



Nemko Test Report: 2014_276625_FCC_15231

Applicant: Holatron Systems
833 Ilaniwai St., Ste 2
Honolulu HI 96813
United States

Equipment Under Test: XMTR12C
(E.U.T.)

FCC Identifier: OI4XMTR12C

Industry Canada Identifier: 11556A-XMTR12C

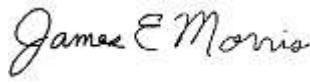
In Accordance With: **FCC Part 15, Subpart C and**
Industry Canada RSS-210, Issue 8
For Low Power Transmitters Operating Periodically
In The Band 40.66 - 40.77 MHz and Above 70 MHz

Tested By: Nemko USA Inc.
2210 Faraday Ave.
Suite 150
Carlsbad, CA 92008

TESTED BY: 

David Light, Wireless Engineer

DATE: 12 January 2015

APPROVED BY: 

James Morris, EMC/Wireless Manager

DATE: 11 March 2015

Total Number of Pages: 20

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Nemko USA, Inc.

EQUIPMENT: XMTR12C

FCC Part 15, Subpart C and
Industry Canada RSS-210, Issue 8
PERIODICALLY OPERATED LOW POWER TRANSMITTERS
PROJECT NO.: 2014_276625_FCC_15231

Section 1. Summary of Test Results

Manufacturer: Holatron Systems

Model No.: XMTR12C

Serial No.: None

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with CFR47 Part 15, Subpart C, Paragraph 15.231 and Industry Canada RSS-210, Issue 8. All tests were conducted using measurement procedure ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC and Industry Canada.

<input checked="" type="checkbox"/>	New Submission	<input type="checkbox"/>	Production Unit
<input type="checkbox"/>	Class II Permissive Change	<input checked="" type="checkbox"/>	Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.

See "Summary of Test Data".



NVLAP Lab Code 200116-0

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EQUIPMENT: XMTR12C

FCC Part 15, Subpart C and
Industry Canada RSS-210, Issue 8
PERIODICALLY OPERATED LOW POWER TRANSMITTERS
PROJECT NO.: 2014_276625_FCC_15231

Summary of Test Data

Name of Test	Paragraph No.	Results
Transmission Requirements	FCC 15.231(a) RSS-210 A1.1.1	Complies
Radiated Emissions	FCC 15.231(b) RSS-210 A1.1.2	Complies
Occupied Bandwidth	FCC15.231(c) RSS-210 A1.1.3	Complies
Frequency Tolerance	FCC 15.231(d) RSS-210 A1.1.4	NA
Alternate Field Strength Requirements	FCC 15.231(e) RSS-210 A1.1.5	NA
Powerline Conducted Emissions	FCC 15.207 RSS-Gen 7.2.4	NA

Footnotes:

- 1) The device does not operate between 40.66 to 40.70 MHz
- 2) The device does not operate at a periodic rate.
- 3) The device is battery powered.

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FCC Part 15, Subpart C and
Industry Canada RSS-210, Issue 8

PERIODICALLY OPERATED LOW POWER TRANSMITTERS

EQUIPMENT: XMTR12C

PROJECT NO.: 2014_276625_FCC_15231

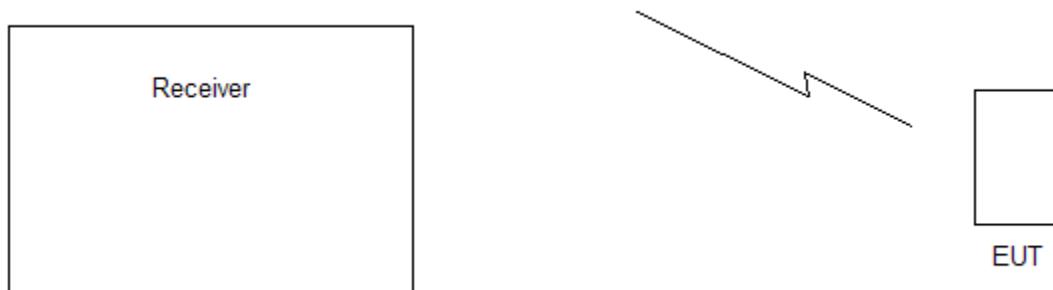
Section 2. Equipment Under Test (E.U.T.)

General Equipment Information

Frequency Range:	315 MHz
Operating Frequency(ies) of Sample:	315 MHz
Type of Emission:	FSK
Supply Power Requirement:	3 Vdc (2 AAA batteries)
Integral Antenna:	No
Antenna Connector:	R-SMA

Description of E.U.T.

The model XMTR12C high-speed 12-shot wireless controller is a low power hand-held remote control radio transmitter which can transmit commands over any of twelve different digital channels at 315 MHz.

System Diagram

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EQUIPMENT: XMTR12C

PERIODICALLY OPERATED LOW POWER TRANSMITTERS

PROJECT NO.: 2014_276625_FCC_15231

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2014_276625_FCC_15231

Section 3. Transmission Requirements

NAME OF TEST: Transmission Requirements	PARA. NO.: FCC 15.231(a) RSS-210 A1.1.1
TESTED BY: David Light	DATE: 12 January 2015

Minimum Standard: 15.231(a) Continuous transmissions such as voice, video or data transmissions are not permitted.

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

15.231(a)(2) A transmitter activated automatically shall cease transmission within 5 seconds of activation.

15.231(a)(3) Periodic transmissions at regular pre-determined intervals are not permitted. However polling or supervisory transmissions to determine system integrity of transmitters used in security or safety applications are allowed if the periodic rate of transmission does not exceed one transmission of not more than one second duration per hour for each transmitter.

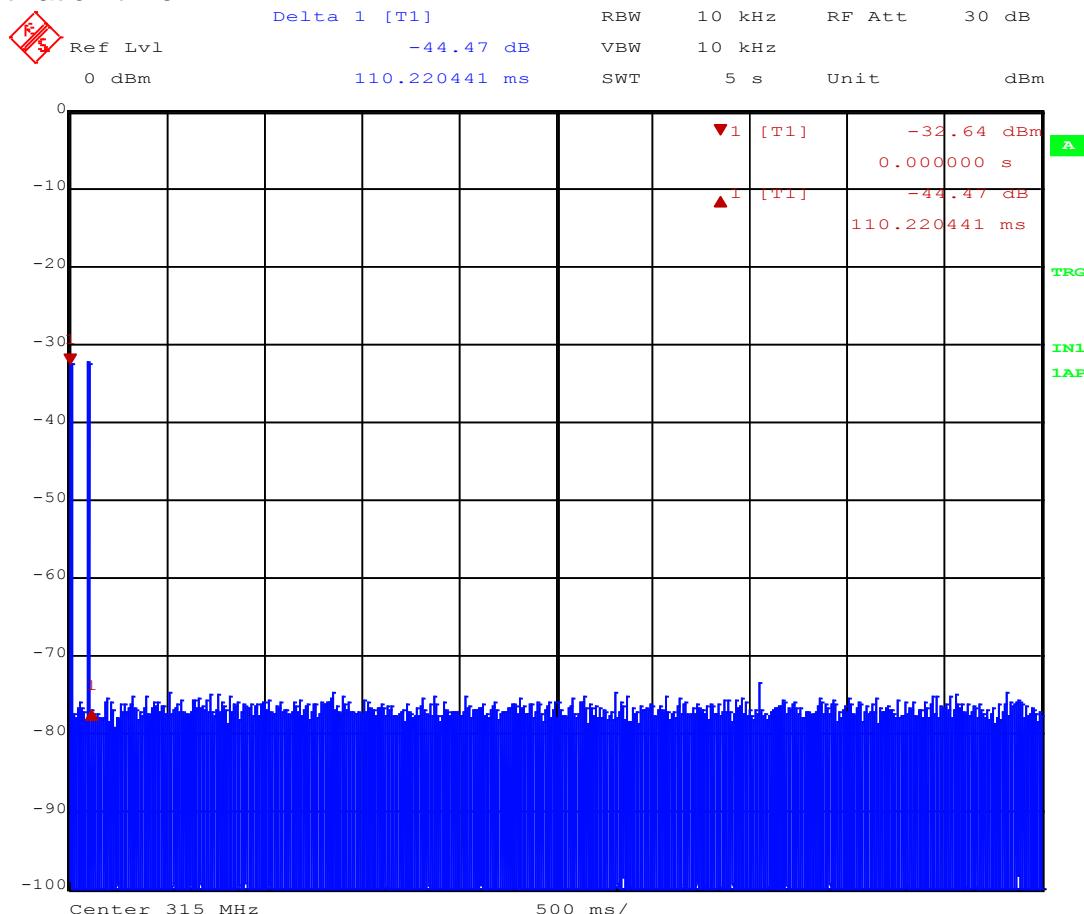
15.231(a)(4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm.

Test Results: Complies.

Test Data: Compliance was determined by verification of technical specifications and a functional test on the equipment.

Rationale for Compliance with Transmission Requirements

15.231(a)(1)	<input checked="" type="checkbox"/> Manual activation	TX deactivation time:
15.231(a)(2) :	<input type="checkbox"/> Automatic activation	110 msec.
15.231(a)(3) :	<input type="checkbox"/> Regular, predetermined transmissions <input type="checkbox"/> Polling or supervisory transmissions	TX rate and duration:
15.231(a)(4) :	<input type="checkbox"/> Alarm device operating during the pendency of alarm condition <input checked="" type="checkbox"/> Non-alarm device	

Test Data – Transmission Requirements**Deactivation time**

Date: 12.JAN.2015 10:14:55

Section 4. Radiated Emissions

NAME OF TEST: Radiated Emissions	PARA. NO.: FCC 15.231(b) RSS-210 A1.1.2
TESTED BY: David Light	DATE: 12 January 2015

Minimum Standard:**Permissible Field Strength Limits (Momentarily Operated Devices)**

Fundamental Frequency (MHz)	Field Strength of Fundamental Microvolts/Meter at 3 meters; (watts)	Field Strength of Unwanted Emissions Microvolts/Meter at 3 meters; (watts)
40.66 - 40.70	2,250	225
70-130	1,250	125
130-174	1,250 to 3,750*	125 to 375
174-260 (note 1)	3,750	375
260-470 (note 1)	3,750 to 12,500*	375 to 1,250
Above 470	12,500	1,250

Notes:

Use quasi-peak or averaging meter.

* Linear interpolation with frequency F in MHzFor 130 - 174 MHz: $FS \text{ (microvolts/m)} = (56.82 \times F) - 6136$ For 260 - 470 MHz: $FS \text{ (microvolts/m)} = (41.67 \times F) - 7083$

Any emissions that fall within the restricted bands of 15.205 shall not exceed the following limits:

Frequency (MHz)	Field Strength (μ V/m @ 3m)	Field Strength (dB @ 3m)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

Test Results:

Complies. The worst-case emission level is 74.4 dB μ V/m @ 3m at 315 MHz. This is 1.2 dB below the specification limit.

Test Data:

See attached table.

Above 1 GHz a spectrum analyzer and low noise amplifier are used to measure emission levels. The spectrum analyzer resolution bandwidth was set to 1 MHz and video bandwidth was 1 MHz.

Test Data - Radiated Emissions**Peak Data**

Meas. Freq. (MHz)	Ant. Pol. (H/V)	Duty Cycle (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail Unc.	Comment
315	H	0.0	88.1	13.3	2.6	32.1	71.9	95.6	-23.7	Pass	
630	H	0.0	40.4	20.0	4.0	32.6	31.8	75.6	-43.8	Pass	
945	H	0.0	52.0	24.1	5.0	31.1	50.0	75.6	-25.6	Pass	Noise Floor
1260	H	0.0	34.0	25.7	5.7	45.2	20.2	75.6	-55.4	Pass	
1575	H	0.0	54.0	25.6	6.8	45.2	41.2	74.0	-32.8	Pass	
1890	H	0.0	44.0	27.3	7.8	45.2	33.9	75.6	-41.7	Pass	Noise Floor
2205	H	0.0	49.0	27.3	8.3	45.2	39.4	74.0	-34.6	Pass	
2520	H	0.0	44.0	28.7	9.4	45.4	36.7	75.6	-38.9	Pass	Noise Floor
2835	H	0.0	46.0	29.0	10.2	44.7	40.5	74.0	-33.5	Pass	Noise Floor
3150	H	0.0	44.0	30.5	10.3	44.7	40.1	75.6	-35.5	Pass	Noise Floor
315	V	0.0	104.0	13.3	2.6	32.1	87.8	95.6	-7.8	Pass	
630	V	0.0	63.3	20.0	4.0	32.6	54.7	75.6	-20.9	Pass	
945	V	0.0	52.0	24.1	5.0	31.1	50.0	75.6	-25.6	Pass	Noise Floor
1260	V	0.0	53.1	25.7	5.7	45.2	39.3	75.6	-36.3	Pass	
1575	V	0.0	57.4	25.6	6.8	45.2	44.6	74.0	-29.4	Pass	
1890	V	0.0	44.0	27.3	7.8	45.2	33.9	75.6	-41.7	Pass	Noise Floor
2205	V	0.0	45.0	27.3	8.3	45.2	35.4	74.0	-38.6	Pass	Noise Floor
2520	V	0.0	48.0	28.7	9.4	45.4	40.7	75.6	-34.9	Pass	
2835	V	0.0	46.0	29.0	10.2	44.7	40.5	74.0	-33.5	Pass	Noise Floor
3150	V	0	44.0	30.5	10.3	44.7	40.1	75.6	-35.5	Pass	Noise Floor

Test Data - Radiated Emissions**Average Data**

Meas. Freq. (MHz)	Ant. Pol. (H/V)	Duty Cycle (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail Unc.	Comment
315	H	-13.4	88.1	13.3	2.6	32.1	58.5	75.6	-17.1	Pass	
630	H	-13.4	40.4	20.0	4.0	32.6	18.4	55.6	-37.2	Pass	
945	H	-13.4	52.0	24.1	5.0	31.1	36.6	55.6	-19.0	Pass	
1260	H	-13.4	34.0	25.7	5.7	45.2	6.8	55.6	-48.8	Pass	
1575	H	-13.4	54.0	25.6	6.8	45.2	27.8	54.0	-26.2	Pass	
1890	H	-13.4	44.0	27.3	7.8	45.2	20.5	55.6	-35.1	Pass	
2205	H	-13.4	49.0	27.3	8.3	45.2	26.0	54.0	-28.0	Pass	
2520	H	-13.4	44.0	28.7	9.4	45.4	23.3	55.6	-32.3	Pass	
2835	H	-13.4	46.0	29.0	10.2	44.7	27.1	54.0	-26.9	Pass	
3150	H	-13.4	44.0	30.5	10.3	44.7	26.7	55.6	-28.9	Pass	
315	V	-13.4	104.0	13.3	2.6	32.1	74.4	75.6	-1.2	Pass	
630	V	-13.4	63.3	20.0	4.0	32.6	41.3	55.6	-14.3	Pass	
945	V	-13.4	52.0	24.1	5.0	31.1	36.6	55.6	-19.0	Pass	
1260	V	-13.4	53.1	25.7	5.7	45.2	25.9	55.6	-29.7	Pass	
1575	V	-13.4	57.4	25.6	6.8	45.2	31.2	54.0	-22.8	Pass	
1890	V	-13.4	44.0	27.3	7.8	45.2	20.5	55.6	-35.1	Pass	
2205	V	-13.4	45.0	27.3	8.3	45.2	22.0	54.0	-32.0	Pass	
2520	V	-13.4	48.0	28.7	9.4	45.4	27.3	55.6	-28.3	Pass	
2835	V	-13.4	46.0	29.0	10.2	44.7	27.1	54.0	-26.9	Pass	
3150	V	-13.4	44.0	30.5	10.3	44.7	26.7	55.6	-28.9	Pass	

The spectrum was searched from 30 MHz to 5 GHz.

Asset Tag	Description	Manufacturer	Model	Serial #	Last Cal	Next Cal
752	Antenna, DRWG	EMCO	3115	4943	19-Feb-2014	19-Feb-2015
901	Preamplifier	Sonoma	310 N	130607	21-Jan-2014	21-Jan-2015
911	Spectrum Analyzer	Agilent	E4440A	US41421266	21-Jan-2014	21-Jan-2015
E1029	Preamplifier (20MHz to 18GHz)	A.H. Systems, Inc.	PAM-0118	343	12-Aug-2014	12-Aug-2015
1480	Antenna, Bilog	Schaffner-Chase	CBL6111C	2572	02-Apr-2014	02-Apr-2015

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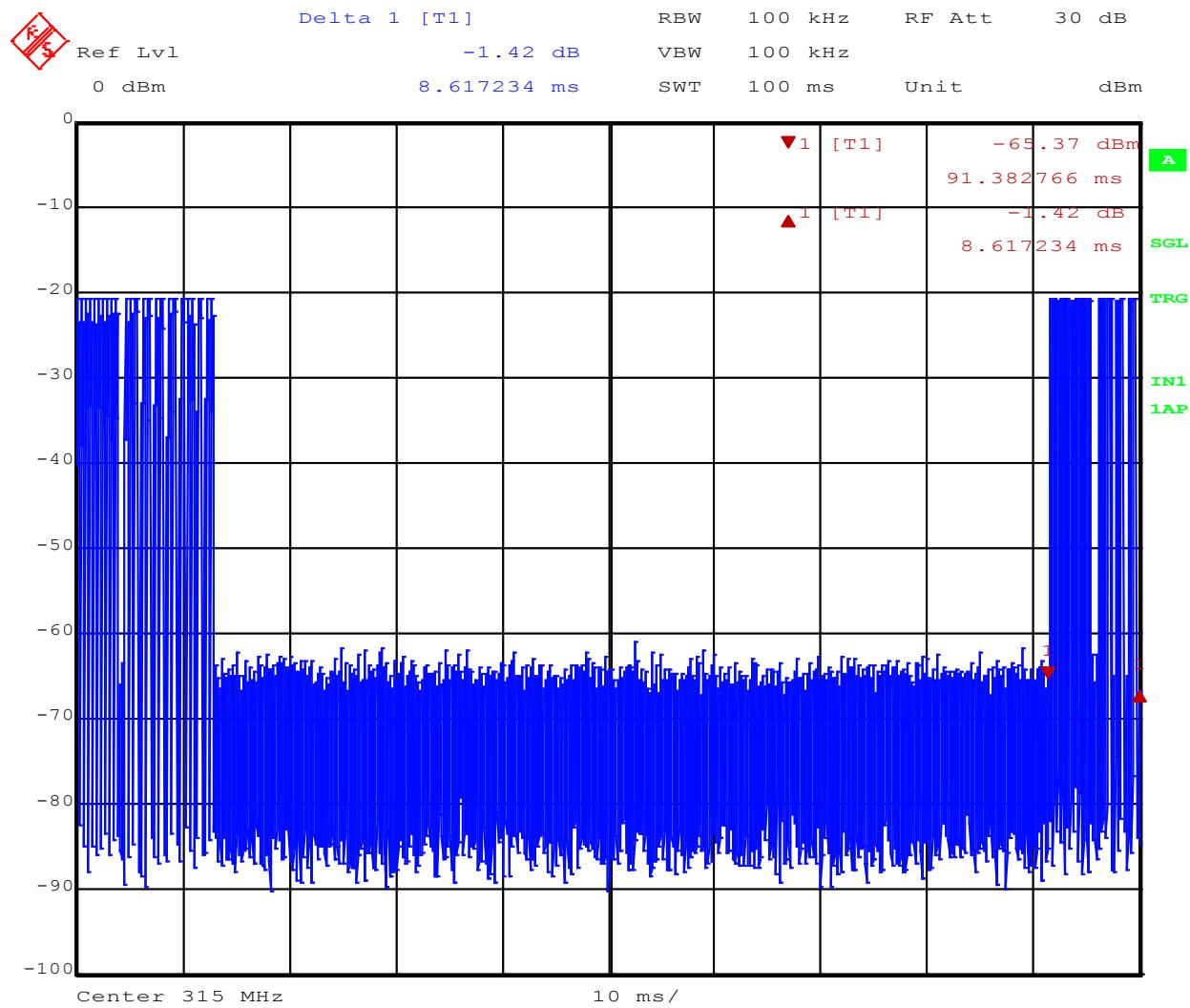
FCC Part 15, Subpart C and Industry Canada RSS-210, Issue 8

PERIODICALLY OPERATED LOW POWER TRANSMITTERS

EQUIPMENT: XMTR12C

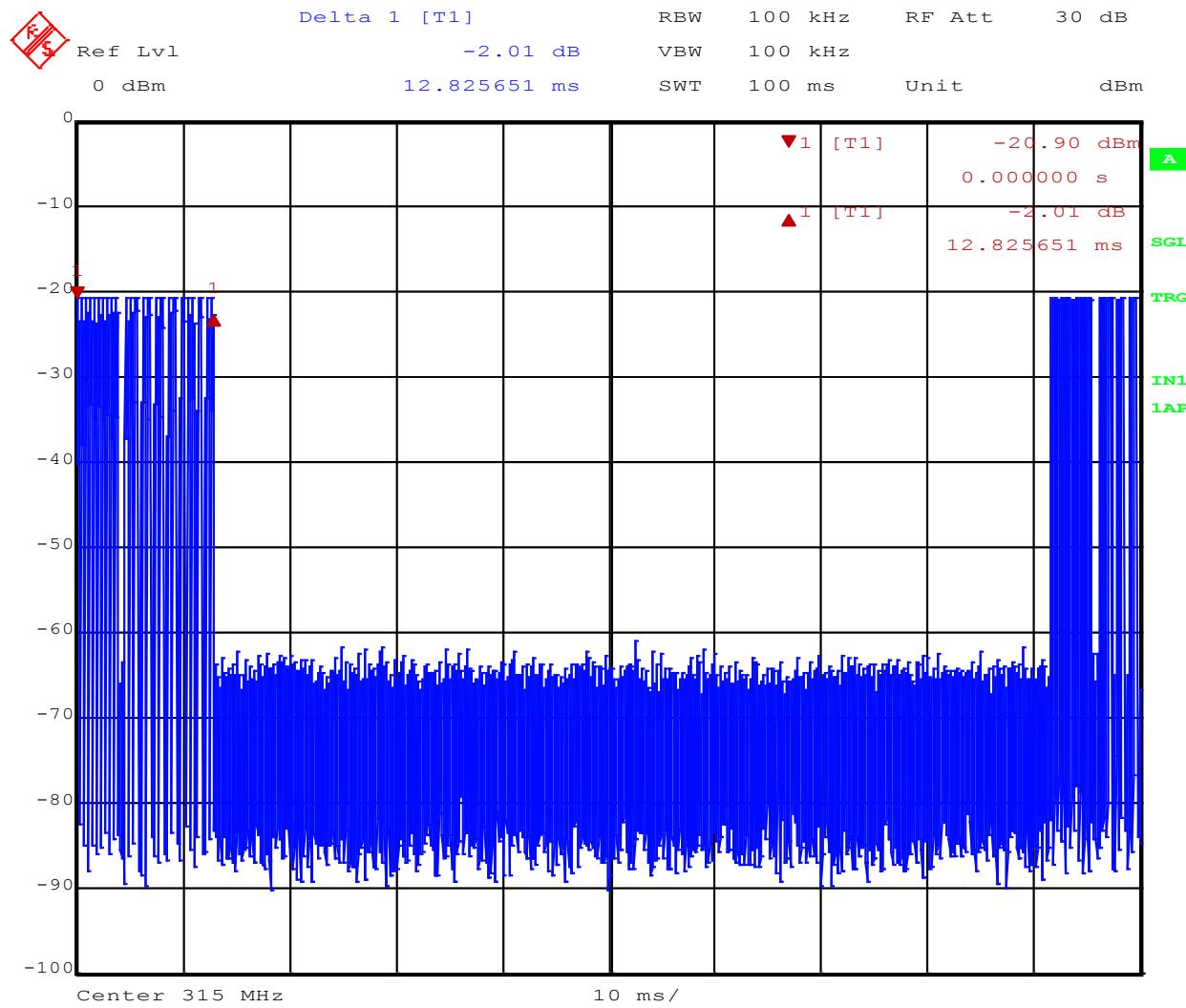
PROJECT NO.: 2014 276625 FCC 15231

Duty Cycle Correction



ON 8 62 ms

Duty Cycle Correction



ON 12.83 ms

Total ON time = 21.45 ms per 100 ms

$$\text{Correction} = 20 \log (21.45/100) = -13.4 \text{ dB}$$

Nemko USA, Inc.

EQUIPMENT: XMTR12C

PERIODICALLY OPERATED LOW POWER TRANSMITTERS

PROJECT NO.: 2014_276625_FCC_15231

FCC Part 15, Subpart C and
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Section 5. Occupied Bandwidth

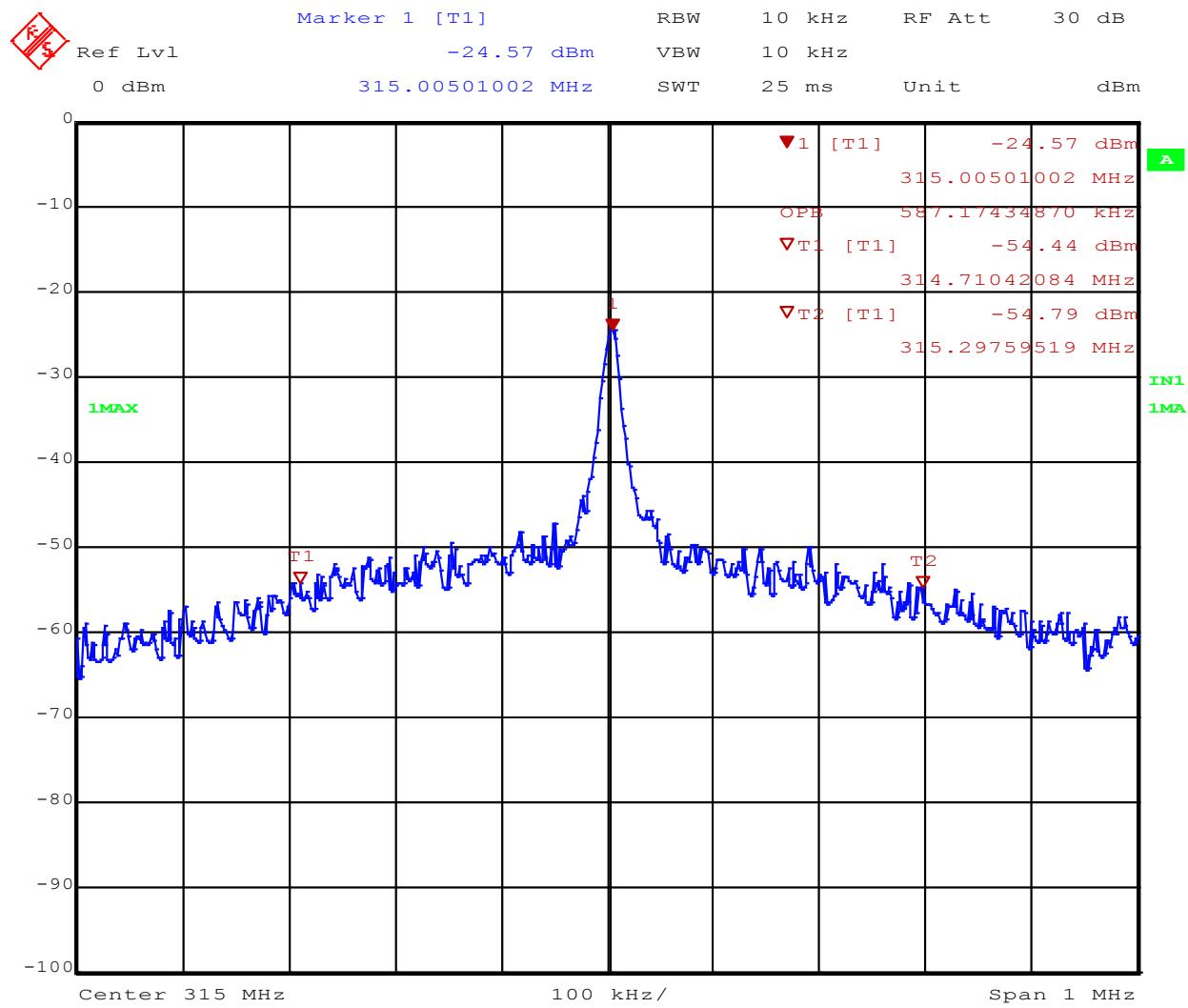
NAME OF TEST: Occupied Bandwidth	PARA. NO.: FCC 15.231(c)
TESTED BY: David Light	DATE: 01 April 2014

Minimum Standard: 15.231(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.

Test Results: Complies. See attached graph.

Test Data: See attached graph.

Test Data – 99% Occupied Bandwidth

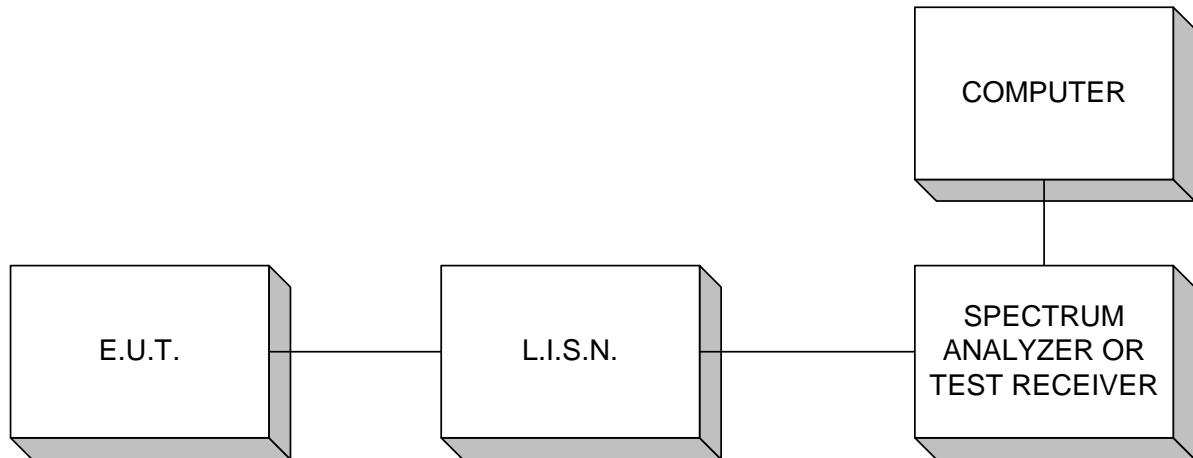


Date: 12.JAN.2015 10:12:03

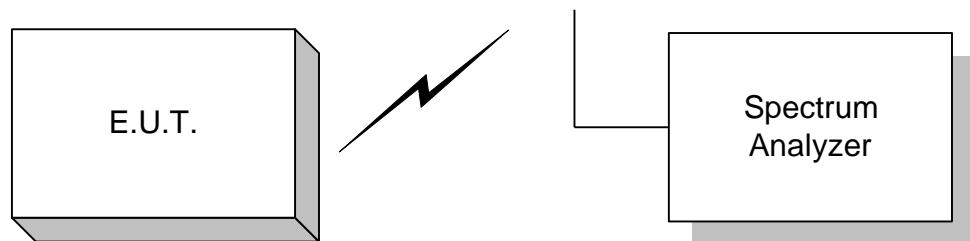
Limit = 787.5 kHz

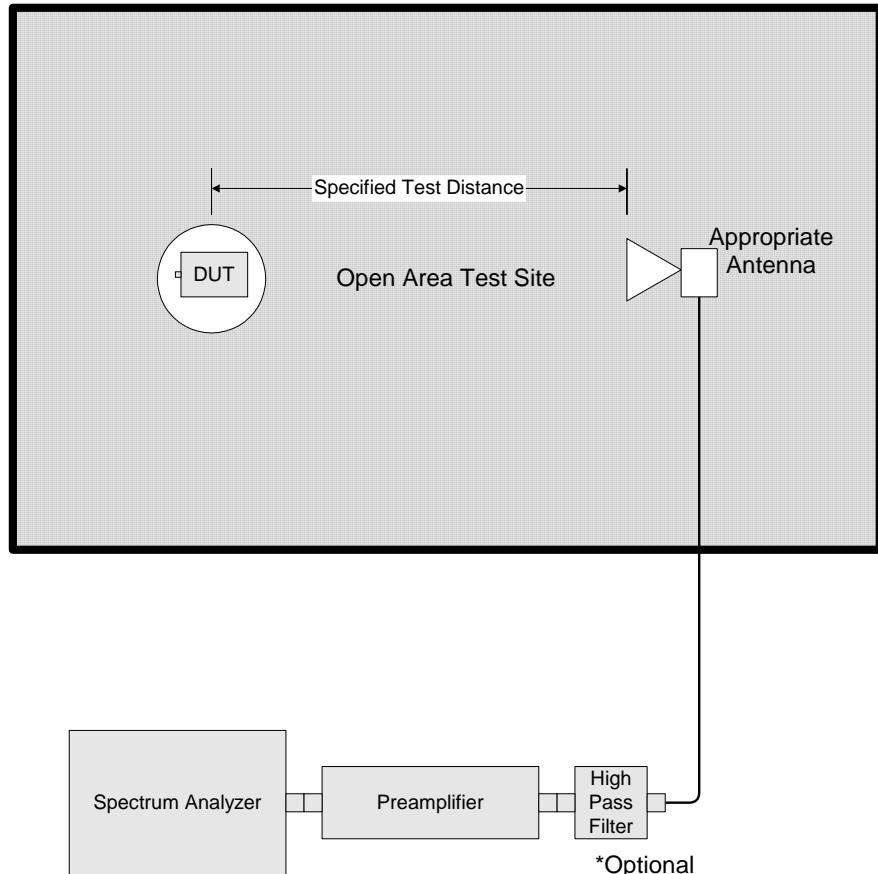
Section 6. Block Diagrams

Conducted Emissions

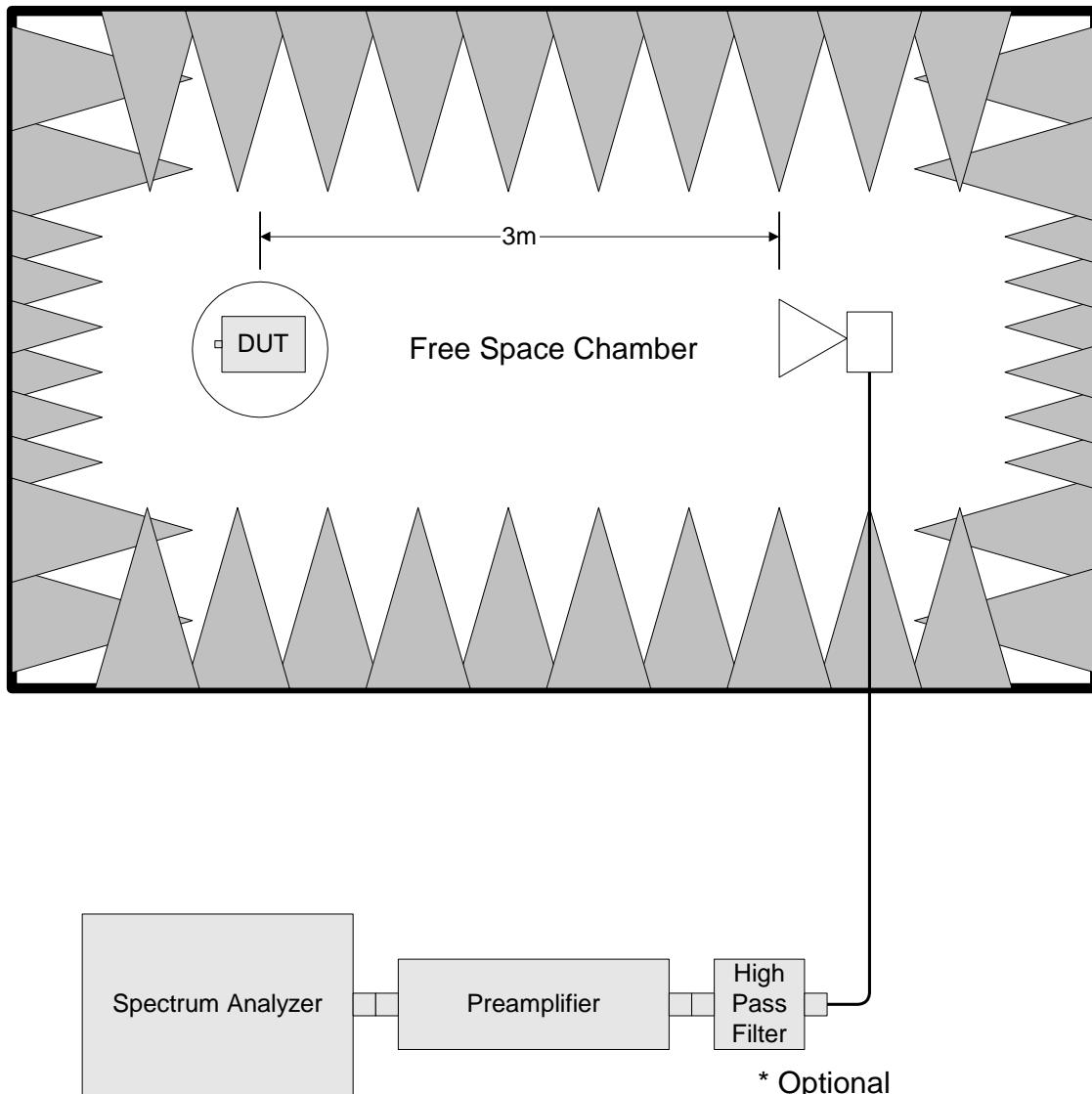


Occupied Bandwidth, Duty Cycle



Outdoor Test Site For Radiated Emissions**Radiated Emissions 30 MHz - 1 GHz**

The spectrum was searched up to the 10th harmonic of the fundamental frequency of operation.



Radiated Emissions above 1 GHz

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PERIODICALLY OPERATED LOW POWER TRANSMITTERS

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FCC Part 15, Subpart C and
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ANNEX A - RESTRICTED BANDS

Annex A**Restricted Bands of Operation**

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42-16.423	399.9-410	4.5-5.15
0.49 - 0.51	16.69475-16.69525	608-614	5.35-5.46
2.1735 - 2.1905	16.80425-16.80475	960-1240	7.25-7.75
3.020 - 3.026	25.5-25.67	1300-1427	8.025-8.5
4.125 - 4.128	37.5-38.25	1435-1626.6	9.0-9.2
4.17725 - 4.17775	73-74.6	1645.5-1646.5	9.3-9.5
4.20725 - 4.20775	74.8-75.2	1660-1710	10.6-12.7
6.215 - 6.218	108-121.94	1718.8-1722.2	13.25-13.4
6.31175 - 6.31225	123-138	2220-2300	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	2655-2900	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	Above 38.6
13.36 - 13.41			