

FCC 47 CFR PART 15 SUBPART C INDUSTRY CANADA RSS-247 ISSUE 1

CERTIFICATION TEST REPORT

FOR

WI-FI COMMUNICATIONS MODULE

MODEL NUMBER: COM1

FCC ID: 2AHES-COMGEN1 IC: 21152-COMGEN1

REPORT NUMBER: R11093405-E1

ISSUE DATE: 2016-04-05

Prepared for

BSH HOME APPLIANCES CORP 1901 MAIN STREET, SUITE 600 IRVINE, CA 92614 USA

Prepared by

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NVLAP Lab code: 200246-0

Revision History

| Ver. | Issue Date | Revisions | Revised By |
|------|---------------|---|--------------|
| 1 | 2016-03-17 | Initial Issue | Ron Reichard |
| 2 | 2016-03-25 | Added below 30 MHz data. | Ron Reichard |
| 3 | 2016-03-30 | Revised company address, IC ID revised in header, revised Chain designations in Radiated Emissions sections, added duty cycle correction for 802.11 g/n modes, revised 18-26 GHz tabular data, revised ANSI document reference on page 219. | Ron Reichard |
| 4 | 2016-04-05 | Revised company name. | Ron Reichard |

DATE: 2016-04-05

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: BSH HOME APPLIANCES CORP

1901 MAIN STREET, SUITE 600

IRVINE, CA 92614 USA

EUT DESCRIPTION: WI-FI COMMUNICATIONS MODULE

MODEL: COM1

SERIAL NUMBER: Non-serialized

DATE TESTED: 2016-01-27 to 2016-03-25

APPLICABLE STANDARDS

STANDARD TEST RESULTS

CFR 47 Part 15 Subpart C PASS

INDUSTRY CANADA RSS-247 Issue 1 PASS

INDUSTRY CANADA RSS-GEN Issue 4 PASS

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL LLC based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For UL LLC By:

Prepared By:

Jeff Moser

EMC Program Manager

UL – Consumer Technology Division

Ron Reichard EMC Engineer

UL - Consumer Technology Division

DATE: 2016-04-05

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, RSS-GEN Issue 4, RSS-247 Issue 1.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Dr., Research Triangle Park, NC 27709, USA and 2800 Suite B, Perimeter Park Drive, Morrisville, NC 27560.

| 12 Laboratory Dr., RTP, NC 27709 |
|----------------------------------|
| ☐ Chamber A |
| |
| |
| 2800 Suite B Perimeter Park Dr |

| 2800 Suite B Perimeter Park Dr., | | | | | |
|----------------------------------|--|--|--|--|--|
| Morrisville, NC 27560 | | | | | |
| | | | | | |
| □ Chamber SOUTH | | | | | |

The onsite chambers are covered under Industry Canada company address code 2180C with site numbers 2180C -1 through 2180C-4, respectively.

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0. The full scope of accreditation can be viewed at http://www.nist.gov/nvlap/

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Gain (dB) 36.5 dBuV + 18.7 dB/m + 0.6 dB - 26.9 dB = 28.9 dBuV/m

TEL: (919) 549-1400

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4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| PARAMETER | | UNCERTAINTY |
|--------------------------------------|-----|-------------|
| Total RF power, conducted | +/- | 0.45 |
| RF power density, conducted | +/- | 1.50 |
| Spurious emissions, conducted | +/- | 2.94 |
| All emissions, radiated up to 18 GHz | +/- | 5.36 |
| Temperature | +/- | 0.07 |
| Humidity | +/- | 2.26 |
| DC and low frequency voltages | +/- | 1.27 |

Uncertainty figures are valid to a confidence level of 95%.

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11b/g/n transceiver module. It is a SISO module that contains two antenna ports for diversity. Additionally, there is an option to install an external antenna on Antenna Port 0 for improved performance. The external antenna in not intended to be installed on Chain 1.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

| Frequency Range | Mode | Output Power | Output Power |
|-----------------|--------------|---------------------|--------------|
| (MHz) | | (dBm) | (mW) |
| 2412 - 2462 | 802.11b | 15.98 | 39.63 |
| 2412 - 2462 | 802.11g | 12.88 | 19.41 |
| 2412 - 2462 | 802.11n HT20 | 12.80 | 19.05 |

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes two internal Inverted F antennas, Chain 0 has a maximum gain of +0.7 dBi, and Chain 1 has a maximum gain of +0.5 dBi.

The radio also utilizes an external PCB slot antenna, with a maximum gain of -1.7 dBi. This external antenna is only intended to be installed on Chain 0.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was COM Application CPU (STM) version SW 1.3.23 and WiFi SiP version 5.90.230.12.

The EUT driver software installed during testing was written by Prolific, version 3.6.78.350

The test utility software used during testing was WiFi SiP, version 5.90.230.12, FWID 01-169cf8b2.

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5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario, unless otherwise documented.

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The fundamental of the EUT was investigated in three orthogonal orientations X, Y, Z for the two internal antennas, chains 0 and 1. It was determined that the X orientation for both internal antennas were the worst-case orientations, therefore, all final radiated testing was performed in the X orientation using the internal antennas.

Additionally, the fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, for the external antenna. It was determined that the Y orientation with the external antenna was worst-case orientation; therefore, all final radiated testing was performed with the EUT in the Y orientation using the external antenna.

Based on the baseline scan, the worst-case data rates were:

802.11b mode: 5.5 Mbps 802.11g mode: 12 Mbps 802.11n HT20mode: MCS5

Note Regarding desired powered for each mode:

- 802.11b This mode was set so that all channels are set for the same power.
- 802.11g This mode was set so the channels had a stair-step power setting: Channels 1-3 were stepped up in power, with 3 reaching the same maximum power setting as the middle channel. Channels 9-11 were stepped down in power, where 9 was the same maximum power setting as the middle channel, and then 10 and 11 were stepped down in power.
- 802.11n This mode was set so the channels had a stair-step power setting: Channels
 1-3 were stepped up in power, with 3 reaching the same maximum power setting as the
 middle channel. Channels 9-11 were stepped down in power, where 9 was the same
 maximum power setting as the middle channel, and then 10 and 11 were stepped down
 in power.

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5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

| Support Equipment List | | | | | | | |
|---|---------------|---------------------|------------|--------------|--|--|--|
| Description Manufacturer Model Serial Number FCC ID | | | | | | | |
| Supporting Laptop | Compaq | Presario CQ56-115DX | CNF1134NRP | PPD-AR5B95-H | | | |
| Laptop Power Supply | Not Available | | | | | | |
| USB-Serial Port Adapter | | | | | | | |

I/O CABLES

| | I/O Cable List | | | | | | | | |
|-------|----------------|----------------|-------------|-------------|------------|-----------------------|--|--|--|
| Cable | Port | # of identical | Connector | Cable Type | Cable | Remarks | | | |
| No | | ports | Туре | | Length (m) | | | | |
| 1 | Antenna | 1 | SMA | Un-Shielded | 0.5 | To U.FL Adapter cable | | | |
| 2 | Antenna | 1 | SMA to U.FL | Un-Shielded | 0.1 | To Spectrum Analyzer | | | |
| 3 | DC Supply | 1 | | Un-Shielded | 0.5 | DC Supply to EUT | | | |
| 4 | Control Port | 1 | | Un-Shielded | 0.5 | 4 Wire Cable | | | |
| 5 | DC | 1 | DC | Un-Shielded | 0.8 | N/A | | | |
| 6 | AC | 1 | 2 Prong | Un-Shielded | 1.5 | N/A | | | |

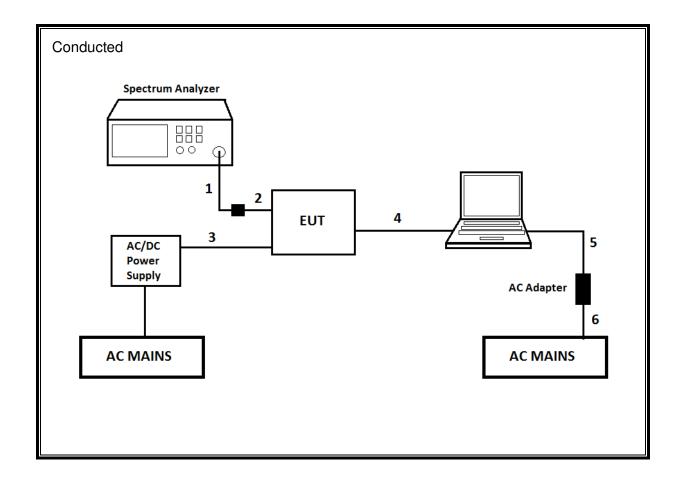
TEST SETUP

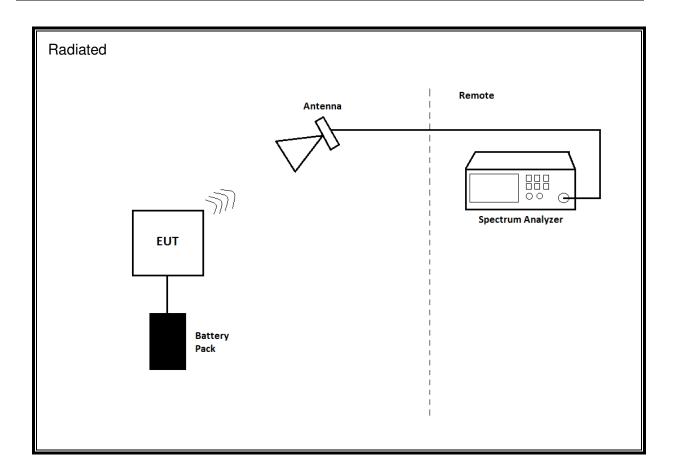
The EUT is a wireless communications module. Test software exercised the radio card. Two configurations were used during the testing. One configuration utilized the two internal trace antenna chains in a SISO mode for diversity. The second configuration utilized an external antenna on chain 0 only for improved performance, while antenna chain 1 remained an internal trace antenna. Therefore, antenna 1 was only tested once.

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SETUP DIAGRAM FOR TESTS





6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - North Chamber)

| Equip. | | | | | |
|---------|---|----------------------------|--------------|------------|------------|
| iD. | Description | Manufacturer | Model Number | Last Cal. | Next Cal. |
| AT0073 | Hybrid Broadband Antenna, 30-1000MHz | Sunol Sciences Corp. | JB3 | 2015-06-10 | 2016-06-30 |
| AT0072 | Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz | ETS Lindgren | 3117 | 2015-02-17 | 2016-02-29 |
| N-SAC02 | Gain-loss string: 30- 1000MHz | Various | Various | 2015-06-04 | 2016-06-30 |
| N-SAC03 | Gain-loss string: 1- 18GHz | Various | Various | 2015-09-29 | 2016-09-30 |
| SA0026 | Spectrum Analyzer | Agilent | N9030A | 2015-03-27 | 2016-03-31 |
| SOFTEMI | EMI Software | UL | Version 9.5 | NA | NA |
| HI0079 | Temp/Humid/Pressure Meter | Springfield Precision | PreciseTemp | 2015-07-01 | 2016-07-31 |

Note – All testing in this chamber was performed prior to 2016-02-29

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Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - South Chamber)

| Equip. ID | Description | Manufacturer | Model Number | Last Cal. | Next Cal. |
|--------------|---|----------------------------|--------------|------------|------------|
| AT0079 | Active Loop Antenna | ETS-Lindgren | 6502 | 2015-12-08 | 2016-12-31 |
| AT0074 | Hybrid Broadband Antenna, 30-1000MHz | Sunol Sciences Corp. | JB3 | 2015-06-10 | 2016-06-30 |
| AT0069 | Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz | ETS Lindgren | 3117 | 2015-02-17 | 2016-02-29 |
| S-SAC01 | Gain-loss string: 0.009-30MHz | Various | Various | 2015-10-07 | 2016-10-31 |
| S-SAC02 | Gain-loss string: 30- 1000MHz | Various | Various | 2015-06-09 | 2016-06-30 |
| S-SAC03 | Gain-loss string: 1-18 GHz | Various | Various | 2015-08-22 | 2016-08-31 |
| SA0018 | Spectrum Analyzer | Agilent | N9030A | 2015-11-07 | 2016-11-30 |
| SA0025 | Spectrum Analyzer | Agilent | N9030A | 2016-03-17 | 2017-03-31 |
| SOFTEMI | EMI Software | UL | Version 9.5 | NA | NA |
| HI0050 | Temp/Humid/Pressure Meter | Cole-Parmer | 99760-00 | 2015-07-01 | 2016-07-31 |

Note – All testing in this chamber was performed prior to 2016-02-29, except 9kHz-30 MHz testing performed on 2016-03-25.

Test Equipment Used - Radiated Disturbance Emissions (E-field) - Chamber C

| Equip. | | , | , | | |
|---------|--------------------------------|--------------|--------------|------------|------------|
| ID | Description | Manufacturer | Model Number | Last Cal. | Next Cal. |
| AT0063 | Horn Antenna, 18- 26.5GHz | ARA | MWH-1826/B | 2015-08-27 | 2016-08-31 |
| C-SAC03 | Gain-loss string: 18- 40GHz | Various | Various | 2015-09-27 | 2016-09-30 |
| SA0016 | Spectrum Analyzer | Agilent | N9030A | 2015-08-26 | 2016-08-31 |
| SOFTEMI | EMI Software | UL | Version 9.5 | NA | NA |
| HI0034 | Temp/Humid/Pressure Meter | Cole-Parmer | 99760-00 | 2015-03-23 | 2016-03-31 |

Test Equipment Used - Line-Conducted Emissions - Voltage (Morrisville - Conducted 1)

| Equipment ID | Description | Manufacturer | Model Number | Last Cal. | Next Cal. |
|-----------------------|---|----------------------------|------------------------------|------------|------------|
| CBL077 | Coax cable, RG223, N-male to BNC-male, 20-ft. | Pasternack | PE3476-240 | 2015-10-29 | 2016-10-31 |
| HI0079 | Temp/Humid/Pressure Meter | Springfield Precision | PreciseTemp | 2015-07-01 | 2016-07-31 |
| LISN002 | LISN, 50-ohm/50-uH, 2- conductor, 25A | Fischer Custom Com. | FCC-LISN-50-25-2- 01-550V | 2015-08-24 | 2016-08-31 |
| MM0167 | Multi-meter | Agilent | U1232A | 2015-08-17 | 2016-08-31 |
| PRE0101521 (75141) | EMI Test Receiver 9kHz- 7GHz | Rohde & Schwarz | ESCI 7 | 2015-08-26 | 2016-08-31 |
| TL001 | Transient Limiter, 0.009- 30MHz | Com-Power | LIT-930A | 2015-05-22 | 2016-05-31 |
| PS215 | AC Power Source | Elgar | CW2501M (s/n 1523A02397) | NA | NA |
| SOFTEMI | EMI Software | UL | Version 9.5 | NA | NA |
| 76022 | DC Regulated Power Supply | CircuitSpeciali sts.Com | CSI3005X5 | NA | NA |

Test Equipment Used - Wireless Conducted Measurement Equipment(Morrisville - Conducted

| Equipment ID | Description | Manufacturer | Model Number | Last Cal. | Next Cal. |
|--------------|---|--------------------------|--------------|------------|------------|
| | Conducted Room 1 | | | | |
| SA0019 | Spectrum Analyzer | Agilent Technologies | E4446A | 2015-09-02 | 2016-09-30 |
| PWM004 | RF Power Meter | Keysight Technologies | N1911A | 2015-06-08 | 2017-06-08 |
| PWS004 | Peak and Avg Power Sensor, 50MHz to 6GHz | Keysight Technologies | E9323A | 2015-06-05 | 2016-06-05 |
| HI0079 | Temp/Humid/Pressure Meter | Springfield | PreciseTemp | 2015-07-01 | 2016-07-31 |
| MM0167 | True RMS Multimeter | Agilent | U1232A | 2015-08-17 | 2016-08-31 |
| 76022 | DC Regulated Power Supply | CircuitSpecialis ts.Com | CSI3005X5 | NA | NA |

7. MEASUREMENT METHODS

6 dB BW: KDB 558074 D01 v03r04, Section 8.1.

Output Power: KDB 558074 D01 v03r04, Section 9.2.3.1

Power Spectral Density: KDB 558074 D01 v03r04, Section 10.2.

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v03r04, Section 11.0.

Out-of-band emissions in restricted bands: KDB 558074 D01 v03r04, Section 12.0.

Band-edge: KDB 558074 D01 v03r04, Section 13.3

DATE: 2016-04-05

8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

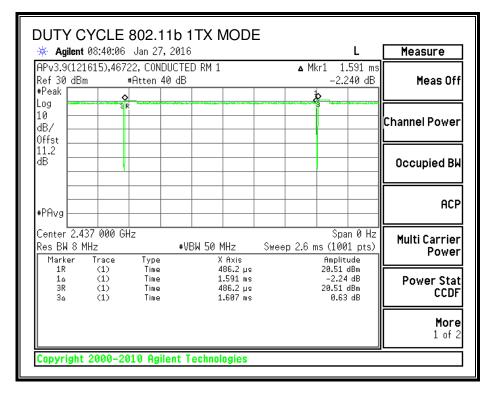
ON TIME AND DUTY CYCLE RESULTS

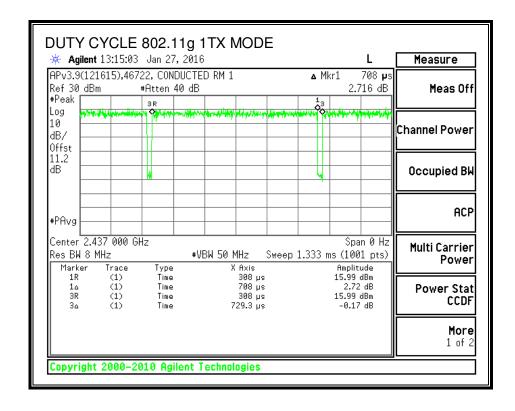
| Mode | ON Time | Period | Duty Cycle | Duty | Duty Cycle | 1/B |
|------------------|---------|--------|-------------------|--------|--------------------------|-------------|
| | В | | х | Cycle | Correction Factor | Minimum VBW |
| | (msec) | (msec) | (linear) | (%) | (dB) | (kHz) |
| 2.4GHz Band | | | | | | |
| 802.11b 1TX | 1.591 | 1.607 | 0.990 | 99.00% | 0.00 | 0.010 |
| 802.11g 1TX | 0.708 | 0.729 | 0.971 | 97.08% | 0.13 | 1.412 |
| 802.11n HT20 1TX | 0.196 | 0.216 | 0.905 | 90.48% | 0.43 | 5.107 |

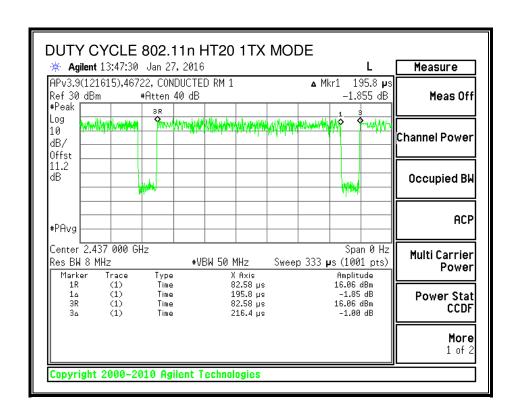
DATE: 2016-04-05

DUTY CYCLE PLOTS

2.4 GHz BAND







8.2. 802.11b MODE IN THE 2.4 GHz BAND

8.2.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-247 5.2 (1)

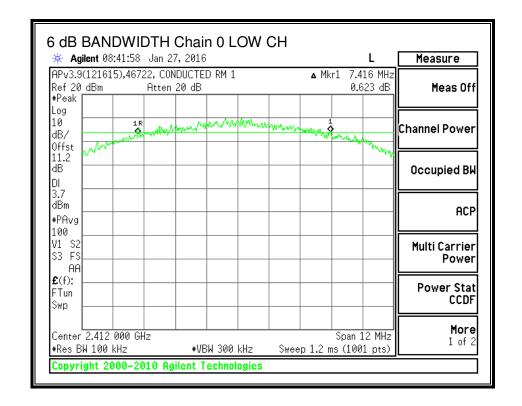
The minimum 6 dB bandwidth shall be at least 500 kHz.

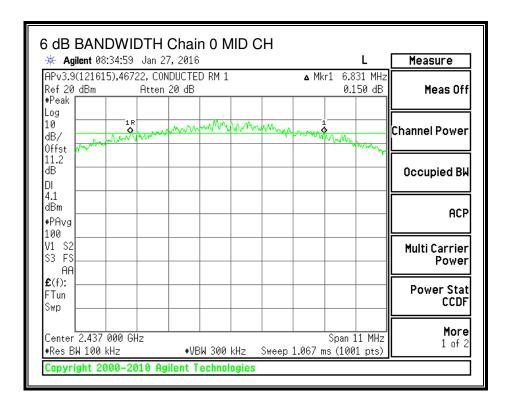
RESULTS

| Channel | Frequency | 6 dB BW | 6 dB BW | Minimum |
|---------|-----------|---------|---------|---------|
| | | Chain 0 | Chain 1 | Limit |
| | (MHz) | (MHz) | (MHz) | (MHz) |
| Low | 2412 | 7.416 | 7.224 | 0.5 |
| Mid | 2437 | 6.831 | 7.326 | 0.5 |
| High | 2462 | 6.754 | 7.956 | 0.5 |

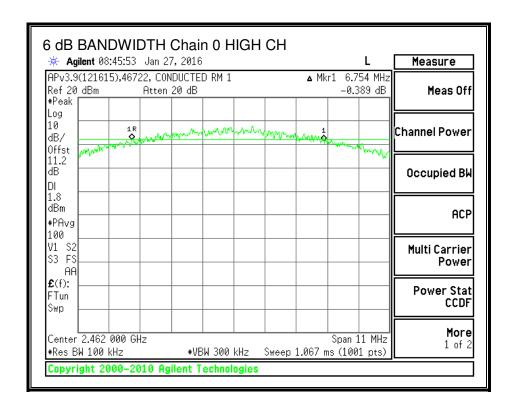
DATE: 2016-04-05

6 dB BANDWIDTH, Chain 0

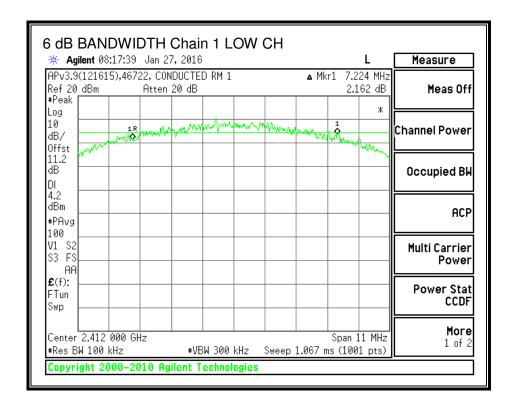


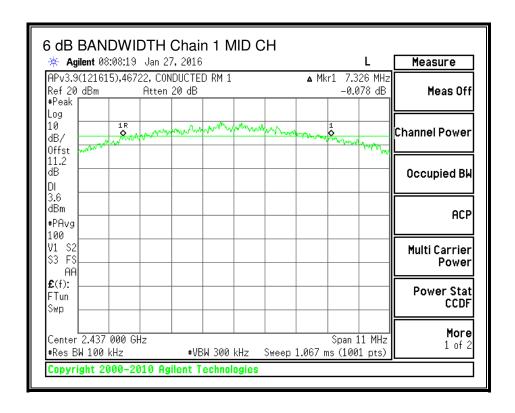


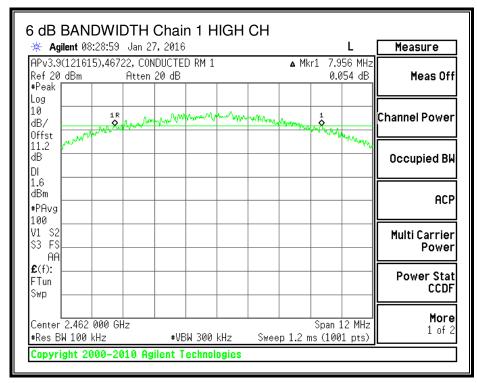
DATE: 2016-04-05



6 dB BANDWIDTH, Chain 1







8.2.2. 99% BANDWIDTH

LIMITS

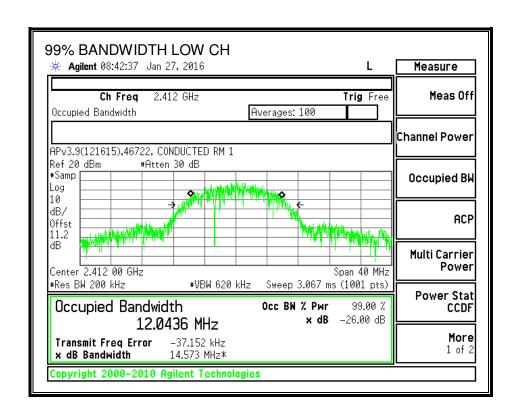
None; for reporting purposes only.

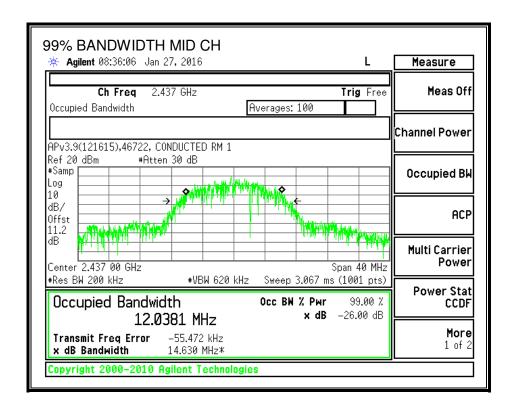
RESULTS

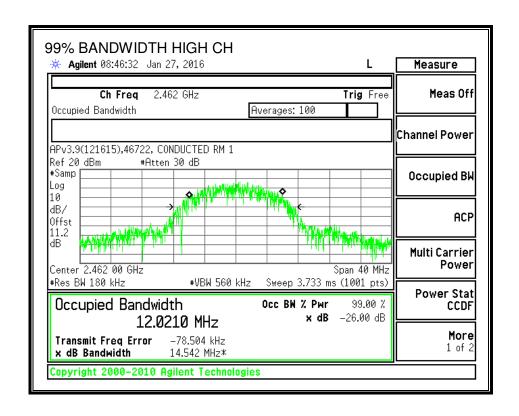
Chain 0

| Channel | Frequency | 99% Bandwidth | | |
|---------|-----------|---------------|--|--|
| | (MHz) | (MHz) | | |
| Low | 2412 | 12.0436 | | |
| Mid | 2437 | 12.0381 | | |
| High | 2462 | 12.0210 | | |

99% BANDWIDTH



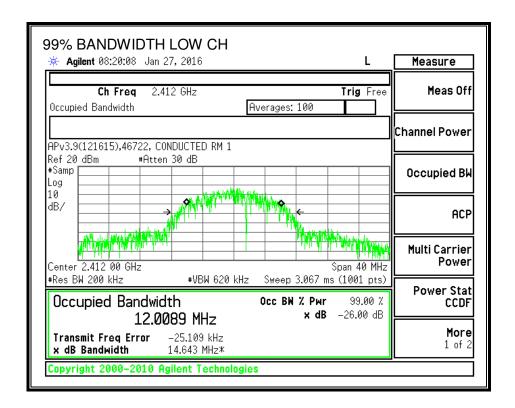


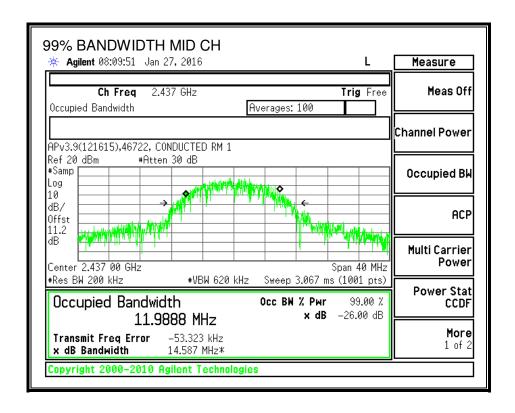


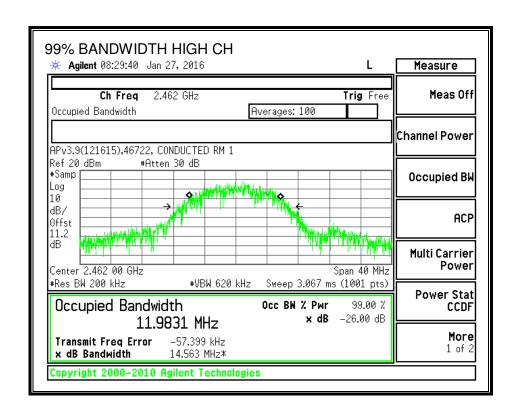
Chain 1

| Channel | Frequency | 99% Bandwidth |
|---------|-----------|---------------|
| | (MHz) | (MHz) |
| Low | 2412 | 12.0089 |
| Mid | 2437 | 11.9888 |
| High | 2462 | 11.9831 |

99% BANDWIDTH







8.2.3. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-247 5.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter chain operating at one time, therefore the directional gain is equal to the antenna gain of that chain.

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RESULTS

Chain 0 - Average Power

Limits

| Channel | Frequency | Directional | FCC | IC | IC | Max |
|---------|-----------|-------------|-------|-------|-------|-------|
| | | Gain | Power | Power | EIRP | Power |
| | | | Limit | Limit | Limit | |
| | (MHz) | (dBi) | (dBm) | (dBm) | (dBm) | (dBm) |
| Low | 2412 | 0.70 | 30.00 | 30 | 36 | 30.00 |
| Mid | 2437 | 0.70 | 30.00 | 30 | 36 | 30.00 |
| High | 2462 | 0.70 | 30.00 | 30 | 36 | 30.00 |

| Duty Cycle CF (dB) | 0.00 | Included in Calculations of Corr'd Power |
|--------------------|------|--|
|--------------------|------|--|

Results

| Channel | Frequency | Chain 0 | Total | Power | Margin |
|---------|-----------|---------|--------|-------|--------|
| | | Meas | Corr'd | Limit | |
| | | Power | Power | | |
| | (MHz) | (dBm) | (dBm) | (dBm) | (dB) |
| Low | 2412 | 15.60 | 15.60 | 30.00 | -14.40 |
| Mid | 2437 | 15.72 | 15.72 | 30.00 | -14.28 |
| High | 2462 | 15.98 | 15.98 | 30.00 | -14.02 |

Chain 1 – Average Power

Limits

| Channel | Frequency | Directional | FCC | IC | IC | Max |
|---------|-----------|-------------|-------|-------|-------|-------|
| | | Gain | Power | Power | EIRP | Power |
| | | | Limit | Limit | Limit | |
| | (MHz) | (dBi) | (dBm) | (dBm) | (dBm) | (dBm) |
| Low | 2412 | 0.50 | 30.00 | 30 | 36 | 30.00 |
| Mid | 2437 | 0.50 | 30.00 | 30 | 36 | 30.00 |
| High | 2462 | 0.50 | 30.00 | 30 | 36 | 30.00 |

| Duty Cycle CF (dB) 0.00 | Included in Calculations of Corr'd Power |
|-------------------------|--|
|-------------------------|--|

Results

| Channel | Frequency | Chain 1 | Total | Power | Margin |
|---------|-----------|---------|--------|-------|--------|
| | | Meas | Corr'd | Limit | |
| | | Power | Power | | |
| | (MHz) | (dBm) | (dBm) | (dBm) | (dB) |
| Low | 2412 | 15.75 | 15.75 | 30.00 | -14.25 |
| Mid | 2437 | 15.76 | 15.76 | 30.00 | -14.24 |
| High | 2462 | 15.89 | 15.89 | 30.00 | -14.11 |

DATE: 2016-04-05

REPORT NO: R11093405-E1 DATE: 2016-04-05 FCC ID: 2AHES-COMGEN1 IC: 21152-COMGEN1

Chain 0 - Average Power (External Antenna)

Limits

| Channel | Frequency | Directional | FCC IC | | IC | Max |
|---------|-----------|-------------|--------|-------|-------|-------|
| | | Gain | Power | Power | EIRP | Power |
| | | | Limit | Limit | Limit | |
| | (MHz) | (dBi) | (dBm) | (dBm) | (dBm) | (dBm) |
| Low | 2412 | -1.70 | 30.00 | 30 | 36 | 30.00 |
| Mid | 2437 | -1.70 | 30.00 | 30 | 36 | 30.00 |
| High | 2462 | -1.70 | 30.00 | 30 | 36 | 30.00 |

Results

| Channel | Frequency | Chain 0 Total | | Power | Margin |
|---------|-----------|---------------|--------|-------|--------|
| | | Meas | Corr'd | Limit | |
| | | Power | Power | | |
| | (MHz) | (dBm) | (dBm) | (dBm) | (dB) |
| Low | 2412 | 15.60 | 15.60 | 30.00 | -14.40 |
| Mid | 2437 | 15.72 | 15.72 | 30.00 | -14.28 |
| High | 2462 | 15.98 | 15.98 | 30.00 | -14.02 |

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8.2.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-247 5.2 (2)

RESULTS

Chain 0

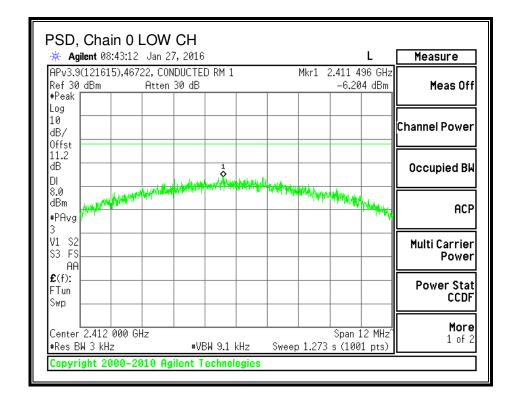
| Duty C | ycle CF (dB) | 0.00 Included in Calculations of Corr'd P | | | | of Corr'd PSD | | |
|-------------|--------------|---|--------|-------|--------|---------------|--|--|
| PSD Results | | | | | | | | |
| Channel | Frequency | Chain 0 | Total | Limit | Margin | | | |
| | | Meas | Corr'd | | | | | |
| | (MHz) | (dBm) | PSD | | | | | |
| | | | (dBm) | (dBm) | (dB) | | | |
| Low | 2412 | -6.20 | -6.20 | 8.0 | -14.2 | | | |
| Mid | 2437 | -4.74 | -4.74 | 8.0 | -12.7 | | | |
| High | 2462 | -8.29 | -8.29 | 8.0 | -16.3 | | | |

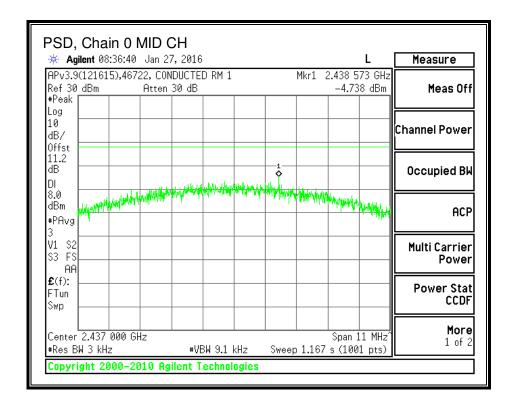
Chain 1

| Duty C | ycle CF (dB) | 0.00 | Included in Calculations of | | | of Corr'd PSD | |
|----------|--------------|---------|-----------------------------|-------|--------|---------------|--|
| PSD Resu | PSD Results | | | | | | |
| Channel | Frequency | Chain 1 | Total | Limit | Margin | | |
| | | Meas | Corr'd | | | | |
| | (MHz) | (dBm) | PSD | | | | |
| | | | (dBm) | (dBm) | (dB) | | |
| Low | 2412 | -5.62 | -5.62 | 8.0 | -13.6 | | |
| Mid | 2437 | -6.34 | -6.34 | 8.0 | -14.3 | | |
| High | 2462 | -6.58 | -6.58 | 8.0 | -14.6 | | |

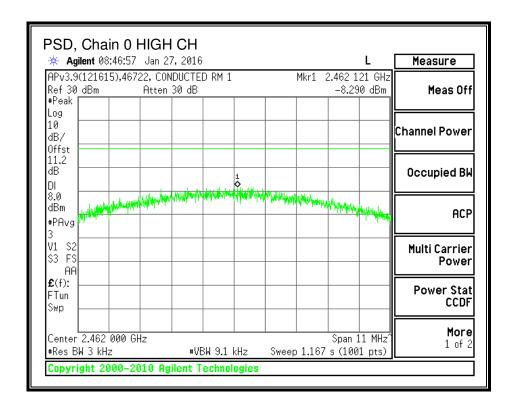
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PSD, Chain 0

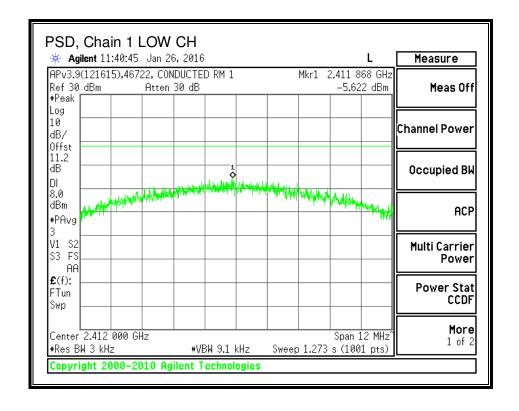


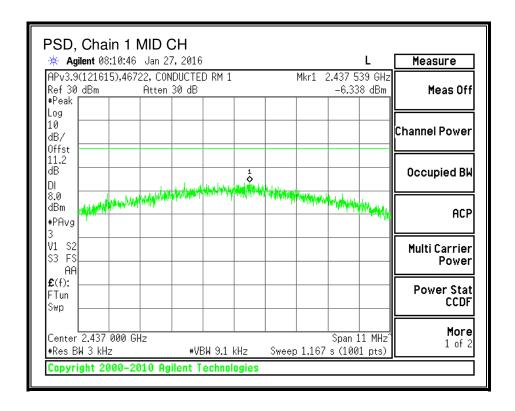


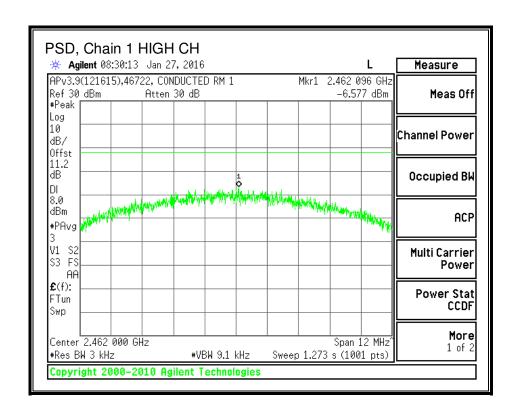
DATE: 2016-04-05



PSD, Chain 1







8.2.5. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-247 5.5

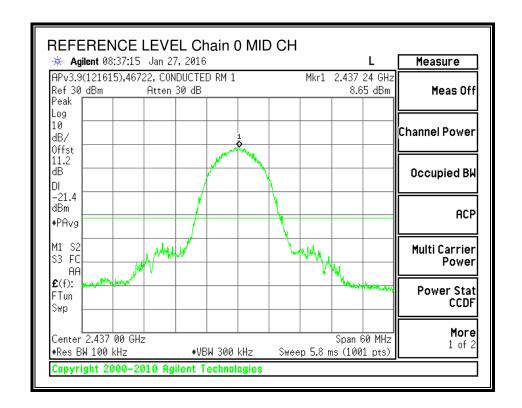
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

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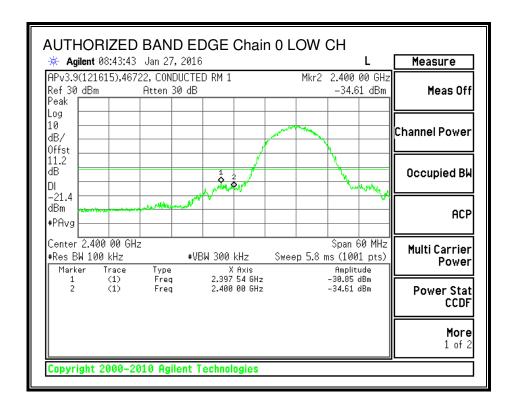
DATE: 2016-04-05

RESULTS

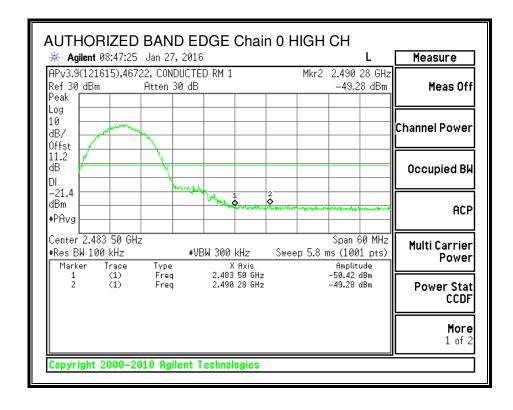
IN-BAND REFERENCE LEVEL, Chain 0



LOW CHANNEL BANDEDGE, Chain 0

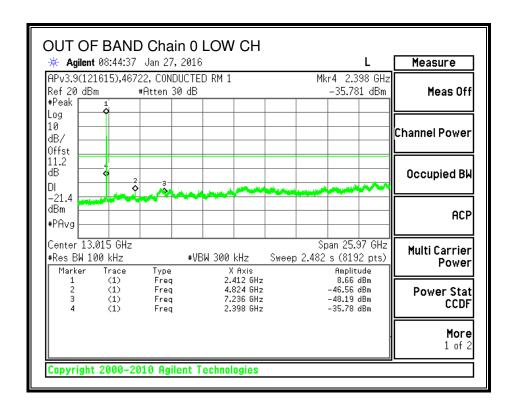


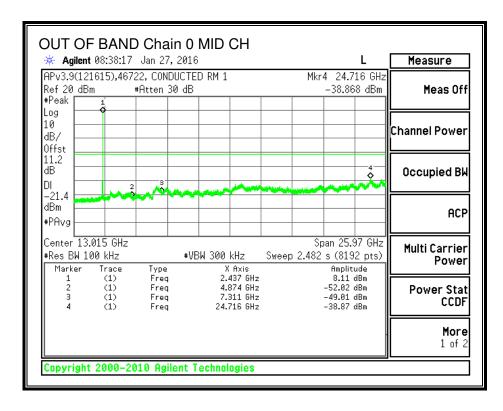
HIGH CHANNEL BANDEDGE, Chain 0

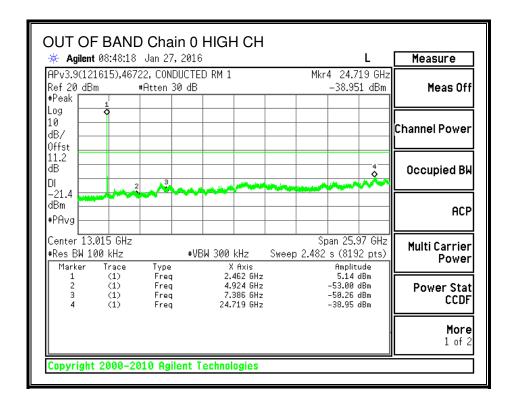


DATE: 2016-04-05

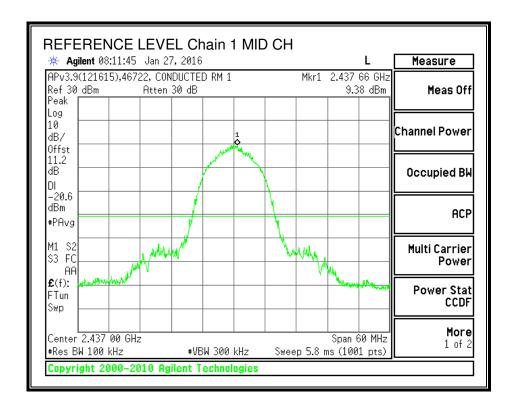
OUT-OF-BAND EMISSIONS, Chain 0



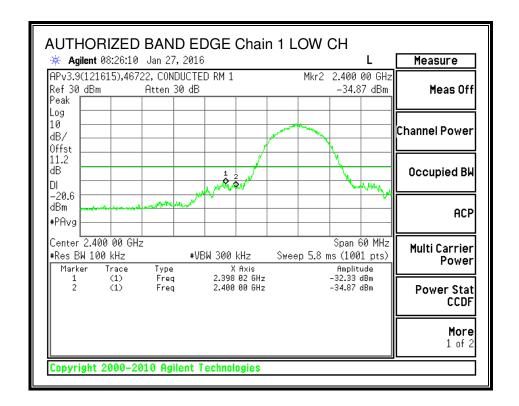




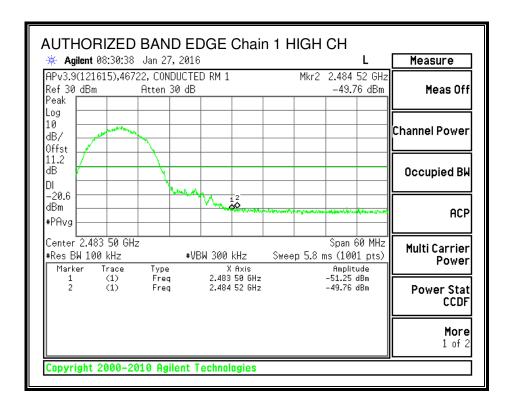
IN-BAND REFERENCE LEVEL, Chain 1



LOW CHANNEL BANDEDGE, Chain 1



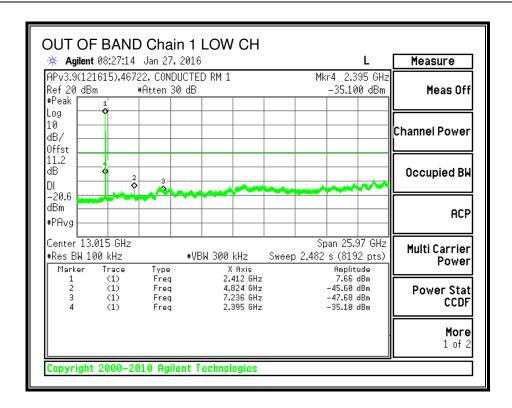
HIGH CHANNEL BANDEDGE, Chain 1

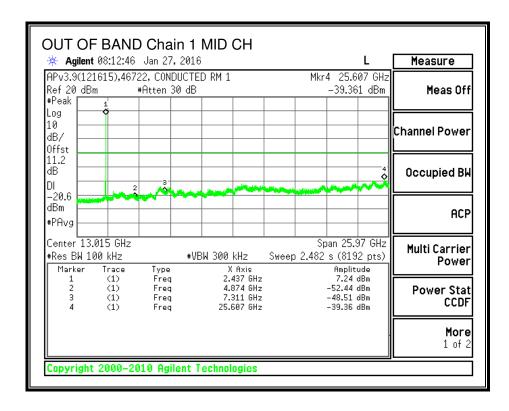


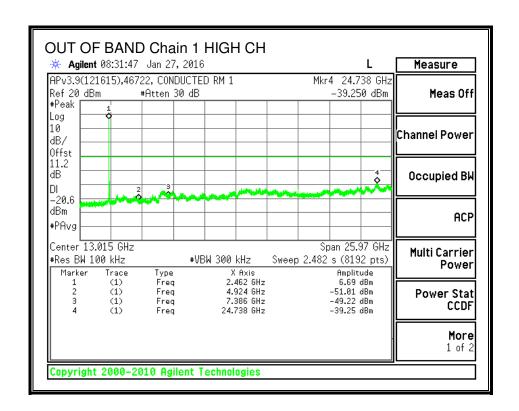
DATE: 2016-04-05

IC: 21152-COMGEN1

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8.3. 802.11g MODE IN THE 2.4 GHz BAND

8.3.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-247 5.2 (1)

The minimum 6 dB bandwidth shall be at least 500 kHz.

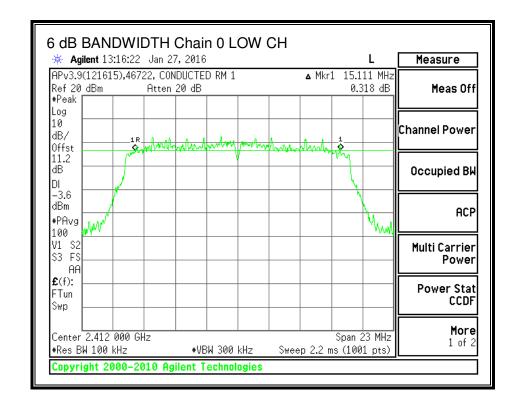
RESULTS

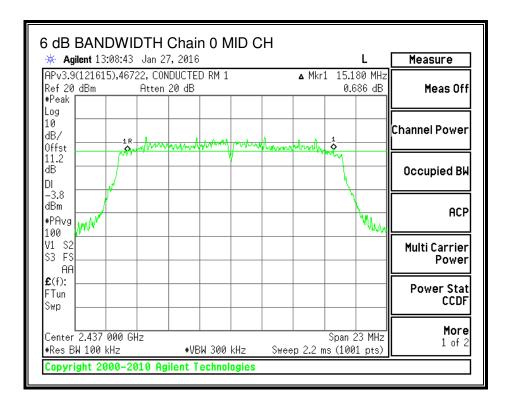
| Channel | Frequency | 6 dB BW | 6 dB BW | Minimum |
|---------|-----------|---------|---------|---------|
| | | Chain 0 | Chain 1 | Limit |
| | (MHz) | (MHz) | (MHz) | (MHz) |
| Low | 2412 | 15.111 | 15.111 | 0.5 |
| Mid | 2437 | 15.180 | 15.088 | 0.5 |
| High | 2462 | 15.088 | 15.111 | 0.5 |

Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

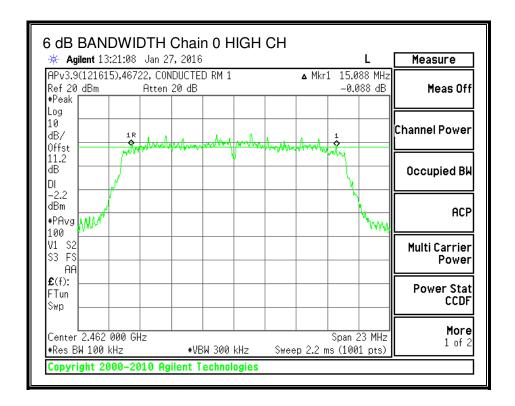
DATE: 2016-04-05

6 dB BANDWIDTH, Chain 0

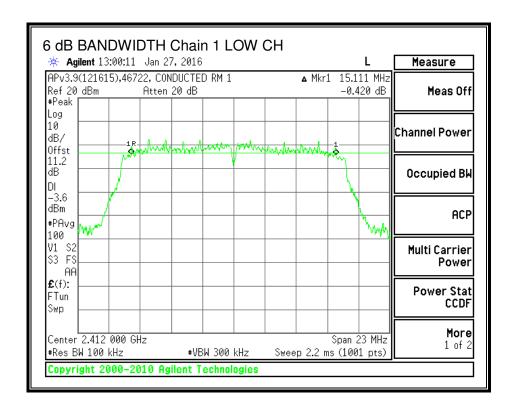


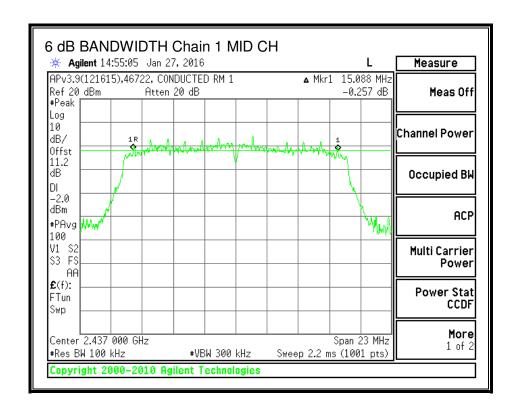


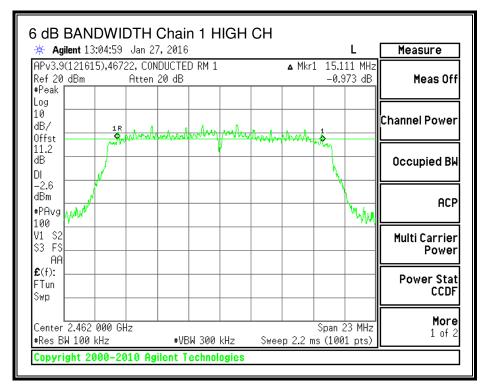
DATE: 2016-04-05



6 dB BANDWIDTH, Chain 1







8.3.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

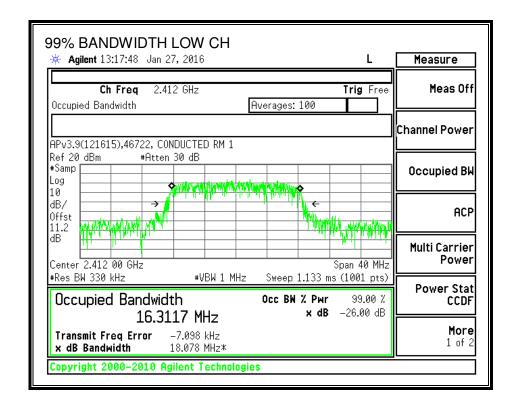
RESULTS

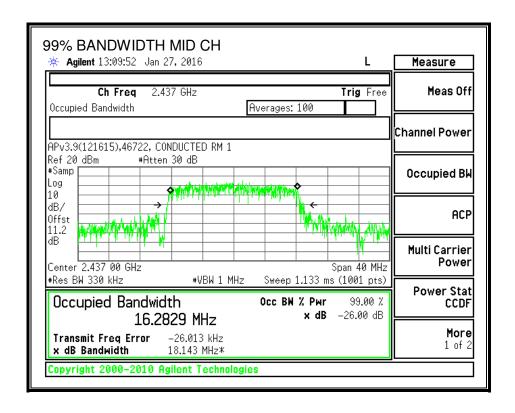
Chain 0

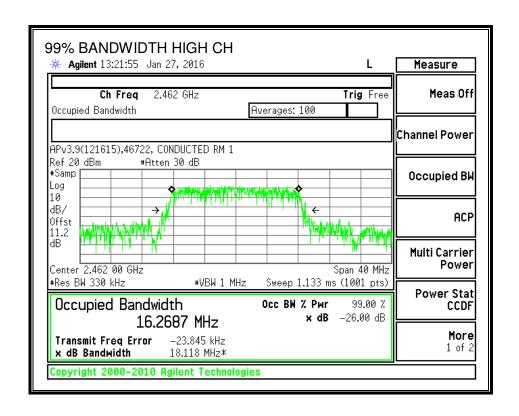
| Channel | Frequency | 99% Bandwidth | | |
|---------|-----------|---------------|--|--|
| | (MHz) | (MHz) | | |
| Low | 2412 | 16.3117 | | |
| Mid | 2437 | 16.2829 | | |
| High | 2462 | 16.2687 | | |

Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

99% BANDWIDTH



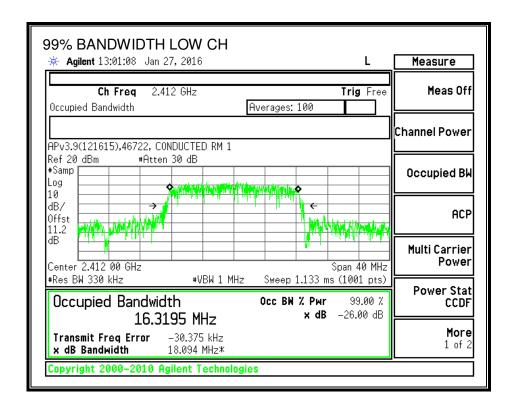


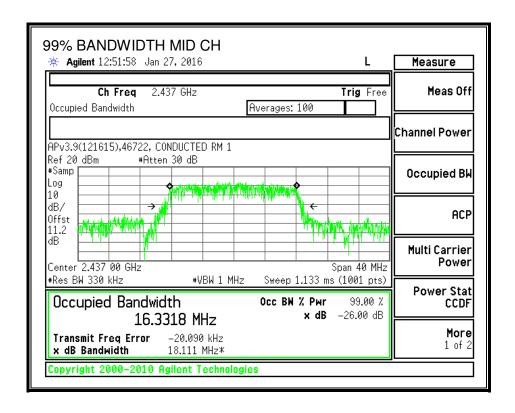


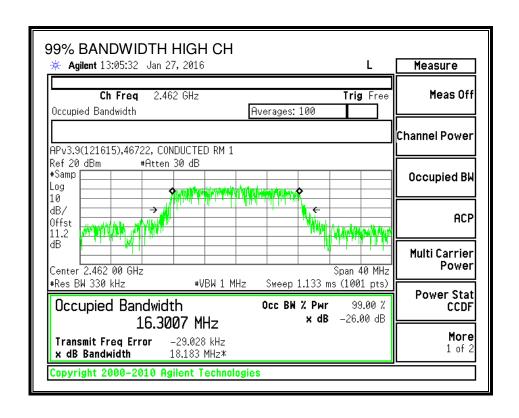
Chain 1

| Channel | Frequency | 99% Bandwidth | | |
|---------|-----------|---------------|--|--|
| | (MHz) | (MHz) | | |
| Low | 2412 | 16.3195 | | |
| Mid | 2437 | 16.3318 | | |
| High | 2462 | 16.3007 | | |

99% BANDWIDTH







8.3.3. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-247 5.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter chain operating at one time, therefore the directional gain is equal to the antenna gain of that chain.

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RESULTS

Chain 0

Limits

| Channel | Frequency | Directional | FCC | IC | IC | Max |
|---------|-----------|-------------|-------|-------|-------|-------|
| | | Gain | Power | Power | EIRP | Power |
| | | | Limit | Limit | Limit | |
| | (MHz) | (dBi) | (dBm) | (dBm) | (dBm) | (dBm) |
| Low | 2412 | 0.70 | 30.00 | 30 | 36 | 30.00 |
| Ch. 2 | 2417 | 0.70 | 30.00 | 30 | 36 | 30.00 |
| Ch. 3 | 2422 | 0.70 | 30.00 | 30 | 36 | 30.00 |
| Mid | 2437 | 0.70 | 30.00 | 30 | 36 | 30.00 |
| Ch. 9 | 2452 | 0.70 | 30.00 | 30 | 36 | 30.00 |
| Ch. 10 | 2457 | 0.70 | 30.00 | 30 | 36 | 30.00 |
| High | 2462 | 0.70 | 30.00 | 30 | 36 | 30.00 |

| Duty Cycle CF (dB) | 0.13 | Included in Calculations of Corr'd Power |
|--------------------|------|--|
|--------------------|------|--|

Results

| Channel | Frequency | Chain 0 Total | | Power | Margin |
|---------|-----------|---------------|--------|-------|--------|
| | | Meas | Corr'd | Limit | |
| | | Power | Power | | |
| | (MHz) | (dBm) | (dBm) | (dBm) | (dB) |
| Low | 2412 | 10.32 | 10.45 | 30.00 | -19.55 |
| Ch. 2 | 2417 | 11.41 | 11.54 | 30.00 | -18.46 |
| Ch. 3 | 2422 | 12.50 | 12.63 | 30.00 | -17.37 |
| Mid | 2437 | 12.65 | 12.78 | 30.00 | -17.22 |
| Ch. 9 | 2452 | 12.63 | 12.76 | 30.00 | -17.24 |
| Ch. 10 | 2457 | 11.78 | 11.91 | 30.00 | -18.09 |
| High | 2462 | 10.69 | 10.82 | 30.00 | -19.18 |

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Chain 1

| Channel | Frequency | Directional | FCC | IC | IC | Max |
|---------|-----------|-------------|-------|-------|-------|-------|
| | | Gain | Power | Power | EIRP | Power |
| | | | Limit | Limit | Limit | |
| | (MHz) | (dBi) | (dBm) | (dBm) | (dBm) | (dBm) |
| Low | 2412 | 0.50 | 30.00 | 30 | 36 | 30.00 |
| 2 | 2417 | 0.50 | 30.00 | 30 | 36 | 30.00 |
| 3 | 2422 | 0.50 | 30.00 | 30 | 36 | 30.00 |
| Mid | 2437 | 0.50 | 30.00 | 30 | 36 | 30.00 |
| 9 | 2452 | 0.50 | 30.00 | 30 | 36 | 30.00 |
| 10 | 2457 | 0.50 | 30.00 | 30 | 36 | 30.00 |
| High | 2462 | 0.50 | 30.00 | 30 | 36 | 30.00 |

| Duty Cycle CF (dB) 0.13 | Included in Calculations of Corr'd Power |
|-------------------------|--|
|-------------------------|--|

Results

| Channel | Frequency | Chain 1 | Total | Power | Margin |
|---------|-----------|-------------|-------|-------|--------|
| | | Meas Corr'd | | Limit | |
| | | Power | Power | | |
| | (MHz) | (dBm) | (dBm) | (dBm) | (dB) |
| Low | 2412 | 10.34 | 10.47 | 30.00 | -19.53 |
| 2 | 2417 | 11.40 | 11.53 | 30.00 | -18.47 |
| 3 | 2422 | 12.54 | 12.67 | 30.00 | -17.33 |
| Mid | 2437 | 12.65 | 12.78 | 30.00 | -17.22 |
| 9 | 2452 | 12.75 | 12.88 | 30.00 | -17.12 |
| 10 | 2457 | 11.83 | 11.96 | 30.00 | -18.04 |
| High | 2462 | 10.63 | 10.76 | 30.00 | -19.24 |

Chain 0 (External Antenna)

Limits

| Channel | Frequency | Directional | FCC | IC | IC | Max |
|---------|-----------|-------------|-------|-------|-------|-------|
| | | Gain | Power | Power | EIRP | Power |
| | | | Limit | Limit | Limit | |
| | (MHz) | (dBi) | (dBm) | (dBm) | (dBm) | (dBm) |
| Low | 2412 | -1.70 | 30.00 | 30 | 36 | 30.00 |
| 2 | 2417 | -1.70 | 30.00 | 30 | 36 | 30.00 |
| 3 | 2422 | -1.70 | 30.00 | 30 | 36 | 30.00 |
| Mid | 2437 | -1.70 | 30.00 | 30 | 36 | 30.00 |
| 9 | 2452 | -1.70 | 30.00 | 30 | 36 | 30.00 |
| 10 | 2457 | -1.70 | 30.00 | 30 | 36 | 30.00 |
| High | 2462 | -1.70 | 30.00 | 30 | 36 | 30.00 |

| Duty Cycle CF (dB) | 0.13 | Included in Calculations of Corr'd Power |
|--------------------|------|--|
|--------------------|------|--|

Results

| Channel | Frequency | Chain 0 | Total | Power | Margin |
|---------|-----------|-------------|-------|-------|--------|
| | | Meas Corr'd | | Limit | |
| | | Power | Power | | |
| | (MHz) | (dBm) | (dBm) | (dBm) | (dB) |
| Low | 2412 | 10.32 | 10.45 | 30.00 | -19.55 |
| 2 | 2417 | 11.41 | 11.54 | 30.00 | -18.46 |
| 3 | 2422 | 12.50 | 12.63 | 30.00 | -17.37 |
| Mid | 2437 | 12.65 | 12.78 | 30.00 | -17.22 |
| 9 | 2452 | 12.63 | 12.76 | 30.00 | -17.24 |
| 10 | 2457 | 11.78 | 11.91 | 30.00 | -18.09 |
| High | 2462 | 10.69 | 10.82 | 30.00 | -19.18 |

8.3.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-247 5.2 (2)

RESULTS

Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

Chain 0

| Duty Cycle CF (dB) | 0.13 | Included in Calculations of Corr'd PSD |
|--------------------|------|--|
| PSD Results | | • |

| Channel | Frequency | Chain 0 | Total | Limit | Margin |
|---------|-----------|---------|--------|-------|--------|
| | | Meas | Corr'd | | |
| | (MHz) | (dBm) | PSD | | |
| | | | (dBm) | (dBm) | (dB) |
| Low | 2412 | -9.04 | -8.91 | 8.0 | -16.9 |
| Mid | 2437 | -10.11 | -9.98 | 8.0 | -18.0 |
| High | 2462 | -10.18 | -10.05 | 8.0 | -18.1 |

Chain 1

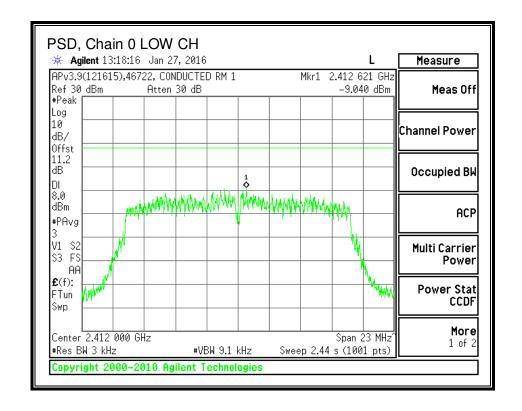
| Duty C | ycle CF (dB) | 0.13 | Included in Calculations of Corr'd PSD | | | |
|-------------|--------------|---------|--|-------|--------|--|
| PSD Results | | | | | | |
| Channel | Frequency | Chain 0 | Total | Limit | Margin | |

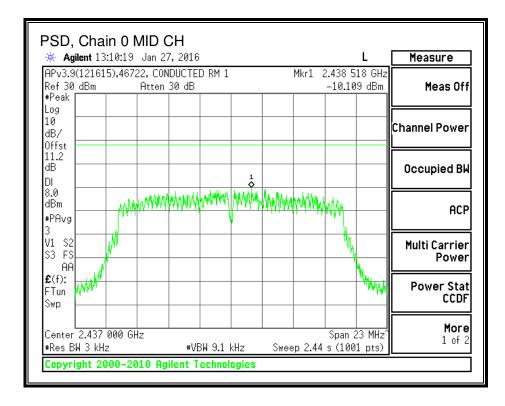
| Channel | Frequency | Chain 0 | Total | Limit | Margin |
|---------|-----------|---------|--------|-------|--------|
| | | Meas | Corr'd | | |
| | (MHz) | (dBm) | PSD | | |
| | | | (dBm) | (dBm) | (dB) |
| Low | 2412 | -10.05 | -9.92 | 8.0 | -17.9 |
| Mid | 2437 | -9.50 | -9.37 | 8.0 | -17.4 |
| High | 2462 | -8.72 | -8.59 | 8.0 | -16.6 |

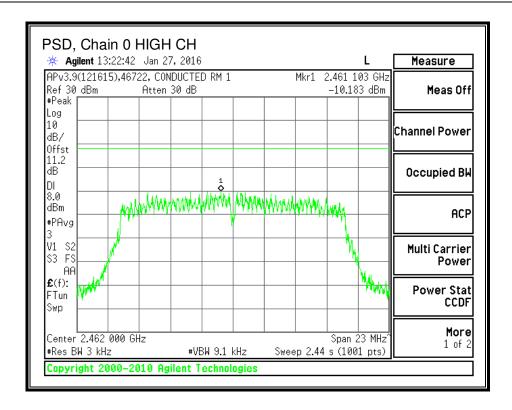
FORM NO: 03-EM-F00858

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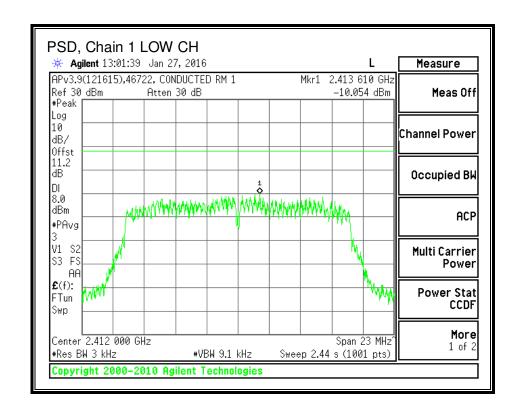
PSD, Chain 0

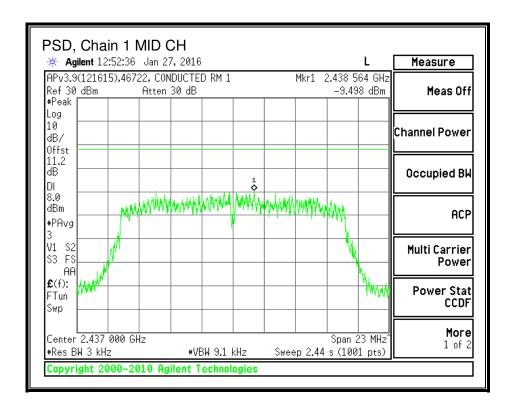


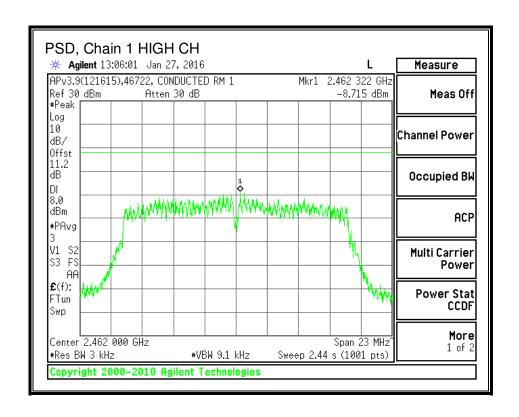




PSD, Chain 1







8.3.5. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-247 5.5

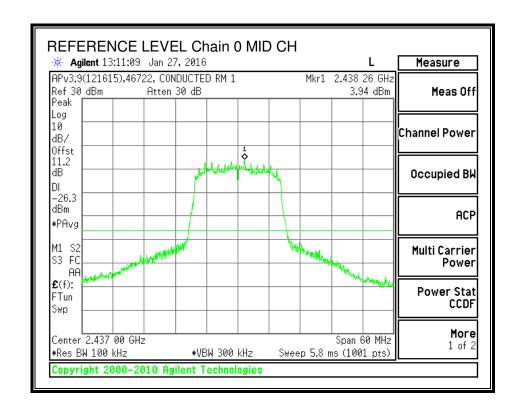
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

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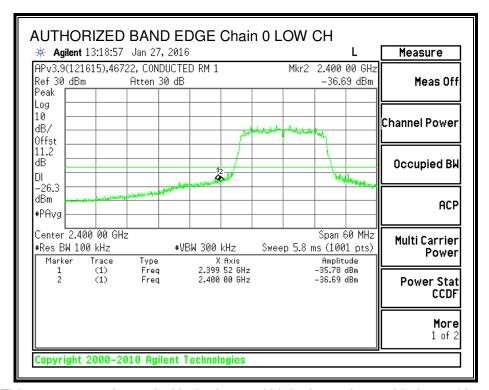
RESULTS

IN-BAND REFERENCE LEVEL, Chain 0



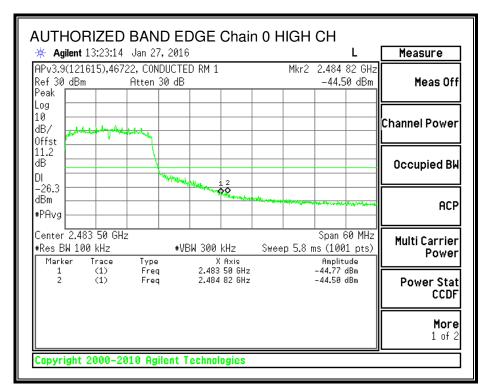
REPORT NO: R11093405-E1 DATE: 2016-04-05 FCC ID: 2AHES-COMGEN1 IC: 21152-COMGEN1

LOW CHANNEL BANDEDGE, Chain 0



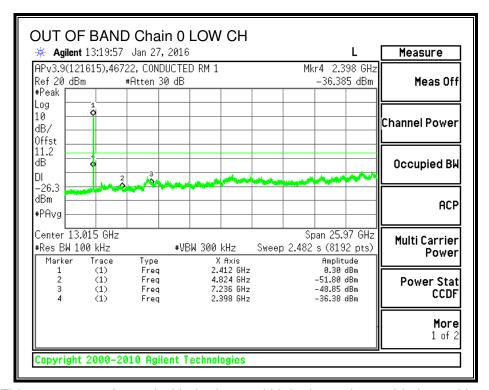
Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

HIGH CHANNEL BANDEDGE, Chain 0

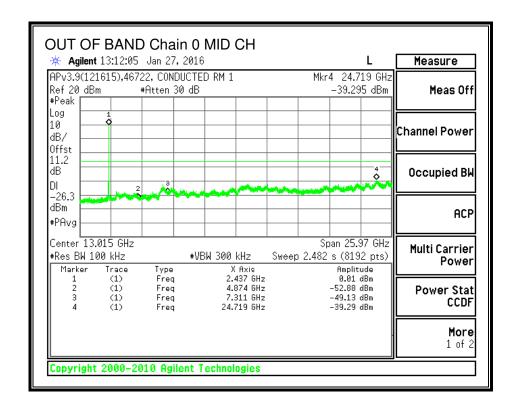


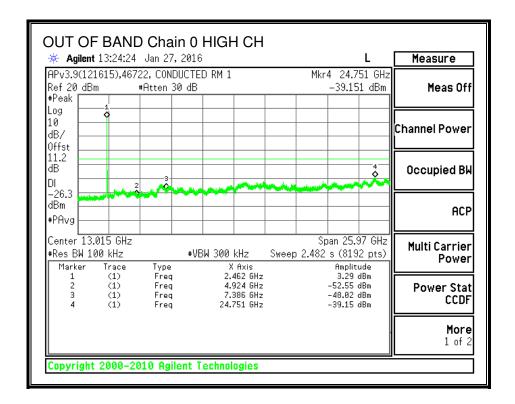
Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

OUT-OF-BAND EMISSIONS, Chain 0



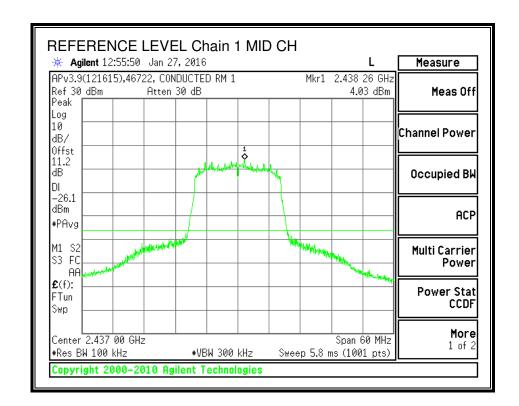
Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.





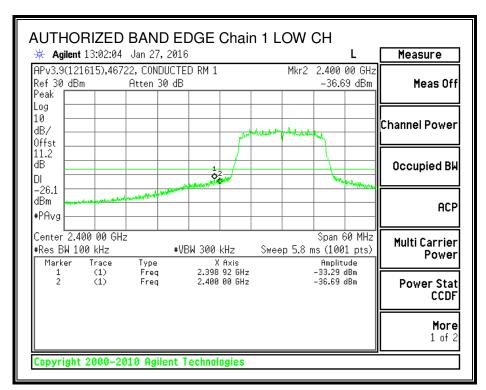
Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

IN-BAND REFERENCE LEVEL, Chain 1



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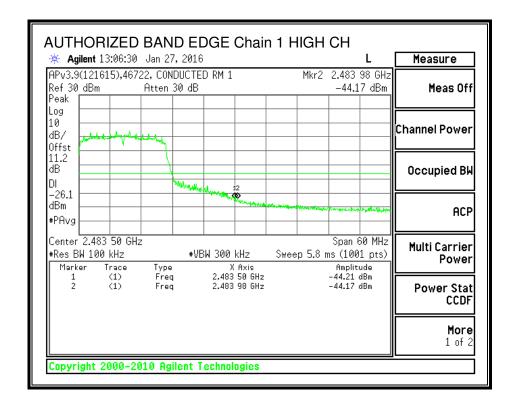
LOW CHANNEL BANDEDGE, Chain 1



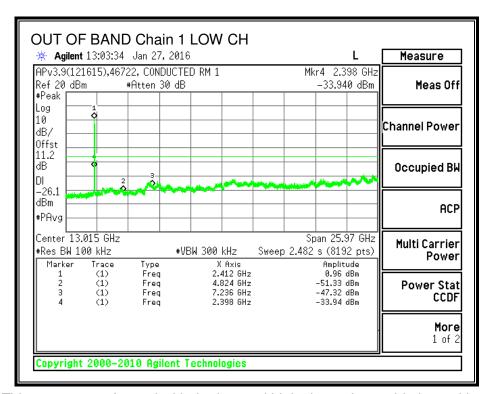
Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

REPORT NO: R11093405-E1 DATE: 2016-04-05 FCC ID: 2AHES-COMGEN1 IC: 21152-COMGEN1

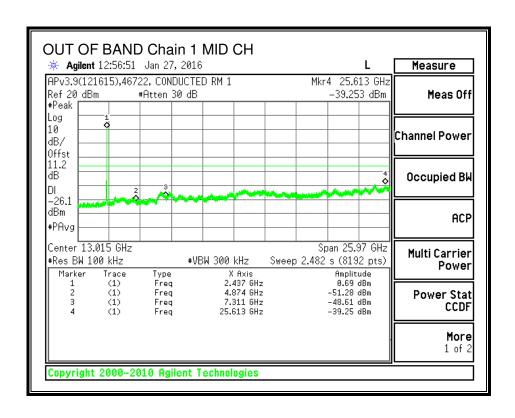
HIGH CHANNEL BANDEDGE, Chain 1

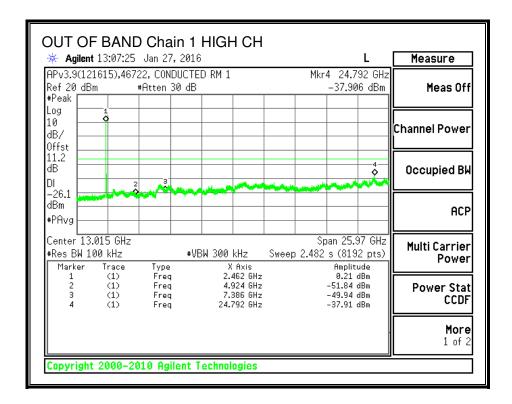


Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.



Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.





Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

8.4. 802.11n HT20 MODE IN THE 2.4 GHz BAND

8.4.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-247 5.2 (1)

The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

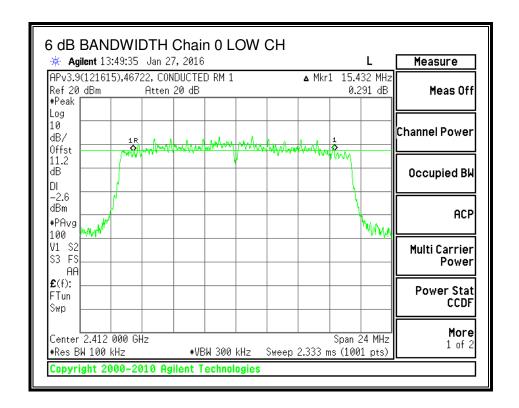
| Channel | Frequency | 6 dB BW | 6 dB BW | Minimum |
|---------|-----------|---------|---------|---------|
| | | Chain 0 | Chain 1 | Limit |
| | (MHz) | (MHz) | (MHz) | (MHz) |
| Low | 2412 | 15.432 | 15.720 | 0.5 |
| Mid | 2437 | 15.111 | 15.134 | 0.5 |
| High | 2462 | 16.050 | 16.100 | 0.5 |

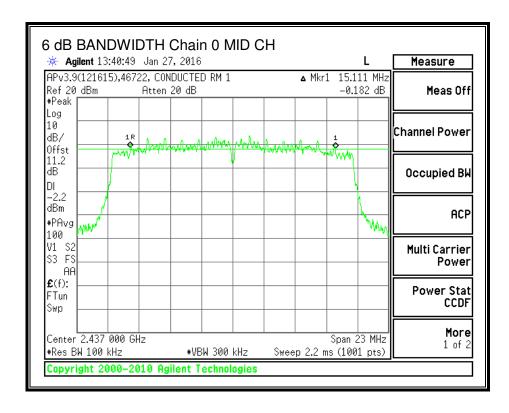
Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

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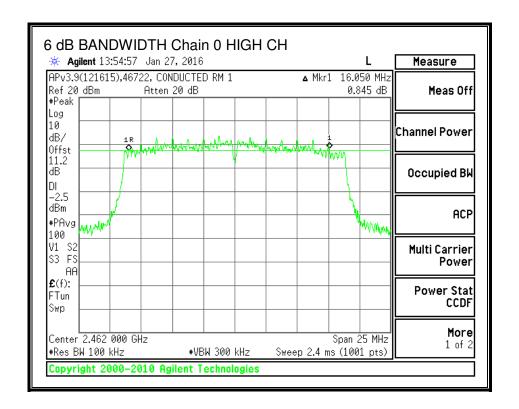
DATE: 2016-04-05

6 dB BANDWIDTH, Chain 0

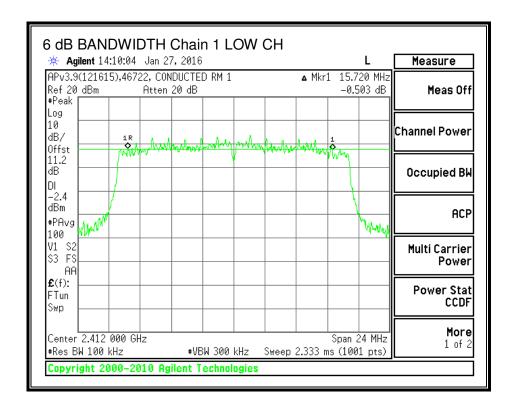


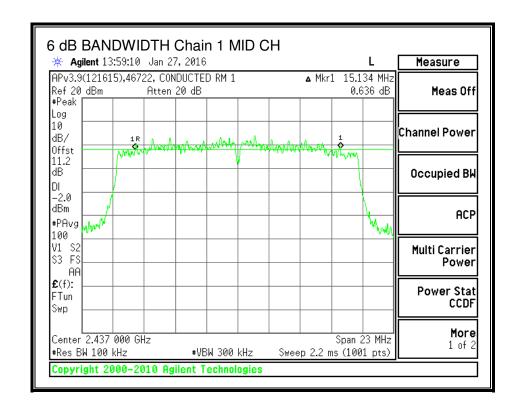


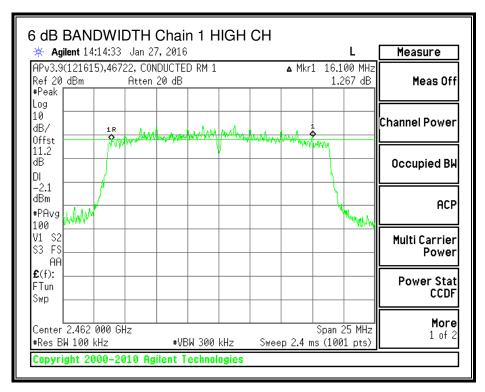
DATE: 2016-04-05



6 dB BANDWIDTH, Chain 1







8.4.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

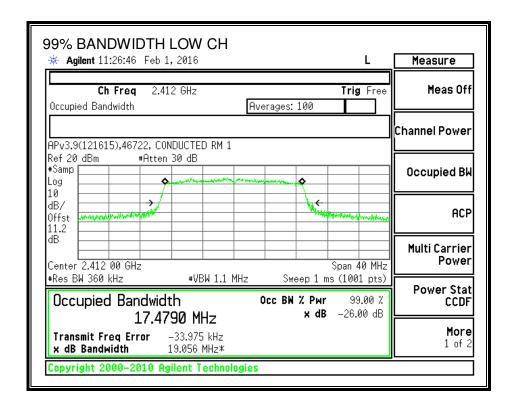
RESULTS

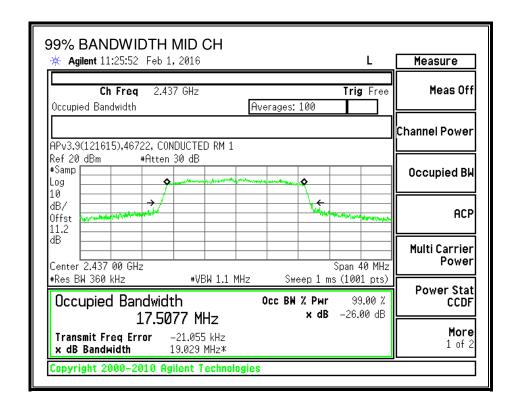
Chain 0

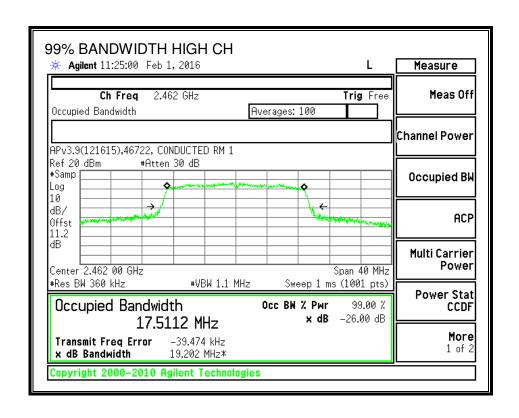
| Channel | Frequency | 99% Bandwidth |
|---------|-----------|---------------|
| | (MHz) | (MHz) |
| Low | 2412 | 17.4790 |
| Mid | 2437 | 17.5077 |
| High | 2462 | 17.5112 |

Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

99% BANDWIDTH



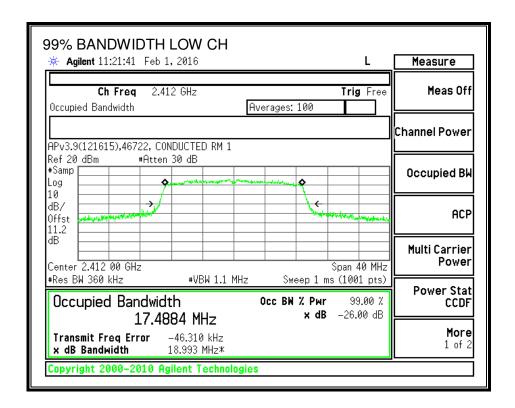


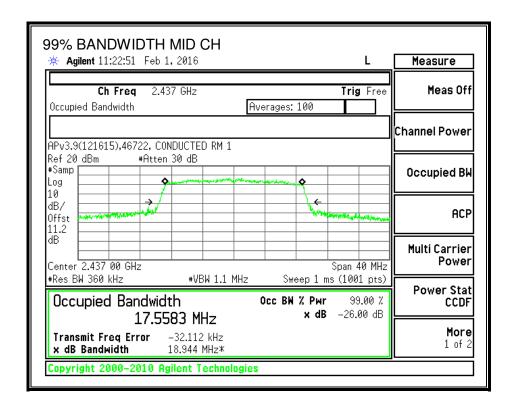


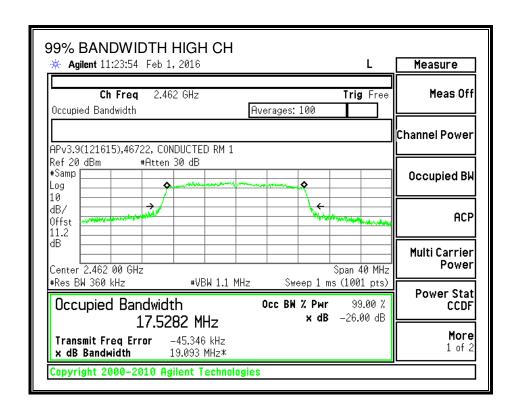
Chain 1

| Channel | Frequency | 99% Bandwidth |
|---------|-----------|---------------|
| | (MHz) | (MHz) |
| Low | 2412 | 17.4884 |
| Mid | 2437 | 17.5583 |
| High | 2462 | 17.5282 |

99% BANDWIDTH







8.4.3. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-247 5.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter chain operating at one time, therefore the directional gain is equal to the antenna gain of that chain.

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RESULTS

Chain 0

Limits

| Channel | Frequency | Directional | FCC | IC | IC | Max |
|---------|-----------|-------------|-------|-------|-------|-------|
| | | Gain | Power | Power | EIRP | Power |
| | | | Limit | Limit | Limit | |
| | (MHz) | (dBi) | (dBm) | (dBm) | (dBm) | (dBm) |
| Low | 2412 | 0.70 | 30.00 | 30 | 36 | 30.00 |
| 2 | 2417 | 0.70 | 30.00 | 30 | 36 | 30.00 |
| 3 | 2422 | 0.70 | 30.00 | 30 | 36 | 30.00 |
| Mid | 2437 | 0.70 | 30.00 | 30 | 36 | 30.00 |
| 9 | 2452 | 0.70 | 30.00 | 30 | 36 | 30.00 |
| 10 | 2457 | 0.70 | 30.00 | 30 | 36 | 30.00 |
| High | 2462 | 0.70 | 30.00 | 30 | 36 | 30.00 |

| Duty Cycle CF (dB) 0.43 Included in Calculations of Corr'd Power |
|--|
|--|

Results

| Channel | Frequency | Chain 0 | Total | Power | Margin |
|---------|-----------|---------|--------|-------|--------|
| | | Meas | Corr'd | Limit | |
| | | Power | Power | | |
| | (MHz) | (dBm) | (dBm) | (dBm) | (dB) |
| Low | 2412 | 10.11 | 10.54 | 30.00 | -19.46 |
| 2 | 2417 | 11.22 | 11.65 | 30.00 | -18.35 |
| 3 | 2422 | 12.10 | 12.53 | 30.00 | -17.47 |
| Mid | 2437 | 12.17 | 12.60 | 30.00 | -17.40 |
| 9 | 2452 | 12.27 | 12.70 | 30.00 | -17.30 |
| 10 | 2457 | 11.43 | 11.86 | 30.00 | -18.14 |
| High | 2462 | 10.12 | 10.55 | 30.00 | -19.45 |

DATE: 2016-04-05

IC: 21152-COMGEN1

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Chain 1

Limits

| Channel | Frequency | Directional | FCC | IC | IC | Max |
|---------|-----------|-------------|-------|-------|-------|-------|
| | | Gain | Power | Power | EIRP | Power |
| | | | Limit | Limit | Limit | |
| | (MHz) | (dBi) | (dBm) | (dBm) | (dBm) | (dBm) |
| Low | 2412 | 0.50 | 30.00 | 30 | 36 | 30.00 |
| 2 | 2417 | 0.50 | 30.00 | 30 | 36 | 30.00 |
| 3 | 2422 | 0.50 | 30.00 | 30 | 36 | 30.00 |
| Mid | 2437 | 0.50 | 30.00 | 30 | 36 | 30.00 |
| 9 | 2452 | 0.50 | 30.00 | 30 | 36 | 30.00 |
| 10 | 2457 | 0.50 | 30.00 | 30 | 36 | 30.00 |
| High | 2462 | 0.50 | 30.00 | 30 | 36 | 30.00 |

| Duty Cycle CF (dB) | 0.43 | Included in Calculations of Corr'd Power |
|--------------------|------|--|
|--------------------|------|--|

Results

| Channel | Frequency | Chain 1 | Total | Power | Margin |
|---------|-----------|---------|--------|-------|--------|
| | | Meas | Corr'd | Limit | |
| | | Power | Power | | |
| | (MHz) | (dBm) | (dBm) | (dBm) | (dB) |
| Low | 2412 | 10.10 | 10.53 | 30.00 | -19.47 |
| 2 | 2417 | 11.09 | 11.52 | 30.00 | -18.48 |
| 3 | 2422 | 12.10 | 12.53 | 30.00 | -17.47 |
| Mid | 2437 | 12.37 | 12.80 | 30.00 | -17.20 |
| 9 | 2452 | 12.33 | 12.76 | 30.00 | -17.24 |
| 10 | 2457 | 11.45 | 11.88 | 30.00 | -18.12 |
| High | 2462 | 10.32 | 10.75 | 30.00 | -19.25 |

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Chain 0 (External Antenna)

Limits

| Channel | Frequency | Directional | FCC | IC | IC | Max |
|---------|-----------|-------------|-------|-------|-------|-------|
| | | Gain | Power | Power | EIRP | Power |
| | | | Limit | Limit | Limit | |
| | (MHz) | (dBi) | (dBm) | (dBm) | (dBm) | (dBm) |
| Low | 2412 | -1.70 | 30.00 | 30 | 36 | 30.00 |
| 2 | 2417 | -1.70 | 30.00 | 30 | 36 | 30.00 |
| 3 | 2422 | -1.70 | 30.00 | 30 | 36 | 30.00 |
| Mid | 2437 | -1.70 | 30.00 | 30 | 36 | 30.00 |
| 9 | 2452 | -1.70 | 30.00 | 30 | 36 | 30.00 |
| 10 | 2457 | -1.70 | 30.00 | 30 | 36 | 30.00 |
| High | 2462 | -1.70 | 30.00 | 30 | 36 | 30.00 |

| Duty Cycle | CF (dB) | 0.43 | Included in Calculations of Corr'd Power |
|-------------------|---------|------|--|
|-------------------|---------|------|--|

Results

| Channel | Frequency | Chain 0 | Total | Power | Margin |
|---------|-----------|---------|--------|-------|--------|
| | | Meas | Corr'd | Limit | |
| | | Power | Power | | |
| | (MHz) | (dBm) | (dBm) | (dBm) | (dB) |
| Low | 2412 | 10.11 | 10.54 | 30.00 | -19.46 |
| 2 | 2417 | 11.22 | 11.65 | 30.00 | -18.35 |
| 3 | 2422 | 12.10 | 12.53 | 30.00 | -17.47 |
| Mid | 2437 | 12.17 | 12.60 | 30.00 | -17.40 |
| 9 | 2452 | 12.27 | 12.70 | 30.00 | -17.30 |
| 10 | 2457 | 11.43 | 11.86 | 30.00 | -18.14 |
| High | 2462 | 10.12 | 10.55 | 30.00 | -19.45 |

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8.4.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-247 5.2 (2)

RESULTS

Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

Included in Calculations of Corr'd PSD

Chain 0

| Duty Cycle CF (dB) 0.43 Included in Calculations of Corr'd PS | | | | | | |
|---|-----------|---------|--------|-------|--------|--|
| PSD Resu | ults | | | | | |
| Channel | Frequency | Chain 0 | Total | Limit | Margin | |
| | | Meas | Corr'd | | | |
| | (MHz) | (dBm) | PSD | | | |
| | | | (dBm) | (dBm) | (dB) | |
| Low | 2412 | -10.88 | -10.45 | 8.0 | -18.5 | |
| Mid | 2437 | -9.96 | -9.53 | 8.0 | -17.5 | |
| High | 2462 | -11.44 | -11.01 | 8.0 | -19.0 | |

Chain 1

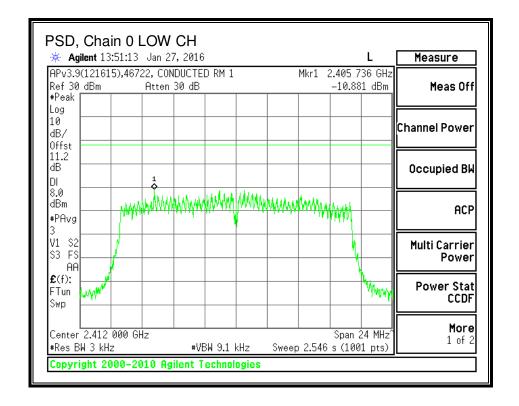
Duty Cycle CF (dB)

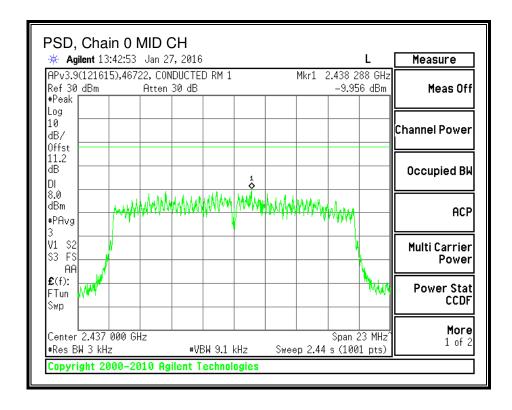
| PSD Resu | ults | | | | |
|----------|-----------|---------|--------|-------|--------|
| Channel | Frequency | Chain 0 | Total | Limit | Margin |
| | | Meas | Corr'd | | |
| | (MHz) | (dBm) | PSD | | |
| | | | (dBm) | (dBm) | (dB) |
| Low | 2412 | -11.09 | -10.66 | 8.0 | -18.7 |
| Mid | 2437 | -11.64 | -11.21 | 8.0 | -19.2 |
| High | 2462 | -10.80 | -10.37 | 8.0 | -18.4 |

0.43

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PSD, Chain 0

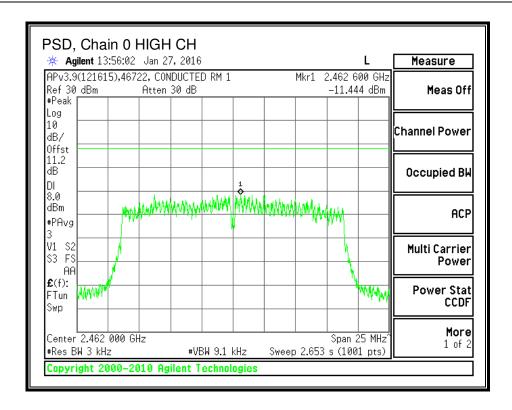




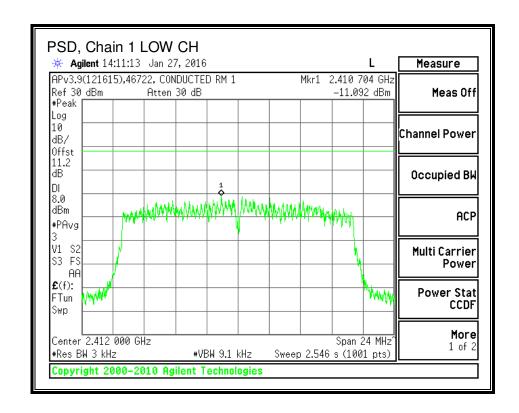
DATE: 2016-04-05

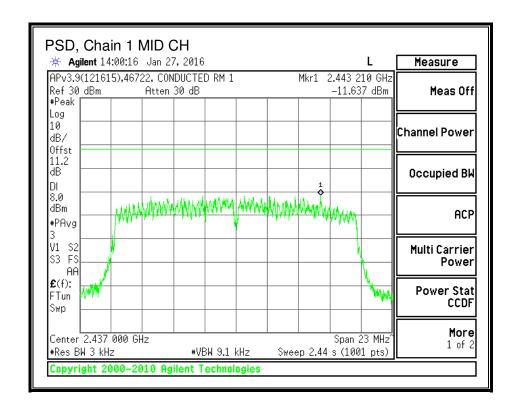
IC: 21152-COMGEN1

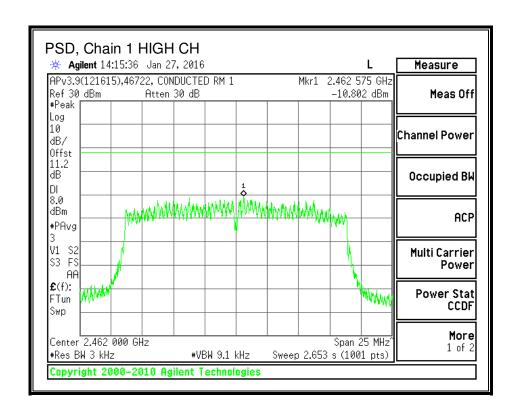
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PSD, Chain 1







8.4.5. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-247 5.5

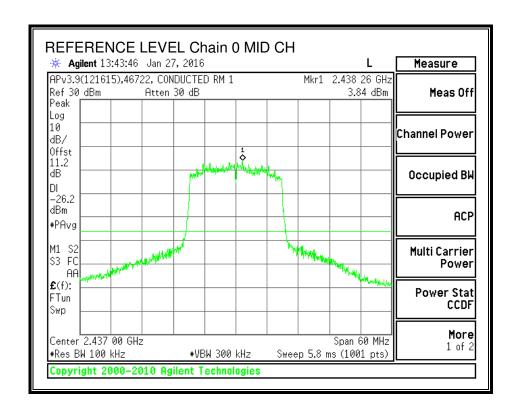
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

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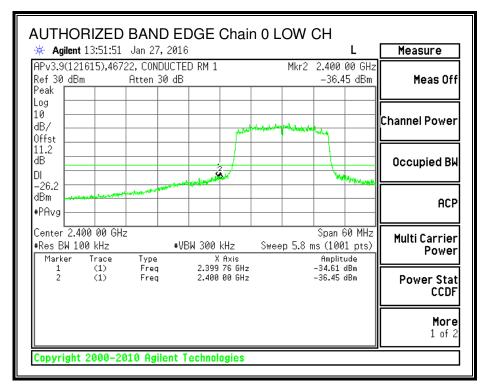
RESULTS

IN-BAND REFERENCE LEVEL, Chain 0



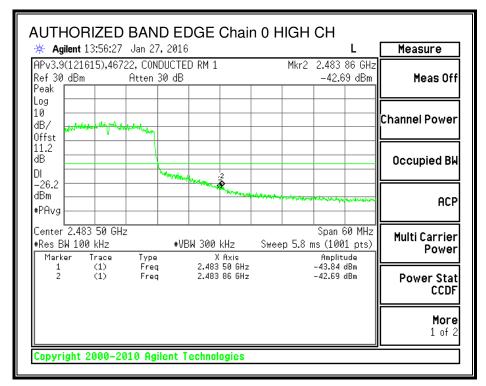
REPORT NO: R11093405-E1 DATE: 2016-04-05 FCC ID: 2AHES-COMGEN1 IC: 21152-COMGEN1

LOW CHANNEL BANDEDGE, Chain 0



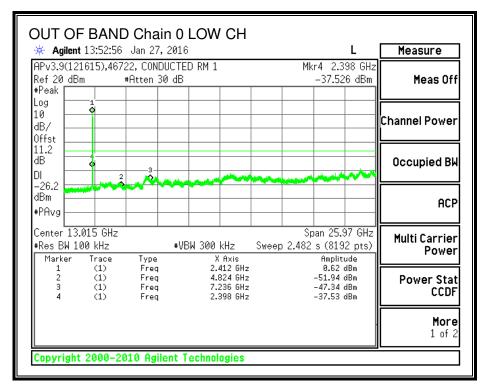
Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

HIGH CHANNEL BANDEDGE, Chain 0

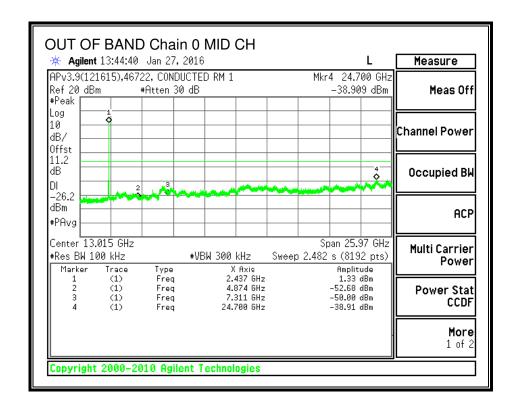


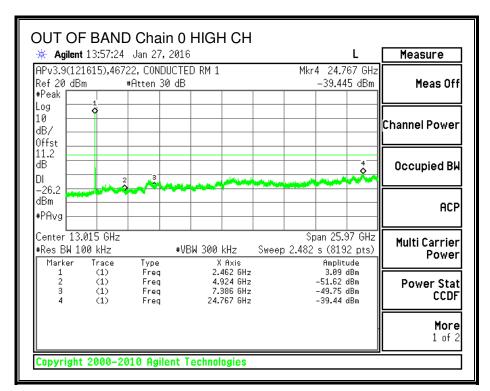
Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

OUT-OF-BAND EMISSIONS, Chain 0



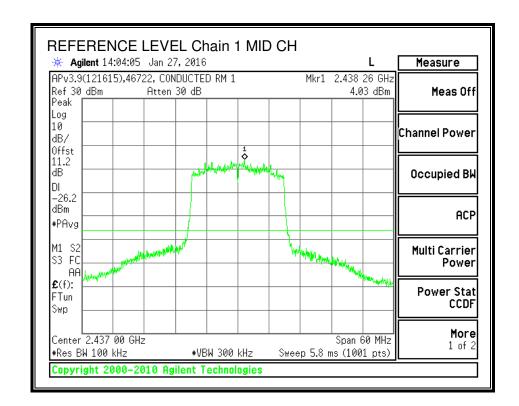
Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.





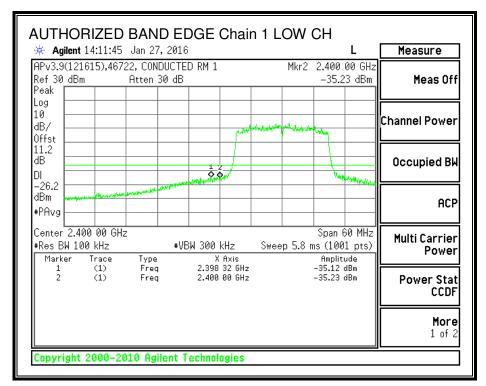
Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

IN-BAND REFERENCE LEVEL, Chain 1



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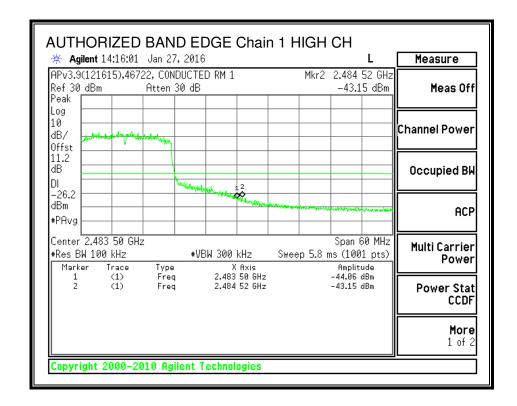
LOW CHANNEL BANDEDGE, Chain 1



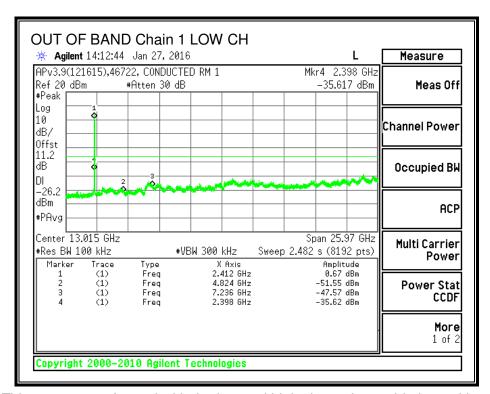
Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

REPORT NO: R11093405-E1 DATE: 2016-04-05 FCC ID: 2AHES-COMGEN1 IC: 21152-COMGEN1

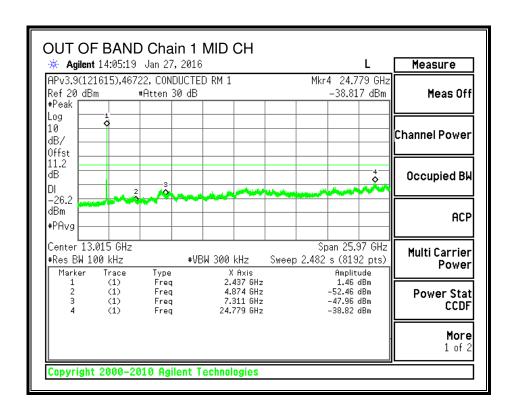
HIGH CHANNEL BANDEDGE, Chain 1

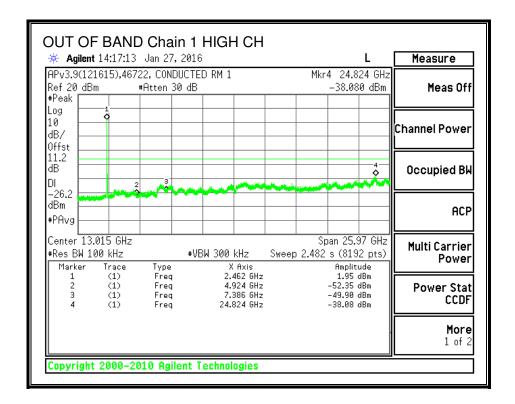


Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.



Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.





Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-GEN Clause 8.9 (Transmitter)

IC RSS-GEN Clause 7.1.2 (Receiver)

| Frequency Range (MHz) | Field Strength Limit (uV/m) at 3 m | Field Strength Limit (dBuV/m) at 3 m |
|-----------------------|---------------------------------------|---|
| 0.009-0.490 | 2400/F(kHz) @ 300 m | - |
| 0.490-1.705 | 24000/F(kHz) @ 30 m | - |
| 30 - 88 | 100 | 40 |
| 88 - 216 | 150 | 43.5 |
| 216 - 960 | 200 | 46 |
| Above 960 | 500 | 54 |

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz measurements and 1.5 m above the ground plane for above 1GHz measurements. The antenna to EUT distance is 3 meters.

For measurements below 1 GHz the resolution bandwidth is set to 120 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements for the 30-1000 MHz range, 9 kHz for peak detection measurements or 9 kHz for quasi-peak detection measurements for the 0.15-30 MHz range and 200 Hz for peak detection measurements or 200 Hz for quasi-peak detection measurements for the 9 to 150 kHz range. Peak detection is used unless otherwise noted as quasi-peak.

For peak measurements above 1 GHz, the resolution bandwidth is set to 1 MHz and the video bandwidth is set to 3 MHz. For average measurements above 1GHz, the resolution bandwidth and video bandwidth are set as described in ANSI C63.10:2013 for the applicable measurement. The averaging method used for this test program was Power Averaging (RMS).

The spectrum from 9 kHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band, except where noted.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

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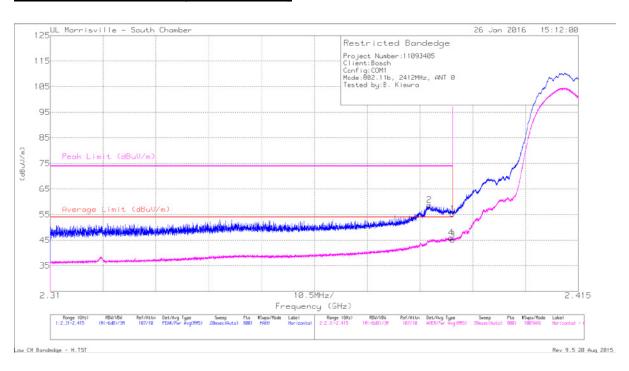
DATE: 2016-04-05

9.2. TRANSMITTER 1-18 GHz

9.2.1. TX 1-18 GHz 802.11b MODE IN THE 2.4 GHz BAND

Chain 0 (Internal Antenna)

RESTRICTED BANDEDGE (LOW CHANNEL)



Trace Markers

| Marker | Frequency | Meter | Det | AF | Amp/Cbl | DC Corr | Corrected | Average | Margin | Peak Limit | PK | Azimuth | Height | Polarity |
|--------|-----------|---------|-----|--------|-----------|---------|-----------|----------|--------|-------------------|--------|---------|--------|----------|
| | (GHz) | Reading | | AT0069 | /Fltr/Pad | (dB) | Reading | Limit | (dB) | (dBuV/m) | Margin | (Degs) | (cm) | |
| | | (dBuV) | | (dB/m) | (dB) | | (dBuV/m) | (dBuV/m) | | | (dB) | | | |
| 1 | * 2.39 | 47.52 | Pk | 32 | -24.2 | 0 | 55.32 | - | - | 74 | -18.68 | 28 | 140 | Н |
| 2 | * 2.385 | 50.9 | Pk | 32 | -24.1 | 0 | 58.8 | - | - | 74 | -15.2 | 28 | 140 | Н |
| 3 | * 2.39 | 37.4 | RMS | 32 | -24.2 | 0 | 45.2 | 54 | -8.8 | - | - | 28 | 140 | Н |
| 4 | * 2.39 | 38.05 | RMS | 32 | -24.1 | 0 | 45.95 | 54 | -8.05 | - | - | 28 | 140 | Н |

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

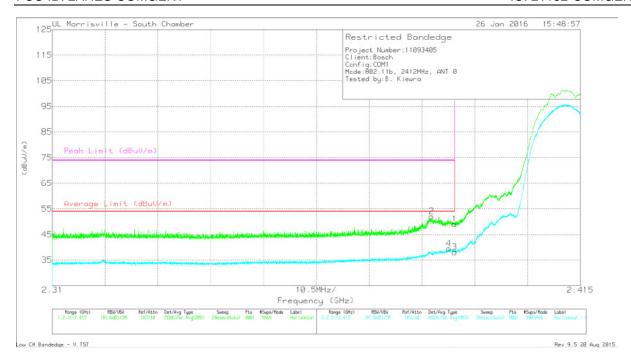
Pk - Peak detector

RMS - RMS detection

DATE: 2016-04-05

IC: 21152-COMGEN1

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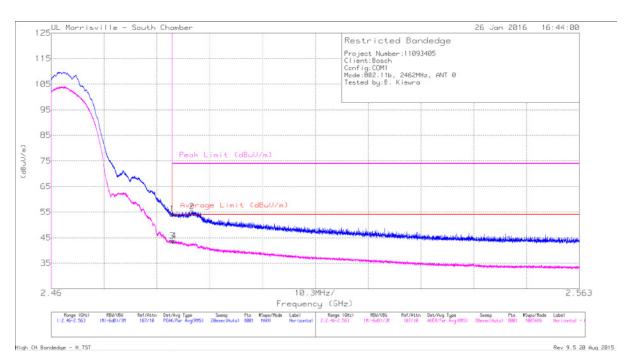
Trace Markers

| Marker | Frequency | Meter | Det | AF | Amp/Cbl | DC Corr | Corrected | Average | Margin | Peak Limit | PK | Azimuth | Height | Polarity |
|--------|-----------|---------|-----|--------|-----------|---------|-----------|----------|--------|------------|--------|---------|--------|----------|
| | (GHz) | Reading | | AT0069 | /Fltr/Pad | (dB) | Reading | Limit | (dB) | (dBuV/m) | Margin | (Degs) | (cm) | |
| | | (dBuV) | | (dB/m) | (dB) | | (dBuV/m) | (dBuV/m) | | | (dB) | | | |
| 1 | * 2.39 | 41.25 | Pk | 32 | -24.2 | 0 | 49.05 | - | - | 74 | -24.95 | 81 | 384 | V |
| 2 | * 2.385 | 44.2 | Pk | 32 | -24.1 | 0 | 52.1 | - | - | 74 | -21.9 | 81 | 384 | V |
| 3 | * 2.39 | 30.33 | RMS | 32 | -24.2 | 0 | 38.13 | 54 | -15.87 | - | - | 81 | 384 | V |
| 4 | * 2.389 | 31.6 | RMS | 32 | -24.1 | 0 | 39.5 | 54 | -14.5 | - | - | 81 | 384 | V |

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)



Trace Markers

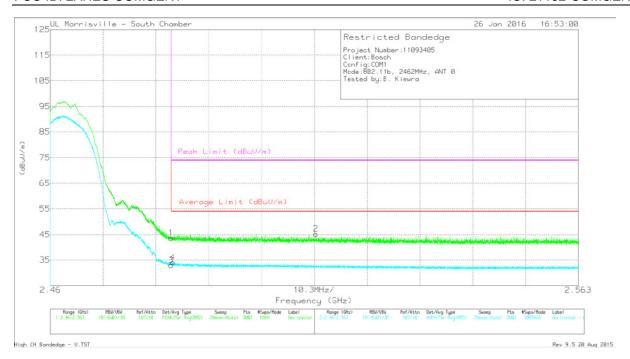
| Marker | Frequency | Meter | Det | AF | Amp/Cbl | DC Corr | Corrected | Average | Margin | Peak Limit | PK | Azimuth | Height | Polarity |
|--------|-----------|---------|-----|--------|-----------|---------|-----------|----------|--------|------------|--------|---------|--------|----------|
| | (GHz) | Reading | | AT0069 | /Fltr/Pad | (dB) | Reading | Limit | (dB) | (dBuV/m) | Margin | (Degs) | (cm) | |
| | | (dBuV) | | (dB/m) | (dB) | | (dBuV/m) | (dBuV/m) | | | (dB) | | | |
| 1 | * 2.484 | 46.86 | Pk | 32.1 | -24.7 | 0 | 54.26 | - | - | 74 | -19.74 | 13 | 178 | Н |
| 2 | * 2.487 | 47.88 | Pk | 32.1 | -24.7 | 0 | 55.28 | - | - | 74 | -18.72 | 13 | 178 | Н |
| 3 | * 2.484 | 36.44 | RMS | 32.1 | -24.7 | 0 | 43.84 | 54 | -10.16 | - | - | 13 | 178 | Н |
| 4 | * 2.484 | 36.34 | RMS | 32.1 | -24.7 | 0 | 43.74 | 54 | -10.26 | - | - | 13 | 178 | Н |

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

DATE: 2016-04-05



Trace Markers

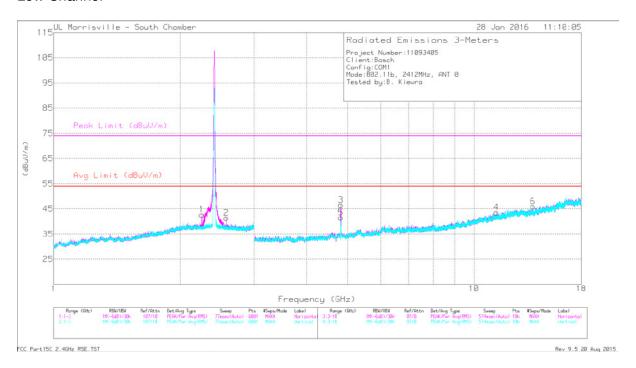
| Marker | Frequency | Meter | Det | AF | Amp/Cbl | DC Corr | Corrected | Average | Margin | Peak Limit | PK | Azimuth | Height | Polarity |
|--------|-----------|---------|-----|--------|-----------|---------|-----------|----------|--------|------------|--------|---------|--------|----------|
| | (GHz) | Reading | | AT0069 | /Fltr/Pad | (dB) | Reading | Limit | (dB) | (dBuV/m) | Margin | (Degs) | (cm) | |
| | | (dBuV) | | (dB/m) | (dB) | | (dBuV/m) | (dBuV/m) | | | (dB) | | | |
| 1 | * 2.484 | 36.25 | Pk | 32.1 | -24.7 | 0 | 43.65 | - | - | 74 | -30.35 | 137 | 317 | V |
| 3 | * 2.484 | 25.62 | RMS | 32.1 | -24.7 | 0 | 33.02 | 54 | -20.98 | - | - | 137 | 317 | V |
| 4 | * 2.484 | 26.68 | RMS | 32.1 | -24.7 | 0 | 34.08 | 54 | -19.92 | - | - | 137 | 317 | V |
| 2 | 2.512 | 38.02 | Pk | 32.1 | -24.9 | 0 | 45.22 | - | - | 74 | -28.78 | 137 | 317 | V |

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

Low Channel



| Marker | Frequency | Meter | Det | AF | Amp/Cbl | DC Corr | Corrected | Avg Limit | Margin | Peak Limit | PK | Azimuth | Height | Polarity |
|--------|-----------|---------|------|--------|----------|---------|-----------|-----------|--------|------------|--------|---------|--------|----------|
| | (GHz) | Reading | | AT0069 | /Fltr/Pa | (dB) | Reading | (dBuV/m) | (dB) | (dBuV/m) | Margin | (Degs) | (cm) | |
| | | (dBuV) | | (dB/m) | d (dB) | | (dBuV/m) | | | | (dB) | | | |
| 1 | * 2.251 | 39.37 | PK2 | 31.8 | -23.6 | 0 | 47.57 | - | - | 74 | -26.43 | 15 | 133 | Н |
| | * 2.252 | 26.51 | MAv1 | 31.8 | -23.6 | 0 | 34.71 | 54 | -19.29 | - | - | 15 | 133 | Н |
| 3 | * 4.824 | 49.03 | PK2 | 34 | -31.7 | 0 | 51.33 | - | - | 74 | -22.67 | 196 | 159 | Н |
| | * 4.824 | 36.29 | MAv1 | 34 | -31.7 | 0 | 38.59 | 54 | -15.41 | - | - | 196 | 159 | Н |
| 4 | * 11.316 | 34.95 | PK2 | 38.2 | -24.3 | 0 | 48.85 | - | - | 74 | -25.15 | 167 | 266 | Н |
| | * 11.315 | 23.36 | MAv1 | 38.2 | -24.3 | 0 | 37.26 | 54 | -16.74 | - | - | 167 | 266 | Н |
| 5 | * 4.824 | 44.7 | PK2 | 34 | -31.7 | 0 | 47 | - | - | 74 | -27 | 48 | 320 | V |
| | * 4.824 | 32.25 | MAv1 | 34 | -31.7 | 0 | 34.55 | 54 | -19.45 | - | - | 48 | 320 | V |
| 2 | 2.572 | 34.44 | Pk | 32.2 | -25.2 | 0 | 41.44 | - | - | - | - | 0-360 | 102 | Н |
| 6 | 13.81 | 32.24 | Pk | 39 | -25.3 | 0 | 45.94 | - | - | - | - | 0-360 | 102 | V |

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

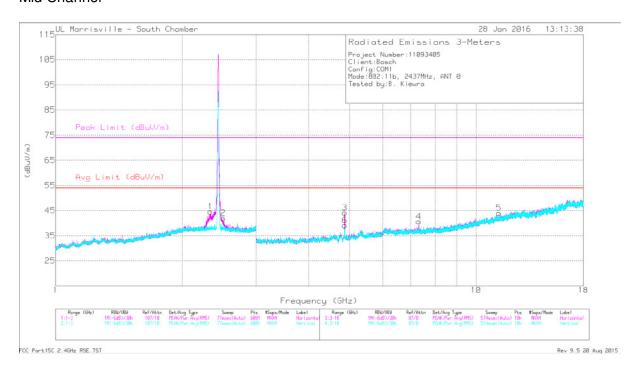
Pk - Peak detector

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

DATE: 2016-04-05 IC: 21152-COMGEN1

Mid Channel



| Marker | Frequency | Meter | Det | AF | Amp/Cbl/ | DC Corr | Corrected | Avg Limit | Margin | Peak Limit | PK | Azimuth | Height | Polarity |
|--------|-----------|---------|------|--------|----------|---------|-----------|-----------|--------|------------|--------|---------|--------|----------|
| | (GHz) | Reading | | AT0069 | Fltr/Pad | (dB) | Reading | (dBuV/m) | (dB) | (dBuV/m) | Margin | (Degs) | (cm) | |
| | | (dBuV) | | (dB/m) | (dB) | | (dBuV/m) | | | | (dB) | | | |
| 1 | * 2.332 | 45.98 | PK2 | 31.9 | -23.9 | 0 | 53.98 | - | - | 74 | -20.02 | 13 | 107 | Н |
| | * 2.333 | 31.66 | MAv1 | 31.9 | -23.9 | 0 | 39.66 | 54 | -14.34 | - | - | 13 | 107 | Н |
| 3 | * 4.874 | 47.61 | PK2 | 34 | -31.6 | 0 | 50.01 | - | - | 74 | -23.99 | 321 | 132 | Н |
| | * 4.874 | 36.52 | MAv1 | 34 | -31.6 | 0 | 38.92 | 54 | -15.08 | - | - | 321 | 132 | Н |
| 4 | * 7.311 | 39.57 | PK2 | 35.5 | -28.3 | 0 | 46.77 | - | - | 74 | -27.23 | 170 | 102 | Н |
| | * 7.31 | 26.87 | MAv1 | 35.5 | -28.3 | 0 | 34.07 | 54 | -19.93 | - | - | 170 | 102 | Н |
| 5 | * 11.339 | 34.64 | PK2 | 38.2 | -24.1 | 0 | 48.74 | - | - | 74 | -25.26 | 195 | 185 | Н |
| | * 11.338 | 23.55 | MAv1 | 38.2 | -24.1 | 0 | 37.65 | 54 | -16.35 | - | - | 195 | 185 | Н |
| 6 | * 4.874 | 44.47 | PK2 | 34 | -31.6 | 0 | 46.87 | - | - | 74 | -27.13 | 358 | 377 | V |
| | * 4.874 | 32.89 | MAv1 | 34 | -31.6 | 0 | 35.29 | 54 | -18.71 | - | - | 358 | 377 | V |
| 2 | 2.503 | 34.65 | Pk | 32.1 | -24.8 | 0 | 41.95 | - | - | - | - | 0-360 | 199 | Н |

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

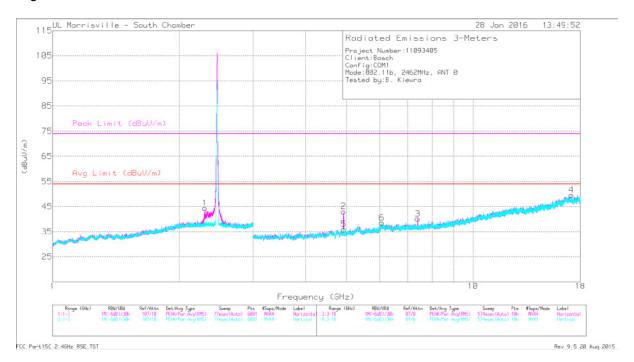
Pk - Peak detector

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

DATE: 2016-04-05

High Channel



Trace Markers

| Marker | Frequency | Meter | Det | AF | Amp/Cbl | DC Corr | Corrected | Avg Limit | Margin | Peak Limit | PK | Azimuth | Height | Polarity |
|--------|-----------|---------|------|--------|-----------|---------|-----------|-----------|--------|------------|--------|---------|--------|----------|
| | (GHz) | Reading | | AT0069 | /Fltr/Pad | (dB) | Reading | (dBuV/m) | (dB) | (dBuV/m) | Margin | (Degs) | (cm) | |
| | | (dBuV) | | (dB/m) | (dB) | | (dBuV/m) | | | | (dB) | | | |
| 2 | * 4.924 | 46.71 | PK2 | 33.9 | -31.5 | 0 | 49.11 | - | - | 74 | -24.89 | 100 | 108 | Н |
| | * 4.924 | 34.53 | MAv1 | 33.9 | -31.6 | 0 | 36.83 | 54 | -17.17 | - | - | 100 | 108 | Н |
| 3 | * 7.385 | 38.49 | PK2 | 35.6 | -28.3 | 0 | 45.79 | - | - | 74 | -28.21 | 166 | 103 | Н |
| | * 7.385 | 26.36 | MAv1 | 35.6 | -28.3 | 0 | 33.66 | 54 | -20.34 | - | - | 166 | 103 | Н |
| 5 | * 4.929 | 41.45 | PK2 | 33.9 | -31.4 | 0 | 43.95 | - | - | 74 | -30.05 | 351 | 307 | V |
| | * 4.929 | 32.29 | MAv1 | 33.9 | -31.4 | 0 | 34.79 | 54 | -19.21 | - | - | 351 | 307 | V |
| 1 | 2.302 | 36.3 | Pk | 31.9 | -23.8 | 0 | 44.4 | - | - | - | - | 0-360 | 199 | Н |
| 6 | 6.069 | 32.27 | Pk | 35.1 | -28.8 | 0 | 38.57 | - | - | - | - | 0-360 | 101 | V |
| 4 | 17.148 | 31.44 | Pk | 41.8 | -23.6 | 0 | 49.64 | - | - | - | - | 0-360 | 102 | Н |

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

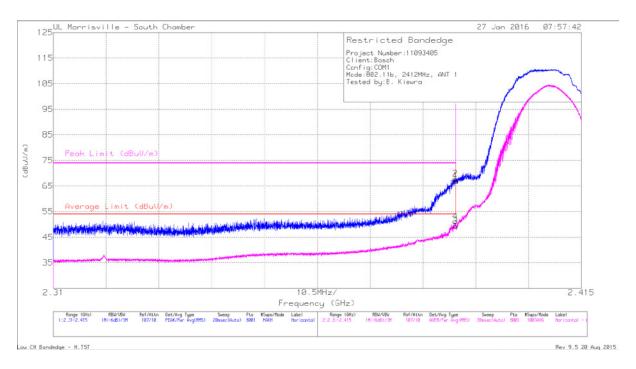
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

DATE: 2016-04-05

Chain 1

RESTRICTED BANDEDGE (LOW CHANNEL)

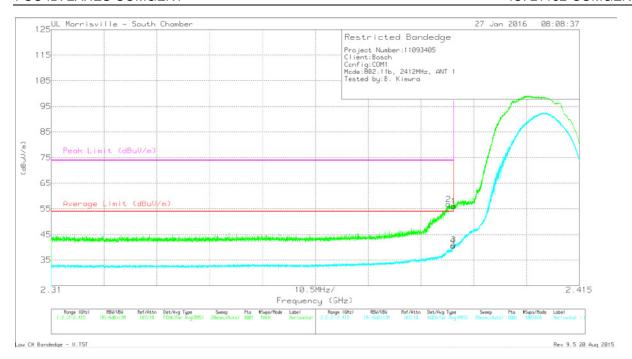


Trace Markers

| Marker | Frequency | Meter | Det | AF | Amp/Cbl | DC Corr | Corrected | Average | Margin | Peak Limit | PK | Azimuth | Height | Polarity |
|--------|-----------|---------|-----|--------|-----------|---------|-----------|----------|--------|-------------------|--------|---------|--------|----------|
| | (GHz) | Reading | | AT0069 | /Fltr/Pad | (dB) | Reading | Limit | (dB) | (dBuV/m) | Margin | (Degs) | (cm) | |
| | | (dBuV) | | (dB/m) | (dB) | | (dBuV/m) | (dBuV/m) | | | (dB) | | | |
| 1 | * 2.39 | 59.31 | Pk | 32 | -24.2 | 0 | 67.11 | - | - | 74 | -6.89 | 173 | 115 | Н |
| 2 | * 2.39 | 60.03 | Pk | 32 | -24.2 | 0 | 67.83 | - | - | 74 | -6.17 | 173 | 115 | Н |
| 3 | * 2.39 | 41.58 | RMS | 32 | -24.2 | 0 | 49.38 | 54 | -4.62 | - | - | 173 | 115 | Н |
| 4 | * 2.39 | 43.39 | RMS | 32 | -24.2 | 0 | 51.19 | 54 | -2.81 | - | - | 173 | 115 | Н |

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector RMS - RMS detection DATE: 2016-04-05



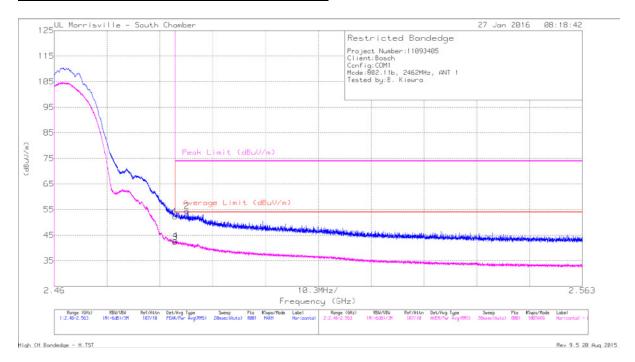
Trace Markers

| Marker | Frequency | Meter | Det | AF | Amp/Cbl | DC Corr | Corrected | Average | Margin | Peak Limit | PK | Azimuth | Height | Polarity |
|--------|-----------|---------|-----|--------|-----------|---------|-----------|----------|--------|------------|--------|---------|--------|----------|
| | (GHz) | Reading | | AT0069 | /Fltr/Pad | (dB) | Reading | Limit | (dB) | (dBuV/m) | Margin | (Degs) | (cm) | |
| | | (dBuV) | | (dB/m) | (dB) | | (dBuV/m) | (dBuV/m) | | | (dB) | | | |
| 1 | * 2.39 | 48.19 | Pk | 32 | -24.2 | 0 | 55.99 | - | - | 74 | -18.01 | 330 | 401 | V |
| 2 | * 2.389 | 48.8 | Pk | 32 | -24.1 | 0 | 56.7 | - | - | 74 | -17.3 | 330 | 401 | V |
| 3 | * 2.39 | 33.16 | RMS | 32 | -24.2 | 0 | 40.96 | 54 | -13.04 | - | - | 330 | 401 | V |
| 4 | * 2.39 | 32.76 | RMS | 32 | -24.2 | 0 | 40.56 | 54 | -13.44 | - | - | 330 | 401 | V |

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)



Trace Markers

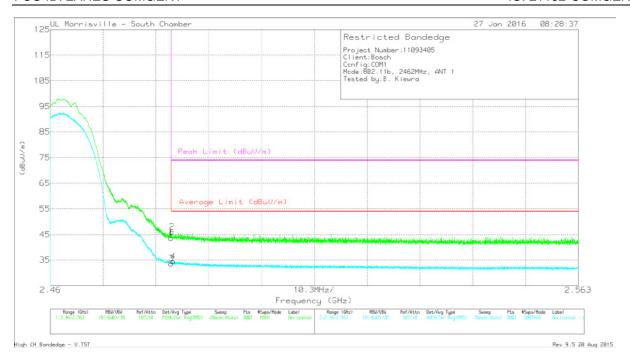
| Marker | Frequency | Meter | Det | AF | Amp/Cbl | DC Corr | Corrected | Average | Margin | Peak Limit | PK | Azimuth | Height | Polarity |
|--------|-----------|---------|-----|--------|-----------|---------|-----------|----------|--------|------------|--------|---------|--------|----------|
| | (GHz) | Reading | | AT0069 | /Fltr/Pad | (dB) | Reading | Limit | (dB) | (dBuV/m) | Margin | (Degs) | (cm) | |
| | | (dBuV) | | (dB/m) | (dB) | | (dBuV/m) | (dBuV/m) | | | (dB) | | | |
| 1 | * 2.484 | 44.88 | Pk | 32.1 | -24.7 | 0 | 52.28 | - | - | 74 | -21.72 | 176 | 131 | Н |
| 2 | * 2.486 | 46.96 | Pk | 32.1 | -24.7 | 0 | 54.36 | - | - | 74 | -19.64 | 176 | 131 | Н |
| 3 | * 2.484 | 34.87 | RMS | 32.1 | -24.7 | 0 | 42.27 | 54 | -11.73 | - | - | 176 | 131 | Н |
| 4 | * 2.484 | 35.46 | RMS | 32.1 | -24.7 | 0 | 42.86 | 54 | -11.14 | - | - | 176 | 131 | Н |

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

DATE: 2016-04-05



Trace Markers

| Marker | Frequency | Meter | Det | AF | Amp/Cbl | DC Corr | Corrected | Average | Margin | Peak Limit | PK | Azimuth | Height | Polarity |
|--------|-----------|---------|-----|--------|-----------|---------|-----------|----------|--------|------------|--------|---------|--------|----------|
| | (GHz) | Reading | | AT0069 | /Fltr/Pad | (dB) | Reading | Limit | (dB) | (dBuV/m) | Margin | (Degs) | (cm) | |
| | | (dBuV) | | (dB/m) | (dB) | | (dBuV/m) | (dBuV/m) | | | (dB) | | | |
| 1 | * 2.484 | 36.22 | Pk | 32.1 | -24.7 | 0 | 43.62 | - | - | 74 | -30.38 | 322 | 291 | V |
| 2 | * 2.484 | 38.61 | Pk | 32.1 | -24.7 | 0 | 46.01 | - | - | 74 | -27.99 | 322 | 291 | V |
| 3 | * 2.484 | 26.26 | RMS | 32.1 | -24.7 | 0 | 33.66 | 54 | -20.34 | - | - | 322 | 291 | V |
| 4 | * 2.484 | 27.1 | RMS | 32.1 | -24.7 | 0 | 34.5 | 54 | -19.5 | - | - | 322 | 291 | V |

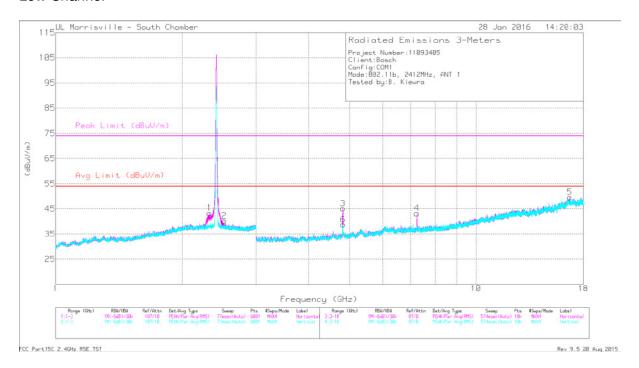
^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector RMS - RMS detection

DATE: 2016-04-05 IC: 21152-COMGEN1

HARMONICS AND SPURIOUS EMISSIONS

Low Channel



| Marker | Frequency | Meter | Det | AF | Amp/Cbl | DC Corr | Corrected | Avg Limit | Margin | Peak | PK | Azimuth | Height | Polarity |
|--------|-----------|---------|------|--------|-----------|---------|-----------|-----------|--------|----------|--------|---------|--------|----------|
| | (GHz) | Reading | | AT0069 | /Fltr/Pad | (dB) | Reading | (dBuV/m) | (dB) | Limit | Margin | (Degs) | (cm) | |
| | | (dBuV) | | (dB/m) | (dB) | | (dBuV/m) | | | (dBuV/m) | (dB) | | | |
| 1 | * 2.32 | 44.41 | PK2 | 31.9 | -23.9 | 0 | 52.41 | - | - | 74 | -21.59 | 204 | 170 | Н |
| | * 2.32 | 31.24 | MAv1 | 31.9 | -23.9 | 0 | 39.24 | 54 | -14.76 | - | - | 204 | 170 | Н |
| 3 | * 4.824 | 48.25 | PK2 | 34 | -31.7 | 0 | 50.55 | - | - | 74 | -23.45 | 357 | 252 | Н |
| | * 4.824 | 36.22 | MAv1 | 34 | -31.7 | 0 | 38.52 | 54 | -15.48 | - | - | 357 | 252 | Н |
| 6 | * 4.829 | 44.07 | PK2 | 34 | -31.6 | 0 | 46.47 | - | - | 74 | -27.53 | 12 | 366 | V |
| | * 4.829 | 35.05 | MAv1 | 34 | -31.6 | 0 | 37.45 | 54 | -16.55 | - | - | 12 | 366 | V |
| 2 | 2.516 | 33.04 | Pk | 32.1 | -24.9 | 0 | 40.24 | - | - | - | - | 0-360 | 199 | Н |
| 4 | 7.235 | 36.34 | Pk | 35.5 | -28.6 | 0 | 43.24 | - | - | - | - | 0-360 | 102 | H |
| 5 | 16.718 | 32.91 | Pk | 42 | -25.3 | 0 | 49.61 | - | - | - | - | 0-360 | 199 | Н |

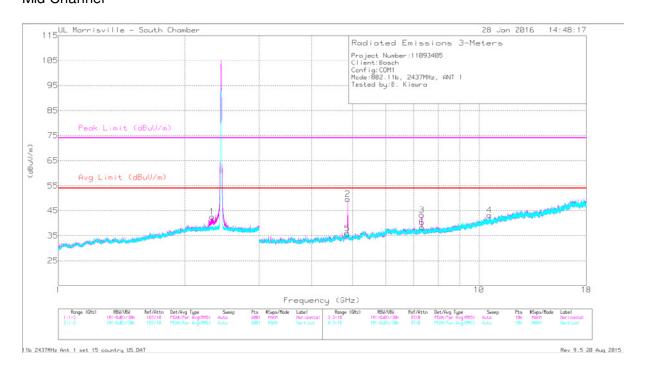
^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

Mid Channel



| Marker | Frequency | Meter | Det | AF | Amp/Cbl/ | DC | Corrected | Avg Limit | Margin | Peak Limit | PK | Azimuth | Height | Polarity |
|--------|-----------|---------|------|--------|----------|------|-----------|-----------|--------|------------|--------|---------|--------|----------|
| | (GHz) | Reading | | AT0069 | Fltr/Pad | Corr | Reading | (dBuV/m) | (dB) | (dBuV/m) | Margin | (Degs) | (cm) | |
| | | (dBuV) | | (dB/m) | (dB) | (dB) | (dBuV/m) | | | | (dB) | | | |
| 1 | * 2.32 | 44.4 | PK2 | 31.9 | -23.9 | 0 | 52.4 | - | - | 74 | -21.6 | 208 | 148 | Н |
| | * 2.32 | 30.21 | MAv1 | 31.9 | -23.9 | 0 | 38.21 | 54 | -15.79 | - | - | 208 | 148 | Н |
| 2 | * 4.874 | 48.09 | PK2 | 34 | -31.6 | 0 | 50.49 | - | - | 74 | -23.51 | 305 | 120 | Н |
| | * 4.874 | 37.6 | MAv1 | 34 | -31.6 | 0 | 40 | 54 | -14 | - | - | 305 | 120 | Н |
| 3 | * 7.31 | 42.63 | PK2 | 35.5 | -28.3 | 0 | 49.83 | - | - | 74 | -24.17 | 300 | 107 | Н |
| | * 7.31 | 28.54 | MAv1 | 35.5 | -28.3 | 0 | 35.74 | 54 | -18.26 | - | - | 300 | 107 | Н |
| 5 | * 4.868 | 42.23 | PK2 | 34 | -31.5 | 0 | 44.73 | - | - | 74 | -29.27 | 351 | 350 | V |
| | * 4.869 | 33.36 | MAv1 | 34 | -31.5 | 0 | 35.86 | 54 | -18.14 | - | - | 351 | 350 | V |
| 6 | * 7.315 | 37.61 | PK2 | 35.5 | -28.4 | 0 | 44.71 | - | - | 74 | -29.29 | 248 | 390 | V |
| | * 7.316 | 26.08 | MAv1 | 35.5 | -28.4 | 0 | 33.18 | 54 | -20.82 | - | - | 248 | 390 | V |
| 4 | 10.586 | 30.91 | Pk | 37.6 | -25.3 | 0 | 43.21 | - | - | - | - | 0-360 | 102 | Н |

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

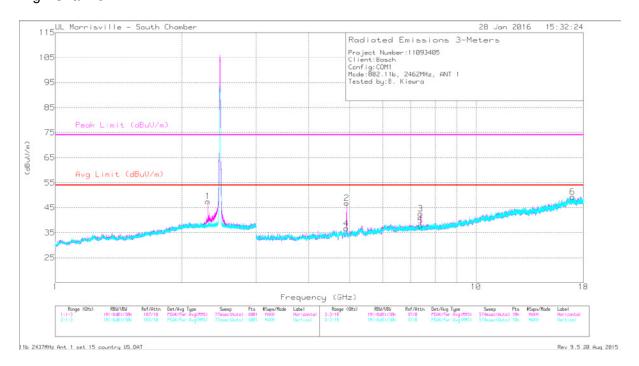
Pk - Peak detector

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

DATE: 2016-04-05

High Channel



| Marker | Frequency | Meter | Det | AF | Amp/Cbl | DC Corr | Corrected | Avg Limit | Margin | Peak Limit | PK | Azimuth | Height | Polarity |
|--------|-----------|---------|------|--------|-----------|---------|-----------|-----------|--------|------------|--------|---------|--------|----------|
| | (GHz) | Reading | | AT0069 | /Fltr/Pad | (dB) | Reading | (dBuV/m) | (dB) | (dBuV/m) | Margin | (Degs) | (cm) | |
| | | (dBuV) | | (dB/m) | (dB) | | (dBuV/m) | | | | (dB) | | | |
| 2 | * 4.924 | 47.81 | PK2 | 33.9 | -31.5 | 0 | 50.21 | - | - | 74 | -23.79 | 298 | 137 | Н |
| | * 4.924 | 35.75 | MAv1 | 33.9 | -31.5 | 0 | 38.15 | 54 | -15.85 | - | - | 298 | 137 | Н |
| 3 | * 7.385 | 39.68 | PK2 | 35.6 | -28.3 | 0 | 46.98 | - | - | 74 | -27.02 | 354 | 129 | Н |
| | * 7.382 | 27.34 | MAv1 | 35.6 | -28.3 | 0 | 34.64 | 54 | -19.36 | - | - | 354 | 129 | Н |
| 4 | * 4.919 | 42.5 | PK2 | 33.9 | -31.6 | 0 | 44.8 | - | - | 74 | -29.2 | 204 | 389 | V |
| | * 4.919 | 33.59 | MAv1 | 33.9 | -31.6 | 0 | 35.89 | 54 | -18.11 | - | - | 204 | 389 | V |
| 5 | * 7.385 | 37.64 | PK2 | 35.6 | -28.3 | 0 | 44.94 | - | - | 74 | -29.06 | 333 | 348 | V |
| | * 7.387 | 25.61 | MAv1 | 35.6 | -28.4 | 0 | 32.81 | 54 | -21.19 | - | - | 333 | 348 | V |
| 1 | 2.302 | 39.43 | Pk | 31.9 | -23.8 | 0 | 47.53 | - | - | - | - | 0-360 | 199 | Н |
| 6 | 16.97 | 31.91 | Pk | 42 | -24.6 | 0 | 49.31 | - | - | - | - | 0-360 | 102 | V |

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

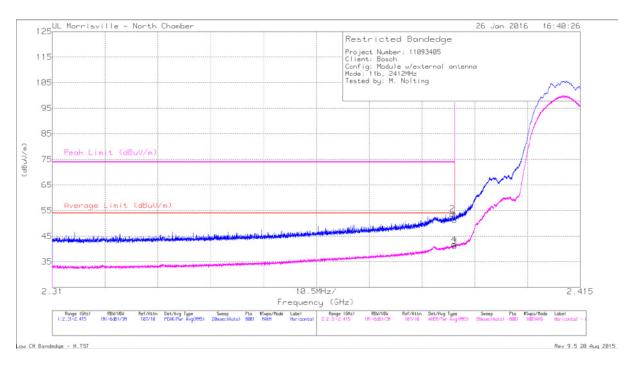
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

DATE: 2016-04-05

External Antenna

RESTRICTED BANDEDGE (LOW CHANNEL)

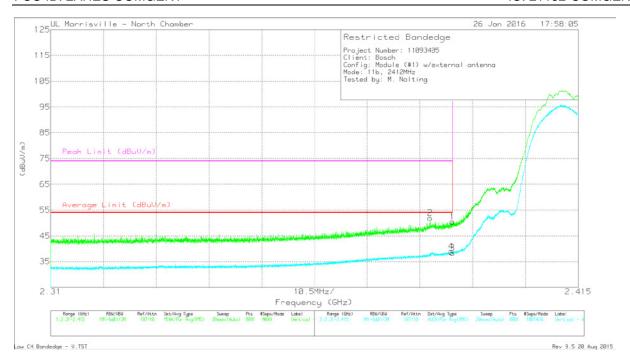


Trace Markers

| Marker | Frequency (GHz) | Meter Reading | Det | AF AT0072 | Amp/Cbl/ Fltr/Pad | Corrected Reading | Average Limit | Margin (dB) | Peak Limit (dBuV/m) | PK Margin | Azimuth (Degs) | Height (cm) | Polarity |
|--------|--------------------|------------------|-----|--------------|----------------------|----------------------|------------------|----------------|------------------------|--------------|-------------------|-------------|----------|
| | | (dBuV) | | (dB/m) | (dB) | (dBuV/m) | (dBuV/m) | | | (dB) | | | |
| 1 | * 2.39 | 44.09 | Pk | 31.9 | -24.8 | 51.19 | - | 1 | 74 | -22.81 | 298 | 165 | Н |
| 2 | * 2.39 | 46.6 | Pk | 31.9 | -24.8 | 53.7 | - | 1 | 74 | -20.3 | 298 | 165 | Н |
| 3 | * 2.39 | 34.01 | RMS | 31.9 | -24.8 | 41.11 | 54 | -12.89 | - | 1 | 298 | 165 | Н |
| 4 | * 2.39 | 34.59 | RMS | 31.9 | -24.8 | 41.69 | 54 | -12.31 | - | - | 298 | 165 | Н |

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector RMS - RMS detection DATE: 2016-04-05



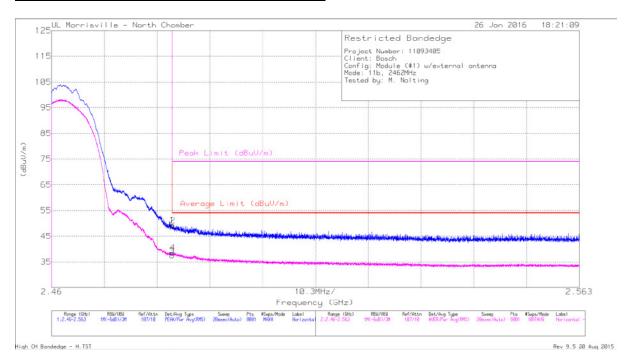
Trace Markers

| Marker | Frequency | | Det | | | Corrected | | Margin | | | Azimuth | _ | Polarity |
|--------|-----------|---------|-----|--------|-----------|-----------|----------|--------|----------|--------|---------|------|----------|
| | (GHz) | Reading | | AT0072 | /Fltr/Pad | Reading | Limit | (dB) | (dBuV/m) | Margin | (Degs) | (cm) | |
| | | (dBuV) | | (dB/m) | (dB) | (dBuV/m) | (dBuV/m) | | | (dB) | | | |
| 2 | * 2.385 | 44.85 | Pk | 31.9 | -24.8 | 51.95 | - | - | 74 | -22.05 | 22 | 101 | V |
| 1 | * 2.39 | 43.37 | Pk | 31.9 | -24.8 | 50.47 | - | - | 74 | -23.53 | 22 | 101 | V |
| 3 | * 2.39 | 31.27 | RMS | 31.9 | -24.8 | 38.37 | 54 | -15.63 | - | - | 22 | 101 | V |
| 4 | * 2.39 | 31.81 | RMS | 31.9 | -24.8 | 38.91 | 54 | -15.09 | - | - | 22 | 101 | V |

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)

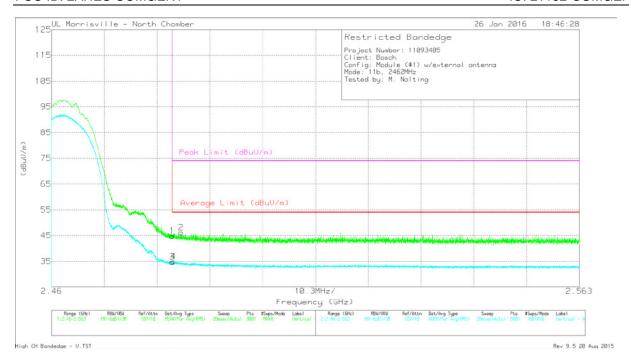


Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | | Amp/Cbl /Fltr/Pad (dB) | 0 | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|--------------------|----------------------------|-----|------|------------------------------|-------|------------------------------|----------------|------------------------|----------------------|-------------------|----------------|----------|
| 1 | * 2.484 | 42 | Pk | 32.1 | -24.8 | 49.3 | - | - | 74 | -24.7 | 299 | 204 | Н |
| 2 | * 2.484 | 41.77 | Pk | 32.1 | -24.8 | 49.07 | - | - | 74 | -24.93 | 299 | 204 | Н |
| 3 | * 2.484 | 30.19 | RMS | 32.1 | -24.8 | 37.49 | 54 | -16.51 | - | - | 299 | 204 | Н |
| 4 | * 2.484 | 31.2 | RMS | 32.1 | -24.8 | 38.5 | 54 | -15.5 | - | - | 299 | 204 | Н |

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector RMS - RMS detection



Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | | Amp/Cbl /Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|--------------------|----------------------------|-----|------|------------------------------|----------------------------------|------------------------------|----------------|------------------------|----------------------|-------------------|----------------|----------|
| 1 | * 2.484 | 37.58 | Pk | 32.1 | -24.8 | 44.88 | - | - | 74 | -29.12 | 22 | 117 | V |
| 3 | * 2.484 | 27.45 | RMS | 32.1 | -24.8 | 34.75 | 54 | -19.25 | - | - | 22 | 117 | V |
| 4 | * 2.484 | 27.64 | RMS | 32.1 | -24.8 | 34.94 | 54 | -19.06 | - | - | 22 | 117 | V |
| 2 | * 2.485 | 38.85 | Pk | 32.1 | -24.8 | 46.15 | - | - | 74 | -27.85 | 22 | 117 | V |

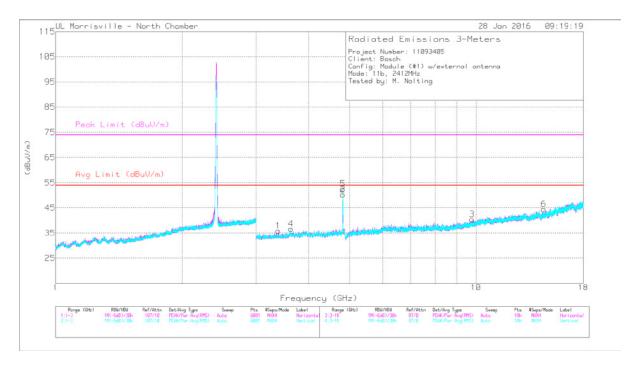
^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

Low Channel



| Marker | Frequency | Meter | Det | AF | Amp/Cbl | Corrected | Avg Limit | Margin | Peak Limit | PK | Azimuth | Height | Polarity |
|--------|-----------|---------|------|--------|-----------|-----------|-----------|--------|------------|--------|---------|--------|----------|
| | (GHz) | Reading | | AT0072 | /Fltr/Pad | Reading | (dBuV/m) | (dB) | (dBuV/m) | Margin | (Degs) | (cm) | |
| | | (dBuV) | | (dB/m) | (dB) | (dBuV/m) | | | | (dB) | | | |
| 2 | * 4.824 | 49.93 | PK2 | 34.1 | -32.2 | 51.83 | - | - | 74 | -22.17 | 21 | 107 | Н |
| | * 4.819 | 39.37 | MAv1 | 34.1 | -32.2 | 41.27 | 54 | -12.73 | 1 | 1 | 21 | 107 | Н |
| 4 | * 3.631 | 39.59 | PK2 | 33.3 | -32.2 | 40.69 | - | - | 74 | -33.31 | 110 | 101 | V |
| | * 3.632 | 28.37 | MAv1 | 33.3 | -32.2 | 29.47 | 54 | -24.53 | ı | 1 | 110 | 101 | V |
| 5 | * 4.824 | 53.69 | PK2 | 34.1 | -32.2 | 55.59 | - | - | 74 | -18.41 | 122 | 103 | V |
| | * 4.819 | 44.08 | MAv1 | 34.1 | -32.2 | 45.98 | 54 | -8.02 | - | 1 | 122 | 103 | V |
| 6 | * 14.494 | 37.62 | PK2 | 39.6 | -28.1 | 49.12 | - | - | 74 | -24.88 | 250 | 101 | V |
| | * 14.491 | 26.17 | MAv1 | 39.6 | -28.1 | 37.67 | 54 | -16.33 | ı | 1 | 250 | 101 | V |
| 1 | 3.382 | 36.02 | Pk | 33 | -33.1 | 35.92 | - | - | - | - | 0-360 | 199 | Н |
| 3 | 9.784 | 31.84 | Pk | 37 | -28.4 | 40.44 | - | - | - | - | 0-360 | 199 | Н |

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

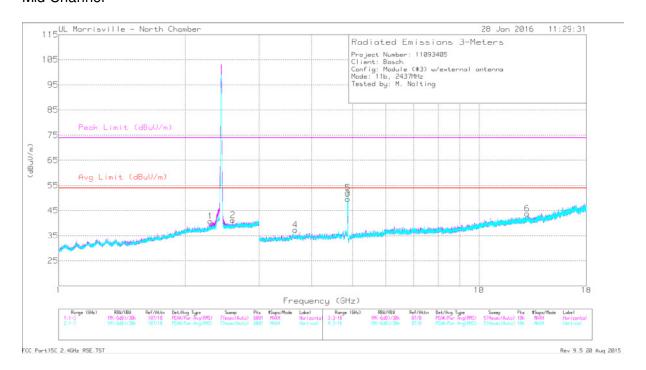
Pk - Peak detector

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

DATE: 2016-04-05

Mid Channel



| Marker | Frequency | Meter | Det | AF | Amp/Cbl | | Avg Limit | Margin | Peak Limit | PK | Azimuth | - | Polarity |
|--------|-----------|---------|------|--------|-----------|----------|-----------|--------|------------|--------|---------|------|----------|
| | (GHz) | Reading | | AT0072 | /Fltr/Pad | Reading | (dBuV/m) | (dB) | (dBuV/m) | Margin | (Degs) | (cm) | |
| | | (dBuV) | | (dB/m) | (dB) | (dBuV/m) | | | | (dB) | | | |
| 1 | * 2.293 | 39.05 | PK2 | 31.7 | -24.8 | 45.95 | ı | - | 74 | -28.05 | 300 | 153 | Н |
| | * 2.293 | 27.34 | MAv1 | 31.7 | -24.8 | 34.24 | 54 | -19.76 | ı | 1 | 300 | 153 | Н |
| 3 | * 4.874 | 53.29 | PK2 | 34.1 | -32.2 | 55.19 | ı | - | 74 | -18.81 | 320 | 101 | Н |
| | * 4.868 | 44.09 | MAv1 | 34.1 | -32 | 46.19 | 54 | -7.81 | ı | 1 | 320 | 101 | Н |
| 4 | * 3.655 | 42.37 | PK2 | 33.3 | -32.3 | 43.37 | ı | - | 74 | -30.63 | 130 | 200 | V |
| | * 3.656 | 33.32 | MAv1 | 33.3 | -32.3 | 34.32 | 54 | -19.68 | ı | 1 | 130 | 200 | V |
| 5 | * 4.874 | 56.07 | PK2 | 34.1 | -32.2 | 57.97 | - | - | 74 | -16.03 | 122 | 103 | V |
| | * 4.869 | 46.8 | MAv1 | 34.1 | -32 | 48.9 | 54 | -5.1 | - | 1 | 122 | 103 | V |
| 2 | 2.597 | 33.58 | Pk | 32.2 | -24.6 | 41.18 | • | - | - | 1 | 0-360 | 199 | Н |
| 6 | 13.026 | 31.08 | Pk | 39.3 | -26.6 | 43.78 | - | - | - | - | 0-360 | 101 | V |

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

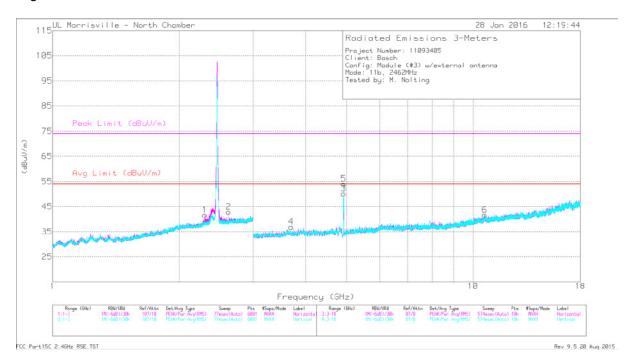
Pk - Peak detector

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

DATE: 2016-04-05

High Channel



| Marker | Frequency (GHz) | Meter Reading | Det | AF AT0072 | Amp/Cbl /Fltr/Pad | | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin | Azimuth (Degs) | Height (cm) | Polarity |
|--------|--------------------|------------------|------|--------------|----------------------|----------|-----------------------|----------------|------------------------|--------------|-------------------|----------------|----------|
| | (3112) | (dBuV) | | (dB/m) | (dB) | (dBuV/m) | (abav/iii) | (ub) | (ubuv/iii) | (dB) | (DCg3) | (6111) | |
| 3 | * 4.924 | 51.61 | PK2 | 34.1 | -32.5 | 53.21 | - | - | 74 | -20.79 | 323 | 118 | Н |
| | * 4.919 | 41.37 | MAv1 | 34.1 | -32.4 | 43.07 | 54 | -10.93 | - | - | 323 | 118 | Н |
| 4 | * 3.693 | 43.37 | PK2 | 33.3 | -32.6 | 44.07 | - | - | 74 | -29.93 | 129 | 185 | V |
| | * 3.693 | 35.25 | MAv1 | 33.3 | -32.6 | 35.95 | 54 | -18.05 | - | - | 129 | 185 | V |
| 5 | * 4.924 | 53.77 | PK2 | 34.1 | -32.5 | 55.37 | - | - | 74 | -18.63 | 121 | 111 | V |
| | * 4.919 | 43.92 | MAv1 | 34.1 | -32.4 | 45.62 | 54 | -8.38 | - | - | 121 | 111 | V |
| 6 | * 10.67 | 34.99 | PK2 | 37.8 | -26 | 46.79 | - | - | 74 | -27.21 | 17 | 102 | V |
| | * 10.669 | 23.54 | MAv1 | 37.8 | -26 | 35.34 | 54 | -18.66 | - | - | 17 | 102 | V |
| 1 | 2.302 | 34.62 | Pk | 31.7 | -24.7 | 41.62 | - | - | - | - | 0-360 | 101 | Н |
| 2 | 2.622 | 35.18 | Pk | 32.2 | -24.5 | 42.88 | - | - | - | - | 0-360 | 101 | Н |

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

DATE: 2016-04-05