



## **CINCH Systems**

**RF-FOB-PANIC-319**

**FCC 15.231:2018  
Low Power Radio**

**Report # CINC0029**



NVLAP LAB CODE: 200881-0



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# CERTIFICATE OF TEST

Last Date of Test: October 11, 2018

CINCH Systems

Model: RF-FOB-PANIC-319

## 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:



Matt Nuernberg, Operations Manager

*Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information. As indicated in the Statement of Work sent with the quotation, Element's standard process is to always use the latest published version of the test methods even when earlier versions are cited in the test specification. Issuance of a purchase order was de facto acceptance of this approach. Otherwise, the client would have advised Element in writing of the specific version of the test methods they wanted applied to the subject testing.*

# REVISION HISTORY



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

# ACCREDITATIONS AND AUTHORIZATIONS



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## 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

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## 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.

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## European Union

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

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## Australia/New Zealand

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

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## Korea

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

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## Japan

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

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## 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.

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## Singapore

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

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## Israel

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

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## Hong Kong

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

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## Vietnam

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

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## SCOPE

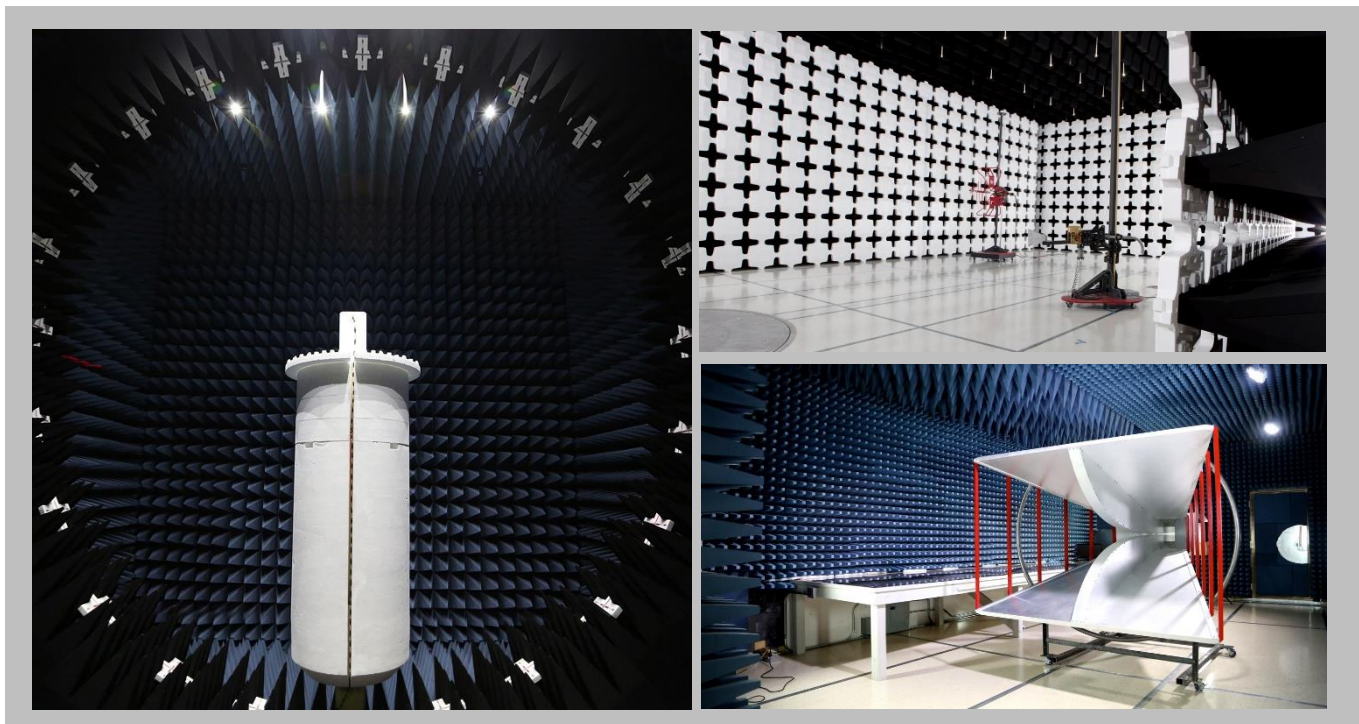
For details on the Scopes of our Accreditations, please visit:

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

# FACILITIES



<b>California</b> Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	<b>Minnesota</b> Labs MN01-10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	<b>New York</b> Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	<b>Oregon</b> Labs EV01-12 6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	<b>Texas</b> Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	<b>Washington</b> Labs NC01-05 19201 120 <sup>th</sup> Ave NE Bothell, WA 98011 (425)984-6600
<b>NVLAP</b>					
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
<b>Innovation, Science and Economic Development Canada</b>					
2834B-1, 2834B-3	2834E-1, 2834E-3	N/A	2834D-1, 2834D-2	2834G-1	2834F-1
<b>BSMI</b>					
SL2-IN-E-1154R	SL2-IN-E-1152R	N/A	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
<b>VCCI</b>					
A-0029	A-0109	N/A	A-0108	A-0201	A-0110
<b>Recognized Phase I CAB for ACMA, BSMI, IDA, KCC/RRR, MIC, MOC, NCC, OFCA</b>					
US0158	US0175	N/A	US0017	US0191	US0157



# MEASUREMENT UNCERTAINTY



## Measurement Uncertainty

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

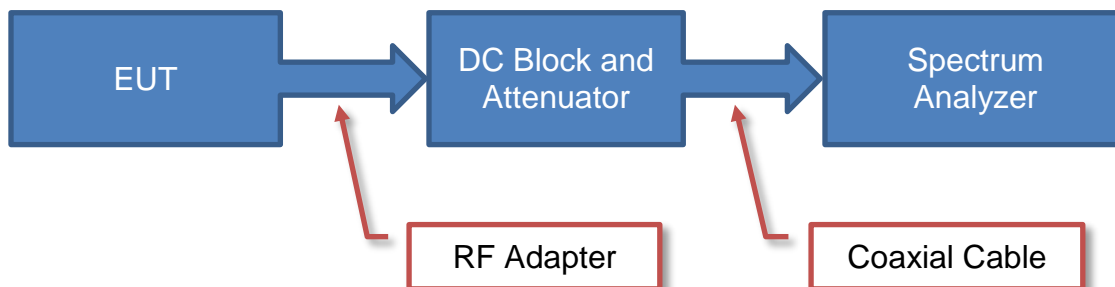
A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) for each test is on each data sheet. Our measurement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

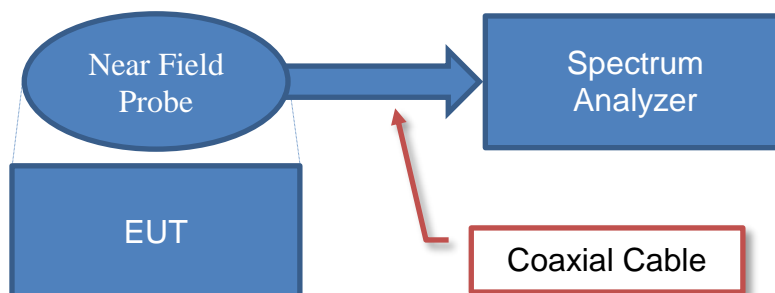
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%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

# Test Setup Block Diagrams

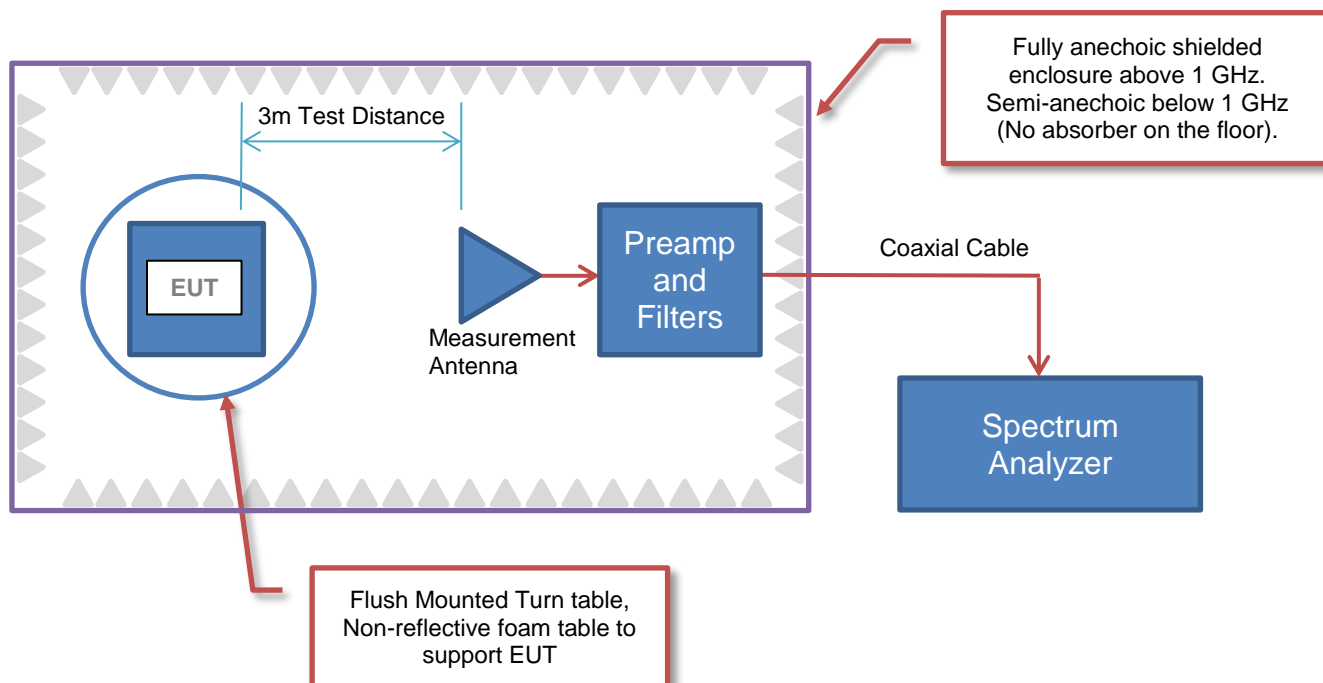
## Antenna Port Conducted Measurements



## Near Field Test Fixture Measurements



## Spurious Radiated Emissions



# PRODUCT DESCRIPTION



## Client and Equipment Under Test (EUT) Information

Company Name:	CINCH Systems
Address:	Suite 300 12075 43rd Street NE
City, State, Zip:	St. Michael, MN 55376
Test Requested By:	Jibril Aga
Model:	RF-FOB-PANIC-319
First Date of Test:	October 11, 2018
Last Date of Test:	October 11, 2018
Receipt Date of Samples:	October 11, 2018
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

## Information Provided by the Party Requesting the Test

<b>Functional Description of the EUT:</b>
Low power radio with one antenna type operating at 319.5 MHz
<b>Testing Objective:</b>
To demonstrate compliance to FCC 15.231 specifications.

# CONFIGURATIONS



## Configuration CINC0029- 1

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Keyfob	CINCH Systems	RF-FOB-PANIC-319	0348139

## Configuration CINC0029- 2

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Keyfob	CINCH Systems	RF-FOB-PANIC-319	03C46DE

## Configuration CINC0029- 3

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Keyfob	CINCH Systems	RF-FOB-PANIC-319	0348139

# MODIFICATIONS



## Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2018-10-11	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.
2	2018-10-11	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.
3	2018-10-11	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.
4	2018-10-11	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



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 at 319.5 MHz, CW

## POWER SETTINGS INVESTIGATED

Battery

## CONFIGURATIONS INVESTIGATED

CINC0029 - 3

## FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	1000 MHz
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## 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	E4440A	AAX	26-Mar-2018	12 mo
Cable	Element	Biconilog Cable	MNX	24-Feb-2018	12 mo
Antenna - Biconilog	ETS Lindgren	3142D	AXO	15-Dec-2017	24 mo

## TEST DESCRIPTION

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" =  $N1L1 + N2L2 + \dots$

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 =  $(N1L1 + N2L2 + \dots)/100\text{mS}$  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 = <0.6635> mSec  
Pulsewidth of Type 2 Pulse = <0.4484> mSec  
Pulsewidth of Type 3 Pulse = <0.1233> mSec  
Number of Type 1 Pulses = <1>  
Number of Type 2 Pulses = <1>  
Number of Type 3 Pulses = <58>

Duty Cycle =  $20 \log \left[ \frac{(1)(0.6635) + (1)(0.4484) + (58)(0.1233)}{100} \right] = <-21.66> \text{ dB}$


The duty cycle correction factor of <-21.66> 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.

# FIELD STRENGTH OF FUNDAMENTAL



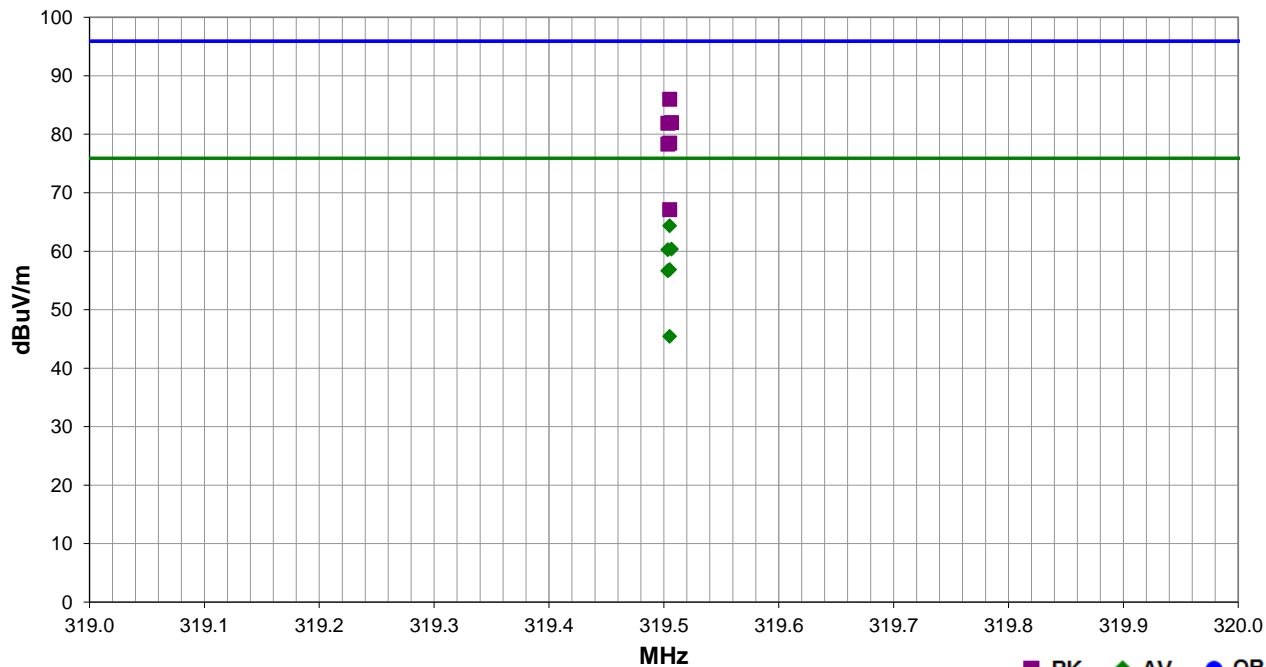
EmiR5 2018.09.26

PSA-ESCI 2018.07.27

Work Order:	CINC0029	Date:	11-Oct-2018	
Project:	None	Temperature:	20.3 °C	
Job Site:	MN09	Humidity:	38.8% RH	
Serial Number:	0348139	Barometric Pres.:	1018 mbar	
EUT:	RF-FOB-PANIC-319			
Configuration:	3			
Customer:	CINCH Systems			
Attendees:	Jibril Aga			
EUT Power:	Battery			
Operating Mode:	Transmitting at 319.5 MHz, CW			
Deviations:	None			
Comments:	See data comments for EUT orientation			

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

Run #	6	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
319.505	66.5	19.5	1.0	360.0	0.0	0.0	Horz	PK	0.0	86.0	95.9	-9.9	EUT horz
319.505	66.5	19.5	1.0	360.0	-21.7	0.0	Horz	AV	0.0	64.3	75.9	-11.6	EUT horz
319.507	62.5	19.5	1.7	360.0	0.0	0.0	Vert	PK	0.0	82.0	95.9	-13.9	EUT on side
319.503	62.4	19.5	1.6	92.0	0.0	0.0	Vert	PK	0.0	81.9	95.9	-14.0	EUT vert
319.507	62.5	19.5	1.7	360.0	-21.7	0.0	Vert	AV	0.0	60.3	75.9	-15.6	EUT on side
319.503	62.4	19.5	1.6	92.0	-21.7	0.0	Vert	AV	0.0	60.2	75.9	-15.7	EUT vert
319.505	59.0	19.5	1.3	187.0	0.0	0.0	Horz	PK	0.0	78.5	95.9	-17.4	EUT vert
319.503	58.8	19.5	2.2	261.0	0.0	0.0	Horz	PK	0.0	78.3	95.9	-17.6	EUT on side
319.505	59.0	19.5	1.3	187.0	-21.7	0.0	Horz	AV	0.0	56.8	75.9	-19.1	EUT vert
319.503	58.8	19.5	2.2	261.0	-21.7	0.0	Horz	AV	0.0	56.6	75.9	-19.3	EUT on side
319.505	47.6	19.5	1.4	242.0	0.0	0.0	Vert	PK	0.0	67.1	95.9	-28.8	EUT horz
319.505	47.6	19.5	1.4	242.0	-21.7	0.0	Vert	AV	0.0	45.4	75.9	-30.5	EUT horz

# 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 at 319.5 MHz, CW

## POWER SETTINGS INVESTIGATED

Battery

## CONFIGURATIONS INVESTIGATED

CINC0029 - 3

## FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	3195 MHz
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## 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	Coaxicom	3910-10	AWZ	26-Sep-2018	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVX	24-Feb-2018	12 mo
Cable	Element	Double Ridge Guide Horn Cables	MNV	24-Feb-2018	12 mo
Antenna - Double Ridge	ETS-Lindgren	3115	AJQ	14-Nov-2016	24 mo
Amplifier - Pre-Amplifier	Miteq	AM-1064-9079 and SA18E-10	AOO	24-Feb-2018	12 mo
Cable	Element	Biconilog Cable	MNX	24-Feb-2018	12 mo
Antenna - Biconilog	ETS Lindgren	3142D	AXO	15-Dec-2017	24 mo
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	26-Mar-2018	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 frequency in each operational band 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, 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

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 + ....

# SPURIOUS RADIATED EMISSIONS



PSA-ESCI 2018.07.27

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 =  $(N1L1 + N2L2 + \dots)/100\text{mS}$  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 = <0.6635> mSec  
Pulsewidth of Type 2 Pulse = <0.4484> mSec  
Pulsewidth of Type 3 Pulse = <0.1233> mSec  
Number of Type 1 Pulses = <1>  
Number of Type 2 Pulses = <1>  
Number of Type 3 Pulses = <58>

Duty Cycle =  $20 \log [((1)(0.6635) + (1)(0.4484) + (58)(0.1233))/100] = <-21.66> \text{ dB}$

The duty cycle correction factor of <-21.66> 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 for measurements at or below 1GHz. Above 1GHz, a resolution bandwidth of 1MHz and a video bandwidth of 3MHz was used.

# SPURIOUS RADIATED EMISSIONS

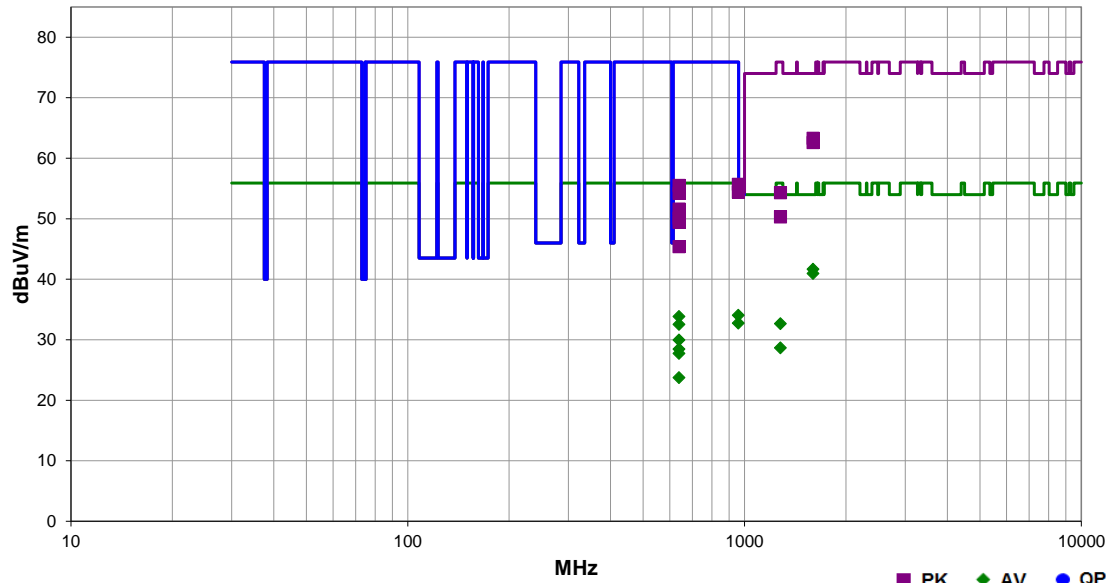


EmiR5 2018.09.26 PSA-ESCI 2018.07.27

Work Order:	CINC0029	Date:	11-Oct-2018	<i>Trevor Buls</i>
Project:	None	Temperature:	20.3 °C	
Job Site:	MN09	Humidity:	38.8% RH	
Serial Number:	0348139	Barometric Pres.:	1018 mbar	
EUT:	RF-FOB-PANIC-319			Tested by: Andrew Rogstad, Trevor Buls
Configuration:	3			
Customer:	CINCH Systems			
Attendees:	Jibril Aga			
EUT Power:	Battery			
Operating Mode:	Transmitting at 319.5 MHz, CW			
Deviations:	None			
Comments:	None			

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

Run #	7	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
1597.575	70.1	-6.8	1.0	166.0	0.0	0.0	Vert	PK	0.0	63.3	74.0	-10.7	EUT on side
1597.490	69.4	-6.8	1.0	330.0	0.0	0.0	Horz	PK	0.0	62.6	74.0	-11.4	EUT horz
1597.575	70.1	-6.8	1.0	166.0	-21.7	0.0	Vert	AV	0.0	41.6	54.0	-12.4	EUT on side
1597.490	69.4	-6.8	1.0	330.0	-21.7	0.0	Horz	AV	0.0	40.9	54.0	-13.1	EUT horz
958.514	32.5	13.2	1.4	30.0	0.0	10.0	Horz	PK	0.0	55.7	75.9	-20.2	EUT horz
639.010	37.6	7.9	1.2	136.0	0.0	10.0	Horz	PK	0.0	55.5	75.9	-20.4	EUT horz
958.522	31.2	13.2	1.1	66.0	0.0	10.0	Vert	PK	0.0	54.4	75.9	-21.5	EUT on side
1278.135	62.3	-8.0	2.6	271.0	0.0	0.0	Horz	PK	0.0	54.3	75.9	-21.6	EUT horz
639.008	36.3	7.9	1.0	0.0	0.0	10.0	Vert	PK	0.0	54.2	75.9	-21.7	EUT on side
958.514	32.5	13.2	1.4	30.0	-21.7	10.0	Horz	AV	0.0	34.0	55.9	-21.9	EUT horz
639.010	37.6	7.9	1.2	136.0	-21.7	10.0	Horz	AV	0.0	33.8	55.9	-22.1	EUT horz
958.522	31.2	13.2	1.1	66.0	-21.7	10.0	Vert	AV	0.0	32.7	55.9	-23.2	EUT on side
1278.135	62.3	-8.0	2.6	271.0	-21.7	0.0	Horz	AV	0.0	32.6	55.9	-23.3	EUT horz
639.008	36.3	7.9	1.0	0.0	-21.7	10.0	Vert	AV	0.0	32.5	55.9	-23.4	EUT on side
639.022	33.7	7.9	1.8	353.0	0.0	10.0	Vert	PK	0.0	51.6	75.9	-24.3	EUT vert
1278.030	58.3	-8.0	1.0	13.0	0.0	0.0	Vert	PK	0.0	50.3	75.9	-25.6	EUT on side
639.010	32.2	7.9	1.4	76.0	0.0	10.0	Horz	PK	0.0	50.1	75.9	-25.8	EUT vert
639.022	33.7	7.9	1.8	353.0	-21.7	10.0	Vert	AV	0.0	29.9	55.9	-26.0	EUT vert
639.008	31.5	7.9	3.9	85.0	0.0	10.0	Horz	PK	0.0	49.4	75.9	-26.5	EUT on side
1278.030	58.3	-8.0	1.0	13.0	-21.7	0.0	Vert	AV	0.0	28.6	55.9	-27.3	EUT on side
639.010	32.2	7.9	1.4	76.0	-21.7	10.0	Horz	AV	0.0	28.4	55.9	-27.5	EUT vert
639.008	31.5	7.9	3.9	85.0	-21.7	10.0	Horz	AV	0.0	27.7	55.9	-28.2	EUT on side
639.019	27.5	7.9	1.0	35.0	0.0	10.0	Vert	PK	0.0	45.4	75.9	-30.5	EUT horz
639.019	27.5	7.9	1.0	35.0	-21.7	10.0	Vert	AV	0.0	23.7	55.9	-32.2	EUT horz

# 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	E4440A	AAX	26-Mar-2018	26-Mar-2019
Cable	Element	Biconilog Cable	MNX	24-Feb-2018	24-Feb-2019
Antenna - Biconilog	ETS Lindgren	3142D	AXO	15-Dec-2017	15-Dec-2019

## TEST DESCRIPTION

The measurement was made in a radiated configuration of the fundamental with the carrier fully maximized for its highest radiated power. The EUT was transmitting at its maximum data rate.

The 20 dB occupied bandwidth is required to be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz.

# OCCUPIED BANDWIDTH



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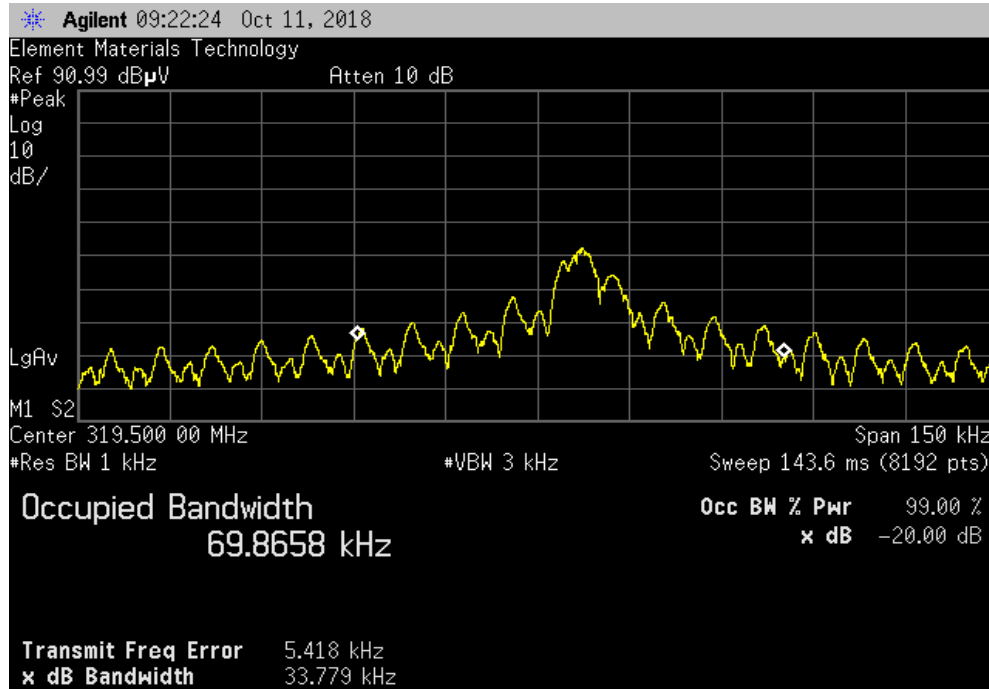
EUT: RF-FOB-PANIC-319		Work Order: CINC0029	
Serial Number: 0348139		Date: 11-Oct-18	
Customer: CINCH Systems		Temperature: 20.4 °C	
Attendees: Jibril Aga		Humidity: 39.8% RH	
Project: None		Barometric Pres.: 1015 mbar	
Tested by: Andrew Rogstad, Trevor Buls		Power: Battery	
Job Site: MN09			
TEST SPECIFICATIONS		Test Method	
FCC 15.231:2018		ANSI C63.10:2013	
COMMENTS			
Transmitting at 319.508 MHz modulated			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature <i>Trevor Buls</i>	
		-20 OB (kHz)	Limit (kHz)
319.5 MHz		33.779	798
			Pass

# OCCUPIED BANDWIDTH



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319.5 MHz						
				-20 OB (kHz)	Limit (kHz)	Result
				33.779	798	Pass



# DUTY CYCLE



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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	E4440A	AAX	26-Mar-2018	26-Mar-2019
Cable	Element	Biconilog Cable	MNX	24-Feb-2018	24-Feb-2019
Antenna - Biconilog	ETS Lindgren	3142D	AXO	15-Dec-2017	15-Dec-2019

## TEST DESCRIPTION

The measurement was made in a radiated configuration of the fundamental with the carrier fully maximized for its highest radiated power. 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" =  $N1L1 + N2L2 + \dots$

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 =  $(N1L1 + N2L2 + \dots)/100\text{ms}$  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 = <\_.6635\_> mSec

Pulsewidth of Type 2 Pulse = <\_.4484\_> mSec

Pulsewidth of Type 3 Pulse = <\_.1233\_> mSec

Number of Type 1 Pulses = <\_1\_>

Number of Type 2 Pulses = <\_1\_>

Number of Type 3 Pulses = <\_58\_>

Duty Cycle =  $20 \log [(1)(.6635) + (1)(.4484) + (58)(.1233)/100] = <-21.66> \text{ dB}$

# DUTY CYCLE



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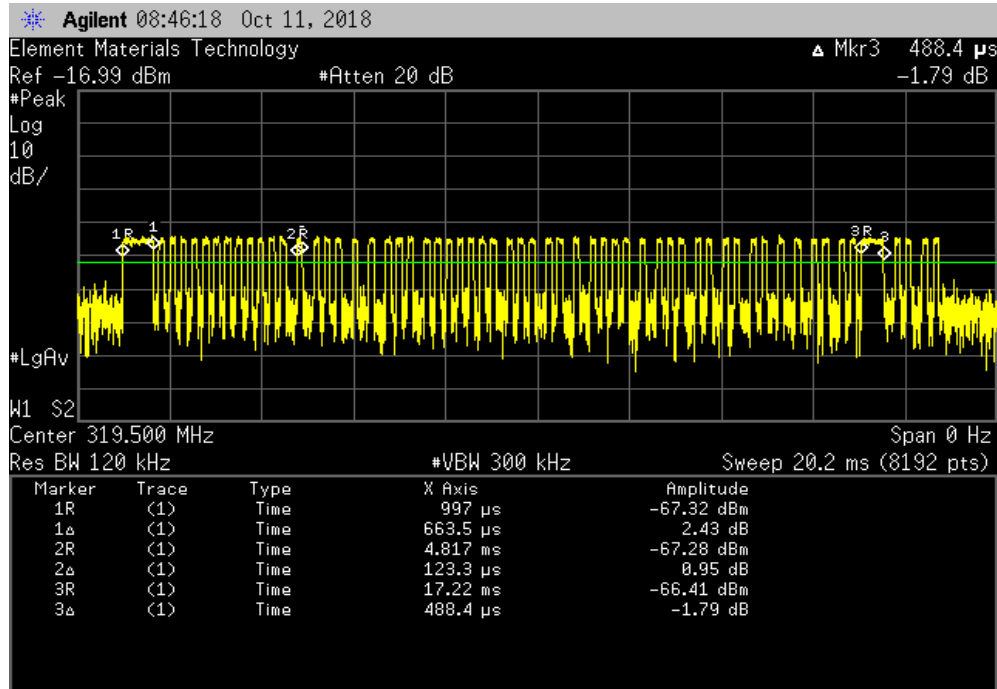
EUT: RF-FOB-PANIC-319		Work Order: CINC0029	
Serial Number: 0348139		Date: 11-Oct-18	
Customer: CINCH Systems		Temperature: 20.4 °C	
Attendees: Jibril Aga		Humidity: 39.8% RH	
Project: None		Barometric Pres.: 1015 mbar	
Tested by: Andrew Rogstad, Trevor Buls		Power: Battery	
Job Site: MN09			
TEST SPECIFICATIONS			
FCC 15.231:2018		Test Method	
		ANSI C63.10:2013	
COMMENTS			
Transmitting at 319.5 MHz			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	1	Signature <i>Trevor Buls</i>	
		Number of Type 1	Type 1 Pulse length (ms)
		Number of Type 2 Pulses	Type 2 Pulse length (ms)
		Number of Type 3 Pulses	Type 3 Pulse length (ms)
			DCCF
			Result
100 ms		1	0.6635
5 s		N/A	N/A
10 s		N/A	N/A

# DUTY CYCLE

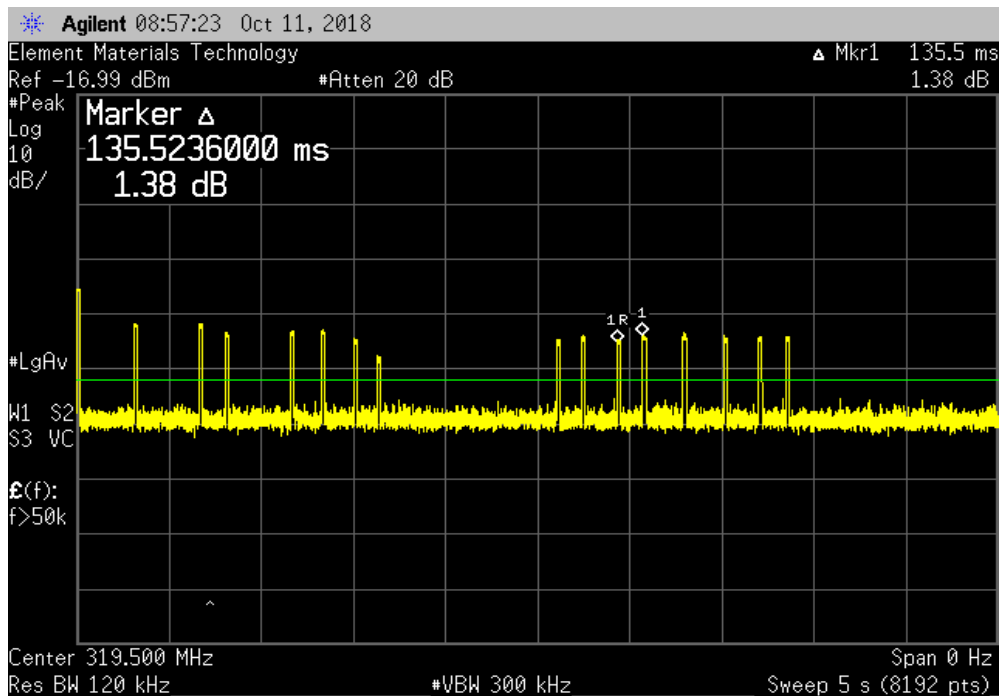


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100 ms						
Number of Type 1 Pulses	Type 1 Pulse length (ms)	Number of Type 2 Pulses	Type 2 Pulse length (ms)	Number of Type 3 Pulses	Type 3 Pulse length (ms)	DCCF
1	0.6635	1	0.4484	58	0.1233	-21.66



5 s						
Number of Type 1 Pulses	Type 1 Pulse length (ms)	Number of Type 2 Pulses	Type 2 Pulse length (ms)	Number of Type 3 Pulses	Type 3 Pulse length (ms)	DCCF
N/A	N/A	N/A	N/A	N/A	N/A	N/A



DUTY CYCLE



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10 s						
Number of Type 1 Pulses	Type 1 Pulse length (ms)	Number of Type 2 Pulses	Type 2 Pulse length (ms)	Number of Type 3 Pulses	Type 3 Pulse length (ms)	DCCF
N/A	N/A	N/A	N/A	N/A	N/A	N/A

