

PARTIAL TEST REPORT

| | |
|------------------------|--|
| EUT Description | WLAN and BT, 2x2 PCIe M.2 2230 adapter card |
| Brand Name | Intel® Dual Band Wireless-AC 3165 |
| Model Name | 3165NGW |
| FCC ID | PD93165NG |
| ISED ID | 1000M-3165NG |
| Date of Test Start/End | 2020-02-26 / 2020-03-12 |
| Features | 802.11 a/b/g/n/ac Wireless LAN + BDR/EDR/BLE 4.0 (see section 5) |

| | |
|----------------------|--|
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| | |
|---------------------|--|
| Reference Standards | FCC CFR Title 47 Part 15 E RSS-247 issue 2, RSS-Gen issue 5 A1 (see section 1) |
|---------------------|--|

| | |
|----------------------------|--|
| Test Report identification | 200225-01.TR02 |
| Revision Control | Rev. 00 This test report revision replaces any previous test report revision (see section 0) |

The test results relate only to the samples tested.
The test report shall not be reproduced in full, without written approval of the laboratory.
Reference to accreditation shall be used only by full reproduction of test report.

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1. Standards, reference documents and applicable test methods

1. FCC 47 CFR part 15 – Subpart E – Unlicensed National Information Infrastructure Devices.
2. FCC 47 CFR part 15 - Subpart C – §15.209 Radiated emission limits; general requirements.
3. FCC OET KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 – Guidelines for compliance testing of Unlicensed National Information Infrastructure (U-NII) Devices (Part 15, Subpart E)
4. ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.
5. RSS-247 Issue 2 - Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices.
6. RSS-Gen Issue 5 Amendement 1- General Requirements for Compliance of Radio Apparatus.

2. General conditions, competences and guarantees

- ✓ Tests performed under FCC standards identified on section 1 are covered by A2LA accreditation.
- ✓ Tests performed under ISED standards identified on section 1 are covered by Cofrac accreditation.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an ISO/IEC 17025:2017 laboratory accredited by the American Association for Laboratory Accreditation (A2LA) with the certificate number 3478.01.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an Accredited Test Firm recognized by the FCC, with Designation Number FR0011.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an ISO/IEC 17025:2017 testing laboratory accredited by the French Committee for Accreditation (Cofrac) with the certificate number 1-6736.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is a Registered Test Site listed by ISED, with ISED #1000Y.
- ✓ Intel WRF Lab declines any responsibility with respect to the identified information provided by the customer and that may affect the validity of results.
- ✓ Intel WRF Lab only provides testing services and is committed to providing reliable, unbiased test results and interpretations.
- ✓ Intel WRF Lab is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.
- ✓ Intel WRF Lab has developed calibration and proficiency programs for its measurement equipment to ensure correlated and reliable results to its customers.
- ✓ This report is only referred to the item that has undergone the test.
- ✓ This report does not imply an approval of the product by the Certification Bodies or competent Authorities.
- ✓ Complete or partial reproduction of the report cannot be made without written permission of Intel WRF Lab.

3. Environmental Conditions

- ✓ At the site where the measurements were performed the following limits were not exceeded during the tests:

| | |
|-------------|-----------------|
| Temperature | 23.5°C ± 0.5 °C |
| Humidity | 39% ± 11% |


4. Test samples

| Sample | Control # | Description | Model | Serial # | Date of receipt |
|--------|---------------|---------------------|----------------|-------------------|-----------------|
| #01 | 200123-01.S05 | Module | 7265NGW | WFM: 6057180D75D2 | 2020-02-05 |
| | 15022001.S21 | NGFF Extender Board | PCB00435 | 4350213-328 | 2015-10-29 |
| | 170000-01.S02 | Laptop | Latitude E5470 | 21HTPF2 | 2017-03-28 |
| #02 | 200123-01.S06 | Module | 7265NGW | WFM: B89A2A5AABBD | 2020-03-11 |
| | 15022001.S21 | NGFF Extender Board | PCB00435 | 4350213-328 | 2015-10-29 |
| | 170000-01.S02 | Laptop | Latitude E5470 | 21HTPF2 | 2017-03-28 |

5. EUT Features

| | | |
|------------------------|---|------------------------------|
| Brand Name | Intel® Dual Band Wireless-AC 3165 | |
| Model Name | 3165NGW | |
| FCC ID | PD93165NG | |
| ISED ID | 1000M-3165NG | |
| Software Version | DRTU 03376-1.7.7, 03823-1.9.1 | |
| Driver Version | 18.33.3.1 | |
| Prototype / Production | Production | |
| Supported Radios | 802.11b/g/n | 2.4GHz (2400.0 – 2483.5 MHz) |
| | 802.11a/n/ac | 5.2GHz (5150.0 – 5350.0 MHz) |
| | | 5.6GHz (5470.0 – 5725.0 MHz) |
| | | 5.8GHz (5725.0 – 5850.0 MHz) |
| | Bluetooth 4.0 | 2.4GHz (2400.0 – 2483.5 MHz) |
| Antenna Information | CHAIN A: PIFA antenna. WiFi 2.4GHz & 5GHz and BT CHAIN B: PIFA antenna. WiFi 2.4GHz & 5GHz | |
| Additional Information | | |

6. Remarks and comments

1. According to the applicant the device 3165NGW has formerly been tested in conformity with the FCC Part15 Subpart C as per Report ID 44948RRE.002
2. According to the applicant this partial report presents only the results for Undesirable emissions limits: Band Edge.
3. Device model 3165NGW is a variant of model 7265NGW with the same hardware, layout, and Bill of Materials. As per the applicant's declaration (find attached  in model 3165NGW MIMO data rates are disabled, therefore, no additional tests have been performed on model 3165NGW, considering the tests performed on 7265NGW are valid for model 3165NGW as well.

7. Test Verdicts summary

The statement of conformity to applicable standards in the table below are based on the measured values, without taking into account the measurement uncertainties.

7.1. 802.11 a/n/ac – U-NII- 3

| FCC part | RSS part | Test name | Verdict |
|--------------------------|--|---|---------|
| 15.407 (a) (3) | RSS-247 Clause 6.2.4.1 | Power Limits. Maximum output power | NR |
| 15.407 (a) (3) | RSS-247 Clause 6.2.4.1 | Peak power spectral density | NR |
| 15.407 (b) (3) | RSS-247 Clause 6.2.4.2 | Undesirable emissions limits: Band Edge (conducted) | P |
| 15.407 (b) (3) 15.209 | RSS-247 Clause 6.2.4.2 RSS-GEN Clause 8.9 | Undesirable emissions limits (radiated) | NR |
| 15.407 (6) 15.207 | RSS-GEN Clause 8.8 | AC power-line conducted emission measurements | NR |

P: Pass

F: Fail

NM: Not Measured

NA: Not Applicable

NR: Not Requested

8. Document Revision History

| Revision # | Date | Modified by | Revision Details |
|------------|------------|-------------|------------------|
| Rev. 00 | 2020-03-19 | G. ROUSTAN | First Issue |

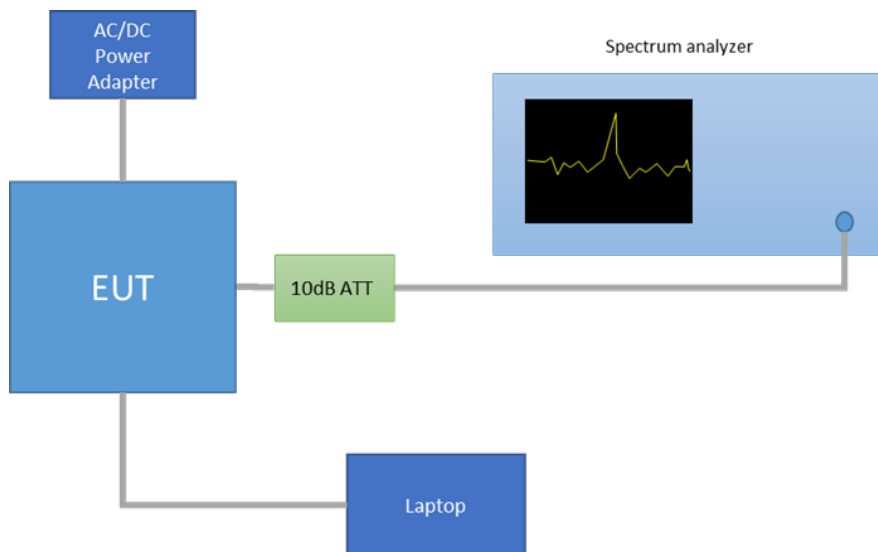
Annex A. Test & System Description

A.1 Measurement System

Measurements were performed using the following setups, made in accordance to the general provisions of FCC KDB 789033 D02 General UNII Test Procedures.

The DUT was installed in a test fixture and this test fixture is connected to a laptop computer and AC/DC power adapter. The laptop computer was used to configure the EUT to continuously transmit at a specified output power using all different modes and modulation schemes, using the Intel proprietary tool DRTU.

Conducted Setup



A.2 Test Equipment List

Conducted Setup

| ID# | Device | Type/Model | Serial # | Manufacturer | Cal. Date | Cal. Due Date |
|------|-------------------|------------|----------|-----------------|------------|---------------|
| 0315 | Spectrum analyzer | FSV30 | 103307 | Rohde & Schwarz | 2018-04-10 | 2020-04-10 |

A.3 Measurement Uncertainty Evaluation

The system uncertainty evaluation is shown in the below table:

| Measurement type | Uncertainty | Unit |
|------------------------------|-------------|------|
| RF Output Power, conducted | ± 0.49 | dB |
| Unwanted Emission, conducted | ± 1.53 | dB |
| Temperature | 1.52 | °C |
| Time | ± 0.12 | % |

Annex B. Test Results U-NII-3

B.1 Test Conditions

For 802.11a mode the EUT can transmit at both CHAIN A and CHAIN B RF outputs individually, but not simultaneously.

For 802.11n20 (20 MHz channel bandwidth), 802.11n40 (40MHz channel bandwidth) and 802.11ac80 (80MHz channel bandwidth) modes the EUT can transmit at both CHAIN A and CHAIN B RF outputs individually, and also simultaneously.

The conducted RF output power at each chain was adjusted according to the client's supplied target values (see following table) using the Intel DRTU tool and measuring the power by using a spectrum analyser with the channel integration method according to section II) E) 2) e) (Method SA-2 Alternative) of Guidance KDB 789033 D02 .

Measured values for adjustment were within +/- 0.25 dB from the declared target values..

| U-NII-3 | | | | | Conducted Power, Target Value (dBm) | | |
|----------|----------|-------------|------|-------------|-------------------------------------|--------------|----------------------------|
| Mode | BW (MHz) | Data Rate | CH # | Freq. (MHz) | SISO Chain A | SISO Chain B | MIMO at both ports A and B |
| 802.11a | 20 | 6Mbps | 149 | 5745 | 15.5 | 15.0 | - |
| | | | 157 | 5785 | 15.5 | 15.0 | - |
| | | | 165 | 5825 | 15.5 | 15.0 | - |
| 802.11n | 20 | HT0 HT8* | 149 | 5745 | 15.5 | 15.0 | 13.5 |
| | | | 157 | 5785 | 15.5 | 15.0 | 13.5 |
| | | | 165 | 5825 | 15.5 | 15.0 | 13.5 |
| 802.11n | 40 | HT0 HT8* | 151 | 5755 | 16.5 | 16.5 | 16.5 |
| | | | 159 | 5795 | 16.5 | 16.5 | 16.5 |
| 802.11ac | 80 | VHT0 | 155 | 5775 | 14.0 | 14.5 | 16.0 |

* Note: HT8 for MIMO modes only

The following data rates were selected based on preliminary testing that identified those rates as the worst cases for output power and spurious levels at the band edges:

| Transmission | Mode | Bandwidth (MHz) | Worst Case Data Rate |
|--------------|----------|-----------------|----------------------|
| SISO | 802.11a | 20 | 6Mbps |
| | 802.11n | 20 | HT0 |
| | | 40 | HT0 |
| | | 80 | VHT0 |
| MIMO | 802.11n | 20/40 | HT8 |
| | 802.11ac | 80 | VHT0 |

Alternative channels to the lowest and highest channels per band have been also tested for Band Edge compliance.

B.2 Test Results

B.2.1 Undesirable emission limits : Band Edge (Conducted)

Test limits

| FCC part | RSS part | Limits |
|-------------------|---------------------------|--|
| 15.407 (b) (4) | RSS-247 Clause 6.2.4.2 | For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge. |

Test procedure

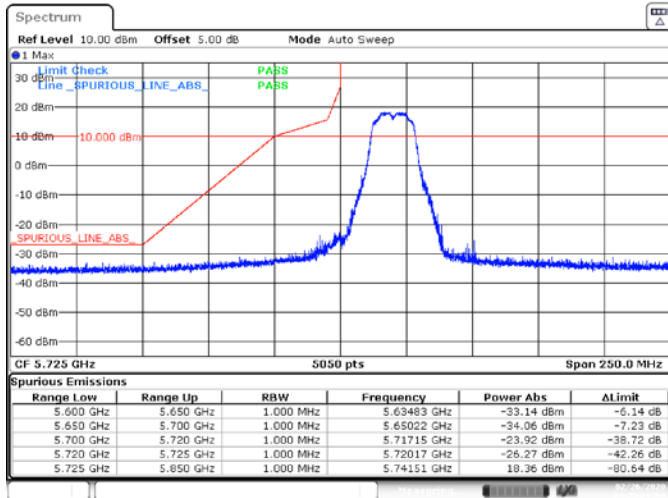
The conducted setup shown in section *Test & System Description* was used to measure undesirable emissions on the Band Edge domain. The antenna terminal of the EUT is connected to the spectrum analyzer through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss and the declared Antenna Gain.

The declared maximum antenna gain is +5dBi.

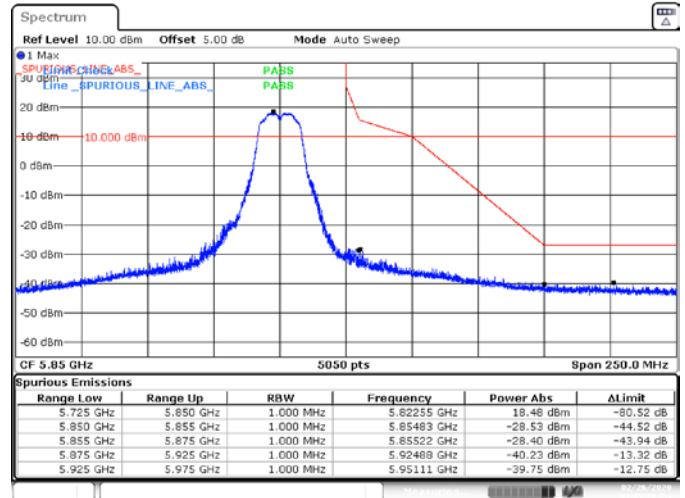
See Section B.3.1 for the screenshot results.

B.3 Test Results Screenshot

B.3.1 Undesirable emission limits : Band Edge (Conducted)



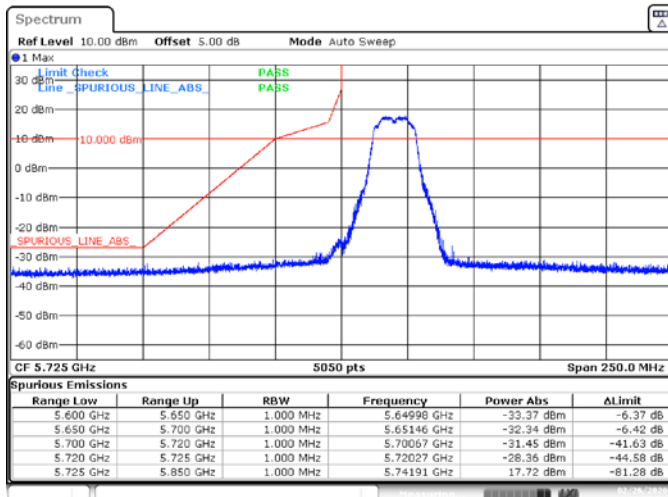
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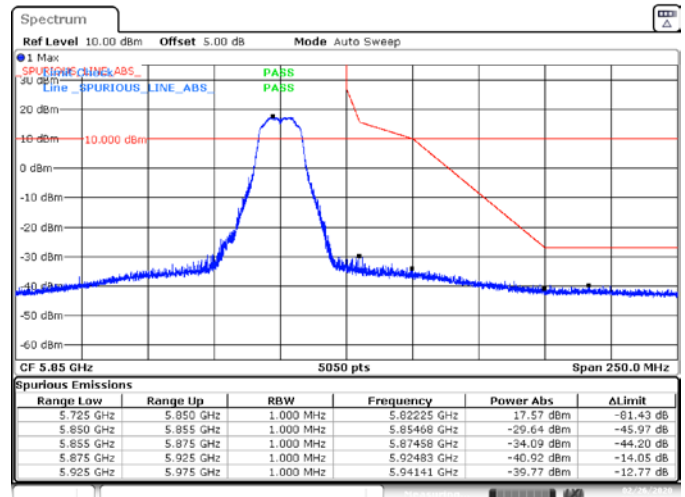
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SISO A, 802.11a, 6Mbps, CH149, BE Low Peak

SISO A, 802.11a, 6Mbps, CH165, BE High Peak



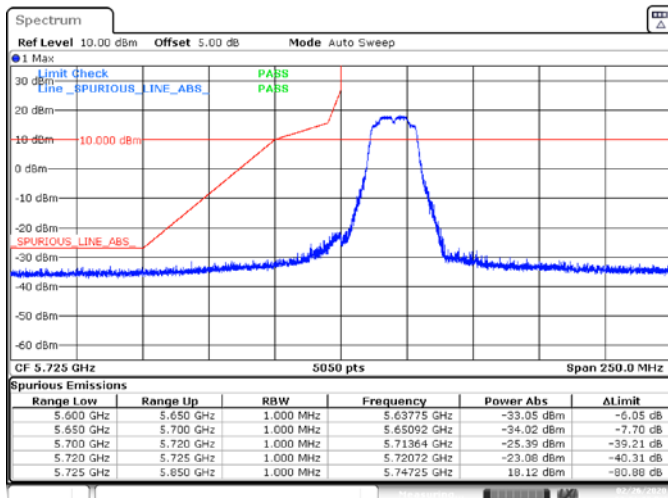
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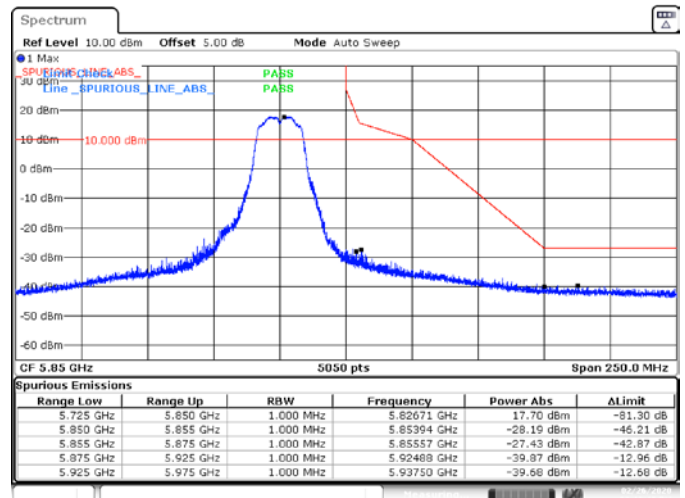
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SISO B, 802.11a, 6Mbps, CH149, BE Low Peak

SISO B, 802.11a, 6Mbps, CH165, BE High Peak



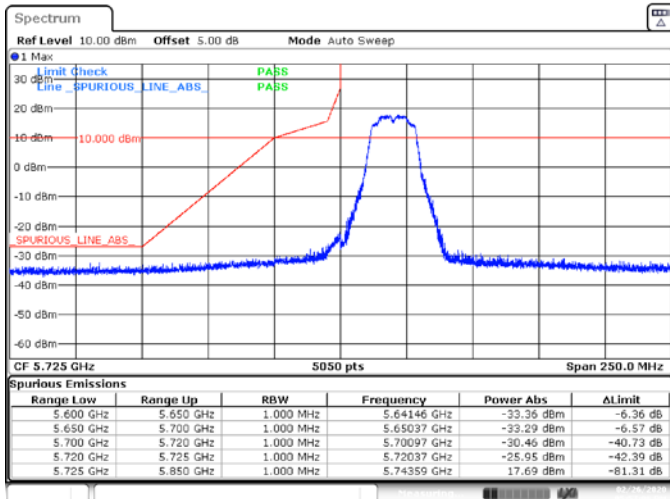
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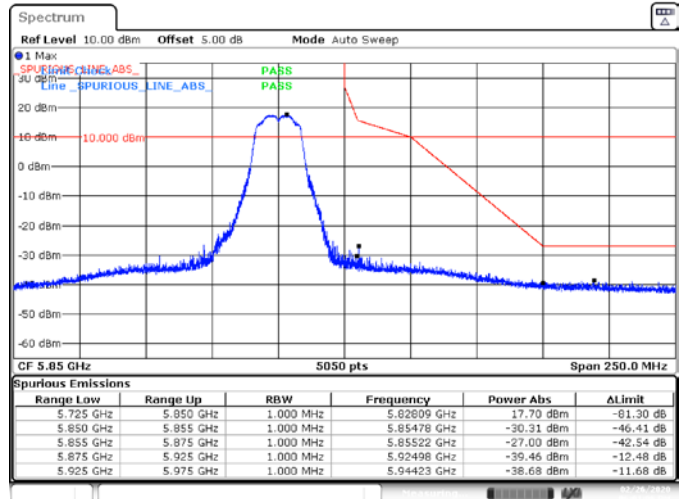
SISO A, 802.11n20, HT0, CH149, BE Low Peak

SISO A, 802.11n20, HT0, CH165, BE High Peak



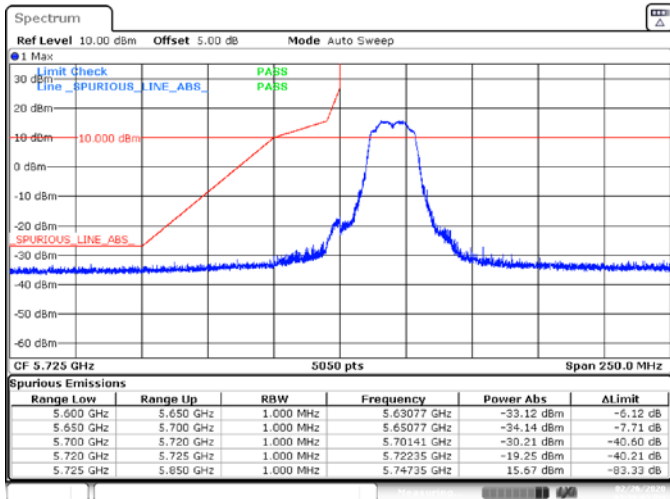
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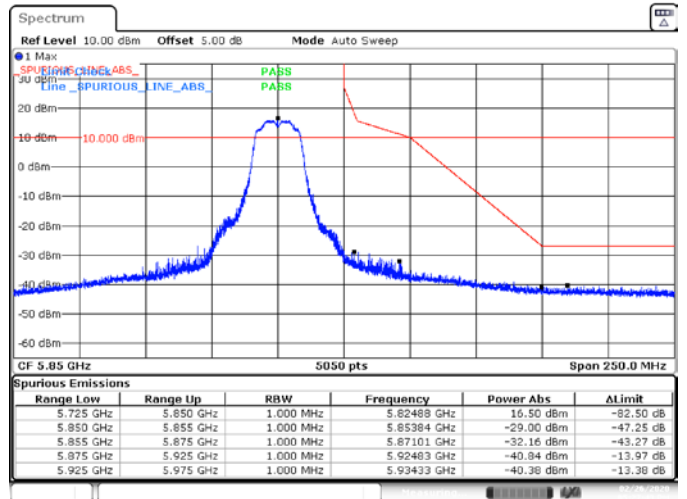
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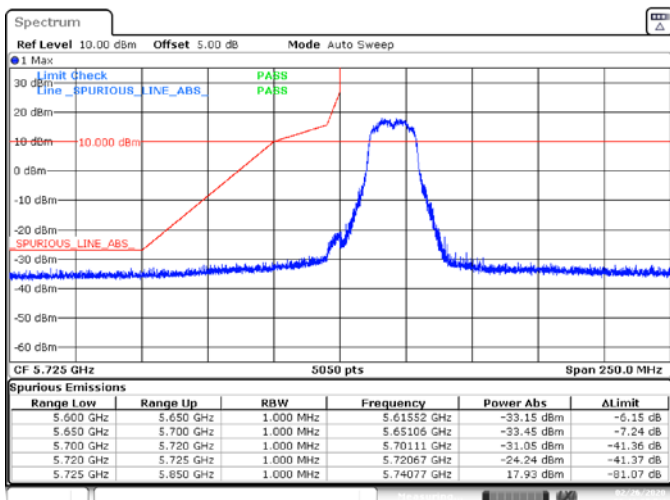
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MIMO A, 802.11n20, HT8, CH149, BE Low Peak



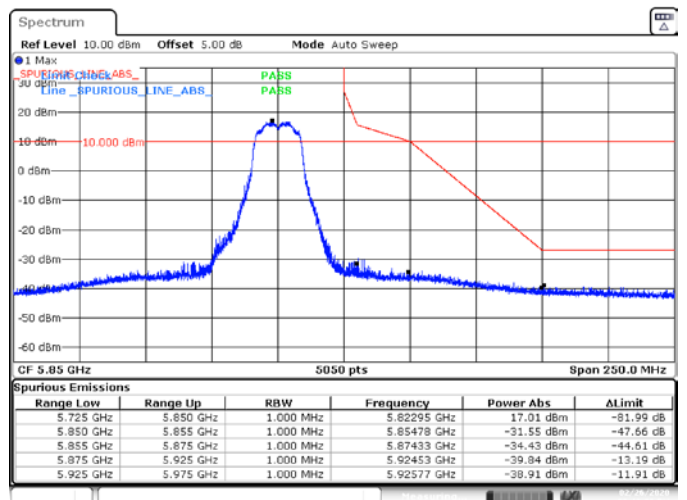
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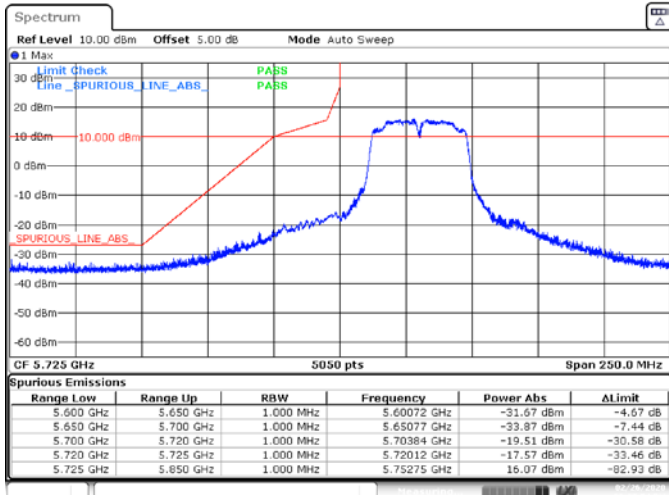
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MIMO B, 802.11n20, HT8, CH149, BE Low Peak



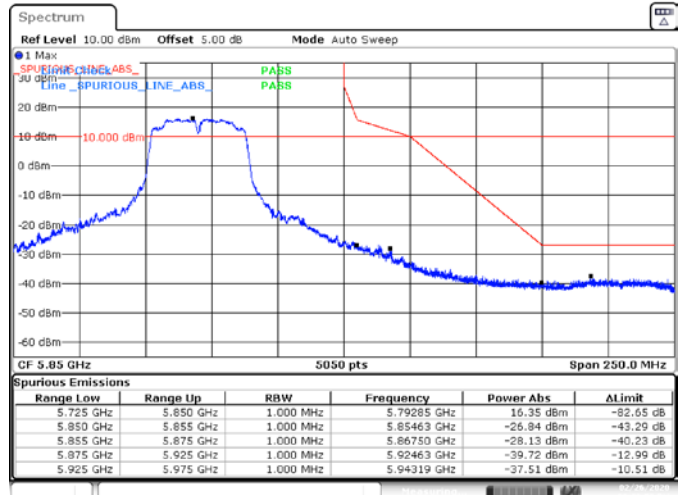
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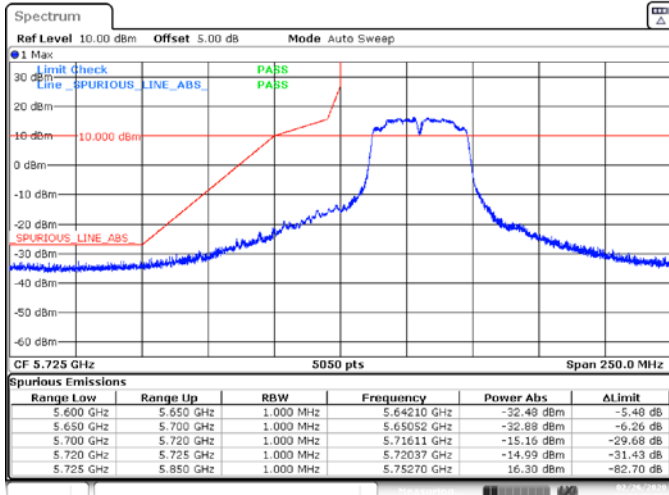
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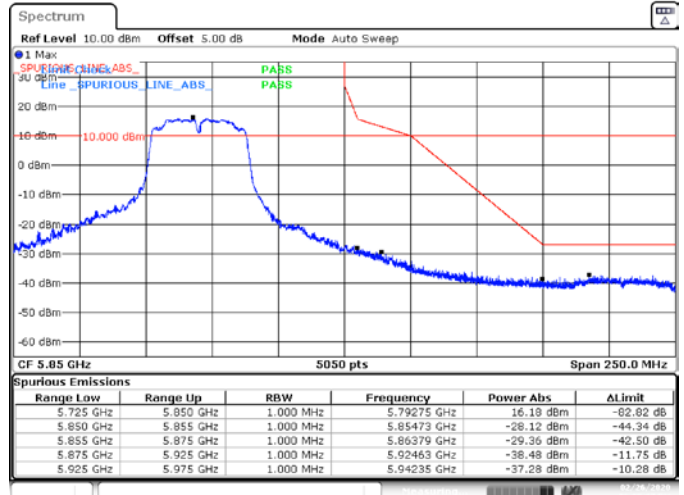
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SISO A, 802.11n40, HT0, CH159, BE High Peak



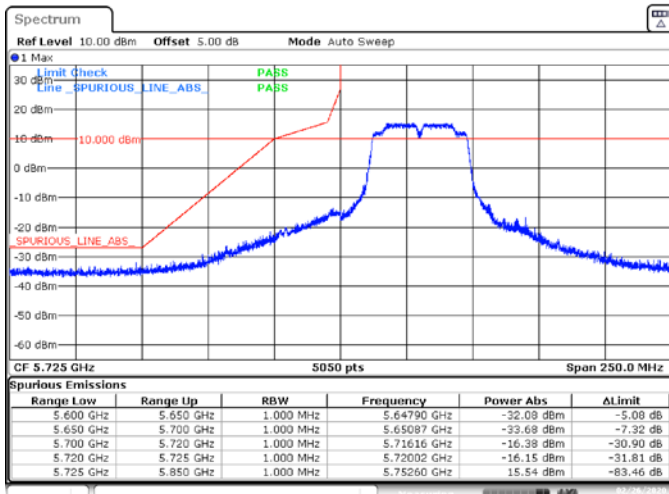
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SISO B, 802.11n40, HT0, CH151, BE Low Peak



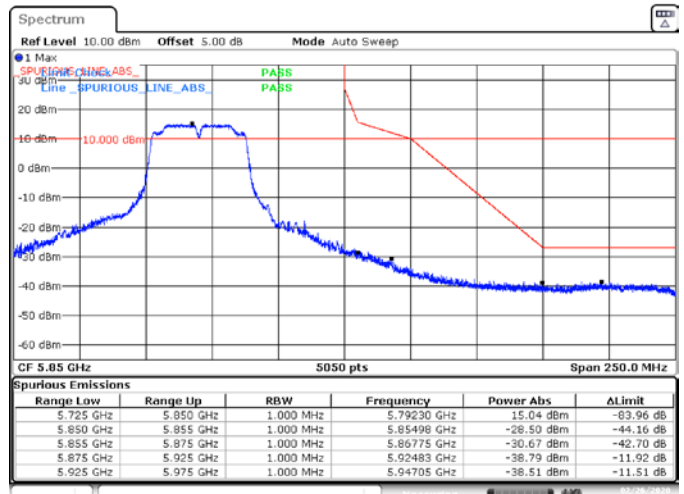
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SISO B, 802.11n40, HT0, CH159, BE High Peak



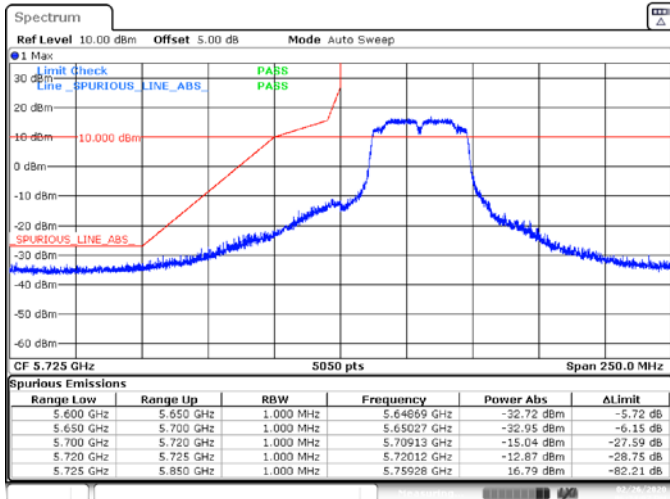
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MIMO A, 802.11n40, HT8, CH151, BE Low Peak



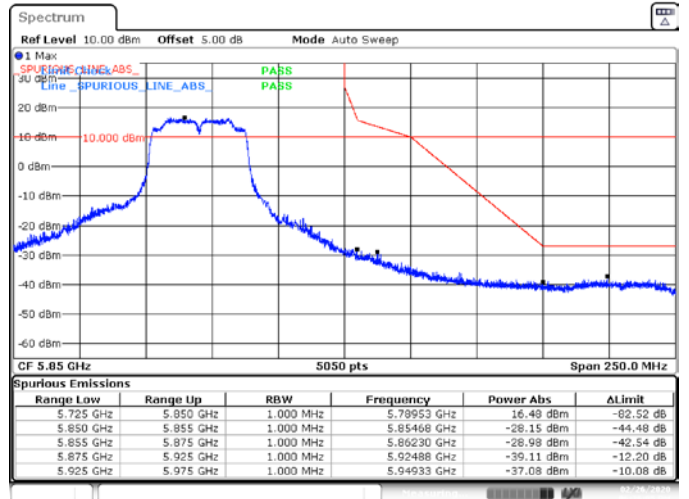
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MIMO A, 802.11n40, HT8, CH159, BE High Peak



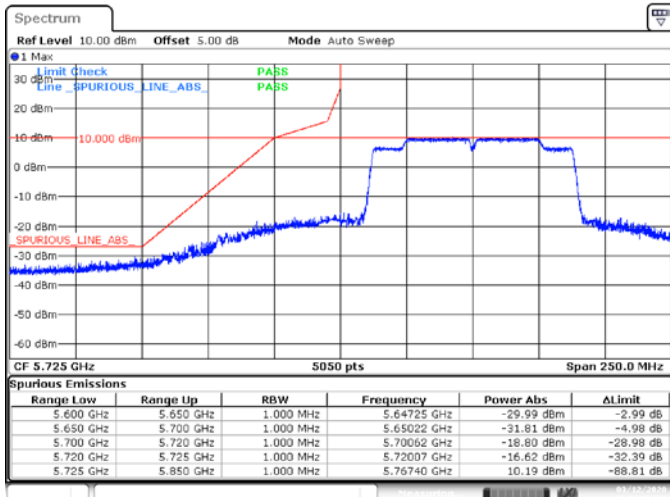
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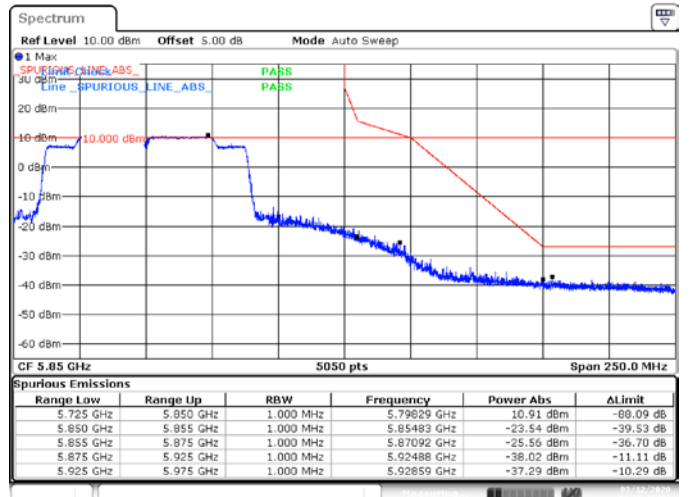
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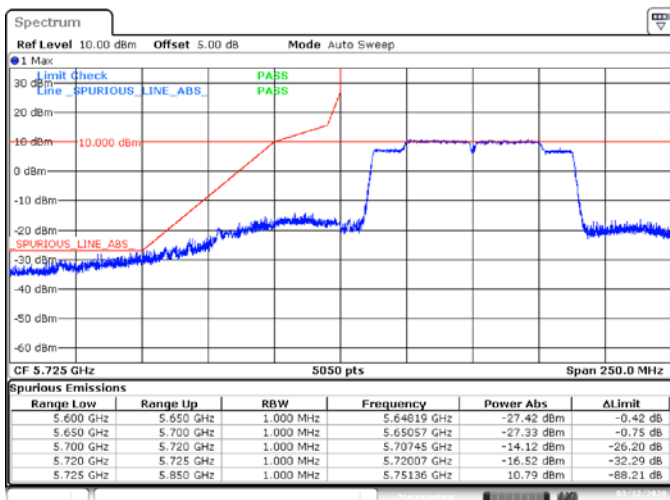
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SISO A, 802.11ac80, VHT0, CH155, BE Low Peak



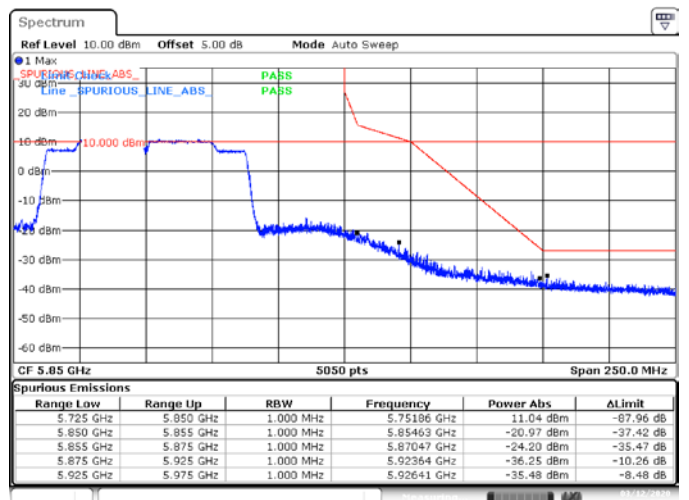
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SISO A, 802.11ac80, VHT0, CH155, BE High Peak



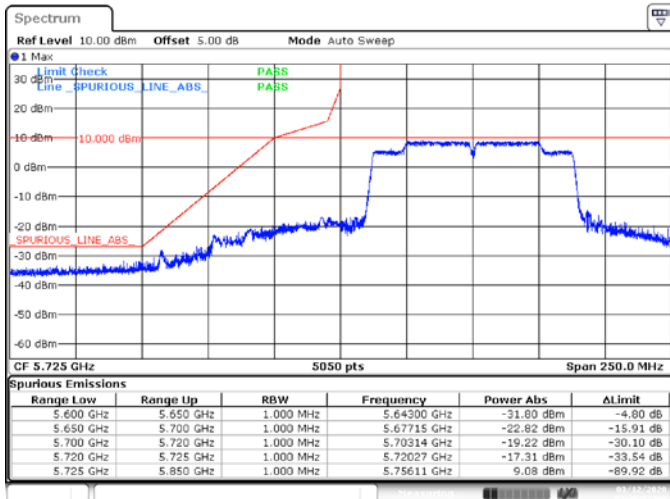
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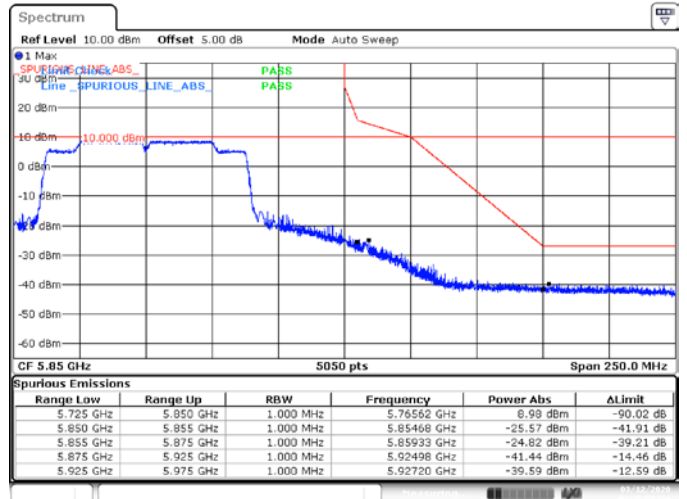
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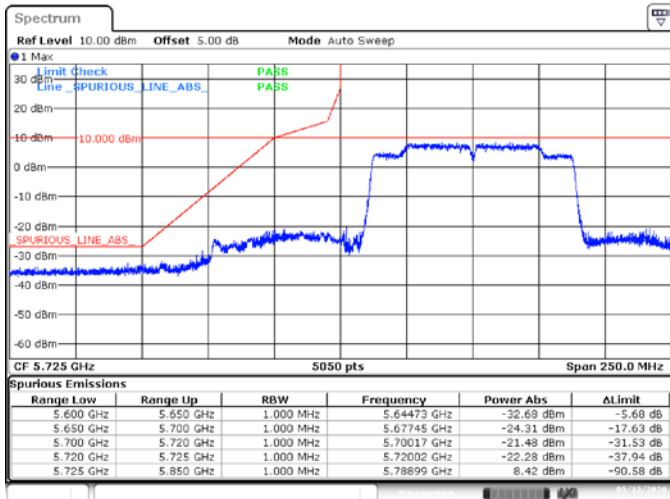
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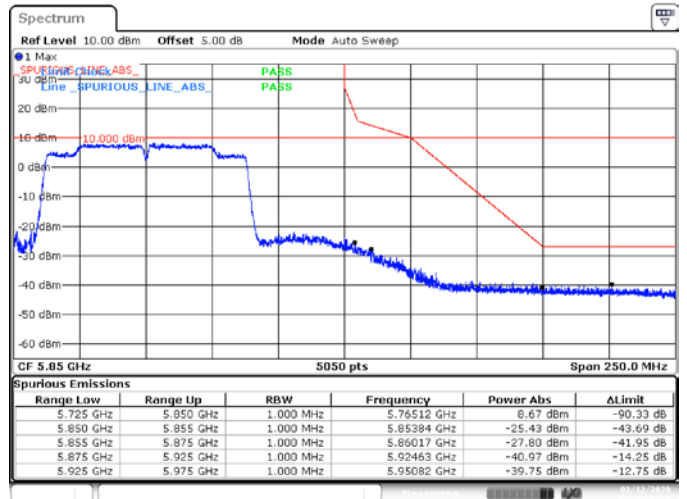
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Date: 12/MAR/2020 16:35:49

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Date: 12/MAR/2020 16:35:17

MIMO B, 802.11ac80, VHT0, CH155, BE High Peak