

NORTHWEST EMC

Onity Inc., A Division of UTCFS

Trillium RFID Reader
RFID Reader Model: RH600101
RFID Host Device Models: 10104332P1, 10104333P1

FCC 15.225:2016
13.56 MHz Radio Using RFID

Report # ONIT0017.1



NVLAP Lab Code: 200630-0

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.

CERTIFICATE OF TEST



Last Date of Test: April 25, 2016
Onity Inc., A Division of UTCFS
Trillium RFID Reader
RFID Reader Model: RH600101
RFID Host Device Models: 10104332P1, 10104333P1

Radio Equipment Testing

Standards

| Specification | Method |
|-----------------|------------------|
| FCC 15.225:2016 | ANSI C63.10:2013 |

Results

| Method Clause | Test Description | Applied | Results | Comments |
|---------------|---|---------|---------|--|
| 6.2 | Powerline Conducted Emissions | No | N/A | Not required for a battery powered EUT |
| 6.4 | Field Strength of Fundamental | Yes | Pass | |
| 6.4 | Field Strength of Spurious Emissions < 30 MHz | Yes | Pass | |
| 6.5 | Field Strength of Spurious Emissions > 30 MHz | Yes | Pass | |
| 6.8 | Frequency Stability | Yes | Pass | |

Deviations From Test Standards

None

Approved By:

Kyle Holgate, 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

United States

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

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

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

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

European Union

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

Australia/New Zealand

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

Korea

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

Japan

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

Taiwan

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

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

Singapore

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

Israel

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

Hong Kong

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

Vietnam

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

SCOPE

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

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

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

MEASUREMENT UNCERTAINTY

Measurement Uncertainty

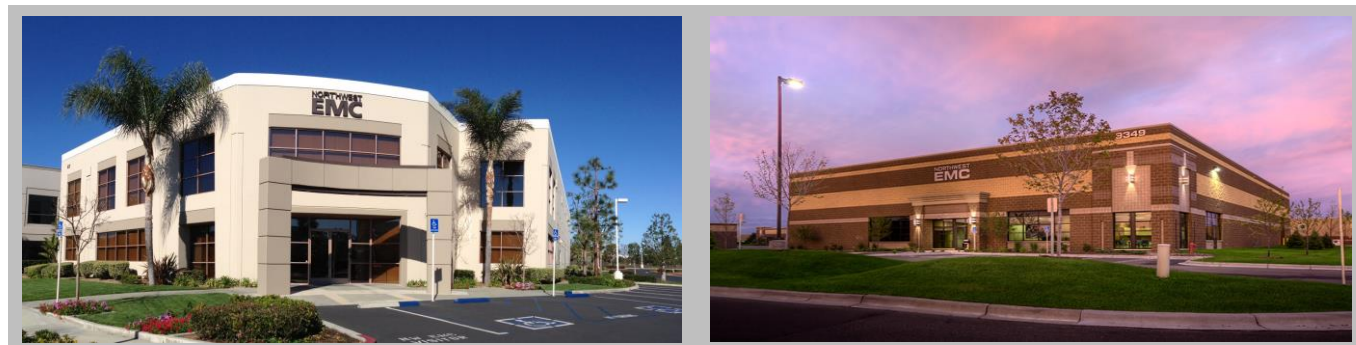
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement 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 WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) for each test is on each data sheet. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-2 as applicable), and are available upon request.

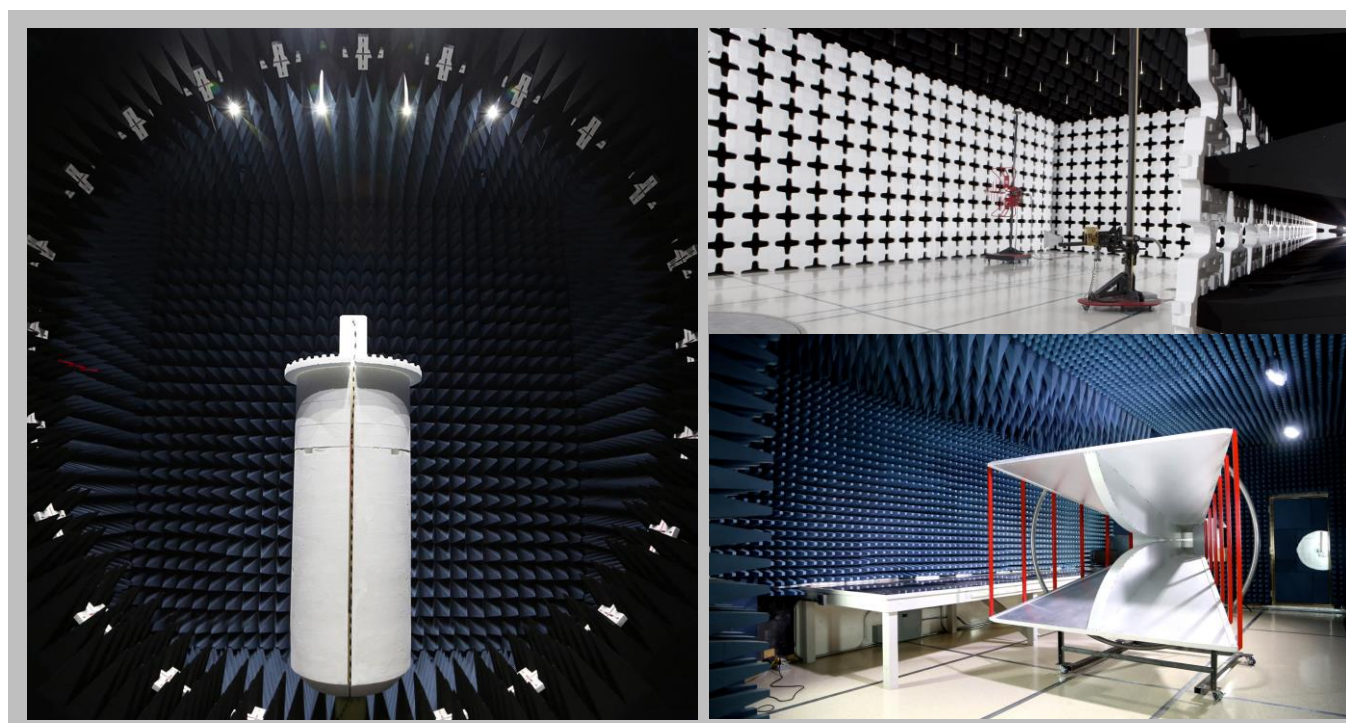
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

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

FACILITIES



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



PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

| | |
|---------------------------------|--|
| Company Name: | Onity Inc., A Division of UTCFS |
| Address: | 4001 Fairview Industrial Drive |
| City, State, Zip: | Salem, OR 97302-1142 |
| Test Requested By: | Troy Klopfenstein |
| Model: | Trillium RFID Reader RFID Reader Model: RH600101 RFID Host Device Models: 10104332P1, 10104333P1 |
| First Date of Test: | April 18, 2016 |
| Last Date of Test: | April 25, 2016 |
| Receipt Date of Samples: | April 18, 2016 |
| Equipment Design Stage: | Production |
| Equipment Condition: | No Damage |

Information Provided by the Party Requesting the Test

| |
|---|
| Functional Description of the EUT: |
| RFID lock |

| |
|-----------------------------|
| Client Justification |
|-----------------------------|

Model Equivalency Statement

The following lock regulatory model numbers are covered by this EMC test report due to similarities in their configuration:

| Regulatory Model Number | Lock Marketing Name | Model Equivalency |
|-------------------------|-----------------------------------|---|
| 10104332P1 | Trillium RFID Lock | All electrical and mechanical parts in 10104333P1 are identical to 10104332P1 with the exception of layout changes to the lock control board to allow the mounting of the Bluetooth DirectKey Module, which enables Bluetooth connectivity. |
| 10104333P1 | Trillium RFID Lock with DirectKey | |

NOTE: The DirectKey Module's certification information is:

Supra DirectKey™ Module
Model: 002220
FCC ID: TCZ-10103751G1
IC: 1175F-10103751G1

| |
|--|
| Testing Objective: |
| To demonstrate compliance to FCC Part 15.225 specifications. |

CONFIGURATIONS

Configuration ONIT0017- 1

| EUT | | | |
|----------------|--------------|-------------------|---------------|
| Description | Manufacturer | Model/Part Number | Serial Number |
| RFID Door Lock | Onity Inc. | None | 100176 |

| Peripherals in test setup boundary | | | |
|------------------------------------|--------------|-------------------|---------------|
| Description | Manufacturer | Model/Part Number | Serial Number |
| RFID Key card | Onity Inc. | None | None |

MODIFICATIONS

Equipment Modifications

| Item | Date | Test | Modification | Note | Disposition of EUT |
|------|-----------|---|--------------------------------------|---|---|
| 1 | 4/18/2016 | Field Strength of Fundamental | 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 | 4/18/2016 | Field Strength of Spurious Emissions < 30 MHz | 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 | 4/18/2016 | Field Strength of Spurious Emissions > 30 MHz | 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. |
| 4 | 4/25/2016 | Frequency Stability | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | Scheduled testing was completed. |

FREQUENCY STABILITY

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.

TEST EQUIPMENT

| Description | Manufacturer | Model | ID | Last Cal. | Interval (mo) |
|--------------------------------|---------------------------|----------------|-----|-----------|---------------|
| Attenuator | Fairview Microwave | SA3N512-20 | TWQ | 5/28/2015 | 12 |
| Thermometer | Omegaette | HH311 | DTY | 1/21/2015 | 36 |
| Chamber - Temperature/Humidity | Cincinnati Sub Zero (CSZ) | ZPH-8-2-SCT/AC | TBI | NCR | 0 |
| Meter - Multimeter | Tektronix | DMM912 | MMH | 2/17/2016 | 36 |
| Power Supply - DC | Topward | TPS-2000 | TPD | NCR | 0 |
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFP | 2/13/2016 | 12 |
| Probe - Near Field Set | EMCO | 7405 | IPD | NCR | 0 |

TEST DESCRIPTION

A near field measurement was made using a near field probe between the EUT's integral antenna and a spectrum analyzer. The spectrum analyzer is equipped with a precision frequency reference that exceeds the stability requirement of the EUT.

Measurements were made on the single transmit frequency as called out on the data sheets. Testing was done while the EUT was continuously polling.

The primary supply voltage was varied from 85 % to 115% of the nominal voltage while at ambient temperature. Using a temperature chamber, the transmit frequency was recorded at the extremes of the specified temperature range of -30 ° to +50° C and at 10°C intervals.


The requirement of a frequency tolerance of $\pm 0.01\%$ is equivalent to 100 ppm
The formula to check for compliance is:

$$\text{ppm} = (\text{Measured Frequency} / \text{Measured Nominal Frequency} - 1) * 1,000,000$$

FREQUENCY STABILITY

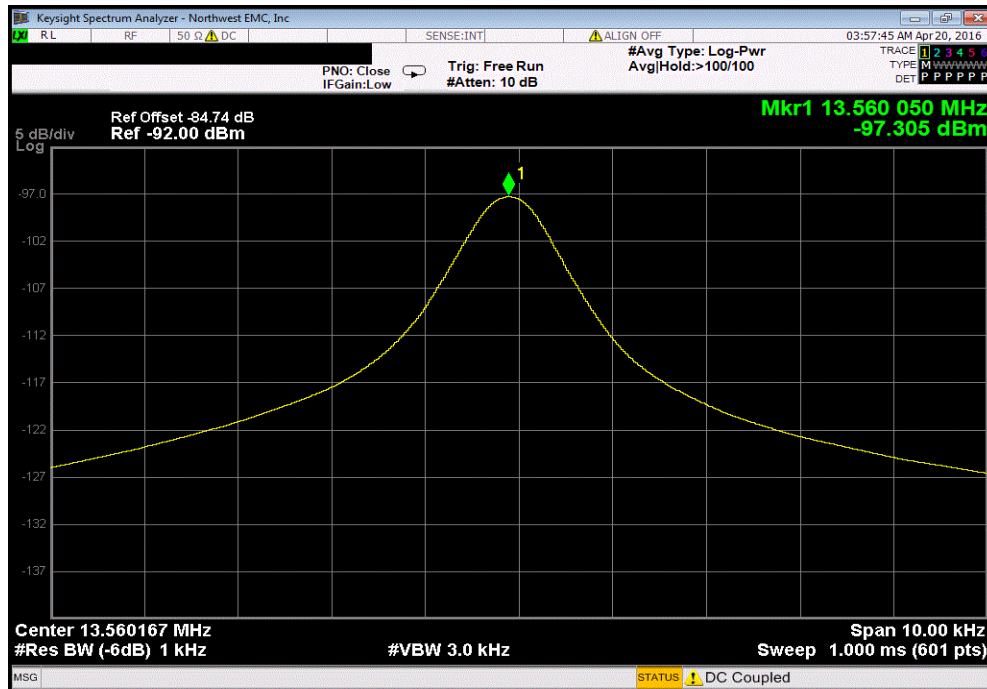


XMR 2015.01.14

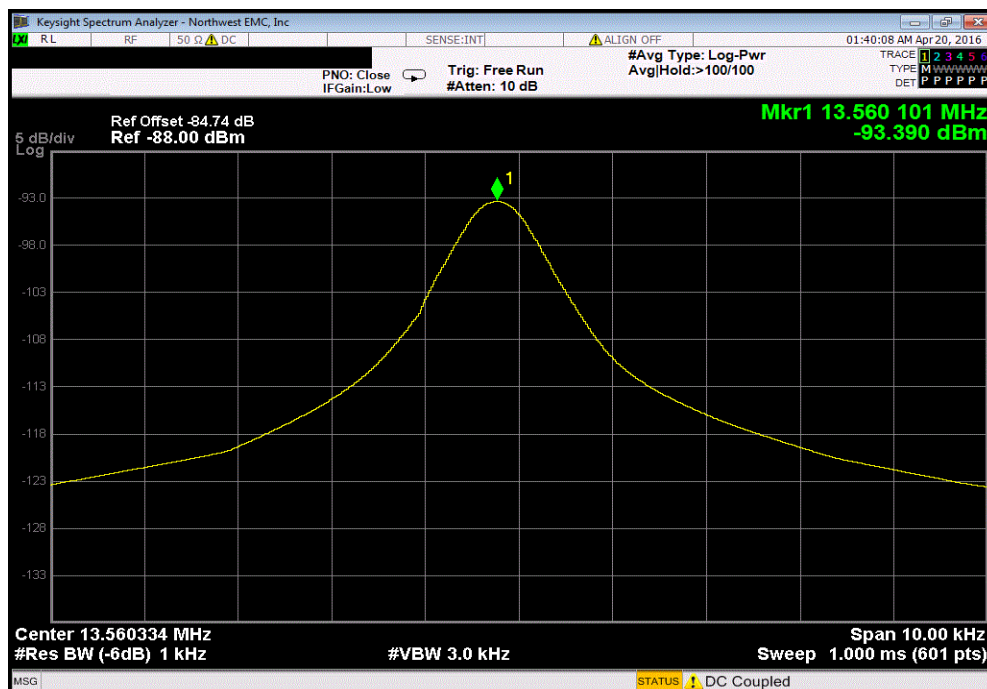
| | | | | | | |
|---|-------------------|---|----------------------|-------------|-------------|---------|
| EUT: HTRFID Lock | | Work Order: ONIT0017 | | | | |
| Serial Number: 100176 | | Date: 04/25/16 | | | | |
| Customer: Onity Inc., A Division of UTCFS | | Temperature: 23°C | | | | |
| Attendees: None | | Humidity: 42% | | | | |
| Project: None | | Barometric Pres.: 1012 mbr | | | | |
| Tested by: Brandon Hobbs | Power: Battery | Job Site: EV01 | | | | |
| TEST SPECIFICATIONS | | Test Method | | | | |
| FCC 15.225:2016 | | ANSI C63.10:2013 | | | | |
| COMMENTS | | | | | | |
| The EUT was RFID tag driven. | | | | | | |
| DEVIATIONS FROM TEST STANDARD | | | | | | |
| None | | | | | | |
| Configuration # | 1 | Signature  | | | | |
| | | Measured Value (MHz) | Assigned Value (MHz) | Error (ppm) | Limit (ppm) | Results |
| RFID, 13.56 MHz | | | | | | |
| | Voltage: 115% | 13.56005033 | 13.56 | 3.7 | 100 | Pass |
| | Voltage: 100% | 13.56010067 | 13.56 | 7.4 | 100 | Pass |
| | Voltage: 85% | 13.56006633 | 13.56 | 4.9 | 100 | Pass |
| | Temperature: +50° | 13.560084 | 13.56 | 6.2 | 100 | Pass |
| | Temperature: +40° | 13.560083 | 13.56 | 6.1 | 100 | Pass |
| | Temperature: +30° | 13.560083 | 13.56 | 6.1 | 100 | Pass |
| | Temperature: +20° | 13.56010067 | 13.56 | 7.4 | 100 | Pass |
| | Temperature: +10° | 13.560083 | 13.56 | 6.1 | 100 | Pass |
| | Temperature: 0° | 13.560083 | 13.56 | 6.1 | 100 | Pass |
| | Temperature: -10° | 13.5601 | 13.56 | 7.4 | 100 | Pass |
| | Temperature: -20° | 13.5601 | 13.56 | 7.4 | 100 | Pass |
| | Temperature: -30° | 13.56006667 | 13.56 | 4.9 | 100 | Pass |

FREQUENCY STABILITY

| RFID, 13.56 MHz, Voltage: 115% | | | | | |
|--------------------------------|----------------------|----------------------|-------------|-------------|---------|
| | Measured Value (MHz) | Assigned Value (MHz) | Error (ppm) | Limit (ppm) | Results |
| | 13.56005033 | 13.56 | 3.7 | 100 | Pass |

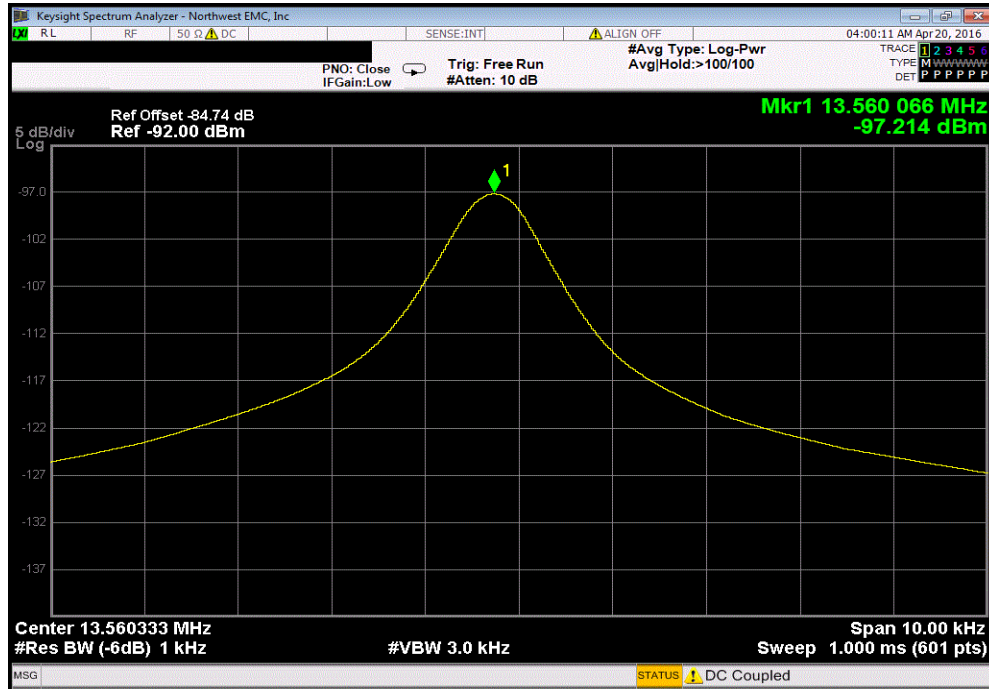


| RFID, 13.56 MHz, Voltage: 100% | | | | | |
|--------------------------------|----------------------|----------------------|-------------|-------------|---------|
| | Measured Value (MHz) | Assigned Value (MHz) | Error (ppm) | Limit (ppm) | Results |
| | 13.56010067 | 13.56 | 7.4 | 100 | Pass |

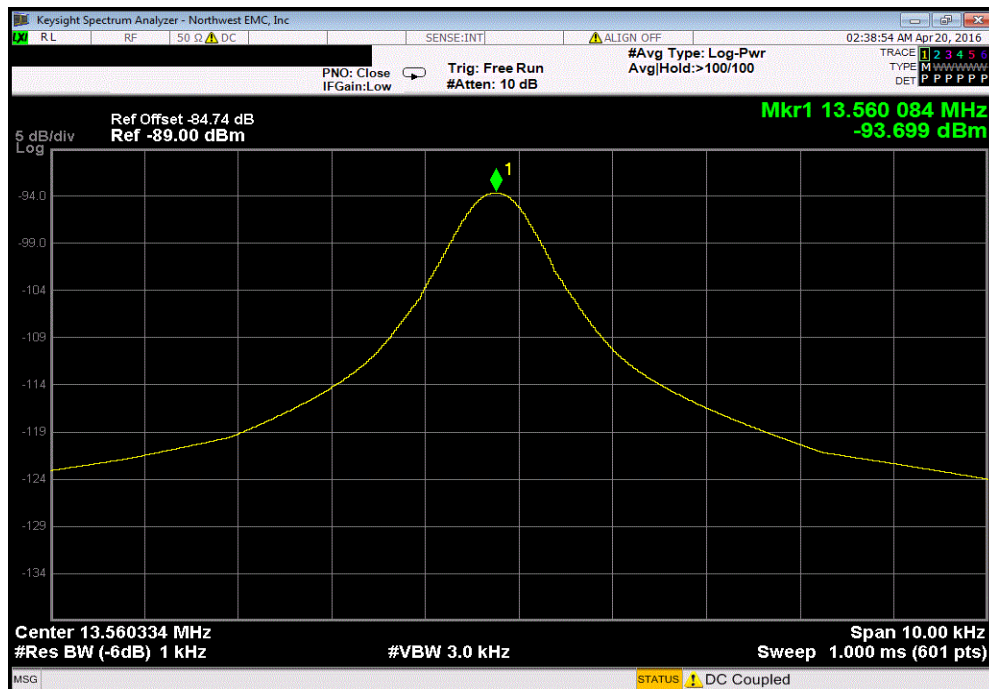


FREQUENCY STABILITY

| RFID, 13.56 MHz, Voltage: 85% | | | | | |
|-------------------------------|----------------------|----------------------|-------------|-------------|---------|
| | Measured Value (MHz) | Assigned Value (MHz) | Error (ppm) | Limit (ppm) | Results |
| | 13.56006633 | 13.56 | 4.9 | 100 | Pass |

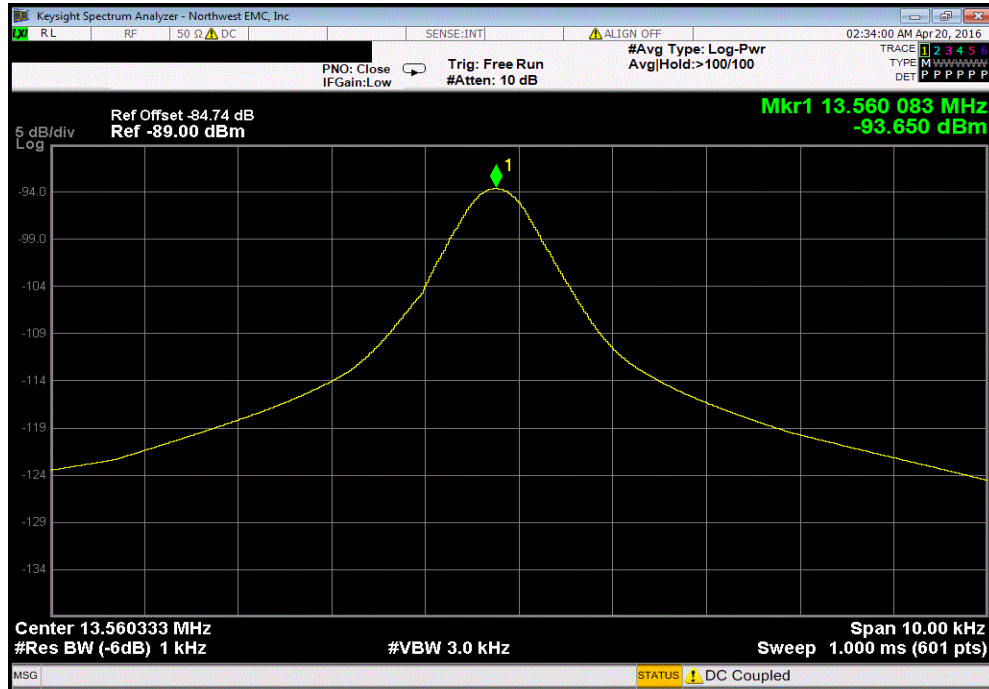


| RFID, 13.56 MHz, Temperature: +50° | | | | | |
|------------------------------------|----------------------|----------------------|-------------|-------------|---------|
| | Measured Value (MHz) | Assigned Value (MHz) | Error (ppm) | Limit (ppm) | Results |
| | 13.560084 | 13.56 | 6.2 | 100 | Pass |

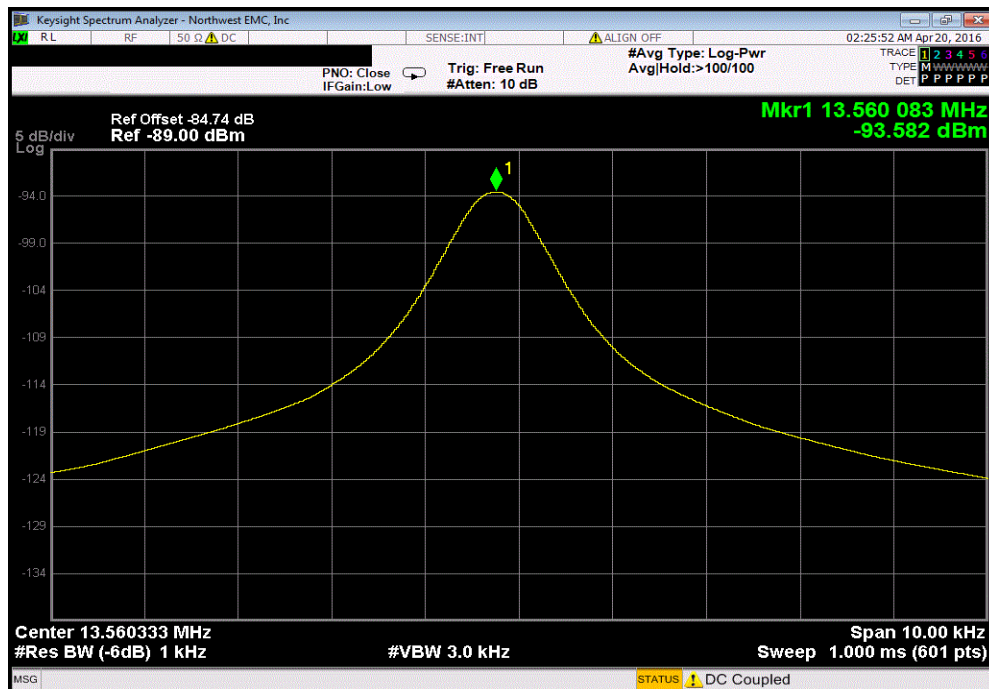


FREQUENCY STABILITY

| RFID, 13.56 MHz, Temperature: +40° | | | | | | |
|------------------------------------|----------------------|----------------------|-------------|-------------|---------|--|
| | Measured Value (MHz) | Assigned Value (MHz) | Error (ppm) | Limit (ppm) | Results | |
| | 13.560083 | 13.56 | 6.1 | 100 | Pass | |

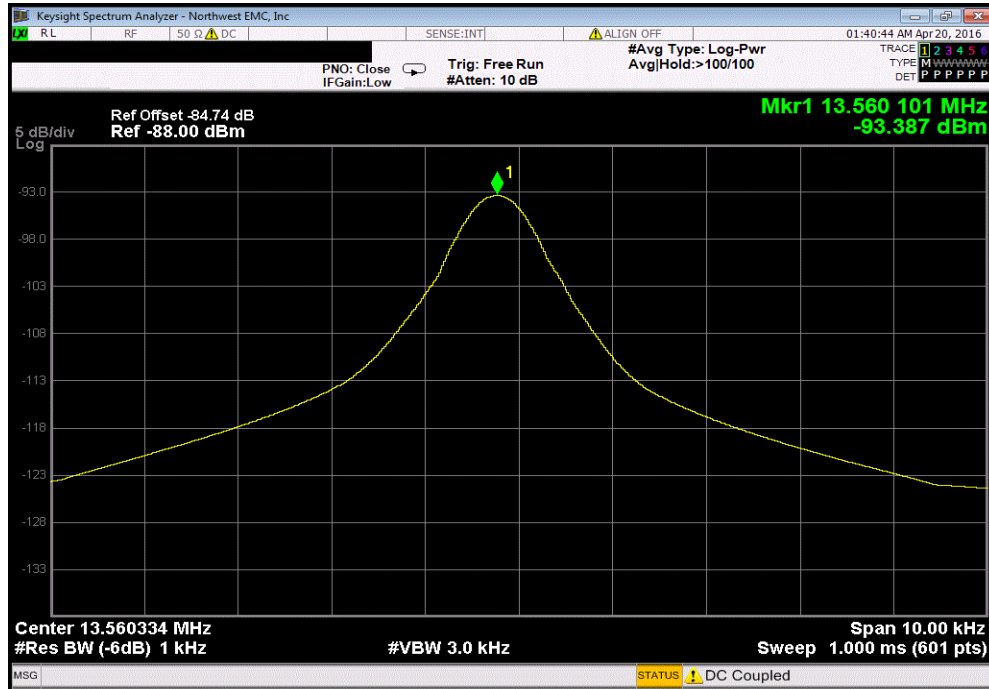


| RFID, 13.56 MHz, Temperature: +30° | | | | | | |
|------------------------------------|----------------------|----------------------|-------------|-------------|---------|--|
| | Measured Value (MHz) | Assigned Value (MHz) | Error (ppm) | Limit (ppm) | Results | |
| | 13.560083 | 13.56 | 6.1 | 100 | Pass | |

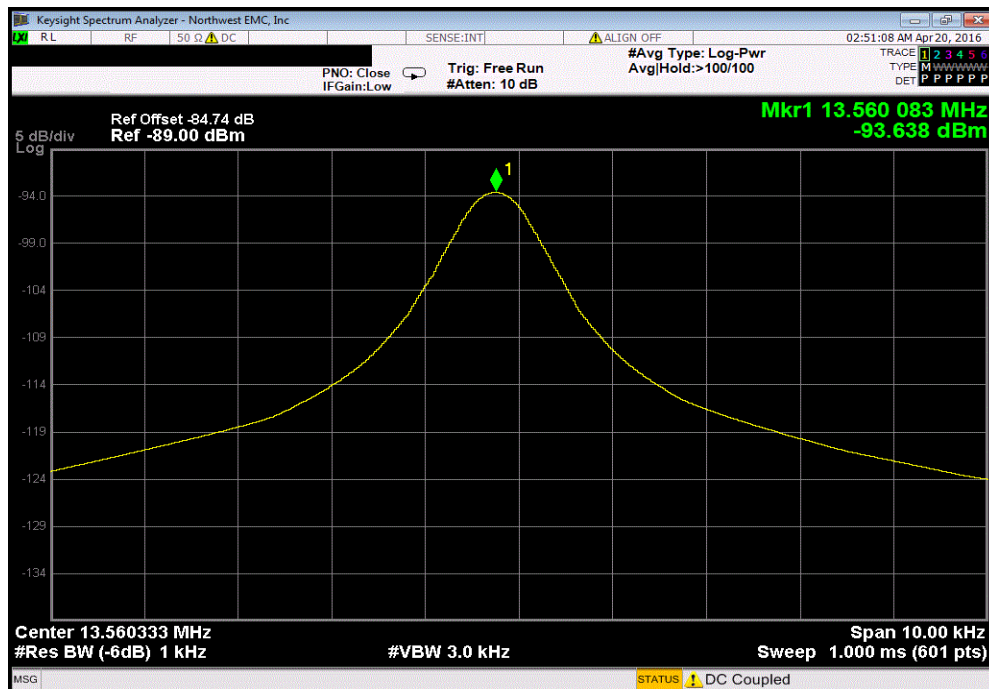


FREQUENCY STABILITY

| RFID, 13.56 MHz, Temperature: +20° | | | | | |
|------------------------------------|----------------------|----------------------|-------------|-------------|---------|
| | Measured Value (MHz) | Assigned Value (MHz) | Error (ppm) | Limit (ppm) | Results |
| | 13.56010067 | 13.56 | 7.4 | 100 | Pass |

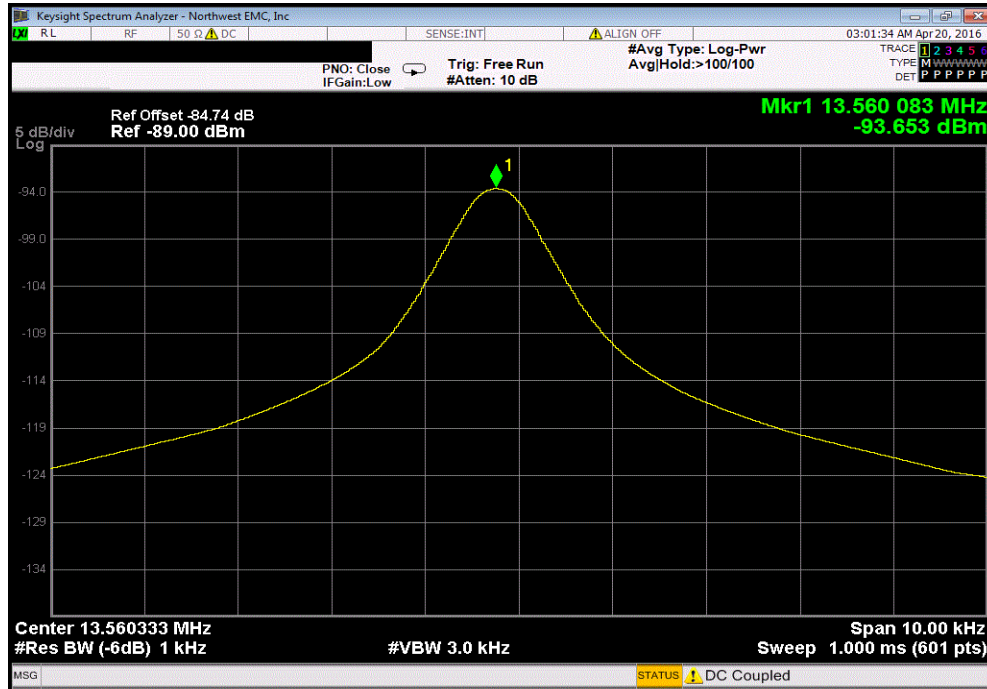


| RFID, 13.56 MHz, Temperature: +10° | | | | | |
|------------------------------------|----------------------|----------------------|-------------|-------------|---------|
| | Measured Value (MHz) | Assigned Value (MHz) | Error (ppm) | Limit (ppm) | Results |
| | 13.560083 | 13.56 | 6.1 | 100 | Pass |

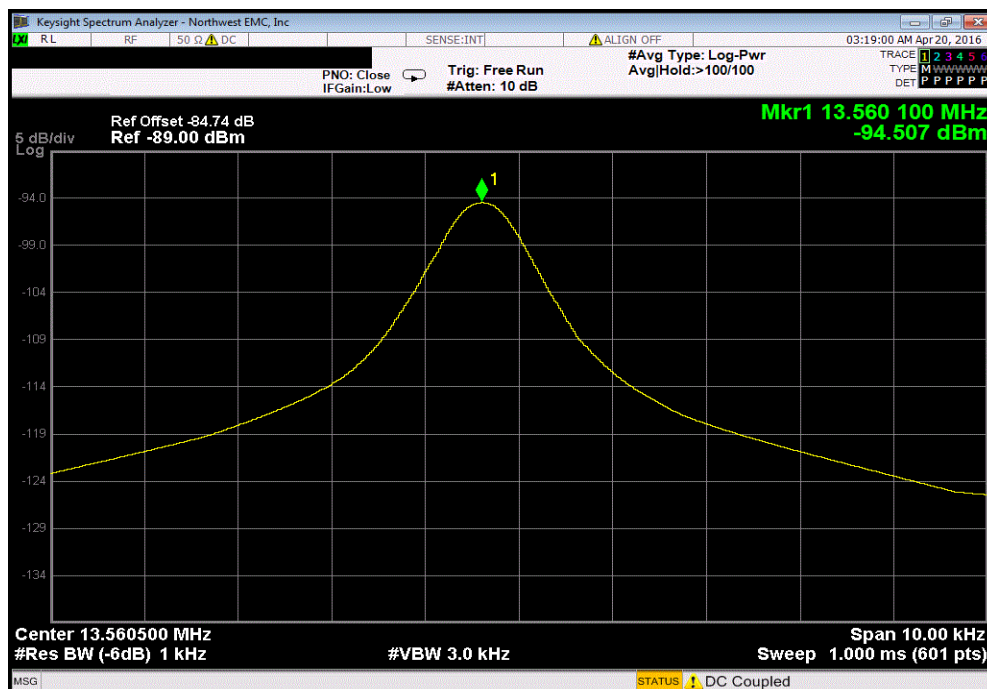


FREQUENCY STABILITY

| RFID, 13.56 MHz, Temperature: 0° | | | | | | |
|----------------------------------|----------------------|----------------------|-------------|-------------|---------|--|
| | Measured Value (MHz) | Assigned Value (MHz) | Error (ppm) | Limit (ppm) | Results | |
| | 13.560083 | 13.56 | 6.1 | 100 | Pass | |

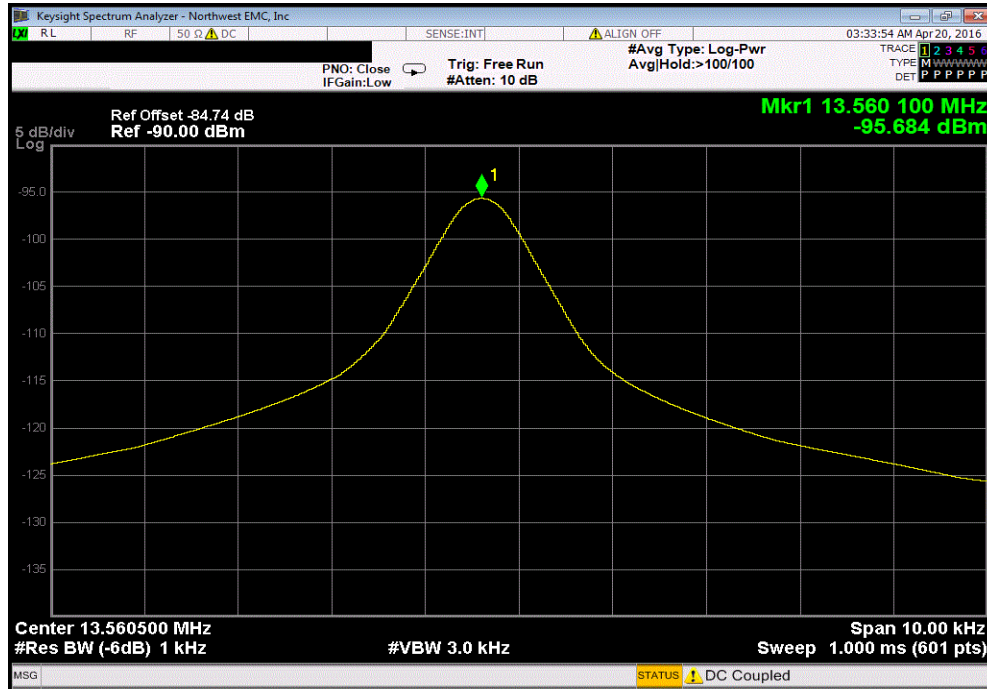


| RFID, 13.56 MHz, Temperature: -10° | | | | | | |
|------------------------------------|----------------------|----------------------|-------------|-------------|---------|--|
| | Measured Value (MHz) | Assigned Value (MHz) | Error (ppm) | Limit (ppm) | Results | |
| | 13.5601 | 13.56 | 7.4 | 100 | Pass | |

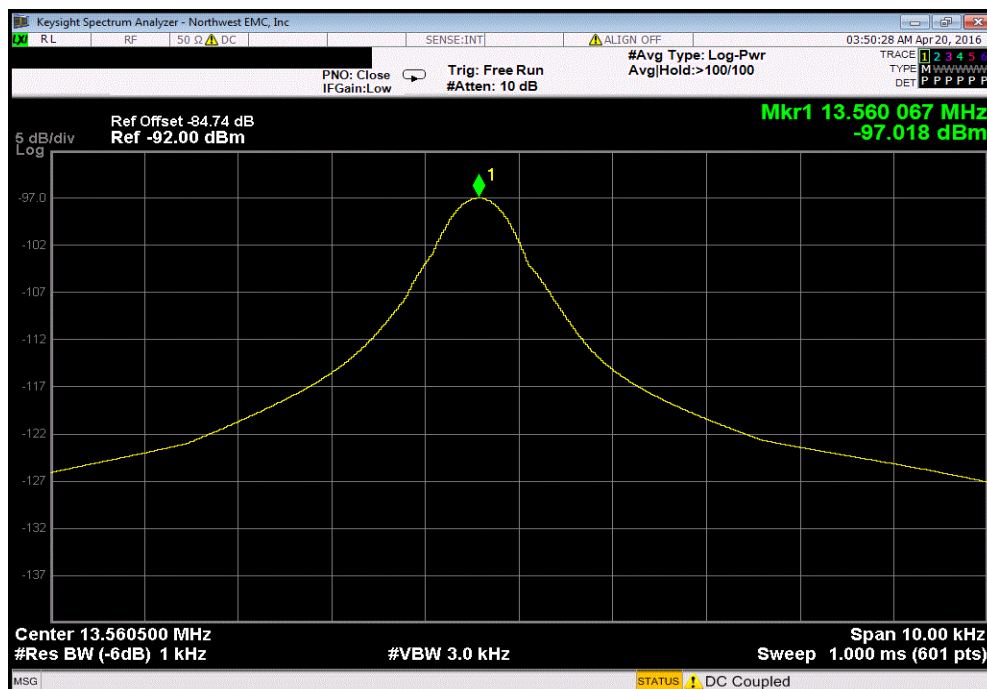


FREQUENCY STABILITY

| RFID, 13.56 MHz, Temperature: -20° | | | | | | |
|------------------------------------|----------------------|----------------------|-------------|-------------|---------|--|
| | Measured Value (MHz) | Assigned Value (MHz) | Error (ppm) | Limit (ppm) | Results | |
| | 13.5601 | 13.56 | 7.4 | 100 | Pass | |



| RFID, 13.56 MHz, Temperature: -30° | | | | | | |
|------------------------------------|----------------------|----------------------|-------------|-------------|---------|--|
| | Measured Value (MHz) | Assigned Value (MHz) | Error (ppm) | Limit (ppm) | Results | |
| | 13.56006667 | 13.56 | 4.9 | 100 | Pass | |



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

On Transmitting at 13.56 MHz, RFID

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

ONIT0017 - 1

FREQUENCY RANGE INVESTIGATED

| | | | |
|-----------------|--------|----------------|--------|
| Start Frequency | 12 MHz | Stop Frequency | 15 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 (mo) |
|------------------------------|--------------|-------------------------|-----|-----------|---------------|
| Cable | None | 10m Test Distance Cable | EVL | 5/11/2015 | 12 |
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFP | 2/13/2016 | 12 |
| Antenna | EMCO | 6502 | AOA | 6/24/2014 | 24 |

TEST DESCRIPTION

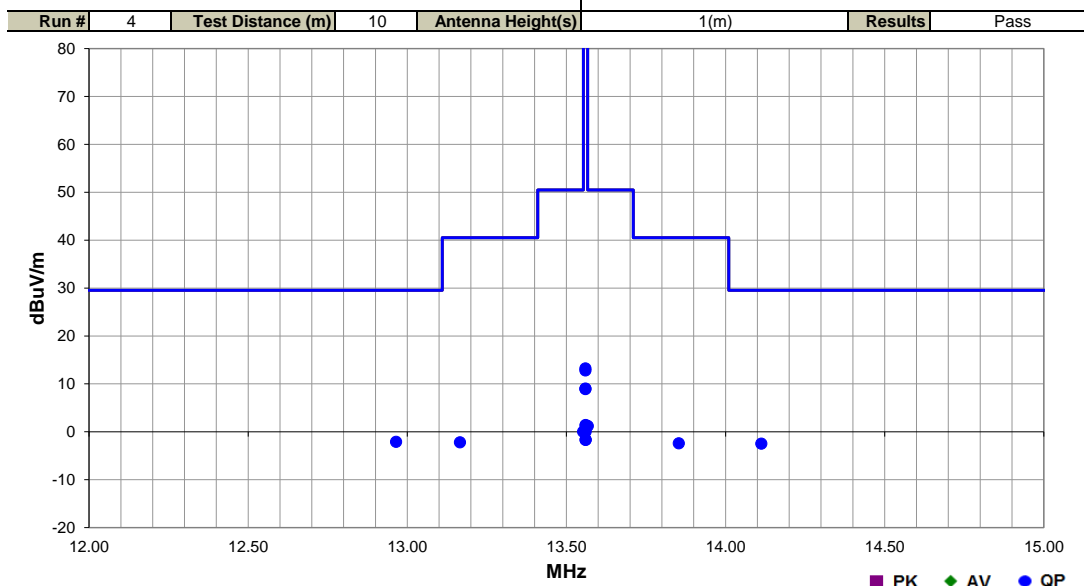
The antennas to be used with the EUT were tested. The EUT was continuously transmitting while set to the channel specified.

While scanning, fundamental carrier from the EUT was maximized by rotating the EUT, adjusting the measurement antenna height and orientation in 3 orthogonal planes, the EUT and/or associated antenna is positioned in 3 orthogonal planes (per ANSI C63.10). An active loop antenna was used for this test in order to provide sufficient measurement sensitivity.

As outlined in 15.209(e) and 15.31(f)(2), measurements may be performed at a distance closer than what is specified with the limit. The limit at the specified distance is shown on the data sheet. Measurements are made at a closer distance and the data is adjusted using a distance correction factor of 40dB/decade for comparison to the limit.

| | | | | |
|--|----------|-------------------|-----------|--|
| Work Order: | ONIT0017 | Date: | 04/18/16 |  |
| Project: | None | Temperature: | 21.9 °C | |
| Job Site: | EV11 | Humidity: | 42.8% RH | |
| Serial Number: | 100176 | Barometric Pres.: | 1021 mbar | |
| EUT: HTRFID Lock | | | | |
| Configuration: 1 | | | | |
| Customer: Onity Inc., A Division of UTCFS | | | | |
| Attendees: None | | | | |
| EUT Power: Battery | | | | |
| Operating Mode: On Transmitting at 13.56 MHz, RFID | | | | |
| Deviations: None | | | | |
| Comments: Please see data comments for EUT orientation, and antenna position | | | | |

| Test Specifications | Test Method |
|---------------------|------------------|
| FCC 15.225:2016 | ANSI C63.10:2013 |



| 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 |
|------------|------------------|-------------|-------------------------|-------------------|------------------------|---------------------------|---------------------------|----------|--------------------------|-------------------|----------------------|------------------------|--|
| 12.965 | 6.2 | 10.8 | 1.0 | 300.0 | 10.0 | 0.0 | See Comments | QP | -19.1 | -2.1 | 29.5 | -31.6 | Ant perp to GND, Ant perp to EUT, EUT On Side |
| 14.112 | 5.8 | 10.8 | 1.0 | 138.0 | 10.0 | 0.0 | See Comments | QP | -19.1 | -2.5 | 29.5 | -32.0 | Ant perp to GND, Ant perp to EUT, EUT On Side |
| 13.165 | 6.1 | 10.8 | 1.0 | 246.0 | 10.0 | 0.0 | See Comments | QP | -19.1 | -2.2 | 40.5 | -42.7 | Ant perp to GND, Ant perp to EUT, EUT On Side |
| 13.853 | 5.9 | 10.8 | 1.0 | 275.0 | 10.0 | 0.0 | See Comments | QP | -19.1 | -2.4 | 40.5 | -42.9 | Ant perp to GND, Ant perp to EUT, EUT On Side |
| 13.567 | 9.5 | 10.8 | 1.0 | 106.0 | 10.0 | 0.0 | See Comments | QP | -19.1 | 1.2 | 50.5 | -49.3 | Ant perp to GND, Ant perp to EUT, EUT On Side |
| 13.553 | 8.3 | 10.8 | 1.0 | 94.0 | 10.0 | 0.0 | See Comments | QP | -19.1 | 0.0 | 50.5 | -50.5 | Ant perp to GND, Ant perp to EUT, EUT On Side |
| 13.560 | 21.5 | 10.8 | 1.0 | 109.0 | 10.0 | 0.0 | See Comments | QP | -19.1 | 13.2 | 84.0 | -70.8 | Ant perp to GND, Ant perp to EUT, EUT On Side |
| 13.560 | 21.1 | 10.8 | 1.0 | 120.0 | 10.0 | 0.0 | See Comments | QP | -19.1 | 12.8 | 84.0 | -71.2 | Ant perp to GND, Ant perp to EUT, EUT Vertical |
| 13.560 | 17.3 | 10.8 | 1.0 | 47.0 | 10.0 | 0.0 | See Comments | QP | -19.1 | 9.0 | 84.0 | -75.0 | Ant perp to GND, Ant para to EUT, EUT On Side |
| 13.560 | 17.2 | 10.8 | 1.0 | 40.0 | 10.0 | 0.0 | See Comments | QP | -19.1 | 8.9 | 84.0 | -75.1 | Ant perp to GND, Ant para to EUT, EUT Vertical |
| 13.560 | 9.7 | 10.8 | 1.0 | 325.0 | 10.0 | 0.0 | See Comments | QP | -19.1 | 1.4 | 84.0 | -82.6 | Ant para to GND, Ant perp to EUT, EUT Vertical |
| 13.560 | 9.6 | 10.8 | 1.0 | 351.0 | 10.0 | 0.0 | See Comments | QP | -19.1 | 1.3 | 84.0 | -82.7 | Ant para to GND, Ant perp to EUT, EUT On Side |
| 13.560 | 8.3 | 10.8 | 1.0 | 143.0 | 10.0 | 0.0 | See Comments | QP | -19.1 | 0.0 | 84.0 | -84.0 | Ant perp to GND, Ant para to EUT, EUT Horizontal |
| 13.560 | 6.6 | 10.8 | 1.0 | 177.0 | 10.0 | 0.0 | See Comments | QP | -19.1 | -1.7 | 84.0 | -85.7 | Ant perp to GND, Ant perp to EUT, EUT Horizontal |
| 13.560 | 6.6 | 10.8 | 1.0 | 151.0 | 10.0 | 0.0 | See Comments | QP | -19.1 | -1.7 | 84.0 | -85.7 | Ant para to GND, Ant perp to EUT, EUT Horizontal |

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

On Transmitting at 13.56 MHz, RFID

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

ONIT0017 - 1

FREQUENCY RANGE INVESTIGATED

| | | | |
|-----------------|--------|----------------|--------|
| Start Frequency | 10 kHz | Stop Frequency | 30 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 (mo) |
|------------------------------|--------------|------------------------|-----|-----------|---------------|
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFP | 2/13/2016 | 12 |
| Antenna | EMCO | 6502 | AOA | 6/24/2014 | 24 |
| Cable | None | 3m Test Distance Cable | EVM | 5/11/2015 | 12 |

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was continuously transmitting while set to the channel specified.

While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and orientation in 3 orthogonal planes, the EUT and/or associated antenna is positioned in 3 orthogonal planes (per ANSI C63.10). An active loop antenna was used for this test in order to provide sufficient measurement sensitivity.

As outlined in 15.209(e) and 15.31(f)(2), measurements may be performed at a distance closer than what is specified with the limit. The limit at the specified distance is shown on the data sheet. Measurements are made at a closer distance and the data is adjusted using a distance correction factor of 40dB/decade for comparison to the limit.



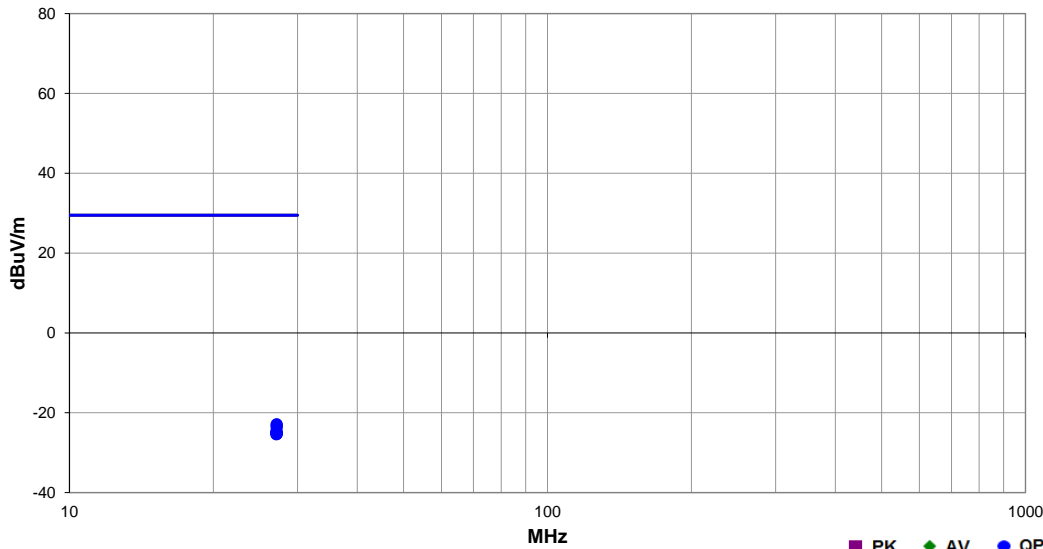
FIELD STRENGTH OF SPURIOUS EMISSIONS < 30MHz

PSA-ESCI 2016.03.11
EmiR5 2016.03.11

| | | | | |
|--------------------------|--|-------------------|-----------|--|
| Work Order: | ONIT0017 | Date: | 04/18/16 | |
| Project: | None | Temperature: | 21.9 °C | |
| Job Site: | EV11 | Humidity: | 42.8% RH | |
| Serial Number: | 100176 | Barometric Pres.: | 1021 mbar | |
| Tested by: Brandon Hobbs | | | | |
| EUT: | HTRFID Lock | | | |
| Configuration: | 1 | | | |
| Customer: | Onity Inc., A Division of UTCFS | | | |
| Attendees: | None | | | |
| EUT Power: | Battery | | | |
| Operating Mode: | On Transmitting at 13.56 MHz, RFID | | | |
| Deviations: | None | | | |
| Comments: | Please see data comments for EUT orientation, and antenna position | | | |

| Test Specifications | Test Method |
|---------------------|------------------|
| FCC 15.225:2016 | ANSI C63.10:2013 |

| Run # | 7 | 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 |
|------------|------------------|-------------|-------------------------|-------------------|------------------------|---------------------------|---------------------------|----------|--------------------------|-------------------|----------------------|------------------------|--|
| 27.121 | 7.9 | 9.2 | 1.0 | 81.0 | 3.0 | 0.0 | See Comments | QP | -40.0 | -22.9 | 29.5 | -52.4 | Ant perp to GND, Ant perp to EUT, EUT Horizontal |
| 27.121 | 7.6 | 9.2 | 1.0 | 87.0 | 3.0 | 0.0 | See Comments | QP | -40.0 | -23.2 | 29.5 | -52.7 | Ant para to GND, Ant perp to EUT, EUT Horizontal |
| 27.121 | 7.1 | 9.2 | 1.0 | 316.0 | 3.0 | 0.0 | See Comments | QP | -40.0 | -23.7 | 29.5 | -53.2 | Ant para to GND, Ant perp to EUT, EUT Vertical |
| 27.120 | 6.2 | 9.2 | 1.0 | 161.0 | 3.0 | 0.0 | See Comments | QP | -40.0 | -24.6 | 29.5 | -54.1 | Ant perp to GND, Ant perp to EUT, EUT Vertical |
| 27.120 | 5.9 | 9.2 | 1.0 | 258.0 | 3.0 | 0.0 | See Comments | QP | -40.0 | -24.9 | 29.5 | -54.4 | Ant para to GND, Ant perp to EUT, EUT On Side |
| 27.119 | 5.7 | 9.2 | 1.0 | 133.0 | 3.0 | 0.0 | See Comments | QP | -40.0 | -25.1 | 29.5 | -54.6 | Ant perp to GND, Ant perp to EUT, EUT On Side |
| 27.120 | 5.7 | 9.2 | 1.0 | 59.0 | 3.0 | 0.0 | See Comments | QP | -40.0 | -25.1 | 29.5 | -54.6 | Ant perp to GND, Ant para to EUT, EUT Vertical |
| 27.152 | 5.5 | 9.2 | 1.0 | 58.0 | 3.0 | 0.0 | See Comments | QP | -40.0 | -25.3 | 29.5 | -54.8 | Ant perp to GND, Ant para to EUT, EUT On Side |
| 27.091 | 5.4 | 9.2 | 1.0 | 239.0 | 3.0 | 0.0 | See Comments | QP | -40.0 | -25.4 | 29.5 | -54.9 | Ant perp to GND, Ant para to EUT, EUT Horizontal |

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

On Transmitting at 13.56 MHz, RFID

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

ONIT0017 - 1

FREQUENCY RANGE INVESTIGATED

| | | | |
|-----------------|--------|----------------|----------|
| Start Frequency | 30 MHz | Stop Frequency | 1000 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 (mo) |
|------------------------------|--------------|------------------------|-----|-----------|---------------|
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFP | 2/13/2016 | 12 |
| Cable | None | 3m Test Distance Cable | EVM | 5/11/2015 | 12 |
| Amplifier - Pre-Amplifier | Miteq | AM-1616-1000 | AOL | 3/11/2016 | 12 |
| Antenna - Biconilog | EMCO | 3141 | AXL | NCR | 0 |

TEST DESCRIPTION

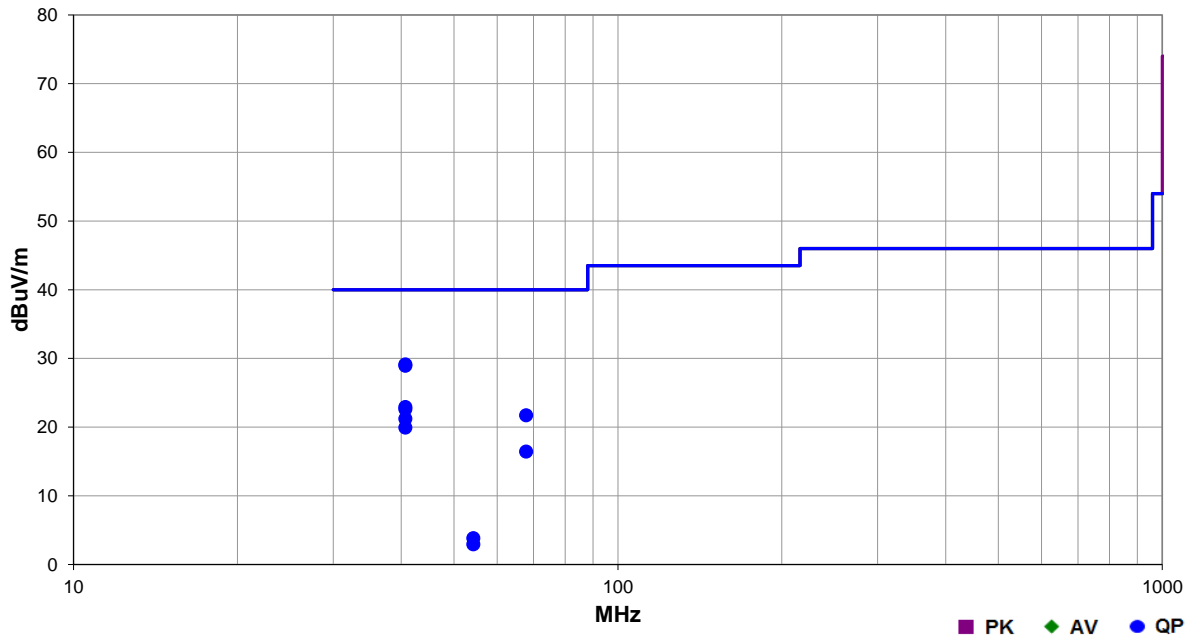
The antennas to be used with the EUT were tested. The EUT was transmitting while set at the operating channel.

While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.10:2009).

| | | | | |
|-----------------|--|-------------------|-----------|--|
| Work Order: | ONIT0017 | Date: | 04/18/16 |  |
| Project: | None | Temperature: | 21.9 °C | |
| Job Site: | EV11 | Humidity: | 42.8% RH | |
| Serial Number: | 100176 | Barometric Pres.: | 1021 mbar | |
| EUT: | HTRFID Lock | | | |
| Configuration: | 1 | | | |
| Customer: | Onity Inc., A Division of UTCFS | | | |
| Attendees: | None | | | |
| EUT Power: | Battery | | | |
| Operating Mode: | On Transmitting at 13.56 MHz, RFID | | | |
| Deviations: | None | | | |
| Comments: | Please see data comments for EUT orientation | | | |

| Test Specifications | Test Method |
|---------------------|------------------|
| FCC 15.225:2016 | ANSI C63.10:2013 |

| Run # | 8 | 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 |
|------------|------------------|-------------|-------------------------|-------------------|------------------------|---------------------------|---------------------------|----------|--------------------------|-------------------|----------------------|------------------------|-------------|
| 40.685 | 55.2 | -26.1 | 1.0 | 272.0 | 3.0 | 0.0 | Vert | QP | 0.0 | 29.1 | 40.0 | -10.9 | EUT Vert |
| 40.683 | 55.0 | -26.1 | 1.0 | 106.0 | 3.0 | 0.0 | Vert | QP | 0.0 | 28.9 | 40.0 | -11.1 | EUT On Side |
| 40.683 | 49.0 | -26.1 | 4.0 | -5.0 | 3.0 | 0.0 | Horz | QP | 0.0 | 22.9 | 40.0 | -17.1 | EUT Vert |
| 40.682 | 48.7 | -26.1 | 3.9 | 180.0 | 3.0 | 0.0 | Horz | QP | 0.0 | 22.6 | 40.0 | -17.4 | EUT On Side |
| 67.802 | 52.8 | -31.1 | 1.0 | 261.0 | 3.0 | 0.0 | Vert | QP | 0.0 | 21.7 | 40.0 | -18.3 | EUT Vert |
| 40.682 | 47.3 | -26.1 | 2.7 | 192.0 | 3.0 | 0.0 | Horz | QP | 0.0 | 21.2 | 40.0 | -18.8 | EUT Horz |
| 40.682 | 46.0 | -26.1 | 1.0 | 131.0 | 3.0 | 0.0 | Vert | QP | 0.0 | 19.9 | 40.0 | -20.1 | EUT Horz |
| 67.803 | 47.5 | -31.1 | 2.7 | 159.0 | 3.0 | 0.0 | Horz | QP | 0.0 | 16.4 | 40.0 | -23.6 | EUT Vert |
| 54.248 | 33.9 | -30.1 | 3.8 | 298.0 | 3.0 | 0.0 | Horz | QP | 0.0 | 3.8 | 40.0 | -36.2 | EUT Vert |
| 54.247 | 33.0 | -30.1 | 3.1 | 258.0 | 3.0 | 0.0 | Vert | QP | 0.0 | 2.9 | 40.0 | -37.1 | EUT Vert |