



Engineering Solutions & Electromagnetic Compatibility Services

**Intentional Radiated Emissions Test Report - FCC Part 15.231 & RSS-210**

|                                                                                                                                               |                                                                                            |                                                                                                                           |              |
|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>Test Lab:</b><br>Rhein Tech Laboratories, Inc.<br>360 Herndon Parkway<br>Suite 1400<br>Herndon, VA 20170<br>E-Mail: atcbinfo@rheintech.com |                                                                                            | <b>Applicant:</b><br>Honeywell International<br>2 Corporate Center Drive<br>Melville, NY 11747<br>Contact: Andrew Roussin |              |
| Tel: 703-689-0368<br>Fax: 703-689-2056<br>www.rheintech.com                                                                                   |                                                                                            | Tel: 516-577-5863                                                                                                         |              |
| <b>FCC ID</b>                                                                                                                                 | CFS8DL582                                                                                  | <b>Test Report Date</b>                                                                                                   | May 12, 2016 |
| <b>IC</b>                                                                                                                                     | 573F-582                                                                                   | <b>RTL Work Order Number</b>                                                                                              | 2016112      |
| <b>Model</b>                                                                                                                                  | 582T                                                                                       | <b>RTL Quote Number</b>                                                                                                   | QRTL16-112A  |
| <b>American National Standard Institute</b>                                                                                                   | ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices       |                                                                                                                           |              |
| <b>FCC Rule Part(s)</b>                                                                                                                       | 15.231 Periodic operation in the band 40.66–40.70 MHz and above 70 MHz (10-01-15)          |                                                                                                                           |              |
| <b>IC Rule Part</b>                                                                                                                           | RSS-210 Issue 8 Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment |                                                                                                                           |              |

I, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described in this test report. No modifications were made to the equipment during testing in order to achieve compliance with these standards. Furthermore, there was no deviation from, additions to, or exclusions from, the applicable parts of FCC Part 2, FCC Part 15, IC RSS-210 and ANSI C63.10.

Signature: \_\_\_\_\_

Date: May 12, 2016

Typed/Printed Name: Desmond A. Fraser

Position: President

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*These test(s) are accredited under Rhein Tech Laboratories, Inc. ISO/IEC 17025 accreditation issued by the ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation AT-1445.*

## Table of Contents

|       |                                                           |    |
|-------|-----------------------------------------------------------|----|
| 1     | General Information .....                                 | 4  |
| 1.1   | Scope .....                                               | 4  |
| 1.2   | Description of EUT .....                                  | 4  |
| 1.3   | Test Facility .....                                       | 4  |
| 1.4   | Modifications .....                                       | 4  |
| 2     | Test Information .....                                    | 5  |
| 2.1   | Description of Test Modes .....                           | 5  |
| 2.2   | EUT Disposition .....                                     | 5  |
| 2.3   | Test Result Summary.....                                  | 5  |
| 2.4   | Related Submittal(s)/Grant(s) .....                       | 5  |
| 2.5   | Test System Details .....                                 | 5  |
| 2.6   | Configuration of Tested System.....                       | 6  |
| 3     | Duty Cycle.....                                           | 7  |
| 4     | 20 dB Bandwidth – FCC 15.231(c); RSS-Gen .....            | 8  |
| 5     | Radiated Emissions – FCC 15.209; IC RSS-210; RSS-Gen..... | 10 |
| 5.1   | Limits of Radiated Emissions Measurement.....             | 10 |
| 5.2   | Radiated Emissions Measurement Test Procedure .....       | 10 |
| 5.3   | Radiated Emissions Test Results .....                     | 11 |
| 5.3.1 | Radiated Emissions Harmonics/Spurious .....               | 11 |
| 6     | Conclusion .....                                          | 12 |

## Table Index

|            |                                                                                           |    |
|------------|-------------------------------------------------------------------------------------------|----|
| Table 2-1: | Frequencies Tested .....                                                                  | 5  |
| Table 2-2: | Test Result Summary – FCC Part 15, Subpart C (Section 15.231), IC RSS-210/IC RSS-Gen..... | 5  |
| Table 2-3: | Equipment Under Test .....                                                                | 5  |
| Table 4-1: | Bandwidth Test Equipment .....                                                            | 8  |
| Table 4-2: | Bandwidth Results.....                                                                    | 9  |
| Table 5-1: | Radiated Emissions Test Equipment .....                                                   | 10 |
| Table 5-2: | Radiated Emissions Harmonics/Spurious - Peak .....                                        | 11 |
| Table 5-3: | Radiated Emissions Harmonics/Spurious – Average (Calculated).....                         | 11 |
| Table 5-4: | Unintentional Radiated Emissions .....                                                    | 12 |

## Plot Index

|           |                       |   |
|-----------|-----------------------|---|
| Plot 4-1: | 20 dB Bandwidth ..... | 8 |
|-----------|-----------------------|---|

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### Appendix Index

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|                                    |    |
|------------------------------------|----|
| Appendix A: Test Photographs ..... | 13 |
| Appendix B: EUT Photograph.....    | 15 |

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### Photograph Index

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|                                        |    |
|----------------------------------------|----|
| Photograph 1: Radiated Emissions ..... | 13 |
| Photograph 2: Radiated Emissions ..... | 14 |
| Photograph 3: 582T .....               | 15 |

## **1 General Information**

### **1.1 Scope**

Applicable Standards:

- FCC Part 15.231: Periodic operation in the band 40.66–40.70 MHz and above 70 MHz
- Industry Canada RSS-210 Issue 8 Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

### **1.2 Description of EUT**

|                               |               |
|-------------------------------|---------------|
| <b>Equipment Under Test</b>   | 582T          |
| <b>Power Supply</b>           | 3 VDC battery |
| <b>Frequency Range</b>        | 344.94 MHz    |
| <b>Antenna Connector Type</b> | Internal      |
| <b>Antenna Type</b>           | Internal      |

### **1.3 Test Facility**

The open area test site and conducted measurement facility used to collect the radiated data is located at 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. This site has been fully described in a report and approved by the Federal Communications Commission to perform AC line conducted and radiated emissions testing.

### **1.4 Modifications**

No modifications were required for compliance.

## 2 Test Information

### 2.1 Description of Test Modes

In accordance with FCC 15.31(m) the following frequencies were tested:

**Table 2-1: Frequencies Tested**

| Channel | Frequency  |
|---------|------------|
| N/A     | 344.94 MHz |

### 2.2 EUT Disposition

The EUT was adapted to continuously transmit for testing purposes.

### 2.3 Test Result Summary

**Table 2-2: Test Result Summary – FCC Part 15, Subpart C (Section 15.231), IC RSS-210/IC RSS-Gen**

| FCC Reference | Test               | Pass/Fail or N/A |
|---------------|--------------------|------------------|
| FCC 15.231    | Radiated Emissions | Pass             |

### 2.4 Related Submittal(s)/Grant(s)

This report is to support an application for certification under FCC ID: CFS8DL582, IC: 573F-582.

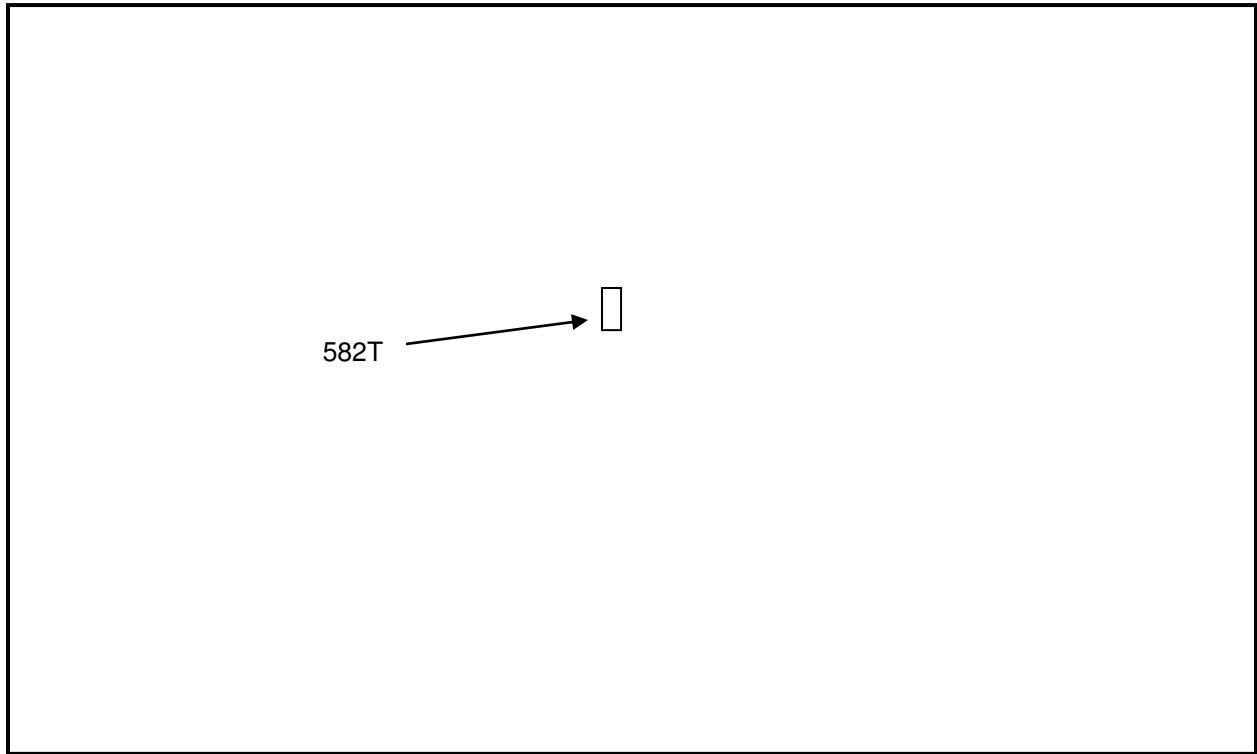
### 2.5 Test System Details

The test samples were received on May 5, 2016. The FCC identifiers for all applicable equipment, plus descriptions of all cables used in the tested system, are identified in the following tables.

**Table 2-3: Equipment Under Test**

| Part                | Manufacturer            | Model | Serial Number | FCC ID    | RTL Bar Code |
|---------------------|-------------------------|-------|---------------|-----------|--------------|
| Key Fob (modulated) | Honeywell International | 582T  | 058-6258      | CFS8DL582 | 22038        |
| Key Fob (encrypted) | Honeywell International | 582T  | 059-1284      | CFS8DL582 | 22039        |
| Key Fob (CW)        | Honeywell International | 582T  | A041-1490     | CFS8DL582 | 22040        |

## 2.6 Configuration of Tested System



### 3 Duty Cycle

The manufacturer attests the duty cycle to be 14.3 ms = total on time in 100ms

Duty Cycle Correction Calculation:  $20\log(14.3/100) = -16.9 \text{ dB}$

#### Test Personnel:

|                   |                                                                                   |              |
|-------------------|-----------------------------------------------------------------------------------|--------------|
| Dan Baltzell      |  | May 11, 2016 |
| EMC Test Engineer | Signature                                                                         | Date of Test |

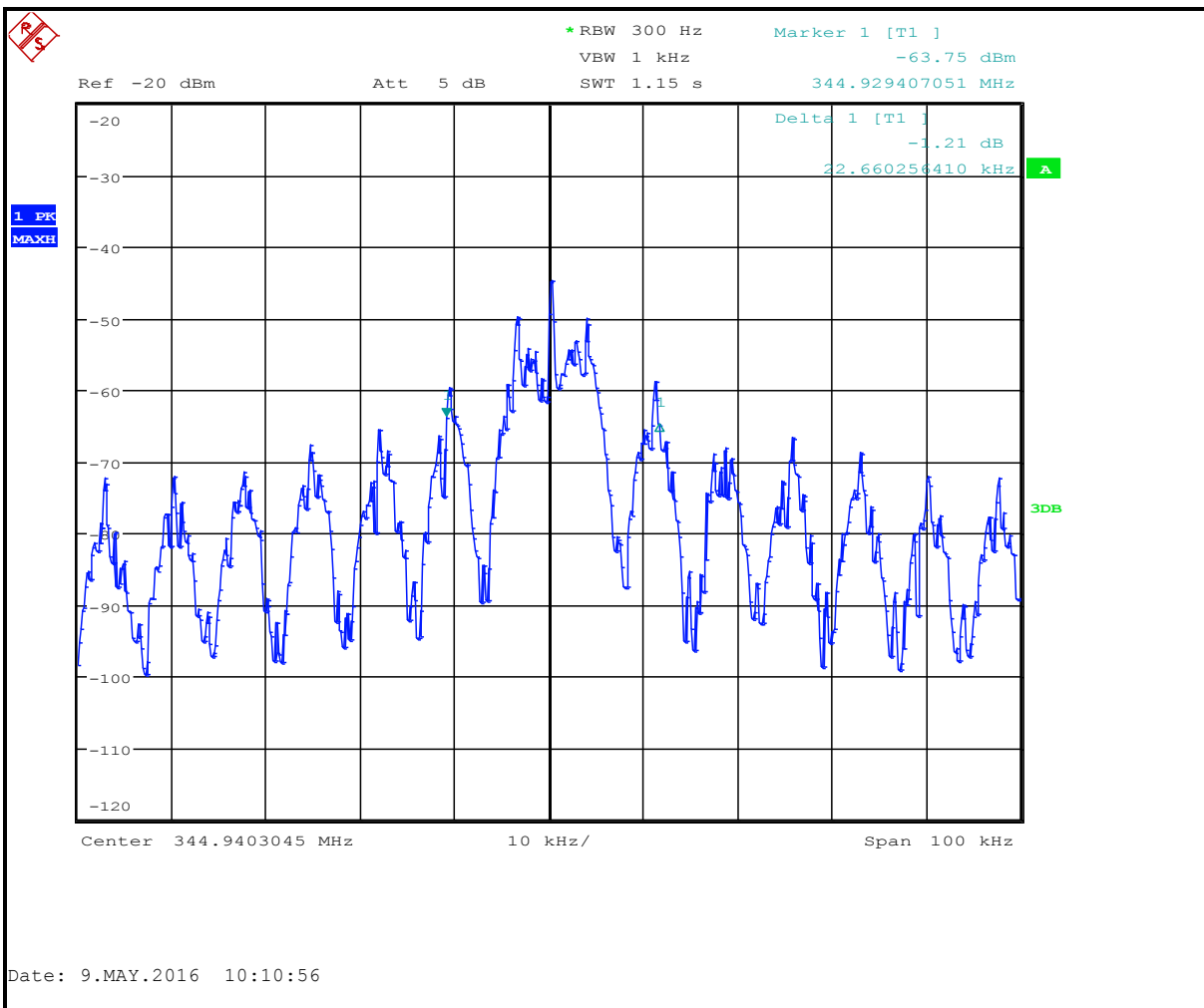
#### 4 20 dB Bandwidth – FCC 15.231(c); RSS-Gen

A delta marker was used to determine the 20 dB bandwidth from the peak of the modulated emission.

**Table 4-1: Bandwidth Test Equipment**

| RTL Bar Code | Manufacturer    | Model | Part Type         | Serial Number | Calibration Due Date |
|--------------|-----------------|-------|-------------------|---------------|----------------------|
| 901581       | Rohde & Schwarz | FSU   | Spectrum Analyzer | 1166.1660.50  | 3/22/18              |

**Plot 4-1: 20 dB Bandwidth**



**Table 4-2: Bandwidth Results**

| <b>Fundamental Frequency<br/>(MHz)</b> | <b>20 dB Bandwidth Measured<br/>(kHz)</b> | <b>Limit<br/>(0.25% of CF)<br/>(kHz)</b> | <b>Pass/Fail</b> |
|----------------------------------------|-------------------------------------------|------------------------------------------|------------------|
| 344.94                                 | 22.7                                      | 862.4                                    | Pass             |

Limit 15.231(c): The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

**Test Personnel:**

|                   |                                                                                   |              |
|-------------------|-----------------------------------------------------------------------------------|--------------|
| Dan Baltzell      |  | May 9, 2016  |
| EMC Test Engineer | Signature                                                                         | Date of Test |

## 5 Radiated Emissions – FCC 15.209; IC RSS-210; RSS-Gen

### 5.1 Limits of Radiated Emissions Measurement

The data and limits presented in this report are for radiated emissions per 15.231(b)(2) which references 15.35(b), and peak limiting for restricted bands per 15.209(e), which again references 15.35(b)(2). Data (if any) is also presented for spurious, non-harmonic radiated emissions per 15.209.

### 5.2 Radiated Emissions Measurement Test Procedure

Procedure: C63.10-2013 6.5, 6.6

Before final measurements of radiated emissions were made on the open-field three/ten meter range, the EUT was scanned indoors at a one meter distance. This was done in order to determine the emissions spectrum signature. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. This process was repeated during final radiated emissions measurements on the open-field range, at each frequency, in order to ensure that maximum emission amplitudes were attained.

Radiated fundamental and spurious emissions were tested at three meters. The EUT was placed on a nonconductive turntable 0.8 meters above the ground plane. The spectrum was examined from 9 kHz to the 10<sup>th</sup> harmonic of the highest fundamental transmitter frequency (344.94 MHz).

The EUT was tested in the three orthogonal planes with the receive antenna in both polarities. The emissions were maximized; that is, the measurement antenna height was varied between 1 and 4 m, and the EUT was rotated through 360° on a rotating turntable until the maximum emissions were found. Both horizontal and vertical measurement antenna polarizations were used. A resolution bandwidth of 100 kHz was used for frequencies less than 1000 MHz, and a resolution bandwidth of 1 MHz was used for frequencies greater than or equal to 1000 MHz. The video bandwidth was set to a value at least three times greater than the resolution bandwidth.

**Table 5-1: Radiated Emissions Test Equipment**

| RTL Bar Code | Manufacturer            | Model             | Part Type                                    | Serial Number | Calibration Due Date |
|--------------|-------------------------|-------------------|----------------------------------------------|---------------|----------------------|
| 900913       | Hewlett Packard         | 85462A            | EMI Receiver RF Section<br>(9 kHz – 6.5 GHz) | 3325A00159    | 12/9/16              |
| 900914       | Hewlett Packard         | 85460A            | RF Filter Section<br>(100 kHz - 6.5 GHz)     | 3330A00107    | 12/9/16              |
| 901581       | Rohde & Schwarz         | FSU               | Spectrum Analyzer                            | 1166.1660.50  | 3/22/18              |
| 900905       | Rhein Tech Laboratories | PR-1040           | Amplifier<br>(30 - 2000 MHz)                 | N/A           | 9/10/16              |
| 900772       | EMCO                    | 3161-02           | Horn Antenna<br>(2 - 4 GHz)                  | 9804-1044     | 4/20/17              |
| 900791       | Chase                   | CBL6112           | Antenna<br>(30 MHz – 2 GHz)                  | 2099          | 6/11/17              |
| 901592       | Insulated Wire Inc.     | KPS-1503-3600-KPR | SMK RF Cables 20'                            | NA            | 9/4/16               |

### 5.3 Radiated Emissions Test Results

#### 5.3.1 Radiated Emissions Harmonics/Spurious

**Table 5-2: Radiated Emissions Harmonics/Spurious - Peak**

| Emission Frequency (MHz) | Analyzer Reading (dBuV) | Site Correction Factor (dB/m) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Pass/Fail |
|--------------------------|-------------------------|-------------------------------|-------------------------|----------------|-------------|-----------|
| 344.940                  | 59.5                    | 16.0                          | 75.5                    | 97.3           | -21.8       | Pass      |
| 689.880                  | 21.7                    | 21.1                          | 42.8                    | 77.3           | -34.5       | Pass      |
| 1034.820                 | 25.4                    | 24.5                          | 49.9                    | 74.0           | -24.1       | Pass      |
| 1379.760                 | 26.8                    | 28.1                          | 54.9                    | 74.0           | -19.1       | Pass      |
| 1724.700                 | 37.8                    | 30.9                          | 68.7                    | 77.3           | -8.6        | Pass      |
| 2069.640                 | 46.6                    | 24.8                          | 71.4                    | 77.3           | -5.9        | Pass      |
| 2414.580                 | 46.2                    | 25.4                          | 71.6                    | 77.3           | -5.7        | Pass      |
| 2759.520                 | 43.4                    | 25.9                          | 69.3                    | 74.0           | -4.7        | Pass      |
| 3104.460                 | 42.0                    | 26.6                          | 68.6                    | 77.3           | -8.7        | Pass      |
| 3449.400                 | 34.1                    | 27.2                          | 61.3                    | 77.3           | -16.0       | Pass      |

**Table 5-3: Radiated Emissions Harmonics/Spurious – Average (Calculated)**

| Emission Frequency (MHz) | Peak Less Duty Cycle (dBuV) | Site Correction Factor (dB/m) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Pass/Fail |
|--------------------------|-----------------------------|-------------------------------|-------------------------|----------------|-------------|-----------|
| 344.940                  | 42.6                        | 16.0                          | 58.6                    | 77.3           | -18.7       | Pass      |
| 689.880                  | 4.8                         | 21.1                          | 25.9                    | 57.3           | -31.4       | Pass      |
| 1034.820                 | 8.5                         | 24.5                          | 33.0                    | 54.0           | -21.0       | Pass      |
| 1379.760                 | 9.9                         | 28.1                          | 38.0                    | 54.0           | -16.0       | Pass      |
| 1724.700                 | 20.9                        | 30.9                          | 51.8                    | 57.3           | -5.5        | Pass      |
| 2069.640                 | 29.7                        | 24.8                          | 54.5                    | 57.3           | -2.8        | Pass      |
| 2414.580                 | 29.3                        | 25.4                          | 54.7                    | 57.3           | -2.6        | Pass      |
| 2759.520                 | 26.5                        | 25.9                          | 52.4                    | 54.0           | -1.6        | Pass      |
| 3104.460                 | 25.1                        | 26.6                          | 51.7                    | 57.3           | -5.6        | Pass      |
| 3449.400                 | 17.2                        | 27.2                          | 44.4                    | 57.3           | -12.9       | Pass      |

**Table 5-4: Unintentional Radiated Emissions**

| Emission Frequency (MHZ) | Ant. Pol (H/V) | Emission Level (dBuV) | Site Factor (dB/m) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|--------------------------|----------------|-----------------------|--------------------|-------------------------|----------------|-------------|
| 113.184                  | H              | 32.0                  | -19.6              | 12.4                    | 43.5           | -31.1       |
| 113.184                  | V              | 35.9                  | -19.6              | 16.3                    | 43.5           | -27.2       |
| 140.047                  | H              | 33.5                  | -19.9              | 13.6                    | 43.5           | -29.9       |
| 140.047                  | V              | 37.6                  | -19.9              | 17.7                    | 43.5           | -25.8       |
| 161.691                  | H              | 32.4                  | -20.3              | 12.1                    | 43.5           | -31.4       |
| 161.691                  | V              | 39.6                  | -20.3              | 19.3                    | 43.5           | -24.2       |
| 183.249                  | H              | 32.7                  | -21.0              | 11.7                    | 43.5           | -31.8       |
| 183.249                  | V              | 39.4                  | -21.0              | 18.4                    | 43.5           | -25.1       |
| 194.030                  | H              | 33.3                  | -20.7              | 12.6                    | 43.5           | -30.9       |
| 194.030                  | V              | 35.0                  | -20.7              | 14.3                    | 43.5           | -29.2       |
| 204.809                  | H              | 33.1                  | -20.5              | 12.6                    | 43.5           | -30.9       |
| 204.809                  | V              | 32.9                  | -20.5              | 12.4                    | 43.5           | -31.1       |

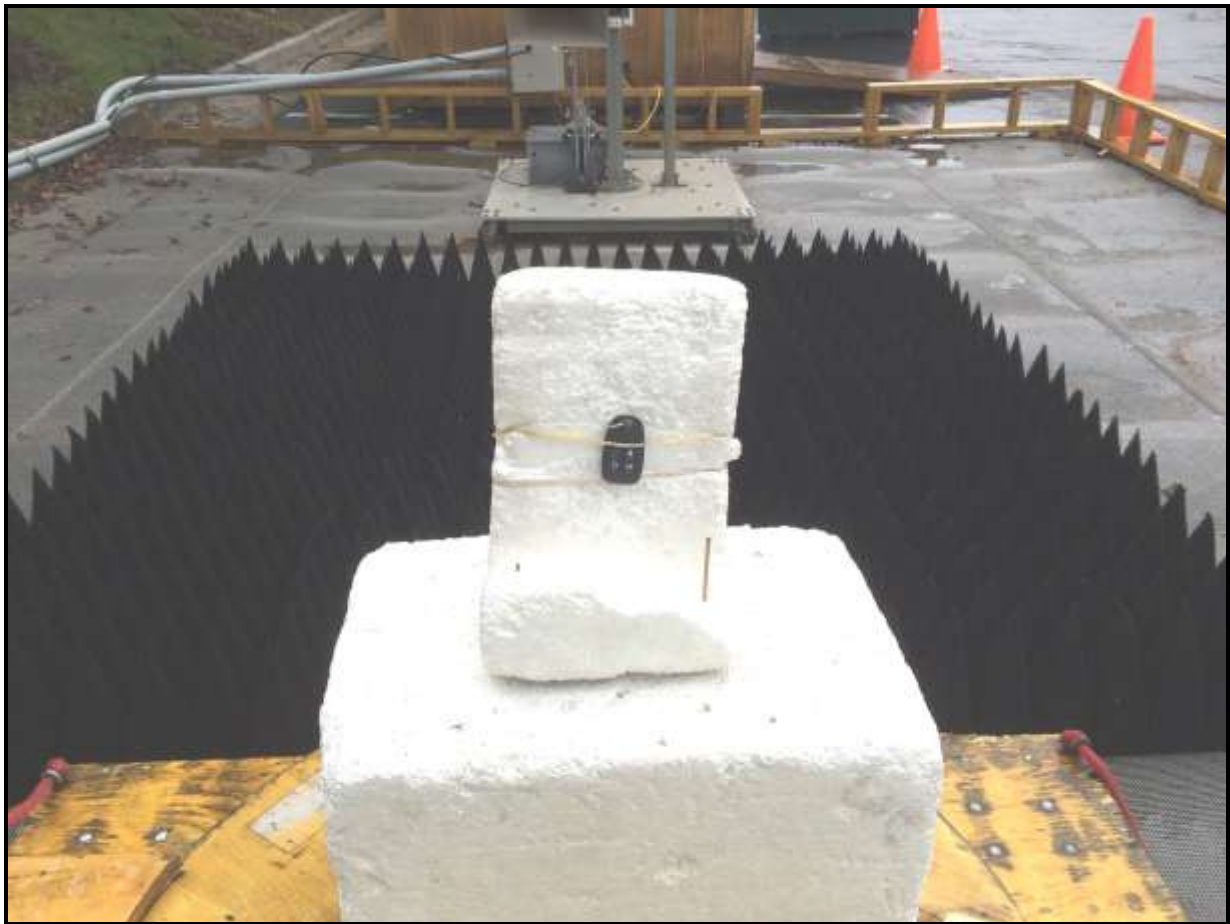
**Test Personnel:**

|                   |                                                                                     |              |
|-------------------|-------------------------------------------------------------------------------------|--------------|
| Dan Baltzell      |  | May 9, 2016  |
| EMC Test Engineer | Signature                                                                           | Date of Test |

**6 Conclusion**

The data in this measurement report shows that the Honeywell International Model 582T, FCC ID: CFS8DL582, IC: 573F-582, complies with the applicable intentional radiated emissions requirements of Parts 2 and 15 of the FCC rules and regulations and RSS-210 of the Industry Canada rules and regulations.

## Appendix A: Test Photographs



**Photograph 1: Radiated Emissions**



**Photograph 2: Radiated Emissions**

**Appendix B: EUT Photograph**



**Photograph 3: 582T**