NORTHWEST EMC

Cirrus Aircraft Corporation

36774

FCC 15.231:2015

FCC 15.231(b):2015

Report # CIRR0001

NVLAP Lab Code: 200630-0

CERTIFICATE OF TEST

NORTHWEST EMC
2014-12-10

Last Date of Test: December 15, 2015
Cirrus Aircraft Corporation
Model: 36774

Radio Equipment Testing

Standards

Specification	Method
FCC 15.231:2015	ANSI C63.10:2013
FCC 15.231(b):2015	

Results

Method Clause	Test Description	Applied	Results	Comments
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	N/A	

Deviations From Test Standards

None

Approved By:

Kyle Holgate, 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

REV 2015.2.19

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

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

European Union

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

Australia/New Zealand

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

Korea

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

Japan

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

Taiwan

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

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

Singapore

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

Israel

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

Hong Kong

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 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.

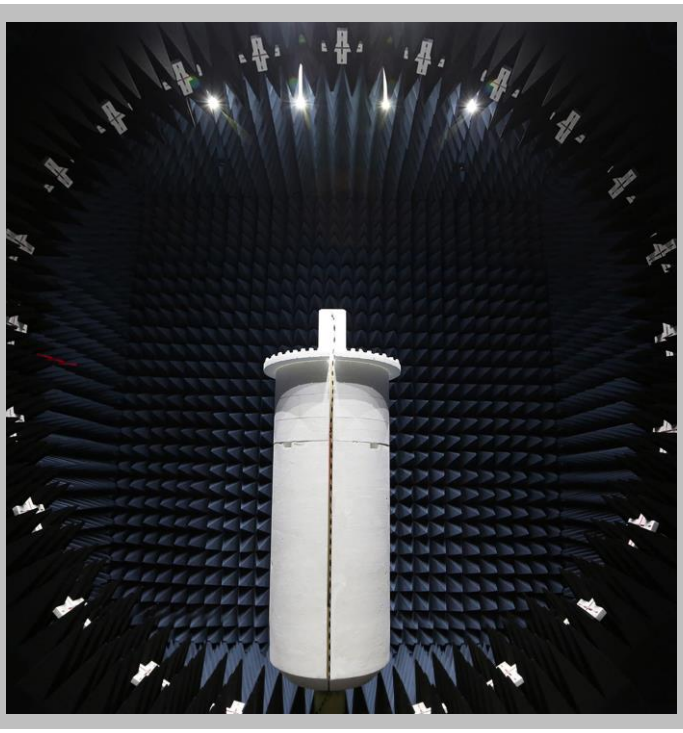
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

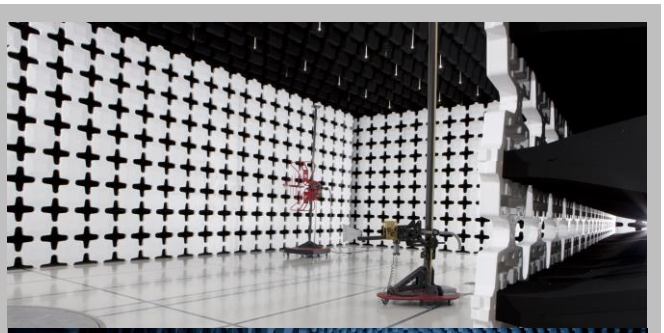
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%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

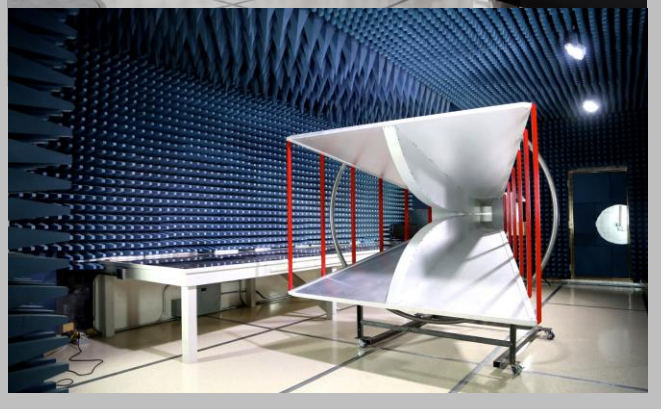
FACILITIES

REV 2015.2.19

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 9801 (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
Industry 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







PRODUCT DESCRIPTION

NORTHWEST EMC
2014-12-10

Client and Equipment Under Test (EUT) Information

Company Name:	Cirrus Aircraft Corporation
Address:	4515 Taylor Circle
City, State, Zip:	Duluth, MN 55811
Test Requested By:	Scott Jardine
Model:	36774
First Date of Test:	December 02, 2015
Last Date of Test:	December 15, 2015
Receipt Date of Samples:	November 13, 2015
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Wireless key fob entry for aircraft operating at 433.92 MHz with FSK modulation

Testing Objective:
To demonstrate compliance to FCC 15.231 specifications

CONFIGURATIONS

NORTHWEST EMC
2014-12-10

Configuration CIRR0001- 1

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Key Fob	Cirrus Aircraft Corporation	36774	3

Configuration CIRR0001- 2

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Key Fob	Cirrus Aircraft Corporation	36774	1

MODIFICATIONS

NORTHWEST EMC
2014-12-10

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	12/2/2015	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.
2	12/2/2015	Field Strength of Fundamental	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	12/3/2015	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.
4	12/15/2015	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

DUTY CYCLE

XMit 2015.01.14

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Cable	N/A	Bilog Cables	EVA	2/10/2015	12
Antenna - Biconilog	EMCO	3141	AXE	8/29/2014	24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2/10/2015	12

TEST DESCRIPTION

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.

A duty cycle correction factor per 15.35(c) was utilized. This duty cycle correction factor was applied to the average measurement.

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 ms

Pulsewidth of Pulse= 35 ms

Number of Pulses = 1

Duty Cycle = 20 log [(1)(35.1)/100]= -9.1 dB

The duty cycle correction factor of –9.1 dB was added to average readings. Measurements were made with a resolution bandwidth of 120kHz and a video bandwidth of 300kHz.

The field strength of the fundamental (transmit) frequency meets the limits as defined in 47 CFR 15.231(b). It also meets the provisions in 15.35 for averaging pulsed emissions and for limiting peak emissions.

DUTY CYCLE

NORTHWEST EMC

XMit 2015.01.14

EUT:	36774			**Work Order:**	CIRR0001
Serial Number:	3			**Date:**	12/02/15
Customer:	Cirrus Aircraft Corporation			**Temperature:**	23°C
Attendees:	None			**Humidity:**	35%
Project:	None			**Barometric Pres.:**	1022.1
Tested by:	Cole Ghizzone, Rod Peloquin	**Power:**	Battery	**Job Site:**	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.231:2015	ANSI C63.10:2013

COMMENTS

Standard pulse train with normal modulation triggered manually.

DEVIATIONS FROM TEST STANDARD

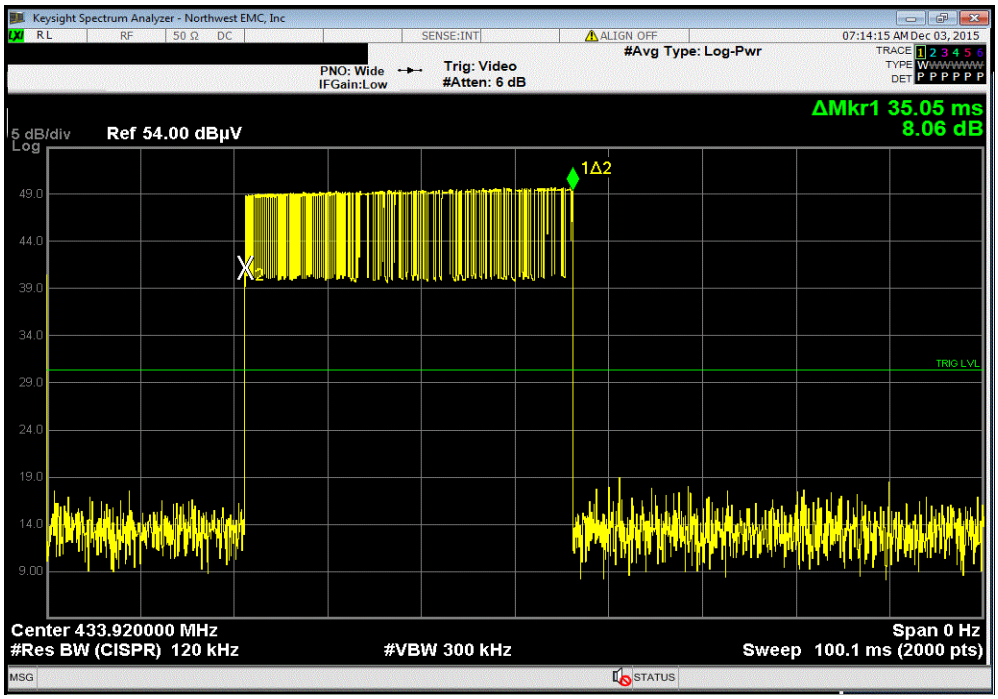
Configuration #	1	Signature

	Value	Limit	Result
Pulse Width	35.1 ms	N/A	N/A
100 ms Period	35.1 ms	N/A	N/A
Pulse Train	N/A	N/A	N/A

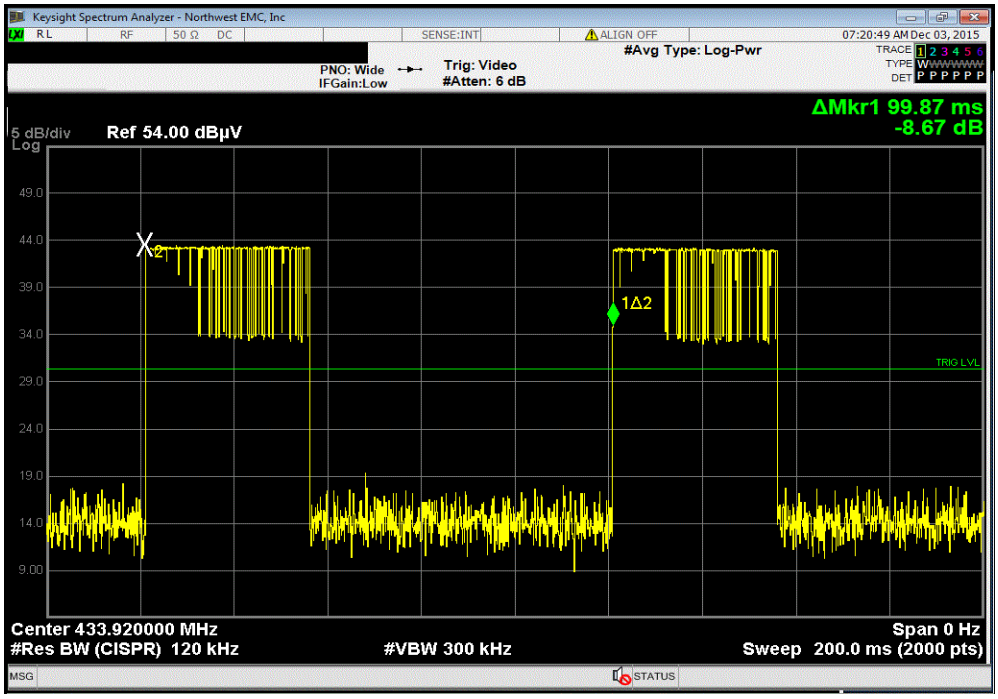
DUTY CYCLE

XMit 2015.01.14

Pulse Width							
					Value	Limit	Result
					35.1 ms	N/A	N/A



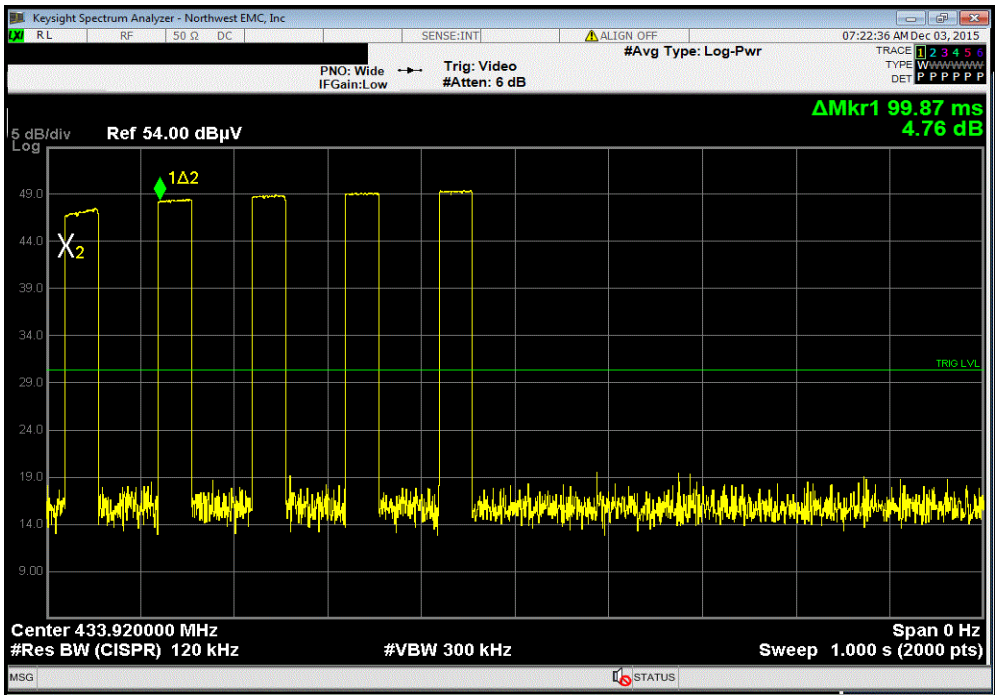
100 ms Period							
					Value	Limit	Result
					35.1 ms	N/A	N/A



DUTY CYCLE

XMit 2015.01.14

Pulse Train						
				Value	Limit	Result
				N/A	N/A	N/A



OCCUPIED BANDWIDTH

XMit 2015.01.14

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval (mo)
Cable	N/A	Bilog Cables	EVA	2/10/2015	12
Antenna - Biconilog	EMCO	3141	AXE	8/29/2014	24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2/10/2015	12

TEST DESCRIPTION

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

The measurement was made using a biconilog antenna connected to a the spectrum analyzer. The EUT was at a 3m distance from the antenna.

OCCUPIED BANDWIDTH

NORTHWEST EMC

XMit 2015.01.14

EUT:	36774			**Work Order:**	CIRR0001
Serial Number:	1			**Date:**	12/15/15
Customer:	Cirrus Aircraft Corporation			**Temperature:**	22.5°C
Attendees:	None			**Humidity:**	36%
Project:	None			**Barometric Pres.:**	1028.7
Tested by:	Cole Ghizzone, Rod Peloquin	**Power:**	Battery	**Job Site:**	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.231:2015	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

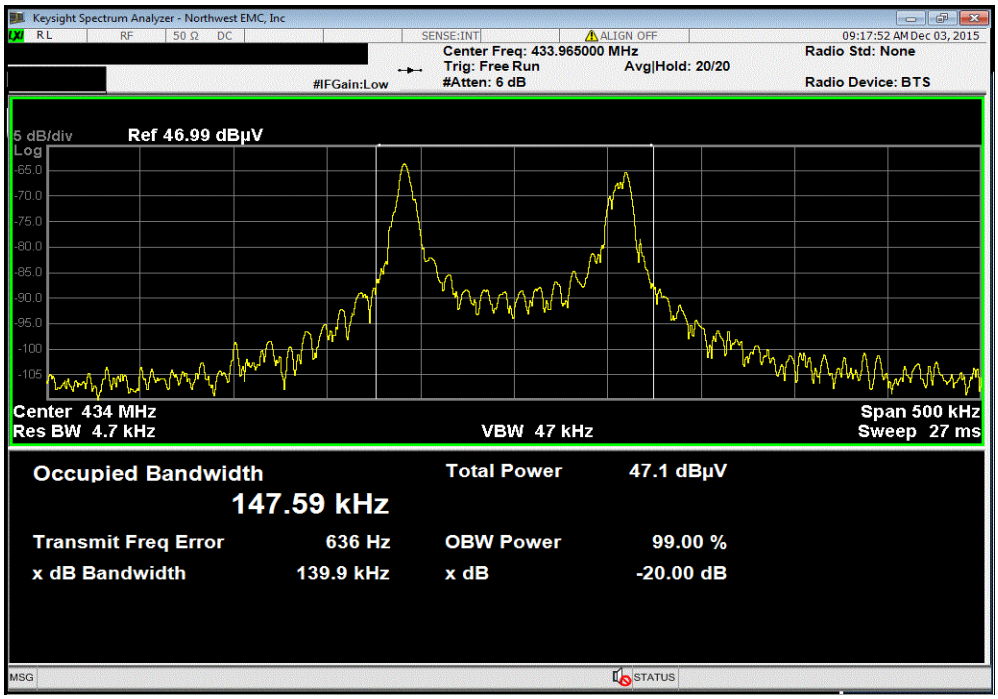
Configuration #	2	Signature

		Value	Limit	Result
Carrier 433.92 MHz				
FSK		0.14759 MHz	1.085 MHz	Pass

OCCUPIED BANDWIDTH

XMit 2015.01.14

Carrier 433.92 MHz, FSK						
				Value	Limit	Result
				0.14759 MHz	1.085 MHz	Pass



FIELD STRENGTH OF THE FUNDAMENTAL

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

Continuous Tx at 433.92MHz FSK modulation

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

CIRR0001 - 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
Cable	N/A	Bilog Cables	EVA	2/10/2015	12 mo
Antenna - Biconilog	EMCO	3141	AXE	8/29/2014	24 mo
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2/10/2015	12 mo

TEST DESCRIPTION

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 ms

Pulsewidth of Pulse= 35 ms

Number of Pulses = 1

Duty Cycle = 20 log [(1)(35.1)/100]= -9.1 dB

The duty cycle correction factor of –9.1 dB was added to the peak readings to mathematically derive the average levels. Peak measurements were made with a resolution bandwidth of 120kHz 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.

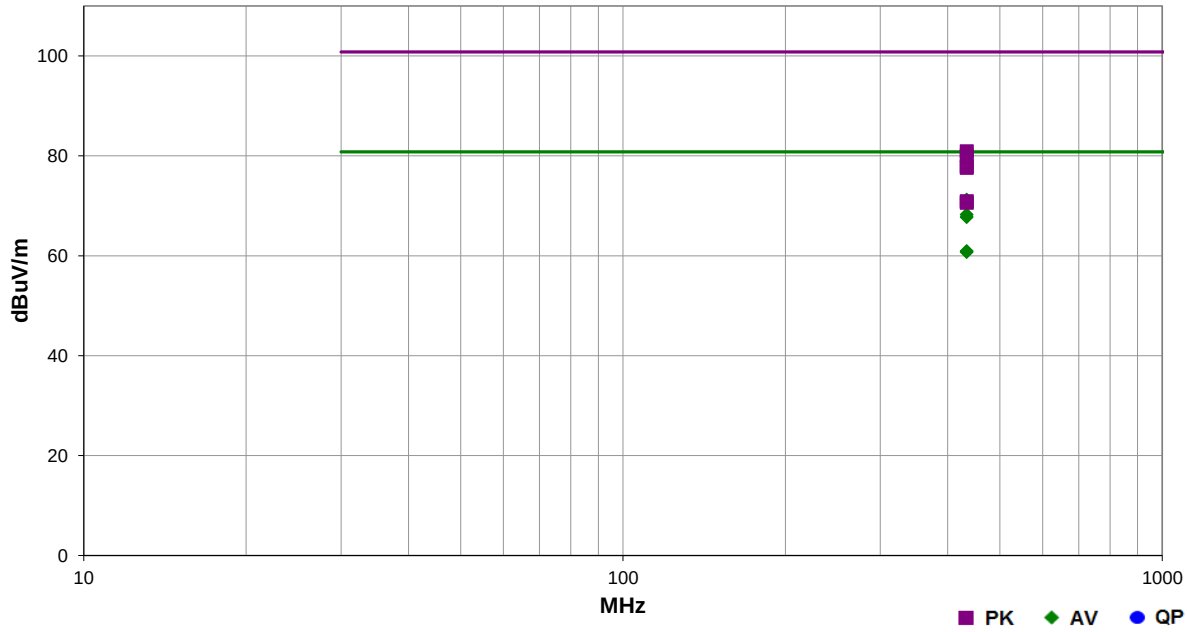
The field strength of the spurious emissions meet the limits as defined in 47 CFR 15.231(b). The spurious emissions also meet the provisions in 15.35 for averaging pulsed emissions and for limiting peak emissions. Further, spurious emissions meet the provisions of 15.205 using the measurement instrumentation specified in that section.

FIELD STRENGTH OF THE FUNDAMENTAL

Work Order:	CIRR0001	**Date:**	12/02/15		
Project:	None	**Temperature:**	22.7 °C		
Job Site:	EV01	**Humidity:**	34.3% RH		
Serial Number:	1	**Barometric Pres.:**	1022.1 mbar	**Tested by:**	Cole Ghizzone, Rod Peloquin
EUT:	36774				
Configuration:	2				
Customer:	Cirrus Aircraft Corporation				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	Continuous Tx at 433.92MHz FSK modulation				
Deviations:	None				
Comments:	See data comments for EUT orientation				

Test Specifications	**Test Method**
FCC 15.231(b):2015	ANSI C63.10:2013

Run #	12	**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)	Duty Cycle Correction (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
433.902	58.3	22.0	1.2	123.0	3.0	-9.1	Vert	AV	0.0	71.2	80.8	-9.6	EUT Vertical
433.912	57.6	22.0	2.1	64.0	3.0	-9.1	Horz	AV	0.0	70.5	80.8	-10.3	EUT Horizontal
433.908	55.3	22.0	1.0	231.0	3.0	-9.1	Horz	AV	0.0	68.2	80.8	-12.6	EUT On Side
433.918	54.8	22.0	1.0	128.0	3.0	-9.1	Vert	AV	0.0	67.7	80.8	-13.1	EUT On Side
433.918	48.0	22.0	3.6	223.0	3.0	-9.1	Horz	AV	0.0	60.9	80.8	-19.9	EUT Vertical
433.908	58.9	22.0	1.2	123.0	3.0	0.0	Vert	PK	0.0	80.9	100.8	-19.9	EUT Vertical
433.905	47.8	22.0	1.1	164.0	3.0	-9.1	Vert	AV	0.0	60.7	80.8	-20.1	EUT Horizontal
433.912	58.1	22.0	2.1	64.0	3.0	0.0	Horz	PK	0.0	80.1	100.8	-20.7	EUT Horizontal
433.913	55.9	22.0	1.0	231.0	3.0	0.0	Horz	PK	0.0	77.9	100.8	-22.9	EUT On Side
433.908	55.6	22.0	1.0	128.0	3.0	0.0	Vert	PK	0.0	77.6	100.8	-23.2	EUT On Side
433.915	48.9	22.0	3.6	223.0	3.0	0.0	Horz	PK	0.0	70.9	100.8	-29.9	EUT Vertical
433.910	48.6	22.0	1.1	164.0	3.0	0.0	Vert	PK	0.0	70.6	100.8	-30.2	EUT Horizontal

SPURIOUS RADIATED EMISSIONS

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

MODES OF OPERATION

Continuous Tx at 433.92MHz FSK modulation

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

CIRR0001 - 2

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	8200 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	N/A	Bilog Cables	EVA	2/10/2015	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AOL	2/10/2015	12 mo
Antenna - Biconilog	EMCO	3141	AXE	8/29/2014	24 mo
Cable	N/A	Double Ridge Horn Cables	EVB	4/16/2015	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAG	4/16/2015	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AIZ	1/27/2014	24 mo
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2/10/2015	12 mo

TEST DESCRIPTION

The single, integral antenna to be used with the EUT was tested. The EUT was configured for 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).

A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

A duty cycle correction factor per 15.35(c) was utilized. This duty cycle correction factor was applied to the average measurement.

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 ms

Pulsewidth of Pulse= 35 ms

Number of Pulses = 1

Duty Cycle = 20 log [(1)(35.1)/100]= -9.1 dB

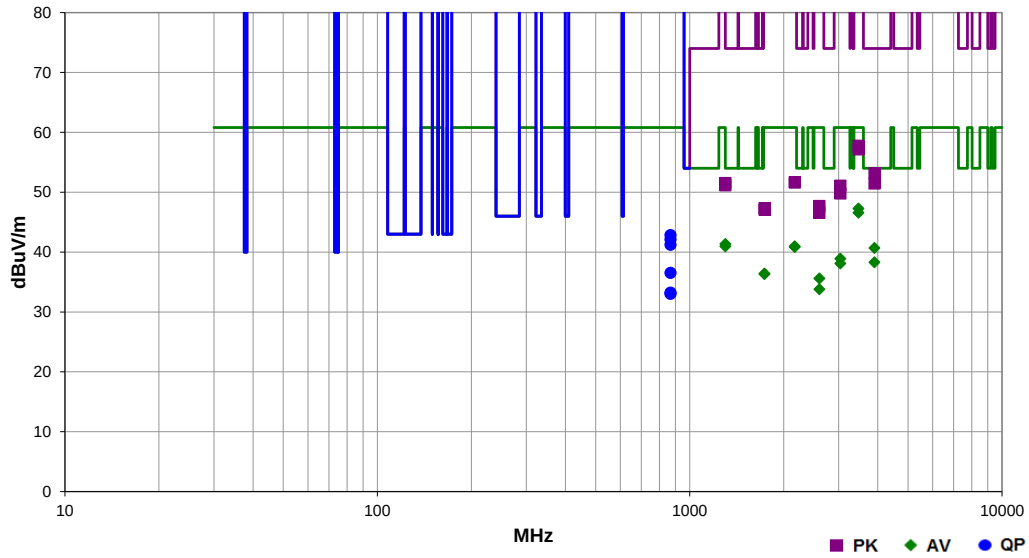
The duty cycle correction factor of –9.1 dB was added to the peak readings to mathematically derive the average levels.

SPURIOUS RADIATED EMISSIONS

Work Order:	CIRR0001	**Date:**	12/03/15		
Project:	None	**Temperature:**	22.6 °C		
Job Site:	EV01	**Humidity:**	31% RH		
Serial Number:	1	**Barometric Pres.:**	1000.4 mbar	**Tested by:**	Cole Ghizzone, Rod Peloquin
EUT:	36774				
Configuration:	2				
Customer:	Cirrus Aircraft Corporation				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	Continuous Tx at 433.92MHz FSK modulation				
Deviations:	None				
Comments:	See data comments for EUT orientation				

Test Specifications	**Test Method**
FCC 15.231:2015	ANSI C63.10:2013

Run #	16	**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)	Duty Cycle Correction (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
1302.025	57.0	-6.6	1.2	247.0	3.0	-9.1	Horz	AV	0.0	41.3	54.0	-12.7	EUT Horizontal
1301.692	56.6	-6.6	1.0	298.0	3.0	-9.1	Vert	AV	0.0	40.9	54.0	-13.1	EUT Vertical
3906.110	44.3	5.5	1.2	65.0	3.0	-9.1	Horz	AV	0.0	40.7	54.0	-13.3	EUT Horizontal
3471.240	53.3	3.1	1.0	253.0	3.0	-9.1	Horz	AV	0.0	47.3	60.8	-13.5	EUT Horizontal
3471.233	52.6	3.1	1.0	312.0	3.0	-9.1	Vert	AV	0.0	46.6	60.8	-14.2	EUT Vertical
3905.167	41.9	5.5	1.0	293.0	3.0	-9.1	Vert	AV	0.0	38.3	54.0	-15.7	EUT Vertical
2169.567	52.4	-2.4	1.0	137.0	3.0	-9.1	Vert	AV	0.0	40.9	60.8	-19.9	EUT Vertical
2169.540	52.3	-2.4	1.2	289.0	3.0	-9.1	Horz	AV	0.0	40.8	60.8	-20.0	EUT Horizontal
3906.190	47.7	5.5	1.2	65.0	3.0	0.0	Horz	PK	0.0	53.2	74.0	-20.8	EUT Horizontal
3038.140	48.0	0.0	1.2	305.0	3.0	-9.1	Horz	AV	0.0	38.9	60.8	-21.9	EUT Horizontal
1302.080	58.1	-6.6	1.2	247.0	3.0	0.0	Horz	PK	0.0	51.5	74.0	-22.5	EUT Horizontal
3905.058	46.0	5.5	1.0	293.0	3.0	0.0	Vert	PK	0.0	51.5	74.0	-22.5	EUT Vertical
3037.317	47.2	0.0	1.0	67.0	3.0	-9.1	Vert	AV	0.0	38.1	60.8	-22.7	EUT Vertical
1302.058	57.7	-6.6	1.0	298.0	3.0	0.0	Vert	PK	0.0	51.1	74.0	-22.9	EUT Vertical
3471.270	54.7	3.1	1.0	253.0	3.0	0.0	Horz	PK	0.0	57.8	80.8	-23.0	EUT Horizontal
3471.233	54.1	3.1	1.0	312.0	3.0	0.0	Vert	PK	0.0	57.2	80.8	-23.6	EUT Vertical
1735.635	51.1	-5.6	1.2	134.0	3.0	-9.1	Horz	AV	0.0	36.4	60.8	-24.4	EUT Horizontal
1735.667	51.0	-5.6	1.0	54.0	3.0	-9.1	Vert	AV	0.0	36.3	60.8	-24.5	EUT Vertical
2603.390	46.7	-2.0	1.2	103.0	3.0	-9.1	Horz	AV	0.0	35.6	60.8	-25.2	EUT Horizontal
2603.400	44.9	-2.0	1.0	135.0	3.0	-9.1	Vert	AV	0.0	33.8	60.8	-27.0	EUT Vertical
2169.535	54.0	-2.4	1.2	289.0	3.0	0.0	Horz	PK	0.0	51.6	80.8	-29.2	EUT Horizontal
2170.083	54.0	-2.4	1.0	137.0	3.0	0.0	Vert	PK	0.0	51.6	80.8	-29.2	EUT Vertical
3038.135	51.1	0.0	1.2	305.0	3.0	0.0	Horz	PK	0.0	51.1	80.8	-29.7	EUT Horizontal
3038.183	49.8	0.0	1.0	67.0	3.0	0.0	Vert	PK	0.0	49.8	80.8	-31.0	EUT Vertical
2604.125	49.7	-2.0	1.2	103.0	3.0	0.0	Horz	PK	0.0	47.7	80.8	-33.1	EUT Horizontal
1735.570	52.9	-5.6	1.2	134.0	3.0	0.0	Horz	PK	0.0	47.3	80.8	-33.5	EUT Horizontal
1735.617	52.7	-5.6	1.0	54.0	3.0	0.0	Vert	PK	0.0	47.1	80.8	-33.7	EUT Vertical
2603.492	48.6	-2.0	1.0	135.0	3.0	0.0	Vert	PK	0.0	46.6	80.8	-34.2	EUT Vertical
868.068	34.7	8.1	1.0	266.0	3.0	0.0	Horz	QP	0.0	42.8	80.8	-38.0	EUT Horizontal
868.068	34.0	8.1	1.1	247.0	3.0	0.0	Vert	QP	0.0	42.1	80.8	-38.7	EUT Vertical
868.067	33.1	8.1	1.0	151.0	3.0	0.0	Horz	QP	0.0	41.2	80.8	-39.6	EUT On Side
868.068	28.4	8.1	1.1	95.0	3.0	0.0	Vert	QP	0.0	36.5	80.8	-44.3	EUT On Side
868.070	25.1	8.1	2.3	175.0	3.0	0.0	Horz	QP	0.0	33.2	80.8	-47.6	EUT Vertical
868.070	24.9	8.1	1.0	253.0	3.0	0.0	Vert	QP	0.0	33.0	80.8	-47.8	EUT Horizontal