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CERTIFICATION TEST REPORT

In Accordance With:	FCC Part 15 Subpart C, 15.249
Applicant:	Residential Control Systems 11481 Sunrise Gold Circle, Ste. 1 Rancho Cordova, CA 95742
Equipment Under Test (EUT):	Thermostat
Model:	TZ45
FCC ID Number:	WIBTZW008
Tested By:	Nemko USA Inc. 11696 Sorrento Valley Road, Suite F San Diego, CA 92121
Test Report:	2010 10159492 FCC
Date:	October 25, 2010
Project number:	58365-1
Total Number of Pages:	18

Section 1. Summary of Test Results

General

All measurements are traceable to national standards

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15; Subpart C. Radiated tests were conducted is accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

The assessment summary is as follows:

Apparatus Assessed:	Thermostat TZ45
Specification:	FCC Part 15 Subpart C, 15.249
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None

Report Release History:

REVISION	DATE	COMMENTS
-	October 25, 2010	Prepared By: Alan Laudani
-	October 25, 2010	Initial Release: Alan Laudani

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

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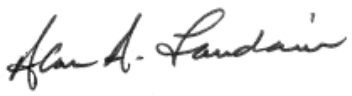

Alan Laudani, RF/EMC Test Engineer

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Section 2: Equipment Under Test

2.1 Theory of Operation

The TZ45 is a Thermostat. Its function is to communicate set point data with a furnace or air conditioner system. Unterminated typical wiring was added to ensure worst case spurious emissions. The EUT was exercised by an internal test program set to transmit with continuous modulation for RF testing.

The EUT's performance during test was evaluated against the performance criterion specified by applicable test standards. Performance results are detailed in the test results section of this report.

Highest frequency generated or used: **908.42 MHz**

2.4 Technical Specifications of the EUT

Manufacturer:	Residential Control Systems
Operating Frequency:	908.42 MHz in the 902--928 MHz Band
Measured Power:	Quasi-Peak 86.1 dBuV/m @ 3m or 20 mV/m
Modulation:	FSK
Antenna Data:	Circuitry trace – Not available
Antenna Connector:	NONE
Power Source:	"Wall Wart" power supply: Amseco Model XF-1640

Section 3: Test Conditions

3.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 15 Subpart C, 15.249
Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5850 MHz and 24.0-24.25 GHz bands.

IC RSS-210 Issue 7 June 2007
Low-power Licence-exempt Radio-communication Devices (All Frequency Bands): Category I Equipment. Annex 8 - Frequency Hopping and Digital Modulation Systems Operating in the Bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

IC RSS-Gen Issue 2 June 2007
General Requirements and Information for the Certification of Radio-communication Equipment

3.2 Deviations From Laboratory Test Procedures

No deviations from Laboratory Test Procedure

3.3 Test Environment

All tests were performed under the following environmental conditions:

Temperature range	:	14 – 22 ^{o}C
Humidity range	:	32--66 %
Pressure range	:	102.0 kPa
Power supply range	:	+/- 5% of rated voltages

3.4 Test Equipment

Nemko ID	Device	Mfr.	Model	Serial Number	Cal Date	Cal Due Date
110	Antenna, LPA	EMCO	LPA-25	1217	1/10/2009	2/10/2011
128	Antenna, Bicon	EMCO	3104	2882	2/9/2009	2/9/2011
317	Preamplifier	HP	8449A	2749A00167	5/7/2010	5/7/2011
395	LISN	Solar	9348-50-R-24-BNC	941718	4/9/2010	4/9/2011
674	Spectrum Analyzer	HP	8568B	2007A00910	5/14/2010	5/14/2011
675	Spectrum Analyzer Display	HP	85662A	2005A01282	5/14/2010	5/14/2011
676	Quasi-Peak Adapter	HP	85650A	2430A00576	5/14/2010	5/14/2011
682	Transient Limiter	HP	11974A	3107A02633	1/26/2010	1/26/2011
814	Multimeter	Fluke	111	78130060	9/16/2009	9/16/2011
835	Spectrum Analyzer	Rohde & Schwarz	RHDFSEK	829058/005	7/12/2010	7/12/2011
877	Antenna, DRG Horn, .7-18GHz	AH Systems	SAS-571	688	8/16/2010	8/16/2011
898	EMI Receiver & filter set	HP	8546A	3625A00348	6/22/2010	6/22/2011
899	Filter Section	HP	85460A	3448A00288	6/22/2010	6/22/2011
NA	Regulating Transfmr, TDGC	0-250VAC	NA	NA	NCR	NCR

Registration of the OATS are on file with the Federal Communications Commission, under Registration Number 90579, the VCCI under registration number R-3027, and are also registered with Industry Canada under Site Numbers 2040B-1 and 2040B-2.

Section 4: Observations

4.1 Modifications Performed During Assessment

No modifications were performed during assessment.

4.2 Record Of Technical Judgements

No technical judgements were made during the assessment.

4.3 EUT Parameters Affecting Compliance

The user of the apparatus could not alter parameters that would affect compliance.

4.4 Tests Deleted

No Tests were deleted from this assessment.

4.5 Additional Observations

There were no additional observations made during this assessment.

Section 5: Results Summary

This section contains the following:

FCC Part 15 Subpart C: Test Results.

The column headed “Required” indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

N No: not applicable / not relevant
Y Yes: Mandatory i.e. the apparatus shall conform to these tests.
N/T Not Tested, mandatory but not assessed. (See section 4.4 Test deleted)

The results contained in this section are representative of the operation of the apparatus as originally submitted.

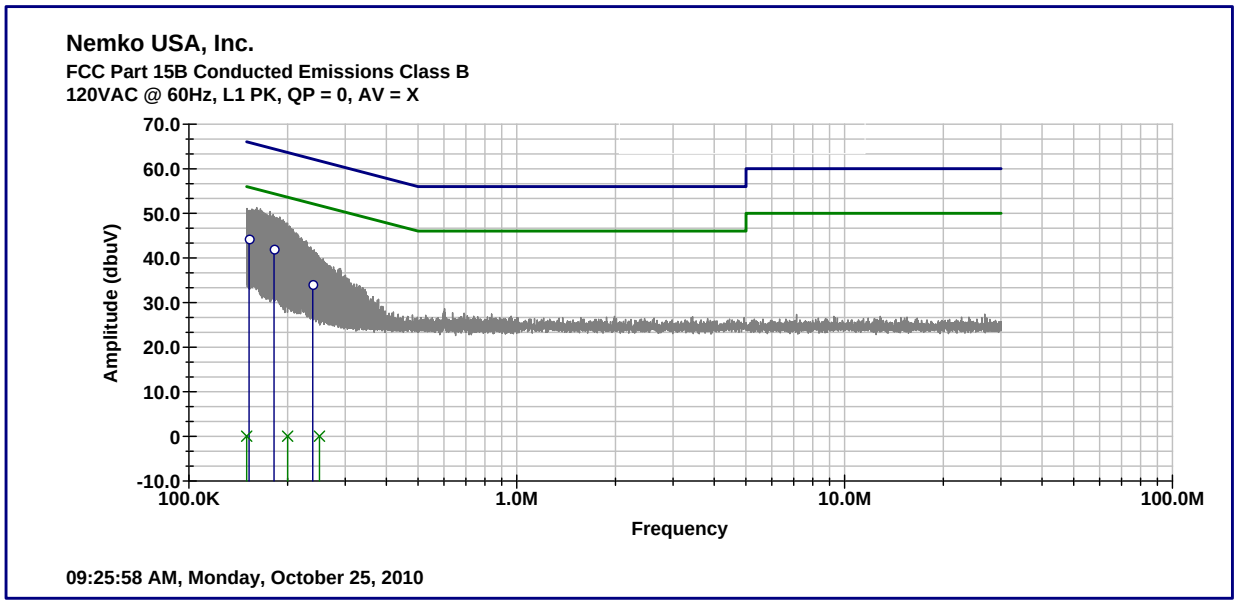
5.1 FCC Part 15 Subpart C Test Results

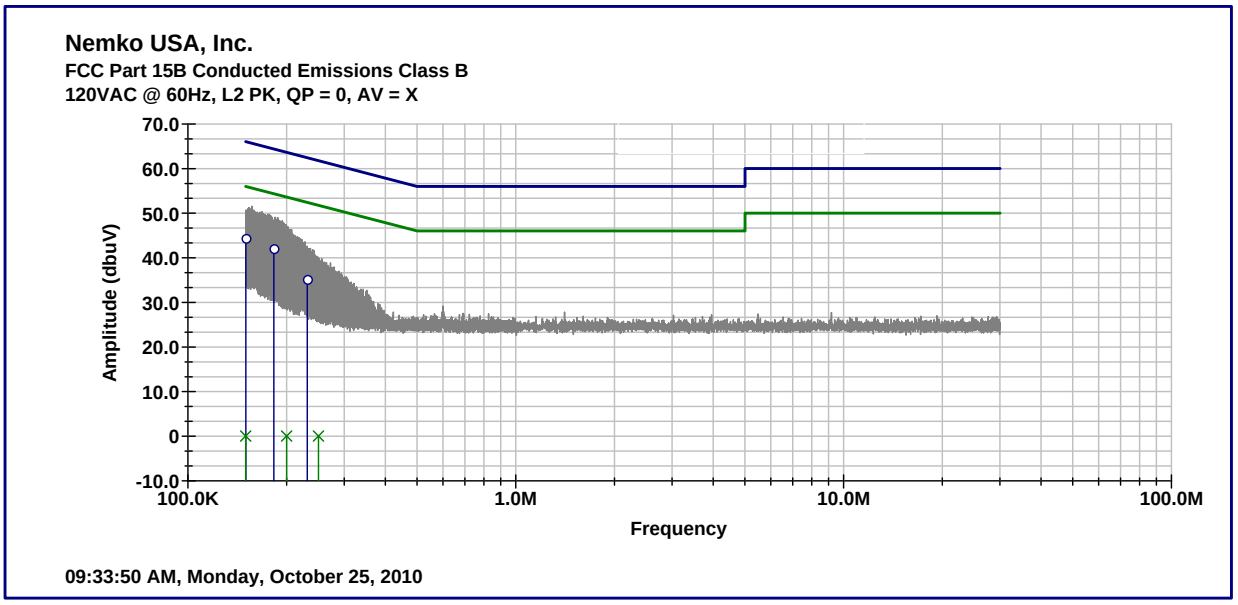
FCC	Industry Canada	Test Description	Required	Result
15.107 (a)	RSS-Gen 7.2.2	Power line Conducted Emissions – Receive or Stand-by Mode	Y	Pass
15.207 (a)	RSS-Gen 7.2.2	Power line Conducted Emissions -- Transmit Mode	Y	Pass
15.215 (c)	RSS-Gen 4.6.1	Occupied Bandwidth	Y	Pass
		Duty Cycle Test	Y	Pass
15.249 (a)	RSS-Gen 4.8 & 4.9 & RSS-210 A2.9	Field Strength of Emissions	Y	Pass
15.249 (d) 15.209 (a)	RSS-Gen 4.9 & RSS-210 A2.9	Spurious Emissions Outside of the band	Y	Pass
15.249 (b)		Fixed Point-to-Point Operation	N	
15.109 (a)	RSS-Gen 4.10 RSS-Gen 7.2.3	Receiver Spurious Emissions	Y	Pass

Appendix A: Test Results

Conducted Emissions Test Data

Client	Residential Control Systems	Temperature	22	°C
Pan #	58365-1	Relative Humidity	36	%
EUT Name	Thermostat	Barometric Pressure	102.0	kPa
EUT Model	TZ45	Test Location	Enclosure 2	
Governing Doc	CFR 47, Part 15B	Test Engineer	Alan Laudani	
Basic Standard	Sec. 15.207 Class "B" Transmit	Date of test	October 25, 2010	
Test Parameters	Peak RBW: 100kHz VBW: 100kHz Quasi-Peak: RBW 9kHz, VBW 30 kHz Average: RBW 9kHz, VBW 30 kHz Quasi-Peak Limit Blue Line, Average Limit Green Line			





Clause 15.215(c) Occupied Bandwidth

Test Conditions:

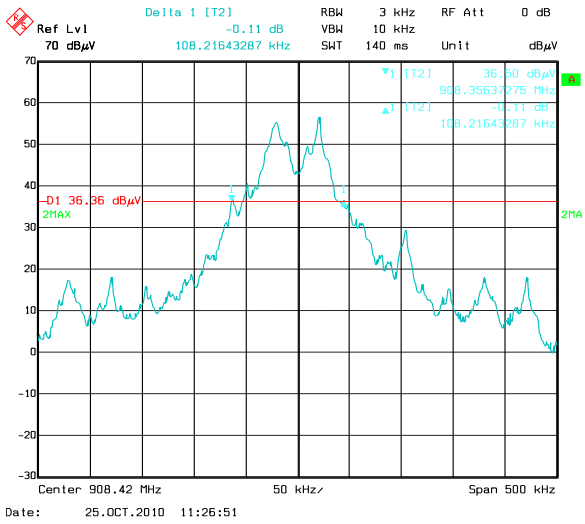
Client	**Residential Control Systems**	Temperature	22
Pan #	58365-1	Relative Humidity	36
EUT Name	**Thermostat**	Barometric Pressure	102.0
EUT Model	TZ45	Test Location	South OATS
Governing Doc	CFR 47, Part 15C	Test Engineer	Alan Laudani
Basic Standard	Sec. 15.249 Transmit	Date of test	October 25, 2010

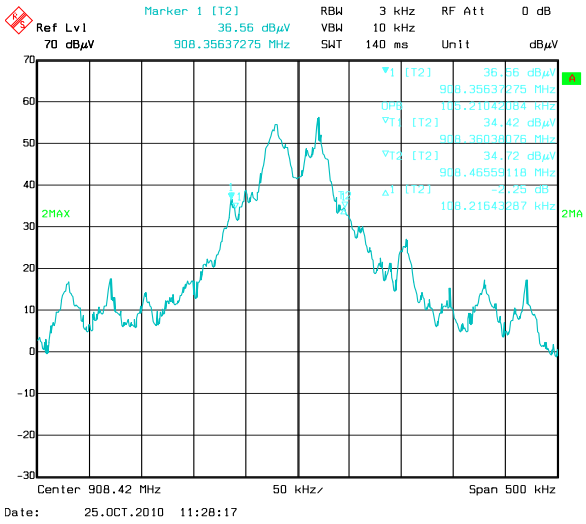
15.215(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in Sec. Sec. 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

4.6.1 Occupied Bandwidth When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured. The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

Test Results:

Measured Occupied Bandwidth: 108 kHz 20dBc and 105 kHz 99%BW





Radiated Emissions within Restricted Bands

(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (uV/meter)	Measurement Distance (meter)
0.009-0.490	2400/F (kHz)	300
0.490-1.705	24000/F (kHz)	30
1.705-30.0	30	3
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Radiated Emissions

Clause 15.249(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency (MHz)	Field strength of fundamental (mV/meter)	Field strength of harmonics (uV/meter)
902-928	**50**	**500**
2400-2483.5	50	500
5725-5875	50	500
24000-24250	250	2500

Clause 15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Sec. 15.209, whichever is the lesser attenuation.

Test Conditions:

Sample Number:	**TZ45**	**Temperature:**	16°C
Date:	10-25-2010	**Humidity:**	58%
Modulation State:	w/ modulation	**Tester:**	Alan Laudani
		Laboratory:	SOATS

Test Results:

See Table. EUT complies for fundamental power, bandedges and spurious emissions.

Additional Observations:

The Spectrum was searched from 30MHz to the 10th Harmonic (9280 MHz).

These results apply to emissions that may be found in the restricted bands defined in FCC Part 15 Subpart C, 15.205. The EUT was investigated with a variac that showed no output power differences when the line voltage was varied by +/- 15 % of nominal 120 Vac.

All Measurements below 1GHz were performed at 3m employing a CISPR quasi-peak detector, except for the radio's fundamental. Peak measurements above 1GHz were done utilizing RBW of 1MHz and VBW of 3MHz. Average measurements above 1GHz were done utilizing RBW of 1MHz and VBW of 10Hz as the duty cycle was 100%.

Measurements made at the 3 meter Outside Area Test Site, all measurements max hold after peaking for EUT rotation and antenna height from 1 to 4 meters.

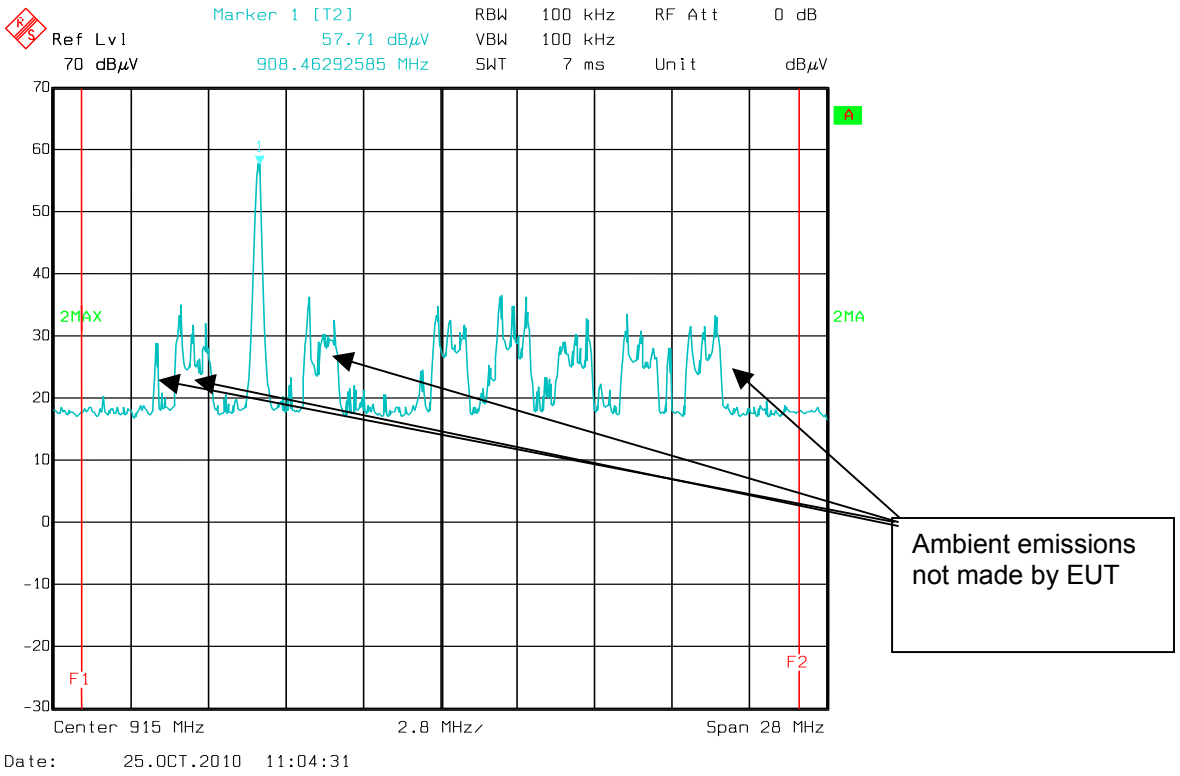
Fundamental power was measured at 1 MHz RBW, 3 MHz VBW to ensure capture of entire emissions envelope. 15.249(e). And the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. The peak field strength emission passes when measured at max hold RBW of 1 MHz with 3 MHz VBW. The Fundamental was also measured with a Quasi-Peak detector as it was less than 1000 MHz.

The 908.42 MHz signal did not effect either the lower or upper band edge of 902 to 928 MHz. No other emissions found within 20 dB of the limits.

Actual measurements Bandedge were done using a Quasi-Peak detector, see table below.

EUT passes Bandedge.

Red lines are band edge 902 to 928 MHz



Note: *Corrected Reading Computations*
Peak = Maximum Meter Reading + Antenna Factor + Path Loss
86.2 = 58.6 + 23.4 + 4.2

EUT **passes**
Limit = 50 mV/m
Corrected Quasi-Peak Reading = 86.1 dBuV/m
$10^{((86.1-120)/20)}$ *= 0.020V/m, or 20 mV/m*
No other emissions found within 20 dB of the limits.

Radiated Emissions Data

Job # :	58365-1	Date :	10-25-2010	Page 1 of 1	
NEX #:	159492	Time :	1035		
		Staff :	aal		
Client Name :	Residential Control Systems			EUT Voltage :	120
EUT Name :	Thermostat			EUT Frequency :	60
EUT Model # :	TZ45			Phase:	1
EUT Serial # :	NA			NOATS	
EUT Config. :	Transmit -continuous test mode			SOATS	X
				Distance < 1000 MHz:	3 m
				Distance > 1000 MHz:	3 m
Specification :	CFR47 Part 15, Subpart B, Class B				
Loop Ant. #:	NA				
Bicon Ant.#:	128_3m	Temp. (°C) :	16		
Log Ant.#:	110_3m	Humidity (%) :	51		
DRG Ant. #	877	Spec Analyzer #:	898	835 > 1GHz	
Cable LF#:	SOATS	Analyzer Display #:	898	835	
Cable HF#:	SOATS	Quasi-Peak Detector #:	898		
Preamp LF#:	NA	Preselector #:	899		
Preamp HF#	317				

Quasi-Peak	RBW:	120 kHz
	Video Bandwidth	300 kHz
Peak	RBW:	1 MHz
	Video Bandwidth	3 MHz
Average	RBW:	1 MHz
	Video Bandwidth	10 Hz

Measurements below 1 GHz are Quasi-Peak values, unless otherwise stated.
Measurements above 1 GHz are Average values, unless otherwise stated.

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
908.4	53.0	58.6	P	F	1.3	58.6	86.2	94.0	-7.8	Pass	
908.4	52.7	58.5	Q	F	1.3	58.5	86.1	94.0	-7.9	Pass	
908.4	52.0	58.2	A	F	1.3	58.2	85.8	94.0	-8.2	Pass	
902.0	0.9	1.3	Q	-	1.0	1.3	28.9	46.0	-17.2	Pass	
928.0	1.5	0.7	Q	-	1.0	1.5	29.0	46.0	-17.1	Pass	

Fixed Point-to-Point Operation

15.249 (b) Fixed, point-to-point operation as referred to in this paragraph shall be limited to systems employing a fixed transmitter transmitting to a fixed remote location. Point-to-multipoint systems, omnidirectional applications, and multiple co-located intentional radiators transmitting the same information are not allowed. Fixed, point-to-point operation is permitted in the 24.05–24.25 GHz band subject to the following conditions:
(1) The field strength of emissions in this band shall not exceed 2500 millivolts/meter.
(2) The frequency tolerance of the carrier signal shall be maintained within ±0.001% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.
(3) Antenna gain must be at least 33 dBi. Alternatively, the main lobe beamwidth must not exceed 3.5 degrees. The beamwidth limit shall apply to both the azimuth and elevation planes. At antenna gains over 33 dBi or beamwidths narrower than 3.5 degrees, power must be reduced to ensure that the field strength does not exceed 2500 millivolts/meter.

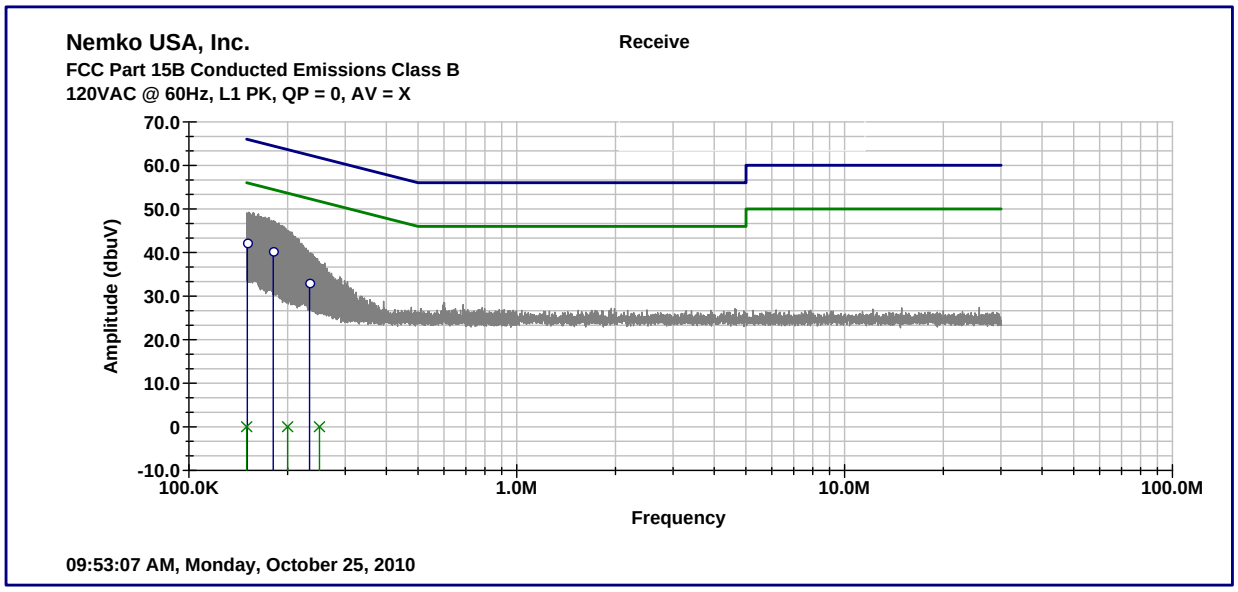
Test Conditions:

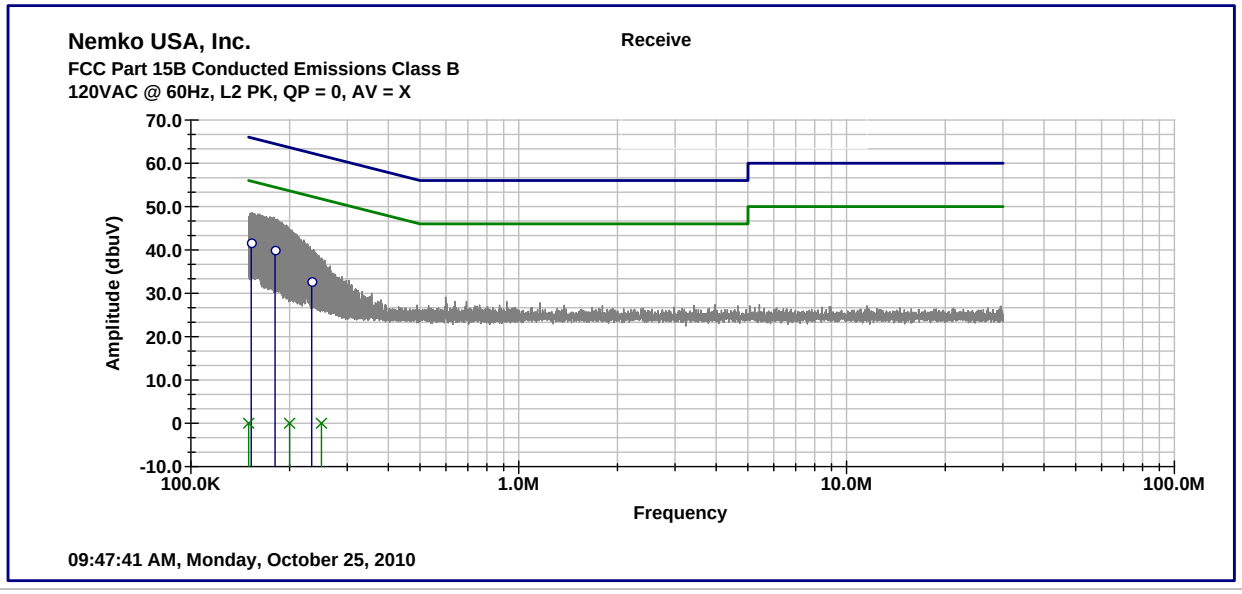
Sample Number:		**Temperature:**	
Date:		**Humidity:**	
Modification State:		**Tester:**	Alan Laudani
		Laboratory:	Nemko

Test Results: Not Applicable, EUT is not Point-to-Point.

Conducted Emissions Test Data—Receive Mode

Client	Residential Control Systems	Temperature	24	°C
Pan #	58365-1	Relative Humidity	51	%
EUT Name	Thermostat	Barometric Pressure	101.5	kPa
EUT Model	TZ45	Test Location	Enclosure 2	
Governing Doc	CFR 47, Part 15B	Test Engineer	Alan Laudani	
Basic Standard	Sec. 15.107 Class "B"	Date of test	October 25, 2010	
Test Parameters	Peak RBW: 100kHz VBW: 100kHz Quasi-Peak: RBW 9kHz, VBW 30 kHz Average: RBW 9kHz, VBW 30 kHz Quasi-Peak Limit Blue Line, Average Limit Green Line			





Radiated Emissions Test Data—Receive Mode

The following receiver spurious emission limits shall be complied with: If a radiated measurement is made, all spurious emissions shall comply with the limits of Table 1.

Table 1 - Spurious Emission Limits for Receivers

Spurious Frequency (MHz)	Field Strength (microvolt/m at 3 metres)
30-88	100
88-216	150
216-960	200
Above 960	500

Test Conditions:

Sample Number:	TZ45	**Temperature:**	16°C
Date:	10-25-2010	**Humidity:**	58%
Modulation State:	Standby / receive	**Tester:**	Alan Laudani
		Laboratory:	SOATS

Test Results:

The Spectrum was searched from 30 MHz to the 5th Harmonic (4550 MHz) of the fundamental.

No other emissions found within 20 dB of the limits.