TEST REPORT

Report Number: 101608881DEN-002
Project Number: G101608881

Report Issue Date: 6/11/2014

Product Designation: **Model: LC-800**

Standards: FCC 47 CFR Part 15C, Subpart 15.231 – Periodic Operation within the band 40.66-40.70 MHz and above 70MHz
RSS-210 Issue 8 2010
RSS-GEN Issue 3 2010

Tested by:
Intertek Testing Services NA, Inc.
1795 Dogwood St. Suite 200
Louisville, CO 80027

Client:
BI Inc.
6400 Lookout Road
Boulder, CO 80301

Report prepared by

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Senior EMC Project Engineer

Report reviewed by

Michael Spataro
Engineering Team Leader

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1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 3.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded **the product tested complies with the requirements of the standard(s) indicated**. The results obtained in this test report pertain only to the item(s) tested.

Test Report Scope

The scope of this report was to qualify the radio portion Model: LC-800. This radio operates within the following Tx Band: 260-470 MHz (Periodic Operation).

Refer to the following Intertek Test Report for the unintentional emissions test results for the digital electronics portion of the product:

- Unintentional Radiated and Conducted Emissions (DoC): 101608881DEN-001

General Test Methodology

All measurements were performed according to the procedures in the following documents:

- ANSI C63.10:2009 – ANSI Standard for Testing Unlicensed Wireless Devices

Test Facility

Intertek Denver's testing facilities are located at 1795 Dogwood St. Suite 200 Louisville, CO 80027. The testing facility is ISO17025:2005 accredited by A2LA, our lab code is 2506.02, our VCCI registration number under Article 14 is A-0160, our FCC registration no. 432519 and our IC lab no. 2042N.

Testing contained in this test report may not be covered under the laboratories scope of accreditation. A note will be placed in the specific test section for testing not covered under the laboratories scope.

2 Test Summary

Section	Test Specification	Test Description	Test Date	Result
5	FCC 15.31(e)	Variation of AC Power Source	Note [3]	N/A
6	FCC 15.203 RSS-GEN 7.1.2	Antenna Requirement	06/06/2014	Pass [2]
7	FCC 15.207(a) RSS-GEN 7.2.4	AC Power Transmitter AC Conducted Emissions	Note [3]	N/A
8	FCC 15.231(a) RSS-210 A1.1.1	Conditions of Periodic Operation – Off Time	06/06/2014 Note [8]	Pass
9	FCC 15.231(e) RSS-210 A1.1.5	Radiated Field Strength Emissions – Tx Fundamental	06/06/2014	Pass
10	FCC 15.231(e) FCC 15.205/209 RSS-210 A1.1.5 RSS-GEN 7.2.2	Radiated Tx Spurious Emissions – Including Out-of-Band & Restricted Band/ Band Edge	06/06/2014	Pass
11	FCC 15.231(c) RSS-210 A1.1.2	Periodic Operation – Maximum Bandwidth of the Fundamental	06/06/2014	Pass
12	FCC 15.231(d)	Requirements for devices operating within 40.66-40.70MHz band	Note [4]	N/A
13	FCC 15.231(e)	Conditions of Periodic Operation for periodic transmits at pre-determined intervals	06/06/2014	Pass
14	FCC 15.35(c) RSS-GEN 4.5	Duty Cycle Correction Factor	06/06/2014	Pass
15	FCC 15.109	Receiver/ Digital Device Radiated Emissions	Note [7]	Pass
16	FCC 15.107	Digital Device AC Conducted Emissions	Note [7]	Pass

Table Notes:

[1] The fundamental field strength was measured with the ac supply voltage varied between 85% and 115% of the nominal rated supply voltage of 120V – in this case, 102V and 138V. No change in the fundamental field strength was observed.

[2] The product was configured with an integral antenna.

[3] The product is not ac-powered – the product was battery-powered only.

[4] The product does not operate in the range of 40.66 – 40.70 MHz – specification is not applicable.

[5] The product does not periodically transmit at pre-determined intervals – specification is not applicable.

[6] The duty cycle correction factor (pulsed emissions) permitted by FCC 15.35(c) was not utilized in this report.

[7] Reference Intertek Test Report: 101608881DEN-001

[8] Per FCC 15.231(e) – Intentional radiators may operate at a periodic rate exceeding that specified in paragraph (a) and may be employed for any type of operation – including those prohibited - provided the intentional radiator complies with the provisions of paragraphs (b) through (d). The field strength limit table in paragraph (b) is replaced by the limit table in FCC 15.231(e).

Notes:

1) The radio is not manually operated or utilized for radio control during emergencies involving fire, security or life. Also, the product is not utilized for security systems.
2) The product is not used for continuous transmissions of voice, video or radio control of toys.
3) The 6dB bandwidth was used to determine the minimum RBW used for the fundamental measurement – reference only.

General Radio Test Notes:

- ANSI C63.10, Section 6.3: Testing was performed in 3 different orthogonal axes to determine the worst-case emissions from the device. The worst-case axis and emissions are shown in this report.
- ANSI C63.10, Section 5.13/ FCC CFR Part 15.31(e): For battery-operated equipment, the equipment tests shall be performed using a new battery. For ac-operated equipment, measurements of the fundamental frequency were performed with the supply voltage varied between 85% and 115% of the nominal rated voltage to determine worst-case.
- ANSI C63.10, Section 4.2.3.2/ FCC 15.35: Measurement detector functions and bandwidths utilized in this testing were per the preceding guidelines.
- ANSI C63.10, Section 4.2.3.2.2/ FCC 15.35(b): When an average limit is specified, the peak emission must also be measured to ensure the emissions is less than 20dB above the average limit and/or below the peak limit specified. This report includes both average and peak test data.
- ANSI C63.10, Section 4.2.3.2.4/ FCC 15.35(c): When the field strength (or envelope power) is not constant or when it pulses, and an average detector/limit is specified to be used, a duty cycle correction factor may be utilized to determine the pulsed "average" of the field strength or power. Duty cycle correction was utilized in this report.
- ANSI C63.10, Section 5.3/ FCC 15.31: All radiated field strength measurements taken at an antenna-to-product test distance of 3-meters.
- ANSI C63.10, Section 5.5, Table 2/ FCC 15.33(a): The frequency range of measurement was per the requirements of the preceding standards. The product was tested from 30MHz to 5GHz.
- ANSI C63.10, Section 6.3.1/ FCC 15.35(b): Measurement bandwidths utilized for fundamental peak emissions were equal to or greater than the 6dB bandwidth of the emission.
- ANSI C63.10, Section 6.3/ FCC 15.31(m): If applicable, measurements were taken for at the lowest, near the middle and highest channels of the product tested.

3 Description of Equipment Under Test

Model:	LC-800
Type of EUT:	IT Equipment
Serial Number:	FCC_PHASE1
FCC ID:	CSQ-LC800A
Industry Canada ID:	1499A-LC800A
Related Submittal(s) Grants:	Contains Cell Module FCC ID: R5Q-LISAC200A, IC ID: 8595B-LISAC200A
Company:	BI, Inc.
Customer:	BI, Inc.
Address:	BI Inc. 6400 Lookout Road Boulder, CO 80301
Phone:	(800) 241-2911
Fax:	-----
e-mail:	Lemu.Temesgen@bi.com, Don.Melton@bi.com
Test Standards:	☒ 47 CFR, Part 15C:§15.231 ☒ RSS–210, Issue 8, 2010 ☐ RSS-Gen, Issue 3, 2010 ☒ 47 CFR, Part 15B:§15.107 and §15.109, Class B ☐ Other
Type of radio:	☒ Stand -alone ☐ Module ☐ Hybrid
Date Sample Submitted:	06/06/2014
Test Work Started:	06/06/2014
Test Work Completed:	06/06/2014
Test Sample Conditions:	☐ Damaged ☐Poor (Usable) ☒ Good

Product Description:	Ankle-Worn Bracelet – GPS Tracker
Transmitter Type:	☒ CW ☐ FHSS ☐ Digital Modulation ☐ WiFi ☐ Blue Tooth
Operating Frequency Range(s):	433.92MHz (Single Channel)
Number of Channels:	1
Modulation:	CW (No Modulation)
Emission Designator:	215KN0N
Antenna(s) Info:	Antenna: Type: Custom Monopole Gain: unknown Connector Type: N/A Integral Antenna
Rated Power:	61.24 dBuV @ 3-meters -33.99 dBm .000399 mW
Antenna Installation:	☐ User ☐ Professional ☒ Factory
Transmitter power configuration:	☒ Internal battery ☐ External power source
Special Test Arrangement:	Since the product can be moved in several orientations, the EUT was rotated and tested in three orthogonal axes to determine the maximum emissions
Test Facility Accreditation:	A2LA (Certificate No. 2506.02)
Test Methodology:	Measurements performed according to the procedures in ANSI C63.10-2009

Description of Equipment Under Test (provided by client)

The product tested is the BI Inc. Model: LC-800.

The product is a single-piece, ankle-worn GPS tracker unit using GPS data and other location monitoring technologies to track individuals supervised by law enforcement agencies or pursuant to the order of a court. The product is worn by the “offender” 24/7.

The product also utilizes a cell module to transmit data to the host and an approved WiFi module configured in “sniffing” mode.

The Cellular, GPS and WiFi are FCC approved.

The device has Inertial Measurement unit (IMU) for motion detection. The device has an internal battery and external battery. The external battery will be removed from the unit and docked onto a charging pod while the unit operates on the internal battery, for un-tethered charging.

Radio Frequencies:

- Cellular CDMA – 800/1900 MHz
- GPS – 1575.4 MHz
- WiFi – 2.4 GHz
- RF Shield Detection – 433.92 MHz (radio tested in this report)

Non-Radio Clocks: 32.768kHz, 1MHz, 12MHz, 19.2 MHz, µP PLL 48MHz

There are no external signal or I/O ports or cables configured on the product.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
Internal Battery 3.7VDC	150mAh	N/A	N/A
External Battery Lithium Ion 3.6VDC (Re-Chargeable)	1575mAh	N/A	N/A

Descriptions of EUT Exercising
☐ Standby/Idle Mode
☒ Transmission (special test operation – 10ms On/ 490ms Off) , un-modulated carrier (CW)
☐ Continuous transmission, modulated carrier (CW)
☒ Periodic Transmission – Normal Operation, un-modulated carrier (CW)
☐ Continuous Receive Mode

Note: The chosen mode of operation described above is dependent upon the specific test to be performed.

In addition, the following product operations were configured in the following manner for testing:

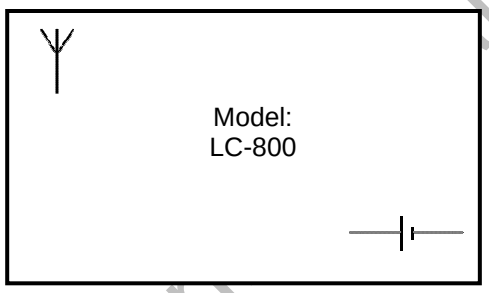
- GPS: turned on, not in sleep mode
- Cellular Module: turned on, not in sleep mode
- WiFi: On-time 12-sec, every minute, listening mode
- Proximity Sensor: enabled (being driven)

4 System setup including cable interconnection details, support equipment and simplified block diagram

Method:
Record the details of EUT cabling, document the support equipment, and show the interconnections in a block diagram.

EUT Block Diagram: EMC Perspective

Note: If applicable, items in dashed line are support equipment – not directly tested.



Support Data:

ID	Description/ Function	Shield Type	Length	Connector	Connection	Ferrites
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Support Equipment			
Description	Manufacturer	Model Number	Serial Number
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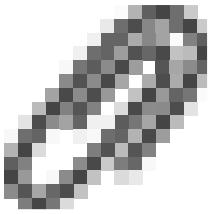
Notes:

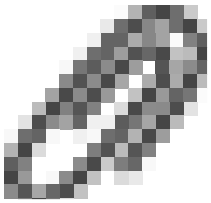
1) The product has no external signal or I/O cables.

Photograph: Product Tested – Model LC-800

Front View



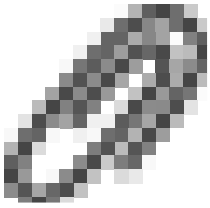
Rear View



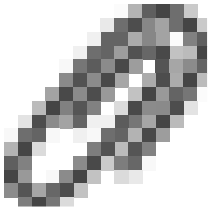
Photograph: Product Tested – Product Test Axes

Model LC-800

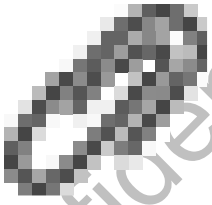
Axis 1 – Product Horizontal (Flat on Table)



Axis 2 – Product Vertical



Axis 3 – Product Vertical & Rotated 90 degrees CW



5 Variation of AC Power Source

Method

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC CFR47 15.31(e).

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Requirement/Specification

For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

- FCC 15.31(e)

Results:

The product was tested with a new fully-charged battery.

The sample tested was found to comply.

6 Antenna Requirement

Method

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC CFR47 15.203.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Requirement/Specification

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

- FCC 15.203

Results:

The product utilizes an integral antenna (custom monopole) – not user accessible; therefore, the sample tested was found to comply.

7 AC Mains Conducted Emissions – Transmitter

Method:

The test methods used comply with ANSI C63.4 and CISPR 16. Unless otherwise stated no deviations were made from FCC 15.207/RSS-GEN.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Requirement/Specification:

- FCC 15.207
- RSS-GEN Section 7.2.4 Table 4

The product must pass the AC Conducted average and quasi-peak Limits defined in FCC Part 15.207.

Test Equipment Used:

Asset ID	Description	Manufacture	Model	Serial	Cal Date	Cal Due

Test Procedure:

Measurements are carried out using quasi-peak and average detector receivers in accordance with CISPR 16. An AMN is required to provide a defined impedance at all frequencies across the power feed at the point of measurement of terminal voltage and also to provide isolation of the circuit under test from the ambient noise on the power lines. An AMN as defined in CISPR 16 shall be used.
The EUT is located so that the distance between the boundary of the EUT and the closest surface of the AMN is 0.8m.

Where a flexible mains cord is provided by the manufacturer, this shall be 1m long or if in excess of 1m, the excess cable is folded back and forth as far as possible so as to form a bundle not exceeding 0.4m in length.
The EUT is arranged and connected with cables terminated in accordance with the product specification.

Conducted disturbance is measured between the phase lead and the reference ground, and between the neutral lead and the reference ground. Both measured values are reported.

The EUT, where intended for tabletop use, is placed on a table whose top is 0.8m above the ground plane. A vertical, metal reference plane is placed 0.4m from the EUT. The vertical metal reference-plane is at least 2m by 2m. The EUT shall be kept at least 0.8m from any other metal surface or other ground plane not being part of the EUT. The table is constructed of non-conductive materials. Its dimensions are 1m by 1.5m, but may be extended for larger EUT.

Equipment setup for conducted disturbance tests followed the guidelines of ANSI C63.10.

Results:

Not Applicable – the product utilizes an internal battery and has no ac port.

Test Summary:

FREQ	LEVEL	DET	CABLE	LISN	PREAMP	ATTEN	FINAL	TEST POINT	DELTA1	DELTA2	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	Line 1 Line2 (Neutral)	FCC 15.207 Average	FCC 15.207 Qp	(MHz)

Test Method:

- ANSI C63.10:2009, Section 6.2
- RSS-GEN Section 7.2.4

Notes:

None

Setup Photographs: AC Mains Conducted Emissions – Transmitter

Plots: AC Mains Conducted Emissions – Transmitter

Final Plots: AC Mains Conducted Emissions – Transmitter

Test Data: AC Mains Conducted Emissions – Transmitter

Example calculation:

Measured Level	+	Transducer, Cable Loss & Amplifier corrections	=	Corrected Reading	Specification Limit	-	Corrected Reading	=	Delta Specification
(dBµV)		(dB)		(dBµV/m)	(dBµV/m)		(dBµV/m)		
14.0		**14.9**		**28.9**	**40.0**		**28.9**		**-11.1**

8 Conditions of Periodic Operation – Transmit Duration / Deactivate Time

Method:

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC 15.231.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Requirement/Specification:

(a) The provisions of this section are restricted to periodic operation within the band 40.66-40.70 MHz and above 70 MHz. Except as shown in paragraph (e) of this section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Continuous transmissions, voice, video and the radio control of toys are not permitted. Data is permitted to be sent with a control signal. The following conditions shall be met to comply with the provisions for this periodic operation:

(1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

(2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

(3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

(4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition

(5) Transmission of set-up information for security systems may exceed the transmission duration limits in paragraphs (a)(1) and (a)(2) of this section, provided such transmissions are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.

- FCC 15.231(a)

Test Equipment Used:

Asset ID	Description	Manufacture	Model	Serial	Cal Date	Cal Due
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/29/2014	01/29/2015
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	8447F	3113A05545	05/21/2014	05/21/2015
19936	Bilog Antenna 30MHz – 6GHz	Sunol Sciences	JB6	A050707-1	11/13/2013	11/13/2014
SW-6	Software for Radiated and Conducted emissions.	Intertek	OATS vba	V. 2.0	VBU	VBU

Results:

The sample tested was found to comply with FCC 15.231 a(2)(4)(5). Note that 15.231a(3) does not apply to the product tested per FCC 15.231(e) relaxed provisions and more stringent radiated field strength limits.

Test Summary: Periodic Operation – Transmit Duration / Deactivate Time

Fundamental	Transmit Duration/ Off Time		
Frequency Range:	☒ 260-470MHz		
Frequency MHz	**Measured On Time (sec)**	**Limit (sec)**	**Margin (sec)**
433.92	.01026	5.0	4.98974

Test Method:

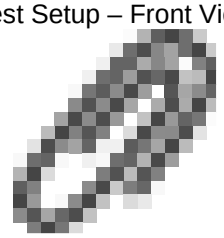
- ANSI C63.10:2009, Section 7.4

Notes:

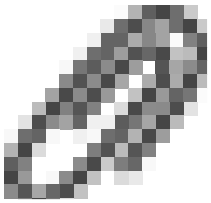
1. The product does not support wireless continuous transmission, voice, video or radio control of toys.
2. The product is not utilized in emergency conditions of fire, safety and life.
3. The product does not support manual initiation of wireless transmission.
4. The product does not utilize periodic supervisory signals for security systems.
5. The radio is a single-channel transmitter.
6. The limit for RSS-210 is identical to the limit for FCC 15.231.

Setup Photographs: Periodic Operation – Transmit Duration/ Deactivate time

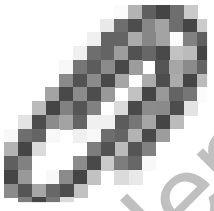
Test Setup – Front View



Test Setup – Rear View

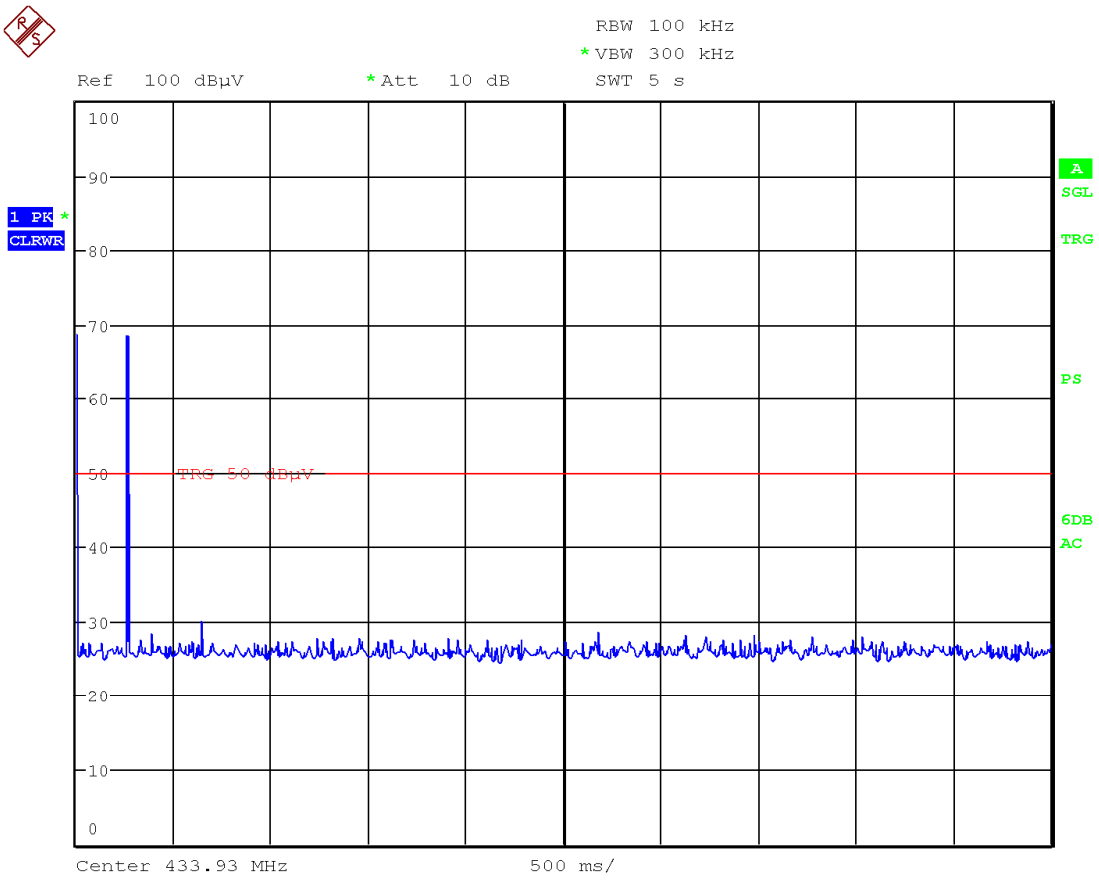


Antenna – 30MHz to 1000MHz



Plots: Periodic Operation – Transmit Duration / Off Time

Channel: 433.92MHz

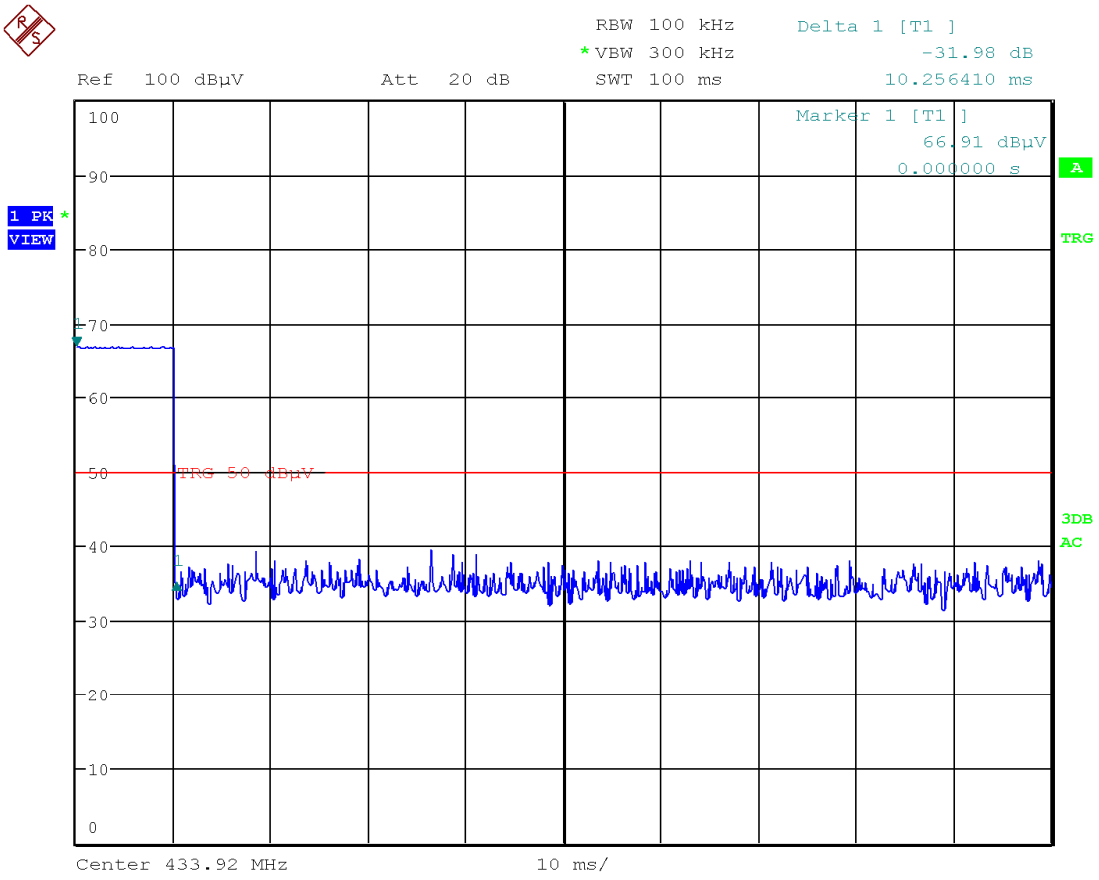


Date: 6.JUN.2014 16:08:13

Plot Sweep Time – 5-seconds

Plots: Periodic Operation – Transmit Duration / Off Time

Channel: 433.92MHz



Date: 6.JUN.2014 09:22:25

Plot Sweep Time – 100ms (to measure on-time)

9 Radiated Field Strength Emissions – Tx Fundamental (Periodic Operation)

Method:

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC 15.231.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Requirement/Specification:

- FCC 15.231(e)

15.231(e) In addition to the provisions of § 15.205 (restricted band), the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental Tx Frequency (MHz)	**Field Strength of Fundamental (uV/m)**	Field Strength of Spurious Emissions (uV/m)
40.66 – 40.70	2,250	225
70 - 130	1,250	125
130 - 174	1,250 to 3,750	125 to 375
174 - 250	3,750	375
260 - 470	1,500 to 5,000 (63.52 to 73.98 dBuV/m)	150 to 500
Above 470	12,500	1,250

15.231(e) The above field strength limits are specified at a distance of 3-meters. The tighter limits apply at the band edges.

15.231(b)(2) Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in 15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of 15.205 shall be demonstrated using the measurement instrumentation specified in that section.

15.35(b) When average radiated emission measurements are specified in this part, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. Unless otherwise specified, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.

Test Equipment Used:

Asset ID	Description	Manufacture	Model	Serial	Cal Date	Cal Due
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/29/2014	01/29/2015
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	8447F	3113A05545	05/21/2014	05/21/2015
19936	Bilog Antenna 30MHz – 6GHz	Sunol Sciences	JB6	A050707-1	11/13/2013	11/13/2014
SW-6	Software for Radiated and Conducted emissions.	Intertek	OATS vba	V. 2.0	VBU	VBU

Results:

The sample tested was found to comply.

Test Summary: Radiated Field Strength Emissions – Tx Fundamental (Periodic)

Tx Fundamental	FCC 15.231(e) Radiated Field Strength @ 3-meters						
Frequency Range:	☒ 260-470MHz						
Low Channel Frequency (MHz)	Peak Field Strength (dBuV/m)	Peak Field Strength Limit (dBuV/m)	Peak Field Strength Margin (dB)	Duty Cycle Correction Factor (dB)	Average Field Strength (dBuV/m)	Average Field Strength Limit (duV/m)	Average Field Strength Margin (dB)
433.92 (Pk)	61.24	92.84	-31.60	-19.78	41.46	72.84	-31.38
RBW:	☐ 100kHz	☒ 300kHz	☐ 500kHz	☐ 1MHz	☐ 3MHz	☐ 10MHz	
VBW:	☐ 300kHz	☒ 1MHz	☐ 1MHz	☐ 3 MHz	☐ 10MHz	☐ 10MHz	
Antenna Gain:	☒ < 6dBi	☐ >6dBi and = dBi, Output power reduction = dB					

Test Method:

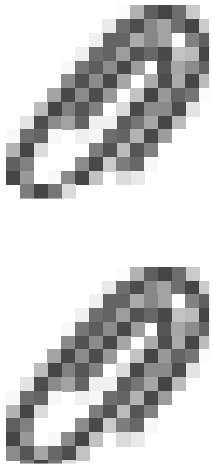
- ANSI C63.10:2009, Section 6.5 & 7.6.1

Notes:

1. All Fundamental measurements are radiated field at 3-meters, peak detector, max hold, 300kHz RBW.
2. The measurement alternative of quasi-peak (or peak) detector per FCC 15.231 guidelines was utilized. Note that average detector measurements are also acceptable. If an average detector is used, the provisions of FCC 15.35 for averaging pulsed emissions and limiting peak emissions apply.
3. The measurement bandwidth ≥6dB bandwidth – refer to appendix of this report.
4. Product measured in (3) axes – refer to section 4 for details.
5. The product is a single-channel transmitter.
6. The limit for RSS-210 is identical to the limit for FCC 15.231.

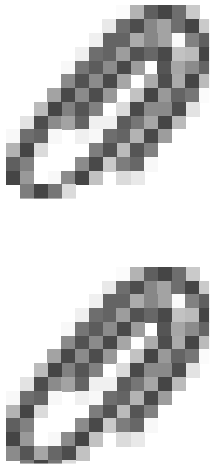
Setup Photographs: Radiated Field Strength Emissions – Tx Fundamental

Test Setup – Front View



Setup Photographs: Radiated Field Strength Emissions – Tx Fundamental

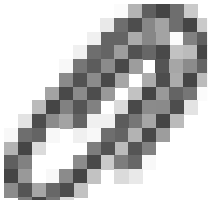
Test Setup – Rear View



Setup Photographs: Radiated Field Strength Emissions – Tx Fundamental

Test Setup

Antenna – 30MHz to 1000MHz



Test Data: Radiated Field Strength Emissions – Tx Fundamental

Radiated Field Strength – Tx Fundamental - Periodic

Test Report #:	**G101608881**	Test Area:	CC1 Radiated	Temperature:	23.5	°C
Test Method:	FCC 15.231(e)	Test Date:	06-June-2014	Relative Humidity:	31.2	%
EUT Model #:	LC-800	EUT Power:	Battery	Air Pressure:	82.8	kPa
EUT Serial #:	FCC PHASE1					
Manufacturer:	BI, Inc.					
EUT Description:	Ankle-Worn GPS Tracker					
Notes:	Product transmitting continuously – 433MHz Radio active – CW					
	Radio is single-channel:433.92MHz					
	All measurements peak detector – RBW > 6dB BW					

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

The following Duty Cycle was verified by Intertek: 10.26ms/ 100ms

No Duty Cycle Correction Utilized in test data below

Averaging method for pulsed signals and calculation in accordance to FCC CFR47 Part 15.35(c) utilized to calculate field strength emissions.

The testing performed in accordance to FCC CFR47 Part 15.231 and delta limits were calculated as follows:

Final Corrected Peak Measurement – Duty Cycle Correction Factor* = Final Calculated Emission

The Final Calculated Emission was then compared to the Limits in CFR47 Part 15.231(e) and the emission/limit delta was calculated.

DTCF is calculated as follows 20*$\log_{10}$(duty cycle in 100mS**)** – not to exceed 20dB.

FCC Part 15.31(e) Average Limit: Frequency Range 260-470MHz, 1,500 to 5,000 uV/m = 63.52 to 73.98 dBuV/m

FREQ	LEVEL	DET	CABLE	Antenna	PREAMP	FINAL	Duty Cycle CF	Duty Cycle Corrected	POL	HGT	AZ	LIMIT (Average)	DELTA LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	= [dBuV]	- [dB]	= [dBuV/m]	(V/H)	(m)	(DEG)	FCC 15.231(e) 72.84 dBuV/m	FCC 15.231(e)	(MHz)
Fundamental Measurements - Axis 1 - EUT Flat on Table (Horizontal)														
Tx Channel														
433.92	63.73	**Pk**	1.42	16.73	28.13	53.76	0.00	53.76	V	1.11	17.1	72.84	-19.08	0.300
433.92	71.21	**Pk**	1.42	16.73	28.13	61.24	0.00	61.24	H	1.98	184.5	72.84	-11.60	0.300
Fundamental Measurements - Axis 2 - EUT Vertical on Table														
Tx Channel														
433.92	70.56	**Pk**	1.42	16.73	28.13	60.59	0.00	60.59	H	2.09	191.0	72.84	-12.25	0.300
433.92	68.42	**Pk**	1.42	16.73	28.13	58.45	0.00	58.45	V	1.05	79.9	72.84	-14.39	0.300
Fundamental Measurements - Axis 3 - EUT Vertical & Rotated 90 Degrees														
Tx Channel														
433.92	70.61	**Pk**	1.42	16.73	28.13	60.64	0.00	60.64	V	1.04	114.0	72.84	-12.20	0.300
433.92	64.88	**Pk**	1.42	16.73	28.13	54.91	0.00	54.91	H	1.73	329.8	72.84	-17.93	0.300

Notes:

1. Measurement alternative of quasi-peak (or peak) detector per FCC 15.231 guidelines were utilized. In addition, average measurements are also acceptable. If an average measurement is used, the provisions of FCC 15.35(c) for averaging pulsed emissions and limiting peak emissions apply. Note all measurements above are peak detector relative to average limits.
2. The RBW utilized was ≥ 6dB BW of the fundamental signal.

10 Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

Method:

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC 15.231 & IC RSS-210.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Requirement/Specification

- FCC 15.231(e)

15.231(e) In addition to the provisions of § 15.205 (restricted band), the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental Tx Frequency	Field Strength of Fundamental (uV/m)	**Field Strength of Spurious Emissions (uV/m)**
40.66 – 40.70	2,250	225
70 - 130	1,250	125
130 - 174	1,250 to 3,750	125 to 375
174 - 250	3,750	375
260 - 470	1,500 to 5,000	150 to 500 (43.52 to 53.98 dBuV/m)
Above 470	12,500	1,250

15.231(e) The above field strength limits are specified at a distance of 3-meters. The tighter limits apply at the band edges.

15.231(b)(2) Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak (or peak) detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in 15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of 15.205 shall be demonstrated using the measurement instrumentation specified in that section.

15.231(b)(3) The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in 15.209, whichever limit permits higher field strength.

15.35(b) When average radiated emission measurements are specified in this part, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. Unless otherwise specified, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.

Test Equipment Used:

Asset ID	Description	Manufacture	Model	Serial	Cal Date	Cal Due
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/29/2014	01/29/2015
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	8447F	3113A05545	05/21/2014	05/21/2015
19936	Bilog Antenna 30MHz – 6GHz	Sunol Sciences	JB6	A050707-1	11/13/2013	11/13/2014
18906	RF Pre-Amp (1-4GHz)	Mini-Circuits Lab	ZHL-42	N052792-2	05/23/2014	05/23/2015
18900	RF Pre-Amplifier (4-8 GHz)	Avantek	AFT97-8434-10F	1007	05/23/2014	05/23/2015
SW-6	Software for Radiated and Conducted emissions.	Intertek	OATS vba	V. 2.0	VBU	VBU

Results:

The sample tested was found to comply.

Test Summary: Radiated Field Strength – Tx Spurious (Harmonics Non-Restricted Band)

Tx Fundamental	Part 15.231(e) Radiated Field Strength @ 3-meters						
Tx Frequency Range:	☒ 260-470MHz						
Frequency (MHz)	Peak Field Strength (dBuV/m)	Peak Field Strength Limit (dBuV/m)	Peak Field Strength Margin (dB)	Duty Cycle Correction Factor (dB)	Average Field Strength (dBuV/m)	Average Field Strength Limit (duV/m)	Average Field Strength Margin (dB)
867.86 (Peak)	58.37	72.84	-14.47	19.78	38.59	52.84	-14.25
RBW: ☒ 120kHz ☐ 300kHz ☐ 500kHz ☒ 1MHz ☐ 3MHz ☐ 10MHz VBW: ☒ 300kHz ☐ 1MHz ☐ 1MHz ☒ 3 MHz ☐ 10MHz ☐ 10MHz							

Note: 120kHz RBW 30MHz to 1000MHz, 1MHz RBW above 1GHz

Test Summary: Radiated Field Strength – Tx Spurious (Harmonics Restricted Band)

Tx Fundamental	Part 15.205/209 Radiated Field Strength @ 3-meters						
Tx Frequency Range:	☒ 260-470MHz						
Frequency (MHz)	Peak Field Strength (dBuV/m)	Peak Field Strength Limit (dBuV/m)	Peak Field Strength Margin (dB)	Duty Cycle Correction Factor (dB)	Average Field Strength (dBuV/m)	Average Field Strength Limit (duV/m)	Average Field Strength Margin (dB)
4339.30 (Peak)	56.19	74.00	-17.81	19.78	36.41	54.00	-17.59
RBW: ☒ 120kHz ☐ 300kHz ☐ 500kHz ☒ 1MHz ☐ 3MHz ☐ 10MHz VBW: ☒ 300kHz ☐ 1MHz ☐ 1MHz ☒ 3 MHz ☐ 10MHz ☐ 10MHz							

Note: 120kHz RBW 30MHz to 1000MHz, 1MHz RBW above 1GHz

Test Summary: Radiated Field Strength – Tx Spurious (Non-Harmonics)

Tx Fundamental	Part 15.209/ 15.231(e) Radiated Field Strength @ 3-meters						
Tx Frequency Range:	☒ 260-470MHz						
Frequency (MHz)	Field Strength (dBuV/m)	Field Strength Limit FCC 15.209 (dBuV/m)	Field Strength Margin FCC 15.209 (dB)		Field Strength Limit FCC 15.231(e) (dBuV/m)	Field Strength Margin FCC 15.231(e) (dB)	
49.97 (Qp)	24.41	40.00	-15.59		52.84	-28.43	
RBW: ☒ 120kHz ☐ 300kHz ☐ 500kHz ☒ 1MHz ☐ 3MHz ☐ 10MHz VBW: ☒ 300kHz ☐ 1MHz ☐ 1MHz ☒ 3 MHz ☐ 10MHz ☐ 10MHz							

Test Method:

- ANSI C63.10:2009, Section 6.5/6.6 & 7.6.1

An intentional radiator shall be measured in accordance with 47 CFR 15.31-15.35. The detector functions and measuring bandwidths for these measurements are specified in 15.35. For measurements below 1 GHz, a quasi-peak detector shall be used. However, a peak detector may be used, since the measured value will generally be higher with a peak detector. For measurements above 1 GHz, the limits are in terms of using an instrument with an average detector, unstated otherwise for a specific type of device.

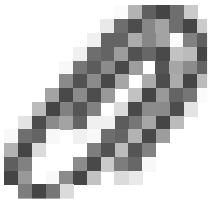
For device operating under Section 15.231, the limit is in terms of average with an additional peak limit of 20 dB over the average limit (see 47 CFR 15.231).

Notes:

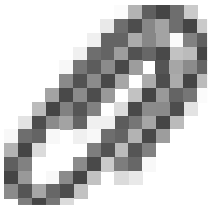
1. All Tx Spurious measurements are radiated field – peak detector, max hold measurements.
2. The product was tested in (3) axes – refer to section 4 for details.
3. The transmitter is single-channel.

Setup Photographs: Radiated Field Strength – Tx Spurious (Out-of-Band Emissions)

Test Setup – Front View



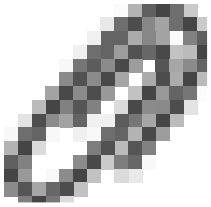
Test Setup – Rear View



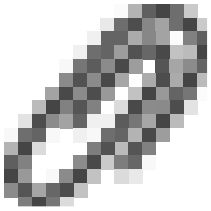
Setup Photographs: Radiated Field Strength – Tx Spurious (Out-of-Band Emissions)

Test Setup

Antenna – 30MHz to 1000MHz

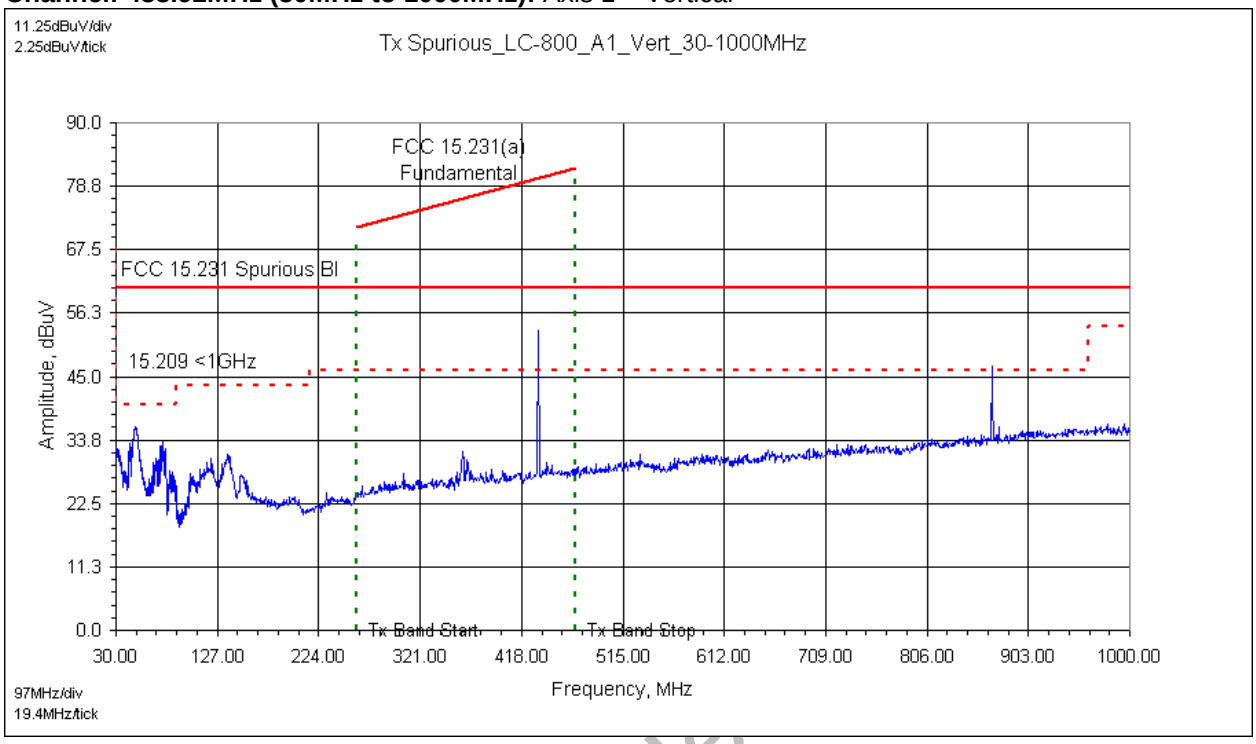


Antenna – 1GHz to 18GHz

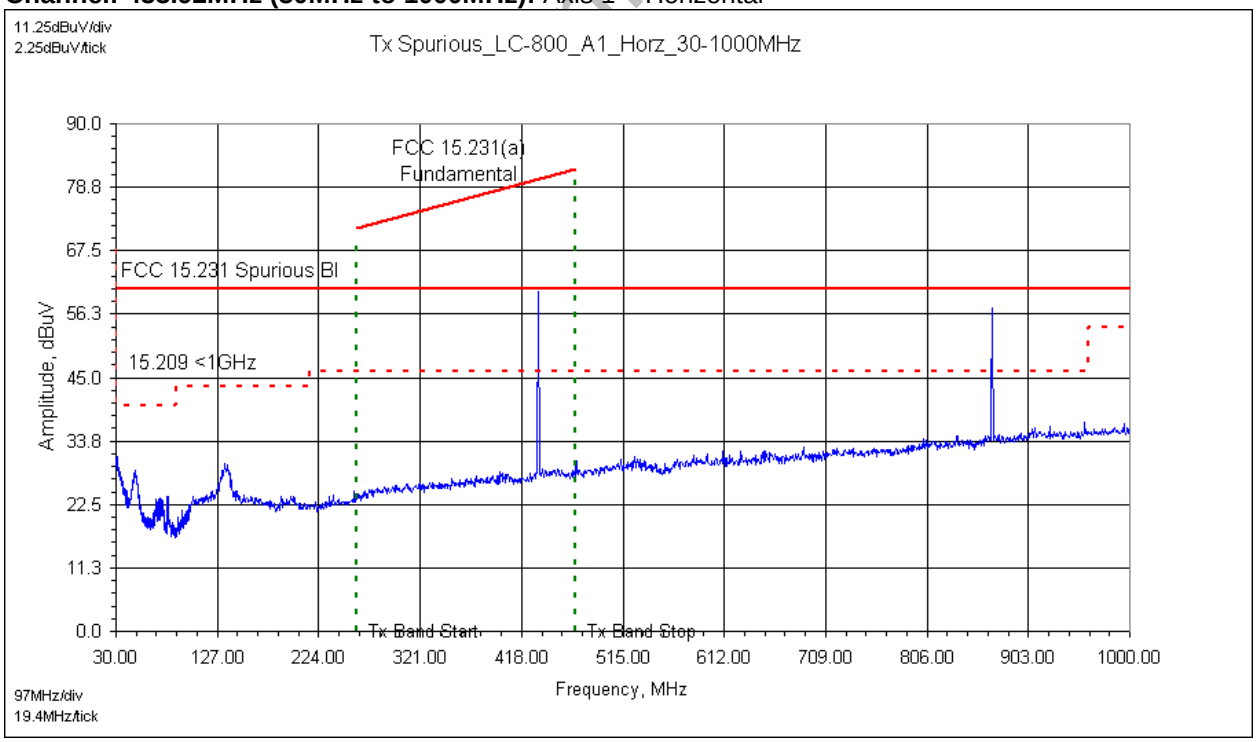


Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

Channel: 433.92MHz (30MHz to 1000MHz): Axis 1 – Vertical



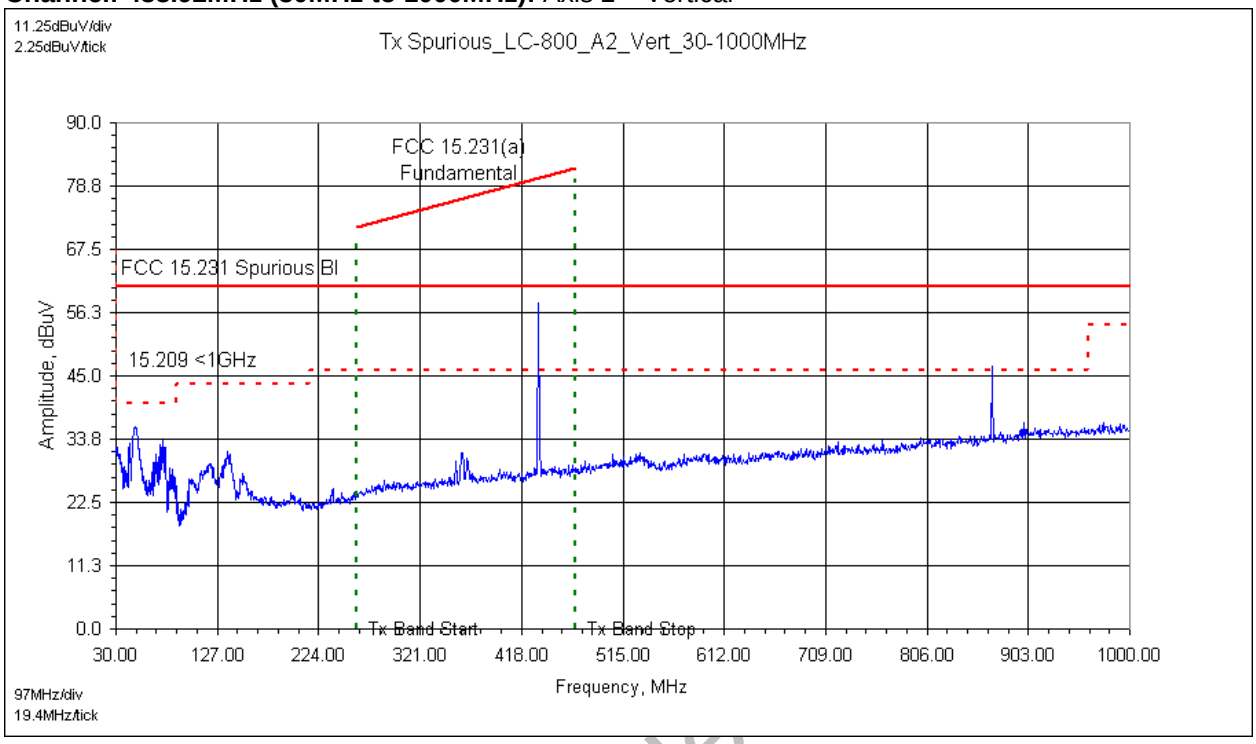
Channel: 433.92MHz (30MHz to 1000MHz): Axis 1 – Horizontal



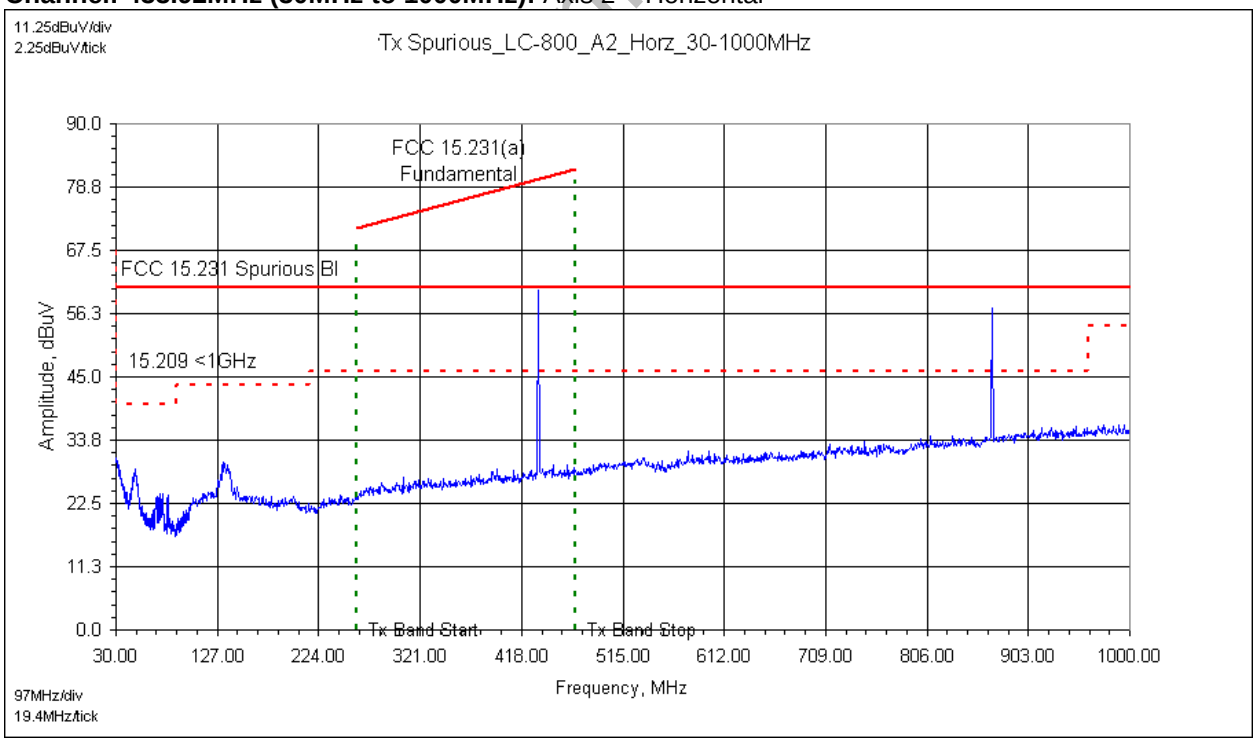
Note: Above plots are reference only – not final test data

Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

Channel: 433.92MHz (30MHz to 1000MHz): Axis 2 – Vertical



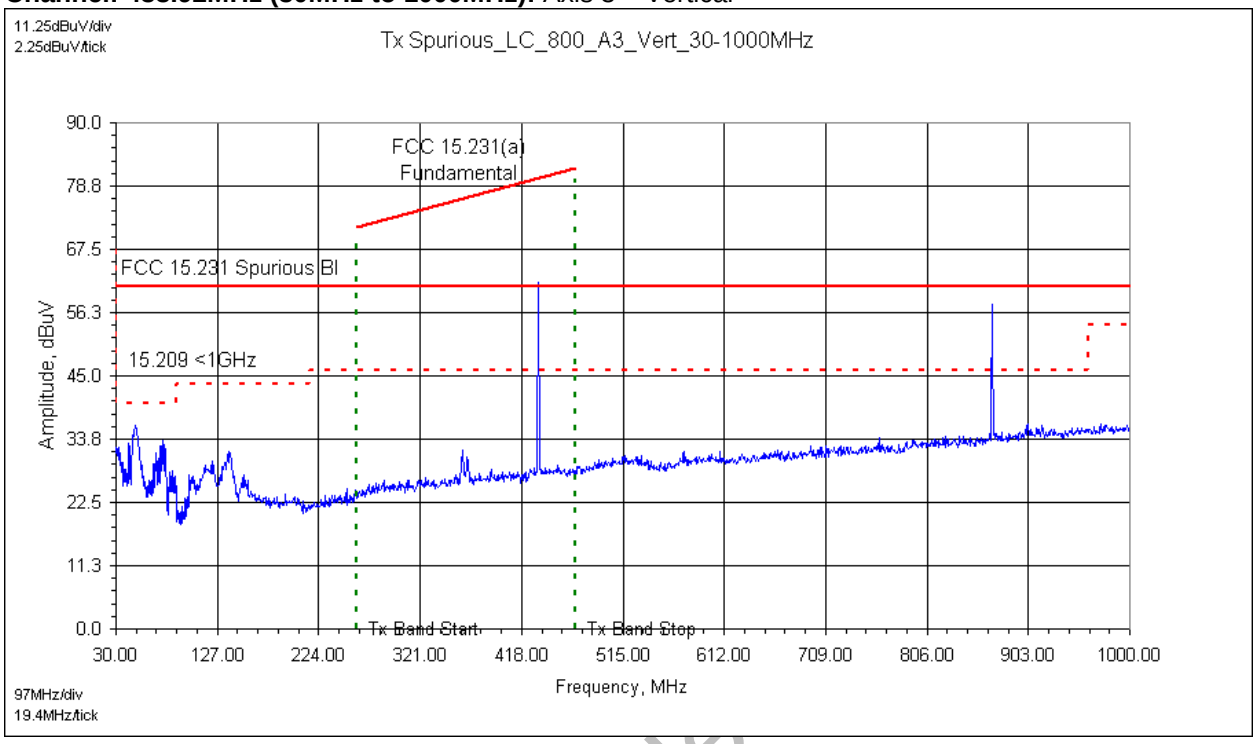
Channel: 433.92MHz (30MHz to 1000MHz): Axis 2 – Horizontal



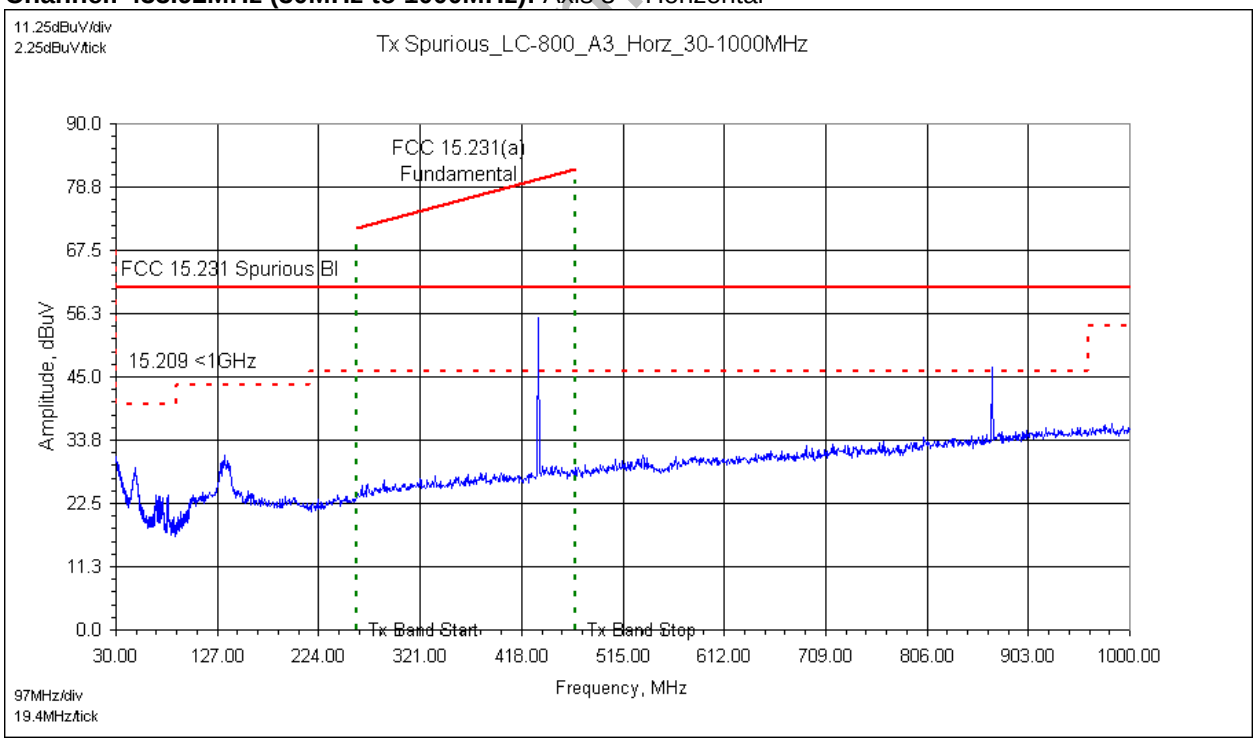
Note: Above plots are reference only – not final test data

Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

Channel: 433.92MHz (30MHz to 1000MHz): Axis 3 – Vertical



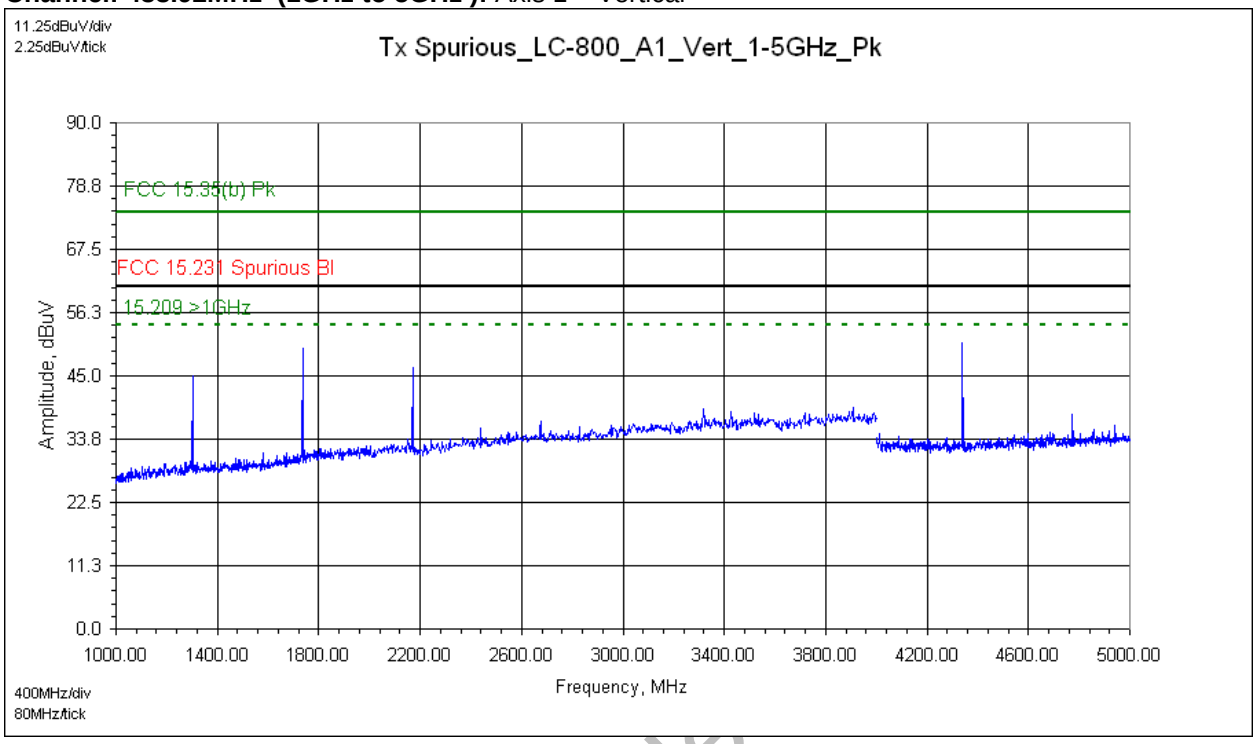
Channel: 433.92MHz (30MHz to 1000MHz): Axis 3 – Horizontal



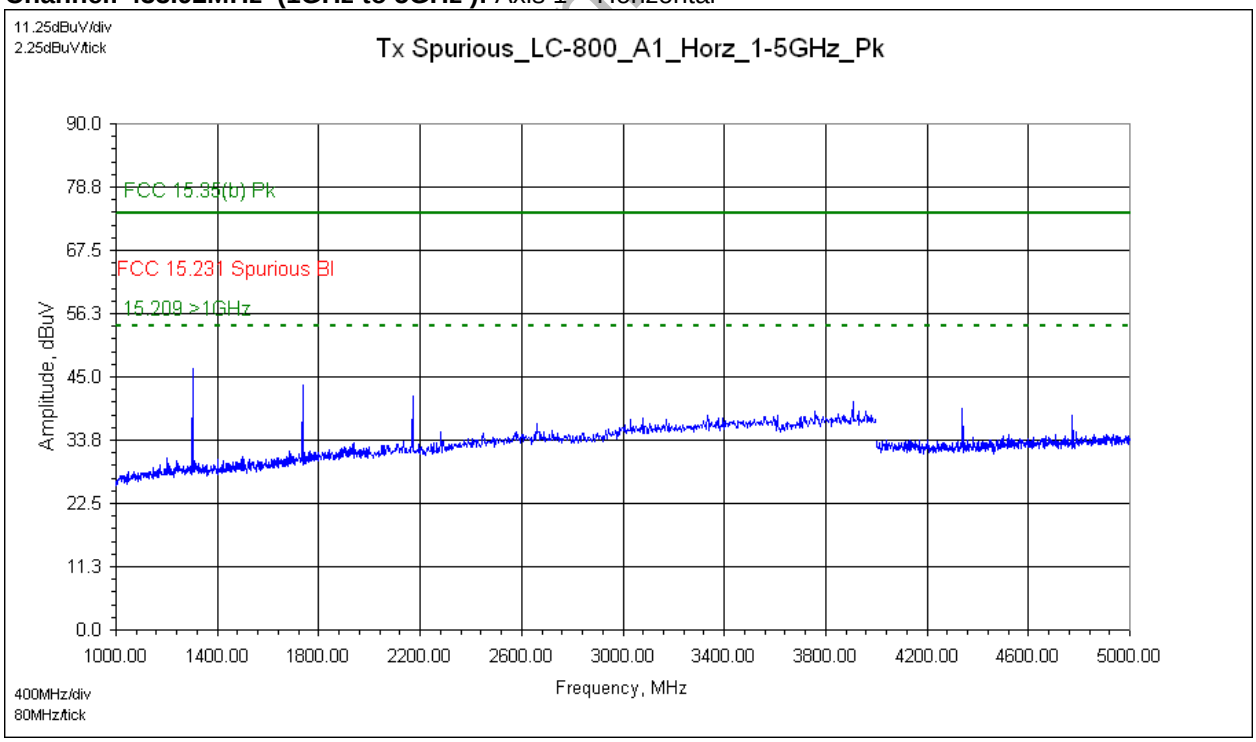
Note: Above plots are reference only – not final test data

Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

Channel: 433.92MHz (1GHz to 5GHz): Axis 1 – Vertical



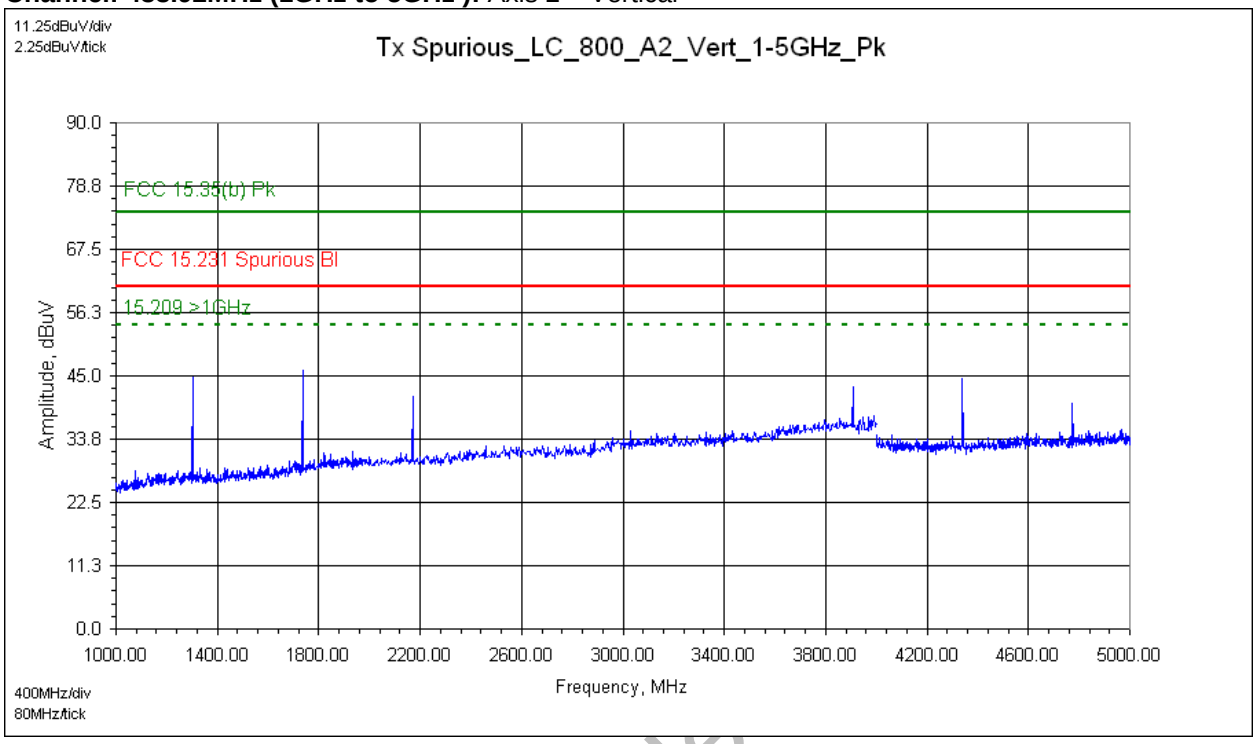
Channel: 433.92MHz (1GHz to 5GHz): Axis 1 – Horizontal



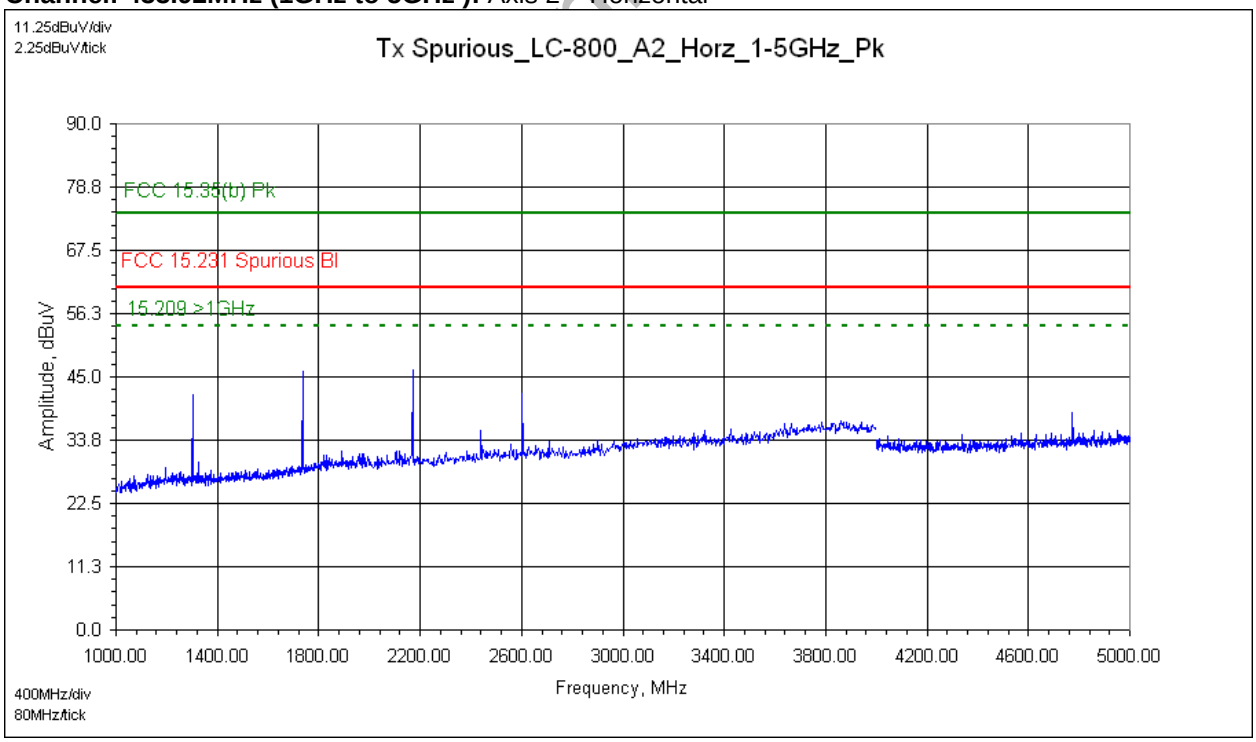
Note: Above plots are reference only – not final test data

Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

Channel: 433.92MHz (1GHz to 5GHz): Axis 2 – Vertical



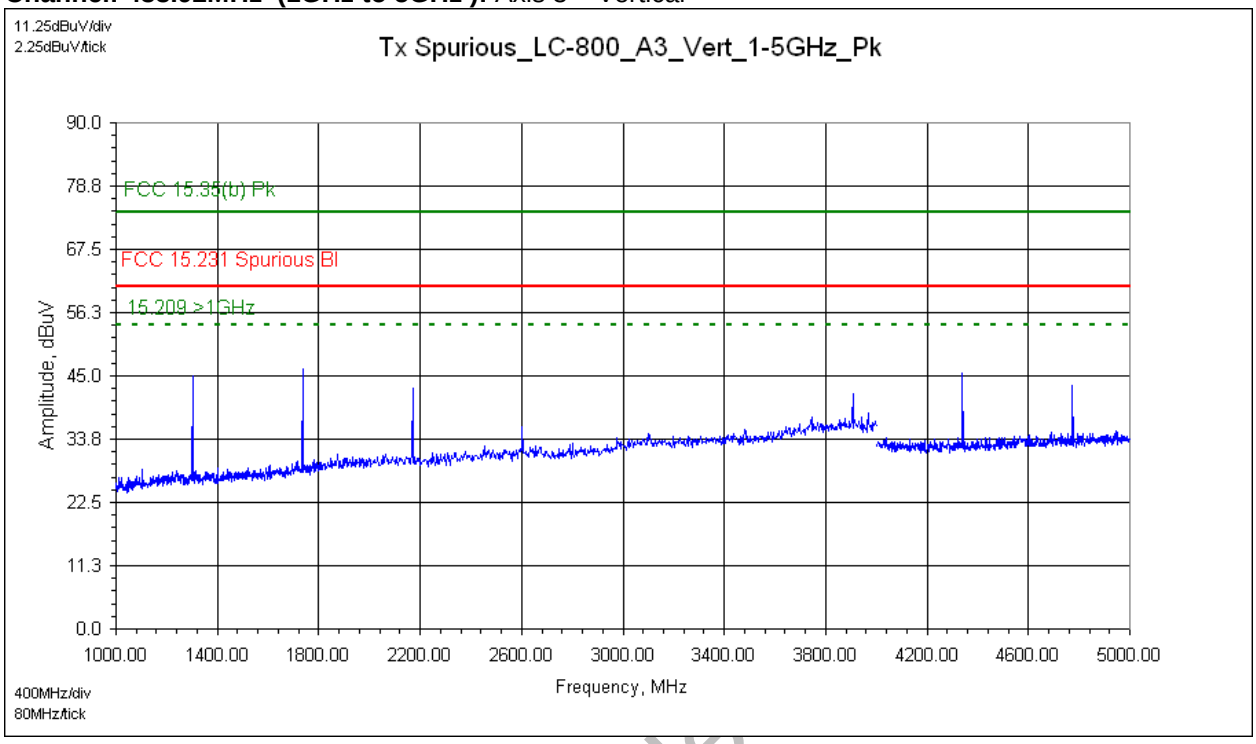
Channel: 433.92MHz (1GHz to 5GHz): Axis 2 – Horizontal



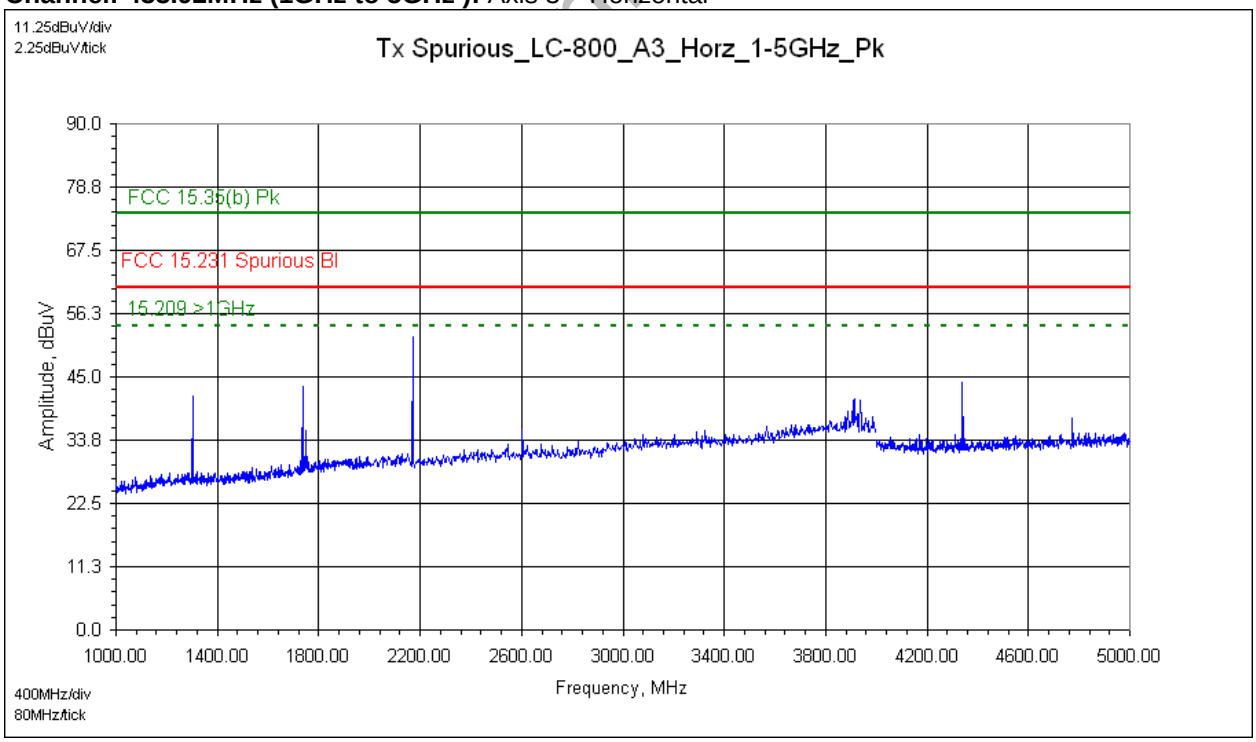
Note: Above plots are reference only – not final test data

Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

Channel: 433.92MHz (1GHz to 5GHz): Axis 3 – Vertical



Channel: 433.92MHz (1GHz to 5GHz): Axis 3 – Horizontal



Note: Above plots are reference only – not final test data

Test Data: Radiated Field Strength – Tx Spurious (Harmonics) – Test Axis 1

Tx Spurious Harmonics - Radiated Field Measurements

Test Report #:	**G101608881**	Test Area:	CC1 Radiated	Temperature:	23.5	°C
Test Method:	FCC 15.231(e) FCC 15.205/209	Test Date:	06-June-2014	Relative Humidity:	31.2	%
EUT Model #:	LC-800	EUT Power:	Battery	Air Pressure:	82.8	kPa
EUT Serial #:	FCC PHASE1					
Manufacturer:	BI, Inc.					
EUT Description:	Ankle-Worn GPS Tracker					

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

Notes: Product transmitting continuously – 433MHz Radio active – CW

Radio is single-channel:433.92MHz - All measurements peak detector – RBW 1MHz, VBW 3MHz

Note: FCC Restricted Bands per 15.205/209 noted in yellow highlight

The following Duty Cycle was verified by Intertek: 10.26ms/ 100ms

Duty Cycle Correction Utilized

Averaging method for pulsed signals and calculation in accordance to FCC CFR47 Part 15.35(c) utilized to calculate field strength emissions.

The testing performed in accordance to FCC CFR47 Part 15.231 and delta limits were calculated as follows:

Final Corrected Peak Measurement – Duty Cycle Correction Factor* = Final Calculated Emission

The Final Calculated Emission was then compared to the Limits in CFR47 Part 15.231(e) and the emission/limit delta was calculated.

DTCF is calculated as follows 20*$\log_{10}$(duty cycle in 100mS**)** – not to exceed 20dB.

FCC Part 15.31(e) Average Limit: Frequency Range 260-470MHz, 150 to 500 uV/m = 43.52 to 53.98 dBuV/m

FREQ	LEVEL	DET	CABLE	Antenna	PREAMP	FINAL	Duty Cycle CF	Duty Cycle Corrected	POL	HGT	AZ	LIMIT (Average)	DELTA LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	= [dBuV]	- [dB]	= [dBuV/m]	(V/H)	(m)	(DEG)	FCC 15.231(e) 15.209 dBuV/m	FCC 15.231(e) 15.209 dB	(MHz)
Tx Spurious Measurements – Test Axis 1 - EUT Flat on Table (Horizontal)														
867.8600	59.22	**Pk**	2.06	21.90	27.90	55.27	19.78	35.49	H	2.34	352.5	52.84	-17.35	1.000
867.8600	55.08	**Pk**	2.06	21.90	27.90	51.13	19.78	31.35	V	1.04	227.2	52.84	-21.49	1.000
1301.7900	59.65	**Pk**	2.54	25.26	36.93	50.51	19.78	30.73	H	1.50	119.0	54.00	-23.27	1.000
1301.7900	59.28	**Pk**	2.54	25.26	36.93	50.14	19.78	30.36	V	1.00	192.0	54.00	-23.64	1.000
1735.7200	63.71	**Pk**	2.95	26.37	36.95	56.08	19.78	36.30	V	1.00	95.0	52.84	-16.54	1.000
1735.7200	58.82	**Pk**	2.95	26.37	36.95	51.19	19.78	31.41	H	2.16	351.0	52.84	-21.43	1.000
2169.6500	57.89	**Pk**	3.33	27.79	37.32	51.69	19.78	31.91	V	1.08	171.0	52.84	-20.93	1.000
2169.6500	61.00	**Pk**	3.33	27.79	37.32	54.80	19.78	35.02	H	2.09	217.0	52.84	-17.82	1.000
2603.5800	55.48	**Pk**	3.67	29.03	37.54	50.64	19.78	30.86	H	2.12	184.0	52.84	-21.98	1.000
2603.5800	49.76	**Pk**	3.67	29.03	37.54	44.92	19.78	25.14	V	1.05	149.0	52.84	-27.70	1.000
3037.5100	47.43	**Pk**	4.02	30.56	37.59	44.42	19.78	24.64	V	1.24	90.0	52.84	-28.20	1.000
3037.5100	46.95	**Pk**	4.02	30.56	37.59	43.94	19.78	24.16	H	2.18	224.0	52.84	-28.68	1.000
3471.4400	47.65	**Pk**	4.33	31.29	37.63	45.64	19.78	25.86	H	2.07	98.0	52.84	-26.98	1.000
3471.4400	48.35	**Pk**	4.33	31.29	37.63	46.34	19.78	26.56	V	1.78	222.0	52.84	-26.28	1.000
3905.3700	49.85	**Pk**	4.61	32.87	37.08	50.24	19.78	30.46	V	1.50	151.0	54.00	-23.54	1.000
3905.3700	51.89	**Pk**	4.61	32.87	37.08	52.28	19.78	32.50	H	2.23	315.0	54.00	-21.50	1.000
4339.3000	58.67	**Pk**	4.88	32.14	39.50	56.19	19.78	36.41	H	1.50	155.0	54.00	-17.59	1.000
4339.3000	54.98	**Pk**	4.88	32.14	39.50	52.50	19.78	32.72	V	1.23	139.0	54.00	-21.28	1.000

Notes:

1. Per 15.231(b)(3): The limits on the field strength of spurious emissions (non-restricted) are based upon the fundamental frequency of the intentional radiator. Spurious emissions should be attenuated to the limits shown in the table OR to the general limits in 15.209, whichever limit permits the higher field strength. Therefore – to determine compliance - the limit used will be the highest limit from the following:

   - FCC 15.231(e) Average Limit: 52.84 dBuV/m
   - FCC 15.209 Average Limit: 54dBuV/m

Test Data: Radiated Field Strength – Tx Spurious (Harmonics) – Test Axis 2

Tx Spurious Harmonics - Radiated Field Measurements

Test Report #:	**G101608881**	Test Area:	CC1 Radiated	Temperature:	23.5	°C
Test Method:	FCC 15.231(e) FCC 15.205/209	Test Date:	06-June-2014	Relative Humidity:	31.2	%
EUT Model #:	LC-800	EUT Power:	Battery	Air Pressure:	82.8	kPa
EUT Serial #:	FCC PHASE1					
Manufacturer:	BI, Inc.					
EUT Description:	Ankle-Worn GPS Tracker					

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

Notes: Product transmitting continuously – 433MHz Radio active – CW

Radio is single-channel:433.92MHz - All measurements peak detector – RBW 1MHz, VBW 3MHz

Note: FCC Restricted Bands per 15.205/209 noted in yellow highlight

The following Duty Cycle was verified by Intertek: 10.26ms/ 100ms

Duty Cycle Correction Utilized

Averaging method for pulsed signals and calculation in accordance to FCC CFR47 Part 15.35(c) utilized to calculate field strength emissions.

The testing performed in accordance to FCC CFR47 Part 15.231 and delta limits were calculated as follows:

Final Corrected Peak Measurement – Duty Cycle Correction Factor* = Final Calculated Emission

The Final Calculated Emission was then compared to the Limits in CFR47 Part 15.231(e) and the emission/limit delta was calculated.

DTCF is calculated as follows 20*$\log_{10}$(duty cycle in 100mS**)** – not to exceed 20dB.

FCC Part 15.31(e) Average Limit: Frequency Range 260-470MHz, 150 to 500 uV/m = 43.52 to 53.98 dBuV/m

FREQ	LEVEL	DET	CABLE	Antenna	PREAMP	FINAL	Duty Cycle CF	Duty Cycle Corrected	POL	HGT	AZ	LIMIT (Average)	DELTA LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	= [dBuV]	- [dB]	= [dBuV/m]	(V/H)	(m)	(DEG)	FCC 15.231(e) 15.209 dBuV/m	FCC 15.231(e) 15.209 dB	(MHz)
Tx Spurious Measurements – Test Axis 2 - EUT Flat on Table (Horizontal)														
867.8600	62.32	**Pk**	2.06	21.90	27.90	58.37	19.78	38.59	H	1.83	32.7	52.84	-14.25	1.000
867.8600	54.34	**Pk**	2.06	21.90	27.90	50.39	19.78	30.61	V	1.40	5.8	52.84	-22.23	1.000
1301.7900	58.23	**Pk**	2.54	25.26	36.93	49.09	19.78	29.31	H	2.17	251.0	54.00	-24.69	1.000
1301.7900	55.36	**Pk**	2.54	25.26	36.93	46.22	19.78	26.44	V	1.08	160.0	54.00	-27.56	1.000
1735.7200	51.82	**Pk**	2.95	26.37	36.95	44.19	19.78	24.41	V	1.08	167.0	52.84	-28.43	1.000
1735.7200	57.48	**Pk**	2.95	26.37	36.95	49.85	19.78	30.07	H	2.25	131.0	52.84	-22.77	1.000
2169.6500	55.11	**Pk**	3.33	27.79	37.32	48.91	19.78	29.13	H	1.90	318.0	52.84	-23.71	1.000
2169.6500	53.77	**Pk**	3.33	27.79	37.32	47.57	19.78	27.79	V	1.24	343.0	52.84	-25.05	1.000
2603.5800	45.14	**Pk**	3.67	29.03	37.54	40.30	19.78	20.52	V	1.24	340.0	52.84	-32.32	1.000
2603.5800	47.46	**Pk**	3.67	29.03	37.54	42.62	19.78	22.84	H	2.31	25.0	52.84	-30.00	1.000
3037.5100	37.17	**Pk**	4.02	30.56	37.59	34.16	19.78	14.38	H	2.31	323.0	52.84	-38.46	1.000
3037.5100	35.69	**Pk**	4.02	30.56	37.59	32.68	19.78	12.90	V	1.25	56.0	52.84	-39.94	1.000
3471.4400	41.21	**Pk**	4.33	31.29	37.63	39.20	19.78	19.42	V	1.38	329.0	52.84	-33.42	1.000
3471.4400	40.55	**Pk**	4.33	31.29	37.63	38.54	19.78	18.76	H	2.23	187.0	52.84	-34.08	1.000
3905.3700	50.25	**Pk**	4.61	32.87	37.08	50.64	19.78	30.86	H	2.23	204.0	54.00	-23.14	1.000
3905.3700	47.63	**Pk**	4.61	32.87	37.08	48.02	19.78	28.24	V	1.23	332.0	54.00	-25.76	1.000
4339.3000	54.61	**Pk**	4.88	32.14	39.50	52.13	19.78	32.35	H	2.25	124.0	54.00	-21.65	1.000
4339.3000	52.13	**Pk**	4.88	32.14	39.50	49.65	19.78	29.87	V	1.27	179.0	54.00	-24.13	1.000

Notes:

1. Per 15.231(b)(3): The limits on the field strength of spurious emissions (non-restricted) are based upon the fundamental frequency of the intentional radiator. Spurious emissions should be attenuated to the limits shown in the table OR to the general limits in 15.209, whichever limit permits the higher field strength. Therefore – to determine compliance - the limit used will be the highest limit from the following:

    - FCC 15.231(e) Average Limit: 52.84 dBuV/m
    - FCC 15.209 Average Limit: 54dBuV/m

Test Data: Radiated Field Strength – Tx Spurious (Harmonics) – Test Axis 3

Tx Spurious Harmonics - Radiated Field Measurements

Test Report #:	**G101608881**	Test Area:	CC1 Radiated	Temperature:	23.5	°C
Test Method:	FCC 15.231(e) FCC 15.205/209	Test Date:	06-June-2014	Relative Humidity:	31.2	%
EUT Model #:	LC-800	EUT Power:	Battery	Air Pressure:	82.8	kPa
EUT Serial #:	FCC PHASE1					
Manufacturer:	BI, Inc.					
EUT Description:	Ankle-Worn GPS Tracker					
Notes:	Product transmitting continuously – 433MHz Radio active – CW					
	Radio is single-channel:433.92MHz - All measurements peak detector – RBW 1MHz, VBW 3MHz					

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

Note: FCC Restricted Bands per 15.205/209 noted in yellow highlight

The following Duty Cycle was verified by Intertek: 10.26ms/ 100ms

Duty Cycle Correction Utilized

Averaging method for pulsed signals and calculation in accordance to FCC CFR47 Part 15.35(c) utilized to calculate field strength emissions.

The testing performed in accordance to FCC CFR47 Part 15.231 and delta limits were calculated as follows:

Final Corrected Peak Measurement – Duty Cycle Correction Factor* = Final Calculated Emission

The Final Calculated Emission was then compared to the Limits in CFR47 Part 15.231(e) and the emission/limit delta was calculated.

DTCF is calculated as follows 20*log$_{10}$(duty cycle in 100mS**)** – not to exceed 20dB.

FCC Part 15.31(e) Average Limit: Frequency Range 260-470MHz, 150 to 500 uV/m = 43.52 to 53.98 dBuV/m

FREQ	LEVEL	DET	CABLE	Antenna	PREAMP	FINAL	Duty Cycle CF	Duty Cycle Corrected	POL	HGT	AZ	LIMIT (Average)	DELTA LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	= [dBuV]	- [dB]	= [dBuV/m]	(V/H)	(m)	(DEG)	FCC 15.231(e) 15.209 dBuV/m	FCC 15.231(e) 15.209 dB	(MHz)
Tx Spurious Measurements – Test Axis 3 - EUT Flat on Table (Horizontal)														
867.8600	55.71	**Pk**	2.06	21.90	27.90	51.76	19.78	31.98	H	2.30	349.4	52.84	-20.86	1.000
867.8600	62.14	**Pk**	2.06	21.90	27.90	58.19	19.78	38.41	V	1.03	63.0	52.84	-14.43	1.000
1301.7900	58.87	**Pk**	2.54	25.26	36.93	49.73	19.78	29.95	H	2.25	263.0	54.00	-24.05	1.000
1301.7900	47.59	Pk	2.54	25.26	36.93	38.45	19.78	18.67	V	1.37	276.0	54.00	-35.33	1.000
1735.7200	59.34	**Pk**	2.95	26.37	36.95	51.71	19.78	31.93	V	1.45	353.0	52.84	-20.91	1.000
1735.7200	63.06	**Pk**	2.95	26.37	36.95	55.43	19.78	35.65	H	1.55	102.0	52.84	-17.19	1.000
2169.6500	56.44	**Pk**	3.33	27.79	37.32	50.24	19.78	30.46	H	2.16	190.0	52.84	-22.38	1.000
2169.6500	60.50	**Pk**	3.33	27.79	37.32	54.30	19.78	34.52	H	2.26	289.0	52.84	-18.32	1.000
2603.5800	51.51	**Pk**	3.67	29.03	37.54	46.67	19.78	26.89	H	2.26	66.0	52.84	-25.95	1.000
2603.5800	51.34	**Pk**	3.67	29.03	37.54	46.50	19.78	26.72	V	2.26	178.0	52.84	-26.12	1.000
3037.5100	46.21	**Pk**	4.02	30.56	37.59	43.20	19.78	23.42	H	2.21	69.0	52.84	-29.42	1.000
3037.5100	46.56	**Pk**	4.02	30.56	37.59	43.55	19.78	23.77	V	1.32	282.0	52.84	-29.07	1.000
3471.4400	46.72	**Pk**	4.33	31.29	37.63	44.71	19.78	24.93	V	1.32	225.0	52.84	-27.91	1.000
3471.4400	49.66	**Pk**	4.33	31.29	37.63	47.65	19.78	27.87	H	2.14	243.0	52.84	-24.97	1.000
3905.3700	51.25	**Pk**	4.61	32.87	37.08	51.64	19.78	31.86	H	2.14	219.0	54.00	-22.14	1.000
3905.3700	47.97	**Pk**	4.61	32.87	37.08	48.36	19.78	28.58	V	1.27	170.0	54.00	-25.42	1.000
4339.3000	55.15	**Pk**	4.88	32.14	39.50	52.67	19.78	32.89	H	1.61	258.0	54.00	-21.11	1.000
4339.3000	53.19	**Pk**	4.88	32.14	39.50	50.71	19.78	30.93	V	1.50	234.0	54.00	-23.07	1.000

Notes:

1. Per 15.231(b)(3): The limits on the field strength of spurious emissions (non-restricted) are based upon the fundamental frequency of the intentional radiator. Spurious emissions should be attenuated to the limits shown in the table OR to the general limits in 15.209, whichever limit permits the higher field strength. Therefore – to determine compliance - the limit used will be the highest limit from the following:

   - FCC 15.231(e) Average Limit: 52.84 dBuV/m
   - FCC 15.209 Average Limit: 54dBuV/m

Tx Harmonics in Restricted Bands – Reference Only

fundamental	Harmonics									
MHz0	MHz1	MHz2	MHz3	MHz4	MHz5	MHz6	MHz7	MHz8	MHz9	MHz10
433.92	433.92	867.86	**1301.79**	1735.72	2169.65	2603.58	3037.51	3471.44	**3905.37**	**4339.30**

FCC Part 15.205 Restricted Bands

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
[1] 0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	[2]
13.36–13.41.			

Test Data: Radiated Field Strength – Tx Spurious (Non-Harmonics)

Radiated Electromagnetic Emissions

Test Report #:	**G101608881**	Test Area:	CC1 Radiated	Temperature:	23.5	°C
Test Method:	FCC 15.209	Test Date:	06-June-2014	Relative Humidity:	31.2	%
EUT Model #:	LC-800	EUT Power:	Battery	Air Pressure:	82.8	kPa

EUT Serial #: FCC PHASE1

Manufacturer: BI, Inc.

EUT Description: Ankle-Worn GPS Tracker

Notes: Product transmitting continuously – 433MHz Radio active – CW

Radio is single-channel:433.92MHz

All measurements quasi-peak detector – RBW 120kHz, VBW 300kHz

Level Key
Pk – Peak
Qp – Quasi Peak
Av - Average

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	Delta2	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	FCC 15.209 Qp	N/A	(MHz)
Measurements: 30MHz to 1000MHz													
49.9680	43.57	**Qp**	0.77	8.31	28.24	0.00	24.41	V	1.03	235.0	- 15.59*	NA	0.120
76.8910	38.53	**Qp**	0.77	7.92	28.15	0.00	19.07	V	1.03	26.0	- 20.93	NA	0.120
138.7820	34.66	**Qp**	0.80	12.90	27.88	0.00	20.47	V	1.04	149.0	- 23.05	NA	0.120
138.7820	32.53	**Qp**	0.80	12.90	27.88	0.00	18.34	H	2.48	318.0	- 25.18	NA	0.120

Example calculation:

Measured Level	+	Cable Loss	+	Antenna Factor	-	Pre-Amp	+	Atten	=	Final Corrected Reading	Specification Limit	-	Final Corrected Reading	=	Delta Specification
(dBµV)		(dB)		(dB)		(dB)		(dB)		(dBµV/m)	(dBµV/m)		(dBµV/m)		
20.0		**3.0**		**5.0**		**10.0**		**0.0**		**18.0**	**40.0**		**18.0**		**- 22.0**

11 Periodic Operation – Maximum Fundamental Emission Bandwidth Requirement

Method:

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC 15.231.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Requirement/Specification:

(c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

- FCC 15.231(c)

Test Equipment Used:

Asset ID	Description	Manufacture	Model	Serial	Cal Date	Cal Due
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/29/2014	01/29/2015
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	8447F	3113A05545	05/21/2014	05/21/2015
19936	Bilog Antenna 30MHz – 6GHz	Sunol Sciences	JB6	A050707-1	11/13/2013	11/13/2014
SW-6	Software for Radiated and Conducted emissions.	Intertek	OATS vba	V. 2.0	VBU	VBU

Results:

The sample tested was found to comply.

Test Summary: Periodic Operation – Maximum Bandwidth Requirement

Fundamental	Periodic Operation – Maximum Bandwidth Requirement		
Frequency Range:	☒ 260-470MHz		
Channel Frequency MHz	**Measured Bandwidth (kHz)**	**Limit 0.25% Center Frequency (kHz)**	**Margin (kHz)**
433.92	214.74	1082.5	867.76

Test Method:

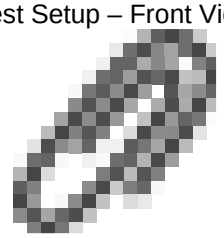
- ANSI C63.10:2009, Section 6.9

Notes:

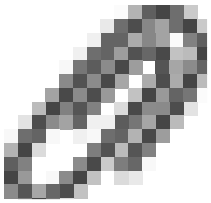
1. All Fundamental measurements are radiated field - peak detector, max hold – 100 kHz RBW.
2. The limit for RSS-210 is identical to the limit for FCC 15.231.

Setup Photographs: Periodic Operation – Maximum Bandwidth requirement

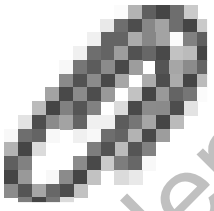
Test Setup – Front View



Test Setup – Rear View

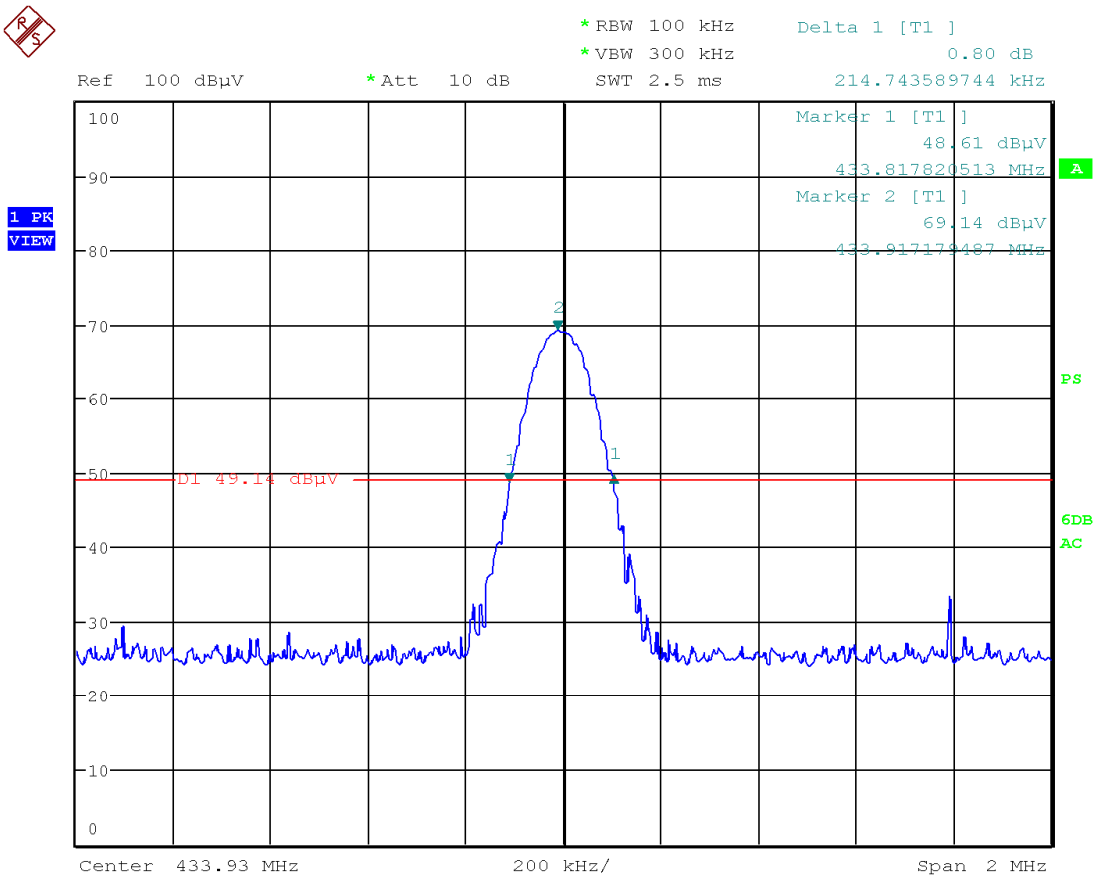


Antenna – 30MHz to 1000MHz



Plots: Periodic Operation – Maximum Bandwidth Requirement

Channel 433.92MHz



Date: 6.JUN.2014 15:59:57

12 Requirements for devices operating within the 40.66 – 40.70MHz band

Method

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC CFR47 15.231(d).

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Requirement/Specification

15.231(d) For devices operating within the frequency band 40.66-40.70 MHz, the bandwidth of the emission shall be confined within the band edges and the frequency tolerance of the carrier shall be ±0.01%. This frequency tolerance shall be maintained for a temperature variation of −20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

- FCC 15.231(d)

Results:

The product tested does not transmit in the 40.66 – 40.70MHz band; therefore, this specification is not applicable.

13 Conditions of Periodic Operation (periodic transmits at pre-determined intervals)

Method

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC CFR47 15.231(e).

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Requirement/Specification

15.231(e) Intentional radiators may operate at a periodic rate exceeding that specified in paragraph (a) of this section and may be employed for any type of operation, including operation prohibited in paragraph (a) of this section, provided the intentional radiator complies with the provisions of paragraphs (b) through (d) of this section, except the field strength table in paragraph (b) of this section is replaced by the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emission (microvolts/meter)
40.66-40.70	1,000	100
70-130	500	50
130-174	500 to 1,500 [1]	50 to 150 [1]
174-260	1,500	150
260-470	1,500 to 5,000 [1]	150 to 500 [1]
Above 470	5,000	500

[1] Linear interpolations.

In addition, devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

- FCC 15.231(e)
- IC RSS-210, A1.1.5

Results:

The product tested transmits at regular pre-determined intervals – however, the above periodic timing limitations and conditions are satisfied per client declaration. In addition, the more stringent radiated field strength limits were satisfied. Refer to Section 9 and Section 10 of this report for details.

Client Declaration: The transmitter transmits for 10 msec at a minimum interval of 30 seconds. So we do also comply with maximum transmission time of less than 2 seconds per hour (1.2 seconds).

14 Duty Cycle Correction Factor

Duty cycle correction factor was utilized during this testing.

Method:

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC CFR47 15.35(c) & IC RSS-GEN.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Requirement/Specification:

Unless otherwise specified, e.g. §15.255(b), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

Determine the period of the pulse train, T, in mSec and record the results. T is defined as the time from the beginning of one pulse train to the beginning of the next pulse train.
Count the number of different types of pulses, N and record the results.
For each of the different types of pulses, count the number of occurrences within one pulse train.
Use the Duty Cycle Correction Factor, DCCF, from the results table and use it to adjust the field strength measurements recorded for radiated emissions.

- FCC 15.35(c)
- RSS-GEN, Clause 4.5

Test Equipment Used:

Results:

For Reference Only – to determine the average value of pulsed operation per FCC 15.35(c).

Test Method:

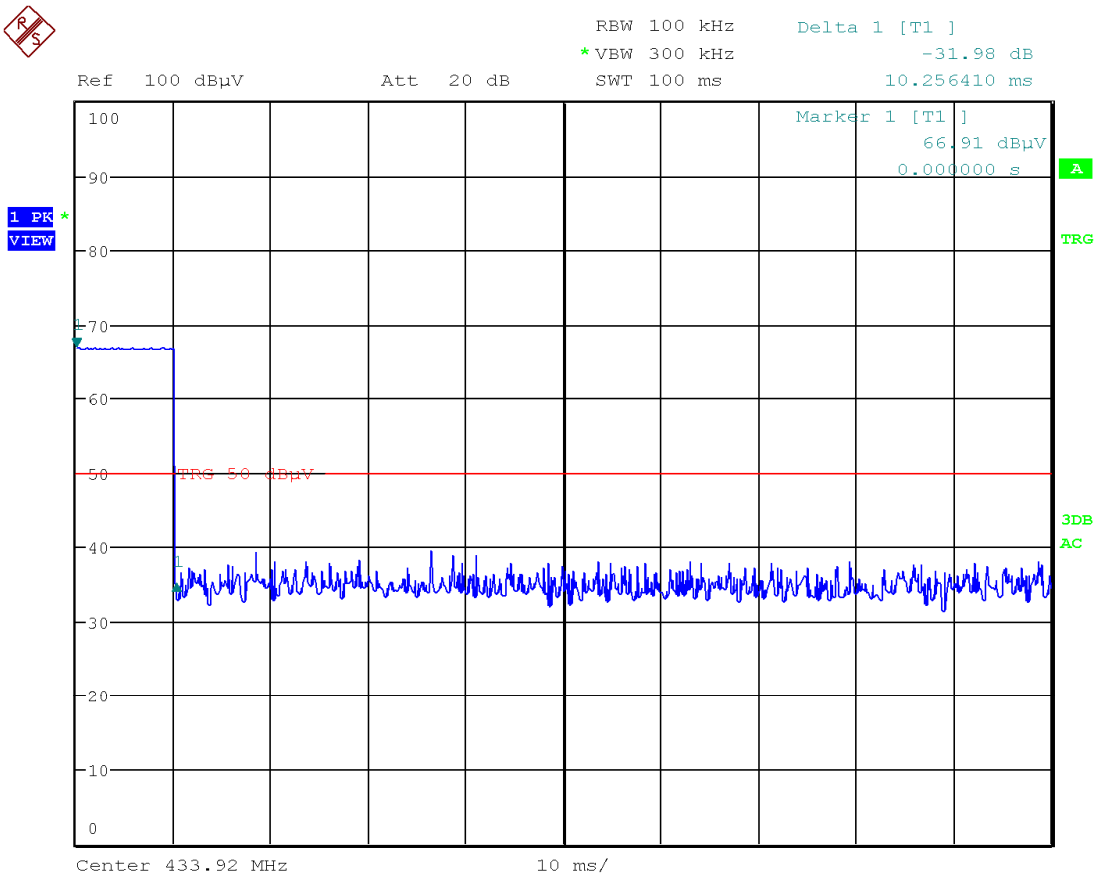
- ANSI C63.10: 2009, Clause 7.5

Test Summary:

Channel Frequency (MHz)	Duty Cycle Per 100ms	Duty Cycle Correction Factor
433.93	10.26ms	-19.78 dB

Plots:

Channel: 433.92MHz



Date: 6.JUN.2014 09:22:25

15 Unintentional Radiated Emissions (Digital Part of Receiver)

Method:

Unless otherwise stated no deviations were made from FCC Part 15.109 – Class B.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Equipment Used:

Asset ID	Description	Manufacture	Model	Serial	Cal Date	Cal Due

Test Requirement:

The product must pass Unintentional Radiated Emissions – Class B.
Unwanted emissions below 1GHz must comply with the general field strength limits defined in FCC Part 15.109, when measured with a quasi-peak detector. Unwanted emissions above 1GHz are measured with an average detector.

Test Procedure:

The Resolution Bandwidth is 120 kHz for frequencies 30 MHz -1000 MHz and 1 MHz for frequencies above 1000 MHz.

The EUT is placed on a plastic turntable that is 80 cm in height. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). During testing, all cables are manipulated to produce worst-case emissions. The signal is maximized by rotating the turntable through a 360º rotation. The antenna height is varied from 1-4 meters. Both vertical and horizontal antenna configurations are utilized in the testing.

Radiated emissions are taken at 3-meter antenna-to-product test distance for all measurements.

Data is included for the worst-case configuration (the configuration which resulted in the highest emission levels).

Test Results:

The product tested was found to comply.

Reference Intertek Test Report: 101608881DEN-001

Setup Photographs:

Pre-scan Plots:

Final Plots:

Test Data:

Example calculation:

Measured Level	+	Cable Loss	+	Antenna Factor	-	Pre-Amp	+	Atten	=	Final Corrected Reading	Specification Limit	-	Final Corrected Reading	=	Delta Specification
(dBµV)		(dB)		(dB)		(dB)		(dB)		(dBµV/m)	(dBµV/m)		(dBµV/m)		
20.0		**3.0**		**5.0**		**10.0**		**0.0**		**18.0**	**40.0**		**18.0**		**- 22.0**

Notes: None

Deviations, Additions, or Exclusions: None

16 AC Mains Conducted Emissions

Method:

Unless otherwise stated no deviations were made from FCC Part 15.107 – Class B.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Equipment Used:

Asset ID	Description	Manufacture	Model	Serial	Cal Date	Cal Due
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/23/2013	01/23/2014
18885	Transient Limiter	Hewlett-Packard	11947A	3107A00700	05/05/2013	05/05/2014
18914	Single Phase LISN	EMCO	3816/NM	9408-1003	04/11/2013	04/11/2014
SW-6	Software for Radiated and Conducted emissions.	Intertek	OATS vba	V. 1.0	VBU	VBU

Test Requirement:

The product must pass the AC Conducted average and quasi-peak Class B Limits defined in FCC Part 15.107.

Test Procedure:

Measurements are carried out using quasi-peak and average detector receivers in accordance with CISPR 16. An AMN is required to provide a defined impedance at all frequencies across the power feed at the point of measurement of terminal voltage and also to provide isolation of the circuit under test from the ambient noise on the power lines. An AMN as defined in CISPR 16 shall be used.
The EUT is located so that the distance between the boundary of the EUT and the closest surface of the AMN is 0.8m.

Where a flexible mains cord is provided by the manufacturer, this shall be 1m long or if in excess of 1m, the excess cable is folded back and forth as far as possible so as to form a bundle not exceeding 0.4m in length.
The EUT is arranged and connected with cables terminated in accordance with the product specification.

Conducted disturbance is measured between the phase lead and the reference ground, and between the neutral lead and the reference ground. Both measured values are reported.

The EUT, where intended for tabletop use, is placed on a table whose top is 0.8m above the ground plane. A vertical, metal reference plane is placed 0.4m from the EUT. The vertical metal reference-plane is at least 2m by 2m. The EUT shall be kept at least 0.8m from any other metal surface or other ground plane not being part of the EUT. The table is constructed of non-conductive materials. Its dimensions are 1m by 1.5m, but may be extended for larger EUT.

Equipment setup for conducted disturbance tests followed the guidelines of ANSI C63.4.

Test Results:

The sample tested was found to Comply.

Reference Intertek Test Report: 101608881DEN-001.

Setup Photographs:

Pre-scan Plots:

Final Plots:

Test Data:

Example calculation:

Measured Level	+	Transducer, Cable Loss & Amplifier corrections	=	Corrected Reading	Specification Limit	-	Corrected Reading	=	Delta Specification
(dBµV)		(dB)		(dBµV/m)	(dBµV/m)		(dBµV/m)		
14.0		**14.9**		**28.9**	**40.0**		**28.9**		**-11.1**

Notes: None

Deviations, Additions, or Exclusions: None

17 Appendix - 6dB Bandwidth (Reference Only)

Method:

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC 15.231 & IC RSS-210.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Requirement/Specification:

- ANSI C63.10: 2009, Section 6.3.1

Radiated measurements of the fundamental-signal peak field strength shall be made using instrumentation with a bandwidth equal to or greater than the 6 dB bandwidth of the emission.

Test Equipment Used:

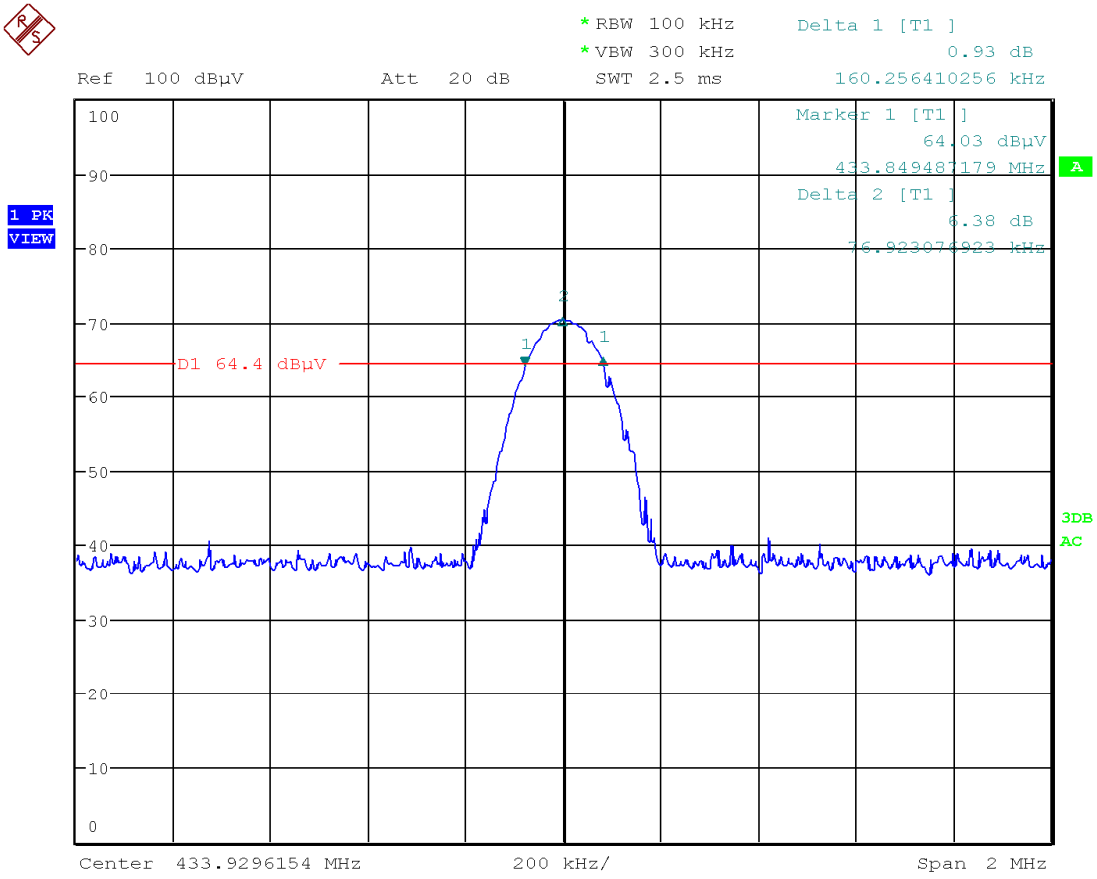
Asset ID	Description	Manufacture	Model	Serial	Cal Date	Cal Due
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/29/2014	01/29/2015
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	8447F	3113A05545	05/21/2014	05/21/2015
19936	Bilog Antenna 30MHz – 6GHz	Sunol Sciences	JB6	A050707-1	11/13/2013	11/13/2014
SW-6	Software for Radiated and Conducted emissions.	Intertek	OATS vba	V. 2.0	VBU	VBU

Results:

Not applicable – measurement used for reference only – to determine minimum RBW required for testing fundamental.

Plot: 6dB Bandwidth

Channel: 433.92MHz



Date: 6.JUN.2014 09:25:38

Test Summary:

6dB Bandwidth Summary	
Channel/ Mode	**6dB Bandwidth**
433.93	160.26 kHz

Specification: Not applicable

Notes:

1) If applicable, measurements were taken using worst-case modulated (maximum bandwidth) mode, using maximum data packet length.
2) All measurements are radiated field strength taken at 3-meters.
3) For fundamental measurements, a minimum RBW of 300kHz will be utilized per the plot and measurements above.

18 Measurement Uncertainty

The measured value related to the corresponding limit will be used to decide whether the equipment meets the requirements.

The measurement uncertainty figures were calculated and correspond to a coverage factor of k = 2, providing a confidence level of respectively 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian).

Measurement uncertainty Table

Parameter	Uncertainty ±	Notes
Radiated emissions, 10kHz to 30 MHz	3.4 dB	
Radiated emissions, 30 to 200 MHz HP	2.2 dB	
Radiated emissions, 30 to 200 MHz VP	3.8 dB	
Radiated emissions, 200 to 1000 MHz HP	2.8 dB	
Radiated emissions, 200 to 1000 MHz VP	2.7 dB	
Radiated emissions, 1 to 18 GHz	5.2 dB	
Conducted port emissions 10kHz to 1000 MHz	1.0 dB	
Conducted port emissions 10kHz to 1000 MHz	1.6 dB	
AC mains Conducted emissions, 9kHz to 30 MHz	3.14 dB	

19 Revision History

Revision Level	Date	Report Number	Notes
0	6/11/2014	101608881DEN-002	Original Issue
1	6/15/2014	101608881DEN-002	Revised per client request: 1. Table-page 6, change “WiFi” module to “Cell” Module 2. Table, page 9, change Internal battery voltage from 3.6VDC to 3.7VDC 3. Table, page 9, change external battery voltage from 4.1VDC to 3.6VDC Revised by: Randy Thompson R.T. Reviewed by: Richard Georgerian RG
2	7/6/2014	101608881DEN-002	Revised per TCB review request: 1. Converted test data for Fundamental & Harmonics from 15.231(a) limits to 15.231(e) limits. - Summary table, page 23 & test data, page 27 - Summary table, page 30 & test data pages 40-45 2. Completed Section 13, page 52 to incorporate 15.231(e) periodic timing details. Revised by: Randy Thompson R.T. Reviewed by: Richard Georgerian
3	7/7/2014	101608881DEN-002	Revised for TCB Short-Term Confidentiality of product external photos. 1. Replace product photos Revised by: Randy Thompson R.T.