

**FCC PART 15 SUBPART C SECTION 15.249
TEST REPORT**

for

**PLUGZ SWITCH
Models: PS15EMZ5-1**

Prepared for

**NORTEK SECURITY & CONTROL LLC
1950 CAMINO VIDA ROBLE SUITE 150
CARLSBAD, CA 92008**

Prepared by: _____


TOREY OLIVER

Approved by: _____


MATT HARRISON

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DATE: JUNE 20th, 2016

| | REPORT BODY | APPENDICES | | | | | TOTAL |
|-------|----------------|------------|---|---|----|----|-------|
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GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced in any form unless done so in full with the written permission of Compatible Electronics.

This report must not be used to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the federal government.

Devices Tested: PlugZ Switch
Model: PS15EMZ5-1
S/N: None

Product Description: The PS15EMZ5-1 is a simple Plug & Play Home Automation device that lets you control any lighting or small appliance while monitoring the amount of energy being used. Bright multi-colored LEDs provide an instant indication of the energy being used while simultaneously reporting this information to your Z-Wave hub that may be used for energy monitoring and analysis.

Modifications: The EUTS were not modified in order to comply with specifications.

Manufacturer: Nortek Security & Control LLC
1950 Camino Vida Roble Suite 150
Carlsbad, CA 92008

Test Date: June 13th, 15th, & 20th, 2016

Test Specifications: EMI requirements
CFR Title 47, Part 15 Subpart C Sections 15.205, 15.207, 15.209 and 15.249

Test Procedure: ANSI C63.4 & C63.10



SUMMARY OF TEST RESULTS

| TEST | DESCRIPTION | RESULTS |
|------|---|---|
| 1 | Conducted RF Emissions, 150 kHz - 30 MHz. | Complies with the limits of CFR Title 47 Part 15 Subpart C Section 15.207, & 15.249 |
| 2 | Radiated RF Emissions & Harmonics, 9 kHz – 10,000 MHz. | Complies with the limits of CFR Title 47 Part 15 Subpart C Section 15.205, 15.209, & 15.249 |
| 3 | Fundamental Field Strength | Complies with the limits of CFR Title 47 Part 15 Subpart C Section 15.249 |
| 4 | Emissions Radiated Outside of the Fundamental Frequency Band | Complies with the limits of CFR Title 47 Part 15 Subpart C Section 15.205, 15.209, & 15.249 |



1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the PlugZ Switch Models: PS15EMZ5-1. The EMI measurements were performed according to the measurement procedure described in ANSI. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT (equipment under test) hereafter, are within the specification limits defined by the Code of Federal Regulations Title 47, Part 15 Subpart C sections 15.205, 15.207, 15.209 and 15.249.



2. ADMINISTRATIVE DATA

2.1 Location of Testing

The tests described herein were performed at the test facility of Compatible Electronics, 20621 Pascal Way Lake Forest, California 92630.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

Nortek Security & Control LLC

Josh Hansen Regulatory Engineer

Compatible Electronics, Inc.

Torey Oliver Test Technician

Matt Harrison Lab Manager

2.4 Date Test Sample was Received

The test sample was received on June 13th, 2016.

2.5 Disposition of the Test Sample

The test sample remains at Compatible Electronics, Inc. as of the date of this test report.

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

| | |
|-------|---|
| RF | Radio Frequency |
| EMI | Electromagnetic Interference |
| EUT | Equipment Under Test |
| P/N | Part Number |
| S/N | Serial Number |
| HP | Hewlett Packard |
| ITE | Information Technology Equipment |
| CML | Corrected Meter Limit |
| LISN | Line Impedance Stabilization Network |
| NVLAP | National Voluntary Laboratory Accreditation Program |
| CFR | Code of Federal Regulations |
| PCB | Printed Circuit Board |
| TX | Transmit |
| RX | Receive |



3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this Test Report.

| SPEC | TITLE |
|-----------------------|---|
| CFR Title 47, Part 15 | FCC Rules – Radio frequency devices (including digital devices) |
| ANSI C63.4 2014 | Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz. |
| ANSI C63.10: 2013 | American National Standard for Testing Unlicensed Wireless Devices |



4. DESCRIPTION OF TEST CONFIGURATION

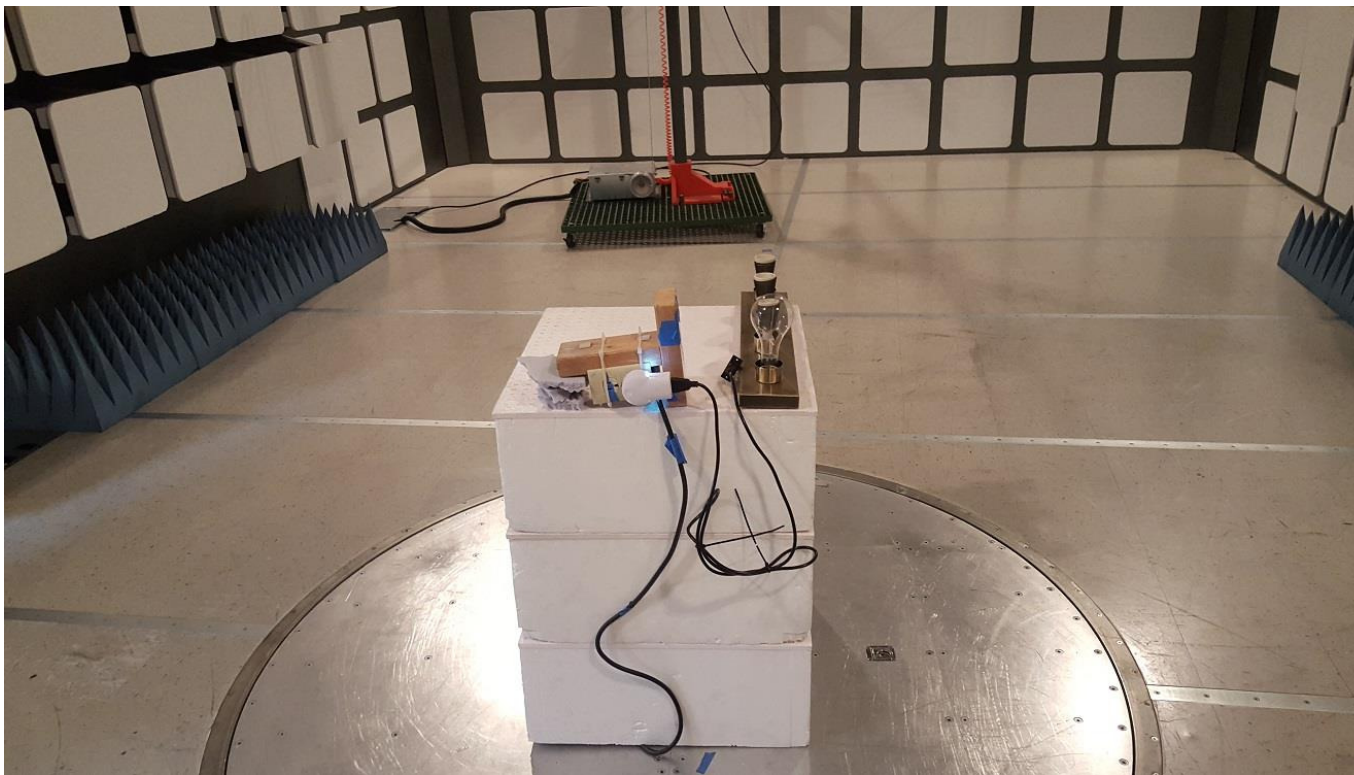
4.1 Description of Test Configuration

The PlugZ Switch Model: PS15EMZ5-1 (EUT) was setup in a test fixture to simulate a real life scenario use. The EUT was connected to a resistive load fixture. A laptop paired with a HubZ was used to program the device for the specific channels. The EUT was checked in all three axis (X, Y, & Z) for the worst case. The worst case was found to be the Z-Axis. The EUT was continuously transmitting a data stream during transmit tests.

The EUTs power was varied +/- 15% and no changes in amplitude or frequency were found.

It was determined that the emissions were at their highest level when the EUT was transmitting in the configuration described above for Radiated Emissions. The final radiated data was taken in the above configuration. Please see Appendix E for the test data.

4.1.1 Photograph Test Configuration (Z-Axis)



4.1.2 Cable Construction and Termination

Cable 1

This is a 1 meter, unshielded, IEC cable that connects the EUT to the resistive load fixture. The cable was hardwired at the EUT end and had a female IEC connector at the fixture end of the cable. The cable was not bundled.

Cable 2

This is a 1 meter, unshielded, IEC cable that connects the EUT to the AC mains. The cable was hardwired at the EUT end and had a male US plug connected to AC mains under the turntable via wall port. The cable was not bundled.



5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT**5.1 EUTs and Accessory List**

| # | EQUIPMENT TYPE | MANUFACTURER | MODEL | SERIAL NUMBER | FCC ID |
|---|---------------------|-------------------------------|------------|------------------------|----------|
| 1 | PLUGZ SWITCH (EUT) | NORTEK SECURITY & CONTROL LLC | PS15EMZ5-1 | NONE | EF400140 |
| 2 | LAPTOP | LENOVO | W530 | R9-WRFYR 13/01 | N/A |
| 3 | LAPTOP POWER SUPPLY | LENOVO | 45N0113 | 11S45M0113Z1ZHX82CB1M9 | NONE |
| 4 | HUBZ | NORTEK SECURITY & CONTROL LLC | HUSBZB-1 | NONE | EF400131 |
| 5 | LIGHT FIXTURE | GENERIC | GENERIC | NONE | NONE |
| 6 | RESISTIVE LOAD (x3) | GENERIC | 500W | NONE | NONE |
| 7 | LIGHT BULB | GENERIC | 300W | NONE | NONE |



5.2 EMI Test Equipment

| EQUIPMENT TYPE | MANUFACTURER | MODEL NUMBER | SERIAL NUMBER | CAL. DATE | CAL. DUE DATE |
|-------------------------------|---------------------------|--------------|----------------|------------|---------------|
| Computer | Compatible Electronics | NONE | NONE | N/A | N/A |
| EMI Receiver | Rohde & Schwarz | ESIB40 | 100219 | 09/03/2015 | 09/03/2016 |
| Antenna, Loop | Com Power | AL-130 | 121049 | 12/06/2013 | 12/06/2016 |
| Antenna, CombiLog | Com Power | AC-220 | 25857 | 05/19/2015 | 05/19/2017 |
| Antenna, Horn 1-18GHz | Com Power | AH-118 | 071250 | 07/01/2014 | 07/01/2016 |
| Pre-Amp, 1-18GHz | Com Power | PAM-118 | 551034 | 08/25/2015 | 08/25/2016 |
| Notch Filter | AMTI Microwave Circuits | N03019-01 | 3709-01 DC0415 | 01/06/2015 | 01/06/2017 |
| Mast, Antenna Positioner | Sunol Science Corporation | TWR 95-4 | 020808-3 | N/A | N/A |
| Antenna Mast | Sunol Science Corporation | TWR 95-4 | 020808-3 | N/A | N/A |
| Turntable | Sunol Science Corporation | FM 2001 | N/A | N/A | N/A |
| Mast and Turntable Controller | Sunol Science Corporation | SC104V | 020808-1 | N/A | N/A |
| LISN | Com-Power | LI-150 | 191935 | 5/19/2016 | 5/19/2017 |

5.3 Test Software

| LAB(S) | SOFTWARE TITLE | MANUFACTURER | VERSION |
|--------|-------------------------------------|-----------------|---------|
| R | Z-Wave Compliance Test Tool | Z-Wave Alliance | 2.4.10 |
| R | Measurement and Automation Software | TDK TestLab | 5.53 |



6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 2.1 and the figures in Appendix D of this report for test location.

6.2 EUT Mounting, Bonding and Grounding

The EUTs were mounted on a on a table, which was placed on the ground plane. The height of the table was 0.8 meters below 1 GHz and 1.5 meters for testing done above 1 GHz.

The EUT was grounded through the AC power cable.

6.3 Facility Environmental Characteristics

When applicable refer to the data sheets in Appendix E for the relative humidity, air temperature, and barometric pressure.



7. CHARACTERISTICS OF THE TRANSMITTER

7.1 Channel Number and Frequencies

There 2 operating channels and the EUT uses 2-key FSK/GFSK modulation schemes. The 908.4MHz channel uses the FSK modulation with a 40kbps or a 9kbps data rate. The 40kbps data rate was used for all testing since it was found to be the worst case. The 916MHz channel uses GFSK at a data rate of 100kbps. The gain settings were preset for all units.

1 == 908.4 MHz

2 == 916.0 MHz

7.2 Antenna

The antenna is made up of a wire connected to the PCB.



8. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

8.1 RF Emissions

8.1.1 Conducted Emissions Test

The EMI receiver was used as a measuring meter. A quasi-peak and/or average reading was taken only where indicated in the data sheets. The LISN output was measured using the EMI receiver. The output of the second LISN was terminated by a 50-ohm termination. The effective measurement bandwidth used for this test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding, and grounding of the EUT. The EUT received its power through the LISN, which was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI 63.4. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The conducted emissions from the EUT were maximized for operating mode as well as cable placement. The final data was collected under program control by the computer software. The final qualification data is located in Appendix E.

Test Results:

The EUTs complies with the limits of CFR Title 47 Part 15 Subpart C sections 15.207.



8.1.2 Radiated Emissions (Spurious and Harmonics) Test

The EMI receiver was used as a measuring meter. The receiver was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the receiver records the highest measured reading over all the sweeps. Amplifiers were used to increase the sensitivity of the instrument. There was one Preamplifier used for frequencies above 1 GHz.

For the fundamental and spurious emissions the quasi-peak detector was used for frequencies below 1GHz and the average detector was used for frequencies above 1 GHz.

The measurement bandwidths and transducers used for the radiated emissions test were:

| FREQUENCY RANGE (MHz) | TRANSDUCER | EFFECTIVE MEASUREMENT BANDWIDTH |
|-----------------------|---------------------|--|
| 0.009 to .150 | Active Loop Antenna | 200 Hz |
| 0.150 to 30 | Active Loop Antenna | 9 kHz |
| 30 to 1000 | Combilog Antenna | 100 kHz (120kHz for Quasi-Peak Measurements) |
| 1000 to 10000 | Horn Antenna | 1 MHz |

The TDK FAC-3 shielded test chamber of Compatible Electronics, Inc. was used for radiated emissions testing. This test site is in full compliance with ANSI. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters in both vertical and horizontal polarizations (for E field radiated field strength).

Test Results:

The EUTs complies with the limits of CFR Title 47 Part 15 Subpart C sections 15.205, 15.209 and 15.249.



8.1.3 Fundamental Field Strength

The Peak Transmit Radiated Field Strength was measured at a 3-meter test distance. The EMI Receiver was used to obtain the final test data. The final qualification data sheets are located in Appendix E.

Test Results:

The EUTs complies with Part 15 Subpart C, Section 15.249.

8.1.4 Emissions Radiated Outside of the Fundamental Frequency Band

The Band Edge measurement was measured using the EMI Receiver at a 3-meter test distance to obtain the final test data. The lower and upper channels were tuned during the low and high band edge tests. The final qualification data sheets are located in Appendix E.

Test Results:

The EUTs complies with Part 15 Subpart C, Section 15.205 & 15.249.



9. TEST PROCEDURE DEVIATIONS

The test procedures were not deviated from throughout all tests.

10. CONCLUSIONS

The PlugZ Switch Models: PS15EMZ5-1 meets all of the relevant specification requirements defined in the Code of Federal Regulations Title 47, Part 15 Subpart C sections 15.205, 15.207, 15.209 and 15.249.



APPENDIX A

***LABORATORY ACCREDITATIONS AND
RECOGNITIONS***



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Lake Forest Division
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(949) 587-0400

LABORATORY ACCREDITATIONS AND RECOGNITIONS



NVLAP LAB CODES 200063-0,
200528-0, 200527-0

For US, Canada, Australia/New Zealand, Taiwan and the European Union, Compatible Electronics is currently accredited by NVLAP to ISO/IEC 17025 an ISO 9002 equivalent. Please follow the link to the NIST site for each of our facilities NVLAP certificate and scope of accreditation.

NVLAP listing links

Agoura Division - <http://ts.nist.gov/Standards/scopes/2000630.htm>

Brea Division - <http://ts.nist.gov/Standards/scopes/2005280.htm>

Silverado/Lake Forest Division - <http://ts.nist.gov/Standards/scopes/2005270.htm>



ANSI listing

[CETCB](#)

<https://www.ansica.org/wwwversion2/outside/ALLdirectoryDetails.asp?menuID=1&prgID=3&orgID=123&status=4>



Compatible Electronics has been nominated as a Conformity Assessment Body (CAB) for EMC under the US/EU Mutual Recognition Agreement (MRA).



Compatible Electronics has been nominated as a Conformity Assessment Body (CAB) for Taiwan/BSMI under the US/APEC (Asia-Pacific Economic Cooperation) Mutual Recognition Agreement (MRA).

We are also certified/listed for IT products by the following country/agency:



VCCI Listing, from VCCI site

[Enter "Compatible" in search form](#) http://www.vcci.or.jp/vcci_e/activity/registration/setsubi.html



FCC Listing, from FCC OET site

[FCC test lab search](#) <https://fjallfoss.fcc.gov/oetcf/eas/reports/TestFirmSearch.cfm>



Compatible Electronics IC listing can be found at:

<http://www.ic.gc.ca/eic/site/ic1.nsf/eng/home>



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APPENDIX B

MODIFICATIONS TO THE EUTS



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Agoura, CA 91301
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Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
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MODIFICATIONS TO THE EUT

There were no modifications were made during testing.



APPENDIX C

***ADDITIONAL MODELS COVERED
UNDER THIS REPORT***



Brea Division
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Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

PLUGZ SWITCH

Models: PS15EMZ5-1

S/N: None

No additional models were tested.

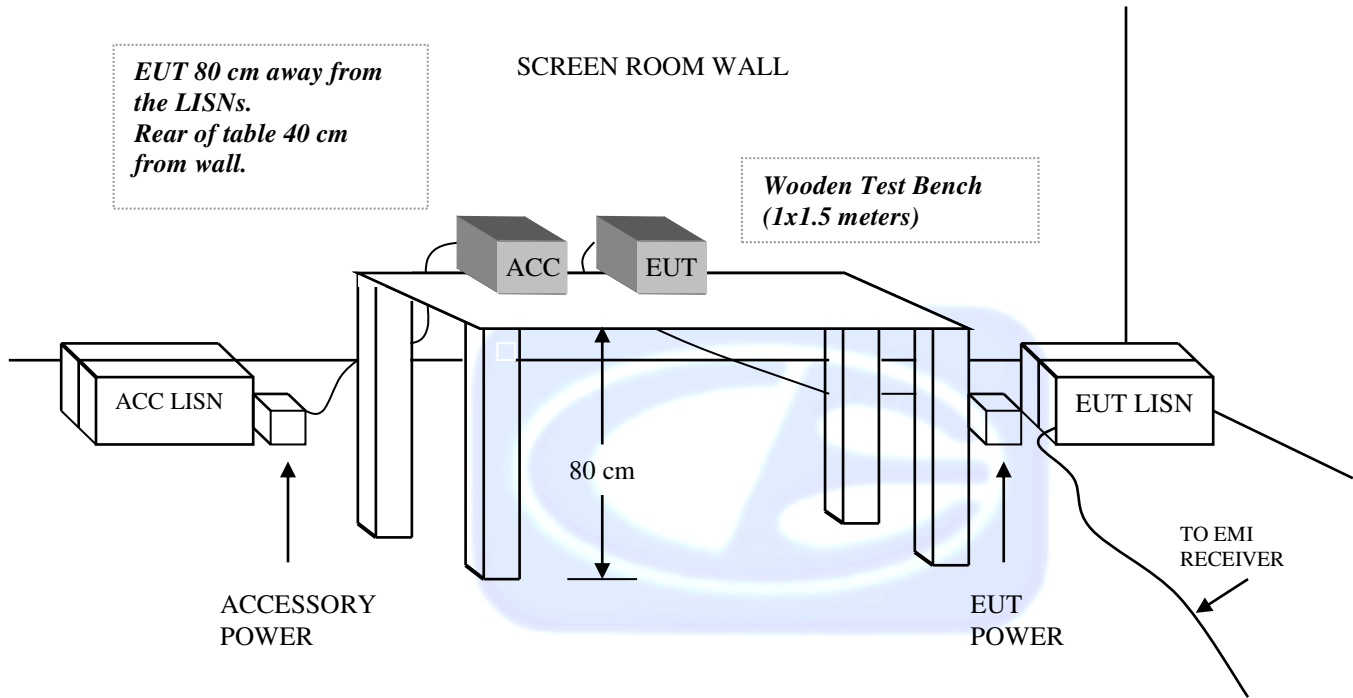


APPENDIX D

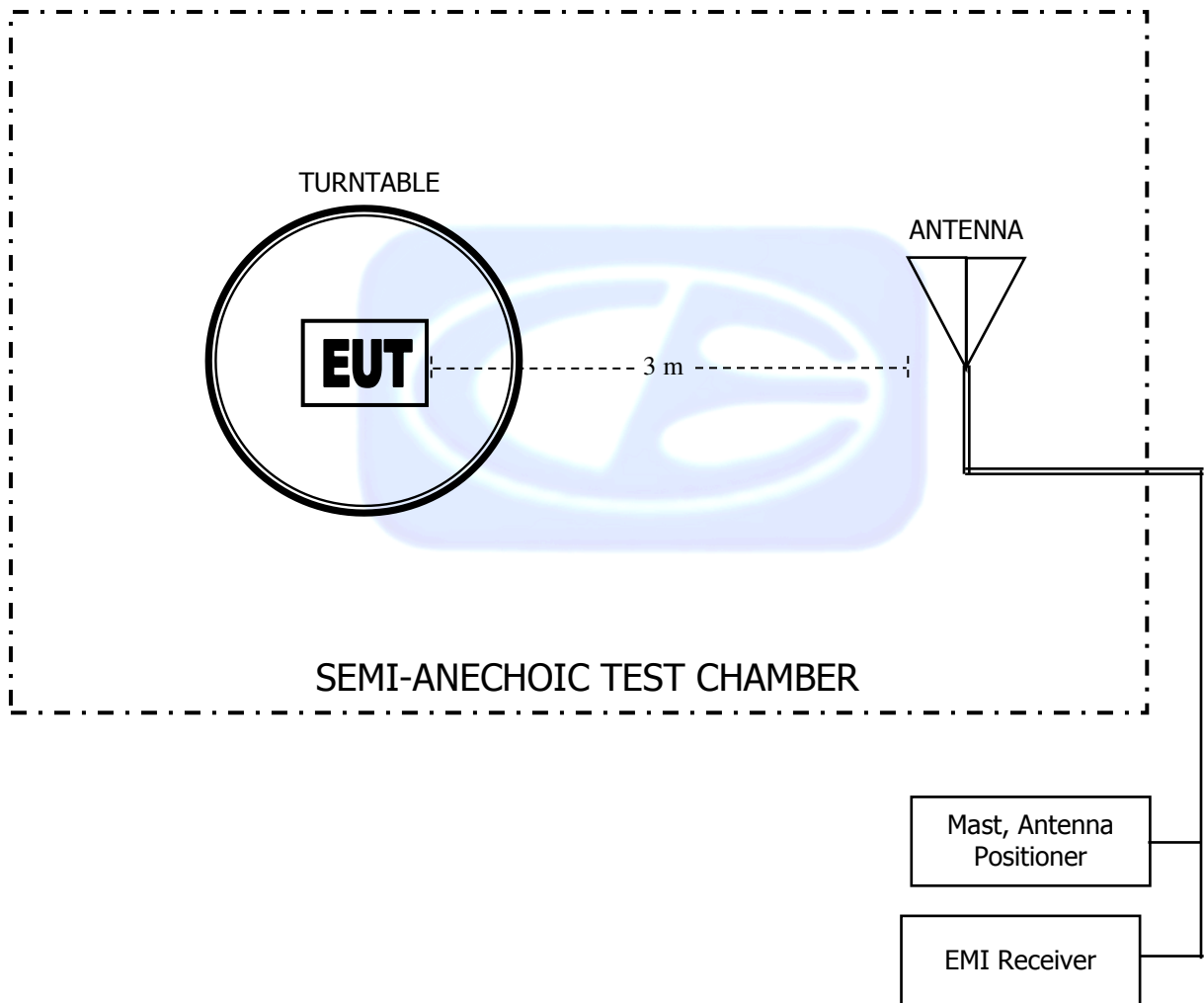
DIAGRAMS, CHARTS, AND PHOTOS



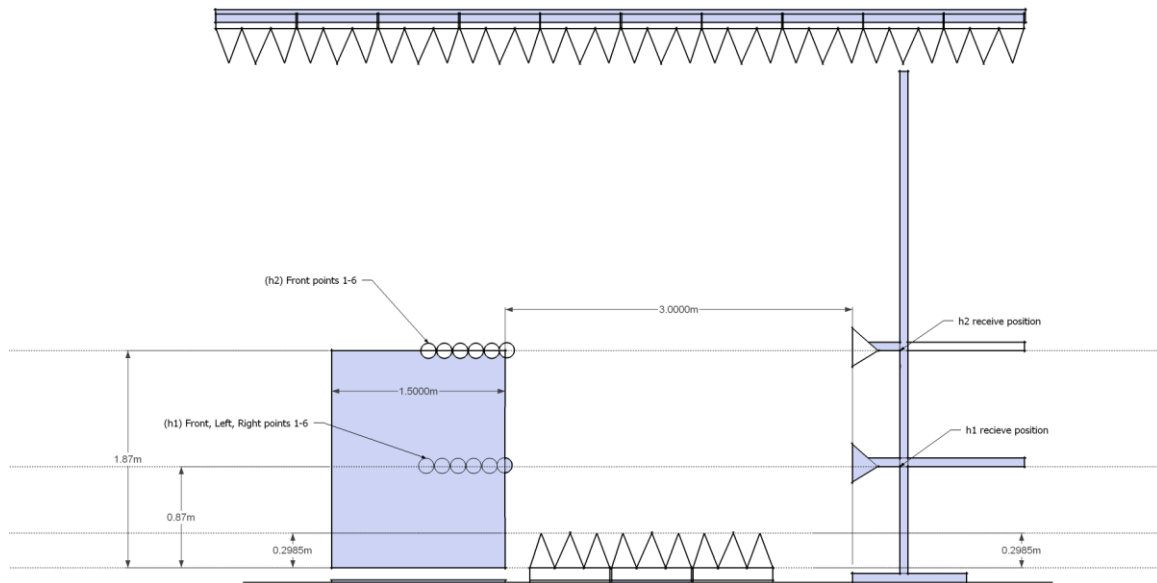
FIGURE 1: CONDUCTED EMISSIONS TEST SETUP



**FIGURE 2: PLOT MAP AND LAYOUT OF TEST SITE
BELOW 1GHZ**



**FIGURE 3: PLOT MAP AND LAYOUT OF TEST SITE
ABOVE 1GHZ**



COM-POWER AL-130**LOOP ANTENNA**

S/N: 121049

CALIBRATION DUE: DECEMBER 6, 2016

| FREQUENCY (MHz) | MAGNETIC (dB/m) | ELECTRIC (dB/m) | FREQUENCY (MHz) | MAGNETIC (dB/m) | ELECTRIC (dB/m) |
|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| 0.009 | -34.64 | 16.86 | 0.8 | -36.32 | 15.18 |
| 0.01 | -34.78 | 16.72 | 0.9 | -36.22 | 15.28 |
| 0.02 | -35.91 | 15.59 | 1.0 | -36.22 | 15.28 |
| 0.03 | -35.48 | 16.02 | 2.0 | -35.91 | 15.59 |
| 0.04 | -35.82 | 15.68 | 3.0 | -35.91 | 15.59 |
| 0.05 | -36.49 | 15.01 | 4.0 | -36.01 | 15.49 |
| 0.06 | -36.30 | 15.20 | 5.0 | -35.80 | 15.70 |
| 0.07 | -36.43 | 15.07 | 6.0 | -36.00 | 15.50 |
| 0.08 | -36.30 | 15.20 | 7.0 | -35.90 | 15.60 |
| 0.09 | -36.39 | 15.11 | 8.0 | -35.70 | 15.80 |
| 0.1 | -36.41 | 15.09 | 9.0 | -35.70 | 15.80 |
| 0.2 | -36.61 | 14.89 | 10.0 | -35.60 | 15.90 |
| 0.3 | -36.63 | 14.87 | 15.0 | -36.52 | 14.98 |
| 0.4 | -36.52 | 14.99 | 20.0 | -35.75 | 15.75 |
| 0.5 | -36.63 | 14.87 | 25.0 | -37.78 | 13.72 |
| 0.6 | -36.62 | 14.88 | 30.0 | -38.62 | 12.88 |
| 0.7 | -36.53 | 14.97 | | | |



COM-POWER AC-220**LAB R - COMBILOG ANTENNA**

S/N: 25857

CALIBRATION DUE: MAY 19, 2017

| FREQUENCY (MHz) | FACTOR (dB) | FREQUENCY (MHz) | FACTOR (dB) |
|------------------------|--------------------|------------------------|--------------------|
| 30 | 22.5 | 160 | 13.3 |
| 35 | 22.5 | 180 | 15.0 |
| 40 | 23.0 | 200 | 14.6 |
| 45 | 21.5 | 250 | 16.5 |
| 50 | 21.3 | 300 | 18.1 |
| 60 | 18.2 | 400 | 19.4 |
| 70 | 13.2 | 500 | 21.4 |
| 80 | 11.6 | 600 | 21.6 |
| 90 | 11.9 | 700 | 23.7 |
| 100 | 12.6 | 800 | 26.0 |
| 120 | 15.1 | 900 | 26.6 |
| 140 | 13.6 | 1000 | 28.5 |



COM-POWER AH-118**HORN ANTENNA**

S/N: 071250

CALIBRATION DUE: JULY 1, 2016

| FREQUENCY (MHz) | FACTOR (dB) | FREQUENCY (MHz) | FACTOR (dB) |
|------------------------|--------------------|------------------------|--------------------|
| 1000 | 30.1 | 9500 | 44.2 |
| 1500 | 29.2 | 10000 | 43.4 |
| 2000 | 31.6 | 10500 | 44.6 |
| 2500 | 35.5 | 11000 | 45.1 |
| 3000 | 33.7 | 11500 | 45.7 |
| 3500 | 36.0 | 12000 | 46.2 |
| 4000 | 35.4 | 12500 | 45.4 |
| 4500 | 35.5 | 13000 | 44.8 |
| 5000 | 40.1 | 13500 | 46.7 |
| 5500 | 37.8 | 14000 | 47.8 |
| 6000 | 39.0 | 14500 | 46.4 |
| 6500 | 39.9 | 15000 | 47.2 |
| 7000 | 40.4 | 15500 | 45.5 |
| 7500 | 44.4 | 16000 | 45.0 |
| 8000 | 44.1 | 16500 | 44.5 |
| 8500 | 43.1 | 17000 | 47.0 |
| 9000 | 43.0 | 17500 | 47.8 |
| | | 18000 | 44.2 |



COM-POWER PAM-118**1-18GHz - PREAMPLIFIER**

S/N: 551034

CALIBRATION DUE: August 25, 2016

| FREQUENCY (MHz) | FACTOR (dB) | FREQUENCY (MHz) | FACTOR (dB) |
|----------------------------|------------------------|----------------------------|------------------------|
| 500 | 26.2 | 5500 | 25.3 |
| 1000 | 25.6 | 6000 | 25.0 |
| 1100 | 25.9 | 6500 | 24.7 |
| 1200 | 25.9 | 7000 | 23.6 |
| 1300 | 26.3 | 7500 | 23.3 |
| 1400 | 26.5 | 8000 | 23.7 |
| 1500 | 26.3 | 8500 | 24.0 |
| 1600 | 26.1 | 9000 | 24.3 |
| 1700 | 26.2 | 9500 | 24.1 |
| 1800 | 26.3 | 10000 | 23.7 |
| 1900 | 25.8 | 11000 | 24.2 |
| 2000 | 26.0 | 12000 | 23.2 |
| 2500 | 26.0 | 13000 | 22.8 |
| 3000 | 25.8 | 14000 | 22.6 |
| 3500 | 25.9 | 15000 | 22.9 |
| 4000 | 26.4 | 16000 | 22.3 |
| 4500 | 26.0 | 17000 | 22.6 |
| 5000 | 25.6 | 18000 | 23.9 |



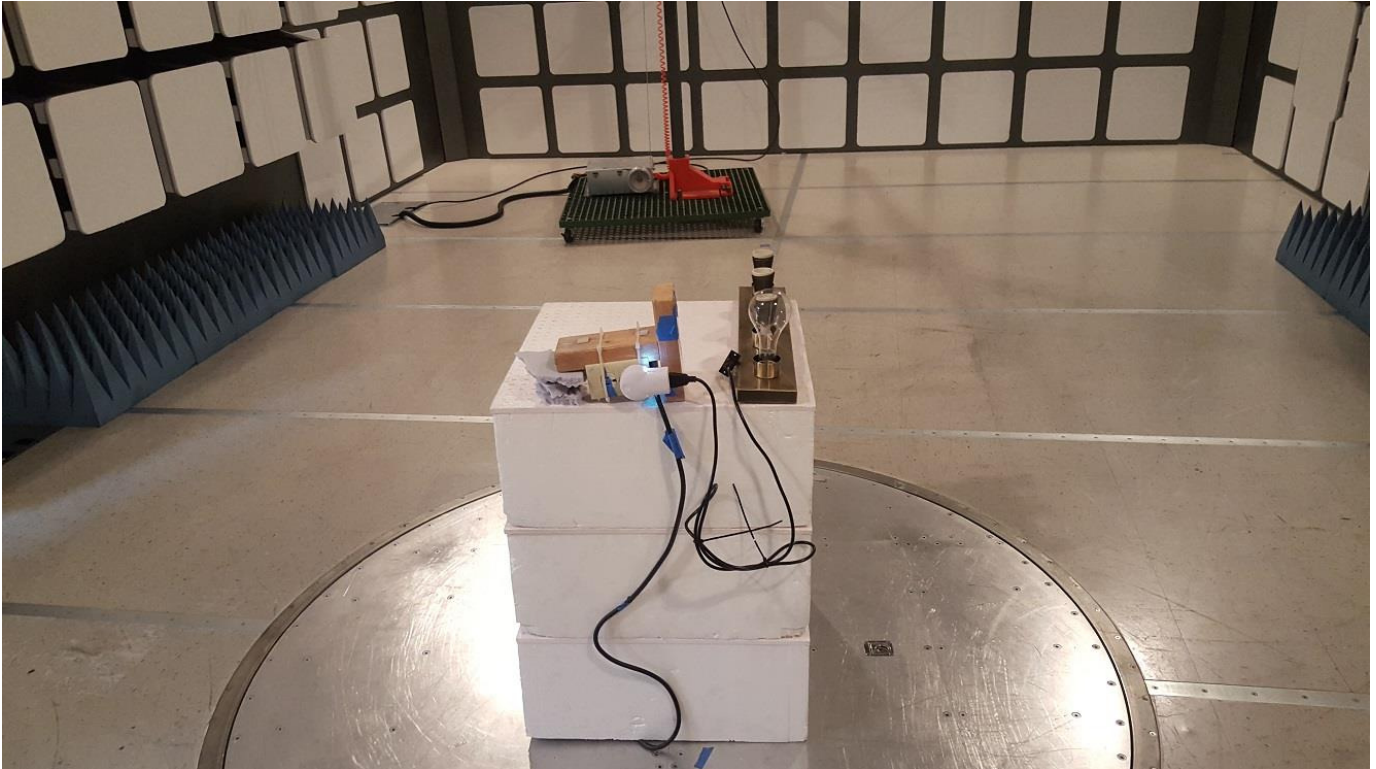


FRONT VIEW

NORTEK SECURITY & CONTROL LLC
PLUGZ SWITCH
MODELS: PS15EMZ5-1
FCC SUBPART C - RADIATED EMISSIONS < 1GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**





REAR VIEW

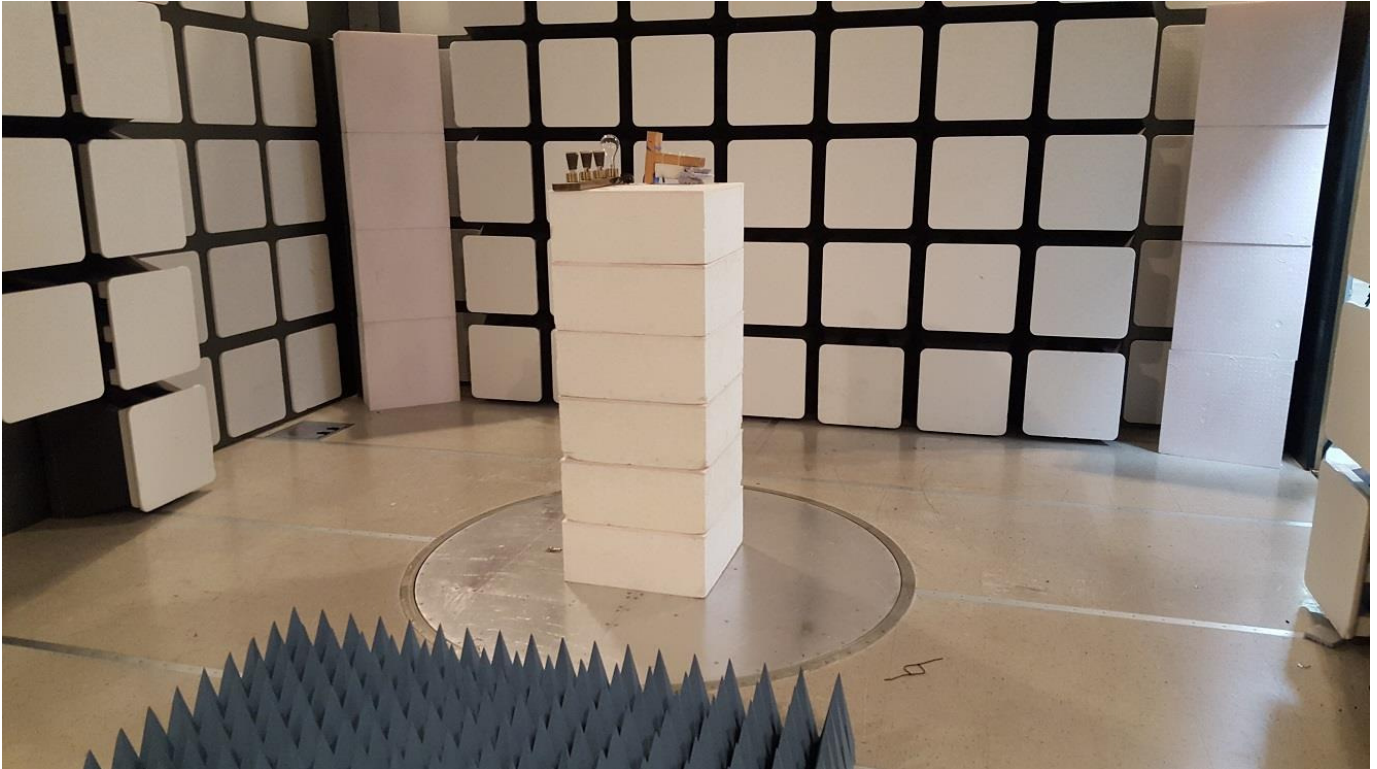
**NORTEK SECURITY & CONTROL LLC
PLUGZ SWITCH**

MODELS: PS15EMZ5-1

FCC SUBPART C - RADIATED EMISSIONS < 1GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**





FRONT VIEW

NORTEK SECURITY & CONTROL LLC
PLUGZ SWITCH
MODELS: PS15EMZ5-1
FCC SUBPART C - RADIATED EMISSIONS > 1GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**





REAR VIEW

NORTEK SECURITY & CONTROL LLC

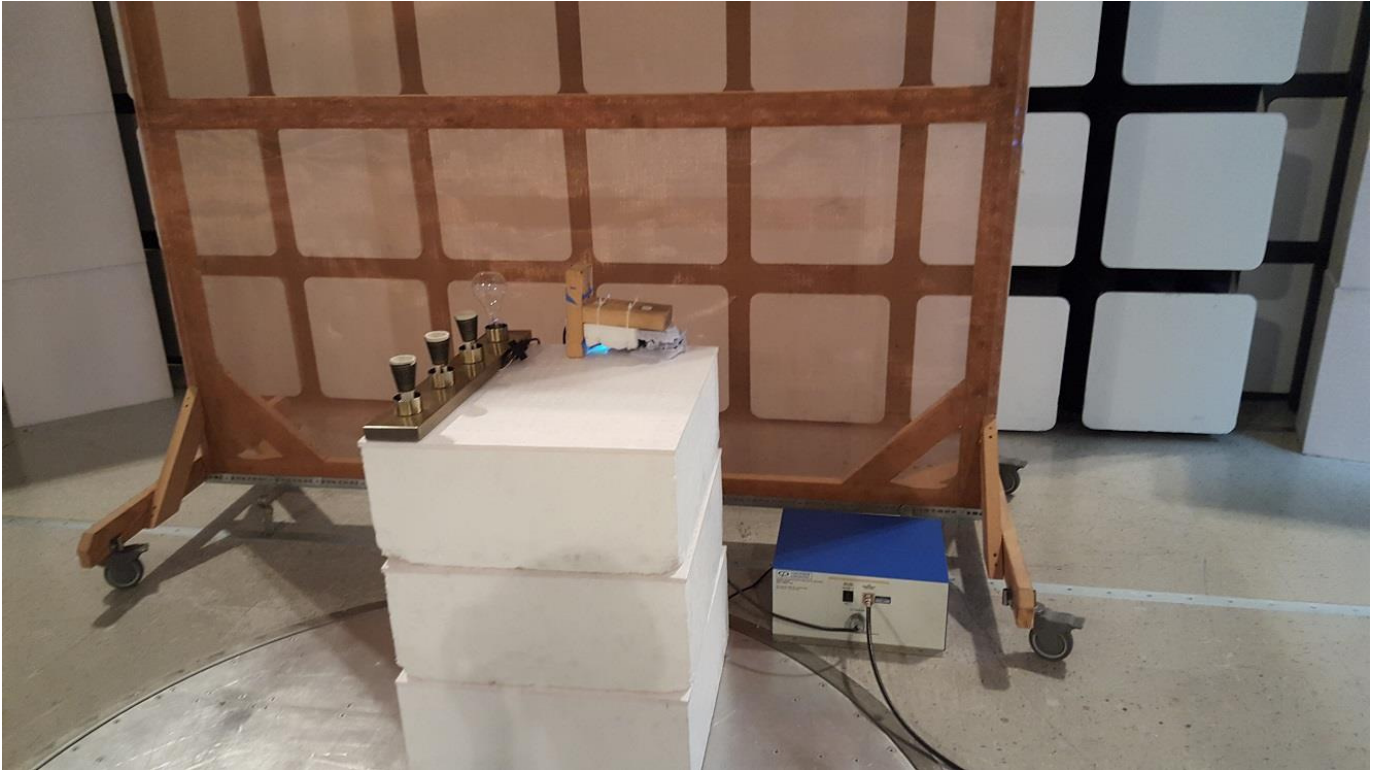
PLUGZ SWITCH

MODELS: PS15EMZ5-1

FCC SUBPART C - RADIATED EMISSIONS > 1GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**





FRONT VIEW

NORTEK SECURITY & CONTROL LLC
PLUGZ SWITCH
MODELS: PS15EMZ5-1
FCC SUBPART C – CONDUCTED EMISSIONS

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**

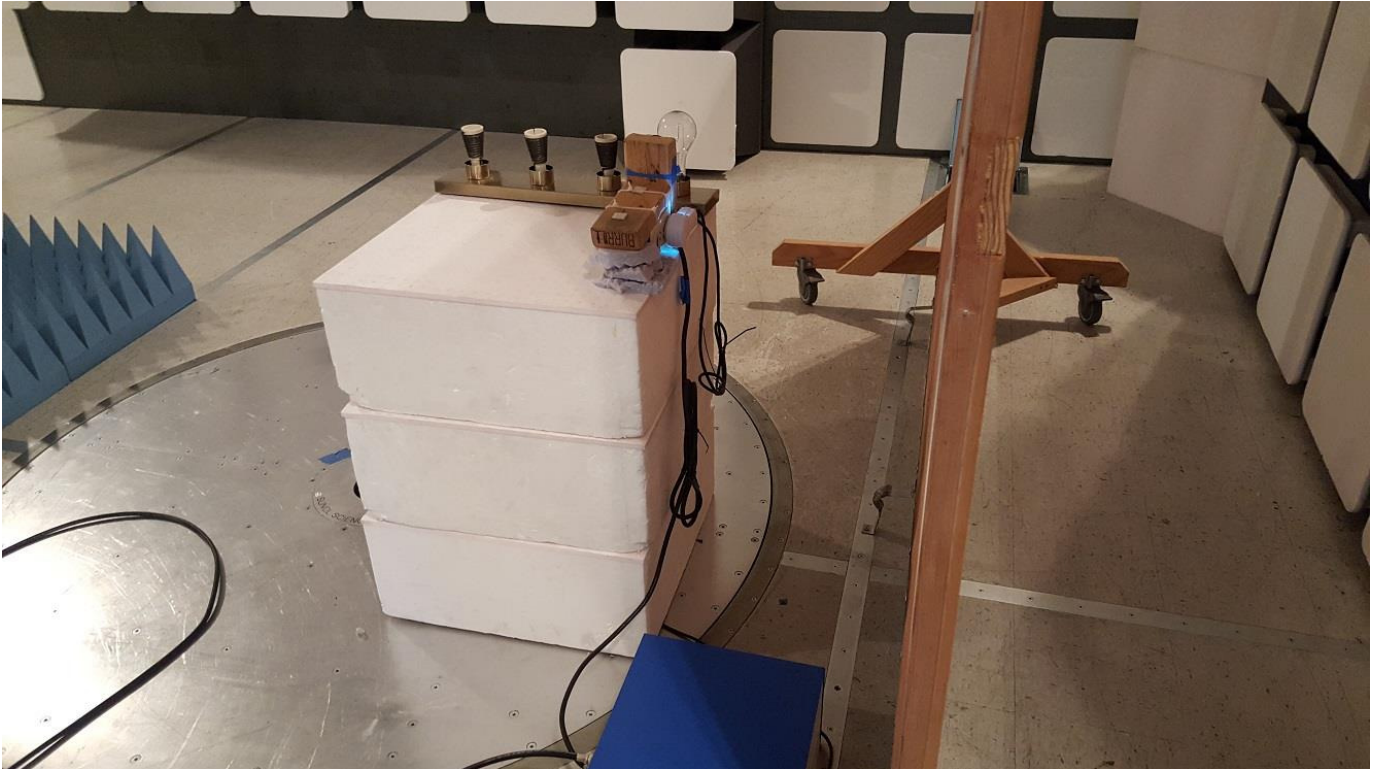


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(818) 597-0600

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Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400



REAR VIEW

NORTEK SECURITY & CONTROL LLC
PLUGZ SWITCH
MODELS: PS15EMZ5-1
FCC SUBPART C – CONDUCTED EMISSIONS

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



APPENDIX E

RADIATED EMISSIONS DATA SHEETS



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(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

Title: FCC 15.209

6/15/2016 9:12:38 AM

File: Radiated Pre-Scan 30-1000Mhz Tx 908.42MHz.set

Sequence: Preliminary Scan

Operator: Torey Oliver

EUT Type: Plug Z Switch / PS15EMZ5-1

EUT Condition: The EUT is constantly transmitting 908.42MHz.

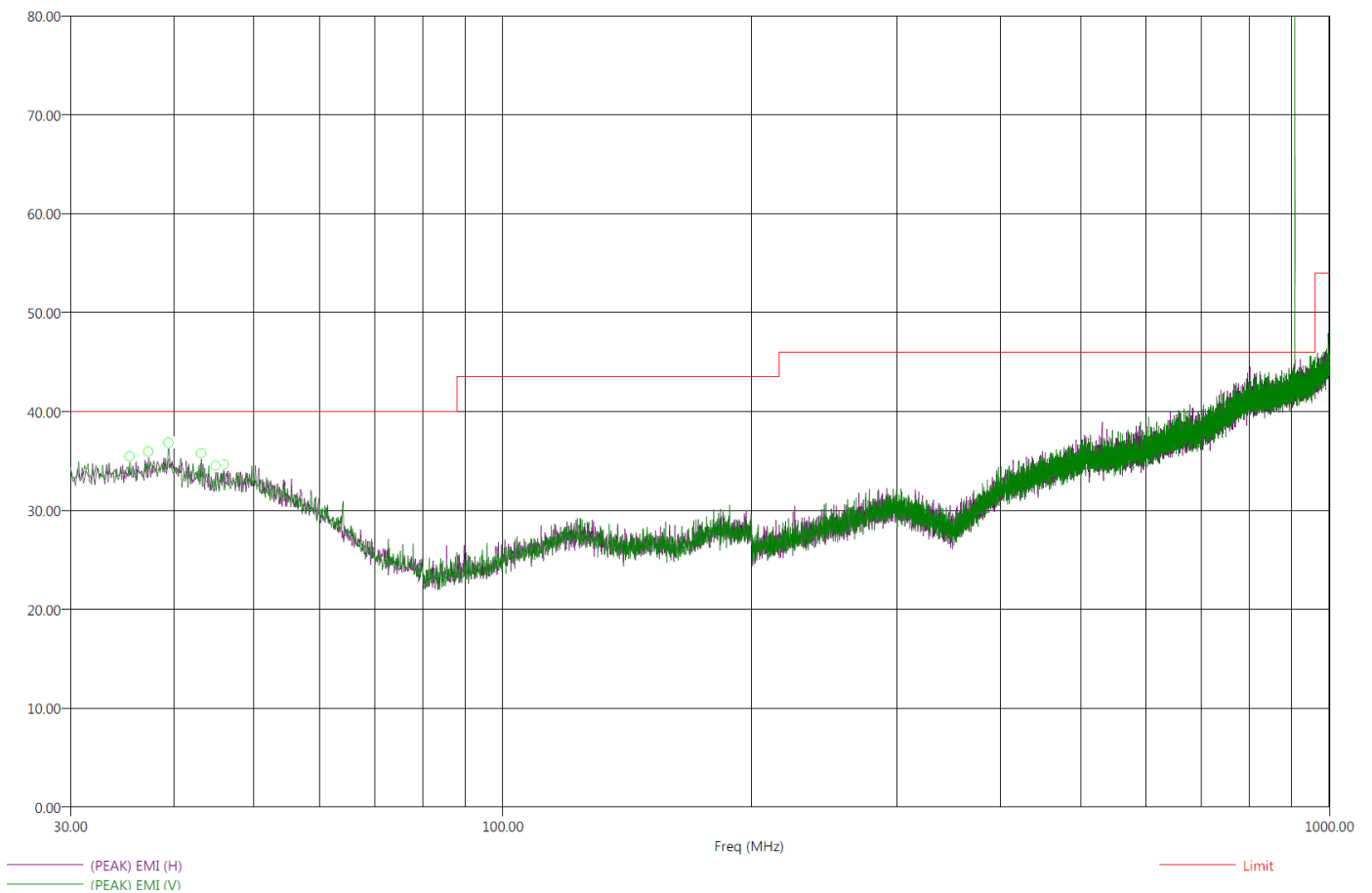
Comments: Temp: 74f

Hum: 33%

120V 60Hz

Compatible Electronics, Inc. FAC-3 (Lab R)

Electric Field Strength (dB μ V/m)



There were no radiated spurious emissions other than harmonics found below 30 MHz or above 1GHz. This is the worst case operating mode.



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Lake Forest, CA 92630
(949) 587-0400

Title: FCC 15.209 6/15/2016 10:08:38 AM
File: Radiated Final-Scan 30-1000Mhz Tx 908.42MHz.set Sequence: Final Measurements
Operator: Torey Oliver
EUT Type: Plug Z Switch / PS15EMZ5-1
EUT Condition: The EUT is constantly transmitting 908.42MHz.
Comments: Temp: 71f
Hum: 41%
120V 60Hz

Compatible Electronics, Inc. FAC-3 (Lab R)

| Freq (MHz) | (QP) Margin (dB) | (QP) EMI (dB μ V/m) | (PEAK) EMI (dB μ V/m) | Limit (dB μ V/m) | Pol | Ttbl Agl (deg) | Twr Ht (cm) | Transducer(dB) | Cable(dB) |
|------------|------------------|-------------------------|---------------------------|----------------------|-----|----------------|-------------|----------------|-----------|
| 35.40 | -20.54 | 19.46 | 25.83 | 40.00 | V | 220.25 | 380.59 | 22.53 | 0.56 |
| 37.30 | -20.24 | 19.76 | 25.72 | 40.00 | H | 2.75 | 343.76 | 22.75 | 0.58 |
| 39.40 | -19.96 | 20.04 | 26.03 | 40.00 | V | 358.50 | 399.16 | 22.94 | 0.59 |
| 43.20 | -20.70 | 19.30 | 24.44 | 40.00 | V | 1.00 | 261.97 | 22.02 | 0.63 |
| 45.00 | -21.12 | 18.88 | 24.62 | 40.00 | H | 7.25 | 289.97 | 21.52 | 0.65 |
| 46.00 | -21.10 | 18.90 | 24.77 | 40.00 | H | 236.25 | 341.91 | 21.46 | 0.66 |

*There were no radiated spurious emissions other than harmonics found below 30 MHz or above 1GHz.
This is the worst case operating mode.*



CONDUCTED EMISSIONS DATA SHEETS



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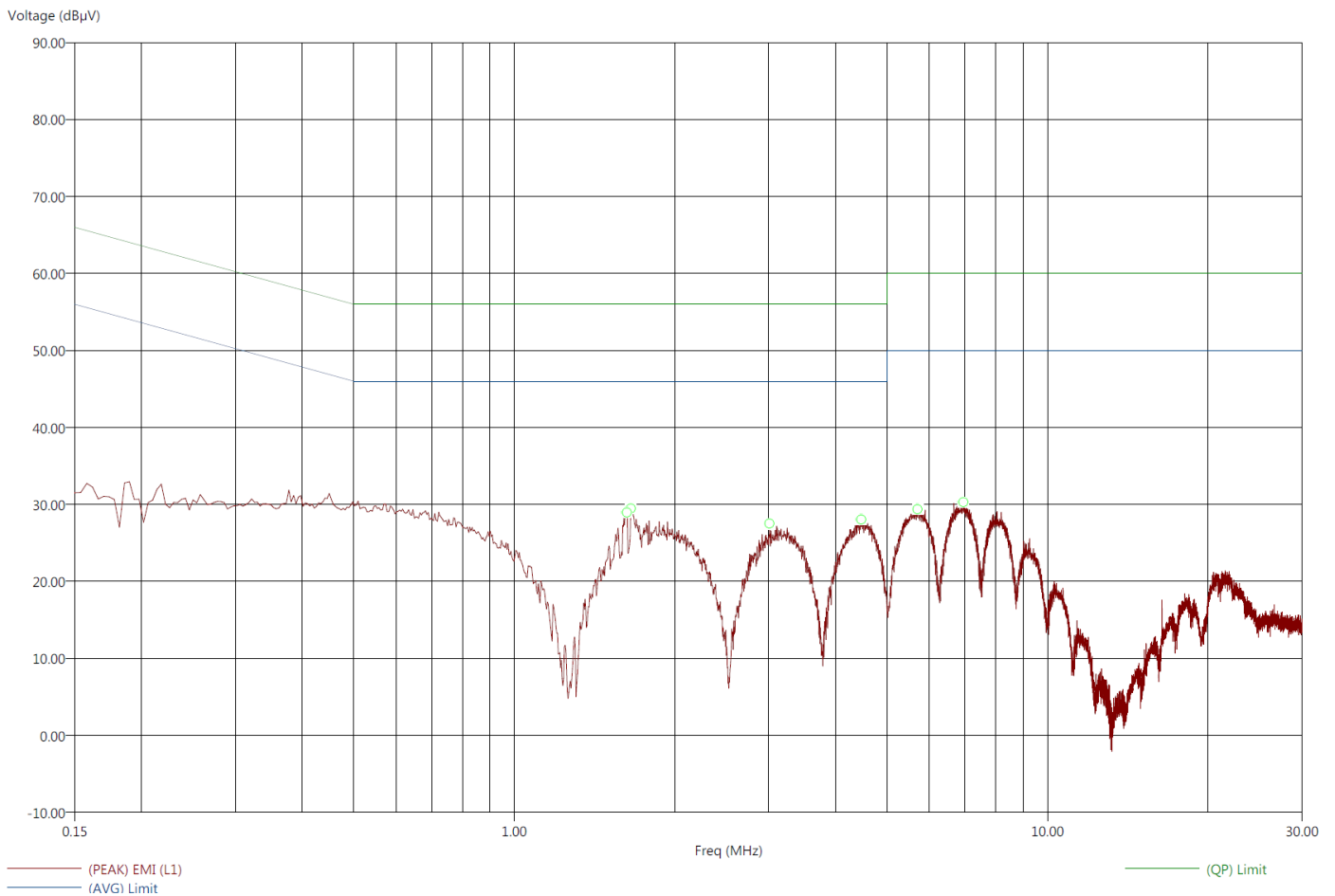
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(949) 589-0700

Lake Forest Division
20621 Pascal Way
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(949) 587-0400

Title: FCC 15.207
File: Conducted Pre-Line 120V.set
Operator: Torey Oliver
EUT Type: PlugZ Switch / PS15EMZ5-1
EUT Condition: The EUT is constantly transmitting 908.42MHz
Comments: Temp: 74f
Hum: 33%
120V 60Hz

6/20/2016 4:46:00 PM
Sequence: Preliminary Scan

Compatible Electronics, Inc. FAC-3 (Lab R)



This is the worst case operating mode.



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(949) 587-0400

Title: FCC 15.207

6/20/2016 4:50:04 PM

File: Conducted Final-Line 120V.set

Sequence: Final Measurements

Operator: Torey Oliver

EUT Type: PlugZ Switch / PS15EMZ5-1

EUT Condition: The EUT is constantly transmitting 908.42MHz.

Comments: Temp: 74f

Hum: 33%

120V 60Hz

Compatible Electronics, Inc. FAC-3 (Lab R)

| Freq (MHz) | (AVG) Margin AVL (dB) | (QP) Margin QPL (dB) | (AVG) EMI (dBμV/m) | (QP) EMI (dBμV/m) | (Peak) EMI (dBμV/m) | (AVG) Limit (dBμV/m) | (QP) Limit (dBμV/m) | Transducer(dB) | Cable(dB) |
|------------|-----------------------|----------------------|--------------------|-------------------|---------------------|----------------------|---------------------|----------------|-----------|
| 1.63 | -26.55 | -31.34 | 19.45 | 24.66 | 28.86 | 46.00 | 56.00 | 0.04 | 0.03 |
| 1.65 | -23.53 | -28.88 | 22.47 | 27.12 | 30.05 | 46.00 | 56.00 | 0.04 | 0.03 |
| 3.01 | -25.82 | -32.29 | 20.18 | 23.71 | 26.90 | 46.00 | 56.00 | 0.04 | 0.05 |
| 4.47 | -23.60 | -29.79 | 22.40 | 26.21 | 28.50 | 46.00 | 56.00 | 0.04 | 0.07 |
| 5.71 | -27.05 | -32.22 | 22.95 | 27.78 | 29.13 | 50.00 | 60.00 | 0.03 | 0.12 |
| 6.95 | -26.62 | -32.19 | 23.38 | 27.81 | 29.87 | 50.00 | 60.00 | 0.03 | 0.17 |

This is the worst case operating mode.

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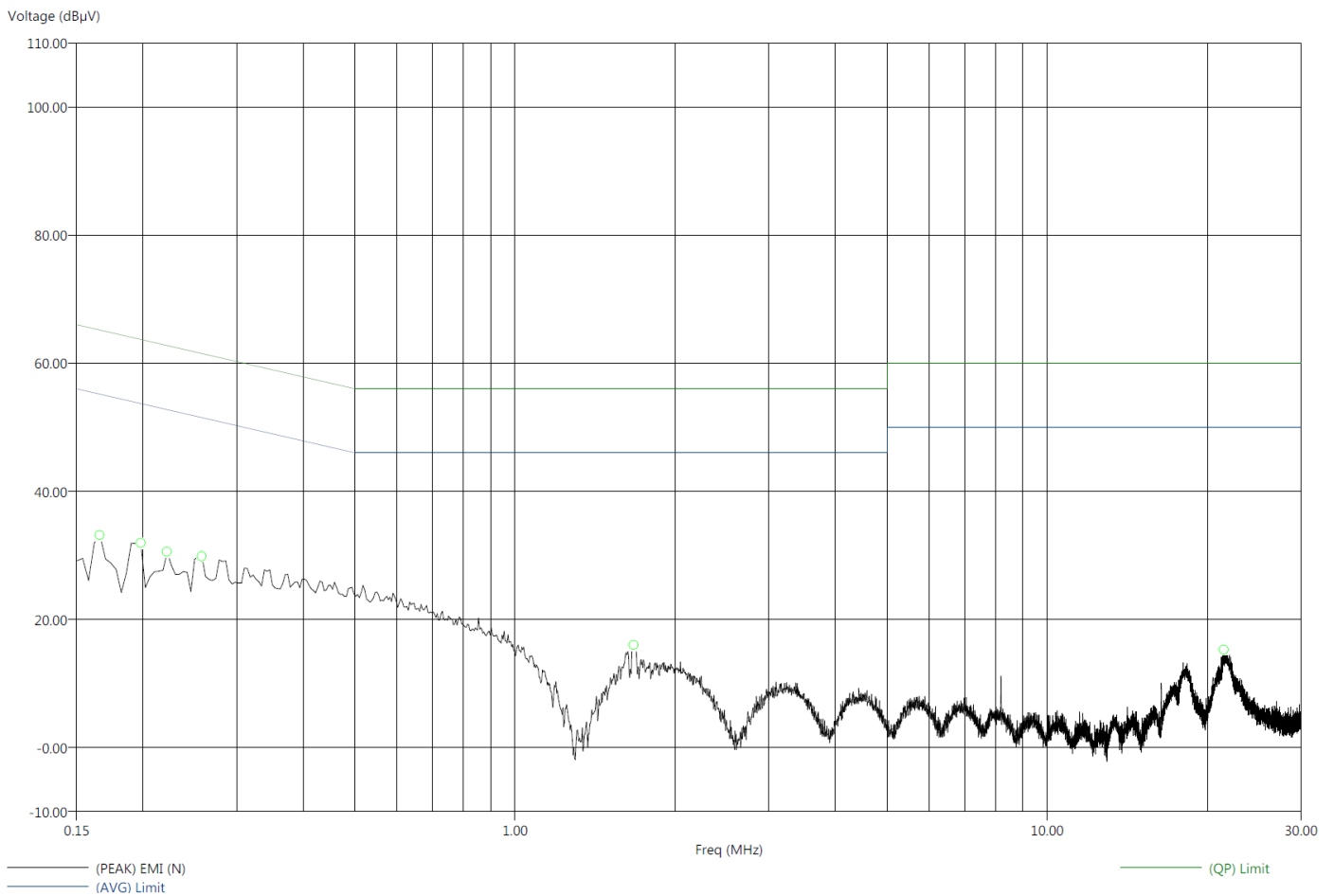
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Lake Forest Division
 20621 Pascal Way
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Title: FCC 15.207
 File: Conducted Pre-Neutral 120V.set
 Operator: Torey Oliver
 EUT Type: PlugZ Switch / PS15EMZ5-1
 EUT Condition: The EUT is constantly transmitting 908.42MHz.
 Comments: Temp: 74f
 Hum: 33%
 120V 60Hz

6/20/2016 5:51:18 PM
 Sequence: Preliminary Scan

Compatible Electronics, Inc. FAC-3 (Lab R)



This is the worst case operating mode.



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Title: FCC 15.207

6/20/2016 5:53:47 PM

File: Conducted Final-Neutral 120V.set

Sequence: Final Measurements

Operator: Torey Oliver

EUT Type: PlugZ Switch / PS15EMZ5-1

EUT Condition: The EUT is constantly transmitting 908.42MHz.

Comments: Temp: 74f

Hum: 33%

120V 60Hz

Compatible Electronics, Inc. FAC-3 (Lab R)

| Freq (MHz) | (AVG) Margin AVL (dB) | (QP) Margin QPL (dB) | (AVG) EMI (dBμV/m) | (QP) EMI (dBμV/m) | (Peak) EMI (dBμV/m) | (AVG) Limit (dBμV/m) | (QP) Limit (dBμV/m) | Transducer(dB) | Cable(dB) |
|------------|-----------------------|----------------------|--------------------|-------------------|---------------------|----------------------|---------------------|----------------|-----------|
| 0.17 | -13.66 | -18.69 | 41.49 | 46.47 | 53.08 | 55.16 | 65.16 | 0.40 | 0.03 |
| 0.20 | -11.85 | -16.44 | 41.84 | 47.25 | 53.28 | 53.69 | 63.69 | 0.31 | 0.04 |
| 0.22 | -11.15 | -15.97 | 41.59 | 46.77 | 52.51 | 52.74 | 62.74 | 0.26 | 0.04 |
| 0.26 | -11.14 | -15.97 | 40.36 | 45.53 | 51.95 | 51.50 | 61.50 | 0.18 | 0.03 |
| 1.67 | -13.84 | -19.92 | 32.16 | 36.08 | 44.97 | 46.00 | 56.00 | 0.03 | 0.03 |
| 21.45 | -15.51 | -21.14 | 34.49 | 38.86 | 46.26 | 50.00 | 60.00 | 0.11 | 0.23 |

This is the worst case operating mode.



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***FUNDAMENTAL
DATA SHEETS***



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FUNDAMENTAL FIELD STRENGTH

Company: Nortek
EUT: Plug Z Switch
Model: PS15EMZ5-1Date: 6/13/2016
Lab: R
Tested By: Torey Oliver

Compatible Electronics, Inc. FAC-3

| Freq. (MHz) | Level (dBuV/m) | Pol (v/h) | Limit | Margin | Peak / QP / Avg | Table | Tower | Comments |
|-------------|----------------|-----------|--------|--------|-----------------|-------|-------|----------|
| 908.42 | 95.84 | H | 113.97 | -18.13 | Peak | 66 | 1.00 | Z Axis |
| 908.42 | 93.31 | H | 93.97 | -0.66 | QP | 66 | 1.00 | Z Axis |
| 908.42 | 96.01 | V | 113.97 | -17.96 | Peak | 132 | 1.20 | Z Axis |
| 908.42 | 93.57 | V | 93.97 | -0.40 | QP | 132 | 1.20 | Z Axis |
| 916.00 | 94.03 | H | 113.97 | -19.94 | Peak | 336 | 1.00 | Z-Axis |
| 916.00 | 90.94 | H | 93.97 | -3.03 | QP | 336 | 1.00 | Z-Axis |
| 916.00 | 95.13 | V | 113.97 | -18.84 | Peak | 138 | 1.20 | Z-Axis |
| 916.00 | 92.38 | V | 93.97 | -1.59 | QP | 138 | 1.20 | Z-Axis |

Test Distance
3 Meters

***HARMONIC
DATA SHEETS***

1



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HARMONIC EMISSIONS LOW CHANNEL HORIZONTAL

FCC 15.249

 Company: Nortek
 EUT: Plug Z Switch
 Model: PS15EMZ5-1

 Date: 6/20/2016
 Lab: R
 Tested By: Torey Oliver

| Freq. (MHz) | Level (dBuV) | Pol (v/h) | Limit | Margin | Peak / QP / Avg | Ant. Height (m) | Table Angle (deg) | Comments |
|-------------|--------------|-----------|-------|--------|-----------------|-----------------|-------------------|-------------------|
| 1816.8 | | H | 73.98 | | Peak | | | No emission found |
| 1816.8 | | H | 53.98 | | Avg | | | No emission found |
| 2725.3 | | H | 73.98 | | Peak | | | No emission found |
| 2725.3 | | H | 53.98 | | Avg | | | No emission found |
| 3633.7 | | H | 73.98 | | Peak | | | No emission found |
| 3633.7 | | H | 53.98 | | Avg | | | No emission found |
| 4542.1 | 56.39 | H | 73.98 | -17.59 | Peak | 1.10 | 236 | |
| 4542.1 | 40.16 | H | 53.98 | -13.82 | Avg | 1.10 | 236 | |
| 5450.5 | | H | 73.98 | | Peak | | | No emission found |
| 5450.5 | | H | 53.98 | | Avg | | | No emission found |
| 6358.9 | 47.75 | H | 73.98 | -26.23 | Peak | 1.05 | 208 | |
| 6358.9 | 35.00 | H | 53.98 | -18.98 | Avg | 1.05 | 208 | |
| 7267.4 | 56.47 | H | 73.98 | -17.51 | Peak | 2.33 | 360 | |
| 7267.4 | 40.58 | H | 53.98 | -13.40 | Avg | 2.33 | 360 | |
| 8175.8 | | H | 73.98 | | Peak | | | No emission found |
| 8175.8 | | H | 53.98 | | Avg | | | No emission found |
| 9084.2 | | H | 73.98 | | Peak | | | No emission found |
| 9084.2 | | H | 53.98 | | Avg | | | No emission found |

 Test distance
 3 meter


HARMONIC EMISSIONS LOW CHANNEL VERTICAL

FCC 15.249

Company: Nortek
 EUT: Plug Z Switch
 Model: PS15EMZ5-1

Date: 6/20/2016
 Lab: R
 Tested By: Torey Oliver

| Freq. (MHz) | Level (dBuV) | Pol (v/h) | Limit | Margin | Peak / QP / Avg | Ant. Height (m) | Table Angle (deg) | Comments |
|-------------|--------------|-----------|-------|--------|-----------------|-----------------|-------------------|-------------------|
| 1816.8 | | V | 73.98 | | Peak | | | No emission found |
| 1816.8 | | V | 53.98 | | Avg | | | No emission found |
| 2725.3 | | V | 73.98 | | Peak | | | No emission found |
| 2725.3 | | V | 53.98 | | Avg | | | No emission found |
| 3633.7 | | V | 73.98 | | Peak | | | No emission found |
| 3633.7 | | V | 53.98 | | Avg | | | No emission found |
| 4542.1 | 58.92 | V | 73.98 | -15.06 | Peak | 1.68 | 150 | |
| 4542.1 | 42.98 | V | 53.98 | -11.00 | Avg | 1.68 | 150 | |
| 5450.5 | | V | 73.98 | | Peak | | | No emission found |
| 5450.5 | | V | 53.98 | | Avg | | | No emission found |
| 6358.9 | 47.75 | V | 73.98 | -26.23 | Peak | 1.69 | 237 | |
| 6358.9 | 35.00 | V | 53.98 | -18.98 | Avg | 1.69 | 237 | |
| 7267.4 | 56.47 | V | 73.98 | -17.51 | Peak | 1.26 | 213 | |
| 7267.4 | 41.10 | V | 53.98 | -12.88 | Avg | 1.26 | 213 | |
| 8175.8 | | V | 73.98 | | Peak | | | No emission found |
| 8175.8 | | V | 53.98 | | Avg | | | No emission found |
| 9084.2 | | V | 73.98 | | Peak | | | No emission found |
| 9084.2 | | V | 53.98 | | Avg | | | No emission found |

Test distance
 3 meter



HARMONIC EMISSIONS HIGH CHANNEL HORIZONTAL

FCC 15.249

Company: Nortek
 EUT: Plug Z Switch
 Model: PS15EMZ5-1

Date: 6/20/2016
 Lab: R
 Tested By: Torey Oliver

| Freq. (MHz) | Level (dBuV) | Pol (v/h) | Limit | Margin | Peak / QP / Avg | Ant. Height (m) | Table Angle (deg) | Comments |
|-------------|--------------|-----------|-------|--------|-----------------|-----------------|-------------------|-------------------|
| 1832.0 | | H | 73.98 | | Peak | | | No emission found |
| 1832.0 | | H | 53.98 | | Avg | | | No emission found |
| 2748.0 | | H | 73.98 | | Peak | | | No emission found |
| 2748.0 | | H | 53.98 | | Avg | | | No emission found |
| 3664.0 | | H | 73.98 | | Peak | | | No emission found |
| 3664.0 | | H | 53.98 | | Avg | | | No emission found |
| 4580.0 | 47.76 | H | 73.98 | -26.22 | Peak | 2.65 | 241 | |
| 4580.0 | 31.36 | H | 53.98 | -22.62 | Avg | 2.65 | 241 | |
| 5496.0 | | H | 73.98 | | Peak | | | No emission found |
| 5496.0 | | H | 53.98 | | Avg | | | No emission found |
| 6412.0 | | H | 73.98 | | Peak | | | No emission found |
| 6412.0 | | H | 53.98 | | Avg | | | No emission found |
| 7328.0 | 48.44 | H | 73.98 | -25.54 | Peak | 1.23 | 188 | |
| 7328.0 | 36.32 | H | 53.98 | -17.66 | Avg | 1.23 | 188 | |
| 8244.0 | | H | 73.98 | | Peak | | | No emission found |
| 8244.0 | | H | 53.98 | | Avg | | | No emission found |
| 9160.0 | | H | 73.98 | | Peak | | | No emission found |
| 9160.0 | | H | 53.98 | | Avg | | | No emission found |

Test distance
 3 meter



HARMONIC EMISSIONS HIGH CHANNEL VERTICAL

FCC 15.249

Company: Nortek
 EUT: Plug Z Switch
 Model: PS15EMZ5-1

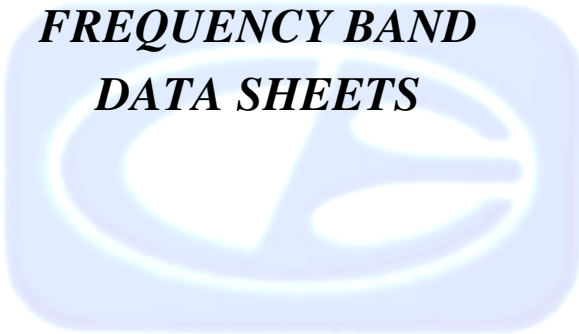
Date: 6/20/2016
 Lab: R
 Tested By: Torey Oliver

| Freq. (MHz) | Level (dBuV) | Pol (v/h) | Limit | Margin | Peak / QP / Avg | Ant. Height (m) | Table Angle (deg) | Comments |
|-------------|--------------|-----------|-------|--------|-----------------|-----------------|-------------------|-------------------|
| 1832.0 | | V | 73.98 | | Peak | | | No emission found |
| 1832.0 | | V | 53.98 | | Avg | | | No emission found |
| 2748.0 | | V | 73.98 | | Peak | | | No emission found |
| 2748.0 | | V | 53.98 | | Avg | | | No emission found |
| 3664.0 | | V | 73.98 | | Peak | | | No emission found |
| 3664.0 | | V | 53.98 | | Avg | | | No emission found |
| 4580.0 | 42.40 | V | 73.98 | -31.58 | Peak | 2.30 | 153 | |
| 4580.0 | 29.79 | V | 53.98 | -24.19 | Avg | 2.30 | 153 | |
| 5496.0 | | V | 73.98 | | Peak | | | No emission found |
| 5496.0 | | V | 53.98 | | Avg | | | No emission found |
| 6412.0 | | V | 73.98 | | Peak | | | No emission found |
| 6412.0 | | V | 53.98 | | Avg | | | No emission found |
| 7328.0 | 49.30 | V | 73.98 | -24.68 | Peak | 1.00 | 0 | |
| 7328.0 | 36.37 | V | 53.98 | -17.61 | Avg | 1.00 | 0 | |
| 8244.0 | | V | 73.98 | | Peak | | | No emission found |
| 8244.0 | | V | 53.98 | | Avg | | | No emission found |
| 9160.0 | | V | 73.98 | | Peak | | | No emission found |
| 9160.0 | | V | 53.98 | | Avg | | | No emission found |

Test distance
 3 meter



***EMISSIONS RADIATED OUTSIDE OF THE FUNDAMENTAL
FREQUENCY BAND
DATA SHEETS***



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BAND EDGE LOW CHANNEL

FCC 15.249

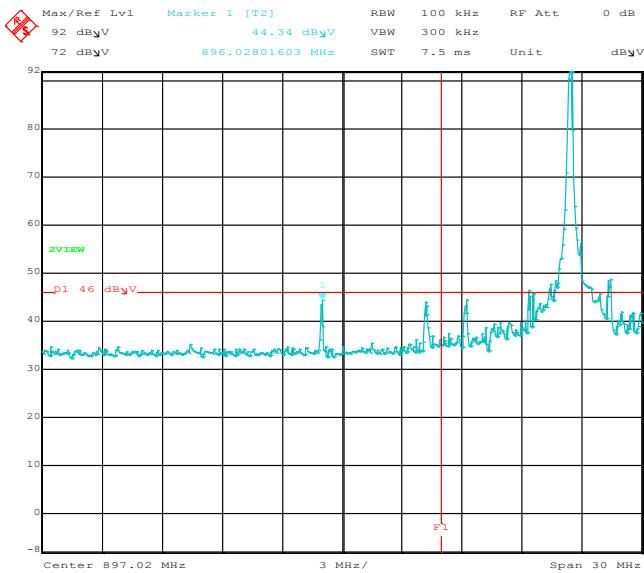
Company: Nortek
EUT: Plug Z Switch
Model: PS15EMZ5-1

Date: 6/15/2016
Lab: R
Test ENG: Torey Oliver

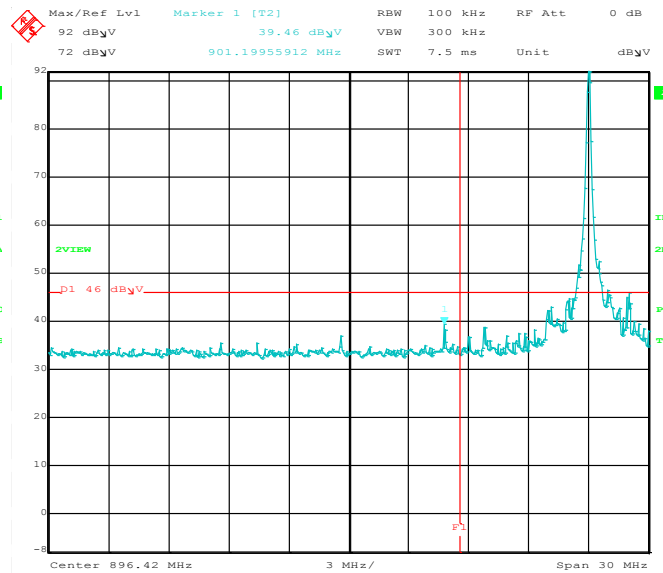
Compatible Electronics, Inc. FAC-3 (Lab R)

| Freq. (MHz) | Level (dBµV/m) | Pol | Limit (dBµV) | Margin (dB) | Peak / QP / Avg | Table Angle (Deg) | Tower Height (m) | Comments |
|-------------|----------------|-----|--------------|-------------|-----------------|-------------------|------------------|-----------------|
| 896.03 | 44.34 | H | 46.00 | -1.66 | Peak | 341 | 1.00 | No Marker Delta |
| 896.03 | -- | H | -- | -- | QP | -- | -- | Method Used |
| 901.20 | 39.46 | V | 46.00 | -6.54 | Peak | 136 | 1.15 | No Marker Delta |
| 901.20 | -- | V | -- | -- | QP | -- | -- | Method Used |

Test distance
3 meter



Comment A: Lower Band Edge 908.42MHz Horizontal
Date: 15.JUN.2016 10:06:56



Comment A: Lower Band Edge 908.42MHz Vertical
Date: 15.JUN.2016 10:24:13



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Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

BAND EDGE HIGH CHANNEL

FCC 15.249

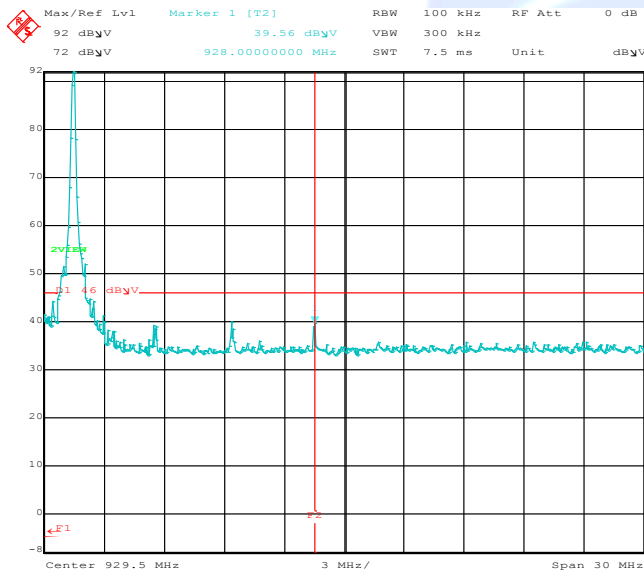
Company: Nortek
 EUT: Plug Z Switch
 Model: PS15EMZ5-1

Date: 6/15/2016
 Lab: R
 Test ENG: Torey Oliver

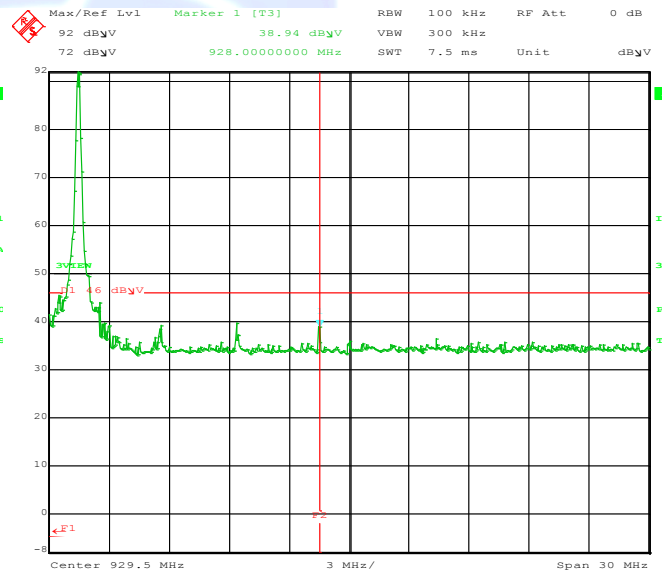
Compatible Electronics, Inc. FAC-3 (Lab R)

| Freq. (MHz) | Level (dBμV/m) | Pol | Limit (dBμV) | Margin (dB) | Peak / QP / Avg | Table Angle (Deg) | Tower Height (m) | Comments |
|-------------|----------------|-----|--------------|-------------|-----------------|-------------------|------------------|-----------------|
| 928.00 | 39.56 | H | 46.00 | -6.44 | Peak | 336 | 1.00 | No Marker Delta |
| 928.00 | -- | H | -- | -- | QP | -- | -- | Method Used |
| 928.00 | 38.94 | V | 46.00 | -7.06 | Peak | 138 | 1.20 | No Marker Delta |
| 928.00 | -- | V | -- | -- | QP | -- | -- | Method Used |

Test distance
 3 meter



Comment A: Upper Band Edge 916MHz Horizontal
 Date: 15.JUN.2016 11:49:42



Comment A: Upper Band Edge 916MHz Vertical
 Date: 15.JUN.2016 11:58:27

