

Report No.: FR842742-03AA



FCC RADIO TEST REPORT

FCC ID : UIDW31

Equipment : Wireless Router

Brand Name : ARRIS

Model Name : W31, W30

Applicant : ARRIS

3871 Lakefield Drive Suite 300, Suwanee, Georgia,

30024 United States

Manufacturer : ARRIS

3871 Lakefield Drive Suite 300, Suwanee, Georgia,

30024 United States

Standard : 47 CFR FCC Part 15.247

The product was received on Sep. 13, 2018, and testing was started from Sep. 13, 2018 and completed on Jan. 02, 2019. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

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Photographs of EUT v01

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Report Version : 01

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History of this test report

Report No. : FR842742-03AA

| Report No. | Version | Description | Issued Date |
|---------------|---------|-------------------------|---------------|
| FR842742-03AA | 01 | Initial issue of report | Jun. 28, 2019 |
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Summary of Test Result

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| Report Clause | Ref Std. Clause | Test Items | Result (PASS/FAIL) | Remark |
|------------------|--------------------|---|-----------------------|--------|
| 1.1.2 | 15.203 | Antenna Requirement | PASS | - |
| 3.1 | 15.247(a) | DTS Bandwidth | PASS | - |
| 3.2 | 15.247(b) | Maximum Conducted Output Power | PASS | - |
| 3.3 | 15.247(e) | Power Spectral Density | PASS | - |
| 3.4 | 15.247(d) | Emissions in Non-restricted Frequency Bands | PASS | - |
| 3.5 | 15.247(d) | Emissions in Restricted Frequency Bands | PASS | - |

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

- The test configuration, test mode and test software were written in this test report are declared by the manufacturer.
- The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen Report Producer: Cindy Peng

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1 General Description

1.1 Information

1.1.1 RF General Information

| Frequency Range (MHz) | IEEE Std. 802.11 | Ch. Frequency (MHz) | Channel Number |
|-----------------------|---|---------------------|----------------|
| 2400-2483.5 | b, g, n (HT20), ac (VHT20), ax (HEW20) | 2412-2462 | 1-11 [11] |
| 2400-2483.5 | n (HT40), ac (VHT40), ax (HEW40) | 2422-2452 | 3-9 [7] |

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| Band | Mode | BWch (MHz) | Nant |
|---------------|-------------------|------------|------|
| 2.4-2.4835GHz | 802.11b | 20 | 4TX |
| 2.4-2.4835GHz | 802.11g | 20 | 4TX |
| 2.4-2.4835GHz | 802.11n HT20 | 20 | 4TX |
| 2.4-2.4835GHz | 802.11n HT20-BF | 20 | 4TX |
| 2.4-2.4835GHz | 802.11ac VHT20 | 20 | 4TX |
| 2.4-2.4835GHz | 802.11ac VHT20-BF | 20 | 4TX |
| 2.4-2.4835GHz | 802.11ax HEW20 | 20 | 4TX |
| 2.4-2.4835GHz | 802.11ax HEW20-BF | 20 | 4TX |
| 2.4-2.4835GHz | 802.11n HT40 | 40 | 4TX |
| 2.4-2.4835GHz | 802.11n HT40-BF | 40 | 4TX |
| 2.4-2.4835GHz | 802.11ac VHT40 | 40 | 4TX |
| 2.4-2.4835GHz | 802.11ac VHT40-BF | 40 | 4TX |
| 2.4-2.4835GHz | 802.11ax HEW40 | 40 | 4TX |
| 2.4-2.4835GHz | 802.11ax HEW40-BF | 40 | 4TX |

Note:

- ◆ 11b mode uses a combination of DSSS-DBPSK, DQPSK, CCK modulation.
- 11g, HT20 and HT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.
- VHT20, VHT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.
- HEW20, HEW40 use a combination of OFDMA-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.
- BWch is the nominal channel bandwidth.
- Nss-Min is the minimum number of spatial streams.
- Nant is the number of outputs. e.g., 2(2,3) means have 2 outputs for port 2 and port 3. 2 means have 2 outputs for port 1 and port 2.

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1.1.2 Antenna Information

| Ant. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) |
|------|----------|--------------------|------------------------------|-----------|------------|
| 1 | PEGATRON | RFPCA2620-01_Rev02 | Dual band PCB dipole antenna | I-PEX | |
| 2 | PEGATRON | RFPCA2620-02_Rev02 | Dual band PCB dipole antenna | I-PEX | |
| 3 | PEGATRON | RFPCA2620-03_Rev01 | Dual band PCB dipole antenna | I-PEX | |
| 4 | PEGATRON | RFPCA2620-04_Rev02 | Dual band PCB dipole antenna | I-PEX | |
| 5 | PEGATRON | RFPCA2307-02 Rev02 | PCB dipole antenna | I-PEX | Note |
| 6 | PEGATRON | RFPCA2211-03 Rev01 | PCB dipole antenna | I-PEX | Note |
| 7 | PEGATRON | RFPCA2211-04 Rev02 | PCB dipole antenna | I-PEX | |
| 8 | PEGATRON | RFPCA1806-03 Rev01 | PCB dipole antenna | I-PEX | |
| 9 | PEGATRON | RFPCA3508-05_Rev02 | PCB antenna | I-PEX | |
| 10 | PEGATRON | RFPCA1806-03 Rev01 | PCB dipole antenna | I-PEX | |

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Note:

| note: | voie. | | | | | | | |
|-------|--------------------|--------|----------------------------|------------------|------------------|------------------|-----------|------|
| | Uncorrelated (dBi) | | | Correlated (dBi) | | | (dBi) | |
| Ant. | Port | 2.4GHz | 5GHz Band 5GHz Band 2.4GHz | 2.4GHz | 5GHz Band 1~2 | 5GHz Band 3~4 | Bluetooth | |
| 1 | 1 | 4.22 | 5.71 | - | 5.35 | 6.23 | | - |
| 2 | 2 | 4.22 | 5.71 | - | 5.35 | 6.23 | | - |
| 3 | 3 | 4.22 | 5.71 | - | 5.35 | 6.23 | | - |
| 4 | 4 | 4.22 | 5.71 | - | 5.35 | 6.23 | | - |
| 5 | 1 | - | - | 5.82 | - | - | 6.93 | - |
| 6 | 2 | - | - | 5.82 | - | - | 6.93 | - |
| 7 | 3 | - | - | 5.82 | - | - | 6.93 | - |
| 8 | 4 | - | - | 5.82 | - | - | 6.93 | - |
| 9 | 1 | - | - | - | - | - | - | 4.12 |
| 10 | - | - | 5.23 | 5.23 | - | - | - | - |

Note 1: The above information was declared by manufacturer.

Note 2: The EUT has ten antennas.

For Radio 1

WLAN 2.4GHz Functions

For IEEE 802.11b/g/n/ac/ax mode (4TX, 4RX):

Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.

WLAN 5GHz Functions (1RX):

Ant. 10 only supports the antenna receive function.

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For Radio 3

WLAN 5GHz Band 1~2 Functions

For IEEE 802.11a/n/ac/ax mode (4TX, 4RX):

Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.

For Radio 2

WLAN 5GHz Band 3~4 Functions

For IEEE 802.11a/n/ac/ax mode (4TX, 4RX):

Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.

For Radio 4

Bluetooth Functions (1TX, 1RX):

Only Port 1 could transmit/receive simultaneously.

1.1.3 Table for Radio Type

| Radio No. | 2.4GHz | 5GHz Band 1~2 | 5GHz Band 3~4 | Bluetooth |
|-----------|--------|------------------|------------------|-----------|
| Radio 1 | V | Only RX function | Only RX function | - |
| Radio 2 | - | - | V | - |
| Radio 3 | - | V | - | - |
| Radio 4 | - | - | - | V |

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1.1.4 Mode Test Duty Cycle

| Mode | DC | DCF(dB) | T(s) | VBW(Hz) ≥ 1/T |
|-------------------|-------|---------|---------|---------------|
| 802.11ac VHT20-BF | 0.827 | 0.825 | 3.844m | 300 |
| 802.11ac VHT40-BF | 0.768 | 1.146 | 960u | 3k |
| 802.11ax HEW20-BF | 0.671 | 1.733 | 1.504m | 1k |
| 802.11ax HEW40-BF | 0.754 | 1.226 | 836.25u | 3k |

Note:

- DC is Duty Cycle.
- DCF is Duty Cycle Factor.

1.1.5 EUT Operational Condition

| EUT Power Type | From power adapter | | | | |
|-----------------------|---|--|--|--|--|
| Beamforming Function | ☑ With beamforming ☐ Without beamforming | | | | |
| Beamonning Function | The product has beamforming function for 802.11n/ac/ax. | | | | |
| Function | ⊠ Point-to-multipoint □ Point-to-point | | | | |
| Test Software Version | accessMTool(version 3.0.0.9) | | | | |

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1.1.6 Table for EUT Functions

| Type of Function | 2.4GHz | 5GHz Band 1~2 | 5GHz Band 3~4 |
|---|--------|---------------|---------------|
| Master (AP Router) | V | V | V |
| Master (Extender) | - | - | V |
| Bridge (Client without radar detection) | - | - | V |
| Client without radar detection | - | - | V |

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1.1.7 Table for Multiple Listing

The model names in the following table are all refer to the identical product.

| Model Name | Color of Device's Bottom |
|------------|--------------------------|
| W31 | Matte Black |
| W30 | Silver |

From the above models, model name "W31" was selected as representative model for the test and its data was recorded in this report.

1.1.8 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR842742-01AA Below is the table for the change of the product with respect to the original one.

| | Modifications | Performance Checking | | |
|----|--|----------------------|---------------------------------------|--|
| | | 1. | DTS Bandwidth. | |
| | Adding the beamforming function for 802.11n/ac/ax. | 2. | Maximum Conducted Output Power. | |
| | | 3. | Power Spectral Density. | |
| 1. | | 4. | Emissions in Non-restricted Frequency | |
| | | | Bands. | |
| | | 5. | Emissions in Restricted Frequency | |
| | | | Bands Above 1GHz. | |
| 2. | Adding Zero-Wait function. | lt c | doesn't need to verify RF test. | |

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1.2 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

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- 47 CFR FCC Part 15
- ANSI C63.10-2013
- FCC KDB 558074 D01 v05
- FCC KDB 662911 D01 v02r01

1.3 Testing Location Information

| | Testing Location | | | | | | | |
|-------------|--|-----|---|--|--|--|--|--|
| | HWA YA ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) | | | | | | | |
| | | TEL | : | 886-3-327-3456 FAX : 886-3-327-0973 | | | | |
| \boxtimes | JHUBEI | ADD | : | No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. | | | | |
| | | TEL | : | 886-3-656-9065 FAX : 886-3-656-9085 | | | | |

| Test Condition | Test Site No. | Test Engineer | Test Environment | Test Date |
|----------------|---------------|---------------|------------------|-----------------------------|
| RF Conducted | TH01-CB | Serway Li | 20°C / 55% | Sep. 15, 2018~Jan. 02, 2019 |
| Radiated | 03CH01-CB | Stim Sung | 22°C / 54% | Sep. 13, 2018~Dec. 23, 2018 |

Test site Designation No. TW0006 with FCC.

1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

| Test Items | Uncertainty | Remark |
|-----------------------------------|------------------------|--------------------------|
| Radiated Emission (1GHz ~ 18GHz) | 3.7 dB | Confidence levels of 95% |
| Radiated Emission (18GHz ~ 40GHz) | 3.5 dB | Confidence levels of 95% |
| Conducted Emission | 1.7 dB | Confidence levels of 95% |
| Output Power Measurement | 1.33 dB | Confidence levels of 95% |
| Power Density Measurement | 1.27 dB | Confidence levels of 95% |
| Bandwidth Measurement | 9.74 x10 ⁻⁸ | Confidence levels of 95% |

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Test site registered number IC 4086D with Industry Canada.

2 Test Configuration of EUT

2.1 Test Channel Mode

| Mode | Power Setting |
|-----------------------------------|---------------|
| 802.11ac VHT20-BF_Nss1,(MCS0)_4TX | - |
| 2412MHz | 88 |
| 2417MHz | 95 |
| 2422MHz | 98 |
| 2427MHz | 98 |
| 2432MHz | 98 |
| 2437MHz | 97 |
| 2442MHz | 98 |
| 2447MHz | 98 |
| 2452MHz | 98 |
| 2457MHz | 96 |
| 2462MHz | 81 |
| 802.11ac VHT40-BF_Nss1,(MCS0)_4TX | - |
| 2422MHz | 85 |
| 2427MHz | 85 |
| 2432MHz | 86 |
| 2437MHz | 90 |
| 2442MHz | 86 |
| 2447MHz | 86 |
| 2452MHz | 81 |
| 802.11ax HEW20-BF_Nss1,(MCS0)_4TX | - |
| 2412MHz | 79 |
| 2417MHz | 88 |
| 2422MHz | 96 |
| 2427MHz | 97 |
| 2432MHz | 96 |
| 2437MHz | 96 |
| 2442MHz | 96 |
| 2447MHz | 97 |
| 2452MHz | 94 |
| 2457MHz | 92 |

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| Mode | Power Setting | |
|-----------------------------------|---------------|--|
| 2462MHz | 82 | |
| 802.11ax HEW40-BF_Nss1,(MCS0)_4TX | - | |
| 2422MHz | 82 | |
| 2427MHz | 84 | |
| 2432MHz | 84 | |
| 2437MHz | 89 | |
| 2442MHz | 86 | |
| 2447MHz | 84 | |
| 2452MHz | 83 | |

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Note:

 VHT20/VHT40 covers HT20/HT40, due to same modulation. The power setting for 802.11n HT20 and HT40 are the same or lower than 802.11ac VHT20 and VHT40.

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2.2 The Worst Case Measurement Configuration

| The Worst Case Mode for Following Conformance Tests | | | | |
|---|---|--|--|--|
| Tests Item | DTS Bandwidth Maximum Conducted Output Power Power Spectral Density Emissions in Non-restricted Frequency Bands | | | |
| Test Condition Conducted measurement at transmit chains | | | | |

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| Th | The Worst Case Mode for Following Conformance Tests | | | | |
|--|--|--|--|--|--|
| Tests Item Emissions in Restricted Frequency Bands | | | | | |
| Test Condition | Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type. | | | | |
| Operating Mode > 1GHz | CTX | | | | |
| 1 | EUT in Y axis | | | | |

| The Worst Case Mode for Following Conformance Tests | | | | |
|---|---|--|--|--|
| Tests Item Simultaneous Transmission Analysis - Co-location RF Exposure Evaluation | | | | |
| Operating Mode | | | | |
| 1 | Radio 1 (WLAN 2.4GHz) + Radio 3 (WLAN 5GHz Band 1~2) + Radio 2 (WLAN 5GHz Band 3~4) + Radio 4 (Bluetooth) | | | |
| Refer to Sporton Test Report No.: FA842742-03 for Co-location RF Exposure Evaluation. | | | | |

Note: The EUT can only be used at Y axis position.

2.3 EUT Operation during Test

For Conducted Mode:

The EUT was programmed to be in continuously transmitting mode.

For Radiated Mode:

During the test, the following programs under WIN 7 were executed.

The program was executed as follows:

- 1. During the test, the EUT operation to normal function.
- 2. Executed command fixed test channel under Telnet.
- 3. Executed "Lantest.exe" to link with the remote workstation to transmit and receive packet by RX Device and transmit duty cycle no less than 98%.

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2.4 Accessories

| | Accessories | | | | | | | | |
|-----|-------------------|------------|--------------------|-----------|---|--|--|--|--|
| No. | Equipment Name | Brand Name | Model Name | P/N | Rating | | | | |
| 1 | Adapter 1 | APD | WA-36L12FU | | INPUT: 100-120V ~, 60Hz, 0.9A Max OUTPUT: 12V, 3A | | | | |
| 2 | Adapter 2 | NetBit | NBS42D120 350VU | AREP05751 | INPUT: 100-120V ~, 50/60Hz, 1.0A OUTPUT: 12.0V, 3.5A | | | | |

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Note: The adapter does not affect the test result of radio tests, so only adapter 2 was tested and recorded in this report.

2.5 Support Equipment

For Test Site No: 03CH01-CB

| | Support Equipment | | | | | | | |
|-----|--|----------|-------------|-----|--|--|--|--|
| No. | No. Equipment Brand Name Model Name FCC ID | | | | | | | |
| 1 | Notebook | DELL | E4300 | N/A | | | | |
| 2 | Notebook | DELL | E4301 | N/A | | | | |
| 3 | RX Device | PEGATRON | Retail (T2) | N/A | | | | |

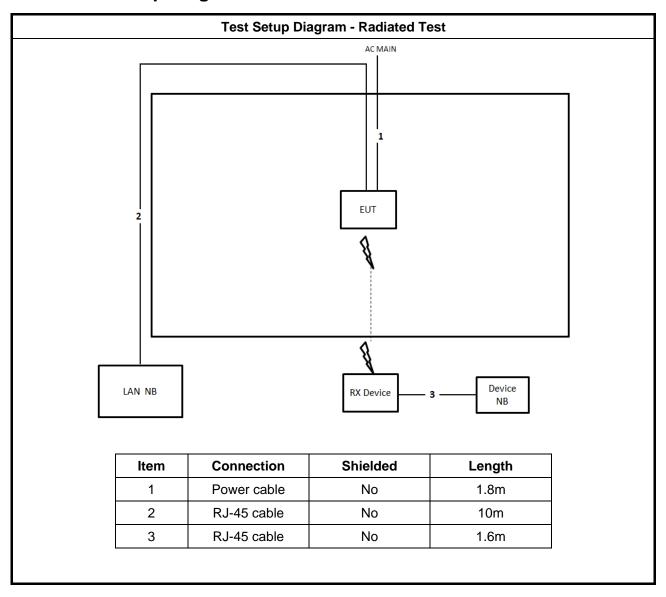
For Test Site No: TH01-CB

| | Support Equipment | | | | | | | |
|-----|--|--|--|--|--|--|--|--|
| No. | No. Equipment Brand Name Model Name FCC ID | | | | | | | |
| 1 | 1 Notebook DELL E4300 N/A | | | | | | | |

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2.6 Test Setup Diagram



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3 Transmitter Test Result

3.1 DTS Bandwidth

3.1.1 6dB Bandwidth Limit

| | 6dB Bandwidth Limit | | | | | | | |
|----|--|--|--|--|--|--|--|--|
| Sy | Systems using digital modulation techniques: | | | | | | | |
| • | ■ 6 dB bandwidth ≥ 500 kHz. | | | | | | | |

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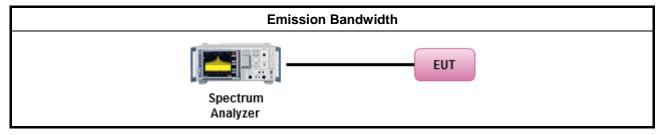
3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

| | Test Method | | | | | | | | | | | |
|---|--|---|--|--|--|--|--|--|--|--|--|--|
| • | For the emission bandwidth shall be measured using one of the options below: | | | | | | | | | | | |
| | \boxtimes | Refer as FCC KDB 558074, clause 8.2 & C63.10 clause 11.8.1 Option 1 for 6 dB bandwidth measurement. | | | | | | | | | | |
| | | Refer as FCC KDB 558074, clause 8.2 & C63.10 clause 11.8.2 Option 2 for 6 dB bandwidth measurement. | | | | | | | | | | |
| | | Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing. | | | | | | | | | | |

3.1.4 Test Setup



3.1.5 Test Result of Emission Bandwidth

Refer as Appendix A

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3.2 Maximum Conducted Output Power

3.2.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit ■ If $G_{TX} \le 6$ dBi, then $P_{Out} \le 30$ dBm (1 W) ■ Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm ■ Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm ■ Smart antenna system (SAS): - Single beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm - Overlap beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm - Aggregate power on all beams: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3 + 8$ dB dBm $P_{Out} =$ maximum peak conducted output power or maximum conducted output power in dBm, $G_{TX} =$ the maximum transmitting antenna directional gain in dBi.

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3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

| | Test Method | |
|---|--|-----|
| • | Maximum Peak Conducted Output Power | |
| | Refer as FCC KDB 558074, clause 8.3.1.1 & C63.10 clause 11.9.1.1 (RBW ≥ EBW method). | |
| | Refer as FCC KDB 558074, clause 8.3.1.3 & C63.10 clause 11.9.1.3 (peak power meter). | |
| • | Maximum Conducted Output Power | |
| | duty cycle ≥ 98% or external video / power trigger] | |
| | Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.2 Method AVGSA-1. | |
| | Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.3 Method AVGSA-(alternative) | 1A. |
| | uty cycle < 98% and average over on/off periods with duty factor | |
| | Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.4 Method AVGSA-2. | |
| | Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.5 Method AVGSA-(alternative) | -2A |
| | Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.6 Method AVGSA-3 | |
| | Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.7 Method AVGSA-(alternative) | -3A |
| | Measurement using a power meter (PM) | |
| | Refer as FCC KDB 558074, clause 8.3.2.3 & C63.10 clause 11.9.2.3.1 Method AVGPM (using RF average power meter). | an |
| | Refer as FCC KDB 558074, clause 8.3.2.3 & C63.10 clause 11.9.2.3.2 Method AVGPM-G (us an gate RF average power meter). | ing |

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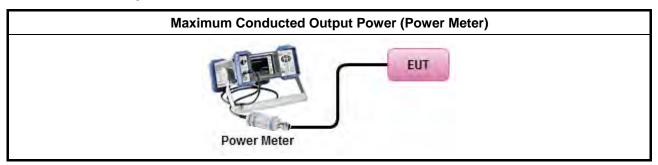
For conducted measurement.

If the EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.

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If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + ... + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) EIRP_{total} = $P_{total} + DG$

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Refer as Appendix B

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3.3 Power Spectral Density

3.3.1 Power Spectral Density Limit

Power Spectral Density Limit ■ Power Spectral Density (PSD) ≤ 8 dBm/3kHz

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3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

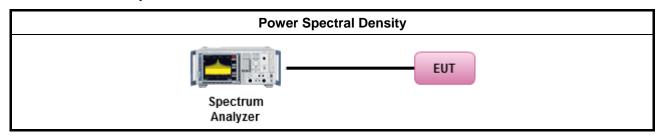
| | | Test Method | | | | | | | |
|---|--|--|--|--|--|--|--|--|--|
| • | outp the c cond of th | k power spectral density procedures that the same method as used to determine the conducted out power. If maximum peak conducted output power was measured to demonstrate compliance to output power limit, then the peak PSD procedure below (Method PKPSD) shall be used. If maximum ducted output power was measured to demonstrate compliance to the output power limit, then one ne average PSD procedures shall be used, as applicable based on the following criteria (the peak D procedure is also an acceptable option). | | | | | | | |
| | | Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10.2 Method PKPSD. | | | | | | | |
| | [dut | y cycle ≥ 98% or external video / power trigger] | | | | | | | |
| | | Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10.3 Method AVGPSD-1. | | | | | | | |
| | | Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10.5 Method AVGPSD-2. | | | | | | | |
| | | Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10.7 Method AVGPSD-3. | | | | | | | |
| | duty | cycle < 98% and average over on/off periods with duty factor | | | | | | | |
| | Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10.4 Method AVGPSD-1A. (alternative). | | | | | | | | |
| | Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10.6 Method AVGPSD-2A. (alternative) | | | | | | | | |
| | | Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10.8 Method AVGPSD-3A. (alternative) | | | | | | | |
| - | For | conducted measurement. | | | | | | | |
| | • | If The EUT supports multiple transmit chains using options given below: | | | | | | | |
| | | Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace. | | | | | | | |
| | | Option 2: Measure and sum spectral maxima across the outputs. With this technique, spectra are measured at each output of the device at the required resolution bandwidth. The maximum value (peak) of each spectrum is determined. These maximum values are then summed mathematically in linear power units across the outputs. These operations shall be performed separately over frequency spans that have different out-of-band or spurious emission limits, | | | | | | | |

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Option 3: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with 10 log(N). Or each transmit chains shall be add 10 log(N) to compared with the limit.

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3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Refer as Appendix C

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3.4 Emissions in Non-restricted Frequency Bands

3.4.1 Emissions in Non-restricted Frequency Bands Limit

| Un-restricted Band Emissions Limit | | | | | | | |
|------------------------------------|------------|--|--|--|--|--|--|
| RF output power procedure | Limit (dB) | | | | | | |
| Peak output power procedure | 20 | | | | | | |
| Average output power procedure | 30 | | | | | | |

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- Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.
- Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.

3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

| | Test Method |
|---|---|
| • | Refer as FCC KDB 558074, clause 8.5 for unwanted emissions into non-restricted bands. |

3.4.4 Test Setup



3.4.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix D

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3.5 Emissions in Restricted Frequency Bands

3.5.1 Emissions in Restricted Frequency Bands Limit

| Restricted Band Emissions Limit | | | | | | | | | | |
|---------------------------------|-----------------------|-------------------------|----------------------|--|--|--|--|--|--|--|
| Frequency Range (MHz) | Field Strength (uV/m) | Field Strength (dBuV/m) | Measure Distance (m) | | | | | | | |
| 0.009~0.490 | 2400/F(kHz) | 48.5 - 13.8 | 300 | | | | | | | |
| 0.490~1.705 | 24000/F(kHz) | 33.8 - 23 | 30 | | | | | | | |
| 1.705~30.0 | 30 | 29 | 30 | | | | | | | |
| 30~88 | 100 | 40 | 3 | | | | | | | |
| 88~216 | 150 | 43.5 | 3 | | | | | | | |
| 216~960 | 200 | 46 | 3 | | | | | | | |
| Above 960 | 500 | 54 | 3 | | | | | | | |

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- Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).
- Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.
- Note 3: Using the distance of 1m during the test for above 18 GHz, and the test value to correct for the distance factor at 3m.

3.5.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

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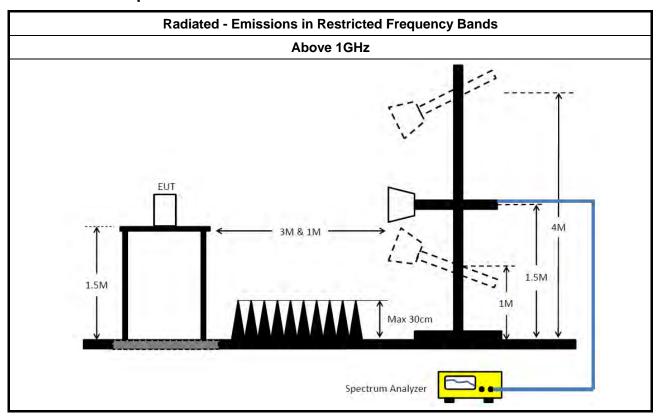
3.5.3 Test Procedures

| | | Test Method | | | | | | | | |
|---|---|--|--|--|--|--|--|--|--|--|
| • | The | average emission levels shall be measured in [duty cycle ≥ 98 or duty factor]. | | | | | | | | |
| • | Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band. | | | | | | | | | |
| • | For the transmitter unwanted emissions shall be measured using following options below: | | | | | | | | | |
| | Refer as FCC KDB 558074, clause 8.6 for unwanted emissions into restricted bands. □ Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.1(trace averaging for cycle ≥98%). | | | | | | | | | |
| | | | | | | | | | | |
| | | Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.2(trace averaging + duty factor). | | | | | | | | |
| | | Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.3(Reduced VBW≥1/T). | | | | | | | | |
| | | Refer as ANSI C63.10, clause 11.12.2.5.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time. | | | | | | | | |
| | Refer as ANSI C63.10, clause 7.5 average value of pulsed emissions. | | | | | | | | | |
| | | Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.4 measurement procedure peak limit. | | | | | | | | |
| • | For | the transmitter band-edge emissions shall be measured using following options below: | | | | | | | | |
| | Refer as FCC KDB 558074 clause 8.7 & C63.10 clause 11.13.1, When the performing pe average radiated measurements, emissions within 2 MHz of the authorized band edge ma measured using the marker-delta method described below. | | | | | | | | | |
| | • | Refer as FCC KDB 558074, clause 8.7 (ANSI C63.10, clause 6.10.6) for marker-delta method for band-edge measurements. | | | | | | | | |
| | • | Refer as FCC KDB 558074, clause 8.7 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz). | | | | | | | | |
| | • | For conducted unwanted emissions into restricted bands (absolute emission limits). Devices with multiple transmit chains using options given below: (1) Measure and sum the spectra across the outputs or (2) Measure and add 10 log(N) dB | | | | | | | | |
| | • | For FCC KDB 662911 The methodology described here may overestimate array gain, thereby resulting in apparent failures to satisfy the out-of-band limits even if the device is actually compliant. In such cases, compliance may be demonstrated by performing radiated tests around the frequencies at which the apparent failures occurred. | | | | | | | | |

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3.5.4 Test Setup



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3.5.5 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

3.5.6 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix E

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4 Test Equipment and Calibration Data

| Instrument | Instrument Manufacturer Model No. | | Serial No. | Characteristics | Calibration Date | Calibration Due Date | Remark |
|-------------------|-----------------------------------|---------------------|------------------|------------------|---------------------|-------------------------|--------------------------|
| Horn Antenna | EMCO | 3115 | 00075790 | 750MHz ~ 18GHz | Nov. 20, 2017 | Nov. 19, 2018 | Radiation (03CH01-CB) |
| Horn Antenna | EMCO | 3115 | 00075790 | 750MHz ~ 18GHz | Nov. 13, 2018 | Nov. 12, 2019 | Radiation (03CH01-CB) |
| Horn Antenna | Schwarzbeck | BBHA 9170 | BBHA917025 2 | 15GHz ~ 40GHz | Jun. 28, 2018 | Jun. 27, 2019 | Radiation (03CH01-CB) |
| Pre-Amplifier | EMCI | EMC330N | 980332 | 20MHz ~ 3GHz | May 02, 2018 | May 01, 2019 | Radiation (03CH01-CB) |
| Pre-Amplifier | Agilent | 8449B | 3008A02310 | 1GHz ~ 26.5GHz | Jan. 09, 2018 | Jan. 08, 2019 | Radiation (03CH01-CB) |
| Spectrum Analyzer | R&S | FSP40 | 100056 | 9kHz ~ 40GHz | Nov. 23, 2017 | Nov. 22, 2018 | Radiation (03CH01-CB) |
| Spectrum analyzer | R&S | FSP40 | 100080 | 9kHz~40GHz | Oct. 03, 2018 | Oct. 02, 2019 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-16 | N/A | 1 GHz ~ 18 GHz | Oct. 11, 2017 | Oct. 10, 2018 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-16 | N/A | 1 GHz ~ 18 GHz | Oct. 08, 2018 | Oct. 07, 2019 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-16+17 | N/A | 1 GHz ~ 18 GHz | Oct. 11, 2017 | Oct. 10, 2018 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-16+17 | N/A | 1 GHz ~ 18 GHz | Oct. 08, 2018 | Oct. 07, 2019 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-40G#1 | N/A | 18GHz ~ 40 GHz | Oct. 11, 2017 | Oct. 10, 2018 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-40G#1 | N/A | 18GHz ~ 40 GHz | Jul. 27, 2018 | Jul. 26, 2019 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-40G#2 | N/A | 18GHz ~ 40 GHz | Oct. 11, 2017 | Oct. 10, 2018 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-40G#2 | N/A | 18GHz ~ 40 GHz | Jul. 27, 2018 | Jul. 26, 2019 | Radiation (03CH01-CB) |
| Spectrum analyzer | R&S | FSV40 | 101027 | 9kHz~40GHz | Jun. 22, 2018 | Jun. 21, 2019 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-06 | 1 GHz – 26.5 GHz | Oct. 11, 2017 | Oct. 10, 2018 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-06 | 1 GHz – 26.5 GHz | Oct. 08, 2018 | Oct. 07, 2019 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-07 | 1 GHz –26.5 GHz | Oct. 11, 2017 | Oct. 10, 2018 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-07 | 1 GHz – 26.5 GHz | Oct. 08, 2018 | Oct. 07, 2019 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-08 | 1 GHz –26.5 GHz | Oct. 11, 2017 | Oct. 10, 2018 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-08 | 1 GHz – 26.5 GHz | Oct. 08, 2018 | Oct. 07, 2019 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-09 | 1 GHz –26.5 GHz | Oct. 11, 2017 | Oct. 10, 2018 | Conducted (TH01-CB) |

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| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Calibration Due Date | Remark |
|---------------|--------------|-----------|------------------|------------------|---------------------|-------------------------|------------------------|
| RF Cable-high | Woken | RG402 | High Cable-09 | 1 GHz – 26.5 GHz | Oct. 08, 2018 | Oct. 07, 2019 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-10 | 1 GHz –26.5 GHz | Oct. 11, 2017 | Oct. 10, 2018 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-06 | 1 GHz – 26.5 GHz | Oct. 08, 2018 | Oct. 07, 2019 | Conducted (TH01-CB) |
| Power Sensor | Agilent | U2021XA | MY53410001 | 50MHz~18GHz | Nov. 20, 2017 | Nov. 19, 2018 | Conducted (TH01-CB) |
| Power Sensor | Agilent | U2021XA | MY53410001 | 50MHz~18GHz | Nov. 05, 2018 | Nov. 04, 2019 | Conducted (TH01-CB) |

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Note: Calibration Interval of instruments listed above is one year.

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Summary

| Mode | Max-N dB | Max-OBW | ITU-Code | Min-N dB | Min-OBW |
|-----------------------------------|----------|---------|----------|----------|---------|
| | (Hz) | (Hz) | | (Hz) | (Hz) |
| 2.4-2.4835GHz | - | - | - | - | - |
| 802.11ac VHT20-BF_Nss1,(MCS0)_4TX | 17.575M | 17.791M | 17M8D1D | 17.3M | 17.691M |
| 802.11ac VHT40-BF_Nss1,(MCS0)_4TX | 36.35M | 36.332M | 36M3D1D | 35.7M | 36.082M |
| 802.11ax HEW20-BF_Nss1,(MCS0)_4TX | 18.975M | 19.015M | 19M0D1D | 18.675M | 18.916M |
| 802.11ax HEW40-BF_Nss1,(MCS0)_4TX | 37.6M | 37.681M | 37M7D1D | 36.3M | 37.481M |

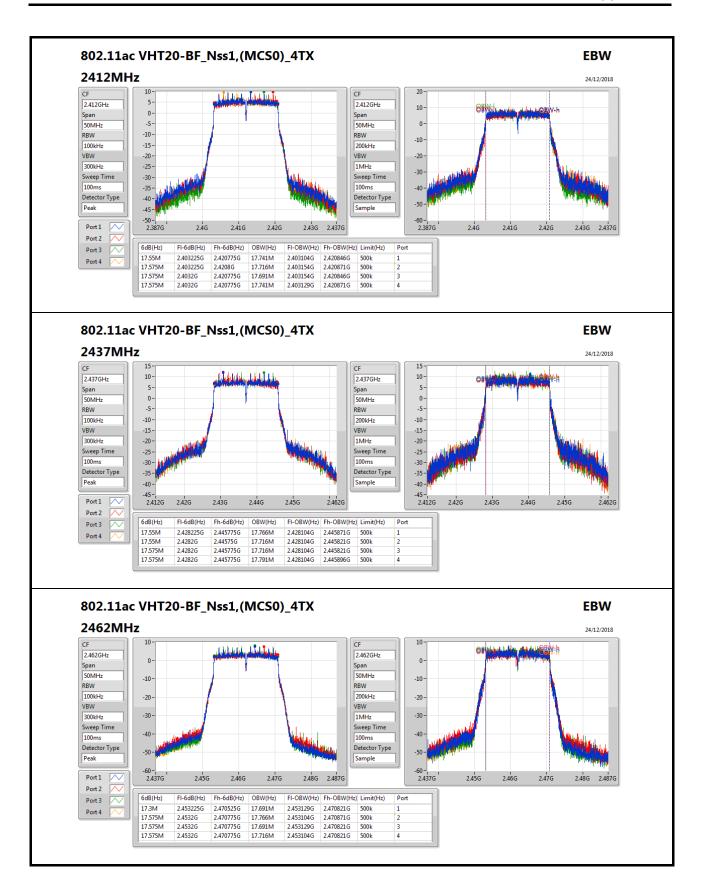
Max-N dB = Maximum 6dB down bandwidth; Max-OBW = Maximum 99% occupied bandwidth; Min-N dB = Minimum 6dB down bandwidth; Min-OBW = Minimum 99% occupied bandwidth;

Result

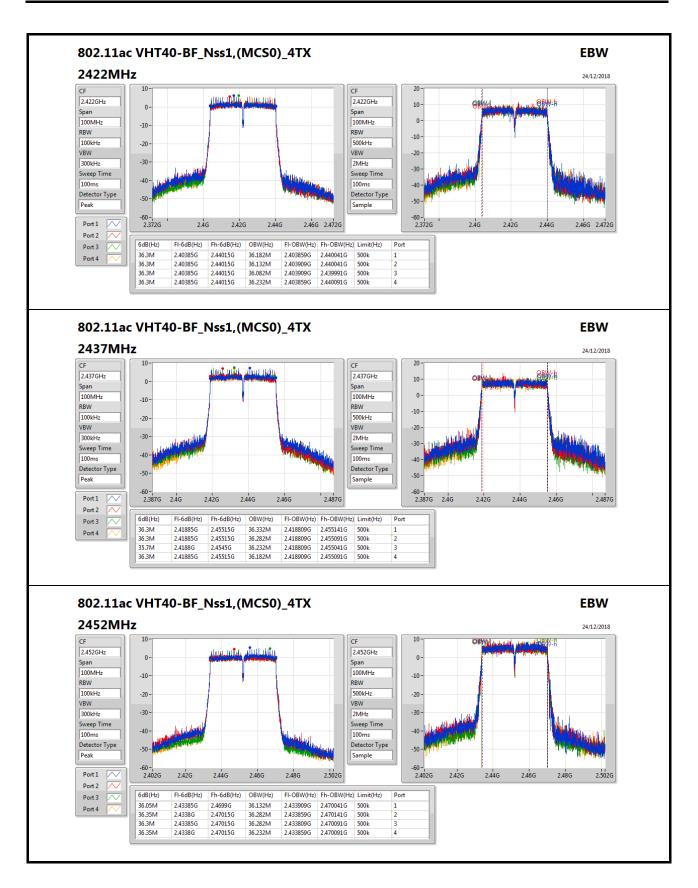
| Mode | Result | Limit | Port 1-N dB | Port 1-OBW | Port 2-N dB | Port 2-OBW | Port 3-N dB | Port 3-OBW | Port 4-N dB | Port 4-OBW |
|-----------------------------------|--------|-------|----------------|---------------|----------------|---------------|----------------|---------------|----------------|---------------|
| | | (Hz) | (Hz) | (Hz) | (Hz) | (Hz) | (Hz) | (Hz) | (Hz) | (Hz) |
| 802.11ac VHT20-BF_Nss1,(MCS0)_4TX | - | - | - | - | - | - | - | - | - | - |
| 2412MHz | Pass | 500k | 17.55M | 17.741M | 17.575M | 17.716M | 17.575M | 17.691M | 17.575M | 17.741M |
| 2437MHz | Pass | 500k | 17.55M | 17.766M | 17.55M | 17.716M | 17.575M | 17.716M | 17.575M | 17.791M |
| 2462MHz | Pass | 500k | 17.3M | 17.691M | 17.575M | 17.766M | 17.575M | 17.691M | 17.575M | 17.716M |
| 802.11ac VHT40-BF_Nss1,(MCS0)_4TX | - | - | - | - | - | - | - | - | - | - |
| 2422MHz | Pass | 500k | 36.3M | 36.182M | 36.3M | 36.132M | 36.3M | 36.082M | 36.3M | 36.232M |
| 2437MHz | Pass | 500k | 36.3M | 36.332M | 36.3M | 36.282M | 35.7M | 36.232M | 36.3M | 36.182M |
| 2452MHz | Pass | 500k | 36.05M | 36.132M | 36.35M | 36.282M | 36.3M | 36.282M | 36.35M | 36.232M |
| 802.11ax HEW20-BF_Nss1,(MCS0)_4TX | - | - | - | - | - | - | - | - | - | - |
| 2412MHz | Pass | 500k | 18.95M | 18.916M | 18.725M | 18.966M | 18.875M | 18.966M | 18.875M | 18.991M |
| 2437MHz | Pass | 500k | 18.925M | 18.991M | 18.925M | 18.941M | 18.925M | 18.966M | 18.975M | 19.015M |
| 2462MHz | Pass | 500k | 18.8M | 18.966M | 18.95M | 18.966M | 18.675M | 18.966M | 18.925M | 18.941M |
| 802.11ax HEW40-BF_Nss1,(MCS0)_4TX | - | - | - | - | - | - | - | - | - | - |
| 2422MHz | Pass | 500k | 37.2M | 37.581M | 36.3M | 37.481M | 37.45M | 37.481M | 37.25M | 37.581M |
| 2437MHz | Pass | 500k | 36.9M | 37.581M | 37.35M | 37.631M | 37.5M | 37.531M | 37.35M | 37.581M |
| 2452MHz | Pass | 500k | 37.25M | 37.481M | 37.3M | 37.681M | 37.6M | 37.531M | 36.5M | 37.481M |

Port X-N dB = Port X 6dB down bandwidth; Port X-OBW = Port X 99% occupied bandwidth;

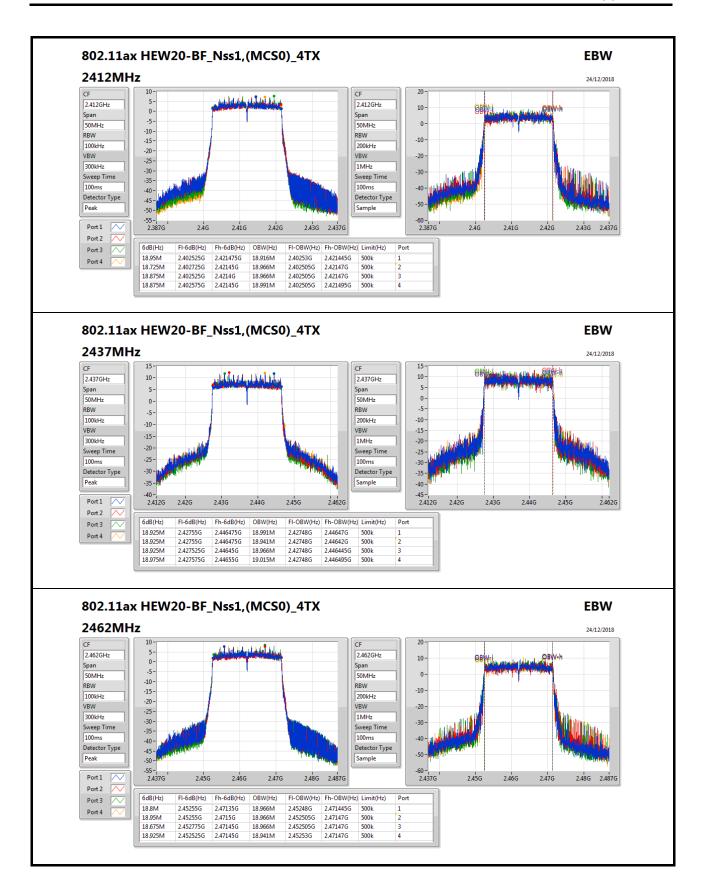




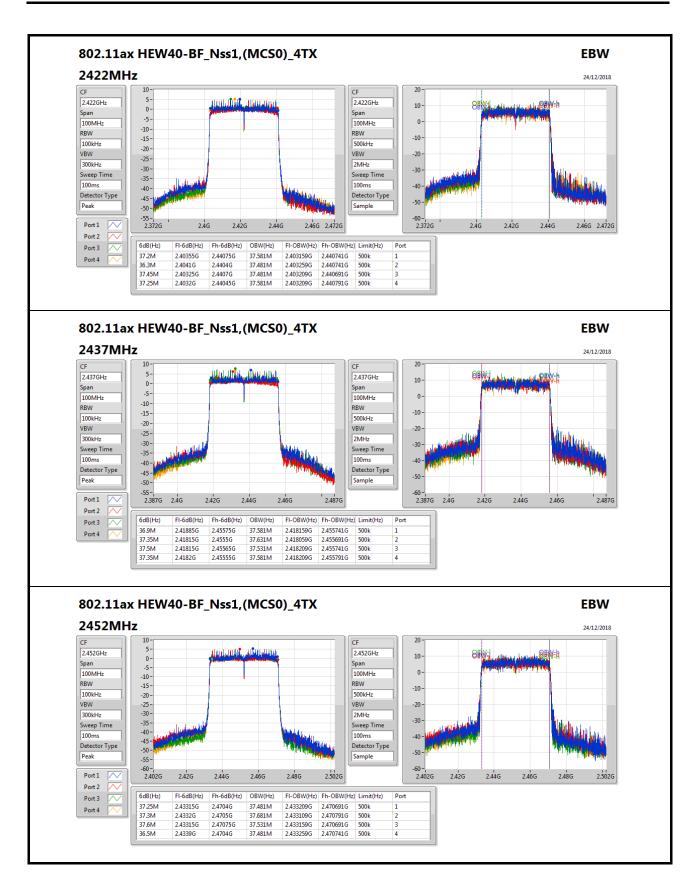














AV Power Result Appendix B

Summary

| Mode | Total Power | Total Power | | |
|-----------------------------------|-------------|-------------|--|--|
| | (dBm) | (W) | | |
| 2.4-2.4835GHz | - | - | | |
| 802.11ac VHT20-BF_Nss1,(MCS0)_4TX | 29.87 | 0.97051 | | |
| 802.11ac VHT40-BF_Nss1,(MCS0)_4TX | 27.55 | 0.56885 | | |
| 802.11ax HEW20-BF_Nss1,(MCS0)_4TX | 29.87 | 0.97051 | | |
| 802.11ax HEW40-BF_Nss1,(MCS0)_4TX | 27.56 | 0.57016 | | |



AV Power Result Appendix B

Result

| Mode | Result | DG | Port 1 | Port 2 | Port 3 | Port 4 | Total Power | Power Limit |
|-----------------------------------|--------|-------|--------|--------|--------|--------|-------------|-------------|
| | | (dBi) | (dBm) | (dBm) | (dBm) | (dBm) | (dBm) | (dBm) |
| 802.11ac VHT20-BF_Nss1,(MCS0)_4TX | - | - | - | - | - | - | - | - |
| 2412MHz | Pass | 5.35 | 21.68 | 21.39 | 21.52 | 21.58 | 27.56 | 30.00 |
| 2417MHz | Pass | 5.35 | 22.87 | 23.23 | 23.28 | 23.11 | 29.15 | 30.00 |
| 2422MHz | Pass | 5.35 | 23.72 | 23.78 | 23.81 | 23.85 | 29.81 | 30.00 |
| 2427MHz | Pass | 5.35 | 24.09 | 23.67 | 23.85 | 23.79 | 29.87 | 30.00 |
| 2432MHz | Pass | 5.35 | 23.81 | 23.48 | 23.81 | 23.89 | 29.77 | 30.00 |
| 2437MHz | Pass | 5.35 | 23.91 | 23.61 | 23.76 | 23.89 | 29.81 | 30.00 |
| 2442MHz | Pass | 5.35 | 23.74 | 23.62 | 23.98 | 23.81 | 29.81 | 30.00 |
| 2447MHz | Pass | 5.35 | 23.79 | 23.59 | 24.03 | 23.69 | 29.80 | 30.00 |
| 2452MHz | Pass | 5.35 | 23.74 | 23.61 | 23.82 | 23.77 | 29.76 | 30.00 |
| 2457MHz | Pass | 5.35 | 23.10 | 23.20 | 23.34 | 23.18 | 29.23 | 30.00 |
| 2462MHz | Pass | 5.35 | 19.33 | 19.31 | 19.91 | 19.31 | 25.49 | 30.00 |
| 802.11ac VHT40-BF_Nss1,(MCS0)_4TX | - | - | - | - | - | - | - | - |
| 2422MHz | Pass | 5.35 | 20.38 | 20.34 | 20.36 | 20.34 | 26.38 | 30.00 |
| 2427MHz | Pass | 5.35 | 20.58 | 20.16 | 20.30 | 20.38 | 26.38 | 30.00 |
| 2432MHz | Pass | 5.35 | 20.71 | 20.51 | 20.74 | 20.50 | 26.64 | 30.00 |
| 2437MHz | Pass | 5.35 | 21.71 | 21.39 | 21.62 | 21.40 | 27.55 | 30.00 |
| 2442MHz | Pass | 5.35 | 20.73 | 20.54 | 20.49 | 20.55 | 26.60 | 30.00 |
| 2447MHz | Pass | 5.35 | 20.83 | 20.53 | 20.49 | 20.40 | 26.59 | 30.00 |
| 2452MHz | Pass | 5.35 | 19.49 | 18.99 | 19.35 | 19.18 | 25.28 | 30.00 |
| 802.11ax HEW20-BF_Nss1,(MCS0)_4TX | - | - | - | - | - | - | - | - |
| 2412MHz | Pass | 5.35 | 19.40 | 19.27 | 19.57 | 19.35 | 25.42 | 30.00 |
| 2417MHz | Pass | 5.35 | 21.47 | 21.61 | 21.79 | 21.94 | 27.73 | 30.00 |
| 2422MHz | Pass | 5.35 | 23.87 | 23.61 | 23.62 | 23.82 | 29.75 | 30.00 |
| 2427MHz | Pass | 5.35 | 23.91 | 23.80 | 23.82 | 23.85 | 29.87 | 30.00 |
| 2432MHz | Pass | 5.35 | 23.66 | 23.74 | 23.86 | 23.62 | 29.74 | 30.00 |
| 2437MHz | Pass | 5.35 | 23.98 | 23.74 | 23.62 | 23.73 | 29.79 | 30.00 |
| 2442MHz | Pass | 5.35 | 24.01 | 23.72 | 23.74 | 23.69 | 29.81 | 30.00 |
| 2447MHz | Pass | 5.35 | 23.82 | 23.69 | 23.85 | 23.78 | 29.81 | 30.00 |
| 2452MHz | Pass | 5.35 | 23.16 | 23.31 | 23.21 | 23.02 | 29.20 | 30.00 |
| 2457MHz | Pass | 5.35 | 22.61 | 22.20 | 22.44 | 22.24 | 28.40 | 30.00 |
| 2462MHz | Pass | 5.35 | 20.12 | 20.14 | 20.42 | 20.01 | 26.20 | 30.00 |
| 802.11ax HEW40-BF_Nss1,(MCS0)_4TX | - | - | - | - | - | - | - | - |
| 2422MHz | Pass | 5.35 | 19.81 | 19.61 | 19.89 | 19.75 | 25.79 | 30.00 |
| 2427MHz | Pass | 5.35 | 20.36 | 19.98 | 20.48 | 20.29 | 26.30 | 30.00 |
| 2432MHz | Pass | 5.35 | 20.44 | 20.11 | 20.50 | 20.45 | 26.40 | 30.00 |
| 2437MHz | Pass | 5.35 | 21.67 | 21.28 | 21.71 | 21.47 | 27.56 | 30.00 |
| 2442MHz | Pass | 5.35 | 21.09 | 20.73 | 20.83 | 20.73 | 26.87 | 30.00 |
| 2447MHz | Pass | 5.35 | 20.40 | 20.09 | 20.44 | 20.17 | 26.30 | 30.00 |
| 2452MHz | Pass | 5.35 | 20.10 | 19.91 | 20.12 | 19.62 | 25.96 | 30.00 |

DG = Directional Gain; Port X = Port X output power
Note : Conducted average output power is for reference only



PSD Result Appendix C

Summary

| Mode | PD | | | |
|-----------------------------------|-----------|--|--|--|
| | (dBm/RBW) | | | |
| 2.4-2.4835GHz | - | | | |
| 802.11ac VHT20-BF_Nss1,(MCS0)_4TX | 3.19 | | | |
| 802.11ac VHT40-BF_Nss1,(MCS0)_4TX | 0.08 | | | |
| 802.11ax HEW20-BF_Nss1,(MCS0)_4TX | 5.10 | | | |
| 802.11ax HEW40-BF_Nss1,(MCS0)_4TX | -1.02 | | | |

RBW=3kHz.

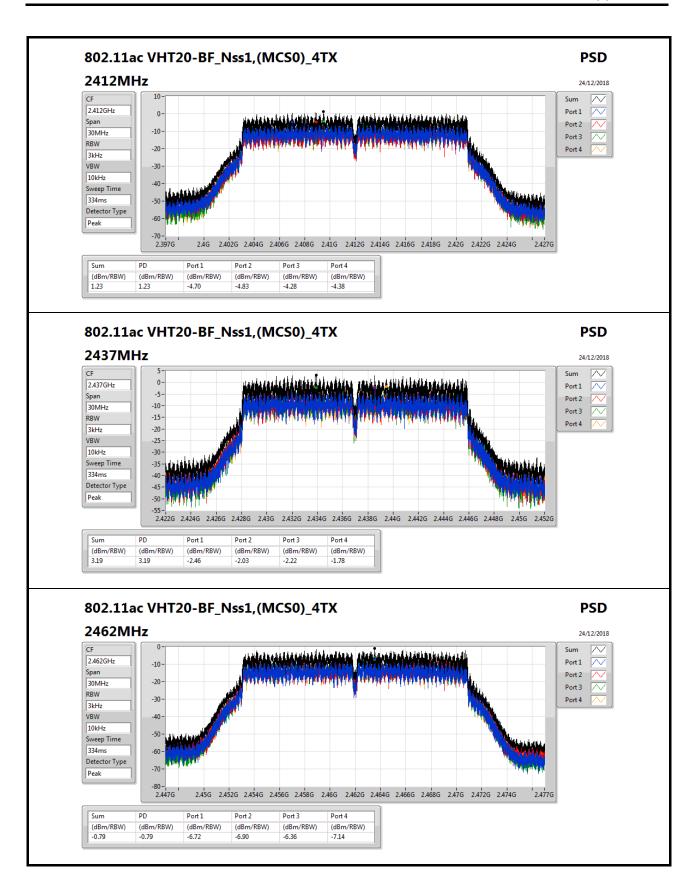
Result

| Mode | Result | DG | Port 1 | Port 2 | Port 3 | Port 4 | PD | PD Limit |
|-----------------------------------|--------|-------|-----------|-----------|-----------|-----------|-----------|-----------|
| | | (dBi) | (dBm/RBW) | (dBm/RBW) | (dBm/RBW) | (dBm/RBW) | (dBm/RBW) | (dBm/RBW) |
| 802.11ac VHT20-BF_Nss1,(MCS0)_4TX | - | - | - | - | - | - | - | - |
| 2412MHz | Pass | 5.35 | -4.70 | -4.83 | -4.28 | -4.38 | 1.23 | 8.00 |
| 2437MHz | Pass | 5.35 | -2.46 | -2.03 | -2.22 | -1.78 | 3.19 | 8.00 |
| 2462MHz | Pass | 5.35 | -6.72 | -6.90 | -6.36 | -7.14 | -0.79 | 8.00 |
| 802.11ac VHT40-BF_Nss1,(MCS0)_4TX | - | - | - | - | - | - | - | - |
| 2422MHz | Pass | 5.35 | -7.41 | -6.72 | -7.28 | -8.34 | -1.89 | 8.00 |
| 2437MHz | Pass | 5.35 | -6.05 | -6.11 | -5.45 | -6.21 | 0.08 | 8.00 |
| 2452MHz | Pass | 5.35 | -9.24 | -9.55 | -9.54 | -8.60 | -3.83 | 8.00 |
| 802.11ax HEW20-BF_Nss1,(MCS0)_4TX | - | - | - | - | - | - | - | - |
| 2412MHz | Pass | 5.35 | -5.65 | -7.13 | -5.90 | -5.58 | -0.82 | 8.00 |
| 2437MHz | Pass | 5.35 | -1.31 | -0.74 | -0.70 | -0.92 | 5.10 | 8.00 |
| 2462MHz | Pass | 5.35 | -6.53 | -5.44 | -4.54 | -4.66 | 0.79 | 8.00 |
| 802.11ax HEW40-BF_Nss1,(MCS0)_4TX | - | - | - | - | - | - | - | - |
| 2422MHz | Pass | 5.35 | -8.75 | -10.45 | -8.06 | -9.60 | -3.18 | 8.00 |
| 2437MHz | Pass | 5.35 | -7.03 | -7.22 | -6.46 | -7.54 | -1.02 | 8.00 |
| 2452MHz | Pass | 5.35 | -8.88 | -9.01 | -9.32 | -10.39 | -3.45 | 8.00 |

DG = Directional Gain; RBW=3kHz;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port Xpower density;

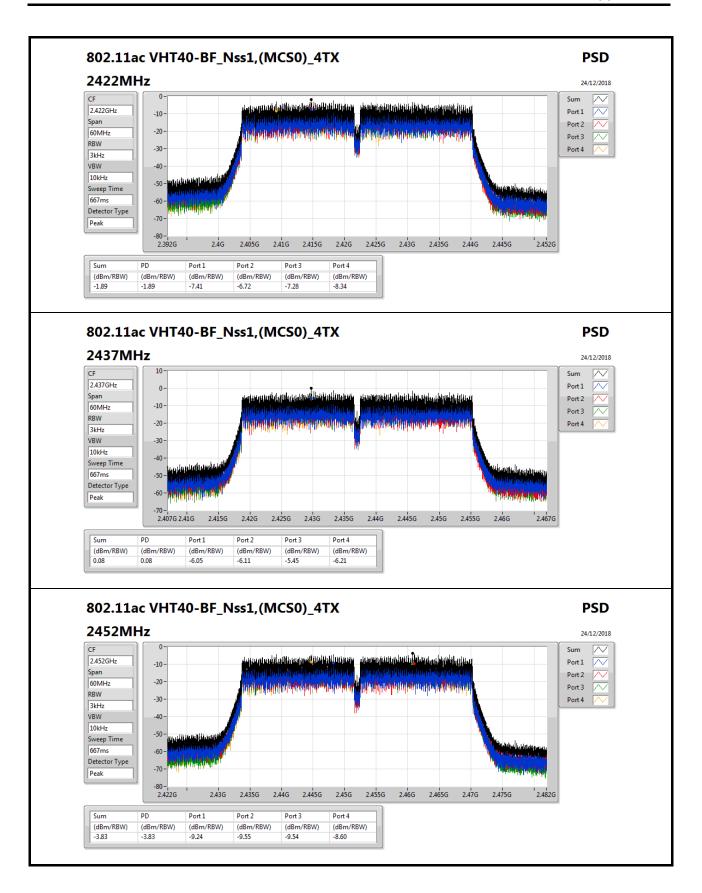


PSD Result Appendix C



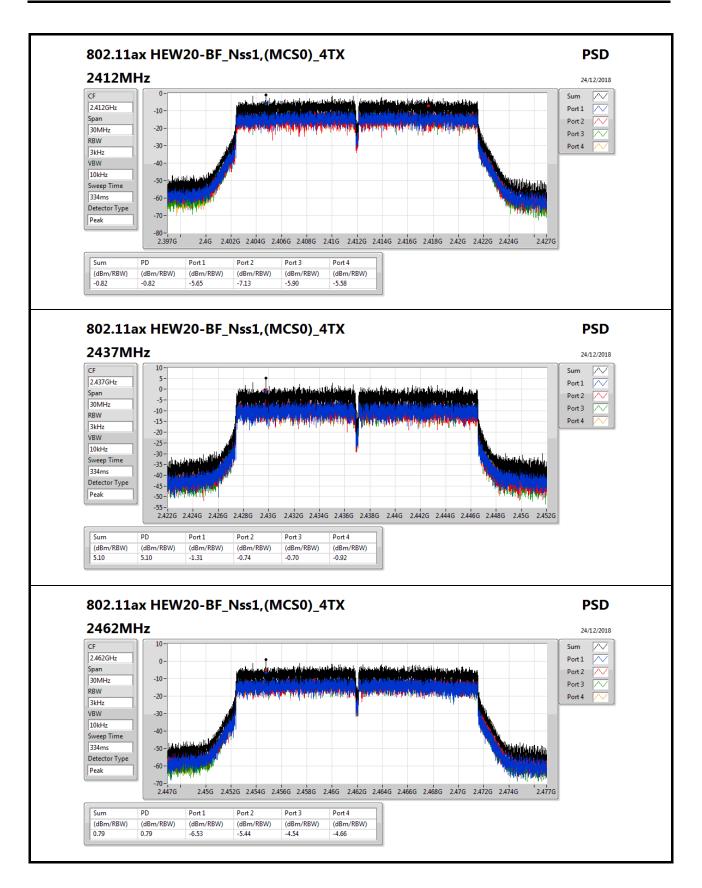


PSD Result Appendix C



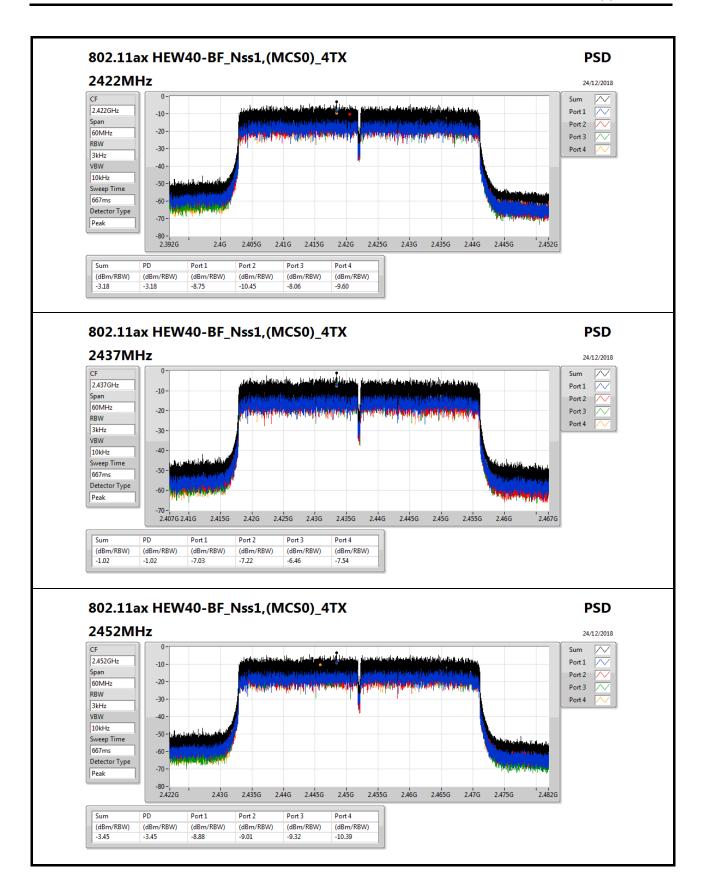


PSD Result Appendix C





PSD Result Appendix C





CSE Non-restricted Band Result

Appendix D

Summary

| - Cummun y | | | | | | | | | | | | | |
|-----------------------------------|--------|----------|-------|--------|----------|--------|----------|--------|----------|--------|-----------|--------|------|
| Mode | Result | Ref | Ref | Limit | Freq | Level | Freq | Level | Freq | Level | Freq | Level | Port |
| | | (Hz) | (dBm) | (dBm) | (Hz) | (dBm) | (Hz) | (dBm) | (Hz) | (dBm) | (Hz) | (dBm) | |
| 2.4-2.4835GHz | - | - | - | - | - | - | - | - | - | | • | | |
| 802.11ac VHT20-BF_Nss1,(MCS0)_4TX | Pass | 2.44451G | 12.11 | -17.89 | 946.86M | -43.33 | 2.39854G | -29.08 | 2.5034G | -42.93 | 16.39993G | -35.45 | 1 |
| 802.11ac VHT40-BF_Nss1,(MCS0)_4TX | Pass | 2.45448G | 6.92 | -23.08 | 624.26M | -43.54 | 2.39668G | -32.65 | 2.4995G | -43.47 | 16.58351G | -35.29 | 1 |
| 802.11ax HEW20-BF_Nss1,(MCS0)_4TX | Pass | 2.43198G | 11.85 | -18.15 | 1.90303G | -44.02 | 2.39998G | -31.50 | 2.48932G | -42.69 | 24.69938G | -35.74 | 2 |
| 802.11ax HEW40-BF_Nss1,(MCS0)_4TX | Pass | 2.43198G | 7.09 | -22.91 | 829.21M | -43.93 | 2.39952G | -31.84 | 2.4849G | -40.83 | 16.3339G | -36.10 | 2 |

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CSE Non-restricted Band Result

Appendix D

Result

| Result | | | | | | | | | | | | | |
|-----------------------------------|--------|----------|-------|--------|----------|--------|----------|--------|----------|--------|-----------|--------|------|
| Mode | Result | Ref | Ref | Limit | Freq | Level | Freq | Level | Freq | Level | Freq | Level | Port |
| | | (Hz) | (dBm) | (dBm) | (Hz) | (dBm) | (Hz) | (dBm) | (Hz) | (dBm) | (Hz) | (dBm) | |
| 802.11ac VHT20-BF_Nss1,(MCS0)_4TX | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2412MHz | Pass | 2.44451G | 12.11 | -17.89 | 946.86M | -43.33 | 2.39854G | -29.08 | 2.5034G | -42.93 | 16.39993G | -35.45 | 1 |
| 2412MHz | Pass | 2.44451G | 12.11 | -17.89 | 834.43M | -43.86 | 2.3995G | -29.78 | 2.4994G | -43.41 | 24.87919G | -35.35 | 2 |
| 2412MHz | Pass | 2.44451G | 12.11 | -17.89 | 757.25M | -42.69 | 2.3982G | -32.42 | 2.52074G | -42.53 | 24.92976G | -35.09 | 3 |
| 2412MHz | Pass | 2.44451G | 12.11 | -17.89 | 849.87M | -43.94 | 2.39928G | -30.54 | 2.50932G | -42.67 | 16.28474G | -35.83 | 4 |
| 2437MHz | Pass | 2.44451G | 12.11 | -17.89 | 776.77M | -43.40 | 2.39798G | -42.18 | 2.5235G | -43.15 | 16.57131G | -35.09 | 1 |
| 2437MHz | Pass | 2.44451G | 12.11 | -17.89 | 2.19137G | -44.02 | 2.3973G | -39.46 | 2.5119G | -43.42 | 16.28193G | -34.75 | 2 |
| 2437MHz | Pass | 2.44451G | 12.11 | -17.89 | 372.8M | -43.88 | 2.39612G | -41.32 | 2.4885G | -42.36 | 24.98314G | -35.07 | 3 |
| 2437MHz | Pass | 2.44451G | 12.11 | -17.89 | 861.23M | -43.57 | 2.39694G | -40.76 | 2.5063G | -42.74 | 16.50107G | -34.96 | 4 |
| 2462MHz | Pass | 2.44451G | 12.11 | -17.89 | 950.64M | -43.43 | 2.39256G | -44.37 | 2.48474G | -42.61 | 16.59098G | -35.30 | 1 |
| 2462MHz | Pass | 2.44451G | 12.11 | -17.89 | 800.36M | -44.07 | 2.3936G | -43.89 | 2.5197G | -42.71 | 14.93615G | -35.49 | 2 |
| 2462MHz | Pass | 2.44451G | 12.11 | -17.89 | 910.45M | -44.42 | 2.39756G | -43.43 | 2.48604G | -42.94 | 16.5376G | -35.17 | 3 |
| 2462MHz | Pass | 2.44451G | 12.11 | -17.89 | 2.19719G | -43.36 | 2.39108G | -42.92 | 2.48526G | -42.85 | 17.47599G | -35.94 | 4 |
| 802.11ac VHT40-BF_Nss1,(MCS0)_4TX | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2422MHz | Pass | 2.45448G | 6.92 | -23.08 | 624.26M | -43.54 | 2.39668G | -32.65 | 2.4995G | -43.47 | 16.58351G | -35.29 | 1 |
| 2422MHz | Pass | 2.45448G | 6.92 | -23.08 | 680.36M | -43.26 | 2.39952G | -32.92 | 2.5291G | -42.74 | 16.53022G | -34.91 | 2 |
| 2422MHz | Pass | 2.45448G | 6.92 | -23.08 | 1.98194G | -43.72 | 2.39456G | -37.46 | 2.54478G | -43.18 | 24.9355G | -34.91 | 3 |
| 2422MHz | Pass | 2.45448G | 6.92 | -23.08 | 603.07M | -43.04 | 2.39792G | -35.98 | 2.5359G | -43.58 | 16.91725G | -36.21 | 4 |
| 2437MHz | Pass | 2.45448G | 6.92 | -23.08 | 937.99M | -43.51 | 2.39828G | -33.42 | 2.48878G | -39.19 | 16.32829G | -35.52 | 1 |
| 2437MHz | Pass | 2.45448G | 6.92 | -23.08 | 688.95M | -43.41 | 2.3996G | -33.97 | 2.48846G | -40.93 | 16.47693G | -35.66 | 2 |
| 2437MHz | Pass | 2.45448G | 6.92 | -23.08 | 2.14911G | -44.08 | 2.3996G | -36.14 | 2.4843G | -40.04 | 24.98317G | -34.91 | 3 |
| 2437MHz | Pass | 2.45448G | 6.92 | -23.08 | 658.03M | -43.92 | 2.39964G | -35.87 | 2.49098G | -41.65 | 17.30709G | -35.39 | 4 |
| 2452MHz | Pass | 2.45448G | 6.92 | -23.08 | 877.01M | -42.95 | 2.39716G | -43.11 | 2.4935G | -42.49 | 16.22172G | -35.68 | 1 |
| 2452MHz | Pass | 2.45448G | 6.92 | -23.08 | 358.9M | -43.75 | 2.3988G | -43.52 | 2.48442G | -43.23 | 16.30866G | -35.71 | 2 |
| 2452MHz | Pass | 2.45448G | 6.92 | -23.08 | 851.25M | -42.79 | 2.39264G | -43.85 | 2.55766G | -42.56 | 16.39841G | -36.12 | 3 |
| 2452MHz | Pass | 2.45448G | 6.92 | -23.08 | 725.02M | -43.77 | 2.39632G | -43.80 | 2.4859G | -42.32 | 16.34792G | -35.40 | 4 |
| 802.11ax HEW20-BF_Nss1,(MCS0)_4TX | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2412MHz | Pass | 2.43198G | 11.85 | -18.15 | 870.26M | -43.22 | 2.39954G | -31.64 | 2.51138G | -43.31 | 21.71843G | -35.54 | 1 |
| 2412MHz | Pass | 2.43198G | 11.85 | -18.15 | 1.90303G | -44.02 | 2.39998G | -31.50 | 2.48932G | -42.69 | 24.69938G | -35.74 | 2 |
| 2412MHz | Pass | 2.43198G | 11.85 | -18.15 | 1.98079G | -42.64 | 2.39894G | -33.51 | 2.49716G | -43.23 | 16.57693G | -36.11 | 3 |
| 2412MHz | Pass | 2.43198G | 11.85 | -18.15 | 735.41M | -44.14 | 2.39938G | -32.71 | 2.50382G | -43.01 | 24.94381G | -35.38 | 4 |
| 2437MHz | Pass | 2.43198G | 11.85 | -18.15 | 868.8M | -44.17 | 2.39986G | -40.05 | 2.51844G | -42.02 | 21.68191G | -35.72 | 1 |
| 2437MHz | Pass | 2.43198G | 11.85 | -18.15 | 912.78M | -43.81 | 2.3991G | -41.70 | 2.49374G | -42.66 | 24.94662G | -35.13 | 2 |
| 2437MHz | Pass | 2.43198G | 11.85 | -18.15 | 894.43M | -40.35 | 2.39612G | -40.87 | 2.51926G | -42.59 | 16.3915G | -34.79 | 3 |
| 2437MHz | Pass | 2.43198G | 11.85 | -18.15 | 865.6M | -43.88 | 2.39604G | -42.71 | 2.4929G | -42.52 | 16.52636G | -34.93 | 4 |
| 2462MHz | Pass | 2.43198G | 11.85 | -18.15 | 1.81449G | -42.45 | 2.39284G | -44.35 | 2.48388G | -37.95 | 16.31283G | -36.05 | 1 |
| 2462MHz | Pass | 2.43198G | 11.85 | -18.15 | 455.23M | -43.00 | 2.39406G | -42.74 | 2.48478G | -37.82 | 16.56288G | -34.34 | 2 |
| 2462MHz | Pass | 2.43198G | 11.85 | -18.15 | 878.7M | -43.74 | 2.3967G | -43.66 | 2.48386G | -38.72 | 24.941G | -35.95 | 3 |
| 2462MHz | Pass | 2.43198G | 11.85 | -18.15 | 801.81M | -43.90 | 2.39402G | -43.81 | 2.48418G | -37.65 | 24.46618G | -35.84 | 4 |
| 802.11ax HEW40-BF_Nss1,(MCS0)_4TX | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2422MHz | Pass | 2.43198G | 7.09 | -22.91 | 677.5M | -44.35 | 2.39732G | -37.24 | 2.55338G | -43.19 | 16.51339G | -35.44 | 1 |
| 2422MHz | Pass | 2.43198G | 7.09 | -22.91 | 891.04M | -43.65 | 2.39952G | -33.71 | 2.50722G | -43.23 | 16.92006G | -34.53 | 2 |
| 2422MHz | Pass | 2.43198G | 7.09 | -22.91 | 719M | -43.92 | 2.39712G | -36.40 | 2.4963G | -42.67 | 16.88921G | -35.01 | 3 |
| 2422MHz | Pass | 2.43198G | 7.09 | -22.91 | 2.15512G | -43.30 | 2.39916G | -38.60 | 2.50486G | -42.49 | 24.95232G | -35.26 | 4 |
| 2437MHz | Pass | 2.43198G | 7.09 | -22.91 | 768.81M | -43.75 | 2.39956G | -33.47 | 2.48682G | -41.09 | 15.27097G | -35.66 | 1 |
| 2437MHz | Pass | 2.43198G | 7.09 | -22.91 | 829.21M | -43.93 | 2.39952G | -31.84 | 2.4849G | -40.83 | 16.3339G | -36.10 | 2 |
| 2437MHz | Pass | 2.43198G | 7.09 | -22.91 | 879.02M | -43.31 | 2.39636G | -35.43 | 2.49042G | -42.95 | 16.90323G | -35.68 | 3 |



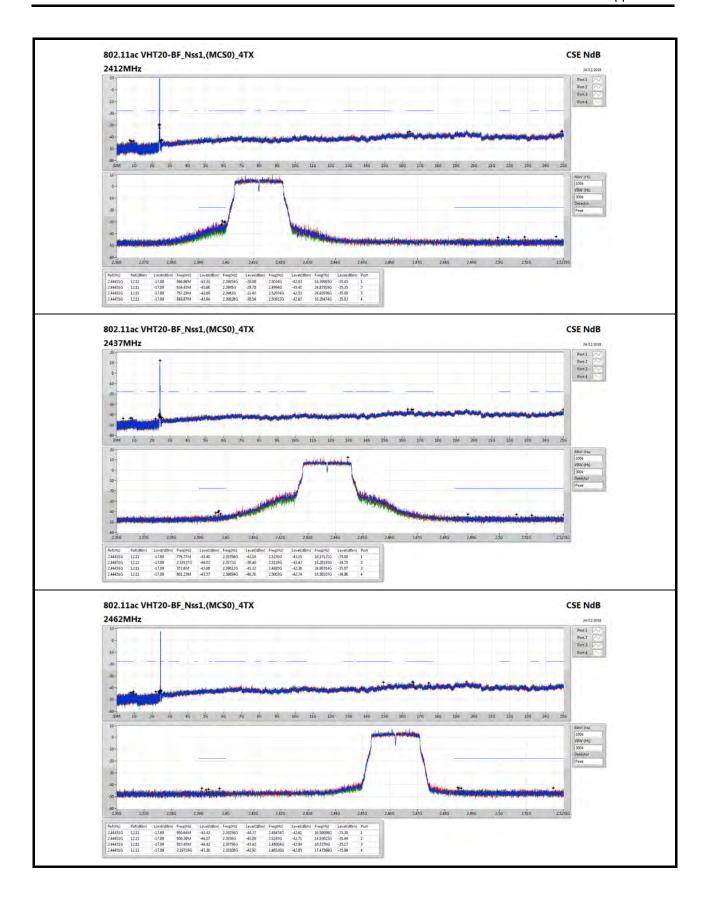
CSE Non-restricted Band Result

Appendix D

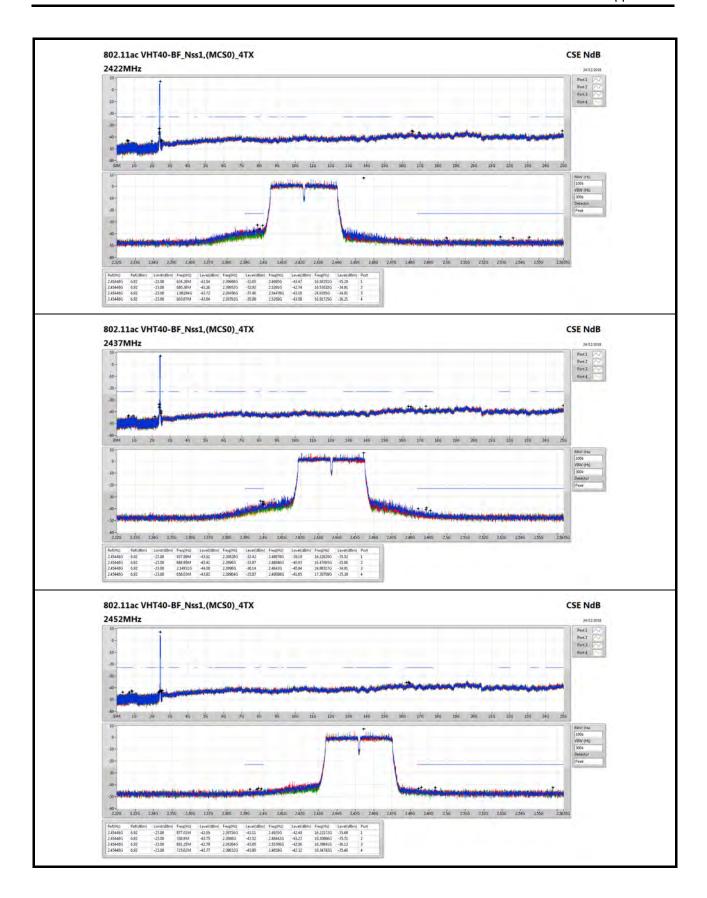
| Mode | Result | Ref | Ref | Limit | Freq | Level | Freq | Level | Freq | Level | Freq | Level | Port |
|---------|--------|----------|-------|--------|----------|--------|----------|--------|----------|--------|-----------|--------|------|
| | | (Hz) | (dBm) | (dBm) | (Hz) | (dBm) | (Hz) | (dBm) | (Hz) | (dBm) | (Hz) | (dBm) | |
| 2437MHz | Pass | 2.43198G | 7.09 | -22.91 | 653.17M | -44.11 | 2.39984G | -38.14 | 2.48678G | -42.59 | 16.54705G | -35.41 | 4 |
| 2452MHz | Pass | 2.43198G | 7.09 | -22.91 | 2.17716G | -44.11 | 2.39132G | -43.08 | 2.48362G | -39.66 | 24.87379G | -35.97 | 1 |
| 2452MHz | Pass | 2.43198G | 7.09 | -22.91 | 650.88M | -44.20 | 2.3928G | -43.47 | 2.48654G | -39.26 | 24.59334G | -35.46 | 2 |
| 2452MHz | Pass | 2.43198G | 7.09 | -22.91 | 674.92M | -44.01 | 2.39996G | -42.37 | 2.48478G | -41.89 | 16.31988G | -35.98 | 3 |
| 2452MHz | Pass | 2.43198G | 7.09 | -22.91 | 820.91M | -43.27 | 2.39128G | -44.05 | 2.48434G | -40.01 | 16.51059G | -35.34 | 4 |

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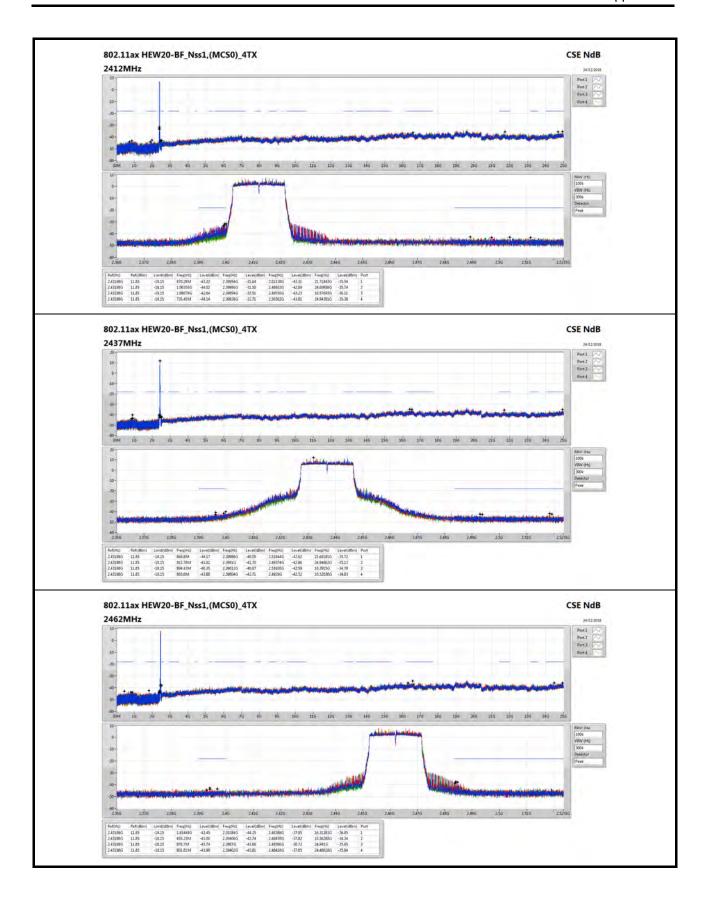




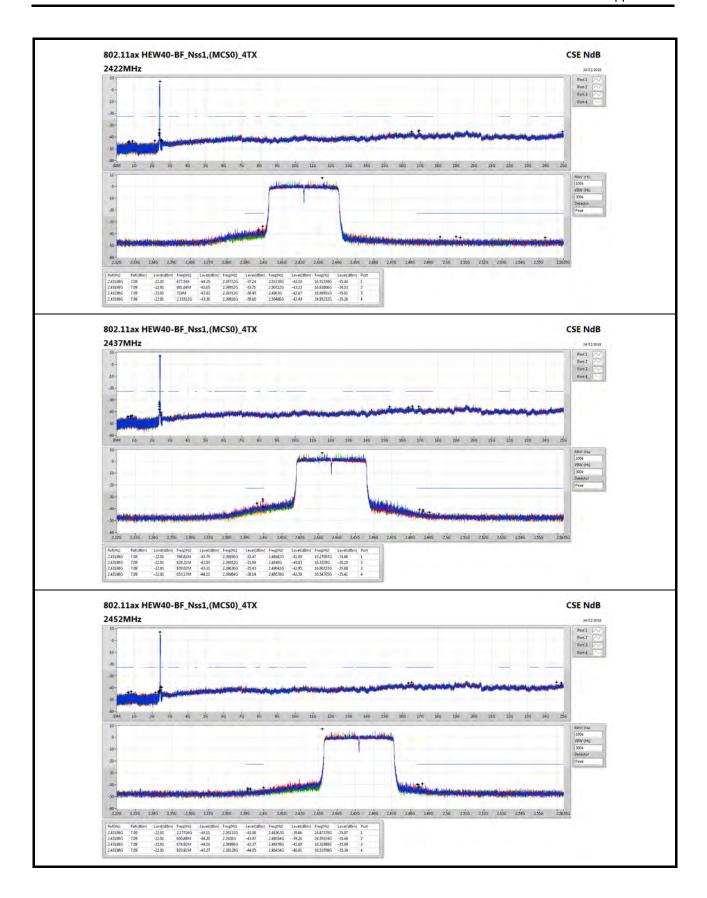














RSE TX above 1GHz Result

Appendix E

Summary

| Mode | Result | Туре | Freq | Level | Limit | Margin | Factor | Dist | Condition | Azimuth | Height | Comments |
|-----------------------------------|--------|------|---------|----------|----------|--------|--------|------|------------|---------|--------|----------|
| | | | (Hz) | (dBuV/m) | (dBuV/m) | (dB) | (dB) | (m) | | (°) | (m) | |
| 2.4-2.4835GHz | - | - | - | - | - | - | - | - | - | - | - | - |
| 802.11ac VHT20-BF_Nss1,(MCS0)_4TX | Pass | AV | 2.4836G | 53.99 | 54.00 | -0.01 | 31.59 | 3 | Horizontal | 91 | 1.17 | - |



