

NORTHWEST EMC

Remote Insights, Inc.

Beacon

FCC 15.231:2014

Report # NGRF0005



NVLAP Lab Code: 200881-0

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America. This Report may only be duplicated in its entirety

CERTIFICATE OF TEST

Last Date of Test: December 31, 2014
Remote Insights, Inc.
Model: Beacon

Radio Equipment Testing

Standards

Specification	Method
FCC 15.231:2014	ANSI C63.10:2009

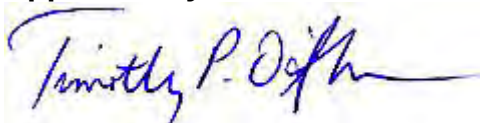
Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	No	N/A	Not required for battery powered devices.
6.5, 6.6	Field Strength of Fundamental	Yes	Pass	
6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	
6.9.1	Occupied Bandwidth	Yes	Pass	
7.5	Duty Cycle	Yes	Pass	

Deviations From Test Standards

None

Approved By:



Tim O'Shea, 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.

REVISION HISTORY

Revision Number		Description	Date	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 Guide 65 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

OFTA – Recognized by OFTA 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/>

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.

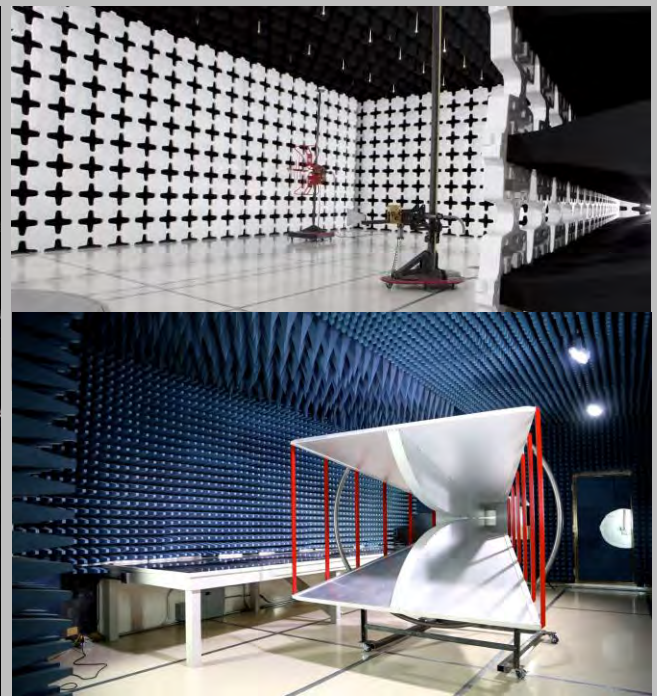
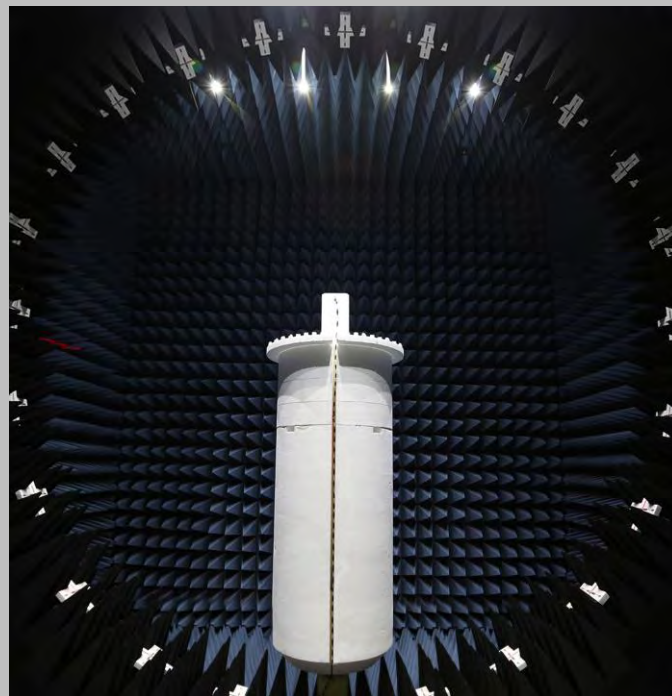
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

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)	4.7 dB	-4.7 dB
AC Powerline Conducted Emissions (dB)	2.9 dB	-2.9 dB

FACILITIES



California Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	Minnesota Labs MN01-08, MN10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	New York Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 685-0796	Oregon Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	Texas Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Washington Labs NC01-05 19201 120 th 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



PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	Remote Insights, Inc.
Address:	5129 Bryant Ave South
City, State, Zip:	Minneapolis, MN 55419
Test Requested By:	Lucas Anderson
Model:	Beacon
First Date of Test:	December 31, 2014
Last Date of Test:	January 06, 2015
Receipt Date of Samples:	December 31, 2014
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Beacon Rev 3
Testing Objective:
To demonstrate compliance to FCC 15.231 specifications.

CONFIGURATIONS

Configuration NGRF0005- 1

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Beacon	NextGen RF Design, Inc.	None	FCC 1

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	12/31/2014	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	12/31/2014	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.
3	12/31/2014	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	12/31/2014	Field Strength of Fundamental	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

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 908.5 MHz, modulated.

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

NGRF0005 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency 902 MHz Stop Frequency 928 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
Antenna, Biconilog	Teseq	CBL 6141B	AYD	12/17/2013	24 mo
MN05 Cables	ESM Cable Corp.	Bilog Cables	MNH	3/14/2014	12 mo
Spectrum Analyzer	Agilent	N9010A	AFI	1/27/2013	24 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 antennas to be used with the EUT were tested. The EUT was configured for continuous modulated 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 C63.10:2009).

To derive average emission measurements, a duty cycle correction factor per 15.35(c) 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 = 3.174 mSec
Number of Type 1 Pulses = 1

Duty Cycle = $20 \log \left[\frac{(1)(3.174)}{100} \right] = -29.97 \text{ dB}$

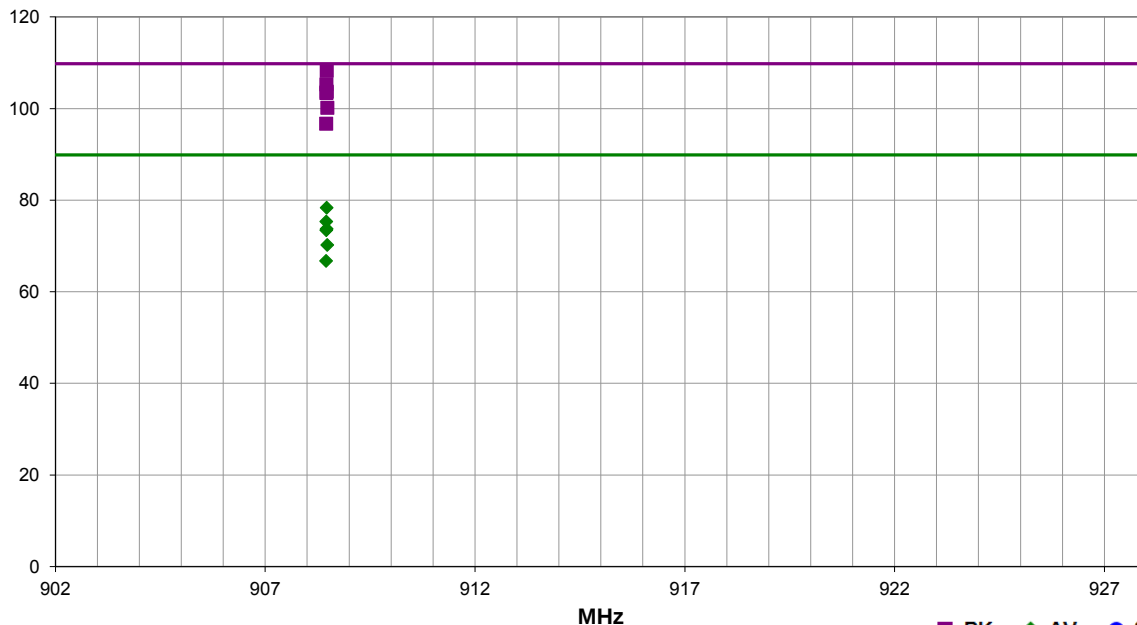
The duty cycle correction factor of -29.97 dB was added to the peak readings to mathematically derive the average levels. Peak measurements were made with a resolution bandwidth of 100kHz and a video bandwidth of 300kHz.

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.

Work Order:	NGRF0005	Date:	12/31/14	<i>Trevor Buls</i>
Project:	None	Temperature:	23.2 °C	
Job Site:	MN05	Humidity:	12% RH	
Serial Number:	FCC 1	Barometric Pres.:	1027.7 mbar	
EUT:	Beacon			
Configuration:	1			
Customer:	Remote Insights, Inc.			
Attendees:	None			
EUT Power:	Battery			
Operating Mode:	Transmitting 908.5 MHz, modulated.			
Deviations:	None			
Comments:	None			

Test Specifications	Test Method
FCC 15.231:2014	ANSI C63.10:2009

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)	Comments
908.467	77.5	30.8	1.0	135.0		0.0	Horz	PK	0.0	108.3	109.8	-1.5	EUT Horizontal
908.458	74.5	30.8	1.4	315.0		0.0	Vert	PK	0.0	105.3	109.8	-4.5	EUT on Side
908.468	72.9	30.8	1.5	180.0		0.0	Horz	PK	0.0	103.7	109.8	-6.1	EUT Vertical
908.457	72.6	30.8	1.5	270.0		0.0	Vert	PK	0.0	103.4	109.8	-6.4	EUT Vertical
908.478	69.4	30.8	2.5	225.0		0.0	Horz	PK	0.0	100.2	109.8	-9.6	EUT on Side
908.467	77.5	30.8	1.0	135.0	-30.0	0.0	Horz	AV	0.0	78.3	89.9	-11.6	EUT Horizontal
908.452	65.9	30.8	1.0	270.0		0.0	Vert	PK	0.0	96.7	109.8	-13.1	EUT Horizontal
908.458	74.5	30.8	1.4	315.0	-30.0	0.0	Vert	AV	0.0	75.3	89.9	-14.6	EUT on Side
908.468	72.9	30.8	1.5	180.0	-30.0	0.0	Horz	AV	0.0	73.7	89.9	-16.2	EUT Vertical
908.457	72.6	30.8	1.5	270.0	-30.0	0.0	Vert	AV	0.0	73.4	89.9	-16.5	EUT Vertical
908.478	69.4	30.8	2.5	225.0	-30.0	0.0	Horz	AV	0.0	70.2	89.9	-19.7	EUT on Side
908.452	65.9	30.8	1.0	270.0	-30.0	0.0	Vert	AV	0.0	66.7	89.9	-23.2	EUT Horizontal

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 908.5 MHz, modulated.

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

NGRF0005 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency 30 MHz Stop Frequency 10 GHz

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
High Pass Filter	Micro-Tronics	HPM50108	HGP	5/15/2014	12 mo
Attenuator, 20 dB, 'SMA'	SM Electronics	SA6-20	REO	5/15/2014	12 mo
Attenuator, 10db, 'SMA'	S.M. Electronics	SA18H-10	REN	5/15/2014	12 mo
MN05 Cables	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	3/14/2014	12 mo
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	3/14/2014	12 mo
Antenna, Horn	ETS	3160-07	AXP	NCR	0 mo
Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVX	3/14/2014	12 mo
MN05 Cables	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	3/14/2014	12 mo
Antenna, Horn	ETS	3115	AJA	6/3/2014	24 mo
Pre-Amplifier	Miteq	AM-1616-1000	PAD	3/14/2014	12 mo
Antenna, Biconilog	Teseq	CBL 6141B	AYD	12/17/2013	24 mo
MN05 Cables	ESM Cable Corp.	Bilog Cables	MNH	3/14/2014	12 mo
Spectrum Analyzer	Agilent	N9010A	AFI	1/27/2013	24 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 single, integral antenna to be used with the EUT was tested. The EUT was configured for continuous-modulated 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 C63.10:2009).

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

To derive average emission measurements, a duty cycle correction factor per 15.35(c) 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 = 3.174 mSec
Number of Type 1 Pulses = 1

Duty Cycle = 20 log [(1)(3.174)/100] = -29.97 dB

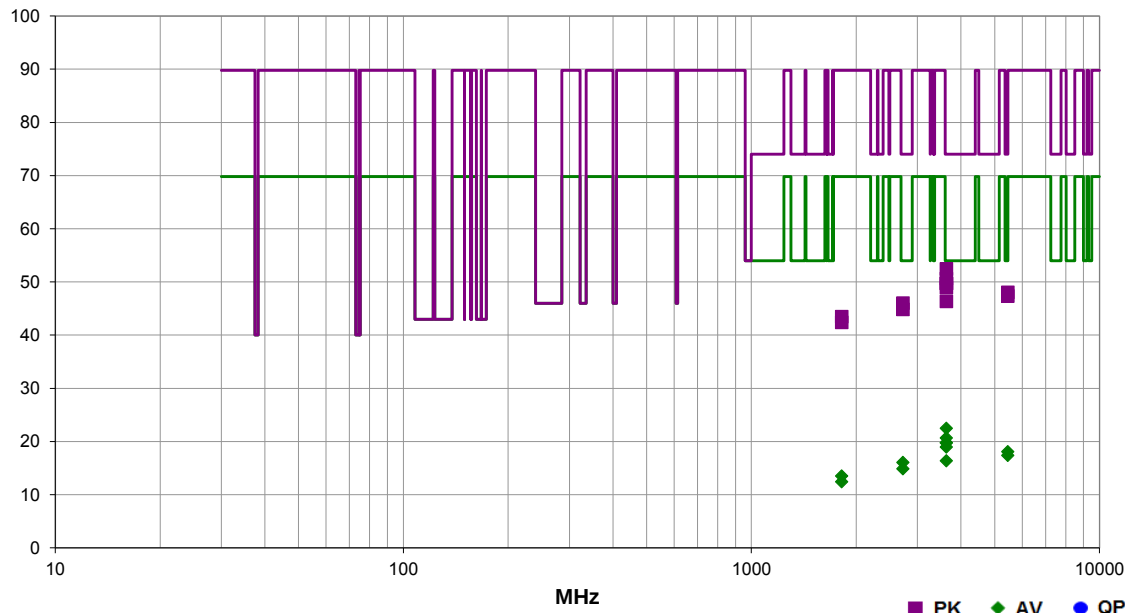
The duty cycle correction factor of -29.97 dB was added to the peak readings to mathematically derive the average levels. Peak measurements were made with a resolution bandwidth of 100kHz and a video bandwidth of 300kHz for measurements at or below 1GHz. Above 1GHz, a resolution bandwidth of 1MHz and a video bandwidth of 3MHz was used.

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.

Work Order:	NGRF0005	Date:	12/31/14	<i>Trevor Buls</i>
Project:	None	Temperature:	23.2 °C	
Job Site:	MN05	Humidity:	12% RH	
Serial Number:	FCC 1	Barometric Pres.:	1027.7 mbar	
EUT:	Beacon			
Configuration:	1			
Customer:	Remote Insights, Inc.			
Attendees:	None			
EUT Power:	Battery			
Operating Mode:	Transmitting 908.5 MHz, modulated.			
Deviations:	None			
Comments:	None			

Test Specifications	Test Method
FCC 15.231(b):2014	ANSI C63.10:2009

Run #	14	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)	Comments
3633.825	52.0	0.4	2.8	166.1		0.0	Vert	PK	0.0	52.4	74.0	-21.6	EUT Vertical
3633.780	50.2	0.4	3.9	211.0		0.0	Vert	PK	0.0	50.6	74.0	-23.4	EUT on Side
3633.905	49.3	0.4	2.8	157.0		0.0	Horz	PK	0.0	49.7	74.0	-24.3	EUT on Side
3633.780	49.3	0.4	2.8	319.9		0.0	Vert	PK	0.0	49.7	74.0	-24.3	EUT Horizontal
3633.720	48.5	0.4	2.8	126.0		0.0	Horz	PK	0.0	48.9	74.0	-25.1	EUT Horizontal
5450.840	41.4	6.6	2.8	297.0		0.0	Vert	PK	0.0	48.0	74.0	-26.0	EUT Vertical
5450.860	40.7	6.6	2.8	76.1		0.0	Horz	PK	0.0	47.3	74.0	-26.7	EUT on Side
3633.730	45.9	0.4	2.8	308.9		0.0	Horz	PK	0.0	46.3	74.0	-27.7	EUT Vertical
2725.375	48.6	-2.6	2.8	177.1		0.0	Vert	PK	0.0	46.0	74.0	-28.0	EUT Vertical
2725.470	47.4	-2.6	2.8	105.1		0.0	Horz	PK	0.0	44.8	74.0	-29.2	EUT on Side
3633.825	52.0	0.4	2.8	166.1	-30.0	0.0	Vert	AV	0.0	22.5	54.0	-31.5	EUT Vertical
3633.780	50.2	0.4	3.9	211.0	-30.0	0.0	Vert	AV	0.0	20.7	54.0	-33.3	EUT on Side
3633.905	49.3	0.4	2.8	157.0	-30.0	0.0	Horz	AV	0.0	19.8	54.0	-34.2	EUT on Side
3633.780	49.3	0.4	2.8	319.9	-30.0	0.0	Vert	AV	0.0	19.8	54.0	-34.2	EUT Horizontal
3633.720	48.5	0.4	2.8	126.0	-30.0	0.0	Horz	AV	0.0	19.0	54.0	-35.0	EUT Horizontal
5450.840	41.4	6.6	2.8	297.0	-30.0	0.0	Vert	AV	0.0	18.1	54.0	-35.9	EUT Vertical
5450.860	40.7	6.6	2.8	76.1	-30.0	0.0	Horz	AV	0.0	17.4	54.0	-36.6	EUT on Side
3633.730	45.9	0.4	2.8	308.9	-30.0	0.0	Horz	AV	0.0	16.4	54.0	-37.6	EUT Vertical
2725.375	48.6	-2.6	2.8	177.1	-30.0	0.0	Vert	AV	0.0	16.1	54.0	-37.9	EUT Vertical
2725.470	47.4	-2.6	2.8	105.1	-30.0	0.0	Horz	AV	0.0	14.9	54.0	-39.1	EUT on Side
1816.925	48.4	-4.9	2.8	326.9		0.0	Horz	PK	0.0	43.5	89.8	-46.3	EUT on Side
1816.925	47.3	-4.9	2.8	181.1		0.0	Vert	PK	0.0	42.4	89.8	-47.4	EUT Vertical
1816.925	48.4	-4.9	2.8	326.9	-30.0	0.0	Horz	AV	0.0	13.5	69.8	-56.3	EUT on Side
1816.925	47.3	-4.9	2.8	181.1	-30.0	0.0	Vert	AV	0.0	12.4	69.8	-57.4	EUT Vertical

OCCUPIED BANDWIDTH

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 (mos)
MN05 Cables	ESM Cable Corp.	Bilog Cables	MNH	3/14/2014	12
Antenna, Biconilog	Teseq	CBL 6141B	AYD	12/17/2013	24
Spectrum Analyzer	Agilent	N9010A	AFI	1/27/2013	24

TEST DESCRIPTION

The occupied bandwidth was measured with the EUT configured for continuous modulated operation at its single transmit frequency. The spectrum analyzer's resolution bandwidth was $\geq 1\%$ of the 20dB bandwidth and the video bandwidth was greater than or equal to the resolution bandwidth.

The 20 dB bandwidth of the transmit frequency is less than 0.5% of the center frequency.

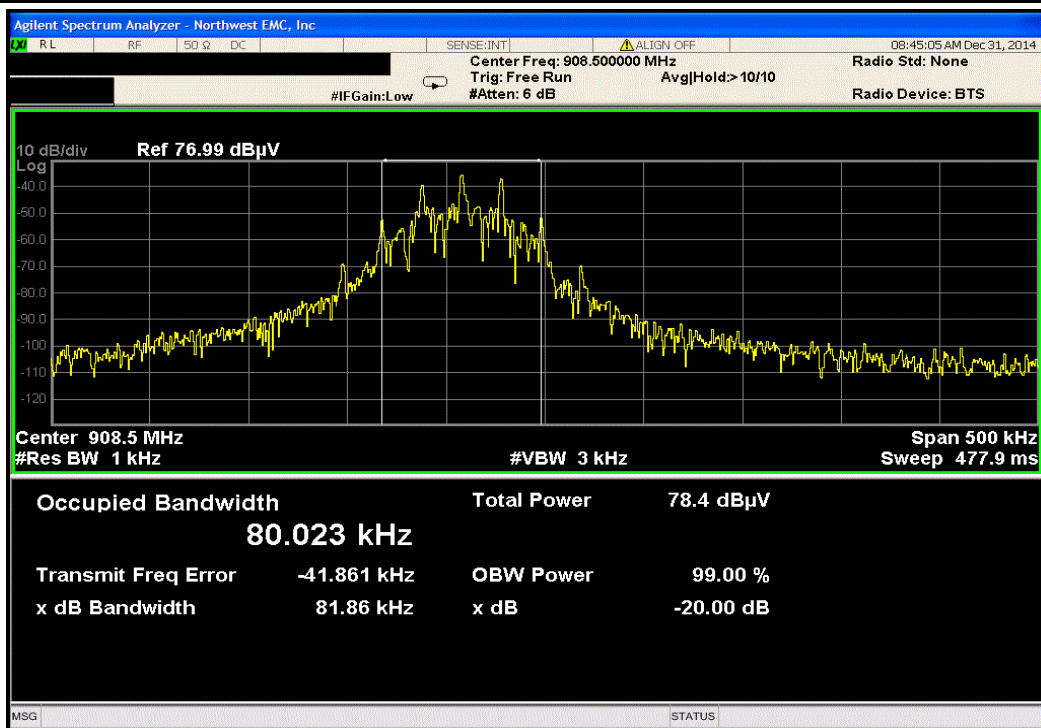


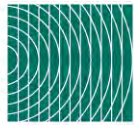
OCCUPIED BANDWIDTH

XMIT 2014.02.07

EUT: Beacon		Work Order: NGRF0005	
Serial Number: FCC 1		Date: 12/31/14	
Customer: Remote Insights, Inc.		Temperature: 23.4°C	
Attendees: None		Humidity: 12%	
Project: None		Barometric Pres.: 1026.4	
Tested by: Trevor Buls		Power: Battery	
		Job Site: MN08	
TEST SPECIFICATIONS		Test Method	
FCC 15.231:2014		ANSI C63.10:2009	
COMMENTS			
Limit is based on center frequency times 0.5%= 908.5 MHz * 0.5% = 4.5425 MHz			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	1	Signature <i>Trevor Buls</i>	
		Value (kHz)	Limit (kHz)
908.5 MHz		81.86	4542.5
			Result
			Pass

908.5 MHz				Value	Limit	Result
				(kHz)	(kHz)	
				81.86	4542.5	Pass





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 (mos)
MN05 Cables	ESM Cable Corp.	Bilog Cables	MNH	3/14/2014	12
Antenna, Biconilog	Teseq	CBL 6141B	AYD	12/17/2013	24
Spectrum Analyzer	Agilent	N9010A	AFI	1/27/2013	24

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.

To derive average emission measurements, a duty cycle correction factor per 15.35(c) 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 = 3.174 mSec

Number of Type 1 Pulses = 1

Duty Cycle = $20 \log \left[\frac{(1)(3.174)}{100} \right] = -29.97 \text{ dB}$

The duty cycle correction factor of -29.97 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.

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.

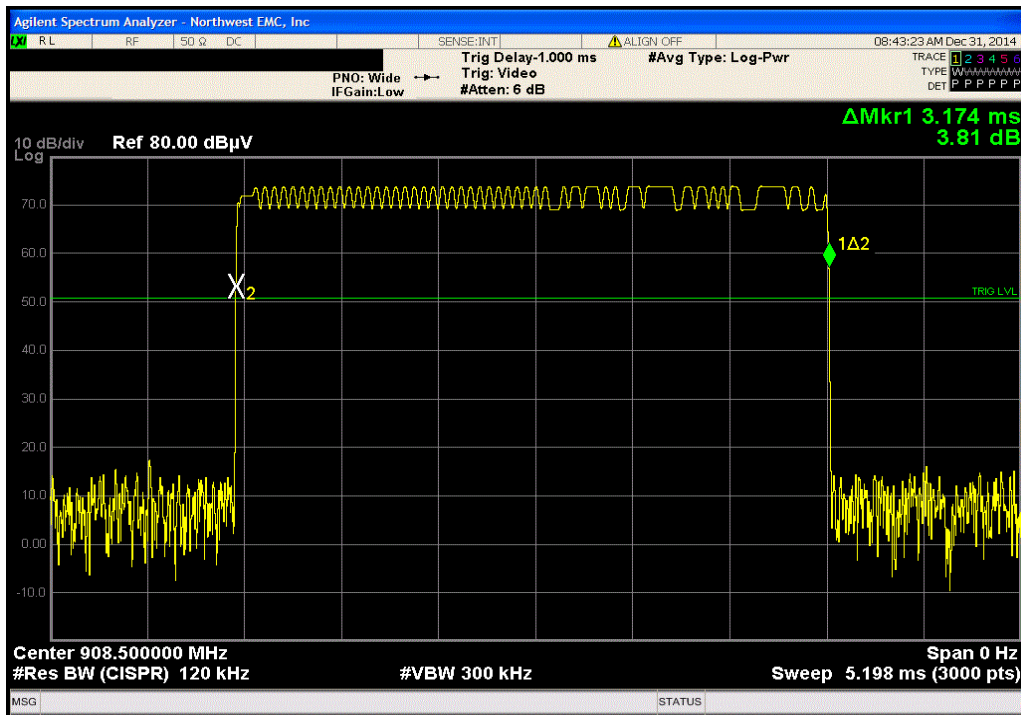


DUTY CYCLE

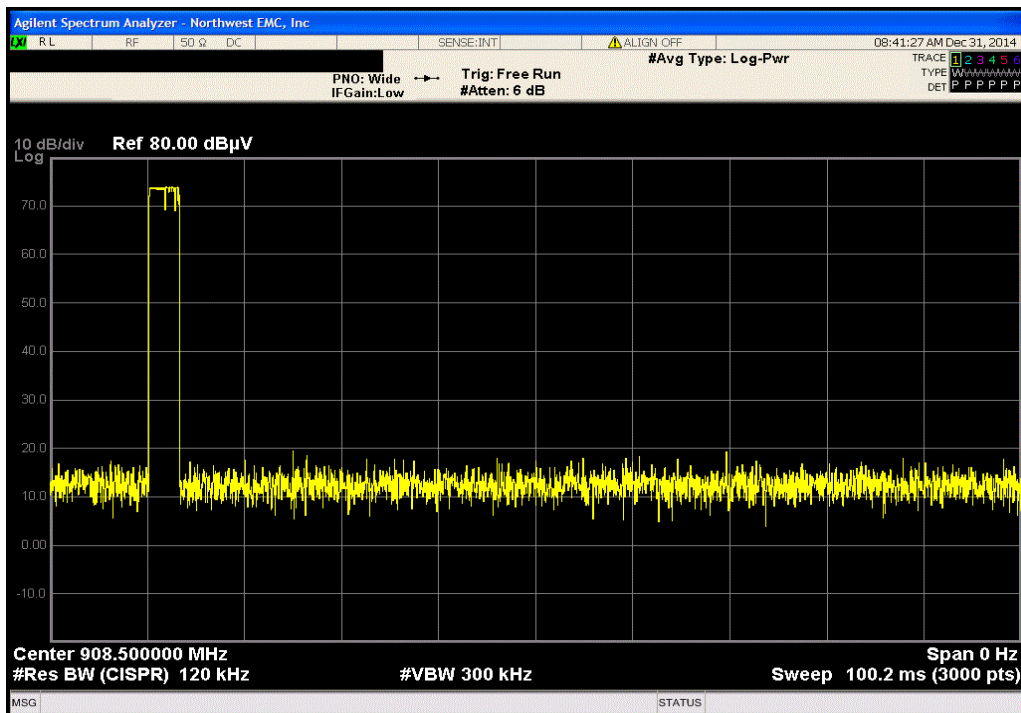
XMIT 2014.02.07

EUT: Beacon		Work Order: NGRF0005			
Serial Number: FCC 1		Date: 12/31/14			
Customer: Remote Insights, Inc.		Temperature: 23.4°C			
Attendees: None		Humidity: 12%			
Project: None		Barometric Pres.: 1026.4			
Tested by: Trevor Buls		Power: Battery			
		Job Site: MN08			
TEST SPECIFICATIONS		Test Method			
FCC 15.231:2014		ANSI C63.10:2009			
COMMENTS					
Test code was setup to provide a duty cycle with a period of ~116 ms. Actual usage case will be closer to 10 seconds or greater.					
DEVIATIONS FROM TEST STANDARD					
None					
Configuration #	1	Signature <i>Trevor Buls</i>			
		Number of Pulses	Pulse Width (ms)	Limit	Result
Pulse Width		N/A	3.174	N/A	N/A
Period 100ms		1	3.174	N/A	N/A
Period 1000ms		N/A	N/A	N/A	N/A

Pulse Width						
			Number of Pulses	Pulse Width (ms)	Limit	Result
			N/A	3.174	N/A	N/A



Period 100ms						
Number of Pulses			Pulse Width (ms)		Limit	Result
			1	3.174	N/A	N/A



Period 1000ms						
			Number of Pulses	Pulse Width (ms)	Limit	Result
			N/A	N/A	N/A	N/A

