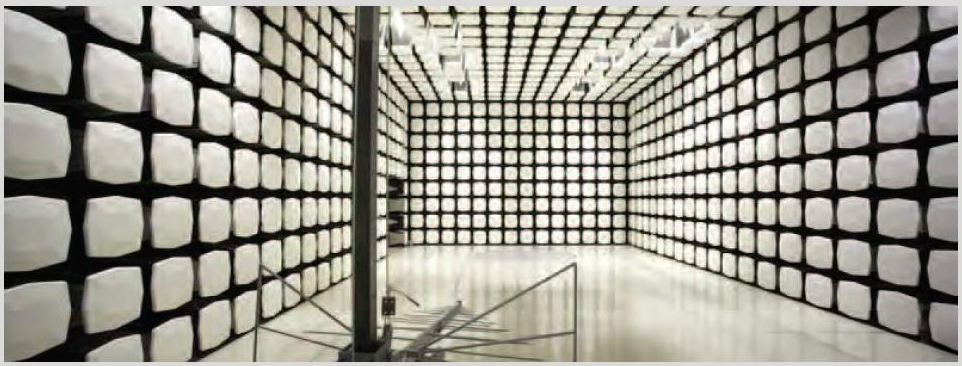
UTC Fire and Security

ITI Wireless Motion Detector

FCC 15.231:2018

Low Power Radio

Report # UTCF0113



NVLAP LAB CODE: 200676-0

CERTIFICATE OF TEST

Last Date of Test: October 12, 2018
UTC Fire and Security
Model: ITI Wireless Motion Detector

Radio Equipment Testing

Standards

Specification	Method
FCC 15.231:2018	ANSI C63.10:2013

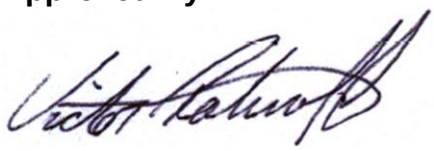
Results

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	Field Strength of Fundamental	Yes	Pass	
6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	
6.9.2	Occupied Bandwidth	Yes	Pass	
7.5	Duty Cycle	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. As indicated in the Statement of Work sent with the quotation, Element's standard process is to always use the latest published version of the test methods even when earlier versions are cited in the test specification. Issuance of a purchase order was de facto acceptance of this approach. Otherwise, the client would have advised Element in writing of the specific version of the test methods they wanted applied to the subject testing.

REVISION HISTORY

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

ACCREDITATIONS AND AUTHORIZATIONS

United States

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

A2LA - Accredited by A2LA to ISO / IEC 17065 as a product certifier. This allows Element to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

ISED - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with ISED.

European Union

European Commission – Within Element, we have a EU Notified Body validated for the EMCD and RED Directives.

Australia/New Zealand

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

Korea

MSIT / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

BSMI – Recognized by BSMI as a CAB for the acceptance of test data.

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

Singapore

IDA – Recognized by IDA as a CAB for the acceptance of test data.

Israel

MOC – Recognized by MOC as a CAB for the acceptance of test data.

Hong Kong

OFCA – Recognized by OFCA as a CAB for the acceptance of test data.

Vietnam

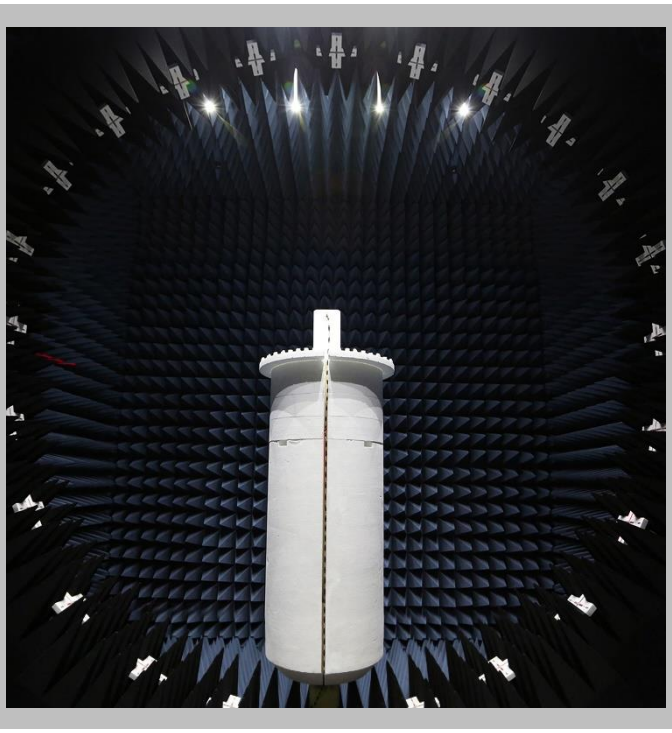
MIC – Recognized by MIC as a CAB for the acceptance of test data.

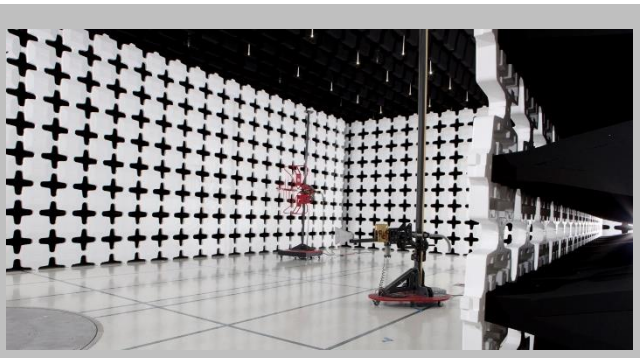
SCOPE

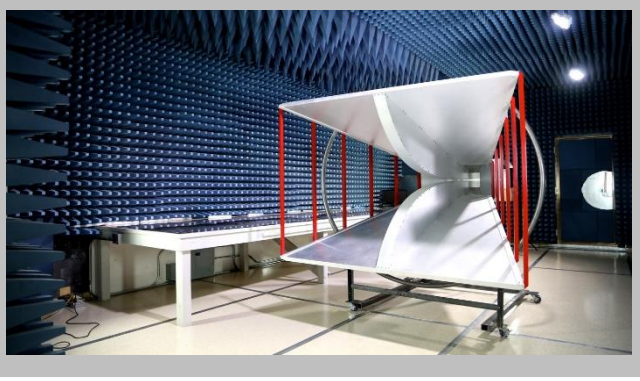
For details on the Scopes of our Accreditations, please visit:
https://www.nwemc.com/emc-testing-accreditations

FACILITIES

California	Minnesota	New York	Oregon	Texas	Washington
Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-10 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 6775 NE Evergreen Pkwy #400 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







MEASUREMENT UNCERTAINTY

element
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.

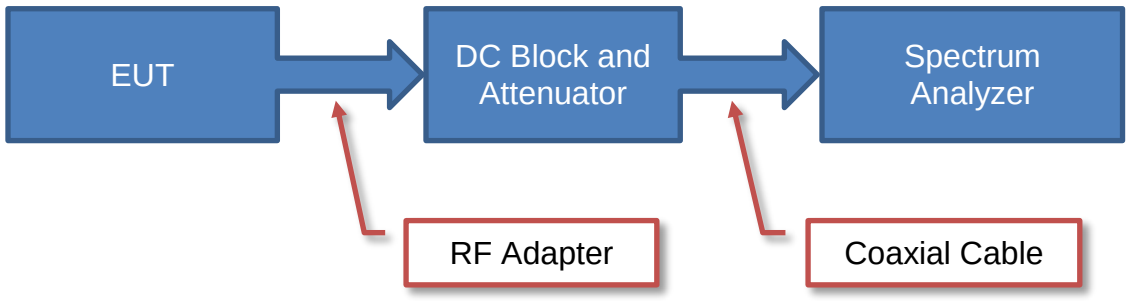
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found included as part of the applicable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

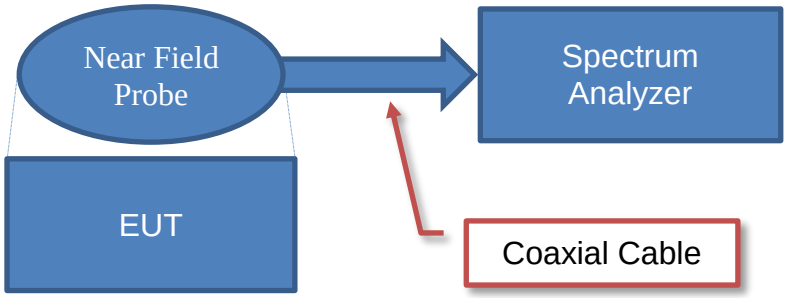
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.1 dB	-5.1 dB
AC Powerline Conducted Emissions (dB)	2.4 dB	-2.4 dB

Test Setup Block Diagrams

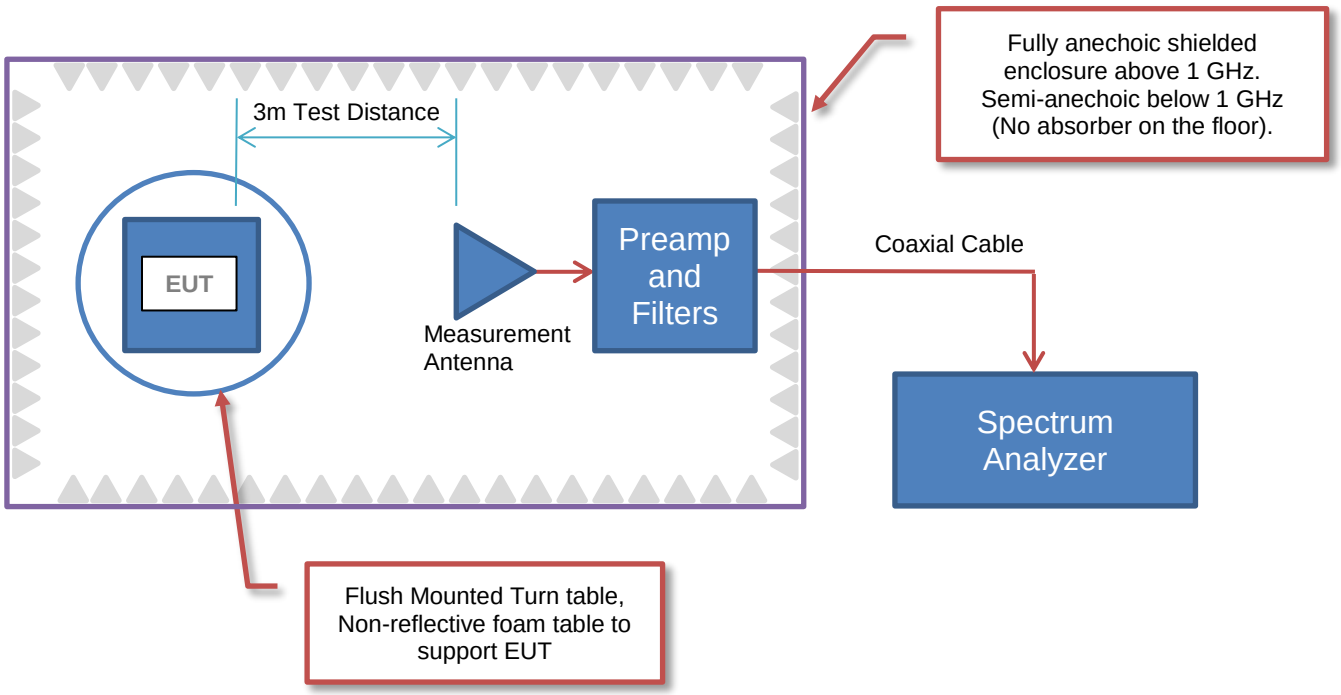
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	UTC Fire and Security
Address:	9 Farm Springs Road
City, State, Zip:	Farmington, CT 06034
Test Requested By:	Konstantin Khrustov
Model:	ITI Wireless Motion Detector
First Date of Test:	October 12, 2018
Last Date of Test:	October 12, 2018
Receipt Date of Samples:	October 12, 2018
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
This device is a wireless passive infrared motion detector and transmitter for use in a wireless security system. The unit is self-contained and powered by one 3.0 Volt Lithium battery. The transmitter's frequency is crystal controlled and is not adjustable by the user. The device measures approximately 5″ by 2.75″ by 2″. The unit weighs approximately 8 ounces with the battery.

Testing Objective:
To demonstrate compliance to FCC 15.231 specifications.

CONFIGURATIONS

Configuration UTCF0113- 1

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
ITI Wireless Motion Detector	UTC Fire and Security	PIR 60-880-95	04EA91C

Configuration UTCF0113- 2

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
ITI Wireless Motion Detector	UTC Fire and Security	PIR 60-880-95	04A0545

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2018-10-12	Duty Cycle	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
2	2018-10-12	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
3	2018-10-12	Field Strength of Fundamental	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
4	2018-10-12	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

FIELD STRENGTH OF FUNDAMENTAL

element

PSA-ESCI 2018.07.27

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Transmitting CW at 319.5 MHz

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

UTCF0113 - 2

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	1000 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
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAY	21-Nov-2017	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1402	AOZ	10-Jul-2018	12 mo
Cable	Northwest EMC	10kHz-1GHz RE Cables	OCH	20-Sep-2018	12 mo
Antenna - Biconilog	Teseq	CBL 6141A	AYE	7-Nov-2017	24 mo

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was configured for continuous un-modulated CW operation at its single transmit frequency. The field strength of the transmit frequency was maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT in 3 orthogonal planes (per ANSI C63.10:2013).

To derive average emission measurements, a duty cycle correction factor was utilized:

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

To derive average emission measurements, a duty cycle correction factor was utilized:

Duty Cycle = On time/100 milliseconds (or the period, whichever is less)

Where “On time” = N1L1 +N2L2 +….

Where N1 is the number of type 1 pulses, L1 is length of type 1 pulses, N2 is the number of type 2 pulses, L2 is the length of type 2 pulses, etc.

Therefore, Duty Cycle = (N1L1 +N2L2 +…)/100mS or T, whichever is less. Where T is the period of the pulse train.

The measured values for the EUT’s pulse train are as follows:

Period = 100 mSec
Pulsewidth of Type 1 Pulse = 0.9533 mSec
Pulsewidth of Type 2 Pulse = 0.1251 mSec
Pulsewidth of Type 3 Pulse = 0.4909 mSec
Number of Type 1 Pulses = 1
Number of Type 2 Pulses = 58
Number of Type 3 Pulses = 1

Duty Cycle = 20 log [((1)(0.9533) + (58)(0.1251) + (1)(0.4909))/100] = -21.2 dB

The duty cycle correction factor of -21.2 dB was added to the peak readings to mathematically derive the average levels. Peak measurements were made with a resolution bandwidth of 100kHz and a video bandwidth of 300kHz.

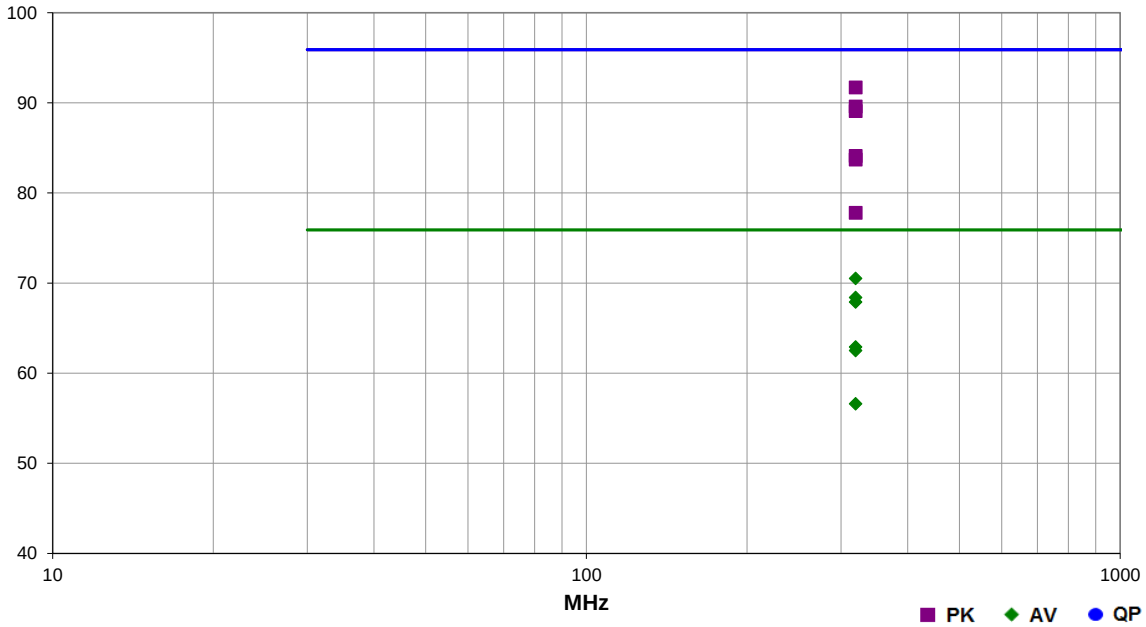
RADIATED EMISSIONS

EmiR5 2018.09.26 PSA-ESCI 2018.07.27

Work Order:	UTCF0113	**Date:**	12-Oct-2018		
Project:	None	**Temperature:**	21.3 °C		
Job Site:	OC10	**Humidity:**	51.5% RH		
Serial Number:	04EA91C	**Barometric Pres.:**	1010 mbar	**Tested by:**	Mark Baytan
EUT:	ITI Wireless Motion Detector				
Configuration:	2				
Customer:	UTC Fire and Security				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	Transmitting CW at 319.5 MHz				
Deviations:	None				
Comments:	None				

Test Specifications	**Test Method**
FCC 15.231:2018	ANSI C63.10:2013

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



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
319.506	86.1	5.6	1.0	278.0		0.0	Horz	PK	0.0	91.7	95.9	-4.2
319.506	86.1	5.6	1.0	278.0	-21.2	0.0	Horz	AV	0.0	70.5	75.9	-5.4
319.505	84.0	5.6	1.0	199.0		0.0	Horz	PK	0.0	89.6	95.9	-6.3
319.505	83.5	5.6	2.0	299.0		0.0	Vert	PK	0.0	89.1	95.9	-6.8
319.505	84.0	5.6	1.0	199.0	-21.2	0.0	Horz	AV	0.0	68.4	75.9	-7.5
319.505	83.5	5.6	2.0	299.0	-21.2	0.0	Vert	AV	0.0	67.9	75.9	-8.0
319.506	78.5	5.6	2.3	113.0		0.0	Vert	PK	0.0	84.1	95.9	-11.8
319.505	78.1	5.6	1.0	24.0		0.0	Horz	PK	0.0	83.7	95.9	-12.2
319.506	78.5	5.6	2.3	113.0	-21.2	0.0	Vert	AV	0.0	62.9	75.9	-13.0
319.505	78.1	5.6	1.0	24.0	-21.2	0.0	Horz	AV	0.0	62.5	75.9	-13.4
319.506	72.2	5.6	3.8	22.0		0.0	Vert	PK	0.0	77.8	95.9	-18.1
319.506	72.2	5.6	3.8	22.0	-21.2	0.0	Vert	AV	0.0	56.6	75.9	-19.3

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2018.07.27

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Transmitting CW at 319.5 MHz

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

UTCF0113 - 2

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	5000 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
Amplifier - Pre-Amplifier	Miteq	AMF-4D-010120-30-10P-1	AOP	6-Sep-2018	12 mo
Cable	Northwest EMC	1-8GHz RE Cables	OCJ	6-Sep-2018	12 mo
Antenna - Double Ridge	EMCO	3115	AHB	28-Mar-2018	24 mo
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAY	21-Nov-2017	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1402	AOZ	10-Jul-2018	12 mo
Cable	Northwest EMC	10kHz-1GHz RE Cables	OCH	20-Sep-2018	12 mo
Antenna - Biconilog	Teseq	CBL 6141A	AYE	7-Nov-2017	24 mo

TEST DESCRIPTION

PK = Peak Detector
AV = RMS Detector

To derive average emission measurements, a duty cycle correction factor was utilized:

Duty Cycle = On time/100 milliseconds (or the period, whichever is less)

Where “On time” = N1L1 +N2L2 +….

Where N1 is the number of type 1 pulses, L1 is length of type 1 pulses, N2 is the number of type 2 pulses, L2 is the length of type 2 pulses, etc.

Therefore, Duty Cycle = (N1L1 +N2L2 +…)/100mS or T, whichever is less. Where T is the period of the pulse train.

The measured values for the EUT’s pulse train are as follows:

Period = 100 mSec
Pulsewidth of Type 1 Pulse = 0.9533 mSec
Pulsewidth of Type 2 Pulse = 0.1251 mSec
Pulsewidth of Type 3 Pulse = 0.4909 mSec
Number of Type 1 Pulses = 1
Number of Type 2 Pulses = 58
Number of Type 3 Pulses = 1

Duty Cycle = 20 log [((1)(0.9533) + (58)(0.1251) + (1)(0.4909))/100] = -21.2dB

The duty cycle correction factor of -21.2dB was added to the peak readings to mathematically derive the average levels. Peak measurements were made with a resolution bandwidth of 100kHz and a video bandwidth of 300kHz for measurements at or below 1GHz. Above 1GHz, a resolution bandwidth of 1MHz and a video bandwidth of 3MHz was used.

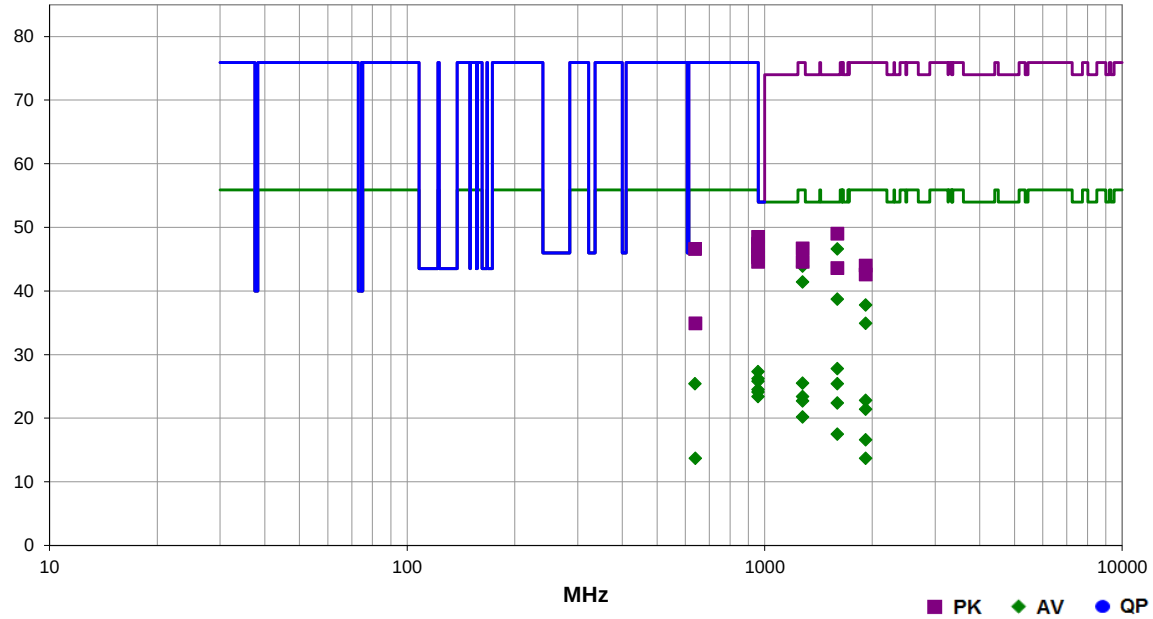
RADIATED EMISSIONS

EmiR5 2018.09.26 PSA-ESCI 2018.07.27

Work Order:	UTCF0113	**Date:**	12-Oct-2018		
Project:	None	**Temperature:**	21.3 °C		
Job Site:	OC10	**Humidity:**	51.5% RH		
Serial Number:	04EA91C	**Barometric Pres.:**	1010 mbar	**Tested by:**	Mark Baytan
EUT:	ITI Wireless Motion Detector				
Configuration:	2				
Customer:	UTC Fire and Security				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	Transmitting CW at 319.5 MHz				
Deviations:	None				
Comments:	None				

Test Specifications	**Test Method**
FCC 15.231:2018	ANSI C63.10:2013

Run #	2	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
1597.550	47.1	-0.5	1.1	333.0		0.0	Horz	AV	0.0	46.6	54.0	-7.4
1278.045	46.8	-2.9	1.5	227.0		0.0	Horz	AV	0.0	43.9	55.9	-12.0
1278.025	44.3	-2.9	2.5	184.0		0.0	Vert	AV	0.0	41.4	55.9	-14.5
1597.545	39.2	-0.5	1.0	237.0		0.0	Vert	AV	0.0	38.7	54.0	-15.3
1917.045	36.3	1.5	1.7	182.0		0.0	Horz	AV	0.0	37.8	55.9	-18.1
1917.055	33.4	1.5	2.0	156.0		0.0	Vert	AV	0.0	34.9	55.9	-21.0
1597.465	49.5	-0.5	1.1	333.0		0.0	Horz	PK	0.0	49.0	74.0	-25.0
1597.465	49.5	-0.5	1.1	333.0	-21.2	0.0	Horz	AV	0.0	27.8	54.0	-26.2
958.537	28.4	20.1	1.0	307.0		0.0	Horz	PK	0.0	48.5	75.9	-27.4
958.544	27.3	20.1	1.0	3.0		0.0	Horz	PK	0.0	47.4	75.9	-28.5
1597.550	47.1	-0.5	1.1	333.0	-21.2	0.0	Horz	AV	0.0	25.4	54.0	-28.6
958.537	28.4	20.1	1.0	307.0	-21.2	0.0	Horz	AV	0.0	27.3	55.9	-28.6
958.515	26.9	20.1	1.0	231.0		0.0	Horz	PK	0.0	47.0	75.9	-28.9
1278.115	49.6	-2.9	1.5	227.0		0.0	Horz	PK	0.0	46.7	75.9	-29.2
639.020	33.4	13.2	1.6	190.0		0.0	Horz	PK	0.0	46.6	75.9	-29.3
958.544	27.3	20.1	1.0	3.0	-21.2	0.0	Horz	AV	0.0	26.2	55.9	-29.7
958.515	26.9	20.1	1.0	231.0	-21.2	0.0	Horz	AV	0.0	25.8	55.9	-30.1
958.546	25.6	20.1	1.2	59.0		0.0	Vert	PK	0.0	45.7	75.9	-30.2
1278.115	49.6	-2.9	1.5	227.0	-21.2	0.0	Horz	AV	0.0	25.5	55.9	-30.4
1597.325	44.1	-0.5	1.0	237.0		0.0	Vert	PK	0.0	43.6	74.0	-30.4

OCCUPIED BANDWIDTH

XMit 2017.12.13

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAY	21-Nov-17	21-Nov-18
Probe - Near Field Set	Com-Power	PS-400	IPF	NCR	NCR

TEST DESCRIPTION

A near-field probe was placed near the transmitter. A low-loss coaxial cable was used to connect the near-field probe to the spectrum analyzer. The EUT was transmitting at its maximum data rate.

The 20dB occupied bandwidth is required to be less than or equal to 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz.

OCCUPIED BANDWIDTH

XMit 2017.12.13

EUT:	**ITI Wireless Motion Detector**			**Work Order:**	**UTCF0113**
Serial Number:	**04EA91C**			**Date:**	**12-Oct-18**
Customer:	**UTC Fire and Security**			**Temperature:**	**21.2 °C**
Attendees:	**None**			**Humidity:**	**51.4% RH**
Project:	**None**			**Barometric Pres.:**	**1011 mbar**
Tested by:	**Mark Baytan**	**Power:**	**Battery**	**Job Site:**	**OC10**

TEST SPECIFICATIONS	**Test Method**
FCC 15.231:2018	ANSI C63.10:2013

COMMENTS

Limit based on center frequency: 319.5 MHz * 0.25% = 0.79875 MHz

DEVIATIONS FROM TEST STANDARD

None

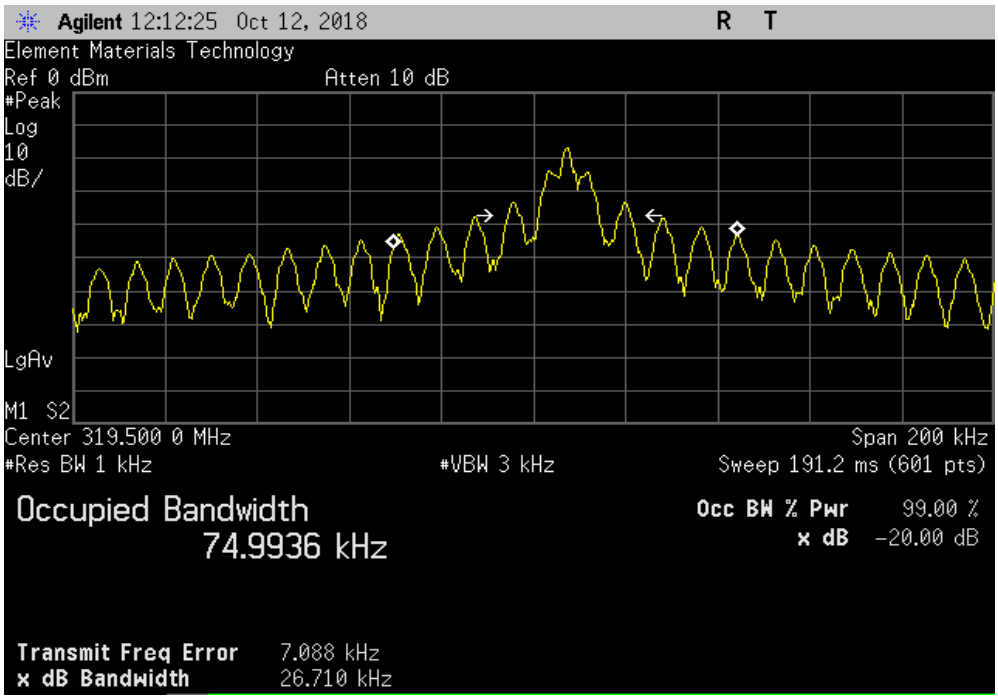
Configuration #	**1**	*Signature*

	Value	**Limit**	**Result**
319.50 MHz	26.71 kHz	798.75 kHz	Pass

OCCUPIED BANDWIDTH

XMit 2017.12.13

319.50 MHz						
				Value	Limit	Result
				26.71 kHz	798.75 kHz	Pass



DUTY CYCLE

XMit 2017.12.13

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Probe - Near Field Set	Com-Power	PS-400	IPF	NCR	NCR
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAY	21-Nov-17	21-Nov-18

TEST DESCRIPTION

A near-field probe was placed near the transmitter. A low-loss coaxial cable was used to connect the near-field probe to the spectrum analyzer. For software controlled or pre-programmed devices, the manufacturer shall declare the duty cycle class or classes for the equipment under test. For manually operated or event dependant devices, with or without software controlled functions, the manufacturer shall declare whether the device once triggered, follows a pre-programmed cycle, or whether the transmission is constant until the trigger is released or manually reset. The manufacturer shall also give a description of the application for the device and include a typical usage pattern. The typical usage pattern as declared by the manufacturer shall be used to determine the duty cycle and hence the duty class.

Where an acknowledgement is required, the additional transmitter on-time shall be included and declared by the manufacturer.

To derive average emission measurements, a duty cycle correction factor was utilized:

Duty Cycle = On time/100 milliseconds (or the period, whichever is less)

Where “On time” = N1L1 +N2L2 +….

Where N1 is the number of type 1 pulses, L1 is length of type 1 pulses, N2 is the number of type 2 pulses, L2 is the length of type 2 pulses, etc.

Therefore, Duty Cycle = (N1L1 +N2L2 +…)/100mS or T, whichever is less. (Where T is the period of the pulse train.)

The measured values for the EUT’s pulse train are as follows:

Period = 100 mSec
Pulsewidth of Type 1 Pulse = **0.9533** mSec
Pulsewidth of Type 2 Pulse = **0.1251** mSec
Pulsewidth of Type 3 Pulse = **0.4909** mSec
Number of Type 1 Pulses = **1**
Number of Type 2 Pulses = **58**
Number of Type 3 Pulses = **1**

Duty Cycle = 20 log [((1)(0.9533) + (58)(0.1251) + (1)(0.4909))/100] = -21.2 dB

The duty cycle correction factor of -21.2 dB was added to the peak readings to mathematically derive the average levels. Peak measurements were made with a resolution bandwidth of 100kHz and a video bandwidth of 300kHz.

DUTY CYCLE

XMit 2017.12.13

EUT:	**ITI Wireless Motion Detector**			**Work Order:**	**UTCF0113**
Serial Number:	**04EA91C**			**Date:**	**12-Oct-18**
Customer:	**UTC Fire and Security**			**Temperature:**	**21.1 °C**
Attendees:	**None**			**Humidity:**	**51.1% RH**
Project:	**None**			**Barometric Pres.:**	**1011 mbar**
Tested by:	**Mark Baytan**	**Power:**	**Battery**	**Job Site:**	**OC10**

TEST SPECIFICATIONS	**Test Method**
FCC 15.231:2018	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

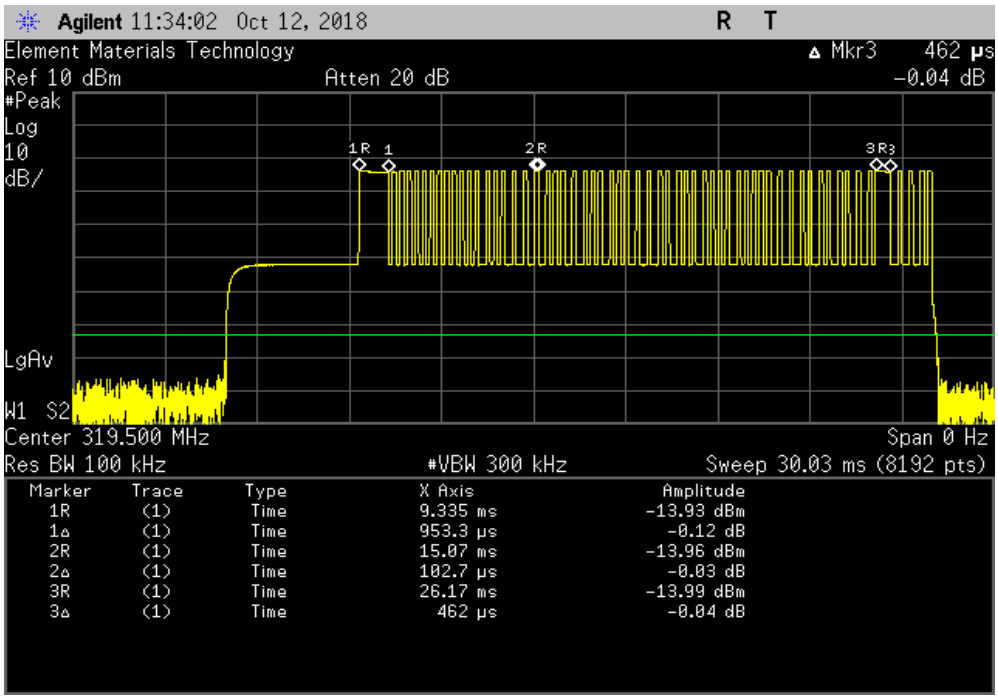
Configuration #	**1**	*Signature*

	Pulse Width Type 1 (ms)	**Pulse Width Type 2 (ms)**	**Pulse Width Type 3 (ms)**	**Limit**	**Result**
30ms Interval	0.9533	0.1027	0.462	N/A	N/A
100ms Interval	N/A	N/A	N/A	N/A	N/A
1s Interval	N/A	N/A	N/A	N/A	N/A
5s Interval	N/A	N/A	N/A	N/A	N/A
10s Interval	N/A	N/A	N/A	N/A	N/A

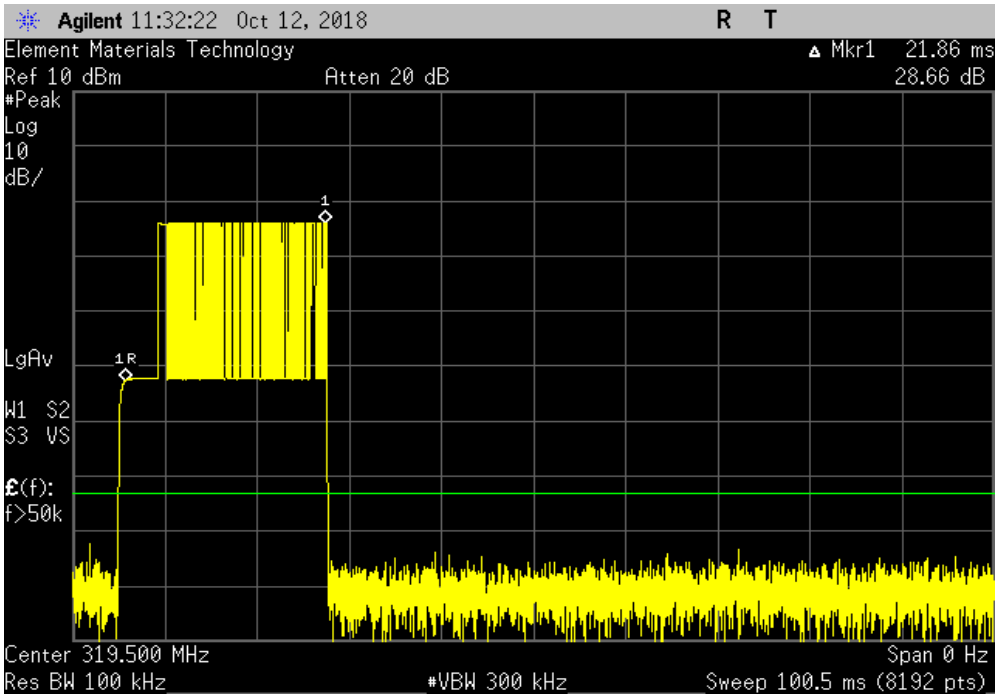
DUTY CYCLE

XMit 2017.12.13

30ms Interval						
		Pulse Width Type 1 (ms)	Pulse Width Type 2 (ms)	Pulse Width Type 3 (ms)	Limit	Result
		0.9533	0.1027	0.462	N/A	N/A



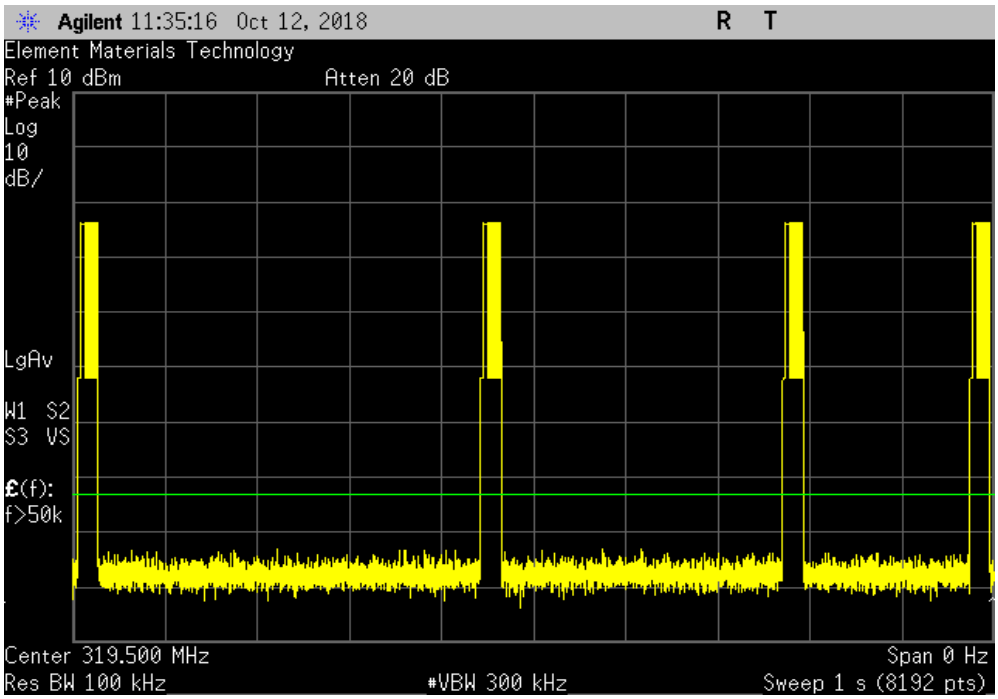
100ms Interval						
		Pulse Width Type 1 (ms)	Pulse Width Type 2 (ms)	Pulse Width Type 3 (ms)	Limit	Result
		N/A	N/A	N/A	N/A	N/A



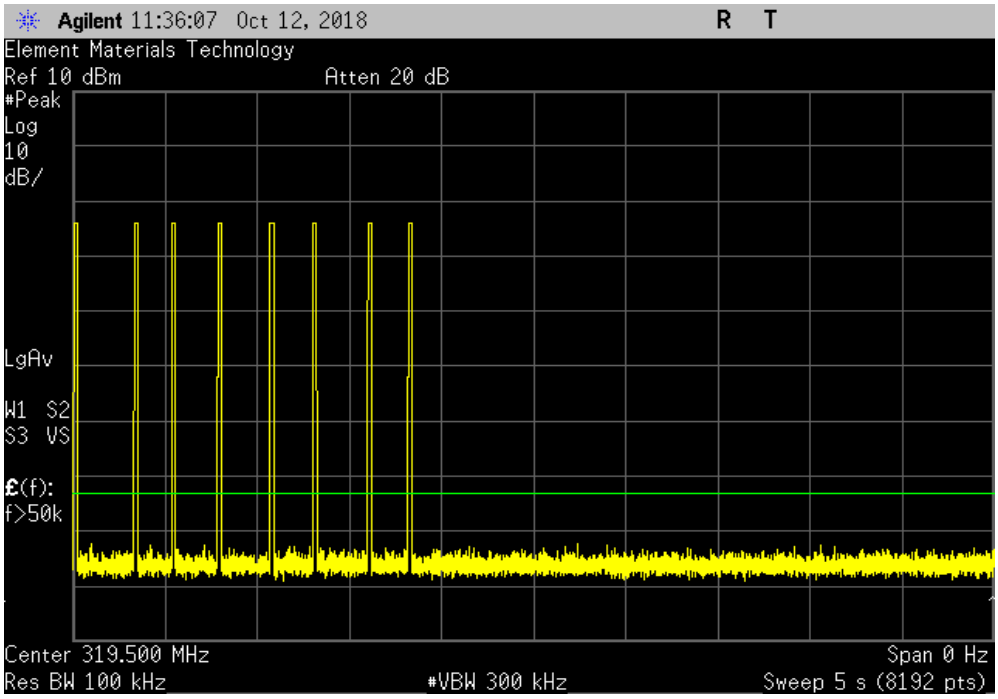
DUTY CYCLE

XMit 2017.12.13

1s Interval						
		Pulse Width Type 1 (ms)	Pulse Width Type 2 (ms)	Pulse Width Type 3 (ms)	Limit	Result
		N/A	N/A	N/A	N/A	N/A



5s Interval						
		Pulse Width Type 1 (ms)	Pulse Width Type 2 (ms)	Pulse Width Type 3 (ms)	Limit	Result
		N/A	N/A	N/A	N/A	N/A



DUTY CYCLE

XMit 2017.12.13

10s Interval						
		Pulse Width Type 1 (ms)	Pulse Width Type 2 (ms)	Pulse Width Type 3 (ms)	Limit	Result
		N/A	N/A	N/A	N/A	N/A