Honeywell International Inc.

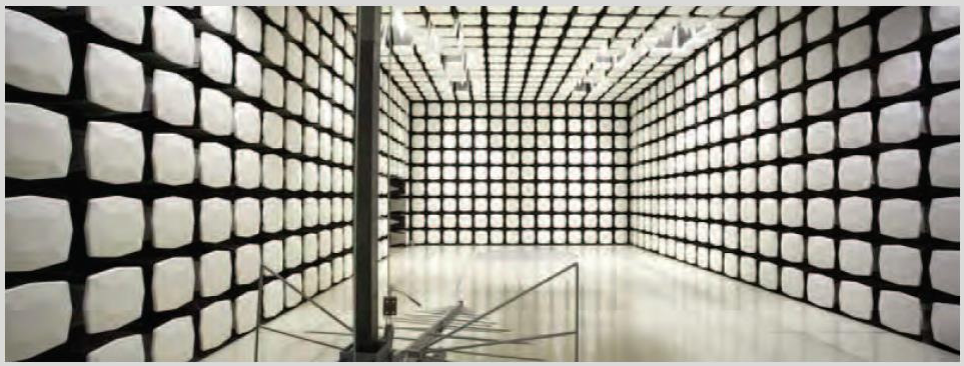
T6 Pro Z-Wave Programmable Thermostat

FCC 15.207:2017

FCC 15.249:2017

902 - 928 MHz Transceiver

Report # HNYW0209.1



NVLAP Lab Code: 200881-0

CERTIFICATE OF TEST

2017-1-25

Last Date of Test: October 11, 2017
Honeywell International Inc.
Model: T6 Pro Z-Wave Programmable Thermostat

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2017 Class B	ANSI C63.10:2013
FCC 15.249:2017	

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	
6.5	Field Strength of Fundamental	Yes	Pass	
6.5, 6.6	Field Strength of Harmonics and Spurious Radiated Emissions	Yes	Pass	

Deviations From Test Standards

None

Approved By:

Matt Nuernberg, Operations Manager

Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information.

REVISION HISTORY

Revision Number	Description	Date	Page Number
00	None		

ACCREDITATIONS AND AUTHORIZATIONS

2017.6.12

United States

FCC - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

A2LA - Accredited by A2LA to ISO / IEC 17065 as a product certifier. This allows Element to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

ISED - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with ISED.

European Union

European Commission – Within Element, we have a EU Notified Body validated for the EMCD and RED Directives.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

MSIP / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

BSMI – Recognized by BSMI as a CAB for the acceptance of test data.

NCC - Recognized by NCC as a CAB for the acceptance of test data.

Singapore

IDA – Recognized by IDA as a CAB for the acceptance of test data.

Israel

MOC – Recognized by MOC as a CAB for the acceptance of test data.

Hong Kong

OFCA – Recognized by OFCA as a CAB for the acceptance of test data.

Vietnam

MIC – Recognized by MIC as a CAB for the acceptance of test data.

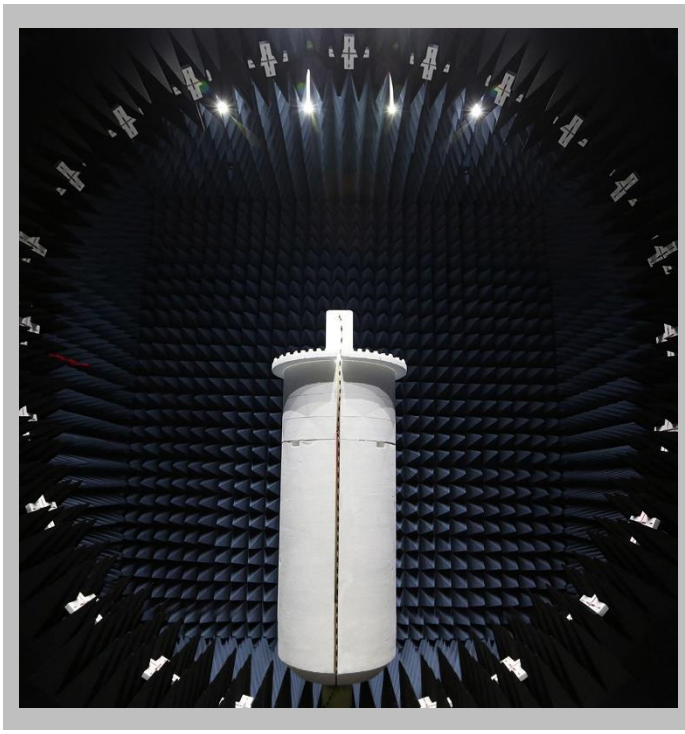
SCOPE

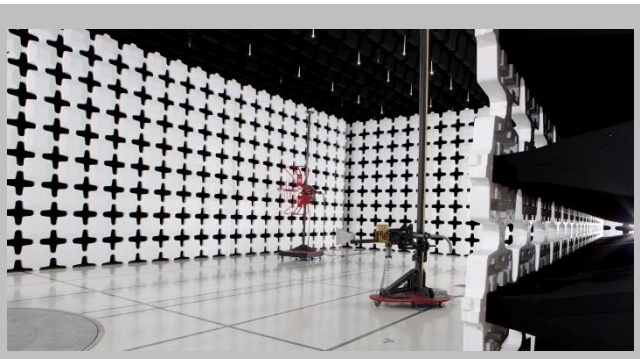
For details on the Scopes of our Accreditations, please visit:
http://portlandcustomer.element.com/ts/scope/scope.htm
http://gsi.nist.gov/global/docs/cabs/designations.html

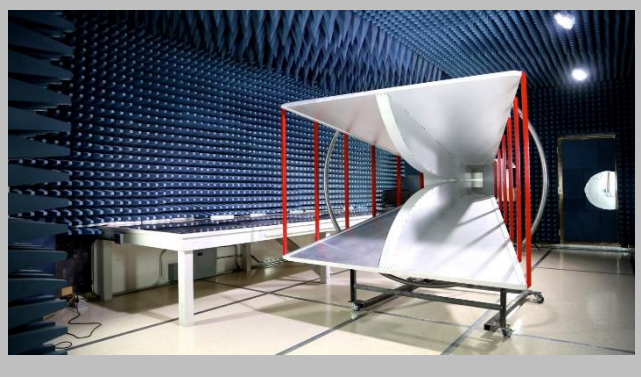
FACILITIES

2017.9.15

California	Minnesota	New York	Oregon	Texas	Washington
Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-08, MN10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Labs NC01-05 19201 120th Ave NE Bothell, WA 98011 (425)984-6600
NVLAP					
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0
Innovation, Science and Economic Development Canada					
2834B-1, 2834B-3	2834E-1, 2834E-3	N/A	2834D-1, 2834D-*2*	2834G-1	2834F-1
BSMI					
SL2-IN-E-1154R	SL2-IN-E-1152R	N/A	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI					
A-0029	A-0109	N/A	A-0108	A-0201	A-0110
Recognized Phase I CAB for ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA					
US0158	US0175	N/A	US0017	US0191	US0157







MEASUREMENT UNCERTAINTY

TMU.2015.07.10

Measurement Uncertainty

When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

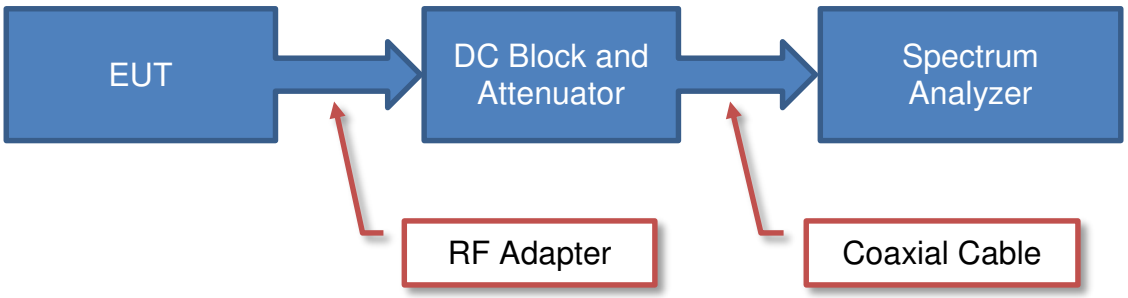
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found included as part of the applicable test description page. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-2 as applicable), and are available upon request.

The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

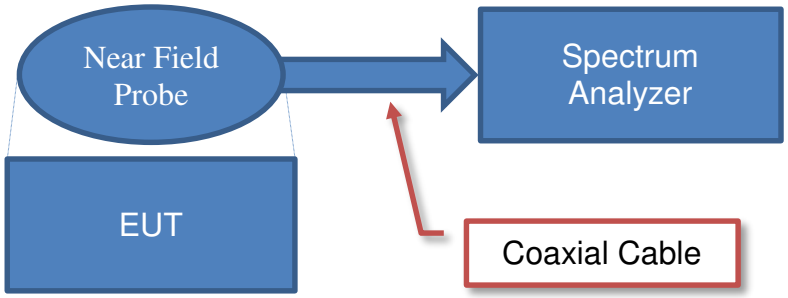
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	2.4 dB	-2.4 dB

Test Setup Block Diagrams

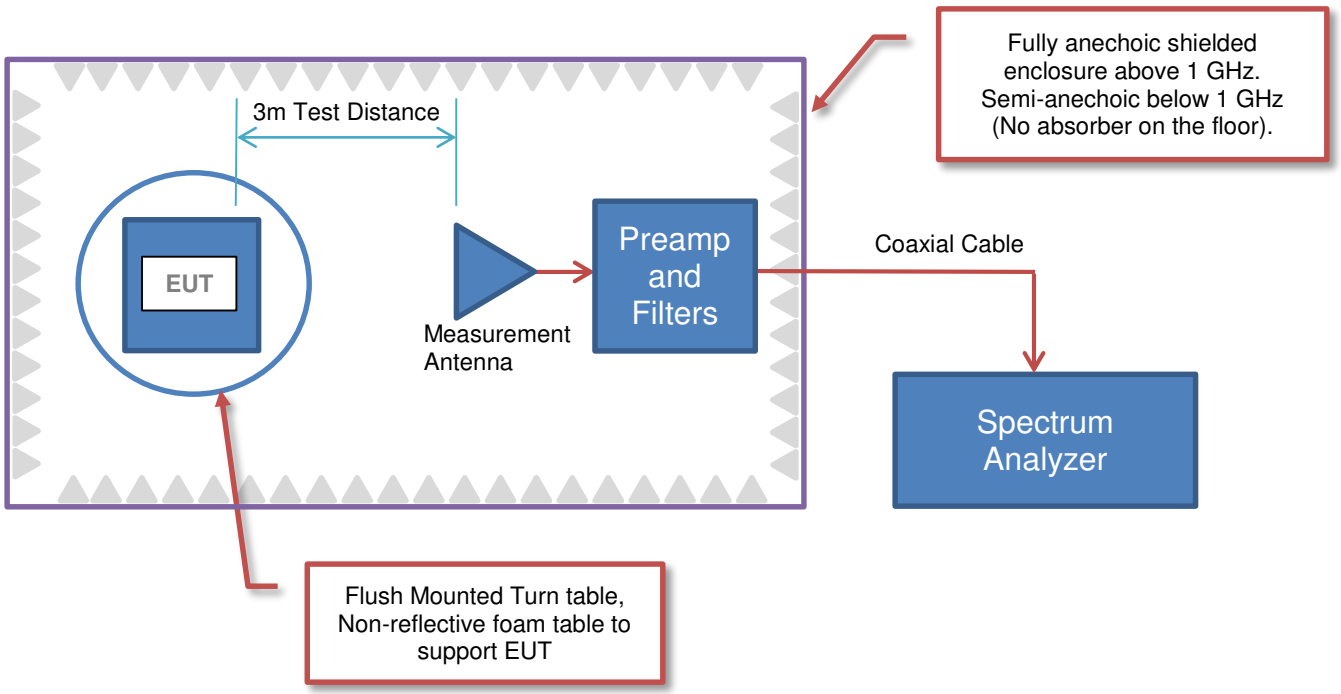
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	Honeywell International Inc.
Address:	1985 Douglas Drive North
City, State, Zip:	Golden Valley, MN 55422-3992
Test Requested By:	Dave Mulhouse
Model:	T6 Pro Z-Wave Programmable Thermostat
First Date of Test:	September 26, 2017
Last Date of Test:	October 11, 2017
Receipt Date of Samples:	September 26, 2017
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
The Honeywell T6 Pro Z-Wave Programmable Thermostat is a Z-Wave Plus certified thermostat capable to control up to three heat and two cool stages of heat pump, (incl. dual fuel heat pump systems) and up to two heat and two cool stage of conventional system (3H/2C HP, 2H/2C Conv.) It is one of the easiest smart thermostat to install and is controllable by all Z-Wave controllers (Z-Wave certified) that has the control capability for "Thermostat" devices. When integrated with the App that control your Z-Wave controller, it lets you to program and control your home's HVAC system as well as to control other Z-Wave devices connected to the same Z-Wave controller. Because of battery-powered thermostat, also low-voltage integrators can easily connect the thermostat to most of HVAC systems. Optional 24VAC powering via "C" or common wire is also available, if desired.

Testing Objective:
Seeking to demonstrate compliance under FCC 15.249:2017 for operation in the 902 - 928 MHz Band.

CONFIGURATIONS

Configuration HNYW0209- 1

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
T6 Pro Z-Wave Programmable Thermostat	Honeywell International Inc.	TH6320ZW2003	1729LBJ00151

Configuration HNYW0209- 2

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
T6 Pro Z-Wave Programmable Thermostat	Honeywell International Inc.	TH6320ZW2003	1729LBJ00151

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC Transformer	Honeywell International Inc.	AT87A	1106 4

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
24VAC Power	No	2.0m	No	T6 Pro Z-Wave Programmable Thermostat	AC Transformer
110VAC Power	No	0.2m	No	AC Transformer	AC Mains

CONFIGURATIONS

Configuration HNYW0209- 4

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
T6 Pro Z-Wave Programmable Thermostat	Honeywell International Inc.	TH6320ZW2003	1729LBJ00153

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC Transformer	Honeywell International Inc.	AT87A	1106 4

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
24VAC Power	No	2.0m	No	T6 Pro Z-Wave Programmable Thermostat	AC Transformer
110VAC Power	No	0.2m	No	AC Transformer	AC Mains

Configuration HNYW0209- 5

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
T6 Pro Z-Wave Programmable Thermostat	Honeywell International Inc.	TH6320ZW2003	1729LBJ00153

MODIFICATIONS

2017-1-25

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	9/26/2017	Field Strength of Harmonics and Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
2	10/2/2017	Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
3	10/11/2017	Field Strength of Fundamental	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWER SETTINGS

The EUT was tested using the power settings provided by the manufacturer:

SETTINGS FOR FIELD STRINGTH OF FUNDAMENTAL

Modulation Types	Position (if multiple channels)	Power Setting
Z-wave	Low Channel	0X0B
	High Channel	

SETTINGS FOR ALL OTHER TESTING IN THIS REPORT

Modulation Types	Position (if multiple channels)	Power Setting
Z-wave	Low Channel	0X0E
	High Channel	

POWERLINE CONDUCTED EMISSIONS

WTD.2017.06.02.1

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Per the standard, an insulating material was also added to ground plane between the EUT's power and remote I/O cables. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50ohm measuring port is terminated by a 50ohm EMI meter or a 50ohm resistive load. All 50ohm measuring ports of the LISN are terminated by 50ohm. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Receiver	Rohde & Schwarz	ESR7	ARI	6/4/2017	6/4/2018
Cable - Conducted Cable Assembly	Element	MNC, HGN, TYK	MNCA	1/27/2017	1/27/2018
LISN	Solar Electronics	9252-50-R-24-BNC	LIY	3/20/2017	3/20/2018

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

CONFIGURATIONS INVESTIGATED

HNYW0209-2

MODES INVESTIGATED

Tx modulated signal on Ch 0 (916MHz).

POWERLINE CONDUCTED EMISSIONS

WTD.2017.06.02.1

EUT:	T6 Pro Z-Wave Programmable Thermostat	Work Order:	HNYW0209
Serial Number:	1729LBJ00151	Date:	10/02/2017
Customer:	Honeywell International Inc.	Temperature:	21.9°C
Attendees:	Dave Mulhouse	Relative Humidity:	53.7%
Customer Project:	None	Bar. Pressure:	1015 mb
Tested By:	Kyle McMullan	Job Site:	MN03
Power:	110VAC/60Hz, Battery	Configuration:	HNYW0209-2

TEST SPECIFICATIONS

Specification: Equipment Class B	Method:
FCC 15.207:2017	ANSI C63.10:2013

TEST PARAMETERS

Run #:	12	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

None

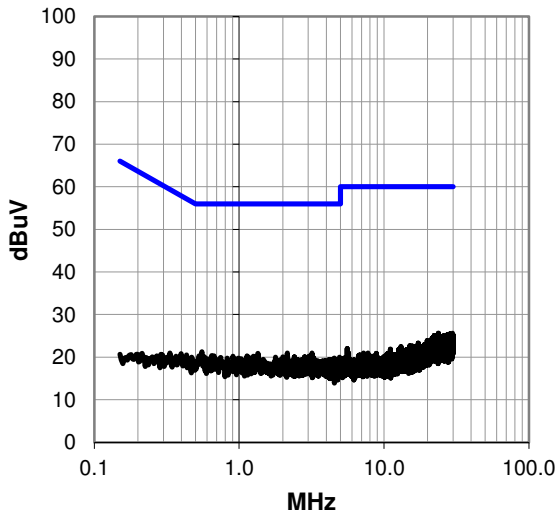
EUT OPERATING MODES

Tx modulated signal on Ch 0 (916MHz).

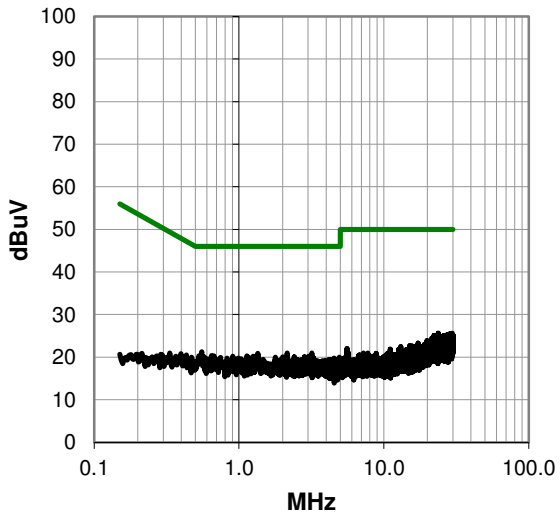
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

WTD.2017.06.02.1

RESULTS - Run #12

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
23.792	3.5	22.1	25.6	60.0	-34.4
29.631	2.7	22.9	25.6	60.0	-34.4
28.511	2.8	22.7	25.5	60.0	-34.5
0.553	1.0	20.3	21.3	56.0	-34.7
27.459	2.7	22.6	25.3	60.0	-34.7
29.978	2.3	22.9	25.2	60.0	-34.8
22.177	3.3	21.8	25.1	60.0	-34.9
26.784	2.7	22.4	25.1	60.0	-34.9
29.955	2.2	22.9	25.1	60.0	-34.9
2.146	0.6	20.4	21.0	56.0	-35.0
3.176	0.6	20.4	21.0	56.0	-35.0
22.195	3.1	21.9	25.0	60.0	-35.0
25.822	2.7	22.3	25.0	60.0	-35.0
1.348	0.6	20.3	20.9	56.0	-35.1
22.777	2.8	22.0	24.8	60.0	-35.2
28.653	2.1	22.7	24.8	60.0	-35.2
22.128	2.9	21.8	24.7	60.0	-35.3
29.231	1.8	22.7	24.5	60.0	-35.5
0.646	0.1	20.3	20.4	56.0	-35.6
21.479	2.6	21.8	24.4	60.0	-35.6
24.012	2.3	22.1	24.4	60.0	-35.6
27.881	1.8	22.6	24.4	60.0	-35.6
29.030	1.7	22.7	24.4	60.0	-35.6
29.586	1.6	22.8	24.4	60.0	-35.6
29.813	1.5	22.9	24.4	60.0	-35.6
29.843	1.5	22.9	24.4	60.0	-35.6

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
23.792	3.5	22.1	25.6	50.0	-24.4
29.631	2.7	22.9	25.6	50.0	-24.4
28.511	2.8	22.7	25.5	50.0	-24.5
0.553	1.0	20.3	21.3	46.0	-24.7
27.459	2.7	22.6	25.3	50.0	-24.7
29.978	2.3	22.9	25.2	50.0	-24.8
22.177	3.3	21.8	25.1	50.0	-24.9
26.784	2.7	22.4	25.1	50.0	-24.9
29.955	2.2	22.9	25.1	50.0	-24.9
2.146	0.6	20.4	21.0	46.0	-25.0
3.176	0.6	20.4	21.0	46.0	-25.0
22.195	3.1	21.9	25.0	50.0	-25.0
25.822	2.7	22.3	25.0	50.0	-25.0
1.348	0.6	20.3	20.9	46.0	-25.1
22.777	2.8	22.0	24.8	50.0	-25.2
28.653	2.1	22.7	24.8	50.0	-25.2
22.128	2.9	21.8	24.7	50.0	-25.3
29.231	1.8	22.7	24.5	50.0	-25.5
0.646	0.1	20.3	20.4	46.0	-25.6
21.479	2.6	21.8	24.4	50.0	-25.6
24.012	2.3	22.1	24.4	50.0	-25.6
27.881	1.8	22.6	24.4	50.0	-25.6
29.030	1.7	22.7	24.4	50.0	-25.6
29.586	1.6	22.8	24.4	50.0	-25.6
29.813	1.5	22.9	24.4	50.0	-25.6
29.843	1.5	22.9	24.4	50.0	-25.6

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

WTD.2017.06.02.1

EUT:	T6 Pro Z-Wave Programmable Thermostat	Work Order:	HNYW0209
Serial Number:	1729LBJ00151	Date:	10/02/2017
Customer:	Honeywell International Inc.	Temperature:	21.9°C
Attendees:	Dave Mulhouse	Relative Humidity:	53.7%
Customer Project:	None	Bar. Pressure:	1015 mb
Tested By:	Kyle McMullan	Job Site:	MN03
Power:	110VAC/60Hz, Battery	Configuration:	HNYW0209-2

TEST SPECIFICATIONS

Specification: Equipment Class B	Method:
FCC 15.207:2017	ANSI C63.10:2013

TEST PARAMETERS

Run #:	13	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

None

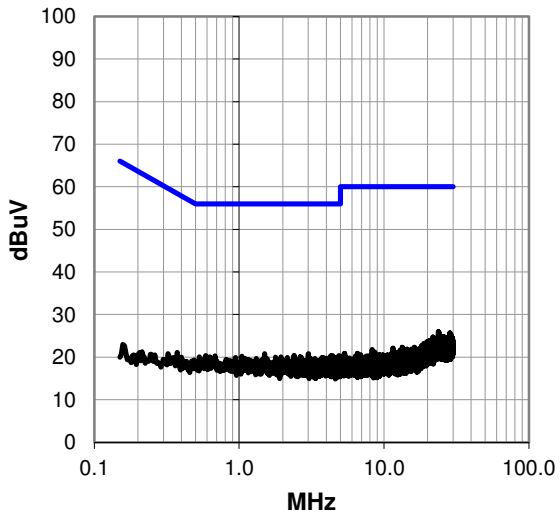
EUT OPERATING MODES

Tx modulated signal on Ch 0 (916MHz).

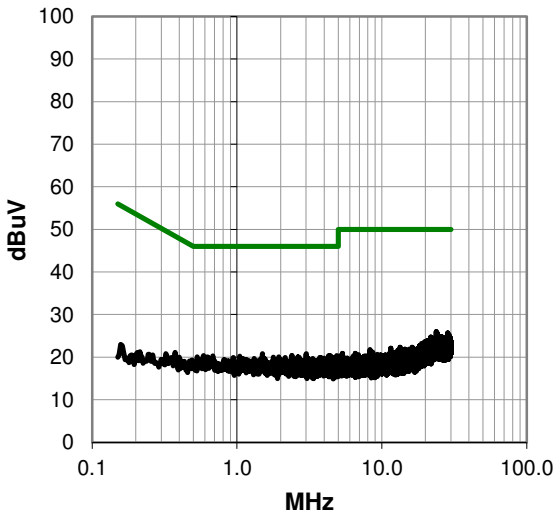
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

WTD.2017.06.02.1

RESULTS - Run #13

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
23.762	3.9	22.1	26.0	60.0	-34.0
28.549	3.0	22.7	25.7	60.0	-34.3
24.113	3.5	22.1	25.6	60.0	-34.4
29.176	2.6	22.7	25.3	60.0	-34.7
25.721	2.6	22.3	24.9	60.0	-35.1
28.582	2.2	22.7	24.9	60.0	-35.1
1.497	0.5	20.3	20.8	56.0	-35.2
3.004	0.4	20.4	20.8	56.0	-35.2
21.785	2.9	21.8	24.7	60.0	-35.3
27.784	2.1	22.6	24.7	60.0	-35.3
28.008	2.1	22.6	24.7	60.0	-35.3
23.516	2.5	22.1	24.6	60.0	-35.4
25.072	2.4	22.2	24.6	60.0	-35.4
28.631	1.9	22.7	24.6	60.0	-35.4
28.996	1.9	22.7	24.6	60.0	-35.4
29.772	1.7	22.9	24.6	60.0	-35.4
22.512	2.5	22.0	24.5	60.0	-35.5
25.101	2.3	22.2	24.5	60.0	-35.5
26.116	2.2	22.3	24.5	60.0	-35.5
28.661	1.8	22.7	24.5	60.0	-35.5
0.587	0.1	20.3	20.4	56.0	-35.6
2.392	0.0	20.4	20.4	56.0	-35.6
4.351	0.0	20.4	20.4	56.0	-35.6
4.888	-0.1	20.5	20.4	56.0	-35.6
24.408	2.2	22.2	24.4	60.0	-35.6
25.128	2.2	22.2	24.4	60.0	-35.6

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
23.762	3.9	22.1	26.0	50.0	-24.0
28.549	3.0	22.7	25.7	50.0	-24.3
24.113	3.5	22.1	25.6	50.0	-24.4
29.176	2.6	22.7	25.3	50.0	-24.7
25.721	2.6	22.3	24.9	50.0	-25.1
28.582	2.2	22.7	24.9	50.0	-25.1
1.497	0.5	20.3	20.8	46.0	-25.2
3.004	0.4	20.4	20.8	46.0	-25.2
21.785	2.9	21.8	24.7	50.0	-25.3
27.784	2.1	22.6	24.7	50.0	-25.3
28.008	2.1	22.6	24.7	50.0	-25.3
23.516	2.5	22.1	24.6	50.0	-25.4
25.072	2.4	22.2	24.6	50.0	-25.4
28.631	1.9	22.7	24.6	50.0	-25.4
28.996	1.9	22.7	24.6	50.0	-25.4
29.772	1.7	22.9	24.6	50.0	-25.4
22.512	2.5	22.0	24.5	50.0	-25.5
25.101	2.3	22.2	24.5	50.0	-25.5
26.116	2.2	22.3	24.5	50.0	-25.5
28.661	1.8	22.7	24.5	50.0	-25.5
0.587	0.1	20.3	20.4	46.0	-25.6
2.392	0.0	20.4	20.4	46.0	-25.6
4.351	0.0	20.4	20.4	46.0	-25.6
4.888	-0.1	20.5	20.4	46.0	-25.6
24.408	2.2	22.2	24.4	50.0	-25.6
25.128	2.2	22.2	24.4	50.0	-25.6

CONCLUSION

Pass

Tested By

FIELD STRENGTH OF HARMONICS AND SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2017.06.01

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Transmitting Z-wave - low channel (908.4 MHz) and high channel (916 MHz) modulated

POWER SETTINGS INVESTIGATED

Battery

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

HNYW0209 - 1

HNYW0209 - 2

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	12400 MHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	12/22/2016	12 mo
Cable	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	7/12/2017	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	2/14/2017	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AXP	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVT	2/14/2017	12 mo
Cable	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	12/1/2016	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AJA	6/23/2016	24 mo
Attenuator	Fairview Microwave	SA18E-10	TYA	9/20/2017	12 mo
Attenuator	Fairview Microwave	SA18E-20	TWZ	9/20/2017	12 mo
Filter - High Pass	Micro-Tronics	HPM50108	LFM	9/20/2017	12 mo
Filter - Low Pass	Micro-Tronics	LPM50003	LFJ	9/20/2017	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AVO	12/1/2016	12 mo
Cable	ESM Cable Corp.	Bilog Cables	MNH	12/1/2016	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AYD	1/6/2016	24 mo

MEASUREMENT BANDWIDTHS

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies and the modes as showed in the data sheets.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

Measurements at the edges of the allowable band may be presented in an alternative method as provided for in the ANSI C63.10 Marker-Delta method. This method involves performing an in-band fundamental measurement followed by a screen capture of the fundamental and out-of-band emission using reduced measurement instrumentation bandwidths. The amplitude delta measured on this screen capture is applied to the fundamental emission value to show the out-of-band emission level as applied to the limit.

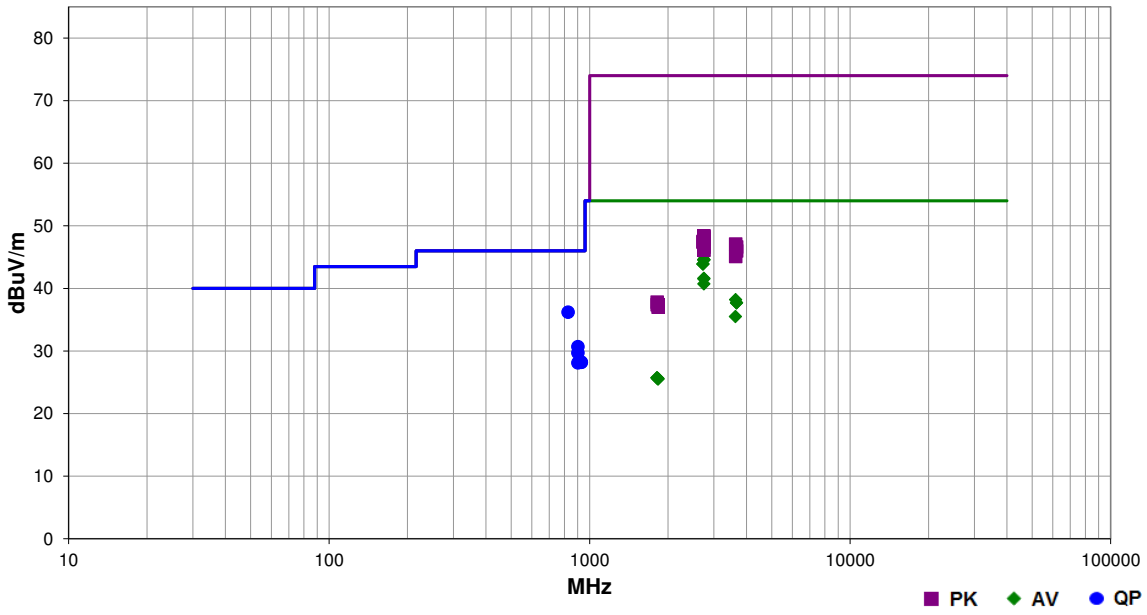
FIELD STRENGTH OF HARMONICS AND SPURIOUS RADIATED EMISSIONS

EmiR5 2017.07.11 PSA-ESCI 2017.06.01

Work Order:	HNYW0209	**Date:**	09/26/17		
Project:	None	**Temperature:**	21.9 °C		
Job Site:	MN05	**Humidity:**	53.3% RH		
Serial Number:	1729LBJ00151	**Barometric Pres.:**	1018 mbar	**Tested by:**	Dustin Sparks
EUT:	T6 Pro Z-Wave Programmable Thermostat				
Configurations:	1, 2				
Customer:	Honeywell International Inc.				
Attendees:	Dave Mulhouse				
EUT Power:	Battery, 110VAC/60Hz				
Operating Mode:	Transmitting Z-wave - low channel (908.4 MHz) and high channel (916 MHz) modulated				
Deviations:	None				
Comments:	See power table for radio software control settings.				

Test Specifications	**Test Method**
FCC 15.249:2017	ANSI C63.10:2013

Run #	6	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2747.975	46.9	-1.7	1.2	53.0	3.0	0.0	Horz	AV	0.0	45.2	54.0	-8.8	Battery, High ch, EUT vert
2747.992	46.3	-1.7	1.0	64.0	3.0	0.0	Horz	AV	0.0	44.6	54.0	-9.4	Battery, High ch, EUT horz
2748.008	46.3	-1.7	1.0	152.1	3.0	0.0	Horz	AV	0.0	44.6	54.0	-9.4	AC, High ch, EUT vert
2748.000	46.2	-1.7	1.0	102.1	3.0	0.0	Vert	AV	0.0	44.5	54.0	-9.5	Battery, High ch, EUT horz
826.311	16.2	10.0	3.9	294.9	3.0	10.0	Horz	QP	0.0	36.2	46.0	-9.8	Battery, High ch, EUT horz
2725.192	45.8	-1.9	1.0	104.0	3.0	0.0	Vert	AV	0.0	43.9	54.0	-10.1	Battery, Low ch, EUT horz
2725.175	45.8	-1.9	1.0	70.1	3.0	0.0	Horz	AV	0.0	43.9	54.0	-10.1	Battery, Low ch, EUT vert
2748.000	43.3	-1.7	1.0	286.0	3.0	0.0	Vert	AV	0.0	41.6	54.0	-12.4	Battery, High ch, EUT on side
2748.008	43.2	-1.7	2.2	333.0	3.0	0.0	Horz	AV	0.0	41.5	54.0	-12.5	Battery, High ch, EUT on side
2748.000	42.4	-1.7	3.5	76.1	3.0	0.0	Vert	AV	0.0	40.7	54.0	-13.3	Battery, High ch, EUT vert
901.247	19.4	11.3	1.7	200.0	3.0	0.0	Horz	QP	0.0	30.7	46.0	-15.3	Battery, Low ch, EUT horz
3633.583	35.9	2.3	1.0	336.0	3.0	0.0	Vert	AV	0.0	38.2	54.0	-15.8	Battery, Low ch, EUT horz
3664.042	35.4	2.3	1.7	340.0	3.0	0.0	Horz	AV	0.0	37.7	54.0	-16.3	Battery, High ch, EUT vert
3663.942	35.4	2.3	1.2	306.0	3.0	0.0	Vert	AV	0.0	37.7	54.0	-16.3	Battery, High ch, EUT horz
901.262	18.4	11.3	1.0	168.0	3.0	0.0	Horz	QP	0.0	29.7	46.0	-16.3	AC, Low ch, EUT horz
928.517	16.2	12.0	1.0	245.0	3.0	0.0	Horz	QP	0.0	28.2	46.0	-17.8	AC, High ch, EUT horz
928.553	16.2	12.0	1.0	260.0	3.0	0.0	Vert	QP	0.0	28.2	46.0	-17.8	AC, High ch, EUT vert
901.125	16.8	11.3	1.0	181.1	3.0	0.0	Vert	QP	0.0	28.1	46.0	-17.9	AC, Low ch, EUT vert
3633.525	33.2	2.3	1.0	16.1	3.0	0.0	Horz	AV	0.0	35.5	54.0	-18.5	Battery, Low ch, EUT vert
2747.842	50.1	-1.7	1.2	53.0	3.0	0.0	Horz	PK	0.0	48.4	74.0	-25.6	Battery, High ch, EUT horz
2747.983	50.0	-1.7	1.0	64.0	3.0	0.0	Horz	PK	0.0	48.3	74.0	-25.7	Battery, High ch, EUT horz
2747.883	49.8	-1.7	1.0	102.1	3.0	0.0	Vert	PK	0.0	48.1	74.0	-25.9	Battery, High ch, EUT horz

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2747.983	49.6	-1.7	1.0	152.1	3.0	0.0	Horz	PK	0.0	47.9	74.0	-26.1	AC, High ch, EUT vert
2725.300	49.4	-1.9	1.0	104.0	3.0	0.0	Vert	PK	0.0	47.5	74.0	-26.5	Battery, Low ch, EUT horz
2725.192	49.3	-1.9	1.0	70.1	3.0	0.0	Horz	PK	0.0	47.4	74.0	-26.6	Battery, Low ch, EUT horz
3633.633	44.8	2.3	1.0	336.0	3.0	0.0	Vert	PK	0.0	47.1	74.0	-26.9	Battery, Low ch, EUT horz
2747.975	48.4	-1.7	3.5	76.1	3.0	0.0	Vert	PK	0.0	46.7	74.0	-27.3	Battery, High ch, EUT vert
3664.025	44.3	2.3	1.7	340.0	3.0	0.0	Horz	PK	0.0	46.6	74.0	-27.4	Battery, High ch, EUT vert
2748.142	48.2	-1.7	2.2	333.0	3.0	0.0	Horz	PK	0.0	46.5	74.0	-27.5	Battery, High ch, EUT on side
2747.925	47.8	-1.7	1.0	286.0	3.0	0.0	Vert	PK	0.0	46.1	74.0	-27.9	Battery, High ch, EUT on side
3663.675	43.7	2.3	1.2	306.0	3.0	0.0	Vert	PK	0.0	46.0	74.0	-28.0	Battery, High ch, EUT horz
1814.733	30.0	-4.3	1.0	209.1	3.0	0.0	Vert	AV	0.0	25.7	54.0	-28.3	Battery ,Low ch, EUT horz
1815.650	30.0	-4.3	1.0	318.9	3.0	0.0	Horz	AV	0.0	25.7	54.0	-28.3	Battery, Low ch, EUT vert
1831.483	29.8	-4.2	1.0	219.0	3.0	0.0	Vert	AV	0.0	25.6	54.0	-28.4	Battery, High ch, EUT horz
1830.317	29.7	-4.2	1.0	297.9	3.0	0.0	Horz	AV	0.0	25.5	54.0	-28.5	Battery, High ch, EUT vert
3633.617	42.8	2.3	1.0	16.1	3.0	0.0	Horz	PK	0.0	45.1	74.0	-28.9	Battery, Low ch, EUT vert
1816.875	42.1	-4.3	1.0	209.1	3.0	0.0	Vert	PK	0.0	37.8	74.0	-36.2	Battery, Low ch, EUT horz
1832.892	41.5	-4.1	1.0	297.9	3.0	0.0	Horz	PK	0.0	37.4	74.0	-36.6	Battery, High ch, EUT vert
1817.350	41.7	-4.3	1.0	318.9	3.0	0.0	Horz	PK	0.0	37.4	74.0	-36.6	Battery, Low ch, EUT vert
1830.983	41.2	-4.2	1.0	219.0	3.0	0.0	Vert	PK	0.0	37.0	74.0	-37.0	Battery, High ch, EUT horz

FIELD STRENGTH OF FUNDAMENTAL

PSA-ESCI 2017.06.01

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Tx modulated signal on Ch 0 (916 Mhz) or Ch 1 (908.4 MHz)

POWER SETTINGS INVESTIGATED

110VAC/60Hz

Battery

CONFIGURATIONS INVESTIGATED

HNYW0209 - 4

HNYW0209 - 5

FREQUENCY RANGE INVESTIGATED

Start Frequency	902 MHz	Stop Frequency	928 MHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	12/22/2016	12 mo
Cable	ESM Cable Corp.	Bilog Cables	MNH	12/1/2016	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AYD	1/6/2016	24 mo

MEASUREMENT BANDWIDTHS

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was transmitting and while set at the lowest channel, a middle channel, and the highest channel available. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT and EUT antenna in 3 orthogonal planes.

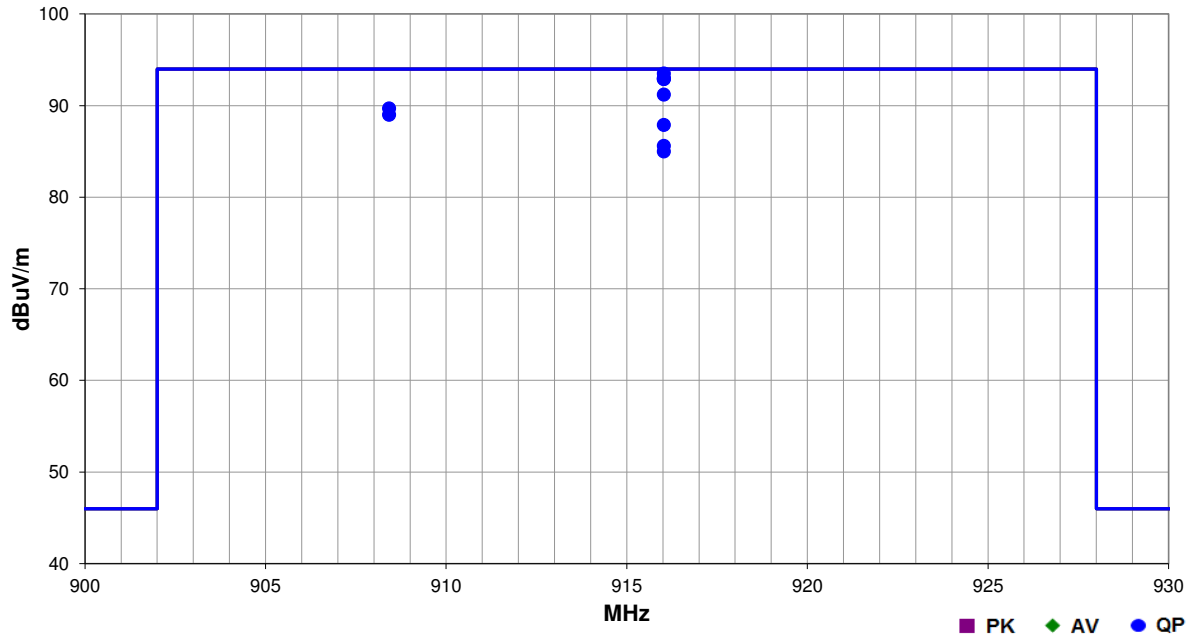
FIELD STRENGTH OF FUNDAMENTAL

EmiR5 2017.07.11 PSA-ESCI 2017.06.01

Work Order:	HNYW0209	**Date:**	10/11/17		
Project:	None	**Temperature:**	22.6 °C		
Job Site:	MN05	**Humidity:**	32.9% RH		
Serial Number:	1729LBJ00153	**Barometric Pres.:**	1026 mbar	**Tested by:**	Kyle McMullan
EUT:	T6 Pro Z-Wave Programmable Thermostat				
Configurations:	4, 5				
Customer:	Honeywell International Inc.				
Attendees:	Dave Mulhouse				
EUT Power:	110VAC/60Hz, Battery				
Operating Mode:	Tx modulated signal on Ch 0 (916 Mhz) or Ch 1 (908.4 MHz)				
Deviations:	None				
Comments:	See power table for radio software control settings.				

Test Specifications	**Test Method**
FCC 15.249:2017	ANSI C63.10:2013

Run #	37	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
916.027	61.0	32.5	1.0	229.9	3.0	0.0	Horz	QP	0.0	93.5	94.0	-0.5	AC, Ch 0, EUT Horz
916.027	60.5	32.5	1.2	77.1	3.0	0.0	Vert	QP	0.0	93.0	94.0	-1.0	AC, Ch 0, EUT Vert
916.025	60.4	32.5	1.0	347.0	3.0	0.0	Horz	QP	0.0	92.9	94.0	-1.1	Battery, Ch 0, EUT Horz
916.027	60.4	32.5	1.0	328.0	3.0	0.0	Horz	QP	0.0	92.9	94.0	-1.1	AC, Ch 0, EUT On Side
916.027	58.7	32.5	1.2	154.0	3.0	0.0	Vert	QP	0.0	91.2	94.0	-2.8	Battery, Ch 0, EUT Vert
908.418	57.4	32.3	1.0	24.0	3.0	0.0	Horz	QP	0.0	89.7	94.0	-4.3	AC, Ch 1, EUT Horz
908.418	56.7	32.3	1.2	75.1	3.0	0.0	Vert	QP	0.0	89.0	94.0	-5.0	AC, Ch 1, EUT Vert
916.027	55.4	32.5	1.0	73.1	3.0	0.0	Vert	QP	0.0	87.9	94.0	-6.1	AC, Ch 0, EUT On Side
916.025	53.1	32.5	1.0	192.1	3.0	0.0	Horz	QP	0.0	85.6	94.0	-8.4	AC, Ch 0, EUT Vert
916.027	52.5	32.5	1.6	97.0	3.0	0.0	Vert	QP	0.0	85.0	94.0	-9.0	AC, Ch 0, EUT Horz