
Project 18876-15

**Hubbell Control Solutions
NXSMP-SMI**

Wireless Certification Report

Prepared for:

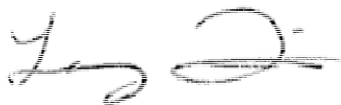
Hubbell Control Solutions
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By

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16 Feb 2018

Reviewed by



Larry Finn
Chief Technical Officer

Written by



Eric Lifsey
EMC Engineer

Revision History

Revision Number	Description	Date
DRAFT 02	Draft for review.	28 Jul 2017
Final 03	Add 99% BW.	18 Feb 2018

Corrections:

None.

Table of Contents

Revision History.....	2
Compliance Certificate.....	5
1.0 Introduction.....	6
1.1 Scope.....	6
1.2 EUT Description	6
1.3 EUT Operation.....	6
1.4 Modifications to Equipment.....	6
1.5 Test Site	6
1.6 Radiated Measurements	6
1.7 Applicable Documents and Clauses.....	7
2.0 Fundamental Power and Duty Cycle	8
2.1 Test Procedure	8
2.2 Test Criteria	8
2.3 Test Results, Peak Power	8
2.4 Test Results, Duty Cycle.....	9
3.0 Power Spectral Density.....	10
3.1 Test Procedure	10
3.2 Test Criteria	10
3.3 Test Results.....	10
4.0 Occupied Bandwidth.....	11
4.1 Test Procedure	11
4.2 Test Criteria	11
4.3 Test Results.....	11
4.3.1 Bandwidth Plots, 6 dB.....	12
4.3.2 Bandwidth Plots, 20 dB.....	13
4.3.3 Bandwidth Plots, OBW 99%	14
5.0 Band Edge.....	16
5.1 Test Procedure	16
5.2 Test Criteria	16
5.3 Test Results.....	16
5.3.1 Low Channel Band Edge.....	17
5.3.2 High Channel Band Edge	17
6.0 Radiated Spurious Emissions, Receive Mode.....	18
6.1 Test Procedure	18
6.2 Test Criteria	18
6.3 Test Results.....	18
6.3.1 Up to 1 GHz	19
6.3.1 Above 1 GHz.....	21
7.0 Radiated Spurious Emissions, Transmit Mode	23
7.1 Test Procedure	23
7.2 Test Criteria	23
7.3 Test Results.....	23
7.3.1 Up to 1 GHz	24
7.3.2 1 GHz to 18 GHz, Bottom Channel.....	26
7.3.3 1 GHz to 18 GHz, Middle Channel	28
7.3.4 1 GHz to 18 GHz, Top Channel	30
7.3.5 18 GHz to 25 GHz, Bottom Channel.....	32
7.3.6 18 GHz to 25 GHz, Middle Channel	34
7.3.7 18 GHz to 25 GHz, Top Channel	36
8.0 Antenna Construction Requirements	38
8.1 Procedure	38
8.2 Criteria	38
8.3 Results.....	38
9.0 Conducted Emissions, Mains.....	39
9.1 Test Procedure	39
9.2 Test Criteria	39
9.3 Test Results.....	39
9.3.1 Mains, Neutral	40

9.3.2	Mains, Phase.....	41
10.0	Equipment.....	42
10.1	Spurious Radiated Emissions 30 MHz to 25 GHz	42
10.2	Bandwidth and Duty Cycle	43
10.3	Mains Conducted Emissions	43
11.0	Measurement Bandwidths.....	44
	Appendix: Policy, Rationale, and Evaluation of EMC Measurement Uncertainty	45
	End of Report	46

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Compliance Certificate

Applicant	Device & Test Identification
Hubbell Control Solutions 1812 Centre Creek Dr Suite 240 Austin, TX 78754-3962 Certificate Date: 16 Feb 2018	FCC ID: YH9NXSMPSMI Industry Canada ID: 9044A-NXSMPSMI Model(s): NXSMPSMI Laboratory Project ID: 18876-15

The device named above was tested utilizing the following documents and found to be in compliance with the required criteria:

Requirement	Reference	Detail
FCC 47 CFR Part 15 C	15.247	Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.
FCC 47 CFR Part 15 C	15.209	Radiated emission limits; general requirements.
FCC 47 CFR Part 15 C	15.107, 15.207	Conducted emission limits.
FCC 47 CFR Part 15 C	15.205	Restricted Bands of Operation
KDB 558074 D01	DR01	DTS Measurement Guidance v03r02
KDB 412172	D01	Guidelines for Determining the ERP and EIRP of an RF Transmitting System
OET Bulletin 65*	Edition 97-01, and Supplement C, Ed. 01-01	Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields
RSS-247	Issue 2	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
RSS-Gen	Issue 4	General Requirements and Information for the Certification of Radio Apparatus
RSS-102	Issue 5	Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)

*MPE is reported separately from this document. **Corresponding RSS references are listed in the body of the report.

I, Eric Lifsey, for Professional Testing (EMI), Inc., being familiar with the above requirements and test procedures have reviewed the test setup, measured data, and this report. I believe them to be true and accurate.

Eric Lifsey
EMC Engineer

This report has been reviewed and accepted by the Applicant. The undersigned is responsible for ensuring that this device will continue to comply with the requirements listed above.

Representative of Applicant

1.0 Introduction

1.1 Scope

This report describes the extent to which the equipment under test (EUT) conformed to the intentional radiator requirements of the United States and Canada.

Professional Testing (EMI), Inc., (PTI) follows the guidelines of National Institute of Standards and Technology (NIST) for all uncertainty calculations, estimates, and expressions thereof for electromagnetic compatibility testing.

1.2 EUT Description

Table 1.2.1: Equipment Under Test		
Manufacturer / Model	Serial #	Description
Hubbell Building Automation / NXSMP-SMI	None	2400-2483.5 MHz FHSS transceiver; using Bluetooth Low Energy radio protocols.

Table 1.2.2: Support Equipment		
Manufacturer / Model	Serial #	Description
none		none

The EUT is an occupancy/light sensor in support of a building control system. It measures approximately 50 mm x 20 mm x 21 mm.

1.3 EUT Operation

The EUT was exercised in a manner consistent with normal operations.

The EUT was tested as a DTS device as its bandwidth satisfies the DTS minimum bandwidth requirements. In the final application it will be also hopping per the Bluetooth protocol.

1.4 Modifications to Equipment

No modifications were made to the EUT during the performance of the test program.

1.5 Test Site

Measurements were made at the PTI semi-anechoic facility designated Site 45 (FCC 459644, IC 3036B-1) in Austin, Texas. The site is registered with the FCC under Section 2.948 and Industry Canada per RSS-GEN, and is subsequently confirmed by laboratory accreditation (NVLAP). The test site is located at 11400 Burnet Road, Austin, Texas 78758, while the main office is located at 1601 North A.W. Grimes Boulevard, Suite B, Round Rock, Texas, 78665.

1.6 Radiated Measurements

Radiated levels are determined as follows:

Raw Measured Level + Antenna Factor + Cable Losses – Amplifier Gain = Corrected Level
--

Conducted RF levels are determined as follows:

$$\text{Raw Measured Level} + \text{Attenuator Factor} + \text{Cable Losses} = \text{Corrected Level}$$

Conducted mains levels are determined as follows:

$$\text{Raw Measured Level} + \text{LISN Factor} + \text{Cable/Filter/Limiter Losses} = \text{Corrected Level}$$

Additionally, measurement distance extrapolation factors are applied and documented where used.

1.7 Applicable Documents and Clauses

Table 1.7.1: Applicable Documents	
Document	Title
47 CFR	Part 15 – Radio Frequency Devices Subpart C -Intentional Radiators
RSS-247 Issue 2	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
RSS-Gen Issue 4	General Requirements and Information for the Certification of Radio Apparatus
ANSI C63.10 2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

Table 1.7.2: Applicable Clauses		
Parameter	FCC Part 15 Rule Paragraphs	IC RSS References
Transmitter Characteristics	15.247	RSS-247 5.2 (DTS) & 5.4, RSS-Gen
Bandwidth	15.247(a)(1), 2.1049, KDB 558074 D01	RSS-Gen 4.6
Spurious Emission	15.247, 15.209, 15.205	RSS-247 5.5, RSS-GEN 4.9, 4.10
Band Edge	15.247, 15.205	RSS-247 5.5, RSS-Gen 4.9
Antenna Requirement	15.203	RSS-Gen 8.3
Conducted Emissions, Mains	15.207	RSS-Gen 8.8

2.0 Fundamental Power and Duty Cycle

2.1 Test Procedure

Peak power is measured using radiated means. The transmitter hopping sequence is disabled to operate on a single channel for the measurement.

Duty cycle measurement is taken based on intervals not to exceed 100 msec. Maximum transmitter on time is divided by the lesser of 100 msec or the actual measured minimum transmitter interval time. The result is converted to dB and applied as needed to peak measurements of transmitter artifacts to determine average power. This is not a pass/fail measurement.

2.2 Test Criteria

47 CFR (USA) // IC (Canada)		
Section Reference	Parameter	Date
15.247(a)(3) // RSS-247 5.2	Fundamental Power Conducted Limits 1 W Limit Restated as Field: 125.23 dB μ V/m @ 3 m	17 Mar 2017

2.3 Test Results, Peak Power

The EUT was measured for radiated power in normal position of horizontal orientation. It is not operated hand-held.

Table 2.3.1 Power, Peak, Radiated			
Frequency MHz	Measured Peak Power dB μ V/m @ 3 m Vertical Polarity	Measured Peak Power dB μ V/m @ 3 m Horizontal Polarity	Maximum Measured Peak Power Restated as EIRP dBm
2402	88.4	94.3	-0.93
2440	89.4	95.4	0.17
2480	89.9	96.7	1.5

Measured in 1 MHz RBW, 3 MHz VBW.

The EUT was found to be in compliance with the applicable criteria.

2.4 Test Results, Duty Cycle

Measurement is based on intervals not to exceed 100 msec. Maximum transmitter on time is divided by the lesser of 100 msec or the actual measured minimum transmitter interval time. The result is converted to dB and applied as needed to peak measurements of transmitter artifacts to determine average power. This is not a pass/fail measurement.

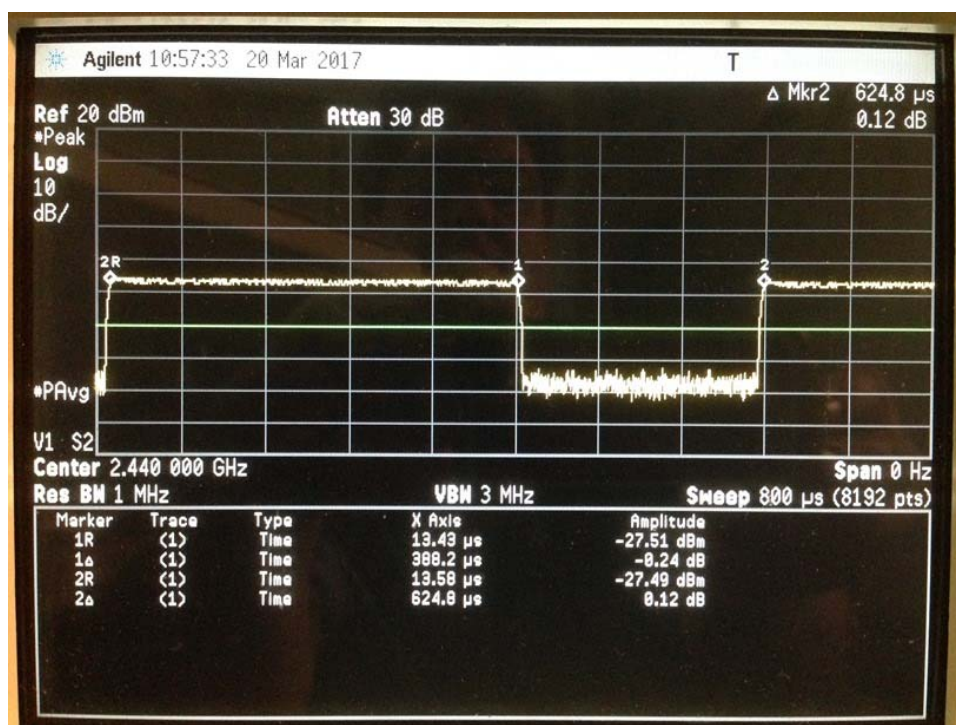
The EUT was placed in the packet transmit mode representing a high transmit duty cycle that likely exceeds that of normal operation but provides a conservative result.

Table 2.4.1 Duty Cycle Factor Result				
Measured On Time (msec)	Measured Time Period (msec)	Duty Cycle Factor Calculation	Result (dB)	Duty Cycle Factor Allowed (dB)
0.3882	0.6248	$= 20 * \text{Log}_{10} (0.3882 \text{ msec} / 0.6248 \text{ msec})$	- 4.1	- 4.1

The allowed duty cycle factor is applied to peak measured harmonic signals to find average levels.

The source based factor for exposure is half of the above or: - 2dB

Plotted results appear below.



Transmit On Time and Period

3.0 Power Spectral Density

3.1 Test Procedure

A spectrum analyzer is either connected directly to the EUT or used by radiated means to measure the fundamental emission. It is adjusted to measure the power spectral density in the prescribed resolution bandwidth.

3.2 Test Criteria

47 CFR (USA) // IC (Canada)		
Section Reference	Parameter	Date
15.247(e) // RSS-247, 5.2	Power Spectral Density, Conducted Limit: 8 dBm / 3 kHz	17 Mar 2017

3.3 Test Results

The fundamental peak power measured below the 8 dBm limit for this test; the EUT satisfies the criteria without additional measurement.

4.0 Occupied Bandwidth

4.1 Test Procedure

Bandwidth is measured by radiated means. A recording of the results is included.

4.2 Test Criteria

47 CFR (USA) // IC (Canada)		
Section Reference	Parameter	Date(s)
14.247(a)(2), 2.1049, KDB 558074 D01 // RSS-Gen 4.6	Bandwidth, 6 dB, 20 dB	20 Mar 2017

4.3 Test Results

The bandwidth measurement is used to verify DTS characteristics and/or for general reporting for agency application.

The EUT was found to be in compliance with applicable requirements.

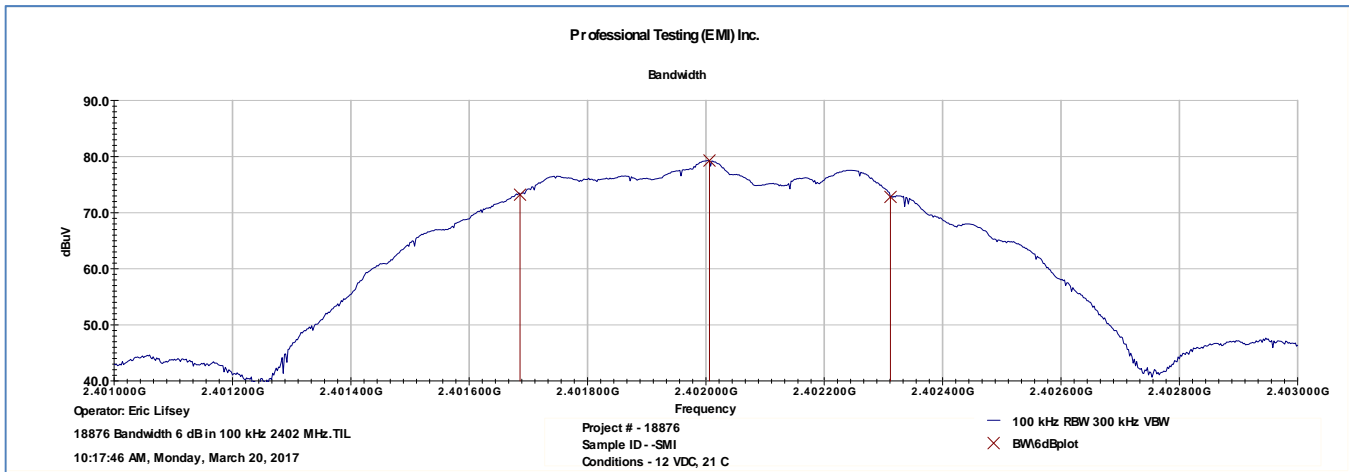
Table 4.3.1 Bandwidth 6 dB, Minimum 500 kHz in 100 kHz RBW			
Low Channel Measured BW (kHz)	Mid Channel Measured BW (kHz)	High Channel Measured BW (kHz)	Reported Minimum BW (kHz)
626	616	640	616

Table 4.3.2 Bandwidth 20 dB, Measure and Report			
Low Channel Measured BW (kHz)	Mid Channel Measured BW (kHz)	High Channel Measured BW (kHz)	Reported Maximum BW (kHz)
1076	1076	1094	1094

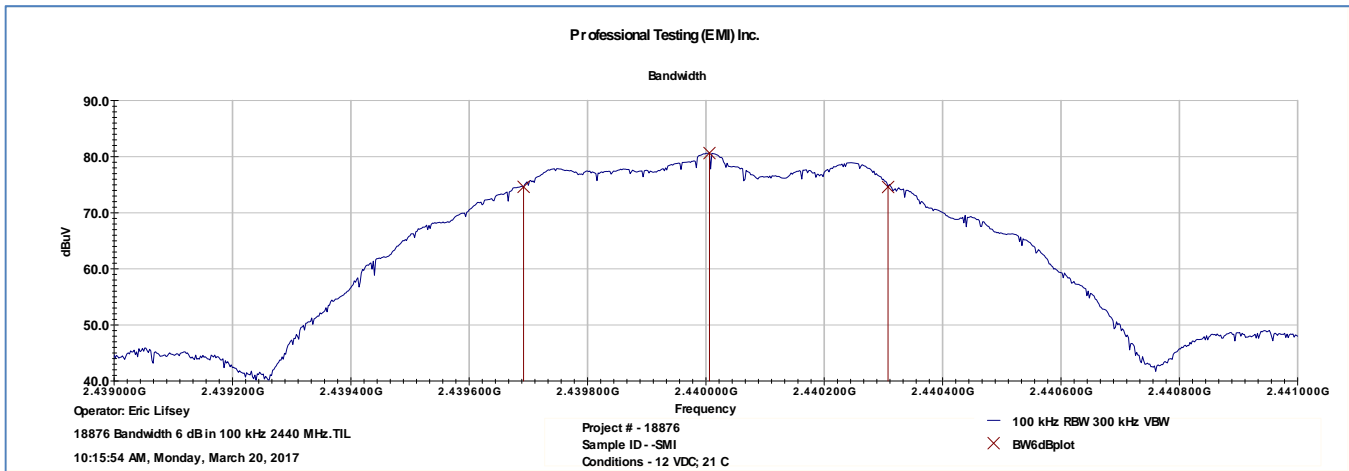
Table 4.3.3 Bandwidth OBW 99%, Measure and Report			
Low Channel Measured BW (kHz)	Mid Channel Measured BW (kHz)	High Channel Measured BW (kHz)	Reported Maximum BW (kHz)
1018	1018	1012	1018

Plotted measurements appear on the following pages.

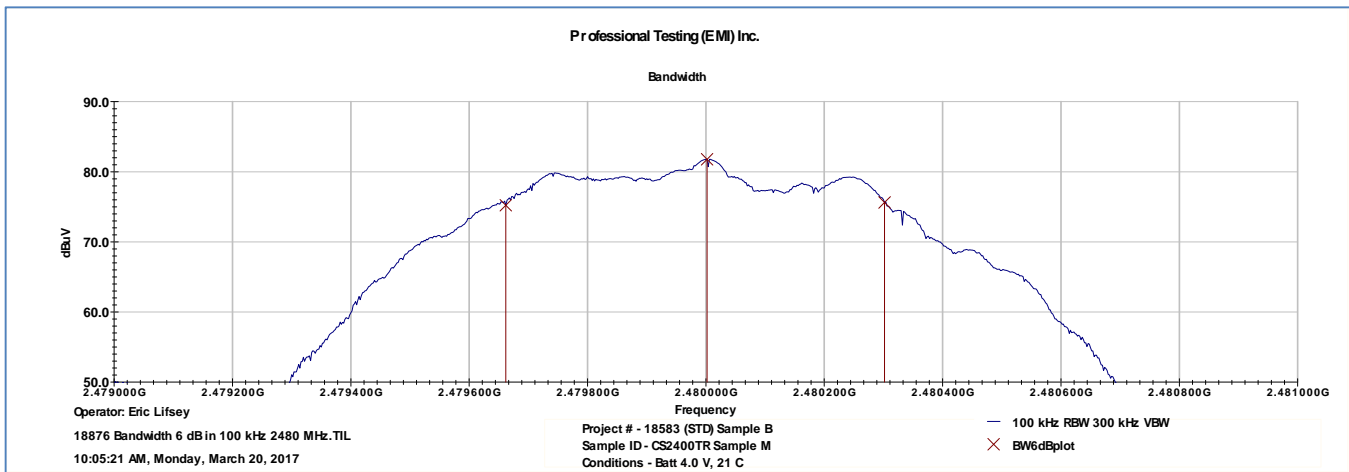
4.3.1 Bandwidth Plots, 6 dB



6 dB, Low Channel

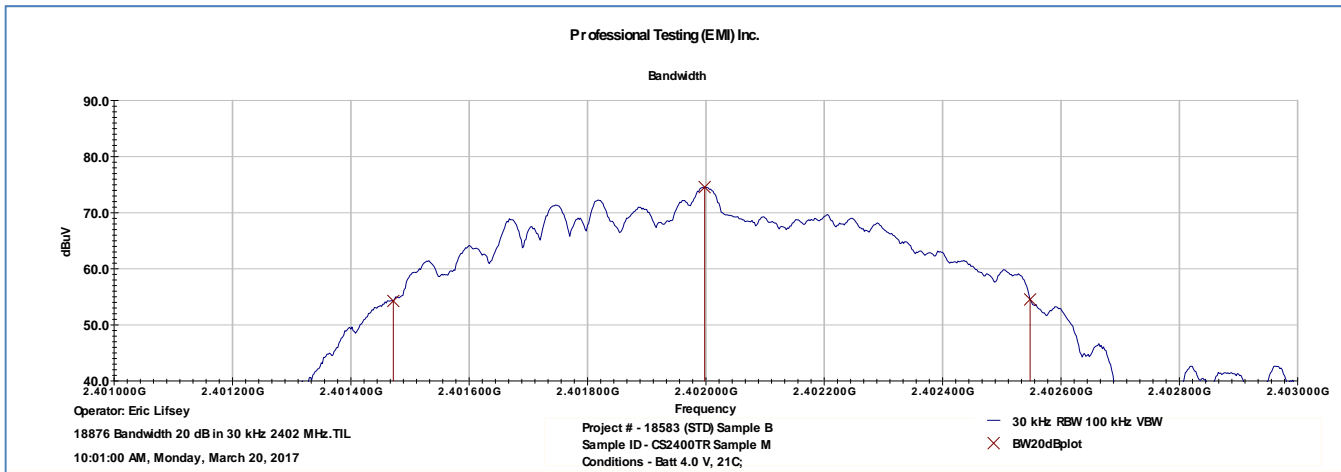


6 dB, Middle Channel

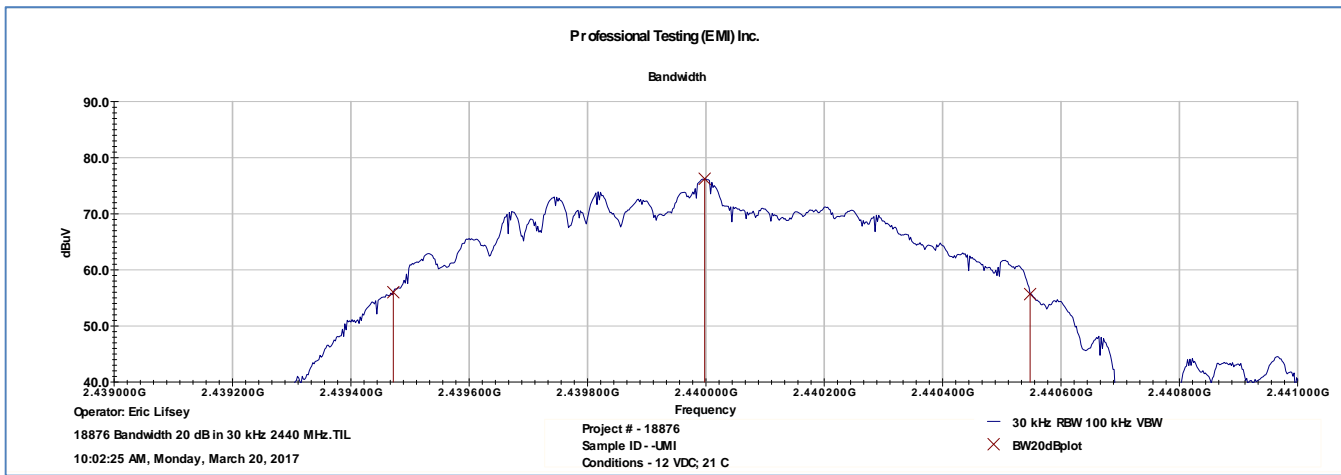


6 dB, High Channel

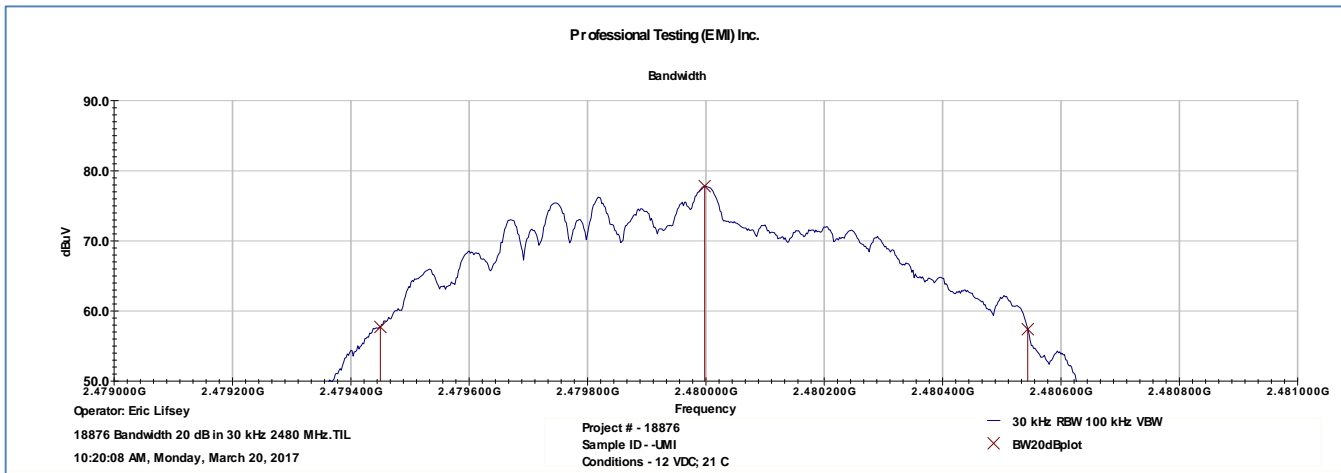
4.3.2 Bandwidth Plots, 20 dB



20 dB, Low Channel

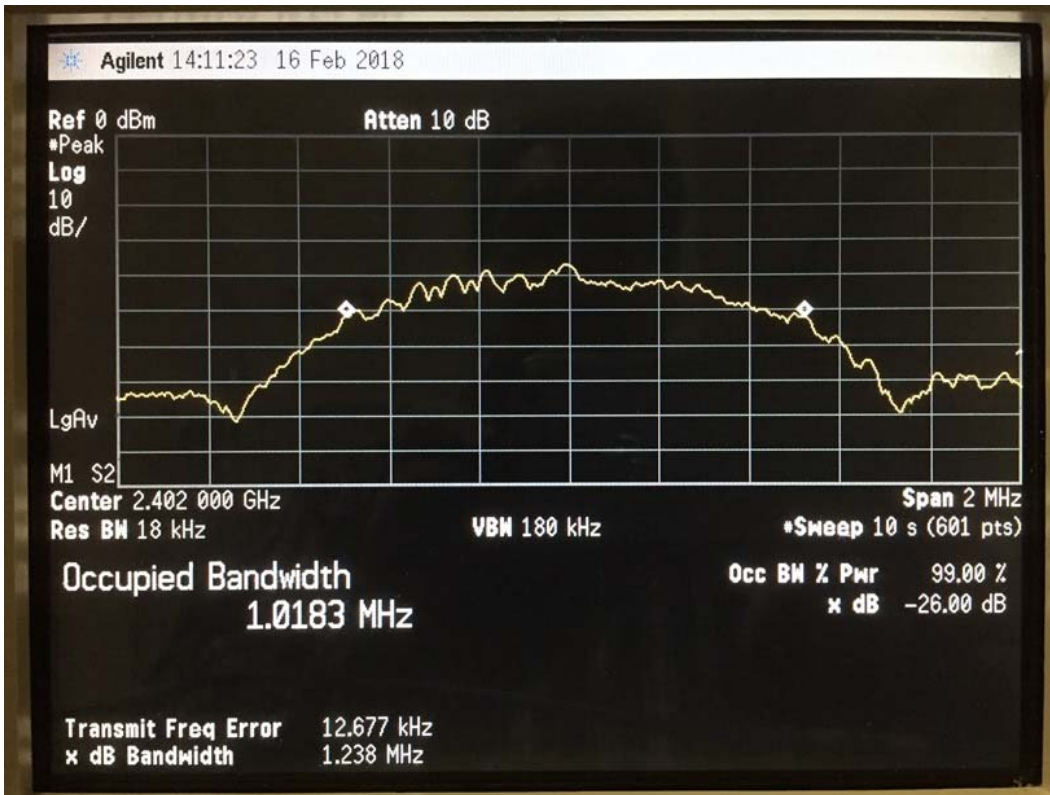


20 dB, Middle Channel

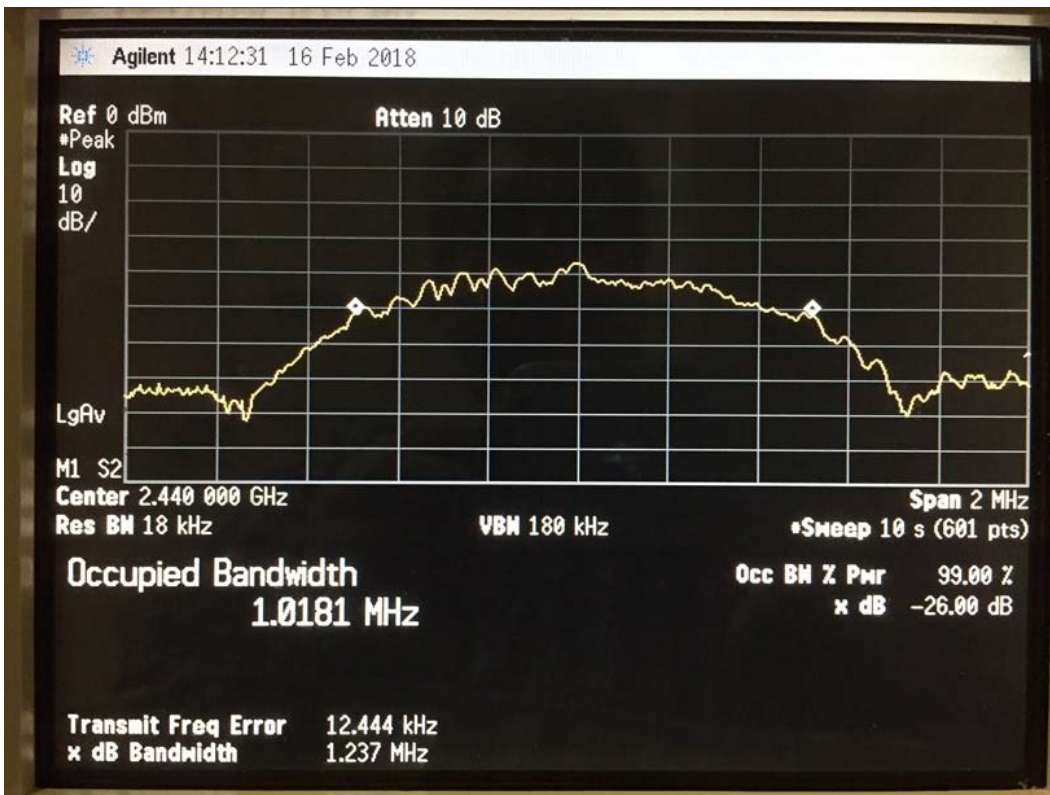


20 dB, High Channel

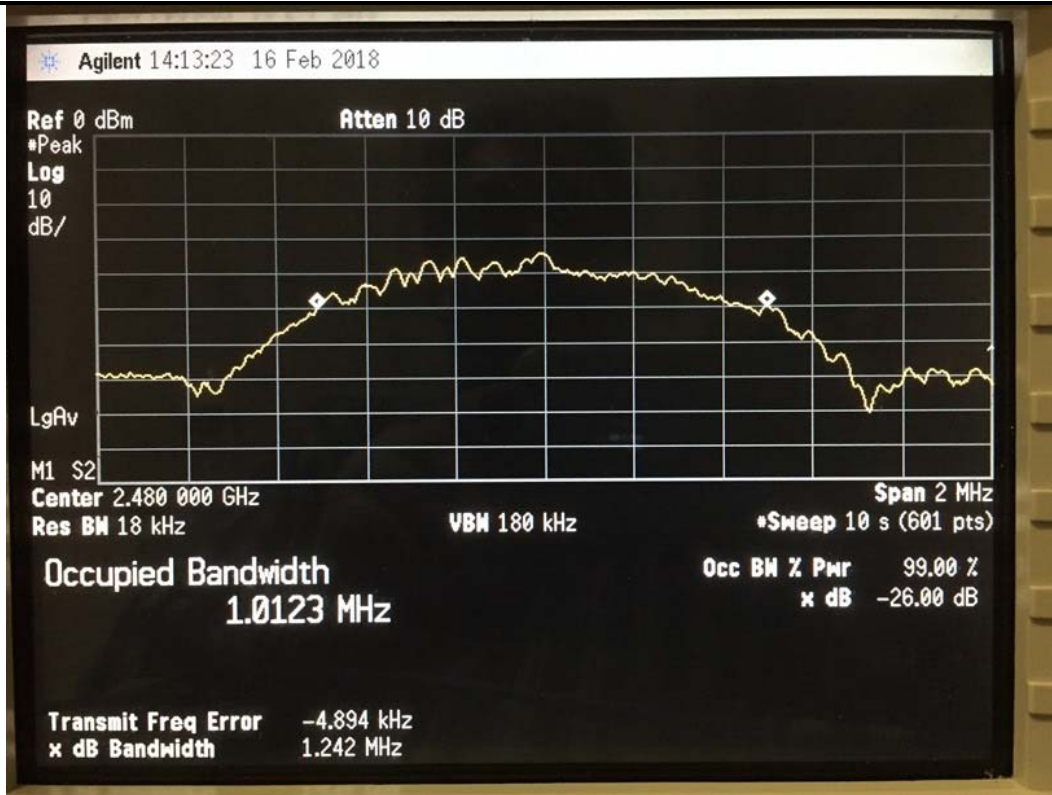
4.3.3 Bandwidth Plots, OBW 99%



Low Channel



Low Channel



High Channel

5.0 Band Edge

5.1 Test Procedure

EUT is placed into normal transmit operation on the nearest band edge channel. The spectrum analyzer is approximately centered on the band edge frequency with span sufficient to include the peak of the adjacent fundamental signal. Measurement includes at least two standard bandwidths from the respective band edge. If required, the band-edge marker-delta method of C63.4 is utilized.

5.2 Test Criteria

47 CFR (USA) // IC (Canada)		
Section Reference	Parameter	Date(s)
15.247, 15.205 // RSS-247 5.5, RSS-Gen 4.9	Unwanted Emissions Adjacent to Authorized Band, Radiated	27 Mar 2017

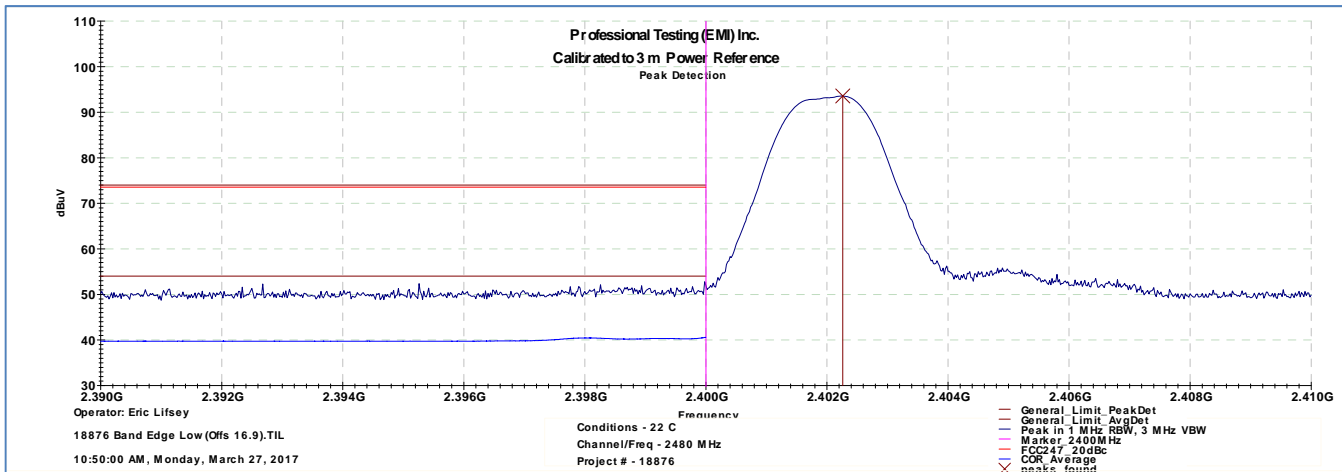
5.3 Test Results

Measurements included more than 2 standard bandwidths (standard bandwidth 1 MHz) from the band edges to provide a clear view of the fundamental and the declining emission levels. Peak detection with max-hold was employed.

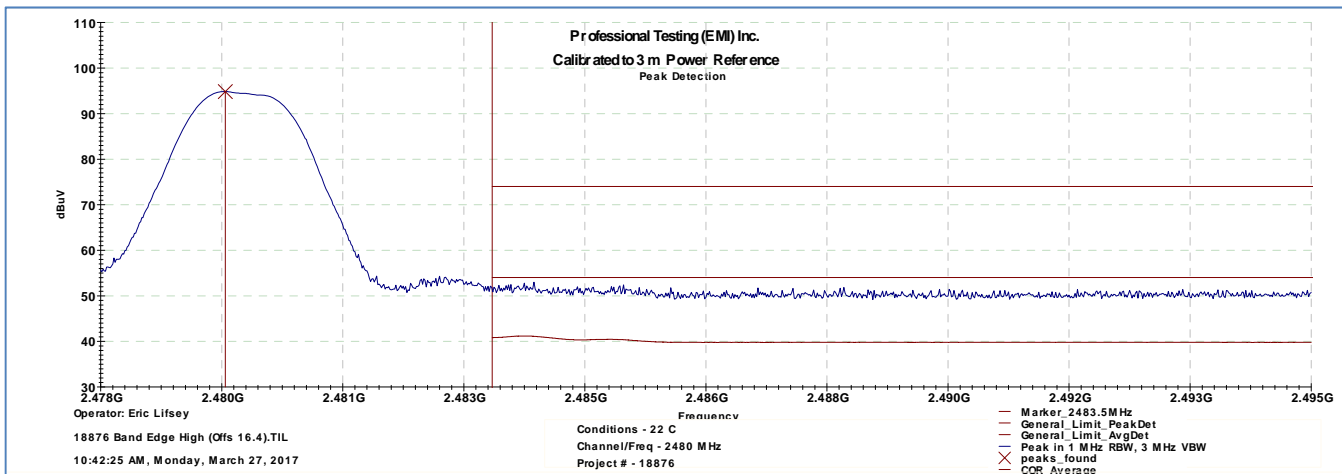
Peak detection of emissions at both band edges were below the general emission limits for average limit levels. Also, the duty cycle averaging factor applies -4.1 dB to the peaks recorded.

The EUT satisfied the criteria. Plotted results appears on the following pages.

5.3.1 Low Channel Band Edge



5.3.2 High Channel Band Edge

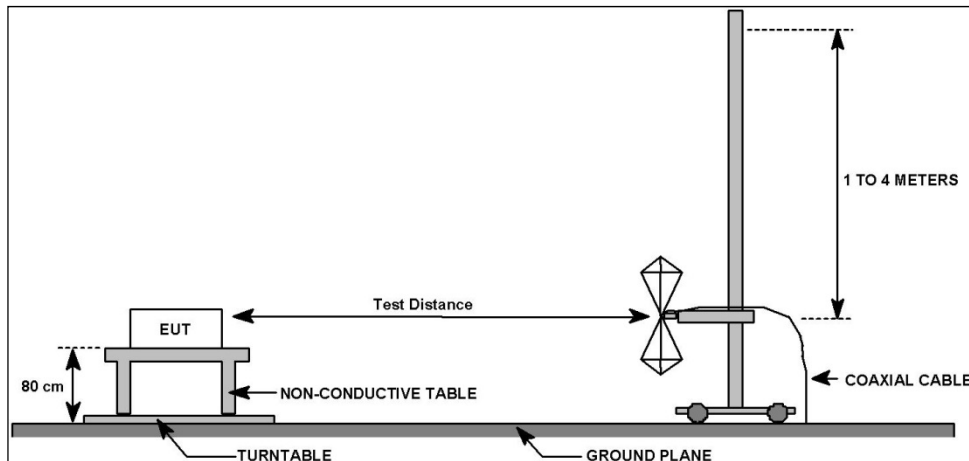


6.0 Radiated Spurious Emissions, Receive Mode

6.1 Test Procedure

The EUT was placed on a non-conductive table 0.8 meters above the ground plane. The EUT was centered on a rotating turntable. Measurements below 1 GHz were taken at a test distance of 10 meters from the measurement antenna. Above 1 GHz the measurement distance was 3 meters.

Spurious emissions below 1 GHz were measured with quasi-peak detection with a resolution bandwidth of 120 kHz. Above 1 GHz peak measurements were taken and average measured where appropriate and 1 MHz resolution bandwidth. A diagram showing the test setup appears below.



6.2 Test Criteria

47 CFR (USA) // IC (Canada)		
Section Reference	Parameter	Date(s)
15.247, 15.209 // RSS-247 5.5, RSS-Gen 4.9 & 4.10	Field Strength of Radiated Spurious/Harmonic Emissions Receive Mode	31 Mar 2017

6.3 Test Results

The EUT was tuned to the middle channel and placed in receive mode.

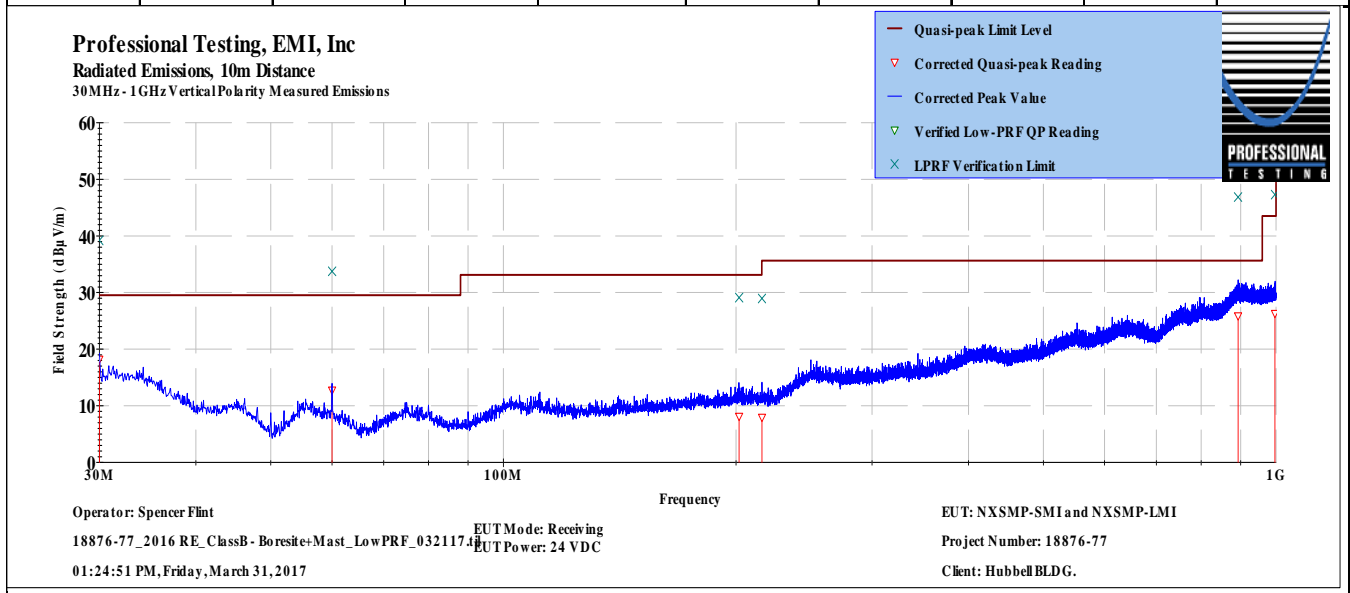
The EUT satisfied the criteria. Recorded data is presented below.

6.3.1 Up to 1 GHz

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.4: 2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz		
In accordance with:	FCC Part 15.109 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Radiated Emissions Limits		
Section:	15.109		
Test Date(s):	3/31/2017	EUT Serial #:	0
Customer:	Hubbell	EUT Part #:	0
Project Number:	18876	Test Technician:	Spencer Flint
Purchase Order #:	0	Supervisor:	Lisa Arndt
Equip. Under Test:	NXSM-EMI	Witness' Name:	None

Radiated Emissions Test Results Data Sheet Page: 1 of 1

EUT Line Voltage:	12 VDC	EUT Power Frequency:	0 N/A						
Antenna Orientation:	Vertical	Frequency Range:	30MHz to 1GHz						
EUT Mode of Operation:		Receive Mode							
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
29.9838	10	9	1.23	Quasi-peak	30.3	18.197	30.0	-11.8	Pass
60.0296	10	217	3.26	Quasi-peak	31	12.731	29.5	-16.8	Pass
201.937	10	6	4.06	Quasi-peak	22.5	8.105	33.1	-25.0	Pass
216.16	10	29	2.4	Quasi-peak	22.3	7.942	35.6	-27.7	Pass
893.185	10	22	2.08	Quasi-peak	21.3	25.862	35.6	-9.7	Pass
997.018	10	17	3.29	Quasi-peak	21	26.295	43.5	-17.2	Pass



≤ 1GHz Vertical Antenna Polarity Measured Emissions

Professional Testing, EMI, Inc.

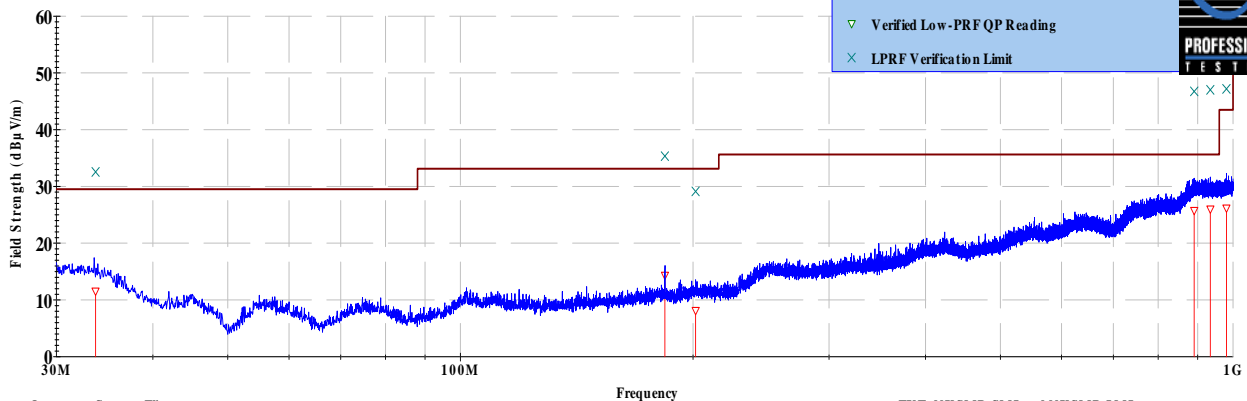
Test Method:	ANSI C63.4: 2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz		
In accordance with:	FCC Part 15.109 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Radiated Emissions Limits		
Section:	15.109		
Test Date(s):	3/31/2017	EUT Serial #:	0
Customer:	Hubbell	EUT Part #:	0
Project Number:	18876	Test Technician:	Spencer Flint
Purchase Order #:	0	Supervisor:	Lisa Arndt
Equip. Under Test:	NXSM-EMI	Witness' Name:	None

Radiated Emissions Test Results Data Sheet

Page: 1 of 1

EUT Line Voltage:	12 VDC	EUT Power Frequency:	0 N/A						
Antenna Orientation:	Horizontal	Frequency Range:	30MHz to 1GHz						
EUT Mode of Operation:									
Receive Mode									
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
33.7091	10	247	3.96	Quasi-peak	23.4	11.527	29.5	-18.0	Pass
183.978	10	185	3.74	Quasi-peak	29.5	14.32	33.1	-18.8	Pass
201.637	10	98	3.44	Quasi-peak	22.5	8.117	33.1	-25.0	Pass
891.019	10	13	3.61	Quasi-peak	21.3	25.735	35.6	-9.9	Pass
935.074	10	48	3.59	Quasi-peak	21.2	26.013	35.6	-9.6	Pass
980.577	10	135	2.81	Quasi-peak	21	26.174	43.5	-17.3	Pass

Professional Testing, EMI, Inc
 Radiated Emissions, 10m Distance
 30MHz - 1GHz Horizontal Polarity Measured Emissions



Operator: Spencer Flint
 18876-77_2016 RE_Class B - Bore site + Mast_LowPRF_032117.4
 01:24:51 PM, Friday, March 31, 2017

EUT Mode: Receiving
 EUT Power: 24 VDC

EUT: NXSM-EMI and NXSM-LMI
 Project Number: 18876-77
 Client: Hubbell BLDG.

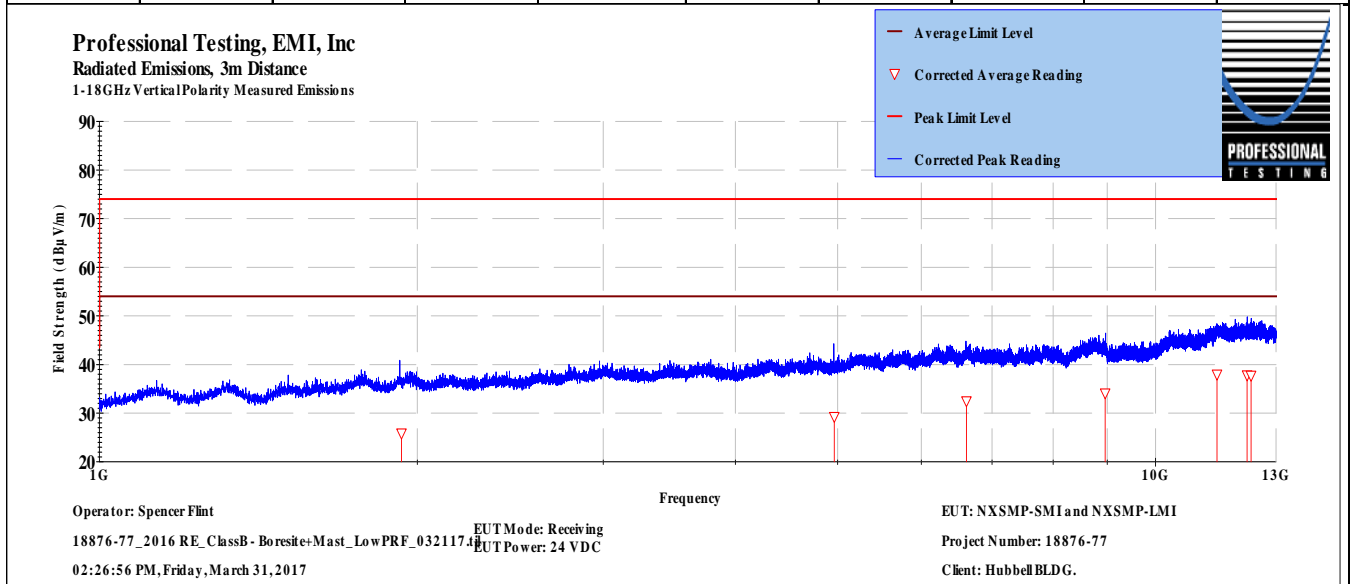
≤ 1GHz Horizontal Antenna Polarity Measured Emissions

6.3.1 Above 1 GHz

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.4: 2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz		
In accordance with:	FCC Part 15.109 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Radiated Emissions Limits		
Section:	15.109		
Test Date(s):	3/31/2017	EUT Serial #:	0
Customer:	Hubbell	EUT Part #:	0
Project Number:	18876	Test Technician:	Spencer Flint
Purchase Order #:	0	Supervisor:	Lisa Arndt
Equip. Under Test:	NXSM-EMI	Witness' Name:	None

Radiated Emissions Test Results Data Sheet Page: 1 of 1

EUT Line Voltage:	12 VDC	EUT Power Frequency:	0 N/A						
Antenna Orientation:	Vertical	Frequency Range:	Above 1GHz						
EUT Mode of Operation: Receive Mode									
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
1932.08	3	294	3.22	Average	35.2	25.863	54.0	-28.1	Pass
4963.48	3	32	2.63	Average	33.3	29.256	54.0	-24.7	Pass
6621.1	3	188	2.6	Average	31	32.501	54.0	-21.5	Pass
8958.55	3	26	2.87	Average	27.1	34.103	54.0	-19.9	Pass
11431.8	3	290	1.66	Average	27.2	37.954	54.0	-16.0	Pass
12208.7	3	350	2.82	Average	27.5	37.811	54.0	-16.1	Pass
12312.7	3	249	2.42	Average	27.3	37.726	54.0	-16.2	Pass



> 1GHz Vertical Antenna Polarity Measured Emissions

Professional Testing, EMI, Inc.

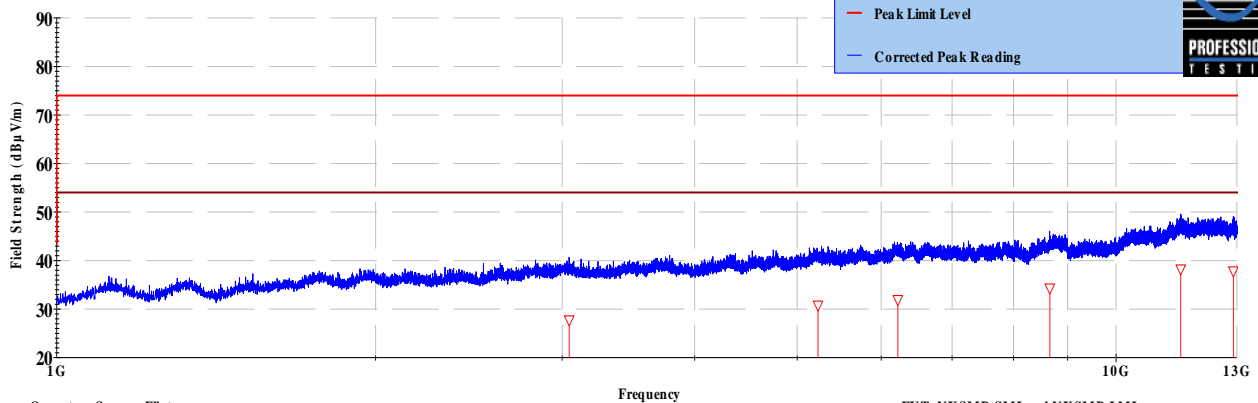
Test Method:	ANSI C63.4: 2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz		
In accordance with:	FCC Part 15.109 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Radiated Emissions Limits		
Section:	15.109		
Test Date(s):	3/31/2017	EUT Serial #:	0
Customer:	Hubbell	EUT Part #:	0
Project Number:	18876	Test Technician:	Spencer Flint
Purchase Order #:	0	Supervisor:	Lisa Arndt
Equip. Under Test:	NXSMF-SMI	Witness' Name:	None

Radiated Emissions Test Results Data Sheet

Page: 1 of 1

EUT Line Voltage:		12 VDC		EUT Power Frequency:		0 N/A			
Antenna Orientation:		Horizontal		Frequency Range:		Above 1GHz			
EUT Mode of Operation:					Receive Mode				
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
3045.6	3	13	2.97	Average	34.9	27.713	54.0	-26.2	Pass
5230.67	3	121	2.14	Average	33.4	30.728	54.0	-23.2	Pass
6222.17	3	219	3.65	Average	31.4	31.9	54.0	-22.1	Pass
8656.44	3	209	2.33	Average	27.2	34.28	54.0	-19.7	Pass
11506.8	3	236	1.13	Average	27.2	38.221	54.0	-15.7	Pass
12900.3	3	132	2.34	Average	27.7	37.808	54.0	-16.1	Pass

Professional Testing, EMI, Inc
Radiated Emissions, 3m Distance
1-18GHz Horizontal Polarity Measured Emissions



Operator: Spencer Flint
18876-77_2016 RE_ClassB-Boresite+Mast_LowPRF_032117.4 EUT Mode: Receiving
02:26:56 PM, Friday, March 31, 2017 EUT Power: 24 VDC

EUT: NXSMF-SMI and NXSMF-LMI
Project Number: 18876-77
Client: Hubbell BLDG.

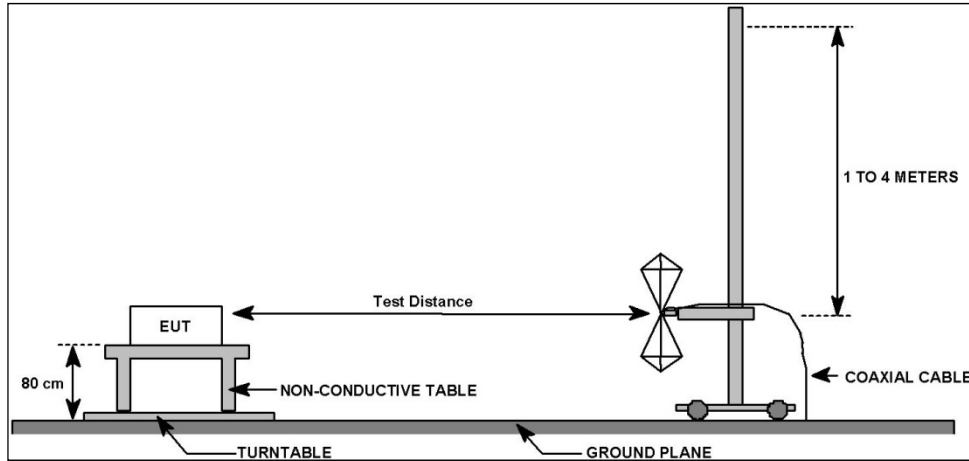
> 1GHz Horizontal Antenna Polarity Measured Emissions

7.0 Radiated Spurious Emissions, Transmit Mode

7.1 Test Procedure

The EUT was placed on a non-conductive table 0.8 meters above the ground plane. The EUT was centered on a rotating turntable. Measurements below 1 GHz were taken at a test distance of 10 meters from the measurement antenna. Above 1 GHz the measurement distance was 3 meters.

Spurious emissions below 1 GHz were measured with quasi-peak detection with a resolution bandwidth of 120 kHz. Above 1 GHz peak measurements were taken and average measured where appropriate using 1 MHz resolution bandwidth. A diagram showing the test setup appears below.



7.2 Test Criteria

47 CFR (USA) // IC (Canada)		
Section Reference	Parameter	Date(s)
15.247, 15.209 // RSS-247 5.5, RSS-Gen 4.9 & 4.10	Field Strength of Radiated Spurious/Harmonic Emissions Transmit Mode	10 Mar 2017

7.3 Test Results

Below 1 GHz measurements were taken for the middle channel. Above 1 GHz measurements were taken for the three standard channels of the band.

The duty cycle averaging factor applies -4.1 dB to the peaks recorded for the harmonics.

All measurements used peak detection.

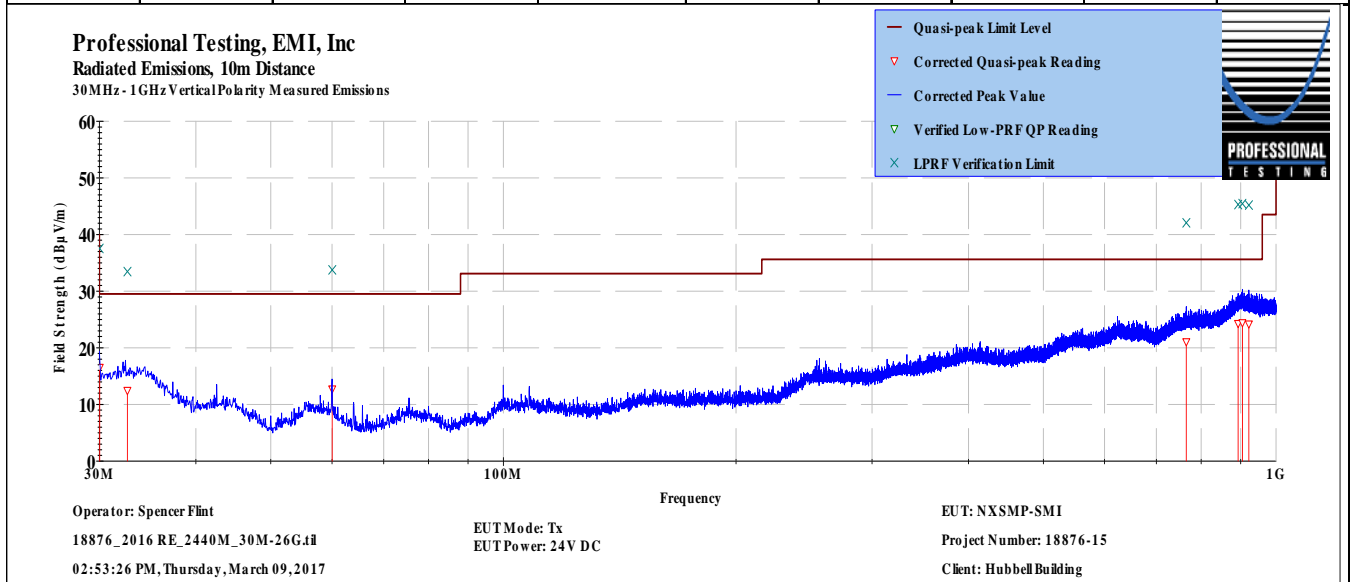
7.3.1 Up to 1 GHz

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices		
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits		
Section:	15.209		
Test Date(s):	3/10/2017	EUT Serial #:	0
Customer:	Hubbell Building Automation	EUT Part #:	0
Project Number:	18876	Test Technician:	Spencer Flint
Purchase Order #:	0	Supervisor:	Lisa Arndt
Equip. Under Test:	NXSM-PMI	Witness' Name:	None

Radiated Emissions Test Results Data Sheet

Page: 1 of 1

EUT Line Voltage:	24	VDC	EUT Power Frequency:	0	N/A				
Antenna Orientation:	Vertical		Frequency Range:	30MHz to 1GHz					
EUT Mode of Operation:			Transmitting (Mid Channel - 2440 MHz)						
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
30.0266	10	224	2.36	Quasi-peak	28.3	16.537	29.5	-13.0	Pass
32.6181	10	133	1.6	Quasi-peak	24.2	12.459	29.5	-17.0	Pass
60.0305	10	190	3.14	Quasi-peak	31.2	12.735	29.5	-16.8	Pass
765.677	10	227	3.42	Quasi-peak	21.6	21.061	35.6	-14.5	Pass
893.392	10	117	3.78	Quasi-peak	21.4	24.281	35.6	-11.3	Pass
904.804	10	211	1.58	Quasi-peak	21.2	24.425	35.6	-11.2	Pass
922.412	10	347	1.34	Quasi-peak	21.3	24.193	35.6	-11.4	Pass



≤ 1GHz Vertical Antenna Polarity Measured Emissions

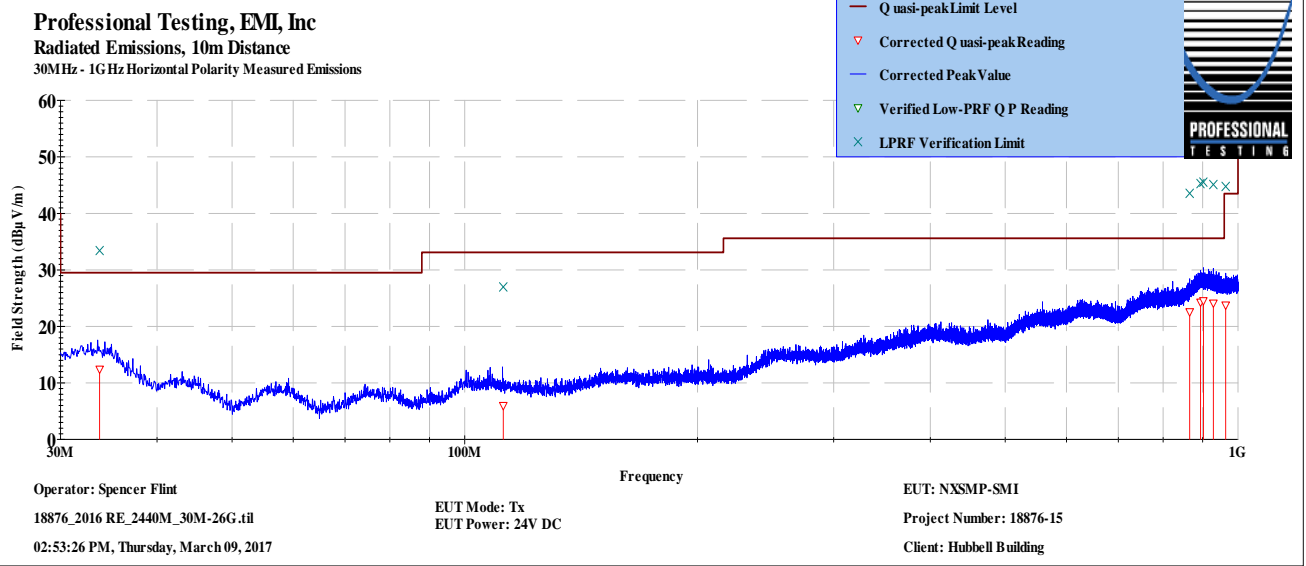
Professional Testing, EMI, Inc.

Test Method:	ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices		
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits		
Section:	15.209		
Test Date(s):	3/10/2017	EUT Serial #:	0
Customer:	Hubbell Building Automation	EUT Part #:	0
Project Number:	18876	Test Technician:	Spencer Flint
Purchase Order #:	0	Supervisor:	Lisa Arndt
Equip. Under Test:	NXSMP-SMI	Witness' Name:	None

Radiated Emissions Test Results Data Sheet

Page: 1 of 1

EUT Line Voltage:	24	VDC	EUT Power Frequency:	0	N/A				
Antenna Orientation:	Horizontal		Frequency Range:	30MHz to 1GHz					
EUT Mode of Operation:			Transmitting (Mid Channel - 2440 MHz)						
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
33.7142	10	134	3.72	Quasi-peak	24.1	12.419	29.5	-17.1	Pass
112.141	10	299	1.5	Quasi-peak	22.9	5.973	33.1	-27.1	Pass
866.048	10	290	3.12	Quasi-peak	21.3	22.55	35.6	-13.1	Pass
894.335	10	251	3.41	Quasi-peak	21.3	24.266	35.6	-11.3	Pass
901.877	10	184	2.82	Quasi-peak	21.3	24.53	35.6	-11.1	Pass
929.174	10	201	2.5	Quasi-peak	21.2	24.094	35.6	-11.5	Pass
964.019	10	310	1.53	Quasi-peak	21	23.749	43.5	-19.8	Pass



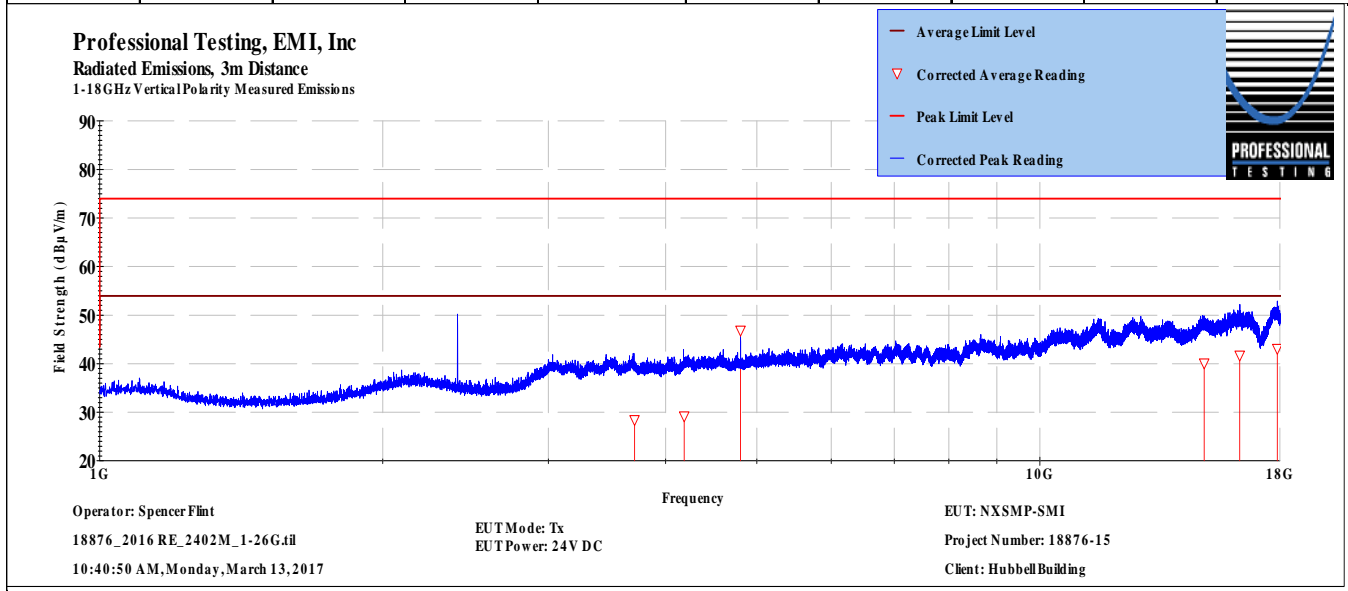
≤ 1GHz Horizontal Antenna Polarity Measured Emissions

7.3.2 1 GHz to 18 GHz, Bottom Channel

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices		
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits		
Section:	15.209		
Test Date(s):	3/10/2017	EUT Serial #:	0
Customer:	Hubbell Building Automation	EUT Part #:	0
Project Number:	18876	Test Technician:	Spencer Flint
Purchase Order #:	0	Supervisor:	Lisa Arndt
Equip. Under Test:	NXSMP-SMI	Witness' Name:	None

Radiated Emissions Test Results Data Sheet Page: 1 of 1

EUT Line Voltage:	24	VDC	EUT Power Frequency:	0	N/A				
Antenna Orientation:	Vertical		Frequency Range:	Above 1GHz					
EUT Mode of Operation:			Transmitting (Bottom Channel - 2402 MHz)						
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
3705.99	3	240	3.48	Average	34.3	28.453	54.0	-25.5	Pass
4184.18	3	127	2.66	Average	34	29.207	54.0	-24.8	Pass
4804.04	3	215	1.93	Average	50.6	46.868	54.0	-7.1	Pass
14954.6	3	62	3.75	Average	28.2	40.089	54.0	-13.9	Pass
16311.7	3	154	2.84	Average	27.3	41.718	54.0	-12.2	Pass
17886.2	3	3	2.49	Average	26.9	43.104	54.0	-10.9	Pass



> 1GHz Vertical Antenna Polarity Measured Emissions

Professional Testing, EMI, Inc.

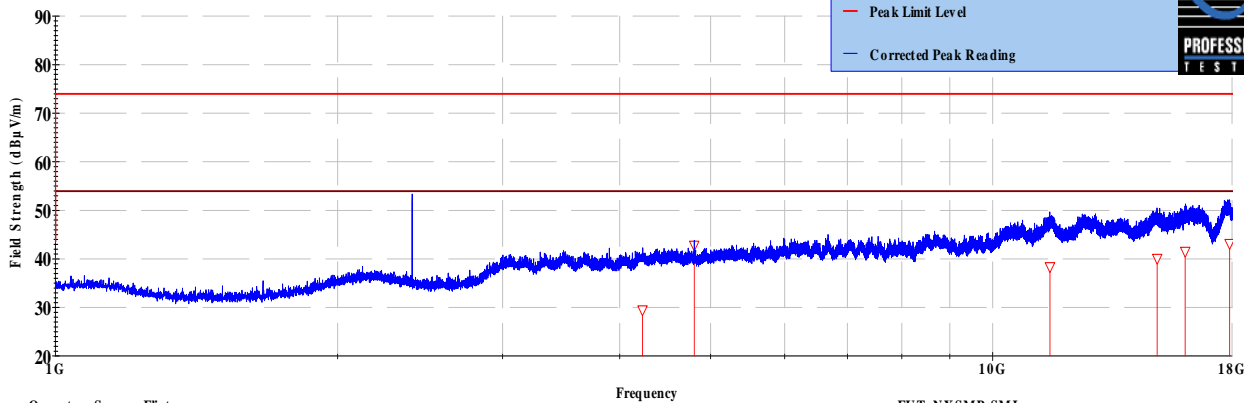
Test Method:	ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices		
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits		
Section:	15.209		
Test Date(s):	3/10/2017	EUT Serial #:	0
Customer:	Hubbell Building Automation	EUT Part #:	0
Project Number:	18876	Test Technician:	Spencer Flint
Purchase Order #:	0	Supervisor:	Lisa Arndt
Equip. Under Test:	NXSMP-SMI	Witness' Name:	None

Radiated Emissions Test Results Data Sheet

Page: 1 of 1

EUT Line Voltage:	24	VDC	EUT Power Frequency:	0	N/A				
Antenna Orientation:	Horizontal		Frequency Range:	Above 1GHz					
EUT Mode of Operation:			Transmitting (Bottom Channel - 2402 MHz)						
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
4230.51	3	43	3.01	Average	34	29.452	54.0	-24.5	Pass
4804.05	3	172	3.19	Average	46.5	42.775	54.0	-11.2	Pass
11511.6	3	286	1.36	Average	27.3	38.354	54.0	-15.6	Pass
14981	3	158	3.42	Average	28	40.071	54.0	-13.9	Pass
16047.4	3	232	2.56	Average	27.1	41.516	54.0	-12.4	Pass
17898.9	3	100	2.37	Average	26.9	43.119	54.0	-10.8	Pass

Professional Testing, EMI, Inc
 Radiated Emissions, 3m Distance
 1-18GHz Horizontal Polarity Measured Emissions



Operator: Spencer Flint
 18876_2016 RE_2402M_1-26G.tif
 10:40:50 AM, Monday, March 13, 2017

EUT Mode: Tx
 EUT Power: 24V DC

EUT: NX SMP-SMI
 Project Number: 18876-15
 Client: Hubbell Building

> 1GHz Horizontal Antenna Polarity Measured Emissions

7.3.3 1 GHz to 18 GHz, Middle Channel

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices		
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits		
Section:	15.209		
Test Date(s):	3/10/2017	EUT Serial #:	0
Customer:	Hubbell Building Automation	EUT Part #:	0
Project Number:	18876	Test Technician:	Spencer Flint
Purchase Order #:	0	Supervisor:	Lisa Arndt
Equip. Under Test:	NXSMP-SMI	Witness' Name:	None

Radiated Emissions Test Results Data Sheet

Page: 1 of 1

EUT Line Voltage:	24	VDC	EUT Power Frequency:	0	N/A
Antenna Orientation:	Vertical		Frequency Range:	Above 1GHz	

EUT Mode of Operation:

Transmitting (Mid Channel - 2440 MHz)

Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
4887.94	3	184	2.27	Average	42.8	39.371	54.0	-14.6	Pass
7320.35	3	42	3.78	Average	29.8	33.087	54.0	-20.9	Pass
11546.4	3	298	2.86	Average	27.4	38.274	54.0	-15.7	Pass
12497.8	3	84	2.53	Average	27.7	38.499	54.0	-15.5	Pass
14968.2	3	76	1.72	Average	28.2	40.232	54.0	-13.7	Pass
17685.7	3	85	3.38	Average	27.1	42.973	54.0	-11.0	Pass
17852.9	3	28	2.57	Average	27.1	43.214	54.0	-10.7	Pass

Professional Testing, EMI, Inc
Radiated Emissions, 3m Distance
1-18GHz VerticalPolarity Measured Emissions



Operator: Spencer Flint
18876_2016 RE_2440M_30M-26G.tif
05:22:10 PM, Thursday, March 09, 2017

EUT Mode: Tx
EUT Power: 24V DC

EUT: NX SMP-SMI
Project Number: 18876-15
Client: Hubbell Building

> 1GHz Vertical Antenna Polarity Measured Emissions

Professional Testing, EMI, Inc.

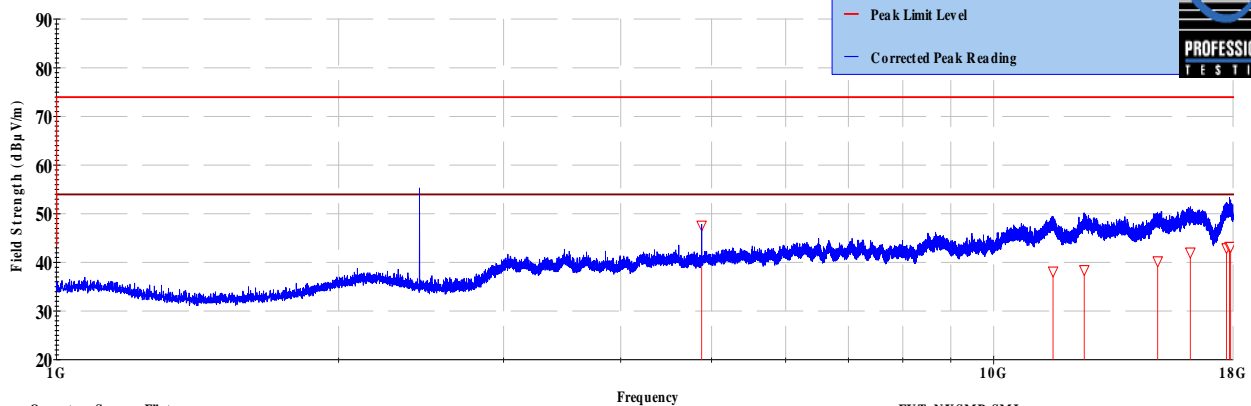
Test Method:	ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices		
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits		
Section:	15.209		
Test Date(s):	3/10/2017	EUT Serial #:	0
Customer:	Hubbell Building Automation	EUT Part #:	0
Project Number:	18876	Test Technician:	Spencer Flint
Purchase Order #:	0	Supervisor:	Lisa Arndt
Equip. Under Test:	NXSM-PMI	Witness' Name:	None

Radiated Emissions Test Results Data Sheet

Page: 1 of 1

EUT Line Voltage:		24	VDC		EUT Power Frequency:		0	N/A			
Antenna Orientation:				Horizontal		Frequency Range:				Above 1GHz	
EUT Mode of Operation:						Transmitting (Mid Channel - 2440 MHz)					
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results		
4879.85	3	188	1.61	Average	51.1	47.617	54.0	-6.3	Pass		
11573.6	3	300	2.29	Average	27.4	38.156	54.0	-15.8	Pass		
12491.8	3	126	3.88	Average	27.7	38.463	54.0	-15.5	Pass		
14963.3	3	133	1.8	Average	28.3	40.262	54.0	-13.7	Pass		
16208.6	3	284	3.51	Average	27.6	42.064	54.0	-11.9	Pass		
17718.9	3	35	2.7	Average	27	42.966	54.0	-11.0	Pass		
17847.8	3	253	2.93	Average	27.1	43.24	54.0	-10.7	Pass		
17898.6	3	129	2.68	Average	27	43.242	54.0	-10.7	Pass		

Professional Testing, EMI, Inc
Radiated Emissions, 3m Distance
1-18GHz Horizontal Polarity Measured Emissions



Operator: Spencer Flint
18876_2016 RE_2440M_30M-26G.tif
05:22:10 PM, Thursday, March 09, 2017

EUT Mode: Tx
EUT Power: 24V DC

EUT: NXSM-PMI
Project Number: 18876-15
Client: Hubbell Building

> 1GHz Horizontal Antenna Polarity Measured Emissions

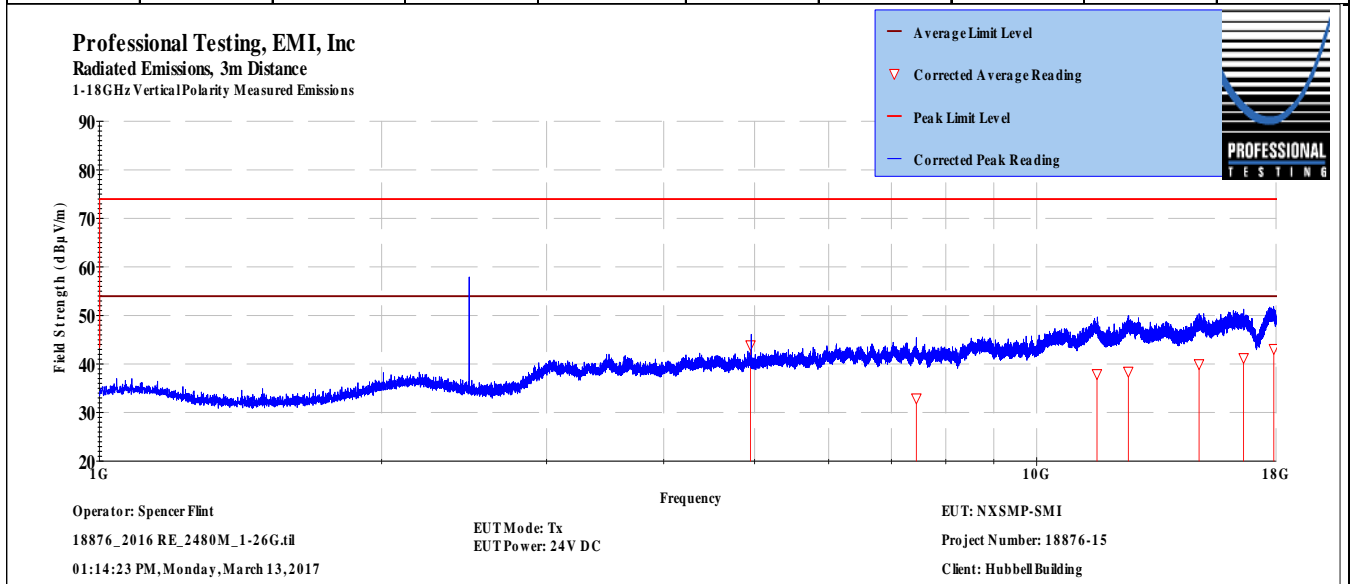
7.3.4 1 GHz to 18 GHz, Top Channel

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices		
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits		
Section:	15.209		
Test Date(s):	3/10/2017	EUT Serial #:	0
Customer:	Hubbell Building Automation	EUT Part #:	0
Project Number:	18876	Test Technician:	Spencer Flint
Purchase Order #:	0	Supervisor:	Lisa Arndt
Equip. Under Test:	NXSM-PMI	Witness' Name:	None

Radiated Emissions Test Results Data Sheet

Page: 1 of 1

EUT Line Voltage:	24	VDC	EUT Power Frequency:	0	N/A				
Antenna Orientation:	Vertical		Frequency Range:	Above 1GHz					
EUT Mode of Operation:			Transmitting (Top Channel - 2480 MHz)						
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
4950.38	3	181	1.94	Average	47.2	43.908	54.0	-10.0	Pass
7440.43	3	105	1.43	Average	29.2	32.969	54.0	-21.0	Pass
11594.3	3	289	3.98	Average	27.3	37.989	54.0	-16.0	Pass
12524.1	3	36	3.59	Average	27.7	38.479	54.0	-15.5	Pass
14902.9	3	318	2.78	Average	28.3	40.014	54.0	-13.9	Pass
16625	3	254	2.91	Average	27.2	41.273	54.0	-12.7	Pass
17908.9	3	32	2.93	Average	26.9	43.148	54.0	-10.8	Pass



> 1GHz Vertical Antenna Polarity Measured Emissions

Professional Testing, EMI, Inc.

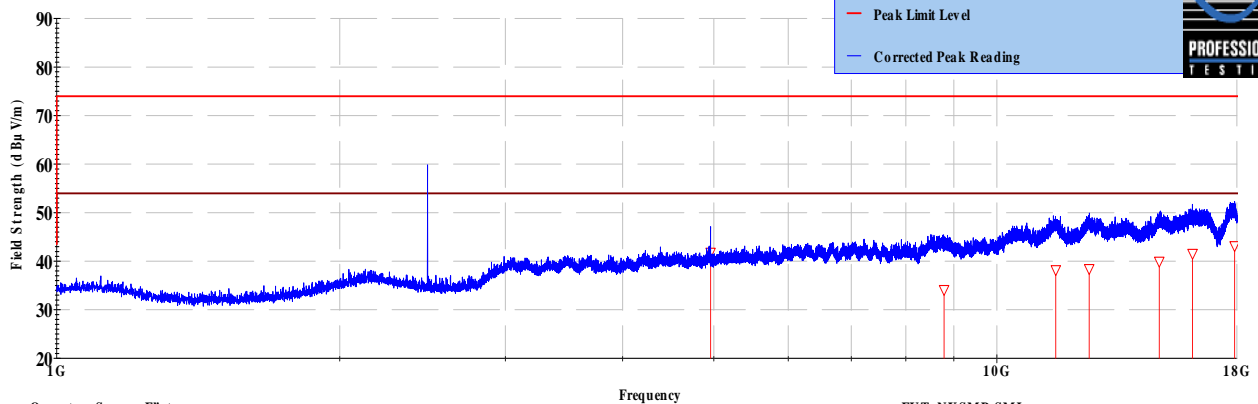
Test Method:	ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices		
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits		
Section:	15.209		
Test Date(s):	3/10/2017	EUT Serial #:	0
Customer:	Hubbell Building Automation	EUT Part #:	0
Project Number:	18876	Test Technician:	Spencer Flint
Purchase Order #:	0	Supervisor:	Lisa Arndt
Equip. Under Test:	NXSMP-SMI	Witness' Name:	None

Radiated Emissions Test Results Data Sheet

Page: 1 of 1

EUT Line Voltage:		24	VDC		EUT Power Frequency:		0	N/A	
Antenna Orientation:			Horizontal			Frequency Range:		Above 1GHz	
EUT Mode of Operation:					Transmitting (Top Channel - 2480 MHz)				
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
4959.86	3	226	1.95	Average	45	41.789	54.0	-12.2	Pass
8785.39	3	15	1.23	Average	26.6	34.13	54.0	-19.8	Pass
11550.3	3	35	2.55	Average	27.3	38.203	54.0	-15.8	Pass
12538.7	3	51	3.5	Average	27.7	38.435	54.0	-15.5	Pass
14881.6	3	98	1.11	Average	28.4	39.946	54.0	-14.0	Pass
16147.4	3	348	3.99	Average	27.1	41.565	54.0	-12.4	Pass
17896.9	3	36	1.14	Average	27	43.154	54.0	-10.8	Pass

Professional Testing, EMI, Inc
 Radiated Emissions, 3m Distance
 1-18GHz Horizontal Polarity Measured Emissions



Operator: Spencer Flint
 18876_2016 RE_2480M_1-26G.tif
 01:14:23 PM, Monday, March 13, 2017

EUT Mode: Tx
 EUT Power: 24V DC

EUT: NX SMP-SMI
 Project Number: 18876-15
 Client: Hubbell Building

> 1GHz Horizontal Antenna Polarity Measured Emissions

7.3.5 18 GHz to 25 GHz, Bottom Channel

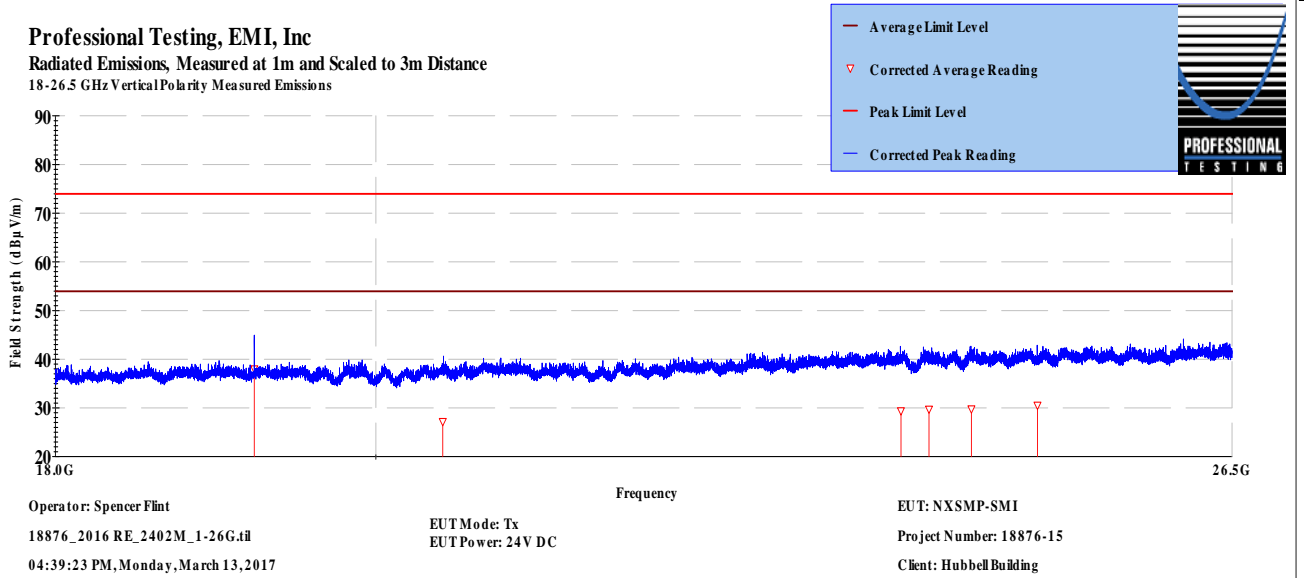
Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices		
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits		
Section:	15.209		
Test Date(s):	3/10/2017	EUT Serial #:	0
Customer:	Hubbell Building Automation	EUT Part #:	0
Project Number:	18876	Test Technician:	Spencer Flint
Purchase Order #:	0	Supervisor:	Lisa Arndt
Equip. Under Test:	NXSM-PMI	Witness' Name:	None

Radiated Emissions Test Results Data Sheet

Page: 1 of 1

EUT Line Voltage:	24	VDC	EUT Power Frequency:	0	N/A				
Antenna Orientation:	Vertical		Frequency Range:	Above 1GHz					
EUT Mode of Operation:			Transmitting (Bottom Channel - 2402 MHz)						
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
19215.9	3	84	1	Average	43.9	37.979	54.0	-16.0	Pass
20444.5	3	24	1	Average	32.8	27.187	54.0	-26.8	Pass
23768.2	3	93	1	Average	33.7	29.384	54.0	-24.6	Pass
23988.5	3	58	1	Average	33.9	29.721	54.0	-24.2	Pass
24324.8	3	275	1	Average	33.7	29.783	54.0	-24.2	Pass
24859.1	3	70	1	Average	34.3	30.511	54.0	-23.4	Pass

Professional Testing, EMI, Inc
Radiated Emissions, Measured at 1m and Scaled to 3m Distance
18-26.5 GHz Vertical Polarity Measured Emissions



Operator: Spencer Flint
18876_2016 RE_2402M_1-26G.jil
04:39:23 PM, Monday, March 13, 2017

EUT Mode: Tx
EUT Power: 24V DC

EUT: NXSM-PMI
Project Number: 18876-15
Client: Hubbell Building

> 1GHz Vertical Antenna Polarity Measured Emissions

Professional Testing, EMI, Inc.

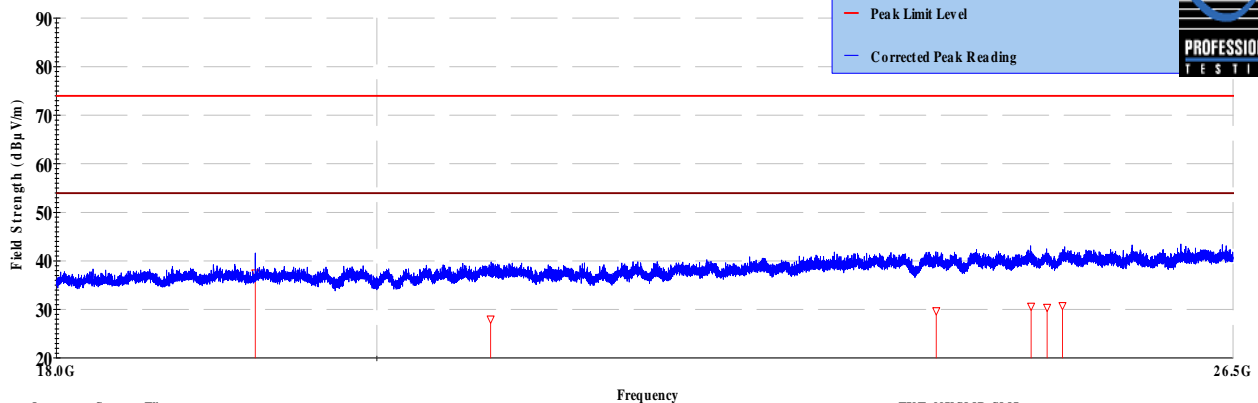
Test Method:	ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices		
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits		
Section:	15.209		
Test Date(s):	3/10/2017	EUT Serial #:	0
Customer:	Hubbell Building Automation	EUT Part #:	0
Project Number:	18876	Test Technician:	Spencer Flint
Purchase Order #:	0	Supervisor:	Lisa Arndt
Equip. Under Test:	NXSMF-SMI	Witness' Name:	None

Radiated Emissions Test Results Data Sheet

Page: 1 of 1

EUT Line Voltage:	24	VDC	EUT Power Frequency:	0	N/A				
Antenna Orientation:	Horizontal		Frequency Range:	Above 1GHz					
EUT Mode of Operation:			Transmitting (Bottom Channel - 2402 MHz)						
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
19216	3	275	1	Average	43.4	37.503	54.0	-16.5	Pass
20762.4	3	293	1	Average	33.6	28	54.0	-26.0	Pass
24037	3	48	1	Average	33.8	29.719	54.0	-24.2	Pass
24799	3	347	1	Average	34.4	30.641	54.0	-23.3	Pass
24930.3	3	294	1	Average	34.2	30.428	54.0	-23.5	Pass
25056.1	3	318	1	Average	34.5	30.784	54.0	-23.2	Pass

Professional Testing, EMI, Inc
 Radiated Emissions, Measured at 1m and Scaled to 3m Distance
 18-26.5 GHz Horizontal Polarity Measured Emissions



Operator: Spencer Flint
 18876_2016 RE_2402M_1-26G.tif
 04:39:23 PM, Monday, March 13, 2017

EUT Mode: Tx
 EUT Power: 24V DC

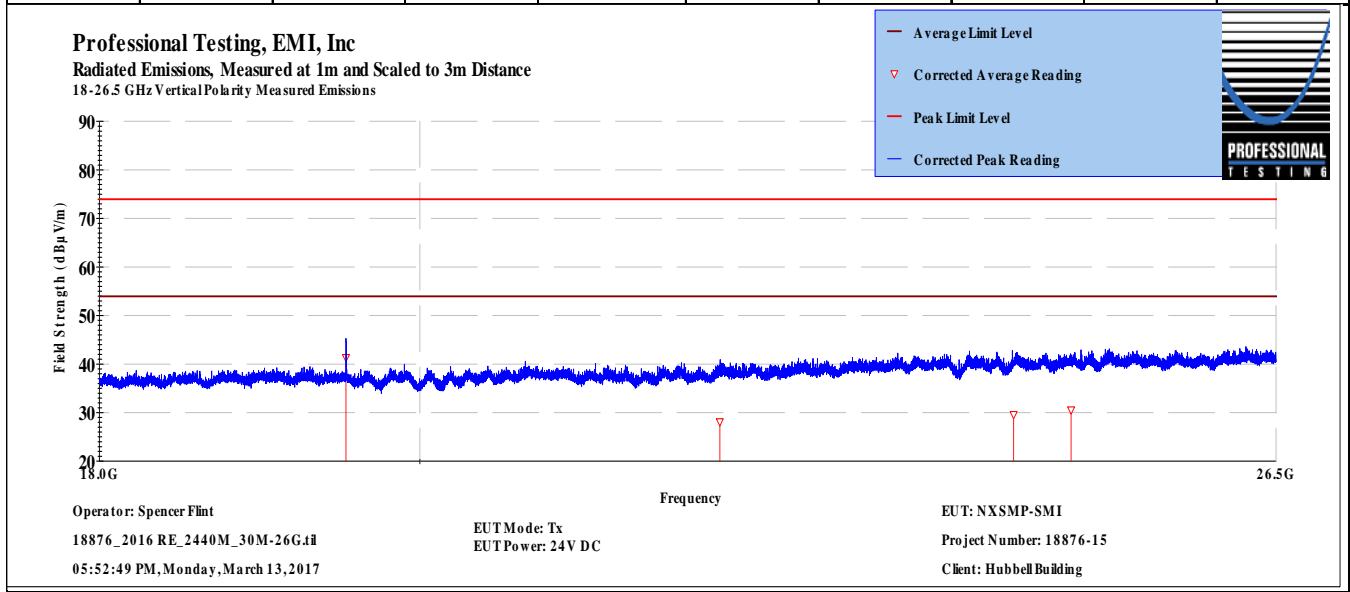
EUT: NXSMF-SMI
 Project Number: 18876-15
 Client: Hubbell Building

> 1GHz Horizontal Antenna Polarity Measured Emissions

7.3.6 18 GHz to 25 GHz, Middle Channel

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices		
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits		
Section:	15.209		
Test Date(s):	3/10/2017	EUT Serial #:	0
Customer:	Hubbell Building Automation	EUT Part #:	0
Project Number:	18876	Test Technician:	Spencer Flint
Purchase Order #:	0	Supervisor:	Lisa Arndt
Equip. Under Test:	NXSMP-SMI	Witness' Name:	None

Radiated Emissions Test Results Data Sheet						Page: 1 of 1			
EUT Line Voltage:	24	VDC	EUT Power Frequency:	0	N/A				
Antenna Orientation:	Vertical		Frequency Range:	Above 1GHz					
EUT Mode of Operation:			Transmitting (Mid Channel - 2440 MHz)						
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
19520	3	251	1	Average	47.2	41.309	54.0	-12.6	Pass
22072	3	23	1	Average	33.4	28.083	54.0	-25.9	Pass
24310.5	3	43	1	Average	33.5	29.569	54.0	-24.4	Pass
24773.8	3	126	1	Average	34.4	30.52	54.0	-23.4	Pass



> 1GHz Vertical Antenna Polarity Measured Emissions

Professional Testing, EMI, Inc.

Test Method:	ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices		
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits		
Section:	15.209		
Test Date(s):	3/10/2017	EUT Serial #:	0
Customer:	Hubbell Building Automation	EUT Part #:	0
Project Number:	18876	Test Technician:	Spencer Flint
Purchase Order #:	0	Supervisor:	Lisa Arndt
Equip. Under Test:	NXSM-PMI	Witness' Name:	None

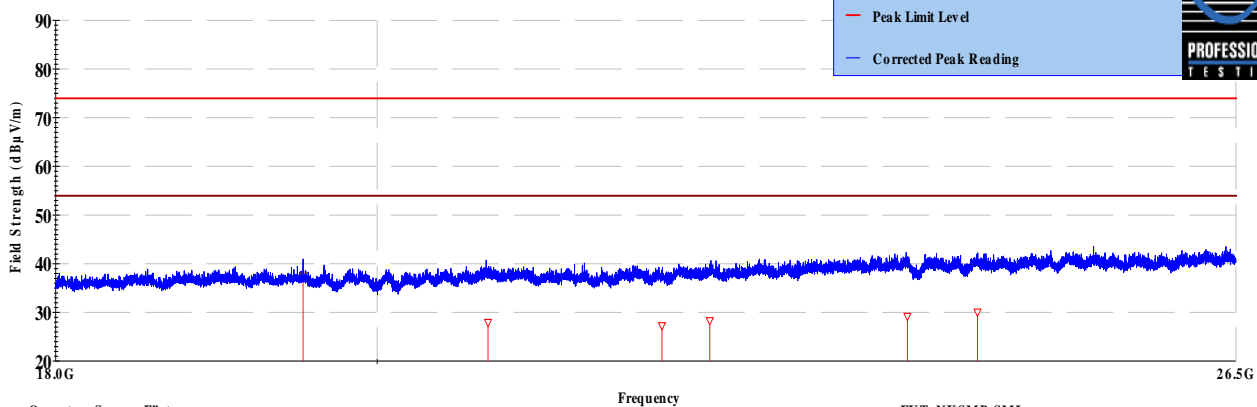
Radiated Emissions Test Results Data Sheet

Page: 1 of 1

EUT Line Voltage:	24	VDC	EUT Power Frequency:	0	N/A				
Antenna Orientation:	Horizontal		Frequency Range:	Above 1GHz					
EUT Mode of Operation:			Transmitting (Mid Channel - 2440 MHz)						
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
19520.2	3	34	1	Average	43.6	37.676	54.0	-16.3	Pass
20739.8	3	124	1	Average	33.5	27.913	54.0	-26.0	Pass
21956.2	3	168	1	Average	32.8	27.272	54.0	-26.7	Pass
22303.5	3	219	1	Average	33.5	28.308	54.0	-25.6	Pass
23794.7	3	314	1	Average	33.5	29.187	54.0	-24.8	Pass
24347.8	3	267	1	Average	34	30.053	54.0	-23.9	Pass

Professional Testing, EMI, Inc

Radiated Emissions, Measured at 1m and Scaled to 3m Distance
18-26.5 GHz Horizontal Polarity Measured Emissions



Operator: Spencer Flint
18876_2016 RE_2440M_30M-26G.tif
05:52:49 PM, Monday, March 13, 2017

EUT Mode: Tx
EUT Power: 24V DC

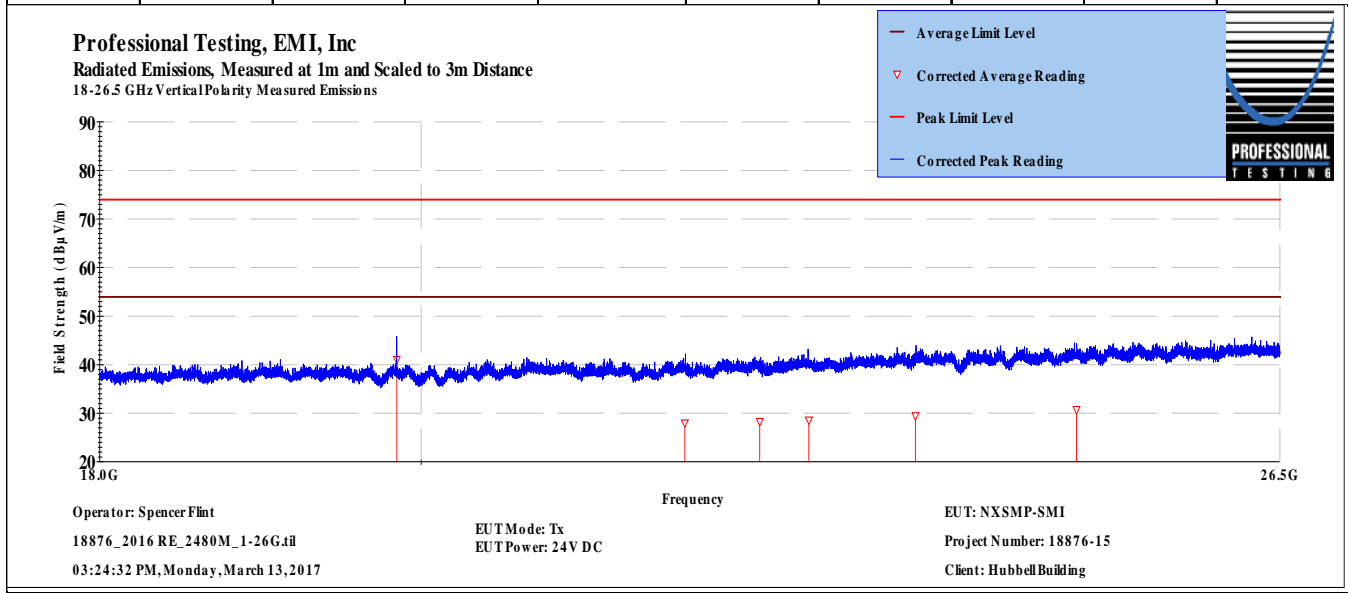
EUT: NXSM-PMI
Project Number: 18876-15
Client: Hubbell Building

> 1GHz Horizontal Antenna Polarity Measured Emissions

7.3.7 18 GHz to 25 GHz, Top Channel

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices		
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits		
Section:	15.209		
Test Date(s):	3/10/2017	EUT Serial #:	0
Customer:	Hubbell Building Automation	EUT Part #:	0
Project Number:	18876	Test Technician:	Spencer Flint
Purchase Order #:	0	Supervisor:	Lisa Arndt
Equip. Under Test:	NXSMP-SMI	Witness' Name:	None

Radiated Emissions Test Results Data Sheet						Page: 1 of 1			
EUT Line Voltage:	24	VDC	EUT Power Frequency:	0	N/A				
Antenna Orientation:	Vertical		Frequency Range:	Above 1GHz					
EUT Mode of Operation:			Transmitting (Top Channel - 2480 MHz)						
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
19840.2	3	246	1	Average	46.8	41.056	54.0	-12.9	Pass
21805.3	3	287	1	Average	33.6	27.984	54.0	-26.0	Pass
22347.4	3	348	1	Average	33.4	28.278	54.0	-25.7	Pass
22709.1	3	41	1	Average	33.7	28.547	54.0	-25.4	Pass
23517.1	3	185	1	Average	34.1	29.455	54.0	-24.5	Pass
24791.5	3	183	1	Average	34.5	30.731	54.0	-23.2	Pass



> 1GHz Vertical Antenna Polarity Measured Emissions

Professional Testing, EMI, Inc.

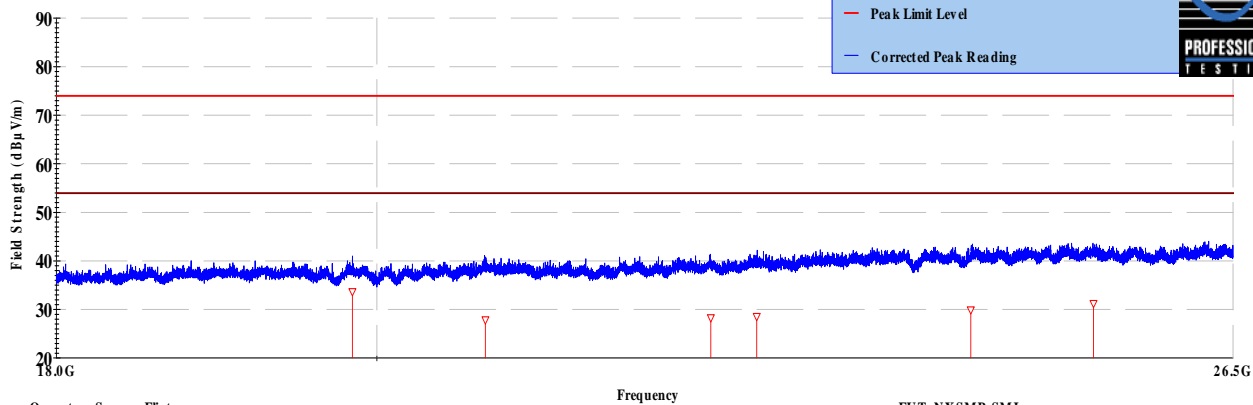
Test Method:	ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices		
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits		
Section:	15.209		
Test Date(s):	3/10/2017	EUT Serial #:	0
Customer:	Hubbell Building Automation	EUT Part #:	0
Project Number:	18876	Test Technician:	Spencer Flint
Purchase Order #:	0	Supervisor:	Lisa Arndt
Equip. Under Test:	NXSM-PMI	Witness' Name:	None

Radiated Emissions Test Results Data Sheet

Page: 1 of 1

EUT Line Voltage:	24	VDC	EUT Power Frequency:	0	N/A				
Antenna Orientation:	Horizontal		Frequency Range:	Above 1GHz					
EUT Mode of Operation:			Transmitting (Top Channel - 2480 MHz)						
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
19839.9	3	3	1	Average	39.4	33.657	54.0	-20.3	Pass
20726.7	3	115	1	Average	33.5	27.831	54.0	-26.1	Pass
22320.7	3	87	1	Average	33.4	28.266	54.0	-25.7	Pass
22659.9	3	339	1	Average	33.6	28.529	54.0	-25.4	Pass
24312.7	3	304	1	Average	33.9	29.89	54.0	-24.1	Pass
25313.2	3	315	1	Average	34.9	31.219	54.0	-22.7	Pass

Professional Testing, EMI, Inc
 Radiated Emissions, Measured at 1m and Scaled to 3m Distance
 18-26.5 GHz Horizontal Polarity Measured Emissions



Operator: Spencer Flint
 18876_2016 RE_2480M_1-26G.tif
 03:24:32 PM, Monday, March 13, 2017

EUT Mode: Tx
 EUT Power: 24V DC

EUT: NXSM-PMI
 Project Number: 18876-15
 Client: Hubbell Building

> 1GHz Horizontal Antenna Polarity Measured Emissions

8.0 Antenna Construction Requirements

The design was investigated for meeting the antenna construction requirements of the applicable rules.

8.1 Procedure

A direct examination of the antenna construction is performed and compared to rule criteria that prevent wireless device antennas from being modified by end users in ways that would void their authorization to use the device.

8.2 Criteria

47 CFR (USA) // IC (Canada)		
Section Reference	Parameter	Date(s)
15.203 // RSS-Gen 8.3	Antenna Construction	1 Nov 2017

8.3 Results

- Antenna is chip style component surface mounted on board.
- There is no external antenna connector.

The antenna design above satisfies the requirements of the rules.

9.0 Conducted Emissions, Mains

9.1 Test Procedure

The EUT was placed on a non-conductive table 0.8 meters above the floor and 0.4 meters from the conductive reference plane (wall). The EUT is powered through a line impedance stabilization network (LISN) that provides a measurement tap and a termination approximating 50 Ohms in the measurement range of 150 kHz to 30 MHz. A spectrum analyzer is connected, in turn, to each mains line measurement tap and the measurement is taken.

9.2 Test Criteria

47 CFR (USA) // IC (Canada)		
Section Reference	Parameter	Date(s)
15.107, 15.207 // RSS-Gen	Mains conducted emissions	31 Mar 2017

9.3 Test Results

The EUT satisfied the criteria.

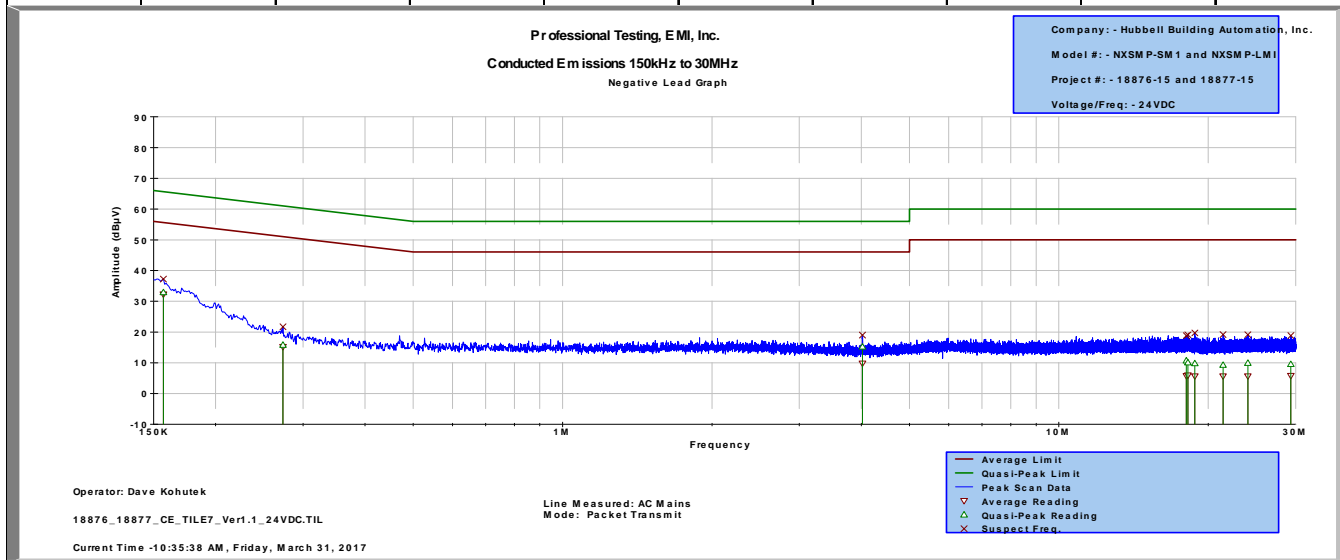
Tabular and plotted measurements appear on the following pages.

9.3.1 Mains, Neutral

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.4: 2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz		
In accordance with:	FCC Part 15.107 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Conducted Limits		
Section:	15.107		
Test Date(s):	3/31/2017	EUT Serial #:	None
Customer:	Hubbell Building Automation, Inc.	EUT Part #:	None
Project Number:	18876-15 and 18877-15	Test Technician:	Dave Kohutek
Purchase Order #:	N/A	Supervisor:	Lisa Arndt
Equip. Under Test:	NXSMP-SM1 and NXSMP-LMI	Witness' Name:	None

Conducted Emissions Test Results Data Sheet - Neutral Lead Page: 1 of 2

EUT Line Voltage:		24	VDC	EUT Line Frequency:		N/A	Hz		
Frequency Measured (MHz)	Peak Detector Reading (dBµV)	Quasi-peak Detector Reading (dBµV)	Quasi-peak Detector Limit (dBµV)	Quasi-peak Detector Margin (dB)	Quasi-peak Detector Test Results	Average Detector Reading (dBµV)	Average Detector Limit (dBµV)	Average Detector Margin (dB)	Average Detector Test Results
0.157	39.9	32.9	65.6	-32.7	PASS	32.3	55.6	-23.4	PASS
0.2734	22.1	15.8	61	-45.3	PASS	15.2	51	-35.8	PASS
4.0215	23.2	15.2	56	-40.8	PASS	9.8	46	-36.2	PASS
18.066	18.7	10.7	60	-49.3	PASS	5.7	50	-44.3	PASS
18.2013	18.8	10.1	60	-49.9	PASS	5.9	50	-44.1	PASS
18.7963	18.5	9.8	60	-50.2	PASS	5.6	50	-44.4	PASS
21.4241	18.5	9.3	60	-50.7	PASS	5.6	50	-44.4	PASS
24.03	20.4	9.9	60	-50.1	PASS	5.6	50	-44.4	PASS
29.3353	18.7	9.5	60	-50.5	PASS	5.8	50	-44.2	PASS



Measured Conducted Emissions - Neutral Lead

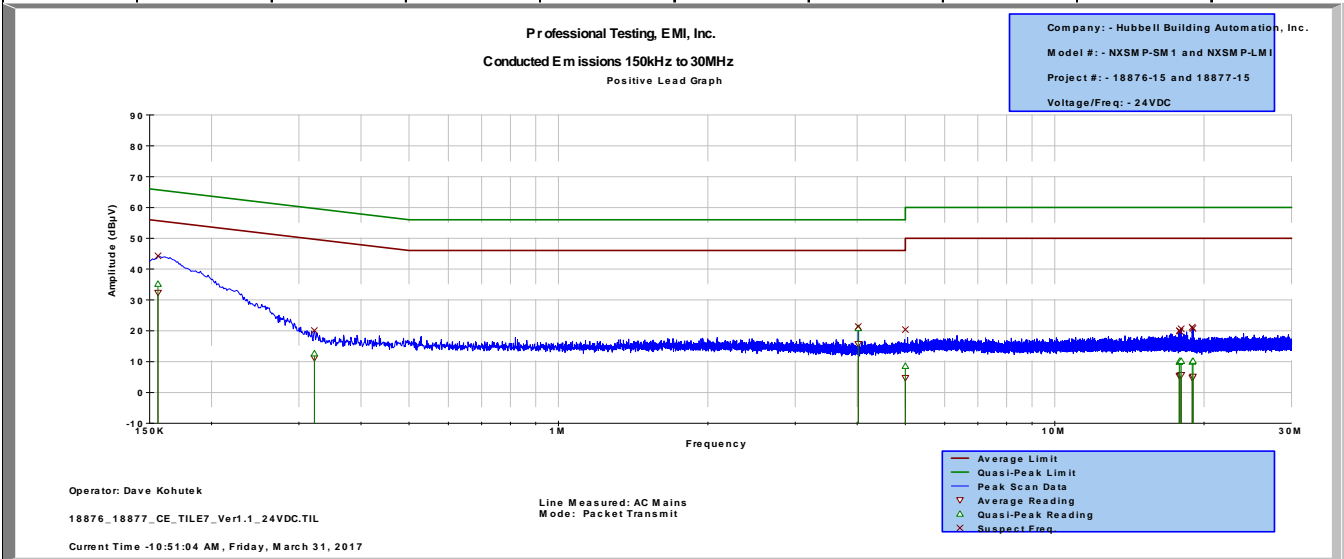
9.3.2 Mains, Phase

Professional Testing, EMI, Inc.

Test Method:	ANSI C63.4: 2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz		
In accordance with:	FCC Part 15.107 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Conducted Limits		
Section:	15.107		
Test Date(s):	3/31/2017	EUT Serial #:	None
Customer:	Hubbell Building Automation, Inc.	EUT Part #:	None
Project Number:	18876-15 and 18877-15	Test Technician:	Dave Kohutek
Purchase Order #:	N/A	Supervisor:	Lisa Arndt
Equip. Under Test:	NXSMP-SM1 and NXSM P-LMI	Witness' Name:	None

Conducted Emissions Test Results Data Sheet - Phase Lead (Line 1) Page: 2 of 2

EUT Line Voltage:			24	VDC	EUT Line Frequency:			N/A	Hz
Frequency Measured (MHz)	Peak Detector Reading (dBµV)	Quasi-peak Detector Reading (dBµV)	Quasi-peak Detector Limit (dBµV)	Quasi-peak Detector Margin (dB)	Quasi-peak Detector Test Results	Average Detector Reading (dBµV)	Average Detector Limit (dBµV)	Average Detector Margin (dB)	Average Detector Test Results
0.156	41.7	35.1	65.7	-30.5	PASS	32.3	55.7	-23.3	PASS
0.3221	20.3	12.6	59.7	-47.1	PASS	11.2	49.7	-38.5	PASS
4.0186	24.7	20.8	56	-35.2	PASS	15.7	46	-30.3	PASS
5.001	17.6	8.5	60	-51.5	PASS	4.7	50	-45.3	PASS
17.8252	19.9	9.8	60	-50.2	PASS	5.4	50	-44.6	PASS
17.8759	20.2	10.2	60	-49.8	PASS	5.5	50	-44.5	PASS
17.9784	19.9	10.1	60	-49.9	PASS	5.7	50	-44.3	PASS
18.9316	18.6	9.9	60	-50.1	PASS	4.8	50	-45.2	PASS
18.9913	20.1	10.2	60	-49.8	PASS	5.1	50	-44.9	PASS



Measured Conducted Emissions - Phase Lead (Line 1)

10.0 Equipment

10.1 Spurious Radiated Emissions 30 MHz to 25 GHz

Radiated Emissions Test Equipment List					
Tile! Software Version:		4.2.A, May 23, 2010, 08:38:52 AM			
Test Profile:		2016 RE_ClassA - Boresite+Mast_LowPRF_030617.til or 2016 RE_ClassB - Boresite+Mast_LowPRF_030617.til			
Asset #	Manufacturer	Model	Equipment Nomenclature	Serial Number	Calibration Due Date
1509A	Braden	N/A	TDK 10M Chamber, NSA < 1 GHz	DAC-012915-005	7/10/2017
1890	HP	8447F	Preamp/Amp, 9kHz-1300MHz, 28/25dB	3313A05298	2/1/2018
1937	Agilent	E4440A	Spectrum Analyzer, 3 Hz - 26.5 GHz, Opt. AYZ	MY44808298	11/15/2017
2172	ETS-Lindgren	3142C	Antenna, Biconilog, 26 MHz-3GHz	49383	11/27/2018
C027D	PTI	None	Relay	none	N/A
1327	EMCO	1050	Controller, Antenna Mast	none	N/A
0942	EMCO	11968D	Turntable, 4ft.	9510-1835	N/A
1969	HP	11713A	Attenuator/Switch Driver	3748A04113	N/A
1509B	Braden	N/A	TDK 10M Chamber, VSWR > 1 GHz	DAC-012915-005	6/19/2017
2004	Miteq	AFS44-00101800- 2S-10P-44	Amplifier, 40dB, .1-18GHz	0	1/11/2018
C030	none	none	Cable Coax, N-N, 30m	none	10/1/2017
1325	EMCO	1050	Controller, Antenna Mast	9003-1461	N/A
819	EMCO	3115	Antenna, Horn, DRG, 1-18GHz	113	8/4/2018
1542	A.H. Systems	SAS-572	Antenna, Horn 18-26.5GHz, 20dB gain	225	11/20/2018
1973	Agilent	83017A	Amplifier, Microwave 0.5-26.5 GHz	MY39500497	11/17/2018

10.2 Bandwidth and Duty Cycle

Asset #	Manufacturer	Model #	Description	Calibration Due
2295	Agilent	E4440A	Spectrum Analyzer	30 Sep 2017
1831	HP	6622A	Power Supply	CIU
0472	Tektronix	THS730A	DMM/Scope	15 Nov 2017
C241	Pasternack	PE300-120	RG type cable	21 Jan 2018
None	ETS	5211	Shielded Enclosure	CIU
None	PTI	None	2 GHz Sleeve Sense Antenna	CIU

10.3 Mains Conducted Emissions

Conducted Emissions Test Equipment List					
Title! Software Version:		Version: 7.1.2.17 (Jan 08, 2016 - 02:12:48 PM) or 4.1.A.0, April 14, 2009, 11:01:00PM			
Test Profile:		2017_CE_TILE7_Ver1.1.TIL or CE_Marine_100616.TIL			
Asset #	Manufacturer	Model	Equipment Nomenclature	Serial Number	Calibration Due Date
1145	HP	8568B	Spectrum Analyzer 100Hz-1.5GHz	2517A01821	7/20/2017
1834	HP	85662A	Spec Anal Dsply, use with A/N 1145	2349A06182	N/A
0990	HP	85685A	RF Preselector	3010A01119	7/20/2017
0085	HP	85650A	Quasi-Peak Adapter CISPR	3033A01458	7/20/2017
1173	PTI	100k HPF	Filter, High Pass, 100kHz	none	2/2/2018
1088	PTI	PTI-ALF4	Attenuator Limiter Filter	none	10/6/2017
C171	HP	08444-60018	Cable, RF, BNC-BNC, 18", Grey	none	6/13/2018
C303	Coleman Cable	RG-58A/U	Cable, BNC-BNC, 36" Black	None	3/25/2018
C107	Pomona	RG-223	Cable 9 ft BNC RG-223 (black)	none	8/4/2018
1185	EMCO	3825/2	LISN, 10kHz-100MHz	1235	8/1/2017

11.0 Measurement Bandwidths

Radiated Emissions Spectrum Analyzer Bandwidth and Measurement Time - Peak Scan				
Frequency Band Start (MHz)	Frequency Band Stop (MHz)	6 dB Bandwidth (kHz)	Number of Ranges Used	Measurement Time per Range
0.009	0.15	0.3	2	Multiple Sweeps
0.15	30	9	6	Multiple Sweeps
30	1000	120	2	Multiple 800 mS Sweeps
1000	6000	1000	2	Multiple Sweeps
6000	18000	1000	2	Multiple Sweeps
18000	26500	1000	2	Multiple Sweeps

*Notes:

1. The settings above are specifically calculated for the E4440A series of spectrum analyzers, which have 8,000 data points per range.
2. The measurement receiver resolution bandwidth setting was 300 Hz for quasi-peak measurements from 9-150 kHz.
3. The measurement receiver resolution bandwidth setting was 9 kHz for quasi-peak measurements from 0.15-30 MHz.
4. The measurement receiver resolution bandwidth setting was 120 kHz for quasi-peak measurements from 30-1000 MHz.
5. The measurement receiver resolution bandwidth setting was 1 MHz for average measurements from 1-18 GHz.

Conducted Emissions Spectrum Analyzer Bandwidth and Measurement Time				
Frequency Band Start (MHz)	Frequency Band Stop (MHz)	6 dB Bandwidth (kHz)	Number of Ranges Used	Measurement Time per Range
0.01	0.15	0.3	7	Five 1 second sweeps
0.15	30	9	20	Five 1 second sweeps

*Notes:

1. The settings above are specifically calculated for the HP856X series of spectrum analyzers, which have 1,000 data points per range.
2. The measurement receiver resolution bandwidth setting was 300 Hz for quasi-peak measurements from 10-150 kHz.
3. The measurement receiver resolution bandwidth setting was 9 kHz for quasi-peak measurements from 0.15-30 MHz.

Appendix: Policy, Rationale, and Evaluation of EMC Measurement Uncertainty

All uncertainty calculations, estimates and expressions thereof shall be in accordance with NIST policy. Since PTI operates in accordance with NIST (NVLAP) Handbook 150-11: 2007, all instrumentation having an effect on the accuracy or validity of tests shall be periodically calibrated or verified traceable to national standards by a competent calibration laboratory. The certificates of calibration or verification on this instrumentation shall include estimates of uncertainty as required by NIST Handbook 150-11.

1. Rationale and Summary of Expanded Uncertainty.

Each piece of instrumentation at PTI that is used in making measurements for determining conformance to a standard (or limit), shall be assessed to evaluate its contribution to the overall uncertainty of the measurement in which it is used. The assessment of each item will be based on either a type A evaluation or a type B evaluation. Most of the evaluations will be type B, since they will be based on the manufacturer's statements or specifications of the calibration tolerances, or uncertainty will be stated along with a brief rationale for the type of evaluation and the resulting stated uncertainties.

The individual uncertainties included in the combined standard uncertainty for a specific test result will depend on the configuration in which the item of instrumentation is used. The combination will always be based on the law of propagation of uncertainty. Any systematic effects will be accommodated by including their uncertainties, in the calculation of the combined standard uncertainty; except that if the direction and amount of the systematic effect cannot be determined and separated from its uncertainty, the whole effect will be treated as uncertainty and combined along with the other elements of the test setup.

Type A evaluations of standard uncertainty will usually be based on calculating the standard deviation of the mean of a series of independent observations, but may be based on a least-squares curve fit or the analysis of variance for unusual situations. Type B evaluations of standard uncertainty will usually be based on manufacturer's specifications, data provided in calibration reports, and experience. The type of probability distribution used (normal, rectangular, a priori, or u-shaped) will be stated for each Type B evaluation.

In the evaluation of the uncertainty of each type of measurement, the uncertainty caused by the operator will be estimated. One notable operator contribution to measurement uncertainty is the manipulation of cables to maximize the measured values of radiated emissions. The operator contribution to measurement uncertainty is evaluated by having several operators independently repeat the same test. This results in a Type A evaluation of operator-contributed measurement uncertainty.

A summary of the expanded uncertainties of PTI measurements is shown as Table 1. These are the worst-case uncertainties considering all operative influence factors.

Table 1: Summary of Measurement Uncertainties for Site 45

Type of Measurement	Frequency Range	Meas. Dist.	Expanded Uncertainty U, dB (k=2)
Mains Conducted Emissions	150 kHz to 30 MHz	N/A	2.9
Telecom Conducted Emissions	150 kHz to 30 MHz	N/A	2.8
Radiated Emissions	30 to 1,000 MHz	10 m	4.8
	1 to 18 GHz	3 m	5.7

End of Report

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