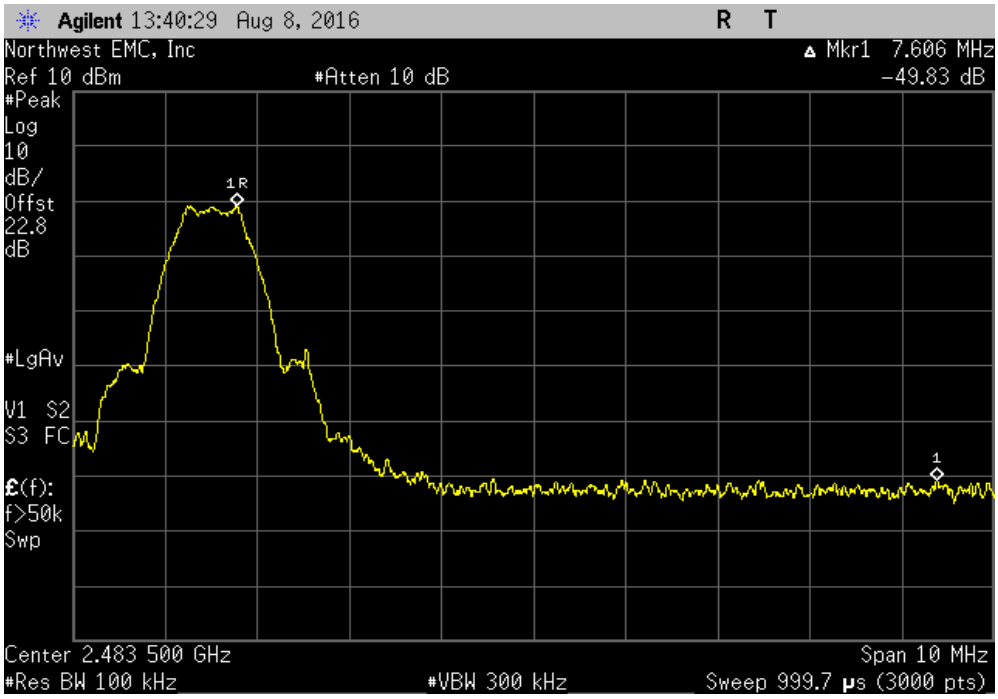
Configuration #	4	Signature

	Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK Low Channel, 2402 MHz	-47.55	-20	Pass
BLE/GFSK High Channel, 2480 MHz	-49.83	-20	Pass

BLE/GFSK Low Channel, 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-47.55	-20	Pass



BLE/GFSK High Channel, 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-49.83	-20	Pass



SPURIOUS CONDUCTED EMISSIONS

XMit 2016.05.06

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
Attenuator	Fairview Microwave	SA18E-20	TKS	4/4/2016	4/4/2017
Block - DC	Aeroflex	INMET 8535	AMO	4/4/2016	4/4/2017
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	NCR
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	11/19/2015	11/19/2016
Generator - Signal	Keysight	N5182B	TFX	4/16/2015	4/16/2018

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

NORTHWEST EMC

XMit 2016.05.06

EUT:	BLEB			**Work Order:**	AWAR0023
Serial Number:	QS15260346			**Date:**	08/08/16
Customer:	Awarepoint Corporation			**Temperature:**	22.4 °C
Attendees:	None			**Humidity:**	50% RH
Project:	None			**Barometric Pres.:**	1013 mbar
Tested by:	Mike Tran	**Power:**	USB Powered	**Job Site:**	OC13

TEST SPECIFICATIONS	Test Method
FCC 15.247:2016	ANSI C63.10:2013

COMMENTS

Total reference level offset: DC Block + 20dB attenuator + RF Cable + Patch Cable = 22.75 dB. Power setting = -9.

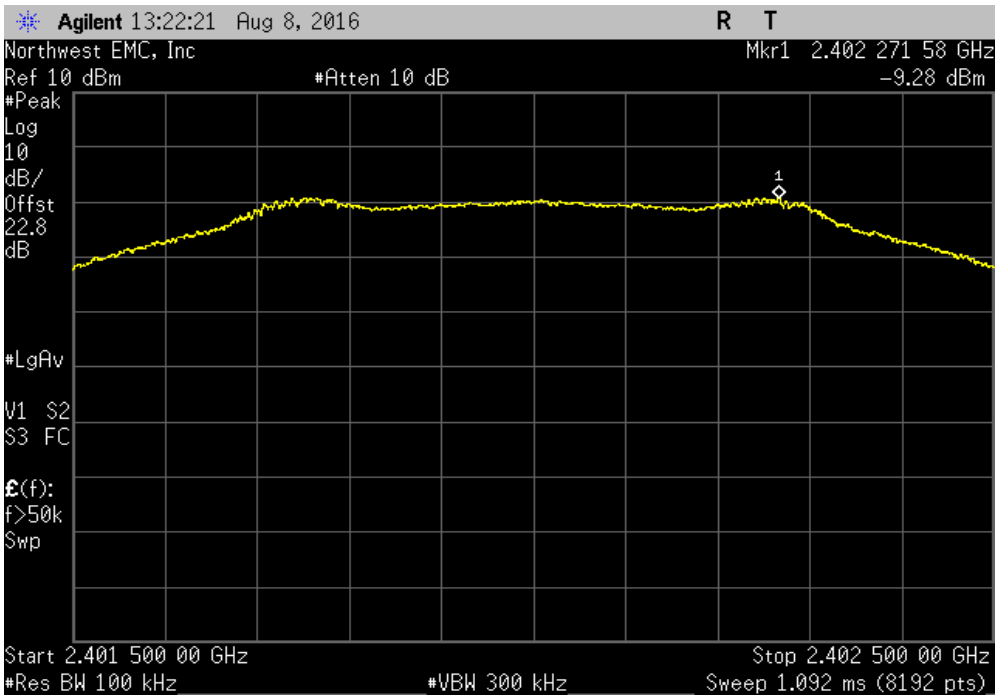
DEVIATIONS FROM TEST STANDARD

None

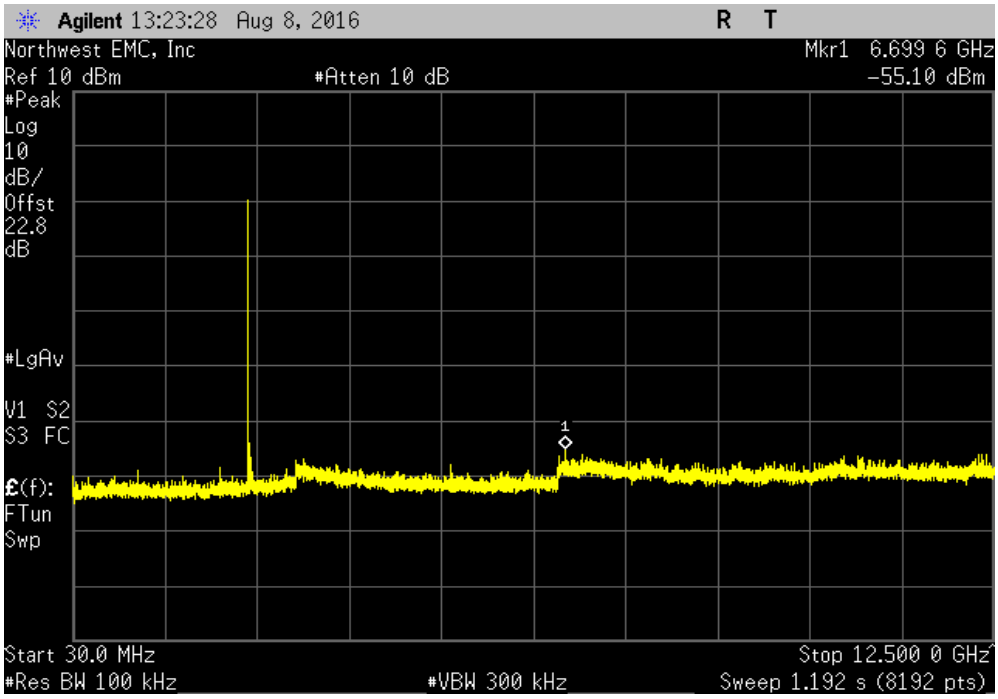
Configuration #	4	Signature

	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	-45.82	-20	Pass
BLE/GFSK Low Channel, 2402 MHz	12.5 GHz - 25 GHz	-42.81	-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	-46.16	-20	Pass
BLE/GFSK High Channel, 2480 MHz	12.5 GHz - 25 GHz	-42.31	-20	Pass
BLE/GFSK Mid Channel, 2442 MHz	Fundamental	N/A	N/A	N/A
BLE/GFSK Mid Channel, 2442 MHz	30 MHz - 12.5 GHz	-45.46	-20	Pass
BLE/GFSK Mid Channel, 2442 MHz	12.5 GHz - 25 GHz	-41.51	-20	Pass

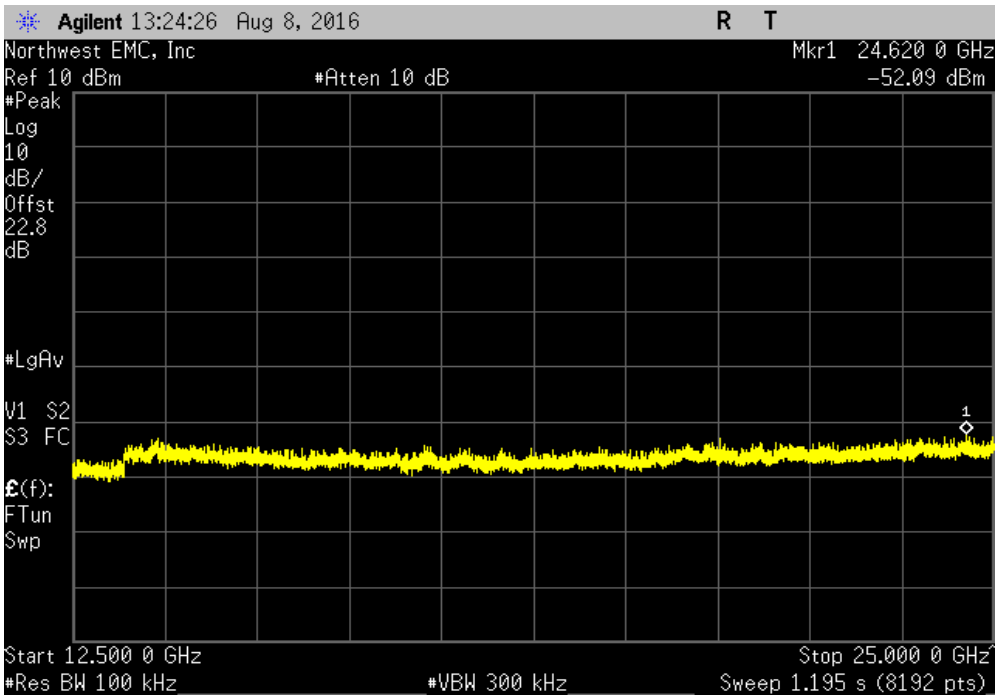
BLE/GFSK Low Channel, 2402 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



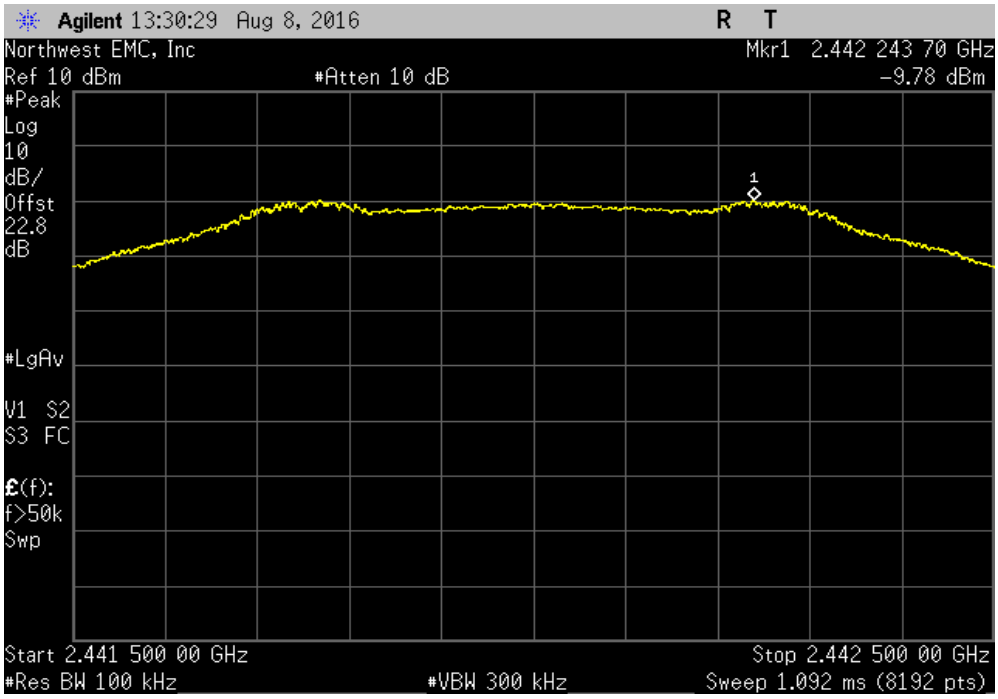
BLE/GFSK Low Channel, 2402 MHz					
Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-45.82	-20	Pass



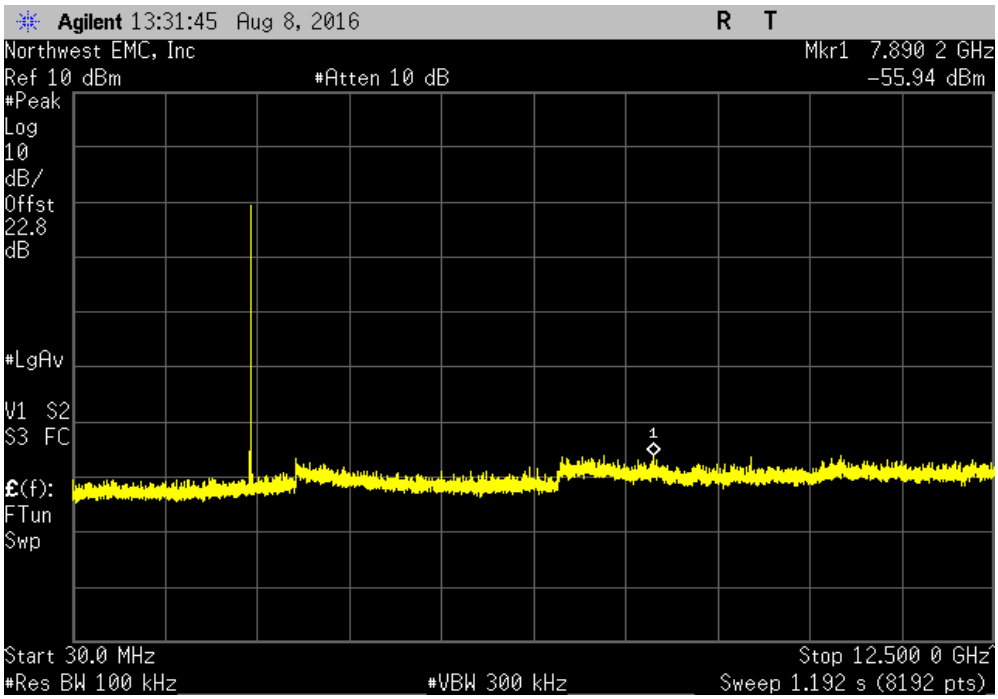
BLE/GFSK Low Channel, 2402 MHz				
Frequency Range		Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz		-42.81	-20	Pass



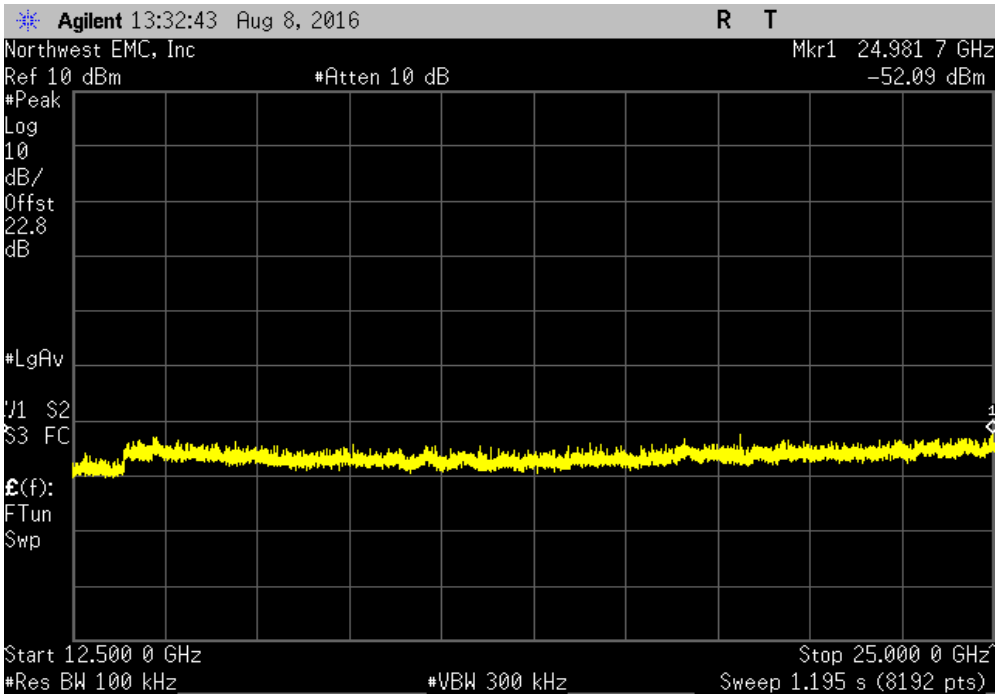
BLE/GFSK High Channel, 2480 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



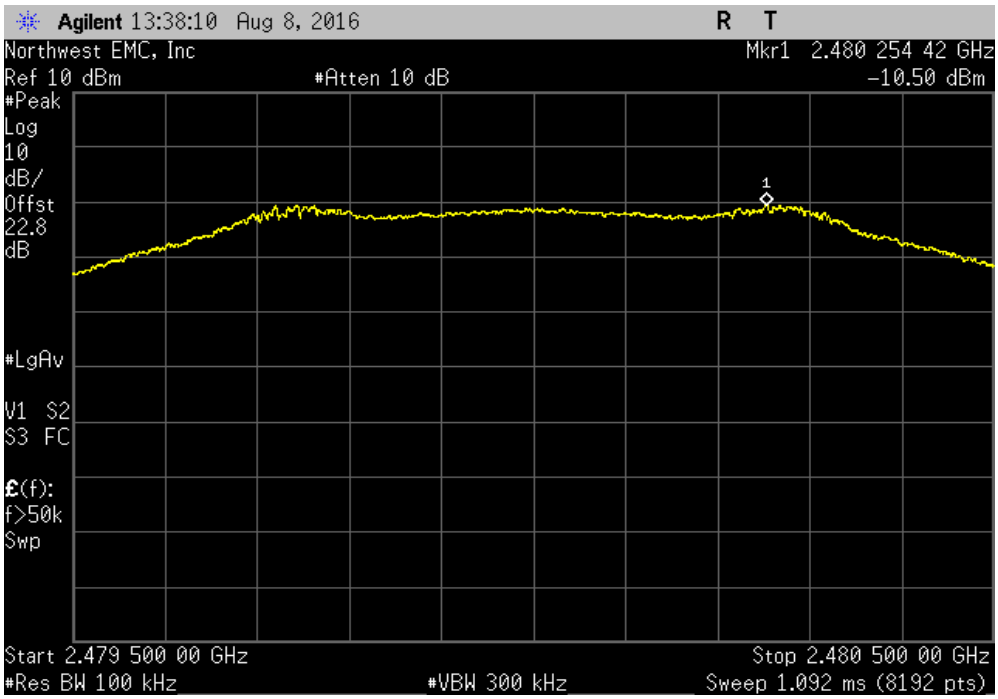
BLE/GFSK High Channel, 2480 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz		-46.16	-20	Pass



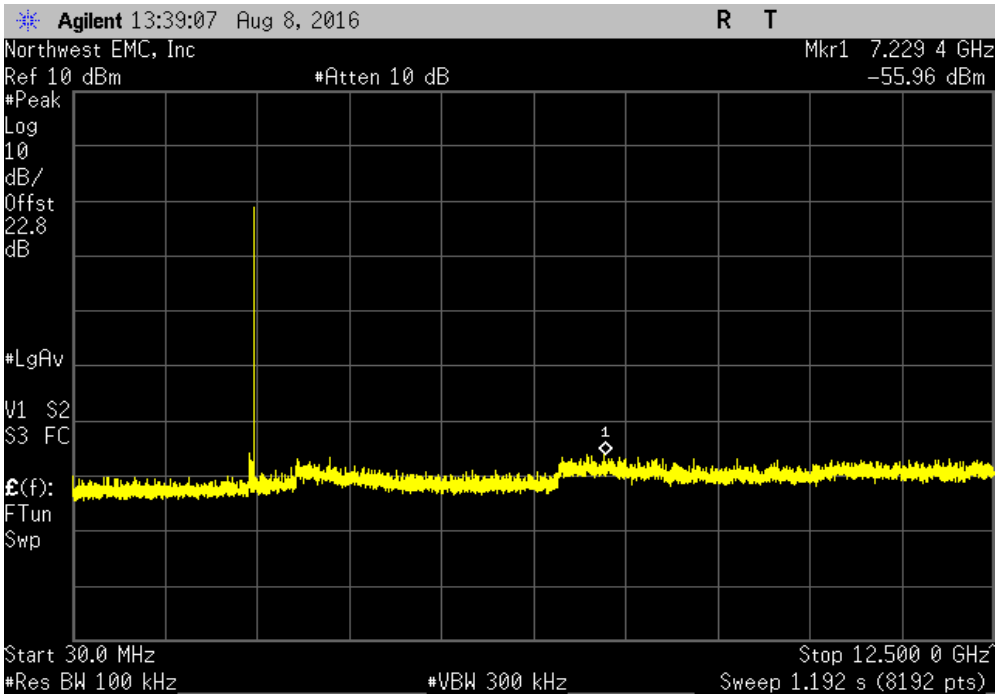
BLE/GFSK High Channel, 2480 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-42.31	-20	Pass



BLE/GFSK Mid Channel, 2442 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



BLE/GFSK Mid Channel, 2442 MHz					
Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-45.46	-20	Pass



BLE/GFSK Mid Channel, 2442 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-41.51	-20	Pass