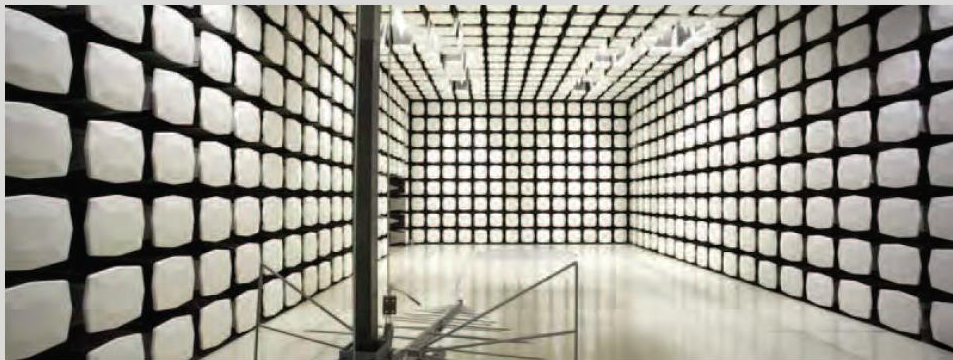


# NORTHWEST EMC

**Honeywell, Automation and Control Solutions**

**5881ENHCVE**

**Report # HNYW0166**



NVLAP Lab Code: 200881-0

*This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America. This Report may only be duplicated in its entirety*

# CERTIFICATE OF TEST

**Last Date of Test: July 19, 2016**  
**Honeywell, Automation and Control Solutions**  
**Model: 5881ENHCVE**

## Emissions

### Standards

| Specification           | Method          |
|-------------------------|-----------------|
| FCC 15.109:2016 Class B | ANSI C63.4:2014 |
| ICES-003:2016 Class B   | ANSI C63.4:2014 |

### Results

| Test Description                  | Applied | Results | Comments |
|-----------------------------------|---------|---------|----------|
| Radiated Emissions                | Yes     | Pass    |          |
| Radiated Emissions High Frequency | Yes     | Pass    |          |
| Receiver Spurious Emissions       | Yes     | Pass    |          |

### Deviations from Test Standards

None

### Approved By:



Jeremiah Darden, Operations Manager

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

# REVISION HISTORY

| Revision Number |  | Description | Date | Page Number |
|-----------------|--|-------------|------|-------------|
| 00              |  | None        |      |             |

# ACCREDITATIONS AND AUTHORIZATIONS

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## United States

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

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

**NVLAP** - Each laboratory is accredited by NVLAP to ISO 17025

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## Canada

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**IC** - Recognized by Industry Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with IC.

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## European Union

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**European Commission** – Validated by the European Commission as a Notified Body under the R&TTE Directive.

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## Australia/New Zealand

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

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## Korea

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

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## Japan

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

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## Taiwan

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

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

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## Singapore

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

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## Israel

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

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## Hong Kong

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

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## Vietnam

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

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## SCOPE

For details on the Scopes of our Accreditations, please visit:

<http://www.nwemc.com/accreditations/>

<http://gsi.nist.gov/global/docs/cabs/designations.html>

# EMISSIONS MEASUREMENTS

## Measurement Uncertainty

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

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

## Measurement Bandwidths

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

*Measurements were made using the bandwidths and detectors specified. No video filter was used.*

## Sample Calculations

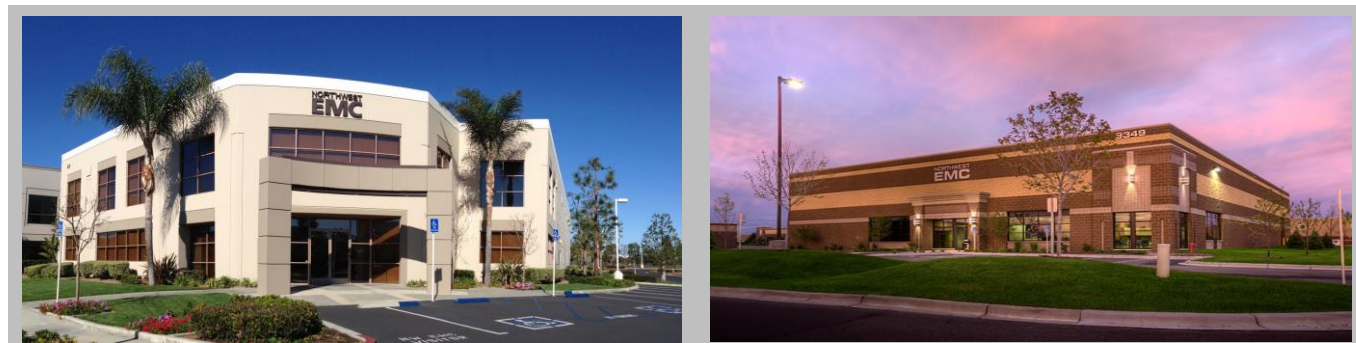
### Radiated Emissions:

| Field Strength |   | Measured Level |   | Antenna Factor |   | Cable Factor |   | Amplifier Gain |   | Distance Adjustment Factor |   | External Attenuation |
|----------------|---|----------------|---|----------------|---|--------------|---|----------------|---|----------------------------|---|----------------------|
| 33.5           | = | 42.6           | + | 28.6           | + | 3.1          | - | 40.8           | + | 0.0                        | + | 0.0                  |

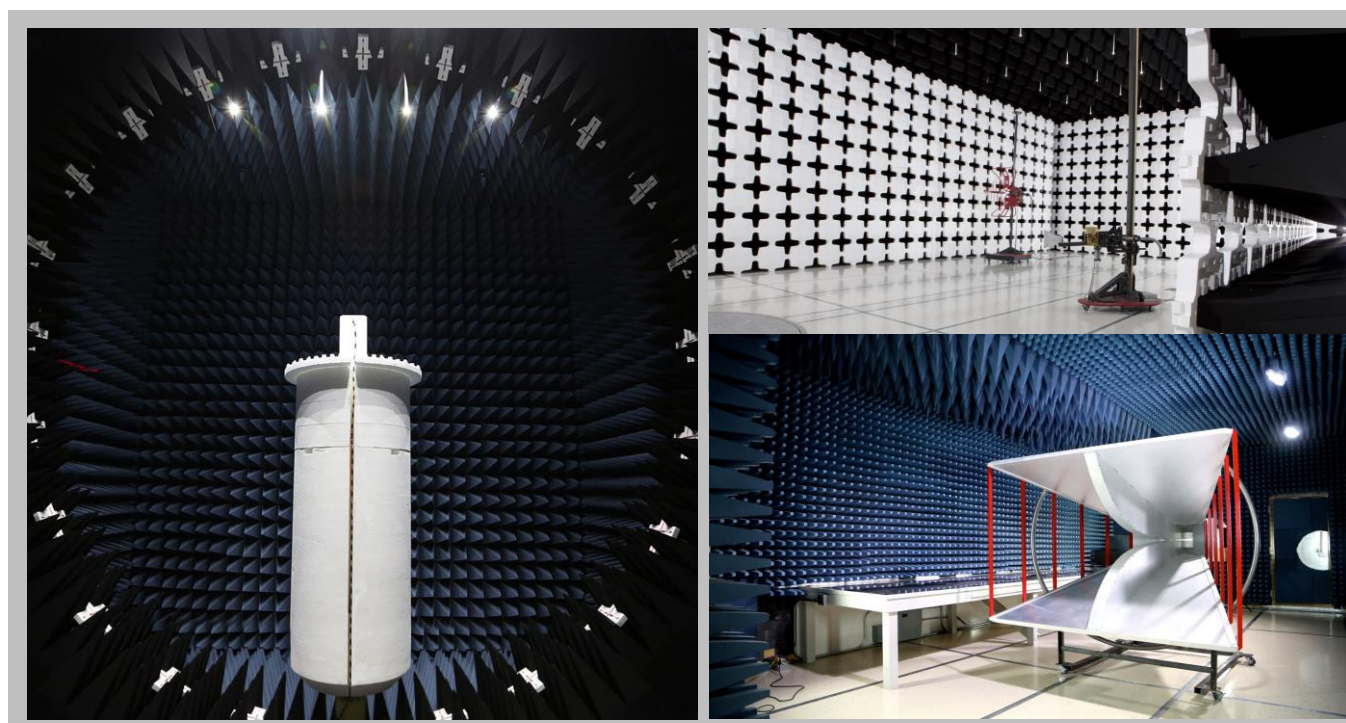
### Conducted Emissions:

| Adjusted Level |   | Measured Level |   | Transducer Factor |   | Cable Factor |   | External Attenuation |
|----------------|---|----------------|---|-------------------|---|--------------|---|----------------------|
| 47.1           | = | 26.7           | + | 0.3               | + | 0.1          | + | 20.0                 |

# FACILITIES



|                                                                                     |                                                                                                             |                                                                                            |                                                                                                   |                                                                                        |                                                                                                           |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| <b>California</b><br>Labs OC01-13<br>41 Tesla<br>Irvine, CA 92618<br>(949) 861-8918 | <b>Minnesota</b><br>Labs MN01-08, MN10<br>9349 W Broadway Ave.<br>Brooklyn Park, MN 55445<br>(612)-638-5136 | <b>New York</b><br>Labs NY01-04<br>4939 Jordan Rd.<br>Elbridge, NY 13060<br>(315) 554-8214 | <b>Oregon</b><br>Labs EV01-12<br>22975 NW Evergreen Pkwy<br>Hillsboro, OR 97124<br>(503) 844-4066 | <b>Texas</b><br>Labs TX01-09<br>3801 E Plano Pkwy<br>Plano, TX 75074<br>(469) 304-5255 | <b>Washington</b><br>Labs NC01-05<br>19201 120 <sup>th</sup> Ave NE<br>Bothell, WA 98011<br>(425)984-6600 |
| <b>NVLAP</b>                                                                        |                                                                                                             |                                                                                            |                                                                                                   |                                                                                        |                                                                                                           |
| NVLAP Lab Code: 200676-0                                                            | NVLAP Lab Code: 200881-0                                                                                    | NVLAP Lab Code: 200761-0                                                                   | NVLAP Lab Code: 200630-0                                                                          | NVLAP Lab Code:201049-0                                                                | NVLAP Lab Code: 200629-0                                                                                  |
| <b>Industry Canada</b>                                                              |                                                                                                             |                                                                                            |                                                                                                   |                                                                                        |                                                                                                           |
| 2834B-1, 2834B-3                                                                    | 2834E-1                                                                                                     | N/A                                                                                        | 2834D-1, 2834D-2                                                                                  | 2834G-1                                                                                | 2834F-1                                                                                                   |
| <b>BSMI</b>                                                                         |                                                                                                             |                                                                                            |                                                                                                   |                                                                                        |                                                                                                           |
| SL2-IN-E-1154R                                                                      | SL2-IN-E-1152R                                                                                              | N/A                                                                                        | SL2-IN-E-1017                                                                                     | SL2-IN-E-1158R                                                                         | SL2-IN-E-1153R                                                                                            |
| <b>VCCI</b>                                                                         |                                                                                                             |                                                                                            |                                                                                                   |                                                                                        |                                                                                                           |
| A-0029                                                                              | A-0109                                                                                                      | N/A                                                                                        | A-0108                                                                                            | A-0201                                                                                 | A-0110                                                                                                    |
| <b>Recognized Phase I CAB for ACMA, BSMI, IDA, KCC/RRR, MIC, MOC, NCC, OFCA</b>     |                                                                                                             |                                                                                            |                                                                                                   |                                                                                        |                                                                                                           |
| US0158                                                                              | US0175                                                                                                      | N/A                                                                                        | US0017                                                                                            | US0191                                                                                 | US0157                                                                                                    |



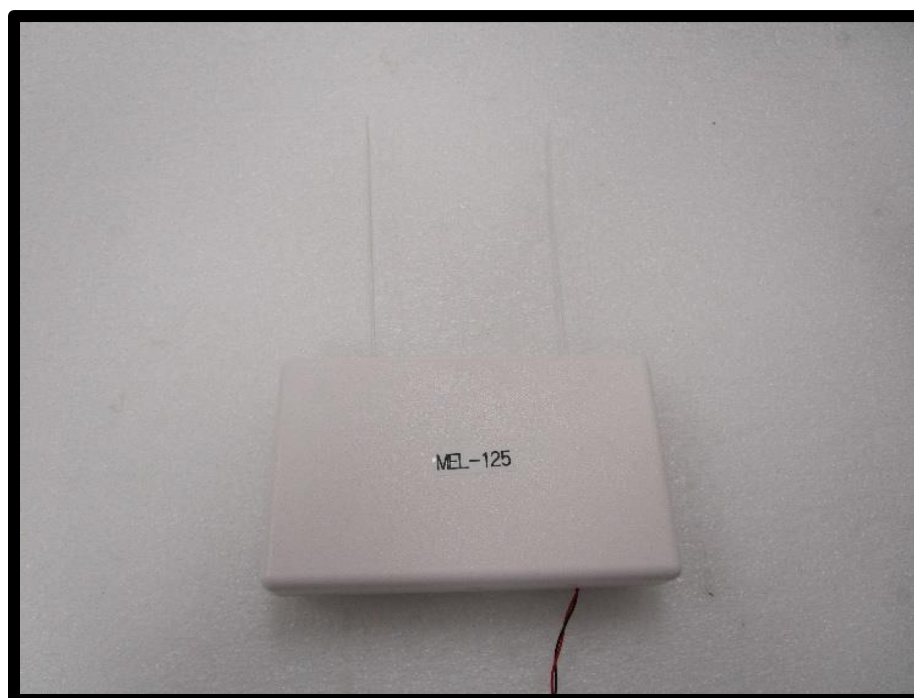
# PRODUCT DESCRIPTION

## Client and Equipment Under Test (EUT) Information

|                                 |                                             |
|---------------------------------|---------------------------------------------|
| <b>Company Name:</b>            | Honeywell, Automation and Control Solutions |
| <b>Address:</b>                 | 2 Corporate Center Drive                    |
| <b>City, State, Zip:</b>        | Melville, NY 11747-3265                     |
| <b>Test Requested By:</b>       | Andrew Roussin                              |
| <b>Model:</b>                   | 5881ENHCVE                                  |
| <b>First Date of Test:</b>      | July 19, 2016                               |
| <b>Last Date of Test:</b>       | July 19, 2016                               |
| <b>Receipt Date of Samples:</b> | July 19, 2016                               |
| <b>Equipment Design Stage:</b>  | Prototype                                   |
| <b>Equipment Condition:</b>     | No Damage                                   |

## Information Provided by the Party Requesting the Test

|                                                                  |
|------------------------------------------------------------------|
| <b>Functional Description of the EUT:</b>                        |
| Wireless Receiver                                                |
| <b>Highest frequency generated or used in the device:</b>        |
| Assumes > 108 MHz and < 1 GHz                                    |
| <b>Testing Objective:</b>                                        |
| To demonstrate compliance to FCC 15.109 receiver specifications. |
| <b>EUT Photo</b>                                                 |



# CONFIGURATIONS

## Configuration HNYW0166- 1

| EUT         |                                             |                   |               |
|-------------|---------------------------------------------|-------------------|---------------|
| Description | Manufacturer                                | Model/Part Number | Serial Number |
| RF Receiver | Honeywell, Automation and Control Solutions | 5881ENHCVE        | MEL-125       |

| Peripherals in test setup boundary |                                             |                   |               |
|------------------------------------|---------------------------------------------|-------------------|---------------|
| Description                        | Manufacturer                                | Model/Part Number | Serial Number |
| AC/DC Adapter                      | Honeywell, Automation and Control Solutions | MGT12500RTS       | None          |

| Cables     |        |            |         |              |               |
|------------|--------|------------|---------|--------------|---------------|
| Cable Type | Shield | Length (m) | Ferrite | Connection 1 | Connection 2  |
| DC Power   | No     | 1.4m       | No      | RF Receiver  | AC/DC Adapter |

# MODIFICATIONS

## Equipment Modifications

| Item | Date      | Test                              | Modification                         | Note                                                                | Disposition of EUT                                |
|------|-----------|-----------------------------------|--------------------------------------|---------------------------------------------------------------------|---------------------------------------------------|
| 1    | 7/19/2016 | Radiated Emissions                | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Northwest EMC following the test. |
| 2    | 7/19/2016 | Radiated Emissions High Frequency | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Northwest EMC following the test. |
| 3    | 7/19/2016 | Receiver Spurious Emissions       | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | Scheduled testing was completed.                  |

# RADIATED EMISSIONS

## TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, a final radiated emissions test was performed. The frequency range investigated (scanned), is also noted in this report. Radiated emissions measurements were made at the EUT azimuth and antenna height such that the maximum radiated emissions level was detected. This required the use of a turntable and an antenna positioner. The preferred method of a continuous azimuth search was utilized for frequency scans of the EUT field strength with both polarities of the measuring antenna. A calibrated, linearly polarized antenna was positioned at the specified distance from the periphery of the EUT. Tests were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna was varied in height above the conducting ground plane to obtain the maximum signal strength. Though specified in the report, the measurement distance was 3 meters or 10 meters (from antenna to boundary of EUT). At any measurement distance, the antenna height was varied from 1 meter to 4 meters. These height scans apply for both horizontal and vertical polarization, except that for vertical polarization the minimum height of the center of the antenna was increased so that the lowest point of the bottom of the antenna cleared the ground surface by at least 25 cm.

The EUT arrangement is configured as equivalent to that occurring in normal use. Tabletop equipment is placed on a 0.8 meter high non-conductive table & for Floor-standing equipment, it is placed on, but insulated from a ground reference plane by the use of its own rollers or stand-off supports. If measurements above 1 GHz were required, the test setup was modified to meet the regulatory requirements for higher frequency measurements. If required, RF absorber was placed on the floor between the measurement antenna and EUT. If required, per the standard, an insulating material was also added to ground plane between the EUT's power and remote I/O cables.

The diameter of the illumination area is the dimension of the line tangent to the EUT formed by 3 dB beamwidth of the measurement antenna at the measurement distance. At a 3 meter test distance, the diameter of the illumination area was 3.8 meters at 1 GHz and greater than 2.1 meters up to 6 GHz. Above 1 GHz, when required by the measurement standard, the antenna is pointed for both azimuth and elevation to maintain the receive antenna within the cone of radiation from the EUT. The specified measurement detectors were used for comparison of the emissions to the peak and average specification limits.

The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

## TEST EQUIPMENT

| Description                  | Manufacturer  | Model          | ID  | Last Cal.  | Cal. Due   |
|------------------------------|---------------|----------------|-----|------------|------------|
| Analyzer - Spectrum Analyzer | Agilent       | N9010A         | AFL | 10/29/2015 | 10/29/2016 |
| Antenna - Biconilog          | ETS Lindgren  | 3143B          | AYF | 4/13/2016  | 4/13/2018  |
| Cable                        | Northwest EMC | RE 9kHz - 1GHz | TXB | 5/31/2016  | 5/31/2017  |
| Amplifier - Pre-Amplifier    | Miteq         | AM-1551        | PAH | 9/18/2015  | 9/18/2016  |

## MEASUREMENT UNCERTAINTY

| Description  |        |         |
|--------------|--------|---------|
| Expanded k=2 | 4.8 dB | -4.8 dB |

## FREQUENCY RANGE INVESTIGATED

30 MHz TO 1000 MHz

## POWER INVESTIGATED

110VAC/60Hz

## CONFIGURATIONS INVESTIGATED

HNYW0166-1

## MODES INVESTIGATED

Idle Mode

# RADIATED EMISSIONS

|                   |                                             |                    |            |
|-------------------|---------------------------------------------|--------------------|------------|
| EUT:              | 5881ENHCVE                                  | Work Order:        | HNYW0166   |
| Serial Number:    | MEL-125                                     | Date:              | 07/19/2016 |
| Customer:         | Honeywell, Automation and Control Solutions | Temperature:       | 21°C       |
| Attendees:        | None                                        | Relative Humidity: | 56%        |
| Customer Project: | None                                        | Bar. Pressure:     | 1025 mb    |
| Tested By:        | Jonathan Kiefer                             | Job Site:          | TX02       |
| Power:            | 110VAC/60Hz                                 | Configuration:     | HNYW0166-1 |

## TEST SPECIFICATIONS

|                                  |                 |
|----------------------------------|-----------------|
| Specification: Equipment Class B | Method:         |
| FCC 15.109:2016                  | ANSI C63.4:2014 |
| ICES-003:2016                    | ANSI C63.4:2014 |

## TEST PARAMETERS

|        |   |                    |   |                     |           |
|--------|---|--------------------|---|---------------------|-----------|
| Run #: | 2 | Test Distance (m): | 3 | Ant. Height(s) (m): | 1 to 4(m) |
|--------|---|--------------------|---|---------------------|-----------|

## COMMENTS

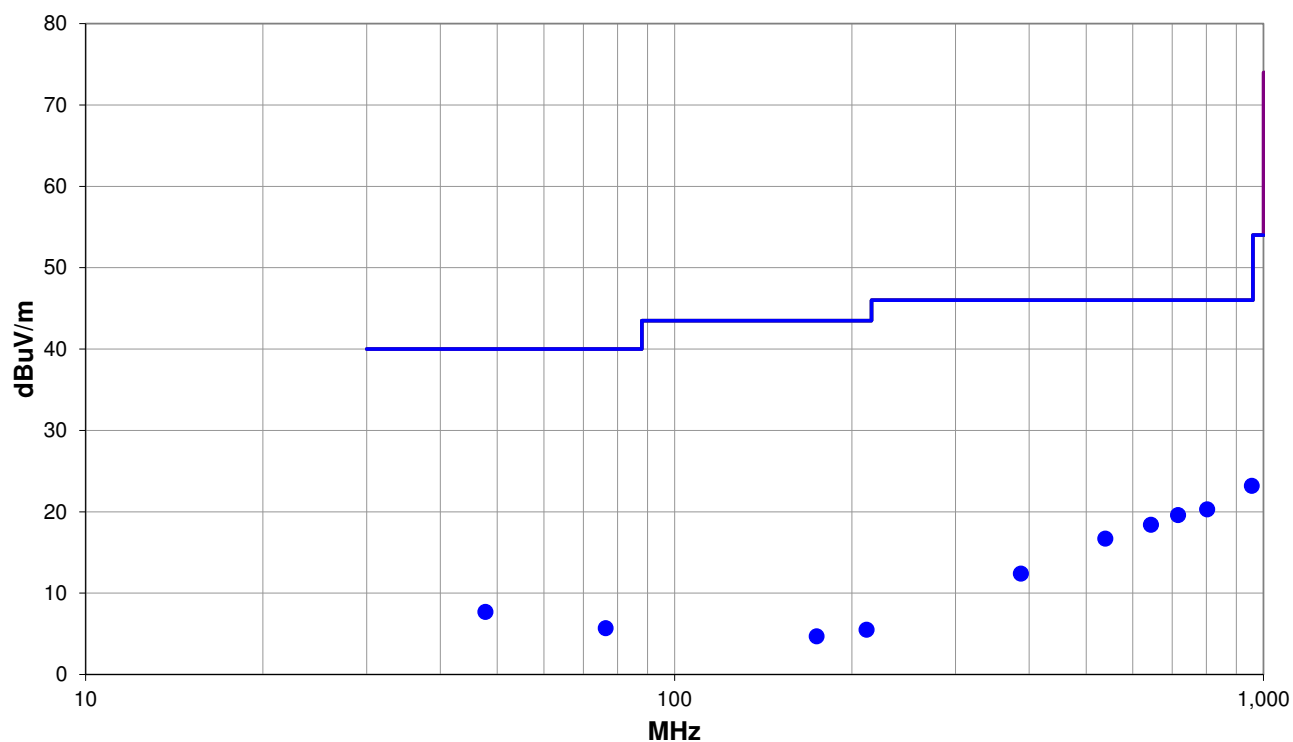
None

## EUT OPERATING MODES

Idle Mode

## DEVIATIONS FROM TEST STANDARD

None



Run #: 2

■ PK ◆ AV ● QP

# RADIATED EMISSIONS

## RESULTS - Run #2

| Freq<br>(MHz) | Amp.<br>(dBuV) | Factor<br>(dB) | Ant.<br>Height<br>(m) | Azimuth<br>(deg.) | Test<br>Dist.<br>(m) | Ext.<br>Atten.<br>(dB) | Polar.<br>Trans.<br>Type | Detect. | Dist.<br>Adjust.<br>(dB) | Adj.<br>(dBuV/m) | Spec.<br>Limit<br>(dBuV/m) | Margin.<br>(dB) |
|---------------|----------------|----------------|-----------------------|-------------------|----------------------|------------------------|--------------------------|---------|--------------------------|------------------|----------------------------|-----------------|
| 955.734       | 32.2           | -9.0           | 1.9                   | 129.0             | 3.0                  | 0.0                    | Vert                     | QP      | 0.0                      | 23.2             | 46.0                       | -22.8           |
| 802.746       | 32.3           | -12.0          | 3.3                   | 195.0             | 3.0                  | 0.0                    | Horz                     | QP      | 0.0                      | 20.3             | 46.0                       | -25.7           |
| 716.056       | 32.7           | -13.1          | 1.5                   | 333.9             | 3.0                  | 0.0                    | Horz                     | QP      | 0.0                      | 19.6             | 46.0                       | -26.4           |
| 644.115       | 32.7           | -14.3          | 1.5                   | 228.0             | 3.0                  | 0.0                    | Vert                     | QP      | 0.0                      | 18.4             | 46.0                       | -27.6           |
| 539.011       | 32.5           | -15.8          | 1.5                   | 328.9             | 3.0                  | 0.0                    | Vert                     | QP      | 0.0                      | 16.7             | 46.0                       | -29.3           |
| 47.740        | 40.3           | -32.6          | 1.5                   | 188.0             | 3.0                  | 0.0                    | Vert                     | QP      | 0.0                      | 7.7              | 40.0                       | -32.3           |
| 387.265       | 32.7           | -20.3          | 2.0                   | 289.0             | 3.0                  | 0.0                    | Vert                     | QP      | 0.0                      | 12.4             | 46.0                       | -33.6           |
| 76.376        | 38.0           | -32.3          | 2.2                   | 255.0             | 3.0                  | 0.0                    | Vert                     | QP      | 0.0                      | 5.7              | 40.0                       | -34.3           |
| 211.841       | 32.7           | -27.2          | 1.5                   | 19.0              | 3.0                  | 0.0                    | Vert                     | QP      | 0.0                      | 5.5              | 43.5                       | -38.0           |
| 174.272       | 32.6           | -27.9          | 2.8                   | 183.9             | 3.0                  | 0.0                    | Horz                     | QP      | 0.0                      | 4.7              | 43.5                       | -38.8           |

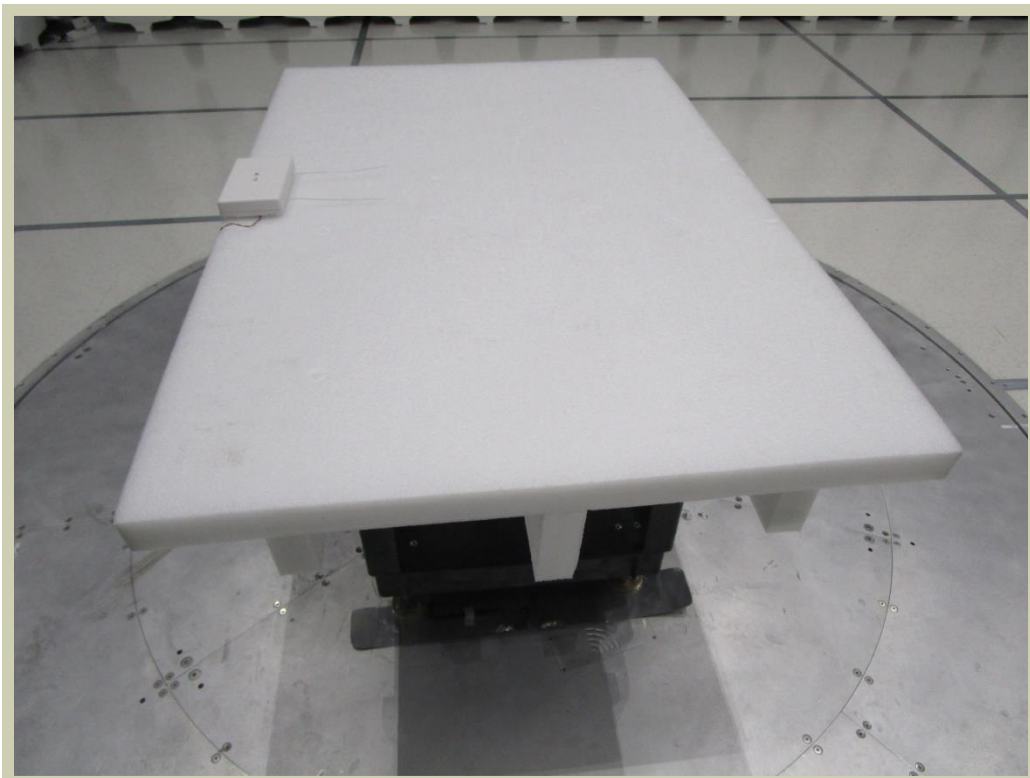
## CONCLUSION

Pass

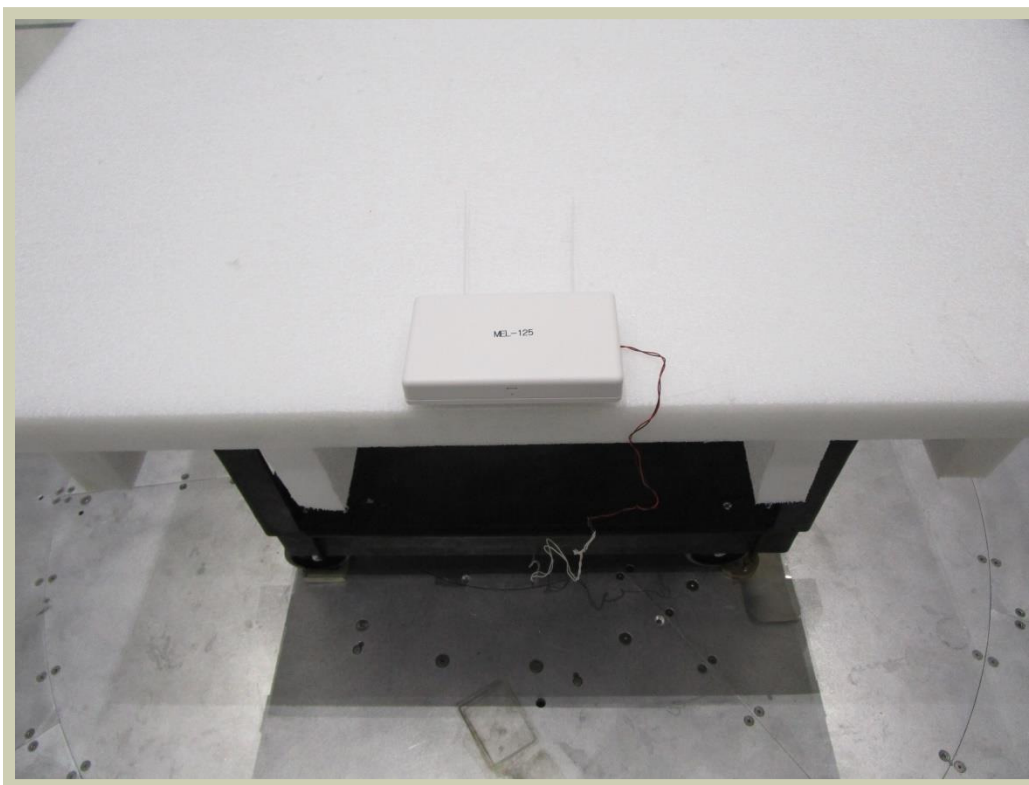
*Jonathan Kiefer*

Tested By

# RADIATED EMISSIONS



# RADIATED EMISSIONS



# RADIATED EMISSIONS HIGH FREQUENCY

## TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, a final radiated emissions test was performed. The frequency range investigated (scanned), is also noted in this report. Radiated emissions measurements were made at the EUT azimuth and antenna height such that the maximum radiated emissions level was detected. This required the use of a turntable and an antenna positioner. The preferred method of a continuous azimuth search was utilized for frequency scans of the EUT field strength with both polarities of the measuring antenna. A calibrated, linearly polarized antenna was positioned at the specified distance from the periphery of the EUT. Tests were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna was varied in height above the conducting ground plane to obtain the maximum signal strength. Though specified in the report, the measurement distance was 3 meters or 10 meters (from antenna to boundary of EUT). At any measurement distance, the antenna height was varied from 1 meter to 4 meters. These height scans apply for both horizontal and vertical polarization, except that for vertical polarization the minimum height of the center of the antenna was increased so that the lowest point of the bottom of the antenna cleared the ground surface by at least 25 cm.

The EUT arrangement is configured as equivalent to that occurring in normal use. Tabletop equipment is placed on a 0.8 meter high non-conductive table & for Floor-standing equipment, it is placed on, but insulated from a ground reference plane by the use of its own rollers or stand-off supports. If measurements above 1 GHz were required, the test setup was modified to meet the regulatory requirements for higher frequency measurements. If required, RF absorber was placed on the floor between the measurement antenna and EUT. If required, per the standard, an insulating material was also added to ground plane between the EUT's power and remote I/O cables.

The diameter of the illumination area is the dimension of the line tangent to the EUT formed by 3 dB beamwidth of the measurement antenna at the measurement distance. At a 3 meter test distance, the diameter of the illumination area was 3.8 meters at 1 GHz and greater than 2.1 meters up to 6 GHz. Above 1 GHz, when required by the measurement standard, the antenna is pointed for both azimuth and elevation to maintain the receive antenna within the cone of radiation from the EUT. The specified measurement detectors were used for comparison of the emissions to the peak and average specification limits.

The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

## TEST EQUIPMENT

| Description                  | Manufacturer  | Model                  | ID  | Last Cal.  | Cal. Due   |
|------------------------------|---------------|------------------------|-----|------------|------------|
| Analyzer - Spectrum Analyzer | Agilent       | N9010A                 | AFL | 10/29/2015 | 10/29/2016 |
| Antenna - Double Ridge       | ETS Lindgren  | 3115                   | AJL | 9/15/2014  | 9/15/2016  |
| Cable                        | Northwest EMC | 1-8.2 GHz              | TXC | 5/31/2016  | 5/31/2017  |
| Amplifier - Pre-Amplifier    | Miteq         | AMF-3D-00100800-32-13P | PAJ | 5/31/2016  | 5/31/2017  |

## MEASUREMENT UNCERTAINTY

| Description  |        |         |
|--------------|--------|---------|
| Expanded k=2 | 4.8 dB | -4.8 dB |

## FREQUENCY RANGE INVESTIGATED

1 GHz TO 6 GHz

## POWER INVESTIGATED

110VAC/60Hz

## CONFIGURATIONS INVESTIGATED

HNYW0166-1

## MODES INVESTIGATED

Idle Mode

# RADIATED EMISSIONS HIGH FREQUENCY

|                   |                                             |                    |            |
|-------------------|---------------------------------------------|--------------------|------------|
| EUT:              | 5881ENHCVE                                  | Work Order:        | HNYW0166   |
| Serial Number:    | MEL-125                                     | Date:              | 07/19/2016 |
| Customer:         | Honeywell, Automation and Control Solutions | Temperature:       | 21°C       |
| Attendees:        | None                                        | Relative Humidity: | 56%        |
| Customer Project: | None                                        | Bar. Pressure:     | 1025 mb    |
| Tested By:        | Jonathan Kiefer                             | Job Site:          | TX02       |
| Power:            | 110VAC/60Hz                                 | Configuration:     | HNYW0166-1 |

## TEST SPECIFICATIONS

|                                  |                 |
|----------------------------------|-----------------|
| Specification: Equipment Class B | Method:         |
| FCC 15.109:2016                  | ANSI C63.4:2014 |
| ICES-003:2016                    | ANSI C63.4:2014 |

## TEST PARAMETERS

|        |   |                    |   |                     |           |
|--------|---|--------------------|---|---------------------|-----------|
| Run #: | 3 | Test Distance (m): | 3 | Ant. Height(s) (m): | 1 to 4(m) |
|--------|---|--------------------|---|---------------------|-----------|

## COMMENTS

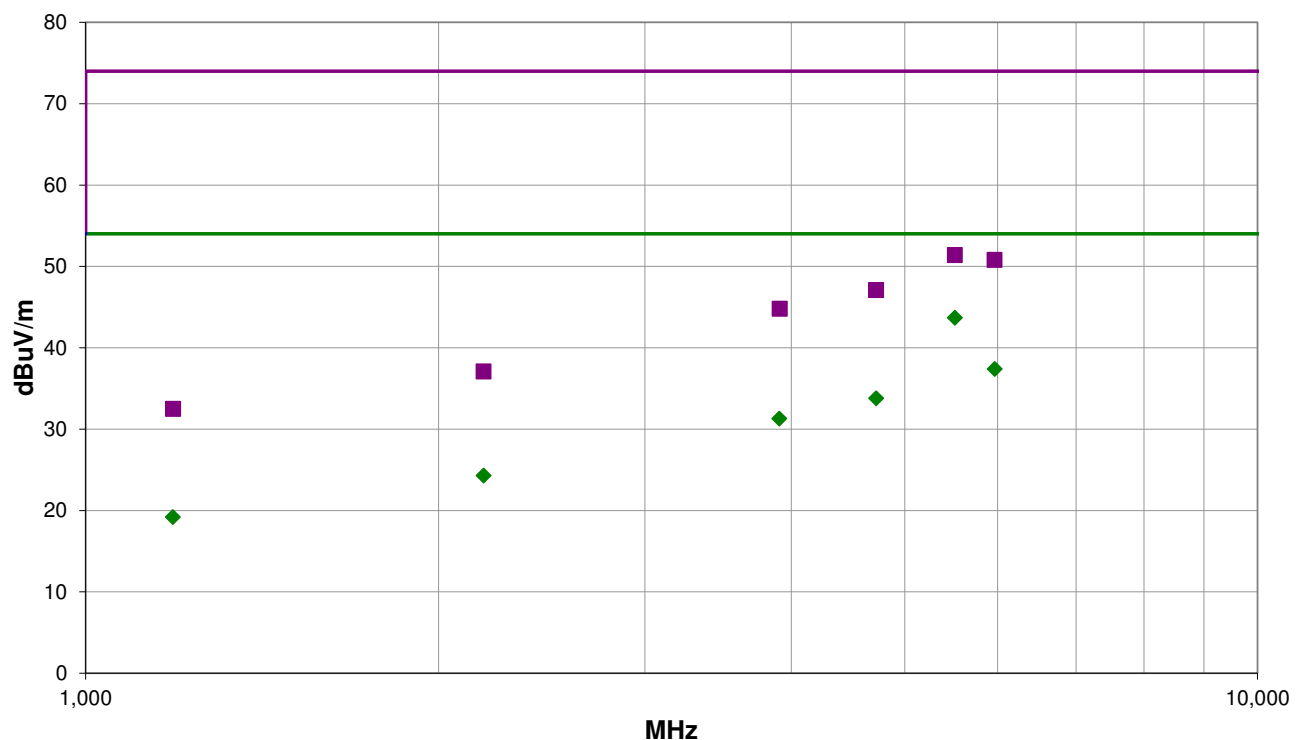
None

## EUT OPERATING MODES

Idle Mode

## DEVIATIONS FROM TEST STANDARD

None



Run #: 3

■ PK ◆ AV ● QP

# RADIATED EMISSIONS HIGH FREQUENCY

## RESULTS - Run #3

| Freq<br>(MHz) | Amp.<br>(dBuV) | Factor<br>(dB) | Ant.<br>Height<br>(m) | Azimuth<br>(deg.) | Test<br>Dist.<br>(m) | Ext.<br>Atten.<br>(dB) | Polar.<br>Trans.<br>Type | Detect. | Dist.<br>Adjust.<br>(dB) | Adj.<br>(dBuV/m) | Spec.<br>Limit<br>(dBuV/m) | Margin.<br>(dB) |
|---------------|----------------|----------------|-----------------------|-------------------|----------------------|------------------------|--------------------------|---------|--------------------------|------------------|----------------------------|-----------------|
| 5517.075      | 35.0           | 8.7            | 4.0                   | 174.0             | 3.0                  | 0.0                    | Vert                     | AV      | 0.0                      | 43.7             | 54.0                       | -10.3           |
| 5966.500      | 26.6           | 10.8           | 1.2                   | 129.9             | 3.0                  | 0.0                    | Horz                     | AV      | 0.0                      | 37.4             | 54.0                       | -16.6           |
| 4726.500      | 28.0           | 5.8            | 1.2                   | 63.0              | 3.0                  | 0.0                    | Horz                     | AV      | 0.0                      | 33.8             | 54.0                       | -20.2           |
| 5517.058      | 42.7           | 8.7            | 4.0                   | 174.0             | 3.0                  | 0.0                    | Vert                     | PK      | 0.0                      | 51.4             | 74.0                       | -22.6           |
| 3907.225      | 28.4           | 2.9            | 1.2                   | 18.0              | 3.0                  | 0.0                    | Vert                     | AV      | 0.0                      | 31.3             | 54.0                       | -22.7           |
| 5964.158      | 40.0           | 10.8           | 1.2                   | 129.9             | 3.0                  | 0.0                    | Horz                     | PK      | 0.0                      | 50.8             | 74.0                       | -23.2           |
| 4725.192      | 41.3           | 5.8            | 1.2                   | 63.0              | 3.0                  | 0.0                    | Horz                     | PK      | 0.0                      | 47.1             | 74.0                       | -26.9           |
| 3910.492      | 41.9           | 2.9            | 1.2                   | 18.0              | 3.0                  | 0.0                    | Vert                     | PK      | 0.0                      | 44.8             | 74.0                       | -29.2           |
| 2185.467      | 29.3           | -5.0           | 1.2                   | 144.0             | 3.0                  | 0.0                    | Horz                     | AV      | 0.0                      | 24.3             | 54.0                       | -29.7           |
| 1186.700      | 28.7           | -9.5           | 1.2                   | 154.9             | 3.0                  | 0.0                    | Vert                     | AV      | 0.0                      | 19.2             | 54.0                       | -34.8           |
| 2185.267      | 42.1           | -5.0           | 1.2                   | 144.0             | 3.0                  | 0.0                    | Horz                     | PK      | 0.0                      | 37.1             | 74.0                       | -36.9           |
| 1187.067      | 42.0           | -9.5           | 1.2                   | 154.9             | 3.0                  | 0.0                    | Vert                     | PK      | 0.0                      | 32.5             | 74.0                       | -41.5           |

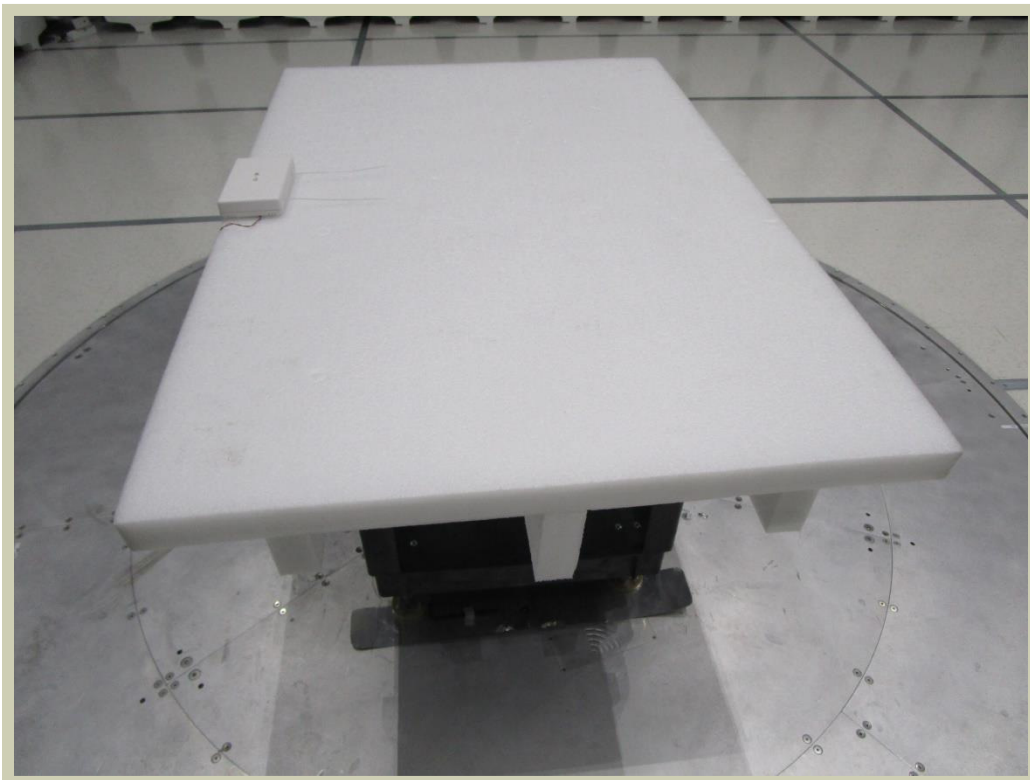
## CONCLUSION

Pass

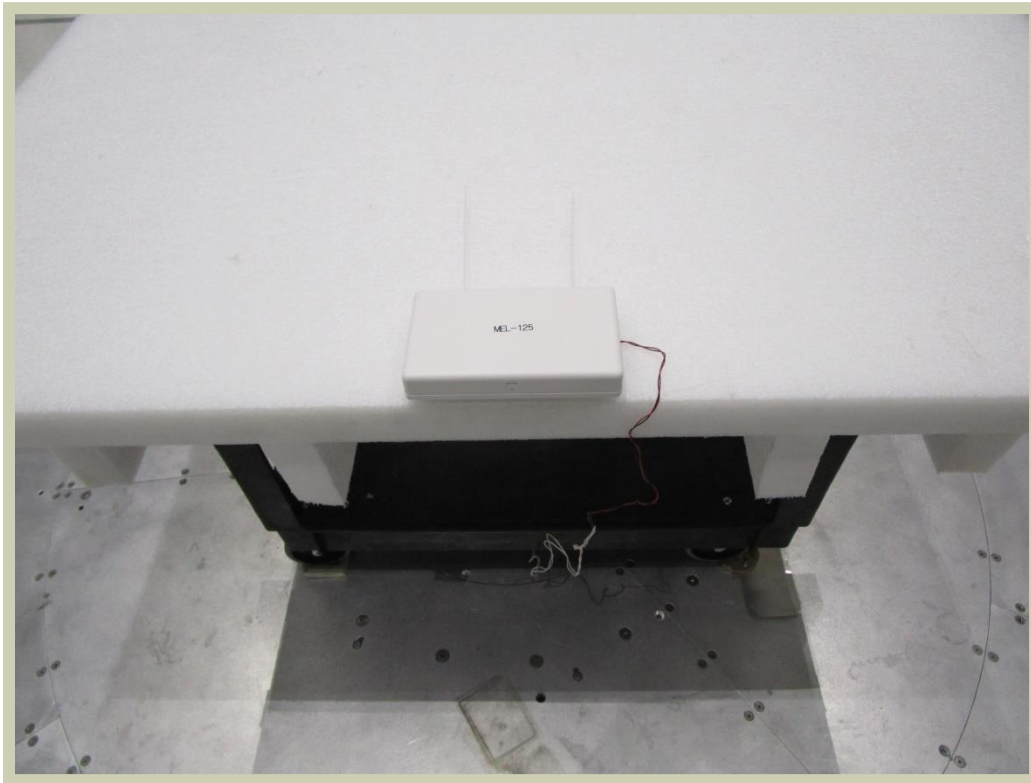


Tested By

# RADIATED EMISSIONS HIGH FREQUENCY



# RADIATED EMISSIONS HIGH FREQUENCY



# RECEIVER SPURIOUS EMISSIONS

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

## MODES OF OPERATION

Receive Mode

## POWER SETTINGS INVESTIGATED

110VAC/60Hz

## CONFIGURATIONS INVESTIGATED

HNYW0166 - 1

## FREQUENCY RANGE INVESTIGATED

|                 |        |                |          |
|-----------------|--------|----------------|----------|
| Start Frequency | 30 MHz | Stop Frequency | 8200 MHz |
|-----------------|--------|----------------|----------|

## SAMPLE CALCULATIONS

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

## TEST EQUIPMENT

| Description                  | Manufacturer  | Model                  | ID  | Last Cal.  | Interval |
|------------------------------|---------------|------------------------|-----|------------|----------|
| Amplifier - Pre-Amplifier    | Miteq         | AMF-3D-00100800-32-13P | PAJ | 5/31/2016  | 12 mo    |
| Cable                        | Northwest EMC | 1-8.2 GHz              | TXC | 5/31/2016  | 12 mo    |
| Antenna - Double Ridge       | ETS Lindgren  | 3115                   | AJL | 9/15/2014  | 24 mo    |
| Amplifier - Pre-Amplifier    | Miteq         | AM-1551                | PAH | 9/18/2015  | 12 mo    |
| Cable                        | Northwest EMC | RE 9kHz - 1GHz         | TXB | 5/31/2016  | 12 mo    |
| Antenna - Biconilog          | ETS Lindgren  | 3143B                  | AYF | 4/13/2016  | 24 mo    |
| Analyzer - Spectrum Analyzer | Agilent       | N9010A                 | AFL | 10/29/2015 | 12 mo    |

## TEST DESCRIPTION

The EUT was configured for receive mode. The spectrum was scanned throughout the specified range. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization. A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

# RECEIVER SPURIOUS EMISSIONS

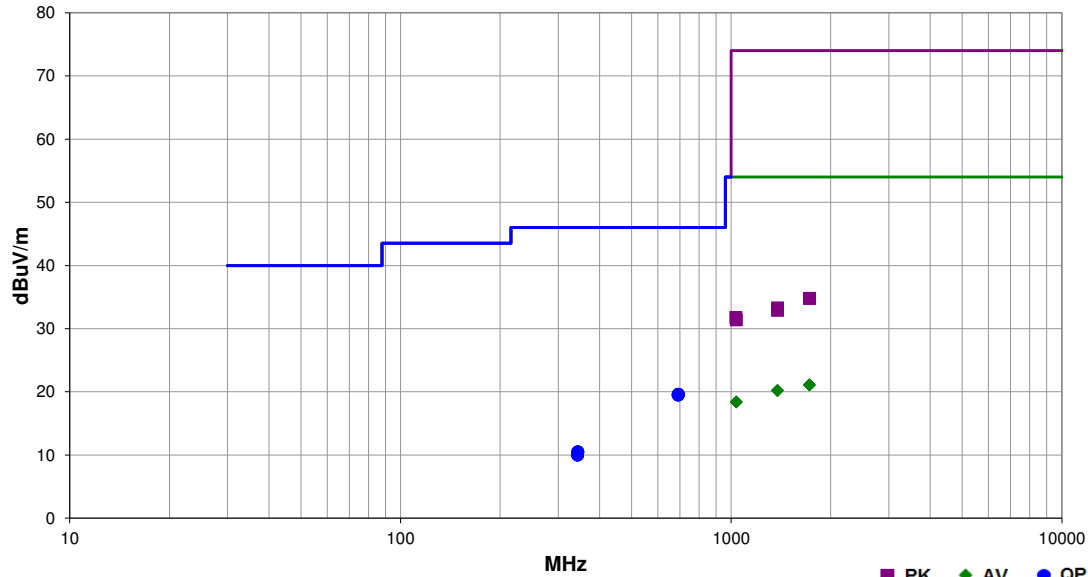
**NORTHWEST  
EMC**

PSA-ESCI 2016.04.26.1  
EmiR5 2016.03.11

|                 |                                             |                   |           |                                                                                    |                 |
|-----------------|---------------------------------------------|-------------------|-----------|------------------------------------------------------------------------------------|-----------------|
| Work Order:     | HNYW0166                                    | Date:             | 07/19/16  |  |                 |
| Project:        | None                                        | Temperature:      | 21 °C     |                                                                                    |                 |
| Job Site:       | TX02                                        | Humidity:         | 56% RH    |                                                                                    |                 |
| Serial Number:  | MEL-125                                     | Barometric Pres.: | 1025 mbar | Tested by:                                                                         | Jonathan Kiefer |
| EUT:            | 5881ENHCVE                                  |                   |           |                                                                                    |                 |
| Configuration:  | 1                                           |                   |           |                                                                                    |                 |
| Customer:       | Honeywell, Automation and Control Solutions |                   |           |                                                                                    |                 |
| Attendees:      | None                                        |                   |           |                                                                                    |                 |
| EUT Power:      | 110VAC/60Hz                                 |                   |           |                                                                                    |                 |
| Operating Mode: | Receive Mode                                |                   |           |                                                                                    |                 |
| Deviations:     | None                                        |                   |           |                                                                                    |                 |
| Comments:       | Receiver operating at 345 MHz.              |                   |           |                                                                                    |                 |

| Test Specifications | Class B | Test Method     |
|---------------------|---------|-----------------|
| FCC 15.109:2016     |         | ANSI C63.4:2014 |
| ICES-003:2016       |         | ANSI C63.4:2014 |

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

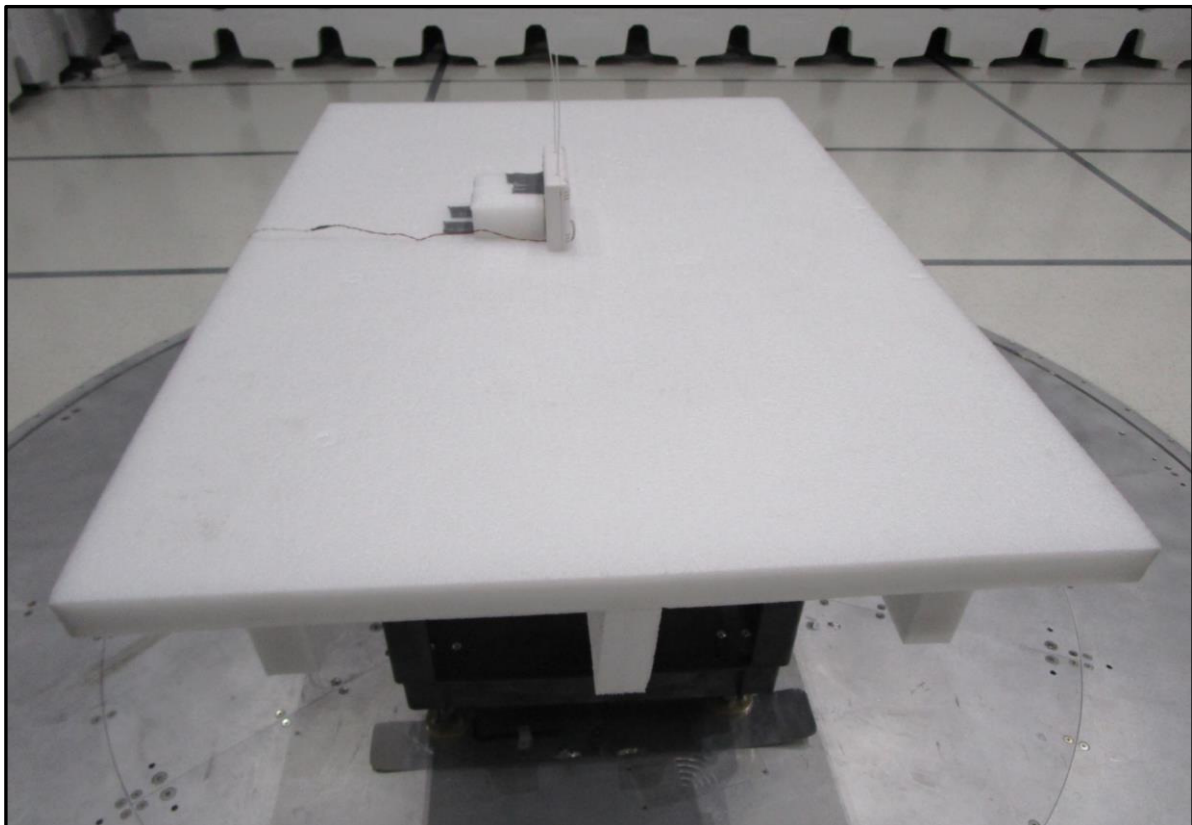
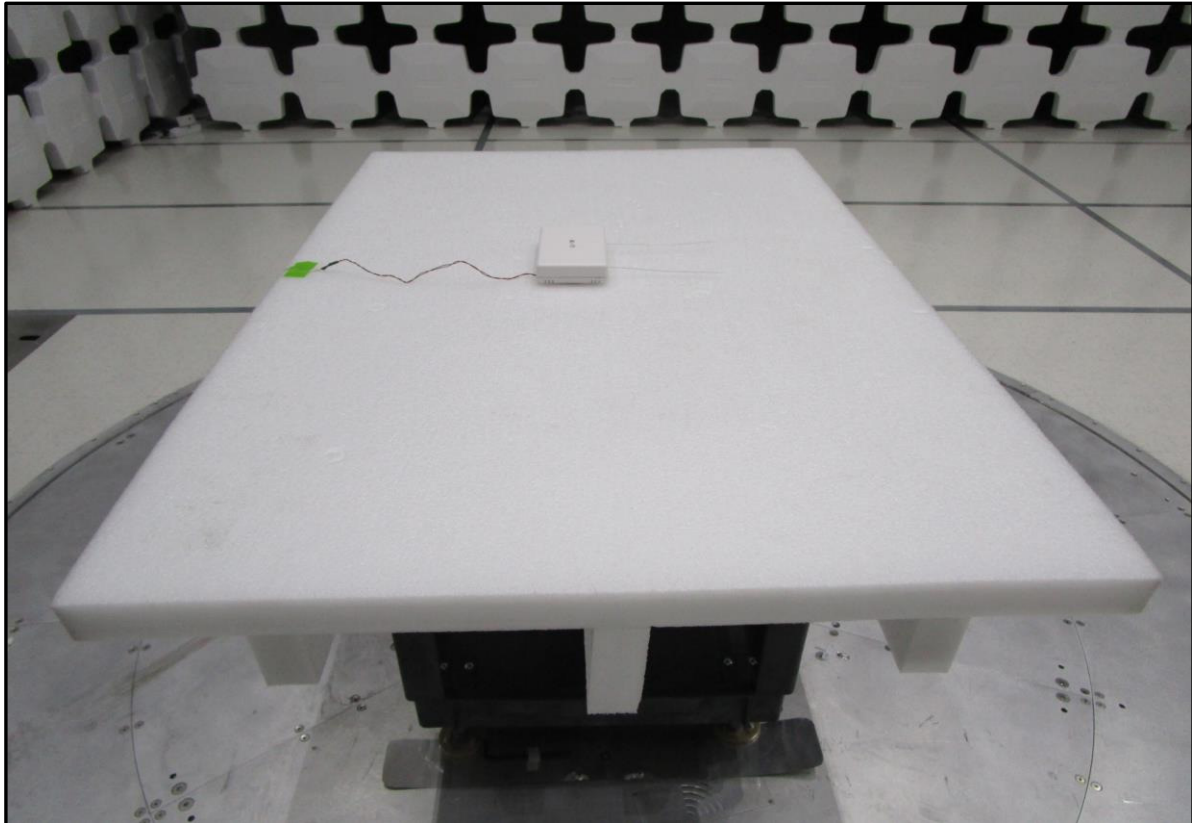


| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Antenna Height (meters) | Azimuth (degrees) | Test Distance (meters) | External Attenuation (dB) | Polarity/Transducer Type | Detector | Distance Adjustment (dB) | Adjusted (dBuV/m) | Spec. Limit (dBuV/m) | Compared to Spec. (dB) | Comments       |
|------------|------------------|-------------|-------------------------|-------------------|------------------------|---------------------------|--------------------------|----------|--------------------------|-------------------|----------------------|------------------------|----------------|
| 691.733    | 32.7             | -13.1       | 3.9                     | 158.0             | 3.0                    | 0.0                       | Horz                     | QP       | 0.0                      | 19.6              | 46.0                 | -26.4                  | EUT Horizontal |
| 691.937    | 32.7             | -13.1       | 1.2                     | 117.9             | 3.0                    | 0.0                       | Vert                     | QP       | 0.0                      | 19.6              | 46.0                 | -26.4                  | EUT Horizontal |
| 691.980    | 32.7             | -13.1       | 1.2                     | 313.0             | 3.0                    | 0.0                       | Horz                     | QP       | 0.0                      | 19.6              | 46.0                 | -26.4                  | EUT On Side    |
| 691.567    | 32.6             | -13.1       | 1.2                     | 301.0             | 3.0                    | 0.0                       | Horz                     | QP       | 0.0                      | 19.5              | 46.0                 | -26.5                  | EUT Vertical   |
| 691.718    | 32.6             | -13.1       | 1.2                     | 272.0             | 3.0                    | 0.0                       | Vert                     | QP       | 0.0                      | 19.5              | 46.0                 | -26.5                  | EUT Vertical   |
| 691.327    | 32.6             | -13.1       | 1.2                     | 104.0             | 3.0                    | 0.0                       | Vert                     | QP       | 0.0                      | 19.5              | 46.0                 | -26.5                  | EUT On Side    |
| 1725.092   | 28.8             | -7.7        | 3.4                     | 26.0              | 3.0                    | 0.0                       | Horz                     | AV       | 0.0                      | 21.1              | 54.0                 | -32.9                  | EUT Horizontal |
| 1725.533   | 28.8             | -7.7        | 1.2                     | 196.9             | 3.0                    | 0.0                       | Vert                     | AV       | 0.0                      | 21.1              | 54.0                 | -32.9                  | EUT Horizontal |
| 1381.067   | 28.7             | -8.5        | 1.2                     | 75.0              | 3.0                    | 0.0                       | Horz                     | AV       | 0.0                      | 20.2              | 54.0                 | -33.8                  | EUT Horizontal |
| 1381.617   | 28.7             | -8.5        | 1.2                     | 261.9             | 3.0                    | 0.0                       | Vert                     | AV       | 0.0                      | 20.2              | 54.0                 | -33.8                  | EUT Horizontal |
| 343.648    | 33.0             | -22.5       | 1.2                     | 219.0             | 3.0                    | 0.0                       | Vert                     | QP       | 0.0                      | 10.5              | 46.0                 | -35.5                  | EUT Horizontal |
| 343.638    | 33.0             | -22.5       | 1.2                     | 360.0             | 3.0                    | 0.0                       | Vert                     | QP       | 0.0                      | 10.5              | 46.0                 | -35.5                  | EUT Vertical   |
| 343.648    | 33.0             | -22.5       | 1.2                     | 351.9             | 3.0                    | 0.0                       | Vert                     | QP       | 0.0                      | 10.5              | 46.0                 | -35.5                  | EUT On Side    |
| 1036.742   | 29.0             | -10.6       | 1.2                     | 38.0              | 3.0                    | 0.0                       | Horz                     | AV       | 0.0                      | 18.4              | 54.0                 | -35.6                  | EUT Horizontal |
| 1036.717   | 29.0             | -10.6       | 1.2                     | 360.0             | 3.0                    | 0.0                       | Vert                     | AV       | 0.0                      | 18.4              | 54.0                 | -35.6                  | EUT Horizontal |
| 343.133    | 32.6             | -22.6       | 1.2                     | 145.0             | 3.0                    | 0.0                       | Horz                     | QP       | 0.0                      | 10.0              | 46.0                 | -36.0                  | EUT Horizontal |
| 343.232    | 32.5             | -22.5       | 1.2                     | 303.9             | 3.0                    | 0.0                       | Horz                     | QP       | 0.0                      | 10.0              | 46.0                 | -36.0                  | EUT Vertical   |
| 343.063    | 32.6             | -22.6       | 2.1                     | 82.9              | 3.0                    | 0.0                       | Horz                     | QP       | 0.0                      | 10.0              | 46.0                 | -36.0                  | EUT On Side    |
| 1726.783   | 42.5             | -7.7        | 3.4                     | 26.0              | 3.0                    | 0.0                       | Horz                     | PK       | 0.0                      | 34.8              | 74.0                 | -39.2                  | EUT Horizontal |
| 1724.958   | 42.5             | -7.7        | 1.2                     | 196.9             | 3.0                    | 0.0                       | Vert                     | PK       | 0.0                      | 34.8              | 74.0                 | -39.2                  | EUT Horizontal |
| 1381.975   | 41.8             | -8.5        | 1.2                     | 75.0              | 3.0                    | 0.0                       | Horz                     | PK       | 0.0                      | 33.3              | 74.0                 | -40.7                  | EUT Horizontal |
| 1380.650   | 41.4             | -8.5        | 1.2                     | 261.9             | 3.0                    | 0.0                       | Vert                     | PK       | 0.0                      | 32.9              | 74.0                 | -41.1                  | EUT Horizontal |
| 1032.700   | 42.4             | -10.6       | 1.2                     | 360.0             | 3.0                    | 0.0                       | Vert                     | PK       | 0.0                      | 31.8              | 74.0                 | -42.2                  | EUT Horizontal |
| 1037.283   | 42.0             | -10.6       | 1.2                     | 38.0              | 3.0                    | 0.0                       | Horz                     | PK       | 0.0                      | 31.4              | 74.0                 | -42.6                  | EUT Horizontal |

# RECEIVER SPURIOUS EMISSIONS



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