Project 18878-15

Hubbell Control Solutions NXOFM-1R1D-UNV

Wireless Certification Report

Prepared for:

Hubbell Control Solutions 1812 Centre Creek Dr Suite 240 Austin, TX 78754

By

Professional Testing (EMI), Inc. 1601 North A.W. Grimes Blvd., Suite B Round Rock, Texas 78665

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.	16 Feb 2018

			ns	

None.

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Compliance Certificate

Applicant	Device & Test Identification	
Hubbell Control Solutions	FCC ID:	YH9NXOFM1R1DUNV
1812 Centre Creek Dr	Industry Canada ID:	9044A-NXOFM1R1DUNV
Suite 240	Model(s):	NXOFM-1R1D-UNV
Austin, TX 78754-3962		
Certificate Date: 16 Feb 2018	Laboratory Project ID:	18878-15

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, <u>2400-2483.5 MHz</u> , 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.



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 / NXOFM-1R1D-UNV 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 a sensor in support of a lighting control system. It is cylindrical and measures approximately 13.5 cm x 8 cm.

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:

Conducted mains levels are determined as follows:

Raw Measured Level + LISN Factor + Cable/Filter/Limiter Losses = 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			
47 CFK	Subpart C -Intentional Radiators		
RSS-247 Issue 1	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-		
K55-247 ISSUE 1	Exempt Local Area Network (LE-LAN) Devices		
RSS-Gen Issue 4	General Requirements and Information for the Certification of Radio Apparatus		
ANCI C62 10 2012	American National Standard of Procedures for Compliance Testing of Unlicensed		
ANSI C63.10 2013	Wireless Devices		

Table 1.7.2: Applicable Clauses					
Parameter	FCC Part 15	IC RSS References			
Turumeter	Rule Paragraphs	ie noo neierenees			
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	Date				
15.247(a)(3) // RSS-247 5.2	Fundamental Power Conducted Limits 1 W	19 May 2017			
	Limit Restated as Field: 125.23 dBμV/m @ 3 m				

2.3 Test Results, Peak Power

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

Table 2.3.1 Power, Peak, Radiated									
Frequency MHz	Measured Peak Power dBμV/m @ 3 m Vertical Polarity	Measured Peak Power dBμV/m @ 3 m Horizontal Polarity	Maximum Measured Peak Power Restated as EIRP dBm						
2402	90.0	91.7	-3.53						
2440	88.3	93.0	-2.23						
2480	87.8	91.7	-3.53						

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 measurement was not needed due to the low power and low spurious emissions.

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	27 Jul 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	19 Jun 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.

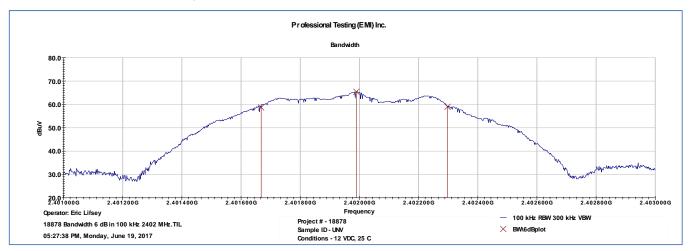
Table 4.3.1 Bandwidth 6 dB, Minimum 500 kHz in 100 kHz RBW									
Low Channel Mid Channel High Channel Reported									
Measured BW	Measured BW	Measured BW	Minimum BW						
(kHz)	(kHz)	(kHz)	(kHz)						
630	628	624	624						

Table 4.3.2 Bandwidth 20 dB, Measure and Report									
Low Channel Mid Channel High Channel Reporte									
Measured BW	Measured BW	Measured BW	Maximum BW						
(kHz)	(kHz)	(kHz)	(kHz)						
972	1076	1088	1088						

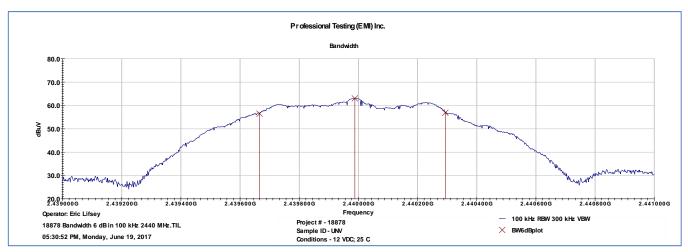
Table 4.3.3 Bandwidth OBW 99%, Measure and Report									
Low Channel	High Channel	Reported							
Measured BW	Measured BW	Measured BW	Maximum BW						
(kHz)	(kHz)	(kHz)	(kHz)						
1018	1019	1015	1019						

Plotted measurements appear on the following pages.

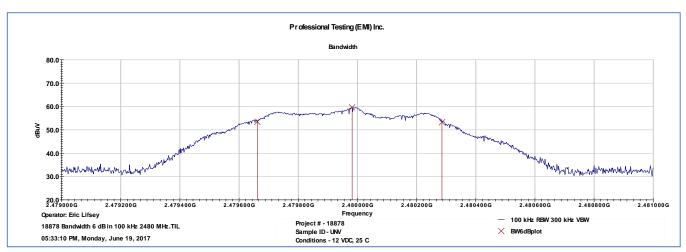
4.3.1 Bandwidth Plots, 6 dB



6 dB, Low Channel

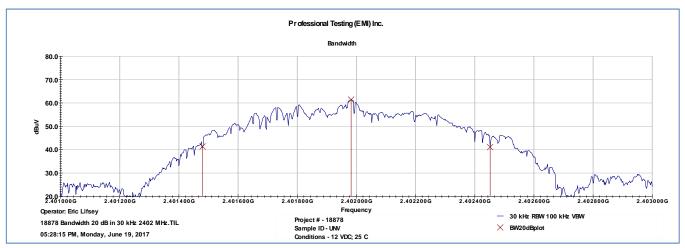


6 dB, Middle Channel

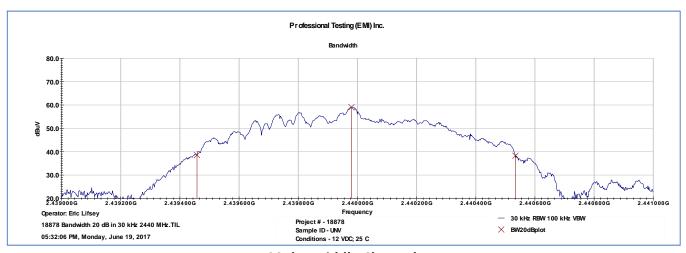


6 dB, High Channel

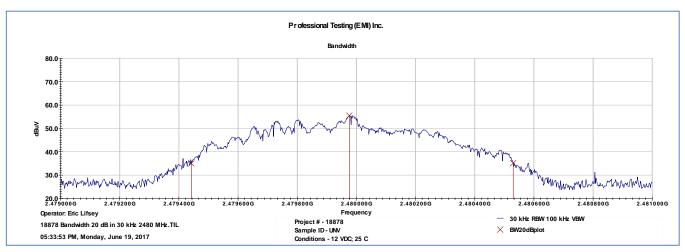
4.3.2 Bandwidth Plots, 20 dB



20 dB, Low Channel

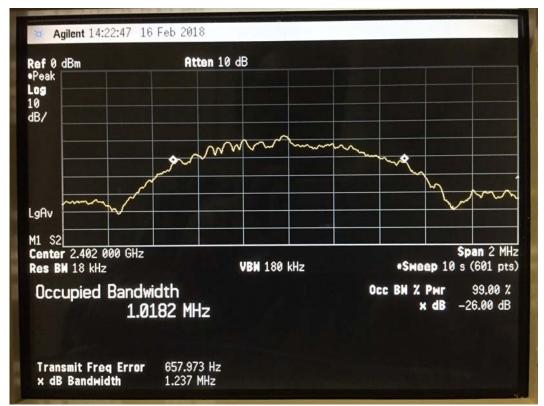


20 dB, Middle Channel

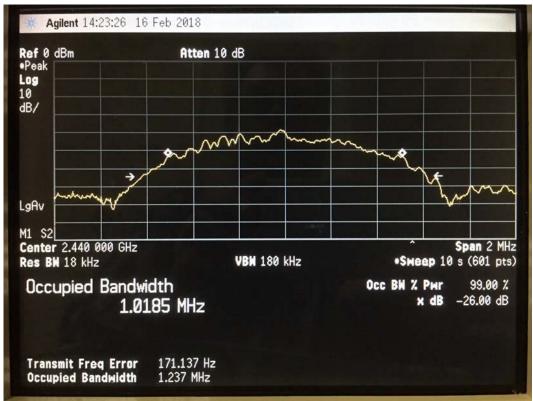


20 dB, High Channel

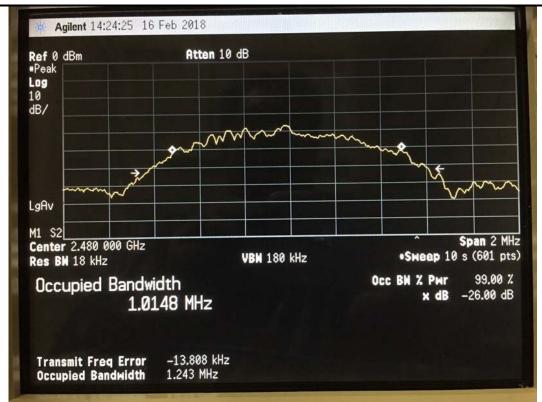
4.3.3 Bandwidth Plots, OBW 99%



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 //	Unwanted Emissions Adjacent to Authorized	20 Jun 2017						
RSS-247 5.5, RSS-Gen 4.9	Band, Radiated	28 Jun 2017						

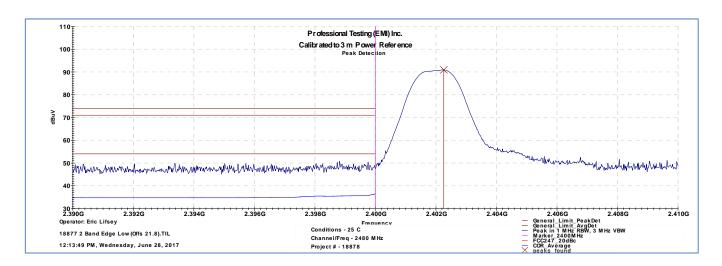
5.3 Test Results

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.

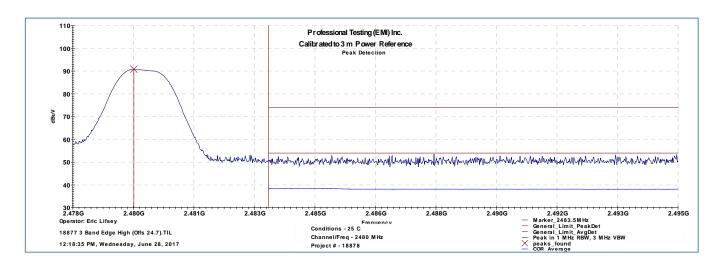
Peak detection of emissions at both band edges were below the general emission limits for average limit levels.

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

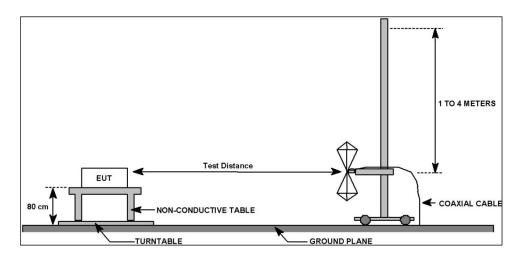


6.0 Radiated Spurious Emissions, Receive Mode

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	16 Jun 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

			Profes	sional Te	sting, EN	VII, Inc.				
Test Metho	d:		•	an National Star Electronic Equi				dio-Noise Em	issions from	
In accordan	ice with:	FCC Part 15.109 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Radiated Emissions Limits								
Section:		15.109								
Test Date(s):	6/16/2017			EUT Serial		None			
Customer:		7	ilding Auto	mation	EUT Part #:		None			
Project Nur		18878-10			Test Techni		Bob Redou	tey		
Purchase O		N/A	N./		Supervisor:		Lisa Arndt	1		
Equip. Und	er Test:	NXOFM-UN	IV		Witness' N	ame:	Tom Hartn	agei		
	F	Radiated Em	issions Test	Results Data	Sheet		Pa	ge: 1	of 1	
EUT Li	ne Voltage:	23	30 VAC		EUT Pow	ver Frequen	cy: 5	0 Hz		
Antenna	Orientatio	n:	Vertic	al	Frequ	ency Range		30MHz to	1GHz	
	EUT N	Node of Ope	eration:			R	eceive Mod	е		
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	
35.1019	10	145	3.54	Quasi-peak	23.2	11.263	29.5	-18.2	Pass	
173.56	10	28	1.28	Quasi-peak	29.8	14.212	33.1	-18.9	Pass	
257.657	10	32	1.35	Quasi-peak	40.4	30.216	35.6	-5.4	Pass	
515.661	10	9	3.69	Quasi-peak	36.5	31.192	35.6	-4.4	Pass	
562.817	10	216	2.24	Quasi-peak	34.7	30.697	35.6	-4.9	Pass	
773.462	10	141	2.2	Quasi-peak	29	29.624	35.6	-6.0	Pass	
Radiated 30MHz-16 60 50 40 MHz-16 80	Emissions, 10m Di GHz Vertical Polarity	istance Measured Emissions		Hill Hall	X June 1	∨ Corn	i-peak Limit Level ceted Quasi-peak Read ceted Peak Value ied Low-PRF QP Read F Verification Limit CUT: NXOFM-UNV Project Number: 1887i	ing	PROFESSIONAL ESTING	
	M, Friday, June 16, 2	017					Client: Hubbell Building			

						Hub	bell Co	ontrol So	lutions	s – NXOFI	M-1R1D-UNV
			Profes	sional Te	sting, El	MI, I	nc.				
Test Metho	d:			an National Star I Electronic Equi						-Noise Em	nissions from
In accordan	ice with:	FCC Part 15.109 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Radiated Emissions Limits								iated	
Section:		15.109	5.109								
Test Date(s):	6/16/201	7		EUT Serial	#:		None			
Customer:		Hubbell E	Building Auto	mation	EUT Part #:			None			
Project Nur		18878-10			Test Techn			Bob Red		y	
Purchase O		N/A			Supervisor			Lisa Arn			
Equip. Und	er Test:	NXOFM-L	JNV		Witness' N	ame:		Tom Ha	rtnage	el	
	R	Radiated E	missions Tes	t Results Data	a Sheet				Page	1	of 1
EUT Li	ne Voltage:	:	230 VAC		EUT Pow	ver Fre	equen	су:	50	Hz	
Antenna	Orientatio	n:	Horizo	ntal	Frequ	ency F	Range:		3(OMHz to	1GHz
	EUT N	lode of O	peration:				R	eceive N	/lode		
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	- 0	Detector Function	Recorded Amplitude (dBµV)	Le	ected vel V/m)	Limit Lev (dBµV/r		Margin (dB)	Test Results
189.446	10	59	3.56	Quasi-peak	39.9	24.	577	33.1		-8.5	Pass
209.146	10	99	3.86	Quasi-peak	41.4	26.	968	33.1		-6.1	Pass
257.73	10	292	1.13	Quasi-peak	27.2	16.	978	35.6		-18.6	Pass
260.022	10	307	1.07	Quasi-peak	24.9	14.	627	35.6		-21.0	Pass
516.291	10	227	1.41	Quasi-peak	_	_	622	35.6		-13.0	Pass
561.277	10	33	1.23	Quasi-peak	35.5	31.	589	35.6		-4.0	Pass
Radiated	sional Testing, Emissions, 10m Di GHzHorizontalPolar	stance	ions				CorreCorreVerific	i-peak Limit Lev ected Quasi-peal ected Peak Value ed Low-PRF QI	k Reading e PReading		PROFESSIONAL TESTING
Field Strength (dBy Vm) 300 M 90 M	Bob Redoutey	41h 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	100M		quency	×	E E	UT: NXOFM-U	× July Juny	, and the last of	16
	_2016 RE_041417.ti PM,Friday,June16,2			de: Receive Mode ver: 230 VAC /50 Hz				roject Number: lient: Hubbell B			

≤ 1GHz Horizontal Antenna Polarity Measured Emissions

6.3.2 Above 1 GHz

			Profess	sional Te	sting, EN	VII, Inc.			
Test Metho	od:		•	n National Star Electronic Equi				dio-Noise Em	issions from
In accordar	nce with:		FCC Part 15.109 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Radiated Emissions Limits						
Section:		15.109							
Test Date(s	s):	6/16/2017			EUT Serial	# :	None		
Customer:		Hubbell Bu	ilding Auto	mation	EUT Part #:		None		
Project Nui	mber:	18878-10			Test Techni	ician:	Bob Redou	tev	
Purchase O		N/A			Supervisor:		Lisa Arndt		
Equip. Und		NXOFM-UN	IV		Witness' N		Tom Hartna	agel	
	F	Radiated Em	issions Test	Results Data	a Sheet		Pag	ge: 1	of 1
EUT Li	ine Voltage	: 23	0 VAC		EUT Pow	er Frequen	cy: 5	0 Hz	
Antenna	a Orientatio	n:	Vertic	al	Frequ	ency Range:		Above 1	GHz
	EUT N	lode of Ope	eration:			R	eceive Mod	e	
Frequency	Test	EUT	Antenna		Recorded	Corrected			
Measured	Distance	Direction	Height	Detector	Amplitude	Level	Limit Level	Margin	Test Results
(MHz)	(Meters)	(Degrees)	(Meters)	Function	(dBµV)	(dBµV/m)	(dBµV/m)	(dB)	Test nesuns
1125.76	3	167	1.33	Average	37.2	24.504	54.0	-29.5	Pass
1313.5	3	44	1.29	Average	39.1	27.167	54.0	-26.8	Pass
1406.34	3	9	1.37	Average	34.5	22.475	54.0	-31.5	Pass
	3	134	1.51	Average	35.3	24.379	54.0	-29.6	Pass
1632.74			,			7			
1632.74 1801.55	3	48	2.24	Average	36.1	26.269	54.0	-27.7	Pass
,	3	48 134			36.1 35.6	26.269 26.563	54.0 54.0	-27.7 -27.4	Pass Pass
1801.55			2.24 2.01 1.59	Average Average Average	_	_			
1801.55 2436.85	3	134	2.01	Average	35.6	26.563	54.0	-27.4	Pass
1801.55 2436.85 15983.3 Profess	3 3 sional Testing,	134 324 EMI, Inc	2.01	Average	35.6	26.563 41.351	54.0	-27.4	Pass
1801.55 2436.85 15983.3 Profess Radiated	3 3 sional Testing, Emissions, 3m Dis	134 324 EMI, Inc	2.01	Average	35.6	26.563 41.351 — Avera	54.0 54.0	-27.4 -12.6	Pass
1801.55 2436.85 15983.3 Profess Radiated 1-18GHzV	3 3 sional Testing,	134 324 EMI, Inc	2.01	Average	35.6	26.563 41.351 — Aven	54.0 54.0	-27.4 -12.6	Pass
1801.55 2436.85 15983.3 Profess Radiated 1-18GHzV	3 3 sional Testing, Emissions, 3m Dis	134 324 EMI, Inc	2.01	Average	35.6	26.563 41.351 — Aven ∇ Corre — Peak	54.0 54.0 age Limit Level	-27.4 -12.6	Pass Pass Pass
1801.55 2436.85 15983.3 Profess Radiated 1-18GHzV	3 3 sional Testing, Emissions, 3m Dis	134 324 EMI, Inc	2.01	Average	35.6	26.563 41.351 — Aven ∇ Corre — Peak	54.0 54.0 age Limit Level ected Average Reading	-27.4 -12.6	Pass Pass
1801.55 2436.85 15983.3 Profess Radiated 1-18GHzV	3 3 sional Testing, Emissions, 3m Dis	134 324 EMI, Inc	2.01	Average	35.6	26.563 41.351 — Aven ∇ Corre — Peak	54.0 54.0 age Limit Level ected Average Reading	-27.4 -12.6	Pass Pass Pass
1801.55 2436.85 15983.3 Profess Radiated 1-18GHzV	3 3 sional Testing, Emissions, 3m Dis	134 324 EMI, Inc	2.01	Average	35.6	26.563 41.351 — Aven ∇ Corre — Peak	54.0 54.0 age Limit Level ected Average Reading	-27.4 -12.6	Pass Pass Pass
1801.55 2436.85 15983.3 Profess Radiated 1-18GHz V	3 3 sional Testing, Emissions, 3m Dis	134 324 EMI, Inc	2.01	Average	35.6	26.563 41.351 — Aven ∇ Corre — Peak	54.0 54.0 age Limit Level ected Average Reading	-27.4 -12.6	Pass Pass Pass
1801.55 2436.85 15983.3 Profess Radiated 1-18GHz V	3 3 sional Testing, Emissions, 3m Dis	134 324 EMI, Inc	2.01	Average	35.6	26.563 41.351 — Aven ∇ Corre — Peak	54.0 54.0 age Limit Level ected Average Reading	-27.4 -12.6	Pass Pass Pass
1801.55 2436.85 15983.3 Profess Radiated 1-18GHz\\ 90	3 3 sional Testing, Emissions, 3m Dis	134 324 EMI, Inc	2.01	Average	35.6	26.563 41.351 — Aven ∇ Corre — Peak	54.0 54.0 age Limit Level ected Average Reading	-27.4 -12.6	Pass Pass Pass
1801.55 2436.85 15983.3 Profess Radiated 1-18GHzV 90 80 (mm/h) 60 60 1-19 (mm/h) 80 1-19 (mm/h)	3 3 sional Testing, Emissions, 3m Dis	134 324 EMI, Inc	2.01	Average	35.6	26.563 41.351 — Aven ∇ Corre — Peak	54.0 54.0 age Limit Level ected Average Reading	-27.4 -12.6	Pass Pass Pass
1801.55 2436.85 15983.3 Profess Radiated 1-18GHzV 90 40 80 1-19 60 40 1-19 60 40 30	3 3 sional Testing, Emissions, 3m Dis	134 324 EMI, Inc	2.01	Average	35.6	26.563 41.351 — Aven ∇ Corre — Peak	54.0 54.0 age Limit Level ected Average Reading	-27.4 -12.6	Pass Pass Pass
1801.55 2436.85 15983.3 Profess Radiated 1-18GHzV 90 40 80 1-19 60 40 1-19 60 40 30	3 3 sional Testing, Emissions, 3m Dis	134 324 EMI, Inc	2.01	Average	35.6	26.563 41.351 — Aven ∇ Corre — Peak	54.0 54.0 age Limit Level ected Average Reading	-27.4 -12.6	Pass Pass Pass
1801.55 2436.85 15983.3 Profess Radiated 1-18GHzV 90 40 40 40 40 40 40 40 40 40 40 40 40 40	3 3 sional Testing, Emissions, 3m Dis	134 324 EMI, Inc	2.01	Average Average	35.6	26.563 41.351 - Aven ∇ Corre - Peak - Corre	54.0 54.0 age Limit Level exted A verage Reading Limit Level exted Peak Reading	-27.4 -12.6	Pass Pass Pass
1801.55 2436.85 15983.3 Profess Radiated 1-18GHzV 90 100 100 100 100 100 100 100 100 100	3 3 sional Testing, Emissions, 3m Dis /ertical Polarity Measure	134 324 EMI, Inc tance ured Emissions	2.01 1.59	Average Average	35.6 27.1	26.563 41.351 - Aven ∇ Corre - Peak - Corre	54.0 54.0 age Limit Level ceted A verage Reading Limit Level ceted Peak Reading	-27.4 -12.6	Pass Pass Pass

						Hub	bell C	ontrol S	Solutio	ns – NXOF	M-1R1D-UN\
			Profess	ional Te	sting, El	ΜI, I	nc.				
Test Metho	d:		2014, America Electrical and							lio-Noise En	nissions from
In accordan	ice with:	ith: FCC Part 15.109 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Radiated Emissions Limits								iated	
Section:		15.109									
Test Date(s):	6/16/2017			EUT Serial	#:		None			
Customer:		Hubbell Bu	ilding Autor	nation	EUT Part #:	:		None			
Project Nur	nber:	18878-10			Test Techn	ician:		Bob R	edout	ey	
Purchase O		N/A			Supervisor			Lisa A			
Equip. Und	er Test:	NXOFM-UN	NV .		Witness' N	ame:		Tom I	lartna	gel	
	F	Radiated Em	nissions Test	Results Dat	a Sheet				Pag	e: 1	of 1
EUT Li	ne Voltage:	2	30 VAC		EUT Pov	ver Fr	equen	су:	50) Hz	
Antenna	Orientatio	n:	Horizon	tal	Frequ	ency l	Range:			Above 1	GHz
	EUT N	lode of Ope	eration:				R	Receive	Mode	9	
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Le	ected vel V/m)	Limit I (dBµ\		Margin (dB)	Test Results
1123.59	3	270	1.82	Average	37	24.	298	54	.0	-29.7	Pass
1287.38	3	249	3.81	Average	37.4	25.	507	54	.0	-28.5	Pass
1801.47	3	326	2.24	Average	36.5	26.	711	54	.0	-27.2	Pass
2313.16	3	312	2.26	Average	35.7	26	.26	54	.0	-27.7	Pass
3503.36	3	173	2.86	Average	35.5	28	.41	54	.0	-25.5	Pass
15874.7	3	287	3.69	Average	27.4	41.	292	54	.0	-12.7	Pass
Radiated	sional Testing, Emissions, 3m Dis	tance						rage Limit Lev rected Averaş			
90=								Limit Level			PROFESSIONAL
80							— Corr	ected Peak R	eading		TESTING
<u> </u>						-					
ਭੁੰ ₆₀ –											
Field Strength (dBµVm) 400 (dBµVm) 400 (dBµVm)									the block	Production of the Parket	- Y
30		Y		-		<u> </u>					
20 G Operator: 1	Bob Redoutey				equency	-	1	EUT: NXOF	10G M-UNV		18G
	_2016 RE_041417.ti PM,Friday,June16,2			: Receive Mode r: 230VAC/50Hz				Project Num Client: Hubb		-10 Automation	

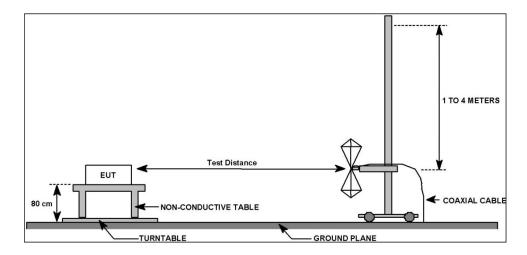
> 1GHz Horizontal Antenna Polarity Measured Emissions

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	14 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.

All measurements used peak detection.

7.3.1 Up to 1 GHz, Middle Channel

			Profes	sional Te	sting, EN	VII, Ind	: .			
Test Metho	d:	ANSI C63.10- Devices	2013 America	an National Star	ndard of Proce	dures for	Complianc	e Testing	of Unlicen	sed Wirele
In accordan	ice with:	FCC Part 15.2 Limits	209 - Code of	Federal Regulat	ions Part 47, S	Subpart C -	Intention	al Radiato	ors, Radiat	ed Emissio
Section:		15.209			1					
Test Date(s):	3/14/2017			EUT Serial		0			
Customer:			ilding Auto	mation	EUT Part #:		0			
Project Nur		18878			Test Techni			cer Flint		
Purchase O		O NYOFNA LIN	IV/		Supervisor: Witness' N		Lisa A			
Equip. Und		NXOFM-UN			<u> </u>	ame:	None			
	F	Radiated Em	issions Test	t Results Data	Sheet			Page	: 1	of :
EUT Li	ne Voltage:	23	30 VAC		EUT Pow	ver Frequ	iency:	50	Hz	
Antenna	Orientatio	n:	Vertic	al	Frequ	ency Ran	ge:	3	0MHz to	1GHz
	EUT N	lode of Ope	eration:		Tra	ansmittir	ng (Mid C	Channel	- 2440 M	Hz)
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Correcte Level (dBµV/r	Limit	Level V/m)	Margin (dB)	Test Resu
70.2463	10	39	1.35	Quasi-peak	39.7	19.528	3 29	9.5	-10.0	Pass
209.089	10	42	1.21	Quasi-peak	39.8	24.986	5 33	3.1	-8.1	Pass
258.563	10	187	1.31	Quasi-peak	37.7	27.046	5 35	5.6	-8.6	Pass
276.44	10	274	1.55	Quasi-peak	38.2	27.504	1 35	5.6	-8.1	Pass
515.576	10	71	3.99	Quasi-peak	36.7	30.578	3 35	5.6	-5.0	Pass
563.413	10	251	1.99	Quasi-peak	27.6	23.241		5.6	-12.4	Pass
773.87	10	36	2.08	Quasi-peak	28.9	28.512	2 35	5.6	-7.1	Pass
Radiated 30MHz-10 60 50 40 Mm 40 40 40 Mm 30 40 Mm 30 40 Mm	sional Testing, Emissions, 10m Di GHz Vertical Polarity	istance		Walter Market	×	▼—▼	Quasi-peak Lim Corrected Quas Corrected Peak Verified Low-PR LPRF Verification	i-peak Reading Value RF QP Reading	×	PROFESSION
18878_20	Spencer Flint 16 RE_2440M_30M PM, Tuesday, May 16			Free e: Transmitting er: 230 VAC/50 Hz	quency		-	FM-UNV nber: 18878-1 bell Building	5	16

						Hubbell C	ontrol Solutio	ons – NXOFI	M-1R1D-UNV
			Profes	sional Te	sting, El	VII, Inc.			
Test Metho	od:	ANSI C63.10 Devices	0-2013 America	an National Star	ndard of Proce	dures for Con	npliance Testii	ng of Unlicens	sed Wireless
In accordar	ice with:	FCC Part 15 Limits	209 - Code of	Federal Regulat	tions Part 47,	Subpart C - Int	entional Radia	ators, Radiate	ed Emissions
Section:		15.209							
Test Date(s	<u>):</u>	3/14/2017			EUT Serial	#:	0		
Customer:			uilding Auto	mation	EUT Part #:		0		
Project Nur		18878			Test Techn		Spencer Fli	nt	
Purchase O		0	A IV /		Supervisor		Lisa Arndt		
Equip. Und	er rest:	NXOFM-U	NV		Witness' N	ame:	None		
	F	Radiated E	nissions Test	t Results Data	a Sheet		Pa	ge: 1	of 1
EUT Li	ne Voltage:	: 2	30 VAC		EUT Pov	ver Frequen	cy: 5	0 Hz	
Antenna	orientation	n:	Horizor	ntal	Frequ	ency Range		30MHz to	1GHz
	EUT N	lode of Op	eration:		Tra	ansmitting (Mid Channe	el - 2440 M	Hz)
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
193.52	10	48	2.76	Quasi-peak	39.1	24.025	33.1	-9.1	Pass
210.746	10	275	3.02	Quasi-peak	44	29.184	33.1	-3.9	Pass
258.021	10	74	3.41	Quasi-peak	44.3	33.567	35.6	-2.0	Pass
272.471	10	61	1.86	Quasi-peak	38.4	27.767	35.6	-7.8	Pass
516.013	10	113	1.7	Quasi-peak	40.5	34.408	35.6	-1.2	Pass
562.179 772.882	10 10	132 109	3.02	Quasi-peak Quasi-peak	39.7 27.7	35.373 27.314	35.6 35.6	-0.2 -8.3	Pass Pass
772.002	10	103	3.02	Quasi-peak	21.1	27.314	33.0	-0.3	F d 3 3
Radiated 30MHz-10 60 1 50 1 50 1 50 1 50 1 50 1 50 1 50	Spencer Flint	stance	100M		X	∨ Corre Corre V Verifi × LPRF	peak Limit Level cted Quasi-peak Read cted Peak Value ed Low-PRF QP Readi Verification Limit		PROFESSIONAL TESTING
18878_20	16 RE_2440M_30M PM. Tuesday, May 16			e: Transmitting er: 230 VAC/50 Hz		P	roject Number: 18878 lient: Hubbell Building	-15	

≤ 1GHz Horizontal Antenna Polarity Measured Emissions

Client: Hubbell Building

04:57:00 PM, Tuesday, May 16,2017

7.3.2 1 GHz to 18 GHz, Bottom Channel

			Profess	sional Te	sting, El	VII, Inc.			
Test Metho	d:	ANSI C63.10- Devices	2013 America	ın National Sta	ndard of Proce	dures for Con	npliance Testi	ng of Unlicen	sed Wireless
In accordan	ice with:	FCC Part 15.2 Limits	209 - Code of F	ederal Regula	tions Part 47, S	Subpart C - Int	entional Radi	ators, Radiat	ed Emissions
Section:		15.209							
Test Date(s):	3/14/2017			EUT Serial	#:	0		
Customer:		Hubbell Bu	ilding Autor	mation	EUT Part #:		0		
Project Nur	nber:	18878			Test Techn	ician:	Spencer Fli	nt	
Purchase O		0			Supervisor		Lisa Arndt		
Equip. Und		NXOFM-UN	IV		Witness' N		None		
	F	Radiated Em	issions Test	Results Dat	a Sheet		Pa	ge: 1	of 1
EUT Li	ne Voltage	: 23	30 VAC		EUT Pow	ver Frequen	cy: 5	0 Hz	
Antenna	Orientatio	n:	Vertic	al	Frequ	ency Range:		Above 1	GHz
	EUT N	/lode of Ope	eration:		Tran	smitting (B	ottom Chan	nel - 2402	MHz)
Frequency Measured	Test Distance	EUT Direction	Antenna Height	Detector Function	Recorded Amplitude	Corrected Level	Limit Level (dBµV/m)	Margin (dB)	Test Results
(MHz)	(Meters)	(Degrees)	(Meters)		(dBµV)	(dBµV/m)			
3506.61	3	171	2.23	Average	34.8	29.041	54.0	-24.9	Pass
4804.03	3	204	1.26	Average	49.1	45.423	54.0	-8.5	Pass
11515.8	3	132	2.01	Average	27.3	38.366	54.0	-15.6	Pass
12490.4	3	237	2.16	Average	27.7	38.426	54.0	-15.5	Pass
14944.4	3	183	3.8	Average	28.3	40.15	54.0	-13.8	Pass
16235.9	3	262	3.74	Average	27.5	41.938	54.0	-12.0	Pass
16684.9	3	311	1.43	Average	27.2	41.201	54.0	-12.8	Pass
17811.2	3	94	3.34	Average	27	43.078	54.0	-10.9	Pass
Profess	sional Testing,	FM1 Inc				— Avera	g e Limit Level		
Radiated	Emissions, 3m Dis	tance				▽ Corre	cted Average Reading		
90 _‡						— Peak l	Limit Lev el		
80 -						— Corre	cted Peak Reading		PROFESSIONAL TESTING
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eld St				il i i i i i i i i i i i i i i i i i i	Ψ.	النبر إسلاميناه ويرسي والمالي	A STATE OF THE PARTY OF THE PAR		$\nabla \nabla$
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30	and the state of t			√					_
20									
20± 1G						,	10G		18G
Operator: S	Spencer Flint		EUT Mode		quency	E	UT: NXOFM-UNV		
			EU LIVIO DE	. 14					

> 1GHz Vertical Antenna Polarity Measured Emissions

			Profess	sional Te	sting, EN	VII, Inc.			
Test Metho	d:	ANSI C63.10- Devices	2013 America	n National Sta	ndard of Proce	dures for Con	npliance Testi	ng of Unlicen	sed Wireless
In accordan	ce with:	FCC Part 15.2 Limits	09 - Code of F	ederal Regulat	tions Part 47, S	Subpart C - Int	entional Radi	ators, Radiat	ed Emissions
Section:		15.209							
Test Date(s):	3/14/2017			EUT Serial	# :	0		
Customer:		Hubbell Bu	ilding Autoi	mation	EUT Part #:		0		
Project Nur	nber:	18878			Test Techni	ician:	Spencer Fli	nt	
Purchase O	rder #:	0			Supervisor:		Lisa Arndt		
Equip. Und	er Test:	NXOFM-UN	IV		Witness' N	ame:	None		
	R	tadiated Em	issions Test	Results Data	a Sheet		Pa	ge: 1	of 1
EUT Li	ne Voltage:	23	0 VAC		EUT Pow	er Frequen	cy: 5	0 Hz	
Antenna	Orientatio	n:	Horizon	tal	Frequ	ency Range:		Above 1	GHz
	EUT N	lode of Ope	ration:		Tran	smitting (B	ottom Chan	nel - 2402	MHz)
Frequency	Test	EUT	Antenna	Detector	Recorded	Corrected	Limit Level	Margin	
Measured (MHz)	Distance (Meters)	Direction (Degrees)	Height (Meters)	Function	Amplitude (dBμV)	Level (dBμV/m)	(dBµV/m)	(dB)	Test Result
3504.46	3	82	2.42	Average	35.2	29.437	54.0	-24.5	Pass
4803.97	3	75	2.77	Average	51.7	47.941	54.0	-6.0	Pass
13690.4	3	260	2.96	Average	28.4	38.467	54.0	-15.5	Pass
14911.2	3	50	1.13	Average	28.4	40.155	54.0	-13.8	Pass
15549.2	3	128	2.11	Average	27.1	40.723	54.0	-13.2	Pass
16231.6	3	92	2.77	Average	27.5	41.986	54.0	-12.0	Pass
16822.3	3	141	2.05	Average	27.5	40.76	54.0	-13.2	Pass
17827.8	3	308	1.81	Average	27	43.133	54.0	-10.8	Pass
Radiated	ional Testing, Emissions, 3m Dist orizontal Polarity Me	tance				▽ Corre	ge Limit Level cted Average Reading Limit Level cted Peak Reading		PROFESSIONAL TESTING
(W) 70 (Bp (ABp (ABp (ABp (ABp (ABp (ABp (ABp	and the same of th	and the description of the second			y and the same				**************************************
18878_201	Spencer Flint 16 RE_2402M_1-260 M,Friday,May 19,2		EUT Mode EUT Powe		quency	P	10G UT: NXOFM-UNV roject Number: 18878 lient: Hubbell Building	-15	18G

7.3.3 1 GHz to 18 GHz, Middle Channel

			Profess	sional Te	sting, EN	VII, Inc.			
Test Metho	d:	ANSI C63.10- Devices	-2013 America	ın National Sta	ndard of Proce	dures for Con	npliance Testir	ng of Unlicen	sed Wireless
In accordar	nce with:	Limits	209 - Code of I	ederal Regula	ions Part 47, S	Subpart C - Int	entional Radia	ators, Radiat	ed Emissions
Section:		15.209					<u> </u>		
Test Date(s	<u>;):</u>	3/14/2017			EUT Serial		0		
Customer:			ilding Auto	mation	EUT Part #:		0		
Project Nur		18878			Test Techni		Spencer Fli	<u>nt</u>	
Purchase O		0			Supervisor:		Lisa Arndt		
Equip. Und	er Test:	NXOFM-UN	IV		Witness' N	ame:	None		
	F	Radiated Em	issions Test	Results Dat	a Sheet		Pa	ge: 1	of 1
EUT Li	ne Voltage	: 23	30 VAC		EUT Pow	ver Frequen	cy: 5	0 Hz	
Antenna	Orientatio	n:	Vertic	al	Frequ	ency Range:	;	Above 1	GHz
	EUT N	/lode of Ope	eration:		Tra	ansmitting (Mid Channe	el - 2440 M	Hz)
Frequency	Test	EUT	Antenna		Recorded	Corrected			
Measured	Distance	Direction	Height	Detector	Amplitude	Level	Limit Level	Margin	Test Results
(MHz)	(Meters)	(Degrees)	(Meters)	Function	(dBμV)	(dBµV/m)	(dBµV/m)	(dB)	
3465.96	3	180	3.36	Average	35	29.103	54.0	-24.9	Pass
3554.21	3	286	2.54	Average	34.7	28.931	54.0	-25.0	Pass
4879.91	3	242	3.27	Average	50.8	47.339	54.0	-6.6	Pass
12198.8	3	320	2.73	Average	26.7	37.124	54.0	-16.8	Pass
14946.2	3	29	3.13	Average	28.2	40.118	54.0	-13.8	Pass
17767.8	3	104	1.09	Average	26.7	42.746	54.0	-11.2	Pass
17808.6	3	92	2.73	Average	27.1	43.142	54.0	-10.8	Pass
17835.7	3	19	3.09	Average	27	43.114	54.0	-10.8	Pass
	sional Testing,					— Avera	g e Limit Level		
	Emissions, 3m Dis ertical Polarity Meas					∇ Corre	cted Average Reading		
90∓ —						— Peak I	Limit Level		
80 -						— Corre	cted Peak Reading		PROFESSIONAL
70									1 E S 1 I N 6
Field Strength (dB trVm) 30 - 30 - 30 - 30 - 30 - 30 - 30 - 30									
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m 40					V		Marin Marin Marin		V
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20									
10				<u> </u>					
$q_G^{\frac{1}{2}}$							10G		18G
1G									
	Spencer Flint			Fre	luency	171	UT: NXOFM-UNV		
Operator:	Spencer Flint 16 RE_2440M_30M	-26G_04.til		Free: Transmitting r: 230 VAC/50 Hz	quency		UT: NXOFM-UNV roject Number: 18878	-15	

> 1GHz Vertical Antenna Polarity Measured Emissions

		Duefee						
		Profess	sional Te	sting, El	MI, Inc.			
od:	ANSI C63.10 Devices	0-2013 America	n National Sta	ndard of Proce	dures for Con	npliance Tes	sting of Unlicen	sed Wireless
nce with:	FCC Part 15. Limits	209 - Code of F	ederal Regula	tions Part 47, S	Subpart C - Int	entional Ra	diators, Radiat	ed Emissions
	15.209							
s):	3/14/2017	<u> </u>		EUT Serial	#:	0		
	Hubbell B	uilding Auto	mation	EUT Part #:		0		
mber:	18878			Test Techn	ician:	Spencer F	lint	
rder #:	0			Supervisor		Lisa Arnd	t	
er Test:	NXOFM-U	NV		Witness' N	ame:	None		
R	Radiated Er	nissions Test	Results Dat	a Sheet		P	Page: 1	of 1
ine Voltage:	: 2	30 VAC		EUT Pow	ver Frequen	cy:	50 Hz	
a Orientatio	n:	Horizon	ıtal	Frequ	ency Range:		Above 1	GHz
EUT N	lode of Op	eration:		Tra	ansmitting (Mid Chan	nel - 2440 N	IHz)
Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)			Test Results
3	103	1.28	Average	35.1	29.187	54.0	-24.8	Pass
		_						Pass
3	128	2.05		27.5	42.035	54.0	-11.9	Pass
3	71	3.18		27.2	41.415	54.0	-12.5	Pass
3	49	2.92	Average	27	42.617	54.0	-11.3	Pass
3	165	2.18	Average	27.1	43.233	54.0	-10.7	Pass
Emissions, 3m Dist	tance			*	▽ Corre	cted Average Read Limit Level	ling	PROFESSIONAL
	Test Distance (Meters) 3 3 3 3 3 3 sional Testing, Emissions, 3m Dis	Devices FCC Part 15. Limits 15.209 S): 3/14/2017 Hubbell Br mber: 18878 Order #: 0 er Test: NXOFM-U Radiated Err ine Voltage: 2 Orientation: EUT Mode of Op Test EUT Distance (Meters) (Degrees) 3 103 3 50 3 128 3 71 3 49	Devices FCC Part 15.209 - Code of I limits 15.209 3): 3/14/2017 Hubbell Building Autor mber: 18878 Order #: 0 er Test: NXOFM-UNV Radiated Emissions Test ine Voltage: 230 VAC a Orientation: Horizor EUT Mode of Operation: Test EUT Antenna Height (Meters) GMeters) (Degrees) (Meters) 3 103 1.28 3 50 1.14 3 128 2.05 3 103 3.18 3 49 2.92 3 165 2.18	Devices FCC Part 15.209 - Code of Federal Regular Limits 15.209 3): 3/14/2017 Hubbell Building Automation mber: 18878 Order #: 0 er Test: NXOFM-UNV Radiated Emissions Test Results Dat ine Voltage: 230 VAC a Orientation: Horizontal EUT Mode of Operation: Test Distance (Meters) Direction (Degrees) (Meters) 3 103 1.28 Average 3 50 1.14 Average 3 128 2.05 Average 3 128 2.05 Average 3 129 2.92 Average 3 49 2.92 Average 3 165 2.18 Average	Devices FCC Part 15.209 - Code of Federal Regulations Part 47, 9 Limits 15.209 S): 3/14/2017 EUT Serial 9 Hubbell Building Automation EUT Part #1 Bioder #: 0 Supervisor: Per Test: NXOFM-UNV Witness' N Radiated Emissions Test Results Data Sheet Ine Voltage: 230 VAC EUT Pow a Orientation: Horizontal Frequence EUT Mode of Operation: Transcription (Degrees) (Meters) 3 103 1.28 Average 35.1 3 50 1.14 Average 53 3 128 2.05 Average 27.5 3 71 3.18 Average 27.2 3 49 2.92 Average 27.3 Sional Testing, EMI, Inc Emissions, 3m Distance Emissions, 3m Distance Sional Testing, EMI, Inc Emissions, 3m Distance	Devices FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Int Limits 15.209 S): 3/14/2017	Devices Devices FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Ratimits 15.209	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiat Limits 15.209

EUT Mode: Transmitting EUT Power: 230 VAC /50 Hz

Frequency

EUT: NXOFM-UNV

Client: Hubbell Building

Project Number: 18878-15

Operator: Spencer Flint

18878_2016 RE_2440M_30M-26G_04.til

11:01:24 AM, Wednesday, May 17, 2017

7 3 4 1 GHz to 18 GHz Ton Channel

			Profess	sional Te	sting, El	MI, Ir	ıc.						
Test Metho	d:	ANSI C63.10	-2013 America	ın National Staı	ndard of Proce	dures fo	or Com	pliance	Testing	g of Ui	nlicens	ed Wire	eless
In accordar	ice with:	FCC Part 15.2	209 - Code of F	ederal Regulat	tions Part 47, 9	Subpart	C - Inte	entiona	I Radiat	ors, R	adiate	d Emiss	ions
Section:		15.209											
Test Date(s):	3/14/2017			EUT Serial	# :		0					
Customer:		_	ilding Auto	mation	EUT Part #:			0					
Project Nur		18878			Test Techn	ician:			er Flin	t			
Purchase O		0			Supervisor			Lisa A	rndt				
Equip. Und	er Test:	NXOFM-UN	IV		Witness' N	ame:	•	None					
	F	Radiated Em	nissions Test	Results Data	a Sheet				Page	e:	1	of	1
EUT Li	ne Voltage	23	30 VAC		EUT Pov	ver Fre	quenc	cy:	50		Hz		
Antenna	Orientatio	n:	Vertic	al	Frequ	ency Ra	ange:			Abo	ove 1	GHz	
	EUT N	/lode of Ope			•	ansmit		Top Ch	hannel				
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Correc Lev (dBμV	el	Limit l (dBμV		Mai (d	_	Test R	esults
3540.72	3	134	1.31	Average	34.7	28.9	83	54.	.0	-25	5.0	Pa	ss
4959.94	3	210	1.2	Average	54.7	51.4	75	54.	.0	-2	.5	Pa	SS
12396.7	3	56	3.74	Average	27.3	38.0	16	54.	.0	-15	5.9	Pa	SS
14877.8	3	123	1.96	Average	28.5	40.0	21	54.	.0	-13		Pa	SS
14888.1	3	9	2.73	Average	28.5	40.1		54.	.0	-13		Pa	SS
17760.3	3	135	2.89	Average	26.7	42.7	22	54.	.0	-11	L.2	Pa	SS
							[
Radiated 1-18GHz V 90 80	sional Testing, Emissions, 3m Dis ertical Polarity Measu	tance				_	7 Correct	ge Limit Level ted Average imit Level ted Peak Re	e Reading			PROFESS	
Field Strength (d B p V m) 30 30 30 40 40 40 40 40 40 40 40 40 40 40 40 40	and the second of the second o	and the second s			Y Andrew Alexanders Al	and the state of t	Medit at he was		10G	7	<u> </u>	186	;
1(+									-			100	
	Spencer Flint			Free	quency		EU	JT: NXOFM	M-UNV				

> 1GHz Vertical Antenna Polarity Measured Emissions

Client: Hubbell Building

12:43:49 PM, Wednesday, May 17, 2017

						Hubbell Co	3111101301	iutions -	INVOL	AI-TKTD.	-UIV
			Profess	sional Te	sting, El	MI, Inc.					
Test Method	:	ANSI C63.1 Devices	0-2013 America	an National Sta	ndard of Proce	dures for Con	npliance To	esting of	Unlicen	sed Wire	less
n accordance	e with:	FCC Part 15 Limits	.209 - Code of I	Federal Regula	tions Part 47, S	Subpart C - Int	entional R	Radiators	Radiate	ed Emissi	ions
Section:		15.209					_				
Test Date(s):		3/14/201	7		EUT Serial	#:	0				
Customer:		•	uilding Auto	mation	EUT Part #:		0				
Project Numl		18878			Test Techn	ician:	Spencer	Flint			
Purchase Ord	_	0			Supervisor		Lisa Arn	dt			
Equip. Under	Test:	NXOFM-U	INV		Witness' N	ame:	None				
	R	adiated E	missions Test	Results Dat	a Sheet			Page:	1	of	1
EUT Line	e Voltage:		230 VAC		EUT Pow	ver Frequen	су:	50	Hz		
Antenna (Orientatio	n:	Horizor	ntal	Frequ	ency Range:		Al	oove 1	GHz	
	EUT N	lode of O	eration:		Tra	ansmitting (Top Cha	nnel - 2	480 M	Hz)	
	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Lev (dBµV/r		argin dB)	Test Re	esults
3478.34	3	82	2.67	Average	35.3	29.49	54.0	-:	24.5	Pas	SS .
4959.92	3	66	2.86	Average	54.4	51.179	54.0	-	2.8	Pas	SS
14881.2	3	266	1.35	Average	28.5	40.06	54.0	-:	13.9	Pas	SS
16225.1	3	290	2.4	Average	27.6	42.107	54.0	-:	11.9	Pas	SS
17732.8	3	182	2.37	Average	26.7	42.703	54.0	=	11.3	Pas	SS
Radiated En	nal Testing, issions, 3m Dist	tance				∇ Corr— Peak	age Limit Level ected Average R Limit Level ected Peak Read	Ť		PROFESSI	IONAL IN 6
1873 2016	ncer Flint	G.til	EUT Mod		quency		100 ZUT: NXOFM-U	JNV	<u> </u>	18G	į

> 1GHz Horizontal Antenna Polarity Measured Emissions

7.3.5 18 GHz to 25 GHz, Bottom Channel

			Profess	sional Te	sting, EN	VII, Inc.			
Test Metho	od:	ANSI C63.10 Devices)-2013 America	an National Sta	ndard of Proce	dures for Con	npliance Testi	ng of Unlicer	sed Wireless
In accordar	nce with:	FCC Part 15.	209 - Code of I	Federal Regula	tions Part 47, S	Subpart C - Int	tentional Radi	ators, Radiat	ed Emissions
Section:		15.209							
Test Date(s	s):	3/14/2017	,		EUT Serial	#:	0		
Customer:	<u> </u>	_	uilding Auto	mation	EUT Part #:	<u> </u>	0		
Project Nui	mber:	18878			Test Techni	ician:	Spencer Fli	nt	
Purchase C		0			Supervisor:		Lisa Arndt		
Equip. Und	er Test:	NXOFM-U	NV		Witness' N		None		
	ı	Radiated Er	nissions Test	Results Dat	a Sheet		Pa	ge: 1	of 1
EUT L	ine Voltage	: 2	30 VAC		EUT Pow	ver Frequen	icy: 5	0 Hz	
Antenna	orientation of the contraction o	on:	Vertic	al	Frequ	ency Range		Above 1	.GHz
	EUT I	Mode of Op	eration:		Tran	smitting (B	ottom Chan	nel - 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
19217.9	3	182	1	Average	32.5	26.553	54.0	-27.4	Pass
20301.5	3	41	1	Average	32.6	26.886	54.0	-27.1	Pass
21612	3	347	1	Average	33	27.171	54.0	-26.8	Pass
23200.2	3	140	1	Average	33.7	28.579	54.0	-25.4	Pass
24009.3	3	293	1	Average	33.6	29.41	54.0	-24.5	Pass
24789.4	3	357	1	Average	34.3	30.478	54.0	-23.5	Pass
Radiated	sional Testing, Emissions, Measu Hz Vertical Polarity M	red at 1m and Sca	aled to 3m Distance	γ		▽ Corre — Peak	age Limit Level ected Average Reading Limit Level ected Peak Reading		PROFESSIONAL TESTING
Ī									26.5 G
20 18.0 G									
	Spencer Flint			Fre	quency	E	CUT: NXOFM-UNV		
Operator:	Spencer Flint 16 RE_2402M_1-26	6G.til	EUT Mode EUT Powe		quency		EUT: NXOFM-UNV Project Number: 18878	3-15	

						Hub	bell Co	ontroi	solutio	ons – N	IXOFI	M-1R1E)-UNV
			Profess	sional Te	sting, El	MI, I	lnc.						
Test Metho	d:	ANSI C63.10 Devices	-2013 America	n National Sta	ndard of Proce	dures	for Con	npliance	e Testir	ng of Ui	nlicens	sed Wire	eless
In accordan	ce with:	FCC Part 15.2 Limits	209 - Code of F	ederal Regula	tions Part 47, S	Subpar	t C - Int	entiona	al Radia	ators, R	adiate	ed Emiss	ions
Section:		15.209						_					
Test Date(s):	3/14/2017			EUT Serial	#:		0					
Customer:			ilding Auto	mation	EUT Part #:			0					
Project Nur		18878			Test Techn			Spend		nt			
Purchase O		<u>′</u> 0			Supervisor:			Lisa A	rndt				
Equip. Und	er Test:	NXOFM-U	NV .		Witness' N	ame:		None					
	F	Radiated En	nissions Test	Results Dat	a Sheet				Pag	ge:	1	of	1
EUT Li	ne Voltage:	: 2	30 VAC		EUT Pow	ver Fr	equen	су:	50	0	Hz		
Antenna	Orientatio	on:	Horizon	ital	Frequ	ency l	Range:			Abo	ove 1	GHz	
	EUT N	Node of Op	eration:		Tran	smitt	ing (Bo	ottom	Chan	nel - 2	402 I	MHz)	
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Le	ected vel V/m)	Limit I		Mar (di	_	Test R	esults
19215.7	3	16	1	Average	38.1	32.	178	54	.0	-21	L.8	Pa	SS
21612	3	313	1	Average	33.1	27.	199	54	.0	-26	5.8	Pa	SS
23786.5	3	165	1	Average	33.1	28.	763	54	.0	-25	5.2	Pa	SS
24016.1	3	298	1	Average	33.5		318	54		-24		Pa	SS
24351.8	3	236	1	Average	33.6		657	54	-	-24		Pa	
24535.2	3	36	1	Average	33.3	29.	317	54	.0	-24	1.6	Pa	SS
Radiated	ional Testing, Emissions, Measu Iz Horizontal Polarity	red at 1m and Sca	led to 3m Distance				∇ CorrePeak I	ge Limit Lev cted Averag Limit Level cted Peak R	e Reading			PROFESS	IONAL I N 6
Field Strength (d B µ V/m) 18 90 18 90 18 90 18 90 18 90	Nagarina de Cardella a de la				r, versi jahrt des strikturens hidden	and a second			, _Y				
Operator: \$	Spencer Flint 16 RE_2402M_1-26 YM, Friday, May 19,2		EUT Mode EUT Powe		quency		P	UT: NXOF! roject Numb	ber: 18878	-15		26.50	•

> 1GHz Horizontal Antenna Polarity Measured Emissions

7.3.6 18 GHz to 25 GHz, Middle Channel

		Profess	sional Te	sting, El	MI, Inc.			
Fest Method:	ANSI C63.10- Devices	2013 America	ın National Sta	ndard of Proce	dures for Con	npliance Testi	ng of Unlicen	sed Wireless
n accordance with:	FCC Part 15.2 Limits	209 - Code of F	ederal Regula	tions Part 47, S	Subpart C - Int	tentional Radi	ators, Radiat	ed Emissions
Section:	15.209							
Test Date(s):	3/14/2017			EUT Serial	#:	0		
Customer:		ilding Autor	mation	EUT Part #:		0		
Project Number:	18878			Test Techn		Spencer Fli	nt	
Purchase Order #:	0			Supervisor		Lisa Arndt		
Equip. Under Test:	NXOFM-UN	IV		Witness' N	ame:	None		
F	Radiated Em	issions Test	Results Dat	a Sheet		Pa	ge: 1	of 1
EUT Line Voltage	: 23	30 VAC		EUT Pov	ver Frequen	cy: 5	0 Hz	
Antenna Orientatio	on:	Vertic	al	Frequ	ency Range		Above 1	.GHz
EUT N	/lode of Ope	eration:		Tra	ansmitting ((Mid Chann	el - 2440 M	lHz)
Frequency Test Measured Distance (MHz) (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
19519.8 3	17	1	Average	42	36.053	54.0	-17.9	Pass
21962.8 3	30	1	Average	32.5	26.981	54.0	-27.0	Pass
22611.8 3	206	1	Average	33.2	28.191	54.0	-25.8	Pass
23559.6 3	305	1	Average	33.7	29.075	54.0	-24.9	Pass
23783.9 3	139	1	Average	33.1	28.764	54.0	-25.2	Pass
24409.6 3	262	1	Average	33.6	29.6	54.0	-24.4	Pass
24789.7 3	120	1	Average	34.2	30.372	54.0	-23.6	Pass
Professional Testing, Radiated Emissions, Measure 18-26.5 GHz Vertical Polarity M 90 80 70 40 40 40 40 40 40 40 40 40 40 40 40 40	red at 1m and Scal	ed to 3m Distance			▽ Corre — Peak	nge Limit Level ected Average Reading Limit Level ected Peak Reading		PROFESSIONAL TESTING

02:11:38 PM, Friday, May 19,2017

Client: Hubbell Building

			Profess	sional Te	sting, El	MI, I	nc.				
Test Metho	d:	ANSI C63.10- Devices	2013 America	nn National Star	ndard of Proce	dures	for Com	npliance Testir	ng of Unlice	ensed Wirel	ess
n accordan	ce with:	FCC Part 15.2 Limits	109 - Code of I	ederal Regulat	tions Part 47, 9	Subpart	t C - Int	entional Radia	ators, Radi	ated Emissio	ons
Section:		15.209									
Test Date(s)	:	3/14/2017			EUT Serial	#:		0			
Customer:		Hubbell Bu	ilding Auto	mation	EUT Part #:			0			
Project Nun	nber:	18878			Test Techn	ician:		Spencer Fli	nt		
Purchase O	rder #:	0			Supervisor:			Lisa Arndt			
Equip. Unde	er Test:	NXOFM-UN	IV		Witness' N	ame:		None			
	F	Radiated Em	issions Test	Results Data	a Sheet			Pag	ge: 1	. of	1
EUT Liı	ne Voltage	: 23	30 VAC		EUT Pow	ver Fre	equen	cy: 50	0 Hz		
Antenna	Orientatio	n:	Horizor	ntal	Frequ	ency F	Range:		Above	1GHz	
	EUT N	/lode of Ope	eration:		Tra	ansmi	tting (Mid Channe	el - 2440	MHz)	
Frequency Measured	Test Distance	EUT Direction	Antenna Height	Detector Function	Recorded Amplitude	_	vel	Limit Level (dBµV/m)	Margin (dB)	Test Res	sults
(MHz)	(Meters)	(Degrees)	(Meters)	•	(dBµV)		V/m)				
19519.8	3	21	1	Average	36.2		277	54.0	-23.7	Pass	
21969.4	3	201	1	Average	32.5	26.		54.0	-27.0	Pass	
23774 23984.9	3	348	1	Average	33.2 33.5		867 278	54.0	-25.1	Pass	
24409.2	3	344 232	1	Average Average	33.5	_	278 504	54.0 54.0	-24.7 -24.5	Pass Pass	
24513.7	3	18	1	Average	33.5		437	54.0	-24.5	Pass	
24777.3	3	335	1	Average	34	_	194	54.0	-23.8	Pass	
2177710		000	_	71101080	<u> </u>	7		00		1 4 5 5	_
Duofoasi	ional Tastina	EMI Inc					— Avera	g e Limit Lev el			\equiv
	ional Testing, Emissions, Measu	red at 1m and Scal	ed to 3m Distance				∇ Corre	cted Average Reading			7
	z Horizontal Polarity	Measured Emissions									Ł
90							- Peak	Limit Level		nporreeio	MAI
80 -							— Corre	cted Peak Reading		PROFESSIO	N 6
Field Strength (d Bμ V/m) 100 100 100 100 100 100 100 1											
Field Stren	Anna de la contra d	and a second		distance and other second					النياتية البيانية	the state of the s	
30 = -								7 77 7			
20 18.0 G										26.5G	
		0M_30M-26G_04.til 2017		Free: Transmitting r: 230 VAC /50 Hz	quency		P	UT: NXOFM-UNV roject Number: 18878 lient: Hubbell Building			
		> 1G	Hz Horizont	al Antenna F	Polarity Mea	sured	Emiss	sions			

7.3.7 18 GHz to 25 GHz, Top Channel

			Profess	sional Te	sting, EN	MI, I	nc.					
Test Metho	od:	ANSI C63.10 Devices	-2013 America	ın National Staı	ndard of Proce	dures f	or Con	npliance	Testing	of Unlice	nsed Wi	reless
n accordar	nce with:	FCC Part 15.2 Limits	209 - Code of I	ederal Regulat	tions Part 47, S	Subpart	C - Int	entiona	l Radiat	ors, Radia	ted Emis	ssions
Section:		15.209						P.				
Test Date(s	s):	3/14/2017			EUT Serial			0				
Customer: Project Nui	mhori	18878	ilding Auto	mation	EUT Part #:			0 Spence	or Elin	<u> </u>		
Purchase O		0			Supervisor:			Lisa Ar		<u> </u>		
quip. Und		NXOFM-UN	١٧		Witness' Na			None	···at			
				Results Data					Page	e: 1	of	1
EUT Li	ine Voltage		30 VAC		EUT Pow	ver Fre	quen	cy:	50			
	a Orientatio		Vertic	al		ency R		-		Above	1GHz	
	EUT N	/lode of Ope	eration:			•			annel	- 2480 N	ЛHz)	
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corre Lev (dBµ\	cted rel	Limit L (dBμV	evel	Margin (dB)		Result
19839.9	3	17	1	Average	40.8	35.0)25	54.	0	-18.9	Pa	ass
22330	3	33	1	Average	33.1	27.9	95	54.	0	-26.0	Pa	ass
23544.2	3	306	1	Average	33.7	29.0		54.		-24.9	Pa	ass
24158.7	3	63	1	Average	33.4	29.3		54.		-24.6		ass
24548.1 24793.5	3	205 341	1	Average Average	33.4 34.2	29.4 30.4		54. 54.		-24.5 -23.5	_	ass ass
Radiated	sional Testing, Emissions, Measu Hz Vertical Polarity M	red at 1m and Scal	ed to 3m Distance				∨ Corre	ge Limit Leve cted Average Limit Level cted Peak Rea	Reading		PROFES T E S	SSIONAL T I N 6
Бield Strength (d ВµVm) (4 BµVm) (4 Bµ			_									
30	والمتعرب والمراجع والماري	Mongolishaddayati	المادوب الماداء	Malinghallangagala	Manufacturing as a self-		en el la compansión de la		uli julius jur		ad planting	
					<u> </u>		ľ	Ĭ				
20± 18.0G	Spencer Flint		-	Free:: Tx	quency		E	UT: NXOFM	I-UNV		26.	5G

						Hub	bell Co	ontrois	solutio	ons – N	XOFN	И-1R1D)-UN\
			Profess	sional Te	sting, El	MI, I	nc.						
Test Metho	d:	ANSI C63.10 Devices	-2013 America	n National Star	ndard of Proce	dures	for Com	pliance	e Testir	ng of Un	licens	ed Wire	eless
In accordan	ce with:	FCC Part 15.2 Limits	209 - Code of F	ederal Regulat	tions Part 47,	Subpart	t C - Int	entiona	al Radia	ators, Ra	diate	d Emiss	ions
Section:		15.209						_					
Test Date(s):	3/14/2017											
Customer:			ilding Auto	mation	EUT Part #:			0					
Project Nur		18878			Test Techn			Spend		nt			
Purchase O		0			Supervisor			Lisa A	rndt				
Equip. Und	er Test:	NXOFM-UI	NV .		Witness' N	ame:		None					
	F	Radiated En	nissions Test	Results Data	a Sheet				Pag	ge:	1	of	1
EUT Li	ne Voltage:	. 2	30 VAC		EUT Pov	ver Fre	equen	су:	50	0 H	Ηz		
Antenna	Orientatio	n:	Horizon	tal	Frequ	ency F	Range:			Abov	ve 10	3Hz	
	EUT N	lode of Op	eration:		Tra	ansmi	tting (Top C	hanne	el - 248	0 MI	tz)	
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Le	ected vel V/m)	Limit I		Marg (dB		Test Ro	esults
19839.7	3	245	1	Average	32.7	26	.96	54	.0	-27.	0	Pas	SS
22325.4	3	102	1	Average	33.1	27.	997	54	.0	-26.	0	Pas	SS
23560.1	3	67	1	Average	33.7	29.	072	54	.0	-24.		Pas	SS
23996.9	3	75	1	Average	33.5		349	54		-24.		Pas	
24541.5	3	301	1	Average	33.4	_	343	54	-	-24.		Pa	
24796.4	3	296	1	Average	34.2	30.	396	54	.0	-23.	6	Pas	SS
Radiated	ional Testing, Emissions, Measun Iz Horizontal Polarity	red at 1m and Sca	led to 3m Distance				∇ CorrectPeak I	ge Limit Lev eted Averag .imit Level eted Peak R	e Reading			PROFESS!	IONAL I N 6
Field Strength (d B µ V) (m) (100 gr) (والمراجعة والمراجعة والمرجعة	indepolation to entire to entire y			\(\begin{array}{cccccccccccccccccccccccccccccccccccc			y the same of the	Y		philip to the same of the same	26.5	G
18878_201	Spencer Flint 16 RE_2480M_1-26 M,Friday,May 19,2		EUT Mode EUT Powe		quency		P	UT: NXOF! roject Numb lient: Hubb	ber: 18878	-15			

> 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 soldered to the circuit 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	18 May 2017

9.3 Test Results

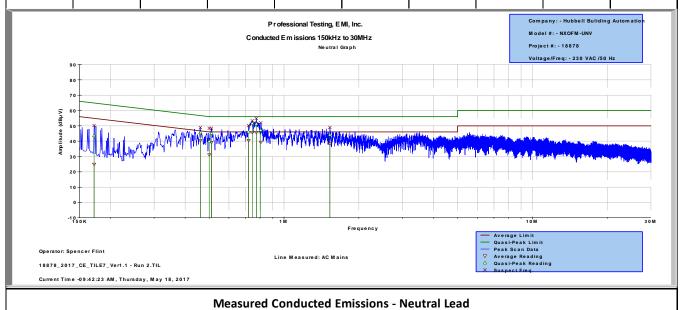
The EUT satisfied the criteria.

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:	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):	5/18/2017	EUT Serial #:	0							
Customer:	Hubbell Building Automation	EUT Part #:	NXOFM-UNV							
Project Number:	18878	Test Technician:	Spencer Flint							
Purchase Order #:	0	Supervisor:	Lisa Arndt							
Equip. Under Test:	NXOFM-UNV	Witness' Name:	Tom Hartnagel							

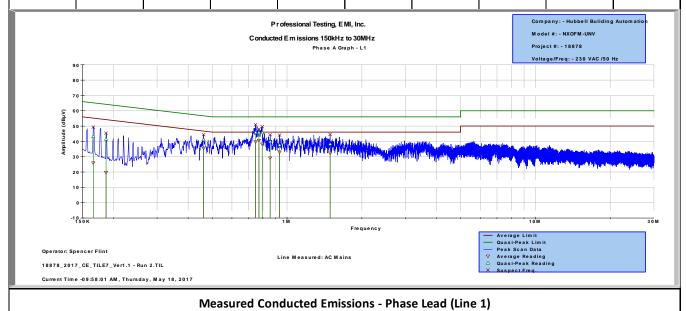
	Conduct	ed Emissions	Test Result	s Data Sheet	- Neutral Le	ad	Pa	ge: 1	of 2
EU	T Line Volta	ge:	230	VAC	EUT	Line Freque	ncy:	50	Hz
Frequency Measured (MHz)	Peak Detector Reading (dBµV)	Quasi-peak Detector Reading (dBµV)	Quasi-peak Detector Limit (dBµV)	Quasi-peak Detector Margin (dB)	Quasi-peak Detector Test Results	Average Detector Reading (dBµV)	Average Detector Limit (dBµV)	Average Detector Margin (dB)	Average Detector Test Results
0.1719	50.3	43.6	64.9	-21.2	PASS	24.9	54.9	-30	PASS
0.4604	50.4	45.6	56.7	-11.1	PASS	40.3	46.7	-6.4	PASS
0.5	49.6	39.9	56	-16.1	PASS	31.1	46	-14.9	PASS
0.5102	49.4	45.1	56	-10.9	PASS	39.2	46	-6.8	PASS
0.7201	52.5	46	56	-10	PASS	40.5	46	-5.5	PASS
0.745	55.7	51.6	56	-4.4	PASS	45.6	46	-0.4	PASS
0.7739	56.1	51.3	56	-4.7	PASS	45.6	46	-0.4	PASS
0.8057	55	47.1	56	-8.9	PASS	39.3	46	-6.7	PASS
1.5291	49.3	44.1	56	-11.9	PASS	38.2	46	-7.8	PASS
	I	I	ı	1			l		



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:	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):	5/18/2017	EUT Serial #:	0							
Customer:	Hubbell Building Automation	EUT Part #:	NXOFM-UNV							
Project Number:	18878	Test Technician:	Spencer Flint							
Purchase Order #:	0	Supervisor:	Lisa Arndt							
Equip. Under Test:	NXOFM-UNV	Witness' Name:	Tom Hartnagel							

Conduc	Conducted Emissions Test Results Data Sheet - Phase Lead (Line 1)								
EUT Line V	oltage:	230	VAC	EUT Line Frequency:			50	Hz	
Frequency Measured (MHz) Pea Detec Readi (dBµ	or Detector Reading	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	
0.1659 51.3	43.2	65.2	-22	PASS	26	55.2	-29.2	PASS	
0.1868 50	41.4	64.2	-22.7	PASS	19.7	54.2	-34.5	PASS	
0.4614 44.9	41.1	56.7	-15.5	PASS	35.6	46.7	-11.1	PASS	
0.747 51.1	45.8	56	-10.2	PASS	39.7	46	-6.3	PASS	
0.7709 51.9	45.8	56	-10.2	PASS	40.6	46	-5.4	PASS	
0.7948 52.1	45.6	56	-10.4	PASS	38.3	46	-7.7	PASS	
0.8555 45.6	39.9	56	-16.1	PASS	29.2	46	-16.8	PASS	
0.9331 43.9	37.6	56	-18.4	PASS	33	46	-13	PASS	
1.4913 44.9	38.2	56	-17.8	PASS	32.3	46	-13.7	PASS	



10.0 Equipment

10.1 Spurious Radiated Emissions 30 MHz to 25 GHz

	Radiated Emissions Test Equipment List											
Ti	le! Software Version	on: 4.2.A	, May 23, 2010, 08:38:52 AM									
	Test Profile:		RE_ClassA - Boresite+Mast_LowPRF_ RE_ClassB - Boresite+Mast_LowPRF_									
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	НР	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	11968D Turntable, 4ft.		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							
_												

10.2 Bandwidth and Duty Cycle

Asset #	Manufacturer	Model #	Description	Calibration Due
2295	Agilent	E4440A	Spectrum Analyzer	30 Sep 2017
1831	НР	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

		sional Testing, EMI, Inc.		
7·				
ce with:		of Federal Regulations Part 47, Subpa	art B - Unintention	al Radiators,
15.10	7			
: 5/18/	2017	EUT Serial #:	0	
Hubb	ell Building Autom	nation EUT Part #:	NXOFM-UNV	
nber: 18878		Test Technician:	Spencer Flint	
rder #: 0		Supervisor:	Lisa Arndt	
r Test: NXOF	M-UNV	Witness' Name:	Tom Hartnagel	
	Conduct	ed Emissions Test Equipment List		
e! Software Versio	on: Versio	on: 7.1.2.17 (Jan 08, 2016 - 02:12:48 PM)	or 4.1.A.0, April 14, 2	2009, 11:01:00PM
Test Profile:	2017	_CE_TILE7_Ver1.1.TIL or CE_Marine_1	100616.TIL	
Manufacturer	Model	Equipment Nomenclature	Serial Number	Calibration Due Date
НР	8568B	Spectrum Analyzer 100Hz-1.5GHz	2517A01821	7/20/2017
НР	85662A	Spec Anal Dsply, use with A/N 1145	2349A06182	N/A
НР	85685A	RF Preselector	3010A01119	7/20/2017
НР	85650A	Quasi-Peak Adapter CISPR	3033A01458	7/20/2017
PTI	100k HPF	Filter, High Pass, 100kHz	none	2/2/2018
PTI	PTI-ALF4	Attenuator Limiter Filter	none	10/6/2017
HP	08444-60018	Cable, RF, BNC-BNC, 18", Grey	none	6/13/2018
Coleman Cable	RG-58A/U	Cable, BNC-BNC, 36" Black	None	3/25/2018
Pomona	RG-223	Cable 9 ft BNC RG-223 (black)	none	8/4/2018
EMCO	3825/2	LISN, 10kHz-100MHz	1235	8/1/2017
AilTech	91550-1M	Probe, Current, 10kHz-100MHz	1856	2/9/2018
Teseq	ISN T800	ISN-T8, Impedance Stabilization Network	27091	6/15/2017
EMCO	3825/2	LISN, 10kHz-100MHz	9010-1708	10/5/2017
HP	8447D	Preamp, 0.1-1300MHz, 26dB	1726A01364	2/12/2018
	Emiss Ene with: FCC P Condu 15.10 5/18/ Hubb Ber: 18878 der #: 0 Test: NXOF E! Software Version Test Profile: Manufacturer HP HP HP HP HP PTI PTI PTI PTI	Emissions from Low-Vo to with: FCC Part 15.107 - Code Conducted Limits 15.107 : 5/18/2017	Emissions from Low-Voltage Electrical and Electronic Equipment In 15.107 Every with: FCC Part 15.107 - Code of Federal Regulations Part 47, Subproconducted Limits 15.107 EVERT Serial #: Hubbell Building Automation EVT Part #: Beer: 18878 Ger #: O Supervisor: Conducted Emissions Test Equipment List El Software Version: Version: 7.1.2.17 (Jan 08, 2016 - 02:12:48 PM) Test Profile: 2017_CE_TILE7_Ver1.1.TIL or CE_Marine_1 Manufacturer Model Equipment Nomenclature HP 8568B Spectrum Analyzer 100Hz-1.5GHz HP 8568CA Spec Anal Dsply, use with A/N 1145 HP 85685A RF Preselector HP 85685A RF Preselector HP 85650A Quasi-Peak Adapter CISPR PTI 100k HPF Filter, High Pass, 100kHz PTI PTI-ALF4 Attenuator Limiter Filter HP 08444-60018 Cable, RF, BNC-BNC, 18", Grey Coleman Cable RG-58A/U Cable, BNC-BNC, 36" Black Pomona RG-223 Cable 9 ft BNC RG-223 (black) EMCO 3825/2 LISN, 10kHz-100MHz Teseq ISN T800 ISN-T8, Impedance Stabilization Network EMCO 3825/2 LISN, 10kHz-100MHz LISN, 10kHz-100MHz LISN, 10kHz-100MHz	Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of Conducted Limits 15.107 EVENT SET 15.107 - Code of Federal Regulations Part 47, Subpart B - Unintentionic Conducted Limits 15.107 EVENT SET 15.10

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
Radiated Emissions	1 to 18 GHz	3 m	5.7

End	οf	R	en	ort
Lillu	VI.	7.	CD	UI L

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