



**Green Goose Inc.
GreenGoose Sensor**

Report #: PTEN0008



Report Prepared By Northwest EMC Inc.

NORTHWEST EMC – (888) 364-2378 – www.nwemc.com

California – Minnesota – Oregon – New York – Washington



22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Last Date of Test: February 8, 2012

Green Goose, Inc.

Model: GreenGoose Sensor

Emissions

| Test Description | Specification | Test Method | Pass/Fail |
|------------------------------|-----------------|------------------|-----------|
| Occupied Bandwidth | FCC 15.247:2011 | ANSI C63.10:2009 | Pass |
| Output Power | FCC 15.247:2011 | ANSI C63.10:2009 | Pass |
| Band Edge Compliance | FCC 15.247:2011 | ANSI C63.10:2009 | Pass |
| Spurious Conducted Emissions | FCC 15.247:2011 | ANSI C63.10:2009 | Pass |
| Power Spectral Density | FCC 15.247:2011 | ANSI C63.10:2009 | Pass |
| Spurious Radiated Emissions | FCC 15.247:2011 | ANSI C63.10:2009 | Pass |

Deviations From Test Standards

None

Approved By:

Tim O'Shea, Operations Manager



NVLAP Lab Code: 200630-0

Test Facility

The measurement facility used to collect the data is located at:

Northwest EMC, Inc.
22975 NW Evergreen Parkway, Suite 400
Hillsboro, OR 97124

Phone: (503) 844-4066 Fax: 844-3826

This site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada (Site filing #2834D-1)

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.

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. This Report may only be duplicated in its entirety. 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.



Revision History

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

FCC

Accredited by NVLAP for performance of FCC radio, digital, and ISM device testing. Our Open Area Test Sites, certification chambers, and conducted measurement facilities have been fully described in reports filed with the FCC and accepted by the FCC in letters maintained in our files. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by the FCC as a Telecommunications Certification Body (TCB). This allows Northwest EMC to certify transmitters to FCC specifications in accordance with 47 CFR 2.960 and 2.962.

NVLAP

Northwest EMC, Inc. is accredited under the National Voluntary Laboratory Accreditation Program (NVLAP) for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. NVLAP is administered by the National Institute of Standards and Technology (NIST), an agency of the U.S. Commerce Department. The NVLAP accreditation encompasses Electromagnetic Compatibility Testing in accordance with the European Union EMC Directive 2004/108/EC, and ANSI C63.4. Additionally, Northwest EMC is accredited by NVLAP to perform radio testing in accordance with the European Union R&TTE Directive 1999/5/EEC, the requirements of FCC, and the RSS radio standards for Industry Canada.

Industry Canada

Accredited by NVLAP for performance of Industry Canada RSS and ICES testing. Our Open Area Test Sites and certification chambers comply with RSS-Gen, Issue 2 and have been filed with Industry Canada and accepted. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by NIST and recognized by Industry Canada as a Certification Body (CB) per the APEC Mutual Recognition Arrangement (MRA). This allows Northwest EMC to certify transmitters to Industry Canada technical requirements. (*Site Filing Numbers - Hillsboro: 2834D-1, 2834D-2, Sultan: 2834C-1, Irvine: 2834B-1, 2834B-2, Brooklyn Park: 2834E-1*)

CAB

Designated by NIST and validated by the European Commission as a Conformity Assessment Body (CAB) to conduct tests and approve products to the EMC directive and transmitters to the R&TTE directive, as described in the U.S. - EU Mutual Recognition Agreement.

Australia/New Zealand

The National Association of Testing Authorities (NATA), Australia has been appointed by the ACA as an accreditation body to accredit test laboratories and competent bodies for EMC standards. Accredited test reports or assessments by competent bodies must carry the NATA logo. Test reports made by an overseas laboratory that has been accredited for the relevant standards by an overseas accreditation body that has a Mutual Recognition Agreement (MRA) with NATA are also accepted as technical grounds for product conformity. The report should be endorsed with the respective logo of the accreditation body (NVLAP).

VCCI

Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. (*Registration Numbers.* - Hillsboro: C-1071, R-1025, G-84, C-2687, T-1658, and R-2318, Irvine: R-1943, G-85, C-2766, and T-1659, Sultan: R-871, G-83, C-3265, and T-1511, Brooklyn Park: R-3125, G-86, G-141, C-3464, and T-1634).

BSMI

Northwest EMC has been designated by NIST and validated by C-Taipei (BSMI) as a CAB to conduct tests as described in the APEC Mutual Recognition Agreement (US0017).

GOST

Northwest EMC, Inc. has been assessed and accredited by the Russian Certification bodies Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC, to perform EMC and Hygienic testing for Information Technology Products. As a result of their laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification

KCC

Northwest EMC, Inc is a CAB designated by MRA partners and recognized by Korea. (*Assigned Lab Numbers:* Hillsboro: US0017, Irvine: US0158, Sultan: US0157, Brooklyn Park: US0175)

VIETNAM

Vietnam MIC has approved Northwest EMC as an accredited test lab. Per Decision No. 194/QD-QLCL (dated December 15, 2009), Northwest EMC test reports can be used for Vietnam approval submissions.

SCOPE

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

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



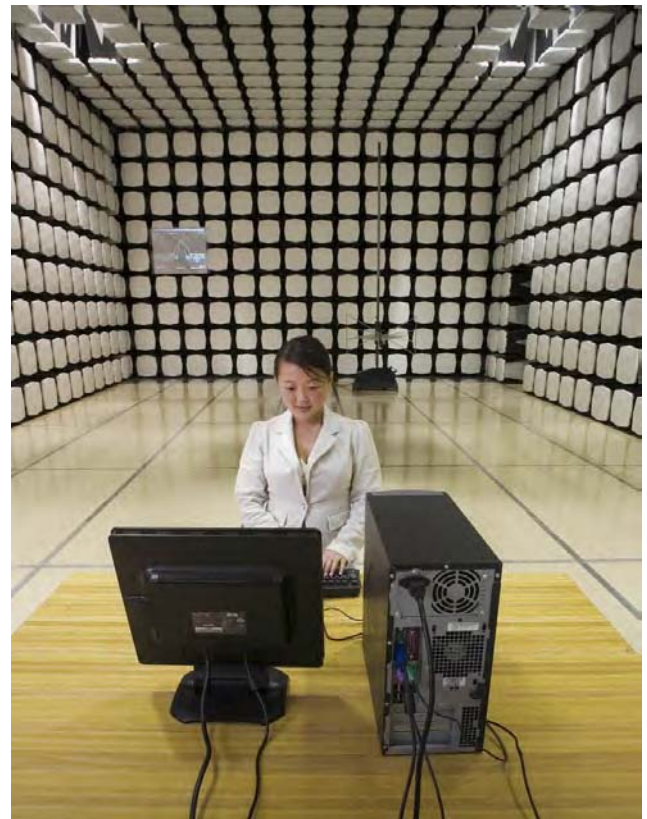
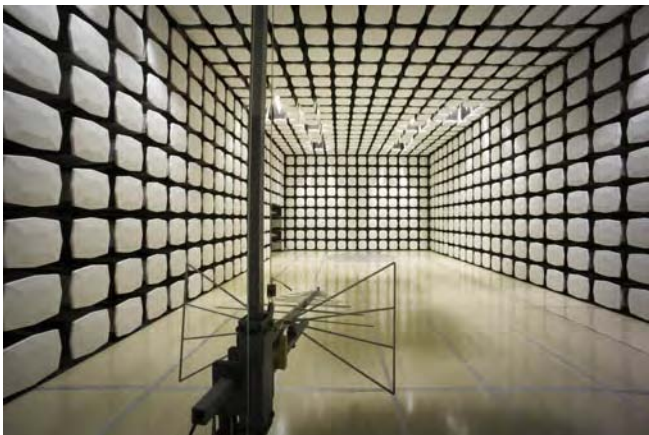
Oregon
Labs EV01-EV12
22975 NW Evergreen Pkwy
Suite 400
Hillsboro, OR 97124
(503) 844-4066

California
Labs OC01-OC13
41 Tesla
Irvine, CA 92618
(949) 861-8918

Minnesota
Labs MN01-MN08
9349 W Broadway Ave.
Brooklyn Park,
MN 55445
(763) 425-2281

Washington
Labs SU01-SU07
14128 339th Ave. SE
Sultan, WA 98294
(360) 793-8675

New York
Labs WA01-WA04
4939 Jordan Rd.
Elbridge, NY 13060
(315) 685-0796





Product Description

Client and Equipment Under Test (EUT) Information

| | |
|---------------------------------|--|
| Company Name: | Green Goose, Inc. |
| Address: | 153 Townsend St. 9 th Floor |
| City, State, Zip: | San Francisco, CA 94107 |
| Test Requested By: | Ward Ramsdell – Prototype Engineering, LLC |
| Model: | GreenGoose Sensor |
| First Date of Test: | December 19, 2011 |
| Last Date of Test: | February 8, 2012 |
| Receipt Date of Samples: | December 19, 2011 |
| Equipment Design Stage: | Preproduction |
| Equipment Condition: | No Damage |

Information Provided by the Party Requesting the Test

| |
|--|
| Functional Description of the EUT (Equipment Under Test): |
| Wireless Sensor |
| Testing Objective: |
| To demonstrate compliance to FCC 15.247 requirements |



Configurations

Configuration 1 PTEN0008

| EUT | | | |
|-----------------|-------------------|-------------------|---------------|
| Description | Manufacturer | Model/Part Number | Serial Number |
| Wireless Sensor | Green Goose, Inc. | Green Goose | FCC1 |

Configuration 3 PTEN0008

| EUT | | | |
|-----------------|-------------------|-------------------|---------------|
| Description | Manufacturer | Model/Part Number | Serial Number |
| Wireless Sensor | Green Goose, Inc. | Green Goose | FCC3 |



Equipment Modifications

| Item | Date | Test | Modification | Note | Disposition of EUT |
|------|------------|------------------------------|--------------------------------------|---|---|
| 1 | 12/19/2011 | Spurious 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 | 12/20/2011 | Band Edge Compliance | 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 | 12/20/2011 | Output Power | 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 | 12/20/2011 | Power Spectral Density | 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. |
| 5 | 12/20/2011 | Spurious Conducted 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. |
| 6 | 2/8/2012 | Occupied Bandwidth | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | Scheduled testing was completed |

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 |
| Spectrum Analyzer | AT | E4446A;B | R049 | 1/31/2012 | 24 |
| MXG Vector Signal Generator | Agilent | N5182A | TIF | NCR | 0 |
| Attenuator 20 dB, SMA M/F 26GHz | S.M. Electronics | SA26B-20 | AUY | 8/2/2011 | 12 |
| EV06 Direct Connect Cable | ESM Cable Corp. | TT | ECA | NCR | 0 |
| 40GHz DC Block | Miteq | DCB4000 | AMD | 8/12/2011 | 12 |

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

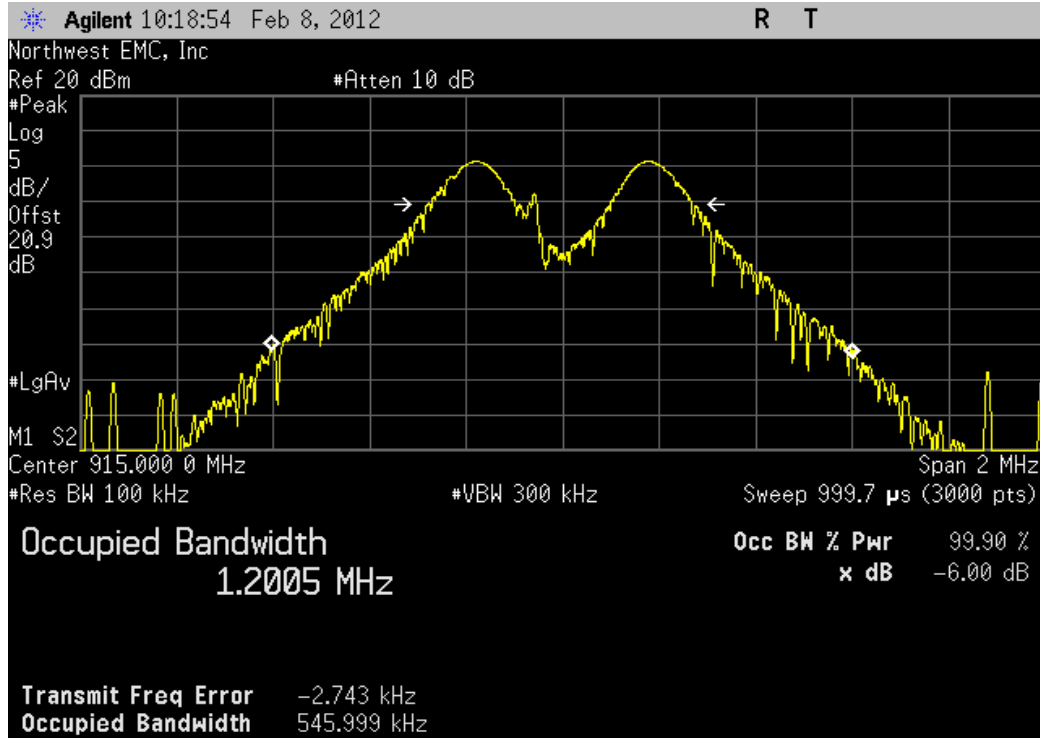
TEST DESCRIPTION

The occupied bandwidth was measured with the EUT set at the only transmit frequency. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate with the typical modulation.

| | | | | | | | |
|-------------------------------|--|-------------------|---|--------------------|-------------------|-------------------------------------|----------|
| NORTHWEST | | EMC | | Occupied Bandwidth | | XMit 2011.10.26 PsaTx 2011.09.28 | |
| EUT: | | GreenGoose Sensor | | | Work Order: | | PTEN0008 |
| Serial Number: | | FCC3 | | | Date: | | 02/08/11 |
| Customer: | | Green Goose Inc. | | | Temperature: | | 22.2°C |
| Attendees: | | none | | | Humidity: | | 36% |
| Project: | | None | | | Barometric Pres.: | | 1019 |
| Tested by: | | Ethan Schoonover | Power: | Battery | Job Site: | | EV01 |
| TEST SPECIFICATIONS | | | | Test Method | | | |
| FCC 15.247:2011 | | | | ANSI C63.10:2009 | | | |
| COMMENTS | | | | | | | |
| None | | | | | | | |
| DEVIATIONS FROM TEST STANDARD | | | | | | | |
| None | | | | | | | |
| Configuration # | | 3 | Signature  | | | | |
| | | | | Value | Limit | Result | |
| Mid Channel | | | | 546 kHz | > 500 kHz | Pass | |

Mid Channel

| Value | Limit | Result |
|---------|-----------|--------|
| 546 kHz | > 500 kHz | 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.

| TEST EQUIPMENT | | | | | |
|---------------------------------|------------------|----------|-----|-----------|----------|
| Description | Manufacturer | Model | ID | Last Cal. | Interval |
| MXG Vector Signal Generator | Agilent | N5182A | TIF | NCR | 0 |
| Attenuator 20 dB, SMA M/F 26GHz | S.M. Electronics | SA26B-20 | AUY | 8/2/2011 | 12 |
| EV06 Direct Connect Cable | ESM Cable Corp. | TT | ECA | NCR | 0 |
| 40GHz DC Block | Miteq | DCB4000 | AMD | 8/12/2011 | 12 |
| Spectrum Analyzer | Agilent | E4440A | AFD | 7/5/2011 | 12 |
| Spectrum Analyzer | Agilent | E4440A | AFD | 7/5/2011 | 12 |


MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

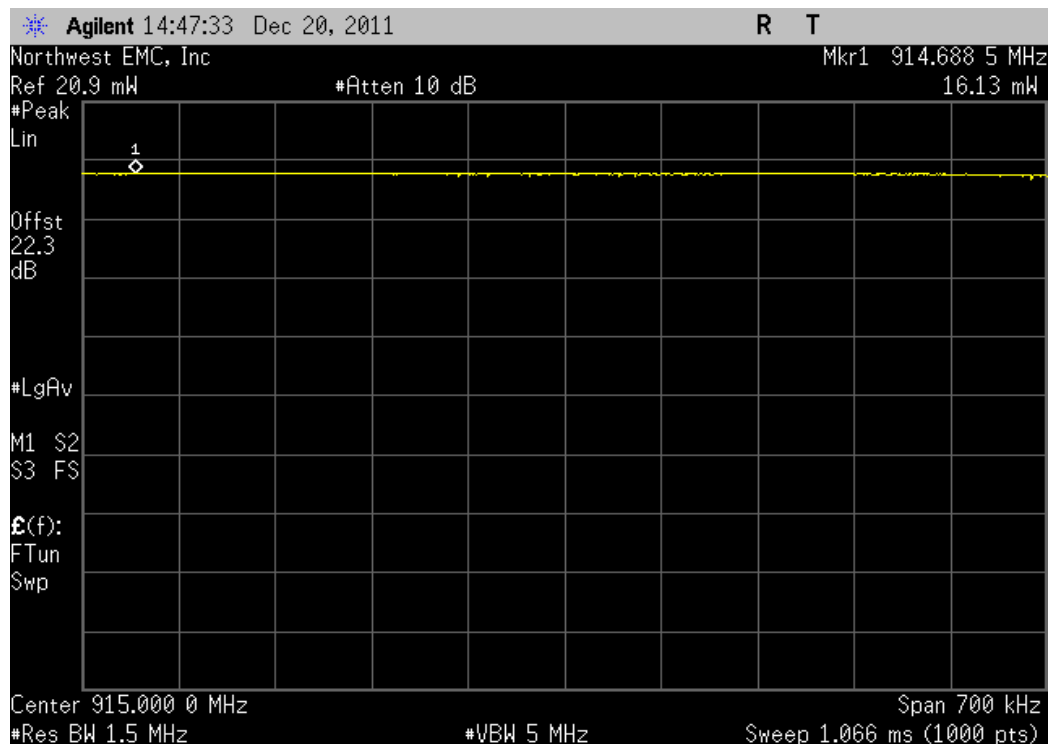
The peak output power was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode.

De Facto EIRP Limit: Per 47 CFR 15.247 (b)(1-3), the EUT meets the de facto EIRP limit of +36dBm.

| | | | |
|-------------------------------|-------------------|---|----------|
| NORTHWEST | | XMit 2011.10.26 | |
| EMC | | PsaTx 2011.09.28 | |
| Output Power | | | |
| EUT: | GreenGoose Sensor | Work Order: | PTEN0008 |
| Serial Number: | FCC3 | Date: | 12/20/11 |
| Customer: | Green Goose Inc. | Temperature: | 22.5°C |
| Attendees: | none | Humidity: | 32% |
| Project: | None | Barometric Pres.: | 1032 |
| Tested by: | Ethan Schoonover | Power: | Battery |
| | | Job Site: | EV06 |
| TEST SPECIFICATIONS | | Test Method | |
| FCC 15.247:2011 | | ANSI C63.10:2009 | |
| COMMENTS | | | |
| None | | | |
| DEVIATIONS FROM TEST STANDARD | | | |
| None | | | |
| Configuration # | 3 | Signature  | |
| | | Value | Limit |
| Mid Channel | | 16.125 mW | < 125 mW |
| | | | Pass |

Mid Channel

| | | | | Value | Limit | Result |
|--|--|--|--|-----------|----------|--------|
| | | | | 16.125 mW | < 125 mW | 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.

| TEST EQUIPMENT | | | | | |
|---------------------------------|------------------|----------|-----|-----------|----------|
| Description | Manufacturer | Model | ID | Last Cal. | Interval |
| MXG Vector Signal Generator | Agilent | N5182A | TIF | NCR | 0 |
| Attenuator 20 dB, SMA M/F 26GHz | S.M. Electronics | SA26B-20 | AUY | 8/2/2011 | 12 |
| EV06 Direct Connect Cable | ESM Cable Corp. | TT | ECA | NCR | 0 |
| 40GHz DC Block | Miteq | DCB4000 | AMD | 8/12/2011 | 12 |
| Spectrum Analyzer | Agilent | E4440A | AFD | 7/5/2011 | 12 |
| Spectrum Analyzer | Agilent | E4440A | AFD | 7/5/2011 | 12 |


MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

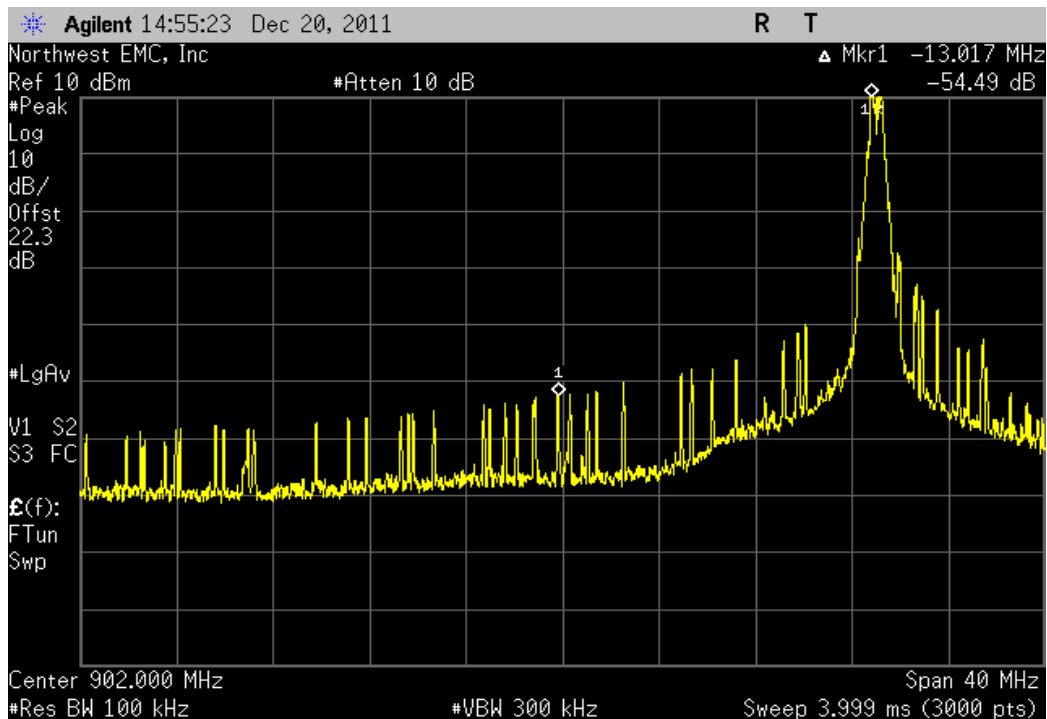
The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in each available band. The channels closest to the band edges were selected. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its only data rate available.

The spectrum was scanned across each band edge from at least 10 MHz below the band edge to 10 MHz above the band edge.

| | | | | | | | |
|------------------------|--|-----------------------------|--|----------------------------|--|---|--|
| NORTHWEST | | EMC | | Band Edge Compliance | | XMit 2011.10.26 PsaTx 2011.09.28 | |
| EUT: GreenGoose Sensor | | Serial Number: FCC3 | | Customer: Green Goose Inc. | | Attendees: none | |
| Project: None | | Tested by: Ethan Schoonover | | Power: Battery | | Work Order: PTEN0008 | |
| Date: 12/20/11 | | Temperature: 22.5°C | | Humidity: 32% | | Barometric Pres.: 1032 | |
| Job Site: EV06 | | TEST SPECIFICATIONS | | FCC 15.247:2011 | | Test Method | |
| ANSI C63.10:2009 | | COMMENTS | | None | | DEVIATIONS FROM TEST STANDARD | |
| None | | Configuration # | | 3 | | Signature  | |
| Value | | Limit | | Result | | | |
| Mid Channel | | -54.49 dBc | | ≤ -20 dBc | | Pass | |
| Mid Channel | | -53.82 dBc | | ≤ -20 dBc | | Pass | |

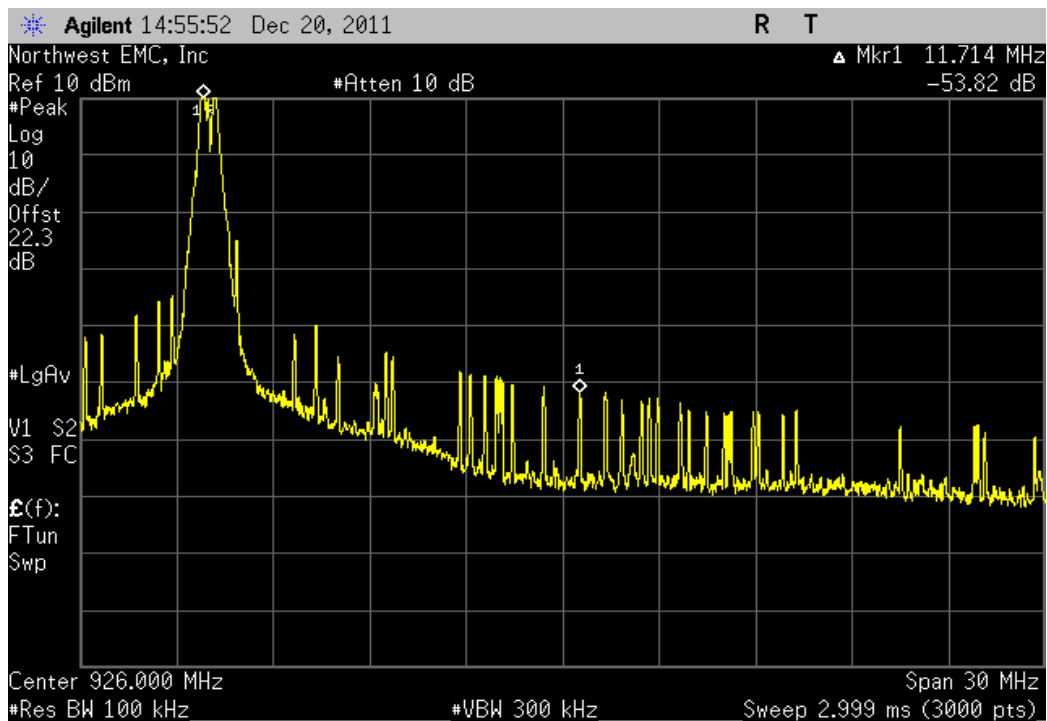
Mid Channel

| | Value | Limit | Result |
|--|------------|-----------|--------|
| | -54.49 dBc | ≤ -20 dBc | Pass |



Mid Channel

| | Value | Limit | Result |
|--|------------|-----------|--------|
| | -53.82 dBc | ≤ -20 dBc | Pass |



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| TEST EQUIPMENT | | | | | |
|---------------------------------|------------------|----------|-----|-----------|----------|
| Description | Manufacturer | Model | ID | Last Cal. | Interval |
| MXG Vector Signal Generator | Agilent | N5182A | TIF | NCR | 0 |
| Attenuator 20 dB, SMA M/F 26GHz | S.M. Electronics | SA26B-20 | AUY | 8/2/2011 | 12 |
| EV06 Direct Connect Cable | ESM Cable Corp. | TT | ECA | NCR | 0 |
| 40GHz DC Block | Miteq | DCB4000 | AMD | 8/12/2011 | 12 |
| Spectrum Analyzer | Agilent | E4440A | AFD | 7/5/2011 | 12 |
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TEST DESCRIPTION

The spurious RF conducted emissions were measured with the EUT set to low, medium, and high transmit frequencies. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate using direct sequence modulation. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.

| | | | | | | | |
|------------------------|--|-----------------------------|--|------------------------------|--|-------------------------------------|--|
| NORTHWEST | | EMC | | Spurious Conducted Emissions | | XMit 2011.10.26 PsaTx 2011.09.28 | |
| EUT: GreenGoose Sensor | | Serial Number: FCC3 | | Customer: Green Goose Inc. | | Attendees: none | |
| Project: None | | Tested by: Ethan Schoonover | | Power: Battery | | Work Order: PTEN0008 | |
| Date: 12/20/11 | | Temperature: 22.5°C | | Humidity: 32% | | Barometric Pres.: 1032 | |
| Job Site: EV06 | | TEST SPECIFICATIONS | | FCC 15.247:2011 | | Test Method | |
| ANSI C63.10:2009 | | COMMENTS | | None | | DEVIATIONS FROM TEST STANDARD | |
| None | | Configuration # | | 3 | | Signature | |
| Frequency Range | | Value | | Limit | | Result | |
| Mid Channel | | 30 MHz - 12.5 GHz | | -35.08 dBc | | ≤ -20 dBc | |
| Pass | | | | | | | |

Mid Channel

Frequency
Range

30 MHz - 12.5 GHz

Value

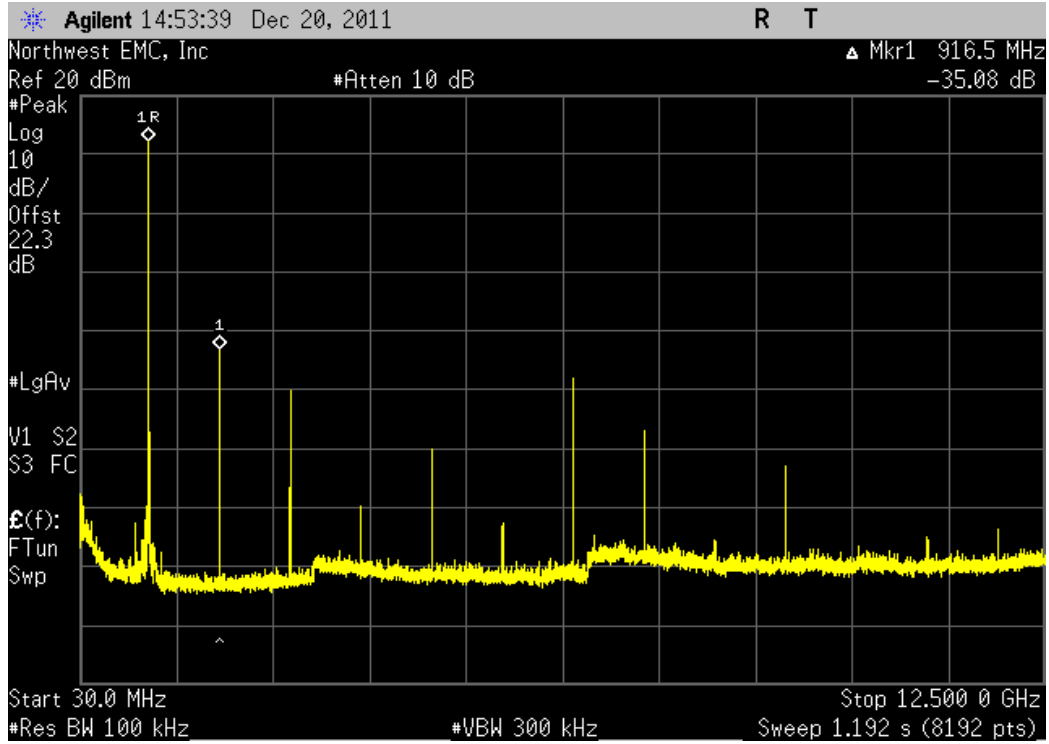
-35.08 dBc

Limit

≤ -20 dBc

Result

Pass



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| TEST EQUIPMENT | | | | | |
|---------------------------------|------------------|----------|-----|-----------|----------|
| Description | Manufacturer | Model | ID | Last Cal. | Interval |
| MXG Vector Signal Generator | Agilent | N5182A | TIF | NCR | 0 |
| Attenuator 20 dB, SMA M/F 26GHz | S.M. Electronics | SA26B-20 | AUY | 8/2/2011 | 12 |
| EV06 Direct Connect Cable | ESM Cable Corp. | TT | ECA | NCR | 0 |
| 40GHz DC Block | Miteq | DCB4000 | AMD | 8/12/2011 | 12 |
| Spectrum Analyzer | Agilent | E4440A | AFD | 7/5/2011 | 12 |
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TEST DESCRIPTION

The power spectral density measurements were measured with the EUT set to low, mid, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate for each modulation type available. Since the average output power was measured as defined in section ANSI C63.10:2009, section 6.10.2.2, the procedure outlined in section 6.11.2.4 was used. The spectrum analyzer was set as follows:

Locate and zoom in on emission peak(s) within the passband.

a) Set RBW = 3 kHz

b) Set VBW = 9 kHz

c) Set Sweep time to Automatic


d) Use a peak detector. A sample detector mode can be used only if the following conditions can be achieved with automatic sweep time and adjusting the bin width.

1) Bin width (i.e., span/number of points in spectrum display) < 0.5 RBW.

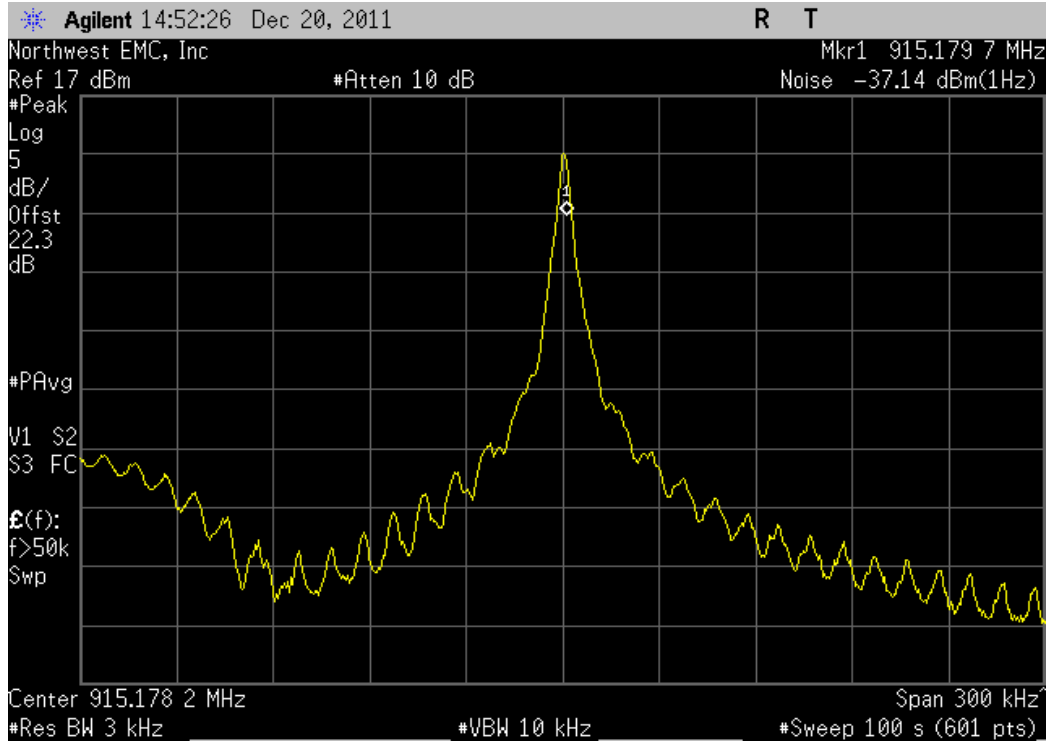
2) The transmission pulse or sequence of pulses remains at maximum transmit power throughout each of the 100 sweeps of averaging and that the interval between pulses is not included in any of the sweeps.

e) Use a video trigger (or RF gating) with the trigger level set to enable the sweep only during full power pulses. Transmitter shall operate at full control power for entire sweep of every sweep. If the device transmits continuously, with no off intervals or reduced power intervals, the trigger may be set to "free run."

f) Trace average 100 traces in power averaging mode. Do not use video averaging mode.

| | | | | | | | | | |
|-------------------------------|---|---|--|------------------|--|-------------------------------------|---------------------|---------------------|--------|
| NORTHWEST | | Power Spectral Density | | | | XMit 2011.10.26 PsaTx 2011.09.28 | | | |
| EMC | | | | | | | | | |
| EUT: GreenGoose Sensor | | Work Order: PTEN0008 | | | | | | | |
| Serial Number: FCC3 | | Date: 12/20/11 | | | | | | | |
| Customer: Green Goose Inc. | | Temperature: 22.5°C | | | | | | | |
| Attendees: none | | Humidity: 32% | | | | | | | |
| Project: None | | Barometric Pres.: 1032 | | | | | | | |
| Tested by: Ethan Schoonover | | Power: Battery | | Job Site: EV06 | | | | | |
| TEST SPECIFICATIONS | | Test Method | | | | | | | |
| FCC 15.247:2011 | | ANSI C63.10:2009 | | | | | | | |
| COMMENTS | | | | | | | | | |
| None | | | | | | | | | |
| DEVIATIONS FROM TEST STANDARD | | | | | | | | | |
| None | | | | | | | | | |
| Configuration # | 3 | Signature  | | Value (dBm / Hz) | | (dBm / Hz) To (dBm / 3 kHz) | Value (dBm / 3 kHz) | Limit (dBm / 3 kHz) | Result |
| | | | | -37.14 | | 34.8 | -2.34 | 8 | Pass |

| | | Value | Mid Channel | Value | Limit | Result |
|--|--|------------|---------------|---------------|---------------|--------|
| | | (dBm / Hz) | (dBm / Hz) To | (dBm / 3 kHz) | (dBm / 3 kHz) | |
| | | -37.14 | 34.8 | -2.34 | 8 | Pass |



SPURIOUS RADIATED 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

Transmitting single channel, +10 dBm, 2FSK spread

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

PTNE0008 - 1

FREQUENCY RANGE INVESTIGATED

| | | | |
|-----------------|--------|----------------|-----------|
| Start Frequency | 30 MHz | Stop Frequency | 12400 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 |
|----------------------|---------------|----------------------------|-----|-----------|----------|
| 5.8 GHz Notch Filter | Micro-Tronics | BRC50705 | HFQ | 7/22/2010 | 24 |
| EV01 Cables | N/A | Standard Gain Horns Cables | EVF | 3/2/2011 | 12 |
| Pre-Amplifier | Miteq | AMF-6F-08001200-30-10P | AVC | 3/2/2011 | 12 |
| Antenna, Horn | ETS | 3160-07 | AHU | NCR | 0 |
| Spectrum Analyzer | Agilent | E4446A | AAQ | 6/24/2011 | 12 |
| EV12 Cables | N/A | Conducted Cables | EVR | 7/27/2011 | 12 |
| Pre-Amplifier | Miteq | AM-1616-1000 | AOL | 6/28/2011 | 12 |
| Antenna, Biconilog | EMCO | 3142 | AXJ | 5/17/2011 | 12 |
| EV01 Cables | N/A | Double Ridge Horn Cables | EVB | 6/28/2011 | 12 |
| Pre-Amplifier | Miteq | AMF-4D-010100-24-10P | APW | 6/28/2011 | 12 |
| Antenna, Horn | ETS | 3115 | AIZ | 1/24/2011 | 24 |

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 IF bandwidths and detectors specified. No video filter was used, except in the case of the FCC Average Measurements above 1GHz. In that case, a peak detector with a 10Hz video bandwidth was used.

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. 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 axes, and adjusting measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.10:2009). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.



SPURIOUS RADIATED EMISSIONS

PSA 2011.11.16
EMI 2008.1.9

| | | | |
|----------------|----------------------------|-------------------|----------|
| EUT: | Green Goose Sensor | Work Order: | PTEN0008 |
| Serial Number: | FCC1 | Date: | 12/19/11 |
| Customer: | Green Goose Inc. | Temperature: | 24 |
| Attendees: | Ward Ramsdell, Pat Mystrom | Humidity: | 42% |
| Project: | None | Barometric Pres.: | 29.95 |
| Tested by: | Ethan Schoonover | Power: | Battery |
| | | Job Site: | EV01 |

TEST SPECIFICATIONS

FCC 15.247:2011

Test Method

ANSI C63.10:2009

TEST PARAMETERS

| | | | |
|-----------------------|-------|-------------------|---|
| Antenna Height(s) (m) | 1 - 4 | Test Distance (m) | 3 |
|-----------------------|-------|-------------------|---|

COMMENTS


None

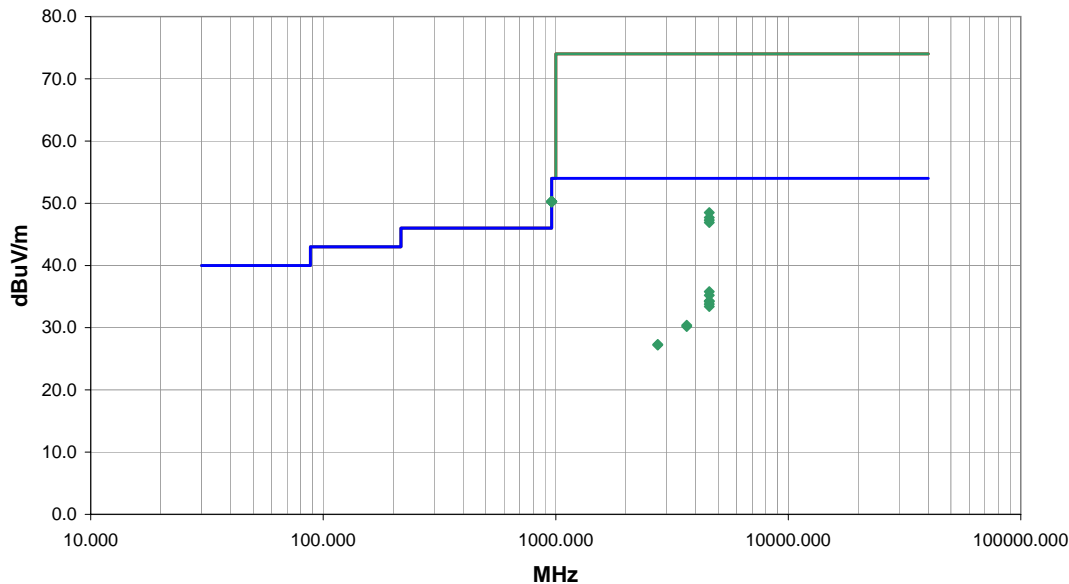
EUT OPERATING MODES

Transmitting single channel, +10 dBm, 2FSK spread

DEVIATIONS FROM TEST STANDARD

No deviations.

| | | |
|-----------------|------|---|
| Run # | 1 |  |
| Configuration # | 1 | |
| Results | Pass | |



| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Azimuth (degrees) | Height (meters) | Distance (meters) | External Attenuation (dB) | Polarity | Detector | Distance Adjustment (dB) | Adjusted dBuV/m | Spec. Limit dBuV/m | Compared to Spec. (dB) | Comments |
|------------|------------------|-------------|-------------------|-----------------|-------------------|---------------------------|----------|----------|--------------------------|-----------------|--------------------|------------------------|-------------|
| 960.277 | 17.0 | 13.3 | 188.0 | 1.0 | 3.0 | 20.0 | V-Bilog | QP | 0.0 | 50.3 | 54.0 | -3.7 | EUT Vert |
| 960.445 | 17.0 | 13.3 | 28.0 | 1.0 | 3.0 | 20.0 | V-Bilog | QP | 0.0 | 50.3 | 54.0 | -3.7 | EUT On side |
| 960.623 | 17.0 | 13.3 | -1.0 | 2.4 | 3.0 | 20.0 | H-Bilog | QP | 0.0 | 50.3 | 54.0 | -3.7 | EUT Vert |
| 961.124 | 17.0 | 13.3 | 126.0 | 1.0 | 3.0 | 20.0 | H-Bilog | QP | 0.0 | 50.3 | 54.0 | -3.7 | EUT On side |
| 960.691 | 16.9 | 13.3 | 33.0 | 1.0 | 3.0 | 20.0 | H-Bilog | QP | 0.0 | 50.2 | 54.0 | -3.8 | EUT Horz |
| 960.754 | 16.9 | 13.3 | 296.0 | 1.0 | 3.0 | 20.0 | V-Bilog | QP | 0.0 | 50.2 | 54.0 | -3.8 | EUT Horz |
| 4575.720 | 27.0 | 8.8 | 0.0 | 1.9 | 3.0 | 0.0 | H-Horn | AV | 0.0 | 35.8 | 54.0 | -18.2 | EUT Onside |
| 4576.105 | 26.4 | 8.8 | 15.0 | 1.0 | 3.0 | 0.0 | V-Horn | AV | 0.0 | 35.2 | 54.0 | -18.8 | EUT Horz |
| 4575.850 | 25.5 | 8.8 | 360.0 | 1.0 | 3.0 | 0.0 | V-Horn | AV | 0.0 | 34.3 | 54.0 | -19.7 | EUT Vert |
| 4575.915 | 25.4 | 8.8 | 131.0 | 1.9 | 3.0 | 0.0 | H-Horn | AV | 0.0 | 34.2 | 54.0 | -19.8 | EUT Horz |
| 4575.970 | 25.0 | 8.8 | 48.0 | 1.0 | 3.0 | 0.0 | V-Horn | AV | 0.0 | 33.8 | 54.0 | -20.2 | EUT Onside |
| 4575.950 | 24.6 | 8.8 | 95.0 | 1.9 | 3.0 | 0.0 | H-Horn | AV | 0.0 | 33.4 | 54.0 | -20.6 | EUT Vert |
| 3659.267 | 24.5 | 5.9 | 195.0 | 1.0 | 3.0 | 0.0 | H-Horn | AV | 0.0 | 30.4 | 54.0 | -23.6 | EUT Vert |
| 3659.575 | 24.3 | 5.9 | 175.0 | 1.5 | 3.0 | 0.0 | V-Horn | AV | 0.0 | 30.2 | 54.0 | -23.8 | EUT Vert |
| 4576.040 | 39.7 | 8.8 | 15.0 | 1.0 | 3.0 | 0.0 | V-Horn | PK | 0.0 | 48.5 | 74.0 | -25.5 | EUT Horz |
| 4575.905 | 38.9 | 8.8 | 0.0 | 1.9 | 3.0 | 0.0 | H-Horn | PK | 0.0 | 47.7 | 74.0 | -26.3 | EUT Onside |
| 2745.667 | 23.5 | 3.8 | 93.0 | 1.0 | 3.0 | 0.0 | H-Horn | AV | 0.0 | 27.3 | 54.0 | -26.7 | EUT Vert |
| 4576.910 | 38.5 | 8.8 | 131.0 | 1.9 | 3.0 | 0.0 | H-Horn | PK | 0.0 | 47.3 | 74.0 | -26.7 | EUT Horz |
| 2746.942 | 23.4 | 3.8 | 351.0 | 1.0 | 3.0 | 0.0 | V-Horn | AV | 0.0 | 27.2 | 54.0 | -26.8 | EUT Vert |
| 4576.260 | 38.1 | 8.8 | 48.0 | 1.0 | 3.0 | 0.0 | V-Horn | PK | 0.0 | 46.9 | 74.0 | -27.1 | EUT Onside |
| 4575.800 | 37.3 | 8.8 | 360.0 | 1.0 | 3.0 | 0.0 | V-Horn | PK | 0.0 | 46.1 | 74.0 | -27.9 | EUT Vert |
| 4574.408 | 37.1 | 8.8 | 95.0 | 1.9 | 3.0 | 0.0 | H-Horn | PK | 0.0 | 45.9 | 74.0 | -28.1 | EUT Vert |

| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Azimuth (degrees) | Height (meters) | Distance (meters) | External Attenuation (dB) | Polarity | Detector | Distance Adjustment (dB) | Adjusted dBuV/m | Spec. Limit dBuV/m | Compared to Spec. (dB) | Comments |
|---------------|---------------------|----------------|----------------------|--------------------|----------------------|---------------------------------|----------|----------|--------------------------------|--------------------|-----------------------|------------------------------|----------|
| 3660.992 | 37.5 | 5.9 | 195.0 | 1.0 | 3.0 | 0.0 | H-Horn | PK | 0.0 | 43.4 | 74.0 | -30.6 | EUT Vert |
| 3661.833 | 36.2 | 5.9 | 175.0 | 1.5 | 3.0 | 0.0 | V-Horn | PK | 0.0 | 42.1 | 74.0 | -31.9 | EUT Vert |
| 2745.292 | 36.5 | 3.8 | 93.0 | 1.0 | 3.0 | 0.0 | H-Horn | PK | 0.0 | 40.3 | 74.0 | -33.7 | EUT Vert |
| 2745.250 | 35.7 | 3.8 | 351.0 | 1.0 | 3.0 | 0.0 | V-Horn | PK | 0.0 | 39.5 | 74.0 | -34.5 | EUT Vert |