

**FCC PART 15, SUBPART C 15.231  
TEST REPORT***for***WIRELESS DOOR/WINDOW CONTACT WITH LOCAL BYPASS****MODEL: 2GIG-DW40-345**

Prepared for

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

Prepared by: \_\_\_\_\_

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DATE: FEBRUARY 20, 2015

|       | REPORT<br>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 without the written permission of Compatible Electronics, unless done so in full.

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

Device Tested: Wireless Door/Window Contact with Local Bypass  
Model: 2GIG-DW40-345  
SN: 11

Product Description: The 2GIG-DW40-345 Wireless Door/Window Contact has a local bypass feature. This means that the contact allows opening of a protected door or window without sending a signal to the control panel.

Modifications: The EUT was not modified.

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

Test Date: February 20 & 24, 2015

Test Specifications: CFR Title 47, Part 15 Subpart C, Sections 15.205, 15.209 and 15.231

Test Procedure: ANSI C63.10: 2009

Test Deviations: The test procedure was not deviated from during the testing.

## SUMMARY OF TEST RESULTS

| TEST | DESCRIPTION                               | RESULTS   |
|------|---|---|
| 1    | Radiated RF Emissions, 0.01 - 4000 MHz    | Complies with the limits of CFR Title 47, Part 15, Subpart C, section 15.205 & 15.209 |
| 2    | -20 dB Occupied Bandwidth of the Emission | Complies with the limits of CFR Title 47, Part 15, Subpart C, section 15.231.         |
| 3    | Peak Radiated EMI                         | Complies with the limits of CFR Title 47, Part 15, Subpart C, section 15.231.         |
| 4    | Transmit Timeout                          | Complies with the limits of CFR Title 47, Part 15, Subpart C, section 15.231.         |

### 1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Wireless Door/Window Contact With Local Bypass Model: 2GIG-DW40-345. The EMI measurements were performed according to the measurement procedure described in ANSI C63.10. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the specification limits defined by CFR Title 47, Part 15, Subpart C, sections 15.205, 15.209, 15.231.

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## 2. ADMINISTRATIVE DATA

### 2.1 Location of Testing

The EMI 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

Josh Hansen                      Regulatory Engineer

Compatible Electronics, Inc.

Matt Harrison                      Test Technician  
Jeff Klinger                          Director of Engineering

### 2.4 Date Test Sample was Received

The test sample was received on February 20, 2015.

### 2.5 Disposition of the Test Sample

The sample remains at Compatible Electronics 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                      |
| CLA  | Cigar Lighter Adaptor                |
| 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 |

**3. APPLICABLE DOCUMENTS**

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

| <b>SPEC</b>              | <b>TITLE</b>  |
|--------------------------|---|
| CFR Title 47,<br>Part 15 | FCC Rules – Radio frequency devices (including digital devices)   |
| CFR Title 47,<br>Part 2  | Frequency Allocations And Radio Treaty Matters; General Rules And Regulations   |
| ANSI C63.10<br>2009      | American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz |

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**4. DESCRIPTION OF TEST CONFIGURATION****4.1 Description Of Test Configuration - EMI**

Setup and operation of the equipment under test.

Specifics of the EUT and Peripherals Tested

The Wireless Door/Window Contact With Local Bypass Model: 2GIG-DW40-345 (EUT) was set up in a table top configuration. The transmit antenna of the EUT is a PCB trace on the PCB, which is contained inside the plastic housing. The EUT was explored in 3 orthogonal axes (X-axis, Y-axis and Z-axis).

The final test was performed in the worse case emission configuration.

The EUT was continuously transmitting throughout the tests.

The final data was taken in the mode described above in the X-axis configuration. Please see Appendix E for the data sheets.



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**4.1.1 Cable Construction and Termination**

There were no interconnecting cables.



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

| <b>EQUIPMENT</b>  | <b>MANUFACTURER</b>          | <b>MODEL NUMBER</b> | <b>SERIAL NUMBER</b> | <b>FCC ID</b> |
|---|------------------------------|---------------------|----------------------|---------------|
| WIRELESS<br>DOOR/WINDOW CONTACT<br>WITH LOCAL BYPASS<br>(EUT) | NORTEK SECURITY &<br>CONTROL | 2GIG-DW40-345       | NONE                 | WDQ-DW40345   |
| 3V Battery  | RADIO SHACK                  | N/A                 | N/A                  | N/A           |

5.2 EMI Test Equipment

| EQUIPMENT TYPE  | MANUFACTURER               | MODEL NUMBER | SERIAL NUMBER | CALIBRATION DATE | CALIBRATION DUE DATE |
|---|----------------------------|--------------|---------------|------------------|----------------------|
| <b>GENERAL TEST EQUIPMENT USED FOR ALL RF EMISSIONS TESTS</b> |                            |              |               |                  |                      |
| Computer  | Compatible Electronics     | N/A          | N/A           | N/A              | N/A                  |
| EMI Receiver  | Rohde & Schwarz            | ESIB40       | 100219        | 9/5/2014         | 9/5/2015             |
| Combilog Antenna  | Com-Power                  | AC-220       | 25857         | 5/21/2014        | 5/21/2015            |
| Loop Antenna  | Com-Power                  | AL-130       | 121049        | 12/6/2013        | 12/6/2015            |
| Horn Antenna  | Com-Power                  | AH-118       | 071250        | 7/1/2014         | 7/1/2016             |
| Pre Amplifier   | Com-Power                  | PAM-118      | 443013        | 4/24/2014        | 4/24/2015            |
| Antenna Mast  | Sunol Sciences Corporation | TWR 95-4     | 081309-3      | N/A              | N/A                  |
| Turntable   | Sunol Sciences Corporation | FM2011VS     | N/A           | N/A              | N/A                  |
| Mast and Turntable Controller                                 | Sunol Sciences Corporation | SC104V       | 081309-1      | N/A              | N/A                  |

**6. TEST SITE DESCRIPTION****6.1 Test Facility Description**

Please refer to section 2.1 and 7.1 of this report for EMI test location.

**6.2 EUT Mounting, Bonding and Grounding**

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The EUT was placed in the center of the table, in accordance with ANSI C63.10. The test site receive antenna distance was measured from the closest periphery of the EUT setup.

The EUT was not grounded.

## 7. TEST PROCEDURES

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

### 7.1 RF Emissions

#### 7.1.1 Conducted Emissions Test

*(This test was not performed.)*

The EMI Receiver was used as a measuring meter. A 10 dB attenuation pad was used for the protection of the EMI Receiver input stage. All factors associated with attenuator and cables were recorded into the EMI Software Program accordingly to display the actual corrected measured level. The LISN output was connected to the input of the EMI Receiver. The output of the second LISN was terminated with 50-ohm termination. The effective measurement bandwidth used for the conducted emissions test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in FCC 15.207. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The initial test data was taken in manual mode while scanning the frequency ranges of 0.15 MHz to 30 MHz. The conducted emissions from the EUT were maximized for operating mode as well as cable placement. Once a predominant frequency (within 12 dB of the limit) was found, it was more closely examined with the spectrum analyzer span adjusted to 1 MHz.

#### **Test Results:**

The EUT is battery powered; therefore this test was not performed.

## 7.1.2 Radiated Emissions (Spurious and Harmonics) Test

The 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.

The spurious emission frequencies above 1 GHz were investigated with the built-in average detector.

The harmonic emissions frequencies were investigated with the duty cycle correction factor.

The measurement bandwidths and transducers used for the radiated emissions (Spurious) tests were:

| FREQUENCY RANGE   | EFFECTIVE MEASUREMENT BANDWIDTH | TRANSDUCER          |
|-------------------|---------------------------------|---------------------|
| 9 kHz to 150 kHz  | 200 Hz                          | Active Loop Antenna |
| 150 kHz to 30 MHz | 9 kHz                           | Active Loop Antenna |
| 30 MHz to 1 GHz   | 100 kHz                         | CombiLog Antenna    |
| 1 GHz to 4 GHz    | 1 MHz                           | Horn Antenna        |

The Semi-Anechoic test site of Compatible Electronics, Inc, Lab R (Lake Forest), was used for all tests. This test sites are set up according to ANSI C63.10. 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. Final data was collected in the worst case configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength). The loop antenna was also rotated in the horizontal and vertical axis in order to ensure accurate results.

### 7.1.3 Radiated Emissions (Spurious and Harmonics) Test (Continued)

The EUT was continuously transmitting during the test. The EUT was tested at a 3-meter test distance to obtain the final test data. The final qualification data sheets are located in Appendix E.

#### Test Results:

The EUT complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B; and CFR Title 47, Part 15, Subpart C, sections 15.205, 15.209 and 15.231. There were no emissions found below 30MHz.

### 7.1.4 Peak radiated EMI

The EUT was tested at a 3-meter test distance to obtain the final test data. The final qualification data sheets are located in Appendix E. This data also shows compliance at the band edges.

Duty Cycle Correction Factor = -20.00dB

$$\delta(\text{dB}) = 20 \log \left[ \frac{\sum (nt_1 + mt_2 + \dots + \xi t_x)}{T} \right]$$

where

$n$  is the number of pulses of duration  $t_1$

$m$  is the number of pulses of duration  $t_2$

$\xi$  is the number of pulses of duration  $t_x$

$T$  is the period of the pulse train or 100 ms if the pulse train length is greater than 100 ms

Pulse Type 1 =  $40 * 150.701403 \mu\text{S} = 6.028056 \text{ mS}$

Pulse Type 2 =  $12 * 283.967936 \mu\text{S} = 3.407615 \text{ mS}$

Total On Time =  $6.028056 \text{ mS} + 3.407615 \text{ mS} = 9.435671 \text{ mS}$

$100\text{ms} / 9.435671 = 0.09435671$

$20 \log (0.09435671) = -20.50 \text{ dB}$  correction factor

**Max Duty Cycle Correction Factor = -20.00dB**

#### Test Results:

The EUT complies with Part 15, Subpart C, section 15.231.

### 7.1.5 Bandwidth of the Fundamental

The -20 dB bandwidth was checked using the EMI Receiver to see that the emissions were wholly within the 0.25% of the operating frequency centered on the fundamental frequency. The RBW was set to 500 Hz and the VBW was set to 3 kHz. A Plot of the -20 dB bandwidth is located in Appendix E.

#### **Test Results:**

The EUT complies with the requirements of CFR Title 47, Part 15, Subpart C, section 15.231 (c) for the -20 dB bandwidth of the fundamental. The EUT has a -20 dB bandwidth that lies wholly within the 0.25% of the operating frequency centered on the fundamental frequency.

## 8. CONCLUSIONS

The wireless door/window contact with local bypass Model: 2GIG-DW40-345 meets all of the specification limits defined in CFR Title 47, Part 15, Subpart B for the digital portion; and the limits defined in Subpart C, sections 15.205, 15.209, and 15.231 for the transmitter portion.





**APPENDIX A**

***LABORATORY RECOGNITIONS***

---

**Brea Division**  
114 Olinda Drive  
Brea, CA 92823  
(714) 579-0500

**Agoura Division**  
2337 Troutdale Drive  
Agoura, CA 91301  
(818) 597-0600

**Silverado Division**  
19121 El Toro Road  
Silverado, CA 92676  
(949) 589-0700

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

## LABORATORY ACCREDITATIONS AND RECOGNITIONS

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

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

**NVLAP listing links**[Agoura Division](#) / [Brea Division](#) / [Silverado/Lake Forest Division](#)

.Quote from ISO-ILAC-IAF Communiqué on 17025:

"A laboratory's fulfilment of the requirements of ISO/IEC 17025:2005 means the laboratory meets both the technical competence requirements and management system requirements that are necessary for it to consistently deliver technically valid test results and calibrations. The management system requirements in ISO/IEC 17025:2005 (Section 4) are written in language relevant to laboratory operations and meet the principles of ISO 9001:2008 Quality Management Systems – Requirements."

**ANSI listing** [CETCB](#)

Compatible Electronics has been nominated as a Conformity Assessment Body (CAB) for EMC under the US/EU Mutual Recognition Agreement (MRA).  
**US/EU MRA list** [NIST MRA site](#)



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).  
**APEC MRA list** [NIST MRA site](#)

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[FCC test lab search](https://fjallfoss.fcc.gov/oetcf/eas/reports/TestFirmSearch.cfm) <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>**Brea Division**  
114 Olinda Drive  
Brea, CA 92823  
(714) 579-0500**Agoura Division**  
2337 Troutdale Drive  
Agoura, CA 91301  
(818) 597-0600**Silverado Division**  
19121 El Toro Road  
Silverado, CA 92676  
(949) 589-0700**Lake Forest Division**  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400



**APPENDIX B**

***MODIFICATIONS TO THE EUT***

## **MODIFICATIONS TO THE EUT**

No modifications were made to the EUT.





**APPENDIX C**

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

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

USED FOR THE PRIMARY TEST

WIRELESS DOOR/WINDOW CONTACT WITH LOCAL  
BYPASS  
Model: 2GIG-DW40-345  
S/N: 11

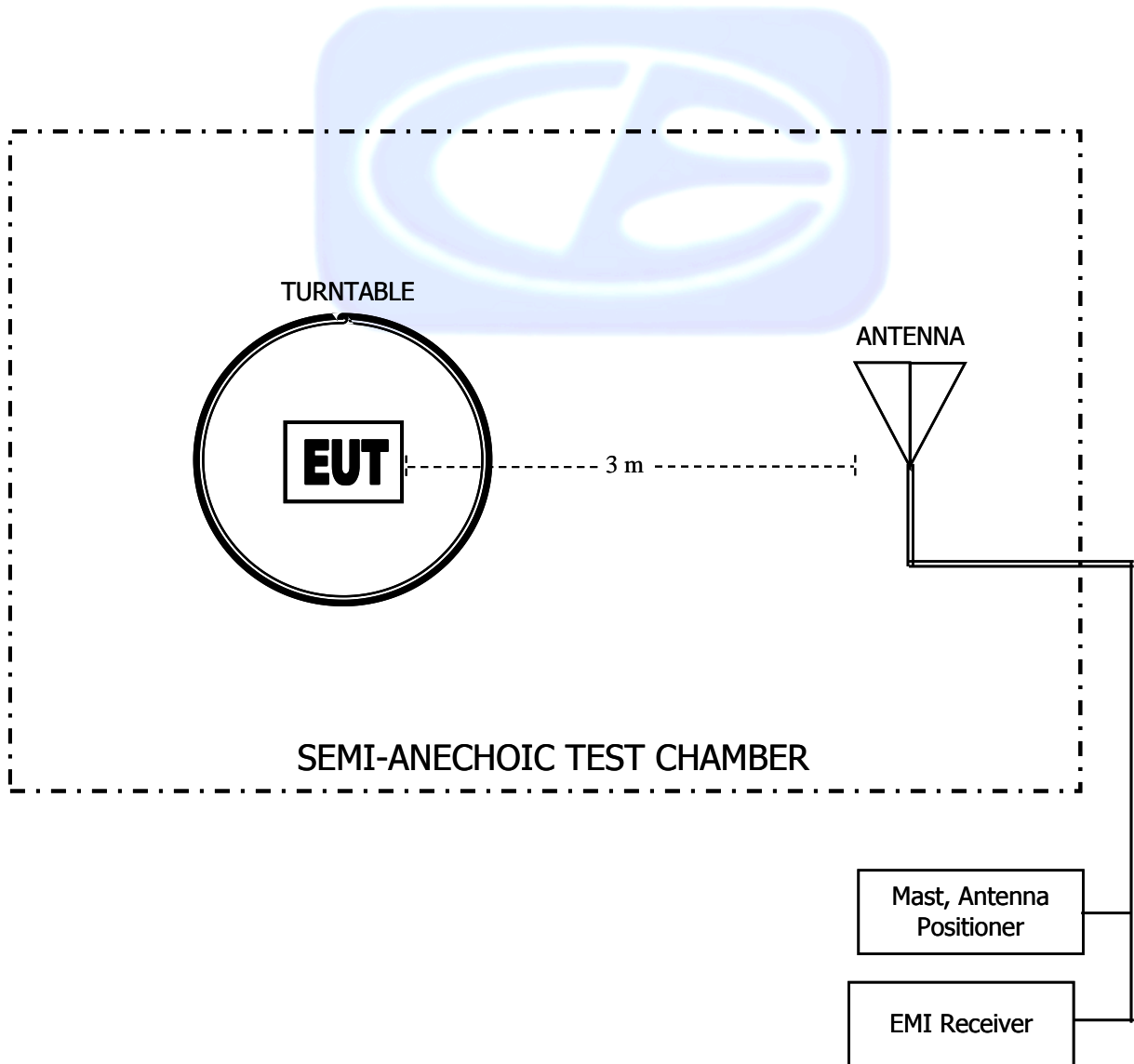
There were no additional models covered under this report.



**APPENDIX D**

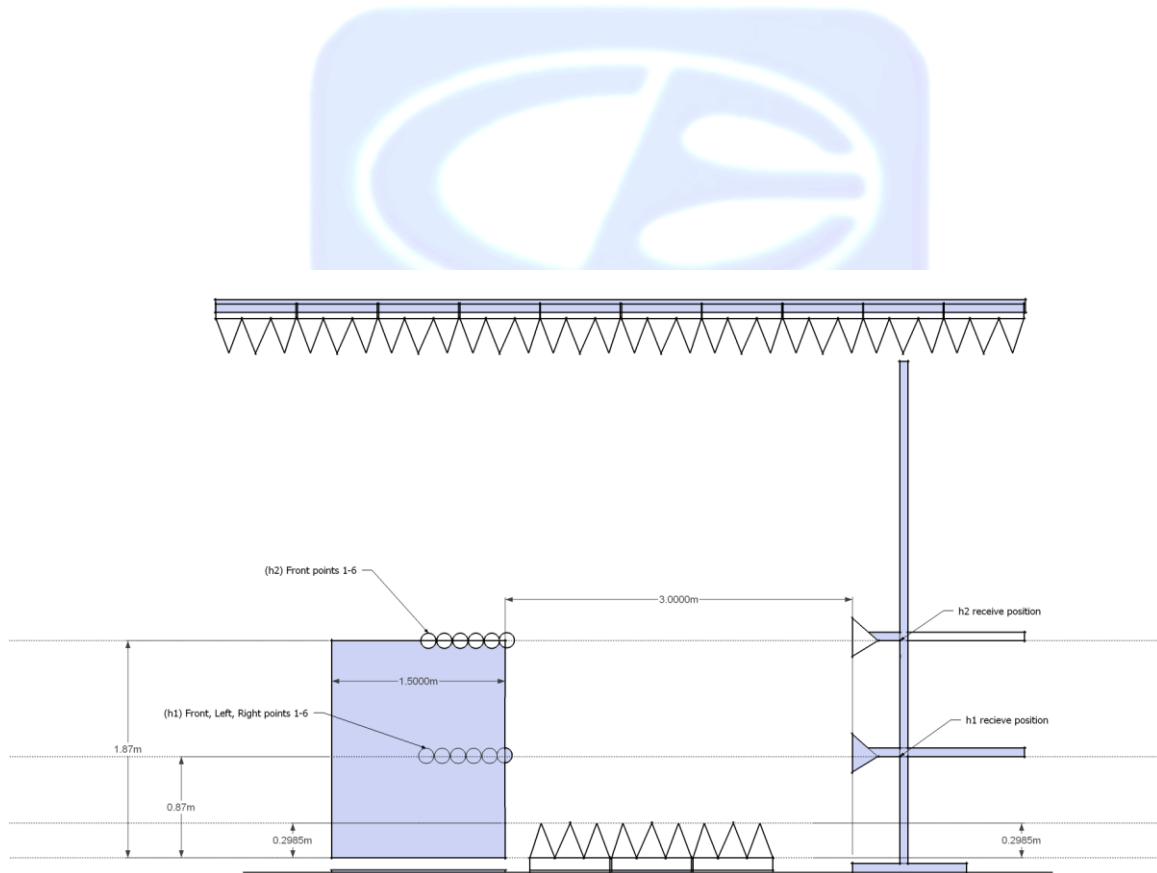
***DIAGRAMS, CHARTS, AND PHOTOS***

**FIGURE 1: RADIATED EMISSIONS 3-METER  
SEMI-ANECHOIC TEST CHAMBER BELOW 1GHz**





**FIGURE 2: RADIATED EMISSIONS 3-METER  
SEMI-ANECHOIC TEST CHAMBER ABOVE 1 GHz**



COM-POWER AL-130

LOOP ANTENNA

S/N: 121049

CALIBRATION DUE: DECEMBER 6, 2015

| 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 21, 2015**

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

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

S/N: 071250

**CALIBRATION DUE: JULY 1, 2016**

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

**COM-POWER PAM-118****1-18GHz - PREAMPLIFIER****S/N: 443013****CALIBRATION DUE: APRIL 24, 2015**

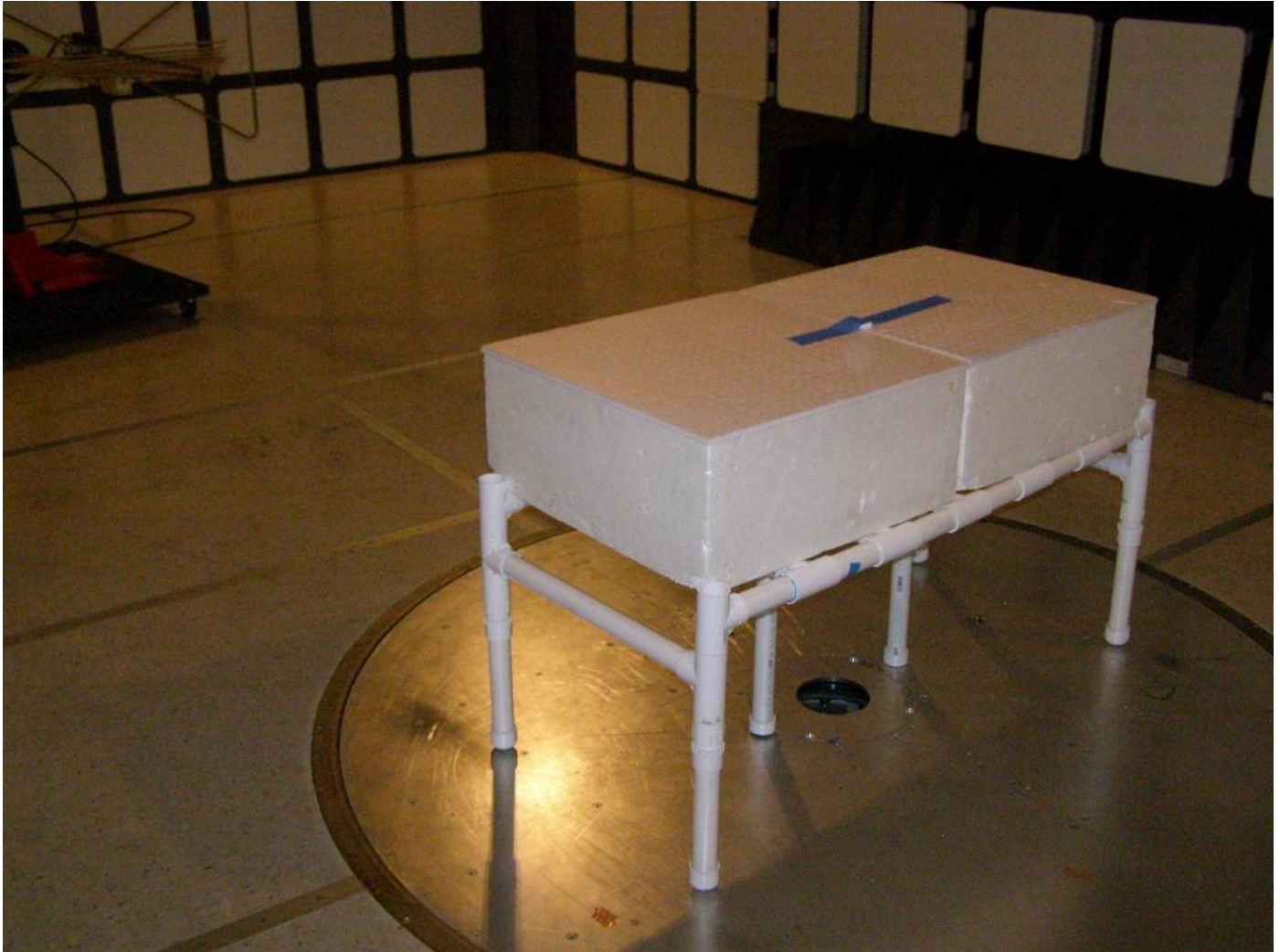
| <b>FREQUENCY<br/>(MHz)</b> | <b>FACTOR<br/>(dB)</b> | <b>FREQUENCY<br/>(MHz)</b> | <b>FACTOR<br/>(dB)</b> |
|----------------------------|------------------------|----------------------------|------------------------|
| <b>500</b>                 | 26.2                   | <b>5500</b>             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



**VIEW 1  
(X-AXIS)**

NORTEK SECURITY & CONTROL  
WIRELESS DOOR/WINDOW CONTACT WITH LOCAL BYPASS  
MODEL: 2GIG-DW40-345  
FCC SUBPART B AND C – RADIATED SPURIOUS EMISSIONS BELOW 1GHz

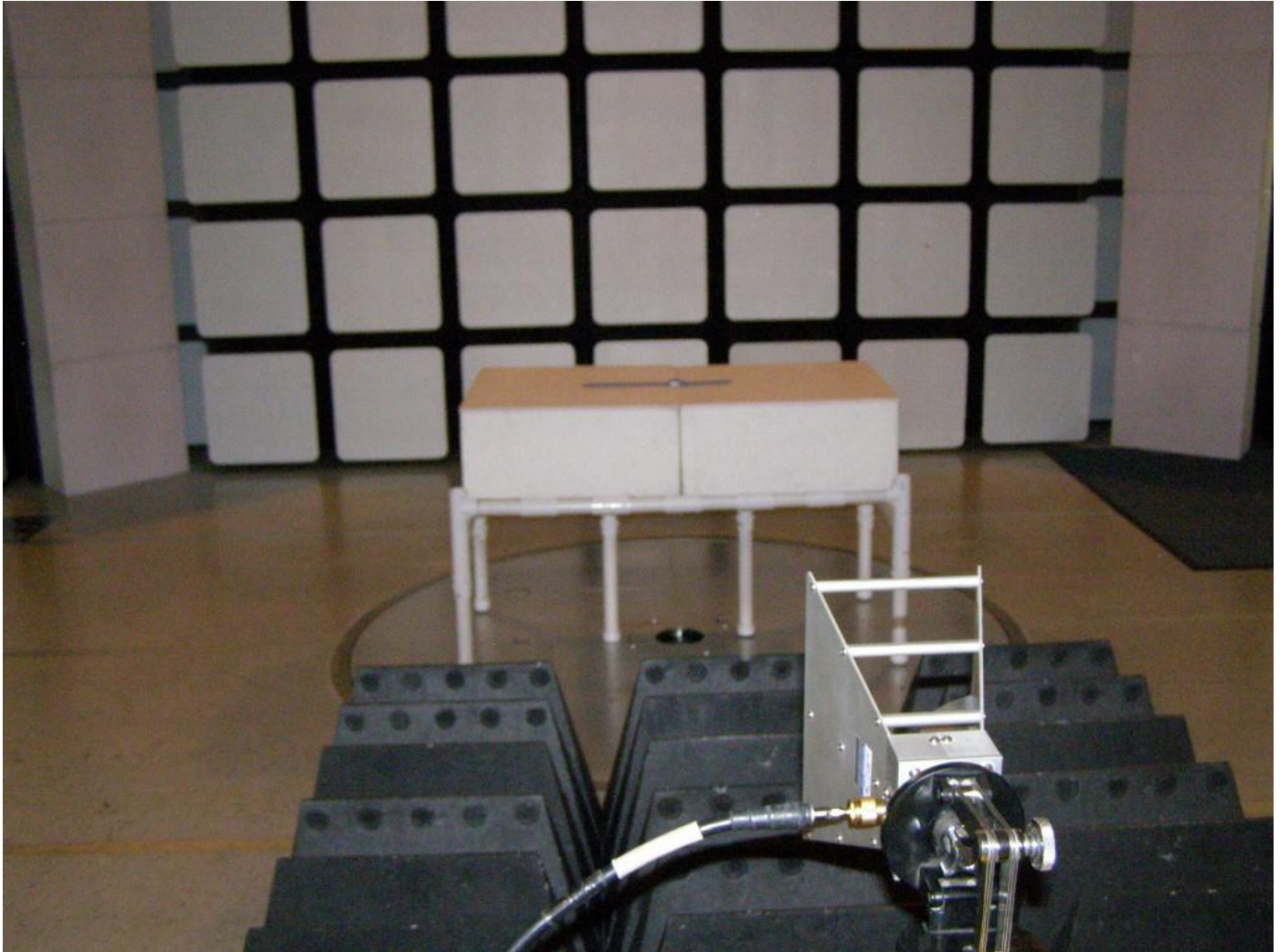
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION  
FOR MAXIMUM EMISSIONS**



**VIEW 2  
(X-AXIS)**

**NORTEK SECURITY & CONTROL  
WIRELESS DOOR/WINDOW CONTACT WITH LOCAL BYPASS  
MODEL: 2GIG-DW40-345  
FCC SUBPART B AND C – RADIATED SPURIOUS EMISSIONS BELOW 1GHz**

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



**VIEW 1  
(X-AXIS)**

**NORTEK SECURITY & CONTROL  
WIRELESS DOOR/WINDOW CONTACT WITH LOCAL BYPASS  
MODEL: 2GIG-DW40-345  
FCC SUBPART B AND C – RADIATED SPURIOUS EMISSIONS ABOVE 1GHz**

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

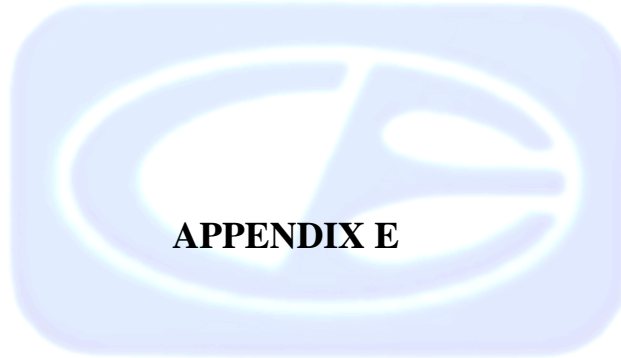




**VIEW 2  
(X-AXIS)**

**NORTEK SECURITY & CONTROL  
WIRELESS DOOR/WINDOW CONTACT WITH LOCAL BYPASS  
MODEL: 2GIG-DW40-345  
FCC SUBPART B AND C – RADIATED SPURIOUS EMISSIONS ABOVE 1GHz**

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



**APPENDIX E**

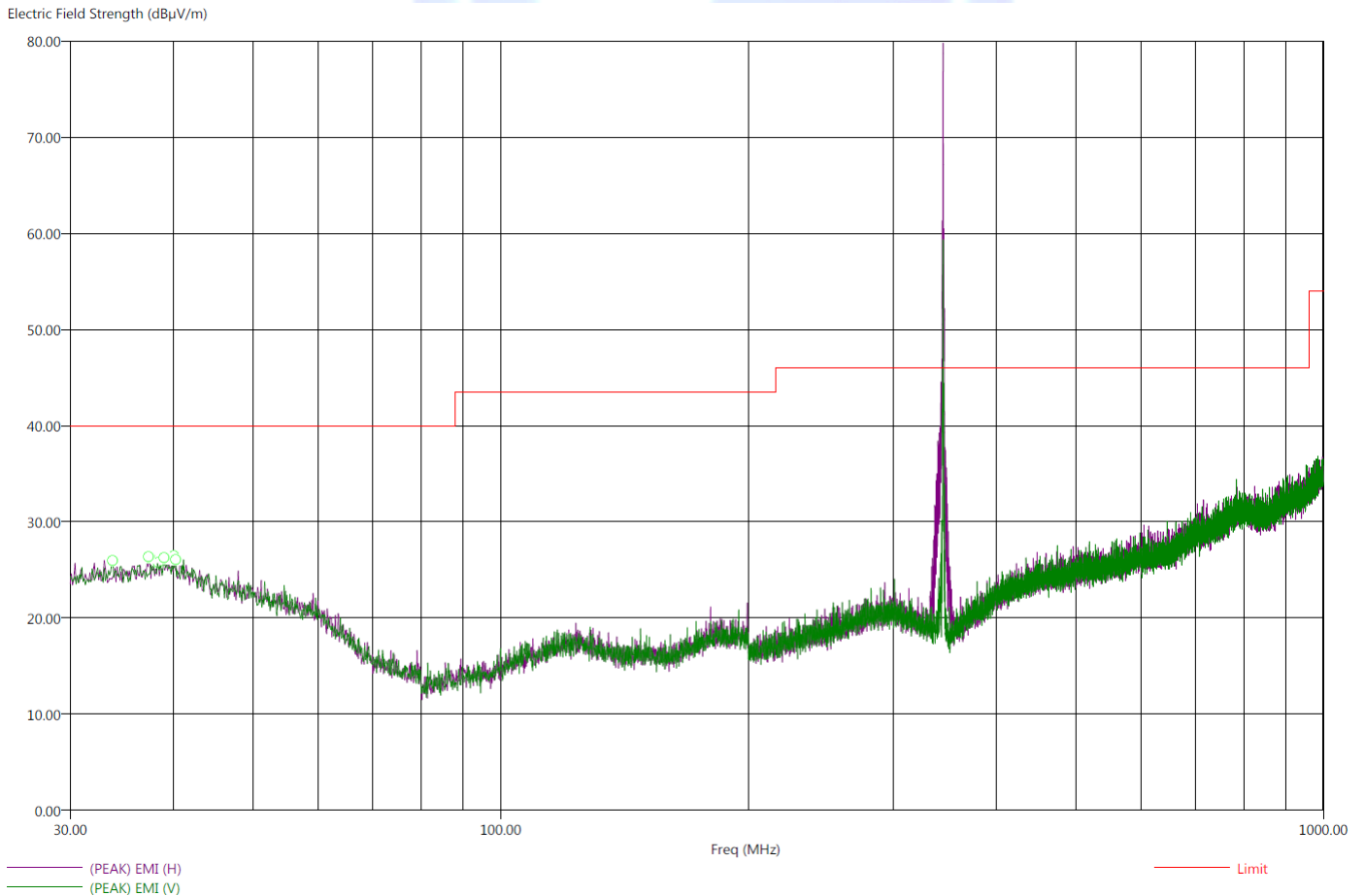
***DATA SHEETS***



***RADIATED EMISSIONS  
SPURIOUS AND HARMONICS  
DATA SHEETS***

Title: FCC 15.209  
File: Radiated Pre-Scan 30-1000Mhz.set  
Operator: Matt Harrison  
EUT Type: 2GIG-DW40-345.  
EUT Condition: Transmitting 345 MHz.  
Comments: X-Axis  
Temp: 68f  
Hum: 43%  
Battery Powered

2/20/2015 2:47:03 PM  
Sequence: Preliminary Scan



**No spurious emissions except for harmonics found between 10kHz to 30MHz or 1-4GHz.  
There were no emissions found in stand-by mode**

Title: FCC 15.209  
File: Radiated Final 30-1000Mhz.set  
Operator: Matt Harrison  
EUT Type: 2GIG-DW40-345.  
EUT Condition: Transmitting 345 MHz.  
Comments: X-Axis  
Temp: 68f  
Hum: 43%  
Battery Powered

2/20/2015 3:10:27 PM  
Sequence: Final Measurements

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

| Freq (MHz) | (QP)Margin (dB) | (QP)EMI (dB $\mu$ V/m) | (PEAK)EMI (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Pol | Ttbl Agl (deg) | Twr Ht (cm) | Transducer (dB) | Cable (dB) |
|------------|-----------------|------------------------|--------------------------|----------------------|-----|----------------|-------------|-----------------|------------|
| 33.80      | -20.26          | 19.74                  | 24.47                    | 40.00                | V   | 231.50         | 146.38      | 22.50           | 0.94       |
| 37.40      | -19.64          | 20.36                  | 25.66                    | 40.00                | H   | 319.50         | 210.08      | 22.75           | 1.16       |
| 38.40      | -19.50          | 20.50                  | 25.76                    | 40.00                | H   | 103.50         | 125.61      | 22.84           | 1.21       |
| 39.00      | -19.32          | 20.68                  | 26.76                    | 40.00                | V   | 54.00          | 288.65      | 22.91           | 1.25       |
| 40.10      | -19.15          | 20.85                  | 25.87                    | 40.00                | H   | 283.75         | 158.56      | 22.98           | 1.29       |
| 40.30      | -19.19          | 20.81                  | 25.95                    | 40.00                | V   | 170.50         | 400.00      | 22.91           | 1.26       |

*No spurious emissions except for harmonics found between 10kHz to 30MHz or 1-4GHz.  
There were no emissions found in stand-by mode*

## HARMONICS - HORIZONTAL

**FCC 15.231**

Company: Nortek  
 EUT: Door/Window Sensor  
 Model: 2GIG-DW40-345  
 Duty Cycle Correction Factor: -20.00

Date: 2/20/2015  
 Lab: R  
 Tested By: Matt Harrison

| Freq. (MHz) | Level (dBuV) | Pol (v/h) | Limit | Margin | Peak / QP / Avg | Ant. Height (m) | Table Angle (deg) | Comments           |
|-------------|--------------|-----------|-------|--------|-----------------|-----------------|-------------------|--------------------|
| 690.00      | --           | H         | --    | --     | Peak            | --              | --                | No Emissions Found |
| 690.00      | --           | H         | --    | --     | Avg             | --              | --                | No Emissions Found |
| 1035.00     | 38.22        | H         | 73.98 | -35.76 | Peak            | 1.18            | 139               | In Restricted Band |
| 1035.00     | 18.22        | H         | 53.98 | -35.76 | Avg             | 1.18            | 139               |                    |
| 1380.00     | --           | H         | 73.98 | --     | Peak            | --              | --                | In Restricted Band |
| 1380.00     | --           | H         | 53.98 | --     | Avg             | --              | --                | No Emissions Found |
| 1725.00     | 50.01        | H         | 77.26 | -27.25 | Peak            | 1.08            | 128               |                    |
| 1725.00     | 30.01        | H         | 57.26 | -27.25 | Avg             | 1.08            | 128               |                    |
| 2070.00     | 55.91        | H         | 77.26 | -21.35 | Peak            | 3.58            | 315               |                    |
| 2070.00     | 35.91        | H         | 57.26 | -21.35 | Avg             | 3.58            | 315               |                    |
| 2415.00     | 58.79        | H         | 77.26 | -18.47 | Peak            | 1.38            | 289               |                    |
| 2415.00     | 38.79        | H         | 57.26 | -18.47 | Avg             | 1.38            | 289               |                    |
| 2760.00     | 56.50        | H         | 73.98 | -17.48 | Peak            | 2.17            | 31                | In Restricted Band |
| 2760.00     | 36.50        | H         | 53.98 | -17.48 | Avg             | 2.17            | 31                |                    |
| 3105.00     | 63.49        | H         | 77.26 | -13.77 | Peak            | 1.14            | 156               |                    |
| 3105.00     | 43.49        | H         | 57.26 | -13.77 | Avg             | 1.14            | 156               |                    |
| 3450.00     | 59.29        | H         | 77.26 | -17.97 | Peak            | 1.79            | 37                |                    |
| 3450.00     | 39.29        | H         | 57.26 | -17.97 | Avg             | 1.79            | 37                |                    |

Test distance  
 3 meter

## HARMONICS - VERTICAL

**FCC 15.231**

Company: Nortek  
 EUT: Door/Window Sensor  
 Model: 2GIG-DW40-345  
 Duty Cycle Correction Factor: -20.00

Date: 2/20/2015  
 Lab: R  
 Tested By: Matt Harrison

| Freq. (MHz) | Level (dBuV) | Pol (v/h) | Limit | Margin | Peak / QP / Avg | Ant. Height (m) | Table Angle (deg) | Comments           |
|-------------|--------------|-----------|-------|--------|-----------------|-----------------|-------------------|--------------------|
| 690.00      | --           | V         | --    | --     | Peak            | --              | --                | No Emissions Found |
| 690.00      | --           | V         | --    | --     | Avg             | --              | --                | No Emissions Found |
| 1035.00     | 41.54        | V         | 73.98 | -32.44 | Peak            | 1.19            | 2                 | In Restricted Band |
| 1035.00     | 21.54        | V         | 53.98 | -32.44 | Avg             | 1.19            | 2                 |                    |
| 1380.00     | --           | V         | 73.98 | --     | Peak            | --              | --                | In Restricted Band |
| 1380.00     | --           | V         | 53.98 | --     | Avg             | --              | --                | No Emissions Found |
| 1725.00     | 50.01        | V         | 77.26 | -27.25 | Peak            | 1.08            | 128               |                    |
| 1725.00     | 30.01        | V         | 57.26 | -27.25 | Avg             | 1.08            | 128               |                    |
| 2070.00     | 51.57        | V         | 77.26 | -25.69 | Peak            | 2.92            | 48                |                    |
| 2070.00     | 31.57        | V         | 57.26 | -25.69 | Avg             | 2.92            | 48                |                    |
| 2415.00     | 49.74        | V         | 77.26 | -27.52 | Peak            | 1.25            | 56                |                    |
| 2415.00     | 29.74        | V         | 57.26 | -27.52 | Avg             | 1.25            | 56                |                    |
| 2760.00     | 55.98        | V         | 73.98 | -18.00 | Peak            | 2.17            | 31                | In Restricted Band |
| 2760.00     | 35.98        | V         | 53.98 | -18.00 | Avg             | 2.17            | 31                |                    |
| 3105.00     | 62.54        | V         | 77.26 | -14.72 | Peak            | 1.20            | 66                |                    |
| 3105.00     | 42.54        | V         | 57.26 | -14.72 | Avg             | 1.20            | 66                |                    |
| 3450.00     | 55.07        | V         | 77.26 | -22.19 | Peak            | 1.38            | 329               |                    |
| 3450.00     | 35.07        | V         | 57.26 | -22.19 | Avg             | 1.38            | 329               |                    |

Test distance  
 3 meter



***-20 dB BANDWIDTH***

***DATA SHEETS***



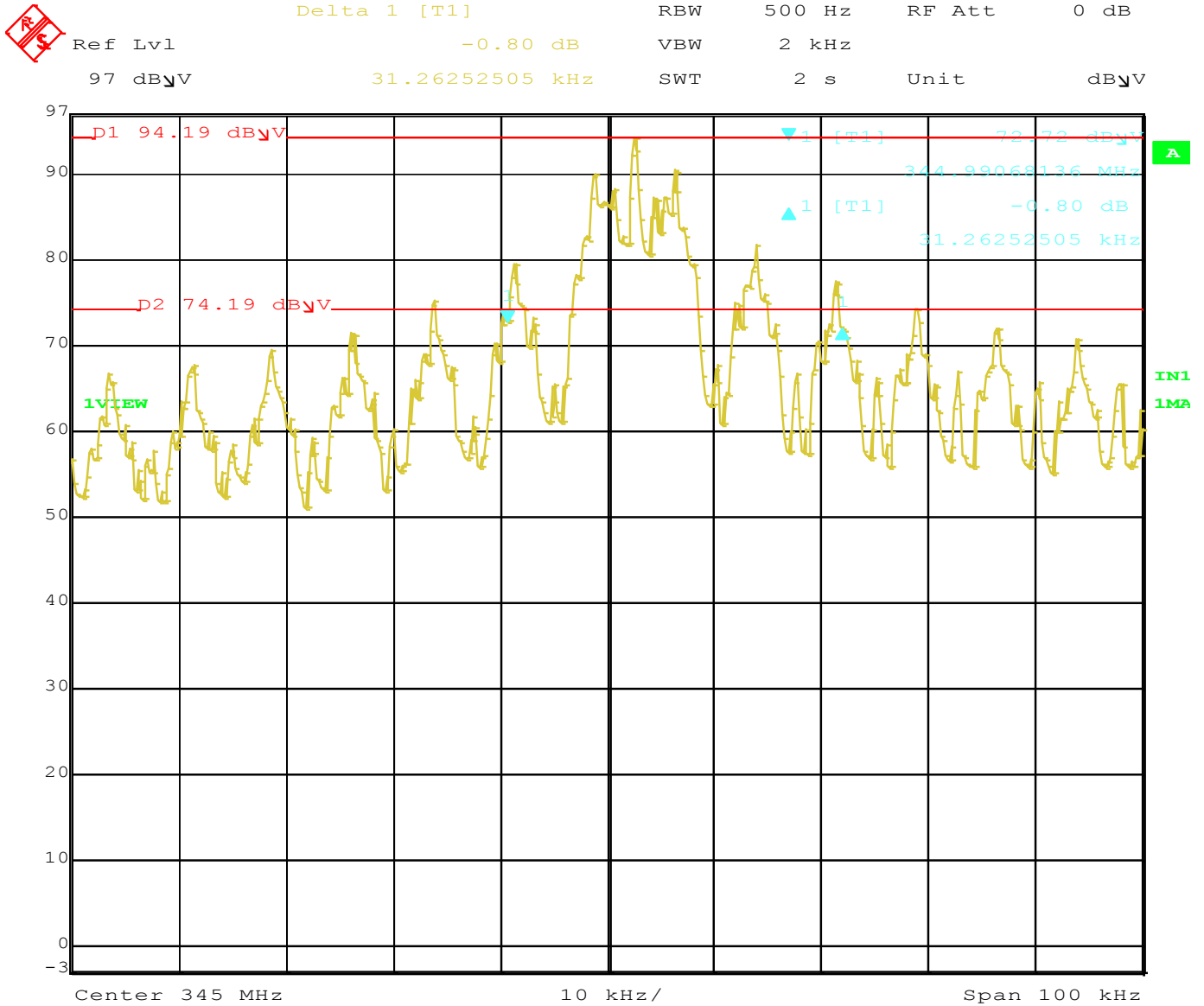
Title: FCC 15.231  
File: 2GIG-DW40-345 -20dB occupied Bandwidth  
Operator: Matt Harrison  
EUT Type: 2GIG-DW40-345  
EUT Condition: Continuously Transmitting  
Temp: 68f  
Hum: 43%

2/24/2014 13:12:33 PM

  
**Compatible Electronics, Inc. FAC- 3 (LAB R)**

| <b>Freq (MHz)</b> | <b>BW (kHz)</b> | <b>Limit (kHz)</b> | <b>Margin (kHz)</b> |
|-------------------|-----------------|--------------------|---------------------|
| 345.00            | 31.26           | 862.50             | -831.24             |

### -20 dB Occupied Bandwidth Plot



Title: 2GIG-DW40-345  
 Comment A: 20dB Bandwidth.  
 Date: 24.FEB.2015 13:12:33



***PEAK TRANSMIT EMI***

***DATA SHEETS***

**FCC 15.231**Company: Nortek  
EUT: Door/Window Sensor  
Model: 2GIG-DW40-345  
Duty Cycle Correction Factor: -20.00Date: 2/20/2015  
Lab: R  
Tested By: Matt Harrison**Compatible Electronics, Inc. FAC-3**

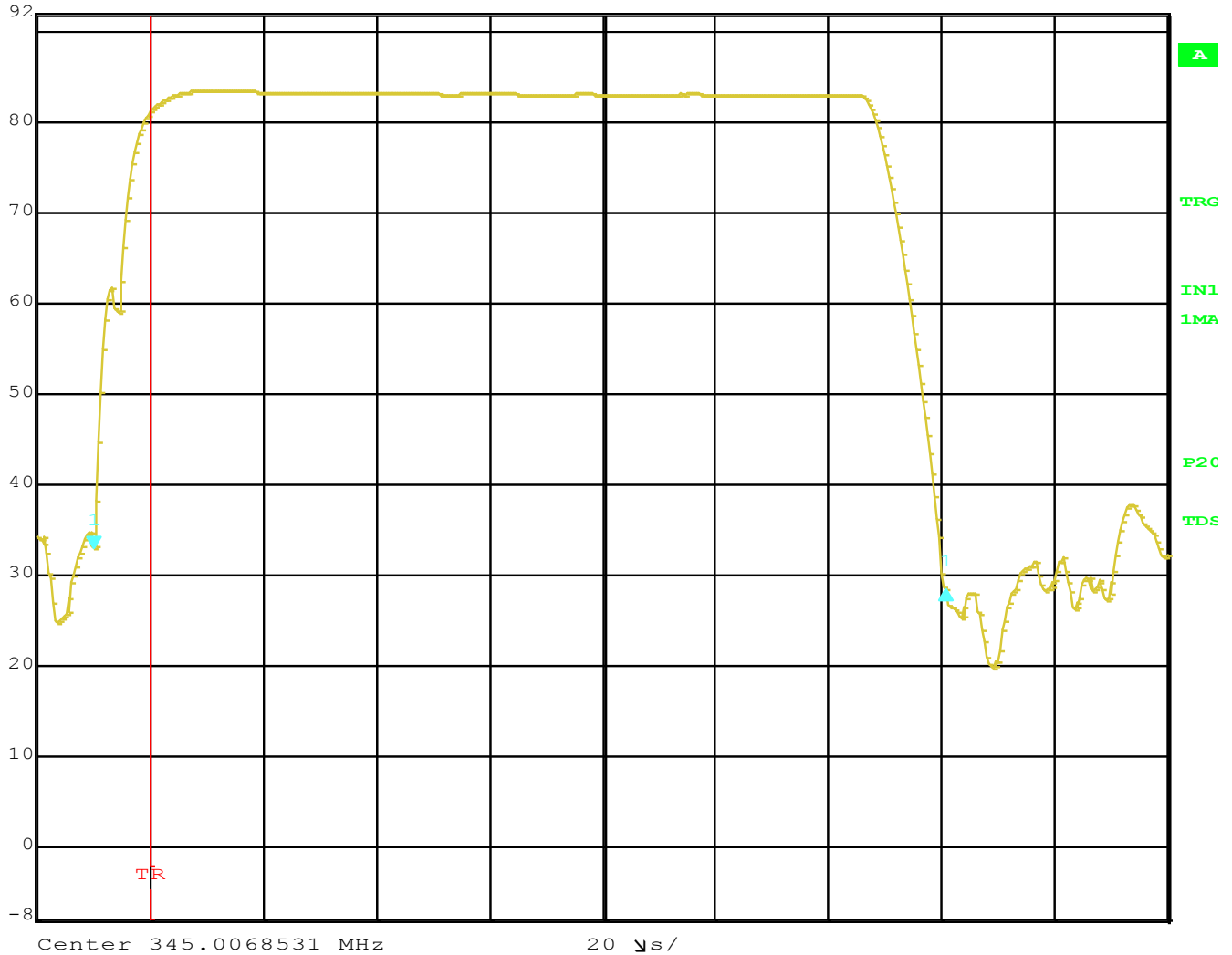
| Freq. (MHz) | Level (dBuV/m) | Pol (v/h) | Limit | Margin | Peak / QP / Avg | Table  | Tower | Comments |
|-------------|----------------|-----------|-------|--------|-----------------|--------|-------|----------|
| 345.00      | 83.70          | H         | 97.26 | -13.56 | Peak            | 240.00 | 1.00  | X-Axis   |
| 345.00      | 63.70          | H         | 77.26 | -13.56 | Avg             | 240.00 | 1.00  | X-Axis   |
| 345.00      | 68.87          | V         | 97.26 | -28.39 | Peak            | 345.00 | 1.40  | X-Axis   |
| 345.00      | 48.87          | V         | 77.26 | -28.39 | Avg             | 345.00 | 1.40  | X-Axis   |

Test distance  
3 meter

**DUTY CYCLE**



|                      |                    |     |                    |        |                   |
|----------------------|--------------------|-----|--------------------|--------|-------------------|
| Max/Ref Lvl          | Delta 1 [T1]       | RBW | 100 kHz            | RF Att | 20 dB             |
| 92 dB $\downarrow$ V | -4.35 dB           | VBW | 300 kHz            |        |                   |
| 92 dB $\downarrow$ V | 150.701403 $\mu$ s | SWT | 200 $\downarrow$ s | Unit   | dB $\downarrow$ V |

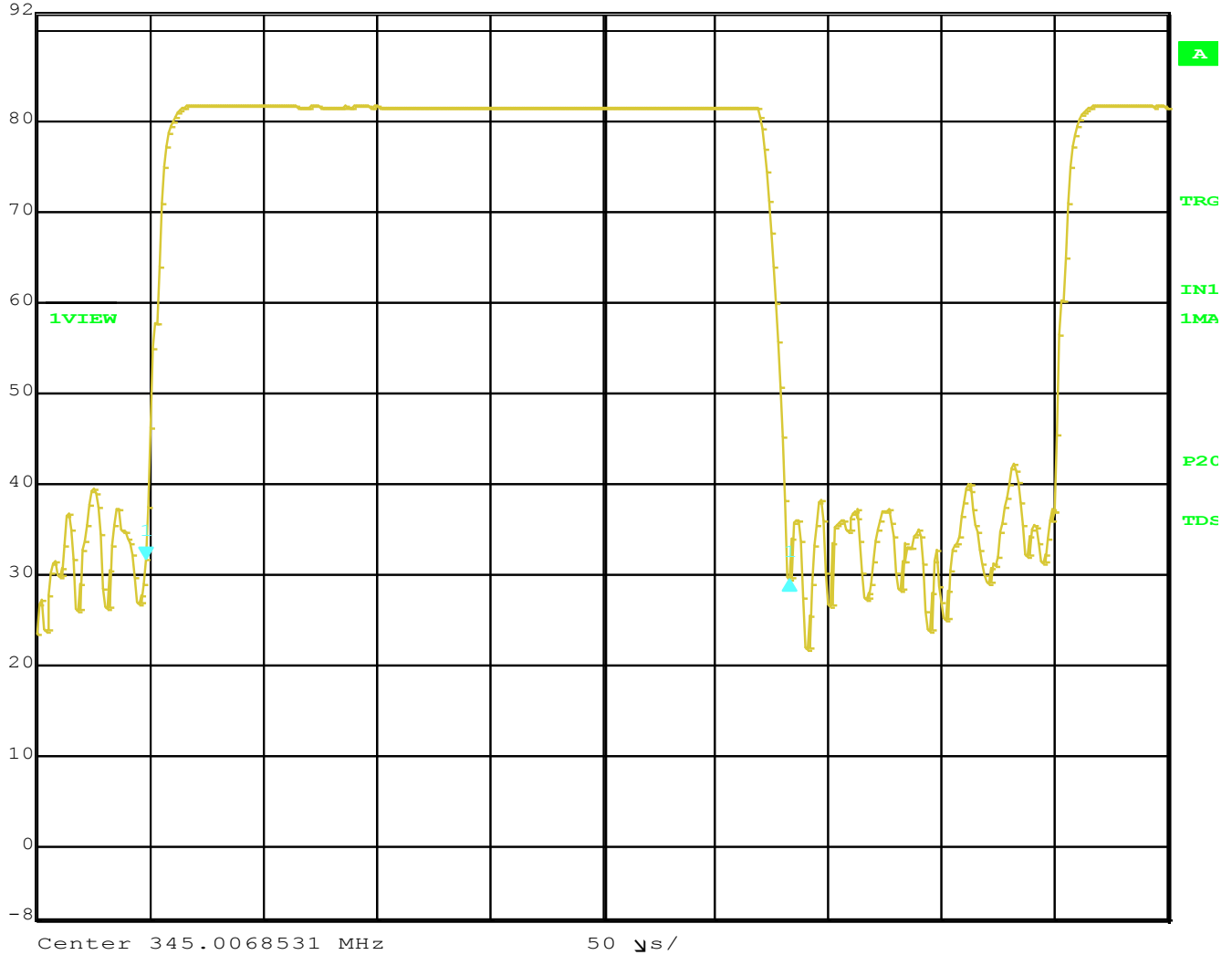


Title: 2GIG-DW40-345.  
 Comment A: Duty Cycle.  
 Date: 20.FEB.2015 13:46:00

Time of Pulse 1 = 150.701403  $\mu$ S

## DUTY CYCLE

⚠ Max/Ref Lvl      Delta 1 [T1]      RBW    100 kHz      RF Att    20 dB  
 92 dB $\mu$ V                                      -2.12 dB      VBW    300 kHz  
 92 dB $\mu$ V                                      283.967936  $\mu$ s      SWT    500  $\mu$ s      Unit                      dB $\mu$ V



Title:            2GIG-DW40-345.  
 Comment A:    Duty Cycle.  
 Date:            20.FEB.2015    13:49:22

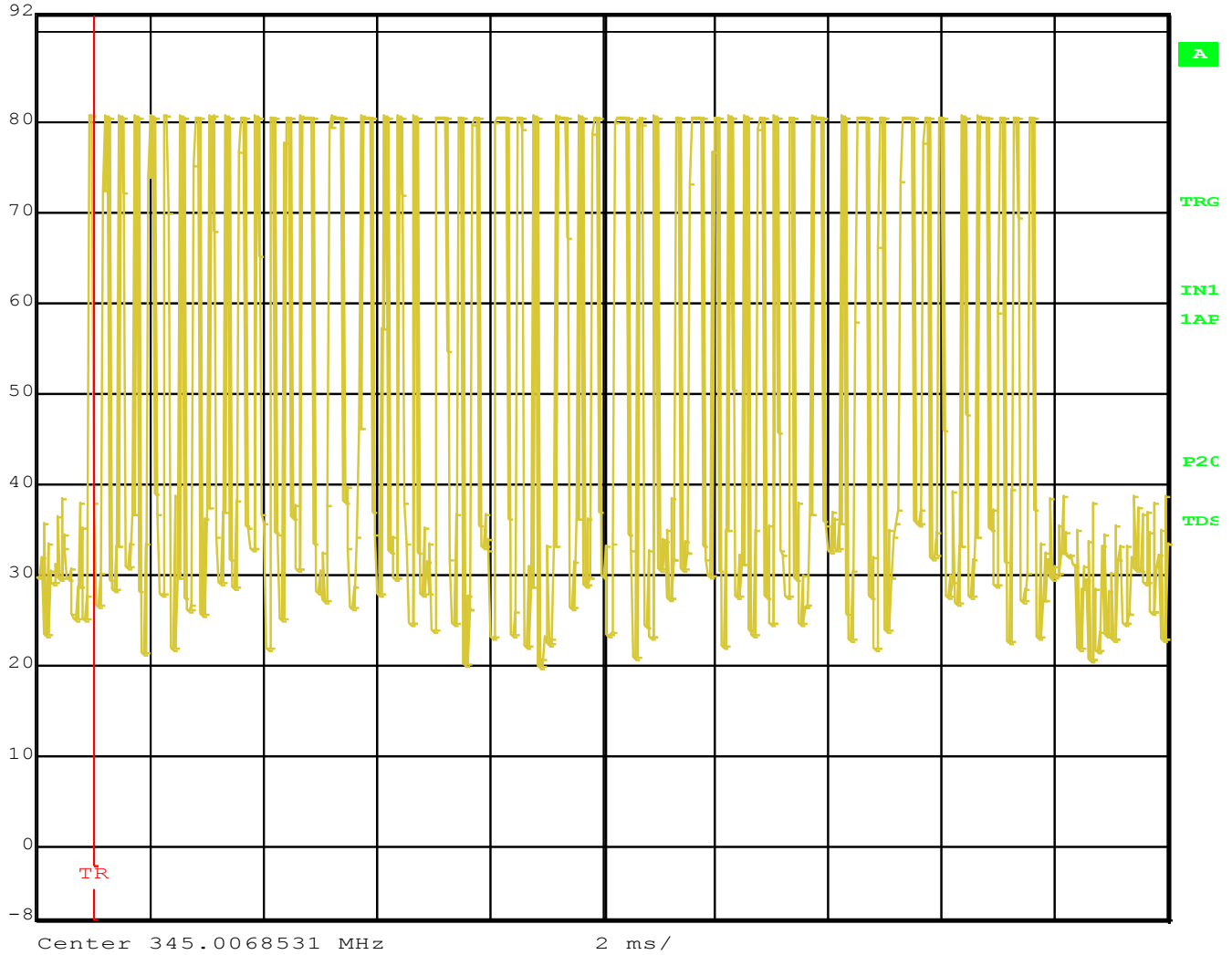
Time of Pulse 2 = 283.967936  $\mu$ s

### Duty Cycle



Ref Lvl  
 92 dB $\mu$ V

RBW 100 kHz RF Att 20 dB  
 VBW 300 kHz  
 SWT 20 ms Unit dB $\mu$ V



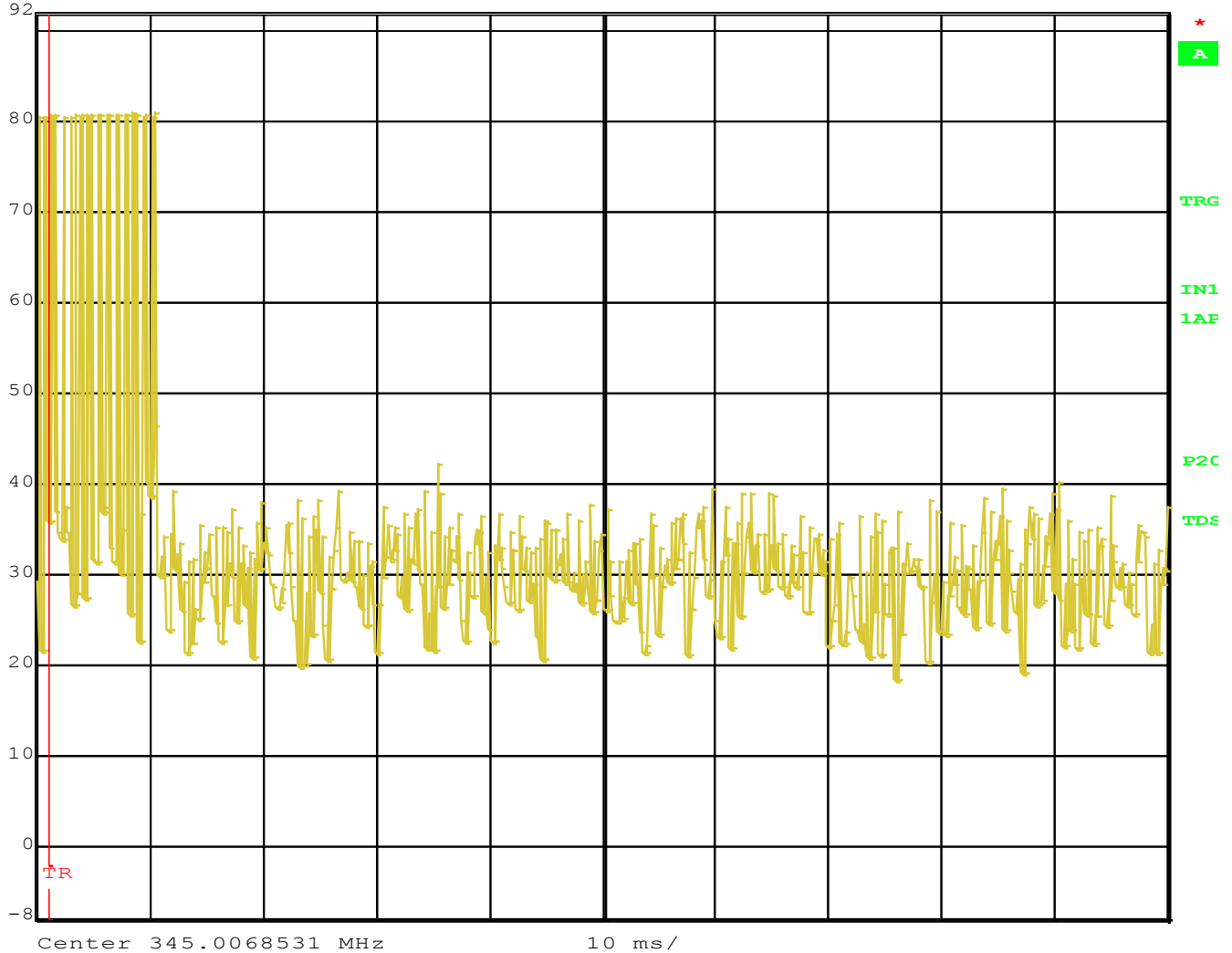
Title: 2GIG-DW40-345.  
 Comment A: Duty Cycle.  
 Date: 20.FEB.2015 13:42:44

## Duty Cycle



Ref Lvl  
 92 dB $\mu$ V

RBW 100 kHz RF Att 20 dB  
 VBW 300 kHz  
 SWT 100 ms Unit dB $\mu$ V



Title: 2GIG-DW40-345.  
 Comment A: Duty Cycle.  
 Date: 20.FEB.2015 13:41:31

Number of Pulse Type 1 Pulses in Worst Case 100 mS = 40  
 Number of Pulse Type 2 Pulses in Worst Case 100 mS = 12  
 Pulse Type 1 On Time = 150.701403  $\mu$ S\*40 = 6.028056 mS  
 Pulse Type 2 On Time = 283.967936  $\mu$ S\*12 = 3.407615 mS  
 Duty Cycle = 6.028056 + 3.407615 = 9.435671 mS / 100 mS = 0.09435671  
 The Peak to Average Duty Cycle Correction = -20.50dB  
 Max Duty Cycle Correction Factor = -20.00dB



